UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LENOVO (UNITED STATES) INC. and
MOTOROLA MOBILITY LLC,
Petitioners

v.

THETA IP, LLC
Patent Owner

Patent No. 10,524,202 B2

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,524,202 B2**

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LISTING OF EXHIBITS

Exhibit	Description
Exhibit 1001	U.S. Patent No. 10,524,202 B2
Exhibit 1002	Declaration of R. Jacob Baker, P.E., Ph.D.
Exhibit 1003	Prosecution History of U.S. Patent No. 10,524,202 B2
Exhibit 1004	European Patent Application Publication No. 0 999 649 A2 to Rauhala ("*Rauhala*") published on May 10, 2000
Exhibit 1005	U.S. Patent No. 5,513,387 B2 to Saito ("*Saito*") issued on April 30, 1996
Exhibit 1006	Rudolf F. Graf, *Modern Dictionary of Electronics* (7th ed. 1999)
Exhibit 1007	Claim Construction Order, *Theta IP, LLC v. Samsung Electronics Co.*, No. W-20-CV-00160-ADA (W.D. Tex. Jan. 7, 2020)
Exhibit 1008	Memorandum and Order on Claim Construction, *Theta IP, LLC v. Samsung Electronics Co.,* No. 2:16-CV-527-JRG-RSP (E.D. Tex. Jun. 6, 2017)
Exhibit 1009	Patent Owner's Claim Construction Brief, *Theta IP, LLC v. Samsung Electronics Co.,* No. 2:16-CV-527-JRG-RSP (E.D. Tex. April 11, 2017), ECF No. 63
Exhibit 1010	Patent Owner's Claim Construction Reply Brief, *Theta IP, LLC v. Samsung Electronics Co.*, No. W-20-CV-00160-ADA (W.D. Tex. Dec. 16, 2020), ECF No. 45
Exhibit 1011	A. Kestenbaum et al., Design Concepts for Process Control, Ind. Eng. Chem., Process Des. Dev., Vol. 15, No. 1, (1976)
Exhibit 1012	Lijun Qian, Optimal Power Control in Cellular Wireless Systems, Ph.D. diss., Rutgers The State University of New Jersey, School of Graduate Studies (2001)

Exhibit 1013	United States Patent No. 3,880,104 to Saye ("*Saye*") issued on April 29, 1975
Exhibit 1014	Scheduling Order, *Theta IP, LLC v. Motorola Mobility LLC*, No. 1:22−cv−03441 (N.D. Ill. Sep. 29, 2022), ECF No. 26
Exhibit 1015	Mahmood Nahvi, Ph.D. & Joseph A. Edminister, *Schaum's Outline of Theory and Problems of Electric Circuits* (4^{th} ed. 2003)

I. INTRODUCTION

Lenovo (United States) Inc. and Motorola Mobility LLC (collectively, "Petitioners") request *inter partes* review of claims 7-11, 13, and 19-21 ("the challenged claims") of U.S. Patent No. 10,524,202 ("the '202 patent"), assigned to Theta IP, LLC ("Patent Owner"). As explained below, the challenged claims should be found unpatentable and cancelled.

II. MANDATORY NOTICES

Real Party-in-Interest: The real parties-in-interest for this Petition are Lenovo (United States) Inc. ("Lenovo US"); Motorola Mobility LLC ("Motorola"); and Lenovo Group Ltd ("LGL").[1]

Related Matters: Patent Owner has asserted the '202 patent against Lenovo US, Motorola, and LGL in *Theta IP, LLC v. Motorola Mobility LLC, et al*., 1:22-cv-03441 (N.D. Ill.) ("co-pending litigation").

The '202 patent issued from U.S. Application No. 15/824,841, which is a continuation of U.S. Application No. 15/080,421 ("the '421 application"), which

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[1] Petitioners identify LGL out of an abundance of caution because it is a named party in the co-pending litigation, but maintain that LGL is not a proper party to the co-pending litigation.

matured into U.S. Patent No. 9,838,962. The ’421 application is a continuation of U.S. Application No. 11/318,646 (“the ’646 application”), which matured into U.S. Patent No. 9,331,728 (“the ’728 patent”). The ’646 application is a continuation of U.S. Application No. 10/784,613 (“the ’613 application”), which matured into U.S. Patent No. 7,010,330 (“the ’330 patent”). The ’202 patent also claims the benefit of priority to U.S. Application No. 60/451,229 (“the ’229 application”) and U.S. Application No. 60/451,230 (“the ’230 application”), both of which are expired provisional applications.

Petitioners have filed a petition for IPR challenging claims 1, 23, 29, and 30 of the ’330 patent. Petitioners have also filed a petition for IPR challenging claims 1, 3, 4, and 8 of U.S. Patent No. 10,129,825 (“the ’825 patent”), which is also assigned to Patent Owner and issued from a continuation of the ’646 application.

Counsel and Service Information: Lead counsel is Dinesh N. Melwani (Reg. No. 60,670), and Backup counsel is William Uhr (Reg. No. 71,282). Service information is: Bookoff McAndrews, PLLC, 2020 K Street, NW, Suite 400, Washington, DC 20006; Tel.: 202.808.3497; Fax.: 202.450.5538; email: docketing@bomcip.com, dmelwani@bomcip.com, and wuhr@bomcip.com. Petitioners consent to electronic service.

III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-5906.

IV. GROUNDS FOR STANDING

Petitioners certify that the ’202 patent is available for review and Petitioners are not barred/estopped from requesting review on these grounds. 37 C.F.R. § 42.104(a).

V. PRECISE RELIEF REQUESTED AND GROUNDS

A. Identification of Challenge

Petitioners request IPR and cancellation of the challenged claims. The challenged claims should be cancelled as unpatentable based on:

Ground 1: Claims 7-11, 13, and 19-21 are unpatentable under 35 U.S.C. §102(b) as anticipated by European Patent Application No. 0999649A2 (“*Rauhala*”).

Ground 2: Claims 7-11, 13, and 19-21 are unpatentable under 35 U.S.C. §103(a) as obvious over *Rauhala* in view of U.S. Patent No. 5,513,387 ("*Saito*").[2]

The application that matured into the '202 patent was filed on November 28, 2017, as a continuation of the '421 application, filed on March 24, 2016, which is a continuation of the '646 application, filed on December 27, 2005, which is a continuation of the '613 application, filed on February 23, 2004, which claims the benefit of priority to the '229 application and the '230 application, both of which were filed on March 1, 2003. Ex. 1001 at pages 1-2. For the purposes of this proceeding only, Petitioners assume the priority date of the '202 patent is March 1, 2003.

Rauhala was published on May 10, 2000, *i.e.*, more than one year before March 1, 2003, and is prior art under 35 U.S.C. §102(b).

Saito issued on April 30, 1996, and is prior art under 35 U.S.C. §102(b).

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[2] For each Ground, Petitioners do not rely on any reference other than those listed here. Other references are discussed to show the state of the art at the time of the invention. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015).

VI. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art ("POSITA") as of the claimed priority date of the '202 patent would have had a bachelor's degree in electrical engineering, electronics engineering, or the equivalent, and two or more years of experience in wireless communication devices including transceivers and circuitry thereon. Ex. 1002 at ¶¶28-32. Significantly more practical experience could also qualify one not having the aforementioned education as a person of ordinary skill in the art, while, conversely, a higher level of education could offset a lesser amount of practical experience. *Id.*

VII. THE '202 PATENT AND PRIOR ART

A. The '202 Patent

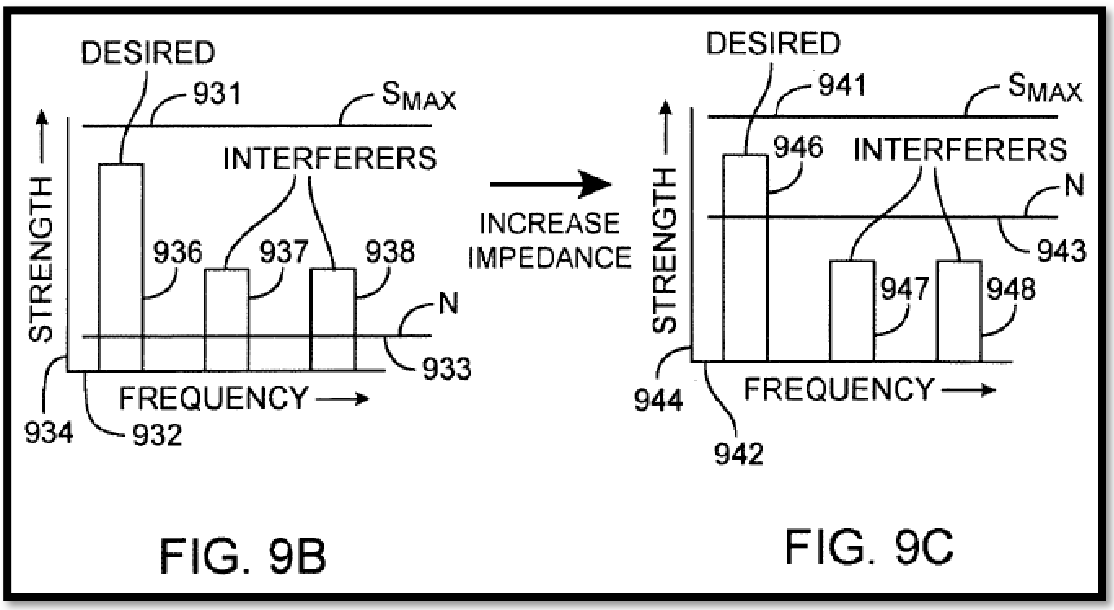
The '202 patent describes methods for reducing power dissipation in wireless transceivers. Ex. 1001 at 1:21-23; Ex. 1002 at ¶38. The '202 patent asserts that the techniques described are useful in wireless networking devices, such as laptops and cellular telephones, in which wireless performance impacts battery life. Ex. 1001 at 1:19-30, 1:67-2:4.

The '202 patent purports to address power dissipation in the receiver signal path of a wireless transceiver. Ex. 1002 at ¶¶43, 47. The receiver signal path includes an antenna on which signals are received. Ex. 1001 at 4:32-35. From the antenna, the received signals pass through various circuits, such as amplifiers, filters, and mixers for processing. Ex. 1001 at 4:15-21, 4:35:47.

When the receiver is active, received signals include a desired signal, which contains useable information, and interfering signals. Ex. 1001 at 4:17-21; Ex. 1002 at ¶¶39-42 During operation, the qualities of the desired signal and the interfering signals can vary. Ex. 1001 at 5:28:41; Ex. 1002 at ¶¶48-56. For example, the “worst-case input signal” occurs when the desired signal is weak and the interfering signals are strong. Ex. 1001 at 5:51-53, 6:3-7. Conversely, the “best-case input signal” occurs when the desired signal is strong and the interfering signals are weak. Ex. 1001 at 6:11-13.

For the receiver to function properly in the “worst-case” operating condition, the receiver must dissipate large amounts of power and battery life is drained rapidly. Ex. 1001 at 1:26-37. Power dissipation can be reduced in the “best-case” operating condition, however, by adjusting certain parameters of the receiver’s circuits. Ex. 1001 at 6:11-20; Ex. 1002 at ¶52. The parameters that are adjusted for the “best-case” operating condition can include impedances and bias currents. Ex. 1001 at 6:17-20.

Figures 9B and 9C of the ’202 patent, reproduced below, illustrate an example of how impedance of a receiver circuit can be adjusted for a better-than-worst-case operating condition. Ex. 1001 at 9:39-64; Ex. 1002 at ¶52. As shown by the graphical representations of Figures 9B and 9C, the desired signals 936 and 946 of a signal spectrum are strong, while the interfering signals 937, 938, 947, and 948 are relatively weak. Ex. 1001 at 9:48-50. The receiver represented by Figure 9B is configured for the "worst-case" operating condition with a high maximum signaling capability 931 and a low noise floor 933. *Id.* at 11:55-58. Due to the strong desired signal and weak interfering signals, however, the noise floor 933 as shown in Figure 9B can be permitted to rise to the level of noise floor 943 as shown in Figure 9C without impacting signal reception. Ex. 1001 at 9:55-58.



According to the '202 patent, the noise floor can be increased as shown in FIG. 9C by increasing an impedance of a circuit in the receiver. *Id.* at 9:58-60. The increased impedance results in decreased drive current through the circuit and lower power dissipation. *Id.* at 9:60-64; Ex. 1002 at ¶52. Despite the reduced power dissipation, the desired signal 946 remains within the receivable signal band of the receiver. *See* Ex. 1001 at 9:47-64.

The ’202 patent explains that other power saving adjustments to receiver circuits can be made depending on desired signal strength and interferer signal strength. *See* Ex. 1001 at FIGS. 8A-12. Figure 12, below, summarizes these adjustments. Ex. 1001 at 10:62; Ex. 1002 at ¶56.

	1210 RECEIVED SIGNAL		1220 RESPONSE TO RECEIVED SIGNAL		
	SIGNAL STRENGTH	INTERFERER STRENGTH	DECREASE SMAX	INCREASE IMPEDANCE NOT GAIN	INCREASE IMPEDANCE AND GAIN
1230	SMALL	SMALL	YES	NO	YES
1240	LARGE	SMALL	NO	YES	NO
1250	LARGE	LARGE	NO	YES	NO
1260	SMALL	LARGE	NO	NO	NO

FIG. 12

In row 1230, the desired signal and interferer signal strengths are both small. Ex. 1001 at 10:65-66. In response, impedance and gain of a circuit are increased. *Id.* at 10:66-11:9. In row 1240, the desired signal strength is large, while the interfering signals are small. *Id.* at 11:10-11. Similar to the example of Figures 9B and 9C, impedance is increased. *Id.* at 11:11-14. In row 1250, both the desired and interfering signal strengths are large. *Id.* at 11:15-16. In response, impedance is increased. *Id.* at 11:16-18. In row 1260, the received desired signal strength is small, while the interfering signals are large. *Id.* at 11:20-21. As this is the worst-case operating condition, the ’202 patent calls for no adjustment of impedance or gain and power dissipation is not reduced. *Id.* at 11:21-26.

The ’202 patent contends that by making the foregoing adjustments to receiver circuit parameters, power can be saved. Ex. 1001 at 11:36-45; Ex. 1002 at ¶40. Figure 13, below, depicts a graphical representation of the purported power savings. Ex. 1001 at 11:36-39. Line 1310 represents power dissipation for a receiver configured to operate under worst-case conditions. *Id.* at 11:39-41. By adjusting gains, impedances, and biasing, power dissipation represented by line 1320 can be reduced when conditions allow, thereby reducing the overall average power dissipated represented by line 1330. *Id.* at 11:41-45.

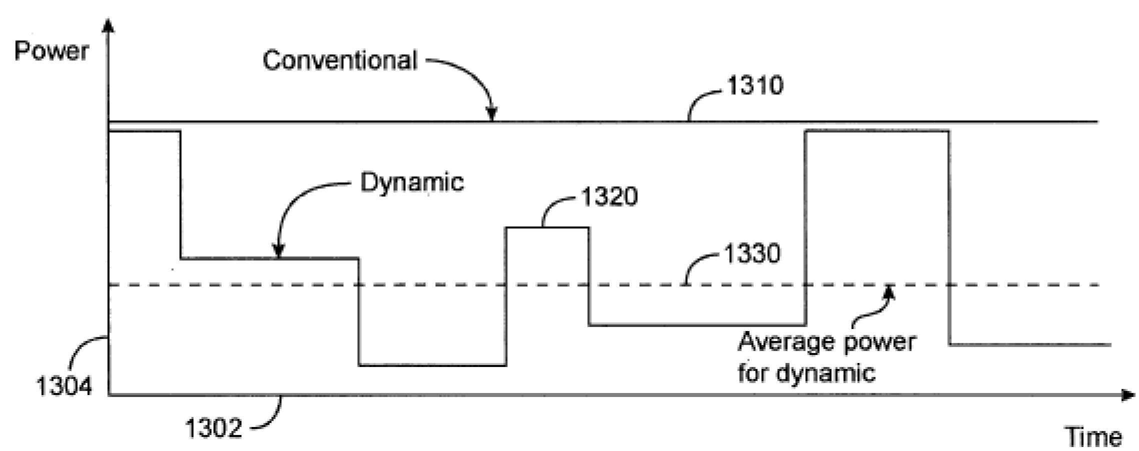


FIG 13

B. Prosecution Summary of the ’202 patent

The ’202 patent was filed as Application No. 15/824,841 (“’841 application”) on November 28, 2017. While the claims originally filed in the ’841 application and the challenged claims of the ’202 patent have some overlap in scope, they are substantially different from each other. *Compare* Ex. 1003 at 305-309, *with* Ex. 1001 at 12:63-18:43.

In a first Office Action dated July 18, 2018, all pending claims were rejected over prior art. Ex. 1003 at 217-257. Then-pending claims 26-30 were also rejected as indefinite. *Id.* at 219. Further, all of the pending claims were rejected on the ground of nonstatutory double patenting as being unpatentable over related patents and applications. *Id.* at 232-256.

In a response dated January 17, 2019, Patent Owner amended several of the independent claims to include the method step “comparing the signal strength of the desired signal to the signal strength of the interferer signal,” or similar variations thereof. *Id*. at 189-194. Patent Owner also added new claims 32-39. *Id*. at 194-197. In remarks, Patent Owner argued that the cited prior art references do not disclose “performing a comparison of desired signal strength and interfere signal strength.” *Id*. at 199. With the response, Patent Owner submitted a terminal disclaimer to overcome the double patenting rejections. *Id*. at 180-182; 200.

In a Final Office Action dated April 12, 2019, all pending claims were again rejected over prior art, including a newly cited reference. *Id.* at 153-172. Claims 31 and 37 were also rejected for failing to comply with the written description requirement. *Id.* at 156.

In a response dated October 11, 2019, Patent Owner cancelled claims 25, 31, 33-37 and amended the remaining pending claims. *Id.* at 114-121. Patent Owner also added new claims 40-51. *Id*. at 122-125. By way of amendment, Patent Owner added the term "dynamically" to several of the claims so as to recite "dynamically adjusting," "dynamically increasing," or another similar variation. *Id.* at 114-125. In remarks, Patent Owner again argued that "comparison of the strengths of the desired and interferer signals," distinguished the claims from the cited art. *Id*. at 126-132. Patent Owner further argued that the various "dynamic change[s]" recited by the claims were not disclosed by the cited art. *Id.* at 131-136.

A notice of allowance was subsequently issued on November 13, 2019. *Id*. at 91-95. The claims numbered 26, 42, 43, 44, 27, and 30 during prosecution correspond to issued claims 7, 8, 9, 10, 11, and 13 of the '202 patent, respectively. *Id*. at 100-101; *compare* Ex. 1003 at 117-119; 122 *with* Ex. 1001 at 13:58-14:54; 15:11-26.

C. The Prior Art

The claimed features of the '202 patent were well-known at the time of the alleged invention. Ex. 1002 at ¶¶33-37.

1. *Rauhala*

Rauhala discloses "a method and an arrangement for linearizing a radio receiver," to be "applied in the reception circuit of mobile stations." Ex. 1004 at [0001]. *Rauhala* discloses techniques for minimizing power dissipation resulting from requiring "a relatively large supply of energy" or "a relatively large continuous current" even when signal conditions at a particular time do not warrant such a large energy supply. *Id.* at [0004]. To that end, *Rauhala* teaches varying currents supplied to circuit components based on the conditions of the detected signals. Ex. 1002 at ¶¶68-78. For instance, *Rauhala* discloses that "[i]n normal conditions, i.e., when the signal strength if satisfactory on the receive channel and ordinary on the neighboring channels, the supply currents of the receiver's front-end amplifiers and at least the first mixer are kept relatively low" and "[i]f the signal strength goes below a certain value on the receive channel or exceeds a certain value on a neighboring channel, said supply currents are increased." Ex. 1004 at [0006].

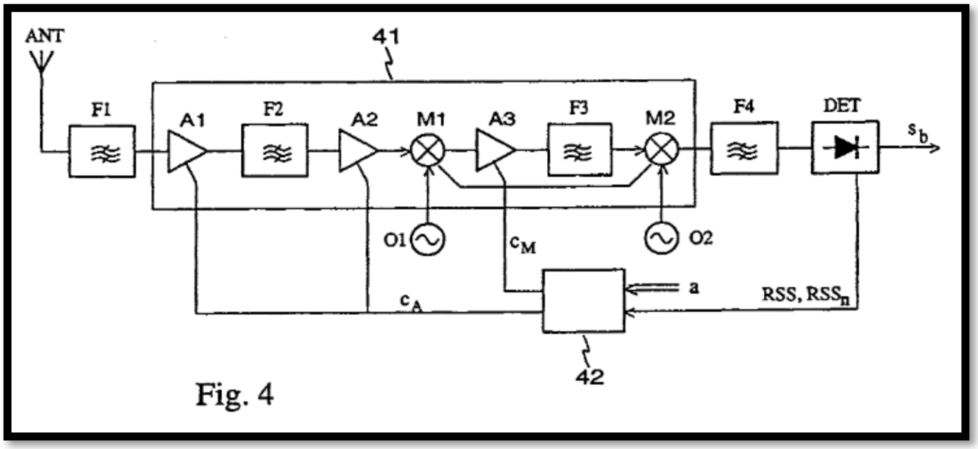


FIG. 4 of *Rauhala*, above, shows "a simplified example of a radio receiver" that includes "linear units." *Id.* at [0012]. The linear units include amplifiers and mixers in the receiver. Ex. 1002 at ¶69. The amplifiers are designated as A1, A2, and A3 and the mixers are designated as M1 and M2. *Id.*

Still referring to FIG. 4, *Rauhala* discloses an example of how the currents supplied to the linear units are controlled. Ex. 1004 at [0017]; Ex. 1002 at ¶70. First, "[a] control unit 42 receives from detect[or] DET an indication about either the receive channel signal strength RSS or the strength of any signal on the reception band." Ex. 1004 at [0017]. The neighboring channel signal strength is designated as "RSS_n." *Id.* at [0013], [0017]. Each signal condition represented by the values of RSS and RSS_n dictates the levels (e.g., high and low) of currents supplied to the linear units. *Id.* at [0017]-[0018]; Ex. 1002 at ¶70.

	RSS_n	RSS	I_A	I_M
Row 1 →	<Sn	>S4	I_{Al}	I_{Ml}
Row 2 →	<Sn	≤S4	I_{Ah}	I_{Ml}
Row 3 →	≥Sn	>S4	I_{Ah}	I_{Ml}
Row 4 →	≥Sn	≤S4	I_{Ah}	I_{Mh}

Id. at [0017].

The table reproduced above shows different signal conditions and the levels of currents supplied to the linear units under each of the signal conditions. *Id.*; Ex. 1002 at ¶71. Sn is a "threshold value […] which corresponds to a relatively high signal strength on the [neighboring] channel," and S4 is a "threshold value […] which corresponds to a relatively low receive signal strength." Ex. 1004 at [0017]. Further, the subindex A refers to "linear units A1 and A2," meaning I_A is a current supplied to linear units A1 and A2, and the subindex M refers to "linear units M1, A3, and M2," meaning I_M is a current supplied to linear units M1, A3, and M2. *Id.* Furthermore, the subindex 1 refers to a "lower supply current of the linear unit" and the subindex "h" refers to a "higher supply current." *Id.* Thus, as an example, "I_{M1} means that the control current in mixers M1 and M2 and in amplifier A3 is set to the lower value." *Id.*

With reference to the table above, *Rauhala* discloses "[w]hen the signal strength on the receive channel is normal or relatively high, and on the neighboring channels normal or relatively low," which represents the best case signal condition corresponding to Row 1 in the table, "all linear unit supply current are set to the lower values." *Id.* at [0018]. *Rauhala* further discloses "[w]hen the signal strength on the receive channel drops relatively low and on a neighboring channel relatively high," which represents the worst-case signal condition corresponding to Row 4 in the table, "the supply currents of all linear units are set to the higher values." *Id.*; Ex. 1002 at ¶72. During other signal conditions that are neither best-case nor worst-case, the current levels supplied may vary between the linear units in the receiver. Ex. 1002 at ¶¶73-74.

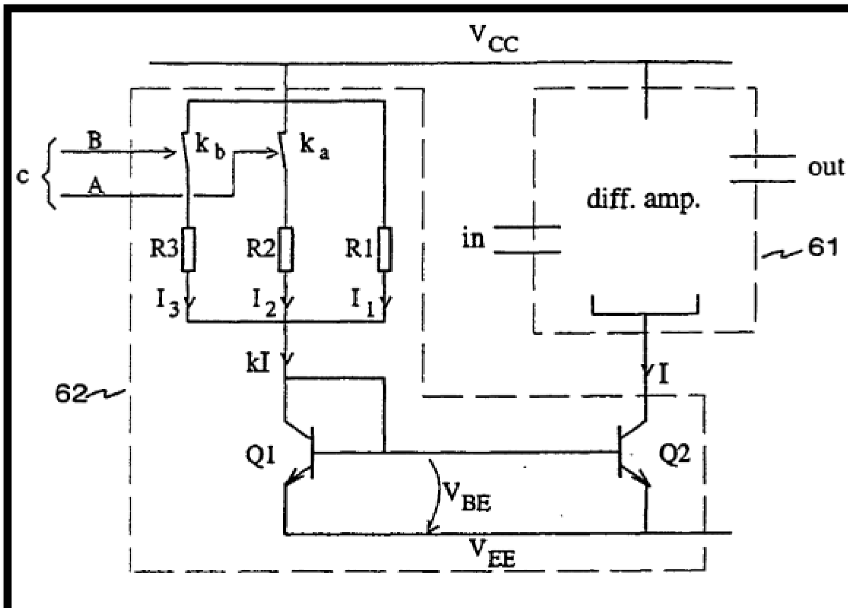


Fig. 6

Figure 6 of *Rauhala*, above, shows an example of "a linear unit's supply current control." Ex. 1004 at [0021]. The supply current control 62 is configured to vary the current supplied to the linear unit 61, by varying the impedance within the enclosed circuit. *Id.* Specifically, "[t]he supply current control circuit 62 comprises transistors Q1 and Q2, resistors R1, R2 and R3," as well as switch k_a "in series with resistor R2" and switch k_b "in series with resistor R3." *Id.* These "series connections are coupled in parallel with resistor R1," forming a three-branch parallel connection. *Id.*; Ex. 1002 at ¶75. In the three-branch parallel connection, "the current of resistor R1 is I_1, the current of resistor R2 is I_2 and the current of resistor R3 is I_3." Ex. 1004 at [0021]. Accordingly, "the current kI of transistor Q1 is the sum $I_1+I_2+I_3$." *Id.* The switches k_a and k_b are controlled by control unit 42. *Id.*; Ex. 1002 at ¶¶76-77.

2. *Saito*

Saito, titled "Automatic Gain Control Circuit," relates to electronic circuitry to automatically adjust the gain of an amplifier in a receiver of a mobile device. Ex. 1005 at 1:5-7; Ex. 1002 at ¶79. *Saito* explains that one-stage gain switching of the prior art is insufficient for managing intermodulation distortion and disturbance over a broad range of input signal levels. Ex. 1005 at 1:13-22. To improve signal reception over a broad range of input signal levels, the gain of the amplifier is controlled "at multiple stages by [a] gain control signal" and that "a gain control unit comprising one or a plurality of continuous feedback systems is added." *Id.* at 41-54.

Saito states that the automatic gain control circuitry is directed to "reducing reception disturbance resulting from intermodulation distortion for input levels of a broad range from the reception of a small input signal to the reception of a large input signal in receivers." *Id*. at 1:34-40. *Saito* explains that the automatic gain control circuitry includes "reception field level detection means" which "outputs a gain control signal in accordance with the reception field level." *Id*. at 1:41-47; Ex. 1002 at ¶80.

In an embodiment, *Saito* teaches that a continuous feedback mechanism is used so that a gain control signal output from a reception field detector is continuously varied. Ex. 1005 at 6:17-27; Ex. 1002 at ¶81. The continuous feedback allows the receiver to maintain the signal strength of the input signal to at a constant level, which could not be accomplished using staged gain control alone. Ex. 1005 at 6:20-27. According to *Saito*, continuous gain control "eliminat[es] the intermodulation distortion in a wide range of reception field levels ranging from the input of the very fine signal to the input of the large signal." *Id*. at 7:51-62; Ex. 1002 at ¶81.

VIII. CLAIM CONSTRUCTION

The claims of the '202 patent should be construed under the Phillips standard. 37 C.F.R. § 42.100(b); *see generally Phillips v. AWH Corp*., 415 F.3d 1303 (Fed. Cir. 2005). Under *Phillips*, claim terms are typically given their ordinary and customary meanings, as would have been understood by a POSITA, at the time of the invention, having taken into consideration the language of the claims, specification, and prosecution history. *Phillips*, 415 F.3d at 1313; *see also id.* at 1312-16. The Board, however, only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Sys., Inc.*, IPR2015-00633, Paper No. 11 at 16 (Aug. 14, 2015). Except for the terms identified below, Petitioners believe that no express constructions of the claims are necessary to assess whether the prior art reads on the challenged claims.[3]

A. "dynamically adjusting"

The proper construction of this term appearing in claims 7, 19, and 21 is "adjusting during operation based, at least in part, on information gained during operation." This construction is consistent with the specification of the '202 patent, the claims, and Patent Owner's own representations of the meaning of this term in

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[3] Petitioners reserve all rights to raise claim construction and other arguments in district court. For example, Petitioners have not raised all challenges to the '202 patent in this petition, including validity under 35 U.S.C. §112, and a comparison of the claims to any accused products in litigation may raise controversies needing resolution through claim constructions not presented here.

prior litigations.[4] The Board should reject any attempt by Patent Owner to further limit this term.

In descriptions of exemplary embodiments, the ’202 patent repeatedly refers to receiver circuit parameters as “dynamically adjusted” in response to measured conditions. Ex. 1002 at ¶60. In one example, the ’202 patent states that “impedance in the signal path is configured to be ***dynamically adjusted*** in response to the first signal strength.” Ex. 1001 at 2:51-53 (emphasis added). In another example, a “bias current in the signal path is configured to be ***dynamically adjusted*** in response to the first signal strength.” *Id.* at 2:62-64 (emphasis added). In a third example, a “gain of the first circuit is configured to be ***dynamically adjusted*** [...] and an impedance in the second circuit is configured to be dynamically adjusted in

[4] The ’202 patent was asserted by Patent Owner, and the term “dynamically adjusting” was construed by the court, in *Theta IP, LLC v. Samsung Electronics Company*, No. W-20-CV-00160-ADA (W.D. Tex.) (“*Theta II*”). Ex. 1007. The ’330 patent and ’728 patent—predecessors of the ’202 patent—were asserted by Patent Owner in an earlier litigation titled *Theta IP, LLC v. Samsung Electronics Company*, No. 2:16-CV-527-JRG-RSP (E.D. Tex.) (“*Theta I*”). Ex. 1008 at 3. “Dynamically adjust[ed]” was also construed in *Theta I*. *Id.* at 7-15.

response to the first signal strength.” *Id.* at 3:4-8 (emphasis added). For each example, the ’202 patent explains that a “signal strength indicator circuit” is configured to determine the first signal strength. Ex. 1001 at 2:43-51; 2:54-62; 2:65-3:4. A POSITA would have understood that signal strength is identified during operation of the system. Ex. 1002 at ¶60. It follows that a POSITA would have understood that the responsive adjustment likewise occurs during operation of the system. *Id.*

In Figure 13, below, the ’202 patent illustrates an example of dynamic adjustment of circuit parameters allegedly resulting in “dynamic power dissipation.” Ex. 1001 at 11:41-45; Ex. 1002 at ¶61. Power is shown on the Y axis and time on the X axis. Ex. 1002 at ¶61.

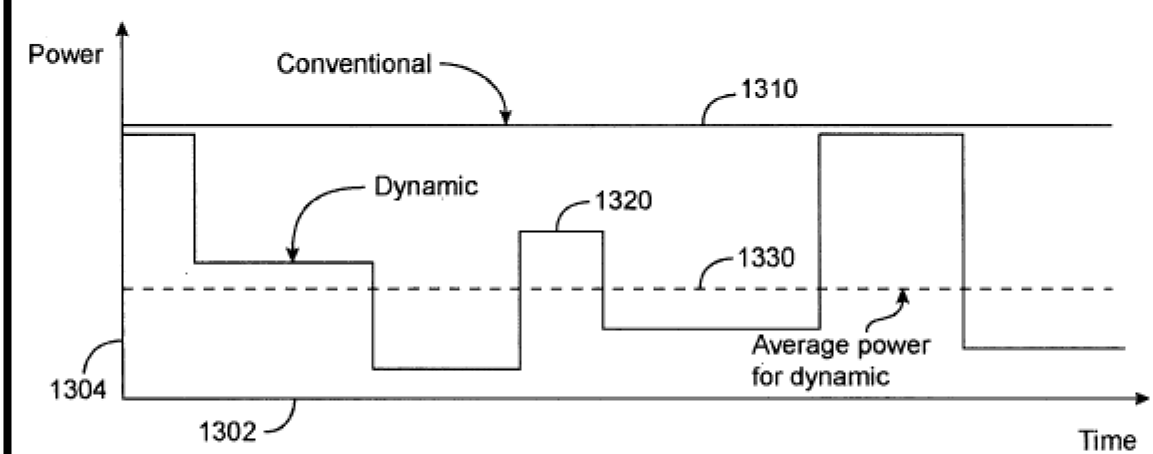


FIG 13

According to the ’202 patent, “control of variable gains, impedances, biasing, or combination thereof, allows for a lower average power” dissipation. Ex. 1001 at 11:41-45. Figure 13 shows that “dynamic power dissipation” occurs in discrete steps, as opposed to along a continuous curve, and in contrast with “conventional” power dissipation, which is depicted as a straight line (*i.e.* static). Ex. 1002 at ¶62. A POSITA would have understood from Figure 13 and the accompanying description in the specification that “***dynamic*** power dissipation” is simply power dissipation that varies over time. *Id.*

The claims of the ’202 patent use the term “dynamically adjusted” consistently with the specification. For example, claim 7 recites:

> receiving a wireless signal having a desired signal and an interferer signal by the receiver;
>
> ***determining*** the strength of the desired signal;
>
> ***determining*** the strength of the interferer signal;
>
> ***comparing*** the strength of the desired signal relative to the strength of the interferer signal; and
>
> ***based on the comparison***, when the plurality of circuits are functioning at better than the worst-case condition, ***dynamically adjusting*** one or more of an impedance, a bias or a gain of one or more of the plurality of circuits in the signal path, thereby controlling power dissipation.

Ex. 1001 at 14:5-15 (emphases added.) Other claims are structured similarly:

- Claim 1: "***dynamically adjusting*** [...] responsive to the comparing;"
- Claim 14: "based on the comparing [...] ***dynamically adjusting***;"
- Claim 16: "based on the comparing [...] ***dynamically adjusting***;"
- Claim 19: "based on the comparing [...] ***dynamically adjusting***;"

Ex. 1001 at 13:17-19; 15:50-56; 16:26-32; 17:32-37 (emphases added). Read in the context of the claims, A POSITA would have understood "dynamically adjusting" to mean adjusting during operation (while receiving a wireless signal) based, at least in part, on information (signal strengths and/or comparisons thereof) gained during operation. Ex. 1002 at ¶¶63-65.

Patent Owner has itself argued during litigation that the term "dynamically adjusting" should be no more limited than Petitioners propose here. In *Theta I*, Patent Owner argued that "dynamically adjust[ed]" should be construed according to its plain and ordinary meaning, or alternatively to mean "changing during operation," an interpretation even broader than proposed by Petitioners here. Ex. 1009 at 8. Patent Owner argued that interpreting "dynamically adjust[ed]" to mean "adjust[ed] in a continuous manner, as opposed to discrete steps," is "unduly limiting." *Id*. at 9. The *Theta I* court agreed with Patent Owner that "dynamically adjust[ed]" is not so limited. Ex. 1008 at 15.

In *Theta II*, Patent Owner argued that "[n]o negative limitation should be included in the 'dynamically adjusting' claims at issue." Ex. 1010 at 12. Patent

Owner took the position that "dynamically adjusting" <u>does not</u> preclude "reliance on a signal strength threshold." *Id.* Rather than distinguish the art cited during prosecution by limiting the phrase "dynamically adjusting" in this way, Patent Owner asserted that it "made distinctions over [the cited art] based on the limitations of the claims," and that "the limitations are clear on their face." *Id.* at 13. The *Theta II* court agreed and construed "dynamically adjusting" as Petitioners proposes here. Ex. 1007 at 2.

Whether the Board construes the term "dynamically adjusting" as Petitioners propose does not impact the ultimate conclusion that the challenged claims are unpatentable. Ex. 1002 at ¶66. Even under a narrower construction, the cited references would still render the challenged claims unpatentable. *Id*.

B. "dynamically [increasing/reducing/decreased/increased]"

Challenged claims 8, 9, 11, and 13 recite "dynamically increasing," "dynamically reducing," "dynamically decreased," and "dynamically increased," respectively. "Dynamically reducing" also appears in claims 20. These terms should be construed consistently with "dynamically adjusting" to mean [increasing/reducing/decreased/increased] during operation based, at least in part, on information gained during operation. *See supra* Section VIII(A); Ex. 1002 at ¶67.

IX. DETAILED EXPLANATION OF GROUNDS

A. Ground 1: *Rauhala* Anticipates Claims 7-11, 13, and 19-21

7. Claim 7

7.1 "A method for power dissipation control in a receiver of a wireless transceiver of a battery-powered portable wireless device,"

Rauhala teaches this element. Ex. 1002 at ¶85. *Rauhala* describes methods "for linearizing a radio receiver" in which "the energy consumption of the receiver can be reduced without degrading the signal quality." Ex. 1004 at ¶¶[0001], [0007]. *Rauhala* states that such techniques are "appli[cable] in the reception circuits of mobile stations," such as mobile phones, which are wireless transceivers. Ex. 1004 at ¶¶[0001], [0012]; Ex. 1002 at ¶85. *Rauhala* further states that "energy consumption of the receiver can be reduced without degrading the signal quality," leading to "longer life for the battery or […] a smaller battery can be used." Ex. 1004 at ¶[0007].

7.2 "the receiver having a signal path comprising a plurality of circuits including at least an amplifier, a filter, and a mixer,"

Rauhala teaches this element. Ex. 1002 at ¶¶86-87. In particular, *Rauhala* describes several examples of receiver signal paths, each including an amplifier, a mixer, and a filter. *See* Ex. 1004 at FIGS. 1-5. Figure 2 of *Rauhala*, reproduced below with annotations, depicts a receiver signal path structure including an amplifier A1, a mixer M1, and a filter F3. Ex. 1004 at ¶¶[0012]-[0013].

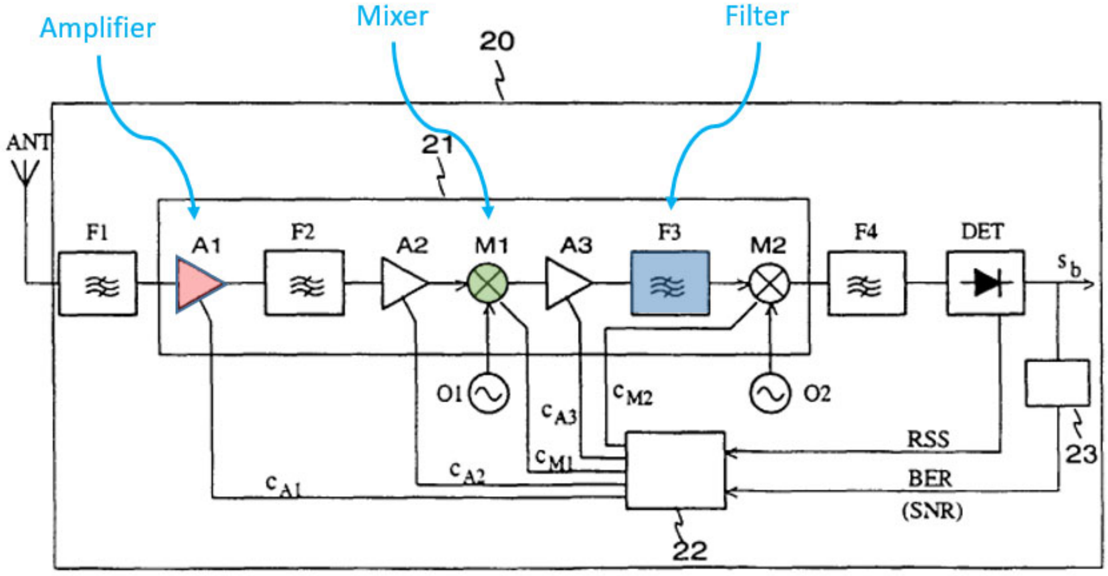


Fig. 2

Annotated Excerpt of *Rauhala* Figure 2

7.3 "wherein the receiver is configured to receive a wireless signal having a desired signal and an interferer signal,"

Rauhala teaches this element. Ex. 1002 at ¶¶88-89. *Rauhala* describes various configurations of a "radio receiver." Ex. 1004 at ¶[0002]. *Rauhala* also states that the radio receiver can be used in "mobile stations" and "mobile phones." Ex. 1004 at ¶¶[0001], [0012]. A POSITA would have understood that the radio receiver described in *Rauhala* is configured to receive a wireless radio signal. Ex. 1002 at ¶88.

Rauhala states that the "receiver monitors the signal strength on the receive channel and neighboring channels" and that "the receiver is tuned" during operation to a particular channel. Ex. 1004 at ¶¶[0006], [0013]. *Rauhala* also explains that "noise and interference [is] indirectly caused by other radio signals," including "a signal on a neighboring channel." Ex. 1004 at ¶[0002]. A POSITA would have understood that a signal on the receive channel is a "desired signal" and a signal on a neighboring channel is an "interferer signal." Ex. 1002 at ¶89.

7.4 "wherein the plurality of circuits are designed to function between a worst-case condition when a strength of the desired signal is low and a strength of the interferer signal is high,"

Rauhala teaches this element. Ex. 1002 at ¶¶90-98. *Rauhala* explains that the "receiver monitors the signal strength on the receive channel and neighboring channels" and that supply currents for receiver circuit components are adjusted accordingly while maintaining signal quality. Ex. 1004 at ¶¶[0006]-[0007]; Ex. 1002 at ¶90. *Rauhala* specifically teaches that when "the signal strength goes below a certain value on the receive channel or exceeds a certain value on a neighboring channel, said supply currents are increased." Ex. 1004 at ¶[0006].

In one configuration, *Rauhala* explains that "receive signal strength" (RSS) and the "strength of any signal on the reception band" (RSS_n) are monitored by a detector and a control unit, collectively. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶91. "Signal RSS has one threshold value S4 which corresponds to a relatively low receive signal strength," whereas RSS_n has "a threshold value Sn, which corresponds to a relatively high signal strength on the channel." Ex. 1004 at ¶[0017]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶91-92.

RSS_n	RSS	I_A	I_M
<Sn	>S4	I_{A1}	I_{M1}
<Sn	≤S4	I_{Ah}	I_{M1}
≥Sn	>S4	I_{Ah}	I_{M1}
≥Sn	≤S4	I_{Ah}	I_{Mh}

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0017]

The bottom row of the table represents a situation in which RSS is less than or equal to S4, or at its lowest, and RSS_n is greater than or equal to Sn, or at its highest. Ex. 1002 at ¶¶93-94. This represents a worst-case operating condition for the receiver. *Id.*

In another configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶95. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations.

Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶95-96.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0019]

The bottom row of the table represents a situation in which RSS is less than or equal to S52, or at its lowest, and BER is greater than or equal to E2, or at its highest. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶¶97-98. This represents a worst-case operating condition for the receiver. Ex. 1002 at ¶¶97-98.

7.5 "and a best-case condition when the strength of the desired signal is high and the strength of the interferer signal is low, the method comprising:"

Rauhala teaches this element. Ex. 1002 at ¶¶99-107. As explained above, *Rauhala* teaches several configurations of supply current control. *See supra* Section IX(A)(7)(7.4); Ex. 1002 at ¶99. For example, *Rauhala* explains that supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶99.

RSS_n	RSS	I_A	I_M
$<Sn$	$>S4$	I_{A1}	I_{M1}
$<Sn$	$\leq S4$	I_{Ah}	I_{M1}
$\geq Sn$	$>S4$	I_{Ah}	I_{M1}
$\geq Sn$	$\leq S4$	I_{Ah}	I_{Mh}

Best-case condition

Annotated Excerpt of *Rauhala* at ¶[0017]

The top row of the table represents a situation in which RSS is greater than S4, or at its highest, and RSS_n is less than Sn, or at its lowest. Ex. 1002 at ¶¶102-103. This represents a best-case operating condition for the receiver. *Id.* The two middle rows represent operating conditions for the receiver between this best-case condition and the worst-case condition. *Id.* at ¶¶103.

In another configuration, *Rauhala* explains that supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶104.

Best-case condition

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Annotated Excerpt of *Rauhala* at ¶[0019]

In the top row, RSS is greater than S51, or at its highest, and BER is less than E1, or at its lowest. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶¶106-107. This represents a best-case operating condition for the receiver. Ex. 1002 at ¶107. The seven intermediate rows represent operating conditions for the receiver between the best-case and worst case conditions. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶107.

7.6 "receiving the wireless signal having the desired signal and the interferer signal by the receiver;"

Rauhala teaches this element. Ex. 1002 at ¶¶108-110. *Rauhala* states that the "receiver monitors the signal strength on the receive channel and neighboring channels" and that "the receiver is tuned" during operation to a particular channel. Ex. 1004 at ¶¶[0006], [0013]. *Rauhala* also explains that "noise and interference

[is] indirectly caused by other radio signals," including "a signal on a neighboring channel." *Id.* at ¶[0002].

In one configuration, *Rauhala* explains that circuit parameters are adjusted depending on the strengths of the signals actually received. Ex. 1004 at ¶[0018]; Ex. 1002 at ¶109. For example, "[w]hen the signal strength on the receive channel is normal or relatively high, and on the neighboring channels normal or relatively low, all linear unit supply currents are set to the lower values." Ex. 1004 at ¶[0018]. Additionally, "when the signal strength on the receive channel is relatively low and on a neighboring channel relatively high, the supply currents of all linear units are set to the higher values." *Id.*

A POSITA would have understood that a signal on the receive channel is a "desired signal" and a signal on a neighboring channel is an "interferer signal." Ex. 1002 at ¶110.

7.7 "determining the strength of the desired signal;"

Rauhala teaches this element. Ex. 1002 at ¶¶111-114. *Rauhala* states that the "receiver monitors the signal strength on the receive channel." Ex. 1004 at ¶[0006]. *Rauhala* explains that "[d]etector DET provides information about the signal strength (RSS) on the channel to which the receiver is tuned." *Id.* at ¶[0013]. Receive signal strength (RSS) is transmitted from DET "to the control unit 22 the outputs of which are coupled to the linear units" such that control unit 22 may control supply currents for the amplifiers and mixers. *Id.*; Ex. 1002 at ¶111. Figure 2, reproduced below with annotations, depicts the position of detector DET along the receiver signal path and the transmission of RSS to control unit 22. Ex. 1004 at ¶[0013], FIG. 2; Ex. 1002 at ¶111.

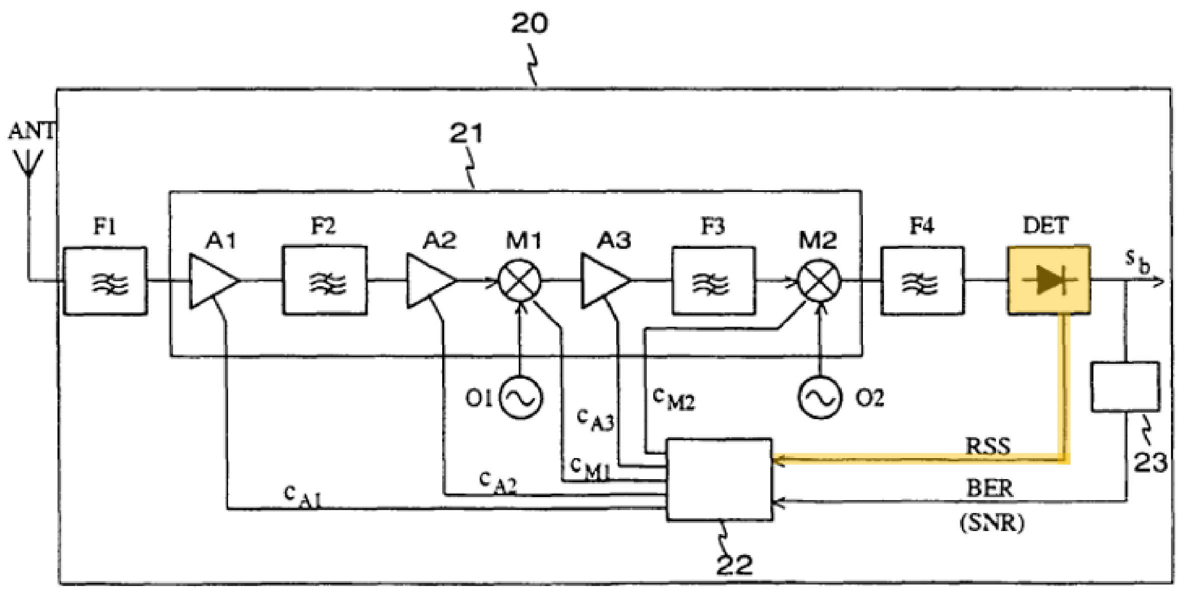


Fig. 2

Annotated Excerpt of *Rauhala* Figure 2

For each of the several configurations, *Rauhala* explains that a detector DET measures the receive signal strength (RSS) and transmits the RSS to a control unit. Ex. 1004 at ¶¶[0015], [0017], [0019]; Ex. 1002 at ¶113. For example, *Rauhala* teaches that "control unit 42 receives from detector DET an indication about [...] the receive channel signal strength RSS." Ex. 1004 at ¶[0017]. Figure 4 of *Rauhala*, reproduced below with annotations, depicts the position of detector DET along the receiver signal path and the transmission of RSS to control unit 42. Ex.

1004 at ¶[0017], FIG. 2; Ex. 1002 at ¶¶113-114.

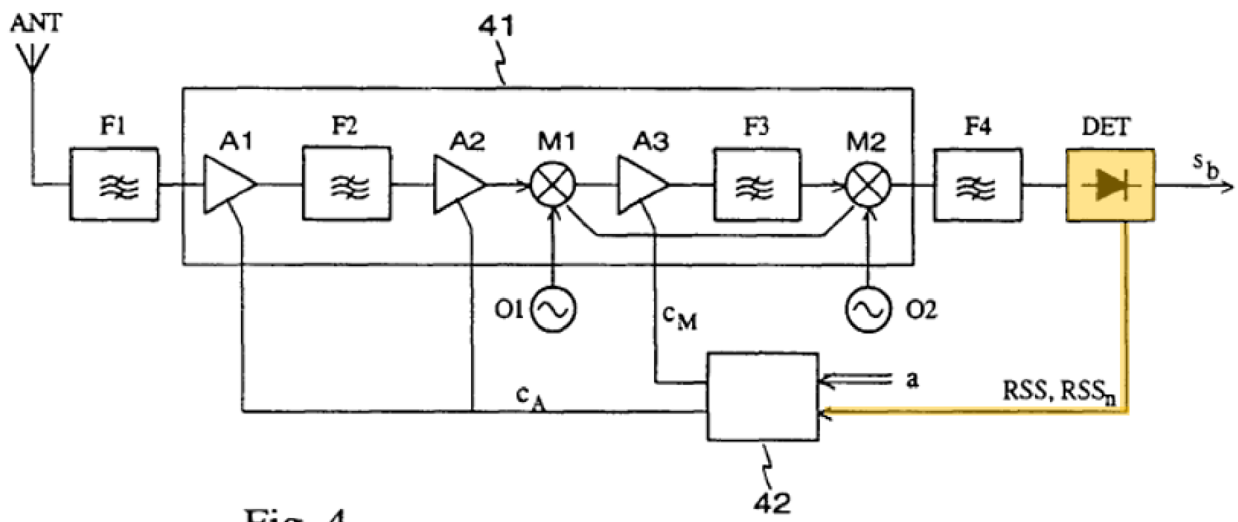
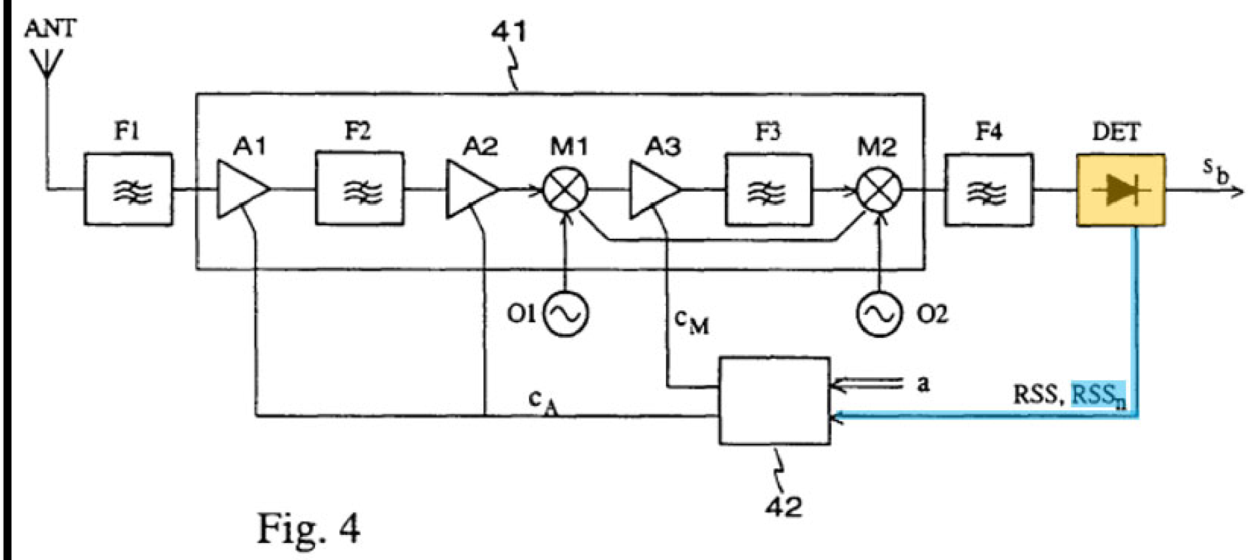


Fig. 4

Annotated Excerpt of *Rauhala* Figure 4

7.8 "determining the strength of the interferer signal;"

Rauhala teaches this element. Ex. 1002 at ¶¶115-116. *Rauhala* states that the "receiver monitors the signal strength on the [...] neighboring channels." Ex. 1004 at ¶[0006]. With reference to the configuration of Figure 4, *Rauhala* explains that "control unit 42 receives from detector DET an indication about [...] the strength of any signal on the reception band." *Id.* at ¶[0017]. *Rauhala* refers to this value as RSS_n, which "stands for the signal strength of the neighboring channel in which the signal strength is greater." *Id.*; Ex. 1002 at ¶115. Figure 4 of *Rauhala*, reproduced below with annotations, depicts the position of detector DET along the receiver signal path and the transmission of RSS_n to control unit 42. Ex. 1004 at ¶[0017], FIG. 4; Ex. 1002 at ¶¶115-116.

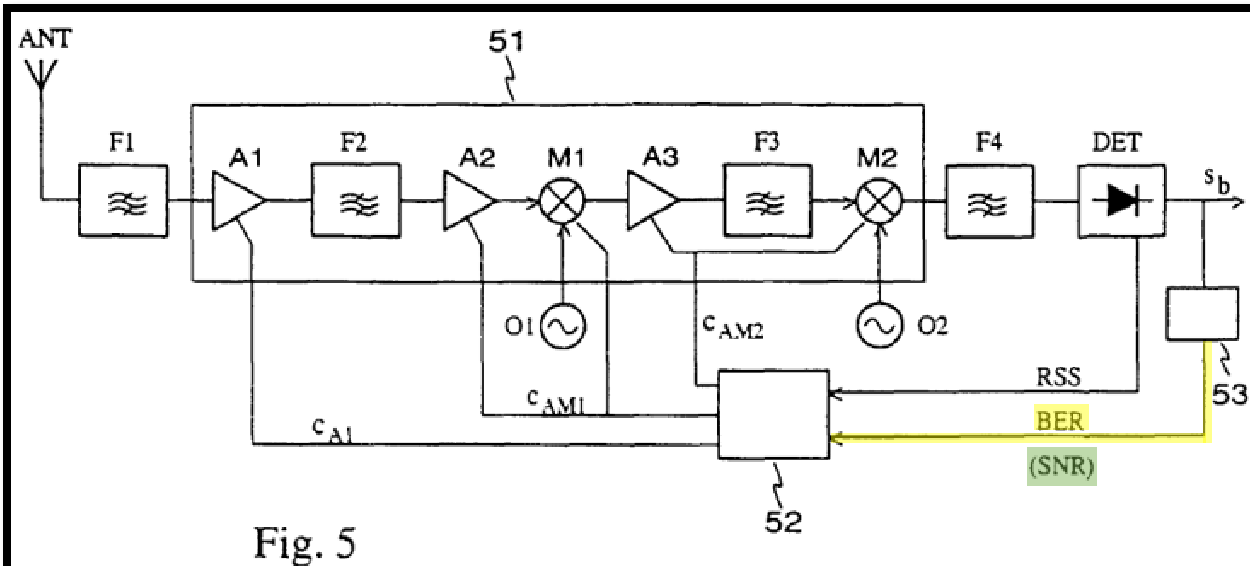


Annotated Excerpt of *Rauhala* Figure 4

7.9 "comparing the strength of the desired signal relative to the strength of the interferer signal; and"

Rauhala teaches this element. Ex. 1002 at ¶¶117-120. *Rauhala* states that a unit of the receiver circuit "calculates the bit error ratio (BER) that describes the quality of the received and detected signal." Ex. 1004 at ¶[0013]. *Rauhala* explains that as an alternative to bit error ratio (BER), "the quality of the detected signal can be determined by calculating its signal-to-noise ratio" (SNR)." *Id.* at ¶[0014]; Ex. 1002 at ¶117.

In one configuration, *Rauhala* explains that a "control unit 52 receives a receive signal strength indication RSS and receive channel bit error ratio indication BER." Ex. 1004 at ¶[0019]; Ex. 1002 at ¶118. Figure 5 of *Rauhala*, reproduced below with annotations, depicts the transmission path of the bit error ratio BER from unit 53 to control unit 52 and specifically indicates that the signal-to-noise ratio (SNR) could be substituted for the BER. Ex. 1004 at ¶[0017], FIG. 5; Ex. 1002 at ¶¶118-119.



Annotated Excerpt of *Rauhala* Figure 5

A POSITA would have understood that calculation by unit 53 of the signal-to-noise ratio is a comparison of the strength of the desired signal relative to the strength of the interferer signal. Ex. 1002 at ¶120; Ex. 1006 at 9 (defining signal-to-noise ratio as "1. Ratio of the magnitude of the signal to that of the noise [...] 3. The ratio of the amplitude of the signal after detected to the amplitude of the noise accompanying the signal [...] 5. The difference, measured in decibels, between a specified signal reference level and the level of unwanted noise.")

7.10 "[...]when the plurality of circuits are functioning at better than the worst-case condition,"

Rauhala teaches this element. Ex. 1002 at ¶¶121-125. In one configuration, *Rauhala* explains that control unit 52 receives the "receive signal strength indication" (RSS) and the "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶121-122. According to *Rauhala*, "[s]ignal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents of amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶121.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Better than worst-case condition

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0019]

As explained herein previously, the bottom row of the table represents a situation in which RSS is less than or equal to S52, or at its lowest, and BER is greater than or equal to E2, or at its highest. *See supra* Section IX(A)(7)(7.4); Ex. 1004 at ¶[0020]; Ex. 1002 at ¶¶123-124. This represents a worst-case operating condition for the receiver. Ex. 1002 at ¶124. The rows above the bottom row, including the second and third rows highlighted blue, represent operating conditions that are better than the worst-case operating condition. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶125.

7.11 "based on the comparison[...] dynamically adjusting one or more of an impedance, a bias or a gain of one or more of the plurality of circuits in the signal path, thereby controlling power dissipation."

Rauhala teaches this element. Ex. 1002 at ¶¶126-136. *Rauhala* explains that supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2 of the receiver are controlled based on the RSS values and the BER values according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶126-127. *Rauhala* states that "supply current values are denoted by" simple integers, where "1 means the lowest supply current values, number two the second lowest values, number 3 the third lowest values and number 4 the highest supply current values." Ex. 1004 at ¶[0019].

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Annotated Excerpt of *Rauhala* at ¶[0019]

In the third row of the table, highlighted blue, BER is greater than E2 and the current values for the respective receiver circuits are 4, 4, and 2. *See* Ex. 1004 at ¶[0019]; Ex. 1002 at ¶128. When BER decreases from above E2 to between E1 and E2 during operation of the receiver, and RSS remains above S51, the operating condition of the receiver moves from the third row to the second row. *See* Ex. 1004 at ¶[0019]; Ex. 1002 at ¶128. As a result, the current values for the respective receiver circuits are dynamically adjusted to 3, 2, and 1. *See* Ex. 1004 at ¶[0019]; Ex. 1002 at ¶128.

As explained *supra* Section IX(A)(7)(7.9), "the quality of the detected signal can be determined by calculating its signal-to-noise ratio (SNR)." Ex. 1004 at

¶[0014]; Ex. 1002 at ¶129. A POSITA would have understood from *Rauhala* that signal-to-noise ratio (SNR) could be substituted for bit error ratio (BER) in the table following paragraph [0019] as a basis for determining and adjusting the supply current values of the amplifiers and mixers. Ex. 1002 at ¶129.

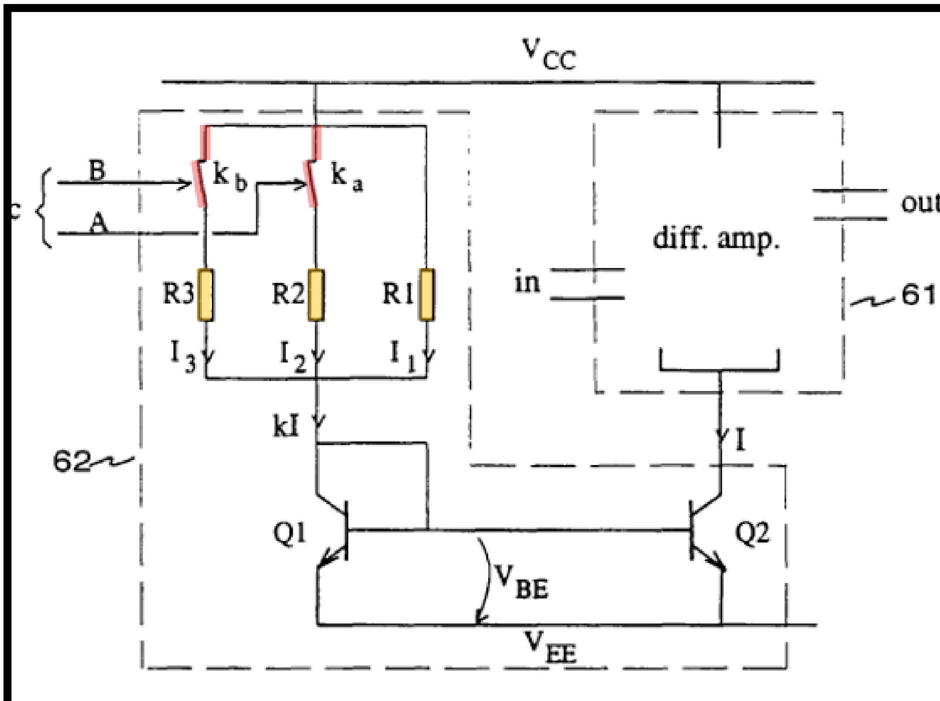


Fig. 6

Annotated Excerpt of *Rauhala* Figure 6

With reference to Figure 6, *Rauhala* explains that an amplifier of the receiver is powered by a voltage supply having a higher power supply voltage V_{CC} terminal and a lower power supply voltage V_{EE} terminal. Ex. 1002 at ¶131; Ex. 1004 at ¶[0021]. Transistors Q1 and Q2, resistors R1, R2, and R3, and switches k_a and k_b are arranged between the voltage supply terminals. Ex. 1004 at ¶[0021].

Resistor R2 is connected in series with switch k_a and resistor R3 is connected in series with switch k_b. *Id.* Each of those series connections are connected in parallel with resistor R1. *Id.* The three resistors R1, R2, and R3 and the respective switches are positioned between the higher power supply voltage V_{CC} terminal and a collector of transistor Q1. *Id.*

The base of transistor Q1 is connected to the base of transistor Q2 such that the pair of transistors Q1 and Q2 act as a current mirror, or current amplifier. Ex. 1002 at ¶131; Ex. 1004 at ¶¶[0021], [0022]. As a result, the current kI of transistor Q1 is proportional to the current of transistor Q2, which is the supply current I for the amplifier. Ex. 1002 at ¶132; Ex. 1004 at ¶¶[0021]-[0022].

To achieve the supply current I prescribed by *Rauhala* in the table appearing after paragraph [0019], switches k_a and k_b are opened or closed selectively. Ex. 1002 at ¶133; Ex. 1004 at ¶[0021]. Changing the configuration of either or both of switches k_a and k_b changes the resistance between higher power supply voltage V_{CC} terminal and transistor Q1 and in turn changes current kI. Ex. 1002 at ¶133; Ex. 1004 at ¶[0021]. By virtue of the relationship between current kI and supply current I, supply current I is adjusted proportionally with current kI. Ex. 1002 at ¶133; Ex. 1004 at ¶[0021]. The resistance acting against supply current I likewise must change as the voltage supply is held constant. Ex. 1002 at ¶133; Ex. 1004 at ¶[0021]. Changing the foregoing resistances in the circuit of Figure 6 changes the impedance of the circuit. Ex. 1002 at ¶134; Ex. 1006 at 7 (defining "impedance" as "1. The total opposition (i.e., resistance and reactance) a circuit offers to the flow of alternating current at a given frequency[...] 2. The combination of resistance and reactance. 3. Combined opposition to current resulting from resistance, capacitance, and inductance.")

Controlling the supply currents as described above controls power dissipation by the receiver. Ex. 1002 at ¶136.

8. Claim 8

8.1 "The method of claim 7, wherein when the strength of the interferer signal is low and the relative strength of the desired signal with respect to the interferer signal increases,"

Rauhala teaches this element. Ex. 1002 at ¶¶137-144. In one configuration, *Rauhala* explains that "receive signal strength" (RSS) and the "strength of any signal on the reception band" (RSS_n) are monitored by a detector and a control unit, collectively. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶138. "Signal RSS has one threshold value S4 which corresponds to a relatively low receive signal strength," whereas RSS_n has "a threshold value Sn, which corresponds to a relatively high signal strength on the channel." Ex. 1004 at ¶[0017]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶138-139.

RSS_n	RSS	I_A	I_M
<Sn	>S4	I_{A1}	I_{M1}
<Sn	≤S4	I_{Ah}	I_{M1}
≥Sn	>S4	I_{Ah}	I_{M1}
≥Sn	≤S4	I_{Ah}	I_{Mh}

RSS Increasing

Annotated Excerpt of *Rauhala* at ¶[0017]

When RSS_n is less than threshold value Sn, as shown in the top two rows of the table, the strength of the interferer signal is low. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶140. When RSS is also initially less than threshold value S4, as shown in the second row, and subsequently increases to a value greater than S4, as shown in the first row, the relative strength of the desired signal increases with respect to the interferer signal. Ex. 1002 at ¶140.

In another configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶141. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "Signal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶141-142.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

RSS increasing

Annotated Excerpt of *Rauhala* at ¶[0019]

The two highlighted rows of the table represent conditions in which BER is less than threshold value E1. Ex. 1002 at ¶¶143-144. A POSITA would have understood that the strength of any interferer signals would be low when BER is also low. Ex. 1002 at ¶¶143-144. When RSS is also initially less than threshold value S51, as shown in the fourth row, and subsequently increases to a value greater than S51, as shown in the first row, the relative strength of the desired signal increases with respect to the interferer signal. Ex. 1002 at ¶¶143-144.

8.2 **"dynamically increasing the impedance of one or more of the plurality of circuits in the signal path to reduce the power dissipation and thereby save power."**

Rauhala teaches this element. Ex. 1002 at ¶¶145-151. As explained herein previously, supply currents are controlled according to the table reproduced below with annotations. *See supra* Section IX(A)(8)(8.1); Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶145-146. I_A represents the supply current to amplifiers A1 and A2 of the receiver circuit shown in Figure 4. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶145. I_{Ah} represents a "higher supply current" value, whereas I_{A1} represents a "lower supply current" value. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶145.

RSS_n	RSS	I_A	I_M
<Sn	>S4	I_{A1}	I_{M1}
<Sn	≤S4	I_{Ah}	I_{M1}
≥Sn	>S4	I_{Ah}	I_{M1}
≥Sn	≤S4	I_{Ah}	I_{Mh}

RSS Increasing

Annotated Excerpt of *Rauhala* at ¶[0017]

In response to a shift from the conditions of the second row (yellow) to the conditions of the first row (blue), supply current I_A is reduced from the higher supply current value I_{Ah} to the lower supply current value I_{A1}. Ex. 1002 at ¶147. As discussed herein previously, *Rauhala* explains that adjusting a supply current of a linear unit of the receiver is realized by adjusting the impedance of the respective linear unit. *See supra* Section IX(A)(7)(7.11); Ex. 1002 at ¶147. To reduce the supply current I_A of the amplifiers A1 and A2 from the higher supply current value I_{Ah} to the lower supply current value I_{A1}, the impedances of each of amplifiers A1 and A2, respectively, are increased. *See* Ex. 1004 at ¶[0021]; Ex. 1002 at ¶147. Reducing the supply currents of amplifiers A1 and A2 also reduces power consumption by amplifiers A1 and A2, thereby saving power. Ex. 1002 at ¶¶147, 151.

In another configuration, *Rauhala* explains that the supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶148. *Rauhala* states that "supply current values are denoted by" simple integers, where "1 means the lowest supply current values, number two the second lowest values, number 3 the third lowest values and number 4 the highest supply current values." Ex. 1004 at ¶[0019].

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

RSS increasing

Annotated Excerpt of *Rauhala* at ¶[0019]

In response to a shift from the conditions of the fourth row to the conditions of the first row, the supply current I_{A1} for amplifier A1 is reduced from the higher supply current value (2) to the lower supply current value (1). Ex. 1002 at ¶150. As discussed herein previously, *Rauhala* explains that adjusting a supply current of a linear unit of the receiver is realized by adjusting the impedance of the respective linear unit. *See supra* Section IX(A)(7)(7.11); Ex. 1002 at ¶150. To reduce the supply current I_{A1} of the amplifier A1 the higher supply current value (2) to the lower supply current value (1), the impedance of amplifier A1 is increased. *See* Ex. 1004 at ¶[0021]; Ex. 1002 at ¶150. Reducing the supply current of amplifier A1 also reduces power consumption by amplifier A1, thereby saving power. Ex. 1002 at ¶151.

9. Claim 9

9.1 "The method of claim 7, wherein when the strength of the desired signal is low but the relative strength of the desired signal with respect to the interferer signal is better than the worst-case condition and the interferer signal reduces in strength,"

Rauhala teaches this element. Ex. 1002 at ¶¶153-157. In one configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶153. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶153-154.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

BER decreasing

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0019]

The bottom row of the table represents a situation in which RSS is less than or equal to S52, or at its lowest, and BER is greater than or equal to E2, or at its highest. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶¶155-156. This is a worst-case operating condition for the receiver. Ex. 1002 at ¶¶155-156. The two highlighted rows above the worst-case operating condition represent conditions in which RSS is less than S52, or low, and BER is less than E2. Ex. 1002 at ¶157. These rows represent conditions for the receiver that are better than the worst-case operating condition. Ex. 1002 at ¶157. A POSITA would have understood that BER decreasing from greater than threshold value E1 (yellow row) to less than E1 (blue row), while RSS remains less than threshold value S52, would be indicative of a strength of the interferer signal decreasing. Ex. 1002 at ¶157.

9.2 "dynamically reducing the bias of one or more of the plurality of circuits in the signal path, thereby reducing power dissipation and saving power."

Rauhala teaches this element. Ex. 1002 at ¶¶158-163. In one configuration, *Rauhala* explains that the supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶158-159.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

BER decreasing

Annotated Excerpt of *Rauhala* at ¶[0019]

In response to a shift from the conditions of the second to last row (yellow) to the conditions of the row immediately above (blue row), each of the supply currents I_{A1}, I_{A2}, I_{M1}, I_{A3}, and I_{M2} is reduced. Ex. 1002 at ¶¶160-161. The supply currents are bias currents, or biases. Ex. 1002 at ¶162. Reducing the supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2, respectively, reduces power dissipated by each of the aforementioned linear units, thereby saving power. Ex. 1002 at ¶163.

10. Claim 10

10.1 "The method of claim 9, wherein reducing power dissipation reduces a power drain from a battery in the battery-powered portable wireless device."

Rauhala teaches this element. Ex. 1002 at ¶¶165-166. *Rauhala* states that the current control configurations are "appli[cable] in the reception circuits of mobile stations," such as mobile phones. Ex. 1004 at ¶¶[0001], [0012]; Ex. 1002 at ¶165. *Rauhala* explains that due to the current control, "the energy consumption of the receiver can be reduced without degrading the signal quality," leading to "longer life for the battery or [...] a smaller battery can be used." Ex. 1004 at ¶ [0007]. A POSITA would have understood that reducing power dissipation by amplifiers and mixers of the receiver, (*see supra* Section IX(A)(9)(9.2)), reduces power drain from a battery powering the receiver. Ex. 1002 at ¶166.

11. Claim 11

11.1 "A method for power dissipation reduction in a receiver of a wireless transceiver of a battery powered portable wireless device,"

Rauhala teaches this element. Ex. 1002 at ¶¶168-169. *Rauhala* describes methods "for linearizing a radio receiver" in which "the energy consumption of the receiver can be reduced without degrading the signal quality." Ex. 1004 at

¶¶[0001], [0007]. *Rauhala* states that such techniques are "appli[cable] in the reception circuits of mobile stations," such as mobile phones, which are wireless transceivers. Ex. 1004 at ¶¶[0001], [0012]; Ex. 1002 at ¶168. As a result, "energy consumption of the receiver can be reduced without degrading the signal quality," leading to "longer life for the battery or [...] a smaller battery can be used." Ex. 1004 at ¶[0007]. A POSITA would have understood that the techniques described in *Rauhala* result in reduced power dissipation by the receiver. Ex. 1002 at ¶169.

11.2 "the receiver having a signal path comprising a plurality of circuits including at least an amplifier, a filter, and a mixer,"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.2); Ex. 1002 at ¶¶170-171.

11.3 "the plurality of circuits designed to function under at least a worst case condition when a strength of a received desired signal is low and a strength of a received interferer signal is high, the method comprising:"

Rauhala teaches this element. Ex. 1002 at ¶¶172-180. *Rauhala* explains that the "receiver monitors the signal strength on the receive channel and neighboring channels" and that supply currents for receiver circuit components are adjusted accordingly while maintaining signal quality. Ex. 1004 at ¶¶[0006]-[0007]; Ex. 1002 at ¶172. *Rauhala* teaches that "when the signal strength is satisfactory on the receive channel and ordinary on the neighboring channels, the supply currents of the receiver's front-end amplifiers and at least the first mixer are kept relatively low." Ex. 1004 at ¶[0006]. *Rauhala* further teaches that when "the signal strength goes below a certain value on the receive channel or exceeds a certain value on a neighboring channel, said supply currents are increased." *Id.*

In one configuration, *Rauhala* explains that "receive signal strength" (RSS) and the "strength of any signal on the reception band" (RSS_n) are monitored by a detector and a control unit, collectively. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶173. "Signal RSS has one threshold value S4 which corresponds to a relatively low receive signal strength," whereas RSS_n has "a threshold value Sn, which corresponds to a relatively high signal strength on the channel." Ex. 1004 at ¶[0017]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶173-174.

RSS_n	RSS	I_A	I_M
<Sn	>S4	I_{A1}	I_{M1}
<Sn	≤S4	I_{Ah}	I_{M1}
≥Sn	>S4	I_{Ah}	I_{M1}
≥Sn	≤S4	I_{Ah}	I_{Mh}

Best-case condition

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0017]

The bottom row of the table represents a situation in which RSS is less than or equal to S4, or at its lowest, and RSS_n is greater than or equal to Sn, or at its highest. Ex. 1002 at ¶¶175-176. This is a worst-case operating condition. Ex. 1002 at ¶176.

In another configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶177. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "Signal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶177-178.

Best-case condition

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0019]

The bottom row of the table represents a situation in which RSS is less than or equal to S52, or at its lowest, and BER is greater than or equal to E2, or at its highest. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶¶179-180. This is a worst-case operating condition for the receiver. Ex. 1002 at ¶180.

11.4 "receiving a wireless signal having a desired signal and an interferer signal by the receiver;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.6); Ex. 1002 at ¶¶181-183.

11.5 "determining a strength of the desired signal;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.7); Ex. 1002 at ¶¶184-187.

11.6 "determining a strength of the interferer signal;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.8); Ex. 1002 at ¶¶188-189.

11.7 "comparing the strength of the desired signal relative to the strength of the interferer signal;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.9); Ex. 1002 at ¶¶190-193.

11.8 "based on the comparing, determining a functioning condition of the plurality of circuits; and"

Rauhala teaches this element. Ex. 1002 at ¶¶194-197. In one configuration, *Rauhala* explains that supply currents are controlled based on the "receive signal strength indication" (RSS) and the "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶194. According to *Rauhala*, "[s]ignal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2 (shown in FIG. 5) of the receiver are controlled based on the RSS values and the BER values according to the table reproduced below. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶194-195.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Each row of the table represents a functioning condition of the receiver circuits, determined by comparing the detected RSS and BER values to the respective threshold values. Ex. 1002 at ¶196. Supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2 of the receiver are controlled based on the row, or functioning condition, indicated. Ex. 1002 at ¶196.

As explained *supra* Section IX(A)(7)(7.9), *Rauhala* states that "the quality of the detected signal can be determined by calculating its signal-to-noise ratio (SNR)." Ex. 1004 at ¶[0014]; Ex. 1002 at ¶197. Figure 5 of *Rauhala* also depicts signal-to-noise ratio (SNR) as a substitute for the bit error ratio BER. Ex. 1004 at ¶[0017], FIG. 5; Ex. 1002 at ¶197. A POSITA would have understood from *Rauhala* that signal-to-noise ratio (SNR) could be substituted for bit error ratio (BER) in the table following paragraph [0019] as a basis for determining the functioning condition of the receiver circuits and adjusting the supply current values of the circuits. Ex. 1002 at ¶197.

11.9 "when the plurality of circuits are determined to function at a better than the worst case condition in which the strength of the interferer signal is low and the strength of the desired signal is low, causing a bias current of one or more of the plurality of circuits in the receiver signal path of the wireless transceiver to be dynamically decreased relative to the worst-case condition, thereby saving power."

Rauhala teaches this element. Ex. 1002 at ¶¶198-206. In one configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶198. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶198-199.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

BER decreasing

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0019]

The bottom row of the table represents a situation in which RSS is less than or equal to S52, or at its lowest, and BER is greater than or equal to E2, or at its highest. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶¶200-201. This is a worst-case operating condition for the receiver. Ex. 1002 at ¶¶200-201. The two highlighted rows above the worst-case operating condition represent conditions in which RSS is less than S52, or low, and BER is less than E2. Ex. 1002 at ¶202. These rows represent conditions for the receiver that are better than the worst-case operating condition. Ex. 1002 at ¶202. A POSITA would have understood that when BER is less than E2 while RSS is less than S52, the interferer signal is low. Ex. 1002 at ¶202. A POSITA would also have understood that BER decreasing from greater than threshold value E1 (yellow row) to less than E1 (blue row), while RSS remains less than threshold value S52, would be indicative of a strength of the interferer signal decreasing. Ex. 1002 at ¶202.

In response to a shift from the conditions of the second to last row (yellow) to the conditions of the row immediately above (blue row), each of the supply currents I_{A1}, I_{A2}, I_{M1}, I_{A3}, and I_{M2} is reduced relative to the worst-case operating condition (red row). Ex. 1002 at ¶¶203-205. The supply currents are bias currents, or biases. Ex. 1002 at ¶205. Reducing the supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2, respectively, would reduce power dissipation by each of the aforementioned linear units, thereby saving power. Ex. 1002 at ¶206.

13. Claim 13

13.1 "A method for power dissipation reduction in a receiver of a wireless transceiver of a battery powered portable wireless device,"

Rauhala teaches this element. *See supra* Section IX(A)(11)(11.1); Ex. 1002 at ¶208.

13.2 "the receiver having a signal path comprising a plurality of circuits including at least an amplifier, a filter, and a mixer,"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.2); Ex. 1002 at ¶¶209-210.

13.3 "the plurality of circuits designed to function under at least a worst case condition when a strength of a received desired signal is low and a strength of a received interferer signal is high, the method comprising:"

Rauhala teaches this element. *See supra* Section IX(A)(11)(11.3); Ex. 1002 at ¶¶211-219.

13.4 "receiving a wireless signal having a desired signal and an interferer signal by the receiver;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.6); Ex. 1002 at ¶¶220-222.

13.5 "determining the strength of the desired signal;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.7); Ex. 1002 at ¶¶223-226.

13.6 "determining the strength of the interferer signal"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.8); Ex. 1002 at ¶¶227-228.

13.7 "comparing the strength of the desired signal relative to the strength of the interferer signal; and"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.9); Ex. 1002 at ¶¶229-232.

13.8 "when the interferer signal is high and the desired signal is low, causing a bias current of one or more of the plurality of circuits in the receiver signal path of the wireless transceiver to be dynamically increased, controlling the power dissipation of the receiver."

Rauhala teaches this element. Ex. 1002 at ¶¶233-239. In one configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶233. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶233-234.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Increased currents

Annotated Excerpt of *Rauhala* at ¶[0019]

The bottom row of the table (highlighted blue) represents a situation in which RSS is less than or equal to S52, or at its lowest, and BER is greater than or equal to E2, or at its highest. Ex. 1004 at ¶[0020]; Ex. 1002 at ¶235. The row immediately above (highlighted yellow) represents a condition in which RSS is less than S52, or low, and BER is less than E2. Ex. 1002 at ¶235. A POSITA would have understood that when BER is greater than E2, as shown in the row highlighted blue, the interferer signal is high. Ex. 1002 at ¶235.

In response to a shift from the conditions of the second to last row (yellow) to the conditions of the last row (blue row), each of the supply currents I_{A1}, I_{A2}, I_{M1}, I_{A3}, and I_{M2} is increased. Ex. 1002 at ¶236. The supply currents are bias currents, or biases. Ex. 1002 at ¶238. Increasing the supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2, respectively, controls power dissipation by each of the aforementioned linear units and the receiver as a whole by increasing the overall power dissipation. Ex. 1002 at ¶239.

19. Claim 19

19.1 "A method of power dissipation optimization in a receiver of a wireless transceiver of a wireless communication device based on its operating signal conditions,"

Rauhala teaches this element. Ex. 1002 at ¶¶241-242. *Rauhala* describes methods "for linearizing a radio receiver" in which "the energy consumption of the receiver can be reduced without degrading the signal quality." Ex. 1004 at ¶¶[0001], [0007]. *Rauhala* states that such techniques are "appli[cable] in the reception circuits of mobile stations," such as a mobile phone, which is a wireless communication device including a wireless transceiver. Ex. 1004 at ¶¶[0001], [0012]; Ex. 1002 at ¶241. *Rauhala* explains that the "receiver monitors the signal strength on the receive channel and neighboring channels" and that supply currents for receiver circuit components are adjusted accordingly while maintaining signal quality. Ex. 1004 at ¶¶[0006]-[0007]; Ex. 1002 at ¶241. As a result, "the energy consumption of the receiver can be reduced without degrading the signal quality," leading to "longer life for the battery or [...] a smaller battery can be used." Ex. 1004 at ¶[0007]. A POSITA would have understood that *Rauhala* is directed to optimization of power dissipation in such receivers. Ex. 1002 at ¶242.

19.2 "wherein the transceiver has a signal path comprising a plurality of circuits designed to function under operating signal conditions that vary based on relative signal strengths of an interferer signal and a desired signal in a received wireless signal,"

Rauhala teaches this element. Ex. 1002 at ¶¶243-245. *Rauhala* describes several examples of transceiver signal paths, each including a plurality of circuits. *See* Ex. 1004 at FIGS. 1-5. Figure 2 of *Rauhala*, reproduced below with annotations, depicts a receiver of a transceiver having a signal path structure including, for example, an amplifier A1, a mixer M1, and a filter F3. Ex. 1004 at ¶¶[0012]-[0013].

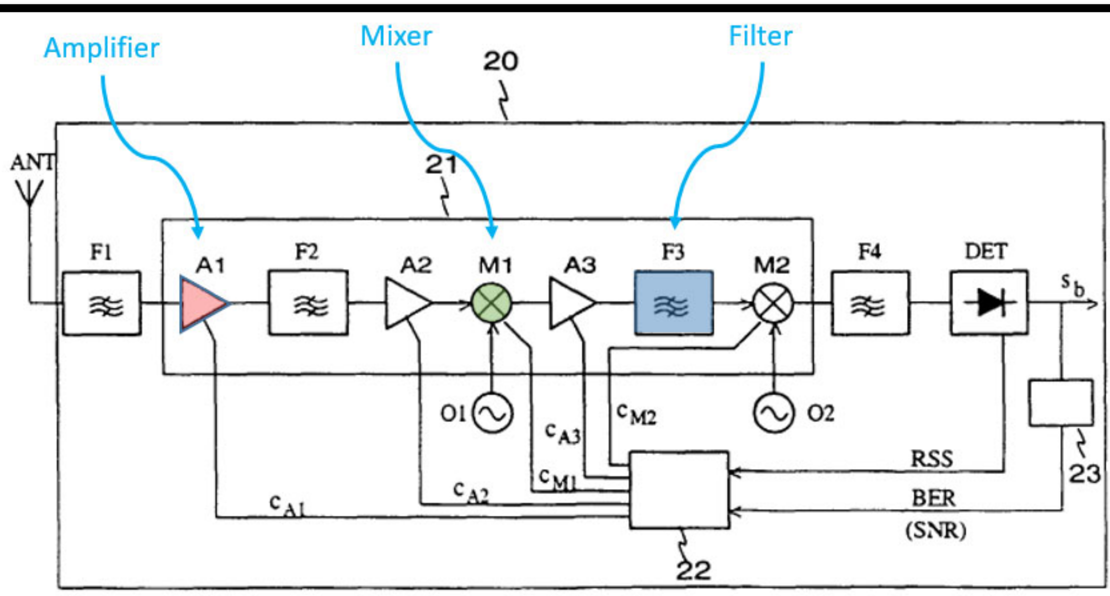


Fig. 2

Annotated Excerpt of *Rauhala* Figure 2

Rauhala explains that the "receiver monitors the signal strength on the receive channel and neighboring channels" and that supply currents for receiver circuit components are adjusted accordingly while maintaining signal quality. Ex. 1004 at ¶¶[0006]-[0007]; Ex. 1002 at ¶245.

19.3 "wherein operating conditions vary between a worst-case operating signal condition, wherein the receiver operates with a maximum power dissipation when a desired signal strength is low and an interferer signal strength is high and"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.4); Ex. 1002 at ¶¶246-256. In one configuration, *Rauhala* explains that supply currents for the amplifiers and mixers of a receiver are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶247-248.

RSS_n	RSS	I_A	I_M
<Sn	>S4	I_{A1}	I_{M1}
<Sn	≤S4	I_{Ah}	I_{M1}
≥Sn	>S4	I_{Ah}	I_{M1}
≥Sn	≤S4	I_{Ah}	I_{Mh}

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0017]

I_{Ah} and I_{Mh} represent a "higher supply current" values, whereas I_{A1} and I_{Ml} represent "lower supply current" value. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶249-250. As shown in the table above, the higher supply current values are used during the worst-case operating signal condition. Ex. 1002 at ¶¶249-250.

In another configuration, *Rauhala* explains that supply currents for amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶251-252

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Worst-case condition

Annotated Excerpt of *Rauhala* at ¶[0019]

Rauhala states that "supply current values are denoted by" simple integers, where "1 means the lowest supply current values, number two the second lowest values, number 3 the third lowest values and number 4 the highest supply current values." Ex. 1004 at ¶[0019]. As shown in the table immediately above, the supply current values are highest during the worst-case operating signal condition. Ex. 1002 at ¶¶253-255.

Maximizing the supply current values, as in the foregoing configurations of *Rauhala* during the worst-case operating signal condition, results in maximum power dissipation. Ex. 1002 at ¶¶256.

19.4 "a best-case operating signal condition, wherein the receiver operates with minimum power dissipation when the desired signal strength is high and the interferer signal strength is low, the method comprising:"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.5); *supra* Section IX(A)(19)(19.3); Ex. 1002 at ¶¶257-264. In one configuration, *Rauhala* explains that supply currents for the amplifiers and mixers of a receiver are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0017]; Ex. 1002 at ¶¶258-259.

Best-case condition

RSS_n	RSS	I_A	I_M
<Sn	>S4	I_{A1}	I_{M1}
<Sn	≤S4	I_{Ah}	I_{M1}
≥Sn	>S4	I_{Ah}	I_{M1}
≥Sn	≤S4	I_{Ah}	I_{Mh}

Annotated Excerpt of *Rauhala* at ¶[0017]

As shown in the table above, the lower supply current values are used during the best-case operating signal condition. Ex. 1002 at ¶260.

In another configuration, *Rauhala* explains that supply currents for amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶261-262.

Best-case condition

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Annotated Excerpt of *Rauhala* at ¶[0019]

As shown in the table immediately above, the supply current values are lowest during the best-case operating signal condition. Ex. 1002 at ¶263.

Minimizing the supply current values, as in the foregoing configurations of *Rauhala* during the best-case operating signal condition, results in minimum power dissipation. Ex. 1002 at ¶264.

19.5 "receiving the wireless signal having the desired signal and the interferer signal by the receiver;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.6); Ex. 1002 at ¶¶265-267.

19.6 "determining the desired signal strength;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.7); Ex. 1002 at ¶¶268-271.

19.7 "determining the interferer signal strength;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.8); Ex. 1002 at ¶¶272-273.

19.8 "comparing the desired signal strength to the interferer signal strength to determine an operating signal condition of the receiver;"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.9); Ex. 1002 at ¶¶274-280. In one configuration, *Rauhala* explains that supply currents are controlled based on the "receive signal strength indication" (RSS) and the "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶275. According to *Rauhala*, "[s]ignal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2 (shown in FIG. 5) of the receiver are controlled based on the RSS values and the BER values according to the table reproduced below. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶278.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

Each row of the table represents an operating condition of the receiver circuits, determined by comparing the detected RSS and BER values to the respective threshold values. Ex. 1002 at ¶280. Supply currents for amplifiers A1, A2, and A3 and mixers M1 and M2 of the receiver are controlled based on the row, or operating condition, indicated. Ex. 1002 at ¶280.

As explained *supra* Section IX(A)(7)(7.9), *Rauhala* states that "the quality of the detected signal can be determined by calculating its signal-to-noise ratio (SNR)." Ex. 1004 at ¶[0014]; Ex. 1002 at ¶¶275-277. Figure 5 of *Rauhala* also depicts signal-to-noise ratio (SNR) as a substitute for the bit error ratio BER. Ex. 1004 at ¶[0017], FIG. 5; Ex. 1002 at ¶275. A POSITA would have understood from *Rauhala* that signal-to-noise ratio (SNR) could be substituted for bit error ratio (BER) in the table following paragraph [0019] as a basis for determining the functioning condition of the receiver circuits and adjusting the supply current values of the circuits. Ex. 1002 at ¶¶275-277.

19.9 "[...]when the receiver operating signal condition is better than the worst case operating signal condition,"

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.10); Ex. 1002 at ¶¶281-285.

19.10 "based on the comparing, [...] dynamically adjusting one or more of an impedance, a bias, or a gain of one or more of the plurality of circuits in the receiver signal path, thereby optimizing power consumption to save power."

Rauhala teaches this element. *See supra* Section IX(A)(7)(7.11); Ex. 1002 at ¶¶286-296. Adjusting the current values for the respective receiver circuits from 4, 4, and 2 to 3, 2, and 1, respectively, would reduce and thereby optimize power consumption by the receiver. Ex. 1002 at ¶296.

20. Claim 20

20.1 "The method of claim 19, wherein power saving occurs when the desired signal strength is low and the operating signal condition is better than the worst-case operating signal condition, by dynamically reducing the bias current of one or more of the plurality of circuits in the signal path of the receiver, thereby reducing power dissipation."

Rauhala teaches this element. *See supra* Section IX(A)(11)(11.9); Ex. 1002 at ¶¶298-306.

21. Claim 21

21.1 "The method of claim 20, wherein [...] when the operating signal condition improves when the strength of the interferer signal decreases over time,"

Rauhala teaches this element. Ex. 1002 at ¶¶308-310. In one configuration, *Rauhala* explains that the control unit receives a "receive signal strength indication" (RSS) and a "receive channel bit error ratio indication" (BER). Ex. 1004 at ¶[0019]; Ex. 1002 at ¶308. According to *Rauhala*, BER "describes the quality of the received [] signal." Ex. 1004 at ¶[0013]. "Signal RSS has two threshold values S51 and S52" and "[s]ignal BER has two threshold values E1 and E2." Ex. 1004 at ¶[0019]. The supply currents for the amplifiers and mixers are controlled according to the table reproduced below with annotations. Ex. 1004 at ¶[0019]; Ex. 1002 at ¶¶308-309.

RSS	BER	I_{A1}	I_{A2} and I_{M1}	I_{A3} and I_{M2}
>S51	<E1	1	1	1
>S51	>E1, <E2	3	2	1
>S51	>E2	4	4	2
<S51,>S52	<E1	2	1	1
<S51,>S52	>E1, <E2	3	2	1
<S51,>S52	>E2	4	4	2
<S52	<E1	2	2	1
<S52	>E1, <E2	3	3	2
<S52	>E2	4	4	2

BER decreasing

Annotated Excerpt of *Rauhala* at ¶[0019]

The two highlighted rows of the table represent operating signal conditions in which RSS is less than S52. Ex. 1002 at ¶310. A POSITA would have understood that BER decreasing from greater than threshold value E1 (yellow row) to less than E1 (blue row), while RSS remains less than threshold value S52, would be indicative of a strength of the interferer signal decreasing. Ex. 1002 at ¶310. A POSITA would have also understood that a shift from the yellow row to the blue row represents an improvement in operating signal condition. Ex. 1002 at ¶310.

21.2 "power saving occurs [...] and the bias current is reduced by dynamically adjusting the bias current of one or more of the plurality of circuits in the signal path of the receiver."

Rauhala teaches this element. *See supra* Section IX(A)(9)(9.2); Ex. 1002 at ¶¶311-316.

B. Ground 2: Claims 7-11, 13, and 19-21 are unpatentable over *Rauhala* and *Saito*.

As discussed herein previously, *Rauhala* teaches each element of, and therefore anticipates, claims 7-11, 13, and 19-21. *See supra* Sections IX(A)(7), IX(A)(8), IX(A)(9), IX(A)(10), IX(A)(11), and IX(A)(13); Ex. 1002 at ¶¶82-84, 137, 152, 164, 167, 207, 240, 297, 307, 318. If it is argued that the terms **dynamically adjusting**, **dynamically reducing**, **dynamically decreased**, and/or **dynamically increased** require adjustment without reliance upon a signal strength threshold, which Petitioners do not concede, it would have been obvious to a POSITA to modify *Rauhala* with the teachings of *Saito*. Ex. 1002 at ¶¶317-330.

Saito discloses automatic gain control circuitry for use in receivers of mobile devices. Ex. 1005 at 1:34-40; Ex. 1002 at ¶319. *Saito* states that the automatic gain control circuitry is aimed at "reducing reception disturbance resulting from intermodulation distortion for input levels of a broad range from the reception of a small input signal to the reception of a large input signal in receivers." Ex. 1005 at 1:34-40. *Saito* explains that the automatic gain control circuitry includes "reception field level detection means" which "outputs a gain control signal in accordance with the reception field level." *Id.* at 1:41-47. The "reception field level" referred to by *Saito* is analogous to signal strength. Ex. 1002 at ¶319. *Saito* further explains that the gain of radio frequency gain control units is controlled by "an automatic gain control unit comprising one or a plurality of continuous feedback systems." Ex. 1005 at 1:47-53; Ex. 1002 at ¶319.

In an embodiment, *Saito* teaches that "variable attenuators 20, 21, can continuously vary the damping quantity by the gain control signal outputted from the reception field level detection means 22, which constitute the continuous feedback system." Ex. 1005 at 6:17-27; Ex. 1002 at ¶320. *Saito* explains that "the continuous feedback system [...] operate[s] to keep the input level of the received signal processing circuit always constant." Ex. 1005 at 6:20-27; Ex. 1002 at ¶320.

Saito contends that such gain control "eliminat[es] the intermodulation distortion in a wide range of reception field levels ranging from the input of the very fine signal to the input of the large signal." Ex. 1005 at 7:51-62; Ex. 1002 at ¶320. In other words, the use of continuous feedback in Saito allowed for the desired control outcome— "eliminat[ing] the intermodulation distortion" and "keep[ing] the input level of the received signal processing circuit always constant"—over a broad range of conditions— "in a wide range of reception field levels ranging from the input of the very fine signal to the input of the large signal." Ex. 1005 at 8:51-62; Ex. 1002 at ¶320.

It was well known in the art that "continuous feedback" controllers, such as the one disclosed in *Saito*, operate using "proportional control." Ex. 1002 at ¶¶321-328; Ex. 1011 at 1-3, 12 (discussing that proportional-integral-derivative (PID), proportional-integral (PI), and proportional controllers are forms of a "continuous feedback controller"); Ex. 1012 at 6-7, 25, 27, 29, 31 (using proportional control, e.g., PID controller, to optimize mobile terminal transmission power and signal-to-interference error); Ex. 1013 at 1:26-29 (stating "the system effects proportional control, i.e., there is continuous feedback to the device so that the course correction is proportional to the deviation or error").

Proportional control is "[a] control system in which corrective action is always proportionate to any variation of the controlled process from its desired value. For example, instead of snapping directly open-closed in the manner of two-position control, a proportional valve will be always positioned at some point between open and closed, depending on the flow requirement of the system at any given moment." Ex. 1006 at 8; Ex. 1002 at ¶327. Proportional controllers, like the continuous feedback controller of Saito, do not rely on thresholds because their "corrective action is always proportionate to any variation of the controlled process from its desired value." Ex. 1006 at 8; Ex. 1002 at ¶327.

Rauhala, and *Saito* are analogous art as they all relate to wireless receivers. Ex. 1002 at ¶329.

A POSITA would have been motivated to modify the threshold-based current controls of *Rauhala* to continuously adjust the supply currents using a continuous feedback system, as described by *Saito*, because doing so would have allowed for the desired outcome (tailored supply current level) to be achieved over a broad signal strength range as in Saito. Ex. 1002 at ¶330.

In view of *Saito*, it would have been obvious to a POSITA to modify *Rauhala* with the teachings of *Saito* to apply a continuous feedback mechanism for continuous adjustment of the supply currents. Ex. 1002 at ¶330. *Rauhala* and *Saito* are analogous art and the motivations to combine the references are set forth above.

The modification of *Rauhala* with *Saito* would have amounted to the use of a known technique (*Saito's* continuous feedback control) to improve a similar device (*Rauhala's* threshold-based control). Ex. 1002 at ¶330. Such a modification would have amounted to nothing more than the use of a known technique to improve a similar device, and the results of the modification would have been predictable. *See KSR Int'l. Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007). At the time of the invention, a POSITA would have had the requisite skill level to readily modify the device disclosed by *Rauhala* to implement the teachings of *Saito* without any problem. Ex. 1002 at ¶330. Moreover, such modifications of *Rauhala* would have been routine for the POSITA as they unite old elements with no change in their respective functions. *See KSR*, 550 U.S. at 417; Ex. 1002 at ¶330.

X. ARGUMENTS FOR DISCRETIONARY DENIAL SHOULD BE REJECTED

A. Section 325(d) Is Inapplicable Because the Asserted Art Was Never Evaluated During Examination.

The Board should not deny institution under §325(d) because the art asserted here was not before the Examiner and is not cumulative of art that was. As set forth below, the Examiner either (1) was not presented with the same or substantially the same art or arguments as Petitioner's, or (2) materially erred in allowing the challenged claims. *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8 (P.T.A.B. Feb. 13, 2020) (citing *Becton,* *Dickinson, & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (P.T.A.B. Dec. 15, 2017)).

Becton, Dickinson **Factors (a), (b), and (d).** Neither "the same [nor] substantially the same" art or arguments were previously presented to the Office during prosecution of the challenged claims. *Rauhala* and *Saito* were never cited during prosecution of the '202 patent, let alone considered by the Examiner or made the subject of a rejection. *See generally* Ex. 1003. These references are also not substantially the same or cumulative of references considered during examination. During Examination, the pending claims were rejected under sections 102 and 103 over combinations of U.S. Patent No. 5,001,776 ("Clark"), U.S. Patent No. 6,870,425 ("Leifso"), U.S. Patent No. 6,311,048 ("Loke"), and U.S. Patent No. 5,406,635 ("Jarvinen"). Ex. 1003 at 220-23, 157-170. In consecutive replies, Patent Owner argued that the cited references failed to disclose "performing a comparison of a desired signal strength and interferer signal strength or adjusting [a parameter] based on such a comparison." Ex. 1003 at 199; *see also* Ex. 1003 at 127-129. As explained above, *Rauhala*, which is the primary reference in each of grounds I and II, discloses such a comparison. *See, e.g., supra* Section IX(A)(7)(7.9).

Becton, Dickinson **Factors (c), (e), and (f).** As explained above, the answer to the first inquiry of *Advanced Bionics*—whether the same or substantially the same art or arguments were previously presented to the Office—is a definitive "no." Accordingly, analysis of Examiner error is unnecessary. Nevertheless, to the extent the Board disagrees and determines *Becton, Dickinson* factors (a), (b), and (d) do not favor institution, discretionary denial still is not warranted because the Examiner must have necessarily overlooked anticipatory disclosures of the art that was examined, constituting material error. *Advanced Bionics*, IPR2019-01469, Paper 6, 10 (listing silence as evidence of error). As stated above in detail, *Rauhala* alone teaches every element of the challenged claims. To the extent any reference that was Examined could be considered cumulative of *Rauhala*, the Examiner should have rejected the challenged claims under section 102, or at least under section 103, and maintained the rejection(s).

B. Institution is Proper Under Section 314(a) and *Fintiv*.

The merits of this Petition are strong, which alone warrants institution. On June 21, 2022, Director Vidal issued an interim procedure regarding application of the *Fintiv* factors clarifying that "the PTAB will not deny institution [] under *Fintiv* (i) when a petition presents compelling evidence of unpatentability." Director Vidal, Memorandum, "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation," 9 (June 21, 2022). Here, each ground in the Petition presents compelling evidence of unpatentability. For example, Ground I is an anticipation ground explaining how *Rauhala* discloses each and every limitation of the challenged claims. This evidence, "if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable," (*id.* at 4) and the Board must decline to exercise its discretion under §314(a). *Id.; PopSockets LLC v. Flygrip, Inc.,* IPR2022-00938, Paper 8 (P.T.A.B. Nov. 1, 2022).

The *Fintiv* factors also weigh in favor of institution. First, the District Court has not yet scheduled a trial date. Ex. 1014. Second, the District Court will not hold a claim construction hearing until January 19, 2024, so the district court has not yet invested significant resources in this dispute. *See, e.g., Hulu LLC v. SITO Mobile R&D IP, LLC,* IPR2021-00298, Paper 11 at 13 (P.T.A.B. May 19, 2021). Third, "there is a reasonable likelihood that the Board will address the overlapping validity issues prior to the district court reaching them at trial [...] thereby providing the possibility of simplifying issues for trial." *Juniper Networks, Inc. v. Packet Intelligence LLC,* IPR2020-00339, Paper 21 at 18 (P.T.A.B. Sept. 10, 2020).

XI. CONCLUSION

For the reasons above, Petitioners request institution of IPR of the challenged claims based on all grounds.

Respectfully submitted,

Dated: Mar. 7, 2023

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 10,524,202 contains, as measured by the word-processing system used to prepare this paper, 13,964 words. This word count does not include the items excluded by 37 C.F.R. § 42.24 as not counting towards the word limit.

Dated: Mar. 7, 2023

Respectfully submitted,

By: ______________________

Dinesh N. Melwani (Reg. No. 60,670)
Counsel for Petitioners

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105(a), I hereby certify that on March 7, 2023, I caused a true and correct copy of the foregoing "PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,524,202 B2" and supporting exhibits to be served via Federal Express on the Patent Owner at the following correspondence address of record as listed in Patent Center:

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