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Information technology — JPEG 2000 image coding system: Core coding system

AMENDMENT 2: Extended profiles for cinema and video production and archival applications PREVIEW

Strechnologies de l'information — Système de codage d'images JPEG 2000: Système de codage de noyau

ISO/TEC 15444-1-2004/Amd 2:2009
AMENDEMENT 2: Profils étendus pour production au cinéma et vidéo, https://standards.iteh.avcata.ou/standards.sis/30/34421-c183-4561-a854-et applications d'archivage ded2fd93daactso-tec-15444-1-2004



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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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INTERNATIONAL STANDARD RECOMMENDATION ITU-T

Information technology – JPEG 2000 image coding system: Core coding system

Amendment 2

Extended profiles for cinema and video production and archival applications

1) Annex A

Add the following at the end of Annex A (i.e., immediately following Table A.46):

The profiles listed under profile indication numbers Rsiz = 5 to 7 are intended for archiving and production purposes. The two extended scalable profiles are intended to be used for easily accessible archives. The long-term storage profile is intended for original camera capture or post-production workflows.

Table A.46 (contd.) – Codestream restrictions for cinema and video production and archival applications

	Scalable 2k digital cinema profile	Scalable 4k digital cinema profile	/ Long-term storage profile	
SIZ marker segment	(standar	ds.iteh.ai)		
Profile Indication	Rsiz = 5	Rsiz = 6	Rsiz = 7	
Image size	Xsiz ≤ 2048, <u>ISO/IEC 15444</u> Ysiz ≤ 1080 this //standards.iteh.ai/catalog/stan	Xsiz(≤4096, 2:2009 Ysiz(≤2160314421-c183-4bb1-;	Xsiz ≤ 16384, Ysiz ≤ 8640	
Tiles	One tile for the whole image: jec-1 YTsiz + YTOsiz ≥ Ysiz	One tile for the whole image: YTsiz + YTOsiz ≥ Ysiz	One tile for the whole image or minimum tile size:	
	XTsiz + XTOsiz ≥ Xsiz	XTsiz + XTOsiz ≥ Xsiz	$YTsiz + YTOsiz \ge 512$ $XTsiz + XTOsiz \ge 1024$	
Image and tile origin	XOsiz = YOsiz = XTOsiz = YTOsiz = 0	XOsiz = YOsiz = XTOsiz = YTOsiz = 0	XOsiz = YOsiz = XTOsiz = YTOsiz = 0	
Sub-sampling	$XRsiz^i = YRsiz^i = 1$	$XRsiz^i = YRsiz^i = 1$	No restriction	
Number of components	Csiz = 3	Csiz = 3	Csiz ≤ 8	
Bit depth	$Ssiz^i = 11$ (i.e., 12-bit unsigned)	$Ssiz^i = 11$ (i.e., 12-bit unsigned)	No restriction	
RGN marker segment	Disallowed, i.e., no region of interest	Disallowed, i.e., no region of interest	Disallowed, i.e., no region of interest	
COD/COC marker segments	Main header only	Main header only	Main header only	
Coding style	Scod, Scoc = 0000 0esp, where $e = s = 0$, and $p = 1$	Scod, Scoc = 0000 0esp, where $e = s = 0$, and $p = 1$	Scod, Scoc = 0000 0esp, where $e = s = 1$, and $p = 0$ or 1	
	NOTE – $e = 0$: EPH marker shall not be used	NOTE – $e = 0$: EPH marker shall not be used	NOTE – e: EPH marker shall be used	
	s = 0: SOP marker shall not be	s = 0: SOP marker shall not be	s: SOP marker may be used	
	used p = 1: precincts defined in SPcodI'/SPcocI'	used p = 1: precincts defined in SPcodI'/SPcocI'	p: precincts with PPx = 15 and PPy = 15 or defined in SPcodI ⁱ /SPcocI ⁱ	
Progression order	CPRL	CPRL	CPRL	
Number of layers	L = 2	L = 2	L≤5	
Multiple component transform	All component transforms defined in this Recom- mendation International Standard may be used.	All component transforms defined in this Recom- mendation International Standard may be used.	All component transforms defined in this Recommendation International Standard may be used.	

Table A.46 (contd.) – Codestream restrictions for cinema and video production and archival applications

	Scalable 2k digital cinema profile	Scalable 4k digital cinema profile	Long-term storage profile
Number of	$N_L \le 5$	$1 \le N_L \le 6$	No restriction, with respect to:
decomposition levels	Every component of every	Every component of every	$(Xsiz - XOsiz)/D(I) \le 64$
	image of a codestream shall have the same number of	image of a codestream shall have the same number of	$(Ysiz - YOsiz)/D(I) \le 64$
	wavelet transform levels. The number of deployed	wavelet transform levels. The number of deployed	and $D(I) = pow(2,N_L)$ for each component I
	decomposition levels shall be set accordingly in all COD and COC markers.	decomposition levels shall be set accordingly in all COD and COC markers.	Every component of every image of a codestream shall have the same number of wavelet transform levels.
			The number of deployed decomposition levels shall be set accordingly in all COD and COC markers.
Code-block size	xcb = ycb = 5	xcb = ycb = 5	$xcb \le 6$, $ycb \le 6$
	The corresponding values shall be set accordingly in all deployed COD and COC markers.	The corresponding values shall be set accordingly in all deployed COD and COC markers.	The corresponding values shall be set accordingly in all deployed COD and COC markers.
Code-block style	SPcod, SPcoc = 0000 0000	SPcod, SPcoc = 0000 0000	SPcod, SPcoc = 00 sp vtra
			where $r = v = 0$, and a, t, p, $s = 0$ or 1
	iTeh STANDA		NOTE – $a = 1$ for selective arithmetic coding bypass,
	(standar	ds.iteh.ai)	t = 1 for termination on each coding pass,
	ISO/IFC 15444	-1:2004/Amd 2:2009	p = 1 for predictive termination,
1	nttps://standards.iteh.ai/catalog/stan		s=1 for segmentation symbols.
Transformation	9-7 irreversible filter aac/iso-iec-	947.jrreversible filter_2009	9-7 irreversible filter
	The corresponding filter shall be	The corresponding filter shall be	5-3 reversible filter
	set accordingly in all COD and COC markers.	set accordingly in all COD and COC markers.	The corresponding filter shall be set accordingly in all COD and COC markers.
Precinct size	$PPx = PPy = 7 \text{ for } N_L LL \text{ band,}$	$PPx = PPy = 7 \text{ for } N_L LL \text{ band,}$	$PPx \ge xcb, PPy \ge ycb$
	else 8 The corresponding values shall be set accordingly in all COD and COC markers.	else 8 The corresponding values shall be set accordingly in all COD and COC markers.	The corresponding values shall be set accordingly in all COD and COC markers.

Table A.46 (contd.) – Codestream restrictions for cinema and video production and archival applications

	Scalable 2k digital cinema profile	Scalable 4k digital cinema profile	Long-term storage profile
Tile-parts	Each compressed image shall have exactly 6 tile-parts. Each of the first 3 tile-parts shall contain all data necessary to decompress one 2K color component compatible to 2k digital cinema profile. Each of the next 3 tile-parts shall contain all additional data necessary to decompress the rest of one 2K color component. The resulting codestream structure is shown in Figure A-26	Each compressed image shall have exactly 12 tile-parts. Each of the first 3 tile-parts shall contain all data necessary to decompress one 2K color component compatible to 2k digital cinema profile. Each of the next 3 tile-parts shall contain all additional data necessary to decompress one 4K color component. Each of the next 3 tile-parts shall contain all additional data necessary for the rest of one 2k color component. Each of the next 3 tile-parts shall contain all additional data necessary to decompress the rest of one 4K color component.	Each compressed image tile shall consist of exactly Csiz tile-parts. Each tile-part shall contain all data from one component of the considered tile.
Other markers			
Packed headers (PPM, PPT)	Disallowed	Disallowed	Disallowed
Tile-part lengths marker (TLM)	TLM segments are required in each image	TLM segments are required in each image	TLM segments are required in each image
Packet length, tile-part header (PLT)	For each tile-part, a complete list of packet lengths shall be provided	For each tile-part, a complete list of packet lengths shall be provided	For each tile-part, a complete list of packet lengths shall be provided
QCD, QCC	Main header only	Main header only	Main header only
SOP, EPH	nttps://standards.iteh.ai/catalog/stan	Disallowed -1:2004/Amd 2:2009 dards/sist/50314421-c183-4bb1-a 5444-1-2004-amd-2-2009	Each packet in any given tile- part shall be prepended with a SOP marker segment and each packet header in any given tile- part shall be postpended with an EPH marker segment
POC marker	There shall be exactly one POC marker segment in the main header. Other POC marker segments are disallowed. The POC marker segments are disallowed. The POC marker segment shall specify exactly two progressions having the following parameters: First progression: a. RSpoc = 0, CSpoc = 0, LYEpoc = 1, REpoc = N _L +1, CEpoc = 3, Ppoc = 4 Second progression: b. RSpoc = 0, CSpoc = 0, LYEpoc = 2, REpoc = N _L +1, CEpoc = 3, Ppoc = 4	There shall be exactly one POC marker segment in the main header. Other POC marker segments are disallowed. The POC marker segments are disallowed. The POC marker segment shall specify exactly four progressions having the following parameters: First progression: a. RSpoc = 0, CSpoc = 0, LYEpoc = 1, REpoc = N _L , CEpoc = 3, Ppoc = 4 Second progression: b. RSpoc = N _L , CSpoc = 0, LYEpoc = 1, REpoc = N _L +1, CEpoc = 3, Ppoc = 4 Third progression: c. RSpoc = 0, CSpoc = 0, LYEpoc = 2, REpoc = N _L , CEpoc = 3, Ppoc = 4 Fourth progression: d. RSpoc = N _L , CSpoc = 0, LYEpoc = 2, REpoc = N _L +1, CEpoc = 3, Ppoc = 4	Disallowed

Table A.46 (contd.) – Codestream restrictions for cinema and video production and archival applications

	Scalable 2k digital cinema profile	Scalable 4k digital cinema profile	Long-term storage profile	
Application-specific estrictions				
Error protection	Disallowed	Disallowed	The use of marker segments defined in Rec. ITU-T T.810 ISO/IEC 15444-11 for the detection, correction and protection against errors that may result from aging media is not mandatory but optional and recommended.	
Max compressed bytes for any image frame (aggregate of all 3 color components)	1302083 bytes	2604166 bytes	No restrictions	
Max compressed bytes for any single color component of an image frame including all relevant tile-part headers	1041666 bytes	2083332 bytes	No restrictions	
Max compressed bytes for quality layer 0 of any image frame (aggregate of all 3 color components) shall include relevant headers and markers assuring Digital Cinema packages can be obtained by simply stripping some tile-parts	(standar	1302083 bytes for 24 fps ARD PREVIEW 'ds.iteh.ai) -1:2004/Amd 2:2009 dards/sist/50314421-c183-4bb1-a		
Max compressed bytes for layer 0 of any single color component of an image frame including all relevant tile-part headers	1041666 bytes for 24 fps iso-iec- 520833 bytes for 48 fps	1041666 bytes: for 24 fps for 2K portion of each component	No restrictions	

Main Tile-part c0p*r*I1 Tile-part c1p*r*I1 Tile-part c2p*r*I1 Tile-part c2p*r*I1 Tile-part c0p*r*12 Tile-part c0p*r*12 Tile-part c2p*r*I1 Tile-part c2p*r*I1 Tile-part c2p*r*I1 Tile-part c2p*r*I2 Tile-part c2p*r*I2 Tile-part c2p*r*I3 Tile-part c2p*r*I3 Tile-part c2p*r*I4 Tile-part c2p*r*I5 Tile-part c2p*r*I5 Tile-part c2p*r*I5 Tile-part c2p*r*I6 Tile-part c2p*r*I6 Tile-part c2p*r*I7 Tile-part c2p*r*I7 Tile-part c2p*r*I8 Tile-part c2p*r*I8 Tile-part c2p*r*I8 Tile-part c2p*r*I9 Tile-part c2p*r*Tile-part c2p*r*Tile-part c2p*r*Tile-part c2p*r*Tile-part c2p*r*Tile-part c2p*r*Tile-pa			r*12 Tile-par	c0p*r*12	Tile-part header	c2p*r*I1	Tile-part header	c1p*r*I1	Tile-part header	c0p*r*I1		Main header	
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Figure A.26 – Proposed codestream structure

Assuming N_L wavelet transform levels (N_L +1 resolutions), the rectangles labelled cip*r*11 (i = 0, 1, 2) contain all packets for color component i, all precincts, resolutions 0 through N_L and layer 1. The rectangles labelled cip*r*12 (i = 0, 1, 2) contain all packets for color component i, resolutions 0 through N_L and layer 2.

2) Clause 2, reference

Add the following to clause 2:

Recommendation ITU-T T.810 (2006) | ISO/IEC 15444-11:2007, Information technology – JPEG 2000 image coding system: Wireless.

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ISO/IEC 15444-1:2004/Amd 2:2009 https://standards.iteh.ai/catalog/standards/sist/50314421-c183-4bb1-a8b4-ded2fd93daac/iso-iec-15444-1-2004-amd-2-2009