

Filed on behalf of: Yangtze Memory Technologies Company, Ltd.

Entered: March 12, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC.,
Petitioner,

v.

YANGTZE MEMORY TECHNOLOGIES COMPANY, LTD.,
Patent Owner.

Case IPR2025-00189
Patent 11,145,666

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Background.....	4
	A. Only Claim 19 Is at Issue	4
	B. The '666 Patent (Ex.1001)	4
	C. Prosecution History	6
	D. Person of Ordinary Skill in the Art	6
	E. Claim Construction	7
III.	Ground 1: Petitioner Failed to Demonstrate that Kim Renders Claim 19 Obvious.....	7
	A. Kim, Alone or in Combination, Does Not Disclose a “curved side surface in contact with a side surface of the insulating layer”	7
	B. Kim, Alone or in Combination, Does Not Teach nor Render Obvious a “curved side surface in contact with a side surface of the insulating layer”.....	12
	1. A POSITA Would Not Be Motivated to Modify Kim to Reduce the Risk of Short-Circuit.....	14
	2. A POSITA Would Not Have Modified Kim In View Of Park, Yun, Or Nam	17
IV.	Ground 2: Petitioner Failed to Demonstrate that Nam Renders Claim 19 Obvious.....	21
	A. Nam Does Not Render Obvious Both a “curved side surface in contact with a side surface of the insulating layer” and “a second portion of the insulating layer of the adjacent stack is laterally displaced from the conductive layer of the layer stack”	21
V.	Ground 3: Petitioner Failed to Demonstrate that Lee in View of Park Renders Claim 19 Obvious.....	26

A.	Lee In View Of Park Does Not Render Obvious a “curved side surface in contact with a side surface of the insulating layer”	26
VI.	The Board should exercise its discretion and deny institution under 35 U.S.C. § 314.....	31
A.	Factor 1 favors denial if the district court denies Petitioner’s motion to stay and lifts the temporary stay before institution	32
B.	Factor 2 is neutral because the trial date is three days after Final Written Decision.....	33
C.	Factor 3 favors denial because substantial effort will have been expended by the deadline for institution	34
D.	Factor 4 favors denial because there is significant overlap between the issues raised in the Petition and the district court proceeding	36
E.	Factor 5 favors denial because Micron is the defendant in the district court proceeding.....	37
F.	Factor 6: The limited resources of the Board favors denial.....	38
VII.	Conclusion	39

TABLE OF AUTHORITIES**Page(s)****CASES**

<i>10x Genomics, Inc. v. President & Fellows of Harvard Coll.</i> , IPR2023-01299, Paper 15, 2024 WL 993828	35, 37
<i>Adidas AG v. Nike, Inc.</i> , 963 F.3d 1355 (Fed. Cir. 2020)	19
<i>Apple Inc. v. Fintiv, Inc.</i> , Ar, Paper 11 (Mar. 20, 2020).....	31, 34, 38
<i>Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.</i> , 876 F.3d 1350 (Fed. Cir. 2017)	31
<i>Boe Tech. Grp. Co. v. Element Cap. Com. Co. Pte. Ltd.</i> , IPR2023-00808, Paper 9, 2023 WL 7715885	36, 37
<i>Catalyst Orthoscience Inc. v. Shoulder Innovations, Inc.</i> , PGR2024-00042, Paper 17 (Dec. 19, 2024).....	34
<i>Comcast Cable Commc'ns, LLC v. Touchstream Techs., Inc.</i> , IPR2024-00323, Paper 13, 2024 WL 3530021	35, 37, 38
<i>DSS Tech. Mgmt., Inc. v. Apple Inc.</i> , 885 F.3d 1367 (Fed. Cir. 2018)	13
<i>Eli Lilly & Co. v. Teva Pharms. Int'l GmbH</i> , 8 F.4th 1331 (Fed. Cir. 2021)	18
<i>Entangled Media, LLC v. Dropbox Inc.</i> , 732 F. Supp. 3d 1120 (N.D. Cal. 2024).....	32
<i>Harmonic Inc. v. Avid Tech., Inc.</i> , 815 F.3d 1356 (Fed. Cir. 2016)	10, 18
<i>In re Anova Hearing Labs, Inc.</i> , 809 F. App'x 840 (Fed. Cir. 2020)	16
<i>Inergy Tech., Inc. v. Force MOS Tech. Co.</i> , IPR2024-00094, Paper 9 (May 21, 2024).....	33

<i>Motorola Mobility LLC v. Largan Precision Co.,</i> IPR2024-00688, Paper 7 (Oct. 28, 2024)	13
<i>Personal Web Techs., LLC v. Apple, Inc.,</i> 848 F.3d 987 (Fed. Cir. 2017)	14
<i>Plas-Pak Indus., Inc. v. Sulzer Mixpac AG,</i> 600 F. App'x 755 (Fed. Cir. 2015)	19, 21
<i>Skillz Platform Inc. v. Aviagames Inc.,</i> No. 21-cv-02436-BLF, 2022 WL 1189882 (N.D. Cal. Apr. 21, 2022)	32
<i>Smartmatic USA Corp. v. Election Sys. & Software,</i> IPR2019-00527, Paper 32 (Aug. 5, 2020)	11, 18
<i>Sotera Wireless, Inc. v. Masimo Corp.,</i> IPR2020-01019, Paper 12 (Dec. 1, 2020)	36
<i>South-Tek Sys., LLC v. Eng'd Corrosion Sols., LLC,</i> 748 F. App'x 1003 (Fed. Cir. 2018)	16
<i>Trivascular, Inc. v. Samuels,</i> 812 F.3d 1056 (Fed. Cir. 2016)	21
<i>Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.,</i> 97 F.4th 882 (Fed. Cir. 2024)	17
<i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology,</i> <i>Inc.,</i> Case No. 3:23-cv-05792-RFL (N.D. Cal.)	32

STATUTES

§ 314(a)	31
----------------	----

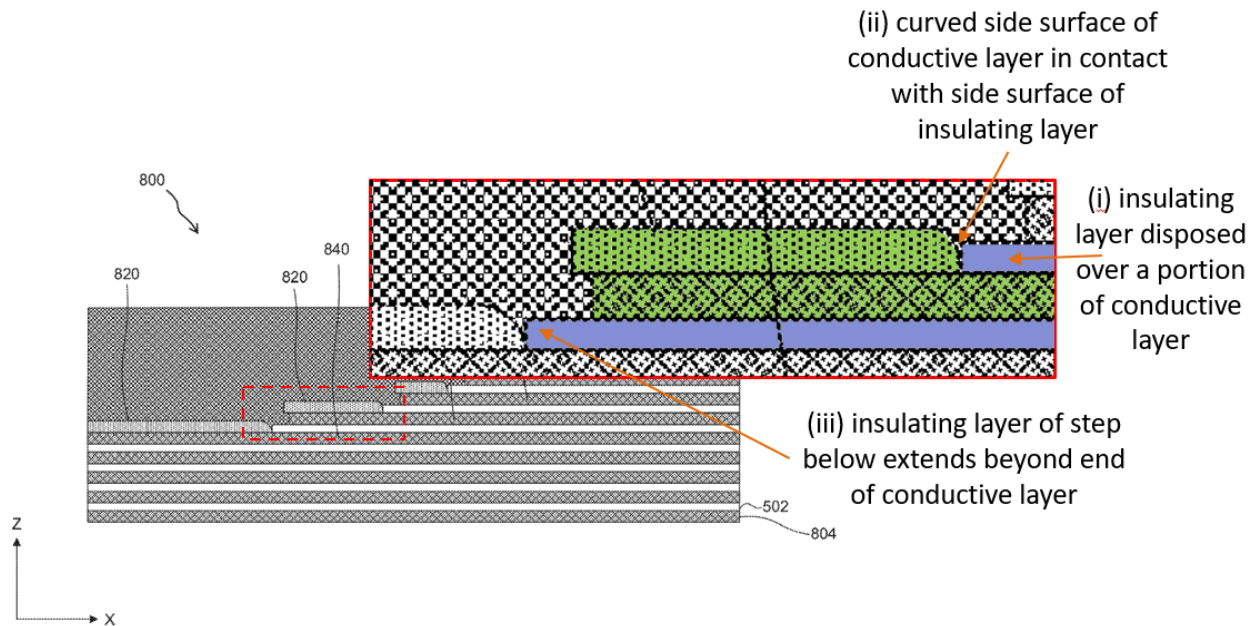
Exhibit List

Ex.	Description
2001	Micron's Motion to Stay the Case Pending Inter Partes Review and Post Grant Review Proceedings, <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc.</i> , No. 3:23-cv-05792-RFL (N.D. Cal. Jan. 16, 2025), ECF No. 200
2002	Plaintiff/Counterclaim Defendant Yangtze Memory Technologies Company, Ltd.'s and Counterclaim Defendant Yangtze Memory Technologies, Inc.'s Opposition to Micron's Motion to Stay Case Pending Inter Partes Review and Post-Grant Proceedings, <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc.</i> , No. 3:23-cv-05792-RFL (N.D. Cal. Feb. 3, 2025), ECF No. 221
2003	Docket Entry Order (issuing temporary stay), <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc.</i> , No. 3:23-cv-05792-RFL (N.D. Cal. Mar. 3, 2025), ECF No. 242
2004	U.S. District Courts—Time Intervals from Filing Date to Beginning Date for Completed Civil Trials, by District, During the 12-Month Period Ending September 30, 2024 (https://www.uscourts.gov/sites/default/files/2025-01/jb_t3_0930.2024.pdf)
2005	Statutory Disclaimer of Claims 17 and 20 of U.S. Patent 11,145,666 Under 37 C.F.R. § 1.321(a) (Filed Mar. 12, 2025)
2006	Curriculum Vitae of Konstantinos Giapis, Ph.D.
2007	Declaration of Konstantinos Giapis, Ph.D. ("Giapis")
2008	James D. Plummer et al., SILICON VLSI TECHNOLOGY: FUNDAMENTALS, PRACTICE AND MODELING (Prentice Hall Elecs. & VLSI Series) (Charles Sodini ed. 2000) (excerpts)

I. Introduction

Patent Owner Yangtze Memory Technologies Company, Ltd. ("YMTC") respectfully submits this Preliminary Response to the Petition for *inter partes* review of U.S. Patent 11,145,666 ("’666 patent" (Ex.1001)). As explained below, Petitioner has failed to carry its burden to show a reasonable likelihood that claim 19 (the only remaining challenged claim) is unpatentable. Thus, the Board should deny the Petition and no IPR proceeding should be instituted.

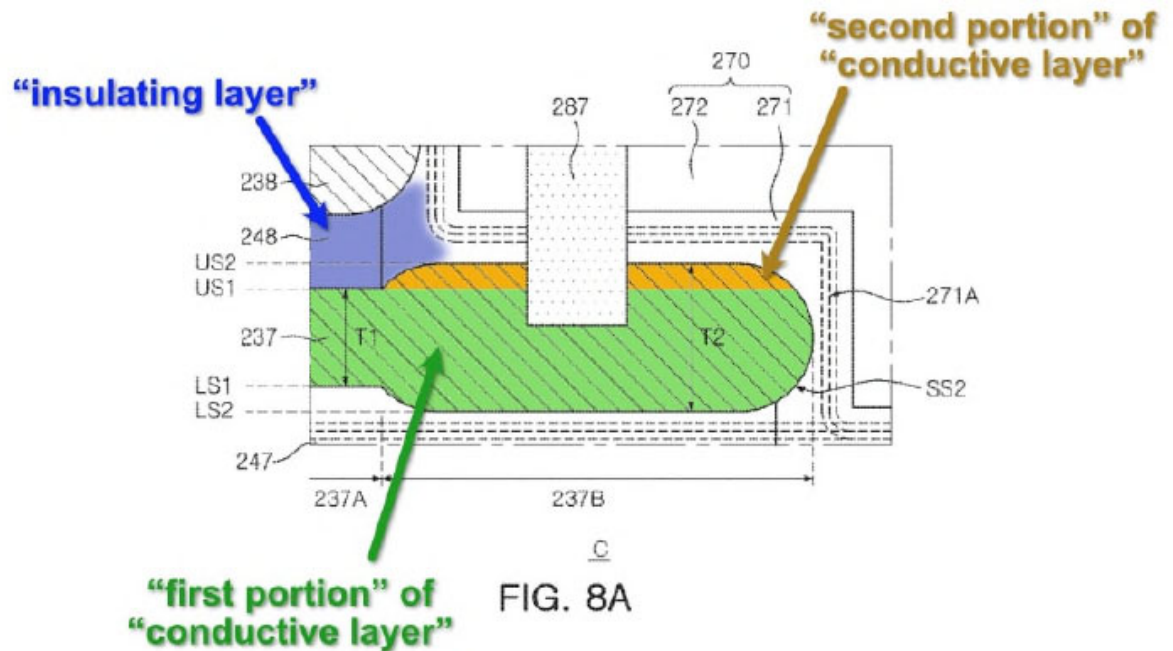
The ’666 patent describes and claims a novel staircase structure for 3D memory devices. The ’666 patent’s staircase structure includes a plurality of stacked steps with each step having (i) an insulating layer disposed over a first portion of the conductive layer in its step, (ii) a second portion of the conductive layer having a curved side surface in contact with a side surface of the insulating layer in its step, and (iii) the conductive layer is disposed over a first portion of the insulating layer of the step below while a second portion of the insulating layer of the step below extends beyond the end of the conductive layer. These features are shown below and work together to prevent short-circuits between conductive layers in the staircase structure.



The Petition presents three grounds of purported invalidity, all based on obviousness. All fail. Kim (Ex.1005) (Ground 1) does not disclose a conductive layer with a “curved side surface” as contemplated by the ’666 patent. Petitioner nevertheless asserts that a POSITA would modify Kim’s straight side surface into a curved side surface to avoid short-circuits. But Kim already addresses preventing short-circuits in different ways. And Kim teaches a manufacturing process that cannot form the “curved side surfaces” Petitioner proposes.

With respect to Nam (Ex.1006) (Ground 2), Petitioner has failed to establish that the identified “curved side surface” is in contact with a “side surface of the insulating layer” and “a second portion of the insulating layer of the adjacent stack is laterally displaced from the conductive layer of the layer stack” as required by claim 19. Petitioner does not provide any explanation to justify arbitrarily defining

only a piece of the insulating layer (which Petitioner colors in blue as shown below) as purportedly in contact with a “curved side surface” as shown below.



The Petition then compounds its error by redefining “the insulating layer” to allege that “a second portion of the insulating layer of the adjacent stack is laterally displaced from the conductive layer of the layer stack.”

For Lee (Ex.1007) in view of Park (Ex.1008) (Ground 3), the Petition acknowledges that Lee does not have a “curved side surface.” To remedy this, Petitioner proposes performing a technically impossible oxidation process to form a curved side surface. Ground 3 fails as well.

The Board should deny the Petition.

II. Background

A. Only Claim 19 Is at Issue

Although the Petition challenges claims 17, 19, and 20 (Pet. 10), YMTC has disclaimed claims 17 and 20 of the '666 patent. Ex.2005. Thus, only claim 19 is at issue and the Board can only institute an IPR if it finds Petitioner has established a reasonable likelihood of prevailing on the merits of claim 19. As explained herein, Petitioner has failed to do so.

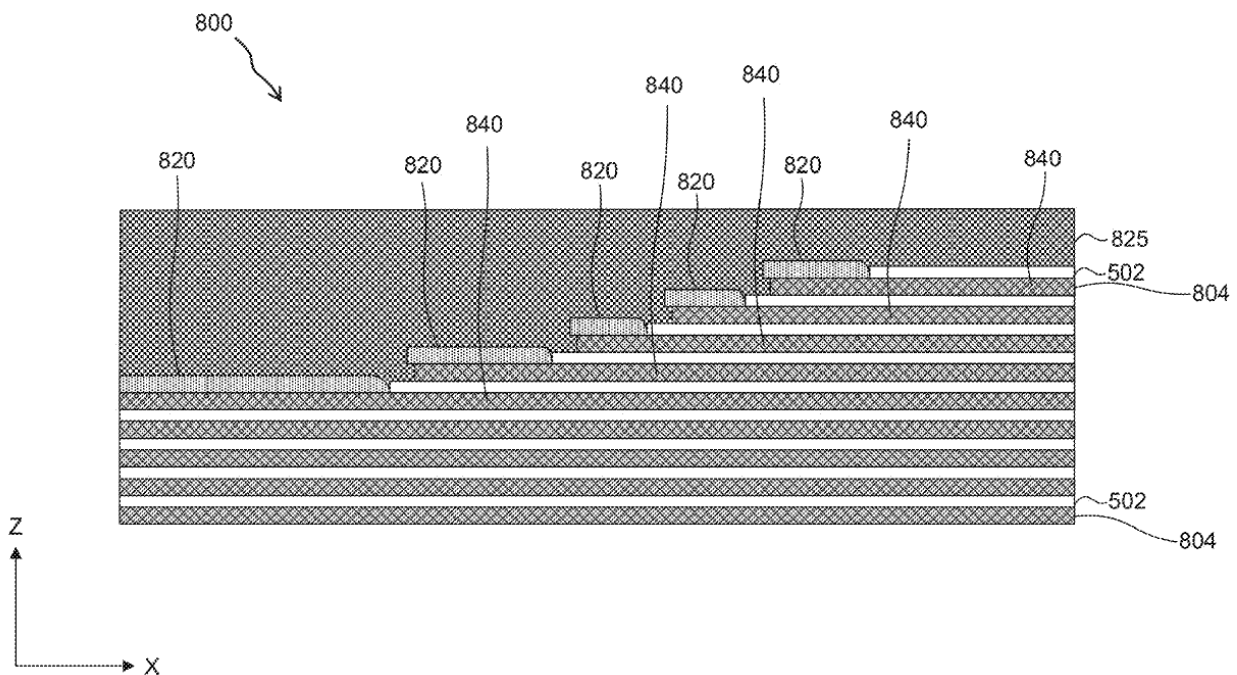
B. The '666 Patent (Ex.1001)

The '666 patent discloses and claims novel semiconductor memory structures with “a staircase structure for a memory device” that “provide[s] numerous benefits including, but not limiting to, yield and manufacturing cost improvements.” '666 patent at 1:35-41. The claimed “staircase structure” includes steps comprising “a plurality of layer stacks, where each layer stack includes a first material layer disposed over a first portion of a second material layer.” *Id.* at 1:42-46, Fig. 8. The second material layer is made of conductive material(s), while the first material layer is made of insulating material. *Id.* at 1:53-62, Fig. 8.

In the staircase structure, the second material layers may have two portions, such as landing pad areas for contact connections and word lines. *Id.* at 1:46-50, 9:37-56, Fig. 8. Additionally, a portion of the second material layer has a curved side surface that is in contact with a side surface of the first material layer. *Id.* at Fig. 8. The second material layer is further disposed over a first portion of the first

material layer of an adjacent layer of the staircase structure while a second portion of the first material layer of the adjacent layer is laterally displaced from the second material layer. *Id.* at 1:62-64, Fig. 8.

The '666 patent details the process by which its novel structure is formed. *See id.* at 6:1-13:8, Figs. 1-9. At the end of this process, the '666 patent's novel structure, including as recited in claim 19, is formed as shown in Figure 8 below.



The conductive material 804, 820, and 840 form conductive word lines, with the thicker landing pads 820 to contact vertical vias that are not shown in the figure above. Each of structures 820 has a curved side surface in the x-z plane, which is in contact with the side surface of the insulating layer 502. Such “curved side surfaces” help improve yield and reduce manufacturing costs, such as by avoiding

short-circuits between adjacent layers. *See id.* at 1:35-41, Fig. 8; Giapis (Ex.2007) ¶¶28, 33-34; *see also* Pet. 32, 46-47, 49-50, 84-86.

C. Prosecution History

For brevity, YMTC does not address the prosecution history in this Preliminary Response. YMTC's decision to not address the prosecution history here should not be understood as agreement or acquiescence with the statements made by Petitioner regarding the prosecution history. *See* Pet. 20-23.

D. Person of Ordinary Skill in the Art

The Petition asserts that a person of ordinary skill in the art in the field of the '666 patent would have had a bachelor's degree in electrical engineering or a similar discipline, along with 2-3 years of professional experience working with (e.g., researching, designing, or teaching) 3D memory devices, or an equivalent level of skill, knowledge, and experience (e.g., an advanced degree may substitute for professional experience). Pet. 24-25. YMTC takes no position on the level of ordinary skill in the art for the purposes of this Preliminary Response only, as the Petition has failed to establish a reasonable likelihood of prevailing under any reasonable definition of a person having ordinary skill in the art ("POSITA"). Giapis ¶22.

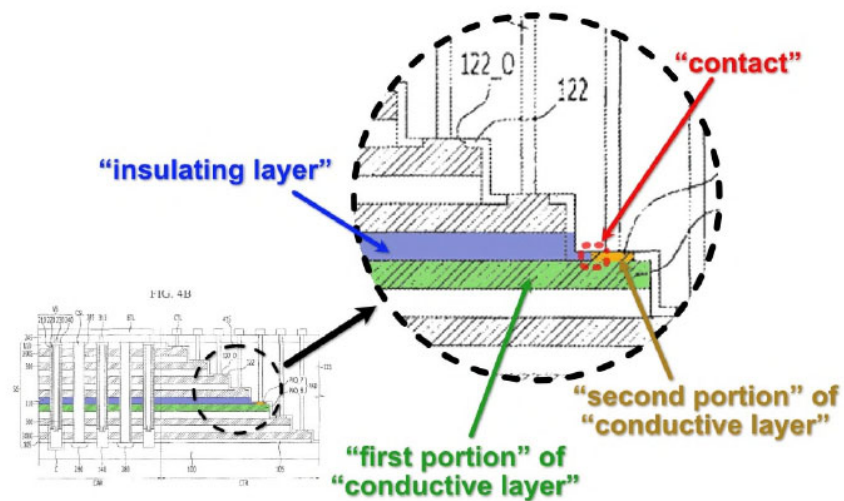
E. Claim Construction

The Petition does not identify any terms for construction. Pet. 23. For purposes of this Preliminary Response, YMTC does not believe any terms require construction for the Board to determine that institution is not warranted.¹

III. Ground 1: Petitioner Failed to Demonstrate that Kim Renders Claim 19 Obvious**A. Kim, Alone or in Combination, Does Not Disclose a “curved side surface in contact with a side surface of the insulating layer”**

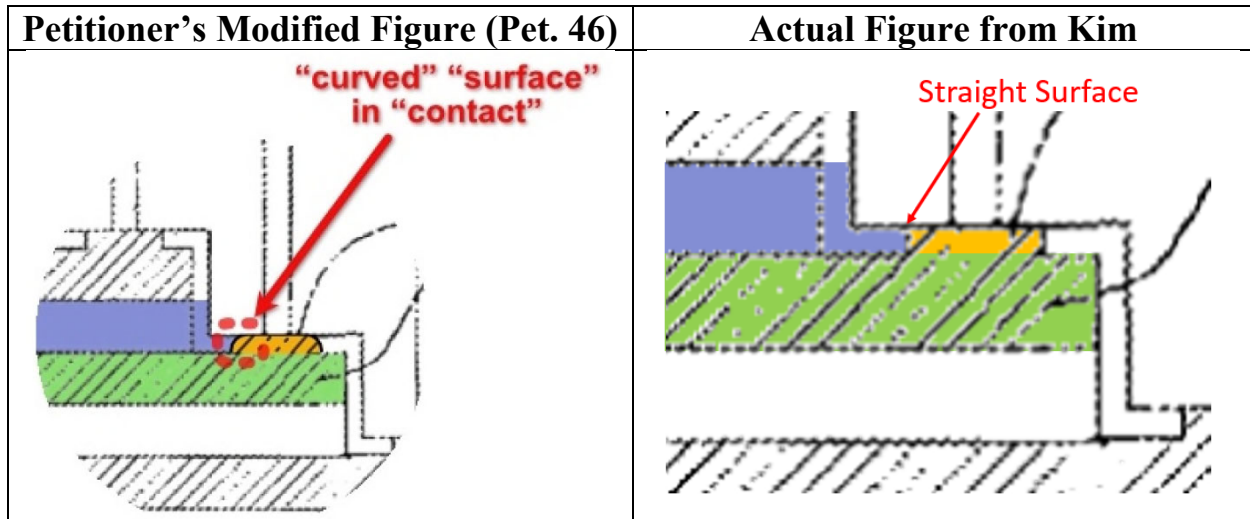
The Petition cites Fig. 4B of Kim and asserts that Kim discloses a “conductive layer” with a “curved side surface in contact with a side surface of the insulating layer.” Pet. 44-45. The Petition is wrong. As the Petition acknowledges, Fig. 4B discloses a “conductive layer” (orange) with a *straight* side surface in “contact” (red) with a side surface of the insulating material (blue):

¹ YMTC reserves the right to advocate for claim constructions in the event the Board institutes review in this case.



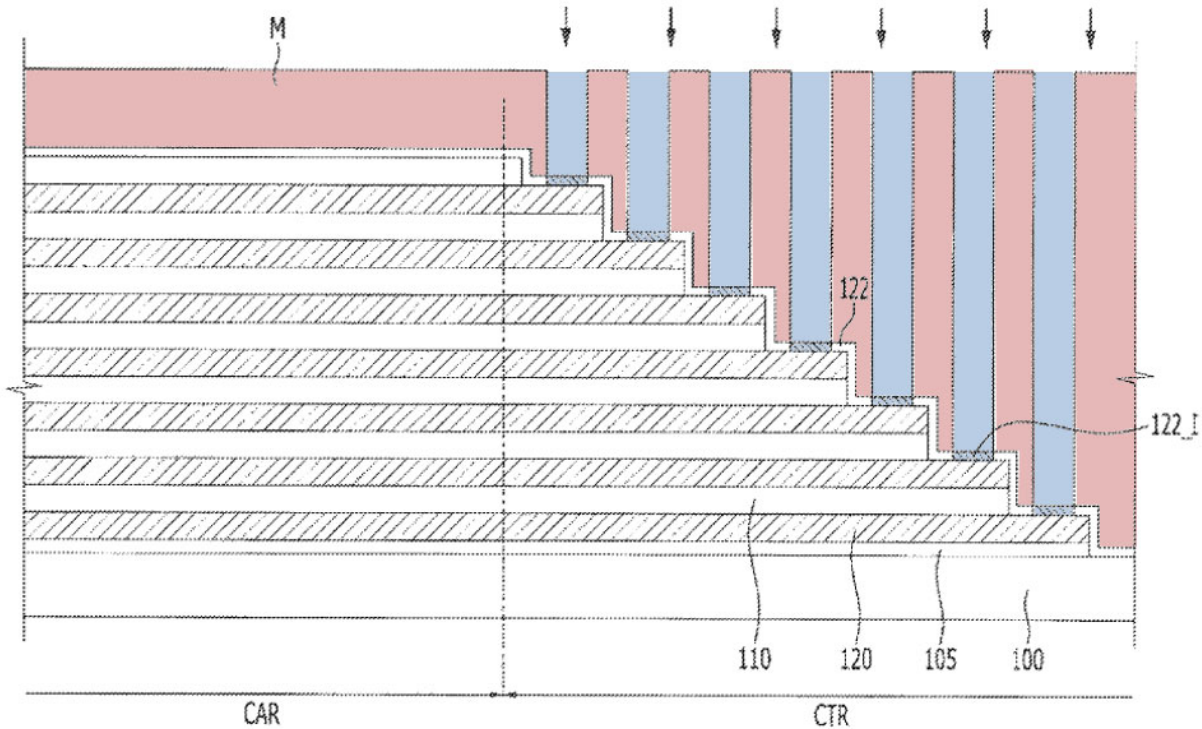
Pet. 45 (Petition's annotations). Kim expressly discloses that the conductive "PAD_P" (orange) has "a rectangular parallel[] shape"—i.e., a shape with straight surfaces. Kim at 7:58-8:31, Fig. 5 (showing PAD-P having a box shape with no curved sides), Fig. 6 (same), Fig. 7 (same); Giapis ¶¶40-41.

Petitioner nevertheless cites Kim at 8:29-34 to allege that Kim's conductive pad (orange) "would obviously be shaped in the manner shown" in its modified figure, in contrast to what Kim actually discloses. Pet. 45-46. Petitioner is incorrect again.



First, Petitioner ignores that the “curved side surface” shown in its modified figure cannot be formed through Kim’s manufacturing process. Specifically, Kim uses “a photosensitive resin pattern M” to precisely define “the region 122_I for forming the protrusion pad” (i.e., conductive layer). Kim at 12:61-67. The regions 122_I exposed through the pattern M—and only those exposed regions—are doped to “have a different etching ratio” from the rest of auxiliary insulating layer 122. Kim at 13:5-11; Giapis ¶37. This is shown in annotated Figure 12 below, where the openings in pattern M are shown in blue. Kim 12:61-13:11; Giapis ¶37.

FIG. 12



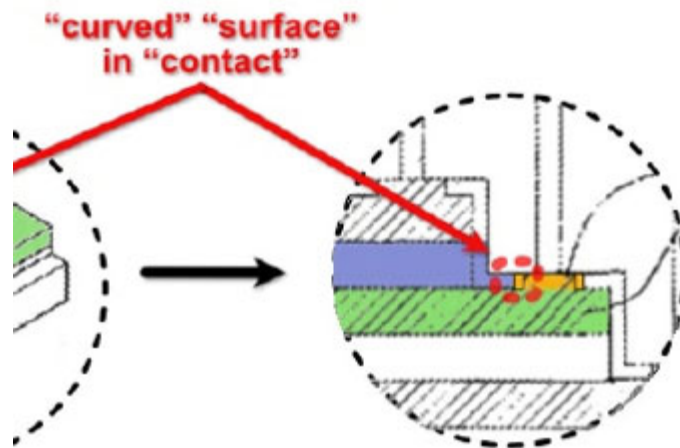
Subsequently, “opening[s] 122_O” are created by etching the entirety of the regions 122_I and the “conductive layer” PAD_Ps are formed in those openings. Kim at 13:55-67, 14:6-17, Figs. 16-17; Giapis ¶¶38-41. This etching results only in *straight* side surfaces for the PAD_Ps, as defined by pattern M. Giapis ¶¶37-41, 44-45.

The Petition does not explain how Kim’s process can form “curved side surfaces” as shown in Petitioner’s modified figure. Instead, the Petition baldly concludes that “PAD_P would obviously be shaped in the manner shown in the” modified figure above, Pet. 45-46, citing only its expert, who parrots the same statement. Ex.1003 ¶203. That is insufficient and, as discussed above, incorrect.

See, e.g., Harmonic Inc. v. Avid Tech., Inc., 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[Petitioner’s] expert testimony in support of this theory is equally unavailing, adding nothing beyond the conclusory statements in [the] petition.”); *Smartmatic USA Corp. v. Election Sys. & Software*, IPR2019-00527, Paper 32 at 34 (Aug. 5, 2020) (giving no weight to an expert declaration that “merely parrots the language in the Petition”).

Second, the Petition creates its own figures purporting to show the contact pads that Kim contemplates at column 8 lines 29-34. Pet. 52. But the cross-sectional view the Petition created confirms that the side surface in contact with the “insulating layer” is straight and not “curved.” Pet. 52.²

² Petitioner may be suggesting that its newly created figures show a “curved side surface” when viewed in the bird’s eye perspective. Pet. 51-52. But Petitioner provides no explanation as to how such a surface is “in contact with a side surface of the insulating layer” as claimed. It is not. *Giapis* ¶¶42-45, 52-57. At most, any “curved surface” is only in contact with an inner surface of the insulating layer. *Id.*



Petitioner has failed to establish that Kim discloses the alleged “conductive layer” with a “curved side surface in contact with a side surface of the insulating layer” as shown in the modified figure of the Petition. Pet. 46.

B. Kim, Alone or in Combination, Does Not Teach nor Render Obvious a “curved side surface in contact with a side surface of the insulating layer”

Petitioner next argues that “[c]ontact pads” with “curved” side surfaces were “well-known in the art.” Pet. 46-49. According to Petitioner, a POSITA would have been motivated to modify Kim’s straight surfaces to be curved surfaces instead to reduce the risk of short-circuit in Kim and/or because curved side surfaces were supposedly well known. *Id.* Petitioner is incorrect.

As an initial matter, Petitioner’s reliance on general knowledge or what was purportedly well known to show obviousness is misplaced. Petitioner failed to demonstrate that “the missing limitation in question [is] *unusually simple* and the

technology *particularly straightforward.*” *Motorola Mobility LLC v. Largan Precision Co.*, IPR2024-00688, Paper 7 at 29 (Oct. 28, 2024) (emphasis added) (citation omitted) (denying institution). To the contrary, forming precise structures such as curved side surfaces involves complex semiconductor manufacturing processes, including “a (gas-phase) vapor deposition technique with both directional and isotropic flux components” such as through “plasma-enhanced CVD and directional sputter deposition (PVD).” *Giapis* ¶30; ’666 patent at 8:41-9:7. And 3D NAND technology is plainly not “particularly straightforward.” *DSS Tech. Mgmt., Inc. v. Apple Inc.*, 885 F.3d 1367, 1374-75 (Fed. Cir. 2018) (reversing Board’s obviousness finding based on single-reference obviousness, noting that “common sense and common knowledge” rarely may be used “to supply a missing claim limitation,” especially when the limitation is not “unusually simple” and technology is not “particularly straightforward” (citations omitted)); *Giapis* ¶¶23-34. Petitioner’s reliance on what is purportedly well known to a POSITA to supply the missing “curved side surface” is legal error.

Regardless, the Petition fails to establish a POSITA would have been motivated to modify Kim’s straight side surface into a curved side surface based on the three references the Petition relies on to demonstrate the knowledge of a POSITA as explained below.

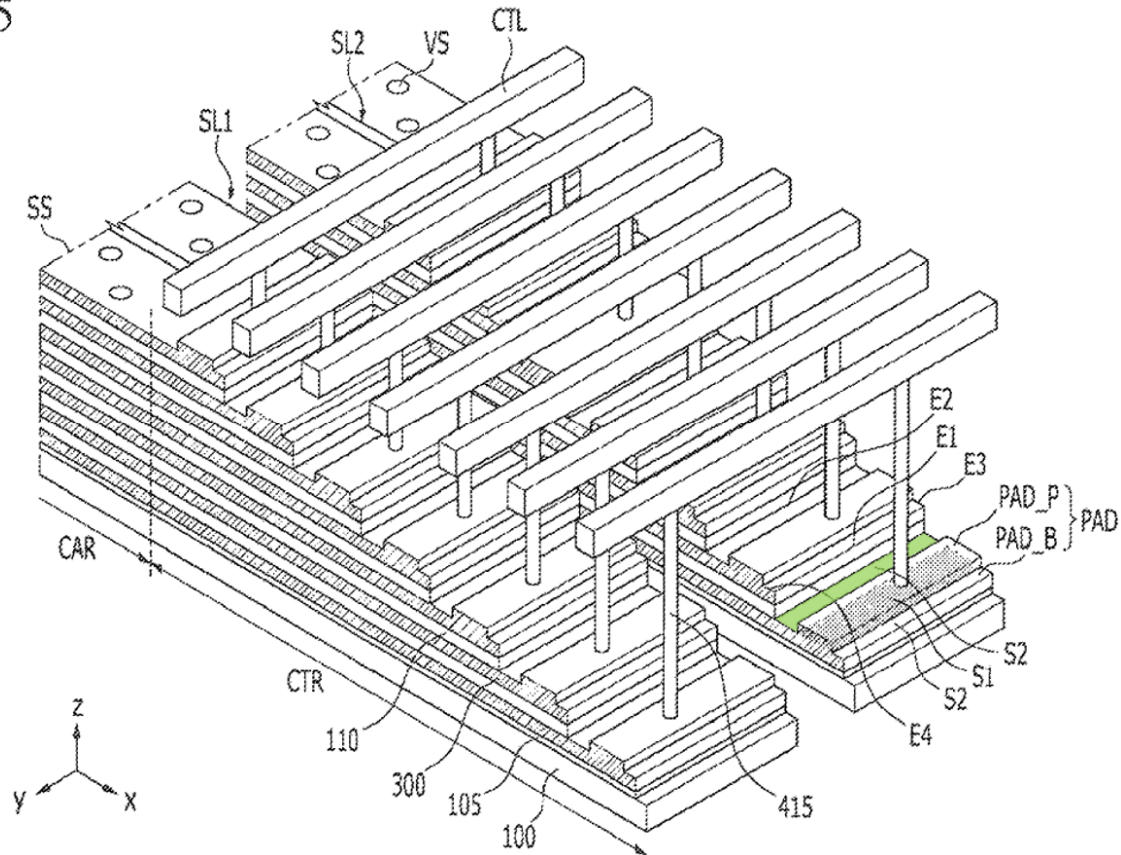
1. A POSITA Would Not Be Motivated to Modify Kim to Reduce the Risk of Short-Circuit

The Petition alleges that Kim's process of forming PAD_P "*could* be readily adapted to form a curved opening that surrounds a curved contact pad," purportedly by using ion implantation "to form a 'doped region 122_I' with a rounded as opposed to rectangular shape." Pet. 50-51 (emphasis added). But even if Kim's process *could* be so adapted, that is not enough to motivate a POSITA to do so. *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993-94 (Fed. Cir. 2017) (vacating obviousness ruling and noting, that a POSA would have understood two references "*could* be combined" was "not enough" to show a POSA *would* have been motivated to combine the two references (emphasis added)).

The Petition also argues that a POSITA would have been motivated to add a curved side surface to Kim to "reduc[e] the risk of short circuit." Pet. 49-50. That is incorrect for several reasons.

First, Kim forms the protrusion pad PAD_P "inside from the edge of a surface of the base pad PAD_B to prevent the short-circuit between the pad units PAD positioned at different rows." Kim at 9:46-49, Figs. 5-9; Giapis ¶¶60-61. This is shown below by the green set-off region. Giapis ¶¶60-61; *see also* Kim at 7:63-67 ("The pad unit PAD and the adjacent pad unit PAD may not overlap with each other.").

FIG. 5



Kim at Fig. 5 (annotated). Kim's use of a mask pattern creates this separation between Kim's pad units PAD in order to prevent short-circuits. Giapis ¶¶37, 60-61, 64. Notably, neither the Petition nor Petitioner's expert even mention that Kim's mask process already prevents short-circuits, even without any alleged "curved side surface."

Second, Kim prevents short-circuits by retaining “auxiliary insulating layer 122 positioned between the adjacent protrusion pads PAD_P positioned at different rows.” Kim at 9:50-55, Fig. 4B. As Kim explicitly states, by retaining the auxiliary insulating layer in this way, “the short-circuit between the pad units PAD

may be effectively prevented.” *Id.*; Giapis ¶¶66. Again, neither the Petition nor Petitioner’s expert even mention this second way that Kim prevents short-circuits.

Third, Kim “prevent[s] short circuits” by making the “z-direction thickness of the insulating layer 110 ... larger than the minimum distance in the z-direction between two adjacent pad units PAD.” Kim at 9:7-11; Giapis ¶¶67. In other words, Kim makes insulating layers 110 thick enough to account for the increased thickness of the pad units PAD from protrusion PAD_P to avoid a short-circuit. Giapis ¶¶67.

Thus, a POSITA would not have been motivated to modify Kim with a “curved side surface” technique to avoid short-circuits, when Kim already uses three other techniques for this very purpose. *See, e.g., In re Anova Hearing Labs, Inc.*, 809 F. App’x 840, 843 (Fed. Cir. 2020) (reversing obviousness finding because “[t]he Board also does not explain why a person of ordinary skill in the art would be motivated to modify Brown, **which already includes vents, to address occlusion effect**”); *South-Tek Sys., LLC v. Eng’d Corrosion Sols., LLC*, 748 F. App’x 1003, 1006-07 (Fed. Cir. 2018) (finding claims non-obvious because “South-Tek only argued that a person of ordinary skill would have been motivated to use Wood’s drain to allow water to drain from Viking’s system. **Viking’s system already includes a drum drip drain that serves this purpose**” (emphasis added)); Giapis ¶¶58-59, 68. The Petition does not provide any reason why Kim’s

express disclosures would be inadequate to prevent short-circuits. Nor does the Petition identify any advantages a “curved side surface” would have over Kim’s disclosed methods for preventing short-circuits, and Kim does not suggest there would be. The Petition therefore fails to establish that a POSITA would have been motivated to modify Kim’s straight side surface with a “curved side surface” as claimed.

2. A POSITA Would Not Have Modified Kim In View Of Park, Yun, Or Nam

Aside from its flawed short-circuit motivation, the Petition only asserts that Park, Yun, and Nam disclose structures that were purportedly well known. Pet. 49-50. That is insufficient as a matter of law. *See, e.g., Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886-88 (Fed. Cir. 2024) (reversing Board’s obviousness finding and explaining that relying on disclosure in prior art as “therefore ‘known’” without “[a] reason for combining” “is an error as a matter of law”).

Further, even if Petitioner has established a motivation to combine (it has not), Petitioner has failed to establish that a POSITA would have had a reasonable expectation of success in implementing the proposed combination. The Federal Circuit has “emphasize[d]” the “clear distinction in our case law between a patent challenger’s burden to prove that a skilled artisan would have been motivated to combine prior art references and the additional requirement that the patent

challenger also prove that the skilled artisan would have had a reasonable expectation of successfully achieving the claimed invention from the combination.” *Eli Lilly & Co. v. Teva Pharms. Int’l GmbH*, 8 F.4th 1331, 1344 (Fed. Cir. 2021) (citation omitted). “A finding by the Board that a patent challenger has demonstrated a motivation to combine references does not necessarily imply that the challenger has also met its burden of showing a reasonable expectation of success in achieving a claimed method of treatment.” *Id.* (citation omitted).

The Petition provides no explanation for *how* a POSITA would change Kim’s side surfaces to be “curved.” All Petitioner’s expert says is that Kim “would simply be tailored to form a ‘doped region 122_I’ with curved rather than straight sides.” Pet. 50-51; Ex.1003 ¶234. Such conclusory testimony should be given no weight. *See, e.g., Harmonic Inc.*, 815 F.3d at 1363 (“[Petitioner’s] expert testimony in support of this theory is equally unavailing, adding nothing beyond the conclusory statements in [the] petition.”); *Smartmatic USA Corp.*, IPR2019-00527, Paper 32 at 34 (giving no weight to an expert declaration that “merely parrots the language in the Petition”). Regardless, a POSITA would not have had any reasonable expectation of success in combining Kim’s manufacturing processes with the entirely different processes of Park, Yun, or Nam.

Park. Park's and Kim's processes differ significantly. Giapis ¶¶62-65, 71-74. As just one example, the rounding in Park is due to Park's use of a thermal oxidation process in forming additional insulating layer 40, *see, e.g.*, Park at 8:28-33, 12:16-20, but Kim does not disclose using a thermal oxidation process at all for forming any layers. Giapis ¶74. There is no reason to conclude that a POSITA could (or would) simply "tailor" Kim's non-oxidative process into an oxidative process to form curved side surfaces on a conductive layer. Giapis ¶74. To get Park's rounded corners into Kim, a POSITA would have to abandon Kim's disclosed process (discussed above) altogether and start with Park. Giapis ¶74. But it is well settled that "combinations that change the 'basic principles under which the [prior art] was designed to operate,' or that render the prior art 'inoperable for its intended purpose,' may fail to support a conclusion of obviousness." *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App'x 755, 758 (Fed. Cir. 2015) (citations omitted); *see also, e.g., Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359 (Fed. Cir. 2020) ("Fundamental differences between the references are central to this motivation to combine inquiry.").

Yun. Kim's and Yun's processes for making their resulting structures also differ such that a POSITA would have to make significant changes to Kim to form the pad structures of Yun. Giapis ¶77. Neither the Petition nor its expert demonstrate otherwise. Giapis ¶¶75-77. Moreover, Yun does not even teach "a

curved side surface in contact with a side surface of the insulating layer” as claimed. In all Yun’s embodiments, the relevant side of pads 120 is not rounded or curved. Instead, the “inner side surface of the protrusion part 65 may have a *flat surface*.” Yun (Ex.1018) 8:31-40 (emphasis added), Fig. 3, Figs. 5A-5F; Giapis ¶76. Furthermore, in all Yun’s embodiments, the inner side surface of the pads 120 does not contact the interlayer insulating layer 102 as claimed.

Nam. Nam purportedly forms convex, or bull nose shaped, pad regions by injecting impurities into a sacrificial layer to create a damaged region, and then enlarging the damaged regions through heat. Nam at [0099]-[0100]; Giapis ¶79. This has the effect of increasing the thickness of Nam’s pad region to avoid contacts penetrating through the pad. Nam at [0044]-[0045], [0065], [0107]-[0108], Fig. 7, Figs. 8A-8B, Fig. 37, Fig. 39; Giapis ¶79. But this also has the effect of shrinking the distance between adjacent gate electrode layers in Nam, thus increasing the potential for a short-circuit—the opposite of Kim’s goal of preventing short-circuits. Giapis ¶¶79-80.

By contrast, Kim’s manufacturing process is much different. Kim uses a mask pattern to precisely define the locations of the resulting PAD_Ps. Kim’s process results in increasing the thickness of the pad portion with PAD_P, thus solving the same problem Nam tries to solve of contacts penetrating through the pad. Kim at 7:58-8:28, 11:48-56; Giapis ¶80. But as explained in Section III.B.1

above, Kim's process additionally solves the problem of short-circuits between gate electrodes, without any modification. The Petition provides no explanation for why a POSITA would modify Kim to try and solve a problem Kim already solves while introducing potential short-circuits. Thus, a POSITA would not have had a reasonable expectation of success in modifying Kim in view of Nam. *Plas-Pak Indus.*, 600 F. App'x at 758; *see also, e.g., Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (finding no motivation to modify the prior art where doing so "would destroy the basic objective" of the prior art); *Giapis* ¶¶80-81.

IV. Ground 2: Petitioner Failed to Demonstrate that Nam Renders Claim 19 Obvious

A. Nam Does Not Render Obvious Both a "curved side surface in contact with a side surface of the insulating layer" and "a second portion of the insulating layer of the adjacent stack is laterally displaced from the conductive layer of the layer stack"

Petitioner asserts that Nam renders obvious claim 19's requirements of a "curved side surface in contact with a side surface of the insulating layer" and "a second portion of the insulating layer of the adjacent stack is laterally displaced from the conductive layer of the layer stack." Petitioner alleges that Nam's (i) "conductive layer" is in contact with a "side surface" of Nam's "layer 248 and layer 271" and (ii) insulating layer 247 with layer 271 ("the insulating layer of the adjacent stack") includes a "portion" that is laterally displaced from the

“conductive layer.” Pet. 67-69. But to show this, the Petition resorts to arbitrary and unexplained labels for Nam. That approach fails to show obviousness.

First, Petitioner attempts to create a “side surface” where Nam does not show one. As shown below, the Nam stairsteps comprise “insulating layers 241 to 248” (blue) and “interlayer insulating layer 271” (yellow). Nam at [0098]; Giapis ¶82.

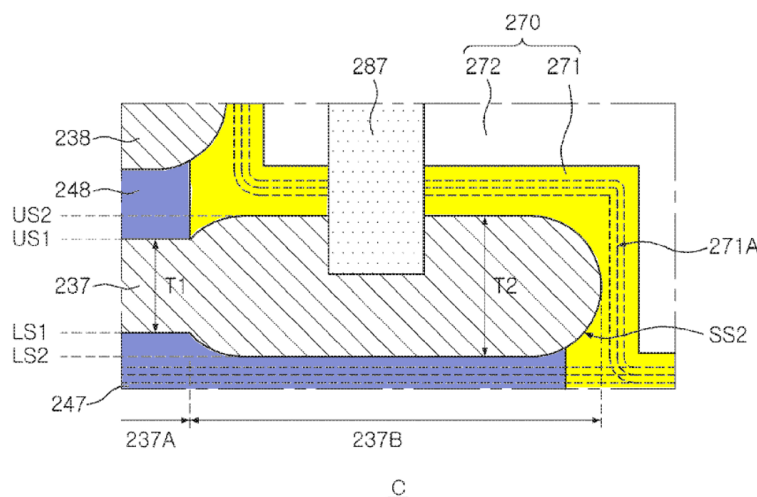
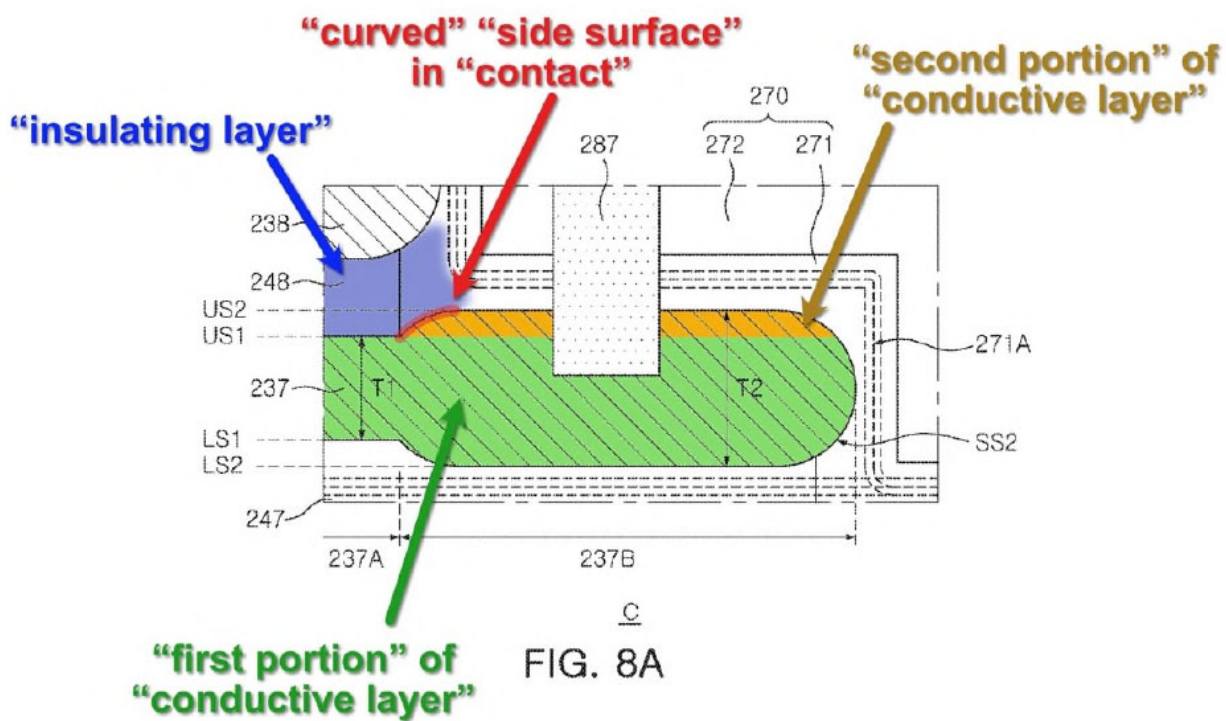
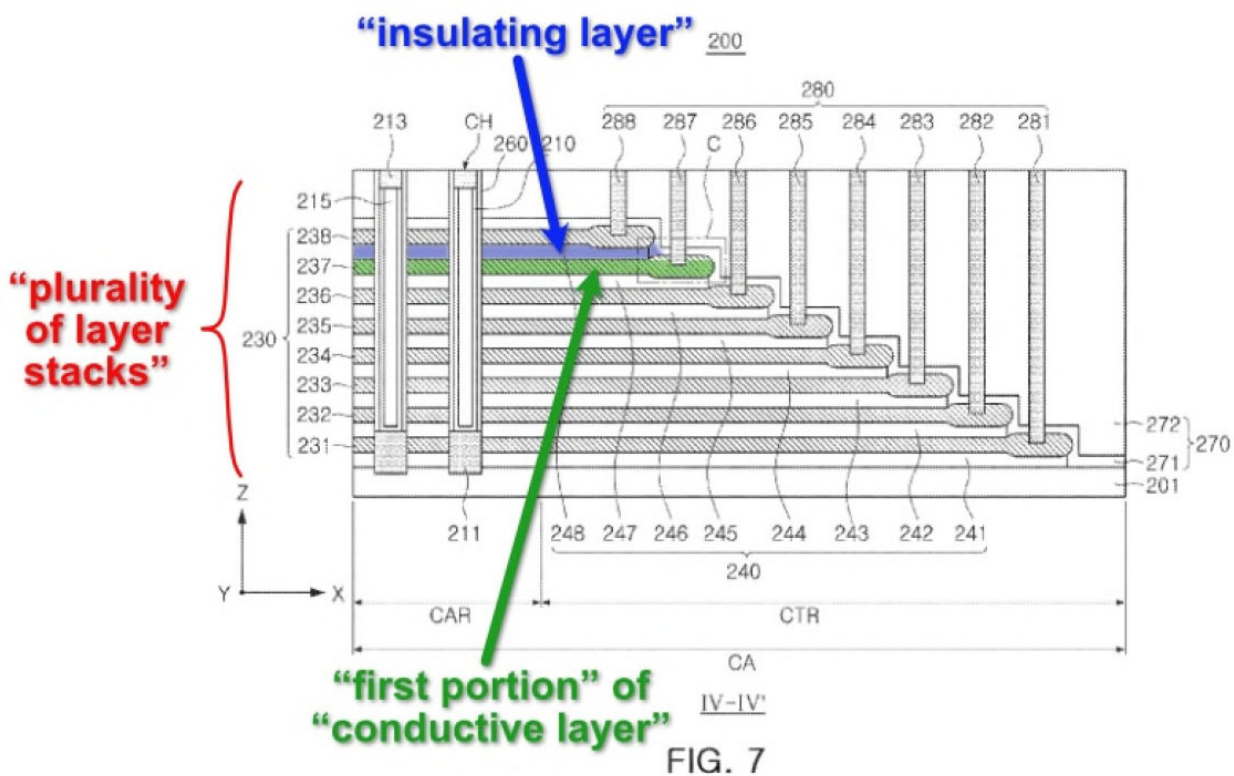


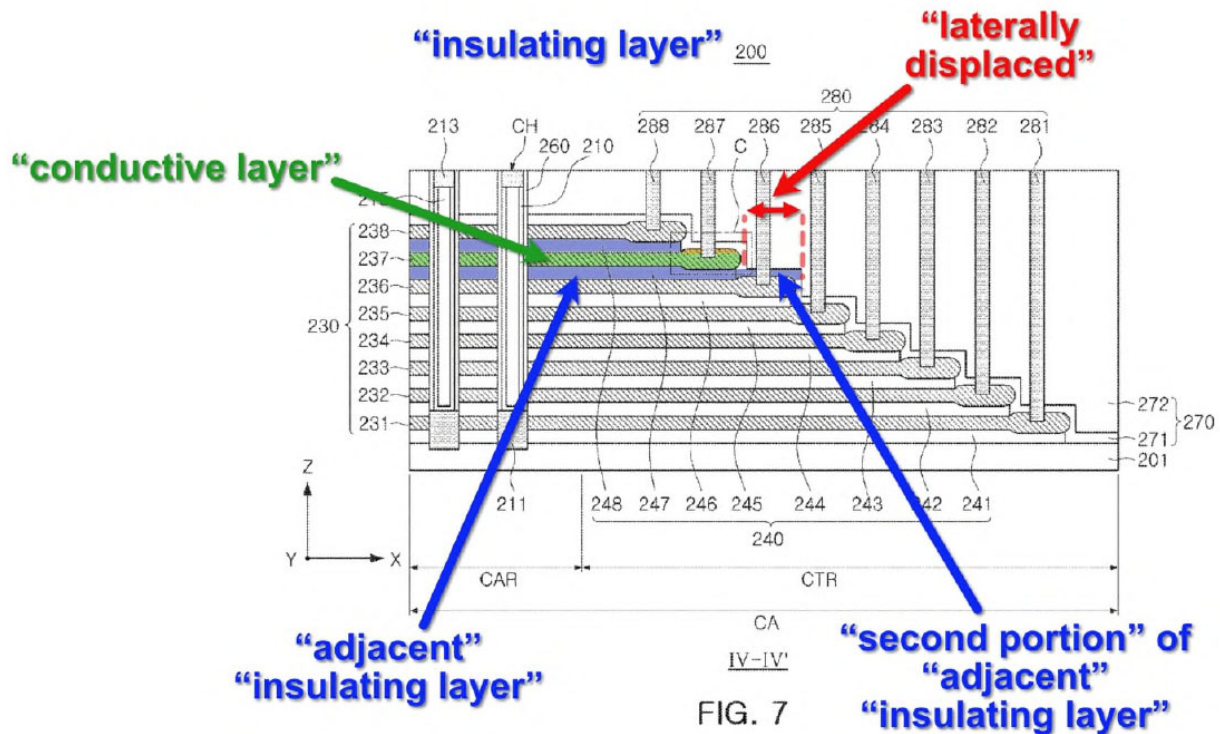
FIG. 8A

To support its obviousness argument, without explanation, Petitioner identifies only an arbitrary section of the interlayer insulating layer 271 as part of the Petition’s identified “insulating layer.”



Pet. 61, 67 (annotations in Petition). Neither the Petition nor Petitioner's expert explain why the blue "insulating layer" depicted above purportedly stops where it does, or why a POSITA would draw the same conclusion. *Giapis* ¶¶83-84. This conclusory identification without evidentiary support cannot demonstrate a "side surface of the insulating layer" that is in contact with the "curved side surface" of a conductive layer.

Second, even if Nam discloses the claimed "curved side surface" as Petitioner alleges (it does not), Nam does not disclose that a "portion" of "the insulating layer of the adjacent layer stack" is "laterally displaced from the conductive layer." Rather than treating the "adjacent layer stack" as it does above, Petitioner identifies it ***differently***—namely, insulating layer 247 and the entirety of interlayer insulating layer 271 at that step (shown below in blue).



Pet. 71 (annotations in Petition). As Petitioner's own annotated figure above shows, Petitioner identifies only insulating layer 248 as "the insulating layer." Thus, a POSITA would understand that "*the* insulating layer of the adjacent layer stack" is the same section of insulating layer 247. Petitioner, however, identifies layer 247 and the entirety of layer 271 at that step as "the insulating layer of the adjacent layer stack." Neither the Petition nor Petitioner's expert explain this inconsistency and arbitrary labeling. Nor do they explain why a POSITA would reach the same inconsistent and arbitrary conclusions (absent hindsight). Giapis ¶¶85-86.

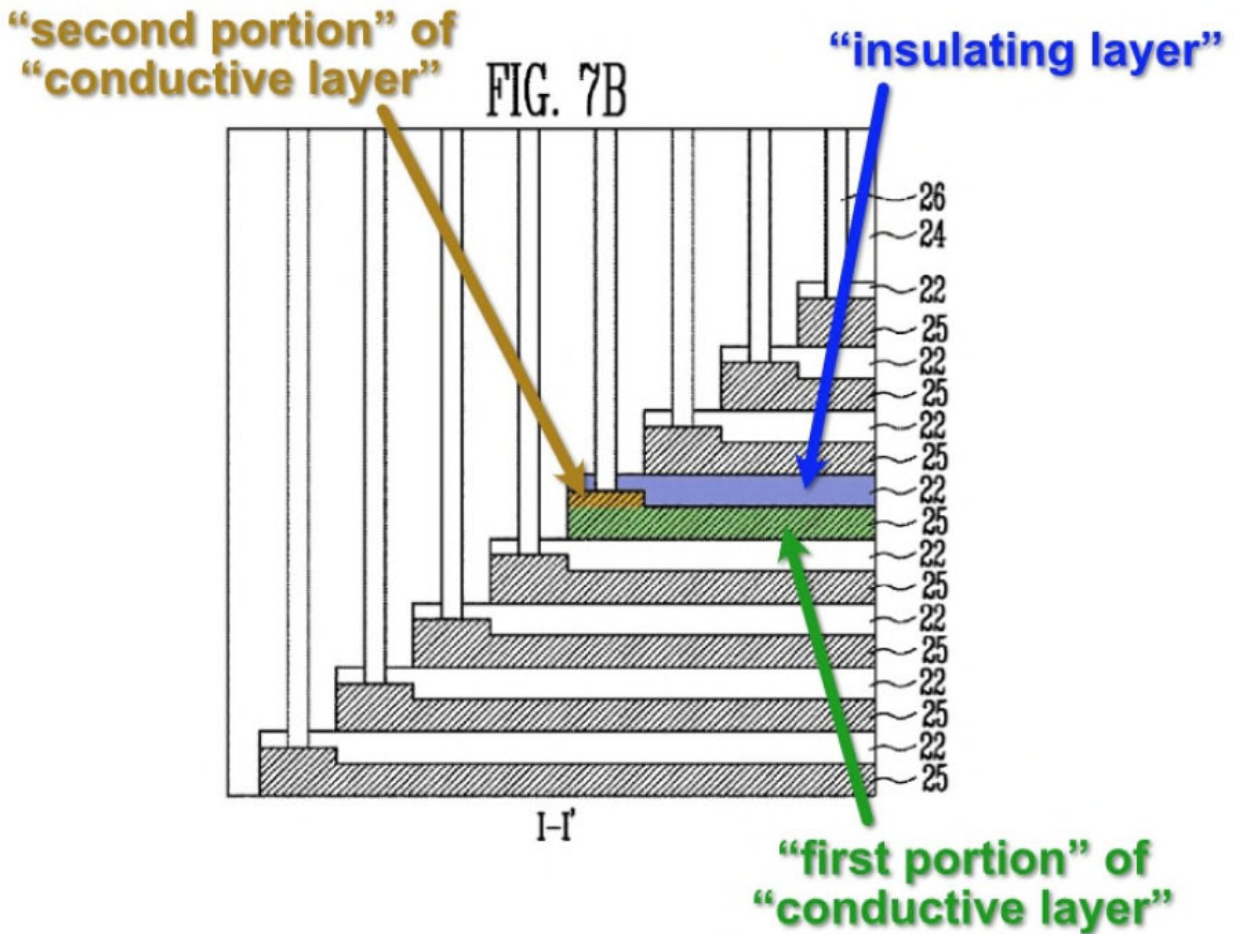
The Petition's unexplained, arbitrary, inconsistent, and hindsight-driven positions do not establish that Nam discloses or renders obvious both a "curved

side surface in contact with a side surface of the insulating layer” and “a second portion of the insulating layer of the adjacent layer stack is laterally displaced from the conductive layer of the layer stack” as required.

V. Ground 3: Petitioner Failed to Demonstrate that Lee in View of Park Renders Claim 19 Obvious

A. Lee In View Of Park Does Not Render Obvious a “curved side surface in contact with a side surface of the insulating layer”

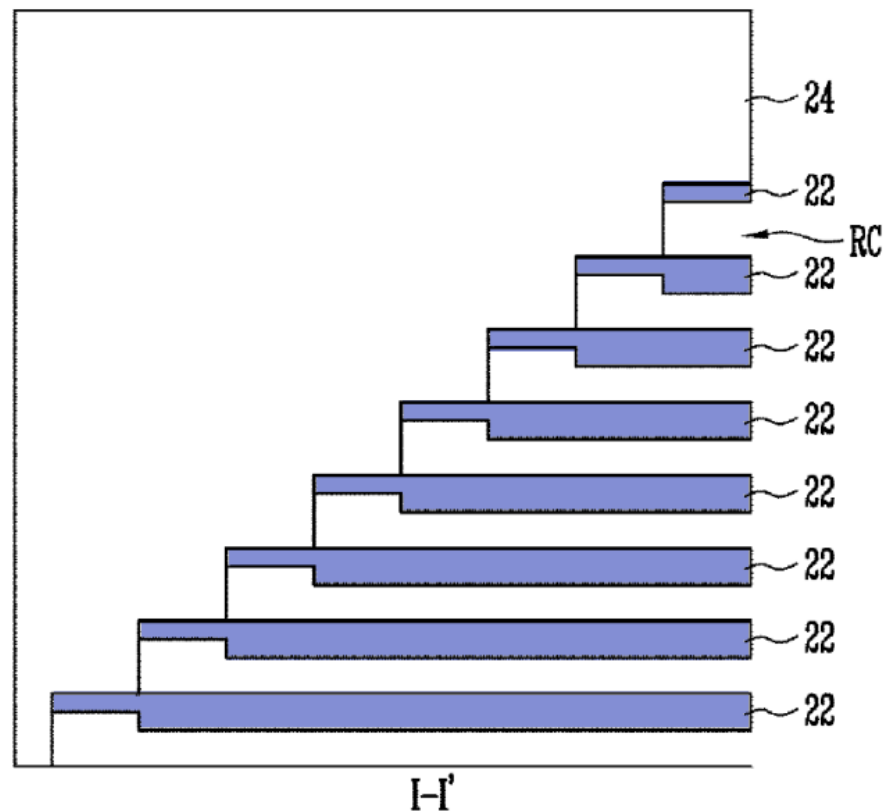
For Ground 3, the Petition combines Lee with Park. Specifically, Petitioner asserts that it would have been obvious to take Lee’s pad portions PAD “having straight sides,” and make those sides “‘curved’ in view of Park’s teachings.” Pet. 82. According to the Petition and its expert, each of the blue “insulating layers” 22 are “an oxide layer.” Ex.1003 ¶391.



Pet. 78 (annotations in Petition). Petitioner’s expert states that, in the combination, “the process shown in Figures 3B, 4B, and 5B of Lee could still be followed,” resulting “in the same-shaped openings shown in Figure 5B of Lee.” Ex.1003

¶411. Figure 5B of Lee is depicted below showing the remaining oxide insulating layers 22 annotated in blue and the “openings” in white between the blue insulating layers.

FIG. 5B



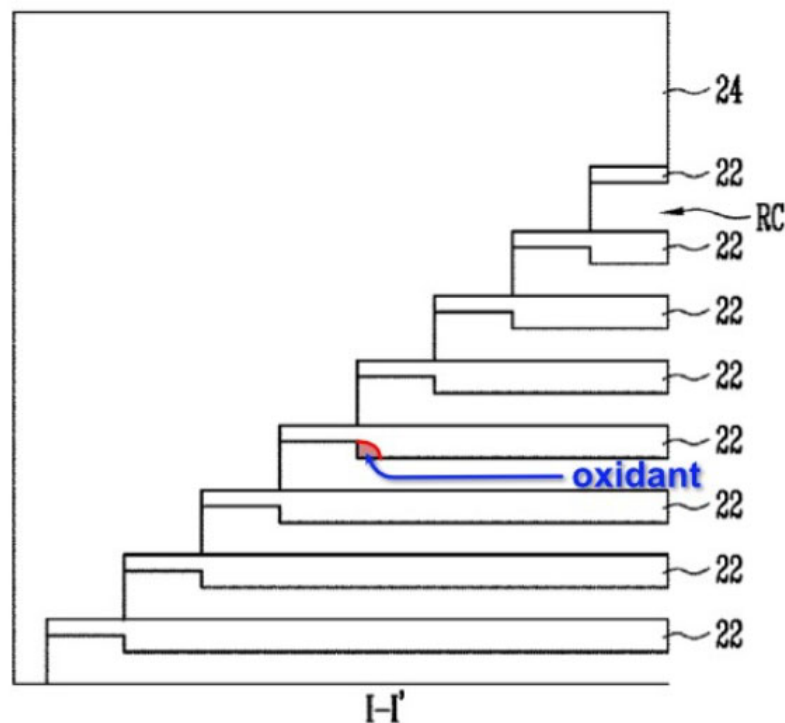
Lee at Fig. 5B (annotated); Giapis ¶¶89. Petitioner's expert asserts, "[t]hen, to achieve a rounded rather than straight sided contact pad, *oxidant* would be introduced into the openings." Ex.1003 ¶411 (emphasis added).

In other words, Petitioner's expert asserts that a POSITA would start with oxide-based insulating layer 22, introduce an oxidant gas into the adjacent openings, and then oxidize an already oxide-based surface to form a curved surface. That is technically infeasible. Adding oxidant as in Park will not promote further oxidation nor change the shape of the existing oxide. Giapis ¶¶90-91.

Nor does Park suggest this nonsensical approach. Park does not attempt to oxidize an oxide layer as the Petition proposes. Instead, Park oxidizes the sacrificial layers, which are “silicon nitride” or “polysilicon,” to form “an additional insulating layer 66.” Park at 11:67-12:23; Giapis ¶¶91. Thus, the approach taken in Park is not combinable with Lee in the way suggested by the Petition and its expert. Giapis ¶¶91. Petitioner ignores this technical glitch and provides no explanation as to how or why a POSITA would have been motivated to oxidize an oxide layer. Nor does Petitioner explain why a POSITA would have had a reasonable expectation of success in doing so. Giapis ¶¶91.

Compounding his first error, Petitioner's expert cites the below modified Lee Figure 5B, and asserts that a rounded corner (red) would be formed. Ex.1003 ¶412.

FIG. 5B



Ex.1003 ¶413 (annotations in Ex.1003). But Petitioner's expert inexplicably refers to this as an "exterior corner." Ex.1003 ¶¶412-413. The identified corner is plainly *within* Park's solid oxide-based insulating layer 22 and is not an "exterior corner." Giapis ¶¶92-93. Not only would introducing an oxidant to an oxide layer not lead to oxide growth, it certainly would not lead to the rounding depicted *inside* already-existing solid oxide material. Giapis ¶¶93-94.

Thus, the Petition fails to establish that a POSITA would have been motivated to combine Lee with Park's teachings as asserted. And because the Petition fails to demonstrate that the combination of oxidizing an oxide could even be done, a POSITA would have had no expectation of success in combining the

methods as proposed. *See, e.g., Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360-61 (Fed. Cir. 2017) (“[W]here a party argues a skilled artisan would have been motivated to combine references, it **must** show the artisan would have had a reasonable expectation of success from doing so.” (emphasis added) (citation and internal quotations omitted)).

The Petition fails to show claim 19 would have been obvious over Lee in view of Park.

VI. The Board should exercise its discretion and deny institution under 35 U.S.C. § 314

Institution of an IPR is always discretionary. 35 U.S.C. § 314(a). Here, the Board should exercise its discretion to deny institution because the Petition will not serve as an effective and efficient alternative to litigation. Rather, the overall balance of the *Fintiv* factors shows that “efficiency, fairness, and the merits support the exercise of authority to deny institution.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (Mar. 20, 2020) (precedential).

A. Factor 1 favors denial if the district court denies Petitioner's motion to stay and lifts the temporary stay before institution

The Court has temporarily stayed the Parallel Proceeding³ while it considers Petitioner's motion for a stay pending IPRs. Ex.2001; Ex.2003. The Parallel Proceeding involves 70 asserted claims from 19 patents. Ex.2002 at 006. Of those, the Board has only instituted IPRs against 23 claims from 8 patents. Ex.2002 at 006. And 11 claims from one patent have had IPR institution denied across the board. *Id.*; see, e.g., *Entangled Media, LLC v. Dropbox Inc.*, 732 F. Supp. 3d 1120, 1124 (N.D. Cal. 2024) (characterizing arguments about simplification as “premature” “[b]ecause the PTO has not yet instituted proceedings,” and denying motion to stay); *Skillz Platform Inc. v. Aviagames Inc.*, No. 21-cv-02436-BLF, 2022 WL 1189882, at *3–4, *5 (N.D. Cal. Apr. 21, 2022) (denying motion to stay, stating that any simplification from IPRs “is purely speculative at this stage,” and “the cost of non-institution would be delay without benefit”).

³ *Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc.*, Case No. 3:23-cv-05792-RFL (N.D. Cal.).

It is not clear how long the temporary stay will remain in effect.⁴ However, if the district court denies Petitioner's stay motion and lifts the temporary stay, Factor 1 would favor denial. *Inergy Tech., Inc. v. Force MOS Tech. Co.*, IPR2024-00094, Paper 9 at 32 (May 21, 2024) (denial of stay motion favors discretionary denial of IPR petition); *see also Fintiv*, Paper 11 at 7-8 (similar).

For these reasons, this factor favors discretionary denial of institution.

B. Factor 2 is neutral because the trial date is three days after Final Written Decision

Trial is set to begin in the Parallel Proceeding on June 15, 2026.⁵ Ex.1019 at 002. That is three days after the statutory deadline for a Final Written Decision in this case (June 12, 2026). And it is *well before* the expected Final Written Decisions that would issue in *eight* other proceedings filed by Micron against patents at issue in the Parallel Proceeding. *See* IPR2025-00190, -00191, -00228, -

⁴ YMTC reserves its rights to address changes in the district court proceeding as they relate to discretionary denial in future briefs.

⁵ Petitioner's assertion of a 48.9-month median time to trial (Pet. 12 (citing Ex.1020) misleadingly includes non-jury trials, which have a significantly longer time-to-trial. *See* Ex.2004 at 003. The corresponding number for jury trials is 32.8 months. Ex.2004 at 003.

00229, -00244, -00245, -00294, and PGR2025-00021. This factor therefore favors denial of institution, or is at worst neutral. *Fintiv*, IPR2020-00019, Paper 11 at 9 (“If the court’s trial date is at or around the same time as the projected statutory deadline, ... the decision whether to institute will likely implicate other factors”); *Catalyst Orthoscience Inc. v. Shoulder Innovations, Inc.*, PGR2024-00042, Paper 17 at 12-14 (Dec. 19, 2024) (finding Factor 2 neutral where scheduled trial was “just weeks” after the scheduled conclusion of the PGR). A Final Written Decision here would issue after expert discovery, after dispositive motions, and after the pretrial conference. Ex.1019 at 002.

C. Factor 3 favors denial because substantial effort will have been expended by the deadline for institution

The parties have expended, and continue to expend, substantial resources into the Parallel Proceeding. In that case, the parties have collectively propounded, responded to, and supplemented responses to 38 interrogatories and 117 requests for production. The parties have already produced over 113,000 pages of documents and are continuing to produce thousands more pages of documents. Ex.2002 at 012. They have also engaged in extensive source code discovery, which has involved 14 days of YMTC expert and/or attorney review of code in this District and, more recently, three weeks and counting of code review at Micron’s headquarters in Boise, ID. Ex.2002 at 012. And upon order of the Court, YMTC

has narrowed its claims of infringement to 70 asserted claims, which has required extensive analysis of infringement, validity, and damages issues. Ex.2002 at 012.

The parties have also devoted, and continue to devote, substantial effort to claim construction, including exchanging claim terms and proposed constructions and filing a Joint Claim Construction and Prehearing Statement. The parties have also exchanged expert declarations in connection with claim construction and conducted two claim construction expert depositions.

Petitioner's assertion that the parties and district court have invested "very little" in the Parallel Proceeding is both wrong and, at the time of this filing and the institution decision, outdated. Pet. 12. Petitioner does not even address the substantial effort invested in the Parallel Proceeding in the more than 7 months between filing and the Board's institution decision. Because the parties and the Court will expend significant effort in the parallel litigation *before institution*, this factor favors discretionary denial of institution. *See, e.g., Comcast Cable Commc'ns, LLC v. Touchstream Techs., Inc.*, IPR2024-00323, Paper 13 at 9-10, 2024 WL 3530021, at *4 ("Factor 3 favor[ed] denial" where "substantial work on claim construction [had] happened," and "the related district court litigation ha[d] progressed in other aspects as well," including with respect to contentions); *10x Genomics, Inc. v. President & Fellows of Harvard Coll.*, IPR2023-01299, Paper 15 at 18, 2024 WL 993828, at *8 (similar, noting that the parties had exchanged

contentions, “completed claim construction briefing,” and that the “district court ha[d] also considered two motions to dismiss and presided over several discovery disputes”); *Boe Tech. Grp. Co. v. Element Cap. Com. Co. Pte. Ltd.*, IPR2023-00808, Paper 9 at 23, 2023 WL 7715885, at *8 (finding “the parties and the District Court ha[d] invested substantial resources in th[e] litigation” because, among other things, “[s]ignificant discovery ha[d] been completed, including the exchange of infringement and invalidity contentions, document requests and interrogatories, and proposed claim terms for construction”).

D. Factor 4 favors denial because there is significant overlap between the issues raised in the Petition and the district court proceeding

Petitioner Micron has served invalidity contentions identifying the same art from its Petition, and explicitly incorporating its IPR petition by reference.

Petitioner has also not filed a *Sotera*-type stipulation in this proceeding. *Cf. Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (Dec. 1, 2020)

(precedential). Although Petitioner stipulates in its Petition that “[s]hould the Board institute, Micron stipulates that it will not advance in District Court on any ground asserted in this Petition,” no such stipulation has been made in the district court. Pet. 13. Such a narrow stipulation runs the risk of significant overlap both in consideration of the same evidence and arguments framed as “different grounds” than the Petition. Because such a narrow stipulation risks having the district court address substantially the same evidence and arguments that the Board will have to

address should it institute an IPR, and on a similar timeline, an IPR of the '666 patent would be an inefficient use of the Board's resources and would risk conflicting decisions. *See 10x Genomics*, IPR2023-01299, Paper 15 at 20, 2024 WL 993828, at *9 (“[W]e agree with Patent Owner that the overlapping art and arguments presented in the parallel proceeding weigh in favor of exercising our discretion to deny institution.”) (footnote omitted); *see also Comcast*, IPR2024-00323, Paper 13 at 12, 2024 WL 3530021, at *5 (questioning whether a narrower stipulation “not to pursue in the District Court any ground that utilizes the same combination of prior art references relied upon in the instituted petition” adequately addressed “concerns of inefficiency and the possibility of conflicting decisions”).

E. Factor 5 favors denial because Micron is the defendant in the district court proceeding

Petitioner is the defendant and counterclaimant in the parallel district court case and, as such, will have a full and fair opportunity to litigate its (overlapping) invalidity contentions in that forum. Thus, this factor favors discretionary denial. *Comcast*, IPR2024-00323, Paper 13 at 13, 2024 WL 3530021, at *5 (“Petitioner is the defendant in the related district court case.... We find that this factor favors denial.”) (citations omitted); *Boe Tech.*, IPR2023-00808, Paper 9 at 24-27, 2023 WL 7715885, at *9.

F. Factor 6: The limited resources of the Board favors denial.

“The sixth *Fintiv* factor takes into account other circumstances that may bear on the decision to exercise discretion to deny, such as the merits of the patentability challenges.” *Comcast*, IPR2024-00323, Paper 13 at 13, 2024 WL 3530021, at *5 (citation omitted). For the reasons explained in Sections III-V, above, the Petition fails on the merits for numerous reasons and thus does not present a “particularly strong” showing that can tip the scales in favor of institution. *Fintiv*, IPR2020-00019, Paper 11 at 14-15 (“[I]f the merits of a ground raised in the petition seem particularly strong on the preliminary record, this fact has favored institution.... [I]f the merits of the grounds raised in the petition are a closer call, then that fact has favored denying institution when other factors favoring denial are present.”) (citations omitted); *see also USPTO Rescinds Memorandum Addressing Discretionary Denial Procedures* (Feb. 28, 2025), available at <https://www.uspto.gov/about-us/news-updates/uspto-rescinds-memorandum-addressing-discretionary-denial-procedures> (compelling merits analysis no longer applicable).

As five of the six *Fintiv* factors favor discretionary denial of institution, and the remaining factor is, at worst, neutral, Patent Owner respectfully requests that the Board exercise its discretion to deny institution.

VII. Conclusion

For the reasons set forth above, the Board should deny the Petition for Inter Partes Review.

Respectfully submitted,

Dated: March 12, 2025

By: / Amit Makker /

Amit Makker (Reg. No. 68,086)
amit.makker@lw.com
Latham & Watkins LLP
505 Montgomery Street, Ste. 2000
San Francisco, CA 94111-6538
Telephone: 415.391.0600
Fax: 415.395.8095

*Counsel for Patent Owner
Yangtze Memory Technologies
Company, Ltd.*

CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

I hereby certify that this Patent Owner's Preliminary Response complies with the word count limitation of 37 C.F.R. § 42.24(b)(1) because the Patent Owner's Preliminary Response contains 6,408 words using Microsoft Word's counting feature, excluding the cover page, signature block, and the parts of the Patent Owner's Preliminary Response exempted by 37 C.F.R. § 42.24(b)(1).

By: / Amit Makker /

Amit Makker (Reg. No. 68,086)
amit.makker@lw.com
Latham & Watkins LLP
505 Montgomery Street, Ste. 2000
San Francisco, CA 94111-6538
Telephone: 415.391.0600
Fax: 415.395.8095

*Counsel for Patent Owner
Yangtze Memory Technologies
Company, Ltd.*

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 12th day of March, 2025, a true and correct copy of the foregoing **Patent Owner's Preliminary Response and all Exhibits** were served by electronic mail on Petitioner's lead and backup counsel at the following email addresses:

K. Patrick Herman
Orrick, Herrington & Sutcliffe LLP
51 West 52nd Street
New York, NY 10019
T: 212-506-5000
F: 212-506-5151
pherman@orrick.com
P52PTABDocket@orrick.com
PTABDocketJL2@orrick.com
PTABDocketJ3B3@orrick.com
micron-ymtc_ohs@orrick.com

Jeremy Jason Lang
Jared Bobrow
Orrick, Herrington & Sutcliffe LLP 1000 Marsh Road
Menlo Park, CA 94025-1015
T: 650-614-7400
F: 650-614-7401
jlang@orrick.com
jbobrow@orrick.com

By: / Amit Makker /

Amit Makker (Reg. No. 68,086)
amit.makker@lw.com
Latham & Watkins LLP
505 Montgomery Street, Ste. 2000
San Francisco, CA 94111-6538
Telephone: 415.391.0600
Fax: 415.395.8095

*Counsel for Patent Owner
Yangtze Memory Technologies
Company, Ltd.*