

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM SERVICES LLC,
Petitioner,

V.

INTERDIGITAL MADISON PATENT HOLDINGS, S.A.S.,
Patent Owner.

IPR2026-00195
U.S. Patent No. 10,250,877

PETITIONER'S PRELIMINARY REPLY

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EXHIBIT LIST

No.	Exhibit
1001	U.S. Patent No. 10,250,877 (“’877 Patent”)
1002	File History of the ’877 Patent
1003	Declaration of Dr. Joseph P. Havlicek in Support of Petition
1004	Dr. Joseph P. Havlicek CV
1005	Declaration of Dr. Clifford Reader
1006	Dr. Clifford Reader CV
1007	U.S. Patent No. 5,805,222 (“Nakagawa”)
1008	U.S. Application No. 2004/0150747 (“Sita”)
1009	Thomas Wiegand et al., <i>WD3: Working Draft 3 of High-Efficiency Video Coding</i> , JCTVC-E603 v.8 (June 27, 2011) (“Wiegand”)
1010	Thomas Davies, <i>Resolution switching for coding efficiency and resilience</i> , JCTVC-F158 v.4 (July 7, 2011) (“Davies”)
1011	U.S. Patent No. 6,628,714 (“Fimoff”)
1012	Joint Chart Setting Forth Parties’ Post-Hearing Claim Constructions, <i>In the Matter of Certain Electronic Devices, Including Smartphones, Computers, Tablet Computers, and Components Thereof</i> , Inv. No. 337-TA-1373 (Feb. 21, 2024)
1013	Kiran Misra, <i>AHG18/21: Absolute signaling for resolution switching</i> , JCTVC-G715 v.3 (Nov. 19, 2011) (“Misra”)
1014	U.S. Patent Application No. 2008/0089417 (“Bao”)
1015	International Patent Application No. WO 2011/127961 (“Siek-mann”)
1016	International Patent Application No. WO 1990/00780 (“Dolazza”)

No.	Exhibit
1017	U.S. Patent No. 8,199,812 (“Ye”)
1018	Alex Wiltshire, <i>How many frames per second can the human eye really see?</i> , PCGamer (Jan. 19, 2017), www.pcgamer.com/how-many-frames-per-second-can-the-human-eye-really-see/
1019	Noah Snavely, <i>Lecture 3: Image Resampling</i> , Cornell (Spring 2011), www.cs.cornell.edu/courses/cs6670/2011sp/lectures/lec03_resample.pdf
1020	BDTi, <i>How video compression works</i> , EETimes (Aug. 6, 2007), https://www.eetimes.com/how-video-compression-works/
1021	Gary J. Sullivan & Thomas Wiegand, <i>Video Compression—From Concepts to the H.264/AVC Standard</i> , 93 Proceedings of the IEEE 18 (Jan. 2005)
1022	Niels Laukens, <i>Adaptive Streaming – a brief tutorial</i> , EBU Tech. Rev. (Q1 2011)
1023	Real, <i>Infographic – The History of Digital Video File Formats</i> (Apr. 22, 2012), https://blog.real.com/digital-video-file-formats/
1024	Gavin Wright, <i>Definition: interlaced display</i> , TechTarget, https://www.techtarget.com/whatis/definition/interlaced-display
1025	A. Tamhankar & K. R. Rao, <i>An Overview of H.264/MPEG-4 Part 10</i> , 4 th EURASIP Conf., Zagreb, Croatia (July 2-5, 2003)
1026	Jordi Ribas-Corbera, et al., <i>A Generalized Hypothetical Reference Decoder for H.264/AVC</i> , 13 IEEE Trans. on Circuits and Sys. For Video Tech., 674 (July 2003)
1027	Colt McAnlis & Aleks Haecky, <i>Understanding Compression, Chapter 4: Variable-Length Codes</i> , O’Reilly (July 2016), https://www.oreilly.com/library/view/understanding-compression/9781491961520/ch04.html
1028	David A. Huffman, <i>A Method for the Construction of Minimum-Redundancy Codes</i> , Proc. of the I.R.E., 1098 (Sept. 1952)

No.	Exhibit
1029	Tino von Roden, <i>H.261 and MPEG1 – A Comparison</i> , Conf. Proc. of the 1996 IEEE Fifteenth Annual Int’l Phoenix Conf. on Comp. and Comm’cns, 65 (1996)
1030	<i>JCT-VC – Joint Collaborative Team on Video Coding</i> , Int’l Telecomm. Union, https://www.itu.int/en/ITU-T/studygroups/2013-2016/16/Pages/video/jctvc.aspx
1031	<i>Terms of Reference of the Joint Collaborative Team on Video Coding Standard Development</i> , JCT-VC (Jan. 2010)
1032	A.W. Johnson & J. Princen, <i>Drift Minimization in Frequency Scalable Coders Using Block Based Filtering</i> , IEEE Workshop on Visual Signal Processing and Comm’n, 231 (September 1993)
1033	Shuai Hu et al., <i>Optimization of Memory Allocation for H.264/AVC Video Decoder on Digital Signal Processors</i> , 2008 Congress on Image and Signal Processing
1034	Paige Albiniak, <i>HDTV: Launched and Counting</i> , Highbeam Research (Nov. 2, 1998), http://www.highbeam.com/doc/1G1-53190401.html , WayBack Machine (Sept. 24, 2014)
1035	Siwei Ma, <i>Rate Control for JVT Video Coding Scheme with HRD Considerations</i> , Proceedings 2003 Int’l Conf. on Image Processing (Nov. 24, 2003)
1036	<i>All Meetings</i> , JCT-VC, phenix.int-evry.fr/jct/doc_end_user/all_meeting.php
1037	<i>Special Section on the Joint Call for Proposals on High Efficiency Video Coding (HEVC) Standardization</i> , 20 IEEE Trans. on Circuits and Sys. For Video Tech. 1661 (Dec. 2010)
1038	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the first meeting of the Joint Collaborative Team on Video Coding (JCT-VC), Dresden, DE, 15-23 April, 2010</i> , JCT-VC-A200 (Mar. 19, 2012)

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1039	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the second meeting of the Joint Collaborative Team on Video Coding (JCT-VC)</i> , Geneva, CH, 21-28 July, 2010, JCT-VC-B200 (Mar. 19, 2012)
1040	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the third meeting of the Joint Collaborative Team on Video Coding (JCT-VC)</i> , Guangzhou, CN, 7–15 October, 2010, JCT-VC-C400 (Jan. 16, 2011)
1041	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the fourth meeting of the Joint Collaborative Team on Video Coding (JCT-VC)</i> , Daegu, KR, 20-28 January, 2011, JCT-VC-D500, v.2 (Apr. 15, 2011)
1042	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the fifth meeting of the Joint Collaborative Team on Video Coding (JCT-VC)</i> , Geneva, CH, 16-23 March 2011, JCT-VC-E600, v.3 (July 19, 2011)
1043	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the sixth meeting of the Joint Collaborative Team on Video Coding (JCT-VC)</i> , Torino, IT, 14–22 July 2011, JCT-VC-F800 (Nov. 18, 2011)
1044	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the seventh meeting of the Joint Collaborative Team on Video Coding (JCT-VC)</i> , Geneva, CH, 21–30 Nov. 2011, JCT-VC-G1100 (Jan. 31, 2012)
1045	Document Information, JCTVC-E603, phenix.int-evry.fr/jct/doc_end_user/current_document.php?id=2471
1046	<i>About ITU</i> , https://www.itu.int/en/about/Pages/default.aspx
1047	European Patent Application No. 2,533,537
1048	Japanese Patent Application No. 2013-12887
1049	U.S. Patent Application No. 2012/0257702

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1050	Document Information, JCTVC-F158, phenix.int-evry.fr/jct/doc_end_user/current_document.php?id=2623
1051	<i>ITU-T In Brief</i> , https://www.itu.int/en/ITU-T/about/Pages/default.aspx
1052	<i>About MPEG</i> , https://www.mpeg.org/about-mpeg/
1053	Declaration of Benjamin Bross, <i>Samsung Elecs. Co., Ltd. v. M&K Holdings Inc.</i> , IPR2018-00696, Ex. 1002 (Excerpted)
1054	“Resolution,” Guangzhou Meeting (C) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php
1055	“Deblock,” Daegu Meeting (D) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php
1056	“Resolution,” Daegu Meeting (D) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php
1057	Geneva Meeting (E) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php?id_meeting=148&search_category=m&search_id_group=1&search_sub_group=1
1058	“Resolution,” Geneva Meeting (E) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php
1059	“Working Draft,” Geneva Meeting (E) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php
1060	Torino Meeting (F) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php?id_meeting=149&search_id_group=1&search_sub_group=1
1061	“Resolution,” Torino Meeting (F) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php
1062	“Resolution,” Geneva Meeting (G) – Document Register, phenix.it-sudparis.eu/jct/doc_end_user/current_meeting.php

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1063	Mehmet Umut Demircin, et al., <i>TE2: Compressed Reference Frame Buffers (CRFB)</i> , Geneva, CH, 21–28 July, 2010, JCT-VC-B089 (Mar. 19, 2012)
1064	Zuhang Jia and Qingjiu Huang, <i>Image Interpolation with Regional Gradient Estimation</i> , Applied Sci. (July 22, 2022)
1065	Canon, <i>EOS Movie Compression Options: All-I and IPB</i> , https://www.canon.com.hk/cpx/en/technical/va_EOS_Movie_Compression_Options_All_I_and_IPB.html
1066	Scott Sargent, <i>AV Workshop’s HD Upres Video Transfer Add On</i> (May 12, 2021), https://av-workshop.com/av-workshop-video-transfer-hd-upres/
1067	<i>Interdigital v. Lenovo</i> , Evidentiary Hearing Transcript (Aug. 14, 2024)
1068	Stipulation Letter, dated February 23, 2026
1069	Complaint, <i>InterDigital, Inc. v. Amazon.com Services LLC</i> , No. 2:25-cv-00822 (E.D. Va. Dec. 18, 2025), ECF No. 1
1070	InterDigital 10-K (Fiscal Year 2022)
1071	Order, <i>InterDigital, Inc. v. Hisense Co.</i> , C.A. No. 1:26-cv-754, ECF No. 38 (N.D. Ga. Apr. 7, 2026)
1072	Order, <i>InterDigital, Inc. v. TCL Indus. Holdings Co.</i> , C.A. No. 2:26-cv-101, ECF No. 10 (E.D. Tex. Apr. 15, 2026)
1073	EDIS Docket Filings, <i>Certain Video-Capable Electronic Devices, Including Smart Televisions, Monitors, and Components Thereof</i> , Inv. No. 337-TA-1495 (Feb. 26, 2026)

I. NO LIMITATIONS ARE MISSING FROM THE PRIOR ART

In the Patent Owner Preliminary Response (“POPR”), Patent Owner (“PO”) takes an unduly narrow reading of 37 C.F.R. §42.104, and mischaracterizes the Petition and prior art. PO’s apparent view is that a petition must identify in the prior art an *express* disclosure of every limitation in detail; there is no room for broader teachings of the same concepts, or experts to explain *how* features that may not be express, or described in different words, would be understood to be present. PO identifies no requirement that the prior art must teach every claim limitation expressly using the same words. Nor is it improper gap filling for experts to explain how a POSITA would have understood the prior-art disclosures. The Petition here identifies where the prior art teaches every claim element (as required), at times supported by testimony to explain how.

PO first argues that Nakagawa expressly discloses only an encoder but not a decoder (Ground 1, cls. 1[pre]/7[pre]), and PO further argues that Wiegand-Davies discloses only a decoder but not an encoder (Grounds 2-3, cls. 4[pre]/8[pre]). POPR, 12-16, 22-23. PO ignores, however, the Petition’s explanation that Nakagawa discloses a decoder *within* the encoder (even providing a decoder output). Paper 1, 15-17 (“Pet.”) (citing Nakagawa, 5:42-59, 6:15-40, Fig. 2). And, as Petitioner’s expert explained, because encoders and decoders are inverses of one another—as shown in ample supporting evidence (Pet., 15-16, n.4 (supported by Ex-1014, ¶4;

Fimoff, 2:33-37, 2:47-50; Sita, ¶51; Ex-1003, ¶¶49-52, 117-24); Pet., 63-64 (supported by Fimoff, 2:47-50; Ex-1032, 1; Ex-1003, ¶¶302-07)—when a reference describes an encoder or decoder, it also describes its counterpart. Pet., 15-17, 62-64.

PO next argues that “Petitioner admits that Sita’s filter operation 224 does not include a vertical filter” (POPR, 16), but that is incorrect. Sita describes the detailed operations of a “horizontal filter” (Pet., 29), and states that those teachings “easily extend...in the **vertical** direction if desired.” Sita, ¶95 (emphasis added); *see also* Pet., 29. PO latches onto “if desired” to cabin Sita to only expressly describing a “horizontal filter” through unsupported attorney argument (POPR, 17-18)—contrary to Sita’s express words. *Invitrogen Corp. v. Clontech Lab., Inc.*, 429 F.3d 1052, 1068 (Fed. Cir. 2005) (“[u]nsubstantiated attorney...is no substitute for competent, substantiated expert testimony.”); *Twitch Interactive, Inc. v. RazDog Holdings LLC*, IPR2025-00307, Paper 21 (July 28, 2025).

PO then argues Fimoff fails to teach a horizontal filter. POPR, 20-22. Here, PO recognizes that Fimoff discusses horizontal filtering, but argues Fimoff does not *expressly* apply that filter to “lines of a reference block.” *Id.*, 20-21. That is the entire point of a horizontal filter, which Petitioner’s expert properly explains. *See* Pet., 52 (citing Sita, ¶123; Ex-1050, ¶30 to demonstrate horizontal filters apply to lines).

PO further contends that, despite outlining a four-step reconstruction process (Wiegand, 109), Wiegand fails to disclose a “reconstruction process” because the

intricate details of that process had not been written yet (POPR, 23-24). The claims do not require the details PO demands; they merely require combining a “residue block” and a “motion compensated reference block” (Ex-1001, cls. 1, 7), like nearly every predictive video-decoding process that came before it (Pet., 55; Ex-1003, ¶¶273-74 (citing Fimoff, 2:20-27, 2:60-66, Wiegand, 20). *See In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994); *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1570 (Fed. Cir. 1997).

Finally, PO argues that Wiegand fails to disclose a generic “circuit” in claims 7 and 8. POPR, 25-26. But PO ignores the Petition’s explanation that, by Wiegand discussing its applicability to “videoconferencing,” “television broadcasting,” “internet streaming,” and use of “computer data,” that would have been understood to involve computers, and thus a generic circuit. Pet., 68; Ex-1003, ¶¶324-27.

II. PO MISREPRESENTS PREDICTIVE DECODING

PO also dives into technical details—unsupported by expert analysis—to argue that Sita’s filters would break Nakagawa, allegedly undermining the combination (POPR, 27-37), and that Fimoff’s “linear interpolation” is not a “GFv” filter (POPR, 45-51). These arguments are either an unsupported claim-construction argument as to what “motion-compensation interpolation” (“MCI”) requires, or otherwise misunderstand how MCI works.

Specifically, PO conflates “motion compensation” with MCI. POPR, 28.

Although motion vectors “are required to perform motion compensation” (*id.*), MCI is different. Indeed, PO’s expert in third-party proceedings explained that MCI involves “generat[ing] half pixels and quarter pixels that don’t actually exist,” because objects in a video “probably [do] not move[] an exact number of pixels” between two video frames, and thus “we can often get a better prediction” through interpolation. Ex-1067, 508:11-511:12. In other words, MCI is effectively more resampling on top of what Nakagawa already does *to calculate* (in an encoder) *or apply* (in a decoder) motion vectors, but motion vectors are not required for MCI.

Thus, PO wrongly contends that incorporating Sita’s joint filter “would render Nakagawa’s encoder unable to generate accurate motion vectors.” POPR, 29. Indeed, the only technical evidence of record is that the combination would generate *more accurate* motion vectors. Ex-1003, ¶¶144-49. Relatedly, PO wrongly contends that Fimoff’s “linear interpolation” filter is not MCI because it “does not consider a motion vector.” POPR, 47-48. But it *is* MCI because it produces the *interpolated* picture used *to perform motion compensation*. Ex-1003, ¶¶106, 258-60, 276.

III. THE PETITION DOES NOT IMPROPERLY INCORPORATE EXPERT OPINION BY REFERENCE

Finally, PO argues improper incorporation by reference for the Petition’s evidence that: (1) Sita teaches a joint resampling/MCI filter; and (2) Wiegand and Davies are prior art. POPR, 37-45, 51-55. These arguments should be rejected.

First, the *Petition* identifies two tables in Sita (7B and 7C), explaining each

represents a filter that takes pixel values as inputs and applies weights to perform both resampling and MCI in a single clock cycle (Pet., 29), consistent with 37 C.F.R. §42.104(b)(4). PO takes issue with Petitioner's expert providing a step-by-step walkthrough of *how* the weights in those Tables are applied. POPR, 40 (citing Ex-1003, ¶¶165-81). That proper expert testimony explains how Sita would be understood, and is a far cry from the cases PO cites. *See, e.g., Cisco*, IPR2014-00454, Paper 12 at 8-9 (improper to summarily state limitations are met or motivations exist, with no explanation, citing only the expert declaration); *Canadian Solar*, IPR2024-01039, Paper 13, 27 (rejecting attempts to incorporate Examiner/Board conclusions involving different claims/patents through expert); *3M*, 860 F. App'x at 728 (rejecting argument not raised in briefing at all, but referenced in expert report).

Second, PO identifies no requirement that a Petition itself must include all of the reasoning underlying public accessibility, and the Board routinely accepts reference to supporting declarations on this issue. *See, e.g., DISH Network LLC v. Entropic Communications, LLC*, IPR2024-00373, Paper 48 at 27-31 (Nov. 14, 2025) (evaluating public accessibility based on referenced declaration); *see id.*, Paper 2 at 27 (petition stating only "Jacobsen was publicly available in 1994 and qualifies as prior art under at least 102(b)," citing declaration); *Samsung Elecs. Co.. v. Wilus Institute of Standards and Tech. Inc.*, IPR2025-00934, Paper 12 at 10-11 (Nov. 3, 2025) (same).

Dated: May 5, 2026

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CERTIFICATE OF SERVICE

I hereby certify that on May 5, 2026 true and correct copies of the foregoing PETITIONERS' PRELIMINARY REPLY was served via electronic mail upon the following counsel of record for Patent Owner:

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