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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**  10th Meeting: Stockholm, Sweden, 11– 20 July 2012 | Document: JCTVC-J0173 |

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| *Title:* | **Cross-check of J0044 on SAO encoder modification from Samsung** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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# Abstract

This document is a crosscheck report of the contribution JCTVC-J0044 about the encoder modification to turn on/off SAO on LCUs based on a statistical criterion of the previous frame. This document confirms the BDR gains (on average: 0.2% for Luma and 0.0% for Chroma) provided by Samsung

# Introduction

In current HM7.0 design, SAO tools are turned on/off at frame level based on a statistical criterion of the previous frame. In JCTVC-J0044 the same criterion is used but applied separately for Luma and Chroma.

In order to achieve better balance JCTVC-J0044 suggests counting separately LCUs with SAO off for Luma and for Chroma. If portion of LCUs with SAO off for Luma is less than 75% (this threshold is the same as HM7.0) then Luma SAO will be disabled on higher temporal depths.

In addition to HM7.0, JCTVC-J0044 proposes to add a new threshold for Chroma. If portion of LCUs with SAO off for Chroma is less than 50% (this threshold is lower than for Luma) then both Cr and Cb SAO search will be skipped on higher depths.

# Results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | -0,2% | -0,1% | -0,1% | 0,0% | -0,1% | 0,1% |
| Class B | -0,2% | 0,2% | 0,0% | -0,1% | 0,0% | -0,1% |
| Class C | -0,3% | -0,1% | -0,1% | -0,2% | -0,1% | -0,1% |
| Class D | -0,5% | -0,3% | -0,3% | -0,4% | -0,3% | -0,4% |
| Class E |  |  |  |  |  |  |
| **Overall** | -0,3% | -0,1% | -0,1% | -0,2% | -0,1% | -0,1% |
|  | -0,3% | 0,0% | -0,1% | -0,2% | -0,1% | -0,1% |
| Class F | -0,3% | -0,1% | 0,0% | -0,2% | -0,1% | -0,1% |
| Enc Time[%] | 99% | | | 100% | | |
| Dec Time[%] | 106% | | | 102% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 0,0% | 0,3% | 0,1% | -0,1% | 0,1% | 0,4% |
| Class C | -0,1% | 0,0% | 0,2% | -0,1% | -0,1% | 0,0% |
| Class D | -0,3% | -0,3% | 0,0% | -0,2% | -0,4% | -0,3% |
| Class E | -0,1% | -0,2% | 0,0% | 0,0% | 0,0% | 0,3% |
| **Overall** | -0,1% | 0,0% | 0,1% | -0,1% | -0,1% | 0,1% |
|  | -0,1% | 0,0% | 0,1% | -0,1% | 0,0% | 0,2% |
| Class F | -0,3% | 0,2% | 0,4% | -0,1% | 0,5% | 1,0% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 101% | | | 101% | | |
|  |  |  |  |  |  |  |
|  | **Low delay P Main** | | | **Low delay P HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | -0,5% | 0,4% | 0,0% | -0,1% | 0,3% | 0,0% |
| Class C | -0,2% | -0,1% | 0,2% | -0,1% | -0,1% | 0,0% |
| Class D | -0,3% | 0,0% | 0,2% | -0,2% | 0,1% | -1,0% |
| Class E | -0,3% | -0,2% | 0,0% | -0,1% | 0,2% | -0,1% |
| **Overall** | -0,4% | 0,1% | 0,0% | -0,2% | 0,1% | -0,2% |
|  | -0,3% | 0,1% | 0,0% | -0,1% | 0,1% | -0,1% |
| Class F | -0,4% | 0,3% | -0,2% | -0,3% | 0,1% | -0,1% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 101% | | | 100% | | |

Performance improvement in terms of BDR gains is about 0.2% for Luma and 0.0% for Chroma under common test conditions of HM7.0.

# Conclusion

The BD-rate gains provided by Samsung in J0444 are confirmed. Regarding the context reduction, we did not perform the statistics analysis.

We recommend this encoder modification for adoption in HM8.0 which enables to improve SAO performance with a minimum change at the encoder side.