

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SECURUS TECHNOLOGIES, INC.,
Petitioner,

v.

GLOBAL TEL*LINK CORPORATION,
Patent Owner.

Case IPR2016-01123
Patent 8,630,726 B2

Before KEVIN F. TURNER, BARBARA A. BENOIT, and
GEORGIANNA W. BRADEN, *Administrative Patent Judges*.

BRADEN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318 and 37 C.F.R. § 42.73

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has failed to show by a preponderance of the evidence that claims 1–11 of U.S. Patent No. 8,630,726 B1 (Ex. 1001, “the ’726 patent”) are unpatentable.

A. Procedural History

Securus Technologies, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 1–11 of the ’726 patent. Global Tel*Link Corporation (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”).

Pursuant to 35 U.S.C. § 314(a), we instituted an *inter partes* review of (1) claims 1–7 under 35 U.S.C. § 103(a)¹ as unpatentable over McNitt², Li³, and Gupta⁴; and (2) claims 8–11 under 35 U.S.C. § 103(a) as unpatentable over McNitt, Li, Gupta, Ananthaiyer⁵, and Monti⁶. See Paper 7 (“Dec. to Inst.”), 47.

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 100 et seq. effective on March 16, 2013. The ’726 patent issued from an application filed before March 16, 2013; therefore, we apply the pre-AIA versions of the statutory bases for unpatentability.

² US Patent No. 7,079,637 B1 (iss. Jul. 18, 2006) (“McNitt,” Ex. 1003).

³ US Patent No. 6,549,587 B1 (iss. Apr. 15, 2003) (“Li,” Ex. 1007).

⁴ US Patent No. 5,483,593 (iss. Jan. 9, 1996) (“Gupta,” Ex. 1004).

⁵ US Patent No. 6,385,548 B2 (iss. May 7, 2002) (“Ananthaiyer,” Ex. 1006).

⁶ US Patent No. 3,985,956 (iss. Oct. 12, 1976) (“Monti,” Ex. 1005).

After institution of trial, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”), to which Petitioner filed a Reply (Paper 21, “Reply”). In addition, Patent Owner filed objections to Evidence in Petitioner’s Reply (Paper 23), but did not file a Motion to Exclude Evidence.

An oral argument was held on August 9, 2017. A transcript of the oral argument is included in the record.⁷ Paper 32 (“Tr.”).

B. Related Proceedings

Petitioner informs us that the ’726 patent is not currently the subject of any civil action between the parties to this proceeding. Pet. 1; Paper 29 (Petitioner’s updated mandatory notices). Patent Owner also indicates that the ’726 patent is not currently the subject of any civil action, but informs us that a pending patent application is related to the challenged patent. Paper 5 (Patent Owner’s mandatory notices).

C. The ’726 Patent

The ’726 patent was filed on February 12, 2009, and is titled “System and Method for Detecting Three-Way Call Circumvention Attempts.” Ex. 1001, [54]. Many institutions, such as prisons, nursing homes, and mental institutions, include controlled telecommunications systems that offer inmates or residents limited calling access. *Id.* at 1:28–30. According to the ’726 patent, in order for a system’s methods of monitoring and control to be effective, it is important to prevent inmates or residents from exploiting any

⁷ The parties filed Objections to Demonstrative Exhibits. Papers 30, 31. In this Final Written Decision, we rely directly on the arguments presented properly in the parties’ briefs and the evidence of record. The demonstrative exhibits were only considered to the extent they are consistent with those arguments and evidence; therefore, the objections are overruled.

loopholes that can be used to bypass the control features of the system. For example, inmates or residents have been known to use three-way calling to have an outside party connect the inmate or resident to a blocked number. *Id.* at 1:46–51.

In a three-way call, the remote called party initiates a call to a third party by pressing “the hook switch on the telephone, generating a hook flash signal.” *Id.* at 1:51–54. The calling party “is temporarily put on hold while the called party establishes a connection” and then “all three parties can converse.” *Id.* at 1:54–56. Three-way calling initiated by the called party therefore provides a mechanism for an inmate or resident to bypass controls and “access blocked telephone numbers, for example, to perpetrate additional criminal activities, or harass certain parties.” *Id.* at 1:56–60. The ’726 patent recognizes that prior art systems were used to detect and prevent three-way calling; however, the ’726 patent characterizes these prior art systems as “inaccurate and subject to both false positives and false negatives.” *Id.* at 1:66–2:1. According to the ’726 patent, the prior art systems also lacked the ability to prevent a calling party from masking or covering up a three-way call attempt “by creating a constant or continuous noise (e.g., a constant hum or a constant hiss) while the three-way call is being attempted.” *Id.* at 4:61–66.

To prevent three-way calling, the ’726 patent teaches a “three-way call detection circuit for use with an existing telephone management system, and is designed to reduce the number of three-way call attempts not detected by current three-way call detection techniques.” *Id.* at 4:25–29. One embodiment of the ’726 patent is shown in Figure 1, reproduced below.

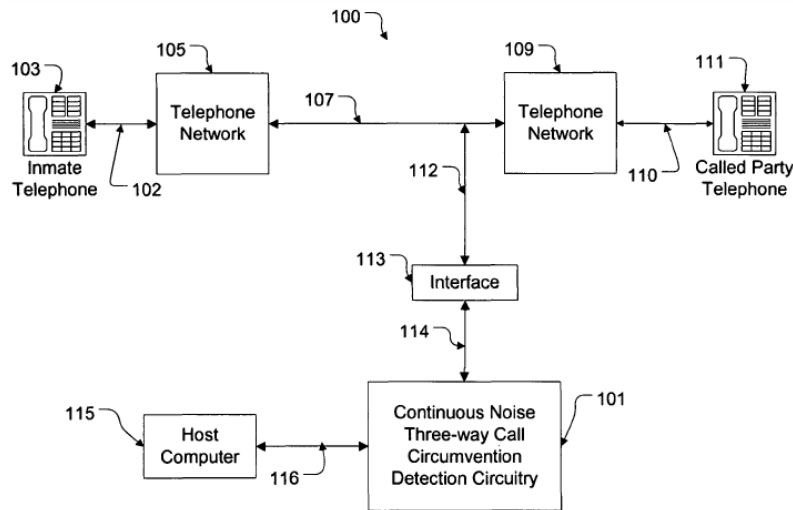


Figure 1 depicts a schematic view of a “three-way call detection system including continuous noise detection.” *Id.* at 6:8–10. As shown in Figure 1, telephone networks 105 and 109 “bi-directionally communicate audio data through connection 107” allowing users 103 and 111 to communicate (*id.* at 6:63–67), while three-way call detection circuit 101 receives audio signals from connection 107 (*id.* at 7:1–7).

Another embodiment is shown in Figure 2, reproduced below.

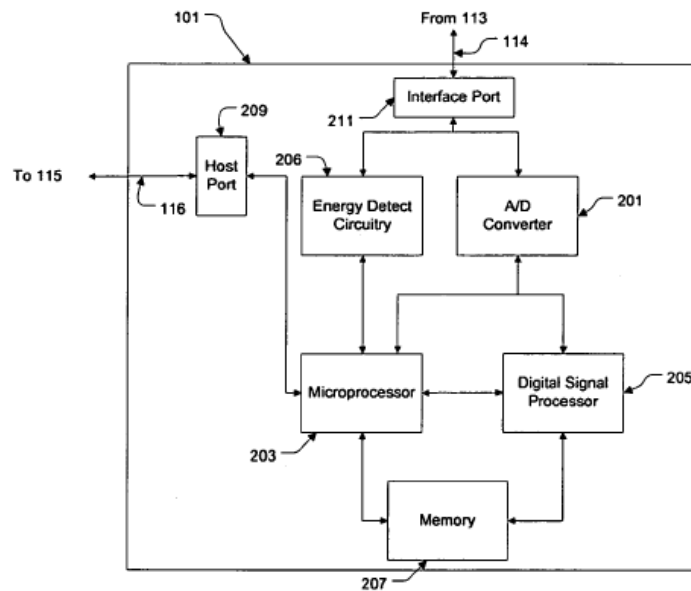


Figure 2 depicts a schematic view of “three-way call detection circuit 101 [that] detects continuous noise (i.e., power levels in a continuous noise audio stream) generated by a user in an attempt to circumvent three-way call detection.” *Id.* at 8:59–62. Specifically, three-way call detection circuit 101 examines the audio data “to identify an initial period of silence followed by continuous noise and a second period of silence (also called ‘three-way’ event).” *Id.* at 8:62–66.

The ’726 patent teaches that the implementation of three-way call detection circuit 101 “includes a digital signal processor 205 comprising a “‘continuous noise detection’ algorithm (or CND Algorithm) for identifying areas in the audio stream where the signal level is continuously above a certain threshold.” *Id.* at 8:66–9:4. The ’726 patent further teaches that the detection of continuous noise could “identify some parts of the audio stream as three-way events (i.e., silence, noise followed by silence), where no three-way event had been attempted,” such as, for example, loud continuous speech. *Id.* at 9:4–7. Therefore, according to the ’726 patent, the continuous noise detection algorithm also “detect[s] the presence of false positives in the audio stream.” *Id.* at 1:22–24.

One embodiment for implementing the method of the ’726 patent is shown in Figure 5, reproduced below.

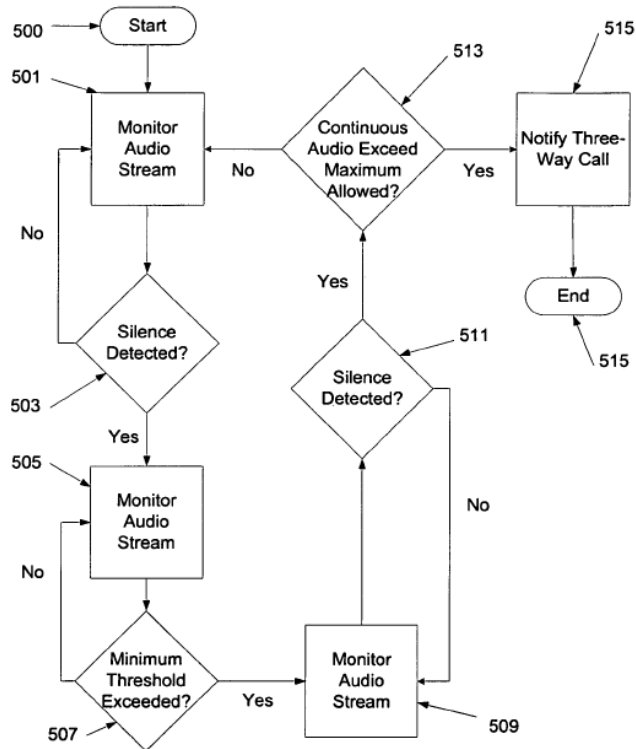


Figure 5 illustrates a method for detecting continuous noise, which is implemented within three-way call detection circuit 101. *Id.* at 10:58–61.

An alternate embodiment to the method shown in Figure 5 is shown in Figure 6, reproduced below.

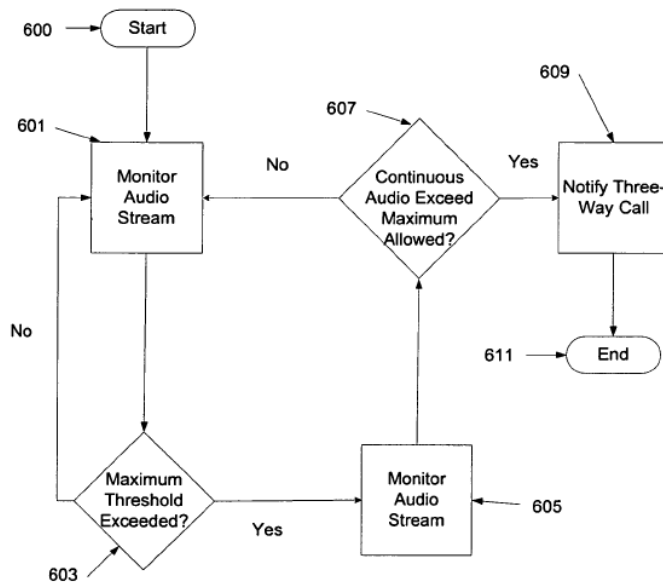


Figure 6 illustrates that, instead of monitoring for when a sample falls below a predetermined threshold, the process may monitor for sample having a power level above a pre-determined threshold. *Id.* at 11:46–49. In this way, according to the '726 patent, a timer will begin when the pre-determined threshold is reached (regardless of whether it is preceded by the sample falling below a pre-determined minimum threshold) and continue for a set period of time (T). *Id.* at 11:49–53. The '726 patent teaches that if the sample remains above the pre-determined threshold for the entire period T, the system determines that an attempt to circumvent the three way call system has occurred and appropriate action is taken. *Id.* at 11:53–56. If not, the system continues to monitor the call for events indicative of attempts to circumvent the system's three-way call detection method. *Id.* at 11:57–59.

The '726 patent teaches that the continuous noise detection algorithm “may include a plurality of Algorithms, such as a Power Distribution Filter (PDF) Algorithm and a Zero Crossing Filter (ZCRF) Algorithm to identify these false positives.” *Id.* at 13:13–17. The PDF algorithm “detects events that do not have signal power evenly distributed across the reported CND event time interval T2-T1.” *Id.* at 13:26–28. The PDF algorithm splits the audio segment into a configurable number of parts, calculates the cumulative power over each part normalized by the length of the part, and finds the largest difference between the normalized cumulative power of any of the two parts, called a “distance.” *Id.* at 13:28–36. According to the '726 patent, if the distance is larger than a “predefined configurable parameter,” then the reported CND interval is declared a false positive. *Id.* at 13:20–38.

The '726 patent further teaches that the ZCRF Algorithm “filters out all three-way events where the Zero Crossing Rate (ZCR) is below a certain

threshold that characterizes human speech.” *Id.* at 13:39–41. The ZCRF Algorithm “calculates the number of zero-crosses (X axis crosses) of a waveform signal averaged by the number of samples in the Audio Segment. If the resulting value is greater than a preconfigured reference value, such Audio Segment is declared as a false positive three-way event.” *Id.* at 13:42–46.

D. Illustrative Claims

As noted above, an *inter partes* review was instituted as to claims 1–11. Claims 1 and 6 are the only independent claims, are illustrative of the challenged claims, and are reproduced below (with paragraphing):

1. A method for detecting an attempt to mask a three-way call, said method comprising the steps of:
monitoring an audio stream;
detecting when a power level of said audio stream exceeds a pre-determined threshold;
calculating an elapsed time when said power level of said audio stream exceeds said pre-determined threshold; and
determining whether said elapsed time exceeds a maximum allowable period of time,
wherein the above steps are performed by a processor.

Ex. 1001, 14:7–16.

6. An apparatus for detecting an attempt to mask a three way call, said apparatus comprising:
an interface for receiving audio streams from a telephone line;
a microprocessor coupled to said interface for detecting when a power level of said audio stream exceeds a predetermined threshold;
wherein said microprocessor monitors said audio stream for a pre-determined time; and

wherein said microprocessor determines whether said power level of said audio stream exceeded said pre-determined threshold for the duration of said predetermined time.

Id. at 14:27–39.

II. DISCUSSION

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (“We conclude that the regulation represents a reasonable exercise of the rulemaking authority that Congress delegated to the Patent Office.”). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may provide a meaning for a term that is different from its ordinary meaning by defining the term in the specification with “reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Limitations, however, are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). In addition, the Board may not “construe claims during [an *inter partes* review] so broadly that its constructions are unreasonable under general claim construction principles.” *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015).

Petitioner proposes constructions for the claim terms “continuous noise detection algorithm” and “power distribution filter algorithm.”

Pet. 24–28. Patent Owner disputes Petitioner’s proposed constructions for these terms. Prelim. Resp. 8–11. After analyzing the claims and supporting specification of the ’726 patent, we determine that we need not provide express constructions for the disputed claim terms in order to reach our decision.

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) 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.” *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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

A determination of whether a patent claim is invalid as obvious under § 103 requires consideration of all four *Graham* factors, and it is error to reach a conclusion of obviousness until all those factors are considered.” *Apple v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. Oct. 7, 2016), *cert. denied* (Nov.6, 2017). “This requirement is in recognition of the fact that each of the *Graham* factors helps inform the ultimate obviousness determination.” *Id.* Additionally, a determination of obviousness cannot be made with conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of

obviousness. *KSR*, 550 U.S. at 418; *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). We must be careful not to allow hindsight reconstruction of references to reach the claimed invention without any explanation as to how or why the reference would produce the claimed invention. *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368 (Fed. Cir. 2012) (quoting *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 n.3 (Fed. Cir. 2008)); *see also KSR*, 550 U.S. at 421 (“A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.”).

“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”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (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).

Thus, to prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. At this final stage, we determine whether a preponderance of the evidence of record shows that the challenged claims would have been obvious over the proposed combinations of prior art.

We analyze the instituted grounds of unpatentability in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. “The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). The level of ordinary skill in the art may be reflected by the prior art of record. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *GPAC*, 57 F.3d at 1579. In a given case, one or more factors may predominate. *Id.* Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovention Toys, LLC v. MGA Entm’t, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) (“A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.”).

Petitioner’s Declarant, Dr. Tim A. Williams, opines that a person of ordinary skill in the art relevant to the ’726 patent would have had “at least a bachelor’s degree in electrical engineering, computer engineering, or the equivalent and two or more years of industry experience in a relevant field,

or the academic equivalent thereof.” Ex. 1009 ¶ 80. Dr. Williams further opines that “[s]uch a person would have been familiar with the standard components, methods, and protocols used at the time of the invention of the ’726 patent for networking, data transmission, and data storage.” *Id.*

Patent Owner does not dispute Dr. Williams’ testimony. *See generally* Prelim. Resp. Patent Owner’s Declarant, Dr. Leonard J. Forys (“Dr. Forys”), however, proffers his own assessment regarding a person of ordinary skill in the art relevant to the ’726 patent. According to Dr. Forys, one of ordinary skill in the art would have had “a B.S. degree in Electrical Engineering, Computer Science, or an equivalent field as well as at least 3–5 years of academic or industry experience in communications systems, or comparable industry experience.” Ex. 2002 ¶ 29. Dr. Forys does not address Dr. Williams’ testimony in this regard or otherwise indicate whether his analysis would change if Dr. Williams’ proffered level of ordinary were adopted. *Id.*

We have reviewed the ’726 patent, the types of problems and solutions described in the ’726 patent and cited prior art, and the testimony of Dr. Williams and Dr. Forys (who mostly agree as to the level of skill of an ordinarily skill artisan). Based on our review, we adopt and apply Dr. Williams’ definition of a person of ordinary skill in the art at the time of the claimed invention for purposes of this Decision. In addition, our analysis would not change if Dr. Forys’ proffered level of ordinary skill were adopted.

*D. Alleged Obviousness of Claims 1–7 in view of
McNitt, Li, and Gupta*

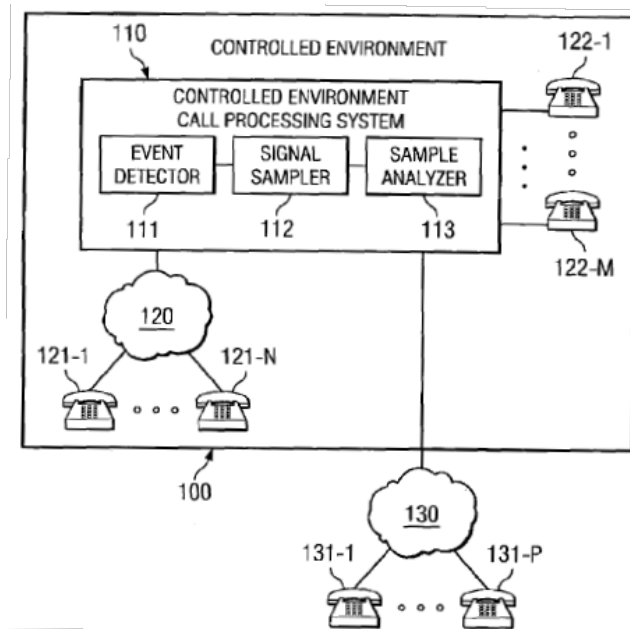
Petitioner contends claims 1–7 of the ’726 patent are unpatentable under 35 U.S.C. § 103 in view of McNitt, Li, and Gupta. Pet. 28–55. Patent Owner disputes Petitioner’s contentions, arguing that Petitioner fails to demonstrate the unpatentability of the claims. PO Resp. 14–47. In reply, Petitioner maintains its position. Pet. Reply 6–23. We have reviewed the Petition, Patent Owner’s Response, and Petitioner’s Reply, as well as the relevant evidence discussed in those papers. For reasons that follow, we determine Petitioner has failed to demonstrate by a preponderance of the evidence the unpatentability of claims 1–7.

1. Overview of McNitt

McNitt is titled “System and Method for Detecting Unauthorized Call Activity” and discloses a system for detecting unauthorized calls through a silence detection technique employing multiple samples. Ex. 1003, [54], Abst. McNitt “monitors a call in progress” in controlled environments such as prisons “to detect an event such as might be indicative of unauthorized call activity” such as having a called party instigate a hook flash in preparation of making a three-way call. *Id.* at 2:25–42. After an event that may indicate an unauthorized call activity is detected, a sampling process is invoked that analyzes multiple samples of a called party’s side of a call to make a determination as to whether or not a particular unauthorized call activity is being attempted. *Id.* at 2:31–34. For certain embodiments, McNitt teaches “monitor[ing] a call in a linear, non-compressed form, for a loud noise, e.g., presence of signal energy above a predetermined threshold,

for an indication that unauthorized call activity may be being attempted.”
Id. at 2:35–39.

A call processing system adapted to use the teaching of McNitt is shown in Figure 1, reproduced below:

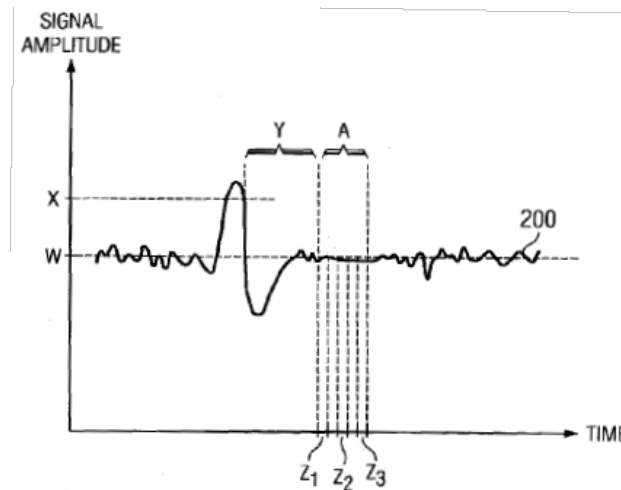


As shown in Figure 1, call processing system 110 may provide a number of access points coupled to a variety of user terminals. *Id.* at 4:33–35.

Accordingly, call processing system 110 of the illustrated embodiment provides connectivity to user terminals 122-1 through 122-M disposed within controlled environment facility 100 via direct connections, user terminals 121-1 through 121-N disposed within controlled environment facility 100 via indirect connections (here comprising a network or networks, referred to herein as network 120), and user terminals 131-1 through 131-P disposed external to controlled environment facility 100 via indirect connections (here comprising a network or networks, referred to herein as network 130). *Id.* at 4:35–45. For example, network 120 coupling user terminals 121-1 through 121-N to call processing system 110 may

comprise a private branch exchange (PBX) system, a local area network (LAN), an intranet, or other suitable communication network. *Id.* at 4:45–49. Network 130 coupling user terminals 131-1 through 131-P to call processing system 110 may comprise the public switched telephone network (PSTN), a LAN, a wide area network (WAN), the Internet, or other suitable communication network. *Id.* at 4:49–54.

Figure 2, reproduced below, represent a telephone conversation portion as monitored by call processing system 110.



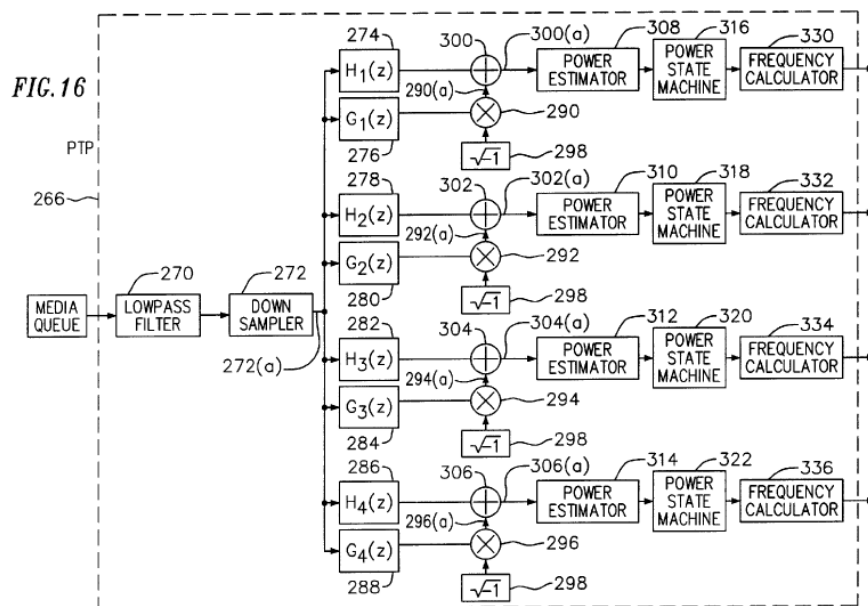
As shown in Figure 2, illustrated above, audio portions of telephone conversations may be converted to digital signals, such as linear digital signals conforming to the wave (.wav) file format, as may be represented by waveform 200. *Id.* at 5:6–9. According to McNitt, call processing system 110 is adapted to monitor communications by analyzing waveforms, such as wave form 200, to detect unauthorized call activity. *Id.* at 5:10–13. McNitt teaches that a switch that enhanced calling services, such as three-way calling, are desired results in a burst of high energy in the received signal. *Id.* at 5:33–36. Therefore, McNitt suggests monitoring signal energy to detect if it exceeds a predetermined threshold (shown in Figure 2 as X),

which may correspond to unauthorized call activity, as may be provided by event detector 111 of Figure 1. *Id.* at 5:37–41.

2. Overview of Li

Li is titled “Voice and Data Exchange Over a Packet Based Network with Timing Recovery” and discloses a signal processing system that discriminates between voice signals and data signals modulated by a voiceband carrier. Ex. 1007, [54], Abst. Li teaches that the signal processing system interfaces with telephone devices and packet based networks. *Id.* at 6:13–15. Li’s integrated interface for “various telephony devices” include a “tone detector” for analyzing the strength and duration of sounds to detect call progress tones and a “voice activity detector” for identifying “digital voice samples with an energy below the threshold.” *Id.* at 22:11–23, 38:7–35.

One embodiment of Li’s signal processor 266 is reproduced in Figure 16, shown below.



As illustrated in Figure 16 above, Li employs its power estimators at specific locations in its processing chain after lowpass filtering, down sampling, bandpass filtering, and combining multiple signals to form complex signals. Ex. 1007, 38:36–39:5. Power estimator 308, 310, 312, 314 estimate the short term average power of the combined complex signals for comparison to power threshold determined in accord with the industry standard. *Id.* at 39:1–5. The power estimator forwards an indication to the power state machines. *Id.* at 39:5–6.

The signal processor of Figure 16 forwards a tone on/tone off indication to cadence processor 268, which considers the time sequence of events to determine whether a precise tone is present. *Id.* at 40:10–14. Specifically, Li’s tone detector compares the time an audio signal’s power is above a pre-determined threshold (the “POWER ON” time) against a standard value to determine the presence of a call progress tone. *Id.* at 40:10–44. Li’s voice activity detector distinguishes voice from “noise” by determining if the power of the audio signal is greater than a power threshold, e.g., a default value of -20 dBm in an environment with a noisy background. *Id.* at 22:11–23.

3. Overview of Gupta

Gupta is titled “Call Progress Decoder for Multiple Cadenced Tones on Telephone Lines” and discloses an apparatus that monitors a telephone line to detect call progress tones, e.g., a busy signal or a ring back signal, on telephone networks. Ex. 1004, 1:38–41, [54]. To accomplish this, Gupta compares a sampled signal from an audio stream to a minimum energy threshold and establishes the ON and OFF times that the signal exceeds the threshold. *Id.* at 6:28–7:25. Gupta then characterizes the cadence of the

signal by comparing the ON and OFF times of the signal to MIN and MAX time thresholds to establish whether the signal represents a valid call progress tone. *Id.* Gupta uses a call progress status detector, such as that shown in Figure 1 reproduced below, for “detecting a valid tone being generated over a telephone line.” Ex. 1004, 1:62–64.

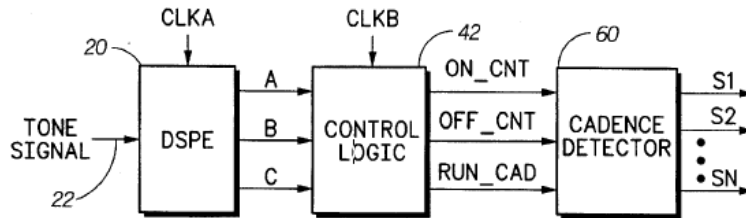
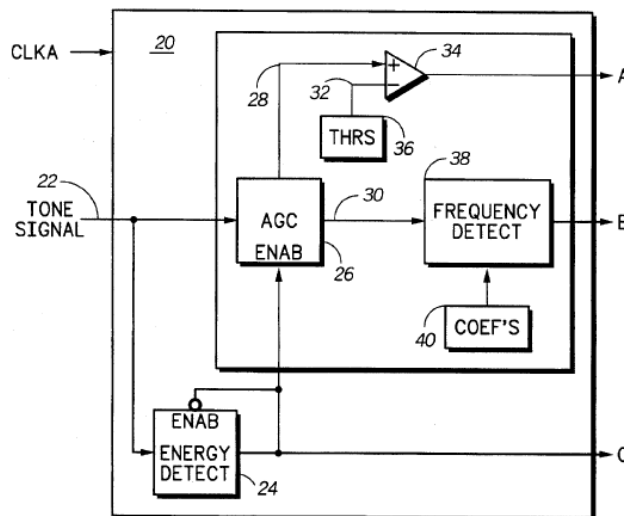


Figure 1 illustrates digital signal processing element (DSPE) 20 that monitors a telephone line of any one of a plurality of telephone networks to detect tone signal 22 and determines the validity thereof. *Id.* at 2:65–3:1. Gupta teaches that analog tone signal 22 maybe sampled in accordance with a clock signal, designated as CLKA, and each sample digitized and processed. *Id.* at 3:1–4.

Figure 2 of Gupta, reproduced below, illustrates one embodiment of a DSPE’s functionality.



As shown in Figure 2, sampled tone signal 22 is operated on by gross energy detection function 24, which performs a “leaky-type” integration on tone signal 22, and thereafter, compares the resultant signal to an energy detect threshold. Ex. 1004, 3:7–11. According to Gupta, when the resultant signal, reaches the threshold, a digital signal or a flag, denoted as C, is set true and it disables detection function 24 and enables automatic gain control (AGC) operational block 26. *Id.* at 3:11–14. When enabled, AGC function 26 operates on tone signal 22 to produce signals 28 and 30, which are representative of tone signal 22. *Id.* at 3:14–16. Gupta teaches that signal 28 is compared with threshold setting 32 in comparator 34 and a flag, designated as A, is set true when signal 28 exceeds signal 32. *Id.* at 3:16–19. Gupta further teaches that signal 32 may be a programmable threshold stored in memory register 36 of element 20 and represents a valid tone energy threshold level. *Id.* at 3:19–21. Additionally, signal 30 is frequency discriminated in operational block 38, which according to Gupta, is a bandpass filter having a frequency pass band that may be programmed by a set of programmable coefficients stored in memory registers 40 of processor element 20. *Id.* at 3:21–26. Operational block 38 also compares filtered and unfiltered signals 30 to decide for the absence or presence of any tone within the programmed frequency band, and if present, sets a flag B, which Gupta teaches is a further indication of a valid tone signal. *Id.* at 3:26–30.

4. Analysis of Cited Art as Applied to the Independent Claims 1 and 6

Petitioner contends independent claims 1 and 6 of the '726 patent are unpatentable under 35 U.S.C. § 103 in view of McNitt, Li, and Gupta. Pet. 31–42, 47–54. Patent Owner disputes Petitioner's contentions arguing

that the proffered combination fails to teach multiple limitations of the challenged claims and that Petitioner fails to provide articulated reasoning with rational underpinning for combining the cited references. PO Resp. 14–47. The dispositive issues in this case are whether Petitioner (1) has established that the combination of McNitt, Gupta, and Li disclose, “*detecting when a power level of said audio stream exceeds a pre-determined threshold*” as recited in independent claims 1 and 6, and (2) has shown a rationale for combining the cited prior art references.

Petitioner contends that Li discloses the “detecting” “a power level” limitation because Li’s call progress tone detectors include “power estimators” that determine “the short term average power” of its input signals “for comparison to power thresholds determined in accordance with [a] standard.” Pet. 33 (citing Ex. 1007, 39:1–5, 39:17–22). Petitioner then argues that the limitation also is disclosed by Gupta, because “Gupta monitors a telephone line to detect when the energy level of a valid call progress tone exceeds a pre-determined threshold, Gupta’s call progress status detector utilizes a digital signal processing element (DSPE) that ‘monitors a telephone line to detect [] tone signal 22.’” Pet. 33–34 (citing Ex. 1004, 2:65–67, 6:42–44, Fig. 1).

Petitioner argues it is significant that Gupta discloses that the “minimum energy threshold may be programmed to [a] required power level” for a valid signal. *Id.* at 35 (citing Ex. 1004, 6:41–44). According to Petitioner, this “required power level” corresponds to the claimed “pre-determined threshold.” *Id.* (citing Ex. 1009 ¶ 186). Petitioner states that a person of ordinary skill in the art would have understood that Gupta’s

energy threshold is the same as the power level threshold disclosed in Li. *Id.* (citing Ex. 1009 ¶¶ 174–177).

Petitioner supports its position with the Declaration of Dr. Williams. Dr. Williams testifies that Gupta’s energy threshold is based on the “required power level,” and one of ordinary skill in the art would have understood that both thresholds “are essentially equivalent and can be used interchangeably” in this context. Ex. 1009 ¶ 176. Therefore, Dr. Williams concludes that the substitution of Gupta’s energy threshold for a power threshold would have yielded predictable results. *Id.*

Petitioner then argues that McNitt discloses detecting when a power level of the monitored stream exceeds a certain threshold by including embodiments that monitor signal attributes indicative of signal energy, such as signals above a relatively high signal energy threshold exceeding a specified time limit. Pet. 36 (citing Ex. 1003, 9:54–63). According to Petitioner, one of ordinary skill in the art would have found the claimed “power level of said audio stream” obvious in light of “McNitt’s disclosure of the use of “other indirect indices of unauthorized activity . . . such as a loud noise sustained for a period of time” detects “above a relatively high signal energy threshold.” *Id.*

Patent Owner contests Petitioner’s contentions arguing that unlike Li, the disclosures of Gupta and McNitt measure energy, not power. PO Resp. 24. Aside from a conclusory statement that Gupta and Li are “the same,” “essentially equivalent,” and “interchangeabl[e],” Patent Owner contends Petitioner never actually proposes substituting Li’s power thresholds into Gupta or McNitt; rather, Patent Owner explains that the Petitioner merely notes that Gupta already discloses the “*detecting*” element. *Id.* at 25 (citing

Pet. 33, 35–36). Patent Owner argues that “[t]he mere existence of power thresholds in Li does not on its own render claim 1 obvious.” *Id.* According to Patent Owner, Petitioner’s failure to articulate an actual combination of Li’s power estimators with Gupta and/or McNitt is not a harmless omission, because the Petition failed to put Patent Owner on notice as to the actual proposed rejection of its patented claims. *Id.* at 26 (citing *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015)).

Patent Owner further contests Petitioner’s contentions because energy and power are not the same thing and are not “essentially equivalent” or “interchangeable.” *Id.* at 27. Patent Owner relies on the declaration of Dr. Forsys to support its position. Dr. Forsys testifies that energy and power are distinct measurements of a signal that provide different information and produce different results. Ex. 2002 ¶¶ 39–40. Dr. Forsys further explains, and Dr. Williams agreed during his in deposition, that energy is the integral of power. *Id.* ¶ 43; Ex. 2001, 27:5–14.

We agree with Patent Owner that energy and power are not the same thing. Yet, we understand Petitioner to rely on Li’s teaching to meet the limitation of the detecting “power” as recited in the challenged claims, because Gupta and McNitt do not disclose the detection of “energy.” Thus, if Petitioner demonstrates a rationale to combine Li with Gupta and McNitt, then the combined teachings would have at least suggested the disputed limitation for claims 1 and 6. Accordingly, we now analyze whether Petitioner sufficiently provides an articulated reasoning with rational underpinnings for the combination of McNitt, Gupta, and Li.

a. Rationale to Combine Cited Art

Petitioner contends there would have been multiple reasons that would have prompted a person of ordinary skill in the art to modify McNitt in view of Gupta. Pet. 28–30. First, Petitioner specifically contends that a person of ordinary skill would have combined McNitt with the features disclosed in Gupta and Li. *Id.* at 28 (citing Ex. 1009 ¶ 138) (indicating that from the perspective of a person of ordinary skill, “McNitt begs to be combined with the features disclosed in Gupta and Li”); Reply 7. According to Petitioner, the ’726 patent and McNitt describe the desire to solve identical problems (i.e., preventing circumvention of a three-way call detection scheme). Pet. 28. Petitioner argues that in addition to detecting a hook flash (three-way call attempt) directly, McNitt discloses the obvious, known method of monitoring a call for indirect indices of unauthorized activity—detecting a loud noise sustained for a period of time that masks a three-way call. *Id.* Petitioner further argues that a person of ordinary skill in the art would have been motivated to incorporate the known signal processing techniques of Gupta and Li with the teachings of McNitt to provide an improved capability to detect an attempt to mask a three-way call by detecting continuous noise (e.g., blowing into the receiver). *Id.* at 28–29.

Second, Petitioner contends that the compatibility of McNitt, Gupta, and Li would have been obvious, and so would have been the reasons that a skilled artisan would have combined them: (1) McNitt, Gupta, and Li are all in the same field of telecommunications monitoring and control as the ’726 patent (Ex. 1009 ¶ 192); (2) all three references operate in a very similar manner using similar components (*id.* ¶ 143); and McNitt, Gupta, and Li are similarly equipped with a processor, and indeed would readily operate

separately or together to monitor the same audio stream of the same telephone line (*id.* ¶ 164). Pet. 29. Petitioner argues these examples: (i) where McNitt detects a loud noise indicative of unauthorized call activity, Gupta and Li detect a tone, which would provide improved filtering of the audio stream for unauthorized call activity (Ex. 1009 ¶ 140); and (ii) where McNitt discloses a time threshold of two seconds to distinguish a loud sound as an attempt to mask a three-way call, Gupta and Li calculate the elapsed time when the signal level of the audio stream exceeds one or more pre-determined thresholds by using counters to detect a tone cadence (*id.* ¶ 141). Pet. 29. According to Petitioner, it would have been understood that Gupta's and Li's teachings could be applied to calculate the duration of loud sounds of McNitt with no more than reasonable experimentation. Pet. 29–30 (citing Ex. 1009 ¶ 142). Petitioner explains that McNitt's method of detecting noise exceeding a duration of two seconds could be improved by applying the known techniques of Gupta and Li, since those techniques would have allowed McNitt to differentiate between precise sound levels and minimize false positives. *Id.*

Third, Petitioner contends that a person of ordinary skill in the art at the time of the '726 patent would have understood "the rudimentary relationship between power and energy of a signal sample for a given time." Reply 9 (citing Ex. 1013 ¶¶ 30–34). Petitioner asserts that a person of ordinary skill in the art would have recognized that Li's power thresholds could be used when applying Gupta and McNitt. *Id.* at 12 (citing Pet. 28-30; Ex. 1013 ¶¶ 32–33). Petitioner further argues that a demonstration of the physical combinability of McNitt and Gupta with Li is unnecessary to show obviousness of the combined teachings. *Id.* Nonetheless, Petitioner asserts

that a skilled artisan would have understood that such physical combination “could be accomplished utilizing the processor of McNitt, which Dr. Forys (Depo., 58:1–19) agrees is programmable to modify ‘in the light of what McNitt is trying to do.’” Reply 13 (citing Ex. 1012 (Deposition Transcript for Dr. Forys); Ex. 1013 ¶¶ 24–25 (explaining that McNitt is trying to utilize a plurality of techniques to detect unauthorized call activity in a prison setting)).

Petitioner then contends that Patent Owner cannot support its arguments regarding the interchangeability of energy and power. Reply 13–14. Specifically, Petitioner argues Patent Owner “has no evidence that energy thresholds cannot be programmed to their required power level.” *Id.* at 13. According to Petitioner, Dr. Forys’s admission that power and energy “scale linearly” contradicts Patent Owner’s “assertion that power and energy measurements thresholds are incompatible, not interchangeable, and different.” *Id.* at 14 (citing Ex. 1012, 19:24–20:5; Ex. 1013 ¶ 34). Petitioner explains that “[g]iven a sample of an audio signal having **a known time interval**, for example, one may monitor that sample to measure both power or energy because they are mathematically related (power is energy used over time).” *Id.* (citing Ex. 1012, 32:1–3; Ex. 1013 ¶ 37–38).

Petitioner concludes that the claims of the ’726 patent do no more than incorporate known techniques for measuring signal level over time. Pet. 30 (citing Ex. 1009 ¶ 138). According to Petitioner, those of ordinary skill would have readily implemented such techniques into known systems and methods with no more than reasonable experimentation and it would have yielded predictable results in the detection of attempts to mask a three-way call attempt. *Id.* Petitioner argues that the addition of Gupta or Li to

McNitt would have predictably increased the overall reliability of McNitt to prevent unwanted call activity by improving McNitt's ability to detect valid tones and other sounds and decreasing McNitt's detection of false positives. *Id.* (citing Ex. 1009 ¶ 152).

Patent Owner contests Petitioner's position. PO Resp. 14–24. Specifically, Patent Owner contends Petitioner never explains what arrangement of McNitt, Gupta, and Li renders the claims obvious. *Id.* at 15. Instead, according to Patent Owner, Petitioner cites to various portions of the references as separately disclosing each claim element, which Patent Owner contends requires the Board and Patent Owner to make the final step of combining the various citations into a system that renders obvious the challenged claims as a whole. *Id.* For example, Patent Owner notes Petitioner argues that each of Li, Gupta, and McNitt separately discloses the “detecting” limitation of claim 1. *Id.* at 17 (citing Pet. 33–36). Patent Owner asserts that Petitioner's citations to Li's “power estimators that determine the short term average power... in accordance with [a] standard,” fails to explain the actual operation of these estimators or how or why a person of ordinary skill in the art would combine Li's power estimators with Gupta and McNitt. *Id.* at 17 (citing Pet. 33, 37, 52).

Patent Owner further contends that Petitioner fails to describe why similarities between the '726 patent and McNitt would motivate combining McNitt with Gupta and Li. PO Resp. 18–19. According to Patent Owner Petitioner's assertion that the references “are all in the same field of telecommunications monitoring and control as the '726 patent” is unsupported attorney argument. *Id.* at 19 (citing Pet. 29). Patent Owner argues Petitioner's reliance on Dr. Williams's declaration is insufficient,

because Dr. Williams does not testify about the field of any the references or the '726 patent. *Id.* (Ex. 1009 ¶ 192).

Patent Owner next contends that Petitioner's statement that "all three references operate in a very similar manner using similar components" is insufficient to provide a rationale to combine their teachings. *Id.* (citing Pet. 29). According to Patent Owner, Petitioner fails to provide sufficient evidence that the teachings of the references operate in a similar manner using similar components, because Petitioner relies on Dr. William's testimony that only compares Gupta and McNitt but not Li. *Id.* at 20 (citing Pet. 29; Ex. 1009 ¶ 143).

Patent Owner then contends that Petitioner's substitution of power for energy as a metric for making decisions that "would yield predictable results" is incorrect and unsupportable. PO Resp. 23 (citing Pet. 30). According to Patent Owner, Petitioner has no support for its position, because the cited paragraphs of Dr. Williams's declaration say nothing about the predictability of substituting power and energy metrics. *Id.* (citing Ex. 1009 ¶¶ 141–143). Patent Owner asserts that to the extent other portions of Dr. Williams's testimony repeat Petitioner's argument, Dr. Williams provides no evidence to support his conclusions. *Id.* In contrast, Patent Owner argues that its declarant, Dr. Forys, testifies regarding the differences between power and energy at length and cites supporting evidence. *Id.* at 20 (citing Ex. 2002 ¶¶ 39–43).

Patent Owner concludes that beyond Petitioner's conclusory statements that Gupta's energy thresholds and Li's power thresholds are "the same" or "interchangeabl[e]," Petitioner never articulates how these references would have been combined to render the claims obvious or why a

skilled artisan would have combined their teachings to reach the challenged claims. PO Resp. 27 (citing Pet. 35–36).

We agree with Petitioner that a person of ordinary skill in the art at the time of the '726 patent would likely understand the relationship between power and energy. We also agree that there is a relationship between power and energy, and that it is possible to derive information about one from the other. See Ex. 1012, 18:14–25:8; Ex. 2001, 25:10–27:14; Ex. 2005, 238. Based on the evidence of record, we do not agree, however, that power and energy “are essentially equivalent and can be used interchangeably” as asserted in the Petition. See *id.*; see Pet. 36 (citing Ex. 1009 ¶¶ 174–177). Nor do we agree one of ordinary skill in the art would have understood that the Gupta energy threshold is the same as the power level threshold disclosed in Li. See Ex. 1012, 18:14–25; Ex. 2001, 25:10–27:14; Ex. 2005, 238. Petitioner’s reliance on Dr. Williams’s testimony regarding Gupta’s disclosure that “[a] minimum energy threshold may be programmed to [the cadence tone’s] required power level for a valid signal on a line” is equally unpersuasive. Ex. 1009 ¶ 181 (citing Ex. 1004, 6:41–44). We are unpersuaded because neither Petitioner nor Dr. Williams explains sufficiently how Gupta’s minimum energy threshold relates to a required power level or how it relates to Li’s power estimator and the purpose of Li’s power estimators.

Given the lack of equivalence between power and energy, we find Petitioner fails to present sufficient evidence explaining why a person of ordinary skill in the art *would* have switched from detecting a power threshold, such as that described in Li and required by the challenged claims, to detecting an energy threshold as disclosed in McNitt and Gupta.

Petitioner must articulate a *reason why* a person of ordinary skill in the art would combine the prior art references. *Personal Web Techs. v. Apple*, 848 F.3d 987, 991–92 (Fed. Cir. 2017); *In re NuVasive*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *Metalcraft of Mayville, Inc. v. The Toro Company*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) (“[I]t is insufficient to simply conclude the [prior art] combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination.”); *see Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“obviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention”). Conclusory statements alone, even those provided by a declarant, are inadequate to demonstrate a rationale for why a person of ordinary skill in the art would combine the teachings from prior art references. *NuVasive*, 842 F.3d at 1383. Instead, Petitioner’s arguments must be supported by a “reasoned explanation.” *Id.* (citing *In re Lee*, 277 F.3d 1338, 1342, 1345 (Fed. Cir. 2002)). We understand that a person of ordinary skill is a person of ordinary creativity, not an automaton, but “[w]ithout any explanation as to how or why the references would be combined to arrive at the claimed invention, we are left with only hindsight bias that *KSR* warns against.” *Metalcraft*, 848 F.3d at 1367 (“[T]he obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation,’ we also recognize that we cannot allow hindsight bias to be the thread that stitches together prior art patches into something that is the claimed invention” (quoting *KSR*, 550 U.S. at 420–21)).

We agree with Petitioner that the cited references do not need to be physically combinable to render claim 1 obvious. *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.”); *see also In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc). Obviousness, however, “may not be established using hindsight or in view of the teachings or suggestions of the inventor.” *Para-Ordnance Mfg. v. SGS Importers Int’l*, 73 F.3d 1085, 1087 (Fed. Cir. 1995) (citing *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1551, 1553 (Fed. Cir. 1983)). Additionally, it is impermissible for Petitioner to “use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (citing *In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991)). Accordingly, Petitioner must set forth clearly in the Petition which references it is relying on for each specific limitation and how those combined teachings would render the challenged claims obvious. *See* 35 U.S.C. § 312(a)(3).

In the instant case, Petitioner appears to argue that McNitt, Gupta, and Li are so clearly combinable that a person of ordinary skill in the art would have automatically combined the disparate elements taught in the prior art references to render the challenged claims obvious. *See* Pet. 28–29. Petitioner further argues that a person of ordinary skill in the art would have wanted to improve McNitt to prevent false positives and false negatives by using the techniques of Li and Gupta. *Id.* During oral arguments, Petitioner stated “McNitt discloses pretty much the entire invention. And to the extent you need to grab [some missing element], you could look to these other

references [Gupta and Li] to supplement McNitt.” Paper 32, 8:3–7.

According to Petitioner, “McNitt, in and of itself, states that you should look to other references to add and to supplement McNitt’s invention to improve its techniques, including tone-detection references.” *Id.* at 8:8–11. Yet, in the Petition, Petitioner fails to identify which reference it relies on for each claim limitation or why a person of ordinary skill in the art would use a particular disclosure to arrive at the claimed invention.

Dr. Williams testifies that all of the elements of the claims disparately existed in the prior art, but fails to provide sufficient reason for why one of ordinary skill in the art at the time of filing would have combined these references. *See, e.g., InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1348–49 (Fed. Cir. 2014) (holding expert testimony to be impermissible hindsight for failing to explaining what reason or motivation one of ordinary skill in the art at the time of the invention would have had to place the prior art together). Neither Petitioner nor Dr. Williams identifies what particular advantages or efficiencies would have prompted a person of ordinary skill in the art to combine Li’s power estimators with McNitt’s energy system or with a system combining McNitt and Gupta. Accordingly, we find that Petitioner’s argument is fraught with hindsight bias. *See KSR*, 550 U.S. at 418 (“A patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently, known in the prior art.”); *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368-69 (Fed. Cir. 2012) (“[Smith & Nephew] never offered evidence articulating why a person having ordinary skill in the art would combine the primary references to obtain the disclosed inventions.”); *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373-74

(Fed. Cir. 2008) (“We must still be careful not to allow hindsight reconstruction of references to reach the claimed invention without any explanation as to how or why the references would be combined to produce the claimed invention.”). In the absence of Li teaching the detection of a minimum energy threshold or Gupta teaching the conversion of an energy threshold into a power threshold, Petitioner needed to explain what would have led a person of ordinary skill in the art at the time of the invention to consider replacing an energy threshold detection system with the detection of a power threshold. Petitioner failed to provide such an explanation. Moreover, we find Petitioner fails to provide sufficient evidence showing a person of ordinary skill in the art would have had a reasonable expectation of success in combining the teachings of Gupta’s minimum energy threshold with Li’s power threshold to get the recited invention.

Based on the totality of the record, we agree with Patent Owner that Petitioner fails to offer sufficient explanation as to why or how a person of ordinary skill in the art would have combined the teachings of Li regarding power levels with the teachings of McNitt’s energy detection and Gupta’s energy threshold. We also agree with Patent Owner that Petitioner fails to sufficiently demonstrate a reasonable expectation of success in combining the teachings of the cited references. Accordingly, we determine Petitioner has failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claims 1 and 6 would have been obvious under 35 U.S.C. § 103(a) in view of McNitt, Li, and Gupta.

5. Analysis of Cited Art as Applied to Dependent Claims 2–5 and 7

Petitioner argues the combination of McNitt, Li, and Gupta teaches, or at least suggests, the limitations recited in dependent claims 2–5 and 7. Pet. 42–54. Petitioner supports its contentions with the testimony of Dr. Williams. *See* Ex. 1009 ¶¶ 202–234. Patent Owner disputes Petitioner’s position and contends McNitt, Li, and Gupta fail to teach the limitations of independent claim 6 dependent claims 2–5 and 7. *See* PO Resp. 38–47.

We have considered carefully all arguments and supporting evidence in light of the limitations recited in challenged independent claim 6 as well as dependent claims 2–5 and 7. After careful consideration of the entire record, we find Petitioner’s argument and evidence about claims 2–5 and 7 are deficient for the same reasons as claims 1 and 6 above. Accordingly, we determine Petitioner has failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claims 2–5 and 7 would have been obvious under 35 U.S.C. § 103(a) in view of McNitt, Li, and Gupta.

6. Summary

We have considered the entirety of the evidence, the arguments presented by Patent Owner in its Response, and its declarant’s testimony in support thereof. For the foregoing reasons, and weighing the evidence as a whole, we conclude Petitioner has failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claims 1–7 would have been obvious under 35 U.S.C. § 103 in view of the teachings of McNitt, Li, and Gupta.

E. Alleged Obviousness of Claims 8–11 in view of McNitt, Li, Gupta, Ananthaiyer, and Monti

Petitioner contends claims 8–11 of the '726 patent are unpatentable under 35 U.S.C. § 103 in view of McNitt, Li, Gupta, Ananthaiyer, and Monti. Pet. 55–66. Patent Owner disputes Petitioner's contentions. PO. Resp. 32–38. For reasons that follow, we determine Petitioner failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claims 8–11 would have been obvious under 35 U.S.C. § 103 in view of the teachings of McNitt, Li, Gupta, Ananthaiyer, and Monti.

1. Overview of McNitt

See supra Section II.D.1.

2. Overview of Li

See supra Section II.D.2.

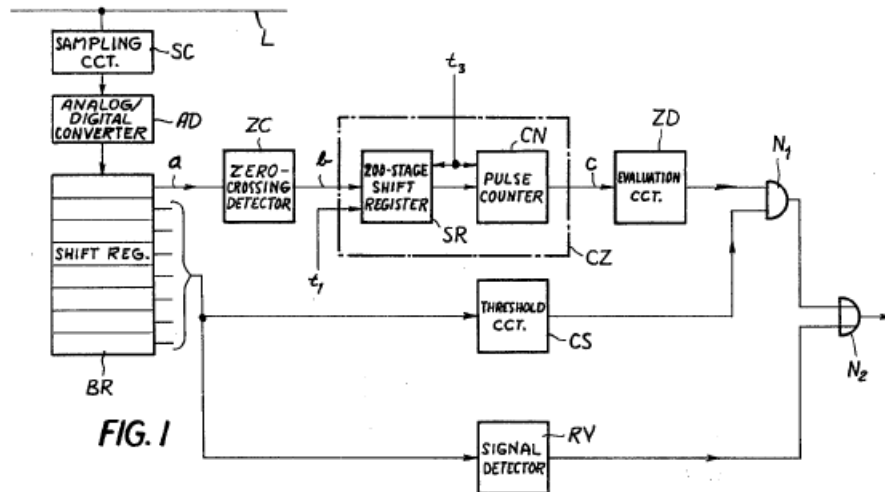
3. Overview of Gupta

See supra Section II.D.3.

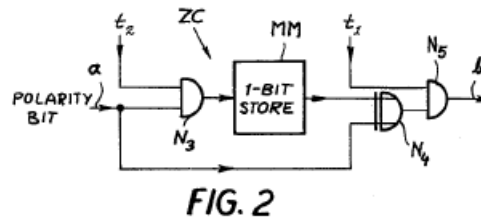
4. Overview of Monti

Monti is titled “Method of and Means for Detecting Voice Frequencies in Telephone System” and is related to “a method of checking the activity of a voice-communication line, i.e. of ascertaining the presence or absence of voice frequencies on that line, as well as to a system for carrying out this method.” Ex. 1005, 1:6–10. Monti solves the problem of systems that fail to recognize significant elements of human speech by detecting the characteristic frequencies of speech that distinguish them by magnitude and rate of change from line noise. *Id.* at 1:56–63. To detect a characteristic frequency, Monti discloses providing “a zero-crossing detector connected to an analog/digital converter in a line-sampling circuit to receive

successive polarity bits therefrom, this detector emitting a counting pulse in response to any changeover in the binary value of the oncoming polarity bits.” *Id.* at 2:21–31. A conventional sampling circuit SC periodically testing the voltage level on a telephone line L is shown in Figure 1, reproduced below. *Id.* at 2:62–64.



Sampler SC works into analog/digital converter AD deriving from each voltage sample a combination of bits which are fed to shift register BR for parallel readout. *Id.* at 2:65–68. The highest-ranking bit, indicative of the polarity of the voltage sample, is read out over a lead to zero-cross detector (ZC) shown in Figure 2, reproduced below. *Id.* at 2:68–3:3.



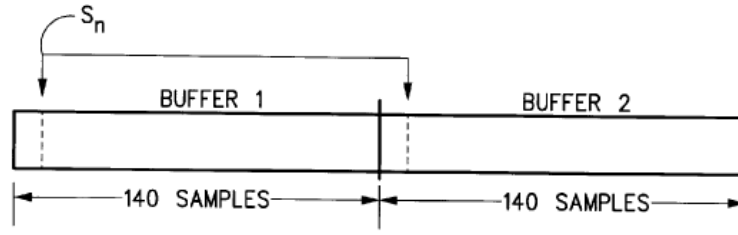
Monti’s zero-crossing detector ascertains “zero crossings of the line voltage” (*id.* at 1:64–2:3), and a “numerical value indicative of the character of the line signal” is obtained (*id.* at 2:3–2:20). Monti explains: “By counting the number of such changeovers within a predetermined test

interval substantially longer than a sampling period, that number being a measure of the instantaneous signal frequency, we can derive from the count of zero crossings a numerical value indicative of the character of a line signal.” *Id.* at 2:3–9. “A comparison of this numerical value with a predetermined threshold, therefore, reveals whether the signal has the characteristic of a constituent of a spoken syllable” indicating “speech in an audio stream.” *Id.* at 2:9–12.

5. Overview of Ananthaiyer

Ananthaiyer is titled “Apparatus and Method for Detecting and Characterizing Signals in a Communication System” and relates particularly “to detecting and characterizing signals in a communication system.” Ex. 1006, 1:7–9, [54]. In particular, Ananthaiyer teaches efficient voice, tone, and noise detection by use of an Average Magnitude Difference Function (AMDF) to evaluate pitch variations over discrete time intervals to determine whether a signal in a communication system is a voice signal, a tone signal, or a noise signal. *Id.* at 3:15–16. In Ananthaiyer, signal processing hardware continually samples and buffers a signal directly from the line. *Id.* at 3:63–4:7. Ananthaiyer also teaches that “a tone signal will maintain a relatively constant energy level at its fundamental pitch, a voice signal will have a varying energy level at its fundamental pitch, and a noise signal will have no distinguishable fundamental pitch.” *Id.* at 3:12–16.

In one embodiment in Ananthaiyer, a double buffer system is used for storing the input samples. *Id.* at 3:14–4:2. Such a buffer system is shown in Figure 5, reproduced below.



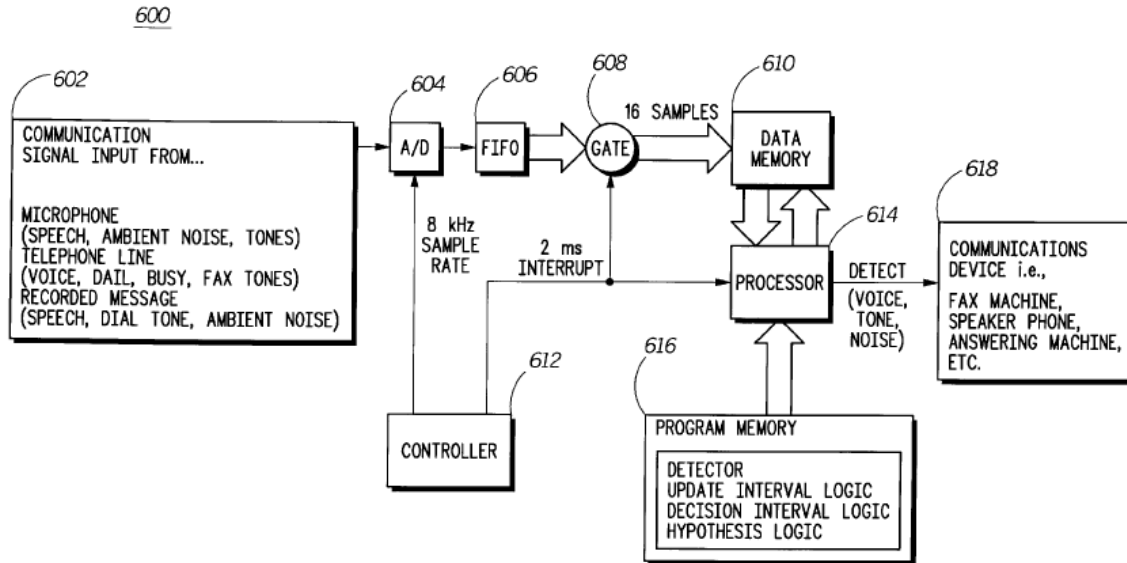
As shown in Figure 5, above, the two buffers are contiguous, and each stores X input samples ($X > 140$), where the two buffers are filled initially with zeros. *Id.* at 4:2–4. Each input sample S_n is stored at an equivalent slot in each buffer, so that the stored samples are X slots apart. *Id.* at 4:4–6. Each buffer is treated as a circular buffer in that each slot is overwritten with a new sample every X samples. *Id.* at 4:6–7. During each update interval m , the update interval logic operates on the buffer of input samples. *Id.* at 4:8–9. In one embodiment disclosed in Ananthaiyer, the interval m is 2 milliseconds and the sampling rate is 8 KHz, and therefore, the update interval logic operates on 16 input samples per update interval m . *Id.* at 4:9–12. The detector calculates a local AMDF value over the interval m for each of the pitch periods K . *Id.* at 4:12–14. The local AMDF value $AMDF_{16m}(K)$ for each pitch period K is equal to:

$$AMDF_{16m}(K) = \sum_{n=1}^{16} |x(n) - x(n-K)|$$

where $x(n)$ is sample n from the buffer and $x(n-K)$ is a prior sample, which precedes sample n by K samples. *Id.* at 4:14–22.

Ananthaiyer further teaches an embodiment that uses signal detector apparatus 600 to distinguish communication signal input 602 between voice, tone, or noise signals based on computation of two metrics according to an

embodiment of the present invention. *Id.* at 8:3–7. This embodiment is shown in Figure 7, reproduced below.



The apparatus of Figure 7, above, includes analog/digital (A/D) converter 604 for converting the analog input signal into a digital signal. *Id.* at 8:7–9. Typically, as taught by Ananthaiyer, signal input 602 can be from a microphone (speech, ambient noise or tones) or a telephone line (voice, dial, busy or fax tones) or can be a recorded message (speech, dial tone, ambient noise). *Id.* at 8:9–12. The apparatus further includes FIFO (first in first out) buffer 606, which stores samples from A/D converter in accordance with the chosen sampling rate. *Id.* at 8:12–14. According to Ananthaiyer, in one embodiment, the sampling rate is 8 KHZ. *Id.* at 8:14–16. Gate 608 is at the output of the FIFO transfers a block of sixteen input signal samples to data memory 610 upon an interrupt generated by controller 612. *Id.* at 8:16–18. In the preferred embodiment, the interrupt period is 2 ms that is the update interval. *Id.* at 8:18–20. Controller 612 generates the clock and interrupt signals, and the interrupt invokes processor 614 to execute program

instructions from program memory 616 on newly received input samples.
Id. at 8:20–23.

6. Analysis of Cited Art as Applied to Dependent Claim 8

Claim 8 depends from independent claim 6 and recites
“microprocessor includes a continuous noise detection algorithm for
detecting a false three-way call.” Ex. 1001, 14:42–44.

Petitioner contends claim 8 of the ’726 patent are unpatentable under
35 U.S.C. § 103 in view of McNitt, Li, Gupta, Ananthaiyer or Monti.
Pet. 55–57. Petitioner specifically contends that Gupta teaches claim 8,
because Gupta uses DSPE 20, a microprocessor, to implement an algorithm
that detects the energy level of tone signal 22 and representative signal 28,
which is sampled from an audio stream received from the telephone line. *Id.*
at 55–56 (citing Ex. 1004, 3:4–22, Fig. 2; Ex. 1009 ¶ 238). Petitioner
appears to rely on Monti or Ananthaiyer solely for their disclosures of
processors that are capable of performing specific algorithms to detect
human speech. *Id.* at 57 (citing Ex. 1001, 13:9–17; Ex. 1009 ¶ 241).
Petitioner does not appear to rely on Monti or Ananthaiyer for any
limitations recited in independent claim 6.

Therefore, after careful consideration of the entire record, we find
Petitioner’s argument and evidence about claim 8 deficient for the same
reasons as claims 1 and 6 above. Accordingly, we determine Petitioner has
failed to present sufficient evidence to demonstrate by a preponderance of
the evidence that claim 8 would have been obvious under 35 U.S.C. § 103 in
would have been obvious under 35 U.S.C. § 103(a) in view of McNitt, Li,
Gupta, Ananthaiyer, and/or Monti.

7. Analysis of Cited Art as Applied to Dependent Claim 9

Claim 9 depends from independent claim 6 and recites “wherein said continuous noise detection algorithm includes a power distribution filter algorithm and a zero crossing filter algorithm.” Ex. 1001, 14:45–47.

Petitioner contends claim 9 of the ’726 patent are unpatentable under 35 U.S.C. § 103 in view of McNitt, Li, Gupta, Ananthaiyer, and Monti. Pet. 57–61. First, Petitioner specifically argues that Monti teaches the claimed zero crossing filter algorithm. *Id.* at 58 (citing Ex. 1005, 1:64–2:20). According to Petitioner, a person of ordinary skill in the art would have understood that Monti and the ’726 patent use the same zero crossing filter algorithm for the same purpose. *Id.* (citing Ex. 1001, 13:42–43; Ex. 1005, 2:1–3).

Second, Petitioner argues that Ananthaiyer teaches that the claimed “continuous noise detection algorithm includes a power distribution filter algorithm” under Petitioner’s proposed construction of the term. Pet. 60. According to Petitioner, because Ananthaiyer is capable of distinguishing various signal types, it would have been apparent to persons of ordinary skill in the art that apparatus 600 discloses a power distribution filter algorithm (i.e., an algorithm capable of detecting the distribution of power levels over a period of time). *Id.* at 60–61 (citing Ex. 1006, 8:3–16; Ex. 1009 ¶¶ 249–251). Petitioner presents side-by-side comparison of two equations it contends are from Ananthaiyer and the ’726 patent:

PDF Algorithm of Ananthaiyer	PDF Algorithm of the ’726 patent
$AMDF16_m(K) = \sum_{n=1}^{16} x(n) - x(n - K) $	$PDF(K) = \sum_{n=1}^y x(n) - \sum_{n=1}^y x(n - K) $

Id. at 61. Petitioner supports its equation comparison with testimony from Dr. Williams. Dr. Williams testifies that algorithms are from Ananthaiyer (Ex. 1006, 4:14–22) and the '726 patent (Ex. 1001, 12:26–38) and that:

It would have understood by persons ordinarily skilled that Ananthaiyer's algorithm, which utilized the equation above, was capable of detecting a tone, which has an even distribution of power across the same segment, a voice, which had a varied distribution, and a noise. Accordingly, Ananthaiyer teaches the claimed "power distribution filter algorithm" under the broadest reasonable interpretation.

Ex. 1009 ¶ 255. Petitioner then argues that the two equations "would have been understood by person of ordinary skill to arrive at the same result, namely a characterization of the power distribution across a given sample." Pet. 61 (citing Ex. 1009 ¶¶ 254–255).

Petitioner appears to rely on Monti or Ananthaiyer teach or suggest the limitation of "wherein said continuous noise detection algorithm includes a power distribution filter algorithm and a zero crossing filter algorithm," as recited by claim 9. Petitioner does not appear to rely on Monti or Ananthaiyer for any limitations recited in independent claim 6.

Therefore, after careful consideration of the entire record, we find Petitioner's argument and evidence about claim 9 deficient for the same reasons as claims 1 and 6 above. Accordingly, we determine Petitioner has failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claim 9 would have been obvious under 35 U.S.C. § 103 in would have been obvious under 35 U.S.C. § 103(a) in view of McNitt, Li, Gupta, Ananthaiyer, and/or Monti.

8. Analysis of Cited Art as Applied to Dependent Claims 10 and 11

Petitioner argues the combination of McNitt, Li, Gupta, Ananthaiyer, and Monti teaches, or at least suggests, the limitations recited in challenged dependent claims 10 and 11. Pet. 61–64. Petitioner supports its contentions with the testimony of Dr. Williams. See Ex. 1009 ¶¶ 256–267.

Petitioner appears to rely on Monti or Ananthaiyer solely for their disclosures of limitations recited in dependent claims 10 and 11. Petitioner does not appear to rely on Monti or Ananthaiyer for any limitations recited in independent claim 6.

Therefore, after careful consideration of the entire record, we find Petitioner’s argument and evidence about claims 10 and 11 deficient for the same reasons as claims 1 and 6 above. Accordingly, we determine Petitioner has failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claims 10 and 11 would have been obvious under 35 U.S.C. § 103 in would have been obvious under 35 U.S.C. § 103(a) in view of McNitt, Li, Gupta, Ananthaiyer, and/or Monti.

9. Summary

We have considered the entirety of the evidence, the arguments presented by Patent Owner in its Response, and its declarant’s testimony in support thereof. For the foregoing reasons, and weighing the evidence as a whole, we conclude Petitioner has failed to present sufficient evidence to demonstrate by a preponderance of the evidence that claims 8–11 would have been obvious under 35 U.S.C. § 103 in view of the teachings of McNitt, Li, Gupta, Ananthaiyer, and/or Monti.

III.CONCLUSION

For the foregoing reasons, we determine Petitioner has failed to show by a preponderance of the evidence that: (1) claims 1–11 of the '726 patent are obvious in view of McNitt, Li, and Gupta; or (2) claims 8–11 of the '726 patent are obvious in view of McNitt, Li, Gupta, Ananthaiyer, and/or Monti.

IV. ORDER

For the reasons given, it is

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1–11 of the '726 patent are unpatentable; and

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

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