

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS AMERICA, INC.,
SAMSUNG ELECTRONICS CO., Ltd.
Petitioner,

v.

MASSIVELY BROADBAND LLC,
Patent Owner.

CASE: IPR2025-01564
Patent 11,063,625

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. STATEMENT OF THE PRECISE RELIEF REQUESTED	2
III. BACKGROUND	2
A. Overview of the '625 Patent.....	2
B. Priority	4
C. Level of Ordinary Skill.....	5
D. Claim Construction.....	5
E. The Petition's Asserted Grounds.....	6
1. Grounds Asserted in the Petition	6
2. Summary of the Asserted Grounds' Prior Art	7
IV. THE PETITION FAILS TO ESTABLISH A REASONABLE LIKELIHOOD OF SUCCESS ON A SINGLE CLAIM.....	10
A. The Petition Purports To Apply Plain and Ordinary Meaning but in Fact Applies a Materially Different Construction Of "Nulls"	11
1. Legal Standard: A Petition Premised on an Incorrect Claim Construction Cannot Support Institution.....	11
2. Petitioner Purports to Apply Plain and Ordinary Meaning of "Nulls," but Omits a Material Requirement from Its Own Dictionary Evidence.....	12
3. Petitioner's Claim-Construction Defect Warrants Denial of Institution .	13
B. Schlub Does Not Disclose the Claimed "Nulls or Dead Zones" even under Petitioner's Asserted Construction	14
1. Petitioner Treats the "Nulls or Dead Zones" Limitation as Requiring "Nulls"	14
2. Petitioner Fails to Show that Schlub Discloses or Suggests "Nulls or Dead Zones" under Its Construction	15

C.	The Petition Fails to Articulate Well-Reasoned Rational Underpinnings Motivating the Combination of Ground 3	18
1.	Applicable Legal Standard.....	18
2.	Petitioner’s Asserted Motivations to Combine Are Generalized, Conclusory, and Untethered to the Claimed Invention	20
3.	Petitioner’s Motivation Analysis Does Not Address the Claimed Directional Radiation Limitations	24
4.	Petitioner Has Not Carried Its Burden for Ground 3	24
V.	CONCLUSION.....	25

TABLE OF AUTHORITIES

Page

Cases

<i>In re Aoyama</i> , 656 F.3d 1293 (Fed. Cir. 2012)	11
<i>Aqua Prods., Inc. v. Matal</i> , 872 F.3d 1290 (Fed. Cir. 2017)	10
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<i>Catalyst OrthoScience Inc. v. Shoulder Innovations, Inc.</i> , PGR2024-00042, Paper 17 (PTAB Dec. 19, 2024).....	6
<i>Dish Network L.L.C. v. TQ Beta, LLC</i> , IPR2015-01791, Paper 30 (PTAB Jan. 30, 2017)	18
<i>Hartness Int’l Inc. v. Simplimatic Eng’g Co.</i> , 819 F.2d 1100 (Fed. Cir. 1987)	25
<i>Hunting Titan, Inc. v. DynaEnergetics Europe GmbH</i> , PGR2020-00080, Paper 7 (PTAB Feb. 12, 2021)	19
<i>Intel Corp. v. PACT XPP Schweiz AG</i> , IPR2020-00532, Paper 12 (PTAB Sept. 10, 2020).....	11, 13
<i>InTouch Techs., Inc. v. VGO Commc’ns, Inc.</i> , 751 F.3d 1327 (Fed. Cir. 2014)	19
<i>KSR Int’l Co. v. Teleflex, Inc.</i> , 550 U.S. 398 (2007).....	18
<i>In re Magnum Oil Tools Int’l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016)	10, 18
<i>MModal LLC v. Nuance Commc’ns, Inc.</i> , 846 Fed.App’x 900 (Fed. Cir. 2021)	11

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Statutes	
35 U.S.C. § 314(a)	10
35 U.S.C. § 316(e)	10
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37 C.F.R. § 42.107(a).....	1

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Exhibit No.	Description
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I. INTRODUCTION

MASSIVELY BROADBAND LLC (“Patent Owner”) submits this Patent Owner Preliminary Response pursuant to 37 C.F.R. § 42.107(a) to the *Inter Partes* Review petition (“Petition” or “Pet.”) filed by Samsung Electronics Co., Ltd. and Samsung Electronics America, LLC (“Petitioner”) for all thirty-three (33) claims (the “Challenged Claims”) of Patent 11,063,625 (“’625 Patent”).

The Board should deny institution because the Petition fails to demonstrate a reasonable likelihood that the Petitioner will prevail as to any challenged claim. Specifically:

(1) despite asserting that the plain and ordinary meaning of the claim terms applies, Petitioner ignores the technical dictionary definition on which the Petition itself relies, and instead applies a materially broader and unsupported meaning to the term “*nulls*”—a limitation that appears in every independent claim. Deviating from the very dictionary definition *upon which the Petition itself relies* undermines the Petitioner’s analysis across all grounds;

(2) even under the interpretation of “nulls” that Petitioner applies, Grounds 1 and 2 of the Petition fail to show that the cited prior art discloses or teaches all limitations of the independent claims; and

(3) Ground 3 of the Petition fails because Ground 3 does not articulate a well-reasoned motivation, supported by a rational underpinning, for combining the

cited references.

Accordingly, institution should be denied.

II. STATEMENT OF THE PRECISE RELIEF REQUESTED

Patent Owner requests that the Board deny institution of the Petition with respect to all of the Challenged Claims (claims 1-33) and all asserted grounds. A full statement of the reasons for the relief requested is set forth in Sections III and IV of this Preliminary Response.

III. BACKGROUND

A. Overview of the '625 Patent

The '625 Patent concerns antenna-related techniques for wireless devices. The specification describes two principal sets of concepts. First, the '625 Patent discusses architectures for simplifying antenna implementations in wireless devices by enabling an antenna to be used across multiple frequency bands, including embodiments using active tuning and matching to support simultaneous multi-band operation. Ex. 1001, 5:10-9:28, Figs. 1-6C. Second, the '625 Patent describes using steerable antennas—particularly in higher-frequency (e.g., millimeter-wave) contexts—to shape radiated energy away from a user or nearby structure for performance and safety reasons. *Id.*, 9:29-14:31, Figs. 7-8.

The challenged claims recite elements directed to beam steering with avoidance of user/structure directions in the context of a device operating at frequencies of 10 GHz to 500 GHz. The '625 Patent includes three independent

claims—claims 1, 11, and 23—which are similar in scope and vary primarily by statutory class: a method for claim 1; a wireless device for claim 11; and a steerable antenna system for claim 23. Collectively, the independent claims recite a wireless device (or system) having at least one steerable antenna and one or more sensors and processing that:

- detects, in three-dimensional space, an orientation of the wireless device relative to a user and/or a structure using one or more specified sensor types (e.g., cameras, microphones or audio sensors, ultrasound sensors/transducers, range finders, capacitive sensors, gyroscopes, light detectors, or motion detectors);
- determines zones or spans of directions in the three-dimensional space corresponding to one or more directions of the user and/or the structure relative to the steerable antenna; and
- adjusts one or more beam radiation patterns of the steerable antenna so that the device radiates in directions that are not within the determined zones/spans—the antenna is configured to steer or direct energy in particular directions while providing “nulls or dead zones” in other directions, and the adjusted radiation pattern avoids the identified user/structure directions.

Thus, while the specification includes detailed discussion of multi-band antenna simplification and active tuning architectures, the independent claims focus on sensor-informed computation of avoidance zones and dynamic beam-pattern adjustment—including the provision of “nulls or dead zones” in avoided directions—implemented in a steerable-antenna wireless device that operates on one or multiple bands and, in the independent claims, radiates within a frequency range of 10 GHz to 500 GHz.

B. Priority

The '625 Patent application was filed August 14, 2013. Ex. 1001, field code (22). The '625 Patent claims priority as a continuation-in-part to predecessor applications dating back to August 14, 2009 and a provisional application filed August 14, 2008. *Id.*, field codes (63), (60).

The challenged claims recite, among other things, sensor-informed determination of zones or spans of directions corresponding to a user or structure and dynamic adjustment of beam radiation patterns to avoid those zones while providing nulls or dead zones, which, as Petitioner acknowledges, is not disclosed in the predecessor applications. Pet., 6-7; Exs. 2038–2039. Accordingly, for purposes of this proceeding, the earliest filing date to which the challenged claims are entitled is August 14, 2013. The AIA provisions of 35 U.S.C. §§ 102, 103 apply. *See* Pub. L. No. 112-29, § 3(n)(1), 125 Stat. 284, 293 (2011).

C. Level of Ordinary Skill

For purposes of this Preliminary Response, Patent Owner accepts the skill level proposed by Petitioner for a person of ordinary skill in the art (“POSITA”). Petitioner’s proposed POSITA is a person having a “at least a Bachelor’s degree in electrical engineering, computer engineering, physics, or a related field, and at least two years of experience working with design and integration of RF circuits and antennas for wireless communication devices,” where “[m]ore education can substitute for practical experience and vice versa.” Pet., 5. Patent Owner reserves the right to address or refine the level of ordinary skill at a later stage of this proceeding or in any parallel litigation, should the POSITA’s skill level become relevant.

D. Claim Construction

Patent Owner agrees with Petitioner that, for the purposes of this Preliminary Response, all claim terms should be given their plain and ordinary meaning as understood by a POSITA in the context of the ’625 Patent and its prosecution history. Pet., 9. However, as discussed below (see Section IV.A.2 regarding “nulls”), Petitioner has not applied the plain and ordinary meaning of certain claim terms. In particular, Petitioner first relied upon a well-known dictionary for evidence of the plain and ordinary meaning of the claim term “nulls,” but then failed to apply that same dictionary definition throughout the

Petition.

To the extent any dispute exists regarding the meaning of a claim term, such dispute does not provide a basis for institution. *See, e.g., Catalyst OrthoScience Inc. v. Shoulder Innovations, Inc.*, PGR2024-00042, Paper 17, 43 n. 13 (PTAB Dec. 19, 2024) (Board “need not resolve the expression construction of [disputed claim terms] because doing so would not change the outcome of our compelling-merits analysis”). The Petition fails under the plain and ordinary meaning of the claim terms, and Patent Owner reserves the right to address claim construction post-institution if necessary.

E. The Petition’s Asserted Grounds

1. Grounds Asserted in the Petition

Petitioner asserts that the Challenged Claims are unpatentable under the following asserted grounds:

Ground	Basis	Reference(s)	Claims
1	§§ 102, 103	Schlub	1–2, 5, 9–14, 17, 21–26, 29, 33
2	§ 103	Schlub in view of Seol	3–4, 6–8, 15–16, 18–20, 27–28, 30–32
3	§ 103	Prasad in view of Seol and further in view of Yin	1–33

There are two, and only two, asserted grounds for each claim in the Petition.

2. Summary of the Asserted Grounds' Prior Art

a. Schlub (Ex. 1005) – Pub. 2011/0250928 A1

Schlub describes wireless-capable electronic devices that adjust operation of their wireless circuitry based on whether a user's body or another external object is near one or more antennas. Ex. 1005, ¶¶[0006]-[0009], [0021]-[0023], [0056]-[0057]. Schlub emphasizes detecting proximity—e.g., whether an object is within a threshold distance of an antenna—using antenna-impedance measurements derived from monitoring RF signal phase and magnitude (including reflected signals), optionally augmented with other device sensors such as thermal/infrared sensors, motion sensors, capacitive touch/proximity sensors, ambient light and IR proximity sensors, acoustic sensors (including ultrasound), electrical sensors, and cameras. *Id.*, ¶¶[0006]-[0007], [0021]-[0022], [0040]-[0049], [0057], [0060]. .

When the device determines that an external object is in the vicinity of an antenna, Schlub teaches a range of responsive actions focused on managing emissions while maintaining wireless performance. *Id.*, ¶¶[0009], [0023], [0057], [0086]-[0089]. The responsive actions include adjusting transmit power, switching among antennas (e.g., diversity), changing communications mode (including reducing or altering MIMO operation), changing protocol or data rate, changing the active communications band, delaying transmissions, issuing user prompts, and tuning antenna-related circuitry (e.g., matching networks, feed locations,

resonating element geometry, and other tunable components and switches). *Id.*, ¶¶[0009], [0023], [0030]-[0031], [0088]-[0089].

Schlub also contemplates multi-antenna arrays, including a phased array controlled by phase controllers to implement beam steering. *Id.*, ¶¶[0005], [0032], [0078]-[0081]. In that context, Schlub describes altering operational parameters of the wireless transmission system (*id.*, ¶¶[0032], [0081], [0088]), but does not characterize resulting radiation patterns or identify any defined angular regions of reduced radiation, such as nulls or dead zones, relative to surrounding zones or spans of directions. In that connection, Schlub does not refer to any nulls or dead zones in radiation patterns.

b. Prasad (Ex. 1006) – Pub. 2013/0237272 A1

Prasad describes a radiation-reduction system for mobile devices that is primarily concerned with lowering user exposure to radio-frequency energy, as measured by Specific Absorption Rate (SAR), while maintaining acceptable communication performance. Ex. 1006, ¶¶[0007], [0016], [0025]. Prasad focuses on actively varying and controlling a mobile device antenna system based on device proximity to the user, usage mode or operating scenario, device orientation, and signal quality parameters. *Id.*, ¶¶[0007], [0016], [0021]-[0025].

Prasad's system includes sensors, such as proximity sensors, contact sensors, orientation sensors (e.g., gyroscopes and accelerometers), and sensors indicative of

usage scenarios (e.g., handset mode, speaker mode, headset detection, data transfer mode, and cradle or holder detection), with signals from Prasad’s sensors being processed, together with signal quality parameters from the transceiver, to generate control signals that adjust the antenna’s radiation behavior for purposes of reducing user exposure. *Id.*, ¶¶[0008]-[0010], [0020]-[0027]. Like Schlub, Prasad also does not refer to any nulls or dead zones in radiation patterns.

c. Seol (Ex. 1007) – Patent 9,362,994

Seol describes hybrid analog/digital beamforming for millimeter-wave (“mmWave”)¹ wireless communications, combining directional analog beams (via RF phase shifters and antenna arrays) with digital MIMO/precoding/combining to improve link performance. Ex. 1007, 2:31-35, 7:14-45, 8:17-64, 13:34-63, 14:25-50. Seol discloses procedures in which a base station sweeps multiple beams, a mobile station measures channel quality and reports preferred beam(s)/beam pair(s), the base station selects a final beam, and the mobile station provides feedback for digital beamforming (e.g., precoder/codebook, stream/rank, CSI/CQI) based on an effective channel matrix for the selected beam(s). *Id.*, 2:43-63, 9:48-57, 10:28-64, Figs. 8-9.

¹ Millimeter-wave communications include operations at frequencies such as at 28 GHz and 38 GHz. Exs. 2013-2014.

d. Yin (Ex. 1008) – WO 2014/194455 A1

Yin discloses reducing human exposure to EM radiation from a wireless client device by using a camera (optionally infrared/panoramic processing) to detect nearby people, identify spatial region(s) occupied by those people, and then compute antenna-array control weights (beamforming /spatial suppression techniques) so the device transmits with an EM radiation pattern that steers energy away from the detected people/regions, potentially triggered when transmissions begin or when link quality degrades. Ex. 1008, 3:19-26, 7:1-15, 8:6-19, 9:6-27.

**IV. THE PETITION FAILS TO ESTABLISH A REASONABLE
LIKELIHOOD OF SUCCESS ON A SINGLE CLAIM**

The Board should deny institution of the IPR because Petitioner has failed to establish a likelihood that Petitioner will succeed in showing that any Challenged Claim is unpatentable under any asserted ground. 35 U.S.C. § 314(a) (“Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”); *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1298 (Fed. Cir. 2017) (similar).

A. The Petition Purports To Apply Plain and Ordinary Meaning but in Fact Applies a Materially Different Construction Of “Nulls”

1. Legal Standard: A Petition Premised on an Incorrect Claim Construction Cannot Support Institution

At the institution stage, Petitioner bears the burden of demonstrating a reasonable likelihood of prevailing on at least one challenged claim; that burden never shifts to Patent Owner. 35 U.S.C. § 316(e); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375 (Fed. Cir. 2016). The Board may deny institution where a petition’s unpatentability analysis applies a claim construction that is materially different from the construction on which the petitioner purports to rely.

In *Intel Corp. v. PACT XPP Schweiz AG*, IPR2020-00532, Paper 12 (PTAB Sept. 10, 2020), the Board denied institution where the petitioner asserted that the plain and ordinary meaning of a claim term –“dedicated”—applied, yet the petitioner’s asserted grounds relied on an implied interpretation inconsistent with the intrinsic and dictionary evidence. *Id.* at 9-16. Accordingly, the Board found that petitioner’s challenges were “premised on its incorrect implied construction.” *Id.* The Board then held that the petitioner failed to show a likelihood of prevailing and denied institution without reformulating petitioner’s theory or analyzing the prior art under a different construction. *Id.* at 16-24.

Claim construction is the first step in any anticipation or obviousness analysis. *See e.g., In re Aoyama*, 656 F.3d 1293, 1296 (Fed. Cir. 2012). When a

petition applies a materially incorrect or inconsistent construction, the resulting unpatentability analysis cannot satisfy petitioner's burden at institution. *See e.g., Intel, supra; MModal LLC v. Nuance Commc 'ns, Inc.*, 846 Fed.App'x 900, 906-07 (Fed. Cir. 2021) (affirming final written decision where Board rejected petitioner's proposed construction of claim term such that petitioner failed to prove unpatentability under the proper construction).

2. Petitioner Purports to Apply Plain and Ordinary Meaning of "Nulls," but Omits a Material Requirement from Its Own Dictionary Evidence

Petitioner asserts that the claim terms should be given their plain and ordinary meaning and that the Board does not need to construe any claim term. Pet., 9; *see also* Ex. 1003, ¶77. Purporting to adhere to that position, Petitioner and its expert contend that the plain and ordinary meaning of "nulls"—which appears in every independent claim of the '625 Patent—is "minima in the radiation pattern." Pet., 22; Ex. 1003, ¶102. As support, Petitioner and its expert cite the definition of "directional-null" in "IEEE Standards for Definitions of Terms for Antennas," IEEE Std 145-2013. *Id.* This dictionary definition, however, specifically requires "[a] *sharp* minimum in a radiation pattern that has been produced for the purpose of direction-finding or the suppression of unwanted radiation in a specified direction." Ex. 1012, 24 (emphasis added). Petitioner and its expert have omitted the requirement that the minima be "sharp," without any

explanation or justification. Pet., 22; Ex. 1003, ¶102. Consequently, Petitioner's asserted "plain and ordinary meaning" of the term "nulls" is materially broader than the very same dictionary definition Petitioner selected and relied upon as evidence for that plain and ordinary meaning.

3. Petitioner's Claim-Construction Defect Warrants Denial of Institution

The Petition suffers from a threshold claim-construction defect: although Petitioner asserts that the plain and ordinary meaning of "nulls" applies, the asserted grounds apply a materially *different* construction. Specifically, the asserted grounds omit a required feature of the very dictionary definition Petitioner cites as evidence of that plain and ordinary meaning. This defect is not a dispute between the parties over how the term "nulls" should be construed, nor is the Board being asked to choose, at the institution stage, between competing interpretations. Rather, similar to *Intel*, Petitioner here expressly disclaims the need for claim construction, selects a specific dictionary definition as evidence of the plain and ordinary meaning of "nulls," and then fails to apply a material requirement of that definition in its unpatentability analysis.

Because Petitioner asserts that the plain and ordinary meaning for "nulls" applies, identifies a dictionary definition as support for that meaning, and then fails to apply a material requirement of that very definition in its unpatentability

analysis, Petitioner’s asserted grounds suffer from a fatal defect such that Petitioner cannot carry its burden to demonstrate a reasonable likelihood of prevailing on any challenged claim. The Board should deny institution rather than undertaking its own claim construction and unpatentability analysis to repair Petitioner’s defective showing. *See Intel*, IPR2020-00532, Paper 12 at 20–24. Petitioner—not the Board—bears the burden of articulating and applying a coherent claim construction at institution, and having failed to do so, the Petition does not warrant institution.

B. Schlub Does Not Disclose the Claimed “Nulls or Dead Zones” even under Petitioner’s Asserted Construction

1. Petitioner Treats the “Nulls or Dead Zones” Limitation as Requiring “Nulls”

Each independent claim of the ’625 Patent expressly requires that the steerable antenna steer or direct its radiated energy in particular directions while providing “nulls or dead zones” in other directions, such that the “nulls or dead zones” are placed in the directions of the user or a structure. Ex. 1001, claims 1, 11, 23. Although the claims recite “nulls or dead zones” with the conjunction “or,” neither Petitioner nor its expert draw any meaningful distinction between the two concepts. Instead, Petitioner treats “nulls” and “dead zones” as functionally interchangeable and focuses its analysis exclusively on whether Schlub allegedly discloses “nulls” under an asserted construction that differs materially from the

technical dictionary on which Petitioner relies. Pet., 22-23; Ex. 1003, ¶¶102-103. As shown below, however, even under its asserted construction, Petitioner fails to demonstrate that Schlub provides “nulls” in any direction as the claims require.

2. Petitioner Fails to Show that Schlub Discloses or Suggests “Nulls or Dead Zones” under Its Construction

Petitioner’s Grounds 1 and 2 depend on the assertion that Schlub discloses the independent-claim requirement that the steerable antenna provides “nulls or dead zones” in certain directions. Pet., 22–23; Ex. 1003, ¶¶102–103. Petitioner relies on a dictionary definition of “null” that requires a “*sharp*” minimum in a radiation pattern, yet nowhere does the Petitioner ever contend that Schlub discloses such a sharp minimum. Instead, even accepting Petitioner’s asserted construction of “nulls” as “minima in a radiation pattern,” Petitioner fails to demonstrate that Schlub discloses or suggests the formation of such minima. This failure is consequential: the term “nulls” appears in every independent claim, and Petitioner’s inability to show this limitation is fatal to Grounds 1 and 2 in their entirety.

Petitioner’s analysis rests on an unsupported logical leap—namely, that because Schlub discloses beam steering or directional adjustment, Schlub necessarily discloses the creation of “nulls.” *Id.* Schlub, however, never describes the formation of minima in a radiation pattern, never characterizes any angular

regions as suppressed relative to surrounding directions, and never discusses antenna-pattern features corresponding to nulls or dead zones. At most, Schlub describes redirecting or steering radiated energy. That is not the same as demonstrating the existence of minima in a radiation pattern, which would be required under Petitioner’s own construction. Petitioner provides no technical explanation, citation, or analysis establishing that Schlub’s disclosed steering behavior produces a minima in a particular direction, and the Petition simply assumes—without evidentiary support—that beam steering inherently results in null formation. That assumption cannot substitute for the showing Petitioner must make to justify institution.

Schlub’s disclosure is limited to the general ability to steer or redirect radiated energy, without placing nulls or dead zones in specific directions. For example, Schlub explains that control circuitry may adjust antenna phases to alter the direction in which the antenna operates, including in response to detection of an external object. Ex. 1005 ¶[0032]. Schlub states that the array “can be adjusted so that antenna signals are oriented in a different direction” or to “minimize emissions into external objects.” *Id.* But Schlub never explains how such minimization is achieved, does not describe the resulting radiation pattern, and does not indicate or describe how any angular region exhibits a minimum—let alone a defined or discernible minimum—relative to surrounding directions. Nor

does Schlub describe suppression of radiation over any defined angular extent or direction relative to surrounding directions; Schlub’s disclosure is limited to control actions that reduce or redirect emissions without characterizing resulting pattern features. *See, e.g.*, Ex. 1002, 41-42 (Board distinguishing, in an *ex parte* appeal, a reference that, similar to Schlub, did not adjust a beam radiation pattern for a steerable antenna away from a user or obstacle).

Critically, Petitioner has not shown that minimizing emissions toward an object is equivalent to forming a minimum in a radiation pattern (Petitioner’s purported definition of “null”). Even if a POSITA might have known that emissions may be “minimized” through a wide range of techniques—such as modest beam redirection, power reduction, antenna selection, or other control strategies—without producing any minima in the radiation pattern, Schlub does not disclose that its steering produces localized depressions in radiated energy. Nor does Schlub identify any regions or spatial zones that function as “nulls” or “dead zones” under Petitioner’s construction.

Petitioner’s expert does not bridge this gap. Although Dr. Mahon references Schlub’s ¶[0032] discussion of steering or avoidance behavior generally (*see* Ex. 1003, ¶101), he does not identify any disclosure in Schlub that describes or evidences minima in a radiation pattern for purposes of the “nulls or dead zones” limitation. Instead, Dr. Mahon simply asserts—without technical explanation,

analysis, or citation—that steering energy away from certain directions inherently produces “nulls.” *Id.* That assertion is conclusory, unsupported by Schlub itself, and inconsistent with the IEEE dictionary definition requiring a “sharp” minimum in the radiation pattern.

Furthermore, Petitioner does not contend that Seol remedies this deficiency. Petitioner does not argue that Seol discloses or suggests nulls or dead zones in the sense required by the claims, nor that Seol supplies any missing disclosure from Schlub concerning the formation of minima in a radiation pattern. *See* Pet., Ground 2 (pp. 36-44).

Petitioner has not shown that Schlub discloses or suggests “nulls or dead zones,” even under Petitioner’s own construction of “nulls.” By equating beam steering or emission minimization with null formation—without explanation or evidentiary support—Petitioner fails to demonstrate that Schlub teaches all elements of the independent claims. That failure is fatal to Grounds 1 and 2 and applies equally to all challenged claims that depend from the independent claims.

C. The Petition Fails to Articulate Well-Reasoned Rational Underpinnings Motivating the Combination of Ground 3

1. Applicable Legal Standard

To institute on an obviousness ground based on a combination of references, Petitioner must demonstrate a reasonable likelihood that Petitioner would prevail by articulating a reasoned rationale underpinning the proposed combination. *KSR*

Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 418 (2007); *Dish Network L.L.C. v. TQ Beta, LLC*, IPR2015-01791, Paper 30, 19 (PTAB Jan. 30, 2017) (petitioner failed to show claim unpatentable because petitioner failed to provide articulated reasoning with some rational underpinning for combining references). A petition must do more than identify prior art elements and assert that they could be combined; the petition must explain why a POSITA would have been motivated to combine the references in the manner proposed. *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d at 1378-81. Conclusory assertions, general design goals, or labels such as “simple substitution” or “obvious to try” do not suffice. *See, e.g., TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1358-59 (Fed. Cir. 2019) (“Conclusory expert testimony does not qualify as substantial evidence.”); *Arendi S.A.R.L. v. Apple, Inc.*, 832 F.3d 1355, 1362 (Fed. Cir. 2016) (“references to ‘common sense’ . . . cannot be used as a wholesale substitute for reasoned analysis and evidentiary support”); *In re Nuvasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (conclusory statements alone insufficiently articulate a motivation to combine); *Hunting Titan, Inc. v. DynaEnergetics Europe GmbH*, PGR2020-00080, Paper 7, 11 (PTAB Feb. 12, 2021) (petitioner’s reliance “on generalized statements that such [obviousness] combinations would, for instance, be ‘predictable,’ ‘simple substitution,’ application of ‘known techniques,’ and ‘obvious to try’” insufficient to meet burden to justify institution).

Among other things, Petitioner must explain why and how a POSITA would have combined the references in the manner asserted, with a reasonable expectation of success. *See Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (party asserting obviousness must 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). Expert testimony may support such a showing, but only if the expert testimony provides independent technical reasoning and does more than merely repeat the Petition’s conclusions. *See InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1349-52 (Fed. Cir. 2014) (reversing finding of obviousness where expert “failed to provide the necessary ‘articulated reasoning with some rational underpinning’ to support a conclusion of invalidity based on these combinations”).

As set forth below, Petitioner fails to meet these requirements.

2. Petitioner’s Asserted Motivations to Combine Are Generalized, Conclusory, and Untethered to the Claimed Invention

Ground 3 relies on an alleged combination of Prasad, Seol, and Yin. Pet., 45. But the Petition does not articulate a reasoned explanation, grounded in the disclosures of those references and the claim requirements, showing why a POSITA would have combined them in the manner required by the independent

claims. Instead, the Petition strings together generalized observations about mmWave communications, beamforming, and known techniques, without explaining how or why those teachings would be integrated into Prasad's system to arrive at the claimed invention.

At a high level, Petitioner advances four asserted motivations to combine:

1. that mmWave communications were desirable to increase throughput;
2. that beamforming is useful in mmWave systems to mitigate propagation loss;
3. that Prasad's steerable antenna could therefore be operated at mmWave frequencies; and
4. that known techniques such as different uplink/downlink beam patterns or time division duplexing (TDD) could be incorporated with predictable results.

Pet. 47-51; Ex. 1003, ¶¶187-197. Petitioner's assertions do not supply the required rational underpinning to support any of Petitioner's four asserted motivations to combine for at least three independent reasons.

a. Petitioner's Frequency-Band Rationale Does Not Explain the Claimed Combination

Petitioner's primary justification for combining Prasad with Seol is that Seol discloses operation in mmWave frequency bands, whereas Prasad does not

expressly disclose operation in the claimed 10–500 GHz range. Pet., 47; Ex. 1003, ¶¶187-188. But pointing to Seol’s general discussion of mmWave systems does not explain *why or how* a POSITA would modify Prasad’s system—designed for user-proximate radiation protection—to operate in those mmWave frequency bands while retaining the claimed directional behavior.

The Petition does not: (i) analyze any compatibility issues between Prasad’s disclosed antenna architecture and mmWave operation; (ii) identify any design changes required to implement mmWave frequencies in Prasad’s system; or (iii) identify any disclosure in Seol that addresses user-proximate radiation avoidance in the manner claimed. Instead, Petitioner relies on the conclusory assertion that Prasad’s antenna “is not limited to or dependent on certain operating frequencies” and therefore could be configured to operate in the claimed range. Pet., 50; Ex. 1003 ¶¶196–197. That assertion merely states possibility, not motivation, and does not explain why a POSITA would have made the modification in view of the problem Prasad set out to solve.

b. The Beamforming Rationale Merely Restates Known Capabilities Without Explaining the Claimed Integration

Petitioner next asserts that Seol’s discussion of beamforming in mmWave systems would motivate a POSITA to combine Seol with Prasad because Prasad already discloses a steerable antenna. Pet., 47-48; Ex. 1003, ¶189. This reasoning,

however, collapses into the observation that both references involve beam steering—an overlap that, standing alone, is insufficient to justify a combination. Critically, Petitioner does not explain (i) why Seol’s hybrid beamforming techniques would be incorporated into Prasad’s radiation-protection system; (ii) how Seol’s base-station-centric beam selection procedures would be adapted to Prasad’s user-protection emissions use case; or (iii) how this combination would result in the claimed directional behavior, including the formation of “nulls or dead zones.”

As the Federal Circuit has repeatedly held, identifying that two references address beamforming or steering does not supply a rational underpinning for combining them absent a reason to integrate their teachings in the specific manner claimed. *Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 887-88 (Fed. Cir. 2024) (legal error to treat the mere fact that elements or techniques are known, or that references address the same field or problem, as sufficient motivation to combine).

c. Petitioner’s Reliance on “Routine Engineering” and “Predictable Results” Is Conclusory

Throughout its motivation-to-combine discussion, Petitioner characterizes the asserted modifications as involving “routine engineering” and “predictable results.” Pet., 49, 51; Ex. 1003, ¶197. Petitioner’s descriptions are just self-serving

labels, not explanations. The Petition does not: (i) identify the specific engineering steps a POSITA would take to combine these references; (ii) explain how those steps would preserve Prasad's radiation-avoidance functionality at mmWave frequencies; or (iii) articulate why a resulting combination would reasonably be expected to succeed in achieving the claimed behavior.

Such conclusory assertions—particularly when echoed verbatim by Petitioner's expert—do not satisfy Petitioner's burden at institution.

3. Petitioner's Motivation Analysis Does Not Address the Claimed Directional Radiation Limitations

Still further, Petitioner's asserted motivations to combine Prasad, Seol, and Yin focus on throughput, propagation loss, and system performance (Pet., 47-49; Ex. 1003, ¶¶188-189, 192), and not on the claimed directional radiation behavior of the '625 Patent. The Petition does not explain why a POSITA would combine Prasad, Seol, and Yin to achieve the specific directional radiation characteristics required by the independent claims, including providing reduced radiation in particular zones or spans of directions while steering energy elsewhere.

This disconnect between the asserted motivations and the claim limitations underscores the absence of a reasoned rationale underpinning the proposed combination, without which Petitioner cannot carry its burden to justify institution.

4. Petitioner Has Not Carried Its Burden for Ground 3

Taken together, Petitioner's motivation-to-combine arguments for Ground 3

amount to a collection of generalized statements about known technologies rather than a coherent explanation of why a POSITA, at the time of the '625 patent, would have combined the cited references, in this manner, to achieve the claimed invention, with a reasonable expectation of success.

Because Petitioner has not articulated a well-reasoned rationale with a rational underpinning for the asserted combination, Ground 3 does not demonstrate a reasonable likelihood of prevailing, and institution should be denied.

V. CONCLUSION

For the reasons set forth above, the Petition fails to demonstrate a reasonable likelihood that Petitioner will prevail on any challenged claim. Petitioner has not established that any of the independent claims of the '625 Patent are anticipated or would have been obvious under any asserted ground, including because the Petition applies an unsupported construction of “nulls,” fails to show that the cited prior art discloses all required limitations, and fails to articulate a well-reasoned motivation to combine with a rational underpinning.

Because Petitioner has not shown that any independent claim is unpatentable, Petitioner likewise has not shown that any dependent claim is unpatentable. *See, e.g., Hartness Int’l Inc. v. Simplimatic Eng’g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987) (if an independent claim is nonobvious, a dependent claim is necessarily nonobvious and novel). Each dependent claim incorporates

the limitations of its corresponding independent claim, and the Petition advances no separate unpatentability theory directed specifically to any dependent claim.

Accordingly, institution should be denied as to all challenged claims.

Dated: January 6, 2026

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**CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME
LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE
REQUIREMENTS**

1. This Patent Owner Preliminary Response complies with the type-volume limitation of 14,000 words, comprising 5,232 words, as counted using the Microsoft Word software that was used to prepare this paper, excluding the parts exempted by 37 C.F.R. § 42.24(a), (b).

2. This Patent Owner Preliminary Response complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft Word 2016 in 14-point Times New Roman.

Date: January 6, 2026

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CERTIFICATION OF SERVICE

I hereby certify that on January 6, 2026, I caused a true and correct copy of the foregoing to be served on the following counsel for Petitioners by electronic mail to the following email address:

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