

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

RED ROCK ANALYTICS, LLC,
Patent Owner.

Case IPR2018-00555
Patent 7,346,313 B2

Before MICHAEL R. ZECHER, MIRIAM L. QUINN, and
JOHN D. HAMANN, *Administrative Patent Judges*.

HAMANN, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

I. INTRODUCTION

Samsung Electronics Co., Ltd. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 1–6 and 38–43 of U.S. Patent No. 7,346,313 B2 (Ex. 1001, “the ’313 patent”) pursuant to 35 U.S.C. § 311. Red Rock Analytics, LLC (“Patent Owner”) filed a redacted and unredacted Patent Owner Preliminary Response (Papers 9, 10¹ (“Prelim. Resp.”)), along with a Motion for Entry of a Joint Protective Order (Paper 7) and a Motion to Seal (Paper 8). With our authorization (Papers 11, 12, 14), Petitioner filed a Reply to the Preliminary Response (Paper 13 (“Reply”)), and Patent Owner filed a Sur-Reply in response to the Reply (Paper 15).

We have authority to determine whether to institute *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). *Inter partes* review may be instituted if “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.” 35 U.S.C. § 314(a).

Based on the record before us, the information presented in the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing that at least one challenged claim is obvious under 35 U.S.C. § 103(a). Accordingly, we deny the Petition and do not institute *inter partes* review.

¹ We do not rely on any redacted information, which relates to Patent Owner’s arguments as to whether Petitioner properly named all real parties in interest in its Petition. We cite to the redacted version of Patent Owner’s Preliminary Response (Paper 9).

A. *Related Matters*

The parties identify the following matters that may affect or would be affected by a decision in this proceeding:

1.	<i>Red Rock Analytics, LLC v. Samsung Elec. Co.</i>	2:17-CV-00101	E.D. Tex.
2.	<i>Unified Patent LLC v. Red Rock Analytics, LLC</i>	Case IPR2017-01490	PTAB
3.	<i>Samsung Elec. Co. v. Red Rock Analytics, LLC</i>	Case IPR2018-00556	PTAB
4.	<i>Samsung Elec. Co. v. Red Rock Analytics, LLC</i>	Case IPR2018-00557	PTAB

Pet. 1, Paper 3, 2.

B. *The Challenged Patent (Ex. 1001)*

The '313 patent relates to transceivers for digital communications that transmit and receive data using two baseband signals (i.e., when the signals are not impressed on a carrier signal) as complex components (i.e., an in-phase (“I”) component and a quadrature (“Q”) component (ideally, a 90 degree phase separation)) of a carrier signal (e.g., a radio frequency (“RF”) signal, which is the signal transmitted or received at the antenna). Ex. 1001, 1:6–10, 1:25–30. More specifically, the '313 patent relates to minimizing any gain imbalance between these I and Q channels. *See, e.g., id.* at 1:6–10.

A quadrature transceiver can transmit data by impressing a baseband signal upon the cosine carrier (referred to as the real or I signal), and impressing the other baseband signal upon the sine carrier (referred to as the imaginary or Q signal). *Id.* at 1:31–36. Figure 1A, shown below, illustrates this operation from baseband to RF. *See id.* at 4:47–50.

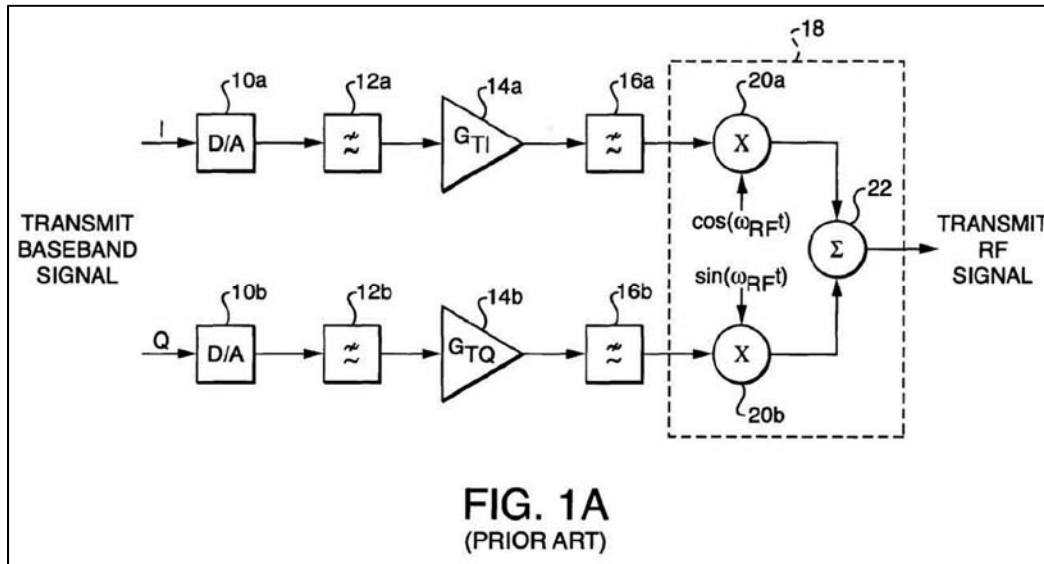


Figure 1A is a block diagram of the transmit chain for a typical prior art transceiver.² See Ex. 1001, 4:47–50. In Figure 1A:

[t]he baseband I and Q digital signals are converted by digital-to-analog [(D/A)] converters 10a and 10b, respectively, to analog signals, and passed through low-pass anti-aliasing filters 12a and 12b to form the analog version of the baseband transmit waveform. The resulting signals are amplified by the in-phase and quadrature transmit gains G_{TI} and G_{TQ} amplifiers 14a and 14b, low-pass filtered again by low pass filters 16a and 16b to limit the noise bandwidth, then converted to the complex RF signal in a complex modulator 18, as shown here using cosine and sine mixers 20a and 20b and summation at 22.

Id. at 6:24–35 (emphases omitted).

In contrast, Figure 1B, shown below, illustrates the transceiver's receive operation from RF to baseband. See *id.* at 4:47–50.

² For purposes of this Decision, we have chosen to discuss a direct-conversion transceiver, which “convert[s] directly between RF and baseband,” as the Decision does not turn on the difference between a direct-conversion transceiver and a heterodyne-conversion transceiver, which employs an intermediate frequency. See Ex. 1001, 1:14–24, 2:27–28.

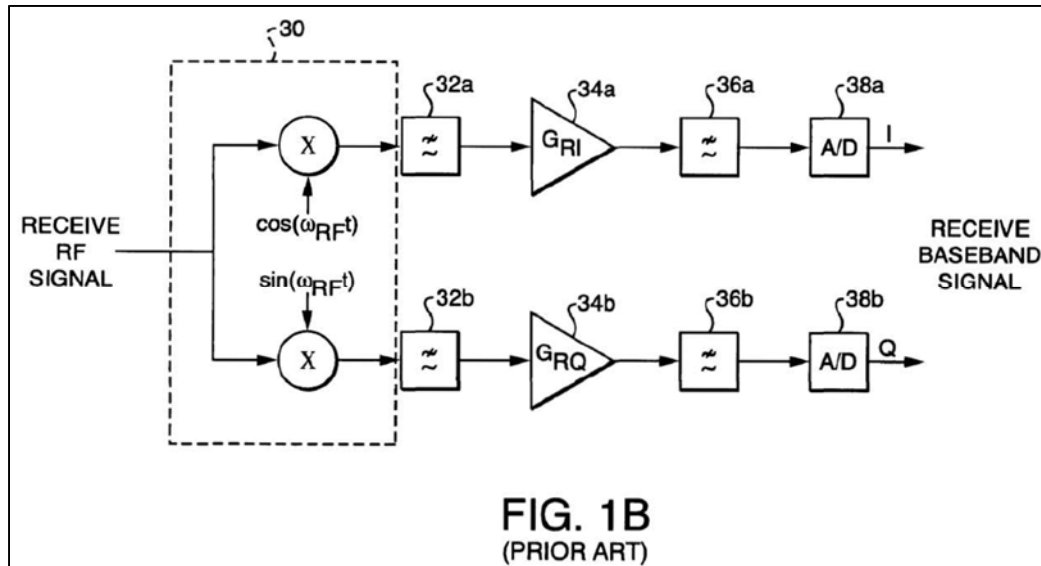


Figure 1B is a block diagram of the receive chain for a typical prior art transceiver. *See* Ex. 1001, 4:47–50. In Figure 1B:

The RF signal is converted using demodulator 30 to baseband by mixing with cosine and sine signals at the RF frequency, and the I and Q components subsequently passed through low-pass filters 32a and 32b to suppress undesired frequencies. The resulting signals are amplified by the in-phase and quadrature receive gains G_{RI} and G_{RQ} of amplifiers 34a and 34b then passed through low-pass filters 36a and 36b which limit the noise bandwidth before sampling in the analog-to-digital (A/D) converters 38a and 38b.

Id. at 6:36–45 (emphases omitted).

According to the '313 patent, balancing the gains provided in the I and Q channels of the entire transmit and receive chains can be critical for adequate operation of the transceiver. *See id.* at 1:47–67. To balance the gains, the '313 patent discloses (i) applying a calibration signal (I and Q signals) to the baseband input of the transmit chain; (ii) injecting the amplified and converted calibration signal from the transmit chain into the receive chain via a signal path between the transmit RF output port and the receive RF input port; (iii) observing the calibration signal at the receive

chain baseband output port; and (iv) determining the I-Q gain settings (e.g., by varying the I-Q gain settings) for each chain which minimize an observable indicator of the gain imbalance while holding the I-Q gain settings for the other chain constant. *See id.* at 2:14–58; 5:21–6:6.

Figure 4, shown below, illustrates this approach, which “employs the normal baseband transmit input for introducing the calibration signal, and the normal baseband receive output for” observing the indicator for minimizing the I-Q gain imbalance. Ex. 1001, 8:35–38.

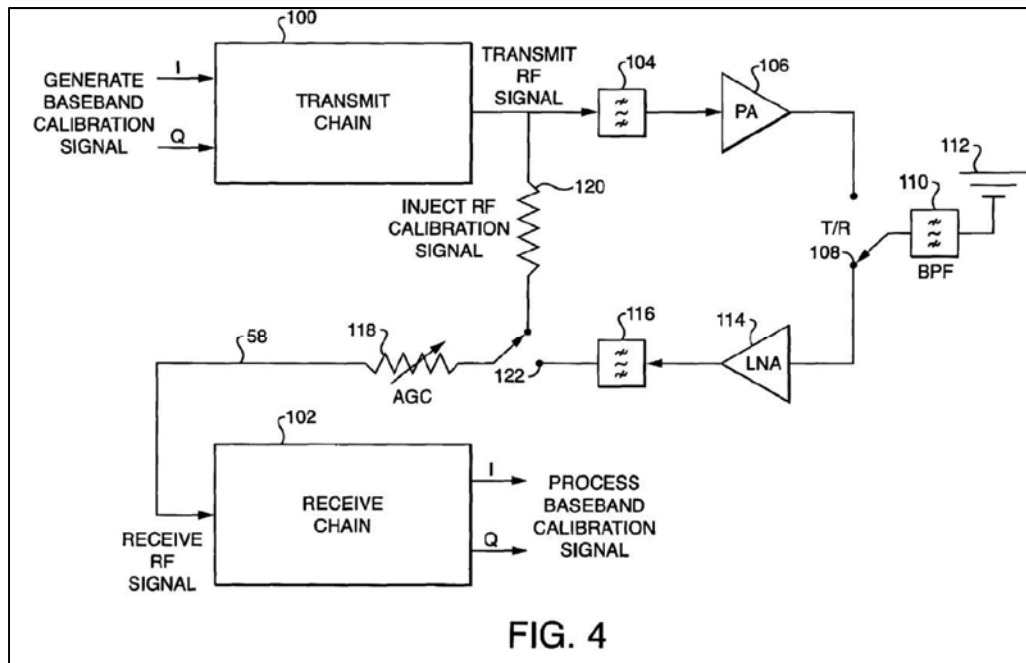


Figure 4 shows a transceiver having conventional transmit chain 100 and conventional receive chain 102, such as those illustrated above. *Id.* at 8:10–11; *see supra* Figs. 1A, 1B. The transceiver also includes the above discussed signal path from the transmit chain’s output to the receive chain’s input (i.e., through attenuator 120 and switch 122 used to switch between a calibration mode and an operation RF mode) to inject a calibration signal. *See id.* at 8:21–34. The calibration signal chosen “must be designed to be sensitive to I-Q gain imbalance” and produce an observable indicator of that

imbalance that “can only be minimized when both the transmit and receive gain imbalances have been individually minimized.” *See id.* at 5:58–65, 8:48–53. An example of such a calibration signal is “a sequence of pulses, in any order, for which a pulse is either purely real or purely imaginary at the transmit baseband input.” Ex. 1001, 8:51–53.

C. The Challenged Claims

Petitioner challenges claims 1–6 and 38–43. Of the challenged claims, claims 1 and 38 are independent claims. Claim 1 is illustrative of these challenged claims and is reproduced below:

1. A transceiver system for transmitting and receiving data using both I and Q channels, comprising:
 - a transmit chain;
 - a receive chain; and
 - a calibration subsystem comprising a signal path for injecting a calibration RF signal, generated in response to and as a function of a signal generated through the transmit chain, into the receive chain of the transceiver in order to independently calibrate the I-Q gain balance of the both transmit and receive chains in their entirety;wherein the calibration RF signal includes a calibration cycle, and the calibration cycle determines transmitter I-Q gain settings which minimize an observable indicator while holding receive I-Q gain settings constant, and which in turn determines receiver I-Q gain settings which minimizes the observable indicator while holding the transmit I-Q gain settings constant.

Ex. 1001, 11:56–12:5.

D. Asserted Ground of Unpatentability

Petitioner asserts the following ground of unpatentability:

References ³	Basis ⁴	Challenged Claims
Yellin ⁵ and Su ⁶	§ 103(a)	1–6 and 38–43

Pet. 2, 18–52.

E. Submitted Declarations

Petitioner submits the Declaration of R. Jacob Baker, Ph.D., P.E. (Ex. 1002) in support of its contentions concerning the disclosures of the asserted prior art and the '313 patent. Patent Owner submits the Declaration of Payam Heydari, Ph.D. (Ex. 2001) in support of its contentions concerning the disclosures of the asserted prior art and the '313 patent.

II. DISCUSSION

For the reasons that follow, we determine that Petitioner has not shown a reasonable likelihood that it would prevail in showing the unpatentability of the challenged claims.

A. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active

³ For clarity and ease of reference, we only list the first named inventor.

⁴ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 100 *et seq.* effective on March 16, 2013. Because the '313 patent issued from an application filed before March 16, 2013, we apply the pre-AIA versions of the statutory bases for unpatentability.

⁵ US 6,898,252 B1 (issued May 24, 2005) (Ex. 1005).

⁶ US 6,272,322 B1 (issued Aug. 7, 2001) (Ex. 1006).

workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). “[O]ne or more factors may predominate.” *Id.*

Petitioner asserts a person having ordinary skill in the art at the time of the invention of the ’313 patent would have had “at least a Master’s degree in electrical engineering or a similar discipline, and at least one to two years of work experience in the design and analysis of radio frequency communication systems.” Pet. 3 (citing Ex. 1002 ¶¶ 19, 20). Petitioner also asserts that “[m]ore education can substitute for practical experience and vice versa.” *Id.* Patent Owner does not propose a level of skill for one of ordinary skill in the art at the time of the invention of the ’313 patent.

Petitioner’s assessment of the level of skill in the art is consistent with the ’313 patent and the asserted prior art. Therefore, we adopt Petitioner’s assessment for purposes of this Decision and apply it to our construction analysis and obviousness evaluations below.

B. Claim Construction

We interpret claims of an unexpired patent using the “broadest reasonable construction in light of the specification of the patent in which [the claims] appear[.]” 37 C.F.R. § 42.100(b). Under that standard, claim terms are presumed to be given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Further, “[t]he [U.S. Patent and Trademark Office] should also consult the patent’s prosecution history in proceedings in

which the patent has been brought back to the agency for a second review.” *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015), *overruled on other grounds by Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017).

The parties dispute what constitutes the broadest reasonable interpretation of “receive chain.” Prelim. Resp. 18–21; Pet. 18–25, 27–28; Reply 1. The parties’ dispute hinges on whether the claimed “receive chain” must receive an *external* signal (i.e., a signal from a source *external* to the transceiver). *Id.*

Petitioner contends that the correct interpretation of “receive chain” includes receiving an internal RF signal. See Pet. 20–21 (citing Ex. 1005, Fig. 2, 3:21–22, 3:65–66, 4:14–15, 10:5–10; Ex. 1002 ¶¶ 54, 75), 27 (citing Ex. 1002 ¶¶ 54, 92); see also Reply 1. In contrast, Patent Owner argues that a “receive chain” is “the portion of the transceiver circuitry that receives and processes an external signal at radio frequency.” Prelim. Resp. 19. In other words, a receive chain receives signals from an external source in the normal operation of a transceiver, according to Patent Owner. *Id.* at 19–20 (citing Ex. 1001, [54], 1:6–10, 5:46–55, 7:46–59, 8:23–34, 8:42–57; Ex. 1002 ¶ 22). Patent Owner argues the ’313 patent’s Specification supports its construction. *Id.* at 19, 21 (citing Ex. 1001, 4:60–65, 5:45–57, Fig. 4). For example, Patent Owner argues that Figure 4 “show[s] [an] antenna connected to [the] transmit chain and [the] receive chain.” *Id.* at 21 (citing Ex. 1001, Fig. 4).

On this record,⁷ we agree with Patent Owner that the broadest reasonable interpretation of a “receive chain” is “the portion of the transceiver circuitry that receives and processes an external signal at radio frequency.” Beginning with the intrinsic record, the language of each of the challenged, independent claims indicates that the *receive chain* is part of the transceiver for receiving data. *E.g.*, Ex. 1001, 11:56–57, 11:59, 11:63; *see also* Ex. 1002 ¶ 23 (identifying transceivers as “systems including both a transmitter and a receiver”). The ’313 patent discloses that a transceiver communicates (i.e., transmits and receives data) with external sources, such as in wireless communication systems. *See* Ex. 1001, 1:6–11 (disclosing that the ’313 patent relates to transceivers for digital communications, such as in wireless local area networks), 1:14–24 (disclosing that wireless communication systems employ transceivers, such as heterodyne and direct-conversion transceivers). For example, Figure 4 shows “a typical transceiver incorporating the present invention and comprising transmit and receive chains plus a transmit power amplifier, receive low-noise amplifier, transmit/receive switch, band-pass filter, an antenna and an automatic gain control.” *Id.* at 4:60–65, Fig. 4. Figure 4 clearly evidences transmitting and receiving signals from external sources to provide communications. *Id.*

Turning to the extrinsic record, Patent Owner’s interpretation is consistent with the testimony of Petitioner’s expert, Dr. Baker. Dr. Baker testifies that:

⁷ The parties’ arguments alleging that the other party takes inconsistent claim construction positions with respect to those taken in the related district court case are not helpful to our analysis, and we instead focus on the current record.

Wireless communication systems use radio waves . . . to convey information from a source to a destination. At the source, a transmit chain (also known as a transmitter) processes a signal to prepare it to be propagated along a carrier wave at radio frequency (RF) to the destination, where the received RF signal is processed by a receive chain (also known as a receiver) to extract relevant information.

Ex. 1002 ¶ 22.

Upon considering the plain language of the challenged, independent claims, the Specification of the '313 patent, and the testimony of Dr. Baker, we agree with Patent Owner that for purposes of this Decision a “receive chain” should be construed as “the portion of the transceiver circuitry that receives and processes an external signal at radio frequency.”

C. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of non-obviousness, if present.⁸ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁸ Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness in its Preliminary Response. *See generally* Prelim. Resp. 37–58.

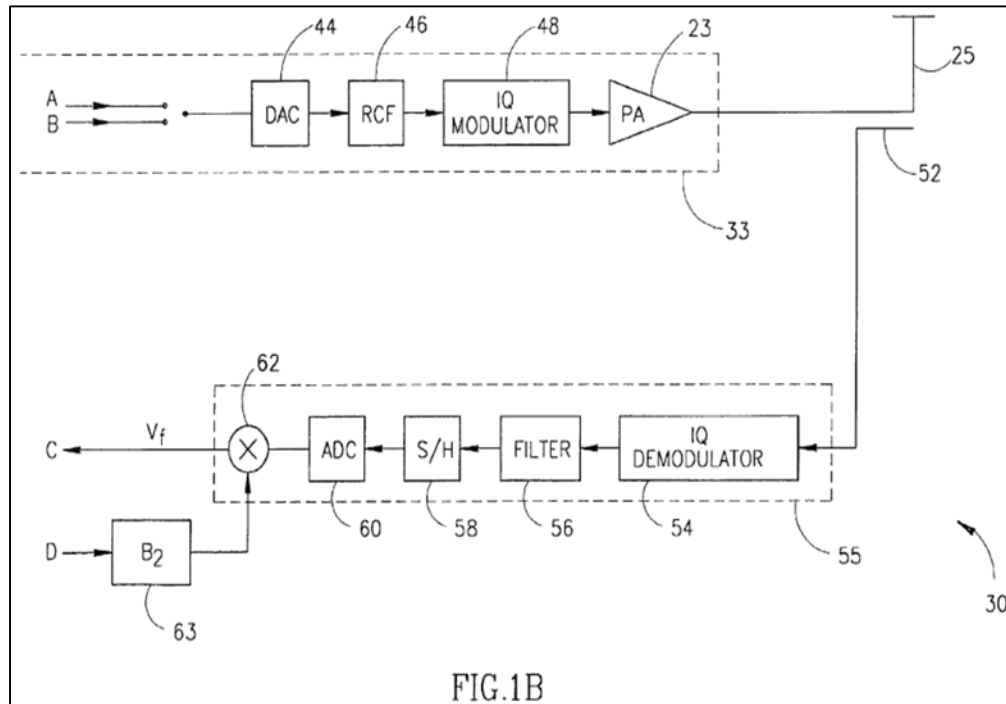
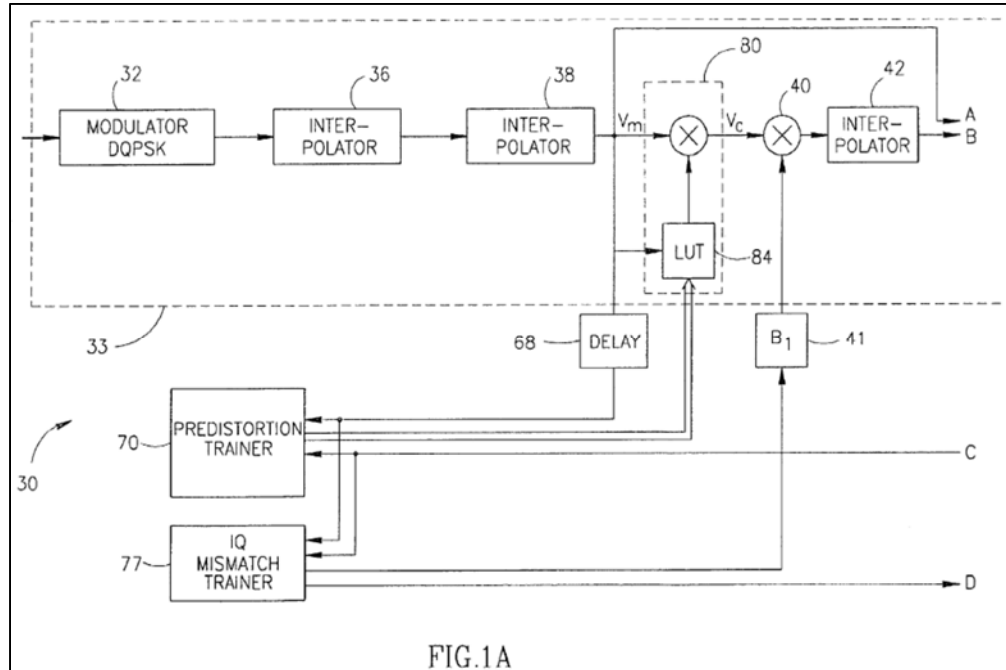
Challenges “on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

In assessing the prior art, we must consider whether a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention. *In re Nuvasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016). As part of our analysis to determine whether the challenged claims would have been obvious, we must be vigilant to avoid the distortion caused by hindsight bias and cautious of arguments reliant upon *ex post facto* reasoning. See *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368 (Fed. Cir. 2012).

D. Overview of Prior Art

1. Summary of Yellin

Yellin relates to canceling mismatch in the I and Q components of a complex communication signal. *E.g.*, Ex. 1005, [54]. Yellin discloses canceling the mismatch that occurs when the complex baseband signal is modulated onto a carrier frequency for transmission—Yellin refers to this type of mismatch as “IQ mismatch.” *Id.* at 1:7–13, 1:17–20. Figures 1A and 1B, shown below, illustrate a schematic block diagram of a transmitter in accordance with Yellin’s disclosure. *Id.* at 1:45–47.



Figures 1A and 1B illustrate transmitter 30, which comprises transmission modulation path 33 for transmitting complex signals over antenna 25. *Id.* at 1:67–2:2. Path 33 includes conventional transmitter components, such as Differential Quadrature Phase Shift Keying

(“DQPSK”) modulator 32 (which encodes bits to be transmitted to form a complex baseband signal), digital to analog converter (“DAC”) 44, IQ modulator 48 (which modulates the complex baseband signal onto a carrier frequency), and power amplifier 23 (which amplifies the signal before transmission). *Id.* at 2:3–14.

Figure 1B also shows reverse conversion unit 55, which obtains the modulated and amplified signal via directional coupler 52 before the signal is transmitted over antenna 25. *Id.* at 2:15–16, Figs. 1A, 1B. Reverse conversion unit 55 “substantially reverses the operation of . . . modulation path 33, bringing the signal[] back to a state in which [it] can be compared to the signal[]” before it was converted to analog, modulated onto the carrier frequency, and amplified. *Id.* at 2:17–20. Reverse conversion unit 55 includes, among other components, IQ demodulator 54 (which converts the signal back to baseband). *Id.* at 2:27–32, Fig. 1B. Reverse conversion unit 55 outputs the reversed signal to mismatch trainer 77, which, in turn, estimates correction values for canceling the IQ mismatch effects of modulator 48 and demodulator 54. *Id.* at 2:58–62.

Figure 2,⁹ shown below, “is a schematic *functional* block diagram of *elements relevant* to mismatch cancellation in an apparatus 300.” *Id.* at 3:5–6 (emphases added). In other words, Figure 2 is a more generalized diagram focusing on Yellin’s mismatch circuitry such as in Figures 1A and 1B.

⁹ This corrective annotated version of Figure 2 was taken from the Petition. Pet. 13. The parties agree that Figure 2 as produced in the ’313 patent has a typographical error and the rightmost non-linear element should have been labeled as “330.” Pet. 14 n.2; Prelim. Resp. 13 n.1.

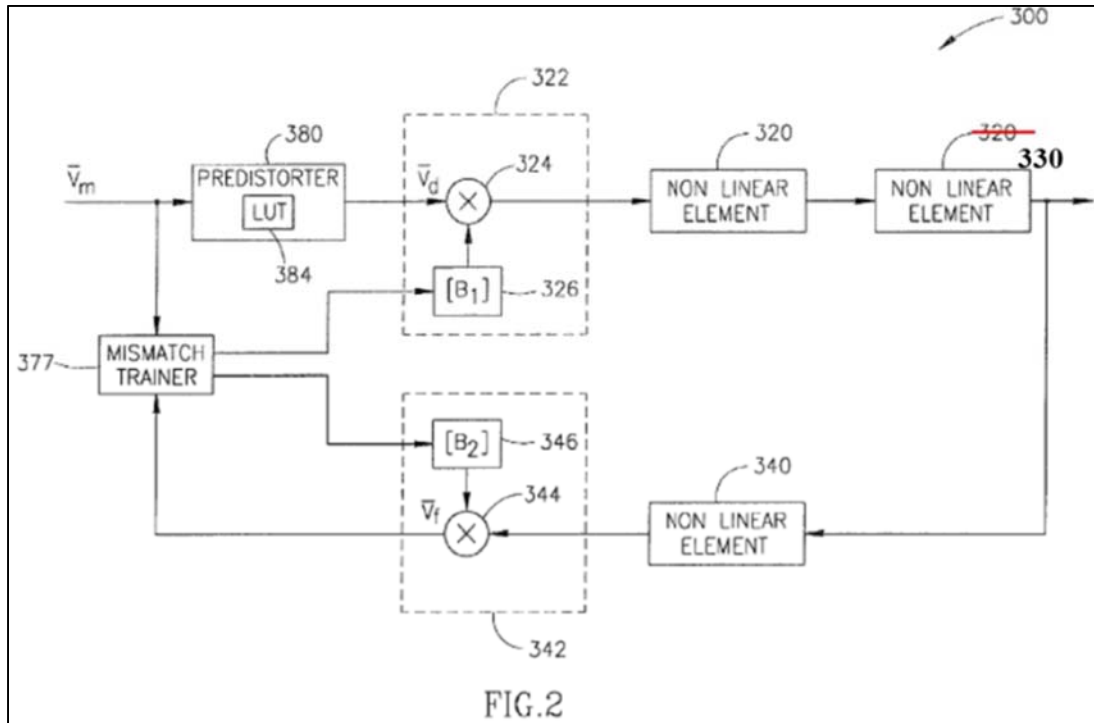


Figure 2 illustrates apparatus 300, which can be “a communication device, such as transmitter 30 of F[igs.] 1A and 1B, a receiver or any other apparatus [that] suffers from IQ mismatch.” *Id.* at 3:8–11. Figure 2 shows a transmitter with non-linear elements 320 and 340, which can be transmitter 30’s IQ modulator 48 and IQ demodulator 54, respectively. *Id.* at 3:20–22. Also shown is mismatch trainer 377, which compares the complex baseband transmit signal before it has been provided to non-linear element 320 (denoted as vector V_m) with the signal once it has passed through non-linear elements 320, 330, and 340 (denoted as vector V_f). *Id.* at Fig. 2, 2:58–62, 4:3–15. Based on this comparison, mismatch trainer 377 estimates correction values for the correction matrices B_1 (326) and B_2 (346) to be applied by IQ correction units 322 and 342, respectively, to minimize the IQ mismatch caused by non-linear elements 320 and 340. *Id.*

2. *Summary of Su*

Su relates to controlling the transmitter power of mobile units and base stations in wireless communication systems. Ex. 1006, [54], 1:7–10. Su discloses calibrating mobile units' transmitter power so that the power received by a base station from each mobile unit is the same; this provides for maximum capacity of the wireless communication system. *Id.* at 2:24–26. The mobile units, however, can be located at widely varying distances from the base station, and, as a consequence, their corresponding path losses also can widely vary. *Id.* at 1:64–67, 2:4–12, 2:20–26. To account for the differences in path loss, Su's mobile units transmit and receive signals at known power levels to and from the base station for evaluation so that the path losses can be determined. *Id.* at 5:66–6:44, Fig. 4. Based in part on the determined path losses, “each mobile unit adjusts the mobile unit's output power level so as to provide a desired power at the receiver of the base station.” *Id.* at 7:66–8:4.

E. *Analysis*

1. *Claims 1 and 38*

Petitioner contends that the challenged, independent claims (claims 1 and 38) would have been obvious in light of the combined teachings of Yellin and Su. Pet. 2, 18–39, 49–50. Each of the challenged, independent claims recites “the receive chain of the transceiver.” We focus our analysis below on this limitation as it is dispositive as to whether Petitioner satisfies the “reasonable likelihood” threshold standard for institution. Petitioner attempts to show this limitation by arguing that (i) Yellin discloses it, or alternatively, (ii) in light of the teachings of Su, one of ordinary skill in the art would have been motivated to modify Yellin's transmitter to use its IQ

mismatch circuitry to function also as the claimed “receive chain.” For the reasons that follow, we determine that Petitioner’s showings are not sufficient.

a. Yellin’s Disclosure

Petitioner argues Yellin discloses “a receive chain” because Yellin’s apparatus 300 transmits *and receives data*. Pet. 18–19 (citing Ex. 1002 ¶ 73), 29 (citing Ex. 1002 ¶ 92). More specifically, Petitioner argues that in Yellin’s apparatus 300, IQ correction unit 342 and non-linear element 340 constitute a *receive chain*, in which non-linear element 340 *receives* “the transmitted high frequency signal.” Pet. 20 (citing Ex. 1005, Fig. 2, 3:21–22), 27 (citing Ex. 1002 ¶ 92). Petitioner argues that Yellin’s non-linear element 340 demodulates the high frequency data into IQ vectors, which are then calibrated and provided to mismatch trainer 377. *Id.* (citing Ex. 1005, 3:21–22, 3:65–66, 4:14–15, 4:31–41, 10:5–10, Fig. 2; Ex. 1002 ¶¶ 54, 75). According to Petitioner, because the high frequency data is demodulated, calibrated, and provided to the mismatch trainer 377, *Yellin* discloses receiving data (i.e., the claimed “receive chain”). *Id.* at 20–21 (citing Ex. 1002 ¶¶ 54, 74), 27.

In response, Patent Owner argues that Yellin discloses that non-linear element 340 obtains signals directly from non-linear element 330, which is not external to Yellin’s apparatus 300, and instead forms part of the transmitter. Prelim. Resp. 44–45 (citing Ex. 1005, Figs. 1, 2). Accordingly, Patent Owner argues that Yellin’s non-linear element 340 does not receive signals from an external source, and, thus, Yellin does not disclose the claimed “receive chain.” *Id.* at 45–46.

We agree with Patent Owner that Yellin fails to disclose the claimed “receive chain.” As we discuss in our claim construction section above, the claimed “receive chain” receives *external* signals. *See supra* Section II(B). Yellin’s non-linear element 340, in contrast, only is fed signals from apparatus 300’s transmit chain, which is *internal* to the transceiver, and not from an external source, as required. Ex. 1005, Figs. 1A, 1B, 2, 3:11–17. Accordingly, Yellin fails to disclose a “receive chain” because the current record does not include sufficient evidence to support a finding that Yellin’s non-linear element 340 receives signals from an external source.

b. Combining Yellin’s and Su’s Teachings

Alternatively, Petitioner argues that, in light of the teachings of Su, “it would have been obvious to implement Yellin’s apparatus 300 as a ‘transceiver.’” Pet. 21 (citing Ex. 1002 ¶¶ 76–90), 27. More specifically, Petitioner argues that it would have been obvious to modify Yellin’s transmitter to use its IQ mismatch circuitry also for the claimed “receive chain.” Pet. 21, 23–26.

i. Purported Rationale to Combine

According to Petitioner, one of ordinary skill in the art “would have been motivated to implement [Yellin’s] apparatus 300 . . . as a transceiver . . . because doing so would have increased the utility of the apparatus 300 with minimal modifications.” Pet. 23 (citing Ex. 1002 ¶¶ 81–83). In response, Patent Owner asserts that this reasoning is conclusory, failing to explain the purported increased utility. Prelim. Resp. 49–51, 56. Patent Owner also argues that the needed modifications are much more than “minimal.” *Id.* at 50–53, 57.

We agree with Patent Owner that Petitioner’s reasoning for combining Yellin and Su’s teachings is conclusory. Such statements of *increased utility* and *minimal* modifications are generic, and fail to provide necessary factual support — they are akin to stating in a conclusory fashion that the combination “would have been obvious.” See *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017); see also *ActiveVideo Networks Inc. v. Verizon Comm., Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (finding expert testimony of motivation to combine “to build something better,” “more efficient, cheaper, or” something that “had more features” was generic and insufficient).

Dr. Baker’s testimony concerning increased utility also does not provide the necessary factual support. For example, Dr. Baker opines that one of ordinary skill in the art would have viewed Yellin’s apparatus 300 as including a receive chain “like those found in a typical transceiver as evidenced by both *Su* and the ’313 patent.” Ex. 1002 ¶ 80; see also *id.* ¶ 81 (discussing a receive path in Yellin’s apparatus 300). As we discuss in our analysis above, however, Yellin’s transmitter fails to disclose a receive chain for receiving external signals. See *supra* Section II(E)(1)(a).

Dr. Baker also opines that one of ordinary skill in the art would have recognized that Yellin’s transmitter *could have been modified* into a transceiver. See Pet. 23 (citing Ex. 1002 ¶ 80 (recognizing “apparatus 300 in figure 2 of *Yellin* *could* be implemented as a transceiver”) (emphasis added)); see also Ex. 1002 ¶ 82 (recognizing “apparatus 300 *could* be employed to function as an RF receiver during normal operation”) (emphasis added)). “[O]bviousness[, however,] concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the

combinations or modifications of prior art to arrive at the claimed invention.” *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015). In any event, Dr. Baker provides no factual support for his opinion that Yellin’s transmitter *could have been modified* into a transceiver, or that one of ordinary skill in the art would have recognized as much. *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.”).

Accordingly, we do not credit the above cited testimony of Dr. Baker because it is conclusory and lacks factual support and, therefore, is entitled to little, if any, weight. *See In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) (“[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations.”).

In addition, Petitioner relies on Yellin’s disclosure that apparatus 300 “can be used with transmitters, receivers, or ‘any other apparatus which suffers from IQ mismatch’” as support for its argument that Yellin’s transmitter could be implemented as a transceiver. *See* Pet. 24 (citing Ex. 1005, 3:8–11). This statement, however, does not disclose using Yellin’s mismatch circuits for the claimed “receive chain” for receiving external signals. *Id.* Rather, as Patent Owner argues (Prelim. Resp. 49–50), and we agree, Yellin suggests, at best, implementing a transceiver as a separate transmitter and a separate receiver, each having their own IQ mismatch circuits. *See* Ex. 1005, 3:8–11 (disclosing a “transmitter” or “receiver”).

Petitioner also argues that one of ordinary skill in the art “would have looked to *Su* to refine the teachings of *Yellin* because . . . [they both] disclose techniques for improving the performance of wireless communication devices.” Pet. 23 (citing Ex. 1002 ¶ 80). At best, Petitioner’s argument in this regard indicates that *Yellin* and *Su* are directed to the same art or same techniques. Merely asserting that these prior art references are directed to the same art or same techniques, however, does not suffice as an articulated reason with a rational underpinning to combine their respective teachings—more is required to support the legal conclusion of obviousness. See *KSR*, 550 U.S. at 418; see also *Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (determining that the Board correctly concluded that Microsoft “gave no reason for the motivation of a person of ordinary skill [in the art] to combine Visual Basics and Salton except that the references were directed to the same art or same techniques”).

Accordingly, Petitioner does not show that one of ordinary skill in the art would have had a sufficient reason to combine the relevant teachings of *Yellin* with those of *Su*.

ii. *Impermissible Hindsight*

Patent Owner argues that Petitioner relies on impermissible hindsight in modifying *Yellin*’s transmitter to use its IQ mismatch circuitry to function also as the claimed “receive chain.” *E.g.*, Prelim. Resp. 48–51. We agree.

Petitioner, via Dr. Baker’s testimony, appears to have relied impermissibly on the ’313 patent itself as a roadmap for putting what amounts to pieces of a jigsaw puzzle together. See *Grain Processing Corp. v. Am.-Maize Prods. Co.*, 840 F.2d 902, 907 (Fed. Cir. 1988) (quoting *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1012 (Fed. Cir.

1983) (“Care must be taken to avoid hindsight reconstruction by using ‘the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.’”). For example, Dr. Baker opines, in a conclusory fashion, that a person of ordinary skill in the art would have (i) chosen to use Yellin’s non-linear element 340 and IQ correction unit 342, and then (ii) added thereto at least the following to obtain a receiver: (1) a processor for the data received by the receive chain (Ex. 1002 ¶ 83); (2) a path between an antenna and nonlinear element 340 for receiving an incoming RF signal from an external device (*id.* ¶ 85); and (3) a switching mechanism that could select between a transmit mode and a receive mode (*id.* ¶ 86).

Furthermore, Dr. Baker does not explain how or why adding all these additional components to Yellin’s non-linear element 340 and IQ correction unit 342 would have amounted to “minimal” modifications. See Ex. 1002 ¶ 81. Nor does Dr. Baker address how the existing components of Yellin’s IQ mismatch circuitry (e.g., sample and hold circuitry 58) would function in light of these proposed modifications. See *id.* at ¶¶ 81–88; see also Yellin Fig. 1B.

The conclusory nature of Dr. Baker’s testimony and his opining on what *could* be combined evidences hindsight bias. See Ex. 1002 ¶¶ 80, 82; see also *InTouch Tech., Inc. v. VGO Comm., Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (finding hindsight bias in expert testimony that “primarily consisted of conclusory references to [the] belief that one of ordinary skill in the art *could* combine these references, not that they *would* have been motivated to do so”).

c. Summary

In summary, we determine that Petitioner does not provide sufficient reasoning, based on evidence of record, to show that one of ordinary skill in the art at the time of the '313 patent would have combined the relevant teachings of Yellin with those of Su.

2. Claims 2–6 and 39–43

Petitioner alleges that (i) claims 2–6, which depend from independent claim 1 and (ii) claims 39–43, which depend from independent claim 38, are unpatentable. *See* Pet. 40–52.

We determine above, however, that Petitioner does not show a reasonable likelihood that it would prevail in establishing that either independent claim 1 or 38 is unpatentable. Petitioner does not present any additional argument or information with respect to these dependent claims that cures the deficiencies discussed above regarding Petitioner's challenges to independent claims 1 and 38. *See id.* Thus, for the reasons stated above, Petitioner has not shown a reasonable likelihood of success in challenging these dependent claims for any asserted ground.

III. CONCLUSION

For the foregoing reasons, after taking into account the arguments presented in the Preliminary Response, the information presented in the Petition does not demonstrate a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of any one of claims 1–6 and 38–43 of the '313 patent on any ground of unpatentability presented in the Petition.

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IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied and no trial is instituted.

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