

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HYUNDAI MOTOR AMERICA,
Petitioner,

v.

STRATOSAUDIO, INC.,
Patent Owner.

IPR2021-01303
Patent 8,688,028 B2

Before JUSTIN T. ARBES, HYUN J. JUNG, and KEVIN C. TROCK,
Administrative Patent Judges.

ARBES, *Administrative Patent Judge.*

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

I. INTRODUCTION

A. Background and Summary

Petitioner Hyundai Motor America filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 11–20 of U.S. Patent No. 8,688,028 B2 (Ex. 1001, “the ’028 patent”) pursuant to 35 U.S.C. § 311(a).

On January 26, 2022, we instituted an *inter partes* review as to all challenged claims on all grounds of unpatentability asserted in the Petition. Paper 9 (“Decision on Institution” or “Dec. on Inst.”). Patent Owner StratosAudio, Inc. filed a Patent Owner Response (Paper 18, “PO Resp.”), Petitioner filed a Reply (Paper 22, “Reply”), and Patent Owner filed a Sur-Reply (Paper 27, “Sur-Reply”). With our authorization provided by email, the parties also filed supplemental briefs addressing certain briefing submitted in related district court litigation. *See* Papers 33 (“Pet. Supp. Br.”), 34 (“PO Supp. Br.”); Exs. 1031, 1032.

A combined oral hearing with Case IPR2021-01305 was held on October 24, 2022, and a transcript of the hearing is included in the record (Paper 38, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 11–20 of the ’028 patent are unpatentable.

B. Related Matters

The parties indicate that the ’028 patent is the subject of the following pending district court cases: *StratosAudio, Inc. v. Volkswagen Group of America, Inc.*, Case No. 2:22-cv-10524 (E.D. Mich.), and *StratosAudio, Inc. v. Hyundai Motor America*, Case No. 2:22-cv-01712 (C.D. Cal.). *See* Pet. 2–3; Paper 5, 1; Paper 32, 1. Petitioner filed a petition challenging claims of a patent related to the ’028 patent in Case IPR2021-01305 (instituted), and petitions challenging claims of other patents asserted in one or more of the district court cases in Cases IPR2021-01267 (instituted) and IPR2021-01371 (instituted). Volkswagen Group of America, Inc.

(“Volkswagen”) filed a petition challenging claims 11, 14–16, and 18 of the ’028 patent in Case IPR2021-00716 (instituted, “the Volkswagen IPR”)¹ and petitions challenging claims of other patents asserted in one or more of the district court cases in IPR2021-00712 (instituted), IPR2021-00717 (denied), IPR2021-00718 (denied), IPR2021-00719 (denied), IPR2021-00720 (instituted), and IPR2021-00721 (instituted). Various parties filed petitions and motions for joinder to certain of the instituted proceedings, which were granted, in Cases IPR2022-00203, IPR2022-00204, IPR2022-00205, and IPR2022-00224.

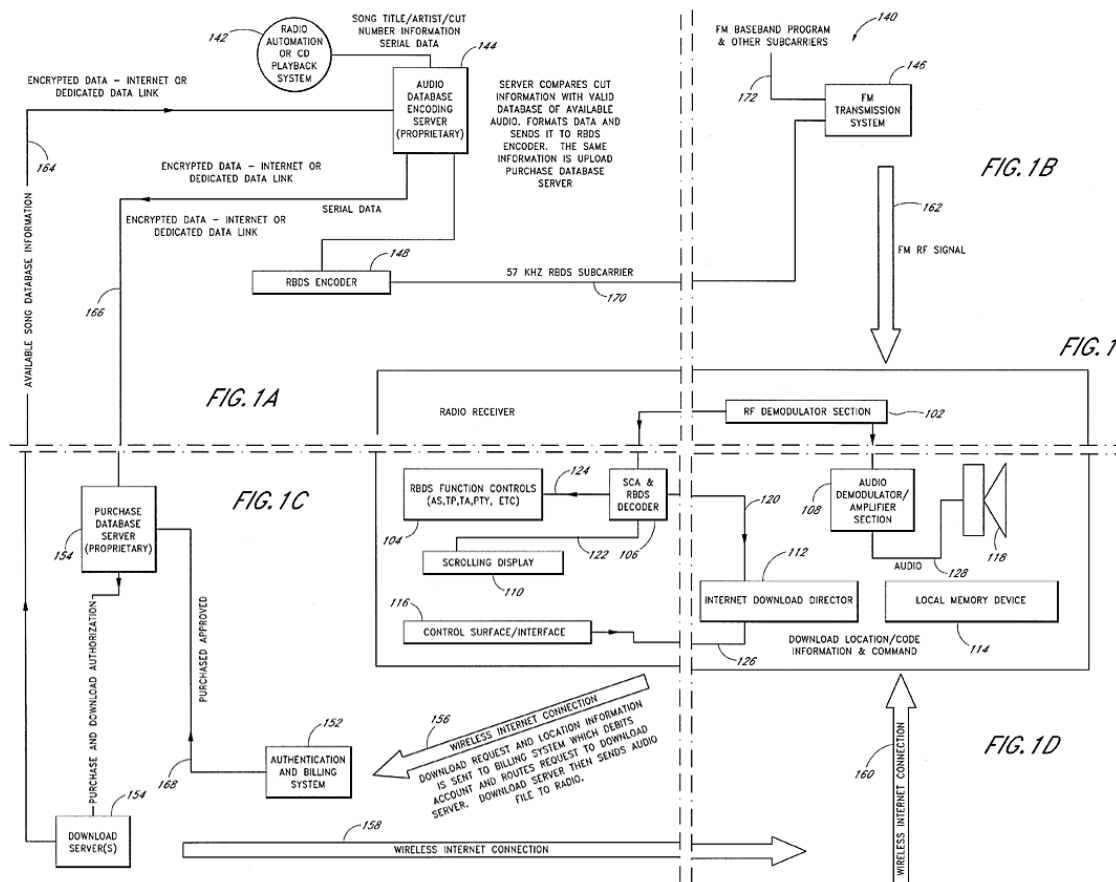
C. The ’028 Patent

The ’028 patent discloses “[a] broadcast response system [that] provides, e.g., a radio broadcast listener with the ability to obtain media content such as music or speech while listening to the radio.” Ex. 1001, code (57). “From the early days of FM broadcast transmission, stations have included ancillary signals such as background music or reading services for the blind along with a main carrier signal.” *Id.* at col. 1, ll. 26–28. “The most current and widely used data transmission standard is the United States Radio Broadcast Data Systems (‘RBDS’) standard” in which a system “broadcast[s] a variety of program-related information,” such as station “call letters, station format, traffic alerts and scrolling text messages,” on a “subcarrier of a standard FM broadcast channel.” *Id.* at col. 1, ll. 32–53.

¹ The Volkswagen IPR involves different prior art from the references asserted in this proceeding. In a concurrently entered final written decision in the Volkswagen IPR, we determine that Volkswagen has shown by a preponderance of the evidence that claims 11, 14–16, and 18 of the ’028 patent are unpatentable.

The '028 patent states that “[b]roadcasters using the RBDS standard can distribute information to a large number of users,” but “the standard does not allow individual users to respond to the broadcast information.” *Id.* at col. 2, ll. 26–29. For example, a user listening to the radio may like a particular song that he or she would like to purchase, but “must write down or remember the identifying information and then go to a store or online retailer to purchase the media.” *Id.* at col. 2, ll. 30–37. The '028 patent purportedly solves that problem by allowing the user to respond to the broadcast and purchase media content. *Id.* at col. 2, ll. 53–58.

The '028 patent includes Figures 1A–D, which are reproduced together below.



Figures 1A–D depict radio station 140, radio receiver 100, and various other devices. *Id.* at col. 4, ll. 22–25. Radio automation or CD playback system

142 “extract[s] information about songs or a radio program” from various sources and provides playlist information to Automatic Purchase System (APS) server 144, which matches the extracted information with information in a database of audio files available to download. *Id.* at col. 5, ll. 41–52. If such a file is available, APS server 144 provides download information to RBDS/RDS encoder 148. *Id.* at col. 5, ll. 52–55. RBDS/RDS encoder 148 then “transmits the RBDS/RDS information using the 57 khz RBDS/RDS subcarrier 170 to the FM transmission system 146. The RBDS/RDS subcarrier signal 170 is mixed by the FM transmission system 146 with the FM baseband program signal 172 and any other subcarriers.” *Id.* at col. 5, ll. 57–62. “The FM transmission system 146 then transmits an FM [radio frequency (RF)] signal 162 which is received by the radio receiver 100.” *Id.* at col. 5, ll. 62–63.

The ’028 patent describes various types of information that can be provided to the radio user using the data subcarrier signal, such as a song title, artist, album name, purchase price of the song, and IP address for the location where the digital version of the song is stored. *Id.* at col. 3, ll. 39–45, col. 5, ll. 4–13, 48–49. A “reference number” representing the information stored in a lookup table accessed by APS server 144 “can also be employed for ease of implementation.” *Id.* at col. 3, ll. 42–48.

RF demodulator section 102 “splits the [received FM RF signal] into an audio signal and a data signal.” *Id.* at col. 4, ll. 39–43. Audio demodulator amplifier section 108 receives the audio signal and converts it to audio signal 128 that can be output on speaker 118. *Id.* at col. 4, ll. 35–38, 53–54. RBDS/RDS decoder 106 receives the data signal and processes it to display information to the user on scrolling display 110. *Id.* at col. 4, ll. 39–47, col. 4, l. 66–col. 5, l. 3.

The '028 patent further describes a process whereby “a user can place an order to download a song using the control interface 116” of radio receiver 100. *Id.* at col. 5, ll. 14–15. Radio receiver 100 provides a signal to authentication and billing system 152 (e.g., over wireless Internet connection 156) and, when the purchase is approved, download server 154 provides the requested material to radio receiver 100 (e.g., over wireless Internet connection 158). *Id.* at col. 5, ll. 15–40. The '028 patent discloses that “[i]n one embodiment, activity of each sale using the [disclosed] system is tracked for the purposes of aggregating data or ‘Data Mining’ for sale to interested parties such as trade publications and record companies.” *Id.* at col. 3, ll. 52–55.

D. Illustrative Claim

Challenged claim 11 of the '028 patent is independent. Claims 12–20 each depend directly or indirectly from claim 11. Claim 11 recites (with letter designations used in the Petition to refer to the various limitations):

11. A method for correlating media content identifying data with at least one broadcast segment received by a communication device, the method comprising:

[a] receiving a broadcast stream comprising the at least one broadcast segment and associated media content;

[b] receiving a data stream associated with the broadcast stream, the data stream comprising, at a minimum, the media content identifying data, wherein the media content identifying data comprises at least one element;

[c] extracting the media content identifying data from the data stream, associating each media content identifying data element with at least one of a plurality of media content;

[d] storing in an electronic memory of the communication device, at a minimum, media content identifying data elements

into identifying data aggregates, each identifying data aggregate associated with at least one of the plurality of media content and the at least one broadcast segment, wherein the at least one broadcast segment is corollary to the at least one of the plurality of media content; and

[e] providing for presentation of at least a portion of the data elements stored in the electronic memory of the communication device, whereby the providing provides selective outputting, using an interface, of at least one of the following: the media content identifying data, the media content, the corollary broadcast segment, a temporal position of the corollary broadcast segment of the broadcast stream.

E. Evidence

The pending grounds of unpatentability in the instant *inter partes* review are based on the following prior art:

U.S. Patent No. 6,925,489 B1, filed Nov. 22, 1999, issued Aug. 2, 2005 (Ex. 1010, “Curtin”);

U.S. Patent No. 6,628,928 B1, filed Dec. 10, 1999, issued Sept. 30, 2003 (Ex. 1006, “Crosby”);

U.S. Patent No. 5,063,610, issued Nov. 5, 1991 (Ex. 1011, “Alwadish”); and

European Patent No. EP 0 647 377 B2, issued Jan. 7, 1999 (Ex. 1012, “Koerber”).²

Petitioner filed a declaration from Kevin C. Almeroth, Ph.D. (Ex. 1002) with its Petition and a reply declaration from Dr. Almeroth (Ex. 1026) with its Reply. Patent Owner filed a declaration from John C. Hart, Ph.D.

² We refer to “Koerber” as the English translation of the original patent document in German (both filed as Exhibit 1012). Petitioner provided a “Certificate of Accuracy” attesting to the accuracy of the translation. See Ex. 1012, 1; 37 C.F.R. § 42.63(b).

(Ex. 2020) with its Response. Also submitted as evidence are transcripts of the depositions of Dr. Almeroth (Exs. 2018, 2021) and Dr. Hart (Ex. 1029).

F. Asserted Grounds

This *inter partes* review involves the following grounds of unpatentability (Pet. 4):

Claims Challenged	35 U.S.C. § ³	Reference(s)/Basis
11, 13–20	103(a)	Curtin, Crosby
11, 13–20	103(a)	Curtin
11, 12, 14–16, 18	103(a)	Alwadish ⁴
12, 16	103(a)	Alwadish, Koerber

II. ANALYSIS

A. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art for a challenged patent, we look to “1) the types of problems encountered in the art; 2) the prior art solutions to those problems; 3) the rapidity with which innovations are made; 4) the sophistication of the technology; and 5) the educational level of active workers in the field.” *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 666–667 (Fed. Cir. 2000). “Not all such factors may be present in every case, and one or more of them may predominate.” *Id.* at 667.

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Because the challenged claims of the ’028 patent have an effective filing date before the effective date of the applicable AIA amendment, we refer to the pre-AIA version of 35 U.S.C. § 103. *See* Pet. 11.

⁴ Petitioner list claims 11, 14, 15, and 18 in “Ground 3” and claims 12 and 16 in “Ground 4,” both based on obviousness over Alwadish alone. Pet. 4.

Petitioner states that it takes no position on the effective filing date of the challenged claims of the '028 patent, but assumes an effective filing date of September 13, 2000, for purposes of the Petition. Pet. 11. Petitioner argues in the Petition that a person of ordinary skill in the art at that time would have had “a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in the communications- or broadcast-related industries, or the equivalent, with additional education substituting for experience and vice versa.” *Id.* (citing Ex. 1002 ¶¶ 34, 40–42).

In the Decision on Institution, we adopted a slightly different definition from the Volkswagen IPR of “a B.S. in computer science or electrical engineering (or a related field), and approximately three years of experience working in the communications- or Internet-related industries, or, alternatively, an advanced degree (such as a master’s degree) in computer science or electrical engineering (or a related field),” and encouraged the parties to address the issue if they disagreed. Dec. on Inst. 18. Patent Owner does not oppose the adopted definition and Petitioner did not address the issue in its Reply. *See* PO Resp. 19. Based on the full record developed during trial, including our review of the '028 patent and the types of problems and solutions described in the '028 patent and cited prior art, we maintain the previously adopted definition of the level of ordinary skill in the art and apply it for purposes of this Decision. *See, e.g.*, Ex. 1001, col. 1, l. 25–col. 2, l. 49 (describing in the “Background” section of the '028 patent various FM broadcast and other communication methods).

B. Claim Interpretation

We interpret the claims of the challenged patent

using the same claim construction standard that would be used to construe the [claims] in a civil action under 35 U.S.C. 282(b), including construing the [claims] in accordance with the ordinary and customary meaning of such [claims] as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2020). “In determining the meaning of [a] disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006). Claim terms are given their plain and ordinary meaning as would be understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).⁵

⁵ The claim interpretations adopted herein are identical to those set forth in the concurrently entered final written decision in the Volkswagen IPR, with one exception—we adopt an agreed-upon interpretation of “broadcast stream” in the Volkswagen IPR, but need not interpret the term in this proceeding. See *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“Because we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy,’ we need not construe [a particular claim limitation] where the construction is not ‘material to the . . . dispute.’” (citation omitted)).

1. Preamble of Claim 11

In the Decision on Institution, we determined based on the record at the time that the preamble of claim 11 is limiting because the body of the claim refers to the preamble for antecedent basis for the terms “media content identifying data,” “at least one broadcast segment,” and “communication device.” *See* Dec. on Inst. 27 n.6; *Eaton Corp. v. Rockwell Int’l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003) (“When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention.”). Patent Owner agrees, and Petitioner does not argue otherwise in its Petition or Reply. *See* Pet. 20, 39 (arguing that Curtin and Alwadish both “disclose[] or teach[] the preamble of Claim 11, to the extent it is determined to be limiting”); PO Resp. 36–37. Based on the full trial record, we determine that the preamble of claim 11 is limiting.

2. “Broadcast Segment”

In the Decision on Institution, based on the record at the time, we interpreted “broadcast segment” as “a distinguishable piece or portion of a broadcast stream, such as an individual song, speech, or video,” which had been proposed by the petitioner in the Volkswagen IPR. *See* Dec. on Inst. 20. Petitioner agrees with that interpretation. Reply 2–4. Patent Owner argues that “broadcast segment” instead should be interpreted to mean “a discretely identifiable portion of programming as broadcasted.” PO Resp. 20–22; Sur-Reply 2–6.

As an initial matter, we note that there is little difference between the two interpretations. The preliminary interpretation uses the term “distinguishable,” whereas Patent Owner uses “discretely identifiable.” *See*

Dec. on Inst. 20; PO Resp. 20. Petitioner acknowledges that “as a matter of English language,” there may not be “much of a difference between distinguishable and discretely identifiable.” Tr. 7:3–8:9, 11:6–23.

Similarly, the preliminary interpretation uses the phrase “portion of a broadcast stream,” whereas Patent Owner uses “portion of programming as broadcasted.” *See* Dec. on Inst. 20; PO Resp. 20. Petitioner states that there is no difference between “of a broadcast stream” and “as broadcasted,” and agrees with the use of “as broadcasted.” Tr. 7:19–8:5, 14:10–13.

The dispute between the parties appears to be in the *application* of the prior art when using Patent Owner’s proposed interpretation. *See id.* at 7:3–8:9 (disagreeing with the term “discretely identifiable” “as applied by Patent Owner to the prior art”), 11:6–23 (arguing that the issue is how “Patent Owner is applying its interpretation to the prior art”); Reply 2–4, 8–10, 22–24. For example, Petitioner contends that Patent Owner’s arguments import requirements that broadcast segments differentiate between different instances of the same song broadcasted multiple times and are tracked for purposes of aggregating data or “data mining.” *See* Reply 8–10, 22–24. These alleged requirements, however, are not part of Patent Owner’s proposed interpretation. To the extent relevant, we discuss them below in our analysis of Petitioner’s obviousness grounds. *See infra* Sections II.D.3.b, II.F.2.b.

After reviewing the full trial record, we are persuaded that the phrasing of Patent Owner’s proposed interpretation is correct, primarily because of its use of “as broadcasted.”

First, by its plain language, a “broadcast segment” is a “segment” of a “broadcast.” *See* Reply 2 (arguing that “the plain meaning of ‘broadcast segment’” is “a ‘segment’ of a ‘broadcast’”); Tr. 8:12–25 (Petitioner arguing

that the plain and ordinary meaning is “a segment or portion of a broadcast or some type of transmission”), 10:1–6 (Petitioner agreeing that a “broadcast segment” is distinguishable from “others within the broadcast,” such as the immediately preceding and subsequent broadcast segments). Our preliminary proposed interpretation was that a “broadcast segment” is a piece or portion “of a broadcast stream,” but that is already part of the claim—limitation 11[a] recites “a broadcast stream *comprising* the at least one broadcast segment” (emphasis added). Patent Owner’s proposed interpretation more clearly specifies that a “broadcast segment” is a portion of programming “as broadcasted.” *See* PO Resp. 20. To illustrate, although a song can be an example of a “broadcast segment,” the “broadcast segment” is not the song in the abstract, but rather the portion of the broadcast that is the song. *See* Tr. 9:2–7 (Petitioner agreeing that the term refers not to “a song in the abstract,” but rather “a song that’s part of a broadcast”). In other words, an individual song as broadcasted may be an example of a “broadcast segment” *because* the broadcast of the song constitutes a discretely identifiable portion of a broadcasting that includes the song. We are persuaded that the language of claim 11 supports Patent Owner’s proposed interpretation.

Second, although the Specification of the ’028 patent only uses the term “broadcast segment” twice, it provides some support for Patent Owner’s view that a “broadcast segment” is a portion of programming “as broadcasted.” The Specification discloses:

[R]adio station 140, using either a standard radio automation system for tracking of *music content which is being broadcast*, or a data-enabled audio player, *broadcasts audio material* and synchronously sends RBDS/RDS or similar data to an APS

server 144 that assigns a unique identifier to each specific *broadcast segment* or song.

The APS server 144 compares the *broadcast segment* identifier with a database 150 of audio available for purchase. If the *broadcasted audio* is available, the APS server 144 incorporates station call letter information, and an audio download location such as IP address and a file name into a data stream that is inserted into a radio station's broadcast using RBDS/RDS or similar technology. The information identifying the audio selected by the listener or user is routed to the APS Data Server and passed on to the location where a digital version of the audio content is stored and available for transfer to the end user. The user's radio receiver 100 receives and recognizes the encoded RBDS/RDS or other data and presents it on the radio display 110 notifying the user that the audio is available for purchase.

Ex. 1001, col. 5, l. 64–col. 6, l. 16 (emphasis added). Thus, in the exemplary embodiment described above, the “broadcast segment” is a portion of the audio content being broadcasted.⁶ *See id.*

Based on the full trial record, we interpret “broadcast segment” to mean “a discretely identifiable portion of programming as broadcasted.”

⁶ The “broadcast segment” described in the Specification also has an assigned “unique identifier” as part of the broadcast. Ex. 1001, col. 5, l. 64–col. 6, l. 2. Patent Owner contends that the unique identifiers are “data that enables a unique identification of each specific broadcast segment,” which matches the language of dependent claim 16 (i.e., “data that enables a unique identification of the least one broadcast segment”). *See* PO Resp. 11. Also, Petitioner argues that Patent Owner's proposed interpretation, which uses the phrase “discretely identifiable,” is improper because it “would render [the ‘unique identification’ language of claim 16] redundant and improperly capture claim 16's scope”. *See* Reply 2–3. We disagree. Claim 16 provides a further limit on what the “data stream” of claim 11 comprises—namely, it “further comprises data that enables a unique identification of the at least one broadcast segment.” Patent Owner's proposed interpretation, by contrast, correctly pertains to what the “broadcast segment” is. *See* Sur-Reply 3.

3. “*Media Content*”

In the Decision on Institution, based on the record at the time, we interpreted “media content” as “any form of media content that, when translated from the signal-form in which it is transmitted, is discernible to humans.” Dec. on Inst. 20. The parties do not dispute that interpretation, which we adopt based on the full trial record. *See* PO Resp. 22; Reply 4.

4. “*Receiving a Broadcast Stream Comprising the At Least One Broadcast Segment and Associated Media Content*”

In the Decision on Institution, we noted our previous analysis in the Volkswagen IPR and encouraged the parties to address in their papers the interpretation of the full “receiving” limitation in claim 11. Dec. on Inst. 20. Specifically, in the Volkswagen IPR, the petitioner had

read the claim language as encompassing the same underlying content (e.g., a song) in two different forms—the “broadcast segment” being a distinguishable piece or portion of the broadcast stream itself, which is in signal-form, and the “media content” being the content after it has been translated from signal-form into a form that is discernible to humans.

IPR2021-00716, Paper 16, 22–23. We stated that, based on the record at the time, that reading appeared to be consistent with the Specification of the ’028 patent. *Id.* Patent Owner argues that a person of ordinary skill in the art “would understand the clause consistent with the Board’s finding, with the qualification” that we should adopt Patent Owner’s proposed interpretation of “broadcast segment.” PO Resp. 23–24. Petitioner agrees that our preliminary interpretation in the Volkswagen IPR “is consistent with how a [person of ordinary skill in the art] would have understood th[e] claim term in view of the [S]pecification.” Reply 5. Based on the full trial record, we maintain our earlier determination in the Volkswagen IPR for the

“receiving” limitation and adopt Patent Owner’s proposed interpretation of “broadcast segment” for the reasons explained above. *See supra* Section II.B.2; IPR2021-00716, Paper 16, 22–23.

5. “Associate” Terms

Claim 11 recites “a broadcast stream comprising the at least one broadcast segment and *associated* media content,” “receiving a data stream *associated* with the broadcast stream,” “extracting the media content identifying data from the data stream, *associating* each media content identifying data element with at least one of a plurality of media content,” and “each identifying data aggregate *associated* with at least one of the plurality of media content and the at least one broadcast segment” (emphasis added). Claim 18 recites “detecting a selection input *associated* with the presentation of the stored data” (emphasis added). We refer to these as the “associate” terms.

After our Decision on Institution, the district court issued a Claim Construction Order construing the terms “associated,” “associating,” and “associating each media content identifying data element with at least one of a plurality of media content” to each have their “[p]lain and ordinary meaning.” Ex. 3003, 1–2. During the district court proceedings, Patent Owner proposed the “[p]lain and ordinary meaning” construction, whereas Petitioner argued that the terms were indefinite. Ex. 3001, 1–2.

In this proceeding, Patent Owner argues in its Response that the “associate” terms “are used in their ordinary manner in the context of the ’028 patent to mean an implemented link between two or more items (such as data, broadcast segments, and media content)” where the link is “formal,” “intentional,” and “implement[ed] by claim 11.” PO Resp. 24–25 (citing

Ex. 2020 ¶¶ 58–59); Sur-Reply 7–8. According to Patent Owner, this is different than a merely “conceptual” link; the term “related,” for example, also is used in the Specification of the ’028 patent and does not necessarily require “a connection that is implemented in a system.” PO Resp. 24–25 (citing Ex. 1001, col. 1, ll. 24, 35–39, col. 8, ll. 7–12, col. 11, ll. 13–17, 27–30). Petitioner responds that the terms should be given their “plain meaning, which merely indicates some relationship between items,” arguing that the requirement of an implemented “link” is not supported by the Specification, file history, or extrinsic evidence. Reply 5–6 (citing Ex. 1026 ¶¶ 21–22).

We disagree with Patent Owner’s arguments. Patent Owner does not point to—and we do not find—any language in the claims requiring that the recited associations be implemented in a particular way, such as by a system storing a link. Rather, each limitation merely recites that one item is “associate[d]” with another: “broadcast segment” with “media content,” “data stream” with “broadcast stream,” “each media content identifying data element” with “at least one of a plurality of media content,” “each identifying data aggregate” with “at least one of the plurality of media content and the at least one broadcast segment,” and “selection” with “the presentation of the stored data.”

Nor does the Specification define or use the term “associated” in a manner indicating that the term should be limited to require a formal link implemented by the disclosed system. To the contrary, in every instance, the Specification uses the term “associated” broadly to refer to two items related to each other in some manner; for example, consistent with the language of claim 11, the Specification explains how a broadcast may have an “associated” data stream providing information about what is being played.

See, e.g., Ex. 1001, col. 6, ll. 31–33 (“storage server 154 at a source location . . . uploads the requested audio to the routing address *associated* with the user’s cell phone account identifier”), col. 7, ll. 27–33 (“[a]utomotive radios equipped with the APS module 202 and *associated* technologies . . . send a purchase request (or interactive response) complete with [other information] accompanying the *associated* broadcast”), col. 8, ll. 7–14 (“The user can also receive offers or hyperlinks posted on a personal web site

Associated books, magazine articles, merchandise and event information can also be posted for the user to purchase using the APS.”), col. 12, ll. 13–20 (“television adapters equipped with the APS module 302 and *associated* technologies can use a wireless interface 318 to send a purchase request (or interactive response) complete with [other information] derived from the RBDS/RDS data string accompanying the *associated* broadcast”) (emphasis added); *see also* Tr. 66:21–67:8 (Patent Owner agreeing that the Specification does not describe expressly a formal, implemented link). The mere fact that the Specification also uses “related” in other contexts does not demonstrate that the patentee intended for there to be a meaningful difference between “related” and “associated.”

We interpret the “associate” terms to not require a formal link implemented by the method of claim 11 as Patent Owner argues, and conclude that no further interpretation is necessary to decide the issues presented during trial.⁷ *See Nidec*, 868 F.3d at 1017.

⁷ Given the analysis above, we need not determine whether Patent Owner’s proposed interpretation in this proceeding is inconsistent with arguments it made in a related district court case, as Petitioner contends. *See* Pet. Supp. Br. 2–3; PO Supp. Br. 2–3.

6. “Corollary”

In the Decision on Institution, we encouraged the parties to address in their papers the interpretation of the term “corollary” in claim 11. Dec. on Inst. 20. Patent Owner argues that the term means “correlated,” and Petitioner agrees. *See* PO Resp. 25; Reply 6. We conclude that no interpretation of the term is necessary to decide the issues presented during trial. *See Nidec*, 868 F.3d at 1017.

C. Legal Standards

To prevail in its challenges to the patentability of claims 11–20 of the ’028 patent, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015); *see also In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) (“Where, as here, the only question presented is whether due consideration of the four *Graham* factors renders a claim or claims obvious, no burden shifts from the patent challenger to the patentee.”).

A claim is unpatentable for obviousness if, to one of ordinary skill in the pertinent art, “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a) (2006)). The question of obviousness is resolved on the basis of underlying factual

determinations, including “the scope and content of the prior art”; “differences between the prior art and the claims at issue”; and “the level of ordinary skill in the pertinent art.” *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Additionally, objective indicia of nonobviousness, such as “commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.” *Id.* When conducting an obviousness analysis, we consider a prior art reference “not only for what it expressly teaches, but also for what it fairly suggests.” *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1049 (Fed. Cir. 2019) (citation omitted).

A patent claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. An obviousness determination requires finding “both ‘that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted); *see KSR*, 550 U.S. at 418 (for an obviousness analysis, “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does”). Also, “[t]hough less common, in appropriate circumstances, a patent can be obvious in light of a single prior art reference if it would have been obvious to modify that reference to arrive at the patented invention.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016).

“Although the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to produce the claimed invention.’” *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (citation omitted). Further, an assertion of obviousness “cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)); accord *In re NuVasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (stating that “conclusory statements” amount to an “insufficient articulation[] of motivation to combine”; “instead, the finding must be supported by a ‘reasoned explanation’” (citation omitted)); *Magnum Oil*, 829 F.3d at 1380 (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”).

*D. Obviousness Ground Based on Curtin and Crosby
(Claims 11 and 13–20)*

1. Curtin

Curtin discloses “systems for purchase and delivery of music or other information” and “techniques for allowing users to identify and purchase music or other information associated with a particular broadcast from a radio station, digital audio broadcasting (DAB) system or other type of communication system.” Ex. 1010, col. 1, ll. 8–14.

Figure 1 of Curtin is reproduced below.⁸

FIG. 1

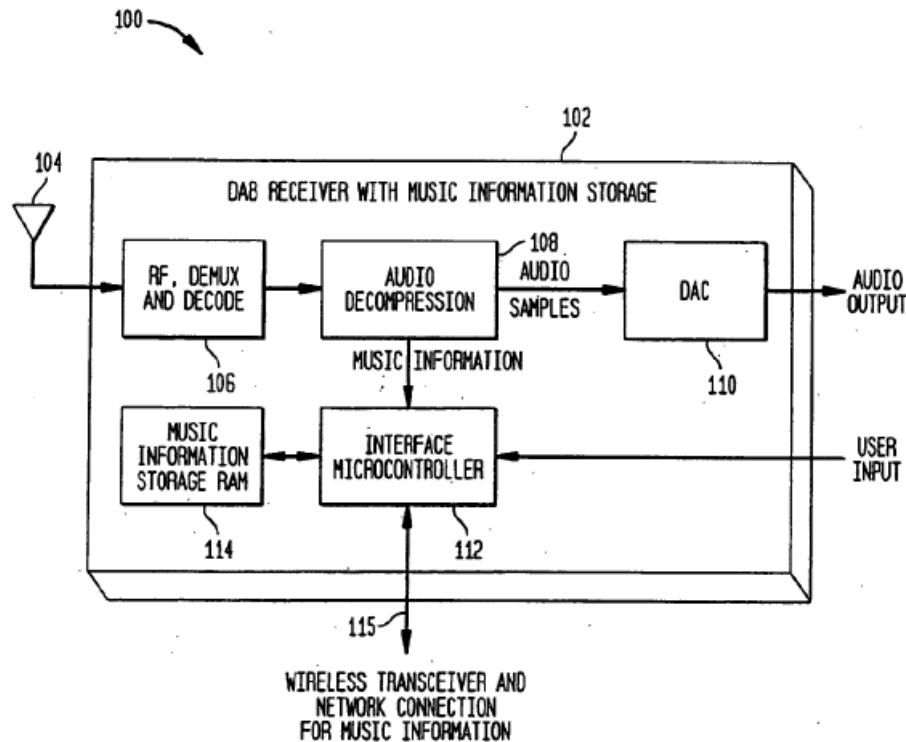


Figure 1 depicts DAB receiver 102 (e.g., in an automobile) comprising receiving antenna 104, radio frequency (RF) demultiplex and decode element 106, audio decompression element 108, digital-to-analog converter (DAC) 110, random access memory (RAM) 114, interface microcontroller 112, and network connection 115. *Id.* at col. 3, l. 25–col. 4, l. 42.

⁸ Figures 1–4 of Curtin were corrected in a Certificate of Correction dated September 27, 2005. Ex. 1010.

Figure 2 of Curtin is reproduced below.

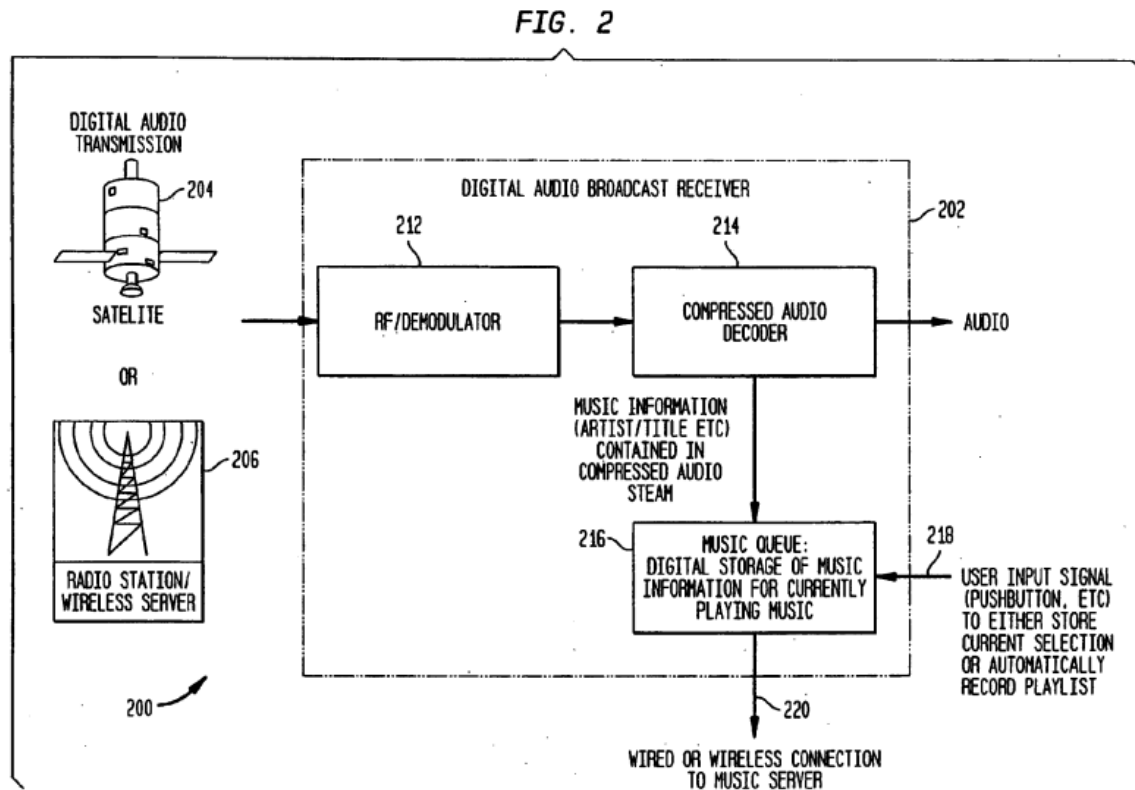


Figure 2 depicts an alternate embodiment of DAB receiver 202, which receives a DAB signal from satellite-based transmitter 204 or terrestrial transmitter 206 (e.g., a radio station). *Id.* at col. 5, ll. 13–20. The DAB signal may be “a hybrid in-band on-channel (HIBOC) FM signal having an analog FM host and one or more digital sidebands” for transmitting “digital audio information.” *Id.* at col. 3, ll. 31–36. “The digital audio information may correspond to, e.g., a particular song or other piece of music broadcast by the system.” *Id.* at col. 3, ll. 48–50.

RF/demodulator block 212 “processes [the] received DAB signal and delivers a compressed digital audio bit stream” to decoder 214, which “extracts music information, e.g., artist, title, etc., from the compressed digital audio bit stream” and plays the received audio. *Id.* at col. 5, ll. 29–32, 36–40. The extracted music information “uniquely identifies a

particular piece of music or other audio information by artist, title, album, label, source, date, time, etc.” and “may be incorporated in the encoded audio bitstream using conventional techniques.” *Id.* at col. 2, ll. 35–46, col. 3, l. 64–col. 4, l. 2. “[W]hen a user hears a particular song or other piece of music of interest, . . . the user can push a button or otherwise enter a command or other instruction to direct [the DAB receiver] to store extracted music information for the current audio output in” RAM or a removable memory device, such as a Personal Computer Memory Card International Association (PCMCIA) card. *Id.* at col. 4, ll. 5–14, 54–61. Alternatively, the input signal may put the receiver in a “mode in which music information for all possible broadcast music selections is automatically extracted and stored as long as the system remains in that mode.” *Id.* at col. 5, ll. 40–46.

“At a later point in time” when the user is able to establish a wired or wireless network connection, “the extracted music information is transmitted over [a] network connection [] to a music server which is capable of delivering the corresponding music.” *Id.* at col. 4, ll. 20–26, col. 5, ll. 3–5, 46–51. For example, the removable memory device storing the extracted music information may be inserted into a personal computer (PC) having such a connection. *Id.* at col. 4, l. 61–col. 5, l. 2. The music server then “uses the extracted music information to determine what the user might like to purchase, and presents this information, as well as appropriate ordering instructions, to the user via the network connection.” *Id.* at col. 6, ll. 13–16. “[T]he user places an order for the corresponding music track, album, CD, etc. with the music server,” “[t]he music server then processes the order,” and “the user . . . receives the ordered product, e.g., receives a CD or MP3 file via download for later playback.” *Id.* at col. 6, ll. 16–21. Thus, Curtin’s system purportedly “eliminates the need for the user to write

down or otherwise remember easily-forgotten information such as the radio station or time of broadcast” when the user hears a song of interest. *Id.* at col. 4, ll. 48–53.

2. Crosby

Crosby discloses an “interactive radio system . . . for use with broadcast radio stations wherein feedback is provided to subscribers of the system via the Internet.” Ex. 1006, code (57). The disclosed interactive radio mobile unit comprises radio receiver 116, Global Positioning System (GPS) unit 118, wireless transmitter 120, and “subscriber interface 122 for receiving control signals from [a] subscriber via one or more input buttons or other input devices,” such as an “INFO” button for “receiv[ing] additional information pertaining to a program segment” and “ORDER” button for “purchas[ing] the goods or services offered for sale via a broadcast radio segment.” *Id.* at col. 6, l. 65–col. 7, l. 3, col. 13, ll. 3–19.

“[T]he subscriber can select various advertisements, musical selections or the like while listening to the radio, then access the Internet at a later time to review information pertaining to the various program segments that have been selected.” *Id.* at col. 3, ll. 59–63. When selected by the user, the mobile unit transmits a “broadcast attribute signal” identifying, for example, “the date and time of a program segment selected by the subscriber,” “the carrier frequency of the broadcast,” and “the geographical location of the radio,” as well as a “client identifier signal” identifying the subscriber or mobile unit. *Id.* at col. 3, ll. 30–44, col. 7, ll. 30–37.

In response, a network operations center “determines the identity of the broadcaster or other program originator based upon the carrier frequency and the geographical location of the mobile unit,” “accesses a database of

information provided by the broadcaster” with “date[s] and time[s] of various program segments” to “identif[y] the particular program segment selected by the subscriber,” and “downloads information pertinent to the program segment and provides that information” to the subscriber in a web page or email. *Id.* at col. 3, ll. 44–58, col. 7, ll. 37–50, col. 9, ll. 14–19, col. 10, ll. 20–24, Fig. 5 (depicting database 202 with broadcaster ID, program segment ID, and date and time fields).

Figure 7 of Crosby is reproduced below.

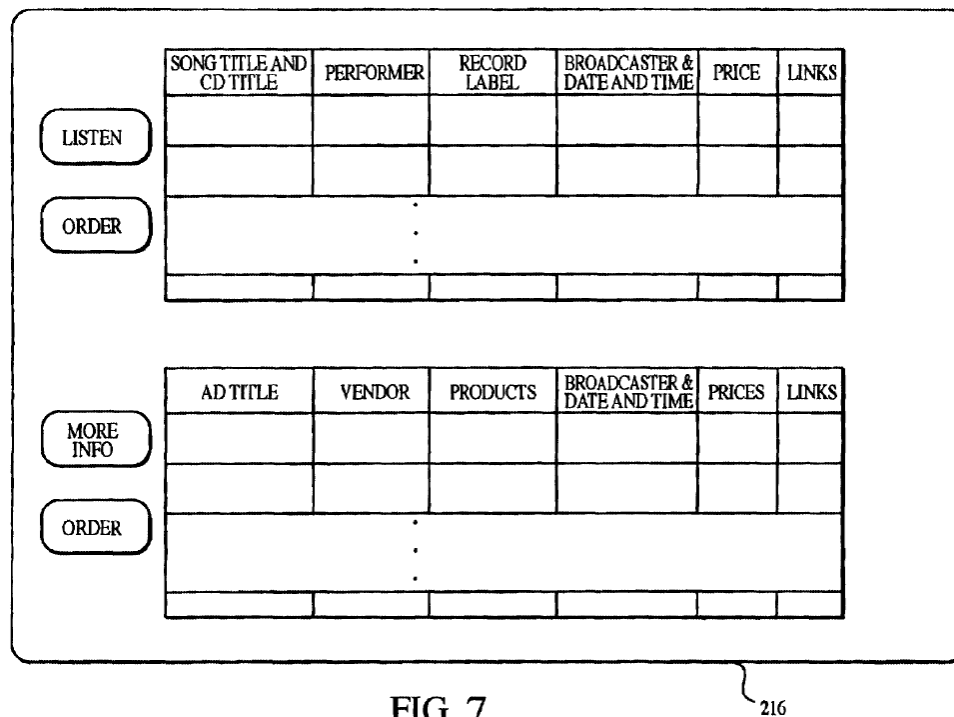


FIG. 7

Figure 7 depicts exemplary web page screen 216 where “information pertaining to various songs selected by the subscriber [is] provided including the title of the song, the name of the performer of the song, the radio station broadcasting the song and the date and time of day of the broadcast.” *Id.* at col. 10, ll. 30–35. The web page also provides “a hyperlink to permit the subscriber to immediately download a digital version of a portion of the song for verifying that the song identified in the list was indeed the song

listened to by the subscriber” and “links to e-commerce sites permitting the subscriber to purchase the CD in which the song appears or perhaps to create a customized CD containing the song or a customized digital music file.” *Id.* at col. 10, ll. 36–43.

3. *Claim 11*

Petitioner argues that claim 11 is unpatentable over Curtin and Crosby under 35 U.S.C. § 103(a), relying on the testimony of Dr. Almeroth as support. Pet. 19–31 (citing Ex. 1002). Patent Owner makes various arguments in response, relying on the testimony of Dr. Hart. PO Resp. 36–46, 48–57 (citing Ex. 2020); Sur-Reply 8–19.

a) Petitioner’s Arguments

Petitioner argues that Curtin and Crosby collectively teach all of the limitations of claim 11 and it would have been obvious to combine the references’ disclosures to achieve the method of claim 11. Pet. 19–31.

With respect to the preamble of claim 11, Petitioner contends that Curtin teaches a method for correlating “media content identifying data” (i.e., music information extracted from an encoded digital bitstream) with a “broadcast segment” (i.e., digital audio information corresponding to a broadcasted song or other piece of music) received by a “communication device” (i.e., DAB receiver 102). *Id.* at 20–23. In arguing that Curtin teaches the recited correlation, Petitioner cites Curtin’s disclosure of DAB receiver 102 extracting the music information and transmitting it to a server to purchase the broadcasted song. *Id.* at 21–22.

With respect to limitation 11[a], Petitioner contends that Curtin teaches receiving (via DAB receiver 102 with antenna 104) a “broadcast

stream” (i.e., HIBOC FM signal containing a stream of songs or other pieces of music) comprising “at least one broadcast segment and associated media content.” *Id.* at 22–23. Petitioner cites Curtin’s “digital audio information” corresponding to “a particular song or other piece of music broadcast by the system” and the conversion of that information to an “analog audio output signal . . . supplied to a speaker.” *Id.* (quoting Ex. 1010, col. 3, ll. 48–50, 55–61).

With respect to limitation 11[b], Petitioner argues that DAB receiver 102 receives a “data stream” (i.e., encoded digital bitstream) comprising the “media content identifying data compris[ing] at least one element” (i.e., at least one of the artist, title, album name, label, source, date, and time in the extracted music information). *Id.* at 23.

With respect to limitation 11[c], Petitioner contends that Curtin teaches extracting (using audio decompression element 108) the music information for a song from the data stream, where each piece of music information is associated with media content “by [the user] pushing a button to indicate that a piece of broadcasted music is of interest,” causing the music information for that piece of music to be stored in memory. *Id.* at 23–24. Petitioner contends that the individual data elements of the extracted music information (e.g., artist, title) “correspond[] to the currently playing music.” *Id.* at 24.

With respect to limitation 11[d], Petitioner argues that Curtin teaches storing in an “electronic memory” (i.e., RAM or a memory card) the extracted music information for a song. *Id.* at 25–26. Petitioner asserts, with supporting testimony from Dr. Almeroth and citations to various disclosures in Curtin, that a person of ordinary skill in the art “would have understood that th[e] collection of information (i.e., multiple data elements

[of artist, title, album name, label, source, date, and time]) would be stored as identifying data aggregates, based on the teachings of Curtin that the information can be received together, . . . is a set of information tied to a particular item, . . . and is referred to as a collective when stored.” *Id.* at 26 (citing Ex. 1002 ¶ 88; Ex. 1010, col. 2, ll. 39–59, col. 5, ll. 3–5). Petitioner further contends that storing the elements of music information into “identifying data aggregates” would have been obvious based on the knowledge of a person of ordinary skill in the art that “essentially all computer programming languages” at the time of the ’028 patent “included data structures that would store a plurality of data elements as data aggregates,” and “[a] common programming practice at the time would have been to store the types of data described in Curtin in the kinds of data structures available in existing programming languages.” *Id.* at 26–27 (citing Ex. 1002 ¶ 89).

With respect to limitation 11[e], Petitioner argues that Curtin teaches presenting information about a musical selection to the user, Crosby teaches an output (i.e., the web page display shown in Figure 7) that presents “media content identifying data elements” to provide “selective outputting, using an interface,” of “media content identifying data,” and a person of ordinary skill in the art would have been motivated to modify Curtin’s system to present information using an interface of the type described in Crosby. *Id.* at 19–20, 27–31 (citing Ex. 1002 ¶¶ 76–80, 92–95).

We are persuaded by Petitioner’s analysis, as explained above and supported by the testimony of Dr. Almeroth, and notwithstanding Patent Owner’s arguments to the contrary, which we address below.

b) Patent Owner's Arguments

Patent Owner makes various arguments disputing Petitioner's contentions regarding the preamble of claim 11, limitation 11[a], and the combination of Curtin and Crosby with respect to limitation 11[e]. *See* PO Resp. 36–46, 48–57; Sur-Reply 8–19.

(1) Preamble of Claim 11

Claim 11 recites “[a] method for correlating media content identifying data with at least one broadcast segment received by a communication device.” Ex. 1001, col. 15, ll. 21–23. Patent Owner argues that Petitioner fails to identify a “broadcast segment” in Curtin because Curtin’s music information (i.e., artist, title, album name, label, source, date, and time) is only “intended to identify a song, and specifically a particular version of a song,” so that “the listener could [later] purchase a personal copy of the media content they heard.” PO Resp. 37–39. Thus, in Patent Owner’s view, Curtin teaches “a correlation of the media content identifying information with the media content, . . . not with the broadcast segment that delivered it,” as the preamble requires. *Id.* (citing Ex. 2020 ¶¶ 74–75); Sur-Reply 8–9.

As explained above, we adopt Patent Owner’s proposed interpretation of “broadcast segment” as “a discretely identifiable portion of programming as broadcasted.” *See supra* Section II.B.2. We are persuaded, however, that Curtin teaches the preamble of claim 11 under that interpretation.

The issue we must resolve is how a person of ordinary skill in the art would have understood Curtin’s disclosure pertaining to the encoded music

information,⁹ and whether Curtin teaches or suggests a correlation between that information and a “broadcast segment” (as Petitioner contends) or between the information and the music content itself (as Patent Owner contends). Curtin discloses that

identification information is extracted from a current broadcast of a piece of music or other type of information of interest to a user, and stored in a memory or other storage device, in response to a user command. The identification information includes sufficient information to identify at least one deliverable information item *associated with the current broadcast*, e.g., a CD or MP3 file which contains the particular piece of music. Examples of such identification information in the case of a piece of music include artist, title, album name, label, source, date and time *associated with the current broadcast of the piece of music*. The identification information may be extracted from a compressed digital audio bitstream *associated with the current broadcast*.

Ex. 1010, col. 2, ll. 35–48 (emphasis added); *see also id.*, claims 6, 17 (“the identification information comprises at least one of an artist, a title, an album name, a label identifier, a source identifier, a date, and a time *associated with the current broadcast of the piece of music*” (emphasis added)).

DAB receiver 102 “extracts from the encoded digital bitstream music information that uniquely identifies a particular piece of music or other audio information by artist, title, album, label, source, date, time, etc.” *Id.* at

⁹ Curtin appears to use the terms “music information” and “identification information” interchangeably, referring to the former in the “Detailed Description of the Invention” and figures, and the latter in the Abstract, “Summary of the Invention,” and claims. *See, e.g.*, Ex. 1010, code (57), col. 2, ll. 35–63, col. 3, l. 38–col. 6, l. 24, claims 1–23, Figs. 1–3. For consistency, unless quoting portions of Curtin using “identification information” or other documents doing the same, we use the term “music information” herein.

col. 3, l. 64–col. 4, l. 1. Thus, the encoded music information is “associated” with, and “uniquely identifies,” the current broadcast of a piece of music at a particular date and time.

Curtin’s description of the music information shows that each segment is distinct from the other segments of the broadcast and can be uniquely identified. Certainly, some components of the music information, such as “artist” or “title,” by themselves could be used to identify a song in the abstract, as Patent Owner contends. But, by also including at least the “date” and “time,” the music information is able to distinguish the segment currently being broadcasted from other segments broadcasted at different dates and times. *See* Tr. 13:10–16. Indeed, Patent Owner acknowledges that a “temporal component” can distinguish portions of a broadcast as individual broadcast segments. *See* PO Resp. 21. “Date” and “time” are temporal components.

Patent Owner nevertheless argues that Curtin only uses “date” and “time” to differentiate between multiple songs with the same “artist” and “title,” or “when multiple versions of the same song appear on the same album.” *Id.* at 39–40 (citing Ex. 1010, col. 3, ll. 66–67; Ex. 2020 ¶ 76). And Patent Owner appears to contend that Curtin is ambiguous as to what the referenced “date” and “time” are and where they come from, arguing that they might refer to “the date the song was recorded” or “potentially the duration of the song.” *See* Sur-Reply 14–15; Tr. 33:18–36:11. Curtin, however, expressly states that the “date” and “time” are “associated with the current broadcast of the piece of music,” and the music information can be extracted from the incoming bitstream “associated with the current broadcast.” Ex. 1010, col. 2, ll. 35–48. Based on those disclosures, we agree with Petitioner and Dr. Almeroth that a person of ordinary skill in the

art would have understood the “date” and “time” in Curtin to refer to the “date and time of airing,” i.e., the date and time in which the segment is broadcasted (which is distinguishable from the dates and times when other segments are broadcasted). *See* Reply 9–10; Ex. 1026 ¶¶ 28–29.

We see no indication in Curtin that when the reference used the terms “date” and “time,” it meant to refer to something other than the date and time of the current song being broadcasted. If, for example, Patent Owner were correct that “date” and “time” merely distinguish between “multiple versions of the same song . . . on the same album,” or indicate when the song was recorded, the “date” and “time” would not be “associated with the current broadcast,” as Curtin expressly states. *See* PO Resp. 39; Sur-Reply 15; Ex. 1010, col. 2, ll. 35–48. Further, as Petitioner correctly points out, Patent Owner’s arguments pertain to *why* Curtin uses “date” and “time,” but claim 11 does not limit *why* the “broadcast segment” is a discretely identifiable portion of programming as broadcasted; it only requires a correlation between a “broadcast segment” and “media content identifying data.” *See* Reply 10.

Finally, Patent Owner argues that the ’028 patent discloses a “motivation for tracking not only the specific media content received, e.g., a particular version of a song, but also the specific broadcast of that specific media content”—namely, tracking broadcast segments for the purpose of “aggregating data or ‘Data Mining.’” PO Resp. 40 (citing Ex. 2020 ¶ 77). According to Patent Owner, Curtin is deficient because it “performs no data mining function, and therefore has no need to create the type of aggregate” described in the Specification and recited in limitation 11[d]. Sur-Reply 9. We disagree. Patent Owner describes such data mining as a mere “purpose” or “objective” of data aggregation. PO Resp. 21. There is no *requirement* in

the language of claim 11, or our interpretation of “broadcast segment,” that the aggregation recited in limitation 11[d] be used for data mining and selling information to interested parties. Indeed, the portions of the Specification relied upon by Patent Owner do not even use the term “broadcast segment,” and refer to aggregation of “sale” information (i.e., when the user purchases a song), which is not recited in claim 11. *See* Ex. 1001, col. 3, ll. 8–15, 52–55, col. 9, ll. 34–37; Ex. 1026 ¶ 14.

Thus, we agree with Petitioner that the digital audio information corresponding to a particular broadcasted song or other piece of music in Curtin constitutes a “broadcast segment” because it is a discretely identifiable portion of the broadcast transmitted to the user, and Curtin indicates that each such instance of digital audio information is correlated with the associated music information (i.e., “media content identifying data”) with which it is broadcasted, such that the user can later purchase the song. *See* Pet. 20–22; Reply 8–10. We credit the testimony of Dr. Almeroth in that regard, as his analysis is consistent with the disclosures of Curtin referenced above. *See* Ex. 1002 ¶¶ 82–83; Ex. 1026 ¶¶ 25–30.

For the foregoing reasons, we find that Curtin teaches the preamble of claim 11.

(2) Limitation 11[a]

Limitation 11[a] recites “receiving a broadcast stream comprising the at least one broadcast segment and associated media content.” Ex. 1001, col. 15, ll. 24–25. Patent Owner argues that Petitioner in the Petition cites different signals and components of signals in Curtin, without identifying specifically what it believes to be a “broadcast stream” or “broadcast segment.” PO Resp. 41 (citing Pet. 22; Ex. 2020 ¶ 78). Patent Owner

further contends that Petitioner’s “broadcast segment” arguments in the Reply constitute improper new argument under 37 C.F.R. § 42.23(b).
Sur-Reply 10.

We disagree. Petitioner’s contentions in the Petition mirror the language of limitation 11[a]. Specifically, Petitioner first argues that Curtin teaches a receiver (i.e., DAB receiver 102), then quotes Curtin’s disclosure of what DAB receiver 102 “receiv[es]”: “a hybrid in-band on-channel (HIBOC) FM signal having an analog FM host and one or more digital sidebands.” Pet. 22 (quoting Ex. 1010, col. 3, ll. 26–40); *see* Ex. 1002 ¶ 83. Petitioner then quotes Curtin’s disclosure of what the HIBOC FM signal includes: “digital audio information . . . correspond[ing] to, e.g., a particular song or other piece of music broadcast by the system.” Pet. 22–23 (quoting Ex. 1010, col. 3, ll. 48–50). Finally, Petitioner cites Curtin’s disclosure of how the digital audio bitstream is converted to an “analog audio output signal . . . supplied to a speaker.” *Id.* at 23 (citing Ex. 1010, col. 3, ll. 55–61). Thus, based on the language of limitation 11[a], which recites (A) a “broadcast stream” comprising (B) a “broadcast segment” and (C) “associated media content,” we understand Petitioner’s position to be that (A) the HIBOC FM signal constitutes a “broadcast stream,” (B) the digital audio information corresponding to a particular broadcasted song or piece of music constitutes a “broadcast segment,” and (C) the digital audio information as converted into an analog output signal constitutes “associated media content.” *See id.* at 22–23; Ex. 1002 ¶ 83; Dec. on Inst. 27.

As explained above, we are persuaded that the digital audio information of a broadcasted song or other piece of music constitutes a “broadcast segment.” *See supra* Section II.D.3.b.(1). Each broadcasted song is a discretely identifiable portion of programming as broadcasted, as

evidenced by the fact that the music information associated with the broadcast includes the “date” and “time” of the broadcast, and each broadcasted song is part of the HIBOC FM signal, converted into analog form, and output through the speakers. *See id.* Petitioner’s mappings are consistent with our interpretations of “broadcast segment,” limitation 11[a], “media content,” and the “associate” terms. *See supra* Sections II.B.2–5.

For the foregoing reasons, we find that Curtin teaches limitation 11[a].

(3) *Obviousness Arguments*

Petitioner argues that Curtin teaches all limitations of claim 11 other than limitation 11[e], for which it relies on the combination of Curtin and Crosby. Pet. 19–31. Limitation 11[e] recites:¹⁰

providing for presentation of at least a portion of the data elements stored in the electronic memory of the communication device, whereby the providing provides selective outputting, using an interface, of at least one of the following: *the media content identifying data*, the media content, the corollary broadcast segment, a temporal position of the corollary broadcast segment of the broadcast stream.

Ex. 1001, col. 15, l. 41–col. 16, l. 4 (emphasis added). Petitioner relies on the combined teachings of Curtin and Crosby,¹¹ arguing that a person of

¹⁰ Claims 11, 12–15, and 20 recite multiple alternatives preceded by the phrase “at least one of” or “at least one of the following.” For these claims, Petitioner need only show that the asserted prior art teaches one of the alternatives. *See Fresenius USA, Inc. v. Baxter Int’l, Inc.*, 582 F.3d 1288, 1297–98 (Fed. Cir. 2009). When introducing each claim, we add emphasis to the alternative(s) argued by Petitioner.

¹¹ Petitioner also argues, for purposes of the asserted obviousness ground based on Curtin, that Curtin alone teaches limitation 11[e], and Patent Owner makes various arguments in response. *See* Pet. 27–28; PO Resp.

ordinary skill in the art would have been motivated to modify Curtin's system to include the "additional presentation features" of Crosby. Pet. 28–31. Specifically, Petitioner contends that the web page display shown in Figure 7 of Crosby is an output that presents media content identifying data elements stored in an electronic memory of a communication device to provide selective outputting, using an interface, of media content identifying data. *Id.* at 29. Petitioner asserts that in Crosby, "while listening to [a] musical program on receiver 116, the user may want to obtain more information. By pressing single interactive radio control button 123 (similar to Curtin's 'push button'), information is forwarded to a network operations center" and, "[a]fter identifying the program . . . segment of interest from the user, the network operations center downloads information pertinent to the program segment and provides that information within a web site accessible by the subscriber." *Id.*

According to Petitioner, Crosby "presents similar media content identifying data elements as disclosed in Curtin" (e.g., song title, performer, broadcaster, date, time) and, "like Curtin, presents the data elements over a network connection." *Id.* at 29–30 (citing Ex. 1006, Fig. 7). Petitioner argues that a person of ordinary skill in the art

seeking to present the media content identifying data for ordering media content over a network connection (on e.g., a PDA, laptop or desktop computer, as taught by Curtin), . . . would have recognized that such information could be presented to the user using Crosby's web-based interface, which also allows for

42–46, 55; Reply 12–15; Sur-Reply 10–14. We need not address those arguments premised on Curtin's system alone (i.e., not modified based on the teachings of Crosby), though, because we find persuasive Petitioner's arguments regarding the combination of Curtin and Crosby. *See* Pet. 19–20, 28–31.

ordering. At the time of Curtin and Crosby, web-based user interfaces were a common and straightforward design choice for a [person of ordinary skill in the art] to allow consumers to download media content over a network, such as taught by Crosby. Combining Curtin's selective outputting of media content identifying data, with Crosby's interface displaying media content identifying data and allowing for a purchase would have been [a] straightforward combination of familiar elements that could be combined with predictable results.

Id. at 30–31.

Petitioner also points out that Curtin and Crosby are from “the same field of use” and disclose similar “interactive radio systems that uniquely identify broadcasts using information transmitted with the broadcast and allow for users to indicate selections for purchase,” such that an ordinarily skilled artisan “seeking to solve well-known interactive streaming and/or targeted content issues in media enhancement technologies would have known of and consulted” the references’ proposed solutions. *Id.* at 19–20. And Petitioner contends that a person of ordinary skill in the art would have had a reasonable expectation of success in making the combination because the references solve those problems “in similar ways, . . . using well-known broadcasting methods to enhance the user’s media experience, with predictable results,” and both use “substantially the same types of hardware, software, Internet, and/or communication means.” *Id.* at 20. Petitioner’s analysis is supported by the testimony of Dr. Almeroth, consistent with the disclosures of the two references, and persuasive, notwithstanding Patent Owner’s arguments to the contrary, which we now discuss. *See id.* at 19–20, 28–31; Ex. 1002 ¶¶ 76–80, 95.

First, Patent Owner asserts that a person of ordinary skill in the art would not have been motivated to combine Curtin and Crosby, and would

not have had a reasonable expectation of success in doing so, because the references “disclose two different solutions that are incompatible with each other in design, motivation and implementation.” PO Resp. 48–50 (citing Ex. 2020 ¶¶ 92–97). Patent Owner contends that Curtin provides music information with the broadcast, but Crosby “is designed to avoid sending such data,” where its “broadcast need only include the media content itself.” *Id.* at 50. The fact that Crosby does not *require* such communication, however, does not make the references incompatible. Indeed, Crosby states that “in the exemplary implementation, the system identifies specific program content selected by the subscriber by examining the carrier frequency of the broadcast in combination with the geographical location of the mobile unit and programming information provided by the broadcasters,” but “[i]n the alternative, the broadcast itself includes information encoded therein identifying the program segments,” and “the system can exploit that additional information as well.” Ex. 1006, col. 4, ll. 46–58, col. 8, ll. 48–56, col. 11, ll. 37–54. Crosby, therefore, at least contemplates the arrangement employed in Curtin (i.e., providing information identifying particular broadcast segments as part of the broadcast itself). *See In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”); *In re Mouttet*, 686 F.3d 1322, 1331 (Fed. Cir. 2012) (“A reference may be read for all that it teaches, including uses beyond its primary purpose.”).

Patent Owner further argues that Crosby uses a wireless transmitter in “constant communication” with a server that communicates a musical selection “instantaneously to [the] server,” whereas “Curtin is designed to circumvent this requirement, such that the receiver need not have any such

transmission capability.” PO Resp. 50; Sur-Reply 16–17. We do not agree that Curtin is designed to circumvent transmission of information from the receiver using a wireless transceiver. To the contrary, at the “later point in time” referenced in Curtin, the user “establish[es] a network connection 115 via a wireless transceiver” and transmits the extracted music information to the music server using that connection. Ex. 1010, col. 4, ll. 20–26, col. 5, ll. 46–52, Figs. 1–2. Although Patent Owner is correct that this occurs prior to any interaction for making a purchase, the fact that Curtin uses a wireless transceiver to transmit information demonstrates that the references are not incompatible as Patent Owner contends. *See* Sur-Reply 16–17.

The final difference discussed by Patent Owner is that Curtin’s receiver has a memory for storing the received music information because it is designed to transfer the information at a “later” time, whereas Crosby “requires no such memory” because it “instantaneously transmits the interactive response to a server.” PO Resp. 50; Sur-Reply 17. We do not see how the timing of the various communications renders the references incompatible, however. We also disagree that Crosby’s mobile unit does not need any memory to transmit information to a server. Although the reference does not mention such memory expressly, a person of ordinary skill in the art logically would have understood the mobile unit to have memory at least to “buffer incoming data in order to send it to the network operations center.” Ex. 1026 ¶ 43; *see* Ex. 1006, col. 6, l. 65–col. 7, l. 26 (describing the components of the disclosed interactive radio mobile unit), col. 4, ll. 46–58 (disclosing that Crosby can use “information encoded [in the broadcast itself] identifying the program segments” in an alternative embodiment), claim 34 (reciting a mobile unit comprising “computer

memory for storing a user identifier value” and “a transmitter for wirelessly transmitting . . . a user identifier value”).

Second, Patent Owner disputes Petitioner’s assertion that Curtin and Crosby are combinable because they refer to similar information pertaining to a song. PO Resp. 51 (citing Pet. 19–20; Ex. 2020 ¶ 98). Patent Owner notes that the information in Crosby is provided by network operations center 110, not broadcaster 102. *Id.* We do not see the relevance of this difference, however. Curtin discloses music information, including, for example, artist name, song title, source, and date and time of the broadcast, sent to DAB receiver 102. Ex. 1010, col. 2, ll. 35–46, col. 3, l. 64–col. 4, l. 1; *see supra* Section II.D.3.b.(1). At a later point in time, that extracted information is transmitted to the music server. Ex. 1010, col. 5, ll. 36–52. In response, the music server provides to the receiver (or a PC) “detailed information about the [user’s] music selections and instructions to the user regarding how to make the purchase,” but Curtin does not describe in detail how such information is presented to the user. *See id.* at col. 5, ll. 3–8, col. 6, ll. 13–16. Crosby similarly discloses information (i.e., artist name, song title, broadcaster, date and time of the broadcast, and links to e-commerce sites to make a purchase) provided by network operations center 110 to mobile unit 104, using a particular type of web page interface. Ex. 1006, col. 7, l. 62–col. 8, l. 8, col. 10, ll. 30–43, Figs. 1, 7. Notably, that information can originate from the broadcaster. Crosby discloses that network operations center 110 receives the information “via the Internet from the broadcasters” and stores it in various “pre-loaded” databases. *Id.* at col. 4, l. 58–col. 5, l. 1, col. 8, l. 60–col. 9, l. 31, Figs. 3–6.

We find that it would have been natural, therefore, for a person of ordinary skill in the art reading Curtin to look to a reference like Crosby,

which describes an interface for presenting to a user the same types of information that Curtin extracts, stores, and transmits (regardless of the particular device from which the information is received). The references disclose similar devices communicating similar information for a similar purpose—as Patent Owner acknowledges, both references are directed to “enabling a listener to tag and later purchase a piece of music they have heard via broadcast radio.” *See* Pet. 19–20, 29–30; PO Resp. 49; Tr. 40:12–14; *KSR*, 550 U.S. at 418–420 (holding that it is often necessary to “look to interrelated teachings of multiple patents” to determine whether there was a reason to combine known elements in the manner claimed, as “in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle”); *In re Hyon*, 679 F.3d 1363, 1366 (Fed. Cir. 2012) (affirming an obviousness determination where two “references both teach processes directed to making the same class of products” and minor differences between the disclosures did not “negate the motivation to combine”).

Third, Patent Owner argues that Petitioner’s contention that a person of ordinary skill in the art would have been motivated to add “additional features and benefits” taught by Crosby to Curtin’s system is unsupported. PO Resp. 52 (citing Ex. 2020 ¶ 99). We disagree. Curtin describes presenting information about a particular broadcasted song to the user, but does not describe in detail how such presentation is accomplished. *See* Ex. 1010, col. 5, ll. 3–8, col. 6, ll. 13–16. Crosby describes a particular web page interface presented to the user to make a purchase that Petitioner asserts an ordinarily skilled artisan would have found advantageous to incorporate into Curtin’s system. *See* Pet. 19–20, 28–31.

Fourth, Patent Owner argues that Petitioner’s contention that a person of ordinary skill in the art would have had a reasonable expectation of success in making the asserted combination is unsupported. PO Resp. 52–53 (citing Ex. 2020 ¶¶ 100–101). Patent Owner contends that Curtin and Crosby disclose “entirely different interactive radio systems” using “entirely different methods for communicating the interaction” and “different types of hardware.” *Id.* The only differences Patent Owner points to, though, are those discussed above: Curtin stores music information in memory at the receiver for subsequent transmission when “later connected to a network,” whereas Crosby uses a wireless transmitter to “transmit interactions as they happen.” *See id.* For the reasons explained above, we do not agree that these differences mean a person of ordinary skill in the art would not reasonably have been expected to succeed in modifying Curtin’s system to include an interface as described in Crosby. Again, the references disclose similar devices communicating similar information (albeit at different times) for a similar purpose. *See* Pet. 19–20, 29–30; PO Resp. 49. We also see no reason why it would have been beyond the level of ordinary skill to modify Curtin’s system to present at least some of the music information using an output interface of the type shown in Figure 7 of Crosby. *See supra* Section II.A; *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1382 (Fed. Cir. 2007) (the obviousness analysis must account for “modifications that one skilled in the art would make to a device borrowed from the prior art”).

Fifth, Patent Owner disputes whether the references teach limitation 11[e], arguing that “Crosby does not disclose a communications device with an electronic memory that stores at least a portion of the data elements” and “instead discloses transmission of the information directly to the network operations center.” PO Resp. 54–55 (citing Ex. 2020 ¶ 104). According to

Patent Owner, the web page interface of Figure 7 displays the “information stored in the network operation[s] center’s database,” not “the identifying information.” *Id.*

Petitioner, however, relies on the combined teachings of Curtin and Crosby as teaching limitation 11[e], beginning with Curtin’s system and proposing a modification to that system based on Crosby. Pet. 28–31.

Specifically, Petitioner argues that a person of ordinary skill in the art

seeking to present the media content identifying data [of Curtin] for ordering media content over a network connection (on e.g., a PDA, laptop or desktop computer, as taught by Curtin), . . . would have recognized that such information could be presented to the user using Crosby’s web-based interface, which also allows for ordering. . . . Combining Curtin’s selective outputting of media content identifying data, with Crosby’s interface displaying media content identifying data and allowing for a purchase would have been straightforward combination of familiar elements that could be combined with predictable results.

Id. at 30–31.

Thus, in the asserted combination, Curtin’s system, which already stores “media content identifying data elements” (i.e., elements of the extracted music information) in an “electronic memory” (i.e., RAM or a memory card) (as recited in limitation 11[d], which Patent Owner does not dispute) and transmits that information to a server, would be modified based on the teachings of Crosby (i.e., a network operations center receiving identification information upon selection by the user and providing in response the web page interface of Figure 7 showing certain information about a program segment to facilitate a purchase), such that the server provides an interface that selectively outputs the information to the user. *See id.*; Reply 18 (“Crosby is used simply for what the outside server does with the media content identifying data—selectively outputting pertinent

information about the program segment”); PO Resp. 56 (acknowledging that “Petitioner proposes the use of Crosby’s interface for displaying media content identifying data as disclosed by Curtin”); Tr. 56:15–57:7; *Bradium*, 923 F.3d at 1050 (“A finding of obviousness . . . cannot be overcome ‘by attacking references individually where the rejection is based upon the teachings of a combination of references.’” (quoting *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986))); *Mouttet*, 686 F.3d at 1333 (holding that “the test for obviousness is what the combined teachings of the references would have suggested to those having ordinary skill in the art”); *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1166 (Fed. Cir. 2006) (explaining that in an obviousness analysis, “the prior art must be considered *as a whole* for what it teaches”). Petitioner has made a sufficient showing as to that combination.¹²

Sixth, Patent Owner states that Curtin’s music server uses the extracted music information received from the receiver to present further

¹² We disagree with Patent Owner that Petitioner improperly changed its obviousness theory in its Reply. *See* Sur-Reply 17–19. Petitioner in the Petition proposed “modifying Curtin’s presentation of media information to the user” to use an interface like that described in Crosby for “displaying media content identifying data and allowing for a purchase,” and maintained that theory in its Reply. *See* Pet. 28–31; Reply 18–19; *Chamberlain Group, Inc. v. One World Techs., Inc.*, 944 F.3d 919, 924–25 (Fed. Cir. 2019) (“Parties are not barred from elaborating on their arguments on issues previously raised.”); *Ericsson Inc. v. Intellectual Ventures I LLC*, 901 F.3d 1374, 1381 (Fed. Cir. 2018) (determining that a reply argument was proper where it “cite[d] no new evidence and merely expand[ed] on a previously argued rationale”). Contrary to Patent Owner’s argument, Petitioner does not propose adding a network operations center to Curtin’s system, but rather discusses that device because it is the server with which the receiver in Crosby communicates (analogous to the music server with which the receiver in Curtin communicates). *See* Reply 18–19; Sur-Reply 18–19.

information to the user to enable a purchase, whereas Crosby's network operations center retrieves information from a database, "independently of the broadcaster," to create the Figure 7 web page. PO Resp. 55–56 (citing Ex. 2020 ¶ 107). From this, Patent Owner concludes that Crosby "teach[es] away from Curtin's teaching of presenting broadcaster-provided information," and "Crosby's reliance on complex identification databases teaches away from, or at a minimum is not compatible with Curtin's use of music information extracted from the broadcast." *Id.*; Sur-Reply 18–19.

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). "The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant." *Id.* Also, "mere disclosure of alternative designs does not teach away." *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

Crosby's network operations center retrieves "media content identifying data" (e.g., song title, performer, broadcaster, date, time) from a database and provides that data to the user in the web page interface of Figure 7. Ex. 1006, col. 7, ll. 37–50, col. 10, ll. 20–24, 30–35. We do not agree that a person of ordinary skill would have been discouraged from making the combination based on the fact that Crosby receives such information from a database, rather than from a receiver, as in Curtin. In that regard, we find persuasive the following explanation provided by Dr. Almeroth:

[t]hat the network operations center receives th[e] content from databases as a result of a query would have no bearing on a [person of ordinary skill in the art's] ability to implement the combination or expectation of success. Once the information is received by the network operations center, from whatever source, it would have been a simple matter for a [person of ordinary skill in the art] to format and output that information as taught by Crosby

Ex. 1026 ¶ 45. Indeed, as explained above, Crosby describes an “alternative” arrangement where “the broadcast itself includes information encoded therein identifying the program segments.” Ex. 1006, col. 4, ll. 46–58, col. 8, ll. 48–56. Crosby, therefore, does not teach away from using broadcaster-provided information, as in Curtin.

Seventh, Patent Owner argues that the asserted combination would not have been straightforward and predictable as Petitioner contends because it is unclear “[w]hat would be received by (and transmitted by) Curtin’s digital audio broadcasting receiver as media content identifying data.” PO Resp. 56–57 (citing Ex. 2020 ¶ 108). We disagree. Petitioner identifies the music information in Curtin, such as artist, title, source, date, and time, which, in the asserted combination, would be displayed using an interface of the type shown in Figure 7 of Crosby. *See* Pet. 28–31; Reply 19–20; Ex. 1026 ¶ 46.

Patent Owner further argues that “any benefit possibly provided by Crosby’s Figure 7 display was a result of Crosby’s use of server-side databases, not Curtin’s received media data,” and modifying Curtin’s system based on Crosby would have rendered it “inoperable in practice” because “[t]he resulting system would have been vulnerable to broadcast data errors, malicious content and inconsistencies, since the broadcast data in Curtin does not utilize the identification databases and verification steps of Crosby that Petitioner did not require for its combination.” PO Resp. 56–57. Again,

however, the only modification to Curtin is the output, in a particular type of interface, of information that Curtin already collects (e.g., song title, performer, broadcaster, date, time). *See* Pet. 28–31; Reply 18–20. Thus, we do not see how any security or consistency concerns would dissuade a person of ordinary skill in the art from making the combination.

Petitioner has persuasively shown that the combination of Curtin and Crosby teaches limitation 11[e], and a person of ordinary skill in the art would have been motivated to modify Curtin’s system based on the teachings of Crosby and would have had a reasonable expectation of success in doing so. In making that determination, we have considered Patent Owner’s arguments regarding secondary considerations of nonobviousness, which we discuss next.

(4) Secondary Considerations of Nonobviousness

Patent Owner argues that “praise by others in the industry supports patentability of the challenged claims.” PO Resp. 67–68. Patent Owner asserts that “[t]he industry has recognized the value of the claimed inventions” and “[t]his recognition has come in various forms, including recognition of the claimed solutions in well-known technical publications. For example, the claimed subject matter, as implemented in Hyundai Autonet’s DIF radios, was honored as one of the best innovations of the year in the 2004 CES Innovations Awards.” *Id.* As support, Patent Owner cites—without explanation—Exhibits 2014–2017. *Id.*

“In order to accord substantial weight to secondary considerations in an obviousness analysis, the evidence of secondary considerations must have a nexus to the claims, *i.e.*, there must be a legally and factually sufficient connection between the evidence and the patented invention.” *Fox Factory*,

Inc. v. SRAM, LLC, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (citations and internal quotation marks omitted). “The patentee bears the burden of showing that a nexus exists.” *Id.* “To determine whether the patentee has met that burden, we consider the correspondence between the objective evidence and the claim scope.” *Id.* A patentee is entitled to a rebuttable 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.’” *Id.* (citation omitted). However, “[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations.” *Id.* “To the contrary, 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 1373–1374 (citation omitted). With respect to industry praise in particular, “[e]vidence that the industry praised a claimed invention or a product which embodies the patent claims weighs against an assertion that the same claim would have been obvious. Industry participants, especially competitors, are not likely to praise an obvious advance over the known art.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1334 (Fed. Cir. 2016). But evidence of industry praise must be for “the claimed invention.” *See Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (en banc).

Patent Owner makes no attempt to tie the alleged industry praise evidenced in Exhibits 2014–2017 to any challenged claim¹³ or any product

¹³ In its arguments regarding secondary considerations of nonobviousness, Patent Owner refers collectively to “the challenged claims” or “the claimed inventions.” PO Resp. 67–68. Although we address those arguments herein in connection with claim 11 and the obviousness ground based on Curtin and

that allegedly embodies such claims. *See* PO Resp. 67–68. Patent Owner merely cites the exhibits by number. *Id.* We have reviewed the exhibits, which appear to refer to a “Hyundai Autonet Interactive Symphony Digital IF Radio” receiver. Absent some explanation of how that product worked, though, there is no basis to say that it embodies any of the challenged claims. Accordingly, we find that Patent Owner has not established a sufficient nexus between any of the challenged claims and the alleged industry praise. We conclude that Patent Owner’s evidence purportedly showing industry praise does not weigh in favor of nonobviousness of the challenged claims.

c) Conclusion

Petitioner has shown sufficiently that Curtin and Crosby collectively teach all of the limitations of claim 11 and a person of ordinary skill in the art would have been motivated to combine the references’ disclosures to arrive at the method of claim 11 with a reasonable expectation of success. *See* Pet. 19–31; Ex. 1002 ¶¶ 76–89, 92–96. Based on all of the evidence of record, including evidence of secondary considerations of nonobviousness submitted by Patent Owner, we determine that Petitioner has proven, by a preponderance of the evidence, that claim 11 would have been obvious based on Curtin and Crosby under 35 U.S.C. § 103(a).

Crosby, our analysis of secondary considerations applies to all challenged claims and obviousness grounds asserted by Petitioner.

4. *Claim 14*

Claim 14 depends from claim 11 and recites that “at least one of the receiving, *storing*, aggregating, correlating operations are *accessible by* at least one of the following: a response authentication system, a broadcaster, an advertiser, *a content provider*, a wireless carrier, a web portal, a third party database.” Ex. 1001, col. 16, ll. 13–17 (emphasis added). Petitioner argues that the step of storing music information in the electronic memory (e.g., RAM) of Curtin’s receiver is “accessible to a ‘content provider’ via the transmission of that information over the Internet to facilitate a purchase of the media content.” Pet. 33–35. Petitioner cites Curtin’s disclosure of the music server providing information over the network connection to the user’s device. *Id.* Petitioner does not rely on any teaching in Crosby for the additional limitation of claim 14. *See id.* In the Decision on Institution, we determined, based on the record at the time, that Petitioner had not shown a reasonable likelihood of prevailing on its assertion that claim 14 is unpatentable over Curtin and Crosby. Dec. on Inst. 35. Neither party addressed the asserted ground as to claim 14 in their papers filed during trial. *See* Tr. 25:13–17, 46:20–23.

Claim 14 recites, in relevant part to Petitioner’s allegations, that the step of storing in the electronic memory is accessible *by* a content provider. Curtin discloses that the music server transmits information *to* the receiving device (e.g., the receiver itself or a PC), which is then responsible for any further processing. Ex. 1010, col. 5, ll. 6–8, col. 6, ll. 13–16. We do not see—and Petitioner has not explained—how this equates with the step of storing in the electronic memory of the device being accessible *by* the music server. Further, although Curtin discloses that the user can order a particular music track or album and “download [it] for later playback,” Curtin does not

disclose where such content is stored. *See id.* at col. 6, ll. 16–21. Based on the full trial record, Petitioner has not proven, by a preponderance of the evidence, that claim 14 would have been obvious based on Curtin and Crosby under 35 U.S.C. § 103(a).

5. *Claim 16*

Claim 11 recites a “data stream” comprising “media content identifying data,” which in turn comprises “at least one element.” Ex. 1001, col. 15, ll. 26–29. Claim 16, which depends from claim 11, recites that “the data stream further comprises data that enables a unique identification of the at least one broadcast segment.” *Id.* at col. 16, ll. 25–27. Petitioner argues that Curtin teaches that “the extracted music information includes ‘information that uniquely identifies a particular piece of music or other audio information by artist, title, album, label, source, date, time, etc.’” Pet. 36 (quoting Ex. 1010, col. 3, l. 64–col. 4, l. 2; emphasis omitted).

Patent Owner responds that the cited information could be used to identify “a particular piece of music,” but it does not identify a “broadcast segment.” PO Resp. 47 (citing Ex. 2020 ¶ 90); Sur-Reply 14–15. Patent Owner further argues that Curtin does not disclose “tracking of information for data mining purposes and therefore demonstrates no motivation to identify broadcast segments using the data stream.” PO Resp. 47 (citing Ex. 2020 ¶ 90). We disagree and find, for the reasons explained above, that Curtin’s music information, including “date” and “time,” distinguishes broadcast segments from each other (i.e., other segments broadcasted at different dates and times), such that each broadcast segment is uniquely identified. *See supra* Section II.D.3.b.(1). And claim 11 does not require identifying broadcast segments or aggregating data for the purpose of data

mining. *See id.* Finally, as we noted in the Decision on Institution, the extracted music information in Curtin is made up of multiple pieces of information, such that one or more pieces of such music information may be considered “media content identifying data” and one or more other pieces of music information considered “data that enables a unique identification of the at least one broadcast segment,” as recited in claims 11 and 16. *See* Dec. on Inst. 36–37.

We find that Curtin teaches the limitation that “the data stream further comprises data that enables a unique identification of the at least one broadcast segment,” as recited in claim 16, for the reasons stated by Petitioner. *See* Pet. 36; Ex. 1002 ¶ 108. Based on the full trial record, including evidence of secondary considerations of nonobviousness submitted by Patent Owner, we determine that Petitioner has proven, by a preponderance of the evidence, that claim 16 would have been obvious based on Curtin and Crosby under 35 U.S.C. § 103(a).

6. *Claims 13, 15, and 17–20*

Claim 13 depends from claim 11 and recites that “at least one of the receiving, storing, aggregating, *correlating* operations are performed *externally to a database system which contains at least one of the data aggregates.*” Ex. 1001, col. 16, ll. 9–12 (emphasis added). Petitioner argues that a person of ordinary skill in the art would have been motivated to “perform the correlating operation ‘externally to a database,’ as taught by Crosby,” relying on Crosby’s teachings of (1) the user pressing a button to either obtain more information about a program segment or make a purchase, causing a signal to be sent to a network operations center, and (2) the network operations center maintaining databases with aggregated

data. Pet. 32–33 (citing Ex. 1006, code (57), col. 3, ll. 47–49, 59–63, col. 4, ll. 58–66, col. 8, l. 60–col. 9, l. 4, col. 9, ll. 14–26). According to Petitioner, an ordinarily skilled artisan would have been motivated to use a database in that way in Curtin’s system “based on Crosby’s teaching that a database was well-known prior art for correlating broadcasted program segments with ‘goods or services the subscriber wishes to purchase,’” and “would have had a reasonable expectation of success” because “relational databases were designed for such purposes as keeping associated data together and accessible.” *Id.* at 33 (citing Ex. 1006, col. 1, ll. 48–56; Ex. 1002 ¶ 103).

Claim 15 depends from claim 11 and recites that

the association of the data stream with the broadcast stream is at least one of the following: the data stream is frequency multiplexed with the broadcast stream, the data stream is time multiplexed with the broadcast stream, the data stream is transmitted independently from the broadcast stream, *the data stream is encoded in the broadcast stream.*

Ex. 1001, col. 16, ll. 18–24 (emphasis added). Petitioner argues that the association in Curtin is the digital bitstream comprising the music information being encoded in the HIBOC FM signal. Pet. 35–36 (citing Ex. 1010, col. 2, ll. 46–48, col. 3, ll. 31–40, 51–52).

Claim 17 depends from claim 11 and recites that the method further comprises “selecting the at least one broadcast segment,” “preparing a data packet comprising at least one of the media content identifying elements,” and “communicating the data packet to a server.” Ex. 1001, col. 16, ll. 28–32. With respect to the selection limitation, Petitioner argues that “Curtin discloses selecting, preparing, and transmitting data to the server, for example as explained above with regard to [c]laim 11.” Pet. 37; *see CRFD Research, Inc. v. Matal*, 876 F.3d 1330, 1345–46 (Fed. Cir. 2017) (agreeing

with the petitioner that it “incorporated [an] argument into other grounds of unpatentability . . . by direct citation to [the] argument in the petition”).

In its analysis of claim 11, Petitioner explains how “user input” occurs in Curtin, in particular how a user selects the currently playing piece of music by “pushing a button [on the receiver] to indicate that [the] piece of broadcasted music is of interest,” causing the receiver to store extracted music information in memory. Pet. 24. And we agree with Petitioner, for the reasons explained above, that the user receives and selects a “broadcast segment.” *See id.* at 20–23, 28–31; *supra* Section II.D.3.b. With respect to the data packet limitations, Petitioner argues that Curtin uses a network connection to communicate extracted music information to the music server and “[i]t would have been obvious to a [person of ordinary skill in the art] to use a reliable protocol such as [Transmission Control Protocol/Internet Protocol (TCP/IP)], which would packetize the data as part of its well-understood internet operations.” Pet. 37 (citing Ex. 1010, col. 6, ll. 11–12 (DAB receiver 102 “is connected to an Internet music server via a network connection”); Ex. 1002 ¶ 109).

Claim 18 depends from claim 11 and recites that the method further comprises “detecting a selection input associated with the presentation of the stored data.” Ex. 1001, col. 16, ll. 33–35. Petitioner argues that Curtin teaches the recited selection input, relying on the reference’s disclosure of the music server providing to the receiver “detailed information about the corresponding music selections and instructions to the user regarding how to make the purchase” and the receiver allowing the user to place an order for a particular music track in a “purchase operation.” Pet. 37–38 (quoting Ex. 1010, col. 5, ll. 3–24, col. 6, ll. 6–21).

Claim 19 depends from claim 18 and recites that the method further comprises “creating and communicating a data packet to a server responsive to the selection input detection.” Ex. 1001, col. 16, ll. 36–38. Petitioner argues that Curtin teaches the recited creation and communication, relying on the reference’s disclosure of “user input” at the receiver, communication with the music server, and the music server providing information in response, and referencing Petitioner’s previous arguments pertaining to claim 17 regarding the use of data packets in Curtin. Pet. 38–39 (citing Pet. 37; Ex. 1010, col. 4, ll. 19–26, col. 5, ll. 36–56).

Claim 20 depends from claim 19 and recites that “the communication of the data packet to the server is accomplished by at least one of the following: communicating wirelessly, communicating using a wired connection, communicating over the internet, communicating using a removable memory storage device.” Ex. 1001, col. 16, ll. 39–43. Petitioner argues that Curtin teaches “wired or wireless” communication between the receiver and music server, as well as use of a “PCMCIA card or other type [of] memory card.” Pet. 39 (quoting Ex. 1010, col. 5, ll. 47–48, col. 6, ll. 10–11).

Patent Owner does not argue separately dependent claims 13, 15, and 17–20. *See* PO Resp. 57. We disagree with Patent Owner’s arguments regarding parent claim 11 and secondary considerations of nonobviousness for the reasons explained above. *See supra* Section II.D.3. We have reviewed Petitioner’s contentions and supporting evidence, including the testimony of Dr. Almeroth, and are persuaded that Petitioner has proven, by a preponderance of the evidence, that claims 13, 15, and 17–20 would have been obvious based on Curtin and Crosby under 35 U.S.C. § 103(a), for the

reasons stated by Petitioner. *See* Pet. 31–33, 35–39; Ex. 1002 ¶¶ 97–98, 101–104, 107, 109–113.

E. Obviousness Ground Based on Curtin (Claims 11 and 13–20)

Petitioner contends that claims 11 and 13–20 are unpatentable over Curtin under 35 U.S.C. § 103(a). Pet. 19–39. Petitioner argues that Curtin teaches limitations 11[a]–[e], and argues in the alternative that the combination of Curtin and Crosby teaches limitation 11[e]. *See supra* Section II.D.3. As explained above, we conclude that claims 11, 13, and 15–20 are unpatentable over Curtin and Crosby. *See supra* Section II.D. As such, we need not address Petitioner’s alternative ground based on Curtin alone as to those claims. *See Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. Apr. 30, 2020) (non-precedential) (recognizing that “the Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”). With respect to claim 14, Petitioner relies solely on Curtin and, for the reasons explained above, we are not persuaded by Petitioner’s arguments that Curtin teaches or suggests the additional limitation of the claim. *See supra* Section II.D.4. Accordingly, Petitioner has not proven, by a preponderance of the evidence, that claim 14 would have been obvious based on Curtin under 35 U.S.C. § 103(a). *See id.*

F. Obviousness Ground Based on Alwadish (Claims 11, 12, 14–16, and 18)

1. Alwadish

Alwadish discloses “[a] technique for broadcasting program material together with encoded items of information pertaining to the program material such as the title of a broadcast musical piece, the artist name, catalog number, and the like.” Ex. 1011, code (57). Alwadish is directed to a purported solution to the problem where listeners “frequently wish they can remember the name, artist or other pertinent information relating to a musical piece or selection they heard during a recent broadcast,” but they are “driving or under some other condition where it is not possible or practical to jot down identifying information so as to enable the selection to be later purchased at a record/tape store.” *Id.* at col. 1, ll. 20–31.

Figure 1 of Alwadish is reproduced below.

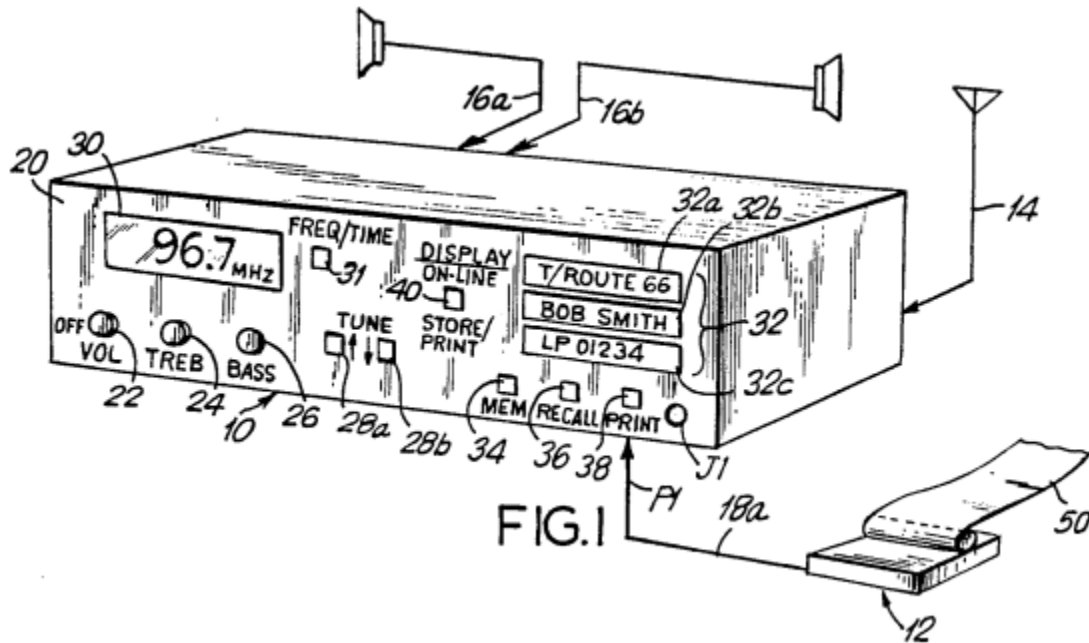


Figure 1 depicts receiver 10, which may be an FM broadcast receiver “dimensioned to fit in the dashboard of an automobile,” with antenna cable 14, speaker cables 16a and 16b, and associated printer device 12. *Id.* at col. 3, ll. 18–27. An FM radio broadcast station encodes “identifying information text” (e.g., title, artist name, catalog number) for a particular musical piece, also referred to as “information items,” with the musical program material in the FM broadcast carrier signal, which receiver 10 is able to detect and decode using extractor circuit 112 (shown in Figure 5). *Id.* at code (57), col. 2, ll. 21–56, col. 5, l. 64–col. 7, l. 23.

Liquid crystal (LC) display panel 32 displays the decoded information items in “up to 3 lines of alphanumeric text” of 16 characters each, where first line 32a “displays a title, e.g., ‘Route 66’ identifying a broadcast musical piece,” line 32b “displays the artist’s name,” and line 32c “display[s] a corresponding record or tape catalogue number to facilitate the purchase of the musical piece by a listener.” *Id.* at col. 3, ll. 43–54.

Pressing memory button 34 causes receiver 10 to “store the various information items displayed by the lines 32a, 32b and 32c in a receiver memory.” *Id.* at col. 3, ll. 55–59, col. 9, ll. 8–16, Fig. 6. Pressing recall button 36 “enables the recall of previously stored information items, for display and printing.” *Id.* at col. 3, ll. 59–62. Pressing print button 38 “causes the printing of the recalled information items via the printer device 12.” *Id.* at col. 3, ll. 62–64, Figs. 3, 4.

Figure 3 of Alwadish is reproduced below.

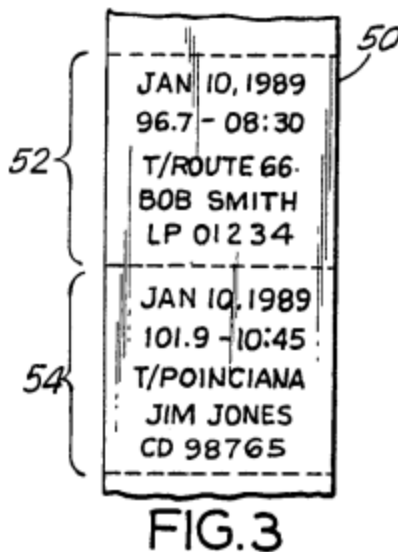


Figure 3 depicts paper strip 50, printed by printer device 12 when the user presses recall button 36 to recall “the most recent set of identification data that was stored by operation of the memory button 34,” then presses print button 38. *Id.* at col. 4, ll. 37–48, Fig. 3. Paper strip 50 shows in frame 52, for example, that the user pressed memory button 34 at 8:30 AM on January 10, 1989, while listening to a musical piece called “Route 66” by “Bob Smith” with catalog number “LP 01234” on the FM station broadcasting at 96.7 MHz. *Id.* at col. 4, ll. 13–29. Internal calendar circuit 222 of receiver 10 provides “the present date and time in 24-hour format,” and

frequency-time switch circuit 31 provides the current FM broadcast frequency, to memory buffers for display on LC display panel 30 and/or printing on paper. *Id.* at col. 7, l. 66–col. 8, l. 11, Fig. 6. Alwadish discloses:

The date and time data from the buffer 224, and the frequency data from the buffer 226 are also supplied to an input bus of a print memory 228. Information item data as decoded and output from the decode stage 220 is also supplied to the input bus of the print memory 228, so that data corresponding to the current date, time and station frequency are continuously appended to the decoded information item data obtained from the tuner/demodulator unit 206 of the receiver 10, whenever the information item data is written at selected addresses of the print memory 228.

Address selector circuit 230 is coupled to the print memory 228 and selects sets of, e.g., five memory addresses for storage of each set of information item data. Read/write circuit 232 coupled to the address circuit 230 and the print memory 228 sets the print memory in either a store/write mode in response to operation of memory button 34, or a read/print mode in response to operation of the recall button 36. The output of print memory 228 is supplied to a print buffer/control circuit 234 which is responsive to operation of the print button 38 on the front of the receiver. . . .

Id. at col. 8, ll. 12–33.

2. Claim 11

Petitioner argues that claim 11 is unpatentable over Alwadish under 35 U.S.C. § 103(a), relying on the testimony of Dr. Almeroth as support. Pet. 39–47 (citing Ex. 1002). Patent Owner makes various arguments in response, relying on the testimony of Dr. Hart. PO Resp. 58–62 (citing Ex. 2020); Sur-Reply 19–21.

a) Petitioner's Arguments

Petitioner argues that Alwadish teaches or suggests all of the limitations of claim 11. Pet. 39–47.

With respect to the preamble of claim 11, Petitioner contends that Alwadish teaches a method for correlating “media content identifying data” (i.e., information items, “such as the title of a broadcast musical piece, the artist name, catalog number, and the like”) with a “broadcast segment” (i.e., a broadcasted musical piece) received by a “communication device” (i.e., receiver 10). *Id.* at 39–40. In arguing that Alwadish teaches the recited correlation, Petitioner cites Alwadish’s disclosure of receiver 10 detecting, storing, retrieving, and printing the information items in response to the user pressing buttons on the device. *Id.*

With respect to limitation 11[a], Petitioner contends that Alwadish teaches receiving (via receiver 10 with antenna cable 14 for receiving an FM broadcast) a “broadcast stream” (i.e., FM broadcast signal containing a stream of musical pieces) comprising “at least one broadcast segment and associated media content.” *Id.* at 40–41. Petitioner cites Alwadish’s disclosures that “[b]roadcast stations often transmit a number of musical pieces, one right after the other,” and argues that the received music content in Alwadish is “demodulated from the broadcast, . . . amplified, and played over left and right speakers.” *Id.* (quoting Ex. 1011, col. 1, ll. 32–34; citing *id.* at col. 7, ll. 34–38).

With respect to limitation 11[b], Petitioner argues that receiver 10 receives a “data stream” (i.e., data encoded in the broadcast carrier signal) comprising the “media content identifying data compris[ing] at least one element” (i.e., at least one of the information items for a musical piece, such as title, artist name, catalog number, and the like). Pet. 41–42.

With respect to limitation 11[c], Petitioner contends that Alwadish teaches extracting (using extractor circuit 112) the information items for a musical piece from the data stream, where each piece of information is associated with media content, “according to [the musical piece’s] date and time of broadcast and station frequency.” *Id.* at 42–44. Petitioner argues that Alwadish appends the date, time, and station frequency to the information items, stores them together in memory, and prints them together in response to the user pressing a button. *Id.* at 43–44.

With respect to limitation 11[d], Petitioner argues that Alwadish teaches storing in an “electronic memory” (i.e., print memory 228) the extracted information items for a musical piece. *Id.* at 44. Petitioner asserts, with supporting testimony from Dr. Almeroth and citations to various disclosures in Alwadish, that a person of ordinary skill in the art would have understood Alwadish’s disclosures that date, time, and station frequency are continuously appended to the decoded information items for a musical piece, and particular sets of addresses are selected for storage of the data, to mean that the information items are stored as “identifying data aggregates.” *Id.* at 44–45 (citing Ex. 1002 ¶ 120; Ex. 1011, col. 8, ll. 14–37).

Petitioner further contends that storing the information items into “identifying data aggregates” would have been obvious based on the knowledge of a person of ordinary skill in the art that “essentially all computer programming languages” at the time of the ’028 patent “included data structures that would store a plurality of data elements as data aggregates,” and “[a] common programming practice at the time would have been to store the types of data described in Alwadish in the kinds of data structures available in existing programming languages, and then writing them to a set of memory addresses, as Alwadish discloses.” *Id.* at 45–46

(citing Ex. 1002 ¶ 121). And a person of ordinary skill in the art would have been motivated to do so, with a reasonable expectation of success, according to Petitioner because “the purpose of the storage is to enable the user to later recall [information] for display or print” and purchase the musical piece that was broadcasted. *Id.*

With respect to limitation 11[e], Petitioner argues that Alwadish teaches display panel 32 and printer device 12 for selectively displaying and printing the “media content identifying data” (i.e., the information items for a musical piece, such as title, artist name, catalog number, and the like) when the user presses recall button 36 and print button 38, respectively. *Id.* at 46–47.

We are persuaded by Petitioner’s analysis, as explained above and supported by the testimony of Dr. Almeroth, and notwithstanding Patent Owner’s arguments to the contrary, which we address below.

b) Patent Owner’s Arguments

Patent Owner makes various arguments disputing Petitioner’s contentions regarding the preamble of claim 11 and limitation 11[d]. *See* PO Resp. 58–62; Sur-Reply 19–21.

(1) Preamble of Claim 11

Claim 11 recites “[a] method for correlating media content identifying data with at least one broadcast segment received by a communication device.” Ex. 1001, col. 15, ll. 21–23. Patent Owner argues that Petitioner fails to identify a “broadcast segment” in Alwadish because Alwadish’s internal calendar circuit merely provides the “local time for inclusion in the displayed and printed record made available to the listener” and does not

receive date and time information “with the broadcast.” PO Resp. 58–59 (citing Ex. 2020 ¶¶ 110–111); Sur-Reply 19. “At most,” in Patent Owner’s view, “Alwadish teaches recording when a song was played, but that provides no information about a broadcast segment containing a song.” PO Resp. 59. Patent Owner further contends that the date and time in Alwadish “would not be sufficient [by themselves] to discretely identify a portion of programming as broadcasted to any system,” and Alwadish also “does not address the situation where multiple stations use the same frequency.” *See id.*; Sur-Reply 19.

Similar to Curtin, which uses the date and time of the current song being broadcasted, Alwadish utilizes date and time when receiving a broadcasted musical piece. The difference between the two is that Curtin’s receiver receives the date and time of the broadcasted song in the encoded music information received with the broadcasted song, whereas Alwadish’s receiver uses an internal calendar circuit to determine the current date and time when listening to a broadcasted musical piece. Given the full disclosure of Alwadish, however, we do not find this difference dispositive, and conclude that Alwadish’s broadcasted musical pieces are “broadcast segments.”

Alwadish discloses that receiver 10 receives “the title of [the] broadcast musical piece, the artist name, catalog number, and the like” for the musical piece currently being broadcasted. Ex. 1011, code (57), col. 2, ll. 21–56, col. 5, l. 64–col. 6, l. 11. “[D]ata corresponding to the current date, time and station frequency are continuously appended to the decoded information item data . . . whenever the information item data is written at selected addresses of the print memory 228.” *Id.* at col. 8, ll. 14–22. Importantly, the data is written when the user presses memory button 34

during the broadcast of a particular musical piece. *Id.* at col. 4, ll. 20–36 (disclosing that “the listener activated memory button 34 on the receiver 10 while listening to a musical piece” with the attributes shown in Figure 3, and 8:30 AM was “the time of day during which the musical piece was actually being broadcast”), col. 8, ll. 23–30, col. 9, ll. 8–16. Thus, the stored date and time are the date and time when the user pressed the button, and correspond to the musical piece being broadcasted at that time. This is evidenced by Figure 3 above, for example, which depicts all of the information together: title, artist name, catalog number, date, time, and station frequency. Showing all of the information together allows the user to recall and potentially purchase the musical piece broadcasted at that date and time, which Alwadish describes as the purpose of storing date and time. *See id.* at col. 4, ll. 48–53 (“date, time and station frequency information are included in the frames 52, 54, so that the listener can correctly associate the printed data with the piece that was being broadcast when the memory button 34 was operated”).

Thus, like Curtin, the fact that Alwadish refers to date and time (along with other information, such as title and artist name) indicates that each segment of the broadcast is distinct from other segments of the broadcast and can be uniquely identified. *See supra* Section II.D.3.b.(1). Based on the disclosures of Alwadish discussed above, we find persuasive Dr. Almeroth’s testimony that the information about a broadcasted musical piece stored in Alwadish “enables each specific instance of a song being played to be uniquely identified by its airing time.” *See* Ex. 1026 ¶ 51. Further, we see no basis in our interpretation of “broadcast segment” (“a discretely identifiable portion of programming as broadcasted”), or the other language of claim 11, to require that any one piece of information be sufficient in and

of itself to make the broadcasted musical pieces “discretely identifiable.” *See supra* Section II.B.2. Nor do we see any requirement that all of the information that makes something “discretely identifiable” be provided with the broadcast (as opposed to a mix of information provided with the broadcast and information provided internally, as in Alwadish). The interpretation of “broadcast segment” only requires that a portion of programming be “discretely identifiable,” and does not limit how or why that attribute exists.

Finally, Patent Owner argues that Alwadish’s “internal calendar circuit was not designed to meet the ’028 patent’s requirements to differentiate multiple broadcasts of the same song or advertisement” and would not fulfill the ’028 patent’s “motivation for tracking sales activity for the purposes of aggregating data or Data Mining.” PO Resp. 59–60 (quotation marks omitted; citing Ex. 2020 ¶ 112). As explained above, though, we do not agree that claim 11 limits why the “broadcast segment” is a discretely identifiable portion of programming as broadcasted or requires aggregation of data pertaining to broadcast segments to be used for such purposes. *See supra* Section II.D.3.b.(1).

Thus, we agree with Petitioner that each broadcasted musical piece in Alwadish constitutes a “broadcast segment” because it is a discretely identifiable portion of the broadcast transmitted to the user, and Alwadish indicates that each such instance is correlated with the associated information items (i.e., “media content identifying data”) with which it is broadcasted, where the relevant date and time during the broadcast of the musical piece is appended to the information items and stored in memory, allowing the user to later print all of the information for the musical piece together. *See* Pet. 39–41; Reply 22–24. We credit the testimony of

Dr. Almeroth in that regard, as his analysis is consistent with the disclosures of Alwadish referenced above. *See* Ex. 1002 ¶¶ 114–115; Ex. 1026 ¶¶ 48–53.

For the foregoing reasons, we find that Alwadish teaches the preamble of claim 11.

(2) Limitation 11[d]

Limitation 11[d] recites

storing in an electronic memory of the communication device configured to store, at a minimum, media content identifying data elements into identifying data aggregates, each identifying data aggregate associated with at least one of the plurality of media content and the at least one broadcast segment, wherein the at least one broadcast segment is corollary to the at least one of the plurality of media content.

Ex. 1001, col. 15, ll. 34–40. As explained above, Petitioner argues that Alwadish aggregates the information items (e.g., title, artist name, catalog number) for a particular music piece that is broadcasted into an “identifying data aggregate” and stores the aggregated data in memory, citing Alwadish’s description of how the date, time, and station frequency are continuously appended to the set of decoded information items. *See* Pet. 44–46; *supra* Section II.F.2.a.

Patent Owner responds that Petitioner fails to show an association between the alleged “identifying data aggregate” and “broadcast segment.” PO Resp. 60–62 (citing Ex. 2020 ¶¶ 113–116). According to Patent Owner, a person of ordinary skill in the art “would have understood that Alwadish’s processes for storage, display and later printing of the local time, date and frequency along with the title, album and catalogue number do[] not *implement* any link between an identifying data aggregate and a broadcast

segment.” *Id.* at 61–62. Patent Owner contends that “[a]t best, Alwadish’s process merely allows a user to infer a link . . . through later memory recall, depending on the user’s cognitive abilities,” but that is insufficient because it does not result in an implemented, formal link. Sur-Reply 20–21.

Patent Owner’s arguments are premised on its proposed interpretation of the “associate” terms as requiring a formal link implemented by the method of claim 11. *See* PO Resp. 60–62; Sur-Reply 20–21. We disagree that the claim requires such a link, and find that Alwadish teaches the recited “broadcast segment,” for the reasons explained above. *See supra* Sections II.B.5, II.F.2.b. We are persuaded that Alwadish teaches aggregated data—namely, the set of information items (e.g., title, artist name, catalog number) for a particular musical piece—“associated with” the relevant “broadcast segment” (i.e., the broadcasted musical piece).

Alwadish discloses that “data corresponding to the current date, time and station frequency are continuously appended to the decoded information item data . . . whenever the information item data is written at selected addresses of the print memory 228.” Ex. 1011, col. 8, ll. 14–22. “Address selector circuit 230 . . . selects sets of, e.g., five memory addresses for storage of each set of information item data.” *Id.* at col. 8, ll. 23–25, col. 9, ll. 8–16 (the user, “upon hearing a musical piece or an advertisement of particular interest, operates the memory button 34 so as to enable information item data . . . to be decoded at 220 and stored with the current date, time and station frequency at predetermined addresses of the print memory 228”). Thus, whenever data is written to memory as a result of the user pressing memory button 34, the information items are stored together (with date, time, and station frequency). And all of the data for the broadcasted musical piece is displayed together on the printed paper strip, as

shown in Figure 3 above—from top to bottom: date, station frequency, time, title, artist name, and catalog number. *Id.* at col. 4, ll. 46–53. We agree with Petitioner, and the analysis of Dr. Almeroth, that the aggregated information items are, therefore, “associated with” the broadcast segment. *See* Pet. 44–45; Ex. 1002 ¶¶ 119–120. For the foregoing reasons, we find that Alwadish teaches limitation 11[d].

c) Conclusion

Petitioner has shown sufficiently that a person of ordinary skill in the art would have understood Alwadish to teach all of the limitations of claim 11. *See* Pet. 39–47; Ex. 1002 ¶¶ 114–123. Based on the full trial record, including evidence of secondary considerations of nonobviousness submitted by Patent Owner, we determine that Petitioner has proven, by a preponderance of the evidence, that claim 11 would have been obvious based on Alwadish under 35 U.S.C. § 103(a).

3. Claim 12

Claim 12 depends from claim 11 and recites that “at least one of the *receiving, storing, aggregating, correlating operations are performed in conjunction with a database system which contains at least one of the identifying data aggregates.*” Ex. 1001, col. 16, ll. 5–8 (emphasis added).

Petitioner argues that the receiving of both the “broadcast stream” (i.e., FM broadcast signal) and “data stream” (i.e., data encoded in the broadcast carrier signal) in Alwadish are performed in conjunction with a database system containing the “identifying data aggregates” (i.e., the aggregated information items discussed above with respect to claim 11). Pet. 53–55. Petitioner notes that studio control and processing unit 102 of

FM radio broadcast station 100, which provides the program material and associated information items to receiver 10, includes memory units for storing the data. *Id.* at 54 (citing Ex. 1011, col. 5, ll. 37–43 (studio control and processing unit 102 includes “working memories” and other components, which “are ordinarily required in accordance [with] standard engineering practice”), col. 5, l. 64–col. 6, l. 6 (“various sources of musical program material such as [compact discs (CDs)] and [digital audio tapes (DATs)] will provide, in addition to pre-recorded musical program material, identification information or data in digital form . . . for purposes of identifying the title, artist and catalogue number pertaining to the prerecorded material”)).

According to Petitioner and Dr. Almeroth, a person of ordinary skill in the art “would have recognized that in addition to movable storage formats, such as CDs and DATs, an online database would be an alternative means of [storing] media content identifying information at the studio control and processing unit 102”; using a database “would be advantageous so as to provide a constantly accessible source of updated media content identifying information and avoid constantly shipping CDs or DATs every time new media content was available”; and relational databases were well-known mechanisms for “keeping associated data together and accessible.” *Id.* at 54–55 (citing Ex. 1002 ¶ 136).

Patent Owner responds that Alwadish fails to teach the limitation because receiver 10 is not “connected to” a database. PO Resp. 62; Sur-Reply 21–22. Patent Owner, however, cites no support for its view that the phrase “in conjunction with” means “connected to,” other than the unsupported testimony of Dr. Hart. *See* PO Resp. 62 (citing Ex. 2020 ¶ 119). Absent some indication in the ’028 patent, prosecution history, or

extrinsic record, we do not read claim 12 as requiring a direct connection to a database. Rather, the relevant portions of the claim language recite that the “receiving” the broadcast stream and the “receiving” the data stream are performed “in conjunction with” a database system. In Alwadish, FM radio broadcast station 100 stores the relevant data in memory and would provide the data, from that storage, to receiver 10 via a broadcast stream and data stream. *See* Ex. 1011, col. 5, ll. 37–43, col. 5, l. 64–col. 6, l. 6. Petitioner provides a persuasive explanation, supported by the testimony of Dr. Almeroth, which we credit, as to why a person of ordinary skill in the art would have been motivated to use a database system for such storage. *See* Pet. 54–55; Ex. 1002 ¶¶ 135–136.

Patent Owner further disputes Petitioner’s reasoning, arguing that media content providers would indeed use CDs rather than database storage because “media content such as on a CD does not change and does not need to be ‘updated’” and “media content such as on a CD could be secured through copy protection in ways that might not be possible in an online database.” PO Resp. 62–63 (citing Ex. 2020 ¶ 120). Obviousness, however, “does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.” *Intel Corp. v. Qualcomm Inc.*, – F.4th –, No. 2020-2092, 2022 WL 880681, at *4 (Fed. Cir. Mar. 24, 2022). Petitioner needs to “show only that ‘there is something in the prior art as a whole to suggest the *desirability* . . . of making the combination,’ not whether there is something in the prior art as a whole to suggest that the combination is the *most desirable* combination available.” *Id.*; *see also Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021) (“[It is] not necessary to show that a combination is ‘the *best* option, only that it be a

suitable option.”). We are persuaded that a person of ordinary skill in the art would have found it advantageous to use a relational database to store the aggregated data, at least because a database would be “constantly accessible,” could be easily modified as necessary, and would avoid difficulties associated with physical media, such as CDs. *See* Pet. 54–55; Reply 25–26; Ex. 1002 ¶ 136; Ex. 1026 ¶ 56.

Based on the full trial record, including evidence of secondary considerations of nonobviousness submitted by Patent Owner, we determine that Petitioner has proven, by a preponderance of the evidence, that claim 12 would have been obvious based on Alwadish under 35 U.S.C. § 103(a).

4. *Claims 14, 15, and 18*

Claim 14 depends from claim 11 and recites that “at least one of the *receiving*, storing, aggregating, correlating operations are *accessible by* at least one of the following: a response authentication system, *a broadcaster*, an advertiser, a content provider, a wireless carrier, a web portal, a third party database.” Ex. 1001, col. 16, ll. 13–17 (emphasis added). Petitioner argues that Alwadish’s receiving of the broadcast stream and data stream is “accessible by at least a broadcaster that controls which media content and media content identifying information the receiving steps receive.” Pet. 48. Petitioner cites Alwadish’s disclosure of an FM radio broadcaster entering program information and transmitting it to the receiver using a sub-carrier along with the FM broadcast signal. *Id.* at 48–50 (citing Ex. 1011, col. 5, ll. 33–36, col. 6, ll. 61–63, col. 8, ll. 54–58, col. 8, l. 64–col. 9, l. 2, claim 1, Fig. 5; Ex. 1002 ¶¶ 124–125).

Claim 15 depends from claim 11 and recites that

the association of the data stream with the broadcast stream is at least one of the following: the data stream is frequency multiplexed with the broadcast stream, the data stream is time multiplexed with the broadcast stream, the data stream is transmitted independently from the broadcast stream, *the data stream is encoded in the broadcast stream.*

Ex. 1001, col. 16, ll. 18–24 (emphasis added). Petitioner argues that the association in Alwadish is the data stream comprising the information items being encoded in the FM broadcast signal. Pet. 50–51 (citing Ex. 1011, col. 5, ll. 33–36, col. 6, ll. 17–35, col. 8, l. 64–col. 9, l. 2, claim 1, Fig. 5).

Claim 18 depends from claim 11 and recites that the method further comprises “detecting a selection input associated with the presentation of the stored data.” Ex. 1001, col. 16, ll. 33–35. Petitioner argues that Alwadish teaches the recited selection input, citing memory button 34, recall button 36, and print button 38. Pet. 51 (citing Ex. 1011, col. 8, ll. 23–49, col. 9, ll. 8–16, 20–27, claims 1, 3).

Patent Owner does not argue separately dependent claims 14, 15, and 18. See PO Resp. 62. We disagree with Patent Owner’s arguments regarding parent claim 11 and secondary considerations of nonobviousness for the reasons explained above. See *supra* Sections II.D.3.b.(4), II.F.2. We have reviewed Petitioner’s contentions and supporting evidence, including the testimony of Dr. Almeroth, and are persuaded that Petitioner has proven, by a preponderance of the evidence, that claims 14, 15, and 18 would have been obvious based on Alwadish under 35 U.S.C. § 103(a), for the reasons stated by Petitioner. See Pet. 48–51; Ex. 1002 ¶¶ 124–127.

5. *Claim 16*

Petitioner contends that claim 16 is unpatentable over Alwadish under 35 U.S.C. § 103(a). Pet. 56–57. As explained above, we conclude that claim 16 is unpatentable over Curtin and Crosby. *See supra* Section II.D.5. As such, we need not address Petitioner’s alternative ground based on Alwadish as to that claim. *See Boston Sci. Scimed*, 809 F. App’x at 990.

G. Obviousness Ground Based on Alwadish and Koerber (Claims 12 and 16)

1. Koerber

Koerber discloses a “process for identifying a broadcasting program that contains sound and/or image information.” Ex. 1012, col. 1, ll. 3–5. The process involves the transmission of identification information for a broadcasting program to a receiver “along with the sound and/or image information,” where the identification information is decoded and stored in memory on the receiver. *Id.* at col. 1, ll. 42–45, col. 3, ll. 4–12. Koerber describes “allocating a specific code to each broadcasting program or music title,” and states that

[i]t is practical to allocate information about the broadcasting program to the identification information, such as the title, the performers and the composer of a music title; the information that is allocated to each other is filed in a database, and the information about the broadcasting program is brought up from the database and output with the aid of the identification information after the identification information is read from the memory. The database represents a type of table, which contains the encoded identification information in one column (such as the above binary number) and the allocated information in further columns. One broadcasting program is allocated to one table line, respectively. It is practical to allocate the identification information to the information about the

broadcasting program and the creation of the database in a central location to ensure the uniqueness of the allocation. The identification information is used to refer to the corresponding dataset of the database after it is read out. These technologies to query a database are known in the state of the art.

Id. at col. 2, l. 27–col. 3, l. 3.

2. *Claim 12*

In addition to its arguments based on Alwadish alone, Petitioner contends that claim 12 would have been obvious over the combination of Alwadish and Koerber. Pet. 52–56. Petitioner points to Koerber’s teachings of identification information (e.g., title, performers, composer) for a broadcasting program or music title stored in a database, encoded with a “specific code,” and transmitted to a receiver along with sound and/or image information, such that the receiver can decode the identification information and store it in memory. *Id.* at 55–56 (citing Ex. 1012, col. 2, ll. 27–30, 36–47, col. 3, ll. 4–6, 41–47, col. 6, ll. 32–38). Petitioner argues that a person of ordinary skill in the art would have been motivated based on Koerber to use a database system in Alwadish to store the information about musical pieces that is sent to the user in the data stream, with a reasonable expectation of success, for the reasons identified in the asserted ground based on Alwadish alone and for a number of other reasons: (1) the references are “from the same field of use and relate to the same well-known issues, namely interactive radio systems that uniquely identify broadcasts using information transmitted with the broadcast and allow for users to indicate selections for purchase,” (2) the references are similar in that both send information identifying a musical piece to a receiver to facilitate the user purchasing the piece, and use similar “hardware, software, Internet,

and/or communication means,” (3) Koerber teaches that “a database allows the data to be centralized (at, for example, Alwadish’s studio control and processing unit 102) and ensur[es] the data’s uniqueness,” and (4) “relational databases were designed for such purposes as keeping associated data together and accessible.” *Id.* at 52–53, 56. Petitioner’s contentions are supported by the testimony of Dr. Almeroth. Ex. 1002 ¶¶ 128–132, 139.

Patent Owner makes two arguments in response. First, Patent Owner contends that Petitioner fails to identify which of the “at least one of” alternatives it is using in its analysis of claim 12. PO Resp. 65–66. Given that Petitioner refers throughout to identification information being sent to the receiver, as in Koerber and similarly in Alwadish, however, we understand Petitioner to be relying on the alternative of “receiving [the] data stream associated with the broadcast stream.” Pet. 55–56.

Second, Patent Owner argues that receiving a database index key and sending it to another device to retrieve information, as in Koerber, is insufficient because the receiver would not be “connected to” a database. PO Resp. 66 (citing Ex. 2020 ¶ 127); Sur-Reply 24–25. For the reasons explained above, we do not agree that “in conjunction with” in claim 12 means “connected to.” *See supra* Section II.F.3. Petitioner provides a persuasive explanation as to why, in the modified Alwadish system, the receiver would receive the data stream in conjunction with a database system, and a person of ordinary skill in the art would have been motivated to combine the teachings of Alwadish and Koerber in that manner. *See* Pet. 52–56; Reply 27; Ex. 1002 ¶¶ 128–133, 137–140; Ex. 1026 ¶ 58. Petitioner’s asserted motivations are supported by Koerber itself, which states that it was “practical” to store identification information in a “database in a central location to ensure the uniqueness of the allocation” and

“technologies to query a database [were] known in the state of the art.” *See* Ex. 1012, col. 2, l. 49–col. 3, l. 3.

Based on the full trial record, including evidence of secondary considerations of nonobviousness submitted by Patent Owner, we determine that Petitioner has proven, by a preponderance of the evidence, that claim 12 would have been obvious based on Alwadish and Koerber under 35 U.S.C. § 103(a).

3. *Claim 16*

Petitioner contends that claim 16 is unpatentable over Alwadish and Koerber under 35 U.S.C. § 103(a). Pet. 56–57. As explained above, we conclude that claim 16 is unpatentable over Curtin and Crosby. *See supra* Section II.D.5. As such, we need not address Petitioner’s alternative ground based on Alwadish and Koerber as to that claim. *See Boston Sci. Scimed*, 809 F. App’x at 990.

III. CONCLUSION¹⁴

Petitioner has demonstrated, by a preponderance of the evidence, that claims 11–20 of the '028 patent are unpatentable on the bases set forth in the following table.

¹⁴ 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), 42.8(b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
11, 13–20	103(a)	Curtin, Crosby	11, 13, 15–20	14
11, 13–20	103(a) ¹⁵	Curtin		14
11, 12, 14–16, 18	103(a) ¹⁶	Alwadish	11, 12, 14, 15, 18	
12, 16	103(a) ¹⁷	Alwadish, Koerber	12	
Overall Outcome			11–20	

¹⁵ As explained above, given our disposition of the ground based on Curtin and Crosby as to claims 11, 13, and 15–20, we do not reach Petitioner’s alternative ground based on Curtin alone with respect to those claims. *See supra* Section II.E.

¹⁶ As explained above, given our disposition of the ground based on Curtin and Crosby as to claim 16, we do not reach Petitioner’s alternative ground based on Alwadish with respect to that claim. *See supra* Section II.F.5.

¹⁷ As explained above, given our disposition of the ground based on Curtin and Crosby as to claim 16, we do not reach Petitioner’s alternative ground based on Alwadish and Koerber with respect to that claim. *See supra* Section II.G.3.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 11–20 of the '028 patent have been shown to be unpatentable.

This is a final decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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