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| *Title:* | **Cross-check of JCTVC-G373--****Performance of secondary boundary DC intra prediction** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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# Abstract

The document reports cross-check results for proposal JCTVC-G373, “Performance of secondary boundary DC intra prediction”. It has been verified that removal of secondary boundary DC intra prediction resulted in average luminance BD-Rate of 0.04% for I\_HE and 0.03% for I\_LC relative to HM4 with JCTVC-F122 multi-line smoothing and JCTC-F358 planar smoothing enabled. The source code has also been checked and compiled. No issue is reported.

# Introduction

The DC secondary boundary intra prediction from JCTVC-E069 was adopted in HM3 with further improvement by JCTVC-F252 which is adopted in HM4. To further improve intra prediction, CE6.d [6] studies the performance of other secondary boundary non‑DC intra prediction with HM4 including the followings:

* Secondary boundary angular intra prediction proposed by JCTVC-F122 [4].
* Secondary boundary planar intra prediction proposed by JCTVC-F358 [5].

Proposal JCTVC-G373 studied the performance of secondary boundary DC intra prediction in CE6.d [6] and proposed to remove the secondary boundary DC intra prediction to reduce complexity when the other non-DC secondary boundary intra predictions are available.

# Performance results of the proposed method

The proposed method from JCTVC-G373 was based on CE6 distributed HM 4.0 software CE6\_D\_r2.zip. For this cross verification, simulations using software provided by the proponents were compared to a reference coded with HM 4.0, using the common conditions described in [3]. Results are shown in Table 1. The results of comparison with CE6\_D\_r2 are shown in Table 2. The secondary boundary DC intra prediction can be turned off with

#define MN\_DC\_PRED\_FILTER 0

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All Intra HE** | | | **All Intra LC** | | |
|  | Y | U | V | Y | U | V |
| Class A | -0.79% | -0.61% | -0.63% | -0.71% | -0.65% | -0.77% |
| Class B | -0.65% | -0.51% | -0.51% | -0.65% | -0.63% | -0.62% |
| Class C | -0.64% | -0.56% | -0.55% | -0.66% | -0.66% | -0.58% |
| Class D | -0.66% | -0.60% | -0.55% | -0.69% | -0.61% | -0.62% |
| Class E | -0.82% | -0.80% | -0.85% | -0.74% | -0.87% | -0.87% |
| **Overall** | -0.70% | -0.60% | -0.60% | -0.69% | -0.67% | -0.68% |
|  | -0.70% | -0.61% | -0.61% | -0.68% | -0.67% | -0.68% |
| Enc Time[%] | 101% | | | 102% | | |
| Dec Time[%] | 101% | | | 101% | | |

Table 1: BD-Rate when “MN\_DC\_PRED\_FILTER” is zero (using HM4 as anchor).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All Intra HE** | | | **All Intra LC** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.15% | 0.22% | 0.24% | 0.13% | 0.32% | 0.37% |
| Class B | 0.05% | 0.15% | 0.10% | -0.03% | 0.18% | 0.20% |
| Class C | 0.00% | 0.10% | 0.11% | 0.02% | 0.10% | 0.13% |
| Class D | -0.01% | 0.05% | 0.12% | 0.01% | 0.06% | 0.08% |
| Class E | 0.02% | -0.01% | 0.13% | 0.02% | 0.06% | 0.05% |
| **Overall** | 0.04% | 0.11% | 0.14% | 0.03% | 0.15% | 0.18% |
|  | 0.05% | 0.11% | 0.14% | 0.03% | 0.15% | 0.18% |
| Enc Time[%] | 100% | | | 101% | | |
| Dec Time[%] | 100% | | | 100% | | |

Table 2: BD-Rate comparison with “MN\_DC\_PRED\_FILTER” is one (anchor) and “MN\_DC\_PRED\_FILTER” is zero.

# Summary

The results obtained during this cross checking match those provided by the proponents. Examination of the software confirms that it is indeed disable the secondary boundary DC intra prediction. Run times for the proposed tool are on par with the results in JCTVC-G373, allowing for minor variations due to the computer cluster computing.

# References

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