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| *Title:* | **Cross verification of JCTVC-I0295 from Samsung on Edge Offset signs signaling.** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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# Abstract

This document is a crosscheck report of the contribution JCTVC-I0295 about the signaling of the signs for SAO Edge Offsets.

The BD-rate results provided by Samsung in I0295 are confirmed. The complexity reduction of 2-6% based on a single sequence of Class E has not been checked.

# Introduction

In the contribution I0295, the proponents proposed to explicitly signal the signs for 2 types of Edge Offsets. For category 1 and category 4, the sign is coded while the signs for category 2 and category 3 remain unchanged compared to HM6.0.

The proponents have also modified the encoder by using a background-luminance dependent function to avoid visual artifacts due to higher difference of neighboring pixels when using positive or negative signs for category 1 and 4. With the proposed modification, the sign of category 1 and 4 is changed only when the average value of the LCU filtered is inferior to threshold or is superior to another threshold.

# Results

Here are the results of our cross-check. The anchors are HM6.0.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All Intra Main** | | | **All Intra HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% |
| Class B | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Class C | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Class D | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |
| Class E | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Class F | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| **Overall** | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
|  | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 101% | | | 101% | | |
| Dec Time[%] | 101% | | | 102% | | |
|  |  |  |  |  |  |  |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.0% | -0.2% | -0.6% | 0.0% | 0.0% | 0.1% |
| Class B | 0.0% | -0.5% | -0.3% | 0.0% | -0.1% | 0.0% |
| Class C | 0.0% | -0.1% | -0.1% | 0.0% | 0.1% | 0.0% |
| Class D | 0.0% | -0.1% | 0.1% | 0.1% | 0.0% | 0.1% |
| Class E |  |  |  |  |  |  |
| Class F | 0.0% | 0.0% | -0.1% | 0.1% | 0.0% | 0.0% |
| **Overall** | 0.0% | -0.2% | -0.2% | 0.0% | 0.0% | 0.0% |
|  | 0.0% | -0.2% | -0.2% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 103% | | | 100% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | -0.1% | -0.4% | 0.1% | 0.0% | -0.2% | 0.1% |
| Class C | 0.0% | 0.2% | -0.1% | 0.0% | 0.1% | 0.1% |
| Class D | 0.1% | 0.1% | 0.4% | 0.0% | 0.0% | -0.3% |
| Class E | -0.4% | -0.2% | 0.5% | -0.4% | -0.2% | 0.1% |
| Class F | 0.0% | 0.1% | 0.0% | 0.0% | 0.2% | -0.2% |
| **Overall** | -0.1% | -0.1% | 0.2% | 0.0% | 0.0% | 0.0% |
|  | -0.1% | -0.1% | 0.1% | 0.0% | 0.0% | -0.1% |
| Enc Time[%] | 100% | | | 101% | | |
| Dec Time[%] | 102% | | | 98% | | |
|  |  |  |  |  |  |  |
|  | **Low delay P Main** | | | **Low delay P HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 0.1% | -0.2% | 0.0% | 0.0% | 0.2% | 0.4% |
| Class C | 0.1% | -0.2% | -0.2% | 0.0% | 0.0% | 0.0% |
| Class D | 0.1% | 0.5% | -0.4% | 0.0% | 0.9% | -0.1% |
| Class E | -0.1% | -0.1% | 0.6% | 0.0% | 1.0% | 0.3% |
| Class F | 0.0% | 0.0% | 0.3% | 0.1% | 0.3% | 0.3% |
| **Overall** | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% | 0.2% |
|  | 0.0% | 0.0% | 0.0% | 0.0% | 0.4% | 0.2% |
| Enc Time[%] | 101% | | | 100% | | |
| Dec Time[%] | 104% | | | 100% | | |

The results provided by the authors of I0295 match except for three sequences of LB-Main configuration in the first version of Excel sheet provided by Samsung. The results of these three sequences are the same than the anchors. It comes from a wrong copy paste which was corrected in the second version of Excel sheet provided by Samsung.

The Authors provided also visual comparisons between proposal and HM6.0. We checked it and as mention by the authors it seems that the proposal doesn’t have any visual impact.

# Conclusion

The BD-rate results provided by Samsung in H0295 are confirmed except for 3 sequences of LB-Main configuration. Yet, this mismatch comes from a wrong copy paste which was corrected.

Regarding the complexity reduction, we did not perform the statistics analysis related to the complexity reduction based on the class E sequence “Johnny”.