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| *Title:* | **Description of Core Experiment 2 (CE2): Disparity Vector Derivation** | | |
| *Status:* | Output Document | | |
| *Purpose:* | Core Experiment Description | | |
| *Author(s) or Contact(s):* | Ying Chen | Tel: Email: | +1-858-651-6660 [cheny@qti.qualcomm.com](mailto:cheny@qti.qualcomm.com) |
| *Source:* | CE coordinators | | |

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# Abstract

This document defines Core Experiment (CE) 2 on disparity vector derivation to be performed for the 3rd JCT-3V meeting.

# Introduction

The goal of this CE is to further investigate the methods for disparity vector derivation in both ATM and HTM at the 2nd JCT-3V meeting. Tools under test will be evaluated according to their impact on compression efficiency and implementation complexity.

# Participants

|  |  |  |  |
| --- | --- | --- | --- |
| ***Participant*** | ***Contact*** | ***Email*** | ***Type*** |
| ETRI | Gun Bang | [gbang@etri.re.kr](mailto:gbang@etri.re.kr) | P/C |
| KHU | Kyung Yong Kim | [kimky@khu.ac.kr](mailto:kimky@khu.ac.kr) | P/C |
| MediaTek | Jian-Liang Lin  Yi-Wen Chen  Yu-Wen Huang | [jl.lin@mediatek.com](mailto:jl.lin@mediatek.com)  [yiwen.chen@mediatek.com](mailto:yiwen.chen@mediatek.com)  [yuwen.huang@mediatek.com](mailto:yuwen.huang@mediatek.com) | P/C |
| Samsung | Jin Young Lee | [jinyoung79.lee@samsung.com](mailto:jinyoung79.lee@samsung.com) | P/C |
| LG | Jaewon Sung | [jw.sung@lge.com](file:///C:\Users\cheny\AppData\Local\Temp\Rar$DI00.838\jw.sung@lge.com) | P/C |
| Qualcomm | Jewon Kang  Li Zhang | [jewonk@qti.qualcomm.com](mailto:jewonk@qti.qualcomm.com)  [lizhang@qualcomm.com](mailto:lizhang@qualcomm.com) |  |
| INRIA | Laurent Guillo | [Laurent.guillo@inria.fr](mailto:Laurent.guillo@inria.fr) |  |
| NTT | Shinya Shimizu | [shimizu.shinya@lab.ntt.co.jp](mailto:shimizu.shinya@lab.ntt.co.jp) |  |

(P=proponent, C=crosss checker)

# Tools under test

## CE2.a: Disparity Vector Derivation in ATM

The scope of this CE for 3D-AVC is to simplify the disparity vector derivation process by e.g., less memory access to the depth map and to potentially improve the coding efficiency.

### JCT3V-B0073: Simplification of disparity vector derivation

This contribution proposes a simplified disparity vector derivation method for saving the memory access bandwidth. The implementation of the proposed process can be achieved with sharing a depth sample to derivate the disparity vector in all sub-blocks inside each MB. It is indicated that the proposed approach reduces searching and comparison operations to find maximum depth samples in every sub-blocks and additionally reduces of the encoder complexity.

Negligible coding loss was observed by changing the disparity vector value from the maximum value of the four corners of the depth map to the value of one corner (e.g., bottom-right).

### JCT3V-B0082: Memory access reduction for skip mode from the base view

In this contribution, it is proposed to derive the inter-view candidate from a single corresponding block located by a disparity vector derived for list 0 and list 1 to reduce the memory access bandwidth for the inter-view motion data fetch, instead of locating two different blocks for list 0 and list 1 separately as in the current design.

## CE2.h: Disparity Vector Derivation in HTM

In HTM, depth map is unavailable for the coding of texture views. Disparity vectors are derived from spatial and temporal neighboring blocks. For a neighboring block, either a disparity motion vector (DMV) or a derived disparity vector (DDV) can be used to derive the final disparity vector.

### JCT3V-B0088: Modification of the selection of temporal neighboring blocks

In this contribution, two schemes are proposed to provide different signaling methods of the temporal collocated picture for disparity vector (DV) derivation. In scheme 1, an additional syntax is used to signal the temporal collocated picture for DV derivation in the same manner as the signaling of temporal collocated picture for temporal motion vector predictor (TMVP). In scheme 2, the signaling of the temporal collocated picture for DV derivation and the one for TMVP uses the same syntax. Besides, in scheme 2, one additional temporal neighboring block is checked to increase the probability of having an available DV.

### JCT3V-B0157: Modification of the usage of DDVs

In the proposed design, the derived disparity vectors are stored for both skip- and inter-coded blocks that are coded with the inter-view motion prediction, because the motion compensated blocks by the inter modes as well as the skip mode can also involve the disparity vector.

In the current design, the DDVs are only stored for the skip predicted blocks that use inter-view motion prediction.

# Mandates

Mandates for the CE are as follows:

1. To target at a simplified and mature and robust solution for disparity vector derivation and inter-view motion vector prediction in skip mode for ATM. The solutions proposed in JCT3V-B0082 and JCT3V-B0073 are to be studied in this CE. The SW implementations of the relevant methods will be provided in ATM. It is planned that tests should be done for symmetric resolutions (of texture and depth) as addtional information of these proposed technologies.
2. To study the benifits of modifiying the disparity vector derivation processes as proposed in both JCT3V-B0088 and JCT3V-B0157. The SW implementations of these methods will be provided in the HTM.

# Software, Configuration and Evaluation

## Software

Experiments in CE2.a will use the ATM 6.0 software and experiments in CE2.h will use the HTM 5.0 software, as recommended in JCT3V-B1100.

Proponents are requested to provide software that can be compiled under Windows and Linux platforms.

## Test Sequences, Bit Rates and Coding Conditions

The CE will use the test sequences, configuration and conditions that are recommended in JCT3V-B1100. Moreover, proponents and cross checkers are required to provide simulation results for the random access configuration as specified in JCT3V-B1100.

## Evaluation of CE Results

The performance measurements are evaluated by switching on and off individual tools to identify their relative performance. The following measurements are considered to be used in this core experiment.

1. **Coding performance measurements:** Measure impact on bitrate/PSNR. PSNR shall be calculated for the decoded texture views, relative to original texture views and for the synthesized views relative to uncompressed synthesized views. Use 4-point BD-PSNR and BD-Rate according to common conditions. The anchors will be generated according to common test conditions.
2. **Complexity measurements:** Measure impact on encoding and decoding runtimes for all test cases relative to the unmodified test model software.

# Timelines

**2013/01/07** Make source code, simulation results and draft text available for all proponents and cross-checkers.

**2013/01/10** Register documents for the JCT-3V 3rd meeting.

**2013/01/10** Upload contributions to JCT-3V 3rd meeting.