

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners

v.

MAXELL, LTD.,
Patent Owner

Inter Partes Review No. IPR2025-01312

**PETITIONER'S REPLY TO
PATENT OWNER'S RESPONSE**

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PETITIONER’S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 7,952,645 (“the ‘645 patent”).
1002	File History of U.S. Patent No. 7,952,645.
1003	Declaration of Dr. Dan Schonfeld.
1004	U.S. Patent App. Pub. No. 2004/0156545 (“Kim”).
1005	U.S. Patent No. 5,808,697 (“Fujimura”).
1006	ITU “Recommendation ITU-R BT.1298*; Enhanced wide-screen NTSC TV transmission system” (1997) (retrieved from https://www.itu.int/dms_pubrec/itu-r/rec/bt/R-REC-BT.1298-0-199710-W!!PDF-E.pdf).
1007	Definition of “signal” from <i>Chambers Dictionary of Science & Technology</i> (2007).
1008	Definition of “according to” from <i>The New Oxford American Dictionary</i> (2nd ed. 2005).
1009	Definition of “according to” from <i>Webster’s New College Dictionary</i> (2005).
1010	Definition of “according to” from <i>The Chambers Dictionary</i> (10th ed. 2007).
1011	Patent Owner’s responsive claim construction brief from <i>Maxell, Ltd., v. Lenovo Group Ltd.</i> , No. 6:21-cv-01169 (W.D. Tex. Jun. 13, 2022).
1012	Patent Owner’s sur-reply claim construction brief from <i>Maxell, Ltd., v. Lenovo Group Ltd.</i> , No. 6:21-cv-01169 (W.D. Tex. Jul. 11, 2022).
1013	Patent Owner’s infringement contentions cover pleading from <i>Maxell, Ltd. v. Samsung Elecs. Co., Ltd.</i> , No. 5:25-cv-00052 (E.D. Tex.).
1014	Patent Owner’s ‘645 patent infringement contentions claim chart from <i>Maxell, Ltd. v. Samsung Elecs. Co., Ltd.</i> , No. 5:25-cv-00052 (E.D. Tex.).
1015	Petitioner’s “Sotera plus” Stipulation.
1016	Complaint from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:23-cv-00092 (E.D. Tex. Sept. 7, 2023).
1017	Order from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:23-cv-00092 (E.D. Tex. Mar. 21, 2025).
1018	Order from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:23-cv-00092 (E.D. Tex. Jul. 9, 2025).

Exhibit No.	Description
1019	Order from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:23-cv-00092 (E.D. Tex. May 2, 2025) (public version).
1020	Order from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:23-cv-00092 (E.D. Tex. Sept. 18, 2025) (public version).
1021	Excerpts of the trial transcript from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:23-cv-00092 (E.D. Tex. May 22, 2025).
1022	Letter from Maxell to Samsung dated July 7, 2021.
1023	Email thread between Maxell and Samsung from July 2021 to January 2022.
1024	Letter from Maxell to Samsung dated December 29, 2021.
1025	IPR2024-00867, Paper 40 (Petitioner’s Response to Patent Owner’s Request for Authorization to File Materials from Related Matters).
1026	IPR2024-00717, Paper 33 (Order Denying Patent Owner’s Request for Authorization to File Materials).
1027	IPR2024-00828, Paper 42 (Petitioner’s Response to Patent Owner’s Motion to Submit Supplemental Information).
1028	IPR2024-00828, Paper 47 (Petitioner’s Sur-reply to Patent Owner’s Motion to Submit Supplemental Information).
1029	IPR2024-00828, Paper 50 (Order Denying Patent Owner’s Motion to Submit Supplemental Information).
1030	IPR2024-00735, Paper 41 (Petitioner’s Opposition to Motion to Submit Supplemental Information).
1031	U.S. Patent No. 7,046,302 (“Konuma”).
1032	Petitioner’s Motion to Stay Pending <i>Inter Partes</i> Review from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:25-cv-00052 (E.D. Tex. Oct. 24, 2025).
1033	“Order Focusing Patent Claims and Prior Art” from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:25-cv-00052 (E.D. Tex. Aug. 18, 2025).
1034	Law360 article, “Stewart Says New Patent Policies Aim to Bring Stability,” dated Sept. 8, 2025.
1035	Supplemental Declaration of Dr. Dan Schonfeld Regarding Patent Owner’s Motion to Amend.
1036	U.S. Patent App. Pub. No. 2006/0258289 (“Dua”).
1037	Joint Claim Construction Statement from <i>Maxell, Ltd. v. Samsung Elecs. Co.</i> , No. 5:25-cv-00052 (E.D. Tex. Jan. 28, 2026).

Exhibit No.	Description
1038	Supplemental Declaration of Dr. Dan Schonfeld Regarding Patent Owner’s Response.
1039	U.S. Patent No. 8,139,157 (“Someya”).
1040	U.S. Patent No. 8,792,039 (“Hirooka”).
1041	U.S. Patent No. 8,184,200 (“Biswas”).
1042	U.S. Patent No. 6,148,103 (“Nenonen”).
1043	Definition of “when” from <i>The New Oxford American Dictionary</i> (2nd ed. 2005).
1044	Definition of “when” from <i>Webster’s New College Dictionary</i> (2005).
1045	Definition of “controller” from <i>Dictionary of ICT</i> (4th ed. 2004).
1046	Definition of “controller” from <i>Wiley Electrical and Electronics Engineering Dictionary</i> (2004).
1047	U.S. Patent No. 6,125,371 (“Bohannon”).
1048	Markus P.J. Fromherz, <i>Model-Based Computing for Design and Control of Reconfigurable Systems</i> , AI MAGAZINE, Winter 2004.
1049	A.S. Bishell, <i>Designing the Control Architecture for Algorithm Specific Custom Processors on FPGAs</i> , Elecs. N.Z. Conf. (Nov. 2007).
1050	Joel Johnson, <i>Drive Safe</i> , POPULAR MECHANICS, May 2006.
1051	Matthew Turk, <i>Perceptual Interfaces</i> , EMERGING TOPICS IN COMPUTER VISION, 2004.
1052	Definition of “pixel” from <i>Dictionary of Computer Vision and Image Processing</i> (2005).
1053	International Organization for Standardization, <i>Digital imaging — Specification guideline for digital cameras</i> , ISO 18383:2025, (2nd ed. 2025).
1054	Sony, <i>What is a pixel and how does it form a picture?</i> , Sony USA (May 1, 2024), https://www.sony.com/electronics/support/articles/00342545 .
1055	Transcript of deposition of Patent Owner’s expert Dr. Matthew Turk (Jul. 21, 2026).

I. INTRODUCTION

Petitioner submits this reply to PO's Response (Paper 24).

II. CLAIM CONSTRUCTION

A. "video signal" (claims 1-3, 5-6)

Petitioner established that the plain meaning of "video signal" includes a logical unit of video. Petition, 6; *see also* EX1055, 50:19-51:5 (PO's expert testifying that "video signal" "broadly [] means representing information about a video").

PO's argument that Petitioner's interpretation of "video signal" is "inconsistent" is incorrect. Resp., at 7-8. Petitioner always maps "video signal" to a logical unit of video even though Petitioner may identify different logical units of video for different claims, which is proper. Petition, 60 n.2.

PO's proposed construction ("a frame or series of related frames ...") is fatally flawed. The claim language does not recite "frames," and PO therefore is improperly trying to rewrite the claims. *Rembrandt Data Techs., LP v. AOL, LLC*, 641 F.3d 1331, 1339 (Fed. Cir. 2011) ("courts may not redraft claims"); *Int'l Rectifier Corp. v. IXYS Corp.*, 361 F.3d 1363, 1372 (Fed. Cir. 2004) (one may not "excuse the patentee from the consequences of its own word choice"). PO argues that "video signal" in the claims is limited to "the logical unit of the video that is being analyzed to detect the pattern portion." Resp. at 8. But the claims do not restrict the recited "video signal" in this way. *E.g.*, EX1001, 24:50 ("a video signal

containing contents is input”).

Moreover, by importing “frame” limitations from the specification into the claims, PO commits a “cardinal sin[] of patent law.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1319-20 (Fed. Cir. 2005) (en banc); Resp. at 8. PO’s construction also improperly excludes an embodiment in which the video signal is part of a frame. *Nobel Biocare Servs. AG v. Intradent USA, Inc.*, 903 F.3d 1365, 1381 (Fed. Cir. 2018) (“[T]here is a strong presumption against a claim construction that excludes a disclosed embodiment.”). In that embodiment, the system “conduct[s] the characteristic point detection only in the contents display area” (part of the frame) and not the “black no-picture area[s]” on its left and right. EX1001, 20:61-64, 20:14-20, 21:1-8, 22:14-18, Figs. 36A, 39. To do so, it “handles only the *video signal* obtained while the characteristic point detection enable signal is at the high level ... and disregards the *video signal* obtained while the characteristic point detection enable signal is at the low level.” *Id.*, 20:57-61 (emphasis added). Thus, the part of the frame the system “handles” still is a “video signal,” as is the part of the frame that it “disregards.”

PO’s criticism that Petitioner’s construction allows for correcting some parts of the video signal but not others is misplaced because the specification discloses doing exactly that, as PO acknowledges. EX1001, 24:12-16 (“exclude the pattern portions and conduct correction only in the contents display area”); Resp., 3

(“apply the correction to the picture area while leaving the no-picture areas uncorrected”), 13 (“limit correction to the picture area”); *see also* § II.C.

B. “a corrector which corrects ...” (claims 1 and 5) and “a corrector which changes correction characteristics ...” (claim 3)

PO adopts the position that “the claimed ‘corrector’ language includes ‘means-plus-function limitations and that the corresponding structure is [CPU 7] or equivalents.’” Resp. at 10. But these limitations do not recite “means for,” which creates a presumption that they are not means-plus-function limitations.

Williamson v. Citrix Online, LLC, 792 F.3d 1339, 1348 (Fed. Cir. 2015). PO has not attempted to overcome this presumption. Resp. at 10. And PO’s expert did not opine on whether “corrector” implies a structure. EX2017, ¶81; EX1055, 57:19-21.

Moreover, a claim term’s structure can be inferred from its function. *See Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996) (“Many devices take their names from the functions they perform.”). And a claim term can refer to a class of structures. *Personalized Media Comm’s, LLC v. Int’l Trade Comm.*, 161 F. 3d 696, 705 (Fed. Cir. 1998) (“detector” refers to a class of structures known as “detectors”). A POSITA would understand the recited “corrector” to refer to the class of structures that perform video correction. Such structures were well known. *See, e.g.*, EX1039, 2:18-19 (“A video corrector performs a video correction on the video signal”); EX1040, 6:40-47 (“image

corrector portion” performs image correction); EX1041, 3:4-11 (“error corrector” corrects errors in a video frame); EX1055, 57:22-58:5 (various components could be a corrector). Such structures were well known in part because video enhancement functionality was well known. *See, e.g.*, EX1004, ¶41 (“a number of known enhancement methods”); EX1005, 1:7-10 (“well-known histogram equalization method” enhances a video’s luminance contrast); EX1042, 1:14-15 (“Histogram equalization is a known method for maximizing picture contrast.”). A POSITA would have understood such structures to typically include an input module, a buffer for storing the input, a module to modify the input, and an output module. EX1038, ¶15.¹

Moreover, PO did not identify these limitation as means-plus-function limitations in the district court, undermining its position here. EX1037, 18-20. Nonetheless, the prior art discloses and renders obvious PO’s proposed corresponding structure. *See* Petition, 24-26, 43-45; § IV.B.

C. “correct[s] the video signal” (claims 1-3 and 5)

Petitioner established that this limitation should include correcting part of the video signal. Petition, 7-8. PO’s construction (“applying a correction to a

¹ Kim’s and Fujimura’s *corrector(s)* also would include this or a similar structure. EX1038, ¶15.

logical unit (frame, or series of frames)”) fails because a “video signal” is not limited to a frame or a series of frames. § II.A. Petitioner understands PO’s construction to otherwise be consistent with Petitioner’s construction because the plain meaning of “applying a correction” includes correcting part of a video signal.

PO focuses on a specification disclosure of not correcting an entire frame (Resp. at 11-12), but the claims are not limited to selected specification passages. *Phillips*, 415 F.3d at 1319-20. And PO ignores the specification’s disclosure of correcting only part of a frame. EX1001, 24:12-16 (“exclude the pattern portions and conduct correction only in the contents display area”).

PO’s semantic argument that functions that change only part of a video signal nonetheless correct the entire video signal (Resp. at 12-13) is irrelevant because the specification elsewhere discloses correcting only part of a video signal. EX1001, 24:12-16 (quoted above), 19:59-61 (“[i]f a pattern portion is contained, the picture quality enhancement processing for the video signal is stopped”), 19:64-66 (“processing is stopped in response to the detection of pattern portions”); *see also* EX1055, 63:18-65:10 (PO’s expert agreeing that the passages in column 19 describe correcting the video and then stopping).

PO’s suggestion that the claims are limited to the specification’s third embodiment (Resp. at 11, 13) is contradicted by its reliance on the specification’s fourth embodiment. Resp. at 16-17 (citing 20:17-22 and Figs. 45A-B); *see also*

Paper 13 (POPR) at 9-11 (citing same). And parts of claim 5 are reflected in the fourth embodiment, such as the claim’s recitation of “correc[ting] the video signal ... when the pattern portions are the no-picture areas,” which “hav[e] a single color.” See EX1001, 20:20-22. PO’s expert likewise opines that claim 5 “acts as a hybridization” of the third and fourth embodiments. EX2017, ¶88. The claims therefore should be construed to account for both embodiments, as is required absent contrary “highly persuasive evidentiary support.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583-84 (Fed. Cir. 1996). And claim terms should be construed consistently across the claims. *Cloud Farm Assocs. LP v. Volkswagen Grp. of Am., Inc.*, 674 F. App’x 1000, 1006 (Fed. Cir. 2017). Moreover, even the third embodiment discloses correcting part of the video signal, as established above. EX1001, 19:59-61, 19:64-66.

PO also argues that the claim drafters “knew how to describe when a correction is applied only to a portion of a frame, versus when it is applied (or not applied) to a frame overall” but “did not make this distinction in the claims.” Resp. at 14. This admission supports the conclusion that the claims cover both scenarios.

PO’s proposed construction of the claim language “not ... correcting” fails for the same reasons. Resp. at 10-11. If the Board construes that limitation, it should construe it to include not correcting part of the video signal, consistent with

the proper construction of “correct[s] the video signal” and the intrinsic evidence.

D. “the pattern portions are [contained / no contained]” (claims 1, 3, 5)

Petitioner established that “contained” means “included” and that some frames in a video signal could include a pattern portion while other frames do not. Petition, 8-9.

PO’s construction (“frame always contains ...”) fails because the claims do not recite a “frame,” and a “video signal” is not limited to a frame. Resp., 14, § II.A. PO’s construction also improperly refers to an “inquiry” and “contents,” neither of which arise from this claim language. *Id.*

PO argues that the recited “pattern portions” and “content” must be in “the same frame.” Resp., 15-16. But the claims recite that these things are part of “a video signal,” which is not limited a single frame, as PO acknowledges. § II.A; Resp., 7 (construing it to encompass a “series of related frames”). Thus, nothing in the claims prohibits pattern portions from occupying an entire frame where other frames in the video signal include contents. And the specification includes no lexicography or disclaimer that would so limit the claims. *Thorner v. Sony Comp. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). PO’s reliance on the specification embodiments (Resp. at 15-17) improperly tries to limit the claims to those embodiments. *Phillips*, 415 F.3d at 1319-20.

PO’s argument regarding one frame “caus[ing]” correction of a different

frame is irrelevant because Petitioner does not rely on such a causal relationship. Resp. at 18. PO's argument that the specification passages referring to "stopp[ing]" correction do not disclose frames containing only patterns also is irrelevant because Petitioner does not contend otherwise. *Id.* at 19.

PO's argument that the purpose of the invention is to address pattern portions within one frame repackages its arguments above and fails for the same reasons. Resp. at 19-20. PO's related argument that "the claims are focused on the third embodiment" is incorrect because certain claim limitations are based on the fourth embodiment, as established above. *Id.*, 20; § II.C.

E. "when the pattern portions are [contained / not contained / not the no-picture areas]" (claims 1, 3, 5)

Petitioner established that "when" in these limitations is not limited to "whenever" and includes correcting or not correcting the video signal in certain instances (*i.e.*, in some instances). Petition, 9-10. Since then, PO asserted in district court a construction consistent in scope. EX1037, 19 ("based on or upon determination that the pattern portions" [are contained / not contained / not the no-picture areas ...]). PO's construction there likewise does not require correcting or not correcting the video signal whenever (*i.e.*, every time) the pattern portions are contained or not contained. It requires doing so only in some instances—those instances when it is determined that the pattern portions are contained or not.

PO disputes what can be inferred from its infringement contentions, but does

not disagree with Petitioner’s construction. Resp., 20-21. PO also asserts that, in its infringement contentions, “the ‘when’ condition is met when the system detects food or detects a face.” *Id.*, 20 (emphasis in original). Because detection may not occur whenever a food or a face is present, PO effectively concedes that these limitations can be satisfied in only some instances.

PO argues about Petitioner’s application of this limitation to Fujimura (Resp., 21-22), but that is not a claim construction argument. Nonetheless, PO ignores the fact that Petitioner maps the recited “video signal” differently between Grounds 2 and 3. *Compare* Petition, 37 (scanning line) *with id.*, 60 (frame). With this mapping in mind, there is no contradiction.

PO’s arguments also contradict the broad scope of “when,” which in the context of limitations 1.d and 3.e allows for correction of the video signal’s non-pattern portions and no correction of its pattern portions. *See* EX1043, 3 (“when” includes “in what circumstances” and “in view of the fact that”); EX1044, 3 (“when” includes “considering the fact that”).

F. “characteristic point detector” (claims 2-3, 6)

PO does not substantively dispute Petitioner’s construction. Resp., 22.

G. “a result of detection output from the characteristic point detector” (claim 3)

PO does not dispute that the prior art discloses this limitation (3.d). *See* Resp. at 44-45, 52-53. Nonetheless, Kim discloses this limitation under PO’s

construction (Resp. at 23-24) because the extent to which its mixer 36 applies enhanced image e (which extent is *correction characteristics*) changes based on (*according to*) the luminance histogram (*a result of detection output from the characteristic point detector* under PO's construction). Petition, 32-33. Fujimura also discloses this limitation under PO's construction because its mapping functions (that include *correction characteristics*) change based on (*according to*) the starting and ending line numbers of the picture area (*a result of detection output from the characteristic point detector* under PO's construction). *Id.*, 52-54.

H. “a corrector which changes correction characteristics according to a result ...” (claim 3)

PO does not meaningfully dispute that Petitioner's proposed construction of “according to” is correct. Resp., 25-26. Petitioner addresses PO's “superfluous[ness]” argument below. *Id.*, 25; §§ IV.D, V.C.

I. “cause the corrector not to change the correction characteristics ...” (claim 3)

PO does not substantively dispute Petitioner's construction. Resp., 25-26.

J. “a controller” (claims 1, 3, 5)

PO asserts that “a controller” must include “some sort of processing circuitry, such as a CPU.” Resp., 40-41. But the plain meaning of “controller” is broader, and includes components without circuitry, such as software.

A 2004 dictionary defines “controller” as “a hardware or software device ...” EX1045, 4; *see also* EX1046, 4 (defining “controller” to include “[a] signal,

circuit, device or system”). A patent filed in 1997 explains that “[t]hose skilled in the art should be familiar with the use of controllers in processing environments generally” and that such “[c]ontrollers may be implemented in software, firmware, [or] hardware” EX1047, 4:52-57. This passage “stresses ... that ‘controller’ is used in its ordinary sense.” *Sound View Innovations, LLC v. Facebook, Inc.*, No. 1:16-cv-116, 2017 WL 2221177, at *5 (D. Del. May 19, 2017). Computing publications also referred to controllers that are software. *E.g.*, EX1048, 3 (“[t]he system controller ... is the most challenging piece of software”); EX1049, 2 (a “software controller ... [u]ses ... instructions defined in software”); EX1050, 5 (“USB software controller within [Windows] XP”). The PTAB also has acknowledged that a controller can be software. *Westinghouse Air Brake Techs. Corp. v. Siemens Indus., Inc.*, IPR2017-00580, Paper 12 at 12 (P.T.A.B. Jul. 20, 2017) (construing “controller” as “[c]omputer hardware, firmware and/or software ...”). Even PO’s expert has used “controller” more broadly. EX1051, 32 (“the human brain is a ... controller”); *see also* EX1055, 27:13-20, 40:9-19 (PO’s expert accepting a broader view of “controller”); EX1038, ¶17.

PO cites the specification’s disclosure of a CPU, but claim terms are not limited to specification examples. *Resp.*, 40-41; *Phillips*, 415 F.3d at 1323. And there is no lexicography or disclaimer that would narrow “controller” from its plain and ordinary meaning. *Thorner*, 669 F.3d at 1365. PO also cites a passage

describing “microcontrollers.” Resp., 40 (citing EX2016). But “microcontrollers” is a different, narrower term, and that passage reflects just one company’s use of that term. EX1038, ¶18.

III. PETITIONER’S EXPERT DECLARATION IS PROPER

PO’s argument that Petitioner’s expert declaration “parrots” the petition is contrary to law. Resp. 27-30. An expert declaration is judged by its substance, not whether it includes the same language as the petition. *Shopkick, Inc. v. Novitaz, Inc.*, IPR2015-00279, Paper 11 at 15 (P.T.A.B. Sept. 3, 2015) (“the Petition can be drafted to closely mirror an expert’s opinion”); *Eleкта, Inc. v. Varian Med. Sys. Int’l. AG*, IPR2016-00845, Paper 11 at 7 (P.T.A.B. Sept. 28, 2016) (expert testimony is evaluated substantively, even if the petition’s language is the same).

PO’s assumption that the declaration “copies” the petition is speculative because the petition could just as easily “copy” the declaration or be drafted in parallel. Resp. 27. And the petition in fact adopts parts of the declaration. PO’s argument regarding “missing limitation[s]” is irrelevant because Kim and Fujimura collectively disclose all of the claims’ limitations. *Id.*, 30.

IV. KIM DISCLOSES AND RENDERS OBVIOUS CLAIMS 1-3.

A. Kim Discloses Limitation 1.b.

Kim detects a “pattern-like image,” such as the one in its Figure 1 (*pattern portions other than contents*). Petition, 21-24.

PO emphasizes the claim language “other than contents,” but does not

dispute that the pattern of Kim’s Figure 1 is not contents. Resp., 31-34. And PO admits that Figure 1 is a “whole-frame pattern,” meaning it is not contents. *Id.*, 31.

PO may be asserting that Kim must disclose a pattern portion and contents in the same frame. *See* Resp., 32-33. But claim 1 does not recite a “frame;” it recites “a video signal,” which can include multiple frames. *See* Petition, 6 (construing “video signal”); EX1001, 24:50-51. PO conceded as much in the district court. EX1037, 18 (PO’s construction including “adjacent frames”). Petitioner maps the recited “video signal” to Kim’s “incoming video,” which can include multiple frames. Petition, 19-21; *see also* EX1004, ¶1 (“video images” (plural)). And Kim’s “incoming video” can include both “normal images” (*content*) and “pattern-like images” (*pattern portions other than content*). *See* Petition, 20 (*content*), 21-22 (*pattern portions*), 22 (parameter “r” varies across frames); *see also* EX1004, ¶1 (a frame can be a normal image), Fig. 1 (a frame can be a pattern). Moreover, nothing in the claim precludes a pattern portion from occupying a whole frame. For example, the claim does not recite “sub-frame pattern portions” or “pattern portions of a frame.”

PO addresses Petitioner’s contingent argument that applies if this limitation is found to be a means-plus-function limitation, but neither party contends this limitation is a means-plus-function limitation. Resp., 34-35.

B. Kim Discloses Limitation 1.c.

Kim's image enhancer 32 combined with mixer 36 is the *corrector* of limitation 1.c, as is mixer 36 alone. Petition, 24-26.

PO's argument that Kim does not disclose a CPU or equivalent is based on the assumption that this limitation is a means-plus-function limitation, which it is not, and which PO has not attempted to show. Resp., 35-38; *see* § II.B (claim construction). The premise of PO's argument therefore fails.

PO's argument that Kim does not inherently disclose a CPU or equivalent because "analog signals" can be "mixed together ... without use of a CPU" overlooks that Kim is directed to digital signals. Resp., 36-37. Kim's "input picture (field or frame) f" is a digital signal because it is "composed of J pixels," which are digital data because they include, for example, "a specific gradation level x" that varies from "0" to "L," which typically is 255. EX1004, ¶22; *see also* EX1052, 3 (defining "pixel" to be "[t]he intensity values of a digital image"); EX1053, 9 (defining "pixel" as "the smallest geometric unit of information in a digital representation of an image"); EX1054, 1 ("pixel ... refers to the smallest unit of a digital image"); EX1055, 42:15-43:2, 43:20-44:12, 47:16-48:4 (PO's expert not disagreeing with such definitions). Moreover, even if Kim's signals were analog, the analog processor would be equivalent to a CPU. EX1038, ¶20.

PO's argument that Petitioner has not shown that Kim's functionality "*must*

be implemented in a CPU” and “*must* be performed by a CPU” confuses obviousness with inherentness because an implementation can be obvious even though it is not required. Resp., 37-38 (emphasis added); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416-17 (2007). PO’s argument that Fujimura and Kim are “not analogous” to each other fails because the relevant inquiry is whether the prior art is analogous to the claimed invention. Resp., 37-38; *see* M.P.E.P. § 2141.01(a) (9th ed. 2024). Petitioner established that both are analogous to the ’645 patent. Petition, 15, 18. And they are analogous to each other for the same reasons. EX1038, ¶22.

C. Kim Discloses Limitation 1.d.

Kim’s “r calculation device 34” is the *controller* of limitation 1.d, as is that device combined with the part of “mixer 36” that applies equation 6. Petition, 27-29.

PO’s argument that “Kim always corrects the video signal by generating the Enhanced Image e ...” overlooks Kim’s full disclosure. Resp., 39-40 (citation modified). Kim’s output is not enhanced image e, but “adjusted image g.” Petition, 27; EX1004, Fig. 4. And when “r” equals 1 (meaning input image f is a “pattern-like image”), adjusted image g is equal to input image f, meaning it is not corrected. Petition, 27. Thus, mixer 36 alone and mixer 36 combined with image enhancer 32 (each *the corrector*) do *not correct the video signal when the pattern*

portions are contained. Although image enhancer 32 still creates enhanced image e, which mixer 36 does not use and does not output, a POSITA would have understood that limitation 1.d refers to the video signal output rather than a temporary, purely internal copy of the video signal. EX1038, ¶24.

PO also overlooks the claim language and Petitioner's full mappings. Limitation 1.d recites that "the corrector [does not] correct the video signal when pattern portions" are contained. In Petitioner's mapping where *the corrector* is mixer 36 alone, PO's argument does not apply because it relies on correction performed at image enhancer 32, a different component. Resp., 39-40; Petition 25 ("mixer 36 by itself also is a *corrector* ..."). And limitation 1.d does not prohibit a component other than *the corrector* from correcting a copy of the input image, especially where that corrected copy is never used and never output. EX1038, ¶25.

PO again overlooks Kim's full disclosure and Petitioner's full mapping when it argues that "r calculation device 34" is not the recited *controller* because image enhancer 32 always creates an enhanced image. Resp. at 42. "R" calculation device 34 controls whether mixer 36 will fully correct the image (when "r" equals 1) or will not correct the image at all (when "r" equals 0), by providing "r" to mixer 36. Petition, 27-29. Device 34 therefore performs the *control*[ling] of limitation 1.d. EX1038, ¶26.

PO's argument that "r calculation device 34" is not a *controller* because a

controller requires “processing circuitry, such as a CPU” is based on an overly narrow construction of “controller.” Resp., 40. The plain meaning of controller includes a “device,” such as “r calculation device 34,” and includes software.

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Furthermore, Petitioner established that Kim inherently discloses that “r calculation device 34” executes on a CPU or equivalent, and that doing so also would have been obvious to a POSITA. Petition, 24. PO does not address either argument. Resp., 40-41.

D. Kim Discloses Limitation 2.b.

Kim’s “histogram calculation device 10” is a *characteristic point detector* that detects a *level* and *distribution* of *luminance* when it generates a luminance histogram. Petition, 29-31. Kim’s mixer 36 (a *corrector*) *corrects the video signal according to* the luminance histogram and the parameter “r” calculated from it. *Id.*, 31-32.

PO argues that this mapping renders limitation 2.b “superfluous” because Petitioner relied on parameter “r” for the limitation 1.d. Resp., 43-44. But Petition interprets limitation 2.b to include limitations beyond limitation 1.d, such as a “characteristic point detector,” “detect[ion]” of a “level or distribution,” and the use of that level or distribution in correcting the video signal. *Compare* Petition, 31-32 *with id.*, 27-29. Petitioner’s mapping of limitation 2.b likewise relies on

additional parts of Kim, such as its “histogram calculation device 10” and luminance histogram. *Id.* Moreover, Petitioner relies on “r,” which is calculated based on the histogram, indicating whether pattern portions exist for limitation 1.b, and relies on a different disclosure—the application of “r” in Kim’s equation 6—for limitation 2.b. *Id.* Petitioner therefore does not render limitation 2.b superfluous.

E. Kim Discloses Claim 3.

Kim discloses claim 3. Petition, 32-33. PO’s arguments to the contrary refer to its arguments for limitations 1.b and 1.d, which Petitioner addresses above. Resp., 44-45.

V. FUJIMURA DISCLOSES AND RENDERS OBVIOUS CLAIMS 1-4.

A. Fujimura Discloses Limitations 1.a and 1.b.

Fujimura detects whether a video scanning line (*video signal*) includes a sufficient number of “dark pixels” (*a pattern portion*) rather than “bright pixels” (*other than content*) to be classified as part of a letterbox band. Petition, 36-42.

PO’s construction of “video signal” (“a frame or series of related frames, such as a scene”) is incorrect. Resp., 46; § II.A.

PO argues that Fujimura does not disclose a scanning line that includes both content and pattern portions (Resp., 46), but overlooks Fujimura’s full disclosure and Petitioner’s full mapping. Fujimura classifies each pixel in a scanning line as either “bright or dark.” Petition, 41-42 (citing EX1005, 14:7-12). Lines with dark

pixels above a certain threshold are classified as being part of a letterbox band. *Id.* (citing EX1005, 14:13-36). A POSITA would have understood this description to disclose the case where a scanning line has some bright pixels (*content*), but not enough to classify the line as part of the picture area. EX1038, ¶28. Thus, Fujimura discloses a scanning line (*video signal*) that includes some bright pixels that are *content* and a number of dark pixels above the threshold (*pattern portions*). Petition, 41-42.

Fujimura discloses an example of such a scanning line as a letterbox band with a caption, the pixels of which are bright pixels. EX1005, 13:53-58 (“a caption is present in the non-picture band beneath the picture area”), 14:1-6 (“[i]f a caption is present in the lower non-picture band ...”), 14:41-50 (detecting a caption’s bright pixels); EX1055, 83:3-19 (PO’s expert confirming that captions are an example of bright pixels in a letterbox band); Petition, 40-41 (citing EX1005, 13:50-58, 14:46-50).

B. Fujimura Discloses Limitation 1.d.

Fujimura’s vertical limiter 47 is the *controller*. Petition, 45-48.

PO’s argument that Fujimura does not disclose a scanning line that includes both pattern portions and contents fails for the reasons above. Resp., 47; § V.A.

PO then argues about Petitioner’s mapping “with respect to claim 5.” Resp., 47-48. But this argument does not apply to claim 1, as PO acknowledges. *Id.* It

also does not apply to claim 5, which recites different conditions for correction than claim 1. *See* limitations 5.e.i, 5.e.ii.

PO again argues that a “controller” requires “processing circuitry, such as a CPU.” *Resp.*, 48-49. But PO’s construction is overly narrow. § II.J. Nonetheless, Fujimura discloses processing circuitry for vertical limiter 47 (the *controller*). Fujimura discloses “add[ing] ... vertical limiter 47 ... to the luminance contrast enhancer 2.” EX1005, 13:34-38. And luminance contrast enhancer 2 can be implemented using “a general-purpose processor,” which would include processing circuitry. *Id.*, 3:63-4:11; *see also* Petition, 42 (citing same). A POSITA would have understood that disclosure to also apply to any “add[itions]” to the luminance contrast enhancer, such as vertical limiter 47, because such “add[itions]” become a functional part of the contrast enhancer. EX1005, 13:34-38; Fig. 17 (showing the two communicatively coupled); EX1038, ¶32. PO’s argument that Fujimura is “silent as to what, if anything, would be used as the ‘vertical limiter 47’” therefore is incorrect. *Resp.*, 49.

A POSITA also would have understood that Fujimura necessarily (inherently) discloses processing circuitry that is used to implement vertical limiter 47 because, for example, if vertical limiter 47 were software, it still would require circuitry to execute. It also would have been obvious to a POSITA to implement vertical limiter 47 using processing circuitry for the same reason. Motivation to do

so arises from Fujimura’s disclosure of implementing luminance contrast enhancer 2 using “a general-purpose processor,” which would have led a POSITA to do the same for components “add[ed]” to the contrast enhancer. EX1005, 3:63-4:11; Petition, 42 (obviousness based on that disclosure). Doing so would have amounted to merely choosing from “a finite number of identified, predictable solutions” for implementing the vertical limiter. *KSR*, 550 U.S. at 421. Doing so also would have been within the “judgment and creativity of the skilled artisan.” *See GOI Pty, Ltd. v. OpenSesame, Inc.*, No. 2024-1762, 2026 WL 1506605, at *6 (Fed. Cir. May 28, 2026); EX1038, ¶33.

PO’s argument that the recited “video signal” must be “the whole frame, not a portion therefore” is incorrect because the plain meaning of “video signal” includes part of a frame. Resp., 50; § II.A. PO’s related argument that Fujimura corrects portions of the frame when pattern portions are contained rests on the false premise that the “video signal” must be an entire frame. Resp., 50; § II.A. PO also ignores Petitioner’s mapping for this Ground, which maps the “video signal” to a scanning line. Petition, 37.

C. Fujimura Discloses Limitation 2.b.

Fujimura’s letterbox signal detector 46 is a *characteristic point detector* that detects a *level* and *distribution of luminance* in a scanning line, which it uses to detect the picture area’s starting and ending lines. Petition, 48-51. Primary

mapper 12 (a *corrector*) *corrects the video signal according to* this information. *Id.*, 51.

PO argues that this mapping renders limitation 2.b “superfluous” because Petitioner “already used ... detection of the letterbox boundaries as the claimed ‘controller’” of limitation 1.d. Resp., 51-52. But Petitioner maps the *controller* instead to vertical limiter 47. Petition, 48. Nonetheless, Petitioner interprets limitation 2.b to include limitations beyond limitation 1.d, such as a “characteristic point detector,” “detect[ion]” of a “level or distribution,” and the use of that level or distribution in correcting the video signal. *Compare* Petition, 48-51 *with id.*, 45-48. And Petitioner makes additional showings to establish that Fujimura discloses limitation 2.b. *Id.* Petitioner therefore does not render limitation 2.b superfluous.

D. Fujimura Discloses Claim 3.

For claim 3, PO refers to its arguments for limitations 1.b and 1.d, which Petitioner addresses above. Resp., 52-53. PO’s argument that vertical limiter 47 changes *correction characteristics* because it “is line-by-line, not frame-by-frame,” does not make sense. *Id.*, 53. For every line of the letterbox bands, no correction is performed. Petition, 56-57. The mapping function that would be used for correction therefore is not changed. *Id.* Processing line-by-line does not change this result. *Id.*

VI. FUJIMURA COMBINED WITH KIM DISCLOSES AND RENDER OBVIOUS CLAIMS 5-8.

A. Combining Fujimura and Kim.

Petitioner established that it would have been obvious to combine the functionality of Kim cited for limitation 5.e.ii with Fujimura such that Fujimura would not correct the image if calculation device 34 detects a pattern (*i.e.*, if $r=1$), as Kim discloses. Petition, 67-71. Stated differently, if $r=1$, the modified Fujimura would not correct the image; otherwise, it would proceed normally. *Id.*

PO wrongly assumes that Kim's Figure 4 and Fujimura's Figure 17 would be placed side-by-side. Resp., 55-59. Petitioner does not propose this combination, and such bodily incorporation is not required. *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015).

Likewise, PO's "Example Combination 1" feeds Figure 17's result to Figure 4 for potential "re-enhance[ment]," which is far from Petitioner's combination. Resp., 55-57. PO's argument regarding Fujimura correcting the image of Kim's Figure 1 also fails because this image would result in an "r" value of 1 and therefore no correction, as described above and as Kim discloses. Resp., 56-57; Petition, 21-22. PO's "Example Combination 2" fares no better because it assumes that Kim's components would enhance the image, which again ignores Petitioner's proposed combination. Resp., 57-59.

B. Fujimura Discloses Limitations 5.b and 5.c.

Petitioner established that Fujimura detects letterbox bands (*no-picture areas having a single color*). Petition, 62-65. PO’s argument that “Fujimura does not contemplate other types of ‘pattern portions’” ignores the language of these limitations, which does not require detection of other types of pattern portions. Resp., 59-60. PO’s emphasis of the word “whether” interprets it too narrowly because the limitation’s plain meaning includes determining if the image includes *no-picture areas having a single color* or not. EX1038, ¶38.

PO’s suggestion that the *pattern portion detector* and *no-picture area detector* require different structures is contrary to law. Resp., 60; *Applied Med. Resources Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1333 n.3 (Fed. Cir. 2006) (different terms “connote different *meanings*, not ... different *structures*”). PO’s argument that these limitations require two independent detections ignores the claim language, which includes no prohibition against the two “detect[ions]” being performed together. Resp., 60; *see Cybersettle, Inc. v. Nat’l Arb. Forum, Inc.*, 243 F. App’x 603, 609 (Fed. Cir. 2007) (steps “can occur concurrently”).

C. Fujimura Discloses Limitation 5.e.i.

For limitation 5.e.i, PO cites its arguments for limitation 1.d in Ground 2, which Petitioner addresses above. Resp., 61.

PO argues that Fujimura makes “no distinction between ‘pattern portions’

and ‘no-picture areas.’” *Id.* But this limitation does not require such a distinction, and the “pattern portions” may be the “no-picture areas.” *See* limitation 5.c. This limitation instead recites correcting the video signal “when the pattern portions are not contained” and “when the pattern portions are the no-picture areas.” Fujimura discloses a frame that does not contain letterbox bands (*the pattern portion*), a frame with no-picture areas, and correcting at least part of each frame. Petition, 66-67, 40-42. The frame that does not contain letterbox bands may be entirely a picture area. EX1005, 13:42-49 (disclosing the frame of Figure 18 in a 16:9 aspect ratio, which would not include letterbox bands). EX1038, ¶39.

PO’s argument regarding Kim is irrelevant because Fujimura alone discloses this limitation. Resp., 62.

D. Fujimura Discloses Limitation 5.e.ii.

Fujimura combined with Kim discloses limitation 5.e.ii. Petition, 67-71. PO refers to its arguments for limitation 5.e.i, which Petitioner addresses above. Resp., 62. PO’s argument about modifying Fujimura’s vertical limiter is irrelevant because Petitioner’s proposed combination does not modify the vertical limiter. *Id.*, 62-63; § VI.A. PO references supposed problems with combining Kim and Fujimura, which Petitioner dispels above. Resp., 63; § VI.A.

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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 applicable word count for the foregoing Reply to Patent Owner's Response totals 5,599 as calculated by Microsoft Word, which is less than the 5,600 allowed under 37 CFR § 42.24.

Date: August 4, 2026

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CERTIFICATE OF SERVICE

The undersigned certifies pursuant to 37 C.F.R. §§ 42.6(e) and 42.105 that on August 4, 2026, a true and correct copy of the foregoing document was served by emailing (with consent) a copy to the following attorneys for the Patent Owner:

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