

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BOSE CORPORATION,
Petitioner,

v.

KOSS CORPORATION,
Patent Owner.

IPR2021-00612
Patent 10,206,025 B2

Before PATRICK R. SCANLON, DAVID C. McKONE, and
NORMAN H. BEAMER, *Administrative Patent Judges*.

SCANLON, *Administrative Patent Judge*.

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

I. INTRODUCTION

Bose Corporation (“Petitioner”) challenges claims 1–56 of U.S. Patent No. 10,206,025 B2 (Ex. 1001, “the ’025 patent”). We have jurisdiction under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3, 6, 8, 10–13, 16, 18, 20–22, 25, 27, 29–31, 34, 36, 38–43, 46, 48, and 51–56 of the ’025 patent are unpatentable but has not shown by a preponderance of the evidence that claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 32, 33, 35, 37, 44, 45, 47, 49, and 50 are unpatentable.

A. *Procedural History*

Petitioner filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of the challenged claims. Koss Corporation (“Patent Owner”) filed a Preliminary Response (Paper 9). With our authorization, Petitioner filed a Preliminary Reply (Paper 12) and Patent Owner filed a Preliminary Sur-reply (Paper 13).

We instituted a trial as to all challenged claims. Paper 15 (“Decision on Institution” or “Dec. Inst.”).

After institution, Patent Owner filed a Patent Owner Response (Paper 20, “PO Resp.”), Petitioner filed a Reply (Paper 29, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 33, “PO Sur-reply”).

Petitioner relies on the Declaration of Tim A. Williams, Ph.D. (Ex. 1003), the Declaration of John G. Casali, Ph.D., CPE (Ex. 1005), and the Reply Declaration of Tim A. Williams, Ph.D. (Ex. 1152) in support of its contentions. Patent Owner relies on the Declaration of Joseph C. McAlexander III (Ex. 2024) and the Declaration of Nicholas S. Blair (Ex. 2025) in support of its contentions.

An oral hearing was held on June 15, 2022. A transcript of the hearing is included in the record. Paper 37 (“Tr.”).

B. Real Parties in Interest

The parties identify themselves as the real parties in interest. Pet. xix; Paper 3, 1.

C. Related Matters

The parties identify the following proceedings as related matters involving the ’025 patent:

Koss Corp. v. Bose Corp., Case No. 6:20-cv-00661 (W.D. Tex.);¹
Koss Corp. v. PEAG LLC, Case No. 6:20-cv-00662 (W.D. Tex.);²
Koss Corp. v. Plantronics, Inc., Case No. 6:20-cv-00663 (W.D. Tex.);³
Koss Corp. v. Skullcandy, Inc., Case No. 6:20-cv-00664 (W.D. Tex.);⁴
Koss Corp. v. Apple Inc., Case No. 6:20-cv-00665 (W.D. Tex.) (“the Apple Litigation”);
Bose Corp. v. Koss Corp., Case No. 1:20-cv-12193 (D. Mass.);
Apple Inc. v. Koss Corp., Case No. 4:20-cv-05504 (N.D. Cal.);
Apple Inc. v. Koss Corp., Case No. 6:21-cv-00495 (W.D. Tex.); and
Koss Corp. v. Skullcandy, Inc., Case No. 2:21-cv-00203 (D. Utah).
Pet. xx–xxi; Paper 3, 1; Paper 7, 1; Paper 8, 2.

¹ This proceeding has been dismissed. Ex. 1137.

² This proceeding has been dismissed. Ex. 1140.

³ This proceeding has been transferred to the United States District Court for the Northern District of California. Ex. 1139.

⁴ This proceeding has been dismissed. Ex. 1138.

In addition, the parties identify the following *inter partes* review proceedings⁵ challenging the '025 patent or patents related to the '025 patent as related matters:

Bose Corp. v. Koss Corp., IPR2021-00297, filed December 7, 2020, challenging U.S. Patent No. 10,368,155 B2 (final written decision, notice of appeal filed Aug. 1, 2022);

Apple Inc. v. Koss Corp., IPR2021-00305, filed December 15, 2020, challenging U.S. Patent No. 10,506,325 B1 (final written decision, notice of appeal filed Aug. 1, 2022);

Apple Inc. v. Koss Corp., IPR2021-00381, filed January 4, 2021, challenging U.S. Patent No. 10,491,982 B1 (final written decision, notice of appeal filed Aug. 9, 2022);

Bose Corp. v. Koss Corp., IPR2021-00546, filed February 22, 2021, challenging the '025 patent (institution denied Oct. 8, 2021);

Apple Inc. v. Koss Corp., IPR2021-00592, filed March 2, 2021, challenging U.S. Patent No. 10,469,934 B2 (terminated Aug. 2, 2022);

Apple Inc. v. Koss Corp., IPR2021-00626, filed March 17, 2021, challenging the '025 patent (institution denied Sept. 30, 2021);

Bose Corp. v. Koss Corp., IPR2021-00680, filed March 17, 2021, challenging U.S. Patent No. 10,469,934 B2;

Apple Inc. v. Koss Corp., IPR2021-00679, filed March 22, 2021, challenging U.S. Patent No. 10,506,325 B1 (institution denied Oct. 12, 2021);

Apple Inc. v. Koss Corp., IPR2021-00686, filed March 22, 2021, challenging U.S. Patent No. 10,491,982 B1 (institution denied Oct. 12, 2021); and

⁵ *Apple Inc. v. Koss Corp.*, IPR2021-00255, filed November 25, 2020, and *Apple Inc. v. Koss Corp.*, IPR2021-00600, filed March 7, 2021, both challenging U.S. Patent 10,298,451 B1, were also pending at the time the Petition was filed. Final written decisions and notices of appeal subsequently have been entered in both of these proceedings.

Apple Inc. v. Koss Corp., IPR2021-00693, filed March 23, 2021, challenging U.S. Patent No. 10,469,934 B2 (institution denied Oct. 13, 2021).

Pet. xx; Paper 3, 1–2; Paper 6, 1–2; Paper 8, 2.

D. The '025 Patent

The '025 patent, titled “System with Wireless Earphones,” issued February 12, 2019, with claims 1–56, and claims priority to several applications dating to April 7, 2008.⁶ Ex. 1001, codes (45), (54), (60), (63), 1:3–28, 18:2–24:56. The '025 patent relates to “a wireless earphone that comprises a transceiver circuit for receiving streaming audio from a data source, such as a digital audio player or a computer, over an ad hoc wireless network.” *Id.* at 1:65–2:2. The '025 patent defines an “ad hoc wireless network” as “a network where two (or more) wireless-capable devices, such as the earphone and a data source, communicate directly and wirelessly, without using an access point.”⁷ *Id.* at 3:2–5. In some embodiments there may be two discrete wireless earphones, one in each ear. *Id.* at 3:45–46.

We reproduce Figure 2A of the '025 patent below.

⁶ Petitioner does not assert that any challenged claim is not entitled to the benefit of the earliest claimed priority date. *See* Pet. 2. Therefore, for purposes of this proceeding, we consider the effective filing date of the '025 patent to be April 7, 2008.

⁷ In contrast, the '025 patent defines an “infrastructure network” as “a wireless network that uses one or more access points to allow a wireless-capable device, such as the wireless earphone, to connect to a computer network, such as a LAN or WLAN (including the Internet).” Ex. 1001, 3:5–10.

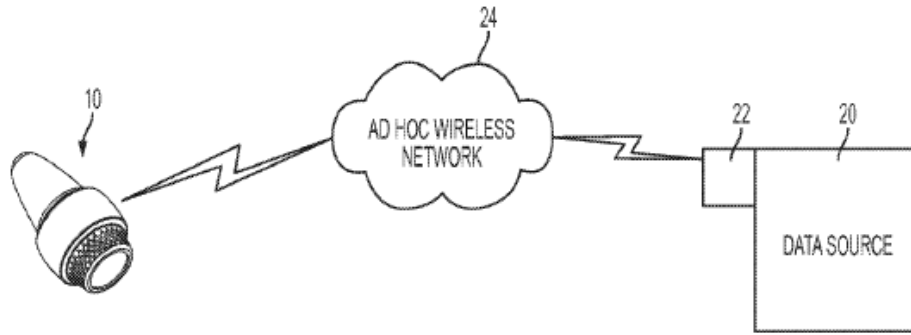


FIG. 2A

Figure 2A illustrates a communication mode for a wireless earphone. *Id.* at 2:27–29, 4:21–24. In particular, Figure 2A shows data source 20 in communication with earphone 10 over ad hoc wireless network 24. *Id.* at 4:24–26. Data source 20 may be a digital audio player (“DAP”), such as an MP3 player, an iPod, or a laptop computer. *Id.* at 4:30–34. “When in range, the data source 20 may communicate with the earphone 10 via the ad hoc wireless network 24 using any suitable wireless communication protocol,” including Bluetooth and other communication protocols. *Id.* at 4:54–59.

In one embodiment, earphone 10 connects to network-enabled host server 40 via networks 30a, 42 so that host server 40 can transmit streaming digital audio to earphone 10. *Id.* at 5:54–60, Fig. 2D. Alternatively, host server 40 may transmit to earphone 10 a network address for streaming digital audio content server 70. *Id.* at 5:60–63, Fig. 2D. In this case, earphone 10 uses the received address to connect to content server 70 via networks 30a, 42 and receive digital audio from content server 70. *Id.* at 5:64–67. Content server 70 may be an Internet radio station server. *Id.* at 6:1–2. In addition, content server 70 may stream digital audio that it has received from data source 20 via networks 30b, 42. *Id.* at 6:5–11.

Figure 3, reproduced below, depicts earphone 10 in more detail.

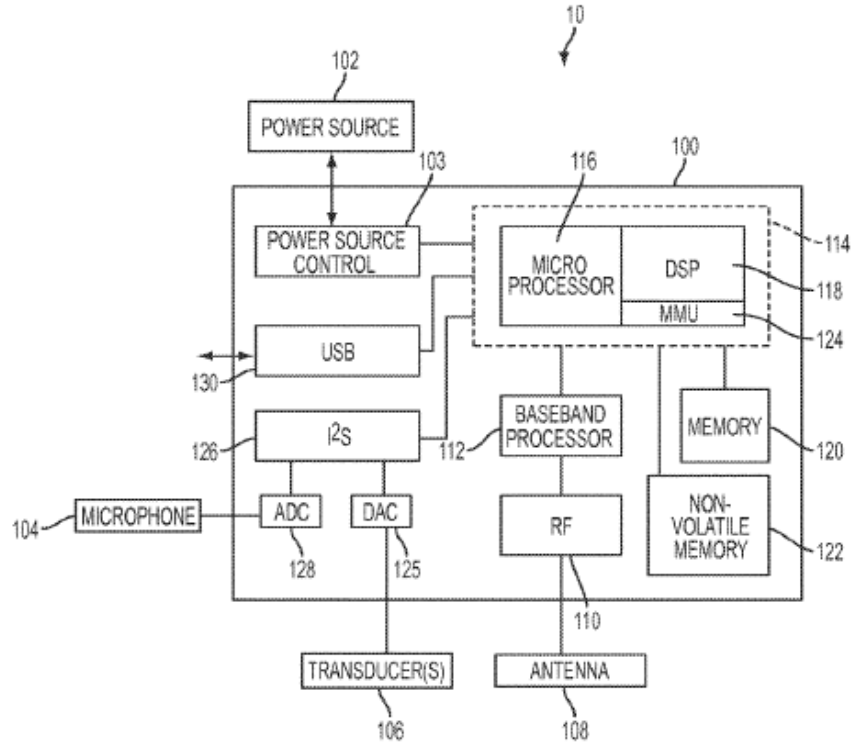


FIG. 3

Figure 3 is a block diagram of a wireless earphone. *Id.* at 2:30–31, 6:26–27. Earphone 10 includes transceiver circuit 100, power source 102, microphone 104, acoustic transducer 106 (e.g., a speaker), and antenna 108. *Id.* at 6:27–33. Transceiver circuit 100, power source 102, and acoustic transducer 106 may be housed within the body of earphone 10. *Id.* at 6:33–36. Microphone 104 and antenna 108 are external to the body. *Id.* at 6:36–38.

E. Challenged Claims

Petitioner challenges claims 1–56 of the '025 patent, of which claim 1 is the sole independent claim. Claim 1 is reproduced below:

1. A system comprising:
 - a mobile, digital audio player that stores digital audio content;
 - and
 - a headphone assembly, separate from and in wireless communication with the mobile digital audio player, wherein the headphone assembly comprises:

first and second earphones, wherein each of the first and second earphones comprises an acoustic transducer;

an antenna for receiving wireless signals from the mobile, digital audio player via one or more ad hoc wireless communication links;

a wireless communication circuit connected to the at least one antenna, wherein the at least one wireless communication circuit is for receiving and transmitting wireless signals to and from the headphone assembly;

a processor;

a rechargeable battery for powering the headphone assembly; and

a microphone for picking up utterances by a user of the headphone assembly; and

a remote, network-connected server that is in wireless communication with the mobile, digital audio player;

wherein the mobile, digital audio player is for transmitting digital audio content to the headphone assembly via the one or more ad hoc wireless communication links, such that the digital audio content received by the headphone assembly from the mobile, digital audio player is playable by the first and second earphones; and

wherein the processor is for, upon activation of a user-control of the headphone assembly, initiating transmission of a request to the remote, network-connected server.

Ex. 1001, 18:2–33.

F. Instituted Grounds of Unpatentability

We instituted *inter partes* review of the challenged claims based on the following grounds of unpatentability asserted by Petitioner:⁸

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 6, 8, 11–13, 16, 18, 20–22, 25, 27, 39, 52, 54–56	103(a)	Rezvani-446, ⁹ Rezvani-875, ¹⁰ Skulley ¹¹
4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28	103(a)	Rezvani-446, Rezvani-875, Skulley, Harada ¹²
10, 38	103(a)	Rezvani-446, Rezvani-875, Skulley, Hind ¹³
29–31, 34, 36, 53	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis ¹⁴
32, 33, 35, 37	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Harada
40–43, 46, 48	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Oh ¹⁵
44, 45, 47, 49, 50	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Oh, Harada
51	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Oh, Hind

⁸ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Because the ’025 patent has an effective filing date before the March 16, 2013, effective date of the applicable AIA amendments, we apply the pre-AIA version of 35 U.S.C. § 103.

⁹ US 2007/0136446 A1, published June 14, 2007 (Ex. 1097).

¹⁰ US 2007/0165875 A1, published July 19, 2007 (Ex. 1016).

¹¹ US 6,856,690 B1, issued Feb. 15, 2005 (Ex. 1017).

¹² US 2006/0229014 A1, published Oct. 12, 2006 (Ex. 1098).

¹³ US 7,069,452 B1, issued June 27, 2006 (Ex. 1019).

¹⁴ US 5,761,298, issued June 2, 1998 (Ex. 1033).

¹⁵ WO 2006/098584 A1, published Sept. 21, 2006 (Ex. 1099).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 6, 8, 10–13, 16, 18, 38–43, 46, 48, 51, 52, 54, 56	103(a)	Schrager, ¹⁶ Goldstein ¹⁷
4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 44, 45, 47, 49, 50	103(a)	Schrager, Goldstein, Harada
29–31, 34, 36, 51, 53, 55	103(a)	Schrager, Goldstein, Davis
32, 33, 35, 37	103(a)	Schrager, Goldstein, Davis, Harada
20–22, 25, 27, 39, 54–56	103(a)	Schrager, Goldstein, Skulley
23, 24, 26, 28	103(a)	Schrager, Goldstein, Skulley, Harada

Dec. Inst. 53; Pet. 2.

II. ANALYSIS

A. Legal Standards

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). “In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

¹⁶ US 7,072,686 B1, issued July 4, 2006 (Ex. 1101).

¹⁷ US 2008/0031475 A1, published Feb. 7, 2008 (Ex. 1026).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective indicia of non-obviousness (also called secondary considerations), such as commercial success, long-felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze grounds based on obviousness in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103 requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner contends that a person having ordinary skill in the art “would have had background in wireless networks, including at least a bachelor’s degree in electrical engineering or a related field and experience

with wireless networks, and would have worked on a team including members with headphone-design experience.” Pet. 7 (citing Ex. 1003 ¶¶ 30–37; Ex. 1005 ¶¶ 41–45).

Patent Owner contends a person having ordinary skill in the art (“POSA”) “would be someone working in the electrical engineering field and specializing in or knowledgeable of speaker components for small wireless devices,” and “would have a bachelor’s degree in electrical engineering and at least two years of work experience in the industry.” PO Resp. 6 (citing Ex. 2047 ¶ 19). Patent Owner adds that a POSA would thus “have studied and have practical experience with circuit design, speaker components, and wireless communication.” *Id.* (citing Ex. 2047 ¶ 19).

Patent Owner argues that its proposed skill level is more appropriate because the ’025 patent relates to headphones, which Petitioner’s expert acknowledges, and Patent Owner’s proposed POSA specializes in, or has knowledge of, speaker components for small wireless devices, but Petitioner’s proposed POSA lacks such skill or knowledge. *Id.* at 6–7.

In the Decision on Institution, we adopted Petitioner’s proposed level of ordinary skill in the art, stating it was “consistent with the evidence of record, including the asserted prior art.” Dec. Inst. 10. Patent Owner concedes that its proposal is only “a slightly different skill level.” PO Resp. 6. We agree that the two proposals do not differ materially. Regarding Patent Owner’s argument that Petitioner’s proposed POSA lacks knowledge of speaker components for small wireless devices, we note that under Petitioner’s proposal, the POSA “would have worked on a team including members with headphone-design experience.” Pet. 7. By working on such a team, Petitioner’s proposed POSA would have gained, or at least had access to, knowledge of speaker components for small wireless devices.

As such, Petitioner's proposed definition implicitly includes what Patent Owner's proposal purports to add.

Furthermore, during the oral hearing, Patent Owner indicated that "the Board should adopt the POSA's skill level set forth in the Petition" and the level of skill adopted in the Decision on Institution "is warranted in this case." Tr. 48:21–22, 50:3–4.

Based on our review of the record before us, we find that Petitioner's stated level of ordinary skill in the art is reasonable because it is consistent with the evidence of record, including the asserted prior art. Accordingly, for the purposes of this Decision, we apply Petitioner's definition, although our conclusions would be the same if we were to apply Patent Owner's definition.

C. Dr. Williams' Credibility

Patent Owner argues that the testimony of Dr. Williams, Petitioner's declarant, "should be afforded little if any weight for three reasons." PO Resp. 61. First, "the opinions expressed in his declaration (BOSE-1003) are founded on a POSA skill level that he, in fact, did not use, thereby rendering his opinions valueless." *Id.* According to Patent Owner, during cross-examination, Dr. Williams "recant[ed] . . . his original POSA skill level" and "instead applied a POSA skill level where a POSA 'is a team of people who have experience in wireless networking and people who have experience in headset design.'" *Id.* at 60–61 (quoting Ex. 2023, 30).

Patent Owner advances two other arguments that hinge on the first argument: 1) "because Williams said a POSA is a team [during his cross-examination], his opinions are contrary to the law"; and 2) "at bottom, his conflicting POSA standards make his testimony unreliable. It is unclear what skill level Williams applied for a POSA in his obviousness opinions."

PO Resp. 61–62. Patent Owner advances similar arguments in its Sur-reply. *See* Sur-reply 2 (“Simply put, Williams did not perform the analysis that he swore to in his original declaration, which undercuts his overall credibility.”).

Dr. Williams relies on the testimony of Dr. Casali (Petitioner’s other declarant), “concerning the relevant headphone design features in much the same way that a POSA (*i.e.*, an individual with expertise in wireless networking as described above) would have worked with an individual with specific experience in headphone design when designing a wireless headphone product.” Ex. 1003 ¶ 36. Patent Owner agrees that Dr. Williams does not advance that a POSA is a team in his original declaration. *See* PO Resp. 60–62. Rather, Dr. Williams applies the concept of a team *member* having gained the requisite knowledge of speakers for small wireless devices through other team members, such as Dr. Casali. *See* Ex. 1003 ¶ 36. In other words, in preparation for this trial, Dr. Williams studied the declaration of Dr. Casali, and other evidence, including the prior art of record. *See id.* ¶¶ 15, 36. Patent Owner does not dispute that Dr. Williams at least has the requisite level of ordinary skill to testify in this proceeding. *See* PO Resp. 60–62.

Moreover, Dr. Williams applies the level of ordinary skill as he states in his declaration, and this does not conflict with his deposition. *See* Ex. 1003 ¶ 36 (“A POSA would have been capable of understanding and applying the teachings of the ’025 patent and the prior art references discussed in this declaration.”). Contrary to Patent Owner’s argument, Dr. Williams did not indicate on cited page 30 of his deposition that he “recant[ed] . . . his original POSA skill level.” *See* PO Resp. 60–61 (citing Ex. 2023, 30). Rather, he testifies that he “would be *one of the members* of

the team of that POSA team.” *See* Ex. 2023, 30:12–13 (emphasis added).

During his deposition, Dr. Williams confirmed his

opinion that, as I express in the bottom part of . . . paragraph [35 of my original declaration], in this case, a POSA would have worked on a team with someone knowledgeable with headphone form factors. *But that does not change the definition of a POSA as an individual with wireless networking experience because the art to which the purported technical advance of the '934 patent principally relates is wireless networking.*¹⁸

Ex. 2023, 35:13–21 (emphasis added); *accord* Pet. Reply 33 (quoting part of the same passage (citing Ex. 2023, 35–36)).

As discussed above, and as Dr. William’s testimony shows, each member of the team at least would have gained “some knowledge of speaker components for small wireless devices” (as Patent Owner proposes) by working on that team or otherwise through other experience. As also noted, Dr. Williams relies on Dr. Casali’s testimony and the record evidence here to gain the required headphone knowledge. *See* Ex. 1003 ¶ 15 (listing the record evidence as materials he “studied and considered,” including Dr. Casali’s declaration (Ex. 1005)), ¶¶ 35–37 (equating his reliance on Dr. Casali’s declaration as a team member through which Dr. Williams testifies he “assumed the perspective of a person having ordinary skill in the art” to form his opinion). This required knowledge (in addition to knowledge of wireless networks), only requires some rudimentary knowledge about well-known form factors, given the breadth of the claims at issue here. As Dr. Williams testifies, “the art to which the purported

¹⁸ “[T]he ’943 patent” likely refers to U.S. Patent No. 10,469,934 B2, which was challenged in related proceeding IPR2021-00680.

technical advance of the '934 patent principally relates is wireless networking.” Ex. 2023, 35:19–21.

Moreover, Mr. McAlexander, Patent Owner’s declarant, similarly lacks direct experience in headphone design. And Mr. McAlexander and Dr. Williams each worked in cell phone design, which includes small speakers. *Compare* Ex. 1003 ¶ 3 (testifying “I have also designed cellular chipsets for operation in cellular phones” and “I have over 40 years of professional experience in wireless communications and telecom technology”), *with* Ex. 2024 ¶ 8 (testifying that he “investigated processes and designs associated with . . . telephones”). Mr. McAlexander also testifies that an artisan of ordinary skill “would be someone working in the electrical engineering field and specializing in or knowledgeable of speaker components for small wireless devices.” *Id.* ¶ 19. But Mr. McAlexander does not testify that this knowledge must be direct knowledge, and he does not testify that he worked directly with small speakers. Rather, he generally testifies that he “investigated processes and designs associated with . . . telephones”: “I have investigated processes and designs associated with personal computers, peripheral computers, software, and wireless communications systems, including telephones, microprocessors, controllers, memories, programmable logic devices, and other consumer electronics.” *Id.* ¶ 8, *see also id.* ¶¶ 1–7, 9 (testifying “I am very familiar with how acoustic speakers operate and the design issues associated with sound systems” without mentioning the size of the speakers.). During his deposition, Mr. McAlexander agreed that he “had not ever designed a headphone” and that “outside of litigation counseling,” he had “not worked on any specific projects that are related to the headphone.” Ex. 1141, 7:13–23.

Nevertheless, Mr. McAlexander testifies that “I satisfied this skill level circa 2008–2009 (and satisfy it now); and I am familiar with the knowledge and skills that a person with this skill level would have possessed circa 2008–2009 through my work and interaction with colleagues in the field.” Ex. 2024 ¶ 19.

On this record, we are not persuaded that there is any reason to discount the weight associated with Dr. William’s testimony.

D. Claim Construction

“In an *inter partes* review proceeding, a claim of a patent . . . 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) (2020). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313–14 (Fed. Cir. 2005) (en banc). Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *Id.* at 1317–19.

Petitioner asserts that because “the prior art plainly discloses claim elements, express construction is unnecessary.” Pet. 8 (citing *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017)).

Patent Owner does not discuss claim construction in a separate claim construction section of its Response, but in addressing one of the asserted grounds, Patent Owner argues that the term “body portion” of claim 40 should be construed as “the central or main portion of the earphone.” PO

Resp. 43 (citing Ex. 2024 ¶ 60). Relying on a dictionary definition, Patent Owner argues that “[t]he ordinary meaning of ‘body’ in this context is ‘the main, central, or principal part.’” *Id.* (citing Ex. 2024 ¶ 60; Ex. 2041, 4). Patent Owner contends that this meaning is consistent with the ’025 patent because disclosed “body 12” forms the main, central, or principal part of earphone 10. *Id.* (citing Ex. 2024 ¶ 60; Ex. 1001, 3:15–20, Figs. 1A–1B).

Petitioner argues that Patent Owner improperly conflates “body” with “body portion,” and the plain meaning of “body portion” is “a part of a ‘body.’” Pet. Reply 21. In its Sur-reply, Patent Owner reiterates its proposed construction and quotes *Fisher-Price, Inc. v. Evenflo Co.*, Case No. 05-cv-280S, 2006 WL 1740263, *3 (WDNY June 26, 2006) as stating: “When the term ‘body’ is used in connection with an intimate object, its ordinary meaning is . . . the main, central or principal part of something.”

PO Sur-reply 15. Patent Owner asserts that:

No reasonable person would consider the tail (or empennage) of an airplane to be the “body portion” of the airplane, even though it is part of the airplane, because the tail is not the main, central, or principal part of the airplane; the fuselage is the main part. Similarly, the “body portion” of the earphone is the main or central part of the earphone.

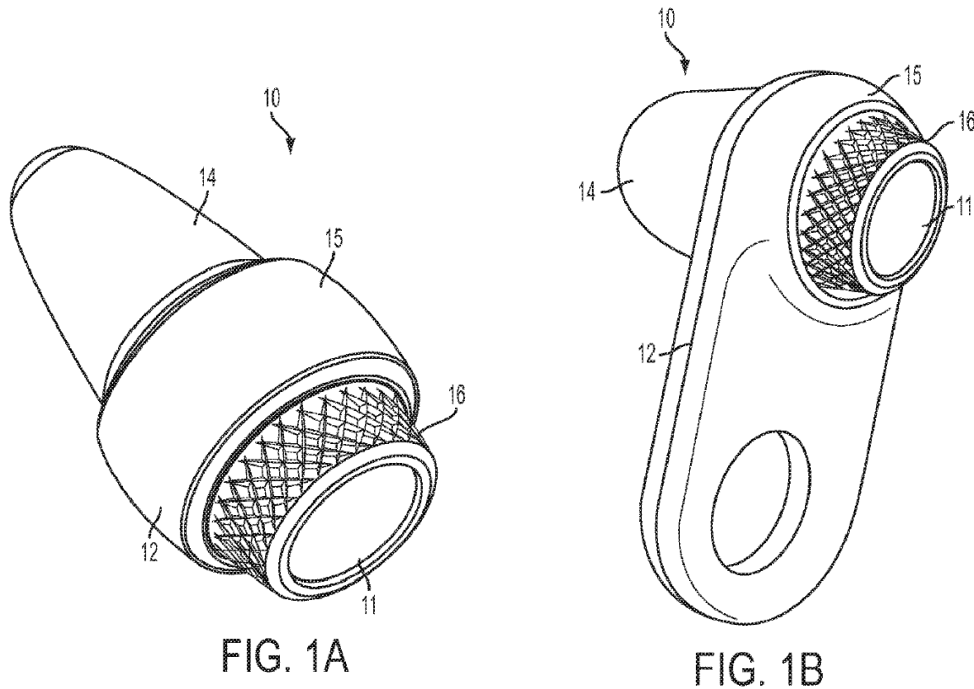
Id.

In light of the disclosure in the Specification, Patent Owner’s arguments are not persuasive. The Court of Appeals for the Federal Circuit has stated:

The main problem with elevating the dictionary to such prominence is that it focuses the inquiry on the abstract meaning of words rather than on the meaning of claim terms within the context of the patent. Properly viewed, the “ordinary meaning” of a claim term is its meaning to the ordinary artisan after reading the entire patent. Yet heavy reliance on the dictionary divorced

from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract, out of its particular context, which is the specification.

Phillips, 415 F.3d at 1321. In this case, the intrinsic evidence does not comport with Patent Owner’s proffered dictionary definition, which is just one of several definitions of “body” provided by the cited dictionary.¹⁹ Specifically, the ’025 patent describes various embodiments of wireless earphones, including those depicted in Figures 1A and 1B, which are reproduced below.



Figures 1A and 1B show example configurations of wireless earphone 10. Ex. 1001, 3:11–12. In each configuration, earphone 10 comprises body 12. *Id.* at 3:15–16. Body 12 comprises ear canal portion 14 that is inserted into a user’s ear canal and exterior portion 15 that is not inserted into the ear canal.

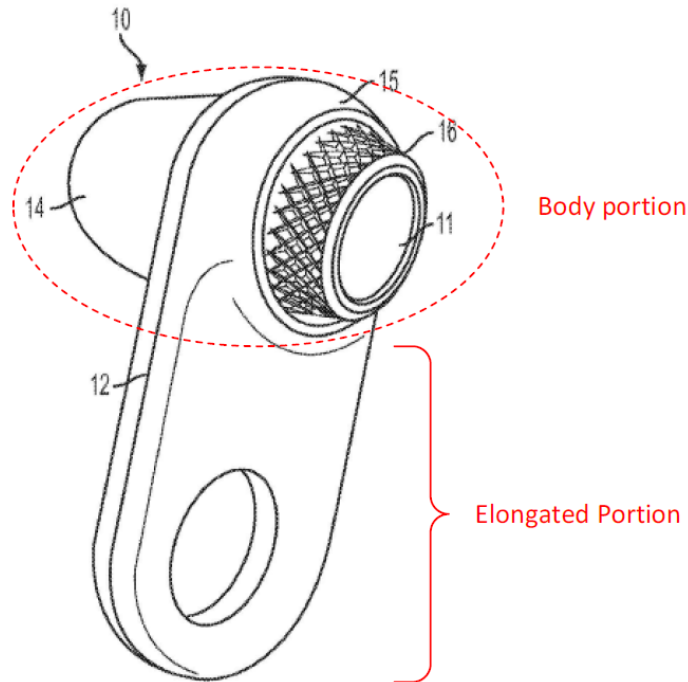
¹⁹ The district court’s use of the same dictionary definition of “body” to construed the term “body portion” in *Fisher-Price* is not applicable here because that case involved a different patent relating to an invention in a different field of art.

Id. at 3:16–20. Exterior portion 15 further includes knob 16 with button 11.
Id. at 3:20–21, 8:27–30.

Accordingly, we disagree with Patent Owner’s assertion that body 12 forms the main, central, or principal *part* of earphone 10 (*see* PO Resp. 43) because it comprises both ear canal portion 14 and exterior portion 15, which make up the entirety of earphone 10. Furthermore, we agree with Petitioner that Patent Owner improperly conflates “body” with “body portion” by relying on a dictionary definition for “body” as defining “body portion.” Patent Owner’s reliance on the definition of “body” as defining “body portion” arguably requires body 12 to correspond to the claimed “body portion.”²⁰ But body 12, which comprises both ear canal portion 14 and exterior portion 15, cannot correspond to the claimed “body portion” because claim 40 also recites a separate “elongated portion.”

Moreover, Patent Owner submits an annotated version of Figure 1B of the ’025 patent, which we reproduce below, that identifies a “body portion” that does not correspond to body 12 as a whole.

²⁰ Other arguments by Patent Owner also appear to suggest that body 12 corresponds to the claimed “body portion.” *See* PO Sur-reply 16 (“Patent Owner’s interpretation of ‘body portion’ also comports with the ‘body 12’ in Figure 1B of the ’025 Patent.”), 17 (referring to “body portion 12”).



PO Sur-reply 17. For this annotated version of Figure 1B, Patent Owner adds (1) a dashed oval enclosing ear canal portion 14 and an upper portion of exterior portion 15 that is labelled “Body portion,” and (2) a bracket adjacent to a lower portion of exterior portion 15 that is labelled “Elongated Portion.” *Id.* Because this annotated figure depicts the “body portion” as something less than the entire body 12, it contradicts Patent Owner assertion that the dictionary definition of “body” should define the “body portion.”

For the above reasons, we decline to adopt Patent Owner’s proposed construction of “body portion” as insufficiently supported by the intrinsic evidence.

Focusing on the intrinsic evidence, we note that claim 40 recites that each earphone comprises “a body portion that sits at least partially in an ear” and “an elongated portion that extends from the body portion.” In other words, each earphone comprises two distinct “portions.” The written description of the ’025 patent does not use the term “body portion” or

“elongated portion” and, thus, does not provide much guidance on construing the claim terms.²¹ Accordingly, because claim 40 requires that the “body portion” and “elongated portion” are two distinct portions of each earphone, we construe “body portion” as “a portion or section of the earphone that forms a body.”

We determine that we need not expressly construe any other claim term to resolve the parties’ disputes because doing so would have no effect on the analysis below. *See Nidec*, 868 F.3d at 1017; *see also 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)).

E. Ground 1A: Asserted Obviousness Based on Rezvani-446, Rezvani-875, and Skulley

Petitioner asserts that claims 1–3, 6, 8, 11–13, 16, 18, 20–22, 25, 27, 39, 52, and 54–56 are unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, and Skulley. Pet. 10–33. Patent Owner provides arguments addressing this asserted ground of unpatentability. PO Resp. 12–20. We first summarize the references and then address the parties’ contentions.

²¹ As discussed above, the ’025 patent describes earphone 10 as comprising ear canal portion 14 that is inserted into a user’s ear canal and exterior portion 15 that is not inserted into the ear canal. Ex. 1001, 3:15–20. Thus, it is reasonable to correlate ear canal portion 14 to the claimed “body portion” and exterior portion 15 (at least the exterior portion depicted in Figure 1B) to the claimed “elongated portion.”

1. Rezvani-446

Rezvani-446 relates to providing content wireless portable media (“WPM”) clients by creating a wireless link between the WPM clients and a WPM server. Ex. 1097 ¶ 4. In one embodiment, the system includes WPM server 402 and headset 404 as the sole WPM client. *Id.* ¶ 55, Fig. 4. A user of headset 404 may make a request for music files across a wireless link to WPM server 402. *Id.* ¶ 55. Figure 7 of Rezvani-446 is reproduced below.

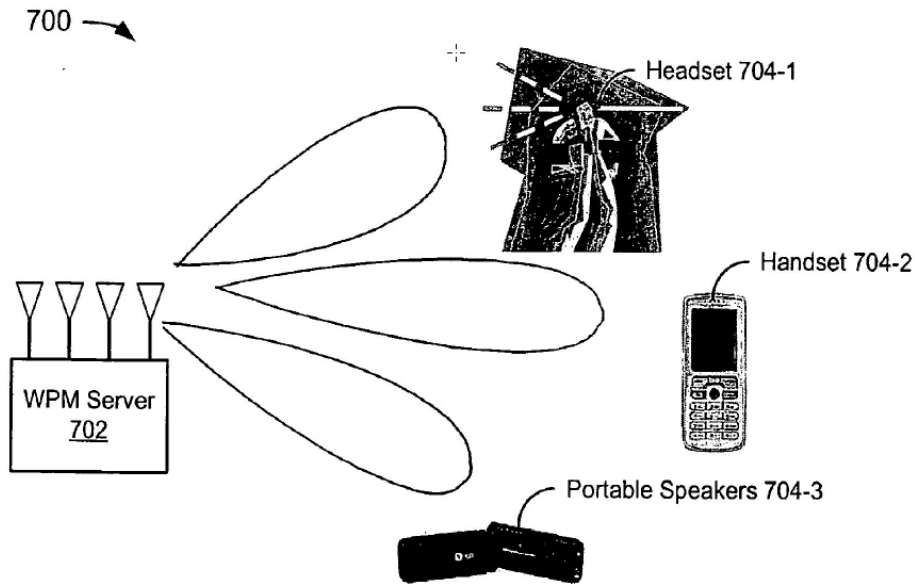


FIG. 7

Figure 7 illustrates a system that includes various WPM clients in a WPM environment. *Id.* ¶¶ 4, 69. More specifically, Figure 7 shows WPM server 702 in wireless communication with WPM clients, including headset 704-1, handset 704-2, and portable speakers 704-3. *Id.* ¶ 69.

2. Rezvani-875

Rezvani-875 discloses a “wireless multi-media headset with high fidelity sound” that performs a “seamless handoff between multiple wireless interfaces.” Ex. 1016, code (57). The headset is capable of several applications and multiple wireless systems may be incorporated. *Id.* ¶ 19.

For example, support may be provided for various cellular standards, Wi-Fi standards, and the Bluetooth standard among others. *Id.* Figure 2 is reproduced below.

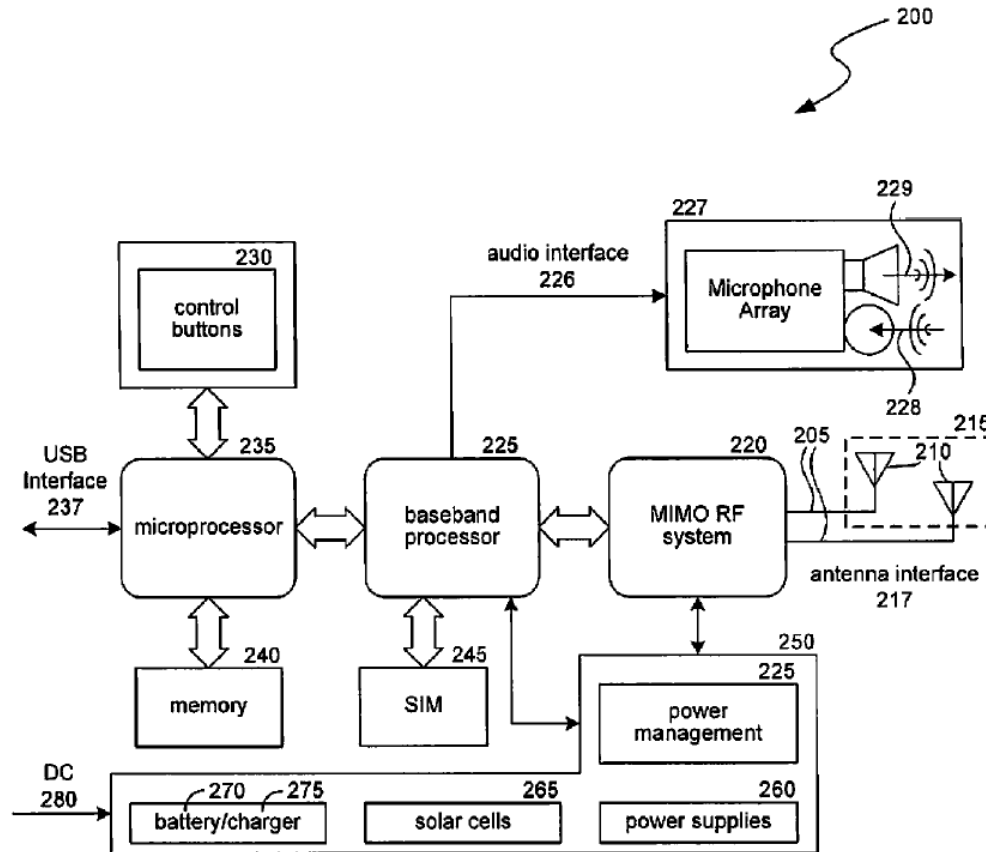


FIG. 2

Figure 2 depicts the subsystems that support the various functionalities. *Id.* ¶¶ 6, 20. These subsystems include antenna array 215, baseband processor 225, microphone array 227, and control buttons 230 for a user interface. *Id.* ¶ 20. Microprocessor 235 performs operations for the various functionalities with the assistance of internal memory 240. *Id.* Power subsystem 250 includes power supplies 260, solar cells 265, battery 270, and battery charger 275. *Id.* ¶ 21.

3. *Skulley*

Skulley discloses that headsets can incorporate one or two earphones and can be classified into three general types: (1) “in-the-ear” earphones, also referred to as “ear buds”; (2) “on-the-ear” earphones; and (3) “over-the-ear” earphones. Ex. 1017, 1:21–34.

4. *Independent Claim 1*

Petitioner contends that the proposed combination of Rezvani-446, Rezvani-875, and Skulley discloses the limitations of claim 1. Pet. 15–28. Patent Owner argues that Rezvani-875 teaches away from the proposed combination and Figure 2 of Rezvani-875 does not depict a headset. PO Resp. 12–20. Patent Owner also argues that objective indicia of non-obviousness confirm that claim 1 would not have been obvious. *Id.* at 23–32.

a) The Combination of Rezvani-446, Rezvani-875, and Skulley

Petitioner first argues that one of ordinary skill in the art would have implemented Rezvani-446’s system using Rezvani-875’s headset. Pet. 13. According to Petitioner, one reason for this modification is that Rezvani-875’s disclosure of its headset being wirelessly connected to another device such as a music server “would have suggested using Rezvani-875’s headset in Rezvani-446’s system because Rezvani-446’s system supports a wireless headset ‘capable of receiving and using content from’ a WPM server storing music.” *Id.* (citing Ex. 1016 ¶ 33; Ex. 1097 ¶¶ 22, 55, Fig. 4; Ex. 1003 ¶¶ 99–100). Petitioner also argues that this modification “would have been ‘nothing more than the predictable application of known technology,’” because “an intended use for Rezvani-875’s headset is connecting to a music server like Rezvani-446’s WPM

server.” *Id.* at 13–14 (quoting *B/E Aerospace v. C&D Zodiac*, 962 F.3d 1373, 1379 (Fed. Cir. 2020); citing Ex. 1016 ¶ 33; Ex. 1003 ¶ 101).

Next, Petitioner argues that one of ordinary skill in the art would have implemented Rezvani-875’s headset with two earphones in Rezvani-446’s system. *Id.* at 14. Petitioner presents three reasons for this modification. First, Petitioner argues that Rezvani-875’s disclosure of playing music and offering high fidelity sounds would have motivated using two earphones. *Id.* (citing Ex. 1016 ¶¶ 4, 15–17, code (57); Ex. 1005 ¶¶ 47–48; *KSR*, 550 U.S. at 417–18). Second, Petitioner argues that Skulley teaches that two-earphone headphones were common, and implementing the headset with two earphones “would have been applying a known technique to improve similar devices in the same way (*e.g.*, to produce stereo sound).” *Id.* (citing Ex. 1005 ¶¶ 47–48, 136, 142–143; *KSR*, 550 U.S. at 417). Third, Petitioner argues that “two-earphone headphones would have been obvious to try because, per Skulley, that was one of two predictable configurations—one or two earphones.” *Id.* (citing Ex. 1005 ¶¶ 47–48, 137; *KSR*, 550 U.S. at 421).

Petitioner also argues that one of ordinary skill in the art would have had a reasonable expectation of success because the proposed modifications would have been routine. *Id.* at 15 (citing Ex. 1005 ¶¶ 50–70, 138; Ex. 1003 ¶ 106).

Patent Owner argues that the headset of Petitioner’s combination has two wireless links (one with Rezvani-446’s WPM server and one with Rezvani-446’s handset 704-2), but one of ordinary skill in the art “would have had no reason to tax Rezvani-875’s headset with an additional connection to the WPM server” because Rezvani-875’s headset is already in wireless communication with handset 704-2 for the same purpose of

obtaining music.²² PO Resp. 13–14. Patent Owner contends that having two wireless connections instead of one would drain the headset’s battery faster and one of ordinary skill in the art would not be interested in such a design. *Id.* at 14 (citing Ex. 2024 ¶ 42).

Patent Owner also argues that ¶ 39 of Rezvani-875 discloses “maintaining a headset in a ‘low power’ mode ‘by shutting down all functions not associated with maintaining a low-rate wireless connection to the handset,’” and that disclosure “cuts against Petitioner’s rationale” for combining the references. *Id.* Patent Owner asserts that “[m]odifying Rezvani-875’s headset with an additional connection in spite of Rezvani-875’s clear purpose of operating in low power by shutting down all functions not associated with maintaining a low-rate wireless connection to the handset, clearly extends beyond the simple swapping of headsets.” *Id.* at 14–15 (citing Ex. 2024 ¶ 43).

In its Reply, Petitioner argues that Patent Owner’s battery drain argument overlooks that Rezvani-875 repeatedly explains “that its headset ‘supports simultaneous operation’ over multiple wireless interfaces,” including a connection to a music server. Pet. Reply 3. (citing Ex. 1016 ¶¶ 33, 40, 49, Fig. 8, claims 1–7, 28–35). According to Petitioner, “[f]ar from being a ‘tax’ on Rezvani-875’s headset, simultaneous wireless connections, including to a music server, are its *raison d’être*.” *Id.*

We agree with Petitioner that Rezvani-875 discloses simultaneous operation of its headset over multiple wireless interfaces. *See, e.g.*, Ex. 1016 ¶¶ 40, 41, 49. Indeed, Patent Owner concedes in its Sur-reply that

²² Patent Owner also asserts that ¶ 33 of Rezvani-875 “cuts against Petitioner’s rationale” for combining the references, but does not discuss any specific language of ¶ 33. PO Resp. 13.

“Rezvani-875’s headset supports simultaneous operation over multiple wireless interfaces, such that it could be used in Rezvani-446’s system.” PO Sur-reply 5. As such, Rezvani-875 would not have suggested to one of ordinary skill in the art that providing a headset with multiple wireless connections would produce undesirable battery drain. Accordingly, we are not persuaded that one of ordinary skill in the art would have been dissuaded from using two wireless connections because of increased battery usage.

Regarding Patent Owner’s argument that ¶ 39 of Rezvani-875 teaches away from the proposed combination, Petitioner asserts that the “low power mode” described in this paragraph does not nullify Rezvani-875’s support for multiple wireless connections. Pet. Reply 4. Specifically, Petitioner asserts that Rezvani-875’s claims explicitly recite both low power operation and multiple wireless connections. *Id.* (citing Ex. 1016, claims 28, 32–35, 50).

We agree with Petitioner that the claims of Revani-875 show that the reference contemplates supporting multiple wireless connections during the low power mode. For example, Revani-875’s claim 28 recites a multimedia headset that includes “power management means for ultra low power operation,” and claim 32, which indirectly depends from claim 28, recites “means supporting simultaneous operation over two or more different wireless systems.” Ex. 1016, claims 28, 32.

Furthermore, paragraph 39 states that “[t]he headset may be designed such that a certain application or set of applications that require relatively low power can be maintained for an indefinite time period under solar power alone,” by using “aggressive power management [to] allow the device to support the given application(s) indefinitely without recharging by shutting down all nonessential functions except those associated with the specific

application or applications.” Ex. 1016 ¶ 39. As such, Rezvani-875 discloses shutting down nonessential functions only when operating under solar power alone. Rezvani-875’s device, however, includes not only solar cells 265, but also power supplies 260 and battery 270 for powering the device. *Id.* ¶ 21, Fig. 2. Accordingly, operating under solar power alone is an alternative power mode applicable to maintaining “a certain application or set of applications that require relatively low power.” *Id.* ¶ 39. Patent Owner does not contend that Rezvani-875 teaches away from maintaining multiple wireless connections when using one or more of the other power sources. For these reasons, we determine that ¶ 39 does not teach away from the proposed combination. *See DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (holding a reference does not teach away “if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed”).

In addition, Patent Owner argues that Rezvani-875’s disclosure of simultaneous operation over multiple wireless interfaces “at best suggests that Rezvani-875’s headset could connect to a music server, like Rezvani-446’s WPM server, and to an *arbitrary* handset.” PO Sur-reply 5–6. Patent Owner contends that “[t]here is no suggestion that Rezvani-875’s headset, once swapped into Rezvani-446’s system, would also have a connection to the very same handset that also has a connection with Rezvani-446’s WPM server.” *Id.* at 6. Patent Owner argues that it would not have been obvious to connect Rezvani-875’s headset to Rezvani-446’s handset because Rezvani-875’s headset already is connected to the server for the same purpose of accessing music files, and poses the question: “Why would Rezvani-875’s headset need to connect to a handset that has a

wireless connection to a server to which Rezvani-875's headset is already connected?" *Id.* at 6–7.

Petitioner, however, argues that Rezvani-875 expressly discloses its headset getting music from multiple sources. Pet. Reply 3 (citing Ex. 1016 ¶ 33). Relying on the testimony of Dr. Williams, Petitioner also argues that the headset being capable of connecting to a server and a handset would provide music-source flexibility desired by users. *Id.* (citing 1003 ¶¶ 42, 115–116; Ex. 1141, 76–79); *see also* Tr. 8:10–25 (arguing that Dr. Williams explained the benefits of music-source flexibility).

Dr. Williams testifies that “[s]treaming music from the server and storing music for later playback on a DAP (*e.g.*, a cellular phone or MP3 player) would have provided a headset’s end-user with desirable flexibility in the available sources for digital audio content.” Ex. 1003 ¶ 116. As an example of why such flexibility would have been desirable, Dr. Williams testifies that the dual arrangement would enable the user “to listen to music from their phone or MP3 player even if the connection to the server were poor and/or the server was unavailable.” *Id.* (citing Ex. 1128 ¶¶ 19–20, 26, 57–58; Ex. 1131 ¶¶ 5, 167; Ex. 1134, 1:24–37; Ex. 1111 ¶ 37; Ex. 1110 ¶¶ 2–4). We credit Dr. Williams’ uncontroverted testimony on this point, which we find persuasive and supported by evidence.

Moreover, Rezvani-875 discloses that the headset may obtain music files from a variety of sources, such as “a wireless connection to the Internet, via a cellular telephone connection, . . . or via a wired or wireless connection to another device (*e.g.* a wireless connection to a computer, music server, handset, PDA, or other wireless device).” Ex. 1016 ¶ 33. We find that this disclosure, together with Rezvani-875’s disclosure of simultaneous operation over multiple wireless interfaces (*see id.* ¶¶ 40, 41, 49) and

Dr. Williams' testimony, would have suggested to one of ordinary skill in the art providing wireless connections between Rezvani-875's headset and both WPM server 702 and handset 704-2.

In sum, we determine that Petitioner's proposed reasons to combine Rezvani-446, Rezvani-875, and Skulley are realistic, have rational underpinning, and are supported by expert testimony, which we find persuasive and credit. Thus, Petitioner's evidence shows that a skilled artisan would have had reasons to combine the teachings of Rezvani-446, Rezvani-875, and Skulley and would have had a reasonable expectation of success in doing so.

b) The Limitations of Claim 1

Petitioner contends that Rezvani-446 discloses a headphone assembly generally (i.e., headset 704-1) and Rezvani-875 discloses a headphone assembly having the claimed antenna, wireless communication circuit, processor, rechargeable battery, and microphone (i.e., the headset depicted in Figure 2). Pet. 10–12, 18–25. Petitioner argues that the combination of Rezvani-446, Rezvani-875, and Skulley uses a two-earphone headset, with each earphone having an acoustic transducer. *Id.* at 20 (citing 1003 ¶ 121; Ex. 1005 ¶¶ 128–129). Petitioner also contends that WPM server 702 of Rezvani-446 corresponds to the claimed remote, network-connected server. *Id.* at 10–11, 25–26.

Regarding the claimed mobile, digital audio player with which the headphone assembly is in wireless communication, Petitioner contends that Rezvani-446 discloses using mobile wireless handset 704-2 with WPM server 702. *Id.* at 10, 16 (citing Ex. 1097 ¶¶ 22, 42, 46, 55, 69, Figs. 4, 5, 7). Petitioner also contends that Rezvani-875 teaches that wireless headphones were commonly used with cell phones for hands-free operation and cell

phones commonly stored and played back music by 2008. *Id.* at 16–17 (citing Ex. 1016 ¶ 4, Fig. 9; Ex. 1003 ¶¶ 111–116). In addition, Petitioner contends that Rezvani-446 teaches that the “WPM clients ‘include *any device* capable of receiving and using content’ from the WPM server . . . , and mobile MP3 players with wireless-communication functionality were common by April 2008.” *Id.* at 17 (quoting Ex. 1097 ¶ 22; citing Ex. 1097 ¶ 42; Ex. 1003 ¶¶ 113–114; Ex. 1099 ¶¶ 3–5; Ex. 1126 ¶¶ 18–19, 22, 25).

Based on these contentions, Petitioner argues that it would have been obvious to one of ordinary skill in the art at the time of invention to implement the combination of Rezvani-446, Rezvani-875, and Skulley with a handset or MP3 player capable of storing digital audio content “because Rezvani-446 teaches that music from the WPM server is either streamed to WPM clients or *downloaded to those clients for later playback.*” *Id.* (citing Ex. 1097 ¶ 73). As for the requirement in claim 1 that the headphone assembly be in wireless communication with the digital audio player, Petitioner contends that the combination of Rezvani-446, Rezvani-875, and Skulley would include this feature because Rezvani-875 teaches that mobile digital audio players and headsets communicate via conventional wireless connections. *Id.* at 19 (citing Ex. 1016 ¶¶ 4, 33, 39, 42, Fig. 9; Ex. 1003 ¶ 118).

Petitioner also argues that the combination’s digital audio player uses a Bluetooth connection (i.e., an ad hoc wireless communication link) to transmit digital audio content that is played back through the headset’s earphones. *Id.* at 19 (citing Ex. 1016 ¶ 4; Ex. 1097 ¶¶ 42–43, 58–59, 73; Ex. 1003 ¶ 132; Ex. 1005 ¶¶ 128–129). Last, Petitioner argues that the combination includes Rezvani-875’s control buttons that initiate a search request for a song or other commands such as rewind or fast-forward. *Id.*

at 27 (citing Ex. 1016 ¶¶ 35–36, claims 14, 41; Ex. 1097 ¶¶ 45–48, 59; Ex. 1003 ¶ 133; Ex. 1005 ¶ 139). According to Petitioner, these searches and commands ‘initiat[e] transmission of a request’ to the server, as claimed” and are implemented by the microprocessor. *Id.* at 27–28 (citing Ex. 1016 ¶ 20; Ex. 1003 ¶¶ 133–136).

Patent Owner argues that, although relying on Rezvani-875’s Figure 2 as disclosing the claimed headphone assembly components, Petitioner fails to prove that Figure 2 depicts a headset and, thus, fails to show that the combination possesses the claimed headphone assembly components. PO Resp. 16 (citing Pet. 18–25; Ex. 1003 ¶¶ 117–130), 20. Patent Owner points to the following three reasons as showing that one of ordinary skill in the art would not have understood that Rezvani-875’s Figure 2 depicts a headset.

First, Patent Owner contends that Rezvani-875 never states that Figure 2 shows a headset. *Id.* at 16. Specifically, Patent Owner argues that Rezvani-875 does not identify Figure 2 as showing a headset in either the Brief Description of the Drawings section or the description of Figure 2 in contrast to explicitly referring to Figure 1 as showing a headset. *Id.* at 16–17 (citing Ex. 1016 ¶¶ 5–6, 18, 20; Ex. 2024 ¶ 36).

Second, Patent Owner argues that Rezvani-875’s use of different reference numerals in Figures 1 and 2 implies that the device depicted in Figure 2 is not a headset. *Id.* at 17 (citing Ex. 1016 ¶¶ 18, 20, Fig. 1; Ex. 2024 ¶ 37; 37 C.F.R. § 1.84(p)(4)).

Third, Patent Owner argues that “the subsystems and components depicted in Figure 2 are not consistent with a headset but in contrast are consistent with other types of electronic devices in the relevant time frame (circa 2008, the priority date for the ’025 Patent), particularly a cell phone.” *Id.* at 18. For example, Patent Owner argues that Figure 2 depicts a

Subscriber Identity Module (“SIM”) card, which typically is installed in a cell phone. *Id.* (citing Ex. 1016 ¶ 21; Ex. 2024 ¶ 38; Ex. 2023, 56).

According to Patent Owner, the presence of the SIM card “precludes Figure 2 from depicting a headset.” *Id.* at 18–19 (citing Ex. 2024 ¶ 38). Patent Owner further argues that Rezvani-875’s solar cells 265, DC input 280, and USB interface 237 are components not commonly included in wireless headsets circa 2008. *Id.* at 19 (citing Ex. 1016 ¶¶ 20–21; Ex. 2024 ¶ 39; Ex. 2023, 58).

Petitioner replies by arguing that Rezvani-875 expressly states that Figure 2 shows headset components. Pet. Reply 5, 7 (citing Ex. 1016 ¶¶ 38, 47). We agree with Petitioner. Paragraph 38 of Rezvani-875 states: “As shown in FIG. 2, *the headset* may have an optional power management algorithm” Ex. 1016 ¶ 38 (emphasis added). Paragraph 47 states: “As shown in FIG. 2, *the headset* has a power management algorithm” *Id.* ¶ 47 (emphasis added). Both of these statements indicate that Figure 2 shows a headset despite ¶ 21 of Rezvani-875 referring to Figure 2 as depicting a “device.”²³ We are not persuaded by Patent Owner’s argument that ¶ 38 “merely explains that the headset could include a ‘power management algorithm’ like the device depicted in Figure 2.” PO Resp. 19 (citing Ex. 1016 ¶ 38; Ex. 2024 ¶ 40). Instead, we find that the above-quoted language from ¶ 38 and ¶ 47 (which Patent Owner does not address) clearly conveys that Figure 2 depicts a headset.

Regarding Patent Owner’s second argument (i.e., Rezvani-875 uses different reference numerals in Figures 1 and 2), Petitioner argues that

²³ We note that ¶ 39 of Rezvani-875 appears to use the terms “headset” and “device” interchangeably.

“consistent with 37 C.F.R. § 1.84(p)(4), Figures 1 and 2 plainly depict different ‘parts’ of the headphone: a functional ‘part’ (Figure 1) and a hardware ‘part’ (Figure 2).” Pet. Reply 7 (citing Ex. 1016 ¶¶ 5–6, 19–21). Indeed, Figure 1 is a *functional* block diagram of the headset (Ex. 1016 ¶¶ 6, 18, Fig. 1), and Figure 2 illustrates the *subsystems* that support the various functionalities (*id.* ¶¶ 6, 20). In this sense, Figures 1 and 2 depict different aspects of the headset invention for which different reference numerals could be used. Thus, we are not persuaded that the use of distinct reference numerals indicates that Figure 2 does not depict a headset.

In reply to Patent Owner’s third argument, Petitioner argues that “Rezvani-875’s novelty was a headset with functionality conventionally associated with cellphones.” Pet. Reply 7. Specifically, Petitioner argues that Figure 2 includes (1) a SIM card because the headset supports cellular phone standards; (2) a USB interface for loading music into the headset memory; and (3) solar cells and a DC input because the headset uses these power sources to charge the battery. *Id.* (citing Ex. 1016 ¶¶ 19, 21, 33, 39).

Rezvani-875 discloses that headset 100 may be integrated with various cellular phone standards 170. Ex. 1016 ¶ 19, Fig. 1. Rezvani-875 also discloses that the headset can have a cellular telephone connection. *Id.* ¶¶ 33, 40–41. In view of these disclosures, we disagree with Patent Owner’s assertion that the presence of the SIM card precludes one of ordinary skill in the art from understanding that Figure 2 depicts a headset. *See* PO Resp. 18–19 (citing Ex. 2024 ¶ 38). As for USB interface 237 and solar cells 265, Rezvani-875 discloses that the “headset” may include “a USB high-speed data port” (Ex. 1016 ¶ 33) and may be designed to operate under solar power alone using embedded “solar cells” (*id.* ¶ 39), thereby undermining Patent Owner’s and Mr. McAlexander’s assertions that wireless headsets circa

2008 did not commonly include such elements. *See* PO Resp. 19; Ex. 2024 ¶ 39. Rezvani-875 does not appear to disclose a DC input beyond the description of Figure 2, but in disclosing that the “headset” can operate under solar power “without recharging,” Rezvani-875 implies that the headset includes means for recharging. *See* Ex. 1016 ¶ 39.

For the above reasons, we are persuaded that one of ordinary skill in the art would have understood Figure 2 of Rezvani-875 to depict a headset and determine that Petitioner has met its burden of establishing that the combination of Rezvani-446, Rezvani-875, and Skulley discloses the headphone assembly limitations of claim 1.

Patent Owner does not offer any arguments specifically addressing the remaining limitations of claim 1. *See generally* PO Resp. We need not set forth formal findings as to the undisputed assertions by Petitioner that the combination of Rezvani-446, Rezvani-875, and Skulley discloses or suggests these limitations. *See LG Elecs., Inc. v. Conversant Wireless Licensing S.A.R.L.*, 759 F. App’x 917, 925 (Fed. Cir. 2019) (“The Board is ‘not required to address undisputed matters’ or arguments about limitations with which it was never presented.” (quoting *In re Nuvasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016))). Also, we cautioned Patent Owner “that any arguments not raised in the response may be deemed waived.” Paper 16, 8; *cf.* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”). Nevertheless, we have reviewed Petitioner’s contentions with respect to the remaining limitations of claim 1 and find that the combination of Rezvani-446, Rezvani-875, and Skulley discloses these limitations as set forth by Petitioner. *See* Pet. 15–18, 25–28.

c) *Objective Indicia of Non-obviousness*

(1) *Legal Standard*

We must consider any evidence of objective indicia of non-obviousness in the record before reaching our conclusion on obviousness. *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1328 (Fed. Cir. 2016). Factual inquiries for an obviousness determination include secondary considerations based on evaluation and crediting of objective evidence of non-obviousness. *Graham*, 383 U.S. at 17 (1966).

For objective indicia of non-obviousness to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention. *ClassCo, Inc., v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). “[T]here is no nexus unless the evidence presented is ‘reasonably commensurate with the scope of the claims.’” *Id.* (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)). A patentee is entitled to a presumption of nexus “when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018)). “A finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations”; rather, “the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” *Id.* at 1373–74 (quoting *In re Huang*, 100 F.3d 125, 140 (Fed. Cir. 1996)); see also *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33 at 33 (PTAB Jan. 24, 2020) (precedential) (explaining that

the Board uses a two-step analysis in evaluating nexus between the claimed invention and objective evidence).

“[T]he purpose of the coextensiveness requirement is to ensure that nexus is only presumed when the product tied to the evidence of secondary considerations is the invention disclosed and claimed.” *Lectrosonics*, Paper 33 at 32 (citing *Fox Factory*, 944 F.3d at 1374) (emphasis and internal quotation marks omitted) (alteration in original). Also, “[a] patent claim is not coextensive with a product that includes a ‘critical’ unclaimed feature that is claimed by a different patent and that materially impacts the product’s functionality.” *Id.* (citing *Fox Factory*, 944 F.3d at 1375).

Ultimately, “[t]he patentee bears the burden of showing that a nexus exists.” *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999).

(2) *Analysis*

Patent Owner argues that the alleged commercial success of third-party products shows that claim 1, as well as dependent claims 2–10, 40–52, and 54, would not have been obvious. PO Resp. 23–32, 58–59. In particular, Patent Owner contends that Apple “sells consumer TWS²⁴ earbuds—the AirPods and AirPods Pros (collectively, ‘AirPods Products’)—that have achieved significant sales since they were introduced in late 2016, more than seven years after the latest possible priority date for the ’025 Patent.” *Id.* at 23. Patent Owner also argues there is “a strong nexus between claim 1 and the commercially successful AirPods Products.” *Id.*

²⁴ Patent Owner uses the term “TWS” to refer to “True Wireless” earphones; i.e., “[w]ireless earphones that do not have a wire/cord connected to the audio source and that do not have a band or wire/cord connected between the earphones.” PO Resp. 4.

As evidence of commercial success, Patent Owner relies on public sources that estimate Apple sold 15 million AirPods in 2017, 35 million AirPods in 2018, 60 million AirPods in 2019, and 114 million AirPods in 2020. *Id.* at 24 (citing Ex. 2030, 15). Patent Owner asserts that “[e]stimated sales for the AirPods alone from 2017–2020 are 224 million units,” and “[a]t \$159 USD apiece, that amounts to more than \$35 billion in sales in four years.” *Id.* at 27 (citing Ex. 2030, 15). In addition, Patent Owner argues that the AirPods Products constituted almost 50% of the over 300 million TWS headsets shipped in 2020 and enjoyed significant sales in a growing market, “which is an ‘important component of the commercial success inquiry.’” *Id.* (citing Ex. 2036, 2; quoting *In re Applied Materials, Inc.*, 692 F.3d 1289, 1300 (Fed. Cir. 2012)).

In arguing that nexus should be presumed, Patent Owner primarily relies on a November 6, 2020, infringement claim chart, comparing the AirPods Products to the ’025 patent’s claims, that it had submitted in the Apple Litigation. *Id.* at 24–25 (citing Ex. 2037, 8–18, 68–78). In particular, Patent Owner asserts that the AirPods Products are the “headphone assembly” of claim 1 because they comprise two earphones, an antenna, a wireless communication circuit, a processor, a rechargeable battery, and a microphone. *Id.* at 27–28 (citing Ex. 2037, 8–18, 68–78; Ex. 2027, 2; Ex. 2028, 2; Ex. 2029, 6). Regarding the non-headphone limitations of claim 1, Patent Owner asserts that “the AirPods Products integrate into the Apple ecosystem by pairing with a mobile DAP (e.g., an iPhone); and initiate transmission of request to a remote, network-connected server (e.g., an Apple server that provides voice assistant (e.g., Siri) services).” *Id.* at 25 (citing Ex. 2037, 8–18, 68–78); *see also id.* at 28–29 (arguing that the AirPods Products are designed specifically to work in “the Apple

ecosystem”) (citing 2039, 1; Ex. 2027, 2; Ex. 2028, 4; Ex. 2027, 2; Ex. 2029, 6).

Petitioner argues that Patent Owner has failed to meet its burden to establish nexus, because the AirPods Products do not embody claim 1, and because Patent Owner has not shown the required coextensiveness between the AirPods Products and claim 1. Reply 11–15. In particular, Petitioner argues that the infringement claim chart, which is mere attorney argument that Apple denies, provides no explanation of how the “remote, network-connected server” and “digital audio player is for transmitting digital audio content to the headphone assembly” limitations are satisfied. *Id.* at 12. Also, Petitioner argues that Patent Owner’s reliance on a litigation infringement claim chart is an improper incorporation by reference. *Id.* at 11.

Petitioner also contends that Patent Owner “made no effort to meet its burden to show that AirPods lack unclaimed features responsible for their success.” *Id.* at 13 (citing *Fox Factory*, 944 F.3d at 1376). Petitioner identifies the following alleged unclaimed features: “‘ultra-low power Apple W1 chip’; ‘high-quality audio’; ‘industry-leading battery life’; ‘one-tap setup’; ‘flexible ear tips’; ‘vent system to equalize pressure’; ‘sweat- and water-resistan[ce]’; ‘high dynamic range amplifier’; ‘force sensor’; ‘[a]udio [s]haring’; ‘[a]nnounce [m]essages’; and integration with Apple’s ecosystem.” *Id.* (quoting Ex. 2027, 2–3; Ex. 2029, 1–8; citing Ex. 1152 ¶ 44) (alterations in original).

Petitioner adds that Patent Owner’s “own employee [and declarant here,] Mr. Blair[,] admitted that headphones’ commercial success is affected by cost, weight, comfort, durability, ease of use, battery life, sound quality, moisture tolerance, and brand name—none of which are in the claims.” *Id.*

at 14 (citing Ex. 1142 (Mr. Blair’s deposition), 15–20). And critically, Petitioner argues that Mr. Blair “admitted that the Apple brand—obviously unclaimed—drives Apple sales.” *Id.* (citing Ex. 1142, 20; Ex. 1152 ¶¶ 45–46).

Petitioner also argues that “[t]he irrelevance of the claims to commercial success is confirmed by the failure of [Patent Owner’s] own Striva earbuds—which [Patent Owner] argues practiced the ’025 patent.” *Id.* (citing Ex. 1148, 1; Ex. 1142, 22–30; Ex. 1149, 6).

Last, Petitioner argues that Patent Owner’s assertions in other Board proceedings that AirPods have nexus to claims in two other patents dooms its argument here. *Id.* Specifically, Petitioner argues that Patent Owner asserts in IPR2021-00680 that “AirPods are co-extensive with a claim requiring the headphone to receive firmware updates from the same server to which it sends requests—a feature purportedly critical to AirPods’ reliability.” *Id.* (citing Ex. 1150, 52–60). Petitioner adds that Patent Owner asserts in IPR2021-00381 that “AirPods are co-extensive with a claim reciting two physically-separate earbuds with elongated portions ‘extending downward’ (like AirPods)—purportedly the invention’s ‘heart.’” *Id.* (citing Ex. 1151, 24). Petitioner contends that Patent Owner cannot enjoy a presumption of nexus for claim 1 because the features noted above are not recited in claim 1. *Id.* (citing *Fox Factory*, 944 F.3d at 1374; *Lectrosonics*, Paper 33 at 32).

We find that Patent Owner has not met its burden of showing the requisite nexus—that the AirPods Products “embod[y] the claimed features, and [are] coextensive with them.” *Fox Factory*, 944 F.3d at 1373. Patent Owner’s primary basis for asserting that the AirPods Products embody claim 1 relies on several pages from a claim chart submitted in a district

court proceeding. Ex. 2037, 8–18, 68–78. This extensive incorporation by reference is improper. 37 CFR § 42.6(a)(3) (“[a]rguments must not be incorporated by reference from one document into another document”). Patent Owner contends that it did not improperly incorporate Exhibit 2037 by reference because it explained why the AirPods Products, when combined with an iPhone and in communication with the Apple server system, possesses all the limitations of claim 1. PO Sur-reply 24 (citing PO Resp. 27–29). Patent Owner, however, merely alleges that the AirPods Products comprise certain limitations of claim 1 but does not provide a detailed comparison of the AirPods Products with claim 1 in its Response. PO Resp. 27–30.

In addition, we agree with Petitioner that the unclaimed features that it relies on demonstrate a lack of coextensiveness. *See* Pet. Reply 13 (citing Ex. 2027, 2–3; Ex. 2029, 1–8; Ex. 1152 ¶ 44). We are not persuaded by Patent Owner’s argument that Petitioner does not assert that any of the unclaimed features are significant. *See* PO Sur-reply 25 (citing Pet. Reply 13; Ex. 1152 ¶ 44). On the contrary, Petitioner submits evidence—testimony by Patent Owner’s declarant, Mr. Blair—showing that several of the unclaimed features (such as comfort, ease of use, battery life, sound quality, and moisture tolerance) affect the commercial success of a headphone product. Pet. Reply 14 (citing Ex. 1142, 15–20). Furthermore, Patent Owner does not address Petitioner’s argument (*id.* (citing Ex. 1142, 20; Ex. 1152 ¶¶ 45–46)) that Mr. Blair “admitted that the Apple brand—obviously unclaimed—drives Apple sales.”

In view of the above, we are also persuaded by Petitioner’s arguments that Patent Owner has not met its burden of showing the requisite nexus

between the AirPods Products and dependent claims 2–10, 40–52, and 54. *See* Pet. Reply 36.

As noted above, Patent Owner may still show nexus by showing that the commercial success of the AirPods Products is the direct result of the unique characteristics of the claimed invention. *See Fox Factory*, 944 F.3d at 1373–74; *Huang*, 100 F.3d at 140. However, the record makes no such showing. Because Patent Owner has not shown a nexus between the claimed invention and the alleged commercial success, Patent Owner has not made a persuasive showing that commercial success evidences non-obviousness.

d) Conclusion

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Rezvani-446, Rezvani-875, and Skulley renders obvious claim 1.

5. Claims 2, 3, 6, 8, 11–13, 16, 18, 20–22, 25, 27, 39, 52, and 54–56

Petitioner provides reasonable and detailed explanations, supported by the testimony of Dr. Williams and Dr. Casali, indicating where in the references the limitations of claims 2, 3, 6, 8, 11–13, 16, 18, 20–22, 25, 27, 39, 52, and 54–56 are disclosed by Rezvani-446, Rezvani-875, and Skulley. Pet. 28–35. Other than its contentions regarding objective indicia of non-obviousness (entitled to little weight, as discussed above), Patent Owner offers no particular arguments with respect to these dependent claims.

We have considered the evidence and arguments of record and determine that Petitioner has demonstrated by a preponderance of the evidence that the combination of Rezvani-446, Rezvani-875, and Skulley renders obvious claims 2, 3, 6, 8, 11–13, 16, 18, 20–22, 25, 27, 39, 52, and

54–56 for the reasons discussed in the Petition and as supported by the testimony of Dr. Williams and Dr. Casali.

F. Ground 1B: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, and Harada

The parties refer to claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 32, 33, 35, 37, 44, 45, 47, 49, and 50 as the “Signal Strength claims.” PO Resp. 32–34; Pet. Reply 16–19. Claim 4 is representative of the Signal Strength claims and is reproduced below, with bracketed numbering added to track those used in the Petition:

4. The system of claim 3, wherein:

[4A] the mobile, digital audio player is a first digital audio source;

[4B] the system further comprises a second digital audio source that is different from the first digital audio source; and

[4C] the headphone assembly transitions to play digital audio content received wirelessly from the second digital audio source via a second wireless communication link based on, at least, a signal strength level for the second wireless communication link.

Ex. 1001, 18:51–60. Petitioner relies on the additional teachings of Harada and alleges that claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, and 28 would have been obvious over Rezvani-446, Rezvani-875, Skulley, and Harada. Pet. 35–40.

1. Harada

Harada discloses a “dynamic priority connection system” (Ex. 1098 ¶ 78) for “any device[] equipped with [a] short-range wireless communication function” to “connect with a device having the highest availability” (*id.* ¶ 23). “As a specific example, the present invention relates

to an emergency transmission of an electronic device such as a cellular phone and contributes to the improvement of the credibility of the emergency transmission by selecting an optimum device from surrounding communication devices to utilize the communication function thereof.” *Id.*

¶ 12. Figure 1 of Harada, reproduced below, illustrates an example:

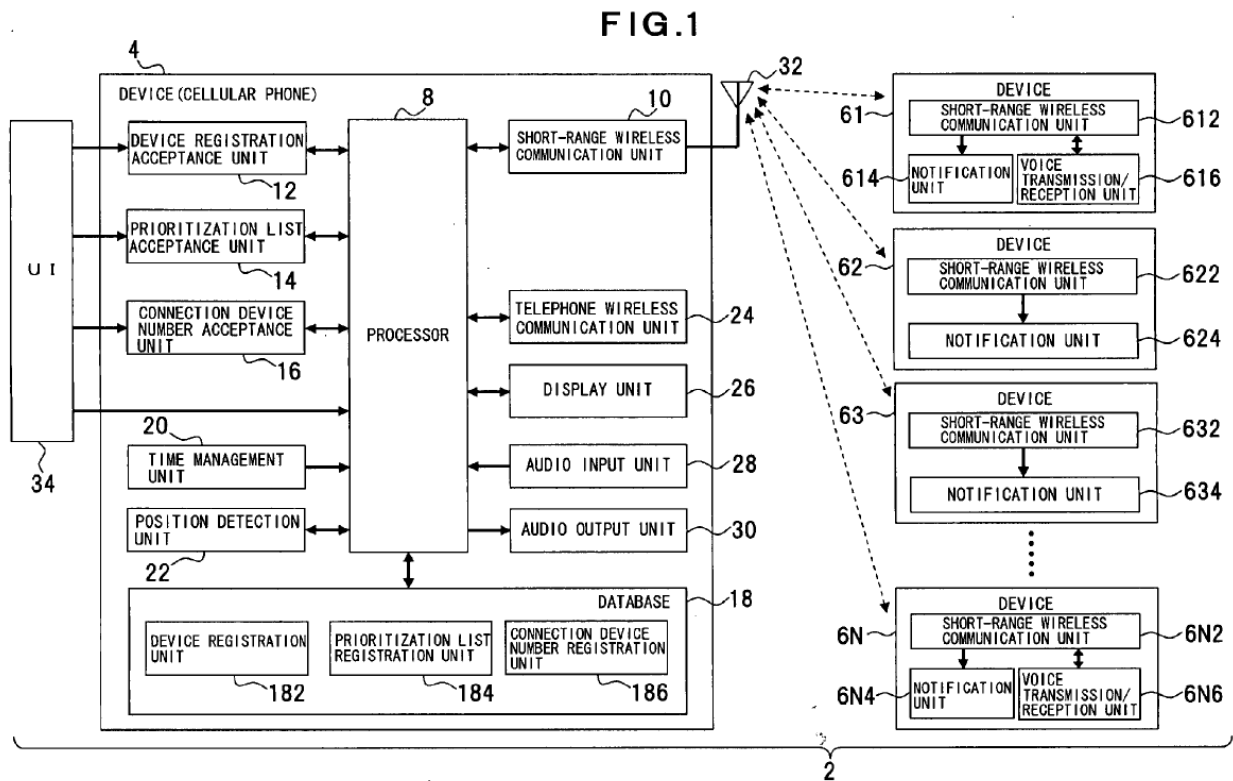


Figure 1 is a block diagram of an inter-device priority connection apparatus, specifically, dynamic priority connection system 2. *Id.* ¶¶ 33, 66–67.

Electronic device 4, e.g., a cellular phone, includes a short-range wireless communication function, such as Bluetooth.²⁵ *Id.* ¶ 67. Devices 61–6N include the same communication function, are connectable with cellular phone 4 using the communication function, and can be, for example,

²⁵ Figure 15 of Harada (not shown), is similar to Figure 1, but shows electronic device 60, a device other than a cellular phone, rather than cellular phone 4. *Id.* ¶¶ 145–147, Fig. 15.

cellular phones, personal computers, television sets, automobiles, watches, or GPS apparatus. *Id.* ¶¶ 67, 70. Device registration acceptance unit 12 accepts registration functions from devices 61–6N as connection destination devices, and prioritization list acceptance unit 14 “accepts a prioritization list dependent on information such as position, time, etc. and a prioritization list not dependent on information such as position, time, etc.” *Id.* ¶71.

In operation, short-range wireless communication unit 10 monitors received signal levels from the devices of devices 61–6N that are registered. *Id.* ¶ 78.

If the registered device is a cellular phone, by synchronizing the communication with the cellular phone and performing communication and by having the cellular phone notify the electronic device of a received signal level from a base station of the cellular phone, a remaining battery power amount of the cellular phone and a phone call status, the received signal level, the remaining battery power amount and the phone call status of the registered cellular phone can be managed.

Id. In one example of cellular phone 4 connecting to one or more of devices 61–6N:

the connection can be achieved with the device with the highest received signal level by monitoring the received signal level of the short-range wireless communication. As an example, if the registered devices are cellular phones, by having the cellular phones notify of a received signal level from a base station of the cellular phone, a remaining battery power amount of the cellular phone and a phone call status, the cellular phones having the remaining battery power amount and not in a phone-calling status are selected and the connection can be achieved with a cellular phone among those cellular phones, which has the highest received signal level from the base station.

Id. ¶ 85. Cellular phone 4 reads the device addresses of the devices of 61–6N that are registered; connects with those devices through the short-range

wireless communication unit; receives signal level, battery level, and call status from each connected device; and connects with one or more of the devices that have a high priority (if the devices are prioritized), enough battery power, and are not already on a call. *Id.* ¶¶ 109–111, Fig. 9.

Harada gives several examples of how its system might be used. In one example, cellular phone 4 sends a textual message to one or more of a television, refrigerator, navigation apparatus, watch, and laptop computer indicating that mail has been received, each of which displays the message. *Id.* ¶¶ 196–210, Fig. 27. In another example, cellular phone 4 sends a scheduling message to one or more such devices, which display the scheduling message. *Id.* ¶¶ 211–224, Fig. 28. In another example, a connected device (e.g., a notebook computer or a watch) can change a set mode (e.g., silent mode) of cellular phone 4. *Id.* ¶¶ 225–228, Fig. 29. In another example, one or more devices, in an order of priority (e.g., a laptop computer from work or a watch from outside work) can send a text mail message to cellular phone 4 (e.g., “I’m coming home now”). *Id.* ¶¶ 229–232, Fig. 30. In another example, cellular phone 4 sends an emergency notification to one or more cellular phones, connecting based on received signal levels, remaining battery power, and phone call status of the cellular phones. *Id.* ¶¶ 233–237, Fig. 31.

2. Discussion

Petitioner contends that Rezvani-446’s wireless handset 704-2 is “the mobile, digital audio player” recited in claim limitation [4A] as “a first digital audio source.” Pet. 38 (citing Ex. 1003 ¶ 206); *see also id.* at 16–18. Petitioner also contends that Rezvani-446’s WPM server or a second DAP is the second audio source recited in claim limitation [4B]. *Id.* at 38–39 (citing Ex. 1003 ¶ 207). Petitioner further contends that Harada discloses a

technique for selecting one or more wireless devices from a plurality of such devices. *Id.* at 35–36 (citing Ex. 1098 ¶¶ 11, 14–16, 23, 25, 78, 85, 145–147, code (57), Fig. 15; Ex. 1003 ¶¶ 195–200). According to Petitioner, by using Harada’s device selection technique, “Rezvani-Rezvani-Skulley-Harada’s headphone assembly ‘dynamically select[s]’ a connection based on ‘a received signal level of a short-range wireless signal’ received from available audio-source devices” and “‘transitions to play digital audio content received wirelessly from the second digital audio source [*e.g.*, WPM server or MP3 player] via a second wireless communication [*e.g.*, Bluetooth or Wi-Fi] based on, at least a signal strength level [*e.g.*, RSSI] for the second wireless communication link’ to the second DAP” as recited in limitation [4C]. *Id.* at 39 (citing Ex. 1098 ¶¶ 15–16, 23, code (57); Ex. 1003 ¶¶ 208–211) (alterations in original). Specifically, Petitioner contends that Harada’s teaching would have provided a technique for connecting the headset to alternative audio sources when a connection to a previous audio source was lost or became poor, such as transitioning from the handset to the MP3 player if the handset’s batteries die or the WPM server if the handset travels out of range of the headset. *Id.* at 37 (citing Ex. 1003 ¶¶ 201–202).

Petitioner argues that Harada’s technique would have been a known technique that would have improved the system of Rezvani-446, Rezvani-875, and Skulley in the same manner, “*e.g.*, by enhancing the device’s connection to audio sources and/or identifying alternative sources based on signal strength when another’s battery died.” *Id.* (citing Ex. 1003 ¶ 203). Petitioner contends that a skilled artisan would have had a reasonable expectation of success in light of Harada’s teaching that its technique could be applied to any device equipped with a short-range wireless

communication function. *Id.* at 37–38 (citing Ex. 1098 ¶¶ 23, 145–147; Ex. 1003 ¶ 204).

We are not persuaded by Petitioner’s arguments and evidence. Petitioner does not show that Harada teaches playing digital audio content received from multiple sources. Harada’s ¶¶ 16, 78, and 85 describe selecting a connection destination device by the received signal strength of the short-range wireless signal or remaining battery life; ¶ 23 lists possible electronic devices, such as cellular phones, personal computers, and watches; and ¶¶ 145–147 make clear that the cellular phone 4 of Figure 1 could be other devices, such as an information processing terminal or household electric device. We do not read these paragraphs as describing a cellular phone (or other device) receiving digital audio content from multiple digital audio content sources.

Paragraph 15 discloses that “one or more devices are dynamically selected based on the prioritization list,” but Petitioner does not explain sufficiently why this disclosure would have suggested to one of ordinary skill in the art transitioning from one audio source to another based on signal strength.

At best, ¶ 85 states that “[w]ith such a connection form, the credibility of the connection can be improved and the intelligibility of the phone call can be enhanced.” Petitioner cites to, but does not explain, its reliance on ¶ 85. Pet. 35. Paragraph 85 provides a general teaching of connecting to one or more registered devices, which may be cellular phones, based on signal level, battery power, and phone call status. Ex. 1098 ¶ 85. Even if this can be read to teach receiving digital audio content from a cellular phone (which is not taught clearly), it does not teach transitioning from one digital audio source to another. In fact, Harada’s examples suggest that

transitioning from audio source to audio source is not contemplated. Rather, as detailed above, Harada's examples are directed to broadcasting a text-based message from a cellular phone to multiple devices or using one such device to reconfigure or send a text-based message to the cellular phone. *Id.* ¶¶ 196–237, Figs. 27–31. We do not find that Harada is limited to those examples. However, Harada does not include the teaching on which Petitioner bases its reliance on Harada, namely, a technique for automatically transitioning from playing digital audio content from one source to playing digital audio content from another source. *See* Pet. 35–39. This claimed feature is missing from the combination of Rezvani-446, Rezvani-875, and Skulley and is not found in Harada.

To the extent Petitioner only argues that Harada shows transitioning from one generic data source to another, and relies instead on Rezvani-446 and Rezvani-875 for sources of digital audio content, Petitioner does not identify where Harada teaches such transitioning. Petitioner's citations (Pet. 35–39 (citing Ex. 1098 ¶¶ 11, 14–16, 20, 23, 25, 31, 78, 85, 145–147)) at most show selecting one or more devices to connect to, from a set of registered devices, based on factors such as registered priority, signal strength, and remaining battery power. In one instance, Harada states that one device might be “concurrently connected” to multiple other devices (Ex. 1098 ¶ 20), but none of Petitioner's citations show a cellular phone (or other device) starting with a connection to a first device and transitioning to a connection to a second device. Thus, even under a more generous reading of Petitioner's combination, Harada still does not teach the transitioning that is missing from the combination of Rezvani-446, Rezvani-875, and Skulley.

Furthermore, we find that Petitioner has not articulated a reason, with rational underpinning, to combine Rezvani-446, Rezvani-875, and Skulley

with a generic teaching of transitioning from one source to another.

Petitioner's stated reason for combining the teachings is that "it would have been using a known technique (Harada's device-selection technique) to improve a similar electronic device in the same way (*e.g.*, by enhancing the device's connection to audio sources and/or identifying alternative sources when another's battery died, by identifying the source with the strongest received signals)." Pet. 37 (citing Ex. 1003 ¶ 203). Even if assuming that Harada teaches that it is possible to transition from one device to another, the evidence still does not support a finding that transitioning from one audio source to another based on the relative strengths of the signals received from the two sources is an improvement.²⁶ Petitioner's evidence in support of this point is no more than conclusory testimony of Dr. Williams (Ex. 1003 ¶ 203), which we do not find credible on this point.²⁷

²⁶ We recognize that the Supreme Court has articulated other reasons, besides an improvement, that could support a conclusion of obviousness. *See KSR*, 550 U.S. at 415–418; *see also In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("This court has further explained that just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes."). Here, however, Petitioner expressly relies on the improvement Harada allegedly provides to improve the combination of Rezvani-446, Rezvani-875, and Skulley in the same way. Pet. 37. Because Petitioner has not shown that Harada's technique would improve the combination of Rezvani-446, Rezvani-875, and Skulley, Petitioner has not supported its primary stated reason to combine Harada with Rezvani-446, Rezvani-875, and Skulley.

²⁷ Petitioner also points to disclosure in Harada that its technique would improve "convenience for the user." Pet. 37 (quoting Ex. 1098 ¶¶ 20, 31). This description, however, explains the benefit of the ability to maintain concurrent connections, not the benefit of transitioning from one connection to another. Ex. 1098 ¶ 20. Thus, Petitioner has not explained persuasively why this disclosure supports its proposed combination.

For the first time at the oral argument, Petitioner argued that with Harada's dynamic selection, "if you walked around the house, you might walk away from your first device, and suddenly have a stronger connection to your second device, and so you would switch that dynamic change from one to the other." Tr. 29:7–15. To the extent that this new argument even should be considered, it is not supported by evidence in the record. For example, Petitioner does not point to any description in Harada that, if a device experiences a lack of a connection or a dropped connection, then the device should connect to something else. Rather, Petitioner's combination is an improvement only in hindsight.

Moreover, it is not clear (even in hindsight) why transitioning from one audio source to another as a user walks from place to place would be an improvement. For example, it might be disorienting and undesirable to switch from a cellular telephone call to a music-playing device when the signal from the music-playing device becomes stronger. Likewise, transitioning from a music-playing device to a television when moving from one room in a house to another might be seen as disadvantageous, at least in the absence of hindsight. Neither the Petition nor Dr. Williams specifies why the behaviors they expect would result from their combinations would have been improvements. Petitioner has not articulated a reason, with rational underpinning, to combine Rezvani-446, Rezvani-875, and Skulley with Harada.

In sum, because Harada does not supply the limitation missing from Rezvani-446, Rezvani-875, and Skulley and because Petitioner has not articulated a reason, with rational underpinning, to combine Rezvani-446, Rezvani-875, and Skulley with Harada, Petitioner has not proved, by a preponderance of the evidence, that claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24,

26, and 28 would have been obvious over Rezvani-446, Rezvani-875, Skulley, and Harada.

G. Ground 1C: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, and Hind

Petitioner challenges claims 10 and 38 as unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, Skulley, and Hind. Pet. 40–42. Claims 10 and 38 depend from claim 1 and claim 11, respectively, and both recite that the remote, network-connected server transmits firmware upgrades to the headphone assembly. Ex. 1001, 19:36–38, 22:63–65.

1. Hind

Hind generally discloses “[m]ethods, systems and computer program products which provide secure updates of firmware (i.e., data stored in a programmable memory device of a processing system).” Ex. 1019, code (57). Hind explains that “[m]any devices today” include “software instructions embedded in the device.” Ex. 1019, 1:23–25. This “software” is “often called firmware because of its persistent association with the device hardware operations.” *Id.* at 1:26–28. “[I]t was historically placed in read-only memory (ROM) and was activated when the device was powered on.” *Id.* at 1:28–30. Hind explains that over time, “it was recognized that firmware, like other forms of software, might be subject to coding mistakes and the over the lifetime of the device there was a need to modify the functional characteristics of the device, for example, to adapt it to a new target environment.” *Id.* at 1:29–33.

Hind states that “[t]he extensive increase in network connectivity in recent years has resulted in an increase in the number of firmware-driven

devices that allow personality updates,” even though these updates may present “security problems.” *Id.* at 1:44–48.

Hind distributes “firmware updates,” which may include “corresponding certificates associated with a firmware update.” *Id.* at 18:46–51. “[S]ervers or other such devices known to those of skill in the art” may provide the firmware updates over the “Internet or an intranet” to “updateable devices” that “may be any type of computing device capable of carrying out some or all of the operations described” in Hind. *Id.* at 18:51–64, Fig. 10. Hind teaches that its “invention” applies to “wireless stereo headphones” with a “microprocessor” to receive such “secure[] upgrade[s]” “by means of a microcode download transmitted wirelessly from, for example, the Internet.” *Id.* at 19:40–47.

2. Discussion

Petitioner relies on Hind as disclosing communicating firmware to a device, such as wireless stereo headphones, through a network connection. Pet. 40 (citing Ex. 1019, 1:23–25, 1:40–44, 18:51–64, 19:40–53, Fig. 10; Ex. 1003 ¶¶ 235–240). Petitioner also provides reasons, supported with the testimony of Dr. Williams, for why one of ordinary skill in the art would have configured, with a reasonable expectation of success, the processor in the combination of Rezvani-446, Rezvani-875, and Skulley to receive firmware updates from the server. *Id.* at 40–42 (citing Ex. 1019, 1:23–55, 19:40–57; Ex. 1097 ¶¶ 4, 26–28; Ex. 1016 ¶¶ 19–21, 33–37; Ex. 1003 ¶¶ 241–246).

Patent Owner argues that one of the passages from Hind cited by Petitioner discloses that a pair of wireless headphones could be securely upgraded via a *microcode* download. PO Resp. 56 (citing Ex. 1019, 19:40–47). According to Patent Owner, however, neither Petitioner nor its experts

provides any insight or explanation as to how a microcode download satisfies the claimed firmware upgrades. *Id.* at 56–57 (citing Pet. 40–41; Ex. 1003 ¶ 246).

In its Reply, Petitioner argues that “[m]icrocode” is another name for “firmware.” Pet. Reply 33 (citing Ex. 1143, 1:13–15 (“microcode[] alternatively called firmware”); Ex. 1144, 10:14–15 (“microcode (i.e., firmware)”); Ex. 1152 ¶¶ 73–76). Relying on record evidence, Petitioner argues that “[t]his is consistent with Hind’s explanation that firmware ‘*control[s]*’ a device’s ‘computational elements . . . to give the device its *functional* personality’ ([Ex. 1019,] 1:23–29) and that microcode likewise ‘*control[s]*’ a digital signal processor’ and adds ‘new functions’ to it ([*id.* at 19:37–47).” Pet. Reply 33. Dr. Williams testifies that “[s]imply put, ‘microcode’ is a form of ‘firmware’ and “conventionally refers to a type of firmware that is intended for a device’s processor, and POSAs understood ‘microcode’ to be synonymous with ‘firmware.’” Ex. 1152 ¶ 74 (citing Ex. 1143, 1:13–15; Ex. 1144, 10:14–15). We credit Dr. Williams’ uncontroverted testimony on this point, which we find well-reasoned and supported by evidence of record.

Furthermore, Petitioner argues “setting aside ‘microcode’ in Hind Column 19, Grounds 1C and 1H also relied on Hind’s numerous disclosures of downloading ‘*firmware*’ to devices from a server, and the benefits of doing so.” Reply 33 (citing Pet. 40–42; Ex. 1003 ¶¶ 238–246). As one example, Dr. Williams relies on Hind’s statement that “firmware, like other forms of software, might be subject to coding mistakes and that over the lifetime of the device there was a need to *modify the functional characteristics* of the device, for example, to *adapt it to a new target environment*.” Ex. 1003 ¶ 243 (quoting Ex. 1019, 1:23–54). In addition,

“[a]s Hind taught, firmware allowed for the device manufacturer to add ‘performance enhancements or . . . to accommodate new parameters not available at the time of distribution of the product’ and repair ‘coding errors.’” *Id.* (quoting Ex. 1019, 1:34–37, 19:54–57). In view of the above, we agree with Petitioner that Hind contains several disclosures of downloading firmware.

In its Sur-reply, Patent Owner argues that “[n]either the Petition nor Williams’s original declaration (BOSE-1003) opined on the relationship between microcode and firmware,” so that Petitioner’s Reply argument and evidence is improper. Sur-reply 22. Contrary to this argument, the Petition provides ample notice that Petitioner relies on microcode as firmware (and also, Hind’s firmware teachings in general as noted above). For example, the following statement in the Petition directly ties microcode and firmware together:

Hind recognizes remote-*firmware-updates* were compatible with “wireless stereo headphones containing a microprocessor [and] memory” (as in Rezvani-Rezvani-Skulley) by “means of a *microcode* download transmitted wirelessly from” servers accessible over a wireless connection to the Internet, and Rezvani-Rezvani-Skulley’s headset already had functionality to exchange software with the WPM server via its Internet connection.

Pet. 41–42 (emphases added) (citing Ex. 1019, 19:40–47; Ex. 1016 ¶¶ 19–21, 33–37; Ex. 1097 ¶¶ 26–28; Ex. 1003 ¶ 246).

Based on the foregoing discussion, Patent Owner’s arguments do not undermine Petitioner’s persuasive showing that Hind teaches the firmware upgrades required by claims 10 and 38. In addition, as discussed above (*see supra* § II.E.4.c), Patent Owner’s objective indicia of obviousness (evidence of commercial success) are entitled to little weight because Patent Owner

has not shown a nexus between the claimed invention and the alleged commercial success.

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Rezvani-446, Rezvani-875, Skulley, and Hind renders obvious claims 10 and 38.

H. Ground 1D: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, and Davis

Petitioner challenges claims 29–31, 34, 36, and 53 as unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, Skulley, and Davis. Pet. 42–47. Claims 29 and 53 depend from claim 11 and claim 1, respectively, and further recite that each of the earphones comprises (1) “an adjustable, curved hanger bar that sits upon an upper external curvature of a user’s ear, behind the an upper portion of an auricula of the user’s ear, when the headphone assembly is worn by the user,” and (2) “a body connected to the hanger bar, wherein the earphone extends from the body into the user’s ear when the headphone assembly is worn by the user.” Ex. 1001, 21:53–61, 24:42–50. Claims 30, 34, and 36 depend from claim 29 and add the same subject matter as claims 2, 3, and 8, respectively. *Id.* at 21:62–22:3, 22:32–39, 22:50–52. Claim 31 depends from claim 30 and adds the same subject matter as claim 8. *Id.* at 22:4–11.

1. Davis

Davis relates to communications headsets, particularly “self-supporting, monaural headsets containing a microphone and a receiver.” Ex. 1033, 1:5–7. The invention of Davis is intended to “overcome[] the limitations of conventional headset designs by providing a lightweight, self-supporting headset which can be comfortably and securely fitted to a wide range of users without undue individual attention.” *Id.* at 2:45–49.

Figure 2 is reproduced below.

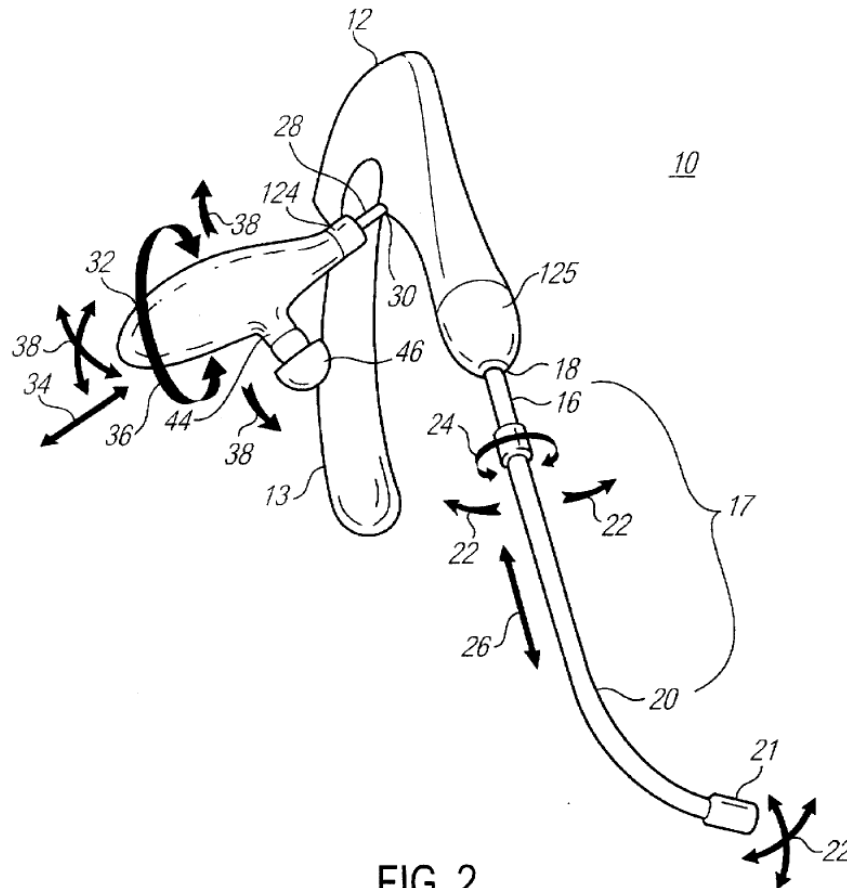


Figure 2 is a front view of one embodiment of a headset. Ex. 1033, 4:17, 4:39–41. Headset 10 includes headset enclosure 12 having arcuate earhook 13. *Id.* at 4:41–42. Voice transmitter 17 and receiver enclosure 32 are coupled to headset enclosure 12. *Id.* at 4:45–46. An attachment member, such as ball tube 28, couples receiver enclosure 32 to headset enclosure 12 to facilitate the angular adjustment of receiver enclosure 32 relative to headset enclosure 12. *Id.* at 4:49–57. Receiver enclosure 32 further includes earbud 46. *Id.* at 6:32–35. Voice transmitter 17 includes voice tube arm 16 voice tube 20 having audio filter cap 21 at its distal end. *Id.* at 5:21–22, 5:36–37.

2. Discussion

Petitioner relies on Davis as disclosing in-the-ear type earphones having an arcuate ear hook or hanger bar 13. Pet. 42–43 (citing Ex. 1033, 2:45–3:12, 7:59–63, 8:48–65, Figs. 1, 8; Ex. 1005 ¶¶ 152–155). Petitioner argues that one of ordinary skill in the art would have had reasons to implement Rezvani-Rezvani-Skulley’s headset with Davis’s in-ear, hanger bar design. *Id.* at 43. Namely, Petitioner argues that Skulley explicitly suggests the modification by disclosing that Davis describes exemplary “in-the-ear” type earphones (*id.* at 44 (citing Ex. 1017, 1:25–27; Ex. 1005 ¶ 145)) and Davis independently suggests the modification because its design “is ‘lightweight, self-supporting’ and ‘can be comfortably and securely fitted to a wide range of users’” (*id.* (citing Ex. 1033, 2:45–51; Ex. 1005 ¶¶ 133, 146–151)). Petitioner contends that one of ordinary skill in the art “would reasonably have expected success in this combination because Skulley identifies Davis as describing an exemplary in-ear design and Davis teaches ‘the shape and size of both the headset enclosure and the receiver could vary’ to accommodate different locations for ‘the electronics.’” *Id.* (citing Ex. 1033, 9:35–10:5; Ex. 1003 ¶¶ 253–257; Ex. 1005 ¶¶ 138, 155).

Petitioner argues that the Rezvani-Rezvani-Skulley-Davis combination implements the form-factor of Davis’s Figure 1 and thus includes earhook 13 corresponding to the curved hanger bar. *Id.* at 45 (citing Ex. 1033, 2:45–3:12, 8:48–65; Ex. 1005 ¶¶ 152–153). Petitioner also argues that “this form-factor has a ‘body . . . 12’ connected to ‘earhook 13’ (hanger bar), and ‘earbud (earphone) 46,’ extending from body 12 that can be ‘positioned within the concha of the [user’s] ear’ when worn by a user.” *Id.* at 46 (citing Ex. 1033, 6:35–48, 8:53–9:34, Figs. 1, 8; Ex. 1017, 1:25–28;

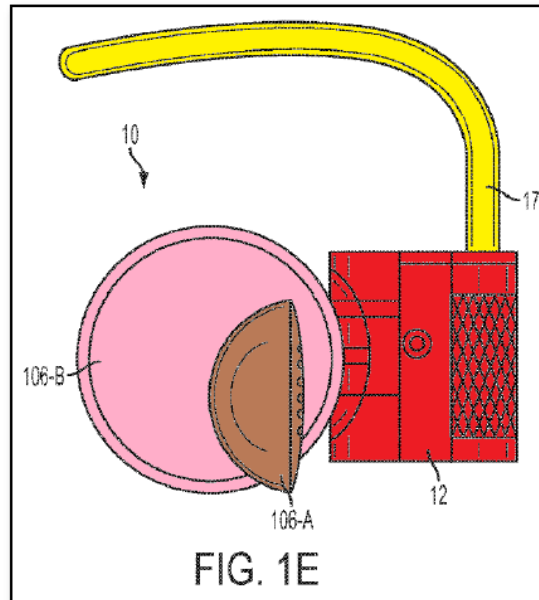
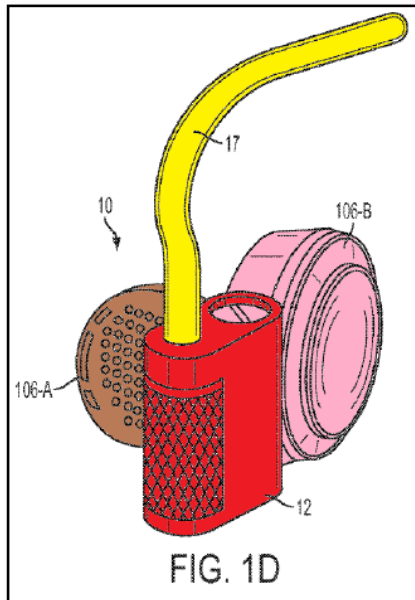
Ex. 1005 ¶ 154). Petitioner thus asserts that the proposed combination discloses the limitations of claims 29–31, 34, 36, and 53. *Id.* at 46–47.

Patent Owner argues that claims 29 and 53 require that the earphone extends from the body, but

Davis’s earbud 46, which Petitioner alleges is the earphone of claims 29 and 53, does not extend from Davis’s headset enclosure 12, which Petitioner alleges is the body of claims 29 and 53. Instead, Davis’s earbud 46 extends from the receiver enclosure 32, which is separate from Davis’s headset enclosure.

PO Resp. 53–54 (citing Ex. 2024 ¶ 75; Ex. 2025 ¶ 21; Ex. 1033, 4:49–53, 6:32–35, Figs. 1–3B, 6–9). For this reason, Patent Owner asserts that Petitioner’s proposed combination fails to disclose all limitations of claim 29 (and thus claims 30, 31, and 34 depending therefrom) and claim 53. *Id.* at 54 (citing Ex. 2024 ¶¶ 74–79).

Petitioner disputes this argument, contending that Patent Owner “interprets ‘extends from’ narrowly to exclude indirect extensions—but the ’025 patent specification forecloses that interpretation.” Pet. Reply 31. In support of this contention, Petitioner points to Figures 1D–1E of the ’025 patent, which Petitioner asserts depict the only hanger-bar embodiment of the ’025 patent. *Id.* (citing Ex. 1001, 3:66–4:20; Ex. 1141, 133–135). Petitioner submits annotated versions of Figures 1D–1E of the ’025 patent, which we reproduce below.



Pet. Reply 32. For these annotated versions of the figures, Petitioner adds (1) yellow overlay to hanger bar 17, (2) red overlay to body 12, (3) brown overlay to speaker element 106-A, and (4) pink overlay to speaker element 106-B. *Id.* Referring to these annotated Figures, Petitioner asserts that speaker 106-A is disclosed as the element that extends into the user's ear, but "speaker 106-A does not extend **directly** from body 12, but rather **indirectly** because speaker 106-B (pink) separates the two." *Id.* at 31 (citing Ex. 1001, 4:5–9). In Petitioner's view, "[c]onstruing 'extends from' to require direct connection would improperly exclude the '025 patent's sole hanger-bar embodiment." *Id.*

Patent Owner argues that this argument mischaracterizes the '025 patent. PO Sur-reply 21. In particular, Patent Owner contends that claim 1, from which claims 29 and 53 depend, recites that each of the claimed earphones "comprises an acoustic transducer," where the indefinite article "an" means that the claim covers earphones having one or more acoustic transducers or speakers. *Id.* (citing *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000)). According to Patent Owner, "[t]he 'one

or more speakers’ are the ‘dual speaker’ element comprising speaker 106-A (brown) and speaker 106-B (pink). This dual speaker element extends *directly* from the body 12 (red) and into the user’s ear. Particularly, speaker 106-A (brown) extends into the user’s ear.” *Id.* (citing Ex.1001, 4:5–7). In view of this assertion, Patent Owner argues that “the ’025 Patent’s intrinsic evidence reinforces that the speaker is directly connected to the body.” *Id.*

Patent Owner’s argument relies on the premise that the “earphone” of claims 29 and 53 comprises both speaker 106-A and speaker 106-B. Claims 29 and 53, however, require the “earphone” (not an individual speaker) to extend into the user’s ear. Thus, under Patent Owner’s premise, both speakers 106-A and 106-B would have to extend into the ear. However, the ’025 patent discloses that speaker 106-A is sized to fit into the user’s ear but speaker 106-B is not. As such, we are not persuaded that the earphone must be directly connected to the body. Instead, we are persuaded by Petitioner’s argument that the earphone of claims 29 and 53 can extend indirectly from the body in view of the ’025 patent’s disclosure of speaker 106-A extending indirectly from body 12.

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Rezvani-446, Rezvani-875, Skulley, and Davis renders obvious claims 29–31, 34, 36, and 53.

I. Ground 1E: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, Davis, and Harada

Petitioner challenges claims 32, 33, 35, and 37 as unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, Skulley, Davis, and Harada. Pet. 47. Claims 32, 33, 35, and 37 are Signal Strength claims, and Petitioner asserts that “[f]or the same reasons POSAs would have

implemented Rezvani-Rezvani-Skulley in view of Harada to make the claimed transition (§VI.A.2.c *supra*), POSAs would have implemented Rezvani-Rezvani-Skulley-Davis in view of Harada to make this transition, and thus Rezvani-Rezvani-Skulley-Davis-Harada meets claims 32–33, 35, and 37.” *Id.* (citing Ex. 1003 ¶¶ 274–283).

We have determined, however, that the arguments and evidence set forth by Petitioner did not prove, by a preponderance of the evidence, that Signal Strength claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, and 28 would have been obvious over Revani-446, Rezvani-875, Skulley, and Harada. *See supra* § II.F.2. For the same reasons discussed above, therefore, we determine that Petitioner has not proved, by a preponderance of the evidence, that claims 32, 33, 35, and 37 would have been obvious over Rezvani-446, Rezvani-875, Skulley, Davis, and Harada.

J. Ground 1F: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, Davis, and Oh

Petitioner challenges claims 40–43, 46, and 48 as unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, Skulley, Davis, and Oh. Pet. 47–54. Claim 40 depends from claim 1 and further recites that each of the earphones comprises “at least one acoustic transducer; a wireless communication circuit; a body portion that sits at least partially in an ear of the user when the headphone assembly is worn by the user; and an elongated portion that extends from the body portion.” Ex. 1001, 23:1–8. Claim 41 depends from claim 40 and adds “a docking station for charging at least one of the first and second earphones.” *Id.* at 23:9–11.

1. Oh

Oh relates to wireless stereo earphones that fit into the ears. Ex. 1099 ¶¶ 1, 19. Figure 1 of Oh is reproduced below.

[Fig. 1]

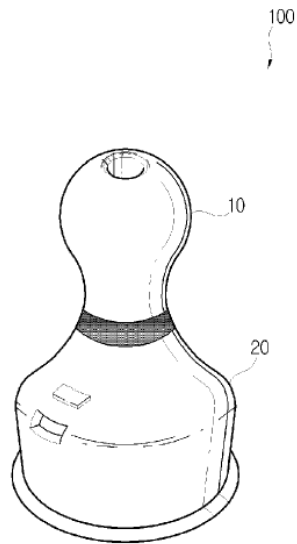


Figure 1 above illustrates wireless earphone 100 that is shaped as an earplug and includes inserting unit 10 for placing in an ear of a user and main body 20, which includes an antenna, battery, speaker, and a signal processing circuit for performing a wireless headset function. Ex. 1099 ¶ 30. Each earphone has the same hardware configuration. *Id.* ¶ 41.

Figure 5 is reproduced below.

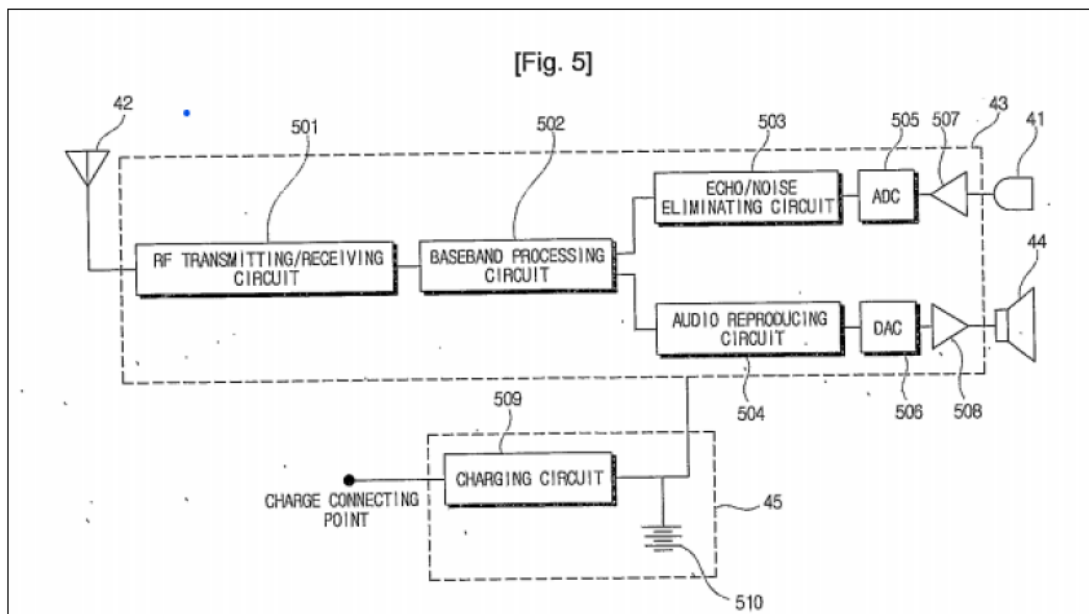


Figure 5 illustrates the hardware circuit in each earphone, including antenna 42, speaker 44, signal processing circuit 43, battery 45 with rechargeable battery 510 and charging circuit 509, RF transmitting/receiving circuit 501 (e.g., for WLAN/Wi-Fi or Bluetooth), baseband processing circuit 502, and echo eliminating circuit 503, which may include a digital signal processor (“DSP”). Ex. 1099 ¶¶ 34, 37, 41, 44, 50, 52.

Oh teaches charging its earphones by inserting them into mounting unit 201 connected to the “mobile communication terminal,” e.g., mobile phone. Ex. 1099 ¶¶ 17, 33, 38, 50. Oh also describes a DSP with an “echo eliminating circuit.” *Id.* ¶ 40. The DSP “determines when the received audio[] signal is mixed with a transmitting audio signal [during a call], and eliminates the mixed signal.” *Id.*

2. Discussion

Petitioner relies on Oh as disclosing in-the-ear type earphones having a speaker and an RF transmitting/receiving circuit. Pet. 48 (citing Ex. 1099 ¶¶ 1, 19, 34, 37, 41, 52, Fig. 5; Ex. 1005 ¶¶ 158–163). Also, Petitioner argues that Oh teaches charging its earphones in a docking station. *Id.* at 48–49 (citing Ex. 1099 ¶¶ 17, 33, 38, 50 Figs. 1, 4; Ex. 1003 ¶¶ 285–292).

Petitioner argues that, in view of Oh’s teachings, one of ordinary skill in the art would have had reasons to implement the Rezvani-Rezvani-Skulley-Davis “earbud” (discussed above in connection to Ground 1D) as a true-wireless design, where “each earbud (1) included Rezvani-875’s subsystem components (e.g., speaker, transceiver, battery), (2) had no wire connecting the earphones, and (3) was dockable (e.g., in handset 704-2 or MP3 player) to recharge the batteries.” *Id.* at 50 (citing Ex. 1003 ¶¶ 293–295). Namely, Petitioner argues that Oh taught that a true-wireless design was beneficial due to economic benefits such as needing to purchase only

one replacement if one earphone is lost or broken. *Id.* at 50 (citing Ex. 1099 ¶ 41; Ex. 1003 ¶ 296; Ex. 1005 ¶¶ 77–80). Petitioner also argues that Oh teaches that charging earphones in a docking station makes them easy to carry and protects them from being lost. *Id.* (citing Ex. 1099 ¶ 19; Ex. 1003 ¶ 296; Ex. 1005 ¶ 161). In addition, Petitioner argues that the proposed combination would have been applying “a known technique (true-wireless earphones charged via a docking station) to improve similar devices (headphones) in the same way (providing true-wireless headphones with a convenient place to be stored and charges).” *Id.* at 50–51 (citing Ex. 1099 ¶¶ 19, 41; Ex. 1003 ¶ 297; Ex. 1005 ¶¶ 77–80).

Petitioner contends that one of ordinary skill in the art would reasonably have expected success in this combination because “implementing earphones with identical components and charging them in a docking station were well-known techniques within a POSA’s ordinary skill, and Davis teaches its earbuds are detachable and their ‘shape and size . . . could vary.’” *Id.* at 51 (citing Ex. 1033, 9:35–50; Ex. 1099 ¶ 33; Ex. 1003 ¶ 298; Ex. 1005 ¶¶ 138, 155, 162–163).

Regarding the limitations of claim 40, Petitioner argues that the earphones in this combination each comprise at least one acoustic transducer to output a stereo audio signal. *Id.* (citing Ex. 1099 ¶¶ 41–42; Ex. 1016 ¶ 20; Ex. 1003 ¶ 299; Ex. 1005 ¶ 47). Petitioner also argues that the combination “uses Davis’s earbud form-factor in a true-wireless design, which Oh taught includes a wireless communication circuit (here, Rezvani-875’s RF system 220) in each earphone.” *Id.* at 51–52 (citing Ex. 1099 ¶¶ 12, 82; Ex. 1003 ¶ 300; Ex. 1005 ¶¶ 77–80). Petitioner contends that Davis’s earbud 46 is the claimed “body portion that sits at least partially in an ear of the user when the headphone assembly is worn by the user.” *Id.* at 52 (citing Ex. 1033,

6:34–35, 7:59–63, Fig. 3b; Ex. 1005 ¶¶ 152–154). According to Petitioner, Davis’s receiver enclosure 32, earhook 13, and voice tube 20 are elongated portions that extend from the body portion (i.e., earbud 46). *Id.* at 53 (citing Ex. 1033, 6:34–35, 7:9–10, 7:59–63, Fig. 3b; Ex. 1005 ¶ 154).

First, Patent Owner argues that one of ordinary skill in the art “would not understand Davis’s earbud to be the ‘body portion’ because the ‘body portion’ is the central or main portion of the earphone. PO Resp. 43 (citing Ex. 2024 ¶ 60). This argument, however, is not persuasive because it is predicated on Patent Owner’s proposed construction of the “body portion,” which we decline to adopt for the reasons set forth above. *See supra* § II.D.2. Instead, we determine that, consistent with our construction of “body portion” as “a portion or section of the earphone that forms a body,” Davis’s earbud 46 satisfies the claimed “body portion that sits at least partially in an ear of the user when the headphone assembly is worn by the user.”

Patent Owner also presents arguments asserting that the claims would not have been obvious if Davis’s receiver enclosure 32 is considered the “body portion.” PO Resp. 43–47. These arguments, however, are not applicable or persuasive because Petitioner does not assert that receiver enclosure 32 is considered the “body portion.”

Patent Owner further contends that, if earbud 46 is considered the “body portion,” neither Davis’s earhook 13 or voice tube 20 would satisfy the claimed “elongated portion” because neither element extends from the earbud 46. *Id.* at 47. This argument is not persuasive because Petitioner does not rely on only earhook 13 or voice tube 20 as elongated portions; instead, Petitioner identifies three alternative structures of Davis: receiver enclosure 32, earhook 13, and voice tube 20. Pet. 53; *see also* Pet. Reply

24–25 (arguing that receiver enclosure 32 is an “elongated portion” that extends from earbud 46). We agree with Petitioner that receiver enclosure 32 satisfies the “elongated portion” as claimed.

Next, Patent Owner argues that Oh “teaches against Petitioner’s proposed combinations for Ground 1F-1H because Oh stresses miniaturization of the earbuds, which is incompatible with Davis’s large headset.” PO Resp. 49 (citing Ex. 2024 ¶ 70). Patent Owner contends that Oh describes difficulties in miniaturizing wireless headphones or headset because of microphone placement. *Id.* (citing Ex. 1099 ¶¶ 14, 35). Accordingly, Patent Owner asserts that one of ordinary skill in the art “would not be motivated to also use Davis’s large (i.e., non-miniaturized) headset design, with its voice tube that extends toward the user’s mouth, in light of Oh’s teaching to miniaturize the earbuds by using a bone-conducting sensor in the earhole portion of the earbud.” *Id.* at 50 (citing Ex. 2024 ¶¶ 68–70).

Petitioner responds by arguing that Patent Owner’s argument misrepresents the proposed combination. Pet. Reply 27. Specifically, Petitioner argues that the proposed combination does not include Oh’s components and relies on Oh only for teaching the benefits of true-wireless headphones. *Id.* (citing Pet. 50). We agree that the proposed combination does not rely on, or even suggest, incorporating Oh’s teachings of miniaturization of earbuds. Therefore, we determine that Oh does not teach away from the proposed combination.

In addition, as discussed above (*see supra* § II.E.4.c), Patent Owner’s objective indicia of obviousness (evidence of commercial success) are entitled to little weight because Patent Owner has not shown a nexus between the claimed invention and the alleged commercial success.

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Rezvani-446, Rezvani-875, Skulley, Davis, and Oh renders obvious claim 40. Regarding claims 41–43, 46, and 48, which depend from claim 40, Petitioner provides reasonable and detailed explanations, supported by the testimony of Dr. Williams and Dr. Casali, indicating where in the references the limitations of these claims are disclosed. Pet. 54. Other than its contentions regarding objective indicia of non-obviousness (discussed above), Patent Owner offers no particular arguments with respect to these dependent claims.

We have considered the evidence and arguments of record, including Patent Owner’s contentions regarding objective indicia of non-obviousness (entitled to little weight, as discussed above), and determine that Petitioner has demonstrated by a preponderance of the evidence that the combination of Rezvani-446, Rezvani-875, Skulley, Davis, and Oh renders obvious claims 41–43, 46, and 48 for the reasons discussed in the Petition and as supported by the testimony of Dr. Williams and Dr. Casali.

K. Ground 1G: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, Davis, Oh, and Harada

Petitioner challenges claims 44, 45, 47, 49, and 50 as unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, Skulley, Davis, Oh, and Harada. Pet. 54–55. Claims 44, 45, 47, 49, and 50 are Signal Strength claims, and Petitioner asserts that “[f]or the same reasons POSAs would have implemented Rezvani-Rezvani-Skulley in view of Harada to make the claimed transition Ground 1B), POSAs would have implemented Rezvani-Rezvani-Skulley-Davis-Oh in view of Harada to make

this transition” and “Rezvani-Rezvani-Skulley-Davis-Oh-Harada thus meets claims 44–45, 47, and 49–50.” *Id.* at 55 (citing Ex. 1003 ¶¶ 314–325).

We have determined, however, that the arguments and evidence set forth by Petitioner did not prove, by a preponderance of the evidence, that Signal Strength claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, and 28 would have been obvious over Revani-446, Rezvani-875, Skulley, and Harada. *See supra* § II.F.2. For the same reasons discussed above, therefore, we determine that Petitioner has not proved, by a preponderance of the evidence, that claims 44, 45, 47, 49, and 50 would have been obvious over Rezvani-446, Rezvani-875, Skulley, Davis, Oh, and Harada.

L. Ground 1H: Asserted Obviousness Based on Rezvani-446, Rezvani-875, Skulley, Davis, Oh, and Hind

Petitioner challenges claim 51 as unpatentable under 35 U.S.C. § 103(a) based on Rezvani-446, Rezvani-875, Skulley, Davis, Oh, and Hind. Pet. 55. Claims 51 depends from claim 40 and, similar to claims 10 and 38 addressed above in Ground 1C, adds that the remote, network-connected server transmits firmware upgrades to the headphone assembly. Ex. 1001, 24:33–35. Petitioner asserts that “[f]or the same reasons POSAs would have implemented Rezvani-Rezvani-Skulley in view of Hind to receive firmware upgrades from the WPM server (Ground 1C), POSAs would have implemented Rezvani-Rezvani-Skulley-Davis-Oh in view of Hind to receive firmware upgrades from that server” and “Rezvani-Rezvani-Skulley-Davis-Oh-Hind thus meets claim 51.” Pet. 55 (citing Ex. 1003 ¶¶ 326–329).

For this ground, Patent Owner relies on the same arguments made in connection with claims 10 and 38 in Ground 1C. PO Resp. 56–57; PO Sur-reply 22–24. As discussed above, we find these arguments unpersuasive and determine that Petitioner’s reliance on Hind was sufficient to establish by a

preponderance of the evidence that that claims 10 and 38 are unpatentable. *See supra* § II.G.2. For the same reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Rezvani-Rezvani-Skulley-Davis-Oh-Hind renders obvious claim 51.

M. Ground 2A: Asserted Obviousness Based on Schrager and Goldstein

Petitioner asserts that claims 1–3, 6, 8, 10–13, 16, 18, 38–43, 46, 48, 51, 52, 54, and 56 are unpatentable under 35 U.S.C. § 103(a) based on Schrager and Goldstein. Pet. 56–76. Patent Owner provides arguments addressing this asserted ground of unpatentability. PO Resp. 20–23. We first summarize the references and then address the parties’ contentions.

1. Schrager

Schrager discloses “a portable electronic device which can include one or more of an AM/FM radio, a music player, a short distance radio, a voice memo pad, a cellular telephone, a global positioning system (GPS) receiver, an AM/FM radio interface, and a transponder.” Ex. 1101, 4:55–59. Each of these units can be operated in a hands-free manner via voice commands. *Id.* at 4:60–62. Figure 1 of Schrager is reproduced below.

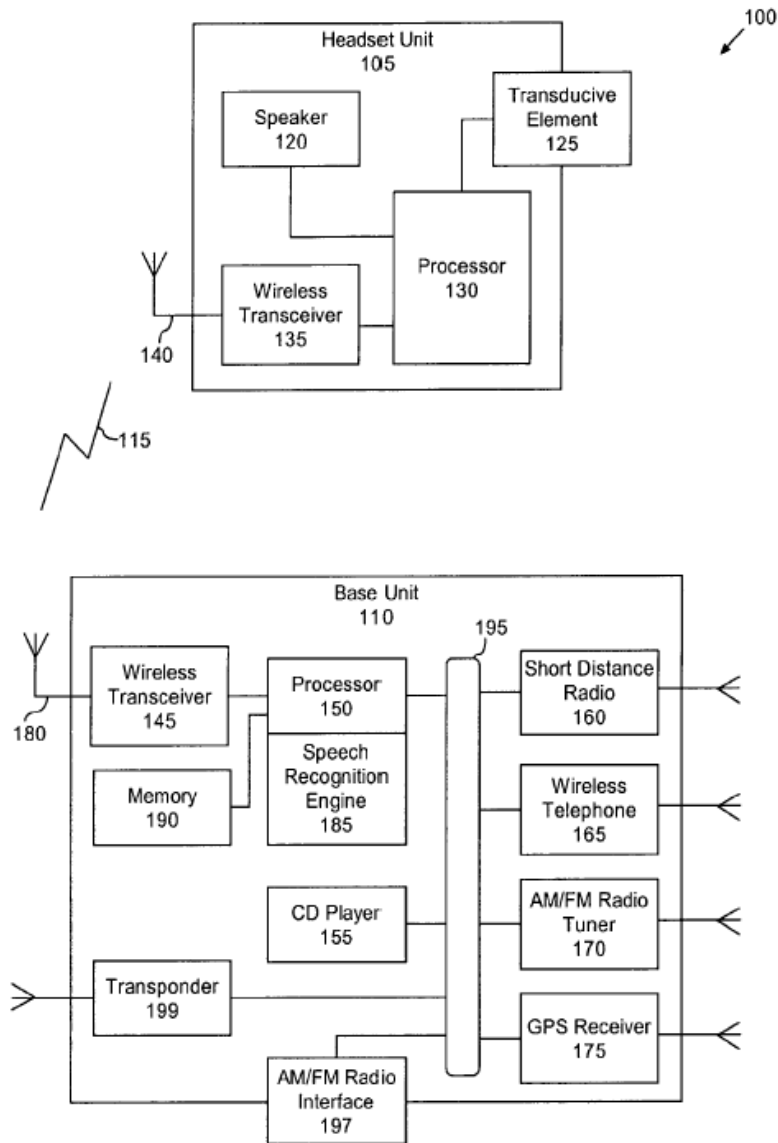


FIG. 1

Figure 1 is a schematic diagram illustrating voice-controlled multimedia and communications device 100. *Id.* at 4:38–40, 4:66–5:2. Device 100 includes headset unit 105 and base unit 110 that communicate via wireless communication link 115. *Id.* at 5:2–5. Headset unit 105 includes speaker 120, transductive element 125, processor 130, wireless transceiver 135, and antenna 140. *Id.* at 5:5–8. Processor 130 can receive audio signals, control signals, and other data from base unit 110 through wireless transceiver 135.

Id. at 5:44–46. Wireless transceiver 135 can communicate with base unit 110 using any of a variety of short-range wireless protocols, including Bluetooth technology. *Id.* at 6:12–16.

Base unit 110 can include wireless transceiver 145, processor 150, and compact disc (“CD”) player 155 or other music source. *Id.* at 6:62–64. Wireless transceiver 145 can be matched to the headset unit’s wireless transceiver 135 through antenna 180. *Id.* at 6:67–7:3.

2. Goldstein

Goldstein relates to the storage and recall of audio content, such as the storage and playing of music or verbal content on a system built into a headphone. Ex. 1026 ¶ 2. “At least one exemplary embodiment is directed to a system for Personalized Services delivered to a Personal Audio Assistant incorporated within an earpiece (e.g., earbuds, headphones).” *Id.* ¶ 17. The Personal Audio Assistant (PAA) is incorporated into an earpiece or headphone system and is capable of digital audio playback. *Id.* ¶ 18. Audio content is seamlessly downloaded to the Personal Audio Assistant and is managed from a “Server system.” *Id.* ¶ 19.

Figure 1 of Goldstein is reproduced below.

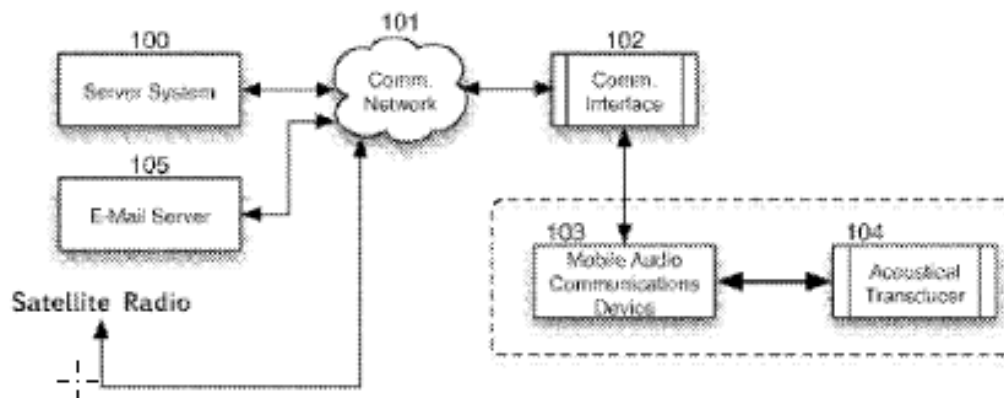


Fig. 1

Figure 1 illustrates the connection between earpiece device 103, 104 and communication network 101. *Id.* ¶¶ 6, 65. Communication network 101 can

be operatively connected to server system 100, e-mail server 105, or both via a wired or wireless connection. *Id.* ¶ 65.

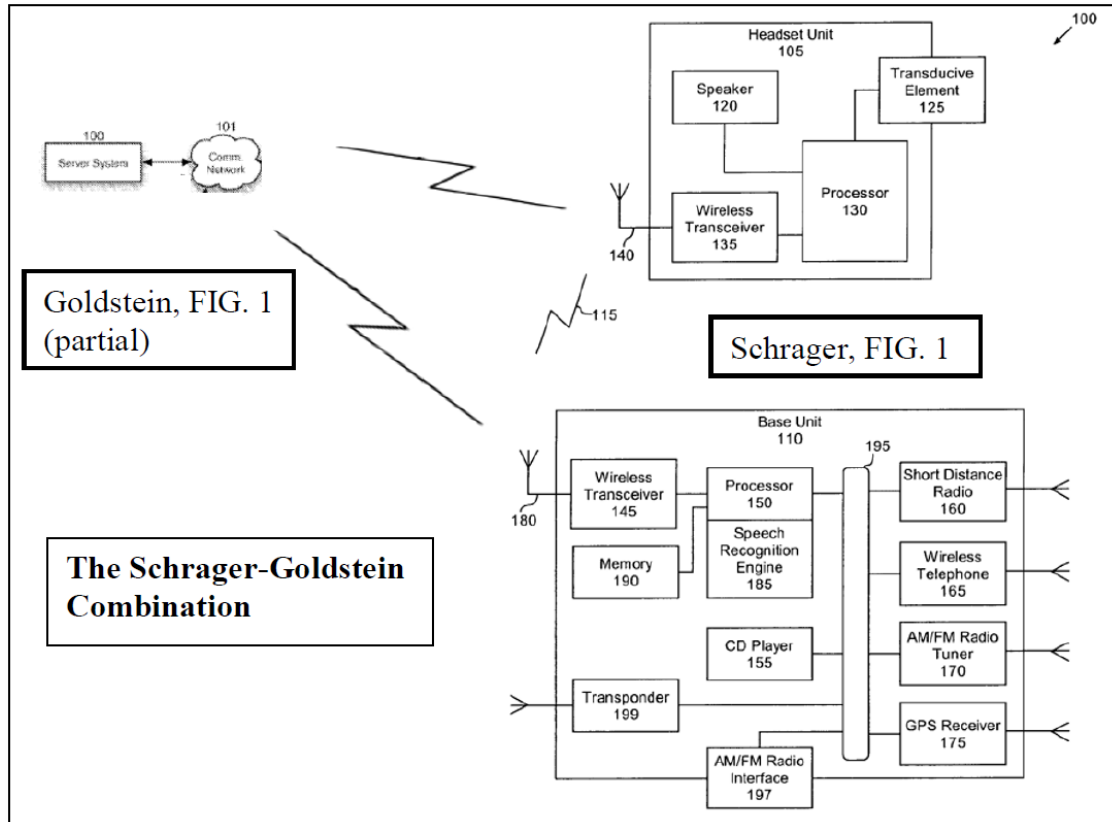
3. *Independent Claim 1*

Petitioner contends that the proposed combination of Schrager and Goldstein discloses the limitations of claim 1. Pet. 64–76. Patent Owner provides arguments addressing this asserted ground of unpatentability. PO Resp. 20–23.

a) *The Combination of Schrager and Goldstein*

Petitioner argues that one of ordinary skill in the art would have “had reason to add Goldstein’s PAA software to Schrager’s headset and base unit so that each communicated with Goldstein’s remote server to (1) purchase/download/stream audio files, and (2) obtain firmware updates, per Goldstein.” Pet. 60 (citing Ex. 1003 ¶ 340). First, Petitioner argues that Schrager’s system is intended to play audio content such as music and “Goldstein provides a convenient way to control/stream/download/subscribe to/purchase music on a remote server offering a larger, updated content library compared to typical handheld devices.” *Id.* at 61 (citing Ex. 1003 ¶ 341). Second, Petitioner argues that Goldstein teaches providing firmware updates to the headphone, and firmware updates had known benefits such as enhancing the headphone’s functionality and security. *Id.* (citing Ex. 1026 ¶¶ 19, 82; Ex. 1003 ¶ 342). Third, Petitioner argues that the proposed combination would have yielded predictable results and would have improved Schrager’s system by permitting the headset and base unit to obtain music and firmware from a remote server, as taught by Goldstein. *Id.* (citing Ex. 1003 ¶¶ 343–344).

Petitioner provides an illustration, reproduced below, intended to depict the system resulting from the proposed combination of Schrager and Goldstein.



Pet. 63. This illustration combines Figure 1 of Schrager on the right with a portion of Figure 1 of Goldstein (i.e., Goldstein's server system 100 and communication network 101) on the left, and shows Schrager's headset unit 105 and base unit 110 both to be in wireless communication with Goldstein's server system 100 and communication network 101.

Petitioner also contends that one of ordinary skill in the art would have a reasonable expectation of success in the combination because the proposed modification "would have been routine, requiring only ordinary skill as both [Schrager's headset and base unit] already include processors, memory, and wireless communication circuits suitable for storing/executing

Goldstein’s PAA-software.” Pet. 62 (citing Ex. 1003 ¶345; Ex. 1101, 5:5–8, 6:62–67, 7:24–28). Petitioner adds that Goldstein discloses that “the PAA software ‘can be totally incorporated with . . . *any portable technology* which incorporates . . . protocols’ like ‘IEEE 802.11, Bluetooth,’ and various cellular standards.” *Id.* (quoting Ex. 1026 ¶ 113; Ex. 1003 ¶ 345).

Petitioner’s proposed reasons to combine Schrager and Goldstein are realistic, have rational underpinning, and are supported by expert testimony, which we find persuasive and credit. Thus, Petitioner’s evidence shows that a skilled artisan would have had reasons to combine the teachings of Schrager and Goldstein and would have had a reasonable expectation of success in doing so.

b) The Limitations of Claim 1

Petitioner contends that Schrager discloses that base unit 110 is a portable electronic device that includes CD player 155 or an MP3 player. Pet. 64–65 (citing Ex. 1101, 7:38–46; Ex. 1003 ¶ 350). Thus, Petitioner argues that the MP3 player is a digital audio player as claimed. *Id.* at 65 (citing Ex. 1101, 2:16–21, 7:38–44; Ex. 1003 ¶ 350). Petitioner also contends that Schrager’s headset 105 is a headphone assembly that is separate from and in wireless communication with base unit 110, and, thus, the MP3 player. *Id.* at 66–67 (citing Ex. 1101, 2:46–48, 5:5–8; Ex. 1003 ¶¶ 352–354; Ex. 1005 ¶ 165). In addition, Petitioner contends that Schrager’s headset 105 includes all of the components of the headphone assembly recited in claim 1. *Id.* at 67–72.

Regarding the claimed remote, network-connected server that is in wireless communication with the mobile, digital audio player, Petitioner contends that the combination of Schrager and Goldstein includes Goldstein’s server system, “which is a ‘remote, network-connected server’

because it is a separate device that communicates over a remote communication network 101 (*e.g.*, Internet).” *Id.* at 72 (citing Ex. 1026 ¶¶ 65, 76–78; Ex. 1003 ¶ 363).

Petitioner also argues that the Schrager’s base unit 110 uses a Bluetooth connection (*i.e.*, an ad hoc wireless communication link) to transmit digital audio content. *Id.* at 74 (citing Ex. 1101, 7:38–44; Ex. 1003 ¶ 367). In addition, Petitioner argues that, as taught by Goldstein, “another headphone assembly having Goldstein’s PAA software (also a mobile DAP) transmits digital audio content (*e.g.*, stored MP3s) to Schrager-Goldstein’s headphone assembly via an ad hoc (*e.g.*, Bluetooth) wireless communication link.” *Id.* (citing Ex. 1026 ¶ 87; Ex. 1003 ¶ 368). Petitioner then asserts that this digital audio content that is playable by the headset’s earphones. *Id.* at 75 (citing Ex. 1101, 5:11–14; . 1026 ¶ 78; Ex. 1003 ¶ 370; Ex. 1005 ¶¶ 165–166).

Last, Petitioner argues that the combination includes Schrager’s control buttons that allow a user to initiate transmission of a request to the server. *Id.* at 75–76 (citing Ex. 1101, 5:31–6:18, 6:37–42; Ex. 1026 ¶¶ 78, 83–84, 100, 104, Figs. 1–2; Ex. 1003 ¶¶ 371–372; Ex. 1005 ¶ 177).

Based on Petitioner’s evidence, including the testimony of Dr. Williams and Dr. Casali, we agree with Petitioner that, if Schrager and Goldstein are combined in the manner proposed by Petitioner, the combination teaches each limitation of claim 1.

c) Patent Owner’s Arguments

Patent Owner argues that Goldstein discloses “connecting the Personal Audio Assistant to the Server *or* connecting the Personal Audio Assistant to other Personal Audio Assistants (peer-to-peer behavior).” PO Resp. 21–22 (quoting Ex. 1026 ¶ 76). Thus, according to Patent Owner,

“Goldstein teaches that Schrager’s base unit, the purported DAP of claim 1, when equipped with Goldstein’s PAA software, pursuant to Petitioner’s theory, can connect to either the Server or to another PAA device (e.g., Schrager’s headset),” but “could not connect simultaneously to both the server and to Schrager’s headset as required by claim 1.” *Id.* at 22 (citing Ex. 2024 ¶ 45). For similar reasons, Patent Owner also argues that “Schrager’s headset, when equipped with Goldstein’s PAA software, could not connect simultaneously to both the Server and to the Schrager’s PAA-software-equipped base unit.” *Id.* at 23 (citing Ex. 2024 ¶ 45).

Petitioner asserts that this argument misapprehends the Schrager-Goldstein combination and misreads Goldstein. Pet. Reply 9. Specifically, Petitioner argues that “in Schrager-Goldstein, the DAP (Schrager’s base unit 110) connects to the combination’s headphone (Schrager’s headset unit 105) using *Schrager’s* pre-existing ‘wireless communication link 115,’ and to Goldstein’s Server using Goldstein’s PAA software.” *Id.* (citing Pet. 62–63, 68–73).

We find Petitioner’s argument persuasive. Petitioner’s illustration (reproduced above) that depicts the proposed combination of Schrager and Goldstein shows headset unit 105 and base unit 110 in communication via wireless communication link 115. *See* Pet. 63. The Petition states that, in the Schrager-Goldstein combination, the headset *continues* to communicate wirelessly with base unit 110 (*id.* at 62–63), thereby implying that headset unit 105 and base unit 110 maintain communication via wireless communication link 115. Furthermore, the Petition states that Schrager-Goldstein’s headphone assembly includes an antenna that receives signals from base unit 110 over wireless communication link 115. *Id.* at 68–69.

In its Sur-reply, Patent Owner asserts that Petitioner’s reply argument is misleading because its “original theory is that the purported DAP ‘include[s] appropriately tailored versions of Goldstein’s PAA software to communicate wirelessly with (i) Goldstein’s Server System . . . and (ii) other headsets having Goldstein’s PAA software.’” PO Sur-reply 9–10 (quoting Ex. 1003 ¶ 347; citing Pet. 62–63)²⁸ (alteration in original). This argument is not persuasive because the quoted language states that the headset and base unit of the combination each include Goldstein’s PAA software to communicate wirelessly with the server and *other* headsets having Goldstein’s PAA software. Ex. 1003 ¶ 347; *see also* Pet. 63. Neither the Petition nor Dr. Williams indicates that the headset of the combination uses Goldstein’s PAA software to communicate wirelessly with the base unit. Ex. 1003 ¶ 347; Pet. 63.

In addition, as discussed above (*see supra* § II.E.4.c), Patent Owner’s objective indicia of obviousness (evidence of commercial success) are entitled to little weight because Patent Owner has not shown a nexus between the claimed invention and the alleged commercial success.

d) Conclusion

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Schragar and Goldstein renders obvious claim 1.

4. Claims 40–43, 46, 48, and 51

Claim 40 depends from claim 1 and further recites that each of the earphones comprises “at least one acoustic transducer; a wireless

²⁸ Patent Owner actually cites to ¶ 327 of Exhibit 1003, but the quoted language appears in ¶ 347.

communication circuit; a body portion that sits at least partially in an ear of the user when the headphone assembly is worn by the user; and an elongated portion that extends from the body portion.” Ex. 1001, 23:1–8. Claims 42, 43, 46, 48, and 51 depend from claim 40.

Regarding the limitations of claim 40, Petitioner argues that the earphones in the Schrager-Goldstein combination each comprise at least one acoustic transducer to provide stereo audio sound. Pet. 82 (citing Ex. 1101, 5:11–14; Ex. 1003 ¶ 404; Ex. 1005 ¶¶ 165–166). Petitioner also argues that the combination uses Goldstein’s form-factors including an “intra-aural” design in which each earpiece has a wireless communication circuit. *Id.* (citing Ex. 1026 ¶¶ 48, 66, Fig. 2). Petitioner contends that “as illustrated in Goldstein’s Figure 5A, each earbud has ‘a body portion that sits at least partially in an ear of the user when the headphone assembly is worn by the user,’ as claimed.” *Id.* at 82–83 (citing Ex. 1026, Fig. 5A; Ex. 1005 ¶¶ 182–183). According to Petitioner, because Goldstein’s intra-aural designs include a behind-the-ear (“BTE”) implementation, one of ordinary skill in the art would have understood this to include the claimed “elongated portion.” *Id.* at 83 (citing Ex. 1026 ¶ 43; Ex. 1005 ¶ 183; Ex. 1003 ¶¶ 406–407).

Patent Owner argues that “even assuming that a BTE implementation includes an elongated portion, Petitioner does not explain that the BTE implementation would even have the ‘body portion’ of the claim 40, much less that the allegedly ‘elongated portion’ would extend from the ‘body portion.’” PO Resp. 51. Patent Owner adds that Goldstein’s description of Figure 5A does not mention a BTE implementation and it is hindsight to say one of ordinary skill in the art would have been motivated to add a BTE

hanger bar to the in-the-canal (“ITC”) earphone of Figure 5A. *Id.* at 51–52 (citing Ex. 1026 ¶ 69).

We agree with Patent Owner. Although ¶ 43 of Goldstein does disclose that “an intra-aural device” could comprise a BTE form factor, Petitioner fails to explain sufficiently why this disclosure would have caused one of ordinary skill in the art to understand earpiece 500 in Figure 5A to include the claimed “elongated portion.” What the Petition actually proposes requires taking elements from two different form-factors: the ITC earpiece of Figure 5A and the BTE device mentioned in ¶ 43. The problem is that Petitioner fails to adequately explain why or how one of ordinary skill in the art would modify earpiece 500 to include a hanger bar. Hanger bars may have been conventional, as Petitioner and Dr. Casali assert, but we find that Petitioner has not articulated a reason, with rational underpinning, for modifying earpiece 500 to include a hanger bar or any other elongated portion.

In its Reply, Petitioner contends it “argued that POSAs knew how to add a ***conventional*** earhook to Goldstein’s Figure 5A earbud, and that such an earhook would have included claim 40’s ‘elongated portion.’” Pet. Reply 30 (citing Pet. 83). We disagree that the Petition asserts *adding* a conventional earhook to the ITC earpiece of Figure 5A. Instead, the Petition states only that persons having ordinary skill in the art understood that a BTE implementation “includes, or conventionally included,” an elongated portion extending from the body portion. Pet. 83. In any event, as discussed above, Petitioner does not articulate an adequate rationale for adding an earhook to the ITC earpiece of Figure 5A.

For the foregoing reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the combination of Schragger and

Goldstein renders obvious claim 40 or claims 41–43, 46, 48, and 51 depending therefrom.

5. *Claims 2, 3, 6, 8, 10–13, 16, 18, 38, 39, 52, 54, and 56*

Petitioner provides reasonable and detailed explanations, supported by the testimony of Dr. Williams and Dr. Casali, indicating where in the references the limitations of claims 2, 3, 6, 8, 10–13, 16, 18, 38, 39, 52, 54, and 56 are disclosed by Schrager and Goldstein. Pet. 76–81, 84. Other than its contentions regarding objective indicia of non-obviousness (entitled to little weight, as discussed above), Patent Owner offers no particular arguments with respect to these dependent claims.

We have considered the evidence and arguments of record and determine that Petitioner has demonstrated by a preponderance of the evidence that the combination of Schrager and Goldstein renders obvious claims 2, 3, 6, 8, 10–13, 16, 18, 38, 39, 52, 54, and 56 for the reasons discussed in the Petition and as supported by the testimony of Dr. Williams and Dr. Casali.

N. Ground 2B, 2D, and 2F: Signal Strength Claims

Petitioner challenges claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 44, 45, 47, 49, and 50 as unpatentable under 35 U.S.C. § 103(a) based on Schrager, Goldstein, and Harada; claims 32, 33, 35, and 37 as unpatentable under 35 U.S.C. § 103(a) based on Schrager, Goldstein, Davis, and Harada; and claims 23, 24, 26, and 28 as unpatentable under 35 U.S.C. § 103(a) based on Schrager, Goldstein, Skulley, and Harada. Pet. 84–86, 88–89, 91. All of these claims are Signal Strength claims. For these grounds, Petitioner relies on the teachings of Harada in the same manner as the teachings were relied on in Ground 1B. *See id.* at 85, 88, 91. During the trial, both parties relied on the same Signal Strength arguments for all grounds challenging

Signal Strength claims. *See* PO Resp. 32–40; Pet. Reply 16–20; PO Sur-reply 10–14. As discussed above, we determine that Harada does not teach that it would have been obvious to implement a headphone assembly to transition from one digital audio source to another based on a signal strength. *See supra* § II.F.2. For the same reasons we find that Harada does not supply the limitation missing from Schrager and Goldstein and Petitioner has not articulated a reason, with rational underpinning, to combine Schrager and Goldstein with Harada. Accordingly, we determine that Petitioner has not proved, by a preponderance of the evidence, that claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 44, 45, 47, 49, and 50 would have been obvious over Schrager, Goldstein, and Harada, that claims 32, 33, 35, and 37 would have been obvious over Schrager, Goldstein, Davis, and Harada, or that claims 23, 24, 26, and 28 would have been obvious over Schrager, Goldstein, Skulley, and Harada.

O. Ground 2C: Asserted Obviousness Based on Schrager, Goldstein, and Davis

Petitioner challenges claims 29–31, 34, 36, 53, and 55 as unpatentable under 35 U.S.C. § 103(a) based on Schrager, Goldstein, and Davis.²⁹ Pet. 87–88. For this ground, Petitioner relies on the teachings of Davis in the same manner as the teachings were relied on in Ground 1D. *See id.* at 87.

Patent Owner relies on the same arguments addressed above in connection with Ground 1D. *See* PO Resp. 53–56; PO Sur-reply 20–21. For

²⁹ Although listed in the heading for this ground on page 87 of the Petition, claim 51 is not addressed in this ground. Pet. 87–88. Accordingly, we do not include it in our analysis.

the reasons addressed above, these arguments are unavailing, and we find Petitioner's showing persuasive. *See supra* § II.H.2.

Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Schrager, Goldstein, and Davis renders obvious claims 29–31, 34, 36, 53, and 55.

P. Ground 2E: Asserted Obviousness Based on Schrager, Goldstein, and Skulley

Petitioner challenges claims 20–22, 25, 27, 39, and 54–56 as unpatentable under 35 U.S.C. § 103(a) based on Schrager, Goldstein, and Skulley. Pet. 89–91.

Other than its contentions regarding objective indicia of non-obviousness (entitled to little weight, as discussed above), Patent Owner does not offer any arguments specifically addressing this challenge to claims 20–22, 25, 27, 39, and 54–56. *See generally* PO Resp. We need not set forth formal findings as to the undisputed assertions by Petitioner that claims 20–22, 25, 27, 39, and 54–56 would have been obvious in view of the combination of Schrager, Goldstein, and Skulley. *See LG Elecs.*, 759 F. App'x at 925; *see also* Paper 16, 8 (cautioning Patent Owner “that any arguments not raised in the response may be deemed waived”).

Nevertheless, we have reviewed Petitioner's contentions for this ground and determine that Petitioner has shown by a preponderance of the evidence that the combination of Schrager, Goldstein, and Skulley renders obvious claims 20–22, 25, 27, 39, and 54–56.

III. CONCLUSION³⁰

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–3, 6, 8, 11–13, 16, 18, 20–22, 25, 27, 39, 52, 54–56	103(a)	Rezvani-446, Rezvani-875, Skulley	1–3, 6, 8, 11– 13, 16, 18, 20– 22, 25, 27, 39, 52, 54–56	
4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28	103(a)	Rezvani-446, Rezvani-875, Skulley, Harada		4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28
10, 38	103(a)	Rezvani-446, Rezvani-875, Skulley, Hind	10, 38	
29–31, 34, 36, 53	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis	29–31, 34, 36, 53	
32, 33, 35, 37	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Harada		32, 33, 35, 37

³⁰ 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).

40–43, 46, 48	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Oh	40–43, 46, 48	
44, 45, 47, 49, 50	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Oh, Harada		44, 45, 47, 49, 50
51	103(a)	Rezvani-446, Rezvani-875, Skulley, Davis, Oh, Hind	51	
1–3, 6, 8, 10–13, 16, 18, 38–43, 46, 48, 51, 52, 54, 56	103(a)	Schrager, Goldstein	1, 2, 3, 6, 8, 10–13, 16, 18, 38, 39, 52, 54, 56	40–43, 46, 48, 51
4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 44, 45, 47, 49, 50	103(a)	Schrager, Goldstein, Harada		4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 44, 45, 47, 49, 50
29–31, 34, 36, 53, 55	103(a)	Schrager, Goldstein, Davis	29–31, 34, 36, 53, 55	
32, 33, 35, 37	103(a)	Schrager, Goldstein, Davis, Harada		32, 33, 35, 37
20–22, 25, 27, 39, 54– 56	103(a)	Schrager, Goldstein, Skulley	20–22, 25, 27, 39, 54–56	
23, 24, 26, 28	103(a)	Schrager, Goldstein, Skulley, Harada		23, 24, 26, 28

Overall Outcome			1–3, 6, 8, 10–13, 16, 18, 20–22, 25, 27, 29–31, 34, 36, 38–43, 46, 48, 51–56	4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 32, 33, 35, 37, 44, 45, 47, 49, 50
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IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–3, 6, 8, 10–13, 16, 18, 20–22, 25, 27, 29–31, 34, 36, 38–43, 46, 48, and 51–56 of U.S. Patent No. 10,206,025 B2 are determined to be unpatentable;

FURTHER ORDERED that claims 4, 5, 7, 9, 14, 15, 17, 19, 23, 24, 26, 28, 32, 33, 35, 37, 44, 45, 47, 49, and 50 of U.S. Patent No. 10,206,025 B2 are not determined 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.

IPR2021-00612
Patent 10,206,025 B2

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