|  |  |
| --- | --- |
| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  13th Meeting: Incheon, KR, 18–26 Apr. 2013 | Document: JCTVC-M0184 |

|  |  |  |  |
| --- | --- | --- | --- |
| *Title:* | Non SCE1: Cross-check for M0115 Simplification of remaining modes coding in SHVC | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
| *Author(s) or Contact(s):* | Yong He  9710 Scranton Rd, Ste 250,  San Diego, CA 92121, USA | Tel: Email: | 1-858-210-4807 Yong.He@InterDigital.com |
| *Source:* | InterDigital Communications Inc | | |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Abstract

This contribution reports the cross-verification results on simplification of remaining modes coding in SHVC of JCTVC-M0115 [1] from Canon. The simulation results verify the results provided from the proponents.

# Introduction

JCT-VC M0115 proposes a simplification of the intra mode coding for the Enhancement Layer, by reducing the number of remaining modes to a limited set of M=2 or 4 modes instead of 32 as in the current SHM design. The proposal reports encoding time reduction and BDR-Y performance for all intra test cases. Two methods are proposed, one is non-normative change and another is normative change. The mode number reported in M0115 can be 2 or 4. Only mode number M=4 is verified in this cross check report. The simulation results of both normative and non-normative changes match the results provided by the proponents in JCT-VC M0115.

# Simulation results

All-intra CTC is used in the cross-check, four categories (Non-normative refidx, normative refidx, non-normative intraBL, normative intraBL) are cross-checked and the results are shown in the following tables. However, the encoding and decoding time may not be accurate due to heterogeneous cluster system.

1. performance of non-normative proposal with M=4 remaining modes (refidx framework)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **AI HEVC 2x** | | | **AI HEVC 1.5x** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.04% | -0.03% | -0.03% |  |  |  |
| Class B | 0.13% | 0.07% | 0.11% | 0.02% | 0.00% | 0.02% |
| **Overall (Test vs Ref)** | 0.10% | 0.04% | 0.07% | 0.02% | 0.00% | 0.02% |
| **Overall (Test vs single layer)** | 12.9% | 15.1% | 14.8% | 10.6% | 9.9% | 9.5% |
| **EL only (Test vs Ref)** | 0.1% | 0.0% | 0.0% | -0.1% | -0.1% | -0.1% |
| Enc Time[%] | 69.8% | | | 70.8% | | |
| Dec Time[%] | 75.7% | | | 74.7% | | |

1. performance of normative proposal with M=4 remaining modes (refidx framework)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **AI HEVC 2x** | | | **AI HEVC 1.5x** | | |
|  | Y | U | V | Y | U | V |
| Class A | -0.16% | -0.05% | -0.01% |  |  |  |
| Class B | -0.15% | -0.10% | -0.11% | -0.04% | 0.05% | 0.04% |
| **Overall (Test vs Ref)** | -0.15% | -0.09% | -0.08% | -0.04% | 0.05% | 0.04% |
| **Overall (Test vs single layer)** | 12.7% | 14.9% | 14.7% | 10.5% | 10.0% | 9.5% |
| **EL only (Test vs Ref)** | -0.2% | -0.1% | -0.1% | 0.0% | 0.1% | 0.1% |
| Enc Time[%] | 88.1% | | | 83.2% | | |
| Dec Time[%] | 93.7% | | | 87.8% | | |

1. performance of non-normative proposal with M=4 remaining modes (intraBL framework)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **AI HEVC 2x** | | | **AI HEVC 1.5x** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.04% | -0.03% | -0.03% |  |  |  |
| Class B | 0.14% | 0.05% | 0.07% | 0.02% | 0.01% | 0.03% |
| **Overall (Test vs Ref)** | 0.11% | 0.03% | 0.04% | 0.02% | 0.01% | 0.03% |
| **Overall (Test vs single layer)** | 12.5% | 13.7% | 13.4% | 10.3% | 10.3% | 9.7% |
| **EL only (Test vs Ref)** | 0.1% | 0.0% | 0.0% | -0.1% | -0.1% | -0.1% |
| Enc Time[%] | 82.8% | | | 84.3% | | |
| Dec Time[%] | 87.3% | | | 87.2% | | |

1. performance of normative proposal with M=4 remaining modes (refidx framework)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **AI HEVC 2x** | | | **AI HEVC 1.5x** | | |
|  | Y | U | V | Y | U | V |
| Class A | -0.16% | -0.06% | -0.01% |  |  |  |
| Class B | -0.16% | -0.10% | -0.11% | -0.04% | 0.03% | 0.02% |
| **Overall (Test vs Ref)** | -0.16% | -0.09% | -0.08% | -0.04% | 0.03% | 0.02% |
| **Overall (Test vs single layer)** | 12.2% | 13.5% | 13.3% | 10.3% | 10.3% | 9.7% |
| **EL only (Test vs Ref)** | -0.2% | -0.1% | -0.1% | 0.0% | 0.1% | 0.0% |
| Enc Time[%] | 85.7% | | | 86.6% | | |
| Dec Time[%] | 89.6% | | | 88.6% | | |

# Conclusions

In this contribution, the experimental results on JCTVC M0115 from Canon have been cross-checked. The software implementation is compliant with the proposal, and the results are also verified.

# References

1. Edouard Francois, et al, Non-SCE1: simplification of intra mode coding in SHVC. Document no JCTVC-M0115. April. 2013.