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| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**  9th Meeting: Geneva, Switzerland, 27 April – 07 May, 2012 | Document: JCTVC-I0577  M25207 |

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| *Title:* | **AHG7: Cross-verification of JCTVC-I0558 on high-level syntax for explicit memory bandwidth restriction** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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# Abstract

This contribution reports cross-check results for JCTVC-I0558 on “High-level syntax for explicit memory bandwidth restriction”. In the proposal, it is advocated to install a high-level control flag to indicate how bi-prediction is restricted for memory bandwidth reduction purpose. This report cross-check results of two cases; 1) interpred\_restriction\_idc =2 which imposes 4x8, 8x4, and 8x8 bi-prediction restriction and and 2) interpred\_restriction\_idc = 3 which disables 4x8 and 8x4 inter prediction (both uni-pred and bi-pred) and 8x8 bi-prediction. The BD-rate results match the ones reported by proponents. The source code was checked and confirmed to be consistent with the proposal description.

# Test Settings and Conditions

The simulations of this document have used HM6.0 software, the simulation platform is LSF equipped with Intel(R) Xeon(R) CPU X5570 64 bits Linux machines of different frequencies, the common test conditions and reference configurations specified in [1] are followed.

# Experimental results

The experimental results for interpred\_restriction\_idc = 2 and interpred\_restriction\_idc = 3 are provided in Table 1 and Table 2, respectively. The results match the ones reported by proponents. Please be advised that runtime here may not be accurate.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.5% | 0.5% | 0.8% | 0.3% | 0.5% | 0.3% |
| Class B | 0.9% | 0.5% | 0.5% | 0.7% | 0.4% | 0.4% |
| Class C | 1.2% | 1.3% | 1.5% | 0.9% | 1.0% | 1.2% |
| Class D | 1.6% | 1.5% | 1.8% | 1.4% | 1.3% | 1.5% |
| Class E |  |  |  |  |  |  |
| **Overall** | 1.0% | 0.9% | 1.1% | 0.8% | 0.8% | 0.8% |
|  | 1.1% | 0.9% | 1.1% | 0.8% | 0.8% | 0.8% |
| Class F | 0.5% | 0.7% | 0.7% | 0.4% | 0.6% | 0.7% |
| Enc Time[%] | 90% | | | 88% | | |
| Dec Time[%] | 95% | | | 92% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 0.8% | -0.2% | 0.1% | 0.6% | -0.1% | -0.2% |
| Class C | 1.3% | 1.2% | 1.1% | 1.1% | 1.3% | 1.3% |
| Class D | 1.6% | 0.6% | 1.2% | 1.5% | 0.4% | 0.7% |
| Class E | 0.6% | 0.6% | 0.8% | 0.2% | 0.8% | 0.2% |
| **Overall** | 1.1% | 0.5% | 0.7% | 0.9% | 0.5% | 0.5% |
|  | 1.1% | 0.5% | 0.8% | 0.9% | 0.5% | 0.5% |
| Class F | 0.6% | 0.6% | 0.7% | 0.6% | 0.6% | 1.0% |
| Enc Time[%] | 88% | | | 87% | | |
| Dec Time[%] | 97% | | | 93% | | |

Table 1. Experimental results for **interpred\_restriction\_idc = 2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Random Access Main** | | | **Random Access HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A | 0.9% | 1.4% | 1.4% | 0.5% | 1.2% | 1.0% |
| Class B | 1.3% | 1.1% | 1.1% | 0.9% | 0.8% | 0.8% |
| Class C | 2.4% | 3.1% | 3.3% | 1.7% | 2.1% | 2.3% |
| Class D | 3.7% | 4.2% | 4.5% | 2.8% | 3.4% | 3.3% |
| Class E |  |  |  |  |  |  |
| **Overall** | 2.0% | 2.4% | 2.5% | 1.4% | 1.8% | 1.8% |
|  | 2.0% | 2.3% | 2.5% | 1.4% | 1.8% | 1.8% |
| Class F | 2.5% | 3.0% | 3.1% | 1.9% | 2.1% | 2.2% |
| Enc Time[%] | 76% | | | 76% | | |
| Dec Time[%] | 96% | | | 93% | | |
|  |  |  |  |  |  |  |
|  | **Low delay B Main** | | | **Low delay B HE10** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | 1.4% | 0.4% | 0.5% | 0.9% | 0.3% | 0.6% |
| Class C | 3.1% | 3.6% | 3.6% | 2.2% | 2.4% | 2.6% |
| Class D | 4.7% | 4.7% | 5.6% | 3.5% | 3.5% | 3.4% |
| Class E | 1.5% | 0.8% | 1.4% | 0.6% | 0.7% | 0.6% |
| **Overall** | 2.7% | 2.4% | 2.7% | 1.8% | 1.7% | 1.8% |
|  | 2.7% | 2.4% | 2.8% | 1.8% | 1.7% | 1.8% |
| Class F | 4.3% | 4.5% | 4.8% | 3.3% | 4.2% | 4.0% |
| Enc Time[%] | 74% | | | 75% | | |
| Dec Time[%] | 96% | | | 92% | | |

Table 2. Experimental results for **interpred\_restriction\_idc = 3**

# Conclusions

The results provided by proponents for interpred\_restriction\_idc = 2 and interpred\_restriction\_idc = 3 are confirmed.

# References

[1] F. Bossen, “Common test conditions and software reference configurations,” JCT-VC Document, JCTVC-G1100, San Jose, CA, USA, February 2012.

[2] [B. Bross](mailto:benjamin.bross@hhi.fraunhofer.de), [W.-J. Han](mailto:wjhan.han@samsung.com), [J.-R. Ohm](mailto:ohm@ient.rwth-aachen.de), [G. J. Sullivan](mailto:garysull@microsoft.com), [T. Wiegand](mailto:thomas.wiegand@hhi.fraunhofer.de) “High Efficiency Video Coding (HEVC) Test Model 6 (HM 6) Encoder Description,” JCT-VC Document, JCTVC-G1003, San Jose, CA, USA, February 2012.

[3] M. Ueda, S. Fukushima, K. Kondo and T. Suzuki, “AHG7: High-level syntax for explicit memory bandwidth restriction,” JCT-VC Document, JCTVC-I0558, 9th Meeting: Geneva, Switzerland, 27 April – 07 May, 2012