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| *Title:* | **Non-SCE1: Improved CGS partitioning on top of SHM-6** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
| *Author(s) or Contact(s):* | Xiang Li, Jianle Chen, Marta Karczewicz  5775 Morehouse Drive  San Diego, CA 92121, USA  Cheung Auyeung  1730 N. First Street San Jose, CA 95112, USA  Kiran Misra, Seung-Hwan Kim, Andrew Segall 5705 NW Pacific Rim Blvd Camas WA 98607 USA  Philippe Bordes, Pierre Andrivon, Edouard François, Franck Hiron,  975 avenue des champs blancs  CS 17616, 35576, Cesson-Sévigné Cedex, France | Tel: Email: | +1 858 658 3923  [lxiang@qti.qualcomm.com](mailto:lxiang@qti.qualcomm.com)  [cjianle@qti.qualcomm.com](mailto:cjianle@qti.qualcomm.com)  [martak@qti.qualcomm.com](mailto:martak@qti.qualcomm.com)  [Cheung.Auyeung@am.sony.com](mailto:Cheung.Auyeung@am.sony.com)  [misrak@sharplabs.com](mailto:misrak@sharplabs.com) [kimse@sharplabs.com](mailto:kimse@sharplabs.com) [asegall@sharplabs.com](mailto:asegall@sharplabs.com)  [philippe.bordes@technicolor.com](mailto:philippe.bordes@technicolor.com),  [pierre.andrivon@technicolor.com](mailto:pierre.andrivon@technicolor.com) |
| *Source:* | Qualcomm Inc., Sony Electronics Inc., SHARP Laboratories of America , Technicolor | | |

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# Abstract

In this proposed, an adaptive chroma partitioning method and better CGS LUT coefficient coding are proposed on top of SHM-6. It is reported that 1.2%, 0.9%, 1.1% and 0.4% luma BD-rate reduction is achieved on average for AI-1x, AI-2x, RA-1x, and RA-2x, respectively.

# Introduction

In JCTVC-R0163, CGS with 8x2x2 non-uniform partitioning and better LUT coefficient coding were proposed. Although the proposal shows better average coding performance than SHM-6, it has following drawbacks

* Too much changes on top of SHVC Draft 6 (JCTVC-Q1008)
* Up to 1.3% loss (RA-1x) for sequence TableCar
* CGS LUT needs at least 14-bit precision

To improve the coding performance while keeping limited changes to the current SHVC draft, CGS in SHM-6 is modified to support non-uniform chroma partitioning when each chroma component is split into two partitions. In addition, the CGS LUT coefficient coding proposed in JCTVC-R0163 is also enabled in this proposal.

With these modifications, the following partitions are possible: 8x2x2, 4x2x2, 2x2x2, 4x1x1, 2x1x1, and 1x1x1. For luma component, it is always evenly partitioned. For chroma, non-uniform partitions is used for 8x2x2, 4x2x2, and 2x2x2, and no chroma partitions is used for 4x1x1, 2x1x1 and 1x1x1.

# Proposed method

To support non-uniform chroma partitioning, partitioning thresholds and are signaled for U and V components when U and V are split into two partitions (namely when cm\_octant\_depth is equal to 1). The partition indexes for an input triplet () of base layer reconstruction are derived as follows where subscript *b* denote the base layer.

Where , , and denote partition indexes, , , and indicate the bits to be shifted as defined in SHVC draft JCTVC-Q1008.

Different from SHVC Draft 6, matrix coefficients *a, b, c, d* of color mapping are signaled instead of the vertexes of cuboid partitions. Accordingly, the color mapping process is changed to

,

where superscript *e* indicates the inter layer prediction after color mapping.

The related text changes on top of SHVC draft 6 (JCTVC-Q1008) are attached with this document.

# Simulation results

The proposed method was tested under SCE1 conditions (JCTVC-Q1101). The simulation results are as summarized as follows. It can be observed that significant luma BD rate reduction is obtained, especially for AI-1x and RA-1x. It should also be noted that the proposed method does not lead to loss for any single sequence when compared to SHM-6. Moreover, the signaled CGS LUT coefficients are restricted to no more than 12 bits.



# Conclusion

In this proposal, an adaptive chroma partitioning method and better CGS LUT coefficient coding are implemented on top of SHM-6. Simulations show that a significant coding improvement is achieved even the CGS LUT coefficients are restricted to be no more than 12 bits.

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