

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASKELADDEN, L.L.C.,
Petitioner,

v.

OHVA, INC.,
Patent Owner.

IPR2023-00921
Patent 9,679,286 B2

Before JOSIAH C. COCKS, AMEE A. SHAH, and
JASON W. MELVIN, *Administrative Patent Judges*.

SHAH, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. BACKGROUND

Askeladden L.L.C. (“Petitioner”) filed a Petition pursuant to 35 U.S.C. §§ 311–319 for *inter partes* review of claims 1–4 (“the Challenged Claims”) of U.S. Patent No. 9,679,286 B2 (Ex. 1001, “the ’286 patent”). Paper 2 (“Pet.”). OHVA, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Pursuant to our authorization, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 8 (“Prelim. Reply”)) and Patent Owner filed a Sur-reply (Paper 10 (“Prelim. Sur-reply”)). On December 4, 2023, we denied institution. Paper 11. Petitioner filed a Rehearing Request (Paper 12, “Reh’g Req.”), Patent Owner filed a Reply (Paper 13, “Reh’g Reply”), and Petitioner filed a Sur-reply (Paper 14, “Reh’g Sur-reply”). On March 15, 2024, we granted Petitioner’s request for rehearing and instituted this *inter partes* review as to all Challenged Claims and all grounds presented in the Petition. Paper 15 (“Institution Decision” or “Inst. Dec.”).

After institution, Patent Owner filed a Response to the Petition. Paper 18 (“PO Resp.”). Petitioner filed a Reply. Paper 20 (“Pet. Reply”). Patent Owner filed a Sur-Reply. Paper 21 (“PO Sur-Reply”). An oral hearing was held on December 13, 2024, and the transcript is entered into the record. Paper 28 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the Challenged Claims of the ’286 patent. For the reasons discussed below, we determine that Petitioner has established by a preponderance of the evidence that Challenged Claims 1–4 are unpatentable.

B. RELATED MATTERS

The parties note that Patent Owner has asserted infringement of the '286 patent in the following proceedings:

OHVA, Inc. v. Helcim USA Inc., 1:18-cv-01945 (D.Del.);

OHVA, Inc. v. CardFlight, Inc., 1:18-cv-01992 (D.Del.);

OHVA, Inc., v. PayStand Inc., 1:19-cv-00083 (D.Del.);

OHVA, Inc., v. Unified Payments, LLC, 1:19-cv-00084 (D.Del.);

OHVA, Inc. v. Payroc LLC, 1:19-cv-03750 (N.D.Ill.);

OHVA, Inc. v. Eventbrite, Inc., 3:19-cv-03342 (N.D.Cal.);

OHVA, Inc. v. National Bankcard Inc., 1:19-cv-06114 (S.D.N.Y.);

OHVA, Inc. v. Blackbaud, Inc., 2:19-cv-00309 (E.D.Tex.);

OHVA, Inc. v. Shift4 Payments, LLC, 1:19-cv-01857 (D.Del.);

OHVA, Inc. v. AffiniPay, LLC, 1:20-cv-00065 (W.D.Tex.);

OHVA, Inc. v. AnywhereCommerce Services LLC, 1:20-cv-00214 (D.Del.);

OHVA Inc. v. eProcessing Network LLC, 4:20-cv-01247 (S.D.Tex.);

OHVA Inc. v. Ace Merchant Processing LLC, 4:20-cv-01244 (W.D.Tex.);

OHVA, Inc. v. AnywhereCommerce Inc., 6:20-cv-01191 (W.D.Tex.);

OHVA, Inc. v. Bbpos Corp., 1:22-cv-00468 (D.Del.);

OHVA, Inc. v. Fiserv, Inc., 6:22-cv-00366 (W.D.Tex.);

OHVA, Inc. v. Electronic Merchant Systems, LLC, 6:22-cv-00935 (W.D.Tex.);

OHVA, Inc. v. Feitian Technologies Co., Ltd., 6:22-cv-00936 (W.D.Tex.);

OHVA, INC. v. MAGTEK, INC., 2:22-cv-03628 (E.D.Pa.);

OHVA, Inc. v. Payzer, LLC, 1:22-cv-01199 (D.Del.);

OHVA, Inc. v. VeriFone, Inc., 1:22-cv-01204 (D.Del.); and

OHVA, Inc. v. Shopify, Inc., 6:22-cv-01270 (W.D.Tex.).

Pet. 1–3; Paper 4, 2. Petitioner indicates that all but two of the above-identified proceedings are terminated, the two remaining being *OHVA, Inc. v. Fiserv, Inc.* and *OHVA, Inc. v. Shopify, Inc.* Pet. 1–3. Patent Owner, however, indicates that all of the above-identified proceedings are terminated. Paper 4, 2.

C. REAL PARTIES IN INTEREST

Petitioner certifies that the real party in interest is “Askeladden L.L.C.” Pet. 1.

Patent Owner certifies that the real party in interest is “OHVA, Inc.” Paper 4, 2.

D. OVERVIEW OF THE ’286 PATENT

The ’286 patent is titled “METHODS AND APPARATUS FOR ENABLING SECURE NETWORK-BASED TRANSACTION,” and issued on June 13, 2017, from U.S. Patent Application No. 14/636,674 (“the ’674 application”), filed Mar. 3, 2015. Ex. 1001, codes (21), (22), (45), (54). The ’286 patent, as indicated on its face,¹ is a continuation of U.S. Patent Application No. 14/524,842, filed Oct. 27, 2014, which is a continuation of U.S. Patent Application No. 11/533,030, filed Sept. 19, 2006, and refers back to Provisional Application No. 60/719,273, filed Sept. 20, 2005. *Id.* at codes (60), (63).

The apparatus includes:

a transaction card bearing data and having an output interface capable of transmitting the data, a card reader having an input

¹ Petitioner contends that the identification of the ’674 application as being a continuation is incorrect and should instead be a continuation-in-part. Pet. 4–5.

interface enabled to accept the data from the output interface of the transaction card, conversion circuitry converting the card data to an analog modulated signal, and an output pin from the card reader adapted to engage in a microphone port of a computerized appliance, the output pin providing the analog modulated signal to the port, and thence to the computerized appliance.

Ex. 1001, code (57).

The '286 patent explains that, as background, “[i]ntegrated circuit cards, commonly referred to as smart cards, are widely used in stores to secure electronic payments.” Ex. 1001, 1:24–26. It also discusses that smart cards provide the best security but have not been adopted in the online market mainly because of the high cost and complexity for most people and the requirement of providing a card and reader “to the millions of potential end-users who comprise this market base.” *Id.* at 1:26–32.

The '286 patent describes an existing system for secure online transactions that includes “a smart card transmitting an identification sequence to a PC in the form of a modulated signal, a card reader plugged into the microphone input of the PC sound card, and a PC applet demodulating the identification sequence.” Ex. 1001, 1:33–38. Also known are “a method and [an] apparatus to secure online transactions over the phone.” *Id.* at 1:50–51. However, “[w]hat is clearly needed is improved and more secure client/server methods including transmission packaging of secure authentication over a network aided in some case by user-friendly peripherals and devices for performing secure transactions over a data-packet-network.” *Id.* at 1:57–61.

In the “BRIEF SUMMARY OF THE INVENTION” section, the '286 patent discloses that the computerized appliance of its apparatus “has sound conversion circuitry converting the analog modulated signal to digital data”

and “comprise[s] a processor executing coded instructions from a non-transitory medium” in which a “coded instruction executed by the processor cause[s] the data to be used in a communication on the network.” Ex. 1001, 2:8–15. According to the ’286 patent, the disclosed apparatus “may be used in a variety of ways using hardware and/or software to provide secure authentication over a network for users and user groups” via “a modulated sound consisting at least in part of an identification number and a session key.” *Id.* at 3:54–61.

Figure 2, reproduced below, shows “an architectural overview of interaction between a user and an authentication server” in accordance with one embodiment of the ’286 patent. Ex. 1001, 3:7–9, 5:32–34.

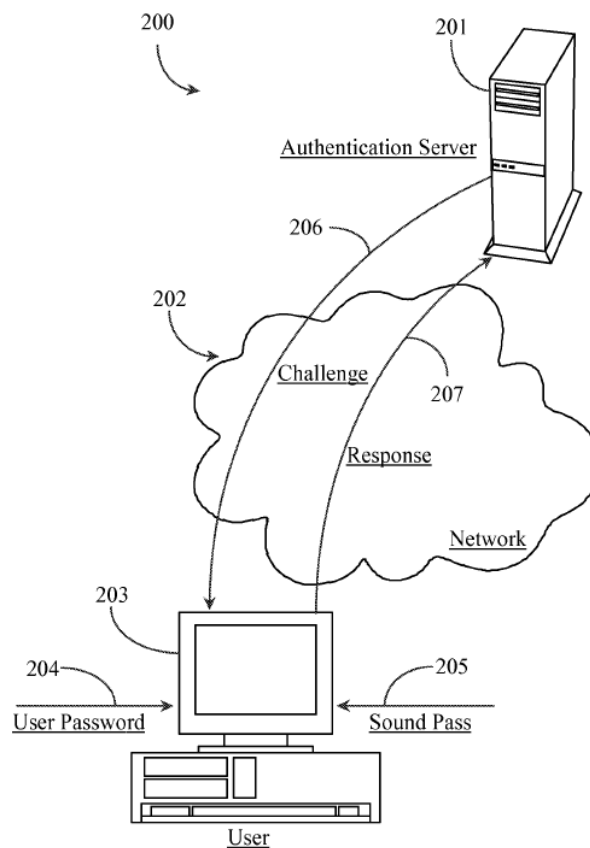


Fig. 2

Figure 2 illustrates an architectural overview 200 of interaction between user 203 and authentication server 201 that is adapted to authenticate user 203 for access to a secure resource, in which authentication server 201 may “includ[e] a transaction portal authenticating transaction for a group of web merchants or banks” and is “adapted to handle secure transactions for individuals.” Ex. 1001, 5:34–40. User 203 operates a PC, i.e., a “client-operated personal computing appliance,” having a network connection to authentication server 201 over network 202 using password 204 and a token that generates a session key. *Id.* at 4:51–52, 5:47–55. Network 202 may be an Internet, Intranet, or wireless telephone network. *Id.* at 5:49–51. User 203 first receives an applet from authentication server 201 which contains a modem and a session key and the “modem demodulates and decodes the signal and includes an encryption algorithm for handling the challenge/response interaction between the user and server.” *Id.* at 5:56–61. User 203 then “enters a password or pin code locally and inserts the sound token, which generates the modulated sound into an audio input on the PC.” *Id.* at 5:61–64. “The session key automatically encrypts the password or PIN ensuring a permanent password encryption state meaning that the password or PIN is never transmitted over the network to the server in a clear or unencrypted state.” *Id.* at 5:64–67. The ’286 patent discloses that sound pass 205 is a sound signal that “may be provided in at least three system compatible forms” and that “any hardware device capable of playing a sound may be incorporated as a sound pass token.” *Id.* at 6:50–55.

One such device “that may serve as a sound pass token is a smart card used in conjunction with a card reader.” Ex. 1001, 6:56–59. Figure 6,

reproduced below, “illustrat[es] basic electronics of a smart card signal generator coupled to a card reader.” *Id.* at 3:19–20.

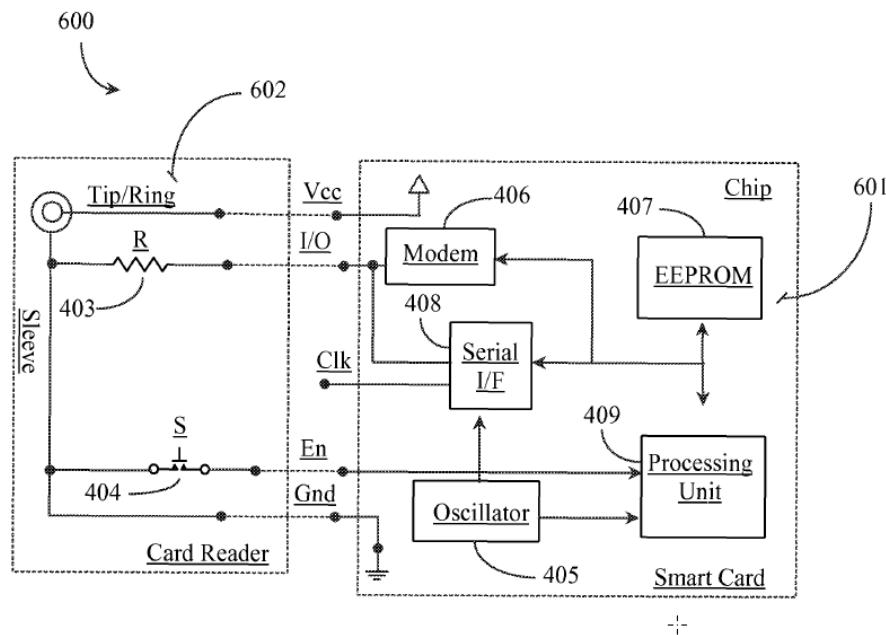


Fig. 6

Figure 6 depicts the electronics of smart card signal generator 601 that has a sound pass chip embedded therein coupled to card reader 602. Ex. 1001, 8:27–30. Card 601 plugs into card reader 602, “which in turn is plugged into the microphone input of the host commuting appliance or other line input capable of carrying sound and directly or indirectly connected to the sound card on the computing appliance such as a PC.” *Id.* at 8:30–35. Reader 602 has no processing components; microprocessor 409 is part of the embedded chip in card 601. *Id.* at 8:39–44. The ’286 patent discloses a smart card signal generator 601 can be coupled to a card reader 602. *Id.* at 8:26–28, Fig. 6.

Figure 7, reproduced below, shows “an architectural overview of interaction using the system of the invention including authentication server

and a mobile device for signal generation” according to another embodiment of the ’286 patent. Ex. 1001, 3:22–25, 5:32–34.

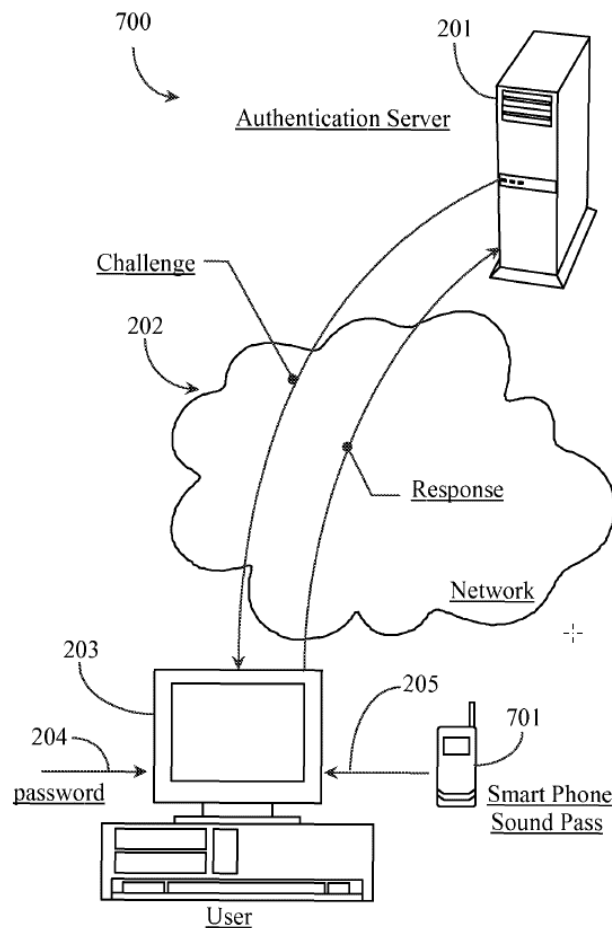


Fig. 7

Figure 7 illustrates an architectural overview of an embodiment using the invention's system including authentication server 201 and mobile device 701 for signal generation. Ex. 1001, 9:38–41. In this embodiment, mobile device such as smart phone 701 can be used for signal generation of sound pass 205 such that “a sound file may serve as the token that includes the user ID number.” *Id.* at 9:38–44. For example, “a modulated audio signal is generated by a sound-generating applet installed on and executable from mobile device 701, which is a smartphone” but “may instead be a PDA

or a hand-held music player such as an Ipod™.” *Id.* at 9:45–49. “The output speaker system of mobile device 701 may be leveraged to play the modulated sound pass into a microphone plugged into PC 203” in which “[t]he server challenge is a hash of the user password and the PC response is the modulated sound pass sent to the PC from mobile device 701 acoustically.” *Id.* at 9:51–57.

The ’286 patent also discloses user authentication using a card verification value (CVV) code, as illustrated in Figure 11, reproduced below.

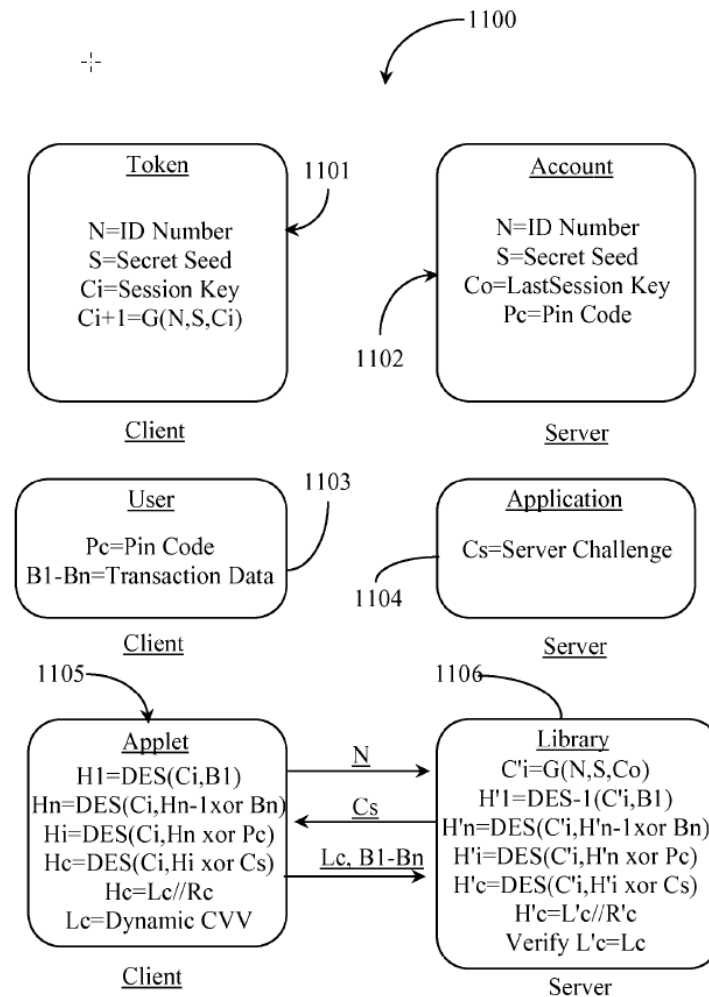


Fig. 11

Figure 11 “is a block diagram illustrating user authentication using a card verification value (CVV) code.” Ex. 1001, 3:36–37. In this example,

financial institutions deploy secure smart card in on which the sound pass token chip is embedded. *Id.* at 12:15–18. The cards are used with a card reader plugged into a microphone jack on the user personal computer as described above. *Id.* at 12:18–21. The bank card, i.e., token 1101, includes token parameters an ID number N, a secret seed S, a current session key C_i , and a generated new session key C_{i+1} . *Id.* at 12:22–28, 32–33. The client account information includes ID number N, secret seed S, last session key C_o , and client PIN code P_c . *Id.* at 12:28–31. The user enters a PIN code P_c and performs “a series of banking transactions by submitting transaction data B_1 - B_n . For each transaction, a new hash code (H_c) is generated by applet 1205 on the client PC,” and “[t]he final H_c is a dynamic card verification value (CVV) [L_c] based on the session key, the transaction data (b_1 - B_n) for the instant transaction, and the P_c ,” the final H_c+L_c then sent to the server for verification. *Id.* at 12:34–42. The server generates its own hash after the user has entered their PIN and the transaction data for that session to generate its L'_c , compares that to the received $H_c L_c$ for each transaction, and the transaction is authenticated when the compared hash codes are identical. *Id.* at 12:43–50.

E. ILLUSTRATIVE CLAIMS

Of the challenged claims, claims 1 and 3 are independent. Claim 2 depends from independent claim 1, and claim 4 depends from independent claim 3.

Claim 1 is reproduced below with certain reformatting:²

1. [[1.0]] An apparatus comprising:

[[1.1.1]] a card reader having an input interface configured to accept transaction data from an output interface of a transaction card,

[[1.1.2]] and an output pin, as a part of the card reader, configured to directly connect the card reader to a microphone port of a smart telephone,

[[1.1.3]] the card reader providing the transaction data accepted from the output interface of the transaction card to the output pin, and hence to the microphone port, as an analog variable voltage audio signal; and

[[1.2]] coded instructions stored in a non-transitory medium of a first Internet-connected server, and accessible by a user of the card reader;

[[1.3.1]] wherein the coded instructions, when executed on a processor in the smart telephone, convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data,

[[1.3.2]] establish direct data exchange between the smart telephone and a second Internet-connected server and facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data.

Ex. 1001, 16:16–38.

F. REFERENCES AND TESTIMONY

Petitioner relies on the testimony of Mr. Bruce McNair in support of its contentions regarding priority and validity. Petitioner relies on Mr. Glenn J. Perry in support of its contentions regarding the real party in interest.

² We apply the same identifiers Petitioner uses for the different portions of claim 1. Pet. 39–58.

Because we need not, and therefore do not, consider the issue of real party in interest, we consider only Mr. McNair's testimony. Patent Owner relies on the testimony of Donald R. Boys in support of its contentions relative to the issues concerning the priority date of the '286 patent. Below are abbreviated summaries of the qualifications of Mr. McNair and Mr. Boys.

1. Petitioner's Expert

Mr. McNair earned both Bachelor and Master of Engineering degrees in Electrical Engineering from Stevens Institute of Technology. Ex. 1004, 1. Mr. McNair has over sixty (60) years of experience in "engineering research, design, development, systems engineering experience in communications systems (including extensive background in wireless communications and system/network security)," with "over 55 years of experience in the areas of electronic circuits." *Id.*; Ex. 1003 ¶ 8. From 1978 through 2002, Mr. McNair held the roles of Member of Technical Staff, Supervisor, Technical Manager, Research Staff Member, Principal Technical Staff Member, and Technology Consultant at various AT&T Bell Labs organizations. Ex. 1004, 3. During this time, he worked in such as areas as digital hardware design, data communications networks, system design, exploratory development, research and development, and security of development processes. *Id.* For example, Mr. McNair "worked on several projects involving public data networks, encryption, analog modems, network security and wireless systems." Ex. 1003 ¶ 10.

Upon retiring from AT&T Bell Labs, Mr. McNair consulted on projects relating to networks and wireless systems interactions in radar, defense, and intelligence systems. Ex. 1004, 2. Mr. McNair also was a Professor of Electrical and Computer Engineer and Program Direction of the

Computer Engineering graduate program at Stevens Institute of Technology, where he currently teaches. *Id.*; Ex. 1003 ¶ 11.

Mr. McNair has, for twenty-four (24) years, been “a well-rated member of one of world's most highly respected R&D organizations, recognized for breadth, depth and practicality of expertise.” Ex. 1004, 1. He has written and presented several papers regarding “various topics in wireless systems and security.” *Id.* at 4. Among his accolades, Mr. McNair was also selected as finalist in the 2014 Bell Labs Prize competition and named to the New Jersey Inventors Hall of Fame as Inventor of the Year in 2012 in the area of wireless communication systems. *Id.* at 5. Mr. McNair also “holds[s] several US patents in encryption and other security technologies, including challenge-response systems,” including two U.S. patents involving authentication and secure communications, “which are closely related to the patents in suit.” Ex. 1003 ¶ 10.

2. *Patent Owner's Expert*

Patent Owner relies on the testimony of Donald R. Boys (Exs. 2001, 2003) in support of its contentions relative to the issues concerning the priority date of the '286 patent. PO Resp. 3.

Mr. Boys is a patent practitioner, registration number 35,047. Ex. 2001, 2; Ex. 2003, 2. Mr. Boys states that his firm, Central Coast Patent Agency, LLC., filed a response to a Final Office Action mailed January 20, 2017 in application 14/673,674. Ex. 2001 ¶ 1; Ex. 2003 ¶ 1. Mr. Boys provides no other description of his qualifications.

3. *References*

Additionally, in the table below we identify the primary references relied upon by Petitioner and Patent Owner, as well as the exhibits

corresponding to the declaration and deposition testimony in the record for Mr. McNair and Mr. Boys.³

References and Witness Testimony	Date	Ex. No.
U.S. Patent No. 9,330,385 B2 (“Cho”)	May 3, 2016	Ex. 1005
U.S. Patent Application Publication No. 2013/0185208 A1 (“Aaron”)	July 18, 2013	Ex. 1006
U.S. Patent Application Publication No. 2013/0124606 A1 (“Carpenter”)	May 16, 2013	Ex. 1008
U.S. Patent Application Publication No. 2014/0008432 A1 (“de Geer”)	Jan. 9, 2014	Ex. 1007
Declaration of Bruce McNair	May 16, 2023	Ex. 1003
Declaration of Donald R. Boys	Sept. 10, 2023	Ex. 2001
Supplemental Declaration of Bruce McNair	Sept. 13, 2023	Ex. 1043
Second Declaration of Donald R. Boys	Oct. 26, 2023	Ex. 2003
Fax Docs Word Document	Mar. 29, 2017	Ex. 2004

³ The table identifies only a select number of documents particularly pertinent to this Decision. A complete identification of the papers and exhibits that form the record of this case is available in the docket of this proceeding. *See also, e.g.*, Prelim. Resp. iv; PO Resp. iv (Patent Owner’s Tables of Exhibits); Pet. Reply 33–36 (Petitioner’s Updated Exhibit List).

G. ASSERTED GROUNDS OF UNPATENTABILITY

Petitioner challenges the patentability of claims 1–4 of the '286 patent on the following grounds (Pet. 6):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	103	Cho, ⁴ Aaron, ⁵ Carpenter ⁶
2	103	Cho, Aaron, Carpenter, de Geer ⁷
3	103	Cho, Aaron
4	103	Cho, Aaron, de Geer

II. ANALYSIS

A. LEGAL STANDARDS

1. *Petitioner's Burden*

Petitioner bears the burden of establishing the unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

2. *Obviousness*

Whether the Challenged Claims would have been obvious over the cited references is at issue in this proceeding. A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject

⁴ Cho et al., U.S. Patent No. 9,330,385 B2, issued May 3, 2016 (Ex. 1005, "Cho").

⁵ Aaron et al., U.S. Patent Application Publication No. 2013/0185208 A1, published July 18, 2013 (Ex. 1006, "Aaron").

⁶ Carpenter et al., U.S. Patent Application Publication No. 2013/0124606 A1, published May 16, 2013 (Ex. 1008, "Carpenter").

⁷ de Geer et al., U.S. Patent Application Publication No. 2014/0008432 A1, published Jan. 9, 2014 (Ex. 1007, "de Geer").

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 legal question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of obviousness or nonobviousness.⁸ *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). Whether a patent claiming the combination of prior art elements would have been obvious is determined by “whether the improvement is more than the predictable use of prior art elements according to their established functions.” *KSR*, 550 U.S. at 417. One seeking to establish obviousness based on more than one reference also must articulate sufficient reasoning with rational underpinnings to combine teachings. *See Id.* at 418.

To show obviousness, it is not enough to merely show that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.” *KSR*, 550 U.S. at 418–419. Moreover, in determining the differences between the prior art and the claims, the question under

⁸ The record does not include allegations or evidence of objective indicia of obviousness or nonobviousness.

35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 164 (Fed. Cir. 1985) (“It is elementary that the claimed invention must be considered as a whole in deciding the question of obviousness.”); *see also Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983) (“[T]he question under 35 U.S.C. § 103 is not whether the differences *themselves* would have been obvious. Consideration of differences, like each of the findings set forth in *Graham*, is but an aid in reaching the ultimate determination of whether the claimed invention as a whole would have been obvious.”).

An obviousness analysis “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.” *KSR*, 550 U.S. at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, a petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, a petitioner must articulate a reason why a person of ordinary skill in the art would have combined or modified the prior art references. *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *see also Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) (“In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason why a person of skill in the art would have made the combination.”); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064,

1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (citing *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)). As a factfinder, we also must be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421.

3. *Priority of Filing Date*

“[A] patent application is entitled to the benefit of the filing date of an earlier filed application only if the disclosure of the earlier application provides support for the claims of the later application, as required by 35 U.S.C. § 112.” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008). “To satisfy the written description requirement [in § 112,] the disclosure of the prior application must ‘convey with reasonable clarity to those skilled in the art that, as of the filing date sought, [the inventor] was in possession of the invention.’” *Id.* (emphasis omitted, alteration in original) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991)).

Although the burden of proof for showing unpatentability remains on Petitioner, Patent Owner may have a burden of production. Patent Owner has the burden for showing it is entitled to priority. *Dynamic Drinkware*, 800 F.3d 1375, 1379 (Fed. Cir. 2015) (discussing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)); *see also In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) (“[A] patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference.”).

“Entitlement to a filing date does not extend to subject matter which is not disclosed, but would be obvious over what is expressly disclosed.” *In re Huston*, 308 F.3d 1267, 1277 (Fed. Cir. 2002) (quoting *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571–72 (Fed. Cir. 1997)).

Applying these general principles, we consider the evidence and arguments of the parties.

B. LEVEL OF ORDINARY SKILL IN THE ART

In determining the level of ordinary skill in the art, various non-exhaustive factors may be considered, including: “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007) (quoting *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696 (Fed. Cir. 1983).

Petitioner contends that a person of ordinary skill in the art at the time of the invention (“POSITA,” “PHOSITA,” or “skilled artisan”) “would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related subject, and one to two years of work experience in mobile payment transactions or a related field” and that “[l]ess experience is necessary with additional education (e.g., a Master’s degree), and likewise, less education is necessary with additional work experience (e.g., 5-6 years).” Pet. 7 (citing Ex. 1003 ¶¶ 57–60).

Patent Owner states that it “does not materially dispute Petitioner’s definition of a POSITA.” PO Resp. 12.

For purposes of this Decision, we find that the '286 patent and the cited prior art references reflect the appropriate level of skill at the time of the claimed invention and that the level of appropriate skill reflected in these references and in the '286 patent is consistent with the level of skill proposed by Petitioner. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Accordingly, for purposes of this Decision, we adopt Petitioner's proposed definition for a person of ordinary skill in the art.

C. CLAIM CONSTRUCTION

In this *inter partes* review, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b). In applying this standard, we generally give claim terms their ordinary and customary meaning as would be understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

In the Petition, Petitioner states that “no claim term requires construction beyond its ordinary and customary meaning.” Pet. 28. In the Preliminary Response, Patent Owner argued that “[t]he Board can deny the Petition without engaging in claim construction because the Petition is deficient under any construction.” Prelim. Resp. 11.

In our Decision Denying Institution, we construed the term “transaction data” as “differentiated from account data.” Paper 11, 30. And we determined that “Petitioner does not explain where or how Cho provides

for account data to include transaction data as differentiated in the '286 patent from account information that comprises account ID number, PIN code, and password.” *Id.* at 29.

In its Request for Rehearing, Petitioner argued that the Board’s Decision Denying Institute “constitutes legal error” because “it improperly imported limitations from the specification of the '286 patent that are not required by the claims.” Reh’g Req. 2; *see also id.* at 3–15; Reh’g. Sur-reply 1–2, 4.

In our Institution Decision, we reconsidered the issue and adopted a broader construction for the term “transaction data.” *See generally* Inst. Dec. In particular, we stated that we “do not limit the claimed ‘transaction data’ and instead preliminarily construe that term as encompassing any data involved in a transaction, including account data.” *Id.* at 8. We also determined that “the claimed transaction data must come from the output interface of a transaction card.” *Id.*

In Patent Owner’s Response, Patent Owner argues “the specification of the '286 Patent makes clear that ‘transaction data’ is not ‘account data,’” but also states that “[t]he Board can deny the Petition without engaging in claim construction because the Petition is deficient under any construction.” PO Resp. 7, 12. In Patent Owner’s Sur-Reply, Patent Owner contends that Petitioner’s construction is “overbroad, that “transaction data” “is separate from ‘account’ information like ID numbers and PIN codes,” and “[t]he '286 Patent clearly distinguishes between these two types of data, as shown in Figure 11 where “transaction data B1-Bn” is separate from “account” information like ID numbers and PIN codes.” PO Sur-Reply 10 (emphasis omitted); *see also* Reh’g Reply 3–5.

In its Reply, Petitioner argues that the construction for “transaction data” applied in our Institution Decision is correct. Pet. Reply 19.

We agree with Petitioner and stand by the interpretation made in the Institution Decision. We substantially reproduce our reasoning and explanation provided in the Institution Decision, and elaborate to address Patent Owner’s further arguments.

Figures 8 through 11 illustrate user authentication embodiments having a token in the form of a smart card having a secure chip that “includes the user ID number (N), a secret seed (S) provided by the authentication service, and a session key (Ci) [that] . . . is the current session key stored in the token.” Ex. 1001, 10:7–18; *see also id.* at 10:4–12:59. A server stores “account data,” i.e., the parameters of the user account including N, S, a record of the last session key (Co) used in an authentication, and a user password (PW) (in Figures 8 and 9) or a PIN code (Pc) (in Figures 10 and 11). *Id.* at 10:31–34, 11:13–20, 11:55–59, 12:28–31. The server “may be any type of server including a transaction portal authenticating transaction for a group of web merchants or banks,” handling secure transactions, and/or providing secure login services to a secure area. *Id.* at 5:36–41.

In the embodiments of Figures 8, 9, and 10, the user manually enters a password (PW), and in Figure 11, the user enters a PIN code. Ex. 1001, 10:40–42, 11:21, 65, 12:34–35. In the embodiment of Figure 10, the user also plays the modulated sound into a microphone input of the PC using the mobile device’s speaker. *Id.* at 11:65–12:4. In the embodiment of Figure 11, after entering the PIN code, the user may “then perform a series of banking transaction by submitting transaction data B1–Bn.” *Id.* at 12:34–36.

The term “transaction data” is only used in the embodiment of Figure 11 where user authentication occurs by using a card verification value (“CVV”). In the embodiment of Figure 11, “[f]or each transaction, a new hash code (Hc) is generated,” with the final Hc being “a dynamic card verification value (CVV) based on the session key, the transaction data (b1-Bn) for the instant transaction, and the Pc.” Ex. 1001, 12:36–42. “In this example, the server hash operation occurs after the user has entered his or her PIN code and the instant transaction data for that session. Otherwise, the server would not have any knowledge of Bi-Bn and could not match the client hash.” *Id.* at 12:46–50. Claims 1–4 of the ’286 patent do not recite coded instructions implementing an authentication process involving generating a hash code. *See id.* at 16:17–66.

Patent Owner argues that “different claim terms are presumed to have different meanings.” PO Resp. 23 (quoting *MicroStrategy Inc. v. Bus. Objects Americas*, 238 F. App'x 605, 609 (Fed. Cir. 2007)); *see also* PO Sur-Reply 10–12 (arguing “[t]he specification’s clear differentiation between these types of data [i.e., transaction data B1-Bn and account information like ID numbers and PIN codes] informs the proper construction of ‘transaction data.’”). However, as Patent Owner notes, the presumption is “[i]n the absence of any evidence to the contrary.” PO Resp. 23 (quoting *CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000)).

Here, although the ’286 patent distinguishes “account data” from “transaction data” in the embodiment of Figure 11, the “transaction data” is submitted by the user to perform a series of banking transactions after manually entering a PIN code, whereas the “account data” is stored on the server, and the token information is accepted from the smart card’s

embedded token, i.e., the output interface of the transaction card. *See* Ex. 1001, 10:12–18, 10:30–35, 10:40–42, 11:21–22, 11:65–12:4, 12:22–36. Thus, the claimed “transaction data” that is “accepted . . . from an output interface of a transaction card” and “accepted . . . from a transaction card at an input interface of the card reader,” as recited in independent claims 1 and 3, comprises data stored on and read from a card, such as an ID number, password, authentication information, or session information, that can be used to facilitate a transaction. The evidence indicates that the claimed “transaction data” is distinct from the “transaction data B1-Bn” described in connection with the Figure 11 embodiment.

Patent Owner argues that our construction is not supported by the Specification and repeats the argument that Figure 11, “the only place that transaction data is disclosed, expressly distinguishes between ‘transaction data’ from both ‘token’ information [that is embedded in the smart card] (1101) and ‘account data’ (1102).” PO Resp. 25. Patent Owner also argues that “[t]he specification shows that the ‘transaction data B1-Bn’ is submitted after a new session key (which includes the ‘ID Number,’ i.e., a form of ‘account data’) is generated.” PO Sur-Reply 11 (citing Ex. 1001, 12:34–36) (emphasis omitted). But, as explained above, one of ordinary skill in the art would understand from the Specification that the “transaction data B1-Bn” is not described as being read from the card, regardless of when it is submitted. Rather, the Specification describes the “transaction data B1-Bn” as being submitted with the manual submission of the PIN. Ex. 1001, 12:34–36, 12:46–50.

As discussed above, the claims require that the transaction data must come from the output interface of a transaction card. Ex. 1001, 16:16–66. The “transaction data B1-Bn” is manually submitted to the user along with

the PIN and then the user “may perform a series of transactions by submitting transaction data B1-Bn.” *Id.* at 10:40–42, 12:34–36. “[T]he server hash operation occurs after the user has entered his or her PIN code and the instant transaction data for that session. Otherwise, the server would not have any knowledge of Bi-Bn and could not match the client hash.” *Id.* at 12:46–50.

As also discussed above, the Specification indicates that rather than “accepting transaction data from the output interface of the transaction card,” the user manually submits transaction data B1-Bn with the PIN code. Ex. 1001, 12:34–36, 12:46–48, 16:17–19. Outside of attorney argument, Patent Owner provides no evidence to suggest otherwise.

Rather, Patent Owner contends that “a skilled artisan would recognize that it makes no sense for ‘transaction data’ to include an ‘ID Number,’ when the ‘ID Number’ has already been expressed in the generation of a new session key” nor “when the PIN code has already been entered.” PO Resp. 26. Outside of attorney argument, Patent Owner provides no evidence to support that a skilled artisan would recognize this.

We further note that the claims do not recite any verification using “transaction data B1-Bn.” Ex. 1001, 16:17–66. At most, the claims require retrieving a card verification code and using that “in the purchases or transactions.” *Id.* at 16:41–42, 16:64–66. We agree with Mr. McNair’s testimony that there is no description in the claims that implies that the recited “transaction data” is distinct from and cannot be account information. *See* Ex. 1043 ¶ 49.

We therefore do not limit the claimed “transaction data” and instead construe that term as encompassing any data involved in a transaction,

including account data. As described above, the claimed transaction data must come from the output interface of a transaction card.

To summarize, based on the evidence, we do not limit the claimed “transaction data” to the ’286 patent’s “transaction data B1-Bn,” but construe that term as encompassing any data involved in a transaction, including account data/information.

D. SCOPE AND CONTENT OF THE PRIOR ART

1. *Overview of Cho – Exhibit 1005*

Cho is titled “CARD PAYMENT SYSTEM” and was issued on May 3, 2016, from U.S. Patent Application No. 14/013,107, filed Aug. 29, 2013. Ex. 1005, codes (21), (22), (45), (54). The card payment system includes:

a card payment apparatus, having an audio jack, configured to: read account information stored on a payment card, transmit the account information via a microphone contact of an audio jack, and receive an acoustic signal via at least one earphone contact of the audio jack; and a client device, having an audio jack socket to receive the audio jack, configured to: receive, from the card payment apparatus, the account information via a receptor for the microphone contact of the audio jack, and transmit, to the card payment apparatus, the acoustic signal via the at least one earphone contact.

Id. at code (57).

Figure 1, reproduced below, shows a “system configuration” implementing “a card payment apparatus” of Cho. Ex. 1005, 2:1–3, 3:3–5.

FIG. 1

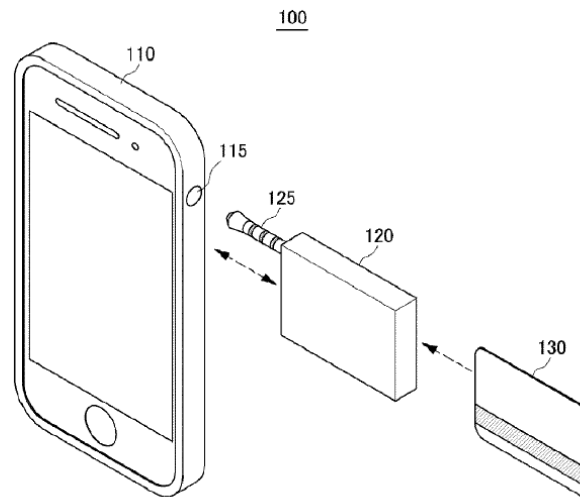


Figure 1 illustrates system configuration 100 that includes client device 110 and card payment apparatus 120. Ex. 1005, 3:5–7. Client device 110 includes audio jack socket 115, such as that of a mobile phone, and card payment apparatus 120 includes audio jack 125. *Id.* at 3:7–9, 3:18–19. Client device 110 and card payment apparatus 120 may be connected when audio jack socket 115 receives audio jack 125. “In some embodiments, audio jack 125 may include at least one earphone contact, a ground contact and a microphone contact.” *Id.* at 4:58–60.

Client device 110 is “configured to receive, from card payment apparatus 120 via audio jack 125, a first analog signal to which a first digital signal is converted.” Ex. 1005, 3:20–22. That digital signal includes account information read from card 130. “[T]he account information may include at least one of an account number, a card expiration date, etc.” *Id.* at 3:24–27. Client device 110 “may be configured to execute a card payment based at least in part on the account information through a card payment server.” *Id.* at 3:52–55.

Card payment apparatus 120 is also configured to read account information into the first analog signal “using any well-known digital-analog converting scheme.” Ex. 1005, 3:27–30. Card payment apparatus 120 includes card reader 230 that may be a magnetic strip reader 230 configured to read account information from a magnetic strip of card 130 or may be an integrated circuit chip reader configured to read account information from an integrated circuit chip of card 130. *Id.* at 4:27–32. 5:54–55, Fig. 2. “Card reader 230 may be configured to read the first digital signal that includes the account information of card 130.” *Id.* at 10:6–7. [T]he account information may include at least one of an account number, a card expiration date, etc.” *Id.* at 5:55–58; 10:7–10.

Cho also discloses that its card device 110, as shown in Figure 10, may include card payment executor 1030 configured to convert a first analog signal into a first digital signal “that includes the account information by using any well-known analog-digital converting scheme” in which “the first digital signal is encrypted [and] card payment executor 1030 [is] configured to decrypt the encrypted first digital signal.” Ex. 1005, 2:39–41, 10:46–48, 11:35–40, Fig. 10. Card payment 1030 may also execute a card payment based on the account information. *Id.* at 11:40–44.

2. *Overview of Aaron – Exhibit 1006*

Aaron is titled “HANDLING TRANSACTION AND TRIP DATA” and was published on July 18, 2013, from U.S. Patent Application No. 13/353,133, filed Jan. 18, 2012. Ex. 1006, codes (21), (22), (43), (54). Aaron “relates to mobile card processing using multiple wireless devices, to acquisition of card information to enhance user experience, and to secure communications between devices.” *Id.* ¶ 1. Aaron discloses that “[a]

customer can conduct a point-of-sale electronic payment transaction with a merchant without giving the merchant a card” by swiping a card on a mobile device that is wirelessly connected to other devices, such as a smart phone, to enable the customer to pay at physical locations. *Id.* ¶¶ 9, 58.

“Before a transaction between the user and the merchant can be performed using the wireless payment system 702, the merchant must create a merchant account with the payment service system 708.” Ex. 1006 ¶ 71. This is performed by the merchant signing up using a mobile application or an online website and by using a device within the wireless payment system 708 or another computing device such as a home computer. *Id.* “At some point prior to the transaction, one or more applications are downloaded to the devices within the wireless payment system 702, e.g., a merchant facing device and a customer facing device.” *Id.* The devices “may run the same application or customized applications to each device (e.g., a merchant application and a customer application).” *Id.* The applications can be downloaded through an application store. *Id.* Data associated with the merchant account is stored in a database at secure server 712. *Id.*

The customer facing device “can include or be attached a credit card reader” and the credit card reader “can be attached to an input, e.g., an audio jack,” of the customer facing device. Ex. 1006 ¶ 59. In some implementations, “the customer facing device 122 receives the amount for a transaction from the merchant facing device 126, and receives card information from the card reader 720 when the customer swipes the card.” *Id.* ¶ 68, Fig. 7. After the customer facing device submits request for authorization of the transaction to a payment service system including a secure server, the secure server processes the transactions from the wireless payment system. *Id.* ¶¶ 68, 69. The secure server “handles secure

information such as credit card numbers, debit card numbers, bank accounts, user accounts, user identifying information or other sensitive information.”

Id. ¶ 69. The payment service system communicates electronically with a card payment network such as “Visa, Mastercard, and the like.” *Id.* ¶ 70.

3. *Overview of Carpenter – Exhibit 1008*

Carpenter is titled “AUTOMATIC PERSONALIZATION OF DOWNLOADABLE MOBILE APPS” and was published on May 16, 2013, from U.S. Patent Application No. 13/295,748, filed Nov. 14, 2011. Ex. 1008, codes (21), (22), (43), (54). Carpenter’s invention “greatly simplifies the process of downloading and personalizing a mobile app by employing a unique code or ‘User ID’ that associates the user with the mobile app.” *Id.* at code (57). Figure 1, reproduced below, shows “a block diagram illustrating . . . an architecture . . . in which mobile apps can be downloaded to mobile devices and personalized automatically.” *Id.* ¶ 14.

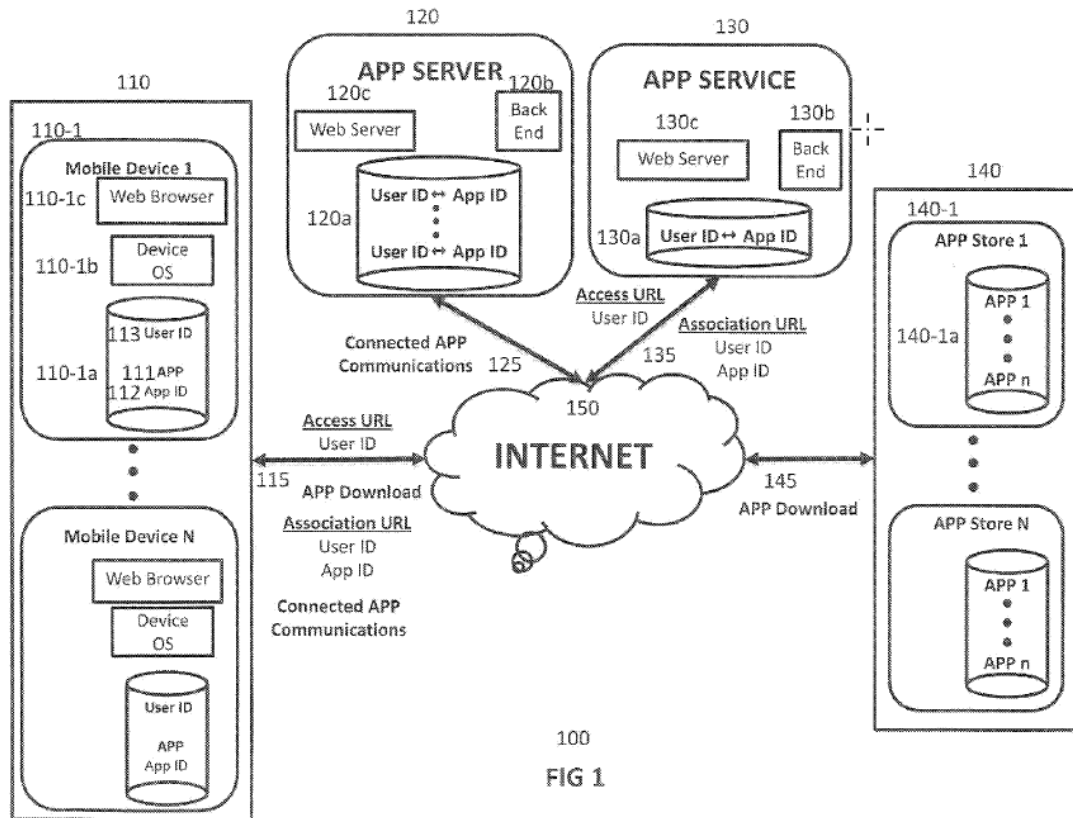


Figure 1 illustrates architecture 100 including client mobile devices 110, such as device 110-1, which communicate via Internet 150. Ex. 1008 ¶ 18. Client mobile device 110-1 can be a smartphone “with a mobile operating system 110-1a capable of running mobile apps, such as app 111 (and web browser 110-1c) and storing data in database 110-1b.” *Id.* ¶ 19. The provider of mobile app 111 maintains App Server 120 “that communicates with mobile app 111, which . . . is a ‘connected’ app” and “App Server 120 utilizes Web Server 120-c initially to create the user’s account and personalized profile.” *Id.* ¶ 22. Certain generic functions are common to many apps, which can be downloaded from App Store 140, which stores mobile app 111 in database 140-1a. *Id.* ¶¶ 23, 26.

4. *Overview of de Geer –Exhibit 1007*

De Geer is titled “METHOD FOR HUB AND SPOKES PIN VERIFICATION FOR CREDIT CARDS WITH CARD INFORMATION STORED IN A MAGNETIC STRIPE” and was published on Jan. 9, 2014, from U.S. Patent Application No. 13/544,301, filed July 9, 2012. Ex. 1007, codes (21), (22), (43), (54). De Geer’s invention “relates in general to the field of secure electronic credit transactions, and more particularly, to a method and a system for secure credit card payment using a credit card with a magnetic stripe.” *Id.* ¶ 1. As Background, De Geer explains that “in the last couple of years the interest, both from the public and from companies, of being able to make payments with portable hand-held devices such as mobile phones have grown rapidly.” *Id.* ¶ 4. Figure 1, reproduced below, “shows a block diagram of a system for conducting card payments using an ordinary mobile device and a card reader device.” *Id.* ¶ 19.

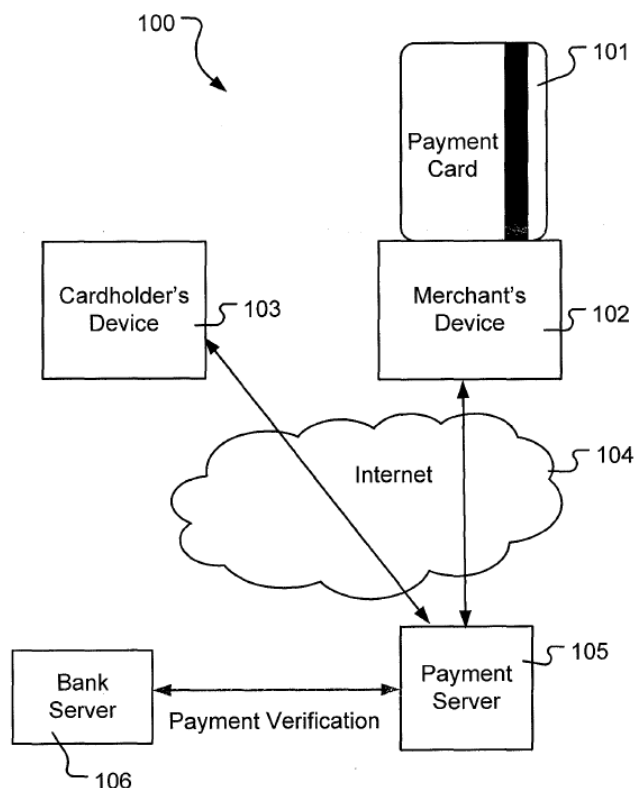


Figure 1 depicts a secure electronic payment system 100 comprising a payment card with a magnetic stripe 101, a merchant's device 102, a cardholders' device 103, a payment server 105 handling the payment session, and a bank server 106. Ex. 1007 ¶ 26. De Geer teaches that merchant's device 102 "may be an ordinary mobile phone with an integrated or add-on unsecure card reader" and that cardholders' device 103 "also may be an ordinary mobile phone." *Id.* When paying, the cardholder will present payment card 101 with a magnetic strip to the merchant. *Id.* ¶ 27.

According to De Geer:

The magnetic stripe on the payment card usually contain[s] up to three tracks with payment card information written in different encodings. The read payment card information generally comprises a primary account number (PAN), the name of the cardholder and but may also comprise discretionary data. The discretionary data may differ depending on the type of payment card and may be any of a personal identification number (PIN) verification value (PVV), expiry date and a card security code (CSC, also known as CVC, CVV, CVV2, CVD, etc.).

Id. ¶ 30.

E. EARLIEST EFFECTIVE FILING DATE OF CHALLENGED CLAIMS

The '286 patent claims priority as a continuation of application 14/524,842, filed on July 31, 2007 ("the '842 application," issued as U.S. Patent No. 9,003,508), which claims priority as a continuation of application 11/533,030, filed on September 19, 2006 ("the '030 application," abandoned). Ex. 1001, code (63). The '286 patent also lists as "Related U.S. Application Data" provisional application 60/719,273 ("the '273 provisional") filed on September 20, 2005. *Id.* at code (60).

1. Petitioner's Position

Petitioner contends the earliest possible effective filing date for claims 1–4 of the '286 patent is March, 3, 2015, i.e., the filing date of the '674 application. Pet. 12; Pet. Reply 2–18. According to Petitioner, “[l]imitations [1.3.1]–[1.3.2] of claim 1 and corresponding limitations [3.3]–[3.4] of claim 3 are not supported by the '030 Application or the '842 Application.” Pet. Reply 3. These limitations pertain to a smart telephone executing coded instructions to: (1) “convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data;” and (2) “establish direct data exchange between the smart telephone and a second Internet-connected server and facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data.” Pet. 17 (quoting Ex. 1001, 16:30–38).

Petitioner contends that support for these limitations can only be found in the '286 patent's “Brief Summary of the Invention” section that replaced the '030 application's summary section. Pet. 20; Pet. Reply 5 (citing Ex. 1003 ¶¶ 70, 74–75; Ex. 1043 ¶ 23).

Petitioner asserts that “[t]he '030 Application never describes a smart telephone **receiving or converting** the claimed analog variable voltage audio signal...to the transaction data **as digital data**.” Pet. Reply 4 (citing Pet. 20–21) (emphasis omitted, second alteration in original). According to Petitioner, “[t]he parties agree that the claimed analog variable voltage audio signal corresponds to the ‘sound signal or sound pass’ (or ‘sound token’).” *Id.* at 5 (emphasis omitted). Petitioner contends that the '030 application discloses that “[t]he sound pass 205 may be provided to the PC 203 by one of three sources: (1) a ‘key jack’ (Figs. 4-5), (2) a smart card and a smart card reader (Fig. 6), or (3) a smart phone (Fig. 7).” *Id.* at 7–8 (citing Pet.

21–26; Ex. 1003 ¶¶ 79–83; Ex. 1043 ¶ 28). And, Petitioner contends that any demodulation in the ’286 patent to convert the signal to data occurs on a PC and not in a smart telephone. Pet. 21.

Petitioner also asserts

The only mention of a ‘smart telephone’ in the specification of the ’030 Application appears in connection with Fig. 4 ([reproduced supra]), where the ’030 Application discusses that a “key jack may be plugged into the sound input or headset connector jack associated with a mobile smart telephone or PDA enabling authentication through a telephone network.

Pet. 22 (citing Ex. 1012, 331, 332, 355; Ex. 1032 ¶ 53, Fig. 4; Ex. 1003 ¶ 79). According to Petitioner, the key jack is not a card reader but is a signal generator that generates a sound pass or signal that is sent to the sound card on the PC in response to a user pushing a mechanism on the key jack’s external surface. *Id.* at 23–24 (citing Ex. 1012, 332, 333, 356; Ex. 1032 ¶¶ 56, 57, Fig. 5; Ex. 1003 ¶ 80).

On page 7 of its Reply, Petitioner provides annotated versions of Figures 2 and 3 of the ’030 application, reproduced below.

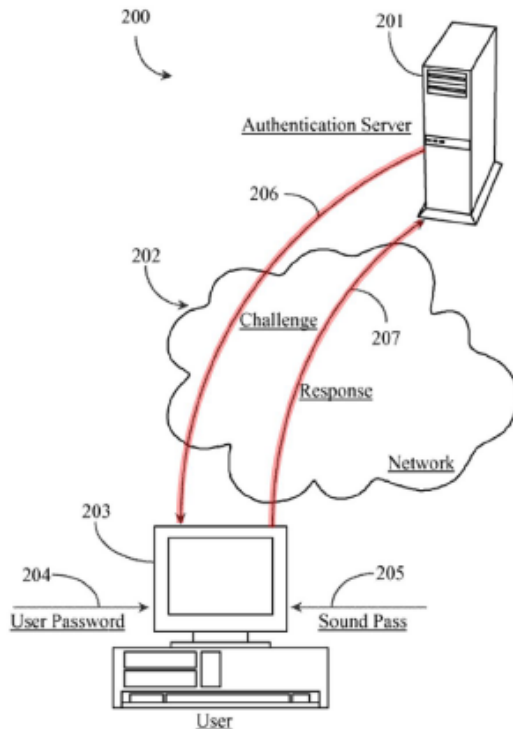


Fig. 2

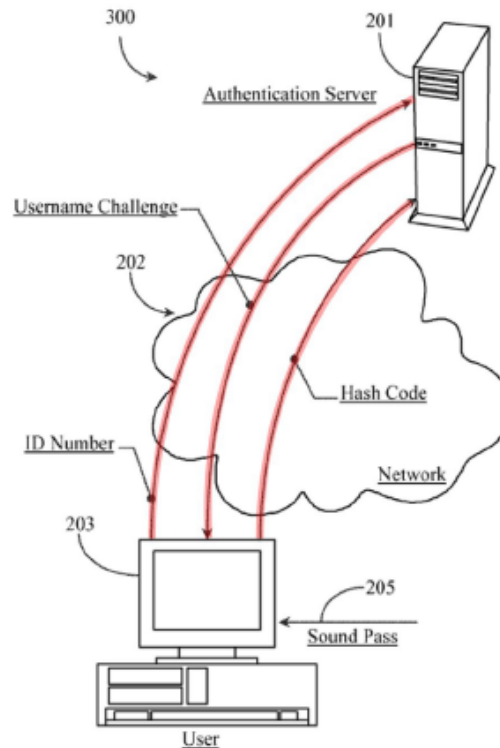


Fig. 3

EX1012, 353-354 ('030 Application, Figs. 2-3) (annotated)

Figures 2 and 3 of the '030 application, as annotated by Petitioner.

According to Petitioner, “the '030 Application provides that the sound pass 205 is provided to the PC 203, which then processes the transaction with the server 201 based on the received soundpass 205.” Pet. Reply 7 (citing Ex. 1012, 330–331; Ex. 1001, 6:32–49). Petitioner contends that “[a]t no point does the '030 Application suggest that the PC 203 may be replaced with a smart telephone.” *Id.* (citing Ex. 1043 ¶ 27). Petitioner also contends that “[t]he '030 Application refers to the key jack above as a ‘mobile device,’ much like it refers to ‘smart phones’ with respect to the Fig. 7 embodiment.” Pet. 24–25 (citing and quoting Ex. 1012, 332, 333, 335, 335, 356; citing Ex. 1032 ¶¶ 56, 67, 68, Fig. 7; Ex. 1003 ¶ 82).

On page 25 of the Petitioner and page 10 of its Reply, Petitioner provides an annotated version of Figure 7 of the '030 application, reproduced below.

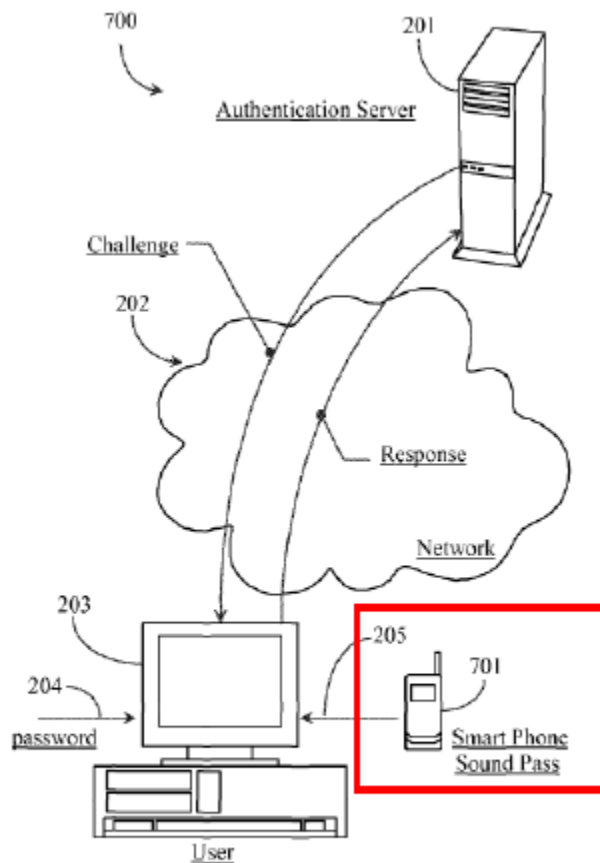


Fig. 7

Figure 7 of the '030 application, as annotated by Petitioner.

Petitioner contends that “[t]he smart telephone in the '030 Application only transmits an analog variable voltage audio signal to a PC, as described with respect to Figure 7.” Pet. Reply 4–5. According to Petitioner, “[t]he smart telephone [in the '030 application] never convert[s] the analog variable voltage audio signal . . . to the transaction data as digital data.” *Id.* at 5 (alterations in original).

Petitioner also cites to the Examiner's final action before allowance stating that "'the claims no longer receive the early filing date' of the prior applications, such that the '[a]pplicant will receive the filing date of the instant application (3/03/15).'" Pet. 14 (quoting Ex. 1002, 115–116 and citing Ex. 1002, 109; Ex. 1003 ¶¶ 63–65) (alteration in original). According to Petitioner, this was in response to the amendment to the claims of the '030 application from a "personal computing device or a smart telephone" to just a "smart telephone" after the Examiner presented prior art teaching a personal computing device. *Id.*; Ex. 1003 ¶¶ 63–65.

Petitioner also contends that the '030 application provides, "[a]s shown in Figures 2, 3, and 7 above, [that] direct data exchange with a server is performed by the PC 203, not the smart telephone." Pet. Reply 15 (citing Pet. 20; Ex. 1043 ¶ 42).

2. *Patent Owner's Position*

Conversely, Patent Owner asserts that claims 1–4 of the '286 patent are entitled to a priority date of September 19, 2006, the filing date of the '030 application. Prelim. Resp. 13; Prelim. Sur-reply 1–5; PO Resp. 12–21; PO Sur-Reply 2–10. Thus, Patent Owner contends that none of the references relied on in the Petition is prior art against the '286 patent. PO Resp. 12–14.

Patent Owner contends that "[o]n its face, the '286 Patent claims priority to a series of applications predating Petitioner's references by nearly a decade, namely to" the '842 application, which was a continuation of the '030 application, which claims priority the '273 provisional. PO Resp. 13 (citing Ex. 1001, 1–2). Patent Owner argues that the '030 application discloses coded instructions executed on a processor in a smart telephone in

disclosing “a modulated audio signal is generated by a sound-generating applet installed on and executable from mobile device 701, which is a smart phone in this example.” *Id.* at 16 (quoting Ex. 1001, 9:45–47 and citing Ex. 1001, Fig. 7; Ex. 1005, 11). Patent Owner submits that a “POSITA would readily recognize that an ‘applet’ is a form of software that is necessarily comprised of ‘coded instructions.’ Indeed, the specification refers to a ‘software applet.’” *Id.* (citing Ex. 1001, 13:60; Ex. 1015, 15⁹).

Patent Owner directs attention to Figure 4 of the ’286 patent and the ’030 application for “illustrating basic electronics 400 of a key jack sound pass generator.” PO Resp. 16. Patent Owner argues that the Specification states that “[a]s a mobile device key jack 400 may be used at virtually any PC station or if so adapted any mobile device capable of a bi-directional network connection,” and that Figure 4’s processing unit 409 “may be a small processor.” *Id.* at 16–17 (quoting Ex. 1001, 7:34–35, 7:52–55; citing Ex. 1015, 9) (emphases and alteration in original). Thus, Patent Owner concludes, a skilled artisan “would readily recognize that the processor disclosed in Fig. 4 discloses a ‘processor in’ a mobile device such as a ‘smart telephone.’” *Id.* at 17 (citing Ex. 2004, 4).

Patent Owner argues that the ’030 application discloses that “implementation with a PC” is “interchangeable with a mobile smart telephone, PDA, or other computing devices.” PO Sur-Reply 2–3 (citing Ex. 1015, 8). Patent Owner contends that the written description clearly

⁹ Patent Owner cites to Exhibit 1015, Petitioner’s redline comparison of the ’030 application to the ’674 application (the ’286 patent). In Exhibit 1015, the text in blue represents additions made in the ’674 application relative to the ’030 application, the text in red represents deletions made in the relative to the ’030 application. Normal black font with no underlining or strikethrough indicates text appearing in both applications.

provides that “the invention may be implemented ‘at virtually any PC station or if so adapted any mobile device capable of a bi-directional network connection.’” *Id.* at 3 (quoting Ex. 1015, 9 (emphases in original)).

Patent Owner also argues that the embodiments shown in Figures 4–7 “illustrate general principles of signal flow that are equally applicable to a smart telephone implementation as to implementation on a PC, which the written description expressly contemplates.” PO Sur-Reply 3–4 (citing Ex. 1015, 9). Patent Owner contends that Petitioner ignores the examples involving the smart telephone, such as the key jack generating the sound pass signal, the key jack being plugged into the sound input or jack associated with a mobile smart telephone to enable authentication. *Id.* at 4 (citing Ex. 1015, 8). This, Patent Owner concludes, “clearly discloses the smart telephone ‘receiving’ and ‘converting’ a ‘sound pass signal,’” and that the authentication inherently requires the smart telephone to convert the received analog audio signal to transaction data as digital data. *Id.* Patent Owner acknowledges that the written description explains that it is the PC that demodulates the sound file, but argues that the written description makes clear that the key jack may be used at any mobile device. *Id.*

Patent Owner also argues that simply by “teach[ing] that that the ‘mobile smart telephone or PDA’ may receive a sound pass signal generated by a key jack plugged into its microphone input,” and that “the sound pass signal is then stored on the ‘mobile device’ for updating,” the written description “necessarily and inherently means that the analog sound pass signal was converted to digital data on the smart telephone,” and that “[a]nalog-to-digital conversion is necessarily and inherently disclosed on the smart telephone in order to accomplish such authentication.” PO Sur-

Reply 7 (citing Ex. 1015, 11, 9; *PowerOasis*, 522 F.3d at 1306); *see also* Tr. 28:8–15.

Regarding the step of establishing a direct data exchange between the smart phone and server using transaction data, Patent Owner argues that the '030 application discloses a “token [that] is not a secure chip but a software file that works with a server driver (dll) and a client applet.” PO Resp. 19 (citing Ex. 1001, 13:35–36, Fig. 14; Ex. 1015, 15). Patent Owner asserts that a “POSITA would readily understand that the ‘client’ could be a ‘mobile device’ or ‘smart phone,’ as the specification elsewhere discloses an ‘applet installed on and executable from mobile device 701, which is a smart phone in this example.’” *Id.* at 19–20 (citing Ex. 1001, 9:45–27 [sic – 47], Fig. 7; Ex. 1015, 11). Patent Owner argues that the '030 application's disclosure of “the authentication server pass[ing] the token contents as clear text string along with a software applet to the client” “discloses a ‘direct data exchange’ between a client and server (including a smart telephone).” *Id.* at 20 (citing Ex. 1001, 13:59–61, Fig. 14; Ex. 1015, 15). And, Patent Owner contends that this “direct data exchange is clearly to facilitate transactions by a financial institution or purchases from an on-line merchant using the transaction data.” *Id.*

Patent Owner asserts that the '030 application discloses a “direct data exchange in that

[t]he '030 Application discloses that “in one embodiment the sound file may be updated by the applet on the device if the server sends a new session key to the mobile device directly or by **the server contacting the telephone directly and establishing a secure network session with the device** to update the file.” EX1015 at 11 (emphasis added). The written description also discloses “any mobile device capable of a bi-directional network connection.” *Id.* at 9.

PO Sur-Reply 8. And, Patent Owner argues that “a POSITA would understand that if a mobile device can execute applets and process signals, it necessarily has the processing capability to handle direct network communication.” *Id.* (citing *PowerOasis*, 522 F.3d at 1306).

3. *Analysis*

a) *a “smart telephone” executing coded instructions to “convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data”*

Patent Owner asserts that claims 1–4 of the ’286 patent are entitled to a priority date of September 19, 2006, the filing date of the ’030 application.

The disclosures of the ’286 patent/the ’674 application and the ’030 application are similar, as indicated by the redline comparison of two provided as Exhibit 1015. Critically, however, the “Summary of the Invention” sections are completely different. *Id.* at 2–4. The question is whether one of ordinary skill in the art would have understood with reasonable clarity, without the benefit of the Summary added for the ’286 patent/’674 application, that the ’030 application describes a smart telephone that executes coded instructions to “convert the analog variable voltage audio signal received at the microphone port to the transaction data as digital data.”

Both disclosures mention the terms “phone” or “mobile device,” which, for context, we summarize below.

In discussing the “secure transmission package 100 of a secure identification number and session key” illustrated in Figure 1, both the ’674 and ’030 applications describe that a soft modem generates “an audible sound compatible with PC sound card capabilities,” with a modulation

frequency “in the range of 0 Hz to 20 kHz for PC server application or in the range of 300 Hz to 3 kHz, which is compatible with telephone networks (wired and mobile).” Ex. 1015, 6. A user 203 can operate “a PC having a network connection to server 201 over a network . . . [that] may be an Internet network, an Intranet network, or a wireless telephone network.” *Id.* at 7.

In the embodiment of figures 2 and 3, both applications provide that a “user 203 is operating a PC having a network connection to server 201 over a network 202,” that can be an Internet, Intranet, or wireless telephone network. Ex. 1015, 7. “Before practicing the invention for the first time, user 203 receives” from the server 201 an applet that has a modem that demodulates and decodes the signal received from the sound token that generates the modulated sound. *Id.* The user enters the password/PIN and inserts the sound token in an audio input on the PC. *Id.*

Both the '674 and the '030 applications recite that “the token may be a hardware device or a software file (soft form) like a Wav file for instance.” Ex. 1015, 8. Devices that can serve as a sound pass token include (1) a smart card used with a card reader, as depicted in Figure 6, (2) “a unique key device termed a key jack by the inventor,” as depicted in Figure 4, and (3) “a sound file deliverable from a mobile device like a cell phone, a personal digital assistant, or a handheld music player such as a Sony music player or an Ipod™,” as depicted in Figure 7. *Id.* at 8–9, 11.

The smart card embodiment depicted in Figure 6 is described in both applications as including an embedded sound pass chip having a microprocessor and components that “are essentially identical to those describe in the example of Fig. 5 for the key jack circuitry.” Ex. 1015, 9–10. The difference between the key jack and the smart card is that the chip is

removable from the card reader circuitry. *Id.* at 10. And, as Mr. McNair explains, “[t]he ’030 Application refers to the key jack above as a ‘mobile device,’ much like it refers to ‘smart phones’ with respect to the Fig. 7 embodiment.” Ex. 1003 ¶ 82.

In the “example” depicted in Figure 7, both applications provide that “a modulated audio signal is generated by a sound-generating applet installed on and executable from mobile device 701,” which is shown as a smart phone in Figure 7 but may be “a PDA or a hand-held music player such as an Ipod™.” Ex. 1015, 10. In one embodiment, a user enters a password or PIN on the PC via the PC keyboard. *Id.* The output speaker of mobile device 701 plays the modulated sound pass into a microphone plugged into the sound card “on PC 203.” In another embodiment, mobile device 701 includes a hardwire cable connecting the speaker output to the microphone input. *Id.* Either way, the “PC-based applet on the PC demodulates the sound pass signal and communicates with the server to authenticate the user.” *Id.* The token on the mobile device may either not be updated by the PC applet or server through the host PC, or “the sound file may be updated by the applet on the sound file may be updated by the applet on the device if the server sends a new session key to the mobile device directly or by the server contacting the telephone directly and establishing a secure network session with the device to update the file.” *Id.*

In a different embodiment for user authentication and generating a new session key as depicted in Figure 10, both applications state that “the token is a sound file stored on a device like a cell phone or a PDA and a sound applet 1001 is provided to the mobile device to perform the modulation, demodulation and encryption.” Ex. 1015, 13. Sound applet 101 then generates a new session key. *Id.* “In this example, user 1003 enters a

PIN code (Pc) and plays the modulated sound into the microphone input of the PC acoustically using the speaker system of the mobile device.” *Id.*

Both the ’030 application and the ’286 patent refer to a “PC” as being “a client-operated personal computing appliance,” and use the term “smart telephone,” but we agree with Petitioner (*see, e.g.*, Pet. Reply 4–14) that it is only in the ’286 patent where there is description of a “smart telephone” that executes instructions to facilitate transactions in lieu of having a PC perform those transactions.

The prosecution history indicates that the smart telephone executing these instructions is not supported by the ’030 application. In the Notice of Allowance mailed, April. 19, 2017, the Examiner referred to an interview conducted with Mr. Boys on March 31, 2017, but no summary of the interview was entered into the record. Ex. 1002, 33. Patent Owner provides Mr. Boys’s post-interview submission of a facsimile of “a document detailing our rationale for enablement re: the new matter issue” (“2017 fax”). Ex. 2004, 2.¹⁰ The 2017 fax provides Patent Owner’s arguments as to why it believes why the terms “**transaction data**,” “*and an output pin. as a part of the card reader*,” “*configured to directly connect the card reader*,” “*and hence to the microphone port, as an analog variable voltage audio signal*,” and “**wherein the coded instructions, when executed on a processor, in the smart telephone, convert the analog variable voltage audio signal on the microphone port to the transaction data as digital data**” are not new matter as indicated by the Examiner. *Id.* at 3–4 (emphases in original and altered). However, there is no evidence that the Examiner

¹⁰ We note that this document is indicated as Exhibit 2004, but does not have markings indicating as such.

agreed with any or all of this. The Examiner's Notice of Allowance contained no indication that any of these arguments was persuasive regarding priority to the '030 application, i.e., that the Examiner withdrew the decision that "the claims no longer receive the early filing date, since the application is a CIP and not a continuation. Applicant will receive the filing date of the instant application (3/03/15)." Ex. 1002, 33–39, 116; *see also* Ex. 1003 ¶¶ 65, 66. Rather, the Examiner only stated

Based on prior art search results, the prior art of record neither anticipated nor renders obvious the claim subject matter of the instant invention as a whole, either taken alone in combination, in particular the prior art of record, does not teach, "a card reader having an input interface configured to accept transaction data from an output interface of a transaction card, and an output pin, as part of the card reader, configured to directly connect the card reader to a microphone port of a smart telephone."

Ex. 1002, 36 (emphasis omitted). The Examiner then discussed the closest prior art. But there was no discussion pertaining to priority to the earlier applications regarding the smart phone executing instruction to convert an analog signal nor whether the prior art taught that limitation. *See id.* at 36–38.

Mr. McNair testifies that "[t]he '030 Application's specification discusses a smart telephone **generating** 'the modulated sound pass,' not '*accept[ing] transaction data from an output interface of a transaction card*' from a card reader via the microphone port." Ex. 1003 ¶ 83 (emphases and first alteration in original) (citing Ex. 1032 ¶ 67); *see also* Ex. 1043 ¶ 32 (testifying "smart telephone 701 never receives the sound pass." (emphasis omitted)). Mr. McNair's testimony is supported by the '030 application's disclosure. As discussed above, Figure 7 clearly depicts the smart phone

sending the signal to the PC and the written disclosure provides that the applet on the PC demodulates the sound pass. Ex. 1015, 10.

As also discussed above, and in Mr. McNair's testimony, the '030 application describes "computing appliance" as the "PC," and does not include a smart phone as an example of either. Ex. 1015, 6; Ex. 1003 ¶¶ 78, 79. Mr. McNair also testifies that at time the '030 application was filed, "a hand-held music layer such as an iPod™," as discussed as an example of a smart phone as shown in Figure 7 (Ex. 1015, 10), would only have had the capability "to output audio," and did not have had the capability to have third party applications to be a "computing appliance," "computerized appliance," or "PC" as discussed in the '030 application and '286 patent. Ex. 1003 ¶¶ 78, 84–87 (citing Ex. 1012, 327, 333, 334; Ex. 1032 ¶¶ 37, 57, 60; Exs. 1035, 1037, 1038). The evidence supports Mr. McNair's testimony.

Exhibit 1035 is a screen shot of the "iPod nano" from 2005 describing it as "impossibly small." In Exhibit 1036, which asks users to identify their iPod model, the iPod nano introduced in September 2005 and February 2006 are described as having "flash memory instead of a hard drive." Ex. 1036, 8–9. Exhibit 1037 is a March 6, 2008, press release from Apple® for its new iPhone™ 2.0 software that "creat[ed] a vibrant third party developer community with potentially thousands of native applications for iPhone and iPod touch." Ex. 1037, 1. The iPhone 2.0 software "contain[ed] the App Store, a *new* application that lets users browse, search, purchase and wirelessly download third party applications directly onto their iPhone or iPod touch." *Id.* at 2 (emphasis added).

Based on the evidence, we agree that at the time the '030 application was filed, a mobile device or smart phone did not necessarily have the operability of receiving applets or converting signals into data. Thus, "[i]n

the '030 Application, the specification does not suggest that the 'smart phone' would operate as anything other than a medium for providing a sound file to a PC." Ex. 1003 ¶ 88.

Patent Owner does not provide evidence contesting Petitioner's evidence and allegations. Although Patent Owner argues that it would have been "inherent" for the smart phone to perform the conversion (*see, e.g.*, PO Sur-Reply 4–5), Patent Owner provides no extrinsic evidence that makes clear that one of ordinary skill in the art would have understood that by simply receiving and storing, the mobile device/smart phone of the '030 application would necessarily execute instructions to convert the signal to digital data. Specifically, Patent Owner does not provide extrinsic evidence that makes clear that the missing descriptive matter regarding the smart phone converting the analog signal is necessarily present in the receiving and storing of a signal as described in the '030 application or that one of ordinary skill in the art would recognize that as necessarily being so.

"Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999); *see also PowerOasis*, 522 F.3d at 1306–07. Similarly, Patent Owner does not argue persuasively how a person of ordinary skill in the art would understand that, as Patent Owner further argues, "the very fact that the sound pass signal generated by the key jack enables authentication through a telephone network after being plugged into the sound input of a smart telephone proves that the signal is converted to digital form." PO Sur-Reply 7 (citing Ex. 1015, 8).

Having reviewed all of the parties' arguments and evidence on this matter, we determine that the preponderance of evidence shows that the

challenged claims the '286 patent are not entitled to the '030 application's priority date of September 19, 2006, because Patent Owner has not shown that the '030 application has written description support for the above-noted limitation of the '286 patent. Therefore, the Cho, Aaron, de Greer, and Carpenter references, filed August 29, 2013, January 18, 2012, July 9, 2012, and November 14, 2011, respectively, qualify as prior art. Because these references pre-date the '842 application's filing date of Oct. 27, 2014, we need not consider whether the challenged claims'286 patent are afforded priority to that date. Ex. 1001, code (63).

b) *“establish[ing] direct data exchange between the smart telephone and a second Internet-connected server and facilitat[ing] transactions by a financial institution, or purchases from an online-merchant, using the transaction data”*

The '030 application provides that in one embodiment, the token is a software file that works with a server driver and is not a chip. Ex. 1015, 15. It also provides that the authentication server passes the tokens contents with a software applet “to the client.” *Id.* The applet can install “itself . . . in the clients [sic] Web browser as a plug-in or as a separate instance.” *Id.* When the client receives the applet, it creates the token file. *Id.*

We agree with Petitioner that one of ordinary skill in the art would understand that the client is a personal computing appliance PC that has direct data exchange with the server. Pet. Reply 15. The term “client” is not specifically defined. The '030 application provides that: (1) a transmission package is “assembled at a client-operated personal computing appliance (PC) (Ex. 1015, 6);” (2) an applet is downloaded “to a client practicing the invention (*id.*);” (3) server 201 sends information based on receiving “the correct ID number from the token on the client PC” (*id.* at 7); (4) while the

PC sends a hash code, the server generates its own hash, and “when the server receives the client response, a comparison of the hash codes is performed” (*id.* at 8; *see also id.* at 12); (5) “a client has a token 801 in the form of a key jack or smart card having the secure chip” (*id.* at 11); (6) “[t]he secrete [sic] seed (S) is a parameter issued to the client” (*id.*); (7) “[t]he client has a sound file token 901 located on a PC or on some external device like a cell phone, PDA, or other handheld device capable of playing the sound file” (*id.* at 12); (8) “[t]he applet on the client generates a final hash code” (*id.* at 13; *see also id.* at 14); and (9) “[t]he applet 1304 on the client PC creates a session key” and generates a hash code (*id.* at 15).

As Petitioner points out, Figures 7 and 14 show that PC 203 communicates with authentication server 201. Pet. Reply 15; *see also* Ex. 1043 ¶ 43. Further, as discussed above, Petitioner has established at the time the ’303 application was filed, a mobile device or smart phone did not necessarily have the receiving and executing applets. *See* Ex. 1003 ¶¶ 78, 84–87; Ex. 1043 ¶ 44; Exs. 1035–1038).

Patent Owner does not provide adequate evidence to support its contention that a “POSITA would readily understand that the ‘client’ could be a ‘mobile device’ or ‘smart phone,’ as the specification elsewhere discloses an ‘applet installed on and executable from mobile device 701, which is a smart phone in this example.” PO Resp. 19–20. Rather, Patent Owner refers only to the written description. *Id.*

Having reviewed all of the parties’ arguments and evidence on this matter, we determine that the preponderance of evidence shows that the challenged claims the ’286 patent are not entitled to the ’030 application’s priority date of September 19, 2006, because Patent Owner has not shown that the ’030 application has written description support for the above-noted

limitation of the '286 patent. Therefore, the Cho, Aaron, de Greer, and Carpenter references, filed August 29, 2013, January 18, 2012, July 9, 2012, and November 14, 2011, respectively, qualify as prior art. Because these references pre-date the '842 application filing date of Oct. 27, 2014, we need not consider whether the '286 patent is afforded priority to that date. Ex. 1001, code (63).

F. GROUND 1 – ALLEGED OBVIOUSNESS OVER CHO, AARON, AND CARPENTER

1. *Discussion*

Petitioner challenges independent claim 1 as unpatentable under 35 U.S.C. § 103 over Cho, Aaron, and Carpenter. Pet. 34–58.

Petitioner contends that Cho “renders obvious”¹¹ limitations [1.0] through [1.1.3] and [1.3.1], the combination of Cho, Aaron, and Carpenter renders obvious limitation [1.2], and Cho alone or in combination with Aaron renders obvious limitation [1.3.2]. Pet. 39–47. Petitioner explains in detail which disclosures and combinations of Cho, Aaron, and Carpenter allegedly teach each of claim 1’s limitations. *Id.* And, Petitioner proffers explanation regarding the motivation of a person of ordinary skill to modify Cho with Aaron and Carpenter and have a reasonable expectation of success in doing so. *Id.* at 34–39, 51–52. Petitioner also cites Mr. McNair’s testimony, in which Mr. McNair details which disclosures and combinations of Cho, Aaron, and Carpenter he believes teach each of claim 1’s limitations and why one of ordinary skill in the art would do so. *Id.* at 34–52; Ex. 1003 ¶¶ 108–156.

¹¹ Throughout the Petition, Petitioner uses the phrase “renders obvious” when arguing that a prior art reference *discloses* a certain claim limitation. We deem this harmless error, unless noted otherwise.

In response, Patent Owner focuses on the “transaction data” and “analog variable voltage audio signal” recited in claim 1. PO Resp. 21–31. More particularly, Patent Owner asserts that Cho does not disclose “transaction data” under what it considers to be proper construction of the term, and that Cho’s “analog signal” is not the same as the claimed “analog variable voltage audio signal.” *Id.*

Having reviewed all of the parties’ arguments and evidence, we find that Petitioner demonstrates by a preponderance of the evidence that claim 1 would have been obvious over Cho, Aaron, and Carpenters. Pet. 34–58; Prelim. Resp. 21–24; PO Resp. 21–31; Pet. Reply 22–30; PO Sur-Reply 10–15. We turn now to a detailed discussion of the parties’ disputes regarding the “transaction data” and “analog variable voltage audio signal” in claim 1.

a) The “transaction data” dispute

Petitioner contends that Cho teaches the claimed transaction data as recited in limitations [1.1.1], [1.1.3], and [1.3.2] of “a card reader having an input interface configured to accept transaction data from an output interface of a transaction card,” “the card reader providing the transaction data accepted from the output interface of the transaction card to the output pin,” and “the coded instructions . . . facilitate transactions by a financial institution, or purchases from an online-merchant, using the transaction data,” respectively. Pet. 40–43, 46–47, 56–58.

Specifically, Petitioner equates Cho’s account data with the claimed transaction data. Pet. 40–43, 46–47, 56–58. Petitioner asserts that Cho’s card payment apparatus 120 transmits to client device 110 analog signals that contain account information that can be read from card 130. *Id.* at

41–42 (citing Ex. 1005, 3:20–24; Ex. 1003 ¶ 118). And, Petitioner asserts that Cho’s payment apparatus 120 uses a magnetic strip reader or integrated circuit chip reader to read that account information. *Id.* at 42 (citing Ex. 1005, 4:28–32, 5:58–62, 10:10–14; Ex. 1003 ¶ 119).

Petitioner further contends that Cho provides that the read account information is provided to the output pin and is used to facilitate transactions or purchases. Pet. 56–57 (citing Ex. 1005, 3:56–4:2, 11:40–44; Ex. 1003 ¶ 150). Alternatively, Petitioner contends that the combination of Cho and Aaron teaches limitation [1.3.1] in that “Cho would send account information read from cards to a card payment server to authorize transactions, as described by Aaron.” *Id.* at 58 (citing Ex. 1005, 11:40–44; Ex. 1006 ¶¶ 68–70; Ex. 1003 ¶ 154).

Patent Owner contends that Petitioner “Fails to Establish that Cho Teaches or Suggests ‘Transaction Data’ as Claimed in the ’286 Patent.” PO Resp. 21 (bolding omitted). Specifically, Patent Owner argues that the claimed “transaction data” is “transaction data B1-Bn” as recited in the ’286 patent. *Id.* at 22. As such, Patent Owner argues, Cho’s account data fails to teach or suggest “transaction data” as recited in the claim 1.

Petitioner replies that even under Patent Owner’s interpretation, “Cho teaches the claimed ‘transaction data.’” Pet. Reply 22. Petitioner asserts that according to Patent Owner, “account data” is for user authentication as it refers to “ID number, password, authentication, or session information.” *Id.* at 22–23 (quoting PO Resp. 7, 27). Thus, Petitioner asserts, “transaction data is used to ‘perform a series of banking transactions’ after a user is authenticated.” *Id.* at 23 (quoting PO Resp. 26). Petitioner contends that Cho’s account information refers to a credit card number and expiration date used for the purpose of performing banking transactions, not for user

authentication, and thus is “transaction data.” *Id.* (citing PO Resp. 26; Ex. 1043 ¶¶ 64–65; Ex. 1005, 3:24–27, 5:55–58; Pet. 46).

Patent Owner argues “[t]he specification makes clear that the ‘ID number’ read from the ‘bank card’ is ‘different than the issued card number’ and hence Cho’s ‘account number’ cannot meet this limitation.” PO Sur-Reply 13. Patent Owner also argues that “[a] transaction, by definition, is an event or instance of conducting business. ‘Transaction data’ must therefore be data associated with a specific transaction being conducted.” *Id.* Thus, Patent Owner contends, Cho’s “static account information stored on a card” is not “transaction data” nor “does Cho disclose processing actual transaction-specific data through its system.” *Id.*

As discussed above in Section II.C, we construe the term “transaction data” as encompassing any data involved in a transaction, including account data. Again, we emphasize that claim 1 requires that the transaction data is accepted by the card reader from an output interface of the transaction card. Cho provides that card reader 230 reads a digital signal that includes account information of card 130 whereby the account information “may include at least one of an account number, a card expiration data, etc.” Ex. 1005, 5:54–58. We further agree with Petitioner that to the extent “transaction data” is for the purpose of conducting banking transactions, Cho’s account data of a credit card number and expiration date can perform that purpose.

Patent Owner’s arguments that the transaction data cannot be “static” and that claim 1 requires “processing actual transaction-specific data” are not commensurate with the scope of the claim 1. The claim does not recite any limitations that the transaction data be dynamic or “not static,” nor does it recite any processing of the transaction data outside of using it to “facilitate transactions.”

Weighing all of the parties' arguments and evidence, we find
Petitioner has shown that Cho teaches the claimed transaction data.

*b) The “analog variable voltage audio signal”
dispute*

Petitioner contends that Cho “renders obvious” the card reader providing the transaction data to the output pin/microphone port as an analog variable voltage audio signal system that is then converted as digital data as recited in limitations [1.1.3], and [1.3.1]. Pet. 46–47, 54–57. Specifically, Petitioner asserts that Cho’s first analog signal is an analog variable voltage audio signal. *Id.* (citing Ex. 1005, 3:20–31, 4:60–67; Ex. 1003 ¶¶ 128–132). Petitioner asserts that Cho’s analog signal is transmitted via audio jack 125 of card payment apparatus 120 to audio socket 115 of client device 110, similar to the ’286 patent’s transaction card reader and smart phone transmitting the analog signal via the audio jack and corresponding microphone port. Pet. Reply 27–28 (citing Pet. 42–44; Ex. 1001, 6:61–64, 9:58–61, Fig. 6; Ex. 1005, 3:20–22, 4:58–65, Figs. 1, 2, 9, 10; Ex. 1043 ¶¶ 74, 75).

Patent Owner contends that Cho’s first analog signal is “not the same as an ‘analog variable voltage audio signal,’” but only transforms the “alternating current (AC) voltage of an acoustic signal, which is transmitted from client device 110, to a direct current (DC) voltage and boosts the direct current voltage.” PO Resp. 28 (quoting Ex. 1005, 7:59–62). Patent Owner alleges a “PHOSITA would recognize important differences between alternating current (AC) voltage of an acoustic signal that is transformed into a direct current (DC) voltage and the claimed ‘analog variable voltage audio signal.’” *Id.*

Patent Owner asserts that when an AC voltage is converted to DC voltage, the “resulting electrical signal is an AC voltage that represents only specific, static characteristics of the acoustic signal,” and the resulting DC voltage when transformed from an AC voltage using a circuit is “a static representation of only some characteristics of the acoustic signal, such as its average amplitude or power, rather than the instantaneous changes in the audio waveform.” PO Resp. 28–29. Thus, Patent Owner alleges, the resulting DC voltage “does not provide information about how the signal changes over time,” and “[t]he DC voltage level remains constant unless the acoustic signal’s characteristics change significantly.” *Id.* at 29.

Patent Owner asserts that “[e]ven a boosted DC voltage still represents a specific characteristic of the acoustic signal and does not directly correspond to the original audio waveform.” PO Resp. 29. Patent Owner contrasts that to the claimed “analog variable voltage audio signal” that Patent Owner asserts “is a direct electrical representation of the acoustic signal,” where the “voltage varies continuously over time, closely tracking the changes in the audio waveform” and “directly represents the instantaneous changes in the acoustic signal’s waveform, preserving its frequency content, amplitude variations, and time domain characteristics[,] . . . allow[ing] for the accurate reproduction and processing of the original audio signal.” *Id.* at 29–30.

Petitioner asserts that “both Cho and the ’286 Patent describe transferring the analog signal in the same way using the same standardized connections,” and “[t]here is no distinction between the ‘analog variable voltage signal’ and ‘alternating current (AC) voltage of an acoustic signal,’” and relies on “Mr. McNair’s testimony, which is based on other prior art at

the time, [to] support[] this understanding.” Pet. Reply 29 (citing Ex. 1043 ¶ 76).

Petitioner further argues that claim 1 does “not require either an AC or DC voltage that ‘directly correspond[s] to the original audio waveform.’ But Cho’s voltage AC voltage does anyway.” Pet. Reply 29 (alteration in original). Petitioner asserts that the AC component is “the portion of analog signals that actually represents sounds.” *Id.* (quoting Ex. 1040 ¶ 46 and citing Ex. 1041, 19:44–49; Ex. 1042, 6:31–33). Petitioner also asserts that “[e]ven after conversion to a DC voltage signal, an analog signal is still ‘representative of the rectified transit audio signal.’” *Id.* at 29–30 (quoting Ex. 1042, 3:53–61 and citing Ex. 1043 ¶¶ 77, 78). Thus, Petitioner contends, “[c]ontrary to Patent Owner’s arguments, ‘an AC voltage signal’ is also a ‘variable frequency and/or voltage’ signal.” *Id.* at 30 (citing Ex. 1044 ¶ 18, claim 17; Ex. 1045, 2:67–3:3; Ex. 1043 ¶ 77).

Patent Owner responds that Petitioner’s Reply “misses the key distinction: Cho’s system converts the AC signal to DC voltage, losing the variable voltage characteristics that define an audio signal.” PO Sur-Reply 14. Patent Owner argues that “the claims require an ‘analog variable voltage audio signal,’ which by definition must preserve the variable voltage characteristics that Cho explicitly eliminates through DC conversion.” *Id.* at 15.

As Petitioner points out, Patent Owner does not provide any evidence to support its contentions, assertions, and allegations. Pet. Reply 27. However, even *assuming arguendo* that Patent Owner’s description of the results of the transformation of the AC voltage to a DC voltage (*see* PO Resp. 28–29) is technically accurate, it does not support the conclusion that the claimed “analog variable voltage audio signal” is different than Cho’s

analog signal. Patent Owner does not direct attention to, and we do not see, where the '286 patent's written disclosure provides specific detail on the "analog variable voltage signal" or even uses that term outside of the claim; rather, the written description repeatedly refers to the signal as "an analog modulated signal." *See, e.g.*, Ex. 1001, code (57), 2:3–67, 2:10–11, 2:19, 2:38–40, 2:45, 2:53–54. And, claim 1 does not recite any specifics regarding the acceptance of the signal in limitation [1.1.3] or the conversion of the signal in limitation [1.3.1].

Weighing all of the parties' arguments and evidence, we find Petitioner has shown that Cho teaches the claimed "analog variable voltage signal."

2. *Conclusion of Ground 1*

Having considered the parties' arguments and evidence, we find, based on the record, Petitioner has established by a preponderance of the evidence that claim 1 would have been obvious over Cho, Aaron, and Carpenter.

G. GROUND 2 – ALLEGED OBVIOUSNESS OVER CHO, AARON, CARPENTER, AND DE GEER – CLAIM 2

Petitioner challenges dependent claim 2 as unpatentable under 35 U.S.C. § 103 over Cho, Aaron, Carpenter, de Geer. Pet. 59–64. In particular, Petitioner asserts that de Greer retrieving a card verification code ("CVV"), and one of ordinary skill in the art would have included de Greer's CVV with Cho's collected card information so as to "allow the apparatus to 'execute a card payment based on the account information' where CVV information was required, such as for authentication purposes." *Id.* at 62–63 (quoting Ex. 1005, 1:40–44 and citing Ex. 1007 ¶ 30; Ex. 1003 ¶¶ 158–160, 164, 165).

For dependent claim 2, Patent Owner relies on the arguments presented for claim 1. PO Resp. 21–22 (“Since Grounds 2 and 4 challenge dependent claims 2 and 4, respectively, and do not address this deficiency of Cho, they two [sic – too] must be denied.).”

Because we find that Petitioner has established by a preponderance of the evidence that claim 1 would have been obvious over Cho, Aaron, and Carpenter, we also find that, based on the record and having considered the parties’ arguments and evidence, Petitioner has also established by a preponderance of the evidence that claim 2 would have been obvious over Cho, Aaron, Carpenter, and de Greer.

H. GROUND 3— ALLEGED OBVIOUSNESS OVER CHO AND AARON —
CLAIM 3

Petitioner challenges independent claim 3 as unpatentable under 35 U.S.C. § 103 over Cho and Aaron. Pet. 64–74.

Independent claim 3 recites:

[[3.0]] A method comprising:

[[3.1.1]] accepting transaction data from a transaction card at an input interface of a card reader having an output pin as a part of the card reader,

[[3.1.2]] the output pin directly connecting the card reader in a microphone port of a smart telephone;

[[3.2]] receiving the transaction data in the smart telephone as an analog variable voltage audio signal from the microphone port of the smart telephone;

[[3.3]] converting the analog variable voltage audio signal received at the microphone port to the transaction data as digital data; [and]

[[3.4]] establishing direct data exchange with an Internet-connected server providing services to a financial institution or

an on-line merchant by executing coded instructions on a processor in the smart telephone.

Ex. 1001, 16:44–58.

Independent claim 3’s steps are substantially similar to the functions recited in independent claim 1. *See* Ex. 1001, 16:17–37, 16:43–61.

However, claim 3 does not recite claim 1’s limitation [1.2] of coded instructions stored in a medium and accessible by a user of the card reader. *Id.* at 16:43–61.

Petitioner contends that “[c]laim 3 is a method claim rendered obvious for the same reasons apparatus claim 1,” except that Carpenter does not apply as it was argued only regarding limitation [1.2]. Pet. 64–65. Patent Owner argues claim 3 with claim 1. Prelim Resp. 21–23; PO Resp. 21–31.

For the same reasons we found that Petitioner has established by a preponderance of the evidence that claim 1 would have been obvious over Cho, Aaron, and Carpenter, we also find that, based on the record and having considered the parties’ arguments and evidence, Petitioner has also established by a preponderance of the evidence that claim 3 would have been obvious over Cho and Aaron.

I. GROUND 4 – ALLEGED OBVIOUSNESS OVER CHO, AARON, AND DE GEER – CLAIM 4

Claim 4 depends from claim 3 and recites the same limitation as claim 2. Ex. 1001, 16:38–41, 16:62–66. Petitioner challenges dependent claim 4 as unpatentable under 35 U.S.C. § 103 over Cho, Aaron, de Geer as described above regarding claim 2. Pet. 74–77.

For dependent claim 4, Patent Owner relies on the arguments presented for claims 1 and 3. PO Resp. 21–22 (“Since Grounds 2 and 4

challenge dependent claims 2 and 4, respectively, and do not address this deficiency of Cho, they two [sic – too] must be denied.).”

Because we find that Petitioner has established by a preponderance of the evidence that claim 2 would have been obvious over Cho, Aaron, Carpenter, and de Greer and claim 3 would have been obvious over Cho and Aaron, we also find that, based on the record and having considered the parties’ arguments and evidence, Petitioner has also established by a preponderance of the evidence that claim 4 would have been obvious over Cho, Aaron, and de Greer.

III. CONCLUSION

After reviewing the evidence and arguments presented, we determine for the reasons discussed above that Petitioner has established by a preponderance of the evidence that Challenged Claims 1–4 are not patentable based on Grounds 1–4.

The outcome for the Challenged Claims in this proceeding is set forth in summary as follows:

Claims	35 U.S.C. §	References/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not shown Unpatentable
1	103	Cho, Aaron, Carpenter	1	
2	103	Cho, Aaron, Carpenter, de Geer	2	
3	103	Cho, Aaron	3	
4	103	Cho, Aaron, de Geer	4	
Overall Outcome			1–4	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 1–4 of the '286 patent are unpatentable based on obviousness over the asserted prior art; and

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

IPR2023-00921
Patent 9,679,286 B2

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