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| *Title:* | **Report of HDR CE1** | | |
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| *Source:* | JCT-VC | | |

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# Abstract

This document provides a description of work done in Core Experiment (CE1). The goal of this CE is to identify and investigate methods for the optimization of the HEVC Main 10 coding of High Dynamic Range (HDR) and Wide Color Gamut (WCG) content without any specification changes. During the course of the CE1, several ways to improve the anchors have been found and incorporated into the anchor generation process. At the interim meeting in Vancouver meeting anchor v3.2 was selected as the anchor to be used.

# Summary

The anchor generation process has gone through a number of versions summarized in Table 1.

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| --- | --- | --- | --- |
| Final code released | Version number | Comment | Date of decision to use as current anchor |
|  | v1.0 | CfE anchor |  |
| Oct 30, 2015 | v2.0 | CE1.a + CE1.b + HM16.7 + VUI/SEI parameter changes + chroma position change + integer QP | Oct 30 2015 |
| Nov 10, 2015 | v2.1 | New sequences, split sequences, new rate points |  |
| Nov 21, 2015 | v3.0 | Average-luma controlled adaptive QP | Dec 1, 2015 |
| Dec 6, 2015 | v3.1 | Bugfix1 (luma dQP LUT metadata file reading) |  |
| Jan 5, 2016 | v3.2 | Bugfix2 (luma dQP signaling) + integer QP | Jan 12, 2016 |

*Table 1. Summary of the different approved versions of the anchor.*

# Work leading up to the Vancouver meeting

During the 113th MPEG meeting in Geneva (output document w15794) it was decided that v2.0 should replace v1.0. The new thing added was CE1.a (Chroma QP offset m37179) and CE1.b (Luma Adjustment m37272). It was also decided to move to HM16.7, and setting correct VUI/SEI parameters that allowed playback on commercial TV sets (m37008). The chroma downsampling (4:4:4. to 4:2:0) filter phase was changed to comply with the BT.2020 chroma position. The QPs were also rounded to the nearest integer.

It was also decided during the same meeting as part of the Common test conditions (CTC) work that new sequences should be incorporated, the sequences should be split along scene cuts and new rate points should be used. To that end, version 2.1 of the anchors was released on Nov 10, 2015.

A telephone conference was held on Dec 1, 2015. It was decided that v3.0 should be adopted as the new anchor. This version contains adaptive QP offset controlled by the average luma value in the block, and is based on m37439.

A bug was found in the software interpreting the configuration file for the average-luma controlled adaptive QP. This was fixed and a new version 3.1 was released on Dec 6.

On Jan 5, 2016, anchor v3.2 was uploaded. This release contained a bugfix and the QPs were rounded to the nearest integer.

# Work during the interim meeting in Vancouver (Jan 2016)

On Jan 5, 2016, Interdigital shared two anchor improvement proposals to the reflector based on m37227. The software was based on v3.0 of the anchors and contained two tests; test1 was anchor v3.0 with added deblocking optimization and chroma QP offset adjustment, and test 2 was anchor v3.0 with deblocking optimization only.

During the interim meeting, anchors 3.2 were shown on the SIM2 display and compared against v2.1. It was concluded that the new anchors (v3.2) were a substantial improvement over v2.1.

A viewing was also held between Interdigital’s test1 and anchor v3.2. The group decided to select anchor v3.2, which became the current anchor.

# Outcome of the interim meeting in Vancouver (Jan 2016)

As of January 12, 2016, the new anchors (v3.2) replace the old anchors. Version 3.2 is thus the only version of the anchors that will be used in comparisons.

# Participants

Table 2 shows a list of the participants in CE1:

|  |  |  |  |
| --- | --- | --- | --- |
| ***Participant*** | ***Contact*** | ***Email*** | ***Type*** |
| Ericsson | Jacob Strom | [jacob.strom@strom.com](mailto:jacob.strom@strom.com) | P |
| Qualcomm | Joel Sole | [joels@qti.qualcomm.com](mailto:dmytror@qti.qualcomm.com) | P |
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*Table 2: List of participants. P equals participant, C equals cross-checker.*

# Communication

For communication, the reflector xyz-ee1@lists.aau.at list will be used.