

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SQUARE, INC.,
Petitioner,

v.

4361423 CANADA INC.,
Patent Owner.

IPR2019-01629
Patent 9,269,084 B2

Before JAMESON LEE, ROBERT J. WEINSCHENK, and
KEVIN C. TROCK, *Administrative Patent Judges*.

TROCK, *Administrative Patent Judge*.

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

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed herein, we determine that Square, Inc. (“Petitioner”) has shown by a preponderance of the evidence that claims 1–8 of U.S. Patent No. 9,269,084 B2 (Ex. 1001, “the ’084 patent”) are unpatentable. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

A. *Procedural History*

Petitioner filed a Petition, Paper 2 (“Pet.” or “Petition”), to institute an *inter partes* review of claims 1–8 (the “challenged claims”) of the ’084 patent. 4361423 Canada, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). We instituted *inter partes* review on all challenged claims on the grounds presented in the Petition. Paper 11 (“Institution Decision” or “Dec.”).

After institution, Patent Owner filed a Response to the Petition. Paper 19 (“PO Resp.”). Petitioner thereafter filed a Reply to Patent Owner’s Response. Paper 24 (“Pet. Reply”). Patent Owner filed a Sur-reply to Petitioner’s Reply. Paper 25 (“PO Sur-reply”). An oral hearing was held on January 27, 2021. A transcript of the hearing is included in the record. Paper 32 (“Tr.”).

B. *Related Proceedings*

Petitioner states that the ’084 patent is the subject of the following action: 4361423 Canada Inc. v. Square, Inc., 4-19-cv-04311 (N.D. Cal.) filed July 26, 2019. Pet. 4. Patent Owner identifies the same proceeding. Paper 5, 2.

Petitioner lists one other petition (IPR2019-01630) filed by Petitioner against the '084 patent. Pet. 4. We declined institution in IPR2019-01630.

Petitioner also lists IPR petitions it has filed against other family members of the '084 patent (IPR2019-01625 and IPR2019-01626 (U.S. Patent No. 8,286,875 B2); IPR2019-01627 and IPR2019-01628 (U.S. Patent No. 8,281,998 B2); IPR2019-01649 (U.S. Patent No. 9,016,566 B2); IPR2019-01650 (U.S. Patent No. 9,311,637 B2); IPR2019-01651 (U.S. Patent No. 9,443,239 B2); IPR2019-01652 (U.S. Patent No. 9,613,351 B2); IPR2019-01653 and IPR2019-01654 (U.S. Patent No. 9,818,107 B2)). *Id.*

Petitioner also identifies two pending patent applications (Application Serial Nos. 15/784,578 and 15/990,911). *Id.* at 5.

C. The '084 Patent (Ex. 1001)

The '084 patent relates to an apparatus, system, and method “for commercial transactions using a transaction card via a communication device.” Ex. 1001, 2:22–25. Specifically, the '084 patent describes a transaction apparatus, such as a portable point of sale (“POS”) device, linked to a communication device, such as a mobile phone. *Id.* at 6:4–7. Figure 1 from the '084 patent is shown below.

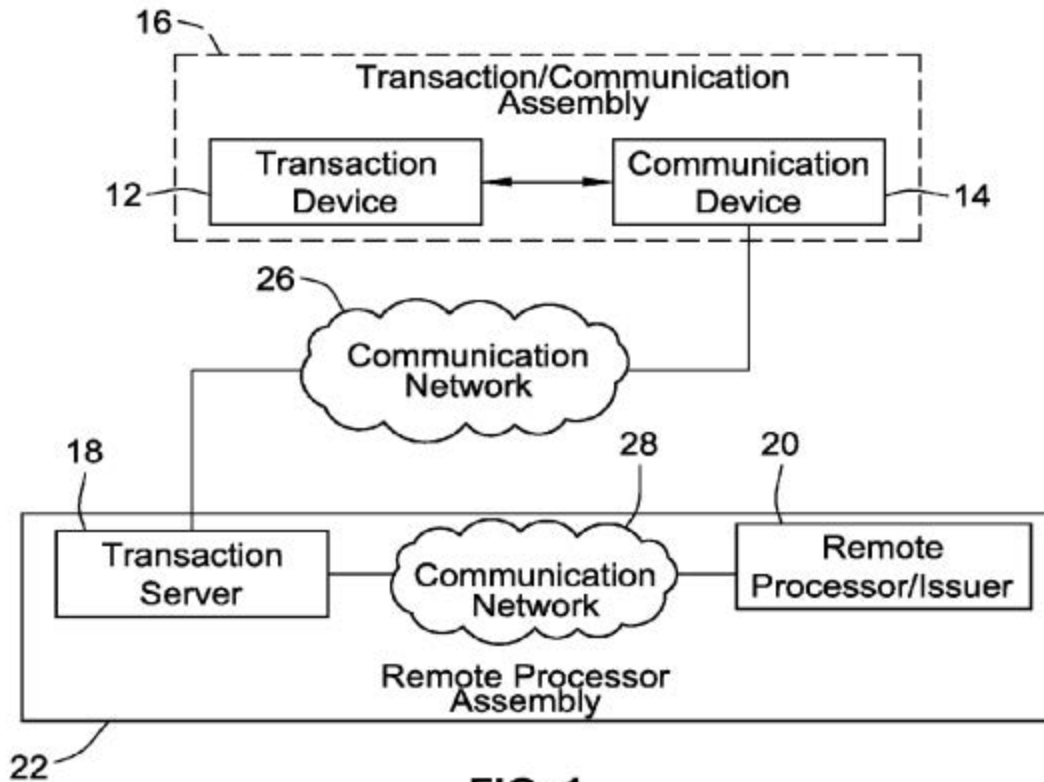


FIG. 1

Figure 1, above, is a flow diagram depicting transaction apparatus 12 and communication device 14, which together form transaction/communication assembly 16. *Id.* at 6:64–66. Transaction server 18 and transaction processor/issuer 20 are part of remote processor assembly 22. *Id.* at 7:2–4. Transaction/communication assembly 16 is in communication with remote processor assembly 22 through communication network 26.

Figure 2 from the '084 patent is shown below.

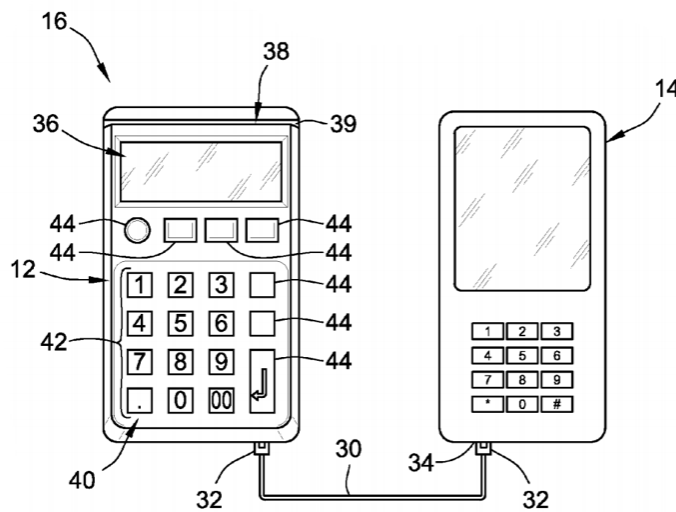


FIG. 2

Figure 2 shows an example of a transaction/communication assembly. *Id.* at 5:27–29. The assembly includes POS device 12 linked to mobile phone 14 via cable 30. *Id.* at 7:25–45. POS device 12 includes card reader slot 39. *Id.* The '084 patent explains that a user swipes a credit card through slot 39, a card reader captures information from the credit card, and the card reader transfers the information to a microcontroller unit (“MCU”). *Id.* at 7:37–40, 7:62–65. The MCU converts the information into an analog audio signal and transmits it via cable 30 to mobile phone 14. *Id.* at 8:4–10. Transaction data is then transmitted to a transaction server for processing. *Id.* at 8:11–12. The transaction server responds to mobile phone 14 by indicating whether a processor/issuer accepts or rejects the transaction. *Id.* at 8:17–24.

D. Challenged Claims

Petitioner challenges claims 1–8 of the '084 patent. Pet. 1. Claims 1 and 5 are independent and are essentially similar. Claim 1 is an apparatus claim and claim 5 is a method claim.

Claim 1 is generally illustrative of the invention.

1. [P] A portable smart card reader device for reading a smart card,
the device comprising:

[A] a sensor for reading information stored on an integrated circuit
incorporated onto said smart card and for producing an encrypted
analog signal indicative of the information;

[B] said sensor including circuitry for converting said encrypted
analog signal to a format suitable for transmission to a hands-free
jack of a mobile communication device; and

[C] an output jack adapted to be inserted into the hands-free jack
associated with said mobile communication device for providing
the converted encrypted analog signal indicative of the
information to said mobile communication device for
transmission to a transaction server for further processing.

Ex. 1001, 11:51–12:6 (lettering and formatting designated by Petitioner; *see*
Pet. 24–32).

E. Prior Art References

Petitioner relies upon the following prior art references:

(1) U.S. Patent Publication No. 2002/0091633 A1, published July 11,
2002 (“Proctor”) (Ex. 1004);

(2) U.S. Patent Publication No. 2005/0236480 A1, published October
27, 2005 (“Vrotsos”) (Ex. 1006);

(3) U.S. Patent Publication No. 2004/0059682 A1, published March
25, 2004 (“Hasumi”) (Ex. 1009);

(4) U.S. Patent Publication No. 2006/0032905 A1, published February
16, 2006 (“Bear”) (Ex. 1021);

(5) U.S. Patent Publication No. 2007 /0067833 A1, published March

22, 2007 (“Colnot”) (Ex. 1012);

(6) WIPO International Patent Application Publication No. WO 01/86599 A2, published November 15, 2001 (Ex. 1011, “Landman”).

F. Testimonial Evidence

In support of its Petition, Petitioner relies on a first declaration of Mr. Bruce McNair (Ex. 1003, “First McNair Decl.”) and a second declaration of Mr. McNair (Ex. 1042, “Second McNair Decl.”).

In support of its Patent Owner Response, Patent Owner relies on a declaration of Mr. Ivan Zatkovich. Ex. 2004 (“Zatkovich Decl.”). Petitioner cross examined Mr. Zatkovich by deposition. Ex. 1041 (“Zatkovich Dep.”).

G. Asserted Grounds of Unpatentability

Claims Challenged	35 U.S.C. §	References
1–8	103	Proctor, Vrotsos, Hasumi
1–8	103	Bear, Landman, Colnot

II. ANALYSIS

A. Level of Ordinary Skill

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1996). “The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991).

Petitioner describes a person of ordinary skill in the art as: “a person with bachelor’s degree in electrical or computer engineering or equivalent and have at least one to two years of relevant experience in the fields of

embedded systems and mobile communication device interfaces, or otherwise equivalent industry experience in the relevant field.” Pet. 13. Petitioner also states that “[l]ess work experience may be compensated by a higher level of education, such as a Master’s Degree, and vice versa.” *Id.* (citing Ex. 1003 ¶¶ 22–27, 5–12). Petitioner’s description of the level of ordinary skill is supported by the testimony of Petitioner’s declarant, Mr. McNair. *See* Ex. 1003 ¶¶ 26–27.

Patent Owner’s expert, Mr. Zatkovich, “agree[s] with Mr. McNair that a [person of ordinary skill in the art] in the field of the challenged claims would have been someone with good working knowledge of device interfaces and the integration of devices involving digital and analog signals. Ex. 2004 ¶ 14. Mr. Zatkovich testifies that a person of ordinary skill in the art “may have a Bachelor of Science in Electrical Engineering or Computer Engineering, or the equivalent and have at least one to two years of relevant experience in the fields of embedded systems and mobile communication device interfaces, or otherwise equivalent industry experience in the relevant field. *Id.*

The parties’ descriptions of a person of ordinary skill are essentially the same and are consistent with the subject matter of the ’084 patent. We agree with the parties’ description of a person of ordinary skill in the art at the time of the claimed invention, with the exception of the qualifier “at least,” to keep the description from extending to a level reflecting that of an expert. Accordingly, for purposes of this Final Written Decision, a person of ordinary skill in the art is a person with a bachelor’s degree in electrical or computer engineering or equivalent having one to two years of relevant experience in the fields of embedded systems and mobile communication device interfaces, or otherwise equivalent industry experience in the field.

B. Claim Construction

In an *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), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019). In applying such standard, claim terms are generally given 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. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); see *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (applying *Vivid Techs.* in the context of an *inter partes* review).

Here, neither party proposes an express construction for any claim terms. We agree that no claim terms require express construction, and use the ordinary and customary meaning of the terms. However, to the extent that the arguments of the parties reflect a particular understanding of the claim language, we discuss each party’s understanding in our analysis of the arguments below.

C. Patentability Challenges

Petitioner presents two grounds challenging the patentability of the '084 patent claims under 35 U.S.C. §103. Petitioner challenges the patentability of claims 1–8 as obvious over the combined teachings of Proctor, Vrotsos, and Hasumi. Pet. 9. Petitioner also challenges the patentability of claims 1–8 as obvious over the combined teachings of Bear, Landman, and Colnot. *Id.*

In its Response (Paper 19, 13–59) and Sur-reply (Paper 25, 2–24), Patent Owner contests Petitioner's arguments and evidence on the unpatentability of the challenged claims.

1. Principles of Law on Obviousness

Section 103(a) forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a) (2006). In *Graham*, 383 U.S. at 19, the Supreme Court set out a framework for applying the statutory language of Section 103: the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; the level of ordinary skill in the pertinent art resolved, and any objective indicia of non-obviousness considered.

The Supreme Court has made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 415 (2007). 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. Reaching this

conclusion, however, requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Id.*

2. *Obviousness over Proctor, Vrotsos, and Hasumi*

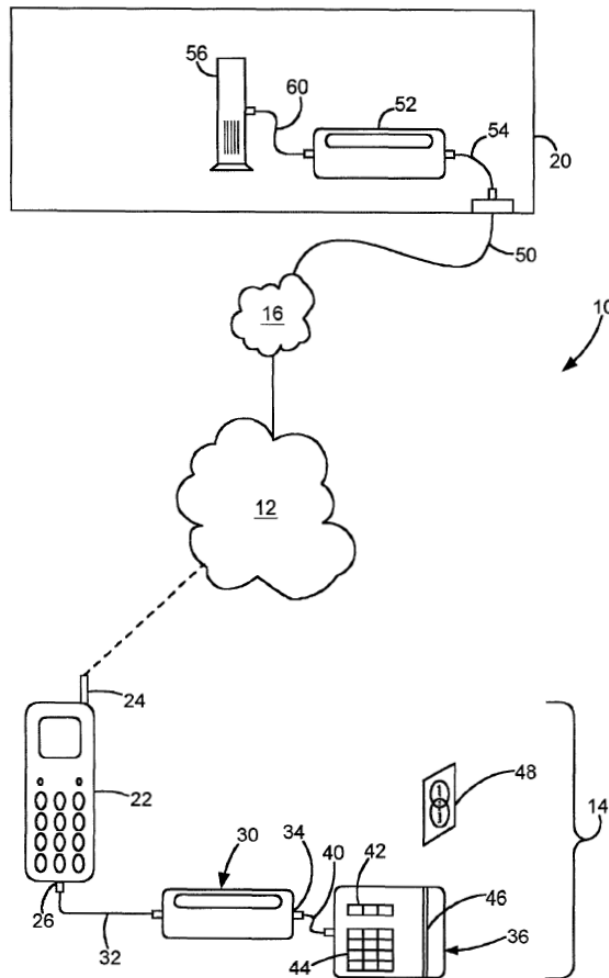
Petitioner asserts claims 1–8 are unpatentable as obvious under 35 U.S.C. § 103 over the combination of Proctor, Vrotsos, and Hasumi. Pet. 15–39. As noted above, claims 1 and 5 are independent.

a. *Relevant Prior Art*

Proctor (Ex. 1004)

Proctor describes “a financial transaction verification system,” as illustrated in Figure 1 below. Ex. 1004 ¶ 7.

FIG. 1



Proctor's Figure 1, above, depicts financial transaction verification system 10 that includes wireless or cellular network 12 with a user system (digital cellular telephone 22) connected to the network. *Id.* "The cellular network is connected to a conventional telephone system 16," and "[a] central verification facility 20 such as a bank, credit card issuer, or agency is connected to the system 16." *Id.* The digital cellular telephone 22 includes a conventional ear piece and microphone, as well as a supplementary connector 26 of the type used for communication with accessories such as hands-free headsets. *Id.* ¶ 8. "A converter 30 is connected to the phone connector via a cable 32." *Id.* ¶ 9. Converter 30 includes a connector 34, to

which a conventional credit card verification terminal 36 is connected via a cable 40. *Id.* ¶ 10. Credit card verification terminal 36 includes a magnetic credit card reader slot 46 that reads unique data encoded on a magnetic strip on a purchaser's credit card 48. *Id.*

Proctor describes the operation of the system as follows:

A merchant having a system 14 wishes to accept a customer's credit card 48. If the merchant system's components are not set up, the merchant connects the components as shown. The phone 22 is activated, and the verification system number is dialed by the merchant. Other phone functions also may be conducted by using the device keyboard 44. In any case, the terminal 36 is used to generate a communication for the center to receive. The communication may be a standardized inquiry identifying the customer's account number and purchase amount, possibly including other information such as PIN number, and other identifiers.

The message generated in the terminal 36 is modulated to an audible stream of tones, which are transmitted to the converter 30. The converter converts this signal into a data stream in encoded format that is readily transmitted via digital cellular networks, as described in the incorporated reference. The phone then transmits this encoded stream to a receiver node on the network 12, which transmits the stream via the conventional telephone network to the facility 20.

Id. ¶¶ 15–16.

Vrotsos (Ex. 1006)

Vrotsos describes “[a]n attachment that may be coupled to a wireless communication device, such as a cellular telephone, personal digital assistant (PDA), or the like, to perform commercial or other information transactions” as illustrated in Figure 1 below. Ex. 1006, Abstr.

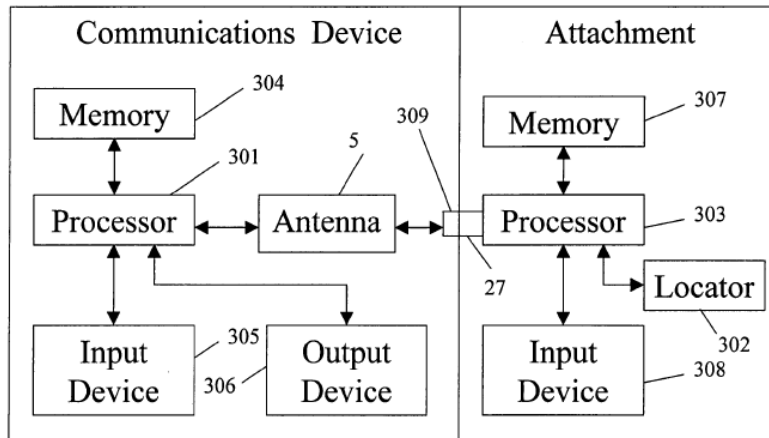


FIGURE
10

Vrotsos's Figure 10, above, is a block diagram that illustrates components of the wireless communication device and the attachment. *Id.* ¶ 23. The attachment includes processor 303, memory 307, and input device 308. *Id.* ¶ 75. The communications device, which in some embodiments may be a cellular telephone, includes memory 304, processor 301, antenna 5, and output device 306. *Id.* ¶¶ 72–73.

Vrotsos explains that “the system may be used to transmit credit card information during a point-of-sale transaction, transmit fingerprint information during a traffic stop, transmit bar code information during a tour of a warehousing facility or retail location, or the like.” *Id.* ¶ 26. “The attachment 21 may include one or more input devices, such as a magnetic stripe reader, a smartcard reader, a fingerprint scanner, an optical scanner, a signature pad, an alphanumeric keypad (such as, a PIN pad), a proximity detector, an audio recording device, or a camera (such as, a digital or charge-coupled device (CCD) camera).” *Id.* ¶ 28. “The attachment 21 may also include an independent processor located on printed circuit board (PCB) 25.” *Id.* ¶ 33.

Vrotsos describes the function of processor 303 as follows:

The attachment 21 may also include a processor 303, a memory 307 and an input device 308. The processor may execute a software application (which may be stored in the attachment memory 307) allowing the processor to receive input information from the input device 308 and process the input information to generate data for transmission to a remote computer 101 via the antenna 5 of the wireless communication device 1. By executing the software application, the attachment may determine from which input device 308 it is receiving input information (if multiple input devices are provided), encrypt the input information, append additional information indicating the identity or location of the user (using locator 302, which may be a GPS position sensor and/or processor or a processor for measuring signal strength from multiple base stations of the communication network to determine the attachments location by triangulation), divide the input information into data packets suitable for transmission over the communication network 102, etc.

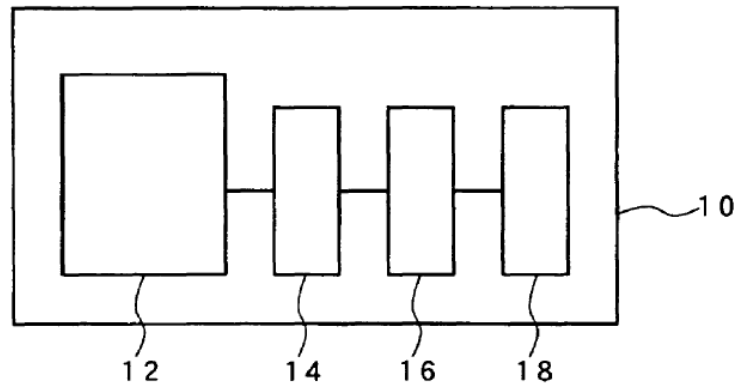
Id. ¶ 75.

Hasumi (Ex. 1009)

Hasumi describes “an electronic-commerce assisting method capable of smoothly and securely conducting electronic commerce on a communication network, and to an electronic-commerce assisting server for realizing the same.” Ex. 1009, Abstr.

Figure 3 of Hasumi is reproduced below.

FIG. 3



Hasumi's Figure 3, above, illustrates an IC card 10 that has a credit card function. *Id.* ¶ 52. "IC card 10 has a storage device 12 formed of a semiconductor memory such as a flash EEPROM, a communication control section 16 and an antenna 18 for performing communication with the outside in a non-contact manner in order to transmit/receive data, and a control section 14 for centrally controlling them." *Id.*

b. Independent Claim 1

Claim 1[P] – A portable smart card reader

The preamble of Claim 1 is directed to a "portable smart card reader device for reading a smart card." Ex. 1001, 11:51–52. Petitioner presents evidence that Proctor teaches a credit card verification attachment terminal for reading a memory chip credit card. Pet. 15–19, 24–26; *see also* Ex. 1003 ¶¶ 71–76. Petitioner relies on Proctor's teaching that:

[a] magnetic credit card reader slot 46 is an input device that reads unique data encoded on a magnetic strip on a purchaser's credit card 48. In alternative embodiments, the credit card may include data encoded by other means, such as a memory chip that records information beyond identifying the card, including balance and available credit.

Pet. 24 (citing Ex. 1004 ¶ 10). Petitioner argues that “Proctor’s card reader device is portable because it can be carried or moved,” and “a device linked to a mobile communication device, such as in Proctor, may be ‘portable.’”

Pet. 26 (citing Ex. 1001, 7:27–30; Ex. 1004 ¶ 3).

Patent Owner argues that “[t]he preamble term ‘portable’ is a necessary part of the claimed invention,” and that Proctor does not disclose a portable device. PO Resp. 13, 15; *see also* PO Sur-reply 2–3. Patent Owner argues that “one of skill in the art would understand that the portable device of the ‘084 patent would require a means of power that could be supplied in a mobile setting.” PO Resp. at 16 (citing Ex. 2004 ¶ 30). Patent Owner argues that “[o]ne of skill would also understand that portability would require that a device cannot rely on fixed, non-portable connections for communication, such as a wired-network connection or a land-line phone.” PO Resp. 16 (citing Ex. 2004 ¶¶ 30–32). Patent Owner further argues that “[t]he primary benefit of a portable device is not only that it can be moved to various locations, but that it can be *operated* from various locations regardless of absence of fixed-wired infrastructure such as power outlets or communication lines.” PO Resp. 16 (citing Ex. 2004 ¶¶ 30–32).

Patent Owner criticizes Petitioner’s reliance on Proctor’s “background section that describes large commercial enterprises” to show portability, because, according to Patent Owner, although “Proctor’s background section

mentions the absence of a land-line telephone,” it “does not rule out other physical connections, such as any power connections necessary to power the Proctor components.” PO Resp. 17. Patent Owner argues that “[t]he examples provided in Proctor are consistent with situations (e.g., craft fairs, travelling circuses, touring Broadway shows) where large equipment would be transported to locations where power would most likely be provided.” *Id.*

In Reply, Petitioner disputes Patent Owner’s position that portability requires an independent “power supply consistent with portability.” Pet. Reply 2–3. Petitioner argues that the term “‘portable’ appears only in the preamble of claim 1 [and] is not limiting.” *Id.* at 3 n.1. Petitioner also argues that Patent Owner’s expert, Mr. Zatkovich, admitted that portable card readers were known in the art. *Id.* (citing Ex. 1041, 18:7–16 (testifying he is aware of “restaurants that used portable point of sale devices”). Petitioner further argues that the ’084 patent “provides a broader understanding of portable,” such that “[s]o long as the POS [point of sale] device may be linked to a ‘communication device in the form of a mobile phone,’ it should readily be considered portable.” Pet. Reply 4.

Finally, Petitioner argues that Patent Owner:

ignores entirely the Proctor embodiment disclosing a portable device even under [Patent Owner’s] narrow definition—namely, a [point-of-sale] device for “wandering food and souvenir vendors at stadium events.” (Ex. 1004 ¶ 3) [Patent Owner] omits these “wandering” vendors in its Response; likely because [Patent Owner] knows it cannot credibly suggest that “wandering” vendors carry an improbably long power cord to a local outlet.

Id. at 5 (citing PO Resp. 17).

We disagree with Patent Owner that the portable card reader device of claim 1 is required to have “a means of power that could be supplied in a mobile setting.” *See* PO Resp. 16.

First, claim 1 does not contain any recitation of a particular type of power supply for a portable card reader device. *See* Ex. 1001, 11:50–12:6. Second, the ’084 patent does not define the term “portable,” let alone define portable to require “a means of power that could be supplied in a mobile setting,” and Patent Owner does not point to any such definition. *See* PO Resp. 13–17; PO Sur-reply 2–3; Ex. 2004 ¶¶ 28–33.

A review of the ’084 patent also shows that it provides minimal support for Patent Owner’s restrictive view that a person of ordinary skill in the art would understand that the term “portable” requires “a means of power that could be supplied in a mobile setting.” PO Resp. 16. Indeed, the ’084 patent explains that “the present invention relates to an apparatus and a method of transactions *via a wireless or a landline communications device using a transaction card.*” Ex. 1001, 1:26–29. A person of ordinary skill in the art reading this description in the context of claim 1 would be unlikely to conclude that the claimed invention is restricted to *only* mobile power situations as Patent Owner ostensibly argues. *See, e.g.,* PO Resp. 16 (“The ’084 patent envisioned providing a portable point-of-sale system that could be used in any number of mobile contexts, such as for taxi drivers *and other merchants.*”) (emphasis added).

Indeed, as Petitioner points out, the ’084 patent describes an embodiment where a power source and a printer are connected to a transaction device, such as transaction device 12 described in connection with Figure 5. *See, e.g.,* Ex. 1001, 7:53–55 (“In an embodiment, the transaction apparatus 12 is powered by a power source 56 optionally

includes a printer 58.”). Patent Owner does not explain how this embodiment, which includes a connected *power source and a printer*, provides support for, or is consistent with, Patent Owner’s view that the ’084 patent “require[s] a means of power that could be supplied in a mobile setting.”

We also note that Patent Owner’s expert, Mr. Zatkovich, acknowledged during his deposition that portable point-of-sale devices were in use at retail establishments such as restaurants the time of the claimed invention. *See* Ex. 1041, 18:7–16. Mr. Zatkovich’s testimony that restaurants used such portable devices is inconsistent with Patent Owner’s argument that “one of skill in the art would understand that the portable device of the ’084 patent would require a means of power that could be supplied in a mobile setting,” as well as Patent Owner’s argument that “[o]ne of skill would also understand that portability would require that a device cannot rely on fixed, non-portable connections for communication, such as a wired-network connection or a land-line phone,” and its argument that “[t]he primary benefit of a portable device is . . . that it can be *operated* from various locations regardless of absence of fixed-wired infrastructure such as power outlets or communication lines.” *See* PO Resp. 16.

We agree with Petitioner that Proctor describes applications that a person of ordinary skill in the art would understand involve portability as that term is commonly understood. Petitioner asserts that “Proctor’s card reader device is portable because it can be carried or moved.” Pet. 26; Ex. 1003, 50. Petitioner also argues that “a device linked to a mobile communication device” may be “portable” in the context of the ’084 patent. Pet. 26 (citing Ex. 1001, 7:27–30) (describing “*a portable transaction apparatus* 12 in the form of a point of sale (POS) device linked to a

communication device in the form of mobile phone 20 via a communication link in the form of a cable 30”) (emphasis added).

Proctor, for example, describes situations where “merchants seeking to accept credit cards do not have telephone lines available,” and provides examples such as “a small merchant at a seasonal craft fair, a large traveling entertainment production such as a circus or touring Broadway show, and *wandering food and souvenir vendors at stadium events*.” Ex. 1004 ¶ 3 (emphasis added); *but see* PO Resp. 17 (referencing Proctor’s craft fairs, travelling circuses, and touring Broadway shows, but omitting Proctor’s “*wandering food and souvenir vendors at stadium events*”). When asked at oral hearing whether these merchants described by Proctor would be using portable devices, Patent Owner’s counsel conceded that Proctor could be made into a portable device:

5 JUDGE TROCK: Well, but you make the same argument in the
6 '1629 case and Hart's not part of that. You make the exact same argument,
7 that Proctor is not portable, but you leave out the description for the prior art
8 about these wandering food and souvenir vendors.

9 Now, would you agree that a wandering food and souvenir vendor
10 carrying around the examples in Proctor would be portable? Because I'm
11 concerned --

12 MR. MACLEOD: It suggests --

13 JUDGE TROCK: -- why you left it out of your brief.

14 MR. MACLEOD: I don't know why we left it out of the brief at the
15 moment. That disclosure in Proctor would, I agree, would suggest that
16 somehow Proctor could somehow be made into a portable device.

Paper 32, 69.

We agree with Patent Owner’s counsel that Proctor suggests a “portable” card reader. Moreover, Proctor’s teaching of “wandering food

and souvenir vendors at stadium events” (Ex. 1004 ¶ 3), even satisfies Patent Owner’s argument that “portability would require that a device cannot rely on fixed, non-portable connections for communication, such as a wired-network connection or a land-line phone.” *See* PO Resp. 16.

Patent Owner also argues that Proctor does not teach a “smart card” reader. *See* PO Resp. 18–21; PO Sur-reply 3–7. Patent Owner argues that Proctor “makes no mention of smart cards,” and also argues that “[a] ‘smart card’ incorporates an integrated circuit (‘IC’) chip that contains information, such as account number and expiration date, needed to perform commercial payment transactions.” PO Resp. 18, 20. Patent Owner argues that a person of ordinary skill in the art

would understand, based on the language in the ‘084 patent and industry standards, that a smart card reader would have to be capable of reading card information (*i.e.*, information identifying the card) from the integrated circuit of a smart card, such that that card information can be processed by a transaction server.

PO Resp. 20 (citing Ex. 2004 ¶¶ 25–27).

Petitioner asserts that Proctor teaches a smart card reader because with respect to Figure 1, Proctor teaches that a:

magnetic credit card reader slot 46 is an input device that reads unique data encoded on a magnetic strip on a purchaser's credit card 48. In alternative embodiments, the credit card may include data encoded by other means, such as a memory chip that records information beyond identifying the card, including balance and available credit.

Pet. 24–25 (citing Ex. 1004 ¶ 10, Fig.1).

For purposes of claim 1’s preamble, Petitioner also relies on Hasumi, asserting that “a memory chip card is a smart card (including memory and processing capabilities).” Pet. 26. According to Petitioner, Hasumi explains that:

FIG. 3 shows the overall configuration of the IC card 10 according to the embodiment. The IC card 10 has a credit card function. The IC card 10 has a storage device 12 formed of a semiconductor memory such as a flash EEPROM, a communication control section 16 and an antenna 18 for performing communication with the outside in a non-contact manner in order to transmit/receive data, and a control section 14 for centrally controlling them.

Id. (citing Ex. 1009 ¶ 52). Petitioner argues that a person of ordinary skill in the art:

would have been motivated to configure Proctor's system, which discloses a memory chip credit card, for use with a contactless IC credit card, as taught by Hasumi, to provide the benefit of allowing the user to use a wireless form of payment. [A person of ordinary skill in the art] would have recognized that contact- and contactless-IC cards were known alternative card types used in the art.

Pet. 23–24 (citing Ex. 1009 ¶ 83).

Petitioner points out that Patent Owner's expert, Mr. Zatkovich, admitted that smart cards and smart card readers were well-known at the time of claimed invention and that point-of-sale (POS) devices commonly included smart card readers. Pet. Reply 5 (citing Ex. 1001, 1:37–46; Ex. 1041, 25:2–20, 83:6–8, 85:7–11, 91:8–10).

Petitioner further argues that Patent Owner is attempting to improperly limit the term “smart card” to “specific types of transaction protocols, including specific data requirements ‘such as account number and expiration date, needed to perform commercial payment transactions’ . . . according to ISO 7816 and 14443 standards.” Pet. Reply 6. Instead, Petitioner argues, the '084 patent “concedes that the claimed smart card can be any of ‘a chip card, EMV card, proximity detector or NFC card, contactless card, or any combination thereof,’” which would “include

Proctor’s disclosure of a credit card with a memory chip.” *Id.* at 6–7 (citing Ex. 1004 ¶ 10; Ex. 1042 ¶¶ 12–15; Ex. 1001, claims 2 and 6). A person of ordinary skill in the art, Petitioner argues, “would have understood the term ‘smart card’ to have its plain and ordinary meaning and would include, but is not necessarily limited to a card with an IC chip such as a memory chip.” Pet. Reply 6 (citing Ex. 1042 ¶¶ 12–15).

In its Sur-reply, Patent Owner argues that “Proctor’s bare reference to a ‘memory chip’ would not convey a smart card reader to [a person of ordinary skill in the art] within the meaning of the ’084 patent and industry usage.” PO Sur-reply 3 (citing Ex. 1041 ¶¶ 69–74; Ex. 2004 ¶¶ 15–27, 34–44). Indeed, Patent Owner’s expert, Mr. Zatkovich, testified at deposition that “no smart cards as far as I know, have what are referred to as a memory chip or contain a memory chip,” and that “as far as I know, no one has ever referred to a smart card as containing a memory chip.” Ex. 1041, 72:24–73:4.

We disagree with Patent Owner that a person of ordinary skill in the art considering the ’084 in its entirety, would understand that a “smart card,” as that term is used in the ’084 patent, must incorporate an IC chip, not a memory chip, and the smart card contains information, such as account number and expiration date, needed to perform commercial payment transactions. *See* PO Resp. 18 (citing Ex. 2004 ¶¶ 34–41).

It is helpful to note that the ’084 patent acknowledges that “smart card” readers were known in the art at the time of the claimed invention. Ex. 1001, 1:37–46 (“These POS devices include a processor as well as an input device to receive and process information from a transaction card.” “The input device may include . . . a smartcard reader.”). Patent Owner’s

expert, Mr. Zatkovich, also acknowledges that smart card readers were known in the art. Ex. 1041, 25:18–20, 91:8–10.

During oral argument, Patent Owner’s counsel acknowledged that the ’084 patent does not expressly state that a smart card requires additional circuitry beyond a memory chip, such as the card described by Proctor.

12 JUDGE TROCK: All right. So, then, why wouldn't a person of
13 ordinary skill in the art in reading Proctor understand that to be a smart card?
14 Why would they be so limited as your expert tries to testify?

15 MR. JACKSON: Because smart card, again, Your Honor, refers to
16 specifications that require additional circuitry, not just a memory chip.

17 JUDGE TROCK: Okay. And so, where do you get that limitation?
18 Where is that in the '084 patent?

19 MR. JACKSON: Again, Your Honor, coming back, it's not expressly
20 stated, but that's what a POSITA means when they use the term smart card.
21 It's a compliant payment card that can be used for commercial transactions.

Paper 32, 85:12–21.

Patent Owner’s counsel argues, however, that a person of ordinary skill in the art would understand that a smart card requires more than a card with a memory chip, such as the one described by Proctor. *Id.*; *see also* Ex. 1004 ¶ 10. Patent Owner’s expert, Mr. Zatkovich, also testifies that “a smart card [] is a card containing a chip or integrated circuit (IC) as defined by the ISO 7816 and ISO 14443 standards.” Ex. 2004 ¶ 37.

Petitioner correctly points out, however, that the ’084 patent does not provide an express definition of a “smart card,” nor does it identify any ISO standards that would establish such a definition. Pet. Reply 6; Ex. 1042 ¶ 13. As Petitioner points out, the ’084 patent explains with respect to Figure 5, that transaction device 12 may include input device 38 in the form

of “a digital signal reader 54 such as an Integrated Circuit (IC) or Smart Card or EMV reader.” Pet. Reply 6; Ex. 1001, 7:50–53. Indeed, the ’084 patent identifies the types of cards it considers to be “smart cards” in claim 2, where it recites, “[t]he card reader device from claim 1, *in which the smart card is selected from a group consisting of a chip card, EMV card, proximity detector or NFC card, contactless card, or any combination thereof.*”

Ex. 1001, 12:7–10 (emphases added).

Based on this description, we agree with Petitioner’s expert, Mr. McNair, that a person of ordinary skill in the art considering the ’084 patent as a whole, would understand that a “smart card,” as that term is used in the ’084 patent, could be a chip card, an EMV card, a NFC card, or a contactless card. *See* Ex. 1042 ¶ 13.¹ As such, we agree with Petitioner that a person of ordinary skill in the art would understand that the recited “chip card” in claim 2 could be a “smart card” even though it was not an EMV (Europay, Mastercard, Visa) card or a NFC (Near Field Communication) card.

Ex. 1042 ¶ 13.

In response to Patent Owner’s arguments and testimony that a person of ordinary skill in the art would understand that “[a] ‘smart card’ incorporates an integrated circuit (‘IC’) chip that contains information, such as account number and expiration date, needed to perform commercial

¹ In its Sur-reply, Patent Owner states that it “believes that the new arguments from Petitioner’s expert McNair (EX1042) are improper for rebuttal; however, if the Board allows the arguments, they actually illustrate PO’s point.” Sur-reply 6. We disagree that these arguments are improper. Petitioner’s arguments in the Reply that rely on McNair’s Second Declaration (Ex. 1042) properly respond to arguments raised by Patent Owner in the Response. *See* 37 C.F.R. § 42.23(b); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1078–79 (Fed. Cir. 2015).

payment transactions” (PO Resp. 18), and that “a smart card [] is a card containing a chip or integrated circuit (IC) as defined by the ISO 7816 and ISO 14443 standards” (Ex. 2004 ¶ 37), Petitioner directs our attention to U.S. Patent No. 8,712,892 (“Dixon”), which issued April 29, 2014.² Ex. 1042 ¶ 15 (citing Ex. 1040). Dixon, which is assigned to Visa U.S.A., Inc. (Ex. 1040 (73)), explains that:

[a] smart card is generally defined as a pocket-sized card (or other portable consumer device) that is embedded with either a microprocessor and one or more memory chips, or as one or more memory chips with non-programmable logic. The microprocessor-type smart card typically can implement certain data processing functions, such as to add, delete, or otherwise manipulate information stored in a memory location of the smart card. In contrast, the memory chip-type card (for example, a pre-paid phone card) can only act as a file to hold data that is manipulated by the reading device to perform a predefined operation, such as debiting a charge from a pre-established balance held in the memory or secure memory. Smart cards, unlike magnetic stripe cards (such as conventional credit cards), can implement a variety of functions and contain a variety of types of information on the card.

Ex. 1040, 1:62–2:10 (emphasis added). Petitioner’s expert, Mr. McNair, testifies that “Dixon expressly demonstrates that, at least, Visa used the term ‘smart card’ to refer to cards with a ‘memory-chip.’” Ex. 1042 ¶ 15.

We agree with Petitioner that Dixon defines a “smart card” as a pocket-sized card embedded with either a microprocessor and one or more memory chips, or as one or more memory chips with non-programmable logic. According to Dixon, a “smart card” could be a pocket-sized card embedded with “one or more memory chips with non-programmable logic,”

² The ’084 patent was filed on March 30, 2015. Ex. 1001, code (22).

but without a microprocessor. Dixon directly conflicts with Mr. Zatkovich's testimony that "as far as I know, no one has ever referred to a smart card as containing a memory chip." *See* Ex. 1041, 72:24–73:4. Accordingly, we give Mr. Zatkovich's testimony on this point little weight.

We agree with Petitioner that a person of ordinary skill in the art considering the '084 patent as a whole would understand that a "smart card," as that term is used in the '084 patent, could be a "chip card" wherein the "chip" could be a "memory chip." We also agree with Petitioner that Proctor discloses such a "smart card" where it describes "[i]n alternative embodiments, the credit card may include data encoded by other means, such as a memory chip that records information beyond identifying the card, including balance and available credit." Ex. 1004 ¶ 10.

Moreover, Patent Owner fails to address Petitioner's combination of Proctor and Hasumi teaching a smart card as recited in claim 1's preamble, discussed *supra*. *See* Pet. 23–26. Patent Owner does not contest that Hasumi teaches a "smart card," and Petitioner's combination of Proctor and Hasumi for purposes of claim 1's preamble is un rebutted by Patent Owner. *See* PO Resp. 18–21; Sur-reply 3–7. Indeed, Patent Owner acknowledges that "Hasumi discloses an IC card 10 with a storage device 12 formed of a memory (such as a flash EEPROM), a communication control section 16, and an antenna for performing communication functions in order to allow the device to transmit and receive data." PO Resp. 9 (citing Ex. 1009 ¶ 52).

Petitioner argues, and we agree, that a person of ordinary skill in the art would have been motivated to configure Proctor's system, which discloses a memory chip credit card, for use with a contactless IC credit card, as taught by Hasumi, to allow for a wireless form of card payment. Petitioner argues, and we also agree, that a person of ordinary skill in the art

would have recognized that contact- and contactless-IC cards were known alternative card types used in the art. *See* Pet. 23–26.

We agree with Petitioner that Proctor, or the combination of Proctor and Hasumi, teach the recited smart card of claim 1’s preamble and that one of ordinary skill in the art would have been motivated to combine the references in the manner described by Petitioner.

We do not reach the issue of whether the preamble is limiting. Regardless of whether the preamble is limiting, we are persuaded that Petitioner demonstrates that the recitation of the preamble is satisfied by Proctor, or the combination of Proctor and Hasumi.

Claim 1[A] – A sensor for reading information

Claim 1 also recites “a sensor for reading information stored on an integrated circuit incorporated onto said smart card and for producing an encrypted analog signal indicative of the information.” Ex. 1001, 11:53–56. Petitioner presents evidence that Proctor teaches a sensor (terminal 36) for capturing information from the memory chip of credit card 48. Pet. 15–19, 26–27; *see also* Ex. 1003 ¶¶ 71–76. Petitioner explains:

terminal 36 includes a keyboard or other input device 44 for the user to enter transaction information to be encoded and transmitted via the cable to the converter. A magnetic credit card reader slot 46 is an input device that reads unique data encoded on a magnetic strip on a purchaser's credit card 48. In alternative embodiments, the credit card may include data encoded by other means, such as a memory chip that records information beyond identifying the card, including balance and available credit.

Pet. 26–27 (citing Ex. 1004 ¶ 10).

Petitioner also presents evidence that “Hasumi discloses a sensor (reading/writing device 4 including an antenna) for reading information on a credit card integrated circuit to produce an encrypted analog signal

indicative of the information (encrypted electromagnetic wave data).”
Pet. 23–24, 26–27 (citing Ex. 1009 ¶¶ 53, 65).

Petitioner argues that “Hasumi teaches that when reading information from a contactless IC credit card 10, the information is received as an encrypted analog signal, for example as electromagnetic waves encrypted using the Data Encryption Standard (DES).” Pet. 23 (citing Ex. 1009 ¶¶ 53, 65; *see also* Ex. 1003 ¶¶ 81–82, 58–63). Petitioner argues, a person of ordinary skill in the art “would have understood that encryption was especially important for the transmission of financial information wirelessly, where transmissions could have been intercepted through the air.” Pet. 24. Petitioner further argues, a person of ordinary skill in the art “would have been well-versed in card technologies, including contact and contactless technologies, and would have had a reasonable expectation of success implementing [Hasumi’s] contactless encryption technologies in Proctor’s payment system.” *Id.* (citing Ex. 1003 ¶¶ 83, 55–63).

Petitioner further argues that:

Vrotsos discloses [an] attachment device [that] includes a processor 303 (i.e., a type of controller) that controls the components and operations of a reader attachment to a mobile communications device, including receiving information (e.g., from a magnetic stripe or smartcard), encrypting the information, and processing the information for transmission over a connector (e.g., a serial or parallel interface) to a communications device and remote computer.

Pet. 20 (citing Ex. 1006 ¶¶ 28, 43, 75, Fig. 11; Ex. 1003 ¶¶ 76–78).

Petitioner argues that a person of ordinary skill in the art:

would have been motivated to include a controller, such as a processor, to control the operations of and provide encryption functionality to Proctor’s terminal 36, which functions to receive information from a transaction card (e.g., a magnetic stripe or

chip card) and process the information for use by a remote verification facility 20 through the phone 22.

Pet. 21.

Patent Owner first argues that “Proctor does not disclose a sensor for reading information stored on a smart card” because “Proctor does not disclose a smart card” as “Proctor’s ‘memory chip’ is not an integrated circuit (IC) incorporated into a smart card.” PO Resp. 21. Patent Owner also argues that “Proctor discloses no means for how the memory chip might be read—i.e., there is no ‘sensor’ or other interface disclosed, other than the read head that reads the magnetic stripe on the payment card.” *Id.* at 21–22.

Patent Owner’s arguments that Proctor does not teach a sensor rely on the same arguments Patent Owner made that Proctor does not teach a “smart card.” We disagree with Patent Owner for the same reasons discussed *supra*. See Section II.C.2.b.Claim1[P]. Moreover, Patent Owner does not respond to Petitioner’s arguments and evidence that Hasumi also teaches the recited sensor. See Pet. 23–24, 26–27 (citing Ex. 1009 ¶¶ 53, 65); See also PO Resp. 21–22. Petitioner’s expert, Mr. McNair, provides credible testimonial evidence that Hasumi teaches a sensor. See Ex. 1003, 51; see also *id.* ¶¶ 81–83.

Patent Owner next argues that “[n]either Proctor nor Hasumi discloses producing an encrypted analog signal.” PO Resp. 22; see also *id.* 23–26; PO Sur-reply 7–9. Patent Owner argues that Proctor “does not disclose any encryption,” and “Proctor does not produce encrypted analog signals.” PO Resp. 22–23 (citing Ex. 1004 ¶ 47). With respect to Hasumi, Patent Owner argues that “[a]lthough Hasumi mentions encryption, it never discloses that the Hasumi reader (the reading/writing device 4) actually produces an encrypted analog signal.” PO Resp. 23. Patent Owner also argues that

Hasumi's "SSL encryption occurs within Hasumi's communication terminal—*not within the reader.*" *Id.* at 24 (citing Ex. 2004 ¶¶ 62–65).

Petitioner replies by arguing that Patent Owner is misinterpreting claim 1 and imposing an unclaimed limitation, "that the reader device itself must perform the encryption." Pet. Reply 8. Petitioner points out that the '084 patent explains that information read from a transaction card by a reader may be "*originally received in analog format* [i.e., from a conventional magnetic stripe transaction card] *or in encrypted digital format* [i.e., from an IC or "smart" transaction card] [to be] converted by the MCU 50 into an analog audio signal." *Id.* at 8–9 (citing Ex. 1001, 8:4–6, 8:30–37).

Petitioner asserts that "by virtue of reading the information from a smart card, the signal produced by the reader already is encrypted, as required by the claims. Then, per the subsequent limitations, the reader converts that encrypted signal into a format suitable for transmission." Pet. Reply 9 (citing Ex. 1001, claims 1, 5).

Petitioner argues, "Proctor in view of Hasumi's teachings provide just this: Proctor discloses a sensor for capturing information from a card and producing a corresponding signal indicative of the information (Ex. 1004 ¶ 10) and Hasumi teaches that the information captured from the card may be encrypted data (Ex. 1009)." Pet. Reply 9.

Petitioner also argues that "Proctor in view of Vrotsos and Hasumi discloses the claimed encryption." *Id.* at 10. Petitioner argues that "Vrotsos discloses encrypting information from a smartcard and that [a person of ordinary skill in the art] would have been motivated to include the encryption functionality taught by Vrotsos into Proctor's terminal." *Id.* (citing Pet. 20–21).

In its Sur-reply, Patent Owner argues “[t]he Hasumi reader doesn’t produce or send *any* encrypted signal—much less an encrypted analog signal suitable for a hands-free jack.” PO Sur-reply 8 (citing Ex. 2004 ¶¶ 58–65). Patent Owner also argues that pages cited by Petitioner “never establish how Vrotsos could disclose a reader that produces an encrypted analog signal or send an encrypted analog signal to a hands-free jack.” PO Sur-reply 9 (citing Ex. 2004 ¶¶ 70–76).

We agree with Petitioner that a person of ordinary skill in the art reading claim 1 in the context of the ’084 specification would understand that claim 1 requires “a sensor for *reading* information stored” on an integrated circuit (IC) a smart card, “and for *producing* an encrypted analog signal,” but not necessarily *encrypting* an analog signal. *See* Ex. 1001, 11:51–56. According to claim 1, the recited “portable smart card reader device” comprises “a sensor for reading information stored on an integrated circuit incorporated onto said smart card and for producing an encrypted analog signal indicative of the information.” *Id.* As Petitioner points out, the ’084 patent describes an embodiment of this claim where:

digital information from the IC chip 48 is captured by the digital signal reader 54 and is transferred to the MCU 50.

The transaction data whether originally received in analog format or in encrypted digital format is converted by the MCU 50 into an analog audio signal suitable for transmission over the analog communication link between the transaction device and the communication device. In this example, this audio signal is then transmitted to the mobile phone via cable 30.

Transaction data is then transmitted to the transaction server 18 for processing.

Ex. 1001, 7:66–8:12 (emphasis added).

The '084 patent explains that the recited “sensor” of claim 1 “read[s] information stored on an integrated circuit incorporated onto said smart card,” in this case digital signal reader 54 captures digital information from IC chip 48 of a smart card, where such information would already be in encrypted digital format. *Id.* The recited “sensor” “produc[es] an encrypted analog signal indicative of the information” from the encrypted digital information. Here, MCU 50 converts the acquired encrypted digital information into an analog audio signal suitable for transmission to a communication device. *Id.* Thus, the embodiment described in the '084 patent shows that the recited “sensor for *reading* . . . and for *producing* an encrypted analog signal” does not necessarily do any “*encrypting*” as Patent Owner argues. Rather, the recited “sensor,” here MCU 50, simply converts *already encrypted* digital information into an analog audio signal, where such information would still be encrypted, for transmission to a mobile communication device.

We are persuaded by Petitioner’s evidence that Proctor discloses a sensor (terminal 36) for capturing information from the memory chip of a transaction card 48 (i.e. a smart card) and producing a corresponding signal indicative of the captured information. *See* Pet. 16, 26–27; Ex. 1004 ¶ 10; Ex. 1003 ¶¶ 71–76. We are also persuaded that Hasumi teaches a sensor (reading/writing device 4) for reading information from a credit card integrated circuit to produce an encrypted analog signal indicative of the information (encrypted electromagnetic wave data). *See* Pet. 23–24, 26–27; Ex. 1009 ¶¶ 53, 65; Ex. 1003 ¶¶ 81–83. We are also persuaded that a person of ordinary skill in the art would have been motivated to combine Proctor

and Hasumi in the manner described by Petitioner.³ *See* Pet. 23–24; Ex. 1003 ¶ 83. We are further persuaded that Vrotsos discloses encrypting information from a smartcard and that a person of ordinary skill in the art would have been motivated to include the encryption functionality taught by Vrotsos into Proctor’s terminal 36 in the manner described by Petitioner. *See* Pet. 19–22; Ex. 1006 ¶ 75; Ex. 1003 ¶¶ 77–80.

Based on the complete record and for the reasons discussed herein, we are persuaded that Petitioner has demonstrated that the combined teachings of Proctor, Vrotsos, and Hasumi as presented teach the recited “sensor for reading information stored on an integrated circuit incorporated onto said smart card and for producing an encrypted analog signal indicative of the information” of independent claim 1.

Claim 1[B] – Circuitry for converting

Claim 1 also recites “said sensor including circuitry for converting said encrypted analog signal to a format suitable for transmission to a hands-free jack of a mobile communication device.” Ex. 1001, 11:57–60.

Petitioner presents evidence that the combination of Proctor and Vrotsos teaches circuitry for converting an encrypted analog signal to a suitable format for transmission to a hands-free jack of a mobile communication device. Pet. 15–20, 28–31; *see also* Ex. 1003 ¶¶ 71–80. Petitioner explains as follows:

terminal 36 operates conventionally, and includes what is essentially a modem that converts the scanned or entered data to be sent from a digital form to a modulated tonal pattern transmissible via conventional telephone lines; it further operates

³ We consider the parties’ arguments and evidence on the motivation to combine Proctor, Vrotsos, and Hasumi in greater detail Section II.C.2.c, *infra*.

to receive such a modulated audio signal and convert it to digital form for display.

Pet. 28 (citing Ex. 1004 ¶ 11).

Petitioner asserts that Vrotsos teaches circuitry (processor 303) that controls the components and operations of a reader attachment to a mobile communications device. Pet 20. According to Petitioner, this includes “receiving information (e.g., from a magnetic stripe or smartcard), encrypting the information, and processing the information for transmission over a connector (e.g., a serial or parallel interface) to a communications device and remote computer.” *Id.* at 20, 28 (citing Ex. 1006 ¶¶ 28, 43, 75; *see also* Fig. 11 showing processor 303; Ex. 1003 ¶¶ 76–78).

Patent Owner argues that “Proctor’s terminal 36 has no encrypted analog signal to convert. And, as discussed above, Proctor also does not perform any encryption itself. Therefore, Proctor does not convert said encrypted analog signal.” PO Resp. 26–27 (citing Ex. 2004 ¶¶ 47, 68) (emphasis omitted).

Patent Owner also argues that “Vrotsos’s processor 303 communicates with the communication device using connector 27 of the attachment to the communication port 309 of the communications device,” or uses “a connection to the antenna of the communication device.” PO Resp. 27 (citing Ex. 2004 ¶ 71; Ex. 1006 ¶ 42, Fig. 10) (emphasis omitted). Patent Owner argues that “[n]either of these two connections—the communication port 309 and the antenna—is an analog hands-free jack as the ’084 patent claims require.” PO Resp. 28 (citing Ex. 2004 ¶¶ 72–73). Patent Owner also argues that “Vrotsos does not transmit anything in an analog-audio format, or disclose any attachment suitable for communication with an analog hands-free jack.” PO Resp. 28 (citing Ex. 2004 ¶ 74).

In Reply, Petitioner criticizes Patent Owner's arguments for "improperly attack[ing] the Proctor, Vrotsos, and Hasumi references individually as purportedly failing to disclose the claimed conversion of an encrypted signal to a format suitable for a hands-free jack, but fail[ing] to address the combination as a whole." Pet. Reply 10 (citing PO Resp. 26–30). "In fact," Petitioner argues:

the Petition does not rely on Vrotsos for any teaching of *converting* and *transmitting* credit card information, but relies on Vrotsos simply for the teaching that it would have been obvious to include a controller, such as a processor, to perform the conversion operations of and provide (to the extent needed) encryption functionality to Proctor's terminal.

Pet. Reply 11 (citing PO Resp. 28–31).

Petitioner also points out that Patent Owner "does not dispute here that Proctor converts a credit card signal into the claimed analog audio signal; instead, [Patent Owner] repeats its argument that Proctor's signal isn't encrypted in the first instance and so is unable to meet the limitations of the claims." Pet. Reply 11 (citing PO Resp. 26–27). Petitioner clarifies that the asserted prior art combination in the Petition is that "Proctor discloses the claimed conversion to an audio signal suitable for a hands-free jack while Hasumi and/or Vrostos teach the encryption of transaction information." Pet. Reply 11.

We agree with Petitioner that Patent Owner's arguments criticize the prior art references individually rather than addressing the combined teachings of Proctor, Vrotsos, and Hasumi asserted by Petitioner. The test for obviousness considers what the *combined* teachings of the references would have suggested to those of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Accordingly, "one cannot show non-

obviousness by attacking references individually where, as here, the rejections are based on combinations of references.” *Id.* at 426.

Here, Petitioner asserts that Proctor teaches the claimed conversion to an audio signal suitable for a hands-free jack, while Hasumi and/or Vrostos teach the encryption of transaction information. Patent Owner’s argument that “Proctor’s terminal 36 has no encrypted analog signal to convert,” therefore, “Proctor does not convert said encrypted analog signal,” is unavailing because Petitioner does not rely on Proctor to provide the recited encryption. Rather, Petitioner relies on Hasumi and/or Vrotsos to supply the encryption. *See* Pet. 22, 24, 28–30; *see also* Ex. 1003 ¶¶ 79–80, 83.

Patent Owner’s argument that neither of Vrotsos’ “two connections—the communication port 309 and the antenna—is an analog hands-free jack,” is similarly misplaced because Petitioner relies on Proctor, not Vrotsos, to teach the recited “transmission to a hands-free jack of a mobile communication device.” As Petitioner points out, Proctor’s “connector 26 on phone 22 is a hands-free jack ‘of the type used for communication with accessories such as hands-free headsets’ and includes an ‘analog microphone input.’” Pet. Reply 11 (citing Ex. 1004 ¶ 8).

We are persuaded by Petitioner’s evidence that Proctor discloses a sensor (terminal 36) for capturing information from the memory chip of a transaction card 48 (i.e. a smart card) and producing a corresponding analog audio signal indicative of the captured information and transmitting it to a hands free jack of a cell phone 22. *See* Pet. 15–19, 28–31; Ex. 1004 ¶¶ 8–11; Ex. 1003 ¶¶ 71–76. We are also persuaded that Hasumi teaches a sensor (reading/writing device 4) for reading information from a credit card integrated circuit to produce an encrypted analog signal indicative of the information. *See* Pet. 23–24; Ex. 1009 ¶¶ 53, 65; Ex. 1003 ¶¶ 81–83. We

are further persuaded that Vrotsos teaches circuitry (processor 303) that controls the components and operations of a reader attachment to a mobile communications device and also discloses encrypting information obtained from a smartcard. *See* Pet. 19–22; Ex. 1006 ¶¶ 28, 74–75; Ex. 1003 ¶¶ 77–80.

Based on the complete record and for the reasons discussed herein, we are persuaded that Petitioner has demonstrated that the combined teachings of Proctor, Vrotsos, and Hasumi as presented teach the recited “sensor including circuitry for converting said encrypted analog signal to a format suitable for transmission to a hands-free jack of a mobile communication device” of independent claim 1.

Claim 1[C] – An output jack adapted to be inserted

Claim 1 also recites “an output jack adapted to be inserted into the hands-free jack associated with said mobile communication device for providing the converted encrypted analog signal indicative of the information to said mobile communication device for transmission to a transaction server for further processing.” Ex. 1001, 12:1–6.

Petitioner provides evidence that Proctor teaches “an output jack (including cable 40 and/or 32) adapted to be inserted into the hands-free jack (connector 26) associated with the mobile communication device (phone 22).” Pet. 31–32. According to Petitioner, Proctor explains that:

[p]hone 22 receives the analog audio signal from terminal 36 at connector 26, a hands-free jack—it is “of the type used for communication with accessories such as hands-free headsets [and] has several lines, some of which are a remote analog microphone input and an analog speaker output.” After phone 22 receives the analog audio signal via the hands-free jack, the signal is converted, by the functionality incorporated from converter 30, into an encoded format readily transmitted via

digital cellular networks and transmitted to verification facility 20.

Id. at 16–17 (emphasis omitted), *see also id.* at 31–32 (citing Ex. 1004 ¶¶ 8–10, 16–18; *see also* Ex. 1003 ¶¶ 71–75).⁴

According to Proctor:

The message generated in the terminal 36 is modulated to an audible stream of tones, which are transmitted to the converter 30. The converter converts this signal into a data stream in encoded format that is readily transmitted via digital cellular networks, as described in the incorporated reference [Preston]. The phone then transmits this encoded stream to a receiver node on the network 12, which transmits the stream via the conventional telephone network to the facility 20.

The facility identifies the stream as an encoded stream in the transmissible format, and if necessary, routes the call to the converter 52. The converter 52 converts the encoded stream into the modulated audible tone signal, which is demodulated by a modem in the computer 56, and processed.

Ex. 1004 ¶¶ 16–17; *see also* Pet. 32.

In a footnote, Patent Owner argues that:

Petitioner is already on record asserting that one of skill in the art would not connect an RJ-11 connection to a hands-free jack connection without the reference explaining how the connection and signals would need be modified so the substitution would work, and here Petitioner provides no evidence that Proctor’s terminal 36, which would have an RJ-11 jack, could be readily adapted to feed directly into the hands-free jack of a mobile communication device.

PO Resp. 29 n.1.

⁴ In a slightly different embodiment also relied on by Petitioner, Proctor explains that, “the telephone may incorporate the decoder circuitry.” Pet. 31 (citing Ex. 1004 ¶18). Petitioner argues, “when the functionality of converter 30 is in phone 22, terminal 36 connects to phone 22 at connector 26 through cable 40 and/or 32).” *Id.*

In Reply, Petitioner reiterates its argument from the Petition that “any such configurations [technical requirements of particular jacks] would have been obvious to [a person of ordinary skill in the art], who would have recognized that different electrical connections in the art have different signaling requirements (e.g., amplitude, impedance, frequency) and, in practice, designed systems to such specifications.” Pet. Reply 12 (citing Pet. [29–30]; *see also* Ex. 1003 ¶¶ 48–51).

Petitioner also points out that:

the '084 itself describes the transmission of raw credit card data to a mobile phone's hand free jack without providing any detail on how that credit card data is processed or converted to make it “suitable” for transmission: “The transaction apparatus 12' comprises one-way device without a screen or control pad and as such, only includes an input device 38' in the form of a slot 39' for capturing information from a transaction card 24 and sending this information without conversion directly to the mobile phone 14 via cable 30.”

Pet. Reply 13 (citing Ex. 1001, 10:36–41). Petitioner also points out that Patent Owner's expert, Mr. Zatkovich, acknowledged that a person of ordinary skill in the art would have understood how to handle the necessary processing in such a configuration. Pet. Reply 13–14 (citing Ex. 1041, 41:14–43:16).

We agree with Petitioner that Proctor teaches an output jack (from card reader terminal 36), adapted to be inserted into the hands-free jack (connector 26) associated with said mobile communication device (mobile phone 22) for providing the converted encrypted analog signal indicative of the information to said mobile communication device (mobile phone 22) for transmission to a transaction server for further processing.

Patent Owner's argument that "Petitioner provides no evidence that Proctor's terminal 36, which would have an RJ-11 jack, could be readily adapted to feed directly into the hands-free jack of a mobile communication device," is unavailing for several reasons. First, Petitioner provides evidence demonstrating that Proctor's output jack from card reader terminal 36 is adapted for insertion into the hands-free jack (connector 26) of Proctor's mobile phone 22 for providing a converted encrypted analog signal to mobile phone 22 for transmission to a transaction server for further processing. *See* Ex. 1003 ¶¶ 71–76, 84.

Second, the '084 patent shows a similar configuration in Figure 7, where transaction apparatus 12' is a one-way device without a screen or control pad and only includes input device 38' in the form of a slot 39' for capturing information from a transaction card 24 and sends this information without conversion directly to mobile phone 14 via cable 30. *See* Ex. 1001, 10:36–41, Fig. 7. Finally, Patent Owner's expert, Mr. Zatkovich, acknowledged that given the device in Figure 7 and the description in the '084 patent, one would know how to properly condition the signal in order to get such a device to operate correctly. *See* Ex. 1041, 41:14–43:16.

Based on the complete record and for the reasons discussed herein, we are persuaded that Petitioner has demonstrated that Proctor teaches the recited "output jack adapted to be inserted into the hands-free jack associated with said mobile communication device for providing the converted encrypted analog signal indicative of the information to said

mobile communication device for transmission to a transaction server for further processing” of independent claim 1.⁵

c. Motivation to Combine

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the teachings of Proctor, Vrotsos, and Hasumi in the manner described in the Petition. Pet. 21–24 (citing Ex. 1003 ¶¶ 29–31, 48–51, 55–63, 79–80, 83). Specifically, Petitioner asserts that a person of ordinary skill in the art “would have been motivated to include a controller, such as [Vrotsos’s] processor, to control the operations of and provide encryption functionality to Proctor’s terminal 36.” Pet. 21 (emphasis omitted). Petitioner contends that doing so would have been “the application of a known technique (Vrotsos’s control via a processor) to a known device ready for improvement (Proctor’s terminal 36 with unspecified circuitry) to yield the predictable result of providing a central processor within a card reader to manage the receiving, processing, and transmitting of transaction card information.” *Id.* at 22 (emphasis omitted). Petitioner also argues that processors “make available more complex tasks, such as encrypting information, which is important for keeping personal

⁵ In a footnote, Petitioner explains that, “[w]hile the embodiment of Proctor primarily used in this Petition and applied in the claim charts takes the option, explicitly given by Proctor, of incorporating converter 30’s functionality into phone 22 (*see* [Ex. 1004] ¶ 18), Proctor’s system and method meet the claim limitations of the ’084 patent even in the alternative embodiments where (1) the converter 30 is a physical unit between terminal 36 and phone 22 and (2) the converter 30 is incorporated in terminal 36.” Pet. 17 n.2. While we agree that Proctor’s embodiments incorporating converter 30 in terminal 36 or in phone 22 meet this limitation, we are not so persuaded by Proctor’s embodiment where converter 30 is a physical unit between terminal 36 and phone 22.

information secure during financial transactions and preventing misuse.” *Id.* (citing Ex. 1006 ¶¶ 8, 71, 75, 78, 80; Ex. 1003 ¶¶ 79, 29–31, 58–63).

Petitioner also argues that a person of ordinary skill in the art:

would have recognized that controllers and processors were staple components of electronic devices and, having real-world examples of controllers in various devices, would have had a reasonable expectation of success in implementing any such controller in Proctor’s terminal 36. *See, e.g.*, Ex. 1007 at 6:41–54 and Figs. 2A, 2B (disclosing a microprocessor controller 205 for processing information from an electronic wallet). Similarly, encryption is old and well-known in the card reader art, and a [a person of ordinary skill in the art] would have recognized a number of ways to generate encrypted information, including Vrotsos’s detailed example described in Figures 9(a)–(c), and would have had a reasonable expectation of success in doing so. *See also* Ex. 1008, 5:3–49 (prior art example converting card data to an encrypted analog signal).

Pet. 22 (citing Ex. 1003 ¶¶ 80, 29–31, 48–51).

Petitioner also asserts that a person of ordinary skill in the art “would have been motivated to configure Proctor’s system, which discloses a memory chip credit card, for use with a contactless IC credit card, as taught by Hasumi, to provide the benefit of allowing the user to use a wireless form of payment.” Pet. 23. Petitioner argues that a person of ordinary skill in the art “would have understood that encryption,” such as that taught by Hasumi, “was especially important for the transmission of financial information wirelessly, where transmissions could have been intercepted through the air.” *Id.* at 24. Petitioner argues that “the wireless payment card encryption and technologies described in Hasumi were old and well-known in the art of contactless cards.” *Id.* (citing Ex. 1013 §§ 1, 2, 3, 5; Ex. 1014 §§ 4.3.1, 4.3.2, 4.6; Ex. 1015 § III.C; and Ex. 1016 ¶¶ 34–47). Petitioner also argues that a person of ordinary skill in the art “would have been well-versed in

card technologies, including contact and contactless technologies, and would have had a reasonable expectation of success implementing contactless encryption technologies in Proctor's payment system." Pet. 24 (citing Ex. 1003 ¶¶ 55–63, 83).

Patent Owner argues that a person of ordinary skill in the art:

would not be motivated to integrate Vrotsos's digital controller into Proctor. Petitioner does not even bother to teach how Vrotsos would even connect to Proctor or Proctor's mysterious "converter 30." In any event, the combination of the references would *still* not result in a device that would convert payment-card information into an encrypted analog-audio signal and transmit that signal to the hands-free jack of a mobile phone.

PO Resp. 29.

Patent Owner also argues that:

Petitioner fails to explain why a [a person of ordinary skill in the art] would be motivated to combine Proctor with Vrotsos and still convert to an analog-audio signal and transmit to the hands-free jack of a mobile communication device, when Vrotsos already describes a perfectly good means of converting card information to digital signals and data packets and connecting to a digital communication port or antenna of a cell phone for transmission over a cellular network – means that would appear to be much more simplified and efficient than using a controller or circuitry that converts to digital, then somehow (not explained how or why) converting back to analog and sending to the analog hands-free jack instead, where the signal it then must be converter [sic] to DTMF signals by a specialized communication device that incorporates Proctor's converter 30.

Id. at 52 (citing Ex. 2004 ¶¶ 159–161).

Patent Owner further argues that

Petitioner assumes combinability, without providing any indication of how [a person of ordinary skill in the art] would integrate Vrotsos's digital controller into [Proctor's] modem-based approach, leaving out explanations of physical connections, what becomes of Proctor's converter, or how the

combination of the two disparate references would even yield the elements of the '084 patent claims.

PO Resp. 53 (citing Ex. 2004 ¶¶ 159–161).

Patent Owner argues “the only logical conclusion is that [Proctor’s] card-reader’s connection to the converter would require a specialized communication device containing a port equipped to receive modem signals and direct them to Proctor’s converter.” PO Resp. 54 (citing Ex. 2004 ¶ 53). “This, alone,” Patent Owner argues, “severely diminishes the incentive for [a person of ordinary skill in the art] to use Proctor as part of any combination pertaining to the ‘084 patent.” *Id.*

Patent Owner further argues a person of ordinary skill in the art: would understand that one of the primary advantages to the invention claimed in the '084 patent is to engage in commercial transactions using a standard device. [A person of ordinary skill in the art] would understand that any solution requiring the manufacture of a specialized form of mobile phone would not be an acceptable solution. Aside from the manufacturing expense, the additional expense to merchants in having to buy a specialized phone in order to take card payments, and the overall unlikelihood of the market to accept such a product, this solution is simply at fundamental odds with the '084 patent, which is designed to provide a widely accessible and more simple mobile-payment technology because it is designed to be used with standard (i.e., not specialized) mobile phones.

Id. at 56.

Patent Owner continues arguing that a person of ordinary skill in the art:

trying to solve the problem addressed by the '084 patent and understanding the importance of providing a mobile point-of-sale solution designed to be used with standard mobile phones, would not seek out a solution that would require a specialized communication device. Petitioner’s brief assertions concerning motivation to combine references with Proctor do not account for

this very significant motivation *against* combining a reference with Proctor.

Id. (citing Ex. 2004 ¶¶ 51–55).

In Reply, Petitioner argues that Patent Owner:

does not challenge that [a person of ordinary skill in the art] would have known how to incorporate such teachings into Proctor or that the combination would yield predictable results. Instead, [Patent Owner] argues that the Petition does not show how Proctor’s converter would improve Vrotsos’s and Hasumi’s disclosed systems. [PO Resp. 52–53]. But this argument misses the point; the Petition does not suggest bodily incorporating Proctor into Vrotsos or Hasumi but instead specifies that [a person of ordinary skill in the art] would have been motivated to adopt certain teachings from Vrotsos and Hasumi into Proctor’s system.

Pet. Reply 24 (citing Pet. 21–24).

Petitioner also argues that Patent Owner’s arguments against Proctor “are meritless,” in part because Patent Owner “ignores the Petition’s clear explanation for how the claims are met across any of Proctor’s embodiments.” Pet. Reply 24–25 (citing Pet. 17–18). Petitioner also points out that:

[Patent Owner’s] expert expressly admitted, where the converter is implemented outside the phone and transmits DTMF signals to the phone through the headset jack, this meets the limitations of the challenged claims. (Ex. 1041, 57:21–59:2). Likewise, [Patent Owner’s] expert admitted disclosure of a signal going into a hands-free jack is sufficient for [a person of ordinary skill in the art] to know how to condition those signals appropriately (Ex. 1041, 41:14–43:16); [Patent Owner] cannot now dispute, where Proctor’s converter is incorporated into the mobile phone, that [a person of ordinary skill in the art] would know how to appropriately condition Proctor’s “audible stream of tones” for transmission from the terminal to the hands-free jack.

Pet. Reply 25.

Petitioner also argues that Patent Owner’s “reliance on the purpose of the ’084 [patent]—to be able to use conventional devices—and its complaint about hindsight bias [PO Resp. 54–56] does not rebut Petitioner’s demonstration that [a person of ordinary skill in the art] would have been motivated to modify Proctor to incorporate the straightforward teachings of the secondary references.” *Id.*

We agree with Petitioner that a person of ordinary skill in the art would have been motivated to combine the Proctor, Vrotsos, and Hasumi references in the manner described in the Petition. Petitioner provides credible evidence and persuasive argument that a person of ordinary skill in the art would have been sufficiently motivated to include Vrotsos’s processor as a controller to manage the operations and provide desired encryption for Proctor’s terminal 36. *See* Pet. 21; Ex. 1003 ¶¶ 79–80. We are persuaded that doing so would have been the application of a known technique (Vrotsos’s control using a processor) to a known device ready for improvement (Proctor’s terminal 36) to yield the predictable result of providing a central processor within a card reader to manage the receiving, processing, and transmitting of transaction card information. *See* Pet. 22; Ex. 1003 ¶¶ 79–80. Such a combination would have provided the obvious benefit of allowing Proctor’s controller to engage in more complex tasks, such as encrypting information, which is important for keeping personal information secure during financial transactions and preventing misuse. *See* Pet. 22; Ex. 1003 ¶¶ 29–31, 58–63, 79–80.

We also agree that a person of ordinary skill in the art would have been motivated to configure Proctor’s system to work with Hasumi’s contactless IC credit cards and encryption. Petitioner provides credible evidence and persuasive argument that use of a contactless IC credit card,

such as taught by Hasumi, would provide the benefit and convenience of a wireless form of payment with the added security of encryption, which is especially important during the wireless transmission of financial information, where transmissions can be intercepted through the air. *See* Pet. 23–24; Ex. 1003 ¶¶ 81–83. Such a combination would have had a reasonable expectation of success implementing contactless encryption technologies in Proctor’s payment system. *See* Pet. 24; Ex. 1003 ¶¶ 55–63, 83.

We disagree with Patent Owner that Petitioner fails to sufficiently explain how and why a person of ordinary skill in the art would have combined the references Proctor, Vrotsos, and Hasumi in the manner described by Petitioner. In large part, Patent Owner criticizes, but fails to address the asserted combination provided by Petitioner, while largely ignoring the evidence that many of these technologies, including smart cards, control processors, encryption, wireless transaction cards, and mobile phones, were pre-existing and well-known technologies in the art at the time of the invention. For example, the ’084 patent points out that “[e]lectronic fund transfer over mobile phones is growing popular. Many systems include combining a point of sale (POS) device with a wireless communication device such as a cell phone.” Ex. 1001, 1:33–36. The ’084 patent goes on to explain that:

These [prior art] POS devices include a processor as well as an input device to receive and process information from a transaction card such as a debit card, a credit card, a cash card, a stored value card, an ATM card or combinations thereof and the like. The input device may include a bar code reader, a magnetic stripe reader, an integrated circuit reader, a smartcard reader, a fingerprint scanner, an optical scanner, a signature pad, an alphanumeric keypad (including a PIN pad), a proximity

detector, an audio recording device, a camera or combinations thereof and the like.

Id. at 1:37–46.

The '084 patent even explains how these prior art systems largely work:

The processor of the POS device receives information from the transaction card and sends it to a remote computer via a communication network. This information can be transmitted by the processor via the wireless communication device. The wireless communication device includes a transceiver, a communication port or any other type of similar communication device capable of transmitting information received by the portable transaction device processor from the transaction card to the remote computer. The communication link between the remote computer and the wireless communication device can be provided by the processor of the wireless communication device.

Id. at 1:46–57.

Given this background, Patent Owner's repeated criticism that Petitioner has not articulated sufficiently how to electrically adapt and physically connect the teachings of the references is unavailing. For example, Patent Owner argues that "Petitioner does not even bother to teach how Vrotsos would even connect to Proctor" (PO Resp. 29), or Petitioner does not "provid[e] any indication of how [a person of ordinary skill in the art] would integrate Vrotsos's digital controller into [Proctor's] modem-based approach" (*Id.* at 53), or Petitioner "never bothers to explain how Proctor's converter would physically connect to the systems disclosed in the other references (*id.*).” However, Patent Owner does not appear to take into account the level of skill of someone of ordinary skill in the art, here, a person with bachelor's degree in electrical or computer engineering or equivalent having one to two years of relevant experience in the fields of embedded systems and mobile communication device interfaces, or

otherwise equivalent industry experience in the field. *See* Section II.A, *supra*.

Indeed, Patent Owner also appears to ignore the testimony of the Petitioner’s expert, Mr. McNair, who testifies that a person of ordinary skill in the art

would recognize that various devices, such as microphones, and other external signal sources, such as financial card reading devices, produce various signal levels. [A person of ordinary skill in the art] would also recognize that various networking facilities and devices, such as landline telephone connections or cellular telephone audio inputs will require particular input signal levels, and they would further recognize that there are a variety of ways to match these input and output requirements.

Ex. 1003 ¶ 51.

Mr. McNair also testifies that “[t]o the extent it may be argued that Proctor does not explicitly describe features claimed in the ’084 patent, such as the use of particular circuitry or the encryption of certain information, such components and techniques were well-known in the art at the time of the ’084 patent,” and a person of ordinary skill in the art “would have also known how to implement such systems (and minor variations) because each of the components and functions, individually and as combined in the ’084 patent, were widely used and practiced in the art.” *Id.* ¶¶ 75–76.

Even Patent Owner’s expert, Mr. Zatkovich, acknowledges that one would have known how to properly condition a signal, such as the one necessarily depicted in Figure 7 of the ’084 patent, in order to get such a device to operate correctly. *See* Ex. 1041, 41:14–43:16. We also note that some of Patent Owner’s arguments as to what a person of ordinary skill in the art would, or would not have understood are not supported by any

citation to evidence of record, and are therefore unsupported attorney argument. *See, e.g.*, PO Resp. 56, 1st Para.

We also disagree with Patent Owner’s argument that Petitioner’s use of Proctor would “require[e] the manufacture of a specialized form of mobile phone.” *See id.* at 54–56. Indeed, Proctor itself teaches use of a “digital cellular telephone,” and that its converter “operates conventionally,” and “may be included as an internal circuit board in existing systems or integrated into the circuitry [and/or] software of systems.” Ex. 1004 ¶¶ 11, 13. Moreover, Petitioner’s expert, Mr. McNair, explains how Proctor’s different implementations each generate signals in a format suitable for transmission to a phone’s headset jack. *See* Ex. 1042 ¶ 16.

We find that Petitioner has shown persuasively by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have been motivated to combine the teachings of Proctor, Vrotsos, and Hasumi in the manner proffered by Petitioner.

d. Conclusion as to Claim 1

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Proctor, Vrotsos, and Hasumi.

e. Independent Claim 5

Independent claim 5 is similar to independent claim 1, but differs from claim 1 in a few respects. Claim 5 is written as a method claim whereas claim 1 is written as an apparatus claim. Claim 5 does not recite “circuitry for converting” as part of the sensor as claim 1 does, but claim 5

does recite “further processing” of the encrypted analog signal “by circuitry contained in said mobile communication device.” Claim 5 in its entirety reads as follows.

5. [P] A method for reading a smart card, the method comprising the steps of:
- [A] providing a portable card reader device comprising a sensor for reading information stored on the integrated circuit of a smart card, and an output jack adapted to be inserted into a hands-free jack associated with a mobile communication device;
 - [B] wherein said portable card reader device produces an encrypted analog signal indicative of the information stored on said integrated circuit;
 - [C] said encrypted analog signal suitable for transmission to said hands-free jack of said mobile communication device;
 - [D] providing said encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device for further processing by circuitry contained in said mobile communication device; and
 - [E] transmitting said encrypted analog signal to a transaction server for further processing.

Ex. 1001, 12:24–43.

With respect to sections 5[P]–5[C] and 5[E] of claim 5, both Petitioner and Patent Owner rely on the same evidence and arguments as they relied on for claim 1. *See* Pet. 35–37; PO Resp. 13–30. However, 5[D], “providing said encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device for further processing by circuitry contained in said mobile communication

device,” presents unique issues, where Petitioner and Patent Owner provide different evidence and arguments. *See* Pet. 36–37; PO Resp. 30–32. We address section 5[D] as follows.⁶

For 5[D], Petitioner argues that “Proctor discloses providing said encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device for further processing by circuitry contained in said mobile communication device (converter 30 circuitry contained in phone 22).” Petitioner points to Proctor, which states that:

[t]he message generated in the terminal 36 is modulated to an audible stream of tones, which are transmitted to the converter 30 [in phone 22]. The converter converts this signal into a data stream in encoded format that is readily transmitted via digital cellular networks, as described in the incorporated [Preston] reference. The phone then transmits this encoded stream to a receiver node on the network 12, which transmits the stream via the conventional telephone network to the facility 20.

Pet. 36 (citing Ex. 1004 ¶ 16). Petitioner also points out that Proctor’s “telephone may incorporate decoder circuitry.” Pet. 36 (citing Ex. 1004 ¶ 18).

Petitioner also argues that a person of ordinary skill in the art would have understood that to communicate any information to a communications network, the mobile communication device must have inherently, or at least obviously, included some circuitry for processing such information for transmission, such as radio transceiver circuitry (e.g., phone circuitry as in Proctor ¶ 8). Pet. 36–37 (citing Ex. 1003 ¶¶ 52–54).

⁶ Patent Owner’s counsel clarified at Oral Argument that Section IV.F of its Response does not apply to independent claim 1. *See* Paper 32, 88:6–13.

Patent Owner argues that Petitioner’s evidence “does not show further processing of *card information* by the mobile device.” PO Resp. 31 (emphasis added). Patent Owner argues “Proctor does not disclose any embodiment in which the mobile phone recovers *card information* from the audio signals in order to be processed.” *Id.* (citing Ex. 2004 ¶ 79) (emphasis added).

Patent Owner argues:

[o]ne of skill in the art would understand that the intent is for the mobile phone to further process the *card information* before transmitting that information to a transaction server. Ex. 2004 ¶ 80. In order to further process the payment *card information*, [a person of ordinary skill in the art] would understand that the mobile communication device needs to extract the *card information* from the analog signal in order to have something to process. *Id.* At minimum, this would require converting the received analog signal to digital data representing the credit *card information*.

PO Resp. 31 (emphasis added).

Patent Owner argues that the ’084 patent’s discussion of “[t]he analog signal from the magnetic card 24 is sent via the hands-free interface 41 where the software application of the controller 51 [in the cell phone] converts the received signal back to binary data for example as stored on the magnetic card 34,” shows that “the limitation of ‘further processing’ is not merely relaying an encrypted signal or reformatting the signal for transmission to the transaction server.” *Id.* at 32 (citing Ex. 2004 ¶¶ 81–84; *see also* Ex. 1001, 10:46–50, 58–62 and Figs. 7-8).

In Reply, Petitioner argues that “the claims do not specify what further processing is required or provide any basis to limit and exclude transmission processing performed by the phone to transmit received signals to the verification server over a cellular communications network.” Pet.

Reply 15. Petitioner also point out that Patent Owner’s expert, Mr. Zatkovich, “admit[ted] that simple audio-to-digital conversion (for relaying of information from the mobile phone’s jack to the cellular network), as described in the prior art, is *further processing*.” *Id.* (citing Ex.1041, 153:16–19).

In its Sur-reply, Patent Owner disputes that its expert admitted that simple audio-to-digital conversion amounts to the recited “further processing.” PO Sur-reply 14 n.7 (citing Ex. 1041, 153:14–15).

We disagree with Patent Owner. Patent Owner argues that Petitioner’s evidence “does not show further processing of card information by the mobile device.” PO Resp. 31 (emphasis omitted). Claim 5, however, recites “providing said encrypted analog signal . . . for further processing by circuitry contained in said mobile communication device.” Claim 5 does not recite “further processing *of card information* by the mobile device” as Patent Owner argues. To the extent Patent Owner invites us to limit claim 5 to “further processing *of card information*” because “another embodiment” of the ’084 patent describes “installation of a software application controller 51” on “communication device 14 (a mobile phone),” which “is used to convert between audio and digital signal and to receive and transmit and [sic] audio data to and from the hands-free interface 41,” we decline the invitation. “A particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.” *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (citation omitted); *see also In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

We agree with Petitioner that Proctor shows that a message generated in the terminal 36 is modulated to an audible stream of tones, which are

transmitted to the converter 30 located in phone 22 in this embodiment. Converter 30 converts this signal into a data stream in encoded format that is transmitted via digital cellular networks as described in the incorporated Preston reference. The phone then transmits this encoded stream to a receiver node on the network 12. *See* Pet. 36 (citing Ex. 1004 ¶ 16); *see also* Ex. 1003, 58–60. We also agree with Petitioner’s expert, Mr. McNair, that:

In the ’084 patent and in the prior art, it would have been expected that the mobile communication devices perform at least some minimal processing in order to receive signals (i.e., from the hands-free jacks) and transmit the signals (i.e., to a remote server). This is because an audio signal (e.g., an analog signal having frequencies in the range of 300 to 3000 Hz) cannot simply be transmitted, as-is, by mobile device antenna. . . . This requires proper digital processing of speech, translation to the right frequency, amplification, modulation into a suitable format for long distance transmission, coordination with control networks, and reversing the process by filtering, amplifying, detection, demodulation, and ultimately conversion to the proper analog or digital format.

Therefore, some processing in the mobile communication device would have been required and expected. Examples of this processing would have included microprocessor and transceiver circuitry for encoding and packaging the data (encoding, modulation, frames, packets) and for processing those signals to cause the appropriate wireless antenna(s) to radiate the corresponding mobile communication signals.

Ex. 1003 ¶¶ 53–54.

Mr. McNair further explains, and we agree, that Proctor teaches its “telephone may incorporate the decoder circuitry” and that a person of ordinary skill in the art “would have understood that to communicate any information to a communications network, the mobile communication device must have inherently, or at least obviously, included some circuitry

for processing such information for transmission, such as radio transceiver circuitry (e.g., phone circuitry as in Proctor ¶ 8).” Ex. 1003, 60.

We are persuaded that Petitioner has demonstrated that Proctor teaches the recited “providing said encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device for further processing by circuitry contained in said mobile communication device” of independent claim 5.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments. For the reasons discussed directly above, and for the reasons discussed with respect to claim 1, we determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 5 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Proctor, Vrotsos, and Hasumi.

f. Dependent Claim 2

Dependent claim 2 recites: “The card reader device from claim 1, in which the smart card is selected from a group consisting of a chip card, EMV card, proximity detector or NFC card, contactless card, or any combination thereof.”

Petitioner asserts that “Proctor, in view of Hasumi, discloses that the smart card is a chip card or contactless card.” Pet. 32. Petitioner relies on Proctor, which states that “[i]n alternative embodiments, the credit card may include data encoded by other means, such as a memory chip that records information beyond identifying the card, including balance and available credit.” *Id.* (citing Ex. 1004 ¶ 10).

Petitioner also relies on Hasumi, which states that “[w]hen the IC card 10 is held above the reading/writing device 4, transmission/reception of data

using electromagnetic waves is performed between the antenna 18 of the IC card 10 and the antenna (not shown) within the reading/writing device 4.”

Pet. 32–33 (citing Ex. 1009 ¶ 53). Petitioner further relies on Hasumi, which states that “[w]hen the person desiring to purchase a product holds up the IC card 10 to the reading/writing device 4, at least the unique number data within the credit card information stored in the storage device 12 of the IC card 10 is received, as electromagnetic data encrypted by triple DES, by the reading/writing device 4.” Pet. 33 (citing Ex. 1009 ¶ 65).

Patent Owner relies on the same arguments and evidence it provided with respect to claims 1 and 5, and does not appear to address claim 2 separately. *See* PO Resp. 13–32; PO Sur-reply 2–15. Patent Owner’s expert does not appear to address claim 2 separately. *See* Ex. 2004, 13–32.

Petitioner does not address claim 2 separately in its Reply. *See* Pet. Reply 2–16. Petitioner’s expert provides the same claim chart that appears in the Petition. *See* Ex. 1003, 56.

We are persuaded that Proctor’s memory chip credit card and Hasumi’s IC card 10, as presented by Petitioner, teach a “smart card [] selected from a group consisting of a chip card, EMV card, proximity detector or NFC card, contactless card, or any combination thereof” as recited in dependent claim 2.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 2 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Proctor, Vrotsos, and Hasumi.

g. Dependent Claim 3

Dependent claim 3 recites: “The card reader device of claim 1, wherein said device comprises a device selected from the group consisting of: an analog signal reader, a digital signal reader, a bar code reader, a magnetic stripe reader, and integrated circuit reader, a smartcard reader, an EMV reader, and optical scanner, and any combination thereof.”

Petitioner asserts that “Proctor discloses the device is a magnetic stripe reader (magnetic credit card reader slot 46).” Pet. 33. Petitioner relies on Proctor, which states that “[a] magnetic credit card reader slot 46 is an input device that reads unique data encoded on a magnetic strip on a purchaser's credit card 48.” *Id.* (citing Ex. 1004 ¶ 10).

Petitioner argues that “Proctor further discloses that the credit card may store information in a memory chip (i.e., an integrated circuit).” Pet. 33. Petitioner relies on Proctor, which states that “[i]n alternative embodiments, the credit card may include data encoded by other means, such as a memory chip that records information beyond identifying the card, including balance and available credit.” *Id.* (citing Ex. 1004 ¶ 10).

Petitioner also argues that a person of ordinary skill in the art “would have recognized that reading information from an integrated circuit would have inherently required an integrated circuit reader.” Pet. 33.

Petitioner further argues that “Hasumi teaches that credit cards with integrated circuits include contactless cards and can be read by an analog integrated circuit reader.” *Id.* Petitioner relies on Hasumi, which states that “[w]hen the IC card 10 is held above the reading/writing device 4, transmission/reception of data using electromagnetic waves is performed between the antenna 18 of the IC card 10 and the antenna (not shown) within the reading/writing device 4.” *Id.* (citing Ex. 1009 ¶ 53).

Petitioner further relies on Hasumi, which states that “[w]hen the person desiring to purchase a product holds up the IC card 10 to the reading/writing device 4, at least the unique number data within the credit card information stored in the storage device 12 of the IC card 10 is received, as electromagnetic data encrypted by triple DES, by the reading/writing device 4.” Pet. 34 (citing Ex. 1009 ¶ 65).

Patent Owner relies on the same arguments and evidence it provided with respect to claims 1 and 5, and does not appear to address claim 3 separately. *See* PO Resp. 13–32; PO Sur-reply 2–15. Patent Owner’s expert does not appear to address claim 3 separately. *See* Ex. 2004, 13–32.

Petitioner does not address claim 3 separately in its Reply. *See* Pet. Reply 2–16. Petitioner’s expert provides the same claim chart that appears in the Petition. *See* Ex. 1003, 56–57.

We are persuaded that Proctor’s magnetic credit card reader slot 46 and Hasumi’s reading/writing device 4, as presented by Petitioner, teach a card reader device “selected from the group consisting of: an analog signal reader, a digital signal reader, a bar code reader, a magnetic stripe reader, and integrated circuit reader, a smartcard reader, an EMV reader, and optical scanner, and any combination thereof” as recited in dependent claim 3.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 3 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Proctor, Vrotsos, and Hasumi.

h. Dependent Claim 4

Dependent claim 4 recites: “The card reader device of claim 1, wherein the mobile communication device comprises a device selected from the group consisting of: a wireless communication device a mobile phone, a cellular phone, a personal digital assistant, a pager, a computer, a smartphone, a Blackberry™, an iPhone™, an Android™ phone, an iPad™, and a tablet.”

Petitioner asserts that “Proctor discloses the communication device is, e.g., a wireless phone, mobile phone, or cellular phone.” Pet. 34. Petitioner relies on Proctor, which states that “[t]he user system includes a digital cellular telephone 22 having an antenna 24 communicating with the cellular network 12.” *Id.* (citing Ex. 1004 ¶ 8).

Patent Owner relies on the same arguments and evidence it provided with respect to claims 1 and 5, and does not appear to address claim 4 separately. *See* PO Resp. 13–32; PO Sur-reply 2–15. Patent Owner’s expert does not appear to address claim 4 separately. *See* Ex. 2004, 13–32.

Petitioner does not address claim 4 separately in its Reply. *See* Pet. Reply 2–16. Petitioner’s expert provides the same claim chart that appears in the Petition. *See* Ex. 1003, 57.

We are persuaded that Proctor’s digital cellular telephone 22, as presented by Petitioner, teaches “a device selected from the group consisting of: a wireless communication device a mobile phone, a cellular phone, a personal digital assistant, a pager, a computer, a smartphone, a Blackberry™, an iPhone™, an Android™ phone, an iPad™, and a tablet,” as recited in dependent claim 4.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s

arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 4 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Proctor, Vrotsos, and Hasumi.

i. Dependent Claims 6–8

Dependent claims 6–8 are substantially similar to dependent claims 2–4, with the exception that dependent claims 6–8 depend from claim 5 rather than claim 1. *See* Ex. 1001, 12:7–22, 43–59. Petitioner relies on the same evidence for claims 6–8 as it relied on for claims 2–4. *See* Pet. 37–39. Patent Owner does not address claims 6–8 separately. *See* PO Resp. 13–32; PO Sur-reply 2–15.

Based upon consideration of the entire record, and for the reasons stated, *supra*, with respect to dependent claims 2–4, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claims 6–8 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Proctor, Vrotsos, and Hasumi.

3. Obviousness over Bear, Landman, and Colnot

Petitioner asserts claims 1–8 are unpatentable as obvious under 35 U.S.C. § 103 over the combination of Bear, Landman, and Colnot. Pet. 39–67.

a. *Relevant Prior Art*

Bear (Ex. 1021)

Bear describes a smart card device that may be directly hooked to a network or Internet via a phone or other communication interfaces, as illustrated in Figure 3 below. Ex. 1021, Abstr.

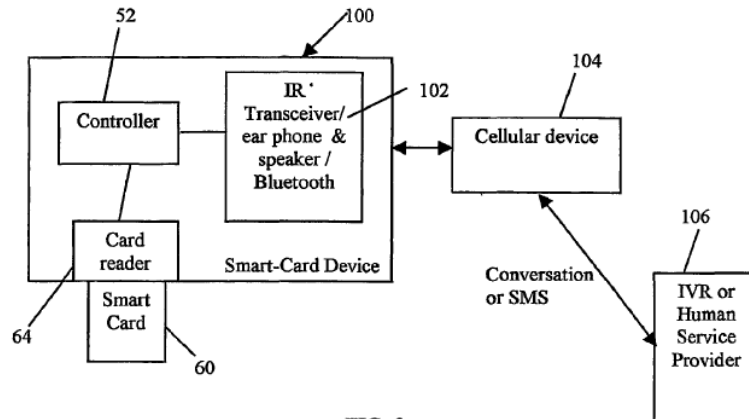


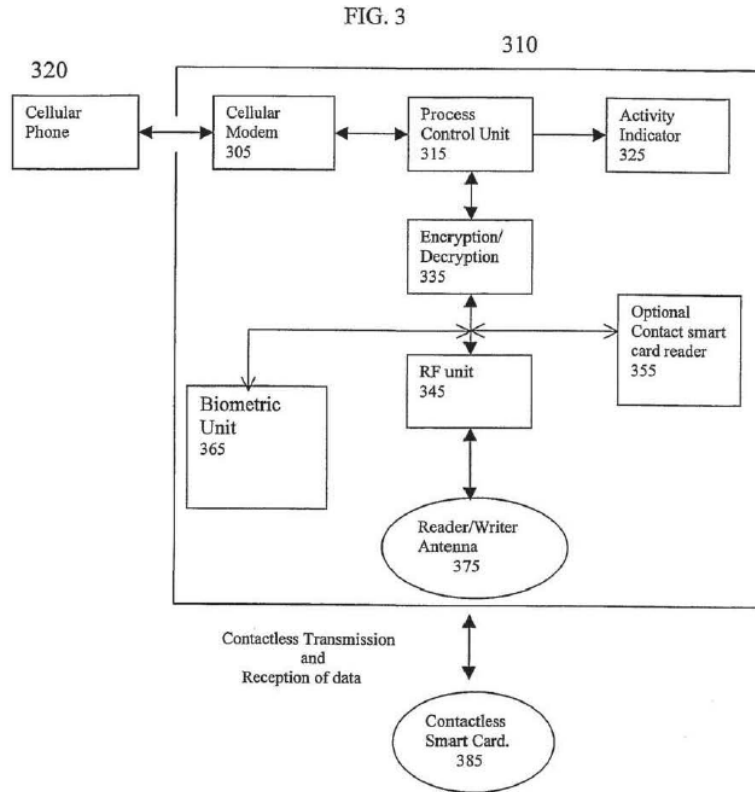
FIG. 3

Bear's Figure 3, above, "is a schematic illustration of a smart card device hooked on to a cellular telephone." *Id.* ¶ 25. "Smart card device 100 comprises a controller 52 connected to a smart card reader 64 and coupled to an infra-red (IR) transceiver 102, or any other interface capable of being supported by cellular phones." *Id.* ¶ 40. Smart card device 100 transmits and receives the data read by smart card reader 64 via the IR transceiver 102 to an IR transceiver located within the cellular device 104, which may then act as a device controller for a specific application. *Id.* ¶ 41. Bear also discloses that authentication of the user's identity can be accomplished using a "PIN that may be keyed on a keyboard that forms an integral part of the device, an external keyboard or the telephone keyboard." *Id.* ¶ 47.

Landman (Ex. 1011)

Landman describes providing "a wireless device with the ability to have secure e-commerce transactions utilizing a contactless smart card."

Ex. 1011, 5:4–5. Landman discloses that a smart card reader/writer module may be provided as an attachment to a standard wireless device, as illustrated in Figure 3 below. *Id.* at 11:13–14.



Landman’s Figure 3, above, depicts device 320 (cellular telephone) in communication with module 310 via a modem 305. *Id.* at 14:18. Central processor unit (PCU) 315 controls activity indicators 325, a display (not shown), and encryption/decryption unit 335. *Id.* at 14:19–15:2. Landman describes the operation of encryption/decryption unit 335 as follows:

The encryption/decryption unit 335 is used to prevent a third party from intercepting the data transferred to and from the contactless card. The information exchanged between the smart card and the module/device may be encrypted according to various well-documented methods. In one embodiment, the card may authenticate the card reader/writer by generating a random number and sending it to the reader/writer. The reader/writer has to encrypt the random challenge (number) with a shared encryption key and return the result to the card. The card then

compares the returned result with its own encryption before agreeing to communicate with the reader/writer. Conversely, the card reader/writer may also authenticate the card's identity by sending a random challenge (number) to the card. The card is then required to sign the number with its own private key, which is part of a private key/public key pair, and return it to the reader/writer for verification.

Id. at 15:2–13.

Colnot (Ex. 1012)

Colnot describes a system for providing secure authentication over a network for users and user groups. Ex. 1012, ¶ 32. “[T]he system uses a modulated sound consisting at least in part of an identification number and a session key.” *Id.* Colnot discloses that the sound signal, or “sound pass,” can be generated by a smart card or other hardware device. *Id.* ¶ 51. Colnot also describes that the sound pass can be generated by “a unique key device termed a key jack” that is “adapted to be inserted into any ‘audio in’ line on a PC such as the microphone port, telephone jack, or any auxiliary port having connection directly or indirectly to the sound card on the PC,” as illustrated in Figure 4 below. *Id.*

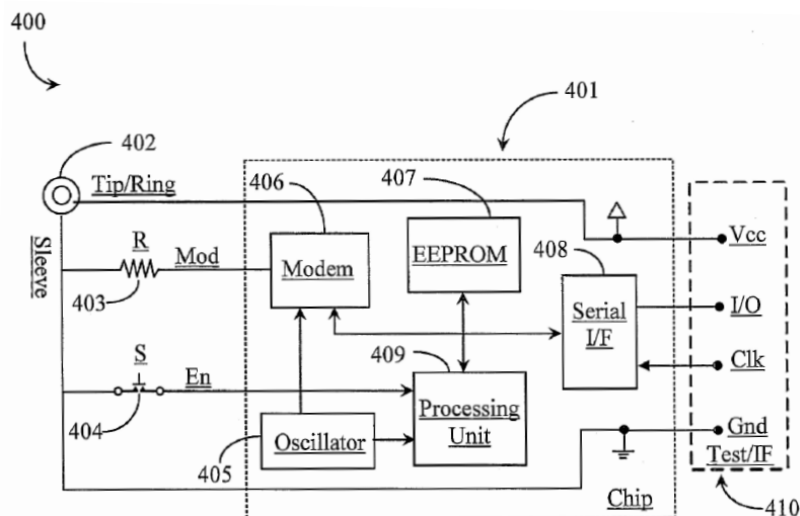


Fig. 4

Colnot's Figure 4, above, is a block diagram illustrating "a key jack sound pass generator." *Id.* ¶ 53. As shown in Figure 4, "chip circuitry 400 includes an electrically erasable programmable read-only memory (EEPROM) 401," "a modem circuit 406, an on-chip oscillator 405, a processing unit 409, and a serial input interface 408." *Id.* ¶ 54. "A tip/ring interface for plugging into a microphone jack or other line in is illustrated in reference to the chip circuitry and electrical paths." *Id.* ¶ 55. In operation, "[t]he key jack is manipulated to play the modulated sound pass by pressing a button provided on the device when the device is properly inserted into the PC." *Id.* ¶ 51. "The applet on the PC makes use of the sound pass token, demodulating the signal and generating the hash code for [sending] to the authentication server." *Id.*

b. Independent Claim 1

Claim 1[P] – A portable smart card reader

The preamble of claim 1 is directed to a "portable smart card reader device for reading a smart card." Ex. 1001, 11:51–52. Petitioner presents evidence that Bear teaches a smart card device 100 that includes a smart card reader 64, which reads data from smart card 60. Pet. 39–40, 49–50 (citing Ex. 1021 ¶¶ 8, 11, 37, 39, 40–41, 62, 72–73); *see also* Ex. 1003 ¶¶ 86–90.

Patent Owner acknowledges that "Bear describes a smart card device 100 that transmits/receives data read by the smart card reader 64 via the reader device's IR transceiver 102 connected to an IR transceiver in the cellular device 104." PO Resp. 9 (citing Ex. 1021 ¶ 41). Patent Owner disputes, however, that Bear's smart card device is "portable." PO Resp. 33–36. Patent Owner argues that "at least one embodiment of the Bear reader is connected to a land-line phone line." Ex. 2004 ¶ 92. Patent

Owner argues this indicates that the device would not be portable.

PO Resp. 34. Patent Owner also argues that a person of ordinary skill in the art “would find at a minimum that a portable device would be able to provide for a means of power and would not need to rely on fixed connections for communication such as a wired network or land line phone.” *Id.* at 35 (citing Ex. 2004 ¶¶ 30–32, 94).

Patent Owner’s argument is unavailing. First, Bear teaches that its smart card device “may include at least one energy source from a group including an internal battery.” Ex. 1021 ¶ 13. Second, Bear also teaches that its smart card device may be connected to a cellular phone. *Id.* ¶¶ 10, 39–42, 68, Fig. 3. Patent Owner concedes as much. *See* PO Resp. 34 (“Yes, it is true that the same Bear reader can be connected to a cell phone.”). Bear therefore teaches that it does not need to rely on fixed connections for communication such as a wired network or land line phone as Patent Owner argues. Finally, the ’084 patent itself indicates that “portability” involves having a point of sale (POS) device linked to a communication device such as a mobile phone by a cable. *See* Ex. 1001, 7:25–30. This is the same basic configuration described by Bear.

We agree with Petitioner that Bear’s smart card device 100 and smart card reader 64 teaches the recited “portable smart card reader device” of claim 1’s preamble. We do not reach the issue of whether the preamble is limiting, because regardless of whether the preamble is limiting, we are persuaded that Petitioner demonstrates that the recitation of the preamble is satisfied by Bear.

Claim 1[A]- A sensor for reading information

Claim 1 also recites “a sensor for reading information stored on an integrated circuit incorporated onto said smart card and for producing an encrypted analog signal indicative of the information.” Ex. 1001, 11:53–56.

Petitioner presents evidence that Bear teaches “a sensor (card reader 64 and controller 52) for reading information stored on the smart card (card reader 64 reads smart card 60).” Pet. 50. Petitioner presents evidence that Landman teaches a “smart card (e.g., a contactless smart card) incorporating an integrated circuit (a chip, memory) storing information.” *Id.* at 51 (citing Ex. 1011, 2:13–16, 10:14–23, 11:4–7). Petitioner presents evidence that Colnot also teaches smart cards with integrated circuits. *Id.* (citing Ex. 1012 ¶ 5).

Petitioner presents evidence that Landman teaches “generating analog signals (analog waveforms, radio frequency signals, intermediate frequency signals) and encrypting the information read from smart cards.” Pet. 51–54 (citing Ex. 1011, 11:1–7, 15:1–5, 6–23, 3:3–4:11). Petitioner argues that a person of ordinary skill in the art would have been motivated to combine Bear, Landman, and Colnot, which we discuss in more detail below. Pet. 43–44, 46–48.

Patent Owner argues that “[n]either Bear nor Landman disclose producing an encrypted analog signal.” PO Resp. 36–38. Patent Owner argues that “Bear only discloses that communicated information may be encrypted, but not by what device or component.” PO Resp. 36 (citing Ex. 2004 ¶ 100). Patent Owner also argues that “Landman discloses using the encryption/decryption unit 335 only for the exchange of information between the smart card and the reader device”—“not for encrypting the card

information as the claims require.” PO Resp. 37–38 (citing Ex. 2004 ¶¶ 104, 106).

Patent Owner’s arguments are unavailing. First, Patent Owner criticizes the references individually rather than addressing the combined teachings of the references presented by Petitioner. *See In re Keller*, 642 F.2d at 426 (“[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.”). Bear teaches a smart card device 100 using a “sensor” (smart card reader 64 and controller 52) for reading information from a smart card 60 and sending the data read from the smart card 60 to a remote server 106, through a cellular phone 104 connected to the smart card device 100. *See* Ex. 1021 ¶¶ 37–41, Fig. 3. Petitioner combines Bear with Landman, which teaches reading information from contactless smart card 385 by reader/writer antenna 375 and RF unit 345 as an analog signal (analog waveforms, radio frequency signals, intermediate frequency signals) and using encryption/decryption unit 335 to encrypt the information to prevent a third party from intercepting the data. *See* Ex. 1011, 3:3–4:11, 11:1–7, 15:1–23, Fig. 3.

Second, Patent Owner’s argument is based on the mistaken notion that the claim requires the recited “sensor” to “encrypt” an analog signal, rather than to merely “produce” an already encrypted analog signal. Claim 1 recites “a sensor for *reading* . . . and for *producing* an encrypted analog signal” The ’084 patent does not disclose any encryption occurring on the reader device subsequent to reading encrypted digital information from an IC card and prior to converting such a signal to an analog/audio signal for transmission to the transaction server. Instead, the ’084 patent discloses that “digital information from the IC chip 48 is captured by the digital signal

reader. . . . The transaction data whether originally received in analog format or in encrypted digital format is converted by the MCU 50 into an analog audio signal suitable for transmission.” Ex. 1001, 7:65–8:10.

Based on the complete record and for the reasons discussed herein, we are persuaded that Petitioner has demonstrated that the combined teachings of Bear, Landman, and Colnot as presented teach the recited “sensor for reading information stored on an integrated circuit incorporated onto said smart card and for producing an encrypted analog signal indicative of the information” of independent claim 1.

Claim 1[B] – Circuitry for converting

Claim 1 also recites “said sensor including circuitry for converting said encrypted analog signal to a format suitable for transmission to a hands-free jack of a mobile communication device.” Ex. 1001, 11:57–60.

Petitioner presents evidence that Bear teaches “a sensor including circuitry (controller 52) for converting the encrypted analog signal to a format suitable for transmission (correctly packaging one communications protocol to another; e.g., audio tones) to a hands-free jack of a mobile communication device (ear-phone-speaker interface of a cell phone).” Pet. 54–55 (citing Ex. 1021 ¶¶ 8, 11, 33, 39–40, Figs. 2–3).

To the extent Bear’s “ear-phone-speaker” is not considered a “hands-free jack,” Petitioner presents evidence that Colnot teaches “transmitting smart card information to a cell phone via a hands-free jack (microphone jack accommodating a tip/ring/sleeve (TRS) plug) after converting it to a format suitable for transmission for the hands-free jack.” Pet. 55–57 (citing Ex. 1012 ¶¶ 15, 16, 42, 53, 55, 57, 60, Figs. 4–6). Petitioner argues that a person of ordinary skill in the art would have been motivated to combine

Bear, Landman, and Colnot, which we discuss in more detail below.
Pet. 43–44, 46–48.

Patent Owner asserts that “Bear does not disclose converting the signal to a format suitable for a hands-free jack.” PO Resp. 38. Patent Owner argues that “Bear does not explain, for example, whether an encrypted analog signal is transmitted via this [ear-phone-speaker] connection, or if it is suitable for a hands-free jack.” *Id.* Patent Owner argues that “the only method Bear indicates for producing audio tones is the MODEM interface described at Bear ¶ 8 [, but] [m]odem audio signals cannot be used to transmit data over a cellular network.” *Id.* at 39 (citing Ex. 1021; Ex. 2004 ¶ 110).

Patent Owner also criticizes Colnot, arguing that Colnot makes “an erroneous assumption” that its “key jack [of the modem sound generator] 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.” PO Resp. 40–41.

Patent Owner’s arguments are unavailing because Patent Owner again criticizes the references individually rather than addressing the combined teachings of the references presented by Petitioner. *In re Keller*, 642 F.2d at 426. Patent Owner does not dispute that Bear teaches the use of tones and transmission of those tones to a transaction server. *See* Pet. 54–56; PO Resp. 38–42. Nor does Patent Owner dispute that Colnot teaches a hands-free jack. Petitioner’s combination of Bear’s teaching of tones and the transmission of those tones with Colnot’s teaching of a hands-free jack is sufficient to satisfy the limitation of “a format suitable for transmission to a hands-free jack of a mobile communication device.”

Moreover, Bear actually teaches a connection between a smart card reader and a cellular phone's "ear-phone-speaker" using audio tones rather than a modem, as Patent Owner argues. *See* Ex. 1021 ¶¶ 8, 39. Thus, a person of ordinary skill in the art would understand that the audio tone signals transmitted to this earphone jack are, in fact, suitable for transmission to the jack. *See* Pet. 54–56; Ex. 1003 ¶¶ 86–90; Ex. 1042 ¶¶ 7–11, 16.

Patent Owner's argument that "Bear does not disclose converting the signal to a format suitable for a hands-free jack" because "[m]odem audio signals cannot be used to transmit data *over a cellular network*" (PO Resp. 39 (emphasis added)), is unavailing because the limitation only requires "converting said encrypted analog signal to a format *suitable for transmission to a hands-free jack,*" not *suitable for transmission over a cellular network*, as Patent Owner argues. Moreover, Colnot teaches that its modem produces "audible sound" signals that are "compatible with telephone networks (wired and mobile)" and are "demodulated by an FSK modem at the server." Ex. 1012 ¶ 42. Indeed, Patent Owner's argument about the incompatibility of modem audio signals and cellular networks is directly refuted by Petitioner's expert, Mr. McNair, which we credit. *See* Ex. 1042 ¶¶ 7–11.

Based on the complete record and for the reasons discussed herein, we are persuaded that Petitioner has demonstrated that the combined teachings of Bear, Landman, and Colnot as presented teach the recited "said sensor including circuitry for converting said encrypted analog signal to a format suitable for transmission to a hands-free jack of a mobile communication device" of independent claim 1.

Claim 1[C] – An output jack adapted to be inserted

Claim 1 also recites “an output jack adapted to be inserted into the hands-free jack associated with said mobile communication device for providing the converted encrypted analog signal indicative of the information to said mobile communication device for transmission to a transaction server for further processing.” Ex. 1001, 12:1–6.

Petitioner provides evidence that Bear teaches “a smart card device, generally designated 100 may be connected to a transceiver, such as a cellular telephone 104, via any of the cellular telephone interfaces (such as, IR, ear-phone-speaker, or Bluetooth), and provide all the required access functions to a remote server 106.” Pet. 55 (citing Ex. 1021, Fig. 3, ¶ 39). Petitioner also provides evidence that Colnot teaches transmitting smart card information to a cell phone via a hands-free jack (microphone jack accommodating a tip/ring/sleeve (TRS) plug). Pet. 55–56 (citing Ex. 1012, Fig. 4, ¶¶ 53, 55, 60).

Petitioner also provides evidence that Bear teaches “providing the converted signal to a transaction server (remote server 106) for further processing (e.g., authenticating a user, authorizing access or an action).” Pet. 58 (citing Ex. 1021, Fig. 3, ¶¶ 39, 41). To the extent Bear does not explicitly disclose transmitting audio tones from a cell phone to a transaction server for further processing, Petitioner provides evidence that Colnot teaches “sending information to a remote server for further processing to secure online transactions over the phone,” including “an encoded and sound modulated transmission.” Pet. 58–60 (citing Ex. 1012 ¶¶ 8–9, 14, 37, 42).

Patent Owner argues:

Bear does not disclose producing encrypted audio signals at all. Ex. 2004 ¶¶ 100-101. In the case of Colnot, only the individual data elements may be encrypted and an encryption key or token sent along with the challenge/response conversation. *Id.* ¶ 140. Thus, Colnot does not teach producing an encrypted analog signal.

PO Resp. 44–45.

Patent Owner’s argument is unavailing because Patent Owner criticizes the references individually rather than addressing the combined teachings of the references presented by Petitioner. *In re Keller*, 642 F.2d at 426. We determine that the combined teachings of Bear, Landman, and Colnot produce an encrypted analog signal for the reasons discussed *supra* in connection with limitation 1[A]. See Section II.C.3.b.Claim 1[A].

Patent Owner also argues that “[n]either Bear nor Colnot discloses a remote transaction server for processing an encrypted analog signal” and “Colnot does not disclose transmitting a signal to a transaction server for further processing.” See PO Resp. 45–50. With respect to Bear, Patent Owner argues that a person of ordinary skill in the art “would not consider an IVR [interactive voice response] unit capable of processing encrypted analog signals, or capable of processing a payment card transaction” because “[a]n IVR system is not capable of performing secure transactions that require a standardized two-way communication, for at least the reason that an IVR system has no way of providing transaction-process status back to the point of sale device.” *Id.* at 45–46.

Patent Owner then criticizes Colnot, arguing that “[t]here are no embodiments within Colnot that use a mobile communication device for transmitting information to a transaction server.” *Id.* at 48 (citing Ex. 2004

¶ 152). Patent Owner also criticizes Colnot because “[t]he embodiments of Colnot refer only to performing a client-authentication transaction” and Colnot “never discloses the use of a transaction server for processing smartcard information or transactions.” PO Resp. 49.

These arguments are also unavailing because Patent Owner criticizes the cited references separately rather than addressing the combination of the prior art proposed by Petitioner. *In re Keller*, 642 F.2d at 426. Moreover, Patent Owner misconstrues Petitioner’s arguments. The Petition provides evidence and argument that the combination of Bear and Colnot teaches transmission of a signal to a remote transaction server for further processing and that person of ordinary skill in the art would have understood that the remote server would decrypt the tones (further processing) as necessary. *See* Pet. 57–60. Patent Owner’s argument that Bear’s remote server is an IVR (interactive voice server) and that it would be incapable of processing encrypted signals misses the point. Colnot teaches that its server is “adapted to authenticate secure access” including “decipher[ing]” the received signal. *See* Ex. 1012 ¶ 37. Landman also teaches encryption/decryption to the extent that is necessary for further signal processing. *See, e.g.*, Ex. 1011, claim 13.

Patent Owner’s separate criticism of Colnot is also based on a misunderstanding of Petitioner’s argument. Petitioner relies on at least Bear’s teaching of cellular telephone 104, and its connection to remote server 106 for transmission of a signal to a remote server for further processing. *See* Pet. 57–60; Ex. 1021 ¶ 41, Fig. 3. Patent Owner’s argument that Colnot doesn’t show a mobile communication device transmitting information to a remote server fails to address Petitioner’s combination. *See* PO Resp. 46–48. Patent Owner’s argument that Colnot

does not disclose the use of a transaction server for processing smartcard information or transactions also misses the point. *See id.* at 49. Petitioner relies on Colnot for its teaching of transmitting audio tones to a transaction server. *See* Pet. 58–60. The teaching of the *type* of transaction being further processed by the remote server comes from Bear and Landman. *See id.*

Based on the complete record and for the reasons discussed herein, we are persuaded that Petitioner has demonstrated that the combined teachings of Bear, Landman, and Colnot as presented teach the recited “an output jack adapted to be inserted into the hands-free jack associated with said mobile communication device for providing the converted encrypted analog signal indicative of the information to said mobile communication device for transmission to a transaction server for further processing” of independent claim 1.

c. Motivation to Combine

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the teachings of Bear, Landman, and Colnot in the manner described in the Petition.

Petitioner asserts that a person of ordinary skill in the art “would have been motivated to configure Bear’s smart card device with a contactless smart card reader and an encryption/decryption unit, as taught by Landman.” Pet. 43. Petitioner asserts Landman teaches that “both contact and contactless smart cards were known in the art, and the benefit of contactless smart cards was that they did not require any physical contact to transfer data between the card and the card reader—data modulated into radio frequencies were transmitted wirelessly.” *Id.* (citing Ex. 1011, 2:13–17, 11:1–3). Furthermore, Petitioner argues, “by encrypting information exchanged between the smart card and the card reader device, third parties

are prevented from intercepting the information.” Pet. 43 (citing Ex. 1011, 15:1–4). Petitioner argues, a person of ordinary skill in the art, “well aware of these security concerns, would have been further motivated to implement encryption as taught by Landman.” Pet. 43 (citing Ex. 1006 ¶¶ 6, 8, 71, 75, 78, 80; Ex. 1003 ¶¶ 95, 58–63).

Petitioner argues a person of ordinary skill in the art “would have had a reasonable expectation of success in implementing Landman’s contactless smart card and encryption technologies in Bear’s smart card device, as commercial contactless reader technologies were known in the art, and encryption methods were well-documented.” Pet. 44 (citing Ex. 1011, 15:4–5, 16:3–4, 19:3–5). Petitioner also argues a person of ordinary skill in the art “would have recognized the various signaling requirements of such components, such that implementation would have required no more than routine experimentation.” Pet. 44 (citing Ex. 1003 ¶¶ 96, 48–51, 55–57).

Petitioner also argues a person of ordinary skill in the art “would have been motivated to transmit information between a card reader device and a mobile communication device using a hands-free jack, as taught by Colnot, in the card reader system of Bear.” Pet. 46–47. Petitioner argues, “Colnot teaches one such interface for audio tones using the well-known TRS plug, which interfaces with hands-free jacks commonly found on a wide range of consumer devices, including computers, laptops, PDAs, and cell phones, thereby improving on the usefulness of Bear’s smart card device by making it compatible with a variety of devices.” *Id.* at 47. Moreover, Petitioner argues, “Colnot shows that, with respect to the transmission of audio tones, the techniques of playing tones over a speaker or transmitting them over an electrical connection/cable were known alternatives.” *Id.* (citing Ex. 1012 ¶¶ 68–70; Ex. 1003 ¶103).

Petitioner further argues that a person of ordinary skill in the art “would have recognized that hands-free jacks were well-known standard connections, and [a person of ordinary skill in the art] would have had a reasonable expectation of success in configuring Bear’s smart card device to interface with a hands-free jack, thereby increasing its compatibility across all such devices.” Pet. 47 (citing Ex. 1003 ¶¶ 104, 34). Petitioner also argues that a person of ordinary skill in the art “would have been further motivated to transmit sound signals to transaction servers for additional processing, as taught by Colnot, in the system of Bear. Both Bear and Colnot disclose that transactions may be processed by Interactive Voice Response (IVR) servers.” Pet. 47 (citing Ex. 1012 ¶ 8; Ex. 1021 ¶¶ 37, 39, claim 42).

Petitioner also argues that a person of ordinary skill in the art “would have been motivated to transmit the sound signal in order to make use of the IVR servers’ sound-processing capabilities and further so that the cell phone would not have needed to perform additional decoding, repackaging, etc., thereby saving time and energy, which is in limited supply for portable battery-operated devices like cell phones.” Pet. 48. Furthermore, Petitioner argues, a person of ordinary skill in the art “would have recognized the security benefits of bypassing any unnecessary processing in the cell phone in possession of a user.” *Id.* (citing Ex. 1003 ¶¶ 105, 58–63). Petitioner argues a person of ordinary skill in the art “would have had a reasonable expectation of success in forwarding sound information to a server for processing, as taught by Bear and Colnot, with a reasonable expectation of success.” Pet. 48 (citing Ex. 1003 ¶¶ 106, 52–54).

Patent Owner argues that “[n]either Bear’s encryption of PIN/biometric data, Landman’s local encryption, nor Colnot’s PC-based

authentication somehow transforms into the encrypted analog-audio signal claimed in the '084 patent merely because they use the word 'encryption' and [a person of ordinary skill in the art] would have generally 'was well aware of ... security concerns.'" PO Resp. 57 (citing Pet. 43).

Patent Owner also argues that "Landman describes a connection to a cellular phone via a modem, while Bear describes a connection to a phone via IR transceiver, and Petitioner does not explain how or why [a person of ordinary skill in the art] would modify either reference to combine them." PO Resp. 57–58.

Patent Owner further argues that "Colnot's device acts as little more than a security token, and Petitioner has not established why [a person of ordinary skill in the art] would be motivated to consult Colnot as part of solving the issues addressed in the '084 patent. *Id.* at 58.

Patent Owner's arguments concerning encryption appear directed to how Petitioner explains its proposed combination satisfies the limitation of claim 1 reciting "a sensor for reading information stored on an integrated circuit incorporated onto said smart card and for producing an encrypted analog signal indicative of the information."

Petitioner's proposed combination involves configuring Bear's smart card device with a contactless smart card reader and an encryption/decryption unit, as taught by Landman. Pet. 43. Bear teaches a smart card device 100, including a smart card reader 64, a controller 52, and a communications interface 102. *Id.* at 39–40 (citing Ex. 1021 ¶¶ 8, 11, 39, 40). Smart card reader 64 reads data from smart card 60. Ex. 1021 ¶¶ 37, 41. This data is transmitted to cellular device 104 via communications interface 102. *Id.* ¶ 39.

Landman teaches implementation of an encryption/decryption unit within a card reader module. *See* Ex. 1006 ¶¶ 6, 8, 71, 75, 78, 80. Commercial contactless reader technologies were already known in the art, and encryption methods were well-documented. *See* Ex. 1011, 15:4–5, 16:3–4, 19:3–5. Petitioner’s expert, Mr. McNair, testifies that a person of ordinary skill in the art would have recognized the various signaling requirements of such components, such that implementation of Landman’s encryption/decryption features with Bear’s smart card device 100, including smart card reader 64 and controller 52, would have required no more than routine experimentation. Ex. 1003 ¶¶ 95–96, 48–51, 55–57.

Given the level of skill of a person of ordinary skill in the art at the time of the invention (a bachelor’s degree in electrical or computer engineering or equivalent and at least one to two years of relevant experience in the fields of embedded systems and mobile communication device interfaces, or otherwise equivalent industry experience in the relevant field), we find Petitioner’s proposed combination of Bear and Landman sufficiently detailed such that a person of ordinary skill in the art would have been able to produce the proposed combination with only routine experimentation.

Patent Owner’s argument that Petitioner does not explain how or why a person of ordinary skill in the art would have modified Bear’s connection to a phone via IR transceiver and Landman’s connection to a cellular phone via a modem to combine them (PO Resp. 57–58), is unavailing because Petitioner does not propose combining Bear’s IR transceiver with Landman’s modem.

As discussed, *supra*, Petitioner proposes configuring Bear’s smart card device with a contactless smart card reader and an

encryption/decryption unit, as taught by Landman. *See* Pet. 43–44. With respect to signal transmission, Petitioner relies on Bear’s teaching that its smart card device may be coupled to any interface capable of being supported by cellular phones and may be connected to a transceiver, such as a cellular telephone, via any of the cellular telephone interfaces, such as an ear-phone-speaker, to provide all the required access functions to a remote server. *Id.* at 54–55 (citing Ex. 1021 ¶¶ 39, 40). Bear also points out that the communications interface may be audio tones, or any other communication media, coupled to a smart card reader. Pet. 55 (citing Ex. 1021 ¶ 8).

Patent Owner’s criticism concerning Colnot, is equally unavailing. Petitioner provides competent evidence and compelling argument as to why a person of ordinary skill in the art would have relied on Colnot for the proposed combination. *See* Pet. 46–48.

We find that Petitioner has shown persuasively by a preponderance of the evidence that one of ordinary skill in the art at the time of the invention would have been motivated to combine the teachings of Bear, Landman, and Colnot in the manner proffered by Petitioner.

d. Conclusion as to Claim 1

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bear, Landman, and Colnot.

e. Independent Claim 5⁷

With respect to sections 5[P]–5[C] and 5[E] of claim 5, Petitioner and Patent Owner rely on the same evidence and arguments as they relied on for claim 1. *See* Pet. 62–66; PO Resp. 32–50. However, with respect to 5[D], “providing said encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device for further processing by circuitry contained in said mobile communication device,” Petitioner and Patent Owner provide separate arguments. *See* Pet. 64–65; PO Resp. 42–44. We address section 5[D] as follows.

Petitioner asserts that “Bear, in view of Landman and Colnot, discloses providing the encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device and transmitting the signal to a transaction server for further processing.” Pet. 64–65. Petitioner also asserts that Bear discloses transmission of the signal using cell phone channels (*id.* at 64 (citing Ex. 1021 ¶ 41), and that a person of ordinary skill in the art “would have recognized that in order for the mobile communication device to receive and transmit the signal to a transaction server over cellular channels, circuitry in the device would have processed the signal, for example to prepare the signal data for transmission.” Pet. 64 (citing Ex. 1011, 6:4–13, Fig. 4).

Patent Owner argues that neither Bear nor Landman disclose further processing of card information in the mobile communication device. PO Resp. 42–44. Patent Owner argues that “the ‘084 patent requires that the

⁷ A complete recitation of independent claim 5, as well as the differences between independent claims 5 and 1, are discussed in Section II.C.2.e, *supra*.

information stored on the integrated circuit be ‘further processed’ by the mobile communication device before transmitting that information to a transaction server. *Id.* at 42–43 (citing Ex. 1001, claim 5, 10:48–49; Ex. 2004 ¶¶ 124–125). Patent Owner also argues that a person of ordinary skill in the art “would understand, in order to further process the information from the card, the mobile communication device needs to extract the card information from the analog signal in order to process it, requiring at least converting the analog signal to digital data representative of the information on the credit card.” PO Resp. 43. Patent Owner argues “Bear never discloses the further processing as claimed in the ‘084 patent.” *Id.* (citing Ex. 2004 ¶¶ 128–129).

Patent Owner also argues that although “Landman’s wireless communications device asserts the capability of processing information,” Landman is missing “any actual examples of embodiments of further processing.” PO Resp. 44 (citing Ex. 2004 ¶ 132).

Patent Owner’s arguments are unavailing because claim 5 does not recite further processing *of card information* by circuitry contained in the mobile communication device before transmitting the signal to a transaction server. *See* Ex. 1001, 12:36–42. Moreover, a single example in the ‘084 patent that describes “installation of a software application controller 51” on “communication device 14 (a mobile phone),” which “is used to convert between audio and digital signal and to receive and transmit and [sic] audio data to and from the hands-free interface 41,” cannot be used to limit claim 5 as Patent Owner argues. “A particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.” *SuperGuide Corp.*, 358 F.3d at 875 (citation omitted); *see also In re Van Geuns*, 988 F.2d at 1184.

We are persuaded that Petitioner’s proposed combination satisfies the requirement of claim 5 for further processing of the encrypted analog signal by circuitry contained in a mobile communication device, in particular by Landman’s teaching of a wireless communication device comprised of a communications interface and a contactless smart card interface, such as a contactless reader/writer, connected to the communications interface. *See* Pet. 64–65.

We are also persuaded that Petitioner has demonstrated that the proffered combination teaches the recited “providing said encrypted analog signal indicative of the information stored on the integrated circuit to said mobile communication device for further processing by circuitry contained in said mobile communication device” of independent claim 5.

For the reasons discussed directly above, and for the reasons discussed with respect to claim 1, we determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 5 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bear, Landman, and Colnot.

f. Dependent Claim 2

Dependent claim 2 recites: “The card reader device from claim 1, in which the smart card is selected from a group consisting of a chip card, EMV card, proximity detector or NFC card, contactless card, or any combination thereof.”

Petitioner asserts that Bear in view of Landman teaches a smart card that is a contactless chip card. Pet. 60–61 (citing Ex. 1011, 2:13–14, 6:11–13, 7:9–10, 10:15–17).

Patent Owner relies on the same arguments and evidence it provided with respect to claims 1 and 5, and does not appear to address claim 2 separately. *See* PO Resp. 32–50; PO Sur-reply 15–21.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 2 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bear, Landman, and Colnot.

g. Dependent Claim 3

Dependent claim 3 recites: “The card reader device of claim 1, wherein said device comprises a device selected from the group consisting of: an analog signal reader, a digital signal reader, a bar code reader, a magnetic stripe reader, and integrated circuit reader, a smartcard reader, an EMV reader, and optical scanner, and any combination thereof.”

Petitioner asserts that Bear in view of Landman teaches a device that is a contactless smart card/integrated circuit reader. Pet. 61 (citing Ex. 1011, 2:13–14, 6:11–13, 7:9–10, 10:15–17, 11:12–14, 15:23).

Patent Owner relies on the same arguments and evidence it provided with respect to claims 1 and 5, and does not appear to address claim 3 separately. *See* PO Resp. 32–50; PO Sur-reply 15–21.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 3 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bear, Landman, and Colnot.

h. Dependent Claim 4

Dependent claim 4 recites: “The card reader device of claim 1, wherein the mobile communication device comprises a device selected from the group consisting of: a wireless communication device a mobile phone, a cellular phone, a personal digital assistant, a pager, a computer, a smartphone, a Blackberry™, an iPhone™, an Android™ phone, an iPad™, and a tablet.”

Petitioner asserts that Bear discloses the communication device is, e.g., a wireless phone, a mobile phone, or a cellular phone. Pet. 61–62 (citing Ex. 1021 ¶ 39).

Patent Owner relies on the same arguments and evidence it provided with respect to claims 1 and 5, and does not appear to address claim 4 separately. *See* PO Resp. 32–50; PO Sur-reply 15–21.

Based upon consideration of the entire record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 4 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bear, Landman, and Colnot.

i. Dependent Claims 6–8

Dependent claims 6–8 are substantially similar to dependent claims 2–4, with the exception that dependent claims 6–8 depend from claim 5 rather than claim 1. *See* Ex. 1001, 12:7–22, 43–59. Petitioner relies on the same evidence for claims 6–8 as it relied on for claims 2–4. *See* Pet. 66–67. Patent Owner does not address claims 6–8 separately. *See* PO Resp. 32–50; PO Sur-reply 15–21.

Based upon consideration of the entire record, and for the reasons stated, *supra*, with respect to dependent claims 2–4, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, and determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claims 6–8 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bear, Landman, and Colnot.

D. Appointments Clause

Patent Owner argues that the appointment of Administrative Patent Judges (“APJs”) of the Patent Trial and Appeal Board by the Secretary of Commerce “is not constitutional under the Appointments Clause.” PO Resp. 60. Patent Owner also argues that the Federal Circuit’s “attempted cure of the Constitutional violation” in *Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320 (Fed. Cir. 2019), “is insufficient, because it does not give a constitutionally appointed principal officer the power to review APJ decisions.” PO Resp. 60. We decline to consider Patent Owner’s constitutional challenge as the Federal Circuit addressed this issue in *Arthrex*, 941 F.3d at 1325.

E. Due Process

Patent Owner argues that “subjecting a patent effectively filed before September 16, 2012 (when the relevant provisions of the AIA went into effect), as is the case here, to IPR is an impermissibly retroactive, unconstitutional taking” and “violates the Due Process Clause of the Fifth Amendment.” PO Resp. 60–61. We decline to consider Patent Owner’s constitutional challenge as the Federal Circuit addressed this issue in *Celgene Corp. v. Peter*, 931 F.3d 1342, 1362–63 (Fed. Cir. 2019).

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–8 of the '084 patent are unpatentable on the bases set forth in the following table.⁸

Claims	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–8	103	Proctor, Vrotsos, Hatsumi	1–8	
1–8	103	Bear, Landman, Colnot	1–8	
Overall Outcome			1–8	

⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Final Decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

IV. ORDER

In consideration of the foregoing, it is hereby

ORDERED that Petitioner has demonstrated by a preponderance of the evidence that claims 1–8 of U.S. Patent No. 9,269,084 B2 are unpatentable; and

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

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