

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

THETA IP, LLC,
Patent Owner.

IPR2023-00698
Patent 10,524,202 B2

Before JEFFREY S. SMITH, THOMAS L. GIANNETTI, and
BARBARA A. BENOIT, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Lenovo (United States) Inc. and Motorola Mobility LLC (collectively, “Petitioner”) filed a Petition requesting institution of *inter partes* review of claims 7–11, 13, and 19–21 (“the challenged claims”) of U.S. Patent No. 10,524,202 B2 (Ex. 1001, “the ’202 patent”). Paper 1 (“Pet.”), 1. Theta IP, LLC (“Patent Owner”) filed a Preliminary Response (Paper 9, “Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” For the reasons stated below, we determine that Petitioner has established a reasonable likelihood that it would prevail with respect to at least one claim. We, therefore, institute *inter partes* review as to all of the challenged claims of the ’202 patent and all of the asserted grounds of unpatentability.

A. Real Parties in Interest

Petitioner identifies Lenovo (United States) Inc., Motorola Mobility LLC, and Lenovo Group Ltd as real parties in interest. Pet. 1. Patent Owner identifies itself as a real party in interest. Paper 4, 2 (Patent Owner’s Mandatory Notices).

B. Related Matters

The parties indicate the ’202 patent is involved in *Theta IP, LLC v. Motorola Mobility LLC*, No. 1:22-cv-03441 (N.D. Ill.) (“Illinois Litigation”). Pet. 1; Paper 4, 2. Patent Owner also identifies a concluded case that involved in the ’202 patent: *Theta IP, LLC v. Samsung Electronics Co.*, No. WA:20-cv-00160 (W.D. Tex.). Paper 4, 2. Patent Owner

additionally identifies a concluded case that involved a patent related to the '202 patent: *Theta IP, LLC v. Samsung Electronics Co.*, No. 2:16-cv-527-JRG-RSP (E.D. Tex.). *Id.*

The parties also each identify two concurrently filed petitions challenging patents related to the '202 patent in IPR2023–00694 (challenging U.S. Patent No. 7,010,330 B1) and IPR2023–00697 (challenging U.S. Patent No. 10,129,825 B2). Pet. 1–2; Paper 4, 2.

C. The '202 Patent (Ex. 1001)

The '202 patent is titled “Power Dissipation Reduction in Wireless Transceivers.” Ex. 1001, (54). The patent relates to “us[ing] bias current reduction, impedance scaling, and gain changes either separately or in combination to reduce power dissipation.” *Id.* at (57).

The patent describes drain on battery life resulting from power consumed by wireless transmitters and receivers on various computers, including mobile devices, such as laptops and handheld computers. *Id.* at 1:24–35. According to the patent, a reason for high power drain “is that electronic circuits are typically designed to function properly under worst-case operating conditions . . . when a desired signal reception strength is low, while other transceivers or nearby electronic equipment generate interfering signals, and other spurious noise.” *Id.* at 1:36–42.

The patent explains that “[w]hen a receiver is actively received a desired signal, each block in the signal path has at its input the desired signal as well as noise and possibly interfering signals.” *Id.* at 5:22–24. “The desired signal is the useful, information-carrying portion of a received signal.” *Id.* at 5:24–26. The patent also refers to an interfering signal or signals as “interferers.” *Id.* at 5:30–31.

Exemplary signals are depicted in Figures 2A and 2B, reproduced below.

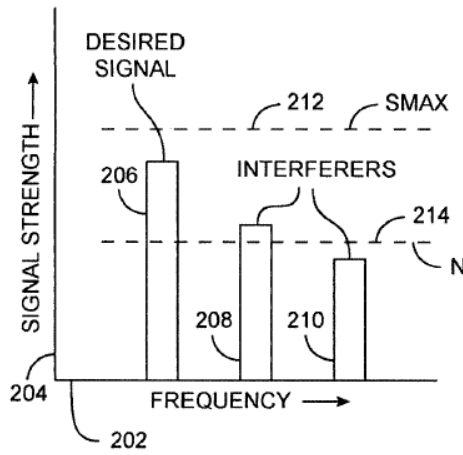


FIG. 2A

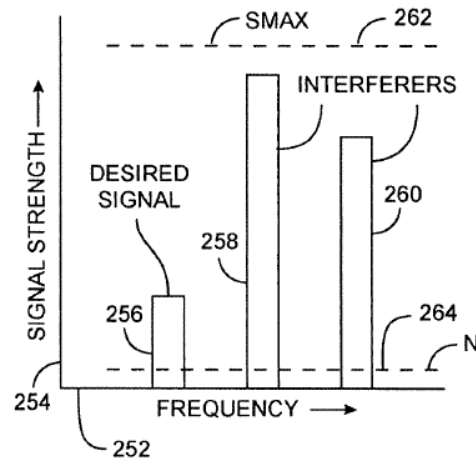


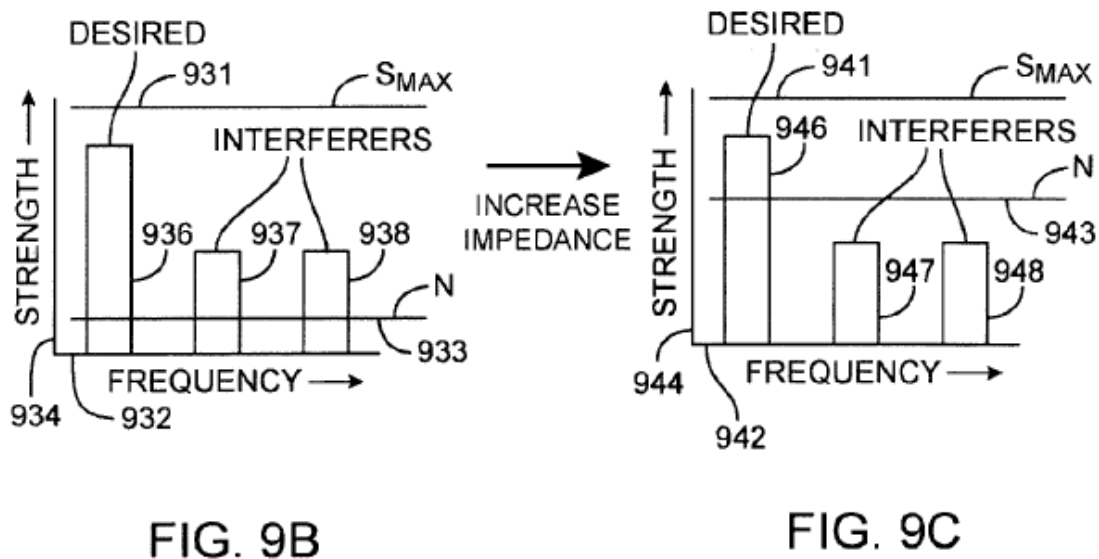
FIG. 2B

Figures 2A and 2B illustrate “desired and interfering signals and noise that may be received by a circuit in a wireless receiver.” *Id.* at 3:19–21.

As shown in Figure 2A, “received desired signal 206 is large in comparison to interfering signals 208 and 210,” which represents “the bestcase input signal.” *Id.* at 5:38–39, 6:16–18. As the patent explains, the best-case input signal is “a robust desired signal accompanied by no or low-level interferers.” *Id.* at 6:17–18. In such a case, according to the patent, the receiver circuit can save significant power by allowing noise floor 214 to rise and reducing the maximum signal power that can be handled with an acceptably low distortion (Smax 212). *Id.* at 5:46–51, 6:18–21. For example, bias currents may be lowered to reduce the maximum signal handling capability. As shown in Figure 2B, received “desired signal 256 is relatively weak compared to the large interferers 258 and 260,” which “is generally considered the worst-case input signal.” *Id.* at 5:56–58, 6:8–9.

Referring to Figure 2, reproduced *supra*, the patent discloses that “[c]ircuit impedances and currents are set such that the noise floor 264 is sufficiently low for an acceptable bit-error rate, while bias currents are set sufficiently high for the required S_{max} 262.” *Id.* at 6:12–15. According to the patent, when a signal is accompanied by no or low-level interferers, the noise floor may be allowed to rise in order to save power. *Id.* at 6:18–20. The noise floor may be increased by increasing the circuit’s impedances. *Id.* at 10:20–21.

Figures 9B and 9C of the ’202 patent follow:



Figures 9B and 9C illustrate one possible power saving technique. *Id.* at 3:38–41. In the example shown in Figures 9B and 9C, the patent explains that a large signal may be detected by detecting a large signal level at the input line” and “a large signal level after a filter.” *Id.* at 9:50–54. Figure 9B shows a “spectrum for what may be considered a best-case received signal” when the “desired signal 936 is strong, while the interfering signals 937 and 938 are relatively weak.” *Id.* at 9:47–50. Figure 9C depicts increasing the

impedance, resulting in a rise in noise floor 943 and reducing the drive current. *Id.* at 9:58–62.

Other examples of methods of reducing power dissipation disclosed in the patent are illustrated in Figure 5 (increasing bias currents) and Figure 7 (inserting a gain element to improve the circuit's signal-to-noise ratio). *Id.* at 7:29–39, 8:6–16.

D. Illustrative Claim

The Petition challenges claims 7–11, 13, and 19–21 of which claims 7, 11, 13, and 19 are independent. Independent claims 7 and 11 are illustrative:

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

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

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

[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,

[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:

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

[7.7] determining the strength of the desired signal;

[7.8] determining the strength of the interferer signal;

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

[7.10] based on the comparison, when the plurality of circuits are functioning at better than the worst-case condition,

[7.11] *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, 13:58–14:14 (emphases added).¹

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

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

[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:

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

[11.5] determining a strength of the desired signal;

[11.6] determining a strength of the interferer signal;

[11.7] comparing the strength of the desired signal relative to the strength of the interferer signal;

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

[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*

¹ Bracketed paragraph references and paragraphing tracking those used by Petitioner have been added.

dynamically decreased relative to the worst-case condition, thereby saving power.

Ex. 1001, 14:31–54 (emphases added).

E. Prior Art and Other Evidence

Petitioner relies upon the references listed below (Pet. 3–4).

Name	Reference	Publication/Issue Date	Exhibit No.
Rauhala	EP Patent App. Pub. No. 0999649 A2	May 10, 2000	1004
Saito	U.S. Patent No. 5,513,387	Apr. 30, 1996	1005

Petitioner also relies on a Declaration of Dr. Jacob Baker. Ex. 1002 (“Baker Decl.”). Patent Owner submits the Declaration of Dr. Lawrence E. Larson. (Ex. 2005, “Larson Decl.”).

F. The Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 3–4):

Claims Challenged	35 U.S.C. § ²	Reference(s)
7–11, 13, 19–21	102(b)	Rauhala
7–11, 13, 19–21	103(a)	Rauhala, Saito

II. CLAIM CONSTRUCTION

In an *inter partes* review, we construe a patent claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (2020).

² For purposes of this Decision, we assume the claims at issue have an effective filing date prior to March 16, 2013, the effective date of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), and we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

Under this standard, the words of a claim generally are given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

*A. Dynamically Changing/Adjusting*³

Petitioner proposes that the claim terms “dynamically adjusting” should be construed to mean “adjusting during operation based, at least in part, on information gained during operation.” Pet. 18–23. Petitioner also contends that whether the Board construes these terms as proposed by Petitioner “does not impact the ultimate conclusion that the challenged claims are unpatentable.” *Id.* at 23.

Patent Owner “does not believe that these ‘dynamically adjusting’ or ‘dynamically [increasing / reducing / decreased / increased]’ terms need to be construed by the Board.” Prelim. Resp. 27. However, if these terms are construed, Patent Owner agrees that they could be construed as proposed by Petitioner. *Id.*

We construe claim terms only as relevant to the parties’ contentions and only to the extent necessary to resolve the issues in dispute. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Having considered the positions of the parties, we

³ Petitioner also argues that terms dynamically “increasing”/“reducing”/“decreased”/“increased” should also be construed consistently with “dynamically adjusting.” Pet. 23.

find that for the purpose of this decision, we do not need to construe this term to resolve a dispute.

B. Impedance

Independent claims 7 and 19 call for “dynamically adjusting one or more of an impedance, a bias or a gain.” Ex. 1001, 14:11–12,17:35–36. Patent Owner proposes that the claim term “impedance” “is well-known to mean the total opposition of a circuit to an alternating current.” Prelim. Resp. 28. In support of this construction, Patent Owner relies on extrinsic evidence in the form of dictionary definitions, the declarations of Dr. Baker and Dr. Larson, as well as claim construction orders in two district court litigations. *See* Prelim. Resp. 27–29. Patent Owner also argues the ’202 patent uses the term “impedance” “consistently with its ordinary definition of total opposition to the flow of alternating current.” Prelim. Resp. 29–31. Dr. Larson testifies that “[i]mpedance includes both resistance (from resistors) and reactance (from inductors or capacitors) to alternating current.” Larson Decl. ¶ 54. He continues, “[i]mpedance is an alternating current (AC) circuit parameter, measured for signals with a frequency component.” *Id.* ¶ 55.

Petitioner does not specifically address this issue. However, Petitioner contends that except for the terms “dynamically adjusting” and “dynamically [increasing/reducing/decreased/increased],” “no express constructions of the claims are necessary to assess whether the prior art reads on the challenged claims.” Pet. 18.

In light of the analysis of the patentability of the claims that follows, and having considered the positions of the parties, we find that for the

purpose of this decision, we do not need to construe this term to resolve a dispute. *See Vivid Techs.*, 200 F.3d at 803.

III. ANALYSIS

A. Principles of Law

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). When evaluating a single prior art reference in the context of anticipation, the reference must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

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

⁴ Neither party presents evidence or arguments regarding objective evidence of non-obviousness at this stage.

B. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quotation marks omitted).

Petitioner asserts that a person of ordinary skill in the art of the ’202 patent would have had “a bachelor’s degree in electrical engineering, electronic engineering, or the equivalent, and two or more years of experience with wireless communications devices.” Pet. 5 (citing Baker Decl. ¶¶ 28–32). Petitioner also asserts “[s]ignificantly 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 lesser amount of practical experience.” *Id.*

Patent Owner asserts a person of ordinary skill in the art would have had at least:

a Bachelor’s Degree in Electrical or Electronics Engineering, along with approximately five years of relevant experience in the design of transceiver architecture, RF systems and components, and analog and mixed signal circuits, as well as experience in control algorithms for such system and familiarity with wireless standards—with additional education substituting for experience and vice versa.

Prelim. Resp. 25 (citing Larson Decl. ¶ 48).

The two proposals are materially similar in the education requirement, but differ marginally in professional experience required (three versus five years). *See supra*. While we are persuaded, on the present record, that both Petitioner’s and Patent Owner’s proposals are consistent with the problems

and solutions in the '202 patent and the prior art of record, on balance, Petitioner's proposal is a better reflection of the level of skill in the prior art, and we therefore adopt it for this decision. Our decision would not change, however, if we had applied Patent Owner's proposed level of ordinary skill.

C. Overview of the Primary Prior Art

1. Rauhala (Ex. 1004)

Rauhala discloses “a method and an arrangement for linearizing a radio receiver” that can be “applied in the reception circuits of mobile stations.” Ex. 1004 ¶ 1. Rauhala explains that “[t]he quality of a signal in a radio receiver is degraded by noise and interference . . . indirectly caused by other radio signals. The latter refers to a situation in which a signal on a neighboring channel, which momentarily is considerably stronger than the signal to be received.” *Id.* ¶ 2. Rauhala further indicates that “the signal quality can be improved by using more energy in the receiver,” but notes that this “shortens the battery life.” *Id.* ¶ 3.

Rauhala summarizes the “basic idea of the invention” as monitoring the signal strength on the receive channel and neighboring channels and determining the quality of the detected signal. *Id.* ¶ 6. “[W]hen 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.” *Id.* “If the signal strength goes below a certain value on the receive channel or exceeds a certain value on the neighboring channel, said supply currents are increased.” *Id.* Rauhala indicates that an “advantage of the invention is that the energy consumption of the receiver can be reduced without degrading the signal quality,” which “means longer life for the battery.” *Id.* ¶ 7.

Figure 1 of Rauhala, shown below, depicts “a simplified example of a radio receiver without the low-frequency components.” *Id.* ¶ 12.

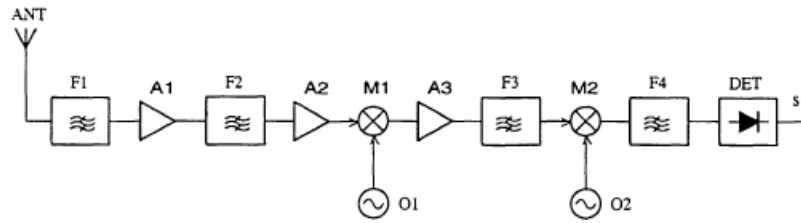


Fig. 1

Figure 1 shows a radio receiver that includes antenna ANT coupled to a series of “linear units” of filters (F1–F4), amplifiers (A1–A3), and mixers (M1, M2), with each mixer connected to an oscillator (O1, O2). *Id.* As shown, the output of filter F4 is coupled to a detector DET, which provides a baseband signal s_b . *Id.*

Figure 4 of Rauhala is depicted below.

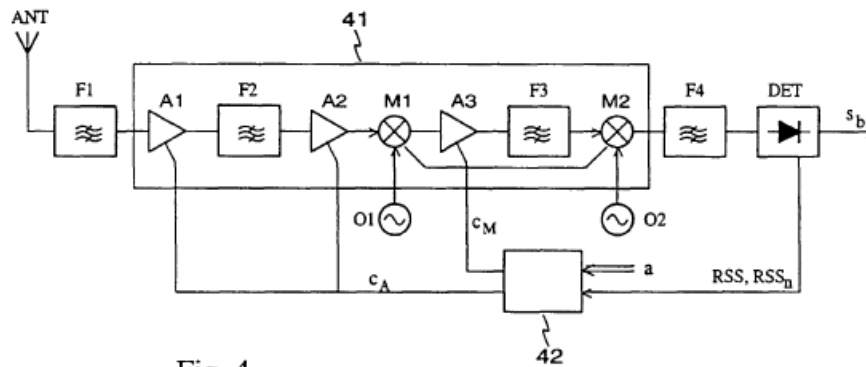


Fig. 4

Figure 4 is similar to Figure 1, and illustrates an example of supply current control for linear units. *Id.* ¶ 17. Figure 4 additionally includes control unit 42 that “receives from detector DET an indication about either the receive channel signal strength RSS or the strength of any signal on the reception band.” *Id.*

As shown, control unit 42 receives two inputs from detector DET—“RSS, RSS_n.” *Id.* at Fig. 4. Rauhala indicates that RSS is the receive channel strength (as noted above) and that RSS_n is the signal strength of the neighboring channel in which the signal strength is greater. *Id.* ¶ 17. Figure 4 also depicts another input to control unit 42—“signal a” that is received “from the receiver’s tuner control [that] indicates the channel.” *Id.* ¶ 17, Fig. 4.

“The control unit 42 provides two one-bit control signals c_A and c_M” to various linear units. *Id.* ¶ 17, Fig. 4. Control signal c_A is provided to amplifiers A1 and A2, whereas control signal c_M is provided to mixer M1, amplifier A3, and mixer M2. *Id.* ¶ 17. The control signals are used control the supply current provided to the respective linear units. *Id.* Each control signal c_A and c_M is set by control unit 42 based on both the signal strength of the receive channel RSS and the signal strength of the neighboring channel RSS_n. *Id.*

More specifically, to set each control signal c_A and c_M, the signal strength of the receive channel RSS is compared to a threshold value S4 “which corresponds to a relatively low receive signal strength” and the signal strength of the neighboring channel RSS_n is compared with threshold value S_n “which corresponds to a relatively high signal strength on the channel.” *Id.* Control signal c_A “is [set to] 0 when signal RSS is greater than S4 and signal RSS_n is at the same time smaller than S_n” and otherwise, control signal c_A is set to 1. *Id.* Control signal c_M “is [set to] 1 when signal RSS is not greater than S4 and signal RSS_n is at the same time at least S_n” and otherwise, control signal c_M is set to 0. *Id.* Rauhala explains that if control signal c_A or control signal c_M is 0, “the supply current in the linear

unit in question is lower, and, conversely, if signal c_A or c_M is 1, the supply current is higher.” *Id.*

In this way supply current to amplifiers A1–A3 and mixers M1, M2 is controlled based on the receive signal strength and neighboring channel signal strength. *Id.*; *see id.* (table showing how control signals c_A and c_M are set based on RSS_n comparison to threshold value S_n and on RSS comparison to threshold value S_4). “When 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.” *Id.* ¶ 18. “When the signal strength on the receive channel drops relatively low, the supply currents of the front-end amplifiers A1 and A2 are increased.” *Id.* “When the signal strength on the receive channel is at least normal, but relatively high on a neighboring channel, the supply currents of amplifiers A1 and A2 are set to the higher values and the supply currents of the other linear units to the lower values.” *Id.* “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.*

Figure 6 of Rauhala is depicted below.

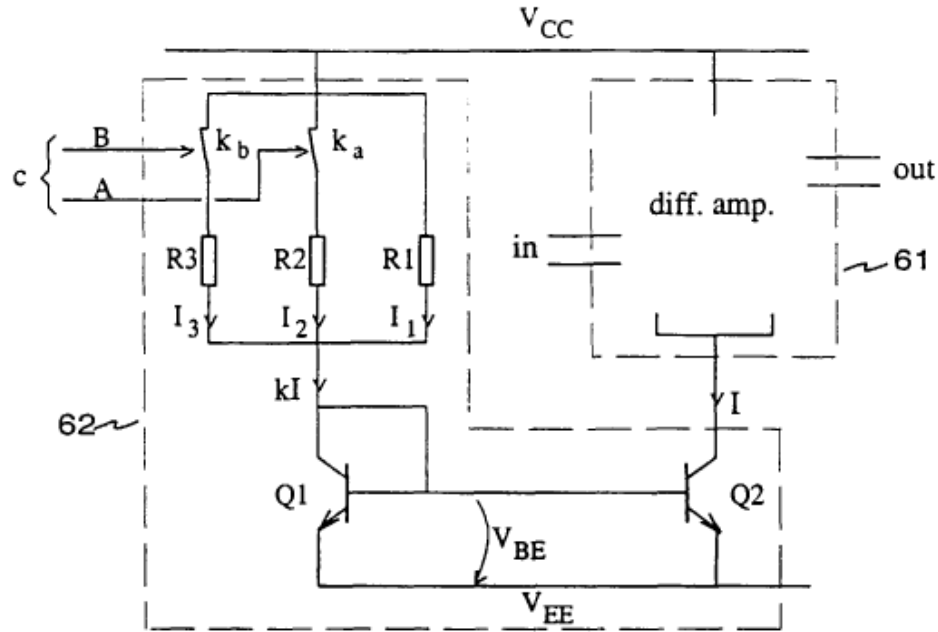


Fig. 6

Figure 6 illustrates an example of a linear unit's supply current control. Ex. 1004 ¶ 21. Figure 6 includes linear unit 61 and control circuit 62. *Id.* The control circuit 62 contains transistors Q1 and Q2, resistors R1 through R3, and switches k_a and k_b . *Id.* Resistors R1 through R3 are connected in parallel, and switches k_a and k_b are connected in series with resistors R2 and R3 respectively. *Id.* As explained in Rauhala, each resistor has a corresponding current, I_1 through I_3 , and “the current kI of transistor Q1 is the sum $I_1 + I_2 + I_3$.” *Id.* Currents I_2 and I_3 (and accordingly current QI) are controlled by opening and closing the switches. Thus, current I_2 is zero if switch k_a is open, and current I_3 is zero if switch k_b is open. *Id.* Switches k_a and k_b , in turn, are controlled with two-bit digital signal c . *Id.*

D. Anticipation of Claims 7–11, 13, and 19–21 by Rauhala

Petitioner asserts that claims 7–11, 13, and 19–21 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Rauhala. Pet. 24–73; Baker

Decl. ¶¶ 84–316. Patent Owner contends Rauhala fails to disclose several limitations found in the independent claims. *See* Prelim. Resp. 33–59; Larson Decl. ¶¶ 64–79.

Upon consideration of Petitioner’s explanations and supporting evidence in this current record, and Patent Owner’s arguments and supporting evidence, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in showing that claims 11 and 13 are anticipated by Rauhala. At this stage, Petitioner has failed to demonstrate a reasonable likelihood of prevailing on its challenge to independent claims 7 and 19, and their dependent claims 8–10, 20 and 21.

i. Claim 7

Petitioner asserts that each limitation of claim 7 is disclosed by Rauhala. Pet. 24–41; Baker Decl. ¶¶ 84–136. For example, for preamble limitation 7.1 (“A method for power dissipation . . .”), Petitioner contends Rauhala describes methods for reducing energy consumption in receivers. Pet. 24–30; Baker Decl. ¶ 85; *see also* Ex. 1004 ¶¶ 1, 7, 12, Figs. 1–5.

For limitation 7.2 (“the receiver having a signal path comprising a plurality of circuits including at least an amplifier . . .”), Petitioner contends that Rauhala “describes several examples of receiver signal paths, each including an amplifier, a mixer, and a filter.” Pet. 24–25; Baker Decl. ¶¶ 86–87; Ex. 1004, Fig. 2 (annotated).

For limitations 7.3–7.5, according to Petitioner, Rauhala describes a wireless receiver monitoring received signal strength (RSS) and comparing the RSS to threshold values. *Id.* at 25–30; Baker Decl. ¶¶ 88–107.

For limitation 7.6 (“receiving the wireless signal having the desired signal and the interferer signal by the receiver”), Petitioner contends that

Rauhala receives signals on a receive channel and on neighboring channels. Pet. 30–31; Baker Decl. ¶¶ 108–110.

For limitation 7.7 (“determining the strength of the desired signal”), Petitioner contends that Rauhala “explains that ‘[d]etector DET provides information about the signal strength (RSS) on the channel to which the receiver is tuned.’” Pet. 31–33 (quoting Ex. 1004 ¶ 13); Baker Decl. ¶¶ 111–114.

For limitation 7.8 (“determining the strength of the interferer signal”), Petitioner contends that Rauhala “states that the ‘receiver monitors the signal strength on the [. . .] neighboring channels.’” Pet. 33–34 (quoting Ex. 1004 ¶ 6 (omissions in original)); Baker Decl. ¶¶ 115–116.

For limitation 7.9 (“comparing the strength of the desired signal relative to the strength of the interferer signal”), Petitioner contends that Rauhala describes calculating a signal-to-noise ratio (SNR). Pet. 34–35; Baker Decl. ¶¶ 117–120. According to Petitioner, a person of ordinary skill in the art “would have understood the 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.” Pet. 35 (citing Baker Decl. ¶ 120; Ex. 1006, 9⁵).

Finally, to meet limitations 7.10 (“based on the comparison . . .”) and 7.11 (“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 . . .”), Petitioner relies on Figure 6 of Rauhala, reproduced in Section III.C.1, *supra*. Pet. 39–41. As explained by Petitioner, in this example from Rauhala,

⁵ Unless otherwise specified, references to pages of exhibits use the page numbers assigned by the parties and not the original page numbers.

“[c]hanging the configuration of either or both of switches k_a and k_b changes the resistance between higher power supply voltage VCC terminal and transistor Q1 and in turn changes current k_I .” Pet. 40. According to Petitioner “[c]hanging the . . . resistances in the circuit of Figure 6 changes the impedance of the circuit.” *Id.* at 40–41.

ii. Claim 11

Petitioner asserts that each limitation of claim 11 is met by Rauhala and provides an element-by-element analysis. Pet. 50–59; Baker Decl. ¶¶ 169–206. Claim 11, unlike claim 7, does not recite adjusting an “impedance . . . in the signal path.” Instead, claim 11 recites “causing a bias current . . . to be dynamically decreased.” Ex. 1001, 14:50–54. Petitioner contends Rauhala discloses this limitation by reducing supply currents for a circuit’s amplifiers and mixers. Pet. 57–59; Baker Decl. ¶¶ 198–206. According to Petitioner, these supply currents are bias currents. Pet. 59 (citing Baker Decl. ¶ 205).

iii. Claim 13

Petitioner’s analysis of claim 13 follows closely its analysis of claim 7. Petitioner asserts that each limitation of claim 13 is met by Rauhala and provides an element-by-element analysis. Pet. 59–63; Baker Decl. ¶¶ 208–239. Claim 13, like claim 11, does not recite adjusting an “impedance . . . in the signal path.” Like claim 11, claim 13 recites “causing a bias current of one or more of the plurality of circuits in the receiver signal path . . . to be dynamically increased.” Ex. 1001, 15:22–26. As with claim 7, Petitioner contends Rauhala discloses this limitation by increasing supply currents for a circuit’s amplifiers and mixers. Pet. 62–63; Baker Decl. ¶¶ 233–239.

According to Petitioner, the supply currents are bias currents. Pet. 59 (citing Baker Decl. ¶ 238).

iv. Claim 19

Petitioner’s analysis of claim 19 follows closely its analysis of claim 7. Petitioner asserts that each limitation of claim 19 is met by Rauhala and provides an element-by-element analysis. Pet. 63–71; Baker Decl. ¶¶ 241–296. For the final limitation 19.10 (“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”), Petitioner relies on its analysis of the corresponding limitation of claim 7, which emphasized the impedance change shown in Figure 6 of Rauhala. Pet. 71; *see supra*, Section III.D.1.

v. Dependent Claims 8–10, 20, and 21

Petitioner provides analyses for each of these dependent claims. Pet. 41–50, 71–73. Patent Owner does not address these dependent claims separately. At this stage we do not separately address any dependent claims.

vi. Patent Owner’s Response and Analysis

Patent Owner’s response focuses on the independent claims and contests Petitioner’s analysis for several limitations found in claims 7, 11, 13, and 19. Prelim. Resp. 33–59; Larson Decl. ¶¶ 64–79. Specifically, Patent Owner challenges whether Rauhala teaches (a) determining the strength of the “desired” and “interferer” signals, (b) comparing the strength of the signals, (c) adjusting an “impedance,” and (d) adjusting an impedance “in the signal path.” Prelim. Resp. 33–59.

- a. “determining the strength of the desired signal” and “determining the strength of the interferer signal”

All challenged independent claims call for “determining the strength of the desired signal” and “determining the strength of the interferer signal.”⁶ For this claim element, Patent Owner contends that Petitioner relies on Rauhala’s disclosure of a single detector component to meet two separate claim limitations. Prelim. Resp. 35–44; Larson Decl. ¶¶ 69–72. According to Patent Owner, “Petitioner[] cannot show anticipatory disclosure of two circuits that perform different functions together—from one circuit alleged to be capable of each, but one at a time.” Prelim. Resp. 38 (citing *In re Robertson*, 169 F.3d 743, 744–745 (Fed. Cir. 1999)).

We disagree. Noting in the language of the claims requires that these method steps be performed by separate components, or that these method steps “provide two different channel indications at once” (Prelim. Resp. 38), only that they be performed as stated in the claim. In that respect, this case is distinguished from *In re Robertson*, where the Federal Circuit determined that the “third fastening means” *required by the claims* was not inherently disclosed by the prior art. *Robertson*, 169 F.3d at 745 (“The [prior art] patent does not expressly include a third fastening means for disposal of the diaper, as claim 76 requires.”). In further contrast to this case, *Robertson* addressed mechanical elements of a product (fasteners for disposable diaper), not steps in a process. More pertinent to our facts is the Federal Circuit’s decision in *Microsoft Corporation v. Uniloc, 2017 LLC*, No. 2021-2039, 2022 WL 11531235 (Fed. Cir. Oct. 20, 2022), that addresses steps in a method claim. Reversing the Board’s determination that a petitioner had

⁶ See Ex. 1001, 14:5–6 (claim 7), 14:41–42 (claim 11), 15:18–19 (claim 13), and 17:28–29 (claim 19).

failed to prove the claims of a method patent unpatentable, the Federal Circuit concluded that the Board had misconstrued the claims to require separate acts:

We agree with [petitioner] that the Board misconstrued the claims to require that the comparing and determining step are performed by two separate acts in a certain order. Nothing in the intrinsic record requires such a narrow construction, and neither party presented this construction to the Board. Without any such evidence, we decline to impose such a narrow claim construction.

Microsoft Corp., 2022 WL 11531235, at *3 (citation and footnote omitted). We find that at this stage, Petitioner has made a sufficient showing that this limitation is met by Rauhala. Pet. 31–33; Baker Decl. ¶¶ 111–114.

b. comparing the strength of the” desired and interferer signals

The challenged independent claims call for “comparing the strength of the desired signal relative to the strength of the interferer signal.”⁷ Patent Owner contends that Rauhala does not disclose this claim step because Rauhala does not indicate “how the SNR [Signal/Noise Ratio] is calculated.” Prelim. Resp. 44–48; Larson Decl. ¶¶ 73–79. According to Patent Owner, “[t]here are multiple ways to calculate SNR” and some ways do not involve comparing the strength of a desired and interferer signal. Prelim. Resp. 47 (citing Larson Decl. ¶¶ 76–78).

We disagree with Patent Owner that the Petition fails to show sufficiently that Rauhala meets this limitation. Dr. Baker testifies that “*Rauhala* teaches comparing the strength of the desired signal relative to the strength of the interferer signal.” Baker Decl. ¶ 117. He explains that

⁷ See Ex. 1001, 14:7–8 (claim 7), 14:43–44 (claim 11), 15:20–21 (claim 13), and 17:30–32 (claim 19).

“*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.’” *Id.* (citing Ex. 1004 ¶ 14). He continues that “*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.* He relates these ratios to the requirement of the claims for making a comparison, testifying that “[a] ratio is a quantitative relationship between two amounts, or in other words, a mathematical comparison of those amounts.” *Id.* ¶ 120.

Patent Owner argues that “[t]here are multiple ways to calculate SNR.” Prelim. Resp. 47. This argument is unavailing. The claims do not specify a particular way of comparing the strengths of the desired and interfering signals. Patent Owner does not dispute that *Rauhala* teaches computing a SNR, and does not address Dr. Baker’s testimony that such a ratio is itself a comparison. *See* Prelim. Resp. 44–48. For the reasons given, at this stage we find that Petitioner has provided sufficient evidence that this limitation is met by *Rauhala*.

c. “dynamically adjusting . . . an impedance”

Independent claims 7 and 19 (but not claims 11 or 13) call for “dynamically adjusting one or more of an impedance.”⁸ For this claim limitation, Petitioner relies on Figure 6 of *Rauhala*, disclosing resistors R1, R2, and R3 controlled by switches k_a and k_b . Pet. 40–41 (“Changing the foregoing resistances in the circuit of Figure 6 changes the impedance of the circuit.”); *see also* Section III.C.1, *supra*. For this claim element, Patent Owner contends that “impedance” refers to the opposition of a circuit to

⁸ *See* Ex. 1001, 14:11–13 (claim 7), 17:34–36 (claim 19).

alternating current, and Rauhala relates only to direct or quiescent supply currents. Prelim. Resp. 48–55; Larson Decl. ¶¶ 64–68. Specifically, according to Patent Owner, the only impedance change alleged by Petitioner “is entirely resistive, and critically, *applies only to a static DC bias current kI.*” Prelim. Resp. 50; *see also* Section II.B, *supra* (declining to adopt Patent Owner’s suggestion at this stage as not necessary to resolving the issues in dispute for this decision).

d. [adjusting an impedance] “in the signal path”

Claims 7 and 19 (but not claims 11 or 13) call for “dynamically adjusting one or more of an impedance . . . of the plurality of circuits *in the [receiver] signal path.*”⁹ For this claim element, Patent Owner contends that switching the resistance of the control circuit in Rauhala is not “in the signal path” as claimed. Prelim. Resp. 56–59. Specifically, referring to Figure 6 of Rauhala, Patent Owner contends that “the signal path from differential signal input ‘in’ to differential signal output ‘out,’ in differential amplifier ‘61’” is “separate and apart from ‘control circuit 62’ for the supply current and its bias current kI.” Pet. 56–57 (citing Ex. 1004 ¶¶ 21, 23; Figs. 6, 7; Larson Decl. ¶¶ 63, 66). According to Patent Owner, therefore, even if Rauhala discloses changing an impedance as Petitioner contends, it does not disclose changing an impedance specifically in the receiver signal path as claimed. Prelim. Resp. 57.

This distinction between Rauhala’s disclosure and the requirements of the challenged claims for adjusting a component in the signal path is illustrated by Patent Owner’s annotated Figure 6 reproduced below.

⁹ *See* Ex. 1001, 14:11–13 (claim 7), 17:34–36 (claim 19) (emphasis added).

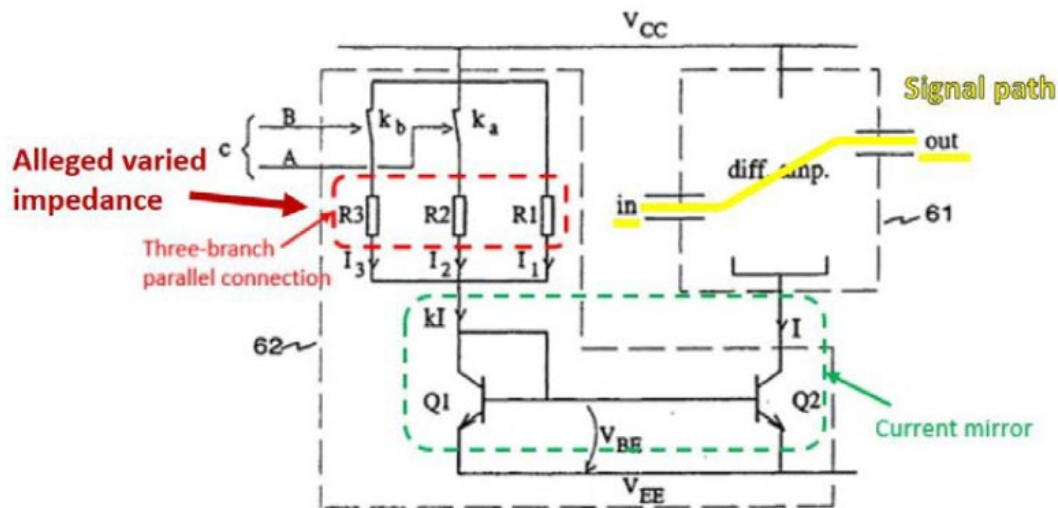


Fig. 6

Figure 6 of Rauhala has been annotated by Patent Owner to show that the parallel connection (outlined in red) including resistors R1, R2, R3 and switches k_a , k_b is outside the signal path (highlighted in yellow) through differential amplifier 61. Prelim. Resp. 38. Petitioner identifies R1, R2, R3 and switches k_a and k_b as the claimed variable impedance. *See, e.g.,* Pet. 39–41. The Petition (and the supporting Baker Declaration) do not explain adequately how, under this interpretation by Petitioner and its expert, Rauhala meets the adjusting an impedance “in the signal path” limitation. *See* Prelim. Resp. 39–41.

For the reasons given, therefore, even if we were to disagree with Patent Owner’s construction of “impedance,” we agree with Patent Owner that Petitioner fails to demonstrate sufficiently that Rauhala meets the limitation in claims 7 and 19 requiring “dynamically adjusting one or more of an impedance . . . in the [receiver] signal path.”

e. *Summary and Conclusions*

For the reasons given, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its challenge to claims 11 and 13 as anticipated by Rauhala. We further determine that Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenge to claims 7 and 19 as anticipated by Rauhala.

E. Obviousness of Claims 7–11, 13, and 19–21 over Rauhala and Saito

Petitioner asserts that independent claims 7, 11, 13, and 19, and their dependent claims 8–10, 20, and 21 are unpatentable under 35 U.S.C. § 103(a) as obvious over Rauhala and Saito. Pet. 73–77. Petitioner relies on Saito to teach “dynamically adjusting” and related terms if Patent Owner argued these terms require “adjustment without reliance upon a signal strength threshold.” *Id.* at 73–74. Petitioner contends that “*Saito* discloses automatic gain control circuitry for use in receivers of mobile devices.” *Id.* at 74. Petitioner argues that “[a person of ordinary skill] 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*.” *Id.* at 76 (citing Baker Decl. ¶ 330). Patent Owner asserts that Rauhala and Saito “are not properly combined,” but at this stage, does not support this argument with any reasoning or evidence. Prelim. Resp. 34. We find that at this stage Petitioner’s showing of motivation to combine is sufficient.

Patent Owner does not separately address Saito, nor does Petitioner rely on Saito to teach the limitations of the challenged claims disputed by Patent Owner and discussed *supra*. See Pet. 73–77; Prelim. Resp. 24.

Therefore, based on the evidence in the present record and for the same reasons provided above in Section III.D, we persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in showing that claims 11 and 13 would have been obvious over Rauhala and Saito. We further determine that Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenge to claims 7 and 19 as obvious over Rauhala and Saito. We do not separately address the dependent claims at this stage.

IV. CONCLUSION

For the foregoing reasons, we determine that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail in showing at least one challenged claim of the '202 patent is unpatentable. At this juncture in the proceeding, we have not made a final determination with respect to the patentability of the challenged claims, or with respect to claim construction.

V. ORDER

For the foregoing reasons, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the '202 patent is hereby instituted for all challenged claims on all of the asserted grounds; and,

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this decision.

IPR2023-00698
Patent 10,524,202 B2

FOR PETITIONER:

Dinesh Melwani
William Uhr
BOOKOFF McANDREWS, PLLC
dmelwani@bomcip.com
wuhr@bomcip.com

PATENT OWNER:

Aaron Hand
BUNSOW DE MORY LLP
ahand@bdiplaw.com