

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Kenji Sugiyama
U.S. Patent No.: 6,845,128 Attorney Docket No.: 39843-0167IP1
Issue Date: January 18, 2005
Appl. Serial No.: 10/067,815
Filing Date: February 8, 2002
Title: VIDEO-EMPHASIS ENCODING APPARATUS AND
DECODING APPARATUS AND METHOD OF VIDEO-
EMPHASIS ENCODING AND DECODING

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 6,845,128 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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EXHIBITS

- SAMSUNG-1001 U.S. Patent No. 6,845,128 to Sugiyama (“the ’128 Patent”)
- SAMSUNG-1002 Excerpts from the Prosecution History of the ’128 Patent (“the Prosecution History”)
- SAMSUNG-1003 Declaration and Curriculum Vitae of Dr. Scott Acton
- SAMSUNG-1004 Complaint, *Advanced Coding Technologies LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00499-JRG, E.D. Tex., filed December 30, 2022
- SAMSUNG-1005 U.S. Patent No. 5,491,514 (“Fukuda”)
- SAMSUNG-1006 U.S. Patent No. 5,241,387 (“Fujikawa”)
- SAMSUNG-1007 U.S. Patent No. 6,801,665 (“Atsumi”)
- SAMSUNG-1008 Reserved
- SAMSUNG-1009 Japanese Patent Application Publication No. JPH 7-162862A (“JPH7-162862”)
- SAMSUNG-1010 Excerpts of Japanese Patent Application No. 2001-033401 File History
- SAMSUNG-1011 Excerpts of Gonzalez et al., *Digital Image Processing*, Second Edition, Prentice-Hall, Inc. (2002)
- SAMSUNG-1012 Excerpts of Helt, *Practical Television Engineering* (1953)
- SAMSUNG-1013 Excerpts of Kaufman, *Introduction to Color TV* (1956)
- SAMSUNG-1014 Excerpts of Sillman, *Television Captioning for the Deaf* (1984)
- SAMSUNG-1015 Excerpts of Jensema et al., *Closed-Captioned Television Presentation Speed and Vocabulary* (1996)
- SAMSUNG-1016 Excerpts of Stott, *Design Technique for Multiplexing Asynchronous Digital Video and Audio Signals* (1978)

SAMSUNG-1017 Excerpts of MPEG 1SO/IEC 11172-3 (1993)

SAMSUNG-1018-1019 RESERVED

SAMSUNG-1020 Excerpts of Puri, Multimedia Systems, Standards, and
Networks (2000)

SAMSUNG-1021 Excerpts of Woods, Subband Coding of Images (1986)

SAMSUNG-1022 Memorandum, Interim Procedure for Discretionary Denials in
AIA Post-Grant Proceedings with Parallel District Court
Litigation (USPTO June 21, 2022) (“Director’s Guidance”)

SAMSUNG-1023 Samsung Stipulation letter regarding IPR grounds in District
court litigation

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.pre]	A video-emphasis encoding apparatus for applying an emphasis processing to an input video signal to obtain a video bitstream comprising:
[1.1]	an emphasis-level setter for setting an emphasis level to the input video signal in accordance with at least one factor among control data carried by the input video signal, a picture state detected from the input video signal and encoding conditions for the input video signal;
[1.2]	an emphasisizer for applying the emphasis processing to the input video signal at the emphasis level to obtain an emphasized video signal;
[1.3]	an encoder for encoding the emphasized video signal to obtain a video bitstream; and
[1.4]	a multiplexer for multiplexing the Video bitstream and data on the emphasis level.
Claim 2	
[2]	The video-emphasis encoding apparatus according to claim 1 further comprising a detector for detecting a degree of quantization applied to the input video signal, wherein the emphasis-level setter sets the emphasis level in accordance with the detected degree of quantization as the encoding conditions.
Claim 3	
[3]	The video-emphasis encoding apparatus according to claim 1 further comprising a detector for detecting a degree of enhancement effects already applied to the input video signal, wherein the emphasis-level setter sets the emphasis level in accordance with the detected degree

	of enhancement effects as the picture state detected from the input video signal.
Claim 4	
[4.pre]	A method of video-emphasis encoding for applying an emphasis processing to an input video signal to obtain a video bitstream comprising the steps of:
[4.1]	setting an emphasis level to the input video signal in accordance with at least one factor among control data carried by the input video signal, a picture state detected from the input video signal and encoding conditions for the input video signal;
[4.2]	applying the emphasis processing to the input video signal at the emphasis level to obtain a emphasized video signal;
[4.3]	encoding the emphasized video signal to obtain a video bitstream; and
[4.4]	multiplexing the video bitstream and data on the emphasis level.
Claim 5	
[5pre]	A video-deemphasis decoding apparatus for decoding and applying a deemphasis processing to an input video bitstream comprising:
[5.1]	a deemphasis-level setter for setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level;
[5.2]	a decoder for decoding the input video bitstream for reproducing the video signal; and
[5.3]	a deemphasizer for applying the deemphasis processing to the reproduced video signal at the deemphasis level to obtain a deemphasized video signal.

Claim 6	
[6]	The video-deemphasis decoding apparatus according to claim 5, wherein the deemphasis-level setter obtains data including a degree of quantization applied to the input video signal as the emphasis-level data to obtain the emphasis level in accordance with the degree of quantization, thus setting the deemphasis level that matches the emphasis level.
Claim 8	
[8.pre]	A video-deemphasis decoding method for decoding and applying a deemphasis processing to an input video bit stream comprising the steps of:
[8.1]	setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level;
[8.2]	decoding the input video bitstream for reproducing the video signal; and
[8.3]	applying the deemphasis processing to the reproduced video signal at the deemphasis level to obtain a deemphasized video signal.

Samsung Electronics Co., Ltd. (“Petitioner” or “Samsung”) petitions for *Inter Partes* Review (“IPR”) of claims 1-6 and 8 (“the Challenged Claims”) of U.S. Patent No. 6,845,128 (“the ’128 Patent”). Compelling evidence presented in this Petition demonstrates at least a reasonable likelihood that Samsung will prevail with respect to at least one of the Challenged Claims.

I. REQUIREMENTS FOR IPR

A. Grounds for Standing

Petitioner certifies that the ’128 Patent is available for IPR. This petition is being filed within one year of service of a complaint against Petitioner.

SAMSUNG-1004. Petitioner is not barred or estopped from requesting review of the Challenged Claims on the below-identified grounds.

B. Challenge and Relief Requested

Samsung requests an IPR of the Challenged Claims on the grounds noted below. Dr. Acton provides supporting testimony in his Declaration (SAMSUNG-1003).

Ground	Claims	Basis under 35 U.S.C. § 103
1A	1-6 and 8	Fukuda
1B	1-4	Fukuda in view of Fujikawa
2	1-6 and 8	Atsumi

The ’128 Patent claims priority to two foreign applications, the earliest of

which was filed February 9, 2001. SAMSUNG-1001, Cover (30). As shown below, each reference pre-dates the '128 Patent's earliest proclaimed priority date (February 9, 2001; "Critical Date"), which Petitioner does not concede.

Reference	Filing Date	Publication Date	Prior Art At Least Under
Fukuda	Jan. 27, 1994	Feb. 13, 1996	§102(b)
Fujikawa	Nov. 27, 1991	Aug. 31, 1993	§102(b)
Atsumi	Sep. 15, 1998	Oct. 5, 2004	§102(e)

C. Claim Construction

Petitioner submits that no formal claim constructions are necessary because "claim terms need only be construed to the extent necessary to resolve the controversy." *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); SAMSUNG-1003, ¶¶12-16, 19. Petitioner reserves the right to respond to any constructions offered by Patent Owner or adopted by the Board. Petitioner is not conceding that each challenged claim satisfies all statutory requirements, nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be raised in district court. For this petition, Petitioner applies prior art in a manner consistent with Patent Owner's allegations of infringement before the district court.

D. Level of Ordinary Skill in the Art

A person of ordinary skill in the art at the time of the '128 Patent ("POSITA") would have had at least a Bachelor's degree in computer science, electrical engineering, computer engineering, or a related field, with 2-3 years of experience in digital video processing, or a related field. SAMSUNG-1003, ¶¶17-18. Additional graduate education could substitute for professional experience, and *vice versa*. *Id.*

II. THE '128 PATENT

A. Brief Description

The '128 Patent is directed to a "video emphasis encoding apparatus" and "method of video emphasis encoding," as well as a "video-deemphasis decoding apparatus" and "method of video-deemphasis decoding." SAMSUNG-1001, 2:46-57. The '128 Patent describes "emphasis-level settings in accordance with quantization parameters for encoding of input video signals" where "the emphasis-level settings are performed as the wider the quantization step width, the higher the emphasis" and "the narrower the quantization step width, the lower the emphasis level." SAMSUNG-1001, 4:1-9. The '128 Patent also describes "emphasis level settings in accordance with the level of enhancement processing already applied to input video signals" where "the higher the enhancement level, the lower the emphasis level." SAMSUNG-1001, 4:10-18. An example "first embodiment" of

the '128 Patent is reproduced below in FIGS. 1 and 2. SAMSUNG-1001, 3:43-49;
SAMSUNG-1003, ¶20.

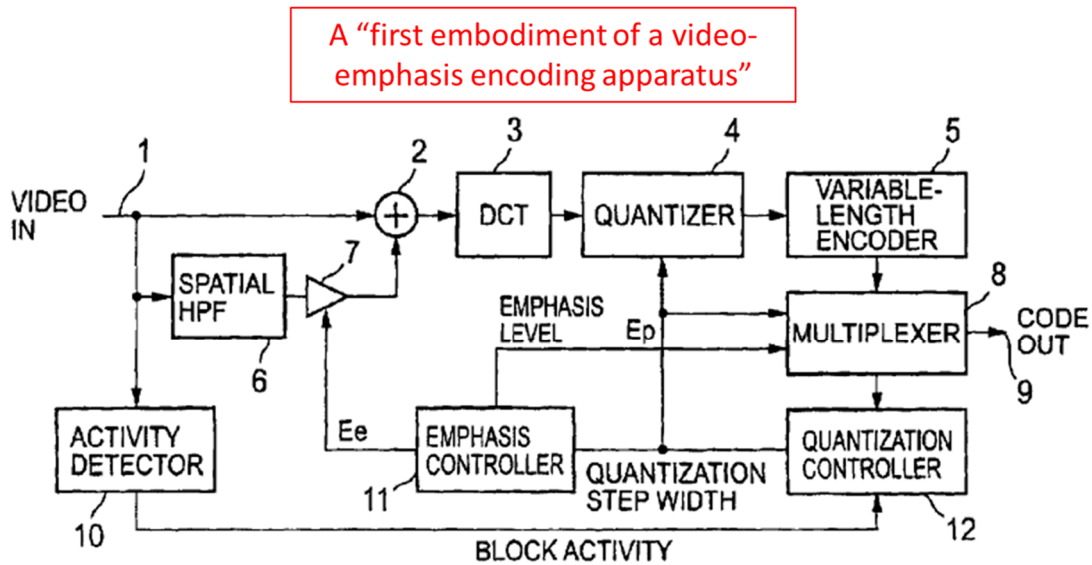


FIG.1

SAMSUNG-1001, FIG. 1¹

¹ Annotations to the figures throughout this Petition are shown in color.

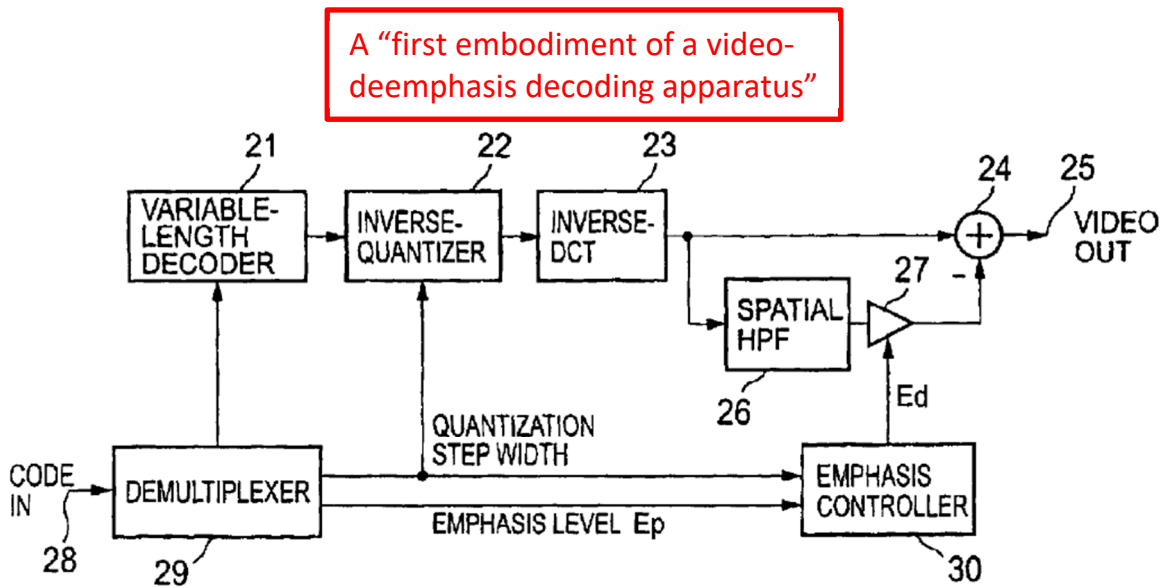


FIG.2

SAMSUNG-1001, FIG. 2

B. Prosecution History

Application Serial No. 10/067,815 (“the ’815 application”) that issued as the ’128 Patent was filed on February 8, 2002, claiming priority to Japanese Application Nos. 2001-033401 and 2001-033403 filed on February 9, 2001.

SAMSUNG-1001, Cover (22), (30). The “BACKGROUND OF THE INVENTION” section of the ’815 application discussed “Japanese Un-examined Patent Publication No. 7-162862” (“JPH7-162862”; SAMSUNG-1009).

SAMSUNG-1002, 3-4; SAMSUNG-1001, 2:4-6. The Applicant did not submit any IDS citing JPH7-162862, and the Examiner did not cite JPH7-162862 to reject the claims. *See* SAMSUNG-1001, Cover (56); *see generally* SAMSUNG-1002.

On September 2, 2004, the Examiner issued a notice of allowance, with a discussion regarding U.S. Patent 5,880,785 to Fujiwara, U.S. Patent 5,315,326 to Sugiyama, and U.S. Patent Application 2001/0033692 to Kimura but no prior art rejections. SAMSUNG-1002, 78-85. The Applicant paid the issue fee on December 2, 2004. SAMSUNG-1002, 96. The '815 application issued as the '128 Patent on January 18, 2005. SAMSUNG-1001, Cover (45); SAMSUNG-1003, ¶21. In sum, the examiner allowed the application over prior art references that are substantially different from those relied upon in this petition. Indeed, during prosecution, there is no indication that the examiner considered Fukuda, Fujikawa, or Atsumi, which render the challenged claims obvious, as discussed below.

On March 9, 2006, after issuance of the '128 patent, the Japanese Patent Office issued a Notice of Reasons for Refusal in Japanese Application No. 2001-033401 to which the '128 Patent claims priority. SAMSUNG-1010, 24-26. In the Notice, the Japanese Application was refused based on JPH7-162862 that was cited in the Background section of the '128 Patent. *Id.* Although the '128 Patent Background section states, as an alleged drawback of the video-emphasis encoding apparatus of JPH7-162862, the “emphasis processing is applied to video signals with no emphasis-level control” and the “emphasis data transferred to the video-deemphasis decoding apparatus indicates only whether or not the emphasis processing has been applied to video signals” (SAMSUNG-1002, 4; SAMSUNG-

1001, 2:25-32), the Japanese Patent Office disagreed. SAMSUNG-1010, 24-26.

Specifically, the Notice of Reasons for Refusal stated that JPH7-162862 paragraphs [0097]-[0101] describe “setting [an] emphasis level according to [a] compression ratio” and thus render obvious setting “the emphasis level according to the degree of quantization” and paragraph [0195] describes “transmitting information related to the emphasis level along with a video code sequence.”

SAMSUNG-1010, 24. With no response from the Applicant in the Japanese Application, the Japanese Patent Office issued a final Decision of Refusal on July 7, 2006. SAMSUNG-1010, 26; SAMSUNG-1003, ¶22.

JPH7-162862 (filed January 14, 1994) and Fukuda (filed January 27, 1994) claim priority to the same three foreign Japanese applications JPH5-012286, JPH 5-174068, and JPH5-247893. SAMSUNG-1009, Cover (31)-(33); SAMSUNG-1009, Cover [30]. JPH7-162862 and Fukuda also contain the same disclosure. *See generally* SAMSUNG-1005 *and* SAMSUNG-1009. As described in detail below and confirmed by the Japanese Patent Office, Fukuda renders obvious the features that the '128 Patent alleges are the drawbacks of Fukuda's video-emphasis encoding apparatus. SAMSUNG-1003, ¶23.

III. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. [GROUND 1A] – Claims 1-6 and 8 are rendered obvious by Fukuda

1. Overview of Fukuda²

Fukuda describes one embodiment of a “coding and decoding apparatus” where input video signals are “enhanced by an emphasis circuit” which has a “nonlinear characteristic increasing an enhancement degree as [the] amplitude of the input video signal decreases.” SAMSUNG-1005, Abstract. The enhanced video signal is coded by an encoder into “a code stream,” and this “code stream” is then transmitted to a “decoder” which “decodes the code stream.” *Id.* The “decoded video signal” is then “fed to a de-emphasis circuit having a nonlinear characteristic increasing a suppression degree as amplitude of the input signal decreases.” *Id.*; SAMSUNG-1003, ¶24.

² Descriptions of the references and combinations are incorporated into each mapping that includes citations to these references. Emphasis is added to text using bold and/or italicized font unless otherwise indicated.

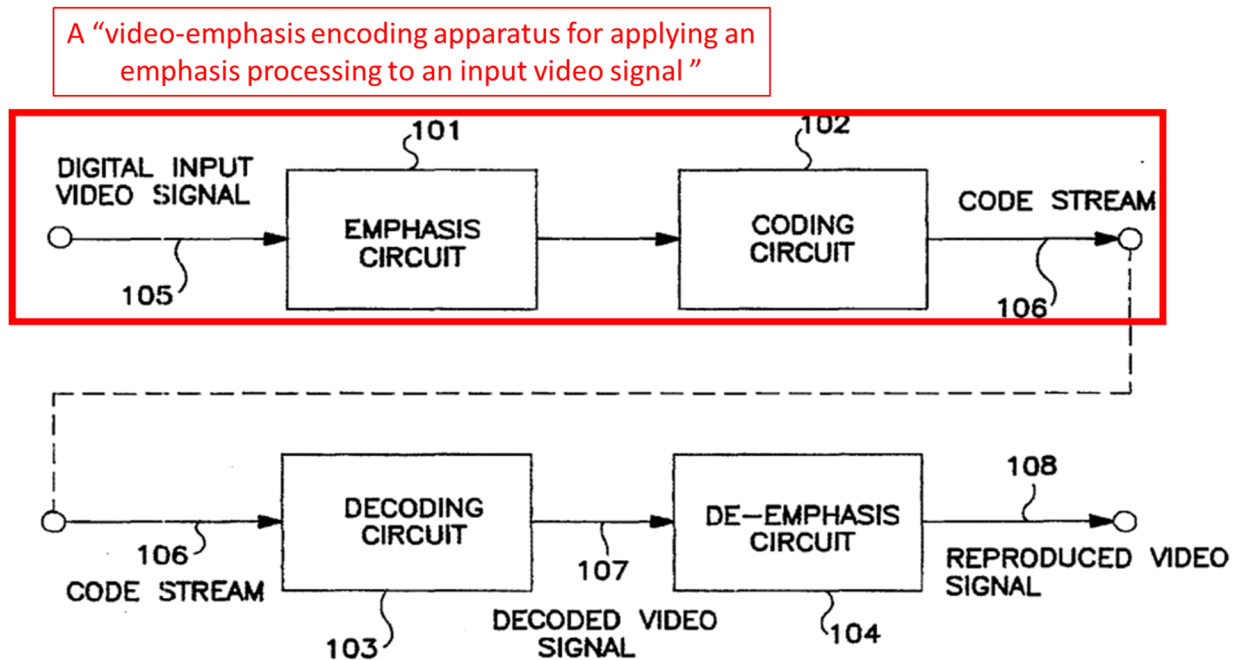


FIG. 1

SAMSUNG-1005, FIG. 1.

Fukuda discloses other embodiments that provide a mode signal for controlling the signal enhancement degree of the emphasis circuit. SAMSUNG-1005, 11:1-40, 12:42-13:16, 14:46-15:4, 15:43-16:5, 16:45-67, 17:51-18:15, 18:28-46, 18:65-19:18, 20:29-64, 22:40-23:22, FIGS. 6-11, 13-14, 17. Fukuda discloses that these embodiments “may also comprise a transmitter for sending or recording mode signals together with coded image data, and the reproducing means may comprise means for receiving mode signals.” SAMSUNG-1005, 24:54-59. For example, with respect to the FIG. 17 embodiment reproduced below, Fukuda discloses that “by transmitting the mode control signal *m* in emphasis or recording in a medium, the reproduction side DC level detection circuit 1701 and mode

control signal generating circuit 1702 in FIG. 17 are not needed, and a reproduced image signal of higher precision may be obtained in a smaller circuit scale.”

SAMSUNG-1005, 23:17-22; SAMSUNG-1003, ¶25.

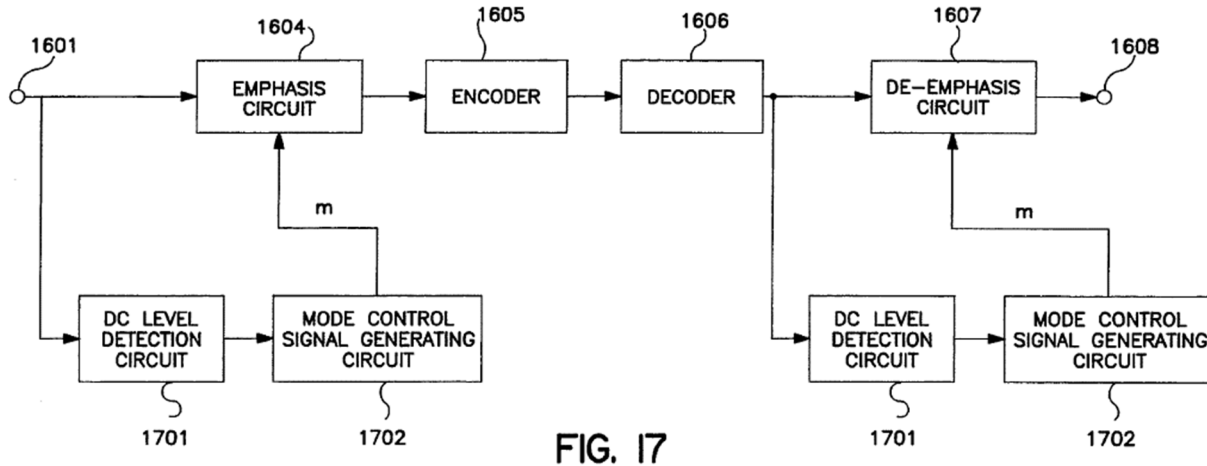


FIG. 17

SAMSUNG-1005, FIG. 17.

2. Analysis

[1.pre]

To the extent the preamble is limiting, Fukuda renders it obvious in multiple ways. SAMSUNG-1003, ¶26. For example, Fukuda describes multiple embodiments of a “coding and decoding apparatus” that each individually render this claim element obvious and include an emphasis circuit that enhances input video signals. SAMSUNG-1005, 2:13-60; FIGS. 1-19. In one example, Fukuda describes a “coding and decoding apparatus” where “[i]nput video signals are enhanced by an emphasis circuit” and “compression coded in an encoder” and “a code stream, representing a compression coded video signal, is outputted from the

encoder” (“*[a] video-emphasis encoding apparatus for applying an emphasis processing to an input video signal to obtain a video bitstream*”). SAMSUNG-1005, Abstract, 3:3-20, 5:29-39, 20:56-21:7, FIG. 1. The “code stream is transmitted to a decoder” and “the decoder decodes the code stream.”

SAMSUNG-1005, Abstract, 3:3-20, 5:29-39, 20:56-21:7, FIG. 1. The “decoded video signal is [then] fed to a de-emphasis circuit” where “low noise high quality video signals [are] reproduced from the de-emphasis circuit.” SAMSUNG-1005, Abstract, 3:3-20, 5:29-39, 20:56-21:7, FIG. 1; SAMSUNG-1003, ¶26. An example apparatus according to Fukuda is presented below in FIG. 1.

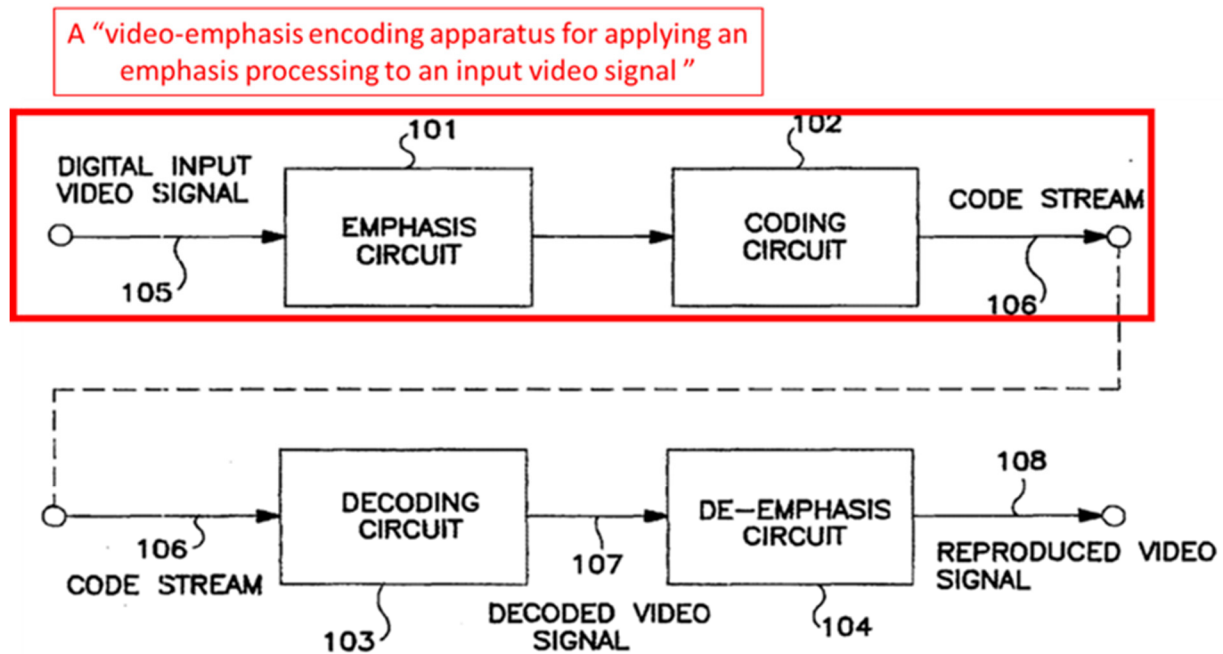


FIG. 1

SAMSUNG-1005, FIG. 1.

Additionally, Fukuda describes an embodiment of a video coding and decoding apparatus shown in FIG. 17 that includes an “emphasis circuit 1604” that “enhances the signal in every component of the digital image signal.” SAMSUNG-1005, 20:56-21:7, FIG. 17; SAMSUNG-1003, ¶27. An example apparatus according to Fukuda is presented below in FIG. 17.

A “video-emphasis encoding apparatus for applying an emphasis processing to an input video signal ”

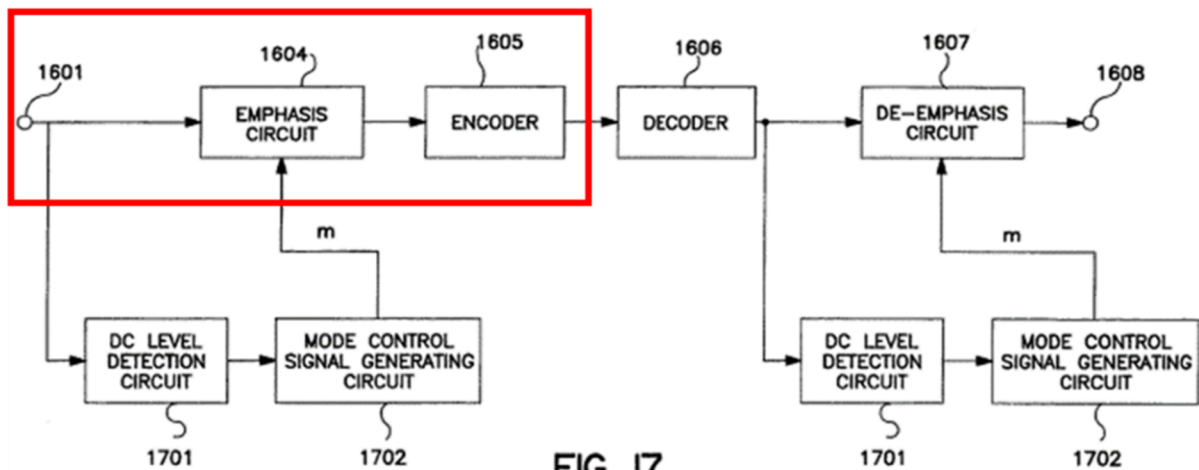


FIG. 17

SAMSUNG-1005, FIG. 17.

[1.1]³

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶28. For example, Fukuda describes multiple embodiments of a coding and decoding apparatus that each include an emphasis-level setter for setting an emphasis level. SAMSUNG-1005, 2:13-60; FIGS. 1-19. In many of these embodiments, the emphasis-level setter sets an emphasis level by at least one of

³ Petitioner is not waiving any arguments concerning indefiniteness or claim scope. *Mylan Pharm. Inc. v. Horizon Pharma USA, Inc.*, IPR2018-00272, Paper 35, 6-8 (PTAB 2019). The Board has regularly compared indefinite claims to the prior art for purposes of considering unpatentability. *See, e.g., Chicago Mercantile Exchange, Inc. v. 5th Market, Inc.*, CBM2013-00027, Paper 33, 3 (PTAB 2014); *SAP America, Inc. v. Lakshmi Arunachalam*, CBM2013-00013, Paper 61, 29 (PTAB 2014). Although Petitioner reserves all rights to pursue indefiniteness or claim construction arguments in other forums, resolution of those issues are not necessary in this Petition because the prior art discloses the claims (e.g., [1.pre]-[4.4]) in substantially identical manner to the '128 patent specification. Petitioner's application of prior art is also consistent with Patent Owner's allegations of infringement before the district court.

“control data carried by the input video signal⁴, a picture state detected from the input video signal and encoding conditions for the input video signal.”⁵ Id.;

SAMSUNG-1005, 2:13-60; FIGS. 1-19; SAMSUNG-1003, ¶28.

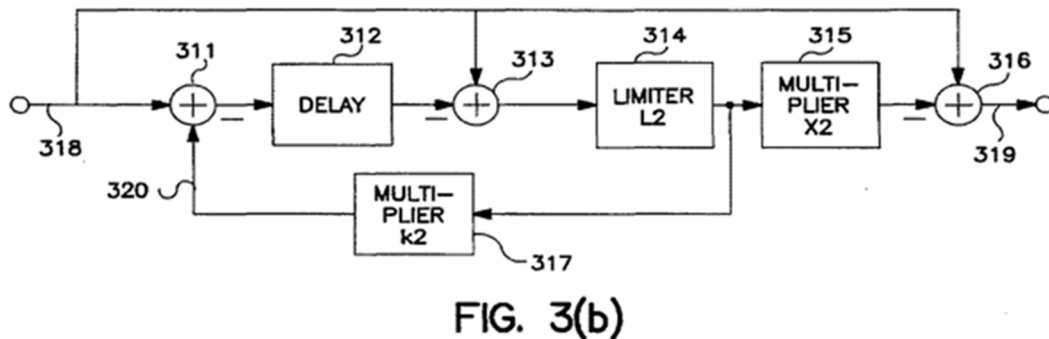
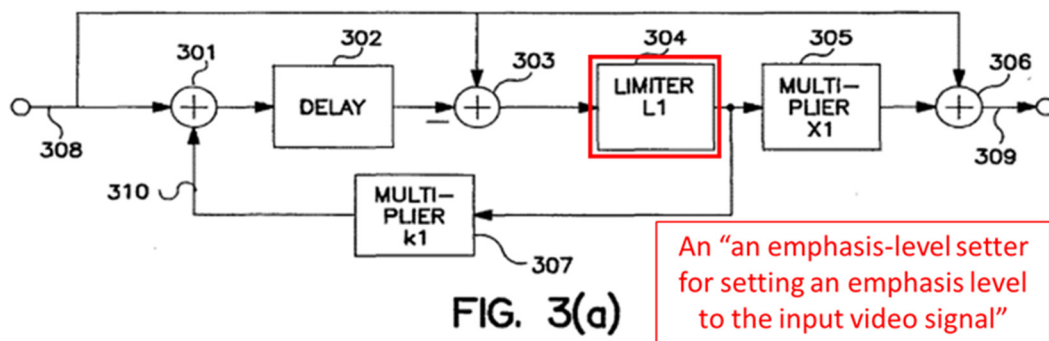
setting an emphasis level to the input video signal in accordance with ... a picture state detected from the input video signal

In a **first** example of Fukuda that renders obvious this option, Fukuda describes an “emphasis circuit having a nonlinear characteristic” (replacing the emphasis circuit 101 in FIG. 1) for “enhancing the signal with a smaller degree as the signal amplitude becomes larger.” SAMSUNG-1005, 5:29-50, 6:9-41. Fukuda explains that, “by providing the signal amplitude with a nonlinear characteristic, the signal components having a similar amplitude to the generated noise components are enhanced and suppressed with a large degree.” SAMSUNG-1005, 5:40-50. Included in Fukuda’s non-linear emphasis circuit is a “limiter 304” (“**an**

⁴ Remarkably, the ’128 patent admits that it does not have written description support for this feature. SAMSUNG-1001, 8:36-38 (“not disclosed in the foregoing embodiments”). Accordingly, Petitioner reserves the right to advance §112 arguments in co-pending litigation.

⁵ Petitioner notes that only one of these three options is needed to satisfy this claim feature.

emphasis-level setter”) that “limits the amplitude of the output signal” based on whether amplitude of the input signal is greater than a set parameter “L” (“*a picture state detected from the input video signal*”). SAMSUNG-1005, 6:21-30. FIG. 4 below illustrates the amplitude of the “output characteristics” (“*emphasis level*”) of the limiter 304, which range from “-L” to “L,” relative to the amplitude of the input signal (thus “enhancing the signal with a smaller degree as the signal amplitude becomes larger”). SAMSUNG-1005, 5:29-39, 6:21-30; SAMSUNG-1003, ¶29.



SAMSUNG-1005, FIGS. 3(a) and 3(b).

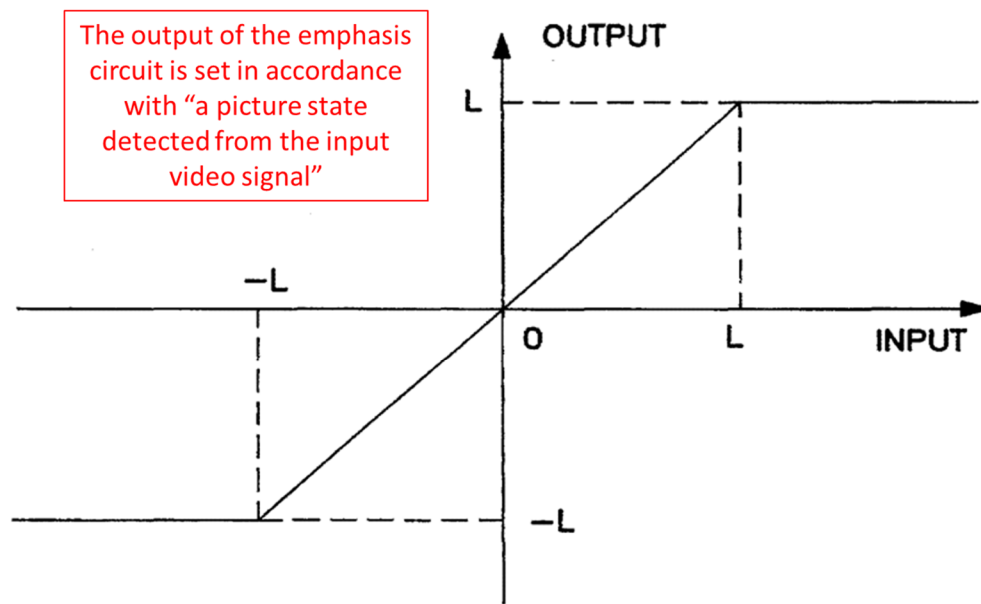


FIG. 4

SAMSUNG-1005, FIG. 4.

Moreover, similar disclosure from JPH7-162862 was used to reject this claim feature in the '128 patent's Japanese application (Application No. 2001-033401). SAMSUNG-1009, [0044]-[0048], [0178]-[0183]; SAMSUNG-1010, 24; SAMSUNG-1003, ¶30.

In a **second** example, Fukuda describes an "activity detector 801 and a mode changeover circuit 802"⁶ ("*an emphasis-level setter*") where "[t]he signal

⁶ Fukuda discloses that these components are "installed in a coding and decoding apparatus as shown in FIG. 1" (i.e., "emphasis circuit 803" is a similar component to "emphasis circuit 101," and so on). SAMSUNG-1005, 14:46-51.

enhancement of the emphasis circuit 803 decreases as activity of the video signal increases” (“*a picture state detected from the input video signal*”). SAMSUNG-1005, 14:46-15:4, 18:65-19:36, FIGS. 8 and 14. Fukuda discloses that the mode changeover circuit 802 issues a “mode signal 809 depending on activity” (“*emphasis level*”). SAMSUNG-1005, 14:52-63. The mode signals disclosed by Fukuda are used at “the reproduction side” where the “de-emphasis circuit suppresses the video signal decoded by the suppression degree depending on the mode signal.” SAMSUNG-1005, 11:57-59; SAMSUNG-1003, ¶31. Presented below are two embodiments of Fukuda’s activity detectors.

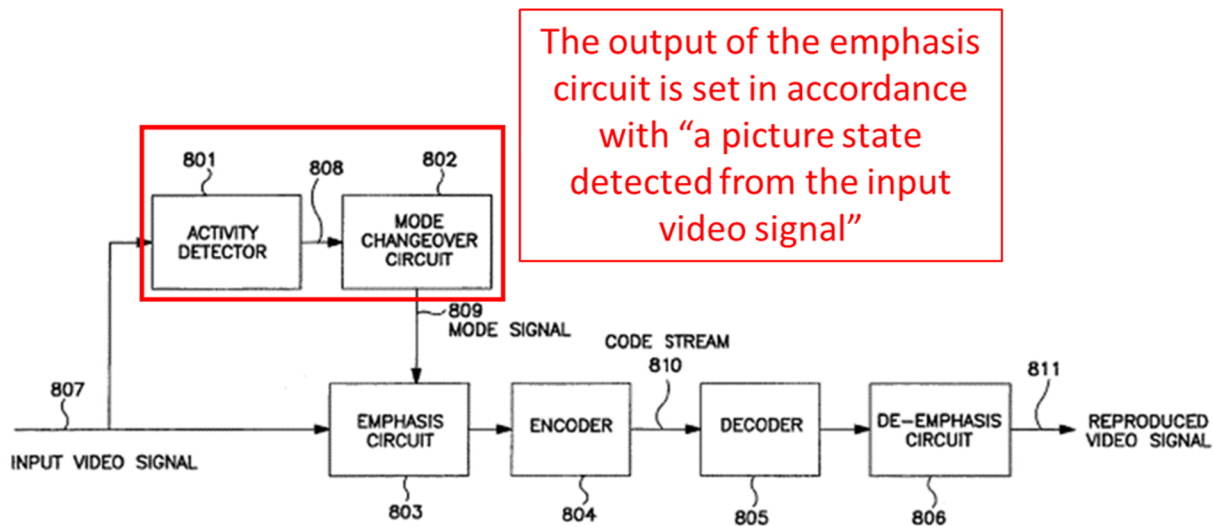


FIG. 8

SAMSUNG-1005, FIG. 8.

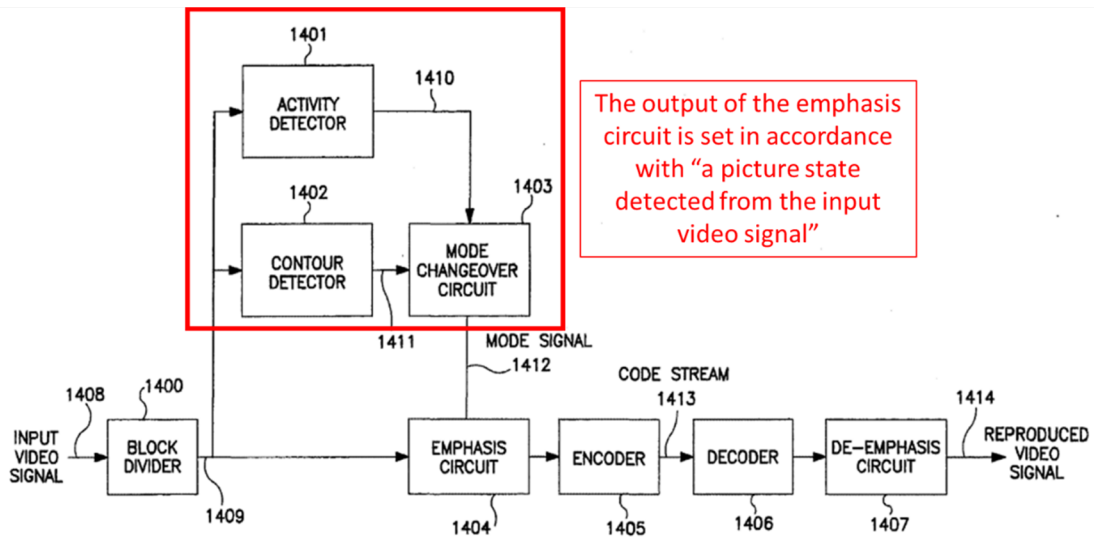


FIG. 14

SAMSUNG-1005, FIG. 14.

The '128 patent similarly describes an embodiment illustrated in FIG. 1 that includes an activity detector 10 that provides an output used by the quantization controller 12, whose output is used to set the emphasis level of the emphasis controller. SAMSUNG-1001, 4:39-41, 5:30-54; SAMSUNG-1003, ¶32.

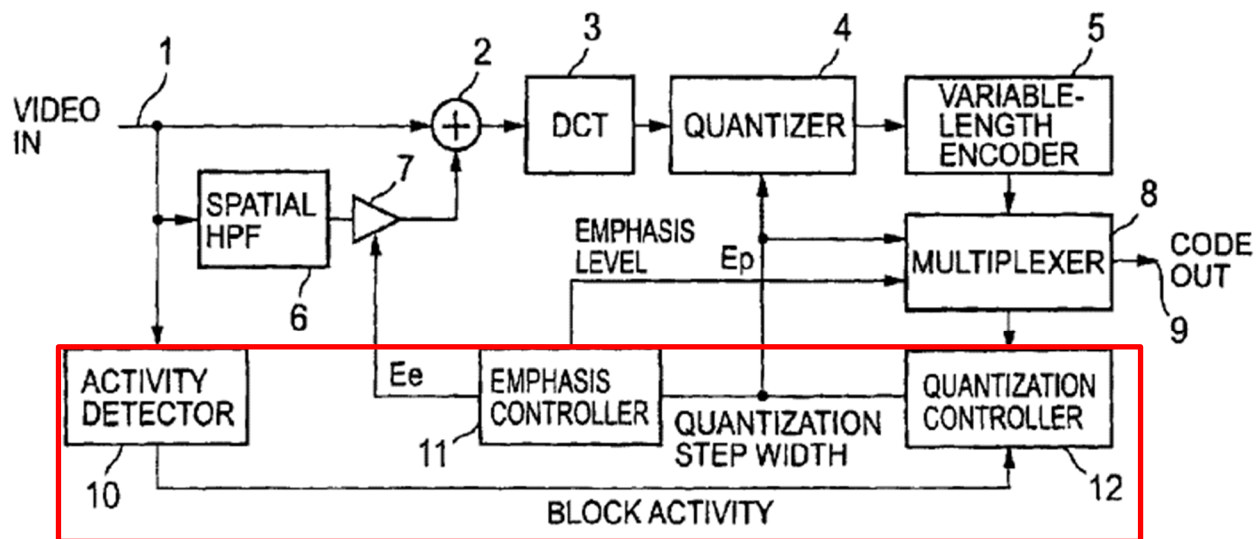


FIG.1

SAMSUNG-1001, FIG. 1.

As a **third** example, Fukuda describes “an example of coding and decoding apparatus having a motion amount detector 901 and a mode changeover circuit 902 installed in the coding and decoding apparatus as shown in FIG. 1” (“*an emphasis-level setter*”) where “[t]he motion amount detector 901 detects the motion amount 908 of a video signal 907, and the mode changeover circuit 902 issues a mode signal 909 [(“*emphasis level*”)] depending on the motion amount 908” (“*a picture state detected from the input video signal*”). SAMSUNG-1005, 15:43-48, FIG. 9. Then, “[a]n emphasis circuit 903 enhances the video signal 907 by the signal enhancement degree depending on the mode signal 909.” SAMSUNG-1005, 15:52-54. Fukuda further explains:

The signal enhancement degree of the emphasis circuit 903

increases as the motion amount of the video signal increases. This is because the video signal with a large motion amount is large in the information quantity, and coding noise is likely to occur in coding process. **Therefore, in the image with a large motion amount, the mode enhancing by a large signal enhancement degree is selected, and signal is suppressed according to the signal enhancement,** so that coding noise may be reduced more positively. Thus, by adaptively determining the signal enhancement degree depending on the motion amount, coding noise can be removed efficiently.

SAMSUNG-1005, 15:61-16:5; SAMSUNG-1003, ¶33. Presented below is an example of a motion amount detector within Fukuda.

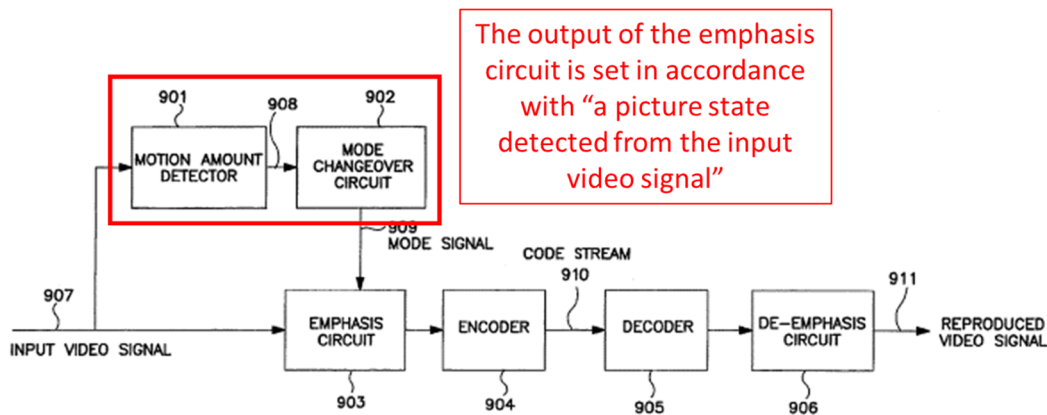


FIG. 9

SAMSUNG-1005, FIG. 9.

As a **fourth** example, Fukuda describes a “DC level detection circuit [1701]” and a “mode control signal generating circuit [1702]”⁷ (“*an emphasis-*

⁷ Fukuda’s FIG. 17 shares components with FIG. 16. SAMSUNG-1005, 22:36-61.

level setter”) which “adds the image data values for a specific period of input digital image signal... detects the DC level by calculating the mean... [and] compares this DC level with, for example, three values (64, 128, 192), and issues a two-bit mode control signal m” (“*a picture state detected from the input video signal*”). SAMSUNG-1005, 22:40-23:5, FIG. 17. Fukuda explains:

...by detecting the DC level for a specified period of digital image signal, and controlling so that the enhancement degree and suppression degree may be small when the value is close to 0 level or 255 level, occurrence of overflow and underflow of signal amplitude may be decreased, thereby **decreasing mismatch between signal enhancement and signal suppression**, and also decreasing noise due to signal enhancement and signal suppression.

SAMSUNG-1005, 23:8-16; SAMSUNG-1003, ¶34. Presented below is Fukuda’s DC level detection circuit 1701 and mode control signal generating circuit 1702.

FIG. 2(a) also provides an example of FIG. 16’s “emphasis circuit 1604.”

SAMSUNG-1005, 20:29-42. Fukuda discloses that “an example of the emphasis circuit 101 is shown in FIG. 2(a).” SAMSUNG-1005, 3:28-31. Taken together, this disclosure demonstrates that emphasis circuit 1604 illustrated in FIGS. 16-18 is a similar component to the emphasis circuit 101 of FIG. 1. SAMSUNG-1005, 3:28-31, 20:29-42, 22:36-61

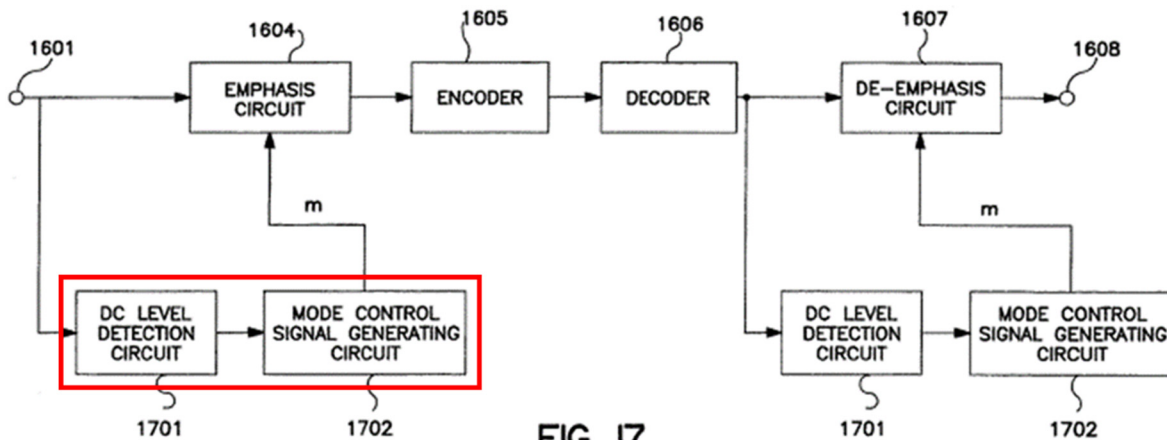


FIG. 17

The output of the emphasis circuit is set in accordance with "a picture state detected from the input video signal"

SAMSUNG-1005, FIG. 17.

setting an emphasis level to the input video signal in accordance with ...
encoding conditions for the input video signal

As a **first** example of Fukuda that renders obvious this option, Fukuda describes a "mode changeover circuit 701" (incorporated into the "apparatus as shown in FIG. 1") ("***an emphasis-level setter***") that issues a "mode signal" that is dependent on the "coding compression rate control signal" ("***encoding conditions***"). SAMSUNG-1005, 12:42-55, FIG. 7. As Dr. Acton explains, a POSITA would have recognized or found obvious that the compression rate of a video signal is representative of "***encoding conditions.***" SAMSUNG-1003, ¶35, *see also* SAMSUNG-1001, 8:42-45. Similar disclosure from JPH7-162862 was used to reject this claim feature in the '128 patent's Japanese application

(Application No. 2001-033401). SAMSUNG-1009, [0097]-[0101]; SAMSUNG-1010, 24; SAMSUNG-1003, ¶35. Presented below is Fukuda's mode changeover circuit 701.

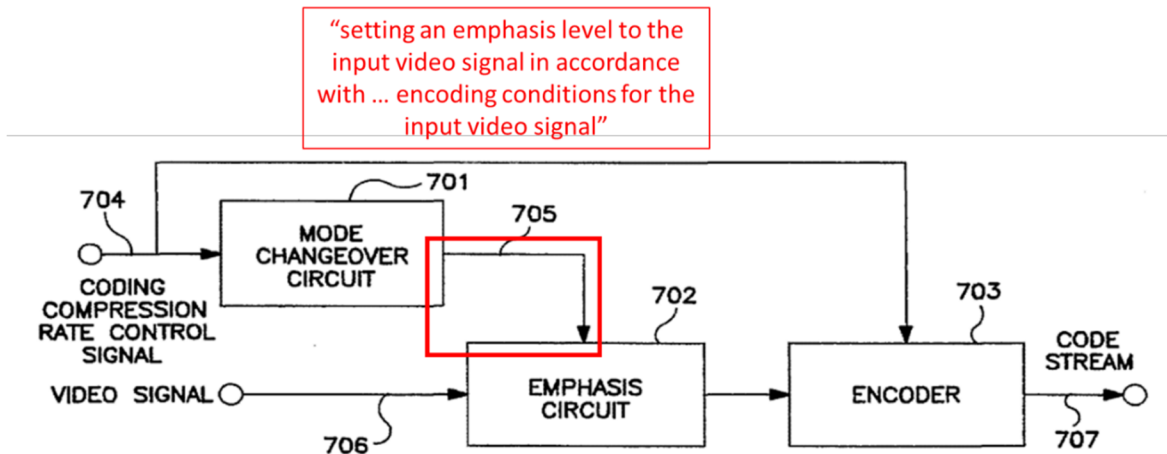


FIG. 7

SAMSUNG-1005, FIG. 7.

As a second example, Fukuda describes a “coding distortion measuring instrument 1001 and a mode changeover circuit 1002” (incorporated into the “apparatus as shown in FIG. 1”) (“*an emphasis-level setter*”) that “issues a mode signal 1009 depending on the coding distortion 1008” (“*encoding conditions*”). SAMSUNG-1005, 16:45-58, 17:29-50, FIG. 10. As Dr. Acton explains, a POSITA would have recognized or found obvious that the coding distortion of a video signal is representative of “*encoding conditions*.” SAMSUNG-1003, ¶36. Indeed, Fukuda reinforces this understanding:

As the measurement of coding distortion, the difference between the original signal and the signal after coding process may be measured... **the amount of coding distortion may be expressed by the quantization step size used in quantizing the signal in coding process. To control to specified coding compression rate in coding process, the quantization step size in quantizing is controlled depending on the generated code amount.** That is, if the generated code amount is not much, the quantization step size is increased to suppress the code amount, and if the generated code amount is small, the quantization step size is decreased to control so that the code amount may be constant. As a result, the generated code amount increases, **and if the quantization step size increases accordingly, the coding distortion increases.**

SAMSUNG-1005, 17:29-45; SAMSUNG-1003, ¶36. Presented below is Fukuda's coding distortion measuring instrument 1001 and mode changeover circuit 1002.

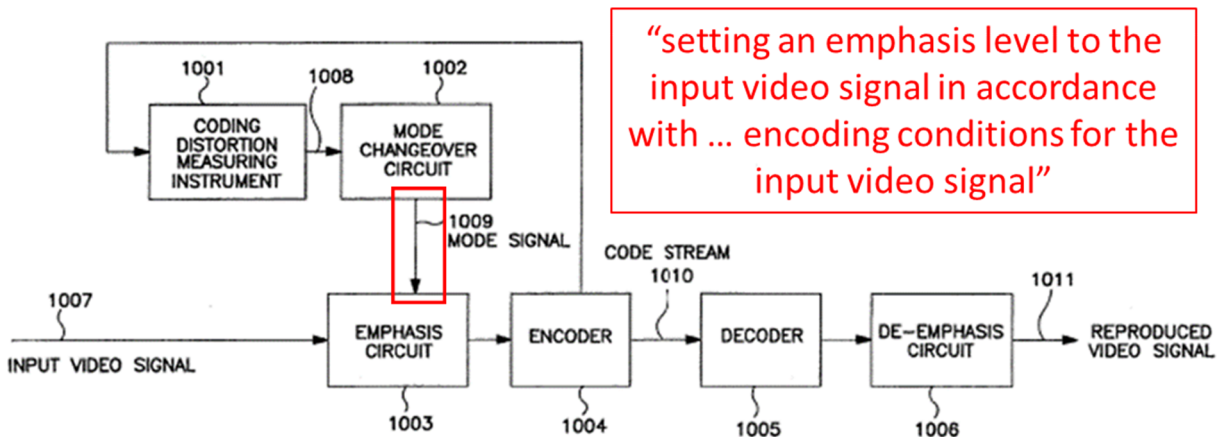


FIG. 10

SAMSUNG-1005, FIG. 10.

[1.2]

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶37. For example, multiple of Fukuda's embodiments each includes an emphasis circuit for applying emphasis processing (e.g., "emphasis circuit" of Fukuda's embodiments referenced above in [1.1]). SAMSUNG-1005, 2:13-60; FIGS. 1-19. A couple of examples are provided below.

As a **first** example, Fukuda describes an "emphasis circuit 101" ("***an emphasisizer***") that enhances an "input video signal" by a "specified enhancement degree" (e.g., a "mode signal," or "output characteristic" of a nonlinear emphasis circuit) ("***applying the emphasis processing to the input video signal at the emphasis level to obtain an emphasized video signal***"). SAMSUNG-1005, 3:8-46, FIG. 1; *see supra* [1.1]; SAMSUNG-1003, ¶38. Presented below is Fukuda's emphasis circuit 101.

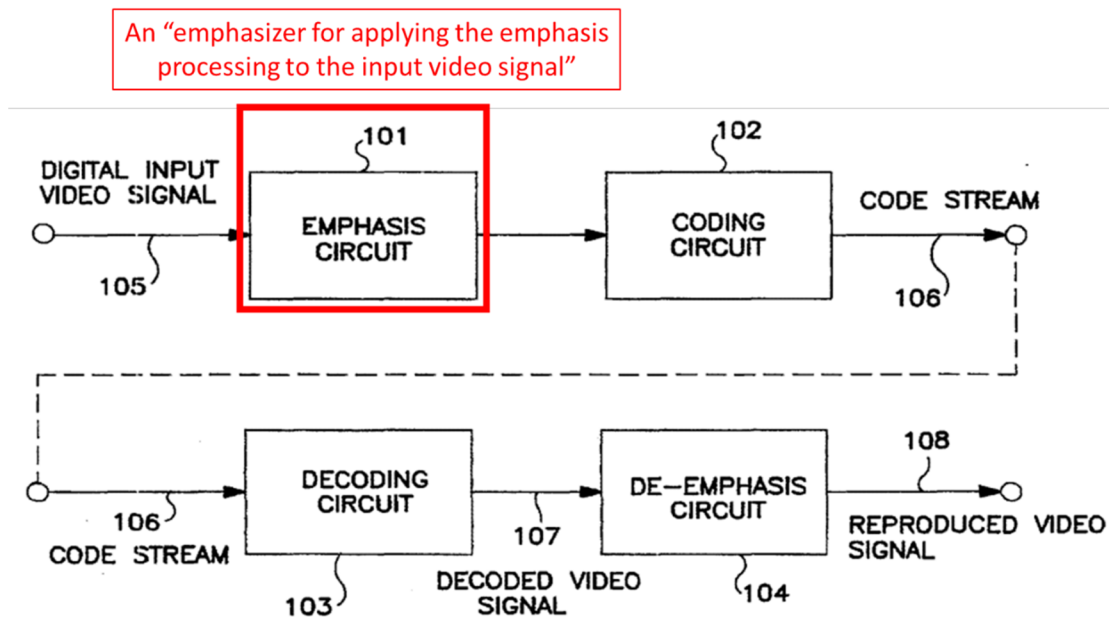
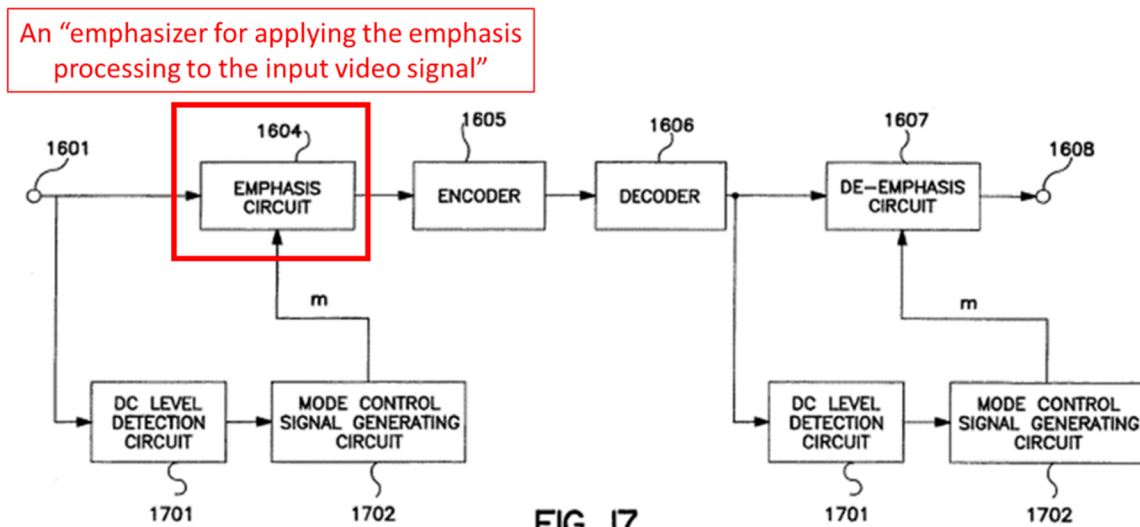


FIG. 1

SAMSUNG-1005, FIG. 1.

As a second example, Fukuda describes an “emphasis circuit 1604” (“*an **emphasizer***”) which “enhances the signal ... according to one of the plural types of emphasis characteristic selected by the mode control signal m” (“*applying the emphasis processing to the input video signal at the emphasis level to obtain an emphasized video signal*”). SAMSUNG-1005, 20:56-21:7, FIG. 17; SAMSUNG-1003, ¶39. Presented below is Fukuda’s emphasis circuit 1604.



SAMSUNG-1005, FIG. 17.

[1.3]

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶40. For example, multiple of Fukuda's embodiments each includes an encoder for encoding the emphasized video signal to obtain a code stream (e.g., "coding circuit" or "encoder" of Fukuda's embodiments referenced above in [1.1] and [1.2]). SAMSUNG-1005, 2:13-60, FIGS. 1-19; SAMSUNG-1003, ¶40. A couple of examples are provided below.

As a **first** example, Fukuda describes a "coding circuit 102" that receives the emphasized "video signal" and produces a "code stream" (*"an encoder for encoding the emphasized video signal to obtain a video bitstream"*). SAMSUNG-1005, 3:8-15, FIG. 1. As a **second** example, Fukuda describes an "encoder 1605" which "encodes the output of the emphasis circuit 1604, and issues a code stream."

SAMSUNG-1005, 20:56-21:7, FIG. 17; SAMSUNG-1003, ¶41. Examples of encoders within Fukuda are presented below.

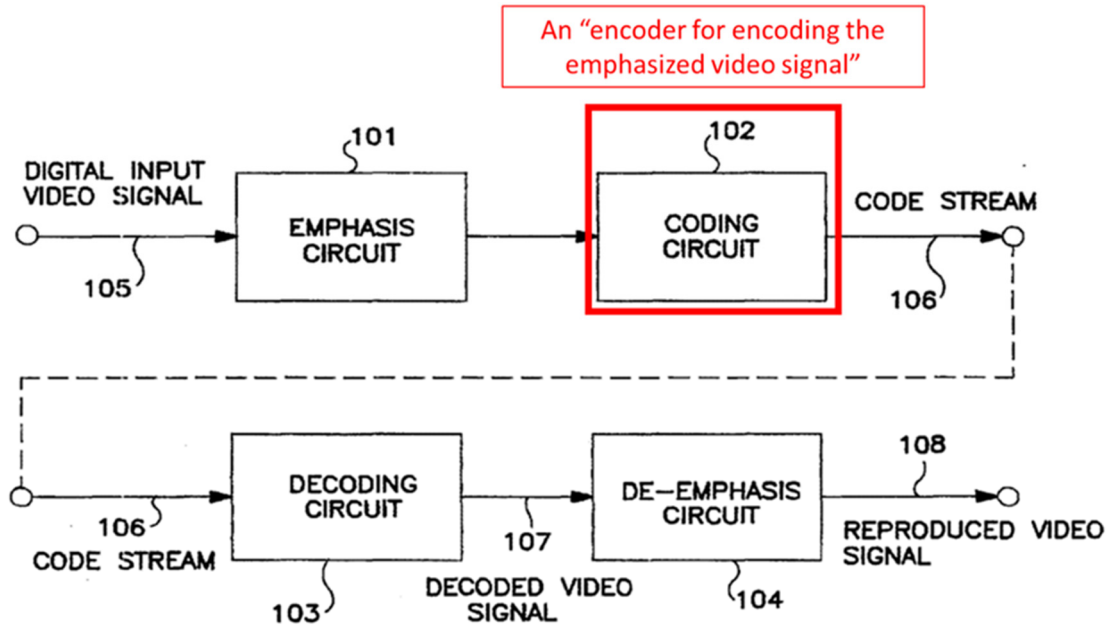


FIG. 1

SAMSUNG-1005, FIG. 1.

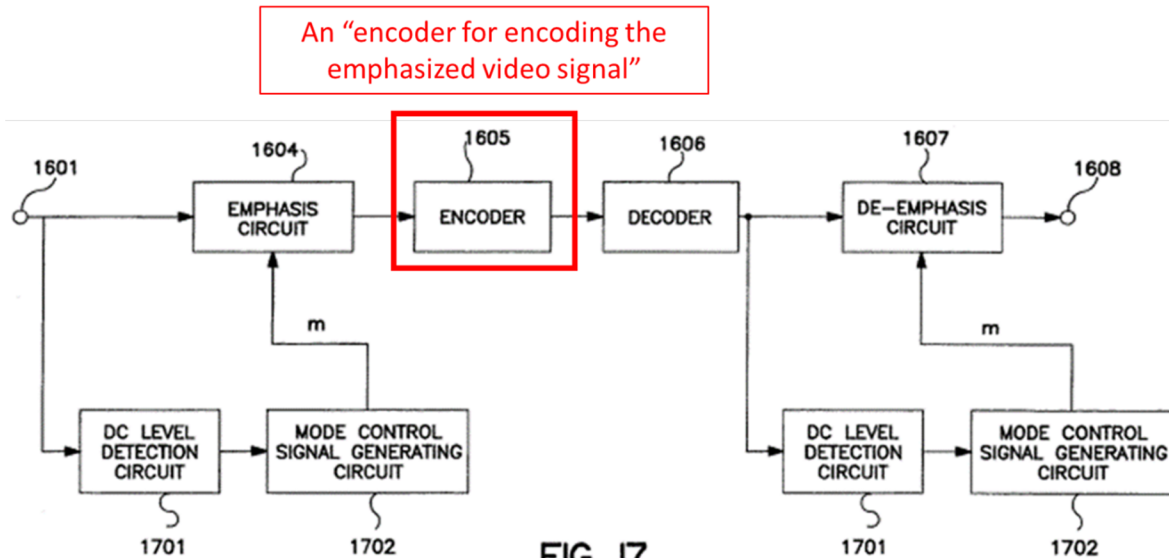


FIG. 17

SAMSUNG-1005, FIG. 17.

[1.4]

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶42. For example, Fukuda discloses many embodiments that provide a mode signal for controlling the signal enhancement degree of the emphasis circuit.

SAMSUNG-1005, 11:1-40, 12:42-13:16, 14:46-15:4, 15:43-16:5, 16:45-67, 17:51-18:15, 18:28-46, 18:65-19:18, 20:29-64, 22:40-23:22, FIGS. 6-11, 13-14, 17.

Fukuda discloses that these embodiments “may also comprise a transmitter for sending or recording mode signals together with coded image data, and the reproducing means may comprise means for receiving mode signals.”

SAMSUNG-1005, 24:54-59. For example, with respect to the FIG. 17 embodiment, Fukuda discloses that, “by transmitting the mode control signal *m* in emphasis or recording in a medium [(the “*emphasis level*”)], the reproduction side DC level detection circuit 1701 and mode control signal generating circuit 1702 in FIG. 17 are not needed, and a reproduced image signal of higher precision may be obtained in a smaller circuit scale.” SAMSUNG-1005, 23:17-22, 23:63-24:5, 24:15-20, 24:54-59; *see supra* [1.1]; SAMSUNG-1003, ¶42.

For the FIG. 3 embodiment, although Fukuda does not describe sending/recording the signal enhancement degree determined by the limiter 304 with coded image data, it would have been obvious and straightforward to a POSITA to apply Fukuda’s teachings of “a transmitter” and “reproducing means”

to Fukuda's FIG. 3 embodiment to send/record the signal enhancement degree determined by the limiter 304 with coded image data and to receive the signal enhancement degree for reproducing the image signal. SAMSUNG-1003, ¶42. Fukuda discloses that the "nonlinear de-emphasis circuit [of FIG. 3(b) has] a complementary characteristic to the nonlinear emphasis circuit shown in FIG. 3(a)." SAMSUNG-1005, 6:54-60. A POSITA would have been motivated to modify Fukuda's FIG. 3 embodiment for similar reasons as Fukuda explains with respect to FIG. 17 and other embodiments, e.g., to eliminate circuit elements so that "a reproduced image signal of higher precision may be obtained in a smaller circuit scale." SAMSUNG-1005, 23:17-22, 23:63-24:5 ("so that the hardware such as ROM storing the characteristic table is not needed"), 24:15-20, 24:54-59. Additionally, similar disclosure from JPH7-162862 was used to reject this claim feature in the '128 patent's Japanese application (Application No. 2001-033401). SAMSUNG-1009, [0195]; SAMSUNG-1010, 24; SAMSUNG-1003, ¶42.

Although Fukuda describes "sending or recording mode signals together with coded image data," Fukuda does not describe the implementation details for how it sends the mode signals together with coded image data and leaves those details to the general knowledge and capabilities of a POSITA. SAMSUNG-1005, 24:54-59, 23:17-22. Accordingly, as Dr. Acton explains, a POSITA reviewing Fukuda would have been motivated to assess the known options available for

transmitting image data together with control data. SAMSUNG-1003, ¶43. As part of this assessment, a POSITA would have readily considered multiplexing as an obvious solution that was well-known and within the general knowledge of a POSITA prior to the '128 Patent. SAMSUNG-1003, ¶43.

Indeed, as Dr. Acton explains, a POSITA would have recognized or found obvious that one example of transmitting Fukuda's "mode signals together with coded image data" would have included a multiplexer to multiplex video bitstreams with data needed to reproduce the video images for transmission/recording, as this was well known in the art. SAMSUNG-1003, ¶44; SAMSUNG-1005, 24:54-59, 23:17-22; SAMSUNG-1012, 673; SAMSUNG-1013, 60; SAMSUNG-1014, 62; SAMSUNG-1015, 284; SAMSUNG-1016, 601-610; SAMSUNG-1017, 77-80; *KSR*, 550 U.S. 398, 421 (2007) ("a person of ordinary skill has good reason to pursue the known options within his or her technical grasp."). A POSITA would have been aware of multiplexing data as a well-known option "for sending or recording mode signals together with coded image data" and would have found it to be simply a matter of design choice to multiplex the data with the image/video signal. *Id.*; SAMSUNG-1003, ¶44. In fact, Fukuda itself describes multiplexing as an option for transmitting image data with control data used in displaying the image data. SAMSUNG-1005, 20:43-47 ("a digital image signal composed of three component signals [e.g., image data] is entered in

synchronism with horizontal and vertical synchronizing signals [e.g., control data for displaying the image data] and in time division multiplex.”); SAMSUNG-1003, ¶44.

In addition, the ’128 Patent acknowledges that it was well-known and disclosed in JPH7-162862 that a “bitstream is multiplexed with emphasis data” that “is then output for storage or transfer.” SAMSUNG-1001, 2:4-10. Further, Fujikawa corroborates a POSITA’s knowledge at the time of the ’128 Patent and describes that “[d]ata which will be subsequently necessary for decoding purposes... are also encoded and are transmitted to the decoding apparatus in the output bit stream from the encoding apparatus, multiplexed with the encoded data of the video signal.” SAMSUNG-1006, 1:50-55; SAMSUNG-1003, ¶¶45-46.

As demonstrated by the disclosure of time division multiplexing in Fukuda, the admitted prior art of multiplexing a bitstream with emphasis data, and third-party evidence (e.g., Fujikawa) corroborating that multiplexing was a well-known technique for transmitting image data with control data used in displaying the image data, multiplexing was a known option for transmitting Fukuda’s “mode signals together with coded image data” that was within a POSITA’s general knowledge and would have been obvious to use in Fukuda. SAMSUNG-1005, 20:43-47; SAMSUNG-1006, 1:50-55; SAMSUNG-1003, ¶47. In fact, as Dr. Acton explains, the use of multiplexing to transmit Fukuda’s image data with its

emphasis level control data amounts to application of a known technique to a known device (Fukuda's apparatus) ready for improvement to yield predictable results. SAMSUNG-1003, ¶47. In this regard, Fukuda describes a base device (Fukuda's apparatus), the prior art contained a known technique (multiplexing) that is applicable to the Fukuda's device, and a POSITA would have recognized that applying the known technique (multiplexing) would have yielded predictable results and resulted in an improved system. SAMSUNG-1005, 3:3-15, 20:43-47; SAMSUNG-1003, ¶47.

In addition, a POSITA would have found multiplexing to be one of a finite number of identified, predictable solutions for transmitting image data with control data that would have been obvious to try. SAMSUNG-1003, ¶48. Indeed, as Dr. Acton explains, "there were only a finite number of solutions for transmitting image data together with control data and a POSITA would have seen multiplexing as one of, if not the most, common and obvious option." SAMSUNG-1003, ¶48. And, given that multiplexing technology was well-developed at the time of the '128 Patent, a POSITA would have had a reasonable expectation of success in using the well-known technique of multiplexing in Fukuda. SAMSUNG-1003, ¶48. For example, as Dr. Acton explains, "multiple companies sold multiplexer devices that could have been used to achieve multiplexing in Fukuda and a POSITA certainly would have been able to use or modify these devices to achieve

the combination of image data and emphasis level data in Fukuda.” SAMSUNG-1003, ¶48. Thus, Fukuda renders obvious a multiplexer for multiplexing the video bitstream and data on the emphasis level. SAMSUNG-1003, ¶48.

[2]

Fukuda renders this claim obvious in multiple ways. SAMSUNG-1003, ¶49. As a **first** example, as described in [1.1] above, Fukuda discloses a “mode changeover circuit 701” (“*a detector for detecting a degree of quantization applied to the input video signal*”) that issues a “mode signal” that is dependent on the “coding compression rate control signal” (a “*degree of quantization*”). SAMSUNG-1005, 12:42-55, FIG. 7; *see supra* [1.1]. Fukuda further explains that “[b]y thus selecting the mode enhancing the signal by the signal enhancement degree depending on the quantization step size [(a “*degree of quantization*”)] in quantizing and suppressing the signal according to the signal enhancement, the coding noise can be removed efficiently.” SAMSUNG-1005, 17:46-50. As Dr. Acton explains, a POSITA would have recognized or found obvious that the compression rate of a video signal is proportional to the “*degree of quantization.*” SAMSUNG-1003, ¶49; *see also* SAMSUNG-1001, 8:42-45.

Indeed, Fukuda reinforces this understanding:

As the measurement of coding distortion, the difference between the original signal and the signal after coding process may be

measured... **the amount of coding distortion may be expressed by the quantization step size used in quantizing the signal in coding process. To control to specified coding compression rate in coding process, the quantization step size in quantizing is controlled depending on the generated code amount.** That is, if the generated code amount is not much, the quantization step size is increased to suppress the code amount, and if the generated code amount is small, the quantization step size is decreased to control so that the code amount may be constant. As a result, the generated code amount increases, **and if the quantization step size increases accordingly, the coding distortion increases.**

SAMSUNG-1005, 17:29-45; SAMSUNG-1003, ¶50. Presented below is Fukuda's mode changeover circuit 701.

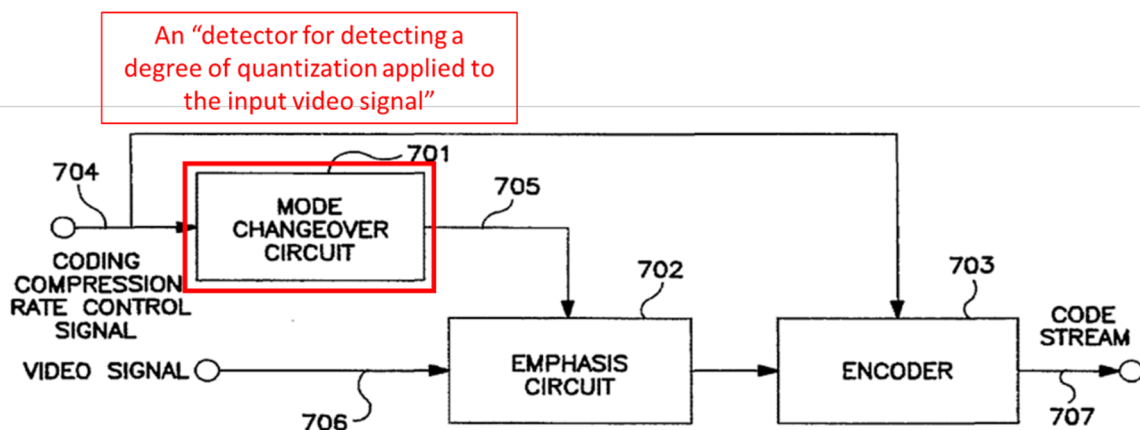


FIG. 7

SAMSUNG-1005, FIG. 7.

As a second example, as described in [1.1] above, Fukuda describes a “coding distortion measuring instrument 1001 and a mode changeover circuit

1002” (“*a detector for detecting a degree of quantization applied to the input video signal*”) that “issues a mode signal 1009 depending on the coding distortion 1008” (a “*degree of quantization*”). SAMSUNG-1005, 16:45-58, 17:29-50, FIG. 10; *see supra* [1.1]. Fukuda further explains that “the amount of coding distortion may be expressed by the quantization step size used in quantizing the signal in coding process.” SAMSUNG-1005, 17:34-36. As Dr. Acton explains, a POSITA would have recognized or found obvious that the coding distortion of a video signal is representative of the “*degree of quantization.*” SAMSUNG-1003, ¶51; SAMSUNG-1005, 17:29-45. Presented below is Fukuda’s mode changeover circuit 1002.

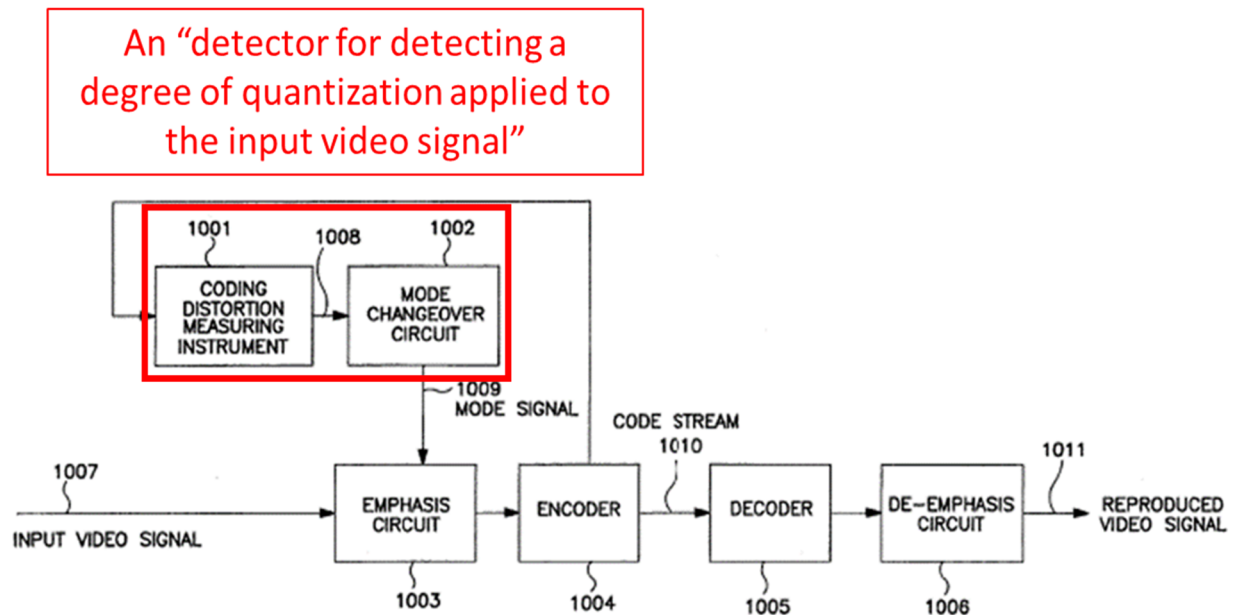


FIG. 10

SAMSUNG-1005, FIG. 10.

Further, similar disclosure from JPH7-162862 was used to reject this claim feature in the '128 patent's Japanese application (Application No. 2001-033401). SAMSUNG-1009, [0097]-[0100]; SAMSUNG-1010, 24; SAMSUNG-1003, ¶52.

[3]

Fukuda renders this claim obvious. SAMSUNG-1003, ¶53. For example, as described in [1.1] and [2] above, Fukuda describes a “mode changeover circuit 701” that issues a “mode signal” that is dependent on the “coding compression rate control signal.” SAMSUNG-1005, 12:42-55, FIG. 7. Fukuda also describes a “coding distortion measuring instrument 1001 and a mode changeover circuit 1002” that “issues a mode signal 1009 depending on the coding distortion 1008.” SAMSUNG-1005, 16:45-58, 17:29-50, FIG. 10. As Dr. Acton explains and based on Fukuda's disclosure, a POSITA would have recognized or found obvious that the coding compression rate and the coding distortion of a video signal is proportional to the quantization step size. SAMSUNG-1005, 17:29-45; SAMSUNG-1003, ¶53; *see also* SAMSUNG-1001, 8:42-45.

In its infringement contentions, Patent Owner appears to advance a scope for “a degree of enhancement effects already applied to the input video signal” as

encompassing quantization parameters derived from a rate control algorithm.⁸ In accordance with the scope of this claim advanced by Patent Owner in its infringement contentions, Fukuda teaches that the “mode changeover circuit 701” and the “mode changeover circuit 1002” (“***emphasis-level setter***”) each includes a detector for detecting the quantization step size determined by a “coding compression rate control signal” or a “coding distortion measuring instrument” (“***degree of enhancement effects already applied to the input video signal***”) and issues a mode signal depending on the quantization step size (“***sets the emphasis level in accordance with the detected degree of enhancement effects as the picture state detected from the input video signal***”) in a similar manner as the products that Patent Owner alleges satisfies this claim. SAMSUNG-1003, ¶54.

[4.pre]

To the extent the preamble is limiting, Fukuda describes that its “coding process and decoding process may be realized by any known method” (a “***method of video-emphasis encoding***”). SAMSUNG-1005, 25:44-47; SAMSUNG-1003, ¶55; *see supra* [1.pre].

⁸ Petitioner reserves the right to challenge Patent Owner’s allegation that a product performing a similar function satisfies this claim of the ’128 patent.

[4.1]-[4.4]

Fukuda renders these claim elements obvious in the same manner as explained above for the corresponding claim elements listed in the following table.

SAMSUNG-1003, ¶¶56-59.

Claim	Corresponding Claim
[4.1]	[1.1]
[4.2]	[1.2]
[4.3]	[1.3]
[4.4]	[1.4]

[5.pre]

To the extent the preamble is limiting, Fukuda renders it obvious. Fukuda describes multiple embodiments of a “coding and decoding apparatus” for decoding and applying a deemphasis processing to an input video code stream.

SAMSUNG-1005, 2:13-60, FIGS. 1-19. In one example, Fukuda describes that, after encoding the code stream, the “code stream is transmitted to a decoder” and “the decoder decodes the code stream.” SAMSUNG-1005, Abstract, 3:3-20, 5:29-39, 20:56-21:7, FIG. 1; *see supra* [1.pre]. The “decoded video signal is [then] fed to a de-emphasis circuit” where “low noise high quality video signals [are] reproduced from the de-emphasis circuit” (“*[a] video-deemphasis decoding*

apparatus for decoding and applying a deemphasis processing to an input video bitstream”). SAMSUNG-1005, Abstract, 3:3-20, 5:29-39, 20:56-21:7, FIG. 1; *see supra* [1.pre]; SAMSUNG-1003, ¶60. An example apparatus according to Fukuda is presented below in FIG. 1.

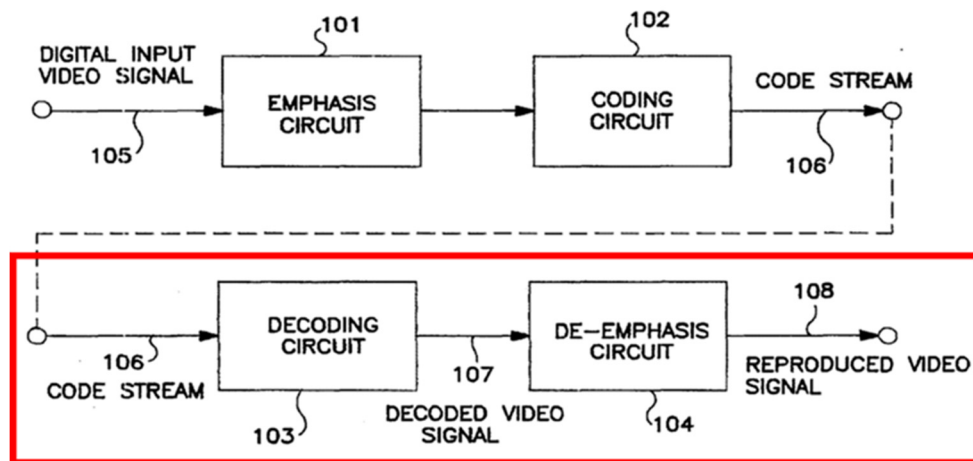


FIG. 1

A "video-deemphasis decoding apparatus for decoding and applying a deemphasis processing to an input video bitstream"

SAMSUNG-1005, FIG. 1.

Additionally, Fukuda describes another example illustrated in FIG. 17 that includes a "decoder 1606" that "decodes the code stream" and a "de-emphasis circuit 1607" that "suppresses the signal in every component of the decoded image signal." SAMSUNG-1005, 20:56-21:7, FIG. 17; *see supra* [1.pre]; SAMSUNG-1003, ¶61. An example apparatus according to Fukuda is presented below in FIG. 17.

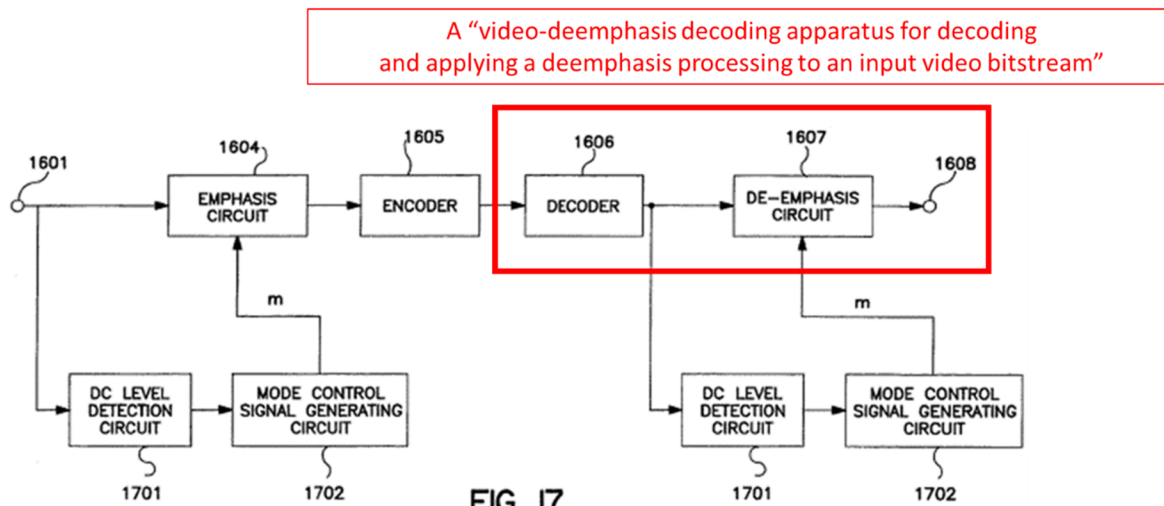


FIG. 17

SAMSUNG-1005, FIG. 17.

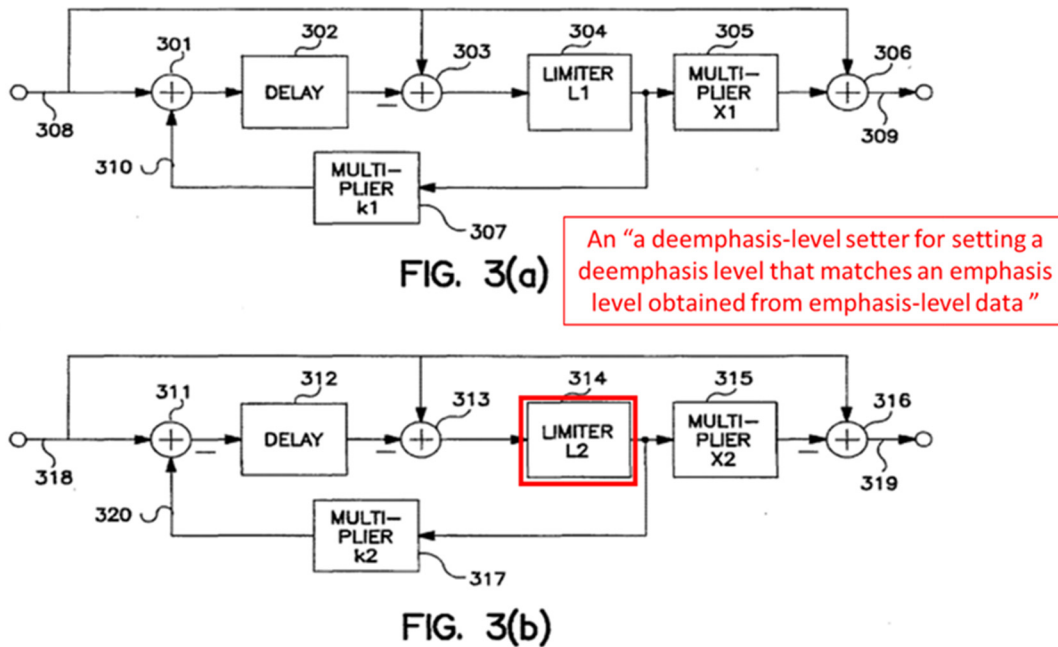
[5.1]

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶62. For example, Fukuda describes multiple embodiments of emphasis coding/decoding, many of which render “*setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream*” obvious. *Id.* For example, Fukuda describes, for many of the embodiments, that “signal enhancement and signal suppression are in complementary relation” and that “the de-emphasis circuit for signal suppression process may be in complementary relation with the emphasis circuit.” *See, e.g.,* SAMSUNG-1005, 12:56-67, 13:1-16, 3:21-27, 4:8-10, 4:28-34, 6:54-56, 15:26-28, 16:16-18, 17:1-3, 21:2-7, 21:42-48, 22:27-28, 23:47-49. As Dr. Acton explains, a POSITA would have recognized or found obvious that Fukuda’s video-deemphasis decoding apparatus would include a “*deemphasis-level setter*” which “[sets] the

deemphasis level that matches the emphasis level” as this is consistent with Fukuda’s disclosure. SAMSUNG-1003, ¶62; SAMSUNG-1005, 12:56-58, FIGS. 16 (“control signal generating circuit 1603”), 17 (“mode control signal generating circuit 1702”).

As a **first** example, Fukuda describes a “de-emphasis circuit having a nonlinear characteristic” (replacing the de-emphasis circuit 104 in FIG. 1) for “suppressing the signal with a smaller degree as the signal amplitude becomes larger.” SAMSUNG-1005, 5:29-50, 6:9-41. Fukuda explains that “by providing the signal amplitude with a nonlinear characteristic, the signal components having a similar amplitude to the generated noise components are enhanced and suppressed with a large degree.” SAMSUNG-1005, 5:40-50. Included in Fukuda’s non-linear de-emphasis circuit is a “limiter 314” (“*a deemphasis-level setter*”) that, similar to limiter 304 described in [1.1], “limits the amplitude of the output signal” based on whether amplitude of the input signal is greater than a set parameter “L.” SAMSUNG-1005, 6:21-30, FIG. 3(b). Fukuda describes that the deemphasis circuit has “a complementary characteristic to the nonlinear emphasis circuit shown in FIG. 3(a)” (“*setting a deemphasis level that matches an emphasis level ... to which an input video signal has been encoded and emphasized at the emphasis level*”). SAMSUNG-1005, 6:61-67, 7:1-5; *see supra* [1.1]; SAMSUNG-1003, ¶63.

As discussed above in [1.4], it would have been obvious and straightforward to a POSITA to apply Fukuda's teachings of a transmitter for sending or recording mode signals together with coded image data (SAMSUNG-1005, 24:54-59, 23:17-22) to Fukuda's FIG. 3 embodiment to send/record the signal enhancement degree determined by the limiter 304 with coded image data. SAMSUNG-1003, ¶64. Fukuda discloses that the "nonlinear de-emphasis circuit [of FIG. 3(b) has] a complementary characteristic to the nonlinear emphasis circuit shown in FIG. 3(a)." SAMSUNG-1005, 6:54-60. A POSITA would have been motivated to modify Fukuda's FIG. 3 embodiment for similar reasons as Fukuda explains with respect to FIG. 17 and other embodiments, e.g., to eliminate circuit elements so that "a reproduced image signal of higher precision may be obtained in a smaller circuit scale." SAMSUNG-1005, 23:17-22, 23:63-24:5 ("so that the hardware such as ROM storing the characteristic table is not needed"), 24:15-20, 24:54-59; *see supra* [1.4]. In this way, the emphasis level is obtained from emphasis-level data carried by the code stream and the de-emphasis level setter sets a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the code stream to which an input video signal has been encoded and emphasized at the emphasis level. Fukuda also teaches similar efficiencies in conjunction with the embodiment shown in FIG. 18. SAMSUNG-1005, 23:63-24:5. SAMSUNG-1003, ¶64.



SAMSUNG-1005, FIG. 3(b).

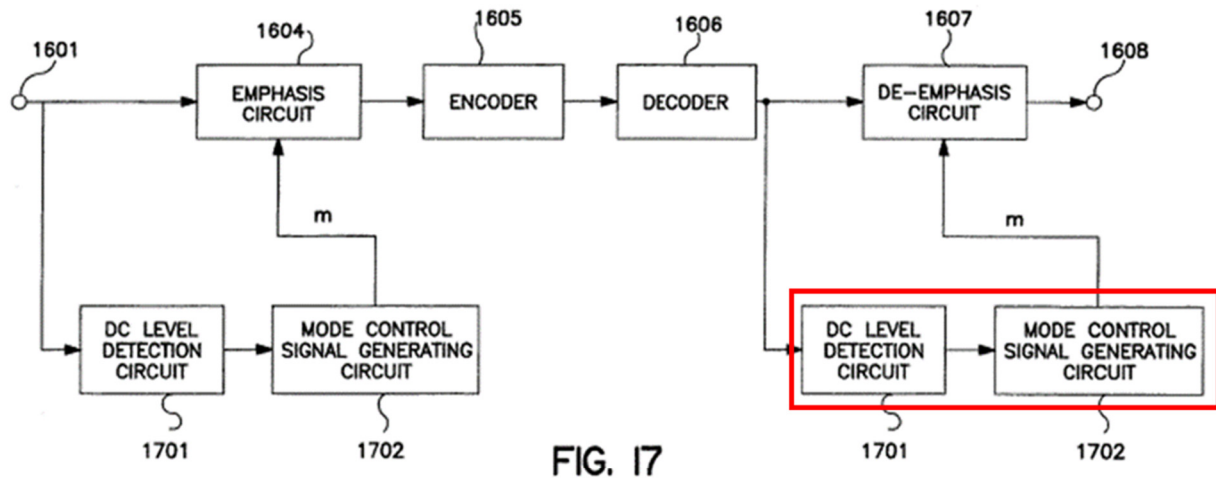
As a second example, Fukuda describes a “DC level detection circuit [1701]” and a “mode control signal generating circuit [1702]”⁹ (“a deemphasis-

⁹ Fukuda’s FIG. 17 shares components with FIG. 16. SAMSUNG-1005, 22:36-61.

FIG. 2(b) also provides an example of FIG. 16’s “deemphasis circuit 1607.”

SAMSUNG-1005, 20:38-42. Fukuda discloses that “an example of the emphasis circuit 101 is shown in FIG. 2(a)” and “[a]n example of de-emphasis circuit having a complementary characteristic to the emphasis circuit in FIG. 2(a) is shown in FIG. 2(b).” SAMSUNG-1005, 3:28-31, 3:53-58. Taken together, this disclosure demonstrates that de-emphasis circuit 1607 illustrated in FIGS. 16-18 is a similar

level setter”) where “the emphasis characteristic of the emphasis circuit 1604 selected by the mode control signal m) and the de-emphasis characteristic of the de-emphasis circuit 1607 selected by the mode control signal m are in complementary relation” (“*setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level*”). SAMSUNG-1005, 22:40-23:5, FIG. 17; *see supra* [1.1]; SAMSUNG-1003, ¶65.



A “deemphasis-level setter”
for “setting a deemphasis
level that matches an
emphasis level”

SAMSUNG-1005, FIG. 17.

component to the de-emphasis circuit 104 of FIG. 1. SAMSUNG-1005, 3:28-31, 20:29-42, 22:36-61

As a **third** example, with respect to the “mode changeover circuit 701” (incorporated into the “apparatus as shown in FIG. 1”) described in [1.1], Fukuda describes that “signal enhancement and signal suppression are in complementary relation” and that “the de-emphasis circuit” (“*a deemphasis-level setter*”) is in “complementary relation with the emphasis circuit 702” (“*setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level*”). SAMSUNG-1005, 12:42-48, 12:56-67, 13:1-16; *see supra* [1.1]; SAMSUNG-1003, ¶66.

As a **fourth** example, with respect to the “activity detector 801 and a mode changeover circuit 802” described in [1.1], Fukuda describes that “[t]he code stream 810 is decoded in a decoder 805, and suppressed in a de-emphasis circuit [806]”¹⁰ (“*a deemphasis-level setter*”) by “the suppression degree depending on the enhancement degree of the emphasis circuit 803” (“*setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized*”).

¹⁰ Fukuda discloses that these components are “installed in a coding and decoding apparatus as shown in FIG. 1” (i.e., “deemphasis circuit 806” is a similar component to “deemphasis circuit 104,” and so on). SAMSUNG-1005, 14:46-51.

at the emphasis level”). SAMSUNG-1005, 14:59-63, 15:26-29 (“[t]he de-emphasis circuit 806 for signal suppression process may be a circuit in a complementary relation with the emphasis circuit 803”); *see supra* [1.1]; SAMSUNG-1003, ¶67.

As a **fifth** example, with respect to the “motion amount detector 901” and “mode changeover circuit 902 installed in the coding and decoding apparatus as shown in FIG. 1” described in [1.1], Fukuda describes that “[t]he obtained code stream 910 is decoded in a decoder 905, and suppressed in a de-emphasis circuit 906 by the suppression degree corresponding to the enhancement degree of the emphasis circuit 903” (“*setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level*”). SAMSUNG-1005, 15:56-60, 16:16-19 (“[t]he de-emphasis circuit 906 for signal suppression process may be a circuit in a complementary relation with the emphasis circuit 903”); *see supra* [1.1]; SAMSUNG-1003, ¶68.

As a **sixth** example, with respect to the “coding distortion measuring instrument 1001 and a mode changeover circuit 1002” (incorporated into the “apparatus as shown in FIG. 1”) described in [1.1], Fukuda describes that “[t]he code stream 1010 is decoded in a decoder 1005, and is suppressed in a de-emphasis circuit 1006 by the suppression degree depending on the enhancement degree of

the emphasis circuit 1003” (*“setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level”*).

SAMSUNG-1005, 16:59-63, 17:1-4 (“[t]he de-emphasis circuit 1006 for signal suppression process may be a circuit in a complementary relation with the emphasis circuit 1003”); *see supra* [1.1]; SAMSUNG-1003, ¶69.

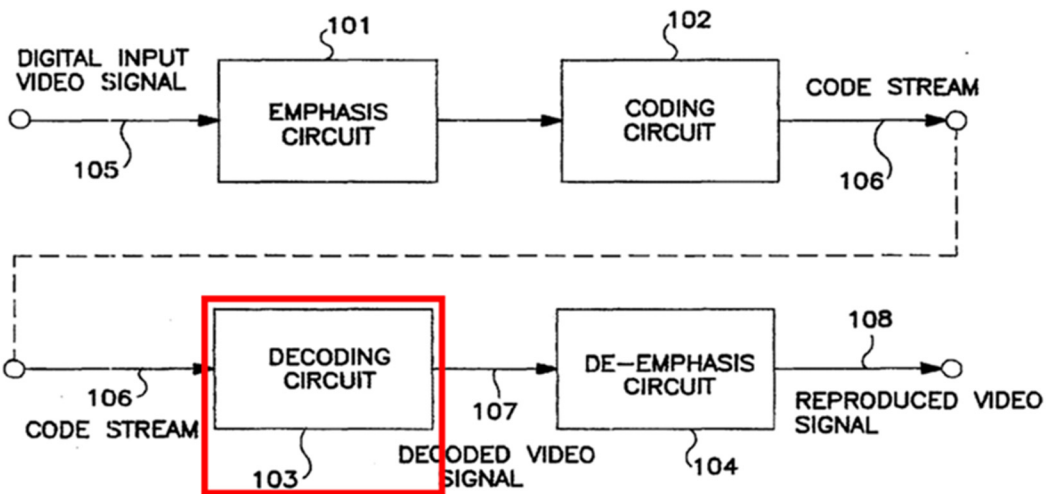
As discussed above in [1.4], Fukuda discloses many embodiments that provide a mode signal for controlling the signal enhancement degree of the emphasis circuit. SAMSUNG-1005, 11:1-40, 12:42-13:16, 14:46-15:4, 15:43-16:5, 16:45-67, 17:51-18:15, 18:28-46, 18:65-19:18, 20:29-64, 22:40-23:22, FIGS. 6-11, 13-14, 17. Fukuda discloses that these embodiments “may also comprise a transmitter for sending or recording mode signals together with coded image data, and the reproducing means may comprise means for receiving mode signals.” SAMSUNG-1005, 24:54-59. For example, with respect to the FIG. 17 embodiment, Fukuda discloses that “by transmitting the mode control signal *m* in emphasis or recording in a medium, the reproduction side DC level detection circuit 1701 and mode control signal generating circuit 1702 in FIG. 17 are not needed, and a reproduced image signal of higher precision may be obtained in a smaller circuit scale.” SAMSUNG-1005, 23:17-22, 23:63-24:5, 24:15-20, 24:54-59. In this way, the mode control signal indicating the emphasis level is obtained

from emphasis-level data carried by the code stream and the de-emphasis level setter sets a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the code stream to which an input video signal has been encoded and emphasized at the emphasis level. SAMSUNG-1003, ¶70.

[5.2]

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶71. For example, multiple of Fukuda's embodiments each includes a decoding circuit for decoding (e.g., "decoding circuit" or "decoder" of Fukuda's embodiments referenced above in [5.1]). SAMSUNG-1005, 2:13-60; FIGS. 1-19; *see supra* [5.1]; SAMSUNG-1003, ¶71. A couple of examples are provided below.

As a **first** example, Fukuda describes a "decoding circuit 103" that receives the "code stream" and "issues a decoded video signal." SAMSUNG-1005, 3:8-15, FIG. 1. As a **second** example, Fukuda describes an "decoder 1606" which "decodes the code stream, and issues the decoded image signal." SAMSUNG-1005, 20:56-21:7, FIG. 17; SAMSUNG-1003, ¶72. Examples of decoders within Fukuda are presented below.



An "decoder for decoding the input video bitstream"

FIG. 1

SAMSUNG-1005, FIG. 1.

An "decoder for decoding the input video bitstream"

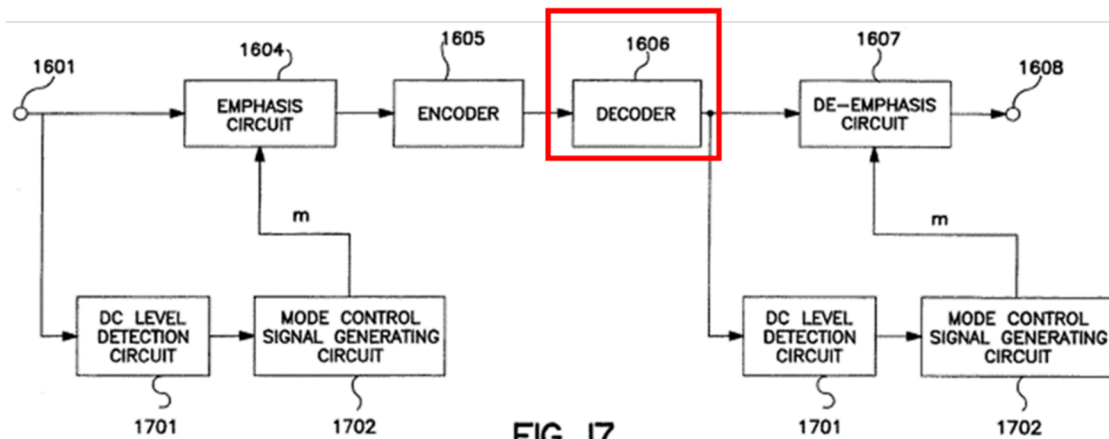


FIG. 17

SAMSUNG-1005, FIG. 17.

[5.3]

Fukuda renders this claim element obvious in multiple ways. SAMSUNG-1003, ¶73. For example, multiple of Fukuda's embodiments each includes a deemphasis circuit for applying deemphasis processing (e.g., "de-emphasis circuit")

of Fukuda's embodiments referenced above in [5.1] and [5.2]). SAMSUNG-1005, 2:13-60; FIGS. 1-19; *see supra* [5.1]-[5.2]; SAMSUNG-1003, ¶73. A couple of examples are provided below.

As a **first** example, Fukuda describes a “de-emphasis circuit 104” (a “*deemphasizer*”) that suppresses a “decoded video signal” by a “specified enhancement degree, and issues a reproduced video signal 108” (“*applying the deemphasis processing to the reproduced video signal at the deemphasis level to obtain a deemphasized video signal*”). SAMSUNG-1005, 3:8-15, FIG. 1; SAMSUNG-1003, ¶74. Presented below is Fukuda's emphasis circuit 101.

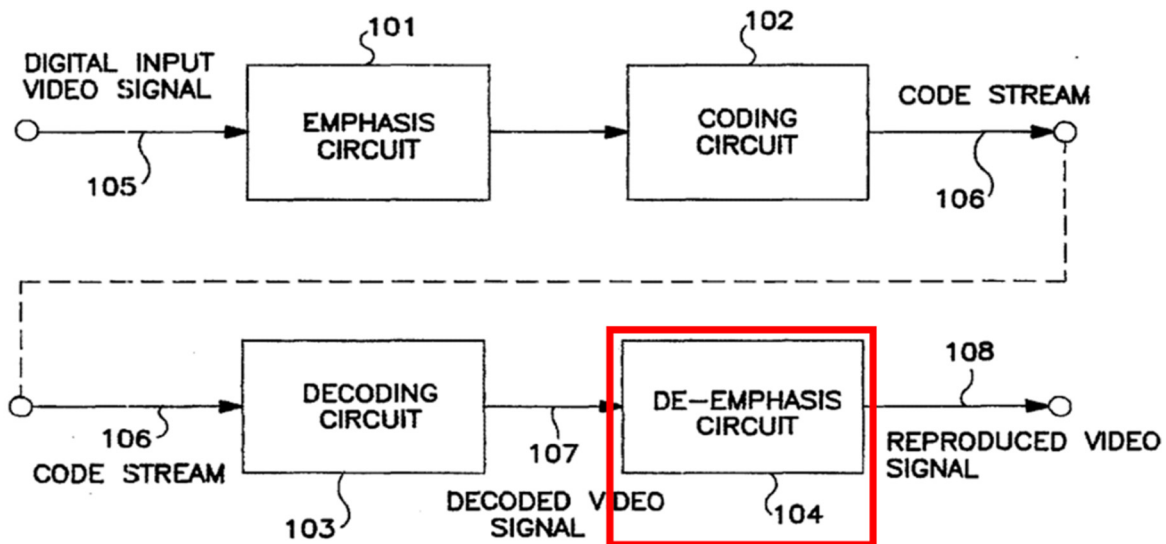


FIG. 1

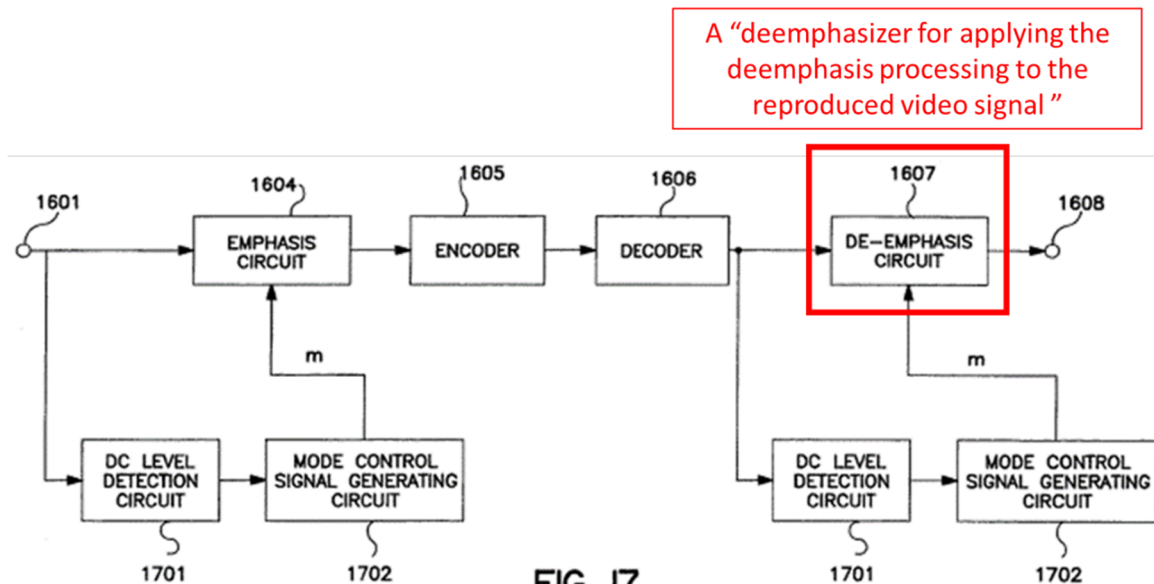
A “deemphasizer for applying the deemphasis processing to the reproduced video signal”

SAMSUNG-1005, FIG. 1.

As a **second** example, Fukuda describes an “de-emphasis circuit 1607” (a

“*deemphasizer*”) which “suppresses the signal ... according to one of the plural types of de-emphasis characteristic selected by the mode control signal m”

(“*applying the deemphasis processing to the reproduced video signal at the deemphasis level to obtain a deemphasized video signal*”). SAMSUNG-1005, 20:56-21:7, FIG. 17; SAMSUNG-1003, ¶75. Presented below is Fukuda’s de-emphasis circuit 1607.



SAMSUNG-1005, FIG. 17

[6]

Fukuda renders this claim obvious in multiple ways. SAMSUNG-1003, ¶76. For example, Fukuda describes, for many of its embodiments, that “signal enhancement and signal suppression are in complementary relation” and that “the de-emphasis circuit for signal suppression process may be in complementary relation with the emphasis circuit.” *See, e.g.*, SAMSUNG-1005, 12:56-67, 13:1-

16, 3:21-27, 4:8-10, 4:28-34, 6:54-56, 15:26-28, 16:16-18, 17:1-3, 21:2-7, 21:42-48, 22:27-28, 23:47-49. As explained above in [5.1], the emphasis level is obtained from emphasis-level data carried by the code stream and the de-emphasis circuit sets a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the code stream to which an input video signal has been encoded and emphasized at the emphasis level. SAMSUNG-1003, ¶76. As Dr. Acton explains, a POSITA would have recognized or found obvious that Fukuda's video-deemphasis decoding apparatus would include a "***deemphasis-level setter***" which "[sets] ***the deemphasis level that matches the emphasis level***" as this is consistent with Fukuda's disclosure. SAMSUNG-1003, ¶76; SAMSUNG-1005, 12:56-58, FIGS. 16 ("control signal generating circuit 1603"), 17 ("mode control signal generating circuit 1702"). As discussed above in [2], Fukuda sets emphasis based on "***a degree of quantization applied to the input video signal***" and therefore would set the deemphasis level to match the emphasis level. *See supra* [2]; SAMSUNG-1003, ¶76.

[8.pre]

To the extent the preamble is limiting, Fukuda describes that its "decoding process may be realized by any known method" (a "***video-deemphasis decoding method***"). SAMSUNG-1005, 25:44-47; SAMSUNG-1003, ¶77; *see supra* [5.pre].

[8.1]-[8.3]

Fukuda renders these claim elements obvious in the same manner as explained above for the corresponding claims listed in the following table.

SAMSUNG-1003, ¶¶78-80.

Claim	Corresponding Claim
[8.1]	[5.1]
[8.2]	[5.2]
[8.3]	[5.3]

B. [GROUND 1B] – Claims 1-4 are rendered obvious by Fukuda and Fujikawa

1. Overview of Fujikawa

Fujikawa describes an “encoding noise reduction filter ... applicable to a decoded video signal produced from a digital video signal encoding and decoding apparatus” where “variable values of quantization step size are utilized within each video signal frame.” SAMSUNG-1006, Abstract. Fujikawa explains that known “methods have been proposed, for use with a moving-picture digital video signal encoding and decoding apparatus, whereby the quantization step size that is used in a quantization operation for the purpose of encoding the video signal is varied such as to maintain a constant bit rate for the encoded data.” SAMSUNG-1006, 1:20-26. In these prior known methods, “[d]ata which will be subsequently necessary

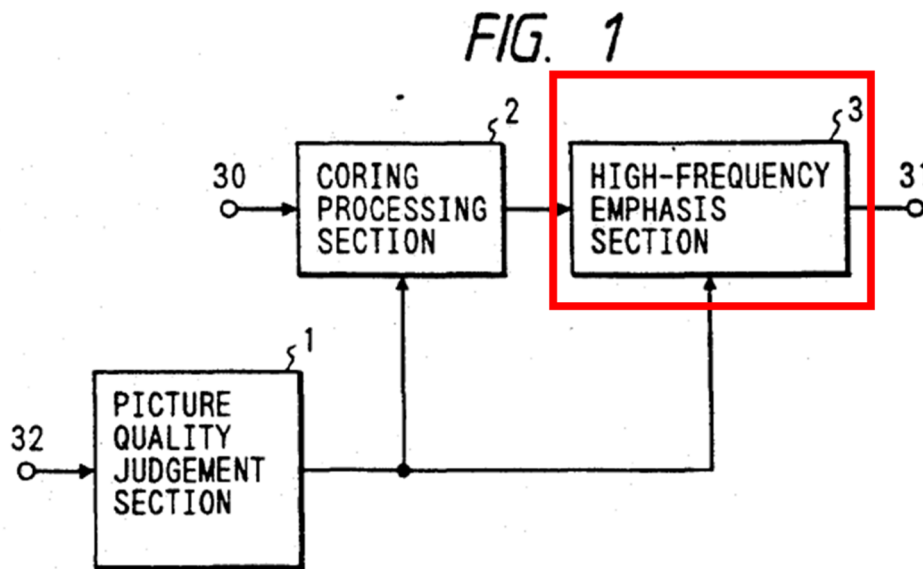
for decoding purposes, including the quantization step size values, are also encoded and are transmitted to the decoding apparatus in the output bit stream from the encoding apparatus, multiplexed with the encoded data of the video signal.” SAMSUNG-1006, 1:50-55. Fujikawa further explains that “with such a digital video signal encoding and decoding apparatus, when the quantization step size is large, a specific type of noise is produced in the display picture that is obtained from the decoded video signal. That noise is most conspicuous at the boundaries between different regions in picture conveyed by the video signal, and is conspicuous in the finally displayed picture. Such noise constitutes a significant problem.” SAMSUNG-1006, 2:5-12; SAMSUNG-1003, ¶81.

Fujikawa thus provides “an encoding noise reduction filter which is applicable to a decoded video signal produced from such a type of digital video signal encoding and decoding apparatus” that provides “an improvement in picture quality.” SAMSUNG-1006, 2:58-3:9, 4:8-10, FIG. 1. The encoding noise reduction filter includes a “coring processing section 2” that “is executed in order to exclude the noise components, which are mainly concentrated in the low-amplitude high spatial frequency components of the video signal.” SAMSUNG-1006, 5:6-23; SAMSUNG-1003, ¶82.

Fujikawa’s encoding noise reduction filter also includes a “high frequency emphasis section 3” that “executes high frequency emphasis ... by calculating for

each picture element a ... ‘Laplacian’ value.” SAMSUNG-1006, 5:24-43. “The Laplacian values of picture elements ... provide an indication of the degree of contrast between the adjoining regions” of the picture. *Id.* Based on the Laplacian values of respective picture elements, the high frequency emphasis section 3 applies compensation for “a loss of resolution which results from the processing executed in the coring processing section 2.” *Id.*; SAMSUNG-1003, ¶83.

A “video-emphasis encoding apparatus for applying an emphasis processing to an input video signal”



SAMSUNG-1006, FIG. 1.

2. Combination of Fukuda and Fujikawa

While Fukuda expressly discloses “a transmitter for sending or recording mode signals together with coded image data, and the reproducing means may comprise means for receiving mode signals” (SAMSUNG-1005, 24:54-59),

Fukuda lacks details regarding the format for transmitting the mode signals together with the coded image data. SAMSUNG-1003, ¶84; *see supra* §III.A.2.[1.4]. As such, a POSITA naturally would have searched for implementation details for Fukuda’s “transmitter” (“sending or recording mode signals together with coded image data”). *Id.* In this search, they would have found a reference that describes multiplexing, like Fujikawa. *Id.*; SAMSUNG-1003, ¶84.

A POSITA would have found it obvious and straightforward to complement Fukuda with Fujikawa’s disclosure that “[d]ata which will be subsequently necessary for decoding purposes ... are transmitted to the decoding apparatus in the output bit stream from the encoding apparatus, multiplexed with the encoded data of the video signal.” SAMSUNG-1006, 1:50-55. Accounting for Fujikawa, Fukuda’s transmitter would multiplex the mode signals needed to reproduce the image signal together with the coded image data into the code stream for sending or recording. SAMSUNG-1005, 24:54-59; SAMSUNG-1006, 1:50-55; SAMSUNG-1003, ¶85. Fujikawa confirms the notion that a POSITA would have been aware that multiplexing data necessary for reproducing an image/video signal together with coded image/video data was a known option for sending/recording the data and image/video signal together as a code stream and would have found it to be simply a matter of design choice to multiplex the data with the image/video

signal. SAMSUNG-1003, ¶85; *KSR*, 550 U.S. at 421 (“a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”).

Additionally, a POSITA would have been motivated and would have found it obvious and straightforward to incorporate in Fukuda’s coding and decoding apparatus, e.g., incorporated into Fukuda’s emphasis circuit, Fujikawa’s teachings of enhancement effects to exclude noise components in a picture and high frequency emphasis processing based on “an indication of the degree of contrast between the adjoining regions” of the picture as a result of the noise reduction enhancement effects applied to the picture. SAMSUNG-1006, 5:6-43. While Fujikawa describes a specific type of noise, it would have been obvious and straightforward to a POSITA to apply Fujikawa’s teachings of noise reduction to a variety of noise present in a picture. SAMSUNG-1003, ¶86. For example, a POSITA knew that noise can arise during image acquisition, as “light levels and sensor temperature are major factors affecting the amount of noise in the resulting image.” SAMSUNG-1011, 222. A POSITA would have been motivated to apply noise reduction to a noisy image to provide an improvement in picture quality. SAMSUNG-1006, 2:58-3:9, 5:6-43. Fujikawa further explains that the high frequency emphasis processing compensates for “a loss of resolution which results from” the noise reduction enhancement effects. *Id.* Thus, a POSITA would have been motivated to incorporate Fujikawa’s teachings to beneficially provide “an

improvement in picture quality” by reducing noise in the picture and to provide compensation for “a loss of resolution which results from” noise reduction enhancement effects. SAMSUNG-1006, 2:58-3:9, 5:6-43. Further, Fujikawa’s method of setting emphasis level based on the degree of contrast between adjoining regions would have enhanced Fukuda’s existing emphasis calculations, which are also conscious of quantization step size. SAMSUNG-1005, 12:42-55, 17:29-45; SAMSUNG-1006, 5:24-43, 7:42-67; SAMSUNG-1003, ¶86.

Moreover, combining Fukuda and Fujikawa would have been obvious at least because such a combination would have merely involved (1) combining prior art elements according to known methods to yield predictable results and (2) the use of known techniques to improve similar devices (methods, or products) in the same way. *KSR*, 550 U.S. at 415-421; SAMSUNG-1003, ¶87. Incorporating Fujikawa’s teachings of multiplexing mode signals and coded image data and emphasis level setting based on the degree of contrast between adjoining regions into Fukuda’s emphasis coding/decoding apparatus would also have been predictable and foreseeable with a reasonable expectation of success because Fukuda describes “sending or recording mode signals together with coded image data.” SAMSUNG-1005, 24:54-59; *supra* [1.4]. Additionally, Fukuda describes multiple embodiments of setting emphasis level based on characteristics of a video signal. SAMSUNG-1005, 5:29-50, 6:9-41, 14:46-15:4, 15:43-48, 18:65-19:36,

22:40-23:5; *supra* §III.A.1; *supra* [1.1]; SAMSUNG-1003, ¶87.

In an example of the combined Fukuda-Fujikawa system, illustrated below using Fukuda's FIG. 1, Fujikawa's teachings of multiplexing and high frequency emphasis/coring processing sections would have been incorporated into Fukuda's emphasis coding/decoding apparatus. SAMSUNG-1003, ¶88. In the resulting system, emphasis information would be multiplexed with the video stream.

SAMSUNG-1005, 24:54-59, FIG. 1; SAMSUNG-1006, 1:50-55. Additionally, in the combined system, Fujikawa's teachings of emphasis processing based on the degree of contrast between adjoining regions would have complemented those of Fukuda. SAMSUNG-1005, 5:29-50, 6:9-41, 14:46-15:4, 15:43-48, 18:65-19:36, 22:40-23:5; SAMSUNG-1006, 5:24-43, 7:42-67; SAMSUNG-1003, ¶88.

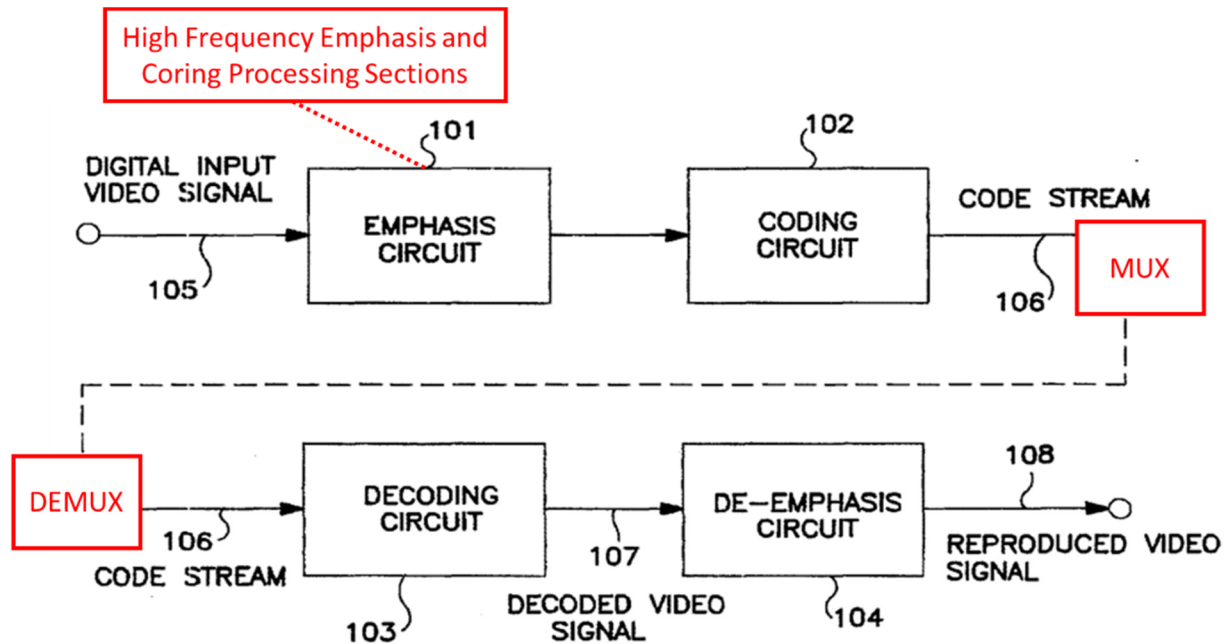


FIG. 1

SAMSUNG-1005, FIG. 1 (modified based on Fujikawa teachings).

3. Analysis

Ground 1B is substantively identical to, and incorporates the analysis of, Ground 1A. But where Ground 1A relies on Fukuda and the POSITA's general knowledge and ordinary level of skill to satisfy elements [1.1], [1.4], [3], [4.1], and [4.4], the Ground 1B analysis of elements [1.1], [1.4], [3], [4.1], and [4.4] relies on Fukuda and Fujikawa as a combination in which Fujikawa is explicitly offered as part of the combination to demonstrate a broader concept that was obvious to a POSITA, namely *“a picture state detected from the input video signal”* of elements [1.1] and [4.1], *“multiplexing the video bitstream and data on the emphasis level”* of elements [1.4] and [4.4], and *“a detector for detecting a degree*

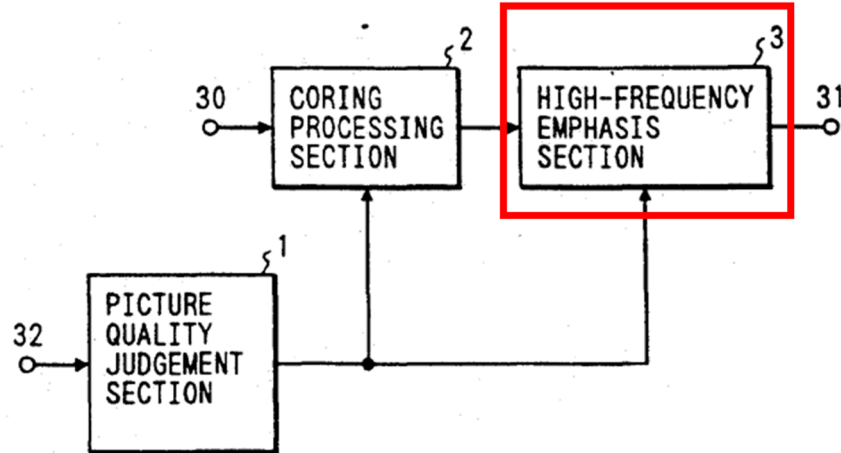
of enhancement effects already applied to the input video signal, wherein the emphasis-level setter sets the emphasis level in accordance with the detected degree of enhancement effects as the picture state detected from the input video signal” of claim 3. Integration of Fujikawa does not disturb the aspects of Fukuda mapped to the claim elements. To avoid repetition, and because the analysis of all other claim elements is identical, only [1.1], [1.4], [3], [4.1], and [4.4] are addressed below. SAMSUNG-1003, ¶89.

[1.1] and [4.1]

Fukuda-Fujikawa renders this claim obvious. SAMSUNG-1003, ¶¶90, 93. Fujikawa describes a “high frequency emphasis section 3” which applies “high frequency emphasis” (“*an emphasis-level setter for setting an emphasis level to the input video signal*”) to a signal produced by a “coring processing section 2” that “separates the high spatial frequency components ... from the low spatial frequency components, and converts to the value zero all of those picture element values contained in the high spatial frequency components which are below a predetermined threshold value” (“*in accordance with ... a picture state detected from the input video signal*”). SAMSUNG-1006, 5:6-43, 7:1-67, FIGS. 1, 3-4; SAMSUNG-1003, ¶¶90, 93; *see infra* [3].

“an emphasis-level setter for setting an emphasis level to the input video signal in accordance with ... a picture state detected from the input video signal”

FIG. 1



SAMSUNG-1006, FIG. 1

[1.4] and [4.4]

Fukuda-Fujikawa renders these claim elements obvious. SAMSUNG-1003, ¶¶91-92, 94. As discussed above in the Ground 1A analysis of [1.4] (incorporated here), Fukuda discloses “a transmitter for sending or recording mode signals together with coded image data, and the reproducing means may comprise means for receiving mode signals.” SAMSUNG-1005, 24:54-59. But Fukuda lacks details regarding the format for transmitting the mode signals together with the coded image data. SAMSUNG-1003, ¶91. As such, a POSITA naturally would have searched for implementation details for Fukuda’s “transmitter” (“sending or recording mode signals together with coded image data”). *Id.* In this search, they

would have found a reference that describes multiplexing, like Fujikawa. *Id.*;
SAMSUNG-1003, ¶91.

A POSITA would have found it obvious and straightforward to complement Fukuda with Fujikawa's disclosure that "[d]ata which will be subsequently necessary for decoding purposes ... are transmitted to the decoding apparatus in the output bit stream from the encoding apparatus, multiplexed with the encoded data of the video signal." SAMSUNG-1006, 1:50-55. Accounting for Fujikawa, Fukuda's transmitter would multiplex the mode signals needed to reproduce the image signal together with the coded image data into the code stream for sending or recording. SAMSUNG-1005, 24:54-59; SAMSUNG-1006, 1:50-55; SAMSUNG-1003, ¶92. Fujikawa confirms the notion that a POSITA would have been aware that multiplexing data necessary for reproducing an image/video signal together with coded image/video data was a known option for sending/recording the data and image/video signal together as a code stream and would have found it to be simply a matter of design choice to multiplex the data with the image/video signal. SAMSUNG-1003, ¶92; *KSR*, 550 U.S. at 421 ("a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.").

[3]

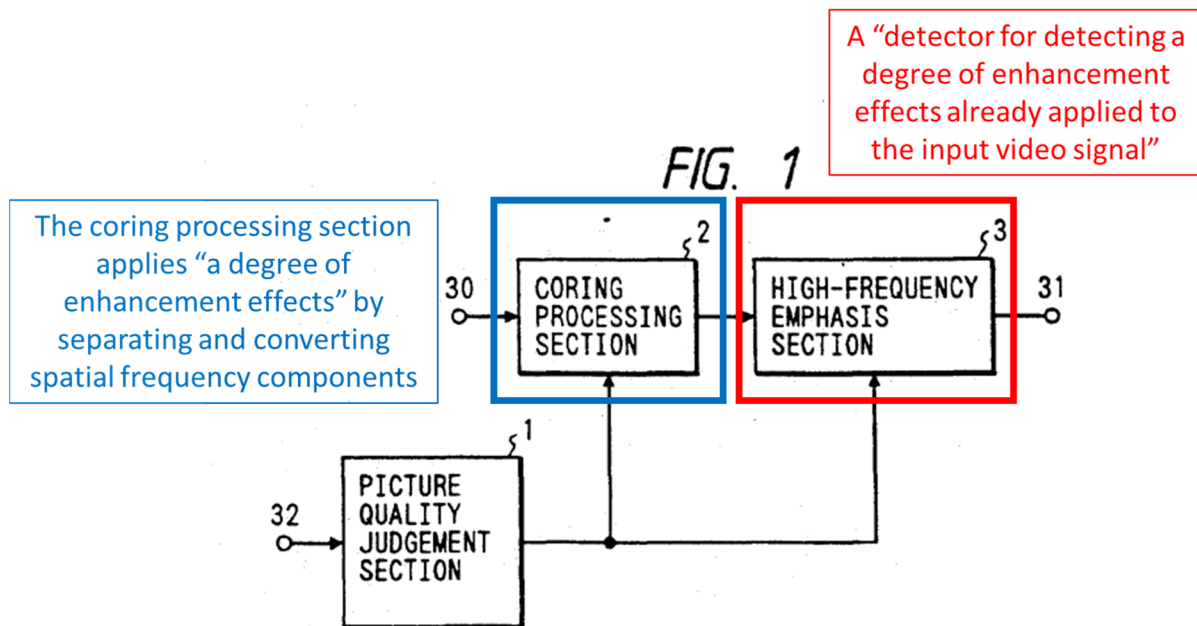
Fukuda-Fujikawa renders this claim obvious. SAMSUNG-1003, ¶95.
Fujikawa describes a "high frequency emphasis section 3" ("*a detector for*

detecting a degree of enhancement effects already applied to the input video

signal”) which applies “high frequency emphasis” to a signal produced by a “coring processing section 2” that “separates the high spatial frequency components ... from the low spatial frequency components, and converts to the value zero all of those picture element values contained in the high spatial frequency components which are below a predetermined threshold value” (“*a degree of enhancement effects already applied to the input video signal*”).

SAMSUNG-1006, 5:6-43, 7:1-67, FIGS. 1, 3-4; SAMSUNG-1003, ¶95.

Reproduced below is an example encoding noise reduction filter according to Fujikawa that contains a coring processing section 2 and a high frequency emphasis section 3. SAMSUNG-1006, FIG. 1.



SAMSUNG-1006, FIG. 1.

Fujikawa describes that, in the high frequency emphasis section 3 (*“detector for detecting a degree of enhancement effects already applied to the input video signal”*), “[t]he Laplacian value calculation section 11 calculates, for each of the picture element values of the output signal from the coring processing section 2” (*“a degree of enhancement effects already applied to the input video signal”*). SAMSUNG-1006, 7:42-67. Once the Laplacian values have been generated, “[t]he compensation value calculation section 12 calculates, for each Laplacian value that is thus produced from the Laplacian value calculation section 11, a corresponding compensation value” (*“the emphasis-level setter sets the emphasis level in accordance with the detected degree of enhancement effects as the picture state detected from the input video signal”*). *Id.*; SAMSUNG-1003, ¶96.

As discussed in [1.1] above, Fukuda describes multiple embodiments of a coding and decoding apparatus that each includes an emphasis-level setter for setting an emphasis level. SAMSUNG-1005, 2:13-60; FIGS. 1-19. As discussed above in §§III.B.1-III.B.2, Fujikawa teaches enhancement effects to exclude noise components in a picture and high frequency emphasis processing based on “an indication of the degree of contrast between the adjoining regions” of the picture as a result of the noise reduction enhancement effects applied to the picture. SAMSUNG-1006, 5:6-43; SAMSUNG-1003, ¶97.

While Fujikawa describes a specific type of noise, it would have been

obvious and straightforward to a POSITA to apply Fujikawa's teachings of noise reduction to a variety of noise present in a picture. SAMSUNG-1003, ¶98. For example, a POSITA knew that noise could arise during image acquisition, as "light levels and sensor temperature are major factors affecting the amount of noise in the resulting image." SAMSUNG-1011, 222. A POSITA would have been motivated to apply noise reduction to a noisy image to provide an improvement in picture quality. SAMSUNG-1006, 2:58-3:9, 5:6-43; SAMSUNG-1003, ¶98.

Fujikawa further explains that the high frequency emphasis processing compensates for "a loss of resolution which results from" the noise reduction enhancement effects. SAMSUNG-1006, 2:58-3:9, 5:6-43. Thus, a POSITA would have been motivated to incorporate Fujikawa's teachings into Fukuda's coding and decoding apparatus, e.g., incorporated into Fukuda's emphasis circuit, to beneficially provide "an improvement in picture quality" by reducing noise in the picture and to provide compensation for "a loss of resolution which results from" noise reduction enhancement effects. SAMSUNG-1006, 2:58-3:9, 5:6-43.

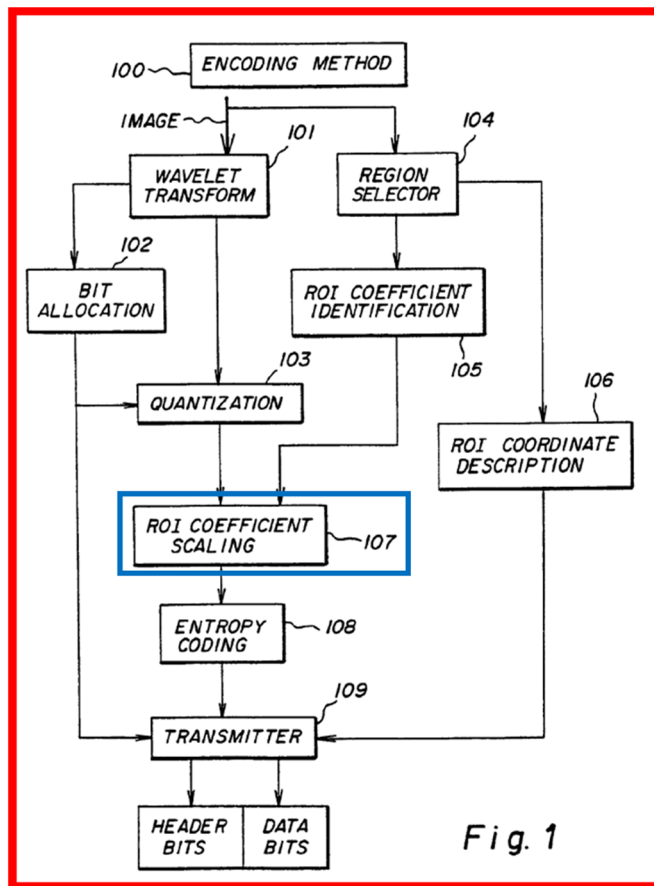
Further, Fujikawa's method of setting emphasis level based on the degree of contrast between adjoining regions would have enhanced Fukuda's existing emphasis calculations, which are also conscious of quantization step size.

SAMSUNG-1005, 12:42-55, 17:29-45; SAMSUNG-1006, 5:24-43, 7:42-67; SAMSUNG-1003, ¶99.

C. [GROUND 2] – Claims 1-6 and 8 are rendered obvious by Atsumi

1. Overview of Atsumi

Atsumi describes a “method and apparatus for encoding (622) digital image data” where “a region of interest (606) can be specified” such that “the encoder outputs are modified so as to place more emphasis on the region of interest.” SAMSUNG-1007, Abstract, 5:22-52, 6:1-23, 10:14-38, FIG. 1. Atsumi describes that this process “[increases] the speed and/or [increases] the fidelity of the reconstructed region of interest.” *Id.* Atsumi describes three different methods of applying emphasis to the region of interest (“ROI”). SAMSUNG-1007, 5:22-52, 6:1-23, 10:14-38, FIGS. 1, 3A-3F, 5A-5C; SAMSUNG-1003, ¶100. Presented below is one example method of Atsumi’s encoding method. SAMSUNG-1007, FIG. 1.



An encoding method
performed by an apparatus

“emphasis processing”

SAMSUNG-1007, FIG. 1

2. Analysis

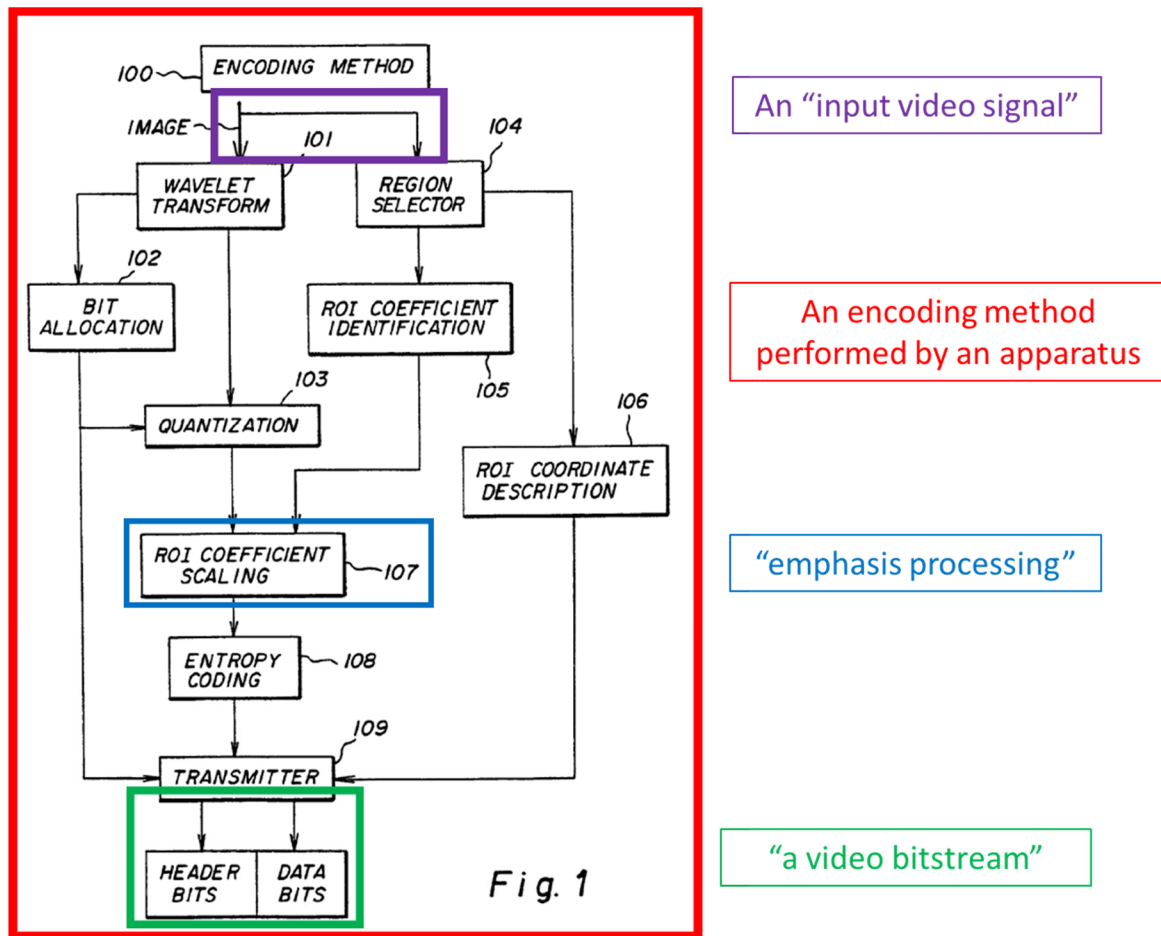
[1.pre]

To the extent the preamble is limiting, Atsumi renders it obvious. Atsumi describes an “apparatus for encoding (662) digital image data” which “place[s] more emphasis on [a] region of interest, therefore increasing the speed and/or increasing the fidelity of the reconstructed region of interest” (“*[a] video-emphasis encoding apparatus for applying an emphasis processing to an input video signal to obtain a video bitstream*”). SAMSUNG-1007, Abstract, 2:56-60, 5:22-52, FIG.

1. FIG. 1 shows a method performed by an apparatus “for compressing an image

with an emphasis on a selected region of interest in an image.” SAMSUNG-1007, 5:22-26. As shown in FIG. 1, the method includes “entropy coding [step 108]... to form an encoded data stream.” SAMSUNG-1007, 6:25-32. “Encoded data formed at step 108 is sent to transmission step 109 where data bits and header bits are appended into a bit stream to be transmitted or stored.” SAMSUNG-1007, 7:18-21; SAMSUNG-1003, ¶101.

Atsumi also discloses that “the above discussed encoding methods and apparatus can also be adapted to digitally reproduced motion pictures. For example, a selected portion of a bit stream being transmitting to allow for real time reproduction of an image could be dedicated to transmitting a region of interest in the resulting motion picture. Furthermore, the dimensions and location of the region of interest could be constantly changing as the motion picture progresses.” SAMSUNG-1007, 29:28-36. Based on Atsumi’s disclosure that its apparatus can be adapted to reproduce motion pictures, a POSITA would have understood that such apparatus applies an emphasis processing to an input video signal to obtain a video bitstream. SAMSUNG-1003, ¶102.



SAMSUNG-1007, FIG. 1

[1.1]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶103. For example, Atsumi describes a “bit allocation step 102” where “a bit per coefficient (i.e., representation accuracy of the coefficient) is assigned to the transform coefficients in each subband in order to represent the transform coefficients with digitized values” and “is determined in such a way that the subband which has higher variance or higher energy of the transform coefficients will be allocated a larger number of bits per coefficient, which is equivalent to being allocated a

smaller quantization step size.” SAMSUNG-1007, 5:30-39, 15:7-14. Atsumi further describes “a quantization step 103” where “quantization is performed on the transform coefficients in each subband in order to represent the transform coefficients of each subband with quantization indices whose representation accuracy is specified by the allocated bits per coefficient or by the quantization step size for each subband.” SAMSUNG-1007, 5:30-47, 7:22-42, 15:14-18.

Based on Atsumi’s disclosure, a POSITA would have understood that the bit per coefficient, quantization step size, and quantization indices are “*encoding conditions for the input video signal*” and that the variance or energy of the transform coefficients of the subband from which the bit per coefficient, quantization step size, and quantization indices are determined corresponds to “*a picture state detected from the input video signal*.” SAMSUNG-1020, 218; SAMSUNG-1021, 1285; SAMSUNG-1003, ¶103.

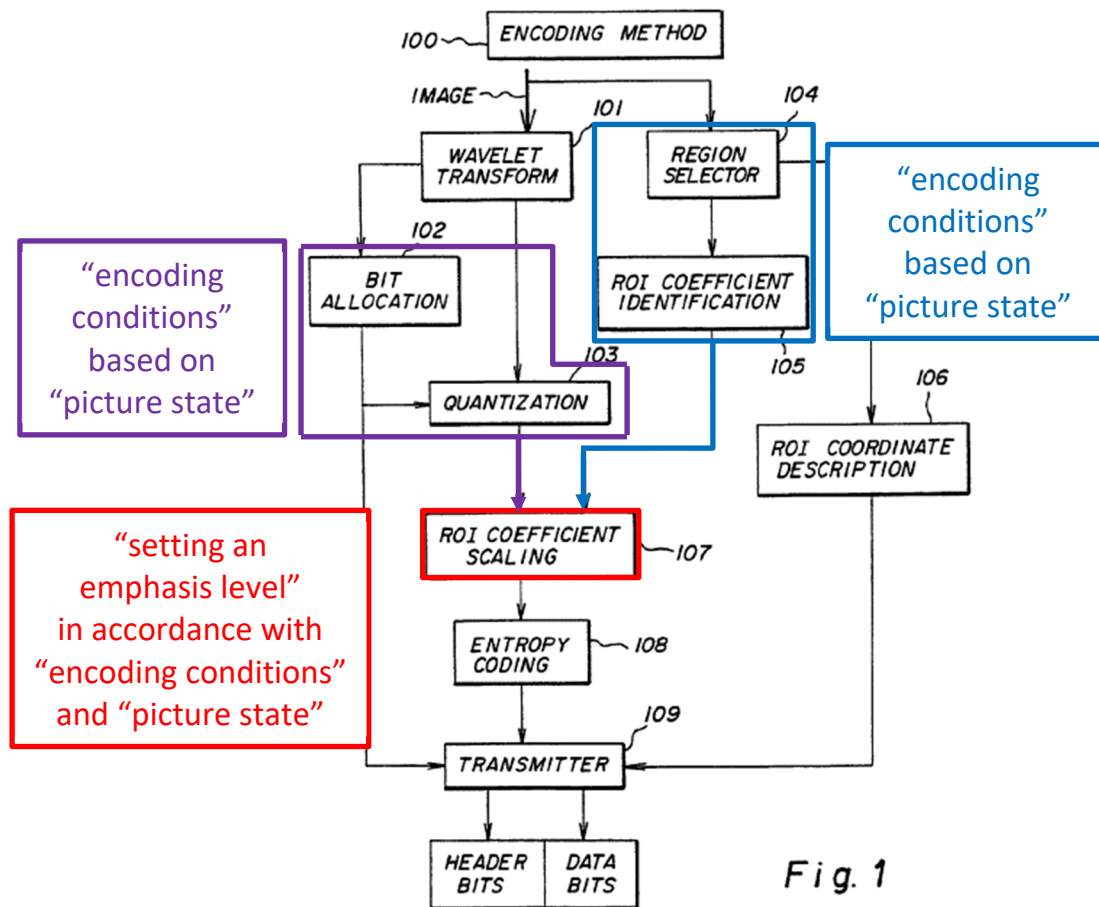
Atsumi further describes “region of interest selection step 104” where a “region of interest is selected on the input image.” SAMSUNG-1007, 5:53-58. Atsumi discloses the region of interest selection step 104 being “performed by a method wherein an automatic target recognition system defines a region or regions of interest based on a set of criteria. The automatic target recognition system may utilize a variety of approaches to identify the region of interest. For example, pattern recognition software may be used to identify objects of interest in the

image.” SAMSUNG-1007, 15:31-37. In Atsumi, “the coordinates of the selected region of interest are input” to a “ROI coefficient identification step 105” where “wavelet transform coefficients corresponding to the selected region of interest, i.e., ROI coefficients, in each subband are identified in order to emphasize the selected region of interest in the image by emphasizing the ROI coefficients in each subband containing the wavelet transform coefficients.” SAMSUNG-1007, 5:53-63, 15:66-18:17. In Atsumi, the “identification result of the ROI coefficients (i.e., categories of the coefficients) ... depicts whether the transform coefficients correspond to each region of interest or regions outside of the region of interest.” SAMSUNG-1007, 5:64-67. Based on Atsumi’s disclosure, a POSITA would have understood Atsumi’s “identification result of the ROI coefficients” based on the identified region of interest is “*encoding conditions for the input video signal*” determined in accordance with “*a picture state detected from the input video signal*.” SAMSUNG-1003, ¶104.

Atsumi further describes that “ROI coefficient scaling step 107” receives the “quantization indices” (“*encoding conditions*” determined based on “*a picture state*”) and the “identification result of the ROI coefficients” (“*encoding conditions*” determined based on “*a picture state*”). SAMSUNG-1007, 5:42-67. Atsumi discloses that at “ROI coefficient scaling step 107, ... the quantization indices for the transform coefficients corresponding to the region of interest are

emphasized in such a way that the quantization indices for the ROI coefficients are scaled up by a left bit shift value (S) specified by a priority assigned to the region of interest so that the indices for the ROI coefficients are to be encoded as if the indices had larger values than their actual values.” SAMSUNG-1007, 6:8-23.

Atsumi explains that, therefore, the quantization indices for the ROI coefficients “are encoded with a larger number of bits at a given bit rate or encoded at the earlier stages of the encoding process.” SAMSUNG-1007, 6:8-23. Accordingly, Atsumi describes the “ROI coefficient scaling step 107” (“*an emphasis-level setter*”) setting an emphasis level to the input video signal in accordance with “quantization indices” (“*encoding conditions for the input video signal*” based on “*a picture state detected from the input video signal*”) and an “identification result of the ROI coefficients” (“*encoding conditions for the input video signal*” based on “*a picture state detected from the input video signal*”). SAMSUNG-1007, 5:30-6:23, FIG. 1; SAMSUNG-1003, ¶105.



SAMSUNG-1007, FIG. 1

[1.2]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶106. For example, Atsumi describes that the “ROI coefficient scaling” component also applies emphasis (“*an emphasize for applying the emphasis processing to the input video signal at the emphasis level to obtain an emphasized video signal*”). SAMSUNG-1007, 5:53-67, 6:8-23, 7:43-12:20, FIGS. 1, 3A-6C; *see supra* Ground 2, [1.1]; *Google LLC v. Personal Audio, LLC*, 743 F. App’x 978, 985 (Fed. Cir, 2018) (non-precedential) (affirming PTAB Decision in IPR2015-00845) (citing

Linear Tech. Corp. v. ITC, 566 F.3d 1049, 1055 (Fed. Cir. 2009) (“the principle that in [an] obviousness analysis, a single element, feature, or mechanism can ordinarily satisfy multiple claim limitations, including by performing multiple claimed functions.”); *Rodime PLC v. Seagate Tech., Inc.*, 174 F.3d 1294, 1305 (Fed. Cir. 1999); *In re Kelley*, 305 F. 2d 909, 915-16 (CCPA 1962)); SAMSUNG-1003, ¶106.

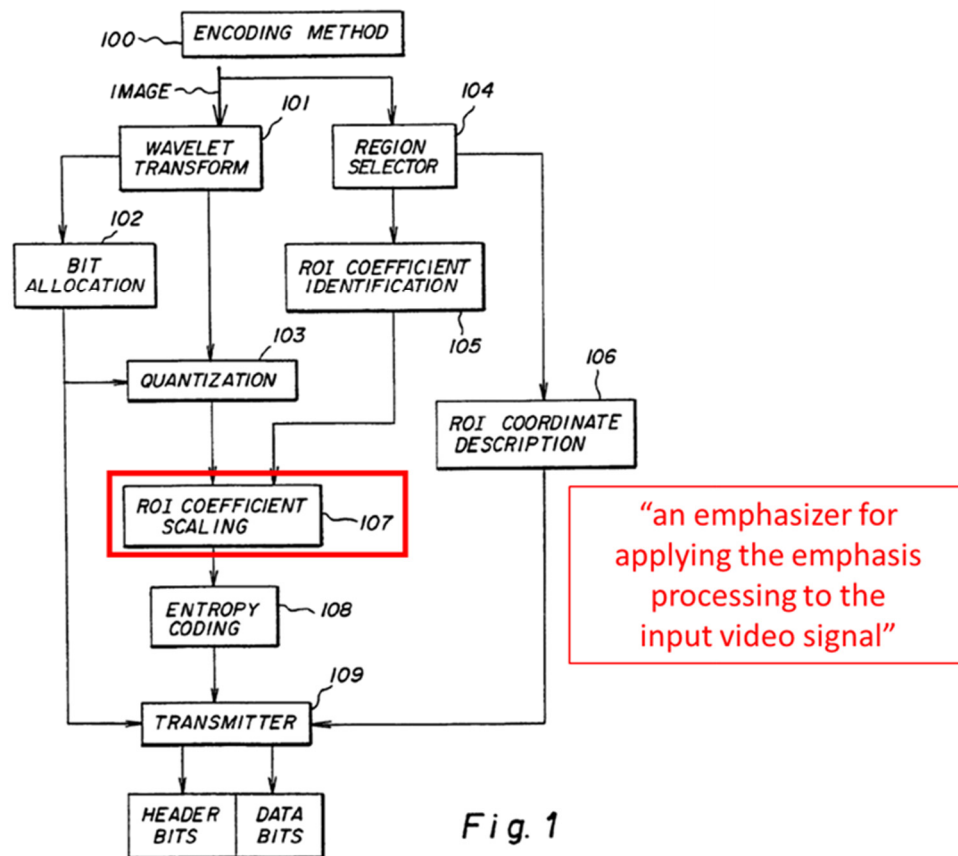


Fig. 1

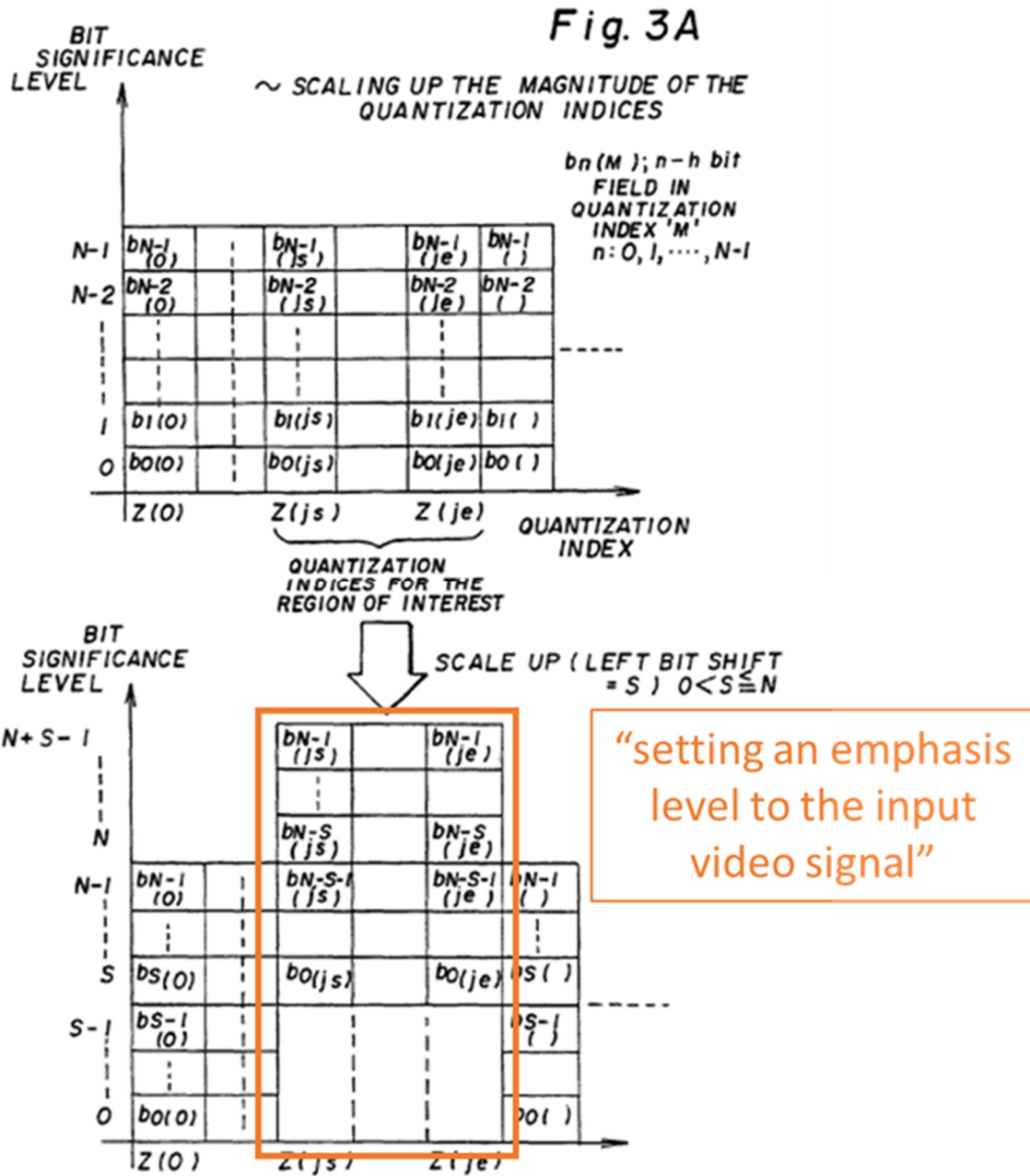
SAMSUNG-1007, FIG. 1

Atsumi describes multiple methods of applying emphasis at the emphasis level set in accordance with the quantization indices and the identification result of

the ROI coefficients, including: (1) “scaling up the value of the quantization indices corresponding to the region of interest,” (2) “scaling up the bit significance levels of the bit fields associated with the region of interest,” and (3) “reassigning encoding ordering.” SAMSUNG-1007, 9:46-58; SAMSUNG-1003, ¶107. These three methods are discussed in more detail below.

Scaling Up Values of Quantization Indices

Atsumi describes a method of applying emphasis that “scales up part of the value of the quantization index for a region of interest (the value consisting of some of the bit fields in the quantization index).” SAMSUNG-1007, 10:14-38, 8:13-44, FIGS. 3A, 3D; SAMSUNG-1003, ¶108. This process is illustrated below in Figures 3A and 3D of Atsumi.



SAMSUNG-1007, FIG. 3A

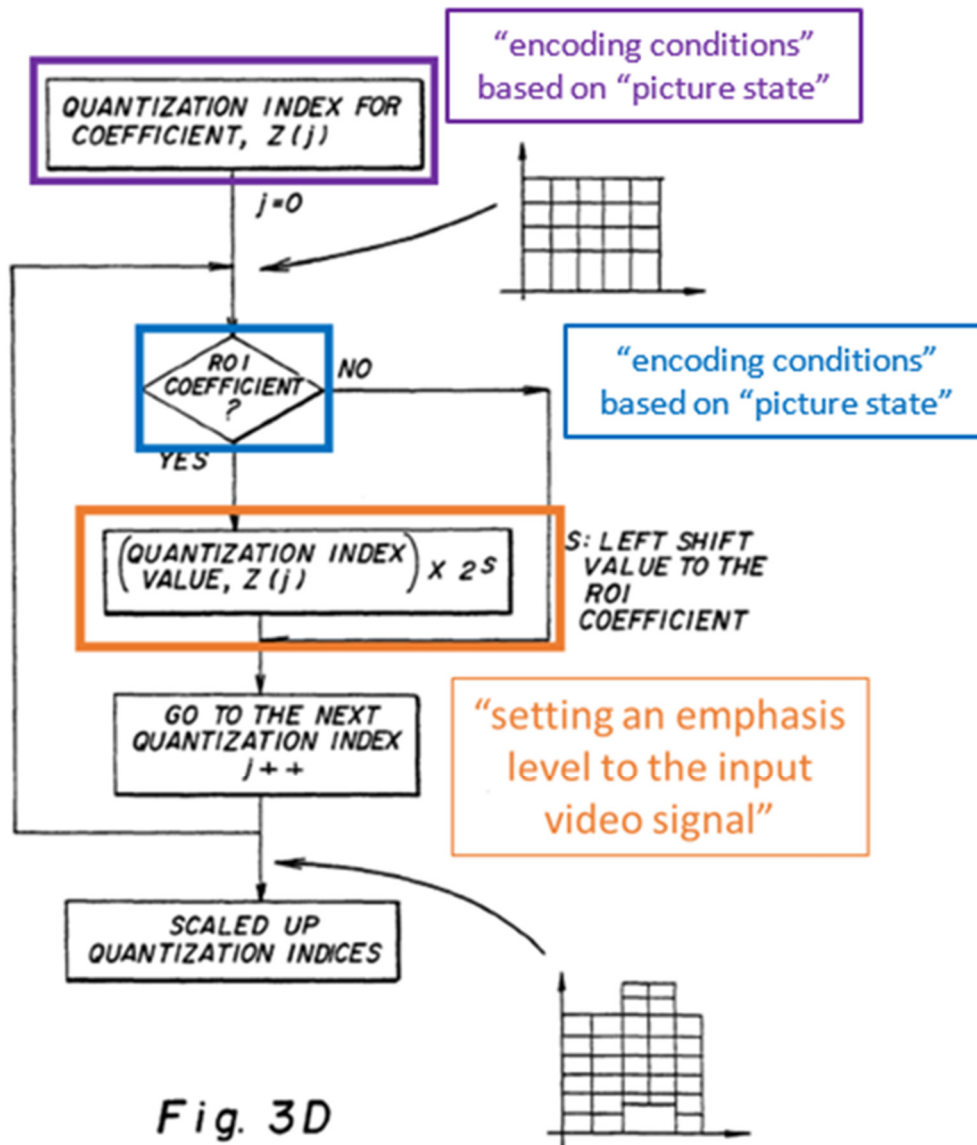


Fig. 3D

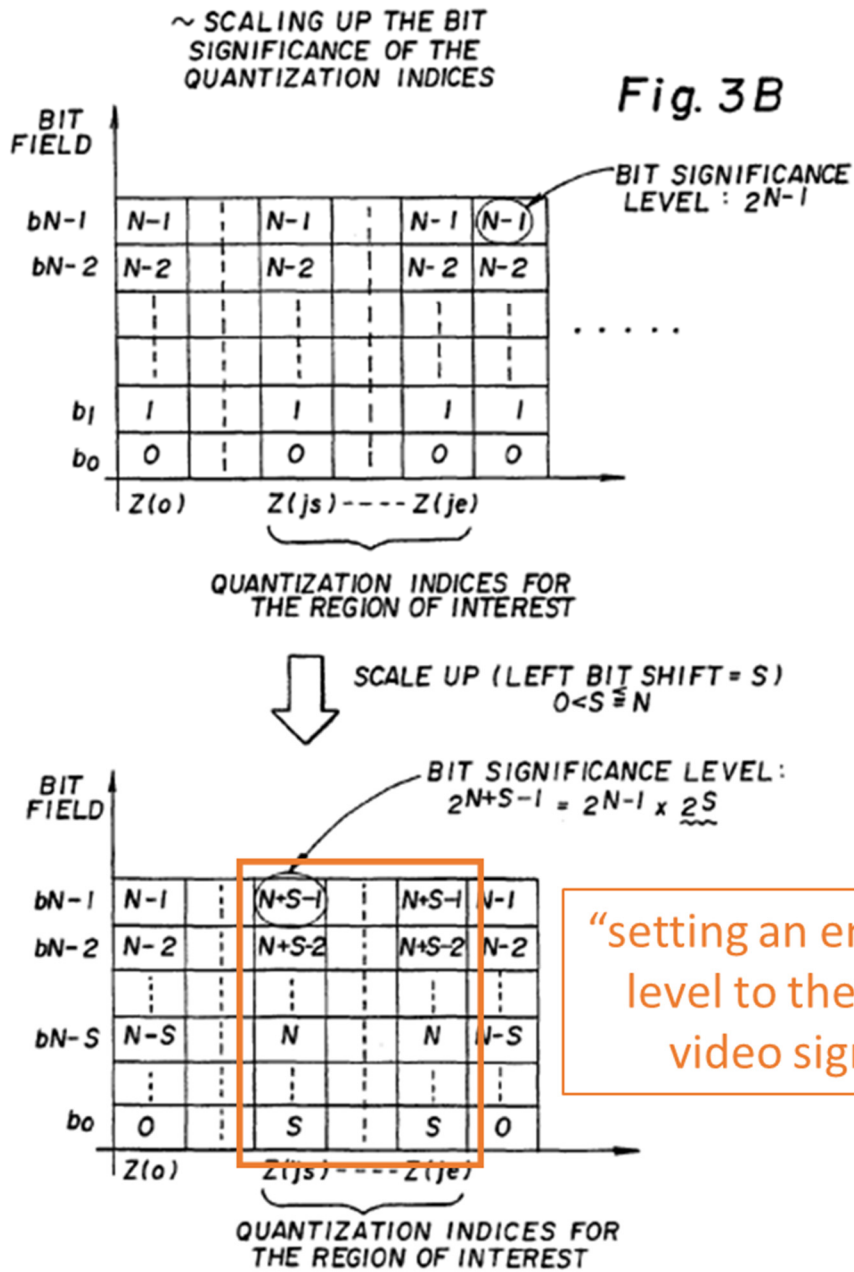
SAMSUNG-1007, FIG. 3D

Scaling Up Bit Significance Level of Quantization Indices

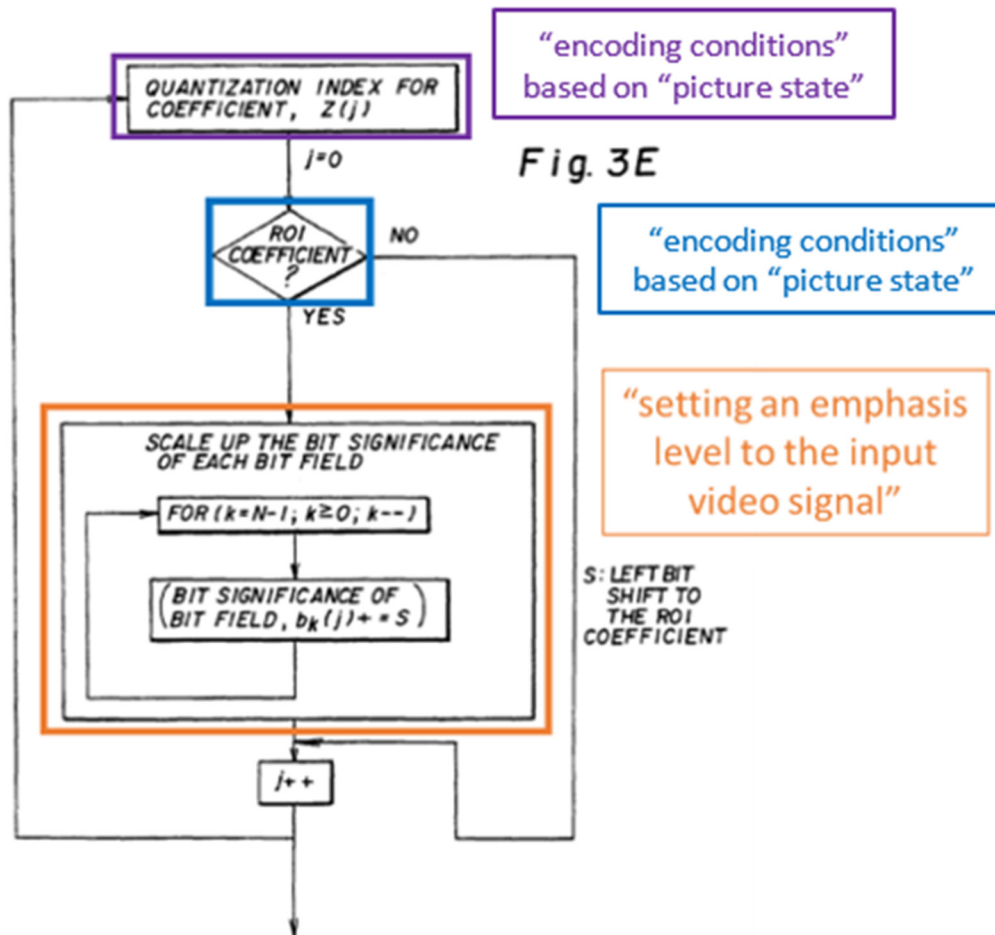
Atsumi describes a method of applying emphasis that “scales up the bit significance level of some of the bit fields in the quantization indices.”

SAMSUNG-1007, 10:14-38, 8:13-44, FIGS. 3B, 3E; SAMSUNG-1003, ¶109.

This process is illustrated below in Figures 3A and 3D of Atsumi.



SAMSUNG-1007, FIG. 3B

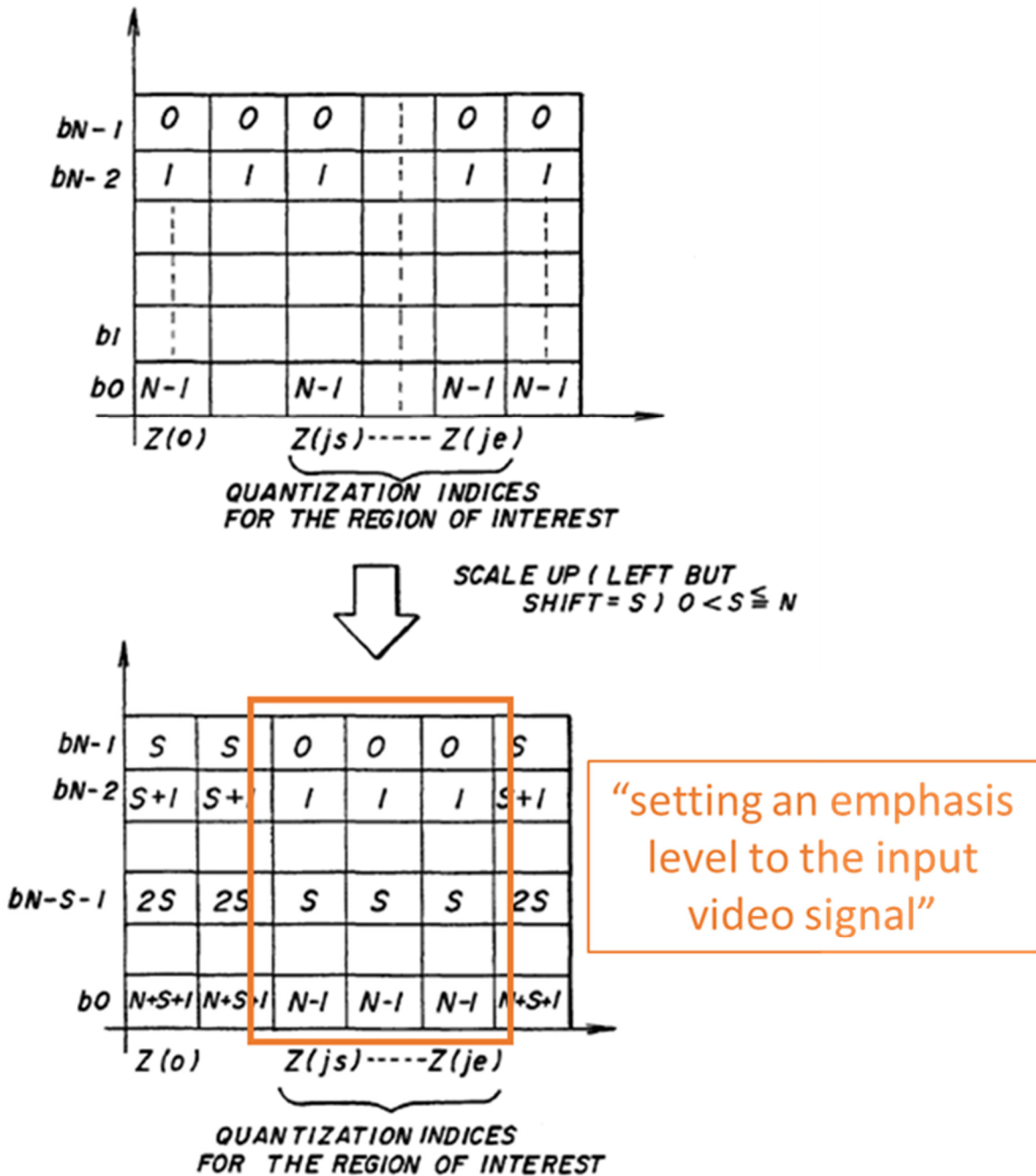


SAMSUNG-1007, FIG. 3E

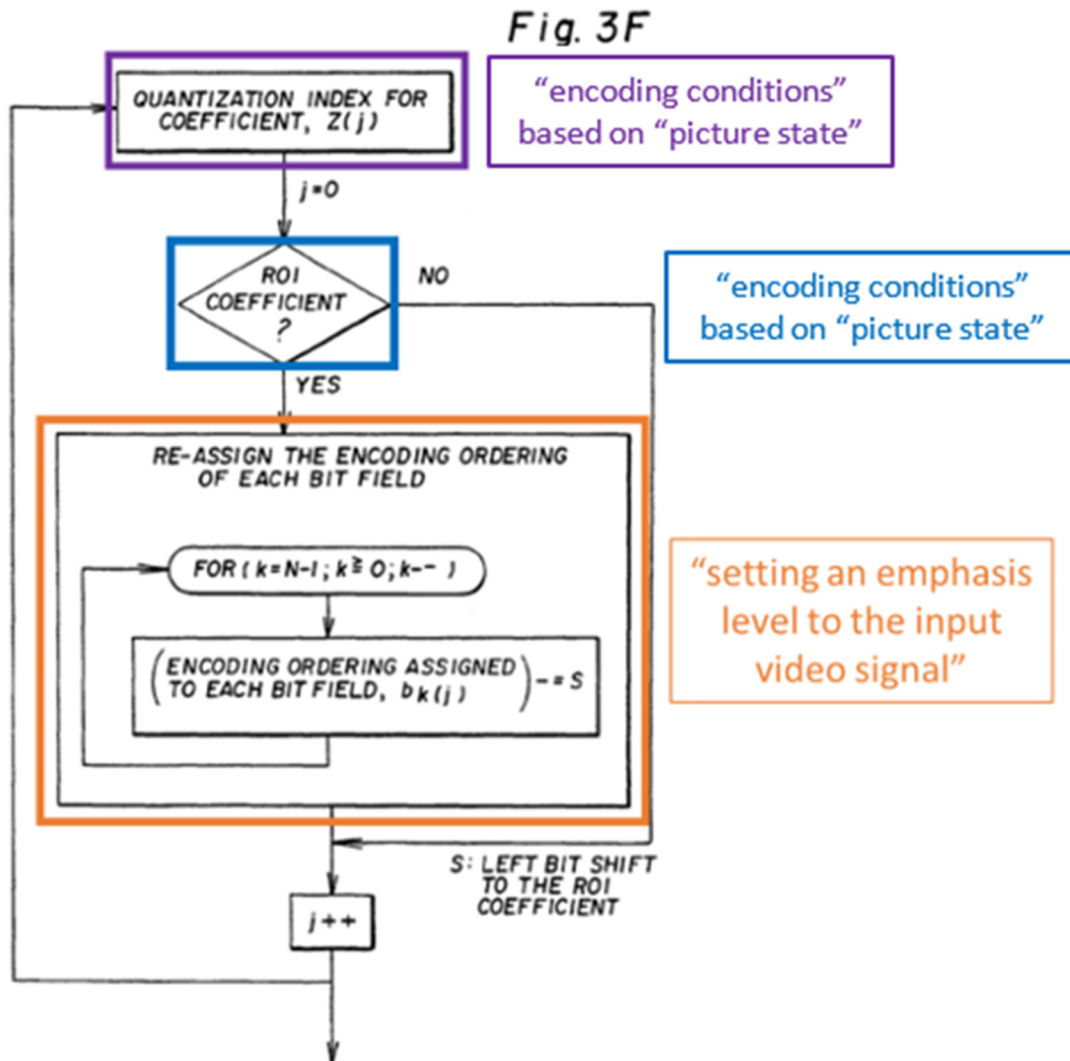
Reassigning Encoding Ordering of the Bit Fields of the Quantization Indices

Atsumi describes a method of applying emphasis that “reassigns encoding ordering of every bit field of the quantization indices.” SAMSUNG-1007, 10:14-38, 8:44-9:45, FIGS. 3B, 3E; SAMSUNG-1003, ¶110. This process is illustrated below in Figures 3C and 3F of Atsumi.

Fig. 3C



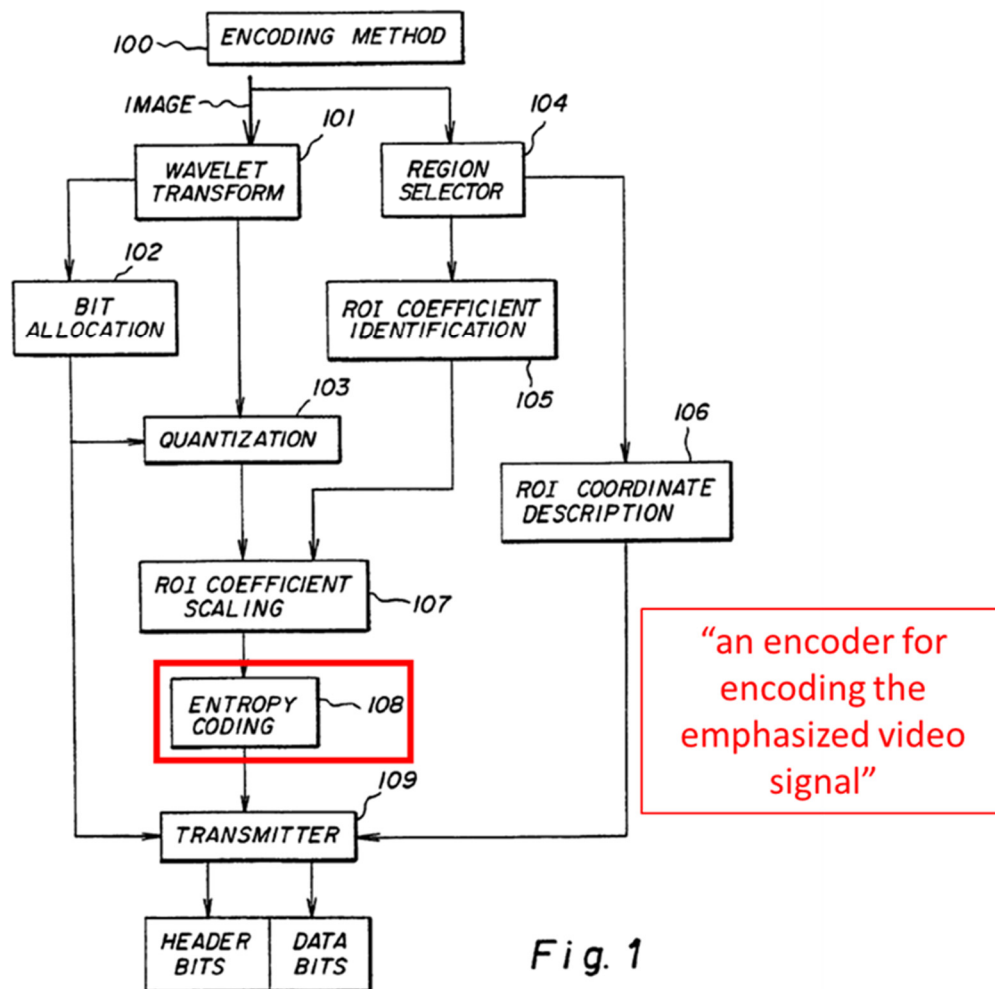
SAMSUNG-1007, FIG. 3C



SAMSUNG-1007, FIG. 3F

[1.3]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶111. For example, Atsumi describes that “entropy coding” is performed following ROI coefficient scaling to “form an encoded data stream” (“*an encoder for encoding the emphasized video signal to obtain a video bitstream*”). SAMSUNG-1007, 6:24-7:17, 12:21-14:55, FIGS. 7A-8C; SAMSUNG-1003, ¶111.



SAMSUNG-1007, FIG. 1

[1.4]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶112. For example, Atsumi describes that “coordinates of the selected region of interest are encoded in order to effectively transmit or store the ROI coordinate information, from which decoder can tell what region of interest is selected to be emphasized in the reconstructed image,” the “ROI description information” (“*data on the emphasis level*”) “is added to the header bits in the bit stream in transmission step

109,” and “[e]ncoded data formed at step 108” (“*video bitstream*”) “is sent to transmission step 109 where data bits and header bits are appended into a bit stream to be transmitted or stored.” SAMSUNG-1007, 6:1-7, 7:18-21, 15:53-65, FIG. 1; SAMSUNG-1003, ¶112. This transmitter step is illustrated below in Atsumi’s Figure 1.

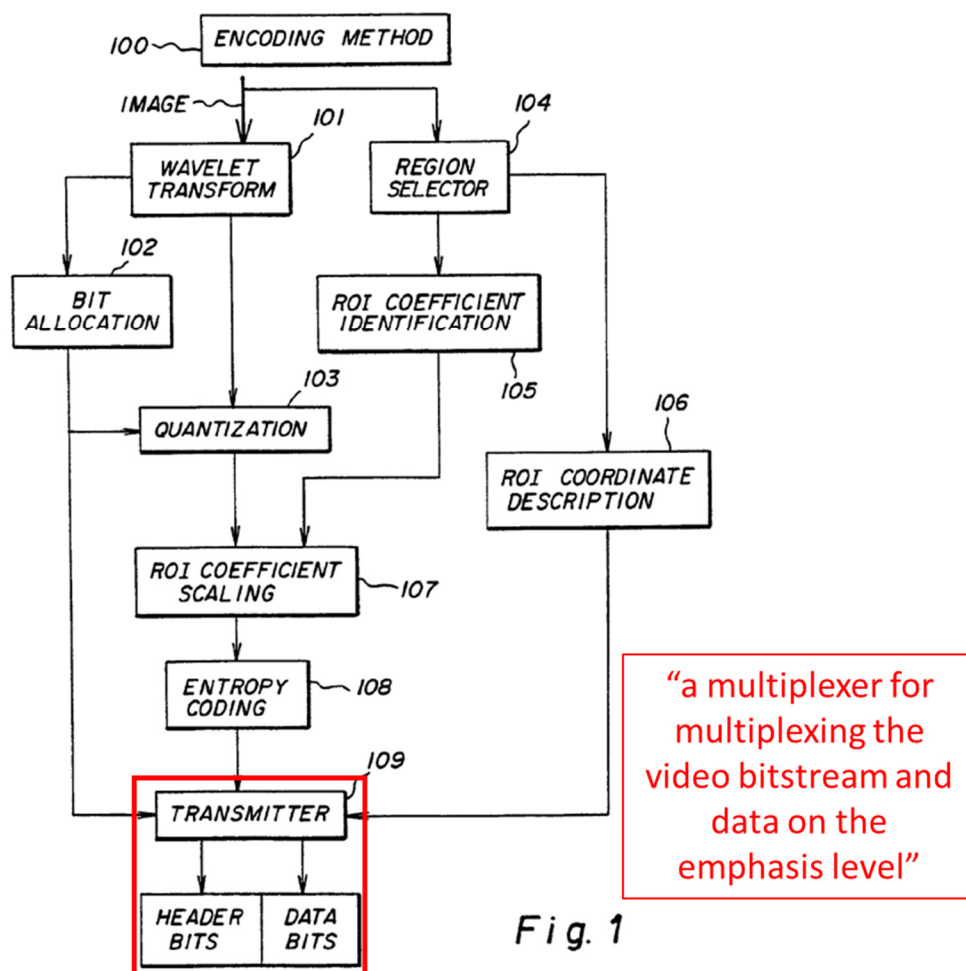


Fig. 1

SAMSUNG-1007, FIG. 1

As discussed in [1.pre], Atsumi discloses that “the above discussed encoding methods and apparatus can also be adapted to digitally reproduced motion pictures,

e.g., digital video. For example, a selected portion of a bit stream being transmitting to allow for real time reproduction of an image could be dedicated to transmitting a region of interest in the resulting motion picture. Furthermore, the dimensions and location of the region of interest could be constantly changing as the motion picture progresses.” SAMSUNG-1007, 29:28-36. As Dr. Acton explains, based on Atsumi’s disclosure, a POSITA would have recognized or found obvious that the transmitter of Atsumi would include a “*multiplexer*” that multiplexes the video bitstream and data on the emphasis level. SAMSUNG-1003, ¶113. A POSITA would have been motivated to implement Atsumi’s transmitter to include such a multiplexer in light of Atsumi’s disclosure that “the dimensions and location of the region of interest could be constantly changing as the motion picture progresses” and to allow Atsumi’s decoder to process the encoded video data “for real time reproduction” while it is being received to reduce delay in reproducing the video signal, consistent with the goal of Atsumi’s invention. *Id.*; SAMSUNG-1007, 29:28-36; SAMSUNG-1003, ¶113.

Further, a POSITA would have been aware that multiplexing data necessary for reproducing an image/video signal together with coded image/video data was a known option for sending/recording the data and image/video signal together as a bitstream and would have found it to be simply a matter of design choice to multiplex the data with the image/video signal. SAMSUNG-1003, ¶114; *KSR*, 550

U.S. at 421 (“a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”). Indeed, the ’128 Patent acknowledges that it was well-known and disclosed in JPH7-162862 that a “bitstream is multiplexed with emphasis data” that “is then output for storage or transfer.” SAMSUNG-1001, 2:4-10. Further, Fujikawa corroborates a POSITA’s knowledge at the time of the ’128 Patent and describes that “[d]ata which will be subsequently necessary for decoding purposes ... are also encoded and are transmitted to the decoding apparatus in the output bit stream from the encoding apparatus, multiplexed with the encoded data of the video signal.” SAMSUNG-1006, 1:50-55; SAMSUNG-1003, ¶114.

[2]

Atsumi renders claim 2 obvious. SAMSUNG-1003, ¶115. As discussed in [1.1], Atsumi describes that “ROI coefficient scaling step 107” receives the “quantization indices” (“*encoding conditions*” determined based on “*a picture state*”) and the “identification result of the ROI coefficients” (“*encoding conditions*” determined based on “*a picture state*”). SAMSUNG-1007, 5:42-67. Atsumi discloses that at “ROI coefficient scaling step 107,... the quantization indices for the transform coefficients corresponding to the region of interest are emphasized in such a way that the quantization indices for the ROI coefficients are scaled up by a left bit shift value (S) specified by a priority assigned to the region

of interest so that the indices for the ROI coefficients are to be encoded as if the indices had larger values than their actual values.” SAMSUNG-1007, 6:8-23.

Atsumi explains that, therefore, the quantization indices for the ROI coefficients “are encoded with a larger number of bits at a given bit rate or encoded at the earlier stages of the encoding process.” SAMSUNG-1007, 6:8-23. Accordingly, Atsumi teaches that the “ROI coefficient scaling step 107” (“*an emphasis-level setter*”) includes a detector for detecting “quantization indices” (“*degree of quantization as the encoding conditions*”) and an “identification result of the ROI coefficients” (“*degree of quantization as the encoding conditions*”) applied to the input video signal and scales up the quantization indices for the ROI coefficients (“*sets the emphasis level*”) in accordance with the detected “quantization indices” (“*degree of quantization as the encoding conditions*”) and the “identification result of the ROI coefficients” (“*degree of quantization as the encoding conditions*”). SAMSUNG-1007, 5:30-6:23, FIG. 1; SAMSUNG-1003, ¶115.

[3]

Atsumi renders claim 3 obvious. SAMSUNG-1003, ¶116. As discussed in [1.1], Atsumi describes that “ROI coefficient scaling step 107” receives the “quantization indices” (“*encoding conditions*” determined based on “*a picture state*”) and the “identification result of the ROI coefficients” (“*encoding conditions*” determined based on “*a picture state*”). SAMSUNG-1007, 5:42-67.

Atsumi discloses that at “ROI coefficient scaling step 107, ... the quantization indices for the transform coefficients corresponding to the region of interest are emphasized in such a way that the quantization indices for the ROI coefficients are scaled up by a left bit shift value (S) specified by a priority assigned to the region of interest so that the indices for the ROI coefficients are to be encoded as if the indices had larger values than their actual values.” SAMSUNG-1007, 6:8-23.

Atsumi explains that, therefore, the quantization indices for the ROI coefficients “are encoded with a larger number of bits at a given bit rate or encoded at the earlier stages of the encoding process.” SAMSUNG-1007, 6:8-23; SAMSUNG-1003, ¶116.

In its infringement contentions, Patent Owner appears to advance a scope for “a degree of enhancement effects already applied to the input video signal” as encompassing quantization parameters derived from a rate control algorithm or quantization parameters identifying high detail/complex areas.¹¹ In accordance with the scope of this claim advanced by Patent Owner in its infringement contentions, Atsumi teaches that the “ROI coefficient scaling step 107” (“*an emphasis-level setter*”) includes a detector for detecting “quantization indices”

¹¹ Petitioner reserves the right to challenge Patent Owner’s allegation that a product performing a similar function satisfies this claim of the ’128 patent.

(“*degree of enhancement effects applied to the input video signal*” “*as the picture state*”) and an “identification result of the ROI coefficients” (“*degree of enhancement effects applied to the input video signal*” “*as the picture state*”) applied to the input video signal and scales up the quantization indices for the ROI coefficients (“*sets the emphasis level*”) in accordance with the detected “quantization indices” (“*degree of enhancement effects applied to the input video signal*” “*as the picture state*”) and the “identification result of the ROI coefficients” (“*degree of enhancement effects applied to the input video signal*” “*as the picture state*”) in a similar manner as the products that Patent Owner alleges satisfies this claim. SAMSUNG-1007, 5:30-6:23, FIG. 1; SAMSUNG-1003, ¶117.

[4.pre]

To the extent the preamble is limiting, Atsumi describes “a method and apparatus for encoding images for transmission or storage where a region of interest (ROI) or certain regions of the image are to be emphasized and for decoding the encoded image after transmission or retrieval from storage” (a “*method of video-emphasis encoding*”). SAMSUNG-1007, 2:56-60; SAMSUNG-1003, ¶118; *see supra* Ground 2, [1.pre].

[4.1]-[4.4]

Atsumi renders the elements of claim 4 obvious in the same manner as

explained above for the corresponding elements of claim 1 listed in the following table. SAMSUNG-1003, ¶¶119-122.

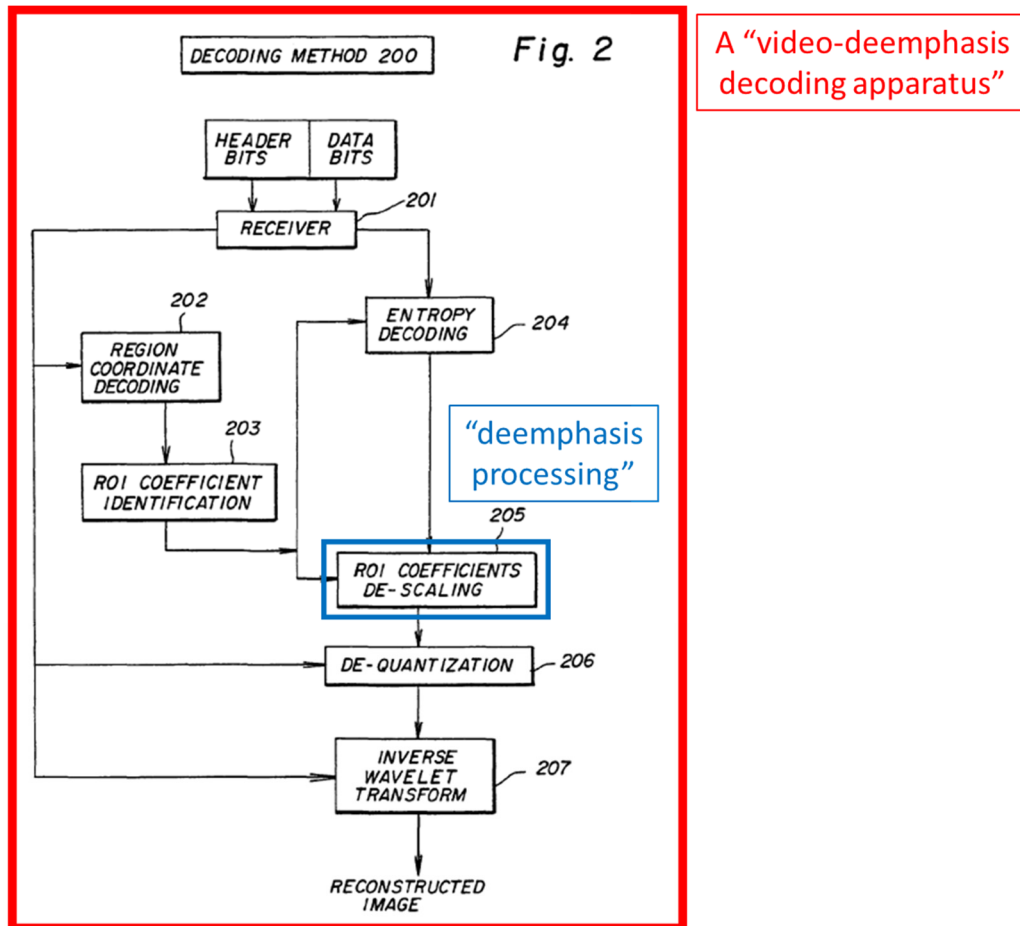
Claim	Corresponding Claim
[4.1]	[1.1]
[4.2]	[1.2]
[4.3]	[1.3]
[4.4]	[1.4]

[5.pre]

To the extent the preamble is limiting, Atsumi renders it obvious. For example, Atsumi describes “a method of decompressing an image which is encoded with an emphasis on the selected region of interest in FIG. 1” (“*[a] video-deemphasis decoding apparatus for decoding and applying a deemphasis processing to an input video bitstream*”). SAMSUNG-1007, 18:60-67, 19:1-7, 19:34-44, FIG. 2. Atsumi describes, with respect to FIG. 2, “the decoding method 200 comprises a receiver step 201 for receiving an encoded bit stream consisting of header bits and data bits. Step 201 is followed by region coordinate decoding step 202 and entropy decoding step 204. At step 202, encoded data of the region coordinates are decoded in order to obtain the coordinates of the region of interest (ROI) which is to be reconstructed with an emphasis in the reconstructed image.” SAMSUNG-1007, 18:62-19:2. At the ROI coefficients de-scaling step 205, the

quantization indices corresponding to the region of interest are scaled down in order to perform de-quantization on the quantization indices at step 206.”

SAMSUNG-1007, 19:34-36; SAMSUNG-1003, ¶123.



SAMSUNG-1007, FIG. 2

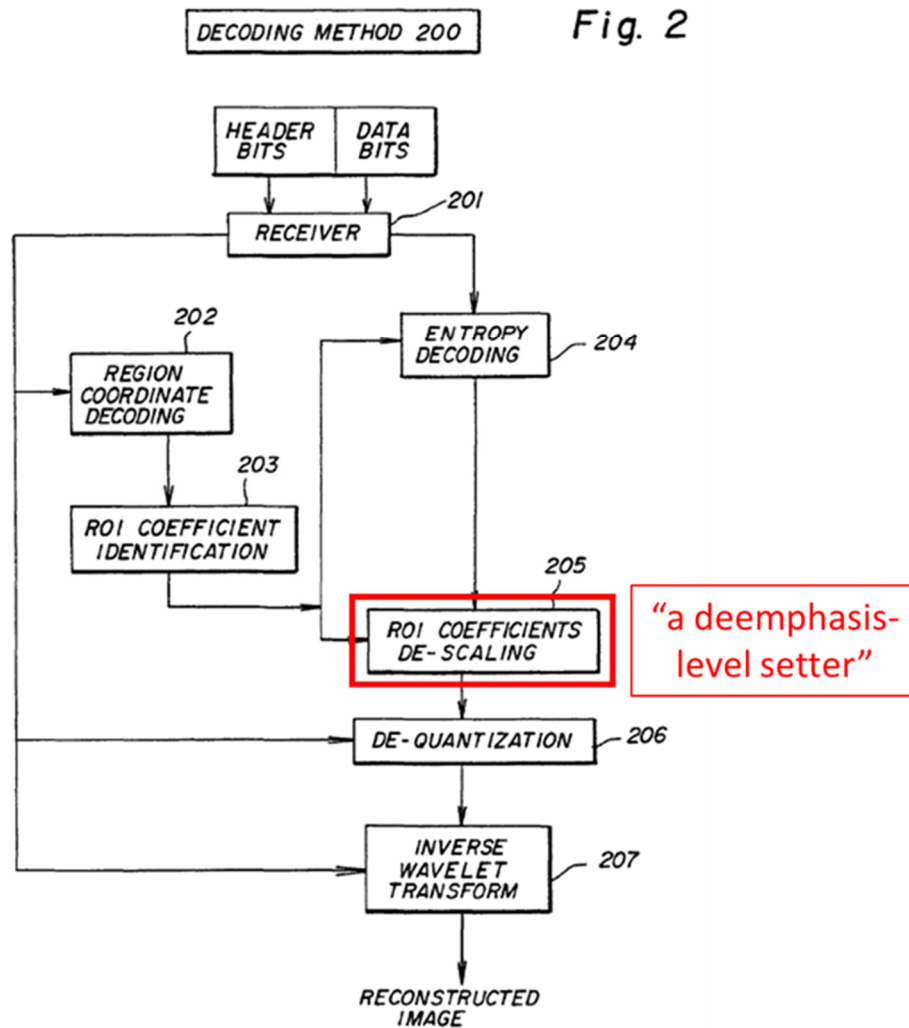
[5.1]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶124. For example, Atsumi describes “a receiver step 201 for receiving an encoded bit stream consisting of header bits and data bits.” SAMSUNG-1007, 18:62-64. At region coordinate decoding step 202, “encoded data of the region coordinates are decoded

in order to obtain the coordinates of the region of interest (ROI) which is to be reconstructed with an emphasis in the reconstructed image” (“***emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level***”). SAMSUNG-1007, 18:66-19:2; 19:59-20:2. “The decoded ROI coordinates are given to ROI coefficient identification step 203 where wavelet transform coefficients corresponding to the region of interest are identified.” SAMSUNG-1007, 19:3-5, 20:3-14; SAMSUNG-1003, ¶124.

Atsumi further describes the “ROI coefficient descaling step 205” (“***a deemphasis-level setter***”) scaling down “the values of the quantization indices corresponding to the region of interest or the bit significance levels of the quantization indices corresponding to the region of interest.” SAMSUNG-1007, 20:63-67, 19:34-44. “Which quantization indices are to be scaled down is given by the ROI coefficient identification result at step 203, and how many bit shifts the indices are scaled down is taken out from the header bits received at step 201” (“***setting a deemphasis level that matches an emphasis level obtained from emphasis-level data carried by the video bitstream to which an input video signal has been encoded and emphasized at the emphasis level***”). SAMSUNG-1007, 18:60-19:7, 19:34-44, 20:63-21:7, FIG. 2. Atsumi describes that “[t]he details of this step are exactly the same as the details of ROI coefficient scaling step 107 in

the encoding method 100.” SAMSUNG-1007, 21:1-7; SAMSUNG-1003, ¶125.

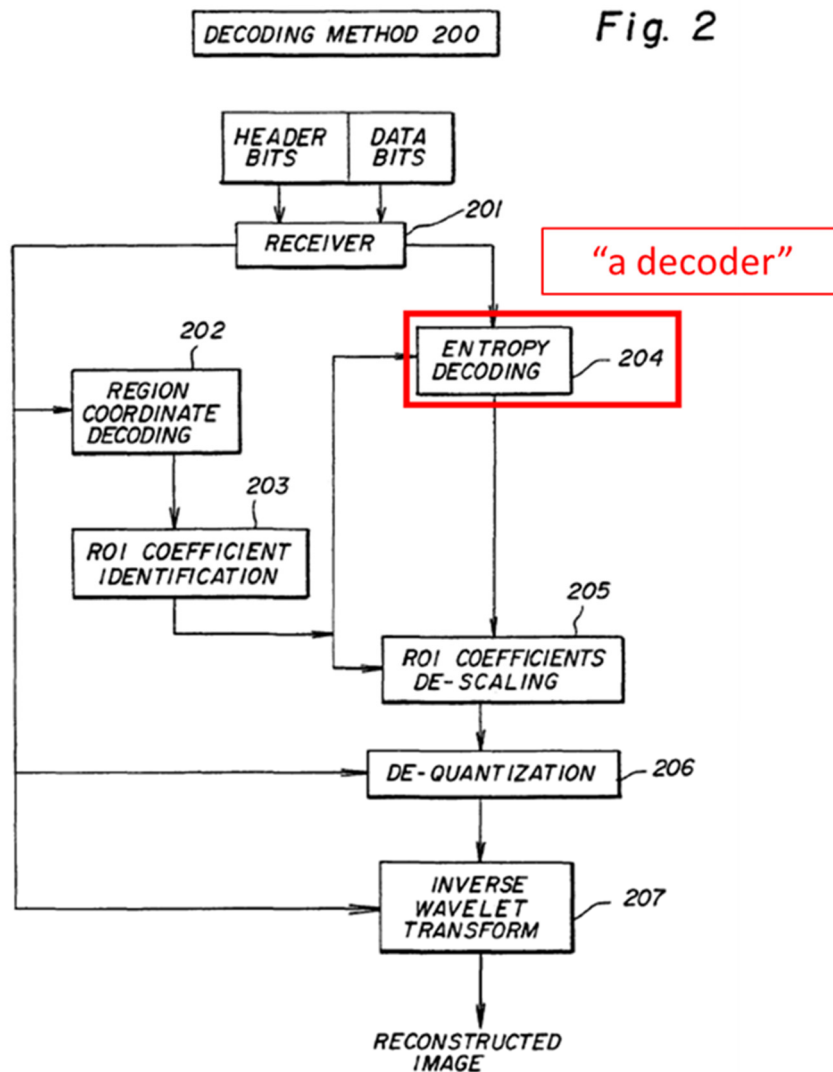


SAMSUNG-1007, FIG. 2

[5.2]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶126. For example, Atsumi describes that “entropy decoding” is performed “on the incoming bit stream with the data bits which are received at receiver step 201” (“*a decoder for decoding the input video bitstream for reproducing the video signal*”).

SAMSUNG-1007, 19:8-33, 20:14-62, FIG. 2; SAMSUNG-1003, ¶126.

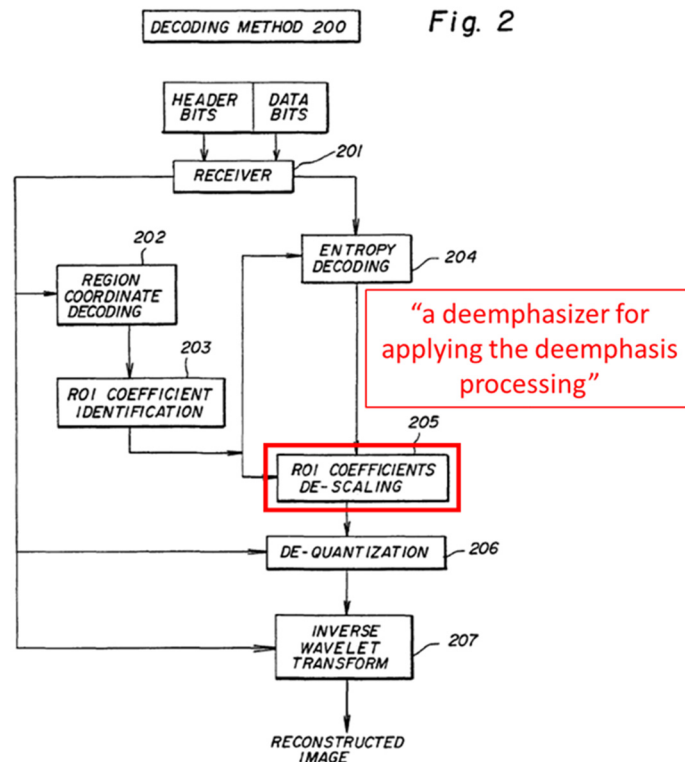


SAMSUNG-1007, FIG. 2

[5.3]

Atsumi renders this claim element obvious. SAMSUNG-1003, ¶127. As discussed in [5.1], Atsumi describes an “ROI coefficient descaling step 205” (“*a deemphasizer*”) that scales down “the values of the quantization indices corresponding to the region of interest or the bit significance levels of the

quantization indices corresponding to the region of interest” “given by the ROI coefficient identification result at step 203, and how many bit shifts the indices are scaled down is taken out from the header bits received at step 201” (“*applying the deemphasis processing to the reproduced video signal at the deemphasis level to obtain a deemphasized video signal*”). SAMSUNG-1007, 18:60-19:7, 19:34-44, 20:63-21:7, FIG. 2; *see supra* Ground 2, [5.1]. Atsumi describes that “[t]he details of this step are exactly the same as the details of ROI coefficient scaling step 107 in the encoding method 100.” SAMSUNG-1007, 21:1-7; *see supra* Ground 2, [1]-[3]; SAMSUNG-1003, ¶127.



SAMSUNG-1007, FIG. 2

[6]

Atsumi renders claim 6 obvious. SAMSUNG-1003, ¶128. As discussed in [5.1], Atsumi describes the “ROI coefficient descaling step 205” (“*the deemphasis-level setter*”) scaling down “the values of the quantization indices corresponding to the region of interest or the bit significance levels of the quantization indices corresponding to the region of interest.” SAMSUNG-1007, 20:63-67, 19:34-44. “Which quantization indices are to be scaled down is given by the ROI coefficient identification result at step 203 [obtained from encoded data of the region coordinates received at step 201], and how many bit shifts the indices are scaled down is taken out from the header bits received at step 201” (“*obtains data including a degree of quantization applied to the input video signal as the emphasis-level data to obtain the emphasis level in accordance with the degree of quantization, thus setting the deemphasis level that matches the emphasis level*”). SAMSUNG-1007, 18:60-19:7, 19:34-44, 19:59-20:2, 20:63-21:7, FIG. 2; SAMSUNG-1003, ¶128.

[8.pre]

To the extent the preamble is limiting, Atsumi describes “a method and apparatus for encoding images for transmission or storage where a region of interest (ROI) or certain regions of the image are to be emphasized and for decoding the encoded image after transmission or retrieval from storage” (“*video-*

deemphasis decoding method”). SAMSUNG-1007, 2:56-60; SAMSUNG-1003, ¶129; *see supra* Ground 2, [5.pre].

[8.1]-[8.3]

Atsumi renders the elements of claim 8 obvious in the same manner as explained above for the corresponding elements of claim 5 listed in the following table. SAMSUNG-1003, ¶¶130-132.

Claim	Corresponding Claim
[8.1]	[5.1]
[8.2]	[5.2]
[8.3]	[5.3]

IV. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. 35 U.S.C. §314(a) - Discretionary Denial is not Merited in view of Petitioner’s *Sotera* Stipulation

In *Apple Inc. v. Fintiv, Inc.*, the Board enumerated six factors to determine whether a petition should be discretionarily denied institution under §314(a). IPR2020-00019, Paper 11 at 2-3 (PTAB “precedential” Mar. 20, 2020) (“*Fintiv*”). In June 2022, the USPTO issued updated discretionary denial guidance in view of the *Fintiv* factors and expressly noted that *the PTAB will not discretionarily deny institution if Petitioner presents a Sotera stipulation*. SAMSUNG-1022, 3, 7-8. Here, Petitioner has eliminated any risk of duplicated effort by voluntarily

presenting a *Sotera* stipulation to Patent Owner. SAMSUNG-1023; *Sotera Wireless, Inc. v. Masimo Corp.*, Case IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020). For at least this reason, the Board should not discretionarily deny this petition.

V. CONCLUSION AND FEES

The Challenged Claims are unpatentable. Petitioner authorizes charge of fees to Deposit Account 06-1050.

VI. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Samsung”) are the real parties-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

The '128 Patent is the subject of a civil action, *Advanced Coding Technologies LLC v. Samsung Electronics Co., Ltd. et al.*, 2:22-cv-00499-JRG, E.D. Tex., filed December 30, 2022 (SAMSUNG-1004) and *Advanced Coding Technologies LLC v. LG Electronics, Inc. et al.*, 2-22-cv-00501 E.D. Tex, filed December 30, 2022.

Petitioner is not aware of any other disclaimers, reexamination certificates, or IPR petitions addressing the '128 Patent.

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation of counsel.

Lead Counsel	Backup counsel
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D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR39843-0167IP1@fr.com

(referencing No. 39843-0167IP1 and cc'ing PTABInbound@fr.com, axf-ptab@fr.com, jjm@fr.com, nstephens@fr.com, and leung@fr.com).

Respectfully submitted,

Dated November 22, 2023

/Jeremy J. Monaldo/

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CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,927 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on November 22, 2023, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by Federal Express, to the Patent Owner, by serving the correspondence address of record as follows:

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