

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,

Petitioners

v.

TELEFONAKTIEBOLAGET LM ERICSSON,

Patent Owner.

IPR2024-01008

U.S. Patent No. 9,641,841

PETITIONER'S PRELIMINARY REPLY

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

EXHIBIT LIST

Exhibit	Reference
1001	U.S. Patent No. 9,641,841 (“’841 Patent”)
1002	File History of the ’841 Patent
1003	Declaration of Dr. Dan Schonfeld in Support of Petition
1004	Dr. Dan Schonfeld CV
1005	Declaration of Dr. Clifford Reader
1006	Dr. Clifford Reader CV
1007	Declaration of June Munford
1008	U.S. Provisional Pat. App. No. 61/447,862
1009	Gisle Bjontegaard et al., <i>Definition of the new coding elements from Telenor</i> , VCEG Document Q15-J-28 (May 5, 2000) (“Bjontegaard”)
1010	Gisle Bjontegaard et al., <i>Software Including Proposed New H.26L Coding Elements from Telenor</i> , VCEG Document Q15-J-29, File System Printout (q15j29.zip) (May 9, 2000) (“Bjontegaard’s Code”)
1011	Gisle Bjontegaard et al., <i>Software Including Proposed New H.26L Coding Elements from Telenor</i> , VCEG Document Q15-J-29, ldecod.c (q15j29.zip\ldecod\src\ldecod.c) (May 9, 2000) (“Bjontegaard’s Code”)
1012	Gisle Bjontegaard et al., <i>Software Including Proposed New H.26L Coding Elements from Telenor</i> , VCEG Document Q15-J-29, image.c (q15j29.zip\ldecod\src\image.c) (May 9, 2000) (“Bjontegaard’s Code”)
1013	Gisle Bjontegaard et al., <i>Software Including Proposed New H.26L Coding Elements from Telenor</i> , VCEG Document Q15-J-29, lencod.c (q15j29.zip\lencod\src\lencod.c) (May 9, 2000) (“Bjontegaard’s Code”)
1014	Gisle Bjontegaard et al., <i>Software Including Proposed New H.26L Coding Elements from Telenor</i> , VCEG Document Q15-J-29, image.c (q15j29.zip\lencod\src\image.c) (May 9, 2000) (“Bjontegaard’s Code”)

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1015	Gisle Bjontegaard et al., <i>Software Including Proposed New H.26L Coding Elements from Telenor</i> , VCEG Document Q15-J-29, Readme (q15j29.zip\readme.txt) (May 9, 2000) (“Bjontegaard’s Code”)
1016	Gisle Bjontegaard et al., <i>Deblocking filter for 4x4 based coding</i> , VCEG Document Q15-J-27 (May 9, 2000) (“Bjontegaard’s Cover”)
1017	Telecommunication Standardization Sector of ITU, <i>ITU Recommendation H.241: Extended video procedures and control signals for H.300-series terminals</i> (May 29, 2006) (“H.241”)
1018	Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, <i>Test Model under Consideration</i> , Document JCTVC-B205, v.7 (Oct. 9, 2010) (“B205”)
1019	International Application Publication No. WO 01/54415 (“Aksu”)
1020	Rafael C. Gonzalez & Richard E. Woods, <i>Digital Image Processing</i> (3d ed.), Pearson-Prentice Hall (2008) (“Gonzalez”)
1021	International Application Publication No. WO 2009/033390
1022	English Translation of International Application Publication No. WO 2009/033390 (“Fu”)
1023	Joint Video Team (JVT) of ISO/IEC MPEG and ITU-T VCEG, <i>Working Draft Number 2, Revision 2 (WD-2)</i> , Document JVT-B118r2 (Mar. 15, 2002) (“B118”)
1024	Peter List et al., <i>Adaptive Deblocking Filter</i> (July 2003)
1025	U.S. Application Publication No. 2006/0078048 (“Bjontegaard ’048”)
1026	<i>In the Matter of Certain Electronic Computing Devices, and Components and Modules Thereof</i> , Investigation No. 337-TA-1387, Joint Claim Construction Chart (ITC May 8, 2024)
1027	<i>In the Matter of Certain Electronic Computing Devices, and Components and Modules Thereof</i> , Investigation No. 337-TA-1387, Complainant’s Opening Claim Construction Brief (ITC May 15, 2024)
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1030	BDTi, How video compression works, EETimes (Aug. 6, 2007), https://www.eetimes.com/how-video-compression-works/
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1032	Mahdi Nazm Bojnordi, et al., <i>A Fast Two Dimensional Deblocking Filter for H.264/AVC Video Coding</i> , IEEE, 2006 Canadian Conference on Electrical and Computer Engineering, 2017 (Jan. 15, 2007)
1033	Chung-Ming Chen & Chung-Ho Chen, <i>Parallel Processing for Deblocking Filter in H.264/AVC</i> , Proceeding of the fourth IASTED International conference on CIIT, 2005:188 (2005)
1034	Purdue University, <i>CE 503 – Photogrammetry I</i> (2002), https://engineering.purdue.edu/~bethel/digim1.pdf
1035	Telecommunication Standardization Sector of ITU, <i>ITU Recommendation H.263: Video coding for low bit rate communication</i> (Feb. 1998)
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1037	Telecommunication Standardization Sector of ITU, <i>ITU Recommendation H.264: Advanced video coding for generic audiovisual services</i> (Mar. 2010)
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1039	Chun-Lung Hsu & Yu-Sheng Huang, <i>A Fast-Deblocking Boundary-strength Based Architecture Design of Deblocking Filter in H.264/AVC Applications</i> , 52 J. of Signal Processing Systems 211 (2008)
1040	Ian E. Richardson, <i>The H.264 Advanced Video Compression Standard</i> (2d. ed, Wiley 2010)

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1041	Ramesh Jain et al., <i>Machine Vision</i> , McGraw-Hill (1995)
1042	<i>JCT-VC – Joint Collaborative Team on Video Coding</i> , https://www.itu.int/en/ITU-T/studygroups/2013-2016/16/Pages/video/jctvc.aspx
1043	Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, <i>CE12: Ericsson's and MediaTek's deblocking filter</i> , Document JCTVC-F118 (July 2, 2011)
1044	Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, <i>Simplification of chroma deblocking filter in JCTVC-F118</i> , Document JCTVC-F120 (July 1, 2011)
1045	Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, <i>Improving Deblocking filter efficiency</i> , Document JCTVC-F256 (July 1, 2011)
1046	Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, <i>CE12: SK Telecom/SKKU Deblocking Filter</i> , Document JCTVC-F258 (July 1, 2011)
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1051	Joint Video Team (JVT) of ISO/IEC MPEG and ITU-T VCEG, <i>AHG Report: Loop Filter</i> , Document JVT-B011 (Jan. 25, 2002)
1052	Kin-Hung Lam, <i>Reduced Complexity Deblocking Filter for H.264 Video Coding</i> , Conference Record of the Thirty-Ninth Asilomar Conference on Signals, Sys. and Comput., 2005 (Mar. 13, 2006)
1053	Yuan Li et al., <i>A Novel Deblocking Filter Algorithm in H.264 for Real Time Implementation</i> , Third Int'l Conf. on Multimedia and Ubiquitous Engineering (Nov. 10, 2009)
1054	O.L. MacSorley, <i>High-Speed Arithmetic in Binary Computers</i> , 49:1 Proc. of the IRE 67 (Jan. 1961)
1055	Dave Shapton, <i>Microsoft Media Player</i> , Sound on Sound (Jan. 2001), https://www.soundonsound.com/people/microsoft-media-player
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1060	U.S. Patent No. 7,283,588
1061	U.S. Patent No. 7,430,336
1062	U.S. Patent No. 7,692,682
1063	U.S. Patent No. 10,142,659

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1064	U.S. Application Publication No. 2005/0243911 (“Kwon”)
1065	U.S. Application Publication No. 2006/0078048
1066	U.S. Application Publication No. 2009/0141808
1067	Video Coding Experts Group (VCEG), <i>Reduced Complexity Loop Filter</i> , ITU-T Study Group 16, Document VCEG-L25 (Dec. 18, 2000)
1068	Video Coding Experts Group (VCEG), <i>H.26L Test Model Long Term Number 6 (TML-6) draft0</i> , ITU-T Study Group 16, Document VCEG-L45d0 (Mar. 3, 2001)
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1076	<i>About MPEG</i> , https://www.mpeg.org/about-mpeg/
1077	<i>H.241 Download</i> , https://www.itu.int/rec/T-REC-H.241-200605-S

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1079	Gary J. Sullivan et al., <i>Using the Draft H.26L Video Coding Standard for Mobile Applications</i> , IEEE (2001)
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1081	All Meetings, VCEG, www.itu.int - /wftp3/av-arch/video-site/
1082	Osaka Meeting (J) – Document Register, VCEG, https://www.itu.int/wftp3/av-arch/video-site/0005_Osa/
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1092	ITU-T Study Group 16 List of Questions under Study (Study Period 1997-2000), https://www.itu.int/ITU-T/1997-2000/com16/questions_old.html

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1099	Gary J. Sullivan & Jens-Rainer Ohm, <i>Meeting report of the second meeting of the Joint Collaborative Team on Video Coding (JCT-VC), Geneva, CH, 21-28 July, 2010</i> , JCT-VC-B200 (October 7, 2010)
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1104	Gary Sullivan, <i>List of Documents of 2nd JVT Meeting (Geneva, 29 Jan – Feb 1, 2001)</i> , JVT-B00r0 (Jan. 28, 2002)

Exhibit	Reference
1105	Gary Sullivan et al., <i>JVT (of ISO/IEC MPEG and ITU-T Q.6/16 VCEG) 2nd Meeting Report, Jan 29-Feb 1 2002</i> , JVT-B001d1 (Feb. 5, 2002)
1106	<i>List of Documents for the Ninth Meeting ITU-T Q.15/SG16 Video Coding Experts Group</i> , VCEG Q15-I-00r0 (Sept. 25, 1999)
1107	<i>List of Documents for the Tenth Meeting ITU-T Q.15/SG16 Video Coding Experts Group</i> , VCEG Q15-J-00r0 (May 12, 2000)
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1111	<i>Terms of Reference for Joint Video Team (JVT) Activities</i> , http://www.itu.int/ITU-T/studygroups/com16/jvt/JVTTToR.pdf , Wayback Machine (Apr. 21, 2003)
1112	Gary Sullivan et al., <i>Invitation to the Second JVT Meeting Geneva, Switzerland, Jan. 29 – Feb. 1, 2002</i> , JVT-B-TD-00r1 (Jan. 24, 2002)
1113	Cliff Reader, <i>Origins of the performance of H.264/AVC: an account of the development of H.263 and H.264 coding tools</i> , 5909 Proc. of SPIE (2005)
1114	Ron Yan, et al., <i>Error Robust Coding for the FGS Enhancement Bitstream</i> (2001), with bibliographical printout
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1121	U.S. Application No. 2007/0014358
1122	U.S. Application No. 2008/0260041
1123	U.S. Application No. 2007/0200923
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1128	Hau-cheoil Choi, <i>Deblocking Filter and Adaptive Loop Filter</i> , 15:4 J. Broadcasting Eng. 66 (Dec. 2010) (machine translation and original)
1129	U.S. Application No. 2012/0106640
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1132	Osaka Meeting (J) – Document Register, VCEG Pictel File-Transfer Protocol Website, http://standard.pictel.com/ftp/video-site/0005_Osa/ , WayBack Machine (Dec. 25, 2002)
1133	Geneva Meeting (B) – Document Register, VCEG/JVT Pictel File-Transfer Protocol Website, http://standard.pictel.com/ftp/video-site/0201_Gen/ , WayBack Machine (Dec. 25, 2002)

In seeking discretionary denial, Patent Owner misapprehends both the relevant standard and the art and arguments presented during prosecution. The discretionary-denial factors weigh heavily against denial; indeed, the Board need not go further than step 1 of the *Advanced Bionics* framework.

To start, the relief Patent Owner seeks is unclear. Patent Owner first contends the *entire* Petition should be discretionarily denied, (POPR, 64), yet argues only for the denial of Ground 2, (POPR, 66). But the Board “do[es] not institute on a ground-by-ground basis.” *Neurent Med. Inc. v. Aerin Med. Inc.*, IPR2024-00275, Paper 9, 13 (July 22, 2024); 37 C.F.R. §42.108(a); *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1359–60 (Fed. Cir. 2018). Because Patent Owner offers no substantive reason for discretionary denial of Ground 1, that should be dispositive. *Neurent*, IPR2024-00275, Paper 9, 13 (refusing denial because “Patent Owner does not argue or present any basis for exercising our discretion...as to any of the additional grounds”).

Even as to Ground 2, Patent Owner’s arguments fail. Patent Owner argues that the Petition presents art and arguments cumulative of what was considered during prosecution based on the Examiner’s combination of Bjontegaard ’048 (Ex-1025) and List (Ex-1024). POPR, 64–65. But to make this argument, Patent Owner combines these references in a way that the Examiner neither considered nor advanced. POPR, 65. That is not a proper basis for the Board to invoke its discretion.

For context, the claims are directed to two separate, block-specific calculations to determine how many pixels to filter in each block, which are depicted below (with block 1 in red, and block 2 in blue):

$$d_{pi} = (|p0_i - 2p1_i + p2_i|) < \beta \qquad d_{qi} = (|q0_i - 2q1_i + q2_i|) < \beta$$

See, e.g., Ex-1001, cl. 1, 9:35–59, Fig. 2A (depicting separate “p” and “q” blocks).

Although Bjontegaard ’048 uses equations with the same coefficients ([1 -2 1]) as those claimed, Bjontegaard ’048 *combines* pixels from multiple blocks into a single equation, using either one or two lines of pixels from each block:

One Line of Pixels
(line 1)

$$d = (|a1 - 2b1 + c1| + |d1 - 2e1 + f1|) < \beta$$

Two Lines of Pixels
(lines 2 and 5)

$$d' = (|a2 - 2b2 + c2| + |d2 - 2e2 + f2| + |a5 - 2b5 + c5| + |d5 - 2e5 + f5|) < \beta$$

Ex-1025, [0042], [0044], Fig. 3 (showing pixels a, b, c in one block, and d, e, f in another). For its part, List—a reference the Examiner cited but never materially applied for rejection—at least considers using separate equations (different than the ones claimed) to determine how many pixels to filter in each block. Ex-1024, 617.

Patent Owner now suggests—without any citation to the prosecution history—that not only did the Examiner recognize Bjontegaard ’048 as teaching a well-known “Laplacian” equation, but also considered combining it with List’s separate equations. POPR, 65–66. These arguments are unsupported and incorrect.

First, the Examiner never recognized that the series of Laplacians ($\begin{bmatrix} 1 & -2 & 1 \end{bmatrix}$) in Bjontegaard '048's equations are well-known measures of pixel activity, or that Bjontegaard '048's series of Laplacians could be split up by block. *See, e.g.*, Ex-1002, 410 (noting only Bjontegaard '048's coefficients $\begin{bmatrix} 1 & -2 & 1 \end{bmatrix}$ match the claims). Any teachings concerning the Laplacian, particularly its benefits over other equations to measure pixel activity (such as those taught by Aksu and List) and its relevance to separate blocks, come from the Petition's reliance on Gonzalez and Petitioner's expert. Petition, 53–54; Ex-1003 ¶¶61–64, 142–43, 382–88. Patent Owner identifies no similar disclosures considered during prosecution.

Second, the Examiner never considered combining Bjontegaard '048 and List in the way Patent Owner suggests. The Examiner merely cited Bjontegaard '048's multi-block equations as meeting the two block-specific equations claimed. Ex-1002, 409–11 (Examiner citing Bjontegaard '048, [0042], [0045], [0046]). And although the Examiner also cited List in a rejection, the Examiner provided **no** modification to Bjontegaard '048 based on List. *See id.*, 409–17.

In response, the Applicant argued that Bjontegaard '048 failed to teach “two ***separate*** determinations,” one for each block, but instead taught “***a single decision***” for both blocks. *Id.*, 506–07 (emphasis added). And when it came to List, the Applicant remarked that “[t]he Office Action's analysis...provides no specific citations to List.... List's pertinence to the specific rejections remains unclear, since the Office

Action does not indicate that List provides any suggestion to modify Bjontegaard [’048]’s teachings *in any way*.” *Id.*, 504 n.1 (emphasis added). The Examiner accepted these arguments and allowed the claims. *Id.*, 518 (noting “the claims cover a *separate* treatment of the pixels on each side of the block boundary,” and that “Bjontegaard [’048] describes filtering equations that consider pixel values *on both sides of a block boundary*” (emphasis added)).

At base, the Examiner never indicated that they considered *any* reference as teaching separate, block-specific calculations as claimed, let alone that List bridged that gap. Yet here, the Petition’s Ground 2 *starts* with separate, block-specific equations (Aksu), which are then substituted with the Laplacian because of its known benefits (Gonzalez). Petition, 55–59. Patent Owner fails to explain how the Examiner’s rejection—which *starts* with equations that use pixels from multiple blocks (Bjontegaard ’048), without modification (List)—is cumulative of the arguments presented here. *See Align Tech., Inc. v. Dental Monitoring SAS*, IPR2024-00052, Paper 10, 11–12 (Apr. 19, 2024) (declining denial for art that provided missing elements and given failure to explain cumulativeness). It is not. And the Examiner’s failure to cite any art as teaching separate, block-specific equations to reach the claims would be material error regardless under *Advanced Bionics* step 2. *See K/S Himpp v. Bragi GmbH*, IPR2023-01205, Paper 8, 21–22 (Mar. 19, 2024).

The Board should decline to invoke its discretion to deny the Petition.

Dated: October 25, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on October 25, 2024 true and correct copies of the foregoing PETITIONER’S PRELIMINARY REPLY was served via electronic mail upon the following counsel of record for Patent Owner:

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