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| *Title:* | **An experimental comparison of memory bandwidth between P and B-slice coding** | | |
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# Abstract

An experimental comparison of memory bandwidth between P and B-Slice coding for low delay configuration is reported. By using the measurement module of memory bandwidth that has been developed by previous AHG of reference memory compression and has been distributed to previous CE of motion compensation, the numerical result of memory bandwidth is shown. As experimental results, the memory bandwidth increase of B-slice compared to P-slice is an average of 41% and a maximum of 70%. Those results should be considered in Profile and Level discussion.

# Memory bandwidth measurement

Regarding memory bandwidth measurement, in order to discuss reference memory compression and motion compensation, AHG of reference memory compression [1] has developed a module and it has been distributed to CE of motion compensation [2]. The detailed specification of memory architecture is described in JCTVC-C007 [3]. This module can measure an average of memory access frame by frame and a maximum of memory access frame by frame. Mainly three parameters that are access block size for luminance and chrominance respectively, alignment number of bits and burst length are provided. Since the following typical two parameter sets was used in previous CE, we use the same parameter sets at this time.

Table Parameter set for memory bandwidth measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Access block size for luma | Access block size for chroma | Alignment | Burst length |
| Case 1 (2D) | 4x2 | 4x2 | 64-bit | 128-bit |
| Case 2 (1D) | 8x1 | 8x1 | 32-bit | 64-bit |

# Experimental results

Table 1 indicates the results of B-slice compared to P-slice. According to common test condition of JCTVC-I1100 [4], Low delay B structure is compared to low delay P structure on Main and HE10 test condition. 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++ 2010. The detailed numerical results are shown in the attached excel sheet.

Table Summary of results (LB compared to LP)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **LP (Main) vs. LB (Main)** | | | **LP (HE10) vs. LB (HE10)** | | |
|  | Y | U | V | Y | U | V |
| Class A |  |  |  |  |  |  |
| Class B | -11.4% | -10.3% | -10.0% | -8.7% | -9.2% | -9.3% |
| Class C | -7.0% | -6.4% | -6.8% | -7.5% | -7.1% | -7.2% |
| Class D | -6.9% | -6.0% | -5.8% | -8.2% | -7.4% | -7.4% |
| Class E | -8.6% | -8.3% | -7.0% | -8.6% | -7.2% | -7.1% |
| **Overall** | -8.7% | -7.9% | -7.6% | -8.3% | -7.8% | -7.9% |
|  | -8.8% | -7.9% | -7.6% | -8.4% | -7.9% | -7.9% |
| Class F | -3.8% | -3.8% | -4.4% | -4.7% | -4.7% | -5.4% |
| Enc Time[%] | 142% | | | 142% | | |
| Dec Time[%] | 109% | | | 106% | | |
| MemBand(2D) Ave.[%] | 42% | | | 40% | | |
| MemBand(2D) Max.[%] | 66% | | | 70% | | |
| MemBand(1D) Ave.[%] | 41% | | | 40% | | |
| MemBand(1D) Max.[%] | 63% | | | 67% | | |

# Conclusions

A result of quantitative memory bandwidth measurement of P and B-Slice coding for low delay configuration has been shown. Those results should be used for discussion of profile and level.

# References

[1] K. Chono, T. Chujoh, C.S. Lim, A. Tabatabai and M. Zhou, “JCT-VC AHG report: Reference pictures memory compression (AHG 8),” Joint Collaborative Team on Video Coding, JCTVC-F008, Torino, July 2011.

[2] T. Chujoh and E. Alshina, “CE3: Motion Compensation,” Joint Collaborative Team on Video Coding, JCTVC-F903, Torino, July 2011.

[3] K. Chono, T. Chujoh and C.S. Lim, “JCT-VC AHG report: Memory compression,” Joint Collaborative Team on Video Coding, JCTVC-C008, Daegu, Oct. 2010.

[4] 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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