

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PLANTRONICS, INC., POLYCOM, INC.,
Petitioner,

v.

KOSS CORPORATION,
Patent Owner.

IPR2022-01503
Patent 10,757,498 B2

Before PATRICK R. SCANLON, DAVID C. McKONE, and
GREGG I. ANDERSON, *Administrative Patent Judges*.

SCANLON, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Plantronics, Inc., and Polycom, Inc., (collectively “Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–26 of U.S. Patent No. 10,757,498 B2 (Ex. 1001, “the ’498 patent”). Koss Corporation (“Patent Owner”) waived the filing of a preliminary response. Paper 7 (“Waiver of Preliminary Response”).¹

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2021). To institute an *inter partes* review, we must determine that the information presented in the Petition shows “a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons explained below, we institute an *inter partes* review of claims 1–26 based on the grounds set forth in the Petition.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner states Plantronics, Inc., Polycom, Inc., and HP Inc. are the real parties in interest. Pet. 2; Paper 6 (“Petitioner’s Updated Mandatory Notice”), 1. Patent Owner identifies itself as the real party in interest. Paper 4 (“Mandatory Notices by Patent Owner”), 1.

B. *Related Matters*

The parties identify the following proceedings as related matters involving the ’498 patent: *Koss Corp. v. Plantronics, Inc.*, Case No. 4:21-

¹ Accordingly, Patent Owner has no stated position at this stage of the proceeding on the issues discussed below.

cv-03854 (N.D. Cal.); and *Koss Corp. v. Skullcandy, Inc.*, Case No. 2:21-cv-00557 (D. Utah). Pet. 2; Paper 4, 1; Paper 6, 1.

The parties also identify the following *inter partes* review proceedings involving patents related to the '498 patent: IPR2021-00297 (challenging U.S. Patent No. 10,368,155); IPR2021-00305 (challenging U.S. Patent No. 10,506,325); IPR2021-00381 (challenging U.S. Patent No. 10,491,982); IPR2021-00612 (challenging U.S. Patent No. 10,206,025); IPR2021-00680 (challenging U.S. Patent No. 10,469,934); and IPR2022-01504 (challenging U.S. Patent No. 10,848,852). Pet. 2; Paper 4, 1–2; Paper 6, 1.

In addition, Patent Owner advises us that the final written decisions involving U.S. Patent Nos. 10,506,325, 10,491,982, and 10,368,155 are on appeal to the United States Court of Appeals for the Federal Circuit in appeals captioned *Koss Corp. v. Vidal*, Case No. 2022-2091 (Fed. Cir.) (for U.S. Patent Nos. 10,506,325 and 10,491,982) and *Koss Corp. v. Bose Corp.*, Case 2022-2090 (Fed. Cir.) (for U.S. Patent No. 10,368,155). Paper 4, 1; *see also* Paper 6, 1 (identifying the same appeals).

C. The '498 Patent

The '498 patent, titled “System with Wireless Earphones,” issued August 25, 2020, with claims 1–26, and claims priority to several applications dating to April 7, 2008. Ex. 1001, codes (45), (54), (60), (63), 1:5–43, 18:5–20:55. The '498 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 2:3–7. In some embodiments there may be two discrete wireless earphones, one in each ear. *Id.* at 3:50–51.

We reproduce Figure 2A of the '498 patent below.

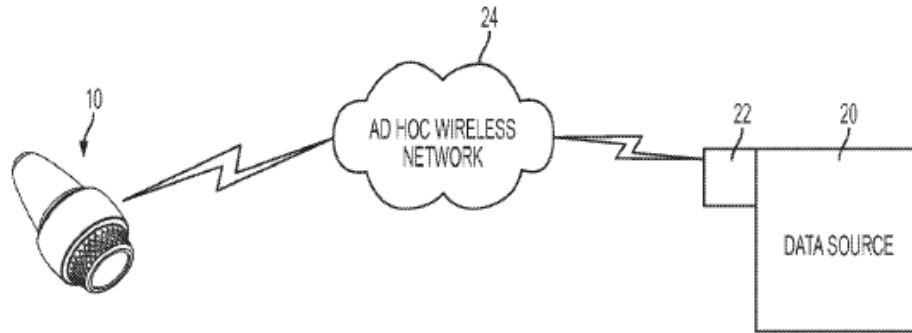


FIG. 2A

Figure 2A is a block diagram illustrating a communication mode for a wireless earphone. *Id.* at 2:32–34, 4:26–29. In particular, Figure 2A shows data source 20 in communication with earphone 10 over ad hoc wireless network 24. *Id.* at 4:29–31. Data source 20 may be a digital audio player (DAP), such as an MP3 player, an iPod, or a laptop computer. *Id.* at 4:35–39. “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 4:59–64.

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 5:58–64, Fig. 2D. Alternatively, host server 40 may transmit to earphone 10 a network address for streaming digital audio content server 70. *Id.* at 5:64–67, 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 6:1–4. Content server 70 may be an Internet radio station server. *Id.* at 6:5–

6. In addition, content server 70 may stream digital audio that it has received from data source 20 via networks 30b, 42. *Id.* at 6:9–15.

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

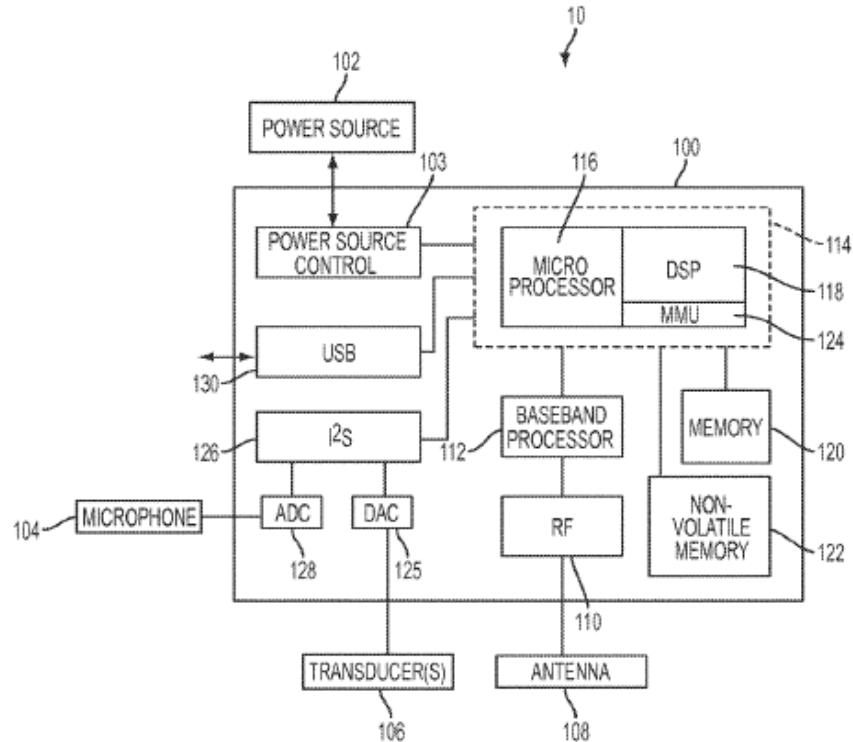


FIG. 3

Figure 3 is a block diagram of a wireless earphone. *Id.* at 2:35–36, 6:30–31. Earphone 10 includes transceiver circuit 100, power source 102, microphone 104, acoustic transducer 106 (e.g., a speaker), and antenna 108. *Id.* at 6:31–37. Transceiver circuit 100, power source 102, and acoustic transducer 106 may be housed within the body of earphone 10. *Id.* at 6:37–40. Microphone 104 and antenna 108 are external to the body. *Id.* at 6:40–42. Transceiver circuit 100 can be implemented as a single integrated circuit, such as a system-on-chip (“SOC”). *Id.* at 6:45–47.

D. Challenged Claims

Petitioner challenges claims 1–26, of which claim 1 is independent. Claim 1 is reproduced below.

1. Headphones comprising:

a pair of first and second wireless earphones to be worn simultaneously by a user, wherein each of the first and second wireless earphones comprises at least one acoustic transducer for producing audible sound;

wherein the first wireless earphone comprises a first system-on-chip (SOC), wherein the first SOC comprises:

a first wireless communication circuit for receiving and transmitting wireless signals;

a first processor circuit connected to the first wireless communication circuit; and

a first memory unit in communication with the first processor circuit for storing firmware updates pushed to the headphones from a remote network server;

wherein the first wireless communication circuit is for receiving audio content streamed wirelessly to the headphones from a first audio content source, such that the first and second wireless earphones play the audio content streamed wirelessly to the headphones; and

wherein the first processor circuit is configured to, in response to detecting an incoming wireless communication to the headphones:

mute the audio content streamed wirelessly to the headphone being played by the headphones; and

output audio of the incoming wireless communication circuit via the first and second wireless earphones.

Ex. 1001, 18:5–32.

E. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §	References/Basis
1–4, 7, 17, 19–22, 24–26	103	Rosener, ² Dua, ³ Price, ⁴ Nakagawa ⁵
5, 6, 8–14, 18	103	Rosener, Dua, Price, Nakagawa, Huddart ⁶
15	103	Rosener, Dua, Price, Nakagawa, Huddart, McIntosh ⁷
16, 23	103	Rosener, Dua, Price, Nakagawa, Feder ⁸

Pet. 4. Petitioner relies on the Declaration of Chris Kyriakakis, Ph.D. (Ex. 1002, “the Kyriakakis Declaration”) to support its challenges.

III. ANALYSIS

A. 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 v. John Deere Co.*, 383 U.S. 1, 17 (1966). 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

² US 2008/0076489 A1, published Mar. 27, 2008 (Ex. 1004).

³ US 2006/0258289 A1, published Nov. 16, 2006 (Ex. 1003).

⁴ US 2006/0026304, published Feb. 2, 2006 (Ex. 1008).

⁵ US 2003/0223604 A1, published Dec. 4, 2003 (Ex. 1010).

⁶ US 7,627,289 B2, issued Dec. 1, 2009 (Ex. 1006).

⁷ US 6,278,786 B1, issued Aug. 21, 2001 (Ex. 1005).

⁸ US 2004/0142693 A1, published July 22, 2004 (Ex. 1017).

level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Relying on the Kyriakakis Declaration, Petitioner alleges a person having ordinary skill in the art “would have had at least a bachelor’s degree in . . . an academic area emphasizing electrical engineering, computer science, or a similar discipline, and at least two years of experience in wireless communications across short-distance or local-area networks.” Pet. 9 (citing Ex. 1002 ¶ 23).

Based on our review of the record before us, we determine that Petitioner’s stated level of ordinary skill in the art is reasonable because it appears consistent with the evidence of record, including the asserted prior art. Accordingly, for the purposes of this Decision, we adopt Petitioner’s definition.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the district-court-type standard, as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). 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*, 415 F.3d at 1313–14. 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. *See id.* at 1317–19.

Petitioner asserts construction is unnecessary and does not propose any term for construction. Pet. 9–10 (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be

construed that are in controversy, and only to the extent necessary to resolve the controversy.”)).

On the present record, we do not discern a need to construe explicitly any claim language because doing so would have no effect on our analyses below of Petitioner’s asserted grounds and will not assist in resolving the present controversy between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms that . . . are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs.*, 200 F.3d at 803).

C. Overview of Asserted Prior Art

1. Rosener

Rosener describes wireless systems with “first and second data sinks having no physical or electrical connection therebetween.” Ex. 1004, Abstract. The data sinks can be, for example, wireless earphones. *Id.* ¶ 2. Each wireless earphone may be in the form of an earbud designed to fit into the concha of the pinna of the user’s ear, and includes a housing containing a speaker, a radio-frequency (RF) transceiver, and a battery. *Id.* ¶ 30.

Figure 9, reproduced below, illustrates some of the components of Rosener’s headphones:

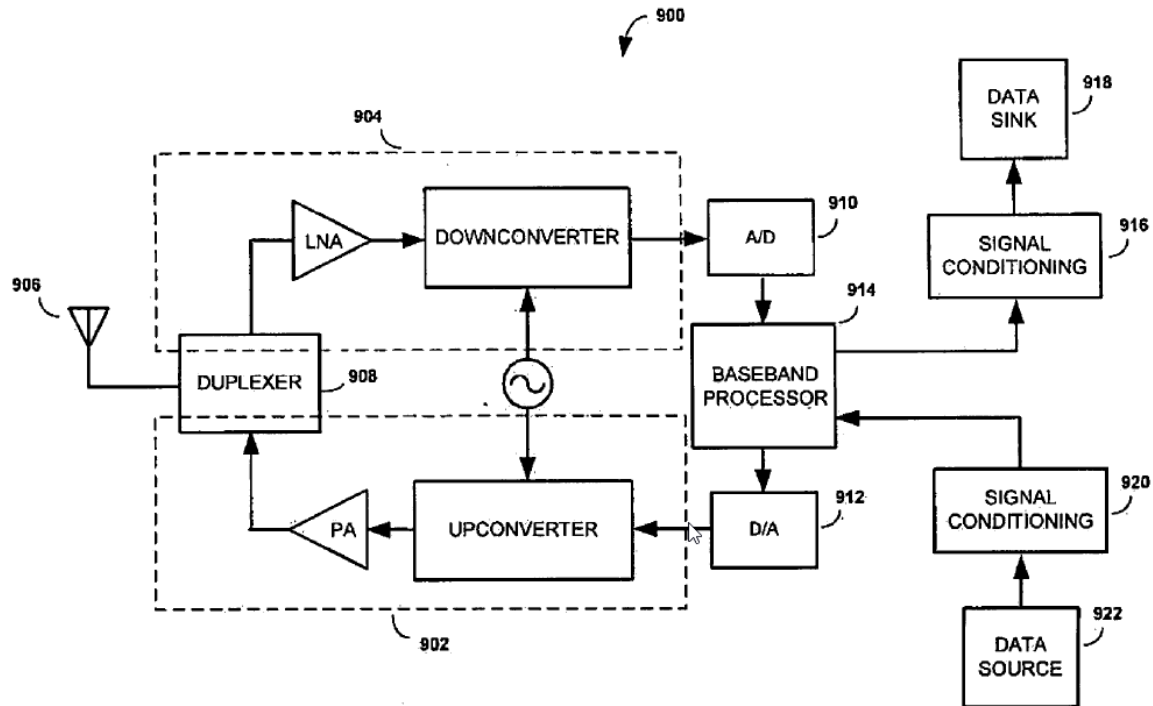


FIGURE 9

Figure 9 is a block diagram of an RF transceiver. *Id.* ¶¶ 24, 49. RF transceiver 900 includes RF transmitter portion 902, RF receiver portion 904, antenna 906, and duplexer 908. *Id.* ¶ 49. A/D converter 910 receives analog baseband signals from RF transceiver portion 904, digitizes the signals, and sends them to baseband processor 914, which, along with signal conditioning circuit 916, processes the signals into a form suitable to drive data sink (speaker) 918. *Id.* Baseband processor 914 receives data from data source 922 (e.g., a microphone) via signal conditioning circuit 920 and provides the data to RF transmitter portion 902 for transmission via antenna 906. *Id.* ¶ 50.

2. Dua

Dua describes a “wireless media system” that “includes a handheld media player (source device) capable of transmitting and receiving information over a wireless connection with other electronic devices (target

devices).” Ex. 1003 ¶ 14. Dua also describes “a method of transmitting media to a target device for viewing or listening, and using controls on the media player, or software operating therein, to alter the viewing/listening experience on the target device.” *Id.* ¶ 19. In one embodiment, “media player 100 includes a display screen and related circuitry 102 for displaying a graphical user interface that allows the user to interact with the device.” *Id.* ¶ 61.

Various components support the media player’s “wireless connectivity with external devices,” including over “Bluetooth.” Ex. 1003 ¶ 62. Dua’s “media player is particularly well suited to interface with wireless sound output devices such as wireless headphone unit 152.” *Id.* ¶ 74. In one embodiment, wireless headphone 152 “may be a Bluetooth-enabled device” having an integrated System-on-Chip assembly 361. *Id.* ¶ 116. Wireless headphones connect to the “media player” and “can stream all audio output via wireless signal 353 to the headphone unit 152.” *Id.* ¶ 123, Fig. 5 (wireless signal 353, media player 100, headphone unit 152).

3. Price

Price “relates generally to collecting data from, sending data to, and/or updating software or digital data in electronic devices.” Ex. 1008 ¶ 3. In one example, updated software code (including firmware) is retrieved by a computer from a data store on a network and delivered (wirelessly) to an electronic device. *Id.* ¶¶ 29, 38–39, Fig. 1.

4. Nakagawa

Nakagawa includes a wireless audio output apparatus 11, illustrated in Figure 1, which is reproduced below.

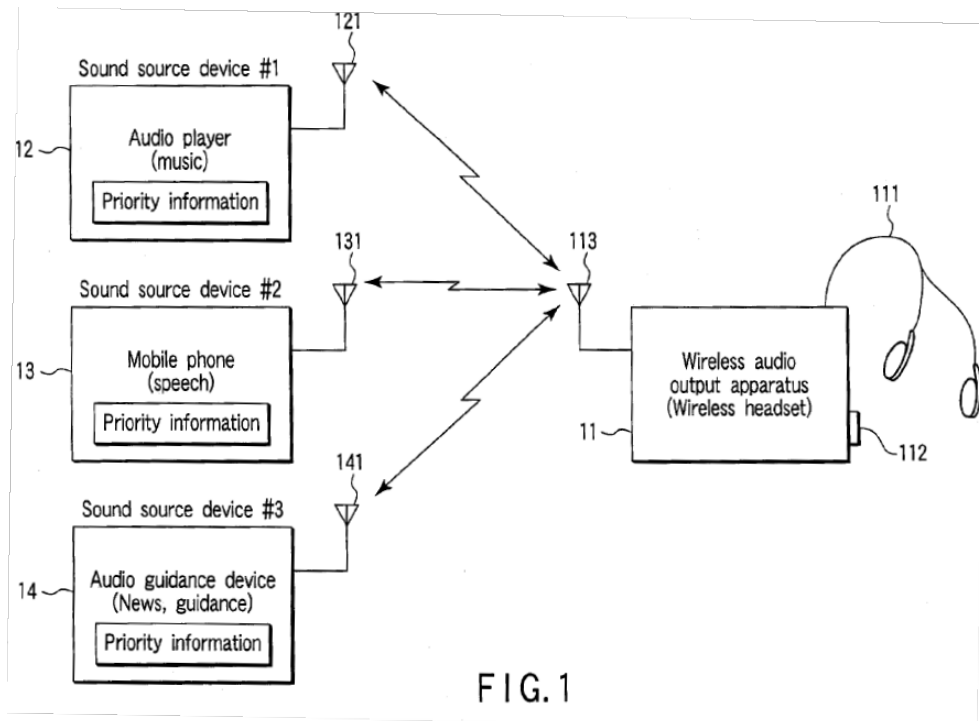


Figure 1 is a diagram showing sound source devices connected by radio to an audio output apparatus, for example a wireless headset. Ex. 1010 ¶¶ 15, 25. As shown in Figure 1, the audio output apparatus 11 receives audio data via a radio signal and generates sound that is output via a speaker or headphone 11. *Id.* ¶¶ 24–25. Sound source devices “are wireless audio transmitters that can transmit audio data representing speech, music and the like, in the form of radio signals,” which signals can be in accord with the Bluetooth™ standard. *Id.* ¶¶ 26–27. Still referring to Figure 1, Nakagawa identifies three sound source devices: a portable audio player like a CD (Compact Disc) 12; a mobile phone 13; and an audio guidance device 14. *Id.* ¶¶ 27–31, Fig. 1.

Regarding the audio player 12 and the mobile phone 13, the user can assign a priority level to each sound source device. Ex. 1010 ¶ 38. For example, if a higher priority level is given to the phone and the user is listening to the audio player, upon receiving a call, the user is “automatically

switched” by the audio output apparatus to the phone. *Id.* ¶ 39. Ending the call, and thus disconnecting the phone from the audio output device, the audio player or second sound source device is “automatically selected” again. *Id.* ¶ 42.

Similarly, if the third sound source device, the audio guidance device 14, is connected to the audio output apparatus 11, it may be given the “highest priority” among the three devices. Ex. 1010 ¶ 45. In this situation, the wireless output device is “automatically switched from the sound source device 12 or 13 to the sound source device 14” when “the headphone 111 is generating sound from the audio data transmitted from the sound source device 12 or 13.” *Id.*

Figure 3 of Nakagawa is reproduced below.

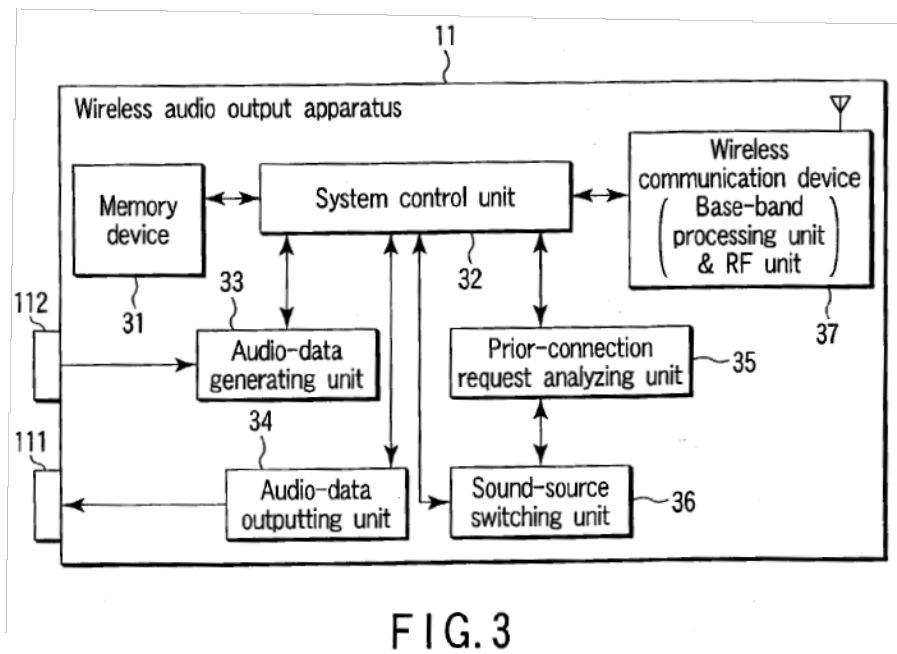


Figure 3 is a block diagram of the audio output apparatus of Figure 1. Ex. 1010 ¶¶ 17, 52. A microphone 112 is part of the mobile phone of the second sound source device and transmits speech input to a mobile phone network. *Id.* ¶ 30. The audio output apparatus 11 includes a control unit 32,

which is a processor that controls other components. *Id.* ¶ 54, Fig. 3. As shown in Figure 3, the control unit 32 “executes the programs stored in the memory device 31 to control the audio-data generating unit 33, audio data-outputting unit 34, prior-connection request analyzing unit 35, sound-source switching unit 36, and wireless communication device 37.” *Id.*

The sound-source switching unit 36 determines from which sound-source device the headset “should acquire audio data.” Ex. 1010 ¶ 58. When a sound-source device is triggered to send audio data to the headset, the device “transmits a wireless-connection request to the” headset and “starts a procedure to establish” a wireless connection with the headset. *Id.* ¶ 61. For example, the mobile phone, the second sound-source device 14, “is triggered when it receives a call from . . . the mobile phone network.” *Id.* ¶ 62. The sound-source device “generates a priority-level notifying command” indicating the device’s “priority level.” *Id.* ¶ 63. As discussed above, the “sound source is automatically switched in accordance with the priority levels.” *Id.* ¶ 72.

5. *Huddart*

Huddart’s wireless stereo headset system “may be utilized in conjunction with a variety of electronic devices, including cell phones, PDAs, and MP3 or other digital format players.” Ex. 1006, 2:18–20. Huddart’s headset and wireless earbud have “wireless communication functionality to form a wireless communication link 18.” *Id.* at 3:8–10, Fig. 1 (headset 4, earbud 6). Both the headset and wireless earbud may be Bluetooth-enabled devices. *Id.* 2:30–32, 3:58–60.

Huddart explains that “[t]he headset system may further include a charger/carrier, such as a pocket charger, including a small plastic storage case for storing the headset 4 and wireless earbud 6 for protection and

charging.” Ex. 1006, 8:25–28. “The primary charger may be a cable or docking facility connecting the pocket charger/carrier to a wall outlet or primary battery such as a car battery, allowing the headset battery, wireless earbud battery, and the storage case battery to be charged using the wall outlet or primary battery.” *Id.*, 8:52–57.

6. *McIntosh*

McIntosh discloses “[a]n active noise cancellation aircraft headset system.” Ex. 1005, Abs. McIntosh discusses the use of a “[d]igital signal processor (DSP).” *Id.* at 1:61. McIntosh explains that an “advantage of employing a DSP in the headset system of the invention is the ease with which other signal processing features may be utilized.” *Id.* at 5:50–53. “In a preferred embodiment, the DSP stores, in software, a series of menu items which the pilot can activate by pressing the ‘menu’ button 41.” *Id.* at 5:57–59. Menu items include an automatic power off that turns the unit off after a set period of time without significant noise; selecting bass or treble boost; and “selecting between a preset frequency response curve optimized for voice intelligibility and a preset frequency response curve optimized for music listening.” *Id.* at 6:3–6.

7. *Feder*

Feder “relates to wireless and wire-line communication,” specifically “a method for a mobile client to choose amongst wireless and wireline service providers.” Ex. 1017 ¶ 1. Feder discloses “a system selection algorithm (SSA)” allowing a “mobile client” to “seamlessly switch” between wireless networks based on “various criteria,” including each network’s wireless signal strength according to a “received signal strength indication (RSSI).” *Id.* ¶¶ 4, 44.

Feder explains that “seamless switching” is provided between cellular networks like 3G and wireless packet data networks like WiFi. *Id.* ¶¶ 16–17. For example, “[t]hresholds for handoff from a 3G system to an 802.11 system [both IEEE and Bluetooth systems]” are set according to “preference rules” which are reported to the SSA to determine the best available system. *Id.* ¶¶ 12, 16, 83. The SSA determines if the RSSI measurement for the WiFi network exceeds a minimum RSSI the selected WiFi “system must achieve in order to perform a handoff.” *Id.* ¶ 83. Feder compares the signal strength to “high” and “low” thresholds to avoid a “ping-pong effect,” “whereby the mobile station is repeatedly handed off between the two systems [because] the measured RSSI of the 802.11 network fluctuates above and below” a single threshold. *Id.* at ¶¶ 84–85.

D. Asserted Obviousness Based on Rosener, Dua, Price, and Nakagawa

Petitioner asserts that claims 1–4, 7, 17, 19–22, and 24–26 are unpatentable under 35 U.S.C. § 103 based on Rosener, Dua, Price, and Nakagawa. Pet. 12–50.

1. Independent Claim 1

Petitioner contends that the proposed combination of Rosener, Dua, Price, and Nakagawa discloses the limitations of claim 1. Pet. 25–38. To support its arguments, Petitioner identifies certain passages in the cited references and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* Petitioner also articulates reasons to combine the relied-upon aspects of Rosener, Dua, Price, and Nakagawa with a reasonable expectation of success. *Id.* at 20–25.

a) Reasons to Combine

First, Petitioner argues that Rosener and Dua both disclose Bluetooth wireless earphones that play audio from audio sources. Pet. 20 (citing Ex. 1002 ¶ 69; Ex. 1003 ¶¶ 115–116; Ex. 1004 ¶¶ 30, 33). Petitioner also argues that Rosener’s earphones comprise an RF transceiver, a baseband processor, and a signal conditioning circuit, but Rosener does not disclose whether these components are on the same chip or integrated circuit. *Id.* at 20–21 (citing Ex. 1002 ¶ 70; Ex. 1004 ¶¶ 39, 49–50, Fig. 9). According to Petitioner, however, “Dua expressly teaches that its wireless headphones comprise ‘System-on-Chip 361 assembly,’ which performs similar functions for communicating with a media player.” *Id.* at 21 (citing Ex. 1002 ¶ 70; Ex. 1003 ¶ 117).

Thus, Petitioner contends that one of ordinary skill in the art “would have been motivated to combine Rosener and Dua by using Dua’s SOC for the separate electronics that together perform the same functionality of communicating with an audio source as Dua’s SOC in Rosener’s earphones to improve the design of Rosener’s wireless-earphone system.” *Id.* (citing Ex. 1002 ¶ 71). To support this contention, Petitioner argues that one of ordinary skill in the art “would have been motivated to incorporate Dua’s SOC design into Rosener’s wireless earphones to provide the benefits taught by Dua of providing ultra-low-power consumption and high-quality audio output.” *Id.* (citing Ex. 1002 ¶¶ 71–72; Ex. 1003 ¶¶ 116, 118). Petitioner also argues that an ordinarily skilled artisan “would have recognized that Dua’s SOC was ideal for the small form factor of Rosener’s in-ear earphones.” *Id.* at 21–22 (citing Ex. 1002 ¶ 73).

At this stage of the proceeding, we are persuaded that Petitioner’s rationale and evidence are sufficient to show that a person of ordinary skill

in the art would have modified Rosener's earphones to the SOC design taught by Dua.

Second, Petitioner argues that one of ordinary skill in the art "would have been motivated to combine Price's wireless-firmware-upgrade system with Rosener-Dua's wireless earphones to provide a convenient way to upgrade the wireless earphones' firmware without using wires." Pet. 23 (citing Ex. 1002 ¶ 76). In particular, Petitioner contends that both Rosener and Dua discouraged using wires, thereby motivating one of ordinary skill in the art to pursue wireless alternatives, and Price discloses a firmware-upgrade system that overcomes the problems of prior upgrade systems being "laborious and inconvenient" and "infrequently performed." *Id.* (citing Ex. 1003 ¶ 6; Ex. 1004 ¶ 4; Ex. 1008 ¶¶ 6, 11). Thus, in Petitioner's view, one of ordinary skill in the art "would have been motivated to combine Price with Rosener-Dua to obtain these benefits and provide a simple, automatic, wire-free way of updating firmware for Rosener-Dua's wireless earphones." *Id.* at 23–24 (citing Ex. 1002 ¶ 77).

At this stage of the proceeding, we are persuaded that Petitioner's rationale and evidence are sufficient to show that a person of ordinary skill in the art would have modified the combination of Rosener and Dua to include Price's wireless firmware-upgrade system.

Third, Petitioner argues that one of ordinary skill in the art "would have been motivated to implement Nakagawa's audio-switching functionality in Rosener-Dua-Price to allow the user to respond to calls using the wireless earphones, including calls received while the user is already listening to other audio." Pet. 24 (citing Ex. 1002 ¶ 79). Petitioner asserts that an ordinarily skilled artisan would have recognized that this modification "would allow managing calls more conveniently, instead of

dealing with the inconvenience of having to manually stop streaming audio using the audio player and pick up a separate device (a cellular phone) to respond to an incoming call.” *Id.* (citing Ex. 1002 ¶ 79).

At this stage of the proceeding, we are persuaded that Petitioner’s rationale and evidence are sufficient to show that a person of ordinary skill in the art would have modified the combination of Rosener, Dua, and Price to include Nakagawa’s audio-switching functionality.

b) The Limitations of Claim 1

(1) Headphones comprising: a pair of first and second wireless earphones to be worn simultaneously by a user, wherein each of the first and second wireless earphones comprises at least one acoustic transducer for producing audible sound

Petitioner contends that Rosener discloses first and second wireless earphones that are worn simultaneously by a user. Pet. 25–26 (citing Ex. 1004 ¶¶ 1, 11, 30, Fig. 5; Ex. 1002 ¶ 82). Petitioner also contends that Rosener discloses that each of the earphones includes a speaker comprising one or more transducer elements. *Id.* at 26 (citing Ex. 1004 ¶ 30).

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

(2) wherein the first wireless earphone comprises a first system-on-chip (SOC), wherein the first SOC comprises:

Petitioner contends that “Dua discloses wireless headphones that include ‘System-on-Chip 361’ comprising ‘CPU 373.’” Pet. 27 (citing Ex. 1003 ¶ 117). Thus, according to Petitioner, one of ordinary skill in the art would have understood that the combination of Rosener and Dua discussed above would have included a “first wireless earphone [having] a first system-on-chip (SOC).” *Id.* (citing Ex. 1003 ¶ 117; Ex. 1002 ¶¶ 74, 84).

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

(3) a first wireless communication circuit for receiving and transmitting wireless signals

Petitioner first argues that Dua's SOC includes a wireless communication circuit for receiving and transmitting wireless signals in the form of 2.4 GHz Bluetooth radio 363. Pet. 27 (citing Ex. 1003 ¶ 117; Ex. 1002 ¶ 85). Next, Petitioner argues that Rosener's earphones each includes RF transmitter portion 902, RF receiver portion 904, duplexer 908, A/D converter 910, and D/A converter 912, and asserts that one of ordinary skill in the art would have understood that these components constitute a wireless communication circuit for receiving and transmitting wireless signals. *Id.* at 27–28 (citing Ex. 1004 ¶¶ 49–50, Fig. 9; Ex. 1002 ¶ 86).

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

(4) a first processor circuit connected to the first wireless communication circuit

Petitioner contends that Dua's SOC includes CPU 373, which one of ordinary skill in the art “would understand comprises a processor circuit that would be included in the SOC incorporated into each of Rosener's wireless earphones.” Pet. 29 (citing Ex. 1003 ¶ 117; Ex. 1002 ¶ 87). Petitioner further contends that Rosener discloses that each earphone includes baseband processor 914, signal conditioning circuits 916, 920, and transceiver 900, which further includes additional processing circuitry. *Id.* (citing Ex. 1004 ¶¶ 49–51, Fig. 9). According to Petitioner, one of ordinary skill in the art would have understood that these components comprise a processor circuit. *Id.* (citing Ex. 1002 ¶ 86).

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

(5) a first memory unit in communication with the first processor circuit for storing firmware updates pushed to the headphones from a remote network server

Petitioner first contends that Dua and Rosener both disclose various memory units. Pet. 29–30 (citing Ex. 1003 ¶¶ 117–118, 121; Ex. 1004 ¶ 39). In particular, Petitioner asserts that one of ordinary skill in the art would have recognized that Dua’s RFID tag memory 370 is a memory that stores firmware updates pushed to the headphones from a remote network server. *Id.* at 30 (citing Ex. 1002 ¶ 91).

In addition, Petitioner argues that to the extent that the Rosener-Dua combination does not disclose the claimed first memory unit, this limitation would have been obvious in view of Price. *Id.* at 30–31 (citing Ex. 1002 ¶ 92). Specifically, Petitioner contends that

Price describes a “system [] capable of updating any electronic devices” with updated “software content,” including device “firmware typically stored in an EEPROM,” and including over “wireless” connections via “Bluetooth.” EX1008 ¶29. Price explains that “software code for updating the software in the electronic devices is delivered from the data store 22, to the network 18, and then to the coordinating computer 12 via wired communication 14 or via direct wireless communication 34 from the network 18” (*id.* ¶38), and the updated software is then “processed by the computer 12 for delivery to the electronic devices” (*id.*, ¶39). *See also id.*, Fig. 1.

Pet. 31 (alteration in original). In view of this disclosure, Petitioner argues that one of ordinary skill in the art would have understood Price to disclose pushing firmware updates to electronic dives from a remote network server (i.e., coordinating computer 12) and would have been motivated to combine

Price with Rosener and Dua for the reasons discussed above. *Id.* (citing Ex. 1002 ¶¶ 92–93).

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

(6) wherein the first wireless communication circuit is for receiving audio content streamed wirelessly to the headphones from a first audio content source, such that the first and second wireless earphones play the audio content streamed wirelessly to the headphones

Petitioner contends that Rosener discloses RF transmitters 610, 614 wirelessly coupled to RF receivers 604, 608 via wireless links 612, 616, respectively, such that Rosener’s earphones receive audio content from data source 618. Pet. 32 (citing Ex. 1004 ¶¶ 32–33; Ex. 1002 ¶ 94). Petitioner then contends that one of ordinary skill in the art would have understood from this disclosure Rosener’s earphones both have wireless communication circuits that receive audio content streamed wirelessly from audio content source 618 such that the earphones play the streamed audio content. *Id.* at 32–33 (citing Ex. 1002 ¶ 94).

Petitioner also asserts that “Dua discloses that ‘media player 100 can stream all audio output via wireless signal 353 to the headphone unit 152’ (EX1003 ¶123), including from ‘a number of Internet media sources for movies, music, radio, news and other content’ (*id.* ¶168).” *Id.* at 33.

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

(7) wherein the first processor circuit is configured to, in response to detecting an incoming wireless communication to the headphones: mute the audio content streamed wirelessly to the headphone being played by the headphones; and output audio of the incoming wireless communication circuit via the first and second wireless earphones.

Petitioner contends that Rosener and Dua both disclose wireless connections to a mobile phone but do not explain how the earphones interact with a mobile phone to receive incoming calls. Pet. 33–34 (citing Ex. 1004 ¶¶ 11, 30, 33; Ex. 1003 ¶¶ 57–58, Figs. 7, 12; Ex. 1002 ¶¶ 96–97).

Petitioner then argues that “Nakagawa expressly discloses switching audio between multiple different sound source devices, including switching from an audio player to a mobile phone in response to receiving a call on a mobile phone,” and one of ordinary skill in the art would have been motivated to combine Nakagawa with the Rosener-Dua-Price combination for the reasons discussed above. *Id.* at 34 (citing Ex. 1010 ¶ 39; Ex. 1002 ¶ 97). Petitioner further argues that Nakagawa’s original audio source is muted because it is disconnected from the audio output apparatus immediately after the sound source is switched from the audio player to the mobile phone. *Id.* at 35 (citing Ex. 1040 ¶ 40; Ex. 1002 ¶ 99).

We have reviewed the evidence cited by Petitioner for this limitation and find it sufficient for institution.

c) Conclusion

For the above reasons, we determine, based on the current record, that the Petition shows a reasonable likelihood that Petitioner would prevail in demonstrating that claim 1 is unpatentable over Rosener, Dua, Price, and Nakagawa.

2. Dependent Claims 2–4, 7, 17, 19–22, and 24–26

Claims 2–4, 7, 17, 19–22, and 24–26 depend from claim 1. Because Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the ’498 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018); *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”); 37 C.F.R. § 42.108(a) (“When instituting inter partes review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”). Therefore, it is not necessary for us to assess every claim challenged by Petitioner.

Nevertheless, we note that Petitioner provides reasonable and detailed explanations, supported with the testimony of Dr. Kyriakakis, indicating where the references teach or suggest the limitations of claims 2–4, 7, 17, 19–22, and 24–26. Pet. 36–50. We have reviewed Petitioner’s contentions with respect to these claims and determine that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail in its assertion that claims 2–4, 7, 17, 19–22, and 24–26 are unpatentable over the combination of Rosener, Dua, Price, and Nakagawa.

E. Remaining Grounds

Petitioner presents three more grounds that build on the combination of Rosener, Dua, Price, and Nakagawa to address claims 5, 6, 8–16, 18, and 23, all of which depend, directly or indirectly, from claim 1. Pet. 51–67. Specifically, Petitioner challenges claims 5, 6, 8–14, and 18 based on the combination of Rosener, Dua, Price, Nakagawa, and Huddart, claim 15

based on the combination of Rosener, Dua, Price, Nakagawa, Huddart, and McIntosh, and claims 16 and 23 based on the combination of Rosener, Dua, Price, Nakagawa, and Feder. *Id.*

Petitioner relies on Huddart as disclosing a docking station and rechargeable power source (*id.* at 51–53), on McIntosh as disclosing an active noise cancelling system (*id.* at 61–63), and on Feder as disclosing a system selection algorithm that allows a mobile device to switch between wireless networks (*id.* at 63–67). Petitioner also provides reasons, supported with the testimony of Dr. Kyriakakis, for why it would have been obvious to one of ordinary skill in the art to combine the relied-on aspects of Huddart, McIntosh, and Feder with Rosener, Dua, Price, and Nakagawa. *See generally, id.* at 51–67 (citing Ex. 1002 ¶¶ 152–157, 159, 162–163, 165–166, 168–172, 174–175, 177–182, 184, 187, 190–193, 197–201).

On the current record, we find Petitioner’s contentions sufficiently persuasive at this stage of the proceeding. Patent Owner offers no arguments with respect to these grounds for us to consider at this time. Furthermore, because Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the ’498 patent is unpatentable, we include these grounds in the instituted *inter partes* review. *See SAS*, 138 S. Ct. at 1354, 1359–60; *PGS Geophysical*, 891 F.3d at 1360; 37 C.F.R. § 42.108(a).

F. Collateral Estoppel

Relying on the final written decisions that have been issued in IPR2021-00297, IPR2021-00381, and IPR2021-00305 (Exs. 1011–1013), Petitioner asserts that “while unnecessary to find the challenged claims unpatentable, Patent Owner is collaterally estopped from disputing that the cited prior art teaches the limitations” that the Board found the references to

teach in the prior proceedings. Pet. 12. Because we find Petitioner's showing, without application of collateral estoppel, is sufficient at this stage of the proceeding, we do not reach the collateral estoppel arguments.

However, we do note that, unlike *MaxLinear, Inc. v. CF CRESPE LLC*, 880 F.3d 1373, 1376 (Fed. Cir. 2018), which Petitioner relies on, this case involves different patents. Also, different parties and different prior art combinations are asserted. *See* Pet. 10–12. We question, but do not decide, how collateral estoppel applies here and leave the issue, if it becomes relevant, to trial.

IV. CONCLUSION

After considering the evidence and arguments of record, we determine that Petitioner has demonstrated a reasonable likelihood of success with respect to at least one of the challenged claims. Accordingly, an *inter partes* review of all of the claims and all of the grounds presented in the Petition is hereby instituted. *See SAS*, 138 S. Ct. at 1354, 1359–60; *PGS Geophysical*, 891 F.3d at 1360; 37 C.F.R. § 42.108(a).

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claims or any underlying factual or legal issues. The final determination will be based on the record as developed during the *inter partes* review.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–26 of the '498 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '498 patent shall commence

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on the entry date of this Order, and notice is hereby given of the institution
of a trial.

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