

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

UNILOC 2017 LLC,
Patent Owner.

IPR2020-00756
Patent 9,564,952 B2

Before SALLY C. MEDLEY, MICHAEL R. ZECHER, and
NABEEL U. KHAN, *Administrative Patent Judges*.

ZECHER, Administrative Patent Judge.

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

I. INTRODUCTION

Google LLC (“Google”), filed a Petition requesting an *inter partes* review of claims 9–12 of U.S. Patent No. 9,564,952 B2 (Ex. 1001, “the ’952 patent”). Paper 1 (“Pet.”). Patent Owner, Uniloc 2017 LLC (“Uniloc”), filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). With our authorization, Google filed a Reply (Paper 10), and Uniloc filed a Sur-reply (Paper 12), each of which were tailored narrowly to address the non-exclusive list of six factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (Order authorizing supplemental briefing) (precedential) that we consider in determining whether to exercise our discretion to institute an *inter partes* review when there is a related district court case involving the same patent. Taking into account the arguments presented in Uniloc’s Preliminary Response together with the arguments presented in the authorized briefing, we determined that the information presented in the Petition established that there was a reasonable likelihood that Google would prevail with respect to at least one challenged claim. Pursuant to 35 U.S.C. § 314, we instituted this *inter partes* review on October 15, 2020, as to all of the challenged claims and all grounds raised in the Petition. Paper 15 (“Institution Decision” or “Dec. on Inst.”).

During the course of trial, Uniloc filed a Patent Owner Response (Paper 18, “PO Resp.”), Google filed a Reply to the Patent Owner Response (Paper 20, “Pet. Reply”), and Uniloc filed a Sur-reply to the Reply (Paper 22, “PO Sur-reply”). An oral hearing was held on July 15, 2021, and a transcript of the hearing is included in the record. Paper 29 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of

claims 9–12 of the ’952 patent. For the reasons we identify below, we hold that Google has demonstrated by a preponderance of the evidence that all challenged claims are unpatentable under § 103(a) as obvious.

A. Related Matters

The parties indicate that the ’952 patent is involved in a district court case captioned *Uniloc 2017 LLC v. Google LLC*, No. 2:18-cv-00552 (E.D. Tex. filed Dec. 31, 2018). Pet. 68–69; Paper 6, 2.¹ On June 19, 2020, the U.S. District Court for the Eastern District of Texas granted Google’s Motion to Transfer Venue to the U.S. District Court for the Northern District of California. Ex. 1021. According to Google, the Northern District of California dismissed the case for lack of subject matter jurisdiction because it found that at least Fortress Credit Co. LLC held sufficient rights in the ’952 patent. Paper 19, 1 (citing *Uniloc 2017 LLC v. Google LLC*, No. 4:20-cv-05345-YGR, Dkt. 120 (N.D. Cal. entered Dec. 22, 2020) (single order addressing eleven cases)). On December 31, 2020, Google indicates that Uniloc appealed the order dismissing the case for lack of subject matter jurisdiction to the U.S. Court of Appeals for the Federal Circuit. *Id.*

B. The ’952 Patent

The ’952 patent, titled “Near Field Authentication Through Communication of Enclosed Content Sound Waves,” issued from U.S. Patent Application No. 13/734,178 (“the ’178 application”), filed on January 4, 2013. Ex. 1001, codes (54), (45), (21), (22). The ’952 patent claims the

¹ Uniloc’s Mandatory Notices filed in accordance with 37 C.F.R. § 42.8 does not include page numbers. Paper 6. We consider the Title page as page 1 and then proceed in numerical order.

benefit of U.S. Provisional Application No. 61/595,599, filed on February 6, 2012. *Id.* at code (60).

The '952 patent generally relates to near field authentication of users and their computing devices, specifically by means of encoded sound waves. Ex. 1001, 1:12–16. Figure 1 of the '952 patent is reproduced below.

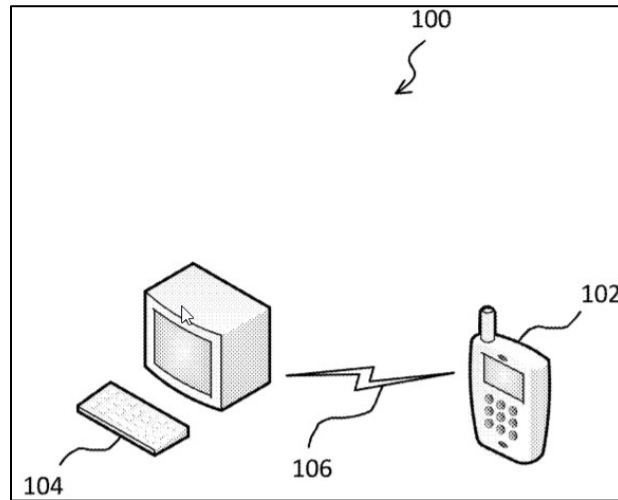


Figure 1, reproduced above, is a block diagram showing an audio transceiving computing device transmitting data to an audio receiving computing device. Ex. 1001, 3:23–25. In Figure 1, system 100 includes audio transceiving computing device 102 and audio receiving computing device 104. *Id.* at 3:64–67. Audio transceiving computing device 102 can transmit data to audio receiving computing device 104 in the form of modulated carrier wave 106, which can be a sound wave. *Id.* at 3:64–4:4. The '952 patent states that “[s]ound waves can transmit information accurately over a very short distance (near field communications) using inexpensive equipment.” *Id.* at 4:4–6.

The '952 patent describes an illustrative example of a user seeking to purchase a product at a register using a mobile phone. Ex. 1001, 11:9–11. In this particular example, the mobile phone through its microphone scans a

plurality of predetermined frequencies for a free frequency. *Id.* at 11:15–17. According to the '952 patent, a free frequency among a plurality of predetermined frequencies is merely a frequency that has no discernable signal, a frequency that has no signal strength that satisfies a minimum amplitude threshold, or a frequency that otherwise meets “pre-established criteria” for being a free frequency. *Id.* at 11:18–24. In another embodiment, the '952 patent discloses that a free frequency that meets “pre-established criteria” may include a frequency that has a noise level below a predetermined noise level threshold or a frequency that has an interference level below a predetermined interference level threshold. *Id.* at 5:17–21.

Turning back to the illustrative example of using a mobile phone at a register, once a free frequency from a plurality of predetermined frequencies has been selected, the mobile phone generates a periodic enclosed content message representing device identification data and the user's credit card information. Ex. 1001, 11:26–30. The mobile phone then generates a carrier wave and modulates the carrier wave using the periodic enclosed content message. *Id.* at 11:33–35. The mobile phone transmits the modulated carrier wave at the free frequency through its output speaker. *Id.* at 11:39–41. In this illustrative example, the mobile phone does not have its physical components modified with expensive equipment, but can use the speaker already included in the phone. *Id.* at 11:44–47.

The periodic enclosed content message includes a plurality of enclosed content messages. Ex. 1001, 5:55–57, Fig. 3 (item 302a–302n). Each of the enclosed messages includes a begin indication, a content, and an end indication. *Id.* at 5:58–60, Fig. 3 (items 304, 306, 308).

Furthermore, the device identification data includes a device fingerprint. Ex. 1001, 6:11–19. A device fingerprint comprises a bit string or bit array that is derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device. *Id.* at 6:34–37. Non-user-configurable data includes data such as serial numbers. *Id.* at 6:37–39. User-configurable data includes data such as registry entries, application usage data, file list information, and Media Access Control addresses. *Id.* at 6:41–43.

C. Challenged Claims

Of the challenged claims, claim 9 is the only independent claim. Independent claim 9 is directed to “[a] method for near field authentication of a source, the source using an audio transceiver computing device.” Ex. 1001, 14:53–54. Claims 10–12 directly depend from independent claim 9. *Id.* at 15:6–14. Independent claim 9 is illustrative of the challenged claims and is reproduced below.

9. A method for near field authentication of a source, the source using an audio transceiver computing device, the method comprising:

scanning a plurality of predetermined frequencies for a free frequency;

selecting the free frequency from the plurality of predetermined frequencies;

generating a periodic enclosed content message;

generating a modulated carrier wave representing the periodic enclosed content message; and

transmitting the modulated carrier wave at the free frequency;

wherein each period of the periodic enclosed content message includes a begin indication, a content, and an end indication;

wherein the content includes device identification data including a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device; and

wherein the modulated carrier wave comprises a sound wave.

Id. at 14:53–15:5.

D. Asserted Prior Art References

Google relies on the prior art references set forth in the table below.

Pet. 7–8.

Name²	Reference	Dates	Exhibit No.
Paulson	US 8,514,662 B2	issued Aug. 20, 2013; filed Aug. 27, 2010	1005
Surprenant	US 8,837,257 B2	issued Sept. 16, 2014; filed June 2, 2011	1006
Beenau	US 2009/0171851 A1	published July 2, 2009; filed Feb. 18, 2009	1007
McConnell	WO 97/31437	published Aug. 28, 1997; filed Feb. 19, 1997	1008

E. Asserted Grounds of Unpatentability

Google challenges claims 9–12 of the '952 patent based on the asserted grounds of unpatentability set forth in the table below. Pet. 8, 10–66.

² For clarity and ease of reference, we only list the first named inventor.

Claim(s) Challenged	35 U.S.C. §	References
9–12	103(a) ³	Paulson, Surprenant
9–12	103(a)	Paulson, Surprenant, Beenau
11	103(a)	Paulson, Surprenant, McConnell
11	103(a)	Paulson, Surprenant, Beenau, McConnell

II. ANALYSIS

A. Claim Construction

In an *inter partes* review proceeding based on a petition filed on or after November 13, 2018, such as here, claim terms are construed using the same claim construction standard as in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2019). That is, claim terms generally are construed in accordance with their ordinary and customary meaning, as understood by one of ordinary skill in the art, and the prosecution history pertaining to the patent at issue. *Id.* The ordinary and customary meaning of a claim term “is its meaning to the ordinary artisan after reading the entire patent,” and “as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Circ. 2005) (en banc).

In its Petition, Google argues that no claim terms require construction because the asserted prior art renders the claims obvious under either of the parties’ proposed constructions in the district court case. Pet. 9. In its Patent

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the ’952 patent issued from the ’178 application, which was filed before this date, the pre-AIA version of § 103 applies. Ex. 1001, codes (21), (22).

Owner Response, Uniloc provides a table listing the parties' proposed constructions in the district court case, but does not argue that any particular claim term requires construction for purposes of this Final Written Decision. *See* PO Resp. 6–8. After considering the fully developed trial record, the issues raised by the parties do not turn on the construction of a particular claim term. As a result, we need not construe any claim term for purposes of determining whether Google has demonstrated by a preponderance of the evidence that claims 9–12 of the '952 are unpatentable as obvious under § 103(a). *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

In our obviousness analysis below, we address the scope and meaning of the claim term “non-user-configurable data,” as this term pertains to the teachings of Surprenant contested by the parties. *See infra* Section II.B.5.c. More specifically, we address below whether Surprenant’s acoustics modulation protocol identification (“AMP ID”), which is described as being a “unique identification string” specific to “transmit device 101,” teaches or suggests the claim term “non-user-configurable data” as that term is used in the context of the '952 patent. *See infra id.*

B. Obviousness Over the Combined Teachings of Paulson and Surprenant

Google contends that claims 9–12 of the '952 patent are unpatentable under § 103(a) as obvious over the combined teachings of Paulson and Surprenant. Pet. 10–54. Google explains how the combined teachings of Paulson and Surprenant account for the subject matter of each challenged

claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of these references. Pet. 10–54; Pet. Reply 2–12, 14–22. Google relies on the Declaration of Stuart J. Lipoff accompanying the Petition and the Reply Declaration of Mr. Lipoff accompanying the Reply to support its positions, both of which are un rebutted on this record. Ex. 1003; Ex. 1027.

During trial, Uniloc contends that the combined teachings of Paulson and Surprenant do not account for the following limitations: (1) “scanning a plurality of predetermined frequencies for a free frequency”; and (2) “the content includes device identification data including a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device.” PO Resp. 10–19; PO Sur-reply 1–12. Uniloc does not introduce testimony from a declarant in support of its positions.

We begin our analysis with the principles of law that generally apply to an obviousness ground, an assessment of the level of skill in the art, followed by brief overviews of Paulson and Surprenant, and then we address the parties’ contentions with respect to the challenged claims.

1. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences

between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations, such as commercial success, long-felt but unsolved needs, failure of others, etc.).⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze the asserted grounds based on obviousness with the principles identified above in mind.

2. Level of Skill in the Art

In determining the level of skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). Relying on the testimony of Mr. Lipoff, Google provides the following assessment of the level of skill in the art:

A person of ordinary skill at the time of the alleged invention of the '952 patent would have held at least a bachelor's degree in electrical engineering or computer science and had one year of relevant experience in the field of wireless communications. Less work experience may be compensated by a higher level of education, such as a master's degree, and vice versa.

Pet. 8–9 (citation omitted) (citing Ex. 1003 ¶¶ 33–35). Uniloc argues that Google's proposed assessment is improper because it does not define thresholds for “[l]ess work experience” or “higher level of education.” PO Resp. 6 (alteration in original). Uniloc, however, does not offer its own

⁴ In its Patent Owner Response, Uniloc does not present arguments or evidence of secondary considerations. *See* PO Resp.

assessment of the level of skill in the art, much less indicate that the resolution of any issue depends on a specific type of work experience or a specific level of education. *See id.* We, therefore, adopt Google's proposed assessment of the level of skill in the art and apply it to our obviousness analysis below because it is consistent with the '952 patent and the asserted prior art.

3. Overview of Paulson

Paulson discloses a method of wirelessly transmitting and receiving data through sonic communication. Ex. 1005, code (57). Sonic transmission frequencies are initially determined by the highest frequencies the transmit device can send and the receive device can detect and decode. *Id.* at 12:51–56. Samples of the ambient sound in the area are used to create a noise characteristic. *Id.* at 11:17–19. This noise characteristic is analyzed to determine which sonic frequencies, if any, are available. *Id.* at 13:14–16. For example, a noise characteristic may show an absence of sonic noise in the frequency range of 15 Khz to 22 Khz. *Id.* at 13:17–19.

If the noise characteristic indicates that the desired sonic transmission frequencies are unavailable, transmission of the sonic signal can be delayed. Ex. 1005, 11:19–22; *see also id.* at 13:26–38 (disclosing the same in the context of steps 406 and 408 of Figure 4). Paulson discloses an example in which the noise of a coffee grinder in a coffee shop may fill a wide range of the available sonic frequency spectrum for a very short time period. *Id.* at 11:27–29. In this example, the delay may be for an interval of time until a subsequent sample of the sound indicates that the grinder has stopped and the sonic transmission frequencies are available. *Id.* at 11:30–33; *see also*

id. at 13:38–49 (disclosing that the delay may be “a predetermined period of time” or “a random or pseudo-random period of time”).

4. Overview of Surprenant

Surprenant is related to Paulson because Surprenant shares an inventor and assignee with Paulson, and incorporates Paulson by reference. *See* Ex. 1005, codes (21), (75); Ex. 1006, code (75), 1:7–10. Surprenant discloses AMP to enable two or more devices to communicate acoustically with one another, without the need for specialized hardware. Ex. 1006, 4:6–9. Surprenant discloses converting a message to binary data; modulating one or more selected frequencies for one or more acoustic carrier signals based on the binary data to generate one or more modulated acoustic carrier signals; and storing the modulated acoustic carrier signal in a buffer for subsequent output and transmission by a speaker. *Id.* at code (57).

Surprenant explains that the message may include an AMP ID. Ex. 1006, 7:44. In one embodiment, Surprenant discloses that the AMP ID is a unique identification string that is associated with the transmit device. *Id.* at 7:45–49. In another embodiment, Surprenant discloses that the AMP ID may comprise credentials that enable the receive device to access an account and perform services such as financial transactions, file sharing, or information exchange. *Id.* at 7:53–57.

5. Claim 9

The preamble of independent claim 9 recites “[a] method for near field authentication of a source, the source using an audio transceiver computing device.” Ex. 1001, 14:53–54. Google contends that, to the extent the preamble is limiting, Paulson discloses a “method, apparatus and computer program product . . . for wirelessly transmitting and receiving data

through sonic communication.” Pet. 20 (citing Ex. 1005, code (57)) (alteration in original). Relying on the testimony of Mr. Lipoff, Google explains that, because sound waves have a limited range, a person of ordinary skill in the art would have understood that a sonic communication system satisfies the “near field” requirement. *Id.* at 22 (citing Ex. 1003 ¶ 63). Additionally, Google cites to Surprenant’s teaching that data transmission is received within a 10 cm range. *Id.* at 23 (citing Ex. 1006, 8:38–41).

Google also relies on Paulson’s disclosure of sonic codes and public-private key management in the context of sonic security processing. Pet. 21–22 (citing Ex. 1005, 10:48–56). Google explains that a person of ordinary skill in the art would have recognized that public-private key systems comprise authenticating a source. *Id.* at 22 (citing Ex. 1003 ¶ 61). Additionally, Google asserts that Surprenant also teaches authenticating a source because Surprenant uses an AMP ID that comprises credentials, and a person of ordinary skill in the art would have understood that credentials are used during authentication. *Id.* (citing Ex. 1006, 7:54–57; Ex. 1003 ¶ 62).

Based on Paulson’s disclosure of sonic communications, Google explains that a person of ordinary skill in the art would have understood that Paulson’s method of communication uses an audio transceiver because sonic communications use an audio/sonic transmitter and receiver in the form of a speaker and microphone. Pet. 21 (citing Ex. 1005, Fig. 7; Ex. 1003 ¶ 59). Google asserts that Paulson also discloses computing devices in the form of mobile devices and computers. *Id.* (citing Ex. 1005, 4:11–16; Ex. 1003 ¶ 60).

The first step of independent claim 9 recites “scanning a plurality of predetermined frequencies for a free frequency.” Ex. 1001, 14:56–57. Google contends that Paulson teaches this limitation. Pet. 23–29. As support for its contentions, Google points to Paulson’s Figure 4, which identifies a “Set of Sonic Transmission Frequencies For Transmitting A Sonic Carrier Signal” in step 402. *Id.* at 24 (quoting Ex. 1005, Fig. 4 (step 402)). According to Google, Paulson describes step 402 as setting the sonic transmission frequencies to the highest frequencies available, and Paulson states that “[t]hese frequencies are initially determined by the highest frequencies the transmit device can send and the receive device can detect and decode.” *Id.* at 24–25 (quoting Ex. 1005, 12:53–56). Then, at step 406, Google argues that Paulson “determine[s] what sonic frequencies, if any, are available.” *Id.* at 25–26 (quoting Ex. 1005, 13:11–19).

According to Google, Paulson explains that this determination is based on an analysis of the noise characteristic. Pet. 25–26 (citing Ex. 1005, 13:11–16). Google argues that the noise characteristic is created by taking “[s]amples of the ambient sound in the area” and using these samples to “create [the] noise characteristic indicative of the most prevalent sounds.” *Id.* at 23, 25 (first alteration in original) (quoting Ex. 1005, 11:16–18) (citing Ex. 1005, 13:1–10, Fig. 4 (step 404)).

Google further argues that Paulson checks whether “the noise characteristic is low enough to not interfere with the transmission of sonic carrier signals,” and this check includes verifying whether the “signal-to-noise (SNR) ratio at these frequencies is higher than a predetermined threshold.” Pet. 26 (quoting Ex. 1005, 13:50–59). Relying on the testimony of Mr. Lipoff, Google explains that a person of ordinary skill in the art

would have recognized that, for a given signal level, the SNR increases when the noise level decreases. *Id.* at 26–27 (citing Ex. 1003 ¶ 72). Google concludes that Paulson’s frequency selection is based on a predetermined threshold, such as having a low enough noise characteristic as reflected in a higher SNR. *Id.* at 27. Google asserts that its conclusion in this regard is consistent with how the ’952 patent describes a “free frequency” as being, “for example, a frequency which has a noise level below a predetermined noise level threshold or a frequency that has an interference level below a predetermined interference level threshold.” *Id.* (emphases omitted) (quoting Ex. 1001, 5:17–21).

The second step of independent claim 9 recites “selecting the free frequency from the plurality of predetermined frequencies.” Ex. 1001, 14:58–59. Google relies on essentially the same arguments and evidence discussed above for the “scanning” limitation to explain how Paulson teaches this limitation. Pet. 23–29. Google explains that a person of ordinary skill in the art would have understood Paulson to disclose “selecting the free frequency from the plurality of predetermined frequencies” because Paulson uses the noise characteristic to choose one or more free frequencies as part of a “careful selection of the sonic transmission frequencies.” *Id.* at 29 (quoting Ex. 1005, 11:13–16).

The third and fourth steps of independent claim 9 recite “generating a periodic enclosed content message” and “generating a modulated carrier wave representing the periodic enclosed content message,” respectively. Ex. 1001, 14:60–62. For these two steps, Google relies on Surprenant’s teachings of “converting a message to binary data” and “modulating one or more selected frequencies for one or more acoustic carrier signals based on

the binary data to generate one or more modulated acoustic carrier signals.” Pet. 29–30 (citing Ex. 1006, code (57)). Relying on the testimony of Mr. Lipoff, Google argues the following:

A person of ordinary skill in the art would have understood that converting a message to binary data and using the binary data to modulate a carrier signal based on the data to be within the scope of the claimed “generating a modulated carrier wave representing the . . . enclosed content message,” because the modulated carrier signal includes the binary message data.

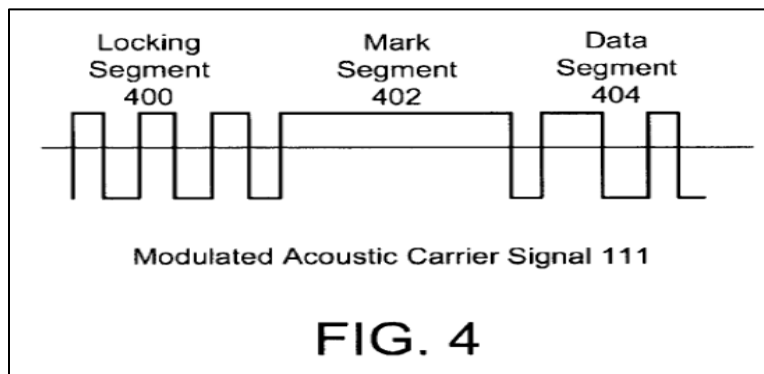
Id. at 30–31 (citing Ex. 1003 ¶ 77).

Google further argues that Paulson and Surprenant collectively teach that the message is “periodic.” Pet. 31. Google argues that Surprenant discloses “transmit[ting] an AMP ID multiple times.” *Id.* (alteration in original) (quoting Ex. 1006, 16:22–23). According to Google, this multiple transmission strategy helps to overcome noise, as Paulson describes a system that “transmit[s] sonic carrier signals multiple times in an effort to overcome a temporary use of the desired sonic frequencies in the area.” *Id.* (alteration in original) (quoting Ex. 1005, 11:23–27). Google further relies on Paulson’s explicit disclosure that the delay between transmissions “can be a predetermined period of time.” *Id.* (emphasis omitted) (quoting Ex. 1005, 13:27–49). Google concludes that, “[w]hen a message is repeated with a predetermined delay, it repeats at a regular interval that one of ordinary skill would have understood to be ‘periodic’ as that term is used in the ’952 patent.” *Id.* at 32 (citing Ex. 1001, 5:52–54, 7:4–16; Ex. 1003 ¶ 80).

The fifth and final step of independent claim 9 recites “transmitting the modulated carrier wave at the free frequency.” Ex. 1001, 14:63–64. Google argues that Paulson teaches this limitation because it discloses

transmitting sonic carrier signals carrying the modulated data over the air at one or more sonic transmission frequencies. Pet. 32–33 (citing Ex. 1005, 2:26–28, 2:31–33, 12:34–36). Relying on the testimony of Mr. Lipoff, Google further explains that Paulson transmits the modulated data over the same free frequency selected using its noise-characteristic process. *Id.* at 33 (citing Ex. 1003 ¶ 83). Google also cites Surprenant’s teachings regarding transmitting at one or more frequencies. *Id.* (citing Ex. 1006, 7:4–8, 7:58–61).

After setting forth the method steps, independent claim 9 recites a first “wherein” clause specifying that “each period of the periodic enclosed content message includes a begin indication, a content, and an end indication.” Ex. 1001, 14:65–67. Google relies on Figure 4 of Surprenant, reproduced below, to teach this limitation.



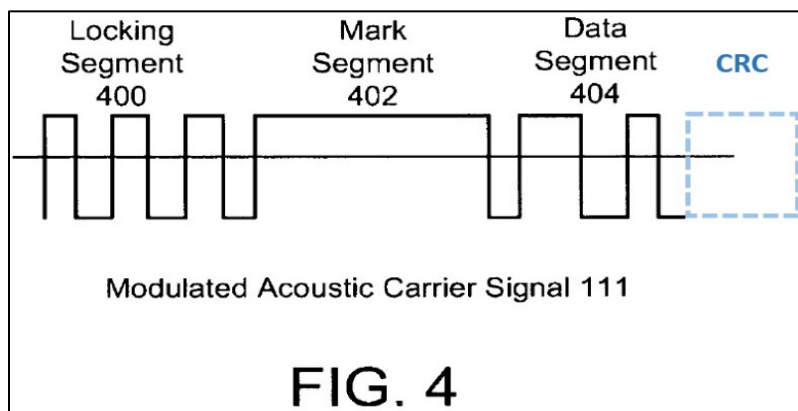
Pet. 34. Figure 4 of Surprenant, reproduced above, illustrates modulated acoustic carrier signal 111 that includes locking segment 400, mark segment 402, and data segment 404. Ex. 1006, 8:54–58.

Relying on the testimony of Mr. Lipoff, Google asserts that a person of ordinary skill in the art would have understood that locking segment 400 or mark segment 402 teaches the claimed “begin indication” because they are disposed at the beginning of the modulated carrier signal and they

indicate the beginning of the periodic enclosed content message. Pet. 35 (citing Ex. 1003 ¶ 86). In this regard, Google explains that Surprenant teaches that mark segment 402 “may be used to reset data reception parameters (buffers are cleared) and prepare for the reception of the data, looking for a *start-bit*,” and explains that “[d]ata alignment begins following the mark segment 402.” *Id.* (quoting Ex. 1006, 9:1–7) (alteration in original).

With respect to the claimed “content,” Google explains that following mark segment 402, Surprenant discloses data segment 404 that “may comprise 2 to N words of data.” Pet. 38 (quoting Ex. 1006, 9:8). Relying on the testimony of Mr. Lipoff, Google asserts that a person of ordinary skill in the art would have understood that Surprenant’s data segment 404 teaches the claimed “content” because it contains the information that the system desires to transmit. *Id.* (citing Ex. 1003 ¶ 93).

Turning to the claimed “end indication,” Google contends that Surprenant teaches that the data is “followed by a cyclic redundancy check, CRC.” Pet. 38 (quoting Ex. 1006, 9:8–9). To illustrate this teaching, Google annotates Figure 4 of Surprenant as shown below.



Id. at 39. This annotated version of Surprenant’s Figure 4, reproduced above, illustrates modulated acoustic carrier signal 111 that includes locking segment 400, mark segment 402, data segment 404, and a CRC following data segment 404. According to Google, the purpose of the CRC, or alternatively a checksum, is to ensure data integrity. *Id.* (citing Ex. 1006, 9:8–12). Google asserts that a person of ordinary skill in the art would have understood the CRC or checksum teaches the claimed “end indication.” *Id.* (citing Ex. 1003 ¶ 94).

Google provides further reasoning why a person of ordinary skill in the art would have understood that “each period of the periodic enclosed content message includes” the locking or mark segments 400 and 402, data segment 404, and CRC. Pet. 40–41 (citing Ex. 1003 ¶¶ 96–100). For example, Google argues mark segment 402 ensures that data buffers are cleared of old data and it identifies where the data starts so that new data may be received properly. *Id.* at 40 (citing Ex. 1006, 9:1–7; Ex. 1003 ¶ 97). Relying on the testimony of Mr. Lipoff, Google argues that a person of ordinary skill in the art could only verify the integrity of each data transmission if the CRC is also transmitted during each data transmission. *Id.* at 41 (citing Ex. 1003 ¶ 99).

Independent claim 9 recites a second “wherein” clause specifying that the “content includes device identification data including a bit array derived from user-configurable and non-user-configurable data.” Ex. 1001, 15:1–3. For this limitation, Google relies on Surprenant’s teaching that “the message may include an AMP ID.” Pet. 42 (quoting Ex. 1006, 7:44–57). Google argues that, because Surprenant’s AMP ID is a “unique *identification* string” that is specific to “the *transmit device* 101 and/or the user of the transmit

device 101,” a person ordinary skill in the art would have understood it to include “device identification data.” *Id.* (quoting Ex. 1006, 7:45–49). Google also asserts that a person of ordinary skill in the art would have understood that the AMP ID includes a “bit array” because the method processes binary data in the form of bits. *Id.* at 42–43 (citing Ex. 1006, 9:8–9, 17:20; Ex. 1003 ¶ 102).

Google further contends that Surprenant’s AMP ID is derived from “user-configurable” data. Pet. 44–45. In particular, because the AMP ID may comprise credentials, Google argues that a person of ordinary skill in the art would have understood that these credentials are user-configurable. *Id.* at 44 (citing Ex. 1006, 7:53–57; Ex. 1003 ¶¶ 105, 106).

Google also contends that Surprenant’s AMP ID is derived from “non-user-configurable data.” Pet. 45–46. Here, Google relies on Surprenant’s teaching that “the AMP ID is a unique identification string” specific to “transmit device 101.” *Id.* (citing Ex. 1006, 7:45–49; Ex. 1003 ¶ 107). Relying on the testimony of Mr. Lipoff, Google argues that, because Surprenant’s AMP ID is disclosed as a “unique identification string” specific to a transmit device, a person of ordinary skill in the art would have understood it to be derived from a unique property of the device itself that is not user-configurable. *Id.* at 46 (citing Ex. 1003 ¶ 107).

Google further explains that Surprenant does not identify expressly the unique identification that is the AMP ID as a serial number or some other information, but to the extent that there is ambiguity as to the exact type of unique information the AMP ID is derived from, it would have been obvious to use any of the options that the ’952 patent identifies as well-known. Pet. 45 (citing Ex. 1003 ¶ 107). As one example, Google argues

that the '952 patent indicates that device fingerprints were known and described elsewhere, including in U.S. Patent No. 5,490,216 (Ex. 1009, “the '216 patent”), which the '952 patent incorporates by reference. Pet. 43 (citing Ex. 1001, 6:27–33); *see also* Ex. 1001, 6:22–24 (describing a device fingerprint as comprising binary data that identifies the audio transceiver computing device by a unique data string). Google, in turn, points out that the '216 patent describes a security key as generated from information entered by a user combined with a serial number generated from information provided by the environment, and that the environment details comprise, for example, an ROM checksum or other elements that are not user-configurable. Pet. 43–44, 46 (citing Ex. 1009, 4:4–29).

With respect to the limitation stating “specific to the audio transceiver computing device,” Google asserts that both the user-configurable data and non-user-configurable data in Surprenant meet this requirement. Pet. 46–47. In particular, Google argues that Surprenant’s credentials are specific to the transmit device and its related access rights, which is consistent with Surprenant’s earlier teaching that the AMP ID is specific to the transmit device. *Id.* at 47 (citing Ex. 1006, 7:45–49). Google further explains that the credentials amount to user-configurable data because they allow a receive device to access an account and perform various services, such as financial transactions, whereas the AMP ID amounts to non-user-configurable data because it helps to uniquely identify the transmit device and it would have been obvious for the AMP ID to take the form of, for example, the device’s serial number. *Id.* at 46–47 (citing Ex. 1006, 7:53–57; Ex. 1003 ¶ 109).

Lastly, independent claim 9 recites a third “wherein” clause specifying that “the modulated carrier wave comprises a sound wave.” Ex. 1001, 15:4–5. Google contends that Paulson and Surprenant collectively teach this limitation because it would have been obvious to use Surprenant’s AMP to transmit information using Paulson’s sonic carrier signals at a frequency selected based on the noise in the environment. Pet. 47. Relying on the testimony of Mr. Lipoff, Google asserts that a person of ordinary skill in the art would have understood that Paulson’s sonic carrier signals carrying data modulated according to Surprenant’s AMP falls within the scope of the claimed “modulated carrier wave compris[ing] a sound wave” because sonic and acoustic both refer to sound. *Id.* at 47–48 (Ex. 1003 ¶ 111).

Turning to rationale to combine, Google contends that it would have been obvious to combine the teachings of Paulson with those of Surprenant in a manner that uses Surprenant’s improved modulation protocol in Paulson’s sonic communication system. Pet. 15 (citing Ex. 1003 ¶¶ 47–56). Google argues that Paulson provides an example of a modulation protocol based upon frequency shift key modulation (“FSK”), but states that alternate modulation protocols may also be used. *Id.* at 16 (citing Ex. 1005, 12:19–31). Meanwhile, Google argues that Surprenant is directed to an “Acoustic Modulation Protocol” or AMP (*id.* (citing Ex. 1006, code (54))), and teaches that this AMP is an alternative to and improvement upon other prior art modulation protocols (*id.* at 18 (citing Ex. 1006, 2:29–35); *see also* Ex. 1006, 2:30–33 (identifying FSK as the prior art solution)). Moreover, Google points out that Paulson and Surprenant are in the same field of sonic/acoustic carrier signals, share an inventor and assignee, and Surprenant

cites to Paulson and then incorporates Paulson by reference. Pet. 15–16 (citing Ex. 1005, code (57); Ex. 1006, code (57), 1:6–10).

During trial, Uniloc presents arguments that fall within one of the following three groupings: (1) Paulson does not teach “scanning a plurality predetermined frequencies,” as recited in independent claim 9; (2) Paulson does not teaching “scanning . . . for a free frequency” among the “plurality of predetermined frequencies,” as recited in independent claim 9; and (3) Google fails to demonstrate that either Surprenant, or the admitted prior art as evidenced by the ’216 patent, teaches “content [that] includes device identification data including a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device,” as recited in independent claim 9. PO Resp. 10–19; PO Sur-reply 1–12. We address these argument groupings in turn.

a. “scanning a plurality of predetermined frequencies”

In its Patent Owner Response, Uniloc contends that Paulson does not teach “scanning a plurality of predetermined frequencies,” as recited in independent claim 9, because the purported indiscriminate “range of sonic frequencies” sampled at step 404 in Figure 4 of Paulson is not set by the “highest frequencies” determined at step 402. PO Resp. 10–11 (quoting Ex. 1005, 13:3, 12:51–53). According to Uniloc, because Paulson discloses that “the sonic transmission frequencies available according to the noise characteristic may be too high for the receive device to sample and demodulate,” the sampling performed at step 404 in Paulson must be outside “the high frequencies . . . the receive device can detect and decode.” *Id.* at 11 (first quoting Ex. 1005, 13:29–32, then quoting *id.* at 12:53–56). Uniloc also argues that other disclosures in Paulson highlight this purported

disconnect between the frequencies that are “initially determined” in step 402 with the sampling that occurs at step 404. *Id.* (citing Ex. 1005, 13:19–21).

In its Reply, Google maintains that step 402 in Figure 4 of Paulson teaches “scanning a plurality predetermined frequencies,” as recited in independent claim 9. Pet. Reply 2–3 (citing Pet. 23–29, Ex. 1003 ¶¶ 65–75; Ex. 1005, 14:10–15, Fig. 4; Ex. 1027 (Reply Declaration of Stuart J. Lipoff) ¶ 8). Google argues that Uniloc’s arguments to the contrary are based on a misunderstanding of Paulson’s disclosure—namely, that the frequencies “initially determined” at step 402 are not then scanned at step 404. *Id.* at 3. To support its argument, Google directs us to Paulson’s Title, which explicitly states its goal to “use[] modulation frequencies that reduce the probability of conflict with ambient noise in the environment.” *Id.* at 3–4 (alteration in original) (quoting Ex. 1005, code (54)). Google argues that Figure 4 merely illustrates a technique for achieving Paulson’s goal of reducing the impact of noise interference. *Id.* at 4 (citing Ex. 1005, 3:1–4; Ex. 1027 ¶ 10). More specifically, Google argues that, for Paulson to achieve its stated goal, it is essential that the noise characteristic created at step 404 covers at least the frequencies “initially determined” at step 402. *Id.* (citing Ex. 1027 ¶ 11). Indeed, Google asserts that step 406 in Figure 4—aptly labeled “Could Noise Interfere with Demodulating Data from Set of Sonic Transmission Frequencies?”—is directed to making this determination. *Id.* at 4–5 (citing Ex. 1005, 13:27–29, 13:50–52; Ex. 1027 ¶ 12).

Relying on the supporting testimony of Mr. Lipoff, together with Paulson’s corresponding description of step 406 that identifies two examples

when noise may cause interference, Google argues that Paulson’s system determines whether the receive device is capable of sampling and demodulating data in the presence of known noise at step 406. Pet. Reply 5–7 (citing Ex. 1005, 11:5–12; 13:11–35, 13:52–59; Ex. 1027 ¶¶ 14, 16). Stated differently, Google argues that, using the noise characteristic determined at step 406, Paulson’s “system verifies whether the receive device may reliably receive the data at the identified frequency given the now-known signal-to-noise ratio.” *Id.* at 7–8 (citing Pet. 26–28; Ex. 1003 ¶ 72; Ex. 1005, 11:27–35; 13:50–59; Ex. 1027 ¶ 17). Google asserts this is why, after the frequencies are “initially determined” at step 402, Paulson’s system performs a secondary check to determine whether the receiving device is capable of sampling and demodulating the incoming transmission. *Id.* at 8 (citing Ex. 1027 ¶ 18). Google further argues that its position in this regard is consistent with Paulson’s “initially determined” language used in step 402, the further refining of available frequencies in light of the noise characteristic of the surrounding environment, and the direct link between the output of step 402 and the input of step 404 illustrated in Figure 4. *Id.* at 8–9 (citing Ex. 1005, annotated version of Fig. 4; Ex. 1027 ¶¶ 19, 20).

In its Sur-reply, Uniloc reiterates its position that Paulson’s disclosure of frequencies that are “initially determined” as step 402 does not preset the range of frequencies sampled at step 404 and, therefore, Paulson does not teach “scanning a plurality of predetermined frequencies,” as recited in independent claim 9. PO Sur-reply 1–2. To support its argument that Paulson indiscriminately samples frequencies at step 404 that are “too high for the receive device to sample and demodulate,” Uniloc directs us to sample frequencies that are “too high” for the system to decode, which,

according to Uniloc, are represented by the frequencies that exceed the sonic frequency limit 502 illustrated in Figure 5. *Id.* at 2–3 (quoting Ex. 1005, 13:29–32) (citing Ex. 1005, Fig. 5). Uniloc also argues that Mr. Lipoff’s supporting testimony on this particular issue should be discarded because it is “plainly inconsistent” with the express disclosure in Paulson. *Id.* at 3. Lastly, Uniloc argues that Google raises a new inherency theory for the first time in the Reply because Google argues that step 404 of Paulson must necessarily “cover at least the frequencies initially set in [s]tep 402.” *Id.* at 3–4 (quoting Pet. Reply 4). Uniloc, however, asserts that Google has failed to meet the exacting standard for demonstrating obviousness by inherency. *Id.* at 4–5.

Based on the fully developed trial record, we agree with Google that the frequencies “initially determined” as step 402 of Figure 4 preset the range of frequencies that are sampled, scanned, and eventually selected as one or more frequencies for transmission throughout steps 404–414 and, therefore, Paulson teaches “scanning a plurality of predetermined frequencies,” as recited in independent claim 9. *See* Pet. 23–25; Pet. Reply 2–9. We begin our analysis by looking at Figure 4 of Paulson, reproduced below, and its corresponding description.

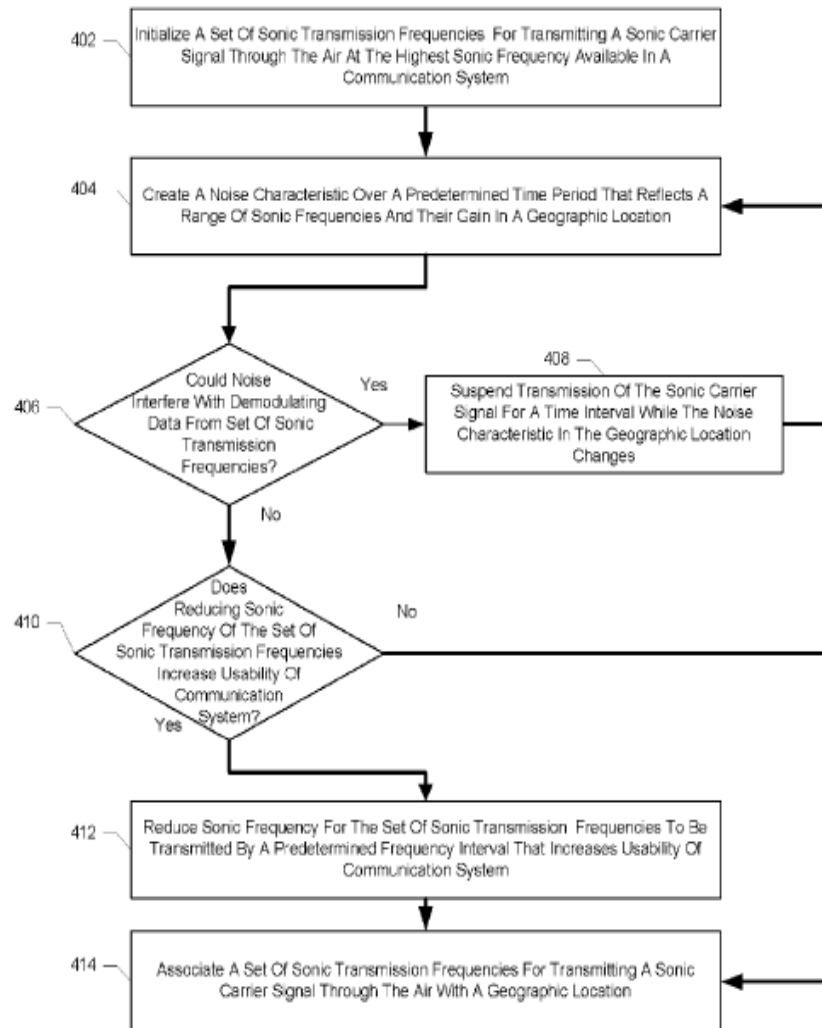


Figure 4, reproduced above, illustrates a flowchart representing “the operations for implementing sonic transmission strategies that reduce the probability of interference from noise.” Ex. 1005, 3:1–4; *see also id.* at 12:49–51 (disclosing the same). Beginning with step 402, Paulson discloses setting the initial sonic transmission frequencies to the highest frequencies in the communication system, which, according to Paulson, are “frequencies [that] are *initially determined* by the highest frequencies the transmit device can send and the receive device can detect and decode.” *Id.* at 12:51–56 (emphasis added). At step 404, Paulson discloses “creat[ing] a noise

characteristic over a predetermined time period that reflects a range of sonic frequencies and their gain in a geographic location.” *Id.* at 13:1–4.

At step 406, using the noise characteristic created in the previous step, Paulson discloses “determin[ing] whether a receive device could potentially demodulate data from sonic carrier signals and sonic transmission frequencies.” Ex. 1005, 13:11–14. In one implementation of this particular step, Paulson requires analyzing the noise characteristic “to determine what sonic transmission frequencies, if any, are available.” *Id.* at 13:15–17. If “the receive device is incapable of demodulating data transmitted over the set of sonic frequencies” because, as one example, “the sonic transmission frequencies available according to the noise characteristic may be too high for the receive device to sample and demodulate,” Paulson discloses “suspend[ing] transmission of the sonic carrier signals for a time interval,” and returning to step 404 to sample the noise characteristic yet again “[o]nce that time interval expires.” *Id.* at 13:27–49.

Eventually, when the receive device is capable of demodulating a set of sonic transmission frequencies, Paulson discloses proceeding to step 410 to “check[] if the noise floor at these particular frequencies in the noise characteristic is low enough to not interfere with the transmission at the sonic transmission frequencies.” Ex. 1005, 13:50–56. Paulson states that, “[i]f the signal-to-noise . . . ratio [SNR] at these frequencies is higher than a predetermined threshold, it is probable that the receive device could demodulate data” when transmitting the sonic carrier signals. *Id.* at 13:56–59. Paulson, however, explains that, in other instances, a reduction or decrease in the sonic transmission frequencies may increase the usability of the sonic communication system. *Id.* at 13:66–14:1. At step 412, sonic

transmission frequencies are decreased, particularly in a situation where it would increase the usability as it impacts “the distance and direction a sonic signal may travel.” *Id.* at 14:7–9. Finally, at step 414, Paulson discloses selecting a set of sonic transmission frequencies (i.e., one or more frequencies) “for transmitting a sonic carrier signal with[in] a geographic location.” *Id.* at 14:10–15.

Given that steps 402–414 of Figure 4 are taken to reduce the impact of noise interference on sonic carrier signals (Ex. 1005, code (54), 3:1–4, 12:49–51), we find that Paulson “initially determine[s]” the frequencies the transmit device is capable of sending and the receive device is capable of detecting and decoding at step 402, and then further refines those “initially determined” frequencies by determining whether they are capable of being demodulated at step 406 using the noise characteristic created at step 404 (*id.* at 12:51–13:49). When considering the “initially determined” frequencies and subsequent refining process together with the sampling, scanning, and eventual selection of one or more frequencies for transmission that occurs throughout steps 404–414, we find that Paulson teaches “scanning a plurality of predetermined frequencies,” as recited in independent claim 9.

Google’s declarant, Mr. Lipoff, provides testimony supporting our findings in this regard. In his Declaration accompanying the Petition, Mr. Lipoff provides the following testimony regarding the “initially determined” frequencies at step 402:

a person of ordinary skill in the art would have recognized these frequencies to be within the scope of a “plurality of predetermined frequencies” because the frequencies are set initially, before communication takes place, and are based on the

capabilities of the communicating devices [(i.e., the transmit device and the receive device)], which are known in advance in at least one disclosed embodiment.

Ex. 1003 ¶ 68 (citing Ex. 1005, 13:23–26). In his Declaration accompanying the Reply Brief, Mr. Lipoff clarifies how the “initially determined” frequencies at step 402 preset the range of frequencies discussed in the context of steps 404 and 406 by testifying that, “[t]o achieve [Paulson’s] goal of reducing the probability of interference from noise, one of ordinary skill [in the art] would have understood that it is essential for the noise characteristic created at Step 404 to cover at least the frequencies initially set in Step 402.” Ex. 1027 ¶ 11. Mr. Lipoff further clarifies that “[o]ne of ordinary skill [in the art] would have understood that the phrase ‘initially determined,’ in conjunction with Paulson’s disclosure about further refining the available frequencies in light of the noise characteristic in the surrounding environment, conveys that the range of frequencies identified at Step 402 is related to the later steps in Paulson’s process,” specifically steps 404 and 406. *Id.* ¶ 19. We credit the aforementioned testimony of Mr. Lipoff because it takes into account the reasonable inferences a person of ordinary skill the art would draw to explain how Paulson’s “initially determined” frequencies at step 402 preset the range of frequencies that are further refined based on the noise characteristic in the surrounding environment at steps 404 and 406. *See KSR*, 550 U.S. at 418 (An obviousness evaluation “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”).

We do not agree with Uniloc’s argument that Paulson discloses indiscriminately sampling frequencies at step 404 that are “too high for the receive device to sample and demodulate,” rather than sampling the frequencies “initially determined” at step 402. *See* PO Resp. 10–11; PO Sur-reply 1–3. Uniloc’s argument is based on a single sentence in Paulson, which states: “[i]n one instance, the sonic transmission frequencies available according to the noise characteristic may be too high for the receive device to sample and demodulate.” Ex. 1005, 13:29–32. According to Uniloc, this sentence amounts to sufficient evidence that would support a finding that the sampling performed at step 404 in Paulson must be outside “the high frequencies . . . the receive device can detect and decode.” PO Resp. 11 (alteration in original); *see also* PO Sur-reply 2–3 (arguing the same).

Uniloc’s argument, however, treats this single sentence in Paulson in isolation, and fails to consider the teachings of Paulson, as a whole. *See In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986) (“It is impermissible within the framework of section 103 to pick and choose [teachings] from any one reference . . . to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” (quoting *In re Wesslau*, 353 F.2d 238, 241 (CCPA 1965))). When considering what the relevant steps of Figure 4 fairly suggests to a person of ordinary skill in the art, the sentence in Paulson at issue refers to “sonic transmission frequencies available according to the noise characteristic,” which, in our view, includes the “initially determined” frequencies at step 402 that may be available when taking into account the noise characteristic created at step 404. As Google explains in its Reply, reading Paulson in this

way is consistent with its goal to “use[] modulation frequencies that reduce the probability of conflict with ambient noise in the environment.” Pet. Reply 3–4 (quoting Ex. 1005, code (54)) (alteration in original); *see also* Ex. 1005, 3:1–4, 12:49–51 (disclosing the same goal of reducing the impact of noise interference).

Once again, Mr. Lipoff provides testimony supporting our view that Paulson’s noise characteristic created at step 404 and the frequencies sampled and demodulated at steps 404 and 406 are based on the “initially determined” frequencies at step 402. According to Mr. Lipoff, Uniloc’s reading of Paulson does not account for the “environmental noise, as determined by and reflected in the noise characteristic,” and how this noise “influences what frequencies a receiving device is able to sample and demodulate.” Ex. 1027 ¶ 14. Mr. Lipoff further testifies that “one of ordinary skill [in the art] would have understood that, in the absence of noise, a receiving device may be able to sample and demodulate an incoming transmission on a wide range of frequencies. But once noise (and the resulting [SNR]) is taken into account, that same device may be incapable of doing so at each of those same frequencies.” *Id.* Turning to the two examples when noise may cause interference that are disclosed in Paulson, one of which being when “the sonic transmission frequencies available according to the noise characteristic may be too high for the receive device to sample and demodulate” (Ex. 1005, 13:29–32), Mr. Lipoff testifies that this particular example indicates that “[t]he level of noise at these frequencies . . . may still be high enough to render the receive device incapable of receiving a transmission because the resulting [SNR] may not meet the receive device’s requirement’s for reliable reception” (Ex. 1027

¶ 16). We credit the aforementioned testimony of Mr. Lipoff because it takes into account the reasonable inferences a person of ordinary skill the art would draw to explain how Paulson achieves its goal of reducing the impact of noise interference by using the noise characteristic created at step 404 to determine whether the “initially determined” frequencies at step 402 have a higher SNR than a predetermined threshold at step 406. *See KSR*, 550 U.S. at 418.

We also do not agree with Uniloc that the frequencies that exceed the sonic frequency limit 502 illustrated in Figure 5 support its argument that Paulson discloses indiscriminately sampling frequencies at step 404 that are “too high for the receive device to sample and demodulate,” rather than sampling the frequencies “initially determined” at step 402. *See PO Sur-reply 2–3*. Figure 5 of Paulson is reproduced below.

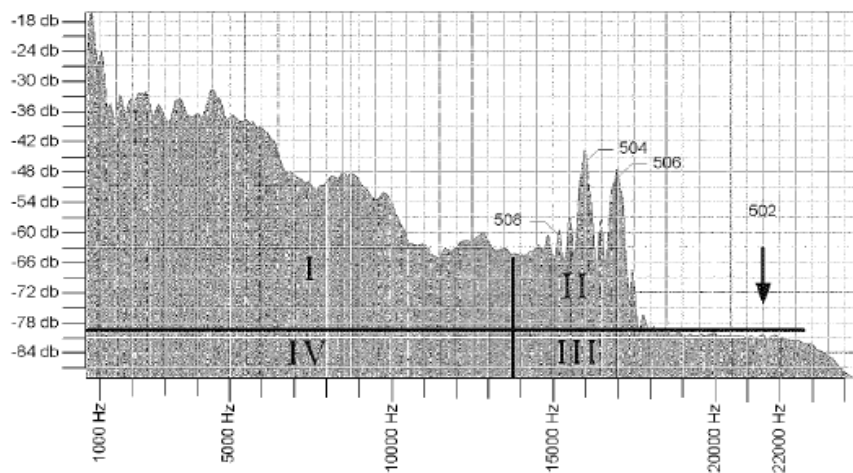


FIG. 5

Figure 5, reproduced above, is a graph that illustrates “a sonic frequency response as received by a receive device” in accordance with one embodiment. Ex. 1005, 3:5–7. This figure depicts four regions that provide a graphical representation of noise characteristic 500 for a particular geographic location. *Id.* at 14:19–23. Of particular importance, Paulson states that “[r]egion II reflects the sonic transmission frequencies suitable for sending sonic carrier signals” and, in this example, that “sonic carrier signals 504 and 506 may be used for modulating data according to a sonic protocol such as FSK.” *Id.* at 14:26–30. Paulson then states, “while higher sonic transmission frequencies in Region II may be available, the sampling rate of the communication system may limit the highest frequency to a sonic frequency limit 502.” *Id.* at 14:33–36. In our view, Figure 5 and its corresponding description are consistent with steps 402–414 illustrated in Figure 4 because Figure 5 merely illustrates that the sampling rate may not exceed sonic frequency limit 502, and within that limit, the communication system has determined that sonic carrier signals 504 and 506 are two signals that are suitable for modulating data because the noise characteristic is low enough to not interfere with transmission. *Compare* Ex. 1005, 13:50–59, *with id.* at 14:19–36; *see also* Tr. 40:24–42:4 (arguing that Figure 5 and its corresponding description actually supports a conclusion of obviousness).

Lastly, we do not agree with Uniloc’s argument that Google raises a new inherency theory for the first time in the Reply. *See* PO Sur-reply 3–5. Contrary to Uniloc’s argument, Google does not use language that would implicate inherency (e.g., necessarily, necessarily present, etc.) when arguing that the noise characteristic created in step 404 of Paulson “cover[s] at least the frequencies initially set in [s]tep 402.” Pet. Reply 4. Instead, we

understand Google to argue that, when viewing the teachings of Paulson through the perspective of a person of ordinary skill in the art as provided by the un rebutted testimony of Mr. Lipoff, Paulson’s “initially determined” frequencies at step 402 preset the range of frequencies that are further refined based on the noise characteristic in the surrounding environment at steps 404 and 406. Pet. 24–27; Ex. 1003 ¶¶ 68–73; Pet. Reply 4–8; Ex. 1027 ¶¶ 11–19. Google’s arguments and evidence with respect to this particular issue are consistent with the well-settled principle that “[w]hat a prior art reference discloses or teaches is determined from the perspective of one of ordinary skill in the art.” *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1361 n.3 (Fed. Cir. 2008).

b. “scanning . . . for a free frequency” among the “plurality of predetermined frequencies”

In its Patent Owner Response, Uniloc contends that the plain language of independent claim 9 and the specification of the ’952 patent both support reading the scanning of a “free frequency” from among the “plurality of predetermined frequencies” as simply requiring the selection of a frequency that is transmittable. PO Resp. 12 (citing Ex. 1001, 11:18–24). In contrast, Uniloc argues that Paulson’s sonic frequency sampling scheme results in outputting frequencies that are “available according to the noise characteristic,” yet are “too high for the receive device to sample and demodulate.” *Id.* (quoting Ex. 1005, 13:29–32). Uniloc also argues that Mr. Lipoff’s supporting testimony on this particular issue should be discarded because it is “plainly inconsistent” with the express disclosure in Paulson. *Id.* at 13.

In its Reply, Google disagrees with Uniloc’s argument that Paulson discloses an inefficient system that generates a noise characteristic for a wide array of frequencies that the transmitting and receiving devices have no hope of using to effect a successful transmission. Pet. Reply 9–10. Relying on the testimony of Mr. Lipoff, Google argues that “[n]othing in Paulson suggests such an inefficient system” and “Uniloc has provided no evidence to support” reading Paulson in this way. *Id.* at 10 (citing Ex. 1027 ¶ 21) (emphasis omitted). Instead, Google maintains that, when considering Paulson’s teachings, “one of ordinary skill [in the art] would have understood that the frequencies identified in [s]tep 402 are scanned during subsequent steps to determine which are free for transmission.” *Id.* (citing Ex. 1003 ¶¶ 67–70). In addition, Google argues that independent claim 9 does not exclude systems that occasionally fail to find a free frequency for transmission. *Id.* at 11. Google asserts that Paulson teaches such a system because it iterates until it finds a free frequency for transmission with minimal noise interference. *Id.* at 11–12 (citing Pet. 23–29; Ex. 1005, Fig. 4 (steps 406–410)).

In its Sur-reply, Uniloc reiterates its position that the plain language of independent claim 9 and the specification of the ’952 patent both support reading the “scanning,” itself, as simply requiring the selection of the first free frequency that is transmittable. PO Sur-reply 5–6 (citing PO Resp. 10–13; Ex. 1001, 11:18–24). Uniloc argues that Paulson’s sonic frequency sampling scheme is inefficient because it performs an indiscriminate scan at step 404 that involves sampling frequencies that are “too high” to be usable by the system (e.g., because the sampled frequencies exceed sonic frequency limit 502 illustrated in Figure 5). *Id.* at 6–7 (quoting Ex. 1005, 13:29–32)

(citing Ex. 1005, 14:34–36, Fig. 5). Stated differently, Uniloc argues that Paulson’s disclosure of determining that certain frequencies conflict with local ambient noise at step 404 and, as a result, are unusable, is distinguishable from “scanning . . . for a free frequency,” as recited in independent claim 9. *Id.* at 7 (alteration in original). Uniloc also argues that Google’s reliance on step 406 in Paulson is unavailing because it amounts to a separate and subsequent decision to determine whether the frequencies that were indiscriminately sampled at step 404 may be usable for transmission, thereby confirming that Paulson lacks scanning for a free frequency in the manner required by independent claim 9. *Id.* (citing Ex. 1005, 13:12–14).

Based on the fully developed trial record, we agree with Google that the sampling, scanning, and the eventual selection of one or more frequencies for transmission throughout steps 404–414 in Figure 4 teaches “scanning . . . for a free frequency” among the “plurality of predetermined frequencies,” as recited in independent claim 9. *See* Pet. 25–29; Pet. Reply 9–12. As we explain above, after Paulson “initially determine[s]” the frequencies the transmit device is capable of sending and the receive device is capable of detecting and decoding at step 402, the system engages in a refining process that involves sampling, scanning, and the eventual selection of one or more frequencies for transmission that occurs throughout steps 404–414. *See supra* Section II.B.5.a. Indeed, there does not appear to be a dispute between the parties that Paulson’s sonic frequency sampling scheme illustrated in Figure 4 concludes with step 414, which results in the selection of one or more frequencies “for transmitting a sonic carrier signal with[in] a geographic location.” Ex. 1005, 14:10–15.

We do not agree with Uniloc’s argument that Paulson’s sonic frequency sampling scheme is inefficient because it performs an indiscriminate scan at step 404 that involves sampling frequencies that are “too high” to be usable by the system. *See* PO Resp. 12–13; PO Sur-reply 6–7. Once again, Uniloc’s argument in this regard is predicated on the notion that Paulson discloses indiscriminately sampling frequencies at step 404 that are “too high for the receive device to sample and demodulate,” rather than sampling the frequencies “initially determined” at step 402. For the same reasons we identify above, this argument is unavailing because it requires reading a single sentence from Paulson in isolation, without considering the teachings of Paulson, as a whole; it runs afoul of Paulson’s stated goal of reducing the impact of noise interference; and it is contradicted by the unrebutted testimony of Mr. Lipoff. *See supra* Section II.B.5.a.

To the extent Uniloc argues that the plain language of independent claim 9 and the specification of the ’952 patent both support its position that the “scanning,” by itself, simply requires selecting the first “free frequency,” without the addition of any other intermediate processing steps, we do not agree. *See* PO Resp. 12; PO Sur-reply 5–6. The plain language of independent claim 9 recites, in relevant part, “scanning a plurality of predetermined frequencies for a free frequency” and then “selecting the free frequency from the plurality of predetermined frequencies.” Ex. 1001, 14:56–59. Neither of these two method steps, nor any other steps required by independent claim 9, place further restrictions or limitations on scanning and selecting a “free frequency” among the “plurality of predetermined frequencies.” Moreover, the use of the transitional phrase “comprising” in

independent claim 9 favors reading the method steps, particularly the “scanning” and “selecting” steps, as open-ended because it is considered a “standard transition term used to make clear that the claim does not preclude the presence of components or steps that are in addition to, though not inconsistent with, those recited in the limitations that follow.” *Amgen Inc. v. Amneal Pharm. LLC*, 945 F.3d 1368, 1379 (Fed. Cir. 2020).

The specification of the '952 patent also does not support reading independent claim 9 as precluding intermediate processing steps, but instead contemplates the potential inclusion of such steps. As support for its reading of independent claim 9, Uniloc directs us to the following disclosure in the specification:

In step 604, the audio transceiver computing device 102 selects the free frequency from the plurality of predetermined frequencies. For example, the mobile phone can identify the first free frequency it scans that has no discernable signal, or that has no signal strength that satisfies a minimum amplitude threshold, or that otherwise meets a pre-established criteria for a free frequency.

PO Resp. 12 (quoting Ex. 1001, 11:18–24); PO Sur-reply 6 (quoting the same). This disclosure in the specification provides three examples by which audio transceiver computing device 102 selects a free frequency from a plurality of predetermined frequencies, one of which requires selecting a free frequency, if any are available, from among a plurality of predetermined frequencies based on “pre-established criteria.” In our view, Paulson’s disclosure of reducing noise interference by using the noise characteristic created at step 404 to determine whether the “initially determined” frequencies at step 402 have a higher SNR than a predetermined threshold at

step 406 is consistent with the “pre-established criteria” example identified in the specification. *See* Ex. 1005, 13:1–59, Fig. 4 (steps 402, 404, 406).

Our determination in this regard finds support in other disclosures in the specification of the ’952 patent and the supporting testimony of Mr. Lipoff. For instance, the specification provides examples of what may qualify as a “free frequency” by explicitly stating that “[t]he free frequency can be . . . a frequency which has a noise level below a predetermined noise level threshold.” Ex. 1001, 5:17–21. Recognizing the similarities between this example in the specification and Paulson’s selection of a frequency based on a “predetermined threshold,” Mr. Lipoff provides the following supporting testimony accompanying the Petition: “[Paulson’s] frequency selection based on a ‘predetermined threshold,’ such as having a low enough noise characteristic as reflected in a higher [SNR], is consistent with how the ’952 patent describes a ‘free frequency’ as being, ‘for example, a frequency which has a noise level below a *predetermined* noise level *threshold*.’” Ex. 1003 ¶ 73 (quoting Ex. 1001, 5:17–21). Notably, Uniloc does not address the similarities between the examples of selecting a free frequency set forth in the specification of the ’952 patent and Paulson’s selection of a frequency based on a “predetermined threshold” in its briefing during trial, nor does Uniloc address Mr. Lipoff’s supporting testimony on this particular issue.

- c. *“the content includes device identification data including a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device”*

Uniloc’s arguments with respect to this limitation fall into three categories: (1) whether Google’s reliance on Surprenant to account for this limitation is predicated on a fallacy; (2) whether Google’s alternative

position that the teachings of admitted prior art, as evidenced by the '216 patent incorporated by reference in the '952 patent, properly accounts for this limitation; and (3) whether certain claim amendments presented during prosecution purportedly distinguish the admitted prior art incorporated by reference in the '952 patent. Beginning with the teachings of Surprenant, Uniloc contends that the underlying premise behind Google's reliance on Surprenant's AMP ID is that it must be "non-user-configurable data" because it is an identification string that is unique and specific to a device. PO Resp. 14. Uniloc, however, argues that "one cannot reasonably conclude an identification string is non-user-configurable simply 'because' it is purportedly unique and specific to a device." *Id.* Uniloc asserts that, because the plain language of independent claim 9 also requires "user-configurable . . . data specific to the audio transceiver device," it cannot be the case that all data that is unique and specific to a device must be "non-user-configurable data." *Id.* at 15 (alteration in original).

In its Reply, Google contends that Uniloc misrepresents the argument presented in the Petition because it never asserts that all data that is "unique and specific to a device" is necessarily "non-user-configurable" data. Pet. Reply 14; *see also id.* at 15 (stating that "Google has not argued that all data that is specific to the audio transceiver computing device is 'non-user-configurable'"). Instead, relying on the testimony of Mr. Lipoff, Google argues that, "[b]ecause [Surprenant's] AMP ID is disclosed as a 'unique identification string' specific to a transmit device, one of ordinary skill [in the art] would have understood it to be derived from a unique property of the device itself that is not user-configurable." *Id.* at 14 (quoting Ex. 1003 ¶ 107 (quoting Ex. 1006, 7:45–49)). Google further argues that Mr. Lipoff testifies

that the serial number of a device is just one example of an identifier that would help uniquely identify Surprenant's transmit device. *Id.* at 14–15 (citing Ex. 1003 ¶ 109). Lastly, Google argues that Uniloc's reliance on the language of independent claim 9 is misplaced because Google explains in the Petition how both “non-user-configurable data” (e.g., a unique identification string, such as a serial number) and “user-configurable data” (e.g., credentials) are specific to Surprenant's audio transceiver computing device. *Id.* at 15–16 (citing Pet. 46–47; Ex. 1006, 7:45–49, 7:53–57; Ex. 1003 ¶ 109).

In its Sur-reply, Uniloc notes that Google carries the burden of persuasion to demonstrate that Surprenant's AMP ID teaches the “non-user-configurable data,” and then proceeds to reiterate its position from the Patent Owner Response that Google has not explained adequately how Surprenant's AMP ID is derived, in part, from “non-user-configurable data” merely because it is a “unique identification string” specific to “transmit device 101.” PO Sur-reply 8–10. Uniloc further argues that “non-user-configurable data” is a “term that means what it says” in that “[i]t must be data that is not configurable by the user.” *Id.* at 10. Uniloc then reproduces the passage in Surprenant describing the AMP ID that Google relies on in the Petition before asserting that nothing in the relevant disclosure precludes the possibility that Surprenant's AMP ID also amounts to “user-configurable data.” *Id.* (citing Ex. 1006, 7:45–49).

At the outset, we note that Uniloc advocates—and Google does not dispute—that the claim term “non-user-configurable data” should be construed in accordance with its plain and ordinary meaning—namely, data that is not configurable by a user. *See* PO Sur-reply 10 (arguing that “non-

user-configurable data . . . must be data that is not configurable by the user”); Tr. 31:13–17, 32:21–23 (arguing the same). Instead, the parties’ dispute appears to turn on what types of data amount to data that is not configurable by a user. The specification of the ’952 patent provides important guidance in this respect because it discloses that “[n]on-user-configurable data includes data such as hardware component model numbers, *serial numbers*, and version numbers, and hardware component parameters such as processor speed, voltage, current signaling, and clock specifications.” Ex. 1001, 6:37–41 (emphasis added). Dependent claim 8 of the ’952 patent, which was not challenged in this proceeding, further limits “non-user-configurable data” to only “hardware component numbers, serial numbers, and version numbers.” *Id.* at 14:50–52. In contrast, independent claim 9 is broader in scope because it does not limit “non-user-configurable data” to any specific type of data and, therefore, encompasses all the examples from the specification identified above. With this in mind, we turn to Google’s reliance on Surprenant’s AMP ID to teach the “non-user-configurable data,” as recited in independent claim 9.

Based on the fully developed trial record, we agree with Google that Surprenant’s AMP ID teaches the “non-user-configurable data” because it discloses that it is a “unique identification string” specific to “transmit device 101.” Pet. 45 (quoting Ex. 1006, 7:45–49). Although Surprenant does not provide further clarification as to what might qualify as a “unique identification string,” Mr. Lipoff provides testimony accompanying the Petition that explains the following: “[b]ecause the AMP ID is disclosed as a ‘unique identification string’ specific to a transmit device, one of ordinary skill [in the art] would have understood it to be derived from a unique

property of the device itself that is not user-configurable.” Ex. 1003 ¶ 107. As just one example, Mr. Lipoff testifies that it would have been obvious to a person of ordinary skill in the art for Surprenant’s AMP ID “to take the form of . . . the device’s serial number,” because it is a “unique identification string” that is nothing more than “data [that] helps uniquely identify the transmit device.” *Id.* ¶ 109. We credit the aforementioned testimony of Mr. Lipoff because it is consistent with Surprenant’s disclosure that the AMP ID is a “unique identification string” specific to “transmit device 101,” and his testimony also is consistent with the examples of “non-user-configurable data” set forth in the specification of the ’952 patent.

We do not agree with Uniloc’s argument that the plain language of independent claim 9 prohibits interpreting *all* “data specific to the audio transceiver computing device” as “non-user-configurable data” because at least some “user-configurable data” must exist that also is specific to the audio transceiver computing device. PO Resp. 14–15; PO Sur-reply 8–10. We do not understand Google to take the position that all data that is unique and specific to an audio transceiver computing device is “non-user-configurable data.” Instead, relying on the teachings of Surprenant together with the supporting testimony of Mr. Lipoff, Google explains in both the Petition and Reply how “non-user-configurable data” (i.e., a unique identification string, such as a serial number) and “user-configurable data” (i.e., credentials) are specific to the audio transceiver computing device. *See* Pet. 46–47 (citing Ex. 1006, 7:45–49, 7:53–57; Ex. 1003 ¶ 109); Pet. Reply 15–16 (citing the same).

Turning to the teachings of admitted prior art as evidenced by the ’216 patent, Uniloc contends that Google’s alternative theory is “demonstrably

false.” PO Resp. 15–16. Uniloc argues that, given the context by which the ’216 patent was addressed in the ’952 patent, “the ’216 patent can hardly be considered a clear and unambiguous admission that it was known to derive a ‘bit array’ from ‘non-user-configurable data specific to the audio transceiver computing device.’” *Id.* at 16–17 (citing Ex. 1001, 6:22–33). Uniloc further argues that, when citing to and incorporating by reference the ’216 patent, the ’952 patent draws a distinction between examples of “user-configurable data and non-user-configurable data specific to the audio transceiver device” from other forms of indicia consisting of “manufacture name, model name, and/or device type.” *Id.* at 17 (quoting Ex. 1001, 6:37–56).

In its Reply, Google argues that Uniloc’s argument that the ’216 patent should not be treated as admitted prior art is unavailing. Uniloc does not respond to our preliminary determination in the Institution Decision that the ’216 patent may be relevant, irrespective of any incorporation by reference, as evidence of the general background knowledge of a person of ordinary skill in the art. Pet. Reply 16 (citing Dec. on Inst. 26–27). Google asserts that our preliminary findings on this particular issue are supported by case law and Uniloc has not provided a sufficient basis to reconsider those findings. *Id.* at 16–17. Google further argues that, given the context in which the ’216 patent was addressed in the ’952 patent, it is clear that only the description of the device fingerprints in the ’216 patent are incorporated by reference. *Id.* at 17 (citing Ex. 1001, 6:27–33). Google also argues that the ’952 patent directly links these known device fingerprints to the claimed features—namely “a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device.” *Id.* (quoting Ex. 1001, 6:34–37).

In its Sur-reply, Uniloc contends that Google does not point to any statement in the '952 patent that clearly and unambiguously treats the device fingerprints of the '216 patent as admitted prior art. PO Sur-reply 10–11. Instead, Uniloc argues that the '952 patent begins a new description of device fingerprints according to an exemplary embodiment following a paragraph break, thereby underscoring that the patentee never intended to consider the incorporation by reference of the '216 patent and its teachings of device fingerprints as admitted prior art for purposes of “a bit array derived from user-configurable data and non-user-configurable data specific to the audio transceiver computing device,” as recited in independent claim 9. *Id.* at 11.

We agree with Google that incorporation by reference of the device fingerprints taught by the '216 patent into the '952 patent is clear and unambiguous. *See* Pet. 43–44; Pet. Reply 17–18. The relevant disclosure in the specification of the '952 patent states the following:

A device fingerprint comprises binary data that identifies the audio transceiver computing device 102 by deriving a unique data string from multiple portions of indicia stored in memory locations within the device, where such indicia can include, for example, data representing a manufacture name, a model name, or a device type. *Device fingerprints and generation thereof are known and are described, e.g., in U.S. Pat. No. 5,490,216 (sometimes referred to herein as the '216 Patent), and in related U.S. Patent Application Publications 2007/0143073, 2007/0126550, 2011/0093920, and 2011/0093701 (the “related applications”), the descriptions of which are fully incorporated herein by reference.*

Ex. 1001, 6:22–33 (emphases added). The plain language in the specification expressly limits the incorporation by reference to the descriptions of the “device fingerprints and the generation thereof” that are

acknowledged to be known and described in the '216 patent. *See, e.g., Zenon Environmental, Inc. v. U.S. Filter Corp.*, 506 F.3d 1370, 1379 (Fed. Cir. 2007) (“The plain language expressly limits the incorporation to only relevant disclosures of the patents, indicating that the disclosures are not being incorporated in their entirety.”).

In the very next paragraph, the specification states that, “[i]n general, the device fingerprint comprises a bit string or bit array that includes or is derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device.” Ex. 1001, 6:34–37 (emphasis added). For three reasons, we agree with Google that this sentence provides a direct link between the device fingerprints taught by the '216 patent and the limitation of independent claim 9 at issue here (i.e., “a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device”). *See* Pet. 42–43; Pet. Reply 17–18. First, this sentence from the specification begins with the transitional phrase “[i]n general,” thereby implying that the discussion is about device fingerprints, as a whole, including those taught by the '216 patent. Second, by referring to the device fingerprint using “the” instead of “a,” this sentence appears to provide proper antecedent basis for the device fingerprints taught by the '216 patent that were discussed in the preceding paragraph. Third, this sentence immediately follows the paragraph that expressly limits the incorporation by reference to the description of the “device fingerprints and the generation thereof” that are acknowledged to be known and described in the '216 patent. Accordingly, we agree with Google that the '216 patent qualifies as admitted prior art that may be used to teach the limitation of independent claim 9 at issue here because the '952 patent limits its

incorporation by reference to the device fingerprints taught by the '216 patent, and the '952 patent admittedly discloses that these known device fingerprints comprise a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device.

Nevertheless, regardless of whether the specification readily admits that the device fingerprints taught by the '216 patent properly accounts for “a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device,” as recited in independent claim 9, Google is still free to rely on the '216 patent as evidence of the general background knowledge possessed by a person of ordinary skill in the art. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015) (explaining that evidence submitted with a petition may be considered to demonstrate the general knowledge that a person of ordinary skill in the art “would bring to bear in reading the prior art identified as producing obviousness”); *see also Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013) (emphasizing that additional prior art references or evidence are not for the purpose of changing the prior art combination that forms the basis of the asserted ground, but rather are merely for the purpose of providing evidence of the state of the art, including the general background knowledge of a person of ordinary skill in

the art).⁵ We made the same preliminary determination in the Institution Decision and, during trial, Uniloc does not provide a sufficient basis for us to treat the device fingerprints taught by the '216 patent any differently for purposes of this Final Written Decision. *See* Dec. on Inst. 26–27. Based on the fully developed trial record, we determine that the “device fingerprints and the generation thereof” that are acknowledged to be known and described in the '216 patent are part of the general background knowledge that a person of ordinary skill in the art would consider in the context of an obviousness evaluation for the reasons we identify above.

We do not agree with Uniloc’s argument that the incorporation by reference of the device fingerprints taught by the '216 patent cannot be considered a clear and unambiguous admission that it was known to derive a bit array from user-configurable and non-user-configurable data specific to the audio transceiver computing device. *See* PO Resp. 16–17; PO Sur-reply 10–11. As we explain above, the '952 patent expressly limits the incorporation by reference to the descriptions of the “device fingerprints and the generation thereof” that are acknowledged to be known and described in the '216 patent, and then provides a direct link between these admittedly known device fingerprints and the claimed features of independent claim 9 that require “a bit array derived from user-configurable and non-user-

⁵ *See* Applicant Admitted Prior Art Memorandum at 9, *available at* https://www.uspto.gov/sites/default/files/documents/signed_aapa_guidance_memo.pdf (“Statements made in the specification of the patent that is being challenged in an IPR can be used as evidence of [the] general knowledge [of a person of ordinary skill in the art], and, thus, . . . can be used to . . . supply missing claim limitations that were generally known in the art prior to the invention.”)

configurable data specific to the audio transceiver computing device.” Whether the ’952 patent draws a distinction between examples of “user-configurable and non-user-configurable data specific to the audio transceiver computing device” and other forms of indicia consisting of “manufacture name, model name, and/or device type,” as asserted by Uniloc, is of no moment because it has no bearing on whether the “device fingerprints” taught by the ’216 patent and incorporated by reference into the ’952 patent properly account for the disputed claimed features of independent claim 9. *See* PO Resp. 17.

Lastly, Uniloc turns to the prosecution history of the ’952 patent to support its argument that the ’216 patent should not be treated as admitted prior art, but in doing so discusses a claim referring to “biometric data.” PO Resp. 18 (citing Ex. 1002 (prosecution history of the ’952 patent), 675, 835). Uniloc argues that the claim amendments entered during prosecution recited “a novel combination of biometric data and ‘device identification data.’” *Id.* at 19; *see also* PO Sur-reply 11–12 (arguing the same). In its Reply, Google contends that Uniloc essentially repeats the same prosecution history arguments presented in the Preliminary Response that we determined were not persuasive on the preliminary record. Pet. Reply 19–20.

We agree with Google that Uniloc’s arguments directed to the prosecution history of the ’952 patent that are raised in the Patent Owner Response are the same arguments raised in the Preliminary Response. *Compare* PO Resp. 18–19, *with* Prelim. Resp. 24–25. For the same reasons discussed in the Institution Decision, those arguments are unavailing. *See* Dec. on Inst. 27. That is, we do not agree with Uniloc’s arguments directed to the prosecution history of the ’952 patent because none of the claims

challenged in this *inter partes* review recite “biometric data.” *See* Ex. 1001, 14:53–15:14 (claims 9–12). Independent claim 1, which is not challenged in this *inter partes* review, recites, in relevant part, that “the content includes biometric data and a bit array.” Ex. 1001, 14:20–21. Accordingly, Uniloc improperly relies on claims in the prosecution history (i.e., independent claim 1) that are materially different from those at issue in this *inter partes* review (i.e., challenged claims 9–12).

To the extent that Uniloc relies on claims from the prosecution history of the ’952 patent that do not include the “biometric data” limitation (*see* PO Resp. 18 (citing Ex. 1002, 715, 721)), we do not agree with Uniloc’s arguments. Based on the fully developed trial record, there is no indication that the Examiner considered and decided the issue of whether the ’216 patent could have been applied as either admitted prior art or as evidence of the general background knowledge possessed by a person of ordinary skill in the art. *See* Ex. 1002. Nor is there evidence that the Examiner considered the teachings of the ’216 patent in relation to the “non-user-configurable data” and “user-configurable data” limitations of independent claim 9. *See id.*

d. Summary

In summary, Google has demonstrated by a preponderance of the evidence that the subject matter of independent claim 9 would have been obvious over the combined teachings of Paulson and Surprenant.

6. Claims 10–12

Each of claims 10–12 directly depend from independent claim 9. Ex. 1001, 15:6–14. Google provides citations to Paulson and Surprenant, along with arguments and supporting evidence as to how the combined

teachings of Paulson and Surprenant account for the additional limitations of these dependent claims. Pet. 48–54.

For example, dependent claim 12 recites that “the carrier wave is modulated by the periodic enclosed content message.” Ex. 1001, 15:13–14. Google contends that Surprenant teaches this limitation because Surprenant discloses “converting a message to binary data; [and] modulating one or more selected frequencies for one or more acoustic carrier signals based on the binary data.” Pet. 53–54 (emphases omitted) (quoting Ex. 1006, code (57)). Relying on the testimony of Mr. Lipoff, Google argues that a person of ordinary skill in the art would have understood that “modulating acoustic carrier signals based on binary data is within the scope of modulating the carrier wave (the acoustic carrier signal) based on the periodic enclosed content message (the binary data).” *Id.* at 54 (citing Ex. 1003 ¶ 124).

During the course of trial, Uniloc does not address separately Google’s arguments and supporting evidence as to how the combined teachings of Paulson and Surprenant account for the additional limitations of dependent claims 10–12. *See* PO Resp. 10–18; PO Sur-reply 1–12. We have reviewed Google’s arguments and supporting evidence as to how the combined teachings of Paulson and Surprenant accounts for the additional limitations of these dependent claims, and we agree with and adopt Google’s analysis. *See* Pet. 48–54. Accordingly, Google has demonstrated by a preponderance of the evidence that the subject matter of dependent claims 10–12 would have been obvious over the combined teachings of Paulson and Surprenant.

*C. Obviousness Over the Combined Teachings of
Paulson, Surprenant, and Beenau*

Google contends that claims 9–12 of the '952 patent are unpatentable under § 103(a) as obvious over the combined teachings of Paulson, Surprenant, and Beenau. Pet. 54–62. Google explains how the combined teachings of Paulson, Surprenant, and Beenau account for the subject matter of each challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of these references. Pet. 54–62; Pet. Reply 2, 13. Google relies on the Declaration of Stuart J. Lipoff accompanying the Petition to support its positions, which is unrebutted on this record. Ex. 1003.

In its Patent Owner Response, apart from its arguments directed to the obviousness ground based on the combined teachings of Paulson and Surprenant, Uniloc does not address separately Google's arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, and Beenau account for the limitations of claims 9–12. *See* PO Resp. 10–19. For the first time in its Sur-reply, Uniloc contends that Beenau fails to address the deficiencies in the proposed combination of Paulson and Surprenant, but Uniloc presents this argument only after Google notes in the Reply that Uniloc fails to address Google's reliance on the teachings of Beenau in the Patent Owner Response. *See* PO Sur-reply 12–13.

We begin our analysis with a brief overview of Beenau, and then we address the parties' contentions with respect to the challenged claims.

1. Overview of Beenau

Beenau discloses a method for using radio frequency ID (RFID) technology to initiate and complete financial transactions. Ex. 1007 ¶ 19.

Beenau explains that, like barcode and voice data entry, RFID is a contactless information acquisition technology. *Id.* ¶ 2.

In one embodiment, Beenau discloses a fob and RFID reader may engage in mutual authentication. *E.g.*, Ex. 1007 ¶ 22. The RFID reader is populated with a unique identifier (e.g., a serial number), which may be used by the fob to determine if the RFID reader is authorized to receive the fob's account number. *Id.* ¶ 90. Beenau further discloses the use of a personal identification number (PIN) in order to verify purchases above a particular spending limit. *Id.* ¶ 140. The user may enter this PIN in a keypad at the merchant system or RFID reader, and the fob verifies the PIN by comparing the PIN to the PIN stored on the fob's memory. *Id.* The fob PIN may be user-selected. *Id.* ¶ 162.

2. Claim 9

Google relies on the same arguments and supporting evidence identified above with respect to the obviousness ground based on the combined teachings of Paulson and Surprenant to account for all the limitations of independent claim 9, except “wherein the content includes device identification data including a bit array derived from user-configurable and non-user-configurable data specific to the audio transceiver computing device.” *See* Pet. 58. Google takes the alternative position that, if the combined teachings of Paulson and Surprenant do not account for this limitation, then it would have been taught by Beenau. *Id.* More specifically, Google relies on Surprenant to teach a “bit array” (*id.* at 61–62 (citing Ex. 1006, 9:8–9, 17:20; Ex. 1003 ¶ 142)), but Google turns to Beenau to teach “user-configurable and non-user-configurable data specific to the audio transceiver computing device” (*id.* at 58–61).

Google asserts that Beenau’s “unique identifier,” which may be a serial number, teaches “non-user-configurable data.” Pet. 58–59 (citing Ex. 1007 ¶ 90). Google cites to claim 1 of Beenau (*id.* at 58), which refers to the unique identifier as a “unique device identification code,” and argues that an authorized sample receiver receives this code from an RF device. (Ex. 1007, Claim 1).

Google explains that Beenau also teaches transmitting PIN information, which a person of ordinary skill in the art would have recognized teaches “user-configurable data.” Pet. 59 (citing Ex. 1007 ¶¶ 140–142). According to Google, Beenau states that the “PIN may be fob user selected.” *Id.* at 60 (emphasis omitted) (quoting Ex. 1007 ¶ 162). Google argues that, during a transaction, the PIN may be provided at either the fob itself or the RFID reader. *Id.* at 59 (citing Ex. 1007 ¶ 140). When providing the PIN to the fob itself, Google argues that the fob transmits the PIN to an RFID reader as part of a process to verify the user’s identity. *Id.* at 59–60 (citing Ex. 1007 ¶ 140; Ex. 1003 ¶ 137).

Google appears to contend that Beenau’s fob teaches the “audio transceiver computing device.” Pet. 61 (explaining that Google relies on the embodiment where the fob transmits the PIN to the RFID reader, and stating that “the PIN is specific to the fob and is therefore ‘specific to the audio transceiver computing device.’”). In arguing that the PIN is specific to the fob, Google also cites to Beenau’s teaching that a corroborating PIN is stored locally in the fob’s memory. *Id.* (citing Ex. 1007 ¶¶ 140–142).

Google further alleges that a “unique identifier” such as a serial number is specific to the audio transceiver computing device. Pet. 60 (citing Ex. 1003 ¶ 139). In support of this position, Google’s declarant, Mr. Lipoff,

testifies that the purpose of using a fob-based system is that, when the fob's identifier is recognized and the related PIN is provided via the fob, the two pieces of information together authenticate the user of that fob and restrictions on tasks like making purchases are lifted. Ex. 1003 ¶ 139.

Although Mr. Lipoff relies on the "fob's identifier," Beenau suggests that it is the RFID reader—not the fob—that contains and transmits the unique identifier (e.g., serial number). *See* Ex. 1007 ¶ 90, Claim 1.

Turning to the rationale to combine, Google proposes combining the teachings of Paulson and Surprenant with those of Beenau based on the assertion that a person of ordinary skill in the art would have been motivated to implement the RFID technology in Beenau by using sound waves instead. Pet. 56. In support of this assertion, Google explains that both Paulson and Surprenant describe sonic/acoustic communications as a better alternative to other forms of wireless communication, including RFID. *Id.* at 55 (citing Ex. 1005, 2:8–14; Ex. 1006, 4:6–20). According to Google, this is because the majority of equipment necessary for sonic/acoustic communication is already included on computers and mobile devices and, therefore, using sound as the communication medium has economic advantages because it eliminates the need for expensive hardware. *Id.* at 55–56 (citing Ex. 1005, 3:51–67; Ex. 1006, 4:6–20). Google also cites to Paulson's disclosure that "sound transmission is unregulated," so "the full spectrum of sonic frequencies is generally available for use by the sonic communication system." *Id.* at 56 (quoting Ex. 1005, 11:1–5). Accordingly, Google concludes that applying the teachings of Beenau by using sound waves instead of RFID would have merely involved substituting one known communication mechanism (i.e., sound) for another (i.e., RFID), with the

predictable benefits of eliminating the need to add specialized RFID hardware and avoiding the use of a regulated spectrum. *Id.* As further support for its conclusion, Google also points out that Paulson, Surprenant, and Beenau all involve similar applications, such as conducting financial transactions. *Id.* at 56–57 (citing Ex. 1007 ¶ 19; Ex. 1005, 10:37–47; Ex. 1006, 7:54–57).

As we explain above, Uniloc does not address separately Google’s arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, and Beenau account for all the limitations of independent claim 9 in the Patent Owner Response. *See* PO Resp. 10–19. Although Uniloc contends that Beenau fails to address the deficiencies in the proposed combination of Paulson and Surprenant in the Sur-reply, Uniloc only presents this argument after Google notes in the Reply that Uniloc failed to address Google’s reliance on the teachings of Beenau in the Patent Owner Response. *See* PO Su-reply 12–13.

In the Scheduling Order, we cautioned Uniloc “that any arguments not raised in the [Patent Owner Response] may be deemed waived.” Paper 16, 8; *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (holding that patent owner’s failure to proffer argument at trial as instructed in the scheduling order constitutes waiver). The Board routinely holds patent owners to this cautionary statement. *See, e.g., Werner Co. v. Louisville Ladder, Inc.*, IPR2019-00336, Paper 34 at 39 (PTAB Aug. 24, 2020) (Final Written Decision) (“Patent Owner’s arguments made for the first time in its Sur-reply are waived because they were not made in the Patent Owner Response, and Petitioner relied on their absence to its detriment and was deprived of the chance to present arguments and evidence

in its Reply to rebut Patent Owner’s assertions.”). We see no reason to deviate from this position in this proceeding, especially because Uniloc does not attempt to explain why we should consider its belated arguments directed to the teachings of Beenau. *See* PO Sur-reply 12–13.

Even if Uniloc did not waive its argument that Beenau fails to address the deficiencies in the proposed combination of Paulson and Surprenant, this argument is unavailing. As we explain above, there are no such deficiencies in the proposed combination of Paulson and Surprenant for Beenau to remedy. *See supra* Section II.B.5.a–c. Moreover, we have reviewed Google’s arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, and Beenau accounts for all the limitations of independent claim 9, and we agree with and adopt Google’s analysis. *See* Pet. 58–62. Accordingly, Google has demonstrated by a preponderance of the evidence that the subject matter of independent claim 9 would have been obvious over the combined teachings of Paulson, Surprenant, and Beenau.

3. *Claims 10–12*

Google relies on the same arguments and supporting evidence identified above with respect to the obviousness ground based on the combined teachings of Paulson and Surprenant to account for all the limitations of dependent claims 10–12. Pet. 62 (citing *id.* at 48–54). During the course of trial, Uniloc does not address separately Google’s arguments and supporting evidence as to how the combined teachings of Paulson and Surprenant account for the additional limitations of dependent claims 10–12. *See* PO Resp. 10–18; PO Sur-reply 1–12. We have reviewed Google’s arguments and supporting evidence as to how the combined teachings of Paulson and Surprenant accounts for the additional limitations of these

dependent claims, and we agree with and adopt Google's analysis. *See* Pet. 48–54, 62. Accordingly, Google has demonstrated by a preponderance of the evidence that the subject matter of dependent claims 10–12 would have been obvious over the combined teachings of Paulson, Surprenant, and Beenau.

*D. Obviousness Over the Combined Teachings of
Paulson, Surprenant, and McConnell*

Google contends that dependent claim 11 of the '952 patent is unpatentable under § 103(a) as obvious over the combined teachings of Paulson, Surprenant, and McConnell. Pet. 62–65. Google explains how the combined teachings of Paulson, Surprenant, and McConnell account for the subject matter of this challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of these references. *Id.* Google relies on the Declaration of Stuart J. Lipoff accompanying the Petition to support its positions, which is unrebutted on this record. Ex. 1003. In its Patent Owner Response, apart from the arguments directed to the obviousness ground based on the combined teachings of Paulson and Surprenant, Uniloc does not address separately Google's arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, and McConnell account for the additional limitation of dependent claim 11. *See* PO Resp. 10–19; PO Sur-reply 1–13.

We begin our analysis with a brief overview of McConnell, and then we set forth Google's contentions with respect to dependent claim 11.

1. Overview of McConnell

McConnell generally relates to digital communications networks and, in particular, to communications using acoustic energy. Ex. 1008, 1:4–5. In one embodiment, McConnell discloses a vehicle that is equipped with a Coded Sound Generator. *Id.* at 6:28, 7:10. A mode selection switch allows an operator to set the Coded Sound Generator to be activated continuously at intervals or only upon user command. *Id.* at 7:19–21.

2. Claim 11

Claim 11 directly depends from independent claim 9, and further recites that “the transmitting step further comprises transmitting the modulated carrier wave until a stop indication is received from a user.” Ex. 1001, 15:10–12. Google takes the alternative position that, if the combined teachings of Paulson and Surprenant do not account for the limitation of dependent claim 11, then this limitation is taught by McConnell. Pet. 64. More specifically, Google contends that McConnell teaches the limitation of dependent claim 11 because it discloses a mode selection switch that allows a user to change modes from continuously at intervals to only upon user command. *Id.* (citing Ex. 1008, 7:19–25, 12:23–13:2). Google asserts that, when the user changes modes in this way, McConnell’s system stops transmitting continuously at intervals and awaits further user input before transmitting. *Id.* (citing Ex. 1003 ¶ 147). In other words, Google argues that the user instructs the transmitter to stop transmitting until the user provides further input, which teaches “transmitting the modulated carrier wave until a stop indication is received from a user.” *Id.* (citing Ex. 1003 ¶ 147).

Turning to rationale to combine, Google argues that it would have been obvious to incorporate McConnell's mode selection switch into the combined system of Paulson and Surprenant to prevent adding potentially disturbing noise to the environment, reduce the opportunity for eavesdropping, and conserve battery power. Pet. 65. As further support for its rationale to combine argument, Google also points out that each of Paulson, Surprenant, and McConnell pertain to similar systems that transmit data through acoustic energy, and they all do so by transmitting the information repeatedly. *Id.* (citing Ex. 1005, 11:23–27; then citing Ex. 1006, 16:22–23; and then citing Ex. 1008, 7:19–25, 12:23–13:2).

As we explain previously, Uniloc does not address separately Google's arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, and McConnell account for the additional limitation of dependent claim 11. *See* PO Resp. 10–18; PO Sur-reply 1–12. We have reviewed Google's arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, and McConnell account for the additional limitation of this dependent claim, and we agree with and adopt Google's analysis. *See* Pet. 62–65. Accordingly, Google has demonstrated by a preponderance of the evidence that the subject matter of dependent claim 11 would have been obvious over the combined teachings of Paulson, Surprenant, and McConnell.

*E. Obviousness Over the Combined Teachings of
Paulson, Surprenant, Beenau, and McConnell*

Google contends that dependent claim 11 is unpatentable under § 103(a) as obvious over the combined teachings of Paulson, Surprenant, Beenau, and McConnell. Pet. 66. Google takes the alternative position that,

if the combined teachings of Paulson, Surprenant, and Beenau do not account for the limitation of dependent claim 11, then this limitation is taught by McConnell for the same reasons discussed above with respect to the obviousness ground based on Paulson, Surprenant, and McConnell. *Id.*

During the course of trial, Uniloc does not address separately Google's arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, Beenau, and McConnell account for the additional limitation of dependent claim 11. *See* PO Resp. 10–18; PO Sur-reply 1–12. We have reviewed Google's arguments and supporting evidence as to how the combined teachings of Paulson, Surprenant, Beenau and McConnell account for the additional limitation of this dependent claim, and we agree with and adopt Google's analysis. *See* Pet. 66. Accordingly, Google has demonstrated by a preponderance of the evidence that the subject matter of dependent claim 11 would have been obvious over the combined teachings of Paulson, Surprenant, Beenau, and McConnell.

III. CONCLUSIONS⁶

Based on the fully developed trial record, Google has demonstrated by a preponderance of the evidence that claims 9–12 are unpatentable under

⁶ Should Uniloc wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Uniloc'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 Uniloc chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Uniloc of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

§ 103(a) as obvious. A summary of our conclusions is set forth in the table below.

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
9–12	103(a)	Paulson, Surprenant	9–12	
9–12	103(a)	Paulson, Surprenant, Beenau	9–12	
11	103(a)	Paulson, Surprenant, McConnell	11	
11	103(a)	Paulson, Surprenant, Beenau, McConnell	11	
Overall Outcome			9–12	

IV. ORDER

In consideration of the foregoing, it is
ORDERED that claims 9–12 of the '952 patent are held to be
unpatentable; and

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

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Patent 9,564,952 B2

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