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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**  34th Meeting: Marrakech, MA, 12–18 Jan. 2019 | Document: JCTVC-AH0006-v4 |

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| *Title:* | **JCT-VC AHG 6 report: Report development for usage of video signal type code points** | | |
| *Status:* | Output Document approved by JCT-VC | | |
| *Purpose:* | Ad Hoc Group 6 Report | | |
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| *Source:* | AHG Chairs |  |  |

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# Abstract

This report summarizes the activities of the AhG related to the Report development for usage of video signal type code points that have taken place between the 33rdst and 34th JCT-VC meetings. Activities focused on work on text and diagrams of the draft output document JCTVC-AG1003 (Version 1/PDTR) intended for a Technical Record, and a follow on draft JCTVC-AG1011 (Version2) for future changes to this technical record.

# Introduction

The mandates of this AHG were:

* Produce the output draft text JCTVC-AG1003 and develop proposed improvements of its content
* Produce the output draft text JCTVC-AG1011 and develop proposed improvements of its content
* Study the industry usage of video signal type code points and identify the most common and important combinations of such code points (including study of the draft text JCTVC-AG1003).

# Activities

## Reflector

The e-mail reflector is [jct-vc@lists.rwth-aachen.de]. To receive email, please subscribe to the e-mail reflector: <http://mailman.rwth-aachen.de/mailman/listinfo/jct-vc>. For e-mail exchange, it is recommended to put [AHG6] in the subject line for easy grouping.

The reflector had several emails on comments to improve the output document content and format. Also there was some discussion on similar topic areas on ultra low latency, IMF , and JPEG 2000. A discussion resulted in adding text to the WD to describe synonyms and common terms and use of CICP, HEVC/HEVC, and SMPTE MXF for the tables listing common combinations of video properties.

## Teleconferences

Two teleconference occurred on October 30 ( Version 1 Edits) and December 17 (remainder Version 1 edits and Version 2 discussion). The following individuals attended the first teleconference: Alexandros Tourapis/ Apple, Chad Fogg (Co-Chair)/Movielabs, Walt Husak/Dolby, Gary Sullivan/Microsoft-JCT CoChair, Lars Borg/Adobe, Chris Seeger/NBCU, Greg Coppa/CBS), Atsuro Ichigaya/ NHK, Andrew Krupiczka /ESPN, Yasser Syed (Co-Chair)/ Comcast-NBCU. The second call had Chad Fogg/Movielabs (Co-Chair), Chris Seeger/NBCU, Atsuro Ichigaya/ NHK, Sean McCarthy/Dolby, Walt Husak/Dolby, Andrew Krupiczka /ESPN, Lars Borg/Adobe, and Yasser Syed/Comcast (Co-Chair)

The Group discussed the working draft for a planned technical report envisioned as 23091-4 where the first iteration is the draft ( AG1003) which would eventually become the First PDTR for consideration. The second working draft (AG1011) will become an Amendment to the eventual Technical Record created from the initial version 1 draft. The goal of the group is to ready AG1003 during the JCT meeting in October 2018 to create a PDTR document. The version 2 document is expected to be an amendment of the initial Technical Record in about a year.

Version 1 Doc was worked on to create an output edit draft. Items that were worked on were:

1. Modifications to Acronyms section
2. Modified MDCV Colour Volume description
   1. A display colour volume can be defined as a solid in colorimetric space containing all possible colours a display can produce. Mastering display colour volume (MDCV) information describes the colour volume through the colour primaries, white point, and luminance range parameters of the display that was used for authoring/grading video content
3. Revised MDCV tags to be more descriptive
   1. BT2100x~~107~~1000n0005- represents a mastering display OLED environment for mastering of SDR/HDR content with displays having 1000 cd/m2 of peak brightness, 0.05 minimum brightness, and a D65 whitepoint setting within a BT.2100 colour representation.
4. In section 4 add in at the beginning that section is within context of this document.  Also add the more specific sentence in the Y’CbCr in light of the document context.  Specifics may be added in the future.
5. in table 1, reformat the left hand column to being HD/SD instead of a separate HD and SD section.  Remove note pertaining to this.
6. converge instances to using “colour representation” instead of “colour space representation” or “domain”
7. Yasser works with Gary to get AG1003 in final shape such that it can be voted on before the next MPEG meeting. ( Many editorial changes came from this effort that resulted in AG1003 final version in first week in November)

Version 2 (AG1011)

1. Additions/ Modifications to AG1003 (Version 1)
   1. Possibly move to 23001-8 to 23091-2 (Coding Points Doc)

                                                              i.      We will need to see what is the timetable at the JCT meeting

* 1. On Colour Tables Row Link SMPTE MXF to 2067-21:2019 / ( YS:add in for both SMPTE MXF and CICP directly on tables)

                                                              i.      Agreed to add the reference on the table. It is easier for the reader to refer back to the sources

* 1. ST 2113 (P3D65) now issued so add to doc

                                                               i.      ST 2067-21:2016

                                                             ii.      ST 2067-20 should be ST 2067-20:2016

                                                           iii.      ST 336 should be ST 336:2017

                                                           iv.      ST 335 should be ST 335:2012

                                                             v.      ST 2003 should be ST 2003:2012

                                                           vi.      ST 2086 should be ST 2086:2018

* Add Year to specs?

1. Discussed format of possible baseband input.  Looked over basic tables that Atsuro created. The information of the payload indicator in the SDI specs use a similar payload indicator with multiple byte description which can include color properties but can also include Chroma Subsampling and bit depth information.  Between multiple SDI specs the information is similar but may not be exact (may need more than 1 decoder ring). This still needs to be examined, but right now should only consider specs that have already HDR material added to it or are already an established spec for the SDR content workflows (e.g. SDI). Continue to figure out decoder ring commonality and about subsampling and bit depth information (separate table that we need to consider across workflow? This is the same topic as proposed section 7.2 in AG1011.;
   1. Target applications table in section 5 (overview).  So far agreeable to add the target applications list and what tags are associated with each target application. Target Applications Table in AG1011

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| **System** | **Format** | **Other restrictions** | **Notes** |
| **HD Broadcast contribution SDR** | BT.709 YCC | 10-bit 4:2:2 (JPEG-2000 Broadcast Contribution Single Tile Profile) | used internally for IP contribution and during live events production,  now available with embedded H.273 signaling per<http://www.videoservicesforum.org/download/technical_recommendations/VSF_TR-01_2018-06-05.pdf> |
| **HD Broadcast contribution SDR** | BT.709 YCC | 10-bit 4:2:2 (AVC High422 Profile) | typically, this is how we provide live content to our business partners |

                                Agreed to discuss at next JCT meeting. Need to add links of where target specs come from. Tentatively to leave this in version 2 of the Doc at the meeting may discuss putting this in earlier..

1. Highest signal discussion.  Should we document the highest signal coming out of the camera ( e.g 422 16 bit with Slog3 [SMPTE Camera Log]).  Still in discussion, but agreed that dealing with the camera raw format is not helpful to describe.  Question of what should be captured and that still needs to be discussed.
2. New Additions

                                                               i.      E.g. Addition of ICtCp? We would need to see an Input at this meeting and even then it may still belong to Version2 of the doc.

1. Where does ColourSampling, Bitdepth Fit?

                                                              i.      Still in discussion. A number of people feel there is a need for this information.

1. What is Baseband- SDI, HD-SDI, 3G-SDI etc, & HDMI? ( STS 292-1, ST 372-1, ST 425-1, ST 2036-3, ST 2081-10, ST 2082-10, BT 1120-8, BT 2077-1, CTA 861.4 ) Recently Published 2110,

                                                              i.      Looking at a checkmark table for this case for each broadband spec ( this avoids repeating what is in the spec) . Basically 3 tables of Baseband specs for colorimetry.

                                                             ii.      Agreed that HDMI also warrants to be here.  May see input document suggesting this.

                                                           iii.      Also add ST 2110 spec to this set of table.

                                                           iv.      If a checkmark table doesn’t seem to fit. It may be good to split baseband inputs into a separate document.  This to be discussed at JCT meeting.

1. What about Camera Logs ( recently a SMPTE Doc ST 2115)- Captured Signal and then Changed? Should this be captured?

                                                              i.      SMPTE Camera Logs doc ST 2115 is in Final Commmittee Draft Stage.  We should ask for a copy of this. May result in a request to add signaling of slog3 in VUI

                                                             ii.      Also P3D65 is now a SMPTE document in Final Committee Draft Stage. We should also ask for a copy of this.  This may cause an update or addition to the references.

1. Revised references to group into different organization and to remove dates to allow for most current reference of that doc (including amendments). Also discussed that version numbering of spec for some ITU-R spec would be indicated in the reference, but table references would be simplier without the version number (e.g. BT.709 instead of BT.709-6)
2. Edited the definitions section for narrow range, colour volume
3. Added/edited abbreviations for 2K/4K/8K, YCbCr (and many varations of this)
4. Section 6 – Revised diagram to reduce the amount of text. Moved camera Logs to Version 2, added text about P3D65 and removed some of DCI information
5. Section 7.1, added summary table to associated SD/HD/UHD, tags, and colourimetry properties
6. Section 7.1.1 revised format on Defined properties to make it more readable and added a code points table for colourimetry properties.
7. Colourimetry Tag tables- removed “.” On tags. Revised SDR-NCG/SDR-WCG/HDR-WCG tables to make it more readable. Added notes on trander characteristics that were functionally the same but may be defined different for each applications. Added note to say that parameters noted in CCIP would use CCIP as a source,
8. Moved Footnotes to table and made them notes added to after the table
9. Moved section7.2 (baseband, codecs, compression, chroma subsampling) into version 2
10. Section 7.2 (Now MDCV)- Revised table to make it more readable. Removed Hex versions of coded decimal values. Removed column for P3Plus-4000 due to no further information on data values for that MDCV display point. (May add this in later if we get this information.)
11. Text in document was edited to use more spec like terminology.
12. Significant discussions on what P3 meant for both signal and display. In end of discussion identified that better definition of it was P3D65 to define white point along with it since this was the white point used in video content workflow. This was also documented in 2067-21.
13. Discussion of ChromaLocation Type ( Parameter specified in HEVC spec) lead to a footnote added in version 1 for parts of workflow that have chroma subsampling. More details will be put in Version 2 of document ( Tables etc).
14. Many discussions on what is defined but not used, what is used but not defined, and how to deal with this.

Version 2 document draft output document was started and made into submitted draft for AG1011.

1. Added references for baseband specification, camera Logs, popular applications links
2. Added table to indicate target applications for the widely used content workflow
3. Added in Chroma vertical alignment to colorimetry section and into code points section
4. Added in possibility for chroma tables for baseband, HDMI, etc.
5. Added back in section of video/image characteristics

Lots of email activities to discuss on the output documents and to discuss what is used by the industry and what is specified as well.

## Input Documents

### JCTVC AH0021 Request for a New Code Point Combination in the TR on Usage of Video Signal Type Code Points (Apple/ D. Concion, D. Singer, A.Tourapis, X. Yang)

This contribution requests the addition of an additional code point combination in the technical report on usage of video signal type code points. In particular, it is requested to add the standard dynamic range with wide colour gamut representation currently supported by millions of iPhone devices.

### JCTVC AH0022 Baseband Signalling Specifications Carriage to Supplement of Usage of Video Signal Coding Types document (NHK/A. Ichigaya, Comcast/ Y. Syed, C. Seeger)

This document contains a draft of an amendment for adding baseband signalling specification compatibility to the non- normative technical report’s video signal property description code points and their combinations that are widely used in production and video content workflows. This report will provide baseband signal specification compatibility and carriage of the combination of video properties.

### JCTVC AH0026 Usage of video signal type code points: ICTCP (Dolby/W.Husak, S. McCarthy)

This JCT-VC input document requests that the ICTCP signal format specified by ITU-R BT.2100-1 be incorporated into the first version of the technical report “Usage of video signal type code points draft technical report,” now Draft 5, in JCTVC-AG1003 (m45220), Macau, October 2018.

## Activities and output

Work was done to produce, review, insert comments, and refine the output document JCTVC-AG1003 (Version1- Submitted on Nov 9th <http://phenix.int-evry.fr/jct/doc_end_user/current_document.php?id=10896> ) and JCTVC- AG1011 (version2- Based on Dec 17th Call Submitted on Dec 31st <http://phenix.int-evry.fr/jct/doc_end_user/current_document.php?id=10899> ) and capture email and teleconference activity in this report JCTVC-AH0006.

At the meeting, JCTVC will review input contributions and resolve comments on PDTR

Some items already to be discussed at Marrakech Meeting:

1. Resolve Comments on PDTR
2. Check for any edits that may need to be done (Tags names etc)
3. Discussions on any concepts that may have since reached maturity
   1. Move table 1 in Version 2 (Client Applications) to version 1
   2. Move Consumer and Client target Applications into two separate tables
   3. Table of specification to tags with check marks
4. Go over Input Contribution Documents

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