UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM SERVICES LLC,
Petitioner

v.

INTERDIGITAL VC HOLDINGS, INC.,
Patent Owner

Case IPR2026-00192
U.S. Patent No. 12,143,606

PATENT OWNER PRELIMINARY RESPONSE
UNDER 37 C.F.R. § 42.107(a)

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

PATENT OWNER'S UPDATED EXHIBIT LIST

Exhibit No.	Description
2001	Complaint, *InterDigital, Inc. v. Amazon.com Services LLC*, Case No. 2:25-cv-00822 (EDVA Dec. 18, 2025)
2002	"Licensing at InterDigital," *InterDigital*, available at https://www.interdigital.com/licensing (last accessed Feb. 20, 2026)
2003	Declaration of Ryan Pohlman (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL)
2004	"InterDigital renews license agreement with Sony," *InterDigital*, available at https://ir.interdigital.com/news-events/press-releases/news-details/2026/InterDigital-renews-license-agreement-with-Sony/default.aspx (last accessed Mar. 3, 2026)
2005	"InterDigital signs license agreement with HP," *InterDigital*, available at https://ir.interdigital.com/news-events/press-releases/news-details/2025/InterDigital-signs-license-agreement-with-HP/default.aspx (last accessed Mar. 3, 2026)
2006	"InterDigital enforces patents against Amazon," *InterDigital*, available at https://ir.interdigital.com/news-events/press-releases/news-details/2025/InterDigital-enforces-patents-against-Amazon/default.aspx (last accessed Mar. 3, 2026)
2007	"2025: InterDigital's Year In Review," *InterDigital*, available at https://www.interdigital.com/post/2025-interdigitals-year-in-review (last accessed Mar. 3, 2026)
2008	Docket Entries, *InterDigital, Inc. v. Amazon.com Services LLC*, Case No. 2:25-cv-00822 (EDVA)
2009	Time to Trial Statistics
2010	U.S. Publication No. 2007/0121728 to Wang et al.

Exhibit No.	Description
2011	Espace Search Result - US Publication No. 2008/170615 A1 (Sekiguchi)
2012	File History of U.S. Application No. 13/389,872
2013	Guidance on USPTO's rescission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation" (March 24, 2025), available at https://www.uspto.gov/sites/default/files/documents/guidance_memo_on_interim_procedure_recission_20250324.pdf (last accessed March 5, 2026)
2014	Enforcement and Non-Waiver of 37 C.F.R. § 42.104(b)(4) and Permissible Uses of General Knowledge In *Inter Partes* Reviews (July 31, 2025), available at https://www.uspto.gov/sites/default/files/documents/aapa_memo_final__signed.pdf (last accessed March 5, 2026)
2015	InterDigital, Inc. Form 10-K (Annual Report), United States Securities and Exchange Commission, File No. 1-33579
2016	*Amazon.com, Inc. et al. v. InterDigital et al.*, Claim No. HP-2025-000043 Transcript of Proceedings December 3, 2025, in the High Court of Justice, London, England
2017	U.S. Publication No. 2010/0086029 to Chen et al.
2018	Meeting Notes Accompanying VCEG-AJ21 - ITU Video Coding Experts Group (VCEG) Archive at VCEG-AJ01.zip accessible at https://www.itu.int/wftp3/av-arch/video-site/0810_San/

I. INTRODUCTION

Patent Owner respectfully submits the Director should deny the Petition because Petitioner does not meet its burden to show that claims 1-6 and 10-20 (the "challenged claims") of U.S. Patent 12,143,606 ("the '606 patent") are unpatentable over the applied references. The Petition presents unpatentability Grounds 1A-1B and 2A-2B, but neither set of Grounds presents compelling reasons as to why the claims of the '606 patent should be found unpatentable.

At the outset, Petitioner violates 37 C.F.R. §42.104(b)(4) by improperly relying on expert testimony to allegedly supply a missing claim limitation in every ground. Specifically, Petitioner solely relies on expert testimony to argue that the VCEG-AJ21 reference applies to ***intra*** prediction processes despite VCEG-AJ21 explicitly applying only to fundamentally different ***inter*** prediction processes. Petitioner's expert admits this is true but nonetheless attempts to stretch VCEG-AJ21's teachings to address the ***intra*** prediction processing recited in the challenged claims. Such an attempt to use expert testimony to address missing claim limitations is a direct violation of Rule 104(b)(4) and the Director should deny institution accordingly. *See* EX2014 (Board Memorandum Regarding Enforcement and Non-Waiver of 37 C.F.R. §42.104(b)(4) (July 31, 2025)).

Moreover, Petitioner effectively presents the same flawed theories already considered and expressly overcome during prosecution. In particular, every

Ground relies on the VCEG-AJ21 reference to allegedly teach 16×16 chroma ***intra*** prediction without once addressing the contrary determinations by the Examiner during prosecution. Specifically, during prosecution the Office rejected this same theory and determined that using a secondary reference describing techniques applicable to ***inter*** prediction does not render obvious ***intra*** prediction techniques, such as those claimed here. Because Petitioner presents the same flawed theories that the Office has already considered and dismissed, the Director should reach the same conclusion here and deny institution on the merits.

As a result of this overarching deficiency, the Petition also suffers from several substantive deficiencies with respect to particular language of the claims.

First, the combination of Sekiguchi and VCEG-AJ21 in Grounds 1A-1B fails to disclose or render obvious at least the claimed: (i) "*performing intra prediction with multiple partition types for chroma encoding of the block, the multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*;" (ii) "*determining a particular chroma [partition] type … in response to a luma partition type utilized to encode the block*;" and (iii) "*only luma*

partition type is signaled, not the chroma partition type."[1] Additionally, Petitioner has not demonstrated that a POSITA would have been motivated to combine Sekiguchi and VCEG-AJ21 given Sekiguchi's focus on ***intra*** prediction and VCEG-AJ21's sole focus on ***inter*** prediction.

Second, the combination of Xiong and VCEG-AJ21 in Grounds 2A-2B is also deficient for similar reasons. For example, and as explained below, the combination of Xiong and VCEG-AJ21 fails to disclose or render obvious at least the claimed "*performing intra prediction with multiple partition types for chroma encoding of the block, the multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*." Additionally, and for similar reasons as with Grounds 1A-1B, Petitioner has not demonstrated that a person of ordinary skill in the art ("POSITA") would have been motivated to combine Xiong and VCEG-AJ21 given Xiong's focus on ***intra*** prediction and VCEG-AJ21's sole focus on ***inter*** prediction.

As illustrated by the above defects, Petitioner has not met—and cannot meet—its burden of establishing the unpatentability of the challenged claims of the

---

[1] For ease of reference, Patent Owner will identify claim language from the '606 patent using *italics* and will identify language quoted from other exhibits using regular font.

'606 patent. Accordingly, Patent Owner respectfully submits the Director should deny the Petition.

II. OVERVIEW OF THE '606 PATENT

The inventors of the '606 patent developed "methods and apparatus for improved intra chroma encoding and decoding." EX1001, Title. Specifically, the '606 patent describes a process for efficiently signaling chroma encoding based on a luma encoding. EX1001, Abstract, 5:59-6:13, 9:10-33. Before addressing the specific deficiencies of Petitioner's applied references, Patent Owner provides a brief discussion of the key aspects relating to the '606 patent's chroma and luma encoding/decoding processes. *See, e.g.*, EX1001, 9:37-10:62.

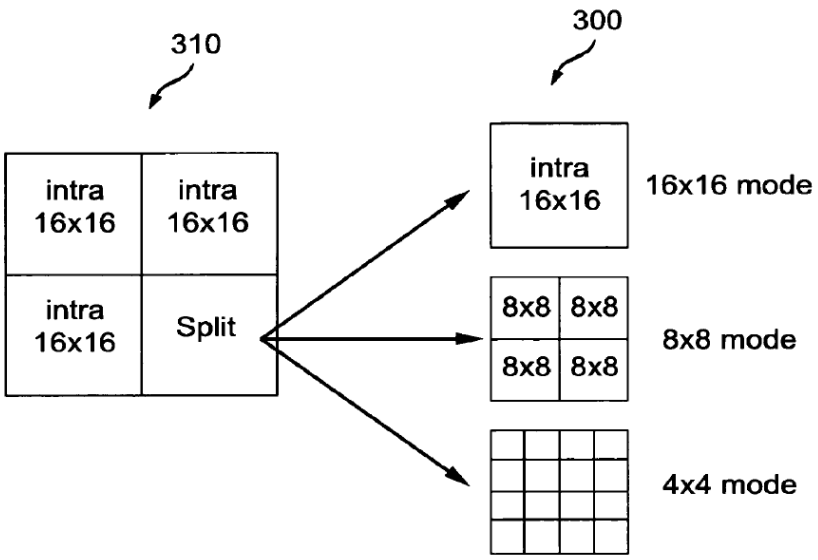
A. Video Coding, Macroblocks, and Partitioning

The '606 patent is directed to encoding and decoding video. EX1001, 1:15-17. Encoding video refers to transforming images in a way that can be communicated and transmitted. *See, e.g.*, EX1003, ¶¶22-23. This typically includes transforming or compressing the images using techniques that reduce the size of the transmitted data. *Id.* Decoding the received transmission includes reconstructing the images using the agreed upon encoding and decoding scheme(s). *Id.*

To illustrate, the '606 patent describes the "MPEG-4 AVC Standard" (also known as "H.264") as an example encoding/decoding scheme. EX1001, 1:23-32.

The MPEG-4 AVC Standard uses a "macroblock" structure that is used to determine how to encode pictures or frames of a video. EX1001, 1:30-43, 2:4-11. Figure 3 of the '606 patent, reproduced below, depicts macroblocks as 16×16 pixel squares:

FIG. 3



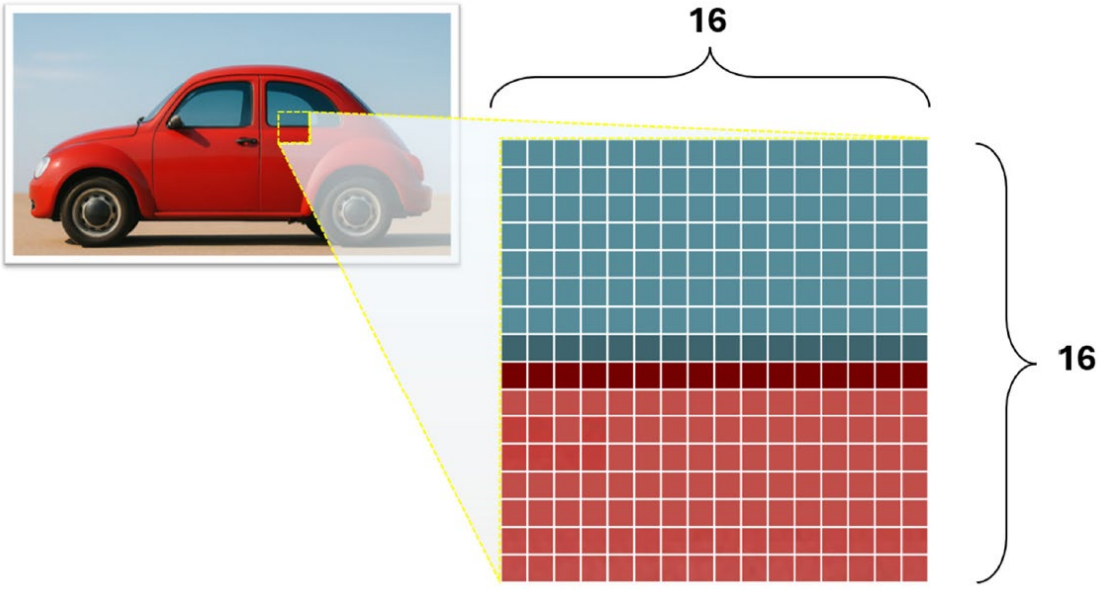
EX1001, FIG. 3.

As seen from Figure 3, the '606 patent also depicts multiple ways to partition macroblocks. EX1001, 2:4-11. The '606 patent explains that "[s]ince the basic coding unit in the MPEG-4 AVC Standard is a macroblock, that is, the size is 16×16, the partition types inside a macroblock are either all 16×16, 8×8 or 4×4." *Id.* Partitioning, and these corresponding partition types, refers to a way of subdividing (or not subdividing) a particular macroblock. As further explained

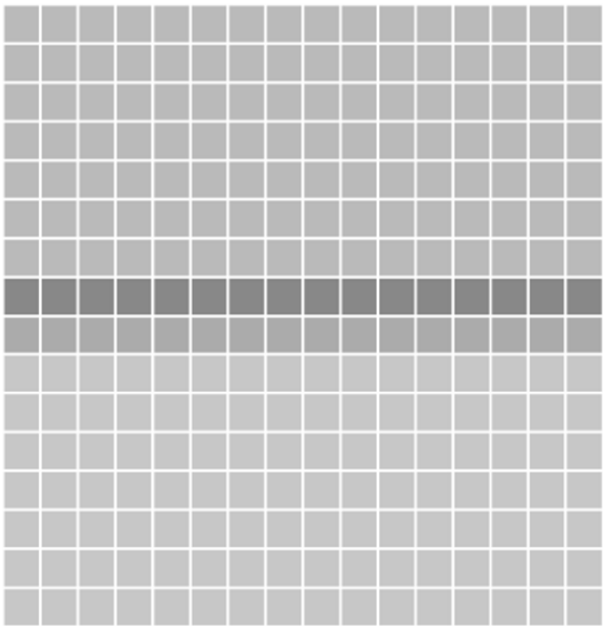
below, different "partition types" in the '606 patent may be applied for chroma and luma partitioning when encoding a picture. EX1001, Cl. 1.

B. Luma and Chroma Encoding/Decoding

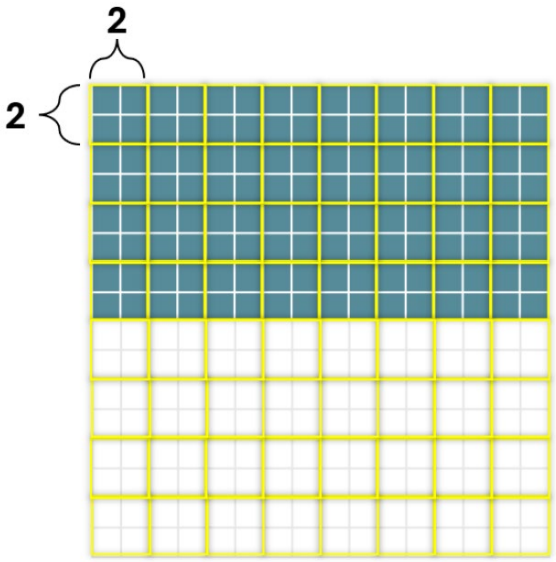
When encoding a picture, luma and chroma values can be used to represent pixels. As the Petition acknowledges, "luma or luminance" (Y) generally refers to the brightness of a pixel while three chroma components (Cr, Cb, and Cg) correspond to the color of the pixel in the red, blue, and green spectrums respectively. Pet., 6. To reduce the amount of information that can be conveyed, a pixel can be represented using the luminance (Y) as well as two chroma components (e.g., Cr and Cb) while still maintaining sufficient quality for what can be perceived by the human eye. To convey these components, each of Y, Cr, and Cb can be thought of as separate images (e.g., there may be a brightness image Y, a first color image Cr, and a second color image Cb). The superimposition of these three images can result in the overall color image. As reproduced below, Petitioner provides an example of Y, Cr, and Cb and their superimposition as 16×16 luma and chroma blocks. Pet., 8-12.



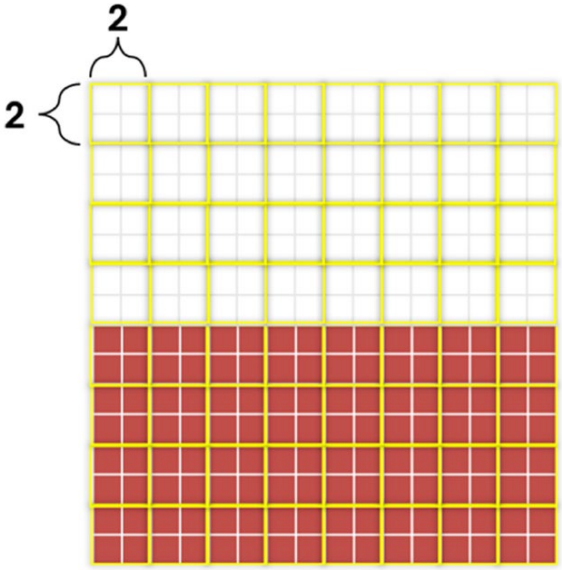
Pet., 9 (example 16×16 block).



Pet., 9 (example luma (Y) 16×16 block).



Pet., 10
(example chroma (Cb) 16×16 block).



Pet., 10
(example chroma (Cr) 16×16 block).

While this example depicts 16×16 blocks for luma and chroma components, the '606 patent contemplates, and claims, the use of multiple luma and chroma partition types and sizes. *See, e.g.*, EX1001, 9:37-10:13 (Table 2).

C. Intra- vs. Inter- Prediction

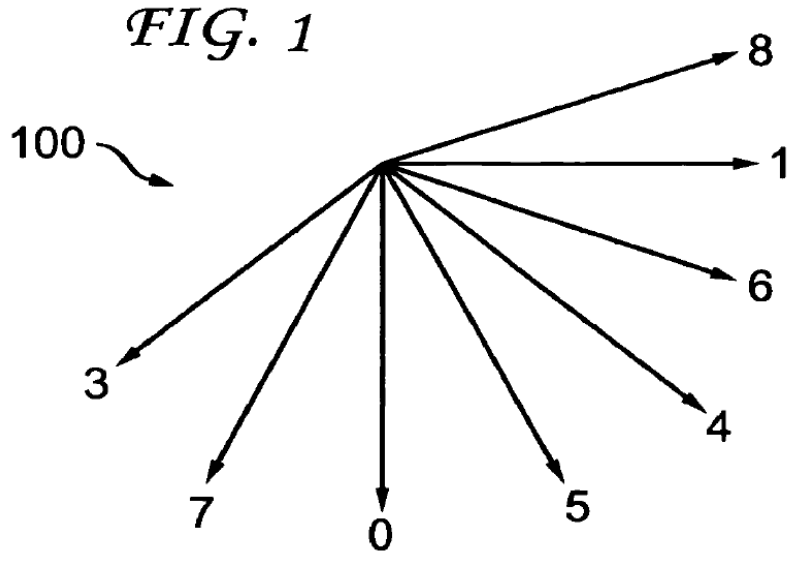
In addition to partition sizes and partitioning luma and chroma components for a block, the '606 patent also draws a distinction between an "***intra*** prediction mode" and an "***inter*** prediction mode."[2] EX1001, 1:23-29 ("a picture can be either intra or inter coded"). These prediction modes allow video encoding systems to exploit image redundancies to provide additional savings when signaling video

[2] Emphasis added throughout unless otherwise specified.

data. EX2017 (Chen), ¶¶5, 89, 90, 92-96. These two prediction modes, however, differ significantly.

For example, ***inter*** prediction examines image information from previous or future reference frames and is used to predict movements or changes in the current frame. EX2017, ¶¶89, 92-96. This type of prediction exploits redundancies between different images in a video sequence. *Id.* Well-known examples of inter prediction techniques include motion estimation (ME) and motion compensation (MC). *Id*.

In contrast, ***intra*** prediction—which is most pertinent to the ’606 patent—refers to examining image information from neighboring image areas ***within the same image or frame***. EX2017, ¶¶90, 92. This type of prediction exploits redundancies ***within the same image*** (i.e., that a particular pixel is redundant with nearby pixels in the same image) rather than ***between different images***. *Id.* For example, with reference to Figure 1, reproduced below, the ’606 patent describes intra prediction modes in terms of predicting nearby-pixels in a particular direction.



EX1001, FIG. 1.

The ’606 patent explains each prediction mode or direction in the following manner:

> In FIG. 1, the reference numeral 0 indicates a vertical prediction mode, the reference numeral 1 indicates a horizontal prediction mode, the reference numeral 3 indicates a diagonal-down/left prediction mode, the reference numeral 4 indicates a diagonal-down/right prediction mode, the reference numeral 5 indicates a vertical-right prediction mode, the reference numeral 6 indicates a horizontal-down prediction mode, the reference numeral 7 indicates a vertical-left prediction mode, and the reference numeral 8 indicates a horizontal-up prediction mode.

EX1001, 1:52-62; *see also id.*, 1:63-2:3, FIG. 2 (depicting a “plane prediction mode” as another example).

In this manner, the ’606 patent describes different ***intra*** prediction modes—as opposed to fundamentally different ***inter*** prediction modes—and describes that

these ***intra*** prediction modes may be applied to both the luma and chroma components of an encoded image or video. EX1001, 2:41-67, 6:16-24, 9:25-28; *see also* EX1001, Cl. 1 (reciting "*using a single chroma intra prediction mode that is different than a luma intra prediction mode*").

D. Problems with the Prior Art

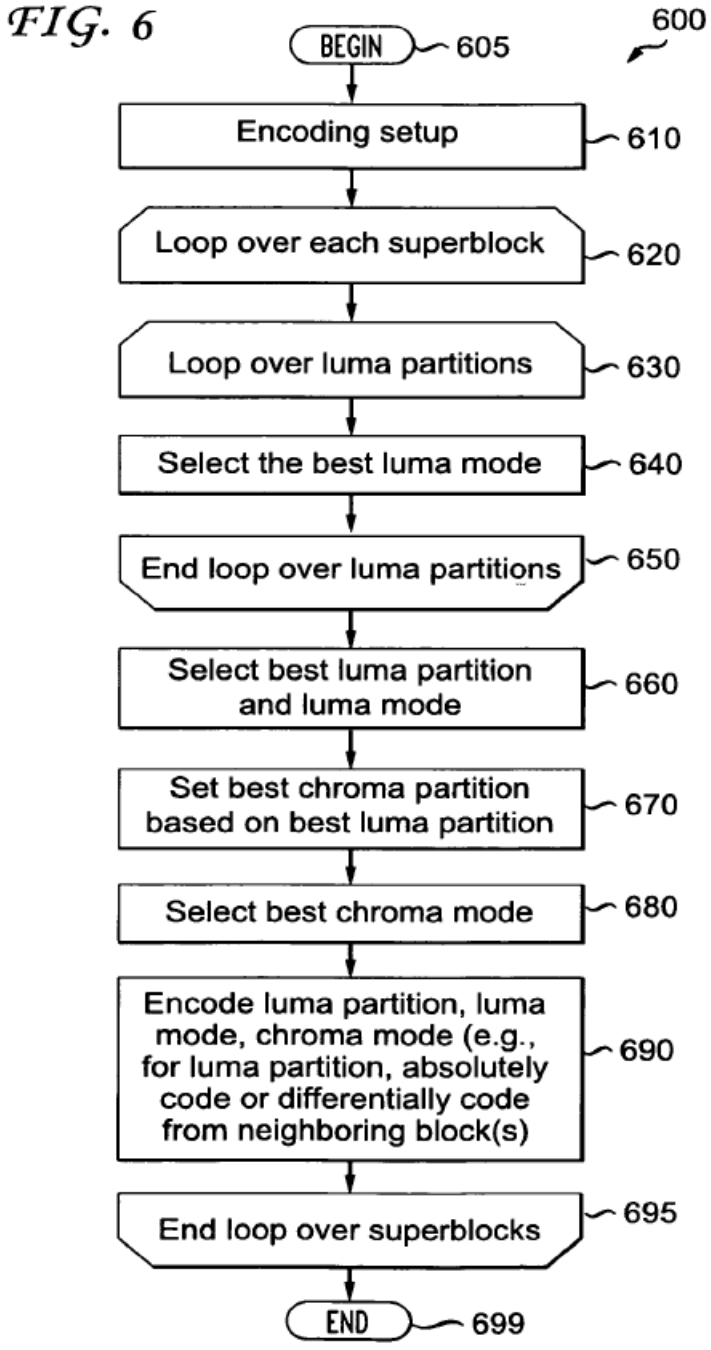
With a thorough understanding of these foundational concepts, the inventors of the '606 patent identified several issues with the existing encoding/decoding techniques at the time. For example, the inventors noted that conventional chroma coding techniques had little flexibility. EX1001, 2:65-67. Specifically, the inventors noted that while the prior art may have described "increasing the number of intra direction modes to more than 9" for ***luma*** predictions, the prior art did not contemplate the same level of flexibility for intra prediction of the ***chroma*** components. EX1001, 2:41-48. Rather, the inventors noted that the chroma partition type was fixed at chroma 8×8. EX1001, 2:48-52, 2:59-62 (in the art, "the chroma coding partition type [was] fixed for all the luma partition types"). This lack of flexibility meant that "the selected coding mode or transform for chroma coding" was suboptimal or not "the best" due to the lack of choice when selecting chroma intra prediction types. EX1001, 2:62-65; *see also id.*, 9:48-54, 10:31-35, 12:48-55.

In view of these issues, the inventors developed techniques for "improved intra chroma encoding and decoding" that offered superior flexibility over existing solutions at the time. EX1001, 9:48-54, 10:31-35, 12:48-55.

E. The '606 Patent's Novel Chroma Encoding/Decoding Technique

To address the lack of flexibility in the prior art, the '606 patent proposed a novel technique for encoding chroma components in terms of ***partition type*** and

intra prediction mode. An example of this technique is depicted in Figure 6, reproduced below.



EX1001, FIG. 6.

To determine the chroma partition type and intra prediction mode, the '606 patent explains that first a best "luma partition type" is determined. EX1001, 9:10-12. This can be seen at steps 630, 640, and 660 of Figure 6. The '606 patent explains that luma partitions are examined and then the encoder selects "the best luma partition and luma mode (based on, e.g., a rate-distortion cost)." EX1001, 10:22-31; *see also id.*, 9:48-52.

Then, at step 670, the '606 patent describes setting "the best ***chroma partition*** based on the best luma partition." EX1001, 10:32-34; *see also id.*, 9:10-12 ("the chroma partition type is determined by [the] luma partition type"). For example, Table 2 of the '606 patent, reproduced below, provides an example correspondence between a luma partition type and a chroma partition type.

TABLE 2

Luma partition type and transform	Chroma partition type and transform
Luma_32x32 and 16x16 DCT cascaded with 2x2 Hadamard transform	Chroma 16x16 and 16x16 DCT
Luma_16x6 and 16x16 DCT	Chroma_8x8 and 8x8 DCT
Luma 8x8 and 8x8 DCT	Chroma_4x4 and 4x4 DCT
Luma 4x4 and 4x4 DCT	Chroma_4x4 and 4x4 DCT

EX1001, 9:58-10:13 (annotated).

As an example, for an 8×8 luma partition type, a 4×4 chroma partition type may be used, and for a 16×16 luma partition type, an 8×8 chroma partition type may be used. EX1001, 9:15-22, 10:7-9.

Returning to Figure 6, at step 680, the '606 patent describes selecting "the best chroma mode" or ***chroma intra prediction mode***, which can differ from the luma intra prediction mode. EX1001, 10:32-38; *see also id.*, 6:16-24 (the intra chroma partition type is a "selection [] made with respect to a set of multiple partition types for intra chroma coding and where the set of multiple partition types for intra chroma coding differs from a set of multiple partition types [for] intra

luma coding"). The images or video are subsequently encoded using the selected chroma and luma partitions and intra prediction modes.

Applying these techniques provides several benefits. Indeed, the mechanisms disclosed and claimed in the '606 patent allow for flexibly selecting the chroma partition type and chroma intra prediction mode. This flexibility allows the chroma partition to follow a selected luma partition while still allowing for different intra prediction modes. This also results in "bit savings" when transmitting encoded video because only the luma partition type is signaled. EX1001, 6:6-12, 9:25-31 ("As for the signaling, ***we only signal the luma partition type, but not the chroma partition type***, since the chroma partition type is decided based on the luma partition type."). That is, the decoder receiving this information is able to determine both the luma and chroma partition types based only on signaling the luma partition type without the explicit need to signal the chroma partition type.

F. Overview of Claims

The techniques and benefits described in the '606 patent are reflected in the claims. For example, independent claims 1 and 2 are directed to an apparatus and method for performing the above-described encoding techniques. Independent claims 10 and 14 are directed to a method and apparatus for decoding the encoded

images. Claim 1 is reproduced below with emphasis added to specific points of distinction between the claim language and Petitioner's asserted references:

1. A video encoding apparatus, comprising:

a memory and a processor, configured for:

encoding picture data for at least a block in a picture, by ***performing intra prediction with multiple partition types for chroma encoding of the block, the multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*** and a set of multiple luma partition types, the set of multiple chroma partition types being different than the set of multiple a partition types, and

determining a particular chroma part type using a ***single chroma intra prediction mode that is different than a luma intra prediction mode***, for encoding a partitioned block from the set of multiple chroma partition types ***in response to a luma partition type utilized to encode the block***, the luma partition type being included in the set of multiple luma partition types ***and only luma partition type is signaled, not the chroma partition type***,

said encoding comprising: setting a luma partition,

setting a chroma partition from the set of multiple chroma partition types; and,

setting a luma prediction mode, setting a chroma prediction mode, ***wherein chroma and luma have different modes***; and encoding the block.

As seen from the emphasized portions of claim 1, the key features described in the specification, which also distinguish the claims from the prior art, are likewise reflected in the claims. *See* Section II.E. This includes having a set of multiple chroma partition types, using a chroma intra prediction mode that differs from a luma intra prediction mode, a selection of the chroma partition type based on a luma partition, and only signaling the luna partition type.

III. PROSECUTION HISTORY

The ’606 patent was thoroughly examined during prosecution. Specifically, prosecution included the following:

(1) eight prior-art searches by the Office on: August 28, 2021 (EX1002, 1461-1463), January 15, 2022 (EX1002, 1464-1486), May 7, 2022 (EX1002, 1413-1457), September 30, 2022 (EX1002, 1321-1409), February 10, 2023 (EX1002, 1141-1317), September 9, 2023 (EX1002, 784-1137), February 10, 2024 (EX1002, 400-780), and June 13, 2024 (EX1002, 28-399);

(2) seven Office Actions on the merits (EX1002, 1616-1629, 1654-1664, 1684-1695, 1729-1741, 1781-1792, 1805-1817, 1856-1867);

(3) ten rounds of claim amendments and remarks (EX1002, 1646-1653, 1671-1680, 1698-1706, 1717-1726, 1747-1756, 1795-1804, 1820-1829, 1841-1850, 1870-1882, 1908-1920); and

(4) an information disclosure statement citing *inter alia* CN-Sekiguchi and H.264 (March 2005) (EX1002, 1537-1539).

During prosecution, the Examiner considered the issue of whether teachings related to ***inter*** prediction techniques apply to the claimed ***intra*** prediction techniques with multiple chroma partition types. In particular, the Examiner contended that Wang (EX2010) taught "performing intra prediction with multiple partition types chroma coding of the block," as recited in an earlier version of the claims. EX1002, 1859-1860 (internal citations omitted). Applicant amended the claims to their current state and argued that Wang's teachings of multiple block sizes for adaptive "motion compensation" (i.e., ***inter*** prediction) did *not* teach the use of multiple block sizes for ***intra*** prediction, as claimed. EX1002, 1917-1918 (referencing EX2010, ¶11 and ¶77, which only describe block sizes for "motion-compensated prediction" or ***inter*** prediction). The Examiner was persuaded that Wang's teachings of multiple chroma partition sizes for ***inter*** prediction did not teach the claimed use of multiple chroma partition types for ***intra*** prediction, and allowed the claims. EX1002, 1923-1930 (Notice of Allowability).

As will be further explained in Section VII, Petitioner now raises the same flawed theories with respect to the VCEG-AJ21 reference, which Petitioner relies on for allegedly teaching a 16×16 partition type for chroma ***intra prediction*** in the challenge to all independent claims in all asserted grounds. In essence, Petitioner

has simply replaced Wang's teaching of multiple chroma partition sizes for ***inter*** prediction with a similar teaching in VCEG-AJ21, which is also limited to ***inter*** prediction. Petitioner therefore presents the same flawed theories that the Office has already considered and dismissed. As such, the Director should reach the same conclusion here and deny institution of the Petition.

IV. PERSON OF ORDINARY SKILL IN THE ART (POSITA)

A POSITA is presumed to be aware of all pertinent art. The POSITA possesses the "understandings and knowledge reflected in the prior art" and thinks along conventional wisdom. *See Abbott Labs. v. Andrx Pharms., Inc.*, 452 F.3d 1331, 1336 (Fed. Cir. 2006). At this stage, Patent Owner submits that the Director does not need to resolve the appropriate level of skill for a POSITA for purposes of deciding institution because the Petition fails under any articulation of a POSITA.

In any event, solely for purposes of this Preliminary Response, Patent Owner applies Petitioner's level of skill for a person of ordinary skill in the art (POSITA). *See* Pet., 14.

V. CLAIM CONSTRUCTION

Petitioner does not propose any terms for construction in the Petition because Petitioner "does not believe that any constructions are necessary to resolve the issues in this Petition." Pet., 14. For purposes of this Preliminary Response, Patent Owner agrees. Patent Owner, however, reserves the right to contest

Petitioner's implicit constructions or any newly presented explicit constructions during the proceeding, should the Director decide to institute review.

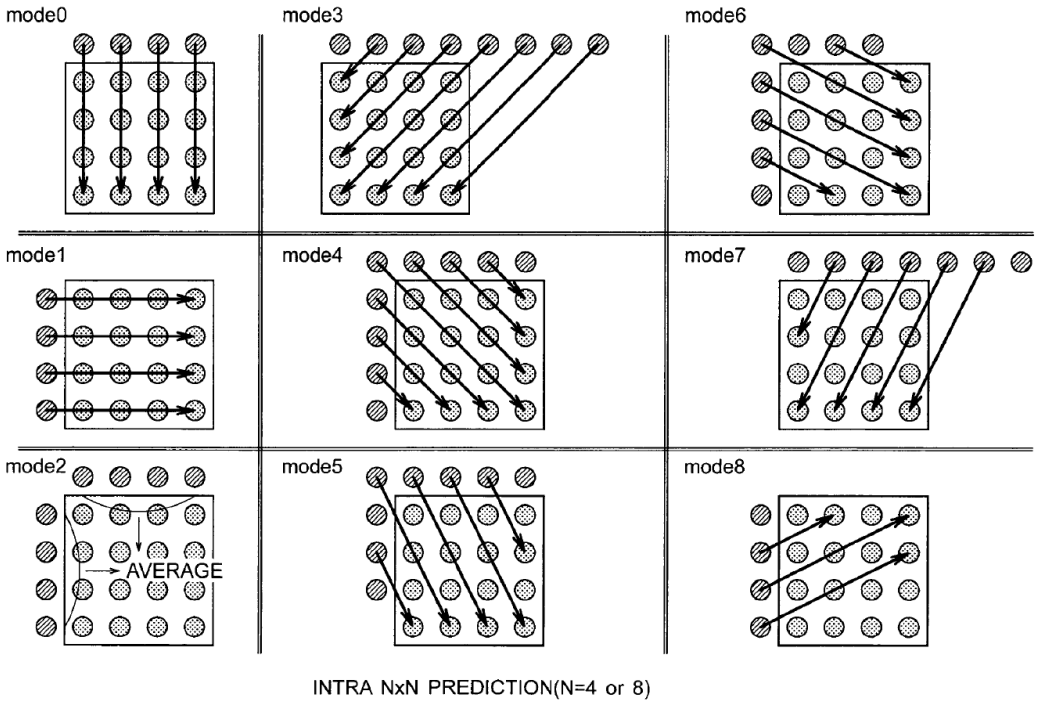
VI. OVERVIEW OF THE PRIOR ART

A. Sekiguchi

Sekiguchi is directed to a "Moving Image Device and Moving Image Decoding Method." EX1005, Title. Sekiguchi describes a technique where a "first intra prediction mode" is applied to a "luminance component" of a video while a "second intra prediction mode is applied to a "chrominance component." EX1005, Abstract.

For the luma intra prediction (Y component), "there are three selectable types of modes, an intra 4×4 prediction mode, an intra 8×8 prediction mode, and an intra 16×16 prediction mode." EX1005, ¶¶43-44. Sekiguchi's figure 5, reproduced below, depicts nine options for a prediction method for the luma component when a 4×4 prediction mode is used. EX1005, ¶43.

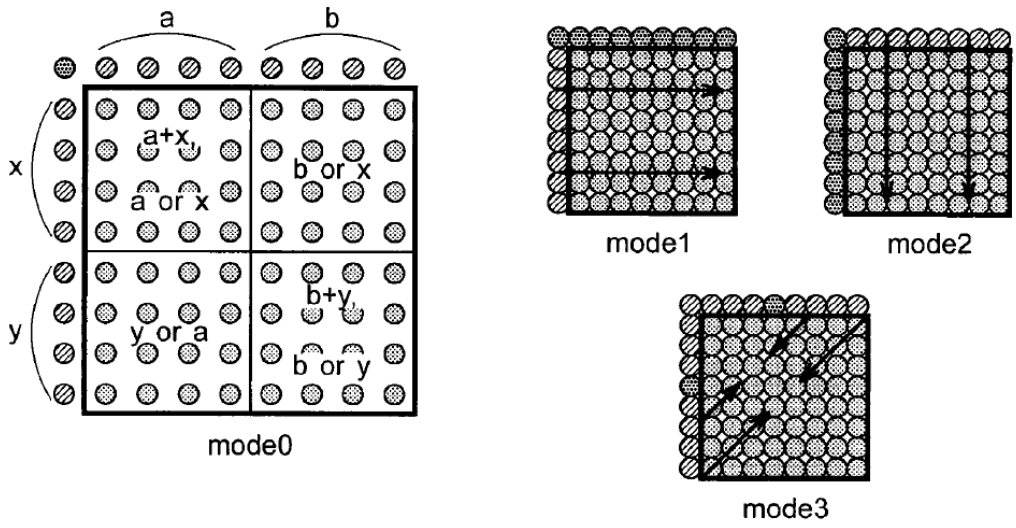
FIG. 5



EX1005, FIG. 5.

In contrast to the luma intra prediction, Sekiguchi describes chroma prediction (Cb and Cr components) not as having three different partition sizes, but as having only one size—8×8. EX1005, ¶5 ("in a macroblock area composed of luminance components 16×16 pixels, corresponding chrominance components are 8×8 pixel blocks for both Cb and Cr"), ¶45. This can be seen in Figure 7, reproduced below, which depicts four intra prediction modes that all apply to an 8×8 pixel block size. EX1005, ¶45.

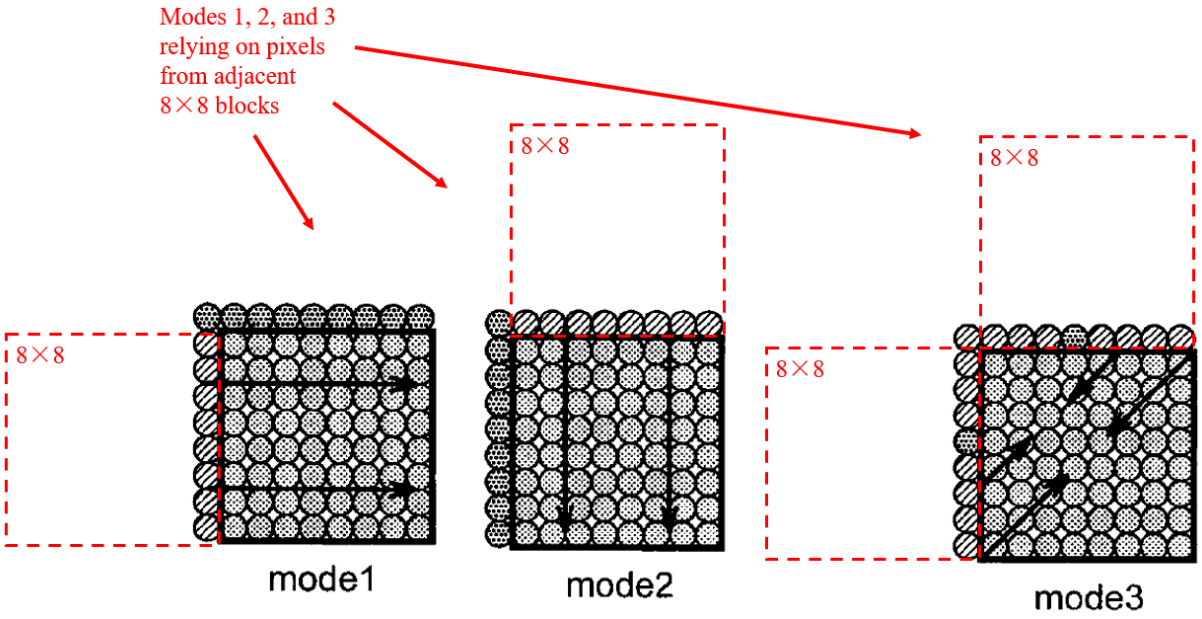
FIG. 7



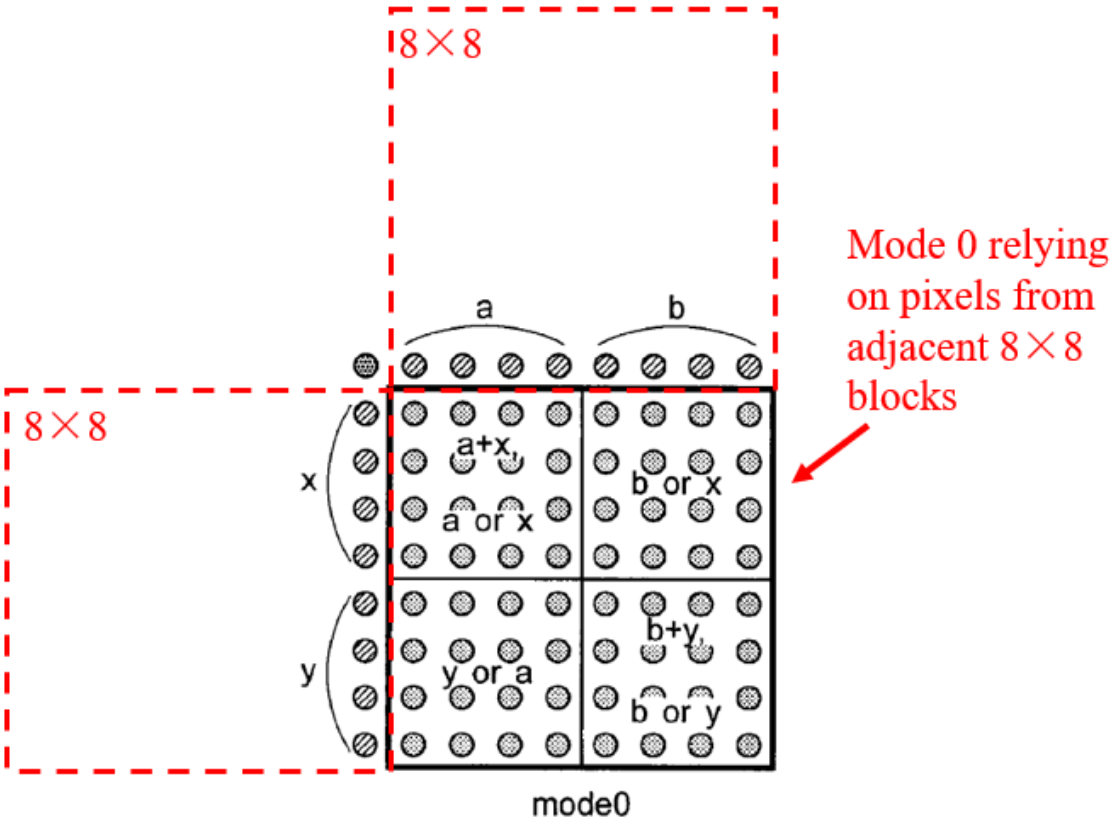
4:2:0/4:2:2 Cb/Cr INTRA PREDICTION

EX1005, FIG. 7.

For modes 1, 2, and 3 depicted in Figure 7, "space prediction having directionality is carried out" for the 8×8 pixel block. EX1005, ¶45. For mode 0, Sekiguchi describes dividing the 8×8 pixel block into "4×4 blocks, and an average value is predicted from the sides by 4×4 block units." EX1005, ¶45. "For example, for a 4×4 block of the upper left part, all 8 pixels of areas 'a' and 'x' are averaged, or 4 pixels of 'a' or 'x' are averaged, and one of those average values is used as a predicted value." EX1005, ¶45. In this manner, when mode 0 is applied to a particular 8×8 block, mode 0 still relies on pixels from adjacent 8×8 pixel blocks to perform intra chroma prediction on the particular 8×8 block. EX1005, ¶¶5, 45. The annotated version of Figure 7 below illustrates this functionality and how mode 0 operates in a manner similar to modes 1, 2, and 3:



EX1005, FIG. 7 (excerpted, annotated).



EX1005, FIG. 7 (excerpted, annotated).

As seen from comparing Sekiguchi's luma and chroma intra prediction mechanisms, Sekiguchi provides different approaches for each. For luma intra prediction, Sekiguchi clearly states that there are "three" selectable sizes: 4×4, 8×8, and 16×16. EX1005, ¶¶43-44. In contrast, for chroma intra prediction, Sekiguchi only describes one 8×8 size with the option to subdivide the 8×8 pixel block (mode 0 only). EX1005, ¶¶5, 45. Despite this optional subdivision of the 8×8 pixel block, however, mode 0 (as well as the other available chroma intra prediction modes) still results in an intra prediction for the entirety of the 8×8 pixel block, because the pixel analysis and intra prediction occurs for all pixels of the 8×8 pixel block. EX1005, ¶¶5, 45. Specifically, each pixel in a target 8×8 block is predicted using pixels from adjacent 8×8 pixel blocks. *See* EX1005, ¶45, FIG. 7 (annotated above). In this manner, Sekiguchi does not describe multiple discrete selectable sizes for chroma intra prediction.

Additionally, Sekiguchi does not describe selecting a chroma intra prediction size based on or in response to a selected luma intra prediction size. *See* EX1005, ¶¶43-45.

B. VCEG-AJ21

VCEG-AJ21 appears to be a proposal for extending the architecture of the H.264 standard, entitled "Enlarging MB size for high fidelity video coding beyond HD." EX1006, 1. VCEG-AJ21 purports to "enlarge the macroblock (MB) of 16x16

for HD or beyond HD video sequences." EX1006, 2. VCEG-AJ21 provides an example of enlarging the macroblock size for H.264 to "NxN" and provides examples of 32x32, 64x64, and 128x128 macroblock sizes. EX1006, 3-4. As part of this proposal, VCEG-AJ21 describes block indexing for luma and chroma components as depicted in Figures 4 and 5, reproduced below. EX1006, 5-6.

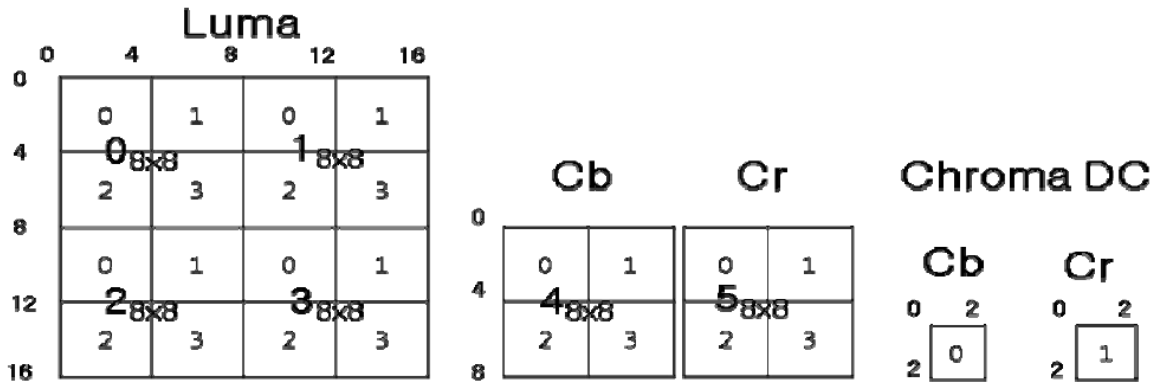


Fig. 4 Block indexing for 16x16 MB

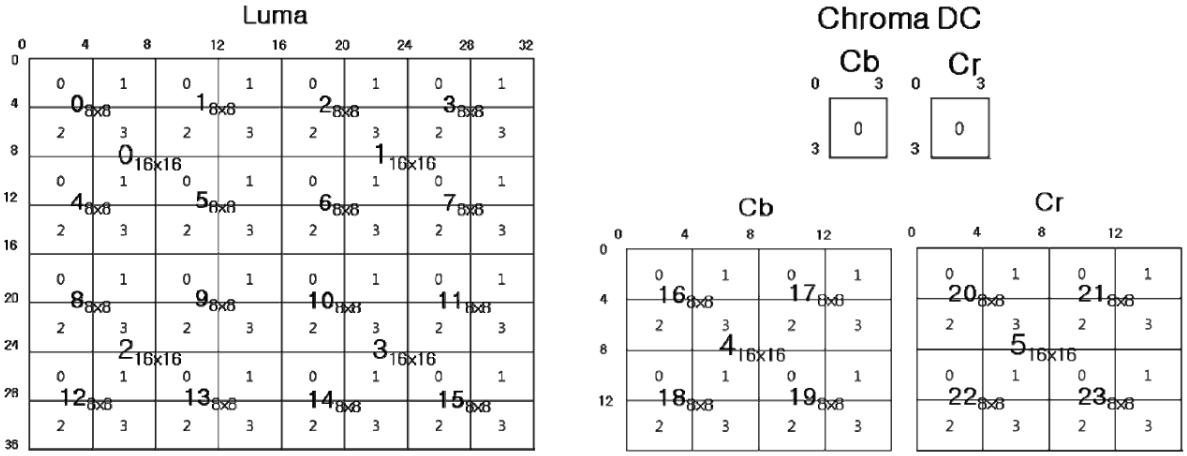


Fig. 5 Block indexing for 32x32 MB

EX1006, FIGs. 4-5.

Critically, VCEG-AJ21 applies the extension of the macroblock sizes only to ***inter*** prediction and explicitly does not apply its techniques to ***intra*** prediction. VCEG-AJ21 states:

> In this proposal, the extended architecture with the enlarged MB structure are ***first proposed for ME&MC [motion estimation (ME) and motion compensation (MC)]*** but ***new designs of*** transform kernels, ***intra prediction***, luma/chroma DC transforms, CABAC context models and de-blocking filters for the enlarged MB ***are not yet addressed***.

EX1006, 1.

As seen from the Abstract, VCEG-AJ21 refers to motion estimation (ME) and motion compensation (MC), which are ***inter prediction*** techniques. *See* Section II.C (explaining that motion estimation and motion compensation are inter prediction techniques); EX2017, ¶¶89, 92, 96; EX1003, ¶¶72-73 (Petitioner's expert admitting that VCEG-AJ21 applies solely to ***inter*** prediction); EX2018, 24-25 (meeting notes accompanying VCEG-AJ21 confirming intra prediction will be reserved for "further study" and is "not yet addressed").

VCEG-AJ21 further confirms that its techniques are only meant to be applied to ***inter*** prediction when examining the possible partition block modes provided for the 128x128, 64x64 and 32x32 sizes. EX1006, 4. Specifically, VCEG-AJ21 addresses ***inter*** prediction when extending the H.264 macroblock syntax:

> The mb_type in the MB syntax of the current H.264 is defined for the MB size of 16x16 and its partitions. The small numbers (0, 1) of mb_type are assigned for the large block modes (SKIP, ***Inter_16x16***) while large numbers (5, 6, 7) are assigned for the block modes (***Inter_8x4, Inter_4x8, Inter_4x4***) of relatively small sizes.

EX1006, 4.

In this manner, VCEG-AJ21 only describes ***inter prediction*** techniques, and not only provides no suggestion that any of its techniques would be applicable to ***intra prediction***, but in fact deliberating avoids applying its techniques to ***intra prediction***.

C. Xiong

Xiong is directed to a "Method for Image Chrominance Prediction Based on Intra-Frame Coding." EX1008, Title. To perform this chrominance prediction, Xiong describes "dividing the chrominance blocks in the macro-blocks into a plurality of 2^n x 2^n pixels, where n = 0, 1 or 2." EX1008, Abstract. Applying "n" results in blocks of 1x1, 2x2, and 4x4.

To further explain its process, Xiong provides Figure 6, reproduced below.

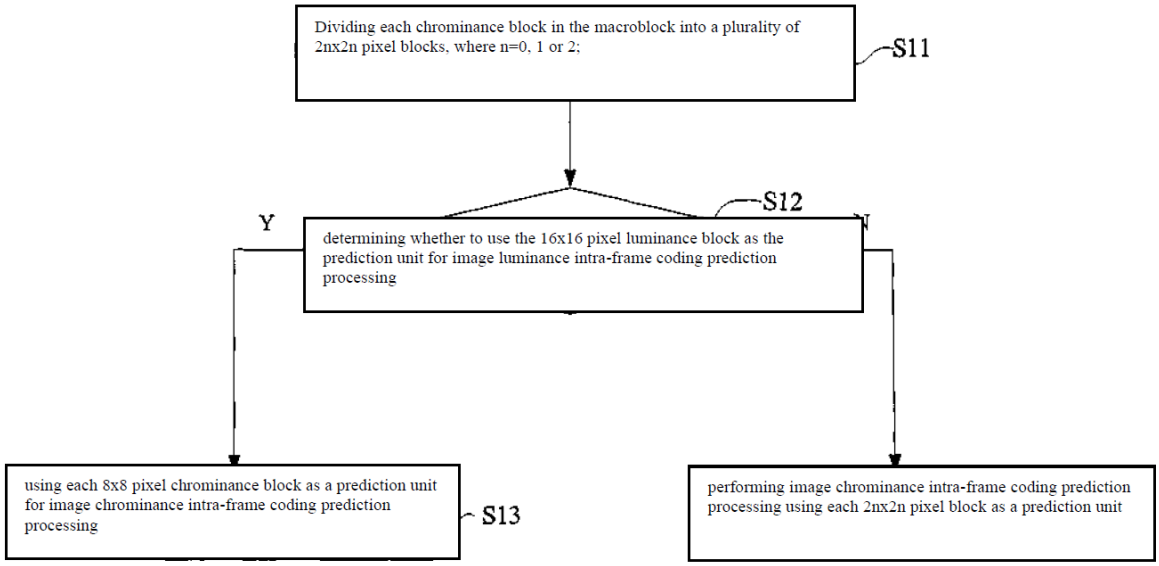


FIG. 6

EX1008, FIG. 6.

As seen from step S11, Xiong describes dividing a chrominance block into a plurality of 2^n x 2^n pixel blocks. EX1008, 9:26-10:1. At step S12, Xiong then determines whether "during the image luminance intra-frame coding prediction, the image luminance intra-frame coding prediction is performed using a luminance block of 16x16 pixels as a prediction unit." EX1008, 10:4-6. If so, Xiong moves to step S13 and performs "image chrominance intra-frame coding prediction with each 8×8-pixel chrominance block (i.e., the entire chrominance block Cb and Cr) as a prediction unit." EX1008, 10:6-7. If a luminance block of 16x16 pixels is not used, Xiong moves to step S14 and uses "each divided 2^n x 2^n pixel block as a prediction unit to perform image chrominance intra-frame coding prediction."

EX1008, 10:8-9. As such, Xiong merely discloses the use of an 8×8 pixel chrominance block along with 2^n x 2^n (where n = 0, 1 or 2) chrominance blocks, but does not disclose the use of 16×16 blocks for chroma prediction.

VII. REASONS TO DENY INSTITUTION

A. All Grounds: Petitioner improperly relies on expert testimony to supply a missing claim limitation in violation of Rule 104(b)(4).

The Director should deny institution because the Petition explicitly relies on expert testimony, and not on prior art patents or printed publications, to allegedly supply a missing claim limitation. This amounts to a failure to comply with 37 C.F.R. §42.104(b)(4), which requires "[t]he petition must specify where each element of the claim is found *in the prior art patents or printed publications* relied upon." The Office has set forth explicitly in a July 2025 Memorandum, that "[p]er 35 U.S.C. §312(a)(4), the Board shall deny an IPR petition that fails to comply with Rule 104(b)(4)." *See* EX2014, 1.

Every ground in the Petition relies on the VCEG-AJ21 reference to allegedly teach or suggest the application of a ***16×16*** partition type for chroma ***intra*** prediction. *See* Pet., 23-24, 64-65. But, as discussed above, VCEG-AJ21 is exclusively directed to ***inter prediction*** and explicitly does not apply to ***intra prediction*** as even Petitioner's declarant Dr. Havlicek admits. EX1006, 1; EX1003, ¶¶72-73. Dr. Havlicek admits that "VCEG-AJ21 is focused on enlarged macroblocks for inter prediction," that its teachings "***are explicitly for inter***

prediction," and that intra prediction is not addressed. EX1003, ¶¶72-73. These admissions doom each of Petitioner's grounds because Petitioner has improperly, and solely, relied on Dr. Havlicek's testimony to stretch VCEG-AJ21's applicability onto ***intra*** prediction. This amounts to improperly using expert testimony to fill a gap in the prior art and supply a missing limitation.

Namely, Petitioner relies on Dr. Havlicek's testimony alone to argue that it would have been obvious to expand VCEG-AJ21's teachings regarding ***inter*** prediction to ***intra*** prediction techniques. Pet., 24, 64; EX1003, ¶¶72-73, 84, 183-184. The Director should reject such attempts under Rule 104(b)(4) as an improper attempt to supply a missing claim limitation—especially in view of Dr. Havlicek's express admission that VCEG-AJ21 does ***not*** apply to ***intra*** prediction. EX1003, ¶¶72-73. Because Petitioner improperly relies on expert testimony to supply a missing claim limitation in every ground, the Petition fails to comply with Rule 104(b)(4), and the Director should deny institution. EX2014, 1.

B. Grounds 1A-1B (all independent claims): The combination of Sekiguchi and VCEG-AJ21 fails to render obvious "*performing intra prediction with multiple partition types for chroma encoding of the block, the multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4.*"

The proposed combination of Sekiguchi and VCEG-AJ21 fails to render obvious any of the challenged independent claims at least because the combination fails to teach or suggest "*performing intra prediction with multiple partition types*

for chroma encoding … comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4," as recited in independent claims 1 and 2, and similarly recited in independent claims 10 and 14 with respect to decoding.

Petitioner relies exclusively on the conclusory testimony of Dr. Havlicek to bridge the technical gaps in the prior art, Pet., 22-26 (citing EX1003, ¶¶82-86), but even with the aid of Dr. Havlicek's unsupported testimony, neither reference, alone or in combination, discloses or renders obvious this limitation.

1. Sekiguchi fails to disclose the claimed 16×16 intra partition type, and VCEG-AJ21 cannot supply the missing teaching because it is strictly directed to inter prediction for enlarged macroblocks.

Each independent claim recites performing intra prediction with ***multiple chroma partition types*** and explicitly defines the set of multiple chroma partition types as including ***16×16***, 8×8, and 4×4 sizes. The Sekiguchi-VCEG-AJ21 combination does not teach or otherwise render obvious such a set of multiple chroma partition types because neither Sekiguchi nor VCEG-AJ21 teach or suggest the application of a ***16×16*** partition type for chroma ***intra*** prediction. *See* Pet., 23-24.

At the outset, Petitioner does not rely on Sekiguchi for the teaching of a 16×16 chroma partition type for intra prediction. Rather, Petitioner relies exclusively on VCEG-AJ21. Pet., 23. But Petitioner's reliance on VCEG-AJ21 is misplaced.

Specifically, VCEG-AJ21 is exclusively directed to ***inter prediction*** and explicitly does not apply to ***intra prediction*** as Petitioner's declarant Dr. Havlicek admits. EX1006, 1; EX1003, ¶¶72-73; Section VII.A. The fact that VCEG-AJ21 only applies to inter prediction is indicative of why Grounds 1A-1B fail. VCEG-AJ21 states:

> In this proposal, the extended architecture with the enlarged MB structure are ***first proposed for ME&MC [motion estimation (ME) and motion compensation (MC)]*** but ***new designs of*** transform kernels, ***intra prediction***, luma/chroma DC transforms, CABAC context models and de-blocking filters for the enlarged MB ***are not yet addressed***.

EX1006, 1; *see also* EX2018, 24-25 (meeting notes accompanying VCEG-AJ21 confirming intra prediction will be reserved for "further study" and is "not yet addressed"). VCEG-AJ21 also explains that its techniques apply to motion estimation (ME) and motion compensation (MC), which are ***inter prediction*** techniques. *See* Section II.C (explaining that motion estimation and motion compensation are inter prediction techniques); EX2017, ¶¶89, 92, 96; EX1003, ¶¶72-73 (Petitioner's expert admitting that VCEG-AJ21 applies solely to ***inter*** prediction).

Because VCEG-AJ21 explicitly states that intra prediction is "not yet addressed" (EX1006, 1), Petitioner's attempts to apply VCEG-AJ21's teaching of a 16×16 partition type to ***intra prediction*** are misplaced, lack support, and are in

direct conflict with the teachings of VCEG-AJ21 itself. Indeed, Petitioner's reliance on Figures 4 and 5, and block indexing for 16×16 and 32×32 macroblocks is misplaced, as there is no indication in VCEG-AJ21 that this partitioning would be applied to—or selectable for—chroma ***intra prediction***. *See* Pet., 24.

Appearing to recognize this deficiency and the lack of applicability of Figures 4 and 5, Petitioner also relies on Table 2 from VCEG-AJ21. Pet., 24-25. But Petitioner's expert Dr. Havlicek directly contradicts this theory and states that "Table 2's modes are explicitly for inter prediction." EX1003, ¶73. Examining the context surrounding Table 2 confirms this understanding and demonstrates that Table 2 is not applicable to chroma ***intra prediction***. EX1006, 4. Specifically, the introduction to Table 2 solely references ***inter*** prediction modes:

> The mb_type in the MB syntax of the current H.264 is defined for the MB size of 16x16 and its partitions. The small numbers (0, 1) of mb_type are assigned for the large block modes (SKIP, ***Inter_16x16***) while large numbers (5, 6, 7) are assigned for the block modes (***Inter_8x4, Inter_4x8, Inter_4x4***) of relatively small sizes.

EX1006, 4.

In this manner, nothing in VCEG-AJ21 suggests any chroma partition for ***intra prediction***, let alone any 16×16 chroma partition type for intra prediction. Because VCEG-AJ21 does not teach a 16×16 partition type for intra prediction, and because Petitioner does not rely on Sekiguchi for this teaching, the

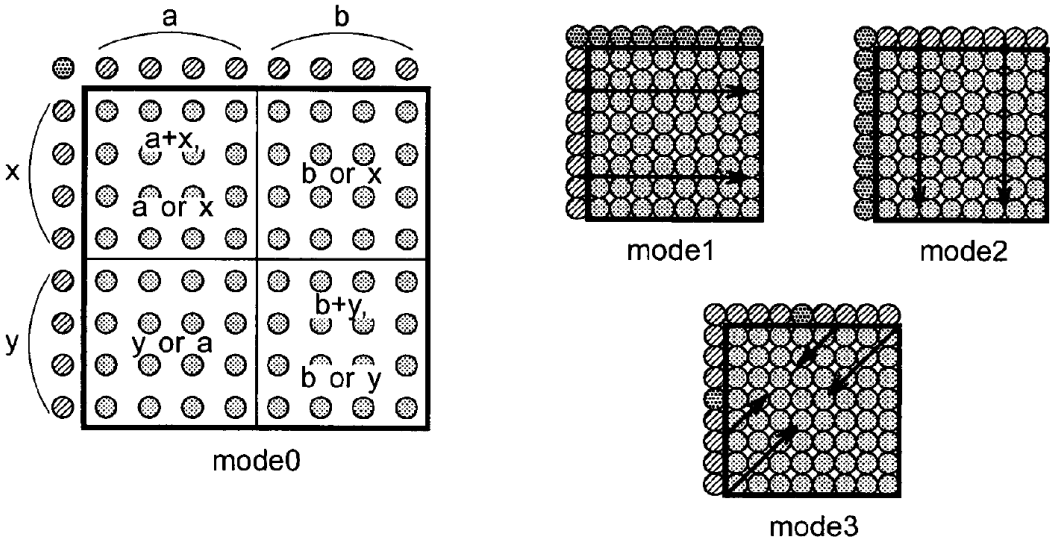
combination of Sekiguchi and VCEG-AJ21 fails to teach the claimed "*multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*" for *performing intra prediction.* Thus, Grounds 1A-1B fail for at least this reason.

2. Sekiguchi also does not teach the claimed "*set of multiple chroma partition types*" that includes a 4×4 size.

Again, each independent claim recites performing intra prediction with ***multiple chroma partition types*** and explicitly defines the set of multiple chroma partition types as including 16×16, 8×8, and ***4×4*** sizes. The Sekiguchi-VCEG-AJ21 combination does not teach or otherwise render obvious such a set of multiple chroma partition types because Sekiguchi does not teach a set that includes a 4×4 size. *See* Pet., 22-23; *see also* EX1001, 6:16-24 (describing that the partition type for intra chroma coding is a selection from a set—i.e., a "selection [] made with respect to a set of multiple partition types for intra chroma coding"—the set including a 4×4 size).

Petitioner relies exclusively on Sekiguchi for allegedly teaching 8×8 and ***4×4*** partition types. Pet., 23. Specifically, Petitioner relies solely on paragraph [0045] and Figure 7 from Sekiguchi, reproduced below:

FIG. 7



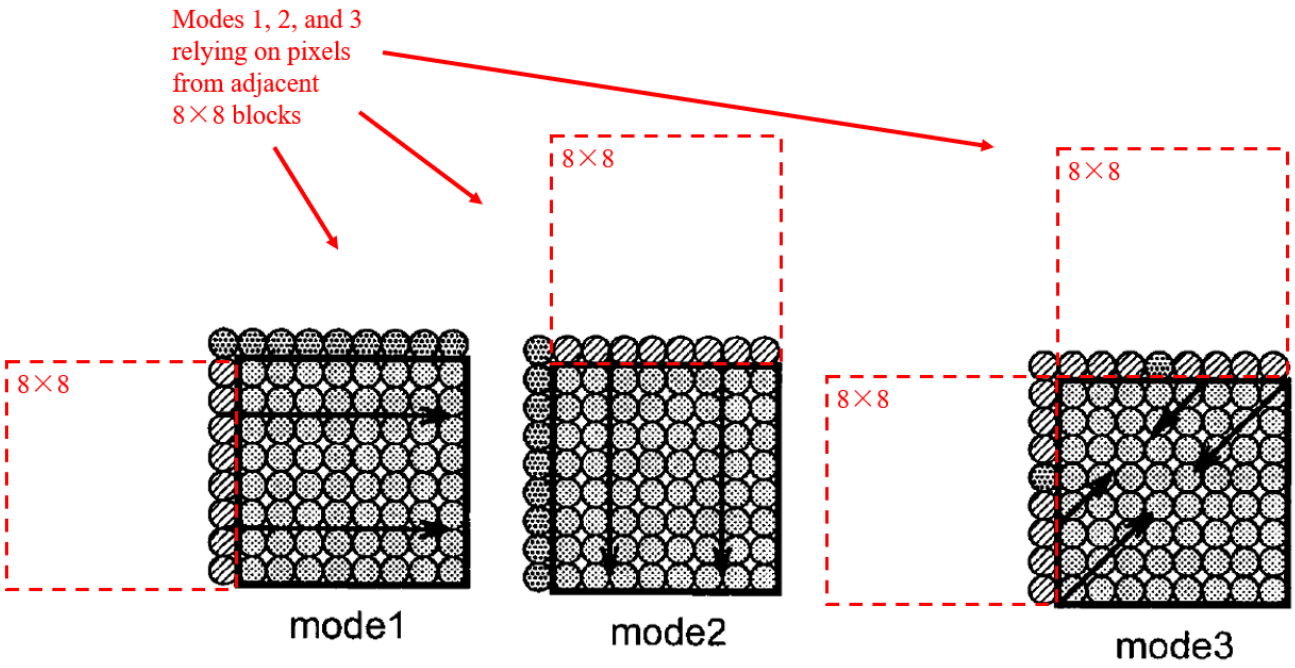
EX1005, FIG. 7.

With reference to Figure 7, Sekiguchi depicts four modes: mode0, mode1, mode2, and mode3. EX1005, ¶45. As Petitioner admits, modes 1, 2, and 3 all depict intra prediction using an 8×8 chroma partition type. *Id.*; Pet., 23. Mode 0 similarly depicts an 8×8 partition type but applies further processing to subdivide and modify the 8×8 partition type into 4×4 blocks to perform further prediction within the 8×8 block. EX1005, ¶45. Petitioner relies on mode 0 to allegedly teach a 4×4 partition type. It does not. Sekiguchi's post-selection processing of an 8×8 partition block does not teach providing 4×4 as a selectable partition type as further explained below. Instead, the selected partition type in Sekiguchi is still 8×8.

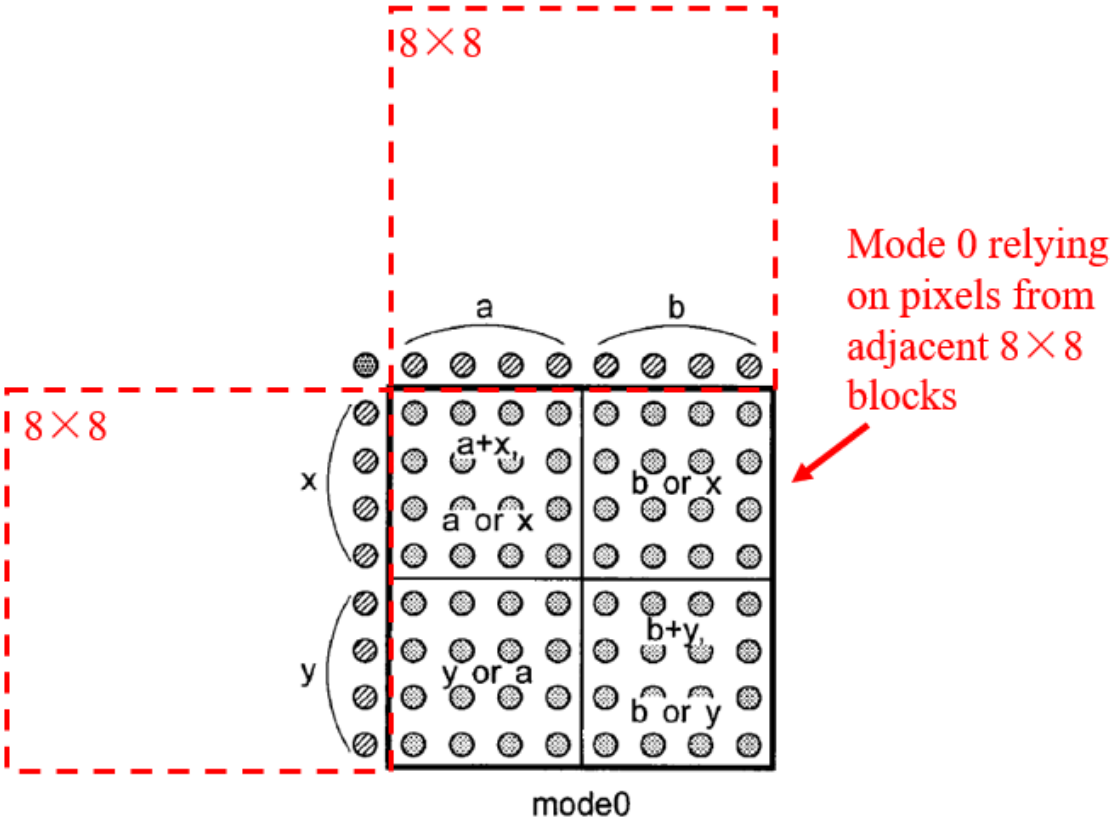
First, Sekiguchi operates in the same conventional way as the prior art described in the '606 patent. EX1001, 2:45-47. Namely, the '606 patent explains that in the MPEG-4 AVC Standard, the "chroma partition type is fixed to be Chroma 8×8." EX1001, 2:45-47. Sekiguchi adopts this same approach by only providing chroma prediction techniques for 8×8 blocks. EX1005, ¶¶4-5, 45, 72. But the '606 patent explicitly diverted from this conventional approach to provide a novel and more flexible way of performing chroma intra prediction. *See* Sections II.E-II.F. In this manner, Sekiguchi's mere adoption of conventional techniques and use of the 8×8 block size does not teach the claimed "*set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*," as described and claimed in the '606 patent.

Second, as recited in the claims, the "*set of multiple chroma partition types*" must include 16×16, 8×8, and ***4×4*** sizes. That is, a 4×4 partition type must be selectable from the set of chroma partition types. Sekiguchi provides no such set and does not allow for such a selection. EX1001, 9:52-54, 9:60-10:12. Rather, Sekiguchi discusses four modes that are all specific to an 8×8 chroma partition type. EX1005, ¶5 ("in a macroblock area composed of luminance components 16×16 pixels, corresponding chrominance components are 8×8 pixel blocks for both Cb and Cr"), ¶45. The application of "mode 0" is still specific to an 8×8 chroma block for the purpose of performing prediction *within* that 8×8 block.

EX1005, ¶45. That is, "mode 0" still corresponds to an 8×8 partition type because all pixels within the 8×8 block are predicted from external 8×8 neighbors similar to the operation of modes 1, 2, and 3. EX1005, ¶¶5, 45, FIG. 7. This reliance on adjacent 8×8 neighbors for all modes is depicted in Figure 7 and illustrated below:



EX1005, FIG. 7 (excerpted, annotated).



EX1005, FIG. 7 (excerpted, annotated).

Sekiguchi's mode 0 therefore still materially differs from the claimed "*set of multiple chroma partition types*" that must include 16×16, 8×8, and 4×4 "*partition types*" available for selection because mode 0 still corresponds to an 8×8 partition type. Petitioner's attempt to recharacterize an internal mathematical subdivision as a standalone "partition type" contradicts the plain meaning of the claim and the technical reality of the reference.

Thus, because Sekiguchi's post-selection processing does not teach a 4×4 partition type that is selectable from a set, Sekiguchi does not teach the claimed "*multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*" and Grounds 1A-1B again fail.

C. Grounds 1A-1B (all independent claims): The combination of Sekiguchi and VCEG-AJ21 fails to render obvious "*determining a particular chroma partition type … in response to a luma partition type utilized to encode the block.*"

The Petition further fails to show that the combination of Sekiguchi and VCEG-AJ21 teaches or suggests "*determining a particular chroma partition type … in response to a luma partition type utilized to encode the block*," as recited in independent claims 1 and 2, and similarly recited in independent claims 10 and 14 with respect to decoding. This limitation recites a specific functional relationship: a decision step where the system determines a *particular* chroma partition type specifically because of, and responsive to, the luma partition type used for the block. See Section II.E. Petitioner erroneously assumes that the mere co-existence

of certain luma and chroma sizes in Sekiguchi and VCEG-AJ21 satisfies this responsive determination. It does not.

1. Sekiguchi does not disclose determining a "particular" chroma partition type "in response to" a luma partition type.

Sekiguchi does not describe determining a particular chroma type ***in response to*** a determined luma partition type. Petitioner's reliance on Sekiguchi's alleged discussion of using a chroma partition type that differs from a luma partition type fails to adequately address this claim language. Pet., 26.

Specifically, Petitioner contends that Sekiguchi teaches "using an 8x8 chroma partition type in response to a 16x16 luma partition type (for modes 1, 2, and 3), and a 4x4 chroma partition type in response to a 16x16 type (for mode 0)." Pet., 26 (citing EX1003, ¶88; EX1005, ¶45, FIG. 7). But Petitioner's theory (1) fails to address the specific language of the claims and (2) clearly demonstrates that Sekiguchi does not determine a chroma partition type based on or in response to a selected luma partition type.

First, the passages from Sekiguchi cited by Petitioner do not address the claim language. Pet., 26 (citing EX1005, ¶¶43-45). For example, Sekiguchi first describes determining an intra prediction mode for a luma (Y) component. EX1005, ¶¶43-44. Then, Sekiguchi describes independently selecting an intra prediction mode for the chroma (Cb and Cr) components. EX1005, ¶45. But

selecting a chroma intra prediction mode separately from a luma intra prediction mode does not teach the claimed functionality. The claims recite a selection of a particular chroma partition type "*in response to*" a luma partition type. Sekiguchi's mere independent selection of chroma and luma partition types provides no such teaching.

Second, by Petitioner's own admission, Sekiguchi's use of the same luma partition type for different chroma partition types demonstrates that Sekiguchi does not teach the claimed functionality. Pet., 26. Specifically, Petitioner states that the same 16x16 luma partition type may correspond to multiple, different chroma partition outcomes—either 8x8 or 4x4—depending on an independent "mode" selection. Pet., 26; EX1005, ¶45, FIG. 7. This is the antithesis of the claimed limitation. In Sekiguchi, the chroma partition type is not determined "*in response to*" the luma partition type; rather, it is a separate, independently selected mode. Because the luma partition type does not drive or constrain the chroma selection to a "*particular*" type, Sekiguchi fails to disclose the claimed functionality, and Grounds 1A-1B again fail.

2. VCEG-AJ21 likewise fails to disclose the claimed responsive determination and cannot cure the deficiencies of Sekiguchi.

First, VCEG-AJ21 is directed to ***inter*** prediction and expressly avoids addressing ***intra*** prediction. EX1006, 1 (stating expressly that intra prediction is "not yet addressed"); *see also* Sections VII.B.1, VII.E. Therefore, VCEG-AJ21

cannot supply the missing intra prediction "determining" step for chroma partition selection recited in the claims. Even if it were applicable to intra prediction (which it is not), VCEG-AJ21 does not disclose the claimed determining of a particular chroma partition type in response to a determined luma partition type.

Petitioner points to Figures 4 and 5 of VCEG-AJ21 as allegedly disclosing "using an 8x8 chroma partition type with a 16x16 luma partition type, and a 16x16 chroma partition type with a 32x32 luma partition type." Pet., 26 (citing EX1003, ¶88). But those figures actually depict a variety of available partition types, including 4x4, 8x8, and 16x16. EX1006, FIGs. 4, 5.

Crucially, Petitioner concedes that VCEG-AJ21 merely states the chroma partition "could be, at most, 16x16" for the 32x32 mode and "could be, at most, 8x8" for the 16x16 mode. Pet., 25-26. The phrases "could be, at most, 16x16" or "could be, at most, 8x8" indicate a range of possible chroma partition sizes, not a requirement to select ***a particular*** size based on the corresponding luma partition type. This theory therefore does not address or otherwise teach the claimed limitation of determining a "*particular*" chroma partition type "*in response to*" the luma partition type utilized to encode the block. Thus, the cited disclosure from VCEG-AJ21 falls short of the specific, responsive determination mandated by the claim.

Because neither Sekiguchi nor VCEG-AJ21, alone or in combination, teach or otherwise render obvious the claimed "*determining a particular chroma partition type … in response to a luma partition type utilized to encode the block*," Grounds 1A-1B fail for this additional reason.

D. Grounds 1A-1B (all independent claims): The combination of Sekiguchi and VCEG-AJ21 fails to render obvious "*only luma partition type is signaled, not the chroma partition type.*"

The combination of Sekiguchi and VCEG-AJ21 further fails to render the independent claims obvious because the combination does not teach or suggest the limitation requiring that "*only [the] luma partition type is signaled, not the chroma partition type*," as recited in independent claims 1, 2, 10, and 14. Petitioner relies solely on Sekiguchi to allegedly teach this feature. Sekiguchi is deficient, however, because (1) Sekiguchi has no explicit disclosure of only signaling a luma partition type and ***not*** signaling a chroma partition type and (2) Sekiguchi's signaling of a chroma mode is still a signaling of a chroma partition type.

First, the passages cited by Petitioner from Sekiguchi do not explicitly describe only signaling a luma partition without signaling a chroma partition type. Pet., 30 (citing EX1005, ¶¶43-45). Nothing in these passages explicitly states that a chroma partition type is not signaled. Thus, Petitioner has already failed to meet its burden to provide such a showing in the art.

But moreover, Sekiguchi describes sending chroma signals that still indicate a partition type. Sekiguchi describes signals 101a and 101b that correspond to Cb and Cr components, which are still signaled along with luma signaling. EX1005, ¶45 (describing chroma components being signaled using signals 101, which are transmitted or "multiplexed on a bit stream"), ¶92 ("independently encoded C1/C2 component intra prediction mode 101 is decoded for the Cb/Cr component"), ¶102 ("the C1/C2 component intra prediction mode 101 indicates one of four types of modes shown in FIG. 7"). In this manner, Sekiguchi still relies on signaling chroma partition information to a decoder. Thus, nothing in Sekiguchi suggests that a luma partition type is signaled without signaling a chroma partition type.

Turning to Petitioner's additional theories, these fare no better. Petitioner argues that Sekiguchi teaches not signaling the chroma partition type because Sekiguchi signals a chroma prediction ***mode*** instead. Pet., 30 (relying on "mode 0, 1, 2, or 3"). But such an argument is internally inconsistent with how Petitioner has relied on Sekiguchi's ***modes*** as directly mapping to the claimed ***partition types***. *See* Section VII.B.2.

As explained in Section VII.B.2, Petitioner argues that modes 1, 2, and 3 correspond to an 8x8 partition type while mode 0 corresponds to a 4x4 partition

type.[3] Pet., 23 (citing EX1005, ¶45). Under Petitioner's mapping, however, signaling the chroma prediction mode is effectively equivalent to signaling the chroma partition type. If a decoder receives a signal indicating "mode 0" and, as a result, must utilize a 4x4 partition type, then the chroma partition type has been signaled to the decoder via the mode designation. Petitioner admits that Sekiguchi signals such a mode designation along with the luma partition type. Pet., 30.

But signaling the mode designation in addition to signaling a luma type does not meet the claim requirement of signaling "only" the luma type. For example, the additional mode signal does not provide the same benefit of "bit savings" described in the '606 patent because Sekiguchi still must use bits to signal the mode designation. *See* EX1001, 5:66-6:8. Because Petitioner's theory amounts to the chroma partition size being explicitly communicated through the mode signaling, Sekiguchi fails to disclose the claimed feature of omitting chroma partition signaling.

---

[3] Again, Patent Owner disagrees with Petitioner's theory that Sekiguchi's internal 4x4 subdivision constitutes a "partition type" as recited in the claims. Section VII.B.2. Under Petitioner's theory, however, Sekiguchi does not teach signaling a luma partition type without signaling a chroma partition type if a mode is still signaled.

Consequently, for these additional reasons, the Petition fails to establish a reasonable likelihood of prevailing on Grounds 1A-1B, and institution should be denied on this basis as well.

E. Grounds 1A-1B: Petitioner's alleged motivation to combine Sekiguchi and VCEG-AJ21 is hindsight-driven and ignores the technical context of the references.

Petitioner's obviousness theory is a classic example of hindsight bias that "uses the patent in suit as a guide through the maze of prior art." *In re NTP, Inc*., 654 F.3d 1279, 1299 (Fed. Cir. 2011); M.P.E.P. § 2143.01. To bridge the gap between the cited references, Petitioner asserts that a POSITA would have been motivated to combine Sekiguchi and VCEG-AJ21 "to extend Sekiguchi's teachings of separating luma and chroma intra prediction to larger block sizes." Pet. 18. This argument fails for at least three reasons.

First, Sekiguchi is limited to signaling methods for indicating ***intra*** prediction modes. EX1005, Abstract. Sekiguchi's signaling method is designed to be utilized by both the 4:2:0 format and the 4:4:4 format to improve efficiency. *Id*., ¶¶5-6. In contrast, VCEG-AJ21 is strictly an ***inter*** prediction reference. It proposes enlarging MB sizes in the H.264 standard specifically for motion estimation (ME) and motion compensation (MC)—i.e., inter prediction—and expressly states intra prediction is "not yet addressed," a point Dr. Havlicek also acknowledges. EX1006, 1; EX1003, ¶¶72-73.

But ***inter*** prediction and ***intra*** prediction are distinct algorithms that address different scenarios: ***inter*** prediction targets movement tracking across temporal frames while ***intra*** prediction extrapolates from spatial neighbors within a single frame. *See* Section II.C. Petitioner offers no explanation why a POSITA seeking to improve spatial intra prediction would look to a reference that expressly avoids addressing that very topic.

Second, VCEG-AJ21 itself underscores that even within the inter prediction domain, extending inter prediction approaches to enlarged macroblocks (MBs) involves complex trade-offs regarding: "fair comparison," "backward compatibility," "extension to the current syntax and required side information," etc. EX1006, 2. If enlarging MBs for its *intended* purpose (inter prediction) was non-trivial, it is pure speculation to suggest a POSITA would seamlessly "plug and play" those sizes into the unaddressed domain of intra prediction.

Third, the state of the art at the time of the invention confirms that applying inter prediction block sizes to intra prediction was not simple or well-known. For example, the H.264 standard treated inter prediction and intra prediction differently and with intentional asymmetry. While H.264 supported a variety of sizes for inter prediction (16x16, 8x8, and 4x4), it strictly limited chroma intra prediction to a single 8x8 block size. EX1010, 136-138 (§ 8.3.3), 143-146 (§ 8.4). This disparity demonstrates that "extending" block sizes was not a matter of simple "common

sense" or a "predictable result," but a departure from the established standards. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

Petitioner's argument is born of hindsight, not the prior art. Because Petitioner fails to show why a POSITA would have been motivated to merge an intra prediction signaling method with an inter prediction macroblock expansion—especially when the latter expressly leaves intra prediction for another day—Petitioner has failed to show that a POSITA would have been motivated to combine Sekiguchi and VCEG-AJ21. Thus, Petitioner has not demonstrated a reasonable likelihood of prevailing on Grounds 1A-1B for this reason as well.

F. Grounds 2A-2B (all independent claims): The combination of Xiong and VCEG-AJ21 fails to render obvious "*performing intra prediction with multiple partition types for chroma encoding of the block, the multiple partition types comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4.*"

The proposed combination of Xiong and VCEG-AJ21 fails to render obvious any of the challenged independent claims for reasons similar to those detailed for Ground 1A: Xiong and VCEG-AJ21 fail to teach or suggest "*performing intra prediction with multiple partition types … comprising a set of multiple chroma partition types of sizes 16×16, 8×8, 4×4*," as recited in independent claims 1 and 2 with respect to encoding, and similarly recited in independent claims 10 and 14 with respect to decoding.

Petitioner does not rely on Xiong to disclose a 16×16 chroma partition size for intra prediction and relies exclusively on VCEG-AJ21 to supply this missing element. *See* Pet., 63-65. Petitioner and Dr. Havlicek provide the same theories for VCEG-AJ21 here as presented for Ground 1A. Pet., 63-65; EX1003, ¶¶183-185. VCEG-AJ21, however, is deficient here for the same reasons presented above for Ground 1A. *See* Section VII.B.1. Specifically, Petitioner again improperly relies solely on Dr. Havlicek's testimony to supply a missing claim limitation in violation of Rule 104(b)(4). *See* Section VII.B.1. The Director should deny institution for this reason alone.

Moreover, and despite Dr. Havlicek's proposed theories to the contrary, VCEG-AJ21 does not teach using a 16×16 partition type for chroma ***intra*** prediction because VCEG-AJ21 is strictly directed to ***inter*** prediction. Section VII.B.1. Indeed, as previously explained, VCEG-AJ21 expressly avoids addressing intra prediction. EX1006, 1 (intra prediction is "not yet addressed"). In this manner, even when combined with Xiong, VCEG-AJ21 still does not teach a 16×16 chroma partition type for intra prediction.

Because VCEG-AJ21 does not teach a 16×16 chroma partition type for intra prediction, VCEG-AJ21 in combination with Xiong does not teach the claimed "*multiple partition types comprising a set of multiple chroma partition types of*

sizes 16×16, 8×8, 4×4" for "*performing intra prediction.*" Thus, Grounds 2A-2B fail.

G. Grounds 2A-2B: Petitioner's alleged motivation to combine Xiong and VCEG-AJ21 is hindsight-driven and ignores the technical context of the references.

Petitioner's obviousness theory for Ground 2A repeats the same hindsight bias found in Ground 1A. *See supra* Section VII.E. Specifically, Petitioner alleges that a POSITA would have been motivated to add VCEG-AJ21 to Xiong "to extend Xiong's teachings of determining chroma block sizes based on luma block sizes to include larger block sizes." Pet., 61. As with Ground 1A, Petitioner attempts to "extend" Xiong's chroma intra prediction logic to the larger block sizes in VCEG-AJ21, but fails to provide any non-hindsight reason why a POSITA would merge these two fundamentally incompatible technical domains to result in the claims. *See supra* Section VII.E.

First, Petitioner improperly conflates intra prediction optimization with an inter prediction framework. Xiong is strictly focused on improving efficiency in ***intra*** prediction by using smaller chroma block sizes (e.g., $2^n x 2^n$ where n=0, 1, or 2) to better capture local spatial correlation. EX1008, Abstract, 5:1-20. Specifically, Xiong recognizes that H.264 intra-frame coding prediction "is only carried out with 8x8 blocks" and seeks to solve the resulting inefficiency by introducing smaller 4x4 chroma blocks. *Id*. In contrast, VCEG-AJ21 is a motion-

estimation (***inter*** prediction) reference that expressly states that ***intra*** prediction is "not yet addressed." EX1006, 1.

As detailed in Sections II.C and VII.E, inter prediction and intra prediction solve fundamentally different problems—***inter*** prediction tracks temporal movement across frames, while the ***intra*** prediction extrapolates spatial data within a single frame. Petitioner offers no explanation for why a POSITA would have been motivated to merge Xiong's intra prediction optimization method with the inter prediction macroblock expansion described in VCEG-AJ21—especially when VCEG-AJ21 expressly leaves intra prediction for another day.

Second, Petitioner's "simple extension" argument ignores the significant technical hurdles inherent in modifying block sizes. VCEG-AJ21 itself admits that enlarging macroblocks even for its *intended* purpose of ***inter*** prediction is a complex task involving trade-offs in backward compatibility and syntax overhead. EX1006, 2; *see also supra* Section VII.E. Petitioner fails to explain how a POSITA would have successfully combined Xiong's specific ***intra*** prediction optimization method with the ***inter*** prediction environment of VCEG-AJ21, particularly when VCEG-AJ21 provides no roadmap for intra prediction implementation.

Because Petitioner fails to show why a POSITA would have been motivated to merge an intra prediction signaling method with an inter prediction macroblock expansion—especially when the latter expressly leaves intra prediction for another

day—Petitioner has failed to show that a POSITA would have been motivated to combine Xiong and VCEG-AJ21. Thus, Petitioner has not demonstrated a reasonable likelihood of prevailing on Grounds 2A-2B for this additional reason.

VIII. CONCLUSION

The Petition fails to show a reasonable likelihood that any of the challenged claims is unpatentable as obvious in view of the cited art and, therefore, the Director should deny institution.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/Ryan C. Richardson, Reg. No. 67,254/

Ryan C. Richardson
Registration No. 67,254
Lead Attorney for Patent Owner InterDigital VC Holdings, Inc.

Date: April 8, 2026

1101 K Street, NW, 10th Floor
Washington, DC 20005
(202) 371-2600

CERTIFICATE OF WORD COUNT (37 C.F.R. § 42.24(d))

1. This Patent Owner Preliminary Response complies with the type-volume limitation of 14,000 words, comprising 8,942 words, excluding the parts exempted by 37 C.F.R. § 42.24(a)(1).

2. This Patent Owner Preliminary Response complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman font.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/Ryan C. Richardson, Reg. No. 67,254/

Ryan C. Richardson
Registration No. 67,254
Lead Attorney for Patent Owner InterDigital VC Holdings, Inc.

Date: April 8, 2026

1101 K Street, NW, 10th Floor
Washington, DC 20005
(202) 371-2600

CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e))

I certify that the above-captioned **PATENT OWNER PRELIMINARY RESPONSE** and associated Exhibits 2017-2018 were served in their entireties on April 8, 2026, upon the following parties via electronic mail:

Jessica Kaiser (Lead Counsel) kaiser-ptab@perkinscoie.com
Jon Carter (Back-Up Counsel) carter-ptab@perkinscoie.com
David Pekarek Krohn (Back-Up Counsel) pekarekkrohn-ptab@perkinscoie.com
Amazon-InterDigital-IPR@perkinscoie.com
PERKINS COIE LLP

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/Ryan C. Richardson, Reg. No. 67,254/

Ryan C. Richardson
Registration No. 67,254
Lead Attorney for Patent Owner InterDigital VC Holdings, Inc.

Date: April 8, 2026

1101 K Street, NW, 10th Floor
Washington, DC 20005
(202) 371-2600