

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
HTC CORPORATION, HTC AMERICA, INC.,
and ZTE (USA) INC.,
Petitioner,

v.

INVT SPE LLC,
Patent Owner.

IPR2018-01473
Patent 6,611,676 B2

Before THU A. DANG, KEVIN F. TURNER, and
BARBARA A. BENOIT, *Administrative Patent Judges*.

DANG, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

In this *inter partes* review instituted pursuant to 35 U.S.C. § 314, Apple Inc., HTC Corporation, HTC America, Inc., and ZTE (USA), Inc. (collectively, “Petitioner”) challenge certain claims of U.S. Patent No. 6,611,676 B2 (Ex. 1001, “the ’676 patent”). Paper 1 (“Pet.”); Paper 10 (“Dec. on Inst.”). During the trial, INVT SPE LLC (“Patent Owner”) filed a Response (Paper 12, “PO Resp.”), to which Petitioner filed a Reply (Paper 21, “Reply”). In turn, Patent Owner filed a Sur-Reply. Paper 25 (“Sur-Reply”). An oral hearing was held with the parties on January 8, 2020. A transcript of the hearing has been entered into the record. Paper 26 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1–3, 5–9, and 11 (the “challenged claims”), on which we instituted trial.¹ Based on the record before us, Petitioner has not shown, by a preponderance of the evidence, that claims 1–3, 5–9, and 11 of the ’676 patent are unpatentable.

¹ After the Petition was filed, Patent Owner disclaimed claims 4 and 10 of the ’676 patent. PO Resp. 1–2; Ex. 2005. Accordingly, this Decision does not address the patentability of claims 4 and 10. *See, e.g., Gunn v. Kopf*, 96 F.3d 1419, 1422 (Fed. Cir. 1996) (“A statutory disclaimer . . . has the effect of canceling the claims . . . and the patent is viewed as though the disclaimed claims had never existed in the patent.”); *Intel Corp. v. VLSI Tech. LLC*, IPR2018-01040, Paper 36 at 2–3, 15–17 (PTAB Feb. 12, 2020); *LG Elecs., Inc. v. Wi-LAN Inc.*, IPR2018-00673, Paper 48 at 3 (PTAB Sept. 5, 2019).

I. BACKGROUND

A. The '676 Patent (Ex. 1001)

The '676 patent, titled “Radio Communication Apparatus and Transmission Rate Control Method,” issued on August 26, 2003, from an application filed February 27, 2002, which, in turn, is a continuation of an international application filed on April 19, 1997 in Japan. Ex. 1001, codes (54), (45), (22), (63). According to the '676 patent, a communication terminal apparatus measures reception quality, and a base station apparatus switches the transmission rate based on the reported result of the reception quality. *Id.* at Abstract. Thus, the transmission rate is switched starting at the point in time at which the reception quality of the communication terminal apparatus deteriorates, so that the amount of interference with others is within the allowable range. *Id.*

Figure 2 is reproduced below:

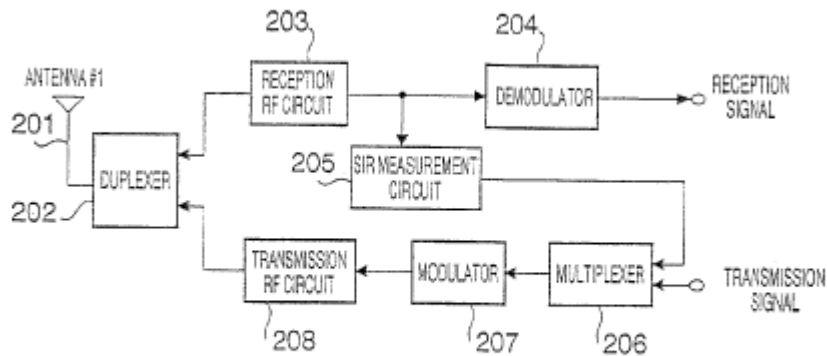


FIG. 2

Figure 2 depicts a block diagram showing a configuration of a communication terminal apparatus that carries out a radio communication with the base station apparatus. *Id.* at 3:61–65.

As shown in Figure 2, a signal received from antenna 201 is sent to reception RF circuit 203 via duplexer 202 to use a same antenna for both transmission and reception, where it is amplified and converted to an intermediate frequency or a baseband frequency. *Id.* at 3:66–4:2. The frequency-converted signal is demodulated by demodulator 204, while the output signal of the reception RF circuit is sent to reception quality measurement circuit 205, where the reception quality is measured. *Id.* at 4:3–6. The reception quality includes, for example, signal to interference ratio (“SIR”), or Signal-to-Interference plus Noise Ratio (“SINR”). *Id.* at 4:7–14.

The ’676 patent acknowledges that, in the prior art, measurement of SIR indicating the reception quality is known in transmission power control, wherein if the measured SIR is greater than the target SIR, a command to reduce transmission power is sent to the base station; if the measured value is smaller than the target SIR, a command to increase transmission power is sent to the base station; and the base station increments or decrements transmission power according to this command. *Id.* at 1:23–32. However, the ’676 patent notes that the prior art has a problem, namely, “the target SIR increases depending on the environment[,] and [the] transmission rate of the mobile station and the reception SIR sometimes decreases due to fading, etc.” *Id.* at 1:47–50. In such case, the mobile station instructs the base station to increase transmission power, which considerably increases transmission power of the base station to the mobile station and is likely to increase interference with other mobile stations to an intolerable degree. *Id.* at 1:50–56.

The operation of a transmission rate switching method in the base station apparatus according to an embodiment (*id.* at 2:45–47) is explained in detail with respect to Figure 13, reproduced below:

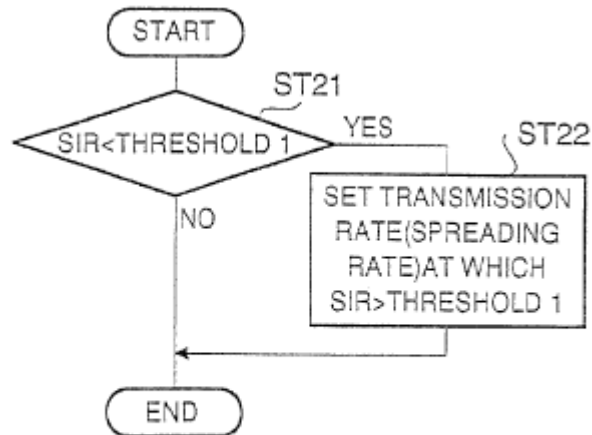


FIG. 13

Figure 13 depicts a flow chart of the transmission rate switching control circuit. *Id.* at 6:60–61. As shown in Figure 13, the base station apparatus compares the reception quality measurement result reported from the communication terminal apparatus with threshold 1 (ST21). *Id.* at 7:9–12. Threshold 1 is set according to the transmission rate, but in a Code-Division Multiple Access (“CDMA”) communication system, it is set according to the spreading factor or the number of multiplexing codes. *Id.* at 6:67–7:3. If SIR is greater than threshold 1, the same transmission rate is used, but if SIR is smaller than threshold 1, the transmission rate is switched to such a transmission rate that SIR is greater than threshold 1 (ST22). *Id.* at 7:12–15. Thus, by switching the transmission rate, SIR exceeds threshold 1 and more accurate control can be performed on varying reception quality. *Id.* at 7:16–18. “This makes it possible to improve the reception quality of

the other end of communication even if the condition of the communication path with the other end of communication deteriorates drastically,” and furthermore, to “reduce the amount of interference with others because the target reception quality is reduced and transmission power is reduced.” *Id.* at 7:19–23.

B. Illustrative Claim

Of the challenged claims, claims 1, 6, and 7 are independent. Claims 2, 3, 5 and 8 depend from claim 1, and claims 9 and 11 depend from claim 7.

Claim 1 is illustrative:

1. A radio communication apparatus having radio transmitting means and radio receiving means, said apparatus comprising:

transmission power control means for increasing or decreasing transmission power of said transmitting means according to transmission power control information received by said receiving means;

average transmission power calculating means for calculating an average value of the transmission power of said transmitting means;

allowable transmission power holding means for holding a predetermined allowable transmission power value; comparing means for comparing the average value with the allowable transmission power value; and

rate changing means for changing a transmission rate according to the comparison result in said comparing means.

Ex. 1001, 15:31–47.

C. Evidence of Record

Petitioner relies upon the references listed below (Pet. 6):

Reference		Exhibit
Keskitalo et al.	WO 95/10145, published April 13, 1995 (“Keskitalo”)	1004
Lindell et al.	US 5,524,275, issued June 4, 1996 (“Lindell”)	1005

Petitioner also relies on the Declaration of Andrew C. Singer, Ph.D. Ex. 1003. Patent Owner relies on the Declarations of Branimir Vojcic, Ph.D. Exs. 2002, 2006. Dr. Vojcic was cross-examined by Petitioner, and a transcript of his deposition was entered into the record. Ex. 1012.

D. Asserted Grounds of Unpatentability

We instituted *inter partes* review of the challenged claims on the following ground of unpatentability (Pet. 6; Dec. on Inst. 35):

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 5–9, 11	103 ²	Keskitalo, Lindell

² The Leahy-Smith America Invents Act (“AIA”), which amended 35 U.S.C. § 103, was signed into law in 2011. Changes to § 103 apply to applications filed on or after March 16, 2013. Because the ’676 patent’s filing date is prior to March 16, 2013, we refer to the pre-AIA version of § 103.

II. ANALYSIS

A. *Claim Construction*

Petitioner contends that claim terms of an “unexpired” patent should be given their “broadest reasonable construction in light of the specification.” Pet. 6. In the Decision to Institute, we gave the claim terms of the ’676 patent their ordinary and customary meaning under the broadest reasonable construction, as would have been understood by one of ordinary skill in the art at the time of the invention. Dec. on Inst. 7–8.

However, as Patent Owner points out, the ’676 patent expired on April 19, 2017, before the filing date of the Petition. PO Resp. 12. For an “expired” patent, we apply the claim construction standard outlined in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313–17 (Fed. Cir. 2005) (en banc), which is applied in Article III courts, and accord claim terms their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention. *See Wasica Finance GmbH v. Cont’l Auto. Sys., Inc.*, 853 F.3d 1272, 1279 (Fed. Cir. 2017); *Cisco Sys., Inc. v. AIP Acquisition, LLC*, IPR2014-00247, Paper 20 at 2 (PTAB July 10, 2014) (citing *Phillips*, 415 F.3d at 1313–17). In doing so, “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 1312–1317). Nevertheless, applying the *Phillips* standard, we reach the same constructions for the terms construed below as we did applying the broadest reasonable construction standard in the Decision to Institute .

Excepting the means-plus-function terms, Petitioner applies “the plain and ordinary meaning of all other claim terms,” which Petitioner contends is consistent with both the broadest reasonable construction standard and the *Phillips* standard. Pet. 6–7. Petitioner contends that Petitioner “does not believe any of these remaining claim terms require express construction to resolve the proposed grounds of rejection” presented in the Petition. *Id.* Although Patent Owner contends that the Board should apply the plain and ordinary meaning of any claim terms for the ’676 patent, Patent Owner does not contest any of Petitioner’s claim constructions set forth in the Petition, but instead contends that “it is not necessary for the Board to construe any terms in this proceeding because . . . construction is not necessary to resolve the controversy.” PO Resp. 13.

Petitioner contends that “[c]laim 1 includes limitations in means-plus[-]function format, which creates a rebuttable presumption that the [Applicant] intended to invoke 35 U.S.C. § 112, ¶ 6.”³ Pet. 7; *see also Altiris Inc. v. Symantec Corp.*, 318 F.3d 1363, 1375 (Fed. Cir. 2003). In the Decision on Institution, we addressed Petitioner’s proposed constructions of the means-plus-function terms (Pet. 10–12), and we determined that Petitioner has set forth proposed structures that support these limitations. Dec. on Inst. 8–12; *see* 37 C.F.R. § 42.104(b)(3) (2018).

As we noted in the Decision on Institution, Petitioner’s constructions presume that the meaning of specific functions, such as “calculating” an

³ Matsushita Electric Industrial Co., Ltd. was the Applicant for the ’676 patent.

average value of transmission power, for example, are generally known.

Dec. on Inst. 9. Patent Owner has not disputed this presumption.

Petitioner’s proposed corresponding structures for the MPF terms and cited supporting portions of the Specification (Pet. 7–10) are as follows:

Claim Term	Corresponding Structure
“means for increasing or decreasing transmission power of said transmitting means according to transmission power control information received by said receiving means” (claim 1)	“a circuit programmed or designed to increase or decrease transmission power based on a transmission power control signal.” As set forth in the Specification: “Transmission RF circuit 109 controls increase/decrease of the transmission power based on the transmission power control signal.” Pet. 8 (citing Ex. 1001, 12:40–42, 12:53–55, Figs. 1, 16).
“means for calculating an average value of the transmission power of said transmission means” (claim 1)	“a processor or other circuitry programmed or designed to calculate an average value of transmission power.” As set forth in the Specification: “During a communication, in ST 131, at least one frame of average transmission power (Pave) is monitored in layer 1. The transmission rate is controlled according to this channel condition.” Pet. 8 (citing Ex. 1001, 13:59–62, Fig. 29).

“means for holding a predetermined allowable transmission power value” (claim 1)	“a processor or other circuitry programmed or designed to hold a predetermined allowable transmission power value.” As set forth in the Specification: “[A]llowable transmission power (Pallow) set in a radio resource control (RRC) layer of layer 3 is sent to layer 1 (physical layer).” Pet. 8–9 (citing Ex. 1001, 13:32–34, Figs. 28, 29).
“means for comparing the average value with the allowable transmission power value” (claim 1)	“a processor or other circuitry programmed or designed to compare the average transmission power value with the predetermined allowable transmission power value.” As set forth in the Specification: “In layer 1, average transmission power is compared with allowable transmission power (Pallow),” and “First, this average transmission power (Pave) is compared with allowable transmission power (Pallow) and the difference between these two ($D = P_{allow} - P_{ave}$) is obtained.” Pet. 9 (citing Ex. 1001, 13:34–36, 13:63–14:5, Fig. 29).

“means for changing a transmission rate according to the comparison result in said comparing means” (claim 1)	“a processor or other circuitry programmed or designed to change a transmission rate according to a comparison between the average transmission power value and the predetermined allowable transmission power value.” As set forth in the Specification: “According to this message, the transmission rate is lowered in medium access control layer (layer 2),” and “Then, according to this message, medium access control layer (layer 2) increases the transmission rate.” Pet. 9–10 (citing Ex. 1001, 14:6–7, 14:23–25).
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Petitioner contends that each of these proposed constructions would be the same under the broadest reasonable interpretation standard and the *Phillips* standard. Pet. 6–7.

As Petitioner points out in its Reply, “[Patent Owner] does not dispute any aspect of Petitioner’s proposed means-plus function constructions, which are made under the broadest reasonable interpretation applicable to this proceeding.” Reply 15–17. Instead, according to Petitioner, “[Patent Owner’s] expert opined that, under the broadest reasonable interpretation applicable to this proceeding, the language of the means-plus-function limitations would have been understood by a [person with ordinary skill in the art (‘POSITA’)] at the time of the ’676 Patent.” *Id.* at 16 (citing Ex. 1012, 6:25–15:14).

As set forth in our Decision on Institution, we found Petitioner’s analysis to be sufficient under the broadest reasonable construction. Dec. on

Inst. 9. Because, on the record before us, we are persuaded that the structure and function of these terms, as would have been understood by a POSITA, are the same under the broadest reasonable construction standard and the *Phillips* standard, we do not alter these initial constructions in this Final Written Decision.

As for the other claim limitations of independent claims 1, 6, and 7, and claims 2, 3, 5, 8, 9 and 11 depending therefrom, neither party has proposed a construction of any other term. *See* Pet. 6–7; PO Resp. 12–13. We determine that we need not further construe expressly any other claim terms to resolve the arguments before us. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (explaining that only claim terms that are in controversy need to be construed and only to the extent necessary to resolve the controversy); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* to an *inter partes* review).

B. Principles of Law

To prevail in challenging Patent Owner’s claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e) (2012); 37 C.F.R. § 42.1(d) (2018). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)); *see also* 37 C.F.R. § 42.104(b) (requiring a petition for *inter*

partes review to identify how the challenged claim is to be construed and where each element of the claim is found in the prior art patents or printed publications relied on). Petitioner, ultimately, has the “burden of persuasion . . . to prove ‘unpatentability by a preponderance of the evidence,’” and this burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (quoting 35 U.S.C. § 316(e); citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time 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 nonobviousness.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁴ Neither party presents arguments regarding objective evidence of nonobviousness in the instant proceeding.

C. 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) (citation omitted). In that regard, Petitioner’s expert, Andrew C. Singer, Ph.D., testifies that a POSITA at the time of the invention

would have been a person having a Bachelor’s degree in electrical engineering or the equivalent plus three years of experience working with digital communication systems or in network engineering or a Master’s degree in electrical engineering with an emphasis on communication systems or the equivalent plus one year of experience working with digital communication systems or in network engineering.

Pet. 4–5; Ex. 1003 ¶ 35.

Patent Owner does not dispute Dr. Singer’s assessment of the level of ordinary skill in the art. *See generally* PO Resp. We adopt and apply Dr. Singer’s assessment of the level of ordinary skill in the art, which is consistent with the level of ordinary skill reflected by the prior art of record. *Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (holding that absent evidence to the contrary, “the prior art itself [may] reflect[] an appropriate level” of ordinary skill in the art).

D. Obviousness over Keskitalo and Lindell

Petitioner contends that claims 1–3, 5–9, and 11 are unpatentable under § 103 as obvious over Keskitalo in view of Lindell. Pet. 10–42. Patent Owner disputes Petitioner’s contentions. PO Resp. 13–41.

For the reasons provided below, we determine that Petitioner has not demonstrated that claims 1–3, 5–9, and 11 would have been obvious over Keskitalo and Lindell. We provide a brief description of Keskitalo and Lindell before turning to the parties’ contentions.

1. Keskitalo

Keskitalo, titled “Method of Increasing Signal Quality by Adjusting the Spreading Ratio in a CDMA Cellular Radio System,” is an international application published under the Patent Cooperation Treaty (“PCT”) on April 13, 1995, with a filing date of October 3, 1994. Ex. 1004, codes (54), (43), (22). Keskitalo discloses improving the quality of a connection between a mobile station and a base station by adjusting the spreading ratio of the connection between the base station and the mobile station during the connection on the basis of signal quality. *Id.* at Abstract.

Keskitalo recognizes that the effect of multiple access interference increases with the number of system users, which degrades the signal-to-noise ratio of connections. *Id.* at 3:6–9. Thus, for this purpose, a CDMA system utilizes power control, wherein the transmit power used by the mobile stations is controlled according to each situation. *Id.* at 3:12–15. For example, when a mobile station moves further away from the base station, it increases its transmit power so that the level of the signal received at the base station does not deteriorate. *Id.* at 3:15–18.

However, Keskitalo also recognizes that there may be situations in the CDMA system where the deterioration of signal quality cannot be compensated for by power control, such as, for example, if the mobile station is already transmitting with its highest power, and thus, “it is not

possible to increase the power any[.]more.” *Id.* at 3:19–25. Accordingly, the purpose of the invention in Keskitalo “is to realize a cellular radio system, where it is possible to improve the quality of the connection between a mobile station and a base station without power control and interference elimination methods.” *Id.* at 4:13–17.

To achieve such improvement in quality, in Keskitalo, the spreading ratio of the connection between a base station and a mobile station is adjusted during the connection on the basis of signal quality. *Id.* at 4:18–23. “The higher the spreading ratio of the CDMA system is, the better the system tolerates interference signals.” *Id.* at 4:30–32. The spreading ratio can be altered either by decreasing the data rate of the user or by increasing the data rate of the spreading code, wherein, to increase the data rate of the spreading code, the frequency band of the modulated signal will also be increased. *Id.* at 5:3–7. In an embodiment, if the quality of the connection from the mobile station to the base station is not adequate with the signal-to-noise ratio, the mobile station can alter the spreading ratio to improve the interference tolerance of the connection by “decreasing the bit rate of the data signal of the user,” for example. *Id.* at 7:23–33.

2. Lindell

Lindell, titled “Averaged RF Exposure Control,” issued on June 4, 1996, from an application filed on December 17, 1993. Ex. 1005, codes (54), (45), (22). Lindell discloses a radio transmitter output power controller that automatically restricts the maximum transmitting time during an averaging time so that the average power remains below an acceptable level. *Id.* at Abstract.

Lindell involves an average power determining circuit for determining an average power by which a radio transmitter has transmitted during a preceding time period. *Id.* at 4:5–9. Lindell’s apparatus also includes a comparator for comparing average power P_{ave} to first, predetermined threshold P_{max} , wherein the first threshold may correspond to maximum allowed average power P_{max} for given averaging time T_{ave} , which can be set by a first threshold setting circuit. *Id.* at 4:17–21. The output of the comparator activates a transmitter disable circuit, which disables the radio transmitter when the comparator determines that threshold P_{max} has been exceeded. *Id.* at 4:21–25.

Additionally or alternatively, the maximum transmitter output power may be automatically reduced to a lower level if and when a predetermined average power level is approached. *Id.* at Abstract.

3. Independent Claims 1, 6, and 7

a. “transmission power control means for increasing or decreasing transmission power of said transmitting means according to transmission power control information received by said receiving means,” “average transmission power calculating means for calculating an average value of the transmission power of said transmitting means” (claim 1, similarly recited in claims 6 and 7)

Petitioner contends that Keskitalo discloses a radio communication apparatus including a base station and a mobile station, both having an antenna, a transmitter, and a receiver. Pet 13–16, 36 (citing Ex. 1004, 5:23–34, 6:22–30, 7:3–16, Figs. 1–3). Petitioner contends that Keskitalo further discloses a “circuit (a transmission power controller) programmed or

designed to increase or decrease transmission power of a transmitter (transmitting means) based on a transmission power control signal.” *Id.* at

16. According to Petitioner, in Keskitalo:

Figure 1 shows a part of a cellular network, where **a base station BTS communicates with mobile stations MSI, MS2 in its area. . . .** The mobile stations are located at different distances from the base station, and **to minimize multiple access interference in the receiver of the base station[,] the mobile stations adjust their transmit power according to control signals supplied by the base station.** Mobile station MSI located nearer to the base station uses, over the connection 11, a transmit power which is on average lower than the one mobile station MS2 further away is using over the connection 12. However, local variations may temporarily cause strong variations in signal powers.

Id. at 16–17 (quoting Ex. 1004, 5:23–6:4) (emphasis included in Petition).

Petitioner contends that Keskitalo’s transmission power of a mobile station varies based on distance to the base station, and that the transmission power must be monitored and adjusted to minimize interference. Pet. 17. According to Petitioner, Keskitalo also recognizes that in order to minimize interference, there must be limits on transmit power permitted for a given handset. *Id.* at 18 (citing Ex. 1004, 3:19–29).

Furthermore, Petitioner contends that Lindell teaches an “integrator and an average power determining circuit that calculates an average transmission power at a mobile station.” Pet. 18. According to Petitioner, in Lindell,

A radio transmitter output power controller . . . automatically restricts the maximum transmitting time during an averaging time so that the average power remains below an acceptable

level. Additionally or alternatively, **the maximum transmitter output power may be automatically reduced to a lower level if and when a predetermined average power level is approached.**

Pet. 18–19 (quoting Ex. 1005, Abstract) (emphasis included in Petition).

Further, Petitioner provides the following excerpt from Lindell:

With reference to FIG. 1, **an apparatus in accordance with this aspect of the present invention involves an average power determining circuit 11 for determining an average power by which a radio transmitter has transmitted during a preceding time period. This might take the form of an integrating circuit. The preceding time period may be the maximum averaging time T_{ave} or a portion thereof.** The average power determining circuit may determine, as a measure of average power P_{ave} , a maximum continuous transmission time based on past transmission time within an averaging time period T_{ave} when the transmission power P_{inst} is at a fixed level.

Pet. 19 (quoting Ex. 1005, 4:5–15) (emphasis included in Petition).

Patent Owner does not dispute Petitioner’s analysis of these limitations. Based on at least the disclosures of Keskitalo and Lindell discussed above, Petitioner has demonstrated persuasively that the combination of Keskitalo and Lindell teaches “transmission power control means for increasing or decreasing transmission power of said transmitting means according to transmission power control information received by said receiving means,” and “average transmission power calculating means for calculating an average value of the transmission power of said transmitting means,” as recited in claim 1, and similarly recited in claims 6 and 7. Pet. 17–23.

b. “allowable transmission power holding means for holding a predetermined allowable transmission power value,” “comparing means for comparing the average value with the allowable transmission power value” (claim 1, similarly recited in claims 6 and 7)

Petitioner contends that Keskitalo discloses a “predetermined allowable transmission power value” and that Lindell discloses a threshold setting circuit 13 that holds a predetermined threshold transmission power $P_{\max}$ for a given averaging time T_{ave} . Pet. 23–24. In particular, according to Petitioner, in Lindell,

The apparatus also includes a comparator 12 for comparing the average power P_{ave} to a first, **predetermined threshold $P_{\max}$** . The first threshold may correspond to **a maximum allowed average power $P_{\max}$ for a given averaging time T_{ave} , which can be set by a first threshold setting circuit 13**. The output of the comparator 12 activates a transmitter disable circuit 14 which disables the radio transmitter when the comparator 12 determines that the first threshold $P_{\max}$ has been exceeded.

Pet. 24 (quoting Ex. 1005, 4:17–25) (emphasis included in Petition). According to Petitioner, “[a] POSITA would understand that the threshold setting circuit in Lindell is a processor or other circuitry programmed or designed to hold a predetermined allowable transmission power value as required by this limitation.” *Id.* at 25 (citing Ex. 1003 ¶ 44).

Petitioner also contends that Keskitalo discloses a “control processor that compares a transmission power measurement to a predetermined maximum value.” Pet. 26. In particular, according to Petitioner, Keskitalo recognizes that:

Due to the propagation conditions of the signals, **the mobile station may be in a situation where the quality of the connection is not adequate, even though the station transmitted with the highest permitted transmit power.** The base station may use as a standard for the quality of the connection for example the received signal power, the signal-to-noise ratio or the bit error rate calculated from the received signal.

Pet. 26 (quoting Ex. 1004, 6:8–16) (emphasis included in Petition).

According to Petitioner, it would have been obvious to modify Keskitalo such that its predetermined thresholds for transmission power are average transmission power values in accordance with the teachings of Lindell. Pet. 26. In particular, Petitioner contends that it would have been obvious that “[t]he first threshold may correspond to a maximum allowed average power $P_{\max}$ for a given averaging time T_{ave} ,” as in Lindell. *Id.* at 27 (quoting Ex. 1005, 4:17–21) (emphasis omitted).

Petitioner contends that the motivations to modify Keskitalo in light of Lindell are “many, including from the references themselves.” Pet. 21. In particular, Petitioner contends a POSITA would recognize that, in addition to saving power and minimizing interference with other users, “the system of Keskitalo would benefit from setting a maximum transmission threshold that ensures radiated power is below a certain level to comply with federal regulations.” *Id.* at 21–22 (citing Ex. 1003 ¶ 42). Thus, “[r]ather than utilizing an instantaneous maximum power threshold, the system of Keskitalo would use an average power as its maximum power threshold.” *Id.* at 22. According to Petitioner, upon reading the disclosure of Keskitalo, a POSITA would have known that benefits can be realized by setting a

maximum power transmission threshold based on an average transmission power value, as taught by Lindell, because “Lindell itself recognizes that its average power technique ‘can be implemented in preexisting system designs through an easily made software modification or through a slight circuit modification, such as the inclusion of an integrator circuit.’” *Id.* at 22–23 (quoting Ex. 1005, 2:13–17). That is, Petitioner argues that, based on Lindell’s disclosure and its expert declaration testimony, one of ordinary skill in the art would have reason and ability to modify Kestikalo with the technique for calculating an average transmission power value of a mobile station and utilizing this value to impose a maximum output, as taught by Lindell. *Id.* at 22–23 (citing Ex. 1003 ¶¶ 42–43).

In response, Patent Owner argues that Keskitalo’s “permitted transmit power” does not disclose a “comparison procedure.” PO Resp. 25 (citing Ex. 1004, 6:8–16). According to Patent Owner, “Keskitalo does not mention a comparison circuitry” but instead only references “compare” in the context of “comparing the bit rate of the spreading code in relation to the bit rate of the user.” *Id.* Patent Owner explains that in Keskitalo, there is no need for any comparison to determine whether a permitted value is reached “since there is no way to go beyond this value.” *Id.* at 26 (citing Ex. 2006 ¶ 7).

Patent Owner then contends that Lindell does not remedy Keskitalo’s shortcomings because Lindell teaches “limiting the transmission power,” not “changing the transmission rate.” PO Resp. 26. Furthermore, Patent Owner contends that the “threshold setting circuitry” for limiting the transmission power in Lindell does not “control the short term average transmission power levels (on the order of milliseconds),” which is the objective of the

'676 patent. PO Sur-reply 9. Citing Dr. Vojcic, Patent Owner contends that “Lindell averages the transmission power value over, e.g., 6 or 30 minutes,” which according to Patent Owner, “may be longer than the actual communication time.” *Id.* (quoting Ex. 2006 ¶ 8; citing Ex. 1012, 63:4–65:20). According to Patent Owner, Lindell does not teach “circuitry that holds the transmission power levels close to the threshold in any meaningful way” but instead teaches “circuitry that would allow the power levels to “vary up and down during T_{ave} as much as tens of decibels, or orders of magnitude.” *Id.* at 9–10. Patent Owner contends that the '676 patent, on the other hand, relates to technology that “operates on time scales of single digit milliseconds.” *Id.* at 10 (citing Ex. 1012, 64:10–23; Ex. 2002 ¶ 31).

In weighing the evidence before us, we find more persuasive the position of Patent Owner. In particular, we are unpersuaded by Petitioner’s contention that it would have been obvious to modify Keskitalo such that its predetermined thresholds for transmission power are *average* transmission power values in accordance with the teachings of Lindell. Pet. 26. That is, we are not persuaded that Petitioner has demonstrated by the preponderance of the evidence that it would have been obvious to have used Lindell’s average transmission power values as Keskitalo’s predetermined thresholds for transmission power. *See Harmonic*, 815 F.3d at 1363 (citing 35 U.S.C. § 312(a)(3) as requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”); *Magnum Oil Tools*, 829 F.3d at 1380 (holding that Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements”).

We agree with Petitioner that Keskitalo discloses a “predetermined allowable transmission power value” and a “control processor that compares a transmission power measurement to a predetermined maximum value.” Pet. 23, 26. In particular, we agree that Keskitalo does make a comparison between the transmission power measurement and the predetermined maximum value because Keskitalo determines (i.e., compares) if the mobile station is already transmitting with its highest (i.e., maximum) power. *See* Ex. 1004, 3:19–25. Thus, we are not persuaded by Patent Owner’s contention that Keskitalo does not disclose a “comparison” procedure. PO Resp. 25 (citing Ex. 1004, 6:8–16).

However, in Keskitalo, the comparison between the transmission power measurement and the predetermined maximum value is to determine if the mobile station is already transmitting with its highest power, and thus, to determine if “it is not possible to increase the power any[]more.” Ex. 1004, 3:19–25. Dr. Vojcic states in his declaration that Keskitalo determines whether it is not possible to increase the power further because the purpose of Keskitalo is “to use the highest permitted transmit power as much as possible to maximally increase the transmission efficiency.” Ex. 2006 ¶ 12. Here, in such situations where power control cannot compensate for the deterioration of signal quality because the power is at its maximum, Keskitalo adjusts the spreading ratio of the connection between the base station and the mobile station instead. Ex. 1004, 3:19–25, 4:13–23.

On the other hand, Lindell discloses reducing the maximum transmitter output power to a lower level if and when a predetermined average power level is approached. Ex. 1005, Abstract. Additionally or

alternatively, Lindell disables the radio transmitter when the comparator determines that the first threshold $P_{\max}$ has been exceeded. *Id.* at 4:21–25. As Dr. Vojcic testifies, “Lindell teaches how to avoid using the highest permitted transmit power in order to prevent potential damage to the user due to exposure to radiation.” Ex. 2006 ¶ 12. Petitioner does not acknowledge, nor adequately address, this testimony of Dr. Vojcic.

According to Dr. Vojcic, Lindell’s $P_{\max}$ value will never be used for transmission because “whenever $P_{\max}$ is reached, the transmission will be blocked.” Ex. 2006 ¶ 12 (citing Ex. 1005, Fig. 4). Dr. Vojcic declares that, on the other hand, Keskitalo affirmatively teaches artisans in the field “how best to utilize $P_{\max}$.” *Id.* (citing Ex. 1004, 6:8–16). Although Petitioner contends that it would have been obvious that Keskitalo’s threshold may correspond to Lindell’s maximum allowed average power $P_{\max}$ for a given averaging time T_{ave} (Pet. 27 (citing Ex. 1005, 4:17–21)), Petitioner’s general statement is not sufficient. In particular, Petitioner does not explain why one of ordinary skill in the art would have chosen to apply an *average* power value *for a given averaging time* for disabling a radio transmitter or reducing the transmitter’s power to a lower level, if and when the average power value approaches the highest permitted power that cannot be further increased.

In its Reply, Petitioner disputes Patent Owner’s contention that Keskitalo’s handsets should seek to maximize the time at which they are transmitting at the highest power. Reply 9 (citing Pet. 18; Ex. 1004, 3:19–29). Petitioner contends that, during his deposition, Dr. Vojcic confirmed that “rather than maximize the time during which they are transmitting at the

highest possible transmit power,” as Patent Owner contends, mobile stations should instead “transmit at the **lowest** possible power necessary to maintain a desired signal-to-noise ratio (SNR).” *Id.* at 8–9 (citing Ex. 1012, 50:14–20, 53:16–21) (emphasis included in Reply). However, assuming *arguendo* that mobile stations should instead transmit at the lowest possible power necessary, Petitioner still does not present sufficient evidence or reasoning as to why one of ordinary skill in the art would have chosen to apply an average power value for a given averaging time for disabling a radio transmitter or reducing the transmitter’s power in Keskitalo’s situations where the deterioration of signal quality cannot be compensated for by power control because the power is at its maximum. For these reasons, Keskitalo’s use of the threshold undermines Petitioner’s reliance on that threshold for substituting with Lindell’s maximum average power value.

We are unpersuaded by Petitioner’s contention that the “system of Keskitalo would benefit from setting a maximum transmission threshold that ensures radiated power is below a certain level to comply with federal regulations.” Pet. 21–22 (citing Ex. 1003 ¶ 42). Although, during oral arguments, Petitioner contended that “there were significant concerns from the [Federal Communications Commission] about the amount of exposure that users of cell phones were going to have from [radio frequency (‘RF’)] signals,” and that Lindell reduces the amount of RF signals as required (Tr. 16 (citing Ex. 1005, 1:22–29)), Petitioner does not explain how applying Lindell’s maximum *average* power value *for a given averaging time* would ensure that Keskitalo’s radiated power is below a certain level to comply with federal regulations. While Petitioner points to Dr. Singer’s declaration

for support (Tr. 18–21), neither Petitioner nor Dr. Singer sufficiently addresses Lindell’s teaching of using the maximum *average* power value for a given averaging time in asserting that Keskitalo would benefit from setting a maximum transmission threshold that ensures radiated power is below a certain level to comply with federal regulations. Pet. 21–22. As Patent Owner pointed out during oral arguments, Petitioner fails to explain why a POSITA “would look to combine an RF exposure reference with a data throughput reference.” Tr. 57.

Here, Dr. Singer’s testimony also relies on Lindell’s use of maximum power value (i.e., the certain level below which radiated power is maintained), but does not explain sufficiently the benefits of using the maximum *average* power value or why one of ordinary skill in the art would have made the particular substitution of Keskitalo’s maximum power value with such maximum average power value. Ex. 1003 ¶ 42 (“Lindell expressly recognizes that ‘new guidelines . . . encompass land-mobile systems, such as cellular radio, pocket and hand-held radio telephones’ and can be exempted ‘if the radiated power is below a certain level.’”).

Because Dr. Singer does not explain why one of ordinary skill in the art would have selected Lindell’s maximum average power value as the threshold beyond which power cannot be increased, we find Dr. Singer’s testimony to be conclusory and accord it minimal weight. 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.”); *see also In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) (“[T]he Board is entitled to weigh the declarations and conclude that the lack

of factual corroboration warrants discounting the opinions expressed in the declarations.”).

Further, as Patent Owner points out, Lindell’s threshold setting circuitry does not control the short-term average transmission power levels. PO Sur-reply 9. We agree with Patent Owner’s contention, based on Dr. Vojcic’s declaration testimony, that “Lindell averages the transmission power value over, e.g., 6 or 30 minutes,” which according to Patent Owner, “may be longer than the actual communication time.” *Id.* (quoting Ex. 2006 ¶ 8; citing Ex. 1012, 63:4–65:20). Relying on Dr. Vojcic’s declaration, Patent Owner contends that Lindell’s circuitry for power measurement is “designed to operate on a long time scale.” PO Resp. 33 (citing Ex. 2002 ¶ 32). As Patent Owner stressed during oral arguments, “6 or 30 minutes would not work in a CDMA system,” such as that of Keskitalo. Tr. 55.

According to Patent Owner, Keskitalo, on the other hand, is directed to a CDMA system, where “the frame duration on the reverse link is in the milliseconds range.” PO Resp. 34 (citing Ex. 2002 ¶¶ 29–33). Thus, “a POSITA would understand that the power control algorithms in Keskitalo are short-term adjustments of power” (e.g. every 1.25 ms), which “cannot be successfully combined with the long-term (e.g. 6 or 30 minutes) power adjustment algorithms in Lindell.” *Id.* at 34–35 (citing Ex. 2002 ¶¶ 31–32).

Although we agree with Petitioner that the claims do not require any particular time period and that a POSITA would understand very small time period variations are not within the claims’ scope (Pet. Reply 12), we agree with Patent Owner that the time period is relevant to the motivation to combine Lindell with Keskitalo. Tr. 56. As Patent Owner pointed out

during oral arguments, Petitioner never address “why would it work to bring 6 or 30 minutes into a CDMA system and try and average over that type of time period?” *Id.* at 55. According to Patent Owner, Petitioner’s expert fails to explain why a POSITA would look to a reference like Lindell of “6 to 30 minutes” to solve a problem related to a CDMA patent. *Id.* at 56.

We find Dr. Singer’s testimony that it would have been apparent to a POSITA that the system of Keskitalo could incorporate an average power as the maximum power threshold to be insufficiently supported. *See* Ex. 1003 ¶ 42. Here, Dr. Singer’s conclusory statement does not provide sufficient explanation as to why a POSITA would look to a reference like Lindell of “6 to 30 minutes” to solve a problem related to a CDMA system, such as that disclosed in Kesitalo. For this reason, we accord Dr. Singer’s testimony little weight. 37 C.F.R. § 42.65(a); *see also Acad. of Sci. Tech Ctr.*, 367 F.3d at 1368.

We recognize that it is axiomatic that bodily incorporation is not required to establish obviousness based on teachings from multiple references. *See, e.g., In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of the elements.”). Here, we are not suggesting that Petitioner must explain how Lindell’s process for restricting the maximum transmitting time during an averaging time could be included in Keskitalo’s method of adjusting the spreading ratio in a CDMA cellular radio system. *See generally* Ex. 1004; Ex. 1005. Rather, we find Petitioner’s explanation to be

incomplete because it does not provide an adequate reason that one of ordinary skill in the art would have combined the references.

In the particular circumstances of this case, with the complex technology of data communications, we are not persuaded that Petitioner has met its burden to provide sufficient articulated reasoning with rational underpinning to support Petitioner's conclusion of obviousness. After considering the full record, we are not persuaded that Petitioner's analysis rises to the level of articulated reasoning with some rational underpinning required to support Petitioner's assertion that one of ordinary skill in the art would have selected Lindell's maximum average power value as Keskitalo's threshold beyond which power cannot be increased. *See KSR*, 550 U.S. at 418.

Accordingly, we are unpersuaded by Petitioner's contention that a POSITA would understand that the threshold setting circuit in Lindell is designed to hold a predetermined allowable transmission power value such as that of Keskitalo. Pet. 25 (citing Ex. 1003 ¶ 44). Similarly, we are also not persuaded by Petitioner's contention that it would have been obvious to modify Keskitalo's disclosed control processor that compares a transmission power measurement to a predetermined maximum value such that the maximum value is the average transmission power value, in accordance with the teachings of Lindell. Pet. 26.

Accordingly, Petitioner has not demonstrated persuasively that Keskitalo and Lindell teach or suggest "allowable transmission power holding means for holding a predetermined allowable transmission power value," and "comparing means for comparing the average value with the

allowable transmission power value,” as recited in claim 1, and similarly recited in claims 6 and 7.

c. “rate changing means for changing a transmission rate according to the comparison result in said comparing means” (claim 1, similarly recited claims 6 and 7).

Petitioner contends that Keskitalo, like the '676 patent, discloses a CDMA transmitter that changes a spreading ratio. Pet. 29. In particular, Petitioner contends that, in Keskitalo, **“the spreading ratio of a connection can be altered, if necessary, and the quality of the connection may thus be improved without increasing the transmit power** and the interference to other connection in the cell.” *Id.* (quoting Ex. 1004, 4:32–5:2) (emphasis included in Petition). Petitioner contends that one of ordinary skill in the art would recognize that changing the “spreading ratio,” as described in Keskitalo, is the same as changing a “‘spreading factor’—the terminology used in the '676 Patent for changing a transmission rate in a CDMA system.” *Id.* (citing Ex. 1003 ¶ 46). That is, in Keskitalo, the spreading ratio **“can be increased by decreasing the bit rate of the data** signal of the user,” or **“can be increased by increasing the bit rate of the spreading code.”** *Id.* (quoting Ex. 1004, 7:31–35, 8:14–16) (emphasis included in Petition). According to Petitioner, it would have been obvious to modify Keskitalo’s CDMA transmitter to implement the average transmission power of Lindell. *Id.* at 30. That is, a POSITA would understand that the CDMA transmitter of Keskitalo modified to implement the average transmission power of Lindell would “change a transmission rate according to a comparison between the average transmission power value and the

predetermined allowable transmission power value.” *Id.* (citing Ex. 1003 ¶ 46).

However, Patent Owner contends that neither Keskitalo nor Lindell discloses a “rate changing means” for changing a transmission rate “according to the comparison result.” PO Resp 21. In particular, according to Patent Owner, Keskitalo discloses adjusting transmission rate without affecting the transmission power but does not disclose “adjusting transmission rate based on the result of a comparison circuitry” that executes the claimed comparison. *Id.* at 23. According to Patent Owner, Keskitalo does not disclose how or when the spreading ratio is adjusted, and in particular, “the only time Keskitalo referenced the word ‘compare’ was in the context of comparing the bit rate of the spreading code in relation to the bit rate of the user.” *Id.* at 25 (citing 1004, 6:25–27).

In weighing the evidence before us, we find more persuasive the position of Patent Owner.

Although we agree with Petitioner that Keskitalo’s CDMA transmitter comprises rate changing means for changing a transmission rate (Pet. 29), Petitioner has not demonstrated persuasively that Keskitalo’s transmission rate is changed according to the comparison results as recited in the claims. As Patent Owner pointed out during oral arguments, although Keskitalo teaches changing a rate if necessary, by increasing or decreasing a bit rate (Tr. 31), Keskitalo does not indicate that the change in rate is “in response to anything, a comparison or otherwise.” *Id.*

We are unpersuaded by Dr. Singer’s declaration that a POSITA would have recognized that Keskitalo’s CDMA transmitter, modified to implement

the average transmission power of Lindell, would be designed to change a transmission rate according to a comparison between the average transmission power value and the predetermined allowable transmission power value. Ex. 1003 ¶ 46. Here, neither Petitioner nor Dr. Singer sufficiently addresses where in Lindell there is at least a suggestion of changing the rate “according to” any comparison result.

Instead, Dr. Singer’s testimony merely points to Lindell’s use of average power value without explaining sufficiently whether any change in rate is done according to any comparison of the average power value. Ex. 1003 ¶ 46. Because Dr. Singer does not explain how a POSITA would have recognized that the power would be changed “according to a comparison,” we find Dr. Singer’s testimony to be conclusory and accord it minimal weight. *See* 37 C.F.R. § 42.65(a).

On the record before us, Petitioner has not demonstrated persuasively that Keskitalo and Lindell teach or suggest allowable transmission power holding “rate changing means for changing a transmission rate according to the comparison result in said comparing means,” as recited in claim 1, and similarly recited in claims 6 and 7.

d. Conclusion regarding independent claims 1, 6, and 7

Accordingly, we conclude that Petitioner does not demonstrate, by a preponderance of the evidence, that independent claim 1 and independent claims 6 and 7, reciting similar limitations, would have been obvious over Keskitalo and Lindell.

4. Dependent claims 2, 3, 5, 8, 9, and 11

We similarly conclude, by virtue of the dependence of claims 2, 3, 5, 8, 9, and 11 from claims 1 and 7, that Petitioner also has not demonstrated persuasively that claims 2, 3, 5, 8, 9, and 11 would have been obvious over Keskitalo and Lindell.

III. ORDER

For the foregoing reasons, it is

ORDERED that, based on a preponderance of the evidence, claims 1–3, 5–9, and 11 of U.S. Patent No. 6,611,676 B2 have not been shown to be unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

Reference(s)/Basis	35 U.S.C	Claims	Claims Shown Unpatentable	Claims Not Shown Unpatentable
Keskitalo, Lindell	103(a)	1–3, 5–9, 11		1–3, 5–9, 11
Overall Outcome				1–3, 5–9, 11

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PETITIONER:

Adam P. Seitz
Paul R. Hart
ERISE IP, P.A.
adam.seitz@eriseip.com
paul.hart@eriseip.com

Stephen S. Korniczky
Martin R. Bader
Nam H. Kim
SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
skorniczky@sheppardmullin.com
mbader@sheppardmullin.com
nkim@sheppardmullin.com

Bing Ai
Vinay P. Sathe
Babak Tehranchi
Kevin J. Patariu
John P. Schnurer
PERKINS COIE LLP
ai-ptab@perkinscoie.com
vsathe@perkinscoie.com
btehranchi@perkinscoie.com
kpatariu@perkinscoie.com
jschnurer@perkinscoie.com

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PATENT OWNER:

Cyrus A. Morton
Bryan J. Vogel
Derrick J. Carman
Li Zhu
Shui Li
John K. Harting
Mary Pheng
ROBINS KAPLAN LLP
cmorton@robinskaplan.com
bvogel@robinskaplan.com
dcarman@robinskaplan.com
sdiehl@robinskaplan.com
lzhu@robinskaplan.com
sli@robinskaplan.com
jharting@robinskaplan.com
mpheng@robinskaplan.com