UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

RED ROCK ANALYTICS, LLC. *Plaintiff*, v. SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS AMERICA, INC., SAMSUNG SEMICONDUCTOR, INC., and SAMSUNG AUSTIN SEMICONDUCTOR, LLC, *Defendants*	Case No. 2:17-cv-00101-RWS-RSP **<u>JURY</u>**

<u>DEFENDANTS' INVALIDITY CONTENTIONS</u>

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Introduction

Pursuant to P.R. 3–3 and the Docket Control Order the Court has entered in this case (Dkt. 41), Defendants Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., Samsung Semiconductor, Inc., and Samsung Austin Semiconductor, LLC (collectively, "Samsung" or "Defendants") provide the following Invalidity Contentions.

At this early stage of the case, Samsung's investigation and analysis of potential prior art is not yet complete. Samsung notes that it has not completed discovery of Red Rock Analytics LLC ("Red Rock"), Dr. Cafarella, or of any third-parties who may possess relevant information pertaining to the identification and analysis of potential prior art or other theories of invalidation or unenforceability. Accordingly, Samsung expressly reserves its right to present additional items of prior art or theories of invalidity under 35. U.S.C. § 102(a), (b), (e), (f), (g) and/or § 103 to the extent that its ongoing discovery or investigation yields a basis for such a contention.

Samsung's invalidity contentions are based on its current understanding of the asserted claims as applied by Red Rock in its infringement contentions. At least under Red Rock's apparent constructions and infringement contentions, all of the elements of the asserted claims were already known or obvious before the respective priority date of each of the Asserted Patents. Samsung makes no admissions, express, or implied, concerning the scope or interpretation of the claims, and nothing in these disclosures should be interpreted as agreement with Red Rock's implicit constructions or infringement theories. Samsung expressly reserves the right to propose its own claim construction positions and to oppose Red Rock's claim construction positions in accordance with the deadlines set forth by the Court in the Docket Control Order.

Samsung also reserves the right to prove invalidity of the asserted claims on bases other than those required to be disclosed in these disclosures pursuant to Patent Rule 3–3. For instance, Samsung reserves the right to contend that one or more asserted claims are invalid because they are ineligible subject matter and thus fail to comply with 35. U.S.C. § 101. Samsung also reserves the right to assert that the patent is invalid due to incorrect inventorship per 35. U.S.C. § 116/256.

Samsung further reserves the right to modify or add additional contentions in the event that Red Rock provides amended infringement contentions, or in response to the Court's anticipated claim construction order.

I. RED ROCK'S ASSERTED PATENTS AND CLAIMS

The patent asserted by Red Rock is U.S. Patent No. 7,346,313 (the "Asserted Patent" or "'313 Patent"). Red Rock asserts claims 1 through 52 and 59 through 74 (hereinafter the "Asserted Claims").

II. IDENTIFICATION OF PRIOR ART REFERENCE PER PATENT RULE 3–3(A)

In this section, Samsung identifies each item of prior art that it alleges anticipates each Asserted Claim under 35 U.S.C. § 102, or renders it obvious under 35 U.S.C. § 103. *See* P. R. 3−3(a). Red Rock has admitted that "each of the Asserted Claims is entitled to a filing date of March 4, 2002." Red Rock's July 12, 2017 P. R. 3–1 Disclosures at 3. Accordingly, there is no dispute that the following patents and publications are prior art to the Asserted Patent under 35 U.S.C. § 102(a), (b) and/or (e):

- U.S. Patent No. 5,381,108 ("Whitmarsh")
- U.S. Patent No. 5,933,448 ("Katisko")
- U.S. Patent No. 5,995,541 ("Navid")
- U.S. Patent No. 6,091,941 ("Moriyama")
- U.S. Patent No. 6,330,290 ("Glas")
- U.S. Patent No. 6,717,981 ("Mohindra")

- U.S. Patent No. 6,898,252 ("Yellin")
- U.S. Patent No. 6,940,916 ("Warner")
- Japanese Patent Publication No. H10-327209 ("Kabashima")
- M. Faulkner, T. Mattsson, & W. Yates, *Automatic Adjustment of Quadrature Modulators*, 27 ELECTRONICS LETTERS 214 (1991) ("Faulkner")
- John K. Cavers, *Adaptive Compensation for Imbalance and Offset Losses in Direct Conversion Transceivers*, 42 IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY 581, 581 (1993) ("Cavers I")
- David A. Noon et al., *Correction of I/Q Errors in Homodyne Step Frequency Radar Refocuses Range Profiles*, 2 INT'L CONFERENCE ON ACOUSTICS, SPEECH, & SIGNAL PROCESSING 369 (1995) ("Noon")
- Asad A. Abidi, *Direct Conversion Radio Transceivers for Digital Communications*, 30 IEEE J. OF SOLID-STATE CIRCUITS 1399, 1401 (1995) ("Abidi")
- John K. Cavers, *A Fast Method for Adaptation of Quadrature Modulators and Demodulators in Amplifier Linearization Circuits*, Vehicular Technology Conference, Mobile Technology for the Human Race, Apr. 28 to May 1, 1996 ("Cavers II")
- John K. Cavers, *New Methods for Adaptation of Quadrature Modulators and Demodulators in Amplifier Linearization Circuits*, 46 IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY 707 (1997) ("Cavers III")
- Jack P.F. Glas, *Digital I/Q Imbalance in a Low-IF Receiver*, 3 IEEE GLOBECOM 1461 (1998) ("Glas Paper").
- Ashkan Mashhour et al., *On the Direct Conversion Receiver—A Tutorial*, MICROWAVE J., Jun. 2001 ("Mashhour")

The following claims are not entitled to the priority date of the '313 Patent's provisional application because the provisional application does not provide written description support for them: 8, 9, 10, 12, 13, 14, 18, 19, 20, 23, 24, 25, 27, 28, 29, 34, 35, 36, 45, 46, 47, 49, 50, 51, 60, 61, 62, 64, 65, 66, 71, 72, and 73. Samsung also contends that the as-filed application does not provide written description support for these claims, as set out below, but at the very least they are not supported by the provisional application.

The identified prior art references further include any other references cited in this document or the accompanying claim charts.

III. CLAIM CHARTS PREPARED PER PATENT RULE 3–3(B) AND (C)

Pursuant to P. R. 3–3(b) and (c), Samsung provides the following charts identifying where specifically in each alleged item of prior art each limitation of each asserted claim is found. These charts also identify how the charted claims are anticipated by the primary references disclosing each limitation of the claims, as well as identifying how the charted claims are obvious over the primary references in light of particular secondary references. In the charts, where combinations of references render limitations obvious, the motivation to combine such references is included in the chart for the limitation in question as well as in this document. *See* P. R. 3–3(b).

The prior art references may disclose the elements of the asserted claims either explicitly or inherently, or may be relied upon to show the state of the art in the relevant timeframe. Persons having ordinary skill in the art at the time of the priority date of the Asserted Patent knew to read references as a whole, and in the context of other publications and literature as well as the general knowledge in the field. Samsung may rely on all such information, including uncited portions of the prior art references listed herein, and on other publications and expert testimony to provide context and as aids to understanding and interpreting the identified references, or to establish that a person of ordinary skill in the art would have been motivated to modify or combine any of the references so as to render the asserted claims obvious.

In the charts, citations to specific portions of the references are exemplary and not exhaustive, and are intended to fairly disclose Samsung's invalidity contentions. Other portions of the references may also contain information and/or teachings that anticipate and/or render obvious elements of the Asserted Claims. Further, the combinations of references and products presented in Samsung's contentions are not intended to, and should not be interpreted as, suggesting that any reference or product identified in a chart does not anticipate any asserted claim. Additionally, citations to a particular figure in a prior art reference encompass all text relating to the figure, and citations to text encompass all figures relating to the text.

Exhibit Number	Exhibit Description
Exhibit 1	'313 Patent as anticipated by Warner and/or obvious over Warner alone or in combination with Whitmarsh, Navid, Moriyama, Mohindra, Yellin, Faulkner, and/or Noon.
Exhibit 2	'313 Patent as anticipated by Yellin and/or obvious over Yellin alone or in combination with Whitmarsh, Navid, Moriyama, Mohindra, Warner, Faulkner, and/or Noon.
Exhibit 3	'313 Patent as obvious over Mohindra and Glas, alone or in combination with Whitmarsh, Navid, Moriyama, Mohindra, Yellin, Warner, Faulkner, Noon, and/or the Glas Paper.

A. Reasons to Combine and/or Modify References

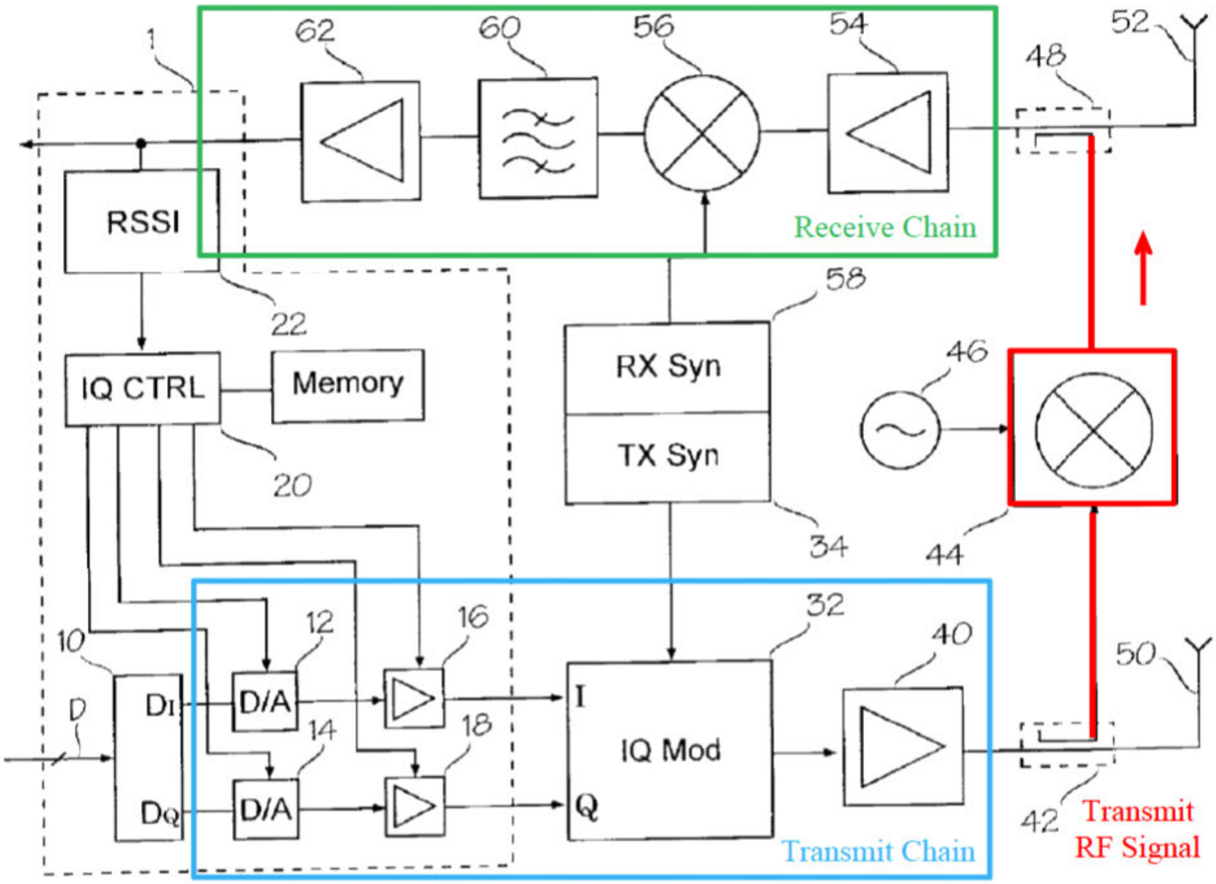
Samsung notes that for all the references identified above, there would have been a reason, motivation, and suggestion to combine them in any potential permutation or combination, not limited to those identified specifically in the charts accompanying this disclosure. More particularly, all of the identified references are expressly directed to: (1) radio frequency transceivers, for use in mobile communications devices (*e.g.*, cellular phones); (2) were directed at GSM, TDMA, CDMA, WCDMA, or related technologies; (3) were directed to correcting quadrature distortion, including IQ gain imbalance, in radio frequency circuits of quadrature transmitters, receivers, or transceivers; (4) were contemplated for implementation in integrated circuits, (5) involve generating baseband signals, sending those signals through a transmit chain, looping the resulting RF signal back through the receive chain, and observing the baseband receive signal in order to apply adjustments, compensation, correction, calibration, or cancellation factors to minimize distortions in the transmitter and/or receiver; (6) were invented by the same company or engineers; and/or (7) were directed to the same or similar international or U.S. patent classifications. As a result, one of ordinary skill would have appreciated that all of the references identified above were directed at one or more of the same problems, thereby providing a motivation to combine their teachings. Additionally, it would have been obvious to try various combinations of components in the transceivers disclosed in the cited references. More particularly, it would have been obvious to apply any of the various teachings on calibration, compensation, correction, and/or cancellation of quadrature imbalance to the well-known loopback architecture recited in the claims.

The ’313 Patent concedes that both direct- and heterodyne-conversion transceivers for digital communications were “well known” and “conventional” in the art by 2002. ’313 Patent 1:14–61, 4:47–53, 6:46–56 (“It is well known in the art that a variety of such direct modulator and demodulator design implementations can be used, including conventional designs as shown in Fig. 1 . . . .”), 8:4–6 (“a conventional heterodyne transceiver”), 8:10–18 (“well-known elements of transceiver RF design”). Indeed, the heterodyne receiver was introduced a century ago, and radio pioneers were considering the use of direct conversion as early as the 1920s. Abidi at 1401; Cavers I at 581.

As the ’313 Patent admits, the problem of I-Q gain imbalance and techniques for calibrating this imbalance in transceivers were also “commonly known” and “conventional.” ’313 Patent 2:7–10 (“commonly known alternate calibration approaches”), 4:54–59, 7:28–33

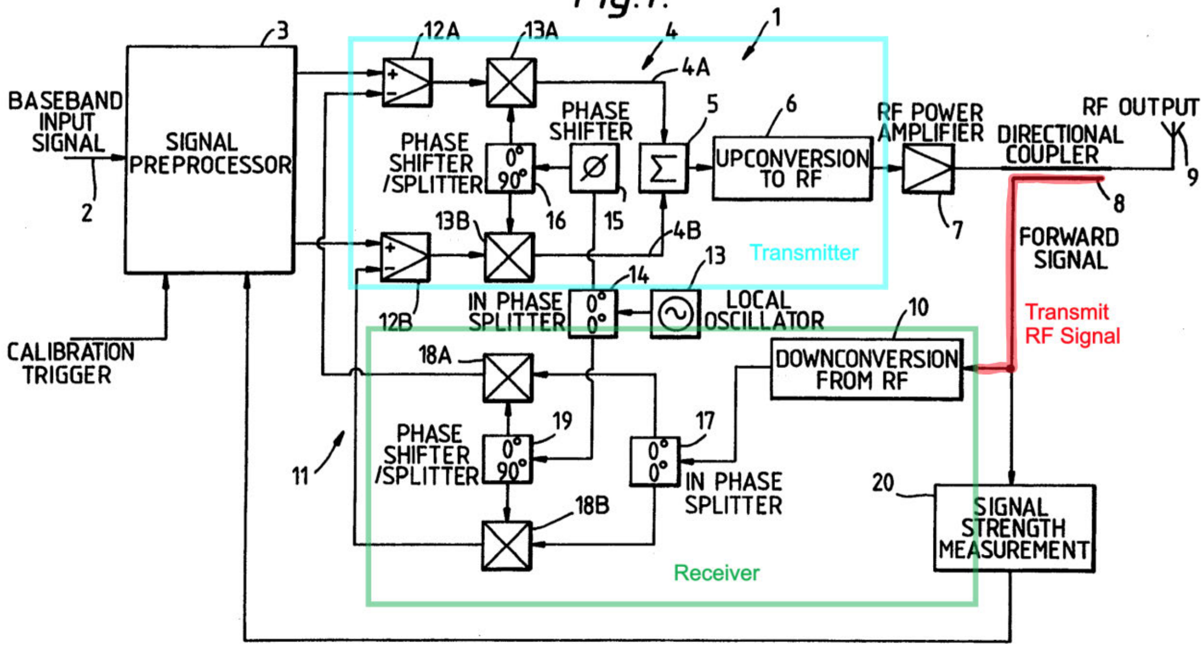
(“FIGS. 3a and 3b show a conventional prior art approach to calibration of the baseband gains in the transmit and receive chains of a transceiver, the approach being one which can be used for . . . either direct-conversion or heterodyne-conversion transceivers.”); Abidi at 1400, 1402 (recognizing in 1995 that I-Q gain imbalances or mismatches may be “self-calibrated with loopback modes”), 1405–07; Cavers I at 581–88 (discussing in 1993 techniques for compensating I-Q gain imbalance in transceivers).

In addition, providing a signal path from the RF transmit output to the RF receive input in a transceiver for testing and calibration was known and conventional in the art well before the time of the invention, for example, as illustrated in the exemplary figures below. In fact, prior to the ’313 Patent, skilled artisans were using signal paths from the RF transmit output to the RF receive input to calibrate I-Q gain imbalance, as shown below.



Katisko Fig. 5 (annotated) (showing path from RF transmit output to RF receive input via coupler 42, mixer 44, and coupler 48 for calibrating, I-Q gain imbalance in transmit chain, which is varied using amplifiers 16 18), 1:46–2:25, 3:6–51. 4:60–5:9.

Fig.1.



Whitmarsh Fig. 1.

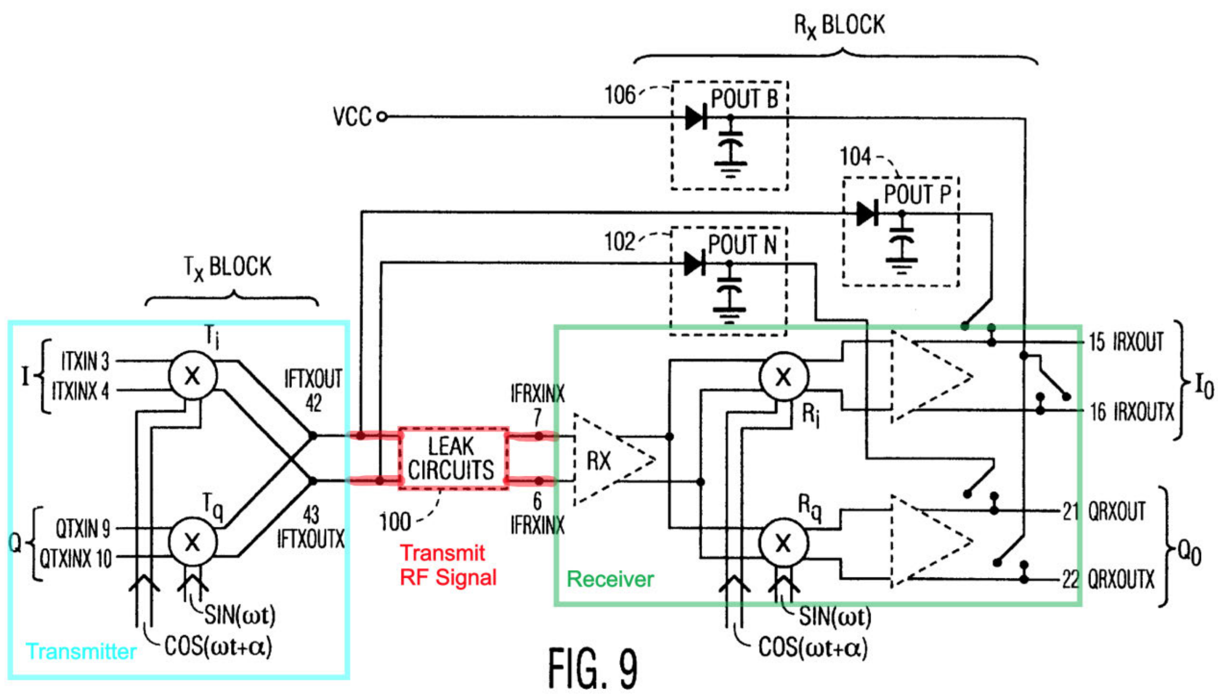
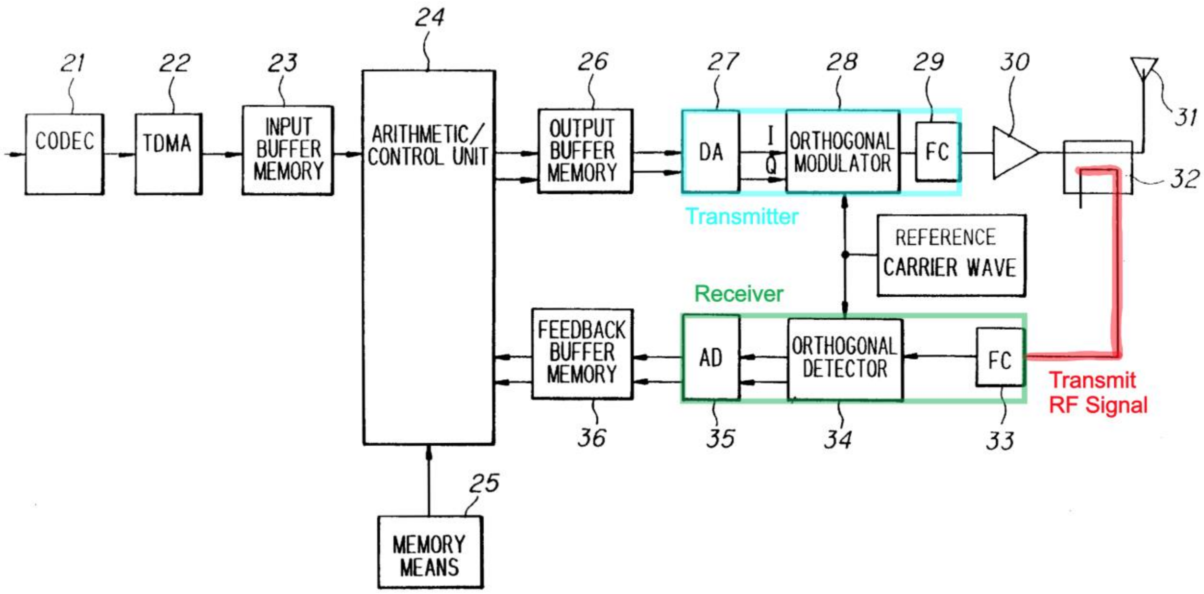


FIG. 9

Navid Fig. 9.

FIG. 6



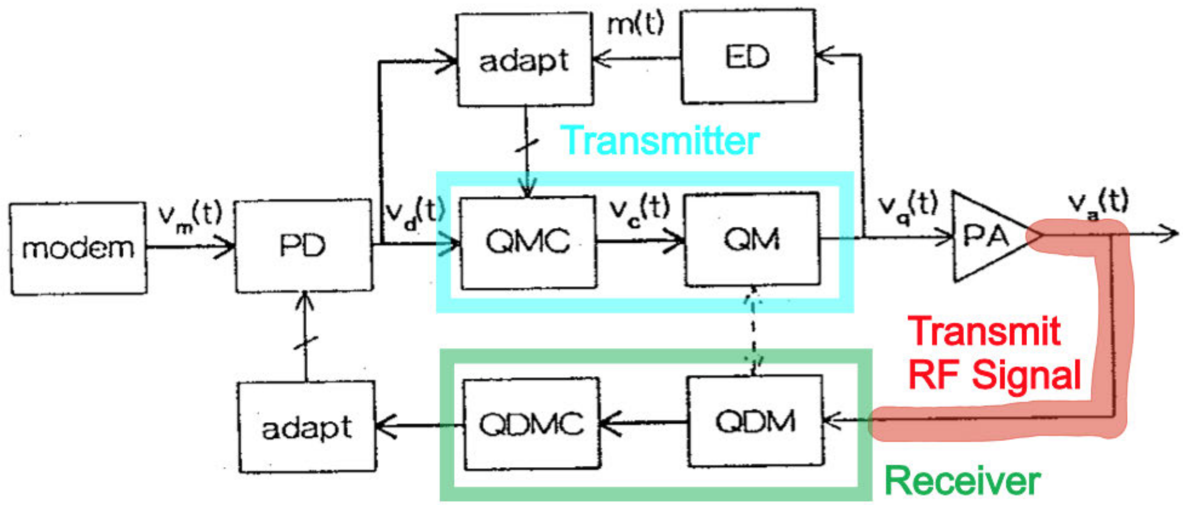
Moriyama Fig. 6.

One of skill in the art would have been motivated to combine the teachings of different references employing a loopback architecture to calibrate or compensate for errors in quadrature transceivers, including the references cited above and referenced in the accompanying claim charts. The similarity of architecture (transmit-receive loopback in a quadrature transceiver) and similarity of purpose (calibrating or compensating for distortion and imbalance in the transmitter and/or receiver) would have been a strong additional motivation to combine such references.

In particular, one of ordinary skill would have had a reason, motivation, and suggestion to combine such loopback architectures that describe calibration of a transmitter (*e.g.* Mohindra) with those that involve calibration of a receiver (*e.g.* Glas). This is because the references that describe either transmitter or receiver calibration (1) expressly describe the transmitter or receiver as being part of a "transceiver" (i.e., transmitter/receiver), (2) generally depict blocks corresponding to both a "transmitter" and receiver, and/or (3) the transmitter or receiver is directed to mobile/cellular phones, WiFi (802.11), Bluetooth, or other communication systems that were understood to be bi-directional and thus required a transmitter/receiver pair. The motivation to improve performance in either the transmitter or receiver would likewise apply to the other direction of communication in the transceiver. Indeed it was well known in the art that it was important to compensate for distortions in both transmitter and receiver, particularly in direct conversion transceivers. *See, e.g.*, Cavers I at 581 (providing an "adaptive compensation technique" for both a quadrature transmitter and quadrature receiver).

Further, motivation to combine the references would have been provided nearly a decade before the priority date of the '313 Patent by articles such as the Cavers I article cited above. Cavers identified the problem the '313 Patent seeks to solve (IQ gain imbalance) as one of the most important challenges with quadrature transceivers. Cavers I at 581 ("Analog implementations of a quad mod and quad demod suffer from several deficiencies . . . of which amplitude and phase imbalance and DC offset are the most important."). Cavers further expounds on particular directions for work to explore those problems by suggesting adoption of a mixed digital and analog approach in which distortions and imperfections, which Cavers calls "impairments," in the analog circuit path are compensated for using digital signal processing algorithms, thereby outlining the method to address the problem that a person having ordinary skill in the art would expect to succeed with limited exploration. In particular, Cavers provided an architectural framework that uses an "analog quad mod and demod, with their wide bandwidth and lower power operation, and compensates for their impairments by DSP algorithms." Cavers suggested approach gave persons having skill in the art a framework for exploration and a motivation to combine existing references to solve the IQ imbalance problem for quadrature transceivers for mobile communications.

A few years later, in 1996, Cavers himself suggested a loopback architecture for correcting impairments in a quadrature transceiver, as shown below.



Cavers II at 1310 (Fig. 1); Cavers III at 708 (Fig. 1). Cavers again recognized that "[c]ompensation for [gain and phase imbalance and dc offset], either with digital signal processor (DSP) or analog circuits, is essential to meeting the stringent out-of-band emission requirements of mobile communications." Cavers III at 707. Cavers work would have motivated one of skill in the art seeking to compensate for impairments in a quadrature transceiver to look to other references combining DSPs with analog mixers, including the cited and charted references, to find an architecture and algorithm that would be effective.

In connection with known IQ calibration and compensation architectures, a number of different test vectors or test signals were known in the art. As explained in Cavers III, "[s]ome existing methods . . . rely on training signals for iterative adjustment of the compensation circuit parameters. These training signals consist of short bursts of carrier with four selected phases for imbalance adjustment, preceded by short 'bursts' of silence for adjustment of dc offset." Cavers III at 707. Cavers cites Faulkner, among other sources, as disclosing such training signals.

Cavers III at 716 n.6. Faulkner in 1991 disclosed the use of training signals to compensate for both gain imbalance and phase error in a quadrature modulator. These training signals consist of "[t]est vectors (A,0) and (0,A)"—that is, purely real and purely imaginary signals applied at the baseband inputs to the transmit chain. Faulkner at 215. Faulkner further disclosed a test vector comprising a "constant amplitude rotating phasor [$i = \cos(2\pi ft)$ and $q = \sin(2\pi ft)$]." *Id.* The use of such test vectors to correct IQ imbalance and phase error was thus known in the art over a decade before the purported inventions of the '313 Patent. One of skill in the art designing a loopback calibration or compensation system for IQ imbalance would have been motivated to use these test signals at least because they were well known in the field for use in solving exactly the same problem (IQ imbalance in a quadrature transceiver). It would at least have been obvious to try such well-known test signals.

At least the teachings of the foregoing references disclose the use of a loopback configuration of a quadrature transceiver to allow calibration, compensation, correction, and/or cancellation of quadrature gain imbalance in the transmitter and receiver, and provide motivation to modify any of the charted references (to the extent not already expressly or inherently disclosed) to use such an architecture and technique to calibrate the transmit and receive chains in their entirety.

IV. RED ROCK'S ASSERTED CLAIMS ARE INVALID UNDER 35 U.S.C. § 112

Pursuant to Rule 3–3(d), Samsung hereby identifies grounds of invalidity based on: (1) lack of written description under 35. U.S.C. § 112 first paragraph; (2) lack of enablement under 35 U.S.C. § 112 first paragraph, and (3) indefiniteness under 35 U.S.C. § 112 second paragraph. Samsung's invalidity contentions under 35 U.S.C. § 112 depend, in part, on the Court's claim constructions for the asserted claims as well as infringement positions Red Rock may take later in the case. Consequently, Samsung identifies the issues under 35 U.S.C. § 112 which it is presently aware and expressly reserves the right to supplement as a result of future developments in the case.

A. Lack of Written Description and/or Enablement

The ’313 Patent does not provide sufficient written description to establish that the inventor was in possession of the alleged inventions recited in certain claims at the time the patent applications were filed. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). In other words, the applicants did not describe their purported inventions in a manner that “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* The specification of the Asserted Patents also does not enable one of ordinary skill in the art to make and/or use certain recited elements of the asserted claims of the Asserted Patents without undue experimentation. To the extent the following claim limitations are even definite under 35 U.S.C. § 112 second paragraph, the specifications of the Asserted Patents fail to sufficiently describe the inventions such that one of ordinary skill could make and use the inventions without undue experimentation as required by 35 U.S.C. § 112, first paragraph.

Claim	Terms invalid for lack of written description and/or enablement
1	“generated in response to and as a function of a signal generated through the transmit chain” “and which in turn”
2	Unsupported terms in parent claim
3	Unsupported terms in parent claim
4	Unsupported terms in parent claim
5	Unsupported terms in parent claim
6	Unsupported terms in parent claim
7	“a processor for processing of the baseband receive signal as required for the normal function of the transceiver” “a calibration RF signal generator for generating a calibration RF signal as a baseband transmit signal”

Claim	Terms invalid for lack of written description and/or enablement
	"a processor for processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance" "and which in turn"
8	Unsupported terms in parent claim "means for preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive"
9	Unsupported terms in parent claim "phase-calibration cycling subsystem"
10	Unsupported terms in parent claim "slowly time-varying phase modulation subsystem"
11	Unsupported terms in parent claim
12	Unsupported terms in parent claim
13	Unsupported terms in parent claim
14	Unsupported terms in parent claim
15	Unsupported terms in parent claim
16	"a processor for processing of the baseband receive signal as required for the normal function of the transceiver" "a calibration RF signal generator for generating a calibration RF signal as a baseband transmit signal" "a processor for processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance" "and which in turn"
17	Unsupported terms in parent claim
18	Unsupported terms in parent claim
19	Unsupported terms in parent claim
20	Unsupported terms in parent claim
21	Unsupported terms in parent claim
22	"a processor for processing of the baseband receive signal as required for the normal function of the transceiver" "a calibration RF signal generator for generating a calibration RF signal as a baseband transmit signal" "a processor for processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance" "and which in turn"

Claim	Terms invalid for lack of written description and/or enablement
23	Unsupported terms in parent claim "means for preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive"
24	Unsupported terms in parent claim "phase-calibration cycling subsystem"
25	Unsupported terms in parent claim "slowly time-varying phase modulation subsystem"
26	Unsupported terms in parent claim
27	Unsupported terms in parent claim
28	Unsupported terms in parent claim
29	Unsupported terms in parent claim
30	Unsupported terms in parent claim
31	Unsupported terms in parent claim
32	"a processor for processing of the baseband receive signal as required for the normal function of the transceiver" "a calibration RF signal generator for generating a calibration RF signal as a baseband transmit signal" "a processor for processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance" "and which in turn"
33	Unsupported terms in parent claim
34	Unsupported terms in parent claim
35	Unsupported terms in parent claim
36	Unsupported terms in parent claim
37	Unsupported terms in parent claim
38	"generated in response to and as a function of a signal generated through the transmit chain"
39	Unsupported terms in parent claim
40	Unsupported terms in parent claim
41	Unsupported terms in parent claim
42	Unsupported terms in parent claim
43	Unsupported terms in parent claim
44	"a processor for processing of the baseband receive signal as required for the normal

Claim	Terms invalid for lack of written description and/or enablement
	function of the transceiver”
45	Unsupported terms in parent claim “preventing the injection of the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive”
46	Unsupported terms in parent claim “phase-calibration cycling”
47	Unsupported terms in parent claim “slowly time-varying phase modulating”
48	Unsupported terms in parent claim
49	Unsupported terms in parent claim
50	Unsupported terms in parent claim
51	Unsupported terms in parent claim
52	Unsupported terms in parent claim
59	“a processor for processing of the baseband receive signal as required for the normal function of the transceiver”
60	Unsupported terms in parent claim “preventing the injection of the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive”
61	Unsupported terms in parent claim “phase-calibration cycling”
62	Unsupported terms in parent claim “slowly time-varying phase modulation”
63	Unsupported terms in parent claim
64	Unsupported terms in parent claim
65	Unsupported terms in parent claim
66	Unsupported terms in parent claim
67	Unsupported terms in parent claim
68	Unsupported terms in parent claim
69	“a processor for processing of the baseband receive signal as required for the normal function of the transceiver”
70	Unsupported terms in parent claim
71	Unsupported terms in parent claim
72	Unsupported terms in parent claim

Claim	Terms invalid for lack of written description and/or enablement
73	Unsupported terms in parent claim
74	Unsupported terms in parent claim

B. Indefiniteness

The Asserted Claims containing the following limitations fail to inform those of ordinary skill in the art about the scope of the invention with reasonable certainty and thus are indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter the applicants regard as their invention.

- "generated in response to and as a function of a signal generated through the transmit chain" (claims 1, 38)
- "the both transmit and receive chains in their entirety" (claims 1, 38)
- "the calibration RF signal includes a calibration cycle" (claims 1, 7, 16, 22, 32, 38, 44, 59, 69)
- "and which in turn" (claims 1, 7, 16, 22, 32)
- "the imbalanced chain" (claims 6, 16, 32, 43, 69)
- "as required for the normal function of the transceiver" (claims 7, 16, 22, 32, 44, 59)
- "generating a calibration RF signal as a baseband transmit signal" (claims 7, 16, 22, 32)
- "processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance" (claims 7, 16, 22, 32)
- "phase-calibration cycling [system]" (claims 9, 24, 46, 61)
- "a slowly time-varying phase modulation/modulating [subsystem]" (claims 10, 25, 47, 62, 74)

- "sampled phasor" (claims 12, 18, 27, 34, 49, 64, 71)
- "discrete phasor" (claims 13, 19, 28, 35, 50, 65, 72)
- "discrete phasor comprising j^n or j^{-n}" (claims 14, 20, 29, 36, 51, 66, 73)
- "successive calibration cycles [are used] to refine or maintain I-Q balance" (claims 15, 21, 30, 37, 52, 67)

C. Means-Plus-Function Claims

The following limitations recited in the asserted claims are means-plus-function terms governed by 35 U.S.C. § 112, sixth paragraph.

- "amplification means for amplifying the transmit signal at the intermediate frequency" (claim 31)

The following limitations recited in the asserted claims are means-plus-function terms governed by 35 U.S.C. § 112, sixth paragraph, and are invalid because they fail adequately to disclose any structure for performing the claimed function, and thus fail to inform those of ordinary skill in the art about the scope of the invention with reasonable certainty and are indefinite under 35 U.S.C. § 112 second paragraph, for failing to particularly point out and distinctly claim the subject matter the applicants regard as their invention.

- "a processor for processing of the baseband receive signal as required for the normal function of the transceiver" (claims 7, 16, 22, 32, 44, 59, 69)
- "a processor for processing the baseband receive calibration RF signal to form an observable indicator of I-Q imbalance" (claims 7, 16, 22, 32)
- "means for preventing the signal path for injecting the calibration RF signal from permanently imparting an unfavorable net phase shift from baseband transmit to baseband receive" (claims 8, 23)

DATED: September 15, 2017

Respectfully submitted,

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CERTIFICATE OF SERVICE

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