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# Abstract

This document provides the description of SHVC Core Experiment 2. The topic of the Core Experiment is to evaluate the signaling and deblocking for inter-layer texture prediction.

# Introduction

This document defines SHVC Core Experiment 2 (SCE 2) on signaling and deblocking for inter-layer texture prediction, to be performed for the upcoming April 2013 JCT-VC meeting.

# Participants

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# Tools to test

**Subset 1 Signaling for inter-layer texture prediction**

## 1.1 Skipped IntraBL signaling using skip\_flag in Inter slice (TI, JCTVC-L0230)

It is proposed to modify skipped IntraBL CU signaling in Inter (P and B) slice. The proposed method signals *cu\_skip\_flag* instead of *rqt\_root\_cbf* for skipped IntraBL CU in Inter slice. To be specific, *cu\_skip\_flag* is always followed by *texture\_bl\_flag* and *merge\_idx* is signaled only if *texture\_bl\_flag* is equal to 0 even when *cu\_skip\_flag* is equal to 1. It means that a CU can be skipped by either the merge process or the inter-layer texture prediction.

## 1.2 Inter-layer texture prediction for PU using the modified merge process (TI, JCTVC-L0230)

The merge process is modified to support inter-layer texture prediction for PU smaller then 2Nx2N in Inter (P and B) slice. After the spatial merging candidate derivation process, if spatial candidate is less than 4, the inter-layer texture prediction mode is added into the merge candidate list before the temporal merging candidate. For this mode, refIdxLx is set to -1 for x = 0 and 1. When the derived refIdxLx by *merge\_idx* are equal to -1 for x = 0 and 1, a PU is predicted from the collocated reference-layer reconstruction. By the proposed method, the inter-layer texture prediction can be enabled in PU level without introducing an additional flag. Note that the inter-layer texture prediction mode can be placed in any index of the merge candidate list (other than index just after spatial candidates) especially when inter-layer MV prediction is enabled by default. In this test, other index selection methods will be tested.

## 1.3 Combined test of 1.1 and 1.2 (TI, JCTVC-L0230)

In this test, 1.1 and 1.2 are combined to see the coding gain when both are enabled.

**Subtest 2 Deblocking for inter-layer texture prediction**

## 2.1 Deblocking boundary strength modification for Intra BL (LG, JCTVC-L0069)

In this test, the boundary strengths of Intra BL coded CU are modified. The deblocking filter at enhancement layer is basically the same as in HEVC, except the boundary strength (BS) decision method and chroma deblocking on/off decision method. If one or two of the adjacent blocks are coded as Intra BL, the boundary strength is set to 1. If BS is higher than 0 and one or two of the adjacent blocks are coded as Intra/Intra BL, chroma deblocking filter is on.



Figure 1 Chroma deblocking on/off decision method at enhancement layer

## 2.2 Deblocking boundary Intra BL (Qualcomm, JCTVC-L0284)

The deblocking for Intra-BL mode is defined as follows. If at least one of the blocks is coded as normal intra mode, the filtering strength is set to 2; otherwise, if at least one of the blocks is coded in intra-BL mode, then the boundary strength for the luma edge is set to 1, and the boundary strength is set to 2 for the chroma edge. Other deblocking strengths for Intra-BL mode may also be investigated in this CE.

# Experimental Conditions

Test Sequences, Bit Rates and Coding Conditions

Common test conditions defined in [1] will be used in this CE.

The CE shall test the AI, RA and LD-P configuration for both 2X and 1.5X spatial scalability scenario. It is mandatory to report the performance of tested tools for these three configurations. RA and LD-P for SNR scalability are optional tests. Proponents shall use the prediction structures provided by the AhG on SHVC tool experiments.

The QP settings are as follows:

|  |  |  |
| --- | --- | --- |
| Scalability | QP of Base Layer | Delta QP of Enhancement layer |
| Spatial 2X | 22, 26, 30, 34 | 0, 2 |
| Spatial 1.5X | 22, 26, 30, 34 | 0, 2 |
| SNR | 26, 30, 34, 38 | -6, -4 |

The anchor results should be from SHVC test model software SM 1.0 with Intra\_BL setting.

Software

The SHVC test model software SM1.0 shall be used in CE2.

Evaluation of CE Results

Results of the CE will be evaluated on the basis of BD-measures and complexity. Visual evaluation will be performed for Subtest 2. Complexity assessment is performed on the base of decoding complexity measurement. The CE contributions should include a description of the tool, the encoding process, and WD texts.

### Complexity assessment

Both HW and SW complexity of proposed tools for both encoder and decoder will be evaluated.

To measure software run time, software with the anchor configuration and the proposal implemented on the software shall be used. To measure decoding time, the decoding shall be executed on the same machine without output of decoded YUV data. The computational time must be measured for each test sequence and test case for both anchor and proposal. Relative computational time calculated against the anchor must be presented.

### Subjective quality assessment

The following test procedure will be used. ABAB test is used. The same sequence and the anchor are shown one after another. The order of proposals is randomized for every test and sequence and identities of the proposals are hidden. Test subjects are asked to rate each proposal on a scale from -2 to 2. The results are later calculated as well as 95-percent confidence intervals for every proposal and test sequence.

Type 1 sequences: these are sequences in CTC. These sequences will be used to demonstrate that there is no visual degradation in common test conditions: "Kimono","Cactus", “ParkScene” and “BasketballDrive”. The selection of sequences may be modified if the content shows visual quality degradation from deblocking.

Type 2 sequences: these are sequences that were not included in CTC. Two sequences are used in this category: “DucksTakeOff” (1920x1080, 25fps, intra period = 24) and “WestWindsEasy” (1920x1080, 30fps, intra period = 32). The sequences and the down-sampled versions are available at <http://sdrv.ms/Y6nbEC>.

The anchor of visual test is SM 1.0 with Intra-BL setting.

The encoding configurations for the sequences are provided in the following table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Test |  | Frame numbers | BL QP | EL QP | Scalability |  |
| 1 | Kimono | 240 | 34 | 36 | 2X | RA |
| 2 | Kimono | 240 | 38 | 34 | SNR | RA |
| 3 | Cactus | 500 | 34 | 36 | 2X | LDP |
| 4 | Cactus | 500 | 38 | 34 | SNR | LDP |
| 5 | ParkScene | 240 | 34 | 36 | 2X | RA |
| 6 | ParkScene | 240 | 38 | 34 | SNR | RA |
| 7 | BasketballDrive | 500 | 34 | 36 | 2X | LDP |
| 8 | BasketballDrive | 500 | 38 | 34 | SNR | LDP |
| 9 | DucksTakeOff | 250 | 34 | 36 | 2X | RA |
| 10 | DucksTakeOff | 250 | 38 | 34 | SNR | RA |
| 11 | WestWindsEasy | 300 | 34 | 36 | 2X | LDP |
| 12 | WestWindsEasy | 300 | 38 | 34 | SNR | LDP |

Cross-checking includes informal viewing of proposals. All cross-checkers should report the informal viewing results (without scoring) and their equipment (e.g., monitor, etc). If a room, equipment, and time-slot for informal viewing are available at the Incheon meeting, informal viewing will be conducted. The test sequences, QP values, and coding conditions for the potential informal viewing at the Incheon meeting are chosen from the sequences, configurations and test cases described in JCTVC-L1102 and additional sequences described in this document. The proponents should be ready to provide the requested sequences. The selection should be conducted by SCE2 participants including non-proponents.

# Cross-checking

The package released for cross-checking shall include both software and test results. Software only without test results should not be considered as ready for cross-check release.

The following table provides the cross-checker assignment for test tools.

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Document No. | Proponent | Cross-checker |
| 1.1 |  | TI (d-kwon@ti.com) | Samsung (elena\_a.alshina@samsung.com) |
| 1.2 |  | TI (d-kwon@ti.com) | Samsung (zhan.ma@sta.samsung.com) |
| 1.3 |  | TI (d-kwon@ti.com) | Samsung (zhan.ma@sta.samsung.com) |
| 2.1 |  | LG (chulkeun.kim@lge.com) | Ericsson ([andrey.norkin@ericsson.com](mailto:andrey.norkin@ericsson.com) ) |
| 2.2 |  | Qualcomm  (liweig@qti.qualcomm.com) |  |

# Time-line and Responsibilities

**2013-Feb.-6:** CE2 description finalized and uploaded.

**2013-Feb.-6:** SM 1.0 distributed.

**2013-Feb.-6:** Common test conditions distributed

**2013-Feb.-20:** Cross-verifications begin; proponents provide software, draft of contribution text and results to CE2 participants (2 weeks after SM 1.0 is available).

**2013-Mar.-6:** Cross-verifiers report results to CE participants (2 weeks from cross-check starts)

**2013-Apr.-8** Contribution documents uploaded, the document number and title are reportedto coordinators.

**2013- Apr.-16** Summary report uploaded

# Reference

[1] X. Li, J. Boyce, P. Onno, and Y.Ye, “Common Test Conditions and Software Reference Configurations for the Scalable Test Model”, JCTVC-L1109, Jan. 2013, Geneva, Switzerland.