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Paper 36
Date: June 16, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD, and SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

STATON TECHIYA, LLC,
Patent Owner.

IPR2022-00242
Patent 8,111,839 B2

Before NATHAN A. ENGELS, SCOTT B. HOWARD, and RUSSELL E. CASS, *Administrative Patent Judges.*

CASS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background

In this *inter partes* review, Samsung Electronics Co., Ltd, and Samsung Electronics America, Inc. ("Petitioner") challenge the patentability of claims 1, 5–12, 14–17, and 21–23 (the "challenged claims") of U.S. Patent No. 8,111,839 B2 (Ex. 1001, "the '839 patent"), which is assigned to Staton Techiya, LLC. ("Patent Owner").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during the trial in this *inter partes* review. For the reasons discussed below, Petitioner has proven by a preponderance of the evidence that claims 1, 5, 7, 11–12, 14–17, and 21–23 are unpatentable. Petitioner has not proven by a preponderance of the evidence that claims 6 and 8–10 are unpatentable.

B. Procedural History

In this proceeding, Petitioner relies upon the following references:

Le et al., US 2003/0161097 A1, published Aug. 28, 2003 (Ex. 1006, "Le");

Victorian, EP 1 519 625 A2, published Mar. 30, 2005 (Ex. 1007, "Victorian");

Yuen et al., US 5,903,868, issued May 11, 1999 (Ex. 1008, "Yuen");

Kvaløy, US 6,728,385 B2, issued Apr. 27, 2004 (Ex. 1009, "Kvaløy");

Sjursen, US 7,756,285 B2, issued July 13, 2010 (Ex. 1010, "Sjursen");

Langhart, US 2002/0118798 A1, published Aug. 29, 2002 (Ex. 1011, "Langhart");

Kurki-Suonio, US 9,123,343 B2, issued Sept. 1, 2015 (Ex. 1012, "Kurki"); and

Stuckman, US 2004/0109668 A1, published June 10, 2004 (Ex. 1013, "Stuckman").

Pet. iv, v, 2. Petitioner submits the Declaration of Dr. Les Atlas, Ph.D. (Ex. 1002). Patent Owner submits declarations from Daniel P. Anagnos (Exs. 2001, 2006).

Petitioner challenges the patentability of claims 1, 5–12, 14–17, and 21–23 of the '839 patent based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1, 6, 22, 23	103(a)[1]	Le, Victorian
5	103(a)	Le, Victorian, Yuen
7	103(a)	Le, Victorian, Kvaløy
8–10	103(a)	Le, Victorian, Sjursen
11 and 12	103(a)	Le, Victorian, Langhart
14–17	103(a)	Le, Victorian, Kurki
21	103(a)	Le, Victorian, Stuckman

Pet. i–iii, 3. Patent Owner filed a Preliminary Response. Paper 13 ("Prelim. Resp."). We instituted trial on all grounds of unpatentability. Paper 16 ("Inst. Dec."), 72.

[1] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), included revisions to 35 U.S.C. § 103 that became effective after the filing of the application that led to the '839 patent. Therefore, we apply the pre-AIA version of 35 U.S.C. § 103.

During the trial, Patent Owner filed a Response (Paper 22, "PO Resp."), Petitioner filed a Reply (Paper 25, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 26, "PO Sur-reply").

An oral hearing was held on March 23, 2023, a transcript of which appears in the record. Paper 35 ("Tr.").

C. Real Parties in Interest

Petitioner states that the real parties in interest are Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. Pet. 1, 75. Patent Owner states that Staton Techiya, LLC and Synergy IP Corporation are the real parties in interest. Paper 8, 1.

D. Related Proceedings

Petitioner states that the '839 patent was asserted in *Staton Techiya, LLC v. Samsung Electronics Co., Ltd.*, Case No. 2:21-cv-00413 (E.D. Tex.), which was filed on November 5, 2021, and consolidated with *Staton Techiya, LLC v. Samsung Electronics Co., Ltd.*, Case No. 2:22-cv-00053 (E.D. Tex.), filed February 14, 2022 ("the District Court Litigation"). Pet. 75; Paper 8, 1; Paper 34, 1.

Petitioner is also challenging the'839 patent in *Samsung Electronics Co. v. Staton Techiya*, IPR2022-00243. *See* Pet. 75; Paper 8, 1; Paper 34, 1. Petitioner has challenged a related patent, U.S. Patent No. 9,124,982, in IPR2022-00234. *Id.*

E. The '839 Patent (Ex. 1001)

The '839 patent is directed to "a device (e.g., earpiece) that can record acoustic signals measured by microphones in the device" and "An Always-On Recording System (AORS)." Ex. 1001, 1:55–59. The '839 patent explains that "[t]he AORS records audio information . . . from at least one

acoustic sound sensor(s) (microphones) mounted in [an] ear-sealing assembly." *Id.* at 3:16–18. The system includes an Ambient Sound Microphone (ASM) that is "located outside the occluded ear canal to monitor sound pressure levels near the entrance to the ear canal" and an Ear Canal Microphone (ECM) 32 that is located "within the occluded ear canal to facilitate monitoring of sound within the ear canal." *Id.* at 3:20–26. The signal generated by the ASM "allows for a binaural recording of the user's recent sound exposure for purposes such as automatic dictation and transmission to a binaural audio signal recording and/or monitoring system." *Id.* at 3:26–30. The signal generated by the ECM "may be recorded to analyze and predict the sound stimulus the user's ear drum is exposed to." *Id.* at 3:33–35. The AORS can also use as its data inputs the electronic signal generated by a cell phone. *Id.* at 5:55–58.

Figure 1A, reproduced below, illustrates "an embodiment of an electroacoustic assembly that Always On (Headwear) Recording System (AORS) may function with." *Id.* at 7:9–11.

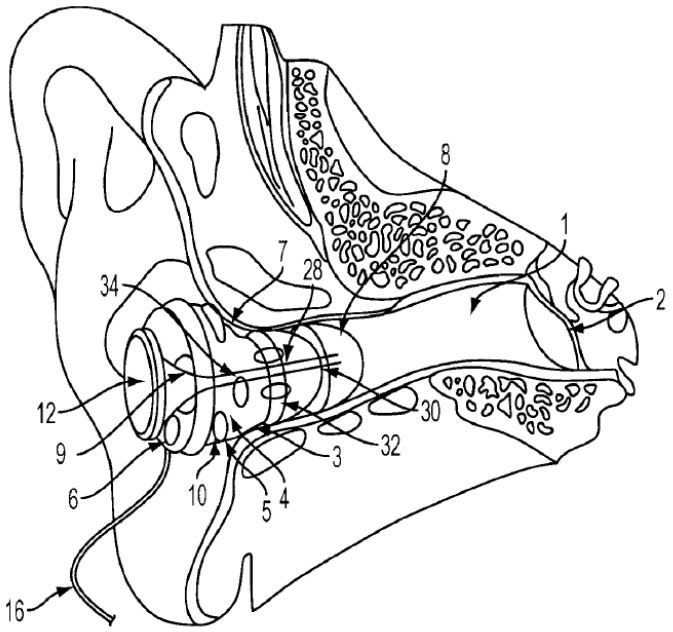


FIG. 1A

Figure 1A of the '839 patent shows an electroacoustic assembly that Always On (Headwear) Recording System (AORS) may function with. Ex. 1001, Fig. 1A, 7:9–8:20.

As shown in Figure 1A, the system includes earphone body 10, which includes ECM 32, loudspeaker 28, and ASM 34. Ex. 1001, 7:12–14. ASM 34 "detects sound in the front chamber 18, which may be fil[l]ed with air or another substance such as gel." *Id.* at 7:25–27. ECM 32 "may detect sound from the eardrum 2 side of the earpiece 8." *Id.* at 7:31–32. The system also includes communication circuitry 20, memories 22 and 26, and processing unit 24. *Id.* at 7:14–17. Communication circuitry 20 communicates with various other devices, and loudspeaker/ear canal receiver 28 reproduces "sound in the eardrum side of the earpiece 8." *Id.* at 7:55–65. Earpiece 8 "forms a seal in the ear canal 1 of a user, with the outside end (at diaphragm 12) substantially flush with the entrance 7 to the ear canal 1," resulting in a "completely in the ear" type of device. *Id.* at 7:17–22.

The '839 patent explains that "[t]he audio input data signals to the AORS are constantly recorded to a data storage system such as a circular buffer of non-volatile RAM mounted locally on the earphone assembly." Ex. 1001, 5:58–61. This can be used to allow "retrieval of a user's recent sound exposure (e.g. the last 10 minutes) for purposes such as determining a user's sound exposure preceding an accident" or to allow the user to listen again to a recent speech conversation. *Id.* at 5:61–66. "Recording of the monitored audio signal to a second audio data storage device can be initiated manually following a user-generated command, or automatically in response to a locally produced sound, such as a user-defined verbal activation message or a transient sound such as a gunshot." *Id.* at 5:66–6:4.

F. Illustrative Claim

Of challenged claims 1, 5–12, 14–17, and 21–23, claim 1 is independent. For purposes of the issues raised in this Decision, claim 1 is illustrative and is reproduced below.

> 1. [preamble] An Always-On Recording System (AORS) comprising:
>
> [a] a first monitoring assembly mounted in an earpiece, the earpiece configured to occlude and form an acoustic Seal of an ear canal, the first monitoring assembly including an Ambient Sound Microphone (ASM) to monitor an ambient acoustic field at an entrance to the ear canal occluded by the earpiece, the ASM producing an ASM signal responsive to the ambient acoustic field;
>
> [b] a second monitoring assembly mounted in the earpiece and including an ear canal microphone (ECM) to monitor an acoustic field within the ear canal occluded by the ear piece, the ECM producing an ECM signal responsive to the acoustic field within the ear canal;

[c] a data storage device configured to act as a circular buffer for continually storing at least one of the ECM signal or the ASM signal;

[d] a further data storage device coupled to the data storage device; and

[e] a record-activation system including software configured to activate the further data storage device to record a content of the data storage device.

Ex. 1001, 14:47–67 (bracketed paragraph identifiers added).

II. DISCUSSION

A. Claim Construction

A claim "shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b)." 37 C.F.R. § 42.100(b).

Petitioner proposes that no claim construction is necessary and "the claims should be given their plain and ordinary meaning." Pet. 13. Patent Owner proposes that the claims be given their "ordinary and customary meaning . . . as understood by a person of ordinary skill in the art at the time of the invention." PO Resp. 10.

Upon review of the arguments and evidence presented, we construe the meaning of several terms in the dependent claims, which we defer to later sections of this Decision. *See infra* Sections II.D.5 (claim 6, "embed"), II.G.2 (claim 14, "audio forensics analysis"), II.H.2 (claim 8, "diaphragm"). No further explicit construction of any claim term is needed to resolve the patentability issues presented here. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent

necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103 if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *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) where in evidence, objective evidence of non-obviousness.[2] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we must also "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Whether a combination of prior art elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416–417.

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

[2] Patent Owner has not presented objective evidence of non-obviousness.

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art at the time of the alleged invention would have had "a bachelor's degree in electrical engineering, computer science, or a similar field and two years of experience in the design of digital audio systems and associated signal processing such as voice or speech processing and/or acoustic pattern recognition." Pet. 12–13 (citing Ex. 1002 ¶ 19). Petitioner further states that "[m]ore education can supplement practical experience and vice versa." *Id.* at 13. Patent Owner "applies the level of ordinary skill in the art that Petitioners propose." PO Resp. 9.

We are persuaded by Petitioner's undisputed assessment of the level of ordinary skill in the art, which is supported by the '839 patent and the asserted prior art.

D. Ground 1A: Asserted Obviousness of Claims 1, 6, 22, and 23 Based on Le in view of Victorian

Petitioner contends that claims 1, 6, 22, and 23 would have been obvious over Le in view of Victorian. Pet. 20–38. Patent Owner disagrees, arguing that Petitioner has failed to establish that the claims would have been obvious based on the proposed combination. PO Resp. 12–39.

1. Overview of Le (Ex. 1006)

Le discloses a wearable computer system that records audio signals from the user's surroundings, such as the user's conversations with other people. *See* Ex. 1006, code (57), ¶ 12. Figures 1A and 1C are reproduced below:

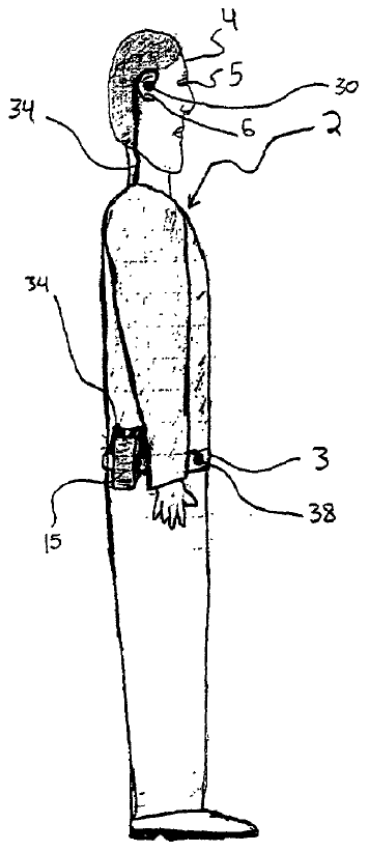


FIG. 1A

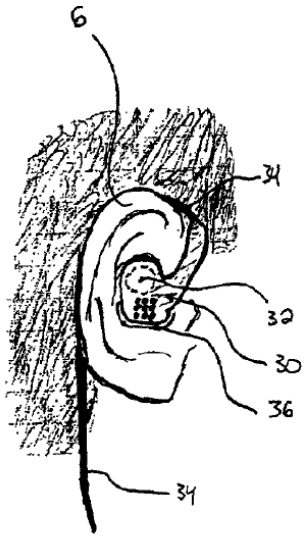


FIG. 1C

Figures 1A and 1C depict Le's wearable computer system. Ex. 1006, Figs. 1A, 1C, ¶¶ 15, 17.

Figure 1A depicts a profile view of user 2 wearing a hands-free, voice-operated computer system 10, and Figure 1C is a closer view of the portion of the system worn on the user's ear 6. Ex. 1006 ¶¶ 15, 17, 20, 22. The system includes computer unit 15 connected to personal microphone 36 and environmental microphone 38. *See id.* ¶¶ 20, 24. Computer unit 15 and environmental microphone 38 are both attached to the user's belt 3, and personal microphone 36 is housed in earpiece 30 on the user's ear 6. *See id.* ¶ 20.

Computer unit 15 includes "a continuously scrolling audio buffer to store audio information received by" microphone 38, and "continuously records ambient audio, and saves it for some predetermined period of time,

such as 30 seconds or one minute." Ex. 1008 ¶ 28. "This allows the user to store audio clips just before, or after, the user issues a predetermined voice command" to store the clips. *Id.* ¶¶ 28, 37. The buffer may be "a part of memory 18" within computer unit 15 (*see id.* ¶ 28, Fig. 2), and the audio clips selected for more permanent storage may also be saved into memory 18 (*id.* ¶ 37). Computer unit 15 includes data port 28 to upload saved audio data to a remote computer (not shown). *Id.* at Fig. 2, ¶¶ 21, 30.

"In another implementation, a cellular telephone is used and worn on a belt clip or kept in the user's pocket" and "[t]his cellular telephone may be integrated with the wearable computer unit (which may be a PDA, for example) to provide communications between the user and a remote user, or a remote computer." Ex. 1008 ¶ 9; *see also id.* ¶¶ 42 (contemplating "using the housing of a cellular phone to enclose the computer unit 15"), 41–42 (disclosing that computer unit 15 may use data port 28 to receive audio messages via the cellular telephone).

According to Le, computer system 10 "is more natural in appearance" than prior wearable computer systems, "and facilitates natural interactions with the system and the user's surroundings." *Id.* ¶¶ 3, 5. Thus, the components of system 10 "blend in with the natural appearance of the user 2" to be "minimally obtrusive to the movements and actions of the user 2." *Id.* ¶ 31. For example, "having an earpiece in one's ear is becoming a normal appearance . . . with cellular telephones . . . to converse on the telephone in a hands-free manner." *Id.* ¶ 33.

2. Overview of Victorian (Ex. 1007)

Victorian is directed to an "[e]ar-level full duplex audio communication system" including "ear attachment devices" such as "in-the-

ear (ITE) or behind-the-ear (BTE) devices" that "wirelessly communicate[] to a remote device" such as "a cellular phone." Ex. 1007, code (57). The system "allows an individual with normal hearing to privately communicate with or through the remote device without the need of holding the device or wearing any device wired to the remote device." *Id.* Victorian explains that "[f]or appearance or secrecy reasons, minimal visibility is generally desirable." *Id.* ¶ 6.

An embodiment of Victorian's ear-level system is shown in Figure 1, reproduced below.

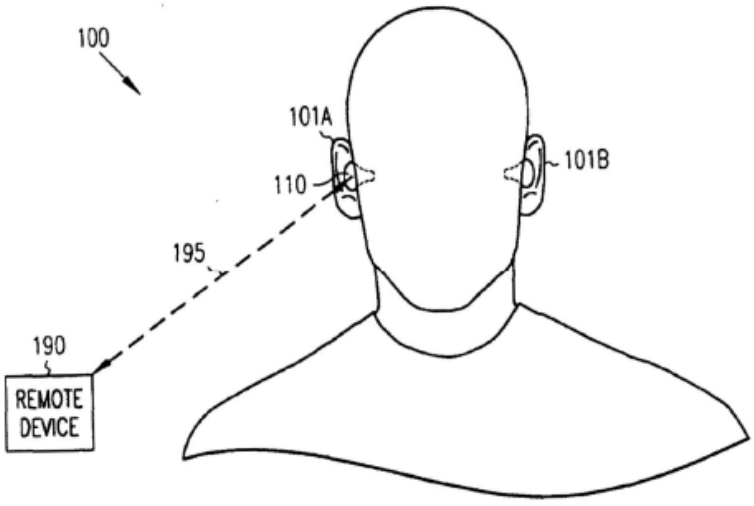


FIG. 1

Victorian's Fig. 1 illustrates an embodiment of the ear-level communication system 100. Ex. 1007 ¶ 18, Fig. 1.

As shown in Figure 1, ear-level communication system 100 includes ear-level device 110 attached to ear 101A. Ex. 1007 ¶ 18. The other ear 101B "is free of device attachment." *Id.* Ear-level device 110 "communicates with a remote device 190 through a wireless telemetry link 195," and is "a full duplex audio device that allows two-way simultaneous conversation between ear 101A and remote device 190." *Id.* ¶¶ 18–19. Ear-level device

110 "picks up sound from the ear canal of ear 101A and delivers sound to the same ear canal." *Id.* ¶ 19. It also "detects the occluded sound from the ear canal when the person speaks and transmits to the same ear canal a sound received from remote device 190 and/or a sound picked up from the environment surrounding the person." *Id.*

An exemplary exterior configuration an in-the-canal version 310B of ear level device 110 is illustrated in Figure 3B, reproduced below.

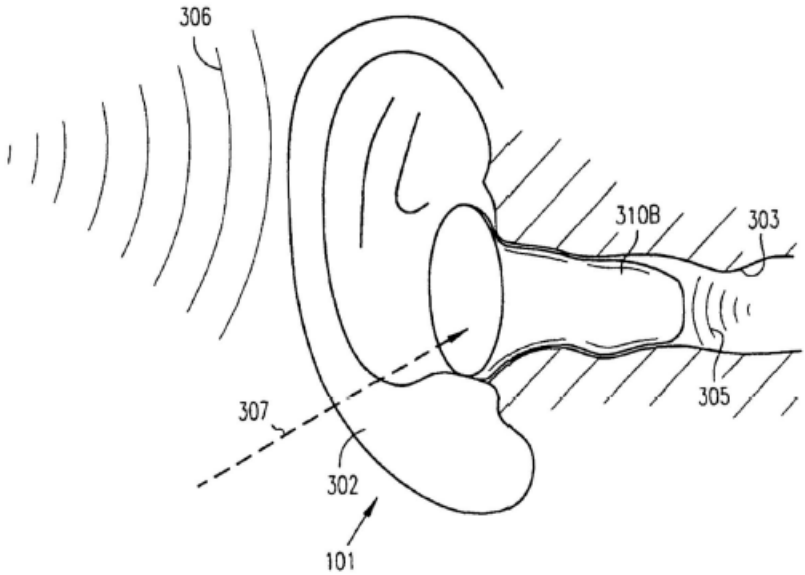


FIG. 3B

Victorian's Fig. 3B illustrates an exemplary exterior configuration of an in-the-canal version of ear-level device 110. Ex. 1007, Fig. 3B, ¶ 25.

As shown in Figure 3B, device 310B is attached to ear 101 having pinna 302 and ear canal 303. Ex. 1007 ¶ 25. A portion of device 310B is inserted into ear canal 303 and another smaller portion is fit into the cavity formed by pinna 302. *Id.* Figure 3B also shows occluded sound 305, ambient sound 306, and remote sound 307 (represented by a wireless radio signal transmitted to the ear-level device). *Id.* ¶ 23.

A block diagram of an embodiment of the circuit of the ear-level device is illustrated in Figure 4A, reproduced below.

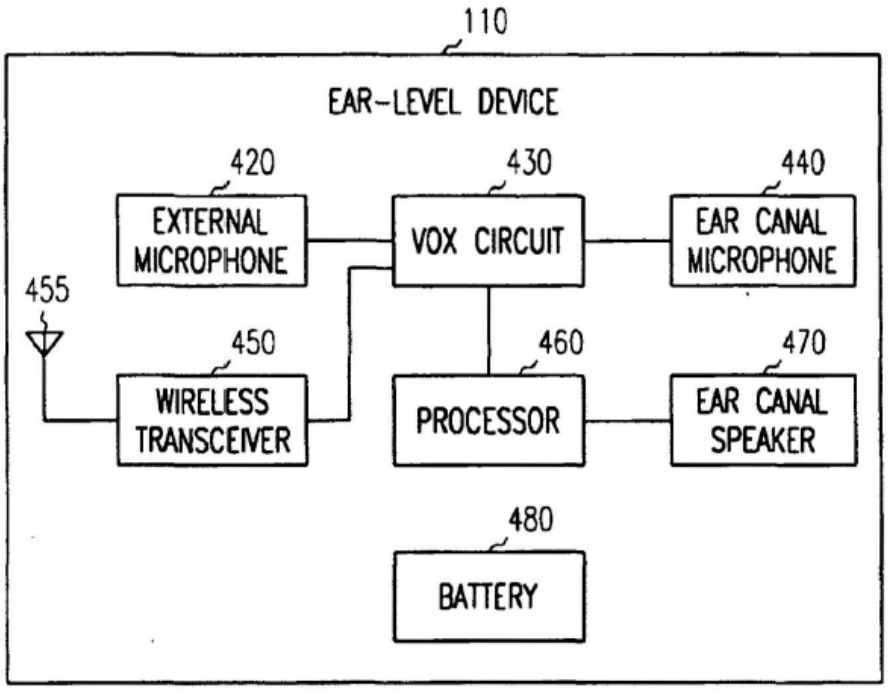


FIG. 4A

Victorian's Figure 4A depicts an embodiment of the circuit of ear-level device 110. Ex. 1007, Fig. 4A, ¶ 29.

As shown in Figure 4A, ear-level device 110 includes external microphone 420, ear canal microphone 440, and ear canal speaker 470. Ex. 1007 ¶ 30. Ear-level device 110 also includes wireless transceiver 450, processor 460, antenna 455, battery 480, and voice operated exchange (VOX) circuit 430. *Id.* External microphone 420 "picks up ambient sound such that a hearing impaired person wearing ear-level device 110 is not 'isolated' when communicating to remote device 190." *Id.* Ear canal microphone 440 "detects sound from the ear canal," primarily "speech of the person wearing ear-level device 110." *Id.* Ear canal speaker 470 "transmits sound received from remote device 190 and/or external microphone 420" to the ear canal. *Id.* Processor 460 "converts the sound picked up from the ear canal to an electrical signal to be transmitted to remote device 190, and converts the

signals received from remote device 190 and/or external microphone 420 to a sound audible to the person wearing ear-level device 110." *Id.* VOX circuit 430 "activates a major portion of ear-level device 110 only when sound is detected by at least one of external microphone 420, ear canal microphone 440, [a]nd wireless transceiver 450." *Id.*

3. Motivation to Combine Le and Victorian

a) The Parties' Arguments

Relying on the testimony of Dr. Atlas, Petitioner argues that one of ordinary skill "would have been motivated to combine the teachings of Le and Victorian and would have had a reasonable expectation of success in doing so." Pet. 14 (citing Ex. 1002 ¶¶ 93–110). According to Petitioner, Le emphasizes the desire for the system to be unobtrusive and blend in with the user's appearance, and explains that the computer unit 15 can be implemented as a cellular telephone with wireless connections for microphones 36 and 38. *Id.* (citing Ex. 1006 ¶¶ 5, 9, 31, 33). Petitioner also contends that Le is "concerned with properly recognizing voice commands that initiate recording in noisy environments." *Id.* (citing Ex. 1006 ¶¶ 23–24). In view of these disclosures, Petitioner argues, one of ordinary skill would have been motivated to look for ways to implement Le's system with a wireless connection to the microphones 36 and 38 and an ability to input audio commands in noisy environments, while making the system more unobtrusive. *Id.* (citing Ex. 1002 ¶ 99).

Petitioner argues that this motivation would have led one of ordinary skill to Victorian, which "'relates to ear-level communication systems' that communicate with remote devices such as cellular phones via full duplex audio" and teaches that "'[f]or appearance or secrecy reasons, minimal

visibility is generally desirable.'" *Id.* at 14–15 (citing Ex. 1002 ¶ 99; Ex. 1007 ¶¶ 1, 6, 7, 28). According to Petitioner, one of ordinary skill would have recognized that Victorian's ear-level device 110 would have advanced Le's disclosed objectives and been as good as or superior to Le's earpiece. *Id.* at 15 (citing Ex. 1002 ¶¶ 103–105). Specifically, Petitioner asserts, Victorian's earpiece would have "minimal visibility or obtrusiveness" and its ear canal microphone 440 "would provide an equivalent or superior voice signal to Le's personal microphone 36 for Le's natural voice commands because it is less susceptible to noise." *Id.* at 15–16 (citing Ex. 1002 ¶¶ 105–106). Petitioner also contends that Victorian's external microphone 420, like Le's environmental microphone 38, "would enable the user 'to talk to another person [] directly (if the other person is nearby),'" that "Le does not limit the location of environmental microphone 38 to the belt of the user," and that Victorian's "external microphone would blend in more with the user's natural appearance." *Id.* at 16–17 (citing Ex. 1007 ¶ 30; Ex. 1002 ¶¶ 107–109).

Thus, Petitioner argues, in the combined system, "Victorian's ear-level device would replace Le's earpiece (including the personal microphone and speaker) and Le's environmental microphone" so that "Victorian's external microphone would be used to pick up sounds in the user's environment, and Victorian's ear canal microphone would be used to pick up the user's speech." Pet. 17 (citing Ex. 1002 ¶ 111). Relying on the testimony of Dr. Atlas, Petitioner asserts that "wireless headsets capable of communication with mobile devices such as cellular phones were common in the 2007 timeframe," and a person of ordinary skill "would have been able to adapt Le's computer unit 15 to wirelessly communicate with

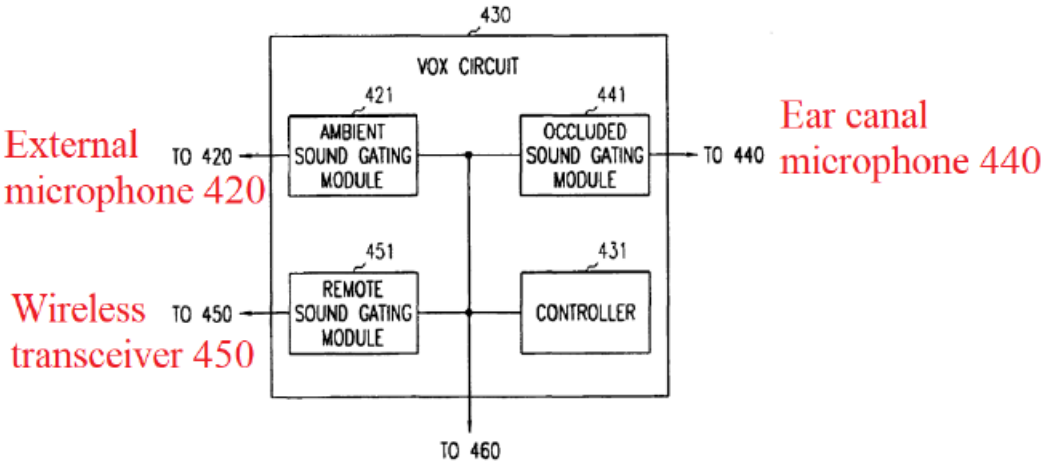
Victorian's ear-level device 110, as Le itself suggests." *Id.* (citing Ex. 1002 ¶¶ 112–113). "Moreover," Petitioner contends, "modifying the ear-level device 110's circuit so as to pass the signal from the external microphone to both (1) the ear canal speaker ***and*** (2) continually to Le's computer unit through Victorian's transmitter would have merely required the exercise of ordinary skill." *Id.* at 18 (citing Ex. 1002 ¶¶ 114–116; Ex. 1007 ¶¶ 19, 30).

As a result, Petitioner argues, the combination of Le and Victorian would have "amounted to no more than the substitution of one known element (Victorian's ear-level device) for another (Le's earpiece and environmental microphone) to obtain predictable results (the Le-Victorian system with a computer unit and a wireless earpiece and microphones). *Id.* at 19 (citing Ex. 1002 ¶ 117).

Patent Owner argues that the Le-Victorian combination "comprises Victorian's ear-level device that must operate in conjunction with Victorian's gating modules," but those gating modules "would render Le inoperable, and would hinder the combination from simultaneously monitoring two acoustic fields as claim 1 requires." PO Resp. 12. First, Patent Owner argues that Victorian's earpiece requires gating modules because such modules "are necessary when a microphone faces the same direction as, and is in vicinity of, the speaker, within minimal separation in between," and Victorian's ear canal microphone and ear canal speaker "are both located in the ear canal, facing the same direction, and adjacent to each other." *Id.* at 14 (citing Ex. 2006 ¶ 55).

Second, Patent Owner argues that Victorian's gating modules, which are part of VOX circuit 430, disable the ear canal microphone when receiving ambient sound or remote signals. PO Resp. 15. To illustrate this

argument, Patent Owner includes an annotated version of a portion of Victorian's Figure 4B, reproduced below.



Patent Owner's annotated version of Figure 4B of Victorian. PO Resp. 16 (citing Ex. 1007, Fig. 4B).

Patent Owner explains that ambient sound module 421 is turned "on" when external microphone 420 detects ambient sound above a threshold, occluded sound gating module 441 is turned "on" when the occluded sound is detected above a threshold, and remote sound gating module 451 is turned "on" when it detects remote sound above a threshold or "an incoming wireless signal representing the report sound." PO Resp. 16. Patent Owner asserts that controller 431 prevents two gating modules from being "on" simultaneously, relying on paragraph 37 of Victorian, reproduced below.

> Controller 431 coordinates the on/off states of all the gating modules so the sounds are processed in an orderly fashion. Even if a sound is detected, the gating module corresponding to that sound is **turned on only when** controller 431 permits. In one embodiment, assuming that sounds A and B are gated by gating modules A and B, respectively, **if both sounds A and B are detected, whichever sound is detected earlier is gated on**. That is, if sound A exceeds its threshold first, gating module A is turned on and remain[s] on until sound A drops below threshold A. **Then**, gating module B is **turned [on] only**

> **if** sound B exceeds its threshold after gating module A has been turn[ed] off.

PO Resp. 16–17 (citing Ex. 1007 ¶ 37) (emphasis in original).

Patent Owner also argues that the "three exemplary rules" in paragraph 38 of Victorian "show that the ambient sound gating module 421 and the occluded sound gating module 441 are never 'on' simultaneously." PO Resp. 17 (emphasis omitted). According to Patent Owner, the first exemplary rule provides that ambient sound gating module 421 and occluded sound gating module 441 are off, and remote sound gating module 451 is on, which "prevents the remote sound from being detected by ear canal microphone 440 and echoed back to remote device 190." *Id.* at 18 (citing Ex. 1007 ¶ 38). The second exemplary rule provides that ambient sound gating module 421 and remote sound gating module are on and occluded sound gating module is off, which "prevents the remote sound from being detected by ear canal microphone and echoed back to remote device" and "ambient sound from being transmitted to remote device 190." *Id.* The third exemplary rule provides that ambient sound gating module 421 and remote sound gating module 451 are off and occluded sound gating module is on," which "allows only the transmission of the occluded sound to remote device 190, and prevents the same sound from being transmitted to remote device 190 twice." *Id.* Patent Owner argues that, under these rules, the processor "cannot receive a sound signal from the external microphone 420 when the processor is receiving a sound signal from the ear canal microphone 440, and vice versa." *Id.* at 19.

Third, Patent Owner argues that Victorian's gating modules render Le inoperable. PO Resp. 19. Patent Owner asserts that VOX circuit 430 must be present in any Le-Victorian combination because otherwise "Victorian's

ear-level device 110 would create a feedback loop that results in echo or ringing." *Id.* at 19–20. However, according to Patent Owner, VOX circuit 430 would render the Le-Victorian combination inoperable "because Le's system expressly contemplates simultaneous recording of a user's voice command and ambient sound," but the VOX circuit "would prevent a user from entering voice commands (the occluded sound gating module 441 is 'on') while recording ambient sound (the ambient sound gating module is 'on')." *Id.* at 20 (citing Ex. 1006 ¶ 24). Additionally, Patent Owner contends, in the proposed combination "the user would not hear ambient sound properly" because Victorian's earmold reduces sound below the level of a normal conversation and amplification of external sound is needed, but the VOX circuit turns ambient sound gating module 421 off when the user speaks. *Id.* at 21 (citing Ex. 1006 ¶¶ 35, 40; Ex. 1007 ¶¶ 30, 33 40, 41; Ex. 2006 ¶ 67; Ex. 2009, 1). Thus, Patent Owner argues, "whenever a user speaks, the user would not be able to hear the other speaker whenever the words overlap, and the user would also not be able to hear other sounds in the environment such as traffic or background noise." *Id.* 22 (citing Ex. 2006 ¶ 67). Additionally, according to Patent Owner, the VOX circuit would prevent the Le system from capturing the user's own voice (including a voice command) when it overlaps with another speaker's speech. *Id.* at 22–26.

Fourth, Patent Owner argues that one of ordinary skill would not have had a reasonable expectation of success in modifying Le's system with Victorian's earpieces. PO Resp. 27. Patent Owner asserts that, to achieve the proposed combination, one of ordinary skill "would have been required to strip Le of virtually all components if its earpiece 30 and environmental

microphone 38 were both replaced by Victorian's ear-level device 110," leaving "nothing but a 'concept.'" *Id.* (citing Ex. 2006 ¶ 76). Moreover, according to Patent Owner, one of ordinary skill "would have been required to completely redesign Victorian's VOX circuit 430, changing all its existing rules (algorithms), and present a brand-new solution" to the problem of "echo and ringing caused by the feedback loop formed by ear canal speaker 470 and ear canal microphone 440." *Id.* at 28 (citing Ex. 1007 ¶ 30). Such a redesign, Patent Owner contends, "is beyond common sense" because "to permit a user to hold a conversation with another speaker and to record that conversation, Victorian's external microphone 420 (recording the other speaker), ear canal microphone 440 (recording the user), and ear canal speaker 470 (permitting the user to hear the other speaker through Victorian's occluded earpiece) must all be on," but "echo, ringing, or feedback would result from the ear canal microphone and speaker 440, 470 being simultaneously on." *Id.* at 29. According to Patent Owner, this is not a problem in Le because "[b]oth of Le's microphones 36, 38 are far enough from speaker 32 to avoid echo, ringing, and feedback," and Le's personal microphone and ear canal microphone face different directions. *Id.* at 30–32 (citing Ex. 1007, Fig. 3A, ¶¶ 5–7; Ex. 2006 ¶¶ 78, 81).

Patent Owner further contends that Victorian presents its VOX circuit as "innovative," and that, beyond hearing aids, "in 2007 Victorian-type earpieces with in-ear microphone and in-ear speakers were not common," and "no such consumer electronics earphones (earbuds) existed on the market precisely because of the technical problems arising from processing in-ear microphones (gating and equalization). PO Resp. 32 (citing Ex. 2006 ¶ 83). Thus, Patent Owner asserts, it is unlikely that one of ordinary skill

would have been able "to use the same components (battery, analog-to-digital circuitry, amplification, detected digital sound processing integrated circuit, etc.) from Victorian in a redesigned VOX system." *Id.* at 33 (citing Ex. 2006 ¶ 86). According to Patent Owner, "most if not all [of] these components, as they existed on the market, would have been difficult to miniaturize within a small earpiece, and difficult to operate within the power budget afforded by requisite miniature batteries available at the time." *Id.* Patent Owner further contends that, in 2007, adapting the processing algorithms needed for the gating modules to Le's voice command function would further add to the complexity of the redesign. *Id.* (citing Ex. 2006 ¶ 87).

Petitioner responds that Patent Owner's arguments are based on the "false premise" that the Le-Victorian combination would not allow a user to hold a conversation with another speaker and record that conversation unless Victorian's external microphone 420, ear canal microphone 440, and ear canal speaker 470 are all simultaneously on, and that echo, ringing, or feedback would result from such a situation. Pet. Reply 3 (citing PO Resp. 29). To the contrary, Petitioner asserts, "the ear canal speaker need not be on for a user of the Le-Victorian combination to hold a conversation with another person and to record it" because Petitioners "rely on Victorian's ***single-ear ear-level device 110*** that is schematically illustrated in Figures 1 and 4A." *Id.* (emphasis added) (citing Pet. 21, 23–25). According to Petitioner, "Victorian describes the ear-level device as a 'single ear-level device'" and discloses that "other ear 101B is free of device attachment." *Id.* (citing Ex. 1007 ¶¶ 13, 18). Petitioner also argues that Victorian is not limited to hearing aids because it "discloses people with 'normal hearing'

using its earpiece." *Id.* at 3–4 (citing Ex. 1007, code (57), ¶¶ 2, 6, 16). "Accordingly," Petitioner contends, "a user of the Le-Victorian combination could still hear the surrounding environment, including the conversation, in his/her other ear even when the ear canal speaker is off." *Id.* at 4. "Furthermore," according to Petitioner, "as long as the ear canal speaker is off, there is no feedback loop between Victorian's ear canal microphone and ear canal speaker, and thus no risk of the echo, ringing, or feedback that [Patent Owner] complains about." *Id.*

Petitioner also argues that, in the proposed combination, it would have been obvious to modify Victorian's ear-level device 110 to pass the signal from the external microphone to both the ear canal speaker and continually to Le's computer unit, so that the external microphone signal is transmitted to the remote device independent of whether the external microphone signal was also transmitted to the ear canal speaker. Pet. Reply 4–5 (citing Pet. 18; Ex. 1002 ¶¶ 114–115). In this configuration, Petitioner asserts, Victorian's ear-level device would "transmit the external microphone signal to Le's computer unit to record conversations independent of whether the signal was also transmitted to the ear canal speaker." *Id.* at 5. Thus, according to Petitioner, "there would be no need to 'completely redesign Victorian's VOX circuit 430' or to 'chang[e] all its existing rules." *Id.* (citing PO Resp. 28). Petitioner further contends that Victorian discloses a rule in which "ambient sound gating module 421 is off, occluded sound gating module 441 is on, and remote sound gating module 451 is off" which, when combined with Petitioner's proposed modification to provide an independent path from the external microphone to the computer unit, would allow the combined system to record conversations. *Id.*

Petitioner also disagrees with Patent Owner's argument that, due to technical challenges, one of ordinary skill would not have had a reasonable expectation of success in making the proposed Le-Victorian combination. Pet. Reply 7–8. Petitioner argues that Patent Owner does not argue that Petitioner's proposed independent path modification would have been beyond the level of ordinary skill, and that the features Patent Owner points to, such as incorporating components into a "small earpiece" that operates within a "power budget," are "unclaimed." *Id.* at 7. Additionally, Petitioner asserts that Victorian itself refutes Patent Owner's arguments about purported technical limitations "because Victorian discloses an earpiece with an in-ear canal form factor including the components that [Patent Owner] alleges would be 'difficult to miniaturize,'" and Victorian is presumed to be enabling. *Id.* (citing Ex. 1007 ¶¶ 13, 29, Figs. 3, 4). Petitioner also contends that Patent Owner's argument about "the alleged absence of commercialized consumer electronics" is "irrelevant." *Id.* at 8. Moreover, Petitioner argues, "the '839 patent itself admits the absence of these purported technical challenges," because "despite having the same microphone and speaker placement as Victorian and the ability to record conversations with a 'user-defined verbal activation message,' the '839 patent does not even mention feedback, echo, or ringing as a problem to solve." *Id.*

Furthermore, Petitioner argues, even if the Le-Victorian combination did not allow recording of conversations, that would not render the combination "inoperable." Pet. Reply 10. According to Patent Owner, Le discloses uses for its system that do not require simultaneous recording of the user and another speaker, including situations "when the user is alone" and an embodiment "in which the audio information received 'between' two

commands is stored (such as 'start recording' and 'stop recording')." *Id.* (citing Ex. 1006 ¶¶ 36, 37). "Thus," Petitioner contends, "only some features Le describes would be less effective, which does not show inoperability." *Id.*

Finally, Petitioner argues that Patent Owner's arguments are "based on a factually incorrect premise that Victorian defined 'blanking' and 'substantial' attenuation to mean the same thing." Pet. Reply 10 (citing Ex. 1045, 52:6–11; PO Resp. 15, 19). According to Petitioner, Victorian discloses that a sound may be "gated off" when it is "blanked ***or substantially attenuated***." *Id.* at 10–11 (citing Ex. 1007 ¶ 32). Petitioner points to Victorian's statement that "[s]ubstantial attenuation refers to an attenuation after which the attenuated sound does not cause ***any echo or [ringing] having an intolerable intensity***," arguing that this statement shows that "substantial attenuation" "allows for tolerable echo or ringing." *Id.* Petitioner also points to Victorian's disclosure that the gating modules are used "to eliminate ***or reduce*** echo and/or ringing." *Id.* (citing Ex. 1007 ¶¶ 30, 31).

Patent Owner responds that Petitioner's Petition and Reply "are full of contradictions." PO Sur-reply 3. Patent Owner argues that Petitioner's argument that "as long as the ear canal speaker is off, there is no feedback loop between Victorian's ear canal microphone and ear canal speaker, and thus no risk of the echo, ringing, or feedback that [Patent Owner] complains about" contradicts the Petition's statement that one of ordinary skill "would have understood that Victorian's 'fully occluded' earmold would have achieved noise reduction in the range of 20–30dB," because "that range is well below the sound of a normal conversation (about 60 dB)." *Id.* at 4

(citing Pet. 22; Pet. Reply 4; PO Resp. 21; Ex. 2009, 1). Patent Owner also argues that Petitioner fails to consider that both Le and Victorian contemplate that, at a minimum, "the speaker must occasionally be on; otherwise the proposed combination would not need a speaker at all." *Id.* (citing Ex. 1006 ¶ 39; Ex. 1007 ¶ 30). Additionally, Patent Owner contends that Petitioner's argument that the ambient sound gating module need not be on contradicts its proposed modification to ear-level device "to pass the signal from the external microphone to both (1) the ear canal speaker and (2) continually to Le's computer unit." *Id.* at 5 (citing Pet. Reply 4).

Patent Owner responds to Petitioner's argument that the Le-Victorian combination does not necessarily have to record conversations by arguing that "[t]he ability to record a conversation is Le's inventive idea," and "eliminating that ability renders Le inoperable." PO Sur-reply 6. Patent Owner points to various portions of Le that state that Le "provides audio data directly to the user" that includes recordings of a user's conversation with another speaker. *Id.* at 7–8 (citing Ex. 1006, code (57), ¶¶ 5, 21). Thus, Patent Owner contends, Le makes clear that its system "must record both microphones including the ear-canal microphone in the proposed Le-Victorian combination that replaces Le's environmental microphone" and that "the ear-canal speaker must be on during this conversation to permit the user to hear the 'new person' due to Victorian's 'fully occluded' earmold that reduces noise." *Id.* at 8–9.

b) Analysis

Based on the full trial record, we find that Petitioner has sufficiently proven that one of ordinary skill would have been motivated to combine Le and Victorian as Petitioner proposes, and would have had a reasonable

expectation of success in doing so. In Petitioner's proposed combination, "Victorian's ear-level device would replace Le's earpiece (including the personal microphone and speaker) and Le's environmental microphone such that Victorian's external microphone would be used to pick up the sounds in the user's environment, and Victorian's ear canal microphone would be used to pick up the user's speech." Pet. 17; Ex. 1002 ¶ 111. Petitioner's combination also relies on Victorian's embodiment that employs a single-ear ear-level device 110 as illustrated in Figures 1 and 4B. Pet. Reply 3 (citing Pet. 21, 23–25; Ex. 1007 ¶¶ 13 (describing Figure 1 as illustrating "a single ear-level device" and Figure 4B as a portion of the VOX circuit "included in the single ear-level device of FIG. 1"), 18 (explaining that the ear-level device is attached to ear 101A, while "[t]he other ear 101B is free of device attachment"). Additionally, in Petitioner's proposed combination, the ear level device is modified to continually pass the signal from the external microphone to the computer unit regardless of whether the signal is being transmitted to the ear canal speaker. Pet. 18; Pet. Reply 4; Ex. 1002 ¶ 114.

We agree with Petitioner that Le emphasizes the desirability of having its device blend in with the user's natural appearance and be unintrusive for the user and people with whom the user interacts. *See* Ex. 1006 ¶¶ 5 ("The invention provides a wearable computer system that is more natural in appearance and facilitates natural interactions with the system and the user's surroundings."), 31 ("[T]he user interface devices of the wearable computer system 10, such as the earpiece 30 and the environmental microphone 38, blend in with the natural appearance of the user" and "[t]he wearable computer system 10 is also minimally obtrusive to the movements and actions of the user."), 33 (describing "[a]dditional measures" that "may be

taken to make the wearable computer system 10 even more unintrusive for the user and people who interact with the user"); Ex. 1002 ¶¶ 94–96.

Le also teaches implementing the computer unit 15 as a cellular telephone and implementing a wireless connection for microphones 36 and 38. Ex. 1006 ¶¶ 9 ("In another implementation, a cellular telephone is used and worn on a belt clip or kept in the user's pocket," which "may be integrated with the wearable computer unit."), 42 (The personal microphone, earpiece speaker, and environmental microphone "may be connected to the computer unit 15 using a conventional wireless connection" and "the housing of a cellular phone" may "enclose the computer unit 15."); Ex. 1002 ¶ 97. Le is further concerned with properly recognizing user voice commands in noisy environments. Ex. 1006 ¶¶ 23 (describing an audio filter "associated with the personal microphone 36 to filter noise from the surroundings of the user while properly receiving predetermined voice commands from the user"), 24 (in a noisy environment, the personal microphone's audio filter "filters the environmental noise and properly inputs the user's voice commands"); Ex. 1002 ¶ 98 .

We agree with and find credible Dr. Atlas's testimony that, in view of these disclosures, one of ordinary skill "would have been motivated to look for (1) ways to implement Le's microphones 36 and 38 with a wireless connection; (2) ways to input audio commands or key phrases in noisy environments, and (3) ways to do both (1) and (2) while also advancing Le's objective to make the wearable system blend in with the natural appearance of the user." Ex. 1002 ¶ 99. We also credit Dr. Atlas's testimony that one of ordinary skill would have recognized that Victorian's ear-level device 110 was compatible with, and advanced Le's disclosed objectives, and would

have been "as good or superior to Le's earpiece 30" in achieving those objectives. *Id.* ¶¶ 103, 105. Specifically, Victorian discloses an earpiece with "minimal visibility" that includes an external microphone for picking up ambient sound, an ear canal microphone for picking up the user's speech, and a wireless transceiver for sending and receiving signals between a remote device and the ear-level device. Ex. 1007 ¶¶ 1, 6, 7, 18, 28, 30; Ex. 1002 ¶¶ 99–102.

We also agree with and find credible Dr. Atlas's testimony that one of ordinary skill would have understood that "Victorian's ear-level device 110 would provide a comparable or superior means of providing voice commands to computer unit 15 because it is less susceptible to noise, as it is picking up sound within the occluded ear canal." Ex. 1002 ¶ 106. We further credit Dr. Atlas's testimony that "Victorian's external microphone 420 would be at least as effective as Le's environmental microphone 38 to pick up sound from the user's environment," and "would have had the additional advantage of blending in more with the user's appearance." *Id.* ¶¶ 107 (citing Ex. 1007 ¶ 30), 109.

Additionally, we find that one of ordinary skill would have had a reasonable expectation of success in achieving the proposed Le-Victorian combination. Our conclusion is supported by Dr. Atlas's testimony that one of ordinary skill "would have been able to adapt Le's computer unit 15 to wirelessly communicate with Victorian's ear-level device 110, as Le itself suggests." Ex. 1002 ¶ 112. We also credit Dr. Atlas's testimony that one of ordinary skill "would have readily understood how to pass the signal from the external microphone to both (1) the ear canal speaker ***and*** (2) continually to Le's computer unit through Victorian's transmitter." *Id.* ¶ 114. We

further agree with and find credible Dr. Atlas's testimony that one of ordinary skill would have been able to configure the ear-level device to transmit the signal from the external microphone to the remote device without causing feedback or echo by transmitting the external microphone's signal back to the remote device independent of whether the external microphone signal was also transmitted to the ear canal speaker. *Id.* ¶ 115.

We do not agree with Patent Owner's arguments that one of ordinary skill would not have been motivated to combine Le and Victorian. *See* PO Resp. 12–34; PO Sur-reply 3–9. First, we disagree with Patent Owner's argument that the proposed combination of Le with Victorian's VOX circuit would render the combination "inoperable." PO Resp. 13–27; PO Sur-reply 3–9. As discussed above, Petitioner's proposed combination relies on Victorian's single-ear embodiment and continually passes the external microphone signal to the computer unit, regardless of whether the external microphone signal was also passed to the ear canal speaker. *See* Pet. Reply 3–5 (citing Ex. 1007 ¶¶ 13, 18; Ex. 1002 ¶¶ 114–115). In this combination, contrary to Patent Owner's argument, the system would be able to simultaneously record a user's voice command and ambient sound because the signals from the external microphone (and the ear canal microphone) could be transmitted to the computer unit while the ear canal speaker is off, obviating any feedback, echo, or ringing caused by the ear canal speaker and ear canal microphone being on simultaneously. *See* PO Resp. 20–21; Pet. Reply 3–4. Because the system could record both the user's voice (through the external microphone or ear canal microphone) as well as another speaker's voice (through the external microphone), the system would be able to record a conversation between the user and another speaker.

Additionally, because the ear-level device is only in one ear, the user would be able to hear ambient sound (including another speaker's voice) through their other ear when the ear canal speaker is off. *See* PO Resp. 21; Pet. Reply 3–4 (citing Ex. 1007 ¶¶ 13, 18). And, because the signal from the external microphone would be continuously sent to the computer unit, Petitioner's combination would not suffer from the gaps in recording that Patent Owner argues would be present when speech switches from one person to another in a conversation or the user utters a voice command during a conversation. *See* PO Resp. 23–26.

In its briefing, Patent Owner does not specifically address Petitioner's reliance on Victorian's single-ear embodiment or explain why combining this embodiment with Le would render the combination "inoperative." *See* PO Resp. 13–27; PO Sur-reply 3–9. However, during the oral hearing in this case, Patent Owner's counsel argued that it was "not realistic to argue that the user could be wearing an earpiece in one ear and use their other ear to hear" because, in doing so, "[y]ou are handicapping an entire half of the user's hearing." Tr. 43:2–8; *see id.* at 43:9–47:12. Patent Owner's counsel further argued that because "Le's core purpose is to let the user naturally interact with their surroundings," and the single-ear configuration would require the user to engage in "unnatural movements to interact with their surroundings, that defeats Le's purpose and that renders Le inoperable." *Id.* at 44:7–12. Patent Owner, however, did not make this argument in its briefing, and it is therefore forfeited. *See* Consolidated Trial Practice Guide (Nov. 2019)[3] ("TPG"), 85–86 (In an oral hearing, a party "may only present

[3] *Available at* https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf?MURL=.

arguments relied upon in the papers previously submitted."); Paper 17, 9 ("Patent Owner is cautioned that any arguments not raised in the response may be deemed forfeited.").

Moreover, even if we were to consider this argument, because Le does not describe its purpose in a way that would preclude Victorian's single-ear embodiment, we do not agree with it. For example, Le explains that its system can be used "to enable the audio receiver to receive voice signals from the user and provide signals and provide the voice signals to the computer unit for processing," and to "enabl[e] the computer unit to send audio signals to the speaker to provide output to the user." Ex. 1006 ¶ 8. Le also describes the use of its system "when the user is alone," and for storing audio information between two commands (such as "start recording" and "stop recording"). *Id.* ¶¶ 35, 37. Moreover, even if Victorian's single-ear configuration were to cause some reduction in the smoothness of the user's conversations with others, that would not render Le "inoperative," because the aspects of Le that Petitioner relies on would still be able to function in the combination. For example, as Petitioner points out, in a conversation with another person, the system could record the user's speech using the ear canal microphone in one ear, while the user hears speech from another person in the user's other ear. *See* PO Resp. 3–4; Tr. 11:19–13:15, 72:22–74:9.

Additionally, Patent Owner does not argue that Petitioner's proposed modification to create an independent path between the external microphone and the computer unit would have rendered the combination inoperable or would have been beyond the level of ordinary skill in the art. *See* PO Resp. 13–27; PO Sur-reply 3–9. As noted above, we agree with and find credible

Dr. Atlas's testimony that one of ordinary skill would have readily understood how to pass the signal from the external microphone continually to the computer unit using Victorian's transmitter regardless of whether the signal is also being sent to the ear canal speaker. Ex. 1002 ¶ 114. Victorian discloses full-duplex communication between the ear-level device and a remote device, including transmitting the signal from the ear canal microphone back to the remote device. Ex. 1007 ¶¶ 19, 30; Ex. 1002 ¶ 114. Thus, as Dr. Atlas testifies, configuring the ear-level device to send the signal from the external microphone to the computer unit for recording "would have required the mere exercise of ordinary skill." Ex. 1002 ¶ 114. Because the signal from the external microphone would be transmitted to the computer unit independent of whether it was also transmitted to the ear canal speaker, the feedback or echo issues that the VOX circuit is designed to reduce would not be an issue. *Id.* ¶ 116. Thus, with this modification, and Petitioner's reliance on Victorian's single-ear embodiment, one of ordinary skill would not "have been required to completely redesign Victorian's VOX circuit" as Patent Owner contends. *See* PO Resp. 28.

We also do not agree with Patent Owner's argument that the Le-Victorian combination would require one of ordinary skill to strip Le down to a "concept" which would no longer be an apparatus. PO Resp. 27–28. Petitioner's combination relies on Le's computer unit which continuously stores, in a scrolling buffer, audio information from the user's surroundings and, when a user enters a voice command, stores a "thirty second sound byte surrounding the event" from the environmental microphone in a memory. Pet. 20, 26–32. Petitioner also relies on Le's software instructions in a computer memory for recognizing spoken words, determining whether they

constitute a predetermined voice command, and using voice commands to trigger storage of content that is in the continuously scrolling buffer to the memory. *Id.* at 32–33. Petitioner then replaces Le's environmental microphone and earpiece with Victorian's ear level device. *Id.* at 17. Thus, Petitioner's combination relies on structure from both Le and Victorian in its proposed combination.

Additionally, we have considered Patent Owner's arguments that certain technological limitations would have prevented one of ordinary skill from combining Le and Victorian as Petitioner proposes. *See* PO Resp. 32–33. As to Patent Owner's argument that in 2007 no computer electronics earphones (earbuds) existed on the market, we agree with Petitioner that this is of little significance because prior art need not have been commercialized as of the critical date in order to render a claim unpatentable. *See* PO Resp. 32; Pet. Reply 8; *Samsung Electronics Co. v. Advanced Touchscreen*, IPR2016-00652, Paper 43 at 23 (PTAB Aug 29, 2017) (Final Written Decision) (holding that products were not "widely used in research or embraced commercially" does "not undermine the fact that [the technology at issue] was known in the art at the time of the invention"). As for Patent Owner's argument that there would have been technical difficulties with miniaturizing components of Victorian's VOX system, operating within the power afforded by miniature batteries at the time, and utilizing the processing algorithms to perform gating, we agree with Petitioner that Victorian itself discloses an earpiece with an in-ear-canal form factor including the components that Patent Owner alleges would be difficult to miniaturize and power, and processing algorithms to perform gating. PO Resp. 33; Pet. Reply 7–8; Ex. 1007 ¶¶ 13, 29–38, Figs. 3–4. As a prior art

printed publication, Victorian is presumed enabling. *In re Antor Media Corp.*, 689 F.3d 1282, 1288 (Fed. Cir. 2012) (prior art printed publications are presumptively enabled); *Apple Inc. v. Corephotonics, Ltd.*, 861 F. App'x 443, 450 (Fed. Cir. 2021). Patent Owner does not introduce sufficient evidence to overcome this presumption.

Moreover, the '839 patent does not mention problems with miniaturization or power usage, or with feedback, echo or ringing, suggesting that the inventors did not believe that addressing such issues was beyond the level of ordinary skill in the art. Ex. 1001, 2:59–67, 5:61–6:20, 6:62–67, 10:61–11:11; *see Google LLC v. Cywee Grp.*, IPR2018-01258, Paper 90 at 38–39 (PTAB Jan 9, 2020)(Final Written Decision) (explaining that because the patent "does not explain how to implement its sensor within appropriate circuits or its mathematics within appropriate software in any detail, this acts as an admission that such details were within the knowledge of one of ordinary skill"); *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) ("[T]he Board's observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board's finding that one skilled in the art would have known how to implement the features of the references.").

For the reasons discussed above, and based on the full trial record, we find that Petitioner has sufficiently proven that one of ordinary skill would have been motivated to combine Le and Victorian as Petitioner proposes.

4. Analysis of Independent Claim 1

a) 1[preamble]: "[a]n Always-On Recording System (AORS) comprising:"

Petitioner argues that, to the extent the preamble is limiting, Le discloses it. Pet. 20 (citing Ex. 1002 ¶¶ 119–123; Ex. 1006, 12, 28). For

example, Petitioner asserts, Le discloses passively recording data of events that the user may recall later, and a computer unit including a "continuously scrolling audio buffer" to store ambient sound. *Id.* (citing Ex. 1006 ¶¶ 12, 28).

Other than its arguments concerning motivation to combine discussed in Section II.D.3 above, Patent Owner does not present arguments regarding the preamble. *See* PO Resp.

Based on the full trial record, we agree with Petitioner's arguments, and find that the preamble would have been obvious over the Le-Victorian combination.[4]

b) 1[a]: "a first monitoring assembly mounted in an earpiece, the earpiece configured to occlude and form an acoustic seal of an ear canal, the first monitoring assembly including an Ambient Sound Microphone (ASM) to monitor an ambient acoustic field at an entrance to the ear canal occluded by the earpiece, the ASM producing an ASM signal responsive to the ambient acoustic field"

Petitioner argues that Le in combination with Victorian discloses or suggests this feature. Pet. 20 (citing Ex. 1002 ¶¶ 124–140). As discussed in Section II.D.3 above, Petitioner's combination replaces Le's earpiece with Victorian's ear-level device. Pet. 20. Petitioner contends that Victorian discloses ear-level device 110 including an occluded earmold that "closely resembles the 'earpiece' disclosed in the '839 patent." *Id.* at 22. Petitioner also points to Victorian's disclosure of external microphone 420 which is "housed in the earmold" and "picks up ambient sound" at the entrance to the

[4] Because we are persuaded that Petitioner has shown that Le teaches the subject matter recited in the preamble, we need not decide whether the preamble is limiting for purposes of this Decision.

user's ear canal. *Id.* at 23 (citing Ex. 1007 ¶¶ 23, 29, 30, Fig. 3B; Ex. 1002 ¶¶ 135–136). Petitioner further points to Victorian's disclosure that processor 460 "converts the signal received from . . . external microphone 420 to a sound audible to the person wearing ear-level device 110." *Id.* (citing Ex. 1007 ¶¶ 30, 52; Ex. 1002 ¶ 137).

> "Accordingly," Petitioner argues, one of ordinary skill
>
> would have understood that the Le-Victorian system discloses or suggests an in-the-canal device that fully occludes the ear canal and also has housed within it an external microphone ("a first monitoring assembly mounted in an earpiece . . . the first monitoring assembly including an Ambient Sound Microphone ASM") for picking up ambient sound outside the fully occluded ear canal ("to monitor ambient acoustic field at an entrance to the ear canal occluded by the earpiece") wherein the external microphone passes a signal to the processor for conversion into a sound the user can hear ("the ASM producing an ASM signal responsive to the ambient acoustic field").

Pet. 24 (citing Ex. 1002 ¶ 139).

Other than its arguments concerning motivation to combine discussed in Section II.D.3 above, Patent Owner does not present arguments regarding this limitation. *See* PO Resp.

Based on the full trial record, we agree with Petitioner's arguments, and find that this limitation would have been obvious over the Le-Victorian combination.

> c) *1[b] a second monitoring assembly mounted in the earpiece and including an ear canal microphone (ECM) to monitor an acoustic field within the ear canal occluded by the earpiece, the ECM producing an ECM signal responsive to the acoustic field within the ear canal*

Petitioner argues that Le in combination with Victorian discloses or suggests this feature. Pet. 24 (citing Ex. 1002 ¶¶ 141–147). Petitioner

asserts that Victorian discloses ear canal microphone 440 "housed in the earmold" of ear-level device 110. *Id.* (citing Ex. 1007 ¶¶ 29–30, Fig. 4A; Ex. 1002 ¶ 142). Petitioner also points to Victorian's disclosure that "[e]ar canal microphone 440 detects sound from the ear canal" which "includes primarily speech of the person wearing ear-level device 110." *Id.* at 25 (citing Ex. 1007 ¶ 30). Petitioner further relies on Victorian's disclosure that "[p]rocessor 460 converts the sound picked up from the ear canal to an electrical signal to be transmitted to remote device 190." *Id.* at 26 (citing Ex. 1007 ¶ 30).

> "Accordingly," Petitioner contends, one of ordinary skill would have understood that [the] Le-Victorian system discloses or suggests an in-the-canal device that fully occludes the ear canal and also has [an] ear canal microphone ("a second monitoring assembly mounted in the earpiece and including an ear canal microphone (ECM)") for picking up the occluded sound within the ear canal ("to monitor an acoustic field within the ear canal occluded by the earpiece") wherein the ear canal microphone produces a signal in response to picking up the occluded sound within the ear canal ("the ECM producing an ECM signal responsive to the acoustic field within the ear canal").

Pet. 26 (citing Ex. 1002 ¶ 146).

Patent Owner argues that the proposed Le-Victorian combination does not disclose an always-on recording system monitoring two acoustic fields (the ambient sound filed at an entrance to the ear canal and an acoustic field within the ear canal) "because Victorian's gating modules only permit monitoring of one acoustic field at a time." PO Resp. 34; PO Sur-reply 9. Patent Owner asserts that "[t]he plain language of claim 1 requires the AORS to monitor both acoustic fields" because "claim 1 recites an 'always-on' recording system comprising an ASM monitoring the ASM signal **and**

an ECM monitoring the ECM signal." *Id.* According to Patent Owner, "[t]he plain meaning of 'always-on' demands the ASM must always monitor the ASM signal **and** the ECM must always monitor the ECM signal." *Id.* However, Patent Owner contends, "Victorian's gating modules prohibit the ASM and the ECM from being simultaneously sent to a processor for data storage." *Id.*

Petitioner responds that nothing in the claim requires that both the ASM and ECM must always be on. Pet. Reply 12–13. Petitioner argues that, even if the preamble were limiting, the preamble's statement that the "system" is "always-on" does not mean that ***both*** the ASM and ECM must always be on. *Id.* Petitioner also contends that nothing in the body of the claim requires that both the ASM and ECM must always be on. *Id.* Petitioner further argues that, "even if the claim required that both the ASM and ECM be 'always-on,' that does not mean that the signals from both microphones must be simultaneously monitored or recorded," because "claim 1 merely requires 'a data storage device configured to act as a circular buffer for continually storing ***at least one of*** the ECM signal or the ASM signal.'" *Id.* at 13.

We agree with Petitioner that claim 1 does not require that the ASM and ECM must always be on. The plain meaning of the preamble's recitation of an "Always-On Recording System" is a recording ***system*** that is always on, which does not require that every component of the recording system must always be on. Additionally, although the body of the claim recites a "first monitoring assembly" for monitoring an ambient field at an entrance to the ear canal and a "second monitoring assembly" for monitoring an acoustic field within the ear canal, it does not require that both

monitoring assemblies must always be "on." Moreover, Patent Owner does not point to anything in the '839 patent Specification or prosecution history that indicates that the claim should be limited to a system where both monitoring assemblies are always on. Finally, we agree with Petitioner that, even if the claim were to require that both the ASM and ECM always be on (which it does not do), there is nothing in the claim that requires that the signals from both microphones must be simultaneously recorded, particularly because claim 1 states that the circular buffer merely stores "at least one of" the ECM and ASM signals. Pet. Reply 12; Ex. 1001, 14:60–62.

Consequently, we determine that, based on the full trial record, this limitation would have been obvious over the Le-Victorian combination.

d) 1[c] a data storage device configured to act as a circular buffer for continually storing at least one of the ECM signal or the ASM signal;

Petitioner argues that Le in combination with Victorian discloses or suggests this feature. Pet. 26 (citing Ex. 1002 ¶¶ 148–172). Petitioner asserts that "Le discloses or suggests a memory 18 and continuously storing, in a scrolling buffer, audio information from the user's surroundings, including from environmental microphone 38." *Id.* (citing Ex. 1006 ¶¶ 10, 28, 37). According to Petitioner, one of ordinary skill would have understood this disclosure of a continuously scrolling buffer "to encompass a circular buffer because Le describes it as a single buffer that continuously stores audio data that is discarded, i.e., overwritten, after some predetermined period of time." *Id.* at 28 (citing Ex. 1002 ¶ 155). Petitioner also references its previous argument concerning motivation to replace Le's environmental microphone with Victorian's microphone for recording into

Le's buffer, and argues that one of ordinary skill would have understood that the combined system discloses or suggests a continuously scrolling buffer "for recording data from an external microphone ('for continually storing the ASM signal.')." *Id.* at 30 (citing Ex. 1002 ¶ 171).

Other than its arguments concerning motivation to combine discussed in Section II.D.3 above, Patent Owner does not present arguments regarding this limitation. *See* PO Resp.

Based on the full trial record, we agree with Petitioner's arguments, and find that this limitation would have been obvious over the Le-Victorian combination.

e) 1[d] a further data storage device coupled to the data storage device; and

Petitioner argues that Le in combination with Victorian discloses or suggests this feature. Pet. 31 (citing Ex. 1002 ¶¶ 173–177). Petitioner asserts that "Le discloses that the computer unit 15 includes a memory 18 and that when a user enters a voice command, a 'thirty-second sound byte surrounding the event is input from the environmental microphone 38 and saved into the computer memory 18.'" *Id.* at 31 (citing Ex. 1006 ¶¶ 36–37). Petitioner also argues that one of ordinary skill would have understood Le to disclose or suggest implementing Le's scrolling buffer and memory 18 in separate memory devices. *Id.* at 29 (citing Ex. 1002 ¶¶ 166–169), 31 (citing Ex. 1002 ¶ 175). According to Petitioner, one of ordinary skill "would have understood that when the scrolling buffer and permanent memory are implemented as separate memory devices, the two must be coupled to each other to continue to achieve Le's purpose of storing information in the buffer into the permanent memory." *Id.* at 31 (citing Ex. 1002 ¶ 176). "Thus," Petitioner contends, one of ordinary skill "would have understood the Le-

Victorian system discloses or suggests a memory (a 'further data storage device') which saves or stores data from a separate scrolling buffer ('coupled to the data storage device')." *Id.* (citing Ex. 1002 ¶ 177).

Other than its arguments concerning motivation to combine discussed in Section II.D.3 above, Patent Owner does not present arguments regarding this limitation. *See* PO Resp.

Based on the full trial record, we agree with Petitioner's arguments, and find that this limitation would have been obvious over the Le-Victorian combination.

f) 1[e] a record-activation system including software configured to activate the further data storage device to record a content of the data storage device.

Petitioner argues that Le in combination with Victorian discloses or suggests this feature. Pet. 32 (citing Ex. 1002 ¶¶ 178–184). Petitioner asserts that Le's processor includes software for "determining whether the recognized spoken words constitute a predetermined natural voice command, and responding to the predetermined natural voice commands." *Id.* (citing Ex. 1006 ¶¶ 11, 36; Ex. 1002 ¶ 181). According to Petitioner, Le discloses that voice commands "are used to trigger storage of content that is in the continuously scrolling buffer to the memory 18." *Id.* (citing Ex. 1006 ¶¶ 27, 37). "Accordingly," Petitioner contends, one of ordinary skill

> would have understood the Le-Victorian system discloses or suggests executing instructions to recognize speech commands such as "start recording" ("a record-activation system including software") which are configured to store audio signals from the continuously scrolling buffer into a separate memory for later retrieval ("configured to activate the further data storage device to record a content of the data storage device").

Id. at 33 (citing Ex. 1002 ¶ 184).

Other than its arguments concerning motivation to combine discussed in Section II.D.3 above, Patent Owner does not present arguments regarding this limitation. *See* PO Resp.

Based on the full trial record, we agree with Petitioner's arguments, and find that this limitation would have been obvious over the Le-Victorian combination.

g) Summary for Claim 1

For the foregoing reasons, and based on the full trial record, Petitioner has proven by a preponderance of the evidence that claim 1 is unpatentable over Le and Victorian.

5. Dependent Claim 6

Claim 6 depends from claim 1, and further recites "a time-stamp audio index system configured to embed a time-coded index into the content transmitted to the further data storage device." Ex. 1001, 15:25–28.

Petitioner contends this limitation is satisfied by the combination of Le and Victorian because Le "discloses that when recording audio into the memory 18, the system also stores the time and date." Pet. 34. Patent Owner argues in opposition that Petitioner's evidence fails to establish Le "**embed[s]** a time-coded index into" recorded content, per claim 6. PO Resp. 36.

We first consider the meaning of the claim term "embed," then we turn to the applicable disclosures of Le and Victorian.

a) Claim Construction — "embed"

Claim 6 includes "a time-stamp audio index system configured to embed a time-coded index into the content." Ex. 1001, 15:25–28. Patent Owner argues that "[a]n embedded time-code index requires adding to, and

updating, an existing data file." PO Resp. 37–38 (section title); Ex. 2006 ¶¶ 96–102. Patent Owner relies on an alleged "plain meaning" of the claim terms "index" and "embed," which Patent Owner asserts "indicate a system that **inserts** index entries **into** the recorded data files." *Id.* at 37 (citing Ex. 2008, 1); Ex. 2006 ¶¶ 96. Patent Owner adds that the '839 patent specification "is consistent with this definition." PO Resp. 37 (citing Ex. 1001, 5:26–27, 11:59–62); Ex. 2006 ¶ 96. According to Patent Owner, such embedding of a time-coded index into recorded content provides several benefits, such as: "accurate referencing and retrieving of associated data"; tamper resistance; ease of frequent updating; audio-film synchronization; and audio mixing, mastering, and production. *See* PO Resp. 37–38 (citing Ex. 2008, 1; Ex. 1001, 6:57–61); Ex. 2006 ¶¶ 97–102. Patent Owner concludes that, although Le may record a time stamp, "that does not necessarily add to, and certainly does not update, an existing data file" and hence is not an embedded time index per claim 6. PO Resp. 38–39; Ex. 2006 ¶¶ 103–106.

Petitioner replies that the plain and ordinary meaning of claim 6 "merely requires taking a time-stamp with an audio recording . . . to facilitate later recall and retrieval," such as is disclosed by Le. Pet. Reply 14 (citing Pet. 34–35; Ex. 1002 ¶¶ 185–190); Pet. 34–35 (stating that Le "discloses that when recording audio into the memory 18, the system also stores the time and date") (citing Ex. 1006 ¶¶ 12, 21, 39). Petitioner asserts that a person of ordinary skill in the art would have understood "that the time and date information saved with the audio content is a time-coded index because Le discloses that the time and date information can be used to

retrieve the information that is stored in the memory." Pet. 34–35 (citing Ex. 1006 ¶ 21); Ex. 1002 ¶ 189.

Petitioner adds that "[t]his is consistent with how the '839 patent describes this feature." Pet. 34 (citing Ex. 1001, 5:24–27, 9:54–57); Ex. 1002 ¶ 188. Petitioner asserts that the '839 patent specification "equates a 'time-stamp' '***embedded*** within the audio stream' with a 'time stamp ***taken with*** . . . the audio recording.'" Pet. Reply 14 (quoting Ex. 1001, 5:24–30). In particular, according to Petitioner: "Because of the parallelism in the two sentences, a [person of ordinary skill in the art] would reasonably infer that a time stamp that is 'embedded within' an 'audio stream' encompasses a time stamp that is 'taken with' an 'audio recording.'" *Id.*

Petitioner argues that Patent Owner's claim construction is "overly narrow" by requiring "a 'system that inserts index entries into the recorded data files', that 'cannot easily be tampered with.'" Pet. Reply 14–15 (quoting PO Resp. 37–38). Petitioner dismisses Exhibit 2008 as "an extrinsic publication directed to 'embedding indexing' for electronic text files" which Patent Owner "never explains why . . . is relevant to" claim 6. *Id.* at 15. Petitioner asserts that Mr. Anagnos's testimony in support of Patent Owner's claim construction is unsupported, and is directed to unclaimed subject matter. *See id.* (citing PO Resp. 38; Ex. 2006 ¶¶ 99–101).

Petitioner further disagrees with Patent Owner's position differentiating between a time stamp (such as is disclosed by Le) and the embedded time-coded index of claim 6. Pet. Reply 15. Petitioner asserts that Patent Owner's position is refuted by claim 6 and the '839 patent specification, because they "demonstrate that the two are related, if not interchangeable, concepts." *Id.* (citing Ex. 1001, 5:25–30, 11:59–62).

Petitioner provides a graphic to illustrate Petitioner's understanding of the different claim construction positions taken by the parties. *See id.* at 16. According to Petitioner, "[t]he claims place no limitation on the 'content' as being a particular file(s), or the timing, manner, or location of the embedding," so "taking a timestamp with each audio recording, as disclosed by Le, is 'embedding a time-coded index' into the 'content transmitted' to the further data storage device." *Id.*

Patent Owner replies that Petitioner's argument "focus[es] on whether a 'time-stamp' is analogous to a 'time-coded index,'" but "the real distinction . . . is how the time is stored — via embedding into the stored content, as claim 6 plainly requires, or via a separate file, as Le discloses." PO Sur-reply 10 (citing PO Resp. 36–39).

We agree with Patent Owner's position that the claim term "embed" requires that the time coded-index is inserted into the recorded content. The language of the claim correspondingly recites "a time-stamp audio index system configured to *embed* a time-coded index *into* the content." Ex. 1001, 15:25–28 (emphasis added). This verbiage precludes Petitioner's broad claim construction whereby the claim would be met simply by storing, along with but separately from the recorded content, the time when the content was recorded.

We disagree with Petitioner's position that claim 6 does not limit "the content" into which the time-coded index is embedded. Claim 6 states that this is "the content transmitted to the further data storage device." Ex. 1001, 15:27–28. This is a clear reference back to the parent claim 1, specifying a data storage device that stores an ECM and/or ASM signal, and a further data storage device that "record[s] a content of the data storage device." *Id.*

at 14:60–67. In this context, a person of ordinary skill in the art would understand that "the content" in claim 6 refers to the ECM and/or ASM signal stored in the data storage device and then transmitted to the further data storage device. Indeed, the Petition itself refers to how Le and Victorian combine to disclose or suggest the features of claim 6, because "the Le-Victorian system discloses or suggests a further data storage device (e.g., memory 18) *into which the content of the continuously scrolling buffer is recorded*." Pet. 34 (emphasis added).

We also disagree with Petitioner's reading of the '839 patent specification. It pertinently states, in two sentences, and with our emphases added:

> When the Transient Event Detector subsystem in the present invention detects a transient with the ASMs, archival recording is activated and *a time-stamp is saved separately or embedded within the audio data stream*. *The time stamp taken with or separately to the audio recording* may be used for an audio forensic examination of the user's sound exposure history profile.

Ex. 1001, 5:24–30. We conclude this disclosure *differentiates between* saving the time-stamp separately from the audio data stream on one hand, and embedding the time-stamp within the audio data stream on the other hand. It does not *equate* those two disparate concepts as Petitioner urges. Further, claim 6 clearly is limited to the latter concept, and excludes the former concept.

The Federal Circuit has stated that "[t]he disjunctive 'or' plainly designates that a series describes alternatives," except that "the 'use of two terms as alternatives' functions as a redefinition of a term if that redefinition is 'so clear that it equates to an explicit one.'" *SkinMedica, Inc. v. Histogen*

Inc., 727 F.3d 1187, 1199–200 (Fed. Cir. 2013) (quoting *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1368 (Fed. Cir. 2012) (citing *Kustom Signals, Inc. v. Applied Concepts, Inc.*, 264 F.3d 1326, 1331 (Fed.Cir.2001); *Oxford English Dictionary* 882, vol. X (2nd ed.1989)). Thus, although "use of two terms as alternatives could amount to an implicit redefinition of the terms" as being the same, this requires that "a person of ordinary skill in the art would have to read the specification and conclude that the applicant has clearly disavowed claim scope or has acted as its own lexicographer." *Thorner*, 669 F.3d at 1368. "Simply referring to two terms as alternatives . . . is not sufficient to redefine a claim term." *Id.* In this case, we conclude that the '839 patent disclosure quoted above uses "or" to describe a series of alternatives, rather than redefining the members of the series as being the same.

Petitioner also relies on the '839 patent's disclosure that: "[t]he buffer may also record non-audio data, such as a time-stamp generated by time stamp unit 91 that may be updated on a sample-by-sample or intermittent basis." Ex. 1001, 9:54–57; *see* Pet. 34. However, regardless of what may constitute a "time-stamp" as a general matter, the claim limitation at issue here specifically requires embedding a time-coded index into recorded content. The '839 patent's discussion of time-stamps has little bearing on that issue.

Thus, we conclude claim 6 requires that the time coded-index is inserted into the recorded content. Claim 6 does not include storing, separately from the recorded content, the time when the content was recorded.

b) Application to Le and Victorian

Petitioner relies on Le at paragraphs 12, 21, and 39, and not on Victorian, as disclosing embedding a time-coded index into recorded content. *See* Pet. 34–35; Pet. Reply 15. Paragraph 12 pertinently describes how Le's system "passively record[s] data of certain events that the user may recall at a later time" and "record[s] sound, location, time, and date information of this event." Ex. 1006 ¶ 12. Paragraphs 21 and 39 pertinently describe how Le's system "record[s] and store[s] an audio clip surrounding the event" as well as "other contextual information about the user's introduction to a new person, such as location, time, and date" to be recalled later. *Id.* ¶¶ 21, 39. Further: "A conventional computer clock and calendar of the computer unit 15 may be used to record the time and date of the introduction of the new person." *Id.* ¶ 39.

Patent Owner argues that "Le, at best, discloses a time stamp stored in a separate file," which does not satisfy claim 6's requirement of embedding a time-coded index into recorded content. PO Resp. 39; Sur-reply 9–10; Ex. 2006 ¶¶ 95, 103–106.

We agree with Patent Owner. In particular, as discussed in Section II.D.5(a) above, claim 6 requires that a time-coded index is inserted into the recorded content. Le discloses only that its system passively records sound, and stores contextual information such as the time that the sound was recorded, to be recalled later. *See* Ex. 1006 ¶¶ 12, 21, 39.

Thus, we conclude Petitioner has not established by a preponderance of the evidence that claim 6 is unpatentable as having been obvious over Le and Victorian.

6. Dependent Claims 22–23

Claim 22 depends on claim 1 and further recites that the system includes "a signal processing circuit configured to at least one of amplify the ECM signal or equalize a frequency sensitivity of the ECM signal." Petitioner argues that one of ordinary skill "would have understood that it is common for audio signal processing systems to amplify microphone signals," and that Victorian discloses processor 460 that "converts the sound picked up from the ear canal to an electrical signal" and "includes one or more of amplification circuitry." Pet. 35–36. Accordingly, Petitioner contends, one of ordinary skill "would have understood that the Le-Victorian system discloses or suggests a processor ('a signal processing circuit') that both processes a signal from the ear canal microphone ('ECM signal') and has amplification circuitry for amplifying the signals that it receives ('configured to at least one of amplify the ECM signal or equalize a frequency sensitivity of the ECM signal')." *Id.* at 36.

Claim 23 also depends on claim 1 and further recites that the system includes "a signal processing circuit configured to at least one of amplify the ASM signal or equalize a frequency sensitivity of the ASM signal." Petitioner argues that Victorian discloses processor 460 that "converts the signals received from . . . external microphone 420 to a sound audible to the person wearing ear-level device 110" and "includes one or more of amplification circuitry." Pet. 37. Accordingly, Petitioner contends, one of ordinary skill "would have understood that the Le-Victorian system discloses or suggests a processor ('a signal processing circuit') that both processes a signal from the external microphone ('ASM signal') and has amplification circuitry for amplifying the signals it receives ('configured to

at least one of amplify the ASM signal or equalize a frequency sensitivity of the ASM signal')." *Id.* at 37–38.

Patent Owner does not provide separate argument for claims 22 and 23, and instead relies on its argument for claim 1. PO Resp. 12–39.

Based on the full trial record, we agree with Petitioner's arguments, and find that Petitioner has proven by a preponderance of the evidence that claims 22 and 23 would have been obvious over the combination of Le and Victorian.

E. Ground 1B: Asserted Obviousness of Claim 5 Based on Le in view of Victorian and Further in view of Yuen

Petitioner contends that claim 5 would have been obvious over Le in view of Victorian and further in view of Yuen. Pet. 39–43. Patent Owner does not provide separate argument for claim 5. PO Resp. 40.

1. Overview of Yuen (Ex. 1008)

Yuen is directed to audio recorders, "particularly to a device which records audio signals in a first-in first-out memory queue and allows the operator to designate previously recorded sections for preservation and later playback." Ex. 1008 at 1:8–12. This audio recorder includes a microphone and a sound responsive switch. *Id*. at 3:36–41. The switch provides the output of the microphone to an analog-to-digital converter which creates digital signals. *Id*. at 3:59–60. These signals are then provided to a compressor which compresses the signal to create a compressed output which is then stored in memory. *Id*. at 3:62–4:3.

2. Analysis of Dependent Claim 5

a) "[t]he system according to claim 1 further comprising: a signal processing system configured to at least one of multiplex output signals from the circular buffer or encode the

output signals to reduce a data rate before transmission of the output signals to the further data storage device."

Petitioner argues that Le in combination with Victorian and Yuen discloses or suggests this feature. Pet. 39 (citing Ex. 1002 ¶¶ 211–226). Petitioner asserts that because "the claim is written in the disjunctive using 'or,' only one of the 'multiplex' or 'encode' features need be disclosed in the prior art to meet this claim." *Id.* Relying on Dr. Atlas, Petitioner argues that one of ordinary skill would have known that encoding and compression techniques were commonly used in recording systems, including retroactive recording systems like Le, to maximize storage space. *Id.*; Ex. 1002 ¶ 214. Petitioner also argues that "Yuen discloses a 'compressor 26' that receives digital signals from an analog-to-digital converter representing the output of a microphone" and "uses any 'commercially available compression algorithm[] to provide an output signal containing fewer bits than the input.'" Pet. 39–40. According to Petitioner, one of ordinary skill "would have recognized Yuen's compressor could be used in the same way in the Le-Victorian system to compress audio signals received prior to storing those signals in Le's memory." *Id.* at 41.

Petitioner acknowledges that Yuan shows the compression occurring before the audio data is stored in a FIFO memory, but argues that one of ordinary skill "would have found it obvious in the Le-Victorian-Yuen system to compress the audio signals outputted from the continuously scrolling buffer and before they are transmitted to the separate memory" so that "the CPU and power resources necessary for compression are only expended with respect to those sets of audio signals that the user wishes to record on a longer term basis in memory 18," rather than expending those

resources by "constantly compressing audio signal[s] that are stored in the scrolling buffer." Pet. 42 (citing Ex. 1002 ¶ 224).

As noted above, Patent Owner does not provide separate argument for claim 5, and instead relies on its argument for claim 1. PO Resp. 40.

Based on the full trial record, we agree with Petitioner's arguments and find that Petitioner has proven by a preponderance of the evidence that claim 5would have been obvious over the combination of Le, Victorian, and Yuen.

F. Ground 1C: Asserted Obviousness of Claim 7 Based on Le in view of Victorian and Further in view of Kvaløy

Petitioner contends that claim 7 would have been obvious over Le in view of Victorian and further in view of Kvaløy. Pet. 43–46. Patent Owner does not provide separate argument for claim 7. PO Resp. 40.

1. Overview of Kvaløy (Ex. 1009)

Kvaløy is directed to a voice detection and discrimination apparatus. Ex. 1009, 1:15–16. Kvaløy describes an earplug which includes acoustic transmission channels. *Id*. at 3:40–57. These channels can be implemented as a very thin duct or valve which "equalises static pressure differences, while retaining strong low frequency sound attenuation." *Id*. at 4:59–62.

2. Analysis of Dependent Claim 7

a) "[t]he system according to claim 1, further comprising: a pressure equalization tube in the earpiece configured to equalize a pressure in the ear canal occluded by the earpiece relative to an ambient pressure external to the ear canal."

Petitioner argues that Le in combination with Victorian and Kvaløy discloses or suggests claim 7. Pet. 43 (citing Ex. 1002 ¶¶ 227–235). Petitioner asserts that Victorian "states that the earmold is 'vented to remove

undesirable low frequency sound.'" *Id.* (citing Ex. 1009 ¶ 27). Petitioner also contends that "Kvaløy discloses an earpiece very similar to Victorian's ear-level device 110," and also discloses that "an equalisation of pressure between the two sides of the earplug system is required" because "the surrounding pressure may very during its use." *Id.* at 44 (citing Ex. 1009, 4:56–59.) "To that end," Petitioner asserts, "Kvaløy discloses an 'ear terminal' having 'very thin duct T3, T4 or a valve that equalizes static pressure differences, while retaining strong low frequency sound attenuation.'" *Id.* (citing Ex. 1009, 4:59–62). According to Petitioner, one of ordinary skill "would have appreciated the pressure equalization problems that can occur with sealing earpieces and that Kvaløy's pressure equalization tubes were a common solution to such a problem that could be readily applied to the Le-Victorian system's ear-level device." *Id.* at 45 (citing Ex. 1002 ¶ 232).

As noted above, Patent Owner does not provide separate argument for claim 7, and instead relies on its argument for claim 1. PO Resp. 40.

Based on the full trial record, we agree with Petitioner's arguments, and find that Petitioner has proven by a preponderance of the evidence that claim 5would have been obvious over the combination of Le, Victorian, and Kvaløy.

G. Ground 1F: Asserted Obviousness of Claims 14–17 Based on Le in view of Victorian and Further in view of Kurki

Petitioner contends that claims 14–17 would have been obvious over Le in view of Victorian and further in view of Kurki. Pet. 61–71; Ex. 1002 ¶¶ 294–319. Patent Owner disagrees, arguing that combination would not have rendered claims 14–17 obvious. PO Resp. 47–50; Ex. 2006 ¶¶ 124–132.

Claim 14 recites: "The system according to claim 1, the system further comprising: a remote audio forensics analysis system configured to analyze either the content of the circular buffer or data stored on the further data storage device." Ex. 1001, 16:13–16. Claims 15–17 depend from claim 14. *See id.* at 16:17–28.

We have reviewed the record, and we conclude Petitioner's contentions are supported by a preponderance of the evidence. We begin our analysis with a brief summary of Kurki, then we consider the meaning of the term "audio forensics analysis" in claim 14, and finally we turn to the applicable disclosures of Le, Victorian, and Kurki.

1. Overview of Kurki (Ex. 1012)

Kurki is directed to a "device for converting speech by replacing inarticulate portions of the speech before the conversion." Ex. 1012, code (54). Kurki describes a "mobile electronic device 202" and "a server 208" which "exchange information 210 via networks 204, 206 in order to carry out the overall speech to text conversion process." *Id*. at 7:16–18. Kurki also describes other functions "such as spell checking, machine/human translation, translation verification or further text to speech synthesis" being "located at sever 208 or another remote entity." *Id*. at 11:14–17.

2. Claim Construction — "audio forensics analysis"

Claim 14 includes "a remote *audio forensics analysis* system." Ex. 1001, 16:14 (emphasis added).

Petitioner argues a person of ordinary skill in the art would have understood Kurki's speech-to-text conversion and translation are "consistent with how the '839 patent describes the 'forensics analysis system.'"

Pet. 62–65 (citing Ex. 1001, 13:32–46); Ex. 1002 ¶ 313. For example, Petitioner asserts, "the '839 patent explains that a 'remote forensics analysis system includes all, either or a combination of the following functionality; . . . a language translation system to translate text from one language to another; [and] a text-to-speech translation system to translate text into speech for transmission back to the AORS user." *Id.* (quoting Ex. 1001, 13:32–46).

Patent Owner argues that Petitioner relies on "a false definition" of "analysis," because "[t]he term 'analyze/analysis,' when used in the hearing protection industry, is the calculation of noise dosage a person receives, not speech-to-text conversion." PO Resp. 47–48; Ex. 2006 ¶¶ 125–126. Patent Owner then discusses various ways in which calculation of noise dosage differs from speech-to-text conversion. *See* PO Resp. 48–49; Ex. 2006 ¶¶ 127–128.

Petitioner maintains in reply that Patent Owner's "overly narrow construction" of "analysis" is unsupported and inconsistent with the intrinsic evidence concerning the '839 patent. Pet. Reply 24–25. Petitioner asserts that the '839 patent "specification uses 'forensic analysis' interchangeably with 'forensic examination,'" which "suggests that 'analysis' and 'examination' should have the same meaning." *Id.* at 25 (citing Ex. 1001, 5:27–30, 13:29–32). Petitioner argues that this is consistent with the plain meaning of the term "analysis" — "[e]xamination for the purpose of understanding." *Id.* (citing Ex. 1053).

Petitioner criticizes Patent Owner's construction as "add[ing] multiple limitations that lack support in the specification," which does not refer to "noise dosage" or discuss the factors that are analyzed to calculate a noise

dosage. Pet. Reply 25. Petitioner also argues that Patent Owner's construction departs from the prosecution history of the '382 patent. *Id.* at 26 (citing Ex. 1049, 160). Petitioner moreover argues that Patent Owner does not explain why the meaning of "analysis" to the "hearing protection industry" is relevant to the '839 patent claims, that Mr. Anagnos has no experience in the hearing protection industry before April 2008, and that Patent Owner's reliance on Exhibit 2014 is unexplained. *See id.* (citing Ex. 1045, 27:19–21).

Patent Owner responds that Petitioner's claim construction relies "on specific terms in the '839 patent taken out of context," and that a complete reading of the '839 patent specification shows the terms "analysis" and "examination" are not the same. Sur-reply 2, 12–14. In particular, Patent Owner asserts that the claim term "remote audio forensic analysis system" "appears in one single paragraph in the specification of the '839 patent," in which "the word 'analysis' appears 4 more times, but the word 'examination' does not appear even once." *Id.* at 12–13 (citing Ex. 1001, 13:29–58). By contrast, according to Patent Owner, the term "examination" "appears in an entirely different paragraph.'" *Id.* at 13 (citing Ex. 1001, 5:24–30). Patent Owner also argues the '382 patent prosecution history cited by Petitioner is not relevant to claim 14 of the '839 patent. *Id.* at 13 (citing Ex. 1049, 478 (¶ 44), 489 (¶ 64)).

We conclude that Petitioner's understanding of the term "audio forensics analysis" in claim 14 as including speech-to-text conversion and translation has ample support in the '839 patent specification. The '839 patent specification correspondingly states that its "remote audio forensics system includes all, either or a combination of the following functionality"

including "a speech-to-text analysis system on the remote server" and "a language translation system to translate text from one language to another." Ex. 1001, 13:29–58. Given the specificity of this disclosure, and its clear correspondence to the system recited in claim 14, we need not delve into the '382 patent prosecution history as disputed between the parties to support applying Petitioner's claim construction here.

Patent Owner's attempt to narrow the meaning of the broad claim term "audio forensics analysis," by contrast, has no objective support in the record. We have reviewed the '839 patent disclosures cited by Patent Owner. *See* Ex. 1001, 5:24–30, 13:29–58. We find nothing therein to support construing the term "audio forensics analysis" to be limited to a noise dosage calculation. *See id.*

Patent Owner's reliance on Exhibit 2014 fares no better. Patent Owner identifies Exhibit 2014 as: "US Department of Labor, Occupational Safety and Health Administration, Appendix A to § 1910.95 —Noise Exposure Computation." PO Resp. iv. Patent Owner argues, and Mr. Anagnos testifies, that page 3 supports Patent Owner's claim construction, but they do not explain how. *See* PO Resp. 48; Ex. 2006 ¶¶ 125–126. We have reviewed page 3, and we find nothing therein to support construing the term "audio forensics analysis" to be limited to a noise dosage calculation. *See* Ex. 2014, 3. Although page 3 does discuss noise dosage, it does nothing to indicate that noise dosage is equivalent to the broad claim term "audio forensics analysis" at issue here. *See id.*

Thus, we conclude the "audio forensics analysis" of claim 14 includes speech-to-text conversion and translation.

3. Analysis of Dependent Claim 14

a) "[t]he system according to claim 1 further comprising: a remote audio forensics analysis system configured to analyze either the content of the circular buffer or the data stored on the further data storage device."

Petitioner argues that Le in combination with Victorian and Kurki discloses or suggests claim 14. Pet. 61 (citing Ex. 1002 ¶¶ 294–319). As noted above, Petitioner argues that the "'839 patent explains that a 'remote forensics analysis system includes all, either or a combination of the following functionality; . . . a language translation system to translate text from one language to another; a text-to-speech translation system to translate text into speech for transmission back to the AORS user.'" Pet. 64–65 (citing Ex. 1001, 13:32–46). According to Petitioner, one of ordinary skill

> would have understood that Kurki makes at least the following teachings relevant to Le's system: (1) a remote server 208 that performs speech-to-text conversion; (2) a further remote entity that, in addition or alternatively to remote server 208, performs machine translation and text-to-speech synthesis; and (3) the "translated text, synthesized speech, etc." is returned to the device 202.

Id. at 64 (citing Ex. 1002 ¶ 312). Petitioner argues that one of ordinary skill "would have understood that the above-described disclosures" of Kurki "are consistent with how the '839 patent describes the 'forensics analysis system.'" *Id.* (citing Ex. 1002 ¶ 313).

Patent Owner's opposition is premised solely on Kurki not disclosing "an analysis of noise dosage or any other similar concepts," per Patent Owner's construction of the "audio forensics analysis" term in claim 14. PO Resp. 49; *see also id.* at 48–50 (the entirety of the Patent Owner Response's argument addressing claim 14). We have rejected that claim construction, and concluded the "audio forensics analysis system" in

claim 14 includes speech-to-text conversion and translation, for reasons provided in Section II.G.2 above.

Applying that claim construction, we find that a preponderance of the evidence supports Petitioner's contention that Kurki discloses a remote audio forensics analysis system, because Kurki's remote server performs speech-to-text conversion and translation. *See* Ex. 1012, 1:6–11, 5:20–26, 6:54–65, 7:14–28, 11:14–18, 12:38–58, 13:1–24. We further determine that a person of ordinary skill in the art would have been motivated to implement such a remote audio forensics system in the combined system of Le, Victorian, and Kurki, for the reasons proffered by Petitioner and summarized above.

We conclude Petitioner has established by a preponderance of the evidence that claim 14 would have been obvious over Le, Victorian, and Kurki.

4. Dependent Claims 15–17

Claim 15 depends from claim 14, and recites that "the remote audio forensics analysis system includes a communication system configured to transmit at least one of the content of the circular buffer or the data of the further data storage device to a remote server for analysis of at least one of the ECM signal or the ASM signal." Ex. 1001, 16:16–21. Petitioner argues that "the Le-Victorian-Kurki system comprises a data port and remote server and another remote entity ('the remote audio forensic analysis system')" and "discloses or suggests transmitting audio information from its wearable recording system to a remote device, such as Kurki's remote server." Pet. 66–67 (citing Ex. 1006 ¶¶ 21, 39). According to Petitioner, "Le teaches that such information include 'an audio clip surrounding the event' that is

recorded and stored upon the receipt of a predetermined voice command, and which may further be uploaded to another computer system." *Id.* at 67 (citing Ex. 1006 ¶ 21). Accordingly, Petitioner contends, one of ordinary skill

> would have understood that the Le-Victorian-Kurki system includes a data port ("communication system") configured to transmit the content of the scrolling buffer ("the content of the circular buffer") and/or the content of the separate memory ("or the data of the data storage device") to a remote server and/or another remote entity to analyze the audio and to perform speech to text conversion, translation, and speech synthesis services ("to a remote server for analysis of at least one of . . . the ASM signal").

Id. (citing Ex. 1002 ¶ 325).

Claim 16 depends from claim 15 and recite that "the remote audio forensics analysis system is configured to receive results of the analysis from the remote server." Ex. 1001, 16:22–24. Petitioner argues that "Le teaches that audio information can be transmitted from its wearable recording system via data port 28 to a remote device, such as Kurki's remote server 208 and/or another remote entity," and Kurki teaches that server 208 "perform[s] the negotiated part of the processing for speech to text conversion and then transmit[s] 'the results to the device 202.'" Pet. 68 (citing Ex. 1012, 13:16–23). Accordingly, Petitioner contends, one of ordinary skill

> would have understood that in the Le-Victorian-Kurki system the data port of the computer unit (which is part of "the remote audio forensics analysis system") receives the results of the speech-to-text conversion from a remote server and/or another remote entity ("is configured to receive results of the analysis from the remote server").

Id. (citing Ex. 1002 ¶ 330).

Claim 17 depends from claim 16 and recites that the system further includes "a text-to-speech translation system to translate the received results of the analysis from the remote server into speech." Ex. 1001, 16:22–24. Petitioner argues that "Kurki discloses that after the results of the speech-to-text conversion are transmitted from the server 208 to the mobile device 202, the mobile device 202 transmits 'approval/acknowledgement message 412 optionally including the whole conversion result to be further processed," and that this "further processing" includes "language translation and text-to-speech synthesis performed at server 208 or another remote entity." Pet. 69 (citing Ex. 1012, 5:62–6:1, 7:20–28, 11:14–18, 13:16–23, 16:8–14). "Then," Petitioner asserts, "[i]n case the output (translated text, synthesized speech, etc.) from the additional service is transmitted forward, the additional service entity shall address it based on the received service order message from the sender party, e.g. the device 202 or server 208, or remit the output back to them to be delivered onwards to another location." *Id.* at 70 (citing Ex. 1012, 12:62–67). Accordingly, Petitioner contends, one of ordinary skill

> would have understood that the *Le-Victorian-Kurki* system discloses or suggests that the remote sever (or another remote entity) translates the converted text-to-speech into another language and then further performs speech synthesis ("a text-to-speech translation system to translate the received results of the analysis from the remote server into speech").

Id. (citing Ex. 1002 ¶ 337).

Patent Owner does not provide separate argument for claims 15–17, and instead relies on its argument for claims 1 and 14. PO Resp. 50.

Based on the full trial record, we agree with Petitioner's arguments and find that Petitioner has proven by a preponderance of the evidence that

claims 15–17 would have been obvious over the combination of Le, Victorian, and Kurki.

H. Ground 1D: Asserted Obviousness of Claims 8–10 Based on Le in view of Victorian and Further in view of Sjursen

Petitioner contends that claims 8–10 would have been obvious over Le in view of Victorian and further in view of Sjursen. Pet. 47–55; Ex. 1002 ¶¶ 236–270. Patent Owner disagrees, arguing that combination would not have rendered claims 8–10 obvious. PO Resp. 40–47; Ex. 2006 ¶¶ 109–122.

Claim 8 recites: "The system according to claim 1, further comprising: a diaphragm to cover the ASM." Ex. 1001, 15:34–35. Claims 9 and 10 are dependent on claim 8. *Id.* at 15:36–41.

We have reviewed the record, and we conclude Petitioner's contentions are not supported by a preponderance of the evidence. We begin our analysis with a brief summary of Sjursen, then we consider the meaning of the term "diaphragm" in claim 8, and finally we turn to the applicable disclosures of Le, Victorian, and Sjursen.

1. Overview of Sjursen (Ex. 1010)

Sjursen is directed to a hearing aid having a tuned resonant cavity. Ex. 1010, 4:58. Figure 1 of Sjursen is reproduced below:

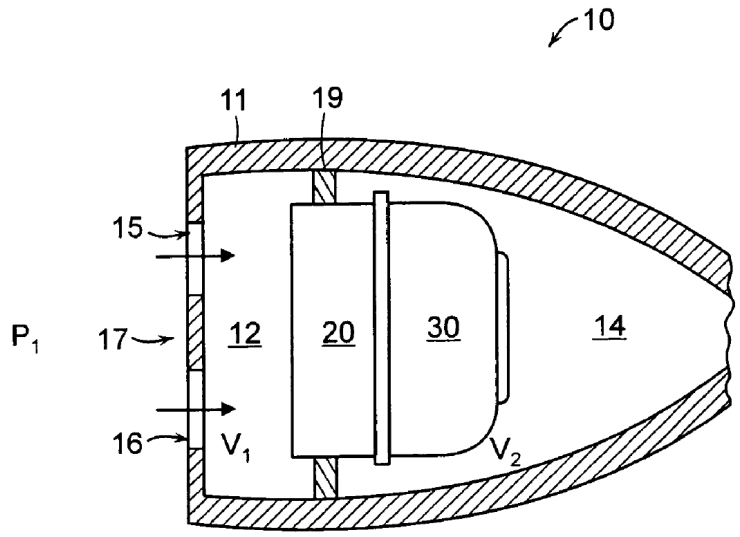


FIG. 1

Figure 1 of Sjursen.

As shown in Figure 1, Sjursen's hearing aid 10 includes a hearing aid shell 11 and a resonant cavity 12. *Id.* at 4:58–60, Fig. 1. The hearing aid shell 11includes a face plate 17 with a pair of openings 15, 16 which aid in the tuning of the resonant cavity. *Id.* at 4:63–5:1. The "tuned resonant cavity can help reduce the cost of the hearing aid" because "smaller, less complex, and/or less expensive circuitry can be employed." *Id.* at 2:59–64.

2. Claim Construction — "diaphragm"

Petitioner argues a person of ordinary skill in the art "would have understood that 'diaphragm' as used in claim 8 refers to a type of structure exemplified by 'diaphragm 12' shown in" Figures 1A and 1B of the '839 patent. Pet. 49. Those Figures are reproduced here, as annotated by Petitioner:

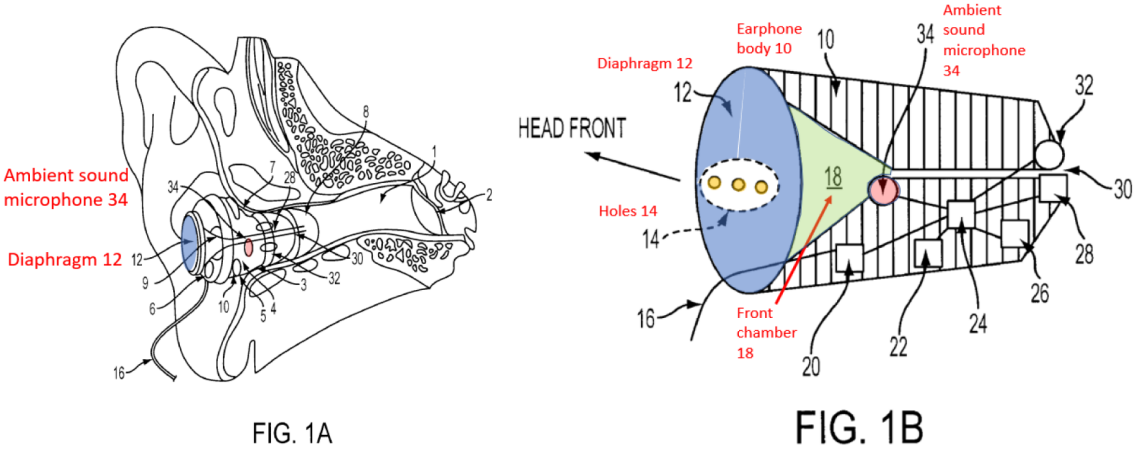


FIG. 1A FIG. 1B

Figures 1A and 1B of the '839 Patent (Annotated at Pet. 39).

Figures 1A and 1B both depict earpiece 8, including diaphragm 12 (annotated in blue by Petitioner) and ambient sound microphone 34 (annotated in red by Petitioner). *See* Pet. 47–48; Ex. 1001, 2:23–27, 7:9–14, 7:25–27, 7:34.

Dr. Atlas testifies on behalf of Petitioner that "the '839 patent uses the term 'diaphragm' in different ways and not always in a manner that is consistent with how a person having ordinary skill in the art would have understood the term." Ex. 1002 ¶¶ 237–240 (citing Ex. 1001, 3:1–11, 7:9–55). He agrees with Petitioner's position that the term "diaphragm" in claim 8 "refers to a type of structure exemplified by" diaphragm 12 of the '839 patent specification. *Id.* ¶ 240. Then he adds that this diaphragm "is not the same thing as what would have been conventionally understood in the art as a 'diaphragm' (i.e., transducer) of a microphone." *Id.*

Patent Owner argues the plain and ordinary meaning of the term "'diaphragm' is a '**thin, flexible sheet** that can be moved,'" as set forth in the *McGraw-Hill Dictionary of Scientific and Technical Terms*. PO Resp. 41 (quoting Ex. 2010, 3); Ex. 2006 ¶ 113. Patent Owner argues such movement may function to generate sound waves by its inherent resonating

behavior when deformed from equilibrium. *Id.* (citing Ex. 2009, 3); Ex. 2006 ¶ 113. In particular, according to Patent Owner, a person of ordinary skill in the art would have distinguished between a *diaphragm* (as recited in claim 8) which is flexible, and a *faceplate* (as disclosed by Sjursen) which is rigid. *See* PO Resp. 41–42; Ex. 2006 ¶¶ 112–114.

Patent Owner contends the '839 patent specification is consistent with the foregoing plain and ordinary meaning of the term "diaphragm." *See* PO Resp. 41–42 (citing Ex. 1001, 3:8–11, 4:32–42, 7:34–44, 8:29–34, 12:3–27); Ex. 2006 ¶ 113. For example, Patent Owner asserts that the '839 patent specification at times "refers to a microphone as a 'diaphragm transducer,'" and at other times uses the term diaphragm "separately for sound modification." *Id.*

Patent Owner further asserts: "A 'faceplate,' in contrast [to a 'diaphragm'], is a 'protective plate used to cover holes in machines or other devices,'" as set forth in the *McGraw-Hill Dictionary of Scientific and Technical Terms*, and is "**usually plastic or metal**" to serve its "**protective**" function. PO Resp. 42 (quoting Ex. 2010, 4, and Ex. 2011, 1); Ex. 2006 ¶ 114. Patent Owner therefore asserts that a faceplate differs from a diaphragm in that a diaphragm is thin and flexible, which is inconsistent with the protective function of a faceplate. PO Resp. 42–43; Ex. 2006 ¶ 111. For example, according to Patent Owner, the '839 patent specification "contemplates protective measures for" its diaphragm 12, such as that "[t]he holes on the diaphragm may be 'covered by a different material than the diaphragm material,' for example a grill." PO Resp. 36 (citing Ex. 1001, 12:4–9); Ex. 2006 ¶ 115.

Petitioner replies that "Sjursen's face plate 17 is analogous to 'diaphragm 12'" of the '839 patent specification. Pet. Reply 17. Petitioner therefore maintains Sjursen's face plate is a diaphragm, as was found preliminarily in the Institution Decision in IPR2022-00234. *Id.* (citing IPR2022-00234, Paper 12 at 41–42 ("Sjursen's Figure 1 similarly illustrates a diaphragm (i.e. face plate 17)[.]")).

Petitioner argues that this interpretation is consistent with the intrinsic record, namely, the prosecution history of U.S. Patent No. 10,635,382 ("the '382 patent"), which is a continuation of the '839 patent. *See id.* at 18–22. Petitioner asserts that, during that prosecution, "the examiner explained that Killion's[5] 'top plate' 'reads on the instant applications [sic] definition of diaphragm,'" which the applicant did not dispute. *Id.* at 18-19 (citing Ex. 1049, 80, 89, 98–99; Ex. 1052, Figs. 3A–3C, ¶ 46). Petitioner additionally relies on the examiner's Notice of Allowance for the '382 patent, as finding Yoshida[6] and Banter[7] also disclose a "diaphragm," which the applicant did not dispute. *See id.* at 20–21 (citing Ex. 1049, 14–18). Petitioner suggests Patent Owner's claim construction limiting "diaphragm" to a thin, flexible sheet is inconsistent with the pertinent disclosures of Killion, Yoshida, and Banter that were found to correspond to a diaphragm. *See id.* at 18–21. Petitioner points out that Mr. Anagnos did not consider the prosecution history of the '382 patent, or the disclosures of Killion, Yoshida, or Banter, as part of his testimony concerning the meaning of "diaphragm." *See* Pet. Reply 18, 21 n.4 (citing Ex. 1045, 37:11–38:8).

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[5] Exhibit 1052 (U.S. Patent App. Pub. No. 2003/0198359 A1).
[6] Exhibit 1051 (U.S. Patent No. 5,740,262).
[7] Exhibit 1050 (U.S. Patent App. Pub. No. 2005/0077102 A1).

Petitioner additionally argues that Patent Owner's claim construction and Mr. Anagnos's testimony in support in this proceeding "deviate[] from their characterization of the Moen[8] reference." Pet. Reply 21–22 (citing Ex. 2001 ¶ 165; Ex. 1036, Fig. 4, 4:51–57, 5:15–19). Specifically, Petitioner asserts Mr. Anagnos there explained that Moen's grill 26 is a diaphragm with holes, despite that Moen does not describe grill 26 as being flexible. *See id.*

Petitioner contends that Patent Owner's claim construction is not persuasive, because it relies on extrinsic evidence that is inconsistent with the intrinsic evidence from the prosecution history of the '382 patent to reach "an overly narrow" result. Pet. Reply 17–22 (citations omitted). Petitioner also asserts Patent Owner's dictionary definition of "diaphragm" is irrelevant to claim 8, "because it applies to the meaning of 'diaphragm' as 'in a microphone' or 'in a loudspeaker,'" whereas the diaphragm of claim 8 "is plainly neither of those because [it] is to 'cover' the microphone." *Id.* at 22 (citing Pet. 47–49, Ex. 1002 ¶¶ 236–240).

Patent Owner responds that "if the '839 patent intended protection from all microphone coverings" as Petitioner would have it, "then claim 8 would have recited a 'cover to the ASM' instead" of a "diaphragm." Sur-reply 10. Patent Owner argues that Petitioner's reliance on the prosecution history of the '382 patent falls short, because "the applicant's position in the prosecution history remains consistent with Patent Owner's assertion that 'diaphragm,' as asserted in claim 8, does not mean *any* microphone cover." PO Sur-reply 1 (emphasis added), 10–12. In support, Patent Owner asserts the applicant did not admit that Killion's top plate 80 is

[8] Exhibit 1036 (U.S. Patent No. 3,876,843).

a "diaphragm," and that Petitioner's argument that the applicant failed to dispute prior art that the examiner read on the term "diaphragm" is "false." *Id.* at 11 (citing Ex. 1049, 204; Pet. Reply 18). Patent Owner also argues that "Petitioner['s] assertion that the applicant failed to dispute the Examiner's reference to Yoshida and Banter as disclosing a diaphragm . . . is misplaced because those references first appeared in the Notice of Allowance, to which Patent Owner had no reason to respond." *Id.* (citing Ex. 1049, 14–18). Patent Owner further argues that Petitioner misconstrues Mr. Anagnos's testimony as stating that he did not consider Killion, Yoshida, Banter, or Moen. *Id.* at 11–12.

We conclude that a "diaphragm" as recited in claim 8 is a thin, flexible sheet that can be moved by sound waves, as in a microphone, or can produce sound waves when moved, as in a loudspeaker. "Claim terms are generally given their plain and ordinary meanings to one of skill in the art when read in the context of the specification and prosecution history." *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc)). "There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution." *Id.* (quoting *Thorner*, 669 F.3d at 1365).

The plain and ordinary meaning of the term "diaphragm" in claim 8 is a thin, flexible sheet that can be moved by sound waves, as in a microphone, or can produce sound waves when moved, as in a loudspeaker, as provided in the *McGraw-Hill Dictionary of Scientific and Technical Terms*. Ex. 2010,

3 (defining "diaphragm" as "[a] thin, flexible sheet that can be moved by sound waves, as in a microphone, or can produce sound waves when moved, as in a loudspeaker"). Petitioner's attempt to dismiss this plain and ordinary meaning as not applicable here because claim 8 states that the diaphragm "cover[s]" a microphone is unavailing. We conclude a diaphragm may cover a microphone, but that does not mean that every structure that covers a microphone is a diaphragm. The claim language does not equate the terms "diaphragm" and "cover."

Mr. Anagnos testifies that the plain and ordinary meaning of "diaphragm" is a thin, flexible sheet that can be moved. *See* Ex. 2006 ¶ 113. Dr. Atlas does not disagree. *See* Ex. 1002 ¶¶ 236–240. Dr. Atlas pertinently states only that "a person having ordinary skill in the art would have used [the term 'diaphragm'] to refer to the transducer of a microphone." *Id.* ¶ 237; *see also id.* ¶ 240 (stating that a "diaphragm" would "have been conventionally understood in the art" as a "transducer" of a microphone). However, he does not provide any further structural or functional detail concerning what a microphone transducer is. *See id.*; *see also* Ex. 2010, 5 (defining "transducer" as "[a]ny device or element which converts an input signal into an output signal of a different form").

Turning to the '839 patent specification, we conclude that the patentee did not depart from the plain and ordinary meaning of "diaphragm" as a thin, flexible sheet that can be moved. "To act as its own lexicographer, a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning." *Hill-Rom*, 755 F.3d at 1371 (quoting *Thorner*, 669 F.3d at 1365). The portions of the '839 patent specification cited by the parties are consistent with the plain and ordinary meaning of

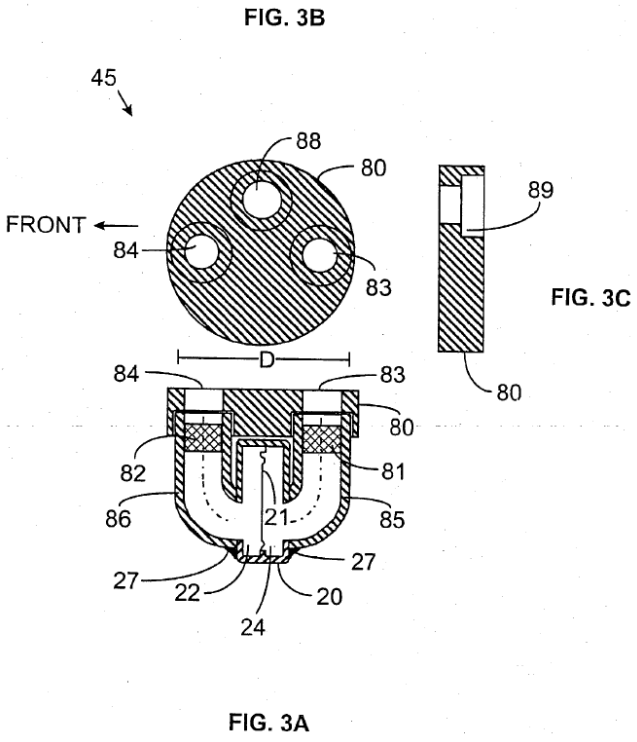
"diaphragm" as a thin, flexible sheet, and do not suggest that a "diaphragm" may instead have a rigid structure. *See* Ex. 1001, Figs. 1A–1B (illustrating diaphragm 12); *id.* at 2:23–27, 3:1–11, 4:30–42, 7:9–55, 8:29–34, 12:3–27 (describing diaphragms).

For example, the '839 patent provides that "various receivers and microphones can be used" including "diaphragm transducers." *See id.* at 3:8–11. The '839 patent further indicates that a "diaphragm" may function to modify sound in a number of ways. *See id.* at 4:31–36. In one example, "the diaphragm is *tuned to resonate* in such a way as to compensate for spectral sensitivity of the ASM," which is consistent with the diaphragm being a thin, flexible sheet that can be moved. Ex. 1001, 4:36–38 (emphasis added), 12:9–16. In another example, "the diaphragm undertakes beam-forming using holes located at particular locations in the diaphragm," which is consistent with the diaphragm being a thin, flexible sheet having holes. *Id.* at 4:38–42 (emphasis added), 12:3–9. Further, the diaphragm "may be acoustically tuned so as to *absorb certain frequencies more than others* [to] compensate for non-linear sensitivity of the ASM 34," which again is consistent with the diaphragm being a thin, flexible sheet that can be moved. *Id.* at 7:34–40 (emphasis added).

Dr. Atlas testifies that "[a] person having ordinary skill in the art would have understood that 'diaphragm 12' [of the '839 patent] is not the same thing as what would have been conventionally understood in the art as a 'diaphragm' (i.e., transducer) of a microphone." Ex. 1002 ¶ 240. However, he does not describe exactly what structure(s) he believes define what a diaphragm is, per the '839 patent specification. *See id.* ¶¶ 236–240. In particular, he does not opine that the '839 patent does anything to suggest

that a rigid structure might be a diaphragm, despite the plain and ordinary meaning of a diaphragm as a thin, flexible sheet. *See id.*

Moreover, we discern little in the prosecution history of the '839 patent's continuation '382 patent to suggest that we should depart from the plain and ordinary meaning of the term "diaphragm" here. Most important in this regard is Killion, and its Figures 3A–3C which are reproduced below:



Figures 3A–3C of Killion.

As described in Killion, these Figures illustrate subassembly 45 of a microphone capsule, including "top plate 80 with sound tubes 85 and 86 coupling sound inlets 83, 84, to the front chamber 22" which includes "diaphragm 21." Ex. 1052 ¶ 46.

The Examiner of the '382 patent found that "Killion teaches a top plate of microphone capsule, which reads on the instant application['s] definition of a diaphragm." Ex. 1049, 98–99. However, we disagree with

Petitioner's position that the applicant did not dispute this finding. The applicant instead amended the then-pending claim (which differs from the challenged claims in various respects) to recite *two* diaphragms, and argued "Killion only discloses the use of a single diaphragm [i.e., diaphragm 21] and does not disclose a second diaphragm [e.g., top plate 80] positioned across from a first diaphragm." *Id.* at 85–86 (claim 28), 89. Thus, although the Examiner stated that Killion's top plate 80 is a diaphragm as recited in the '382 patent claims, the applicant did not accede to that statement. This is a scant basis to depart from the plain and ordinary meaning of "diaphragm" as a thin, flexible sheet that can be moved, so that it might include a rigid structure such as Killion's top plate 80 or Sjursen's face plate 17. In particular, the specific issue we face here is whether a the claimed "diaphragm" can be a rigid structure, but the applicant did not argue that a "diaphragm" can be rigid during the prosecution history.

The Examiner of the '382 patent also stated that Yoshida discloses "an acoustic resistance provided by a nonwoven fabric in front of a microphone" which "appears to teach a diaphragm (e.g., the nonwoven fabric) to cover a microphone." Ex. 1049, 14–15. The Examiner stated that Banter "discloses a protective acoustic cover assembly comprising a metal foil with perforations" which provides an "acoustic reactance . . . related to the movement/vibration of the material used for the acoustic cover," which is a diaphragm. *Id.* at 15–16. It is undisputed that the applicant did not object to these findings. However, these findings are consistent with the plain and ordinary meaning of "diaphragm" as a thin, flexible sheet, so they do not contravene that meaning.

Finally, we acknowledge Mr. Anagnos's testimony that "Moen says that manipulating the size and location of holes in *its diaphragm*, as well as the size of the cavity formed between *the diaphragm* and the microphone, acts to cause a phase shift or delay in the sound entering the microphone." Ex. 2001 ¶¶ 18, 165 (emphasis added) (citing Moen, "4:65–57"). The referenced holes are found in Moen's "grill or screen 26" which appears to be a rigid structure. *See* Ex. 1030, Figs. 3–4, 4:49–5:21. Nonetheless, this is a scant basis to depart from the plain and ordinary meaning of "diaphragm" as a thin, flexible sheet, so that it might include a rigid structure such as Moen's grill 26 or Sjursen's face plate 17. In particular, the specific issue we face here is whether a diaphragm might be a rigid structure, but that issue was not addressed in Mr. Anagnos's declaration testimony cited by Petitioner. *See* Ex. 2001 ¶ 165; Pet. Reply 21–22.

We need not delve into whether or how the respective plain and ordinary meanings of the terms "diaphragm" and "faceplate" might or might not differ. As discussed in Section II.H.3 below, there is no evidence to indicate that Sjursen's face plate 17 is a thin, flexible sheet, per the plain and ordinary meaning of "diaphragm." That is sufficient to resolve the patentability disputes presented here in Patent Owner's favor, regardless of whether in some circumstances a "diaphragm" might also be a "faceplate."

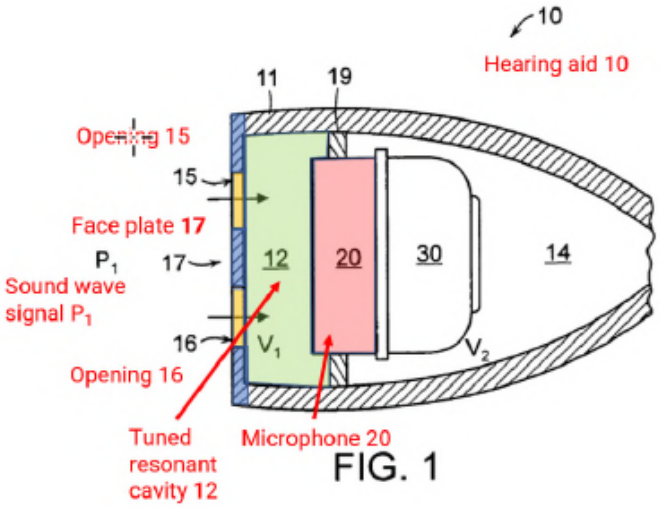
We also need not address whether or how a "diaphragm" might or might not also be a "windscreen." *See, e.g.*, PO Resp. 44–46; Pet. Reply 21 n.5. Sjursen does not describe its face plate 17 as a windscreen either structurally or functionally, so whether in some circumstances a "diaphragm" might also be a "windscreen" has no relevancy to our present Decision.

Thus, we conclude the "diaphragm" of claim 8 is a thin, flexible sheet that can be moved by sound waves, as in a microphone, or can produce sound waves when moved, as in a loudspeaker.

3. Analysis of Dependent Claim 8

a) "[t]he system according to claim 1, further comprising: a diaphragm to cover the ASM."

Petitioner argues that Le in combination with Victorian and Sjursen discloses or suggests this feature. Pet. 47 (citing Ex. 1002 ¶¶ 236–259). Petitioner argues that "Victorian is silent as to the detailed structure of its external microphone" except to say that it "is housed within the earmold of the ear-level device 110." Pet. 49 (citing Ex. 1007 ¶ 29, Fig. 4A). Thus, according to Petitioner, one of ordinary skill "looking to implement Victorian's earpiece would have been motivated to look for different ways to implement Victorian's ear level device" to advance the goals set forth in Victorian, including "improving signal-to-noise ratio" and "cost and battery life." *Id.* (citing Ex. 1007 ¶¶ 7, 28, 50; Ex. 1002 ¶ 242). Petitioner asserts that Sjursen "discloses a hearing aid with a 'tuned resonant cavity' that allows for smaller, less complex, and/or less expensive circuitry, and also for reduced power consumption." *Id.* at 49–50 (citing Ex. 1010, 2:59–67). Petitioner includes an annotated version of Sjursen's Figure 1, reproduced below.



Sjursen, FIG. 1 (annotated).

Petitioner's annotated version of Figure 1 of Sjursen. Pet. 51 (citing Ex. 1010, Fig. 1).

Petitioner argues that Sjursen discloses hearing aid 10 having hearing aid shell 11 including microphone 20 and face plate 17 with a pair of openings 15 and 16 that allow air and sound into a tuned resonant cavity 12. Pet. 50 (citing Ex. 1010, 4:63–65). According to Petitioner, Sjursen discloses tuning resonant cavity 12 by altering the shape and volume of chamber 12 and selecting the number, shapes and sizes of openings 15 and 16, which can effectively tune the incident sound wave signal P1 to provide a desired frequency response characteristic before that signal is received at microphone 20. *Id.* (citing Ex. 1010, 4:46–5:8; 5:37–49, 6:11–29). Thus, Petitioner asserts, Sjursen discloses or suggests to one of ordinary skill "that adjusting the size and shape of the face plate would affect the resonant cavity's tuning." *Id.* (citing Ex. 1002 ¶¶ 246–250).

Petitioner argues that one of ordinary skill "would have understood that Sjursen's face plate 17 which helps to define the resonant cavity is analogous to the 'diaphragm 12' in the '839 patent claims." Pet. 51 (citing

Ex. 1002 ¶ 254). According to Petitioner, one of ordinary skill would have been motivated to apply Sjursen's teachings relating to a tunable resonant cavity defined by a face plate to Victorian's external microphone because "Victorian is concerned with providing a system with 'longevity' between 'battery replacements or recharges,'" and one of ordinary skill "would have understood that Sjursen's face plate having openings (that helps to define a resonant cavity) would have advanced that objective by providing a passive acoustical filter that reduced battery consumption." *Id.* at 51–52 (citing Ex. 1010, 2:64–67, 6:18–29). Petitioner argues that "Victorian is also concerned with providing a smaller earpiece to provide for 'minimal visibility,'" and one of ordinary skill "would have understood that Sjursen's face plate having openings (that helps define a resonant cavity) would allow for a smaller earpiece." *Id.* at 52 (citing Ex. 1010, 2:59–64; Ex. 1002 ¶ 257).

Patent Owner objects that Sjursen's face plate 17 is not a "diaphragm" as recited in claim 8, so incorporating it into the Le-Victorian recording system would not result in the claimed invention. *See* PO Resp. 46–47. We agree. As discussed above in Section II.H.2 above, a diaphragm is a thin, flexible sheet that can be moved. There is nothing in the disclosures of Sjursen cited by Petitioner to suggest that its face plate 17 is flexible or can be moved. *See* Pet. 49–51 (citing Ex. 1010, Fig. 1, 1:45–2:3, 2:59–67, 4:59–5:8, 5:37–49, 6:11–29); Pet. Reply 17–22 (opposing Patent Owner's claim construction, and not arguing that Sjursen's face plate 17 might be a thin, flexible sheet). Instead, Sjursen refers to face plate 17 as being part of shell 11, and as including openings 15 and 16 that allow air and sound into cavity 12, which suggests face plate 17 is rigid. *See* Ex. 1010, Fig. 1, 4:58–5:1, 5:42–49.

We conclude that Petitioner has not established by a preponderance of the evidence that claim 8 is unpatentable as having been obvious over Le, Victorian, and Sjursen.

4. Dependent Claims 9 and 10

Claims 9 and 10 depend from claim 8. Because, as discussed in Section II.H.3 above, we find that Petitioner has not established that claim 8 is unpatentable over Le, Victorian, and Sjursen, Petitioner also fails to establish that dependent claims 9 and 10 are unpatentable over those references.

I. Ground 1E: Asserted Obviousness of Claims 11–12 Based on Le in view of Victorian and Further in view of Langhart

Petitioner contends that claims 11–12 would have been obvious over Le in view of Victorian and further in view of Langhart. Pet. 55–61. Patent Owner does not provide separate argument for claim 5. PO Resp. 47.

1. Overview of Langhart (Ex. 1011)

Langhart is directed to a system for recording telephone conversations. Ex. 1011 ¶ 1. Langhart describes a recording unit 103 including "a processor 155 that processes the information sent by the parties." *Id.* ¶ 20. Langhart also describes "a notification unit 175, coupled to processor 155" being used to notify "the non-recording party that the conversation is being recorded" which may be "an intermittent background tone." *Id.* ¶ 22.

2. Analysis of Dependent Claims 11 and 12

a) Claim 11: "The system according to claim 1 further comprising: a Recording Status Alert System (RSAS) configured to provide an indication when the further data storage device records the content of the data storage device."

Claim 12: "[t]he system according to claim 11, where the RSAS comprises: a decision unit to determine whether the content of the circular buffer is being recorded to the further data storage device; a first system to generate an audio signal when the further data storage device is activated to store the content of the data storage device; and a second system to generate a further audio signal when the further data storage device is activated to stop storing the content of the data storage device."

With regard to claim 11, Petitioner argues that Le in combination with Victorian and Langhart discloses or suggests this claim. Pet. 55 (citing Ex. 1002 ¶¶ 271–283). Petitioner argues that Le discloses implementing the computer unit as a cellular telephone, and that Langhart discloses recording a telephone conversation using a "conversation recording unit" integrated into a mobile phone. *Id.* at 55 (citing ex. 1006 ¶ 9; Ex. 1011 ¶ 2, 19). According to Petitioner, Langhart also recognizes that in certain circumstances it may be illegal to record a telephone conversation without notifying the other party that the conversation is being recorded and, to that end, discloses providing a notification to the non-recording party that the conversation is being recorded, for example, via an audible tone or a visual indication. *Id.* at 56 (citing Ex. 1011 ¶¶ 5, 22).

Petitioner argues that, based on Langhart, one of ordinary skill "would have recognized that it was desirable for a user of the Le-Victorian system to provide visual or audible confirmation to a counterparty that the conversation between them is being recorded to ensure, for example, that the

user does not run afoul of social norms or applicable laws." Pet. 57 (citing Ex. 1002 ¶ 278). According to Petitioner, one of ordinary skill "would have also recognized that providing such a notification would have also had the additional advantage of confirming that the user's voice command had been received and implemented by the Le-Victorian system's computer." *Id.* (citing Ex. 1002 ¶ 279). Thus, Petitioner contends, one of ordinary skill

> would have understood the Le-Victorian-Langhart system to disclose or suggest a notification system ("Recording Status Alert System (RSAS)") configured to provide an audible or visual indication ("configured to provide an indication") when the computer unit records audio signals from the scrolling buffer into the separate memory ("when the further data storage device records the content of the data storage device")."

Id. at 57–58 (citing Ex. 1002 ¶ 281).

With regard to claim 12, Petitioner argues that Le "discloses or suggests a cell phone having a processor executing computer instructions to record the contents of the continuously scrolling buffer into a separate memory," and a person of ordinary skill "would have understood that because Le's processor is capable of executing instructions to cause the content of the scrolling buffer to be recorded into a separate memory, it necessarily determines whether this activity is occurring." Pet. 58–59 (citing Ex. 1002 ¶¶ 285–286). Petitioner further contends that Langhart discloses providing an audible indication when the recording begins and ends, and one of ordinary skill would have understood the combined Le-Victorian-Langhart system to generate these audible indications when recording to the separate memory begins and ends. Pet. 59–61.

As noted above, Patent Owner does not provide separate argument for claims 11 and 12, and instead relies on its argument for claim 1. PO Resp. 47.

Based on the full trial record, we agree with Petitioner's arguments, and find that Petitioner has proven by a preponderance of the evidence that claims 11 and 12 would have been obvious over the combination of Le, Victorian, and Langhart.

J. Ground 1G: Asserted Obviousness of Claim 21 Based on Le in view of Victorian and Further in view of Stuckman

Petitioner contends that claim 21 would have been obvious over Le in view of Victorian and further in view of Stuckman. Pet. 71–73. Patent Owner does not provide separate argument for claim 21. PO Resp. 50.

1. Overview of Stuckman (Ex. 1013)

Stuckman is directed to "video distribution systems," and in particular to a "DSL video service with [a] memory manager." Ex. 1013, code (54) ¶ 7. Stuckman describes "a digital video recorder (DVR) 14" in communication "with the video server 10, via DSL 16 or an alternative telecommunication network" which requests, receives and stores selected "video programs 12 and 13." *Id.* ¶ 35. *Stuckman*'s "memory manager 72 serves to determine if a low memory condition . . . presently exists" and upon such a determination "a memory alert message 76 is outputted . . . by the digital video recorder 14 for display by [a] display device 22." *Id.* ¶ 62.

2. Analysis of Dependent Claim 21

a) "[t]he system according to claim 1, further comprising: a Low-Memory Warning System configured to provide an indication when a remaining memory level of the further data storage device is less than a predetermined amount."

Petitioner argues that Le in combination with Victorian and Stuckman discloses or suggests claim 21. Pet. 71 (citing Ex. 1002 ¶¶ 339–350). Petitioner argues that "Stuckman's 'memory manager 72 serves to determine

if a low memory condition . . . presently exists' and upon such a determination output a memory alert message 76 on a display device 22." Ex. 1013 ¶ 62. According to Patent Owner, one of ordinary skill "would have understood that to determine whether a low memory condition exists, Stuckman's memory manager would have to determine whether the amount of memory remaining was more than or less than a predetermined amount." *Id.* (citing Ex. 1002 ¶ 343). Petitioner argues that one of ordinary skill "would have recognized that Le and Stuckman are directed to analogous technology because they are both directed to systems that record information that a user would like retrieved for playback." *Id.* at 72 (citing Ex. 1006 ¶¶ 1, 37; Ex. 1013 ¶¶ 9, 33; Ex. 1002 ¶ 345).

Petitioner also contends that one of ordinary skill

> would have found it obvious to incorporate Stuckman's low memory manager and low memory alert feature into the Le-Victorian system for the same reason suggested by Stuckman—i.e., so that the user would know when Le's memory 18 is low and have an opportunity to delete recordings to free-up memory to make room for additional recordings.

Id. (citing Ex. 1002 ¶ 346; Ex. 1013 ¶ 63).

Additionally, according to Petitioner, the combination would have been obvious because

> it would have amounted to no more than use of a known technique (Stuckman's memory manager and low memory indicator in a system designed to store information for later retrieval by a user) to improve a similar device (the Le-Victorian system also directed to storing information for later retrieval by a user) in the same way (to incorporate a memory manager and low memory indicator in the Le-Victorian system).

Id. (citing Ex. 1002 ¶¶ 349–350).

As noted above, Patent Owner does not provide separate argument for claim 21, and instead relies on its argument for claim 1. PO Resp. 47.

Based on the full trial record, we find that Petitioner has proven by a preponderance of the evidence that claim 21 would have been obvious over the combination of Le, Victorian, and Stuckman.

III. CONCLUSION

For the reasons discussed above, Petitioner has proven, by a preponderance of the evidence, that the challenged claims are unpatentable, as summarized in the following table:[9]

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 6, 22, 23	103(a)	Le, Victorian	1, 22, 23	6
5	103(a)	Le, Victorian, Yuen	5	
7	103(a)	Le, Victorian, Kvaløy	7	
8–10	103(a)	Le, Victorian, Sjursen		8–10
11, 12	103(a)	Le, Victorian, Langhart	11, 12	
14–17	103(a)	Le, Victorian, Kurki	14–17	

[9] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

21	103(a)	Le, Victorian, Stuckman	21	
Overall Outcome			1, 5, 7, 11, 12, 14–17, 21–23	6, 8–10

IV. ORDER

Accordingly, it is

ORDERED that claims 1, 5, 7, 11, 12, 14–17, and 21–23 of the '839 patent have been proven by a preponderance of the evidence to be unpatentable; and

FURTHER ORDERED that claims 6 and 8–10 of the '839 patent have not been proven by a preponderance of the evidence to be 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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