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

**AMENDMENT 7: Profiles for an  
interoperable master format (IMF)**

**iTeh STANDARD PREVIEW**  
*Technologies de l'information — Système de codage d'images JPEG  
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## Foreword

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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  
ITU-T RECOMMENDATIONInformation technology – JPEG 2000 image coding system:  
Core coding system

## Amendment 7

## Profiles for an interoperable master format (IMF)

## 1) Table A.10

Replace Table A.10 with the following table:

Table A.10 – Capability Rsiz parameter

Value (bits)		Capability
MSB	LSB	
0000	0000 0000 0000	Any capabilities specified in this Recommendation   International Standard
0000	0000 0000 0000 0001	Codestream restricted as described for Profile 0 from Table A.45
0000	0000 0000 0000 0010	Codestream restricted as described for Profile 1 from Table A.45
0000	0000 0000 0000 0011	2k Digital Cinema Profile as specified in Table A.46
0000	0000 0000 0000 0100	4k Digital Cinema Profile as specified in Table A.46
0000	0000 0000 0000 0101	Scalable 2k Digital Cinema Profile as specified in Table A.46
0000	0000 0000 0000 0110	Scalable 4k Digital Cinema Profile as specified in Table A.46
0000	0000 0000 0000 0111	Long-term storage Profile as specified in Table A.46
0000	0001 0000 xxxx	Broadcast Contribution Single Tile Profile as specified in Table A.48, lower 8Bits identify Mainlevel as described in Table A.49
0000	0010 0000 xxxx	Broadcast Contribution Multi-tile Profile as specified in Table A.48, lower 8Bits identify Mainlevel as described in Table A.49
0000	0011 0000 0110	Broadcast Contribution Multi-tile Reversible Profile as specified in Table A.48, Mainlevel 6 as described in Table A.50
0000	0011 0000 0111	Broadcast Contribution Multi-tile Reversible Profile as specified in Table A.48, Mainlevel 7 as described in Table A.50
0000	0100 yyyy xxxx	2k IMF Single Tile Lossy Profile as specified in Table A.51, lower 8 Bits identify Sublevel and Mainlevel as specified in Table A.53 and A.54
0000	0101 yyyy xxxx	4k IMF Single Tile Lossy Profile as specified in Table A.51, lower 8 Bits identify Sublevel and Mainlevel as specified in Table A.53 and A.54
0000	0110 yyyy xxxx	8k IMF Single Tile Lossy Profile as specified in Table A.51, lower 8 Bits identify Sublevel and Mainlevel as specified in Table A.53 and A.54
0000	0111 yyyy xxxx	2k IMF Single/Multi Tile Reversible Profile as specified in Table A.52, lower 8 Bits identify Sublevel and Mainlevel as specified in Table A.53 and A.54
0000	1000 yyyy xxxx	4k IMF Single/Multi Tile Reversible Profile as specified in Table A.52, lower 8 Bits identify Sublevel and Mainlevel as specified in Table A.53 and A.54
0000	1001 yyyy xxxx	8k IMF Single/Multi Tile Reversible Profile as specified in Table A.52, lower 8 Bits identify Sublevel and Mainlevel as specified in Table A.53 and A.54
zzzz	yyyy xxxx	All other values reserved for future use by ITU-T   ISO/IEC
zzzz describe Profile, yyyy describe Sublevel, xxxx describe Mainlevel.		

2) **Table A.49 and additional Tables A.50-A.54**

Replace Table A.49 and add additional Tables A.50-A.54.

**Table A.49 – Operating levels for the broadcast contribution single tile and multi-tile profiles**

Sampling Rate = (Average Components / Pixel) × (pixels / line) × (total lines / frame) × (frames / sec)

Where Average Components is two for 4:2:2, three for 4:4:4 or 4:2:2:4, and four for 4:4:4:4

Levels	Max. Components Sampling Rate (MSamples/sec)	Max. compressed Bit Rate <sup>#</sup> (Mbits/sec)
Mainlevel 0	Unspecified	Unspecified
Mainlevel 1	65	200
Mainlevel 2	130	200
Mainlevel 3	195	200
Mainlevel 4	260	400
Mainlevel 5	520	800
Mainlevel 6	1200	1600
Mainlevel 7	2400	3200
Mainlevel 8	4800	6400
Mainlevel 9	9600	12800
Mainlevel 10	19200	25600
Mainlevel 11	38400	51200
# Max. compressed bit rate = Max. instantaneous bit rate Mega (M), in the context of this Specification, is 10 <sup>6</sup>		

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**Table A.50 – Operating levels for broadcast contribution multi-tile reversible profile**

Sampling rate = (Average components / pixel) × (pixels / line) × (total lines / frame) × (frames / sec)

Where Average components is two for 4:2:2, three for 4:4:4 or 4:2:2:4, and four for 4:4:4:4

Levels	Max. components sampling rate (MSamples/sec)	Max. compressed bit rate <sup>#</sup> (Mbits/sec)
Mainlevel 6	520	1600
Mainlevel 7	520	Unspecified
# Max. compressed Bit Rate = Max. instantaneous Bit Rate Mega (M), in the context of this Specification, is 10 <sup>6</sup>		

**Table A.51 – Codestream restrictions for interoperable master format (IMF) single tile profiles**

	2k IMF single tile lossy profile	4k IMF single tile lossy profile	8k IMF single tile lossy profile
<b>SIZ marker segment</b>			
Profile indication	See Table A.10	See Table A.10	See Table A.10
Image size	Xsiz ≤ 2048, Ysiz ≤ 1556	Xsiz ≤ 4096, Ysiz ≤ 3112	Xsiz ≤ 8192, Ysiz ≤ 6224
Tiles	One tile for the whole image: YTsiz + YTOsiz ≥ Ysiz XTsiz + XTOsiz ≥ Xsiz	Same	Same
Image and tile origin	XOsiz = YOsiz = XTOsiz = YTOsiz = 0	Same	Same
Sub-sampling	(XRsiz <sup>1</sup> = 1 for all components) or (XRsiz <sup>1</sup> = 1, XRsiz <sup>2</sup> = 2 for remaining components).	Same	Same

Table A.51 – Codestream restrictions for interoperable master format (IMF) single tile profiles

	2k IMF single tile lossy profile	4k IMF single tile lossy profile	8k IMF single tile lossy profile
	YRsiz <sup>1</sup> = 1		
Number of components	Csiz ≤ 3	Same	Same
Bitdepth	7 ≤ Ssiz <sup>i</sup> ≤ 15 (8-16 bits unsigned)	Same	Same
<b>RGN marker segment</b>	Disallowed, i.e., no region of interest	Same	Same
<b>Marker locations</b>			
Packed headers (PPM, PPT)	Disallowed	Same	Same
COD, COC, QCD, QCC	Main header only	Same	Same
<b>COD/COC marker segments</b>			
Number of decomposition levels	1 ≤ N <sub>L</sub> ≤ 5 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.	1 ≤ N <sub>L</sub> ≤ 6 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.	1 ≤ N <sub>L</sub> ≤ 7 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.
Number of layers	Shall be exactly 1	Same	Same
Code-block size	xcb=ycb=5 The corresponding values shall be set accordingly in all deployed COD and COC markers.	Same	Same
Code-block style	SPcod, SPcoc = 0000 0000	Same	Same
Transformation	9-7 Irreversible Transform	9-7 Irreversible Transform	9-7 Irreversible Transform
Precinct size	PPx = PPy = 7 for N <sub>L</sub> = 15444-1:2004-amd-7-2015 band, else 8. The corresponding values shall be set accordingly in all COD and COC markers.	Same	Same
<b>Progression order</b>	CPRL, POC marker disallowed	Same	Same
<b>Tile-parts</b>	≤ 3; One for each component	Same	Same
<b>Tile-part lengths</b>	TLM marker segments are required in each image	Same	Same
<b>Application specific restrictions</b>			
Max. components sampling rate	See Table A.53	Same	Same
Max. compressed bit rate	See Tables A.53 and A.54 The maximum codestream size is the Max. compressed bit rate divided by the frame rate.	Same	Same

**Table A.52 – Codestream restrictions for interoperable master format (IMF)  
single tile/multi-tile reversible profiles**

	<b>2k IMF single/multi-tile reversible profile</b>	<b>4k IMF single/multi-tile reversible profile</b>	<b>8k IMF single/multi-tile reversible profile</b>
<b>SIZ marker segment</b>			
Profile Indication	<b>See Table A.10</b>	<b>See Table A.10</b>	<b>See Table A.10</b>
Image size	Xsiz ≤ 2048, Ysiz ≤ 1556	Xsiz ≤ 4096, Ysiz ≤ 3112	Xsiz ≤ 8192, Ysiz ≤ 6224
Tiles	One single tile for the whole image: YTsiz + YTOsiz ≥ Ysiz XTsiz + XTOsiz ≥ Xsiz or multiple tiles with tile sizes: XTsiz=YTsiz=1024	One single tile for the whole image: YTsiz + YTOsiz ≥ Ysiz XTsiz + XTOsiz ≥ Xsiz or multiple tiles with tile sizes: XTsiz=YTsiz=1024 or XTsiz=YTsiz=2048	One single tile for the whole image: YTsiz + YTOsiz ≥ Ysiz XTsiz + XTOsiz ≥ Xsiz or multiple tiles with tile sizes: XTsiz=YTsiz=1024 or XTsiz=YTsiz=2048 or XTsiz=YTsiz=4096
Image and tile origin	XOsiz = YOsiz = XTOsiz = YTOsiz = 0	Same	Same
Sub-sampling	(XRsiz <sup>i</sup> = 1 for all components) or (XRsiz <sup>1</sup> = 1, XRsiz <sup>i</sup> = 2 for remaining components). YRsiz <sup>i</sup> = 1	Same	Same
Number of components	Csiz ≤ 3	Same	Same
Bitdepth	7 ≤ Ssiz <sup>i</sup> ≤ 15 (8-16 bits unsigned)	Same	Same
<b>RGN marker segment</b>	Disallowed, i.e., no region of interest	Same	Same
<b>Marker locations</b>			
Packed headers (PPM, PPT)	Disallowed	Same	Same
COD, COC, QCD, QCC	Main header only	Same	Same
<b>COD/COC marker segments</b>			
Number of decomposition levels	1 ≤ N <sub>L</sub> ≤ 4 for XTsiz ≥ 1024 or 1 ≤ N <sub>L</sub> ≤ 5 for XTsiz ≥ 2048 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.	1 ≤ N <sub>L</sub> ≤ 4 for XTsiz ≥ 1024 or 1 ≤ N <sub>L</sub> ≤ 5 for XTsiz ≥ 2048 or 1 ≤ N <sub>L</sub> ≤ 6 for XTsiz ≥ 4096 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.	1 ≤ N <sub>L</sub> ≤ 4 for XTsiz ≥ 1024 or 1 ≤ N <sub>L</sub> ≤ 5 for XTsiz ≥ 2048 or 1 ≤ N <sub>L</sub> ≤ 6 for XTsiz ≥ 4096 or 1 ≤ N <sub>L</sub> ≤ 7 for XTsiz ≥ 8192 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.
Number of layers	Shall be exactly 1	Same	Same
Code-block size	xcb=ycb=5 The corresponding values shall be set accordingly in all deployed COD and COC markers.	Same	Same
Code-block style	SPcod, SPcoc = 0000 0000	Same	Same



**Table A.52 – Codestream restrictions for interoperable master format (IMF) single tile/multi-tile reversible profiles**

	<b>2k IMF single/multi-tile reversible profile</b>	<b>4k IMF single/multi-tile reversible profile</b>	<b>8k IMF single/multi-tile reversible profile</b>
Transformation	5-3 Reversible Transform	Same	Same
Precinct size	PPx = PPy = 7 for NLLL band, else 8. The corresponding values shall be set accordingly in all COD and COC	Same	Same
<b>Progression order</b>	CPRL, POC marker disallowed	Same	Same
<b>Tile-parts</b>	One tile-part per each tile component	Same	Same
<b>Tile-part lengths</b>	TLM marker segments are required in each image	Same	Same
<b>Application specific restrictions</b>			
Max. components sampling rate	See Table A.53	Same	Same
Max. compressed bit rate	See Tables A.53 and A.54 The maximum codestream size is the Max. compressed Bit rate divided by the frame rate.	Same	Same

**Table A.53 – Operating levels for IMF profiles**

Sampling rate = (Average components / Pixel) × (pixels / line) × (total lines / frame) × (frames / sec)

Where Average components is two for 4:2:2, three for 4:4:4 or 4:2:2:4, and four for 4:4:4:4

<b>Levels</b>	<b>Max. components sampling rate (MSamples/sec)</b>	<b>Allowed sublevels (see Table A.54)</b>
Mainlevel 0	Unspecified	Unspecified
Mainlevel 1	65	Sublevels 0 up to 1
Mainlevel 2	130	Sublevels 0 up to 1
Mainlevel 3	195	Sublevels 0 up to 1
Mainlevel 4	260	Sublevels 0 up to 2
Mainlevel 5	520	Sublevels 0 up to 3
Mainlevel 6	1200	Sublevels 0 up to 4
Mainlevel 7	2400	Sublevels 0 up to 5
Mainlevel 8	4800	Sublevels 0 up to 6
Mainlevel 9	9600	Sublevels 0 up to 7
Mainlevel 10	19200	Sublevels 0 up to 8
Mainlevel 11	38400	Sublevels 0 up to 9