

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ADVANCED MICRO DEVICES INC.,
Petitioner,

v.

REALTEK SEMICONDUCTOR CORPORATION,
Patent Owner.

CASE: IPR2023-00788
U.S. PATENT NO. 9,590,582

PATENT OWNER'S PRELIMINARY RESPONSE

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EXHIBIT LISTING

Exhibit No.	Description
2001	<i>In the Matter of Certain Integrated Circuits, Components thereof, and Products Containing the Same</i> , Inv. No. 337-TA-1350, Order No. 21: Construing Terms of the Asserted Patents (July 25, 2023)

I. INTRODUCTION

Patent Owner, Realtek Semiconductor Corporation (“Realtek”), submits this Patent Owner Preliminary Response (“POPR”) pursuant to 37 C.F.R. § 42.107(a). Realtek respectfully responds to the *Inter Partes* Review (“IPR”) petition (“Petition”) filed by Advanced Micro Devices, Inc. (“Petitioner”) for claims 1-5, and 9 (“Challenged Claims”) of U.S. Patent No. 9,590,582 (“’582 Patent,” Ex.1001).

The Board should deny institution for three reasons.

First, for both Ground 1 and Ground 2, the Petition fails to show that there is a reasonable likelihood that the Petitioner will prevail on a single challenged claim. Both independent claims, challenged in the Petition, require, in part, (1) “a first insulation layer”; (2) “an inductor component (comprising a coil-conductor segment and two extension-conductor segments), located on a surface of the first insulation layer”; and (3) “a capacitor component, arranged corresponding to the first region in an embedded manner on the other surface, opposite to the inductor component, of the first insulation layer.” Ex.1001, cls. 1, 9. The Petition fails to identify the claimed configuration in any of the relied-upon prior art references.

In an attempt to backfill this severe deficiency, Petitioner attempts to rely on expert testimony as a substitute for a teaching of the prior art, but the Trial Practice Guide precludes those attempts. *See* Patent Trial and Appeal Board Consolidated

Trial Practice Guide November 2019 (PTAB November 2019) at 36 (“[E]xpert testimony...is not a substitute for disclosure in a prior art reference itself.”).

Second, for Ground 2, the Petition has another, fatal infirmity. The Petition fails to establish that the Muh reference (Ex.1006) is prior art to the Challenged Claims. The Petition relies on a declaration of a third-party, Dr. Hall-Ellis. While her declaration provides evidence that Muh “is *currently* available from 2 libraries,” *id.* at 46 (emphasis added), Dr. Hall-Ellis’s testimony provides no evidence to establish the *prior* art status of Ex.1006, i.e. that it was available and accessible to persons concerned with the art at the relevant time. Dr. Hall-Ellis does not say that she has any personal knowledge of the prior art status of Exhibit 1006, and she concedes that she “received this thesis from counsel.” (Ex.1036, 44). Her testimony does not provide any evidence to support the conclusion that Muh was available prior art at the relevant time. In addition, even if Dr. Hall-Ellis could have established that the Muh thesis was cataloged *at the time* by author name, article title, and the name of the library where it was located—her declaration does not—that is not sufficient, under Federal Circuit precedent, to establish that Muh was publicly available to constitute prior art.

Third, the Petition fails to follow the established legal framework for demonstrating obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

The Petition does not identify what the Petition contends is the actual scope of the claims and impermissibly tries to shift that burden onto the Board. The Petition also completely fails to address *Graham*'s second factor, which requires the Petitioner to identify the differences between the claimed subject matter and the cited references so that the Board can determine if those differences can be overcome by teachings of the references. Petitioner's refusal to address the issues on which it has the burden is a fatal defect.

Accordingly, Realtek respectfully asks the Board to deny institution.

II. BACKGROUND

The '582 Patent describes and claims a novel configuration for components found within an inductor-capacitor (LC) resonant circuit. Ex.1001, 1:16-18, claim 1. The '582 Patent describes how, in prior art circuits, "a signal may pass through the insulation layer and leak to the silicon substrate, resulting in transmission loss." Ex.1001, 1:33-39. The claimed configuration, in contrast, "reduce[s] generation of phase noise, arrangement of interconnecting wires, and an overall size." Ex.1001, 1:47-2:3. It also reduces "parasitic RLC (Resistance-Inductance-Capacitance)." Ex.1001, 12:47-54.

The '582 Patent claims priority to a Taiwanese application filed on April 16, 2014, and was filed in the United States as Application No. 14/338,904 on July 23,

2014. The '582 Patent issued on March 7, 2017 and contains two independent claims. Independent claim 1 (which is identical to independent claim 9 with the exception of adding a limitation) recites:

A semiconductor device with an inductor-capacitor (LC) resonant circuit, comprising:

a first insulation layer;

an inductor component, comprising:

a coil-conductor segment, located on a surface of the first insulation layer; and

two extension-conductor segments, located on the surface of the first insulation layer, coupled to two ends of the coil-conductor segment respectively, arranged at an interval, and extending outwards relative to the coil-conductor segment, wherein a first region is defined by the two extension-conductor segments and the coil-conductor segment; and

a capacitor component, arranged corresponding to the first region in an embedded manner on the other surface, opposite to the inductor component, of the first insulation layer, wherein the capacitor component is correspondingly configured outwards relative to the coil-conductor segment, and the capacitor component is not substantially overlapped with the coil-

conductor segment,

wherein the capacitor component comprises: a plurality of connecting segments, extending corresponding to the two extension-conductor segments in a same direction, wherein the plurality of connecting segments are respectively overlapped with the two extension-conductor segments in a vertical direction; and

a plurality of electrode segments, located below the first region, wherein one end of each of the plurality of electrode segments is coupled to one of the plurality of connecting segments, and each of the plurality of electrode segments extends laterally relative to the respective coupled connecting segment of the plurality of connecting segments.

Ex.1001, cl. 1.

On July 25, 2023, the ITC issued Order No. 21 regarding claim construction of certain terms of the '582 Patent. Ex.2001. The order delayed construction of “two extension-conductor segments” and “coil conductor segment” until the evidentiary hearing and adopted the construction of “component that includes one or more capacitors” for the claimed “capacitor component” and the term “plurality of connecting segments are respectively overlapped with the two extension-conductor segments in a vertical direction” as “at least a first connecting segment of

the plurality of connecting segments overlaps one extension-conductor segment in a vertical direction, and at least a second connecting segment of the plurality of connecting segments overlaps the other extension-conductor segment in a vertical direction.” Ex.2001, 28-38.

A. The ’582 Patent

The ’582 Patent explains that prior-art surface mounted components increase the “volume,” and therefore the size, of the chip. Ex.1001, 1:29-32. Using surface mounted components therefore thwarts the goals of making chips smaller and improving key performance indicators for these types of devices. Ex.1001, 1:24-32.

The ’582 Patent discloses reorienting the capacitor component so that it is below the extension-conductor segments in a vertical manner, and therefore embedded in an opposite surface of an insulation layer, in contrast to the surface mount technology discussed in the ’582 Patent. Ex.1001, 3:48-55. And the Challenged Claims require “a capacitor component, arranged corresponding to the first region **in an embedded manner**.¹” Ex.1001, cls. 1, 9.

The orientation described in and claimed by the ’582 Patent has another set of benefits. As the ’582 Patent explains, “[a]t a high frequency, a signal may pass

¹ All emphasis added unless otherwise noted.

through the insulation layer and leak to the silicon substrate, resulting in transmission loss.” Ex.1001, 1:36-39. By requiring the extension conductor segments to overlap with a plurality of connecting segments, and by prohibiting the resonant portions of the capacitor from being under the coil-conductor segment, the claimed arrangement achieves the aims of “reduc[ing] generation of phase noise,” facilitating “arrangement of interconnecting wires,” reducing “overall size,” and limiting parasitic RLC. Ex.1001, 1:63-2:3, 12:51-54.

B. Prosecution History

The as-filed claims were rejected over U.S. Patent Publication No. 2009/0322447 to Daley et al. (“Daley”). Ex.1002, 342. However, the examiner stated that “Claim 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.” Ex.1002, 345. The applicant responded by arguing that the specific orientation of the capacitor and inductor on respective sides of the insulation layer distinguished the then-amended claims from the cited prior art. *See* Ex.1002, 330-331.

The then-pending claims were again rejected over Daley. Ex.1002, 319. But the examiner again stated that “Claim 5 is objected to as being dependent upon a

rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.” Ex.1002, 319. The applicant again argued that the specific orientation of the capacitor and inductor on respective sides of the insulation layer distinguished the then-amended claims from the cited prior art. *See* Ex.1002, 73-74.

The then-pending claims were rejected a third time over Daley. Ex.1002, 58-62. In the final rejection, the examiner again indicated that then-pending claim 5 would be allowable if rewritten in independent form. Ex.1002, 61. The applicant then amended claim 1 to reflect the subject matter deemed allowable by the examiner, further specifying the claimed capacitor component located on an opposite surface of the insulation layer from the claimed inductor component. Ex.1002, 27.

The Examiner identified U.S. Patent No. 9,270,247 to Jing (“Jing”) during an interview and substantively discussed Jing, for the first time, in the “Examiner’s Statement of Reasons for Allowance.” Ex.1002, 12. The applicant did not respond to the puzzling and incorrect statements that the examiner made when discussing the Jing reference because reasons for allowance do not limit the scope of a claim. *Salazar v. Procter & Gamble Co.*, 414 F.3d 1342, 1345 (Fed. Cir. 2005) (citing *ACCO Brands, Inc. v. Micro Sec. Devices, Inc.*, 346 F.3d 1075, 1079

(Fed.Cir.2003)). Indeed, Federal Circuit authority precludes drawing inferences from an applicant's decision to decline comment on an Examiner's Statement of Reasons for Allowance, in particular where an examiner raises an argument for the *first time* in a Reasons for Allowance. *Id.*; *see also id.* at 1344. Contrary to the allegations in the Petition, the Examiner's characterization of Jing (Ex.1033) are not applicable to the Petition's challenge. Petition, 29-31. Jing was never used in a rejection of any claim of the '582 Patent. Moreover, Jing is not used by the Petition to challenge the patentability of any challenged claim.

III. THE BOARD SHOULD DENY INSTITUTION BECAUSE THE PETITION FAILS TO IDENTIFY ALL LIMITATIONS IN THE ALLEGED PRIOR ART OF RECORD

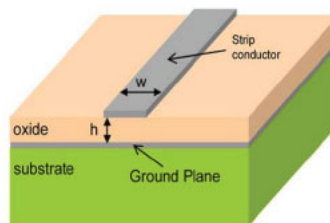
The Board "is permitted, but never compelled, to institute an IPR proceeding." *Harmonic Inc. v. Avid Tech.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016); *see also* 35 U.S.C. § 314(b) ("Director shall determine whether to institute an inter partes review"); 37 C.F.R. § 42.108(c) ("*Inter partes* review shall not be instituted unless the Board decides that the information presented in the petition demonstrates that there is a reasonable likelihood that at least one of the claims challenged in the petition is unpatentable.").

The challenged claims of the '582 Patent all require the same inductor component and capacitor component on opposite surfaces of a first insulation layer.

Ex.1001, cls. 1, 9. The Petition, however, fails to identify in the prior art a first insulation layer with the claimed inductor component on one surface and the claimed capacitor component on the other, arranged in an embedded manner. None of the references and none of the proposed combinations disclose or suggest this configuration, a flaw that is fatal to the Petition.

A. Gonzalez Does Not Disclose or Render Obvious the Claims of the '582 Patent

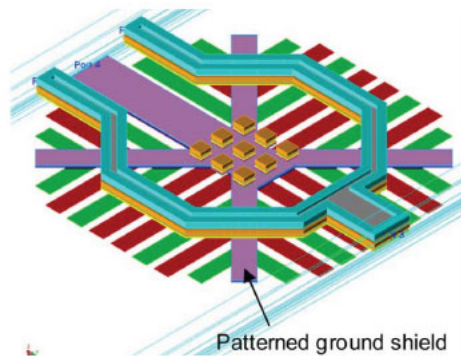
Ground 1 of the Petition relies solely on a publication by Gonzalez (Ex.1005). The Petition alleges that Gonzalez teaches a dielectric layer between top metal layer M6 and a ground plane and that this layer meets the claimed “first insulation layer.” Petition, 38-39. The Petition points to Figure 9 of Gonzalez in support of its allegations. *Id.* Figure 9, reproduced, in part, below, shows an example of a strip conductor metal layer atop an oxide layer:



Ex.1005, Fig. 9.

The Petition then alleges that a separate figure in Gonzalez—Figure 8—shows an inductor component atop a patterned ground shield. Petition, 40-41. The portion

of Figure 8 of Gonzalez relied upon for this element in the Petition is reproduced below:



Ex.1005, Fig. 8. The Petition identifies the “bulb” shape of Figure 8 as the claimed coil-conductor segment (Petition, 42) and alleges that this portion of Gonzalez is on a surface of an insulation layer because it “is implemented with a microstrip transmission line (TL).” Petition, 42 (Quoting Ex.1005, 5). Figure 8 does not disclose any dielectric layer and the Petition provides no motivation to combine the embodiment of Figure 8 with that of Figure 9, including how or why a POSITA would have had any reason to do so.

Indeed, Gonzalez explicitly differentiates between the two figures. Gonzalez explains that Fig 8 shows the “layout of the interconnection between the varactors, the inductor, and the active sections of the VCO core,” and it explains how that “approach is suitable for fixed layout structures.” In contrast, Gonzalez explains that the TL used in the study is instead from Figure 9. Ex.1005, 7.

Figure 8 of Gonzalez does not include any insulation layer (and lacks any description of the oxide layer depicted in Figure 8 or any discussion suggesting it would be used in the structures of Figure 9) and Gonzalez lacks any basis to support the Petition's assumption that Figure 8 would include the oxide layer of Figure 9. In fact, Gonzalez explicitly describes Figure 8 as part of the “*previous* approach” and says that the entirely different embodiment of Figure 9 was used for the study of Gonzalez. Ex.1005, 7. Gonzalez explains that the arrangement of the study (that of Figure 9) separates the conducting strip (TL) from the ground plane using “one or several inter-metal dielectrics” but no such description appears regarding Figure 8. Ex.1005, 7. The Petition offers nothing else to overcome this infirmity. For example, it fails to allege any basis in any prior art reference to modify or otherwise combine these disparate embodiments of Gonzalez.

The Petition's failings with respect to the capacitor component are yet more glaring. The Petition fails to address, in connection with Gonzalez, the limitation “a capacitor component, arranged corresponding to the first region *in an embedded manner on the other surface opposite the inductor component*, of the first insulation layer.” The Petition does not even attempt to identify any disclosure in Gonzalez of the capacitor component embedded in a surface of the insulation layer. Petition, 49-51. In fact, the first instance of the word “insulation layer” in Section

IX.A.2.vi of the Petition is the sentence alleging that “To the extent Gonzalez’s Fig. 8 does not expressly disclose a first insulation layer with a surface on which the capacitor component is arranged in an embedded manner opposite to the inductor component, this would have been understandable and obvious to a POSITA.” Petition, 51. The Petition therefore effectively concedes that Gonzalez does not teach this element, having presented no argument that it is taught by Gonzalez itself. Indeed, Petitioner’s declarant, Dr. Prucnal, admits that Gonzalez does not disclose “the ‘embedded manner’ part of the limitation.” Ex.1003, ¶ 139.

As shown above, there is no disclosure in Figure 8 of any insulation layer. More importantly, there is no disclosure in Figures 8 *or* 9 of “a capacitor component, arranged corresponding to the first region in an embedded manner on the other surface opposite the inductor component, of the first insulation layer.” Nothing in Figure 8 or 9 shows the relationship between and respective physical orientation of the structures Petitioner identifies as the claimed first insulation layer, the claimed inductor component (comprising a coil-conductor segment and two extension-conductor segments on the surface of the first insulation layer), and the claimed capacitor component on the opposite surface arranged in an embedded manner. Indeed, Figure 8 lacks any insulation layer at all, and Figure 9 shows nothing about the claimed capacitor component.

The Petition, acknowledging the deficiency of Gonzalez, attempts to satisfy this element by using the testimony of Dr. Prucnal. Petition, 51-53. The Petition cites to Dr. Prucnal extensively throughout these three pages but fails to identify any instance in any prior art reference of a capacitor located on an opposite surface of an insulation layer. This is directly at odds with the Trial Practice Guide, which explains expert testimony “is not a substitute for disclosure in a prior art reference itself.” Patent Trial and Appeal Board Consolidated Trial Practice Guide November 2019 (PTAB November 2019) at 36.

The Petition alleges that “it would have been obvious to place an insulation layer between” two metallic layers of Gonzalez, but the Petition fails to identify any insulation layer between those two components (and does not identify another reference that includes such a layer). Petition, 51. Instead, the Petition goes on to allege that “cross-layer electric connections, where needed, can be readily formed using vias or other interconnect structures” and “[v]ias may be used to connect the first connecting segment of the fine-tuning varactor to the left extension-conductor segment of the inductor.” Petition, 53. This is legally impermissible and insufficient to show obviousness. *Nautilus Hyosung Inc. v. Diebold Self-service Systems division of Diebold*, IPR2016-00633, Paper 9 at 21 (PTAB Aug. 22, 2016) (“[a]n assertion that something could be done does not articulate a reason why something

would be done by one of ordinary skill in the art at the time of the invention and, therefore, raises a specter of impermissible hindsight bias in an obviousness analysis”). These possibilities do not establish that a POSITA would have found such a teaching in Gonzalez, only that such structures could theoretically exist.

Dr. Prucnal’s declaration merely parrots this same statement with the same hindsight bias. Ex.1003 ¶ 145. His declaration is therefore insufficient: “Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” 37 C.F.R. § 42.65(a). “Merely repeating an argument from the Petition in the declaration of a proposed expert, does not give that argument enhanced probative value.” *Robert Bosch Tool Corp. v. SD3, LLC*, IPR2016-01755, Paper 15 at 17 (PTAB Mar. 31, 2017) (citing 37 C.F.R. § 42.65(a), giving expert declaration “no probative weight” and denying institution); *see also Securenet Techs., LLC v. Icontrol Networks, Inc.*, IPR2016-01911, -01916, Paper 9 at 11, 14-15 (PTAB Mar. 31, 2017) (denying institution and stating expert testimony is conclusory where it merely repeated Petitioner’s conclusory argument “without adequate elaboration or explanation”); *InfoBionic, Inc. v. Braemer Mfg., LLC*, IPR2015-01704, Paper 11 at 6 (PTAB Feb. 16, 2016) (denying institution where expert’s testimony was not “persuasive or helpful as it repeats the Petitioner’s arguments and offers little or no elaboration”); *Qualcomm Inc. v. ParkerVision Inc.*,

IPR2015-01819, Paper 8 at 29 (PTAB Mar. 8, 2016) (denying institution and finding expert testimony regarding motivation to combine not credible “because it essentially repeats the arguments advanced by Qualcomm in its Petition”). Because Dr. Prucnal’s declaration simply repeats Petitioner’s conclusory assertions regarding what could be done with Gonzalez, without elaboration or explanation, it is entitled to no weight.

Afflicted with this hindsight bias, the Petition goes on to allege that “Gonzalez’s fine-tuning varactor would naturally be arranged in an embedded manner on the other surface of the first insulation layer that is opposite the inductor” without any citation to Gonzalez or basis rooted in a prior art reference for this conclusion. Petition, 53. As before, Dr. Prucnal simply parrots this conclusory allegation and is entitled to no additional weight. *Compare* Petition, 53-54 with Ex.1003, ¶ 146. Nowhere does Petitioner offer any evidence or argument, conclusory or otherwise, that supports its claim that Gonzalez’s varactor “would naturally be arranged ... on the other surface of the first insulation layer that is opposite the inductor.” Petition, 53. The Petition’s conclusions with regard to the claimed configuration of the insulation layer, inductor component, and capacitor component are unsupported and untethered to any disclosure in Gonzalez. All that Petitioner offers is Dr. Prucnal’s simple parroting of the conclusions that the varactor

“would naturally be arranged ... on the other surface of the first insulation layer,” but as shown above, based on the Board’s well-established precedent, such conclusory opinions are entitled to no weight. The Petition therefore fails to meet Petitioner’s burden for claim 1.

The Petition likewise provides no independent analysis of independent claim 9. Petition, 75. For the same reasons as claim 1, the Petition fails with regard to independent claim 9. The elements in independent claims 1 and 9 that the Petition fails to identify in Gonzalez are thereby part of each challenged claim. Thus, the lack of demonstrated teachings in Gonzalez is fatal to the Petition’s likelihood of demonstrating unpatentability for any claim and warrants denial of institution.

B. Muh and Niknejad, alone or in combination, Do Not Disclose or Render Obvious the Challenged Claims

The Petition suffers from the same deficiencies with respect to the configuration in Ground 2. In Ground 2, the Petition relies only on Muh for the claimed insulation layer. Petition, 80-81. After alleging that a POSITA would have understood a dielectric to be “an insulation material,” Petitioner claims that Muh’s “oxide layer or a portion thereof[] forms a first insulation layer.” Petition, 80. Next, the Petition alleges that “Fig. B-3 shows vias connecting an inductor to a capacitor in the LC resonant circuit,” but does not actually show or explain where in Figure B-3 (reproduced below) the insulation layer formed by Muh’s “oxide layer or a

portion thereof” is located or where any vias are located.

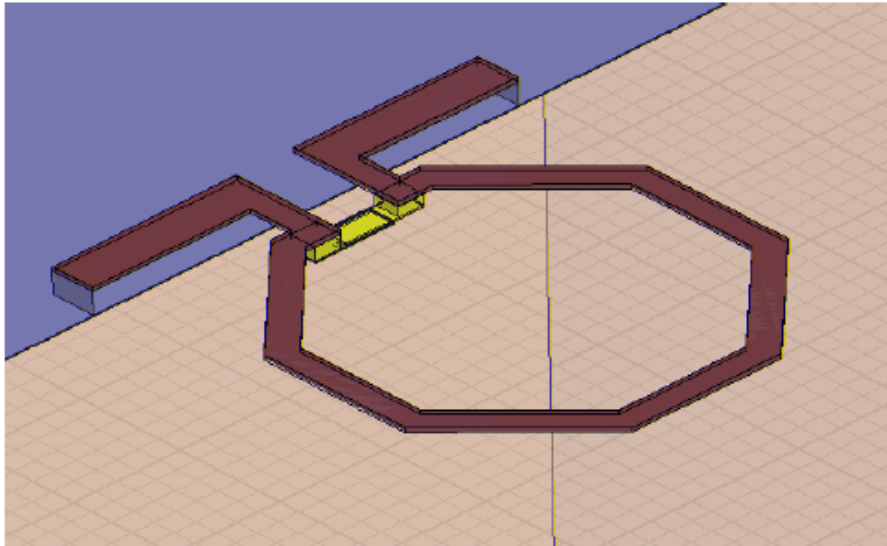


Figure B-3. HFSS model of parallel resonant tank on test chip.

Ex.1006, Fig. B-3. Contrary to Petitioner’s assertions, Muh Figure B-3 does not actually show any vias, and Muh does not describe vias anywhere within the text (*see generally* Ex.1006). Any characterization of Figure B-3 by the Petition is nothing more than unsupported attorney argument that seeks to insert into an image structures that are not shown and that the reference does not identify or even mention. And again, Dr. Prucnal’s declaration parrots Petitioner’s conclusory attorney argument, but as shown above, such conclusory statements cannot provide sufficient evidence. *Compare* Petition, 80-81 *with* Ex.1003, ¶¶ 203-206. *See generally* *supra* Section III.A (citing authority regarding conclusory declarations).

Figure B-3 of Muh, and the corresponding description in Muh, do not show

or suggest an insulation layer or vias showing any connection through that insulation layer. The Petition alleges that “[a] POSITA would have understood that the vias, which are metal structures connecting stacked metal layers, would be implemented in and surrounded by an insulation layer.” Petition, 81. This conclusion is divorced from the actual disclosure of Muh, which does not mention the word “via,” does not describe “vias,” and does not identify the location of the alleged insulation layer. *See generally*, Ex.1006. Petitioner thus asks the Board to institute trial based on Petitioner’s speculation as to where vias *could* be located and Petitioner’s further speculation that an insulation layer of indeterminate size and dimension could surround these hypothetical vias in a manner that satisfies the additional limitations discussed below.

The Petition’s failure to identify an insulation layer carries through to the claimed inductor (comprising a coil-conductor segment and two extension-conductor segments) and capacitor components, each of which must be on a surface of the first insulation layer. *See* Petition, 83-85. Because the Petition fails to identify any insulation layer in Muh, it further fails to identify any coil-conductor segment or extension-conductor segments located on a surface of the insulation layer.

As the Petition progresses to the claimed capacitor, the shortcomings of the Petition’s analysis with regard to the claimed insulation layer become all the more

amplified. The Petition does not even attempt to identify a capacitor “arranged...opposite to the inductor component *on the first insulation layer*” in Muh.² Petition, 89-93. Further, Petitioner does not even attempt to address the “embedded manner” requirement. Muh, and the Petition, are both silent as to the embedding of the capacitor in the first insulation layer, as is required by the challenged claims.

The Petition merely alleges, without grounding in *any* prior art reference that, “[t]o the extent Muh does not expressly disclose a first insulation layer with a surface on which the capacitor component is arranged in an embedded manner opposite to the inductor component, it would have been obvious to a POSITA to use a first insulation layer between the top metal layer (where the inductor is) and the lower metal layers (where the capacitor is).” Petition, 91. The only place in the record where this configuration actually appears is the ’582 Patent itself. That is

² While the Petition relies, in part, on Niknejad for the capacitor component element, it does not cite to any evidence or make any argument that Niknejad discloses the insulation layer or the inclusion of the claimed capacitor component in an embedded manner on a surface of an insulation layer opposite an inductor component. Instead, the Petition only relies on Niknejad for the alleged teachings of a finger capacitor.

insufficient to satisfy Petitioner's burden. Petitioner had an obligation to show that the identified prior art—Muh, individually or in combination with Niknejad—discloses each element. The Petition fails to do so.

The Petition, recognizing the deficiencies in the art it relies upon, alleges that “a POSITA would have understood that Muh's parallel-plate capacitor is arranged on the other surface, opposite to the inductor component, of the first insulation layer” without any support in any prior art for such a claim. Petition, 91. Instead, it relies solely on the testimony of Dr. Prucnal. Petition, 91-92. The Petition cites to Dr. Prucnal extensively throughout these two pages (and does not cite to Muh at all) but fails to identify any instance in any prior art reference of a capacitor embedded in a surface of an insulation layer opposite an inductor. Again, this is directly at odds with the Trial Practice Guide, which explains expert testimony “is not a substitute for disclosure in a prior art reference itself.” *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide November 2019 (PTAB November 2019) at 36 (“expert testimony...is not a substitute for disclosure in a prior art reference itself.”).

The Petition has therefore not satisfied, for independent claim 1, its burden of demonstrating “that there is a reasonable likelihood that the petitioner would prevail with respect to [either independent claim] challenged in the petition.” 35 U.S.C. 314(a). The Petition provides no independent analysis of independent claim 9.

Petition, 116. For the same reasons as claim 1, the Petition fails with regard to independent claim 9.

In sum, Petitioner has not shown that the prior art relied upon in the Petition discloses the claimed configuration of the insulation layer, inductor component, and capacitor component. These elements are required in each challenged claim. Thus, the lack of demonstrated teachings in the prior art is fatal to the Petition's likelihood of demonstrating unpatentability of any of the challenged claims and warrants denial of institution.

IV. THE PETITION FAILS TO ESTABLISH MUH IS PRIOR ART

It is Petitioner's burden to establish Muh is prior art. *In re Wyer*, 655 F.2d 221, 227 (CCPA 1981) ("A party seeking to introduce a reference "should produce sufficient proof of its dissemination or that it has otherwise been available and accessible to persons concerned with the art to which the document relates and thus most likely to avail themselves of its contents.") (quoting *Philips Elec. & Pharm. Indus. Corp. v. Thermal & Elecs. Indus., Inc.*, 450 F.2d 1164, 1171 (3d Cir. 1971)). Failure to include sufficient evidence that a thesis is prior art is grounds to deny institution. *Argentum Pharm. LLC v. Research Corp. Tech., Inc.*, IPR2016-00204, Paper 19 at 12 (PTAB May 23, 2016) (denying institution where the petitioner failed to establish its prior art references qualified as prior art).

The Petition alleges that “Dr. Hall-Ellis demonstrates that the Muh thesis was cataloged on July 8, 2005 at the University of California-Berkley Libraries, indexed and searchable by key word (title, author, institution).” Petition, 33. But Dr. Hall-Ellis does not actually provide evidence to support that assertion, and even if she had, it would be insufficient to establish that Muh constitutes prior art. The Board’s prior holdings apply equally to the evidence offered here: “Absent in the evidence cited by Petitioner is information related to whether the [Muh] thesis itself was publicly accessible *in the relevant time frame*, how one might have obtained a copy of the thesis, or whether the thesis was reasonably accessible through generally available means.” *Argentum Pharm. LLC v. Research Corp. Tech., Inc.*, IPR2016-00204, Paper 19 at 12 (PTAB May 23, 2016). Here, as in *Argentum*, the Petition only presents argument that *today*, Dr. Hall-Ellis was able to identify the Muh thesis in a library, as opposed to during the prior art time frame. What is lacking in the Petition’s “evidence” is any evidence from someone with personal knowledge of the availability of the reference before the effective filing date and/or evidence that any other individual had personal knowledge that it was available. Dr. Hall-Ellis relies on Exhibits 6A and 6B to her declaration, which are exhibits she created as part of the creation of her declaration, long after the priority date of the ’582 Patent. Ex.1036, 45.

The Petition's cited authority confirms that the evidence offered is deficient. In *GoPro, Inc. v. Contour IP Holding LLC*, 908 F.3d 690, 693 (Fed. Cir. 2018), the Petitioner submitted a declaration from a declarant with personal knowledge of the alleged piece of prior art. *GoPro* stands for the proposition that a declaration from the person who personally distributed a catalog at a trade-show is sufficient to establish the catalog is prior art. *Id.* In contrast, Dr. Hall-Ellis's declaration does not establish that she has any personal knowledge of Exhibit 1006. To the contrary, Dr. Hall-Ellis confirms that she received the exhibit from counsel for Petitioner, Ex.1036, 44, which indicates that she had no personal knowledge of it before receiving it from counsel.

The case that *GoPro* cites to for the proposition that Petitioner advances—that a properly indexed and cataloged thesis is prior art—is *In re Hall*, 781 F.2d 897, 900 (Fed. Cir. 1986). In *In re Hall*, the declarant also had personal knowledge of the cataloging process that occurred ***at the library that received the thesis***. See *In re Hall*, 781 F.2d at 900 (noting the declarant was “Dr. Erich Will, who is the director and manager of the Loan Department of the Library of Freiburg University.”). Dr. Hall-Ellis's declaration is not a declaration from anyone with personal knowledge of the Muh reference nor the cataloging processes that were undertaken for masters' theses at the University of California-Berkeley Library system in 2005. Dr. Hall-

Ellis provides no evidence of whether, or how, the thesis at issue could have been accessed by a member of the public during the relevant time. She provides no evidence of when the thesis first became searchable. She only opines that it is available today. That is insufficient to establish Muh as prior art.

Unlike *Seabery North America Inc. v. Lincoln Global, Inc.* IPR2016-00840, Paper No. 11 at 7 (PTAB Oct. 6, 2016), where Petitioner’s declarant had personal knowledge of the “publication” in question, Dr. Hall-Ellis lacks any such personal knowledge, and Petitioner’s evidence therefore does not establish the Muh thesis is prior art. Dr. Hall-Ellis’s lack of personal knowledge alone is sufficient to defeat Petitioner’s claim that the Muh reference is prior art. *See e.g., In re Hall*, 781 F.2d at 900.

Moreover, the pertinent inquiry regarding prior art is whether the reference was accessible to “interested members of the relevant public.” *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1569 (Fed. Cir. 1988) (“[a]ccessibility goes to the issue of whether *interested members of the relevant public* could obtain the information if they wanted to”). The Petition fails to even allege that the relevant public could have obtained Muh’s thesis if they had wanted to. Dr. Hall-Ellis’s declaration alleges that the Muh thesis was “indexed according to its creator/author (field 100), title (field 245), and the higher education institution conferring the

degrees (field 610).” Ex.1036, 46. Indexing using these fields is insufficient to establish Muh’s thesis is prior art. *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1349 (Fed. Cir. 2016) (“Indexing only by title and author’s name did not amount to the references being “either cataloged or indexed in a meaningful way.”)

Dr. Hall-Ellis’s declaration itself is evidence of the deficiencies of her analysis regarding Muh. For example, for the Niknejad reference Dr. Hall-Ellis alleges included a cataloging based on specific subject matter classifications separate and apart from the author/title/institution fields she identifies for Muh. *Compare* Ex.1036, 49 (Dr. Hall-Ellis’s declaration regarding the indexing of Ex.1007) *with* Ex.1036, 46 (Dr. Hall-Ellis’s declaration regarding the “indexing” of Ex.1006). Indeed, “[i]ndexing by subject offers meaningful assurance that an ordinarily skilled artisan, exercising reasonable diligence, will be able to locate a particular reference among the many volumes stored in a library.” *Blue Calypso*, 815 F.3d at 1349. Dr. Hall-Ellis, and the Petition, fails to provide sufficient evidence of public availability.

Thus, neither the Petition nor Dr. Hall-Ellis’s declaration establishes that any interested member of the relevant public could have identified the Muh thesis even if they had wanted to. Indexing by Mr. Muh’s name, the title of the work (which was self-published by a graduate student), and the university’s name fails to establish that any member of the relevant public could have actually found the Muh thesis.

Indeed, the Federal Circuit has held, in similar circumstances, that indexing by name and title and public availability of does not establish public accessibility, even if the title is “descriptive.” *See In re Cronyn*, 890 F.2d 1158, 1161 (Fed. Cir. 1989) (holding that student theses indexed by name and title, and available “[i]n the main library,” were “not accessible to the public because they had not been either cataloged or indexed in a meaningful way” in part because they lacked “Library of Congress catalog numbers”). Here, too, the indexing identified by Dr. Hall-Ellis, even if it had been in place prior to the filing of the ’582 Patent, which Petitioner has not shown, fails to establish that the Muh thesis was “reasonably accessible to the public.”

V. THE PETITION DID NOT FOLLOW THE PROPER FRAMEWORK FOR ASSESSING OBVIOUSNESS

The Petition departs from the legal framework for assessing obviousness. The failure to follow the established legal framework renders the Petition’s analysis and conclusions legally insufficient. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)

A. Legal Framework for Assessing Obviousness

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; (3) the level of ordinary

skill in the pertinent art; and (4) objective evidence of nonobviousness. *Id.* (setting forth “the *Graham* factors”). Against this background, the obviousness or nonobviousness of the claimed subject matter is determined. *Id.* Consideration of the *Graham* factors—including an identification of the differences between the claimed subject matter and the cited references, i.e., *Graham*’s second factor—is essential to resolving the question of obviousness.

A petition seeking to establish obviousness based on more than one reference, as is the case here, “must articulate sufficient reasoning with rationale underpinning to combine the teachings.” *Wilson Elec., LLC. v. Cellphone-Mate, Inc.*, Case No. 2018-01778, Paper 10 at 15 (PTAB April 23, 2019) (citing *KSR*, 550 U.S. at 418). A petitioner cannot demonstrate obviousness “by mere conclusory statements; instead, 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). “To facilitate review, this analysis should be made explicit.” *KSR*, 550 U.S. at 418 (citing *Kahn*, 441 F.3d at 988); *Johns Manville Corp. v. Knauf Insulation, Inc.*, IPR2018-00827, Paper 9 at 20 (PTAB October 16, 2018) (denying institution of IPR because Petition failed to meet burden when “the extent of the modifications proposed by Petitioner, the reasons for such modifications, and whether there would be a reasonable expectation of success are not adequately

supported.”)

“[I]nventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR*, 550 U.S. at 418-419. Therefore, it is important to provide a meaningful explanation as to why a POSITA would have been prompted to combine the elements in the way the claimed invention does. *Id.*; *Securus Techs., Inc. v. Global Tel*Link Corp.*, 701 F. App’x 971, 977 (Fed. Cir. 2017) (agreeing with the Board that “a broad characterization” of the prior art “as both falling within the same alleged field of ‘telecommunications monitoring and control,’ without more, is not enough for [the Petitioner] to meet its burden of presenting a sufficient rationale to support an obviousness conclusion”); *PersonalWeb Tech. LLC v. Apple, Inc.*, 848 F.3d 987, 993-94 (Fed. Cir. 2017) (vacating an obviousness determination because the “reasoning seems to say no more than that a skill artisan, once presented with the two references, would have understood that they *could be* combined. And that is not enough: it does not imply a motivation to pick out those to references and combine them to arrive at the claimed invention.”).

The Supreme Court set forth several rationales for supporting a combination of references in *KSR*: (1) combining prior art elements according to known methods

to yield predictable results; (2) simple substitution of one known element for another to obtain predictable results; (3) use of a known technique to improve similar devices in the same way; (4) applying a known technique to a known device ready for improvement to yield predictable results; (5) choosing from a finite number of identified, predictable solutions with a reasonable expectation of success; (6) variations based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; or (7) some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. *KSR*, 550 U.S. at 418.

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity ... the evidence that supports the grounds for the challenge to each claim”)). The burden of persuasion in an IPR “never shifts to the patentee.” *DynamicDrinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). Moreover, Petitioner may not “place the burden on [the Board] to sift through information presented by the Petitioners, determine where each element [of the challenged claims] is found in

[the cited references], and identify any differences between the claimed subject matter and the teachings of [the cited references.]" *Google Inc. v. Everymd.com LLC*, IPR2014-00347, Paper 9 at 25 (PTAB May 22, 2014).

Here, the Petitioner co-mingles infringement allegations from a co-pending ITC litigation, muddying the water regarding what the *Petition* contends is the actual scope of the claim. This, in effect, amounts to the Petition seeking an advisory opinion regarding the sufficiency of the patent owner's infringement allegations. Moreover, the intermingled analysis of the ITC infringement analysis with the Petition's invalidity analysis impermissibly shifts the burden to the Patent Owner and the Board to try to determine the Petition's actual invalidity theory.

For example, when analyzing the claimed "extension-conductor segments" (Petition, 86-89), the Petition oscillates between characterizing Muh and Realtek's infringement contentions, articulating an unpatentability theory "based on how Realtek interprets the limitation." Petition, 88. This is insufficient as it seeks the Board's determination as to the sufficiency of Realtek's infringement contentions rather than whether the Petition and the art relied upon therein actually satisfies the claims of the '582 Patent; such a request is improper and not an efficient use of the Board's resources.

B. The Petition Does Not Identify the Differences Between the Claimed Subject Matter and the Cited References

The Petition does not follow the framework set forth in *Graham* and entirely fails to address *Graham*'s second factor. Rather than resolving the *Graham* factors and then considering obviousness against this background, the Petition's obviousness analysis first impermissibly tries to extrapolate the teachings of the alleged prior art—with impermissible hindsight bias—and then considers the claim elements against this expanded prior art interpretation rather than the actual teachings of the prior art.

Specifically, and as set forth above in Section III, the Petition provides a cursory analysis of the prior art without actually identifying where the prior art relied upon discloses elements such as the claimed insulation layers. *See e.g.*, Petition, 43, 51, 69, 81, 85, 91 (“to the extent [reference] does not expressly disclose [element]”). This failure to expressly articulate what the Petition relies upon to satisfy each of the claimed limitations warrants denial of the Petition.

Notably, the Petition does not acknowledge which elements of the claimed subject matter are absent from Gonzalez and Muh, and it is unclear which disclosure in each of the references the Petition relies upon to show each of the claimed limitations. For example, the Petition does not state which disclosures in Gonzalez and Muh independently show, or fail to show, each element in independent claim 1.

Instead, the Petition, failing to actually identify the claimed insulation layer in the prior art (*See* Section III), appears to rely on both an unidentified teaching from the reference (a teaching that does not actually exist in the references) and/or the expert's opinions.

In doing so, the Petition fails to identify differences between the claims and the prior art as *Graham's* second factor requires. *See Adaptics Ltd. v. Perfect Co.*, IPR 2018-01596, Paper 20 at 20 (PTAB March 6, 2019) (denying institution for lack of particularity and stating “[c]ritically, however, the Petition fails to specify what Petitioner regards as the difference(s) between [the primary references] and the challenged claims.... Instead, Petitioner provides three ‘example’ limitations that [the primary references] may be deemed not to disclose.... Petitioner does not, however, state that these limitations are missing from [the primary references]”) (*citing Graham*, 383 U.S. at 17.)

The deficiency in failing to resolve *Graham's* second factor infects all of the asserted grounds because they all build on the Gonzalez/Muh references for independent claim 1. By not addressing *Graham's* second factor, the Petition's obviousness analysis is fatally flawed.

C. The Petition's Improper Obviousness Analysis Places an Undue Burden on the Board

By forsaking the established framework from *Graham* and *KSR*, the Petition

wrongly seeks to shift its burden onto the Board (and the Patent Owner). The Board has consistently denied institution in similar instances.

For example, in *Google Inc. v. Everymd.com*, the Board disapproved of the petitioner's dissociated use of summaries, quotations, and figures from the prior art and found that such an approach "[did] not address meaningfully the scope and content of the prior art, and any differences between the claimed subject matter and the prior art." IPR2014-00347, Paper 9 at 24-25 (PTAB May 22, 2014). The Board observed that this approach "place[s] the burden on us to sift through the information presented by Petitioners, determine where each element of claim 1 is found in [the prior art], and identify any differences between the claimed subject matter and the teachings of [the prior art]." *Id.*; see also *Adaptics Ltd. v. Perfect Co.*, IPR2018-01596, Paper 20 at 20 (PTAB Mar. 6, 2019) (denying institution for lack of particularity that results in voluminous and excessive grounds); *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) ("It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify 'with particularity' the 'evidence that supports the grounds for the challenge to each claim.'" (quoting 35 U.S.C. § 312(a)(3))).

As in the cases above, the Petition seeks to shift to the Board the significant burden of resolving the second *Graham* factor, both in trying to determine what the

Petition contends is within the scope of the claim and where in the prior art the Petition contends these limitations are found. Stated differently, Petitioner has shifted a substantial amount of work to the Board, which stands in stark contradiction to Petitioner's actual obligations, which are to identify "with particularity ... the evidence that supports the grounds for the challenge to each claim." 35 U.S.C. § 312(a)(3).

The Petition failed to show with particularity why the claims are allegedly unpatentable, and the Board is not obligated to conduct the obviousness analyses that are the duty of the Petitioner. *See Google Inc. v. Everymd.com*, IPR2014-00347, Paper 9 at 24-25.

VI. CONCLUSION

For the reasons set forth above, Realtek respectfully asks the Board not to institute trial for this Petition.

Dated: July 28, 2023

Respectfully submitted,

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CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Patent Owner's Preliminary Response totals 7,550 words, which is less than the 14,000 words allowed under 37 C.F.R. § 42.24(b)(1).

Dated: July 28, 2023

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CERTIFICATE OF SERVICE

I hereby certify that on July 28, 2023, I caused a true and correct copy of the foregoing to be served on the following counsel for Petitioner by electronic mail to the following email address:

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