
**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

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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_L LL 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) |

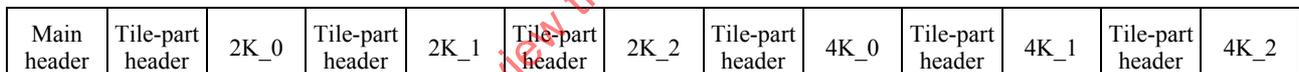


Figure A.25 – 4K tile parts

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 .