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| *Title:* | **Evaluation of Limiting Chroma Transform Depth in RQT on HM4.0** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
| *Author(s) or Contact(s):* | Liwei Guo,  Xianglin Wang  Marta Karczewicz 5775 Morehouse Drive San Diego, CA 92121 USA | Tel: Email: | 1-858-845-7532 [liweig@qualcomm.com](mailto:liweig@qualcomm.com) |
| *Source:* | Qualcomm Incorporated | | |

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# Abstract

In previous Geneva meeting (March 2011), contribution JCTVC-E377 proposed that the maximum Chroma transform depth be limited relative to Luma component, so that Chroma component does not have to share the same transform depth as Luma. In this contribution, the method described in E377 has been implemented on top of HM 4.0. Simulation results show that by doing so an average BD-rate saving of 0.1%, 1.8% and 1.7% can be obtained for Y, U and V respectively in AI-HE condition.

# Introduction

In the 5-th JCTVC meeting (March, 2011, Geneva), it is reported in JCTVC-E377 [1] that limiting the maximum Chroma transform depth can improve the coding efficiency for both Luma and Chroma. In this contribution, the method in E377 has been implemented on top of HM 4.0 and the performance has been evaluated in AI-HE.

# The method

In this contribution, the maximum Chroma transform depth is limited using

MaxTUDepthUV = max (0, MaxTUDepthY - T)

where T is a user-defined parameter.

# Experimental results

Simulation is performed based on HM4.0, with **T** = 3, under common test conditions specified in [2].

Since with default coding configuration the maximum transform depth is 3, With **T**=3, MaxTUDepthUV is equal to 0 with all these test configurations. In this case, For a CU of size 2Nx2N, the transform size of U and V is always NxN (Table 1) .

Table Chroma Transform Size and CU Size (T=3)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CU Size | 64x64 | 32x32 | 16x16 | 8x8 |
| Chroma Transform Size | 32x32 | 16x16 | 8x8 | 4x4 |

Only AI-HE test case are evaluated and the B-D rate changes are provided in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **All Intra HE** | | |
|  | Y | U | V |
| Class A | -0.1% | -4.0% | -4.0% |
| Class B | -0.2% | -1.8% | -1.9% |
| Class C | -0.2% | -0.1% | -0.2% |
| Class D | -0.1% | -0.3% | -0.2% |
| Class E | -0.1% | -4.4% | -3.2% |
| Class F | -0.1% | -0.6% | -0.9% |
| **Overall** | -0.1% | -1.8% | -1.7% |
|  | -0.1% | -1.8% | -1.7% |
| Enc Time[%] | 101% | | |
| Dec Time[%] | 100% | | |

Table I BD rate reduction of limiting chroma RQT depth (T=3)

# Conclusion

In this contribution, the method proposed in E377 (limiting Chroma transform depth) has been mplemented on top of HM 4.0 and evaluated. Experimental results show that for AI-HE, 1.8% and 1.7% B-D rate reduction has been achieved for U and V components.

# References

1. L. Guo, X. Wang, P. Chen, Y. Chen and M. Karczewicz, “Limiting Chroma Transform Depth in Residue Quad Tree (RQT)”, JCTVC-E377, JCT-VC Meeting, Geneva, Switzerland, Mar. 2011.
2. F.Bossen, “Common test conditions and software reference configurations”, JCTVC-F900, JCT-VC Meeting, Torino, Italy, Jul. 2011.

# Patent rights declaration(s)

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