

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SNAP INC. and
HISENSE USA CORPORATION
Petitioners

v.

NOKIA TECHNOLOGIES OY,
Patent Owner

Case: IPR2025-01263

U.S. Patent No. 10,536,714

PATENT OWNER’S PRELIMINARY RESPONSE

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TABLE OF EXHIBITS

Ex. No.	Title	Previously Submitted
2001	Order No. 23-Amended Adopted Procedural Schedule in Investigation No. 337-TA-1448, dated September 30, 2025	X
2002	Investigation Initiation Letter to The Honorable Lisa R. Barton in Investigation No. 337-TA-1448, dated April 11, 2025	X
2003	Respondents Initial Invalidity Contentions in Investigation No. 337-TA-1448, dated July 1, 2025	X
2004	Exhibit D-4 Claim Chart Regarding U. S. Patent No. 10,536,714, in Investigation No. 337-TA-1448	X
2005	Exhibit D-4 Claim Chart Regarding U. S. Patent No. 10,536,714, in Investigation No. 337-TA-1380	X
2006	Public Version of Initial Determination on Violation of Section 337 and Recommended Determination on Remedy and Bond in Investigation No. 337-TA-1380, dated December 20, 2024	X
2007	Original Complaint in <i>Nokia Technologies Oy v. Hisense Co. Ltd. et al.</i> , Case No. 1:25-cv-01871-TWT (N.D. Cal.), dated April 7, 2025	X
2008	Nakamura et al., “Unification of derivation process for merge mode and MVP,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, Italy, Jul. 14-22, 2011, Document JCTVC-F419 (“Nakamura Document”)	
2009	Nakamura et al., “Unification of derivation process for merge mode and MVP” Presentation, Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 6th Meeting, Torino, Italy, Jul. 14-22, 2011, Document JCTVC-F419 (“Nakamura Presentation”)	
2010	Declaration of Dr. Iain Richardson	
2011	CV of Dr. Iain Richardson	

2012	Excerpts from “The H.264 Advanced Video Compression Standard”, Richardson, 2010 (Cover pages, book pages 28-38, 69, 106, 108, 223-229)	
2013	Gary J. Sullivan et al, “Overview of the High Efficiency Video Coding (HEVC) Standard,” in IEEE Transactions on Circuits and Systems for Video Technology, vol. 22, no 12, pp. 1649-1668	
2014	Bici et al., “Non-CE13: Simplification of merge mode,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 7th Meeting: Geneva, CH, 21-30, November, 2011, Document JCTVC-G593	
2015	Bici et al., “CE9: Results of SP experiments on simplification of merge process,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 8th Meeting: San José, CA, USA, 1–10, February, 2012, Document JCTVC- H0252	
2016	ITU-T Series H: Audiovisual and Multimedia Systems, Infrastructure of audiovisual service – Coding of moving video, High efficiency video coding (H.265) (04/2013)	
2017	Kim et al., “CE9: Summary report of core experiment on MV coding and Skip/Merge,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 8th Meeting: San José, CA, USA, 1–10, February, 2012, Document JCTVC- H0039	
2018	Sullivan et al., “Meeting report of the eight meeting of the Joint Collaborative Team on Video Coding (JCT-VC), San Jose, US, 1–10 Feb. 2012,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11 8th Meeting: San Jose, US, 1–10 Feb. 2012, Document JCTVC-H1000	
2019	Deposition Transcript of Dr. Charles D. Creusere, Petitioner’s Expert in IPR Nos. IPR2024-00604 and IPR2024-00605, Exhibit 2020, January 22, 2025	

I. INTRODUCTION

This Petition and the expert declaration in IPR2025-01263 follow similar arguments as previous IPRs, Nos. IPR2024-00604, IPR2024-00605 and IPR2025-1153. The grounds from the previous petitions have been merged, while dropping the Nakamura reference after it failed the former petitioner in prior proceedings. New petitioners, Snap and Hisense, now bring substantially the same arguments, relying upon the same expert.

Patent Owner Nokia Technologies Oy (“Nokia”) sets forth the substantive errors, omissions, and shortcomings underlying the alleged grounds for invalidity argued in the Petition for *Inter Partes* Review of U.S. Patent No. 10,536,714 (the “’714 Patent”) (“Petition” or “Pet.”). Both of Petitioner’s Grounds are flawed and institution should be denied.

First, as to Grounds 1 and 2, Petitioner fails to show that Rusert’s alleged “subset” is “based on the location of the block associated with the first spatial motion vector prediction candidate,” as required by the claims. It is not. In Rusert, the content of the working list (PMV_CANDS) at any iteration is fixed by what has already been scanned and admitted, not by where the next candidate happens to be, so the alleged “subset” is determined before the “first” candidate’s location is even known. The Petition’s theory therefore misreads both the claim language and Rusert’s outward scan, effectively overlooking the Board’s prior rejection of a construction that would decouple the subset

determination from the candidate's associated block. This Petition repackages the same misreading of Rusert from before—now recast with a new declaration from the same expert—yet the reference fails to satisfy the claim limitations for the same fundamental reasons.

Second, as to Grounds 1 and 2, the Board has already rejected the very “subset” theory Petitioner advances here. In the prior Amazon IPRs (IPR2024-00604/605), the Board found that Nakamura does not disclose “determining a subset of spatial motion vector prediction candidates based on a location of the block associated with the first spatial motion vector prediction candidate,” because the subset is fixed before the later candidate is even identified. Petitioner's expert, Dr. Creusere, confirmed this sequencing in deposition and conceded that Rusert operates the same way in all respects relevant to this limitation: the working list is assembled from earlier-processed neighbors, and only afterward is a subsequent candidate considered and compared against that preexisting list. The same fatal timing defects that defeated the Nakamura ground therefore defeats Petitioner's Rusert ground.

In support of this Patent Owner's Response, Nokia provides a declaration from its expert, Dr. Iain Richardson (Ex-2010). Dr. Richardson's CV is attached as Ex-2011.

Nokia respectfully requests that the Board reject Petitioner's arguments and find that the '714 Patent's challenged claims not unpatentable under any of Petitioner's

Grounds. Because none of the grounds establish a reasonable likelihood that the challenged claims are unpatentable, institution should be denied

II. BACKGROUND

A. Motion-Compensated Prediction in Video Coding

At a high level, most video coding techniques exploit pixel redundancy in the spatial and temporal domains and involve finding ways to communicate new information in a bitstream by referencing similar, already communicated information. The references to already coded information are used to generate approximations of each block of a video frame being encoded; such approximations are commonly referred to as predictions. Predictions are combined with additional information, sometimes referred to as prediction error or residual information, to reproduce a reconstructed image upon decoding. The encoder communicates to the decoder how to make predictions for each block as well as the residual information in a compressed form, and the decoder creates the same prediction, decodes the residual information, and combines the residual and prediction to reconstruct the coded block. Ex-2010 at 18.

There are two main ways of exploiting redundancy in video coding to create such predictions—intra coding and inter coding. In an intra-coded block in a frame of video, reference to already coded pixels in the same frame are used to create a prediction and to reduce the number of bits necessary to encode and represent the current block. In an inter-coded block, a prediction block is constructed with reference to pixels in one or

more previously coded frames, which may be frames in the past or the future in display order. The choice of one or more previously coded frames (known as reference pictures or reference frames) and an offset or motion vector identifying each similar region of pixels in a reference picture, are used to create a prediction block. The instructions for creating the prediction block and the prediction error or residual are encoded. *Id.* at 20. In many cases, inter coding can produce a better match than intra coding, resulting in a residual block that contains less data and is therefore smaller once compressed.

The '714 Patent relates to an inter prediction mode in the H.265 video coding standard called merge mode. In merge mode, the encoder and decoder form lists of motion vector prediction candidates, called merge lists, for the current block and then the encoder communicates to the decoder which candidate from the merge list to use for the block. Merge mode exploits the property that motion vectors (i.e., offsets indicating a prediction source in a previously coded frame) in for a block are often similar to the motion vectors of neighboring blocks. Merge mode can save bits by avoiding the need to send a motion vector explicitly and instead just sending an index value to identify a motion vector prediction included in the merge list. If the merge list includes motion vectors that produce accurate predictions, the use of an index to communicate the motion for the block can yield significant savings. Ex-2010 at 25. As explained below, the '714 patent relates to a more efficient method for constructing merge lists.

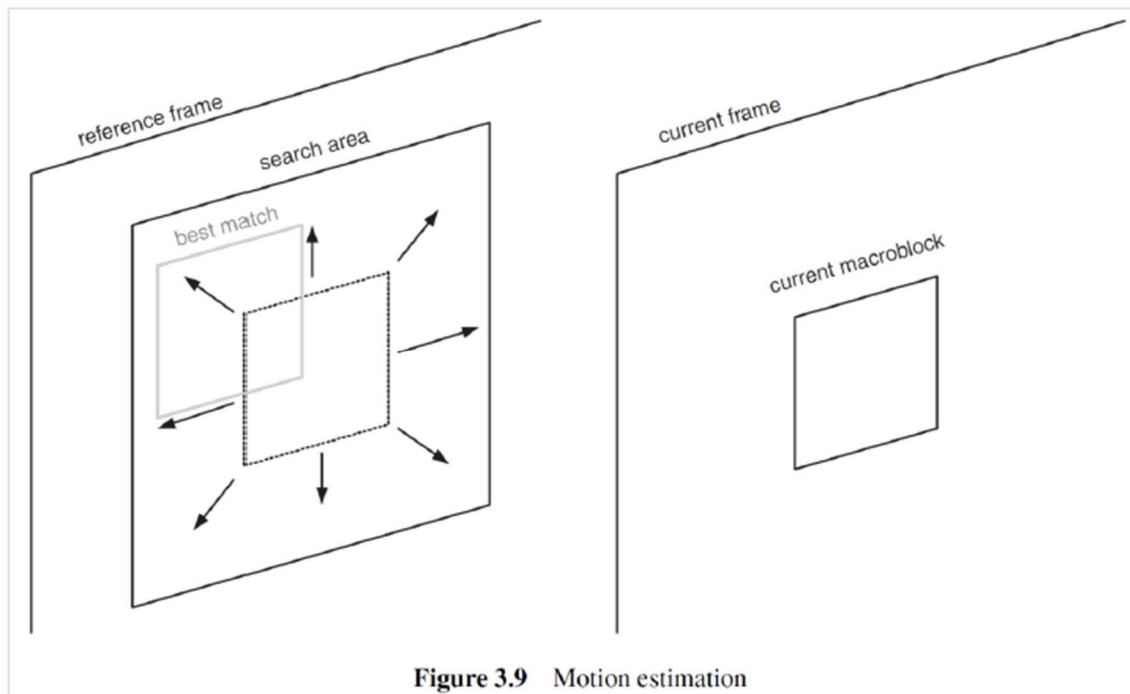
In video coding, motion compensation is applied to blocks of pixels as a unit, i.e., blocks of pixels in a frame are predicted using translational motion represented by a motion vector with a horizontal and a vertical component. An example block size for prediction is 16x16 pixels, however modern video standards such as H.264 (aka AVC, or Advanced Video Coding, first published in 2003 and still widely used today for distribution of video content) and its successor H.265 (aka HEVC, or High Efficiency Video Coding, first published in 2013 and increasingly popular for video streaming) allow variable block size, with blocks potentially as small as 4x4 and as large as 64x64 (in the case of HEVC). *Id.* at 21. Smaller blocks permit more accurate motion compensation, but can incur more signaling costs related to motion vectors for each block. Merge mode in HEVC is one strategy used to address this cost.

A motion vector for a current block to be encoded can be found using a search procedure, whereby the best matching block (according to a similarity criterion) in a previously encoded reference frame is found. Motion-compensated prediction is accomplished by identifying data (image content) from the reference frame(s) that is a good match with data in the current frame. When a suitable matching region is found, its location is communicated by the encoder using the motion vector. The motion vector will allow the decoder to obtain the same block used at the encoder from previously received encoded data. The encoder uses the prediction corresponding to the motion vector to obtain a corresponding block of difference (aka prediction error or residual)

values, which it compresses, encodes and transmits to the decoder. The decoder decodes the compressed difference value information and combines it with the prediction corresponding to the motion vector to reconstruct an approximation of the original data (image content). The encoder and decoder carry out different steps in their respective parts of the process, but the encoder and decoder must form the same prediction for the process to work. *Id.* at 18-19.

1. Role of Encoder in Motion-Compensated Prediction

A computationally taxing part of motion-compensated prediction is identifying the motion vector to use for the prediction. This is typically done by sub-dividing the current frame into blocks and finding matching regions in previously coded frames to use to predict the blocks in the current frame. While the blocks in the current frame are generally formed based on a grid pattern of some sort, the best matching blocks in previous frames may not, and typically do not, align with the same grid. As a result, the search for a best matching block typically involves many comparisons between the current block and many corresponding blocks from prior frames, with differing offsets, or motion vectors, relative to the current block, to find the best available matching block. This search for a matching block is referred to as motion estimation.



The H.264 Advanced Video Compression Standard, Iain Richardson, 2010, at Section 3.3.1.4 (Ex-2012)

The encoder may select an offset or motion vector that points to an integer pixel value, so that the corresponding block is a block of pixels actually present in the prior frame. In typical video codecs in use at the time of the invention of the '714 Patent, the encoder could also choose a motion vector that pointed to a sub-pixel location – a location between full pixel values, which generally results in a need for an even greater number of calculations, to generate pixel values at sub-pixel (fractional pixel) locations. Ex-2010 at 27-28.

Once a suitable block prediction method is chosen and motion vector(s) are identified, the encoder encodes the information necessary to recreate the block prediction, including the motion vector(s) and whether they are to be used as part of a

uni-prediction or bi-prediction and in some cases including an indication of a chosen reference picture. Additionally, the encoder compresses and encodes the difference between the predicted values (identified in the reference frame) and the actual values (present in the current block to be encoded), generally using a block transform such as the Discrete Cosine Transform and quantization to limit the amount of residual data sent. *Id.* at 30.

2. Role of Decoder in Motion Compensated Prediction

The decoder's task, at a high level, is to follow the encoder's instructions in the form of the motion vectors and prediction method to recreate the prediction, and then to decode the compressed prediction error and to add it to the prediction to obtain the decoded video. Importantly, the decoder must recreate the prediction signaled by the encoder exactly. Encoding processes generally use as reference frames previously coded frames that the decoder has already decoded, so that the decoder can reconstruct the same prediction for a current blocking using the prediction information communicated to the decoder. *Id.*

3. Transmission and Decoding of Motion Vectors

A strategy for reducing the amount of data encoded related to motion-compensated prediction is to reduce the data needed to send the motion vector itself.

The motion vectors must be encoded and transmitted to the decoder to allow the decoder to form the same predictions as the encoder. Motion vector information can

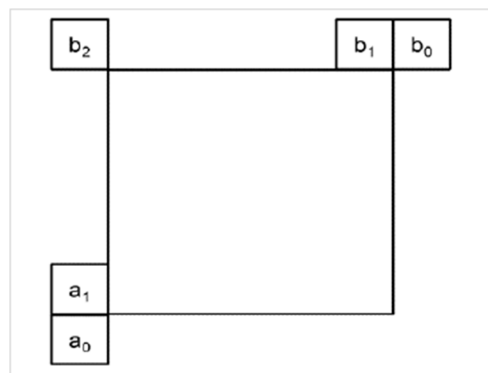
make up a substantial portion of a compressed video frame, particularly when small block sizes are used. However, the motion vectors of adjacent blocks (in space and time) are generally correlated, and this correlation (redundancy) can be exploited through efficient encoding. Modern video coding techniques use predictive methods to encode the motion vectors. Ex-2010 at 20.

Typical encoders encoding bitstreams into H.264-compliant formats can use the median value of three already-coded spatially adjacent motion vectors to form a prediction of the current motion vector. The difference between the current motion vector and its prediction is then losslessly encoded. The decoder forms the same prediction the encoder made, based on previously decoded data, and adds the motion vector difference to reconstruct the motion vector. *Id.*

Typical encoders encoding bitstreams into H.265-compliant formats may use more sophisticated ways to reduce the number of bits necessary to encode motion vectors. One option for signaling each motion vector is Merge mode. Merge mode allows neighboring blocks to share the same motion vectors and other motion information. *Id.* at 25-26.

The following figure, taken from the 2012 paper by Gary Sullivan et al titled “Overview of the High Efficiency Video Coding (HEVC) Standard” (Ex-2013) conceptually displays five blocks labeled a0, a1, b0, b1, and b2 that are spatially adjacent to the current block to be encoded. Ex-2013. The availability of these blocks for

merging is evaluated in the following order: a_1 , b_1 , b_0 , a_0 , b_2 . A temporal candidate for block merging at the same location in a reference frame (i.e., a previously coded frame that is not the current frame) is also evaluated for block merging. A candidate block is selected and the motion information for the current block is “inherited” from the candidate block, such that the motion information of the two blocks is merged. Ex-2010 at 26. Upon completion of the merging process, the blocks in the resulting merged region (i.e., the selected candidate block and the current block) share the same motion vector.



Ex-2013 at Figure 8.

It is frequently the case that two or more candidates in the list have the same motion vector. It is beneficial to eliminate such duplicates to shorten the list and reduce the number of bits needed to specify the index in the list. Comparison of candidates for potential elimination is a computationally costly process which can be simplified using the invention described in the '714 patent. Ex-2010 at 26-27.

B. The '714 Patent

One method for conveying information about a motion prediction, such as the motion vectors and reference frames to use for a particular prediction unit,¹ is the construction of parallel lists of motion information such as motion vectors in both an encoder and a decoder. If both an encoder and decoder construct motion vector prediction lists (also called merge lists), then data can be saved by encoding an index into the list rather than the motion information itself. The inventors of the '714 Patent understood this to be a desirable technique, but there was a need to reduce the computational complexity of constructing such lists and, in particular, the process of comparing candidates in order to remove redundant (i.e., identical) candidates. Ex- 1001 at 4:19-23. The inventors also realized that developing a parallelizable Merge mode, *see* Ex-1001 at 17:40-41, could lead to faster, more efficient candidate processing and thus faster, more efficient encoding and decoding. Ex-2014; *see also* Ex-2015.

A brief analysis of the potential number of such lists confirms the scale of the potential problem. A 1080p (High Definition) video frame has $1920 \times 1080 = 2,073,600$ pixels, and inter prediction units (prediction blocks) in H.265 can be as small as 4×4

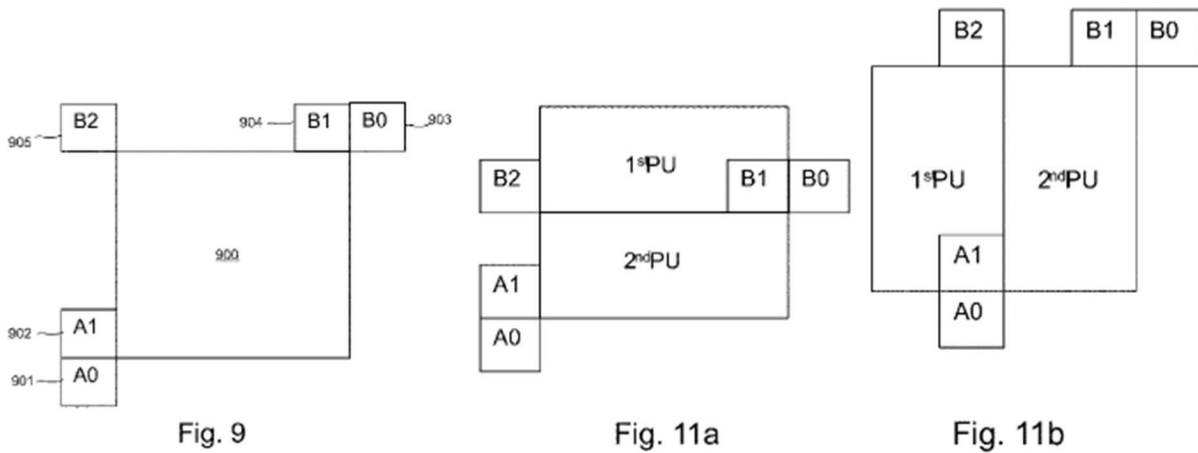
¹ In HEVC, the frame is made up of coding tree units (CTUs) that may be broken down into smaller coding units before predictions are applied. Prediction units are the subdivisions of the CTUs where predictions are applied.

= 16 pixels. Each coded frame can therefore include up to $2,073,600/16 = 129,600$ prediction units, each with its own list to construct. If each list comprises 5 candidates and each candidate is compared once to each other candidate (hence, 10 comparisons), this would total 1,296,000 comparisons per frame. At 30 frames per second, this could require more than 38,880,000 comparisons per second. While many video sequences are encoded using a mix of larger and smaller inter prediction units and other coding methods, a decoder must be able to accommodate such a worst-case sequence, and so must be computationally capable of performing this number of comparisons per second to decode real-time video..

To reduce the complexity of constructing motion prediction candidate lists for inter prediction modes such as merge mode, and to make it less complex to implement at the decoder, the inventors of the '714 Patent sought to incorporate into the merge list construction method a way to improve the diversity of potential candidates while reducing the number of comparisons based on, among other things, the location of the candidates relative to the prediction unit having its spatial motion vector candidate list constructed. Ex-1001 at 4:23-39. The inventors' Merge mode is also parallelizable; in other words, encoders and decoders can perform comparisons in parallel rather than one after the other. Ex-1001 at 17:40-41.

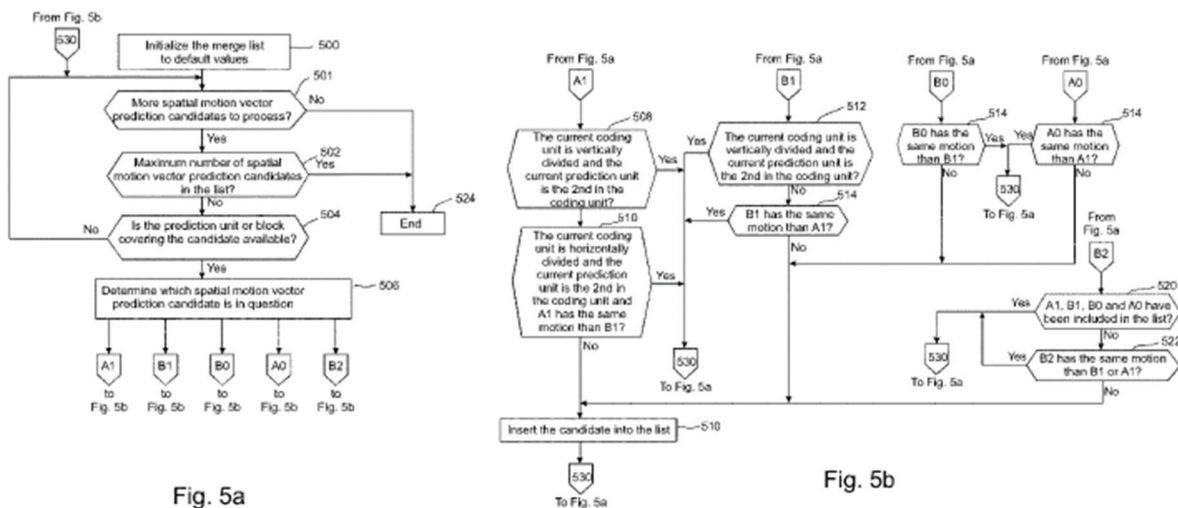
Figure 5 of the '714 Patent, with reference to Figures 9 and 11, illustrates improvements in merge list construction methods developed by the inventors. Figures

9 and 11, reproduced below, label the locations of merge list candidates relative to a current block. In Figures 11a and 11b, the larger block 900 has been divided into two smaller prediction units (PU), and in each case the candidates are shown for the second prediction unit in the block.



Ex-1001 at Figures 9, 11a, and 11b.

Figures 5 and 8 illustrate the encoder and decoder processes for merge list construction, respectively. Figures 5a and 5b are reproduced below:



Ex-1001 at Figures 5a and 5b.

Each motion vector prediction candidate A0, A1, B0, B1, and B2, which represent the locations of the blocks with which the motion prediction candidates are associated, is subject to a limited set of comparisons and other conditions to determine whether it can be included in the merge list. By eliminating unlikely or illogical candidate pairs, the inventors of the '714 Patent reduced the worst- case scenario for comparisons from 10 to 6 (Ex-1001 at 14:21-16:55), significantly reducing the number of comparisons that need to be performed to construct the merge list. As shown in Figure 5b, because subsets for comparison are determined based on the location of the block associated with a spatial motion vector prediction candidate, the comparisons are parallelizable. Ex-1001 at 17:40-41. For example, Figure 5b depicts the possibility of parallel processes for A0, A1, B0, and B1. *Id.*; Ex.-1001 Fig. 5b.

C. The Asserted Prior Art

1. Rusert (Ex-1004)

Rusert (U.S. Patent App. Pub. No. 2011/0194609, Ex-1004) is a published patent application titled “Selecting Predicted Motion Vector Candidates” and naming Thomas Rusert, Jacob Ström, Kenneth Andersson, Per Wennersten, and Rickard Sjöberg as inventors.

Rusert describes a method for generating a potential motion vector (PMV) candidate list, referred to as PMV_CANDS, for a current block of pixels that is either

being encoded or decoded. Ex-1004 at ¶¶ 11-12, 36-37. The PMV candidates are derived from previously coded neighboring blocks within an allowed distance from the current block. *Id.* at ¶¶ 11, 40-44, 73. Rusert provides various “scan orders” that describe the locations of possible PMV candidates and the order in which those locations may be checked for PMV candidates. Ex-1004 at ¶¶ 44, 51-66; *see id.*, Figures 3a-3n (illustrating the numerical scan order around the current block, labeled ‘.’, starting from block 1 and progressing outward in a counterclockwise direction).



Fig. 3n

Ex-1003 at 130 (Dr. Creusere annotating the counterclockwise scan order).

Using Figure 3n as an example, the PMV_CANDS list can ultimately include the blocks available in the scan order, such as some or all of 1, 2, 3, ..., a, b, c, and so on. IPR2024-00604, IPR2024-00605, Ex-2019 at 75:6-76:1; *see also id.* at 72:11-76:19. In Figure 3n, the current block is represented by the dot at the center of the figure. The evaluation begins with the previously coded block immediately above the current block,

labeled ‘1’, if available. The next block to the left of the current block, labeled ‘2’, is evaluated if available, and so on. Ex-2010 ¶ 69. Dr. Creusere characterizes the previously coded blocks in Rusert’s scan orders as the “spatial motion vector prediction candidates.” Ex-2019 at 72:11-76:19; Ex-2010 ¶ 68.

Some of the blocks in Rusert’s scan order may not be available, such as when the current block is near a frame boundary, when certain blocks have not yet been encoded by the time the current block is processed, or when some blocks do not have a motion vector (e.g., intra-coded blocks). Rusert Figure 3c illustrates an example where some blocks from the scan order in Figure 3b are unavailable, showing that only blocks 1, 2, 9, h, j, l, and m are available for inclusion in the PMV_CANDS list. Ex-2010 ¶ 70.

1d9em
#516g
a2.3b
h748i
njcko
Fig. 3b

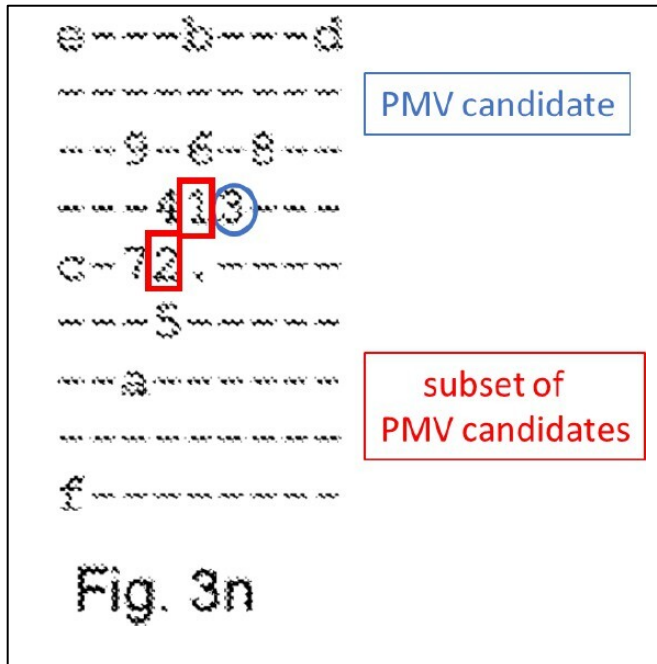
1-9-m
--1--
-2.--
h-----
-j-----
Fig. 3c

Ex-1004 at Figures 3b-3c.

As previously discussed, Rusert conducts counterclockwise scan of selected and available previously coded PMV candidates, beginning from the current block and staying within an allowed distance. *Id.* at ¶¶ 4-5, 36-39, 43-44, 51-66; *see also* Ex-2010 ¶ 71. As the scan progresses outward, what Petitioner refers to as “the subset,” Pet. at 10, has already been determined before Rusert reaches the next “spatial motion vector prediction candidate.” That is, what is in Rusert’s alleged “subset” are the results of evaluations of prior “candidates,” which depend only on the availability of candidates in the prior blocks in the scan order and whether those prior “candidates” met the comparison criteria with the candidates already present in PMV_CANDS at that time, Ex-1004 at ¶¶ 44, 51-66; *see also id.* at Figures 3a-3n; Ex-2010 ¶ 72. Rusert’s prior evaluations to determine the alleged “subset” are complete before Rusert ever reaches what Petitioner alleges is the “first spatial motion vector prediction candidate.” Ex-2010 ¶ 85. These prior evaluations also do not, and cannot, take into account the location of value of subsequent candidates that may be located in Rusert’s scan order.

For instance, when the motion vector for the block at location 3 (“block 3”) is evaluated during Rusert’s scan sequence, the “subset” of candidates in PMV_CANDS already includes candidates from previously evaluated scan locations, such as blocks 1 and 2, assuming those blocks are available and that the candidate associated with block 2 has not been excluded due to similarity to block 1. Petitioner argues the alleged “subset” (here, candidates associated with blocks 1 and/or 2) is based on the location of

block 3, which Petitioner alleges corresponds to the “first spatial motion vector prediction candidate.” Pet. at 30-31. This is incorrect. Rusert’s “subset” is determined prior to knowing the location or value of the next spatial motion prediction candidate, which in this example is block 3. Ex-2010 ¶ 73.



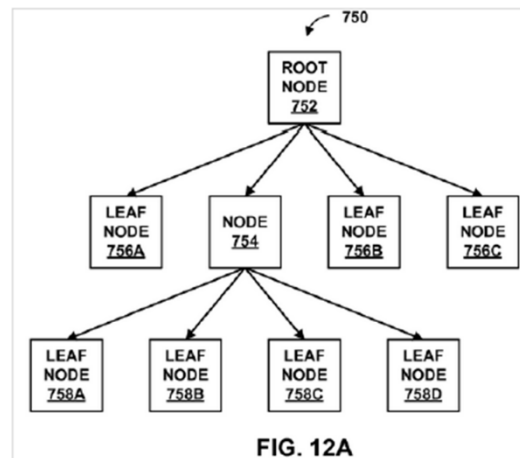
Dr. Creusere annotation of Rusert, IPR2024-00604, Exhibit 1003 ¶ 122.

The motion information for the candidate being evaluated, in this case, the candidate associated with block 3, is then compared to the alleged subset, which includes blocks 1 and 2 in this example, to decide whether block 3’s motion vector will be included in PMV_CANDS. Ex-1004 at ¶¶ 62, 71. When Rusert evaluates block 3, all possible pairs of candidates from the scan order are compared. Ex-2010 ¶ 74.

2. Karczewicz (Ex-1005)

Karczewicz (U.S. Patent App. Pub. No. 2011/0249721) is a published patent application titled “Variable length coding of coded block pattern (cbp) in video compression” that names Marta Karczewicz, Wei-Jung Chien, and Xianglin Wang as inventors.

Karczewicz describes a variable length code (VLC) for describing a quad-tree pattern by which a coding unit (CU) can be divided into sub-CUs. *See* Ex-1005 at ¶¶ 33-32. These CUs, in turn, may be divided into prediction units (PUs), which each include data for retrieving a reference frame and/or a motion vector. *See id.* at ¶ 35. Figure 12A of Karczewicz depicts such a quad-tree structure. *See id.* at ¶¶ 123-125. Karczewicz does not disclose a motion vector prediction list or a method for constructing such a list.

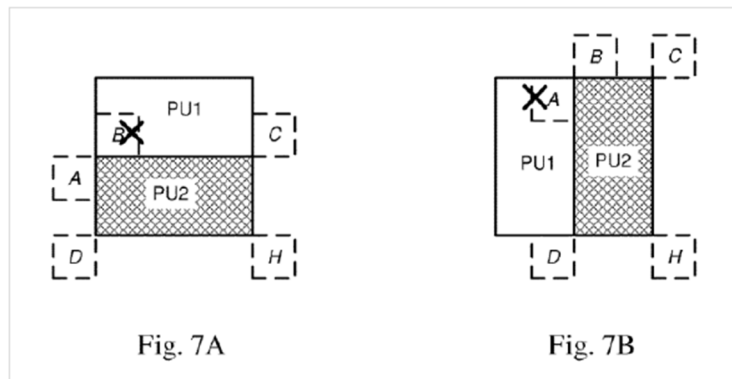


Ex-1005, Fig. 12A.

3. Lin (Ex-1006)

Lin (U.S. Patent No. 10,063,876) is a published patent titled “Method and apparatus for removing redundancy in motion vector predictors” that names Jian- Liang Lin, Yi-Wen Chen, Yu-Wen Huang, and Shaw-Min Lei as inventors.

Lin addresses a scenario where a coding unit (CU) is divided into multiple prediction units (PUs). See Ex-1006 at ¶¶ 6:60-7:26. Lin discloses that, where a CU is divided into $2N \times N$ or $N \times 2N$ PUs, a motion vector prediction candidate for the second PU located within the first PU is redundant and can be discarded to avoid effectively merging the two PUs as though they were in an $N \times N$ configuration. *See id.*



Ex-1006, Figs. 7A and 7B.

D. POSITA

PO has applied Petitioner’s POSITA for the sake of this Response. Pet. at 14-15. This Response does not depend on this skill level. PO reserves the right to argue in favor of different level of skill should trial be instituted.

E. Asserted Grounds

Petitioner asserts the following grounds, none of which have a reasonable likelihood of success:

Ground		Claims	Prior Art
1	§ 103	1-3, 5-10, 12-17, 19-24, 26-30	Rusert and Karczewicz
2	§ 103	1-30	Rusert, Karczewicz, and Lin

F. Claim Construction

Previously, the Board found Petitioner’s interpretation unpersuasive that “the block” in limitation 1[b] means the “current block,” as in the “block of pixels” introduced in limitation 1[a]. Ex-1007 at 16-18, 30-33. Patent Owner agrees.

The Board properly interpreted the phrase “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” to mean the subset is determined based on the location of the block with which the first spatial motion vector prediction candidate is associated. Ex-1007 at 16-18. For instance, in Figure 9 of the ’714 Patent, the block labeled “901” is associated with the first spatial motion vector prediction candidate, “A0.” Ex-2010 ¶ 42.

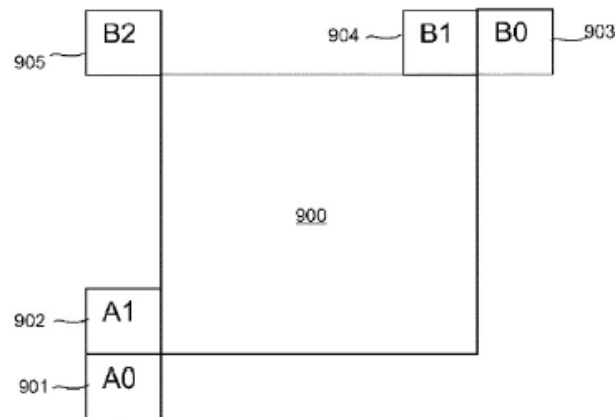


Fig. 9

Ex-1001, Figure 9. The Board has already observed that Petitioner’s construction wrongly reads out “associated with the first spatial motion vector prediction candidate.” Ex-1007 at 17. Petitioner’s attempt to preserve both constructions should be disregarded.

This response does not depend on further constructions, so PO does not address it here. PO Reserves the right to further address claim construction should trial be instituted.

G. Claim Listing

For the sake of this analysis, PO will use Petitioner’s limitation labels provided in the petition’s Claim Appendix. Pet. at 77.

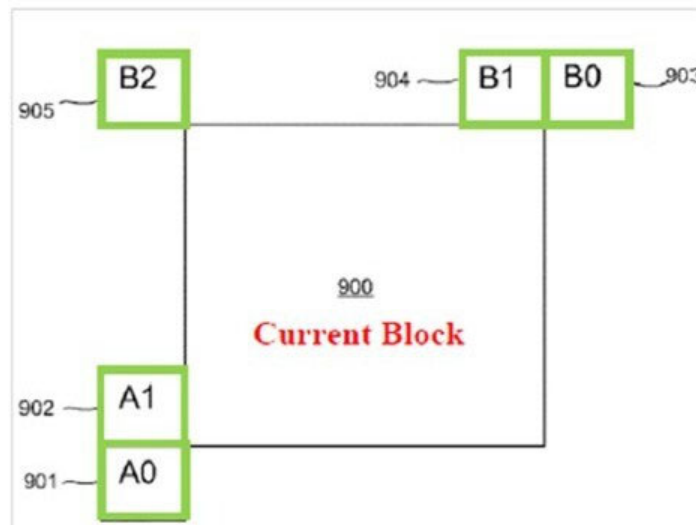
III. ARGUMENT

A. **Petitioner Has Not Established a Reasonable Likelihood That The Challenged Claims Are Unpatentable In Light Of Ground 1**

1. **Petitioner's Ground 1 argument fails because Rusert does not teach "determining a subset of spatial motion vector prediction candidates based on a location of the block associated with the first spatial motion vector prediction candidate"**

Petitioner alleges this limitation is found in Rusert. However, Rusert does not teach "determining a subset of spatial motion vector prediction candidates based on a location of the block associated with the first spatial motion vector prediction candidate," as required by the claims. Ex-1001 at cl. 1, cl. 15, cl. 29. What Petitioner alleges to be Rusert's subset of spatial motion vector candidates is not determined based on the location of the block associated with the alleged first spatial motion vector candidate, nor is the determination of the alleged subset based on the alleged selected first spatial motion vector candidate. Ex-2010 ¶ 94.

The '714 Patent describes how a set of spatial motion vector prediction candidates is derived from neighboring blocks surrounding the current block of pixels being encoded or decoded. Ex-1001 at 13:26-31. The following figure illustrates this relationship, with green highlights added around the neighboring blocks from which the set of spatial motion vector prediction candidates is sourced. Ex-2010 ¶ 89.



Ex-1001 at Figure 9 (annotated to show the set of motion vector prediction candidates A0, A1, B0, B1 and B2).

As the '714 Patent specifies, and as a POSITA would recognize, when creating the motion vector prediction list, first a spatial motion vector prediction candidate is selected for evaluation and is then compared to a subset of other spatial motion vector prediction candidates. This comparison involves checking whether each candidate in the subset shares the same motion information as the selected candidate. *Id.* at 15:50-16:55. The purpose of this comparison is to prevent adding a redundant spatial motion vector prediction candidate to the motion vector prediction merge list. *Id.* at 4:19-26; *see also* Ex-2010 ¶ 90.

The subset described in the '714 Patent is determined “based on the location of the block associated with the first spatial motion vector prediction candidate.” For each selected candidate, a subset is determined that is smaller than the entire set of candidates.

Instead of comparing a selected candidate to all possible candidate pairs (e.g., comparing A0 to A1, B0, B1, and B2), the selected candidate is compared to a subset (e.g., comparing A0 to only A1) to reduce the computational workload for the comparisons while still performing comparisons to eliminate likely duplicates. Ex-1001 at 4:19-26. The '714 Patent provides examples of comparing a selected candidate with a subset. *See, e.g., id.* at cols. 15-16. Referring to the Figure above, for the candidate located to above and to the right (B0), the '714 Patent teaches that a subset containing only B1 can be used for comparison. *Id.* at 16:24-31. Similarly, for the candidate located at the bottom left (A0), the '714 Patent teaches that a subset containing only A1 should be used for comparison. *Id.* at 16:32-39; *see also* Ex-2010 ¶ 91.

In the embodiments of the '714 Patent, the location of the selected spatial motion vector prediction candidate must be known first to determine the subset based on that location. That is, the location of the selected spatial motion vector prediction candidate (e.g., B0 or A0) determines the members of the subset used for comparison (e.g., {B1} or {A1}). *See* Ex-2010 ¶ 91.

As mentioned above, the Board has previously rejected the Petitioner's interpretation of "the block" as "the block of pixels" in limitation 1[a]. Ex-1007 at 18. In fact, the Board sided with Patent Owner, agreeing that "the block" in limitation 1[b] refers to "the block associated with the first spatial motion vector prediction candidate," as specified in limitation 1[b]. *Id.*; *see also* Ex-2010 ¶ 43.

In Rusert, each PMV candidate is obtained from neighboring blocks in a scanning order determined by distance from the current block. For each location, Rusert assesses whether a exists, then whether the candidate should be added to the list, and then proceeds to the next PMV candidate in the scanning order until the process is completed. Ex-1004 at ¶ 44. Figure 3n of Rusert shows an example of this distance-based scanning method, where the closest PMV candidates are evaluated first, followed by the farthest (i.e., in the order 1, 2, 3 . . . 9, a, b . . . depending on availability), in a counterclockwise spiral starting from the current block, marked as ‘.’. *Id.* at ¶ 58; *see also* Ex-2010 ¶ 92.

When deciding whether to add a PMV candidate to the motion vector prediction (PMV_CANDS) list, Rusert compares the candidate to each of the PMV candidates already on the list. For instance, if candidate 1 is already on the list at the time candidate 2 is considered for inclusion, candidate 2 will be compared to candidate 1. If candidates 1 and 2 are on the list at the time 3 is considered, candidate 3 will be compared to both candidates 1 and 2, and so on. Ex-1004 at ¶¶ 71-72. If the comparison shows the candidate being considered is the same or similar to one already on the list, it can be excluded from the PMV_CANDS list. *Id.*; *see also* Ex- 2010 ¶ 93.

Petitioner is mistaken in claiming that the alleged “subset” is determined based on the location of its alleged first spatial motion vector prediction candidate for at least two reasons. First, the contents of PMV_CANDS when a PMV candidate is considered

have already been established, regardless of the first spatial motion vector prediction candidate under consideration. Second, the PMV_CANDS list is determined by the values of the previous candidates, not by the location of the current candidate being evaluated. *See* Ex-2010 ¶ 94.

Regarding the first point, Rusert's PMV_CANDS list is built by scanning neighboring blocks in an order based on their distance from the current block, where each available motion vector block along the scan path can be checked as a PMV candidate.² Ex-1004 at ¶ 61, Figure 3n. Motion vectors of blocks that are outside the allowed distance or are unavailable cannot be included in the PMV_CANDS list. *Id.* at ¶ 54; *see also* Ex-2019 at 125:9-127:20; Ex-2010 ¶ 95.

²In Rusert, only valid motion vectors can be included in the subset of motion vectors in PMV_CANDS. Ex-1004 at ¶ 44. Therefore, a block that is unavailable is excluded from Rusert's scan order and is not evaluated for inclusion in PMV_CANDS. Ex-2010 fn. 10.

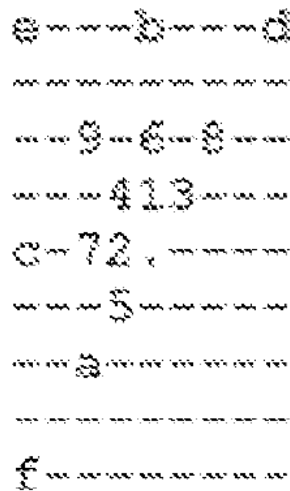


Fig. 3n

Id. at Figure 3n.

Petitioner alleges that, if the current block is 3, the subset determination for 3 is evaluated when PMV_CANDS “likely” already includes blocks 1 and 2, i.e., {1, 2}, and the PMV for block 3 is added to the PMV_CANDS list, “assuming neither [block 1 or 2] was excluded as unnecessary.” Pet. at 29-31. This argument is incorrect and mischaracterizes Rusert’s subset determination of block 3 by conflating the present-iteration consideration of the first motion vector prediction candidate of block 3 with past-iteration subset evaluations of those “likely” previous admissions to PMV_CANDS. For example, at iteration 0 of Rusert’s scan (see below table), PMV_CANDS is empty, and block 1 is evaluated and added to PMV_CANDS. At iteration 1, PMV_CANDS now contains {1}, and block 2 is evaluated and added. At the next iteration (iteration 2), regardless of the position of block 3 (which may or may

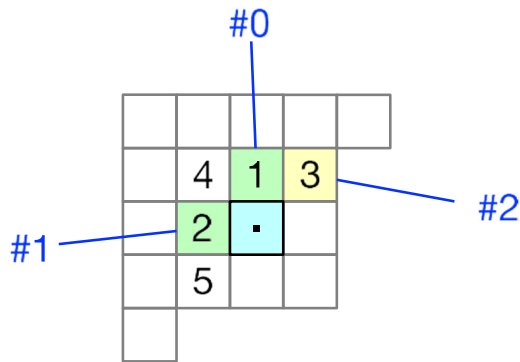
not have an available motion vector to be a spatial motion vector prediction candidate), PMV_CANDS (the alleged subset) can only include blocks 1 and 2. The location of block 3, assuming an associated motion vector is available, does not influence the construction of the previous content of PMV_CANDS (the alleged subset). For instance, if block 3 is available, iteration 2 compares block 3 (following the scan order in Figure 3n above) with a subset (PMV_CANDS) that already contains blocks 1 and 2. Ex-2010 ¶ 96.

Iteration	PMV_CANDS before	Block being evaluated	PMV_CANDS after
0	{}	1	{1}
1	{1}	2	{1, 2}
2	{1, 2}	3	{1, 2, 3}

By the time neighboring block 2 has been evaluated, the content of the PMV_CANDS list for the next block to be considered is already determined. It will include candidates 1 and 2, assuming they are sufficiently dissimilar. The location and information related to block 3 (or block 4 if block 3 is unavailable) do not impact the contents of PMV_CANDS when the motion vector of block 3 (or 4) is being evaluated. PMV_CANDS is already established before considering the next block. No information about a candidate (including its location) is used to determine PMV_CANDS prior to evaluating that candidate. Therefore, PMV_CANDS (the alleged subset) is not

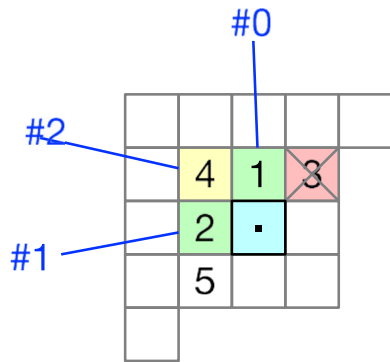
determined based on the location or any other characteristic of the so-called “selected first spatial motion vector prediction candidate.”

Consider three examples, based on the scan order of Figure 3n. First, all neighboring blocks are available (i.e., they have motion vectors and have already been coded). Assume that all evaluated blocks are added to PMV_CANDS based on comparisons. At iteration #0 (highlighted in green), the previous PMV_CANDS is empty {} and block 1 is evaluated. Then the block 1’s motion vector is added to PMV_CANDS. At iteration 1 (highlighted in green), the previous PMV_CANDS is {1} and block 2 is evaluated. Then block 2’s motion vector is added to PMV_CANDS. At iteration 2 (highlighted in yellow), the previous PMV_CANDS is {1, 2} and block 3 is evaluated. Then block 3’s motion vector is added to PMV_CANDS. Ex-2010 ¶ 96.



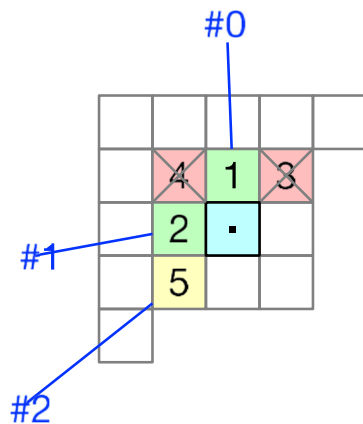
Example 1

Second, assume block 3 is unavailable: e.g., it is intra coded and has no motion vector. Iterations 0 and 1 are the same as in example 1. At iteration 2 (highlighted in yellow), the previous PMV_CANDS is {1, 2} and block 4 is evaluated. See Ex-1004 at ¶ 54. Then block 4’s motion vector is added to PMV_CANDS. Ex-2010 ¶ 97.



Example 2

Third, assume blocks 3 and 4 are both unavailable. Iterations 0 and 1 are the same as in examples 1 and 2. At iteration 2 (highlighted in yellow), the previous PMV_CANDS is {1, 2} and block 5 is evaluated. See Ex-1004 at ¶ 54. Then block 5's motion vector is added to PMV_CANDS.



Example 3

Comparing these three examples, we see that the location of the block evaluated at iteration 2 has changed. That is, it may be the block at location 3, 4, or 5 depending on block availability. However, the contents of PMV_CANDS (the alleged subset) at iteration 2 have not changed, as seen in the table below. Therefore, the content of

PMV_CANDS prior to evaluating a new block (e.g., the block evaluated at iteration 2) cannot depend on the location of that new block. This is demonstrated by the fact that at iteration 2, regardless of whether the new block is located above and to the right (example 1), above and to the left (example 2), or below and to the left (example 3), the content of PMV_CANDS is the same. Ex-2010 ¶¶ 99-102.

Iteration	PMV_CANDS before	Block being evaluated	PMV_CANDS after
0	{}	1	{1}
1	{1}	2	{1, 2}
2	{1, 2}	5	{1, 2, 5}

For purposes of its argument under the Board and Patent Owner’s interpretation, Petitioner alleges that the claimed “block associated with the first spatial motion vector prediction candidate” is the block being evaluated at a current iteration of Ruser’s scan path. In the examples above, this block is either block 3, 4, or 5 depending on availability. Petitioner also alleges that the claimed “subset of spatial motion vector candidates” is the list PMV_CANDS prior to evaluating the block at the current iteration of Ruser’s scan path. In the examples above, this is PMV_CANDS prior to iteration 2.

The above discussion shows that the alleged subset (PMV_CANDS) is not determined based on the location of the alleged first block (whichever block is evaluated at iteration 2 in the above examples). Rather, the content of PMV_CANDS prior to evaluating a new block depends on the current iteration number (iteration 2 in the above examples) and whether each previously evaluated block has been added to

PMV_CANDS or not (whether blocks 1 and 2 have been added to PMV_CANDS in the above examples). In the above examples, the content of PMV_CANDS prior to iteration 2 can be either {1} or {1, 2}. This content cannot and does not depend on the location of the block being evaluated at iteration 2. The only factor determining the candidates in the PMV_CANDS list at any given iteration is the availability and motion vectors of the blocks considered before the current block being evaluated.

Instead of being based on the location of a PMV candidate under consideration, the set of PMV candidates used for comparison in Rusert is determined by the availability and value of each PMV candidate that has already been considered and added to the list. Ex-1004. As explained above, when candidate 3 is compared to candidates 1 and 2, it is not because candidate 3 is in the top right. Rather, it is because candidates 1 and 2 are available and sufficiently dissimilar, which is why they were both previously added to PMV_CANDS. *Id.* at ¶¶ 70-72; *see also* Ex-2010 ¶ 103.

Further evidence that the '714 Patent's approach is different from Rusert is that it is expressly designed to support parallel execution, which is fundamentally at odds with Rusert's inherently sequential scan-and-compare procedure. Because the subsets in the '714 Patent are determined based on the location of the selected candidate, comparisons for different candidates can proceed without interdependence. *See* Ex-1001 at 17:40-41; *see also* Ex-2010 ¶ 66 ("One reason the '714 Patent enables a parallelizable process is that the subset of spatial motion vector candidates is determined

based on the location of the block associated with the first spatial motion vector prediction candidate.”) By contrast, in Rusert each evaluation depends on the evolving contents of PMV_CANDS produced by prior iterations in the scan order, which prevents independent parallel processing. The parallelizability of subset comparisons is not a mere implementation detail; it is evidence of a structural distinction between the ’714 Patent method and Rusert’s method and underscores why Rusert does not teach or suggest the claim requirement that the subset be determined based on the location of the block associated with the first spatial motion vector prediction candidate. Moreover, this trait is known in the art to be valuable and is likewise a benefit of the ’714 Patent claims that Rusert’s teaching lacks. *See* Ex-2010 ¶ 66.

In its previous Institution Decision of IPR2024-00604, the Board presented the following example: “if the first selected candidate is at the location of block 5, then the subset would be the four members 1, 2, 3, and 4, and if the first selected candidate is at the location of block 3, then the subset would be the two members 1 and 2.” Ex-1007 at 35. Respectfully, this example mischaracterizes Rusert. For instance, if the first selected candidate is at the location of block 5, Rusert’s PMV_CANDS *may* consist of {1, 2, 3, 4}, but it could also be a smaller set, such as {1, 2}, {1, 3}, etc., depending on the availability of blocks and the similarity of their motion vector values. Likewise, if the first selected candidate is at the location of block 3, PMV_CANDS could consist of {1, 2}, but it could also consist of {1}, {2}, or be empty, depending on the availability and

similarity of the blocks, as explained above. In other words, the alleged subset PMV_CANDS could consist of {1, 2} for the first selected candidate at block 3, block 4, block 5, or any other block in Rusert's scan, depending on block availability. For these reasons, Patent Owner disagrees with the Board's conclusion for purposes of the prior institution that "[t]he members of the determined subset [PMV_CANDS] depend on the location of the block associated with the first selected spatial motion vector prediction candidate." Ex-1007 (IPR2024-00604 Institution Decision) at 35; *see also* Ex-2010 ¶ 104. In short, Rusert does not determine "a subset of spatial motion vector prediction candidates based on a location of the block associated with the first spatial motion vector prediction candidate."

Petitioner's attempt to rehabilitate Rusert by reframing PMV_CANDS as a subset "ascertained" from a scan ordered by increasing distance—such that, at any given iteration, the subset purportedly includes candidates "as close or closer" than the current PMV candidate—does not meet the claim language or the Board's construction of "the block" in limitation 1[b]. As Dr. Richardson explains, this new framing conflates a scheduling property tied to the current block with the determination required by the limitation, which is to be based on the location of the block associated with the first spatial motion vector prediction candidate. Ex-2010 ¶¶ 105-07. Specifically, the claims require that the subset be determined "based on a location of the block associated with the first spatial motion vector prediction candidate," not based on the distance of

neighbors from the current block or the iteration index of a scan. *See id.* ¶109. Rusert’s distance rules are defined with respect to the current block and control only the visitation schedule in the outward scan. *Id.* ¶ 106. The contents of PMV_CANDS used at the moment the first candidate is evaluated are determined beforehand by availability and duplicate-removal applied to previously visited neighbors; observing the location of any particular first candidate in Rusert’s scan order merely reflects the current-block scan schedule iteration, not the determination of the subset, as explained above. *Id.* ¶¶ 107-08. Thus, regardless of Petitioner’s new framing of Rusert, the contents of PMV_CANDS for the current PMV candidate are determined and finalized before the location of the block associated with that candidate is even known, so the subset cannot be determined based on the location of the candidate. *Id.* ¶ 110.

Petitioner’s attempted “scan distance” framing of the first-candidate location-based determination required by limitation 1[b] is also in conflict with prior Board determinations, including claim construction of “the block” and the sequencing issue the Board identified in the Nakamura reference. Ex-2010 ¶ 111. The shortcomings recognized by the Board apply equally to Petitioner’s “as close or closer” description of Rusert’s process, as explained further below. *See id.*

Accordingly, Rusert fails to teach at least elements 1[b], 15[b], and 29[b], and the Petitioner has failed to show by a preponderance of evidence that the Challenged Claims

are unpatentable based on this Ground. Petitioner does not rely on Karczewicz for this limitation. Pet. at 28-35.

2. Petitioner’s Ground 1 argument fails because the Board already rejected Petitioner’s “subset” theory advanced under Nakamura, and Dr. Creusere admitted that Nakamura and Rusert operate the same way for this limitation

Petitioner’s reading of “determin[ing] a subset of spatial motion vector prediction candidates based on a location of the block associated with the first spatial motion vector prediction candidate” replicates the very sequencing error the Board and the ITC rejected when Amazon advanced it under Nakamura. *See* Ex-1007 at 56–57; *see also* Ex-2010 ¶ 111. The error was confirmed by Petitioner’s own expert, Dr. Creusere, whose analysis the Petition relies upon. Dr. Creusere admitted in deposition that both Nakamura and Rusert follow the same sequential process: the system first adds available candidates to a working list and only thereafter considers a further candidate, comparing that later candidate against whatever is already in the list. As Dr. Creusere’s deposition confirms:

Q. I think I agree with you, that’s certainly true in Rusert, Doctor, that what will be the subset will be based on prior processing done at -- to the point where you reach the -- the first spatial motion vector prediction candidate.

And so to clarify with an example, by the time we reach the -
- candidate 3 in Rusert using Figure 3N, we would have done some processing on 1 and 2.

And depending on 1 and 2 and whether they're the same or sufficiently similar or available, that's going to help us inform our choice of subset 3.

Do you agree with that?

A. Oh, for Rusert?

Q. Yes.

A. Yeah, I agree with that on -- with respect to Rusert.

Q. Okay. And to some extent -- now I'm going to refer to the Nakamura reference.

That's -- that's also true of the Nakamura reference, where we have S0 and S1; and if we're identifying S1 as the first spatial motion vector candidate, what exists in the subset of S0 will depend on some prior processing before we get to S1 in Nakamura's order.

A. I -- I believe it's accurate, yeah. S0 will be filled first, yeah, and then-- and then -- and we don't know what's going to be a priori, right?

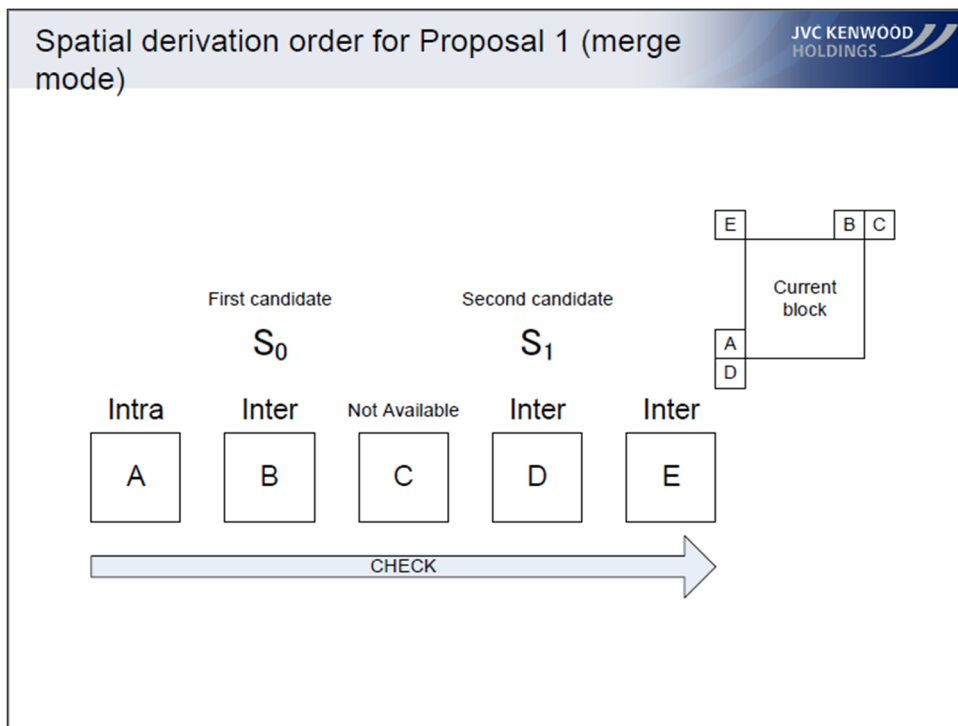
So then you'll -- you'll have -- you'll evaluate candidates for S1.

Ex-2019 103:20–105:9; *see also* Ex-2010 ¶¶ 79–86.

Patent Owner agrees with Dr. Creusere. In both Rusert and Nakamura, the contents of the alleged “subset” are already determined prior to any selection,

processing, or evaluation of what Petitioner refers to as the “first spatial motion vector prediction candidate.” Ex-2010 ¶ 79.

In Nakamura’s approach, S0 (the alleged “subset”) is determined first, without any knowledge or confirmation of what S1 will be. For instance, in the scenario illustrated in Nakamura’s proposal, Ex-2009 at 8, the motion vector associated with neighboring block “B” is selected as the S0 value. Ex-2010 ¶ 81. Importantly, the “check arrow” in Nakamura clearly shows the order in which A to E are considered. Ex-2010 fn. 9.

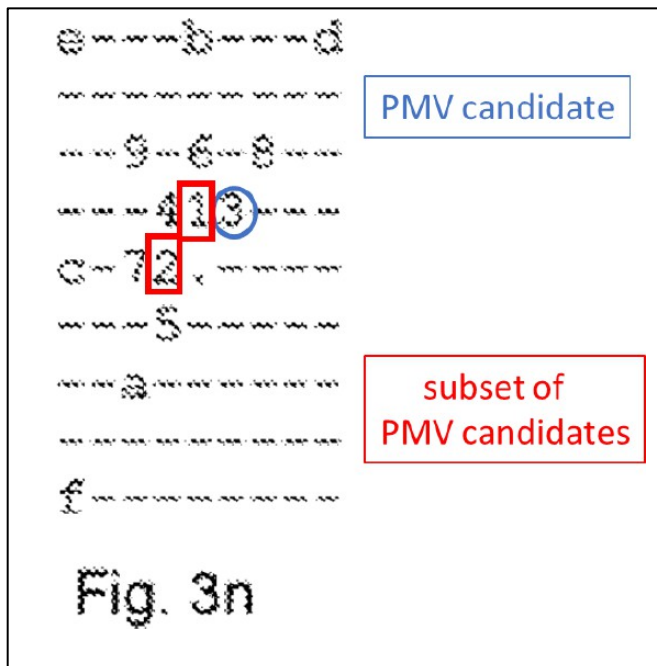


Ex-2009 at 8.

The selection of the motion vector from block B as the value for S0 does not rely on the identity or block location of S1, which—at the time S0 is determined—could be any of C, D, E, or none, depending on availability. This holds true for any potential

configuration in Nakamura's method. In other words, Nakamura's alleged subset (the value S0) is established without any knowledge of the alleged first spatial motion vector prediction candidate (the value S1) or the location of the block associated with S1. Thus, necessarily the subset (alleged to be S0) cannot be based on the location of the first spatial motion vector prediction candidate (S1) if S1 is not known or confirmed when the subset (S0) is determined. As Dr. Richardson explains, POSITAs would recognize that the first spatial motion vector prediction candidate must be known and confirmed for any subset to be "based on" its location. The Board correctly highlighted this point in its previous Institution Decision, noting that "S0 is already selected regardless of what the selection of S1 thereafter might be. The subset S0 does not change depending on the later choice of S1." Ex-1007 at 56; *see also* Ex-2010 ¶ 85.

As for Rusert, below is the annotated version of Rusert's Figure 3n from Dr. Creusere's previous declaration. Here, blocks '1' and '2' are the alleged subset, while block '3' is the alleged first spatial motion vector prediction candidate. Ex-2010 ¶ 83.

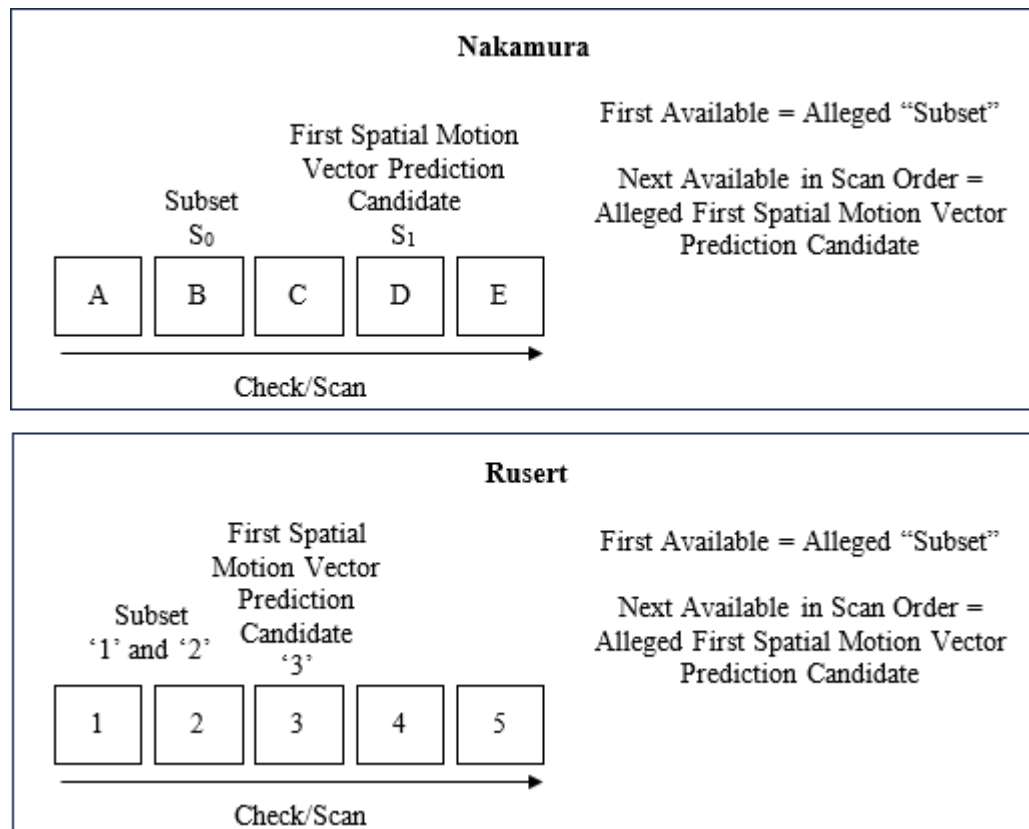


Dr. Creusere annotation of Rusert, IPR2024-00604, Exhibit 1003 ¶ 122.

The content of Rusert’s alleged subset depends on the availability of blocks processed up to that point. For instance, if the motion vector of block ‘1’ is unavailable, Ex-1004 at ¶ 54 (providing examples where blocks may be unavailable due to coding order or lack of motion vector); *see also supra* Section III(B)(1), the alleged subset will consist of just the motion vector of block ‘2’. The alleged subset also depends on a comparison between the motion vectors of blocks ‘1’ and ‘2’, assuming both are available. If both blocks are available and their motion vectors are sufficiently similar or identical, the alleged subset will consist of just block ‘1’. Ex-2010 ¶ 84.

By the time Rusert begins processing to determine whether the motion vector for block ‘3’ is available and whether to add it to PMV_CANDS, the alleged subset has already been established. Rusert does not know if block ‘3’ or any associated motion vector is available when the alleged subset is determined. If block ‘3’ is unavailable (e.g., it is intra-coded), and if blocks ‘1’ and ‘2’ are part of the subset, the next available candidate, such as block ‘4’, ‘5’, or another later block, will be compared to blocks ‘1’ and ‘2’. Therefore, in Rusert, the alleged subset (which could be block ‘1’ or blocks ‘1 and 2’ in this case) has already been selected, regardless of which block (such as block ‘3’, ‘4’, or any later one) is chosen as the first spatial motion vector prediction candidate. The subset does not change based on which candidate is available and later selected for evaluation. *Id.* at ¶ 92.

Dr. Richardson’s figure (provided below) demonstrates how in both Nakamura and Rusert, the alleged subsets are established before the first spatial motion vector prediction candidate is identified or confirmed. In Nakamura, S0 is assigned the motion vector of block B before a suitable motion vector for candidate S1 is determined. Similarly, in Rusert, PMV_CANDS is established as ‘1’, ‘1, 2’, or ‘2’ before deciding whether to add the next available block’s motion vector to PMV_CANDS. *Id.* at ¶ 90.



Ex-2010 ¶ 86.

Petitioner's expert in the Prior IPRs even agreed that Nakamura and Rusert work similarly with respect to how the alleged "subsets" are determined. That is, Nakamura and Rusert both use criteria other than the location of the alleged first spatial motion vector prediction candidate to determine the alleged subset before the first candidate is located. Petitioner's expert in the Prior IPRs explained the following:

All -- all that Nakamura's doing is it's simply looking to see if there's any spatial motion vector prediction information available, and it simply -- if there is, the first one where there's something available, it

puts it into -- into S0; second one where something's available, it puts it into S1; and then the comparisons it does are relative to S1, S0, and the temporal -- and a temporal motion vector prediction candidate.

Ex-2019 122:16-123:12. Petitioner's expert agreed that a similar availability check is done to determine what will constitute the alleged "subset" in Rusert before ever considering what Petitioner alleges is the "first spatial motion vector prediction candidate." *See id.* 126:17-127:14.

This means that Rusert has the same shortcoming as Nakamura. In the words of Petitioner's expert in the Prior IPRs, "for example, if the first motion vector prediction candidate [in Rusert] was actually block 2, then the subset would consist of block 1, motion vector information from block 1." Ex-2019 90:9-91:18. That is, Rusert's block 2 in this example is analogous to Nakamura's S₁, and Rusert's block 1 is analogous to Nakamura's S₀.³

³ The fact that Rusert can have more PMV candidates in its alleged "subset" than Nakamura does not change the way Rusert works. In all cases, Rusert processes PMV candidates sequentially in numerical order such that whatever Petitioners identify as the alleged "subset" will have been decided by Rusert before the alleged "first spatial motion vector prediction candidate is ever determined. *See* Ex-2019 90:9-91:21 ("If, on the other hand, it [the alleged first spatial motion vector

The Board's prior rejection of Nakamura because "S₀ is already selected regardless of what the selection of S₁ thereafter might be" applies equally to Rusert. *See* IPR2024-00604, IPR2024-00605, Paper 11, 57-59. Petitioner's expert in the Prior IPRs agreed that "the way Rusert works, by the time you get to block 2 in the scan order, the only block that has been processed to date is block 1." Ex-2019 91:11-21 ("Well, that -- that is clearly correct... And so block 1 will be considered first, block 2 will be considered next, and so on."). Thus, Rusert cannot teach "determining a subset of spatial motion vector prediction candidates based on the location of the block associated with the first spatial motion vector prediction candidate." *See* IPR2024-00604, IPR2024-00605, Paper 11, 57-59; *see also* Ex-2010 ¶ 111.

Accordingly, Petitioner's Rusert grounds in this IPR are likely to fail for the same reason as the Nakamura grounds from the prior IPRs.

predicition candidate was block 4, then the subset would consist of the motion information from blocks 1, 2, and 3. ... And so block 1 will be considered first, block 2 will be considered next, and so on.").

B. Petitioner Has Not Established A Reasonable Likelihood That The Challenged Claims Are Unpatentable In Light Of Ground 2

In addition to Rusert and Karczewicz, Petitioner's second Ground further relies on Lin (Ex-1006). Ground 2 only relates to dependent claim 4 and accordingly fails for the same reasons as Ground 1. Therefore, for purposes of this Preliminary Response, Ground 2 rises and falls with Ground 1. *See In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (indicating that "[d]ependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.").

IV. CONCLUSION

For any or all of the above-described reasons, PO respectfully requests that the Board deny institution.

Dated: November 5, 2025

Respectfully submitted,

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CERTIFICATION OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER'S PRELIMINARY RESPONSE** specified in 37 C.F.R. §42.24 have 9,105 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. §42.24(b)(1). This word count was prepared using Microsoft Word 2010.

Dated: November 5, 2025

By: /s/ Scott W. Hejny
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CERTIFICATION OF SERVICE

The undersigned hereby certifies that a copy of this **PATENT OWNER'S PRELIMINARY RESPONSE PURSUANT TO 37 C.F.R. § 42.10(b)** has been served on Petitioner via email on the following counsel of record for Petitioner:

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