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| *Title:* | **Non-CE7: Cross-check for Samsung’s Results for Secondary transforms in JCTVC-H0559** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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| *Source:* | MediaTek Inc. | | |

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# Abstract

This contribution reports the crosscheck results for Samsung’s proposal on additional results for secondary transform in JCTVC-H0559. The simulation results achieved by MediaTek reportedly match those provided by the proponents in JCTVC-H0559 in terms of BD-Rate.

# Introduction

In JCTVC-H0559 [1], some additional results are provided for the secondary transform proposed in JCTVC-H0125 [2] and JCTVC-H0126 [3].

# Simulation Results

There are three tests in JCTVC-H0559 as follows:

Test1: HM5.0 (anchor) vs. HM5.0 with 32-point transform off. The results verified by Mediatek are shown in Table 1.

**Table 1 Results of Test1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All Intra HE** | | | **All Intra LC** | | |
|  | Y | U | V | Y | U | V |
| Class A (8bit) | 0.6% | 4.1% | 4.6% | 0.5% | 2.0% | 2.9% |
| Class B | 1.7% | 6.9% | 6.8% | 1.5% | 5.0% | 6.1% |
| Class C | 0.5% | 2.5% | 2.2% | 0.4% | 1.5% | 1.5% |
| Class D | 0.4% | 2.3% | 1.9% | 0.4% | 1.2% | 1.1% |
| Class E | 1.6% | 12.8% | 10.1% | 1.4% | 9.9% | 8.9% |
| **Overall** | 1.0% | 5.6% | 5.0% | 0.9% | 3.9% | 4.1% |
|  | 1.0% | 5.6% | 5.0% | 0.9% | 3.9% | 4.2% |
| Class F | 0.5% | 2.6% | 2.6% | 1.0% | 2.1% | 2.0% |
| Enc Time[%] | 94% | | | 93% | | |
| Dec Time[%] | 102% | | | 102% | | |
|  |  |  |  |  |  |  |
|  | **Random Access HE** | | | **Random Access LC** | | |
|  | Y | U | V | Y | U | V |
| Class A (8bit) | 0.6% | 4.9% | 5.3% | 0.5% | 2.5% | 3.5% |
| Class B | 2.4% | 8.7% | 8.1% | 2.2% | 6.3% | 7.7% |
| Class C | 1.1% | 3.5% | 3.1% | 0.9% | 2.2% | 2.3% |
| Class D | 0.5% | 2.0% | 1.9% | 0.4% | 1.9% | 1.2% |
| Class E |  |  |  |  |  |  |
| **Overall** | 1.3% | 5.0% | 4.7% | 1.2% | 3.5% | 4.0% |
|  | 1.3% | 5.0% | 4.8% | 1.2% | 3.5% | 4.0% |
| Class F | 1.2% | 3.4% | 3.3% | 1.4% | 3.7% | 3.3% |
| Enc Time[%] | 90% | | | 93% | | |
| Dec Time[%] | 100% | | | 101% | | |

Test2: HM5.0 with 32-point transform off + 4x4 secondary transform for intra residue (anchor) vs. HM5.0 with 32-point transform off. The results verified by Mediatek are shown in Table 2.

**Table 2 Results of Test2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All Intra HE** | | | **All Intra LC** | | |
|  | Y | U | V | Y | U | V |
| Class A (8bit) | 0.8% | 0.8% | 0.8% | 1.1% | 0.7% | 0.5% |
| Class B | 0.7% | 0.8% | 0.8% | 0.9% | 0.6% | 0.6% |
| Class C | 0.4% | 0.5% | 0.4% | 0.4% | 0.4% | 0.3% |
| Class D | 0.2% | 0.4% | 0.2% | 0.3% | 0.2% | 0.2% |
| Class E | 0.8% | 1.2% | 1.1% | 1.0% | 0.9% | 0.8% |
| **Overall** | 0.6% | 0.7% | 0.7% | 0.7% | 0.5% | 0.5% |
|  | 0.6% | 0.7% | 0.7% | 0.7% | 0.5% | 0.5% |
| Class F | 0.1% | 0.3% | 0.4% | 0.6% | 0.3% | 0.2% |
| Enc Time[%] | 99% | | | 99% | | |
| Dec Time[%] | 100% | | | 100% | | |
|  |  |  |  |  |  |  |
|  | **Random Access HE** | | | **Random Access LC** | | |
|  | Y | U | V | Y | U | V |
| Class A (8bit) | 0.3% | 0.0% | 0.4% | 0.5% | 0.3% | -0.1% |
| Class B | 0.4% | 0.4% | 0.5% | 0.5% | 0.4% | 0.2% |
| Class C | 0.2% | 0.6% | 0.3% | 0.3% | 0.3% | 0.2% |
| Class D | 0.2% | 0.3% | 0.2% | 0.2% | 0.2% | -0.1% |
| Class E |  |  |  |  |  |  |
| **Overall** | 0.3% | 0.4% | 0.4% | 0.4% | 0.3% | 0.1% |
|  | 0.3% | 0.4% | 0.4% | 0.4% | 0.3% | 0.1% |
| Class F | 0.1% | 0.3% | 0.3% | 0.5% | 0.2% | 0.2% |
| Enc Time[%] | 99% | | | 99% | | |
| Dec Time[%] | 101% | | | 101% | | |

Test3: HM5.0 with 32-point transform off + 8x8 secondary transform for intra residue (anchor) vs. HM5.0 with 32-point transform off. The results (intra only) verified by Mediatek are shown in Table 3.

**Table 3 Results of Test3**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All Intra HE** | | | **All Intra LC** | | |
|  | Y | U | V | Y | U | V |
| Class A (8bit) | 1.2% | 1.5% | 1.6% | 1.6% | 1.3% | 1.2% |
| Class B | 1.0% | 1.5% | 1.5% | 1.2% | 1.2% | 1.2% |
| Class C | 0.5% | 0.8% | 0.7% | 0.5% | 0.6% | 0.6% |
| Class D | 0.3% | 0.6% | 0.4% | 0.4% | 0.4% | 0.4% |
| Class E | 1.1% | 1.8% | 1.7% | 1.2% | 1.5% | 1.4% |
| **Overall** | 0.8% | 1.2% | 1.1% | 0.9% | 0.9% | 0.9% |
|  | 0.8% | 1.2% | 1.1% | 0.9% | 0.9% | 0.9% |
| Class F | 0.1% | 0.3% | 0.5% | 0.1% | 0.3% | 0.2% |
| Enc Time[%] | 96% | | | 93% | | |
| Dec Time[%] | 96% | | | 96% | | |

The simulation results for the three tests matched with those provided by the proponents.

# Conclusions

The proposal JCTVC-H0559 has been verified.

# References

1. A. Saxena, et al., “Non-CE7: Recent results for secondary transforms for the intra/inter prediction residual”, JCTVC-H0559, San Jose, USA, Feb., 2012.
2. A. Saxena, et al., “CE7: On secondary transforms for intra prediction residual”, JCTVC-H0125, San Jose, USA, Feb., 2012.
3. A. Saxena, et al., “CE7: On secondary transforms for inter prediction residual”, JCTVC-H0126, San Jose, USA, Feb., 2012.