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| *Title:* | **CE3: Crosscheck of Qualcomm’s 12/8 Tap Interpolation Filter by MediaTek** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Report | | |
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| *Source:* | MediaTek Inc. | | |

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# Abstract

The purpose of this document is to crosscheck the 12/8 tap interpolation filter for luma proposed by Qualcomm in CE3[1]. The verification task has been done successfully and the BD-rates match those provided by Qualcomm exactly. The relative encoding time from our results is sort of less than that from proponent, and the relative decoding time from our results is a little more than that from proponent. Considering the difference of operating the environments, results are basically confirmed.

# Introduction

Qualcomm provided two TMuC0.9-based source code variations on the proposed 12/8 tap interpolation filter.

Variation 1: Using 12 tap (both vertical and horizontal) for locations a, b, c, d, h, i, j (1 pass filter locations + center half pel), and using 8 Tap (both vertical and horizontal) for locations e, f, g, I, k, m, n, o (Inner Qpel locations).

Variation 2: Using 12 tap (both vertical and horizontal ) for locations a, b, c, d, h, i  (1 pass filter locations), and using 8 Tap (both vertical and horizontal) for locations  e,f,g, I, k, m, n, o, j (Inner Qpel and Hpel locations).

The only difference between Variation 1 and 2 is in variation 2 8 tap is used to filter center half pel location.

The related codes are under the macro definition QC\_FILTER1.

Two configurations random access and lowdelay according to JCTVC-C500 are used to run the simulations.

# Results

The BD-rates from our experimental results listed in Table 1 and Table2 for variation 1 and variation 2 respectively match those provided by Qualcomm exactly. The detailed results are listed in JCTVC-D294\_12\_8tap\_variation1.xls and JCTVC-D294\_ 12\_8tap\_variation2.xls

Table 1. Experimental results of Mediatek’s crosschecking for variation 1

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Random access |  |
| Y BD-rate | U BD-rate | V BD-rate |
| Class A | -0.1 | 0.0 | 0.1 |
| Class B | -0.2 | -0.1 | -0.2 |
| Class C | 0.3 | 0.0 | 0.1 |
| Class D | 0.6 | 0.7 | 0.6 |
| Class E |  |  |  |
| All | 0.2 | 0.2 | 0.1 |
| Enc Time[%] | 100% | | |
| Dec Time[%] | 105% | | |
|  |  |  |  |
|  | Low delay | | |
|  | Y BD-rate | U BD-rate | V BD-rate |
| Class A |  |  |  |
| Class B | -0.7 | -0.3 | -0.3 |
| Class C | -0.2 | 0.2 | 0.3 |
| Class D | -0.1 | 0.0 | 0.7 |
| Class E | -0.9 | -0.9 | -0.6 |
| All | -0.5 | -0.2 | 0.0 |
| Enc Time[%] | 101% | | |
| Dec Time[%] | 104% | | |

Table 2. Experimental results of Mediatek’s crosschecking for variation 2

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Random access |  |
| Y BD-rate | U BD-rate | V BD-rate |
| Class A | -0.1 | 0.0 | 0.1 |
| Class B | -0.2 | -0.1 | -0.2 |
| Class C | 0.4 | 0.2 | 0.1 |
| Class D | 0.8 | 0.6 | 0.6 |
| Class E |  |  |  |
| All | 0.2 | 0.2 | 0.1 |
| Enc Time[%] | 100% | | |
| Dec Time[%] | 106% | | |
|  |  |  |  |
|  | Low delay | | |
|  | Y BD-rate | U BD-rate | V BD-rate |
| Class A |  |  |  |
| Class B | -0.6 | -0.1 | -0.4 |
| Class C | 0.0 | 0.4 | 0.3 |
| Class D | 0.1 | 0.4 | 0.8 |
| Class E | -0.7 | -0.4 | -0.1 |
| All | -0.3 | 0.1 | 0.1 |
| Enc Time[%] | 101% | | |
| Dec Time[%] | 104% | | |

# Conclusion

The results of the 12/8 tap interpolation filter presented by Qualcomm in CE3 are confirmed.

# References

1. Takeshi Chujoh, “CE3: Interpolation for MC (Luma),” Document of Joint Collaborative Team on Video Coding, JCTVC-C503, Oct. 2010.