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| *Title:* | **CE9: crosscheck report of CE9 Test A.3 (JCTVC-S0177)** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
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# Abstract

This proposal reports cross checking results for JCTVC-S0177 on modifying cross-component prediction to compensate for intra boundary filtering. It is confirmed that the cross checking results match the results reported by the component of JCTVC-S0177.

# Introduction

Performance verification on an extended inter-component prediction scheme proposed in JCTVC-S0177 [1] was conducted. Three sets of simulations have been conducted using the provided software with the macro ‘XY\_CCP’ set to 1. Due to limited time, the software was not fully studied by the crosschecker.

# Simulation results

For all the three test sets, the software used in the simulation was provided by the proponent. The test results under XY\_CCP equal to 1 are listed in the following tables. The first two sets of simulations are based on the test conditions specified in the CE9 description [2]. The third test is based on [2] but with the adaptive color transform disabled for both the anchor and tested method.

## Lossy coding results

Decode time ratios may vary due to differences in computing platforms.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All Intra** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% |
| RGB, text & graphics with motion,720p | -0.1% | 0.0% | 0.0% |
| RGB, mixed content, 1440p | 0.0% | -0.1% | -0.1% |
| RGB, mixed content, 1080p | -0.1% | -0.1% | 0.0% |
| RGB, Animation, 720p | -0.1% | 0.0% | -0.1% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1440p | -0.1% | -0.1% | -0.1% |
| YUV, mixed content, 1080p | -0.1% | -0.1% | 0.0% |
| YUV, Animation, 720p | -0.1% | -0.2% | -0.1% |
| YUV, camera captured, 1080p | 0.0% | -0.1% | -0.3% |
| Enc Time[%] | 102% | | |
| Dec Time[%] | 106% | | |
|  |  |  |  |
|  | **Random Access** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% |
| RGB, text & graphics with motion,720p | -0.1% | -0.1% | -0.1% |
| RGB, mixed content, 1440p | -0.1% | -0.1% | -0.1% |
| RGB, mixed content, 1080p | 0.0% | -0.1% | -0.2% |
| 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 | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | 0.0% | -0.2% | 0.0% |
| YUV, mixed content, 1440p | 0.0% | -0.1% | 0.0% |
| YUV, mixed content, 1080p | 0.0% | -0.4% | -0.2% |
| YUV, Animation, 720p | 0.0% | -0.2% | 0.0% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | -0.2% |
| Enc Time[%] | 102% | | |
| Dec Time[%] | 102% | | |
|  |  |  |  |
|  | **Low delay B** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | -0.1% | -0.1% | 0.0% |
| RGB, text & graphics with motion,720p | 0.0% | 0.1% | 0.1% |
| RGB, mixed content, 1440p | -0.2% | -0.1% | -0.1% |
| RGB, mixed content, 1080p | -0.2% | 0.1% | 0.5% |
| RGB, Animation, 720p | 0.0% | 0.0% | 0.1% |
| RGB, camera captured, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | -0.2% | -0.1% | -0.3% |
| YUV, mixed content, 1440p | -0.1% | -0.4% | 0.0% |
| YUV, mixed content, 1080p | -0.1% | -0.1% | -0.8% |
| YUV, Animation, 720p | 0.1% | -0.6% | -0.2% |
| YUV, camera captured, 1080p | 0.0% | -0.1% | 0.1% |
| Enc Time[%] | 102% | | |
| Dec Time[%] | 103% | | |

## Lossless coding results

Decode time ratios may vary due to differences in computing platforms.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **All Intra** | | | |
|  | Bit-rate saving (Total) | Bit-rate saving (Average) | Bit-rate saving (Min) | Bit-rate saving (Max) |
|  |
| RGB, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, mixed content, 1440p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, mixed content, 1080p | 0.0% | 0.0% | 0.0% | 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 | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1440p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1080p | 0.0% | 0.0% | 0.0% | 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[%] | 103% | | | |
|  |  |  |  |  |
|  | **Random Access** | | | |
|  | Bit-rate saving (Total) | Bit-rate saving (Average) | Bit-rate saving (Min) | Bit-rate saving (Max) |
|  |
| RGB, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, mixed content, 1440p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, mixed content, 1080p | 0.0% | 0.0% | 0.0% | 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 | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1440p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1080p | 0.0% | 0.0% | 0.0% | 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[%] | 103% | | | |
| Dec Time[%] | 104% | | | |
|  |  |  |  |  |
|  |  |  |  |  |
|  | **Low Delay B** | | | |
|  | Bit-rate saving (Total) | Bit-rate saving (Average) | Bit-rate saving (Min) | Bit-rate saving (Max) |
|  |
| RGB, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, mixed content, 1440p | 0.0% | 0.0% | 0.0% | 0.0% |
| RGB, mixed content, 1080p | 0.0% | 0.0% | 0.0% | 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 | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1440p | 0.0% | 0.0% | 0.0% | 0.0% |
| YUV, mixed content, 1080p | 0.0% | 0.0% | 0.0% | 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[%] | 102% | | | |
| Dec Time[%] | 103% | | | |

## Additional results for when the adaptive color transform is disabled

When the adaptive color transform is disabled in the configurations for the both anchor and tested conditions, the simulation results are shown in the following table:

Decode time ratios may vary due to differences in computing platforms.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | **All Intra** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | -0.1% | -0.1% | -0.1% |
| RGB, text & graphics with motion,720p | -0.6% | -0.6% | -0.6% |
| RGB, mixed content, 1440p | -1.2% | -1.1% | -1.1% |
| RGB, mixed content, 1080p | -1.3% | -1.3% | -1.2% |
| RGB, Animation, 720p | -0.7% | -0.7% | -0.6% |
| RGB, camera captured, 1080p | -1.1% | -0.9% | -1.2% |
| YUV, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | -0.1% | 0.0% | -0.1% |
| YUV, mixed content, 1440p | -0.1% | -0.1% | 0.0% |
| YUV, mixed content, 1080p | -0.1% | -0.1% | -0.1% |
| YUV, Animation, 720p | -0.1% | -0.2% | -0.1% |
| YUV, camera captured, 1080p | 0.0% | -0.1% | -0.3% |
| Enc Time[%] | 101% | | |
| Dec Time[%] | 109% | | |
|  |  |  |  |
|  | **Random Access** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | -0.1% | 0.0% | -0.1% |
| RGB, text & graphics with motion,720p | -0.6% | -0.5% | -0.5% |
| RGB, mixed content, 1440p | -0.5% | -0.5% | -0.5% |
| RGB, mixed content, 1080p | -0.8% | -0.8% | -0.9% |
| RGB, Animation, 720p | -0.3% | -0.3% | -0.3% |
| RGB, camera captured, 1080p | -0.5% | -0.3% | -0.5% |
| YUV, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.0% |
| YUV, text & graphics with motion,720p | 0.1% | 0.0% | 0.0% |
| YUV, mixed content, 1440p | 0.0% | -0.2% | -0.2% |
| YUV, mixed content, 1080p | 0.0% | -0.2% | 0.0% |
| YUV, Animation, 720p | 0.0% | -0.1% | -0.2% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | -0.1% |
| Enc Time[%] | 101% | | |
| Dec Time[%] | 102% | | |
|  |  |  |  |
|  | **Low delay B** | | |
|  | G/Y | B/U | R/V |
| RGB, text & graphics with motion, 1080p | 0.0% | 0.0% | -0.1% |
| RGB, text & graphics with motion,720p | -0.3% | -0.3% | -0.2% |
| RGB, mixed content, 1440p | -0.4% | -0.2% | -0.1% |
| RGB, mixed content, 1080p | 0.4% | 0.0% | 0.1% |
| RGB, Animation, 720p | -0.1% | -0.1% | 0.0% |
| RGB, camera captured, 1080p | -0.1% | 0.0% | -0.1% |
| YUV, text & graphics with motion, 1080p | 0.0% | 0.0% | 0.1% |
| YUV, text & graphics with motion,720p | 0.0% | -0.1% | -0.1% |
| YUV, mixed content, 1440p | 0.0% | -0.2% | 0.2% |
| YUV, mixed content, 1080p | -0.1% | 0.4% | 0.8% |
| YUV, Animation, 720p | 0.0% | -0.2% | -0.2% |
| YUV, camera captured, 1080p | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 102% | | |
| Dec Time[%] | 102% | | |

# Conclusions

The performance of the proposed method in JCTVC-S0177 has been verified.

# Reference

1. X. Zhang, R. Cohen, “CE9 Test A.3 Modifying cross-component prediction to compensate for intra boundary filtering,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, JCTVC-S0177, 19th Meeting: Strasbourg, FR, 17–24 Oct. 2014.
2. R. Cohen, S. Liu, J. Xu, L. Zhang, “Description of Core Experiment 9 (CE9): IBF/CCP interdependency,” Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, JCTVC-Q1109, 18th Meeting: Sapporo, JP, 30 June – 9 July, 2014.