UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DOLBY LABORATORIES, INC.,
Petitioner,

v.

INTERDIGITAL MADISON PATENT HOLDINGS, SAS,
Patent Owner

Case IPR2026-00448
Patent 10,741,211

PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT NO. 10,741,211 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42

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EX1007	U.S. Pat. No. 9,818,446 to Toma et al. ("Toma446")
EX1008	U.S. Provisional Pat. App. No. 61/925,699
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EX1015	U.S. Pat. No. 11,916,594 to Tsukagoshi ("Tsukagoshi594")
EX1016	U.S. Pat. No. 9,854,333 to Hwang et al. ("Hwang")
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EX1018	U.S. Pat. No. 9,860,505 to Tsukagoshi ("Tsukagoshi505")
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LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.pre]	An information processing device, comprising:
[1.1]	a data processing unit configured to:
[1.2]	acquire high dynamic range (HDR) image metadata from an MP4 file, wherein
[1.2.1]	the acquired HDR image metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file, and
[1.2.2]	the HDR image data stored in the MP4 file is based on an MP4 format;
[1.3]	acquire display function information of a display unit from the display unit;
[1.4]	read the HDR image data from the MP4 file;
[1.5]	execute a conversion process of the read HDR image data based on the acquired HDR image metadata and the acquired display function information of the display unit;
[1.6]	execute an output image generation process based on the execution of the conversion process; and
[1.7]	output an image signal to the display unit based on the executed output image generation process.
Claim 2	
[2.pre]	The information processing device according to claim 1, wherein the data processing unit is further configured to:
[2.1]	acquire a dynamic range of the HDR image data stored in the MP4 file from the acquired HDR image metadata;

[2.2]	determine the HDR image data having the dynamic range is not outputable by the display unit, wherein
[2.3]	the determination is based on the acquired HDR image metadata and the acquired display function information of the display unit;
[2.4]	execute the conversion process of the read HDR image data based on the determination,
[2.5]	wherein the conversion process includes reduction of the dynamic range of the HDR image data; and
[2.6]	output the HDR image data with the reduced dynamic range to the display unit.
Claim 3	
[3.pre]	The information processing device according to claim 1, wherein
[3.1]	the HDR image metadata is recorded in an HDR image metadata storage box,
[3.2]	the HDR image metadata storage box is in a trak box in the MP4 file,
[3.3]	the trak box stores metadata for application of an entire HDR image stored in the MP4 file, and
[3.4]	the data processing unit is further configured to read the HDR image metadata from the HDR image metadata storage box.
Claim 4	
[4.pre]	The information processing device according to claim 1, wherein
[4.1]	the HDR image metadata is recorded in an HDR image metadata storage box in a traf box that stores metadata to be applied to the HDR image data stored in an mdat box as a fragmented image storage region set to the MP4 file, and
[4.2]	the data processing unit is further configured to:

[4.2.1]	read the HDR image metadata from the HDR image metadata storage box in the traf box associated with the mdat box that stores the HDR image data supposed to be output;
[4.2.2]	apply the read HDR image metadata;
[4.2.3]	determine whether executing the conversion process of the HDR image data supposed to be output read from the mdat box; and
[4.2.4]	execute the output image generation process according to a determination result.
Claim 5	
[5.pre]	An information processing device, comprising:
[5.1]	a data processing unit configured to:
[5.2]	generate an MP4 file that stores high dynamic range (HDR) image data;
[5.3]	acquire HDR image metadata associated with the HDR image data, wherein
[5.3.1]	the HDR image data stored in the MP4 file is based on an MP4 format, and
[5.3.2]	the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data stored in the MP4 file;
[5.4]	set an HDR image metadata storage box in the MP4 file; and
[5.5]	store the HDR image metadata in the set HDR image metadata storage box.
Claim 6	
[6]	The information processing device according to claim 5, wherein the HDR image metadata further includes maximum luminance information of the HDR image data.

Claim 7	
[7.pre]	The information processing device according to claim 5, wherein
[7.1]	the HDR image metadata storage box is in a trak box in the MP4 file, and
[7.2]	the trak box stores metadata for application of an entire HDR image stored in the MP4 file.
Claim 8	
[8.pre]	The information processing device according to claim 5, wherein
[8.1]	the data processing unit is further configured to record the HDR image metadata to the HDR image metadata storage box in a traf box that stores metadata to be applied to the HDR image data stored in an mdat box as a fragmented image storage region set to the MP4 file.
Claim 9	
[9.pre]	A non-transitory computer-readable medium having stored thereon an MP4 file and computer-executable instructions, the computer-executable instructions, when executed by a processor of a reproduction device, cause the processor to execute operations, the operations comprising:
[9.1]	reading high dynamic range (HDR) metadata from an HDR image metadata storage box of the MP4 file, wherein
[9.1.1]	an mdat box of the MP4 file stores HDR image data;
[9.1.2]	the HDR image metadata storage box of the MP4 file stores the HDR image metadata corresponding to the HDR image data,
[9.1.3]	the stored HDR image data is based on an MP4 format, and
[9.1.4]	the stored HDR image metadata includes a maximum value of frame average luminance of the HDR image data;

[9.2]	executing a conversion process of the HDR image data based on the read HDR image metadata; and
[9.3]	reproducing the HDR image data based on the execution of the conversion process.
Claim 10	
[10.pre]	The non-transitory computer-readable medium according to claim 9, wherein
[10.1]	the HDR image metadata storage box is in a trak box, and
[10.2]	the trak box stores metadata for application of an entire HDR image stored in the MP4 file.
Claim 11	
[11.pre]	The non-transitory computer-readable medium according to claim 9, wherein
[11.1]	the HDR image metadata is configured to be recorded in the HDR image metadata storage box in a traf box that stores metadata to be applied to the HDR image data stored in the mdat box as a fragmented image storage region set to the MP4 file.
Claim 12	
[12.pre]	An information processing method comprising:
[12.1]	in an information processing device:
[12.1.1]	acquiring, by a data processing unit of the information processing device, high dynamic range (HDR) image metadata from an MP4 file, wherein
[12.1.2]	the acquired HDR image metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file, and

[12.1.3]	the HDR image data stored in the MP4 file is based on an MP4 format;
[12.2]	acquiring, by the data processing unit, display function information of a display unit from the display unit;
[12.3]	reading, by the data processing unit, the HDR image data from the MP4 file;
[12.4]	executing, by the data processing unit, a conversion process of the read HDR image data based on the acquired HDR image metadata and the acquired display function information of the display unit;
[12.5]	executing, by the data processing unit, an output image generation process based on the execution of the conversion process; and
[12.6]	outputting, by the data processing unit, an image signal to the display unit based on the executed output image generation process.
Claim 13	
[13.pre]	An information processing method comprising:
[13.1]	in an information processing device:
[13.2]	generating, by a data processing unit of the information processing device, an MP4 file that stores high dynamic range (HDR) image data;
[13.3]	acquiring, by the data processing unit, HDR image metadata associated with the HDR image data, wherein
[13.3.1]	the HDR image data stored in the MP4 file is based on an MP4 format, and
[13.3.2]	the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data stored in the MP4 file;
[13.4]	setting, by the data processing unit, an HDR image metadata storage box in the MP4 file; and

[13.5]	storing, by the data processing unit, the HDR image metadata in the set HDR image metadata storage box.
Claim 14	
[14.pre]	A non-transitory computer-readable medium having stored thereon computer-executable instructions that, when executed by a processor of an information processing device, cause the processor to execute operations, the operations comprising:
[14.1]	acquiring high dynamic range (HDR) image metadata from an MP4 file, wherein
[14.1.1]	the acquired HDR image metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file, and
[14.1.2]	the HDR image data stored in the MP4 file is based on an MP4 format,
[14.2]	acquiring display function information of a display unit from the display unit;
[14.3]	reading the HDR image data from the MP4 file;
[14.4]	executing a conversion process of the read HDR image data based on the acquired HDR image metadata and the acquired display function information of the display unit;
[14.5]	executing an output image generation process based on the execution of the conversion process; and
[14.6]	outputting an image signal to the display unit based on the executed output image generation process.
Claim 15	
[15.pre]	A non-transitory computer-readable medium having stored thereon computer-executable instructions that, when executed by a processor of an information processing device, cause the processor to execute operations, the operations comprising:

[15.1]	generating an MP4 file that stores high dynamic range (HDR) image data;
[15.2]	acquiring HDR image metadata associated with the HDR image data, wherein
[15.2.1]	the HDR image data stored in the MP4 file is based on an MP4 format, and
[15.2.2]	the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data stored in the MP4 file;
[15.3]	setting an HDR image metadata storage box in the MP4 file; and
[15.4]	storing the HDR image metadata in the set HDR image metadata storage box.

Dolby Laboratories, Inc. ("Petitioner") petitions for *Inter Partes* Review ("IPR") of claims 1-3, 5-7, 9-10, and 12-15 ("the Challenged Claims") of U.S. Patent No. 10,741,211 ("the '211 patent").

I. REQUIREMENTS

A. Standing

Petitioner certifies that the '211 patent is available for IPR, and this Petition is being filed before any litigation initiated by Patent Owner against Petitioner (and, thus, is within one year of service of any such complaint upon Petitioner). The '211 patent has never been the subject of any earlier IPR proceeding. Petitioner is also not barred or estopped from requesting this review.

B. IPR Challenge

Petitioner requests an IPR of the Challenged Claims on the grounds noted below. Dr. Saber provides supporting testimony in his Declaration. EX1003, ¶¶22, 39-42.

Ground	Claims	Basis for Rejection (§103)
1A	1-2, 9, 12, 14	Toma881, Toma446, Drugeon
1B	2	Toma881, Toma446, Drugeon, Toma788
1C	3, 9-10	Toma881, Toma446, Drugeon, Saeki
2A	5-6, 13, 15	Toma446, Drugeon

Ground	Claims	Basis for Rejection (§103)
2B	7	Toma446, Drugeon, Saeki

The ’211 patent claims priority to Japanese patent application 2014-258349, filed 12/22/2014 (“Critical Date”). EX1001, Cover. While Petitioner does not concede that the ’211 patent is entitled to the claimed priority date, for purposes of this proceeding, each reference asserted in this Petition qualifies as prior art (as shown in the table below) even if the Critical Date is used as the filing date of JP 2014-258349. Each asserted reference has an effective prior art date earlier than the December 22, 2014 Critical Date.

Each of the references listed below also constitutes analogous prior art because each are either from the same field of endeavor as the Challenged Claims or, at minimum, is reasonably pertinent to the same technical problems addressed by the ’211 patent. *See* EX1003, ¶¶57-93.

Reference	Issue/Publication Date	Priority Date
Toma881	5/14/2019	6/10/2014
Toma446	11/14/2017	1/10/2014
Drugeon	9/14/2017	12/3/2014
Toma788	1/1/2019	6/30/2014

Saeki	11/16/2006	4/29/2005

Toma881 is prior art under AIA 35 U.S.C. § 102(a)(2) as of its effective filing date of 6/10/2014 based on Provisional App. No. 62/010,096 (EX1005, *see also* EX1006 (English translation)). Toma446 is prior art at least as of 2/25/2014 based on Provisional App. No. 61/944,280 (EX1010, *see also* EX1011 (English translation), EX1008 (first provisional), EX1009 (English translation of first provisional). Drugeon is prior art as of its effective filing date of 12/3/2014 based on Provisional App. No. 62/087,035 (EX1013). Toma788 is prior art as of its effective filing date of 6/30/2014 based on Provisional App. No. 62/018,912 (EX1025, *see also* EX1026 (English translation)). Because the '211 patent is subject to the AIA version of §102, "there is no need" for Petitioner to demonstrate that the respective provisional applications provide written description support for any claim of the respective prior art references. *Penumbra, Inc. v. RapidPulse, Inc*., IPR2021-01466, Paper 34 at 32 (Mar. 10, 2023) (precedential) (quoting MPEP §2154.01(b)).

C. Claim Construction

All claim terms should be construed, to the extent necessary, according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100. Petitioner submits that no claim terms need be expressly

construed to resolve issues of controversy in the present Petition. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). Petitioner is not conceding that each challenged claim satisfies all statutory requirements (e.g., §112 requirements), nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be raised in a district court.

D. Level of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSITA") relating to the subject matter of the '211 patent as of the Critical Date would have had at least (1) a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and (2) two to five years of industry experience in digital image/video processing. EX1003, ¶56. Additional education could substitute for professional experience, and professional experience could substitute for education. *Id*.

II. THE '211 PATENT

A. Specification

The '211 patent is directed toward systems and methods for "recording a high dynamic range (HDR) image according to an MP4 format to make the image reproducible." EX1001, 2:13-18. The '211 patent goes on to describe that "the HDR image and the HDR image metadata are stored in the MP4 file, and the reproduction device can reproduce an optimum HDR image based on metadata."

Id., 4:2-7. The'211 patent describes a computing device that obtains HDR image metadata and display function information for a display unit and uses that information to determine whether a conversion process should be performed on the HDR image data read from the MP4 file. *Id.*, 3:4-8, 4:8-20; EX1003, ¶¶47-49.

The '211 patent goes on to describe that "a dynamic range conversion process based on luminance information described in the metadata is performed for the optical linear luminance signal after the EOTF conversion." EX1001, 9:1-8. The '211 patent discloses that in some cases "maximum content luminance information" and "maximum frame average luminance information" is included as part of the HDR image metadata and used in conversion of the HDR image data. *Id.*, 11:33-45. For example, "when the display of the reproduction device cannot output the data having a luminance level recorded in the HDR image metadata, the reproduction device executes a process of adjusting the luminance level of the image data stored in the MP4 file." *Id.*, 11:46-62.

B. Relevant Prosecution

The '211 patent issued on 8/11/2020 from U.S. Patent App. No. 15/533,592 ("the '592 Application"). EX1001. During prosecution, the '592 application received a restriction requirement and only one rejection. EX1002, 151-156, 163-198. In response to the sole rejection, the applicant amended the claims to introduce the limitation in independent claim 1 that "the acquired HDR image

metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file." *Id.*, 232-241. In accompanying remarks, the applicant characterized the prior art as purportedly not disclosing "the newly presented feature of 'the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data." *Id.*, 229-230. The Notice of Allowance did not specify reasons for allowability; the Examiner stated that the prior art "fails to teach or fairly suggest" followed by the full recitations of each of the independent claims. *Id.* 249-253. As such, the record suggests that the applicant's identification of "HDR image metadata includes a maximum value of frame average luminance of the HDR image data," recited in all independent claims (claims 1, 5, 9, 12-15), represented at least a significant basis for allowance over the prior art of record. EX1003, ¶¶50-53.

III. UNPATENTABILITY

A. [GROUND 1A] – Toma881, Toma446, And Drugeon Renders Claims 1, 2, 9, 12, and 14 Obvious

1. Toma881-Toma446-Drugeon

(a) Toma881 (EX1004, EX1006)

Similar to the '211 patent, Toma881 describes converting HDR (high dynamic range) video content for display on an SDR (standard dynamic range) display based on characteristics of the display device. EX1004, 11:40-51, 14:41-50; EX1006, 14-16. Toma881 describes "[a] conversion method for converting

luminance of a video…based on a luminance range of the display apparatus." EX1004, Abstract, 5:42-50 ("image conversion-playback method and apparatus for displaying a high dynamic range (HDR) signal…. [on] a standard dynamic range (SDR)" device); EX1006, 1, 4-7. Thus, Toma881 teaches converting HDR image data based on display capabilities.

Toma881's conversion includes "using an electro-optical transfer function (EOTF)," which is the same conversion function described in the '211 patent. EX1004, 3:35-48; EX1006, 8; EX1001, 9:1-8. Toma881 describes that a "conversion apparatus 100 acquires the HDR video on which inverse EOTF conversion of HDR is performed." EX1004, 11:31-33; EX1006, 14, 7-8. The conversion apparatus also "acquires content luminance information including at least one of a maximum value of luminance (CPL: Content Peak luminance) of a video (content) and an average luminance value (CAL: Content Average luminance) of a video as information regarding the HDR signal. CPL (first maximum luminance value) is, for example, a maximum value of the luminance values of a plurality of images that constitute the HDR video." EX1004, 12:17-27; EX1006, 15, 18. This luminance data "may be acquired as metadata information on the video." EX1004, 19:35-38, 4:7-12, 23:36-39; EX1006, 24, 14-15.

The "conversion apparatus 100 acquires the display characteristic information on display apparatus 200 from display apparatus 200." EX1004,

12:28-36; EX1006, 14-15, 18. Toma881 uses the acquired HDR metadata and display characteristic information when performing image conversion. EX1004, 11:40-51, 14:41-50; EX1006, 14-16.

Toma881 describes that "luminance conversion is performed to adapt a linear signal after inverse quantization using EOTF of HDR to a maximum value of the luminance range of the display apparatus (peak luminance (DPL (Display Peak luminance)." EX1004, 10:11-24, 20:32-36; EX1006, 8-9, 14-15, 19-20. Thus, Toma881 uses HDR luminance information (i.e., CAL and CPL values) to convert HDR image data for output by the display device. EX1003, ¶¶63-64.

(b) Toma446 (EX1007, EX1011)

Like Toma881 and the '211 patent, Toma446 describes converting HDR video content for display on an SDR device, including "mapping the HDR luminance range on the SDR luminance range…to play back the HDR content with an SDR display." EX1007, 45:57-46:4, EX1011, 54. Toma446 describes that "video data including the luminance within a HDR (High Dynamic Range) luminance range is stored in the MP4 file." EX1007, 4:59-63, EX1011, 54. Toma466 describes that "whether the HDR content is stored in the MP4 file may be signaled in the header information on the MP4" and "the luminance information may be stored as the header information on the MP4" or "HDR-related information may be stored as the metadata managing the MP4 file." EX1007, 46:5-41;

EX1011, 54.

Toma446 describes that a "file format that is increasingly used in content distribution through a network is an MP4 system specified by ISO/IEC 14496-12" which "adopts an extremely flexible data structure on the assumption of application to a randomly accessible medium such as an HDD (Hard Disk Drive) and a flash memory" which makes it compatible with smartphones and tablets. EX1007, 1:26-49, EX1009, 12; EX1011, 15. Additionally, Toma446 describes techniques for generating an MP4 file from an underlying video file such that "it is not necessary to decrypt and re-encrypt the original file" and as such "a processing load necessary for the production of the MP4 file can be suppressed." EX1007, 6:34-43; EX1009, 12, 20; EX1011, 15, 27.Toma446 therefore teaches storing HDR-related information, including luminance information, as MP4 header information or metadata associated with HDR video content. EX1007, 46:5-41; EX1011, 40; EX1003, ¶¶63-64.

(c) Drugeon (EX1012, EX1013)

Like the '211 patent, Toma881, and Toma446, Drugeon describes techniques for enabling "HDR [content to] be reproducible even by an existing reproduction device that supports only the SDR." EX1012, [0030]; EX1013, 12-16. Specifically, Drugeon describes the use of "supplemental enhancement information (SEI) in the video data" such as "maximum average picture level

information indicating a highest average luminance value among average luminance values of all pictures included in a video sequence." EX1012, [0031], [0041], [0052]; EX1013, 15-17, 21, 26. Drugeon further describes that "image signal generator 111 converts a luminance value of a source image covering the HDR into a code value using an opto-electrical transfer function (OETF)," specifically "an SDR-compatible HDR OETF." EX1012, [0064]; EX1013, 12-21.

(d) Predictable Combination of Toma881 with Toma446 and Drugeon

A POSITA seeking to implement the HDR video processing techniques of Toma881 would have been prompted to apply Toma446's teachings regarding storing HDR image data in an MP4 file using an MP4 format. *See* EX1007, 45:56-46:41; EX1011, 54; EX1003, ¶¶94-102. A POSITA also would have been prompted to apply Drugeon's teachings to Toma881 to include maximum average picture level information as part of the luminance metadata for HDR videos. EX1012, [0122]; EX1013, 16-17; EX1003, ¶¶103-108.

(i) Motivation to apply Toma446

Multiple reasons would have prompted a POSITA to store the HDR image data of Toma881 in an MP4 file based on an MP4 format (as suggested by Toma446). EX1003, ¶¶95-102. *First*, Toma881 expressly describes "Internet delivery" of HDR videos and Toma446 describes that a "file format that is

increasingly used in content distribution through a network is an MP4 system specified by ISO/IEC 14496-12." EX1004, 6:16-18, 18:34-39, 18:54-56, 7:27-35; EX1006, 1, 10, 18; EX1007, 1:26-36; EX1009, 12; EX1011, 1. A POSITA would have turned to the teachings of Toma446 to use MP4 as the file format for streaming HDR video because MP4 was a known, increasingly popular file format for distribution of video over a network. EX1003, ¶¶96-97. Toma446 further explains that the MP4 format employs a flexible data structure and is compatible with devices such as smartphones and tablets. EX1007, 1:37; EX. 1011, 1. A POSITA's motivation to use MP4 would have been further strengthened by the fact that MP4 was specified in an industry standard ISO/IEC 14496-12. EX1003, ¶96.

Indeed, other prior art references demonstrate that the MP4 file format was known in the art for transmitting HDR video over networks such as the Internet. *See* EX1018, 18:61-67 ("In case of distribution via the Internet, MP4 or other format containers are often used for distribution."), 6:32-39, 10:6-12; EX1014, 4:1-17; EX1015, 2:32-37, 1:53-67; EX1016, 15:16-22, 23:42-61; EX1017, 50:4-11, 12:39-48, 18:56-67. Use of such a known, existing file format for transmitting video over networks such as the internet would have allowed engineers implementing the system of Toma881 to avoid having to create a new, untested file format from scratch, thereby saving time, money, and development resources.

EX1003, ¶97.

Second, "[t]he MP4 adopts an extremely flexible data structure" and therefore would have been useful across a wide variety of implementations, including various different types/lengths of videos and a variety of different display devices. EX1007, 1:29-32; EX1009, 12; EX1011, 15; EX1003, ¶98. The flexibility of the MP4 format stems in part from its standardized box-based architecture. As would have been known to a POSITA, MP4 (formally known as MPEG-4 Part 14) is a highly compatible digital multimedia container format used to store video, audio, subtitles, and metadata in a single file wrapper. EX1003, ¶98.

An MP4 file is organized into a hierarchy of data blocks called boxes. EX1003, ¶98. The box-based architecture contributes to the flexibility of the MP4 format by enabling media content and associated metadata to be stored and organize in a standardized way. The MP4 file format provides key advantages of: 1) near-universal compatibility, with a wide range of operating systems, web browsers, and media players, 2) efficient compression,, and 3) support for web streaming. *Id.*

Third, use of an MP4 format for network distribution of the HDR video discussed in Toma881 would have allowed for compatibility with display devices that were becoming popular during the relevant time frame such as smartphones and tablets that "do not include an optical disk drive." EX1007, 1:37-45; EX1009,

12; EX1011, 15; EX1003, ¶99. Toma446 explains that smartphones and tablets increasingly supported the MP4 format but not older formats and therefore use of an MP4 file format would have facilitated compatibility with such devices. EX1007, 1:45-49; EX1009, 12; EX1011, 15.

Fourth, Toma881 expressly describes using MPEG compression schemes (MPEG-2TS and MPEG-4 AVC) for the HDR video, and Toma446 teaches techniques for generating MP4 files from MPEG compressed video content. EX1004, 22:8-47; EX1006, 22; EX1007, 6:13-50; EX1009, 12, 18-23; EX1011, 15-16, 21-25; EX1003, ¶100. Accordingly, a POSITA would have recognized that the MPEG-compressed HDR video described in Toma881 would readily be incorporated into the MP4 framework described in Toma446.

Fifth, Toma446's techniques for generating MP4 files for transmitting video content (including HDR video) provide the benefit that "it is not necessary to decrypt and re-encrypt the original file" and as such "a processing load necessary for the production of the MP4 file can be suppressed." EX1007, 6:34-43, 8:29-32, 9:25-31, 10:15-18, 10:40-42, 15:6-15, 32:60-33:9, 48:35-39, 45:54-46:41; EX1009, 20, 24, 34; EX1011, 27, 37, 39; EX1003, ¶101. Reduction of processing load saves energy, decreases the need for larger, more expensive processing hardware, and frees up existing processing capacity for other functions. EX1003, ¶101.

Sixth, use of Toma446's techniques for generating MP4 files for transmitting video content (including HDR video) "is effective in reducing the file size for the large number of copy manifest files" thereby reducing the amount of transmission and storage resources required. EX1007, 32:25-29; EX1009, 28, 34; EX1011, 33, 37; EX1003, ¶102.

(ii) Motivation to apply Drugeon

Multiple reasons would have prompted a POSITA to include Drugeon's maximum average picture level information as part of the "luminance information" disclosed by Toma881 and used in the content conversion process of Toma881. EX1003, ¶¶103-108; EX1012, [0041], [0122]; EX1013, 16-17; EX1004, 23:33-35; EX1006, 15. Specifically, a POSITA would have predictably applied Drugeon's teachings to Toma881 to use Drugeon's "maximum_average_picture_level" **as** Toma881's "CPL: Content Peak luminance" value, or alternatively, to include Drugeon's "maximum_average_picture_level" as additional luminance information in the predictable combination. EX1003, ¶¶103-105.

A first reason, Toma881 describes determining luminance values for each image of a video, and Drugeon provides additional details regarding an image based luminance value that can be beneficially used in Toma881's system. EX1003, ¶¶104-106. In more detail, Toma881 expressly describes that "CPL: Content Peak luminance" is used as one of the luminance values in the conversion

of the HDR video data. EX1004, 12:17-27, 15:4-20, 20:9-48; EX1006, 15, 18-20. Toma881 also specifies that the CPL value is the maximum value of luminance values for each image (frame) where the individual luminance values assessed are determined on a per image (frame) basis. EX1003, ¶104. For example, Toma881 describes that "CPL (first maximum luminance value) is, for example, a maximum value of the ***luminance values*** of a plurality ***of images*** that constitute the HDR video."[1] EX1004, 12:17-27, 19:17-30, cl. 1; EX1006, 18, 20, 11, 15.

Toma881 expressly distinguishes these "luminance values…of images" from luminance values that are based on a single pixel rather than the entire image. EX1003, ¶104. For example, Toma881 differentiates the CPL and CAL, which determine luminance on an image/frame basis from techniques described in older patent applications that describe calculating "luminance for each pixel." EX1004, 12:17-27, 19:17-30, 2:57-3:7. Thus, Toma881 already contemplates luminance values derived from image level characteristics rather than individual pixel values but does not provide details on how to calculate the CPL value. EX1003, ¶¶104-105.

Drugeon beneficially provides additional detail regarding image based luminance values by describing a "maximum average picture level information

[1] All emphasis added unless otherwise noted.

indicating a highest average luminance value among average luminance values of all pictures included in a video sequence." EX1012, [0041]; EX1013, 16-17. In other words, Drugeon discloses determining a luminance value for each image by determining an "average luminance value" for each image/frame and then, similar to Toma881, determines a "maximum" or "highest" image value from those determined image average luminance values. *Id.*; EX1003, ¶105.

Accordingly, a POSITA would have used Drugeon's maximum average picture level as one of the luminance values in Toma881 (e.g., as the CPL value or alternatively in addition to the CPL value described in Toma881) because the "average picture level" ("average luminance value") described in Drugeon is a known value used to quantify image luminance of individual images in a video. Using an already known value would have beneficially avoided expending time and resources to derive such a luminance value from scratch. EX1003, ¶¶105-106.

Indeed, various prior art references confirm that it was known in the prior art to determine the luminance of an image in a video file by determining the average luminance ("average picture level" or "APL") of each image and as such, a POSITA would have been prompted to use such a value to determine image luminance to provide compatibility with such systems that were already configured to use APL as an image luminance value. *See* EX1019, [0009] ("average picture level (APL) expressing the average luminance of an image"), [0048]-[0049];

EX1020, 5:55-59; EX1021, 4:55-58, 7:30-35, 29:26-34; EX1022, [0086]; EX1023, [0027]; EX1003, ¶106.

Second, use of Drugeon's "maximum_average_picture_level" value "allows the difference from the SDR to be set within an arbitrary range" when performing conversion of HDR video data for display on an SDR (or other non-HDR enabled) device. EX1012, [0092]-[0093]; EX1013, 16-17; EX1003, ¶107.

Third, HDR video conversion techniques that utilize maximum_average_picture_level as a luminance value in the conversion (as suggested by Drugeon) make it "possible to reduce the difference in luminance value between when the video is reproduced by an HDR device and when the video is reproduced by an SDR device, and therefore video that is less likely to provide a feeling of discomfort can be reproduced even when the video is reproduced using the SDR OETF." EX1012, [0083]; EX1013, 16; EX1003, ¶108.

Finally, a POSITA would have been prompted to apply the teachings of Toma446 (MP4 format for video file transmission) and Drugeon (maximum average picture level luminance value) to Toma881 because doing so was the application of known techniques to a known method (Toma881's video conversion method) ready for improvement to yield predictable results. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007); EX1003, ¶¶109-110. A POSITA looking to implement Toma881 would have been further prompted to seek out the

teachings of Toma446 and Drugeon because they share overlapping inventors with Toma881 and a POSITA would have looked for additional implementation details contemplated by the same inventors as Toma881. *See* EX1004, Face; EX1007, Face; EX1012, Face; EX1003, ¶¶109-110. All three references disclose techniques for transmitting HDR video data over the internet and converting HDR video data for display on SDR devices and a POSITA would have predictably turned to Toma446 and Drugeon for additional useful teachings in the relevant field and had a reasonable expectation of success in making the proposed modifications without significantly altering or hindering the structure and function of Toma881's systems and methods. EX1003, ¶¶109-110. Indeed, Toma881 expressly contemplates "various modifications" and Toma446 and Drugeon disclose such known and beneficial variations. EX1004, 23:63-24:6.

2. Analysis

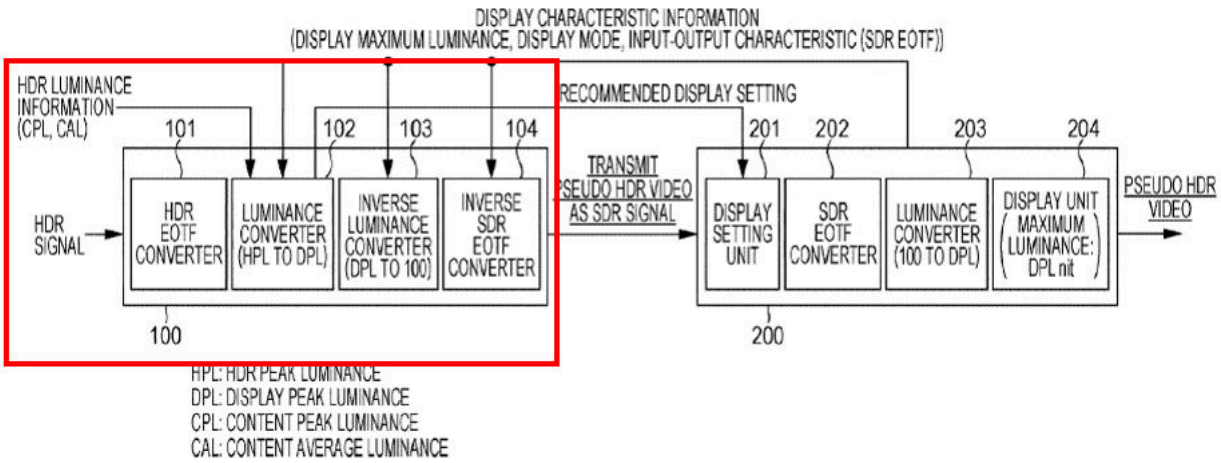
(a) Claim 1

As shown in detail below, the combination of Toma881, Toma446, and Drugeon ("the combination") satisfies all limitations of Claim 1. Toma881 discloses a conversion apparatus that converts HDR video images based on HDR luminance metadata and display device characteristics. Toma446 teaches storing HDR image data and HDR-related metadata in an MP4-formatted file. Drugeon teaches HDR metadata including maximum average picture level. EX1003, ¶111.

[1.pre] An information processing device, comprising:

To the extent the preamble is limiting, Toma881 demonstrates that the combination satisfies [1.pre]. Toma881 discloses a "conversion apparatus 100 [that] acquires the HDR video on which inverse EOTF conversion HDR is performed," "performs EOTF conversion of HDR on the HDR signal of the acquired HDR video," "converts the linear signal…using display characteristic information and content luminance information," "performs inverse luminance conversion according to the display mode of display apparatus 200" and "performs inverse SDR EOTF conversion to generate the pseudo HDR video." EX1004, 11:4-51, 12:41-63, 1:8-9 ("conversion apparatus regarding luminance of a video"); 18:57-61; EX1006, 8-9, 13-14, 18; EX1003, ¶¶112-114.

FIG. 11



EX1004, FIG. 11; EX1006, 13.

"Conversion apparatus 100 (HDR to pseudo HDR conversion processor) may exist within a disc player, disc recorder, set-top box, TV, personal computer, and smart phone. Conversion apparatus 100 may exist within a server apparatus on the Internet." EX1004, 18:57-61; EX1006, 18.

[1.1] a data processing unit configured to:

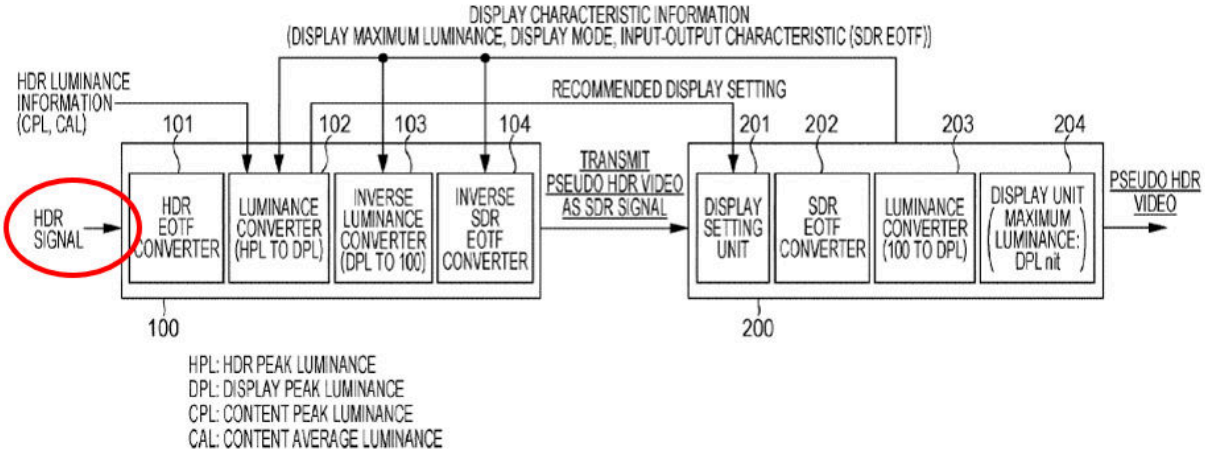
Toma881 describes that "each component may be made of dedicated hardware," for example "[e]ach component may be implemented by a program execution unit, such as a CPU or a processor, reading and executing the software program recorded in a recording medium." EX1004, 23:55-62, 18:57-61 ("Conversion apparatus 100 (HDR to pseudo HDR conversion processor)…"); EX1006, 13-14, 18. Toma881's conversion apparatus 100 therefore includes a "CPU" or "processor" that constitutes a ***data processing unit***. EX1003, ¶¶115-116.

[1.2] acquire high dynamic range (HDR) image metadata from an MP4 file, wherein

Toma881 discloses acquiring HDR video and associated HDR data, including luminance information such as CPL (Content Peak Luminance) and CAL (Content Average Luminance), for use in HDR video processing. EX1004, 11:31-39, 12:17-27; EX1006, 13-15, 18-20; EX1003, ¶¶117-119. Toma881 describes that the "conversion apparatus 100 acquires the HDR video on which inverse

EOTF conversion of HDR is performed." EX1004, 11:31-39, 11:52-12:7, 6:15-17; EX1006, 14, 7-8, 18.

FIG. 11

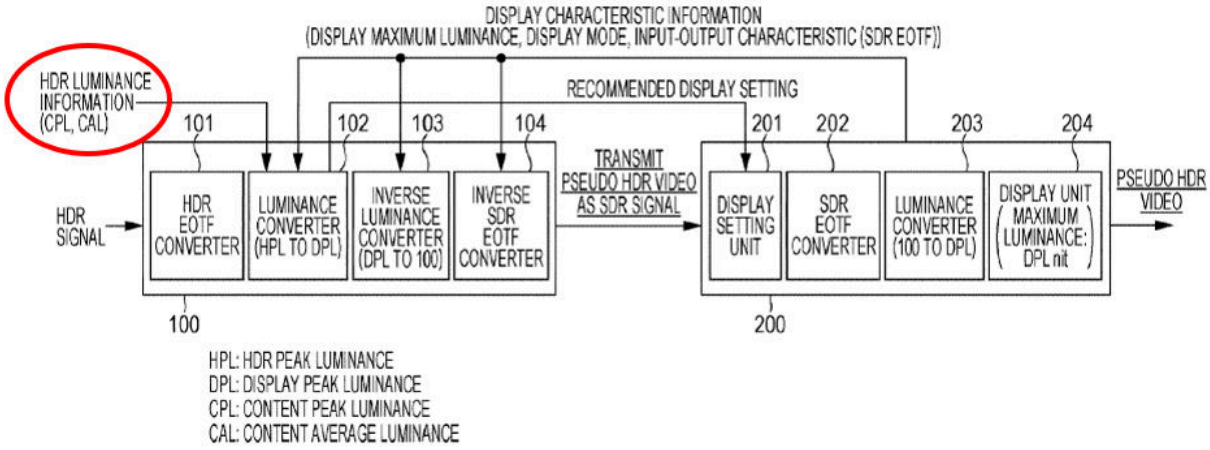


EX1004, FIG. 11; EX1006, 13.

In addition to the HDR video data, "conversion apparatus 100 acquires content luminance information including at least one of a maximum value of luminance (CPL: Content Peak luminance)[2] of a video (content) and an average luminance value (CAL: Content Average luminance) of a video as information regarding the HDR signal." EX1004, 12:17-27; EX1006, 13, 15, 18-20, 24.

[2] The "***Content*** Peak luminance" (CPL) value, which is metadata regarding the HDR video content, is distinct from the "***display*** peak luminance" (DPL) value, which is "display characteristic information" for the display apparatus. EX1004, 12:17-36, 14:46-56, 19:31-38; EX1006, 15, 18.

FIG. 11



EX1004, FIG. 11; EX1006, 13.

Specifically, "***luminance information*** including at least one of the first maximum luminance value and an average luminance value that is an average of the luminance values of the plurality of images that constitute the video may be ***acquired as metadata information of the video***." EX1004, 4:7-30, 19:31-38 ("the luminance information including at least one of CPL and CAL may be ***acquired as metadata*** information ***on the video***, and may be acquired ***via a network***."), 6:15-18 ("Internet delivery"), 18:34-39, 18:54-56, 7:27-35; EX1006, 24, 18.

Toma881 further explains that an "acquisition method of the ***luminance information*** on the HDR video by conversion apparatus 100 include (1) acquisition as ***metadata*** information ***appended to the HDR video***." EX1004, 23:36-42; EX1006, 24; EX1003, ¶119.

As discussed in §III.A.1, *supra*, Toma446 demonstrates that in the

combination, the HDR video data is stored in the MP4 file format. EX1003, ¶¶94-98, 120. For example, Toma446 describes that "video data including the luminance within a HDR (High Dynamic Range) luminance range is stored in the MP4 file." EX1007, 4:59-62, 45:57-46:4 ("video data including luminance of a high luminance area… called a ***HDR*** (High Dynamic Range) is ***stored in the MP4 file***."); EX1011, 54. Similar to Toma881, Toma446 discloses that "luminance information may be stored as the header information on the MP4." EX1007, 46:16-28. ("…the luminance information is fixed in the MP4 file."), 46:29-38 ("…HDR-related information is fixed in the video track may be stored in MP4"); EX1011, 54. Specifically, "[t]he ***HDR-related information may be stored as the metadata*** managing the MP4 file" or "directly stored in the MP4 file." EX1007, 46:39-41; EX1011, 54.

[1.2.1] the acquired HDR image metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file, and

As discussed above, Toma881 teaches that luminance information for the HDR video image data is stored as metadata and Toma446 demonstrates that the HDR image data and metadata is stored in the MP4 file format. EX1004, 12:17-27, 4:7-30, 19:31-38, 23:36-42, FIG. 11; EX1006, 13, 15, 18-20, 24; EX1007, 4:59-62, 45:57-46:41; EX1011, 54, 42; EX1003, ¶121.

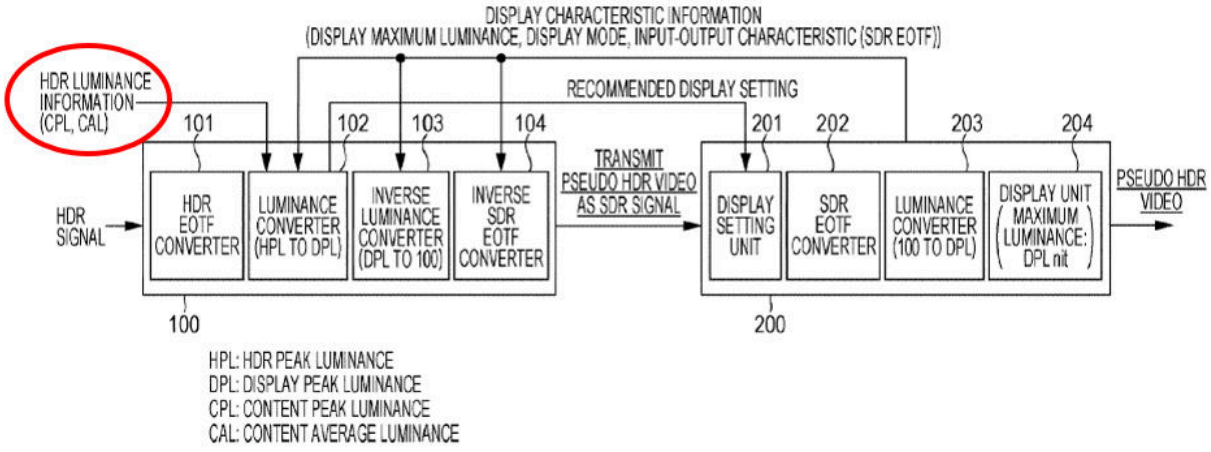
Drugeon demonstrates that the luminance information metadata in the

combination includes "***maximum average picture level information*** indicating a ***highest average luminance value among average luminance values of all pictures*** included in a video sequence."[3] EX1012, [0031], [0041], [0052]; EX1013, 15-17, 21, 26; EX1003, ¶¶123-125. This maximum average picture level information corresponds to the claimed "maximum value of frame average luminance" because it represents the highest average luminance value among the pictures (frames) of the video sequence. EX1003, ¶¶123, 125.

In more detail, Toma881 discloses that in the combination, the luminance information metadata includes "a maximum value of luminance (CPL: Content Peak luminance) of a video (content)" which "is, for example, ***a maximum value of the luminance values of a plurality of images*** that constitute the HDR video." EX1004, 12:17-27, 15:4-20, 19:17-38 ("CPL and CAL may be acquired as metadata information on the video"), cl. 1; EX1006, 15, 18-20.

[3] Drugeon describes storing the maximum_average_picture_level value as "supplemental enhancement information (SEI) in the video data" which would be part of Toma881's HDR metadata in the combination. EX1012, [0122], [0090], [0009]; EX1013, 16, 21; EX1003, ¶124.

FIG. 11



EX1004, FIG. 11; EX1006, 13.

As previously discussed, Toma881 makes clear that the luminance values of the plurality of images that are used to determine the CPL are values for an entire image/frame. EX1004, 12:17-27, Cl. 1; EX1006, 15, 18; EX1003, ¶¶122, 104. Therefore, Toma881 discloses selecting a luminance value for an image that is the highest luminance value for all images in the HDR video. EX1003, ¶122.

As discussed in §III.A.1, *supra*, Drugeon provides additional details specifying that in the combination, Drugeon's maximum average picture level information would have been predictably and beneficially used as the CPL or alternatively, as additional luminance values for use in the conversion. EX1003, ¶¶125, 103. As such, Drugeon provides that in the combination, the luminance information metadata includes "maximum average picture level information indicating a highest average luminance value among average luminance values of all pictures

included in a video sequence." EX1012, [0041], *see also* [0122], [0052], [0092]-[0095] ("(maximum_average_picture_level) indicates the highest average picture level among all the pictures included in a video sequence"), [0108]-[0109], [0129], FIGs. 7-8; EX1013, 16-17. This "maximum_average_picture_level" value is specifically a luminance value for HDR video. EX1012, [0080]-[0082], [0116]-[0125]; EX1013, 16-17. A POSITA would have recognized the "maximum_average_picture_level" disclosed by Drugeon as a maximum value of frame average luminance of the HDR image data. EX1003, ¶¶123, 125.

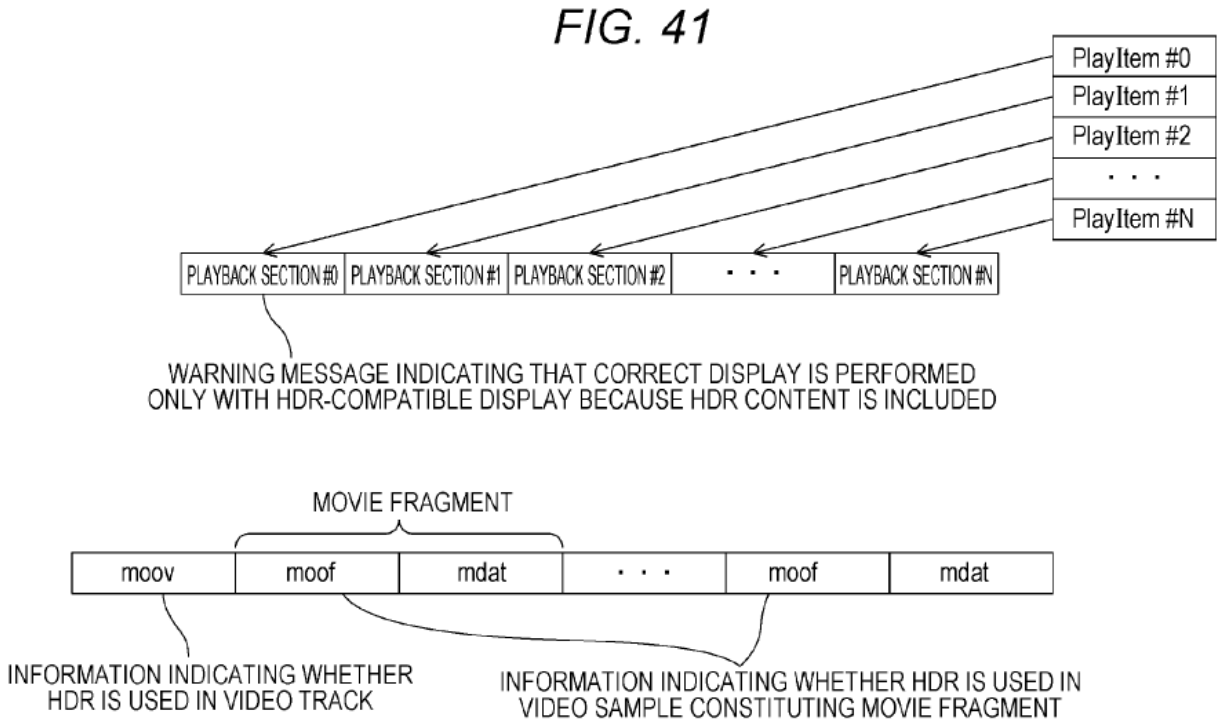
[1.2.2] the HDR image data stored in the MP4 file is based on an MP4 format;[4]

Toma446 demonstrates that in the combination, the HDR image data stored in the MP4 file is based on an MP4 format. EX1003, ¶¶126-129. For example, Toma446 describes that "video data including the luminance within a HDR (High Dynamic Range) luminance range is stored in the MP4 file." EX1007, 4:59-62,

[4] The term "based on an MP4 format" does not appear in the '211 specification nor does the '211 specification explain what it means for HDR image data to be "based on an MP4 format." The specification states that the system "stores high dynamic range (HDR) image data according to an MP4 format." EX1001, 2:38-40. Petitioner therefore interprets this claim element to simply require that the HDR image data is stored according to an MP4 format. EX1003, ¶55.

45:57-46:4 ("video data including luminance of a high luminance area… called a ***HDR*** (High Dynamic Range) is ***stored in the MP4 file***."); EX1011, 54. Similar to Toma881, Toma446 discloses that "luminance information may be stored as the header information on the MP4." EX1007, 46:16-28,, 46:29-38; EX1011, 54.

FIG. 41 of Toma446 shows the MP4 format for the HDR image data:



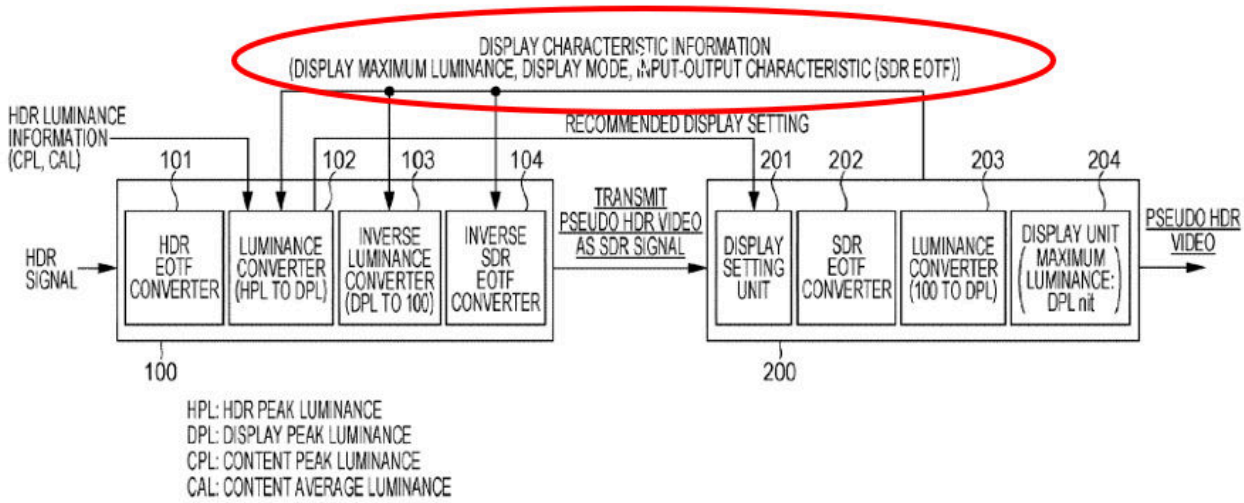
EX1007, FIG. 41, 4:59-62, 45:57-46:41, 2:5-10 (describing converting video data "into an MP4 file format"); EX1011, 54, 30, 15, 36; EX1003, ¶¶127-128.

[1.3] acquire display function information of a display unit from the display unit;

Toma881 discloses that "conversion apparatus 100 ***acquires the display characteristic information*** on display apparatus 200 from display apparatus 200…

such as a maximum value of luminance that display apparatus 200 can display (DPL), display mode (refer to later description) of display apparatus 200, and input-output characteristic (EOTF supported by the display apparatus)." EX1004, 12:28-36, *see also* 1:31-33, 4:56-57, 7:11-14 (describing display modes), 10:15-19, 10:55-57, 14:16-50, 18:64-19:16, 23:20-26; EX1006, 8, 13-18, 24; EX1003, ¶¶130-133.

FIG. 11



EX1004, FIG. 11; EX1006, 13. A POSITA would have recognized that the display characteristic information of maximum value of luminance (DPL), display mode, and EOTF supported by the display are display function information because they are parameters related to the operating characteristics and capabilities of the display. EX1003, ¶133. For example, the display mode information indicates different luminance functionality for the different display modes, such as

"normal mode," "dynamic mode," and "cinema mode." EX1004, 4:56-5:5, 7:5-18; EX1006, 16, 4, 8-9. Different luminance conversion functions are performed "for each mode." EX1004, 10:49-57, 17:30-35; EX1006, 14.

[1.4] read the HDR image data from the MP4 file;

Toma881 discloses that "conversion apparatus 100 acquires the HDR video on which inverse EOTF conversion of HDR is performed." EX1004, 11:31-39, 11:52-12:7, 6:15-17; EX1006, 14, 7-8, 18. Subsequently, the EOTF converter 101 of the conversion apparatus 100 "converts the acquired HDR signal into a linear signal." EX1004, 11:33-39; EX1006, 14, 8. The subsequent "HDR to pseudo HDR conversion processing" allows for "displaying the HDR video on the SDR TV." EX1004, 18:8-15; EX1006, 14, 7-10.

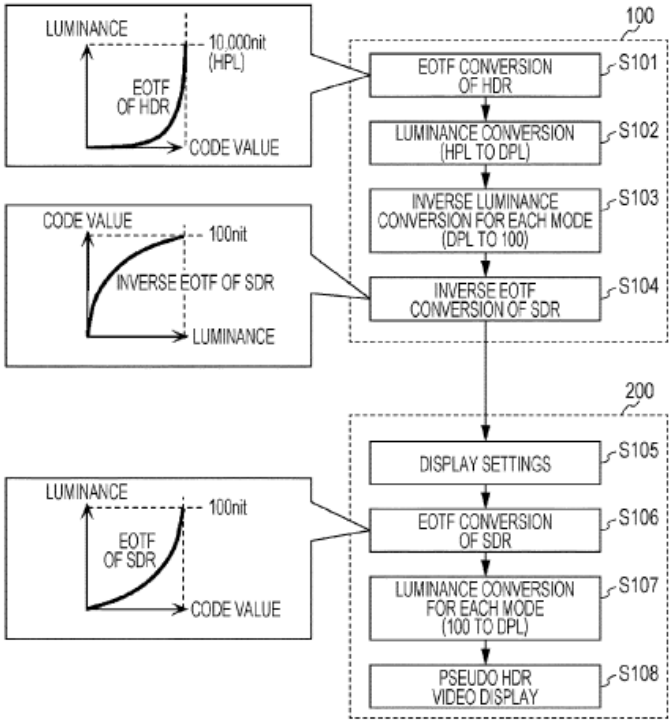
AS Toma881 describes, "conversion apparatus 100 ***performs the first luminance conversion***" "using…the content luminance information ***on the HDR video***." EX1004, 14:46-50, 23:33-42; EX1006, 14-15, 18-20. A POSITA would have recognized that these disclosures performing a conversion process on the acquired HDR video image data would have required the conversion apparatus 100 to read the HDR image data from the MP4 file. EX1003, ¶¶134-137. Alternatively, it would have been obvious to implement Toma881's conversion apparatus 100 to read the acquired HDR image data from the MP4 file so that the conversion apparatus 100 could perform the conversion process expressly

described in Toma881 on the HDR video image data. EX1003, ¶137; *see e.g.* EX1007 9:1-6 ("…reads the MP4 file").

[1.5] execute a conversion process of the read HDR image data based on the acquired HDR image metadata and the acquired display function information of the display unit;

Toma881's "conversion apparatus 100 ***performs first luminance conversion*** that converts the linear signal converted by HDR EOTF converter 101 by ***using display characteristic information and content luminance information*** (S102)." EX1004, 11:40-51; EX1006, 15-16, 18, 24. Toma881 later similarly describes "conversion apparatus 100 performs the first luminance conversion of converting the linear signal (luminance value of HDR) obtained in step S101 by ***using the display characteristic information and the content luminance information*** on the HDR video." EX1004, 14:41-50; EX1006, 15-16, 18, 24; EX1003, ¶¶138-141.

FIG. 12



EX1004, FIG. 12; EX1006, 14.

TOMA881 discloses that the content luminance information used in this conversion includes "a maximum value of luminance (CPL: Content Peak luminance) of a video (content) and an average luminance value (CAL: Content Average luminance) of a video as information regarding the HDR signal." EX1004, 12:17-27; EX1006, 15, 18-19. Additionally, "in the first luminance conversion, CAL and CPL out of the content luminance information are used." EX1004, 15:4-20, 19:17-38, 20:9-48; EX1006, 15, 18-20, 24.

FIG. 13A

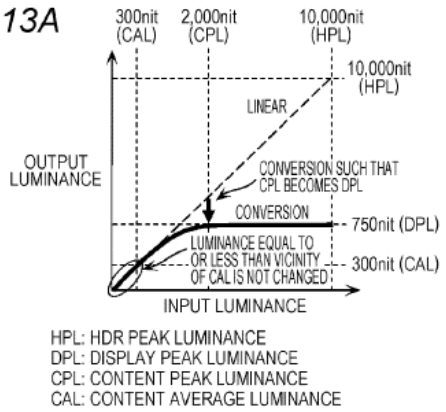
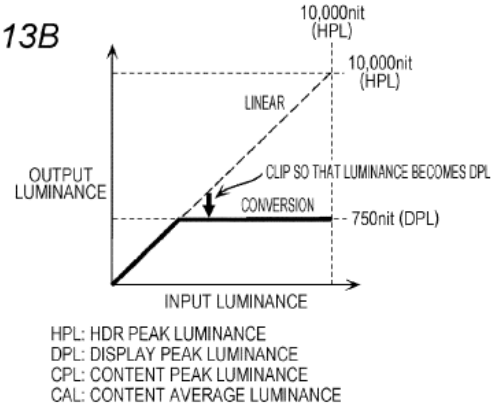


FIG. 13B



EX1004, FIGs. 13A-13B; EX1006, 15.

Additionally, in the combination, Drugeon demonstrates that the luminance information metadata includes "maximum average picture level information indicating a highest average luminance value among average luminance values of all pictures included in a video sequence." EX1012, [0041], [0122], [0092]-[0095]; EX1013, 16-17. For example, as described at §III.A.1, *supra*, Drugeon's maximum_average_picture_level is predictably used as or incorporated into Toma881's CPL related information in the combination because the

maximum_average_picture_level value indicates the luminance value (frame average luminance value) of an image/frame of the HDR video having the highest luminance value among all images of the video, and therefore is the peak luminance value of the images. EX1012, [0041] ("maximum average picture level information indicating a highest average luminance value among average luminance values of all pictures included in a video sequence."); EX1013, 16-17; EX1004, 12:17-27, ("CPL (first maximum luminance value) is, for example, a maximum value of the luminance values of a plurality of images that constitute the HDR video."); EX1006, 15, 18; EX1003, ¶¶139-140.

Alternatively, it would have been obvious to include Drugeon's maximum_average_picture_level value as part of Toma881's luminance value information, and Drugeon describes using such information in HDR content conversion. EX1003, ¶¶140-141. For example, like Toma881, Drugeon describes converting HDR video for display on an SDR display unit. EX1012, [0029]-[0030]; EX1013, 12-16. Drugeon describes "maximum average picture level information allows the difference from the SDR to be set within an arbitrary range" and is used as part of the "sequence parameter set (SPS)" for conversion. EX1012, [0092]-[0095], [0071], [0108]-[0109], [0132]; EX1013, 15-17, 21, 26.

Turning to the display function information of Toma881, conversion apparatus 100 also uses display characteristics, including "the display peak

luminance (DPL)" of the display in the conversion. EX1004, 14:39-15:46, 20:9-64 ("…using the peak luminance value and the display mode of the SDR display to convert the HDR video"), 12:41-49; EX1006, 15-21, 24; EX1003, ¶140.

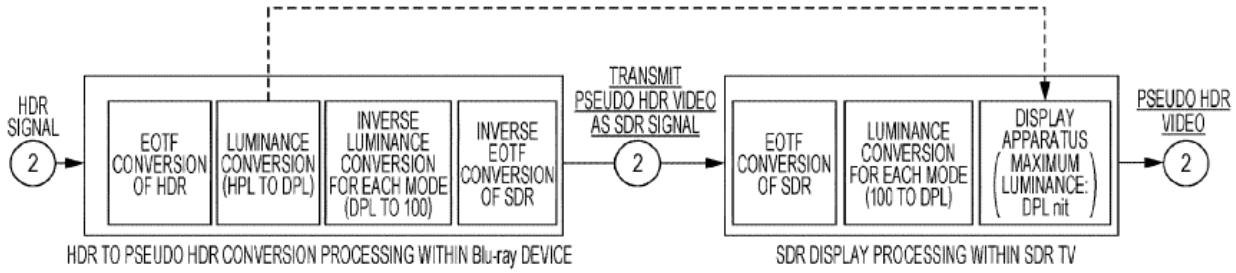
[1.6] execute an output image generation process based on the execution of the conversion process; and

Toma881 describes that "converting the HDR-enabled HDR signal into the SDR signal in the SDR luminance… allows the SDR TV to display ***the SDR video*** obtained by conversion from the HDR video." EX1004, 7:26-42; EX1006, 17. More specifically, after "conversion apparatus 100 performs inverse luminance conversion" based on the metadata and display function information (the claimed conversion process), the "conversion apparatus 100 performs inverse SDR EOTF conversion ***to generate the pseudo HDR video***." EX1004, 12:41-63; EX1006, 7-10, 13-14, 17-18, 20, 24. The output of the "inverse luminance conversion" is used in generating the pseudo HDR video. EX1004, 12:41-13:16; EX1006, 13-17. The "pseudo HDR video" is generated from the original HDR video "to implement display of the pseudo HDR video on the SDR TV." EX1004, 8:40-9:4; EX1006, 17-18; EX1003, ¶¶142-143. Accordingly, Toma881 uses the results of the claimed conversion process to generate a new output image, namely the pseudo HDR video, for display on the SDR TV. EX1004, 8:40-9:4, 12:41-13:16; EX1006, 13-18; EX1003, ¶¶142-143. A POSITA would have recognized the generation of the

pseudo HDR video as an output image generation process. EX1003, ¶¶142-143.

In another example, "[c]onversion apparatus 100 performs the first luminance conversion and the second luminance conversion on the luminance value of HDR… [c]onversion apparatus 100 quantizes the luminance value of SDR by using EOTF of SDR to generate the SDR signal compatible with pseudo HDR." EX1004, 13:17-32, 18:34-39, 18:57-61, 19:6-10 ("…pseudo HDR video generation"), 19:67-20:8, 23:4-14 ("…conversion of the HDR video into a pseudo HDR video"); EX1006, 7-10, 13-14, 17-18, 20, 24.

FIG. 10C



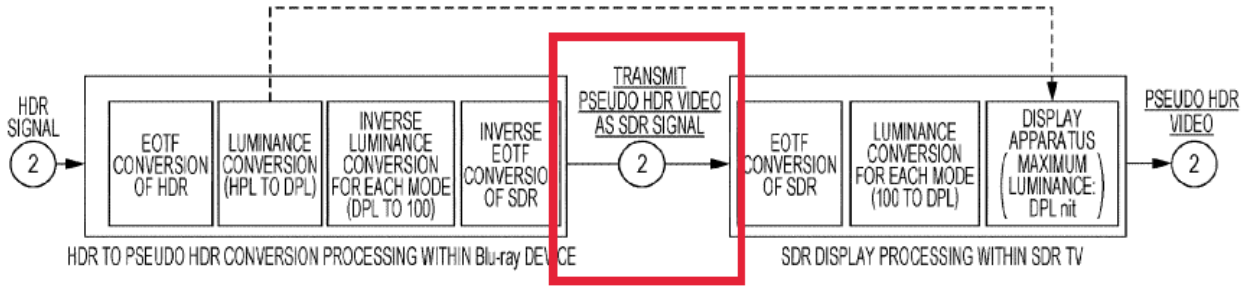
EX1004, FIG. 10C; EX1006, 9, 13. Thus, Toma881 expressly describes generating a pseudo HDR signal and pseudo HDR video as outputs of the HDR conversion processing. EX1004, 18:34-39, 18:57-61, 19:6-10, 23:4-14; EX1006, 17-18, 24; EX1003, ¶142.

[1.7] output an image signal to the display unit based on the executed output image generation process.

Toma881 describes that "converting the HDR-enabled HDR signal into the

SDR signal in the SDR luminance… allows the SDR TV ***to display the SDR video*** obtained by conversion from the HDR video." EX1004, 7:26-42, 8:40-9:4 ("…implement display of the pseudo HDR video on the SDR TV."); EX1006, 17-18. Specifically, after "generat[ing] the pseudo HDR video… conversion apparatus 100 outputs the pseudo HDR signal (SDR signal) generated in step S104 to display apparatus 200." EX1004, 12:62-13:16; EX1006, 9-10, 13-14, 17-18, 23. For example, "display apparatus 200 acquires the SDR signal (pseudo HDR signal)." EX1004, 13:56-59; EX1006, 9-10, 13-14, 17-18, 23. The "display unit 204 of display apparatus 200 [then] displays the pseudo HDR video on display apparatus 200." EX1004, 14:38-40, 16:58-60, 18:34-39, 20:49-56, 21:21-29 ("display the pseudo HDR video…"); EX1006, 17; EX1003, ¶¶144-146.

FIG. 10C



EX1004, FIG. 10C; EX1006, 9, 13.

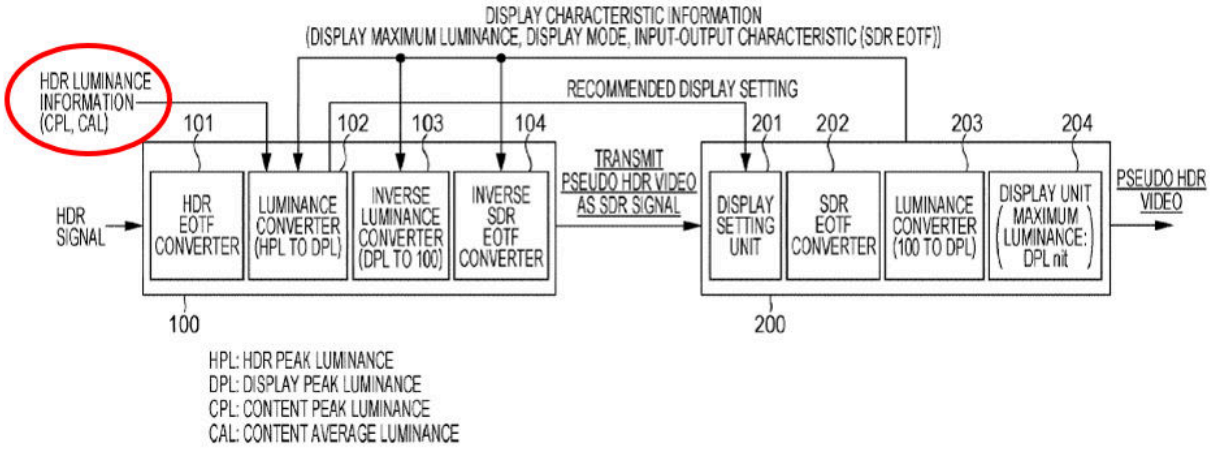
(b) Claim 2

[2.pre]-[2.1] The information processing device according to claim 1, wherein the data processing unit is further configured to: acquire a dynamic range of

the HDR image data stored in the MP4 file from the acquired HDR image metadata;

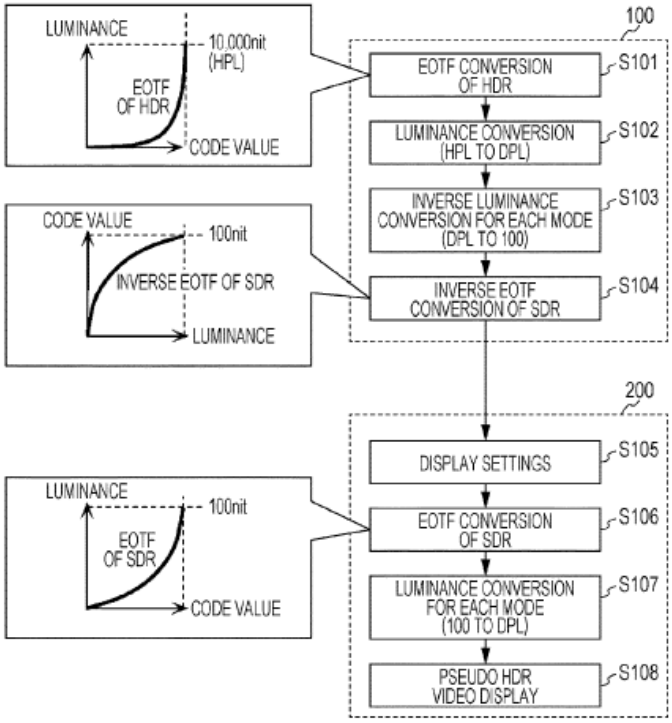
Toma881 describes that "conversion apparatus 100 acquires content luminance information" for the HDR video. EX1004, 12:17-27; EX1006, 13, 15, 18-20, 24. For example, "HDR EOTF converter 101 uses the acquired HDR signal and EOTF of HDR to determine the luminance value of HDR associated with the code value of HDR by EOTF of HDR" and "***the HDR signal indicates*** the code value of HDR obtained by quantization of the ***luminance value of a video (content)*** by using inverse EOTF of HDR that associates the ***luminance value in the luminance range of HDR*** with the plurality of HDR code values." EX1004, 11:65-12:7, 14:46-54 ("the luminance value of HDR (input luminance value)"); EX1006, 11-12, 15, 19. For example, "the luminance value (***luminance value of the HDR-enabled video***) [is] in the ***luminance range of up to 10,000*** nit." EX1004, 9:19-46; EX1006, 11, 18. "[T]he ***luminance information*** including at least one of CPL and CAL may be ***acquired as metadata*** information ***on the video***, and may be acquired ***via a network***." EX1004, 19:31-38, 23:36-42, EX1006, 24, 18.

FIG. 11



EX1004, FIG. 11; EX1006, 13. FIG. 12 shows this input luminance range information:

FIG. 12



EX1004, FIG. 12; EX1006, 14-16. FIGs. 13A-14 (EX1006, 14-16) show

additional examples of conversion from the "input luminance" values to the output luminance values suitable for the SDR device. These are all examples of the dynamic range of the HDR image data acquired from the metadata. EX1003, ¶¶147-150. Specifically, the dynamic range is the range from zero luminance to the peak luminance (CPL) shown in the graphs.

Similarly, Drugeon discloses that "the hybrid SEI message may include…***dynamic range increase information*** (dynamic_range_increase) and maximum average picture level information (maximum_average_picture_level). EX1012, [0090]; EX1013, 16-17. "[D]ynamic range increase information indicat[es] a difference between the ***luminance dynamic range of the video*** data and luminance dynamic range SDR." EX1012, [0122]; EX1013, 16-17; EX1003, ¶151.

Toma446 discloses that the luminance range information is indicated by MP4 file metadata. EX1003, ¶152. In particular, "whether the HDR content is stored in the MP4 file may be signaled in the header information on the MP4." EX1007, 46:5-7. Toma446 further explains that "[t]he HDR-related information may be stored as metadata managing the MP4 file." EX1007, 46:5-15, 46:39-41; EX1011, 54. A POSITA would have recognized that this metadata indicating that the video data includes HDR content indicates the HDR luminance range of 0 to 10,000 nit. EX1004, 9:19-46; EX1006, 11, 18; EX1003, ¶153.

[2.2] determine the HDR image data having the dynamic range is not outputable by the display unit, wherein

Toma446 demonstrates that "whether the HDR content is stored in the MP4 file may be signaled in the header information on the MP4." EX1007, 45:57-46:15; EX1011, 54. Toma446 further explains that, where HDR content is present and "the video data [has] a high luminance area exceeding a luminance range used in BT.709 standard (SDR: Standard Dynamic Range)," the HDR video is not playable on the SDR device without conversion. EX1007, 45:57-46:15; EX1011, 54. Accordingly, "mapping the HDR luminance range on the SDR luminance range is required to play back the HDR content with an SDR display." *Id.*; EX1003, ¶¶154-155. Accordingly, a POSITA would have determined that HDR image data having an HDR luminance range is not outputable by an SDR display unit without conversion because the HDR luminance range exceeds the SDR display's supported luminance range. EX1003, ¶¶154-155.

Toma881 similarly describes that the resulting system determines whether the HDR image data is compatible with the display, and if not uses a "converter that converts the code value indicated by the HDR signal acquired by the acquisition unit into the display luminance value compatible with the luminance range of the display determined based on the luminance range of the display (display apparatus **200**)." EX1004, 11:52-64; EX1006, 20; EX1003, ¶156.

[2.3] the determination is based on the acquired HDR image metadata and the acquired display function information of the display unit;

Toma881's "conversion apparatus 100 acquires the display characteristic information on display apparatus 200 from display apparatus 200" including "a maximum value of luminance that display apparatus 200 can display (DPL)." EX1004, 12:28-36; EX1006, 8, 13-18, 24. As discussed above, the indication that the video data is in the HDR range is indicated by information in the metadata of the MP4 file. EX1007, 46:5-15, 46:39-41; EX1011, 54; EX1003, ¶¶157-158. Accordingly, the determination of whether the HDR image data is outputable by the display unit is based on both the HDR image metadata indicating the HDR luminance range and the acquired display characteristic information, including the display peak luminance (DPL). EX1003, ¶¶157-158.

[2.4] execute the conversion process of the read HDR image data based on the determination,

As disclosed by Toma446, "mapping the HDR luminance range on the SDR luminance range is required to play back the HDR content with an SDR display." EX1007, 45:57-46:15; EX1011, 54. As such, a determination that the video content is HDR content having the HDR luminance range and that the display device is a SDR display devices necessitates the conversion process. EX1003, ¶159.

[2.5] wherein the conversion process includes reduction of the dynamic range of the HDR image data; and

Toma881 describes that "[i]n the first luminance conversion, the luminance value compatible with the luminance range of HDR (hereinafter referred to as "luminance value of HDR"), which is the first luminance range, is converted into the luminance value compatible with the luminance range of the display (hereinafter referred to as "display luminance value"), which is the second luminance range." EX1004, 11:44-51; EX1006, 13-16, 19-20. Specifically, Toma881's conversion process "allows appropriate conversion of the luminance in the first luminance range into luminance in the second luminance range with a ***reduced luminance range***." EX1004, 3:32-34; EX1006, 19-20.

FIG. 13A

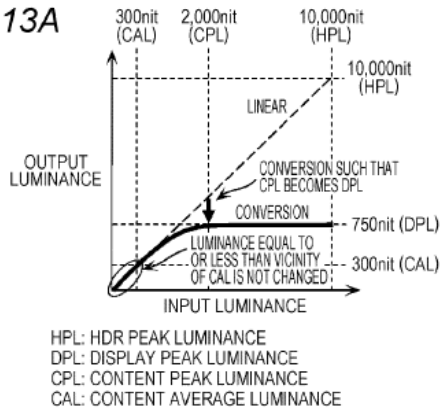
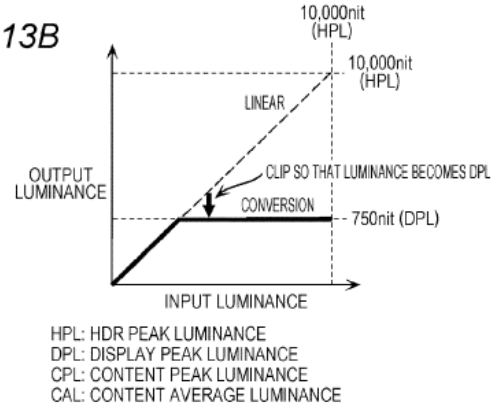


FIG. 13B



EX1004, FIGs. 13A-13B; EX1006, 15.

As discussed above, the HDR luminance range ranges from 0 to 10,000 nits but that in some cases "[t]he maximum luminance of the HDR video (HPL) may not be 10,000 nit, and may be, for example, 4,000 nit or 1,000 nit." EX1004, 9:19-46, 19:16-50; EX1006, 18; EX1003, ¶¶160-161. By contrast, the second luminance (the DPL of the SDR display) can be for "example 300 nit" and therefore the conversion is a reduction of the dynamic range from, for example, 10,000 to 300 nit. EX1004, 10:28-41, *see also* 20:65-21:7 ("reduce non-

displayable brightness information… For example, for a display with a peak luminance of 1,000 nit, overall brightness is maintained by conversion into the pseudo HDR video with a peak luminance reduced to 1,000 nit."); EX1006, 4, 8, 19-21; EX1003, ¶161.

[2.6] output the HDR image data with the reduced dynamic range to the display unit.

See supra Element [1.7]. EX1003, ¶¶162-163. For example, after "generat[ing] the pseudo HDR video… conversion apparatus 100 outputs the pseudo HDR signal (SDR signal) generated in step S104 to display apparatus 200." EX1004, 12:62-13:16; EX1006, 9-10, 13-14, 17-18, 23.

(c) Claim 9

[9.pre] A non-transitory computer-readable medium having stored thereon an MP4 file and computer-executable instructions, the computer-executable instructions, when executed by a processor of a reproduction device, cause the processor to execute operations, the operations comprising:

Toma881 discloses "[e]ach component may be implemented by a program execution unit, such as a CPU or a processor, reading and executing the software program recorded in a recording medium such as a hard disk or a semiconductor memory." EX1004, 23:55-62; EX1006, 18. The HDR video data is received at Toma881's conversion apparatus 101 via "Internet delivery." EX1004, 6:15-17, 18:34-39; EX1006, 1, 10, 18. Furthermore, the "[c]onversion apparatus 100 (HDR to pseudo HDR conversion processor) may exist within a disc player, disc

recorder, set-top box, TV, personal computer, and smart phone. Conversion apparatus 100 may exist within a server apparatus on the Internet." EX1004, 18:57-61; EX1006, 18. A POSITA would have recognized that such computing devices such as set-top boxes, computers, and smartphones include memory and that it would have been obvious to at least temporarily store the received HDR video in such memory so that the conversion of the HDR video by the processor (*See supra*, Element [1.5]) could be performed. EX1003, ¶¶164-165. Additionally, a POSITA would have recognized Toma881's conversion apparatus 100 as a reproduction device because it reproduces the HDR video content for display on an SDR display device. *Supra*, Element [1.5]; EX1003, ¶165. Furthermore, as discussed at Element [1.2], *supra*, in the combination, the HDR image meta data is stored in an MP4 file format. EX1007, 4:59-62, 45:57-46:41; EX1011, 54; EX1003, ¶¶165, 120.

[9.1] reading high dynamic range (HDR) metadata from an HDR image metadata storage box of the MP4 file, wherein

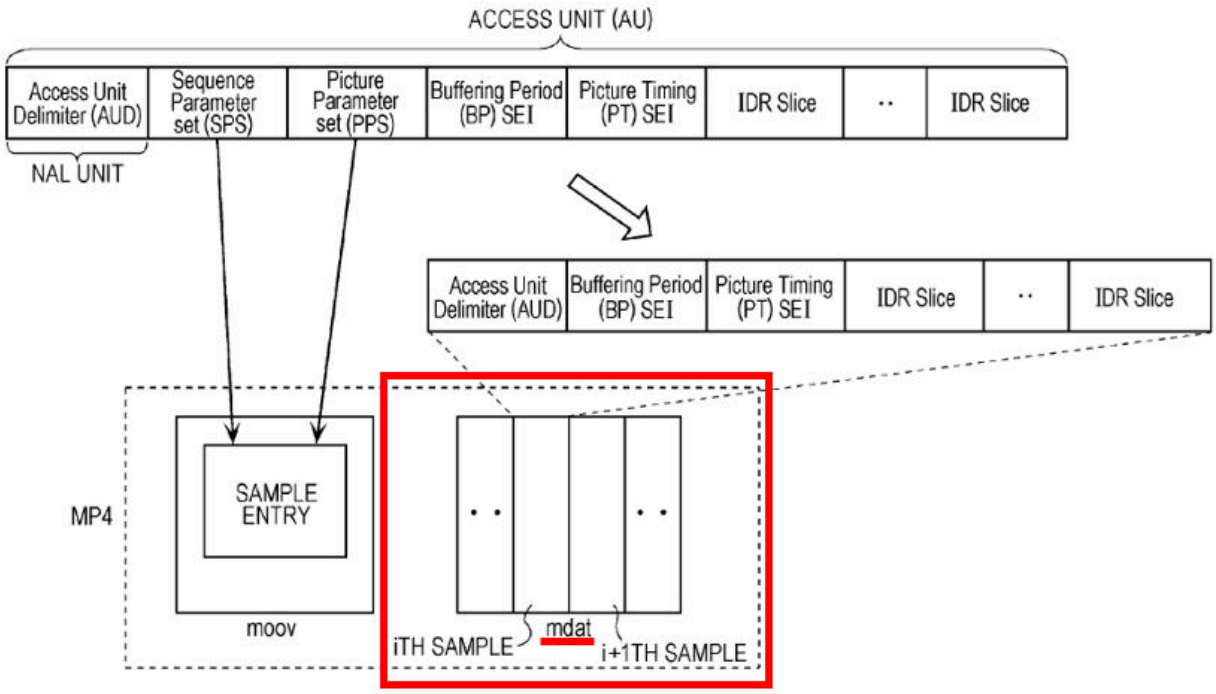
As discussed in §III.A.1, *supra*, Toma446 demonstrates that in the combination, the HDR video data is stored in the MP4 file format. EX1007, 4:59-62, 45:57-46:41; EX1011, 54; EX1003, ¶¶120, 126-129, 166. Toma446 describes that such MP4 files include "a meta-data storing box" for storing metadata and that when the video stored in an MP4 file includes HDR video, "[t]he HDR-related

information may be stored as the meta-data." EX1007, 34:7-11, 34:45-50, 46:39-41; EX1011, 38-39, 54. As discussed at Elements [1.2] and [1.5], *supra*, Toma881's conversion apparatus 100 reads HDR metadata associated with the HDR file, and in the combination that HDR metadata is stored in the MP4 metadata structures taught by Toma446. EX1004, 23:36-42, 4:7-30, 19:31-38, 14:46-50, 23:33-42; EX1006, 14-15, 18-20, 24; EX1003, ¶¶166, 126-129.

[9.1.1] an mdat box of the MP4 file stores HDR image data;

Toma446 describes that in the MP4 format, image data is stored in an mdat box. EX1007, 19:11-20:12, 22:8-15, 24:50-25:36; EX1009, 20-21, EX1011, 23-24. For example, as shown in FIG. 12, the "IDR (Instantaneous Decoder Refresh) picture" slices (the image data) are stored in the mdat box:

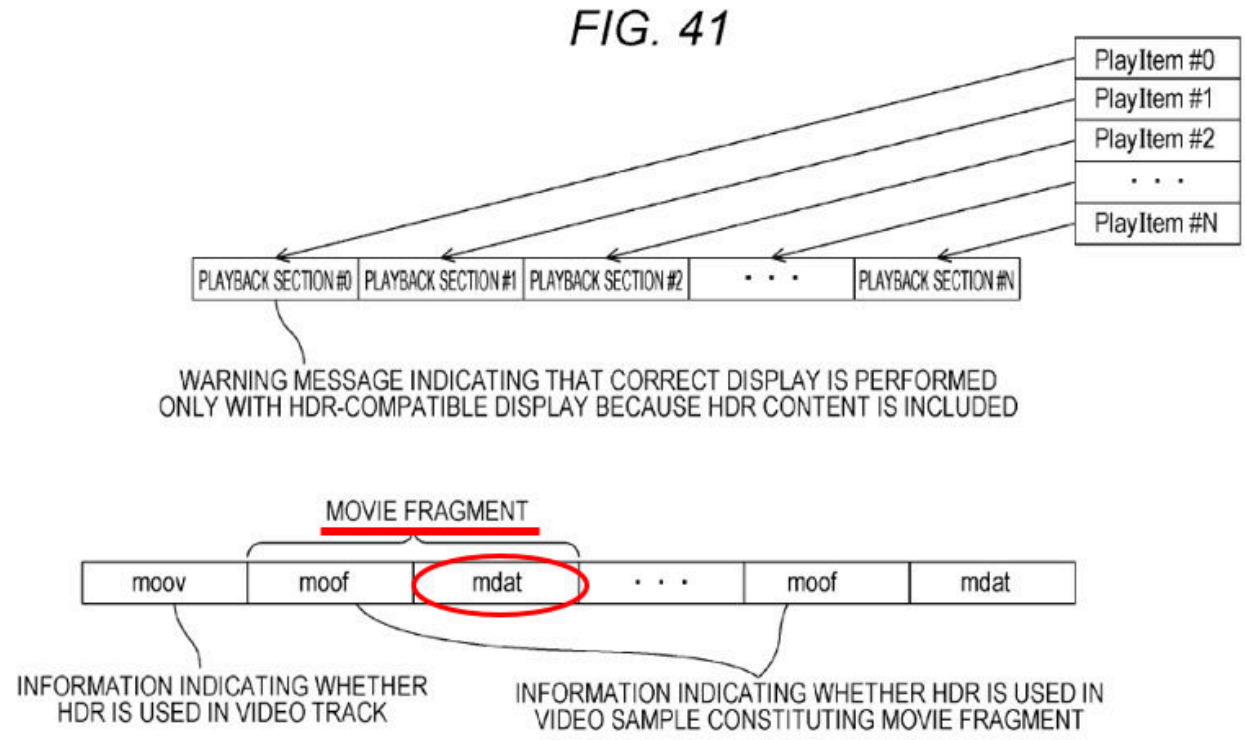
FIG. 12



EX1007, FIG. 12, 19:27-41; EX1009, 21; EX1011, 24, 27; EX1003, ¶167.

Toma446 further describes that "[o]ther pieces of data" aside from the header data "are stored in the mdat as the sample data." EX1007, 19:27-41. Similarly, Toma446 describes that the "Payload" is "stored in the mdat as the sample data." EX1007, 20:7-12; EX1009, 20-22, EX1011, 23-25.

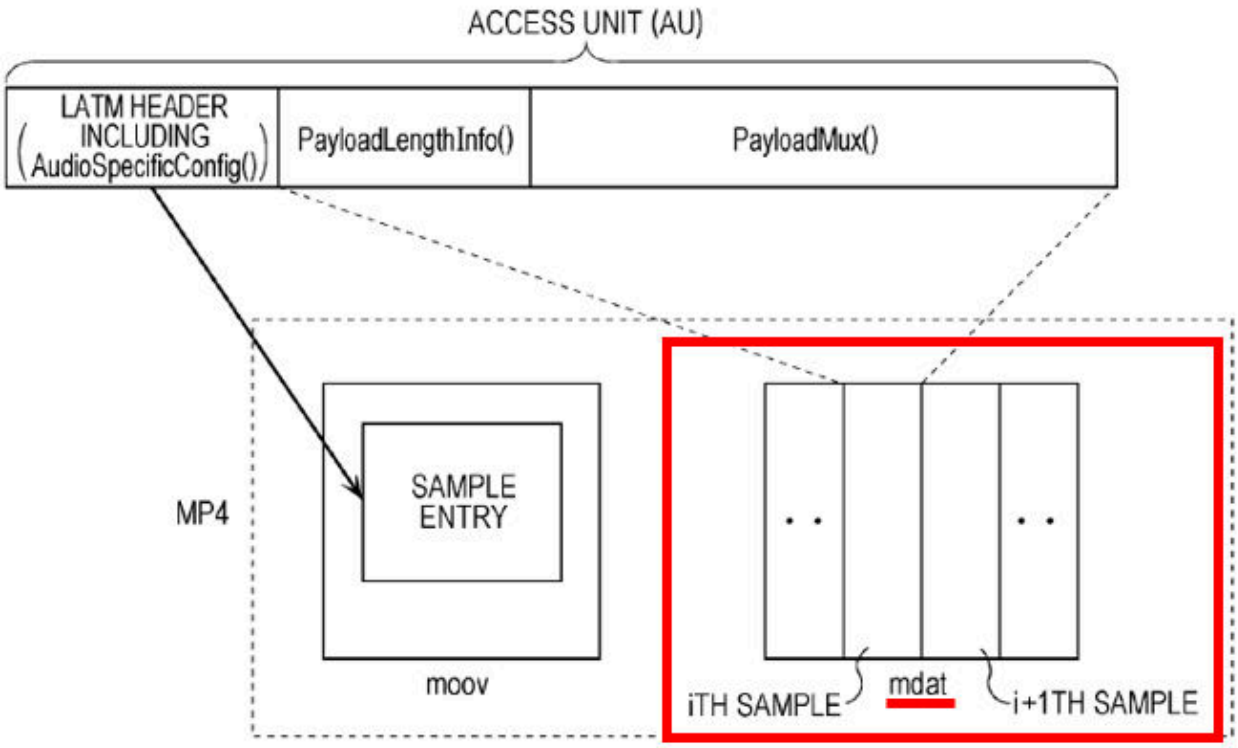
Toma446 further discloses with respect to HDR video specifically that the video portion of the movie fragments for HDR video are stored in the mdat box (with the "moof" storing information on whether a video sample is HDR) as shown in FIG. 41. EX1007, 45:57-46:41; EX1011, 54; EX1003, ¶167.



EX1007, FIG. 41; EX1011, 54.

Likewise, FIG. 11 shows that the payload of the MP4 file is stored in the mdat box.

FIG. 11



EX1007, FIG. 11, *see also* FIGs. 25, 34-35; EX1009, 20-21, 34-38, EX1011, 23-24, 37-41.

[9.1.2] the HDR image metadata storage box of the MP4 file stores the HDR image metadata corresponding to the HDR image data,

As discussed at Elements [1.2] and [1.5], *supra*, the HDR file (stored in the MP4 file format in the combination) includes HDR image metadata corresponding to the HDR image data. EX1004, 23:36-42, 4:7-30, 19:31-38, 14:46-50, 23:33-42; EX1006, 14-15, 18-20, 24; EX1003, ¶168. Toma446 demonstrates that in the combination, in the MP4 file format, the video metadata is stored in "a meta-data

storing box" for storing metadata and that when the video stored in an MP4 file includes HDR video, "[t]he HDR-related information may be stored as the meta-data." EX1007, 34:7-11, 34:45-50, 46:39-41; EX1011, 38-39, 54.

[9.1.3] the stored HDR image data is based on an MP4 format, and

Supra, Element [1.2.2].

[9.1.4] the stored HDR image metadata includes a maximum value of frame average luminance of the HDR image data;

Supra, Element [1.2.1].

[9.2] executing a conversion process of the HDR image data based on the read HDR image metadata; and

Supra, Element [1.5].

[9.3] reproducing the HDR image data based on the execution of the conversion process.

As discussed at Elements [1.6]-[1.7], *supra*, in the combination, the conversion apparatus 100 of Toma881 reproduces the HDR image data by generating an output video signal based on the conversion process and outputting the video signal to a display device to be displayed as the reproduced pseudo-HDR image. EX1003, ¶¶172-173.

(d) Claim 12

[12.pre] An information processing method comprising:

Toma881 discloses "conversion method for converting luminance of a video to be displayed on a display apparatus." EX1004, 1:22-36; EX1006, 1; EX1003,

¶¶174-175.

[12.1] in an information processing device:

Supra, [1.pre].

[12.1.1] acquiring, by a data processing unit of the information processing device, high dynamic range (HDR) image metadata from an MP4 file, wherein

Supra, [1.1]-[1.2].

[12.1.2] the acquired HDR image metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file, and

Supra, [1.2.1].

[12.1.3] the HDR image data stored in the MP4 file is based on an MP4 format;

Supra, [1.2.2].

[12.2] acquiring, by the data processing unit, display function information of a display unit from the display unit;

Supra, [1.3].

[12.3] reading, by the data processing unit, the HDR image data from the MP4 file;

Supra, [1.4].

[12.4] executing, by the data processing unit, a conversion process of the read HDR image data based on the acquired HDR image metadata and the acquired display function information of the display unit;

Supra, [1.5].

[12.5] executing, by the data processing unit, an output image generation process based on the execution of the conversion process; and

Supra, [1.6].

[12.6] outputting, by the data processing unit, an image signal to the display unit based on the executed output image generation process.

Supra, [1.7].

(e) Claim 14

[14.pre] A non-transitory computer-readable medium having stored thereon computer-executable instructions that, when executed by a processor of an information processing device, cause the processor to execute operations, the operations comprising:

Toma881 discloses "[e]ach component may be implemented by a program execution unit, such as a CPU or a processor, reading and executing the software program recorded in a recording medium such as a hard disk or a semiconductor memory." EX1004, 23:55-62; EX1006, 18. Toma881's conversion apparatus 100 is an information processing device. *Supra*, [1.pre]; EX1003, ¶¶185-187.

[14.1] acquiring high dynamic range (HDR) image metadata from an MP4 file, wherein

Supra, [1.1]-[1.2].

[14.1.1] the acquired HDR image metadata includes a maximum value of frame average luminance of HDR image data stored in the MP4 file, and

Supra, [1.2.1].

[14.1.2] the HDR image data stored in the MP4 file is based on an MP4 format,

Supra, [1.2.2].

[14.2] acquiring display function information of a display unit from the display unit;

Supra, [1.3].

[14.3] reading the HDR image data from the MP4 file;

Supra, [1.4].

[14.4] executing a conversion process of the read HDR image data based on the acquired HDR image metadata and the acquired display function information of the display unit;

Supra, [1.5].

[14.5] executing an output image generation process based on the execution of the conversion process; and

Supra, [1.6].

[14.6] outputting an image signal to the display unit based on the executed output image generation process.

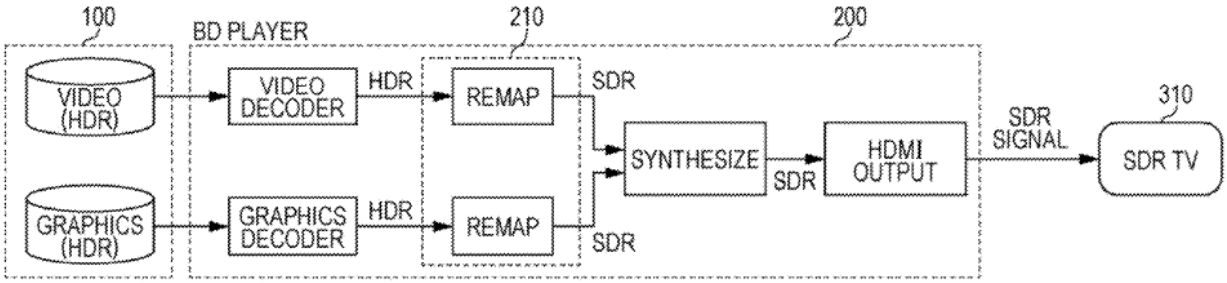
Supra, [1.7].

B. [GROUND 1B] – Toma881, Toma446, Drugeon, and Toma788 Render Claim 2 Obvious

1. Toma788

Toma788 describes a video conversion system having a "conversion device [that] converts the HDR signal to the SDR signal" to allow HDR video to be displayed on SDR devices. EX1024, 7:55-59; EX1026, 1, 18.

FIG. 5B



EX1024, FIG. 5B; EX1026, 6.

Toma788's conversion device 210 "obtains a first luminance signal (an HDR signal) compatible with a first luminance range (HDR)" where "[t]he HDR luminance range is a luminance range where a maximum value is increased from 100 nit which is a maximum value in the SDR luminance range to 1000 nit." EX1024, 7:38-41; 6:3-7; EX1026, 1-2. Toma788 also discloses scenarios in which "the playback control program determines whether the playback device is compatible with HDR graphics (has a function for executing HDR graphics)." EX1024, 32:64-33:3; EX1026, 2, 6, 9, 41-42; EX1003, ¶¶78-87.

2. Toma881-Toma446-Drugeon-Toma788

Multiple reasons would have prompted a POSITA to apply Toma788 to Toma881-Toma446-Drugeon so that the conversion apparatus "determines whether the playback device is compatible with HDR graphics" so that the HDR signal is only converted to an SDR compatible signal when the display device is an SDR display. EX1003, ¶¶196-201; EX1024, 32:64-33:3; EX1026, 2, 6, 9, 41-42. *First*, making such a determination would have allowed for the full HDR video to be displayed on the display device when the display device is HDR compatible. EX1003, ¶197; EX1024, 8:43-60; EX1026, 6, 9, 41-42. As Toma881 recognizes, playing HDR compatible video on an HDR compatible display allows the user "to take full advantage of original video representation of HDR." EX1004, 6:65-7:5;

EX1006, 3. Applying Toma788 would avoid conversion of HDR video to lower quality SDR video in scenarios when the display device is HDR capable. EX1003, ¶197.

Second, application of Toma788 to Toma881-Toma446-Drugeon would save processing resources because when the attached device is HDR enabled "the content signal [in such scenarios] is output without remapping," thus saving the processing resources required to perform the video conversion techniques described in Toma881. EX1003, ¶198; EX1024, 8:43-60; EX1026, 2, 6-9.

Third, the proposed combination would make the resulting system compatible with both HDR and SDR displays while allowing full HDR quality content to be displayed when the display device is HDR capable. EX1003, ¶199.

Finally, a POSITA would have been prompted to apply Toma788 to Toma881-Toma446-Drugeon because doing so was the application of known techniques (contemplated by the same inventors) to a known method ready for improvement to yield predictable results. *KSR*, 550 U.S. at 417; EX1003, ¶¶200-201; EX1004, Face; EX1024, Face.

In the resulting combination, Toma881 provides the HDR conversion architecture, Toma446 provides the MP4 storage framework, Drugeon provides HDR metadata including dynamic-range information and maximum average picture level information, and Toma788 provides the determination of whether a

playback device is HDR-compatible before performing HDR-to-SDR conversion. EX1003, ¶¶111, 196.

3. Analysis

(a) Claim 2

[2.pre]-[2.1]

Supra, Ground 1A, [2.pre]-[2.1]. Additionally, similar to Toma881, Toma788 discloses that "luminance information is obtained as meta-information associated with an HDR video." EX1024, 29:57-65; 26:7-14; 11:9-18; EX1026, 9. Toma 788 also discloses "[t]he HDR luminance range is a luminance range where a maximum value is increased from 100 nit which is a maximum value in the SDR luminance range to 1000 nit." EX1024, 6:3-7; EX1026, 1-2, 9. The system further obtains "[a] luminance range [of] the graphics master" to determine if "the SDR luminance range matches with the luminance range of the graphics master." EX1024, 10:52-11:3; EX1026, 7-8, 22. This "identification information representing that the peak luminance is within the SDR luminance range… may be stored as meta-information of the output interface." EX1024, 11:9-18, *see also* FIGs. 23A-24, 21:29-36 ("input luminance"); EX1026, 7; EX1003, ¶¶202-204.

[2.2]

Toma788 discloses that, in the combination, the resulting conversion apparatus "determines whether the playback device is compatible with HDR graphics

(has a function for executing HDR graphics)." EX1024, 32:64-33:3; EX1026, 2, 6, 9, 41-42. Toma778 describes when "TV310 is ***not compatible with the HDR*** display, BD player 200 ***remaps the HDR data*** of the video and the graphics ***into SDR***." EX1024, 7:22-30; 33:7-20 ("when the playback device is not compatible with the HDR graphics" the conversion apparatus performs the conversion process.); EX1026, 2, 6, 9, 41-42. Conversely, when the TV is HDR compatible, no remapping is performed and the system simply "outputs an HDR signal obtained by the synthesis to TV 300 cmpatible with HDR display." 7:16-21; 33:4-6 ("When the playback device is compatible with the HDR graphics (Yes at S401), the playback control program plays graphics content of the HDR signal (S403)."); EX1026, 2, 6, 9, 41-42. In other words, if the playback device is capable of outputting HDR image data having the HDR dynamic range, no conversion of the signal is necessary. EX1003, ¶¶205-207.

In another example, Toma788 discloses "EOTF determiner 221 determines whether an EOTF compatible with a signal of obtained content (a video and graphics) ***is different from*** an EOTF compatible with an output signal to be output to the display as Illustrated in FIG. 7 (step 101)." EX1024, 8:43-60; EX1026, 6, 8-9, 41-42. In other words, the determiner is determining if the HDR signal can be output as is, or if it needs to be converted. EX1003, ¶208.

> When the determination is made as "Yes" at step 101, processes at step 102 to step 104 are executed in order to convert a system of the luminance range associated with the content signal to the EOTF compatible with the output signal. On the other hand, the determination is made as "No" at step 101, the remap process is ended, and the content signal is output without remapping.

EX1024, 8:43-60, *see also* 11:41-49, 27:32-59 ("undisplayable brightness information"); EX1026, 6, 8-9, 41-42.

[2.3]

Supra, Ground 1A, [2.3]. Additionally, as discussed above, the luminance information includes "[a] luminance range [of] the graphics master" to determine if "the SDR luminance range matches with the luminance range of the graphics master." EX1024, 10:52-11:3; EX1026, 6-9. This "identification information representing that the peak luminance is within the SDR luminance range… may be stored as meta-information of the output interface." EX1024, 11:9-18, *see also* FIGs. 23A-24, 21:29-36 ("input luminance"); EX1026, 7; EX1003, ¶¶209-211. As discussed in Ground 1A, *supra*, in the combination, information indicating that the video data is in the HDR range is provided by the HDR metadata in the MP4 file, while information indicating that display has a DPL in the SDR range is included in the display function information. EX1004, 12:28-36; EX1006, 8, 13-18, 24; EX1007, 46:5-15, 46:39-41; EX1011, 54; EX1003, ¶209.

Toma788 similarly discloses that the conversion device "obtains content luminance information" about the HDR signal and "display characteristics information of display device 600 from display device 600. The display characteristics information is information representing display characteristics of display device 600, such as a maximum value of luminance (DPL) that can be displayed by display device 600, a display mode of display device 600 (see description made later), and input and output characteristics (EOTF compatible with the display device)." EX1024, 19:9-29; EX1026, 22-24, 27. Therefore, the determination that the HDR image data has a dynamic range not outputable by the display data (because the HDR luminance range is greater than the display DPL) is based on the HDR image metadata and the acquired display function information. EX1003, ¶¶210-211.

[2.4]

When "TV310 is ***not compatible with the HDR*** display, BD player 200 ***remaps the HDR data*** of the video and the graphics ***into SDR***." EX1024, 7:16-30; 33:4-20 ("when the playback device is not compatible with the HDR graphics" the conversion apparatus performs the conversion process.); EX1026, 2, 6, 9, 41-42; EX1003, ¶213.

In another example, if the HDR signal is not ouputable by the device, a conversion process is performed "in order to convert a system of the luminance range

associated with the content signal to the EOTF compatible with the output signal. On the other hand, the determination is made as "No" at step 101, the remap process is ended, and the content signal is output without remapping." EX1024, 8:43-60, *see also* 11:41-49; EX1026, 2, 6, 9, 41-42. By contrast, when the content signal is already compatible with the playback device, "the remap process is ended, and the content signal is output without remapping." EX1024, 8:54-56; EX1026, EX1003, ¶213.

[2.5]

Supra, Ground 1A, [2.5]. Additionally, Toma788 discloses that "luminance values are reduced such that undisplayable brightness becomes displayable brightness." EX1024, 27:32-59; EX1026, 29. Thus, Toma788 likewise teaches reducing the dynamic range of HDR image data to a luminance range that is displayable by the playback device. EX1003, ¶214.

[2.6]

Supra, Ground 1A, [2.6]. *See also* EX1024, 6:56-7:5 ("the playback device converts the output signal to an SDR signal compatible with the SDR so as to output the converted signal."); EX1026, 6-9, 22-24, 31. Accordingly, after reducing the dynamic range through the conversion process, Toma788 outputs the converted SDR-compatible signal to the display device, satisfying this limitation. EX1003, ¶¶215-216.

C. [GROUND 1C] – Toma881, Toma446, Drugeon, and Saeki Render Claims 3 and 9-10 Obvious

1. Saeki

Saeki describes methods "for processing metadata in files, including media files, so that an alteration or falsification of the metadata can be detected" including through use of "hash values and digital signatures." EX1027, [0009]-[0010]. FIG. 3 shows "a modified MPEG-4 (sometimes called 'MP4') data structure" including "metadata and underlying audio-visual content." *Id.*, [0035].

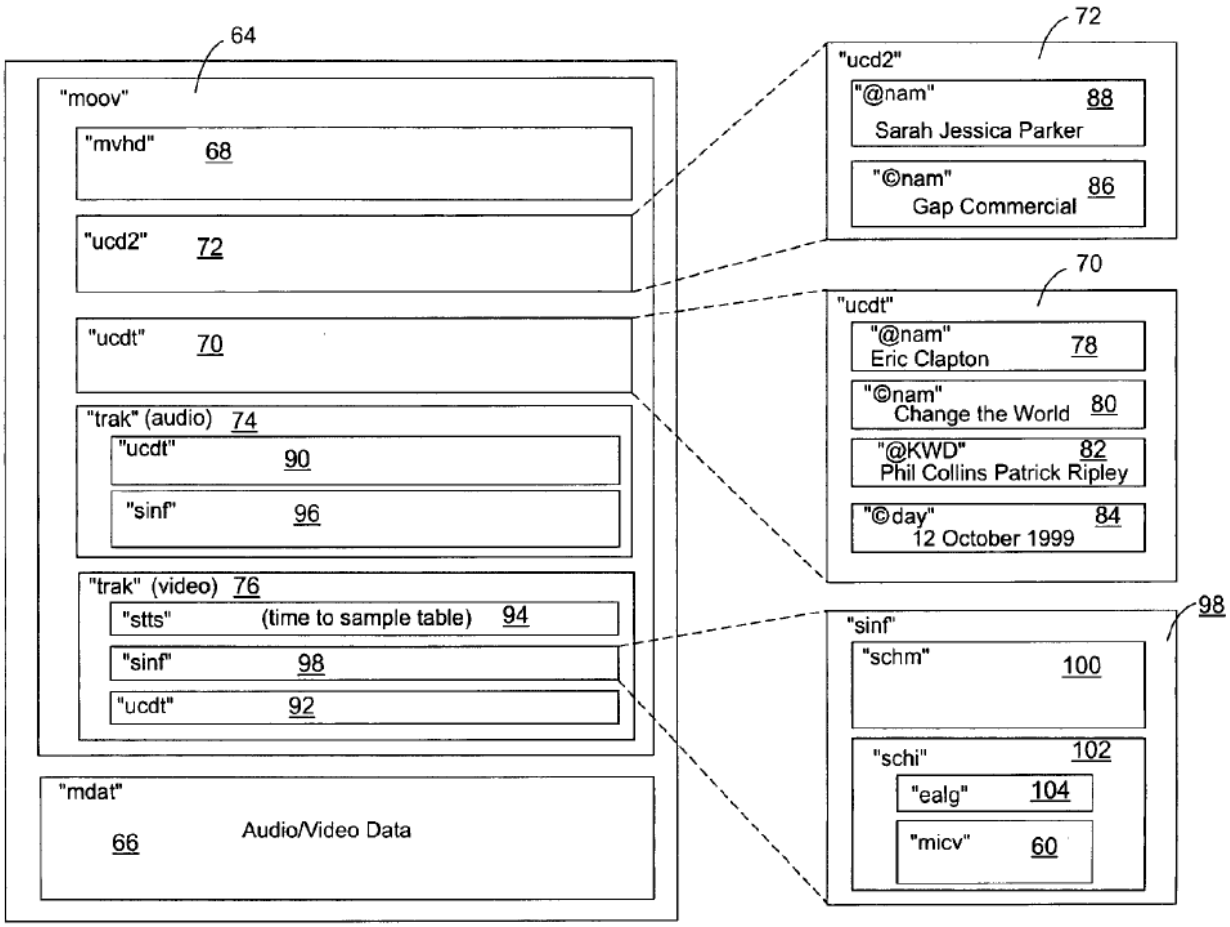


FIG. 3

EX1027, FIG. 3.

The MP4 format "puts the metadata into one integral structure inside the file, which is called the 'movie box'" such that "[t]he media data is referenced and interpreted by the metadata boxes." *Id.*, [0036]. As shown in FIG. 3, this includes an audio trak box and video trak box which "contain other boxes which hold meta information on each media." *Id.*, [0040]-[0042]; EX1003, ¶¶88-93.

2. Toma881-Toma446-Drugeon-Saeki

Multiple reasons would have prompted a POSITA to apply Saeki to Toma881-Toma446-Drugeon so that the resulting MP4 files storing the HDR video and metadata utilize the MP4 file format described in Saeki, including storing metadata in a metadata box within a trak box of the MP4 file. EX1003, ¶¶217-225.

First, the techniques described in Saeki allow for "alteration or falsification of the metadata [to] be detected." EX1027, [0009]-[0010], [0026]. This includes use of "hash and signature values [that] can be used by a client to authenticate the metadata." *Id.* Saeki's "improved method and data structure" provide "protection mechanisms [that] are desirable to accomplish delivery of protected data or content." EX1027, [0008], [0034] ("…data structure for securing metadata"), [0067]. This would have improved the accuracy and security of the resulting system. EX1003, ¶218.

Second, application of Saeki to Toma881-Toma446-Drugeon would save storage and processing resources over other prior art techniques for protecting media content that "encompass[] a complex set of technologies and business models to protect digital media" by providing protection techniques that are less complex to implement. EX1027, [0002]-[0004]; EX1003, ¶219.

Third, the proposed combination would help prevent "widespread distribution of unauthorized, duplicated content" through the improved metadata protection techniques described in Saeki. EX1027, [0002], [0008]-[0010], [0025] ("…metadata 24 with certain data protection attributes."); EX1003, ¶220.

Fourth, application of Saeki to Toma881-Toma446-Drugeon would allow for some metadata to be encrypted while other metadata is not because it is "desirable that potential users have access to this type of metadata" such as "the title of the work, the artist, and other information about the underlying audio-visual content itself" to allow users "to make a purchase decision, etc. prior to ordering and receiving a license with the associated decryption keys." EX1027, [0006]; EX1003, ¶221.

Fifth, Toma881-Toma446-Drugeon already stores the HDR data in an MP4 file format (per Toma446) and therefore a POSITA would have sought out Saeki to provide additional details on how to implement an MP4 file format having "a data structure for securing metadata" to most efficiently implement the Toma881-

Toma446-Drugeon combination. EX1027, [0034]-[0035]; EX1003, ¶222.

Finally, a POSITA would have been prompted to apply Saeki to Toma881-Toma446-Drugeon because doing so was the application of known techniques to a known method ready for improvement to yield predictable results *KSR*, 550 U.S. at 417; EX1003, ¶¶223-225; EX1004, 23:63-24:6. All four references disclose techniques for distributing video media and a POSITA would have predictably turned to Saeki for additional useful teachings in the relevant field and had a reasonable expectation of success in making the proposed modifications. EX1003, ¶¶223-225.

3. Analysis

(a) Claim 3

[3.pre]-[3.1] The information processing device according to claim 1, wherein the HDR image metadata is recorded in an HDR image metadata storage box,

Toma446 describes that the MP4 file includes "a meta-data storing box" for storing metadata and that when the video stored in an MP4 file includes HDR video, "[t]he HDR-related information may be stored as the meta-data." EX1007, 34:7-11, 34:45-50, 46:39-41; EX1011, 38-39, 54; EX1003, ¶¶226-227. Saeki similarly discloses that in the "MPEG-4 (sometimes called 'MP4') data structure" "[t]he audio and video track boxes 74, 76 contain other ***boxes which hold meta information*** on each media according to a type of the media included in the moov

box 64." EX1027, [0041], [0035]-[0036] ("The media data is referenced and interpreted by the ***metadata boxes***."), [0052], [0067], cl. 17; EX1003, ¶227.

[3.2] the HDR image metadata storage box is in a trak box in the MP4 file,

Saeki discloses that the MP4 data structure "[t]he moov box 64 encapsulates several other boxes, including… an audio track ('trak') box 74 and a video track ('trak') box 76." EX1027, [0035]-[0036], [0040]. The combination teaches that the HDR image metadata storage box is in a trak box in the MP4 file. EX1003, ¶228.

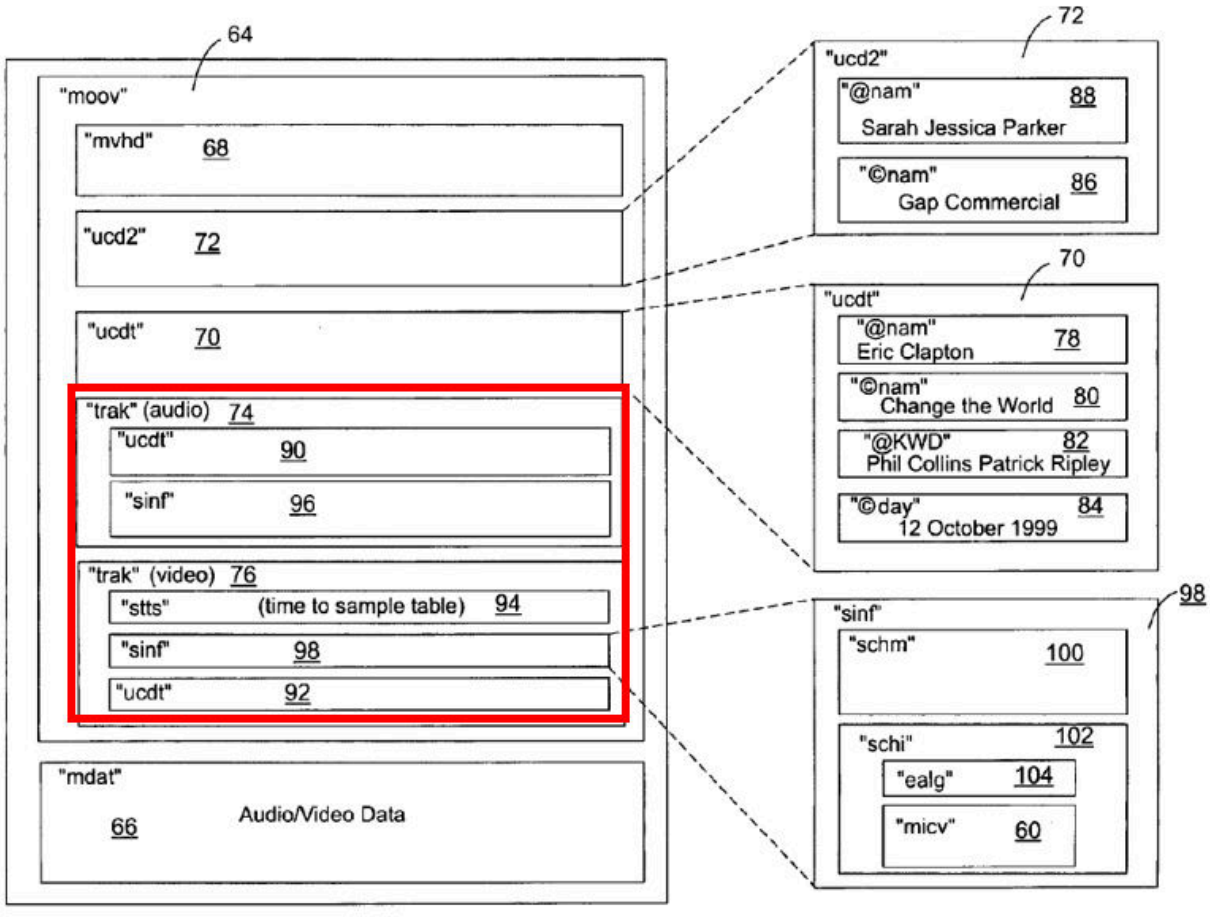


FIG. 3

EX1027, FIG. 3. Additionally, "[t]he audio and video ***track boxes*** 74, 76 contain other ***boxes which hold meta information*** on each media according to a type of the media included in the moov box 64." EX1027, [0041]-[0042]; EX1003, ¶¶228-229.

[3.3] the trak box stores metadata for application of an entire HDR image stored in the MP4 file, and

As discussed in Ground 1A, the MP4 file in the combination stores metadata for the entire HDR image, including luminance information. EX1004, 23:36-42, 4:7-30, 19:31-38, 18:34-39, 18:54-56, 7:27-35; EX1006, 24, 18; EX1003, ¶230. As Toma446 states, "[t]he ***HDR-related information may be stored as the metadata*** managing the MP4 file." EX1007, 46:39-41; EX1011, 54.

Saeki provides additional details indicating that this metadata for the entire HDR image stored in the MP4 file is stored in a trak box, stating, "[t]he audio and video ***track boxes*** 74, 76 contain other ***boxes which hold meta information on each media*** according to a type of the media included in the moov box 64." EX1027, [0041]-[0042], [0036] ("The media data is referenced and interpreted by the metadata boxes."). A POSITA would have recognized that the reference to meta information "on each media" would have included entire HDR images stored in the MP4 file in the combination. EX1003, ¶230.

[3.4] the data processing unit is further configured to read the HDR image metadata from the HDR image metadata storage box.

As discussed at Ground 1A, Elements [1.2] and [1.5], *supra*, the HDR file (stored in the MP4 file format in the combination) includes image metadata (including luminance information) that is read by Toma881's conversion apparatus 100. EX1004, 23:36-42, 4:7-30, 19:31-38, 14:46-50, 23:33-42; EX1006, 14-15, 18-20, 24; EX1003, ¶231. This metadata is stored in a metadata storage box in the combination. EX1007, 34:7-11, 34:45-50, 46:39-41; EX1011, 38-39, 54; EX1027, [0041], [0035]-[0036], [0052], [0067], cl. 17; EX1003, ¶231.

Saeki confirms that "[t]he client 18 decrypts and reproduces the received item of content." EX1027, [0033], [0062]. A POSITA would have recognized that in the combination, in which the HDR image luminance data disclosed by Toma881 is stored as metadata, reproducing the content using the metadata would have included Toma881's conversion apparatus reading the HDR image metadata from the HDR image metadata storage box for use in converting the image data. EX1003, ¶231.

(b) Claim 9

Toma881-Toma-446-Drugeon-Saeki provides claim 9 for the reasons discussed at Ground 1A, *supra*. However, to the extent that Toma446's mdat data structure for storing the HDR image data is not expressly described as an "mdat ***box***," Saeki confirms that in the resulting combination "[t]he ***mdat box*** 66 stores an actually encoded codec stream of a media, i.e., ***content data such as a video***

stream." EX1027, [0037]-[0039], [0049] ("…content located in the mdat box.");

EX1003, ¶¶232-240.

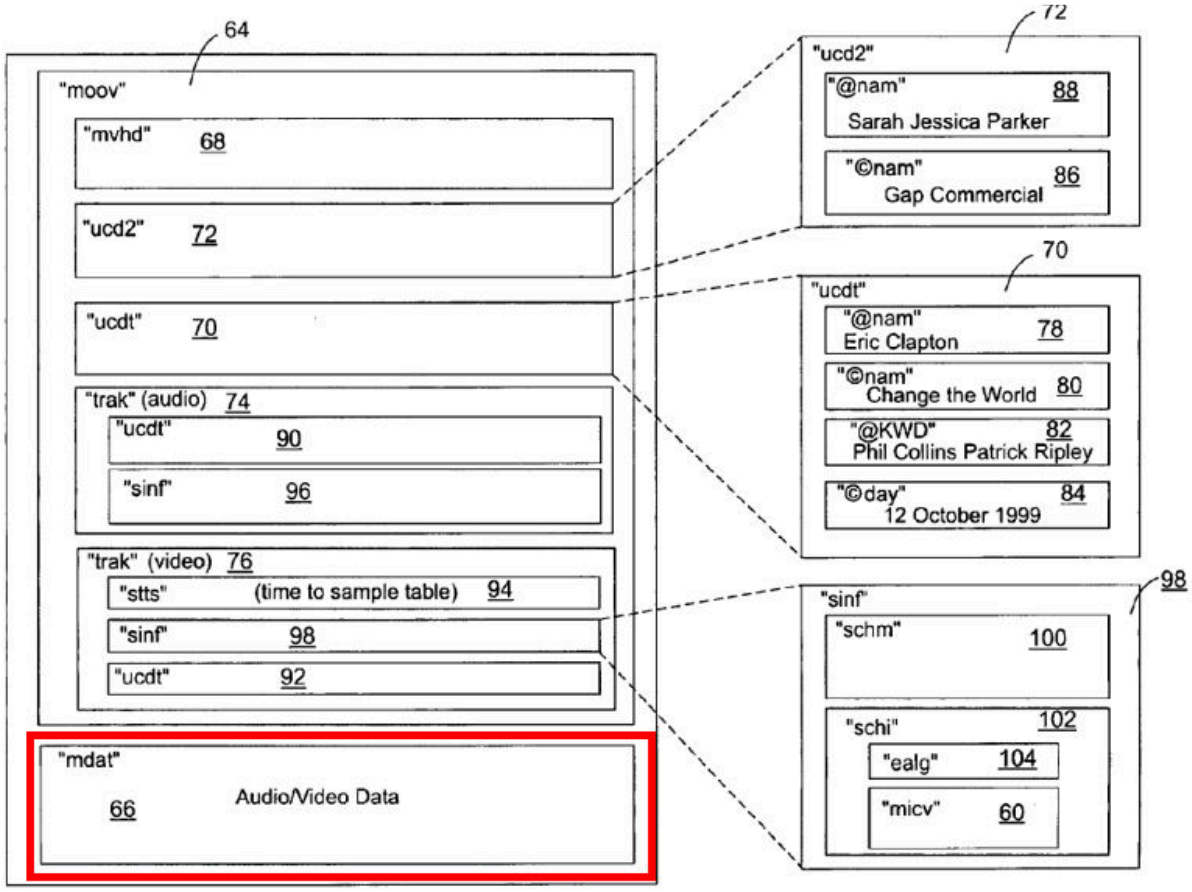


FIG. 3

EX1027, FIG. 3.

(c) Claim 10

[10.pre]-[10.1] The non-transitory computer-readable medium according to claim 9, wherein the HDR image metadata storage box is in a trak box, and

Supra, [3.2].

[10.2] the trak box stores metadata for application of an entire HDR image stored in the MP4 file.

Supra, [3.3].

D. [GROUND 2A] – Toma446 and Drugeon Render Claims 5, 6, 13, and 15 Obvious

1. Toma446-Drugeon

Multiple reasons would have prompted a POSITA to include maximum average picture level information (as taught by Drugeon) as part of the "luminance information" stored as metadata in Toma446's MP4 HDR video file. EX1003, ¶¶243-248; EX1012, [0041]; EX1013, 16-17; EX1007, 46:16-41; EX1011, 54.

First, Toma446 describes that "[d]uring the playback of the HDR content, a gamma curve is adjusted…using luminance information" stored in the MP4 metadata and Drugeon provides additional details on the maximum_average_picture_luminance value that can be beneficially used as an image luminance value in Toma446's system to achieve more accurate adjustment of the gamma curve. EX1007, 46:16-20; EX1011, 54; EX1012, [0041]; EX1013, 16-17; EX1003, ¶244. Indeed, Drugeon describes using the maximum_average_picture_luminance value to adjust a gamma curve. EX1012, [0142]-[0143]; EX1013, 15, 21.

Second, use of Drugeon's "maximum_average_picture_level" value "allows the difference from the SDR to be set within an arbitrary range" when performing conversion of HDR video data for display on an SDR (or other non-HDR enabled)

device. EX1012, [0092]-[0093]; EX1013, 16-17; EX1003, ¶245.

Third, HDR video conversion techniques that utilize maximum_average_picture_level as a luminance value in the conversion (as suggested by Drugeon) make it "possible to reduce the difference in luminance value between when the video is reproduced by an HDR device and when the video is reproduced by an SDR device, and therefore video that is less likely to provide a feeling of discomfort can be reproduced even when the video is reproduced using the SDR OETF." EX1012, [0083]; EX1013, 16; EX1003, ¶246.

Finally, a POSITA would have been prompted to apply the teachings of Drugeon regarding using a maximum average picture level luminance value in HDR image metadata to Toma446 because doing so was the application of known techniques (contemplated by the same inventors) to a known method (Toma446's MP4 file generation methods) ready for improvement to yield predictable results with a reasonable expectation of success. *KSR*, 550 U.S. at 417; EX1003, ¶¶247-248.

2. Analysis

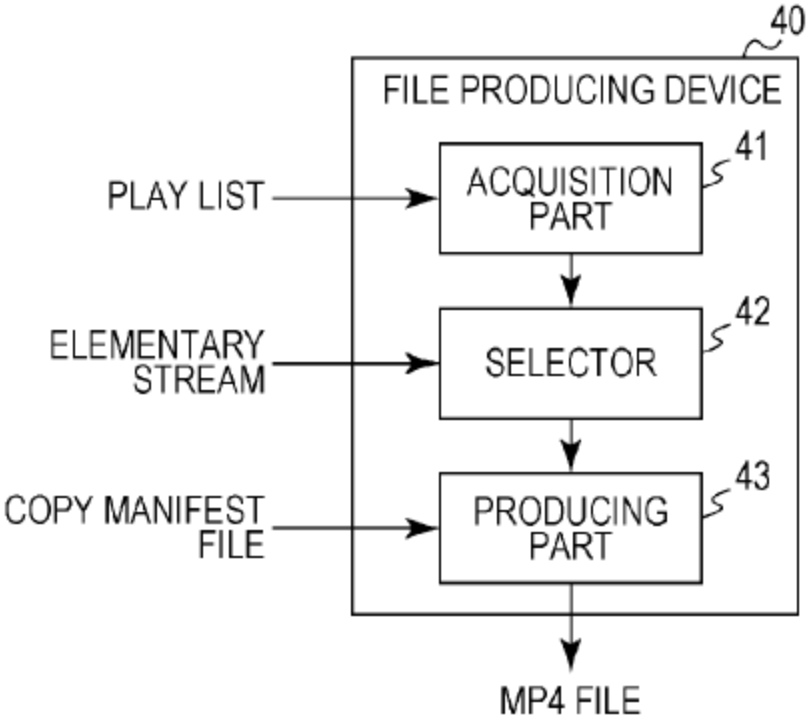
(a) Claim 5

[5.pre] An information processing device, comprising:

To the extent the preamble is limiting, the combination of Toma446 and Drugeon ("the combination") satisfies [5.pre]. EX1003, ¶¶249-250. Toma446

discloses "embodiments may be implemented as a system, a method, an integrated circuit, a computer program, a storage medium, or any selective combination thereof." EX1007, 2:18-21; EX1009, 12, 27; EX1011, 55, 15, 30, 40-42. Toma446 further explains that "[e]ach component may be constructed by a program executing part such as a CPU and a processor which reads and executes a software program recorded in the recording medium such as a hard disk and a semiconductor memory." EX1007, 46:66-47:22; EX1009, 12, 27; EX1011, 55, 15, 30, 40-42. Toma446 also discloses "[a] file producing device according to one aspect of the present disclosure that produces an MP4 file." EX1007, 10:50-62, 37:33-51 ("file producing device 40"), 11:19-35; EX1009, 12, 27; EX1011, 55, 15, 30, 40-42, 49.

FIG. 32A



EX1007, FIG. 5; EX1011, 49.

[5.1] a data processing unit configured to:

"Each component may be constructed by a program executing part such as a CPU and a processor which reads and executes a software program." EX1007, 46:66-47:10, 48:18-22, 2:18-21, 10:50-62, 11:19-35; EX1009, 12, 27; EX1011, 55, 15, 30, 40-42, 49; EX1003, ¶¶251-254.

[5.2] generate an MP4 file that stores high dynamic range (HDR) image data;

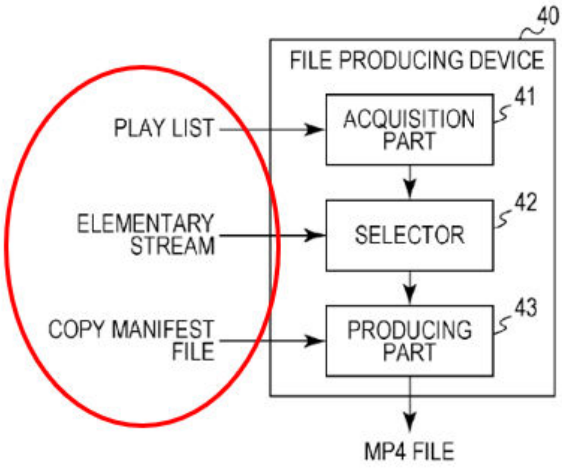
Toma446 describes "[a] file producing device…***that produces an MP4 file***." EX1007, 10:50-62, 37:33-51, 11:19-35; EX1011, 48-49, 15, 21-26. For example,

"[f]ile producing device 40" includes "producing part 43" which "produces the MP4 file by converting the data included in the elementary stream into the MP4 file format based on the manifest file." EX1007, 37:33-51, FIG. 32A, 11:19-35 ("…converts the original file into the MP4 file."); EX1011, 48-49, 15, 21-26. Additionally, Toma446 discloses that in some embodiments, "video data including the luminance within a HDR (High Dynamic Range) luminance range is stored in the MP4 file." EX1007, 4:59-62, 45:56-46:4 (describing "video data including luminance of a high luminance area… called a ***HDR*** (High Dynamic Range) is ***stored in the MP4 file***" in "a sixth modification of the fourth exemplary embodiment"), 48:23-39 ("The exemplary embodiments and the modifications may be combined."); EX1011, 54; EX1003, ¶255.

[5.3] acquire HDR image metadata associated with the HDR image data, wherein

Toma446's, "[f]ile producing device 40…produces the MP4 file by converting the data included in the elementary stream into the MP4 file format based on the manifest file." EX1007, 37:33-51, 38:31-36; EX1011, 48-49, 15, 18-19, 30, 33, 35-36. As shown in FIG. 32A, all of the information for the original file is received at the producing device 40 to produce the MP4 file:

FIG. 32A



EX1007, FIG. 32A.

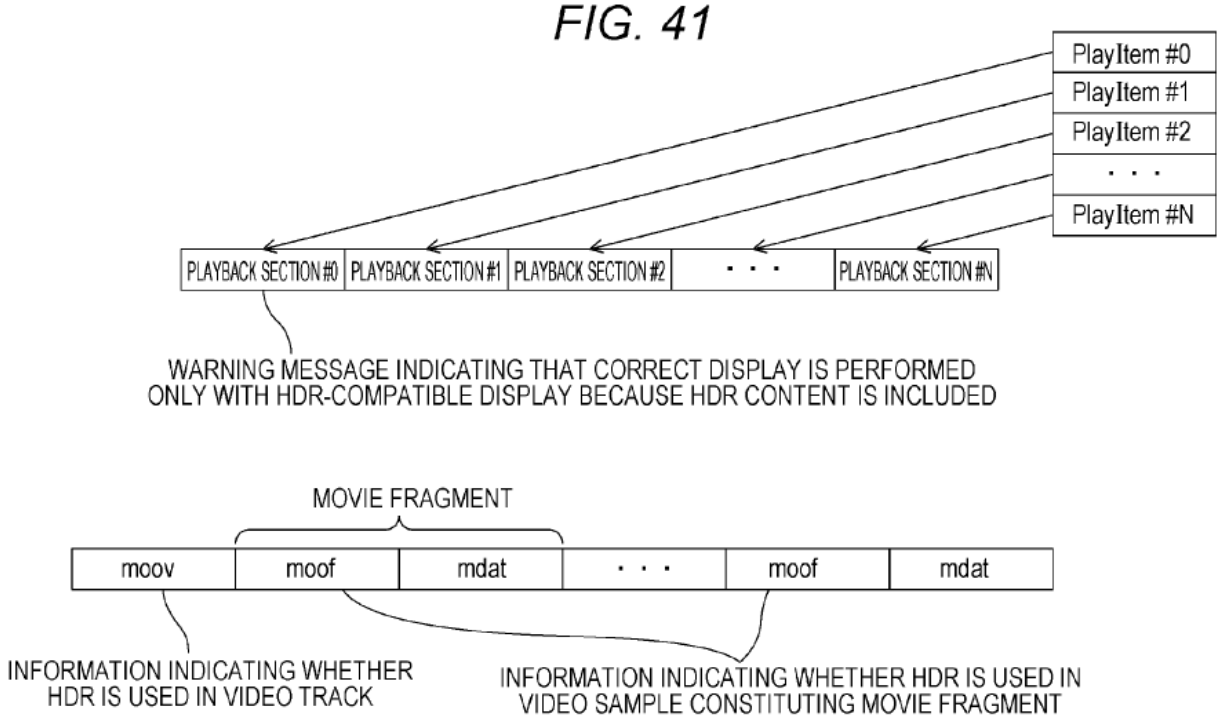
Toma446 discloses that "luminance information may be stored as the header information on the MP4." EX1007, 46:16-28; EX1011, 54. Such ***HDR-related information may be stored as the metadata*** managing the MP4 file." EX1007, 46:39-41; EX1011, 54. Such luminance information is part of the original video file (the elementary stream) and therefore when the file producing device receives the elementary stream it also acquires the HDR image metadata (luminance information) associated with the HDR image data. EX1003, ¶¶256-258. Alternatively, it would have been obvious that the file producing device acquires the HDR image metadata (luminance information) associated with the HDR image data because the file producing device would need to somehow obtain the luminance information in order to store it as metadata for the MP4 file. EX1003, ¶258.

[5.3.1] the HDR image data stored in the MP4 file is based on an MP4 format, and

Toma446 describes that "video data including the luminance within a HDR (High Dynamic Range) luminance range is stored in the MP4 file." EX1007, 4:59-62, 45:57-46:4 ("video data including luminance of a high luminance area… called a ***HDR*** (High Dynamic Range) is ***stored in the MP4 file***."); EX1011, 54.

FIG. 41 shows the MP4 format for the HDR image data

FIG. 41



EX1007, FIG. 41, 4:59-62, 45:57-46:41, 2:5-10 (describing converting video data "into an MP4 file format"), 37:33-51, 11:19-35 ("…converts the original file into the MP4 file."); EX1011, 54, 48-49, 15; EX1003, ¶259.

[5.3.2] the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data stored in the MP4 file;

Toma446 describes that "the luminance information may be stored as the header information on the MP4" and "[t]he HDR-related information may be stored as the meta-data managing the MP4 file." EX1007, 46:30-41; EX1011, 54. As such, Toma446 provides, or at least renders obvious, that luminance information is stored as HDR image metadata in the MP4 file. EX1003, ¶260.

Furthermore, Drugeon demonstrates that in the combination, the luminance information includes the luminance information metadata includes "maximum average picture level information indicating a highest average luminance value among average luminance values of all pictures included in a video sequence." EX1012, [0041], *see also* [0122], [0052], [0092]-[0095], [0108]-[0109], [0129], FIGs. 7-8; EX1013, 16-17. This "maximum_average_picture_level" value is specifically a luminance value for HDR video. EX1012, [0080]-[0082], [0116]-[0125]; EX1013, 16-17. A POSITA would have recognized the "maximum_average_picture_level" disclosed by Drugeon as a maximum value of frame average luminance of the the HDR image data. EX1003, ¶261. Because Drugeon's maximum_average_picture_level identifies the highest average luminance value among the pictures (frames) of a video sequence, a POSITA would have recognized it as the claimed "maximum value of frame average luminance" of the HDR image data. EX1003, ¶261.

[5.4]-[5.5] set an HDR image metadata storage box in the MP4 file; and store the HDR image metadata in the set HDR image metadata storage box.

Toma446 describes storing meta data in "a meta-data storing box in the MP4" generated by the file producing device. EX1007, 34:7-11, 34:45-50 ("…stored in the box indicating the meta-data of the MP4 file."), 46:39-41; EX1011, 38-39, 54; EX1003, ¶¶262-263. As discussed above, the HDR video luminance information (including Drugeon's maximum_average_picture_level in the combination) is stored as "meta-data managing the MP4 file." EX1007, 46:30-41; EX1011, 54. Toma446 states that "[t]he exemplary embodiments and the modifications may be combined" and therefore the luminance information metadata described with respect to the HDR examples would have been stored in a meatadata storing box as disclosed by Toma446. EX1007, 47:11-20, 48:23-34; EX1011, 38-39, 54; EX1003, ¶¶262-263. Alternatively, it would have been obvious to store the luminance information metadata of the HDR example in the metadata storing box described with respect to other examples in Toma446 because the metadata storing box is a known structure of the MP4 file for storing such metadata expressly contemplated by the inventors of Toma446. EX1003, ¶263.

(b) Claim 6

[6] The information processing device according to claim 5, wherein the HDR image metadata further includes maximum luminance information of the HDR image data.

Toma446 discloses that "[t]he HDR-related information may be stored as the meta-data managing the MP4 file" and that such HDR-related information includes "luminance information, such as ***peak luminance*** and a white-level luminance" for the "HDR content." EX1007, 46:39-41, 46:16-28 ("the luminance information may be stored as the header information on the MP4."); EX1011, 54. A POSITA would have recognized that "HDR content" in this context is HDR image data and therefore "peak luminance" for the "HDR content" stored in the MP4 file is maximum luminance information for the HDR image data. EX1003, ¶¶264-266. Drugeon similarly discloses a "maximum luminance" value that would have been stored as metadata in the combination. EX1012, [0092], [0143] ("maximum value of L" where "L is the luminance of an image."), [0029]; EX1013, 16-17.

(c) Claim 13

[13.pre] An information processing method comprising:

Toma446 describes "a file producing method for producing an MP4 file." EX1007, 10:50-62, 1:8-9; EX1011, 48-49, 15, 18-19, 30, 33, 35-36; EX1003, ¶267.

[13.1] in an information processing device:

Supra, [5.pre].

[13.2] generating, by a data processing unit of the information processing device, an MP4 file that stores high dynamic range (HDR) image data;

Supra, [5.1]-[5.2].

[13.3] acquiring, by the data processing unit, HDR image metadata associated with the HDR image data, wherein

Supra, [5.3].

[13.3.1] the HDR image data stored in the MP4 file is based on an MP4 format, and

Supra, [5.3.1].

[13.3.2] the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data stored in the MP4 file;

Supra, [5.3.2].

[13.4]-[13.5] setting, by the data processing unit, an HDR image metadata storage box in the MP4 file; and storing, by the data processing unit, the HDR image metadata in the set HDR image metadata storage box.

Supra, [5.4]-[5.5].

(d) Claim 15

[15.pre] A non-transitory computer-readable medium having stored thereon computer-executable instructions that, when executed by a processor of an information processing device, cause the processor to execute operations, the operations comprising:

Toma446 discloses "[e]ach component may be constructed by a program executing part such as a CPU and a processor which reads and executes a software program recorded in the recording medium such as a hard disk and a semiconductor memory." EX1007, 46:66-47:48:22; EX1009, 12, 27; EX1011, 55,

15, 30, 40-42; EX1003, ¶¶274-276. Toma446's file producing device is an information processing device. *Supra*, [5.pre]-[5.1]; EX1003, ¶¶275-276.

[15.1] generating an MP4 file that stores high dynamic range (HDR) image data;

Supra, [5.2].

[15.2] acquiring HDR image metadata associated with the HDR image data, wherein

Supra, [5.3].

[15.2.1] the HDR image data stored in the MP4 file is based on an MP4 format, and

Supra, [5.3.1].

[15.2.2] the acquired HDR image metadata includes a maximum value of frame average luminance of the HDR image data stored in the MP4 file;

Supra, [5.3.2].

[15.3]-[15.4] setting an HDR image metadata storage box in the MP4 file; and storing the HDR image metadata in the set HDR image metadata storage box.

Supra, [5.4]-[5.5].

E. [GROUND 2B] Toma446, Drugeon, and Saeki Render Claim 7 Obvious

1. Toma446-Drugeon-Saeki

A POSITA would have applied Saeki to Toma446-Drugeon for the same reasons discussed in §§III.C.2, *supra*, including to prevent "alteration or falsification of the metadata," increase security, save resources, provide unencrypted access to certain metadata, and because it would have been the

application of known techniques to known systems. EX1027, [0008]-[0010], [0026], [0034]-[0035], [0002]-[0006]; EX1003, ¶¶282-289.

2. Analysis

(a) Claim 7

[7.pre]-[7.1] The information processing device according to claim 5, wherein the HDR image metadata storage box is in a trak box in the MP4 file, and

Supra, Ground 1C [3.2]; EX1003, ¶¶290-291.

[7.2] the trak box stores metadata for application of an entire HDR image stored in the MP4 file.

Toma446 discloses, "[t]he ***HDR-related information may be stored as the metadata*** managing the MP4 file." EX1007, 46:39-41; EX1011, 54. This metadata is metadata for application of an entire HDR image, such as luminance data. EX1007, 46:16-28; EX1011, 54; EX1003, ¶¶292-294. Saeki discloses "[t]he audio and video ***track boxes*** 74, 76 contain other ***boxes which hold meta information on each media*** according to a type of the media included in the moov box 64." EX1027, [0041]-[0042], [0036] ("The media data is referenced and interpreted by the metadata boxes."). A POSITA would have recognized that the reference to meta information "on each media" would have included entire HDR images stored in the MP4 file in the combination. EX1003, ¶294.

IV. DISCRETIONARY DENIAL IS NOT APPROPRIATE

Petitioner stipulates that if this Petition is instituted and maintained,

Petitioner and its RPIs will not pursue invalidity of the ’211 patent in any other proceeding based on any grounds raised in this petition, any other ground that could haven reasonably been raised, or any ground based on any combination of prior art including any of the references used in the grounds in this Petition.

Additionally, an arbitration agreement appears to have been reached in the Delaware District Court and ITC proceedings involving the ’211 patent but termination of those proceeding is not yet finalized. EX1028; EX1029.

Petitioner submits that discretionary denial is unwarranted. Nevertheless, should Patent Owner raise discretionary denial arguments, Petitioner intends to utilize the bifurcated briefing process contemplated by the March 26, 2025, Stewart Memorandum to address and rebut any such arguments.

V. CONCLUSION

The Challenged Claims are unpatentable. Petitioner authorizes charge of fees to Deposit Account No. 06-1050.

VI. MANDATORY NOTICES

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

Petitioner (Dolby Laboratories, Inc.), Dolby Laboratories Licensing Corporation, and Dolby International AB are the real parties-in-interest.

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

The ’211 patent is the subject of civil action in the following proceedings:

- *InterDigital, Inc. et al. v. Amazon.com Services LLC*, Case No. 1-25-cv-01365 (DDE), filed November 7, 2025
- *Certain Video-Capable Electronic Devices,* Inv. No. 337-TA-1481 (ITC), filed December 18, 2025
- *Dolby Laboratories, Inc. et al v. InterDigital, Inc. et al.*, 2-26-cv-02270 (CDCA), filed March 3, 2026

Petitioner is not aware of any disclaimers, reexamination certificates or petitions for *inter partes* review for the '211 patent.

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

Petitioner provides the following designation of 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 IPR07314-0056IP1@fr.com.

Respectfully submitted,

Dated: July 29, 2026

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CERTIFICATION UNDER 37 C.F.R. § 42.24

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 13,990 words, which is less than the 14,000 allowed under 37 C.F.R. § 42.24.

Dated: July 29, 2026

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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 July 29, 2026, a complete and entire copy of this Petition for *Inter partes* Review, Power of Attorney, and all supporting exhibits were provided via Federal Express, to the Patent Owner by serving the correspondence address of record as follows:

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