

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

CHIEN-MIN SUNG,
Patent Owner

Case: IPR2024-00534

U.S. Patent No. 9,138,862

PATENT OWNER'S PRELIMINARY RESPONSE

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U.S. Patent and Trademark Office
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TABLE OF EXHIBITS

Exhibit	Description
2001	Declaration of Dr. Ming-Yi Tsai
2002	M. Y. Tsai & Y. S. Liao (2009) Dressing Characteristics of Oriented Single Diamond on CMP Polyurethane Pad, Machining Science and Technology, 13:1, 92-105
2003	M. Y. Tsai et al., Novel Diamond Conditioner Dressing Characteristics of CMP Polishing Pad, International Journal of Machine Tools & Manufacture 49 (2009) 722–729
2004	Kuen-Ren Chen & Hong-Tsu Young, Estimation of Dressing Effects in Chemical Mechanical Polishing with Sorts of Diamond Dressers, Advanced Materials Research Online: 2009-06-24 ISSN: 1662-8985, Vols. 76-78, pp 175-180
2005	Hsiu-Ming Yeh & Kuo-Shen Chen, Development of a pad conditioning simulation module with a diamond dresser for CMP applications, Int J Adv Manuf Technol (2010) 50:1–12
2006	Statistics on stay motions relating to Inter Partes review proceedings in the Eastern District of Texas compiled from Docket Navigator

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Through the undersigned Counsel, Patent Owner Dr. Chien-Min Sung (“Dr. Sung,” “Patent Owner,” or “PO”) submits the following Patent Owner Preliminary Response pursuant to 37 C.F.R. § 42.107(a). *See also* 37 C.F.R. § 42.107(b).

I. INTRODUCTION

The *Inter Partes* Review Petition filed by SAMSUNG ELECTRONICS CO. LTD., SAMSUNG ELECTRONICS AMERICA, INC., SAMSUNG SEMICONDUCTOR, INC., and SAMSUNG AUSTIN SEMICONDUCTOR, LLC (“Samsung” or “Petitioner”) against U.S. Patent No. 9,138,862 (the “’862 patent”) should be denied for two reasons.

First, the Board should exercise its discretion under 35 U.S.C. § 314(a) to deny the Petition because the ’862 patent is asserted in a parallel district court proceeding between these parties which under the current schedule will have likely addressed the validity of the challenged claims over the same prior art reference cited in the Petition before the projected Final Written Decision (“FWD”) date in late September 2025. The district court proceeding is already at an advanced stage, with a Final Pretrial Conference set for September 3, 2025, and trial to follow shortly thereafter—*before* the projected date of the FWD in this proceeding. Instituting the present proceeding under these circumstances would be an inefficient use of the Board’s, parties’, and judicial resources. Institution would be highly likely to produce duplication of efforts and the potential for inconsistent results.

Second, even if the Board declines to exercise its discretion, the instant Petition should be denied because it fails to establish a reasonable likelihood that any of the challenged claims is unpatentable. More specifically, the Petition fails to establish that the primary reference, Sung’026 (Ex. 1004) discloses numerous elements recited in independent claim 1 (from which all the challenged claims depend) *as they are arranged in the recitation* and instead seeks to patch together an anticipating disclosure by improperly combining numerous distinct embodiments. To the extent Sung’026 discloses anything for certain dependent claims, it would not have enabled a POSITA to have practiced without undue experimentation what the ’862 patent requires experimentation. And Petitioner at no point attempts to fill these gaps with an explicit inherency rationale or by arguing obviousness (which is only argued for claim 1 to the extent that limitation [1C] advances an “obvious to try” rationale contradicting the POSITA’s understanding that pad dresser performance was known to be “unpredictable”).

In short, Ground I fails because Sung’026 does not disclose the only independent claim 1. This affects all grounds because the arguments advanced in Grounds II-VI assume that claim 1 is satisfied and do not even attempt to patch the gaps in Sung’026’s disclosure with the secondary references. For these reasons, the Petition should be denied on its merits even if the Board declines to exercise its discretion.

II. DISCRETIONARY FACTORS FAVOR DENYING INSTITUTION

The Board should exercise its discretion under § 314(a) and deny the Petition because institution of this proceeding would not be consistent with the objective of the AIA to “provide an effective and efficient alternative to district court litigation.” *NHK*, IPR2018-00752, Paper 8, at 20 (citing *Gen. Plastic Indus. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, at 16-17 (P.T.A.B. Sept. 6, 2017) (precedential)).

In keeping with the precedential decision in *NHK*, “a parallel proceeding in an advanced state implicates considerations of efficiency and fairness, which can serve as an independent reason to apply discretion to deny institution.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15, at 11 (P.T.A.B. May 13, 2020) (“*Fintiv II*”). Indeed, the Board held in *NHK* that the state of a parallel district court proceeding may be an additional factor (beyond those identified in *General Plastic*) favoring denial under § 314(a). IPR2018-00752, Paper 8, at 20.

But there is another proceeding between these same parties (Petitioners and Patent Owner) regarding the same ’862 patent: *Sung v. Samsung Elecs. Co.*, No. 4:23-cv-752-SDJ (E.D. Tex.) (filed Aug. 21, 2023). Pet. at 1. Claim construction briefing is well underway, with a *Markman* hearing scheduled for September 4, 2024, almost a month *before* the Board’s institution decision deadline.¹ (Ex. 1018

¹ The parties met and conferred regarding temporarily staying the district court litigation pending resolution of a MSJ of invalidity brought by a different defendant in a separate case, but no agreement was reached.

at 2.) Further, any trial in this proceeding is unlikely to conclude before the end of September 2025—almost a month after the final pretrial conference, and likely weeks after the district court trial. Ex. 1018 at 5. This timeline strongly favors denial of the Petition under *NHK* and *Fintiv I*.

The totality of these circumstances is contrary to the AIA’s goal of providing “an effective and efficient alternative to district court litigation.” See *NHK*, IPR2018-00752, Paper 8, at 20. Allowing this IPR to proceed in parallel with the district court proceeding would increase, not limit, the parties’ litigation costs.

A. *NHK* and Its Progeny

The circumstances here are the type that the Board has consistently found warranted denying institution under 35 U.S.C. § 314(a) and *NHK*.

In the precedential *NHK* decision, the Board exercised discretion under § 314(a) to deny a petition, on efficiency grounds, involving the same patent, the same parties, the same claim construction standard, and “the same prior art and arguments” as a district court proceeding set to begin trial approximately six months before the statutory deadline for a Final Written Decision (“FWD”). IPR2018-00752, Paper 8, at 20.

Since *NHK*, the Board has continued to exercise its discretion to deny institution in similar circumstances. For example, in *Supercell Oy v. GREE, Inc.*, in view of the advanced state of a parallel district court proceeding involving the same

parties, the Board denied institution of a petition that would be scheduled for trial before the Board on the same date, and also on the same schedule, as the district court proceeding. IPR2020-00310, Paper 13 (P.T.A.B. June 18, 2020). Similarly, in *Fintiv I*, the Board relied on *NHK*, denying institution where: (a) “[t]he same art” was presented in both proceedings; and (b) jury trial in the district court proceeding was set to begin “approximately two months before a final written decision would be due in [the Board] proceeding.” IPR2020-00019, Paper 15, at 7-17.

B. Analysis of the *Fintiv I* Factors Favors Denial

The facts surrounding the present Petition warrant exercise of the Board’s discretion to deny institution under § 314(a) for the same reasons as in *NHK* and its progeny. Indeed, each of the Board’s identified factors relating to “whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding” in line with *NHK*—supports denial here. *Fintiv I*, IPR2020-00019, Paper 11, at 6. A balancing of these factors demonstrates that efficiency and integrity of the AIA are best served by denying institution.

1. *Fintiv* Factor 1: No Stay Has Been Granted in the District Court Proceeding and No Evidence Exists that One May Be Granted If a Proceeding Is Instituted

This factor weighs in favor of discretionary denial because while a district court determines whether to grant a stay to resolve an IPR based on the facts of each

case, nothing here indicates that the district court would grant such a stay even if a proceeding were instituted. In fact, a stay is extremely unlikely.

Indeed, the courts in Eastern District of Texas “have uniformly denied motions for a stay” “when the PTAB has not yet acted on a petition for inter partes review.” *Trover Group, Inc. v. Dedicated Micros USA*, No. 2:13-cv-1047-WCB, 2015 U.S. Dist. LEXIS 29572, at *6 (E.D. Tex. Mar. 11, 2015) (Bryson, J.). The *Trover* ruling was further solidified in *AR Design Innovations LLC v. Ashley Furniture Indus.*, No. 4:20-CV-392, 2021 U.S. Dist. LEXIS 250577 (E.D. Tex. Jan. 11, 2021) (Jordan, J.) (denying as premature motions to stay patent cases before IPR institution). Since Judge Jordan assumed office on August 20, 2019, the Eastern District of Texas has granted 51 Motions to Stay Pending Inter Partes Review and denied 87, not counting those that were granted and denied in part, creating a greater-than 60% chance a stay would be denied. *See* Ex. 2006. As the district court litigation is in the Eastern District of Texas and before Judge Jordan (who decided *AR Design Innovations*), it is unlikely that any stay would be granted prior to institution.

As noted above, any decision from this Board regarding institution is due, under the current schedule in the parallel proceeding, after the claim construction hearing, just two months prior to the burden-of-proof expert report deadline, and less

than a year before trial. By that time, the late stage of the district court proceeding will even further weigh against a stay.

The first *Fintiv* factor thus favors discretionary denial.

2. *Fintiv* Factor 2: The Court’s Scheduled Trial Date Is Not After the Board’s Projected Statutory Deadline for a FWD

“If the court’s trial date is earlier than the projected statutory deadline, the Board generally has weighed this fact in favor of exercising authority to deny institution under *NHK*.” *Fintiv I*, IPR2020-00019, Paper 11, at 9. That applies here.

In the parallel proceeding, the Final Pretrial Conference is currently set for September 3, 2025, with trial expected to begin as soon as practicable thereafter. (Ex. 1018 at 5.) In other words, if the Board were to institute trial here, the district court trial is scheduled to conclude before, or contemporaneously with, the expected FWD in late September 2025.

As noted above, the Board has consistently denied institution in cases involving similar or smaller gaps between the trial date and the statutory deadline for a FWD. *See, e.g., E-One, Inc. v. Oshkosh Corp.*, IPR2019-00161, Paper 16, at 6-9 (P.T.A.B. May 15, 2019) (***one-month gap***); *ZTE USA Inc. v. Fractus SA*, IPR2018-01461, Paper 10, 16-17 (P.T.A.B. Feb. 28, 2019) (“substantially the same grounds” raised, claim construction issued, court “likely to go to trial before a final decision is reached”).

Petitioner concedes that Final Pretrial Conference is scheduled for September 3, 2025, but claims without support that the trial “is expected to occur” after the statutory deadline for the Board’s FWD. (Pet. at 76-77.) PO has no reason to believe that trial will be scheduled more than a month after the Final Pretrial Conference. In PO’s experience, trial in this venue usually occurs within 1-2 weeks of the final pretrial conference.

The second *Fintiv* factor thus favors discretionary denial.

3. *Fintiv* Factor 3: There Has Been Immense “Investment in the Parallel Proceedings by the Court and Parties”

This factor weights strongly in favor of denying institution because the parties and the district court here have already invested substantial resources in the parallel district court proceeding and will have invested even more by the institution deadline of September 28, 2024. Even beyond the extensive third-party discovery already obtained by both parties (with more incoming), the parties will have spent considerable time and resources in completing claim construction, with the opening claim construction brief filed on June 12, 2024, the responsive brief due on July 3, 2024, the reply brief due on July 17, 2024, the technology tutorial scheduled for July 31, 2024, and the *Markman* hearing scheduled for September 4, 2024. (Ex. 1018; Dkt. 64); The current schedule also provides that burden-of-proof expert reports are due on November 27, 2024, just two months after the institution deadline, with rebuttal expert reports due a month later on December 23, 2024.

Cisco Sys., Inc. v. Ramot at Tel Aviv Univ. Ltd., IPR2020-00122, Paper 15 (P.T.A.B. May 15, 2020), where the Board granted a discretionary denial in similar circumstances, is instructive. There, the Board found Factor 3 favored denying institution, noting that “at the time of this decision, the parties have spent months briefing the district court on the claim construction issues,” that “[t]he parties submitted claim construction charts and briefs,” a claim construction hearing was held prior to the institution decision date, and expert discovery was scheduled to be completed within two months of the institution decision deadline. *Id.* at 8-9.

At the instant institution deadline, claim construction briefing will likewise have been concluded for two months, with the *Markman* hearing scheduled to have occurred weeks prior. The current deadline for initial expert reports is also within two months of the institution deadline, with rebuttal expert reports due just a month later. The hefty investment that will occur before this Board decides whether or not to institute indicates that this district court parallel litigation will be in an advanced state and, thus, weighs against institution.

Petitioner contends that the parallel litigation is “in its early stages” and “the investment in it has been minimal” because the parties “have not exchanged preliminary positions on claim construction, and discovery has just begun.” Pet. at 77. But Petitioner knew that claim construction would well underway by the time this POPR was due, and complete long before the statutory institution deadline.

Petitioner acknowledges that the *Markman* hearing is scheduled for September 4, 2024 (Pet. at 77), but erroneously concluded that the statutory institution deadline would be beforehand. Instead, as noted above, the institution deadline is not until almost a month *after* the scheduled hearing date. Petitioner also knew that three additional months of discovery would pass from filing of the Petition to this POPR and three more to the statutory institution deadline. The parties are now entrenched in extensive discovery, incurring considerable expense.

As shown above, the parties have invested, and will continue to invest, substantial time and capital in the parallel proceeding prior to an institution decision. Petitioner's statements are unavailing, and this third *Fintiv* factor heavily favors discretionary denial.

4. *Fintiv* Factor 4: There Is “Overlap Between Issues Raised in the Petition and in the Parallel Proceedings”

Fintiv factor 4 favors discretionary denial because “the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding.” *Fintiv I*, IPR2020-00019, Paper 11 at 12. In the parallel proceeding, the invalidity contentions identify Sung’026 as prior art that purportedly invalidates the ’862 patent. Petitioner has the burden of proof for invalidity when serving its expert reports, currently due on November 27, 2024. *See* Ex. 1018. But Petitioner has not presented a meaningful *Sotera*-type stipulation and thus remains free to assert substantially the same grounds of invalidity alleged in the

Petition. Though Petitioner “stipulate[s]” that if instituted, it “will not pursue the same grounds in the district court litigation,” it does not disclaim pursuing invalidity using the *same references* or *substantially similar arguments*. Petitioners’ own cited case (*Sand Revolution II LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24) specifically cautions Patent Owners against Petitioner’s type of “stipulation” because IPR Petition grounds are very specific. *See id.*, at 7 & n.5. That case favors a stipulation stating that a petitioner “would not pursue any ground raised or that could have been reasonably raised in an IPR.” *Id.* It is telling that Petitioner knew that it could make such a meaningful stipulation but chose not to. Thus, it is reasonable to conclude that Petitioner will make the same or similar arguments in the district court litigation.

To that point, the Board has previously found that mere use of the same two references in a Petition and corresponding district court litigation favored discretionary denial, even though the grounds were not identical. *See Apple Inc. v. Maxell, Ltd.*, IPR2020-00203, Paper 12 at 14 (July 6, 2020) (“Although there may be some differences in the reasoning presented in the various obviousness grounds for combining the prior art teachings, we nevertheless find the assertion of Waldroup and Nakayama in both proceedings may result in duplication of work and create the potential for inconsistent decisions.”) So, even if Petitioner does not use the same grounds in the district court litigation as in the Petition, but uses the same references

for invalidity (which is likely given Petitioner's toothless stipulation), the likely duplication of work that would result favors discretionary denial.

There is also overlap between the claims challenged. In the district court, PO asserted infringement of independent claim 1 and claims 2-13, 15, and 17-20 of the '862 patent. (Dkt. 1.) In the instant Petition, Petitioners challenge those same claims. (Pet. at 1); *see Fintiv II*, IPR2020-00019, Paper 15, at 15 ("Thus, because the identical claims are challenged based on the same prior art in both the Petition and in the District Court, this factor weighs in favor of discretionary denial in this case."). Petitioners additionally challenge claims 14 and 16, but each depends from independent claim 1.

Because it is likely that the same claims, same references, and substantially similar arguments and evidence will be presented in the parallel district court proceeding as in the Petition, this fourth *Fintiv* factor favors discretionary denial.

5. *Fintiv* Factor 5: The Petitioner and the Defendant in the Parallel Proceeding Are the Same Party

This factor favors discretionary denial because the defendants in the parallel proceeding are the Petitioner here. *See Fintiv II*, IPR2020-00019, Paper 15 at 15. Because no unrelated third party is involved in either the IPR or the district court parallel litigation, adjudication in the district court proceeding will therefore resolve all claims between the parties. Thus, this factor favors denying institution.

6. *Fintiv* Factor 6: Petitioner’s Grounds Do Not Rise to the Level of “Compelling Evidence of Unpatentability”

Regarding this factor, as described in detail below there are substantial issues with Petitioner’s analysis of the challenged independent claim and, thus, even if the Board were to determine that Petitioner met the lower threshold for institution, the evidence does not rise to the “compelling” level. Petitioners also failed to present a meaningful *Sotera*-type stipulation barring pursuit in the parallel proceeding of the same grounds or any grounds that could have reasonably been raised before the Board. Therefore, Factor 6 weighs in favor of denial.

7. Conclusion: The *Fintiv* Factors Favor Denying Institution

As the Board has explained, an objective of the AIA is to provide “an effective and efficient alternative to district court litigation.” *NHK*, IPR2018- 00752, Paper 8, at 20. Here, no such “effective and efficient” alternative is needed in view of the district court’s just and speedy adjudication of the same issue, so there is no need for the Board to unnecessarily duplicate those district court’s efforts at the expense of the Board’s time and resources—which are appropriately and best applied elsewhere. *Id.* Because all six *Fintiv* factors favor denial, the Board should deny institution under § 314(a).

III. CLAIM CONSTRUCTION

Petitioner identifies seven terms for construction. For purposes of this Preliminary Response only, PO adopts Petitioner’s proposed claim constructions.

Patent Owner reserves the right to propose alternative constructions of these and other terms should inter partes review be instituted.

IV. PERSON OF ORDINARY SKILL IN THE ART

For the purposes of this Preliminary Response, PO does not contest the definition of POSITA provided by Petitioner and its expert Dr. Stanley Shanfield. Pet. at 22; Ex. 1002 at ¶¶ 60-62. However, should trial be instituted, PO contends that Dr. Shanfield is not qualified as a POSITA.

V. LEGAL STANDARDS

“In an inter partes review, the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. §316(e), and that burden never shifts to the patentee.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375 (Fed. Cir. 2016). Specifically, the Petition must “identif[y] in writing *and with particularity*, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim.”² 35 U.S.C. § 312(a)(3); *see also Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (“[i]t is of the utmost importance that petitioners . . . adhere to the requirement that the initial petition identify ‘with particularity’ the ‘evidence that supports the grounds for the challenge to each claim.’”). An IPR cannot be instituted unless “there is a reasonable

² Emphases added in this Preliminary Response unless otherwise indicated.

likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a).

The Board must make its institution determination based on what the Petition *actually presents*, not what it could have reasonably contained had it been reformulated. *Magnum Oil*, 829 F.3d at 1381 (the Board is *not* “free to adopt arguments on behalf of petitioners that could have been, but were not, raised by the petitioner during [a post-grant proceeding]”). The Board cannot “deviate from the grounds in the petition and raise its own” theories of invalidity. *Sirona Dental Sys. GmbH v. Institut Straumann AG*, 892 F.3d 1349, 1356 (Fed. Cir. 2018).

Petitioner raises grounds based on 35 U.S.C. §§ 102 and 103. For anticipation under 35 U.S.C. § 102, a reference must “disclose[] within the four corners of the document . . . all of the limitations claimed,” and that disclosure must be “arranged or combined in the same way as recited in the claim.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). Nor may Petitioner combine different embodiments in a single prior art or supplement missing limitations—no matter how minor—in proving anticipation. *See id.* Moreover, to be anticipating, the reference must also enable “a [POSITA] [to] make or use the invention without undue experimentation based on the disclosure *of that particular document*.” *In re Morsa*, 713 F.3d 104, 110 (Fed. Cir. 2013) (emphasis in original). Anticipation can also be established via inherency, which requires showing that the allegedly anticipatory

feature is consistent, *necessary*, and inevitable, not simply possible or probable—and it should be clear that it would be so recognized by persons of ordinary skill. *Atofina v. Great Lakes Chemical Corp.*, 441 F.3d 991, 1000 (Fed. Cir. 2006); *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). Inherency “may not be established by probabilities or possibilities,” and “the mere fact that a certain thing *may* result from a given set of circumstances is not sufficient” to show inherency. *Id.* at 745.

To prevail on obviousness under 35 U.S.C. § 103, Petitioner must use “record evidence” to demonstrate that the claimed “features . . . were known prior art elements.” *K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365 (Fed. Cir. 2014). “[W]hile ‘common sense’ can be invoked, even potentially to supply a limitation missing from the prior art, it must still be supported by evidence and a reasoned explanation.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1363 (Fed. Cir. 2016). “Obviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim.” *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “Rather, obviousness requires the additional showing that a [POSITA] at the time of the invention would have selected and combined those prior art elements in the normal courses of research and development to yield the claimed invention.” *Id.* Petitioner must also demonstrate “that a skilled artisan would have been motivated to combine

the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.” *Intelligent Bio-Sys.*, 821 F.3d at 1367-68. These additional requirements cannot be met by “conclusory statements”—“there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see KSR Int’l. Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

VI. BACKGROUND OF CMP PAD DRESSER DEVELOPMENT

A. Conventional CMP Pad Dressers Circa 2007

Circa 2007, conventional diamond pad conditioners were unable to produce micron-sized asperities at high density because the tips of the diamond grits could not be leveled to the same height. Ex. 1005, 1:4-6. The variation in tip height distribution was “intrinsically large (50-100 microns),” which made “the cutting depth of the pad var[y] significantly.” *Id.*, 1:23-24.

At this time, it was thought that controlling the tip heights of the diamond grits *during manufacturing* of the CMP pad dresser would result in none of the diamond grits being overly stressed and “all diamond grits . . . sharing the dressing work” during use. *See id.*, 1:11-13. While this assumption would later turn out to be incomplete, if not inaccurate, it was the understanding at the time of how CMP pad dressers operated in practice. Ex. 2001 ¶¶ 19-21.

B. Sung'026 and Sung ICPT

Reflecting that then-prevailing understanding of the ability to control the heights of the diamond grit to a certain degree and its effect, *see id.*, Sung'026 published on March 15, 2007, though it never issued as a patent. Ex. 1004 at 1. It addressed “issues with properly holding very small superabrasive particles” in the CMP pad dresser. *Id.* [0007]; *see also* [0006] (“the superabrasive particles are so small that a traditional metal matrix is often unsuitable for holding and retaining them”), [0007] (even known polymeric resins “typically [we]re not able to retain superabrasive particles to a degree that [wa]s sufficient for CMP pad dressing”).

To improve “the retention of a superabrasive particle in an organic material layer,” Sung'026 taught “rearranging the superabrasive particles in the organic material layer such that mechanical stress impinging on any individual superabrasive particle is minimized.” Ex. 1004, [0050]; *see* [0051] (providing “a method of improving retention of superabrasive particles . . . in an arrangement that minimizes mechanical stress”). Sung'026 explained that “[b]y reducing the stress impinging on each individual superabrasive particle they can be more readily retained in a solidified organic material layer, particularly for delicate tasks.” *Id.* [0050].

In short, Sung'026 disclosed CMP pad dressers with certain features formed in certain ways that were thought to minimize mechanical stress on the superabrasive particles based on the assumption that the bulk of the superabrasive particles

performed cutting and thus substantially equally shared substantially all of the mechanical stresses during actual use. Ex. 2001 ¶¶ 19-21. It provided “[v]arious configurations or arrangements . . . for minimizing the mechanical stress impinging on the superabrasive particles held in the abrading tool. One potentially useful parameter may include the height that the superabrasive particles protrude above the organic material layer.” Ex. 1004, [0052].

Sung’026 expressly recognized that “there may be some height deviation between superabrasive particles that occur due to limitations inherent in the manufacturing process.” *Id.* [0053]. Even if “it is intended that the plurality of superabrasive particles be arranged according to the designated profile, a small amount of deviation therefrom may be likely,” in an unquantified amount. *See id.* [0011]. Thus, “some level of deviation may occur” from the intended alignment of the tips of the superabrasive particles with the designated profile.” *Id.* [0056].

But Sung’026 neither identified the level of deviation that was likely to occur, nor taught nothing anything about how any of its various disclosed dresser designs would operate in practice. It likewise did not explain how reducing particle tip height variation (or any particular variation in range in particle tip height) correlated to performance in dressing CMP pads.³ It simply assumed that reducing particle tip

³ Sung’026 noted only that the particle tip height variation of over 50 microns in traditional pad dressers was unsuitable to dress a CMP pad and achieve a uniform asperity depth of less than 20 microns. Ex. 1004, [0006].

variation post-manufacturing would result in superior performance in operation, consistent with the prevailing thinking about how dressers actually functioned. *See* Ex. 2001 ¶ 19.

To the extent Sung’026 discussed various ranges of cutting depths that could be produced from the superabrasive particles protruding to a predetermined height above the organic matrix (Ex. 1004 [0010], [0052]), it did not disclose the sets of heights or profiles that would, without undue experimentation, produce those disclosed results in use. Ex. 1004 at, *e.g.*, [0010], [0076]; *see* Ex. 2001 ¶¶ 22, 25-20. Likewise, Sung’026 never provided any description of the particular superabrasive particles that would actually cut asperities in the CMP pad during conditioning, nor taught any way that such particles would (or could) be identified. Ex. 2001 ¶ 31.

Around the same time, Dr. Sung discovered that CMP pad dressers using an organic matrix in a “reverse casting” process to hold pre-leveled diamond tips could reduce their height variation to within 20 microns. *See* Ex. 1005 at 1:30-2:3. Consistent with the prevailing (but inaccurate and incomplete) understanding of how CMP pad dressers operated at that time, Dr. Sung concluded that this level of controlling tip height variation manufacturing would result in “all diamond grits sharing the dressing work” and would produce a “number of working grits . . .

significantly higher than conventional designs.” Ex. 1005 at 1:12-14, 6:20 (“ODD has much higher count of working crystals”).

C. Subsequent Understanding of CMP Pad Dressers in Usage

But the assumption that the as-manufactured distribution of diamond grits corresponded to performance in usage conditions, when pressed against the CMP pad, turned out to be incomplete, if not inaccurate. Ex. 2001 ¶¶ 19-21, 25-31.

Even as of 2009, it was recognized that because “the tips of diamond grits are not at the same height” and they “differ in shape and can be oriented differently,” “the dressing behaviors of polishing pads are unpredictable.” Ex. 2002 at 3-4; *see* Ex. 2001 ¶¶ 19-21, 25-31; Ex. 2003 at 1 (“diamond grits have various shapes and orientations and so their dressing behaviors are unpredictable”). It was not until that time that the dressing behavior of even a single diamond was characterized under particular conditions. *See generally* Ex. 2002.

Similarly, as of 2009, Sung’026’s assumptions that the mechanical stress was substantially equally distributed among the bulk of the superabrasive particles remained an “inference [that] still need[s] to be experimentally verified.” Ex. 2004 at 5. It turned out to be incorrect. Ex. 2001 ¶¶ 19-21, 25-31.

As of 2010, most of the studies on pad dressings were experimental investigations. Ex. 2005 at 2. Even a cutting-edge simulation module for a diamond dresser for CMP conditioning developed in 2010 still took a “bulk view” of the

superabrasive particles that only considered the “the effective radius and the distributed density of the diamond grits.” *Id.* It assumed a uniform distribution of superabrasive particles on the dresser based on a study concluding that “the patterns of diamond grits have no significant influence on the final dressing results.” *Id.* at 5. It did not consider parameters like the orientation, protrusion depth, and height variation among the superabrasive particles. *See id.*; Ex. 2001 at ¶¶ 21-22.

Even circa 2011, what was then considered “a conventional diamond pad conditioner” still had “large variation in the height of the tips of the diamond grits on the” dresser. Ex. 1014 at 3, 6. But by then, it was finally beginning to be recognized that as a result of that height variation, “many diamond grits did not contribute to cutting,” and instead, most diamond grits in contact with the CMP pad merely deformed the dirty pad by pushing debris around. *See id.*; Ex. 2001 at ¶¶ 29-31.

Actually controlling the height variation of the superabrasive particles to the extent that more than just a handful of them were able to cut the CMP pad during usage remained elusive, and was not practically achievable. Ex. 2001 ¶¶ 22-26. Only shortly before the invention of the ’862 patent was it recognized that understanding how particular CMP pad dresser designs worked in practice required post-use analysis of the dresser itself. *See* Ex. 1015 at 1 (“Estimation of the depth of penetration of working diamonds, from used disk analyses, allows meaningful

topographic assessments of alternative conditioner designs and predictions of relative performance”), 3, 4 (“The fine-finish disk design improvements were validated by polishing experiments” that compared the two designs in actual usage conditions), 7 (concluding that “[p]ost-use examination of conditioners provides information regarding the depth-of-penetration (DOP) of the working diamonds into the pad”); Ex. 2001 ¶¶ 26-27. In other words, the height variation of the grit as designed, or even as manufactured, did not predictably correlate with how it actually operated. *Id.* ¶¶ 27-29.

D. The Context of the ’862 Patent

It was from this revised understanding of how CMP pad dressers operated in practice that the ’862 patent arose:

[T]he present disclosure concerns CMP pad dressers having superabrasive particles with substantially leveled tips. ***Traditional CMP pad dresser manufacturing methods, even many of those describing techniques for leveling superabrasive particle tips prior to fixation, generally contain significant variation in tip height across the surface of the dresser.*** Often, the superabrasive particles are affixed to the CMP pad dresser support in a manner that disrupts any leveling that has occurred. For example, fixation techniques that utilize high heat and/or pressure can cause warping of the dresser support as the dresser cools. Thus, unless steps are taken to avoid such warpage, superabrasive particles are not maintained in their leveled state following cooling of the dresser.

Ex. 1001, 6:67-7:13. The ’862 patent likewise reflected the updated understanding of a POSITA that “only a small percentage of superabrasive particles in a typical CMP pad dresser are positioned so as to penetrate or cut into a CMP pad.”

Id., 7:18-23. It elaborated that “a typical CMP pad dresser can have greater than 10,000 superabrasive particles. Of these 10,000 particles, in some cases there may only be a few working superabrasive particles that are actually able to cut the CMP pad. Additionally, out of these few working superabrasive particles, there may be a smaller proportion of overly-aggressive superabrasive particles that cut over 50% of the entire pad that is consumed during conditioning, and in some cases can remove more than 25% of the total pad material.” Ex. 1001 at 8:6-13; *see* Ex. 2001 ¶¶ 29-30. It was thus the few tallest diamond grits on the diamond disk that determined the overall effectiveness of CMP pad conditioning. *Ibid.*

But rather than try to eliminate the outliers to share the workload, as prior art solutions including Sung’026 taught, the ’862 patent focused on bounding and characterizing the protrusion among and variance in the outlying superabrasive particles that actually performed the work. *See* Ex. 2001 at ¶¶ 29-30.

To that end, the ’862 patent explains that the extent of the leveling of the tips of the superabrasive particles “allows differing amounts of superabrasive particles to actually cut asperities into the pad.” Ex. 1001, 10:11-13; *see* 10:13-21. One disclosed (and claimed) embodiment involves a 60-micron *maximum* cutting depth along with the height variation that produces it: the highest and second-highest protruding tips differing by ~10mm (or less), and the 10 highest protruding tips being within ~20mm (or less) of each other. *Id.*, 12:13-26. This reflects (and results from)

the revised understanding that the performance of a CMP dresser is determined primarily by the outliers in protrusion, and not by the evenness of the bulk material. *See* Ex. 2001 ¶¶ 19-21, 28-30.

In other words, the inventions recited in the '862 patent were provided in the context of a POSITA's updated understanding that the manufacturing profile of the diamond tips of a pad dresser did not readily correlate with its performance in actual usage, and that in fact, the overwhelming majority of superabrasive particles did not work at all in dressing the CMP pad. The assumptions underlying Sung'026 and SungICPT—that relatively low height deviations among the diamond tips in manufacturing would result in shared work across the overwhelming majority of the diamond grit because the bulk of the diamond grits were involved in pad dressing—would not have been applied by a POSITA in contravention of what the '862 patent expressly taught to the contrary. *See* Ex. 2001 ¶¶ 29-30.

VII. RESPONSE TO PETITIONER'S SPECIFIC GROUNDS FOR CHALLENGE

A. Ground I: Sung'026 Neither Anticipates nor Renders Obvious Claims 1-6, 9-12, and 20

As explained below, Sung'026 neither anticipates nor renders obvious claim 1 because Petitioner has failed to show that numerous limitations of claim 1 are disclosed in Sung'026. Dependent claims 2-6, 9-12, and 20 are neither anticipated

nor rendered obvious by Sung’026 at least because they all depend from independent claim 1, which is neither anticipated nor rendered obvious.

1. Independent Claim 1

a) Sung’026 does not disclose [1Pre] A method of conditioning a CMP pad, comprising

Absent from the Petition is any argument that [1Pre] is inherently disclosed in Sung’026. *See* Pet. at 25-26. Nor does Petitioner contend that [1Pre] is obvious in view of Sung’026. *See id.* All that remains is express anticipation; Petitioner thus contends that Sung’026 “discloses [1Pre].” *Id.* But it does not.

All that Petitioner identifies in support from the disclosure of Sung’026 is a the very first sentence in the Summary of the Invention section characterizing the disclosure as providing “superabrasive tools and methods that *are . . . suitable* to groom the CMP pads used for the delicate polishing operations *as recited above.*^[4]” *See id.* (citing Ex. 1004 at [0009]). But those polishing operations simply described, at a high level, well-known prior art CMP pad conditioning. *See* Ex. 1004 [0002], [0004]-[0006], To illustrate, Petitioner cites to [0004], which explains that generic *prior art* pad dressers “can be used” to condition a CMP pad. Pet. at 26. No more was identified to support the asserted disclosure.

⁴ Petitioner truncates this quotation, omitting the underlined portion without any indication.

Even if Sung’026 disclosed a pad dresser “*suitable to* groom the CMP pads” in known ways, that is at most a statement of intended use; it does not disclose any of the dressers taught by Sung’026 actually being used for CMP pad conditioning. But actual use (and not mere suitability) is what [1Pre] recites, and so that is what anticipation requires. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). Thus, the disclosure that Petitioner has identified—a pad dresser that is merely “suitable to” be used to perform prior art methods of pad conditioning—because it combines an embodiment of the invention with the background of the prior art it is not “arranged or combined in the same way as recited in the claim” as anticipation requires. *Id.*

Thus, Petitioner has failed to show that Sung’026 discloses [1Pre], which is limiting, because Petitioner has failed to show any disclosed dresser being used.

b) Sung’026 does not disclose [1A] pressing a CMP pad dresser against a CMP pad,

Limitation [1A] expressly requires pressing the CMP pad dresser against a CMP pad. Absent from the Petition is any argument that [1A] is inherently disclosed in Sung’026. *See* Pet. at 26-29. Nor does Petitioner contend that [1A] is obvious in view of Sung’026. *See id.* All that remains is express anticipation, and so Petitioner contends that Sung’026 “discloses limitation [1A].” *Id.* at 26. But it does not.

As discussed above for [1Pre], Sung’026 does not disclose a method of conditioning a CMP pad. Because it discloses no such method, it likewise does not

disclose any steps of such method. That especially applies to any such “pressing a CMP pad dresser against a CMP pad,” which is absent from the support identified in the Petition.

The citations to Sung’026 (Pet. at 27-28) support only that the CMP pad dresser and CMP pad are in contact. Petitioner relies upon portions of Sung ’026 stating that: (a) *prior art* CMP pad dressers are used to revive the pad surface by combing it or cutting it;⁵ and (b) “the superabrasive particles experience ‘mechanical stress’ during abrasion of the work piece and proposes ways to distribute ‘frictional forces’ across substantially each superabrasive particle to improve particle retention.” Pet. at 27. Nothing more is offered to support the argument that Sung’026 discloses limitation [1A]. But [1A] *does not* broadly encompass any sort of contact between a CMP pad dresser and a CMP pad as Petitioner’s citations imply.

While these cited portions do imply that the surface of one object is moving relative to the other as a CMP pad dresser and CMP pad are held in contact, they reveal nothing about how the two objects come into contact. Specifically, these portions cannot reveal whether the CMP pad dresser is pressed against the pad or whether the CMP pad is pressed against the pad dresser simply because friction and

⁵ As noted above, these prior art pad dressers discussed in the background of the invention section are separate from and cannot be combined with the various embodiments of the inventions disclosed in Sung’026 as the basis for an anticipation argument because that is not “arranged or combined in the same way as recited in the claim.” *Net MoneyIN*, 545 F.3d at 1371.

abrasion occur as a result. But that is what [1A] addresses. Sung’026 is simply silent as to which object is pressed and which receives the object being pressed. *Id.* That silence cannot disclose the dresser being pressed against the pad as limitation [1A] expressly recites.

But despite not arguing inherency or obviousness for [1A], Petitioner erroneously infers from the foregoing portions of Sung’026 that “because abrasion, friction, and pressures^[6] are achieved *by pressing two objects against each other*, Sung’026 teaches pressing a CMP pad dresser against a CMP pad.” Not so. This statement is inaccurate and imprecise as phrased: achieving the abrasion and friction described in Sung’026 does not require *pressing two objects against each other*, but instead will result from their remaining in contact as the surface of one moves relative to another, *even if only one of them is pressed against the other*. Thus, [1A] is not inherently present, because the cited disclosure permits pressing the pad into the dresser instead. *See Atofina*, 441 F.3d at 1000; *In re Robertson*, 169 F.3d at 745.

Petitioner’s conclusion is also a complete *non sequitur*. It logically does not follow from two objects being in contact (which PO does not dispute is disclosed) that a specific one of those two objects is being pressed against the other—in this case, that a pad dresser is being pressed against a pad, rather than the other way

⁶ Petitioner does not quote any portion of Sung’026 disclosing “pressures.”

around. Woodworking, in which abrasive materials are similarly used to shape a workpiece, offers a familiar illustration. Commonly used are both abrasive tools that receive wooden workpieces pressed against them (such as freestanding belt or disk sanders) and hand-held abrasion tools like (like hand sanders or grinding wheels) that are pressed against the wooden workpieces. But a description that wood is abraded by abrasive material does not disclose whether the wood is being pressed against the abrasive tool or whether the abrasive tool is being pressed against the wood. That applies equally to the abrasion at issue here.

The disclosure of Sung’026—which, at most, implies that a CMP pad dresser and CMP pad are held in contact, with the surface of one moving relative to the other—fails to disclose the subset of such contact limited to the dresser being pressed against the CMP pad because it includes the CMP pad being pressed against the dresser. Thus, the disclosure that Petitioner has identified to support its explicit anticipation argument—which is the only argument Petitioner has advanced for [1A]—is insufficient to establish its disclosure in Sung’026 because it is not “arranged or combined in the same way as recited in the claim.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). And so it is not anticipated.

Thus, Petitioner has failed to show that Sung’026 discloses limitation [1A].

c) Sung’026 Does Not Disclose [1B] *the* dresser including a monolayer of a plurality of superabrasive particles protruding from a matrix layer,

Limitation [1B] expressly requires that the dresser being pressed against the CMP pad in limitation [1A] pressing the CMP pad dresser against a CMP pad. Absent from the Petition is any argument that limitation [1B] is inherently disclosed in Sung’026. *See* Pet. at 28-29. Nor does Petitioner contend that limitation [1B] is obvious in view of Sung’026. *See id.* All that remains is express anticipation, and so Petitioner contends that Sung’026 “discloses limitation [1B].” *Id.* at 28. But it does not.

As discussed above for [1Pre] and [1A], Sung’026 neither discloses a method of conditioning a CMP pad nor pressing any sort of CMP pad dresser against a CMP pad as part of any such method of conditioning. Because Sung’026 discloses no such pressing step, it likewise does not disclose any particular characteristics of a pad dresser used in that such absent pressing step in a method of conditioning a CMP pad (that it does not disclose).

PO does not dispute that Sung’026 describes *a* dresser including a plurality of superabrasive particles protruding from the matrix layer. But that is not what [1B] recites; it instead specifically requires that *the dresser of [1A]* includes those features. And *that* particular recited dresser does not simply exist in the abstract, but instead is being pressed against a CMP pad. So because Sung’026 fails to

disclose such a dresser being pressed against a CMP pad, its description cannot satisfy what [1B] recites: that a monolayer of a plurality of superabrasive particles protruding from a matrix layer is included *the dresser of [1A]*.

Yet despite not arguing inherency or obviousness for [1B], Petitioner nevertheless concludes that the cited portions of Sung'026 describing some pad dresser with particular features also describe those same features in the pad dresser being pressed against the CMP pad. That usage description in the recited pressing step is precisely what is missing here, and that unbridged gap is fatal to Petitioner's argument. *Magnum Oil*, 829 F.3d at 1381. Because the portion of Sung'026 that purportedly satisfies [1B] does not describe the dresser being pressed against a CMP pad, it is not "arranged or combined in the same way as recited in the claim" and thus cannot satisfy this limitation. *See Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). Thus, Petitioner has failed to show that Sung'026 discloses limitation [1B].

d) Sung’026 Neither Discloses Nor Renders Obvious [1C]

wherein the difference in protrusion distance between the highest protruding tip and the second highest protruding tip of the monolayer of superabrasive particles is less than or equal to about 10 microns

and the difference in protrusion distance between the highest 10 protruding tips of the monolayer of superabrasive particles are [sic] within about 20 microns or less;

Limitation [1C] expressly refers to the superabrasive particles of [1B] that are part of the dresser being pressed against the CMP pad in [1A]. Absent from the Petition is any explicit argument that [1C] is inherently disclosed in Sung’026. *See* Pet. at 30–36. Instead, Petitioner improperly combines features from various embodiments (or “aspects,” in Sung’026’s parlance) to argue that Sung’026 discloses this limitation. Pet. at 30, 32, 33-34. It does not. Such a Frankenstein’s Monster of different embodiments of a disclosure cannot support anticipation. *Net MoneyIN*, 545 F.3d at 1371.

Petitioner’s faulty anticipation argument is premised on a combination of descriptions of numerous *different* “aspects” disclosed in Sung’026. This is easily seen just by tracing Petitioner’s citations through Sung’026. Petitioner begins with “one aspect” from Sung’026 in which “*each* of the superabrasive particles protrudes to a predetermined height” above the matrix layer along a designated planar profile. Pet. at 30-31 (first emphasis in original, citing Ex. 1004 [0073], cls. 31, 36-37), 32 (citing Ex. 1004 [0073]).

Apparently recognizing that Sung’026 did not enable a POSITA to dispose every single superabrasive particle on the pad dresser to the exact same protrusion height along a plane, Petitioner then refers back to an earlier portion of Sung’026 explaining that although “the highest protruding points of the superabrasive particles are intended to be *substantially*⁷ level,” there “may be some height deviation” in planar profiles “due to limitations inherent in the manufacturing process.” Pet. at 30-31 (citing Ex. 1004 [0053]). Petitioner then combines that foregoing disclosure with “yet another aspect” cherry-picked from a long listing of such embodiments: wherein “the plurality of superabrasive particles are arranged such that their tips vary *from the designated profile* by less than about 1 microns.” Pet. at 31-32 (citing Ex. 1004 [0056]). But there is no disclosure in Sung’026 of superabrasive particles disposed according to a planar profile where the tips’ height *also* varies by less than about 1mm. *See* Ex. 1004. Rather, these distinct “aspects” are separate embodiments in Sung’026 and cannot be remixed to support an anticipation argument as Petitioner attempts. *Net MoneyIN*, 545 F.3d at 1371.

Even if Petitioner were correct that it would have been obvious to “*try* to obtain a leveled diamond particles [*sic.*] that control the difference in protrusion distance between the highest set of protruding tips, including the highest, second

⁷ The word “substantially” was silently excised from Petitioner’s quotation of Sung’026 without any indication of alteration or omission. *Compare* Ex. 1004 at [0053] *with* Pet. at 31 (“are intended to be level. . .”).

highest, and the highest 10 protruding tips to be within the claimed range” (Pet. at 34), Petitioner fails to argue (let alone support) that a POSITA would have had a reasonable expectation of success in doing so. Petitioner simply concludes that the claimed ranges “are what would result.” *Id.* This does not suffice. Even if Petitioner offered more than a bare citation to its expert’s declaration, “[e]vidence of obviousness, especially when that evidence is proffered in support of an ‘obvious-to-try’ theory, is insufficient unless it indicates that the possible options skilled artisans would have encountered were ‘finite,’ ‘small,’ or ‘easily traversed,’ and that skilled artisans would have had a reason to select the route that produced the claimed invention.” *Eurand, Inc. v. Mylan Pharms., Inc.*, 676 F.3d 1063, 1072 (Fed. Cir. 2012). Petitioner has offered no such evidence here.

While PO does not dispute that “it was well known that there are numerous disadvantages associated with unleveled tips,” it (again) simply does not logically follow from such knowledge alone that the ’862 patent’s claimed tip height variation ranges would result from mere “*efforts* to provide leveled diamond particles using a reverse casting process,” as Petitioner suggests. Pet. at 34-35. Petitioner is simply incorrect that these ranges *necessarily* “would result” (Pet. at 34-35) from every such attempt. *See* Ex. 2001 ¶¶ 17, 24-25; *contra Atofina*, 441 F.3d at 1000.

Petitioner’s unexplained certainty also contradicts Sung’026 itself, ignoring its numerous caveats about variation in manufacturing and the inability to near-

perfectly control the height variation of the protrusions, especially as precisely as Petitioner contends. *E.g.*, Ex. 1004 [0052] (“leveling of superabrasive particles to a predetermined height may be dependent on superabrasive particle spacing”); *see* [0053], [0056], [0073]. This implicit inherency is not elaborated upon, and because Petitioner does not explain how the recited ranges would *necessarily* result, inherency is not supported by what Petitioner provides. *See Atofina*, 441 F.3d at 1000.

Petitioner is also incorrect that Sung’026 taught a POSITA to control “tip-to-tip variation *across all diamond particles . . . to be less than 2mm*” using the reverse casting process. Pet. at 36. There is nothing in Sung’026 that actually explains how achieving the narrow *<2mm* tip height variation across every superabrasive particle on the dresser that it posits—an order of magnitude better than what [1D] recites—was to be accomplished at all, let alone with a reasonable expectation of success. Ex. 2001 ¶¶ 17, 24-25. That sort of tolerance across all the diamonds on a pad dresser was not possible at the time of the ’862 patent, when the cutting-edge result was tip-to-tip height variation on the order of 15mm for one particular novel design of a pad dresser. *Id.* ¶ 24.

Even if it might have been “obvious to try,” Petitioner fails to flesh out that argument with the requisite provide supporting evidence and explanation of why

there would have been a reasonable expectation of success. Thus, Petitioner has failed to establish that Sung’026 discloses [1C].

- e) Sung’026 does not disclose [1D] rotating the dresser against the CMP pad such that asperities are cut into the CMP pad having a maximum cutting depth of about 60 microns.**

As applied to *the* CMP pad dresser that is pressed against the CMP pad (per [1A]) and having the features recited in [1B]-[1C], limitation [1D] expressly requires rotating that dresser against the CMP pad so that it cuts asperities to a depth of no more than about 60 microns. Importantly, this is expressly reciting the result of this “rotating step.” Absent from the Petition is any argument that [1D] is inherently disclosed in Sung’026. *See* Pet. at 36-37. Nor does Petitioner contend that [1D] is obvious in view of Sung’026. *See id.* All that remains is express anticipation, and so Petitioner contends that Sung’026 “discloses limitation [1D].” *Id.* at 36. But it does not.

As discussed above for [1Pre], Sung’026 does not disclose a method of conditioning a CMP pad. Because it discloses no such method, it likewise does not disclose any steps of such method for any dresser it describes. That includes a step of “rotating *the* CMP pad dresser against the CMP pad,” which is absent from the support identified in the Petition. Moreover, limitation [1D] does not simply require rotating *a* CMP pad dresser against the CMP pad. Rather, it specifically requires rotating against the CMP pad the particular pad dresser with the features of

[1B]-[1C] that is being pressed against the CMP pad per [1A]. And, as discussed above, Sung'026 discloses none of [1Pre]-[1C].

Even putting aside that [1D] specifically refers to the use of a pad dresser that satisfies previously-recited elements, Sung'026 also fails to disclose what limitation [1D] additionally recites. *Id.* All that Petitioner identifies for disclosure of the maximum cutting depth of about 60 microns in Sung'026 is a single line that the predetermined height of the plurality of protruding superabrasive particles “*may* produce a cutting depth of from about 10 micron[s] to about 20 microns when used to abrade a work piece.” Pet. at 36 (citing Ex. 1004 [0010], [0052]).

As an initial matter, this line is not an enabling disclosure because it would not have explained to a POSITA how to achieve *any* cutting depth without undue experimentation, let alone a maximum cutting depth, from a given predetermined height of “each” of the plurality of superabrasive particles. Ex. 2001 ¶ 26. Nor could it, when Sung'026 does not even disclose the corresponding height and profile of superabrasive particles that “may” produce that cutting depth of 10-20mm, and which logically could also produce cutting depths outside that range. *See id.* Again, as discussed above, the actual performance of CMP dressers and their diamond grits was known to be “unpredictable” in actual usage. *Id.* ¶¶ 22, 25-29; *see* Ex. 2002 at 3-4, Ex. 2003 at 1. So a POSITA would not have been able to achieve a cutting

depth below 60mm based on an undisclosed predetermined height profile without undue experimentation. Ex. 2001 ¶¶ 26-27.

Moreover, even if that undescribed height profile “may” produce a particular cutting depth, the cited language does not *limit* the cutting depth to that range. That “mere possibility” in Sung’026 falls short of the inevitability that is required to satisfy [1D]. *See Atofina*, 441 F.3d at 1000. So that verbiage does not disclose what limitation [1D] requires, which is a limit beyond which the particles *may not* cut.

Moreover, that single portion of Sung’026 relied upon by Petitioner does not state that this (undisclosed) predetermined height profile *cannot produce a cutting depth of greater than about 60 microns*, which is what limitation [1D] requires. As mentioned above, the only relationship between cutting depth and particle height variation disclosed in Sung’026 is in the context of the deficiencies of the prior art. *See* Ex. 1004 [0006]. And even that example concerns a *prior art* pad dresser (not the recited pad dresser), about which it is explained that its height variation of more than 50mm would render it “useless” if it were required to “achieve a uniform asperity depth of 20” microns or less. *See id.* Again, Sung’026 is simply silent about which predetermined heights (and what variations therefrom) would produce the potential 10-20mm asperity cutting depth that it discloses. Ex. 2001 ¶¶ 26-27. That silence in Sung’026 is no more enabling of the 60mm maximum cutting depth recited by limitation [1D]. *See id.*

Thus, Petitioner has failed to show that Sung'026 discloses limitation [1D]. Its description of a 10-20mm range of cutting depth that “may” result from some particular undisclosed predetermined tip height profile does not disclose the recited 60mm cutting depth *limit* because other cutting depths may also be possible. Nor does the cited disclosure enable a POSITA to produce only asperities below the recited 60mm limit without undue experimentation, especially in view of the known unpredictability of pad dressers in operation and the failure to disclose the corresponding height profiles.

f) Conclusion: Sung'026 Neither Anticipates Nor Renders Obvious Independent Claim 1

As discussed above, Sung'026 does not disclose any of [1Pre], [1A], [1B], [1C], and [1D]. To the extent Petitioner identifies support for such disclosures in Sung'026, such support impermissibly combines multiple embodiments or “aspects” of Sung'026 and/or fails to apply to the specific pad dresser recited in the respective limitations. Moreover, Petitioner fails to make any express inherency arguments for any limitation in claim 1, and having similarly declined to advance obviousness arguments for any limitation besides [1C], cannot argue that any of these other limitations would have been obvious to a POSITA in view of the disclosure of Sung'026. Even if limitation [1C] might have been “obvious to try” in view of Sung'026 (which it is not), Petitioner has failed to explain how the other limitations

are obvious, and its efforts to assert that they are anticipated by Sung’026 are legally erroneous under *Net MoneyIN* and unavailing. *See* 545 F.3d at 1371.

But Petitioner is stuck with those flawed arguments—*see Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016); *Magnum Oil*, 829 F.3d at 1381; *Sirona Dental Sys. GmbH v. Institut Straumann AG*, 892 F.3d 1349, 1356 (Fed. Cir. 2018)—which are insufficient to justify institution of claim 1, and thus apply to all of the other challenged claims which depend therefrom. Accordingly, institution should be DENIED. 35 U.S.C. § 314(a).

Because each of the dependent claims depends from claim 1, and claim 1 is not disclosed in the prior art, neither are any of the dependent claims that depend therefrom. Petitioner has thus failed to establish that “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Nevertheless, and expressly noting that this failure to establish the disclosure of the sole independent claim is fatal to Petitioner’s likelihood of prevailing on every other claim, PO will proceed to identify additional reasons why Petitioner has failed to establish a reasonable likelihood of prevailing on the dependent claims.

2. Dependent Claims 6, 9-10

[6] The method of claim 5, wherein the peripheral location extends from an outer edge of the dresser inwardly toward a center point of the dresser for up to about 90% of the dresser radius.

[9] The method of claim 1, wherein substantially all of the superabrasive particles are located at a peripheral location of the dresser.

[10] The method of claim 1, wherein substantially all of the superabrasive particles are arranged in uniform predetermined pattern at a peripheral location of the dresser.

As discussed above, Petitioner has failed to show that Sung’026 discloses any of [1Pre], [1A], [1B], [1C], or [1D], let alone all of them. Because dependent claim 6 depends from (and thus incorporates all the limitations of) claim 5, which in turn depends from claim 1, Petitioner has correspondingly failed to show that Sung’026 discloses claim 6. This also applies to claims 9-10, which depend from (and thus incorporates all the limitations of) claim 1. Thus Petitioner has correspondingly failed to show that Sung’026 discloses claim 9-10.

Petitioner’s argument for claims 9-10 also fails for additional reasons. Based on a description of one particular “aspect” of Sung’026 describing a “central location” extending from about 20% to about 90% of the radius, Petitioner jumps to the completely unsupported conclusion that “the region from the center of the disk to about 20% of the radius is *devoid of superabrasive particles* in this particular example.” Pet. at 43 (citing nothing).

But this assertion is nothing but pure *ipse dixit*, and Petitioner has provided no basis for it. Sung’026 *never says that this unnamed region is “devoid of superabrasive particles.”* It is simply silent about this region, both in nomenclature and what its contents might be. Petitioner provides no citation—nothing from Sung’026, and not even anything from its expert—to support its imaginative reading of Sung’026. The absence of evidence regarding the superabrasive particles in this location does not qualify as evidence of their absence.

Having failed to provide any basis for its assumption that there are no superabrasive particles in that unnamed region (or any portion of it), Petitioner cannot establish from that silence that “substantially all” of the superabrasive particles are located at a peripheral location on the dresser, even if that peripheral location extends 90% of the way toward the center. And Petitioner has not even attempted to do so without that assumption being true. Thus, Petitioner has failed to show that claims 9 and 10⁸ are disclosed by Sung’026.

Petitioner’s argument for Claim 10 also fails for an additional reason. As with a number of Petitioner’s other arguments, Petitioner improperly cobbles together multiple “aspects” of Sung’026 to make a simulacrum of an anticipating disclosure. Specifically, Petitioner combines one “aspect” with a particularly defined central

⁸ Petitioner’s argument for claim 10 relies solely on the Petition’s argument for claim 9 for the “substantially all of the superabrasive particles are . . . at a peripheral location of the dresser” portion of its recitation. *See* Pet. at 46.

area (Pet. at 43 (citing Ex. 1004, [0036])) with a different and highly detailed “Example 1” of a particular pad dresser that makes no mention of superabrasive particles being absent from any portion of the dresser. *Id.* at 46-47 (citing Ex. 1004, [0094]). (Tellingly, Sung’026 **does** provide an Example 7 that identifies changes in the pad dresser along the radius toward the center. *See* Ex. 1004, [1000]. But this cannot support anticipation.) But Petitioner never identifies a single embodiment with both a grid **and** substantially all of the superabrasive particles arranged at a peripheral location. And that is what anticipation requires. *See Net MoneyIN*, 545 F.3d at 1371.

3. Dependent Claims 2-5

[2] The method of claim 1, wherein at least 100 tips of the plurality of superabrasive particles cut asperities into the CMP pad as the dresser is rotated.

[3] The method of claim 1, wherein at least 50 tips of the plurality of superabrasive particles cut asperities into the CMP pad as the dresser is rotated.

[4] The method of claim 1, wherein at least 25 tips of the plurality of superabrasive particles cut asperities into the CMP pad as the dresser is rotated.

[5] The method of claim 1, wherein substantially all of the asperities are cut in the CMP pad by superabrasive particles located at a peripheral location of the dresser.

As discussed above, Petitioner has failed to show that Sung’026 discloses any of [1Pre], [1A], [1B], [1C], or [1D], let alone all of them. Because dependent claims

2-5 depend from (and thus incorporate all the limitations of) claim 1, Petitioner has correspondingly failed to show that Sung'026 discloses the additional limitations recited in each of these dependent claims. Petitioner has also failed to show that Sung'026 discloses any number of tips cutting asperities into the CMP pad as the dresser is rotated or asperities . That is because, as discussed for claim 1, Sung'026 does not disclose using the dresser of claim 1 to condition a pad, and thus does not disclose actually the cutting of asperities by superabrasive particles ***in any number or at any location***. As a POSITA would have understood, which particles (and how many) actually cut ***during use*** can only be determined by examining the pad dresser ***post-use***. See Ex. 1015 at 7; Ex. 2001 ¶¶ 26-29, 31.

Petitioner attempts to calculate the number of superabrasive particles that would have been on one particular Sung'026 pad dresser, based on the outdated and incorrect view that “substantially all of the superabrasive particles are contributing to cutting asperities.” Pet. at 38. Petitioner’s assumption contradicts the ’862 patent, which explains that “only a small percentage of superabrasive particles in a typical CMP pad dresser are positioned so as to penetrate or cut into a CMP pad.” Ex. 1001, 7:21-23. Rather, a POSITA would instead have understood that because “the dressing behaviors of polishing pads are unpredictable,” (Ex. 2002 at 3-4), it could not be determined from the pad design or even a manufactured pad how many superabrasive particles of any of the aspects of Sung'026 would cut asperities even

if such dressers were disclosed by Sung’026 as being used (which they were not). Ex. 2001 ¶¶ 26-29, 31.

Nor could it be determined which particular superabrasive particles in any location of the dresser would be the ones to actually cut asperities, let alone peripherally-located ones as claim 5 requires. *Id.* ¶¶ 28-31.

4. Dependent Claim 11

As discussed above, Petitioner has failed to show that Sung’026 discloses any of [1Pre], [1A], [1B], [1C], or [1D], let alone all of them. Because dependent claim 11 depends from (and thus incorporate all the limitations of) claim 1, Petitioner has correspondingly failed to show that Sung’026 discloses claim 11. But Petitioner has also failed to show that Sung’026 discloses the additional elements of claim 11.

**[11A] The method of claim 1, further comprising:
rotating the CMP pad;**

**[11B] applying a slurry to a polishing surface of the
rotating CMP pad;**

**[11C] applying a workpiece to the polishing surface such
that the workpiece is polished by the asperities in
combination with the slurry.**

On limitations [11A] and [11C], Petitioner again seeks to improperly combine various “aspects” of Sung’026 to craft a Frankenstein’s Monster anticipation reference. *See* Pet. at 47-49. In particular, Petitioner combines the “background” section of Sung’026 for disclosure of these limitations with the various different “aspects” of Sung’026 that are relied upon to argue disclosure of the elements of

claim 1. But all of these are separate embodiments in Sung’026, and their combination does not support anticipation. *See Net MoneyIN*, 545 F.3d at 1371.

Specifically for limitation [11A], Sung’026 does not disclose that “*the* CMP pad” of claim 1—against which the specific CMP pad dresser recited in claim 1 is pressed—is rotated. The sole support identified for alleged disclosure of this element in Sung’026 is *a line from the background of the invention* section, not what Sung’026 disclosed about its own CMP pad dresser. Pet. at 47 (citing Ex. 1004 at [0002]. Petitioner also utilized this improper mix-and-match approach to anticipation for limitation [11C], where only the background of the invention section of Sung’026 was cited to support the alleged disclosure. Pet. at 48-49 (citing Ex. 1004 at [0002], [0004]-[0005]). But Sung’026’s description of prior art usage in the background section cannot be combined with the various “aspects” of its invention to support anticipation, as they are separate embodiments. *Net MoneyIN*, 545 F.3d at 1371.

Because Petitioner does not argue inherency or obviousness, and its anticipation argument for claim 11 is legally insufficient, it has failed to show a reasonable likelihood of prevailing on its challenge to claim 11.

5. Dependent Claims 12, 20

[12, 20] The method of claim 11, wherein

[12] the workpiece is a semiconductor device.

[20] the CMP pad is polyurethane.

As discussed above, Petitioner has failed to show that Sung'026 discloses any of [1Pre], [1A], [1B], [1C], or [1D], let alone all of them. Because dependent claims 12 and 20 depends from (and thus incorporate all the limitations of) claim 1, Petitioner has correspondingly failed to show that Sung'026 discloses the additional limitations each recites.

On claim 20, PO does not dispute that Sung'026 discloses the additional limitation recited by dependent claim 20 by itself. But that disclosure is not of any “aspect” of the invention of Sung'026 but is instead a single line from the background invention talking about the prior art. Pet. at 50 (citing Ex. 1004 at [0002]). When Petitioner has failed to argue inherency or obviousness (*see id.*), merely identifying the content in the prior art described in the background section of Sung'026 does not place that disclosure within the same embodiment described in Sung'026 as anticipation requires. *Net MoneyIN*, 545 F.3d at 1371.

B. Ground II: Sung'026 With SungICPT Does Not Render Obvious Claims 5-10

1. Dependent Claims 5, 9-10

[5, 9-10] The method of claim 1, wherein substantially all of the

[5] asperities are cut in the CMP pad by superabrasive particles located at a peripheral location of the dresser.

[9] superabrasive particles are located at a peripheral location of the dresser.

[10] superabrasive particles are arranged in uniform predetermined pattern at a peripheral location of the dresser.

Petitioner's argument for invalidity of claims 5, and 9-10 in Ground II echoes its insufficient arguments for the same claims in Ground I, and largely relies upon that same insufficient evidence. Pet. at 50, 52-53, 58-59. So they fail for the same reasons.

Petitioner's added citations to SungICPT fails to fill these gaps, instead repeating the error of drawing an unsupported inference from a lack of disclosure with new source material. Specifically, Petitioner assumes from the *lack of information* about the contents of the area within radius *a* in SungICPT's figure 1 that there are no superabrasive particles there. Pet. at 50-52. But the figure's showing the detail of between radius *b* and *c* does not establish that the other area has nothing, and Petitioner identifies nothing to the contrary in SungICPT. Again,

this absence of evidence is not evidence of absence, and this lack of evidence cannot satisfy Petitioner’s burden to establish what SungICPT discloses. Simply put, it does not establish that any “peripheral location” contains substantially all of the superabrasive particles as each of these claims requires.

For claim 5, Petitioner cites only to three portions of SungICPT to fill the gap in Sung’026 (which Petitioner does not identify). Pet. at 53 (citing Ex. 1005 at 1:12-16, 5:4-5, 6:21-22). But at most, these cited portions of SungICPT say only that “all diamond grits . . . shar[e] the work” to produce more uniform asperities. *See id.* They say nothing about which particular asperities actually cut as claim 5 requires; rather, actual performance of dressers remained unpredictable. Ex. 2001 ¶¶ 19-22, 26-29.

As such, Petitioner has failed to show a reasonable likelihood of prevailing on its Ground II challenge to these claims 5 and 9-10.

2. Dependent Claims 6-8

[6-8] The method of claim 5, wherein the peripheral location extends from an outer edge of the dresser inwardly toward a center point of the dresser for up to about

[6] 90% of the dresser radius.

[7] 50% of the dresser radius.

[8] 33% of the dresser radius.

PO does not dispute that SungICPT discloses the additional limitations recited by each of dependent claims 6-8. But merely identifying the additional recitations' disclosures in SungICPT and adding each to Sung'026 does not satisfy Petitioner's burden here.

Because Sung'026 does not disclose claim 1 (and 5), as discussed extensively with regard to above, Petitioner needed to identify additional disclosure from SungICPT and/or provide explanation of how the various "aspects" of Sung'026 are combined to make up the deficiencies regarding disclosure of what claims 1 & 5 recite, but Petitioner has failed to do so here. Petitioner has not supplemented its earlier reliance on multiple different "aspects" of or embodiments from Sung'026 for a flawed anticipation argument to flesh out its obviousness argument. Nor has Petitioner identified anything in SungICPT to fill the gaps for what Sung'026 *does not disclose* for the parent claim 1 or what is missing from its arguments for claim 5 in either Ground I or Ground II. Instead, Petitioner has simply built upon the flawed

foundation of its Ground I argument as if it had set forth a perfect anticipation argument for claim 1 without any need to argue obviousness to fill in gaps. But it did not.

Because dependent claims 6-8 depend from (and thus incorporate all the limitations of) claim 1 (which is not anticipated or obvious over Sung'026) and claim 5 (which is neither anticipated by Sung'026 nor obvious over Sung'026 either alone or in combination with SungICPT), Petitioner has correspondingly failed to show that the disclosures from SungICPT it cites to support the additional recitations of these claims 6-8 fills the gaps in their parent claims and renders them obvious.

3. No Reasons To Combine Sung'026 And SungICPT

Even to the extent that Petitioner could rely on its improper patchwork anticipation arguments for claims 1 and 11-12 as a basis for obviousness here, Petitioner has failed to address any reasons to combine the various “aspects” or embodiments of Sung'026. Instead, Petitioner’s obviousness argument for Ground I is limited to limitation [1C], and there is marshalled in support of an “obvious to try” theory rather than justifying the agglomeration of multiple different embodiments of Sung'026. Because Petitioner has never explained why a POSITA would have combined the various embodiments of Sung'026, Petitioner thus has failed to bring life to its Frankenstein’s Monster version of Sung'026 even under an obviousness theory.

C. Ground III: Sung’026 And Nishioka Does Not Render Obvious Claims 13 And 17-19

1. Dependent Claims 13 and 17-19

[13] The method of claim 12, wherein the semiconductor device includes one or more layers of Cu, W, an oxide layer, or a combination thereof.

[17] The method of claim 11, wherein the slurry includes an abrasive selected from the group consisting of silica, alumina, ceria, and combinations thereof.

[18] The method of claim 11, wherein the slurry includes an oxidative compound.

[19] The method of claim 17, wherein the oxidative compound is hydrogen peroxide.

PO does not dispute that Nishioka discloses the additional limitations recited by each of dependent claims 13, 17-19. But merely identifying the additional recitations’ disclosures in Nishioka and adding each to Sung’026 does not satisfy Petitioner’s burden here.

Because Sung’026 does not disclose claim 1, as discussed extensively with regard to Ground I, Petitioner needs to fill those gaps in order to prevail. Specifically, Petitioner needed to identify additional disclosure from Nishioka and/or (b) an explanation of how the various “aspects” of Sung’026 to make up the deficiencies regarding claims 1 and 11-12, but Petitioner has failed to do so in its Ground III. Instead, Petitioner has simply built upon the flawed foundation of its Ground I argument as if it had set forth a perfect anticipation argument for all of

claims 1-6, 9-12, and 20 without any need to argue obviousness to fill in gaps. But it did not.

Petitioner has not supplemented its earlier reliance on multiple different “aspects” of or embodiments from Sung’026 for a flawed anticipation argument to flesh out its obviousness argument here. Nor has Petitioner identified anything in Nishioka to fill the gaps for what Sung’026 *does not disclose* for the parent claims 1 and 11-12. Because dependent claims 13 and 17-19 depend from (and thus incorporate all the limitations of) claim 1, which is not anticipated or obvious over Sung’026, Petitioner has correspondingly failed to show that the additional disclosures from Nishioka addressing the further recitations of the claims in Ground III invalidate these claims.

2. Reasons To Combine Sung’026 And Nishioka

Even to the extent that Petitioner could rely on its improper patchwork anticipation arguments for claims 1 and 11-12 as a basis for obviousness here, Petitioner has failed to address any reasons to combine the various “aspects” or embodiments of Sung’026. Instead, Petitioner’s obviousness argument for Ground I is limited to limitation [1C], and there is marshalled in support of an “obvious to try” theory rather than justifying the agglomeration of multiple different embodiments of Sung’026. Because Petitioner has never explained why a POSITA would have combined the various embodiments of Sung’026, Petitioner thus has

failed to bring life to its Frankenstein’s Monster version of Sung’026 even under an obviousness theory.

D. Ground IV: Sung’026 And Lin Renders Obvious Claim 14

1. Dependent Claim 14

[14] The method of claim 12, wherein the semiconductor device has a node size of less than or equal to 28 nm.

PO does not dispute that Nishioka discloses the additional limitations recited by dependent claim 14. But merely identifying the additional recitation’s disclosures in Lin and adding them to Sung’026 does not satisfy Petitioner’s burden here.

Because Sung’026 does not disclose claim 1, as discussed extensively with regard to Ground I, Petitioner needs to fill those gaps in order to prevail. Specifically, Petitioner needed to identify additional disclosure from Lin and/or (b) an explanation of how the various “aspects” of Sung’026 to make up the deficiencies regarding claims 1 and 11-12, but Petitioner has failed to do so in its Ground IV. Instead, Petitioner has simply built upon the flawed foundation of its Ground I argument as if it had set forth a perfect anticipation argument for all of claims 1-6, 9-12, and 20 without any need to argue obviousness to fill in gaps. But it did not.

Petitioner has not supplemented its earlier reliance on multiple different “aspects” of or embodiments from Sung’026 for a flawed anticipation argument to flesh out its obviousness argument here. Nor has Petitioner identified anything in Lin to fill the gaps for what Sung’026 *does not disclose* for the parent claims 1 and

11-12. Because dependent claim 14 depends from (and thus incorporates all the limitations of) claim 1, which is not anticipated by or obvious over Sung’026, Petitioner has correspondingly failed to show that the additional disclosures from Lin addressing the further recitations of the claims in Ground IV invalidates claim 14.

2. Reasons To Combine Sung’026 And Lin

Even to the extent that Petitioner could rely on its improper patchwork anticipation arguments for claims 1 and 11-12 as a basis for obviousness here, Petitioner has failed to address any reasons to combine the various “aspects” or embodiments of Sung’026. Instead, Petitioner’s obviousness argument for Ground I is limited to limitation [1C], and there is marshalled in support of an “obvious to try” theory rather than justifying the agglomeration of multiple different embodiments of Sung’026. Because Petitioner has never explained why a POSITA would have combined the various embodiments of Sung’026, Petitioner thus has failed to bring life to its Frankenstein’s Monster version of Sung’026 even under an obviousness theory.

E. Ground V: Sung’026 And Kim Does Not Render Obvious Claim 15

1. Dependent Claim 15

[15] The method of claim 12, wherein the semiconductor device has a line width of less than or equal to about 30 nm.

PO does not dispute that Kim discloses the additional limitations recited by dependent claim 15. But merely identifying the additional recitation’s disclosures in Kim and adding them to Sung’026 does not satisfy Petitioner’s burden here.

Because Sung’026 does not disclose claim 1, as discussed extensively with regard to Ground I, Petitioner needs to fill those gaps in order to prevail. Specifically, Petitioner needed to identify additional disclosure from Kim and/or (b) an explanation of how the various “aspects” of Sung’026 to make up the deficiencies regarding claims 1 and 11-12, but Petitioner has failed to do so in its Ground V. Instead, Petitioner has simply built upon the flawed foundation of its Ground I argument as if it had set forth a perfect anticipation argument for all of claims 1 and 11-120 without any need to argue obviousness to fill in gaps. But it did not.

Petitioner has not supplemented its earlier reliance on multiple different “aspects” of or embodiments from Sung’026 for a flawed anticipation argument to flesh out its obviousness argument here. Nor has Petitioner identified anything in Kim to fill the gaps for what Sung’026 *does not disclose* for the parent claims 1 and 11-12. Because dependent claim 15 depends from (and thus incorporates all the

limitations of) claim 1, which is not anticipated by or obvious over Sung'026, Petitioner has correspondingly failed to show that the additional disclosures from Kim addressing the further recitations of the claims in Ground V invalidates claim 15.

2. Reasons to Combine Sung'026 And Kim

Even to the extent that Petitioner could rely on its improper patchwork anticipation arguments for claims 1 and 11-12 as a basis for obviousness here, Petitioner has failed to address any reasons to combine the various “aspects” or embodiments of Sung'026. Instead, Petitioner’s obviousness argument for Ground I is limited to limitation [1C], and there is marshalled in support of an “obvious to try” theory rather than justifying the agglomeration of multiple different embodiments of Sung'026. Because Petitioner has never explained why a POSITA would have combined the various embodiments of Sung'026, Petitioner thus has failed to bring life to its Frankenstein’s Monster version of Sung'026 even under an obviousness theory.

F. Ground VI: Sung’026 And Koyama Does Not Render Obvious Claim 16

1. Dependent Claim 16

[16] The method of claim 12, wherein the semiconductor device is a wafer having a size greater than 400 mm

PO does not dispute that Koyama discloses the additional limitations recited by dependent claim 16. But merely identifying the additional recitation’s disclosures in Koyama and adding them to Sung’026 does not satisfy Petitioner’s burden here.

Because Sung’026 does not disclose claim 1, as discussed extensively with regard to Ground I, Petitioner needs to fill those gaps in order to prevail. Specifically, Petitioner needed to identify additional disclosure from Kim and/or (b) an explanation of how the various “aspects” of Sung’026 to make up the deficiencies regarding claims 1 and 11-12, but Petitioner has failed to do so in its Ground VI. Instead, Petitioner has simply built upon the flawed foundation of its Ground I argument as if it had set forth a perfect anticipation argument for all of claims 1 and 11-12 without any need to argue obviousness to fill in gaps. But it did not.

Petitioner has not supplemented its earlier reliance on multiple different “aspects” of or embodiments from Sung’026 for a flawed anticipation argument to flesh out its obviousness argument here. Nor has Petitioner identified anything in Koyama to fill the gaps for what Sung’026 *does not disclose* for the parent claims 1 and 11-12. Because dependent claim 16 depends from (and thus incorporates all the

limitations of) claim 1, which is not anticipated by or obvious over Sung’026, Petitioner has correspondingly failed to show that the additional disclosures from Koyama addressing the further recitations of the claims in Ground VI invalidates claim 16.

2. Reasons to Combine Sung’026 And Koyama

Even to the extent that Petitioner could rely on its improper patchwork anticipation arguments for claims 1 and 11-12 as a basis for obviousness here, Petitioner has failed to address any reasons to combine the various “aspects” or embodiments of Sung’026. Instead, Petitioner’s obviousness argument for Ground I is limited to limitation [1C], and there is marshalled in support of an “obvious to try” theory rather than justifying the agglomeration of multiple different embodiments of Sung’026. Because Petitioner has never explained why a POSITA would have combined the various embodiments of Sung’026, Petitioner thus has failed to bring life to its Frankenstein’s Monster version of Sung’026 even under an obviousness theory.

VIII. CONCLUSION

For at least the foregoing reasons, Petitioners have failed to meet its burden to show that they have a reasonable likelihood of success with respect to at least one claim. Therefore, the Petition should be denied.

Dated: June 28, 2024

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that there are 13,976 words in this paper, excluding any table of contents, table of authorities, mandatory notices under 37 C.F.R. § 42.8, certificate of word count, certificate of service, or appendix of exhibits. This certification relies on the word count of the word-processing system used to prepare this paper.

Dated: June 28, 2024

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on June 28, 2024, the foregoing document is being served via electronic mail upon the following counsel of record for Petitioner:

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