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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**  20th Meeting: Geneva, CH, 10–18 Feb. 2015 | Document: JCTVC-T0083 |

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| *Title:* | **Crosscheck of CE2 Test 3.1** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Report | | |
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| *Source:* | MediaTek | | |

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# Abstract

This document reports a crosscheck summary for the methods and results in CE2 Test 3.1 (JCTVC-T0040). The source code provided by the proponents was verified to be consistent with the description in CE2 document. The rate-distortion performance was evaluated for CE2 test conditions JCTVC-S1102 and matches the one provided in JCTVC-T0040.

# Introduction

JCTVC-T0040 [1] describes a technique where the IBC merge mode is enabled. The five merge candidates are set according to the spatial candidates in HEVC inter merge mode.

# Simulation results

The performance of the CE2 [2] test 3.2 is cross-checked according to CE2 test conditions [3] and is summarized below. The detailed results can be found in the attached excel datasheets.

Table 1. Average BD rate reduction for Test 3.1 444 lossless coding

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **All Intra** | | | |
|  | Bit-rate change (Total) | Bit-rate change (Average) | Bit-rate change (Min) | Bit-rate change (Max) |
|  |
| RGB, text & graphics with motion, 1080p & 720p | -0.6% | -0.8% | -2.4% | 0.0% |
| RGB, mixed content, 1440p & 1080p | -1.4% | -1.3% | -2.3% | -0.2% |
| RGB, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p & 720p | -0.5% | -0.6% | -1.0% | -0.1% |
| YUV, mixed content, 1440p & 1080p | -1.2% | -1.1% | -2.1% | -0.1% |
| YUV, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 120% | | | |
| Dec Time[%] | 100% | | | |
|  |  |  |  |  |
|  | **Random Access** | | | |
|  | Bit-rate change (Total) | Bit-rate change (Average) | Bit-rate change (Min) | Bit-rate change (Max) |
|  |
| RGB, text & graphics with motion, 1080p & 720p | -0.4% | -0.6% | -1.8% | 0.0% |
| RGB, mixed content, 1440p & 1080p | -0.2% | -0.2% | -0.5% | 0.0% |
| RGB, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p & 720p | -0.5% | -0.6% | -1.7% | 0.0% |
| YUV, mixed content, 1440p & 1080p | -0.2% | -0.2% | -0.4% | 0.0% |
| YUV, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 101% | | | |
| Dec Time[%] | 98% | | | |
|  |  |  |  |  |
|  |  |  |  |  |
|  | **Low Delay B** | | | |
|  | Bit-rate change (Total) | Bit-rate change (Average) | Bit-rate change (Min) | Bit-rate change (Max) |
|  |
| RGB, text & graphics with motion, 1080p & 720p | -0.3% | -0.5% | -2.2% | 0.0% |
| RGB, mixed content, 1440p & 1080p | -0.1% | -0.1% | -0.2% | 0.0% |
| RGB, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p & 720p | -0.5% | -0.6% | -2.1% | 0.0% |
| YUV, mixed content, 1440p & 1080p | -0.1% | -0.1% | -0.2% | 0.0% |
| YUV, Animation, 720p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 100% | | | |
| Dec Time[%] | 98% | | | |

Table 2. Average BD rate reduction for Test 3.1 444 lossy coding

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All Intra** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p & 720p | -0.8% | -0.8% | -0.9% |
| RGB, mixed content, 1440p & 1080p | -1.0% | -1.1% | -1.2% |
| RGB, Animation, 720p | 0.0% | 0.0% | 0.0% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p & 720p | -1.3% | -1.2% | -1.1% |
| YUV, mixed content, 1440p & 1080p | -1.0% | -0.8% | -1.0% |
| YUV, Animation, 720p | -0.1% | -0.1% | -0.2% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 127% | | |
| Dec Time[%] | 100% | | |
|  |  |  |  |
|  | **Random Access** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p & 720p | -0.8% | -0.8% | -0.9% |
| RGB, mixed content, 1440p & 1080p | -0.5% | -0.7% | -0.8% |
| RGB, Animation, 720p | 0.1% | 0.1% | -0.1% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p & 720p | -1.3% | -1.2% | -1.2% |
| YUV, mixed content, 1440p & 1080p | -0.8% | -0.6% | -0.7% |
| YUV, Animation, 720p | -0.2% | -0.2% | 0.1% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.1% |
| Enc Time[%] | 101% | | |
| Dec Time[%] | 98% | | |
|  |  |  |  |
|  | **Low delay B** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p & 720p | -0.7% | -0.6% | -0.7% |
| RGB, mixed content, 1440p & 1080p | -0.4% | -0.2% | -0.5% |
| RGB, Animation, 720p | 0.0% | 0.0% | -0.1% |
| RGB, camera captured, 1080p | 0.1% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p & 720p | -1.1% | -0.9% | -0.8% |
| YUV, mixed content, 1440p & 1080p | -0.6% | -0.8% | -0.8% |
| YUV, Animation, 720p | 0.0% | 0.2% | 0.1% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.2% |
| Enc Time[%] | 100% | | |
| Dec Time[%] | 98% | | |

Table 3. Average BD rate reduction for Test 3.1 420 lossless coding

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **All Intra** | | | |
|  | Bit-rate change (Total) | Bit-rate change (Average) | Bit-rate change (Min) | Bit-rate change (Max) |
|  |
| Text & graphics with motion, 720p | -1.0% | -1.0% | -1.3% | -0.7% |
| Mixed content, 480p | -0.1% | -0.1% | -0.1% | -0.1% |
| Animation, 768p | 0.0% | 0.0% | 0.0% | 0.0% |
| Average of all sequences | -0.3% | -0.5% | -1.3% | 0.0% |
| Enc Time[%] | 105% | | | |
| Dec Time[%] | 98% | | | |
|  |  |  |  |  |
|  | **Random Access** | | | |
|  | Bit-rate change (Total) | Bit-rate change (Average) | Bit-rate change (Min) | Bit-rate change (Max) |
|  |
| Text & graphics with motion, 720p | -0.4% | -0.6% | -0.9% | -0.2% |
| Mixed content, 480p | 0.0% | 0.0% | 0.0% | 0.0% |
| Animation, 768p | 0.0% | 0.0% | 0.0% | 0.0% |
| Average of all sequences | 0.0% | -0.3% | -0.9% | 0.0% |
| Enc Time[%] | 98% | | | |
| Dec Time[%] | 100% | | | |
|  |  |  |  |  |
|  | **Low Delay B** | | | |
|  | Bit-rate change (Total) | Bit-rate change (Average) | Bit-rate change (Min) | Bit-rate change (Max) |
|  |
| Text & graphics with motion, 720p | 0.0% | 0.1% | 0.0% | 0.2% |
| Mixed content, 480p | 0.0% | 0.0% | 0.0% | 0.0% |
| Animation, 768p | 0.0% | 0.0% | 0.0% | 0.0% |
| Average of all sequences | 0.0% | 0.0% | 0.0% | 0.2% |
| Enc Time[%] | 98% | | | |
| Dec Time[%] | 98% | | | |

Table 4. Average BD rate reduction for Test 3.1 420 lossy coding

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All Intra** | | |
|  | G/Y | B/U | R/V |
| Text & graphics with motion, 720p | -2.5% | -2.5% | -2.4% |
| Mixed content, 480p | -0.3% | -0.3% | -0.4% |
| Animation, 768p | -0.2% | -0.1% | -0.1% |
| Average of all sequences | -1.4% | -1.4% | -1.3% |
| Enc Time[%] | 107% | | |
| Dec Time[%] | 95% | | |
|  |  |  |  |
|  | **Random Access** | | |
|  | G/Y | B/U | R/V |
| Text & graphics with motion, 720p | -1.4% | -1.4% | -1.1% |
| Mixed content, 480p | -0.1% | 0.0% | -0.1% |
| Animation, 768p | -0.1% | -0.1% | 0.1% |
| Average of all sequences | -0.7% | -0.7% | -0.5% |
| Enc Time[%] | 100% | | |
| Dec Time[%] | 97% | | |
|  |  |  |  |
|  | **Low delay B** | | |
|  | G/Y | B/U | R/V |
| Text & graphics with motion, 720p | -0.6% | -1.3% | -2.2% |
| Mixed content, 480p | 0.1% | 0.6% | 0.1% |
| Animation, 768p | 0.0% | 0.7% | 0.0% |
| Average of all sequences | -0.3% | -0.4% | -1.1% |
| Enc Time[%] | 98% | | |
| Dec Time[%] | 93% | | |

# References

1. B. Li and J. Xu, “CE2: Result of test 3.1 and 6.1”, JCTVC-T0040, Feb. 2014.
2. S. Liu, C. Pang, J. Xu, “Description of Core Experiment 2 (CE2): Intra block copy relationship to inter coding”, JCTVC-S1102, Oct. 2014.
3. H. Yu, R. Cohen, K. Rapaka, J. Xu, “Common conditions for screen content coding tests” JCTVC-S1015, Oct. 2014.