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| *Title:* | **Cross-check of J0364 on Implicit transform block split process for asymmetric partitions** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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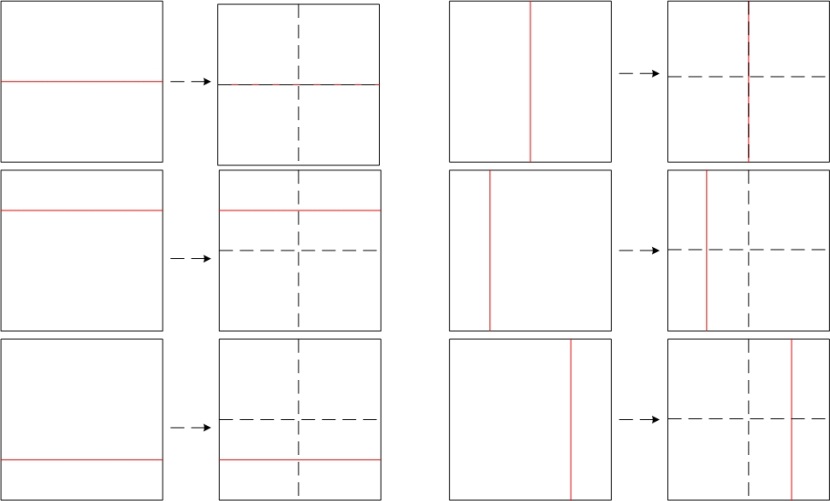
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# Abstract

This document is a crosscheck report of the contribution JCTVC-J0364 about the Implicit transform block split process for asymmetric partitions. This document confirms the results of the two proposals described by HiSilicon Technologies and Huawei Technologies.

# Introduction

Proposal J0364 relates to the cross-boundary issue due to asymmetric partitions (AMP). Such partitions, due to AMP mode, may result in TUs that are crossed by PU frontiers, since only square TUs are used in HM7.0. This is illustrated in the figure below.



J0364 aims at solving this issue, by proposing two solutions:

1. implicit non-square transform split for asymmetric partitions: use of 2Nx0.5N and 0.5Nx2N non-square transforms (the CU being of size 2Nx2N).
2. implicit further transform split for asymmetric partitions: split into square TUs of size 0.5Nx0.5N.

# Results

Tests were done on RA-Main and LB-Main configurations. The source code was compiled successfully using windows32, VC2008 and using Linux 2.6.18-194.el5, gcc version 4.1.2 20080704 (Red Hat 4.1.2-48) 64 bits.

The full cross-check results are in the attached xls files.

## Solution 1

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Random Access Main** | | |
|  | Y | U | V |
| Class A | -0.4% | -0.7% | -0.6% |
| Class B | -0.6% | -1.7% | -1.5% |
| Class C | -0.7% | -0.9% | -0.6% |
| Class D | -0.6% | -0.5% | -0.6% |
| Class E |  |  |  |
| **Overall** | -0.6% | -1.0% | -0.9% |
|  | -0.5% | -1.0% | -0.9% |
| Class F | -0.4% | -0.5% | -0.5% |
| Enc Time[%] | 103% | | |
| Dec Time[%] | 100% | | |
|  |  |  |  |
|  | **Low delay B Main** | | |
|  | Y | U | V |
| Class A |  |  |  |
| Class B | -1.2% | -4.2% | -3.9% |
| Class C | -1.2% | -2.3% | -2.2% |
| Class D | -1.1% | -2.2% | -1.0% |
| Class E | -1.7% | -3.7% | -2.5% |
| **Overall** | -1.3% | -3.1% | -2.5% |
|  | -1.3% | -3.0% | -2.5% |
| Class F | -1.2% | -1.3% | -1.4% |
| Enc Time[%] | 103% | | |
| Dec Time[%] | 101% | | |

## Solution 2

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Random Access Main** | | |
|  | Y | U | V |
| Class A | -0.1% | -0.2% | 0.0% |
| Class B | -0.3% | -0.5% | -0.3% |
| Class C | -0.3% | -0.3% | -0.1% |
| Class D | -0.4% | -0.4% | -0.3% |
| Class E |  |  |  |
| **Overall** | -0.3% | -0.4% | -0.2% |
|  | -0.3% | -0.3% | -0.2% |
| Class F | -0.3% | -0.3% | -0.3% |
| Enc Time[%] | 102% | | |
| Dec Time[%] | 103% | | |
|  |  |  |  |
|  | **Low delay B Main** | | |
|  | Y | U | V |
| Class A |  |  |  |
| Class B | -0.3% | -1.3% | -1.1% |
| Class C | -0.5% | -0.5% | -0.3% |
| Class D | -0.6% | -1.6% | -0.9% |
| Class E | -0.1% | -0.2% | 0.7% |
| **Overall** | -0.4% | -1.0% | -0.5% |
|  | -0.4% | -0.9% | -0.5% |
| Class F | -0.5% | -0.1% | -0.6% |
| Enc Time[%] | 102% | | |
| Dec Time[%] | 104% | | |

# Code analysis

Software implementation of solution 2 has been checked. It simply consists of 2 lines addition, enabling to split a non-rectangular partition into sub-TUs until the size specified by Log2MinTrafoSize.

The change is minor and provides coding gain.

# Conclusion

The BD-rate results provided by Huawei for the two proposals are confirmed. The use of NSQT show gains compared to the use of square transforms, both for luma (0.3% RA, 0.7% LB) and chroma (0.6% U and 0.7%V for RA, 2.1% U and 1.9% V for LB).

Due to the minor change and the related coding gain, the cross-checker suggests adopting the proposal of solution 2.