

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

ADVANCED CODING TECHNOLOGIES LLC,	)	Case No. 2:22-cv-00501-JRG (LEAD CASE)
	)	
Plaintiff,	)	<u>JURY TRIAL DEMANDED</u>
	)	
v.	)	
	)	
LG ELECTRONICS INC. and LG ELECTRONICS U.S.A., INC.,	)	
	)	
Defendants.	)	
	)	

ADVANCED CODING TECHNOLOGIES LLC,	)	Case No. 2:22-cv-00499-JRG (MEMBER CASE)
	)	
Plaintiff,	)	<u>JURY TRIAL DEMANDED</u>
	)	
v.	)	
	)	
SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS AMERICA INC.,	)	
	)	
Defendants.	)	
	)	

**PLAINTIFF’S DISCLOSURE OF ASSERTED CLAIMS
AND INFRINGEMENT CONTENTIONS**

Plaintiff Advanced Coding Technologies LLC (“ACT” or “Plaintiff”) hereby makes the following infringement disclosures under the Local Patent Rules with respect to United States Patent Nos. 6,845,128 (the “’128 Patent”), 8,090,025 (the “’025 Patent”), 8,139,150 (the “’150 Patent”), 9,445,041 (the “’041 Patent”), 9,986,303 (the “’303 Patent”), and 10,218,995 (the “’995 Patent”) (collectively, the “ACT Patents” or “Asserted Patents”). ACT’s investigation is ongoing and discovery is in its preliminary stages. Accordingly, these disclosures are based on information

available to ACT at this time. ACT reserves the right to supplement this disclosure after further discovery from Defendants and non-parties, particularly documents and other discovery regarding Defendants' accused devices. ACT also reserves the right to assert additional claims of the ACT Patents, accuse different products, or find alternative literal and/or equivalent infringing elements in Defendants' products.

I. DISCLOSURE OF ASSERTED CLAIMS AND INFRINGEMENT CONTENTIONS PURSUANT TO LOCAL PATENT RULE 3-1

A. ASSERTED CLAIMS

Defendants Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Samsung" or "Defendants") have infringed and/or continue to infringe one or more of the following claims of the ACT Patents in connection with the Accused Products set forth below:

- Claims 1-4 of the '128 Patent;
- Claims 6-8 and 10 of the '025 Patent;
- Claims 1-4 of the '150 Patent;
- Claims 1, 2, 4, and 6 of the '041 Patent;
- Claim 1 of the '303 Patent; and
- Claims 2-4 and 11 of the '995 Patent.

B. ACCUSED INSTRUMENTALITIES

1. Accused Products

(a) '128 Patent

ACT is currently aware that Defendants have and continue to directly infringe the '128 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States

products that satisfy each and every limitation of one or more claims of the '128 Patent. Such products include each device made, used, offered for sale, sold, and/or imported into the United States containing NVIDIA processors using the “Turing” or “Ampere” architectures including, but not limited to, the Samsung Galaxy Book Odyssey, Samsung Galaxy Book3 Ultra, Samsung Notebook Odyssey and Samsung Notebook 7 Force, which are video-emphasis encoding apparatuses.

(b) '025, '303, and '995 Patents

ACT is currently aware that Defendants have infringed and continue to directly infringe the '025, '303, and '995 Patents, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '025, '303, and '995 Patents. Such products include at least Samsung Televisions compliant with the AV1 and/or SVT-AV1 Standards including, but not limited to, AU7000, AU8000, AU9000, BU8000, BU8500, Q60A, Q60B, Q60C, Q700T, Q70A, Q70B, Q70C, Q800T, Q80A, Q80B, Q80C, Q900TS, Q90T, Q950TS, Q95T, QN700A, QN700B, QN700C, QN800A, QN800B, QN800C, QN85A, QN85B, QN85C, QN900A, QN900B, QN900C, QN90A, QN90B, QN91A, QN95A, QN95B, QN95C, S90C, S95B, S95C, The Frame 2021, The Frame 2022, the Serif 2022, Q95T, Q90T, Q80T, Q70T, Q60T, AU7100, TU8500, TU8300, TU8000, TU7100, TU7000, LS01T, LS03A, LS03T, LS05T, LST7, QP75A-8K, LSP9T, HBU8000, and HQ60B. Products also include at least Samsung Handsets compliant with compliant with the AV1 and/or SVT-AV1 Standards including, but not limited to, Galaxy S23, Galaxy S23+, and Galaxy S23 Ultra. Products also include at least Samsung Laptops compliant with the AV1 and/or SVT-AV1 Standards including, but not limited to, Galaxy Book Pro, Galaxy Book Pro 360, Galaxy Book2

Pro, Galaxy Book2 Pro 360, Galaxy Book2 Business 14', Galaxy Book Odyssey, Galaxy Book3 Ultra, Galaxy Book3 Pro, Galaxy Book3 Pro 360, and Galaxy Book3 360.

(c) '150 Patent

ACT is currently aware that Defendants have infringed and continue to directly infringe the '150 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '150 Patent. Such products include at least Televisions and Handsets compliant with the H.264 Multi-View Coding (MVC) Standard including, but not limited to, DBJ Series, QN900A, QN800A, QN700A, Q950T, Q900T, Q800T, Q700T, QN95A, QN91A, QN90A, QN85A, Q80A, Q70A, Q95T, Q90T, Q80T, Q70T, Q60T, AU8000, AU7100, TU8500, TU8300, TU8000, TU7100, and TU7000.

(d) '041 Patent

ACT is currently aware that Defendants have infringed and continue to directly infringe the '041 Patent, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '041 Patent. Such products include at least Samsung's Handsets including, but not limited to, the Galaxy A13 5G, Galaxy A22 5G, Galaxy A32 5G, Galaxy A33 5G, Galaxy A40, Galaxy A42 5G, Galaxy A50, Galaxy A50s, Galaxy A51 5G, Galaxy A52 5G, Galaxy A52s 5G, Galaxy A53 5G, Galaxy A70, Galaxy A70s, Galaxy A71 5G, Galaxy A73 5G, Galaxy A80, Galaxy A90 5G, Galaxy S9, Galaxy S9+, Galaxy Note9, Galaxy S10e, Galaxy S10, Galaxy S10+, Galaxy S10 Lite, Galaxy Fold 5G, Galaxy Note 10 5G, Galaxy Note 10+ 5G, Galaxy Note 20 5G, Galaxy Note 20 Ultra

5G, Galaxy Quantum 2, Galaxy S10 5G, Galaxy S20 5G, Galaxy S20 FE 5G, Galaxy S20 Ultra 5G, Galaxy S20 UW, Galaxy S20+ 5G, Galaxy S21 5G, Galaxy S21 Ultra 5G, Galaxy S21+ 5G, Galaxy S22, Galaxy S22 5G, Galaxy S22 Ultra, Galaxy S22+, Galaxy S23, Galaxy S23+, and Galaxy S23 Ultra, Galaxy Tab S7 5G, Galaxy Tab S7 FE 5G, Galaxy Tab S7+ 5G, Galaxy Tab S8+ 5G, Galaxy Z Flip 5G, Galaxy Z Flip3 5G, Galaxy Z Flip4 5G, Galaxy Z Fold 2 5G, the Galaxy Z Fold3 5G, and Galaxy Z Fold4 5G.

2. Claim Charts

Claim charts identifying a location of every element of every asserted claim of the ACT Patents within the Accused Products are attached hereto as Appendices A-F. ACT believes that the Accused Products cited in the claim charts are representative of all versions of the Accused Products. The Accused Products include the hardware with associated software and the charts also reference exemplary code to the extent available.

ACT reserves the right to amend these claim charts, as well as other information contained in this document and the Appendices attached hereto, to incorporate new information learned during the course of discovery including, but not limited to, information that is not publicly available or readily discernible without discovery. ACT further reserves the right to amend these claim charts, as well as other information contained in this document and the exhibits attached hereto, pursuant to Local Patent Rules 3-1(g) and 3-6.

C. LITERAL INFRINGEMENT AND DOCTRINE OF EQUIVALENTS

ACT asserts that, under the proper construction of the asserted claims and their claim terms, the limitations of the asserted claims of the ACT Patents are literally present in the Accused Products as set forth in the claim charts attached hereto as Appendices A-F.

ACT contends that any and all elements found not to be literally infringed are infringed under the doctrine of equivalents because the differences between the claimed inventions and the Accused Products, if any, are insubstantial.

ACT contends that Defendants directly infringe the asserted claims by making, using, offering for sale, selling, and importing into the United States the Accused Products. ACT also contends that Defendants indirectly infringe by contributing to and/or inducing others (*e.g.*, Defendants' service providers or partners, suppliers, Defendants' customers or its customers' customers) to directly infringe those claims by making or using the Accused Products. In addition, ACT contends that Defendants directly infringe to the extent that activities of third parties may be legally attributable to Defendants.

ACT contends that Defendants induce infringement of the ACT Patents by others (manufacturers and distributors Accused Products, end-users of Accused Products, and Defendants' customers) by inducing others to make or use the Accused Products with the knowledge that making or using directly infringes the ACT Patents or, in the alternative, with the belief that there was a high probability that others infringe the ACT Patents, but while remaining willfully blind to the infringement.

ACT also contends that Defendants contributorily infringe with the knowledge that the Accused Products, or the use thereof, infringe the Asserted Patents. Defendants knowingly and intentionally contributed to the direct infringement of the Asserted Patents by others, by supplying Accused Products that embody a material part of the claimed invention of the Asserted Patents that are known by Defendants to be specially made or adapted for use in an infringing manner and are not staple articles with substantial non-infringing uses.

Pursuant to Local Patent Rule 3-6(a)(1), ACT reserves the right to amend its Infringement Contentions as to literal infringement or infringement under the doctrine of equivalents in light of the Court's claim construction.

D. PRIORITY DATES

Each asserted claim of the '128 Patent is entitled to at least the priority date of its earliest application, U.S. Provisional Patent Application No. 10/067,815, with a filing date of February 8, 2002. Furthermore, each asserted claim is entitled to at least the filing date of its earliest foreign application, Japan Patent Application Nos. 2001-0033401 and 2001-033403, filed February 9, 2001.

Each asserted claim of the '025 Patent is entitled to at least the filing date of its earliest application, U.S. Provisional Patent Application No. 11/787,623, filed April 17, 2007. Furthermore, each asserted claim is entitled to at least the filing date of its earliest foreign application, Japan Patent Application No. 2006-112995, filed April 17, 2006.

Each asserted claim of the '150 Patent is entitled to at least the filing date of its earliest application, U.S. Provisional Patent Application No. 11/907,188, filed October 10, 2007. Furthermore, each asserted claim is entitled to at least the filing date of its earliest foreign application, Japan Patent Application No. 2006-279364, filed October 13, 2006.

Each asserted claim of the '041 Patent is entitled to at least the filing date of its earliest application, U.S. Provisional Patent Application No. 14/141,238, filed December 26, 2013. Furthermore, each asserted claim is entitled to at least the filing date of its earliest foreign application, Japan Patent Application No. 2012-288402, filed December 28, 2012.

Each asserted claim of the '303 Patent is entitled to at least the priority date of its earliest application, U.S. Patent Application No. 14/657,359, with a filing date of March 13, 2015.

Furthermore, each asserted claim is entitled to at least the filing date of its earliest foreign application, Japan Patent Application No. 2014-071975, filed March 31, 2014.

Each asserted claim of the '995 Patent is entitled to at least the filing date of its earliest application, U.S. Divisional Patent Application No. 12/995,039, filed May 28, 2009. Furthermore, each asserted claim is entitled to at least the filing date of its earliest foreign application, Japan Patent Application No. P2008-142433, filed May 30, 2008.

ACT makes this disclosure without prejudice to its right to prove an earlier date of invention.

II. PRODUCTION OF DOCUMENTS PURSUANT TO LOCAL PATENT RULE 3-2

ACT is producing or making available for inspection documents that are in ACT's possession, custody, or control as set forth in Local Patent Rule 3-2. A Production Index identifying these documents is attached hereto.

This preliminary identification of documents is for convenience and is not an admission that each document falls within any exemplary categories in the Local Patent Rules, or that any document qualifies as prior art. Thus, ACT reserves its right to add to, delete from, or otherwise modify its disclosures in this section as its investigation proceeds.

Dated: May 16, 2023

Respectfully submitted,

/s/ Alfred R. Fabricant

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ATTORNEYS FOR PLAINTIFF

ADVANCED CODING

TECHNOLOGIES, LLC

CERTIFICATE OF SERVICE

I hereby certify that on May 16, 2023, a true and correct copy of the above and foregoing document has been served by email on all counsel of record.

/s/ Alfred R. Fabricant

Alfred R. Fabricant

ACT 3-2 PRODUCTION INDEX

3-2(a)

None.

3-2(b)

Plaintiff is not in possession, custody, or control of any documents responsive to P.R. 3-2(b). Plaintiff states that such documents are in the possession of Victor Company of Japan, Ltd. and/or JVC Kenwood Corporation.

3-2(c)

Bates Start	Bates End
ACT-SAMSUNG00000001	ACT-SAMSUNG00002210

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Based on information presently available, Advanced Coding Technologies LLC (“ACT”) contends that Defendants Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. (collectively, “Defendants” or “Samsung”) infringe claims 1-4 (the “Asserted Claims”) of U.S. Patent No. 8,139,150 (the “’150 Patent”) through the Accused Products which are manufactured, sold, offered for sale, and/or used by Samsung.

Representativeness: The Samsung 8K Neo QLED QN800A television, depicted in this chart, is believed to be representative of other televisions and display products, including at least the DBJ Series, QN900A, QN800A, QN700A, Q950T, Q900T, Q800T, Q700T, QN95A, QN91A, QN90A, QN85A, Q80A, Q70A, Q95T, Q90T, Q80T, Q70T, Q60T, AU8000, AU7100, TU8500, TU8300, TU8000, TU7100, and TU7000 for the purposes of infringement of the ’150 Patent. Based on publicly available information, ACT believes that the Samsung 8K Neo QLED QN800A television, charted herein, and other televisions/display products share substantially the same structure and functionality with respect to the components which are relevant to infringement given that, among other things, the listed televisions/display products all purport to support H.264 Multi View Coding (MVC). Should discovery yield documents or information demonstrating that Defendants sell other infringing products which are not represented by the Samsung 8K Neo QLED QN800A television, ACT reserves its right to amend its infringement contentions to include a chart mapping the claims of the ’150 Patent to the structure and function of the newly-discovered products.

Samsung directly infringes each of the Asserted Claims by using, importing, testing, selling, and/or offering for sale the Accused Products in violation of 35 U.S.C. § 271(a).

Samsung indirectly infringes the Asserted Claims in violation of 35 U.S.C. § 271(b) by inducing third parties, including its users and/or customers, to directly infringe through their operation and use of the Accused Products. Samsung has knowingly and intentionally induced this direct infringement by, *inter alia*, (i) selling, importing, or otherwise providing the Accused Products to third parties with the intent that the Accused Products will be operated and used in a manner that practices the Asserted Claims; and (ii) marketing and advertising the Accused Products. Samsung’s marketing and promotional materials for the Accused Products are found, for example, on Samsung’s website, and in App stores of operating systems for which the Accused Products are made available. For example, Samsung’s website offers customers instructions and/or manuals for the Accused Products that instruct customers to, among other things, use the accused functionality in the Accused Products. Samsung’s website also offers support to customers,

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

including instruction to, among other things, use the Accused Products. On information and belief, Samsung knows that its actions will result in infringement of the Asserted Claims, or subjectively believes that there is a high probability that its actions will result in infringement of the Asserted Claims but has taken deliberate actions to avoid learning these facts.

Plaintiff contends that the Accused Products perform each step of the claimed methods. Plaintiff contends that use, testing, and qualification of the Accused Products by Samsung itself, as well as use by customers and end-users of the Accused Products, perform each step of the claimed methods. On information and belief, backend servers, under the direction and control of the Accused Products, may perform certain steps of the claimed methods. Samsung, its customers, and users of the Accused Products derive benefits from their infringement.

ACT does not concede that any claims of the '150 Patent that are not listed below are not infringed by the identified Accused Products. Moreover, the citations to certain documents and other information below are intended to be exemplary only and in no way foreclose ACT from citing or relying on additional documents, information, source code, and/or testimony at a later time. These contentions are preliminary in nature, and an analysis of Samsung's products, internal documentation, source code, and/or testimony from relevant witnesses may more fully and accurately describe the infringing features of its Accused Products. Accordingly, ACT reserves the right to supplement, correct, modify, and/or amend these contentions once such additional information is made available to ACT. Furthermore, ACT reserves the right to supplement, correct, modify, and/or amend these contentions as discovery in this case progresses; in view of the Court's claim construction order(s); in view of any positions taken by Samsung including, but not limited to, positions on claim construction, invalidity, and/or non-infringement; and in connection with the preparation and exchange of expert reports.

The contents of every below claim cell on which another claim cell depends are expressly incorporated by reference in that dependent cell, as if set forth in their entirety therein.

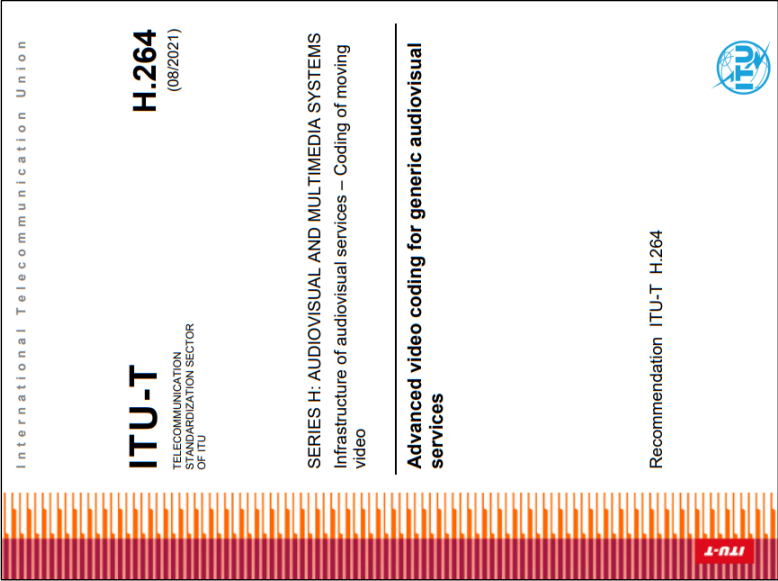
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products																																																																																																																																												
[1Pa] An apparatus for decoding a coded multi-view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints respectively,	The Samsung Accused Products comprise: An apparatus for decoding a coded multi-view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints, respectively. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A television supports the H.264 MVC codec. <table><tr><th colspan="7">Supported video codecs (QN7**A Series or higher)</th></tr><tr><th>File format</th><th>Container</th><th>Video codecs</th><th>Resolution</th><th>Frame rate (fps)</th><th>Bitrate (Mbps)</th><th>Audio codecs</th></tr><tr><td>*.avi</td><td></td><td>H.264 BP/MP/HP</td><td>3840 x 2160</td><td>3840 x 2160: 60 1920 x 1080: 120</td><td>60</td><td></td></tr><tr><td>*.mkv</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.asf</td><td></td><td>HEVC (H.265 - Main, Main10)</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>100</td><td>Dolby Digital LPCM</td></tr><tr><td>*.wmv</td><td>AVI</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.mp4</td><td>MKV</td><td>Motion JPEG</td><td>3840 x 2160</td><td>30</td><td>80</td><td>ADPCM(IMA, MS) AAC HE-AAC WMA Dolby Digital+ MPEG(MP3) AC-4 G.711(A-Law, µ-Law) OPUS</td></tr><tr><td>*.mov</td><td>ASF</td><td>MVC</td><td></td><td></td><td></td><td></td></tr><tr><td>*.3gp</td><td>MP4</td><td>MPEG4 SP/ASP</td><td></td><td></td><td></td><td></td></tr><tr><td>*.vro</td><td>3GP</td><td>Window Media Video v9 (VC1)</td><td></td><td>60</td><td></td><td></td></tr><tr><td>*.mpg</td><td>MOV</td><td>MPEG2</td><td></td><td></td><td></td><td></td></tr><tr><td>*.mpeg</td><td>FLV</td><td>MPEG1</td><td></td><td></td><td></td><td></td></tr><tr><td>*.ts</td><td>VRO</td><td>Microsoft MPEG-4 v1, v2, v3</td><td>1920 x 1080</td><td></td><td>20</td><td></td></tr><tr><td>*.tp</td><td>VOB</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.trp</td><td>PS</td><td>Window Media Video v7 (WMV1), v8 (WMV2)</td><td></td><td>30</td><td></td><td></td></tr><tr><td>*.flv</td><td>TS</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.vob</td><td>SVAF</td><td>H.263 Sorrenson</td><td></td><td></td><td></td><td></td></tr><tr><td>*.svi</td><td></td><td>VP6</td><td></td><td></td><td></td><td></td></tr><tr><td>*.m2ts</td><td></td><td>AV1</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>80</td><td></td></tr><tr><td>*.mts</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Supported video codecs (QN7**A Series or higher)							File format	Container	Video codecs	Resolution	Frame rate (fps)	Bitrate (Mbps)	Audio codecs	*.avi		H.264 BP/MP/HP	3840 x 2160	3840 x 2160: 60 1920 x 1080: 120	60		*.mkv							*.asf		HEVC (H.265 - Main, Main10)	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	100	Dolby Digital LPCM	*.wmv	AVI						*.mp4	MKV	Motion JPEG	3840 x 2160	30	80	ADPCM(IMA, MS) AAC HE-AAC WMA Dolby Digital+ MPEG(MP3) AC-4 G.711(A-Law, µ-Law) OPUS	*.mov	ASF	MVC					*.3gp	MP4	MPEG4 SP/ASP					*.vro	3GP	Window Media Video v9 (VC1)		60			*.mpg	MOV	MPEG2					*.mpeg	FLV	MPEG1					*.ts	VRO	Microsoft MPEG-4 v1, v2, v3	1920 x 1080		20		*.tp	VOB						*.trp	PS	Window Media Video v7 (WMV1), v8 (WMV2)		30			*.flv	TS						*.vob	SVAF	H.263 Sorrenson					*.svi		VP6					*.m2ts		AV1	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	80		*.mts						
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*.vro	3GP	Window Media Video v9 (VC1)		60																																																																																																																																									
*.mpg	MOV	MPEG2																																																																																																																																											
*.mpeg	FLV	MPEG1																																																																																																																																											
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*.tp	VOB																																																																																																																																												
*.trp	PS	Window Media Video v7 (WMV1), v8 (WMV2)		30																																																																																																																																									
*.flv	TS																																																																																																																																												
*.vob	SVAF	H.263 Sorrenson																																																																																																																																											
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	https://downloadcenter.samsung.com/content/UM/202208/20220802173319219/OSNDVBADA-7.2.0_EM_OSCAR_ASIA_ENG_220110.0.pdf The Samsung 8K Neo QLED QN800A is an apparatus for decoding a coded multi-view video signal (<i>e.g.</i>, a coded video sequence conforming to an MVC profile specified in Annex H) including coded signals resulting from encoding picture signals corresponding to different viewpoints (<i>e.g.</i>, view components) respectively. H.264 Annex H provides the definition of coding for a multi-view video signal, supporting coding of different viewpoints, including binocular 3D or binocular stereoscopy, as described in the ‘150 Patent. H.264 Annex C describes the structure and operation of a reference decoder to support the coding standard.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	 The 4th edition of ITU-T H.264, approved in 2009-05, contained enhancement extensions to support <u>multiview video coding (MVC)</u>, specification of a "Constrained Baseline Profile", and some miscellaneous corrections and clarifications. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	Annex H Multiview video coding (This annex forms an integral part of this Recommendation International Standard.) This annex specifies multiview video coding, referred to as MVC. H.1 Scope Bitstreams and decoders conforming to the profile specified in this annex are completely specified in this annex with reference made to clauses 2 to 9 and Annexes A to E.
	H.3.46 view: A sequence of <i>view components</i> associated with an identical value of <i>view_id</i>. H.3.47 view component: A <i>coded representation</i> of a <i>view</i> in a single <i>access unit</i>. When <i>profile_idc</i> is equal to 134, a <i>view</i> contains samples of two distinct spatially packed constituent frames that are packed into one frame using one of the frame packing arrangement schemes as specified in clause D.2.26.
	Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items

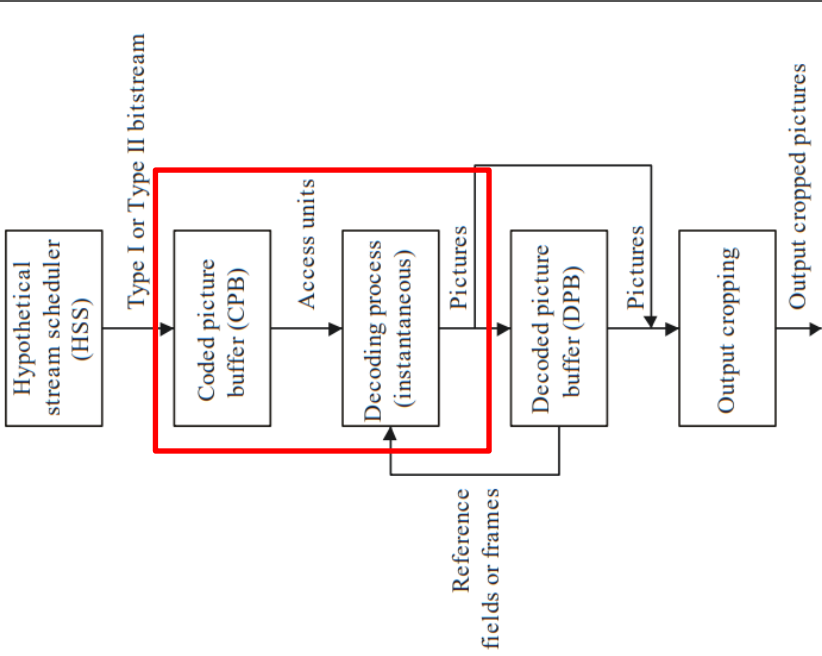
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[1Pb] wherein at least one among the viewpoints is designated as a base viewpoint, the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal	In the Samsung Accused Products, at least one among the viewpoints is designated as a base viewpoint, the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints except the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, in multi-view decoding, at least one among the viewpoints is designated as a base viewpoint (e.g., base view), the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints (e.g., independently of other views) except the base viewpoint. For example, the base view can be decoded independently (without referring to) any other view and there is only one base view in a coded video sequence.
least one picture signal corresponding to one of the viewpoints except the base viewpoint, and	H.3.6 base view: A <i>view</i> that has the minimum value of <i>view order index</i> in a <i>coded video sequence</i>. The base view can be decoded independently of other <i>views</i>, does not use <i>inter-view prediction</i>, and contains <i>VCL NAL units</i> only with <i>nal_unit_type</i> equal to 1, 5, or 14. The <i>bitstream subset</i> corresponding to the base view conforms to one or more of the <i>profiles</i> specified in Annex A. There is only one base view in a <i>coded video sequence</i>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-1!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
[1Pc] wherein the coded multi-view video signal contains coded information representing a desired delay time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, the coded multi-view video signal (e.g., MVC coded video sequence) contains coded information representing a desired delay time (e.g., <i>cpb_removal_delay</i>, picture timing SEI messages that are included in MVC scalable nesting Supplemental Enhanced Information (SEI) messages) of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. The time at which a coded picture for any view (an access unit) is decoded is determined by the coded picture buffer (CPB) removal time. For MVC coded pictures, this removal time is coded in nested SEI messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.	In the Samsung Accused Products, the coded multi-view video signal contains coded information representing a desired delay time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, the coded multi-view video signal (e.g., MVC coded video sequence) contains coded information representing a desired delay time (e.g., <i>cpb_removal_delay</i>, picture timing SEI messages that are included in MVC scalable nesting Supplemental Enhanced Information (SEI) messages) of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. The time at which a coded picture for any view (an access unit) is decoded is determined by the coded picture buffer (CPB) removal time. For MVC coded pictures, this removal time is coded in nested SEI messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	 Figure C-2 – HRD buffer model

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference".</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (a) When an access unit contains one or more buffering period SEI messages that are included in MVC scalable nesting SEI messages, the buffering period SEI message that is associated with the operation point being decoded is the buffering period SEI message that initializes the HRD. Let <code>hrdVid[i]</code> be equal to <code>sei_op_view_id[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and let <code>hrdTId</code> be the value of <code>sei_op_temporal_id</code>, that are associated with the MVC scalable nesting SEI message containing the buffering period SEI message that initializes the HRD. (b) <u>The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>.</u> (c) The HRD parameters that are used for conformance checking are the HRD parameters included in the MVC video usability information extension of the active MVC sequence parameter set that are associated with values of <code>vui_mvc_view_id[i][j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, equal to <code>hrdVid[j]</code>, and the value of <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>. For the specification in this annex, <code>num_units_in_tick</code>, <code>time_scale</code>, <code>fixed_frame_rate_flag</code>, <code>nal_hrd_parameters_present_flag</code>, <code>vcl_hrd_parameters_present_flag</code>, <code>low_delay_hrd_flag</code>, and <code>pic_struct_present_flag</code> are substituted with the values of <code>vui_mvc_num_units_in_tick[i]</code>, <code>vui_mvc_time_scale[i]</code>, <code>vui_mvc_fixed_frame_rate_flag[i]</code>, <code>vui_mvc_nal_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_vcl_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_low_delay_hrd_flag[i]</code>, and <code>vui_mvc_pic_struct_present_flag[i]</code>, respectively, with <code>i</code> being the value for which <code>vui_mvc_view_id[i]</code> is equal to <code>hrdVid[j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, and <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[1A] first means for decoding the coded information in the coded multi-view video signal to recover the desired delay times for the coded signals originating from the picture signals corresponding to the viewpoints	The Samsung Accused Products comprise: first means for decoding the coded information in the coded multi-view video signal to recover the desired delay times for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A comprises first means (<i>e.g.</i>, hypothetical reference decoder (HRD)) for decoding the coded information in the coded multi-view video signal to recover the desired delay times (<i>e.g.</i>, cpb_removal_delay) for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. The cpb_removal_delay value must be decoded in order to determine when to remove the access unit from the CPB.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
except the base viewpoint;	Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[1B] second means for decoding the coded signal originating from the picture	The Samsung Accused Products comprise: second means for decoding the coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
signal corresponding to the base viewpoint;	For example, the Samsung 8K Neo QLED QN800A comprises second means (e.g., MVC decoder) for decoding the coded signal originating from the picture signal corresponding to the base viewpoint. As the only view that can be independently decoded, and having the minimum index, the base view will be decoded first. H.3.6 base view: A view that has the minimum value of <u>view order index</u> in a <u>coded video sequence</u>. The base view can be decoded independently of other views, does not use <u>inter-view prediction</u>, and contains <u>VCL NAL units only with nal_unit_type equal to 1, 5, or 14</u>. The <u>bitstream subset</u> corresponding to the base view conforms to one or more of the <u>profiles</u> specified in Annex A. <u>There is only one base view in a coded video sequence.</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[1C] third means for decoding the coded signals originating from the picture signals	The Samsung Accused Products comprise: third means for decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
corresponding to the viewpoints except the base viewpoint; and	For example, the Samsung 8K Neo QLED QN800A comprises third means (e.g., MVC decoder) for decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. For example, other views in the coded sequence will be released from the CPB and instantaneously decoded subsequent to the base view, based on the view index. When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[1D] fourth means for delaying the decoding of the coded signals by the third means relative to the decoding of the coded signal by the second means by time intervals equal to the desired delay times recovered by the first means. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. With respect to “the coded signals by the third means,” the support for Claim [1C] is incorporated by reference. With respect to “the coded signal by the second means,” the support for Claim [1B] is incorporated by reference.	

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
means by time intervals equal to the desired delay times recovered by the first means.	With respect to “the desired delay times recovered by the first means,” the support for Claim [1A] is incorporated by reference. For example, the Samsung 8K Neo QLED QN800A comprises fourth means (e.g., hypothetical reference decoder (HRD)) for delaying the decoding of the coded signals (e.g., other viewpoints) by the third means (e.g., MVC decoder) relative to (e.g. after) the decoding of the coded signal (e.g., base view) by the second means (e.g., MVC decoder) by time intervals equal to the desired delay times (e.g., <i>cpb_removal_delay</i>) recovered by the first means (e.g., hypothetical reference decoder). The time at which a coded picture for any view (an access unit) is decoded is determined by the CPB removal time. For MVC coded pictures, this removal time is coded in nested Supplemental Enhanced Information (SEI) messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	Figure C-2 – HRD buffer model

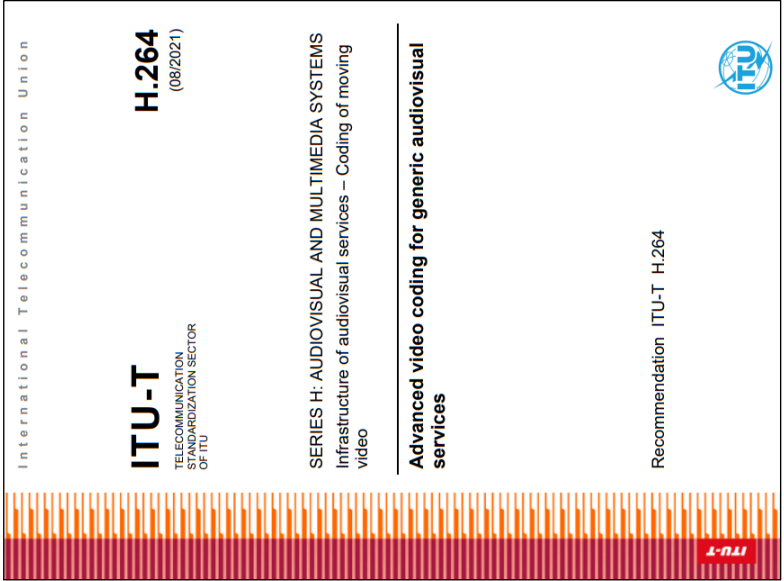
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times.</u> Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference". When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. <u>cpb_removal_delay</u> specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The <code>cpb_removal_delay</code> is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[2Pa] A method of decoding a coded multi-	Users of the Samsung Accused Products perform a method of decoding a coded multi-view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints, respectively.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products																																																																																																																																												
view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints respectively,	Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A television supports the H.264 MVC codec. <table><tr><th colspan="7">Supported video codecs (QN7**A Series or higher)</th></tr><tr><th>File format</th><th>Container</th><th>Video codecs</th><th>Resolution</th><th>Frame rate (fps)</th><th>Bitrate (Mbps)</th><th>Audio codecs</th></tr><tr><td>*.avi</td><td></td><td>H.264 BP/MP/HP</td><td>3840 x 2160</td><td>3840 x 2160: 60 1920 x 1080: 120</td><td>60</td><td></td></tr><tr><td>*.mkv</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.asf</td><td></td><td>HEVC (H.265 - Main, Main10)</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>100</td><td>Dolby Digital</td></tr><tr><td>*.wmv</td><td>AVI</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.mp4</td><td>MKV</td><td>Motion JPEG</td><td>3840 x 2160</td><td>30</td><td>80</td><td>LPCM</td></tr><tr><td>*.mov</td><td>ASF</td><td>MVC</td><td></td><td></td><td></td><td>ADPCM(IMA, MS)</td></tr><tr><td>*.3gp</td><td>MP4</td><td>MPEG4 SP/ASP</td><td></td><td></td><td></td><td>AAC</td></tr><tr><td>*.vro</td><td>3GP</td><td>Window Media Video v9 (VC1)</td><td></td><td>60</td><td></td><td>HE-AAC</td></tr><tr><td>*.mpg</td><td>MOV</td><td>MPEG2</td><td></td><td></td><td></td><td>WMA</td></tr><tr><td>*.mpeg</td><td>FLV</td><td>MPEG1</td><td></td><td></td><td></td><td>Dolby Digital+</td></tr><tr><td>*.ts</td><td>VRO</td><td>Microsoft MPEG-4 v1, v2, v3</td><td>1920 x 1080</td><td></td><td>20</td><td>MPEG(MP3)</td></tr><tr><td>*.tp</td><td>VOB</td><td></td><td></td><td></td><td></td><td>AC-4</td></tr><tr><td>*.trp</td><td>PS</td><td>Window Media Video v7 (WMV1), v8 (WMV2)</td><td></td><td>30</td><td></td><td>G.711(A-Law, μ-Law)</td></tr><tr><td>*.flv</td><td>TS</td><td></td><td></td><td></td><td></td><td>OPUS</td></tr><tr><td>*.vob</td><td>SVAF</td><td>H.263 Sorrenson</td><td></td><td></td><td></td><td></td></tr><tr><td>*.svi</td><td></td><td>VP6</td><td></td><td></td><td></td><td></td></tr><tr><td>*.m2ts</td><td></td><td>AV1</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>80</td><td></td></tr><tr><td>*.mts</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Supported video codecs (QN7**A Series or higher)							File format	Container	Video codecs	Resolution	Frame rate (fps)	Bitrate (Mbps)	Audio codecs	*.avi		H.264 BP/MP/HP	3840 x 2160	3840 x 2160: 60 1920 x 1080: 120	60		*.mkv							*.asf		HEVC (H.265 - Main, Main10)	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	100	Dolby Digital	*.wmv	AVI						*.mp4	MKV	Motion JPEG	3840 x 2160	30	80	LPCM	*.mov	ASF	MVC				ADPCM(IMA, MS)	*.3gp	MP4	MPEG4 SP/ASP				AAC	*.vro	3GP	Window Media Video v9 (VC1)		60		HE-AAC	*.mpg	MOV	MPEG2				WMA	*.mpeg	FLV	MPEG1				Dolby Digital+	*.ts	VRO	Microsoft MPEG-4 v1, v2, v3	1920 x 1080		20	MPEG(MP3)	*.tp	VOB					AC-4	*.trp	PS	Window Media Video v7 (WMV1), v8 (WMV2)		30		G.711(A-Law, μ-Law)	*.flv	TS					OPUS	*.vob	SVAF	H.263 Sorrenson					*.svi		VP6					*.m2ts		AV1	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	80		*.mts						
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	The Samsung 8K Neo QLED QN800A is an apparatus for decoding a coded multi-view video signal (e.g., a coded video sequence conforming to an MVC profile specified in Annex H) including coded signals resulting from encoding picture signals corresponding to different viewpoints (e.g., view components) respectively. H.264 Annex H provides the definition of coding for a multi-view video signal, supporting coding of different viewpoints, including binocular 3D or binocular stereoscopy, as described in the ‘150 Patent. H.264 Annex C describes the structure and operation of a reference decoder to support the coding standard. 

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	The 4th edition of ITU-T H.264, approved in 2009-05, contained enhancement extensions to support <u>multiview video coding (MVC)</u>, specification of a "Constrained Baseline Profile", and some miscellaneous corrections and clarifications. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	Annex H Multiview video coding (This annex forms an integral part of this Recommendation International Standard.) This annex specifies multiview video coding, referred to as MVC. H.1 Scope Bitstreams and decoders conforming to the profile specified in this annex are completely specified in this annex with reference made to clauses 2 to 9 and Annexes A to E. H.3.46 view: A sequence of <i>view components</i> associated with an identical value of <i>view_id</i>. H.3.47 view component: A <i>coded representation</i> of a <i>view</i> in a single <i>access unit</i>. When <i>profile_idc</i> is equal to 134, a view contains samples of two distinct spatially packed constituent frames that are packed into one frame using one of the frame packing arrangement schemes as specified in clause D.2.26. Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[2Pb] wherein at least one among the viewpoints is designated as a base viewpoint, the base viewpoint	Users of the Samsung Accused Products perform a method wherein at least one among the viewpoints is designated as a base viewpoint, the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints except the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, in multi-view decoding, at least one among the viewpoints is designated as a base viewpoint (e.g., base view), the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints (e.g., independently of other views) except the base viewpoint. For example, the base view can be decoded independently (without referring to) any other view and there is only one base view in a coded video sequence.
signal corresponding to one of the viewpoints except the base viewpoint, and	H.3.6 base view: A <i>view</i> that has the minimum value of <i>view order index</i> in a <i>coded video sequence</i>. The base view can be decoded independently of other <i>views</i>, does not use <i>inter-view prediction</i>, and contains <i>VCL NAL units</i> only with <i>nal_unit_type</i> equal to 1, 5, or 14. The <i>bitstream subset</i> corresponding to the base view conforms to one or more of the <i>profiles</i> specified in Annex A. There is only one base view in a <i>coded video sequence</i>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-1!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
[2Pc] wherein the coded multi-view video signal contains coded information representing a desired delay time of the start of decoding a coded signal originating from each of the picture signals except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec.	Users of the Samsung Accused Products perform a method wherein the coded multi-view video signal contains coded information representing a desired delay time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, the coded multi-view video signal (e.g., MVC coded video sequence) contains coded information representing a desired delay time (e.g., <i>cpb_removal_delay</i>, picture timing SEI messages that are included in MVC scalable nesting Supplemental Enhanced Information (SEI) messages) of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. The time at which a coded picture for any view (an access unit) is decoded is determined by the coded picture buffer (CPB) removal time. For MVC coded pictures, this removal time is coded in nested SEI messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.
corresponding to the base viewpoint, the method	

(MVC)

Claim – 8,139,150 comprising the steps of:	Exemplary Supporting Evidence Regarding Samsung’s Accused Products The diagram illustrates the HRD buffer model. It begins with a box labeled 'Hypothetical stream scheduler (HSS)' which outputs a 'Type I or Type II bitstream' to a 'Coded picture buffer (CPB)'. The CPB outputs 'Access units' to a 'Decoding process (instantaneous)'. This decoding process outputs 'Pictures' to a 'Decoded picture buffer (DPB)'. The DPB outputs 'Pictures' to an 'Output cropping' block, which finally produces 'Output cropped pictures H.264(13)_FC-2'. A feedback loop labeled 'Reference fields or frames' connects the output of the 'Output cropping' block back to the 'Decoding process (instantaneous)'. A red rectangle highlights the 'Coded picture buffer (CPB)', 'Decoding process (instantaneous)', and 'Decoded picture buffer (DPB)' components. Figure C-2 – HRD buffer model
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference".</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (a) When an access unit contains one or more buffering period SEI messages that are included in MVC scalable nesting SEI messages, the buffering period SEI message that is associated with the operation point being decoded is the buffering period SEI message that initializes the HRD. Let <code>hrdVid[i]</code> be equal to <code>sei_op_view_id[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and let <code>hrdTId</code> be the value of <code>sei_op_temporal_id</code>, that are associated with the MVC scalable nesting SEI message containing the buffering period SEI message that initializes the HRD. (b) <u>The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>.</u> (c) The HRD parameters that are used for conformance checking are the HRD parameters included in the MVC video usability information extension of the active MVC sequence parameter set that are associated with values of <code>vui_mvc_view_id[i][j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, equal to <code>hrdVid[j]</code>, and the value of <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>. For the specification in this annex, <code>num_units_in_tick</code>, <code>time_scale</code>, <code>fixed_frame_rate_flag</code>, <code>nal_hrd_parameters_present_flag</code>, <code>vcl_hrd_parameters_present_flag</code>, <code>low_delay_hrd_flag</code>, and <code>pic_struct_present_flag</code> are substituted with the values of <code>vui_mvc_num_units_in_tick[i]</code>, <code>vui_mvc_time_scale[i]</code>, <code>vui_mvc_fixed_frame_rate_flag[i]</code>, <code>vui_mvc_nal_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_vcl_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_low_delay_hrd_flag[i]</code>, and <code>vui_mvc_pic_struct_present_flag[i]</code>, respectively, with <code>i</code> being the value for which <code>vui_mvc_view_id[i]</code> is equal to <code>hrdVid[j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, and <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[2A] decoding the coded information in the coded multi-view video signal to recover the desired delay times for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. The cpb_removal_delay value must be decoded in order to determine when to remove the access unit from the CPB.	Users of the Samsung Accused Products perform a method decoding the coded information in the coded multi-view video signal to recover the desired delay times for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A decodes the coded information in the coded multi-view video signal to recover the desired delay times (e.g., cpb_removal_delay) for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. The cpb_removal_delay value must be decoded in order to determine when to remove the access unit from the CPB.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[2B] decoding the coded signal originating from the picture signal corresponding to	Users of the Samsung Accused Products perform a method decoding the coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
the base viewpoint;	For example, the Samsung 8K Neo QLED QN800A decodes the coded signal originating from the picture signal corresponding to the base viewpoint. As the only view that can be independently decoded, and having the minimum index, the base view will be decoded first. H.3.6 base view: A <u>view</u> that has the minimum value of <u>view order index</u> in a <u>coded video sequence</u>. The base view can be decoded independently of other <u>views</u>, does not use <u>inter-view prediction</u>, and contains <u>VCL NAL units</u> only with <u>nal_unit_type</u> equal to 1, 5, or 14. The <u>bitstream subset</u> corresponding to the base view conforms to one or more of the <u>profiles</u> specified in Annex A. <u>There is only one base view in a coded video sequence.</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[2C] decoding the coded signals originating from the picture signals	Users of the Samsung Accused Products perform a method decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents.

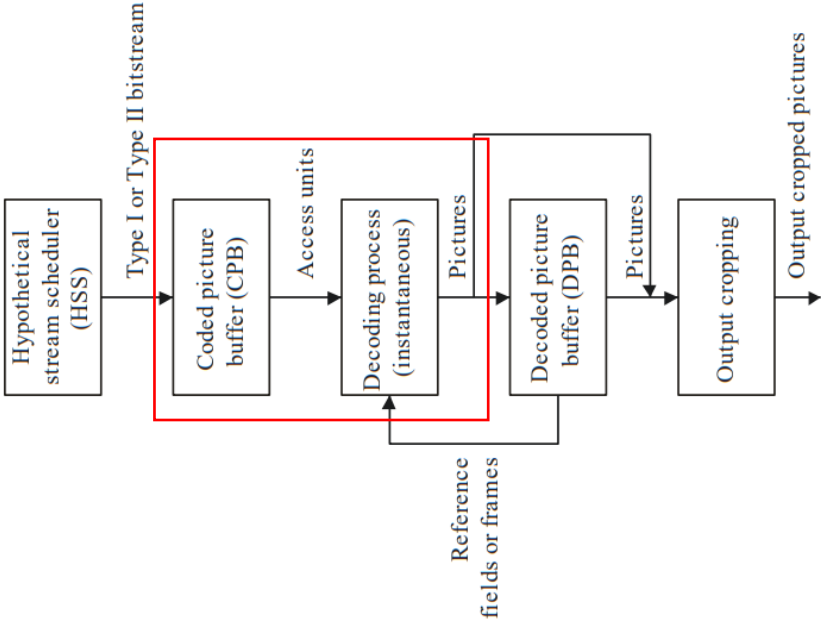
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
corresponding to the viewpoints except the base viewpoint; and	For example, the Samsung 8K Neo QLED QN800A decodes the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. For example, other views in the coded sequence will be released from the CPB and instantaneously decoded subsequent to the base view, based on the view index. When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of sei_op_view_id[i] equal to hrdVId[i] for all i in the range of 0 to num_view_components_op_minus1, inclusive, and sei_temporal_id equal to hrdTId. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[2D] delaying the decoding of the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint	Users of the Samsung Accused Products perform a method delaying the decoding of the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint relative to the decoding of the coded signal originating from the picture signal corresponding to the base viewpoint by time intervals equal to the recovered desired delay times. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. With respect to “the recovered desired delay times,” the support for Claim [2A] is incorporated by reference.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
relative to the decoding of the coded signal originating from the picture signal corresponding to the base viewpoint by time intervals equal to the recovered desired delay times.	For example, the Samsung 8K Neo QLED QN800A delays the decoding of the coded signals (<i>e.g.</i>, other viewpoints) relative to (<i>e.g.</i> after) the decoding of the coded signal (<i>e.g.</i>, base view) by time intervals equal to the desired delay times (<i>e.g.</i>, <i>cpb_removal_delay</i>) recovered. The time at which a coded picture for any view (an access unit) is decoded is determined by the CPB removal time. For MVC coded pictures, this removal time is coded in nested Supplemental Enhanced Information (SEI) messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products  Figure C-2 – HRD buffer model
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times.</u> Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference". When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTld</code>. <u>cpb_removal_delay</u> specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $2^{(cpb_removal_delay_length_minus1 + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3Pa] A non-transitory computer	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for decoding a coded multi-view video signal including coded signals resulting from encoding picture

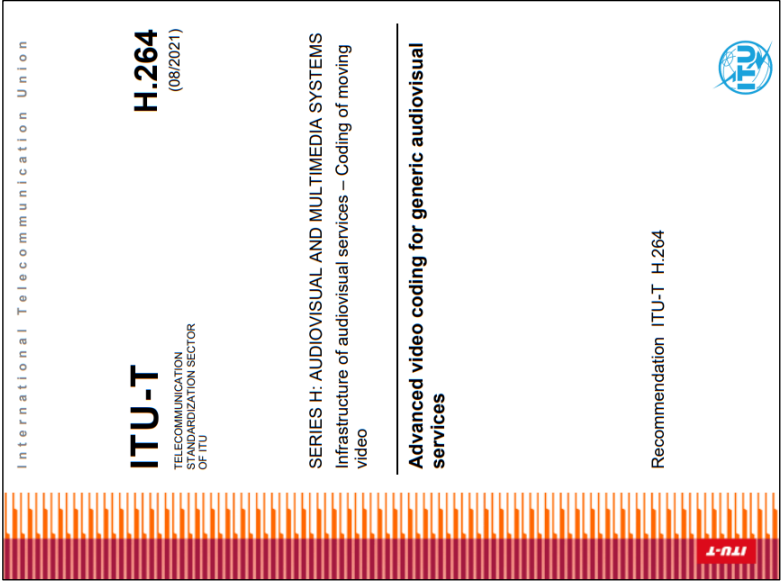
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products																																																																																																																																												
program stored in a computer readable medium for decoding a coded multi-view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints respectively,	signals corresponding to different viewpoints, respectively. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A television supports the H.264 MVC codec. <table><tr><th colspan="7">Supported video codecs (QN7**A Series or higher)</th></tr><tr><th>File format</th><th>Container</th><th>Video codecs</th><th>Resolution</th><th>Frame rate (fps)</th><th>Bitrate (Mbps)</th><th>Audio codecs</th></tr><tr><td>*.avi</td><td></td><td>H.264 BP/MP/HP</td><td>3840 x 2160</td><td>3840 x 2160: 60 1920 x 1080: 120</td><td>60</td><td></td></tr><tr><td>*.mkv</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.asf</td><td>AVI</td><td>HEVC (H.265 - Main, Main10)</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>100</td><td>Dolby Digital</td></tr><tr><td>*.wmv</td><td></td><td></td><td></td><td></td><td></td><td>LPCM</td></tr><tr><td>*.mp4</td><td>MKV</td><td>Motion JPEG</td><td>3840 x 2160</td><td>30</td><td>80</td><td>ADPCM(IMA, MS)</td></tr><tr><td>*.mov</td><td>ASF</td><td>MVC</td><td></td><td></td><td></td><td>AAC</td></tr><tr><td>*.3gp</td><td>MP4</td><td>MPEG4 SP/ASP</td><td></td><td>60</td><td></td><td>HE-AAC</td></tr><tr><td>*.vro</td><td>3GP</td><td>Window Media Video v9 (VC1)</td><td></td><td></td><td></td><td>WMA</td></tr><tr><td>*.mpg</td><td>MOV</td><td>MPEG2</td><td></td><td></td><td></td><td>Dolby Digital+</td></tr><tr><td>*.mpeg</td><td>FLV</td><td>MPEG1</td><td></td><td></td><td></td><td>MPEG(MP3)</td></tr><tr><td>*.ts</td><td>VRO</td><td>Microsoft MPEG-4 v1, v2, v3</td><td>1920 x 1080</td><td></td><td>20</td><td>AC-4</td></tr><tr><td>*.tp</td><td>VOB</td><td>Window Media Video v7 (WMV1), v8 (WMV2)</td><td></td><td>30</td><td></td><td>G.711(A-Law, u-Law)</td></tr><tr><td>*.trp</td><td>PS</td><td></td><td></td><td></td><td></td><td>OPUS</td></tr><tr><td>*.flv</td><td>TS</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.vob</td><td>SVAIF</td><td>H.263 Sorrenson</td><td></td><td></td><td></td><td></td></tr><tr><td>*.svi</td><td></td><td>VP6</td><td></td><td></td><td></td><td></td></tr><tr><td>*.m2ts</td><td></td><td>AV1</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>80</td><td></td></tr><tr><td>*.mts</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Supported video codecs (QN7**A Series or higher)							File format	Container	Video codecs	Resolution	Frame rate (fps)	Bitrate (Mbps)	Audio codecs	*.avi		H.264 BP/MP/HP	3840 x 2160	3840 x 2160: 60 1920 x 1080: 120	60		*.mkv							*.asf	AVI	HEVC (H.265 - Main, Main10)	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	100	Dolby Digital	*.wmv						LPCM	*.mp4	MKV	Motion JPEG	3840 x 2160	30	80	ADPCM(IMA, MS)	*.mov	ASF	MVC				AAC	*.3gp	MP4	MPEG4 SP/ASP		60		HE-AAC	*.vro	3GP	Window Media Video v9 (VC1)				WMA	*.mpg	MOV	MPEG2				Dolby Digital+	*.mpeg	FLV	MPEG1				MPEG(MP3)	*.ts	VRO	Microsoft MPEG-4 v1, v2, v3	1920 x 1080		20	AC-4	*.tp	VOB	Window Media Video v7 (WMV1), v8 (WMV2)		30		G.711(A-Law, u-Law)	*.trp	PS					OPUS	*.flv	TS						*.vob	SVAIF	H.263 Sorrenson					*.svi		VP6					*.m2ts		AV1	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	80		*.mts						
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	7.2.0_EM_OSCAR_ASIA_ENG_220110.0.pdf The Samsung 8K Neo QLED QN800A is an apparatus for decoding a coded multi-view video signal (e.g., a coded video sequence conforming to an MVC profile specified in Annex H) including coded signals resulting from encoding picture signals corresponding to different viewpoints (e.g., view components) respectively. H.264 Annex H provides the definition of coding for a multi-view video signal, supporting coding of different viewpoints, including binocular 3D or binocular stereoscopy, as described in the '150 Patent. H.264 Annex C describes the structure and operation of a reference decoder to support the coding standard.  The image shows the front cover of the ITU-T H.264 standard document. At the top, it says 'International Telecommunication Union'. Below that, 'ITU-T' is prominently displayed, followed by 'H.264' and '(08/2021)'. Underneath, it reads 'TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU'. A horizontal bar with a red-to-orange gradient and vertical lines is present. Below this bar, it says 'SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS' and 'Infrastructure of audiovisual services – Coding of moving video'. A thin line separates this from the bottom section, which says 'Advanced video coding for generic audiovisual services'. At the very bottom, it reads 'Recommendation ITU-T H.264' and features the ITU logo on the right.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	The 4th edition of ITU-T H.264, approved in 2009-05, contained enhancement extensions to support <u>multiview video coding (MVC)</u>, specification of a "Constrained Baseline Profile", and some miscellaneous corrections and clarifications. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	Annex H Multiview video coding (This annex forms an integral part of this Recommendation International Standard.) This annex specifies multiview video coding, referred to as MVC. H.1 Scope Bitstreams and decoders conforming to the profile specified in this annex are completely specified in this annex with reference made to clauses 2 to 9 and Annexes A to E.
	H.3.46 view: A sequence of <i>view components</i> associated with an identical value of <i>view_id</i>. H.3.47 view component: A <i>coded representation</i> of a <i>view</i> in a single <i>access unit</i>. When <i>profile_idc</i> is equal to 134, a <i>view</i> contains samples of two distinct spatially packed constituent frames that are packed into one frame using one of the frame packing arrangement schemes as specified in clause D.2.26.
	Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	Additionally, the H.264 MVC codec comprises a non-transitory computer program stored in a computer-readable medium because the codec allows motion video to be “manipulated as a form of computer data” and “stored on various storage media, transmitted and received over existing and future networks and distributed on existing and future broadcasting channels.” Recommendation ITU-T H.264 Advanced video coding for generic audiovisual services Summary Recommendation ITU-T H.264 International Standard ISO/IEC 14496-10 represents an evolution of the existing video coding standards (ITU-T H.261, ITU-T H.262, and ITU-T H.263) and it was developed in response to the growing need for higher compression of moving pictures for various applications such as videoconferencing, digital storage media, television broadcasting, Internet streaming, and communication. It is also designed to enable the use of the coded video representation in a flexible manner for a wide variety of network environments. The use of this Recommendation International Standard allows motion video to be manipulated as a form of computer data and to be stored on various storage media, transmitted and received over existing and future networks and distributed on existing and future broadcasting channels. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3Pb] wherein at least one among the viewpoints is designated as a base viewpoint,	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for decoding a coded multi-view video signal wherein at least one among the viewpoints is designated as a base viewpoint, the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints except the base viewpoint. Samsung directly

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints except the base viewpoint, and	infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, in multi-view decoding, at least one among the viewpoints is designated as a base viewpoint (e.g., base view), the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints (e.g., independently of other views) except the base viewpoint. For example, the base view can be decoded independently (without referring to) any other view and there is only one base view in a coded video sequence. H.3.6 base view: A view that has the minimum value of <i>view order index</i> in a <i>coded video sequence</i>. The base view can be decoded independently of other <i>views</i>, does not use <i>inter-view prediction</i>, and contains <i>VCL NAL units</i> only with <i>nal_unit_type</i> equal to 1, 5, or 14. The <i>bitstream subset</i> corresponding to the base view conforms to one or more of the <i>profiles</i> specified in Annex A. There is only one base view in a <i>coded video sequence</i>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3Pc] wherein the coded multi-view video signal contains coded information representing a desired delay	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for decoding a coded multi-view video signal wherein the coded multi-view video signal contains coded information representing a desired delay time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC).

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint, the computer program comprising the steps of:	This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, the coded multi-view video signal (<i>e.g.</i>, MVC coded video sequence) contains coded information representing a desired delay time (<i>e.g.</i>, <i>cpb_removal_delay</i>, picture timing SEI messages) that are included in MVC scalable nesting Supplemental Enhanced Information (SEI) messages) of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. The time at which a coded picture for any view (an access unit) is decoded is determined by the coded picture buffer (CPB) removal time. For MVC coded pictures, this removal time is coded in nested SEI messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products <pre> graph TD HSS[Hypothetical stream scheduler (HSS)] --> Bitstream[Type I or Type II bitstream] Bitstream --> CPB[Coded picture buffer (CPB)] CPB -- Access units --> DP[Decoding process (instantaneous)] DP -- Pictures --> DPB[Decoded picture buffer (DPB)] DPB -- Pictures --> OC[Output cropping] OC --> Output[Output cropped pictures H.264(13)_FC-2] DPB -- Reference fields or frames --> DP subgraph RedBox [] CPB DP end </pre> Figure C-2 – HRD buffer model
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference".</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (a) When an access unit contains one or more buffering period SEI messages that are included in MVC scalable nesting SEI messages, the buffering period SEI message that is associated with the operation point being decoded is the buffering period SEI message that initializes the HRD. Let <code>hrdVid[i]</code> be equal to <code>sei_op_view_id[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and let <code>hrdTId</code> be the value of <code>sei_op_temporal_id</code>, that are associated with the MVC scalable nesting SEI message containing the buffering period SEI message that initializes the HRD. (b) <u>The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>.</u> (c) The HRD parameters that are used for conformance checking are the HRD parameters included in the MVC video usability information extension of the active MVC sequence parameter set that are associated with values of <code>vui_mvc_view_id[i][j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, equal to <code>hrdVid[j]</code>, and the value of <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>. For the specification in this annex, <code>num_units_in_tick</code>, <code>time_scale</code>, <code>fixed_frame_rate_flag</code>, <code>nal_hrd_parameters_present_flag</code>, <code>vcl_hrd_parameters_present_flag</code>, <code>low_delay_hrd_flag</code>, and <code>pic_struct_present_flag</code> are substituted with the values of <code>vui_mvc_num_units_in_tick[i]</code>, <code>vui_mvc_time_scale[i]</code>, <code>vui_mvc_fixed_frame_rate_flag[i]</code>, <code>vui_mvc_nal_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_vcl_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_low_delay_hrd_flag[i]</code>, and <code>vui_mvc_pic_struct_present_flag[i]</code>, respectively, with <code>i</code> being the value for which <code>vui_mvc_view_id[i]</code> is equal to <code>hrdVid[j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, and <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{\text{cpb_removal_delay_length_minus1} + 1}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3A] decoding the coded information in the coded multi-view video signal to recover the desired delay times for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint;	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for decoding the coded information in the coded multi-view video signal to recover the desired delay times for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A uses a non-transitory computer program for decoding the coded information in the coded multi-view video signal to recover the desired delay times (e.g., cpb_removal_delay) for the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. The cpb_removal_delay value must be decoded in order to determine when to remove the access unit from the CPB.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3B] decoding the coded signal originating from the picture signal	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for decoding the coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

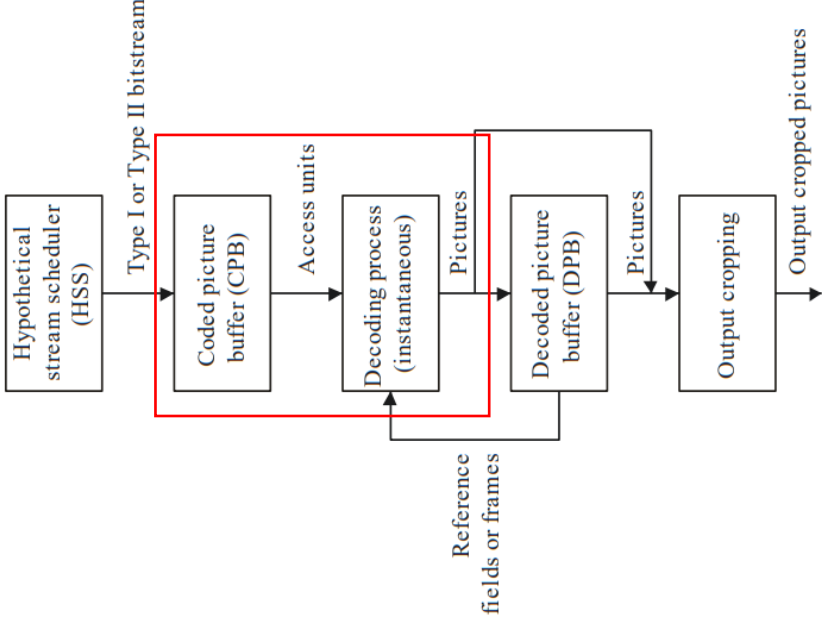
Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
the base viewpoint;	For example, the Samsung 8K Neo QLED QN800A uses a non-transitory computer program for decoding the coded signal originating from the picture signal corresponding to the base viewpoint. As the only view that can be independently decoded, and having the minimum index, the base view will be decoded first. H.3.6 base view: <u>A view that has the minimum value of view order index in a coded video sequence. The base view can be decoded independently of other views, does not use inter-view prediction, and contains VCL NAL units only with nal_unit_type equal to 1, 5, or 14. The bitstream subset corresponding to the base view conforms to one or more of the profiles specified in Annex A. There is only one base view in a coded video sequence.</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of sei_op_view_id[i] equal to hrdVid[i] for all i in the range of 0 to num_view_components_op_minus1, inclusive, and sei_temporal_id equal to hrdTId. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-I!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3C] decoding the coded signals originating from the picture	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC).

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
signals corresponding to the viewpoints except the base viewpoint; and	This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A uses a non-transitory computer program for decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. For example, other views in the coded sequence will be released from the CPB and instantaneously decoded subsequent to the base view, based on the view index. When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[3D] delaying the decoding of the coded signals originating from the picture signals corresponding to	The Samsung Accused Products include a non-transitory computer program stored in a computer readable medium for delaying the decoding of the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint relative to the decoding of the coded signal originating from the picture signal corresponding to the base viewpoint by time intervals equal to the recovered desired delay times. Samsung directly infringes by using, importing, testing, selling, and/or offering for sale devices support H.264 Multi View Coding (MVC). This element is infringed literally, or in the alternative, under the doctrine of equivalents.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
the viewpoints except the base viewpoint relative to the decoding of the coded signal originating from the picture signal corresponding to the base viewpoint by time intervals equal to the recovered desired delay times.	With respect to “the recovered desired delay times,” the support for Claim [3A] is incorporated by reference. For example, the Samsung 8K Neo QLED QN800A uses a non-transitory computer program for delaying the decoding of the coded signals (<i>e.g.</i>, other viewpoints) relative to (<i>e.g.</i> after) the decoding of the coded signal (<i>e.g.</i>, base view) by time intervals equal to the desired delay times (<i>e.g.</i>, <i>cpb_removal_delay</i>) recovered. The time at which a coded picture for any view (an access unit) is decoded is determined by the CPB removal time. For MVC coded pictures, this removal time is coded in nested Supplemental Enhanced Information (SEI) messages. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products  Figure C-2 – HRD buffer model
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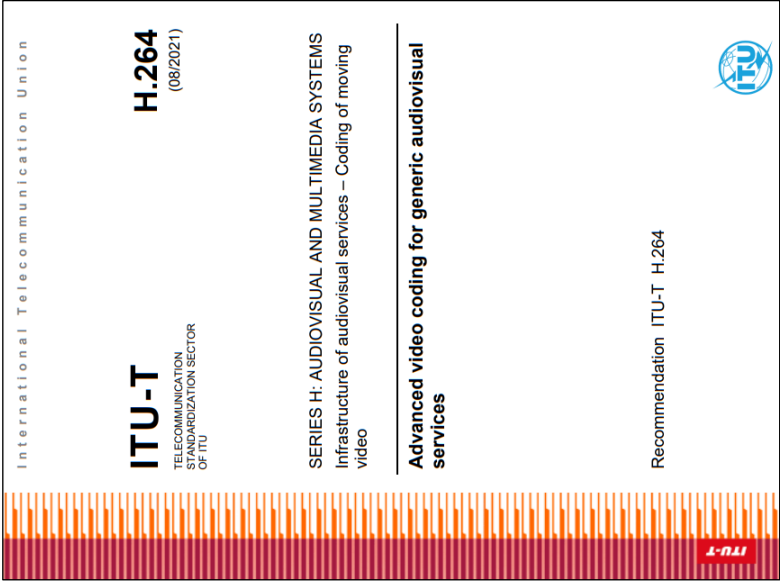
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times.</u> Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference". When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. <u>cpb_removal_delay</u> specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The <code>cpb_removal_delay</code> is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[4Pa] A method of decoding a coded multi-	Users of the Samsung Accused Products perform a method of decoding a coded multi-view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints, respectively.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products																																																																																																																																												
view video signal including coded signals resulting from encoding picture signals corresponding to different viewpoints respectively,	Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A television supports the H.264 MVC codec. <table><tr><th colspan="7">Supported video codecs (QN7**A Series or higher)</th></tr><tr><th>File format</th><th>Container</th><th>Video codecs</th><th>Resolution</th><th>Frame rate (fps)</th><th>Bitrate (Mbps)</th><th>Audio codecs</th></tr><tr><td>*.avi</td><td></td><td>H.264 BP/MP/HP</td><td>3840 x 2160</td><td>3840 x 2160: 60 1920 x 1080: 120</td><td>60</td><td></td></tr><tr><td>*.mkv</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.asf</td><td></td><td>HEVC (H.265 - Main, Main10)</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>100</td><td>Dolby Digital</td></tr><tr><td>*.wmv</td><td>AVI</td><td></td><td></td><td></td><td></td><td>LPCM</td></tr><tr><td>*.mp4</td><td>MKV</td><td>Motion JPEG</td><td>3840 x 2160</td><td>30</td><td>80</td><td>ADPCM(IMA, MS)</td></tr><tr><td>*.mov</td><td>ASF</td><td>MVC</td><td></td><td></td><td></td><td>AAC</td></tr><tr><td>*.3gp</td><td>MP4</td><td>MPEG4 SP/ASP</td><td></td><td>60</td><td></td><td>HE-AAC</td></tr><tr><td>*.vro</td><td>3GP</td><td>Window Media Video v9 (VC1)</td><td></td><td></td><td></td><td>WMA</td></tr><tr><td>*.mpg</td><td>MOV</td><td>MPEG2</td><td></td><td></td><td></td><td>Dolby Digital+</td></tr><tr><td>*.mpeg</td><td>FLV</td><td>MPEG1</td><td></td><td></td><td></td><td>MPEG(MP3)</td></tr><tr><td>*.ts</td><td>VRO</td><td>Microsoft MPEG-4 v1, v2, v3</td><td>1920 x 1080</td><td></td><td>20</td><td>AC-4</td></tr><tr><td>*.tp</td><td>VOB</td><td>Window Media Video v7 (WMV1), v8 (WMV2)</td><td></td><td>30</td><td></td><td>G.711(A-Law, µ-Law)</td></tr><tr><td>*.trp</td><td>PS</td><td>H.263 Sorrenson</td><td></td><td></td><td></td><td>OPUS</td></tr><tr><td>*.flv</td><td>TS</td><td>VP6</td><td></td><td></td><td></td><td></td></tr><tr><td>*.vob</td><td>SVAF</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.svi</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>*.m2ts</td><td></td><td>AV1</td><td>7680 x 4320</td><td>7680 x 4320: 60 3840 x 2160: 120</td><td>80</td><td></td></tr><tr><td>*.mts</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Supported video codecs (QN7**A Series or higher)							File format	Container	Video codecs	Resolution	Frame rate (fps)	Bitrate (Mbps)	Audio codecs	*.avi		H.264 BP/MP/HP	3840 x 2160	3840 x 2160: 60 1920 x 1080: 120	60		*.mkv							*.asf		HEVC (H.265 - Main, Main10)	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	100	Dolby Digital	*.wmv	AVI					LPCM	*.mp4	MKV	Motion JPEG	3840 x 2160	30	80	ADPCM(IMA, MS)	*.mov	ASF	MVC				AAC	*.3gp	MP4	MPEG4 SP/ASP		60		HE-AAC	*.vro	3GP	Window Media Video v9 (VC1)				WMA	*.mpg	MOV	MPEG2				Dolby Digital+	*.mpeg	FLV	MPEG1				MPEG(MP3)	*.ts	VRO	Microsoft MPEG-4 v1, v2, v3	1920 x 1080		20	AC-4	*.tp	VOB	Window Media Video v7 (WMV1), v8 (WMV2)		30		G.711(A-Law, µ-Law)	*.trp	PS	H.263 Sorrenson				OPUS	*.flv	TS	VP6					*.vob	SVAF						*.svi							*.m2ts		AV1	7680 x 4320	7680 x 4320: 60 3840 x 2160: 120	80		*.mts						
Supported video codecs (QN7**A Series or higher)																																																																																																																																													
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*.mov	ASF	MVC				AAC																																																																																																																																							
*.3gp	MP4	MPEG4 SP/ASP		60		HE-AAC																																																																																																																																							
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*.mpg	MOV	MPEG2				Dolby Digital+																																																																																																																																							
*.mpeg	FLV	MPEG1				MPEG(MP3)																																																																																																																																							
*.ts	VRO	Microsoft MPEG-4 v1, v2, v3	1920 x 1080		20	AC-4																																																																																																																																							
*.tp	VOB	Window Media Video v7 (WMV1), v8 (WMV2)		30		G.711(A-Law, µ-Law)																																																																																																																																							
*.trp	PS	H.263 Sorrenson				OPUS																																																																																																																																							
*.flv	TS	VP6																																																																																																																																											
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	https://downloadcenter.samsung.com/content/UM/202208/20220802173319219/OSNDVBADA-7.2.0_EM_OSCAR_ASIA_ENG_220110.0.pdf																																																																																																																																												

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	The Samsung 8K Neo QLED QN800A decodes a coded multi-view video signal (e.g., a coded video sequence conforming to an MVC profile specified in Annex H) including coded signals resulting from encoding picture signals corresponding to different viewpoints (e.g., view components) respectively. H.264 Annex H provides the definition of coding for a multi-view video signal, supporting coding of different viewpoints, including binocular 3D or binocular stereoscopy, as described in the '150 Patent. H.264 Annex C describes the structure and operation of a reference decoder to support the coding standard. 

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	The 4th edition of ITU-T H.264, approved in 2009-05, contained enhancement extensions to support <u>multiview video coding (MVC)</u>, specification of a "Constrained Baseline Profile", and some miscellaneous corrections and clarifications. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	Annex H Multiview video coding (This annex forms an integral part of this Recommendation International Standard.) This annex specifies multiview video coding, referred to as MVC. H.1 Scope Bitstreams and decoders conforming to the profile specified in this annex are completely specified in this annex with reference made to clauses 2 to 9 and Annexes A to E. H.3.46 view: A sequence of <i>view components</i> associated with an identical value of <i>view_id</i>. H.3.47 view component: A <i>coded representation</i> of a <i>view</i> in a single <i>access unit</i>. When <i>profile_idc</i> is equal to 134, a <i>view</i> contains samples of two distinct spatially packed constituent frames that are packed into one frame using one of the frame packing arrangement schemes as specified in clause D.2.26. Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
[4Pb] wherein at least one among the viewpoints is designated as a base viewpoint, the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal	In the Samsung Accused Products, at least one among the viewpoints is designated as a base viewpoint, the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints except the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, in multi-view decoding, at least one among the viewpoints is designated as a base viewpoint (e.g., base view), the base viewpoint corresponding to a picture signal which is encoded without referring to at least one picture signal corresponding to one of the viewpoints (e.g., independently of other views) except the base viewpoint. For example, the base view can be decoded independently (without referring to) any other view and there is only one base view in a coded video sequence. H.3.6 base view: A view that has the minimum value of view order index in a coded video sequence. The base view can be decoded independently of other views, does not use inter-view prediction, and contains <u>VCL NAL units only with nal_unit_type equal to 1, 5, or 14</u>. The <u>bitstream subset</u> corresponding to the base view conforms to one or more of the <u>profiles</u> specified in Annex A. There is only one base view in a coded video sequence. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-1!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[4Pc] wherein the coded multi-view video signal contains coded information	In the Samsung Accused Products, the coded multi-view video signal contains coded information about view dependencies representing which of the picture signals are referred to as reference signals for the encoding of each of the picture signals. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec.

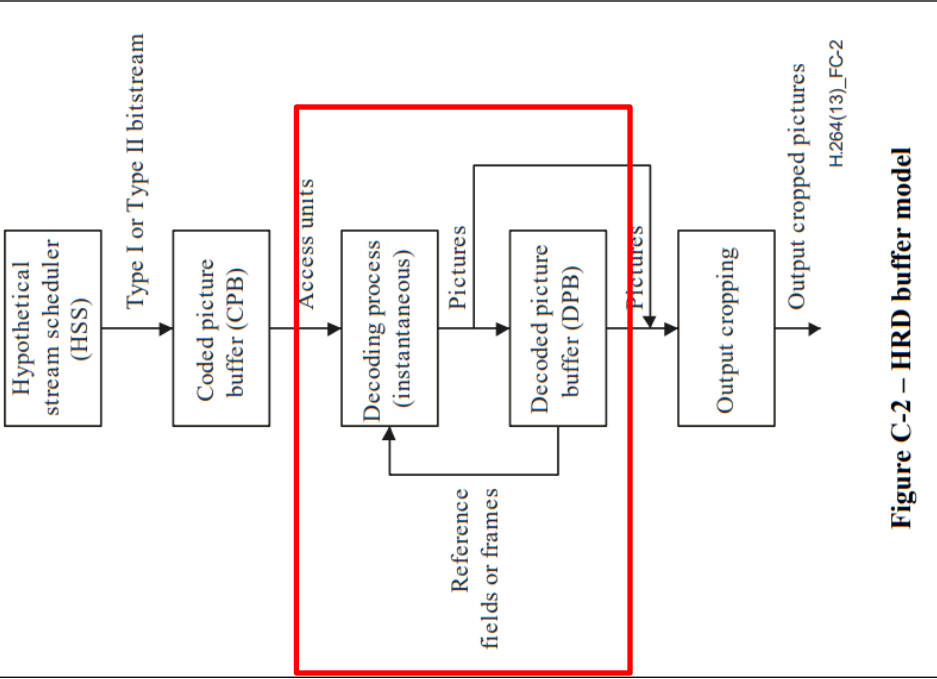
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
about view dependencies representing which of the picture signals are referred to as reference signals for the encoding of each picture signal, the method comprising the steps of:	This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, the coded multi-view video signal (e.g., MVC coded video sequence) contains coded information about view dependencies representing which of the picture signals are referred to as reference signals for the encoding of each of the picture signals (i.e., reference pictures). Specifically, to determine whether a picture signal is referred to as a reference signal, a coded picture has a "nal_ref_idc syntax element that is associated with the target dependency representation" (i.e., coded information about view dependencies) for the purpose of inter prediction in the decoding process of subsequent non-reference signals in the decoding order. G.3.43 reference base field: A <i>reference field</i> that is obtained by decoding a <i>base quality layer representation</i> with the <i>nal_ref_idc syntax element</i> not equal to 0, the <i>store_ref_base_pic_flag syntax element</i> equal to 1, and the <i>field_pic_flag syntax element</i> equal to 1 of a <i>coded picture</i> and all <i>layer representations</i> of the <i>coded picture</i> that are referred to by <i>inter-layer prediction</i> in the <i>base quality layer representation</i>. A reference base field is not a <i>decoded picture</i> and it is not an output of the <i>decoding process</i>, but may be used for <i>inter prediction</i> when <i>P</i>, <i>B</i>, <i>EP</i>, and <i>EB slices</i> of a <i>coded field</i> or a <i>field macroblock</i> of a <i>coded frame</i> are decoded. See also <i>reference base picture</i>. G.3.44 reference base frame: A <i>reference frame</i> that is obtained by decoding a <i>base quality layer representation</i> with the <i>nal_ref_idc syntax element</i> not equal to 0, the <i>store_ref_base_pic_flag syntax element</i> equal to 1, and the <i>field_pic_flag syntax element</i> equal to 0 of a <i>coded picture</i> and all <i>layer representations</i> of the <i>coded picture</i> that are referred to by <i>inter-layer prediction</i> of the <i>base quality layer representation</i>. A reference base frame is not a <i>decoded picture</i> and it is not an output of the <i>decoding process</i>, but may be used for <i>inter prediction</i> when <i>P</i>, <i>B</i>, <i>EP</i>, and <i>EB slices</i> of a <i>coded frame</i> are decoded. See also <i>reference base picture</i>. G.3.45 reference base picture: A collective term for a <i>reference base field</i> or a <i>reference base frame</i>.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	G.3.46 reference field: A <i>reference field</i> may be used for <i>inter prediction</i> when <i>P</i>, <i>B</i>, <i>EP</i>, or <i>EB slices</i> of a <i>coded field</i> or <i>field macroblocks</i> of a <i>coded frame</i> are decoded. See also <i>reference picture</i>. G.3.47 reference frame: A <i>reference frame</i> may be used for <i>inter prediction</i> when <i>P</i>, <i>B</i>, <i>EP</i>, or <i>EB slices</i> of a <i>coded frame</i> are decoded. See also <i>reference picture</i>. G.3.48 reference layer macroblock: A <i>macroblock</i> of a <i>reference layer representation</i>. G.3.49 reference layer representation: A <i>reference layer representation</i> for a particular <i>layer representation</i> of a <i>coded picture</i> is the <i>layer representation</i> that is used for <i>inter-layer prediction</i> of the particular <i>layer representation</i>. The <i>reference layer representation</i> belongs to the same <i>access unit</i> as the <i>layer representation</i> that uses the <i>reference layer representation</i> for <i>inter-layer prediction</i>. G.3.50 reference picture: A collective term for a <i>decoded picture</i> that is obtained by decoding a <i>coded picture</i> for which the <i>nal_ref_idc syntax element</i> that is associated with the <i>target dependency representation</i> is not equal to 0 or a <i>reference base picture</i>. A <i>reference picture</i> contains samples that may be used for <i>inter prediction</i> in the <i>decoding process</i> of subsequent <i>pictures</i> in <i>decoding order</i>. G.3.51 reference picture list: A list of <i>reference pictures</i> that is used for <i>inter prediction</i> of a <i>P</i>, <i>B</i>, <i>EP</i>, or <i>EB slice</i>. For the <i>decoding process</i> of a <i>P</i> or <i>EP slice</i>, there is one <i>reference picture list</i>. For the <i>decoding process</i> of a <i>B</i> or <i>EB slice</i>, there are two <i>reference picture lists</i>. G.3.52 reference picture list 0: A <i>reference picture list</i> used for <i>inter prediction</i> of a <i>P</i>, <i>B</i>, <i>EP</i>, or <i>EB slice</i>. All <i>inter prediction</i> used for <i>P</i> and <i>EP slices</i> uses <i>reference picture list 0</i>. <i>Reference picture list 0</i> is one of two <i>reference picture lists</i> used for <i>inter prediction</i> for a <i>B</i> or <i>EB slice</i>, with the other being <i>reference picture list 1</i>. G.3.53 reference picture list 1: A <i>reference picture list</i> used for <i>inter prediction</i> of a <i>B</i> or <i>EB slice</i>. <i>Reference picture list 1</i> is one of two <i>reference picture lists</i> used for <i>inter prediction</i> for a <i>B</i> or <i>EB slice</i>, with the other being <i>reference picture list 0</i>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

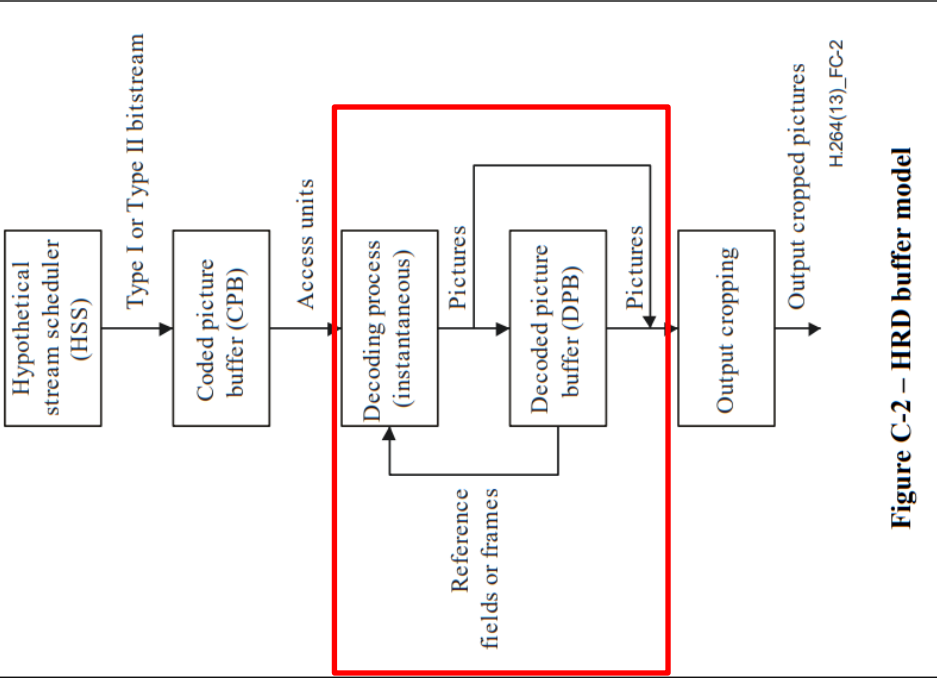
Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products  Figure C-2 – HRD buffer model
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference". https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[4A] decoding the coded information in the coded multi-view video signal to recover the view dependencies;	Users of the Samsung Accused Products perform decoding the coded information in the coded multi-view video signal to recover the view dependencies. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A decodes the coded information in the coded multi-view video signal to recover view dependencies indicating the reference pictures for interframe prediction are fed back into the “decoding process (instantaneous)” for decoding so that the view dependencies can be recovered by the decoder.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
	Annex C Hypothetical reference decoder (This annex forms an integral part of this Recommendation International Standard.) This annex specifies the hypothetical reference decoder (HRD) and its use to check bitstream and decoder conformance. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-1!!PDF-E&type=items The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products  Figure C-2 – HRD buffer model
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference". https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items
[4B] computing a desired delay time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signals corresponding to the viewpoints except the base viewpoint	Users of the Samsung Accused Products perform computing a desired delay time of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint in response to the recovered view dependencies. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, in Samsung 8K Neo QLED QN800A, the coded multi-view video signal (e.g., MVC coded video sequence) contains coded information, which can be used to compute a desired delay time (e.g., <i>cpb_removal_delay</i>, picture timing SEI messages that are included in MVC scalable nesting Supplemental Enhanced Information (SEI) messages) of the start of decoding a coded signal originating from each of the picture signals corresponding to the viewpoints except the base viewpoint relative to the start of decoding a coded signal originating from the picture signal corresponding to the base viewpoint. The time at which a coded picture for any view (an access unit) is decoded is determined by the coded picture buffer (CPB) removal time. For MVC coded pictures, this removal time is coded in nested SEI messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
viewpoint in response to the recovered view dependencies;	The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2. <pre> graph TD HSS[Hypothetical stream scheduler (HSS)] --> Bitstream[Type I or Type II bitstream] Bitstream --> CPB[Coded picture buffer (CPB)] CPB -- Access units --> Decoding[Decoding process (instantaneous)] Decoding -- Pictures --> DPB[Decoded picture buffer (DPB)] DPB -- Reference fields or frames --> Decoding DPB -- Pictures --> Cropping[Output cropping] Cropping --> Output[Output cropped pictures H.264(13)_FC-2] subgraph HRD_Buffer_Model [Red Box] CPB Decoding DPB end </pre> Figure C-2 – HRD buffer model

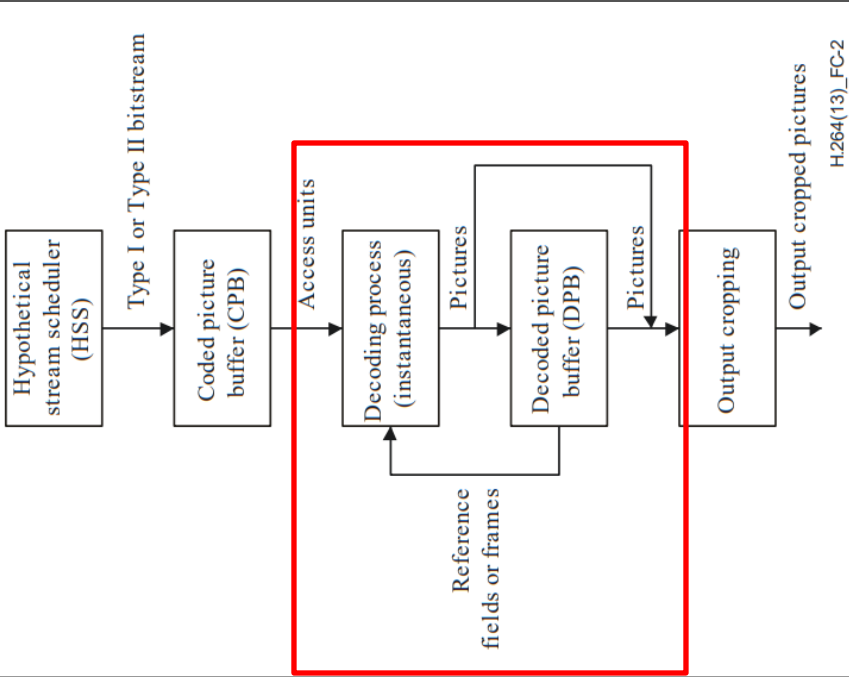
Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference".</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (a) When an access unit contains one or more buffering period SEI messages that are included in MVC scalable nesting SEI messages, the buffering period SEI message that is associated with the operation point being decoded is the buffering period SEI message that initializes the HRD. Let <code>hrdVid[i]</code> be equal to <code>sei_op_view_id[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and let <code>hrdTId</code> be the value of <code>sei_op_temporal_id</code>, that are associated with the MVC scalable nesting SEI message containing the buffering period SEI message that initializes the HRD. (b) <u>The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>.</u> (c) The HRD parameters that are used for conformance checking are the HRD parameters included in the MVC video usability information extension of the active MVC sequence parameter set that are associated with values of <code>vui_mvc_view_id[i][j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, equal to <code>hrdVid[j]</code>, and the value of <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>. For the specification in this annex, <code>num_units_in_tick</code>, <code>time_scale</code>, <code>fixed_frame_rate_flag</code>, <code>nal_hrd_parameters_present_flag</code>, <code>vcl_hrd_parameters_present_flag</code>, <code>low_delay_hrd_flag</code>, and <code>pic_struct_present_flag</code> are substituted with the values of <code>vui_mvc_num_units_in_tick[i]</code>, <code>vui_mvc_time_scale[i]</code>, <code>vui_mvc_fixed_frame_rate_flag[i]</code>, <code>vui_mvc_nal_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_vcl_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_low_delay_hrd_flag[i]</code>, and <code>vui_mvc_pic_struct_present_flag[i]</code>, respectively, with <code>i</code> being the value for which <code>vui_mvc_view_id[i]</code> is equal to <code>hrdVid[j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, and <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!IPDF-E&type=items More specifically, computing the desired delay time (i.e., cpb_removal_delay) is in response to the recovered view dependencies from element [4A] because the parameter cpb_removal_delay indicates the delay relative to the base viewpoints indicated by the recovered view dependencies. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Compliant with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	 The diagram illustrates the HRD buffer model. It begins with a 'Hypothetical stream scheduler (HSS)' which outputs a 'Type I or Type II bitstream' to a 'Coded picture buffer (CPB)'. The CPB then feeds into 'Access units', which are highlighted by a red rectangular box. Inside this box, the 'Access units' feed into a 'Decoding process (instantaneous)'. The output of the decoding process is 'Pictures', which are then stored in the 'Decoded picture buffer (DPB)'. The DPB outputs 'Pictures' to an 'Output cropping' block. The final output is 'Output cropped pictures H.264(13)_FC-2'. A feedback loop labeled 'Reference fields or frames' connects the output of the 'Output cropping' block back to the input of the 'Decoding process (instantaneous)'. Figure C-2 – HRD buffer model

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times. Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference".</u> When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (a) When an access unit contains one or more buffering period SEI messages that are included in MVC scalable nesting SEI messages, the buffering period SEI message that is associated with the operation point being decoded is the buffering period SEI message that initializes the HRD. Let <code>hrdVid[i]</code> be equal to <code>sei_op_view_id[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and let <code>hrdTId</code> be the value of <code>sei_op_temporal_id</code>, that are associated with the MVC scalable nesting SEI message containing the buffering period SEI message that initializes the HRD. (b) <u>The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVid[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>.</u> (c) The HRD parameters that are used for conformance checking are the HRD parameters included in the MVC video usability information extension of the active MVC sequence parameter set that are associated with values of <code>vui_mvc_view_id[i][j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, equal to <code>hrdVid[j]</code>, and the value of <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>. For the specification in this annex, <code>num_units_in_tick</code>, <code>time_scale</code>, <code>fixed_frame_rate_flag</code>, <code>nal_hrd_parameters_present_flag</code>, <code>vcl_hrd_parameters_present_flag</code>, <code>low_delay_hrd_flag</code>, and <code>pic_struct_present_flag</code> are substituted with the values of <code>vui_mvc_num_units_in_tick[i]</code>, <code>vui_mvc_time_scale[i]</code>, <code>vui_mvc_fixed_frame_rate_flag[i]</code>, <code>vui_mvc_nal_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_vcl_hrd_parameters_present_flag[i]</code>, <code>vui_mvc_low_delay_hrd_flag[i]</code>, and <code>vui_mvc_pic_struct_present_flag[i]</code>, respectively, with <code>i</code> being the value for which <code>vui_mvc_view_id[i]</code> is equal to <code>hrdVid[j]</code> for all <code>j</code> in the range of 0 to <code>vui_mvc_num_target_output_views_minus1[i]</code>, inclusive, and <code>vui_mvc_temporal_id[i]</code> equal to <code>hrdTId</code>.

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	cpb_removal_delay specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The cpb_removal_delay is the remainder of a modulo $2^{\text{cpb_removal_delay_length_minus1} + 1}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[4C] decoding the coded signal originating from the picture signal corresponding to the base viewpoint;	Users of the Samsung Accused Products perform decoding the coded signal originating from the picture signal corresponding to the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A decodes the coded signal originating from the picture signal corresponding to the base viewpoint. As the only view that can be independently decoded, and having the minimum index, the base view will be decoded first. H.3.6 base view: A view that has the minimum value of <i>view order index</i> in a <i>coded video sequence</i>. The base view can be decoded <u>independently of other views</u>, does not use <i>inter-view prediction</i>, and contains <i>VC-L NAL units</i> only with <i>nal_unit_type</i> equal to 1, 5, or 14. The <i>bitstream subset</i> corresponding to the base view conforms to one or more of the <i>profiles</i> specified in Annex A. <u>There is only one base view in a coded video sequence.</u>

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

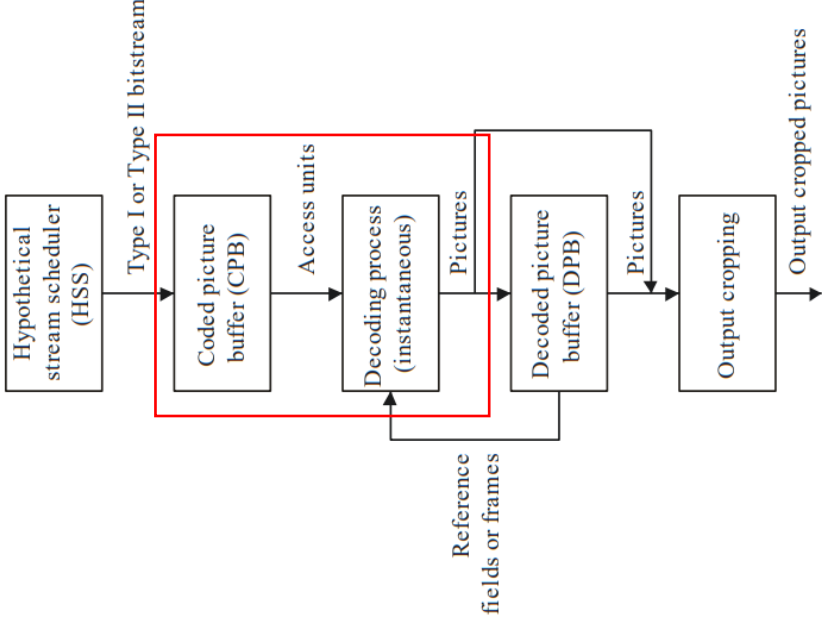
Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[4D] decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint; and	Users of the Samsung Accused Products perform decoding the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. For example, the Samsung 8K Neo QLED QN800A decodes the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint. For example, other views in the coded sequence will be released from the CPB and instantaneously decoded subsequent to the base view, based on the view index. When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified:

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	(b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-1!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.
[4E] delaying the decoding of the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint relative to the decoding of the coded signal originating from the picture signal	Users of the Samsung Accused Products perform delaying the decoding of the coded signals originating from the picture signals corresponding to the viewpoints except the base viewpoint relative to the decoding of the coded signal originating from the picture signal corresponding to the base viewpoint by time intervals equal to the computed desired delay times. Samsung directly infringes and induces infringement by causing users to perform the claimed method on devices having the H.264 MVC codec. This element is infringed literally, or in the alternative, under the doctrine of equivalents. With respect to “computed desired delay times,” the support for Claim [4B] is incorporated by reference. For example, the Samsung 8K Neo QLED QN800A delays the decoding of the coded signals (e.g., other viewpoints) relative to (e.g. after) the decoding of the coded signal (e.g., base view) by time intervals equal to the computed desired delay times (e.g., <i>cpb_removal_delay</i>). The time at which a coded picture for any view (an access unit) is decoded is determined by the CPB removal time. For MVC coded pictures, this removal time is coded in nested Supplemental Enhanced Information (SEI) messages, defined in H.264 section D. Specifically, the parameter <i>cpb_removal_delay</i> determines the delay time for removing the coded data from the CPB relative to decoding of the SEI messages. Since the base view is the only view that can be independently decoded, it must

Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung’s Accused Products
viewpoint by time intervals equal to the computed desired delay times.	be decoded before other views, so the <i>cpb_removal_delay</i> messages for other views will then be relative to the base view. The HRD contains a coded picture buffer (CPB), an instantaneous decoding process, a decoded picture buffer (DPB), and output cropping as shown in Figure C-2.

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products  Figure C-2 – HRD buffer model
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Appendix C - Claim Chart for U.S. Patent No. 8,139,150 Against Samsung TVs and Displays Complaint with H.264 Coding (MVC)

Claim – 8,139,150	Exemplary Supporting Evidence Regarding Samsung's Accused Products
	The HRD operates as follows. Data associated with access units that flow into the CPB according to a specified arrival schedule are delivered by the HSS. <u>The data associated with each access unit are removed and decoded instantaneously by the instantaneous decoding process at CPB removal times.</u> Each decoded picture is placed in the DPB at its CPB removal time unless it is output at its CPB removal time and is a non-reference picture. When a picture is placed in the DPB it is removed from the DPB at the later of the DPB output time or the time that it is marked as "unused for reference". When the coded video sequence conforms to one or more of the profiles specified in Annex H and the decoding process specified in Annex H is applied, the following is specified: (b) The picture timing SEI messages that specify the removal timing of access units from the CPB and output timing from the DPB are the picture timing SEI messages that are included in MVC scalable nesting SEI messages associated with values of <code>sei_op_view_id[i]</code> equal to <code>hrdVId[i]</code> for all <code>i</code> in the range of 0 to <code>num_view_components_op_minus1</code>, inclusive, and <code>sei_temporal_id</code> equal to <code>hrdTId</code>. <u>cpb_removal_delay</u> specifies how many clock ticks (see clause E.2.1) to wait after removal from the CPB of the access unit associated with the most recent buffering period SEI message in a preceding access unit before removing from the buffer the access unit data associated with the picture timing SEI message. This value is also used to calculate an earliest possible time of arrival of access unit data into the CPB for the HSS, as specified in Annex C. The syntax element is a fixed length code having a length in bits given by $\text{cpb_removal_delay_length_minus1} + 1$. The <code>cpb_removal_delay</code> is the remainder of a modulo $2^{(\text{cpb_removal_delay_length_minus1} + 1)}$ counter. https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-H.264-202108-!!PDF-E&type=items Further, to the extent this element is performed at least in part by software source code, ACT reserves the right to supplement these contentions pursuant to production of such source code and to the extent Defendants require additional information in accordance with P.R. 3-1 and for any other reasons.