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| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  24th Meeting: Geneva, CH, 26 May – 1 June 2016 | Document: JCTVC-X0074 |

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| --- | --- | --- | --- |
| *Title:* | **Draft verification test plan for SCC extensions** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposed Draft | | |
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| *Source:* | AHG6 | | |

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# Abstract

This contribution provides a draft test plan for verification of HEVC SCC coding performance. It describes a set of test conditions under consideration and presents a preliminary work plan for test preparation.

## Test material

All test sequences in the SCC common test conditions, JCTVC-U1015 [1], will be used in the test. These sequences are classified into four categories, namely ‘text and graphics with motion (TGM)’, ‘mixed content (M)’, ‘animation (A)’, and ‘camera-captured content (CC)’ category. A list of these sequences is given in **Table 1** and **Table 2** below. For the 4:4:4 sequences, tests will be done in both RGB and YUV colour space.

**Table 1 - 4:4:4 Test Sequences**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Resolution** | **Sequence name** | **Category** | **fps** | **Frames to be encoded** |
| 1920x1080 | sc\_flyingGraphics\_1920x1080\_60\_8bit\*  sc\_desktop\_1920x1080\_60\_8bit  sc\_console\_1920x1080\_60\_8bit  ChineseEditing\_1920x1080\_60\_8bit  MissionControlClip3\_1920x1080\_60p\_8b444  EBURainFruits\_1920x1080\_50\_10bit\*\*  Kimono1\_1920x1080\_24\_10bit\*\*\* | TGM  TGM  TGM  TGM  M  CC  CC | 60  60  60  60  60  50  24 | 0-299\*  0-599  0-599  0-599  0-599  0-249\*\*  0-119\*\*\* |
| 1280x720 | sc\_web\_browsing\_1280x720\_30\_8bit  sc\_map\_1280x720\_60\_8bit  sc\_programming\_1280x720\_60\_8bit  sc\_SlideShow\_1280x720\_20\_8bit  sc\_robot\_1280x720\_30\_8bit | TGM  TGM  TGM  TGM  A | 30  60  60  20  30 | 0-299  0-599  0-599  0-499  0-299 |
| 2560x1440 | Basketball\_Screen\_2560x1440\_60p\_8b444  MissionControlClip2\_2560x1440\_60p\_8444 | M  M | 60  60 | 322-621  120-419 |
| \*Note that only the first 300 frames of this sequence are used.  \*\*Note that only the first 250 frames of this 10-bit sequence are used, and InternalBitDepth is set to 8.  \*\*\*Note that only the first 120 frames of this 10-bit sequence are used, and InternalBitDepth is set to 8  TGM: Text and graphics with motion; M: mixed content; A: animation; CC: camera-captured content | | | | |

**Table 2 - 4:2:0 Test Sequences**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resolution | Sequence name | Category | fps | Frames to be encoded |
| 1920x1080 | sc\_flyingGraphics\_1920x1080\_60\_8bit\_420\*  sc\_desktop\_1920x1080\_60\_8bit\_420  sc\_console\_1920x1080\_60\_8bit\_420  ChineseEditing\_1920x1080\_60\_8bit\_420  MissionControlClip3\_1920x1080\_60p\_8b420 | 4:2:0 TGM  4:2:0 TGM  4:2:0 TGM  4:2:0 TGM  4:2:0 M | 60  60  60  60  60 | 0-299\*  0-599  0-599  0-599  0-599 |
| 1280x720 | sc\_web\_browsing\_1280x720\_30\_8bit\_420\_r1  sc\_map\_1280x720\_60\_8bit\_420  sc\_programming\_1280x720\_60\_8bit\_420  SlideShow\_1280x720\_20  sc\_robot\_1280x720\_30\_8bit\_420 | 4:2:0 TGM  4:2:0 TGM  4:2: 0TGM  4:2:0 TGM  4:2:0 A | 30  60  60  20  30 | 0-299  0-599  0-599  0-499  0-299 |
| 2560x1440 | Basketball\_Screen\_2560x1440\_60p\_8b420  MissionControlClip2\_2560x1440\_60p\_8420 | 4:2:0 M  4:2:0 M | 60  60 | 322-621  120-419 |
| 1024x768 | ChinaSpeed\_1024x768\_30 | 4:2:0 A | 30 | 0-499 |
| \*Note that only the first 300 frames of this sequence are used.  TGM: Text and graphics with motion; M: mixed content; A: animation; CC: camera-captured content | | | | |

## Encoder software

The bitstreams will be generated by using the following software:

* SCM-8.0: next version SCM available before the next JCTVC meeting (based on HM-16.9)

(Note: SCM-7.0 available today at https://hevc.hhi.fraunhofer.de/svn/svn\_HEVCSoftware/tags/HM-16.8+SCM-7.0)

* HM-16.9: https://hevc.hhi.fraunhofer.de/svn/svn\_HEVCSoftware/tags/HM-16.9
* JM-19.0: http://iphome.hhi.de/suehring/tml/download/

## Coding modes, configurations, and bit-rates

Both lossy and mathematically lossless coding modes will be tested. For the lossy mode, three encoding configurations will be tested, which are All Intra (AI), Random Access (RA), and Low-delay (LB).

For the random access configuration, the period for intra random access frames for each test sequence is specified in HM and SCM, as follows:

* IntraPeriod: Specifies the intra refresh period in the random access configuration. The intra refresh period is dependent on the frame rate of the test sequence. A value 16 shall be used for test sequences with a frame rate equal to 20fps, 24 for 24fps, 32 for 30fps, 48 for 50fps, and 64 for 60fps.

The same intra refresh structures can also be specified in JM-19.0.

A list of the encoder configuration files used in the tests is shown in **Table 3**.

**Table 3 – Configuration files for JM, HM, and SCM**

|  |  |  |  |
| --- | --- | --- | --- |
| Coding mode | JM configuration file | HM configuration file | SCM configuration file |
| 4:4:4 lossless |  |  |  |
| 4:2:0 lossless |  |  |  |
| 4:4:4 AI |  |  |  |
| 4:4:4 RA |  |  |  |
| 4:4:4 LB |  |  |  |
| 4:2:0 AI |  |  |  |
| 4:2:0 RA |  |  |  |
| 4:2:0 LB |  |  |  |

Four QP values are proposed to be used in generating HEVC bitstreams. They are QP=22, 27, 32, and 37. The resulting bit-rates from HEVC SCC bitstreams will be used in generating corresponding AVC bitstreams for each test point.

(NOTE: more discussion will be done in the meeting)

# Test results evaluation

The test results from each coding mode in **Table 3** will be collected into an Excel file similar to the result-reporting templates in JCTVC-U1015. The relative coding performance will be reported in BD-rates.

Subjective viewing [To be discussed]

# Schedule [To be discussed]

The following preliminary time-line is proposed for the test:

* Test plan finalization: Oct, 2016
* HEVC bitstream generation: xxxx, 2016
* QP or bit-rate establishment for AVC bitsreams: xxxx, 2016/2017
* AVC bitsream generation: xxxx, 2016/2017

# References

1. JCTVC-U1015, “Common test conditions for screen content coding,” Warsaw, PL, 19–26 June 2015.