INTERNATIONAL STANDARD

ISO/IEC 15444-1

Second edition
2004-09-15

AMENDMENT 1
2006-01-01

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

AMENDMENT 1: Profiles for digital cinema applications

Technologies de l'information — Système de codage d'image JPEG 2000: Système de codage noyau

AMENDEMENT 1: Profils pour applications au cinéma numérique

Reference number
ISO/IEC 15444-1:2004/Amd.1:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC Amendment 2 to ISO/IEC 15444-1:2004 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information,* in collaboration with ITU-T. The identical text is published as ITU-T Rec. T.800/Amd.1.

INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

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

Amendment 1

Profiles for digital cinema applications

Annex A

a) *Delete the following sentence from the first paragraph of subclause A.10:*

"Codestream Restrictions" have two profiles, Profile-0 and Profile-1.

b) *Add the following at the end of Annex A (i.e., immediately following Table A.45):*

A.10.1 Codestream restrictions for digital cinema

In addition to Profile-0 and Profile-1, two profiles are defined for digital cinema applications. These profiles are Profile-3 and Profile-4, and are detailed in Table A.46.

Table A.46 – Codestream restrictions for digital cinema applications

	2K digital cinema profile	4K digital cinema profile
SIZ marker segment		
Profile Indication	Rsiz = 3	Rsiz = 4
Image size	Xsiz ≤ 2048, Ysiz ≤ 1080	Xsiz ≤ 4096, Ysiz ≤ 2160
Tiles	One tile for the whole image: YTsiz + YTOsiz ≥ Ysiz XTsiz + XTOsiz ≥ Xsiz	Same
Image and tile origin	XOsiz = YOsiz = XTOsiz = YTOsiz = 0	Same
Sub-sampling	$XRsiz^i = YRsiz^i = 1$	Same
Number of components	Csiz = 3	Same
Bit depth	$Ssiz^i$ = 11 (i.e., 12-bit unsigned)	Same
RGN marker segment	Disallowed, i.e., no region of interest	Same
Marker locations		
Packed headers (PPM, PPT)	Disallowed	Same
COD, COC, QCD, QCC	Main header only	Same
COD/COC marker segments		
Number of decomposition levels	$N_L \leq 5$ Every component of every image of a distribution shall have the same number of wavelet transform levels.	$1 \leq N_L \leq 6$ Every component of every image of a distribution shall have the same number of wavelet transform levels.
Number of layers	Shall be exactly 1	Same
Code-block size	xcb = ycb = 5	Same
Code-block style	SPcod, SPcoc = 0000 0000	Same
Precinct size	PPx = PPy = 7 for N_LLL band, else 8	Same

Table A.46 – Codestream restrictions for digital cinema applications

	2K digital cinema profile	4K digital cinema profile
Progression order	CPRL, POC marker disallowed	There shall be exactly one POC marker segment in the main header. Other POC marker segments are disallowed. The POC marker segment shall specify exactly two progressions having the following parameters: a) First progression: RSpoc = 0, CSpoc = 0, LYEpoc = 1, REpoc = N_L, CEpoc = 3, Ppoc = 4 b) Second progression: RSpoc = N_L, CSpoc = 0, LYEpoc = 1, REpoc = N_L + 1, CEpoc = 3, Ppoc = 4
Tile-parts	Each compressed image shall have exactly 3 tile parts. Each tile part shall contain all data from one color component	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. Each of the next 3 tile parts shall contain all additional data necessary to decompress one 4K color component. The resulting codestream structure is diagramed in Figure A.25.
Tile-part lengths	TLM marker segments are required in each image	Same
Application specific restrictions		
Max compressed bytes for any image frame (aggregate of all 3 color components)	1302083 bytes for 24 fps 651041 bytes for 48 fps	1302083 bytes (for 24 fps)
Max compressed bytes for any single color component of an image frame	1041666 bytes for 24 fps 520833 bytes for 48 fps	1041666 bytes for 2K portion of each component (for 24 fps)

Main header	Tile-part header	2K_0	Tile-part header	2K_1	Tile-part header	2K_2	Tile-part header	4K_0	Tile-part header	4K_1	Tile-part header	4K_2

Figure A.25 – 4K tile parts

Assuming N_L wavelet transform levels (N_L + 1 resolutions), the rectangle labelled 2K_i (i = 0, 1, 2) contains all packets for color component i, resolutions 0 through N_L – 1. The rectangle labelled 4K_i (i = 0, 1, 2) contains all packets for color component i, resolution N_L.