

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.

IPR2023-00697
Patent 10,129,825 B2

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

BENOIT, *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 (Paper 1, “Pet.”) requesting institution of *inter partes* review of claims 1, 3, 4, and 8 (“the challenged claims”) of U.S. Patent No. 10,129,825 B2 (Ex. 1001, “the 825 patent”). Theta IP, LLC (“Patent Owner”) filed a Preliminary Response (Paper 9, “Prelim. Resp.”).

Applying the standard set forth in 35 U.S.C. § 314, which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we institute an *inter partes* review.

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 (Patent Owner’s Mandatory Notices), 2.

B. Related Matters

As required by 37 C.F.R. § 42.8(b)(2), each party identifies various judicial or administrative matters that would affect or be affected by a decision in this proceeding. Pet. 3; Paper 4, 2. The parties each identify *Theta IP, LLC v. Motorola Mobility LLC*, No. 1:22-cv-03441 (N.D. Ill.). Pet. 1; Paper 4, 2. Patent Owner additionally identifies two concluded cases: *Theta IP, LLC v. Samsung Electronics Co.*, No. WA:20-cv-00160 (W.D. Tex.) and *Theta IP, LLC v. Samsung Electronics Co.*, No. 2:16-cv-527 (E.D. Tex.) that involved a patent related to the ’825 patent. Paper 4, 2.

The parties also each identify two concurrently filed petitions challenging different patents: IPR2023–00694 (challenging U.S. Patent

No. 7,010,330) and IPR2023–00698 (challenging U.S. Patent No. 10,524,202). Pet. 1–2; Paper 4, 2.

C. The '825 Patent

The '825 patent is titled “Power Dissipation Reduction in Wireless Transceivers.” Ex. 1001, code (54). The patent relates to “improving battery life by reducing battery power-drain of battery-powered devices using wireless transceivers.” Ex. 1001, code (57). The patent describes drain on battery life resulting from power consumed by wireless transmitters and receivers on various types of mobile devices. *Id.* at 1:22–33. 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 1:34–40.

The patent explains that “[w]hen a receiver is actively receiving a desired signal, each block in the signal path has at its input the desired signal as well as noise and possibly interfering signals” or “interferers.” *Id.* at 5:20–22, 28–30. “The desired signal is the useful, information-carrying portion of a received signal.” *Id.* at 5:22–24. Figures 2A and 2B, reproduced below, show desired signals and interfering signals that may be received by a circuit in a wireless receiver.

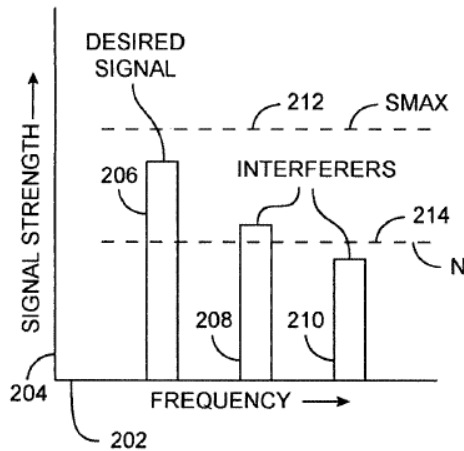


FIG. 2A

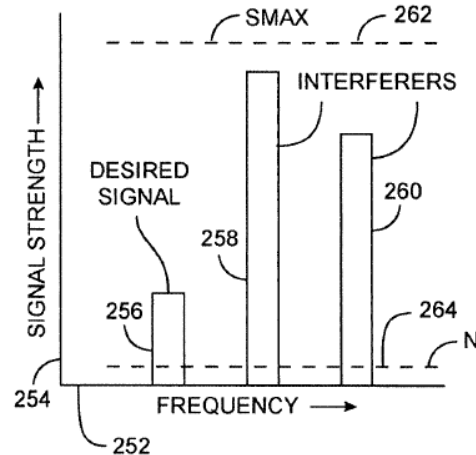


FIG. 2B

Id. at 5:31–33, Figs. 2A, 2B.

As shown in Figure 2A, “received desired signal 206 is large in comparison to interfering signals 208 and 210,” which represents “the best-case input signal.” *Id.* at 5:36–37, 6:14–15. The best-case input signal is “a robust desired signal accompanied by no or low-level interferers.” *Id.* at 6:15–16. In such a case, 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 6:16–19, 5:46–48. For example, bias currents may be lowered to reduce the maximum signal handling capability. By contrast, 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 5:54–56, 6:6–7.

Figure 4 is reproduced below and illustrates “a portion of a receiver consistent with an embodiment of the present invention.”

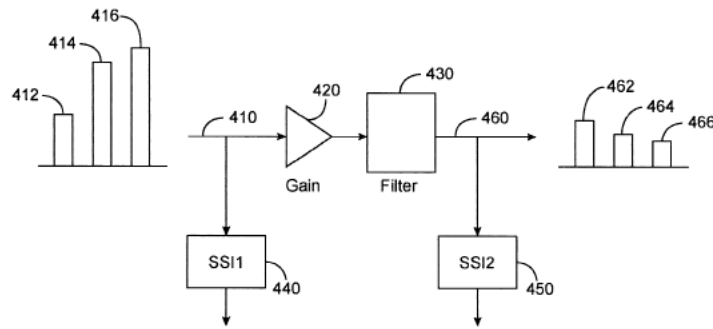


FIG. 4

Ex. 1001, 6:50–51.

In the example of Figure 4, “input signal spectrum on line 410 is shown as desired signal 412 and interferers 414 and 416” and the “signal spectrum at the output line 460 is shown as desired signal 462 and interferers 464 and 466.” *Id.* at 6:55–59. Included in the portion of the receiver shown in Figure 4 is “optional gain element 420 [that] is placed in front of the filter 430 in order to increase signal levels.” *Id.* at 6:52–53.

In the example shown in Figure 4, the patent explains that a “comparison of the signal levels provided by signal strength indicators 440 and 450 indicates that much of the combined received signal on line 410 has been filtered.” *Id.* at 7:4–6. This indicates “that large interfering signals present in the input are being filtered by filter 430,” which allows optimizing “the bias, impedance, and gain of the gain stage 420 and filter 430” to reduce power dissipation. *Id.* at 7:8–11.

D. Challenged Claims

Claims 1, 3, 4, and 8 of the '825 patent are challenged, of which claims 1, 3, and 8 are independent. Illustrative claim 1 follows, with emphasis added identifying a disputed limitation:

1. A method for power dissipation reduction in a receiver of a wireless transceiver of a battery powered portable wireless device, and a corresponding increase in battery life of the battery powered portable wireless device, the method comprising:

receiving a wireless signal having a desired signal and an interferer signal, by the wireless transceiver of the battery powered portable wireless device, the wireless transceiver having a receiver signal path comprising a plurality of circuits, wherein the plurality of circuits includes an amplifier, a filter, and a mixer, and *wherein the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal*;

wherein a worst-case power dissipation condition results when the signal strength of the desired signal is low and the signal strength of the interferer signal is high; and

wherein the power dissipation reduction in the receiver is achieved by causing a bias current to vary in one or more of the plurality of circuits in the receiver signal path of the wireless transceiver as the signal strength of the interferer signal and the signal strength of the desired signal vary according to the following:

(i) when the signal strength of the interferer signal is high and the signal strength of the desired signal is low, and the desired signal is larger than in the worst-case power dissipation condition, causing the bias current of the one or more of the plurality of circuits in the receiver signal path of the wireless transceiver to be reduced compared to the worst-case power dissipation condition, thereby saving power; and

(ii) when the signal strength of the interferer signal is weak and the signal strength of the desired signal is weak, causing the

bias current of the one or more of the plurality of circuits in the receiver signal path of the wireless transceiver to be decreased compared to the worst-case power dissipation condition, thereby saving power.

Ex. 1001, 12:60–13:31 (emphases added).

E. The Asserted Grounds of Unpatentability

In its asserted grounds, Petitioner relies on the following references:

Name	Patent Document	Exhibit
Rauhala	EP 0 999 649 A2 (May 10, 2000)	1004
Masaaki	JP H8-228118 (Sept. 3, 1996)	1005

Pet. 3. Petitioner asserts Rauhala and Masaaki are prior art under pre-AIA 35 U.S.C. § 102(b). Pet. 4. Petitioner also relies on declaration testimony of R. Jacob Baker, P.E., Ph.D. (Ex. 1002).

Petitioner challenges the patentability of the challenged claims on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1, 3, 8	102(b)	Rauhala
4	103(a)	Rauhala and Masaaki

Pet. 3.

II. ANALYSIS

A. Principles of Law

Petitioner bears the burden to demonstrate unpatentability. “*Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). At this preliminary stage, we determine whether the information in the Petition shows a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. *See* 35 U.S.C. § 314(a).

As relevant here, a claim is unpatentable under 35 U.S.C. § 102 if a prior art reference discloses every limitation in a claim, arranged as recited in the claim. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). Although the elements must be arranged or combined in the same way as in the claim, “the reference need not satisfy an *ipsissimis verbis* test,” i.e., identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

A patent claim is unpatentable under 35 U.S.C. § 103 “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103 (2011); *accord KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103). The question of obviousness involves resolving 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) when in evidence, objective indicia of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We apply these principles to the challenges of the Petition.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. Relying declaration testimony from Dr. Baker (Ex. 1002), Petitioner asserts that a person of ordinary skill in the art “would have had a

bachelor's degree in electrical engineering, electronics engineering, or the equivalent, and two or more years of experience in electronic circuits and mobile communication devices including transceivers.” Pet. 4 (citing Ex. 1002 ¶¶ 27–31). Petitioner also indicates that “[m]ore practical experience could qualify one not having the aforementioned education as a POSITA, while a higher level of education could offset lesser experience.” *Id.*

Relying on declaration testimony from Lawrence E. Larson, Ph.D. (Ex. 2005), Patent Owner asserts that a person of ordinary skill “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. 24 (citing Ex. 2005 ¶ 48). Dr. Larson indicates that his opinions would not change if Petitioner’s proposed level of ordinary skill were applied. Ex. 2005 ¶ 51.

The two proposals are materially similar in the education requirement but differ in professional experience required. Pet. 4; Prelim. Resp. 24; Ex. 2005 ¶ 51.

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 ’825 patent and prior art of record. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). On balance, Petitioner’s proposal of education plus a minimum of two years of experience is a better reflection of the level of skill in the prior art. For example, Rauhala presents functional block diagrams of signal

paths and tables of settings of one-bit control signals based on signal strength information. *See, e.g.*, Ex. 1004, Figs. 1–5, ¶¶ 15, 17, 19, 21. Similarly, Masaaki’s Figure 1 shows “a circuit block diagram of a reception unit 40 of a pager” according to an embodiment of the invention. Ex. 1005, 5:3–4. The block diagram shows various components, including an antenna, amplifiers, bandpass filters, a mixer, an oscillator, and a detection circuit. *Id.* at 5:5–8, Fig. 1.

Accordingly, we adopt Petitioner’s definition of the level of ordinary skill for purposes of this Decision. Our decision, however, would not change if we had applied Patent Owner’s proposed level of ordinary skill.

C. Claim Construction

In *inter partes* reviews, the Board construes a claim using the same claim construction standard employed in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (2020). Accordingly, the “words of a claim ‘are generally given their ordinary and customary meaning,’” as would have been understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Additionally, we construe claim terms only as relevant to the parties’ contentions and only to the extent necessary to resolve the issues in dispute. *See Nidec Motor Corp. v. Zhongshan Broad*

Ocean Motor Co., 868 F.3d 1013, 1017 (Fed. Cir. 2017). Neither party has expressly requested a claim construction. To resolve this controversy, however, we must address construction of a term that is implicit in the parties’ analysis of the prior art.

1. The Circuit Limitation

A central issue to our determination whether to institute an *inter partes* review is the claim construction of “the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal challenged independent claims,” which each challenged independent claim recites. *See* Ex. 1001, 13:4–7 (claim 1), 13:49–52 (claim 3), 16:21–24 (claim 8). Petitioner points to a circuit in Rauhala that determines a strength of a neighboring channel signal and determines a strength of the received channel signal as “correspond[ing] to the recited ‘a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal.’” *See, e.g.*, Pet. 23 (regarding claim 1). By pointing to a single circuit that performs both types of signal strength determinations, Petitioner implicitly argues that the claim does not require two separate circuits, with each circuit performing one type of signal strength determination recited in the claim. Rather, according to Petitioner’s implicit argument, the claim only requires “a circuit for determining a signal strength of the interferer signal” and “a circuit for determining a signal strength of the desired signal,” which can be met by a circuit performing both determinations.

Patent Owner, however, contends that the claim requires two circuits, one for each type of determining. *See, e.g.*, Prelim. Resp. 35 (“Petitioners

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.”).

Neither party provides an express claim construction for “the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal challenged independent claims.” *See* Pet. 19 (“Petitioners believe that no express constructions of the claims are necessary to assess whether the prior art reads on the challenged claims.”); Prelim. Resp. 25 (“assert[ing] that no constructions are necessary”), 25–31 (providing arguments regarding the interpretation of “an impedance” recited in claim 8 in response to Petitioner’s arguments). Nor does either Petitioner or Patent Owner identify any circuits performing signal strength determinations from the written description of the ’825 patent or identify any relevant prosecution history (Ex. 1003) to support their respective reading of the claim. *See, e.g.*, Pet. 23; Prelim. Resp. 32,

We begin by examining the claim language itself—“the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal challenged independent claim” (“the circuit limitation”). The claim language recites “a circuit for determining” a signal strength of one signal (i.e., “the interferer signal”) and also recites “a circuit for determining” a signal strength of another signal (i.e., “the desired signal”).

Notably, the claim language does not expressly require that the circuits are separate, different, distinct, or otherwise state that each “a circuit” is not the same circuit. This is unlike the claim at issue in *In re Robertson*, 169 F.3d 743, 744 (Fed. Cir. 1999) that “provide[d] for two

mechanical fastening means to attach the diaper to the wearer and a third such means for securing the diaper for disposal.” The *Robertson* claim itself recited relationships between three mechanical fastening means:

[A] mechanical fastening system for forming side closures . . . comprising

a closure member . . . comprising a first mechanical fastening means for forming a closure, said first mechanical fastening means comprising a first fastening element;

a landing member . . . comprising a second mechanical fastening means for forming a closure with said first mechanical fastening means, said second mechanical fastening means comprising a second fastening element mechanically engageable with said first element; and

disposal means for allowing the absorbent article to be secured in a disposal configuration after use, **said disposal means comprising a third mechanical fastening means for securing the absorbent article in the disposal configuration, said third mechanical fastening means comprising a third fastening element mechanically engageable with said first fastening element** . . .

Id. (emphases added).

Nor does the claim language here recite the number of circuits required. The claim in this respect is unlike the claim at issue in *Lantech, Inc. v. Kelp Machine Co.*, 32 F.3d 542, 546 (Fed. Cir. 1994) (alterations in original) that recited “[a]t least two conveyors’ [means]”; “one of said conveyor [means]”; “other conveyor means,” “both conveyor means”; and “lowest conveyor.” As such, the claim language in *Lantech* makes “unambiguous reference to two distinct elements of the claimed structure.”

Id.

On the other hand, the claim language here does not expressly require that only one circuit be used for determining the signal strength of both signals, such as by using antecedent basis or reciting a single circuit.

Thus, the language of the circuit limitation itself neither requires, nor prohibits, the use of two circuits for the recited determining. Rather, the claim language itself, on this preliminary record, is sufficiently broad to encompass both one and two circuits.

Turning to the written description of the '825 patent, as far as we are aware, there is only one description of the type of determining performed by a signal strength indicator circuit at issue here, and that occurs in a portion of column six referring to Figure 4. Notably, the written description states:

The signal strength indicators 440 and 450 do not provide information as to the relative sizes of the desired and interfering signals. Rather, a cumulative signal level is provided as their outputs. For example, the first signal strength indicator 440 outputs a level corresponding to the sum of desired signal 412 and interfering signals 414 and 416, while the second signal strength indicator 450 provides a signal level corresponding to the sum of desired signal 462 and interfering signals 464 and 466.

Id. at 6:59–67.

As described above, although the written description shows two signal strength indicator circuits 440 and 450, the written description unambiguously discloses that each circuit determines the cumulative signal level of the desired signal and the interfering signals. Neither circuit determines only the signal strength of the interferer signals, nor does a circuit determine only the signal strength of the desired signal. In other words, the written description does not support a limited reading of the claim language so as to require two separate circuits—one circuit for determining a

signal strength of the interferer signal and a separate circuit for determining a signal strength of the desired signal.

Thus, based on this preliminary record, we do not construe the circuit limitation as requiring the wireless transceiver necessarily to have two circuits, one circuit for determining a signal strength of the interferer signal and a different circuit for determining a signal strength of the desired signal, because, under that reading of the claim, the only embodiment in the written description would not fall within the scope of the claim. It is well-established that “[s]uch an interpretation is rarely, if ever, correct and would require highly persuasive evidentiary support,” which is not present in this record as discussed below. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 (Fed. Cir. 1996).

We next consider whether claim language other than the circuit limitation itself provides “highly persuasive evidentiary support” that the claims require a circuit for determining a signal strength of the interferer signal and a different circuit for determining a signal strength of the desired signal. *Vitrionics*, 90 F.3d at 1584. We note that none of the challenged claims recite expressly performing the step of determining a signal strength of the desired signal or determining a signal strength of the interferer signal, much less reciting an express timing limitation that such determinations would need to be made at the same time and require two circuits.

That said, the challenged claims do recite using the result of the signal strength determinations to cause a bias current to a circuit in the receiver signal path to vary.¹ Claim 1, for example, further recites that the bias

¹ Claim 1, for example, recites “wherein the power dissipation reduction in the receiver is achieved by causing a bias current to vary in one or more of the plurality of circuits in the receiver signal path of the wireless transceiver

current is reduced in a particular manner² “when the signal strength of the interferer signal is high and the signal strength of the desired signal is low, and the desired signal is larger than in the worst-case power dissipation condition” that “results when the signal strength of the desired signal is low and the signal strength of the interferer signal is high.” Ex. 1001, 13:8–10, 17–24. Even though the claim recites using results of the signal strength determinations, we are not persuaded on this limited record that the claims require such precise timing that the determinations would have to be made by two different circuits. This is particularly true in light of the written description discussed above, in which signal strength indicator circuits 440 and 450 each determines the signal level of the desired signal and the signal level of interfering signals, the sum of which is output as a cumulative signal level. *See id.* at 6:59–67.

Turning to the prosecution history in evidence, the claims in the challenged patent were added during prosecution to replace previously rejected claims, as Petitioner and Patent Owner both acknowledge. Ex. 1003, 140–146; Pet. 11–12; Prelim. Resp. 17. In remarks accompanying the newly added claims, Applicant characterizes the new claims as being directed to power dissipation reduction in a receiver by causing the bias current to be decreased using various criterion based on the signal strength of an interferer signal and the signal strength of a desired signal. *See*

as the signal strength of the interferer signal and the signal strength of the desired signal vary according to the following” enumerated conditions.

Ex. 1001, 13:11–16.

² Specifically, claim 1 recites “causing the bias current of the one or more plurality of circuits in the receiver signal path of the wireless transceiver to be reduced as compared to the worst-case power dissipation condition.”

Ex. 1001, 13:20–24.

Ex. 1003, 146–147 (discussing new independent claims 19, 21, 23, and 26, which correspond to patent claims 1, 3, 5, and 8). Applicant, however, does not identify specific support in the written description for the circuit limitation at issue here, or even mention the circuit limitation in remarks accompanying the claim amendment. *See generally* Ex. 1003, 146–48. As such, the prosecution history is of limited value to our claim construction issue.

We next consider the claim construction determinations made in civil actions that have been timely made of record. *See* 37 C.F.R. § 42.100(b) (2020) (“Any prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the *inter partes* review proceeding will be considered.”). Patent Owner indicates that “the claims of the ’825 Patent and related patents have been twice construed by district courts.” Prelim. Resp. 24 (citing Ex. 2013; Ex. 2014). Neither district court, however, construed the circuit limitation at issue here. *See generally* Ex. 2013; Ex. 2014.

On this record, and for purposes of institution, after examining the claim language itself, the written description of the ’825 patent, the prosecution history, and the district court claim construction determinations in evidence, for purposes of this decision, we interpret “wherein the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal” as encompassing, but not requiring, the same circuit determining a signal strength of the interferer signal and determining a signal strength of the desired signal.

2. Other Claim Terms

To the extent necessary to address the parties' unpatentability arguments, construction of other claim terms are addressed below in the context of the unpatentability analysis. *Nidec Motor Corp.*, 868 F.3d at 1017.

D. Anticipation of Claims 1, 3, and 8 by Rauhala

Petitioner asserts that the three challenged independent claims—claims 1, 3, and 8—are unpatentable as anticipated by Rauhala. Pet. 20–49.

1. Disclosure of Rauhala

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.” Ex. 1004 ¶ 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.” Ex. 1004 ¶ 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. Ex. 1004 ¶ 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, is “a simplified example of a radio receiver without the low-frequency components.” *Id.* ¶ 12.

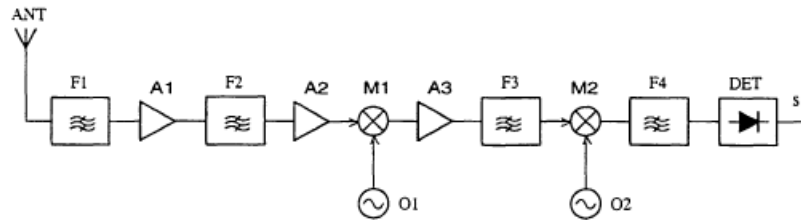


Fig. 1

The radio receiver depicted in Figure 1 includes an 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, below, is similar to Figure 1 and illustrates an example of supply current control for linear units.

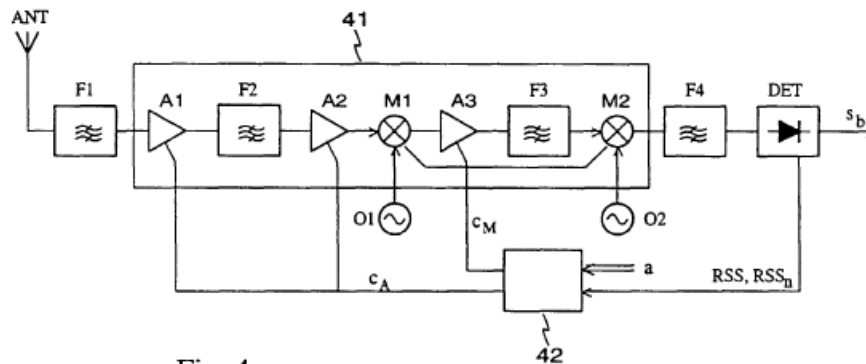


Fig. 4

Id. ¶ 17. In addition to the antenna, oscillators, detector DET, and linear units of filters, amplifiers, and mixers shown in Figure 1, Figure 4 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 to 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 1. *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.*

2. Independent Claim 1

a. Preamble and Receiving a Wireless Signal Limitation

The preamble of claim 1 recites “[a] method for power dissipation reduction in a receiver of a wireless transceiver of a battery powered portable wireless device, and a corresponding increase in battery life of the battery powered portable wireless device.” Petitioner points to Rauhala’s disclosure of techniques for “a method and an arrangement for linearizing a

radio receiver” that can be “applied in the reception circuits of mobile stations.” Ex. 1004 ¶ 1; *see* Pet. 20. For the “power dissipation reduction in a receiver of a wireless transceiver of a battery powered portable wireless device” and “a corresponding increase in the battery of the powered portable wireless device” in the preamble, Petitioner identifies Rauhala’s disclosure of the techniques’ advantage of reducing energy consumption without degrading signal quality, resulting in longer battery life. Pet. 20 (citing Ex. 1004 ¶ 7). Petitioner also relies on Rauhala’s disclosure of a radio receiver used in a mobile phone. Pet. 20 (citing Ex. 1004 ¶ 12, Fig. 1).

Claim 1 recites “receiving a wireless signal having a desired signal and an interferer signal by the wireless transceiver of the battery powered portable wireless device.” For this limitation, Petitioner relies on Rauhala’s radio receiver that can be used in a mobile device as described above. *See* Pet. 20–21 (citing Ex. 1004 ¶¶ 1, 7, 6). Petitioner indicates that Rauhala discloses the receiver “monitors the signal strength on the receive and neighboring channels.” Ex. 1004 ¶ 6; *see* Pet. 21. Petitioner’s position is that Rauhala’s receive channel discloses the recited “desired signal”; Rauhala’s neighboring channel signal discloses the recited “interferer signal”; and “these signals are received” at Rauhala’s radio receiver. Pet. 21 (citing Ex. 1004 ¶¶ 6, 17, 1, 7; Ex. 1002 ¶¶ 78–80, 83).

Claim 1 further recites “the wireless transceiver having a receiver signal path comprising a plurality of circuits, wherein the plurality of circuits includes an amplifier, a filter, and a mixer.” Petitioner identifies the radio receiver having amplifiers, mixers, and filters shown in Rauhala’s Figure 1. Pet. 22 (citing Ex. 1004 ¶¶ 12, 13–20, Figs. 1–5). As discussed above, Rauhala’s Figure 1 shows an antenna coupled to a series of filters F1, F2, F3, amplifiers A1, A2, A3, and mixers M1, M2. Ex. 1004, Fig. 1.

Regardless of whether the preamble is limiting, Petitioner's showing for the preamble and the limitations discussed above are sufficient for purposes of institution because Petitioner relies on express teachings of the cited passages discussed above with respect to Rauhala's disclosure. At this preliminary stage, Patent Owner does not address Petitioner's showing. *See generally* Prelim. Resp.

b. The Disputed Circuit Limitation

As discussed in detail above in the Claim Construction Section II.C, claim 1 also recites “the wireless transceiver comprises a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal” (the “circuit limitation”).

For this limitation Petitioner relies particularly on Rauhala's detector DET shown in Figure 4 and related disclosures in paragraph 17, discussed previously. Pet. 13–14, 23. Petitioner contends that Rauhala's receiver includes “a circuit (e.g., a ‘detector DET’) for determining a signal strength of the neighboring channel signal as well as the receive channel signal, which corresponds to the recited ‘a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal.’” Pet. 23 (citing Ex. 1002 ¶ 83). As such, Petitioner's position as noted earlier is that Rauhala's detector DET corresponds to both the recited “a circuit for determining a signal strength of the interferer signal” and the recited “a circuit for determining a signal strength of the desired signal.”

Patent Owner contends that Petitioner fails to show that Rauhala's single detector DET circuit discloses the circuit limitation as arranged in the claim as required to show anticipation and so does not establish a reasonable likelihood of prevailing. *See, e.g.,* Prelim. Resp. 32, 33–43. For the reasons

explained previously and for purposes of institution, Petitioner's reliance on a single circuit for both "a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal" is within the scope of the claim. The question we address now for purposes of institution only is whether Rauhala's particular detector DET discloses "a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal" as arranged in the claim.

Petitioner and Patent Owner both acknowledge that Rauhala discloses a detector DET that provides control unit 42 "an indication about either the receive channel signal strength RSS or the strength of any signal on the reception band." Ex. 1004 ¶ 17; *see, e.g.*, Pet. 23; Prelim. Resp. 34. As shown previously, Rauhala's Figure 4 shows two inputs provided to control unit 42 by detector DET—RSS and RSS_n—where RSS is the receive channel strength and RSS_n is the signal strength of the neighboring channel in which the signal strength is greater. Ex. 1004 ¶ 17. As Patent Owner correctly notes (Prelim. Resp. 34), Figure 4 also depicts "signal a" as another input to control unit 42 and that is received from the receiver's tuner control which indicates the channel. *Id.* ¶ 17, Fig. 4.

According to Patent Owner, because detector DET provides an indication about either signal (RSS or RSS_n) and needs to be re-tuned to a different channel before sending the indication about the other signal, the indications RSS and RSS_n shown in Figure 4 "must come from two distinct uses of the single disclosed detector." Prelim. Resp. 34–35. According to Patent Owner, claim 1 precludes Rauhala from being an anticipatory disclosure because the determining of the two signal strengths must occur at the same time. *Id.* at 35 ("Petitioners 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.”). For support, Patent Owner quotes the claim language of the circuit limitation and a sentence in the written description of the challenged patent that describes the desired and interferer signals are part of the same received signal input spectrum and are received together. Prelim. Resp. 33 (citing Ex. 1001, 5:20–30).

As explained above, however, on this preliminary record, we do not interpret the circuit limitation to impose a timing requirement such that the determining has to occur at precisely the same time. Nor at this preliminary juncture do we read a precise timing requirement into the circuit limitation based on written description disclosure that the desired signal and the interferer signal are part of the received signal input spectrum. As explained above, for example, the written description describes a circuit providing a cumulative signal level corresponding to the sum of the desired and interfering signals. Ex. 1001, 6:59–67. As such, the written description describes making the determinations on two signals that are part of the received signal input spectrum.

Patent Owner argues that Rauhala does not disclose “two determinations of two different signal strengths together.” Prelim. Resp. 40. We do not agree with Patent Owner on this preliminary record. Rauhala’s disclosure of providing control bits based on the comparisons of the signal strengths to respective thresholds, discussed above, also undermines Patent Owner’s argument that detector DET, which (i) provides one or the other and (ii) needs to be re-tuned to read the other signal, cannot anticipate the claim. Notably, for example, Rauhala discloses setting control bits based on comparisons of the respective signal strengths to thresholds:

The control unit 42 provides two one-bit control signals c_A and c_M . Signal c_A is 0 **when signal RSS is greater than S4 and signal RSS_n is at the same time smaller than S_n** . Otherwise, signal c_A is 1. Signal c_A is taken to amplifiers A1 and A2. Signal c_M is 1 **when signal RSS is not greater than S4 and signal RSS_n is at the same time at least S_n** .

Ex. 1004 ¶ 17 (emphases added). Here Rauhala describes providing control signals based on the strength of *both* signals from the receive and neighboring channels, which undermines Patent Owner's arguments.

Rauhala's table in paragraph 17 specifies "how the linear unit supply currents are controlled" and further illustrates that both signal strengths are used. *Id.* ¶ 17. The table shows whether the supply current provided to each of the two linear unit sets is higher or lower based on the respective comparisons of the signal strengths of the neighboring channel (RSS_n) or the receive channel (RSS) to threshold values. As discussed above, Rauhala shows in the table in paragraph 17 that both the signal strengths of the neighboring channel (RSS_n) or the receive channel (RSS) are used to set the supply current to linear units. This disclosure that Rauhala sets the supply current to the linear units using both outputs from detector DET further undermines Patent Owner's position that Rauhala does not anticipate claim 1 because detector DET "can only give one indication at a time." *See* Prelim. Resp. 34–35.

Patent Owner also suggests that Rauhala does not anticipate because the circuits for determining a signal strength required by claim 1 must perform the determining in a particular manner that precludes comparing the signal strength with a threshold. Prelim. Resp. 34 ("Rauhala does not describe how the detector works, only that it can give an 'indication' whether the signal strength crossed a threshold."). On this preliminary

record, we view the claim more broadly than Patent Owner. As noted above, the circuit limitation requires “a circuit for determining a signal strength of the interferer signal and a circuit for determining a signal strength of the desired signal” without specifying a particular manner in doing so. Thus, on this preliminary record, we do not agree that comparison with thresholds is precluded as a way to determine signal strength.

Additionally, Patent Owner suggests that Petitioner’s declarant Dr. Baker does not agree with Petitioner’s position that Rauhala’s detector DET corresponds to both determining circuits appearing together in the claim element and argues that Dr. Baker’s testimony in this regard is conclusory and should not be credited. Prelim. Resp. 36–41. Our analysis concerning the circuit limitation does not rely on Dr. Baker’s declaration testimony for the determination whether to institute. *Belden Inc. v. Berk–Tek LLC*, 805 F.3d 1064, 1079 (Fed. Cir. 2015) (“No rule requires a Petition to be accompanied by any declaration, let alone one from an expert guiding the Board as to how it should read prior art.”). Patent Owner, of course, may raise the issue of the appropriate weight to be given Dr. Baker’s testimony during trial. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”)

For these reasons, at this preliminary juncture, we find Petitioner’s arguments that rely on Rauhala’s detector DET for the circuit limitation to be sufficient for institution.

c. The Signal Strength Conditions

Claim 1 recites additional “wherein” limitations involving signal strength conditions that under two conditions cause the bias current of a circuit or circuits in the receiver signal path to be reduced or decreased. *See*

Ex. 1001, 13:8–31. For these limitations, Petitioner relies particularly on paragraphs 17 and 18, including Rauhala’s table in paragraph 17. As discussed previously, the table shows whether the supply current provided to each of the two linear unit sets is higher or lower based on the respective comparisons of the signal strengths of the neighboring channel (RSS_n) or the receive channel (RSS) to threshold values. Rauhala’s table in paragraph 17 is shown below with some of Petitioner’s annotations. At this preliminary juncture, Patent Owner does not present any additional arguments with respect to these limitations.

	RSS_n	RSS	I_A	I_M
Row 1 →	$<S_n$	$>S_4$	I_{Al}	I_{Ml}
Row 2 →	$<S_n$	$\leq S_4$	I_{Ah}	I_{Ml}
Row 3 →	$\geq S_n$	$>S_4$	I_{Ah}	I_{Ml}
Row 4 →	$\geq S_n$	$\leq S_4$	I_{Ah}	I_{Mh}

Worst-case
power dissipation condition

Ex. 1004 ¶ 17; Pet. 27.

Rauhala’s table includes a top row having column labels and four additional rows identifying conditions, which Petitioner annotates as Rows 1–4. The leftmost two columns indicate respective comparisons of the signal strengths of the neighboring channel (RSS_n) or the receive channel (RSS) to threshold values (S_n , S_4). As noted previously, Rauhala discloses that threshold value S_4 “corresponds to a relatively low receive signal strength” and threshold value S_n “corresponds to a relatively high signal strength.” Ex. 1004 ¶ 17. Rows 1 and 2 indicate the condition in which the signal strength of neighboring channel (RSS_n) is less than the threshold S_n , whereas Rows 3 and 4 indicate the condition in which the signal strength of neighboring channel (RSS_n) is equal to or greater than the threshold S_n .

Similarly, the receive channel strength (RSS) column indicates conditions in which the strength exceeds the threshold S4 in Rows 1 and 3 and is equal to or less than the threshold S4 in Rows 2 and 4.

The right two columns indicate whether higher or lower supply current is provided to each of the two sets of linear units. The rightmost column I_M identifies the supply current provided to the mixers M1 and M2 and amplifier A3, whereas the next column I_A identifies the supply current provided to the amplifiers A1 and A2. *Id.* Subindex 1 indicates the lower supply current is provided to the particular set of linear units, whereas subindex h indicates the higher supply current is provided. *Id.*

As noted earlier, Petitioner's position is that Rauhala's received signal corresponds to the recited desired signal and Rauhala's neighbor channel signal corresponds to the recited interferer signal. Pet. 21. Petitioner's position additionally is that Rauhala's current supplied to the linear units "corresponds to the recited 'bias current.'" Pet. 26. Petitioner relies on Row 4 disclosing to the recited worst-case power dissipation condition (Ex. 1001, 13:53–56). Pet. 24–25. Petitioner contends that Rauhala's disclosure of a condition shown in Row 4 in which the signal strength of the received channel signal RSS is less than the S4 threshold of "relatively low signal strength" discloses "when the signal strength of the desired signal is low" and the signal strength of the neighboring channel signal RSS_n is equal to or greater than the S_n threshold of relatively high signal strength discloses "when the signal strength of the interferer signal is high." Pet. 24.

According to Row 4, in this condition, high current is supplied to both sets of linear units—amplifiers A1 and A2 and to mixers M1 and M2 and amplifier A3. Petitioner contends that this is a worst-case power dissipation condition as recited because the high currents are supplied to all linear units.

Pet. 25 (citing Ex. 1004 ¶¶ 17–18). At this preliminary stage, Patent Owner does not address Petitioner’s showing. *See generally* Prelim. Resp.

Petitioner’s showing is sufficient for institution. Petitioner relies on an unambiguous disclosure in the table of signal strength conditions, identifies signal strength of the neighbor channel signal above a threshold set identified as “relatively high” to correspond to the recited signal strength of the interferer signal being high. Petitioner contends the signal strength of the receive channel below a respective threshold identified as “relatively low” to the recited signal strength of the desired signal being low. Furthermore, as shown in Row 4, the supply current provided to each set of linear units is high. Petitioner’s characterization of supplying high current to both sets of linear unit as worst-case power dissipation is sufficient for institution. Pet. 24–25.

We next turn to “wherein the power dissipation reduction in the receiver is achieved by causing a bias current to vary in one or more of the plurality of circuits in the receiver signal path of the wireless transceiver as the signal strength of the interferer signal and the signal strength of the desired signal vary according to the following” enumerated two conditions (i) and (ii). Ex. 1001, 13:57–62. Petitioner identifies Rauhala’s “basic idea of the invention” of varying the currents supplied to linear units as well as specific examples of doing so. Pet. 25–26 (citing Ex. 1004 ¶¶ 6, 17–18).

For the first recited condition—“(i) when the signal strength of the interferer signal is high and the signal strength of the desired signal is low, and the desired signal is larger than in the worst-case power dissipation condition, causing the bias current of the one or more of the plurality of circuits in the receiver signal path of the wireless transceiver to be reduced compared to the worst-case power dissipation condition, thereby saving

power”—Petitioner relies on Row 3 in Rauhala’s paragraph 17 table. Pet. 27–28.

In Row 3 (and as in Row 4 discussed above), Petitioner identifies the neighboring channel signal strength RSS_n is equal to or greater than the threshold value S_n identified as “relatively high” to correspond to the recited signal strength of the interferer signal being high. Regarding condition (i) requirements that “the signal strength of the desired signal is low and . . . is larger than in the worst-case power dissipation condition,” Petitioner notes that in Row 3, the signal strength of the receive channel RSS is *above* a respective threshold identified as “relatively low” threshold value S_4 . Petitioner again contends that this signal strength “could still cover a low signal strength” and that one skilled in the art “would have readily understood” this. Pet. 28 (citing Ex. 1002 ¶ 97). Additionally, Petitioner correctly notes that “the receive channel signal strength indicated in Row 3 ($RSS > S_4$) is larger than the receive channel signal strength indicated in Row 4 ($RSS \leq S_4$),” which Petitioner identifies as corresponding to the worst-case power dissipation condition. Pet. 28.

For the recited “causing the bias current . . . to be reduced compared to the worst-case power dissipation condition” in limitation (i), Petitioner notes the current supplied to the linear units M1, A3, and M2 in Row 3 are set to lower values (I_{M1} with subindex 1 indicating the lower current provided) than the supply current provided to those linear units in the worst-case power dissipation condition in Row 4 (I_{Mh} with subindex h indicating the higher supply current provided). Pet. 28–29.

Petitioner applies similar reasoning based on Row 2 in Rauhala’s table in paragraph 17 and related textual descriptions to condition (ii) that recites both the signal strength of the interferer signal and the desired signal are

weak (Ex. 1001, 13:25–31). Pet. 29–30. In Row 2, the neighboring channel signal strength RSS_n is below the relatively high threshold value (S_n) and the receive channel signal strength RSS is equal to or lower than the relatively low threshold value (S_4), which Petitioner characterizes as meeting the claim limitation as “weak.” Here, too, in Row 2, Petitioner relies on the similar reasoning that causing the bias current to be decreased compared with the worst-case power dissipation condition is met because the current supplied to the linear units M1, A3, and M2 in Row 2 are set to lower values than the supply current provided to those linear units in the worst-case power dissipation condition in Row 4. Pet. 30.

Petitioner’s showing is sufficient for institution as it principally relies on Rauhala’s express teaching in Rauhala’s table in paragraph 17 and related textual descriptions. Petitioner’s argument that the signal strength of receive channel RSS in Row 3 is low even though it is above the “relatively low” threshold, however, does not appear to be based on an express teaching in Rauhala but relies on Dr. Baker’s testimony that one of ordinary skill would have readily understood this. *See* Pet. 28 (citing Ex. 1002 ¶ 97). This is sufficient for institution on this preliminary record. “[A] reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would ‘at once envisage’ the claimed arrangement or combination.” *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1343 (Fed. Cir. 2016) (quoting *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015)).

d. Conclusion Regarding Claim 1

In sum, for the reasons discussed above, Petitioner’s showing regarding the limitations recited in claim 1 is sufficient for institution.

Accordingly, having reviewed the Petition, Preliminary Response, and evidence cited therein, we determine that Petitioner has established a reasonable likelihood that Rauhala anticipates claim 1. This showing is sufficient to institute an *inter partes* review on all challenged claims on all asserted grounds. 37 C.F.R. § 42.108(a) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”); see *SAS Inst. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

3. Independent Claim 3

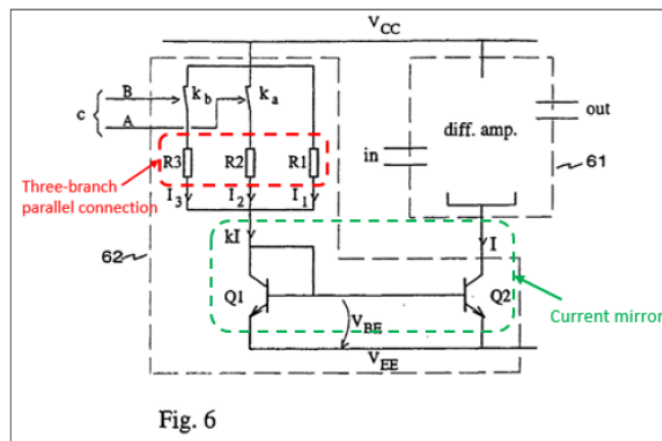
Independent claim 3 is substantially similar to claim 1. *Compare* Ex. 1001, 12:60–13:31, *with id.* at 13:38–14:4. Petitioner relies on substantially similar contentions. *Compare* Pet. 20–30, *with id.* at 30–39. Patent Owner argues claim 3 with claim 1. *See generally* Prelim. Resp. For the reasons discussed above, Petitioner’s showing regarding limitations recited in claim 3 also is sufficient for institution.

4. Independent Claim 8

Independent claim 8 is similar to claim 1 and claim 3, reciting many of the same limitations. *Compare* Ex. 1001, 12:60–13:31, *with id.* at 16:10–48. For the similarities, Petitioner relies on substantially similar contentions. *See, e.g.*, Pet. 20–30 (claim 1), 39–48 (claim 8). Claim 8 differs from claims 1 and 3, as Petitioner and Patent Owner acknowledge, in reciting “by causing a bias current *and an impedance* to vary” and “causing . . . (ii) an impedance of the one or more of the plurality of circuits *in the receiver signal path of the wireless transceiver* to be increased, thereby causing a drive current of the one or more of the plurality of circuits to be decreased.” Ex. 1001, 16:30, 44–48 (emphasis added).

As noted above, we have determined that Petitioner has met the institution threshold for claim 1. 37 C.F.R. § 42.108(a); *see SAS Inst. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). We provide additional commentary regarding arguments of the parties here.

Petitioner contends that Rauhala “teaches the concept of varying the impedance of the circuit as the signal strength of the receive change signal and the signal strength of the neighboring channel signal vary.” Pet. 46 (citing Ex. 1002 ¶¶ 131–35). Petitioner relies on the example of a linear unit’s supply current control shown in Figure 6, which is reproduced below showing Petitioner’s annotations.



Pet. 45. Figure 6 shows linear unit 61 and supply current control circuit 62, which includes transistors Q1, Q2, resistors R1, R2, R3, and switches ka and kb. Ex. 1004 ¶ 21. As Petitioner explains, “by including or excluding resistors R2 and/or R3 from the circuit by opening or closing switches ka and kb, the impedance of the circuit is varied which also affects the current kI to be varied.” Pet. 45–46 (citing Ex. 1002 ¶¶ 132–33; Ex. 1004 ¶ 21). Current I supplied to linear unit 61 (which is differential amplifier 61) is the same as current kI, and, according to Petitioner, Rauhala “teaches the concept of varying the impedance of the circuit as the signal strength of the

receive channel signal and the signal strength of the neighboring channel signal vary.” Pet. 46 (citing Ex. 1004 ¶¶ 21–22, Ex. 1002 ¶¶ 131–35).

Patent Owner contends that the Petition fails to meet the reasonable likelihood threshold for claim 8 because Petitioner fails to show that Rauhala discloses “changing an impedance of a component ‘in the receive signal path.’” Prelim. Resp. 50; *see also* Prelim. Resp. 25–31, 43–52. Petitioner and Patent Owner disagree on the meaning of “impedance” and rely on different definitions in the same engineering dictionary.³ *See, e.g.*, Pet. 53 (citing Ex. 1006, 9; Ex. 1002 ¶ 149); Prelim. Resp. 26–27 (citing Ex. 1006, 9; Ex. 2009, 6; Ex. 2005 ¶ 55).

Moreover, Patent Owner further contends that “even if changing Rauhala’s DC bias current k_I by ‘including or excluding resistors R_2 and/or R_3 ’ were changing an impedance as claimed . . . that would still not be changing an impedance of a component ‘in the receiver signal path’ as required by the language of challenged claim 8.” Prelim. Resp. 50.

On this preliminary record, we agree with Patent Owner. Patent Owner’s annotations to Rauhala’s example of a linear unit’s supply current control shown in Figure 6 are reproduced below:

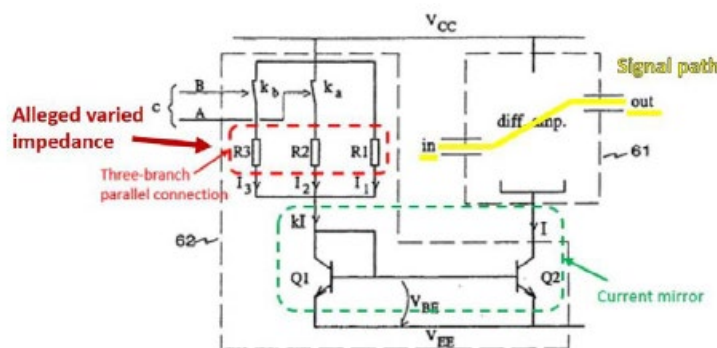


Fig. 6

³ Rudolf F. Graf, *Modern Dictionary of Electronics* (7th ed. 1999) (Ex. 1006; Ex. 2009).

Prelim. Resp. 51.

As noted previously, Figure 6 shows differential amplifier 61 and supply current control circuit 62, which includes transistors Q1, Q2, resistors R1, R2, R3, and switches k_a and k_b . Ex. 1004 ¶ 21. Patent Owner's annotations in yellow illustrate the signal path that proceeds from "in" to "out" of differential amplifier 61. Prelim. Resp. 51 (citing Ex. 2005 ¶ 63). Patent Owner also relies on Dr. Larson's declaration testimony that the circuits to control supply current to differential amplifier 61 are "not in the signal path, which proceeds from 'in' to 'out' of amplifier 61 in Figure 6." Ex. 2005 ¶¶ 62–63. Dr. Larson's testimony relies on, and is consistent with, Rauhala's Figure 6.

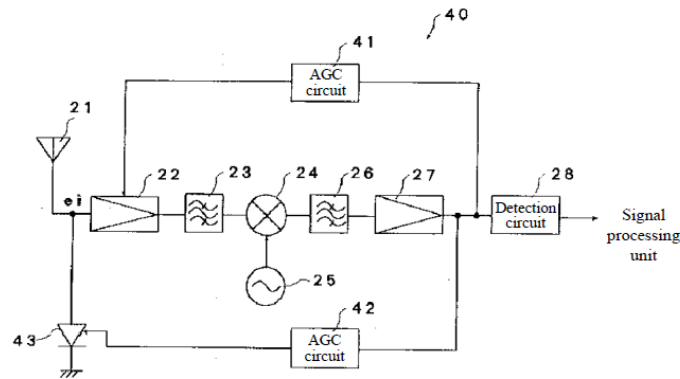
We also agree with Patent Owner that Petitioner does not discuss with particularity how Rauhala discloses causing the impedance to vary in *a circuit in the receiver signal path of the wireless transceiver* in this section of the Petition. See Pet. 44–46 (section titled "wherein the power dissipation reduction in the receiver is achieved by causing a bias current and an impedance to vary in one or more of the plurality of circuits in the receiver signal path of the wireless transceiver as the signal strength of the interferer signal and the signal strength of the desired signal vary, according to the following:"); Prelim. Resp. 51 (indicating that Petitioner does not mention the "'receiver signal path' aspect of the elements beyond quoting the claim in headings"; citing Pet. 44–46, 48–47).

E. Obviousness of Claim 4 over Rauhala and Masaaki

Petitioner asserts that claim 4 would have been obvious under 35 U.S.C. § 103 based on the combined teachings of Rauhala and Masaaki. Pet. 50–56.

1. Disclosure of Masaaki

Masaaki describes “an automatic gain control circuit which improves intermodulation characteristics of an amplification circuit used in a radio receiver such as a pager, and minimizes power consumption in the radio receiver.” Ex. 1005, code 57 (“Abstract”). Figure 1, shown below, “is a circuit block diagram of a reception unit 40 of a pager.” *Id.* ¶ 20.



As shown in Figure 1, reception unit 40 “is configured by an antenna 21, an RF amplifier^[4] 22, a bandpass filter 23, a mixer 24, a local oscillator 25, a bandpass filter 26, an IF amplifier^[5] 27, a detection circuit 28, a bias control AGC [automatic gain control] circuit 41, an input attenuation AGC circuit 42, and an attenuation diode 43.” *Id.* ¶ 21.

Masaaki’s techniques are described in the Abstract using the components shown in Figure 1. *See id.*, code 57 (identifying components in Figure 1 when describing the solution). In general, antenna 21 receives and converts a radio signal to a current signal and outputs the signal to RF amplifier 22. *Id.* ¶ 22. The antenna output to the RF amplifier 22, however, is “attenuat[ed] ahead of time” by input attenuation AGC circuit 42 and

⁴ A RF amplifier is a common abbreviation for a radio frequency amplifier.

⁵ An IF amplifier is a common abbreviation for an intermediate frequency amplifier.

attenuation diode 43 “when an excessive current signal is input into the input attenuation AGC circuit 42.” *Id.* ¶¶ 26–27. Additionally, the bias voltage output to the RF amplifier 22 is controlled by bias control AGC circuit 41 “in response to fluctuations in the current signal which is input from the IF amplifier 27.” *Id.* ¶ 25. “[T]he input attenuation AGC circuit 42 starts working after the bias control AGC circuit 41 reaches its effect limit . . . to prevent a worsening of the intermodulation characteristics” of the pager. *Id.* ¶ 34.

Masaaki’s Figure 3, shown below with Petitioner’s annotations (Pet. 52), depicts another embodiment of an automatic gain control circuit. *Id.* ¶ 36.

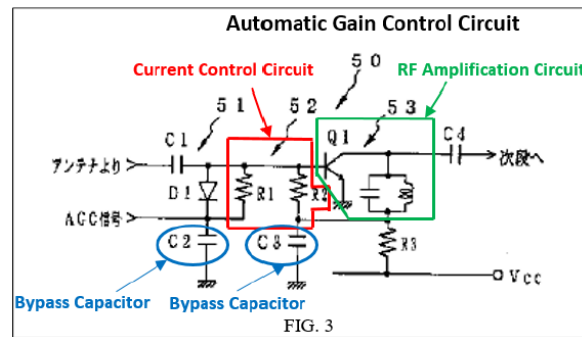


Figure 3 is a diagram of automatic control circuit 50 that includes attenuator circuit 51, current control circuit 52, and RF amplification circuit 53. *Id.* Current control circuit 52 is “configured by resistors R1, R2,” whereas RF amplification circuit 53 is “configured by a transistor Q1 and an LC resonance circuit, bias capacitors C2, C3, a coupling capacitor C4, and low voltage division resistor R3.” *Id.*

Current control circuit 52 “reduces the base current of the transistor Q1 in the RF amplification circuit 53 using resistors R1, R2.” *Id.* ¶ 38. Current control circuit 52 also “reduces the gain of the transistor Q1 when the field strength of the desired wave becomes stronger and the

impedance of the AGC signal falls.” *Id.* This “turns on the diode D1 inside the attenuator circuit 51 by raising the potential on the resistor R1 side.” *Id.*

2. Claim 4

Claim 4 depends from independent claim 3 and additionally recites “[i] wherein the change in the bias current of the one or more of the plurality of circuits in the receiver signal path is related to a change in an impedance in the one or more of the plurality of circuits in the receiver signal path; and [ii] wherein the impedance comprises at least a resistor and a capacitor.”

Ex. 1001, 14:5–11 (brackets added for reference).

Petitioner relies on its anticipation arguments regarding the limitations of claim 4 recited by independent claim 3. Pet. 50. Additionally, for limitation [i], Petitioner again asserts Rauhala’s supply current control circuit 62 varies the supply current provided to linear units and “that the supply current can be decreased by including more resistors (e.g., R2 and/or R3) within the circuit, which will effectively increase the impedance of the circuit.” Pet. 50 (citing Ex. 1004 ¶ 21; Ex. 1002 ¶¶ 143–47).

For “the impedance comprises at least a resistor” portion of limitation [ii], Petitioner relies on Rauhala’s resistors shown in Figure 6 and described above. Pet. 51 (citing Ex. 1004 ¶ 21, Fig. 6; Ex. 1002 ¶¶ 143–47). For the recited capacitor, Petitioner acknowledges that “Rauhala does not expressly state that the impedance can also comprise ‘a capacitor.’” Pet. 52. For this, Petitioner relies on Masaaki’s automatic gain control circuit shown in Figure 3 having “a current control circuit 52 configured by resistors R1, R2” and “bypass capacitors C2, C3.” Pet. 52 (quoting Ex. 1005 ¶¶ 1, 36; citing Ex. 1002 ¶ 149). Petitioner contends that Masaaki’s bypass capacitors “add to the opposition to the flow of the current at a given frequency, the

bypass capacitors can be considered a part of the total impedance of the circuit” because “impedance” was well known and an engineering dictionary defined the term to mean “[c]ombined opposition to current resulting from resistance, capacitance, and inductance.”⁶ Pet. 53.

Petitioner contends that one of ordinary skill would have modified Rauhala’s supply current control circuit 62 to include Masaaki’s bypass capacitors specifically near Rauhala’s resistors R1, R2, and R3 to reduce noise in the circuit. Pet. 53 (citing Ex. 1002 ¶¶ 150–51). Petitioner supports its contention regarding the well-known benefits of using bypass capacitors to remove noise in a circuit with two prior art references and Dr. Baker’s declaration testimony. Pet. 53–54 (citing Ex. 1002 ¶ 150–51; Ex. 1007 (“DeMaw”), 4; Ex. 1008 (“Mustafa”), 2). Petitioner also uses those two prior art references to support the assertions that the proposed modification of Rauhala’s circuit would have been within the level of ordinary skill and the results would have been predictable. Pet. 54–55 (citing Exs. 1007, 1008).

At this preliminary stage, Patent Owner does not address Petitioner’s showing with regard to claim 4. *See generally* Prelim. Resp. 23. Petitioner’s showing is sufficient for purposes of institution because Petitioner primarily relies on express teachings of the cited passages discussed above and because Petitioner’s support is sufficient at this stage for reasons one of ordinary skill would have made the proposed combination.

⁶ This definition was one of two proffered by Petitioner from the Graf engineering dictionary (Ex. 1006) discussed above. *See* Pet. 53.

III. 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 of claims 1, 3, 4 and 8 of the '825 patent is unpatentable. We institute an *inter partes* review of all challenged claims on all asserted grounds. 37 C.F.R. § 42.108(a); *see SAS Inst. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018).

IV. ORDER

Accordingly, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claims 1, 3, 4 and 8 of the '825 patent on all the grounds set forth in the Petition; 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.

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