UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN VIDEO CAPABLE ELECTRONIC DEVICES, INCLUDING COMPUTERS, STREAMING DEVICES, TELEVISIONS, AND COMPONENTS AND MODULES THEREOF**	**Inv. No. 337-TA-1380**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Cameron Elliot

(December 20, 2024)

Pursuant to the Notice of Investigation and Rule 210.42(a) of the Rules of Practice and Procedure of the United States International Trade Commission, this is my Initial Determination in the matter of *Certain Video Capable Electronic Devices, Including Computers, Streaming Devices, Televisions, and Components and Modules Thereof*, Investigation No. 337-TA-1380.

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TABLE OF ABBREVIATIONS

CDX	Complainant's Demonstrative Exhibit
CIB	Complainant's Revised Initial Post-Hearing Brief
CPB	Complainant's Pre-Hearing Brief
CPX	Complainant's Physical Exhibit
CRB	Complainant's Reply Post-Hearing Brief
CX	Complainant's Exhibit
Hr'g Tr.	Hearing Transcript of Inv. No. 337-TA-1380
1379 Hr'g Tr.	Hearing Transcript of Inv. No. 337-TA-1379
JX	Joint Exhibit
RDX	Respondents' Demonstrative Exhibit
RIB	Respondents' Initial Post-Hearing Brief
RPB	Respondents' Pre-Hearing Brief
RPX	Respondents' Physical Exhibit
RRB	Respondents' Reply Post-Hearing Brief
RX	Respondents' Exhibit
SDX	Commission Investigative Staff's Demonstrative Exhibit
SPB	Commission Investigative Staff's Pre-Hearing Brief
SIB	Commission Investigative Staff's Initial Post-Hearing Brief
SRB	Commission Investigative Staff's Reply Post-Hearing Brief

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I. INTRODUCTION

A. Procedural Background

Complainants Nokia Technologies Oy and Nokia Corporation (together, "Nokia") filed the complaint underlying this investigation on October 31, 2023, with supplements filed November 7, 13, and 17, 2023. The complaint alleged respondents HP, Inc. ("HP"), Amazon.com, Inc., and Amazon.com Services, LLC (together, "Amazon") (altogether "Respondents") import or sell in connection with an importation certain video capable electronic devices, including computers, streaming devices, televisions, and components and modules thereof that infringe one or more claims of U.S. Patent Nos. 7,724,818 ("the 818 patent"), 10,536,714 ("the 714 patent"), 11,805,267 ("the 267 patent"), 8,077,991 ("the 991 patent"), and 8,050,321 ("the 321 patent") (together, the "Asserted Patents").

By publication of a notice in the *Federal Register* on December 6, 2023, the U.S. International Trade Commission ordered that:

> Pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, an investigation be instituted to determine whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain products identified in paragraph (2) by reason of infringement of one or more of claims 6-9, 11, 15, 21, and 23 of the '818 patent, claims 1-30 of the '714 patent, claims 1-36 of the '267 patent, claims 1, 5, 6, 8-13, 17, 18, 20-24, 26, 29-33, 35, and 38 of the '991 patent, and claims 8-11 of the '321 patent, and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]

88 Fed. Reg. 84830 (Dec. 6, 2023). The Commission also ordered participation by the Commission Investigative Staff ("Staff"). *Id.* at 84831.

On December 5, 2023, the investigation was assigned to me. EDIS Doc. ID 809797. On December 22, 2023, I set a target date of April 21, 2025, for completion of this investigation. Order No. 7. Also on December 22, 2023, I set a *Markman* hearing date of March 12, 2024, and the evidentiary hearing for September 9-13, 2024. Order No. 8. On February 14, 2024, the

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Markman hearing was cancelled due to the parties' statement that no disputes existed. Order No. 18.

On February 13, 2024, Nokia moved (1380-016) to terminate claim 23 of the 818 patent from the investigation by reason of withdrawal. The motion was granted via initial determination on February 14, 2024. Order No. 19. On March 8, 2024, the Commission determined not to review Order No. 19. EDIS Doc. ID 815795.

On July 11, 2024, Respondents moved (1380-035) for summary determination that all asserted claims were invalid under Section 101 of the Patent Act, and that Nokia cannot establish the existence of a domestic industry. The motion was granted-in-part on August 12, 2024. Order No. 41. On September 10, 2024, the Commission determined not to review Order No. 41. EDIS Doc. ID 831889.

On August 27, 2024, Nokia moved (1380-052) to terminate claims 11 and 21 of the 818 Patent; claims 9 and 11 of the 321 Patent; claims 1-14, 16-22, and 24-30 of the 714 Patent; claims 1-6, 10-24, and 28-36 of the 267 Patent; and claims 1, 5-6, 8-9, 10-13, 17, 18, 20-21, 23-24, 26, 30, 32, 33, and 35 of the 991 Patent from the investigation by reason of withdrawal. The motion was granted via initial determination on September 3, 2024. Order No. 42. On September 17, 2024, the Commission determined not to review Order No. 42. EDIS Doc. ID 823474.

The evidentiary hearing took place on September 9-13, 2024. Pursuant to the procedural schedule, the parties submitted initial and reply post-hearing briefs on September 30, 2024, and October 15, 2024, respectively. Additionally, an earlier evidentiary hearing took place on July 24-31, 2024, in related investigation 337-TA-1379 between the same parties. The parties thereafter

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filed a stipulation to allow certain hearing transcripts and evidence from the 1379 record to be used in this investigation. EDIS Doc. ID 830742.[1]

On September 16, 2024, Nokia moved (1380-053) to terminate claim 7 of the 818 patent from the investigation by reason of withdrawal. The motion was granted via initial determination on September 17, 2024. Order No. 46. On October 1, 2024, the Commission determined not to review Order No. 46. EDIS Doc. ID 833786.

On November 4, 2024, Nokia and HP moved (1380-054) to terminate HP from the investigation based on settlement. The motion was granted via initial determination on November 25, 2024. Order No. 48. Relatedly, on November 25, 2024, Nokia moved (1380-055) to terminate claim 15 of the 714 patent and claims 7-9 of the 267 patent based on withdrawal—claims which were only asserted against HP. Order No. 49. On December 11, 2024, the Commission determined not to review Order Nos. 48 and 49. EDIS Doc. ID 839030. Therefore, there are issues which were briefed by the parties, but are specific to HP and its accused products, that are not discussed in this initial determination (*e.g.*, HP redesign products).

As of the date of this initial determination, no motions remain pending.

B. The Parties

Complainants Nokia Technologies Oy and Nokia Corporation are Finish corporations located in Espoo, Finland. CPB at 15; RIB at 5. Nokia Technologies Oy is a wholly owned subsidiary of Nokia Corporation and is the owner of the Asserted Patents. CPB at 15. Nokia claims it is "a global company responsible for iconic innovations in the mobile space" and "now

[1] The parties cite to the evidentiary hearing transcript of Inv. No. 337-TA-1379 in either of two ways: citation to the direct transcript using page and line numbers; or citation to a compilation of transcript pages, JX-1489C. This initial determination uses its best efforts to consistently cite to the latter when needed.

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innovates the network, creating technology that makes video streaming run at unprecedent speed and quality." *Id.* at 1.

Respondents Amazon.com, Inc. and Amazon.com Services LLC are Delaware corporations with principal places of business in the states of Washington and Virginia. RIB at 6. According to Amazon, "[it] is a customer-centric U.S. company, renowned for transforming online retail and for device innovation." *Id.*

C. The Asserted Patents and Claims

The 818 patent, entitled "Method for Coding Sequences of Pictures," issued on May 25, 2010, to Miska Hannuksela and Ye-Kui Wang. The 818 patent reports an assignment on its face to Nokia Corporation and claims priority to its non-provisional filing date of April 30, 2003. The patent concerns the transmission of video signals, where the video is divided into pictures, the pictures divided into slices, the slices divided into macroblocks, and different parameters used for encoding and decoding the video stream are themselves divided into sets corresponding to the aforementioned video divisions, among others. 818 patent at 1:46-56, 2:48-3:4. One aspect of the invention relates to arranging the parameter sets into those which need to be transmitted at any given time, and those that do not, so as to minimize bandwidth. *Id.* at 3:56-4:5.

The 321 patent, entitled "Grouping of Image Frames in Video Coding," issued on November 1, 2011, to Miska Hannuksela. The 321 patent reports an assignment on its face to Nokia Corporation and claims priority to a non-provisional application date of November 29, 2002. The patent takes advantage of the fact that consecutive image frames in a video stream often contain a number of stationary objects that remain substantially unchanged, and thus the information in those consecutive frames is similar. 321 patent at 1:55-2:4. The patent discloses the difference between I-frames (initiation) and P-frames (predicted), in which P-frames are those

predicted from previous I-frames (*id.* at 2:23-40), with the invention "based on the idea of encoding a video sequence comprising an independent sequence of image frames, wherein at least one reference picture is predictable from at least one previous image frame that is earlier than the previous reference image frame in decoding order" (*id.* at 4:16-20).

The 991 patent, entitled "Spatially Enhanced Transform Coding," issued on December 13, 2011, to Jani Lainema. The 991 patent reports an assignment on its face to Nokia Corporation and claims priority to a provisional application filed April 12, 2007. The patent teaches a certain combination of "energy compaction features of transform coding with localization properties of spatial coding." 991 patent at Abstract. As part of this process, on the decoding side, predicted blocks of pixels are combined with prediction error values to form the outputted video frames. *Id.* at 1:56-63. The invention relates to methods for "representing the prediction error signal as a weighted sum of different basis functions of a selected transform and quantized spatial samples." *Id.* at 2:58-61, 4:18-21.

The 714 patent, entitled "Method for Coding and an Apparatus," issued on January 14, 2020, to Mehmet Oguz Bici, Jani Lainema, and Kemal Ugur. The 714 patent reports an assignment on its face to Nokia Technologies Oy and claims priority to, *inter alia*, a provisional application filed November 4, 2011. The patent concerns motion vector prediction techniques in which the vectors are "predicted from a set of motion vector prediction candidates determined based on previously-coded motion vectors. A motion vector prediction candidate is included in the set based on the location of the block associated with the first spatial motion vector prediction candidate and in comparison with motion vector prediction candidates already in the set." 714 patent at Abstract. The invention seeks to reduce the complexity of the process "by performing a limited number of

[redacted]

motion information comparisons between candidate pairs to remove the redundant candidates rather than comparing every available candidate pair." *Id.* at 4:13-26.

The 267 patent, entitled "Motion Prediction in Video Coding," issued on October 31, 2023, to Kemal Ugur, Jani Lainema, and Antti Hallapuro. The 267 patent reports an assignment on its face to Nokia Technologies Oy and claims priority to, *inter alia*, a provisional application filed January 7, 2011. The patent concerns motion prediction and levels of precision. 267 patent at Abstract. In the invention, "prediction signals are maintained in a higher precision during the prediction calculation and the precision is reduced after the two or more prediction signals have been combined with each other" which allegedly "reduc[es] the effect of rounding errors in bi-directional and multi-directional prediction." *Id.* at 4:29-35.

The following patent claims are presently at issue in this investigation, according to Nokia's briefing:

Asserted Patent	Infringement Claims	Domestic Industry Claims
7,724,818	6, 8, 9, 15	6, 8, 9, 15
8,050,321	8, 10	8, 10
8,077,991	22, 29, 31, 38	22, 29, 31, 38
10,536,714	23	15, 23
11,805,267	25-27	7-9, 25-27

See generally CIB at 1-2.

D. Products at Issue

1. Domestic Industry Products

According to Nokia, the domestic industry products are "notebook computers (Microsoft Surface), gaming consoles (Xbox Series), and smart phones (Samsung Galaxy) that encode and/or

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[redacted]

decode H.264/5-compliant video." CIB at 6. Nokia explains, "Microsoft DI Products include Xbox and Surface products, with AMD chipsets, Intel chipsets, or NVIDIA chipsets. . . . Each Microsoft DI Product includes at least one decoder that decodes H.264/5-compliant bitstreams and includes at least one encoder for encoding video into H.264/5-compliant formats." *Id.* at 7. A demonstrative from Nokia's second testifying expert, Dr. Omid Kia, indicates four categories of Microsoft products:

Microsoft DI Products	Products Tested	Source Code
Xbox products with custom **AMD** CPUs and GPU	Xbox Series X CPX-0003 (testing); CPX-00017 (testing); CX-8280 (H.264/H.265 test results)	AMD [redacted]
Surface products with **Intel** CPUs and GPUs	Surface Pro 8 CPX-0003 (testing); CPX-00017 (testing); CX-8280 (H.264/H.265 test results)	intel
Surface products with **Nvidia** CPUs and GPUs	Surface Studio 2 CPX-0003 (testing); CPX-00017 (testing); CX-8280 (H.264/H.265 test results)	NVIDIA
Surface products with **AMD** CPUs and GPUs	Surface Laptop 4 CPX-0003 (testing); CPX-00017 (testing); CX-8280 (H.264/H.265 test results)	AMD [redacted]

Id. (citing CDX-0005C.87). It is not clear from Nokia's briefing where the actual list of DI products from Microsoft can be found (*see generally* CIB at xiii-xiv), but they are referred to as the "Xbox DI Products," "Surface DI Products," and altogether as "Microsoft DI Products."

For Samsung, Nokia explains, "Samsung DI Products include Galaxy smart phones, with Android OS or a Qualcomm chipset" and "Galaxy DI Products include a version of Android OS that complies with the H.264/5 Standards and practices the Asserted Patents." CIB at 7. It provides the following demonstrative:

[redacted]

Samsung DI Products	Products Tested	Source Code
Galaxy smartphones with **Android OS**	Galaxy S24 Galaxy S23 Galaxy S22 Galaxy S21 Galaxy S20 CPX-0003 (testing); CPX-00017 (testing); CX-8280 (H.264/H.265 test results)	android OS 11-14
Galaxy smartphones with **Qualcomm** SOCs		Qualcomm [redacted]

Id. at 8 (citing CDX-0005C.89). Nokia adds, "Samsung Galaxy smartphones include at least one version of Android OS code 11-14, which includes an H.264/5 decoder for decoding and encoder for encoding video into H.264/5-compliant formats" which all operate the same with respect to the accused features, and the products "with Qualcomm SoCs include an H.264/5 decoder for decoding and encoder for encoding video into H.264/5-compliant formats." *Id.* It is not clear from Nokia's briefing where the actual list of DI products from Samsung can be found (*see generally* CIB at xiv), but altogether they are referred to as the "Galaxy DI Products" or "Samsung DI Products." All "Microsoft DI Products" and "Samsung DI Products" are together referred to as the "DI Products."

2. Accused Products

The accused articles in this investigation from Amazon are, according to Nokia, "tablet computers, streaming devices, and televisions, utilizing FireOS, [redacted] chipsets." CIB at 2. Nokia adds, "Amazon Accused Products further include Fire OS, which Amazon admitted [redacted]. . . . All experts agreed that each of the versions of Android OS and [redacted] operated the same with respect to the accused features." *Id.* at 3. Nokia further states, "Amazon Accused

[redacted]

Products decode video according to the H.264 and H.265 video decoding standards. Newer Amazon Accused Products additionally decode video according to the AV1 specification," and presents the following demonstrative:

Infringing Amazon Products	Codec	Source Code Reviewed
Echo, Fire tablets, Fire TVs, Fire TV cubes, Fire TV sticks with **Fire OS**	H.264 / H.265 / AV1	fire OS [redacted]
Echo with [redacted]	H.264 / H.265	[redacted]
Echo, Fire TV cubes with [redacted]	H.264 / H.265 AV1 ([redacted]	[redacted]
Echo, Fire tablets, Fire TV sticks, and Fire TVs with [redacted]	H.264 / H.265	[redacted]

Id. at 3-4 (citing CDX-0005C.26 (excerpted)). Amazon generally concurs or at least does not dispute that its accused products comply with the H.264 and H.265 standards—as opposed to AV1, for which there are several disputes. *See* RIB at 2-3, 8, 12-17. It is not clear from Nokia's briefing where the actual list of accused products from Amazon can be found, but altogether they are referred to as the "Amazon Accused Products."

As to one particular product, however, the parties dispute whether it has been properly accused in the first place. Amazon states:

> Drs. Orchard and Moulin do not identify the Echo Shows as Accused Products. Tr. (Orchard) 46:6-8 (identifying "tablets, TVs, and media players"); CDX-0004C.39 (lacks image of Echo Show); Tr. (Moulin) 430:20-431:3 (identifying "Fire Tablets, Smart TVs, and streaming devices"); CDX-0012C.32. Dr. Kia identified the Echo Shows as accused on the '818 and '321 patents, but admitted he did not test one. Tr. (Kia) 297:22-298:13. Thus, Nokia failed to prove any allegation for Echo Show products and no violation should be found as to those products.

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RIB at 18. Nokia responds, "Amazon is fully aware Echo Show is accused of infringing all the Asserted Patents," but for support cites irrelevant expert testimony and a 991 patent demonstrative that is not itself evidence. CRB at 80 (citing Hr'g Tr. (Kia) at 177:3-178:18; Hr'g Tr. (Orchard) at 41:10-52:11; CDX-0004C.48). So given that there is a dispute here, and Nokia fails to explicitly identify its accused products in its post-hearing brief (and fails to mention Echo Show in its pre-hearing brief as well), it is fair to find the Echo Show has not been adequately accused. *See generally* Order No. 2 at G.R. 9.2, 13.1; CPB. Accordingly, "Amazon Accused Products" does not include the Echo Show and it has not been adjudicated.

II. STANDARDS OF LAW

A. Standing

Commission Rule 210.12 states in relevant part "[f]or every intellectual property based complaint (regardless of the type of intellectual property involved), [the complaint must] include a showing that at least one complainant is the owner or exclusive licensee of the subject intellectual property." 19 C.F.R. § 210.12(a)(7). In determining whether this rule is met, the Commission looks to the standing requirement used by courts in patent infringement cases. *Certain Audio Processing Hardware, Software, and Products Containing the Same*, Inv. No. 337-TA-1026, Comm'n Op. at 9 (April 18, 2018) (citations omitted).

B. Claim Construction

"The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000). Although most of the disputed claim terms were construed in an earlier order, some of the issues presented below are only resolvable with additional claim construction.

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Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc); *see also Markman v. Westview Instr., Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc). As the Federal Circuit in *Phillips* explained, courts must analyze each of these components to determine the "ordinary and customary meaning of a claim term" as understood by a person of ordinary skill in art at the time of the invention. 415 F.3d at 1313. "Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001).

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). "Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms." *Id.* at 1314; *see Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point [ ] out and distinctly claim [ ] the subject matter which the patentee regards as his invention."). The context in which a term is used in an asserted claim can be "highly instructive." *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id.* "Courts do not rewrite claims; instead, we give effect to the terms chosen by the patentee." *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364 (Fed. Cir. 1999). "[T]he specification 'is always highly relevant to the claim construction analysis.

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Usually it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Id.* at 1316.

In addition to the claims and the specification, the prosecution history should be examined, if in evidence. *Phillips*, 415 F.3d at 1317; *see Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). The prosecution history can "often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Phillips*, 415 F.3d at 1317; *see Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution.").

When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Phillips*, 415 F.3d at 1317. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id.* "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

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The construction of a claim term is generally guided by its ordinary meaning. However, courts may deviate from the ordinary meaning when: (1) "the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention;" or (2) "the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009); *see Apple Inc. v. Wi-LAN Inc.*, 25 F.4th 960, 967 (Fed. Cir. 2022); *GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("the specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."); *Omega Eng'g, Inc, v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) ("[W]here the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender."); *Rheox, Inc. v. Entact, Inc*., 276 F.3d 1319, 1325 (Fed. Cir. 2002) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution."). Nevertheless, there is a "heavy presumption that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citations omitted). The standard for deviating from the plain and ordinary meaning is "exacting" and requires "a clear and unmistakable disclaimer." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see Epistar Corp. v. Int'l Trade Comm'n*, 566 F.3d 1321, 1334 (Fed. Cir. 2009) (requiring "expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope" to deviate from the ordinary meaning) (citation omitted).

C. Infringement

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman*, 52 F.3d at 976. A patentee may prove infringement either literally or under the doctrine of equivalents. Infringement of either sort must be proven by a preponderance of the evidence. *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988). A preponderance of the evidence standard "requires proving that infringement was more likely than not to have occurred." *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

Literal infringement is a question of fact. *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008). "To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly." *Microsoft Corp. v. GeoTag, Inc.*, 817 F.3d 1305, 1313 (Fed. Cir. 2016) (quoting *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed. Cir. 1995). If any claim limitation is absent, there is no literal infringement of that claim as a matter of law. *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

Doctrine of equivalents is also a form of infringement. One rubric for evaluating if a claimed feature is not literally, but nonetheless equivalent to, a claimed feature is known as the function-way-result test. Under this test, the accused feature is equivalent to the claim limitation when "it performs substantially the same function in substantially the same way to obtain the same result." *Duncan Parking Techs., Inc. v. IPS Grp., Inc.*, 914 F.3d 1347, 1362 (Fed. Cir. 2019) (quoting *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950)). Another is known as the insubstantial differences test, where "[a]n element in the accused device is equivalent to a claim limitation if the only differences between the two are insubstantial." *Voda v. Gordia*

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Corp., 536 F.3d 1311, 1326 (Fed. Cir. 2008) (citing *Honeywell Int'l Inc. v. Hamilton Sundstrand Corp.*, 370 F.3d 1131, 1139 (Fed. Cir. 2004)). The Supreme Court has further instructed, "the proper time for evaluating equivalency . . . is at the time of infringement, not at the time the patent was issued." *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 37 (1997).

In addition to direct infringement, Section 271 of the Patent Act defines two categories of indirect infringement, inducement of infringement and contributory infringement. 35 U.S.C. § 271. For indirect infringement violations under Section 337, the direct infringement element may occur after importation, so long as all the other elements of indirect infringement are met at the time of importation. *See Certain Vision-Based Driver Assistance System Cameras and Components Thereof*, Inv. No. 337-TA-907, Comm'n Op. at 19 (Dec. 1, 2015) (citing *Suprema, Inc. v. Int'l Trade Comm'n*, 796 F.3d 1338, 1348 (Fed. Cir. 2015)). It is well settled that "[a]bsent direct infringement of the patent claims, there can be neither contributory infringement ... nor inducement of infringement." *Met–Coil Sys. Corp. v. Korners Unltd., Inc.*, 803 F.2d 684, 687 (Fed.Cir.1986) (citations omitted).

As to the first category, "[w]hoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b); *see DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1305 (Fed. Cir. 2006) (en banc) ("To establish liability under section 271(b), a patent holder must prove that once the defendants knew of the patent, they actively and knowingly aided and abetted another's direct infringement.") (citations omitted). "The mere knowledge of possible infringement by others does not amount to inducement; specific intent and action to induce infringement must be proven." *Id.* (citations omitted). A defendant's belief regarding patent validity is not a defense to a claim of induced infringement. *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920 (2015). A defendant's willful blindness on the question of infringement will satisfy the knowledge

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requirement. *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 765, 768-771 (2011). The requisite intent to induce infringement "may be established through circumstantial evidence" and "'may be inferred from all of the circumstances.'" *See Broadcom Corp. v. Qualcomm, Inc.*, 543 F.3d 683, 699 (Fed. Cir. 2008) (citing *DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293 (Fed. Cir. 2006); *Water Techs. Corp. v. Claco, Ltd.*, 850 F.2d 660, 669 (Fed. Cir. 1988)).

As to the second category, "a party who sells a component with knowledge that the component is especially designed for use in a patented invention, and is not a staple article of commerce suitable for substantial noninfringing use, is liable as a contributory infringer." *Wordtech Sys., Inc. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1316 (Fed. Cir. 2010). Contributory infringement is premised upon a finding that: (1) the entity sells, offers to sell, or imports into the United States a component of a product; (2) the component has no substantial non-infringing use; (3) the component constitutes a material part of the claimed invention; (4) the entity was aware of the patent and knew that the product may be covered by a claim of the patent; and (5) the use of the component in the product directly infringes the claim. *See Certain Gaming & Entm't Consoles, Related Software, & Components Thereof*, Inv. No. 337-TA-752, Initial Determination (Remand) at 7-8 (Mar. 22, 2013) (citing 35 U.S.C. § 271(c); *Arris Group v. British Telecomm. PLC*, 639 F.3d 1368, 1376 (Fed. Cir. 2011)), *non-reviewed*, Notice (May 23, 2013). As with inducement, willful blindness on the question of infringement will satisfy the knowledge requirement. *Global-Tech*, 563 U.S. at 765, 768-771.

D. Domestic Industry

In an investigation based on a claim of patent infringement, section 337 requires that an industry in the United States, relating to the articles protected by the patent, exist or be in the process of being established. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic

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industry requirement has been divided into (i) a "technical prong" (which requires articles covered by the asserted patent) and (ii) an "economic prong" (which requires certain levels of activity with respect to the protected articles or patent itself). *See Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm'n Op. at 6-7 (April 14, 2011) ("*Video Game Systems*").

1. Technical Prong

The technical prong of the domestic industry requirement is satisfied when the complainant in a patent-based section 337 investigation establishes that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. §§ 1337 (a)(2), (3); *Certain Microsphere Adhesives, Process for Making Same and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. at 8 (U.S.I.T.C. Jan. 16, 1996). "In order to satisfy the technical prong of the domestic industry requirement, it is sufficient to show that the domestic industry practices any claim of that patent, not necessarily an asserted claim of that patent." *Certain Ammonium Octamolybdate Isomers*, Inv. No. 337-TA-477, Comm'n Op. at 55 (U.S.I.T.C. Aug. 28, 2003). Historically, the Commission permits the complainant's products, and those of its licensees, to be considered for technical prong purposes. *See Certain Magnetic Tape Cartridges and Components Thereof*, Inv. No. 337-TA-1058, Comm'n Op. at 28-29 (April 9, 2019).

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement. *See Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109 (U.S.I.T.C. May 21, 1990), *aff'd*, Views of the Commission at 22 (U.S.I.T.C. Oct. 31, 1990); *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). "First, the claims of the patent are construed. Second, the complainant's article or process is examined to determine whether it falls within the scope of the claims." *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109. As with infringement, the technical prong of the domestic industry can be

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satisfied either literally or under the doctrine of equivalents. *Certain Dynamic Sequential Gradient Devices and Component Parts Thereof*, Inv. No. 337-TA-335, ID at 44, Pub. No. 2575 (U.S.I.T.C. May 15, 1992). In short, the patentee must establish by a preponderance of the evidence that the domestic product practices one or more claims of the patent.

2. Economic Prong

The "economic prong" of the domestic industry requirement is satisfied when there exists in the United States, in connection with products practicing at least one claim of the patent at issue: (A) significant investment in plant and equipment; (B) significant employment of labor or capital; or (C) substantial investment in its exploitation, including engineering, research and development, and licensing. 19 U.S.C. § 1337(a)(3). Establishment of the "economic prong" is not dependent on any "minimum monetary expenditure" and there is no need for complainant "to define the industry itself in absolute mathematical terms." *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm'n Op. at 25-26 (May 16, 2008) ("*Stringed Instruments*"). However, a complainant must substantiate the significance of its activities with respect to the articles protected by the patent. *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 30 (Feb. 17, 2011) ("*Imaging Devices*"). Further, a complainant can show that its activities are significant by showing how those activities are important to the articles protected by the patent in the context of the company's operations, the marketplace, or the industry in question. *Id.* at 27-28. That significance, however, must be shown in a quantitative context. *Lelo Inc. v. Int'l Trade Comm'n*, 786 F.3d 879, 886 (Fed. Cir. 2015). The Federal Circuit noted that when the ITC first addressed this requirement, it found the word "'significant' denoted 'an assessment of the *relative* importance of the domestic activities.'" *Id.* at 883-4 (internal citation omitted) (emphasis added). In general, "[t]he purpose of the domestic industry requirement is to prevent the ITC from becoming a forum for resolving

disputes brought by foreign complainants whose only connection with the United States is ownership of a U.S. patent." *Certain Battery-Powered Ride-On Toy Vehicles*, Inv. No. 337-TA-314, USITC Pub. No. 2420, Initial Determination at 21 (Aug. 1991); *see Certain Vacuum Insulated Flasks and Components Thereof*, Inv. No. 337-TA-1216, Notice at 3-4 (Oct. 21, 2021) ("Given the nature and extent of [complainant's] investments in plant and equipment as a whole, [complainant] is not a mere importer.").

E. Invalidity

1. 35 U.S.C. § 101

Section 101 states:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

35 U.S.C. § 101. To determine patent eligibility under § 101, courts apply the two-step Alice test and first "determine whether the claims at issue are directed to a patent-ineligible concept," and then if so, "examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice Corp. Pty. v. CLS Bank Intern.*, 573 U.S. 208, 217-18, 221 (2014). "The 'directed to' inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether 'their character as a whole is directed to excluded subject matter.'" *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (citing *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015); *Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1375 (Fed. Cir. 2016)). To save a patent at the second step, an inventive concept must be evident in the claims. *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151-52 (Fed. Cir. 2016).

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2. 35 U.S.C. § 102

Under the previous version of 35 U.S.C. § 102, a patent claim is invalid as anticipated if:

> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant;
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States;

35 U.S.C. § 102 (pre-AIA). Under the current version, a patent claim is invalid as anticipated if:

> (1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or
>
> (2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

35 U.S.C. § 102 (AIA). "A patent is invalid for anticipation if a single prior art reference discloses each and every limitation of the claimed invention. Moreover, a prior art reference may anticipate without disclosing a feature of the claimed invention if that missing characteristic is necessarily present, or inherent, in the single anticipating reference." *Schering Corp. v. Geneva Pharm., Inc.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citations omitted); *see Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1354 (Fed. Cir. 2012). "A century-old axiom of patent law holds that a product 'which would literally infringe if later in time anticipates if earlier.'" *Upsher-Smith Labs., Inc. v. Pamlab, L.L.C.*, 412 F.3d 1319, 1322 (Fed. Cir. 2005) (citing *Schering Corp.*, 339 F.3d at 1322). Anticipation, and all other grounds of patent invalidity, must be proved by clear and convincing evidence. *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 95 (2011).

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3. 35 U.S.C. § 103

Pursuant to the previous version of 35 U.S.C. § 103:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103(a) (pre-AIA). Under the current version:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103(a) (AIA). "Obviousness is a question of law based on underlying questions of fact." *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 528 F.3d 1365, 1379 (Fed. Cir. 2008). The underlying factual determinations include: "(1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) objective indicia of non-obviousness." *Id.* (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)). These factual determinations are often referred to as the "*Graham* factors."

The critical inquiry in determining the differences between the claimed invention and the prior art is whether there is a reason to combine the prior art references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). In *KSR*, the Supreme Court rejected the Federal Circuit's rigid application of the teaching-suggestion-motivation test. While the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant

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field to combine the elements in the way the claimed new invention does," it described a more flexible analysis:

> Often, 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 . . . . As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

Id. at 418. Since *KSR*, the Federal Circuit has announced that, where a patent challenger contends that a patent is invalid for obviousness based on a combination of prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device . . . and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007); *see KSR*, 550 U.S. at 399 ("The proper question was whether a pedal designer of ordinary skill in the art, facing the wide range of needs created by developments in the field, would have seen an obvious benefit to upgrading Asano with a sensor.").

An obviousness determination should also include a consideration of how "secondary considerations" such as "commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Graham*, 338 U.S. at 17-18. "For [such] objective evidence to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention." *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995); *see Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 837 (Fed. Cir. 2015). "Where the offered secondary consideration actually results from something other than what is both claimed and novel in the claim, there is no

nexus to the merits of the claimed invention." *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011); *see Apple Inc. v. Samsung Elecs. Co., Ltd.*, 839 F.3d 1034, 1054-1056 (Fed. Cir. 2016).

III. IMPORTATION, STATUTORY AUTHORITY, AND CONSTITUTIONAL ISSUES

Nokia contends:

> The Commission has statutory authority over this Investigation and Respondents. Personal, subject-matter, and in rem jurisdictional authority under Section 337 is undisputed. Respondents have engaged in violative importation, sale for importation, and/or sale after importation of infringing articles. Respondents participated in this Investigation and do not dispute the importation requirement.

CIB at 9 (citing JX-0017C; JX-0022C). Amazon similarly notes it has stipulated to importation of the Accused Products. RIB at 9 (citing JX-0017C; JX-0022C; RX-1916C; RX-1918C). Accordingly, the importation requirement under 19 U.S.C. § 1337(a)(1)(B) is satisfied, and the Commission has statutory authority over all Accused Products. *See Certain Light-Based Physiological Measurement Devices and Components Thereof*, Inv. No. 337-TA-1276, Comm'n Op. at 15 (Nov. 14, 2023) ("The Commission and ALJs have used the term 'jurisdiction' in the past as a shorthand for statutory authority. Executive agencies, of course, do not have jurisdiction, but rather are creatures of statute that cannot exceed their statutory authority.").

Amazon nonetheless challenges the Commission's authority on a basis it characterizes as statutory. *See* RIB at 11. That challenge is difficult to parse, but Amazon appears to assert the following: (1) Nokia's domestic licensees, Samsung and Microsoft, are not harmed by any alleged infringement and would not benefit from any remedy in this investigation; (2) Samsung's and Microsoft's investments are "wholly unrelated to the accused functionality"; (3) "under these facts . . . the statutory domestic industry requirement [is] meaningless, turning the Commission into a non-Article III forum where patent infringement actions are tried without a jury"; and (4) all this "contravenes Section 337." *Id*. at 11. This initial determination follows Section 337, however, and thus necessarily does not contravene Section 337, so Amazon's argument is meritless.

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Amazon also argues that the Commission lacks a quorum in this investigation and it accordingly requests extensions of the target date until a quorum exists. *See* RIB at 3-5. But as Nokia and Staff observe, the Commission has determined not to review multiple initial determinations in this investigation despite the seeming lack of quorum, and the vote of only one Commissioner is needed to order review, so there is little danger of a complete lack of review. *See* CIB at 9-10; SIB at 4 (citing 19 C.F.R. § 210.42(h)(2)). On balance, Amazon's arguments about a lack of quorum are best considered in the first instance by the Commission itself.

Amazon further contends that the removal restrictions on Commission administrative law judges violate the Take Care Clause of Article II of the Constitution, and that without satisfaction of the domestic industry requirement, "the Commission's resolution of patent infringement disputes would violate both Article III and the Seventh Amendment." RIB at 9-11. But Amazon cites no authority from either the Supreme Court or the Court of Appeals for the Federal Circuit holding that a Commission proceeding heard by an administrative law judge violates any constitutional provision, with or without the domestic industry requirement, or that constitutional violations found by other appellate courts are binding on Commission proceedings. *See id*. The Supreme Court, in fact, has expressly declined to address whether patent infringement actions may be heard in a non-Article III forum, and such actions are heard routinely in the Court of Federal Claims, which is a non-Article III forum. *See Oil States Energy Svcs., LLC v. Greene's Energy Group, LLC*, 584 U.S. 325, 344 (2018); *e.g., Chemical Separation Technology, Inc. v. U.S.*, 51 Fed. Cl. 771 (Mar. 11, 2002). So Amazon's constitutional arguments are meritless.

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IV. U.S. PATENT NO. 7,724,818

A. Claims-at-Issue

Claims 6, 8, 9, and 15 of the 818 patent are at issue in this investigation, either through allegations of infringement or domestic industry technical prong. *See* CIB at 1-2, 206. These claims are reproduced below, along with limitation identifiers:

> 6. [6a] A method for decoding sequences of pictures from a bitstream, wherein parameters are defined in a parameter set and each picture comprises information of one or more slices, the method comprising:
>
> [6b] recognizing, in a decoder, a sequence parameter set and forming at least one sequence parameter pertaining to a sequence using the parameter set;
>
> [6c] recognizing, in the decoder, a picture parameter set and forming at least one first picture parameter value pertaining to a picture using the parameter set;
>
> [6d] forming, in the decoder, at least one second picture parameter value using information of a slice header, the at least one second picture parameter value remaining unchanged at least in all slice headers of one picture; and
>
> [6e] using, in the decoder, the at least one second picture parameter value in decoding.
>
> . . . .
>
> 8. The method according to claim 6, wherein the picture parameter set is included with a reference to a sequence parameter set.
>
> 9. The method according to claim 6, wherein the second picture parameter value is selected from a group of information of a picture order count and a frame number.
>
> . . . .
>
> 15. [15a] A receiving device comprising a decoder for decoding sequences of pictures from a bitstream, wherein parameters are defined in a parameter set and each picture comprises information of one or more slices, the decoder comprising:
>
> [15b] a processor configured for:
>
> [15c] recognizing a sequence parameter set for a sequence of pictures and forming at least one sequence parameter pertaining to a sequence using the parameter set;

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> [15d] recognizing a picture parameter set for a picture and forming at least one first picture parameter value pertaining to a picture using the parameter set;
>
> [15e] forming at least one second picture parameter value using information of a slice header, the at least one second picture parameter value remaining unchanged at least in all slice headers of one picture; and
>
> [15f] using the at least one second picture parameter value in decoding.

818 patent at cls. 6, 8, 9, 15 (annotated).

B. Claim Construction

The parties do not explicitly identify any claim terms needing construction. *See, e.g.*, CIB at 116; RIB at 19.

C. Infringement

According to Nokia's post-hearing briefing, the use, manufacture, or sale of the Accused Products infringes claims 6, 8, 9, and 15. CIB at 1-2. Of these, claims 6 and 15 are independent with claims 8 and 9 each depending from claim 6. All claims relate to decoding a video stream. For the reasons discussed below, Nokia has shown infringement of these claims by the Accused Products.

Nokia's initial brief, primarily relying on the testimony of Dr. Kia, describes how each limitation of claims 6, 8, 9, and 15 is required by the H.264 and H.265 standards. *See* CIB at 118-130 (citing, *inter alia*, Hr'g Tr. (Kia) at 318:12-15, 177:13-198:23, 235:16-236:12). Nokia contends this is undisputed. *Id.* at 117. Nokia contends it is further undisputed that the Accused Products comply with the H.264 and H.265 standards. *Id.* (citing, *inter alia*, Hr'g Tr. (Kia) at 177:21-178:5, 183:5-184:12).

Indeed, Amazon does not dispute that the Accused Products practice the H.264 and H.265 standards. *See generally* RIB at 19-21. As for whether the H.264 and H.265 standards require

claims 6, 8, 9, and 15, Amazon only cursorily argues that limitations [6b] and [6c] may not be met because of the "pertaining to a sequence/picture using the parameter set" limitations:

> Although independent claims 6/15 require a sequence parameter and picture parameter that "*pertain*[] to a sequence/picture using the parameter set," Dr. Kia failed to identify that relationship in the Accused Products. *Compare* JX-0001 12:1-16, 13:30-46, *with* Tr. (Kia) 187:15-23-191:12. As Dr. Storer explained, Dr. Kia's cursory identification of sequence/picture parameters being *stored* omitted how such parameters relate to a *particular* sequence/picture using the sequence/picture parameter set as required by the "pertaining" limitation. Tr. (Storer) 1173:5-1175:13; RDX-0097C.106.

RIB at 19 (emphasis in original). However, the cited testimony from Amazon's expert, Dr. Storer, contains only the barest assertion that the limitations are not met, without any reference to the evidence or the standard. *See* Hr'g Tr. (Storer) at 1174:5-1175:5. So there is no meaningful dispute that claims 6, 8, 9, and 15 are standard essential. Nevertheless, Nokia responds that "pertaining" is met because "the sequence parameter set (SPS) for the sequence is referenced in the picture parameter set (PPS), and the PPS for the picture is referenced in the slice header." CRB at 46-47 (citing Hr'g Tr. (Kia) at 187:12-188:5, 189:14-190:8, 196:13-197:8). This meets a plain and ordinary meaning of "pertaining." Amazon's reply brief suggests "pertaining' requires something more, *i.e.*, that the parameters must be formed with respect to a particular picture or sequence" (RRB at 13), but it provides no expert or other evidence in support of this construction (*id.* (citing RIB at 19-20); see RIB at 19-20). It is therefore unpersuasive.

Accordingly, Nokia has shown claims 6, 8, 9, and 15 are infringed by the Accused Products by way of those claims being essential to the H264 and H.265 standards, and those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18; RRB at 8-11. To the extent Amazon suggests some or all of the Accused Products actually do not comply with the H.264 and H.265 standards as relevant to the techniques of the 818 patent (*see, e.g.*, RIB at 20 ("Dr. Kia again ignored the

[redacted]

[redacted] declaration that demonstrated [redacted] chips do not function in the manner he relied on as evidence of infringement.”)), or that the infringing activity is somehow licensed (*see* RRB at 13 (referencing Microsoft functionality)), neither suggestion has been reliably set forth in Amazon’s briefing.[2]

As for Nokia’s claims of indirect infringement under the 818 patent (CIB at 204-206; CRB at 81-83), they are persuasive. Amazon encourages customers of the Accused Products to stream video (*see, e.g.*, CIB at 204 (citing Hr’g Tr. (Kia) at 236:14-237:4; Hr’g Tr. (Orchard) at 70:25-71:14); Hr’g Tr. at 353:24-354:9), and Amazon was provided notice of the 818 patent, specifically, in the year 2020 in the context of infringement and license negotiations (CX-8149C.0050). As to Amazon’s claim that video playback is not in and of itself infringing because “many video standards are not alleged to practice the ’818 patent” (RIB at 23; see RRB at 10), it has been shown that H.264 and H.265 are used extensively in the market and it is far more likely than not that customers’ Accused Products employ them (*see generally* Hr’g Tr. (Botner) at 334:1-344:2). The standard for inducement is therefore met. *Amarin Pharma, Inc. v. Hikma Pharms. USA Inc.*, 104 F.4th 1370, 1377 (Fed. Cir. 2024). No showing has been made for contributory infringement, however, to the extent it is alleged. *Compare* RIB at 24 *with* CIB at 204-206 *with* CRB at 81-83.

D. Domestic Industry – Technical Prong

According to Nokia’s post-hearing briefing, the DI Products practice claims 6, 8, 9, and 15 patent. CIB at 1-2, 206. For the reasons discussed below, Nokia has shown by a preponderance of the evidence that the DI Products practice these claims.

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[2] Moreover, in the [redacted] example, Amazon cites a declaration, RX-5161, that does not exist within the submitted exhibits, in either public or confidential status. RIB at 20.

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Nokia contends, "[t]he DI Products practice the Asserted Patents for the same reasons as discussed for infringement because each of those products contains chips or an Android OS (Samsung) that Complainants' experts confirmed results in the same capabilities as the Accused Products." CIB at 206 (citing, *inter alia*, Hr'g Tr. (Kia) at 240:13-247:20). Amazon does not dispute the DI Products practice the H.264 and H.265 standards. *See* RIB at 24-25; RRB at 11. As determined above, it has been established that the limitations of claims 6, 8, 9, and 15 are required by the H.264 and H.265 standards.

Accordingly, Nokia has shown claims 6, 8, 9, and 15 are practiced by the DI Products by way of those claims being essential to the H264 and H.265 standards, and those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 24-25; RRB at 8-11.

E. Validity

Amazon identifies the following invalidity theories for the 818 patent:

Claims	Theory
6, 8, 9, 15	Lack of patentable subject matter under 35 U.S.C. § 101
6, 8, 9, 15	Rendered obvious under 35 U.S.C. § 103 by JVT-E022d7 (RX-4608)
6, 8, 9, 15	Rendered obvious under 35 U.S.C. § 103 by VCEG-N52 (RX-0020) in view of Sriram (RX-5188)
6, 8, 9, 15	Improper inventorship

See generally RIB at 39-65. Related to at least one of Amazon's theories is the proper priority date for the 818 patent.

Nokia contends the 818 patent is entitled to a priority date of April 27, 2002, or May 1, 2002, with those dates marking conception of the claimed subject matter, and December 18, 2002, as the date of reduction to practice. *See* CIB at 114, 146. Nokia points to its JVT standard setting organization contributions designated "JVT-Cxxx" and "JVT-C078" as evidencing conception. *Id.* at 137-138 (citing, *inter alia*, JX-0481 (JVT-Cxxx); JX-0471 (JVT-Cxxx); JX-0475 (JVT-C078); JX-0476 (JVT-C078 Annex A)). And Nokia asserts that "[t]he invention was diligently reduced to practice through H.264 standardization and the H.264 reference software" as shown by inventor testimony, third party testimony, additional contribution records, and a series of emails. *Id.* at 143-148 (citing, *inter alia*, JX-0479 (JVT-D094); CX-4929 (JVT-D145); CX-5932 (JVT-D157)). Nokia emphasizes that this development and incorporation of the invention into the H.264 standard—even though done by others—was done at the direction, authorization, and expectation of the inventors Dr. Hannuksela and Dr. Wang; *i.e.*, the work of the other members of the JVT inures to Drs. Hannuksela and Wang. *See id.* at 144, 147 (citing *Cooper v. Goldfarb*, 154 F.3d 1321, 1331-32 (Fed. Cir. 1998); *Arctic Cat v. GEP Power Prods.*, 919 F.3d 1320, 1332 (Fed. Cir. 2019); *Solvay S.A. v. Honeywell Int'l*, 742 F.3d 998, 1006 (Fed. Cir. 2014)).

Amazon disputes these conception and reduction to practice dates. For conception, it contends the primary contribution document, JVT-C078, "cover[s] entirely different ideas" from the claims of the 818 patent application filed on April 30, 2003. RIB at 45. In Amazon's view, JVT-C078 "described a four-parameter-set structure with specific rules for categorizing parameters," while the 818 patent "envisions a two-parameter-set structure that operates under entirely different rules—rules the applicant argued were novel." *Id.* at 46. As examples, Amazon contrasts a "slice header" in the 818 patent with a "slice parameter set" in JVT-C078, and contrasts separate sets for sequence parameters and presentation parameters in JVT-C078 with a combined

set for both in the 818 patent. *Id.* at 47-48. Amazon also asserts a follow-on contribution from Dr. Hannuksela and Dr. Wang, JVT-D094, which "mov[ed] to a two-parameter-set structure and no longer nest[ed] them," shows the inventors' idea was in flux and "did not have a 'definite and permanent' conception by May 1, 2002." *Id.* at 49.

Amazon is not persuasive as to conception. All of Amazon's proposed differences, or evidence of an idea "in flux," are between JVT-C078 and the 818 patent's specification as opposed to the patent's claims. *See* RIB at 45-49 ("this is not an issue of four-parameter-sets versus two-parameter-sets—the issue is the specific rules used for categorizing parameters . . ."); RRB at 16-19 ("The issue is not whether the claims cover a subset, but that the claimed invention differs from that disclosed in JVT-C078, with different parameter sets and different rules."). So, as a practical matter, there is no real dispute that JVT-C078 discloses an embodiment which meets claims 6, 8, 9, and 15. And being a published document, it is critical, if not dispositive, evidence of "definite and permanent" conception. *E.I. du Pont De Nemours & company v. Unifrax I LLC*, 921 F.3d 1060, 1075 (Fed. Cir. 2019) ("Conception requires formation of a 'definite and permanent idea of the complete and operative invention' in the mind of the inventor.") (citation omitted); *see Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1229 (Fed. Cir. 1994) (warning that an idea is not "definite and permanent" if it is in flux).

With that said, Amazon's reply brief asserts that the "rules" of the specification "inform[]" the meaning of the claim terms "sequence parameter set," "picture parameter set," and "slice header," but Amazon cites no expert testimony on the subject, and the cited prosecution history page is merely a generalized description of the invention. *See* RRB at 17 (citing *Phillips*, 415 F.3d at 1315-17; JX-0002.0179), 18 n.15. As noted above in connection with infringement, such perfunctory arguments are not persuasive. And the point does not even show up in Amazon's pre-

hearing brief, and so it is waived anyway. *See* RPB at 8-43. Given this, and the fact that the primary figure of the 818 patent appears identically in JVT-C078 (*compare* JX-0475 at Fig. 1 *with* 818 patent at Fig. 1), Nokia has shown conception as of May 1, 2002.

Moving to reduction to practice, Amazon argues the inventors did not exhibit diligence in incorporating the invention into the standard. RIB at 50. Amazon characterizes the end document, JVT-D145, the final relevant proposal to the standard, as reflecting the ideas of Sony's JVT participants—not Nokia's—and otherwise argues it is not a reduction to practice in and of itself. *Id.* Next, Amazon highlights email correspondence between a JVT implementation organizer, Mr. Karsten Suehring, and Dr. Hannuksela that allegedly shows "Nokia's named inventors wanted no part of implementing JVT-D145 into the reference code." *Id.* at 51 (citing CX-7169). Amazon contends neither Mr. Suehring nor the eventual implementer, Dr. Stephen Wenger, worked at either named inventor's request and so their work should not inure to those inventors. *Id.* at 51-52 (citing *Cooper*, 154 F.3d at 1332); RRB at 20 ("The named inventors did nothing to assist Mr. Suehring in locating someone to implement the code"). And based on Dr. Hannuksela and Dr. Wang's refusal to implement JVT-D145 themselves, Amazon argues that the project, which should have taken five weeks, took five months, which does not reflect diligence. RIB at 52 (citing CX-7136).

Amazon is very nearly persuasive, but the record shows the efforts of Mr. Suehring and Dr. Wenger to implement the invention into the standard properly inures to Drs. Hannuksela and Wang. As Amazon notes, "inurement requires that 'the other person was working either explicitly or implicitly at the inventor's request' . . . The focus is on 'the relationship between them.'" RIB at 51 (citing *Cooper*, 154 F.3d at 1332). The context of a standard-setting working group and the circumstances of this particular JVT relationship are one of collaboration and a shared goal—even

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if the participants are from different companies, and even if individuals of the group decline to perform certain roles. *Id.*; *see generally* CX-7136. There can be no doubt that JVT-D145, containing the invention of the 818 patent, was going to be implemented into the standard (*i.e.*, reduced to practice) and that Dr. Hannuksela's and Dr. Wang's refusal to personally perform the implementation in August 2002 (RX-3524; CX-7169) was not going to defeat the project (CX-7136). Mr. Suehring testified that his job was to make sure adopted proposals became implemented, and there is no dispute JVT-D145 had been adopted. Hr'g Tr. (Suehring) at 110:4-19, 113:18-114:18; CX-5609. The record shows that Mr. Suehring, and the eventual implementer Dr. Wenger, worked diligently to achieve this and did so around December 16-18, 2002. CX-7136; Hr'g Tr. (Suehring) at 117:23-118:13 ("the work was constantly going on. We were obviously busy moving the software forward."), 119:20-121:4; RIB at 38, 52.

These facts align with several cases holding for inurement discussed by the Federal Circuit in *Solvay S.A. v. Honeywell Int'l Inc.*, 742 F.3d 998 (Fed. Cir. 2014) (discussing *Hogue v. Cowling*, 26 CCPA 874, 101 F.2d 541, 542, 544, 550 (1939); *Learned v. Thompson*, 39 C.C.P.A. 730, 191 F.2d 409, 410–11, 415 (1951)). And when considering its own fact pattern involving a U.S. company and foreign company operating under agreement, the *Solvay* court summarized:

> Thus, our case law does not support Solvay's contention that an inventor must make an express directive or request to benefit from a third party's reduction to practice. Rather, inurement exists if the inventor authorizes another to reduce his invention to practice. Here, the research agreement between the RSCAC and Honeywell confirms that the RSCAC authorized Honeywell to practice its invention in the United States and contemplated that Honeywell would do so.

742 F.3d at 1006. Surely, Dr. Hannuksela and Dr. Wang contemplated that their submissions, JVT-C078 and JVT-D094, if adopted, would eventually be reduced to practice by someone within the collaborative breakout group. Hr'g Tr. (Suehring) at 118:1-8. That is seemingly how collaborative standards setting works, and it is distinguishable from the facts of *Cooper*, where the

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implementer "was not required to use the tubes supplied by the [inventor] or to perform his experiments in any particular way." *Cooper*, 240 F.3d at 1381. And even with a more distanced relationship, some aspects of the implementer's work in *Cooper* were held to inure to the inventor. *Id.* at 1384-5. So the efforts of Mr. Suehring and Dr. Wenger properly inure to Dr. Hannuksela and Dr. Wang. As to whether Mr. Suerhing and Dr. Wenger were diligent, the evidence shows they were even if the whole process took five months, which is Amazon's only critique of these individuals' efforts. RIB at 52; *see id.* at 51 (citing *Griffith v. Kanamaru*, 816 F.2d 624, 628-629 (Fed. Cir. 1987) (holding that inventor effectively setting aside invention for a year supported no diligence)); CRB at 57 ("Respondents cannot point to any significant gaps of unexplained activity.").

Amazon makes the additional argument that "JVT-D145 reflects Sony's idea, not Nokia's," and so "Nokia has shown no connection between JVT-C078 (its conception document) and JVT-D145." RIB at 50; *see id.* at 26-34. The record is not so clear, however. JVT-D145 does not, itself, make any reference to Sony's contributions. RX-0036. And Amazon's cited testimony of Dr. Wenger only refers to "the output of the Klagenfurt meeting" as including SPS (sequence parameter set) and PPS (picture parameter set). CX-8729C (Wenger) at 201:1-202:14.[3] In the notes for that meeting, Sony's contribution (JVT-D087) is listed alongside Nokia's second contribution (JVT-D094), both under the section header "4.15.6 Picture Layer":

[3] Amazon also cites CX-5847C (RIB at 33) but that exhibit cannot be located in the record.

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[redacted]

JVT-D087 P2.0/3.1 [Walker+] Network Adaptation Layer and High-Level Syntax
" This contribution presents several modifications intended to simplify and cleanup the NAL design: replacing the picture header with slice-level parameter sets, some modifications to slice header to move some information to slice parameters, as well as a reduction in the number of NAL unit types. It also presents some constraints on the ordering of NAL unit in an AVC stream."

Similar to D066 regarding picture header issue.

Advocates aggressively moving things into dynamic parameter set from current slice and picture header.

Allow multiple parameter sets to be sent in on NAL unit

Simplify the NAL types. No mixed picture versus non-mixed picture indication.

IDR indication.

User data, various SEI-related issues.

Ordering of NAL units

Outcome is reflected in high-level syntax output document.

JVT-D094 P2.0/3.1 [Hannuksela+] Modifications to High-Level Syntax and Semantics
"The contribution proposes replacement of the picture header with the picture parameter set. Furthermore, the contribution proposes an addition to the parameter set, a simplification to the definition of the first byte of the NAL unit syntax, and straightforward changes to the slice header syntax. It also presents a high-level architecture description of the JVT codec."

Similar to D066 regarding picture header issue but contains issues regarding:
- Parameter Sets & Picture Header
- NAL Unit Types
- SEI Messages
- Constraints on Order of NAL Units

Covered in high-level syntax output.

RX-4078.0032. So it is not at all clear that JVT-D145 is unrelated to Nokia's contributions to the group. *See, e.g.*, RX-4900.0023 (draft of JVT-D087 stating, "[b]ased on an earlier draft sent to the authors, we believe that the issues addressed in JVT-D094 are similar to those addressed here, and believe that the ideas could be harmonized here.").

Accordingly, Nokia has shown diligence and reduction to practice, and the 818 patent is entitled to a priority date of May 1, 2002.

In light of this priority date, there is no dispute that Amazon's asserted reference JVT-E022d7 is not prior art to the 818 patent. RIB at 44 ("JVT-E022d7 . . . was created on September 19, 2022 . . ."). Accordingly, JVT-E022d7 is not prior art.

Turning to other art, VCEG-N52 is a September 2001 JVT proposal connected to development of the H.264 standard and authored by Thomas Stockhammer (Munich University) and Stephen Wenger (Teles AG/Technical University Berlin). RIB at 27 (citing RX-0020). Amazon contends VCEG-N52 is "admitted prior art under at least § 102(b)" based on its discussion within the 818 patent itself. *Id.* at 52 n.15. Nokia does not dispute this status (*see generally* CIB at 148-153; CRB at 58-60), and so VCEG-N52 is determined to be prior art.

U.S. Patent No. 6,539,059 ("Sriram") was filed on March 2, 2000, and issued on March 25, 2003. RX-5188. According to Amazon, this qualifies as prior art to the 818 patent under 35 U.S.C. § 102(a) or (e). RIB at 53 n.16. Nokia does not dispute this status (*see generally* CIB at 148-153; CRB at 58-60), and so Sriram is determined to be prior art.

1. Section 101

According to Amazon, "[t]he '818 Asserted Claim are invalid under § 101." RIB at 39. Amazon utilizes the two-step analysis of *Alice*, and argues, under the first, that "the claims are directed to organizing data into smaller groups." *Id.* (citing 818 patent at 4:15-21; Hr'g Tr. (Kia) at 150:5-24). It contends, "[o]rganizing information into categories, including using content-based labels (*e.g.*, aisles in a supermarket or genres in a library), has consistently been held abstract." *Id.* at 40 (citing *Digitech Image Techs., LLC v. Elecs. For Imaging, Inc.*, 758 F.3d 1344, 1349 (Fed. Cir. 2014); *Cyberfone Sys., LLC v. CNN Interactive Grp., Inc.*, 558 F. App'x 998, 991 (Fed. Cir. 2014)). Although acknowledging that "data structures have represented improvements in computer functionality" as under *Enfish*, Amazon contends, "the '818 claims are not focused on a novel data structure." *Id.* It adds "[b]y not specifying how to 'recognize' or 'form' parameters,

the ’818 claims lack any ‘granular, nuanced or useful classification’ that would render them non-abstract.” *Id.* at 41 (citing *Packet Intelligence LLC v. NetScout Sys.*, 965 F.3d 1299, 1310 (Fed. Cir. 2020); *Intellectual Ventures I LLC v. Cap. One Fin. Corp.*, 850 F.3d 1332, 1340-41 (Fed. Cir. 2017)); *see* RRB at 14.

Amazon is not persuasive. The clear aim of the asserted 818 patent claims is to improve a computer’s ability to decode video streams; *i.e.*, an improvement to the way computers function, which *Enfish* and its progeny have held to be non-abstract. *Enfish*, 822 F.3d at 1336, 1338-9; *see, e.g.*, *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1258 (Fed. Cir. 2017); *Koninklijke KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1149-51 (Fed. Cir. 2019); 818 patent at 3:56-58, 4:15-31). None of Amazon’s cases holding claims invalid under *Alice* represent this sort of improvement. *Digitech*, 758 F.3d at 1349 (see claim); *Cyberfone*, 558 F. App’x at 990 (see claim); *Trinity Info Media, LLC v. Covalent, Inc.*, 72 F.4th 1355, 1359 (Fed. Cir. 2023) (see claim); *Intell. Ventures I*, 850 F.3d at 1339 (see claim); *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1255-56 (Fed. Cir. 2016) (see claim). Indeed, asserted claims 6, 8, 9, and 15 are more like those found non-abstract as in *Packet Intelligence*. 965 F.3d at 1304 (see claim). And to be clear, contrary to Amazon’s assertion, the Federal Circuit did not hold that *Enfish*-eligible inventions must have “granular” detail. RRB at 14 (citing *Packet Intelligence*, 965 F.3d at 1304). “Granular” was simply a descriptor, previously used by the lower court, to describe the particular invention’s approach to classification of network traffic. *Packet Intelligence*, 965 F.3d at 1308, 1310. Finally, there is also no assertion—nor could there be—that the claims represent the simple computerization of ordinary human activity. *In re Killian*, 45 F.4th 1373, 1382 (Fed. Cir. 2022) (citing *Alice*, 573 U.S. at 220-21). Humans do not transmit video streams to one another.

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Accordingly, Amazon has not shown claims 6, 8, 9, or 15 are directed to ineligible subject matter under *Alice* step one, so they are not invalid under Section 101.

2. JVT-E022d7

According to Amazon, the asserted claims of the 818 patent are obvious over a September 2002 draft of H.264 (JVT-E022d7). RIB at 43. Amazon claims there is no dispute over this obviousness—only whether the 818 patent is entitled to a priority date earlier than September 2002. *Id.* at 43, 44; see CIB at 148. As determined above, the 818 patent is entitled to a priority date of May 1, 2002, so the reference is not prior art under 35 U.S.C. § 102 and cannot invalidate under 35 U.S.C. § 103.

3. VCEG-N52

Amazon contends, "VCEG-N52 discloses consolidating parameters for various levels of a video sequence—sequence, GOP, picture, and slice—into a parameter set that can be sent separately from the video content" and "Sriram taught using smaller data structures for holding the parameters extracted from the picture and GOP headers." RIB at 52-53 (citing RX-0020; RX-5188; Hr'g Tr. (Storer) at 1138:17-1140:19, 1158:22-1159:22). It continues, "[c]ombining these references renders claims 6, 8, 9, and 15 obvious." *Id.* at 54. Amazon has not shown invalidity of claims 6, 8, 9, and 15.

Amazon describes VCEG-N52 as disclosing "nearly everything in the Asserted Claims except having a separate parameter set for sequence parameters and picture parameters." RIB at 53. Here, the parties agree. VCEG-N52 teaches a *single* parameter set, containing all of sequence, group-of-picture (GOP), picture, and slice parameters. RX-0020.0008; RIB at 27; *see* CIB at 148. VCEG-N52 explains, "[i]n this framework, all information that was traditionally conveyed in sequences, group-of-picture, or picture headers is conveyed out of band." *Id.* As Dr. Storer testified at the hearing:

[redacted]

> [Y]ou see the idea of the invention that instead of sending the parameter set intermixed with the associated video [*i.e.*, as in the header], it is sending the parameter set along the bottom and the video associated with it along the top in separate channels. . . . it comes ahead in a parameter set next to, if you will, the associated – the video that it's associated with.

Hr'g Tr. (Storer) at 1161:19-1162:8; *see id.* at 1139:1-9, 1162:21-1163:18. And conveyance of this information out-of-band is important. Dr. Storer testified:

> So it is beneficial for error resiliency. So now parameters instead of being mixed into the data stream and possibly corrupted with the normal kind of corruptions can be sent separately, maybe more securely, and retained over time but also at the time there was also considered a benefit in efficiency, if you will, where parameters that occurred -- were parameters that occurred often now could be sent once, okay. So there is an efficiency advantage as well. Yeah.

Id. at 1140:11-19.

So at least one difference between the prior art VCEG-N52 and independent claims 6 and 15 of the 818 patent is that VCEG-N52 lacks both a "sequence parameter set" and a "picture parameter set"—there is only one set. Amazon, however, contends that a POSITA would have been motivated to break up this single set into multiple sets "using Sriram's teachings of smaller data structures for parameters." RIB at 55 (citing RX-5188 at 12:64-13:1), 56 ("A POSITA would have found it obvious to split VCEG-N52's parameter set into smaller parameter sets based on Sriram's teachings."). Central to this theory, according to Dr. Storer, is that Sriram discloses "this notion of breaking up of parameter sets." Hr'g Tr. (Storer) at 1159:17-18.

This is where Amazon's theory fails to find support in the record. Amazon repeatedly cites the same passage in Sriram for a teaching or suggestion of breaking up parameter sets:

[redacted]

> In addition, there are several parameters which were extracted from the picture, sequence and GOP headers which are needed for processing an individual MB. Several smaller data structures are defined and a pointer to these data structures is included in the Slice and MB data structures. For example, parameters like Picture Horizontal Size and so on are extracted from Picture headers and extensively used for MB processing (Motion Compensation). Instead of having a copy of this parameter in every Slice and Macroblock structure, parameters like Horizontal and Vertical Size are grouped together into another data structure (for example, PicParameters) and a pointer to this structure is included in every Slice and MB structure. Such an idea is also used to minimize the number of fields in the Slice and MB structures. The number of fields in a MB structure is an issue because a big MB structure will significantly increase the data bandwidth.

RX-5188 (Sriram 12:64-13:12)

RDX-0097C.91 (citing RX-5188 at 12:64-13:12); *see* RIB at 53-54 (citing RX-5188 at 12:64-13:13); Hr'g Tr. (Storer) at 1158:22-1159:22. But while the paragraph mentions parameters at the picture, sequence, and GOP levels, it does not disclose the concept of breaking them apart so as to avoid any sort of redundant transmissions. Rather, it teaches swapping out instances of the parameter with a pointer to that same parameter stored elsewhere as a means of minimizing the number of fields in slice and macroblock (MB) structures. This is unrelated to reducing redundant transmissions which would have been the motivation for the combination under Amazon's theory. Hr'g Tr. (Storer) at 1140:11-19 ("there was also considered a benefit in efficiency, if you will, where parameters that occurred -- were parameters that occurred often now could be sent once, okay."). In other words, the Sriram transmissions appear to be the same in number but smaller in size. So it is neither clear nor convincing how this use of pointers would have motivated a POSITA to break up the single parameter set of VCEG-N52. *KSR*, 550 U.S. at 399; *PharmaStem*, 491 F.3d at 1360 (Fed. Cir. 2007). And without the break-up, the claim limitations "recognizing, in a decoder, a sequence parameter set" (claim 6), "recognizing, in the decoder, a picture parameter

set" (claim 6), "recognizing a sequence parameter set" (claim 15), and "recognizing a picture parameter set" (claim 15) are not present in the proffered combination of VCEG-N52 and Sriram.

Nokia also challenges the limitations "forming, in the decoder, at least one second picture parameter value using information of a slice header, the at least one second picture parameter value remaining unchanged at least in all slice headers of one picture" (claim 6) and "forming at least one second picture parameter value using information of a slice header, the at least one second picture parameter value remaining unchanged at least in all slice headers of one picture" (claim 15) as not present in the alleged combination. CIB at 148-149; CRB at 58. But Amazon has persuasively shown that "PictureID" disclosed in the slice headers of VCEG-N52 would have been unchanged across all slices and used during decoding. *See* RIB at 58 (citing RX-0020 at 4-5); Hr'g Tr. (Storer) at 1164:12-20. And contrary to Nokia's assertion, the argument was not waived. CRB at 58; *compare* RIB at 58 *with* RPB at 34.

Accordingly, Amazon has not shown a prima facie case under the *Graham* factors that claims 6, 8, 9, and 15 are invalid for obviousness.

4. Improper Inventorship

Within their opening brief, and in the section on invalidity, Amazon includes a section entitled "6. Inventorship." RIB at 62-63. Amazon states, "[h]ere, the record shows Sony's Walker and Tabatabai invented the structure in claims 6/15 ('sequence parameter set'/ 'picture parameter set'/ 'slice header'/ static picture parameter in slice header) and the concept that 'the slice header is included with a reference to a picture parameter set' recited in claim 7." *Id.* at 62. Amazon points to a single document, a draft version of JVT-D087 (discussed above for priority), as evidence for these inventions. *Id.* at 63 (citing RX-4900). Amazon claims, "[a]fter their proposal, Walker and Tabatabai collaborated with at least one named inventor, Hannuksela, during the July 200[2] breakout group. RX-4622. There, Walker and Tabatabai shared their ideas with

Hannuksela." *Id.* at 63. Amazon concludes, "[t]hus, Walker and Tabatabai collaborated with Hannuksela on the claimed invention, and Walker and Tabatabai are joint inventors on the '818 patent." *Id.* at 65; RRB at 25 ("no meaningful dispute exists and Sony is the true inventor of the '818's claimed improvement.").

The contention is rejected. First, Amazon failed to even present the legal grounds on which improper inventorship renders a patent claim invalid or an entire patent unenforceable. Second, there is no assertion that JVT-C078, determined above as establishing conception, lacks any of the elements of asserted claims 6, 8, 9, and 15. And because JVT-C078 predates JVT-D087, there can be no improper inventorship based on that document.

Accordingly, Amazon has not established that any asserted claim is invalid and/or unenforceable for improper inventorship.

V. U.S. PATENT NO. 8,050,321

A. Claims-at-Issue

Claims 8 and 10 of the 321 patent are at issue in this investigation, either through allegations of infringement or domestic industry technical prong. *See* CIB at 2, 206. They are reproduced below, along with limitation identifiers:

> 8. [8a] A method for decoding a compressed video sequence, the method comprising:
>
> [8b] decoding from the video sequence an indication of at least one image frame, which is the first image frame, in decoding order, of an independent sequence, wherein all motion-compensated temporal prediction references of the independent sequence refer only to image frames within said independent sequence;
>
> [8c] starting the decoding of the video sequence from said first image frame of the independent sequence, whereby the video sequence is decoded without prediction from any image frame decoded prior to said first image frame;
>
> [8d] decoding identifier values for image frames according to a numbering scheme; and

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[redacted]

> [8e] resetting the identifier value for the indicated first image frame of the independent sequence.
>
> . . . .
>
> 10. [10a] A video decoder comprising at least one processor and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the video decoder to decode a compressed video sequence, by causing the video decoder to at least:
>
> [10b] decode from the video sequence an indication of at least one image frame, which is the first image frame, in decoding order, of an independent sequence, wherein all motion-compensated temporal prediction references of the independent sequence refer only to image frames within said independent sequence;
>
> [10c] start the decoding of the video sequence from said first image frame of the independent sequence, whereby the video sequence is decoded without prediction from any image frame decoded prior to said first image frame; and
>
> [10d] decode identifier values for image frames according to a numbering scheme; and
>
> [10e] reset the identifier value for the indicated first image frame of the independent sequence.

321 patent at cls. 8, 10 (annotated).

B. Claim Construction

The parties do not explicitly identify any claim terms needing construction. RIB at 146.

C. Infringement

According to Nokia's post-hearing briefing, the use, manufacture, or sale of the Accused Products infringes claims 8 and 10. CIB at 2. Both claims are independent and relate to decoding a video stream. For the reasons discussed below, Nokia has shown infringement of these claims by the Accused Products.

Nokia's initial brief, primarily relying on the testimony of Dr. Kia, describes how each limitation of claims 8 and 10 is required by the H.264, H.265, and AV1 standards. *See* CIB at 165-177 (citing, *inter alia*, Hr'g Tr. (Kia) at 210:17-233:23, 234:17-235:9, 278:3-283:19, 305:21-

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307:2). Nokia treats the individual limitations of claim 8 and claim 10 as identical for the purposes of showing infringement and represents that only limitations [8c]/[10c] and [8e]/[10e] are in dispute. *See generally id.*

Amazon's briefing confirms that only limitations [8c]/[10c] and [8e]/[10e] are in dispute. *See* RIB at 146-148. Yet their opposition is rooted in a practicing-the-prior art defense, with specific reference to the MPEG-1 prior art (RX-0540), discussed further below. RIB at 146 ("Because the prior art MPEG-1 standard operates in the exact same way as the accused standards, either MPEG-1 invalidates the Asserted Claims or H.264, H.265, and AV1 do not infringe. . . . "); RRB at 65. There is very little argument that addresses Nokia's infringement theory without reference to MPEG-1.

For example, for limitation [8e]/[10e], Amazon states that "MPEG-1 and H.264, H.265, and AV1 all operate in the same manner with respect to 'resetting'" and identifies how variables within MPEG-1 and H.264, at least, are reset for the first image frame of an independent sequence. *See* RIB at 146-147; RRB at 65-66 ("[I]f H.264 meets the 'reset' by the decoder limitation, MPEG-1 invalidates because it works the exact same way."). But Amazon acknowledges that there is a dispute for MPEG-1 as to whether it is the decoder that resets the identifier value (as required) or the encoder. RRB at 65, 71-72. And it helpfully compares the actual H.264 specification language setting "frame_num" with MPEG-1's setting of "temporal_reference" to support its practicing-the-prior art defense. *Id.* at 65-66 (citing JX-0023.0032; RX-0540.0036). On this, Amazon is persuasive, as it appears "frame_num" in H.264 is not set or "reset" by the decoder but by the encoder prior to being sent in the bitstream. *Compare* JX-0023.0053-72 (Section 7 defining syntax of bitstream and "frame_num") *with id.* at .0113 (Section 8 defining decoding process). Yet Amazon fails to address the *additional* variables beyond "frame_num" that Nokia also relies on

for standards-based infringement: prevPicOrderCntLsb (H.264), PicOrderCntVal (H.265), OrderHints[] (AV1). CIB at 173; Hr'g Tr. (Kia) at 230:12-231:17; *see* RRB at 67 (citing Hr'g Tr. (Saber) at 1041:25-1043:20).

And for limitation [8c]/[10c], Amazon again references validity arguments made by Nokia against MPEG-1, and otherwise concede that "[w]hen decoders using the accused standards receive an indication of an independent sequence's first frame, they perform the 'starting' step *only* after receiving the *first* indication and not for every indication." RIB at 147 (emphasis in original). According to Amazon, this meets the limitations. *See id.* at 148. So it is fair to say there is no real dispute over infringement—only invalidity.

Accordingly, Nokia has shown claims 8 and 10 are infringed by the Accused Products by way of those claims being essential to the H.264, H.265, and AV1 standards, and at least one or more of those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18; RRB at 8-11. And, for the sake of clarity, MPEG-1 has not been shown to anticipate claims 8 and 10 as discussed further below.

As for Nokia's claim of indirect infringement under the 321 patent (*see* CIB at 204-206; CRB at 81-83), Amazon correctly points out that it was not presented with any detail in Nokia's pre-hearing brief (RIB at 149; *see* CPB at 56-57 (no discussion of knowledge); *Amarin*, 104 F.4th at 1377 ("To state a claim for induced infringement, a patent owner must plausibly allege facts establishing that there has been direct infringement by a third party and that the alleged infringer affirmatively induced that infringement with knowledge that the induced acts constituted patent infringement.")). Thus, it has been waived. Order No. 2 at G.R. 9.2.

[redacted]

D. Domestic Industry – Technical Prong

According to Nokia's post-hearing briefing, the DI Products practice claims 8 and 10 of the 321 patent. CIB at 2, 206. For the reasons discussed below, Nokia has shown by a preponderance of the evidence that the DI Products practice these claims.

Nokia contends, "[t]he DI Products practice the Asserted Patents for the same reasons as discussed for infringement because each of those products contains chips or an Android OS (Samsung) that Complainants' experts confirmed results in the same capabilities as the Accused Products." CIB at 206 (citing, *inter alia*, Hr'g Tr. (Kia) at 240:13-247:20). In its briefing, Amazon does not dispute the DI Products practice at least one or more of the H.264, H.265, and AV1 standards. *See* RIB at 149. As determined above, it has been established that the limitations of claims 8 and 10 are required by the H.264, H.265, and AV1 standards.

Accordingly, Nokia has shown claims 8 and 10 are practiced by the DI Products by way of those claims being essential to the H264, H.265, and AV1 standards, and at least one of those standards being practiced. This finding, too, is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 149; RRB at 8-11.

E. Validity

Amazon identifies the following invalidity theories for the 321 patent:

Claims	Theory
8, 10	Lack of patentable subject matter under 35 U.S.C. § 101
8, 10	Anticipated under 35 U.S.C. § 102 by MPEG-1 (RX-0540)
8, 10	Rendered obvious under 35 U.S.C. § 103 by MPEG-1 (RX-0540)

8, 10	Anticipated under 35 U.S.C. § 102 by Kim (CX-8054)
8, 10	Rendered obvious under 35 U.S.C. § 103 by Kim (CX-8054)

See generally RIB at 150-166.

There is no dispute over the prior art status of Amazon's references. Amazon contends MPEG-1 was published in 1993 and "unquestionably qualifies as prior art." RIB at 154 (citing RX-0540; Hr'g Tr. (Saber) at 593:7-11). The document representing MPEG-1 displays "First edition 1993-08-01" on its face. RX-0540.0001. With no dispute from Nokia (*see generally* CIB at 180-182; CRB at 66-73), and the 321 patent's earliest possible filing date of January 23, 2002 (321 patent at cover), MPEG-1 qualifies as prior art to the 321 patent under at least 35 U.S.C. § 102(b) (pre-AIA).

Amazon contends U.S. Patent No. 6,912,351 ("Kim"), which is reproduced at CX-8054, issued on June 28, 2005, from an application filed October 19, 1998 "and is therefore prior art." RIB at 162 (citing Hr'g Tr. (Saber) at 1031:22-1032:4). Although Amazon does not explicitly state which subsection Kim qualifies as prior art under, there is no dispute from Nokia as to its status. *See id.*; CIB at 183-185, 194-198; CRB at 73-75. As compared to the 321 patent's earliest possible filing date of January 23, 2002 (321 patent at cover), Kim qualifies as prior art to the 321 patent under at least 35 U.S.C. § 102(e) (pre-AIA).

1. Section 101

Pursuant to the two-step *Alice* framework, Amazon contends that "[t]he '321 Asserted Claims are directed to the well-known abstract idea of using a numbering scheme for independent sequences that resets at the start of each independent sequence." RIB at 152. They add, "[c]laims directed to mental processes like counting and assigning numerical identifiers have repeatedly

been rejected as abstract." *Id.* at 152-153 (citing *PersonalWeb Techs. LLC v. Google LLC*, 8 F.4th 1310, 1316 (Fed. Cir. 2021)). With respect to *Enfish*, discussed above for the 818 patent, Amazon argues the 321 patent's numbering scheme "does not alter or improve how computers function any more than the content-based identifiers of *PersonalWeb*." *Id.* at 153.

Amazon is not persuasive. The clear aim of the 321 patent claims is to improve a computer's ability to decode video streams; *i.e.*, an improvement to the way computers function held to be non-abstract in *Enfish* and its progeny. *Enfish*, 822 F.3d at 1336, 1338-9; *see, e.g.*, *Visual Memory*, 867 F.3d at 1258; *Gemalto*, 942 F.3d at 1149-51; 321 patent at 2:5-15, 4:16-38. Amazon's assertion that the patent's claimed techniques do not improve computers is belied by, *inter alia*, the MPEG-1 standard (which it holds out as anticipating all claims) that discloses algorithms to "[o]btain[] good picture quality at [high] bitrates," a goal "demand[ing] a very high compression ratio, which is not achievable with intraframe coding alone":

Introduction

Note -- Readers interested in an overview of the MPEG Video layer should read this Introduction and then proceed to annex D, before returning to clauses 1 and 2.

0.1 Purpose

This part of ISO/IEC 11172 was developed in response to the growing need for a common format for representing compressed video on various digital storage media such as CDs, DATs, Winchester disks and optical drives. This part of ISO/IEC 11172 specifies a coded representation that can be used for compressing video sequences to bitrates around 1,5 Mbit/s. The use of this part of ISO/IEC 11172 means that motion video can be manipulated as a form of computer data and can be transmitted and received over existing and future networks. The coded representation can be used with both 625-line and 525-line television and provides flexibility for use with workstation and personal computer displays.

This part of ISO/IEC 11172 was developed to operate principally from storage media offering a continuous transfer rate of about 1,5 Mbit/s. Nevertheless it can be used more widely than this because the approach taken is generic.

. . . .

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0.2 Overview of the algorithm

The coded representation defined in this part of ISO/IEC 11172 achieves a high compression ratio while preserving good picture quality. The algorithm is not lossless as the exact pel values are not preserved during coding. The choice of the techniques is based on the need to balance a high picture quality and compression ratio with the requirement to make random access to the coded bitstream. Obtaining good picture quality at the bitrates of interest demands a very high compression ratio, which is not achievable with intraframe coding alone. The need for random access, however, is best satisfied with pure intraframe coding. This requires a careful balance between intra- and interframe coding and between recursive and non-recursive temporal redundancy reduction.

RX-0540.0004. Notably, Amazon cites no expert opinion from Dr. Saber that the techniques of the 321 patent and MPEG-1 are not aimed at improving the functionality of computers.

Accordingly, Amazon has not shown claims 8 or 10 are directed to ineligible subject matter under *Alice* step one, so they are not invalid under Section 101.

2. MPEG-1

Amazon explains, "MPEG-1 was developed by the Moving Pictures Expert Group in response to 'the growing need for a common format for representing compressed video.'" RIB at 154 (citing RX-0540.0012). It contends, "1993's MPEG-1 Standard, Adopted into the Standards Accused here, Anticipates or Renders Obvious the '321 Asserted Claims" and, overall, notes that "during the hearing, Dr. Kia deliberately eschewed invalidity regarding MPEG-1" such that "Dr. Saber's testimony that MPEG-1 invalidates the asserted '321 claims stands unrebutted." *Id.* (citing Hr'g Tr. (Kia) at 1744:24-1745:9). Amazon has not shown that claims 8 and 10 are invalid over MPEG-1.

Amazon asserts that Nokia's briefing challenges only limitations [8b]/[10b], [8c]/[10c], and [8e]/[10e]. RIB at 154. Amazon is correct (*see* CIB at 187-194; CRB at 71-73), and these limitations are discussed below. As for limitations [8a]/[10a] and [8d]/[10d], they are disclosed in MPEG-1 as supported by the undisputed expert testimony of Dr. Saber. RIB at 154-156, 159; Hr'g Tr. (Saber) at 596:11-598:4, 600:1-16; RX-0540.0004, 0010, 0036; RX-5255.0001, 0003.

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As for limitation [8b]/[10b], it is disclosed in MPEG-1. Amazon persuasively argues that a "'closed_gop' flag found in the GOP header is the indication of the independent sequence's first frame *in decoding order* (*i.e.*, bitstream order) when set to 1." RIB at 156 (citing Hr'g Tr. (Saber) at 598:15-599:11; RX-0540.0078) (emphasis in original). The relevant passage of MPEG-1 describes the flag as denoting whether the following group of pictures can be decoded without using decoded pictures of previous groups (*i.e.*, independent):

Closed GOP

A one bit flag follows the time code. It denotes whether the group of pictures is open or closed. Closed groups can be decoded without using decoded pictures of the previous group for motion compensation, whereas open groups require such pictures to be available.

A typical example of a closed group is shown in figure D.18a.

I	B	B	**P**	B	B	**P**	B	B	**P**	B	B	**P**
0	1	2	3	4	5	6	7	8	9	10	11	12

(a) closed group

B	B	**I**	B	B	**P**	B	B	**P**	B	B	**P**	B	B	**P**
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

(b) open or closed group

Figure D.18 -- Example groups of pictures in display order

A less typical example of a closed group is shown in figure D.18b. In this example, the B-pictures which precede the first I-picture must use backward motion compensation only, i.e. any motion compensation must be based only on picture number 2 in the group.

If the closed_gop flag is set to 0 then the group is open. The first B-pictures that precede the first I-picture in the group may have been encoded using the last picture in the previous group for motion compensation.

RX-0540.0078.

Nokia argues, without support from its own expert, that "the closed_gop flag is a single-bit flag that only indicates whether the entire GOP is closed or open; it does not identify any image frame." CIB at 187 (citing Hr'g Tr. (Saber) at 1053:25-1054:3, 1054:11-15). But this is not persuasive because under a plain reading the claim limitation does not require designation of a particular image frame. "[D]ecoding from the video sequence an indication of at least one image

frame, which is the first image frame, in decoding order, of an independent sequence" only requires an indication of the existence of an image frame which is the first of an independent sequence, and Nokia cites no evidence, intrinsic or extrinsic, to the contrary. *See* RIB at 157. And a flag in a group of pictures header that indicates the group is closed is an indication that an independent sequence with a first independent frame is coming up in the stream:

> **Group of pictures**
>
> **A group of pictures** is a series of one or more coded pictures intended to assist random access into the sequence. In the stored bitstream, the first coded picture in a group of pictures is an I-Picture. The order of the pictures in the coded stream is the order in which the decoder processes them in normal playback. In particular, adjacent B-Pictures in the coded stream are in display order. The last coded picture, in display order, of a group of pictures is either an I-Picture or a P-Picture.

RX-0540.0024; Hr'g Tr. (Saber) at 598:21-599:15; RIB at 157 (citing RX-0540.0024, 77).

Nokia also argues, "the closed_gop flag does not indicate which frame is the first. It is not sufficient that every closed GOP necessarily has a first image frame because the claims require indicating 'which is the first image frame.'" CIB at 187 (citing Hr'g Tr. (Saber) at 1054:4-23). Yet, again, under a plain reading the claim language does not require designating "which" frame is the first image frame, and Nokia cites no evidence, intrinsic or extrinsic, to support its reading. *See* CIB at 187; CRB at 71. Even if Nokia's reading is adopted (it is not) the MPEG-1 system discloses, "the first coded picture in a group of pictures is an I-Picture" as shown in the excerpt above. RX-0540.0024. So while that statement might not be true for open groups of pictures (*see id.* (GOP examples)), it is true for closed groups of pictures, and the limitation is met at least some of the time.

As for limitation [8c]/[10c], it is also disclosed in MPEG-1. The document discloses, as testified to by Dr. Saber, that playback can begin at "a picture start code which introduces an I-picture":

[redacted]

D.7 Decoding MPEG video

D.7.1 Decoding a sequence

D.7.1.1 Decoding for forward playback

. . . .

If playback begins from a random point in the bitstream, the decoder should discard all the bits until it finds a sequence start code, a group of pictures start code, or a picture start code which introduces an I-picture. The slices and macroblocks in the picture are decoded and written into a display buffer, and perhaps into another buffer. The decoded pictures may be post processed and displayed in the order defined by the temporal reference at the picture rate defined in the sequence header.

RX-0540.0112; *see* RIB at 158-159 (citing Hr'g Tr. (Saber) at 599:12-25). The fact that all pictures/frames prior to the I-picture are discarded is sufficient to meet the limitation. Nokia argues that "MPEG-1 never starts the decoding from the first image frame under Dr. Saber's theory" because the aforementioned start code is not an image frame. *See* CIB at 187-191 ("Dr. Saber's testimony confirmed that decoding begins at one of the start codes, not at the first image frame of an independent sequence."). But Amazon correctly points out that this argument was not contained in Nokia's pre-hearing brief and has been waived. *See* RRB at 68-69; CPB at 77 (arguing only generally that [8c]/[10c] is not met because [8b]/[10b] is not met).

As for limitation [8e]/[10e], it is *not* disclosed in MPEG-1. Amazon refers back to MPEG-1's "temporal_reference" as the claimed "identifier value" under limitation [8d]/[10d], and contends "[Dr. Saber] explained that MPEG-1 teaches resetting the temporal_reference for the first image frame in display order of a Closed GOP, and that for the typical example of a Closed GOP, the first frame in display order is the *same exact frame as the first frame in decoding order*." RIB at 159-160 (citing RX-0540.0036, .0078; Hr'g Tr. (Saber) at 602:18-603:10) (emphasis in original).

Nokia contends it is, in fact, the encoder and not the decoder which resets temporal_reference in MPEG-1, and it does so for the first image in display order, not decoding order. CIB at 191-192 (citing RX-0540.0036, .0079). On the second point, Amazon persuasively responds that it is ordinary—and certain to happen at least some of the time—that "the first frame in display order is the same as the first frame in decoding order, such that the temporal reference of the first frame in decoding order is reset." RRB at 71-72 (citing RX-0540.0036, .0078; Hr'g Tr. (Saber) at 602:18-603:16). On the first point, Amazon effectively concedes that the MPEG-1 does not disclose the decoder as resetting temporal_reference values, but nonetheless argues that "MPEG-1 discloses 'resetting' in the same manner as the '321 patent and the accused standards (*e.g.*, H.264)." RRB at 72; *see id.* at 65 ("all perform the resetting the exact same way as the '321 patent."), 66 ("[frame_num in H.264] is the very same disclosure as temporal_reference in MPEG-1").

The standard for invalidity is clear and convincing evidence. *i4i Ltd.*, 564 U.S. at 95. Based on the parties' briefing, there is no real assertion from Amazon that MPEG-1 discloses a *decoder* resetting the "temporal_reference" value. The disclosures in the MPEG-1 document simply state that the value is reset under a section entitled "2.4.2 Specification of the coded video bitstream syntax" which implies activity by the encoder (so as to be present in the bitstream):

2.4.2 Specification of the coded video bitstream syntax

. . . .

[redacted]

2.4.2.5 Picture layer

Syntax	No. of bits	Mnemonic
picture() {		
picture_start_code	32	bslbf
temporal_reference	10	uimsbf
picture_coding_type	3	uimsbf
vbv_delay	16	uimsbf
if ((picture_coding_type == 2) || (picture_coding_type == 3)) {		
full_pel_forward_vector	1	
forward_f_code	3	uimsbf
}		

. . . .

2.4.3.4 Picture layer

picture_start_code -- The picture_start_code is a string of 32-bits having the value 00000100 in hexadecimal.

temporal_reference -- The temporal_reference is a 10-bit unsigned integer associated with each input picture. It is incremented by one, modulo 1024, for each input picture. For the earliest picture (in display order) in each group of pictures, the temporal_reference is reset to zero.

The temporal_reference is assigned (in sequence) to the pictures in display order, no temporal_reference shall be omitted from the sequence.

RX-0540.0027, .0030, .0036. So there is no clear and convincing disclosure of a *decoder* performing the activity of limitations [8e]/[10e], and the limitation is not disclosed. As determined above, this would appear to be also true of "frame_num" in the H.264 standard, but not the other variables Nokia relies on for infringement. So a practicing-the-prior-art defense based on MPEG-1 is not successful for this reason.

With that said, Amazon rightly points out that the MPEG-1 document matches how the 321 patent discusses resetting the identifier value. RRB at 72 (citing RX-0540.0036; 321 patent at 4:42-47). The 321 patent includes only a terse explanation of "identifier values" and how they relate to the invention. The entirety of the specification's teaching is as follows:

> According to an embodiment, identifier values for pictures are encoded according to a numbering scheme, and the identifier value for the indicated first picture of an independent sequence is reset, preferably to zero.

[redacted]

> According to an embodiment, an identifier value for the independent sequence is encoded into the video sequence.

321 patent at 4:42-47. As read, the passage implies that the encoder—and not the decoder—does the resetting of identifier values. Yet, confusingly, both encoder-based and decoder-based claims of the 321 patent recite the exact same resetting step:

> 1. A method for encoding a video sequence comprising an independent sequence of image frames . . . the method comprising . . . resetting the identifier value for the indicated first image frame of the independent sequence.
>
> 4. A video encoder comprising at least one processor and at least one memory including computer program code . . . causing the video encoder to at least . . . reset the identifier value for the indicated first image frame of the independent sequence.
>
> 7. A computer program product . . . for encoding a video sequence comprising an independent sequence of image frames . . . the computer program product comprising . . . a computer code for resetting the identifier value for the indicated first image frame of the independent sequence.
>
> 8. A method for decoding a compressed video sequence, the method comprising . . . resetting the identifier value for the indicated first image frame of the independent sequence.
>
> 10. A video decoder comprising at least one processor and at least one memory including computer program code . . . causing the video decoder to at least . . . reset the identifier value for the indicated first image frame of the independent sequence.
>
> 11. A computer program product, stored on a non-transitory computer readable medium . . . the computer program product comprising . . . a computer program code for resetting the identifier value for the indicated first image frame of the independent sequence.

321 patent at cls. 1, 4, 7, 8, 10, 11 (excerpted). So it is fair to say that the disclosure in MPEG-1 matches the *specification* of the 321 patent:

> According to an embodiment, identifier values for pictures are encoded according to a numbering scheme, and the identifier value for the indicated first picture of an independent sequence is reset, preferably to zero.

321 patent at 4:42-45;

[redacted]

temporal_reference -- The temporal_reference is a 10-bit unsigned integer associated with each input picture. It is incremented by one, modulo 1024, for each input picture. For the earliest picture (in display order) in each group of pictures, the temporal_reference is reset to zero.

RX-0540.0036; *see id.* at .0079 ("The first picture, in display order, in each group must have Temporal Reference equal to zero."). Yet, for purposes of invalidity, the prior art must be compared to the claims—not the specification. *Ortho Pharm. Corp. v. Smith*, 959 F.2d 936, 944 (Fed. Cir. 1992) ("It is the claims not the specification, that define an invention."). And claims 8 and 10 require the decoder, not the encoder, to perform the resetting step. So limitation [8e]/[10e] is not disclosed.

If not disclosed, Amazon alternatively argues "it would have been obvious for a decoder to reset the temporal_reference when it received a closed_gop flag equal to 1." RIB at 161 (citing Hr'g Tr. (Saber) at 602:5-17); RRB at 72 (same). Dr. Saber's testimony here is conclusory, however, and does not address motivation or reason to combine. Hr'g Tr. (Saber) at 602:5-23. So it is not persuasive. *KSR*, 550 U.S. at 399.

Accordingly, MPEG-1 has not been shown to anticipate claims 8 and 10, or to have rendered them prima facie obvious under the *Graham* factors.

3. Kim

Amazon contends that "Kim Anticipates or Renders Obvious the Asserted Claims." RIB at 162. Amazon explains that only limitations [8b]/[10b], [8c]/[10c], and [8e]/[10e] are in dispute, which is consistent with Nokia's briefing. *See id.*; CIB at 194-196; CRB at 73-75. Importantly, for limitation [8e]/[10e], Amazon points to an "I-picture reference address" ("IAD") value associated with each frame/picture in a sequence, including an independent frame which begins the sequence shown in Figure 5A, as the claimed "identifier value" which must be "reset" by the

decoder. RIB at 164-166 (citing Hr'g Tr. (Saber) at 1038:3-12; CX-8054 at 4:46-52); RRB at 73. Amazon has not shown that claims 8 and 10 are invalid over Kim.

There is really no dispute that Kim suffers from the same problem as MPEG-1, which is that the alleged "identifier value" in Kim is set/reset by the encoder and the decoder simply reads or derives it from the bitstream. CRB at 74 (citing Hr'g Tr. (Saber) at 1038:3-12; Hr'g Tr. (Kia) at 1732:3-24). Amazon states:

> Nokia agues Kim does not teach the decoder resetting the IAD, but rather the encoder. . . . Nokia ignores the teachings of the patent, the accused standards, and Dr. Saber's uncontroverted testimony—all of which demonstrate that the decoder reading a 'reset' value from a bitstream and storing it locally meets the resetting limitation.

RRB at 73. As discussed above, Amazon has a point as it relates to "frame_num" in the H.264 standard and the 321 patent's specification. But the claims, as written, require the decoder to perform this step and, as determined, there are other identifier values in the H.264, H.265, and AV1 standards in which the decoder actually does set/reset/alter identifier values as part of the decoding process. *See, e.g.*, JX-0023.0113 (Section 8. Decoding Process), .0116 (setting prevPicOrderCntLab to zero). So in the end, Kim does not teach a decoder resetting the IAD value and limitation [8e]/[10e] is not disclosed.

If not disclosed, Amazon alternatively argues "it would be obvious for a decoder to reset the I-frame's IAD (*i.e.*, the independent sequence's first frame) to zero." RIB at 166. Amazon cites no supporting expert testimony here (*see id.*) and to the extent the obviousness rationale from MPEG-1 is intended to apply, it is not persuasive as determined above.

Accordingly, Kim has not been shown to anticipate claims 8 and 10, or to have rendered them prima facie obvious under the *Graham* factors.

VI. U.S. PATENT NO. 8,077,991

A. Claims-at-Issue

Claims 22, 29, 31, and 38 of the 991 patent are at issue in this investigation, either through allegations of infringement or domestic industry technical prong. *See* CIB at 2, 206. They are reproduced below, along with limitation identifiers:

> 22. A method, comprising:
>
> [22a] receiving a coded prediction error signal, the coded prediction error signal including a plurality of transform coefficients and a plurality of spatial samples;
>
> [22b] decoding, by a processor, the plurality of transformed coefficients into decoded transform information;
>
> [22c] decoding, by a processor, the plurality of spatial samples into decoded spatial information; and
>
> [22d] adding, by a processor, the decoded transform information, the decoded spatial information, and a reconstructed prediction of the block of data, thereby forming a decoded representation of the block of data.
>
> . . . .
>
> 29. The method of claim 22, wherein at least some of the plurality of spatial samples are decoded as a single unit.
>
> . . . .
>
> 31. An apparatus, comprising:
>
> [31a] a processor; and a memory unit communicatively connected to the processor and including:
>
> [31b] computer code for processing a received coded prediction error signal, the coded prediction error signal including a plurality of transformed coefficients and a plurality of spatial samples;
>
> [31c] computer code for decoding the plurality of transformed coefficients into decoded transform information;
>
> [31d] computer code for decoding the plurality of spatial samples into decoded spatial information; and

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[redacted]

> [31e] computer code for adding the decoded transform information, the decoded spatial information, and a reconstructed prediction of the block of data, thereby forming a decoded representation of the block of data.
>
> . . . .
>
> 38. The apparatus of claim 31, wherein at least some of the plurality of spatial samples are decoded as a single unit.

991 patent at cls. 22, 29, 31, 38 (annotated).

B. Claim Construction

The parties identify two claim terms for discussion. Amazon notes that a stipulation filed earlier in the investigation establishes that "spatial samples" means "pixel values." RIB at 123 (citing EDIS Doc. ID 814061). Nokia does not revisit or challenge this construction in its briefing (*see* CIB at 89 (". . . are spatial samples, or pixel values as construed in this case")), and it is applied throughout this initial determination.

Next, Amazon identifies "prediction error" found in limitation [22a]/[31b] as needing construction. RIB at 123-125. Amazon argues the correct construction is, "the difference between the predicted block of pixels and the *original* block of pixels," based primarily on teachings of the 991 patent specification. *See id.* (citing, *inter alia*, 991 patent at 1:37-40, 5:6-9, 5:28-32, Fig. 3) (emphasis by Amazon); RRB at 50. Thus, Amazon rejects what it views as a "previously-undisclosed construction" from Nokia, who defines the term as "the difference between the prediction and the output of the decoder." RIB at 124-125 (citing Hr'g Tr. (Orchard) at 87:17-21, 86:25-88:9); RRB at 50-51.

Nokia does not address the term in its initial brief, but in reply argues it is "an irrelevant dispute that has no impact on infringement or invalidity." CRB at 38. It continues to oppose Amazon, however, arguing the cited specification excerpts relate to an encoder—not decoder—and if the context of the decoder is considered, "'coded prediction error signal' represents the pixel

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values that must be added to the 'prediction of the block of data' in order to determine the 'decoded representation of the block of data.'" *Id.* at 38-39 (citing Hr'g Tr. (Orchard) at 102:16-19). Nokia states, "[t]he decoder attempts to predict the values for a block of pixels, and then adds to or subtracts from the predicted pixel values using 'the coded prediction error signal.'" *Id.* at 39.

Both sides are persuasive. The 991 patent explicitly defines "prediction error" as the difference between the predicted block of pixels and the original block of pixels, and that this is generated within the encoder (*i.e.*, it is encoded) for subsequent transmission to the decoder. 991 patent at 1:37-40, Fig. 3. However, it is equally clear that the decoder receives the prediction error, decodes it, and sums it with a predicted image to form the output image. *Id.* at 1:56-59 ("After applying prediction and prediction error decoding processes, the decoder sums up the prediction and prediction error signals (*i.e.*, the pixel values) to form the output video frame."). So "prediction error" is the difference between original image and predicted image; but it is also the difference between output image and predicted image.

There is an additional nuance which may be the unspoken root of the parties' dispute, and that is that the "predicted image" in both equations are similar but not necessarily the same. The 991 patent explains that the decoder "appl[ies] prediction mechanisms that are *similar* to those used by the encoder in order to form a predicted representation of the pixel blocks" for later summing with the prediction error signal. 991 patent at 1:49-51 (emphasis added). So it is not guaranteed the exact same prediction block will result. The process of coding the prediction error signal and then decoding it may lead to non-identical results as well, which is why the patent teaches of pre- and post-processing mechanisms. *Id.* at 6:39-41 ("Pre- and/or post-processing mechanisms can be applied to the prediction signal, prediction error signal reconstructed signal or any combination thereof."), 2:29-32 ("However, the transform can efficiently pack energy of the

prediction error signal only under certain statistics, and the coding performance deteriorates when the prediction error to be transformed becomes less correlated."). So although the two summing equations mirror each other, their constituent parts are not truly the same in practice.

With this in mind, the meaning of "receiving a coded prediction error signal" is that which is generated by the encoder so as to be sent and received by another device, and that leads to Amazon's preferred construction (*i.e.*, difference between original picture and predicted image). But the dispute need not be resolved because it does not affect the issues of infringement, technical prong domestic industry, or invalidity. Rather, it is the parties' agreed construction for "spatial samples" which most affects those issues, as discussed below.

C. Infringement

According to Nokia's post-hearing briefing, the use, manufacture, or sale of the Accused Products infringes claims 22, 29, 31, and 38. CIB at 2. Claims 22 and 31 are independent. Claims 29 and 38 depend on claims 22 and 31, respectively. All claims relate to decoding a video stream. And both parties treat the limitations of claims 22 and 29 as the same as those of claims 31 and 38. For the reasons discussed below, Nokia has not shown infringement of these claims by the Accused Products.

Nokia, relying on the testimony of Dr. Orchard, contends "the Accused Products all infringe the '991 Patent through the decoding of the Sample Adaptive Offset feature in the H.265 Standard." CIB at 87 (citing Hr'g Tr. (Orchard) at 39:18-22). It adds, "[t]here is no dispute among the parties as to whether every Accused Product is capable of decoding H.265-compliant videos and supports Sample Adaptive Offset." *Id.* Nokia then argues why each limitation of claims 22, 29, 31, and 38 is met in H.265-compliant products, as allegedly confirmed by source code analysis

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and product testing. *See* CIB at 94-101 (citing, *inter alia*, Hr'g Tr. (Orchard) at 51:12-67:68, 70:3-18).

Amazon's dispute primarily lies with limitation [22a]/[31b] and whether or not Nokia has sufficiently shown "spatial samples" as part of a "coded prediction error signal." *See generally* RIB at 125-130; RRB at 51-55. As noted above, the parties agreed that "spatial samples" should be construed as "pixel values." Amazon argues the key accused feature in the H.265 standard, Sample Adaptive Offset ("SAO"), does not constitute "pixel values" but is rather a filter applied later in the decoding process. *See, e.g.*, RIB at 127 ("Dr. Storer explained that the SAO filter is a non-residual, non-prediction error parameter, as indicated by the H.265 excerpt below….").

Amazon is persuasive. The weight of the evidence shows SAO is more like a filter and not "pixel values" as part of coded prediction error or otherwise, a distinction made by the 991 patent itself. 991 patent at 1:54-63; Hr'g Tr. (Storer) at 1099:22-24; Hr'g Tr. (Orchard) at 86:22-24.

To start, the patent, Nokia, and Dr. Orchard are all clear that the invention of the 991 patent uses "spatial samples" or "pixel values" in the prediction error signal to address pixel "outliers"—that is, pixels having values not suitable for the traditional transform/quantization coding processes. The patent states, "the effects of pixel 'outliers' are removed from the transform and are coded separately as a spatially coded pixel prediction" and "various embodiments of the present invention allow for the efficient spatial representation of those components of the prediction error signal of the same image block that are not well correlated with the basis functions of the applied transform (such as certain types of sensor noise, high frequency texture and edge information)." 991 patent at Abstract, 3:7-12. And Nokia explains the same outlier problem:

> The '991 Patent is directed to a novel method of coding a prediction error signal that utilizes transform coding and spatial coding for outlier pixel values that are not efficiently coded using transform coding. Traditionally, prediction error was coded using only transform coding. Tr. (Orchard) 25:11-14. Transform coding is an

> efficient method for coding prediction error because it allows for a block of values (in the case of a 16x16 block, 256 values) to be represented by a small number of coefficients. Tr. (Orchard) 27:5-28:4. However, the efficiency of transform coding "deteriorates when the prediction error to be transformed become less correlated," such as when there are outlier values. Tr. (Orchard) 28:5-29:18; JX-0010 ('991 Patent) at 2:29-32. This means that when there are outlier values present in the prediction error, these values require far more transform coefficients to be represented in the decoded prediction error. Tr. (Orchard) 28:5-29:13. This leads to either a decrease in efficiency of transform coding the prediction error, or a decrease in picture quality of the decoded image.

CIB at 84; *see* Hr'g Tr. (Orchard) at 33:5-17 (identifying the "outlier" in Figure 2), 1674:14-1675:1 (outlier is not "correlated with any of the palettes available for painting this picture.").

The patent, Nokia, and Dr. Orchard further explain that treating outliers differently than other pixel values can result in efficiency gains; specifically, outlier values are kept out of the transform process and are spatially coded instead. 991 patent at Abstract (outliers are "coded separately"), 4:59-5:23 (discussing Fig. 3 and blocks 322, 324, 326, and 328); 5:24-65 (discussing Figs. 2, 4); CIB at 85 ("outlier values can be identified and spatially coded along with the transform coding of the other values."), 86 ("spatial coding is applied involving quantization and entropy coding without transform"); Hr'g Tr. (Orchard) at 34:16-21 ("instead of using four transform coefficients that were used in 2(b), we get away with just sending a single transform coefficient and a single spatial sample. So we get away with sending two numbers instead of four numbers."), 1675:8-16 9 ("[inventor] proposed to take the two pieces apart, have one part that's represented as transform and that will just recover the part that is nice and smooth and for which transform works well. Then for the spatial outliers, to send them as spa[t]ial information . . ."). Thereafter, the transform-applied prediction error values and the spatial samples are combined into the overall prediction error signal which is sent to the bitstream. 991 patent at 4:59-5:23, 5:24-65, Figs. 3 (block 330), 4.

Claims 22 and 31 admittedly do not recite or require "outliers" in any way (991 patent at cls. 22, 31; RIB at 137 n.35), but showing a connection between SAO and outliers would tend to suggest SAO has an identity of "pixel values." At no point, however, do Nokia or Dr. Orchard show this connection or that SAO becomes involved when outliers are found. Nor do they explain with any evidence *why* SAO constitutes "spatial samples" according to the agreed construction of "pixel values." They offer only conclusory statements that such is the case. For example, Nokia asserts, "Dr. Orchard provided a thorough explanation of why the Sample Adaptive Offset parameters are pixel values." CIB at 89 (citing Hr'g Tr. (Orchard) at 54:17-56:13). But the cited testimony does not answer this question. It addresses a different, now-dropped, non-infringement argument from Amazon:

> Q. Go to 4C.52. Where's the coded prediction error signal for the spatial sample?
>
> A. Again, on the left-hand side is the syntax section, and that column on the right designates where bits are associated with things. And there are two places that show AEV, again, bits associated with an arithmetic encoder, were generated by an arithmetic encoder. And the variables on the left that they represent are highlighted in yellow on the right of the definition of those variables. And together they are representation of the sample, the spatial samples. And on the right on the bottom is the equation by which those parts of the spatial samples are put together to create the spatial sample, SaoOffsetValue.
>
> Q. How do we know there's a plurality of them?
>
> A. Because all of this is nested on the left, if you look. It says 4I equals zero to 4 or zero and less than 4, which means exactly four of those values are read and four of the other values are read. So what we conclude is that there are four SaoOffsetValues.
>
> Q. Okay. Now, we've reached the first non-infringement argument from Respondents. They say that because this spatial sample is split into two parts, the absolute value and sign, it's not a spatial sample. If a pixel is plus 5, you send a plus and a 5, but they say that's two separate things.
>
> [Q.] Do you agree with that?
>
> A. I do not agree with that.

[redacted]

> Q. Why not?
>
> A. Because these are two parts of a word or a variable. The variable is SaoOffsetVal. And I would say, for example, if you had a binary bit, you wouldn't say that the number 0110 is not being sent because of the fact that the 0 was sent and the 1 was sent and the 1 was sent and 0 was sent. You would say that both are true, that the parts are being sent and the value is being sent.
>
> Q. Okay. So let's take this out of the digital world for a second. Can you give me an example that even I can understand?
>
> A. If I was asked to check to see if the envelope that I'm being handed includes the word "hello" and I open it up and say yes, and then later I'm challenged and said no, that's not "hello"; instead, what you have in this envelope is H and E and L and L and O, I would say, well, you are exactly right, I wouldn't challenge, the envelope does contain H and E and L and L and O, but it also contains "hello."

Hr'g Tr. (Orchard) at 54:17-56:13; *see* CRB at 36 ("Respondents came one step to closer to admitting infringement by dropping one of their two non-infringement arguments"). Nokia cites the same testimony in addressing limitation 22[a]/[31b], and to the same unhelpful effect. CIB at 97 (citing Hr'g Tr. (Orchard) at 54:17-55:5). And Nokia makes similar, conclusory, declarations in its reply brief, but this time cites no expert testimony for support. CRB at 37 ("But the spatial samples in the Accused and DI Products are part of the coded prediction error signal because SAO parameters are pixel values used to correct prediction error."), 41 ("The SAO spatial samples represent the rest of the coded prediction error signal, *i.e.*, the part of the signal that represents the artifacts created as a result of prediction."). Showing that SAO exists in the bitstream and is used to correct errors is not a showing that SAO constitutes "pixel values" or has any connection to pixel outliers. Notably, Nokia criticized the prior art for the same lack of nexus to outliers. CIB at 103 ("Koga never mentions coding efficiency as a goal of the invention and makes no attempt to efficiently represent outlier values in the coded prediction error signal. As explained above, this efficient representation of the outlier values is the heart of the '991 Patent.").

An example illustrates the point. During the hearing, Dr. Orchard referenced a technical paper dedicated to SAO—an "overview of a newly added in-loop filtering technique, sample adaptive offset (SAO)." Hr'g Tr. (Orchard) at 39:23-24 (citing CDX-0004C.29; RX-5214). He pulled the following example from the paper showing "artifacts localized, little, almost point-wise artifact, similar to the example that we looked at before":

H.265 – Sample Adaptive Offset

(a) (b)

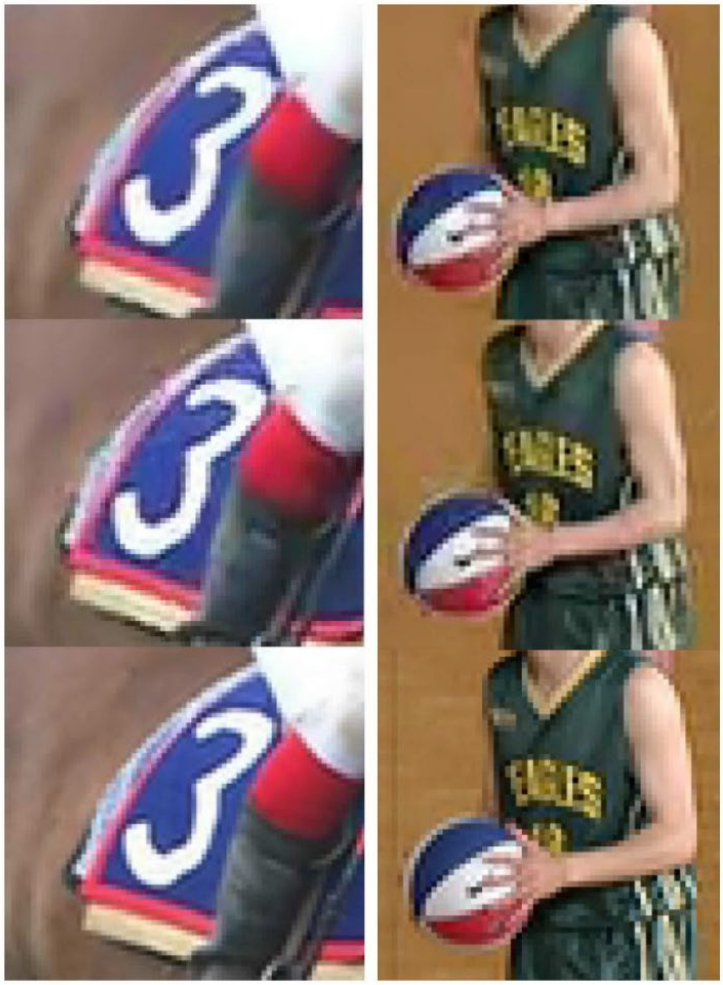
Fig. 9. Example in *SlideEditing* test sequence under LP condition, POC=100, QP=32: SAO is enabled in the left picture whereas SAO is disabled in the right picture.

RX-5214.8 (Sample Adaptive Offset in the HEVC Standard)

Hr'g Tr. (Orchard) at 40:3-8 (discussing CDX-0004C.29); *see* RX-5214.0008. He testified that SAO is enabled in the example on the left, and it has noticeably fewer artifacts than the right which is using only transforms. *Id.* at 40:9-23. But there would not appear to be any "outliers" here. All pixels in the image are green or white. And Nokia makes no effort to show where in the technical paper the problem of "outlier" pixels is addressed, for this example or others, or that SAO is applied in lieu of or alongside transforms as is done in the 991 patent. *See, e.g.*, RX-5214.0002 ("II. Evolutions, Motivations, and Challenges"). Rather, the paper characterizes SAO as "improv[ing] the visual quality by suppressing the ringing artifacts near true edges" (*id.* at .0007)

and it does so by assigning samples to one of a limited group of categories, and then applying a particular offset value to each sample in the category "without signaling the locations of to-be corrected samples" (*id.* at .0002; Hr'g Tr. (Storer) at 1210:23-1212:19).

Indeed, in a much more complicated example, the paper still refers to the advantage as pertaining to the "edges of objects" with no suggestion of "outliers":



(a) (b)

Fig. 10. Subjective quality comparison of: (a) *RaceHorses* test sequence, POC=20, QP=32, LP condition, (b) *BasketballPass* test sequence, POC=14, QP=32, LP condition. For both test sequences, SAO is enabled in above pictures and disabled in middle pictures, and the below pictures are original pictures.

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Fig. 10 shows two natural video examples of *RaceHorses* and *BasketballPass* test sequences. It can be observed easily that the edges of objects become much cleaner when SAO is enabled. According to the blind viewing tests conducted internally on our own, in general SAO can improve subjective quality, which is also reported independently in another subjective testing [34].

RX-5214.0008. Added to this are the paper's repeated references to SAO being a "filter" (RX-5214 at .0001, .0008) and the fact that SAO occurs in the decoding process *after* the block is preliminarily reconstructed:

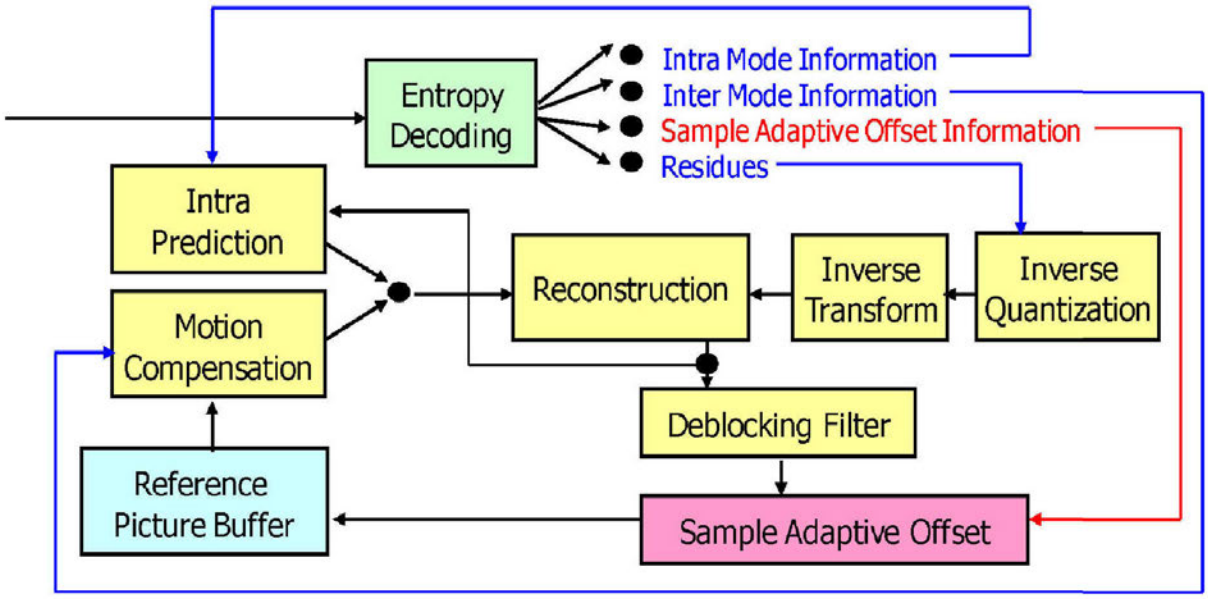

Fig. 1. Block diagram of HEVC decoder.

(*id.* at .0001; *see id.* at Abstract (explaining once blocks are reconstructed, they are categorized, and then offset by SAO values specific to each category), .0002 ("SAO should be applied only for reconstructed samples where the compression causes systematic distortions due to transform, quantization or prediction artifacts.")); Hr'g Tr. (Storer) at 1101:13-21. Already having a reconstructed block before SAO is applied is at odds with the 991 patent, which needs the "spatial sample" values along with the "transform" values to accomplish the reconstruction:

> The prediction error decoding 304 is substantially the opposite of the prediction error coding 303, with the prediction error decoding including an inverse spatial quantizer 332, an inverse transform 334 and an inverse quantization 336. The result of the prediction error decoding 304 is a reconstructed prediction error signal 338, *which is used in combination with the predicted representation of the image block 312 to create the preliminary reconstructed image 314*.
>
> . . . .
>
> FIG. 5 shows a decoding process according to various embodiments of the present invention. At 500 in FIG. 5, a video decoder receives a coded prediction error signal which comprises both transformed coefficients and spatial samples. At 510, both the transformed coefficients and the spatial samples are decoded. At 520, the decoded transform information, *the decoded spatial information and reconstructed prediction of the image block are added together to form decoded representation of the image block*.
>
> . . . .
>
> For pixel prediction 604, either intra-prediction or inter-prediction occurs at 614 to create a predicted representation of an image block 616. *The predicted representation of the image block 616 is used in conjunction with the reconstructed prediction error signal 612 to create a preliminary reconstructed image 618*, which in turn can be used both for prediction 614. Once all of the image blocks have been processed, the preliminary reconstructed image 618 is passed for filtering 620.

991 patent at 5:16-23 (emphasis added), 6:47-55(emphasis added), 6:63-7:4 (emphasis added); CRB at 41 ("The SAO spatial samples represent the *rest* of the coded prediction error signal [from residual transforms]") (emphasis by Nokia). The last excerpt from the patent is highly suggestive that "filtering 620," like SAO, is not considered "spatial samples" or "prediction error."

Applying SAO after reconstruction of a frame also conflicts with Nokia's description of prior art reference Koga (discussed further below). Dr. Orchard concedes "pixel values" are present in the circuit coming out of quantizer 17, and are fed into an adder 20 along with transform information, which, according to the reference, sends the combined result to frame memory 21 which "stores approximately one frame data." Hr'g Tr. (Orchard) at 1684:2-10; RX-5208 at 5:25-29, Fig. 3. So the parties' discussion of prior art, like the 991 patent, shows "pixel data" is that

which is needed to reconstruct a pixel, and not simply anything that is used to improve the image (*e.g.*, filters).

Accordingly, the weight of the evidence favors Amazon's position, which is that SAO is a filter, not "pixel values," and not a component or feature of a "prediction error signal." This is true regardless of whether "prediction error" is construed under Amazon's or Nokia's constructions (discussed above). It is also true regardless of Dr. Orchard's testing evidence which only shows SAO values are present in the bitstream. *See* CIB at 97. His source code evidence is also unavailing as it still depends on accepting SAO as pixel data (*see id.* at 100), which it is not. Thus, limitation [22a]/[31b] has not been shown to be required by the H.265 standard, and has not been shown to be met in the Accused Products, and there is no direct infringement.

As for Nokia's generalized claims of indirect infringement under the 991 patent (*see* CIB at 204-206; CRB at 81-83), Amazon correctly points out that it was not presented with any detail in Nokia's pre-hearing brief (RIB at 130; *see* CPB at 83 (no discussion of knowledge); *Amarin*, 104 F.4th at 1377). Thus, it has been waived. Order No. 2 at G.R. 9.2.

D. Domestic Industry – Technical Prong

According to Nokia's post-hearing briefing, the DI Products practice claims 22, 29, 31, and 38 of the 991 patent. CIB at 2, 206. For the reasons discussed below, Nokia has not shown by a preponderance of the evidence that the DI Products practice these claims.

Nokia contends, "[t]he DI Products practice the Asserted Patents for the same reasons as discussed for infringement because each of those products contains chips or an Android OS (Samsung) that Complainants' experts confirmed results in the same capabilities as the Accused Products." CIB at 206 (citing, *inter alia*, Hr'g Tr. (Orchard) at 46:16-21). In its briefing, Amazon do not dispute the DI Products practice the H.265 standard. *See* RIB at 131-132. But as determined

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above, it has not been established that claims 22, 29, 31, and 38 are required by the H.265 standard. Nokia provides no other argument as to how the claims are practiced. CIB at 206-207; CRB at 42-43.

Accordingly, Nokia has not shown claims 22, 29, 31, and 38 are practiced by the DI Products.

E. Validity

Amazon identifies the following invalidity theories for the 991 patent:

Claims	Theory
22, 29, 31, 38	Lack of patentable subject matter under 35 U.S.C. § 101
22, 29, 31, 38	Rendered obvious under 35 U.S.C. § 103 by Koga (RX-5208)

See generally RIB at 132-145.

Amazon identifies U.S. Patent No. 4,723,161 ("Koga") as prior art to the 991 patent. It states, "[Koga] issued in 1988 and is indisputably prior art." RIB at 122 n.29 (citing RX-5208). Nokia does not dispute the prior art status of Koga (*see generally* CIB at 102-109; CRB at 44-45), and although not explicitly stated by Amazon, it is accepted as prior art under at least 35 U.S.C. § 102(b) (pre-AIA).

1. Section 101

Pursuant to the two-step *Alice* framework, Amazon contends that "the '991 claims are directed to the abstract idea of using two previously unknown calculations, with the encoding claims using mathematical transforms to break information apart and the decoding claims using the same transforms to recombine that data." RIB at 132. Amazon draws particular analogy to the facts of *SAP Am. Inc. v. InvestPic, LLC* and state, "[t]he Federal Circuit has repeatedly

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invalidated claims that simply apply 'a series of mathematical calculations.'" *Id.* at 133 (citing 898 F.3d 1161, 1163, 1167 (Fed. Cir. 2018)). With respect to *Enfish*, discussed above for the 818 and 321 patents, Amazon argues "[t]he [991 patent] claims do not identify any specific or inventive type of 'transform coding' or 'spatial coding' that must be performed, nor how to accomplish either one." RRB at 56.

Amazon is not persuasive. The clear aim of the 991 patent claims is to improve a computer's ability to decode video streams; *i.e.*, an improvement to the way computers function held to be non-abstract in *Enfish* and its progeny. *Enfish*, 822 F.3d at 1336, 1338-9; *see, e.g.*, *Visual Memory*, 867 F.3d at 1258; *Gemalto*, 942 F.3d at 1149-51; 991 patent at 2:59-3:12. Amazon does not dispute that the 991 patent claims aim to improve the operation of computers but suggest that relying on *Enfish* for this principle is to "misapprehend[] the relevant caselaw." RRB at 56. To the contrary, *Enfish* is still good law:

> Miller Mendel relies on *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1337–38 (Fed. Cir. 2016), arguing that the district court overlooked clear improvements offered by the asserted claims. Appellant's Br. 29–30. This argument is also unpersuasive. In *Enfish*, the claims were directed to "a specific type of data structure designed to improve the way a computer stores and retrieves data in memory." 822 F.3d at 1339. Because the asserted claims of the '188 patent are not directed to an improvement in computer technology, *Enfish* is distinguishable.

Miller Mendel, Inc. v. City of Anna, Texas, 107 F.4th 1345, 1353 (Fed. Cir. 2024).

Accordingly, Amazon has not shown claims 22, 29, 31, and 38 are directed to ineligible subject matter under *Alice* step one, so they are not invalid under Section 101.

2. Koga

Amazon contends "[t]he Asserted Claims are . . . obvious over Koga and a POSITA's knowledge." RIB at 132. It summarizes:

> The '991 patent and its named inventor both admit the claimed prediction-error coding concepts were well-known. Koga taught the entire '991 approach two decades earlier. Dr. Storer showed the '991 patent only adds "prediction

> error…spatial samples" to the prior art[.] But Nokia's own inventor admitted that coding prediction error with both transform coefficients and spatial samples was known[.]

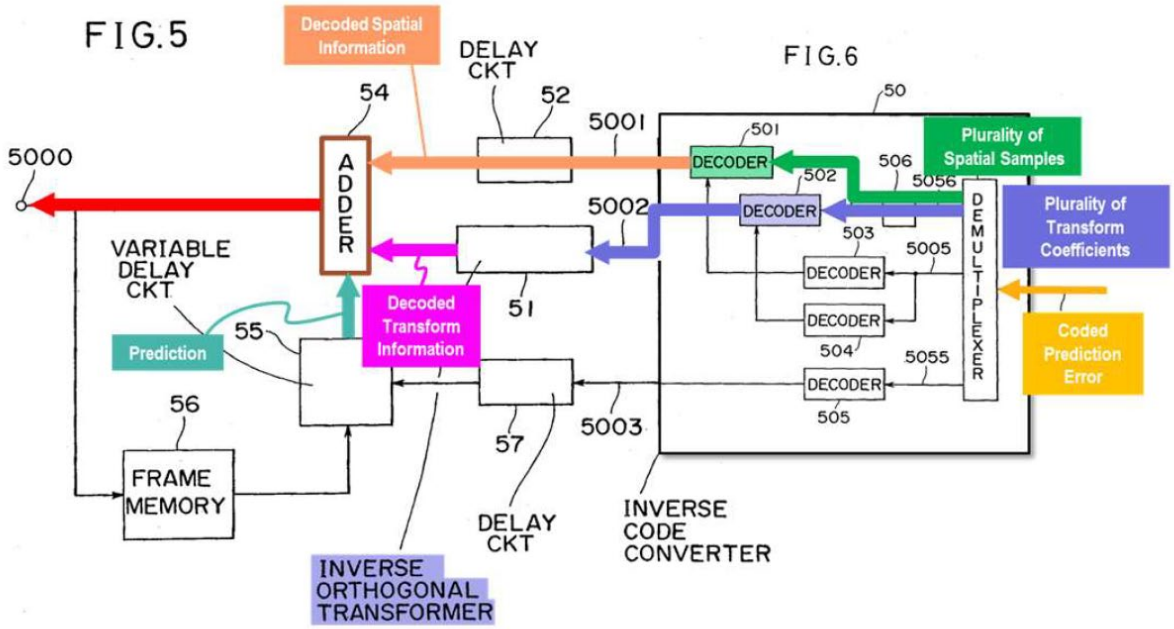
Id. at 134. For the reasons discussed below, Amazon has established a prima facie case of obviousness of claims 22 and 31, but not claims 29 or 38.

a. Claims 22 and 31

Amazon alleges that, as it concerns independent claims 22 and 31, only limitation [22c]/[31d] is in dispute. *See* RIB at 137-143. Nokia's briefing confirms this is the only limitation in dispute (CIB at 102-109; CRB at 44-46) and it is discussed below. For the remaining, undisputed, limitations [31a], [22a]/[31b], [22b]/[31c], and [22d]/[31e], they are disclosed in Koga as alleged by Amazon and its expert, Dr. Storer. *See* RIB at 137-140, 143 (citing Hr'g Tr. (Storer) at 1121:12-18, 1113:7-1122:6).

As for limitation [22c]/[31d], Amazon has shown by clear and convincing evidence that it is disclosed in or obvious in light of Koga. The limitation recites the straightforward step of decoding spatial samples into spatial information. *See* 991 patent at cls. 22 ("decoding, by a processor, the plurality of spatial samples into decoded spatial information"), 31 ("computer code for decoding the plurality of spatial samples into decoded spatial information"). For this function, Amazon points to decoder block 501 (green) in Koga's Figures 5 and 6:

[redacted]



RDX-0097C.50 (showing RX-5082 at Figs. 5 (annotated), 6 (annotated)); RIB at 142. Amazon highlights how block 501 uses "quantization characteristics" supplied by block 503 to decode an incoming block signal: "The decoder 501 decodes correctly an incoming block signal, if (a) the quantization characteristic signal from the decoder 503 is correctly decoded in connection with the incoming block signal and if (b) the difference between the prediction error signal and the inverse orthogonal transformation is to be decoded." RX-5082 at 7:4-9; RIB at 142.

Amazon argues that a POSITA would understand block 501 to use these "quantization characteristics" to dequantize, which is a manner of "decoding" in satisfaction of the broad claim limitation. *See* RIB at 142 (citing Hr'g Tr. (Storer) at 1120:4-11); RRB at 58, 59. And as Amazon correctly notes, Nokia does not challenge that Koga teaches the preceding step of sending spatial samples in a coded prediction error signal, nor the following step of adding spatial information with other values to make a final output image. RIB at 141. Altogether, it is clear and convincing that Koga decodes the received spatial samples into spatial information as alleged.

Nokia's opposition is not persuasive, particularly in light of its concessions that the decoder in Koga receives spatial samples over the bitstream and then also ends up with spatial information to combine with other information to reconstruct an image. Most likely, those spatial samples must be decoded into spatial information for this to happen.

Nokia attempts to argue on one page of its opening brief that block 501 is an "entropy decoder" and its input is bits—not spatial samples—and it turns those bits into spatial information directly without ever having been spatial samples:

> To support his position that the spatial samples are dequantized, Dr. Storer pointed to the figure below and accompanying description, which shows that "quantization characteristics" are sent to block 501. Tr. (Storer) 119:18-1120:14. But as Dr. Orchard explained, this quantization characteristics are used to perform entropy decoding, not dequantization. Tr. (Orchard) 1686:14-19. Notably, Dr. Storer never argued that entropy decoding constitutes the decoding of the claim. This is because the input to the entropy decoder are bits, not spatial samples. The entropy decoder in Koga receives bits and outputs a full block of spatial information, and therefore does not perform the step of decoding spatial samples into spatial information. Tr. (Orchard) 1687:7-11, 1683:22-1686:19.

CIB at 106. But somehow it manages to argue the opposite point in the very next paragraph—that entropy decoding produces spatial samples, not spatial information:

> Dr Storer only points to dequantization in the Koga decoder to satisfy the limitation of decoding a plurality of spatial samples into spatial information, however, dequantization never occurs in Koga. The only decoding that occurs is the decoding of an entropy coded signal (*i.e.*, 1s and 0s) into entropy decoded information (in this case the spatial information for an entire block of data). Tr. (Orchard) 1685:19-24. Entropy coding cannot satisfy the limitations requiring decoding spatial samples into spatial information because entropy decoding only decodes bits into spatial samples, not spatial samples into spatial information. Tr. (Orchard) 1868:20-25. Dr. Storer offered no opinion that it would be obvious for a POSITA to modify Koga in a way that spatial samples would be decoded into spatial information.

Id. at 107. So while Amazon contends block 501 performs dequantization in satisfaction of the claim (RRB at 59-60), it would seem there is no real dispute even if block 501 is treated as an entropy decoder instead. In either case, it receives the necessary starting material—spatial

samples—and produces the necessary result—spatial information. Although not entirely clear on this point, Dr. Orchard did appear to concede this fact on cross-examination:

> Q. By your own diagram Koga has – receives the coded – receives a coded prediction error signal with spatial samples and it entropy decodes an output spatial information, right?
>
> A. Yes, I agree.

Hr'g Tr. (Orchard) at 1696:22-1697:1; *but see id.* at 1697:4-6 ("There is no step in Koga or needed in Koga in decoding a collection of spatial samples into spatial information. What is received is spatial information.").

Accordingly, the documentary evidence and testimony create a clear and convincing case that all limitations of claims 22 and 31 are disclosed in Koga. Because Amazon is only asserting obviousness, the *Graham* factors must be considered. The scope and content of Koga has been detailed above, and it is only minimally different, if at all, from claims 22 and 31. As for the level of ordinary skill, Nokia omits the issue entirely from its briefs. *See generally* CIB; CRB. Amazon, citing expert testimony, asserts that for every Asserted Patent the parties' proposed levels of ordinary skill are either "the same" or are not "materially different." RIB at 25, 73, 99, 132, 150. But with one exception the experts never actually opined on the level of ordinary skill. *See* Hr'g Tr. (Moulin) at 419:5-21; Hr'g Tr. (Saber) at 574:25-575:19; Hr'g Tr. (Storer) at 1087:24-1088:11; Hr'g Tr. (Schonfeld) at 1253:19-1254:7. They were shown demonstrative exhibits that displayed the parties' proposed levels, and Amazon reproduces those demonstratives in its initial brief, but demonstratives are not substantive evidence. *See* RIB at 25, 73, 99, 132.

The upshot of this omission is that Amazon has offered no actual evidence on the level of ordinary skill, which is one of the *Graham* factors. Because all the limitations of claims 22 and 31 are disclosed in Koga, however, it is not clear that this factor is especially weighty or even

relevant. As for objective indicia of non-obviousness, a single paragraph in Nokia's initial brief cites several such indicia, but it relates only to the 818 patent, with every other Asserted Patent seemingly possessing no objective indicia at all. *See* CIB at 153. This is puzzling. The DI Products include famous and top-selling consumer electronic devices, including Microsoft Xbox consoles and Surface laptops and late-model Samsung Galaxy smartphones. *See* CIB at 6-7. Even if only some models have actually been shown to practice the claims, the standards at issue practice all the claims asserted for infringement purposes except those of the 991 patent, so most asserted claims have surely experienced "widespread adoption." *Certain Electronic Devices Including Streaming Players, Televisions, Set Top Boxes, Remote Controllers, and Components Thereof*, Inv. No. 337-TA-1200, Comm'n Op. at 29 (Dec. 3, 2021) ("*Streaming Players*"), *aff'd sub nom., Roku, Inc. v. Int'l Trade Comm'n*, 90 F.4th 1367 (Fed. Cir. 2024).

There may well be a nexus problem, but *Streaming Players* is nonetheless instructive:

> The Commission also finds that UEI's evidence of secondary considerations is even more "substantial," "impressive," or "dispositive" than the ID recognizes. This evidence, which includes industry praise for the invention and widespread adoption, identifies the use of two controlling devices (such as a set top box and a separate remote control) and thus exhibits a clear nexus between the invention and the secondary considerations, for the reasons stated in the ID. UEI is also entitled to a presumption of a nexus because it has shown that this objective evidence is tied to specific Samsung products that practice the invention disclosed and claimed in the '196 patent.

Streaming Players, Inv. No. 337-TA-1200, Comm'n Op. at 29 (citations omitted). That is, sufficiently significant objective indicia can conclusively refute a prima facie obviousness case, and proof of nexus is streamlined where, as here, the nexus is to the DI Products themselves. *See Roku*, 90 F.4th at 1374 ("nor does Roku dispute that [the DI Product] is discussed in the references the Commission relied on").

Regardless, Nokia has offered no evidence or even argument regarding objective indicia for the 991 patent, and an "alternative analysis that was never argued before the ALJ" may not be adopted. *Certain Marine Air Conditioning Systems, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-1346, Comm'n Op. at 76 (Mar. 11, 2024). So no objective indicia have been proven, Amazon has otherwise made out a prima facie case of obviousness for claims 22 and 31 of the 991 patent, and those claims have accordingly been shown to be invalid.

b. Claims 29 and 38

Amazon's briefing does not exactly state whether dependent claims 29 and 38 are disclosed in Koga or obvious in light of Koga. For reference, these claims require decoding at least some spatial samples "as a single unit." 991 patent at cls. 29 ("wherein at least some of the plurality of spatial samples are decoded as a single unit"), 38 ("wherein at least some of the plurality of spatial samples are decoded as a single unit."). The entirety of Amazon's discussion is as follows:

> These claims merely require decoding "some of the plurality of spatial samples…as a single unit." Dr. Storer showed how his analysis for the independent claims confirmed Koga was operating on a plurality of spatial samples/pixel values (*i.e.,* a "block") . . . . Tr. (Storer) 1122:10-24, 1125:2-19; RX-5208 at 5:5-11. As discussed above, Dr. Storer showed that Koga codes the spatial samples using a Huffman code . . . . Tr. (Storer) 1115:8-1116:11.
>
> On cross-examination, Dr. Orchard admitted this element is not novel and is obvious over Koga. First, Dr. Orchard admitted a POSITA "knew how to do this step, right, before the '991 patent." Tr. (Orchard) 1706:5-7. Then he conceded there were multiple ways, including using a median, an average, run-length coding, or a code book. Tr. (Orchard) 1706:8-1707:21. Finally, he admitted that Koga teaches to code a spatial sample using a Huffman codebook. Tr. (Orchard) 1708:8-11.

RIB at 144-145.

Amazon has not presented a clear and convincing case of invalidity for these dependent claims. *i4i Ltd.*, 564 U.S. at 95. To the extent Amazon contends that acting upon a block is acting upon "a single unit," at a minimum that needs to be stated explicitly when the claims are in dispute. And Amazon's first excerpt from Koga (RX-5082 at 4:64-5:11; RDX-0097C.51) deals with

[redacted]

encoding transform information—not decoding as the claim requires, or spatial samples as the claim requires. Amazon also refers to Koga's use of "Huffman codes" (RX-5082 at 6:4-9; RDX-0097C.42) but makes no attempt to explain why Huffman codes mean spatial samples are decoded as a single unit (*see* RIB at 144-145). The cited testimony from Dr. Storer fails to answer these questions. *See generally* Hr'g Tr. (Storer) at 1115:8-1116:11, 1122:10-24, 1125:2-19. To the extent Amazon did not intend to argue that Koga disclosed decoding at least some spatial samples as a single unit, but that it would have been obvious, the testimony of Dr. Storer is only that it was a known technique and not why a POSITA would have employed it with Koga. *See generally* RIB at 144-145; Hr'g Tr. (Storer) at 1125:2-19 ("that's obviously well-known for decades.").

Accordingly, Amazon has not shown a prima facie case that claims 29 or 38 would have been obvious.

VII. U.S. PATENT NO. 10,536,714

A. Claims-at-Issue

Claims 15 and 23 of the 714 patent are at issue in this investigation, either through allegations of infringement or domestic industry technical prong. *See* CIB at 1-2, 206. They are reproduced below, along with limitation identifiers:

> 15. [15a] An apparatus comprising a processor and a memory including computer program code, the memory and the computer program code configured to, with the processor, cause the apparatus to:
>
> [15b] select a first spatial motion vector prediction candidate from a set of spatial motion vector prediction candidates for a block of pixels as a potential spatial motion vector prediction candidate to be included in a motion vector prediction list for a prediction unit of the block of pixels, where the motion vector prediction list comprises motion information of the spatial motion vector prediction candidates and is utilized to identify motion vector prediction candidates of which one spatial motion vector prediction candidate from the motion vector prediction list is signaled as the motion information for the prediction unit;

[15c] determine a subset of spatial motion vector prediction candidates based on the location of the block associated with the first spatial motion vector prediction candidate;

[15d] compare motion information of the first spatial motion vector prediction candidate with motion information of the spatial motion vector prediction candidate in the determined subset of spatial motion vector prediction candidates without making a comparison of each possible candidate pair from the set of spatial motion vector prediction candidates;

[15e] determine to include or exclude the first spatial motion vector prediction candidate in the motion vector prediction list based on comparison of the motion information of the first spatial motion vector candidate with motion information of the spatial motion vector prediction candidate; and

[15f] cause information identifying the one spatial motion vector prediction candidate from the motion vector prediction list to be transmitted to a decoder or to be stored.

. . . .

23. [23a] An apparatus comprising a processor and a memory including computer program code, the memory and the computer program code configured to, with the processor, cause the apparatus to:

[23b] select a first spatial motion vector prediction candidate from a set of spatial motion vector prediction candidates for an encoded block of pixels as a potential spatial motion vector prediction candidate to be included in a motion vector prediction list for a prediction unit of the encoded block of pixels, where the motion vector prediction list comprises motion information of the spatial motion vector prediction candidates;

[23c] determine a subset of spatial motion vector prediction candidates based on the location of the block associated with the first spatial motion vector prediction candidate;

[23d] compare motion information of the first spatial motion vector prediction candidate with motion information of the spatial motion vector prediction candidate in the determined subset of spatial motion vector prediction candidates without making a comparison of each possible candidate pair from the set of spatial motion vector prediction candidates;

[23e] determine to include or exclude the first spatial motion vector prediction candidate in the motion vector prediction list based on comparison of the motion information of the first spatial motion vector candidate with motion information of the spatial motion vector prediction candidate; and

[23f] select a spatial motion vector prediction candidate from the motion vector prediction list for use in decoding the encoded block of pixels, wherein the spatial motion vector prediction candidate is selected from the motion vector prediction list using information that was received identifying a respective spatial motion vector prediction candidate from the motion vector prediction list constructed by an encoder.

714 patent at cls. 15, 23 (annotated).

B. Claim Construction

The parties do not explicitly identify any claim terms needing construction. *See* RIB at 65.

C. Infringement

According to Nokia's post-hearing briefing, the use, manufacture, or sale of the Accused Products infringes claims 15 and 23. *See* CIB at 1-2. Specifically, it contends that claim 15 is an encoding claim and infringed only by HP; and claim 23 is a decoding claim and infringed by all Respondents. CIB at 2. As HP is now terminated from the investigation, infringement of claim 15 would ordinarily not need to be decided. But because of Nokia's decision to tie its technical prong domestic industry claims directly to how the Accused Products operate, infringement of claim 15 is discussed below. For the reasons discussed, Nokia has shown infringement of claim 23 by the Accused Products, but not claim 15. And as for Nokia's generalized claims of indirect infringement under the 714 patent (*see* CIB at 204-206; CRB at 81-83), Amazon correctly points out that it was not alleged in Nokia's pre-hearing brief (RRB at 10; *see* CPB at 101-113 (no discussion)). Thus, it has been waived. Order No. 2 at G.R. 9.2.

1. Claim 15

For reference, claim 15 of the 714 patent requires:

15. [15a] An apparatus comprising a processor and a memory including computer program code, the memory and the computer program code configured to, with the processor, cause the apparatus to:

[15b] select a first spatial motion vector prediction candidate from a set of spatial motion vector prediction candidates for a block of pixels as a potential spatial

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> motion vector prediction candidate to be included in a motion vector prediction list for a prediction unit of the block of pixels, where the motion vector prediction list comprises motion information of the spatial motion vector prediction candidates and is utilized to identify motion vector prediction candidates of which one spatial motion vector prediction candidate from the motion vector prediction list is signaled as the motion information for the prediction unit;
>
> [15c] determine a subset of spatial motion vector prediction candidates based on the location of the block associated with the first spatial motion vector prediction candidate;
>
> [15d] compare motion information of the first spatial motion vector prediction candidate with motion information of the spatial motion vector prediction candidate in the determined subset of spatial motion vector prediction candidates without making a comparison of each possible candidate pair from the set of spatial motion vector prediction candidates;
>
> [15e] determine to include or exclude the first spatial motion vector prediction candidate in the motion vector prediction list based on comparison of the motion information of the first spatial motion vector candidate with motion information of the spatial motion vector prediction candidate; and
>
> [15f] cause information identifying the one spatial motion vector prediction candidate from the motion vector prediction list to be transmitted to a decoder or to be stored.

714 patent at cl. 15 (annotated).[4] Nokia, relying on the testimony of Dr. Pierre Moulin, contends claim 15 is infringed through experimental testing and source code analysis of H.265-compliant videos. *See generally* CIB at 56-59, 66-72 (citing Hr'g Tr. (Moulin) at 500:3-501:10, 502:6-509:6). Nokia asserts that limitations [15a], [15e], and [15f] are not in dispute, which is confirmed by Amazon's briefing. *See* CIB at 66, 70, 71; RIB at 68-69; RRB at 26-27, 29. Based on the lack of dispute, and the testimony from Dr. Moulin, these limitations are determined to be present in the HP Accused Products.

As for disputed limitations [15b], [15c], and [15d], Nokia contends they are met in the "Accused and DI Products" because "the output bitstream included merge blocks," "[e]ach merge

[4] Nokia uses different identifiers which start with [15pre] and end with [15e].

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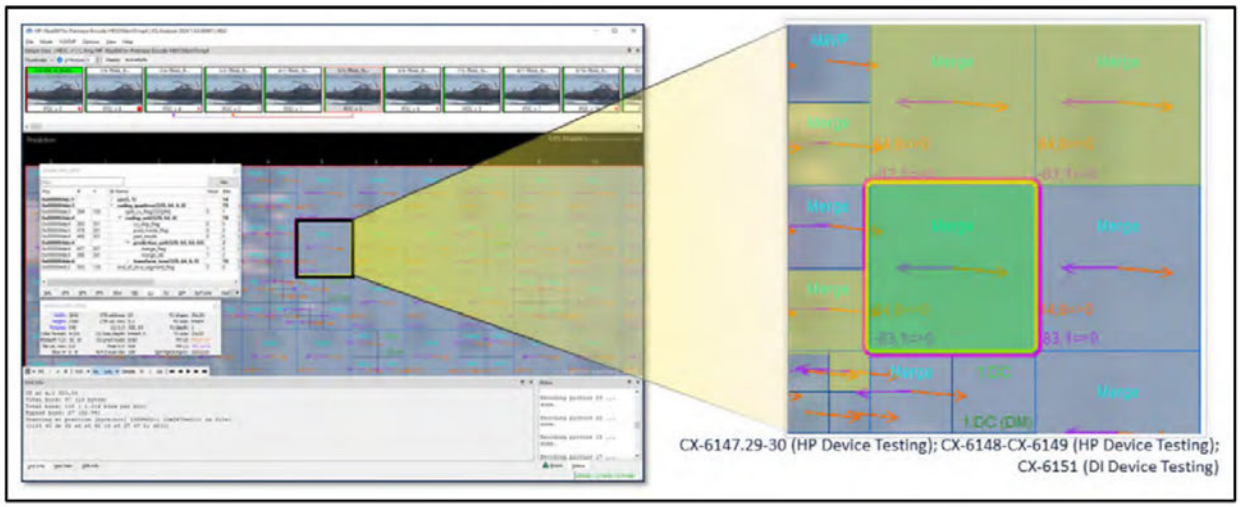
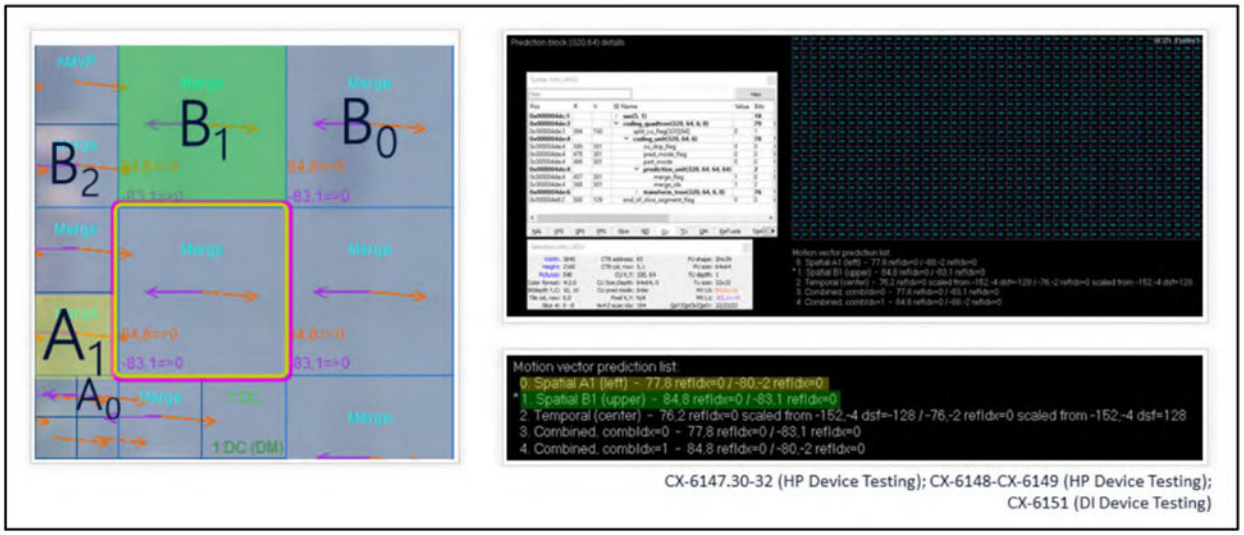
block has an MVP list which is constructed using SMVP candidates taken from a set of SMVP candidates for that block of pixels," "the encoder selected B1 because B1 is in the MVP list for the prediction unit," "testing evidence shows a subset was determined for a selected first SMVP candidate, *e.g.*, B1 or A1," and "the MVP list for the merge block examined in each encoded bitstream reflected a non-exhaustive comparison to the determined subset, such as the subset consisting of A1 for SMVP candidate B1," and "[e]ach has different motion information in the highlighted portions of the screenshot." *See generally* CIB at 67-70. For support, as noted, Nokia and Dr. Moulin cite bitstream analysis taken with a VQ Analyzer tool as in the examples below:



CX-6147.29-30 (HP Device Testing); CX-6148-CX-6149 (HP Device Testing); CX-6151 (DI Device Testing)



CX-6147.30-32 (HP Device Testing); CX-6148-CX-6149 (HP Device Testing); CX-6151 (DI Device Testing)

CIB at 67, 69. Nokia also refers to source code inspected by Dr. Moulin. *Id.* at 70 (citing Hr'g Tr. (Moulin) at 506:7-14), 71-72 (citing Hr'g Tr. (Moulin) at 500:3-501:10, 508:3-509:6, 497:17-499:8); RRB at 27-28. And, in response to Amazon's challenges, Nokia argues this evidence at least indirectly shows the limitations are being performed by the encoders. *See* RRB at 28-30.

Against these several limitations, Amazon first makes a global burden-of-proof argument which is that "Nokia relies on bitstream analysis screen captures for infringement of claim 15. . . . But this after-the-fact analysis does not show how the bitstream was encoded, and thus cannot demonstrate numerous elements of claim 15." RRB at 29. It elaborates:

> In particular, because the "select" (15/23[b]), "determine" (15/23[c]), and "compare" (15/23[d]) steps require specific actions, it is impossible for a VQ Analyzer to show whether those elements were performed. *Id.* 1271:4-1272:3. The VQ Analyzer tool, as Dr. Schonfeld put it, "cannot say anything about what's happening inside the encoder," and as a result, Nokia's and Dr. Moulin's "entire analysis" and reliance on that tool "does not allow you to obtain any conclusion" regarding most of the claim limitations. *Id.* 1271:4-18.

RIB at 68-69; *see generally* RIB at 12-18.

Amazon is not persuasive for the "select" limitation of limitation [15b]. The VQ Analyzer screenshot above shows, at a minimum, that some candidate block labeled B1 was selected as the eventual "motion information for the prediction unit" via the asterisk notation, for subsequent transmission to the decoder. CIB at 69 (citing CX-6147; CX-6148; CX-6149; CX-6151). This is sufficient for limitation [15b].

Amazon is persuasive, however, for the "determine" and "compare" limitations, limitations [15c] and [15d]. The cited VQ Analyzer screenshots above, and many other screenshots included within Dr. Moulin's testing evidence (*see, e.g.*, CX-6148.0002-0042), show: the coded stream is H.265 compliant (*see, e.g.*, *id.* at .0007); various candidates with designators A0, A1, B0, B1, B2 appearing in an eventual "Motion Vector Prediction List" (*see, e.g.*, *id.* at .0020); and various

[redacted]

candidates excluded from that list at the same time as those candidates having matching motion vector information (*see, e.g.*, *id.* at .0032-34, .0038-0040). But the screenshots do not show what Nokia has labeled the heart of the invention and what is captured in limitations [15c] and [15d]—that candidates were excluded from the merge list through comparisons of less than all candidates to each other. *See* CIB at 58-59 ("By performing a limited set of comparisons against only the determined subset, the computational burden of constructing a merge list is significantly reduced, for example from 10 comparisons to only 5"). The screenshots simply do not show any process similar to what is in Figures 5b or 8b of the 714 patent, or contained in the H.265 specification; *e.g.*, where candidate A1 is only compared to B1, B0 is only compared to B1, etc. 714 patent at Figs. 5a, 5b, 8a, 8b; Hr'g Tr. (Moulin) at 519:2-520:23 (citing CDX-0012C.105). So there is no showing of a "subset" having been determined (limitation [15c]) or comparisons of candidates "without making a comparison of each possible candidate pair" (limitation [15d]). To the extent Nokia argues that these specific operations do in fact exist and appear in the source code identified by Dr. Moulin, Dr. Moulin's testimony on source code is conclusory and of little probative value. *See* Hr'g Tr. (Moulin) 500:3-501:10, 506:7-14, 508:3-509:6, 497:17-499:8; CDX-0012C.125-126.

Accordingly, Nokia has not shown infringement of limitations [15c] or [15d] in the Accused Products. And given that Nokia provides no particularized argument or evidence for the DI Products that could remedy the above deficiencies, it has also not shown practice of limitations [15c] or [15d] in the DI Products.

2. Claim 23

For reference, claim 23 of the 714 patent requires:

> 23. [23a] An apparatus comprising a processor and a memory including computer program code, the memory and the computer program code configured to, with the processor, cause the apparatus to:

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[23b] select a first spatial motion vector prediction candidate from a set of spatial motion vector prediction candidates for an encoded block of pixels as a potential spatial motion vector prediction candidate to be included in a motion vector prediction list for a prediction unit of the encoded block of pixels, where the motion vector prediction list comprises motion information of the spatial motion vector prediction candidates;

[23c] determine a subset of spatial motion vector prediction candidates based on the location of the block associated with the first spatial motion vector prediction candidate;

[23d] compare motion information of the first spatial motion vector prediction candidate with motion information of the spatial motion vector prediction candidate in the determined subset of spatial motion vector prediction candidates without making a comparison of each possible candidate pair from the set of spatial motion vector prediction candidates;

[23e] determine to include or exclude the first spatial motion vector prediction candidate in the motion vector prediction list based on comparison of the motion information of the first spatial motion vector candidate with motion information of the spatial motion vector prediction candidate; and

[23f] select a spatial motion vector prediction candidate from the motion vector prediction list for use in decoding the encoded block of pixels, wherein the spatial motion vector prediction candidate is selected from the motion vector prediction list using information that was received identifying a respective spatial motion vector prediction candidate from the motion vector prediction list constructed by an encoder.

714 patent at cl. 23 (annotated).[5] Nokia, relying on the testimony of Dr. Moulin, contends claim 23 is infringed because it is required by the H.265 standard, and as further supported by experimental testing and source code. *See generally* CIB at 56-59, 60-66 (citing Hr'g Tr. (Moulin) at 490:2-501:10). Nokia asserts that limitations [23a], [23b], [23d], and [23e] are not in dispute, which is confirmed by Amazon's briefing. *See* CIB at 60-61, 63-64; RIB at 66-68, 69-72; RRB at 26-29. Based on the lack of dispute, and the testimony from Dr. Moulin, these limitations are determined to be present in the Accused Products.

As for limitation [23c], Nokia contends it is met in the "Accused and DI Products" because

[5] Nokia uses different identifiers which start with [23pre] and end with [23e].

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"the H.265 Standard requires that a subset be determined for each selected SMVP candidate based on the location of the block of pixels," "[f]or each candidate, the H.265 Standard sets forth a corresponding subset of other candidates against which that candidate will be compared," and "this determination is 'based on the location of the block associated with the first SMVP candidate' because the relative location of the blocks in the figure is fixed." *See generally* CIB at 62-63 (citing Hr'g Tr. (Moulin) at 492:7-494:10). For support, and in the example of using A0 as a motion vector candidate, Nokia and Dr. Moulin cite the below passages from the H.265 Standard along with a table prepared by Dr. Moulin:

8.5.3.2.3 Derivation process for spatial merging candidates

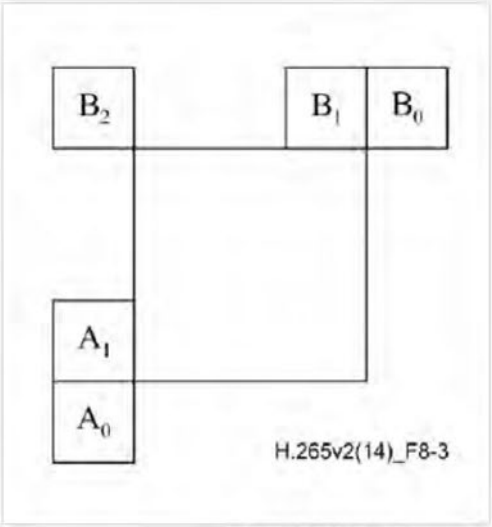
– The variables $availableFlagA_0$, $refIdxLXA_0$, $predFlagLXA_0$ and $mvLXA_0$ are derived as follows:

  – If one or more of the following conditions are true, $availableFlagA_0$ is set equal to 0, both components of $mvLXA_0$ are set equal to 0, $refIdxLXA_0$ is set equal to −1 and $predFlagLXA_0$ is set equal to 0, with X being 0 or 1:

    5. $availableA_0$ is equal to FALSE.

    6. $availableA_1$ is equal to TRUE and the prediction units covering the luma locations ($xNbA_1$, $yNbA_1$) and ($xNbA_0$, $yNbA_0$) have the same motion vectors and the same reference indices.

CX-7651.0170 (H.265 Standard)



Block Location	Subset
A_0	A_1
B_0	B_1
B_1	A_1
B_2	A_1, B_1

See CX-7651.0168-70 (H.265 Standard)

CX-7651.0174 (H.265 Standard)

Id. at 63.

By way of background, Nokia explains that in January 2012, its inventors submitted JCTVC-H0252 to the JCTVC standard-setting group which "disclosed the inventions of the '714 Patent" and was eventually adopted into the H.265 standard. CIB at 59 (citing Hr'g Tr. (Moulin) at 488:6-14; CX-6253). Nokia argues there is no dispute as to these facts. *Id.* Notably, JCTVC-H0252 discloses "comparing each spatial candidate with a limited number of spatial candidates" and provides the following rules and diagram:

> The conditions for each spatial candidate to be excluded from the merge list are as follows:
>
> - A1: No change (which means A1 is always inserted as long as it is available.)

> - B1: B1 has the same motion information as A1
> - B0: B0 has the same motion information as B1
> - A0: A0 has the same motion information as A1
> - B2: B2 has the same motion information as A1 or has the same motion information as B1 (Note that as in HM5, B2 is considered only if any of A1, B1, B0 or A0 is excluded from the merge list.)

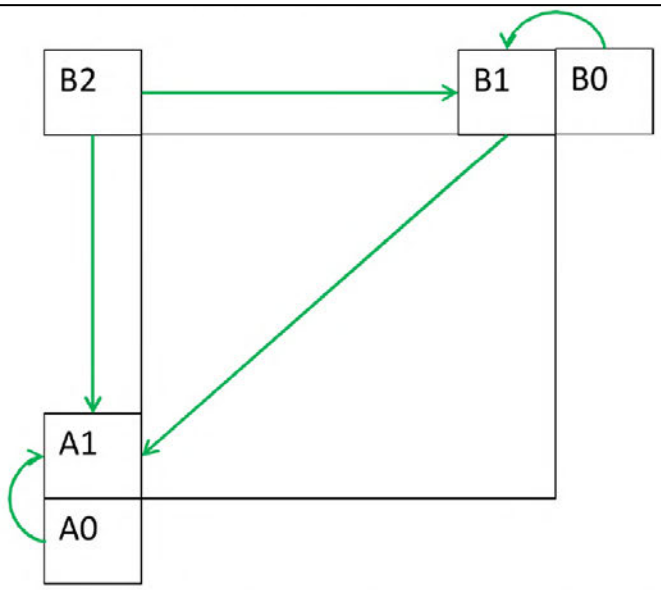


Figure { SEQ Figure * ARABIC }. Spatial neighbors which are the potential candidates for the merge list. Arrows indicate which spatial candidate(s) are to be compared.

CX-6253.0001-2. The limitation is met as alleged.

Amazon's points in opposition are not persuasive. First, it argues the Accused Products

do not "determine" in "determine a subset of spatial motion vector prediction candidates based on the location of the block associated with the first spatial motion vector prediction candidate" because the rules for which motion vector candidate is compared to which other candidate (*i.e.*, creation of the "subset") are pre-defined in H.265:

> Dr. Moulin agreed the portions of H.265 that Nokia identified are all predefined rules for comparisons. Tr. (Moulin) 518:25-523:15; CDX-0012C.105; Tr. (Schonfeld) 1258:24-1259:24, 1266:7-20; RDX-0096C.16-17, 30; JX-0024.172-175. For example, for the A0 neighbor, the supposed subset is always A1. Tr. (Moulin) 493:11-16, 520:12-15; CDX-0012C.104-105; JX-0024.174-175. Dr. Moulin further agreed the five specific comparisons never change. Tr. (Moulin) 520:8-23. Thus, in H.265, the decoder never "determines a subset" because the standard precludes it from doing so. Tr. (Schonfeld) 1266:7-20.

RIB at 66-67. Amazon is correct in that H.265 predefines the subset, as in the green arrow figure above. Yet the term "determine" in a computer apparatus claim ordinarily has broad meaning, and the intrinsic evidence supports finding that a computer can "determine" a value even when that value is provided to it (*e.g.*, by the bitstream from the encoder). For example, the specification teaches that within the decoder, an entropy decoder unit provides an "indication on the prediction mode used" to a pixel predictor unit—and that pixel predictor then "*determines* that an intra-prediction or an inter-prediction is to be carried out." 714 patent at 21:41-43 (emphasis added). The clear implication is that the entropy decoder instructed the pixel predictor which of the two modes to use.

Similarly, the specification teaches "[t]he decoder *determines* 806 which spatial motion prediction candidate of the set of spatial motion prediction candidates is in question," such as A1, A0, B0, B1, or B2. 714 patent at 22:46-48 (emphasis added); *see id.* at Figs. 8a, 8b. The specification uses this word even though it is suggested that the candidate order is predefined or "predetermined" (*id.* at 22:17-22 ("As was the case in the encoding part, in this example the spatial motion prediction candidates are the spatial neighbour blocks A0, A1, B0, B1, B2 and these spatial

motion prediction candidates are processed in the same predetermined order than in the encoder: A1, B1, B0, A0 and B2.”)). So again, the patent seems to use “determine” even in situations where things are predetermined or instructed.

Moreover, if Amazon’s interpretation is accepted such that the decoder must make an original decision on the subset that can vary depending on the circumstances (*i.e.*, providing a choice), then there are no embodiments or teachings in the patent as to how this determination is made or on what grounds; *i.e.*, it finds no support in the patent. Such constructions are usually disfavored. *Kaufman v. Microsoft Corp.*, 34 F.4th 1360, 1372 (Fed. Cir. 2022) (citing, *inter alia*, *Vitronics*, 90 F.3d at 1583).

Finally, Amazon cites no evidence, intrinsic or extrinsic, other than the opinion of their expert to support its preferred meaning of “determine.” *See* RIB at 66-67, 69; RRB at 25-27. That meaning is not persuasive in light of the intrinsic evidence discussed above and its non-infringement position fails. *Phillips*, 415 F.3d at 1315.

Amazon’s second dispute with limitation [23c] is that even if the H.265 decoder “determines” which subset to use, it does not do so “based on the location of the block associated with the first spatial motion vector prediction candidate.” RIB at 67; RRB at 27-28. Amazon argues that the proper construction here is that the “the block” means “the encoded block currently begin decoded,” which would be block 900 in the patent figure below:

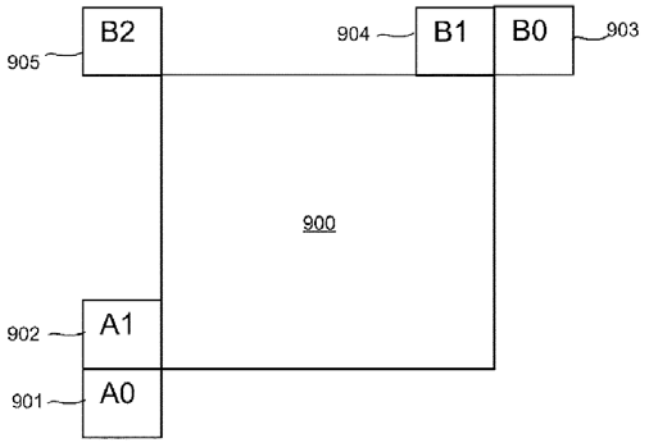


Fig. 9

See RIB at 67; RRB at 27-28; 714 patent at Fig. 9. Amazon applies antecedent basis principles to support their interpretation of "the block," stating, "[e]lement 23[c] recites 'the block,' for which the only antecedent basis is in element 23[b]: 'for an encoded block of pixels.' . . . . Therefore, element 23[c] requires determining a subset based on the location [of] the encoded block currently being decoded." RIB at 67.

This is a close question but the intrinsic record suggests "the block" refers to the block that is the spatial motion vector prediction candidate A0, A1, B0, B1, or B2, and not block 900. To start, Amazon cites no intrinsic support for its construction apart from antecedent basis. RIB at 67; RRB at 27-28. But antecedent basis would not seem to apply because the claim element is not simply "the block," but "the block associated with the first spatial motion vector prediction candidate." 714 patent at cl. 23. Further, the plain meaning of "the block associated with the first spatial motion vector prediction candidate" would be the block from which that motion vector prediction candidate comes—and not the block that could potentially be assigned that same motion vector if all the programmed comparisons and indices pan out that way. After all, the purpose of the patent is to figure out which, if any, of the *known* motion vectors of A0, A1, B0, B1, and B2 should be applied to the *unknown* coding unit 900:

[redacted]

> The invention relates to a method for encoding, a method for decoding, an apparatus, computer program products, an encoder and a decoder for video information. The motion vector for a block in a video image is predicted from a set of motion vector prediction candidates determined based on previously-coded motion vectors. A motion vector prediction candidate is included in the set based on the location of the block associated with the first spatial motion vector prediction candidate and in comparison with motion vector prediction candidates already in the set.

714 patent at Abstract; *see, e.g.*, *id.* at 13:27-31 ("As can be seen from FIG. 9, if the coding unit 900 represents the current block, the neighbouring blocks 901-905 labelled A0, A1, B0, B1 and B2 could be such neighbour blocks which may be used when obtaining the candidate motion vectors."). Moreover, there are no embodiments or discussions in the patent of using the location of block 900 to determine the "subset" of candidates, which weighs heavily against its adoption. *Kaufman*, 34 F.4th at 1372 (citing, *inter alia*, *Vitronics*, 90 F.3d at 1583).

Accordingly, Amazon's non-infringement argument based on a construction of "the block" is not persuasive. And when "the block" is properly construed as referring to one of A0, A1, B0, B1, or B2, the record shows the subset comparisons are based on location. The rules disclosed in connection with Figures 8a and 8b of the patent match the green arrow diagram from the inventors' JVT H.265 submission, reproduced below:

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[redacted]

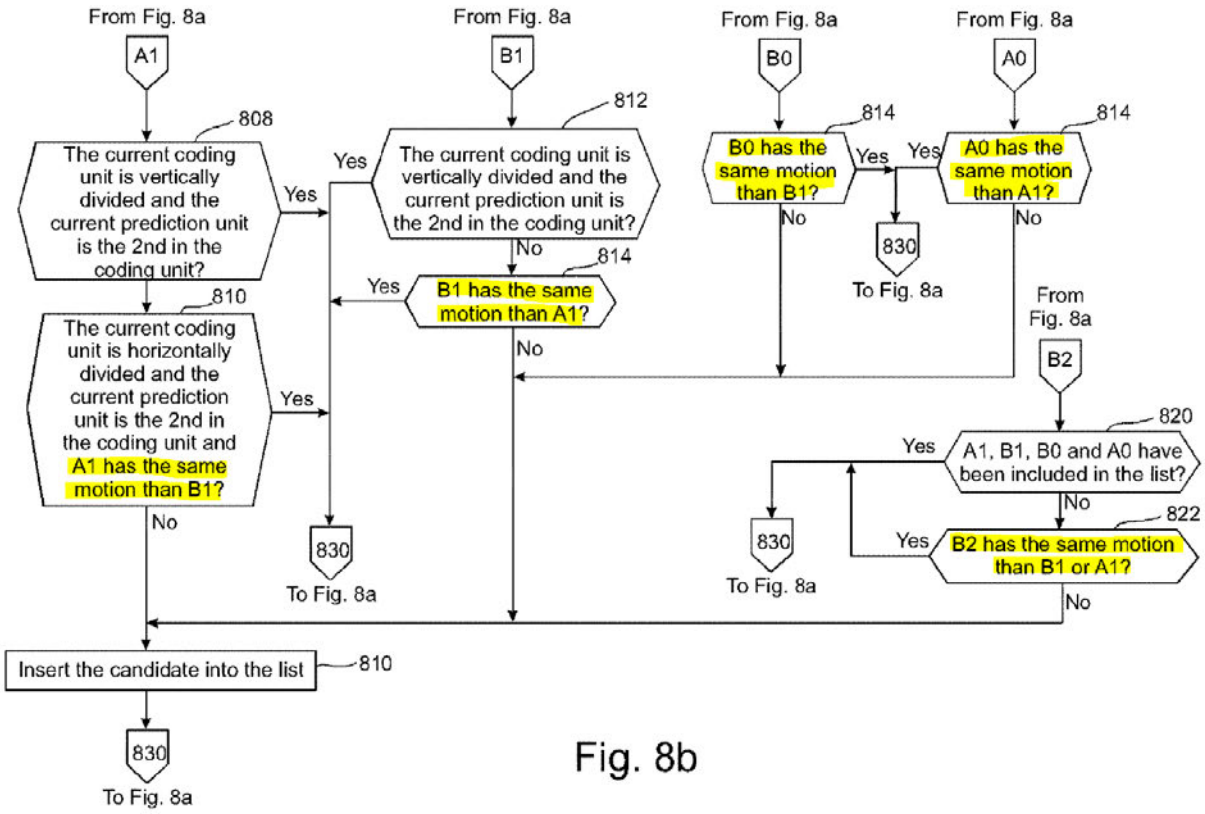

Fig. 8b

714 patent at Fig. 8b (annotated);

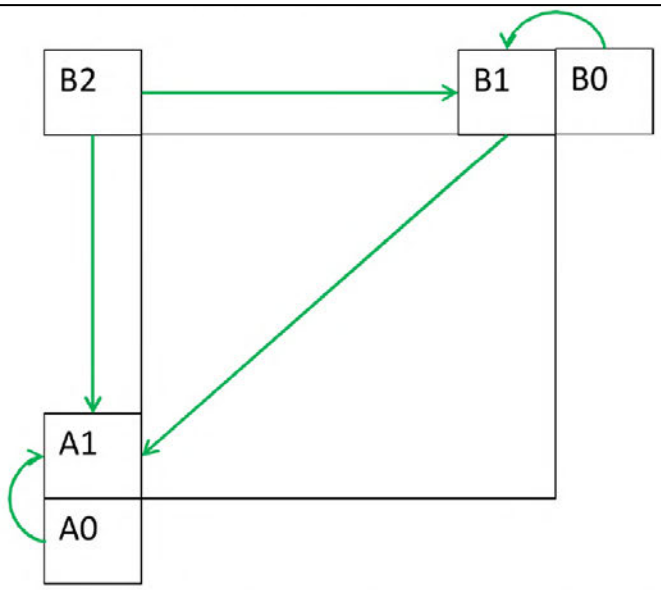

Figure { SEQ Figure * ARABIC }. Spatial neighbors which are the potential candidates for the merge list. Arrows indicate which spatial candidate(s) are to be compared.

CX-6253.0002. There is an obvious location-based pattern here. The lower left block A1 is the

[redacted]

starting point and always included in the list if available. CX-6253.0001. Then, its opposite upper right block B1 is compared to that lower left block A1. *Id.* at .0002. Blocks adjacent to A1 and B1 but further out from the coding unit 900 are then compared to A1 and B1, respectively. *Id.* at .0002. And then an isolated block, on the upper left corner and equally distant from coding unit 900 is compared to A1 and B1, simultaneously. So the two candidate blocks adjacent to coding unit 900 are essentially the starting point, and the three blocks further out on corners are compared to their nearest adjacent block, but not to each other. The location-based rubric is clear and there is no dispute that the locations of A0, A1, B0, B1, or B2 are fixed and that these subset rules exist in the H.265 standard. *See, e.g.*, CX-7651.0174, Fig. 8-3. The limitation is met.

As for limitation [23f], Nokia contends each "Accused and DI Product" practices it through the merge_idx value in the H.265 standard. CIB at 65-66 (citing Hr'g Tr. (Moulin) at 496:23-497:16). It argues, "H.265 Section 8.5.3.2.2 is used to access a candidate from mergeCandList so that it can be used for decoding the encoded block of pixels" as in the below passage:

7.4.9.6 Prediction unit semantics

merge_idx[x0][y0] specifies the merging candidate index of the merging candidate list where x0, y0 specify the location (x0, y0) of the top-left luma sample of the considered prediction block relative to the top-left luma sample of the picture.

When merge_idx[x0][y0] is not present, it is inferred to be equal to 0.

CX-7651.0125 (H.265 Standard)

8.5.3.2.2 Derivation process for luma motion vectors for merge mode

9. The following assignments are made with N being the candidate at position merge_idx[xOrigP][yOrigP] in the merging candidate list mergeCandList (N = mergeCandList[merge_idx[xOrigP][yOrigP]]) and X being replaced by 0 or 1:

refIdxLX = refIdxLXN (8-120)

predFlagLX = predFlagLXN (8-121)

CX-7651.0167 (H.265 Standard)

Id. at 66 (citing CX-7651.0167); CDX-0012C.108. For reference, in connection with undisputed limitation [23e], Nokia contends the merge candidate list constructed by the decoder is set forth in the standard as follows:

[redacted]

5. The merging candidate list, mergeCandList, is constructed as follows:

```
i = 0
if( availableFlagA1 )
    mergeCandList[ i++ ] = A1
if( availableFlagB1 )
    mergeCandList[ i++ ] = B1
if( availableFlagB0 )
    mergeCandList[ i++ ] = B0
if( availableFlagA0 )
    mergeCandList[ i++ ] = A0
if( availableFlagB2 )
    mergeCandList[ i++ ] = B2
if( availableFlagCol )
    mergeCandList[ i++ ] = Col
```

CX-7651.0167 (H.265 Standard)

CIB at 65 (citing CX-7651.0167); CDX-0012C.107. The limitation is met as alleged.

Here, Amazon again attempts to use antecedent basis to establish that "the motion vector prediction list constructed by an encoder" in limitation [23f] can only refer to "a motion vector prediction list" as introduced in limitation [23b] (RIB at 67 ("the 'motion vector prediction list' of elements 23[b] and 23[f] are the same."); RRB at 28) and then, using this equivalence, it argues the limitation is not met because in the Accused Products [redacted]

RRB at 28-29;

[redacted]

[redacted]

RDX-0096C.23; Hr'g Tr. (Schonfeld) at 1262:2-1265:19.

Amazon is not persuasive that "the motion vector prediction list constructed by an encoder" in limitation [23f] must be the same as "a motion vector prediction list" in limitation [23b]. Amazon's only support for this is the appearance of the word "the" in the former. But when the entire limitation [23f] is read in context, it is clear "the [] list constructed by an encoder" is different from the list introduced in limitation [23b], as that list is itself *twice* referenced in the same limitation with simpler verbiage:

> [S]elect a spatial motion vector prediction candidate from *the motion vector prediction list* [previously built through subset comparisons] for use in decoding the encoded block of pixels, wherein the spatial motion vector prediction candidate is selected from *the motion vector prediction list* [previously built through subset comparisons] using information that was received identifying a respective spatial motion vector prediction candidate from *the motion vector prediction list constructed by an encoder*.

714 patent at cl. 23 (annotated) (emphasized). So it is clear that "the" in the last element is simply being used to introduce a new feature that a POSITA would know to exist given the context (*e.g.*, "a computer programmed to: perform data calculations . . . wherein *the* inputted power source for

the computer is 110V 60Hz"). So the proper meaning of "the motion vector prediction list constructed by an encoder" in limitation [23f] is a list constructed by an encoder; and the proper meaning of "a motion vector prediction list for a prediction unit of the encoded block of pixels" in limitation [23b] is a list created and managed by the "apparatus comprising a processor and a memory including computer program code"—*i.e.*, the decoder.

Accordingly, Amazon's non-infringement argument based on "the motion vector prediction list constructed by an encoder" is not persuasive. And when "the motion vector prediction list constructed by an encoder" is properly construed as referring to the list created and managed by the encoder, the limitation is met. The decoder selects which motion prediction vector to use in decoding the encoded block of pixels based on merge_idx, as received from the encoder, where merge_idx was also used in the encoder to mark which candidate from its own list should be used. Hr'g Tr. (Moulin) at 496:23-497:11. There is no dispute on this operation.

Accordingly, Nokia has shown claim 23 is infringed by the Accused Products by way of those claims being essential to the H.265 standard, and those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 68-72; RRB at 8-11.

As for Nokia's generalized claims of indirect infringement under the 714 patent (*see* CIB at 204-206; CRB at 81-83), Amazon correctly points out that it was not alleged in Nokia's pre-hearing brief (RRB at 10; *see* CPB at 101-113 (no discussion)). Thus, it has been waived. Order No. 2 at G.R. 9.2.

[redacted]

D. Domestic Industry – Technical Prong

According to Nokia's post-hearing briefing, the DI Products practice claims 15 and 23 of the 714 patent. CIB at 2, 206. For the reasons discussed below, Nokia has shown by a preponderance of the evidence that the DI Products practice claim 23 but not claim 15.

Nokia contends, "[t]he DI Products practice the Asserted Patents for the same reasons as discussed for infringement because each of those products contains chips or an Android OS (Samsung) that Complainants' experts confirmed results in the same capabilities as the Accused Products." CIB at 206 (citing, *inter alia*, Hr'g Tr. (Moulin) at 489:4-18). Amazon does not dispute the DI Products practice the H.265 standards. *See* RIB at 72-73; RRB at 11. As determined above, it has been established that the limitations of claim 23 are required by the H.265 standard, but it has not been shown that the limitations of claim 15 are practiced through other record evidence.

Accordingly, Nokia has shown claim 23 is practiced by the DI Products by way of that claim being essential to the H.265 standard, and that standard being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 72-73; RRB at 8-11. Nokia has not shown practice of claim 15.

E. Validity

Amazon identifies the following invalidity theories for the 714 patent:

Claims	Theory
15, 23	Lack of patentable subject matter under 35 U.S.C. § 101
15, 23	Rendered obvious under 35 U.S.C. § 103 by Nakamura (RX-4997; RX-4593; RX-4594) in view of WD4 (JX-0042)

See generally RIB at 73-90. With respect to prior art, Nokia contends "[t]he '714 Patent claims

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priority to Provisional Application 61/555,703, filed November 4, 2011. . . . Respondents do not contest this date." CIB at 59. Amazon does not dispute this priority date in its briefing. *See generally* RIB at 77-89; RRB at 30-34.

For the first reference, "Nakamura," Amazon explains it consists of a collection of documents: "Nakamura includes an input document (RX-4997), presentation (RX-4593), and edits to the then-current working draft of the H.265 standard (RX-4594), all of which were publicly-accessible by July 22, 2011." RIB at 78 n.18. Although Amazon does not explicitly state which subsection qualifies Nakamura as prior art, there is no dispute from Nokia as to its status. *See id.* at 78; *see generally* CIB at 74 ("Nakamura was submitted to the JCT-VC in July 2011 . . ."); CRB at 31-35. As compared to the 714 patent's priority date of November 4, 2011, Nakamura qualifies as prior art to the 714 patent under at least 35 U.S.C. § 102(a) (pre-AIA).

The second reference applied by Amazon is described as "H.265's Working Draft 4 ('WD4')." RIB at 77. Amazon explains that WD4 "adopted parts of Nakamura's proposal and was publicly accessible by September 8, 2011." *Id.* at 78 (citing RX-4595; Hr'g Tr. (Schonfeld) at 1275:5-1276:6). Although Amazon does not explicitly state which subsection qualifies WD4 as prior art, there is no dispute from Nokia as to its status. *See id.* at 78; *see generally* CIB at 74-75 ("WD4 was the working draft following the meeting where Nakamura was submitted and considered . . ."); CRB at 31-35. As compared to the 714 patent's priority date of November 4, 2011, WD4 qualifies as prior art to the 714 patent under at least 35 U.S.C. § 102(a) (pre-AIA).

1. Section 101

Pursuant to the two-step *Alice* framework, Amazon contends that: "Organizing a set into a smaller subset is one of the most fundamental ways humans organize information. . . . This basic organizational behavior is all that the '714 patent claims. The focus of the asserted '714 claims is narrowing the list of motion vector candidates that must be compared." RIB at 75. It contends

"performing fewer comparisons than what have been previously compared is neither an inventive concept nor an improvement to video coding." *Id.* (citing Hr'g Tr. (Schonfeld) at 1287:15-1288:16). Amazon draws particular analogy to *Content Extraction & Transmission LLC v. Wells Fargo Bank, N.A.*, to argue "the Federal Circuit has repeatedly invalidated claims that are directed to organizing sets of data." *Id.* at 76 (citing 776 F.3d 1343, 1347 (Fed. Cir. 2014)).

Amazon is not persuasive. Performing fewer operations than what had been previously performed, which Amazon admits is the focus of the claims, constitutes an improvement to a computer, or more specifically, an improvement to video coding. Indeed, the entire purpose of video coding, or any kind of compression, is to send less than everything you could send over a connection. This is what makes video streaming feasible in the first place. Hr'g Tr. (Orchard) at 19:17-20:6 ("For one second [at 4K, 60fps], we need 12 billion bits"); 714 patent at 1:36-39 ("The encoder may discard some information in the original video sequence in order to represent the video in a more compact form, for example at a lower bit rate."). And the clear aim of the 714 patent claims is to improve a computer's ability to encode or decode video streams; *i.e.*, an improvement to the way computers function held to be non-abstract in *Enfish* and its progeny. *Enfish*, 822 F.3d at 1336, 1338-9; *see, e.g.*, *Visual Memory*, 867 F.3d at 1258; *Gemalto*, 942 F.3d at 1149-51; 714 patent at 4:19-26. And *Enfish* is still good law. *Miller Mendel*, 107 F.4th at 1353. By contrast, the type of patent claim in *Content Extraction* was not at all directed to improving a computer. It was concerned with automating the process of depositing bank checks. *Content Extraction*, 776 F.3d at 1345; *see* RRB at 30 (citing *Content Extraction*).

Accordingly, Amazon has not shown claims 15 and 23 are directed to ineligible subject matter under *Alice* step one, so they are not invalid under Section 101.

[redacted]

2. Nakamura

Amazon contends "[t]he '714 Asserted Claims are rendered obvious by JCTVC-F419 ('Nakamura') in combination with H.265's Working Draft 4 ('WD4')." RIB at 77. It asserts that Nakamura employs the same five spatial candidates as H.265 and the 714 patent, and also discloses the same less-than-all approach to comparing candidates. *See id.* at 77-78. As far as the combination with WD4, Amazon "uses Nakamura as the base reference with WD4 as explanation for the HEVC terms and concepts that are discussed in Nakamura and 'clear to everybody in the HEVC community.'" *Id.* at 78. For the reasons discussed below, Amazon has not shown claims 15 and 23 to be invalid.

Amazon largely addresses the limitations of claim 15 and claim 23 at the same time (see RIB at 79-88) and initially alleges that limitations [15a]/[23a], [15f], and [23e]—as under the identifier scheme used in this initial determination—are not in dispute (*id.* at 79, 87, 88). This is accurate, but Nokia identifies its challenges as related only to limitations [15c]/[23c], [15d]/[23d], and [15e]/[23e] (under the numbering scheme established above), leaving [15b]/[23b] also not in dispute. CIB at 78-79; CRB at 32-35. Nokia's challenges are not persuasive, as explained below, but Amazon has otherwise failed to present a clear and convincing case that limitation [15c]/[23c] is disclosed or obvious. *Certain Semiconductor Devices and Methods of Manufacturing Same and Products Containing the Same*, Inv. No. 337-TA-1366, Comm'n Op. at 27 (Nov. 7, 2024) ("Respondents, who bore the burden of proving obviousness by clear and convincing evidence, cannot establish this affirmative defense on this sparse record merely because it was uncontested by EPC and OUII.").

For background, Amazon and Dr. Schonfeld argue that in the "merge mode" technique of Nakamura, the exact same five spatial candidates as in the 714 patent and H.265 standard are considered and qualify as the claimed "set":

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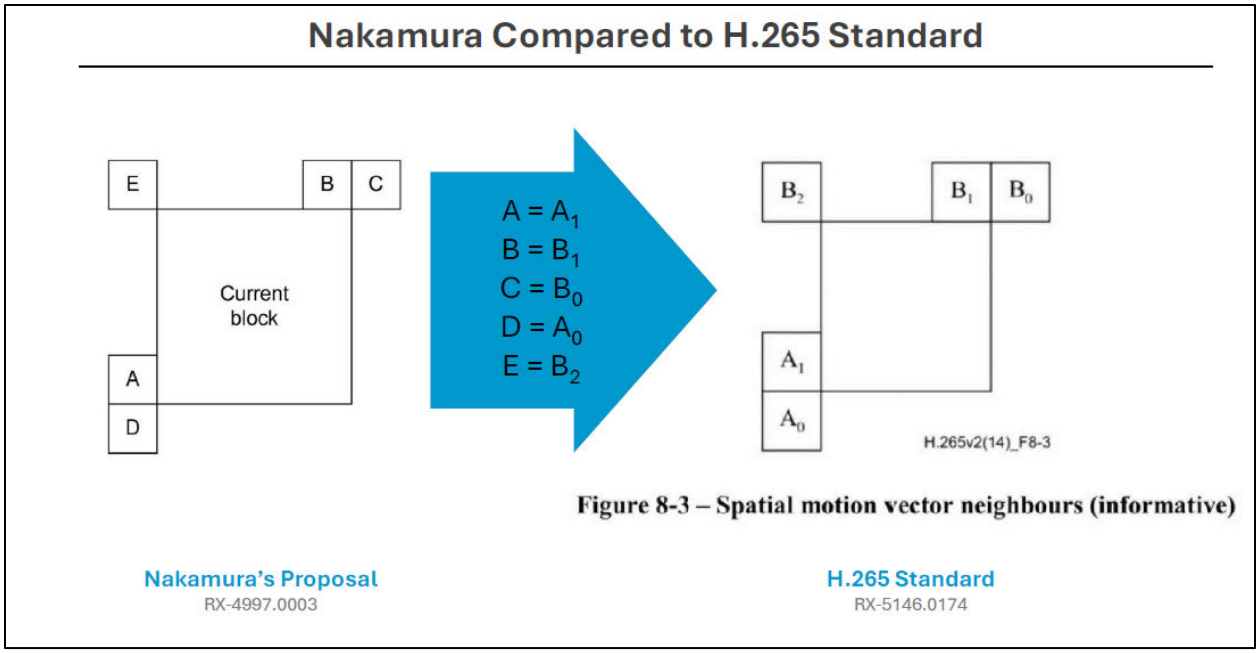
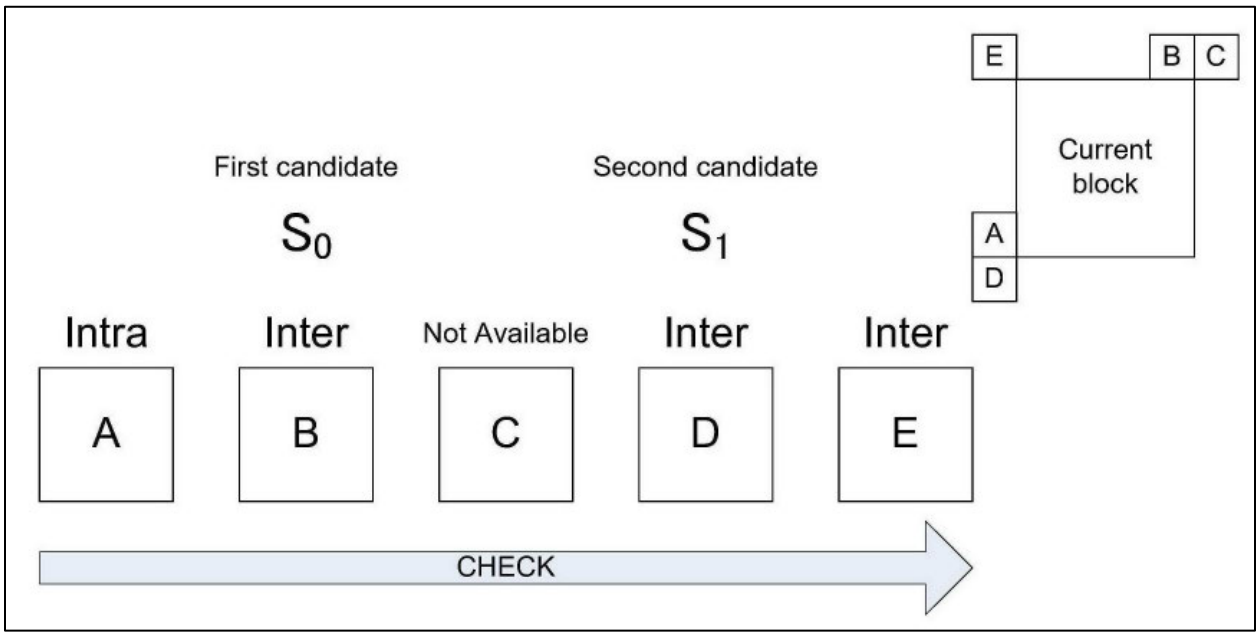
[redacted]



RDX-0096C.42; RIB at 79-80 (citing Hr'g Tr. (Schonfeld) at 1274:1-13). Then, according to Amazon, Nakamura processes these candidates in "spatial derivation order" to arrive at a first candidate of S1 and a claimed "subset" consisting of S0. It states, "after Nakamura selects S0 for the motion vector prediction list and is in the process of selecting S1, the motion vector prediction list includes a subset comprised of the previously selected candidate, S0":



RX-4953.0008; *see* RIB at 81-82 (citing Hr'g Tr. (Schonfeld) at 1281:9-1282:12). Amazon continues, "Nakamura compares the first spatial motion vector prediction candidates (S1) with the spatial motion vector candidate in the determined subset (S0)" (RIB at 83 (citing Hr'g Tr. (Schonfeld) at 1282:13-22)), which meets the claim limitation requiring a comparison of less than all members in the "set" (*id.*). Amazon argues that the result of that comparison determines whether S0, or S0 and S1, make it onto the claimed "merge candidate list." RIB at 85-86 (citing Hr'g Tr. (Schonfeld) at 1283:13-22).

In opposition, Nokia argues that "[i]n Nakamura, there are never more than two spatial merging candidates" which would be S0 and S1 (CIB at 77) and because of this, there is no teaching of selection of a "subset" of candidates for comparisons (limitation [15c]/[23c]), nor is there a teaching of comparing less-than-all candidates of the set (limitation [15d]/[23d]) (*id.* at 78-, 79; CRB at 34 ("Given two candidates, there is no need to determine a subset as required by 15/23[b] because there is only one pair.")). Setting aside that this interpretation of "set" and "subset" is completely at odds with Nokia's infringement theory over the same group of five candidates (as noted by Amazon (RIB at 84; RRB at 32-33)), it is also irrelevant. Amazon controls its own invalidity theory and it has identified Nakamura's A, B, C, D, and E in the figures above, not S0 and S1, as the claimed "set of spatial motion vector prediction candidates for a block of pixels."

Nokia's second argument is that S0 and S1, once identified from the larger set of A, B, C, D, and E, are immediately included on the final "motion vector prediction list" such that there is no determination whether "to include or exclude" (limitation [15e]/[23e]). CIB at 79; CRB at 34-35. In Nokia's view, "Nakamura's comparison [is] performed as part of a removal process, after any candidates are already included in the list," which is completely different from that required

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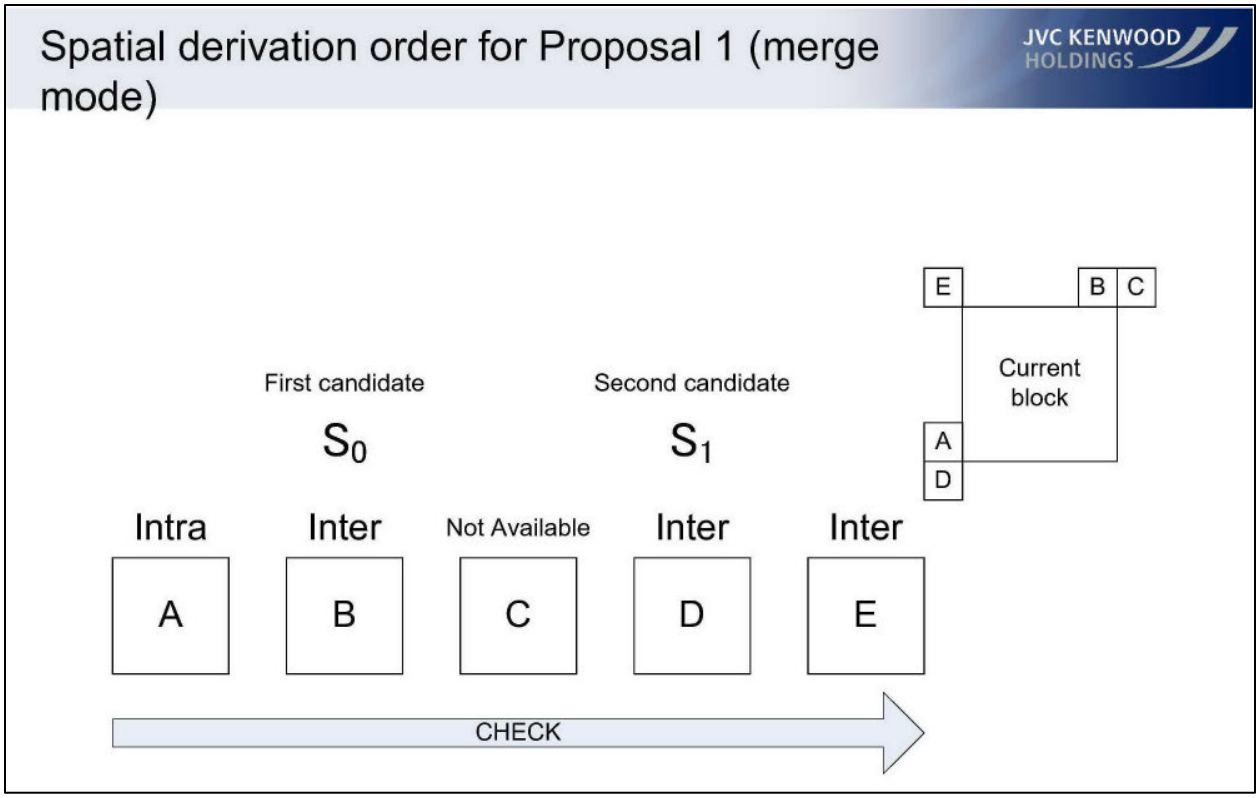
by the claims. CIB at 80. Nokia, however, provides no intrinsic or extrinsic support to justify reading "to include or exclude" so narrowly. *Wasica Finance GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1281-2 (Fed. Cir. 2017) ("Therefore, absent a clear disavowal or alternative lexicography by a patentee, he or she 'is free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning.'"). Amazon, on the other hand, persuasively explains how the 714 patent specification teaches comparisons to determine which candidates "to remove," which, in context, can only mean removal from the final "motion vector prediction list." RIB at 86 (citing, *inter alia*, 714 patent at 4:19-26). So the limitation is found in Nakamura as alleged.

Amazon has not, however, made a clear and convincing case that Nakamura's "subset" of S0 was determined "based on the location of the block associated with the first spatial motion vector prediction candidate," that is, S1 (limitation [15c]/[23c]). In relevant part, Amazon argues:

> Under [Nokia's construction] (*i.e.*, "the block" is the neighboring block from which the spatial motion vector prediction candidate is obtained), Nakamura's determined subset also changes "as a function of the choice of S1" because the determined subset of S0 can only be from those blocks within the same neighboring set as S1 that are processed earlier in Nakamura's derivation order. Tr. (Schonfeld) 1282:10-12 (S0 "can only be the elements prior to" S1).

RIB at 82; see Hr'g Tr. (Schonfeld) at *1283*:10-12. This does not amount to a clear and convincing case for two reasons.

First, as shown below from the Nakamura presentation, and as relied on in Amazon's example, S1 corresponds to block D which is in the bottom non-adjacent corner of the current prediction/coded block:



RX-4593.0008. Unlike the green arrow diagram relied on for infringement, which demonstrated clear, limited, and symmetrical rules based on each block's position, this method appears to allow for any block to be compared to any of the other five blocks regardless of location—you assign S1 to A, B, C, D, or E, and then start back at A to find the next, first, available candidate. Hr'g Tr. (Schonfeld) at 1282:15-22. So there is no discernible connection to the selection of block B as the "subset" given block D's location in the bottom non-adjacent corner. The closest Dr. Schonfeld came to explaining location was to say "depending on where you are," but this conclusory opinion is not clear and convincing:

> Q. … In your opinion, is Nakamura's determined subset based on the location of the block associated with the first spatial motion vector prediction candidate?
>
> A. It is. You can see that the way Nakamura works, you can see on the upper right-hand side there is A, B, C, D, E around the current block, and, in particular, depending on where you are and what the status of the inter and intra blocks around it, you will get different choices for the subset [S0] for the corresponding S1

[redacted]

element block. And it will change both as a function of the current block, as well as a function of the choice of S1, it can only be the elements prior to that.

Q. Let's move now to slide 53 and discuss elements 15d and 23d. . . .

Hr'g Tr. (Schonfeld) at 1283:1-14.

The second reason Amazon fails here is the process outlined by Dr. Schonfeld does not appear to match the Nakamura disclosure. Nakamura discloses that S0—not S1—is the first candidate identified within the set, which is consistent with the numbering convention of S0 and S1:

Table 2 presents the comparison between HM3.0 and proposed technique for merge mode.

Table 2 Comparison between HM3.0 and proposed technique for merge mode

	HM3.0	Proposal 1
The number of spatial candidates	4 in 4 [positions]	2 in 5 [positions]
Spatial derivation order	A, B, C, D	A, B, C, D, E
The number of times of comparison of redundant candidates in the spatial derivation process	0 [time]	0 [time]
The number of temporal candidates	1	1
Merging candidate list order	A, B, Col, C, D	S_0, S_1, Col
The number of times of comparison in the removal process	10 [times] (A vs B, Col, C, D, B vs Col, C, D, Col vs C, D, and C vs D)	3 [times] (S_0 vs S_1, S_0 vs Col, and S_1 vs Col)

Notes:

S_0: The first spatial candidate found in the spatial derivation process

S_1: The second spatial candidate found in the spatial derivation process

RX-4997.0004 (annotated). Testimony from Dr. Moulin supports this understanding, even if it was given regarding Nakamura's MVP proposal 2, and Merge proposal 1 (the basis of Amazon's theory). MVP proposal 2 again identifies S_0 as first, and S_1 as second:

[redacted]

Table 3presents the comparison between HM3.0 and proposed technique for merge mode.

Table 3 Comparison of HM3.0 between HM3.0 and proposed technique for MVP

	HM3.0	Proposal 2
The number of spatial candidates	2 in 5 [positions]	2 in 5 [positions]
Grouping of the neighbors in the spatial derivation process	Group A: Left (A_0, A_1) Group B: Upper (B_0, B_1, B_2)	without grouping
Spatial derivation order	Group A: A_0, A_1 Group B: B_0, B_1, B_2	C, D, A, B, E
The number of times of checking per spatial neighbors in the spatial derivation process	2 [times]	1 [time]
The number of times of comparison of redundant candidates in the spatial derivation process	6 [times] (mvLXA vs $mvLXB_0$, mvLXA vs $mvLXB_1$, and mvLXA vs $mvLXB_2$) x 2	0 [time]
The number of temporal candidates	1	1
MVP list order	mvLXA, mvLXB, mvLXCol	$mvLXS_0$, $mvLXS_1$, mvLXCol
The number of times of comparison in the removal process	2 [times] (mvLXA vs mvLXCol, and mvLXB vs mvLXCol)	3 [times] ($mvLXS_0$ vs $mvLXS_1$, $mvLXS_0$ vs mvLXCol, and $mvLXS_1$ vs mvLXCol)

Notes:

$mvLXS_0$: MVP of the first spatial candidate found in the spatial derivation process

$mvLXS_1$: MVP of the second spatial candidate found in the spatial derivation process

RX-4997.0006 (annotated);

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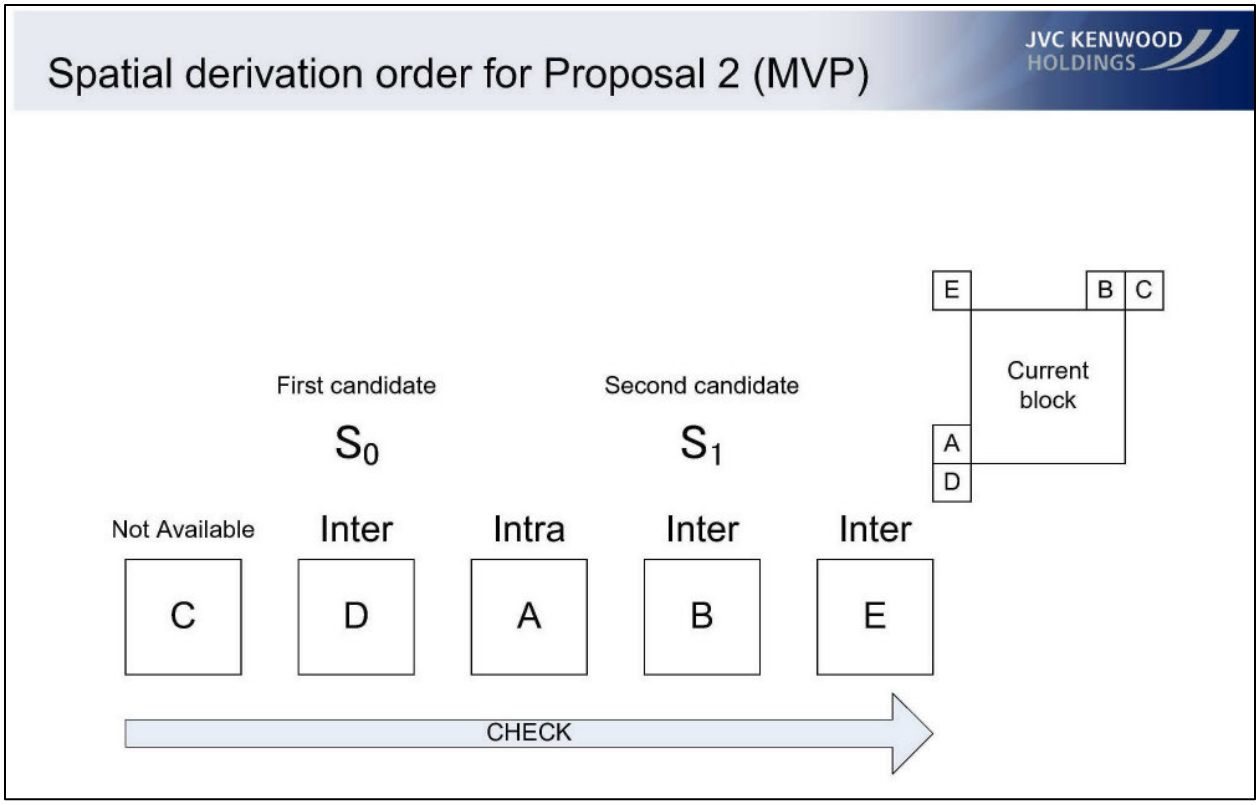
[redacted]



RX-4593.0012;

> Q. . . . So the way this goes in Nakamura is you first inspect the first element of the sequence, which is C. Well, let's say as an example there's no motion vector there. So we just move on to the next. So D, that one, say, has a motion vector there. It's available. So it's instantly selected as the first candidate. You move on. You inspect A. Well, A is intra-coded, which means it doesn't have a motion vector either. So you just keep going. You get to B. B has a motion vector. So that's instantly identified as the second candidate, called S1. Then you don't bother even looking at E. It doesn't matter if there's a motion vector there or not. So that's how Nakamura identifies what he calls a first and a second spatial candidates, S0 and S1.

Hr'g Tr. (Moulin) at 1647:3-16. So, in addition to failure to show a location-based ruleset for creating the "subset," it is not even clear that Amazon and Dr. Schonfeld have described Nakamura correctly. And Amazon does not otherwise attempt to use WD4 to show this limitation would be present in the allegedly obvious combination.

Accordingly, limitation [15c]/[23c] has not been shown in Nakamura and claims 15 and 23 have not been shown to be invalid as obvious in light of the *Graham* factors.

VIII. U.S. PATENT NO. 11,805,267

A. Claims-at-Issue

Claims 7-9 and 25-27 of the 267 patent are at issue in this investigation, either through allegations of infringement or domestic industry technical prong. *See* CIB at 2, 206. They are reproduced below, along with limitation identifiers, which are not necessarily the limitation identifiers the parties use:

> 7. [7a] An apparatus for encoding a block of pixels, the apparatus comprising:
>
> [7b] at least one processor and at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus to:
>
> [7c] determine, for a current block, a first reference block based on a first motion vector and a second reference block based on a second motion vector, wherein the pixels of the current block, the first reference block, and the second reference block have values with a first precision;
>
> [7d] use said first reference block to obtain a first prediction, said first prediction having a second precision, which is higher than said first precision;
>
> [7e] use said second reference block to obtain a second prediction, said second prediction having the second precision;
>
> [7f] obtain a combined prediction based at least partly upon said first prediction and said second prediction;
>
> [7g] decrease a precision of said combined prediction by shifting bits of the combined prediction to the right; and
>
> [7h] encode residual data in a bitstream, wherein the residual data is determined based upon a difference between the combined prediction and the block of pixels.
>
> 8. The apparatus according to claim 7, wherein in an instance in which said first motion vector points to a subpixel, said first prediction is obtained by interpolation using pixel values of said first reference block.
>
> 9. The apparatus according to claim 8, wherein said first prediction is obtained by interpolation using values of said first reference block by:
>
> right shifting a sum of a P-tap filter using values of said first reference block.
>
> . . . .

[redacted]

25. [25a] An apparatus for decoding a block of pixels, the apparatus comprising:

[25b] at least one processor and at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus to:

[25c] determine, for a current block, a first reference block based on a first motion vector and a second reference block based on a second motion vector, wherein the pixels of the current block, the first reference block, and the second reference block have values with a first precision;

[25d] use said first reference block to obtain a first prediction, said first prediction having a second precision, which is higher than said first precision;

[25e] use said second reference block to obtain a second prediction, said second prediction having the second precision;

[25f] obtain a combined prediction based at least partly upon said first prediction and said second prediction;

[25g] decrease a precision of said combined prediction by shifting bits of the combined prediction to the right; and

[25h] reconstruct the block of pixels based on the combined prediction.

26. The apparatus according to claim 25, wherein in an instance in which said first motion vector points to a subpixel, said first prediction is obtained by interpolation using pixel values of said first reference block.

27. The apparatus according to claim 26, wherein said first prediction is obtained by interpolation using values of said first reference block by:

right shifting a sum of a P-tap filter using values of said first reference block.

267 patent at cls. 7-9, 25-27 (annotated).

B. Claim Construction

The parties do not explicitly identify any claim terms needing construction. RIB at 91.

C. Infringement

According to Nokia's post-hearing briefing, the use, manufacture, or sale of the Accused Products infringes claims 7-9 and 25-27. *See* CIB at 1-2. Specifically, it contends that claims 7-9 are encoding claims and infringed only by HP; and claims 25-27 are decoding claims and

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infringed by all Respondents. CIB at 2. As HP is now terminated from the investigation, infringement of claims 7-9 ordinarily would not need to be decided. But because of Nokia's decision to tie its technical prong domestic industry claims directly to Accused Product operation, practice of the limitations of claims 7-9 is discussed below. As determined, Nokia has shown the limitations of claims 7-9 are met as alleged, and shown infringement of claims 25-27 by the Accused Products. As for Nokia's generalized claim of indirect infringement of the 267 patent (*see* CIB at 204-206; CRB at 81-83), Amazon correctly points out that it was not alleged in Nokia's pre-hearing brief (RRB at 10; *see* CPB at 127-140 (no discussion)). Thus, it has been waived. Order No. 2 at G.R. 9.2.

1. Claim 7

For reference, claim 7 of the 267 patent requires:

7. [7a] An apparatus for encoding a block of pixels, the apparatus comprising:

[7b] at least one processor and at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus to:

[7c] determine, for a current block, a first reference block based on a first motion vector and a second reference block based on a second motion vector, wherein the pixels of the current block, the first reference block, and the second reference block have values with a first precision;

[7d] use said first reference block to obtain a first prediction, said first prediction having a second precision, which is higher than said first precision;

[7e] use said second reference block to obtain a second prediction, said second prediction having the second precision;

[7f] obtain a combined prediction based at least partly upon said first prediction and said second prediction;

[7g] decrease a precision of said combined prediction by shifting bits of the combined prediction to the right; and

[7h] encode residual data in a bitstream, wherein the residual data is determined based upon a difference between the combined prediction and the block of pixels.

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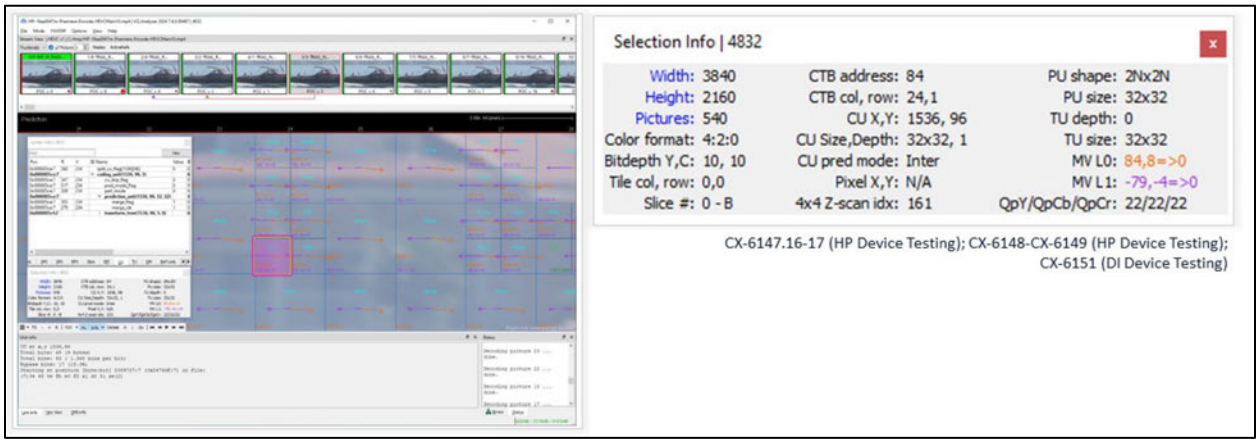
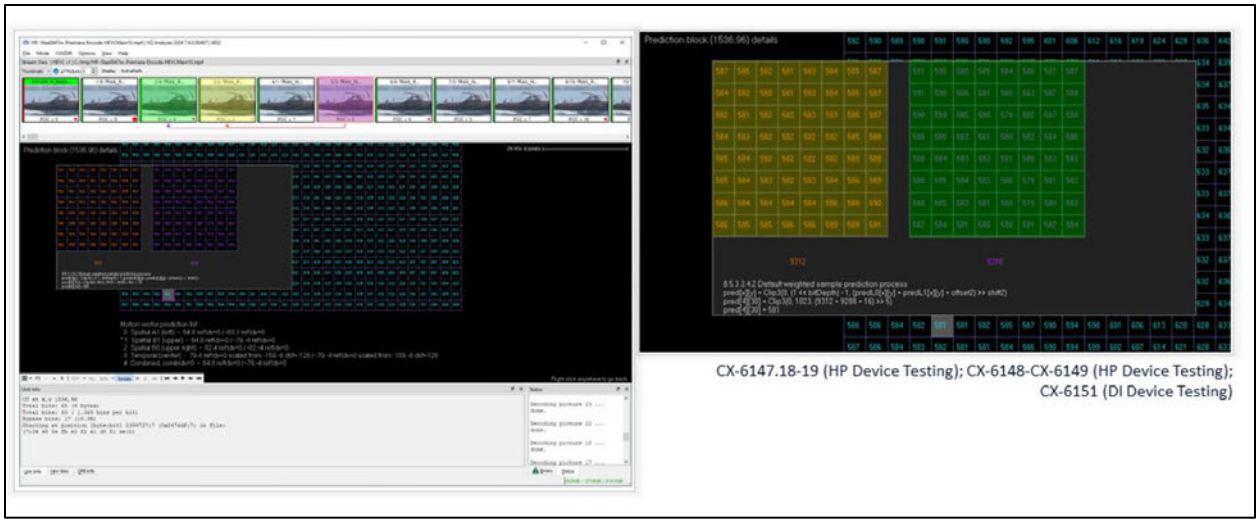
267 patent at cl. 7 (annotated). Nokia, relying on the testimony of Dr. Moulin, contends encoding claim 7 is infringed through experimental testing and source code analysis of H.265-compliant videos. *See generally* CIB at 36-41 (citing Hr'g Tr. (Moulin) at 468:3-476:25). Nokia asserts that limitations [7a], [7b], and [7f] are not in dispute, which is consistent with Amazon's briefing. *See* CIB at 36, 39; RIB at 95-98; RRB at 39-41. Based on the lack of dispute, and the testimony from Dr. Moulin, these limitations are determined to be present in the HP Accused Products, even though there is no infringement due to termination of HP from the investigation.

As for limitation [7c], Nokia argues that "testing evidence demonstrated how bi-predicted blocks in H.265-compliant encoded videos produced by the products have two motion vectors (MVL0, MVL1) used to determine two reference blocks with a first, 10-bit, precision as reflected in the 'Bitdepth Y,C' portion of the Selection Info." CIB at 36-37 (citing Hr'g Tr. (Moulin) at 468:18-471:25). Nokia provides the following testing screenshots showing this Bitdepth, Y,C value, and reference block (green, yellow) and current block (purple) sizes:



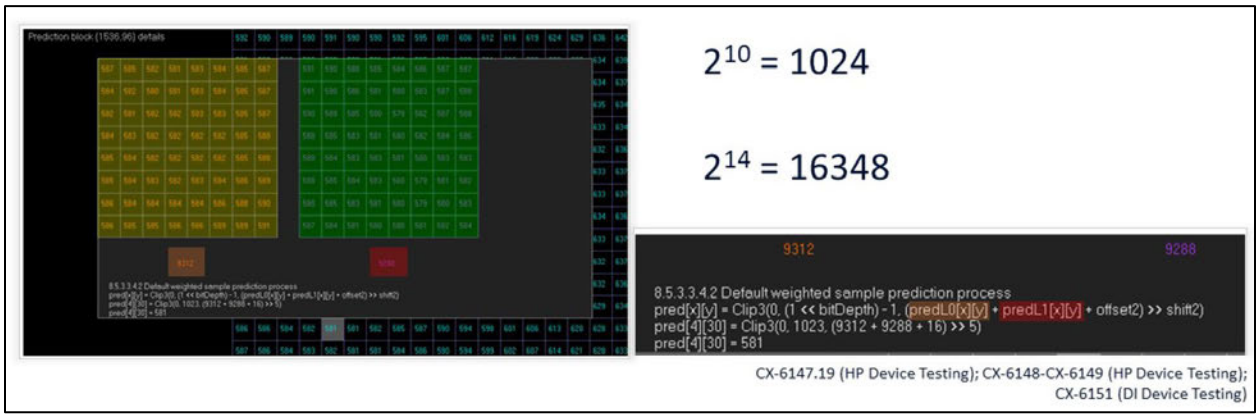
CIB at 37 (citing CDX-0012C.80);

[redacted]



Id. (citing CDX-0012C.81). The limitation is met as alleged. Amazon identifies the limitation as in dispute, but advances argument that only concerns the "second precision" claim term as found in later limitations. RIB at 95.

As for limitations [7d] and [7e], Nokia argues that "testing evidence demonstrates the products obtain predictions from the reference blocks indicated by the two motion vectors, and that those predictions, which exceed the range of a 10-bit number, require 14 bits to represent" and "[t]he encoding products use the same process for the first and second predictions." CIB at 38 (citing Hr'g Tr. (Moulin) at 472:1-473:22). Nokia provides the following testing screenshot showing the 14-bit representation via the "9312" and "9288" values:

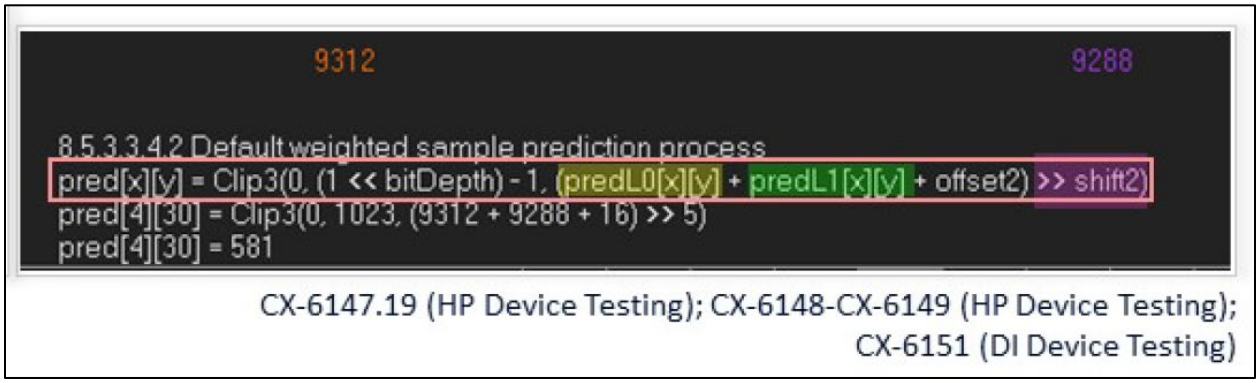


Id. (citing CDX-0012C.82). Amazon, on the other hand, argues the limitation cannot possibly be

shown by this bitstream information (RIB at 95), and the fact that 9312 and 9288 cannot be represented by only 10-bits does not necessarily show the predictions taken from the two reference blocks are at the same precision (RRB at 39).

Amazon's points are well taken but they do not constitute actual evidence indicating the limitation is not met. The standard for infringement is more likely than not. *Warner-Lambert*, 418 F.3d at 1341 n.15. And Nokia's evidence, being the only evidence in the record, demonstrates that the precision of the predictions must be more than the ten bits used for the precision of the current, first, and second reference blocks. That evidence also at least suggests the prediction precisions are likely to be the same given the similarity in magnitude of the values (9312 vs. 9288) and that they are added together to create a combined prediction in the formula as shown.[6] *See* Hr'g Tr. (Moulin) at 4774:7-12. Accordingly, the limitation is met as alleged.

For limitation [7g], Nokia argues "testing evidence demonstrates right shifts are used to decrease the precision of combined predictions." CIB at 39 (citing Hr'g Tr. (Moulin) at 473:23-475:11). Nokia provides the following screenshot highlighting ">> shift2":



CIB at 40 (citing CDX-0012C.83). While the parties and their experts extensively discuss arithmetic and logical shifts in the context of the 267 patent, H.265 and AV1 standard

[6] It is worth noting that 2^14 (*i.e.*, 14 bits) is required to express any number above 8192 (2^13).

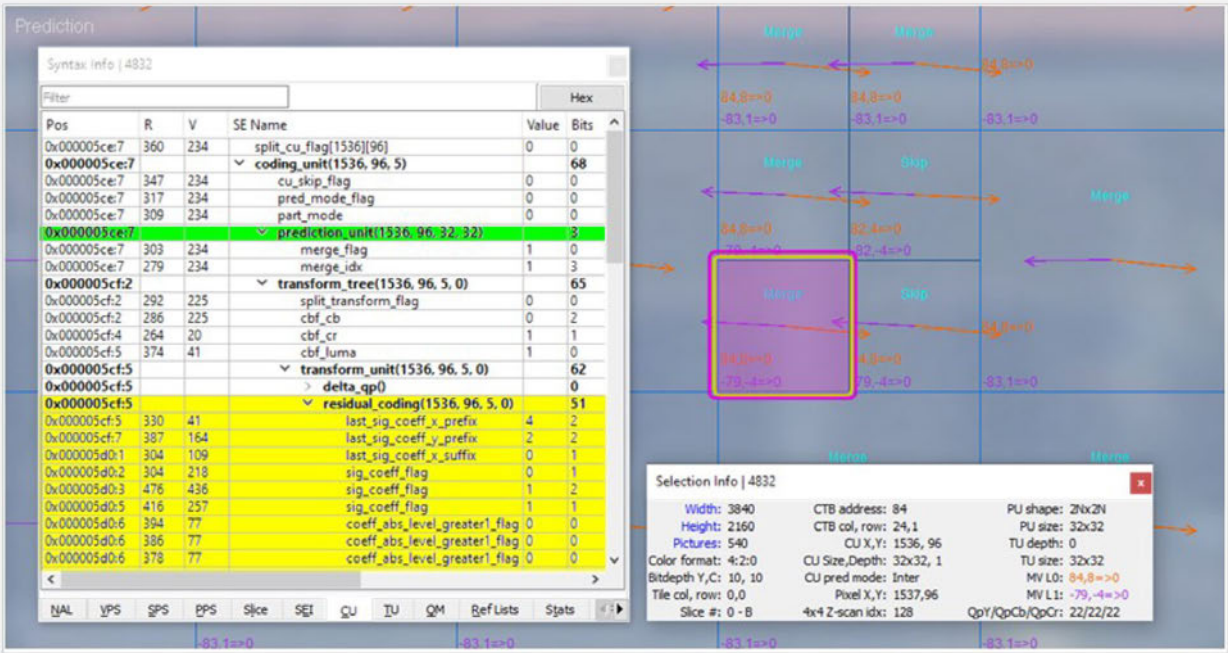
[redacted]

documentation, and ordinary usage in the art, Amazon does not actually contest limitation [7g] on any of these grounds. Rather, Amazon argues limitation [7g] is not shown by the bitstream evidence because that evidence does not show a "second precision." RIB at 95; *see* RRB at 39-40. But this is irrelevant to "shifting bits of the combined prediction to the right." To the extent Amazon intended any principles or argument from these other discussions to apply to limitation [7g], they have not been presented and thus are waived under Ground Rule 13.1. Order No. 2.

Amazon further argues that source code does not show infringement of limitation [7g] for various reasons (*see* RIB at 96-98; RIB at 40-41), but no source code is implicated by the testing evidence above. Amazon does not otherwise argue that the bitstream analysis above is false or offer any evidence that it is not representative of all Accused Product/DI Product encoders providing H.265-compliant bitstreams. *See, e.g.*, RIB at 17-18 ("it is impossible to gauge these experts' claims of representativeness"). Accordingly, the limitation is met as alleged.

As for the final limitation, [7h], Nokia argues "testing analyses demonstrate[] [the] bitstreams encoded by the products include residual values of blocks of pixels determined based on combined predictions obtained by bi-prediction." CIB at 40 (citing Hr'g Tr. (Moulin) at 476:11-25); *see also id.* at 46 (citing Hr'g Tr. (Moulin) at 420:22-421:18). Nokia provides the following screenshot showing residual data (yellow) and prediction data (green) for support:

[redacted]



CX-6147.20 (HP Device Testing); CX-6148-CX-6149 (HP Device Testing); CX-6151 (DI Device Testing)

CIB at 41 (citing CDX-0012C.85). Amazon does not dispute the yellow highlights constitute "residual data," nor that it results from "a difference" between a value and "the block of pixels." Rather, Amazon contends that value was something other than a "combined prediction" because of the "Clip3" function displayed in the above screenshots:

> But in Dr. Moulin's VQ Analyzer screenshots, what he refers to as "the combined prediction" is subject to a Clip3 operation before being output as a final value. Tr. (Schonfeld) 1330:17-1332:9; RDX-0096C.92; CDX-0012C.83. The "combined prediction" claim 7 requires is thus "unavailable" and "inaccessible after you obtain the Clip3 because what you have now is a clipped version of the combined prediction" and "computation of the residual" cannot be performed as required by the claims. *Id.*

RIB at 95-96; *see* RRB at 39-40.

Amazon is not persuasive. Limitation [7h] simply requires the residual data to be "based on" a difference between the combined prediction and the block of pixels. Even if further operations are performed on that difference value before it turns into residual data, that residual data is still "based on" that difference. In other words, the identified residual data depends on that

difference having been calculated at some point prior. *See* CIB at 46. This is no different from saying decoded blocks are reconstructed based upon a received bitstream even though, obviously, a plethora of operations are performed on that bitstream before the decoded block emerges. Amazon offers no intrinsic or extrinsic evidence to show "based on" should receive the narrow reading its argument requires. *See generally* RIB at 95-96; RRB at 39-40; *Wasica Finance*, 853 F.3d at 1281-2. Even then, both experts acknowledge Clip3 will sometimes, if not often, pass through the calculated value without alteration. Hr'g Tr. (Schonfeld) at 1331:10-13; Hr'g Tr. (Moulin) at 475:23-476:10. This is sufficient for the "computer program configured to" claim language of limitation [7a]. Thus, the limitation is met as alleged.

Accordingly, Nokia has shown the limitations of claim 7 are met as alleged, even though there is no infringement due to HP's termination from the investigation. Any additional arguments about whether testing and/or source code analyses sufficiently demonstrate representativeness among Accused Products are also irrelevant in light of this termination.

2. Claim 8

For reference, claim 8 of the 267 patent requires:

> 8. The apparatus according to claim 7, wherein in an instance in which said first motion vector points to a subpixel, said first prediction is obtained by interpolation using pixel values of said first reference block.

267 patent at cl. 8. In support of infringement, Nokia argues, "testing evidence demonstrated that for fractional motion vectors, which point to sub-pixels, the first prediction was obtained using a summed P-tap filter that is right shifted." CIB at 41 (citing Hr'g Tr. (Moulin) at 477:4-478:9), 42 (citing CDX-0012C.86). Amazon does not contest claim 8. *See generally* RIB at 91-98; RRB at 36-41.

Accordingly, Nokia has shown the limitations of claim 8 are met as alleged, even though there is no infringement due to HP's termination from the investigation.

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[redacted]

3. Claim 9

For reference, claim 9 of the 267 patent requires:

> 9. The apparatus according to claim 8, wherein said first prediction is obtained by interpolation using values of said first reference block by:
>
> right shifting a sum of a P-tap filter using values of said first reference block.

267 patent at cl. 9. In support of infringement, Nokia argues, "testing evidence demonstrated that for fractional motion vectors, which point to sub-pixels, the first prediction was obtained using a summed P-tap filter that is right shifted." CIB at 41 (citing Hr'g Tr. (Moulin) at 477:4-478:9), 42 (citing CDX-0012C.86). Amazon does not contest claim 9. *See generally* RIB at 91-98; RRB at 36-41.

Accordingly, Nokia has shown the limitations of claim 9 are met as alleged, even though there is no infringement due to HP's termination from the investigation.

4. Claim 25

For reference, claim 25 of the 267 patent requires:

> 25. [25a] An apparatus for decoding a block of pixels, the apparatus comprising:
>
> [25b] at least one processor and at least one memory including computer program code, the at least one memory and computer program code configured to, with the at least one processor, cause the apparatus to:
>
> [25c] determine, for a current block, a first reference block based on a first motion vector and a second reference block based on a second motion vector, wherein the pixels of the current block, the first reference block, and the second reference block have values with a first precision;
>
> [25d] use said first reference block to obtain a first prediction, said first prediction having a second precision, which is higher than said first precision;
>
> [25e] use said second reference block to obtain a second prediction, said second prediction having the second precision;
>
> [25f] obtain a combined prediction based at least partly upon said first prediction and said second prediction;

[25g] decrease a precision of said combined prediction by shifting bits of the combined prediction to the right; and

[25h] reconstruct the block of pixels based on the combined prediction.

267 patent at cl. 25. Nokia, relying on the testimony of Dr. Moulin, contends decoding claim 25 is infringed as being required by the H.265 and AV1 standards, as supported by experimental testing and source code analysis. *See generally* CIB at 25-34 (citing Hr'g Tr. (Moulin) at 440:3-463:5). Nokia asserts that limitations [25a], [25b], [25d], [25e], [25f], and [25h] are not in dispute, which is consistent with Amazon's briefing. *See* CIB at 25-26, 28, 30, 33; RIB at 91-98; RRB at 36-41. Based on the lack of dispute, and the testimony from Dr. Moulin, these limitations are determined to be present in the Accused Products via the H.265 and AV1 standards.

As for limitation [25c], Nokia contends it is met in the "Accused and DI Products" through practice of both the H.265 and AV1 standards. For H.265, Nokia argues, "[t]he H.265 Standard requires that first and second reference blocks from the reference indices refIdxL0 and refIdxL1 be determined for bi-predicted blocks in a bi-predictive slice based on motion vectors mvL0/mvL1 (for luma blocks) and mvCL0/mvCL1 (for chroma blocks)." CIB at 26 (citing Hr'g Tr. (Moulin) at 440:20-442:3). Nokia continues, "[t]he pixels of the current block and reference blocks have a first precision set by the $BitDepth_Y$ or $BitDepth_C$ signaled by bit_depth_luma_minus8 and bit_depth_chroma_minus8 respectively." *Id.* at 27 (citing Hr'g Tr. (Moulin) at 442:4-443:2). Nokia provides the following screenshot showing the $BitDepth_Y$ and $BitDepth_C$ values within the H.265 standards:

[redacted]

bit_depth_luma_minus8 specifies the bit depth of the samples of the luma array $BitDepth_Y$ and the value of the luma quantization parameter range offset $QpBdOffset_Y$ as follows:

$$BitDepth_Y = 8 + bit_depth_luma_minus8 \quad (7\text{-}4)$$

$$QpBdOffset_Y = 6 * bit_depth_luma_minus8 \quad (7\text{-}5)$$

bit_depth_luma_minus8 shall be in the range of 0 to 8, inclusive.

bit_depth_chroma_minus8 specifies the bit depth of the samples of the chroma arrays $BitDepth_C$ and the value of the chroma quantization parameter range offset $QpBdOffset_C$ as follows:

$$BitDepth_C = 8 + bit_depth_chroma_minus8 \quad (7\text{-}6)$$

$$QpBdOffset_C = 6 * bit_depth_chroma_minus8 \quad (7\text{-}7)$$

bit_depth_chroma_minus8 shall be in the range of 0 to 8, inclusive.

CX-7651.0094 (H.265 Standard)

7.3.2.2.1 General sequence parameter set RBSP syntax

bit_depth_luma_minus8	ue(v)
bit_depth_chroma_minus8	ue(v)

CX-7651.0052 (H.265 Standard)

CIB at 27 (citing CDX-0012C.51).

For AV1, Nokia argues, "Section 7.11.3.1 requires compound-predicted blocks (equivalent to H.265's bi-predicted blocks) determined based on reference blocks obtained using motion vectors. These reference blocks are used in the block inter prediction process of Section 7.11.3.4." CIB at 27-28 (citing Hr'g Tr. (Moulin) at 451:2-452:9). Nokia continues, "[e]ach reference frame from which the reference blocks are obtained has the same bit-depth as the current frame according to the AV1 specification," and provides the following excerpt from the AV1 standard:

ref_frame_idx[i] specifies which reference frames are used by inter frames. It is a requirement of bitstream conformance that RefValid[ref_frame_idx[i]] is equal to 1, and that the selected reference frames match the current frame in bit depth, profile, chroma subsampling, and color space.

CX-8044.0165 (AV1 Specification)

CIB at 28 (citing CDX-0012C.62).

The limitation has been shown in the AV1 decoding standard. The passage from the specification is clear that the bit depth of the selected reference frames must match the bit depth of the current frame. Amazon does not dispute that bit depth corresponds to "precision" as it is used in the claim. Rather, Amazon argues the variable "ref_frame_idx[i]" does not correspond to the "current block," and that the bit depth can vary under different circumstances. RIB at 92 (citing Hr'g Tr. (Schonfeld) at 1327:12-1329:18). Even if true this would seem irrelevant because the passage is clear that in selecting whichever frames are used, at whichever bit depth/precision, they must match the current frame in bit depth/precision. Dr. Schonfeld's additional discussion about "residual" would also seem to be irrelevant as compared to the claim language and Nokia's theory. *See* Hr'g Tr. Hr'g Tr. (Schonfeld) at 1329:5-18; CRB at 11 ("Residual is something entirely separate from the '[] pixels of the current block' being predicted in the claims.").

H.265 is a closer call. Unlike with AV1, Nokia does not provide a specification excerpt explicitly stating the precision of the current block to be decoded is the same as its reference blocks, or, more specifically, that the variables $BitDepth_Y$ or $BitDepth_C$ also apply to the current block. Yet Dr. Moulin does state unequivocally that $BitDepth_Y$ or $BitDepth_C$ do so apply: "So in the H.265 standard, so we see that the verbal is called BitDepthy and BitDepthc highlighted in yellow. These equations, 7-4 and 7-6. So those represent the bit depth or equivalently the precision *for all three*." Hr'g Tr. (Moulin) at 442:13-16 (emphasis added). Amazon complains that Nokia has "'completely ignored'" the need to show that the current block has the same precision as the first and second reference blocks. RIB at 92 (citing Hr'g Tr. (Schonfeld) at 1327:12-1329:18). But this is an exaggeration given Dr. Moulin's clear, albeit brief, statement. And without Amazon offering any contradictory evidence or testimony from Dr. Schonfeld (*see* RIB at 92; RRB at 36; CRB at 9 ("Respondents did not address Dr. Moulin's testimony regarding these parameters")),

the balance of the evidence (*i.e.*, preponderance) favors Nokia. The limitation has thus been shown in the H.265 decoding standard. *Warner-Lambert*, 418 F.3d at 1341 n.15.

As for limitation [25g], Nokia contends it is met in the "Accused and DI Products" through practice of both the H.265 and AV1 standards. For H.265, Nokia argues, "[t]he same H.265 equations (8-266, 8-279) right-shift the combined prediction to reduce its precision." CIB at 32 (citing Hr'g Tr. (Moulin) at 445:25-447:1). Nokia provides the following excerpt showing these equations with the right shift indicated by ">>":

8.5.3.3.4.2 Default weighted sample prediction process

– Otherwise (predFlagL0 is equal to 1 and predFlagL1 is equal to 1), the prediction sample values are derived as follows:

```
pbSamples[ x ][ y ] = Clip3( 0, ( 1 << bitDepth ) − 1,
                        ( predSamplesL0[ x ][ y ] + predSamplesL1[ x ][ y ] + offset2 ) >> shift2 )   (8-266)
```

CX-7651.0186 (H.265 Standard)

8.5.3.3.4.3 Explicit weighted sample prediction process

– Otherwise (predFlagL0 is equal to 1 and predFlagL1 is equal to 1), the prediction sample values are derived as follows:

```
pbSamples[ x ][ y ] = Clip3( 0, ( 1 << bitDepth ) − 1,
      ( predSamplesL0[ x ][ y ] * w0 + predSamplesL1[ x ][ y ] * w1 +
        ( ( o0 + o1 + 1 ) << log2Wd ) ) >> ( log2Wd + 1 ))   (8-279)
```

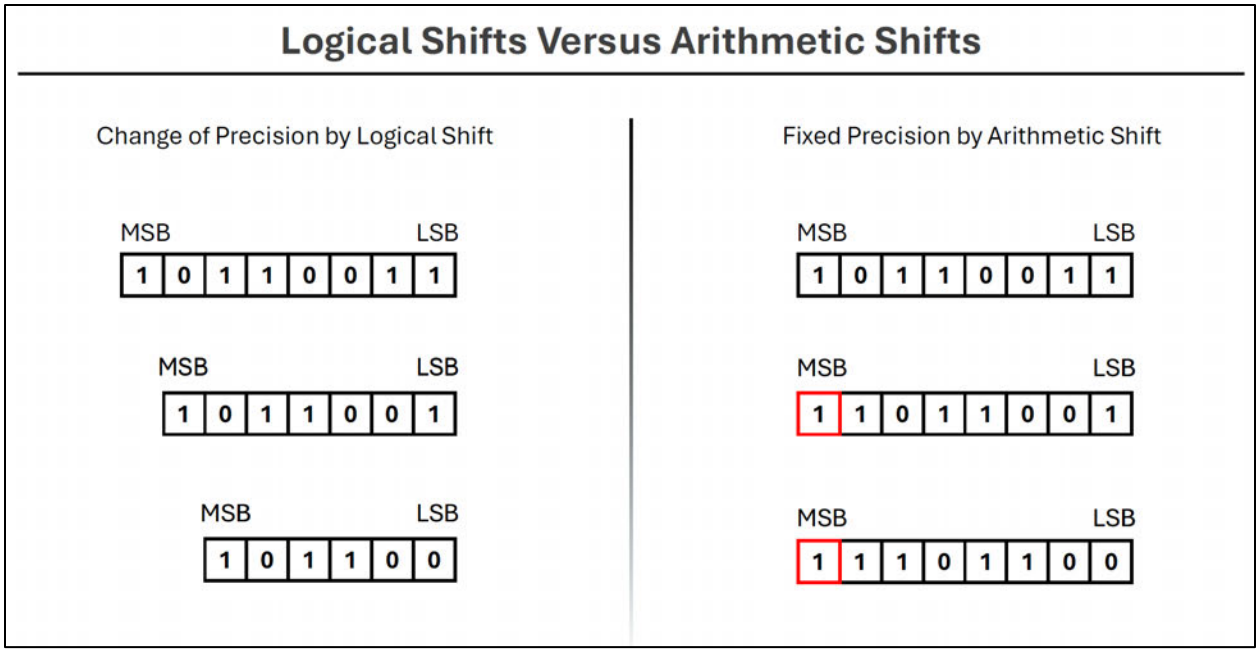
CX-7651.0187 (H.265 Standard)

CIB at 32 (citing CDX-0012C.55). Amazon looks to the H.265 specification's definition for ">>," which is that it represents an "arithmetic shift," and, according to the definition of arithmetic shift, argues it does not affect precision. That definition along with an example provided by Dr. Schonfeld are below:

x >> y	Arithmetic right shift of a two's complement integer representation of x by y binary digits. This function is defined only for non-negative integer values of y. Bits shifted into the most significant bits (MSBs) as a result of the right shift have a value equal to the MSB of x prior to the shift operation.

See RIB at 93 (citing RX-5146.0034);

[redacted]



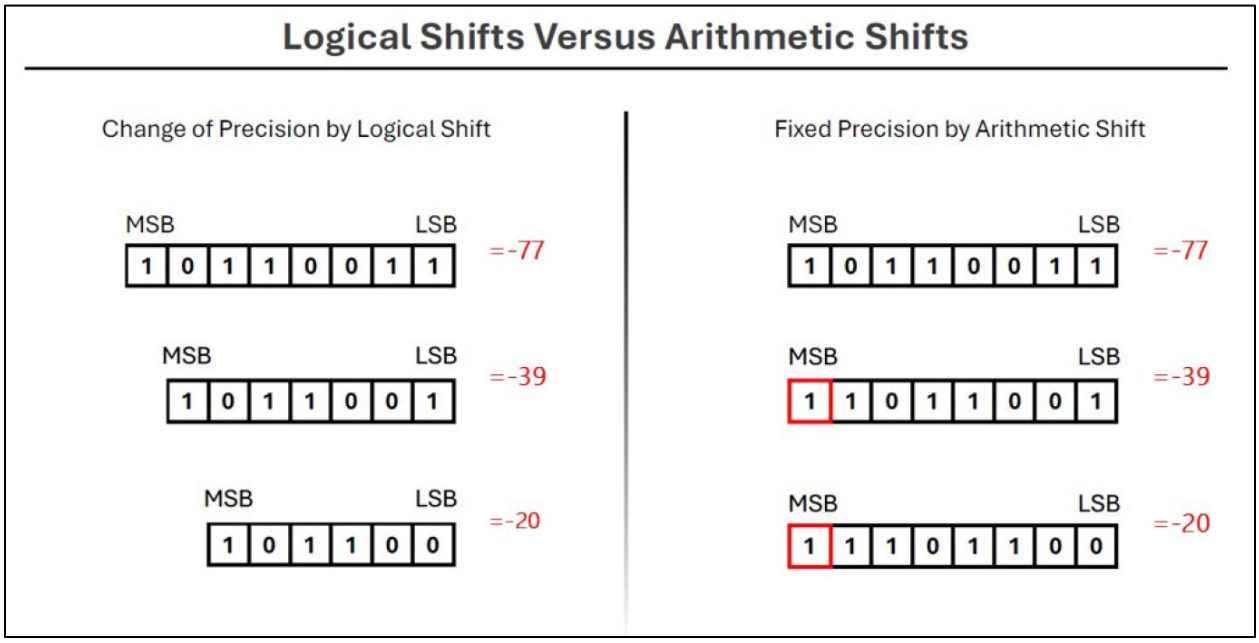
Id. (citing RDX-0096C.80; Hr'g Tr. (Schonfeld) at 1298:6-1301:10, 1360:11-13). According to Amazon, arithmetic shifts are materially different from "logical shifts":

> When a string of bits ("10110011") undergoes a logical shift (at left), its precision can change with each logical right shift because the "most significant bit [MSB] now is one lower so the precision dropped down by one." Tr. (Schonfeld) 1300:19-1302:25. But when that same string undergoes an arithmetic right shift, its precision does not change, because an arithmetic shift is designed to represent signed numbers, and "it is very important that the most significant bit [MSB] remains the same and does not change." *Id.* (if the MSB "is 1, it is negative" and if the MSB "is zero, it is positive"). Instead, in an arithmetic right shift (at right), "everything is shifted except for the most significant bit," which "must remain anchored at that position or else the machine is unable to understand what the meaning of that number is." *Id.* Consequently, "precision remains exactly the same" in an arithmetic right shift, and it cannot be changed "because the computer must look at that particular bit [*i.e.*, the MSB] to know if it is looking at the positive or negative value." *Id.*

Id. at 94; *see* RRB at 35 ("arithmetic right-shifts do not decrease 'precision,' because the number of bits remains the same before and afterward, and a computer needs the entire string of bits to determine signage and the overall value it represents."), 37. Amazon emphasizes the testimony of Dr. Schonfeld is "unrebutted." *Id.* at 37, 38.

The weight of the evidence shows the limitation is met in the H.265 standard. Amazon has presented persuasive evidence, and the parties generally agree, that the shift in the cited H.265 equations is an "arithmetic" shift. CX-7561.0186, .0187; RX-5146.0034; *see* CX-7561.0034. And there appears to be no dispute that Dr. Schonfeld's demonstrative examples are accurate.

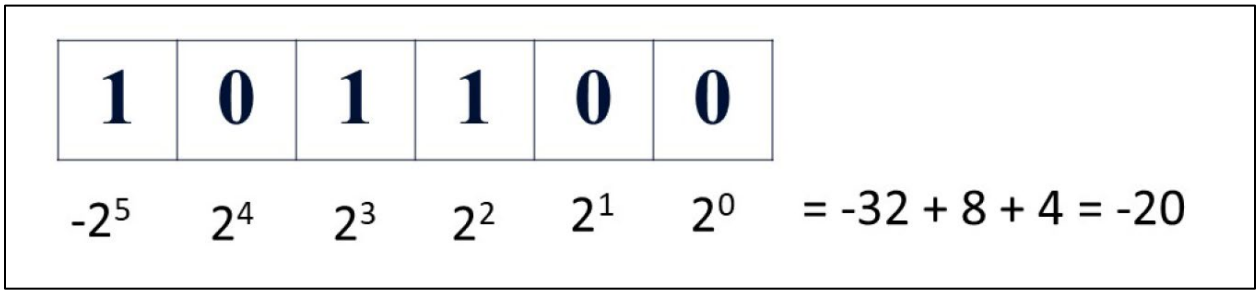
However, the examples do demonstrate a loss of precision. During cross-examination, Dr. Schonfeld admitted that the below math converting binary values to integer values was correct:



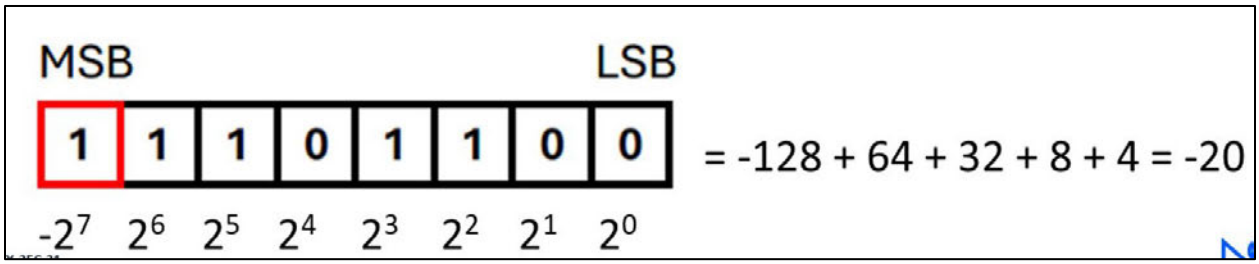
CDX-0035C.42; Hr'g Tr. (Schonfeld) at 1391:8-1392:3. Notably, as recorded, the values are the same between the left, "logical shift," side and the right, "arithmetic shift," side. Yet, there are more digits or bits on the right than the left side, especially for the last row with a value of -20. It is because of this larger amount of digits that Amazon claims precision has stayed the same (from top to bottom). But the math, H.265's definition of arithmetic shift, and Dr. Schonfeld's explanation shows the extra digits—in this case, extra 1's in a two's complement system—are effectively filler and not used to communicate any actual pixel value. Notice how a value of 101100 equates to minus 20, and remains minus 20 even when two extra 1's are placed in front

[redacted]

(extra values, plus sign switch of prior largest value, creates no net change):



CDX-0035C.38; Hr'g Tr. (Schonfeld) at 1388:2-1389:6.



CDX-0035C.31; *see* Hr'g Tr. (Schonfeld) at 1390:8-1392:3 (discussing CDX-0035C.42). This is true regardless of the number of 1s added on to the front of the value—*i.e.*, the number of shifts to the right (*e.g.*, 1111111111101100 = -20). So even though there are the same number of bits before and after the arithmetic shift, fewer of those bits are used to communicate pixel value. And with fewer bits available, the precision has been lowered. Notably, Amazon has no evidence beyond the say-so of Dr. Schonfeld to show arithmetic shifts do not decrease precision.

This is also apparent from the difference in value between -77 and -20 while keeping the same number of bits. In Amazon's view, the "precision" is the same—but the value differs drastically; 20 is not even a third of 77. The only way that 20 could still resemble a pixel value of 77 is if the total range of possible values itself diminishes from 256 (2^8) to 64 (2^6) (*e.g.*, 77/256 = .30078; 39/128 = .30469; 20/64 = .3125). And, again, if the total range of possible values diminishes, the available precision diminishes. This meets the limitation, "decrease a precision of said combined prediction by shifting bits of the combined prediction to the right." The H.265

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[redacted]

standard therefore infringes this last limitation and infringes claim 25 of the 267 patent.

As for AV1, Nokia argues, "[t]he AV1 specification uses the Round2 function, which the specification shows [is] implemented using a right shift, to decrease the precision of the combined prediction." CIB at 32 (citing Hr'g Tr. (Moulin) at 455:16-458:2). Nokia provides the following excerpt showing the Round2 function and associated code incorporating a ">>" operation:

Otherwise if compound_type is equal to COMPOUND_AVERAGE, CurrFrame[plane][y + i][x + j] is set equal to Clip1(Round2(preds[0][i][j] + preds[1][i][j], 1 + InterPostRound)) for i = 0..h-1 and j = 0..w-1.

Otherwise if compound_type is equal to COMPOUND_DISTANCE, CurrFrame[plane][y + i][x + j] is set equal to Clip1(Round2(FwdWeight * preds[0][i][j] + BckWeight * preds[1][i][j], 4 + InterPostRound)) for i = 0..h-1 and j = 0..w-1.

CX-8044.0271 (AV1 Specification)

$$\mathrm{Round2}(x, n) = \left\lfloor \frac{x + \left(2^{n-1}\right)}{2^n} \right\rfloor$$

```
Round2( x, n ) {
  if ( n == 0 )
    return x
  return ( x + ( 1 << (n - 1) ) ) >> n
}
```

CX-8044.0031 (AV1 Specification)

CIB at 33-34 (citing CDX-0012C.66). Amazon's opposition here, as contained in its initial brief, is slightly different than for H.265. Here, it argues that the Round2 equation, as written, "performs different operations than shifting bits," and if considered to shift bits, it shifts a value other than the "combined prediction" because of the addition of (2^{n-1}). RIB at 94-95 (citing Hr'g Tr. (Schonfeld) at 1303:1-1304:22, 1366:16-20, 1394:13-1395:12). Amazon concedes that the code at the bottom of the demonstrative is in the AV1 specification but contends it is only an example, not shown to be actually implemented in any product. RIB at 94-95. Amazon's reply brief differs

further. It repeats the view that the source code example is not actually used in any Accused Product (RRB at 38), but then characterizes the Round2 function—at least as it appears in the sample code—as an "arithmetic shift" (*id.* at 39 (citing Hr'g Tr. (Schonfeld) at 1303:17-1304:22, 1394:22-1395:12)).

The weight of the evidence shows the limitation is met in the AV1 standard. The specification explicitly shows that the Round2 function involves dividing a value by 2^n (*i.e.*, 2^n), which the 267 patent explains accomplishes a right shift, decreasing precision. CX-8044.0031; 267 patent at 4:5-7 ("The filtered value added with the rounding offset is right shifted [] x-bits i.e. divided by 2^x to obtain a first prediction signal P1"). Moreover, Dr. Schonfeld opined that the >> operator shown in the sample code represents an arithmetic shift (Hr'g Tr. (Schonfeld) at 1394:22-1395:12), and it has been determined that arithmetic shifts result in a decrease in precision.

As to whether the Round2 function shifts the "combined prediction" or "something else altogether," the evidence shows it is the "combined prediction." Dr. Schonfeld does not dispute the "x" value shown in the function is the combined prediction. *Id.* at 1304:5-10 ("the combined prediction I have highlighted here in purple. That's the forward times prediction plus backward times prediction. That goes through an operation of round2."). Without further explanation, adding 2^{n-1} to x before implementing the shift would not seem to change the character of x appreciably. And Nokia is otherwise persuasive in describing 2^{n-1} as a rounding offset, which finds support in the specification and dependent claims. CRB at 14 (citing 267 patent at cls. 11, 29); *see* 267 patent at 4:5-20 ("A rounding offset may be added 920 with the combined signal after which the result is right shifted y-bits i.e. divided by 2^y."). Thus, the AV1 standard infringes this last limitation and infringes claim 25 of the 267 patent.

[redacted]

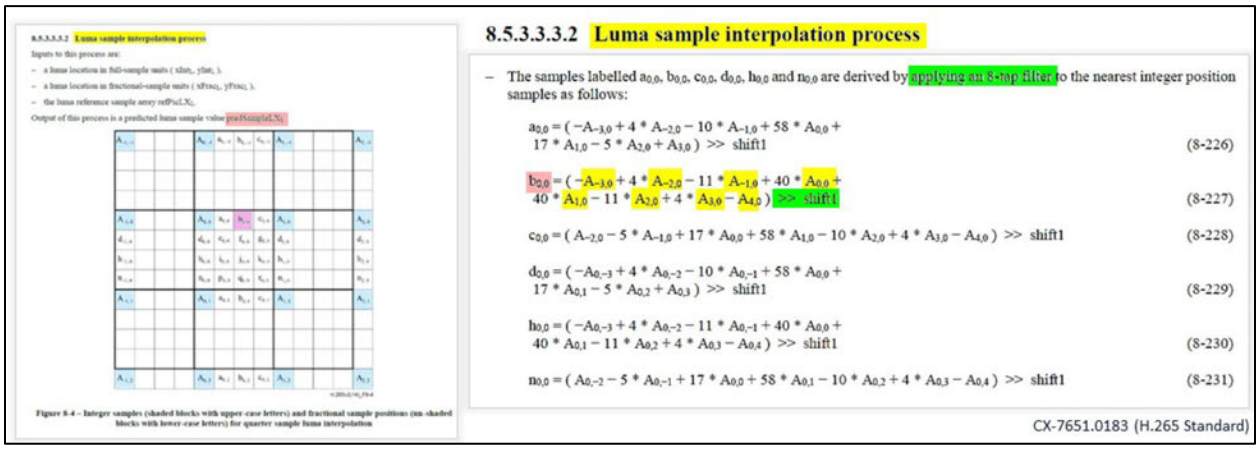
Accordingly, Nokia has shown claim 25 is infringed by the Accused Products by way of the claim being essential to the H.265 and AV1 standards, and at least one of those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 97-98; RRB at 8-11, 40-41.

5. Claim 26

For reference, claim 26 of the 267 patent requires:

> 26. The apparatus according to claim 25, wherein in an instance in which said first motion vector points to a subpixel, said first prediction is obtained by interpolation using pixel values of said first reference block.

267 patent at cl. 26. In support of infringement, Nokia argues it is met by both the H.265 and AV1 standards. CIB at 34-35. For H.265, Nokia explains, "[the standard] uses a P-tap filter to predict the values of sub-pixels and right-shifts the summed tap values as shown in, *e.g.*, equation 8-227." *Id.* at 34 (citing Hr'g Tr. (Moulin) at 449:5-450:9). Nokia provides the following screenshot of the equation:



8.5.3.3.3.2 Luma sample interpolation process

– The samples labelled $a_{0,0}$, $b_{0,0}$, $c_{0,0}$, $d_{0,0}$, $h_{0,0}$ and $n_{0,0}$ are derived by applying an 8-tap filter to the nearest integer position samples as follows:

$$a_{0,0} = (-A_{-3,0} + 4 * A_{-2,0} - 10 * A_{-1,0} + 58 * A_{0,0} + 17 * A_{1,0} - 5 * A_{2,0} + A_{3,0}) >> shift1 \quad (8\text{-}226)$$

$$b_{0,0} = (-A_{-3,0} + 4 * A_{-2,0} - 11 * A_{-1,0} + 40 * A_{0,0} + 40 * A_{1,0} - 11 * A_{2,0} + 4 * A_{3,0} - A_{4,0}) >> shift1 \quad (8\text{-}227)$$

$$c_{0,0} = (A_{-2,0} - 5 * A_{-1,0} + 17 * A_{0,0} + 58 * A_{1,0} - 10 * A_{2,0} + 4 * A_{3,0} - A_{4,0}) >> shift1 \quad (8\text{-}228)$$

$$d_{0,0} = (-A_{0,-3} + 4 * A_{0,-2} - 10 * A_{0,-1} + 58 * A_{0,0} + 17 * A_{0,1} - 5 * A_{0,2} + A_{0,3}) >> shift1 \quad (8\text{-}229)$$

$$h_{0,0} = (-A_{0,-3} + 4 * A_{0,-2} - 11 * A_{0,-1} + 40 * A_{0,0} + 40 * A_{0,1} - 11 * A_{0,2} + 4 * A_{0,3} - A_{0,4}) >> shift1 \quad (8\text{-}230)$$

$$n_{0,0} = (A_{0,-2} - 5 * A_{0,-1} + 17 * A_{0,0} + 58 * A_{0,1} - 10 * A_{0,2} + 4 * A_{0,3} - A_{0,4}) >> shift1 \quad (8\text{-}231)$$

CX-7651.0183 (H.265 Standard)

Id. at 34-35 (citing CDX-0012C.57). For AV1, Nokia explains, "[the standard] makes use of a P-tap interFilter, summed and rounded using the Round2 function, to determine sub-pixels." *Id.* at 35 (citing Hr'g Tr. (Moulin) at 459:14-460:12). Nokia provides the following screenshot of the relevant code:

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[redacted]

```
interpFilter = InterpFilters[ candRow ][ candCol ][ 1 ]
if ( w <= 4 ) {
    if ( interpFilter == EIGHTTAP || interpFilter == EIGHTTAP_SHARP ) {
        interpFilter = 4
    } else if ( interpFilter == EIGHTTAP_SMOOTH ) {
        interpFilter = 5
    }
}
for ( r = 0; r < intermediateHeight; r++ ) {
    for ( c = 0; c < w; c++ ) {
        s = 0
        p = x + xStep * c
        for ( t = 0; t < 8; t++ )
            s += Subpel_Filters[ interpFilter ][ (p >> 6) & SUBPEL_MASK ][ t ] *
              ref[ plane ] [ Clip3( 0, lastY, (y >> 10) + r - 3 ) ]
                           [ Clip3( 0, lastX, (p >> 10) + t - 3 ) ]
        intermediate[ r ][ c ] = Round2(s, InterRound0)
    }
}
```

```
interpFilter = InterpFilters[ candRow ][ candCol ][ 0 ]
if ( h <= 4 ) {
    if ( interpFilter == EIGHTTAP || interpFilter == EIGHTTAP_SHARP ) {
        interpFilter = 4
    } else if ( interpFilter == EIGHTTAP_SMOOTH ) {
        interpFilter = 5
    }
}
for ( r = 0; r < h; r++ ) {
    for ( c = 0; c < w; c++ ) {
        s = 0
        p = (y & 1023) + yStep * r
        for ( t = 0; t < 8; t++ )
            s += Subpel_Filters[ interpFilter ][ (p >> 6) & SUBPEL_MASK ][ t ] *
              intermediate[ (p >> 10) + t ][ c ]
        pred[ r ][ c ] = Round2(s, InterRound1)
    }
}
```

Id. (citing CDX-0012C.68); *see* CX-8044.275. Amazon does not contest claim 26. *See generally* RIB at 91-98; RRB at 36-41.

Accordingly, Nokia has shown claim 26 is infringed by the Accused Products by way of this claim being essential to the H.265 and AV1 standards, and at least one of those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 97-98; RRB at 8-11, 40-41.

6. Claim 27

For reference, claim 27 of the 267 patent requires:

> 27. The apparatus according to claim 26, wherein said first prediction is obtained by interpolation using values of said first reference block by:
>
> right shifting a sum of a P-tap filter using values of said first reference block.

267 patent at cl. 27. In support of infringement, Nokia presents the same arguments and evidence as for claim 26 above. *See* CIB at 34-35. Amazon does not contest claim 27. *See generally* RIB at 91-98; RRB at 36-41.

Accordingly, Nokia has shown claim 27 is infringed by the Accused Products by way of this claim being essential to the H.265 and AV1 standards, and at least one of those standards being practiced. This finding is unaffected by Amazon's general complaints over deficient source code and bitstream testing evidence. *See* RIB at 12-18, 97-98; RRB at 8-11, 40-41.

[redacted]

D. Domestic Industry – Technical Prong

According to Nokia's post-hearing briefing, the DI Products practice claims 7-9 and 25-27 of the 267 patent. CIB at 2, 206. For the reasons discussed below, Nokia has shown by a preponderance of the evidence that only some of the DI Products practice these claims.

Nokia contends, "[t]he DI Products practice the Asserted Patents for the same reasons as discussed for infringement because each of those products contains chips or an Android OS (Samsung) that Complainants' experts confirmed results in the same capabilities as the Accused Products." CIB at 206 (citing, *inter alia*, Hr'g Tr. (Moulin) at 431:4-12). Amazon does not dispute the DI Products practice the H.265 and AV1 standards. *See* RIB at 98; RRB at 11.

As determined above, it has been established that the limitations of decoding claims 25-27 are required by the H.265 and AV1 standards. Accordingly, Nokia has shown claims 25-27 are practiced by the DI Products by way of those claims being essential to the H.265 and AV1 standards, and those standards being practiced.

As for encoding claims 7-9, only the Intel-based Microsoft Surface Pro 8 and the NVIDIA-based Surface Laptop Studio 2 have sufficiently been shown to practice the claims. These are the only DI Products asserted to practice claims 7-9 and tested by Dr. Moulin, with those testing results provided in the CX-6151 exhibit, and then cited against each limitation of the claims (alongside the HP Accused Products). *See* CIB at 36-42 (citing CX-6151 (DI Product testing document)); Hr'g Tr. (Moulin) at 431:11-12 (explaining that only DI Products considered were "Microsoft Surface computers with Intel and NVIDIA hardware.").

To the extent Nokia argues the Surface Pro 8 is representative of all other Intel-based Surface products, or the Surface Laptop Studio 2 is representative of all other NVIDIA-based Surface products, Nokia has not met its burden. Neither its briefing nor the testimony of Dr.

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Moulin adequately explains representativeness, either through identical components, test results, or source code—especially given Amazon's disputes over testing and source code. *See, e.g.*, CIB at 7 (listing large ranges of evidence with no explanation), 206-207 (alleging "same capabilities as the Accused Products" but citing irrelevant hearing testimony); RIB at 12-18 (arguing some but not all NVIDIA-based products implement AV1 and other source code files that may not be used at all); RRB at 8-11 (same). It is not the responsibility of the administrative law judge to piece together a domestic industry technical prong case from the vast record admitted in this investigation. *See* RIB at 13-14 ("This is a mess of Nokia's own making—it chose the Asserted Patents and Accused Products."); *Certain LED Lighting Devices, LED Power Supplies, and Components Thereof*, Inv. No. 337-TA-1081, Comm'n Op. at 10-11 (July 23, 2019).

Accordingly, Nokia has shown claims 7-9 are practiced by the Microsoft Surface Pro 8 and the NVIDIA-based Surface Laptop Studio 2, but no others.

E. Validity

Amazon identifies the following invalidity theories for the 267 patent:

Claims	Theory
7-9, 25-27	Lack of patentable subject matter under 35 U.S.C. § 101
7-9, 25-27	Rendered obvious under 35 U.S.C. § 103 by Walker (JX-1274)

See generally RIB at 99-122.

Amazon identifies U.S. Publication No. 2005/0281334 ("Walker") as prior art to the 267 patent. It states, "Walker's application was filed on May 2, 2005, published on December 22, 2005, and is prior art under §§ 102(b) and 102(e)." RIB at 109 (citing JX-1274). Nokia does not

dispute the prior art status of Walker. *See generally* CIB at 47-52; CRB at 19-20. It is therefore accepted as prior art against the 267 patent under at least 35 U.S.C. § 102(b).

1. Section 101

Pursuant to the two-step *Alice* framework, Amazon first contends that: "one cannot own mathematical principles through patent claims . . . . Yet, that is exactly what Nokia is attempting to do here. Both sides' experts agreed the only 'new' material in the asserted '267 claims concerns rounding at the end of the calculation that combines two predictions to increase precision." RIB at 100 (citing *In re Bd. of Trustees of Leland Stanford Junior Univ.*, 989 F.3d 1367 (Fed. Cir. 2021)). Amazon views claim 25 as representative and argues its "linguistic structure typifies patents that merely use a computer as a tool to implement an abstract idea." *Id.* at 102 (citing *Elec. Power Grp. v. Alstom S.A.*, 830 F.3d 1350, 1354, 1356 (Fed. Cir. 2016)). Amazon adds that both sides' experts agree that "rounding at the end of the combining calculation" is the only possible new feature in claim 25 (*id.*; *see id.* at 105), and that Dr. Schonfeld "confirmed the benefits of delaying rounding are not unique to video coding or even signal processing" (*id.* at 104). Amazon argues that the 267 patent's background in bi-directional prediction is irrelevant "to what those claims actually cover." *Id.* at 106. Amazon contends *Enfish* is distinguishable, as its claims were "'a solution to a problem in the software arts'" while the present claims (like claim 25) are more like "'situations where general-purpose computer components are added post-hoc to a fundamental economic practice or mathematical equation." *Id.* at 106-107 (citing 822 F.3d at 1338, 1339); *see* RRB at 43. Thus, according to Amazon, "[t]he '267 claims are directed to abstract, ineligible subject matter." *Id.* at 107.

Amazon is not persuasive, particularly with its assertions that bi-directional coding is "irrelevant" to what claims 25, or 26-27, or 7-9 "actually cover" (RIB at 106) or that the claims recite generalized steps performed on a conventional computer (RRB at 43). The explicit language

of these claims, even if the preambles are ignored, are grounded in the video coding context which is by no means a fundamental human "economic practice" or mathematical equation as *Enfish* warns against. *See, e.g.*, 267 patent at cl. 25 (reciting "block of pixels," "reference block," "motion vector," and "shifting bits"). And the clear aim of the 267 patent and its claims is to improve a computer's ability to encode or decode video streams; *i.e.*, an improvement to the way computers function held to be non-abstract in *Enfish* and its progeny. *Enfish*, 822 F.3d at 1336, 1338-9; *see, e.g.*, *Visual Memory*, 867 F.3d at 1258; *Gemalto*, 942 F.3d at 1149-51; 267 patent at 4:29-43. Amazon's own expert opined that claims 9 and 27 involve "shifting the register," a process that is "much less costly than multiplication," and therefore less computationally burdensome. Hr'g Tr. (Schonfeld) at 1346:6-1347:7. Again, to the extent there is any doubt, *Enfish* is still good law. *Miller Mendel*, 107 F.4th at 1353. And the type of patent claim at issue in *Bd. Of Trustees*, on which Amazon relies, was not at all directed to improving a computer. It was concerned with "using two types of information, namely genotype data and pedigree data, to determine alleles' inheritance state using a method published in the prior art." *Bd. Of Trustees*, 989 F.3d at 1369-70. The claims at issue in *Digitech*, *SAP America*, or *ChargePoint* were similarly not directed to improving a computer. *Digitech*, 758 F.3d at 1349 (see claim); *SAP America*, 898 F.3d at 1164-5 (see claims); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 766 (Fed. Cir. 2019) (see claim); *see* RIB at 105 (citing cases); RRB at 43 (citing cases).

Accordingly, Amazon has not shown claims 7-9 or 25-27 are directed to ineligible subject matter under *Alice* step one, so they are not invalid under Section 101.

2. Walker

Amazon contends, "[t]he Asserted Claims are rendered obvious by [Walker]." RIB at 109. It summarizes, "Walker takes predictions as an input, shifts them, adds offsets to them, sums them,

and then outputs a prediction." *Id.* For the reasons discussed below, Amazon has shown claims 7, 25, and 26 to be invalid.

a. Claims 7 and 25

For independent encoding claim 7 and independent decoding claim 25, Amazon alleges that all limitations are taught or disclosed in Walker, even if the briefing section is entitled as obviousness. *See* RIB at 109-119; RRB at 46. Amazon's initial brief identifies only limitations [7a]/[25a] and [7h]/[25h] as in dispute (according to the limitation identifier scheme used above) but states that Nokia's opposition to the other limitations boils down to one point—"[that] during Walker's process, a prediction is not a 'prediction.' Nokia insists that when the prediction is multiplied by a weight, it momentarily ceases to be a 'prediction.'" RIB at 109. Nokia's briefings confirm that it disputes invalidity of claims 7 and 25 based on this single principle. *See* CIB at 47 (identifying limitations [7d]/[25d], [7e]/[25e], and [7f]/[25f] as not met in Walker because of proper identity of "predictions"); *see also id.* at 48-51; CRB at 19-20 ("what Walker describes as its first and second predictions have the same precision as its reference blocks.").

Amazon is persuasive. There is no dispute that Walker initially discloses, as alleged by Amazon, "the pixels of Walker's current block, first reference block, and second reference block have values with a first precision: '8 bit for luminance and 8 bit for both chrominance elements.'" RIB at 111 (citing Hr'g Tr. (Schonfeld) at 1336:16-24, 1342:15-21; JX-1274 at [0030], [0060], [0049]-[0052]); CIB at 49 ("Walker expressly calls pred0 and pred1 'samples from prediction blocks' and specifies that they have the same 8-bit precision as the input reference pixel values."). This corresponds to limitation [7c]/[25c], "determine, for a current block, a first reference block based on a first motion vector and a second reference block based on a second motion vector, wherein the pixels of the current block, the first reference block, and the second reference block have values with a first precision."

[redacted]

Then, for limitation [7d]/[25d], "use said first reference block to obtain a first prediction, said first prediction having a second precision, which is higher than said first precision," Amazon argues it is taught "because [Walker's] encoder and decoder use the first reference block (*e.g.*, a 'prediction block' from a past frame) to obtain a first prediction ('(pred0)w0' for encoding and '$((pred0)_{WA})$>>6" for decoding)." RIB at 111. Amazon argues similarly for limitation [7e]/[25e] which recites the same conditions for a "second reference block" and "second prediction." *Id.* at 116 (referencing "(pred1)w1" and"$((pred1)_{WB})$>>6"). For support, Amazon points to the following equations and tables which show these variables and their bit depth of 16 (*i.e.*, precision):

TABLE 2

Operation No.	Operation	Bitwidths Involved	Bitwidth of Operation Result
1	(pred0)w0, (pred1)w1	8 bits * 8 bits	16
3	(pred0)w0 + (pred1)w1 + 2^{LWD-1}		
4	(((pred0)w0 + (pred1)w1 + 2^{logWD}) >> (LWD + 1))		
5	$(o_0 + o_1 + 1)$ >> (1		
6	Clip1[Op. 4 + Op. 5] (for Clip1, see Eq. (11))		

Equation 13:
Weighted Prediction for Encoding

$$Final_pred = Clip1[(((pred0)w0 + (pred1)w1 + 2^{logWD}) >> (logWD+1)) + ((o_0 + o_1 + 1) >> 1)]$$

JX-1274 at ¶¶ 67-69, 84, Table 2 (Walker)

RIB at 111 (citing RDX-0096C.102);

TABLE 4

Operation No.	Operation	Bitwidths Involved	Bitwidth of Operation Result
1	(pred0) w_A, (pred1) w_B	8 bits * 15 bits	23
2	((pred0) w_A) >> 6 + ((pred1)w_B) >> 6 + 2^7	17 bits + 17 bits + 7 bits	19
4	$(o_0$ +		
5	Clip1[(for C		

Equation 18:
Weighted Prediction for Decoding

$$pred_{ij} = ((((pred0)w_A) \gg 6 + ((pred1)w_B) \gg 6) + 2^7) \gg 8 + Offset$$

JX-1274 at ¶¶ 92-94, Table 4 (Walker)

Id. at 113 (citing RDX-0096C.110). The limitations are met in Walker as alleged. (pred0)w0 is the "first prediction" in the [7d] encoding context, (pred1)w1 is the "second prediction" [7e], and both have a precision of 16 bits due to the weight multiplier which is greater than the original 8 bits. Similarly, ((pred0)W_A)>>6 is the "first prediction" in the decoding context [25d], ((pred1)W_B)>>6 is the "second prediction" [25e], and both have a precision of 17 bits which is larger than 8 bits.

Nokia's argument that "the precisions of the predictions are the same as the input values" (CIB at 50) depends on treating (pred0) and (pred1) without the weight multipliers as the "first prediction" and "second prediction." But—as with Nokia's disputes over S0, S1 in Nakamura and the 714 patent—this is irrelevant because it is not Amazon's theory. Amazon's theory is that (pred0) and (pred1) *with* the weight multipliers are the claimed "first prediction" and "second prediction." And Amazon cites intrinsic and extrinsic evidence showing "prediction" is broad enough in a plain and ordinary sense to cover weighted values. RIB at 114-115 (citing, *inter alia*, 267 patent at cls. 10, 28; RX-4654.246-261, 281; Hr'g Tr. (Schonfeld) at 1338:4-21); RRB at 47 (citing 267 patent at 12:52-65 (applying a filter to arrive at prediction value), 14:4-10 (referring to a value after a bit shift as a prediction, P1, P2), 14:33-5[4](applying many "intermediate steps" before obtaining prediction)). Nokia, on the other hand, offers no evidence to show the meaning of "prediction" would not cover these values other than the testimony of its expert. CIB at 49-51 (citing Hr'g Tr. (Moulin) at 1636:17-1638:15); CRB at 19-20. And this position contradicts its infringement theories, at least with respect to the AV1 standard, where weighted prediction values are also involved. CIB at 31 (citing CX-8044.271 ("FwdWeight*preds[0][i][j]," "BckWeight*preds[1][i][j]")).

Thus, Amazon has shown first and second prediction values with a second precision that is higher than a first precision. Given that Nokia raises no other disputes with respect to claims 7 and 25, they are determined to be present in Walker as alleged by Amazon and Dr. Schonfeld. *See* RIB at 109-119 (citing Hr'g Tr. (Schonfeld) at 1289:16-23, 1335:14-1344:16).

As for the *Graham* factors, the scope and content of Walker has been detailed above, and it is only minimally different, if at all, from claims 7 and 25. As noted, Nokia cites no evidence of indicia of non-obviousness, and the level of ordinary skill in the art is addressed below. *See generally* CIB at 47-52; CRB at 19-20.

b. Claims 8 and 26

For dependent encoding claim 8 and dependent decoding claim 26, Amazon and Dr. Schonfeld contend the latter is disclosed and the former would have been obvious. RIB at 119-120 (citing Hr'g Tr. (Schonfeld) at 1345:8-1346:5, 1289:24-1291:1). In the decoding context, Amazon argues that Walker discloses instances in which first motion vectors point to subpixels (*id.* at 119 (citing JX-1274 at [0111], Fig. 8)) and that interpolation is used to obtain the predictions in these circumstances (*id.* at 120 (citing JX-1274 at [0111], [0114], Fig. 9)). And then for the encoding context, Dr. Schonfeld opined it would have been obvious to apply Walker's decoding technique to the encoder, "because one has to make sure that the decoder is looking at the same half-pixel, a motion vector that the encoder actually generated." *Id.* (citing Hr'g Tr. (Schonfeld) at 1345:8-1346:5). In opposition, Nokia applies a variation on its claim 7/25 argument rejected above—that the only values obtained by interpolation are (pred0) and (pred1) (without weighting) and these do not have the required precision. CIB at 52; CRB at 20.

Nokia is not persuasive for the reasons given above—namely that, as an example, (pred0)w0 is the prediction with the required heightened precision, and if (pred0) is "obtained" by interpolation, then it is fairly said that (pred0)w0 is also "obtained" by interpolation. Nokia cites

no evidence to overturn this plain and ordinary meaning and its position is analogous to Amazon's "shift of something else altogether" non-infringement argument (RIB at 95; *see* RRB at 39), rejected above.

Thus, Amazon has shown decoding claim 26 is disclosed in Walker. As for encoding claim 8, Amazon and Dr. Schonfeld have shown it would have been entirely reasonable given the technology that the encoder and decoder create prediction values with the same techniques. Nokia offers no opposition to this motivation. Thus, under the *Graham* factors, the difference between the claim and the prior art is almost negligible, a motivation is present, and Nokia cites no evidence of indicia of non-obviousness. *See generally* CIB at 47-52; CRB at 19-20. The level of ordinary skill in the art and whether a POSITA would have expected success by modifying Walker are addressed below.

c. Claims 9 and 27

For dependent encoding claim 9 and dependent decoding claim 27, Amazon and Dr. Schonfeld contend they would have been obvious. RIB at 120-121. Amazon explains that Walker performs interpolation using a "2-tap FIR filter," where P is 2, and in one embodiment the filter weights of 0.5 and 0.5 are used. *Id.* at 120-121 (citing JX-1274 at [0114], Fig. 9). Further, it argues, "Walker also teaches that bit-shifting to the right can be used instead of division." *Id.* at 121 (citing JX-1274 at [0037], [0046]). Turning to modification of Walker, Amazon and Dr. Schonfeld assert that a POSITA would leverage basic math to alter these filter values, and add a right shift, to obtain computing efficiencies:

> Dr. Schonfeld testified that a POSITA "would know that a 2-tap filter with coefficients half/half is the same as a 2-tap filter with coefficients 1/1, followed by a right shift. It gives the exact same result. It's no different at all." Tr. (Schonfeld) 1346:6-1347:7; RDX-0096C.115; JX-1274 ¶¶114, 37. It thus would have been obvious to a POSITA to modify Walker's FIR [0.5 0.5] filter to a FIR [1 1]>>1 filter because the modification results in a "very simple operation" that is "much less costly than multiplication, which is just shifting the register," and also because

> the modification amounts to little more substituting equivalent mathematical operations. Tr. (Schonfeld) 1346:6-1347:7.

Id. at 121. Nokia's opposition is the same as for claims 8 and 26 and is not persuasive. CIB at 52; CRB at 20.

As for the *Graham* factors, the difference between the claim and the prior art is minimal, a motivation is present, and Nokia cites no evidence of indicia of non-obviousness. *See generally* CIB at 47-52; CRB at 19-20. The level of ordinary skill in the art and whether a POSITA would have expected success by modifying Walker are addressed below.

d. Summary

As mentioned, neither party adequately addresses the level of ordinary skill in the art, but this factor is of little pertinence for those claims where all of the elements are found expressly in Walker, that is, where the level of skill in the art makes little difference. Thus, for claims 7, 25, and 26, Amazon has made out a prima facie case of obviousness, Nokia has no countervailing evidence, and those claims are invalid.

For those claims where not all elements are expressly disclosed, that is, claims 8, 9, and 27, the level of ordinary skill is more pertinent. Although this *Graham* factor frequently goes undisputed, and its importance is often downplayed, it is relevant to evaluating whether expert testimony is needed. *See Perfect Web Techs., Inv. v. InfoUSA, Inc.*, 587 F.3d 1324, 1330 (Fed. Cir. 2009) ("If the relevant technology were complex, the court might require expert opinions."). It is also relevant to understanding what prior art is analogous, and thus what prior art may be considered in the obviousness analysis. *See LKQ Corp. v. GM Global Technology Operations LLC*, 102 F.4th 1280, 1296 (Fed. Cir. 2024). In short, "the knowledge of [a skilled] artisan is part of the store of public knowledge that must be consulted" when considering obviousness, and

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Amazon has not identified that knowledge in a way that allows for such consultation. *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013).

Amazon cites the opinion of Dr. Schonfeld, who testified that a person of ordinary skill would have been motivated to use a right shift and to use the same "interpolation teachings" for both encoding and decoding. RIB at 120-21; Hr'g Tr. (Schonfeld) at 1345:25-1347:14. But Dr. Schonfeld did not opine regarding any expectation of success, and his otherwise well-supported opinion is undermined by the lack of evidence on the level of ordinary skill. *See* Hr'g Tr. (Schonfeld) at 1345:25-1347:14. So Amazon's obviousness case for claims 8, 9, and 27 of the 267 patent does not include evidence sufficient to establish a POSITA's level of knowledge, and thus that a POSITA would have been motivated to modify Walker to practice these dependent claims with an expectation of success. Amazon has therefore failed to offer sufficient evidence to make out a prima facie case of obviousness for claims 8, 9, and 27 of the 267 patent, and those claims are accordingly not invalid for obviousness.

IX. ADDITIONAL AFFIRMATIVE DEFENSES

A. Breach of RAND Obligations

Amazon argues that Nokia has breached its obligations regarding "reasonable" and "non-discriminatory" patent licenses. *See* RIB at 184-98; RRB at 85-94. Nokia identified all five Asserted Patents to the International Telecommunications Union ("ITU"), one of the standard-setting bodies for the H.264 and H.265 standards, as being "believe[d]" to include claims "required to implement" those standards. JX-0500 at 2; *see id*. at 4 (321 patent), 6 (818 patent), 10 (application number 13/666,680, which issued as the 714 patent after a series of intervening continuation applications); JX-1129 at 7 (application number 13/344,893, which issued as the 267 patent after a series of intervening continuation applications); RX-0082 at 3 (991 patent). In each of these "Patent Statement and Licensing Declaration[s]," Nokia agreed that, "to the extent [a

claim in the patent is] essential to the implementation of" the standards, Nokia is "prepared to grant a license . . . on a worldwide, non-discriminatory basis and on reasonable terms and conditions." JX-0500 at 2. This requirement, referred to as "RAND," constitutes a binding agreement "to license [Nokia's] essential patents on RAND terms." *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2012 WL 4827743, at *6 (W.D. Wash. Oct. 10, 2012) (construing the ITU's license declaration as to the H.264 standard).

There is no dispute that Nokia has negotiated with Amazon over a license, but obviously no agreement has been reached, and Amazon now argues that the substantive terms Nokia has offered are neither reasonable nor non-discriminatory. *See* RIB at 184-98. Nokia's most recent offer to Amazon is dated , reiterates an offer made in , and incorporates what Nokia calls its :

CX-5514C at 1; JX-1489C (Braun) at 114:7-16. Alternatively, with certain assumptions made about Amazon's unit sales and sales prices, and a because Amazon would pay , . *See* CX-5514C at 2-3; JX-1489C (Braun) at 121:2-18. Nokia also offered . *See* CX-5514C at 3.

Nokia's expert, Dr. Michael Akemann, compared these offers to the terms of previously-executed Nokia H.264/H.265 licenses and found them to be . *See* Tr. (Akemann) at 358:10-360:23. The previous licenses all involved either

[redacted]. *See id.*; CDX-0008C.6-10 (summarizing the license terms and citing the source documents). Amazon does not dispute that these are the terms of Nokia's many licenses, or that Nokia's current offer to Amazon is "based on Nokia's established [redacted] rates with [redacted]." CRB at 95; *see* RIB at 184-98.

1. Non-Discrimination

Amazon does assert, however, that two of the existing lump sum licenses, [redacted], are more favorable to those licensees than Nokia's offer to Amazon, and Nokia's offer is therefore discriminatory. *See* RIB at 198; RRB at 94. Amazon specifically argues that the two licenses have "effective royalty rates" of [redacted]. RIB at 198. These "effective" rates seemingly take into account Nokia's failure to obtain [redacted]. *See* JX-1489C (Lopez) at 1683:6-1686:9. The [redacted] license became effective in [redacted]. *See* CX-2645C at 1-2, 4. The [redacted] license became effective [redacted]. CX-0624C at 1-2, 7; JX-1489C (Lopez) at 1684:14-1685:15.

Such evidence fails to show that Nokia's current offer to Amazon is discriminatory and therefore violative of RAND principles, for three reasons. First, Nokia's current [redacted] offer is necessarily preliminary and incomplete. *E.g.*, JX-1489C (Braun) at 139:9-17 ([redacted]

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[redacted]). [redacted]. *See* CX-5514C. That is, apparently nothing about Nokia's current offer precludes Amazon from negotiating provisions similar to [redacted].

Second, the calculations of "effective royalty rate" made by Amazon's expert, Dr. Mario Lopez, are opaque and conclusory, and therefore not well-supported. *See* JX-1489C (Lopez) at 1683:6-1685:15; RDX-0015C.34-35; Hr'g Tr. (Lopez) at 1508:1-17. The calculation for [redacted] in particular was undermined during cross examination in the 337-TA-1379 hearing, when Dr. Lopez admitted that [redacted] that is, it in effect did [redacted]. JX-1489C (Lopez) at 1723:2-8; *see generally id*. at 1721:18-1727:23.

Third, although calculating and comparing effective royalty rates is one way to evaluate the "non-discriminatory" prong of RAND, any such comparison should be between "similarly situated licensees," and Amazon has failed to show that it is similarly situated to [redacted] or any other Nokia licensee. *TCL Comm. Tech. Holdings Ltd. v. Telefonaktiebolaget LM Ericsson*, 943 F.3d 1360, 1369 (Fed. Cir. 2019); *see Summit 6, LLC v. Samsung Electronics Co., Ltd.*, 802 F.3d 1283, 1299-1300 (Fed. Cir. 2015); RIB at 198. Certainly it would not be surprising if Amazon, [redacted] were all similarly situated for RAND purposes, but Amazon has offered neither proof nor even argument about that. *See* RIB at 198.

2. Reasonableness

As to the reasonableness prong of RAND, Amazon makes several unpersuasive points. It first argues that Nokia's [redacted] have no objective economic basis, and Nokia has failed

to justify them. *See* RIB at 185-187; RRB at 86-90. But except for Amazon's argument regarding patent pool royalties, which is addressed below, Amazon cites no evidence one way or the other on how Nokia came up with its rates, and inasmuch as this argument places the onus on Nokia, it is inconsistent with the burden of proof. *See* RIB at 185-187.

Amazon also argues that Nokia has engaged in "holdup," that is, it waited to offer licenses until after "the point in which an implementer doesn't have a choice to turn to alternatives," the point Dr. Lopez called "lock-in," such that the "patent holder is going to have undue bargaining power." *See* RIB at 187-192 (citing, *inter alia*, JX-1489C (Lopez) at 1630:9-19). Dr. Lopez's opinion regarding holdup, however, is "belied by the large numbers of sophisticated companies that have repeatedly agreed to take a license to Nokia's patents at an established rate." SIB 28. It is also belied by Amazon's own evidence regarding lock-in, which shows that the adoption rate of the H.264 standard was about 69% when Nokia started offering licenses, rose to about 82% in 2018, and is now less than 60%, but Nokia's rates apparently stayed the same during that entire period. *See* RDX-0101C.21 (citing RX-4752C; RX-0479; RX-0484; RX-0486; RX-0487; RX-0488; RX-0492; RX-0493; RX-0495; RX-0496; RX-0497; RX-0531). And even Amazon does not argue that the adoption rate of the H.265 standard, which was less than 25% in 2022, suggests lock-in and holdup, even though Nokia's rates are . *See id.*; RIB at 187-192.

Amazon next argues that Nokia "created the illusion" of market acceptance by first obtaining licenses from small companies lacking the resources to challenge Nokia, and only then asserting its allegedly illusory against "larger targets." RIB at 189. There is evidence that between 2014 and 2016, when it first licensed , Nokia's licenses were only with companies paying small aggregate royalties. *See* JX-1489C (Lopez) at 1676:21-1678:4; RDX-

0015C.26-27. There is also evidence that . RX-0218C. Again, though, companies, some very large and sophisticated, have agreed to Nokia's rates since 2016. *See* CDX-0020C.4 (summarizing the top , along with the source documents). So an alternative explanation for Nokia starting with smaller companies is simply that companies with less potential exposure were more willing to agree to the rates, and there is literally no direct evidence that the companies who have yet to take a license have declined to do so because Nokia's offers have not been RAND.

Amazon's final argument on reasonableness is based on a comparison of Nokia's rates to the rates charged by "patent pools." RIB at 193-98. The rate charged by such pools, which aggregate patents from many companies, can be considered "a strong indicator of a RAND royalty rate." *Microsoft Corp. v. Motorola, Inc.*, No. C10-1823JLR, 2013 WL 2111217, at *83 (W.D. Wash. Apr. 25, 2013). But they also have weaknesses, including that pools "tend to produce lower rates than those that could be achieved through bilateral negotiations," such that "a rate higher than a pool rate could still be RAND." *Id.* at *80. One reason for such lower rates is that pools do not necessarily allocate royalties based on the merit or strength of a patent, so that holders of valuable patents are less likely to join the pool. *See In re Innovatio IP Ventures, LLC Patent Litigation*, Case No. 11 C 9308, 2013 WL 5596309, at *36 (N.D. Ill. Oct. 3, 2013). The rates charged by the patent pools on which Amazon relies, called MPEG-LA and Access Advance, are $0.20 and , respectively. *See* Tr. (Lopez) at 1498:15-1499:5. Although Dr. Lopez calculated what he believed would be a reasonable royalty for Nokia based on the number of Nokia patents compared to the number in each pool, he apparently simply assumed, unreasonably, that Nokia's patents are on average as valuable as the presumably weak patents already in each pool. *See id.*; CIB at 248.

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And MPEG-LA's royalty rates are so low they appear to have been set primarily to encourage adoption of the standard rather than to obtain a return on investment; the first 100,000 units sold are royalty-free, and the royalty has been $0.20 for the past 20 years, even though the number of patents in the pool has increased 100-fold in that time. *See* Tr. (Akemann) at 367:3-22; RX-1714 at 2-4. In short, Amazon has not shown that either patent pool's rate is comparable to Nokia's rates, or that Nokia's current offer is otherwise not reasonable.

3. Good Faith Negotiations

Nor has Amazon shown that Nokia has violated its duty to bargain in good faith. *See* RIB at 198-203; RRB at 94-98. Nokia does indeed have a duty under the circumstances to "negotiate in good faith towards RAND terms." *Microsoft*, 2012 WL 4827743, at *6. Initial offers, though, "do not have to be on RAND terms, so long as a RAND license eventually issues." *Microsoft*, 2013 WL 2111217, at *2. Amazon's case for a lack of good faith negotiation recites a large number of nitpicky, tit-for-tat details which need not be recited here. *See* RIB at 198-203. It is enough to point out that between Nokia and Staff, each of Amazon's complaints has an adequate rejoinder. *See* CIB at 251-55; SIB at 31-34. The parties' negotiations in , however, are especially probative. *See* CIB at 251-55; SIB at 32.

. *See* JX-1489C (Hayden) at 1013:7-11. *See id.*; CX-3721C; CX-3516C at 1 ( ). Amazon's witness, Mr. Scott Hayden,

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RDX-0001C.10; *see* JX-1489C (Hayden) at 1014:20-1015:3. JX-1489C (Hayden) at 1018:22-1019:1; *e.g.*, CX-3516C.

. *See* JX-1489C (Hayden) at 1018:14-21; JX-1489C (Braun) at 137:3-10; JX-1489C (Brunelle) at 221:17-222:3. , . CX-3568C; *see* CX-1849C; JX-1489C (Hayden) at 1019:18-1020:4. ; RX-2198C; *see* RX-2199C.

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[redacted]

[redacted] RX-0443C; *see* RX-2206C.

[redacted]. *See* JX-1489C (Hayden) at 1023:4-11; RX-0214C at 1, 3. [redacted]. RX-0214C at 1; *see* JX-1489C (Hayden) at 1023:23-1024:13. [redacted] RX-0215C at 1; *see* JX-1489C (Hayden) at 1025:6-16. The [redacted] RX-0215C at 3; *see* JX-1489C (Hayden) at 1025:12-16. [redacted]. *See* CX-3528C. [redacted] RX-3072C.

As noted, there is a great deal of disputed minutiae the parties present in connection with their licensing negotiations, but one particular fact about the [redacted] stands out. Mr. Hayden testified that he [redacted] that he [redacted] that he told Nokia he would [redacted] and that it [redacted]. JX-1489C (Hayden) at

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1026:1-19. He also testified that by . *See* JX-1489C (Hayden) at 1082:23-1084:1. In other words, Mr. Hayden, Amazon's lead negotiator, testified under oath JX-1489C (Hayden) at 1019:18-1020:1; *see id.* at 1074:6-18 ( ).

This is all very implausible, to be sure, but even accepting his version of events, clearly the principal reason the executable license agreement was not signed by Amazon was that Amazon . And on . *See* RX-0447C; RDX-0001C.11. Unsurprisingly, a few months later Nokia sent Mr. Hayden an email which he interpreted as a . *See* JX-1489C (Hayden) at 1029:22-1030:7.

In view of such evidence, Staff contends that "Amazon has made it more difficult for [its] negotiations [with Nokia] to occur as time went on," and that is borne out by the record. SIB at 32. Nokia flatly contends that Amazon has negotiated in bad faith and is an unwilling licensee, and the history of the parties' negotiations certainly suggests that, but it is not necessary to reach the issue. *See* CIB at 251. It is instead enough to observe that Nokia negotiated in good faith until the license was , and since then Nokia has continued to

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[redacted]

attempt to license the Asserted Patents. More to the point, Amazon has not shown that Nokia "breached its duty to negotiate in good faith," either before or after Amazon declined Nokia's [redacted] offer. RIB at 199.

B. Equitable Estoppel and Implied Waiver

Amazon advances multiple miscellaneous defenses, some of which relate to Nokia's RAND obligations. *See* RIB at 207-19; RRB at 99-100. Two such defenses are equitable estoppel and implied waiver. *See* RIB at 207-14; RRB at 99-100. Equitable estoppel requires proof of misleading conduct (which may include failure to satisfy a duty to disclose in the context of standard setting), reliance on the misleading conduct by the accused infringer, and prejudice arising from that reliance. *See A.C. Aukerman Co. v. R.L. Chaides Const. Co.*, 960 F.2d 1020, 1041 (Fed. Cir. 1992), *abrogated on other grounds*, *SCA Hygiene Products Aktiebolag v. First Quality Baby Products, LLC*, 580 U.S. 328 (2017); *Qualcomm Inc. v. Broadcom Corp.*, 548 F.3d 1004, 1023 (Fed. Cir. 2008) (equitable estoppel is cognizable in the context of standard setting). As relevant here, implied waiver requires proof that the patentee had a duty of disclosure to a standard setting organization and breached that duty. *See Core Wireless S.A.R.L. v. Apple Inc.*, 899 F.3d 1356, 1365 (Fed. Cir. 2018).

Both defenses fail because Amazon has failed to show that Nokia breached a duty to disclose. *Qualcomm* does hold that "JVT participants" were required to "disclose patents prior to final approval of a standard under the rules of the JVT parent organizations." 548 F.3d at 1015. It is unclear, though, what sort of disclosure is required, because there would seem to be no need to identify specific patents or claims so long as the patent holder agrees to license its patents on RAND terms, an issue *Qualcomm* does not address. *See* Hr'g Tr. (Levin) at 1619:11-1620:3. The ITU and JVT documents Amazon cites do not expressly state that specific patents must be

disclosed. *See* RIB at 207 (citing RX-0074.0003, .0006; JX-0696.0008; RX-1692.0004; JX-0903.0003). The ITU disclosure requirement is found in its "Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC," which states that "the patent holder has to provide a written statement . . . using the appropriate 'Patent Statement and Licensing Declaration' Form," with no timing requirement other than "good faith and on a best effort basis." JX-0696.0003, .0009. The JVT had its own "Patent Disclosure Form," which was "require[d]" to be "fully filled-out" and attached to each technical proposal submitted to the JVT, and which it distinguished from the ITU's "final [patent] declaration." RX-1692.0009 (emphasis omitted). Both forms only clearly require listing of specific patents or applications when the patentee or application owner is "unwilling to grant licenses" at least on RAND terms, nor does either form impose a filing deadline. *Id*. at .0012; JX-0696.0011.

In *Qualcomm*, by contrast, the patent owner did not file such a form until after it sued for infringement. *See Qualcomm Inc. v. Broadcom Corp*., 539 F.Supp.2d 1214, 1220 (S.D. Cal. 2007). And although that form apparently indicated a willingness to license on RAND terms, no license offer was ever made prior to suit. *See id*. at 1220, 1229. Moreover, industry practice, that is, "JVT participants' understanding of [JVT] policies," was relevant to the *Qualcomm* analysis "to the extent [such policies] are ambiguous." *Qualcomm*, 548 F.3d at 1012, 1016. Nokia's expert, Mr. Arthur Levin, reviewed all 79 patent declarations for the H.265 standard and all 127 patent declarations for the H.264 standard. *See* Hr'g Tr. (Levin) at 1581:4-1583:16; CDX-0013.26-27 (summarizing the declarations). For both standards a solid majority of declarations were filed after the standard was adopted, and a significant minority did not list any patents at all. *See* CDX-0013.26-27. This suggests that JVT participants did not understand the disclosure requirements as imposing a duty to identify specific patents. And, of course, a patent holder cannot identify a

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specific patent on a disclosure form unless at least the patent's application has been filed, so JVT participants understandably did not view the disclosure requirements as necessarily imposing a duty to disclose prior to adoption of the H.264 standard.

On the whole, then, the strict holding of *Qualcomm* is distinguishable on its facts, and as relevant here the duty of disclosure could be satisfied by the filing of a disclosure form, in good faith and on a best effort basis, indicating a willingness to license pertinent patents on RAND terms. Given that standard, Amazon's argument that Nokia "undertook no effort to disclose the Asserted Patents" is completely meritless. RRB at 99. As noted, all five Asserted Patents were specifically cited (as patents or as applications) in patent declarations, and Nokia filed a "General Patent Statement and Licensing Declaration" with the ITU in June 2001, a "Patent Statement and Licensing Declaration" specific to the H.264 standard in October 2002, before the standard was adopted, and another "Patent Statement and Licensing Declaration" specific to the H.265 standard in June 2013, two months after the standard was adopted. *See* JX-0500; JX-0503; CX-1846. Every declaration which indicated Nokia had relevant patents or applications also indicated a willingness to license them on RAND terms. *See* JX-0500; JX-0503; CX-1846; JX-1129; RX-0082. Amazon does not dispute any of this. *See* RRB at 99.

Amazon also argues that Nokia did not engage in "best effort[s]" to file its licensing declarations, but its evidence is weak. RIB at 208; RRB at 99. Nokia filed one particular ITU disclosure for the H.265 standard two months after the standard was approved, and in that disclosure it identified about 200 patents and applications. *See* RIB at 214 (citing JX-1010). However, it had previously filed declarations regarding the subject matter of what became the 267 patent and the 714 patent, both of which indicated a willingness to license on RAND terms and both of which were filed over a year before the H.265 standard was adopted. *See* JX-0456; JX-

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0458. The application that ultimately issued as the 818 patent admittedly was filed after the associated JVT technical disclosure and before the H.264 standard was adopted, so the disclosure to JVT did not identify any pertinent patents. *See* 818 patent; JX-0475. Nonetheless, this appears to be the only relevant disclosure that did not indicate a willingness to license on RAND terms, about six months after the JVT disclosure Nokia filed its July 2001 disclosure indicating a willingness to license all pertinent patents on RAND terms, which encompassed the 818 patent even if it did not specifically identify it, and it filed a disclosure specifically identifying the 818 patent in October 2010, before the H.265 standard was adopted. *See* CX-1846; JX-0503. Amazon otherwise only points to the undisputed timeline of when Nokia's many disclosure forms were filed relative to various benchmarks, with no direct evidence of why Nokia filed them when it did, or how the decisions on when to file them were made. *See* RIB at 207-14. This is insufficient to show a lack of best efforts, so Amazon has not proven a breach of the duty of disclosure that would warrant a finding of either equitable estoppel or implied waiver.

C. Other Defenses

Amazon also asserts waiver and laches. *See* RIB at 214-15, 217-18; RRB at 100, 101. It does not cite any particular legal standard for waiver, however, other than for implied waiver, which is a different doctrine. *See* RIB at 214-15, 217-18. And its factual basis for waiver consists entirely of statements Nokia made in various legal briefs, presumably through counsel, none of which appear to involve the patents in this investigation. *See id*. For laches, which requires proof of unreasonable delay and resulting prejudice, Amazon argues that Nokia delayed suit from [redacted] to 2023. *See id*. at 217-18 (citing *Wanlass v. General Electric Co*., 148 F.3d 1334, 1337 (Fed. Cir. 1998)); RRB at 101. But even the 818 patent only issued in 2010, so Nokia could not have sued on all Asserted Patents in [redacted], and in any event Nokia is still attempting to negotiate a license,

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which excuses any delay. *See Aukerman*, 960 F.2d at 1033 ("negotiations with the accused" can excuse delay). So Amazon has not proven waiver or laches.

Amazon lastly asserts patent misuse and unclean hands. *See* RIB at 218-19; RRB at 101-102. For patent misuse, Amazon's theory appears to mainly be based on Nokia *Id*. at 219. Patent misuse refers to the practice of leveraging the patent right "to derive a benefit not attributable to the use of the patent's teachings," and in the context of tying arrangements involving multi-patent licenses specifically, it requires a showing that the patentee has "market power." *Phillips v. ITC*, 424 F.3d 1179, 1184-86 (Fed. Cir. 2005); *see* 35 U.S.C. § 271(d). Amazon has not even attempted to make such a showing. *See* RIB at 218-19; RRB at 101-02. Proof of unclean hands requires a showing that Nokia has engaged in "particularly egregious conduct which would change the equities significantly in [Amazon's] favor." *Serdarevic v. Advanced Medical Optics, Inc*., 532 F.3d 1352, 1361 (Fed. Cir. 2008) (citation and quotation marks omitted). Amazon's unclean hands defense appears to be based entirely on alleged misconduct (discussed above) that Amazon has failed to substantiate. *See* RIB at 218-19; RRB at 102. So Amazon has not proven patent misuse or unclean hands.

X. DOMESTIC INDUSTRY - ECONOMIC PRONG

In a patent-based complaint, a violation of Section 337 can be found "only if an industry in the United States, relating to the articles protected by the patent ... concerned, exists or is in the process of being established." 19 U.S.C. § 1337(a)(2). Under Commission precedent, this "domestic industry requirement" of Section 337 consists of an economic prong and a technical prong. *Stringed Instruments*, Inv. No. 337-TA-586, Comm'n Op. at 12-14. The complainant bears the burden of establishing that the domestic industry requirement is satisfied. *See Certain Set-Top*

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[redacted]

Boxes and Components Thereof, Inv. No. 337-TA-454, Initial Determination at 294 (June 21, 2002) (not reviewed in relevant part).

The economic prong of the domestic industry requirement is defined in subsection (a)(3) of Section 337 as follows:

> (3) For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark or mask work concerned --
>
> (A) Significant investment in plant and equipment;
>
> (B) Significant employment of labor or capital; or
>
> (C) Substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3). The economic prong of the domestic industry requirement is satisfied by meeting the criteria of any one of the three factors listed above. Importantly, the Commission has clarified that investments in plant and equipment, labor, and capital that may fairly be considered investments in research and development are eligible for consideration under subsections (A) and (B), in addition to subsection (C). *See Certain Solid State Storage Drives, Stacked Electronics Components, and Products Containing Same*, Inv. No. 337-TA-1097, Comm'n Op. at 14 (June 29, 2018).

Nokia contends the economic prong is met under subsections (A) and (B) through the research and development ("R&D") investments of licensed third-parties Microsoft and Samsung. *See* CIB at 208-209. Nokia adds together qualifying expenses for the preceding three years for both the Microsoft DI Products and Samsung DI Products, and further breaks the Microsoft DI Products down into investments directed to the Surface or Xbox product lines. *See id.* at 209-210. The totals easily exceed [redacted]. *Id.* Amazon disputes several aspects of Nokia's theory including whether: the proper patent-practicing articles and articles of commerce

have been considered (RIB at 168-176); the sales-based allocation has sufficient support in the record (*id.* at 176); activities occurring pre-license have been improperly considered (*id.* at 176-177); noncognizable expenses have been included (*id.* at 177-182); and quantitative and qualitative significance has adequately been shown (*id.* at 182-184). The issues of articles and timing are discussed first below, and then an analysis of the proffered investment amounts. For the reasons given, Nokia has satisfied the economic prong.

A. Patent-Practicing Article and Article of Commerce

As noted, Nokia's theory depends upon investments made by Microsoft in support of the Microsoft DI Products, and investments made by Samsung behind the Samsung DI Products. In opposition, Amazon first argues these investments "were not made 'with respect to the articles protected by' the Asserted Patents." RIB at 168 (citing 19 U.S.C. § 1337(a)). Amazon explains that the Surface, Xbox, and Galaxy products are "feature-rich, end-user products" with the actual patent-practicing articles being the chipsets contained inside and utilized for video encoding/decoding; with these chipsets supplied by various non-parties such as Intel, AMD, Qualcomm, etc. *See id.* at 166, 168 (citing Hr'g Tr. (Kia) at 240:16-241:11, 275:3-6, 275:15-28, 347:9-20; Hr'g Tr. (Orchard) at 75:6-76:12; Hr'g Tr. (Moulin) at 439:12-21; Hr'g Tr. (Mody) at 1399:9-23). Amazon argues, "[t]hese chipsets and software are the articles to consider when determining domestic industry investments *unless* Nokia can meet the 'realities of the marketplace' test to extend the domestic industry to downstream products." *Id.* at 169 (emphasis by Amazon). Amazon identifies that test as:

> (1) whether the patent-practicing article is a separate article of commerce; (2) whether the patent-practicing article is essential to the downstream product; and (3) whether the domestic activities have a direct relationship to the exploitation of the patented technology. *Certain Magnetic Tape Cartridges*, Inv. No. 337-TA-1058, Comm'n Op. at 48-50 (Apr. 9, 2019).

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Id. at 169. Amazon contends that, after each factor is considered, Nokia has failed to show the relevant articles are the DI Products and not the chipsets used within.

Amazon's position has some merit. Although Nokia disputes that the patent-practicing article is the chipset as opposed to the whole DI Product, its approach to technical prong domestic industry belies that assertion. Nokia clearly states and commits to an approach where the DI Products meet the limitations of the asserted claims of all Asserted Patents because they have the same "chips" or "Android (OS)" as the Accused Products:

> The DI Products practice the Asserted Patents for the same reasons as discussed for infringement because each of those products contains chips or an Android OS (Samsung) that Complainants' experts confirmed results in the same capabilities as the Accused Products. Tr. (Kia) 240:13-247:20; Tr. (Moulin) 431:4-12, 489:4-18; Tr. (Orchard) at 46:16-21; CDX-5C.86-89C. Dr. Storer did not dispute Complainants' experts' opinions. Tr. (Storer) 1179:4-21.

CIB at 206; *see id.* at 207 ("Dr. Kia specifically reviewed the code for the AMD custom chip for the Xbox products and confirmed it operated the same way as the other AMD code . . . . Dr. Kia reviewed the code identified by Samsung's own website as being on the DI products and confirmed it operated the same way as the other Android code"); *see, e.g.*, Hr'g Tr. (Kia) at 240:23-241:11 (DI Products practice the standards "because they use the same chips" discussed for infringement). This directly contradicts Nokia's subsequent assertion, given in the context of economic prong, that "[w]hile the chipsets and Android OS meet key limitations in the asserted claims, these components themselves do not necessarily practice the patent claims as demonstrated above in the technical sections." *Id.* at 212; *see id.* at 213 ("even assuming, *arguendo*, Respondents are right in restricting the patent-practicing article to a particular sub-component . . ."); CRB at 86 ("Even worse, Respondents never demonstrated other components needed to practice the patents (*e.g.*, memory) are separately available."). So if Nokia's technical prong case is to be accepted, then it is fair to find that actual practice of the asserted claims is done by the chipsets and (in the case of

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Samsung DI Products) Android OS. *See* RRB at 78 ("If Nokia contended that the chipsets and Android OS are not the articles protected by the patent, Nokia's experts would have had to perform an analysis specific to the Domestic Industry Products instead of merely recycling their infringement claims.").[7]

This leads to the three-factor *Magnetic Tapes* test outlined above since Nokia relies on no investments specific to the chipsets as opposed to the entire DI Products themselves. Nokia and Amazon discuss each factor in turn. CIB at 214-220; CRB at 85-90; RIB at 170-176; RRB at 79-83. Ultimately, Nokia fails to meet its burden for all DI Products except the Xbox Microsoft DI Products.

To begin, while the three *Magnetic Tapes* factors are to be considered, the test is ultimately a "realities of the marketplace" one. *See Magnetic Tapes*, Inv. No. 337-TA-1058, Comm'n Op. at 48; *Certain Video Game Systems and Wireless Controllers and Components Thereof*, Inv. No. 337-TA-770, Comm'n Op. at 66-68 (Oct. 28, 2013) ("*Video Game Systems*"). And it is to be invoked when "the patented article is not itself an actual article of commerce, but is physically incorporated as a component in a downstream article of commerce." *Id.* at 66. The Commission instructs, "[i]n such circumstances, the Commission may, depending on the facts of each particular investigation, extend the relevant 'industry' to a downstream article of commerce incorporating the patented component." *Id.* Here, the realities of the marketplace do not support extending "articles protected by the patent" beyond the chipsets in the Surface Microsoft DI Products and Samsung DI Products.

[7] The parties use "chips" and "chipsets" interchangeably.

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[redacted]

1. Surface Products and Galaxy Products

Under the first factor, "whether the patent-practicing article is a separate article of commerce," the chipsets in the Surface and Galaxy DI Products are most decidedly separate articles of commerce.[8] The weight of the evidence shows that Microsoft and Samsung purchase pre-designed and commercially available patent-practicing chipsets from non-parties Intel, AMD, NVIDIA, and Qualcomm. *See, e.g.*, CDX-0005C.87-89 (listing chipset providers); Hr'g Tr. (Herrington) at 568:1-24 (Surface contains no customization); JX-1489C (Herrington) at 371:2-20 (chipsets are purchased by Microsoft and Samsung and may be available for other customers); Hr'g Tr. (Mody) at 1400:19-1401:22 (chipsets are also purchased by Lenovo, HP, Acer, Dell, Asus, etc.). Nokia argues in its initial brief that "certain Surface DI Products" contain custom, non-commercially available chipsets like the Xbox (discussed separately, below). CIB at 217. But Amazon correctly points out this argument was waived for failing to appear in Nokia's pre-hearing brief. RRB at 80, n. 42; *see generally* CPB. In its reply brief, Nokia expands upon that argument, suggesting in several places that all of the DI Product chipsets are custom. In all likelihood, these even broader assertions are also waived.

Even if not waived, however, they are meritless. In one section of its reply brief, Nokia states, "[t]he fact of the matter is the components used in the DI Products are custom and not available for sale separately," and, "[r]egardless, record evidence supports that these custom components are exclusive to the DI Products." CRB at 86-87. But the cited evidence solely concerns the Xbox, which is unique among all DI Products. *See* CRB at 86-87 (citing JX-1489C (Herrington) at 331:16-332:20). Dr. Kia even admitted that the same chipsets in some Surface and Galaxy products are also in the Accused Products:

Q. What are the domestic industry products that you have analyzed for your opinions?

---

[8] Android OS is discussed separately, below.

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A. They are the Microsoft Xbox and the Surface products, and also the Samsung Galaxy Smartphones.

Q. Do they domestic industry products practice the H.264 and H.265 standards?

A. Yes, they do.

Q. How did you confirm that?

A. They utilized the same chipset, the same operating system that we already discussed. And I tested them.

Q. Do the domestic industry products that you have analyzed practice the claims for the same reasons you stated for infringement as to the accused products?

A. Yes, sir, for the same reasons.

Q. Is that because they use the same chips as you just discussed?

A. That's correct.

Hr'g Tr. (Kia) at 240:19-241:11; *see* CRB at 87; *compare* CDX-0005C.69C (listing Intel, AMD, NVIDIA, and Qualcomm in Accused Products) *with* CDX-0005C.87C (listing Intel, AMD, NVIDIA, and Qualcomm in DI Products); RRB at 82 (arguing, for example, the Intel i7-1255U is present in both Surface Laptop 4 and HP Laptop 17t-cn200).

Amazon aptly highlights Nokia's problem: "Indeed, that others use the same chipsets and Android OS is the cornerstone of Nokia's technical case." *Id.* Whatever true support may exist for Nokia's "only available through the DI Products" statement is buried in a long string of citations that, in reality, concern only the Xbox or Android OS. CRB at 88 (citing Hr'g Tr. (Kia) at 245:23-246:25; Hr'g Tr. (Herrington) at 552:18-553:15; Hr'g Tr. (Storer) at 1221:14-1223:11; Hr'g Tr. (Mody) at 1414:5-1423:1; JX-1489C (Herrington) at 331:16-333:10, 356:1-25; JX-1489C (Mody) at 1278:19-25; RX-0955.0017, 20-21; CX-0988; CX-1597; CX-2924C.0007; CX-2157; CX-2158; CX-4648 (irrelevant Xbox product); CX-8725C at 26:18-27:18, 83:21-84:5; CX-

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6214C)). If anything, Nokia's citations to the 2023 10-K statement from AMD show its processors (CPU/GPU)—outside of those developed for the Xbox—are intended to be used with the computer products from a variety of companies. *See* RX-0955.0017-21 (Section entitled "Semi-Custom Products" only mentions gaming consoles for Microsoft, Sony, and Steam).

This immediately puts the Surface and Samsung chipsets at odds with the market realities of *Magnetic Tapes* and *Video Game Systems*. In *Magnetic Tapes*, the Commission found the articles protected by the patent were model no. 3592 tape cartridges, which were of a proprietary format of licensee IBM and, thus, custom to IBM, and could only be used with IBM's equally proprietary 3592 tape drive. *See* Inv. No. 337-TA-1058, Comm'n Op. at 50. In *Video Game Systems*, the exact article protected by the patent was a toy wand "and not the toy wand plus the entire MagiQuest attraction," with those wands being both sold as a standalone item by the complainant in addition to being used in complainant's constructed play spaces. Inv. No. 337-TA-770, Comm'n Op. at 66-67.

Here, the chipsets are not even the products of Microsoft and Samsung, but sold to Microsoft and Samsung by Intel, AMD, NVIDIA, and Qualcomm. Nokia's other cited cases are similarly distinguishable on this ground. *Certain Sleep-Disordered Breathing Treatment Systems and Components Thereof*, Inv. No. 337-TA-890, Initial Determination at 149 (Sep. 16, 2014), *unreviewed*, Comm'n Op. at 45 n. 13 (Jan. 16, 2015) (patent-practicing humidifier and ancillary flow generator both sold by complainant) ("*Breathing Treatment Systems*"); *Certain Personal Computers*, Inv. No. 337-TA-140, Comm'n Op. at 41 (Mar. 9, 1984) (copyrighted software not sold as separate article of commerce, and so economic prong considered entire assembled personal computer). So the first *Magnetic Tapes* factor does not support expanding the domestic industry article beyond the chipsets.

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[redacted]

The facts behind the Android OS are slightly different. There is credible evidence that the Android OS—as it appears in the Samsung DI Products—is the product of collaboration between Samsung and Google and modified internally by Samsung before release. *See, e.g.*, CX-8725C at 26:4-27:18 ([redacted]), 83:21-84:5 ([redacted]); CX-6214C at ¶¶ 9, 18. Nokia relies on this customization work to support finding the OS is not a separate article of commerce (CRB at 87) and Amazon rightfully admits that at least some amount of customization does occur (RIB at 170 n.38). This tends to show that Samsung's version of the software is not a separate article of commerce. Yet, there is also no dispute that Samsung makes its versions of Android OS freely available to the public for download just as Google does. Hr'g Tr. (Kia) at 246:21-25 (referencing opensource.Samsung.com); Hr'g Tr. (Mody) at 1401:8-12. So it is entirely untrue, as Nokia argues, that this patent-practicing code is "not available outside the DI Products." CRB at 87. Moreover, according to Nokia, what modifications Samsung does make are not related to the encoding/decoding techniques of the Asserted Claims. CIB at 207 ("There is No Evidence that Samsung Modifies any Relevant Android Codec [sic] or Makes it Unavailable"). So this first factor is at best neutral towards expanding domestic industry beyond the Android OS. Nokia's additional suggestion that software is, as a matter of law, somehow not an article of commerce (CIB at 214 (citing *Clearcorrect Operating v. Int'l Trade Comm'n*, 810 F.3d 1283 (Fed. Cir. 2015)) is rejected for the reasons stated in Amazon's reply brief (RRB at 79). And if Android OS cannot be an article of commerce, it begs the question as to why it is relevant to the economic prong analysis at all.

The second factor, "whether the patent-practicing article is essential to the downstream product," is neutral. While it is true, as Nokia argues, that the Surface and Galaxy DI Products

cannot function without a chipset (CIB at 219; CRB at 89; *see* RIB at 172), Nokia tacitly, and rightly, acknowledges that the chipsets can be used in other, non-DI Product, devices (CIB at 219 ("It is undisputed that the chipsets of the DI Products cannot function to stream video unless and until they are connected to and integrated into an electronic device *such as* the DI Products.") (emphasis added)). Amazon persuasively analogizes the chipsets to the masks in *Breathing Treatment Systems*, found not to be includable in the domestic industry of humidifiers and flow generators, because the masks "are not designed to be used exclusively with the Domestic Industry Products and are not part of a closed, proprietary system, nor are they the exclusive means to exploit the patented technology." RIB at 173; *see* RRB at 82-83; Inv. No. 337-TA-890, Initial Determination at 150 ("ResMed's masks can be used with other companies' flow generators and humidifiers because they use a standard 22mm connector and tubing."). The same is true for Android OS. The Samsung DI Products cannot function without an operating system, but the operating system is fully available and functional in a variety of non-DI Products. *See generally* RIB at 171-172 (citing Hr'g Tr. (Kia) at 181:20-25 ("Android, which is publicly available, . . .")); RRB at 82 (citing JX-1489C (Mody) at 1223:21-1224:10 ("[Android OS is] open source and it's available to anyone. . . . a lot of products use Android OS")).

Factor three, "whether the domestic activities have a direct relationship to the exploitation of the patented technology," entirely supports limiting the domestic industry to the chipsets and Android OS. As discussed at length above, the technology of the Asserted Patents involves specific techniques to improve a computer's ability to encode and decode video streams. Nokia does not even allege that Microsoft or Samsung perform R&D or other work into this functionality. *See* CIB at 219-220; CRB at 90; RRB at 83. Nor would they. Nokia's theme of the investigation is that these techniques are settled in standards utilized by the industry as a whole. CIB at 1

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("Nokia is a leading telecommunications company that supplies a major portion of the U.S. cellular infrastructure. Nokia has developed critical video coding technologies used in standards implemented across various consumer electronics and have been licensed to many companies with significant and critical domestic operations, including Microsoft and Samsung.").

Accordingly, the *Magnetic Tapes* factors and the reality of the marketplace do not support expanding the cognizable domestic industry to the entire Surface DI Products or Galaxy DI Products. In short, there is an intervening, low-level and separate article of commerce that effects practice of the Asserted Claims of the Asserted Patents. Nokia and Mr. Herrington do not present any investments allocated down to these specific components. Hr'g Tr. (Herrington) at 569:20-570:12. It is not even clear if Intel, AMD, NVIDIA, and Qualcomm are licensed. So these DI Products need not be considered for the remainder of the economic prong analysis.

2. Xbox Products

Under the first factor, the record shows that the chipset inside the Xbox Microsoft DI Products is custom to the Xbox and not by itself a separate article of commerce. These chipsets come exclusively from AMD, and an AMD declaration, produced in response to subpoena, reliably describes

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[redacted]

[redacted]

CX-2924.0007 (excerpted); *see* CIB at 216; *see generally* Order No. 45 at 2-3. Nokia further points to public documentation which corroborates the "custom" designation in the declaration:

Processor	CPU: 8X Cores @ 3.6 GHz (3.4 GHz w/SMT) Custom Zen 2 CPU GPU: 4 TFLOPS, 20 CUs @1.565 GHz Custom RDNA 2 GPU SOC Die Size: 197.05 mm

CX-2157 (Xbox Series S);

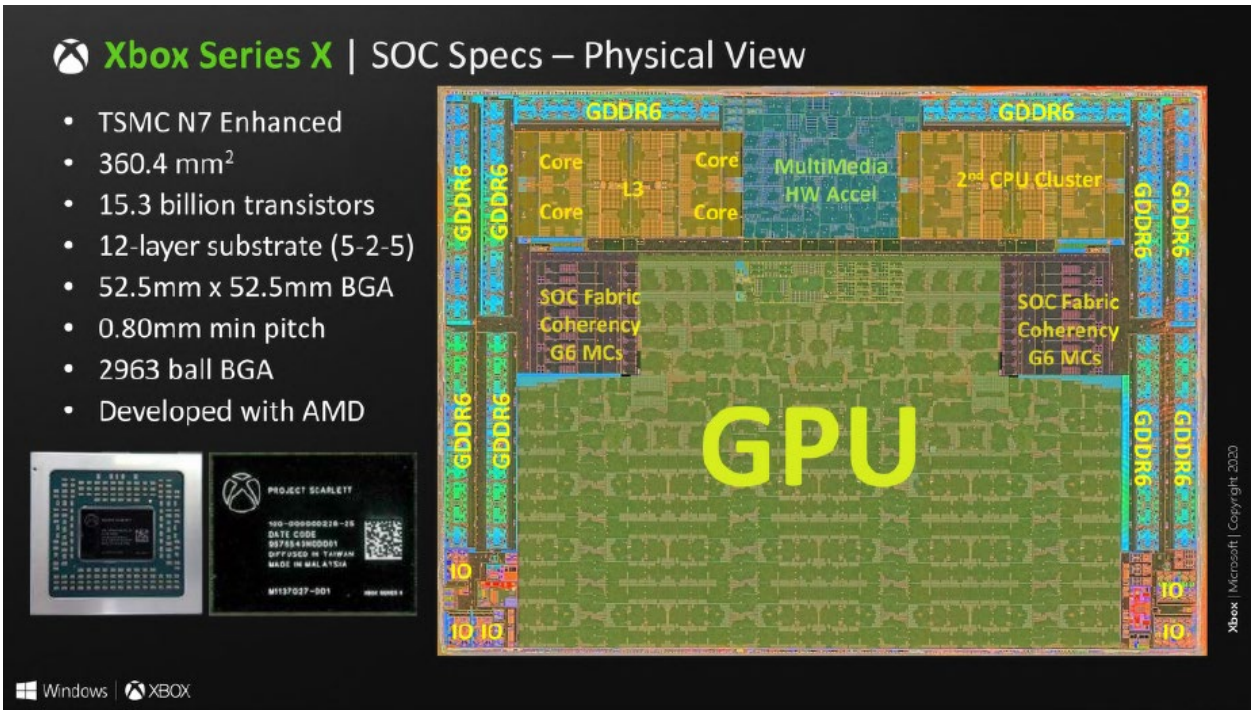
Processor	CPU: 8X Cores @ 3.8 GHz (3.66 GHz w/SMT) Custom Zen 2 CPU GPU: 12 TFLOPS, 52 CUs @1.825 GHz Custom RDNA 2 GPU SOC Die Size: 360.45 mm Process: 7nm Enhanced

CX-2158 (Xbox Series X); *see* CIB at 216. Although not explicit, the obvious implication from "custom" in these entries is that the chipset is customized for (*i.e.*, exclusive to) the Xbox products. Nokia also provides technical presentations which strongly suggest, if not confirm, Microsoft's involvement in the design and development of the AMD chipsets for its gaming consoles, which explains why the chipsets would be custom to the Xbox. *Id.* (citing CX-0988; CX-1597 ("'Xbox

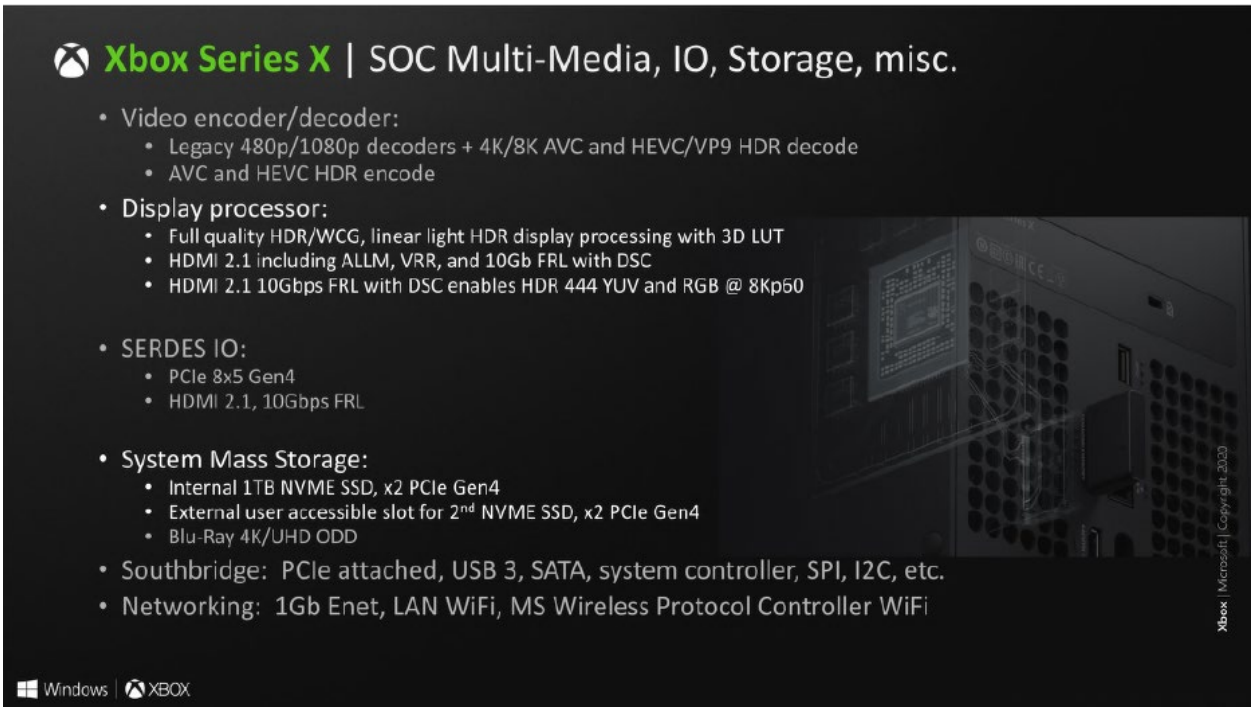
[redacted]

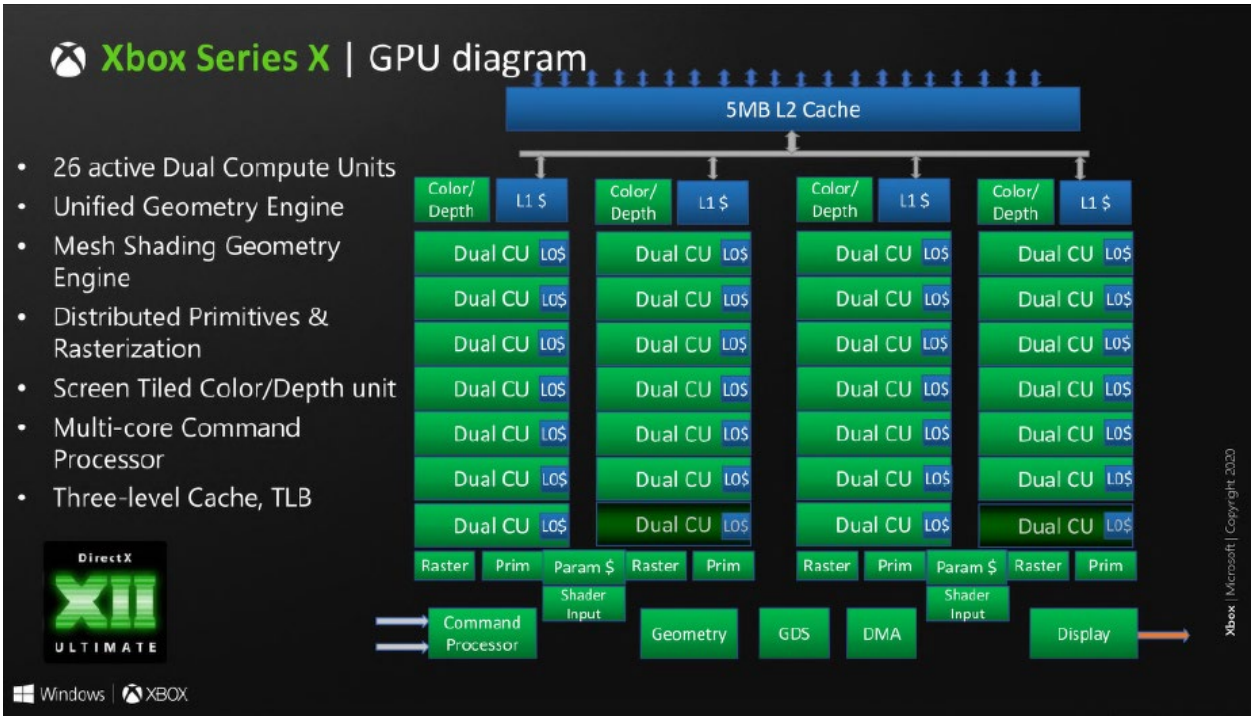
Series X is the biggest generational leap of SOC [System on a Chip] and API design that we've done with Microsoft, and it's really an honor for AMD to be a trusted Microsoft partner for this endeavor.'")).

Amazon acknowledges the Xbox chipset is custom (RIB at 170) but nonetheless complains, "Nokia fails to explain how those chipsets are customized, who customizes them, or whether those chipsets are exclusive to Microsoft" and "the record is devoid of any evidence related to this chipset" (*id.* at 171). These overstatements are not well-taken. The presentations cited by Nokia provide in-depth structural and performance details of the patent-practicing articles:



[redacted]





CX-0988.0003, .0006, .0012. And if they are "custom" to a particular customer (Microsoft), the implication is that they are not sold to other customers—akin to a "have-made" status. Moreover, this same body of evidence contradicts Amazon's assertion that the chipset is "designed,

developed, manufactured, offered for sale, and sold by AMD to Microsoft" (RIB at 171; *see* RRB at 81) because Microsoft was clearly involved in its design and development. Amazon further alludes to the idea that the custom Xbox chipsets are somehow not exclusive to Xbox, but presents no supporting evidence whatsoever. *See, e.g.*, RIB at 171 (challenging exclusive status but no evidence that custom chip is used elsewhere), 173 (same); RRB at 80 (arguing Surface and Galaxy chipsets are sold to other customers, but not Xbox chipsets), 81; *but see id.* at 80 (lumping Xbox chipsets in with Surface and Galaxy chipsets to argue they are all "frequently" sold to other customers, but again with no supporting evidence).

So, overall, the record shows the patent-practicing chipset inside the Xbox Microsoft DI Products is not a separate article of commerce under the first *Magnetic Tapes* factor. As for the second and third factors, there is no assertion that some other sub-component, downstream of the chipset but upstream of the overall Xbox, is an article of commerce. So the first available article of commerce incorporating the patent-practicing chipset is the Xbox Microsoft DI Product itself—exactly as alleged by Nokia. There is no intervening, low-level and separate article of commerce that accomplishes practice of the Asserted Claims of the Asserted Patents. And Microsoft's R&D included designing a custom chipset, so its domestic activities directly relate to the Xbox.

Accordingly, the *Magnetic Tapes* factors and the reality of the marketplace support expanding the cognizable domestic industry to the entire Xbox DI Product.

B. Significant Investment

The Federal Circuit has held that the investment supporting a section 337 domestic industry must be expressed quantitatively. *Lelo*, 786 at 886. Below, Nokia's alleged investments are considered and then a determination on significance is made.

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[redacted]

1. Cognizable Investments

As narrowed to the Xbox Microsoft DI Products, Nokia looks to monetary R&D expenditures made by Microsoft at its Redmond, WA headquarters between FY 2021 to FY 2023. CIB at 222-223. Nokia states that there are about [redacted] employees involved in this hardware-focused work:

> The Xbox devices are gaming consoles that enable people to connect and share online gaming experiences utilizing enhanced video and graphics capabilities. JX-1489C (Herrington) 325:25-326:15; CX-0988; CX-0990; CX-1597; CX-2157; CX-2158. Microsoft has about [redacted] R&D employees within Xbox hardware division, including engineers and designers. CX-8721C (Xbox-Romero) 8:6-20, 13:16-22, 18:17-19:17, 23:22-24:19. Those activities (which cover both pre-launch and post-launch activities) include, among other things, [redacted] along with product and accessory testing. *Id.*; JX-1489C (Herrington) 385:9-15.

Id. As far as records, Nokia explains:

> Microsoft tracks its expenditures, including related to domestic and foreign R&D costs, in the ordinary course of business through its financial database, [redacted] JX-1489C (Herrington) 341:11-17; CX-8717C (Surface-Oberoi) 11:22-17:8, 54:9-55:1; CX-8721C (Xbox-Romero) 11:6-13:22, 15:6-16:14, 20:5-21:9. Microsoft provided documentation of its expenditures for its fiscal years 2021 through 2023 (July 1, 2020, to June 30, 2023) and two witnesses to testify on Microsoft's domestic investments. Tr. (Herrington) 546:20-547:2; CX-4576C; CX-4577C; CX-4832C; CX-4906C; CX-4910C to CX-4913C; CX-5707C; CX-5708C; CX-8717C; CX-8721C. R&D investment numbers reflect the efforts that went into design from conception to product launch and continued support. CX-8717C (Surface-Oberoi) 37:6-12, 56:3-20; CX-8721C (Xbox-Romero) 35:11-37:6.

Id. at 223. Nokia applies revenue-based allocations to Xbox-specific investment figures to arrive at the proper amounts for just the Xbox consoles as opposed to all other Xbox products (previous generations, accessories, etc.). *Id.* at 210 (citing, *inter alia*, JX-1489C (Herrington) at 343:13-345:11, 347:3-348:5, 358:19-360:8; CX-8579C). Based on the table provided, the allocation percentages of the Xbox gaming consoles as compared to all other Xbox products are as follows: [redacted] (2021); [redacted] (2022); [redacted] (2023); and [redacted] (overall). CX-8579C.

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[redacted]

For subsection (A), plant and equipment, the allocations as applied to "Xbox U.S. Plant & Equipment R&D Investments" result in the following cognizable amounts: [redacted] (2021); [redacted] (2022); [redacted] (2023); and [redacted] (overall). CIB at 223 (citing, *inter alia*, JX-1489C (Herrington) at 345:1-11, 347:8-15; CX-8582C).[9] For subsection (B), labor and capital, the allocations as applied to "Xbox U.S. Labor R&D Investments" result in the following amounts: [redacted] (2021); [redacted] (2022); [redacted] (2023); [redacted] (overall). *Id.* at 223-224 (citing, *inter alia*, JX-1489C (Herrington) at 338:3-339:2, 345:12-23; CX-8585C). Nokia has shown these amounts to be reliable and they are considered for significance below. To be clear, these subsection (B) labor amounts do not represent Mr. Herrington's alternate calculation where plant and equipment previously calculated under subsection (A) are considered "capital" under the statute. *See* CX-8585C; RRB at 84-85 ("Such a theory would render subprong (A) superfluous.").

In response, Amazon argues that Nokia's failure to properly show representativeness amongst the DI Products contaminates the sales-based allocation, such that appropriate investments cannot be calculated. *See* RIB at 176. This is of no consequence. For those DI Products found above to practice one or more claims of each asserted patent, they practice because of compliance with the relevant standards—not because they are deemed represented by or representative of other DI Products. Moreover, the sales- or revenue-based allocation employed by Nokia for the Xbox Microsoft DI Products is not used to separate Xbox from other products.

[9] Exhibit CX-8582C itself cites to bates numbered documents MSFT_NOKIA_ITC_0000569 and MSFT_NOKIA_ITC_0000222. CX-8582C. According to Nokia's exhibit list, each of these documents correspond to *two* exhibits: CX-4912C and CX-5707C for the former; CX-4911C and CX-4572C for the latter. None of these documents appear to have FY 2021 data in them. But because Amazon makes no issue, and it is unlikely Mr. Herrington pulled his FY 2021 data from thin air, the data is accepted as reliable for the purposes of this initial determination.

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[redacted]

It is used to separate Xbox console activity from other Xbox product activity (older generations, accessories, etc.). CX-8579C.

Amazon further contends, "Nokia includes noncognizable expenses, overstating its domestic industry investments." RIB at 177. For the Xbox, specifically, Amazon states the activities relate to both pre- and post-launch product timeframes, but Amazon provides no caselaw demonstrating why this is a meaningful distinction. *Id.* at 178; RRB at 84. Amazon also refers to its expert, Dr. Nisha Mody, who testified that at least some of the Xbox activities relate to products Nokia does not claim to be DI Products. RIB at 178 (citing JX-1489C (Mody) at 1231:15-19). Dr. Mody's testimony does not support the point, however. JX-1489C (Mody) at 1231:15-19.

Turning to the plant and equipment investments of Microsoft, Amazon complains, "Mr. Herrington did not receive, nor did he request, information as to [redacted] relates to the alleged Microsoft Domestic Industry Products." RIB at 179 (citing JX-1489C (Herrington) at 388:22-389:10; JX-1489C (Mody) at 1233:17-1234:2). Amazon reasons, "[a]ccordingly, Nokia overstates the alleged plant and equipment investments." *Id.* Amazon's conclusion (investments are overstated) does not logically follow from its premise (lack of information). A lack of information could equally mean Nokia has understated the investment amount. Nevertheless, the standard is a preponderance of the evidence, and Nokia argues the "[redacted] were properly included based on certified business records." CRB at 92 (citing JX-1489C (Herrington) at 358:2-360:8 (Samsung)); *see* JX-1489C (Herrington) at 340:7-341:17 (Microsoft).

For labor and capital, and particular to Microsoft, Amazon argues "[t]he 'people' category Mr. Herrington relies upon for labor investments included [redacted]" RIB at 180. Amazon continues:

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[redacted]

> Yet he never established that [redacted] qualify as cognizable investments and had no information related to these expenses. 1379 Tr. (Mody) 1233:17-1234:7. The [redacted] relate to plant and equipment, not labor and capital. *Id.* 1233:4-12. As Dr. Mody testified, given that the [redacted] Id. 1234:10-1235:6; RX-0986; RDX-0013C.20. [redacted] are counter to the purpose of the Commission and should be excluded. 1379 Tr. (Mody) 1234:10-1235:6.

Id. at 180. These points are not persuasive. The overall cost of employing a person (through salary, benefits, amenities, etc.) fits an ordinary meaning of "labor" cost, and Section 337 does not require a precise accounting. *Stringed Instruments*, Inv. No. 337-TA-586, Comm'n Op. at 26. Amazon supplies no contrary authority on this matter, Microsoft's labor cost records are narrowly tailored to just Xbox-related work, and it is unlikely that backing out [redacted] expenses from those labor costs would change the significance analysis. *See* CX-8721C at 20:5-15. Further, neither Amazon nor Dr. Mody provide any explanation for why [redacted] are problematic, why they are not properly included in Microsoft's payroll expenses, what difference they would have made, or why they are "counter to the purpose of the Commission and should be excluded." RIB at 180 (citing JX-1489C (Mody) at 1234:10-1235:6).

2. Significance

With the reliable investments determined above, the issue becomes whether they are quantitatively "significant" under the statute. For subsection (A), Nokia addresses all of the Microsoft DI Products together, but the underlying data from Mr. Herrington provides Xbox-specific calculations. *See* CIB at 225 (citing, *inter alia*, CX-8588C; CX-8591C; CX-8594C; CX-8597C; Hr'g Tr. (Herrington) at 548:16-550:4). With this data, Nokia argues:

> Domestic P&E investments represent [redacted] of the total worldwide P&E R&D spend for the relevant super divisions allocated to the Microsoft DI Products (and [redacted] of all super divisions). CX-5529C to CX-5540C, CX-8587C to CX-8598C (Microsoft P&E Significance). And qualifying domestic P&E R&D investments

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> constitute [redacted] of Microsoft's total domestic P&E R&D investments across the relevant super divisions (and [redacted] of all super divisions).

Id. If only Xbox hardware is considered (*i.e.*, the "relevant super divisions"), [redacted] in combined cognizable domestic investment represents [redacted] of the same, worldwide investment. CX-8594C. When considered alongside the absolute amount of [redacted], there is no doubt that there is a significant value add in the form of plant and equipment to the Xbox Microsoft DI Products.

For subsection (B), Nokia again addresses all of the Microsoft DI Products together, but the underlying data from Mr. Herrington provides Xbox-specific calculations. *See* CIB at 225 (citing, *inter alia*, CX-8600C; CX-8603C; CX-8606C; CX-8609C; Hr'g Tr. (Herrington) at 548:16-550:4). With this data, Nokia argues:

> Microsoft's domestic labor R&D investments in Microsoft DI Products are a significant portion of all R&D efforts in all Surface and Xbox devices (domestically and worldwide), constituting [redacted] of Microsoft's total domestic R&D labor expenditures for relevant super divisions (and [redacted] of all super divisions). CX-5541C to CX-5552C, CX-8599C to CX-8610C (Microsoft Labor Significance). Microsoft's investments also make up [redacted] of total worldwide labor R&D spend in relevant super divisions (and [redacted] of all super divisions). *Id.*

Id. If only Xbox hardware is considered (*i.e.*, the "relevant super divisions"), [redacted] in combined cognizable domestic investment represents [redacted] of the same, worldwide investment. CX-8606C. When considered alongside the absolute amount of [redacted], there is no doubt that there is a significant value add in the form of labor to the Xbox Microsoft DI Products.

Amazon argues this approach is flawed in that it is "premised on a narrow definition of R&D" in that it relates only to hardware and not all aspects of R&D supporting the products. *See* RIB at 183; *see* RRB at 85. Amazon asserts, "[b]y focusing on one segment and ignoring other activities related to development, manufacture, and sale of the products, Nokia fails to provide the necessary context, such as overall investments, to provide a reliable analysis of significance." RIB

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at 183 (citing, *inter alia*, RX-1979C (Romero) at 22:15-19, 31:21-32:5, 39:11-20; JX-1489C (Herrington) at 385:5-8). But the Commission has found economic prong satisfied under Subsection (B) with only a showing of R&D labor expenses.[10] *See Certain Compact Wallets and Components Thereof*, Inv. No. 337-TA-1355, Comm'n Op. at 16-21 (Aug. 13, 2024) ("*Compact Wallets*"); *see also Certain Semiconductor Devices and Methods of Manufacturing Same and Products Containing the Same*, Inv. No. 337-TA-1366, Initial Determination at 120-30 (July 5, 2024), *aff'd in pertinent part*, Comm'n Op. at 29 (Nov. 8, 2024).

Accordingly, Nokia has shown economic prong domestic industry under subsections (A) and (B) for all Asserted Patents that are practiced by the Xbox Microsoft DI Products.

XI. CONCLUSIONS OF LAW

1. Nokia has proven infringement of claims 6, 8, 9, and 15 of U.S. Patent No. 7,724,818.

2. Nokia has proven infringement of claims 8 and 10 of U.S. Patent No. 8,050,321.

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[10] A "full picture of all expenses" is certainly the best practice, however, and even though Nokia does not discuss it, certain record evidence provides a fuller picture. *See, e.g.*, *Certain Compact Wallets and Components Thereof*, Inv. No. 337-TA-1355, Comm'n Op. at 21, n.11 (Aug. 13, 2024) (perspective of Commissioner Kearns seeking "full picture of all expenses"); Order No. 2 at G.R. 5.2 (seeking "All investments" made in support of the identified articles). For instance, Mr. Herrington's data allows for additional R&D [redacted] beyond hardware to be considered, and when considered, they do not appear to affect the value-add percentage at all. *Compare* CX-8594C (Xbox, worldwide, Hardware Super Division) *with* CX-8597C (Xbox, worldwide, all Super Divisions); *see* CX-4911C; CX-4912C. And Microsoft's 2023 Form 10-K allows for a rough calculation of domestic-to-foreign value-add. The document shows that Microsoft's three-year revenue and three-year cost of that revenue for products (as opposed to services) was $208 billion and $55 billion, respectively. CX-0061.0059. That results in a 26% cost-revenue ratio. If that ratio is applied to Xbox console revenues over the same time period [redacted] (CX-8579C)), it produces an approximate [redacted] cost for that revenue. If this revenue cost is assumed to be entirely foreign labor (which is unlikely but provides a conservative value-add estimation), then the domestic R&D labor constitutes [redacted] of worldwide labor in support of the Xbox Microsoft DI Products. While this does not represent a dispositively significant value-add on its own, when combined with the absolute amount of [redacted], quantitative significance still exists. So although Nokia does not squarely address Amazon's complaint, there is record evidence to refute it.

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3. Nokia has not proven infringement of any claim of U.S. Patent No. 8,077,991.

4. Nokia has proven infringement of claim 23 but not claim 15 of U.S. Patent No. 10,536,714.

5. Nokia has proven infringement of claims 7-9 and 25-27 of U.S. Patent No. 11,805,267.

6. Amazon has not proven the invalidity of any claim of U.S. Patent No. 7,724,818.

7. Amazon has not proven the invalidity of any claim of U.S. Patent No. 8,050,321.

8. Amazon has proven the invalidity of claims 22 and 31 but not claims 29 or 38 of U.S. Patent No. 8,077,991.

9. Amazon has not proven the invalidity of any claim of U.S. Patent No. 10,536,714.

10. Amazon has proven the invalidity of claims 7, 25, and 26 of U.S. Patent No. 11,805,267 but not claims 8, 9, or 27.

11. Nokia has proven the existence of articles protected by claims 6, 8, 9, and 15 of U.S. Patent No. 7,724,818.

12. Nokia has proven the existence of articles protected by claims 8 and 10 of U.S. Patent No. 8,050,321.

13. Nokia has not proven the existence of articles protected by any claim of U.S. Patent No. 8,077,991.

14. Nokia has proven the existence of articles protected by claim 23 but not claim 15 of U.S. Patent No. 10,536,714.

15. Nokia has proven the existence of articles protected by claims 7-9 and 25-27 of U.S. Patent No. 11,805,267, except that claims 7, 25, and 26 are invalid.

16. Nokia has proven the existence of an economic domestic industry as required by 19 U.S.C. § 1337(a)(2) for U.S. Patent Nos. 7,724,818, 8,050,321, 8,077,991, 10,536,714, and 11,805,267.

17. There is a violation of section 337 with respect to U.S. Patent No. 7,724,818.

18. There is a violation of section 337 with respect to U.S. Patent No. 8,050,321.

19. There is no violation of section 337 with respect to U.S. Patent No. 8,077,991.

20. There is a violation of section 337 with respect to U.S. Patent No. 10,536,714.

21. There is a violation of section 337 with respect to U.S. Patent No. 11,805,267.

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XII. RECOMMENDED DETERMINATION ON REMEDY AND BOND

The Commission's Rules provide that subsequent to an initial determination on the question of violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, the administrative law judge shall issue a recommended determination concerning the appropriate remedy in the event that the Commission finds a violation of section 337, and the amount of bond to be posted by respondent during Presidential review of the Commission action under section 337(j). *See* 19 C.F.R. § 210.42(a)(1)(ii).

The Commission has broad discretion in selecting the form, scope, and extent of the remedy in a section 337 proceeding. *Viscofan, S.A. v. Int'l Trade Comm'n*, 787 F.2d 544, 548 (Fed. Cir. 1986). Under Section 337(d)(1), if the Commission determines as a result of an investigation that there is a violation of section 337, the Commission is authorized to enter either a limited or a general exclusion order. 19 U.S.C. § 1337(d)(1). A limited exclusion order instructs the U.S. Customs and Border Protection ("CBP") to exclude from entry all articles that are covered by the patent at issue and that originate from a named respondent in the investigation. A general exclusion order instructs the CBP to exclude from entry all articles that are covered by the patent at issue, without regard to source. *Certain Purple Protective Gloves*, Inv. No. 337-TA-500, Comm'n Op. at 5 (Dec. 22, 2004). Under section 337(f)(1), the Commission may issue a cease and desist order in addition to, or instead of, an exclusion order. 19 U.S.C. § 1337(f)(1). The Commission generally issues a cease and desist order directed to a domestic respondent when there is a "commercially significant" amount of infringing, imported product in the United States that could be sold, thereby undercutting the remedy provided by an exclusion order. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, USITC Pub. 2391, Comm'n Op. on Remedy, the Public Interest and Bonding at 37-42 (June 1991); *Certain Condensers, Parts Thereof*

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and Prods. Containing Same, Including Air Conditioners for Automobiles, Inv. No. 337-TA-334 (Remand), Comm'n Op. at 26-28 (Sept. 10, 1997).

Additionally, during the 60-day period of Presidential review under 19 U.S.C. § 1337(j), "articles directed to be excluded from entry under subsection (d) . . . shall . . . be entitled to entry under bond prescribed by the Secretary in an amount determined by the Commission to be sufficient to protect the complainant from any injury." *See* 19 U.S.C. § 1337(j)(3). "The Commission typically sets the bond based on the price differential between the imported infringing product and the domestic industry article or based on a reasonable royalty. However, where the available pricing or royalty information is inadequate, the bond may be set at one hundred (100) percent of the entered value of the infringing product." *Certain Industrial Automation Systems and Components Thereof Including Control Systems, Controllers, Visualization Hardware, Motion and Motor Control Systems, Networking Equipment, Safety Devices, and Power Supplies*, Inv. No. 337-TA-1074, Comm'n Op. at 13 (Apr. 23, 2019) ("*Automation Systems*") (public version) (citation omitted).

A. The Public Interest

By statute, the Commission must consider the effect of four statutory public interest factors in determining the appropriate remedy. *See* 19 U.S.C. § 1337(d), (f). These considerations are the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers. *Id.* The Commission directed that the presiding administrative law judge in this Investigation "take evidence . . . and hear arguments" on these factors. *See* 88 Fed. Reg. 84831 (Dec. 6, 2023).

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The public health and welfare factor focuses on the nature of the infringing articles, namely, whether they are "necessary for some important health or welfare need." *See Spansion, Inc. v. ITC*, 629 F.3d 1331, 1360 (Fed. Cir. 2010). The Accused Products are computerized devices that are used in health applications, telemedicine, hospitals, senior living centers, and various other clinical settings (among many other contexts), and that have vision, hearing, and speech accessibility features (among many other features and applications). *See* RIB at 227-28. As Staff established, however, the Accused Products are not themselves medical devices or even specialized for use in health-related contexts, and some of the relevant applications can be downloaded for use by any Android device. *See* JX-1489C (Hayden) at 1109:9-1111:11; SIB at 14. Amazon otherwise argues that the "employment and economic growth" that it provides to the United States through its own employees and activities can be considered in the public health and welfare analysis. *See* RIB at 223-27 ("[Amazon] employs nearly one million Americans, making it the largest job creator and the second largest private employer in the U.S."). Amazon cites no authority for this proposition other than a single Initial Determination, and the Commission has seemingly never "denied an exclusion order based on the type of economic concerns raised by Respondents as a public health and welfare concern." SIB at 13; *see* RIB at 223. Therefore, Amazon's arguments on employment and economic growth are inapplicable to this public interest factor, and Staff is correct that there is no evidence that a remedial order would adversely affect the public health and welfare. *See* SIB at 14.

The competitive conditions factor focuses on "reasonable substitutes for the devices subject to the exclusion order." *Certain Electronic Digital Media Devices and Components Thereof*, Inv. No. 337-TA-796, Comm'n Op. at 120 (Sep. 6, 2013). For this factor, Amazon argues that "Nokia engages in patent hold-up as an NPE." RIB at 228. In addition to being unsubstantiated as to

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Nokia's conduct with Amazon, as explained above, there is no evidence of such conduct with any entity beyond Amazon. Amazon also argues that "alternative products" are unavailable. RIB at 222; *see* RRB at 106-09. In support of this point it cites to its expert, Dr. Nisha Mody, who mainly critiqued the opinion of Nokia's own expert but also affirmatively opined that reasonable substitutes are unavailable for Amazon tablets, Echo smart home displays, and Amazon streaming media devices. *See* RIB at 222-23; RRB at 106-09; *see generally* JX-1489C (Mody) at 1240:5-1255:16; Hr'g Tr. (Mody) at 1406:18-1408:10. But she admitted that there are "five or six" providers in the "consumer electronics market" that compete with Amazon. JX-1489C (Mody) at 1266:12-19. And her opinion primarily focused on product price differences, rather than a more holistic consideration of whether a competing product is a reasonable substitute for an Accused Product. *E.g.*, Hr'g Tr. (Mody) at 1408:4-10 ("all" of the Accused Products are "value-priced products").

Nokia's expert, Mr. Bijan Dastmalchi, similarly did not provide a holistic analysis of whether any potential substitutes are reasonable. *See generally* JX-1489C (Dastmalchi) at 934:2-957:6. But he did offer three pertinent opinions: (1) Amazon shares suppliers with other companies that sell their branded consumer electronics products to end users, so that "supply [of components] can be diverted for manufacture of products for another" brand name company as needed; (2) Amazon's market share of tablets and streaming devices is 15% and 13%, respectively (although there is documentary evidence that its tablet market share is only 9%); and (3) in each of these product categories competitors have multiple months' inventory available to fill any gap created by an exclusion order. *Id.* at 936:14-937:3, 945:1-948:10; *see* CX-0420. On balance, Staff is correct that the evidence of "suitable alternatives" to Amazon's products is enough to conclude that competitive conditions would not be significantly affected by a remedial order. SIB at 15.

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The "production of like or directly competitive articles" factor does not weigh against a remedial order here because no party has presented "any evidence that any competitive articles are produced in the United States." *Certain Electronic Devices, Including Streaming Players, Televisions, Set Top Boxes, Remote Controllers, and Components Thereof*, Inv. No. 337-TA-1200, Comm'n Op. at 40 (Nov. 10, 2021); *see* RIB at 229; CIB at 271; SIB at 16-18. Amazon argues that its domestic investments, particularly in applications used in the "Alexa ecosystem," may drop as a result of an exclusion order, but this point is not clearly relevant to the "competitive articles" factor. RIB at 229.

The harm to U.S. consumers factor is a seemingly broad-ranging consideration, and Amazon accordingly makes several points: (1) its products have "important uses and unique features"; (2) U.S. demand for the Accused Products cannot be met; (3) shortages in the relevant product markets would result from an exclusion order; (4) related products and interconnected services would be affected; and (5) the Accused Products all have warranties, which could not be satisfied. *See* RIB at 229. As to the first point, Amazon apparently cannot make up its mind about how to characterize its products—its posthearing reply brief calls them "premium" products, while its expert called them "value-priced"—but in any event Amazon's cited evidence does not show that those products have "important uses and unique features." RRB at 105; Hr'g Tr. (Mody) at 1408:4-10; *see* RIB at 222, 229. As to the second and third points, Amazon's market share in each product category is not enough to conclude that demand in those categories cannot be met, or that shortages would occur. *See* JX-1489C (Dastmalchi) at 936:14-937:3. As to the fourth point, Amazon cites no evidence at all. *See* RIB at 229. So except for the fifth point, which is addressed below, there is insufficient evidence of potential harm to U.S. consumers to weigh against a remedial order.

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Amazon also advances miscellaneous arguments regarding the public interest, most of which are not clearly material to one of the statutory factors and none of which are meritorious. *See* RIB at 219-22, 230-37. It argues that some public interest factors are "overriding considerations," but cites only legislative history for that proposition, and also that Section 337 exists to protect U.S. industry, which is both true and unhelpful. RIB at 219-20. It argues that Nokia "would receive no benefit from an exclusion order," but ignores the benefit arising simply from vindication of its patent rights. *Id*. at 220-21. It argues that an exclusion order "would prevent importation of thousands of downstream products," but the evidence it cites for that proposition does not support it. *Id*. at 221-22 (citing JX-1489C (Mody) at 1240:18-23; Hr'g Tr. (Mody) at 1406:18-1407:3).

Lastly, Amazon argues at length that an exclusion order is against the public interest because it would exclude articles practicing standard essential patents. RIB at 230-37; RRB at 102-105. There have been cases where a proven breach of a RAND obligation has been a consideration in evaluating the public interest. *See Certain Memory Modules and Components Thereof, and Products Containing Same*, Inv. No. 337-TA-1023, Initial Determination at 181 (Nov. 14, 2017), *not reviewed in pertinent part*, Notice (Jan. 16, 2018); *Certain Memory Modules and Components Thereof*, Inv. No. 337-TA-1089, Initial Determination at 172-73 (Apr. 4, 2019), *not reviewed in pertinent part*, Comm'n Op. at 25-29 (Apr. 21, 2020). But Amazon has not shown that Nokia violated its RAND obligations, and in any case Section 337 does not expressly prohibit exclusionary relief merely because standard essential patents are asserted. *Certain UMTS and LTE Cellular Communication Modules and Products Containing the Same*, Inv. No. 337-TA-1240, Recommended Determination at 19-20 (Apr. 15, 2022). Apparently recognizing the lack of

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caselaw supporting its position, Amazon cites various non-authoritative sources, which have been considered but are unpersuasive. RIB at 230-37.

Accordingly, it is my recommended determination that issuance of a remedial order in this investigation would not be contrary to the public interest.

B. Limited Exclusion Order

Nokia seeks a limited exclusion order, which Staff supports. *See* CIB at 276-78; SIB at 35. As noted, the public interest factors do not weigh against such relief, and Amazon otherwise presents only two arguments meriting discussion. First, it argues for a certification provision and for a carve-out encompassing "warranties that cover service, repair, and/or replacement." RIB at 239. Staff supports both, and Nokia does not expressly oppose either. *See* SIB at 36; CIB at 276-78; CRB at 115-17. The certification provision is a "general practice" with Commission exclusion orders, and there is considerable evidence of Amazon warranties in the record. *Certain Plant-Derived Serum Albumins ("rHSA") and Products Containing the Same*, Inv. No. 337-TA-1238, Comm'n Op. at 62-63 (October 11, 2022); *e.g.*, RX-2240; *see* SIB at 36 (collecting warranty evidence). Second, Amazon argues for a delay to allow for resolution of related court proceedings and/or to permit development of redesigned products. *See* RIB at 240. Except as noted above in connection with litigation involving the setting of license terms, though, it offers no authority for such a delay on either ground. *See id.*; RRB at 109. For its part, Nokia argues that a limited exclusion order should include "any imported components of the Accused Products," but it cites no authority for such breadth and otherwise fails to justify such an order. CIB at 277. Therefore, it is recommended that a limited exclusion order should issue, and that it should include the Commission's standard certification provision and should allow an exception for service, repair, and replacement.

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[redacted]

C. Cease and Desist Order

Complainants bear the burden to prove cease and desist orders are warranted. *Certain Microfluidic Devices*, Inv. No. 337-TA-1068, Comm'n Op. at 23 (Jan. 10, 2020). Such orders "are generally issued when, with respect to the imported infringing products, respondents maintain commercially significant inventories in the United States or have significant domestic operations that could undercut the remedy provided by an exclusion order." *Id.* at 22-23 (citations omitted). Amazon employs over one million people in the U.S. and its capital investments are "huge," so it has significant domestic operations. JX-1489C (Hayden) at 993:1-25. Its stockpile of Accused Products is also huge, at [redacted] units, which equates to over two months' worth of inventory. *See* Hr'g Tr. (Herrington) at 560:5-561:22. Amazon criticizes the methodology of Nokia's expert on this point, but Amazon's domestic inventory is unquestionably commercially significant. *See* RIB at 238; CX-5583C. Nokia seeks a cease and desist order (*see* CIB at 278, 279), Staff supports one (*see* SIB at 39-40), and the evidence shows it is warranted. Therefore, it is recommended that a cease and desist order should issue against Amazon if a violation is found.

D. Bond

"The complainant bears the burden of establishing the need for a bond" during the Presidential Review period. *See Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Inv. No. 337-TA-1057, Comm'n Op. at 68 (Feb. 1, 2019). Nokia makes only the barest effort to justify a bond, and both Amazon and Staff persuasively oppose one. *See* CIB at 281; CRB at 117; RIB at 240-41 ("Nokia failed to justify its proposed reasonable royalty of [redacted] . . . [which] is based on Nokia's *entire* portfolio"); SIB at 40-42 (making same distinction). Nokia has not carried its burden, so it is recommended that a bond of zero percent be imposed.

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XIII. INITIAL DETERMINATION AND ORDER

Based on the foregoing,[11] it is my Initial Determination that there is a violation of Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain integrated circuits, components thereof, and products containing the same in connection with the asserted claims of U.S. Patent Nos. 7,724,818, 8,050,321, 10,536,714, and 11,805,267. There is no violation in connection with U.S. Patent No. 8,077,991.

The undersigned hereby certifies to the Commission this Initial Determination, together with the Record of the hearing in this investigation consisting of the following: the transcript of the evidentiary hearing, with appropriate corrections as may hereafter be ordered; and the exhibits accepted into evidence in this investigation.[12]

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission sixty (60) days after the date of service of the Initial Determination, unless a party files a petition for review of the Initial Determination within twelve (12) days after service of the Initial Determination pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion, a review of the Initial Determination or certain issues therein. Any issue or argument not raised in a petition for review, or response thereto, will be deemed to have been abandoned and may be disregarded by the Commission in reviewing the Initial Determination pursuant to 19 C.F.R. § 210.43(b) and (c).

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[11] The failure to discuss any matter raised by the parties or any portion of the Record herein does not indicate that said matter was not considered. Rather, any such matter(s) or portion(s) of the Record has/have been determined to be irrelevant, immaterial or meritless. Arguments made on brief which were otherwise unsupported by Record evidence or legal precedent have been accorded no weight.

[12] The pleadings of the parties filed with the Secretary need not be certified as they are already in the Commission's possession in accordance with Commission rules.

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Confidentiality Notice:

This Initial Determination is being issued as confidential, and a public version will be issued pursuant to Commission Rule 210.5(f). Within seven (7) days of the date of this Initial Determination, the parties shall jointly submit: (1) a proposed public version of this opinion with any proposed redactions bracketed in red; and (2) a written justification for any proposed redactions specifically explaining why the piece of information sought to be redacted is confidential and why disclosure of the information would be likely to cause substantial harm or likely to have the effect of impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions.[13]

SO ORDERED.

Cameron Elliot
Administrative Law Judge

[13] Under Commission Rules 210.5 and 201.6(a), confidential business information includes: information which concerns or relates to the trade secrets, processes, operations, style of works, or apparatus, or to the production, sales, shipments, purchases, transfers, identification of customers, inventories, or amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or other organization, or other information of commercial value, the disclosure of which is likely to have the effect of either impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions, or causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained, unless the Commission is required by law to disclose such information. *See* 19 C.F.R. § 201.6(a). Thus, to constitute confidential business information the disclosure of the information sought to be designated confidential must likely have the effect of either: (1) impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions; or (2) causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained.

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