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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-AH0021 |

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| *Title:* | **Request for a New Code Point Combination in the TR on Usage of Video Signal Type Code Points** | | |
| *Status:* | Input document to JCT-VC | | |
| *Purpose:* | Proposal | | |
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| *Source:* | Apple Inc. | | |

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# Abstract

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.

# Introduction

The camera characteristics and quality of several smart phone devices, such as the iPhone, have made them a rather interesting medium for the capture and creation of movie content [2][3][4]. There are already several feature films and shorts shot entirely or at least partially on iPhone devices, including films from famous directors (*Steven Soderbergh/Unsane*) and Oscar-winning documentaries (*Searching for Sugar Man*).

Recently, there has been an attempt by the JCTVC to document some of the commonly used code points for movie production in its technical report on usage of video signal type code points [1]. However, we have noted that this report does not include one of the representations supported by iPhone devices. In particular, many iPhone models are capable of capturing standard dynamic range images with a wider colour gamut, and more specifically the P3 colour gamut with a D65 white point (P3D65) [5].

Given the proliferation of smart phone, and in particular iPhone, devices for video production, we would like to request that this particular combination of code points is also included in this technical report. Section 2 provides the proposed text modifications needed in that document and highlights the characteristics of that representation.

# Proposed text modifications

*Replace Table 3 with the table below:*

**Table 3 – Code point values widely used for colorimetry properties**

| **HEVC property** | **Code point value** | **Meaning** |
| --- | --- | --- |
| colour\_primaries | 1 | Rec. ITU-R BT.709 primaries |
| 5 | Rec. ITU-R BT.601 625-line systems primaries |
| 6 | Rec. ITU-R BT.601 525-line systems primaries |
| 9 | Rec. ITU-R BT.2020 and Rec. ITU-R BT.2100 primaries  (share the same code point since their values are identical) |
| 12 | SMPTE EG 432-1 (2010) (P3D65) |
| transfer\_characteristics | 1, 6, 14, 15 | Rec. ITU-R BT.709, Rec. ITU-R BT.601, Rec. ITU-R BT.2020, and Rec. ITU-R BT.2100 transfer characteristics  (functionally equivalent values) |
| 16 | Rec. ITU-R BT.2100 PQ |
| 18 | Rec. ITU-R BT.2100 HLG (Hybrid Log-Gamma) |
| matrix\_coeffs | 0 | R′G′B′ (identity matrix applied to primaries after transfer function) |
| 1 | Y′CbCr for Rec. ITU-R BT.709 primaries |
| 5 | Y′CbCr for Rec. ITU-R BT.601 625-line primaries |
| 6 | Y′CbCr for Rec. ITU-R BT.601 525-line primaries |
| 9 | Y′CbCr for Rec. ITU-R BT.2020 and Rec. ITU-R BT.2100 primaries |
| ChromaLocType | 0 | Vertically interstitial, horizontally co-sited |
| 1 | Vertically interstitial, horizontally interstitial |
| 2 | Vertically co-sited, horizontally co-sited |

*In section 7.2.4 (Common descriptions and carriage – standard dynamic range video with wide colour gamut) add the highlighted text as follows:*

The following system identifier tags are described, as defined in Table 5:

* P3D65\_SDR\_YCC\_NCL
* BT2020\_YCC\_NCL
* BT2020\_RGB
* FR2020\_RGB

*Replace Table 5 with the table below:*

**Table 5 – SDR WCG common colour volume descriptions**

|  | **System Identifier** | **P3D65\_SDR\_YCC\_NCL** | **BT2020\_YCC\_NCL** | **BT2020\_RGB** | **FR2020\_RGB** |
| --- | --- | --- | --- | --- | --- |
| **Colour properties** | Colour primaries | P3 D65 | BT.2020 | BT.2020 | BT.2020 |
| Transfer characteristics | BT.709 | BT.2020 | BT.2020 | BT.2020 |
| Colour representation | Y′CbCr | Y′CbCr | R′G′B′ | R′G′B′ |
| **Other** | Full/narrow range | Full | Narrow | Narrow | Full |
| 4:2:0 chroma sample location alignment | Interstitial (1) | Co-sited | Co-sited | Co-sited |
| **CICP parameters** | ColourPrimaries | 12 | 9 | 9 | 9 |
| TransferCharacteristics | 1 | 14 | 14 | 14 |
| MatrixCoefficients | 6 | 9 | 0 | 0 |
| VideoFullRangeFlag | 1 | 0 | 0 | 1 |
| **SMPTE MXF parameters** | Colour primaries | N/A | 06.0E.2B.34.04.01.01.0D.04.01.01.01.03.04.00.0 | | |
| Transfer characteristic | N/A | 06.0E.2B.34.04.01.01.0E.04.01.01.01.01.09.00.00 | | |
| Coding equations | N/A | 06.0E.2B.34.04.01.01.0D.04.01.01.01.02.06.00.00 | N/R | N/R |
| Full/narrow level range  indicated in black reference level, white reference level, colour range | N/A | Inferred | | |
| 4:2:0 chroma sample location alignment | N/A | Inferred (ChromaLocType = 2) | | |

# References

1. L. Borg, C. Fogg, W. Husak, C. Seeger, G. J. Sullivan, Y. Syed, and A. Tourapis, “Usage of video signal type code points,” JCTVC-AG1003, 33rd JCT-VC meeting, Macao, CN, Oct 2018.
2. PC Magazine: 7-movies shot on an iphone, <https://www.pcmag.com/feature/360161/7-movies-shot-on-an-iphone>
3. Variety: 12 Movies That Were Shot on an iPhone, <https://variety.com/2018/film/news/unsane-tangerine-films-iphones-1202730676/>
4. IndieWire: 11 Movies Shot on iPhones, From ‘Tangerine’ to a Charming Short By Michel Gondry, <https://www.indiewire.com/2018/03/movies-shot-on-iphones-unsane-tangerine-shorts-1201941565/>
5. Apple Developer: AVCaptureColorSpace, https://developer.apple.com/documentation/avfoundation/avcapturecolorspace

# Patent rights declaration(s)

**Apple Inc may have current or pending patent rights relating to the technology described in this contribution and, conditioned on reciprocity, is prepared to grant licenses under reasonable and non-discriminatory terms as necessary for implementation of the resulting ITU-T Recommendation | ISO/IEC International Standard (per box 2 of the ITU-T/ITU-R/ISO/IEC patent statement and licensing declaration form).**