

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NETFLIX, INC.
Petitioner,

v.

DIVX, LLC,
Patent Owner.

IPR2020-00511
Patent 9,184,920 B2

Before KEVIN F. TURNER, BART A. GERSTENBLITH, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

GERSTENBLITH, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision on Remand
Determining All Challenged Claims Unpatentable
Granting In Part and Dismissing In Part Petitioner's Motion to Exclude
35 U.S.C. §§ 144, 318

I. INTRODUCTION

This case is on remand from the United States Court of Appeals for the Federal Circuit to address the patentability of claims 1–3, 5, 6, 10–12, 14, and 15 (“the Challenged Claims”) of U.S. Patent No. 9,184,920 B2 (Ex. 1001, “the ’920 patent”). *Netflix, Inc. v. DivX, LLC*, No. 2022-1043, 2023 WL 3115576 (Fed. Cir. Apr. 27, 2023) (nonprecedential). For the reasons discussed herein, we determine that Petitioner has shown, by a preponderance of the evidence, that the Challenged Claims are unpatentable.

A. *Procedural Background*

Netflix, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting institution of *inter partes* review of the Challenged Claims. DivX, LLC (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review of the Challenged Claims (Paper 7 (“Inst. Dec.”)) on the following three grounds:

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
1, 10	103(a)	Chen, ² Grab-333 ³
1–3, 10–12	103(a)	Chen, Grab-333, Candelore ⁴
1, 3, 5, 6, 10, 12, 14, 15	103(a)	Chen, Grab-333, Kocher ⁵

Inst. Dec. 3, 76; *see* Pet. 10.

After institution, Patent Owner filed a Request for Rehearing of Decision Granting Institution (Paper 11) and a request for the Precedential Opinion Panel (“POP”) to review the Decision (Paper 14 (Notification of Receipt of POP Request)). POP denied the requested review (Paper 17), and we subsequently denied Patent Owner’s Rehearing Request (Paper 20). Patent Owner then filed a Patent Owner Response (Paper 19, “PO Resp.”), Petitioner filed a Reply to Patent Owner’s Response (Paper 25, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 30, “Sur-reply”).

Petitioner supports its challenge with two Declarations by Patrick D. McDaniel, Ph.D., executed February 5, 2020 (Ex. 1003, “the McDaniel Declaration”) and February 9, 2021 (Ex. 1032, the “McDaniel Reply Declaration”). Patent Owner deposed Dr. McDaniel twice and a copy

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’920 patent has an effective filing date before March 16, 2013, we apply the pre-AIA version of § 103.

² U.S. Patent Application Publication No. US 2005/0177741 A1, published August 11, 2005 (Ex. 1004, “Chen”).

³ U.S. Patent Application Publication No. US 2004/0081333 A1, published April 29, 2004 (Ex. 1005, “Grab-333”).

⁴ U.S. Patent Application Publication No. US 2005/0063541 A1, published March 24, 2005 (Ex. 1006, “Candelore”).

⁵ International Patent Application Publication No. WO 2005/008385 A2, published January 27, 2005 (Ex. 1007, “Kocher”).

of each transcript is of record. Exs. 2016, 2031. Patent Owner supports its arguments with two Declarations by Seth Nielson, Ph.D., dated May 21, 2020 (Ex. 2009, “the Nielson Declaration”) and November 25, 2020 (Ex. 2024, “the Second Nielson Declaration”), and a Declaration by Bridget A. Smith, dated December 15, 2020 (Ex. 2026, “the Smith Declaration”). Petitioner deposed Dr. Nielson and a copy of the transcript is of record. Ex. 1030.

With prior authorization, Petitioner filed an Identification of Improper New Evidence and Arguments in Sur-reply (Paper 35) and Patent Owner filed a Response to Petitioner’s Identification (Paper 38). In addition, Petitioner filed a Motion to Exclude Evidence (Paper 36), Patent Owner filed an Opposition to Petitioner’s Motion (Paper 39), and Petitioner filed a Reply in support of its Motion (Paper 41). An oral hearing was held on May 12, 2021, and a copy of the transcript is of record. Paper 45 (“Tr.”).

We issued a Final Written Decision determining that Petitioner had not proven by a preponderance of evidence that the Challenged Claims are unpatentable. Paper 46 (“Final Dec.”). In particular, our Final Written Decision focused on limitation 1[c] of claim 1.⁶ *Id.* at 22–45. Even though the Petition includes citations to and discussion of Chen *and* Grab-333, we focused on Chen’s teachings because the parties’ arguments throughout the proceeding were centered on Chen and we did not read the Petition as presenting a combination that relies on Grab-333 for the relevant language of limitation 1[c]. *Id.* In so doing, we found that (1) “Chen is silent with respect to ‘frames,’ including when frames are obtained on the receive side

⁶ We also addressed limitation 10[d], which is similar to limitation 1[c]. Final Dec. 46 (citing Pet. 44–45, 47–48).

of Figure 1” (*id.* at 38) and (2) the evidence of record pertaining to how one of ordinary skill in the art would have understood Chen at the time of the ’920 patent was “very closely balanced” (*id.* at 24). In light of the equally balanced evidence regarding Chen, we found that Petitioner did not establish by a preponderance of the evidence that the combination of Chen and Grab-333 satisfied limitation 1[c]. *Id.* at 45; *see id.* at 45–47 (reaching the same finding regarding limitation 10[d]).

Additionally, because Petitioner relies on the same evidence and argument to challenge independent claims 1 and 10 under Petitioner’s second and third grounds, we similarly determined that Petitioner had not met its burden on those grounds without reaching each of the arguments raised in Patent Owner’s Response. Final Dec. 15–16 (explaining that our analysis was focused on limitations 1[c] and 10[d]), 47–48 (discussing Petitioner’s grounds based on the combinations of Chen, Grab-333, and Candelore and Chen, Grab-333, and Kocher).

Further, we granted in part Petitioner’s Motion to Exclude, excluded Exhibits 2025 and 2028–2030, and did not consider the portions of Patent Owner’s Sur-reply (pages 7 and 18–20) that rely on these exhibits as identified in Paper 35 (Petitioner’s Identification of Improper New Evidence and Arguments in Sur-reply). Final Dec. 52–56. We also dismissed in part Petitioner’s Motion to Exclude as applied to Exhibits 2004–2006, 2008, 2010, 2011, 2014, 2015, and 2017–2023. *Id.* at 49–52.

Petitioner filed a Notice of Appeal of the Final Written Decision with the Federal Circuit. Paper 49. On April 27, 2023, the Federal Circuit issued a decision in the appeal affirming in part and vacating in part our Final Written Decision and remanding for further proceedings consistent with its

decision. *Netflix*, 2023 WL 3115576, at *6. The Federal Circuit stated the following regarding Petitioner’s appeal:

[Petitioner] advances three principal arguments on appeal. It first contends that the Board erred by construing limitation 1[c] of the ’920 patent to require obtaining whole frames of video content before any decryption begins. Second, [Petitioner] argues that the Board improperly narrowed Chen’s disclosure to an embodiment set forth in another prior art reference, and, finally, it asserts that the Board disregarded “the contribution of [Grab-333] to the Chen/[Grab-333] combination, even though [Grab-333] disclosed the transmission and receipt of whole frames (portions of which were encrypted) that the Board found lacking in Chen.”

Id. at *3 (alterations in original).

On the first issue, the Federal Circuit found that because Petitioner’s submissions to the Board did not sufficiently raise or develop the claim construction arguments it now advances—that limitation 1[c] does not mandate an ordered sequence of steps for when decryption of transmitted content must occur or require obtaining whole frames—it forfeited its right to raise those contentions on appeal.

Id. at *4.

On the second issue, the Federal Circuit “affirm[ed] the Board’s determination that [Petitioner] failed to establish that ‘one of ordinary skill in the art would have understood Chen to obtain encrypted frames as recited in the Challenged Claims.’” *Id.* at *5.

On the third issue, the Federal Circuit found that we “erred in not adequately assessing [Petitioner’s] arguments regarding limitation 1[c] based upon a combination of Chen and Grab-333.” *Id.* In so doing, the Federal Circuit explained that Petitioner “did not invoke Grab-333 solely for its teachings on partial encryption,” but also relied on Grab-333 as teaching obtaining encrypted content that includes frames of video in the context of

limitations 1[c] and 10[d]. *Id.* & n.3. The Federal Circuit explained the following regarding the Final Written Decision and our tasks on remand:

Because the Board erred in not adequately assessing [Petitioner's] arguments regarding limitation 1[c] based upon a combination of Chen and Grab-333, we vacate its determination that [Petitioner] failed to demonstrate that the Challenged Claims are unpatentable and remand with instructions that it determine whether Chen in combination with Grab-333 teaches or suggests obtaining encrypted content at the frame level, the disclosure it found lacking in Chen alone. In this regard, even accepting that "Chen's and Grab-333's scrambling and encryption operations are not operating on the same data structures because Chen applies to transport stream packets whereas Grab-333 applies to frames," . . . , we reject [Patent Owner's] argument that a skilled artisan would therefore necessarily lack a motivation to combine teachings from the two references. We leave it to the Board on remand, however, to determine whether a skilled artisan would have been motivated to combine the relevant teachings of Chen and Grab-333 with a reasonable expectation of success. *See Regents of Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018) ("Whether a person of ordinary skill in the art would have been motivated to modify or combine teachings in the prior art, and whether he would have had a reasonable expectation of success, are questions of fact." (citation and internal quotation marks omitted)).

Id. (footnote omitted). The Federal Circuit also recognized that the Final Written Decision did not address all of the parties' arguments directed to other claim limitations and instructed that, "[i]f, on remand, the Board concludes that [Petitioner] has established by a preponderance of the evidence that the prior art teaches or suggests limitations 1[c] and 10[d], it can then proceed to address whether [Petitioner] has met its burden with respect to other claim limitations." *Id.* at *6. And, the Federal Circuit stated

that it “considered the parties’ remaining arguments but [did] not find them persuasive.”⁷ *Id.*

After the Federal Circuit issued its mandate, we conducted a conference call with the parties (Ex. 1035) and issued an Order authorizing each party to file initial and responsive briefs (Paper 54). The parties then filed the following briefs: Petitioner Netflix, Inc.’s Brief on Remand (Paper 55, “Pet. Remand Br.”), Patent Owner’s Brief on Remand (Paper 56), Petitioner Netflix, Inc.’s Response to Patent Owner’s Brief on Remand (Paper 57), and Patent Owner’s Response Brief on Remand (Paper 58, “PO Remand Resp. Br.”).⁸

B. Related Matters

Petitioner and Patent Owner identify the following related matter: *DivX, LLC v. Netflix, Inc.*, No. 2:19-cv-01602 (C.D. Cal.). Pet. 81; Paper 4 (Patent Owner’s Mandatory Notices), 1.

C. The ’920 Patent

The ’920 patent is directed to “digital rights management schemes and more specifically to playback certification schemes where various playback activities are enabled in a coordinated fashion by different entities within the system.” Ex. 1001, 1:19–23. The ’920 patent illustrates “a federated system

⁷ Neither party appealed our ruling on Petitioner’s Motion to Exclude and the Federal Circuit’s decision does not address or impact the Motion or our ruling on the Motion. On remand, we see no reason to disturb our previous findings and decision reached thereon. Accordingly, we adopt pages 49–56 of the Final Written Decision (Paper 46) as though they were set forth herein, thus maintaining our exclusion of Exhibits 2025 and 2028–2030 and decision not to consider Patent Owner’s arguments based on these exhibits, as raised on pages 7 and 18–20 of the Sur-reply.

⁸ We have reviewed the parties’ briefs following remand and have considered the arguments raised therein.

for establishing playback parameters for digital content that includes trusted systems.” *Id.* at 5:51–53. “Playback parameters define the actions that a playback device is able to perform with respect to a particular piece of digital content. Playback parameters can govern the playing, copying and/or distribution of the content.” *Id.* at 5:53–57. The ’920 patent explains that “[t]he system is referred to as federated, because no single system possesses all of the information required to set the playback parameters for a piece of content.” *Id.* at 5:57–59.

The ’920 patent describes a “registration system that registers playback devices.” Ex. 1001, 6:14–15. The registration process includes establishing “one or more ‘user encryption keys’ that are known only to the playback device and the registration entity. The ‘user encryption keys’ can be unique to a device or user or the same encryption keys can be placed in a limited set of devices.” *Id.* at 6:15–20. Once registered, a playback device can request content from a content provider who can encrypt the content using one or more encryption keys that are only known to the content provider. *Id.* at 6:20–24. “The content provider then provides the encryption keys used to encrypt the content to a trusted system provided by the registration entity. The trusted system then encrypts copies of the content provider’s encryption keys using one or more of a user’s ‘user encryption keys.’” *Id.* at 6:24–28. Additionally, the trusted system can encrypt additional information using one or more “base keys that can be known by all playback devices, a predetermined class of playback devices or specified groups of playback devices.” *Id.* at 6:28–33.

The '920 patent also describes a process “for encrypting content and generating a playback certification.” Ex. 1001, 11:44–46. Figure 6 of the '920 patent is reproduced below:

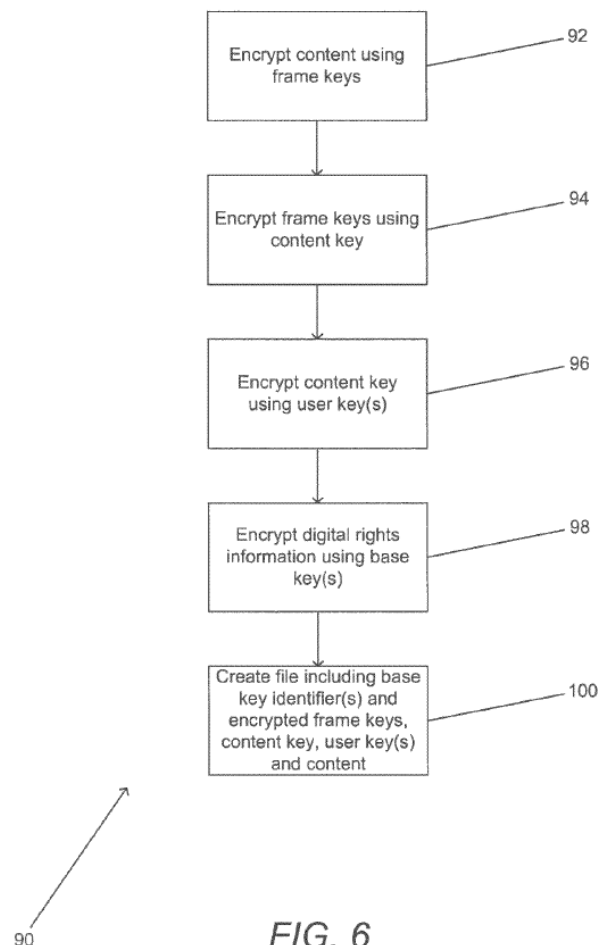


FIG. 6

Figure 6 “is a flow diagram showing a process for encrypting content in accordance with an embodiment” of the '920 patent. *Id.* at 5:32–33. The '920 patent describes the process as follows:

The process 90 includes encrypting (92) the content using “frame encryption keys”. The “frame encryption keys” are then encrypted (94) using the “content encryption keys”. The “content encryption key” is then encrypted (96) using the one or more “user encryption key(s)”, which enables for “user encryption key” revocation or retirement . . . and then digital rights specified with respect to the content by the content provider are then encrypted (98) using one or more “base

encryption keys” appropriate to the class of device for which the playback certification is being issued. Again, the use of multiple “base encryption keys” allows for “base encryption key” revocation or retirement. . . . The resulting bundle of variously encrypted pieces of information are used to create the playback certification. The playback certification is incorporated (100) with the encrypted content to create a file for distribution to the user that requested the content.

Id. at 11:46–62.

The ’920 patent describes the use of a server to provide a trusted system with information to generate one or more playback certifications. Ex. 1001, 12:16–19. In particular,

[t]he server provides the trusted system with a message 100 that includes a content message 102, a user message 104 and instructions 106 concerning the type(s) of playback certification to generate. The trusted system receives the message 100 and replies with a message 108 that contains the playback certification(s) 109. The content message 102 contains one or more content keys issued by the content provider with respect to a specific piece of content and access control that governs the operations that can be performed by a trusted system with respect to that piece of content (e.g., whether the trusted system is allowed to generate a playback certification, the types of playback certifications that are allowed for that content and/or whether the content is bound to a user or bound to a media). The user message 104 contains the “user encryption keys” for the specific user that is requesting the content as well as access control governing what operations the user authorizes the trusted system to perform. . . . The instructions 106 concerning the playback parameters of the playback certification . . . issued specify the manner in which a user can access the content.

Id. at 12:19–40.

The ’920 patent also describes a process for accessing the content for playback after a file has been formed and provided to a playback device. In particular, process 120 includes “identifying (122) the active ‘base

encryption key’ for the particular class of device that is attempting to access the content, which can be used to access information concerning the type of playback parameters supported by the playback certification.” Ex. 1001, 13:50–57 (referring to Fig. 8). The active “user encryption key” is then used “to decrypt (124) the version of the ‘content encryption key’ that was encrypted by the active ‘user encryption key’. The ‘content encryption key’ is then used to decrypt (126) the table of ‘frame encryption keys’ used in the technical protections of the content.” *Id.* at 13:57–62. The ’920 patent explains that “[t]he table of ‘frame encryption keys’ can then be used to playback (128) the content. Any decryption of the content typically occurs as the content is being viewed.” *Id.* at 13:62–65.

D. Illustrative Claims

Claims 1 and 10 are the independent claims challenged in this proceeding. Claims 1 and 10 are illustrative of the claimed subject matter and are reproduced below, with a modified version of Petitioner’s bracketing added for reference:

1. [a] A method of decoding encrypted content using a play-back device on which an active user encryption key is stored, where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key, [b] and the at least one frame encryption key is encrypted using a content encryption key, and one or more copies of the content encryption key are each encrypted using one or more user encryption keys including the active user encryption key, the method comprising:

[c] obtaining encrypted content using a playback device, where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key;

[d] obtaining using the playback device a copy of the at least one frame encryption key that is encrypted using a content

encryption key and obtaining one or more copies of the content encryption key that are each encrypted using one or more user encryption keys including an active user encryption key stored on the playback device;

[e] decrypting one of the one or more copies of the content encryption key using the playback device and the active user encryption key; and

[f] playing back frames of the encrypted content using the playback device, where playing back frames of the encrypted content further comprises:

[g] identifying any portions of a frame that are encrypted;

[h] identifying the frame encryption key used to encrypt the identified portions of the frame;

[i] decrypting the identified frame encryption key using the decrypted content encryption key;

[j] decrypting the encrypted portions of the frame using the decrypted identified frame encryption key; and

[k] decoding the unencrypted frame of video.

10. [a] A playback device configured to playback encrypted content, where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key, [b] and the at least one frame encryption key is encrypted using a content encryption key, and one or more copies of the content encryption key are encrypted using one or more user encryption keys including the active user encryption key, the playback device comprising:

[c] memory comprising a playback application; and
a processor;

wherein the processor is configured by the playback application to:

[d] obtain encrypted content, where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key;

[e] obtain a copy of the at least one frame encryption key that is encrypted using a content encryption key and obtaining one or more copies of the content encryption key that are each encrypted using one or more user encryption keys including an active user encryption key stored on the playback device;

[f] decrypt one of the one or more copies of the content encryption key using the active user encryption key; and

[g] play back frames of the encrypted content, where playing back frames of the encrypted content further comprises:

[h] identifying any portions of a frame that are encrypted;

[i] identifying the frame encryption key used to encrypt the identified portions of the frame;

[j] decrypting the identified frame encryption key using the decrypted content encryption key;

[k] decrypting the encrypted portions of the frame using the decrypted identified frame encryption key; and

[l] decoding the unencrypted frame of video.

Ex. 1001, 16:49–17:14 (claim 1), 17:42–18:23 (claim 10).

II. ANALYSIS

A. *Legal Standards – Burden*

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never

shifts to Patent Owner. See *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

B. Legal Standards – Obviousness

The U.S. Supreme Court set forth the framework for applying the statutory language of 35 U.S.C. § 103 in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966):

Under § 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; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

The Supreme Court explained in *KSR International Co. v. Teleflex Inc.* that

[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.

550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” (alteration in original))).

“Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact.” *WBIP, LLC v.*

Kohler Co., 829 F.3d 1317, 1327 (Fed. Cir. 2016). “[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan ‘would have had a reasonable expectation of success from doing so.’” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

We analyze the asserted grounds of unpatentability in accordance with these principles to determine whether Petitioner has met its burden of establishing unpatentability of the challenged claims by a preponderance of the evidence.

C. Level of Ordinary Skill in the Art

In the Final Written Decision, we stated the following:

Petitioner, supported by the McDaniel Declaration, proposes that a person of ordinary skill in the art at the time of the invention would have had “a bachelor’s degree in electrical engineering, computer science, or a similar field with at least two years of experience in video encryption and cryptography or . . . a master’s degree in electrical engineering, computer science, or a similar field with a specialization in video encryption and cryptography.” Pet. 14 (citing Ex. 1003 ¶¶ 65–67). Patent Owner does not address, expressly, the level of ordinary skill in the art in its Response. *See generally* PO Resp. Dr. Nielson, however, applies Petitioner’s proposed level of ordinary skill in his Declaration (Ex. 2009 ¶ 34) and does not indicate that he does otherwise in his Second Declaration (*see generally* Ex. 2024).

In our Institution Decision, we found that Petitioner’s proposal was consistent with the level of ordinary skill in the art reflected by the prior art of record and we preliminarily adopted Petitioner’s unopposed position. Inst. Dec. 10 (citing *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579

F.2d 86, 91 (CCPA 1978)). As neither party challenges our preliminary finding regarding the level of ordinary skill in the art, we see no reason to disturb that finding. Accordingly, we maintain and reaffirm that one of ordinary skill in the art at the time of the invention would have had “a bachelor’s degree in electrical engineering, computer science, or a similar field with at least two years of experience in video encryption and cryptography or . . . a master’s degree in electrical engineering, computer science, or a similar field with a specialization in video encryption and cryptography.” *See* Inst. Dec. 9–10 (finding the same).

Final Dec. 11–12. Our finding as to the level of ordinary skill in the art was not disturbed on appeal and we see no reason to reach a different result on essentially the same record. Thus, we again find that one of ordinary skill in the art at the time of the invention would have had a bachelor’s degree in electrical engineering, computer science, or a similar field with at least two years of experience in video encryption and cryptography or a master’s degree in electrical engineering, computer science, or a similar field with a specialization in video encryption and cryptography. *Id.*

D. Claim Construction

In this *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2020). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art at the time of the invention. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17.

If the specification “reveal[s] a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess[,] . . . the inventor’s lexicography governs.” *Phillips*, 415 F.3d at 1316 (citing *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). Another exception to the general rule that claims are given their ordinary and customary meaning is “when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Uship Intellectual Props., LLC v. United States*, 714 F.3d 1311, 1313 (Fed. Cir. 2013) (quoting *Thorn v. Sony Computer Entm’t Am., LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)).

Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

In the Final Written Decision, we stated the following:

Petitioner does not present any specific claim terms for construction. Petitioner contends that “the challenged claims are invalid under their plain and ordinary (‘P&O’) meaning.” Pet. 15 (citing Ex. 1003 ¶ 99). In the Preliminary Response, Patent Owner raised the meaning of two claim terms—“user encryption key” and “content encryption key.” Prelim. Resp. 40–44, 46–48. In the Institution Decision, we addressed each term to the extent necessary to resolve the controversy presented, and we found, in each instance, that Petitioner’s mapping of the prior art to these limitations of the claims was sufficient on the record presented at the time. *See* Inst. Dec. 12–15 (discussing the construction of the terms), 22–28

(discussing limitation 1[a], which includes “user encryption key”), 28–31 (discussing limitation 1[b], which includes “content encryption key”). In particular, on the preliminary record, we found that “Chen’s master key Kw teaches the recited ‘user encryption key’” (*id.* at 28) and “Chen’s work key Kw teaches the recited ‘content encryption key’” (*id.* at 30).

In the Response, Patent Owner does not propose a construction for any claim term or contest our preliminary findings regarding limitations 1[a] and 1[b]. *See generally* PO Resp. Accordingly, we maintain and reaffirm our preliminary determinations regarding the meaning of the recited “user encryption key” and “content encryption key.” [Inst.] Dec. 12–15. Additionally, we need not construe other claim terms to resolve the present controversy before us.

Final Dec. 13–14 (footnote omitted). Our conclusions as to these claim constructions were not disturbed on appeal and we see no reason to reach a different result on essentially the same record. Thus, we again reach the same result (as quoted above), for the same reasons. *Id.*

1. Limitation 1[c]

Although the Final Written Decision did not address limitation 1[c] as a matter of claim construction, *see* Final Dec. 12–14, the Federal Circuit characterized one of Petitioner’s arguments on appeal as contending “limitation 1[c] does not mandate an ordered sequence of steps for when decryption of transmitted content must occur or require obtaining whole frames.” We note this here because, as the Federal Circuit found, Petitioner’s “submissions to the Board did not sufficiently raise or develop the claim construction arguments it . . . advance[d]” on appeal. *Netflix*, 2023 WL 3115576, at *4. Thus, to the extent our discussion of limitation 1[c] in the Final Written Decision evinces a claim construction determination, we

maintain that determination here as it was undisturbed on appeal.⁹ Final Dec. 22–45.

2. *Other Remaining Claim Terms*

We determine that it is not necessary to explicitly construe any other term or phrase for the purposes of this Decision, and we give all remaining claim terms their ordinary and customary meaning. *See Realtime Data*, 912 F.3d at 1375.

E. Ground 1: Obviousness over Chen and Grab-333

Petitioner asserts that the combination of Chen and Grab-333 would have rendered the subject matter of claims 1 and 10 obvious to one of ordinary skill in the art at the time of the invention. Pet. 15–48. Patent Owner opposes. PO Resp. 1–29. As discussed briefly above, this ground was the focus of our Final Written Decision and the appeal to the Federal Circuit. After setting out the scope and content of the prior art, we walk through the claims and analyze the parties’ arguments and evidence of record while taking account of the Federal Circuit’s decision and directions on remand.

1. *Scope and Content of the Prior Art*

a) Chen

Chen is directed to a “system and method for security key transmission with strong pairing to destination client.” Ex. 1004, code (54). Chen explains that “implementation of fee-based video broadcasting requires a conventional conditional access (CA) system to prevent

⁹ We need not elaborate because the Federal Circuit affirmed our findings regarding Petitioner’s showing based on Chen, but (as discussed above and further below) remanded for our consideration of the combination of Chen and Grab-333.

non-subscribers and unauthorized users from receiving signal broadcasts.”

Id. ¶ 3. “A complete CA system usually includes three main functions: a scrambling/descrambling function, an entitlement control function, and an entitlement management function.” *Id.* ¶ 4. Chen explains that

[t]he scrambling/descrambling function is designed to make the program incomprehensible to unauthorized receivers. Scrambling may be applied commonly or separately to the different elementary stream components of a program. For example, the video, audio and data stream components of a TV program may be scrambled in order to make these streams unintelligible. Scrambling may be achieved by applying various scrambling algorithms to the stream components. The scrambling algorithm usually utilizes a secret key, called a control word. Once the signal is received, the descrambling may be achieved by [a] receiver that holds the secret key or the control word, used by the scrambling algorithm prior to transmission.

Id.

Chen refers to the “rights and associated keys needed to descramble a program” as “entitlements.” Ex. 1004 ¶ 5. The entitlement control function provides the conditions required to access a scrambled program as “conditional access messages, called entitlement control messages (ECMs).”

Id. “The ECMs carry an encrypted form of the control words, or a means to recover the control words, together with access parameters, such as identification of service and of the conditions required for accessing this service.” *Id.*

Chen explains that “[t]here are several kinds of entitlements matching the different means to ‘buy’ a video program. These entitlements are also broadcasted as condition access messages, called entitlement management messages (EMMs).” Ex. 1004 ¶ 6. “EMMs are used to convey entitlements or keys to users, or to invalidate or delete entitlements or keys. The

entitlement control functions and the entitlement management functions require the use of secret keys and cryptographic algorithms.” *Id.*

Chen’s Figure 1 is reproduced below:

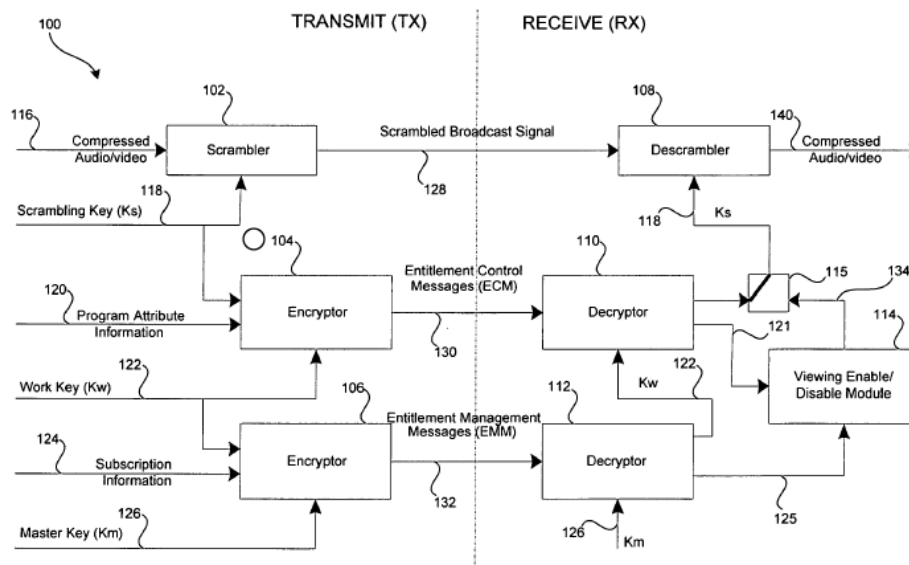


FIG. 1 (PRIOR ART)

Figure 1 is “a block diagram illustrating [a] conditional access system utilizing a conventional key ladder system.” Ex. 1004 ¶ 26. Figure 1 shows conditional access system 100, including scrambler 102, descrambler 108, encryptors 104 and 106, decryptors 110 and 112, switch 115, and viewing enable/disable circuit 114. *Id.* ¶ 10. Chen explains the following regarding the transmit (TX) side of Figure 1:

[T]he compressed audio/video signal 116 may be scrambled by the scrambler 102, utilizing a scrambling key Ks 118, in order to obtain a scrambled broadcast signal 128. Program attribute information 120 may be encrypted by the encryptor 104, utilizing a work key Kw 122, to obtain the entitlement control messages 130. Program subscription information 124 may be encrypted by the encryptor 106, utilizing a master key 126, to obtain the entitlement management messages 132.

Id.

Chen states that scrambling key Ks 118 determines the scrambling pattern and must be continuously transmitted to the subscriber's receiver because it is often changed to maintain a secure system. Ex. 1004 ¶ 11. In Chen's CA system 100, encryptor 104 encrypts scrambling key 118, which is then transmitted within entitlement control messages 130. *Id.* ECM 130 also includes program attribute information 120, which can be used to determine whether a subscriber's subscription permits viewing a program. *Id.* ECM 130 is encrypted by encryptor 104 before transmission, using work key Kw 122. *Id.* Work key Kw 122 is sent to the receiver through entitlement management messages 132, with subscription information 124. *Id.*

Chen explains that “[p]rior to transmission, the EMM 132 is encrypted by a master key Km 126. A master key is unique to each receiver and its security must be commonly managed among different broadcast operators that use the same type of receiver.” Ex. 1004 ¶ 12. Chen teaches that this is accomplished by setting up “an organization for uniform key management,” which Chen describes as follows: “[T]he content scrambling key 118 is protected by the work key 122, which is in turn protected by the master key 126. This key protection ‘chain’ is, sometimes, referred to as a key ladder.” *Id.*

On the receive (RX) side of Figure 1, Chen explains that the same key ladder is utilized in order to decrypt the necessary secure keys and scrambled broadcast audio/video signals 128. The master key 126 may be utilized with the decryptor 112 in order to decrypt the EMM 132 and the work key 122. As a result, the work key 122 is obtained as one of the outputs from the decryptor 112. The decrypted work key 122 may then be utilized by the decryptor 110 to decrypt the ECM 130 and the scrambling key 118. As a result, the scrambling key 118 is

obtained as one of the outputs from the decryptor 110. The decrypted scrambling key 118 may then be utilized by the descrambler 108 to descramble the scrambled broadcast signal 128 and obtain the compressed audio/video output 140.

Access to the compressed audio/video output 140 by a user is determined in accordance with the user's subscription information 124 and the program attribute information 120. The decryptor 112 decrypts the EMM 132 to obtain decrypted Subscription information 125. The decryptor 110 decrypts the ECM 130 to obtain decrypted program attribute information 120. The viewing enable/disable module 114 receives the decrypted subscription information 125 and the decrypted program attribute information 121 and may then determine whether or not a user is entitled to receive the compressed audio/video output 140. If the user is entitled to receive the compressed audio/video output 140 (for example, the user has a valid subscription for a given programming channel), then the viewing enable/disable module 114 issues a control signal 134 activating the switch 115. Once the switch 115 is activated, this allows for the decrypted scrambling key 118 to be entered into the descrambler 108, which in turn allows for the descrambling of the compressed audio/video output 140.

Ex. 1004 ¶¶ 13–14.

b) Grab-333

Grab-333 “is directed to a method and system for generating a protected stream of compressed digital video and for decrypting the protected stream in a bounded-bandwidth fashion.” Ex. 1005 ¶ 2. Grab-333 explains that “modern video display devices are capable of displaying individual of [sic] dots of light, or ‘pixels’, of various colors. The term ‘frame’ has been employed to refer to a matrix of pixels at a given resolution.” *Id.* ¶ 3. Grab-333 states that “[e]xisting digital video compression techniques are complex processes which rely upon a variety of

techniques in transforming (i.e., ‘encoding’) a unit of uncompressed video data into an encoded form.” *Id.* ¶ 5.

Figure 1 of Grab-333 is reproduced below:

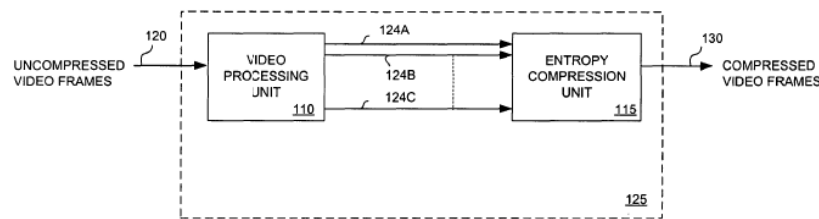


FIG. 1

Figure 1 shows a block diagram of conventional digital video encoder 125. Ex. 1005 ¶¶ 7, 21. “The digital video decoder 125 is comprised of a video processing unit 110 and an entropy compression unit 115. Digital video encoder 125 is configured to generate compressed video output by using motion estimation and motion compensation to exploit temporal redundancy in certain of the uncompressed video frames 120.” *Id.* ¶ 7.

Grab-333’s method for producing a protected stream of compressed video content includes “receiving an input stream of compressed video content containing a sequence of frames.” Ex. 1005 ¶ 16. “A set of encrypted frames are created by encrypting selected parts of selected frames of the sequence of frames in accordance with a frame encryption function.” *Id.* Frame decryption information necessary to decrypt the set of encrypted frames also is generated. *Id.* Grab-333 also describes a decrypting digital decoder “including a video decryption module configured to receive a protected input stream of compressed video content,” which stream contains “at least a set of encrypted frames and frame decryption information

necessary to create a set of decrypted frames through decryption of the set of encrypted frames.” *Id.* ¶ 19.

Grab-333’s Figure 5 is reproduced below:

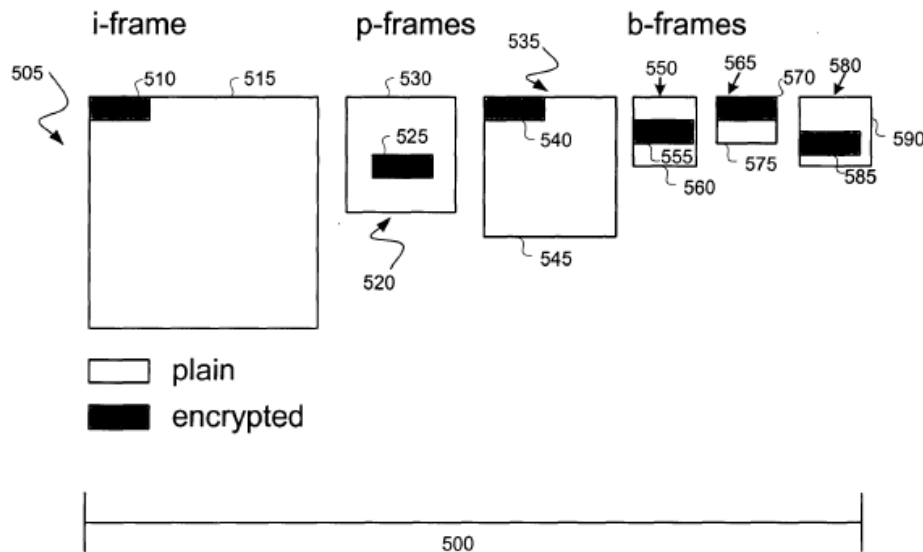


FIG. 5

Grab-333’s Figure 5 “provides an overview of header layout and middle layout encryption . . . as applied to various frames formatted consistently with the MPEG-4 standard.” Ex. 1005 ¶ 25. Specifically, Figure 5 “provides an overview of header layout and middle layout encryption as applied to three different types of frames within a video stream 500.” *Id.* ¶ 35. Grab-333 explains that video stream 500 “includes intra frames (i-frames), predictive frames (p-frames), and bi-direction predictive frames (b-frames).” *Id.* For example, Figure 5 shows that “a particular i-frame 505 contains an encrypted portion 510 and an unencrypted portion 515.” *Id.* Similarly, p-frames 520 and 535 are shown in Figure 5 containing encrypted portions 525 and 540, respectively. *Id.* ¶ 36. And, b-frames 550, 565, and 580 are shown with encrypted portions 555, 570, and 585, respectively. *Id.* ¶ 37.

2. *Differences (if any) Between the Prior Art and the Claims;
Motivation to Combine & Reasonable Expectation of Success*

Although we address motivation to combine in detail after discussing the claims, we include a brief mention here to introduce the combination presented. Petitioner asserts “Chen teaches a video distribution system with a three-level key ladder for video DRM. As was known in the art, considerable computing resources were required to encrypt and decrypt video, given its large volume of data.” Pet. 15 (citing Pet. § I.A. (Encryption)). Petitioner contends “[a] common technique for reducing computational overhead was partial encryption, where only portions of video frames were encrypted, rather than the entire video stream.” *Id.* at 16 (citing Pet. § I.A. (Encryption)). Petitioner asserts “Grab-333 provides an example of partial encryption teachings that were already known in the art, and a [person of ordinary skill in the art] would have been motivated to apply Grab-333’s partial encryption teachings to Chen.” *Id.* (citing Ex. 1003 ¶¶ 100–106). We address Patent Owner’s arguments in response to Petitioner’s contentions regarding motivation after our discussion of claims 1 and 10.

a) *Claim 1*

(1) *Limitation 1[a]*¹⁰

Limitation 1[a] recites “[a] method of decoding encrypted content using a playback device on which an active user encryption key is stored,

¹⁰ Limitations 1[a] and 1[b] are part of the lengthy preamble of claim 1. The parties do not express a position on whether the preamble is limiting. Petitioner, however, addresses each of these limitations in its analysis of the claim. *See, e.g.*, Pet. 19–30. Although we express no determination on whether the preamble is limiting, we find that Petitioner sufficiently

where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key.” Ex. 1001, 16:49–53. Petitioner contends that the combination of Chen and Grab-333 teaches a playback device (i.e., “receiver”) on which an active user encryption key (i.e., “master key K_m ”) is stored. Pet. 19–20 (citing Ex. 1003 ¶¶ 108–111; Ex. 1004 ¶¶ 3, 15, Fig. 1). Petitioner argues that Chen’s Figure 1 shows “a receiver as a playback device, including for example set-top boxes or more generally, an ‘RX’ device (meaning a receiver) or a decrypting digital video decoder, that decode[s] encrypted content.” *Id.* at 20 (citing Ex. 1003 ¶ 108; Ex. 1004, Fig. 1). Petitioner explains that Chen teaches “a conditional access system utilizing a conventional key ladder system,” which includes “a scrambling/descrambling function” utilizing a “secret key, called a control word.” *Id.* (quoting Ex. 1004 ¶ 4). Petitioner points to Chen’s teachings that “[o]nce the signal is received, the descrambling may be achieved by any receiver that holds the secret key or the control word” and “the same key ladder is utilized [on the receive side of Figure 1] in order to decrypt the necessary secure keys and scrambled broadcast audio/video signals 128.” *Id.* at 20–21 (quoting Ex. 1004 ¶¶ 4, 13).

Petitioner asserts that “[a]n active user encryption key, called a master key ‘ K_m ,’ is stored on each playback device, for example in an ‘OTP [one-time programmable] Memory.’” Pet. 21 (quoting Ex. 1003 ¶ 109). Petitioner explains that Chen’s “OTP memory 202 in the key ladder

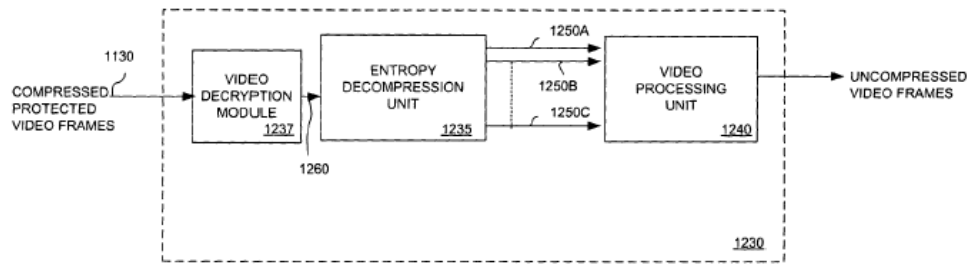
establishes that limitations 1[a] and 1[b] are met by the combination of Chen and Grab-333, for the reasons noted herein.

system 200 may be adapted to store a root key, for example a key such as the master key 126 in FIG. 1.” *Id.* (citing Ex. 1004 ¶¶ 15–16, 39–40, Fig. 2).

Petitioner contends that one of ordinary skill in the art “would have understood Chen’s master key *K_m* to be a user encryption key as claimed by the [’]920 patent because Chen’s ‘master key is unique to each receiver’ and is used to encrypt a user’s subscription information in the entitlement management message (EMM).” Pet. 22 (citing Ex. 1004 ¶¶ 11–12, Fig. 1; Ex. 1003 ¶ 110); *see id.* (citing Ex. 1001, 6:14–36, 8:54–64) (noting that the ’920 patent states that “the ‘user encryption keys’ ‘are known only to the playback device and the registration entity’ and ‘can be unique to a device or user’”). Petitioner asserts that one of ordinary skill in the art “would have recognized that Chen teaches a master key that serves the same function as disclosed for the user key of the [’]920 patent—to restrict access to content to only the subscriber user’s device—and therefore satisfies the ‘user encryption key’ limitation.” *Id.* at 22–23 (citing Ex. 1003 ¶ 110).

Additionally, Petitioner asserts “Grab-333 also teaches this element, further rendering it obvious.” Pet. 23. Petitioner asserts “Grab-333 teaches a method of decoding encrypted content using a playback device, for example, a ‘decrypting digital video decoder’ that receives protected and compressed video, decrypts each encrypted frame, and decompress[es] the decrypted video stream.”¹¹ *Id.* (citing Ex. 1003 ¶ 111; Ex. 1005 ¶¶ 19, 56, Figs. 8, 12). Petitioner also includes Figure 12 of Grab-333, reproduced below.

¹¹ As discussed further in the context of limitation 1[c], the Federal Circuit identified this part of the Petition as one example of Petitioner’s reliance on Grab-333. *Netflix*, 2023 WL 3115576 at *5 (citing Joint Appendix (J.A.), 7026).



Id. Grab-333’s Figure 12 “shows a decrypting digital video decoder containing a video decryption module configured in accordance with” Grab-333’s disclosure. Ex. 1005 ¶¶ 32.

Turning back to Chen, Petitioner contends Chen teaches that “the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key (e.g., scrambling key Ks/control word).” Pet. 23 (citing Ex. 1003 ¶¶ 112–113). In particular, Petitioner asserts that Chen teaches “a ‘compressed audio/video signal 116’ scrambled utilizing a ‘scrambling key Ks.’” *Id.* (citing Ex. 1004 ¶¶ 10, 13, Fig. 1). Petitioner alleges Chen teaches scrambling video, audio, and data stream components of a TV program and that the scrambling algorithm utilizes a secret key, called a control word. *Id.* (citing Ex. 1004 ¶ 4, Fig. 1). Petitioner explains that, in this context, one of ordinary skill in the art “would have understood Chen’s teaching of ‘scrambling’ to refer to symmetric cryptography because it uses a ‘secret key’ to encrypt and then decrypt data,” which “is the definition of symmetric key cryptography.” *Id.* at 23–24 (citing Ex. 1003 ¶ 112). Petitioner asserts Chen teaches the use of a secret key, “which it refers to as a scrambling key or control word.”¹² *Id.*

¹² Petitioner explains that “Chen uses the terms ‘scrambling key’ and ‘control word’ interchangeably, each referring to the key that is used to encrypt content and that is included, in encrypted form, in the ECM [entitlement control message].” Pet. 24 n.2 (citing Ex. 1004 ¶¶ 4, 5, 10, 11, 13; Ex. 1003 ¶ 112 n.2).

at 24 (citing Ex. 1003 ¶ 112). Petitioner argues that one of ordinary skill in the art “would have been motivated to encrypt video data using a secret key, as Chen teaches, because protecting video content from non-subscribers was recognized as a fundamental component of video distribution and a central purpose of Chen.” *Id.* (citing Ex. 1003 ¶ 112).

Petitioner asserts that, “[a]s was widely known, a [person of ordinary skill in the art] would have understood that video data streams were comprised of a series of video frames.” Pet. 24 (citing Ex. 1003 ¶ 112; Ex. 1005 ¶¶ 3–4; Pet. § I (Background)). Thus, Petitioner contends that one of ordinary skill in the art “would have understood that Chen teaches a plurality of frames of video are encrypted using at least one scrambling key/control word.” *Id.* (citing Ex. 1003 ¶ 112).

Additionally, Petitioner asserts one of ordinary skill in the art would have understood that Chen’s scrambling key/control word teaches the recited “frame encryption key” because the “scrambling key/control word is used to encrypt video frames.” Pet. 24–25 (citing Ex. 1003 ¶ 113). In making this connection, Petitioner points to (1) Chen’s description that the video, audio, and data stream may be scrambled utilizing a secret key, referred to as a control word and (2) Chen’s teaching of a “compressed audio/video signal” encrypted using a “scrambling key Ks,” and equates those teachings to the ’920 patent’s teaching that “frame encryption keys 84 can be used to encrypt frames of a video sequence.” *Id.* at 25 (citing Ex. 1004 ¶¶ 4, 10, Fig. 1; Ex. 1001, 10:55–62, 11:37–43).

Further, Petitioner contends that, “[t]o the extent Patent Owner alleges this limitation requires encrypting *only* portions of a plurality of frames of video using at least one frame encryption key, this was widely known in the

art, for example as taught by Chen and Grab-333.” Pet. 25 (citing Ex. 1003 ¶¶ 114–115; Ex. 1004 ¶ 8; Ex. 1005 ¶ 16, Figs. 6, 8). Petitioner also points to Grab-333’s teaching that “each frame encryption key is used to encrypt a predefined number of frames.” *Id.* at 26–27 (citing Ex. 1005 ¶ 41, Figs. 5, 6, 9).

In discussing the combined teachings of Chen and Grab-333, Petitioner contends “[w]hen combined with Chen, a [person of ordinary skill in the art] would have found it obvious and been motivated to apply Grab-333’s frame encryption key teachings to Chen’s teachings regarding the scrambling key/control word because both are first-level keys used to encrypt video frames.” Pet. 27 (citing Ex. 1005, Fig. 5; Ex. 1004 ¶¶ 4, 10, 13, Fig. 1; Ex. 1003 ¶ 115). Petitioner explains that, in the context of digital rights management (DRM), “Grab-333’s frame encryption key and Chen’s scrambling key/control word are data-encrypting keys, meaning they are used to encrypt data such as video frames, as compared to key-encrypting keys, which are used to encrypt other keys for management and distribution purposes, such as for key ladders.” *Id.* at 27–28 (citing Pet. §§ I (Background), IV (Level of Ordinary Skill in the Art); Ex. 1003 ¶ 115). Thus, according to Petitioner, one of ordinary skill in the art “would have recognized Grab-333’s frame encryption key and Chen’s scrambling key/control word to be analogous, and found it obvious to apply Grab-333’s partial encryption teachings to Chen’s scrambling key.” *Id.* at 28 (citing Ex. 1003 ¶ 115).

Although Patent Owner challenged the Petition as to limitation 1[a] in its Preliminary Response (*see* Inst. Dec. 26–28 (discussing Patent Owner’s arguments at that stage)), Patent Owner does not raise any challenge in its

Patent Owner Response to Petitioner’s showing regarding limitation 1[a] (*see generally* PO Resp.). Because those arguments were not raised in the Patent Owner Response, they are deemed waived. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

We find Petitioner’s arguments persuasive as to limitation 1[a] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[a].

(2) *Limitation 1[b]*¹³

Limitation 1[b] recites “and the at least one frame encryption key is encrypted using a content encryption key, and one or more copies of the content encryption key are each encrypted using one or more user encryption keys including the active user encryption key, the method comprising.”

Ex. 1001, 16:53–57. Petitioner contends that the combination of Chen and Grab-333 teaches

at least one frame encryption key (e.g., scrambling key Ks/control word) is encrypted using a content encryption key (e.g., “work key Kw”), and one or more copies of the content encryption key are each encrypted using one or more user

¹³ As discussed above, limitation 1[b] is part of the preamble of claim 1. The parties do not express a position on whether the preamble is limiting. Petitioner, however, addresses this limitation in its analysis of the claim. *See, e.g.*, Pet. 28–30. Although we express no determination on whether the preamble is limiting, we find that Petitioner sufficiently establishes that limitation 1[b] is met by the combination of Chen and Grab-333, for the reasons discussed above.

encryption keys (e.g., “master key K_m ”) including the active user encryption key.

Pet. 28 (citing Ex. 1003 ¶¶ 116–118; Ex. 1004 ¶ 12).

Relying on Chen’s Figure 1, Petitioner contends Chen’s encryptor 104 encrypts scrambling key 118 and transmits it with ECMs 130. Pet. 29 (citing Ex. 1004 ¶ 11). Petitioner explains that Chen’s ECM 130 is encrypted by encryptor 104 before transmission, utilizing work key K_w 122. *Id.* (citing Ex. 1004 ¶ 11). Petitioner argues that Chen’s work key 122 “is sent to the receiver through the entitlement management message [EEM] 132, together with the subscription information 124,” and that EEM 132 is encrypted by master key K_m 126 prior to transmission. *Id.* (citing Ex. 1004 ¶ 12, Fig. 2; Ex. 1003 ¶ 117).

Petitioner asserts Chen’s “three-level key ladder architecture was commonly known.” Pet. 30. Petitioner contends one of ordinary skill in the art would have been motivated and found it obvious “to use Chen’s three-level key ladder because it was widely used in the art for digital video distribution and recommended as an [International Telecommunication Union (ITU)] standard.” *Id.* (citing Ex. 1003 ¶ 118). And, Petitioner contends

Chen expressly teaches this architecture . . . for which a [person of ordinary skill in the art] would have recognized several benefits, including the ability to rapidly change frame encryption keys, thereby increasing the cryptographic strength; the flexible management of keys and rights using EMM and ECM protocols; and the proven security of the platform, which had been tested through years of widespread use in the field of video distribution.

Id. (citing Ex. 1003 ¶ 118).

Although Patent Owner challenged the Petition as to limitation 1[b] in its Preliminary Response (*see* Inst. Dec. 30–31 (discussing Patent Owner’s arguments at that stage)), Patent Owner does not raise any challenge in its Patent Owner Response to Petitioner’s showing regarding limitation 1[b] (*see generally* PO Resp.). Because those arguments were not raised in the Patent Owner Response, they are deemed waived. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

We find Petitioner’s arguments persuasive as to limitation 1[b] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[b].

(3) *Limitation 1[c]*

Limitation 1[c] recites “obtaining encrypted content using a playback device, where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key.” Ex. 1001, 16:58–61. Limitation 1[c] was the primary focus of our Final Written Decision, where we understood the Petition to rely on Chen’s teachings as satisfying limitation 1[c] in the combination proposed in the Petition. *See* Final Dec. 22–45. The Federal Circuit “affirmed the Board’s determination that [Petitioner] failed to establish that ‘one of ordinary skill in the art would have understood Chen to obtain encrypted frames as recited in the Challenged Claims.’” *Netflix*, 2023 WL 3115576, at *5. Therefore, without expressly repeating our entire analysis here (which was over twenty pages), we adopt and incorporate our findings

based on Chen as reflected on pages 22–45 of our Final Written Decision as though they were repeated here.

As discussed above, however, the Federal Circuit also determined that “[c]ontrary to [Patent Owner’s] assertions . . . [Petitioner] did not invoke Grab-333 solely for its teachings on partial encryption.” *Netflix*, 2023 WL 3115576, at *5. First, the Federal Circuit pointed to the following in the Petition’s discussion of limitation 1[a]: “Grab-333 also teaches this element, further rendering it obvious. Grab-333 teaches a method of decoding encrypted content using a playback device, for example, a ‘decrypting digital video decoder’ that receives protected and compressed video, *decrypts each encrypted frame*, and decompress[es] the decrypted video stream.” Pet. 23 (emphasis added¹⁴) (partially quoted in *Netflix*, 2023 WL 3115576, at *5¹⁵).

Second, the Federal Circuit pointed to part of the Petition’s discussion of limitation 1[c], where Petitioner raises the following argument regarding Grab-333. *Netflix*, 2023 WL 3115576, at *5 (citing Pet. 32). Specifically, Petitioner contends “Grab-333 similarly teaches obtaining encrypted content using a playback device (e.g., decrypting digital video decoder), where the content includes frames of video.” Pet. 32 (citing Ex. 1003 ¶ 121); *see id.* (citing Ex. 1005 ¶¶ 19, 56, Figs. 8, 12). Petitioner asserts “Grab-333 teaches a ‘decrypting digital video decoder including a video decryption module configured to receive a protected input stream of compressed video content,’

¹⁴ The Federal Circuit also added emphasis to the same language. *Netflix*, 2023 WL 3115576, at *5.

¹⁵ The Federal Circuit’s citations to the record are to the appellate Joint Appendix. We have substituted those citations with the relevant pages of the record before us for clarity.

which ‘contains at least a set of encrypted frames.’” *Id.* (citing Ex. 1005 ¶¶ 19, 56, Figs. 8, 12). Petitioner contends Grab-333 also teaches “the encrypted content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key.” *Id.* (citing Ex. 1003 ¶ 122; Ex. 1005 ¶ 16, Figs. 5, 6, 8). Petitioner points to Figure 5 of Grab-333, contending it shows an “i-frame, p-frames and b-frames . . . with encrypted and unencrypted portions,” *id.* at 33 (citing Ex. 1005 ¶¶ 35–37, Fig. 5; Ex. 1003 ¶ 122), and that Grab-333 explains that each frame encryption key “is used to encrypt a predefined number of frames,” *id.* (citing Ex. 1005 ¶ 41, Figs. 5, 9). Petitioner asserts “[i]t would have been obvious to apply Grab-333’s frame encryption key teachings to Chen’s scrambling key Ks/control word.” *Id.* (citing Pet. § VI.A.2.1[a] (discussing limitation 1[a])).

In addition to arguing lack of motivation to combine, Patent Owner’s Response to this Ground focused on Chen’s system, including its scrambled broadcast signal 128 and specifically whether Chen’s system obtained content that includes “frames of video.” *See* PO Resp. 2–14 (“Petitioner’s modified system of Chen cannot meet these limitations¹⁶ because, to the extent any frames of video ever exist on the receiving side after they are recovered from the transport stream packets received by Chen’s descrambler 108, those frames are not encrypted or decrypted with the alleged frame encryption key.” (citing Ex. 2009 ¶ 89)).

In its Brief on Remand, Petitioner contends Patent Owner “did not dispute that Grab-333 teaches obtaining encrypted frames.” Pet. Remand Br. 1. We agree. Patent Owner’s Response focuses on Chen’s broadcast

¹⁶ Patent Owner refers to limitations 1[c], 1[g], and 1[j]. PO Resp. 14.

signal and Patent Owner's argument that Chen transmits through the use of transport stream packets. *See* PO Resp. 2–14. Even where Patent Owner “assum[es] any frames were eventually obtained in Petitioner's modified system,” Patent Owner asserts the combination does not satisfy limitations 1[c], 1[g], and 1[j] because “[n]o frames can exist on the receiving side of Petitioner's modified system of Chen until after descrambling is complete and the data in the transport stream packets is recovered.” *Id.* at 12–14 (citing Ex. 2009 ¶¶ 62, 75, 85, 88). In other words, in each instance, Patent Owner's Response does not directly respond to Petitioner's reliance on Grab-333 as teaching limitation 1[c] because Patent Owner assumes that the combination is transmitting a broadcast signal as TS packets. *See, e.g., id.* at 14 (“those frames do not exist on Chen's receiving side until after Chen's descrambler receives a broadcast signal as TS packets”). Patent Owner's Sur-reply likewise does not directly respond to Petitioner's reliance on Grab-333, in the alternative, as teaching limitation 1[c]; rather, Patent Owner's Sur-reply raises the same position as Patent Owner's Response: “No frame is obtained by the receiver in Chen/Grab-333 until *after* descrambler 108 descrambles sufficient packets to reconstitute a frame. At that point, the frame is *not* encrypted with the alleged ‘frame encryption key’; the key ladder has been *exhausted*.” Sur-reply 2. But, as noted by the Federal Circuit, Petitioner's Reply reemphasized that Petitioner also relies on Grab-333 for this teaching by asserting that “Chen and [Grab-333] *both* teach encrypting/decrypting video frames.” *Netflix*, 2023 WL 3115576, at *5 (alteration and emphasis in original) (citing Pet. Reply 22).

In the Petition’s analysis of limitation 1[c], after discussing Chen and Grab-333 individually, the Petition states, “[i]t would have been obvious to apply Grab-333’s frame encryption key teachings to Chen’s scrambling key Ks/control word.” Pet. 33 (citing Pet. § VI.A.2.1[a] (discussing limitation 1[a])). Although we initially did not read the Petition as relying on Grab-333’s teaching of obtaining of frames in the combination proposed,¹⁷ in light of the Federal Circuit’s determination that Petitioner “did not invoke Grab-333 solely for its teachings on partial encryption” (*Netflix*, 2023 WL 3115576, at *5), we now interpret Petitioner’s statement applying “Grab-333’s frame encryption key teachings to Chen’s scrambling key Ks/control word” as encompassing the subject matter of limitation 1[c], namely “obtaining encrypted content using a playback device, where the content includes frames of video and at least a portion of a plurality of frames of video are encrypted using at least one frame encryption key.”¹⁸ Grab-333 undisputedly teaches this step. *See* Ex. 1005 ¶ 19 (“The invention

¹⁷ In our Final Written Decision, we understood the Petition as relying on Grab-333 *in the combination proposed* solely for its teachings on partial encryption. *See* Pet. 16 (one of ordinary skill in the art “would have been motivated to apply Grab-333’s *partial encryption teachings* to Chen” (emphasis added)); *see id.* 16–19 (focusing on Grab-333’s teachings of partial encryption).

¹⁸ As discussed in our consideration of motivation to combine, in light of the Federal Circuit’s determination, we now also understand the Petition’s discussion of motivation to combine as encompassing these teachings of Grab-333 in the proposed combination. *See* Pet. 16 (one of ordinary skill in the art “would have been motivated to apply Grab[-333]’s teaching of encrypting selected parts of video frames and embedding a synchronized frame decryption stream into the video stream with ‘the information necessary [to] decrypt all of the encrypted frames,’ including ‘encryption . . . key pointer, offset value into the frame’” (omission in original)).

also pertains to a[] decrypting digital video decoder including a video decryption module configured to receive a protected input stream of compressed video content. The protected input stream contains at least a set of encrypted frames and frame decryption information necessary to create a set of decrypted frames through decryption of the set of encrypted frames.”); *see also* Pet. 32 (citing Ex. 1005 ¶¶ 19, 56, Figs. 8, 12).¹⁹

Accordingly, for the reasons discussed above, we find that Petitioner has shown that Grab-333 satisfies limitation 1[c]. And, to answer the first question posed by the Federal Circuit for the remand (*Netflix*, 2023 WL 3115576, at *5 (“we . . . remand with instructions that [the Board] determine whether Chen in combination with Grab-333 teaches or suggests obtaining encrypted content at the frame level, the disclosure it found lacking in Chen alone”)), we find that the combination of Chen and Grab-333 teaches or suggests limitation 1[c], for the same reasons.

¹⁹ Patent Owner contends, in its Response Brief on Remand, that one issue we must decide is “whether [Petitioner] sufficiently argued what precise aspects of Chen and of Grab-333, in combination, teach or suggest this limitation so as to provide an ***adequate articulation*** of the necessary analysis to find obviousness.” PO Remand Resp. Br. 4. In this regard, however, the Federal Circuit already found, as a factual matter, that Petitioner relies on Grab-333 as teaching limitation 1[c]. *Netflix*, 2023 WL 3115576, at *5. And, as we discuss above, the Petition’s analysis of limitation 1[c] asserts that Chen and Grab-333 each, *independently*, teach limitation 1[c]. In other words, the Petition presents each of Chen and Grab-333 as alternatives. And, the Federal Circuit explained that the alternative combination of Chen and Grab-333, in which Grab-333 is relied on for teaching the subject matter of limitation 1[c], is what we must address on remand. *Id.* Thus, the Federal Circuit has already answered this question.

(4) *Limitation 1[d]*

Limitation 1[d] recites

obtaining using the playback device a copy of the at least one frame encryption key that is encrypted using a content encryption key and obtaining one or more copies of the content encryption key that are each encrypted using one or more user encryption keys including an active user encryption key stored on the playback device.

Ex. 1001, 16:62–67. Petitioner contends that the combined teachings of Chen and Grab-333 meet limitation 1[d]. Pet. 34–35. Petitioner asserts that Chen “teaches obtaining using the playback device a copy of the at least one frame encryption key that is encrypted using a content encryption key.” *Id.* at 34 (citing Ex. 1004 ¶ 11, Fig. 1). Petitioner asserts “Chen teaches obtaining one or more copies of the content encryption key (e.g., Kw) that are each encrypted using one or more user encryption keys (e.g., Km) including an active user encryption key stored on the playback device.” *Id.* at 35 (citing Ex. 1003 ¶ 124). Petitioner points to Chen’s teaching that “[t]he work key 122 is sent to the receiver through the entitlement management messages 132” and “prior to transmission, the EMM 132 is encrypted by a master key Km 126.” *Id.* (alteration in original) (quoting Ex. 1004 ¶¶ 11–12, Fig. 1).

Petitioner asserts that Grab-333 teaches “obtaining using the playback device (e.g., ‘decrypting digital video decoder’) a copy of the at least one frame encryption key” because “Grab-333 teaches a decrypting digital video decoder that receives an ‘encrypted video stream [that] may be synchronized with frame decryption information necessary to decrypt the set of encrypted frames.’” Pet. 34–35 (alteration in original) (citing Ex. 1005 ¶¶ 18–19, 56, Figs. 8, 12). Petitioner contends that the synchronized frame decryption

stream contains the information necessary to decrypt all of the encrypted frames including the encryption key. *Id.* at 35 (citing Ex. 1005 ¶¶ 39–41, 48, Figs. 6, 8).

Patent Owner’s Response does not challenge Petitioner’s showing regarding limitation 1[d] (*see generally* PO Resp.).

We find Petitioner’s arguments persuasive as to limitation 1[d] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[d].

(5) *Limitation 1[e]*

Limitation 1[e] recites “decrypting one of the one or more copies of the content encryption key using the playback device and the active user encryption key.” Ex. 1001, 17:1–3. Petitioner contends that the combination of Chen and Grab-333 teaches “decrypting one of the one or more copies of the content encryption key (e.g., work key Kw) using the playback device (e.g., the receiver) and the active user encryption key (e.g., master key Km).” Pet. 35 (citing Ex. 1004 ¶¶ 13, 17, 40, 41, 44, Fig. 1; Ex. 1003 ¶ 125).

Patent Owner’s Response does not challenge Petitioner’s showing regarding limitation 1[e] (*see generally* PO Resp.).

We find Petitioner’s arguments persuasive as to limitation 1[e] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[e].

(6) *Limitation 1[f]*

Limitation 1[f] recites “playing back frames of the encrypted content using the playback device, where playing back frames of the encrypted content further comprises.” Ex. 1001, 17:4–6. Petitioner contends that the combined teachings of Chen and Grab-333 meet limitation 1[f]. Pet. 36. Petitioner asserts Chen teaches conditional access systems are used in receivers such as “digital set-top box systems and in other systems utilized in fee-based video broadcasting” and a “viewing enable/disable module” in the receiver “that controls viewing (playing back) and descrambling of the audio/video signal.” *Id.* (citing Ex. 1004 ¶ 14). Petitioner contends one of ordinary skill in the art would have understood that “a digital set-top box is for playing back video that a customer has paid for.” *Id.* (citing Ex. 1003 ¶ 126).

Petitioner also points to Grab-333 as teaching playing back frames of the encrypted content using the playback device. Pet. 36 (citing Ex. 1003 ¶ 126). Petitioner contends Grab-333 “teaches a receiver (e.g., ‘decrypting digital video decoder’), that receives ‘a protected stream of compressed video frames,’ decrypts each encrypted frame, and decompresses the frames to generate ‘an output stream of uncompressed video content.’” *Id.* (quoting Ex. 1005 ¶¶ 19, 56, Fig. 12).

Although Patent Owner challenged the Petition as to limitation 1[f] in its Preliminary Response (*see* Inst. Dec. 40–43 (discussing Patent Owner’s arguments at that stage)), Patent Owner does not raise any challenge in its Patent Owner Response to Petitioner’s showing regarding limitation 1[f] (*see generally* PO Resp.). Because those arguments were not raised in the Patent Owner Response, they are deemed waived. Paper 8 (Scheduling

Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

We find Petitioner’s arguments persuasive as to limitation 1[f] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[f].

(7) *Limitation 1[g]*

Limitation 1[g] recites “identifying any portions of a frame that are encrypted.” Ex. 1001, 17:7. Petitioner contends that the combination of Chen and Grab-333 teaches limitation 1[g]. Pet. 36. Petitioner asserts that, in Grab-333, “‘all encrypted frames are tagged with the necessary information to be decrypted’ and the information, including size and offset of encrypted portions, is ‘added into a synchronized frame decryption stream.’” *Id.* at 36–37 (citing Ex. 1005 ¶ 40, Fig. 6; Ex. 1003 ¶ 127). In particular, Petitioner contends Grab-333’s decryption routine described in Figure 8 “retrieves, from the frame decryption information corresponding to the frame being decrypted, the intra-frame offset information . . . and the size of the encrypted portion of the frame (step 820).” *Id.* at 37 (omission in original) (citing Ex. 1005 ¶ 48, Fig. 8).

Patent Owner challenges Petitioner’s analysis of limitation 1[g] on essentially the same basis as its challenge to Petitioner’s analysis of limitation 1[c]. *See* PO Resp. 2–14 (addressing limitations 1[c], 1[g], and 1[j] together). Specifically, Patent Owner asserts:

Ground 1 does not teach the combination of “obtaining encrypted content using a playback device, where the content includes frames of video and at least a portion of a plurality of

frames of video are encrypted using at least one frame encryption key” (1[c]); “identifying any portions of a frame that are encrypted” ([g]); and “decrypting the encrypted portions of the frame using the identified frame encryption key” ([j]).

Id. at 2. Patent Owner contends this result is because “[t]he encrypted portions, identified in 1[g], of the frame obtained in [c] cannot be decrypted in [j] until there is a frame to decrypt.” *Id.* at 2–3; *see id.* at 12–14 (reiterating the position that “[n]o frames can exist on the receiving side of Petitioner’s modified system of Chen until after descrambling is complete and the data in the transport stream packets is recovered” (citing Ex. 2009 ¶¶ 62, 75, 85, 88)).

We disagree for the same reasons discussed above in the context of limitation 1[c] and in light of the Federal Circuit’s decision. In other words, in the alternative combination in which Petitioner relies on Grab-333 for limitation 1[c], full frames are transmitted and obtained on the receive side before they are decrypted using the frame encryption key in accordance with Grab-333’s teachings. *See supra* § II.E.2.a.3 (discussing limitation 1[c]). And, Petitioner relies entirely on Grab-333 as teaching limitation 1[g]. Pet. 36–38. In this regard, Petitioner points to Grab-333’s description in paragraph 40, and asserts “‘all encrypted frames are tagged with the necessary information to be decrypted’ and the information, including size and offset of encrypted portions, is ‘added into a synchronized frame decryption stream.’” *Id.* at 36–37 (quoting Ex. 1005 ¶ 40). Petitioner further points to Figure 8 of Grab-333, which “is a flow chart detailing an exemplary implementation of a frame decryption process in accordance with” Grab-333’s disclosure. *Id.* at 37–38 (citing Ex. 1005 ¶ 48, Fig. 8); Ex. 1005 ¶ 28 (describing Figure 8). Petitioner asserts, and we agree, that the “decryption routine described in” Figure 8 “retrieves, from the frame

decryption information corresponding to the frame being decrypted, the intra-frame offset information . . . and the size of the encrypted portion of the frame (step 820).” Pet. 37 (omission in original) (quoting Ex. 1005 ¶ 48).

Accordingly, for the reasons discussed above, we find that Petitioner has shown that Chen in combination with Grab-333 teaches limitation 1[g].

(8) *Limitation 1[h]*

Limitation 1[h] recites “identifying the frame encryption key used to encrypt the identified portions of the frame.” Ex. 1001, 17:8–9. Petitioner contends the combination of Chen and Grab-333 teaches “identifying the frame encryption key (e.g., scrambling key Ks/control word) used to encrypt the identified portions of the frame.” Pet. 38–39 (citing Ex. 1003 ¶¶ 128–129). Petitioner contends that Chen teaches (1) the “ECMs carry an encrypted form of the control words . . . required for access[,],” (2) “‘encrypting the scrambling key’ within the ECM,” and (3) decrypting of the ECM and scrambling key by the decryptor (which results in obtaining the scrambling key as one of the outputs). *Id.* at 39 (citing Ex. 1004 ¶¶ 5, 11, 13). Thus, Petitioner asserts Chen teaches “identifying the encrypted Ks or control word from the ECM.” *Id.* (citing Ex. 1003 ¶ 128).

Petitioner also asserts Grab-333 teaches that “the information needed to decrypt the encrypted be [sic] can be added into a synchronized frame decryption stream” (at step 615 of Figure 6), “which ‘includes a key or key pointer identifying the decryption key to be used in connection with decryption of each encrypted frame.’” Pet. 39 (quoting Ex. 1005 ¶¶ 40–41). Petitioner contends that “[t]he decryption routine ‘obtains the applicable decryption key from the received frame decryption information (step 830)’

once the frame portion has been determined.” *Id.* (quoting Ex. 1005 ¶ 48) (citing Ex. 1005 ¶ 47, Fig. 8). Petitioner alleges that it would have been obvious to one of ordinary skill in the art “to apply Grab-333’s frame encryption key teachings to Chen’s scrambling key Ks/control word.” *Id.* (citing Pet. § VI.A.2.1[a] (discussing limitation 1[a]); Ex. 1003 ¶ 129).

Patent Owner’s Response does not challenge Petitioner’s showing regarding limitation 1[h] (*see generally* PO Resp.).

We find Petitioner’s arguments persuasive as to limitation 1[h] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[h].

(9) *Limitation 1[i]*

Limitation 1[i] recites “decrypting the identified frame encryption key using the decrypted content encryption key.” Ex. 1001, 17:10–11. Petitioner contends that the combination of Chen and Grab-333 teaches “decrypting the identified frame encryption key (e.g., scrambling key Ks/control word) using the decrypted content encryption key (e.g., ‘work key Kw’).” Pet. 39–40 (citing Ex. 1003 ¶ 130). In support, Petitioner points to Chen’s teaching that “[t]he decrypted work key 122 may then be utilized by the decryptor 110 to decrypt the ECM 130 and the scrambling key 118. As a result, the scrambling key 118 is obtained as one of the outputs from the decryptor 110.” *Id.* at 40 (quoting Ex. 1004 ¶ 13) (citing Ex. 1004 ¶¶ 5, 17, 40, 41, Fig. 1).

Although Patent Owner challenged the Petition as to limitation 1[i] in its Preliminary Response (*see* Inst. Dec. 45–46 (discussing Patent Owner’s

arguments at that stage)), Patent Owner does not raise any challenge in its Patent Owner Response to Petitioner’s showing regarding limitation 1[i] (*see generally* PO Resp.). Because those arguments were not raised in the Patent Owner Response, they are deemed waived. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

We find Petitioner’s arguments persuasive as to limitation 1[i] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[i].

(10) *Limitation 1[j]*

Limitation 1[j] recites “decrypting the encrypted portions of the frame using the decrypted identified frame encryption key.” Ex. 1001, 17:12–13. Petitioner contends that the combination of Chen and Grab-333 teaches limitation 1[j]. Pet. 40–42. In particular, Petitioner points to Chen’s teaching that “[t]he decrypted scrambling key 118 may then be utilized by the descrambler 108 to descramble the scrambled broadcast signal 128 and obtain the compressed audio/video output 140.” *Id.* at 40 (quoting Ex. 1004 ¶ 13) (citing Ex. 1004 ¶¶ 4–5, 14, Fig. 1; Ex. 1003 ¶¶ 131–132). Petitioner also points to Grab-333’s teaching that “the decrypting digital video decoder ‘create[s] a set of decrypted frames through decryption of the set of encrypted frames.’” *Id.* at 41 (alteration in original) (quoting Ex. 1005 ¶ 19) (citing Ex. 1003 ¶ 132; Ex. 1005, Fig. 12). Petitioner asserts that Grab-333’s Figure 8 describes how the video decryption unit decrypts each encrypted frame and the encrypted portion of the frame is decrypted using the

appropriate decryption key (step 840) identified in step 830. *Id.* at 41–42 (citing Ex. 1005 ¶ 48, Fig. 8).

As discussed above, Patent Owner’s position regarding limitation 1[j] is presented in the same context as Patent Owner’s argument directed to limitations 1[c] and 1[g]. *See, e.g.*, PO Resp. 2–14 (addressing all three limitations). To reiterate, Patent Owner asserts limitations 1[c], 1[g], and 1[j] are not met because “[t]he encrypted portions, identified in 1[g], of the frame obtained in [c] cannot be decrypted in [j] until there is a frame to decrypt.” *Id.* at 2–3; *see id.* at 12–14 (reiterating the position that “[n]o frames can exist on the receiving side of Petitioner’s modified system of Chen until after descrambling is complete and the data in the transport stream packets is recovered” (citing Ex. 2009 ¶¶ 62, 75, 85, 88)).

We disagree for the same reasons discussed above in the context of limitations 1[c] and 1[g] and in light of the Federal Circuit’s decision. In other words, in the alternative combination in which Petitioner relies on Grab-333 for limitation 1[c], full frames are transmitted and obtained on the receive side before they are decrypted using the frame encryption key in accordance with Grab-333’s teachings. *See supra* § II.E.2.a.3 (discussing limitation 1[c]). And, Petitioner relies, in the alternative, on Grab-333 as teaching limitation 1[j]. Pet. 40–42. Petitioner’s discussion of Grab-333 here is similar to its discussion of Grab-333 in the context of limitation 1[g]. In particular, Petitioner relies on Grab-333 as “teach[ing] the decrypting digital video decoder ‘create[s] a set of decrypted frames through decryption of the set of encrypted frames.’” *Id.* at 41 (second alteration in original) (citing Ex. 1003 ¶ 132; Ex. 1005 ¶ 19, Fig. 12). And, again, Petitioner points to Figure 8 of Grab-333, asserting that “[t]he video decryption unit

‘decrypts each encrypted frame in the manner described . . . with reference to FIG. 8.’” *Id.* (omission in original)(quoting Ex. 1005 ¶ 56) (citing Ex. 1005, Fig. 8); *see id.* at 42 (“[T]he encrypted portion of the frame is decrypted using the appropriate decryption key (step 840)’ identified in step 830.” (quoting Ex. 1005 ¶ 48) (citing Ex. 1005, Fig. 8)).

Accordingly, for the reasons discussed above, including our analysis of limitations 1[c] and 1[g], we find that Petitioner has shown that Grab-333 teaches or suggests limitation 1[j].

(11) *Limitation 1[k]*

Limitation 1[k] recites “decoding the unencrypted frame of video.” Ex. 1001, 17:14. Petitioner contends that the combination of Chen and Grab-333 teaches limitation 1[k]. Pet. 42–44. In particular, Petitioner asserts that one of ordinary skill in the art would have understood that digital set-top box systems, used with conditional access systems, were for playing back video. *Id.* at 42–43 (citing Ex. 1004 ¶ 3; Ex. 1003 ¶ 133). Petitioner points to Chen’s descrambler 108, which descrambles the scrambled broadcast signal 128 and obtains the compressed audio/video output 140. *Id.* at 43 (citing Ex. 1004 ¶ 13). Petitioner contends that one of ordinary skill in the art would have understood that “viewing or playing back the video output obviously and inherently includes decoding.” *Id.* (citing Ex. 1003 ¶ 133).

Petitioner also points to Grab-333’s teaching of decoding unencrypted frames of video. Pet. 43. In particular, Petitioner asserts that Grab-333 “teaches a decrypting digital video decoder that ‘includes a video processing unit for generating an output stream of uncompressed video content’ and an entropy decompression unit that conforms to the decoding specifications of

MPEG-4.” *Id.* (citing Ex. 1005 ¶¶ 19, 56, Fig. 12). Petitioner contends Grab-333 teaches decoding the unencrypted frame in the manner described by step 850 of Figure 8. *Id.* at 43–44 (citing Ex. 1005 ¶ 48, Fig. 8; Ex. 1003 ¶ 134).

Patent Owner’s Response does not challenge Petitioner’s showing regarding limitation 1[k] (*see generally* PO Resp.).

We find Petitioner’s arguments persuasive as to limitation 1[k] of claim 1 and supported on the complete record before us, and, therefore, we adopt them as our own findings. Accordingly, for the reasons explained by Petitioner, we find that Chen in combination with Grab-333 teaches limitation 1[k].

b) Claim 10

Independent claim 10 is directed to a playback device, *inter alia*, comprising memory comprising a playback application and a processor, wherein the processor is configured by the playback application to perform essentially the same steps recited in independent claim 1. Ex. 1001, 17:42–18:23. Petitioner equates the following limitations of claims 1 and 10 as set forth below:

Claim 10	Claim 1
10[a]	1[a]
10[b]	1[b]
10[d]	1[c]
10[e]	1[d]
10[f]	1[e]
10[g]	1[f]
10[h]	1[g]

Claim 10	Claim 1
10[i]	1[h]
10[j]	1[i]
10[k]	1[j]
10[l]	1[k]

Pet. 44–45, 47–48. And, Petitioner addresses how the combination of Chen and Grab-333 teaches or suggests limitation 10[c], which is not listed in the chart above. *Id.* at 46–47.

Patent Owner states that “[c]laim 10 includes similar limitations as claim 1 in the context of a device claim and is patentable for at least the same reasons as those given for claim 1.” PO Resp. 2 n.1. Patent Owner further states that “[t]he corresponding limitations of claim 10 follow the same lettering convention in the Petition. For example, Limitation 1[c] corresponds with Limitation 10[c], and the same arguments apply to both.” *Id.*

Although Patent Owner is not correct that limitation 10[c] corresponds to limitation 1[c] (*see* Pet. 44–48; *Netflix*, 2023 WL 3115576, at *5 n.3 (recognizing that “limitation 10[d] corresponds to limitation 1[c]”)), the point made is that Patent Owner’s arguments directed to claim 1 similarly apply to claim 10. With the exception of a single sentence directed to claim 10 in the context of Patent Owner’s arguments against motivation to combine (*see infra* note 22), Patent Owner does not raise any additional arguments directed to claim 10. *See generally* PO Resp. Accordingly, for the same reasons discussed above in the context of claim 1, we find Petitioner has shown that the combination of Chen and Grab-333 teaches or suggests the subject matter of claim 10.

*c) Motivation to Combine and
Reasonable Expectation of Success*

In addition to the discussion above in the context of the specific limitations of claims 1 and 10, Petitioner further explains why one of ordinary skill in the art would have been prompted to modify Chen in light of Grab-333.²⁰ In particular, Petitioner contends that one of ordinary skill in the art “would have been motivated to apply Grab[-333]’s teaching of encrypting selected parts of video frames and embedding a synchronized frame decryption stream into the video stream with ‘the information necessary [to] decrypt all of the encrypted frames,’ including ‘encryption . . . key pointer, [and] offset value into the frame.’” Pet. 16 (omission in original) (citing Ex. 1003 ¶ 101; Ex. 1005 ¶¶ 16, 40, Fig. 9). Petitioner asserts that these teachings in Grab-333 “reflect basic concepts of partial encryption that were known in the art; and by 2006, a [person of ordinary skill in the art] would have been knowledgeable about such teachings and been motivated to apply them for their known purpose of encrypting/decrypting video streams in an efficient manner.” *Id.* (citing Ex. 1003 ¶ 101).

Petitioner contends that partial encryption “provides several known benefits” and one of ordinary skill in the art would have been motivated to apply those teachings from Grab-333 “to reduce computational load, both for server-side encrypting and client-side decrypting, by encrypting/decrypting only portions of video frames rather than the entirety of all frames.” Pet. 17 (citing Ex. 1003 ¶ 102; Ex. 1005 ¶¶ 6, 54). Petitioner

²⁰ The Petition includes a separate discussion on “Motivation to Combine” under “Ground 1: Chen in view of Grab-333” (Pet. 15–19), which we discuss here.

explains that it was known in the art that encrypting portions of a video stream provided sufficient protection against unauthorized users and thus one of ordinary skill would have been motivated to “apply the partial encryption teachings in Grab-333 to thwart piracy while providing computational savings using techniques known by the 1990s.” *Id.* (citing Ex. 1003 ¶ 102).

Petitioner further asserts that one of ordinary skill in the art would have recognized that the teachings from Chen and Grab-333 “were complimentary DRM techniques meant to be used together.” Pet. 17 (citing Ex. 1003 ¶ 103). In particular, Petitioner explains that Chen is “directed to higher-level aspects of DRM including key hierarchies, key ladders, and the management and distribution of keys,” whereas Grab-333 is directed to “lower-level partial encryption techniques, including mechanisms for encrypting portions of video frames and then embedding related information into the video stream.” *Id.* at 17–18 (citing Ex. 1004 ¶¶ 10, 22; Ex. 1005 ¶¶ 18, 40, 42). Thus, Petitioner contends “[b]oth are directed to the same field of encryption generally, and video DRM specifically, and it was well known in the art for these teachings to be combined.” *Id.* at 18 (citing Ex. 1003 ¶ 103).

Petitioner also contends “[t]he references themselves provide additional motivation.” Pet. 18 (citing Ex. 1003 ¶ 104). Petitioner asserts “Chen teaches that the CA system requires ‘protection against signal piracy, efficient scrambling, flexibility, variety of supported formats, and ease of implementation’ and well as teaching ‘the ability to selectively scramble bit streams in a program, if it is desired.’” *Id.* (quoting Ex. 1004 ¶¶ 7–8). And Petitioner contends both references “teach the frame encryption key (e.g.,

‘control word,’ or ‘scrambling key’) should update or change periodically.” *Id.* (citing Ex. 1004 ¶ 4; Ex. 1005 ¶ 44); *see also id.* (contending “Chen teaches the key ‘be changed frequently in order to avoid any exhaustive searches by an unauthorized user,’ and the new key must be ‘continuously transmitted to the subscriber[]’ by using the key ladder in the CA system” (alteration in original) (citing Ex. 1004 ¶¶ 4, 11)).

Additionally, Petitioner asserts one of ordinary skill in the art would have had a reasonable expectation of success in combining the teachings from Grab-333 with Chen “given the similarities in the teachings and systems, and given that key ladders, partial encryption, and related DRM techniques were well-known” to one of ordinary skill in the art. Pet. 18 (citing Pet. § IV (discussing the level of ordinary skill in the art); Ex. 1003 ¶ 105). Petitioner contends “[e]ach of the respective teachings is being used for its known purpose, in the conventional manner in which it was known in the art,” and that their combination “would have been well within the level of ordinary skill in the art” given the ordinary level of knowledge of key hierarchies, partial encryption, and DRM. *Id.* at 19 (citing Ex. 1003 ¶ 105; Pet. § IV (level of ordinary skill in the art)).

Thus, Petitioner argues

the challenged claims are simply an obvious combination of prior art elements (e.g., key ladders, partial encryption, and related DRM techniques) according to known and compatible methods (e.g., using key hierarchies to manage and distribute keys, and using partial encryption to encrypt parts of video frames) to yield predictable results (e.g., partially encrypted video distributed using a key hierarchy).

Pet. 19 (citing Ex. 1003 ¶ 106; *KSR*, 550 U.S. at 401).

Patent Owner challenges Petitioner’s motivation to combine Chen and Grab-333 as proposed. PO Resp. 15–29. Patent Owner, however, does not

challenge Petitioner’s showing as to whether one of ordinary skill in the art would have had a reasonable expectation of success in achieving the proposed combination. *See generally* PO Resp. (not mentioning this issue); *see also* Sur-reply (same). Therefore, this issue is waived. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”). For the reasons explained by Petitioner, which we adopt, we find that one of ordinary skill in the art would have had a reasonable expectation of success in achieving the proposed combination. *See* Pet. 18–19. As to motivation to combine, Patent Owner raises three primary arguments.²¹ PO Resp. 15–29. We address each.

First, Patent Owner contends that Petitioner has not shown Grab-333’s teachings of savings in peak processing power have any relevance in the context of Chen’s scrambling because one of ordinary skill in the art “would have understood Chen’s scrambling to have been performed in hardware, by a dedicated circuit, with no processor needed or used to perform the decryption.” PO Resp. 17 (citing Ex. 2024 ¶¶ 13–17; Ex. 1004 ¶ 7). In other words, Patent Owner asserts, “[a]lthough Grab-333’s partial-frame encryption and decryption may reduce the computational load on a general-purpose processor that otherwise would have performed full-frame encryption and decryption, there is no corresponding reduction in

²¹ None of these arguments repeats the position rejected on appeal. *See Netflix*, 2023 WL 3115576, at *5 (“even accepting that ‘Chen and Grab-333’s scrambling and encryption operations are not operating on the same data structures because Chen applies to transport stream packets whereas Grab-333 applies to frames,’ . . . we reject [Patent Owner’s] argument that a skilled artisan would therefore necessarily lack a motivation to combine teachings from the two references”).

computational load for performing de/scrambling in Chen because the microprocessor is not otherwise performing descrambling.” *Id.* at 19 (citing Ex. 2024 ¶¶ 27–29). According to Patent Owner, “[a]dding Grab-333 does not reduce peak processing power requirements; instead, it *adds* processing requirements by imposing a new need for processing in a general-purpose processor.” *Id.* (citing Ex. 2024 ¶¶ 30–32); *see also id.* at 20 (“the idea that one would want to reduce processing power associated with scrambling is misplaced, if not nonsensical, because hardware-implemented scrambling obviated any need to expend processor resources on it (and, indeed, was universally accepted)” (citing Ex. 2024 ¶¶ 31–32)).²²

In Reply, Petitioner contends “[t]he prior art provides express motivation to combine CA systems with partial encryption, and demonstrates a reasonable expectation of success because actual [persons of ordinary skill in the art] made the combination while accounting for packetization or using proprietary encryption/decryption systems.” Pet. Reply 23 (citing Pet. Reply §§ I.C (asserting frames exist in the transport stream) I.D (contending those of ordinary skill in the art combined CA systems with partial frame encryption); Ex. 1032 ¶¶ 43–46). In that regard, Petitioner points to Candelore-010 (Ex. 1020)²³ as an example of prior art

²² Although Patent Owner argues claims 1 and 10 together, Patent Owner also contends that “the foregoing reasoning provides a separate rationale for the patentability of claim 10, which expressly requires the frame decryption to be performed by a processor.” PO Resp. 20. Patent Owner does not elaborate on this “separate rationale for patentability,” instead containing its statement to a single sentence. *See id.* Our discussion of the parties’ positions regarding motivation to combine is applicable to claims 1 and 10.

²³ For clarity, we note that Petitioner relies, in various ways, on four references identifying Brant Candelore as inventor: (1) Candelore

that encrypts portions of video frames in CA set-top boxes. *Id.* at 16–20; *see also id.* at 20–21 (contending Kocher also teaches CA systems scrambling video frames).

Patent Owner contests Petitioner’s reliance on Candelore-010 and Kocher. Sur-reply 18–20. However, nearly the entire argument by Patent Owner in that section of its Sur-reply relies on exhibits that we excluded in the Final Written Decision, and we therefore did not “consider[] the portions of Patent Owner’s Sur-reply on pages 7 and 18–20 that rely upon these exhibits.” Final Dec. 55–56. As noted above, our decision on Petitioner’s Motion to Exclude was not affected by the appeal to the Federal Circuit and we maintain the decision to exclude Exhibits 2025 and 2028–2030 pursuant to 37 C.F.R. § 42.23(b).

We find that Petitioner has established that one of ordinary skill in the art would have been motivated to combine the teachings of Chen and Grab-333 for several reasons. To begin, we agree with Petitioner that “[a] common technique for reducing computational overhead was partial encryption, where only portions of video frames were encrypted, rather than the entire video stream.” Pet. 16 (citing Pet. § 1.A (Background)); *see id.* at 17 (citing Ex. 1005 ¶¶ 6, 54; Ex. 1003 ¶ 102). Grab-333 compares the processing power required for decryption of a digital video stream encrypted in accordance with Grab-333’s teachings as compared to “the power required for decryption of a conventionally-encrypted video stream” in its Figure 10. Ex. 1005 ¶ 54. And, Grab-333 expressly states “[i]t is apparent from inspection of [Figure] 10 that the bounded encryption approach of the

(Ex. 1006); (2) Candelore-666 (Ex. 1018); (3) Candelore-853 (Ex. 1019); and (4) Candelore-010 (Ex. 1020).

invention requires substantially less peak processing power (see, e.g., frames 8, 15, 20) during the decryption process than would otherwise be required using standard encryption techniques.” *Id.* We find that this express statement in Grab-333 would have prompted one of ordinary skill in the art to consider applying Grab-333’s teachings in this regard to other systems pertaining to conventionally-encrypted video streams, including Chen.

Additionally, we credit Petitioner’s argument and Dr. McDaniel’s testimony that one of ordinary skill in the art “would have recognized that the respective teachings from Chen and Grab-333 were complimentary DRM techniques meant to be used together.” Pet. 17 (citing Ex. 1003 ¶ 102). Specifically, “Chen was directed to higher-level aspects of DRM including key hierarchies, key ladders, and the management and distribution of keys” (*id.* (citing Ex. 1004 ¶¶ 10, 22)), whereas “Grab-333 was directed at lower-level partial encryption techniques, including mechanisms for encrypting portions of video frames and then embedding related information into the video stream” (*id.* at 17–18 (citing Ex. 1005 ¶¶ 40, 42, 18)). And, we do not agree with Patent Owner that Chen’s mention of a “circuit” means that Chen necessarily is limited to a dedicated hardware circuit. *See* PO Resp. 17 (citing Ex. 2024 ¶¶ 13–17; Ex. 1004 ¶ 7). Nor do we agree with Patent Owner’s premise that one of ordinary skill in the art would not have been prompted by Grab-333’s teachings (regarding savings in processing power) to consider applying them in the context described by Chen. *See id.*

Further, even if we were to accept that the combination might not reduce computational load in Chen for the reasons asserted by Patent Owner (namely the use of a circuit as opposed to a processor), Patent Owner’s

argument does not negate Petitioner’s evidence that one of ordinary skill in the art would have been motivated to combine the teachings of Chen and Grab-333 to thwart piracy while also providing sufficient copy protection for commercial video applications. *See* Pet. 17 (one of ordinary skill in the art “would have been motivated to combine the references apply [sic] the partial encryption teachings in Grab-333 to thwart piracy”) (citing Ex. 1003 ¶ 102); *see id.* (citing Ex. 1008,²⁴ 22:29–44, 23:17–24; Ex. 1005 ¶¶ 16, 33–34).

Petitioner’s stated rationale of thwarting piracy provides a sufficient motivation, in and of itself, for one of ordinary skill in the art to have sought to combine teachings from Grab-333 and Chen. No other motivation is needed. Nonetheless, we also find, for the reasons explained by Petitioner, that at least Candelore-010 supports Petitioner’s position that it was known in the art that these teachings (i.e., CA systems using key ladders and partial frame encryption) could be combined. *See id.* at 18 (citing Ex. 1003 ¶ 103); Pet. Reply 15–20 (discussing Candelore-010).

Second, Patent Owner contends that Petitioner does not argue that Chen’s scrambling provided inadequate copy protection for commercial video applications or that partial frame encryption is superior to scrambling in thwarting piracy. PO Resp. 21. Patent Owner asserts that, even if Grab-333 offered stronger security than Chen’s scrambling, “the tradeoff in improved security would have been unacceptable because Petitioner provides no way to overcome the resulting problems associated with degraded signal quality.” *Id.* at 22 (citing Ex. 2024 ¶ 34); *see id.* at 22–26 (asserting that “Petitioner’s combination . . . would *invite* the *new* problem of degraded signal quality for paying customers, by employing a system that

²⁴ U.S. Patent No. 6,957,350 B1, issued Oct. 18, 2005.

is susceptible to loss of a packet containing encrypted data” if these teachings of Grab-333 were combined with Chen as proposed).

In its Reply, Petitioner contends (1) one of ordinary skill in the art knew how to transmit packets without loss (Pet. Reply 24 (citing PO Resp. 24–25; Ex. 1032 ¶ 57)); *id.* (one of ordinary skill in the art “knew how to use protocols, e.g., TCP/IP, to detect and correct packet loss, including for video streaming”)); (2) the claims do not recite any thresholds by which to measure signal loss or quality and, thus, even if less effective, that does not defeat the motivation to combine (*id.* at 25); (3) others used partial encryption with CA systems, as discussed above (*id.* at 25); and (4) Patent Owner’s “signal-loss argument assumes a specific cryptographic mode (CBC)” although “Chen and Grab-333 are not limited to any one mode” (*id.* at 26–27).

In its Sur-reply, Patent Owner contends Petitioner’s Reply “has no response to the acknowledged signal quality problems that its combination provokes in a broadcast system” and that “the Reply concedes that the common-sense answer is to ‘us[e] TS packets,’ which are ‘not affected by packet loss.’” Sur-reply 17 (alteration in original) (citing Pet. Reply 24).

We do not agree with Patent Owner that potential signal quality issues would have negated Petitioner’s stated motivation to combine. In particular, Patent Owner’s argument points to potential disadvantages of the proposed combination while Petitioner touts the potential advantages. *See Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”). Although we weigh the evidence in full below,

we find that, on balance, the potential benefits of the combination identified by Petitioner (as set forth above) outweigh the potential disadvantage of signal quality noted by Patent Owner. In particular, we agree with Petitioner, for the reasons provided by Petitioner, that one of ordinary skill in the art had the ability and knowledge to detect and correct packet loss, and that the claims do not recite any particular required level of signal quality such that the combination would somehow be removed from the scope of the claims if the signal quality were lessened.

Third, Patent Owner contends the combination would not provide a system capable of broadcasting or streaming audio and video. PO Resp. 26–29. Patent Owner contends that the “Petition does not even attempt to allege Grab-333’s teachings could apply to audio” and that, “[s]o far as the Petition suggests, Petitioner is proposing to keep Chen’s existing framework for audio . . . although Petitioner does not address audio with any specificity other than to quote Chen.” *Id.* at 28. Patent Owner asserts the combination “could not work.” *Id.* at 28–29; *see id.* at 29 (“Petitioner needed to provide evidence that a [person of ordinary skill in the art] would have been able to reconstruct the broadcasts at the receiver and did not do so. For this additional reason, every challenged claim should be confirmed as patentable.” (citing Ex. 2024 ¶ 50)).

In its Reply, Petitioner asserts that Patent Owner “faults the Petition for not explaining how audio is encrypted, but the challenged claims do not recite any audio limitations.” Pet. Reply 23. Petitioner contends the ’920 patent specification similarly “does not explain how audio is encrypted, instead relying on the [person of ordinary skill in the art’s] background knowledge.” *Id.* (citing Ex. 1032 ¶¶ 51–52). And Petitioner asserts “[i]t

was common for video patents to focus on video because the handling of audio was well known in the art.” *Id.* at 24 (citing Ex. 1007, 108:5–7; Ex. 1018 ¶¶ 90; Ex. 1032 ¶¶ 53–54).

In its Sur-reply, Patent Owner contends that its arguments in the Patent Owner Response “establish[ed] that problems of synching audio and video in Chen’s ‘compressed audio/video signal 116’ would’ve deterred a [person of ordinary skill in the art] from pursuing the proposed combination” and that Chen would have been rendered “inoperable for its intended purpose.” Sur-reply 16–17. Patent Owner asserts that Dr. McDaniel could only identify synching audio to video using a TS and that Petitioner fails “to identify any known method to synch audio with video encrypted/decrypted *at the frame level* in a broadcast system.” *Id.* at 17 (citing PO Resp. 26–29).

We do not agree with Patent Owner that Petitioner’s combination would render Chen inoperable for its intended purpose or that the Petition was required to explain how to accommodate audio transmission in the combination. The claims are directed to a method (claim 1) or playback device (claim 10) where the content includes frames of video. The claims do not recite limitations regarding audio. Additionally, Patent Owner’s argument reads as coming from a similar place as a bodily incorporation argument, even though bodily incorporation is not the standard we apply. Further, we agree with Petitioner, for the reasons provided by Petitioner (*see* Pet. Reply 23–24) that one of ordinary skill in the art understood how to transmit audio along with video and that Petitioner was not required to provide those details in the Petition, especially where, as here, Petitioner has shown it is common that references directed to video transmission often omit details regarding audio transmission. *Id.*

Accordingly, for the reasons discussed above, we find Petitioner has established that one of ordinary skill in the art would have been motivated to combine the teachings of Chen and Grab-333 as proposed and would have had a reasonable expectation of success in so doing.

3. *Objective Indicia of Nonobviousness*

Neither party presents evidence of objective indicia of nonobviousness.

4. *Weighing the Graham Factors*

“Once all relevant facts are found, the ultimate legal determination [of obviousness or nonobviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.” *Arctic Cat*, 876 F.3d at 1361. On balance, considering the complete record before us, Petitioner has established, by a preponderance of the evidence, that claims 1 and 10 of the ’920 patent would have been obvious to one of ordinary skill in the art at the time of the invention.

F. *Ground 2: Obviousness over Chen, Grab-333, and Candelore*

Petitioner contends that the combined teachings of Chen, Grab-333, and Candelore would have rendered the subject matter of claims 1–3 and 10–12 obvious to one of ordinary skill in the art at the time of the invention. Pet. 48–61. Petitioner starts with its proposition from Ground 1—that one of ordinary skill in the art would have been “motivated to apply Grab-333’s partial encryption teachings to Chen’s three-level hierarchy of keys”—and additionally contends one of ordinary skill in the art “would have also been motivated to apply Candelore’s teachings regarding video streaming and entitlement messages to provide additional implementation details, for

example regarding the ECM and EMM that are used by both Chen and Candelore.” *Id.* at 48 (citing Ex. 1004 ¶¶ 5–6; Ex. 1006 ¶ 34; Ex. 1003 ¶ 150). Petitioner asserts “both Chen and Candelore use EMMs to provide entitlements and keys,” “Candelore provides additional details on how EMMs can be used to convey keys,” and one of ordinary skill in the art “would have been motivated to apply those compatible and advantageous teachings to Chen.” *Id.* at 48–49 (citing Ex. 1004 ¶ 6; Ex. 1006 ¶ 38; Ex. 1003 ¶ 150); *see also id.* at 49–53 (further discussing Petitioner’s argument of motivation to combine and asserting that one of ordinary skill in the art would have had a reasonable expectation of success in achieving the combination proposed).

1. Scope and Content of the Prior Art

a) Chen and Grab-333

Chen and Grab-333 are discussed above. *See supra* §§ II.E.1.a–b.

b) Candelore

Candelore is directed to a system, apparatus, and method for digital rights management using one-time programmable keys. Ex. 1006 ¶ 3. Candelore states that “[v]arious embodiments . . . relate to . . . controlling entitlements concerning digital content received from a content provider.” *Id.* ¶ 21. Candelore provides the following nonlimiting examples of “content provider”: “a terrestrial broadcaster, cable operator, direct broadcast satellite (DBS) company, a company providing content for download via the Internet, or other source of content.” *Id.*

Figures 2A and 2B are reproduced below:²⁵

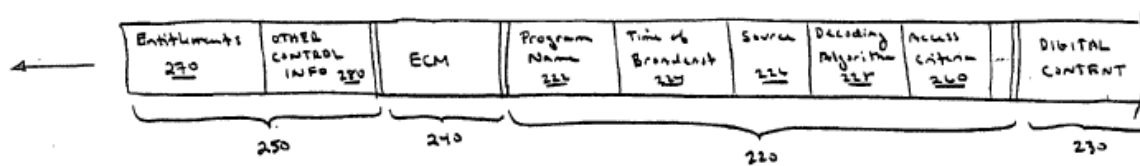
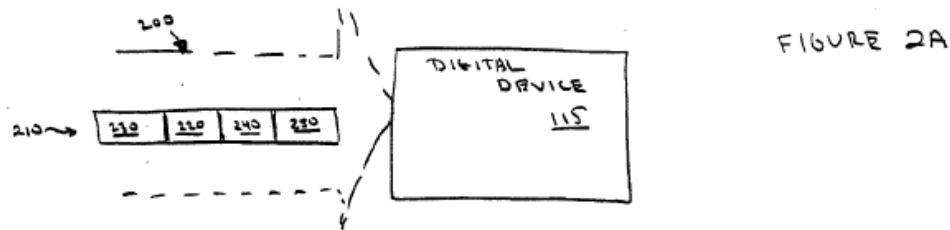


FIGURE 2B

Candelore’s Figures 2A and 2B are exemplary of the “data structure associated with incoming information received by a digital device of the subscriber terminal device.” Ex. 1006 ¶ 11; *see id.* ¶ 35 (“After being obtained, an exemplary order of data propagation as shown in Fig. 2B, system information 220 is processed.”).

Candelore explains that “[t]he digital content 230 may be in a scrambled or clear format. In addition . . . it is contemplated that program data 210 may further comprise[] an Entitlement Control Message (ECM) 240 and/or an Entitlement Management Message (EMM) 250.” Ex. 1006 ¶ 34 (referring to Figs. 2A, 2B). “[A]ccess criteria 260 may be transmitted along with or as part of an ECM 240, which is generally used to regulate access to a particular channel or service. ECM 240 may comprise a

²⁵ The figure quality is reproduced as best as possible based on the image provided.

key (e.g. control word) to descramble incoming scrambled digital content.”

Id. ¶ 37.

Candelore explains that “EMM 250 may be used to deliver access rights (sometimes referred to as ‘entitlements’) 270 to digital device 115.” Ex. 1006 ¶ 38. Examples of entitlements include “keys, digital certificates, access parameters directed to replay, [and] retransmission and/or recordation features of the subscriber terminal device 110.” *Id.* “Control information 280 of EMM 250 may further comprise one or more key identifiers, which are multi-bit entitlement tag values that are signed for use in checking whether any key of EMM 250 has been illicitly altered.” *Id.* ¶ 39.

2. *Differences (if any) Between the Prior Art and the Claims;
Motivation to Combine & Reasonable Expectation of Success*

a) *Independent Claims 1 and 10*

For claims 1 and 10, Petitioner relies on its arguments raised in the context of its challenge based on Chen and Grab-333, discussed above. Pet. 53–54 (claim 1), 58–60 (claim 10). Regarding Candelore, Petitioner contends it “provides additional teachings that reinforce the obviousness analysis explained previously” (i.e., the analysis discussed in Petitioner’s challenge based on Chen and Grab-333) (*id.* at 53–54 (limitation 1[a]), 60 (limitation 10[c]), 59 (incorporating the discussion of limitation 1[a] in Petitioner’s analysis of limitation 10[a])), and it “does not alter” Petitioner’s previous analysis from Ground 1 (*id.* at 54 (limitations 1[b]–1[k]), 59–60 (limitations 10[b]), 10[d]–10[l])).

Regarding claims 1 and 10, Patent Owner relies on the same arguments it raised in response to Petitioner’s challenge in Ground 1 and does not raise any additional arguments directed to claims 1 and 10 in the

context of Ground 2. *See* PO Resp. 30–31 (“Therefore, for at least those reasons, the Petition has not met its burden as to *any* claim in Ground 2.”).

First, in light of Patent Owner’s reliance solely on the arguments previously raised for claims 1 and 10, we find that Patent Owner has waived any additional arguments of patentability for claims 1 and 10 in Ground 2. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”). Second, as discussed in our analysis of Ground 1, we do not agree with the arguments raised by Patent Owner in response to Petitioner’s challenge; instead, we determine that Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1 and 10 would have been obvious to one of ordinary skill in the art at the time of the invention. *See supra* § II.E. For the same reasons, we similarly determine that Petitioner has shown by a preponderance of the evidence that the combination of Chen, Grab-333, and Candelore would have rendered the subject matter of claims 1 and 10 obvious to one of ordinary skill in the art at the time of the invention.

b) Dependent Claims 3 and 12

Claim 3 recites “[t]he method of claim 1, wherein the encrypted content is sent in response to a request from the playback device” (Ex. 1001, 17:18–19) and claim 12 similarly recites “[t]he playback device of claim 10, wherein the encrypted content is sent in response to a request from the playback device” (*id.* at 18:27–29). Petitioner sets forth a detailed analysis addressing the limitations of claims 3 and 12. Pet. 57 (claim 3), 61 (claim 12).

As discussed above regarding claims 1 and 10, Patent Owner similarly does not raise any additional argument in response to Petitioner’s challenge

to dependent claims 3 and 12 aside from the arguments raised in the context of Ground 1, which arguments we have addressed above. *See* PO Resp. 30–36 (addressing Ground 2).

First, in light of Patent Owner’s reliance solely on the arguments previously raised in its response to Ground 1, we find that Patent Owner has waived any additional arguments of patentability for claims 3 and 12 in Ground 2. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”).

Second, as discussed in our analysis of Ground 1, we do not agree with the arguments raised by Patent Owner in response to Petitioner’s challenge; instead, we determine that Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1 and 10 would have been obvious to one of ordinary skill in the art at the time of the invention. *See supra* § II.E. Third, we adopt Petitioner’s analyses of claims 3 and 12 as though they were our own because we find the arguments and evidence persuasive for the reasons explained by Petitioner. *See* Pet. 57–58 (claim 3), 61 (claim 12). Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Chen, Grab-333, and Candelore would have rendered the subject matter of claims 3 and 12 obvious to one of ordinary skill in the art at the time of the invention.

c) Dependent Claims 2 and 11

Dependent claim 2 recites “[t]he method of claim 1, wherein the encrypted copies of the content encryption key are entries in a table” (Ex. 1001, 17:15–16), and dependent claim 11 recites “[t]he playback device of claim 11, wherein the encrypted copies of the content encryption key are entries in a table” (*id.* at 18:24–26). As discussed below, Petitioner presents

detailed argument with supporting evidence directed to claim 2 and also relies on those arguments and evidence for claim 11. *See* Pet. 54–57 (discussing claim 2), 60–61 (discussing claim 11 by referring to the Petition’s discussion of claim 2).

Petitioner contends the combination of Chen, Grab-333, and Candelore would have rendered the subject matter of claim 2 obvious to one of ordinary skill in the art at the time of the invention. Pet. 54. Petitioner asserts “Candelore teaches that ‘EMM 250 may be used to deliver access rights (sometimes referred to as “entitlements”) 270’ and the ‘entitlements 270 may also include one or more keys needed to descramble the digital content.’” *Id.* at 54–55 (citing Ex. 1006 ¶¶ 38, 42, Fig. 2B). Petitioner contends “Candelore teaches that ‘[c]ontrol information 280 of EMM 250 may further comprise one or more **key identifiers**, which are multi-bit entitlement tag values that are signed for use in checking whether any key of EMM 250 has been illicitly altered.’” *Id.* at 55 (alteration in original) (citing Ex. 1006 ¶ 39).

Additionally, Petitioner argues,

[g]iven that Candelore teaches that EMM[s] contain multiple keys, each with a key identifier, a [person of ordinary skill in the art] would have found it obvious to use a key table to organize and store those keys in the EMM because that is perhaps the simplest and most effective way to correlate keys with their respective key identifiers (“key ID”).

Pet. 55 (citing Ex. 1006 ¶¶ 55, 57, 67; Ex. 1003 ¶ 171). Petitioner asserts key tables were “well-known in the art” and were “the nearly universal method of storing structured data such as identifier-value pairs (such as key ID and key pairs).” *Id.* (citing Ex. 1003 ¶ 171). Petitioner contends “key tables make accessing values by identifier (called lookup) efficient and

simple to implement” and one of ordinary skill in the art “would have been motivated and found it obvious to use a key table for EMMs, based on Candelore’s teachings.” *Id.* at 55–56 (citing Ex. 1003 ¶ 171) (illustrating “a prototypical key table”).

Turning to Chen, Petitioner asserts “Chen teaches ‘[t]he work key 122 is sent to the receiver through the entitlement management messages 132,’ which is ‘encrypted by a master key Km 126.’” Pet. 56 (alteration in original) (citing Ex. 1004 ¶¶ 11–12, Fig. 1). Petitioner thus contends “Chen teaches encrypted copies of the work keys (the claimed content key) are transmitted in the EMM.” *Id.* (citing Ex. 1003 ¶ 172).

Petitioner asserts one of ordinary skill in the art would have found it obvious “to apply Candelore’s EMM teachings, including the use of a key table in the EMM, to Chen’s EMM teachings because both are rooted in the same CA message type and Candelore’s teachings offer numerous benefits.” Pet. 56 (citing Pet. § VI.B.1 (motivation to combine for Ground 2)²⁶); Ex. 1003 ¶ 172). Thus, Petitioner contends “it would have been obvious to store . . . [Chen’s] encrypted copies of the work keys in a key table in the EMM, alongside key identifiers, as taught by Candelore.” *Id.* (citing Ex. 1003 ¶ 172). In sum, Petitioner asserts EMMs are used to convey keys (*id.* (citing Ex. 1004 ¶ 6)), which Chen refers to as work keys (*id.* (citing Ex. 1004 ¶ 11)) and Candelore refers to as service keys (*id.* (citing Ex. 1006 ¶¶ 46, 38)). And, Petitioner contends one of ordinary skill in the art “would have applied Candelore’s teachings to Chen regardless of this

²⁶ The benefits referred to by Petitioner are discussed *infra* with respect to Petitioner’s reasons why one of ordinary skill in the art would have been motivated to modify the combined teachings of Chen and Grab-333 in light of Candelore.

difference in naming convention because the relevant teachings relate to key identifiers and EMMs . . . which do not depend on key naming conventions or the particulars of the service keys. *Id.* at 56–57 (citing Ex. 1003 ¶172).

Patent Owner contends claims 2 and 11 “are separately patentable because there is only one alleged ‘content encryption key’ in the proposed combination of Chen and Grab-333 and Petitioner provides no reason why that single key would be ‘entries in a table.’” PO Resp. 31 (emphasis and capitalization of heading omitted). In particular, Patent Owner asserts that “the Petition is relying on an allegation of multiple work keys in an EMM as the recited ‘encrypted copies of the content encryption key,’” but that argument is incorrect because “Chen does not teach multiple *work keys* in a single EMM.” *Id.* (citing Ex. 2024 ¶¶ 51–52). Patent Owner contends that, “as the Petition elsewhere admits, Chen teaches that an EMM contains *a* work key. Not *multiple* work keys.” *Id.* (citing Pet. 29, 25, 76).

Patent Owner asserts “Chen makes clear that, in the Fig. 1 system, there is only one work key sent in an EMM, and it is ‘updated on a monthly or yearly basis.’” PO Resp. 32 (citing Ex. 1004 ¶ 11). Patent Owner contends that, “[b]ecause there is only one work key transmitted in an EMM, there are no ‘encrypted *copies*’ of the work key (the alleged content encryption key) in the EMM and no ‘*entries* in a table,’ as recited.” *Id.* Patent Owner asserts that, “[a]lthough Dr. McDaniel speculated at his deposition that EMMs taught in Chen could contain one *or more* work keys, neither he nor the Petition provided any evidence such a configuration was known in the art. Patent Owner, in contrast, provides copious evidence that it was *not* known.” *Id.* at 33 (citing Ex. 1004 ¶¶ 11–12; Ex. 2015, 3 (§ 3.4), 5 (§ 4.5), 6 (Fig. 1 & Note 1); Ex. 2004, 122 (§ 9.2.2); Ex. 2024 ¶ 53).

Thus, Patent Owner contends “[t]he record evidence . . . does not support Petitioner’s argument that Chen teaches ‘transmitting encrypted copies of work keys in the EMM’” *Id.* at 33–34.

Turning to Candelore, Patent Owner contends that it “does not advance Petitioner’s theory because it too fails to disclose a configuration with more than one work key per EMM.” PO Resp. 34. Patent Owner asserts the Petition contends Candelore teaches multiple keys in an EMM, but not multiple *work* keys in an EMM. *Id.* (citing Pet. 12, 55). And, Patent Owner contends Candelore teaches Service Keys 330 in the EMMs, “[b]ut that is not a disclosure of multiple service keys (the only possible work keys) in any one EMM.” *Id.* (citing Ex. 2024 ¶ 61). To the contrary, Patent Owner asserts “Candelore makes clear that an EMM only contains one such service key, even in a system implementing multiple service keys.” *Id.* (citing Ex. 2024 ¶ 62). Specifically, Patent Owner points to paragraph 60, asserting Candelore “expressly states that an EMM contains only encrypted service key $E(SK) 355_i$, the i th of N encrypted service keys, but not multiple encrypted service keys in the same EMM.” *Id.* (citing Ex. 1006 ¶ 60).

Additionally, Patent Owner argues “the Petition also fails to explain *how* the transmitter or receiver in Chen would have used multiple work keys in an EMM, even if they *were* disclosed in Candelore.” PO Resp. 35 (citing Ex. 2016, 77:1–4). Pointing to the Petition, Patent Owner contends that the Petition “asserts the work key is used to encrypt and decrypt the scrambling key, on the transmitting and receiving sides respectively” of Chen. *Id.* (citing Pet. 28, 30, 40). Patent Owner poses a question that if there are multiple work keys in an EMM after the combination proposed by Petitioner, “what are those extra work keys supposed to encrypt or decrypt,

besides the scrambling key?” *Id.* (contending Dr. McDaniel confirmed the Petition is silent).

To the contrary, Patent Owner asserts “it was not obvious to encrypt, transmit, and decrypt work keys that serve no identified purpose in the proposed system, for that would have added unnecessary overhead to every transaction for no benefit.” PO Resp. 36 (citing Ex. 2024 ¶¶ 70–74). Patent Owner contends “[t]here is only one work key per EMM transmitted in Chen, and Petitioner has not argued or provided evidence that it would have been obvious to transmit more than one work key per EMM.” *Id.* And, Patent Owner asserts “Petitioner has no other explanation how the combination of Chen/Grab-333/Candelore teaches that ‘encrypted copies of the content encryption key are entries in a table’ in the combination of Chen, Grab-333, and Candelore.” *Id.* at 36–37. Therefore, Patent Owner argues “[c]laims 2 and 11 are . . . separately patentable over Ground 2.” *Id.* at 37 (citing Ex. 2024 ¶ 74).

In its Reply, Petitioner asserts “Ground 2 applies Candelore’s service key teachings to Chen’s work key.” Pet. Reply 27 (citing Pet. 56–57). Petitioner contends Candelore provides what Patent Owner claims is missing—a configuration with more than one work key per EMM and an explanation for how multiple work/service keys would be used. *Id.* (citing PO Resp. 34–35). First, Petitioner asserts that Patent Owner admits Candelore teaches each EMM may contain multiple keys. *Id.* (citing Ex. 1006 ¶ 39; PO Resp. 34; Ex. 1003 ¶ 171; Pet. 55; Ex. 1030, 89:2–15). Petitioner argues “Candelore teaches sending ‘one or more Service Keys . . . in the EMMs.’” *Id.* (omission in original) (quoting Ex. 1006 ¶ 52) (citing Ex. 1003 ¶¶ 171–172; Pet. 86–88). Petitioner contends “Candelore explains

that the current and next service key may be delivered together: ‘Depending on the duration of the current Service Key (e.g., SK), *the next Service Key (SKnext) may be delivered along with the SK.*’” *Id.* at 27–28 (quoting Ex. 1006 ¶ 64). Petitioner asserts Patent Owner’s argument—that Candelore is limited to one service key per EMM—is based on nonlimiting “exemplary embodiments” in Candelore. *Id.* at 28 (citing PO Resp. 34; Ex. 1006 ¶¶ 54, 58, 60; Ex. 1032 ¶ 65).

Second, Petitioner asserts “Candelore teaches sending service keys for individual shows or movies ahead of time, and it would have been obvious based on Candelore’s teachings for these service keys to be included in a key table in an EMM.” Pet. Reply 28 (citing Ex. 1006 ¶ 54; Ex. 1003 ¶¶ 95, 171–172; Pet. 86–88). Thus, Petitioner contends “it would have been obvious to send multiple encrypted service keys together in an EMM using a key table.” *Id.* (citing Pet. 55–56; Ex. 1003 ¶¶ 171–172; Ex. 1032 ¶ 64).

Further, Petitioner contends Patent Owner’s argument “contradict[s] its positions in district court.” Pet. Reply 28 (emphasis omitted). Petitioner asserts Patent Owner’s infringement contentions “point to a single copy of the alleged content key, stored by itself in a message payload, as satisfying claim 2.” *Id.* (citing Ex. 1017, 96–98²⁷ (“Within the MSL framework, the encrypted copy of the content encryption key is an entry . . . in the JSON [JavaScript Object Notation] structure, which is a key-value table. Thus, the encrypted copy of the content encryption key is an entry in a table. . . . The encrypted copy of the content encryption key is returned as an MSL payload as shown . . .”). Petitioner contends Patent Owner’s position “appears to

²⁷ Petitioner cites to the page numbers of the underlying document as opposed to the page numbers of the exhibit itself.

be based on the antecedent basis in claim 1, which describes the encrypted copies as ‘one or more copies of the content encryption key.’” *Id.* at 29. “Regardless, [Petitioner asserts Patent Owner’s] contentions undermine its arguments against Ground 2. Even if Candelore were limited to just one service key in the EMM, it would still satisfy dependent claim 2 under [Patent Owner’s] contentions.” *Id.*

In its Sur-reply, Patent Owner asserts Petitioner’s argument—applying Candelore’s service key teachings to Chen’s work key—is unavailing because “Petitioner offers no evidence the relied-upon service keys are work keys.” Sur-reply 20. First, Patent Owner clarifies that it did not admit Candelore teaches multiple keys in an EMM; rather, Patent Owner was repeating Petitioner’s position, not stating its own. *Id.* (citing Pet. Reply 27; PO Resp. 34). Second, Patent Owner contends it is too late for Petitioner to rely on other paragraphs in Candelore in its Reply, regarding whether Candelore teaches multiple service keys in an EMM. *Id.* at 20–21 (citing Pet. Reply 27–28 (relying on Ex. 1006 ¶¶ 52, 54, 64)). Third, Patent Owner asserts Petitioner does not address whether Candelore’s service keys are work keys. *Id.* at 21–22. Patent Owner contends they are not. *Id.* Fourth, Patent Owner asserts “Petitioner’s new argument and evidence provide no rationale to modify Chen. Unlike the scrambling keys, work keys are only ‘updated on a monthly or yearly basis.’” *Id.* at 22 (quoting Ex. 1004 ¶ 11). According to Patent Owner, “Petitioner identifies no benefit in delivering *even one* such infrequently updated work key ahead of time in Chen’s CA system, let alone any benefit of doing so in a table as claimed.” *Id.* Fifth, Patent Owner asserts that its argument in its Response is consistent with its position taken in district court because “[t]he allegedly

infringing product uses a table (‘JSON structure’) to store an encrypted copy of a content encryption key” and “[t]hat structure has no bearing on the structure Petitioner is proposing in Ground 2.”²⁸ *Id.*

We determine that Petitioner has the better argument with supporting evidence. First, Petitioner clearly relies on Candelore as teaching an EMM delivering access rights, sometimes referred to as entitlements 270, where the entitlements may include one or more keys needed to descramble the digital content.²⁹ Pet. 54–55 (citing Ex. 1006 ¶¶ 38, 42, Fig. 2B). Second, we find that Candelore provides these teachings because it specifically states as much. Ex. 1006 ¶¶ 38 (“EMM 250 may be used to deliver access rights (sometimes referred to as ‘entitlements’) 270 to digital device 115. Examples of certain entitlements 270 may include, but are not limited to keys . . .”), 42 (“The entitlements 270 *may also include one or more keys* needed to descramble the digital content.” (emphasis added)). Third, there is nothing improper about Petitioner’s Reply pointing to additional paragraphs of Candelore, including paragraph 64, in response to Patent Owner’s argument that Candelore teaches that only one service key is provided in any one EMM. Petitioner’s citation and argument rebuts Patent Owner’s argument and is completely proper and timely. Fourth, in direct contrast to Patent Owner’s argument regarding Candelore, we find that Candelore

²⁸ We do not reach the issue of whether Patent Owner’s arguments are consistent with its position in district court because we find that Petitioner establishes the combination of Chen, Grab-333, and Candelore teaches or suggests the subject matter of claims 2 and 11 for the reasons discussed.

²⁹ Petitioner also raises an alternative argument that “Chen teaches encrypted copies of the work keys (the claimed content key) are transmitted in the EMM.” Pet. 56. Above, we focus on Petitioner’s alternative based on Candelore’s EMM teachings.

expressly teaches providing more than one service key in *the same* EMM. *Id.* ¶ 64 (“Depending on the duration of the current Service Key (e.g., SK), the next Service Key (SK_{next}) may be delivered along with the SK.”). Patent Owner specifically pointed to certain paragraphs in Candelore in an effort to limit Candelore when Candelore provides an express teaching a few paragraphs later that directly contradicts Patent Owner’s arguments. We appreciate Petitioner pointing to paragraph 64 of Candelore so that we can fully understand the scope of its disclosure. And, for the reasons discussed above, we find that Candelore teaches including one or more service keys in one EMM. Fifth, we agree with Petitioner’s argument that Candelore teaches that control information 280 of EMM 250 may comprise one or more key identifiers that “are signed for use in checking whether any key of EMM 250 has been illicitly altered.” *See* Pet. 55 (quoting Ex. 1006 ¶ 39). Thus, we find Candelore teaches that an EMM may contain multiple keys and that each key may have a corresponding key identifier.

Next, we find Petitioner provides a reason with rational underpinning as to why one of ordinary skill in the art would have applied “Candelore’s implementation details on how EMMs can be used to convey keys” to the combination of Chen and Grab-333. Pet. 49 (citing Ex. 1003 ¶ 150).

Specifically, we agree with Petitioner’s argument that

Chen focuses more on key management aspects and does not provide as much detail about the contents of EMM, leaving those details to the knowledge of a [person of ordinary skill in the art]. Ex. 1003 ¶ 153. Candelore teaches those details, for the same purpose and framework as Chen. *Id.* Thus[,] a [person of ordinary skill in the art] would have been motivated and found it obvious to apply Candelore’s teachings regarding EMM contents to Chen because Candelore provides implementation details that were compatible and advantageous

for Chen, including details on the types of control information that can be used to manage entitlements and keys, facilitating Chen's goal of secure video distribution. *Id.*

Pet. 50; *see also id.* at 50–52 (providing persuasive argument and evidence that one of ordinary skill in the art would have been motivated to apply Candelore's EMM teachings, including the use of key identifiers, to Chen because they provide a number of security benefits). Even if we assume Chen only teaches sending one work key in an EMM, Candelore provides this teaching (as discussed above) and Petitioner provides a reason with rational underpinning as to why one of ordinary skill in the art would have applied Candelore's teachings to Chen (also discussed above).

Further, Patent Owner's attempt to distinguish Candelore's service keys from work keys does not negate Petitioner's argument and evidence discussed above. First, Patent Owner seeks to distinguish work keys because Patent Owner contends work keys are not issued with respect to any specific piece of content. Sur-reply 21 (citing Ex. 2009 ¶ 99). Patent Owner contends that Candelore's service key "is a scrambling key, not a work key, because it is used 'for descrambling incoming scrambled content in real-time.'" *Id.* at 21–22 (citing Ex. 1006 ¶ 59). Patent Owner's argument overlooks that Candelore is not so limited. Although Candelore states "[i]n one embodiment of the invention, Service Key(s) 330 is used as a descrambling key to descramble the content directly," Candelore then states "[i]n another embodiment of the invention, Service Key(s) 330 is used to decrypt one or more descrambling keys, which are received in-band with the scrambled digital content and subsequently used for descrambling purposes." Ex. 1006 ¶ 51 (emphasis added). And, this disclosure from Candelore is similar to Chen's teaching regarding decrypted work key 122,

which Chen teaches may “be utilized by the decryptor 110 to decrypt the ECM 130 *and the scrambling key 118.*” Ex. 1004 ¶ 13 (emphasis added) (“The decrypted scrambling key 118 may then be utilized by the descrambler 108 to descramble the scrambled broadcast signal 128 and obtain the compressed audio/video output 140.”). Based on these teachings, we find strong similarities between Candelore’s service keys and Chen’s work key such that one of ordinary skill in the art would have been prompted to consider the teachings from Candelore regarding its service keys in the context of Chen and its work key.

Second, even assuming Candelore’s service keys are not work keys, that finding would not negate Petitioner’s argument and evidence regarding the combined teachings of Chen, Grab-333, and Candelore. Patent Owner contends that Petitioner’s argument and evidence “provide no rationale to modify Chen” because “[u]nlike the scrambling keys, work keys are only ‘updated on a monthly or yearly basis’” and “Petitioner identifies no benefit in delivering *even one* such in frequently updated work key ahead of time in Chen’s CA system, let alone any benefit of doing so in a table as claimed.” Sur-reply 22. Again, Patent Owner reads the references too narrowly. In contrast to Patent Owner’s argument, Chen states “work key 122 *may* be updated on a monthly or yearly basis.” Ex. 1004 ¶ 11 (emphasis added). Chen is not limited to updating work key 122 monthly or yearly simply because it *may* be updated at those time intervals. In other words, there is nothing precluding one of ordinary skill in the art from applying Chen such that work key 122 is updated more frequently or less frequently.

Third, the critical importance of Candelore, as relied on by Petitioner, is the details of the EMMs and what can be transmitted therein and how one

of ordinary skill in the art would organize such information. It is sufficient, for the purposes relied on by Petitioner, that Candelore teaches transmitting more than one key in an EMM, and Petitioner provides a reason with rational underpinning (as discussed above) as to why one of ordinary skill in the art would have combined those teachings with Chen. And, Petitioner provides persuasive evidence, largely uncontested, that one of ordinary skill in the art would have been motivated to use a key table for EMMs when an EMM transmits more than one key. *See* Pet. 55–56. Even accepting that Chen teaches transmitting one work key in an EMM, Candelore teaches providing more than one key in an EMM. And as Petitioner persuasively explains, we find that one of ordinary skill in the art would have been motivated to modify Chen to “apply Candelore’s EMM teachings, including the use of a key table in the EMM.” *Id.* at 56.

Fourth, we also agree with Petitioner that, even though Chen refers to work keys and Candelore refers to service keys, one of ordinary skill in the art “would have applied Candelore’s teachings to Chen regardless of this difference in naming convention because the relevant teachings relate to key identifiers and EMMs . . . which do not depend on key naming conventions or the particulars of the service keys.” Pet. 56–57 (citing Ex. 1003 ¶ 172).

Turning to reasonable expectation of success, Petitioner presents a detailed argument with supporting evidence that one of ordinary skill in the art would have had a reasonable expectation of success in achieving the combination proposed. Pet. 52–53. Although Patent Owner challenges various aspects of Petitioner’s challenge under Ground 2 as discussed above, Patent Owner does not specifically challenge Petitioner’s showing as to whether one of ordinary skill in the art would have had a reasonable

expectation of success in achieving the proposed combination. *See generally* PO Resp. 30–37 (not mentioning this issue); *see also* Sur-reply 20–22 (same). Therefore, this issue is waived. Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.”). Regardless, for the reasons explained by Petitioner, which we adopt as our own findings, we find that one of ordinary skill in the art would have had a reasonable expectation of success in achieving the proposed combination. *See* Pet. 52–53.

Accordingly, for the reasons discussed above, we find that Petitioner has shown that the combination of Chen, Grab-333, and Candelore teaches or suggests the subject matter of claims 2 and 11 of the ’920 patent and that one of ordinary skill in the art would have been motivated to combine the teachings of Chen, Grab-333, and Candelore as proposed and would have had a reasonable expectation of success in so doing.

3. *Objective Indicia of Nonobviousness*

Neither party presents evidence of objective indicia of nonobviousness.

4. *Weighing the Graham Factors*

“Once all relevant facts are found, the ultimate legal determination [of obviousness or nonobviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.” *Arctic Cat*, 876 F.3d at 1361. On balance, considering the complete record before us, Petitioner has established, by a preponderance of the evidence, that claims 1–3 and 10–12 of the ’920 patent would have been obvious to one of ordinary skill in the art at the time of the invention.

G. Ground 3: Obviousness over Chen, Grab-333, and Kocher

Petitioner contends the combined teachings of Chen, Grab-333, and Kocher would have rendered the subject matter of claims 1, 3, 5, 6, 10, 12, 14, and 15 obvious to one of ordinary skill in the art at the time of the invention. Pet. 61–80.

1. Scope and Content of the Prior Art

a. Chen and Grab-333

Chen and Grab-333 are discussed above. *See supra* §§ II.E.1.a–b.

b. Kocher

Kocher is directed “generally to securing the distribution of digital content and other data against piracy and other unauthorized use or redistribution.” Ex. 1007, 1:6–7.³⁰ Kocher explains that:

A wide variety of systems have been proposed for protecting digital content. Most such schemes encrypt the content to protect it against unauthorized use and copying while it is stored on media or sent over untrusted communication channels. Decryption algorithms and keys are then managed by trusted, tamper-resistant software or hardware modules, which are designed to enforce access control rules (which may be fixed or configurable) specifying how the content can be used.

Id. at 1:11–16.

Kocher states that key management is an example of a “cryptographic primitive[] that can be provided to the content for uses including (without limitation) authenticating the playback environment, [and] deriving content decryption keys.” Ex. 1007, 20:4–6, 20:12–13. Kocher explains that “[t]he specific methods used to assign keys to players and manufacturers depend[]

³⁰ To match the parties’ citation style, page numbers refer to the page number of the underlying document as opposed to the exhibit.

on the specific embodiment and security objectives.” *Id.* at 23:1–2. Kocher describes the following examples of “symmetric cryptographic oracle keys”:

player symmetric keys chosen (pseudo)randomly from a larger global pool of such keys; player-specific symmetric keys generated (pseudo) randomly by the manufacturer; symmetric keys unique to the manufacturer, player model, etc.; and/or symmetric keys authenticating that the player does not have particular characteristics (e.g., was not produced by particular manufacturers).

Id. at 23:4–8.

Kocher provides the following exemplary key management description:

An exemplary player is initialized by its manufacturer with a unique combination of keys. These keys are obtained from a key management authority which is authorized by an entity that controls the media format. The key management authority receives requests from authorized manufacturers, validates the requests, provides player key sets, and receives payment for the keys (and corresponding licensing fees).

Ex. 1007, 94:23–27. A key set for a player may consist of “128 AES keys, each of 128 bits, that are derived from a top-level 256-bit AES key (known only to the key management authority), a 32-bit group ID (identifying the player’s manufacturer), and a 32-bit device ID (identifying the player’s serial number).” *Id.* at 94:27–30. Kocher explains that “different kinds of keys are included. For example, key 0 and keys 101 through 127 will be assigned uniquely to the device. In contrast, keys 1 through 31 will be shared among increasingly large sets of devices of devices within the same group.” *Id.* at 96:9–11.

Kocher states that “[m]edia may be configured to allow a limited number of uses (e.g., any three music videos can be watched) or duration of access (e.g., access expires 3 days after the first viewing). Thereafter the

user may be required to make a payment to obtain authorization for further (or unlimited) playbacks.” Ex. 1007, 110:25–28. Kocher explains that “[a] viewing counter (and/or other security and state information) may be stored on the media itself and/or in the player and/or on remote servers. For example, data authorizing unlimited playback may be placed on a writable portion of the media, thereby enabling playback on any player.” *Id.* at 110:28–31. Alternatively, Kocher states “the authorization can be stored in the player’s nonvolatile memory and/or content code can be configured to contact a server over a network to obtain authorization.” *Id.* at 110:31–111:2.

2. *Differences (if any) Between the Prior Art and the Claims;
Motivation to Combine & Reasonable Expectation of Success*

a. *Independent Claims 1 and 10*

For claims 1 and 10, Petitioner relies on its arguments raised in the context of its challenge based on Chen and Grab-333, discussed above. Pet. 65 (claim 1), 78–79 (claim 10). Regarding Kocher, Petitioner contends that it “provides additional teachings that reinforce the obviousness analysis explained previously” (i.e., the analysis discussed in Petitioner’s challenge based on Chen and Grab-333) (*id.* at 78 (limitation 10[c])) and “does not alter” Petitioner’s analysis based on Chen and Grab-333 (*id.* at 65 (claim 1), 78–79 (limitations 10[a], 10[b], and 10[d]–10[l])).

Regarding claims 1 and 10, Patent Owner relies on the same arguments it raised in response to Petitioner’s challenge in Ground 1 and does not raise any additional arguments directed to claims 1 and 10 in the context of Ground 3. *See* PO Resp. 37 (“Because the challenges are the same in both grounds, the challenge to these independent claims in Ground 3 is inadequate for the same reasons in Section II.”).

First, in light of Patent Owner's reliance solely on the arguments previously raised for claims 1 and 10, we find that Patent Owner has waived any additional arguments of patentability for claims 1 and 10 in Ground 3. Paper 8 (Scheduling Order), 8 ("Patent Owner is cautioned that any arguments not raised in the response may be deemed waived."). Second, as discussed in our analysis of Ground 1, we do not agree with the arguments raised by Patent Owner in response to Petitioner's challenge; instead, we determine that Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1 and 10 would have been obvious to one of ordinary skill in the art at the time of the invention. *See supra* § II.E. For the same reasons, we similarly determine that Petitioner has shown by a preponderance of the evidence that the combination of Chen, Grab-333, and Kocher would have rendered the subject matter of claims 1 and 10 obvious to one of ordinary skill in the art at the time of the invention.

b. Dependent Claims 3, 6, 12, and 15

Claims 3 and 6 depend from claim 1. Ex. 1001, 17:17 (claim 3), 17:28 (claim 6). Claims 12 and 15 parallel the language of claims 3 and 6, but depend from claim 10. *Id.* at 18:27–29 (claim 12), 18:39–46 (claim 15). Petitioner sets forth a detailed analysis addressing the limitations of claims 3, 6, 12, and 15. Pet. 66–67 (claim 3), 73–78 (claim 6), 79 (claim 12), 80 (claim 15).

As discussed above regarding claims 1 and 10, Patent Owner similarly does not raise any additional argument in response to Petitioner's challenge to claims 3, 6, 12, and 15 aside from the arguments raised in the context of Ground 1, which arguments we have addressed above. *See* PO Resp. 37–67 (addressing Ground 3).

First, in light of Patent Owner's reliance solely on the arguments previously raised in its response to Ground 1, we find that Patent Owner has waived any additional arguments of patentability for claims 3, 6, 12, and 15 in Ground 3. Paper 8 (Scheduling Order), 8 ("Patent Owner is cautioned that any arguments not raised in the response may be deemed waived."). Second, as discussed in our analysis of Ground 1, we do not agree with the arguments raised by Patent Owner in response to Petitioner's challenge; instead, we determine that Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1 and 10 would have been obvious to one of ordinary skill in the art at the time of the invention. *See supra* § II.E. Third, we adopt Petitioner's analyses of claims 3, 6, 12, and 15 as though they were our own because we find the arguments and evidence persuasive for the reasons explained by Petitioner. Pet. 66–67 (claim 3), 73–78 (claim 6), 79 (claim 12), 80 (claim 15). Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Chen, Grab-333, and Kocher would have rendered the subject matter of claims 3, 6, 12, and 15 obvious to one of ordinary skill in the art at the time of the invention.

c. Dependent Claims 5 and 14

Claim 5 depends from claim 1, claim 14 depends from claim 10, and each dependent claim adds the following: "wherein digital rights specified with respect to the content by a content provider are encrypted using at least one base encryption key, where the base encryption key is inherent to the class of devices to which the playback device belongs." Ex. 1001, 17:23–27 (claim 5), 18:34–38 (claim 14). As discussed below, Petitioner presents detailed argument with supporting evidence directed to claim 5 and also

relies on those arguments and evidence for claim 14 based on the overlapping claim language. *See* Pet. 68–73 (discussing claim 5), 80 (discussing claim 14 by referring to the Petition’s discussion of claim 2).

Petitioner contends the combination of Chen, Grab-333, and Kocher would have rendered the subject matter of claim 5 obvious to one of ordinary skill in the art at the time of the invention. Pet. 68. Petitioner contends

[t]he combination with Kocher’s teachings further teaches or suggests that digital rights specified with respect to the content (e.g., rules, certificates, licenses, or other DRM information) by a content provider are encrypted using at least one base encryption key (e.g., symmetric keys unique to the manufacturer, player model, or group), where the base encryption key is inherent to the class of devices to which the playback device belongs (e.g., shared by all devices from a manufacturer, of a particular player model, or other group of devices).

Id. (citing Ex. 1003 ¶¶ 202–208).

First, Petitioner asserts “Kocher teaches base encryption keys that are inherent to a class of devices.” Pet. 68 (citing Ex. 1003 ¶ 203). In particular, Petitioner asserts “Kocher teaches that ‘[a]n exemplary player is initialized by its manufacturer with a unique combination of keys’ that are “derived using, e.g., ‘a 32-bit group ID (identifying the player[’]s manufacturer), and a 32-bit device ID (identifying the player’s serial number)’ that ‘together uniquely identify the player and are represented in the player’s digital certificate(s).” *Id.* (first alteration in original) (citing Ex. 1007, 94:23–32). Petitioner points to Kocher’s teaching that “key 0 and keys 101 through 127 will be assigned uniquely to the device” whereas ***“keys 1 through 31 will be shared among increasingly large sets of devices of devices [sic] within the same group.”*** *Id.* at 68–69 (citing Ex. 1007,

96:9–14). Petitioner asserts “[p]layers are assigned keys including ‘symmetric keys unique to the **manufacturer, player model**, etc.; and/or symmetric keys authenticating that the player does not have particular characteristics (e.g., was not produced by particular manufacturers).” *Id.* at 69 (citing Ex. 1007, 23:1–16). Petitioner thus contends Kocher “teaches that a ‘group’ uniquely identifies at least the player’s manufacturer, and that 31 keys are shared among increasingly larger sets of devices within the same group.” *Id.* at 69 (citing Ex. 1007, 94:23–96:14; Ex. 1003 ¶ 203).

Petitioner contends one of ordinary skill in the art “would have found it obvious for the increasingly larger sets of devices to include, for example, classes of devices based on player model, product lines, and product categories, scaling up to the class of all devices made by a manufacturer.” Pet. 69 (citing Ex. 1007, 23:1–16, 94:23–96:14; Ex. 1003 ¶ 204). Petitioner asserts one of ordinary skill in the art “would have been motivated to apply these teachings because they facilitate Kocher’s goal of a flexible key management system, and provide improved granularity for communicating with players, including for updating system capabilities, rules, and rights.” *Id.* at 69–70 (citing Ex. 1003 ¶ 204). Petitioner contends, as an example, “a content provider may decide to revoke playback privileges for devices that are no longer supported, or to add new playback capabilities for devices that previously were not allowed to playback certain types of content, such as when a provider added support for a new model.” *Id.* at 70 (citing Ex. 1007, 23:1–16). Petitioner asserts that,

[b]y teaching the assignment of keys unique to the manufacturer, player model, and other classes of devices, Kocher teaches a base encryption key that is inherent to the class of devices to which the playback device belongs, including for example the class of devices made by a particular

manufacturer or the class of devices of a particular player model.

Id. (citing Ex. 1003 ¶ 204).

Second, Petitioner asserts “the combined teachings of Chen and Kocher further teach that digital rights specified with respect to the content by a content provider are encrypted using at least one base encryption key.” Pet. 70 (citing Ex. 1003 ¶¶ 205–208). Petitioner contends “[b]oth references teach digital rights specified with respect to video content by a content provider.” *Id.* As an example, Petitioner asserts “Kocher teaches keys and algorithms to ‘enforce access control rules’ ‘specifying how the content can be used,’ including features that allow content providers, for example, ‘content publishers’ to provide content with ‘code that can only be decrypted by authorized players or a subset of players.’” *Id.* at 70–71 (citing Ex. 1007, 1:11–16, 21:30–22:18). Petitioner contends Kocher “teaches ‘allow[ing] content owners to continue to specify how their content will be protected’” and teaches “media authentication by player based on digitally-signed rules and certificates.” *Id.* at 71 (alteration in original) (citing Ex. 1007, 27:14–25, 65:15–29, 87:1–22). Additionally, Petitioner asserts “Chen also teaches using EMMs to convey security keys to users, pairing rules with the security keys to provide strong pairing, and rules defining permissible usage.” *Id.* (citing Ex. 1004 ¶¶ 6, 22–24).

Petitioner asserts that one of ordinary skill in the art “would have found it obvious and been motivated to encrypt digital rights, as taught by Kocher and Chen, using at least one base encryption key because it would have facilitated updating the rights for a class of devices, such as a product type or other classes” previously discussed by Petitioner. Pet. 71 (citing Ex. 1003 ¶ 206). Petitioner contends “Kocher assigns a unique combination

of keys to each playback device, including shared keys for groups of devices, to allow secure communications with those groups of devices, including for providing secure DRM to those devices, as was commonly done in the art.” *Id.* at 71–72 (citing Ex. 1003 ¶ 206).

According to Petitioner, one of ordinary skill in the art “would have been motivated to use Kocher’s shared keys to control granularity and encrypt digital rights intended for a class of devices, or for a multicast.” Pet. 72 (citing Ex. 1003 ¶ 207). Petitioner provides the following example.

[A] video content provider seeking to add support for a product type would have been motivated to encrypt digital rights allowing playback for devices belonging to that class of products using shared key for the class to securely provide digital rights to devices of the class—since those devices all share a unique key for that class, they are all able to decrypt the digital rights and update their DRM information.

Id. (citing Ex. 1003 ¶ 207). Petitioner continues,

[c]ontent providers sometimes provided limited-time access to movies or other videos (e.g., video on demand), including for the promotion of particular products, in which case a [person of ordinary skill in the art] would have found it obvious and been motivated to encrypt digital rights specified with respect to the promotional content using shared key for the class of device, so that the digital rights can be securely provided to, e.g., devices of the same product type or from the same manufacturer.

Id. (citing Ex. 1007, 110:25–111:2). Petitioner asserts one of ordinary skill in the art “would have been motivated to encrypt digital rights because DRM information, being used to manage video security, was typically encrypted given its sensitive nature.” *Id.* at 72–73 (citing Ex. 1003 ¶ 207; Ex. 1007, 109:29–110:2, 87:1–29).

Further, Petitioner contends “[d]igital rights often involved confidential information and privileges that needed to be relatively

unalterable, secret cryptographic information, and other information used to protect content, and thus as a general security practice in streaming video, DRM information was typically encrypted.” Pet. 73 (citing Ex. 1003 ¶ 207). Thus, Petitioner asserts that “[a]s a practical matter, the use of encryption can protect against modification of the encrypted information, and it was commonly used in DRM for this purpose.” *Id.* (citing Ex. 1003 ¶ 207). And, Petitioner contends “[h]ere, when digital rights are intended for a class of devices, it would have been obvious to encrypt those rights using the key shared by those devices, as taught by Kocher.” *Id.* (citing Ex. 1007, 23:1–16, 94:23–96:14; Ex. 1003 ¶ 207).

Patent Owner raises several arguments in response to Petitioner’s challenge under this ground. First, Patent Owner contends that Kocher’s player keys (keys 1–31) are not “used to encrypt digital rights specified with respect to the content by a content provider, as recited. Instead, a key management authority uses any one of the player keys stored on a media player (perhaps one of keys 1–31, perhaps not) to encrypt a plaintext arbitrary value, which is not alleged to be a digital right.” PO Resp. 39. Patent Owner asserts “Petitioner provides no argument or evidence that Kocher teaches using any player keys at all, let alone keys 1–31 specifically, to encrypt digital rights specified with respect to the content by a content provider, as recited in claims 5 and 14.” *Id.* at 41.

Patent Owner’s argument does not detract from Petitioner’s showing because, as Petitioner explains, “the Petition addressed a simple dependent claim with a simple explanation: Kocher teaches sending DRM information, such as promotional rights, and it would have been obvious to encrypt them with Kocher’s player keys.” Pet. Reply 29. In other words, Patent Owner’s

argument does not respond specifically to Petitioner’s challenge because Petitioner’s challenge is based on what would have been obvious in light of Kocher teachings. *See* Pet. 71 (it would have been obvious “to encrypt digital rights, as taught by Kocher and Chen, using at least one base encryption key because it would have facilitated updating the rights for a class of devices, such as a product type or the other classes discussed above” (citing Ex. 1003 ¶ 206)).

Second, Patent Owner contends “[t]he Petition does not allege that Chen teaches any base encryption key” and “[i]nstead, the Petition seems to allege that Chen teaches only ‘digital rights specified with respect to the content.’” PO Resp. 42 (citing Pet. 68–73). Patent Owner asserts that Petitioner “does not identify what those digital rights might be in Chen or, more importantly, why they would be encrypted.” *Id.*

As Petitioner explains in its Reply, “[b]y teaching ‘multiple levels of decryption operations,’ Kocher provides motivation for the combination to encrypt EMMs using player keys even if the EMMs already have one encryption layer.” Pet. Reply 32 (citing Ex. 1007, 97:11–15; Ex. 1003 ¶ 193). Petitioner proposes a combination that “uses the master key and player keys as independent security mechanisms. As Chen teaches, EMMs are encrypted with the master key, which authenticates the user as a legitimate user in the system, while Kocher’s player key allows further narrowing, for example to target particular subsets for promotions, etc.” *Id.* at 32–33 (citing Ex. 1003 ¶ 207; Ex. 1007, 110:25–111:2; Ex. 2016, 101:21–102:12). Thus, Petitioner contends “Kocher’s keys facilitate a flexible key system where rights can be easily and securely provided to different classes or types of devices.” *Id.* at 33 (citing Ex. 1003 ¶¶ 203–204, 207; Ex. 1032

¶¶ 76–77). Accordingly, we find that Patent Owner’s argument regarding Chen does not identify a deficiency in Petitioner’s challenge.

Third, Patent Owner contends “[t]he Petition is impenetrably vague as to what digital rights are supposed to be encrypted in the proposed combination of Chen and Kocher, or why.”³¹ PO Resp. 43 (citing PO Resp. § IV.B.3.a (arguing the Petition does not indicate what digital rights are to be encrypted in the combination)); *see id.* at 43–44 (asserting the same). Patent Owner contends that, “[a]t best, the Petition provides a theory, untethered to the references, regarding ‘promotional content’ that was perhaps loosely inspired by Kocher’s disclosure of ‘[m]edia . . . configured to allow a limited number of uses . . . or duration of access’” *Id.* at 45 (second alteration and first and second omissions in original) (citing Ex. 1007, 110:25–111:2).

We disagree with Patent Owner’s argument that the Petition is vague in this regard. Digital rights can be very broad and cover a wide range of information. Petitioner specifically states that “[d]igital rights often involved confidential information and privileges that needed to be relatively unalterable, secret cryptographic information, and other information used to protect content.” Pet. 73 (citing Ex. 1003 ¶ 207); *see id.* at 5 (“rights management, which distributed licenses, certifications, and the rights granted to particular playback devices”), 68 (“The combination with

³¹ Patent Owner contends the Institution Decision did not identify “what digital rights the Board believes may have been encrypted when Kocher’s teachings are implemented in Chen’s conditional access system.” PO Resp. 46 (citing Inst. Dec. 70–71). The Institution Decision summarized and relied on the argument and evidence set forth in the Petition as discussed above. Inst. Dec. 70–71 (citing Pet. 68–73).

Kocher’s teachings further teaches or suggests that digital rights specified with respect to the content (e.g., rules, certificates, licenses, or other DRM information) by a content provider are encrypted using at least one base encryption key”). And, Petitioner provides an example of “digital rights allowing playback for devices belonging to [a particular] . . . class of products using [a] shared key for the class to securely provide digital rights to devices of the class.” *Id.* at 72. Specifically, Petitioner contends

[c]ontent providers sometimes provided limited-time access to movies or other products, in which case a [person of ordinary skill in the art] would have found it obvious and been motivated to encrypt digital rights specified with respect to the promotional content using [a] shared key for the class of device, so that the digital rights can be securely provided to, e.g., devices of the same product type or from the same manufacturer.

Id. (citing Ex. 1007, 110:25–111:2). Additionally, Petitioner asserts that, “as general security practice in streaming video, DRM information was typically encrypted” and “[h]ere, when digital rights are intended for a class of devices, it would have been obvious to encrypt those rights using the key shared by those devices, as taught by Kocher.” *Id.* at 73 (citing Ex. 1003 ¶ 207; Ex. 1007, 23:1–16, 94:23–96:14).

Fourth, Patent Owner presents a series of arguments directed to challenging aspects of the combination pertaining to which digital rights are encrypted, how they are encrypted, and why they would have been encrypted as well as contending that such combination would not have been obvious because it does not achieve improved granularity, Kocher teaches away, and Petitioner relies on hindsight to satisfy claims 5 and 14. PO Resp. 47–65. Patent Owner asserts “the only possible theory Petitioner can maintain regarding encrypted digital rights are digital rights *in Chen’s*

EMM” and “that digital rights in the EMM would have been encrypted with Kocher’s player keys, while the EMM itself would have been encrypted with the master key Km.” *Id.* at 52 (citing Ex. 2016, 92:10–94:5). Patent Owner contends encrypting digital rights in Chen’s entitlements with Kocher’s player keys would not have been obvious for several reasons.

Patent Owner first contends that the combination would not improve granularity because “[t]he master key Km used to encrypt and decrypt the EMM is more granular than Kocher’s player key because it is ‘unique to each receiver.’” PO Resp. 54 (citing Ex. 2024 ¶ 95; Ex. 1004 ¶ 12). Thus, Patent Owner asserts that, “to access the allegedly encrypted digital rights, the EMM first must be decrypted using the *more granular* master key, which is specific to the device, and only then can the digital rights theoretically be decrypted with the *less granular* player keys. That does not ‘improve granularity.’” *Id.* (citing Ex. 2024 ¶ 95). Patent Owner also contends that “in Kocher a content provider is pressing an HD-DVD that will be distributed widely—once pressed, the content of that HD-DVD is fixed forever.” *Id.* at 55 (citing Ex. 2024 ¶ 96). Patent Owner contends that Kocher’s teachings “have no relationship to Chen and no use in Chen.” *Id.* at 56. Patent Owner asserts that Petitioner’s combination results in a “double encryption (encrypting first with the player key and then with the master key)” and the double encryption does not facilitate updating the rights for a class of devices or control granularity because Patent Owner contends “the content provider could have accomplished the *same* result without the extra encryption of the player key because the content provider can choose to send the EMM only to members of the class that should receive the promotion.” *Id.* at 58 (citing Ex. 2024 ¶ 108). Patent Owner

further asserts “the double encryption does nothing to improve security” and adds more encryption and transmission requirements than in Chen alone without corresponding benefit. *Id.* at 60–61.

Patent Owner next asserts Kocher “teaches away from the content provider encrypting the digital rights.” PO Resp. 61 (emphasis and capitalization of heading omitted). Specifically, Patent Owner contends “omitting key management authority and instead allowing the content provider to control the player keys contravenes Kocher’s teachings that, for security reasons, a content provider should **not** have access to the player keys.” *Id.* (citing Ex. 1007, 96:17–18, 96:24–25). Patent Owner also points to Dr. McDaniel’s testimony, where Patent Owner asserts Dr. McDaniel acknowledged that Kocher does not suggest it is a good idea for a content publisher to hold the keys itself. *Id.* at 61–62 (citing Ex. 2016, 91:13–19).

Patent Owner next contends that Petitioner relies on improper hindsight because Petitioner’s combination allegedly relies only on Kocher’s player keys themselves and not “Kocher’s teachings about how to implement the player keys.” PO Resp. 62. Patent Owner asserts that an example is “alter[ing] Kocher’s player keys to serve a different purpose, changing them from key-encrypting keys to data-encrypting keys, for no apparent reason and with no explanation how to apply them in Chen.” *Id.* at 62–63. According to Patent Owner, “[t]hat evinces Petitioner’s reliance on hindsight.” *Id.* at 63; *see id.* (“The Petition provides no evidence it would have been obvious to switch a key-encrypting key to a data-encrypting key in this way, particularly in view of its admission that such keys are used distinctly ‘in DRM parlance.’” (citing Pet. 27)).

We find that Petitioner’s Reply thoroughly and persuasively responds to Patent Owner’s alleged deficiencies regarding the combination. Pet. Reply 29–35. Because Petitioner’s Reply is both thorough and persuasive, we adopt the arguments set forth in Petitioner’s Reply (pages 29–35) as though they were our own for the reasons explained therein by Petitioner. We walk through some of those positions here. First, we agree with Petitioner that Kocher states its invention “may be integrated with *digital data broadcasting systems*” and “[s]ecurity capabilities may also be integrated with (and communicate with) *conventional conditional access cards and systems*.” *Id.* at 29–30 (citing Ex. 1007, 115:30–32, 116:3–5). Thus, we agree with Petitioner that “[r]ather than teach away, Kocher provides additional motivation to apply its teachings to the combination of Ground 3.” *Id.* at 30 (citing Ex. 1032 ¶¶ 66–68; Pet. 63–64; Ex. 1003 ¶¶ 193–194). Additionally, as discussed above, we agree with Petitioner that one of ordinary skill in the art would have understood that one such digital right that could be encrypted/decrypted with Kocher’s player keys are promotions directed at specific types of devices. *Id.* (citing Pet. 72; Ex. 1003 ¶ 207; Ex. 1007, 110:25–111:2, 2:30–3:10 (discussing “promotions”); Ex. 2016, 101:21–102:12, 109:22–110:7). And, we agree with Petitioner that “Kocher teaches that its keys allow ‘decrypt[ion] by authorized players or *a subset of players*.’” *Id.* (alteration in original) (quoting Ex. 1007, 22:5–8).³²

³² We also agree with Petitioner that granularity can be improved by using Kocher’s player keys because manufacturers and content providers can target specific devices (that have the specific keys). This improves granularity as compared to all devices receiving the transmission for the reasons explained by Petitioner. *See* Pet. 61–62, 69–73.

Second, we agree with Petitioner that one of ordinary skill in the art “would have known how to implement the digital rights taught by Kocher and used by the combination.” Pet. Reply 31 (citing Ex. 1003 ¶ 205; Ex. 1004 ¶¶ 6, 22–24; Ex. 1007, 1:11–16, 21:30–22:18, 27:14–25, 65:15–29). And, as Petitioner asserts, “[t]he digital rights may be sent in-band or out-of-band, and may be part of an EMM, but that is not required.” *Id.* (citing Ex. 2016, 85:7–15; Ex. 1004 ¶ 12).

Third, we also agree with Petitioner’s arguments in its Reply, for the reasons expressed therein, as to the following:

(1) Kocher expressly teaches uses multiple levels of decryption operations to protect keys, etc. (*see* Pet. Reply 32 (citing Ex. 1007, 97:12–15)). “By teaching ‘multiple levels of decryption operations,’ Kocher provides motivation for the combination to encrypt EMMs using player keys even if the EMMs already have one encryption layer. The combination uses the masterkey and player keys as independent security mechanisms.” *Id.* “As Chen teaches, EMMs are encrypted with the master key, which authenticates the user as a legitimate user in the system, while Kocher’s player key allows further narrowing, for example to target particular subsets for promotions, etc.” *Id.* at 32–33 (citing Ex. 1003 ¶ 207; Ex. 1007, 110:25–111:2; Ex. 2016, 101:21–102:12). And, we also agree that “Kocher’s keys facilitate a flexible key system where rights can be easily and securely provided to different classes or types of devices.” *Id.* at 33 (citing Ex. 1003 ¶¶ 203–204, 207; Ex. 1032 ¶¶ 76–77).

(2) Patent Owner improperly “attempts to limit Kocher’s player keys to a single embodiment that encrypts an arbitrary plaintext value.” Pet. Reply 33 (citing PO Resp. 39–41). But, “Kocher explains that this is an

‘alternative[]’ embodiment.” *Id.* (alteration in original) (citing Ex. 1007, 96:23–97:11). And, “immediately after explaining this alternative, Kocher states that it may be used in addition to other ‘levels of decryption operations’ and processes.” *Id.* (citing Ex. 1007, 97:12–15 (“Alternative embodiments can, without limitation, use multiple levels of decryption operations, integrate cryptographic results with forensic marking and other operations, use multiple key authorities, and use security code or other processes to further protect or process values (keys, plaintexts, ciphertexts, etc.), etc.”)). Therefore, we agree with Petitioner that “this optional embodiment does not detract from the combination” (*id.* (citing Ex. 1032 ¶¶ 74–75)), and that Kocher teaches or suggests numerous combinations.

(3) Patent Owner “argues it is not a good idea for the ‘content publisher’ to hold the player keys” but, “the combination does not require the content publisher, such as a movie studio, to hold the player keys. For Ground 3, access is determined by who subscribes, receives promotional material, orders PPV [Pay-per-view], etc.” Pet. Reply 33. Petitioner explains “[t]he combination contemplates a broadcast scenario where a service provider transmits video to receiving devices, such as set-top boxes, that it also controls. The service provider, not the content publisher, manages the player keys.” *Id.* (citing Ex. 1032 ¶¶ 79–80).

(4) Patent Owner “argues the combination converts Kocher’s player keys into data-encrypting keys (‘DEKs’)” but, “the combination uses Kocher’s player keys to encrypt *policy*, not content data—therefore, the keys remain key-encrypting keys (‘KEKs’).” Pet. Reply 34. We agree with Petitioner’s position that “DRM systems routinely use KEK to encrypt keys and associated policies, which binds each key with the parameters that

govern its use. This straightforward access control does not convert the KEK into DEK, as [Patent Owner] contends.” *Id.* (citing Ex. 1032 ¶¶ 81–82). Petitioner points to one example of “this common security principle”—the commonly used Kerberos system. *Id.* (citing Ex. 1024). Petitioner contends, and we agree, that “[b]oth experts agree that Kerberos’ service key is a KEK even though it encrypts keys and associated policies.” *Id.* (citing Ex. 1032 ¶¶ 85–87; Ex. 1030, 110:6–16; Ex. 1016 ¶ 100).

Patent Owner’s arguments in its Sur-reply seek to respond to Petitioner’s Reply, but, in nearly each instance, fail to account for what one of ordinary skill in the art would have understood from Kocher, i.e., what Kocher teaches or suggests, as opposed to what Kocher literally discloses. *See* Sur-reply 22–30. Fundamentally, these arguments focus too literally on the express disclosure of Kocher as opposed to how the Petition proposes to rely on those teachings in the combination. Even if Patent Owner is correct that Kocher uses its player keys somewhat differently than Petitioner employs them in the combination, that does not mean Petitioner’s proposed combination would not have been obvious to one of ordinary skill in the art at the time of the invention. The above discussion and teachings of Kocher make clear that there were lots of variations and combinations that one of ordinary skill in the art could have made and would have been motivated to make based on those teachings. Petitioner’s argument and evidence makes clear, on the full record, that one of ordinary skill in the art would have understood Kocher’s player keys to have multiple possible uses and benefits, including those which Petitioner employs in the combination proposed. That there are other potential uses for the player keys does not detract from Petitioner’s proposed combination or reason to combine. Therefore, Patent

Owner's arguments in its Sur-reply do not negate Petitioner's arguments and reliance on the teachings of Kocher as applied to Chen to achieve the combination proposed.

We similarly disagree with Patent Owner's argument that "Kocher provides powerful contemporaneous evidence a [person of ordinary skill in the art] would not have combined Chen's conditional access system with Kocher to arrive at the claims." PO Resp. 65 (emphasis and capitalization of heading omitted). Patent Owner contends "Kocher *already provides a detailed embodiment implementing a conditional access system*" and that embodiment "does not meet the claims." *Id.* at 65–66. Patent Owner asserts that, if the combination proposed by Petitioner were obvious, Kocher's authors would have formed the combination themselves. *Id.* at 66–67. We disagree with Patent Owner's arguments because Petitioner's challenge is based on obviousness, not anticipation by Kocher, thus, there was no need for Kocher to disclose an embodiment that satisfied the contours of claims 5 and 14. Further, simply because a reference teaches an embodiment directed to a certain combination does not mean that other combinations are less obvious or that impermissible hindsight necessarily played a role. Thus, Patent Owner's argument based on Kocher's embodiment does not detract from Petitioner's proposed combination.

Thus, for all of the reasons discussed above, we find that Petitioner establishes that the combination of Chen, Grab-333, and Kocher teaches or suggests the subject matter of claims 5 and 14.

3. *Objective Considerations of Nonobviousness*

Neither party presents evidence of objective considerations of nonobviousness at this stage of the proceeding.

4. *Weighing the Graham Factors*

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.” *Arctic Cat*, 876 F.3d at 1361. On balance, considering the complete record before us, Petitioner has established, by a preponderance of the evidence, that claims 1, 3, 5, 6, 10, 12, 14, and 15 of the ’920 patent would have been obvious to one of ordinary skill in the art at the time of the invention.

III. CONCLUSION

For the reasons discussed above, Petitioner has demonstrated, by a preponderance of the evidence, that claims 1–3, 5, 6, 10–12, 14, 15 are unpatentable.³³ Additionally, we grant in part Petitioner’s Motion to Exclude, exclude Exhibits 2025 and 2028–2030, and do not consider the portions of Patent Owner’s Sur-reply (pages 7 and 18–20) that rely on these exhibits as identified in Paper 35 (Petitioner’s Identification of Improper New Evidence and Arguments in Sur-Reply). We also dismiss in part

³³ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

Petitioner's Motion to Exclude as applied to Exhibits 2004–2006, 2008, 2010, 2011, 2014, 2015, and 2017–2023.

Our conclusions regarding the Challenged Claims are summarized below:

Claim(s)	35 U.S.C. §	Reference(s) /Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 10	103(a)	Chen, Grab-333	1, 10	
1–3, 10–12	103(a)	Chen, Grab-333, Candelore	1–3, 10–12	
1, 3, 5, 6, 10, 12, 14, 15	103(a)	Chen, Grab-333, Kocher	1, 3, 5, 6, 10, 12, 14, 15	
Overall Outcome			1–3, 5, 6, 10– 12, 14, 15	

IV. ORDER

For the reasons given, it is:

ORDERED that claims 1–3, 5, 6, 10–12, 14, and 15 of U.S. Patent No. 9,184,920 B2 are determined to be unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 36) is granted in part such that Exhibits 2025 and 2028–2030 are excluded and dismissed in part such that Exhibits 2004–2006, 2008, 2010, 2011, 2014, 2015, and 2017–2023 are not excluded; and

FURTHER ORDERED that because this is a final written decision, the parties to this 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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Patent 9,184,920 B2

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