Filed on behalf of: Smart RF Inc.

By: David T. DeZern
Registration No. 60,117
NELSON BUMGARDNER CONROY P.C.
2727 N. Harwood Street, Suite 250
Dallas, TX 75201
Telephone: (214) 446-4950
Email: david@nelbum.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

Case IPR2025-00727

Patent 7,035,345

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I. Introduction 1

II. The ’345 Patent and the Challenged Claims 2

A. Overview of the ’345 Patent 2

B. Claim Overview 3

III. Level of Ordinary Skill 8

IV. Claim Construction 9

V. Applicable Legal Standards 11

A. Claims cannot be found obvious if an element is missing. 11

B. A petition must address the *Graham* factors. 12

C. A petition must provide articulated reasoning with rational underpinning to combine references. 13

VI. The Petition Does Not Demonstrate That the Challenged Claims Are Unpatentable Under Ground 1. 14

A. [1c] - Wright does not disclose “producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier” of independent claim 1. 14

B. [5d], [7d], [11d] - Wright does not disclose “a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier” of independent claims 5, 7, and 11. 18

VII. The Petition Does Not Demonstrate That the Challenged Claims Are Unpatentable Under Ground 2. 18

A. [3c] and [9d] - Wright does not disclose “producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier” of independent claim 3 or “a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier” of independent claim 9. 19

VIII. The Petition Does Not Demonstrate That the Challenged Claims Are Unpatentable Under Ground 3. 19

A. [1b] – Booth and Leyendecker fail to disclose "producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal" of independent claim 1. 20

B. [5c] and [11c] - Wright does not disclose "a first digital receiver producing a first feedback signal in response to the RF predistorted signal from said I/Q modulator" of independent claims 5 and 11. 28

IX. Patent Owner's Final Comments 29

X. Conclusion 29

TABLE OF AUTHORITIES

Cases: **Page(s):**

Arendi S.A.R.L. v. Apply, Inc.,
832 F.3d 1355 (Fed. Cir. 2016) 31

Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.,
776 F.2d 281 (Fed. Cir. 1985).....30

Carella v. Starlight Archery & Pro Line Co.,
804 F.2d 135 (Fed. Cir. 1986).....31

CFMT, Inc. v. YieldUp Int'l Corp.,
349 F.3d 1333 (Fed. Cir. 2003) 12

eBay, Inc. v. Paid, Inc.,
No. CBM2014-00125, Paper 15 (P.T.A.B. Sept. 30, 2014).....14

Eizo Corp. v. Barco N.V.,
No. IPR2014-00358, Paper 11 (P.T.A.B. July 23, 2014).....13

Garmin Int'l, Inc. v. Patent of Cuozzo Speed Techs. LLC,
Case No. IPR2012-00001, Paper 15 (P.T.A.B. Jan. 9, 2013).....12

Graham v. John Deere Co.,
383 U.S. 1 (1966).....13

Harmonic Inc. v. Avid Tech., Inc.,
815 F.3d 1356 (Fed. Cir. 2016) 18, 28

In re Kahn,
441 F.3d 977 (Fed. Cir. 2006).....15

In re Rijckaert,
9 F.3d 1531 (Fed. Cir. 1993).....12

In re Royka,
490 F.2d 981 (C.C.P.A. 1974).....12

Innogenetics, N.V. v. Abbott Labs.,
512 F.3d 1363 (Fed. Cir. 2008).....15

Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.,
821 F.3d 1359 (Fed. Cir. 2016)..... 20, 29

KSR Int'l Co. v. Teleflex Inc.,
550 U.S. 398 (2007).....14

KSR Intern. Co. v. Teleflex Inc.,
550 U.S. 398 (2007).....31

LG Elecs., Inc. v. Cellular Commc'ns Equip. LLC,
Case No. IPR2016-00197, Paper 7 (P.T.A.B. April 29, 2016).....15

Moses Lake Indus., Inc. v. Enthone, Inc.,
Case No. IPR2014-00243, Paper 6 (P.T.A.B. June 18, 2014).....14

Moses Lake Indus., Inc. v. Enthone, Inc.,
No. IPR2014-00246, Paper 6 (P.T.A.B. June 18, 2014).....14

SAS Inst., Inc. v. Iancu,
138 S. Ct. 1348 (2018)..... 18, 28

TCL Communication Technology Holdings Ltd. v. Dataquill Limited,

IPR2020-00746, Paper 21 (Sep. 18, 2020) 19, 29

Upjohn Co. v. Mova Pharm. Corp.,
225 F.3d 1306 (Fed. Cir. 2000) 30

Wellman, Inc. v. Eastman Chem. Co.,
642 F.3d 1355 (Fed. Cir. 2011) 9

Whole Space Industries Ltd. v. Zipshade Industrial (B.V.I.) Corp.,
IPR2015-00488 Paper 14 (July 24, 2015) 20, 29

Statutes

35 U.S.C. § 103 .....1, 12

35 U.S.C. § 312 ..... 17, 26

35 U.S.C. § 314 11

37 C.F.R. § 42.65 27

Regulations

37 C.F.R. § 42.104 ..... 17, 26

37 C.F.R. § 42.108 11

37 C.F.R. § 42.22 ..... 17, 26

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 1-11 of U.S. Patent No. 7,035,345 (the "'345 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.

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 '345 PATENT AND THE CHALLENGED CLAIMS

A. Overview of the '345 Patent

The '345 patent issued from an application filed on June 8, 2001. Ex. 1001 at 1. The inventions disclosed and claimed in the '345 patent generally relate "to an adaptive baseband/RF predistorting device, which advantageously integrates the concept of digital receiver technology into the linearization techniques." Ex. 1001 at 5:4-7. "By taking advantage of the digital receiver technology to digitally translate signal from RF to baseband with very high accuracy, the predistorting device of the present invention performs the instantaneous characterization of the memoryless nonlinearity in baseband to supply a correlated predistortion function." *Id*. at 8-13. "The distortion is generated in baseband by addressing the extracted predistortion function and then, the distortion is embedded into the RF signal by dynamically adjusting the amplitude and the phase of the carrier." *Id*. at 13-16. Figure 1 of the '345 patent is illustrated below:

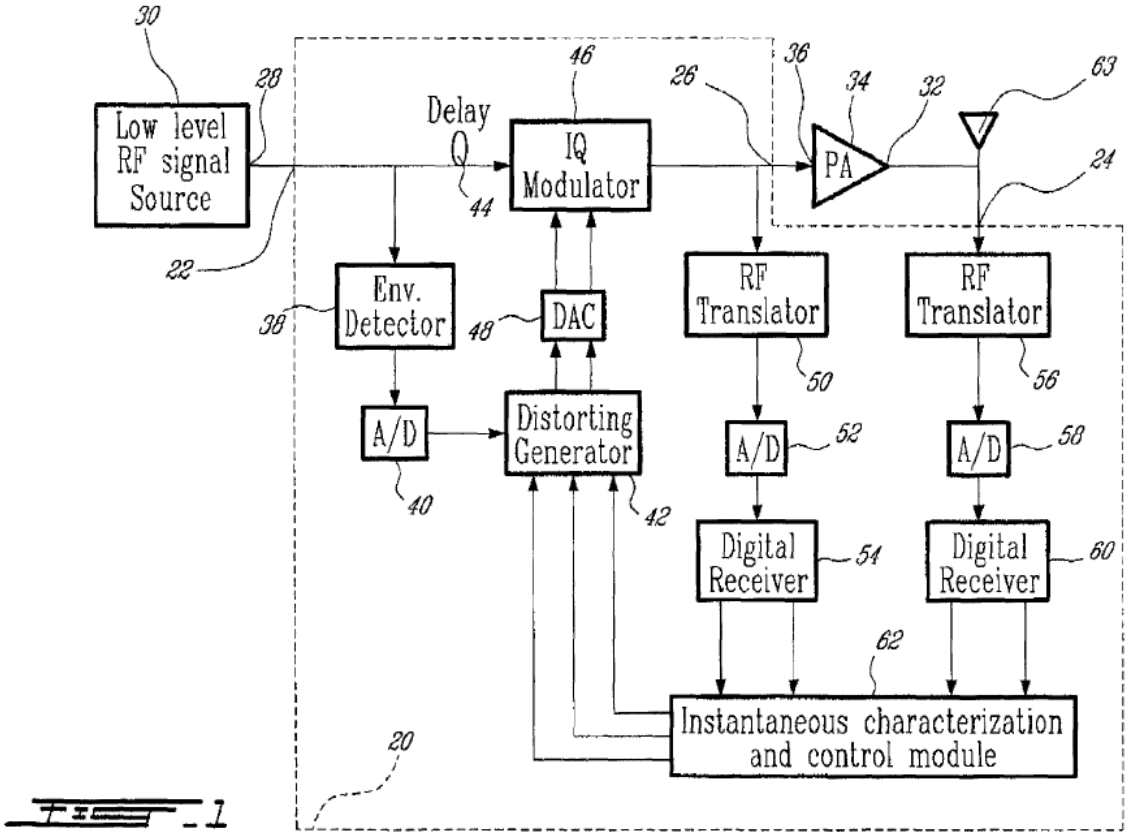


Fig. 1

Id. at Fig. 1.

B. Claim Overview

Independent claims 1, 3, 5, 7, 9 and 11 are reproduced below:

Claim 1	Limitations
1[pre]	An adaptive method for predistorting an RF modulated signal, to be transmitted, supplied by a signal source to an input of a power amplifier having an output for delivering an amplified output signal, said method comprising the steps of:
1[a]	predistorting the RF modulated signal to be transmitted using an I/Q modulator interposed between the signal source and the input of the

	power amplifier, and controlled by means of amplitude and phase look-up tables stored in a distorting generator;
1[b]	producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal;
1[c]	producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier;
1[d]	modeling the power amplifier in response to the first and second feedback signals; and
1[e]	updating the predistortion amplitude and phase look-up tables in response to said modeling of the power amplifier,
1[f]	wherein said second feedback signal includes the complex envelope of the RF amplified output signal, and
1[g]	wherein said modeling step includes the discrimination of the complex envelope of the first feedback signal referenced to the complex envelope of the second feedback signal to yield a predistortion function correlated to a behaviour of the power amplifier including nonlinearities and memory effects.
Claim 3	**Limitations**
3[pre]	An adaptive method for predistorting an RF modulated signal, to be transmitted, supplied by a signal source to an input of a power amplifier having an output for delivering an amplified output signal, said method comprising the steps of:
3[a]	predistorting the RF modulated signal to be transmitted using an I/Q modulator interposed between the signal source and the input of the power amplifier, and controlled by means of amplitude and phase look-up tables stored in a distorting generator;
3[b]	producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal;

3[c]	producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier;
3[d]	modeling the power amplifier in response to the first and second feedback signals; and
3[e]	updating the predistortion amplitude and phase look-up tables in response to said modeling of the power amplifier,
3[f]	wherein said updating step is done when a linearity metric adjacent channel power ratio (ACPR) measurement sub-step indicates that the predistorting step is not adequate to meet predetermined ACPR standards.
Claim 5	**Limitations**
5[pre]	An adaptive device for predistorting an RF modulated signal to be transmitted, supplied by a signal source to an input of a power amplifier having an output for delivering an amplified output signal, said adaptive device comprising:
5[a]	an I/Q modulator interposed between the signal source and the input of the power amplifier;
5[b]	a distorting generator including predistortion amplitude and phase look-up tables; said distorting generator controlling said I/Q modulator to predistort the RF modulated signal to be transmitted in amplitude and in phase;
5[c]	a first digital receiver producing a first feedback signal in response to the RF predistorted signal from said I/Q modulator;
5[d]	a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier;
5[e]	a control module receiving said first and second feedback signals from said first and second digital receivers; said control module being so configured as to model the power amplifier in response to the first and second feedback signals and to update said amplitude

	and phase look-up tables of said distorting generator in response to a dynamic modeling of the power amplifier,
5[f]	wherein said look-up tables of said distorting generator are indexed by an envelope detector that detects the envelope of the signal to be transmitted before predistortion.
Claim 7	**Limitations**
7[pre]	An adaptive device for predistorting an RF modulated signal to be transmitted, supplied by a signal source to an input of a power amplifier having an output for delivering an amplified output signal, said adaptive device comprising:
7[a]	an I/Q modulator interposed between the signal source and the input of the power amplifier;
7[b]	a distorting generator including predistortion amplitude and phase look-up tables; said distorting generator controlling said I/Q modulator to predistort the RF modulated signal to be transmitted in amplitude and in phase;
7[c]	a first digital receiver producing a first feedback signal in response to the RF predistorted signal from said I/Q modulator;
7[d]	a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier;
7[e]	a control module receiving said first and second feedback signals from said first and second digital receivers; said control module being so configured as to model the power amplifier in response to the first and second feedback signals and to update said amplitude and phase look-up tables of said distorting generator in response to a dynamic modeling of the power amplifier,
7[f]	wherein said look-up tables of said distorting generator are indexed by data from a third digital receiver that down-converts the signal to be transmitted to baseband.

Claim 9	Limitations
9[pre]	An adaptive device for predistorting an RF modulated signal to be transmitted, supplied by a signal source to an input of a power amplifier having an output for delivering an amplified output signal, said adaptive device comprising:
9[a]	an I/Q modulator interposed between the signal source and the input of the power amplifier;
9[b]	a distorting generator including predistortion amplitude and phase look-up tables; said distorting generator controlling said I/Q modulator to predistort the RF modulated signal to be transmitted in amplitude and in phase;
9[c]	a first digital receiver producing a first feedback signal in response to the RF predistorted signal from said I/Q modulator;
9[d]	a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier;
9[e]	a control module receiving said first and second feedback signals from said first and second digital receivers; said control module being so configured as to model the power amplifier in response to the first and second feedback signals and to update said amplitude and phase look-up tables of said distorting generator in response to a dynamic modeling of the power amplifier,
9[f]	wherein said control module is so configured as to update said amplitude and phase look-up tables when an adjacent channel power ratio (ACPR) measurement indicates that the predistortion made by said predistorting generator is not adequate to meet predetermined ACPR standards.
Claim 11	**Limitations**
11[pre]	An adaptive device for predistorting an RF modulated signal to be transmitted, supplied by a signal source to an input of a power

	amplifier having an output for delivering an amplified output signal, said adaptive device comprising:
11[a]	an I/Q modulator interposed between the signal source and the input of the power amplifier;
11[b]	a distorting generator including predistortion amplitude and phase look-up tables; said distorting generator controlling said I/Q modulator to predistort the RF modulated signal to be transmitted in amplitude and in phase;
11[c]	a first digital receiver producing a first feedback signal in response to the RF predistorted signal from said I/Q modulator;
11[d]	a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier;
11[e]	a control module receiving said first and second feedback signals from said first and second digital receivers; said control module being so configured as to model the power amplifier in response to the first and second feedback signals and to update said amplitude and phase look-up tables of said distorting generator in response to a dynamic modeling of the power amplifier,
11[f]	wherein said control module is further configured as to insert an adequate delay between the first feedback signal and the second feedback signal.

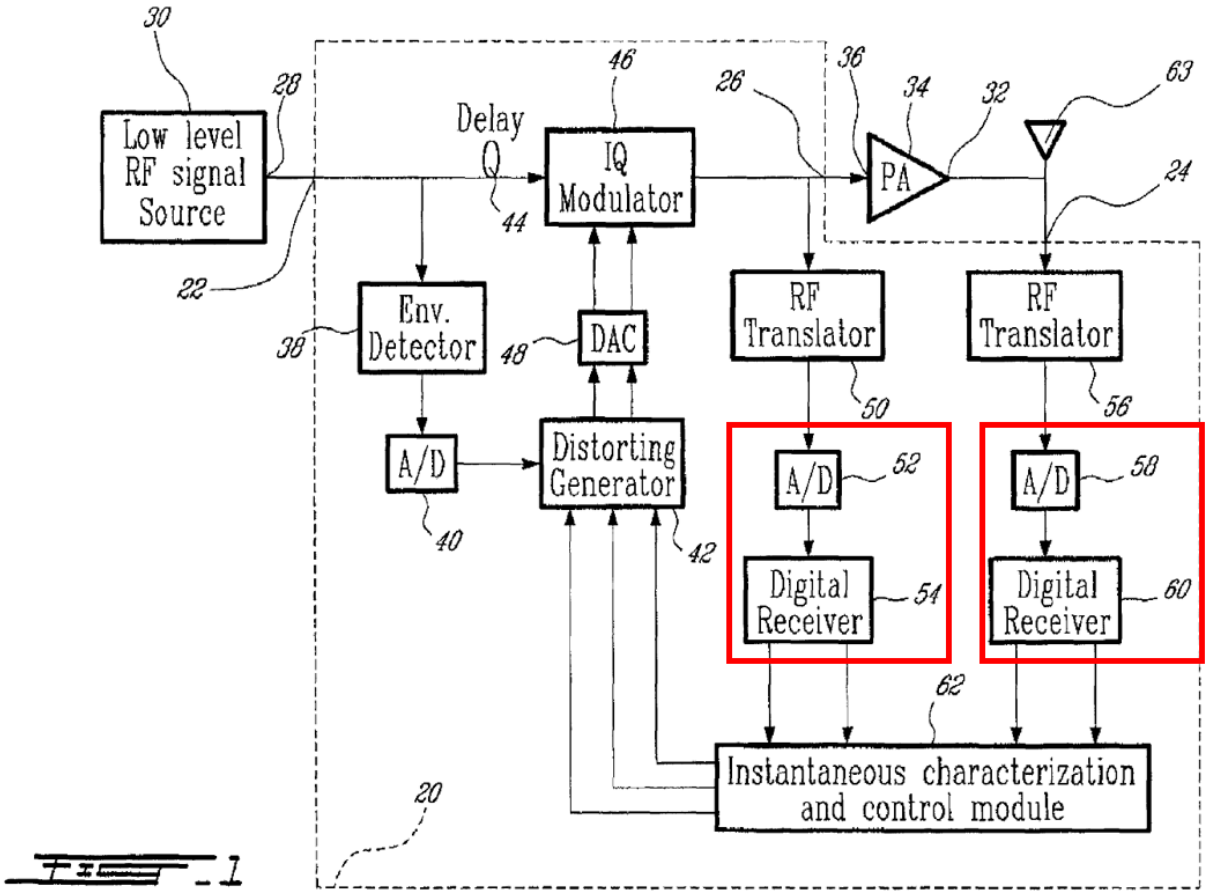
III. LEVEL OF ORDINARY SKILL

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'").

To the extent necessary, the Board should afford the term "digital receiver" its plain and ordinary meaning. A digital receiver is a well understood term that is self-explanatory in the context of the claims. As used in the claims and specification, the term simply refers to a device that receives a digital signal as an input. Every embodiment of the '345 patent explains that the digital receivers receive a digital signal. For example, the specification discusses using an analog to digital converter (A/D converter) to supply "digital samples" to the digital receiver. Ex. 1001 at 5:59-60. Multiple figures show the digital receiver receiving a digital input from an A/D converter:



Id., Fig. 1 (annotations added); *see also id*. at Figs. 2, 4A, 4B, 13, 14.

As its name suggests, a digital receiver receives digital input. Petitioners did not provide a construction for digital receiver. *See* Pet. at 14. The Court presiding over the underlying district court proceedings has not provided a construction for this term.

To the extent necessary, Patent Owner submits that the term "digital receiver" should be given its plain and ordinary meaning to mean a "device that receives a digital signal as an input."

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).

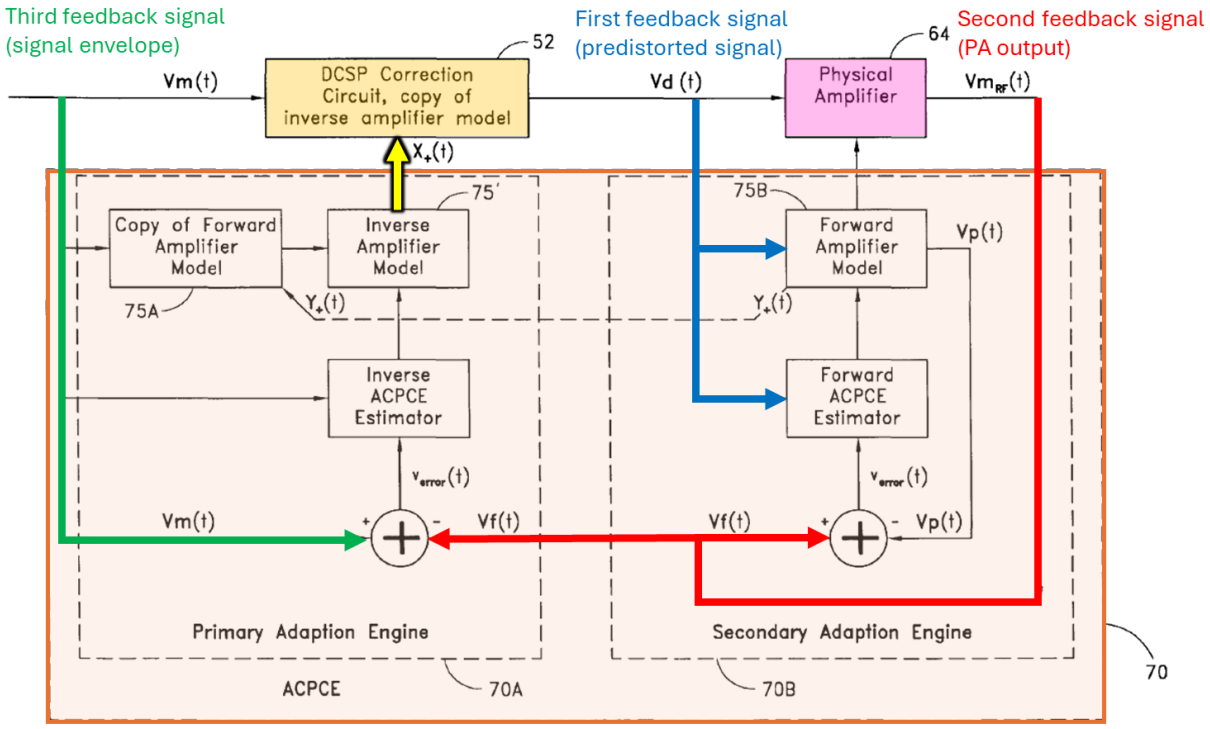
VI. THE PETITION DOES NOT DEMONSTRATE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 1

For Ground 1, Petitioners contend that Wright alone renders claims 1, 2 5-8, and 11 obvious. Wright fails to disclose a number of limitations in independent claims 1, 5, 7, and 11, and Petitioners provide no explanation about how it would have been obvious to modify Wright to add those missing limitations. Thus, the Board should deny institution as to Ground 1.

A. [1c] - Wright does not disclose "producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier" of independent claim

Limitation [1c] of independent claim 1 recites "producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier." Ex. 1001 at 14:60-61. Wright fails to disclose this claim limitation.

Petitioners' allegation that Wright discloses this claim limitation is without merit. *See* Pet. at 25. Indeed, Petitioners only allegation regarding this limitation is that "Wright discloses using a digital receiver to convert the real RF passband signal, $Vm_{rf}(t)$ ('second feedback signal,' red) to complex baseband" with reference to annotated Figure 30 from Wright:



See Pet. at 25; Ex. 1003 at Fig. 30 (annotated by Petitioner).

Petitioners provide several string citations in support of their position, but Petitioners do not identify what it identifies as the claimed "second digital receiver" or where the claimed "second digital receiver" is located. *See* Pet. at 25. Indeed, none of the string citations referenced by Petitioners mention a "receiver," much less a "digital receiver." Annotated Fig. 30 also does not disclose or identify the claimed "second digital receiver."

Petitioners' lone allegation that "Wright discloses using a digital receiver to convert the real RF passband signal, $Vm_{rf}(t)$ ('second feedback signal,' red) to complex baseband" also improperly equates Wright's alleged "real RF passband

signal, $Vm_{rf}(t)$ ('second feedback signal,' red)" to the each of the claimed elements -- "a second feedback signal [produced via second digital receiver]" and "the RF amplified output signal from the power amplifier." This analysis is wholly deficient.

Furthermore, Petitioners' incomplete and conclusory allegation illogically requires the claimed "second digital receiver" to receive an analog RF passband signal $Vm_{rf}(t)$ as an input. However, the plain and ordinary meaning of "digital receiver" requires it to receive a digital signal, not an analog signal, as an input. Identifying an analog signal (the RF passband signal) does not teach or suggest in any way a digital receiver, let alone a digital receiver that *produces* a feedback signal.

Moreover, Petitioners do not present an obviousness argument for this claim limitation, which is not disclosed by Wright. *See* Pet. at 25.

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 this claim limitation. *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, Wright does not teach, suggest, or disclose "producing, via a second digital receiver, a second feedback signal in response to

the RF amplified output signal from the power amplifier" as recited by independent claim 1.

B. [5d], [7d], [11d] - Wright does not disclose "a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier" of independent claims 5, 7, and 11

Claim limitations [5d], [7d], and [11d] of independent claims 5, 7, and 11 require "a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier" Ex. 1001 at 15:49-51; 16:13-16; 18:1-3. For these limitations, Petitioners refer back to their analysis of claim limitation 1[c]. *See* Pet. at 31-32, 36-37, 40-41. For all the same reasons discussed herein in Section VI.A as to claim limitation [1c], Ground 1 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to the claim limitation recited in [1c], [5d], [7d], and [11d].

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

For Ground 2, Petitioners contend that Wright alone or in view of Jin renders claims 3, 4, 9, and 10 obvious. Petitioners rely exclusively on Wright in their contention that certain claim limitations of independent claims 3 and 9 are obvious. Wright fails to disclose a number of limitations in independent claims 3 and 9, and Petitioners provide no explanation about how it would have been obvious to modify

Wright to add those missing limitations. Thus, the Board should deny institution as to Ground 2.

A. [3c] and [9d] - Wright does not disclose "producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier" of independent claim 3 or "a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier" of independent claim 9

Claim limitation [3c] of independent claim 3 recites "producing, via a second digital receiver, a second feedback signal in response to the RF amplified output signal from the power amplifier," and claim limitation [9d] of independent claim 9 requires "a second digital receiver producing a second feedback signal in response to the RF amplified output signal from the power amplifier" Ex. 1001 at 15:15-17; 16:47-49. For these limitations, Petitioners refer back to their analysis of claim limitation 1[c]. *See* Pet. at 48, 54-55. For all the same reasons discussed in Section VI.A as to claim limitation [1c], Ground 2 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to the claim limitation recited in [1c], [3c], and [9d].

VIII. THE PETITION DOES NOT DEMONSTRATE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 3

For Ground 3, Petitioners contend that Booth in view of Leyendecker renders claims 1, 2, 5, 6, and 11 obvious. Booth and Leyendecker fail to disclose a number of limitations in independent claims 1, 5, and 11, and Petitioners provide no

meaningful explanation about how it would have been obvious to modify these references to add those missing limitations. Thus, the Board should deny institution as to Ground 3.

A. [1b] – Booth and Leyendecker fail to disclose "producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal" of independent claim 1

Limitation [1b] of independent claim 1 recites "producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal." Ex. 1001 at 14:58-59. Petitioners acknowledge that both Booth and Leyendecker fail to disclose this limitation. *See* Pet. at 67-71. As illustrated in Figure 2 below, Booth does not teach that the predistorted signal should even be delivered to or used by any trainer:

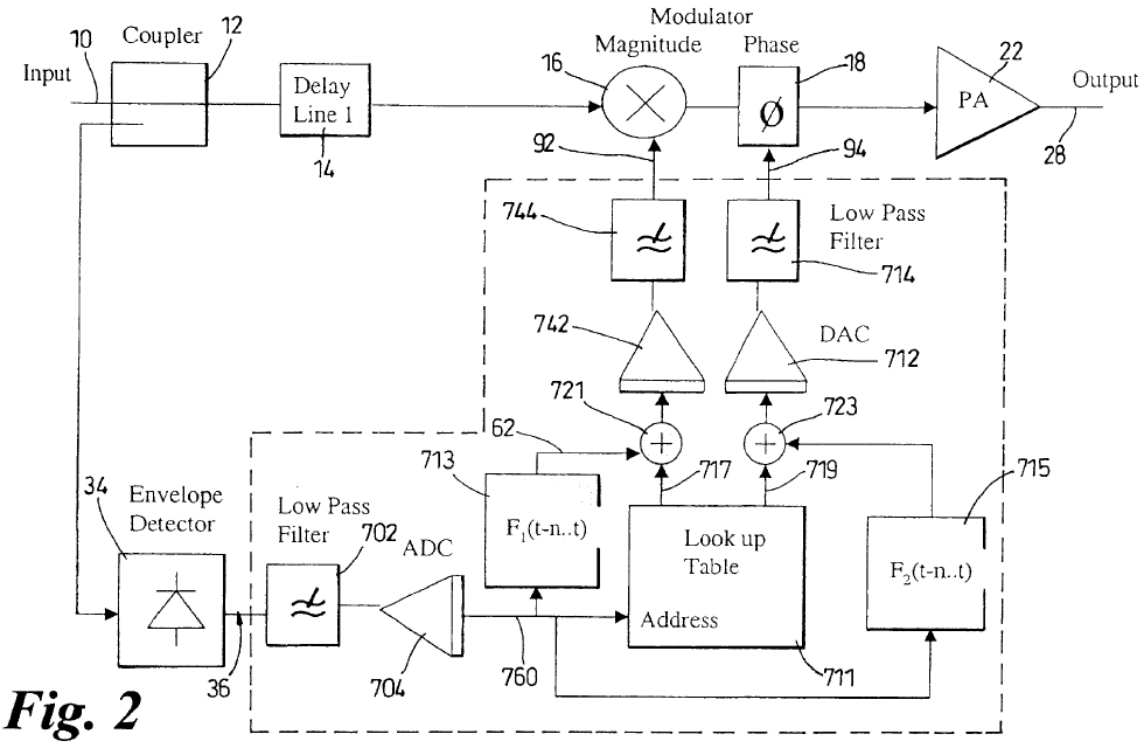


Fig. 2

Ex. 1005 at Fig. 2. Leyendecker discloses that the modulated signal and the input to the power amplifier should be directly input into the trainer, where only the power amplifier signal is modified before being input into the trainer. Ex. 1006 at 21:5-14.

Petitioners then create a Frankenstein depiction of the Booth and Leyendecker components as illustrated in the annotated figure below:

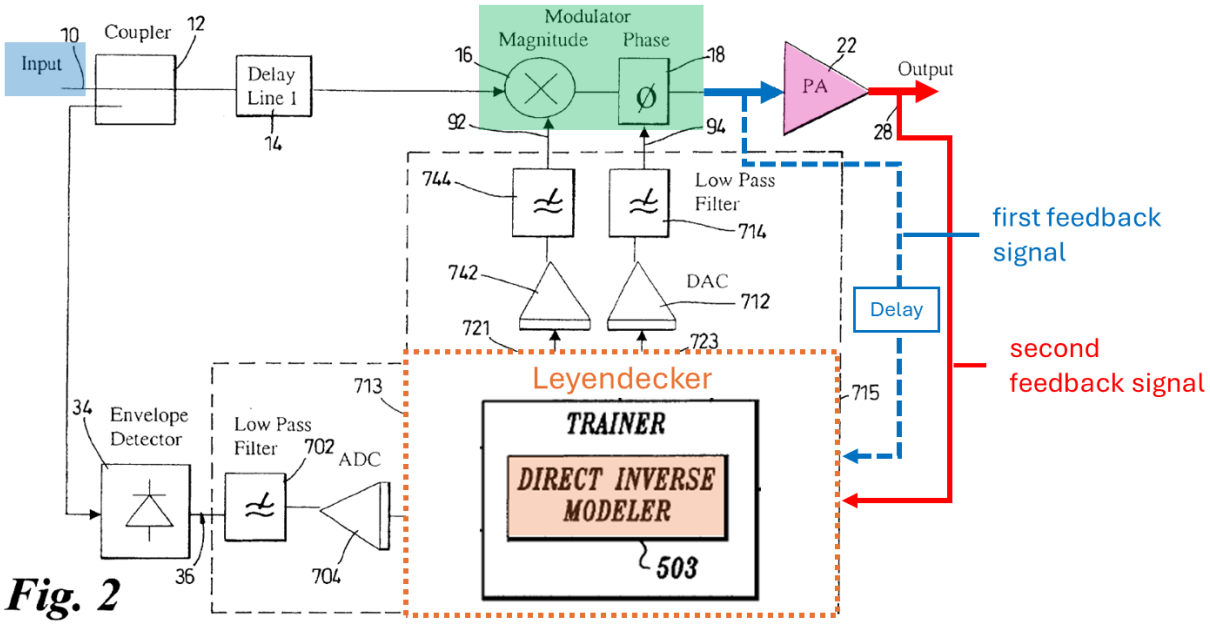
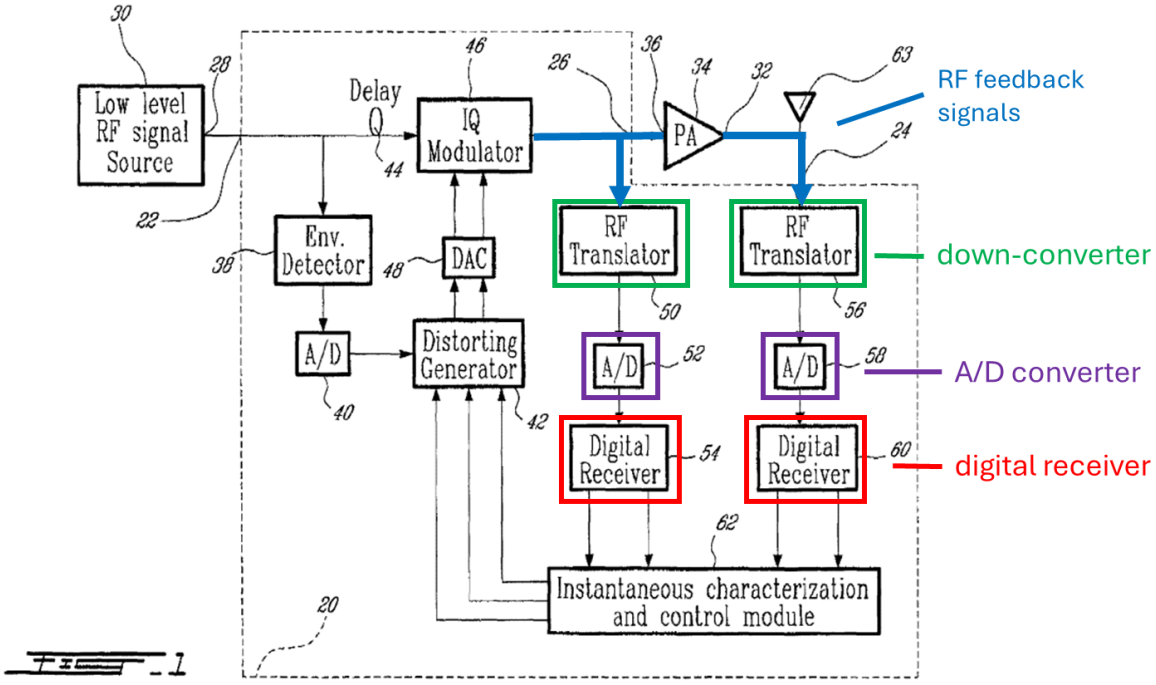


Fig. 2

Pet. at 69. In doing so, Petitioners improperly use the claims of the '345 patent as a roadmap for their obviousness combination. *See, e.g., TQ Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1360 (Fed. Cir. 2019) ("we concluded that the expert appeared to have improperly relied on the challenged patent itself as her roadmap for putting what she referred to as pieces of a jigsaw puzzle together.") (cleaned up) (internal quotations omitted). Indeed, Petitioners actually rely on annotated Fig. 1 of the '345 patent, illustrated below, as part of their rationale:



Pet. at 71.

Petitioners make no attempt to explain how the Booth-Leyendecker combination would even function. See Pet. at 67-71. For example, Leyendecker's trainer is configured to directly receive the modulated signal, where Booth modifies the modulated signal via an envelope detector and low pass filter. *See* Ex. 1005 at Fig. 2; Ex. 1006 at 21:5-14. Furthermore, Leyendecker's trainer is configured to directly receive the input to the power amplifier, but Petitioners propose modifying Leyendecker and Booth to insert a digital receiver that would modify the signal input to the power amplifier (*e.g.*, by removing in-band distortion from the signal). *See* Pet. at 64-65, 67-71; Ex. 1006 at 21:5-14. Moreover, Petitioners provide no explanation of how Leyendecker's trainer would need to be modified to provide a

first output to Booth's components involving "the output of the amplitude linear function processor (713) is added to the output (717) of the amplitude correction RAM at adder (721) and the resulting m-bit digital signal is converted into an analogue signal by digital to analogue converter (DAC) (742) and the output from the DAC is filtered by a low pass anti-alias filter (744) to give amplitude correction signal (92)" or a second output to Booth's components involving "the output of the phase linear function processor (715) is added to the output (719) of the phase correction at adder (723) and the resulting m-bit digital signal is converted into an analogue signal by DAC (712) and the output from the DAC is filtered by a low pass anti-alias filter (714) to give phase correction signal (94)." *See* Pet. at 69 illustrating Annotated Fig. 2 of Booth-Leyendecker; Ex. 1005 at 7:55-66. Indeed, a POSA would have adopted the configuration of Leyendecker, not Booth, if a POSA was motivated to use Leyendecker's trainer. This is problematic for Petitioners because Leyendecker does not disclose "producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal." Instead of this straightforward solution of using Leyendecker's configuration for Leyendecker's trainer, Petitioners improperly rely on the claims of the '345 patent as a roadmap to meet their objectives of attempting to show that the claims of the '345 patent would be obvious in light of a Booth-Leyendecker combination.

Petitioners' allegations as to how this limitation may be rendered obvious are also incorrect. First, Petitioners rely on a purported digital receiver that is only used with respect to the amplified output of the power amplifier, not the predistorted signal. Pet. at 70. Second, Petitioners improperly equate the claimed "first feedback signal" and "RF predistorted signal" to the same element allegedly disclosed in the references. *See* Pet. at 68 ("A POSITA would have understood that implementing Leyendecker's indirect modeler in Booth's predistortion system would require sampling the RF predistorted signal ('first feedback signal,' blue)"); *id*. at 71. ("As explained above, a POSITA would have known that Leyendecker's digital receiver would be obvious to include to generate the complex baseband signal for the RF predistorted signal (first feedback signal) required by Leyendecker's indirect predistortion model.") This analysis is wholly deficient.

Furthermore, Petitioners' incomplete and conclusory allegations would require the claimed "first digital receiver" to receive the analog signal that is input into Booth's power amplifier. However, the plain and ordinary meaning of "digital receiver" requires it to receive a digital signal, not an analog signal, as an input. Petitioners offer no explanation for how Leyendecker's digital receiver could be configured to receive the analog input of Booth's power amplifier. Petitioners do not address this flaw in their analysis.

For at least these reasons, Ground 3 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to this claim limitation. *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).

In support of their obviousness analysis, Petitioners rely on their expert declaration at paragraphs 158 and 160, where Petitioners' expert makes the same conclusory and unfounded allegations made by Petitioners. *See* Pet. at 68-69, 71. Petitioners' expert does not cite to any additional supporting evidence or provide any technical reasoning to support his statement. *See* Ex. 1026 at ¶¶158, 160. 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, the Booth-Leyendecker combination does not teach, suggest, or disclose "producing, via a first digital receiver, a first feedback signal in response to the RF predistorted signal" as recited by independent claim 1.

B. [5c] and [11c] - Wright does not disclose "a first digital receiver producing a first feedback signal in response to the RF predistorted signal from said I/Q modulator" of independent claims 5 and 11

Claim limitations [5c] and [11c] of independent claims 5 and 11 require "a second digital receiver producing a second feedback signal in response to the RF

amplified output signal from the power amplifier" Ex. 1001 at 15:46-48; 17:14-16. For these limitations, Petitioners refer back to their analysis of claim limitation [1b]. *See* Pet. at 79-81, 86-88. For all the same reasons discussed herein in Section VIII.A as to claim limitation [1b], Ground 3 should be denied because Petitioners have wholly failed to provide any type of meaningful analysis in the Petition as to the claim limitation recited in [1b], [5c], and [11c].

IX. 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.

X. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board decline to institute *inter partes* review of the '345 patent.

Dated: July 16, 2025 By: */s/David T. DeZern*

David T. DeZern
Registration No. 60,117
NELSON BUMGARDNER
CONROY P.C.
2727 N. Harwood Street, Suite 250
Dallas, TX 75201
Telephone: (214) 446-4950
Email: david@nelbum.com

Attorney for Patent Owner

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 5,842 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.

Dated: July 16, 2025

By: */s/David T. DeZern*

David T. DeZern
Registration No. 60,117
NELSON BUMGARDNER
CONROY P.C.
2727 N. Harwood Street, Suite 250
Dallas, TX 75201
Telephone: (214) 446-4950
Email: david@nelbum.com

Attorney for Patent Owner

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:

Email: Jacob.Baron@hklaw.com

Jacob.Schneider@hklaw.com

Robert.Jain@hklaw.com

ClientTeamSmartRFLitigation@hklaw.com

Dated: July 16, 2025

By: */s/David T. DeZern*
David T. DeZern
Registration No. 60,117
NELSON BUMGARDNER CONROY P.C.
2727 N. Harwood Street, Suite 250
Dallas, TX 75201
Telephone: (214) 446-4950
Email: david@nelbum.com

Attorney for Patent Owner