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# Abstract

This document reports on the work of the JCT-VC ad hoc group on SCC extensions text editing (AHG7) between the 21st JCT-VC meeting in Warsaw, Poland (June 2015).and the 22nd JCT-VC meeting in Geneva, Switzerland (October 2015).

# Introduction

At the 21st meeting of the ITU-T/ISO/IEC Joint Collaborative Team on Video Coding (JCT-VC), AHG7 on SCC extensions text editing was established with the following mandates:

* Produce and finalize JCTVC-U1005 HEVC screen content coding extensions draft 4 and JCTVC-U1014 test model 5 text.
* Gather and address comments for refinement of the test model.
* Coordinate with AHG8 to address issues relating to mismatches between software and text.

# Status

The fourth specification text draft (JCTVC-U1005) for the High Efficiency Video Coding Screen Content Coding (HEVC SCC) extensions was produced by the editing ad hoc group as an output document following the decisions taken at the 21st JCT-VC meeting in Warsaw, Poland (June 2015).

One significant change was that JCTVC-U1005 is based on the complete text of HEVC v2 with the 3D-HEVC extensions additionally integrated. Two versions JCTVC-U1005 were produced. The two are identical except that the editors' notes are not present in the second version of the document. The text of JCTVC-U1005 (version 2) was submitted to ISO/IEC JTC1/SC29 for the ISO/IEC DIS ballot (which will close on 2016-02-19, in time for FDIS finalization at the February 2016 meeting).

The following is a list of changes with respect to JCTVC-T1005:

* Converted the document to use the complete HEVC version 2 text as its basis with the 3D-HEVC extension integrated
* Integrated the following changes per notes under JCTVC-U0181
  + Storage of both versions of the current decoded picture into the DPB, treating pictures with in-loop filtering on/off differently
  + Increase the value of maxDpbPicBuf equal to 7 for profiles supporting IBC
  + Addition of an PPS flag to enable IBC disabling on picture basis
* Integrated SEI Message for Green Metadata (JCTVC-U0128)
* Integrated SEI Message for ambient viewing environment (JCTVC-U0112)
* Integrated SEI Message for High dynamic range compatibility information (JCTVC-U0033)
* Fixed the discrepancy between HEVC v2 text and software for High Throughput Profile (JCTVC-U0031)
* Added a new VUI entry to support a new opto-electronic transfer function (OETF) on the basis of a new ARIB Standard STD-B67 (JCTVC-U0032)
* Integrated signaling of the adaptive color transform at the TU level (JCTVC-U0106)
* Moved the syntax elements related to palette\_transpose\_flag, delta\_qp, and chroma\_qp\_offset after copy\_above\_indices\_for\_final\_run\_flag (JCTVC-U0133, JCTVC-U0090)
* Integrated using third order exponential Golomb code for palette escape pixel coding (JCTVC-U0052)
* Integrated signalling of palette predictor initializers in the SPS (JCTVC-U0084)
* Integrated proposed editorial improvements to HEVC Screen Context Coding Draft Text 3 (JCTVC-U0038)
* Integrated draft text modifications and bugfixes on palette (JCTVC-U0092, JCTVC\_U0097, JCTVC-U0110)
* Modified the derivation of maxPaletteRun to match with SCM software (JCTVC-U0091)
* Integrated signalling of palette entries and escape pixels values in component-grouped order (JCTVC-U0063, JCTVC-U0087)
* Integrated constraints on palette syntax elements when maximum palette size is 0 (JCTVC-U0036)
* Integrated the following changes per notes under JCTVC-U0089
  + NumPaletteIndices: A bitstream conformance constraint was introduced to state that the value of MaxPaletteRun is non-negative
  + Constrain the palette\_predictor\_run so that the derived position within the palette predictorshall not exceed the size of the palette predictor
* Integrated simplification of coding of NumPaletteIndices (JCTVC-U0086)
* Integrated chroma motion vector derivation and interpolation for intra block copy for non-444 video (JCTVC-U0077, JCTVC-U0080, JCTVC-U0103)
* Integrated sharing of the contexts for copy\_above\_indices\_for\_final\_run\_flag and copy\_above\_palette\_indices\_flag (JCTVC-U0090)
* Integrated changes to the Rice parameter derivation for num\_palette\_indices\_minus1 (JCTVC-U0176)
* Integrated disabling of 8×8 bi-prediction when intra block copying is enabled and use\_integer\_mv\_flag is equal to 0 (JCTVC-U0078)
* Integrated quarter-pel storage of motion vectors for adapative motion vector resolution (JCTVC-U0081, JCTVC-U0107)
* Integrated disabling of weighted prediction for intra block copying (JCTVC-U0104)
* Integrated enabling intra block copying for L0 as well as L1 (JCTVC-U0079, JCTVC-U0104)
* Integrated enabling of I-slices when intra block copying is enabled in the SPS (JCTVC-U0079)
* Integrated placement of current picture into the last position of the active list for L0 (JCTVC-U0180)
* The following aspects to address SCC PDAM ballot comments (m36255)
  + Created separate syntax tables for delta qp and chroma qp offset to avoid duplicate syntax elements with same syntax and semantics
  + Fixed the text related to act qp offsets (ticket 1388)
  + Added 8-bit 4:4:4 and nested 4:2:0 screen content profiles.
  + Added support for additional colour-related enumeration codes
* Integrated condition to avoid overflow in cross-component prediction (ticket 1321)

The screen content coding test model5 (SCM 5) **(**document JCTVC-U1014) was released on 14 October 2015. Its main changes were restriction on use of 8×8 bipred with IBC, allow non-integer IBC chroma displacement vectors, allowing the current picture to appear in both lists, increasing the DPB size to accommodate unfiltered current picture, control adaptive colour transform at the TU level rather than the CU level, and creation of SCC profiles.

# Related Contributions

The contributions related to the editorial aspects are listed below. Some of them contain normative aspects as well.

* JCTVC-V0031 proposes editorial improvements to address the feedback and comments related to the SCC draft text 4. It also summarizes known open issues.
* JCTVC-V0032 proposes general editorial improvements/cleanups of the draft text
* JCTVC-V0036 proposes editorial changes for correction or clarification of colour description semantics, especially for transfer\_characteristics
* JCTVC-V0037 proposes a bug-fix for Table A.1 of draft text 4.
* JCTVC-V0059 proposes editorial changes related to constrained intra prediction
* JCTVC-V0060 proposes editorial changes to palette run coding

# Recommendations

The recommendations of the HEVC SCC extension draft text AHG are to:

* Approve the documents JCTVC-U1005 and JCTVC-U1014 as JCT-VC outputs
* Address the comments and feedback on SCC extensions text specification as appropriate
* Compare the HEVC SCC extensions document with the HEVC SCC extensions software and resolve any discrepancies that may exist, in collaboration with the SCC extension software development (AHG8)
* Review the related contributions