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| **Joint Collaborative Team on 3D Video Coding Extensions**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  9th Meeting: Sapporo, JP, 3 – 9 July 2014 | Document: JCT3V-I0122 |

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| *Title:* | **Cross Check of Method 2 and 3 of Residual DC quantization in intra SDC (JCT3V-I0082)** | | |
| *Status:* | Input Document | | |
| *Purpose:* | Proposal | | |
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| *Source:* | RWTH Aachen University | | |

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# Abstract

This document describes RWTH Aachen University's crosscheck of method 2 and 3 of Samsung’s proposal on *Residual DC quantization in intra SDC (JCT3V-I0082)*.

Samsung’s proposed modifications were implemented into the 3DV-HTM reference software HTM 11.0 and evaluated according to the common test conditions. The results of the crosscheck are provided in terms of rate and distortion. BD-Rates comparing the proposed method and the anchor encodings are also attached to this document.

# Cross Check Results

Cross check simulations were performed according to the JCT-3V common test conditions (CTC) and aas an additional test using an All-Intra (AI) coding configuration.

The encoder and decoder runtimes could not be measured precisely before the submission deadline, but by investigating the performed implementation changes, the proposed modifications should not have any measurable impact on these runtimes, as it is also reported by the proponent’s simulation results.

## Method 2

### CTC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | video 0 | video 1 | video 2 | video PSNR / video bitrate | video PSNR / total bitrate | synth PSNR / total bitrate |
| Balloons | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| Kendo | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| Newspaper\_CC | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| GT\_Fly | 0,00% | 0,22% | 0,24% | 0,05% | -0,04% | -0,01% |
| Poznan\_Hall2 | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| Poznan\_Street | 0,00% | 0,18% | 0,08% | 0,03% | -0,06% | 0,03% |
| Undo\_Dancer | 0,00% | 0,20% | 0,18% | 0,06% | 0,13% | 0,57% |
| Shark | 0,00% | 0,24% | 0,17% | 0,03% | -0,07% | -0,04% |
| 1024x768 | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| 1920x1088 | 0,00% | 0,17% | 0,14% | 0,03% | -0,01% | 0,11% |
| **average** | **0,00%** | **0,10%** | **0,08%** | **0,02%** | **-0,01%** | **0,07%** |

### AI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | video 0 | video 1 | video 2 | video PSNR / video bitrate | video PSNR / total bitrate | synth PSNR / total bitrate |
| Balloons | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| Kendo | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| Newspaper\_CC | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| GT\_Fly | 0,00% | 0,00% | 0,00% | 0,00% | -0,21% | 0,05% |
| Poznan\_Hall2 | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| Poznan\_Street | 0,00% | 0,00% | 0,00% | 0,00% | -0,16% | -0,03% |
| Undo\_Dancer | 0,00% | 0,00% | 0,00% | 0,00% | 0,07% | 1,36% |
| Shark | 0,00% | 0,00% | 0,00% | 0,00% | -0,13% | 0,15% |
| 1024x768 | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% | 0,00% |
| 1920x1088 | 0,00% | 0,00% | 0,00% | 0,00% | -0,09% | 0,30% |
| **average** | **0,00%** | **0,00%** | **0,00%** | **0,00%** | **-0,05%** | **0,19%** |

## Method 3

### CTC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | video 0 | video 1 | video 2 | video PSNR / video bitrate | video PSNR / total bitrate | synth PSNR / total bitrate |
| Balloons | 0,00% | -0,11% | 0,15% | 0,01% | -0,09% | -0,11% |
| Kendo | 0,00% | -0,15% | 0,01% | -0,04% | -0,18% | -0,16% |
| Newspaper\_CC | 0,00% | -0,13% | 0,09% | 0,00% | -0,11% | -0,12% |
| GT\_Fly | 0,00% | 0,30% | 0,09% | 0,04% | 0,05% | -0,02% |
| Poznan\_Hall2 | 0,00% | -0,13% | -0,07% | -0,04% | -0,18% | -0,17% |
| Poznan\_Street | 0,00% | 0,22% | 0,05% | 0,04% | 0,01% | 0,02% |
| Undo\_Dancer | 0,00% | -0,15% | -0,19% | -0,03% | -0,04% | 0,02% |
| Shark | 0,00% | -0,19% | 0,07% | -0,02% | -0,02% | 0,00% |
| 1024x768 | 0,00% | -0,13% | 0,08% | -0,01% | -0,13% | -0,13% |
| 1920x1088 | 0,00% | 0,01% | -0,01% | 0,00% | -0,03% | -0,03% |
| **average** | **0,00%** | **-0,04%** | **0,02%** | **-0,01%** | **-0,07%** | **-0,07%** |

### AI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | video 0 | video 1 | video 2 | video PSNR / video bitrate | video PSNR / total bitrate | synth PSNR / total bitrate |
| Balloons | 0,00% | 0,00% | 0,00% | 0,00% | -0,09% | -0,08% |
| Kendo | 0,00% | 0,00% | 0,00% | 0,00% | -0,12% | -0,12% |
| Newspaper\_CC | 0,00% | 0,00% | 0,00% | 0,00% | -0,14% | -0,09% |
| GT\_Fly | 0,00% | 0,00% | 0,00% | 0,00% | -0,02% | -0,04% |
| Poznan\_Hall2 | 0,00% | 0,00% | 0,00% | 0,00% | -0,15% | -0,12% |
| Poznan\_Street | 0,00% | 0,00% | 0,00% | 0,00% | -0,02% | -0,08% |
| Undo\_Dancer | 0,00% | 0,00% | 0,00% | 0,00% | -0,01% | -0,02% |
| Shark | 0,00% | 0,00% | 0,00% | 0,00% | -0,01% | -0,03% |
| 1024x768 | 0,00% | 0,00% | 0,00% | 0,00% | -0,12% | -0,09% |
| 1920x1088 | 0,00% | 0,00% | 0,00% | 0,00% | -0,04% | -0,06% |
| **average** | **0,00%** | **0,00%** | **0,00%** | **0,00%** | **-0,07%** | **-0,07%** |

# Investigation of Implementation

Samsung provided the source code of their modified 3DV-HTM 11.0 software together with a short explanation on how to enable and compile the proposed algorithm. All the modifications to the reference software were encapsulated in preprocessor statements for conditional compilation. Overall the implementation of the proposed algorithm is done in a clean and maintainable way and does not interfere with other coding tools.