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Paper 9
Entered: July 18, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

ADVANCED CODING TECHNOLOGIES LLC,
Patent Owner.

IPR2024-00372
Patent 10,218,995 B2

Before BART A. GERSTENBLITH, NATHAN A. ENGELS, and JASON M. REPKO, *Administrative Patent Judges*.

REPKO, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

Google
Exhibit 1102
Google v. Advanced Coding
IPR2025-01278
Ex. 1102-001

I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner") filed a petition requesting an *inter partes* review of claims 2–4 and 11 of U.S. Patent No. 10,218,995 B2 (Ex. 1001, "the '995 patent"). Paper 2 ("Pet."). Advanced Coding Technologies LLC ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

To institute an *inter partes* review, we must determine "that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a) (2018). The Petition meets this standard. Thus, we institute an *inter partes* review.

A. Related Matters

According to the parties, the '995 patent has been asserted in *Advanced Coding Technologies LLC v. Samsung Electronics Co.*, No. 2:22-cv-00499-JRG (E.D. Tex.), and *Advanced Coding Technologies LLC v. LG Electronics, Inc.*, No. 2:22-cv-00501-JRG (E.D. Tex.). Pet. 89; Paper 5, 2 (Patent Owner's Mandatory Notices).

B. Real Parties in Interest

Petitioner identifies Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. as the real parties in interest. Pet. 89.

Patent Owner identifies Advanced Coding Technologies LLC as the real party in interest. Paper 5, 2.

C. The '995 Patent

The '995 patent is directed to a video-encoding and decoding system. Ex. 1001, 1:23–31. According to the '995 patent, the system improves quality of a decoded moving-picture sequence by using a second decoder that receives three inputs, as shown in the embodiment below. *Id.* at Fig. 26, 59:15–29.

FIG. 26

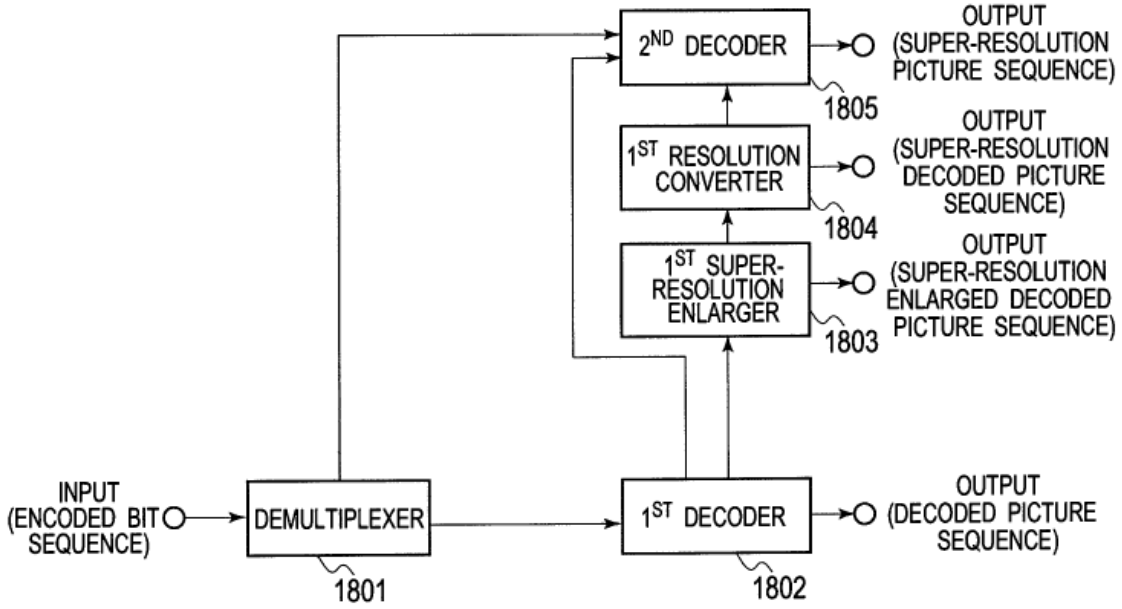


Figure 26 "is a block diagram" showing an exemplary "configuration of a moving picture decoding system." *Id.* at 13:27–29. The system shows demultiplexer 1801 receiving the encoded picture sequence as input and sending it to first decoder 1802 and to the second decoder 1805. *Id.* at Fig. 26. Second decoder 1805 receives two additional sequences: (1) a decoded sequence from first decoder 1802 and (2) a decoded sequence processed by first super-resolution enlarger 1803 and first resolution converter 1804. *Id.* First super-resolution enlarger 1803 increases the picture's resolution. *Id.* at 56:57–65. First resolution converter 1804 converts the picture's resolution to a standard resolution. *Id.* The system can produce three output sequences: a super-resolution picture sequence, a super-resolution decoded picture sequence, and a super-resolution enlarged decoded picture sequence. *Id.* at Fig. 26. According to the '995 patent, this arrangement not only improves the quality of a decoded picture sequence but

also allows for the sequence's resolution to be adapted to a display. *Id.* at 59:15–33.

D. Claims

Of those challenged, claims 2, 3, and 4 are independent, and claim 11 depends from claim 2.

Claim 2 is reproduced below.

2. A moving picture decoding system comprising:

a demultiplexer configured to work on a sequence of input encoded bits to implement a process for a prescribed demultiplexing to output at least a first and a second sequence of encoded bits;

a first decoder configured to acquire the first sequence of encoded bits obtained with a standard resolution at the demultiplexer to implement thereon a process for a prescribed first decoding to create a sequence of decoded pictures with a standard resolution;

a first super-resolution enlarger configured to acquire the sequence of decoded pictures created with a standard resolution at the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with a first enlargement to create a sequence of super-resolution enlarged decoded pictures with a first resolution higher than a standard resolution;

a first resolution converter configured to acquire the sequence of super-resolution enlarged decoded pictures created at the first super-resolution enlarger to work on the sequence of super-resolution enlarged decoded pictures to implement a process for a prescribed resolution conversion to create a sequence of super-resolution decoded pictures with a standard resolution;

a second decoder configured to acquire the second sequence of encoded bits obtained with a standard resolution at the demultiplexer as a set of decoding targets, the sequence of decoded pictures created with the standard resolution at the first decoder as a set of first reference pictures, and the

sequence of super-resolution decoded pictures created with the standard resolution at the first resolution converter as a set of second reference pictures, and select one of the set of first reference pictures and the set of second reference pictures based on reference picture selection information to implement a combination of processes for a prescribed prediction and a prescribed second decoding being a decoding with an extension of the standard resolution, to create a sequence of super-resolution pictures decoded with the standard resolution based on the set of decoding targets and the set of selected reference pictures; and

a second resolution converter configured to acquire the sequence of decoded pictures with the standard resolution from the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with the second enlargement to create a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution,

wherein the set of decoding targets, the set of first reference pictures, and the set of second reference pictures have the same value in spatial resolution.

Ex. 1001, 67:1–52.

E. Evidence

Name	Reference	Exhibit No.
Phek	JP 2007-316161A,[1] published Dec. 6, 2007	1005
Segall	C. A. Segall et al., *Spatial Scalability Within the H.264/AVC Scalable Video Coding Extension,* IEEE Transactions on Circuits and Systems for Video Technology, Vol. 17, No. 9, 1121–35[2] (Sept. 2007)	1006

[1] Petitioner has submitted a certified English translation of Phek.
[2] Petitioner has renumbered the pages of Segall as 1–15. Citations in this decision follow Petitioner's page numbering.

Name	Reference	Exhibit No.
Martins	B. Martins et al., *A Unified Approach to Restoration, Deinterlacing and Resolution Enhancement in Decoding MPEG-2 Video*, IEEE Transactions on Circuits and Systems for Video Technology, Vol. 12, No. 9, 803–11[3] (Sept. 2002)	1007
He	U.S. 2008/0137753 A1, published June 12, 2008	1008

F. Asserted Ground

Petitioner asserts that claims 2–4 and 11 are unpatentable on the following ground. Pet. 1.

Claims Challenged	Pre-AIA[4] 35 U.S.C. §	Reference(s)/Basis
2–4, 11	103	Phek, Segall, Martins, He

II. ANALYSIS

A. Discretionary Denial Under 35 U.S.C. § 314(a)

Patent Owner argues that the Board should exercise its discretion to deny the Petition in view of the parallel litigation. Prelim. Resp. 30 (citing *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020) (precedential)).

Under § 314(a), the Director has discretion to deny institution of a petition for *inter partes* review. *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016). In determining whether to exercise that discretion on behalf of the Director, the Board considers an early trial date in related litigation, among other factors, as part of an assessment of all relevant

[3] Petitioner has renumbered the pages of Martins as 1–9. Citations in this Decision follow Petitioner's page numbering.
[4] Congress amended § 103 when it passed the Leahy-Smith America Invents Act (AIA). Pub. L. No. 112–29, § 3(c), 125 Stat. 284, 287 (2011). Here, Petitioner argues under the previous version of § 103. Pet. 1–2.

circumstances of the case—including the merits—to balance considerations such as system efficiency, fairness, and patent quality. *Fintiv*, Paper 11 at 5. When the same prior art is submitted in district court and to the Board, there are "concerns of inefficiency and the possibility of conflicting decisions." *Id.* at 12. Petitioner can mitigate those concerns by presenting a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the Board. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (precedential).

Here, Petitioner has presented such a stipulation: if the Board grants institution, Petitioner "agrees not to pursue any grounds raised in the petition, or any grounds [Petitioner] could have reasonably raised in the petition, in [the] district court litigation or any parallel proceeding" Ex. 1028, 1. "Consistent with [*Sotera*], the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB." Katherine K. Vidal, *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation* (USPTO June 21, 2022).[5] Thus, we decline to exercise our discretion to deny the Petition.

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art "would have had at least a bachelor's degree in computer science, electrical engineering,

[5] https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf

computer engineering, or a related field, with 2-3 years of experience in digital video processing, or a related field." Pet. 3–4 (citing Ex. 1003[6] ¶¶ 123–125). Petitioner also asserts that "[a]dditional graduate education could substitute for professional experience, and *vice versa*." *Id.* at 4.

Patent Owner uses the same skill level in its Preliminary Response. Prelim. Resp. 13.

We also apply Petitioner's proposed skill level in this Decision. Pet. 3–4.

C. Claim Construction

"The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'" *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

In interpreting the claims here, we use the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (2023). Under that standard, claim terms are generally given their ordinary and customary meaning as would be understood by one with ordinary skill in the art in the context of the specification, the prosecution history, other claims, and extrinsic evidence. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc).

Petitioner submits that "no formal constructions are presently necessary for purposes of demonstrating obviousness of the Challenged

[6] Exhibit 1003 is the declaration of Clifford Reader, Ph.D.

Claims based on Ground 1." Pet. 2–3. Patent Owner agrees that no constructions are needed. Prelim. Resp. 13.

Patent Owner's arguments, however, are based on an implicit construction for the second resolution converter. *See* § II.D.5.c *supra*. For the reasons discussed below, we disagree with Patent Owner's arguments and the implicit construction. *See id.* Apart from rejecting the implicit construction of the second resolution converter, we agree with the parties that no claim term needs to be construed in this Decision.

D. Obviousness: Phek, Segall, Martins, and He

Petitioner asserts that claims 2–4 and 11 are unpatentable as obvious over Phek, Segall, Martins, and He. Pet. 13–81.

1. Phek

Phek is directed to inter-layer prediction in hierarchical video encoding. Ex. 1005, 14. In hierarchical video encoding, a base layer is coded at one quality level and used to predict a layer that is coded at a higher level. Ex. 1003 ¶ 83. Phek's inter-layer coding uses images from the base[7] layer as an additional reference image for encoding the enhanced layer images. Ex. 1005, 14. Super-resolution processing is used to improve the additional reference image from the base layer. *Id.* According to Phek, the inter-layer prediction reduces redundancy and improves encoding efficiency compared to using only the enhanced layer. *Id.*

[7] Phek is a Japanese Patent Publication. Exhibit 1005 is the English translation. The translation uses the term "basic layer." *See, e.g.*, Ex. 1005 14. According to the Petition, "basic layer" is interchangeable with "base layer," and "extended," "enhanced," and "enhancement" are used interchangeably. Pet. 14 n.5.

2. Segall

Segall describes the Scalable Video Coding (SVC) extension to the H.264/AVC video coding standard. Ex. 1006, 1. The SVC extension provides a way to reuse an encoded low-resolution version of an image sequence for the coding of a corresponding high-resolution sequence. *Id.* In particular, the SVC extension introduces image pyramids. *Id.* at 1–2. Image pyramids describe the relationship between the low-resolution and high-resolution versions of an image as a coarse-to-fine image hierarchy. *Id.* at 3. The original high-resolution image sequence is converted to lower resolutions by filtering and decimating, and the low-resolution sequence is coded so that it can be decoded independently. *Id.*

3. Martins

Martins combines multiple pictures to form super-resolution pictures with a higher resolution and then decimates them to the desired format. Ex. 1007, 1. The algorithm uses an estimate of the quality of individual pixels based on MPEG image type and local quantization value. *Id.* According to Martins, the super-resolution pictures obtained in this way have a higher visual quality with fewer artifacts and lower mean-squared error than super-resolution pictures obtained by simple spatial interpolation. *Id.*

4. He

He's video-coding system controls the use of a deblocking filter with a flag. Ex. 1008, code (57). Deblocking filters are part of the SVC extension. *Id.* ¶ 6. A deblocking filter performs both luma and chroma filtering. *Id.* Disabling the deblocking filter significantly reduces computational complexity and power consumption in some cases. *Id.* ¶ 28. But disabling it completely may degrade quality in some cases. *Id.* For example, the

deblocking filter removes block effects, which enhances the decoded picture's quality. *Id.* ¶ 6. Thus, He adaptively disables deblocking filtering based on a video's characteristics, such as its complexity or relative amount of motion. *Id.* ¶ 28.

5. Claim 2

a. First Resolution Converter

Claim 2 recites, in part,

> a first resolution converter configured to acquire the sequence of super-resolution enlarged decoded pictures created at the first super-resolution enlarger to work on the sequence of super-resolution enlarged decoded pictures to implement a process for a prescribed resolution conversion to create a sequence of super-resolution decoded pictures with a standard resolution.

Ex. 1001, 67:18–24. Petitioner refers to this limitation as [2.4]. *See* Pet. 55.

Petitioner asserts that, in the combination of Phek-Segall-Martins-He, it would have been obvious to apply Martins's decimation to pictures generated by the super-resolution enlarger to create standard-resolution pictures. *See id.* at 55–60 (citing Ex. 1003 ¶ 217; Ex. 1007 § IV). Petitioner illustrates the proposed combination with the figure below. *Id.* at 59.[8]

[8] Petitioner created this figure using Phek's figures, annotating the blank boxes with the labels from the certified English translation and adding its own labels. *See* Pet. 14.

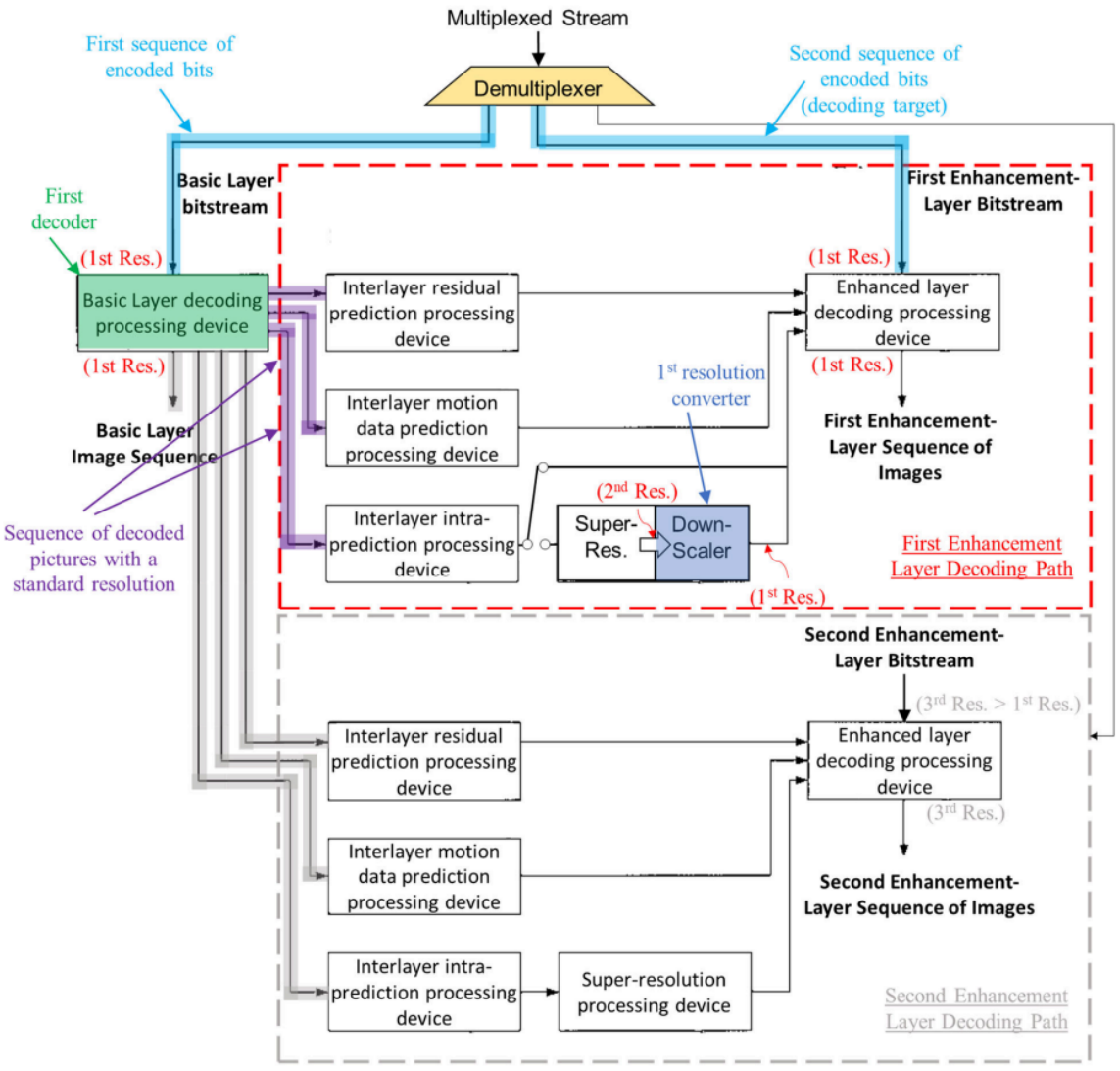


Illustration of Phek-Segall-Martins-He Combination

According to the Petition, the decimation processor ("Down-Scaler" in blue) corresponds to the claimed first resolution converter, and the adjacent super-resolution processor ("Super-Res.") corresponds to the claimed first super-resolution enlarger. *Id.* at 59–60. Petitioner asserts that the decimation processor is based on Martins's teachings. *Id.* Petitioner argues that this decimation processor decimates the pictures to a standard spatial resolution, which corresponds to the claimed process for a prescribed resolution conversion. *Id.* at 60.

Patent Owner disagrees with Petitioner's analysis of the claimed prescribed resolution conversion. Prelim. Resp. 16. In Patent Owner's view, the recited standard resolution must be the resolution of the first sequence of encoded bits, and this resolution is prescribed by the first decoder,[9] as claimed. *Id.* Patent Owner argues that the claim requires a specific relationship between the recited conversion and decoding—that is, "a prescribed resolution conversion can only occur with a prescribed input with standard resolution subject to the first decoding." *Id.* at 20.

Patent Owner argues that, unlike the claimed resolution conversion, Martins's decimation downsamples the picture to a standard resolution to match the output device's supported format. *Id.* That is, according to Patent Owner, the resolution for Martins's decimation is determined by the display's resolution, not the resolution of a super-resolution enlarger's input, as required by the claim. *Id.* at 17–19 (Ex. 1007, Abstract, 2, 8–9, Figs. 11–13).

Yet Petitioner's proposed combination does not depend on incorporating Martins's entire system and its operation in the Phek-Segall-Martins-He combination, as Patent Owner's arguments suggest. *See id.* at 16–20. Rather, the proposed combination acquires the sequence of decoded pictures created by the super-resolution enlarger and decimates them with a decimation processor based on Martins to produce the picture with a first spatial resolution, labeled "1st Res." in the illustration. Pet. 59–

[9] The claim recites, in relevant part, "a first decoder configured to acquire *the first sequence of encoded bits obtained with a standard resolution* at the demultiplexer to implement thereon a process for a *prescribed first decoding* to create *a sequence of decoded pictures with a standard resolution*" (emphasis added).

60. According to the Petition, Martins's decimation can be used to perform image-restoration, which enhances decoding quality while maintaining the restored picture's size. *Id.* at 56 (citing Ex. 1003 ¶¶ 218–219; Ex. 1011, 2). On this record, we disagree with Patent Owner's arguments because they do not address how Petitioner is proposing to use Martins in combination with the other references. *See* Prelim. Resp. 16–20.

Also, the Phek-Segall-Martins-He combination has the recited relationship between the decoding and resolution conversion that Patent Owner argues is missing from Martins. *See id.* at 20. Specifically, in the illustration of the Phek-Segall-Martins-He combination, above, the label "1st Res." appears at the input of the first decoder ("basic-layer decoding processing device"), and the output of the first resolution converter ("Down-Scaler"). *See* Pet. 59. Petitioner relies on Martins for its decimation processor, mapping it to the claimed first resolution converter. *Id.* The decimation processor receives the sequence of decoded pictures with a standard resolution via the inter-layer intra-prediction processing device. *Id.* That is, under the Petition's reasoning, (1) the standard resolution corresponds to the resolution of the first sequence of encoded bits in the proposed combination, and (2) the combination's first resolution converter creates a sequence of super-resolution decoded pictures with a standard resolution, as claimed. *See id.* Thus, at this stage and on the present record, we are persuaded that Petitioner has sufficiently explained how the proposed combination meets the claimed first resolution converter in [2.4]

b. Second Decoder

Claim 2 recites, in part,

> a second decoder configured to acquire the second sequence of encoded bits obtained with a standard resolution at the

> demultiplexer as a set of decoding targets, the sequence of decoded pictures created with the standard resolution at the first decoder as a set of first reference pictures, and the sequence of super-resolution decoded pictures created with the standard resolution at the first resolution converter as a set of second reference pictures, and *select one of the set of first reference pictures and the set of second reference pictures* based on reference picture selection information to implement a combination of processes for a prescribed prediction and a prescribed second decoding being a decoding with an extension of the standard resolution, to create a sequence of super-resolution pictures decoded with the standard resolution based on the set of decoding targets and the set of selected reference pictures.

Ex. 1001, 67:25–42 (emphasis added). Petitioner refers to the "second decoder configured to acquire . . ." limitation as [2.5.i], and the "second decoder configured to . . . select . . ." limitation as [2.5.ii]. *See* Pet. 60, 66. Patent Owner reasserts the arguments discussed in § II.D.5.a to conclude that the Petition is also deficient with respect to [2.5.i] and [2.5.ii]. Prelim. Resp. 20–26. Patent Owner's arguments also address the italicized text above in limitation [2.5.ii]. *Id.* at 23–26.

Petitioner argues that it would have been obvious to use He's control information to "select one of the set of first reference pictures and the set of second reference pictures." Pet. 66. According to the Petition, Phek and Martins do not explain when super-resolution and downscaling filtering should be applied, but He explains that sometimes the costs outweigh the benefits. *Id.* at 38. Petitioner argues that He uses control information to disable filtering, which saves power and processing. *Id.* at 38 (citing Ex. 1008 ¶¶ 6, 69). Petitioner argues that it would have been obvious to select between the pictures filtered by Phek and Martins (the claimed second set of pictures) and those that are unfiltered (the claimed first set of reference

pictures) in the first enhancement-layer decoding path to obtain power and processing savings described by He. *Id.* at 38, 70–71.

Patent Owner argues that He's deblocking-control flags are not the claimed reference picture selection information because the flags are "irrelevant to reference pictures." Prelim. Resp. 23– 26. According to Patent Owner, He's deblocking filter removes block effects on the reconstructed frame's block boundaries, and He's deblocking-control flag merely selects the deblocking filter. *Id.* at 23. Patent Owner argues that He does not select between filtered and unfiltered reconstructed frames—that is, different reference picture sets. *Id.* at 23–24 (citing Pet. 68). In Patent Owner's view, He's only selection is between inter-frame and intra-frame prediction information. *Id.* at 25–26.

At this stage we disagree with Patent Owner's argument because it does not squarely address how Petitioner uses He's control information in the proposed combination. *See id.* at 20–23. In the combination, He's information selectively enables or disables the super-resolution processing. Pet. 37. Petitioner illustrates this in the figure below. *Id.* at 41.

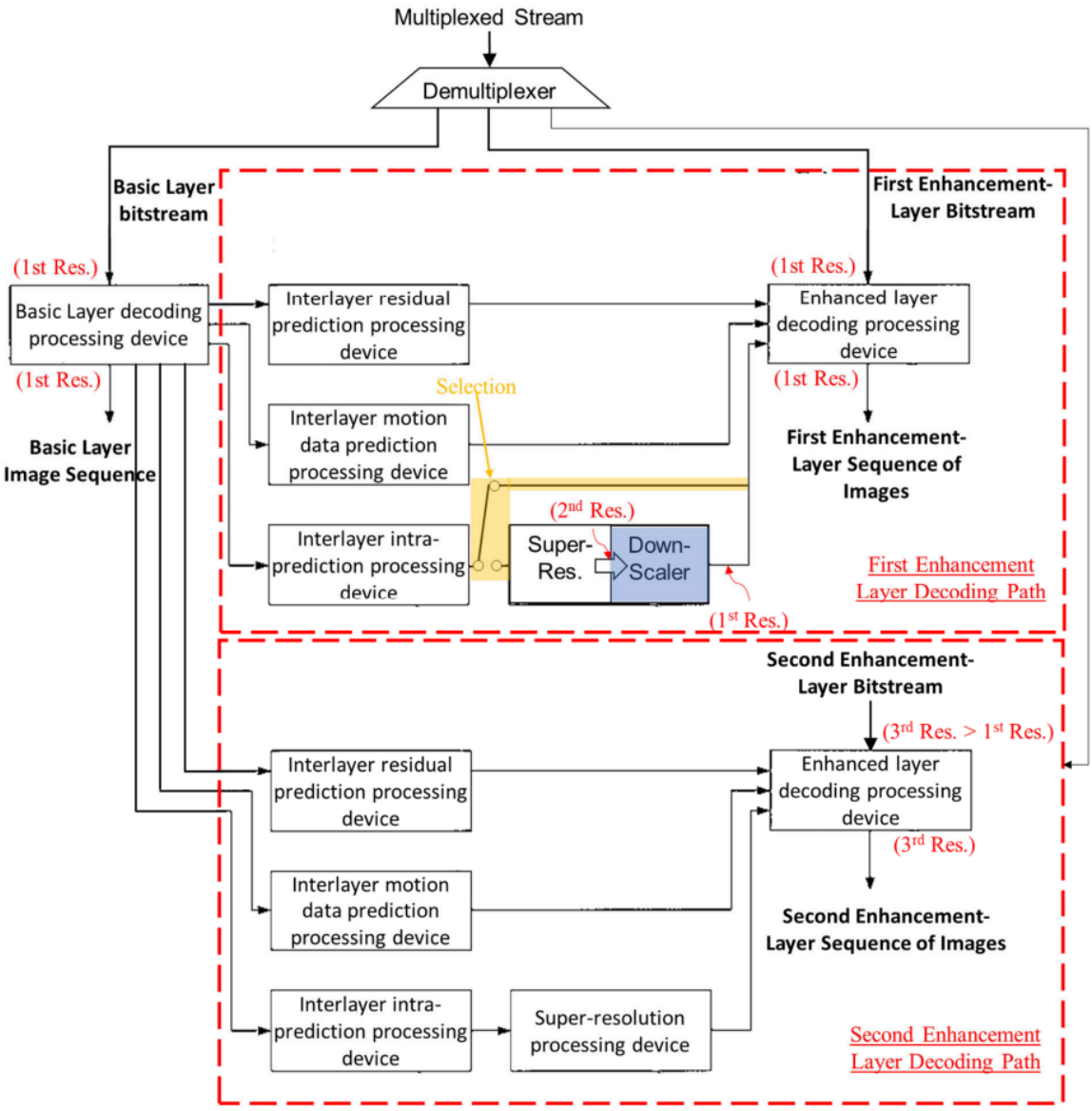


Illustration of Phek-Segall-Martins-He Combination

He's teachings are relevant to the part highlighted in yellow. *See id.* The illustration shows pictures from the inter-layer intra-prediction processing devices being set to the super-resolution processor ("Super-Res.") or being sent to the enhanced layer decoding processing device. *Id.* The part labeled "Selection" (yellow) indicates a selection between the two paths. *Id.* In this way, the proposed combination uses He to selectively apply the Phek-Martins super-resolution and downscaling processing of the reference

pictures. *Id.* at 36–38. As for the reasons for combining these teachings, Petitioner relies upon Phek and Martins for processing the reference images used in the inter-layer prediction of images in the first enhancement layer (*id.* at 37) and relies upon He's control information to disable this processing when it is not effective—for example, "when super-resolution processing does not improve the reference picture significantly" (*id.* at 40).

Patent Owner, though, focuses on He's Figure 2 alone, for example, arguing that Figure 2 shows a selection between inter-frame and intra-frame prediction information. Prelim. Resp. 25–26. But Petitioner's combination applies He's selective in-loop filtering to the pictures in the processing path of the Phek-Segall-Martins-He combination shown in the illustration above. *See* Pet. 38–39 (describing how He works in the combination), 41 (illustrating where He fits into the processing path). Specifically, Petitioner's proposed combination relies on He's control information to arrive at the two recited reference-picture sets:

> Thus, as illustrated above, the "***second decoder***" as implemented in the Phek-Segall-Martins-He combination selects either the sequence of base-layer decoded pictures (when SR-D filter is disabled) as a set of first reference pictures or the sequence of super-resolution enhanced and downscaled base-layer decoded pictures (when SR-D filter is enabled) as the set of second reference pictures.

Id. at 70–71 (citing Ex. 1003 ¶ 234). Thus, we disagree with Patent Owner's arguments at this stage. *See* Prelim. Resp. 25–26.

Patent Owner argues that Petitioner has not shown limitations [2.5.i] and [2.5.ii] for the same reasons discussed with respect to limitation [2.4]. *See id.* at 20–23. For the reasons discussed in § II.D.5.a, we disagree with Patent Owner's arguments at this stage.

At this stage and on the present record, we are persuaded that Petitioner has sufficiently explained how the proposed combination meets the claimed second decoder in [2.5.i] and [2.5.ii].

c. Second Resolution Converter

Claim 2 recites, in part,

> a second resolution converter configured to acquire the sequence of decoded pictures with the standard resolution from the first decoder to work on the sequence of decoded pictures to implement an interpolation of pixels with the second enlargement to create a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution.

Ex. 1001, 67:43–49. Petitioner refers to this limitation as limitation [2.6]. *See* Pet. 73.

In the combination, Petitioner relies upon Segall for a second enhancement layer in Phek's system to encode a video stream at a higher spatial resolution relative to the base and first enhancement layers. *Id.* at 25 (citing Ex. 1003 ¶ 178). According to the Petition, doing so would have increased the number of supported displays, including those with larger formats and higher-definition. *Id.* at 26 (citing Ex. 1003 ¶ 179; Ex. 1006, 1). In this rationale, Petitioner provides two mappings for the second resolution converter: (1) one to the devices in the second enhancement layer and (2) another to only the super-resolution processing device in the second enhancement layer. *See id.* at 75, 77.

Patent Owner argues that the claim's plain language precludes Segall's multiple enhancement layers because "the claimed 'second resolution converter' does not process a different layer of resolution, or even different pictures, than what has already been independently processed by the claimed 'first super resolution enlarger.'" Prelim. Resp. 27. The basis for

Patent Owner's argument is the recited data that is acquired by the second resolution converter and the first super-resolution enlarger:

> a first super-resolution enlarger configured to acquire *the sequence of decoded pictures created with a standard resolution at the first decoder* . . . a second resolution converter configured to acquire *the sequence of decoded pictures with the standard resolution from the first decoder* . . . .

Ex. 1001, 67:11–13, 67:43–45, *quoted in* Prelim. Resp. 27.

Yet, under either of Petitioner's mappings, the second resolution converter and the first super-resolution enlarger acquire decoded pictures with the standard resolution from the first decoder. Pet. 75–76. For instance, the first mapping is shown in the Figure below. *Id.* at 75.

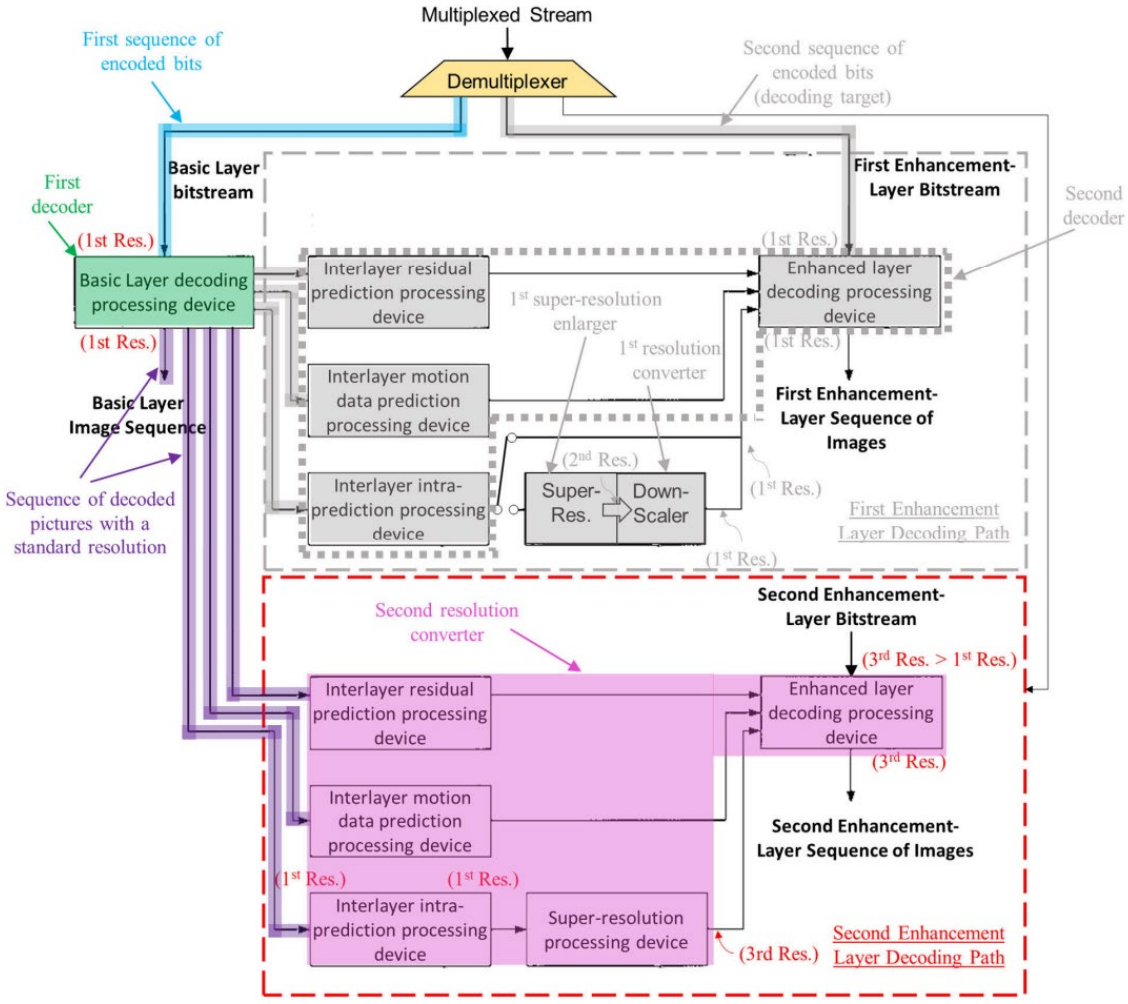


Illustration of Phek-Segall-Martins-He Combination

This figure shows a group of devices in purple (the claimed second resolution converter) receiving the sequence of decoded pictures from the basic-layer decoding processing device (the claimed first decoder). *Id.* The pictures from the inter-layer intra-prediction processing device are in the first resolution, as indicated by the label "1st Res." *Id.* In the combination, the first super-resolution enlarger ("Super-Res" in gray) also receives the decoded pictures from the basic-layer decoding processing device via the inter-layer intra-prediction processing device. *Id.*

Petitioner's second mapping is shown below. *Id.* at 77.

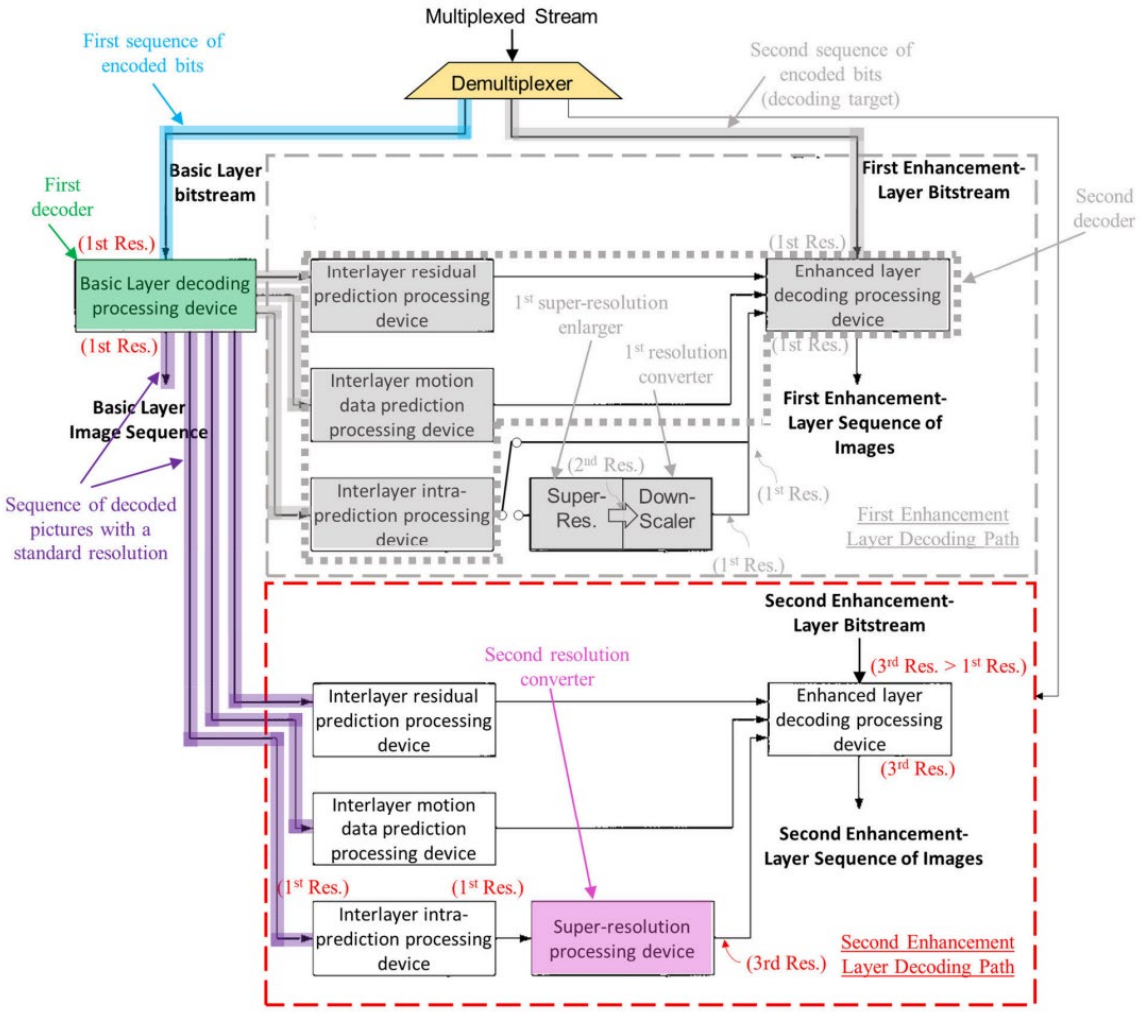


Illustration of Phek-Segall-Martins-He Combination

Unlike the first mapping, only the super-resolution processing device corresponds to the claimed second resolution converter (purple) in the second mapping. *Id.* The super-resolution processing device receives the sequence of decoded pictures from the basic-layer decoding processing device (the claimed first decoder). *Id.* Like the first mapping, the first super-resolution enlarger ("Super-Res" in gray) receives the decoded pictures from the basic-layer decoding processing device via the inter-layer intra-prediction processing device. *Id.* As noted with respect to the first mapping,

the pictures from the inter-layer intra-prediction processing device are in the first resolution, as indicated by the label "1st Res." *Id.*

Instead of addressing the processing path shown in the illustrations, Patent Owner's arguments focus on Segall individually. Prelim. Resp. 27. For example, Patent Owner argues that Segall's multilayer system uses image pyramids, which depend upon a first enhancement layer and a base layer. *Id.* at 27–28. Patent Owner argues that this is precluded by the claim language. *Id.*

Petitioner, though, relies on Segall for the second enhancement layer path (highlighted by a red dashed line in the illustration above). Pet. 25. That is, the proposed combination shows two different decoding paths. *See id.* at 75, 77. In the proposed combination, the second enhancement layer can encode video frames predicted from frames in the base layer, the first enhancement layer, or both. *See id.* at 25. According to the Petition, this layer could support display devices with resolutions higher than the resolution of the video coded in the base and first enhancement layers. *Id.* at 26 (citing Ex. 1003 ¶ 179). By focusing on features of Segall's multilayer system in isolation, Patent Owner's arguments (Prelim. Resp. 27–28) do not squarely address how Petitioner is combining the teachings of Segall to add a second enhancement layer in Phek's decoder (Pet. 26).

Apart from this individual attack on Segall, Patent Owner's argument is based on an implicit claim construction. *See* Prelim. Resp. 27–28. For instance, Patent Owner argues that Segall's dependent decoding of enhancement layers contradicts the claim's requirement that the second resolution converter uses "only one independent layer." *Id.* at 28. In Patent Owner's view, "independent processing" is "built into the language of the claim limitation" and "the claimed second resolution converter cannot be

disclosed by Segall's multilayer scheme in combination with the proposed system of Phek-Martins-He." *Id.*

At this stage, we disagree that the claim's plain language imposes such a limitation. Rather, the claim recites that the second resolution converter "create[s] a sequence of enlarged decoded pictures with a high resolution as a second resolution higher than the standard resolution" but does not further recite how. The claim has limitations to the pictures that are acquired—that is, "second resolution converter [is] configured to acquire the sequence of decoded pictures with the standard resolution from the first decoder to work on the sequence of decoded pictures." But the claim does not preclude using other data to create the sequence of enlarged decoded pictures. Apart from the plain language, Patent Owner provides no further basis for its implicit construction. *See id.* at 26–28. For this additional reason, we disagree with Patent Owner's arguments about the second resolution converter. *See id.*

At this stage and on the present record, we are persuaded that Petitioner has sufficiently explained how the proposed combination meets the claimed second resolution converter in [2.6].

d. Spatial Resolution

Claim 2 recites, in part, "wherein the set of decoding targets, the set of first reference pictures, and the set of second reference pictures have the same value in spatial resolution." Ex. 1001, 67:50–52. Petitioner refers to this limitation as [2.7]. *See* Pet. 77.

Patent Owner argues that the Petition is deficient for the same reasons discussed in connection with the claimed second decoder. Prelim. Resp. 28–29. As discussed in § II.D.5.b, we disagree with Patent Owner's argument about the claimed second decoder.

e. Remaining Limitations

Apart from the arguments discussed above, Patent Owner does not present arguments specifically directed to the subject matter recited in the rest of the claim. *See* Prelim. Resp. Even so, Petitioner has the burden to show that the challenged claims are unpatentable. Thus, we have reviewed Petitioner's arguments and evidence submitted in connection with the remaining limitations and find them to be sufficient at this stage and on this record. From the current record, Petitioner has established a reasonable likelihood that it will prevail in demonstrating that claim 2 is unpatentable.

6. Claims 3, 4, and 11

Patent Owner argues that claims 3 and 4 are patentable for the same reasons as claim 2 because each claim recites limitations that mirror those in claim 2. Prelim. Resp. 29–30. Patent Owner argues that claim 11 is patentable for the same reasons as claim 2 because it depends from claim 2. *Id.*

As discussed in § II.D.5, we disagree with Patent Owner's arguments. Even so, Petitioner has the burden to show that the challenged claims are unpatentable. Thus, we have reviewed Petitioner's arguments and evidence submitted in connection with claims 3, 4, and 11. From the current record, Petitioner has established a reasonable likelihood that it will prevail in demonstrating that claims 3, 4, and 11 are unpatentable.

III. CONCLUSION

Petitioner has shown a reasonable likelihood of prevailing as to the unpatentability of at least one claim. Thus, we institute an *inter partes* review on all claims challenged in the Petition and on all grounds in the Petition.

IV. ORDER

It is

ORDERED that, under 35 U.S.C. § 314(a), an *inter partes* review of claims 2–4 and 11 of the '995 patent is instituted for all grounds in the Petition; and

FURTHER ORDERED that, under 35 U.S.C. § 314(a), *inter partes* review of the '995 patent is instituted on this Decision's entry date, and under 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the trial's institution.

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