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| *Title:* | **Description of Core Experiment 4 (CE4): Residual Prediction** | | |
| *Status:* | Output Document | | |
| *Purpose:* | Core Experiment Description | | |
| *Author(s) or Contact(s):* | Li Zhang | Tel: Email: | +1-858-651-6660 [lizhang@qti.qualcomm.com](mailto:lizhang@qti.qualcomm.com) |
| *Source:* | CE coordinators | | |

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# Abstract

This document defines Core Experiment (CE) 4 on residual prediction to be performed for the 3rd JCT-3V meeting.

# Introduction

The goal of this CE is to investigate the methods for residual prediction proposed 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*** |
| Qualcomm | Li Zhang  Ying Chen | [lizhang@qti.qualcomm.com](mailto:lizhang@qti.qualcomm.com)  cheny@qti.qualcomm.com | P/C |
| MediaTek | Jian-Liang Lin  Jicheng An  Kai Zhang  Yu-Lin Chang  Yu-Wen Huang | [jl.lin@mediatek.com](mailto:jl.lin@mediatek.com)  [jicheng.an@mediatek.com](mailto:jicheng.an@mediatek.com)  [Kai.zhang@mediatek.com](mailto:Kai.zhang@mediatek.com)  [yulin.chang@mediatek.com](mailto:yulin.chang@mediatek.com)  [yuwen.huang@mediatek.com](mailto:yuwen.huang@mediatek.com) | P/C |
| NTT | Shinya Shimizu | [shimizu.shinya@lab.ntt.co.jp](mailto:shimizu.shinya@lab.ntt.co.jp) | C |
| LG | Sehoon Yea | [sehoon.yea@lge.com](mailto:sehoon.yea@lge.com) | C |
| Sharp | Tomohiro Ikai | [ikai.tomohiro@sharp.co.jp](mailto:ikai.tomohiro@sharp.co.jp) | C |
| Intel | Yi-Jen Chiu  Zhipin Deng  Wenhao Zhang | [yi-jen.chiu@intel.com](mailto:yi-jen.chiu@intel.com)  [zhipin.deng@intel.com](mailto:zhipin.deng@intel.com)  [wenhao.zhang@intel.com](mailto:wenhao.zhang@intel.com) | - |

(P=proponent, C=crosss checker)

# Tools under Test

## Advanced residual prediction for multiview coding [JCT3V-B0051]

Inter-view residual prediction is enabled in the current HTM design to code the residue of dependent texture views more efficiently. In this proposal, an advanced residual prediction (ARP) is proposed to further improve the coding efficiency of inter-view residual prediction. In ARP, to ensure high correlation between residues of two views, motion of the current block of picture in current view is applied to the corresponding block in a reference view picture to generate residual in the base view to be used for inter-view residual prediction. Moreover, an adaptive weighting factor is applied to the residue signal so that the prediction error is further reduced. Meanwhile, the parsing issue of current inter-view residual prediction is solved. In this method, inter-view residual prediction is always explicitly signalled, thus there is no parsing dependency to the base view.

## Removal of the parsing dependency of inter-view residual prediction [JCT3V-B0093]

In this contribution, parsing dependency to the base view is also removed in a way that the inter-view residual prediction flag is never signaled and whether inter-view residual prediction is used or not is derived after parsing. Two methods are proposed to improve the inter-view residual prediction in HTM. Firstly, a method to derive at the decoding process whether the current block utilizes inter-view residual prediction. Secondly, the interpolation in inter-view residual prediction is further removed to reduce the complexity, and the disparity vector is directly rounding to a nearest integer pixel.

# Mandates

Mandates for the CE are as follows:

1. To investigate the loss of coding efficiency when inter-view residual prediction (IVRP) flag is always transmitted for each coding unit, without other changes of the current design.
2. To study coding efficiency tools for inter-view residual prediction scheme as proposed in JCT3V-B0051 and JCT3V-B0093. The software implementations of both methods will be provided in the 3DV-HTM.
3. Both methods are to be evaluated in contrast to the 3DV-HTM anchor as well as the 3DV-HTM anchor with the IVRP flag always signalled.

# Software, Configuration and Evaluation

## Software

Experiments in CE4 will use the 3D-HTM-5.0 software that is 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

2013/01/03 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