|  |  |
| --- | --- |
| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**  12th Meeting: Geneva, CH, 14–23 Jan. 2013 | Document: JCTVC-L0218 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Title:* | **TE3: Cross-check results of test 4.4.2 on inter differential coding** | | | |
| *Status:* | Input Document to JCT-VC | | | |
| *Purpose:* | Informational | | | |
| *Author(s) or Contact(s):* | Ximin Zhang  Shan Liu 2860 Junction Ave.  San Jose, CA95134, USA | Tel: Email: | +1-408-5261899 ext. 88129 {ximin.zhang, shan.liu, shawmin.lei}@mediatek.com |
| *Source:* | MediaTek USA Inc. | | | |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Abstract

This document reports the cross check results of JCTVC-L0184 [1] (TE3 subtest 4.4.2) on inter prediction based on difference coding from Vidyo and Samsung. The proposed techniques have been studied. The provided software has been checked, compiled and the results reported by the proponents can be confirmed.

1. Introduction of the proposed methods

In the JCTVC-L0184 [1] proposed inter difference coding mode, motion compensation is not done using reconstructed reference pictures, but using difference reference pictures. A difference reference picture represents the difference of the reconstructed picture and the (upsampled) base layer for the corresponding picture.

The motion vector coding is not modified for the difference mode, but sub-sample positions are interpolated using a bi-linear filter instead of the 8-tap filter for luma and the 4-tap filter for chroma (which are used for standard inter modes).

The difference mode is signaled at CU level.

.

# Experimental Results

Simulations were conducted following common test conditions defined in TE3[3]. Anchor data was generated using SMuC0.1.1 software [2]. Results produced by current software implementation are reported in the following tables. In the JCTVC- L0184 [1] software, two macros have been introduced to integrate the proposed methods:

#define VIDYO\_TE3\_K044\_DIFF\_CODING\_TOOL\_INTER   1

#define VIDYO\_TE3\_K044\_DIFF\_CODING\_TOOL\_INTRA   0

Table 1 reports the results. All the BD rate results matched what proponent provided. Since the simulation jobs were done in computer clusters with variable CPU and memory, the encoding and decoding time is not accurate.

Table 1. Results with the proposed methods

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **RA HEVC 2x** | | | **RA HEVC 1.5x** | | | **RA HEVC SNR** | | |
|  | Y | U | V | Y | U | V | Y | U | V |
| Class A | -1.4% | -3.4% | -3.3% |  |  |  | -1.0% | -3.7% | -3.8% |
| Class B | -1.8% | -2.3% | -2.3% | -2.1% | -3.8% | -3.9% | -2.0% | -3.7% | -4.0% |
| **Overall (EL+BL)** | -1.7% | -2.6% | -2.6% | -2.1% | -3.8% | -3.9% | -1.7% | -3.7% | -4.0% |
| **Overall (EL)** | -3.0% | -5.1% | -5.0% | -5.0% | -9.1% | -9.3% | -3.0% | -7.3% | -7.6% |
| Enc Time[%] | 180.4% | | | 169.4% | | | 155.1% | | |
| Dec Time[%] | 137.4% | | | 135.6% | | | 114.0% | | |
| Enc Mem[%] | #DIV/0! | | | #DIV/0! | | | #DIV/0! | | |
| BL Match | Matched | | | Matched | | | Matched | | |
|  |  |  |  |  |  |  |  |  |  |
|  | **LD-P HEVC 2x** | | | **LD-P HEVC 1.5x** | | | **LD-P HEVC SNR** | | |
|  | Y | U | V | Y | U | V | Y | U | V |
| Class A | -2.2% | -3.9% | -3.7% |  |  |  | -1.6% | -4.1% | -4.1% |
| Class B | -2.9% | -2.5% | -2.1% | -3.3% | -4.5% | -4.4% | -3.2% | -5.2% | -5.6% |
| **Overall (EL+BL)** | -2.7% | -2.9% | -2.5% | -3.3% | -4.5% | -4.4% | -2.7% | -4.9% | -5.2% |
| **Overall (EL)** | -4.5% | -5.5% | -5.0% | -7.2% | -10.5% | -10.2% | -4.5% | -8.3% | -8.7% |
| Enc Time[%] | 177.8% | | | 165.3% | | | 153.5% | | |
| Dec Time[%] | 140.2% | | | 139.1% | | | 116.2% | | |
| Enc Mem[%] | #DIV/0! | | | #DIV/0! | | | #DIV/0! | | |
| BL Match | Matched | | | Matched | | | Matched | | |

# References

1. W. Jang, J. Boyce, A. Abbas, E. Alsina, C. Kim,“ TE3: Results of test 4.4.2 on inter prediction based on difference coding,” Document of Joint Collaborative Team on Video Coding, JCTVC-L0184, Jan, 2013.
2. SMuC0.1.1 Software, <https://hevc.hhi.fraunhofer.de/svn/svn_SMuCSoftware/branches/0.1.1-bugfix>.
3. X. Li, et.al, “Description of Tool Experiment B3: Combined Prediction in SHVC,” JCTVC-K1103, Shanghai, China, Oct. 2012.