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**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

**ISO/IEC JTC 1/SC 29/WG 03 N0324**

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| **Source** | **WG 03, MPEG Systems** |
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Compressed boxes conformance

A set of new conformance test vectors for ISOBMFF Compressed Boxes were provided by Telecom Paris during MPEG#134 meeting [1]. The conformance files were created using latest GPAC version available at <http://gpac.io>, with source code available at <https://github.com/gpac/gpac>. All sequences show a 2 seconds long video counter at 25fps. Note that due to the sequence being very short, the ‘sidx’ and ‘ssix’ boxes are being forced to their compressed versions, although their original sizes are smaller than their compressed sizes.

All 7 conformance files with compressed boxes are located in “./isobmff\_conformance/comp” directory.

comp\_moov\_isoc.mp4:

The file contains a compressed moov and ‘isoC’ brand.

comp\_moov\_otyp.mp4:

The file contains a compressed moov, a ‘ftyp’ with major brand ‘comp’ and a ‘otyp’ wrapping the original ‘ftyp’ with various brand info.

comp\_moof\_nobrand.mp4:

The file contains an empty ‘moov’, no changes in brand info and compressed ‘moof’. A player not understanding compressed boxes could see this file as an init segment (empty ‘moov’ only).

comp\_moof\_otyp.mp4:

The file contains ‘ftyp’=comp, ‘otyp’, an uncompressed empty ‘moov’ and compressed ‘moof’.

comp\_moof\_sidx\_otyp.mp4:

The file contains ‘ftyp’=comp, ‘otyp’, an uncompressed empty ‘moov’ and compressed ‘moof’ and ‘sidx’.

comp\_moof\_sidx\_ssix\_otyp.mp4:

The file contains ‘ftyp’=comp, ‘otyp’, an uncompressed empty ‘moov’ and compressed ‘moof’, ‘sidx’ and ‘ssix’.

comp\_all\_otyp.mp4:

The file contains ‘ftyp’=comp, ‘otyp’ and compressed empty ‘moov’, ‘moof’, ‘sidx’ and ‘ssix’.

Common encryption conformance

A set of new conformance test vectors for Common Encryption (CENC) were provided by Telecom Paris during MPEG#134 meeting [1]. The conformance files include common encryption technologies such as: CENC, CBC1, CENS, CBCS, sample group description for keys, Item encryption and Multi-Key per sample. The CENC conformance files were created using latest GPAC version available at <http://gpac.io>, with code source available at <https://github.com/gpac/gpac>.

All CENC conformance files are located in “./isobmff\_conformance/cenc” directory. Whereby

all DRM configuration files are located in the “./isobmff\_conformance/drm\_cfg” folder, each file containing the KID and key value for each key used. Each protected ISOBMF file also contains a PSSH box using GPAC test system ID, which contains the key values in the PSSH for simple decryption without KMS.

All video sequences show a 2s video counter at 25fps, 1280x720, 420 8 bit HEVC 3x3 motion constrained tile-set. All audio sequences play a 2s audio bip/bop at 44100Hz, mono, AAC. All image sequences show a single HEVC picture of size 1280x720, 420 8 bit, 3x3 tiled.

Basic CENC Conformance

The added sequences are covering most of 23001-7. The only feature not present in these proposed sequences is the presence of non-protected samples in a protected track, as this is under revision in 23001-7:2016 CDAM 2.

The files “**\*\_frag1s.mp4**“ test ‘seig’ sample to group mapping in movie fragments.

Item Encryption and Multi-Key Conformance

The proposed files are “**image\_\***” and “**video\_cenc\_mkey\_\***”. Both CENC-128 and CBCS with constant IV are tested.

Files “**\*\_cenc\_mkey\_subs\*”** and “**\*\_cbcs\_mkey\_const\_iv\_subs\***” only perform partial encryption of the tiles in the source frames.

When playing the content with GPAC, keys can be disabled using the option drop\_keys.

For example:

gpac -play video\_cbcs\_mkey\_const\_iv\_subs.mp4 –drop\_keys=1

This will decrypt the VCL NALUs associated with key 2 but will not decrypt NALUs associated with key 1.

VVC conformance

A set of new conformance test vectors for carriage of VVC in ISOBMFF were contributed by Nokia during MPEG#134 meeting [2] and updated during MPEG#135 [3]. All the VVC encoded bitstreams which were used for packaging are conforming to v12.0 of the VTM reference software.

All 4 VVC conformance files are located in “./isobmff\_conformance/VVC” directory.

vvc\_basic\_track.mp4

Packaging of HRD\_A\_Fujitsu\_3.bit encoded input VVC bitstream which was submitted to JVET for conformance testing.

* Single layer coded bitstream in a single VVC track with the sample entry type ‘vvc1’.
* Source: BasketballPass/BlowingBubbles

vvc\_subpicture\_tracks.mp4

Packaging of Balboa sequence using 8 subpictures with QP 28 and 8 subpictures with QP 32 768x768\_60Hz\_8b\_420.

* Single layer coded bitstream with subpictures. One VVC merge base track with sample entry 'vvc1' (11.3.1),
* eight subpictures coded with two different QPs in 16 VVC subpicture tracks with sample entry 'vvs1' (11.3.2),
* VVC merge base track has 'subp' track reference to VVC subpicture tracks (11.1.5) (11.3.1) (11.6.4),
* VVC subpicture tracks are grouped by 'alte' track grouping (11.1.5)(11.6.4),
* subpicture order sample grouping 'spor' with num\_subpic\_ref\_idx equal to 0 (same order) (11.4.16),
* Subpicture layout map entry 'sulm' (11.4.17)

vvc\_subpicture\_tracks\_spor\_ordered.mp4

Packaging of Balboa sequence using 8 subpictures with QP 32 768x768 60Hz 8b\_420.

* Single layer coded bitstream with subpictures. One VVC merge base track with sample entry 'vvc1' (11.3.1),
* eight subpictures coded in 8 VVC subpicture tracks with sample entry 'vvs1' (11.3.2),
* VVC merge base track has 'subp' track reference to VVC subpicture tracks (11.1.5) (11.3.1) (11.6.4),
* subpicture order sample grouping 'spor' with num\_subpic\_ref\_idx greater than 0 (different order) (11.4.16),

vvc\_substitute\_subpicture\_single\_sample\_track.mp4

Packaging of Balboa sequence 4 subpictures with QP 34 768x768\_60Hz\_8b\_420.

* Single layer coded bitstream with subpictures. One VVC merge base track with sample entry 'vvc1' (11.3.1),
* four subpictures coded in 4 VVC subpicture tracks with sample entry 'vvs1' (11.3.2), one substitute subpicture track with sample entry 'vvs1' (only one sample in the track) (11.3.2) (In VvcNALUConfigBox flags&1=1),
* VVC merge base track has 'subp' track reference to VVC subpicture tracks (11.1.5) (11.3.1) (11.6.4),
* subpicture order sample grouping 'spor' with num\_subpic\_ref\_idx equal to 0 (same order) (11.4.16),

vvc\_substitute\_subpicture\_time\_aligned\_sample\_track.mp4

Packaging of Balboa sequence 4 subpictures with QP 34 768x768\_60Hz\_8b\_420.

* Single layer coded bitstream with subpictures. One VVC merge base track with sample entry 'vvc1' (11.3.1),
* four subpictures coded in 4 VVC subpicture tracks with sample entry 'vvs1' (11.3.2), one substitute subpicture track with sample entry 'vvs1' (time aligned samples) (11.3.2) (In VvcNALUConfigBox flags&1=1),
* VVC merge base track has 'subp' track reference to VVC subpicture tracks (11.1.5) (11.3.1) (11.6.4),
* subpicture order sample grouping 'spor' with num\_subpic\_ref\_idx equal to 0 (same order) (11.4.16)

References

1. Jean Le Feuvre, "Input on ISOBMFF conformance", Telecom ParisTech, MPEG#134 [m56755](https://dms.mpeg.expert/doc_end_user/current_document.php?id=78658)
2. Kashyap Kammachi-Sreedhar, Miska M. Hannuksela, Emre B. Aksu (Nokia), Lasse Heikkilä (Vincit), "VVC in 14496-15 conformance test vectors", Nokia, MPEG#134 [m56817](https://dms.mpeg.expert/doc_end_user/current_document.php?id=78720)
3. Kashyap Kammachi-Sreedhar, Miska M. Hannuksela, Emre B. Aksu (Nokia), Lasse Heikkilä (Vincit), "VVC in 14496-15 conformance test vectors update”, Nokia, MPEG#135 [m57436](https://dms.mpeg.expert/doc_end_user/current_document.php?id=79628)