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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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T-MOBILE US, INC., AT&T MOBILITY LLC, CELLCO PARTNERSHIP  
D/B/A VERIZON WIRELESS, ERICSSON INC. AND  
NOKIA OF AMERICA CORPORATION,

Petitioners

v.

SMART RF INC.,

Patent Owner

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Case IPR2025-00692

Patent 9,641,204

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**PATENT OWNER'S PRELIMINARY RESPONSE**

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## I. INTRODUCTION

Pursuant to 35 U.S.C. § 313 and 37 C.F.R. § 42.107, Patent Owner Smart RF Inc. (“Patent Owner”) submits this Preliminary Response the Petition for *Inter Partes* Review (“Petition”) filed by T-Mobile US, Inc., AT&T Mobility LLC, Cellco Partnership d/b/a Verizon Wireless, Ericsson Inc., and Nokia of America Corporation (“Petitioners”) and challenging claims 1-15 of U.S. Patent No. 9,641,204 (the “’204 patent”) (Ex. 1001). The Board should not institute *inter partes* review because Petitioners have not met their burden of showing a reasonable likelihood of prevailing on any of their proposed grounds of unpatentability, each based on obviousness under 35 U.S.C. § 103(a).

The Petition suffers from many fundamental flaws, each of which warrants denial of institution. The Petition’s allegations are deficient because the proposed grounds do not teach all limitations of the challenged claims. For example, the references relied upon do not teach, disclose, or suggest the claimed “concurrent” limitations of the challenged claims. Indeed, the Petition cannot point to evidence as to where or how these “concurrent” limitations of the challenged claims are disclosed in the references.

To justify the institution of an *inter partes* review, Petitioners must 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). For at least

the reasons discussed in this preliminary response, Petitioners have not shown a reasonable likelihood to prevail on any of the challenged claims.

## **II. THE '204 PATENT AND THE CHALLENGED CLAIMS**

### **A. Overview of the '204 Patent**

The '204 patent issued from an application filed on August 25, 2014, and claims priority to an earlier application that was filed on October 14, 2011. Ex. 1001 at 1. The inventions disclosed and claimed in the '204 patent relate generally to multi-band digital predistortion linearization, particularly as applied to radio frequency (RF) transmitters. *Id.* at 1:25-26. The power amplifiers within those transmitters consume the most power within the system, are inefficient, and function in a non-linear manner that introduces distortions that degrade signal quality. *Id.* at 28-37.

To address those problems, the '204 discloses and claims new and novel systems and methods that utilize a concurrent digital multi-band linearizer that predistorts the signals before they are amplified, effectively removing the resultant distortion from the amplifier. *Id.* at 2:29-35. The patent further discloses the use of a sampling and subsampling feedback loop in which the predistorted signals and the amplified signals are analyzed and modeled to better predict and compensate for signal distortions. *Id.* at 2:9-17, 2:45-48, 4:22-25. “Sampling multi-bands at the same

time also eliminates the time delay taken between different band paths caused by the filters.” *Id.* at 4:26-28.

**B. Claim Overview**

Independent claims 1 and 12 are reproduced below:

<b>Claim 1</b>	<b>Limitations</b>
1[pre]	A transmitter comprising:
1[a]	a power amplifier configured to amplify modulated concurrent multi-band signals to provide amplified concurrent multi-band signals;
1[b]	a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals to compensate for a non-linearity of the power amplifier; and
1[c]	a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals at a subsampling frequency lower than twice a highest signal frequency in the amplified concurrent multi-band signals.
<b>Claim 12</b>	<b>Limitations</b>
12[pre]	A method at transmitter comprising:
12[a]	amplifying a modulated concurrent multi-hand signal to provide an amplified concurrent multi-band signal;
12[b]	predistorting the modulated concurrent multi-hand signal to compensate for a non-linearity of the power amplifier:

12[c]	subsampling of the amplified concurrent multi-band signals at a subsampling frequency lower than twice a highest signal frequency in the amplified multi-band signal: and
12[d]	controlling the predistorting by the subsampled concurrent multi-band signal.

### III. LEVEL OF ORDINARY SKILL

For the limited purpose of this Preliminary Response, Patent Owner does not contest Petitioners’ definition of a person of ordinary skill in the art, but it reserves the right to do so if trial is instituted.

### IV. CLAIM CONSTRUCTION

Patent Owner submits that the Board need not construe any claim terms in a particular manner to arrive at the conclusion that the Petition is substantively deficient. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“need only be construed ‘to the extent necessary to resolve the controversy’”).

### V. APPLICABLE LEGAL STANDARDS

The Board may only grant a petition for inter partes review where “the information presented in the petition . . . 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.” 35 U.S.C. § 314(a); 37 C.F.R. § 42.108(c). Petitioners bear the

burden of showing that this statutory threshold has been met. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,756 (Aug. 14, 2012) (“The Board . . . may institute a trial where the petitioner establishes that the standards for instituting the requested trial are met . . .”).

Each of Petitioners’ Grounds relies on obviousness. Section 103 of the Patent Act provides that “[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). The obviousness analysis requires several threshold inquiries identified below.

**A. Claims cannot be found obvious if an element is missing.**

If a single element of the claim is absent from the prior art, the claim cannot be considered obvious. *See CFMT, Inc. v. YieldUp Int’l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (“Obviousness requires a suggestion of all limitations in a claim.”) (citing *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974)); *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993) (reversing obviousness rejection where prior art did not teach or suggest all claim limitations); *Garmin Int’l, Inc. v. Patent of Cuozzo Speed Techs. LLC*, Case No. IPR2012-00001, Paper 15 at 15 (P.T.A.B. Jan. 9, 2013)

(refusing to institute an IPR under 35 U.S.C. § 103 where prior art did not disclose all claim limitations).

**B. A petition must address the *Graham* factors.**

Obviousness is resolved on a number of factual determinations including: (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of ordinary skill in the art. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). Petitions for IPR “must address the Graham factors.” *Eizo Corp. v. Barco N.V.*, No. IPR2014-00358, Paper 11 at 29-30 (P.T.A.B. July 23, 2014) (citing *Graham*, 383 U.S. at 17-18). For example, the Board faulted the petitioner in *Eizo Corporation* for failing to identify the differences between the claimed subject matter and the prior art. *Id.* at 29-30. In particular, the Board found insufficient the petitioner’s “conclusory assertion” that “[t]o the extent [the first reference] may not explicitly teach” the limitation, the second reference “explicitly teaches this limitation.” *Id.* at 30. The Board explained that “such an assertion *fails* to resolve the exact differences sought to be derived from” the second reference. *Id.* (finding that petitioner had not shown a reasonable likelihood of prevailing on that ground). Other Board decisions have reached the same result. *See, e.g., Moses Lake Indus., Inc. v. Enthone, Inc.*, Case No. IPR2014-00243, Paper 6 at 18 (P.T.A.B. June 18, 2014); *Moses Lake Indus., Inc. v. Enthone*,

*Inc.*, No. IPR2014-00246, Paper 6 at 17 (P.T.A.B. June 18, 2014); *eBay, Inc. v. Paid, Inc.*, No. CBM2014-00125, Paper 15 at 21 (P.T.A.B. Sept. 30, 2014).

**C. A petition must provide articulated reasoning with rational underpinning to combine references.**

The conclusion of obviousness based on a combination of references must also be supported with explicit analysis of a reason to combine those references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). The Federal Circuit has stated that such reasons must be more than “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); *accord Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008) (agreeing with the district court’s reasoning that “some kind of motivation must be shown from some source, so that the jury can understand why a person of ordinary skill would have thought of either combining two or more references or modifying one to achieve the patented method”); *see also LG Elecs., Inc. v. Cellular Commc’ns Equip. LLC*, Case No. IPR2016-00197, Paper 7 at 7-11 (P.T.A.B. April 29, 2016) (faulting a petition’s obviousness analysis for lack of sufficient articulated reasons with rational underpinnings for modifying references to achieve particular elements required in the claims).

**VI. THE PETITION DOES NOT DEMONSTRATE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 1.**

For Ground 1, Petitioners contend that Peroulas alone or in view of Cidronali renders claims 1-15 obvious. Petitioners rely exclusively on Peroulas in their contention that certain claim limitations of independent claims 1 and 12 are obvious. Peroulas fails to disclose a number of limitations in independent claims 1 and 12, and Petitioners provide no explanation about how it would have been obvious to modify Peroulas to add those missing limitations. Thus, the Board should deny institution as to Ground 1.

**A. [1b] - Peroulas does not disclose “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals” of independent claim 1.**

Independent claim 1 recites, in part, “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals ... .” Ex. 1001, 5:64-67. Peroulas fails to disclose this claim limitation.

Petitioners’ allegations that Peroulas’ MIMO Pre-Distortion Module discloses the claimed “concurrent digital multi-band predistortion block” is without merit. *See* Pet. at 32.

First, Petitioners allege that the “[u]se of a common index  $n$ , within either Equation 15 or 16, confirms that both inputs signals  $BB_1$  and  $BB_2$  are received by

each predistortion function concurrently.” *Id.* Thus, Petitioners’ primary argument that this limitation is met by Peroulas is that ‘n’ used within Equations 15 and 16 is a common index. *Id.* Petitioners fail to provide a citation to Peroulas that ‘n’ refers to a common index. *Id.* Indeed, Peroulas includes multiple passages that ‘n’ refers to “the number of the baseband input signals” as to Equations that are nearly identical to Equations 15 and 16. Ex. 1005 at 11:23, 16:22, 17:12. Thus, Petitioners’ reliance on Equations 15 and 16 using “a common index n” in support of their “concurrent” allegations are incorrect. Even if Peroulas had used “a common index n,” which it does not, Petitioners do not provide any rationale or evidence as to why “a common index n” would confirm that “both inputs signals BB<sub>1</sub> and BB<sub>2</sub> are received by each predistortion function concurrently.” Pet. at 32.

Next, Petitioners allege that Peroulas’ MIMO Pre-Distortion Module meets the claimed “concurrent multi-band predistortion block” because “both BB<sub>1</sub> and BB<sub>2</sub> are referenced in each of Equations 15 and 16.” Pet. at 32. Peroulas discloses that the “MIMO pre-distortion function includes at least two pre-distortion functions, and each pre-distortion function has two inputs and one output.” Ex. 1005 at 23:4-6. Thus, Peroulas discloses that Equation 15 receives two inputs (*e.g.*, BB<sub>1</sub> and BB<sub>2</sub>) and produces one output (*e.g.*, PD<sub>1</sub>), and Equation 16 separately receives two inputs (*e.g.*, BB<sub>1</sub> and BB<sub>2</sub>) and separately produces one output (*e.g.*, PD<sub>2</sub>). Peroulas’

disclosure that Equations 15 and 16 each separately receive two inputs  $BB_1$  and  $BB_2$  and each separately produce one output fails to teach, suggest, or disclose that Peroulas' MIMO Pre-Distortion Module discloses the claimed "concurrent multi-band predistortion block." Indeed, Petitioners fail to provide any rationale or evidence as to why this configuration of Peroulas discloses or renders obvious this claim limitation.

Based on the two allegations discussed above, Petitioners conclusory allege that Peroulas' MIMO Pre-Distortion Module "is a *concurrent multi-band predistortion block* as concurrent input signals  $BB_1$  and  $BB_2$  enter the block, and concurrent predistorted signals  $PD_1$  and  $PD_2$  exit the block." Pet. at 32 (emphasis in original) citing to EX-1005, 22:18-20. At lines 18-20 of page 22, Peroulas discloses:

This example will describe two baseband input signals as an example, but the present invention is not limited to two baseband input signals. The architecture of the multiband digital pre-distorter (dual band digital pre-distorter in this example) according to this example is shown in FIG 3. The baseband signals  $BB_1$  301 and  $BB_2$  302 are centered at 0Hz and have bandwidths  $B_1$  and  $B_2$  respectively.

*Id.* This passage of Peroulas fails to disclose, teach, or suggest that Peroulas discloses the claimed "concurrent digital multi-band predistortion block" of claim 1.

Moreover, Petitioners fail to provide any rationale or evidence as to why this passage of Peroulas discloses or renders obvious this claim limitation.

Petitioners then argue that “Figure 3 also depicts concurrent predistorted signals PD<sub>1</sub> and PD<sub>2</sub> being concurrently input into the MIMO Capture Buffer and thus, for any given number of input signals, a POSA would recognize the output of each predistortion function to be concurrent.” Pet. at 32 citing to EX-1003, ¶100. This allegation is completely meritless in the context of this claim limitation. First, Petitioners do not provide any context as to why PD<sub>1</sub> and PD<sub>2</sub> being input into the MIMO Capture Buffer is relevant to this claim limitation. Second, Petitioners do not provide any evidence or rationale as to why PD<sub>1</sub> and PD<sub>2</sub> would be considered to be concurrently input into the MIMO Capture Buffer. Third, Petitioners fail to mention that the signals input into the MIMO Capture Buffer are signals PO<sub>1</sub> and PO<sub>2</sub>, not PD<sub>1</sub> and PD<sub>2</sub>. *See* Ex. 1005 at Fig. 3. Simply showing two signals being delivered to the same module does not show concurrency because the figures do not indicate when each signal is present.

Petitioners’ final conclusory allegation that “for any given number of input signals, a POSA would recognize the output of each predistortion function to be concurrent” is inadequate, unfounded, and improper. *See* Pet. at 32. Petitioners’ reliance on their expert declaration at paragraph 100 is also inadequate and improper,

where Petitioners' expert makes the same conclusory and unfounded allegations made by Petitioners. *See* Pet. at 32; Ex. 1003, ¶100. Petitioners' expert does not cite to any additional supporting evidence or provide any technical reasoning to support his statement. *See* Ex. 1003, ¶100. Thus, the cited declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."); *Upjohn Co. v. Mova Pharm. Corp.*, 225 F.3d 1306, 1311 (Fed. Cir. 2000) ("Lack of factual support for expert opinion to factual determinations, however, may render the testimony of little probative value in a validity determination.") (quoting *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985)); *Carella v. Starlight Archery & Pro Line Co.*, 804 F.2d 135, 138 (Fed. Cir. 1986) ("Although in some circumstances unsupported oral testimony can be sufficient to provide prior knowledge or use, it must be regarded with suspicion and subjected to close scrutiny."). This is particularly problematic in cases where, like here, expert testimony is offered not simply to provide a motivation to combine prior-art teachings, but rather to supply a limitation missing from the prior art. *See KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (stating that a "factfinder . . . must be

cautious of arguments reliant upon *ex post* reasoning”); *Arendi S.A.R.L. v. Apply, Inc.*, 832 F.3d 1355, 1361–62 (Fed. Cir. 2016) (holding that reliance on common sense in an obviousness analysis is “typically invoked to provide a known motivation to combine, not to supply a missing claim limitation”) (emphasis omitted). Although doing so might be permissible when “the limitation in question [is] unusually simple and the technology particularly straightforward” (*id.* at 1362), Petitioners have not alleged that to be the case here, much less provided support for such an allegation.

For at least these reasons, Peroulas does not teach, suggest, or disclose “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals ...” as recited by independent claim 1.

**B. [1c] - Peroulas does not disclose “a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals” of independent claim 1.**

Independent claim 1 requires “a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals.” Ex. 1001, 6:1-3. In Ground 1, Petitioners rely exclusively on Peroulas for disclosing this portion of the greater limitation of independent claim 1. Pet. at 33.

Petitioners fail to show how the claim term “concurrent sampling of the amplified concurrent multi-band signals” is disclosed or rendered obvious by Peroulas. *See* Pet. at 33. Indeed, the Petition does not even allege that any of the

components of Peroulas disclose, teach, or suggest “*concurrent sampling.*” *Id.* Petitioners identify coupler 310, frequency shift 311, BFF<sub>1</sub>, BFF<sub>2</sub>, ADCs (not illustrated), PO<sub>1</sub>, PO<sub>2</sub>, and MIMO Capture Buffer 309 without any attempt to identify which of these components perform the claimed “*concurrent sampling of the amplified concurrent multi-band signals.*” *Id.* Furthermore, Petitioners do not attempt to explain why any of these components of Peroulas would be configured to perform “*concurrent sampling of the amplified concurrent multi-band signals.*” *Id.* Indeed, none of the evidence relied on by Petitioners teaches, suggests, or discloses that any of these components are “configured to effect *concurrent sampling of the amplified concurrent multi-band signals.*” *Id.*

While Petitioners allege that the aforementioned components “generate concurrent feedback signals (PO<sub>1</sub> and PO<sub>2</sub>) that are simultaneously fed into Peroulas’ MIMO Capture Buffer,” they provide no evidence for this claim. *Id.* The feedback signals (PO<sub>1</sub> and PO<sub>2</sub>) are generated by frequency shifters 314 and 315, which are not even identified in the Petition among Petitioners’ wide swath of arbitrarily selected components purportedly related to this claim element. *See* Ex. 1005 at Fig. 4; Pet. at 33. As Peroulas explains elsewhere, each of these frequency shifters would be understood by a POSA to introduce a separate delay. EX-1005, 31:1-5. In other words, Peroulas admits that a POSA would understand that PO<sub>1</sub> and PO<sub>2</sub> will not be

concurrent. And instead, Peroulas suggests using delays in the MIMO Capture Buffer to subsequently align such signals.

Moreover, Petitioners do not present an obviousness argument for this claim limitation, which is not taught, disclosed, or suggested in Posti. *See* Pet. at 33.

For at least these reasons, Ground 1 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to the claimed “*concurrent sampling* of the amplified concurrent multi-band signals.” *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[T]he Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018) (“rather than create (another) agency-led, inquisitorial process for reconsidering patents, Congress opted for a party-directed, adversarial process”); 37 C.F.R. § 42.22(a)(2) (“Each petition ... must include ... a detailed explanation of the significance of the evidence including material facts, and the governing law, rules, and precedent.”); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); 35 U.S.C. § 312(a)(3) (Petitioner bears the burden of identifying “in writing and with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *TCL Communication Technology Holdings Ltd. v. Dataquill Limited*,

IPR2020-00746, Paper 21 at 22 (Sep. 18, 2020) (“It is Petitioner’s responsibility to cite specific evidence to support its arguments, not the Board’s”—nor Patent Owner’s—“responsibility to piece together evidence or speculate as to Petitioner’s position.”); *see also Whole Space Industries Ltd. v. Zipshade Industrial (B.V.I.) Corp.*, IPR2015-00488 Paper 14 at 18 (July 24, 2015) (citations omitted). Indeed, as emphasized by the Federal Circuit, “[i]t 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.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

For at least these reasons, Peroulas does not teach, suggest, or disclose “a signal observation feedback loop configured to effect *concurrent sampling* of the amplified concurrent multi-band signals” as recited by independent claim 1.

**C. Petitioners wholly failed to meet their burden that Peroulas discloses the claim elements of independent claim 12.**

Independent claim 12 differs from independent claim 1. Despite the differences in the claim language between the independent claims, Petitioners improperly refer their analysis of the claim terms of claim 12 to their analysis of the claim terms of claim 1. *See* Pet. at 54.

For example, claim 12 includes the claim limitation [12d] “controlling the predistorting by the subsampled concurrent multi-band signal,” which is not recited in claim 1. *See* Ex. 1001 at 7:16-17. Petitioners’ analysis as to claim limitation [12d] simply says “[s]ee limitations [1b] and [3b].” Pet. at 54. However, limitations [1b] and [3b] are not even directed to “controlling the predistorting by the subsampled concurrent multi-band signal” of limitation [12d].

Limitation [1b] recites “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals to compensate for a non-linearity of the power amplifier,” and limitation [3b] recites “the signal observation feedback loop includes an analyzing and modeling stage directly connected to each of the plurality of outputs of said digital multi-band predistortion block for receiving the respective predistorted signals and for using said received predistorted signals in controlling said digital multi-band predistortion block.” *See* Pet. at 30, 40. Indeed, limitations [1b] and [3b] do not even recite samples, much less “subsampled concurrent multi-band signal” as recited in limitation [12d]. Indeed, the analysis provided in the Petition for limitations [1b] and [3b] do not even mention the term or concept related to sample, subsample, or subsampled. *See* Pet. at 30-33, 40-41. Indeed, Petitioners wholly fail to show how the claim limitation [12d] “controlling the predistorting by the subsampled

concurrent multi-band signal” is disclosed or rendered obvious by Peroulas in their analysis of limitations [1b] and [3b]. *Id.*

For at least these reasons, Ground 1 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to claim limitation [12d]. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[T]he Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018) (“rather than create (another) agency-led, inquisitorial process for reconsidering patents, Congress opted for a party-directed, adversarial process”); 37 C.F.R. § 42.22(a)(2) (“Each petition ... must include ... a detailed explanation of the significance of the evidence including material facts, and the governing law, rules, and precedent.”); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); 35 U.S.C. § 312(a)(3) (Petitioner bears the burden of identifying “in writing and with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *TCL Communication Technology Holdings Ltd. v. Dataquill Limited*, IPR2020-00746, Paper 21 at 22 (Sep. 18, 2020) (“It is Petitioner’s responsibility to cite specific evidence to support its arguments, not the Board’s”—nor Patent Owner’s—“responsibility to piece together evidence or speculate as to

Petitioner’s position.”); *see also Whole Space Industries Ltd. v. Zipshade Industrial (B.V.I.) Corp.*, IPR2015-00488 Paper 14 at 18 (July 24, 2015) (citations omitted). Indeed, as emphasized by the Federal Circuit, “[i]t 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.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

For at least these reasons, Petitioners have failed to show that Peroulas teaches, suggests, or discloses claim limitations as recited by independent claim 12. Accordingly, Petitioners cannot show a likelihood that the challenged claims are unpatentable over Peroulas, and Ground 1 should be denied.

## **VII. THE PETITION DOES NOT DEMONSTRATE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 2.**

For Ground 2, Petitioners contend that Posti alone or in view of Cidronali renders claims 1-15 obvious. Petitioners rely exclusively on Posti in their contention that certain claim limitations of independent claims 1 and 12 are obvious. Posti fails to disclose a number of limitations in independent claims 1 and 12, and Petitioners provide no explanation about how it would have been obvious to modify Posti to add those missing limitations. Thus, the Board should deny institution as to Ground 2.

**A. [1b] - Posti does not disclose “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals” of independent claim 1.**

Independent claim 1 recites, in part, “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals ... .” Ex. 1001, 5:64-67. Posti fails to disclose this claim limitation.

Petitioners’ allegations that Posti’s digital modulators 106 disclose the claimed “concurrent digital multi-band predistortion block” is without merit. *See* Pet. at 63. In Ground 1, Petitioners at least made some allegations that “a *concurrent* digital multi-band predistortion block configured to effect predistortion of the modulated *concurrent* multi-band signals.” *See* Section VI.A. In Ground 2, Petitioners do not even attempt to allege that any of the cited evidence suggests, discloses, or teaches “a *concurrent* digital multi-band predistortion block configured to effect predistortion of the modulated *concurrent* multi-band signals.” *See* Pet. at 63-64. In summary, Petitioners simply allege that each input signal is predistorted through a series a steps. *Id.* Petitioners make no allegations that Posti suggests, discloses, or teaches “a *concurrent* digital multi-band predistortion block configured to effect predistortion of the modulated *concurrent* multi-band signals.” *Id.* Furthermore, Petitioners make unfounded allegations that this limitation is

disclosed, such that Petitioners do not even allege that this limitation would be obvious. *Id.*

Ground 2 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to the claimed “a *concurrent* digital multi-band predistortion block configured to effect predistortion of the modulated *concurrent* multi-band signals.” See *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[T]he Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018) (“rather than create (another) agency-led, inquisitorial process for reconsidering patents, Congress opted for a party-directed, adversarial process”); 37 C.F.R. § 42.22(a)(2) (“Each petition ... must include ... a detailed explanation of the significance of the evidence including material facts, and the governing law, rules, and precedent.”); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); 35 U.S.C. § 312(a)(3) (Petitioner bears the burden of identifying “in writing and with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *TCL Communication Technology Holdings Ltd. v. Dataquill Limited*, IPR2020-00746, Paper 21 at 22 (Sep. 18, 2020) (“It is Petitioner’s responsibility to cite specific evidence to support its arguments,

not the Board’s”—nor Patent Owner’s—“responsibility to piece together evidence or speculate as to Petitioner’s position.”); *see also Whole Space Industries Ltd. v. Zipshade Industrial (B.V.I.) Corp.*, IPR2015-00488 Paper 14 at 18 (July 24, 2015) (citations omitted). Indeed, as emphasized by the Federal Circuit, “[i]t 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.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

For at least these reasons, Posti does not teach, suggest, or disclose “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals ...” as recited by independent claim 1.

**B. [1c] - Posti does not disclose “a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals” of independent claim 1.**

Independent claim 1 requires “a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals.” Ex. 1001, 6:1-3. In Ground 2, Petitioners rely exclusively on Posti for disclosing this portion of the greater limitation of independent claim 1. Pet. at 64-65.

Petitioners fail to show how the claim term “concurrent sampling of the amplified concurrent multi-band signals” is disclosed or rendered obvious by Posti.

See Pet. at 64-65. Indeed, the Petition does not even allege that any of the components of Posti disclose, teach, or suggest “*concurrent* sampling.” *Id.* Petitioners identify coupler 128, mixer 132, ADC 138, channelizer 140 of Posti without any attempt to identify which of these components perform the claimed “*concurrent sampling* of the amplified concurrent multi-band signals.” *Id.* Furthermore, Petitioners do not attempt to explain why any of these components of Posti would be configured to perform “*concurrent sampling* of the amplified concurrent multi-band signals.” *Id.* Indeed, none of the evidence relied on by Petitioners teaches, suggests, or discloses that any of these components are “configured to effect *concurrent sampling* of the amplified concurrent multi-band signals.” *Id.*

While Petitioners allege that the aforementioned components “provide[] concurrent feedback signals at the output of channelizer 140, which *effects concurrent sampling of the amplified concurrent multi-band signals,*” they provide no evidence for this claim. *Id.* at 65 (emphasis in original). The channelizer outputs “N” signals to the adaptive predistorter. Ex. 1009 at 6:12-16. But nothing in Posti suggests that these N signals are delivered to the adaptive predistorter concurrently. Notably, Petitioners offer no explanation for why the adaptive predistorter would receive concurrent signals from the channelizer. Instead, Petitioners appear to rely

solely on Figure 4. But the fact that multiple signals are delivered to the adaptive predistorter has no bearing on whether such signals are concurrent. Showing two signals being delivered to the same module does not show concurrency because the figures do not indicate when each signal is present — they could be time-multiplexed or processed sequentially. This is particularly true here, as Posti contemplates a TDMA environment. Ex. 1009 at 1:23-36; 9:36-43. Without explicit timing information, signal paths only show connectivity, not simultaneous activity. Notably, there is no reference to concurrent signals anywhere in Posti. In fact, Posti’s disclosure suggests that the input signals are received at different times and are thus not concurrent. Ex. 1009 at 4:64-65.

Moreover, Petitioners do not present an obviousness argument for this claim limitation, which is not taught, disclosed, or suggested in Posti. *See* Pet. at 64-65.

Ground 2 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to the claimed “*concurrent sampling* of the amplified concurrent multi-band signals.” *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[T]he Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018) (“rather than create (another) agency-led, inquisitorial process for reconsidering patents,

Congress opted for a party-directed, adversarial process”); 37 C.F.R. § 42.22(a)(2) (“Each petition ... must include ... a detailed explanation of the significance of the evidence including material facts, and the governing law, rules, and precedent.”); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); 35 U.S.C. § 312(a)(3) (Petitioner bears the burden of identifying “in writing and with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *TCL Communication Technology Holdings Ltd. v. Dataquill Limited*, IPR2020-00746, Paper 21 at 22 (Sep. 18, 2020) (“It is Petitioner’s responsibility to cite specific evidence to support its arguments, not the Board’s”—nor Patent Owner’s—“responsibility to piece together evidence or speculate as to Petitioner’s position.”); *see also Whole Space Industries Ltd. v. Zipshade Industrial (B.V.I.) Corp.*, IPR2015-00488 Paper 14 at 18 (July 24, 2015) (citations omitted). Indeed, as emphasized by the Federal Circuit, “[i]t 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.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

For at least these reasons, Posti does not teach, suggest, or disclose “a signal observation feedback loop configured to effect *concurrent sampling* of the amplified concurrent multi-band signals” as recited by independent claim 1.

**C. Petitioners wholly failed to meet their burden that Posti discloses the claim elements of independent claim 12.**

Independent claim 12 differs from independent claim 1. Despite the differences in the claim language between the independent claims, Petitioners improperly refer their analysis of the claim terms of claim 12 to their analysis of the claim terms of claim 1. *See* Pet. at 88.

For example, claim 12 includes the claim limitation [12d] “controlling the predistorting by the subsampled concurrent multi-band signal,” which is not recited in claim 1. *See* Ex. 1001 at 7:16-17. Petitioners’ analysis as to claim limitation [12d] simply says “[s]ee limitations [1b] and [3b].” Pet. at 88. However, limitations [1b] and [3b] are not even directed to “controlling the predistorting by the subsampled concurrent multi-band signal” of limitation [12d].

Limitation [1b] recites “a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band signals to compensate for a non-linearity of the power amplifier,” and limitation [3b] recites “the signal observation feedback loop includes an analyzing and modeling stage directly connected to each of the plurality of outputs of said digital multi-band

predistortion block for receiving the respective predistorted signals and for using said received predistorted signals in controlling said digital multi-band predistortion block.” *See* Pet. at 63, 72. Indeed, limitations [1b] and [3b] do not even recite samples, much less “subsampled concurrent multi-band signal” as recited in limitation [12d]. Indeed, the analysis provided in the Petition for limitations [1b] and [3b] do not even mention the term or concept related to sample, subsample, or subsampled. *See* Pet. at 63-64, 72-74. Indeed, Petitioners wholly fail to show how claim limitation [12d] “controlling the predistorting by the subsampled concurrent multi-band signal” is disclosed or rendered obvious by Posti in their analysis of limitations [1b] and [3b]. *Id.*

For at least these reasons, Ground 2 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to claim limitation [12d]. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“[T]he Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”); *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018) (“rather than create (another) agency-led, inquisitorial process for reconsidering patents, Congress opted for a party-directed, adversarial process”); 37 C.F.R. § 42.22(a)(2) (“Each petition ... must include ... a detailed explanation of the significance of the evidence including material facts, and the governing law,

rules, and precedent.”); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); 35 U.S.C. § 312(a)(3) (Petitioner bears the burden of identifying “in writing and with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *TCL Communication Technology Holdings Ltd. v. Dataquill Limited*, IPR2020-00746, Paper 21 at 22 (Sep. 18, 2020) (“It is Petitioner’s responsibility to cite specific evidence to support its arguments, not the Board’s”—nor Patent Owner’s—“responsibility to piece together evidence or speculate as to Petitioner’s position.”); *see also Whole Space Industries Ltd. v. Zipshade Industrial (B.V.I.) Corp.*, IPR2015-00488 Paper 14 at 18 (July 24, 2015) (citations omitted). Indeed, as emphasized by the Federal Circuit, “[i]t 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.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016).

For at least these reasons, Petitioners have failed to show that Posti teaches, suggests, or discloses claim limitations as recited by independent claim 12. Accordingly, Petitioners cannot show a likelihood that the challenged claims are unpatentable over Posti, and Ground 2 should be denied.

## VIII. PATENT OWNER'S FINAL COMMENTS

Patent Owner does not concede the legitimacy of any arguments in the Petition that are not specifically addressed herein and expressly reserves the right to rebut any such arguments in its Patent Owner Response if *inter partes* review is instituted. Similarly, Patent Owner also does not concede any underlying contentions in the Petition and reserves the right to rebut them later. Additionally, Patent Owner is not limited to the arguments presented here in this Preliminary Response, but expressly reserves the right to raise further arguments, including claim construction arguments, not presented in this Preliminary Response.

## IX. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board decline to institute *inter partes* review of the '204 Patent.

Dated: July 16, 2025

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**CERTIFICATE OF COMPLIANCE WITH WORD COUNT**

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Preliminary Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 6,333 words, excluding the parts of this Patent Owner's Preliminary Response that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Patent Owner's Preliminary Response.

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## CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing Patent Owner's Preliminary Response was served on July 16, 2025, to Lead and Back-up Counsel for Petitioners at the service address provided in Petitioners' Mandatory Notices:

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