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| *Title:* | **Cross-check report of JCTVC-J0101 on splitting contexts for MVD coding** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Report | | |
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# Abstract

Cross-checking results of JCTVC-J0101 on splitting contexts for MVD coding are shown. A source code package was distributed by proponents and it was run on an independent platform. All local decoded images by encoder matched decoded images by decoder perfectly. All bitrate and PSNR were identical with proponent's results perfectly. Detailed experimental results show attached Excel files. The modification of text and software are small and well-considered. JCTVC-J0101 on splitting contexts for MVD coding has been cross-verified independently.

# Proposed specification, software and text check

This contribution proposes a removal of mvd\_l1\_zero\_flag on slice header and introduces additional contexts of MVD coding. The same encoding technology on the software as that of mvd\_l1\_zero\_flag is introduced. In this contribution, three methods are proposed.

1. Addition of two contexts of abs\_mvd\_greater0\_flag for bi-prediction (2ctx)
2. Addition of one context of abs\_mvd\_greater0\_flag for mvd\_l1 (1ctx)
3. Share of context of abs\_mvd\_greater0\_flag and abs\_mvd\_greater1\_flag for each L0 and L1 in B-slice (CtxShare)

The first method (2ctx) is almost the same proposal as their previous contribution [1] and the second and third methods (1ctx and CtxShar) are new proposals. Those methods are simple and the modifications of text and software are small and well-considered.

# Experimental results

The simulation was conducted for all sequences of WQVGA, WVGA, 720p, 1080p and cropped 4kx2k based on the recommended simulation common conditions, JCTVC-I1100. Table 1 indicates the average results of coding efficiency compared to each anchor. Used platform is that the OS is Windows 7 64-bit; the CPU is Core™i7-2600, 3.4GHz and the compiler is Visual C++ 2008. All local decoded images by encoder match decoded images by decoder perfectly. All bitrate and PSNR are identical with proponent's results perfectly.

Table 1 Results of addition of two contexts

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.0% | -0.1% | -0.1% | 0.0% | -0.1% | 0.1% |
| Class B | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Class C | 0.0% | 0.0% | 0.1% | 0.0% | -0.1% | -0.1% |
| Class D | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |
| Class E |  |  |  |  |  |  |
| **Overall** | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
|  | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Class F | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 100% | | | 100% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.2% |
| Class C | 0.0% | 0.0% | 0.2% | 0.0% | -0.1% | 0.2% |
| Class D | 0.0% | 0.1% | 0.2% | 0.0% | -0.3% | -0.1% |
| Class E | 0.0% | -0.4% | -0.5% | 0.1% | -0.3% | 0.3% |
| **Overall** | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% | 0.1% |
|  | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% | 0.2% |
| Class F | -0.1% | 0.2% | 0.2% | 0.1% | 0.1% | 0.6% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 100% | | | 100% | | |

Table 2 Results of addition of one context

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.0% | -0.2% | 0.0% | 0.0% | 0.0% | 0.1% |
| Class B | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |
| Class C | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | -0.1% |
| Class D | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.1% |
| Class E |  |  |  |  |  |  |
| **Overall** | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
|  | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Class F | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 100% | | | 100% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 0.0% | 0.1% | 0.2% | 0.0% | 0.1% | 0.1% |
| Class C | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.1% |
| Class D | 0.0% | 0.2% | -0.1% | 0.0% | -0.3% | -0.1% |
| Class E | 0.1% | -0.2% | -0.1% | 0.1% | 0.0% | -0.1% |
| **Overall** | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% |
|  | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.1% |
| Class F | -0.1% | -0.3% | 0.3% | 0.1% | -0.1% | 0.7% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 100% | | | 100% | | |

Table 3 Results of share of contexts

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.0% | -0.1% | 0.0% | 0.1% | 0.0% | 0.1% |
| Class B | 0.0% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% |
| Class C | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% |
| Class D | 0.1% | 0.2% | 0.1% | 0.1% | 0.1% | 0.0% |
| Class E |  |  |  |  |  |  |
| **Overall** | 0.0% | 0.0% | 0.0% | 0.1% | 0.0% | 0.0% |
|  | 0.0% | 0.1% | 0.0% | 0.1% | 0.0% | 0.0% |
| Class F | 0.1% | 0.2% | 0.1% | 0.1% | 0.0% | 0.1% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 100% | | | 100% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 0.1% | 0.2% | -0.2% | 0.0% | 0.0% | 0.1% |
| Class C | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.3% |
| Class D | 0.1% | 0.2% | 0.4% | 0.1% | 0.1% | 0.3% |
| Class E | 0.1% | -0.1% | 0.1% | 0.1% | -0.2% | 0.3% |
| **Overall** | 0.1% | 0.1% | 0.1% | 0.1% | 0.0% | 0.2% |
|  | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% | 0.3% |
| Class F | 0.1% | 0.1% | 0.2% | 0.2% | 0.3% | 1.3% |
| Enc Time[%] | 100% | | | 100% | | |
| Dec Time[%] | 100% | | | 100% | | |

# Conclusions

JCTVC-J0101 on splitting contexts for MVD coding that is proposed by Qualcomm has been cross-verified independently. As experimental results, two methods have been achieved almost the same performance as the common condition. Although we checked their software and modification text, the changes are small and they are well-considered. We would like to recommend that one of proposed methods should be adopted in HEVC.

# References

[1] V. Seregin, J. Chen, X. Wang and M. Karczewicz, “Splitting contexts for MVD coding,” Joint Collaborative Team on Video Coding, JCTVC-I0350, Geneva, April 2012.

[2] F. Bossen, “Common test conditions and software reference configurations,” Joint Collaborative Team on Video Coding, JCTVC-I1100, Geneva, May 2012.

# Patent rights declaration(s)

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