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| |  |  | | --- | --- | | **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  15th Meeting: Geneva, CH, 23 Oct. – 1 Nov. 2013 | Document: JCTVC-Oxxxx | | Document: JCTVC-O0204 |  |

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| *Title:* | **RCE 3: Cross-check of Results of Experiment B from Samsung** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Information | | |
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# Abstract

In this report, results of combined SAP and nearest neighbour prediction [1] are crosschecked and reported. Simulations are carried out following the common test conditions defined in [2]. All the experimental data presented by the proponent are confirmed in the document.

# Technical Description

Few test subcategories are defined for this method, i.e.,

* **Test 1:** Lossless. Apply SAP for strictly diagonal modes; and Rate-Distortion based variant nearest neighbor prediction for oblique modes.
* **Test 2:** Lossy. Apply SAP for strictly diagonal modes; and Rate-Distortion based variant nearest neighbor prediction for oblique modes.
* **Test 3:** Lossless. Apply SAP for strictly diagonal modes; and Threshold based variant nearest neighbor prediction for oblique modes.
* **Test 4:** Lossy. Apply SAP for strictly diagonal modes; and Threshold based variant nearest neighbor prediction for oblique modes.
* In all the 4 tests, both SAP, and nearest neighbor prediction are applied on all block sizes from 4x4 to 64x64.

For this report, test 1, test 2 and test 4 are fully tested while only the LB case of test 3 is provided. Other cases of test 3 are performed by Fujistu and presented in J[CTVC-O0081](http://phenix.int-evry.fr/jct/doc_end_user/current_document.php?id=8193).

Since the Class Optional Sequences are excluded from the results for decision (as agreed in Vienna meeting), only results for Class F, Class B, SC RGB 444, SC YUV 444, Animation RGB 444, Animation YUV 444 and RangeExt are presented. Meanwhile, for lossless, an averaged bit rate saving among mandatory categories are provided as shown in Table 1 and Table 3. For the convenience, averaged results are highlighted as follows.

* Test 1: Lossless, R-D based nearest neighbour prediction decision + extended angular SAP
  + Bit Rate Saving:
    - 0.7% (Total), 0.8% (Average) for AI
    - 0.3% (Total), 0.4% (Average) for RA
    - 0.2% (Total), 0.3% (Average) for LB
  + Encoding/Decoding Time Increase
    - AI: 8%/0%, RA:1%/0%, LB: 1%/2%
* Test 2: Lossy, R-D based nearest neighbour prediction decision + extended angular SAP
  + BD-Rate Gain (Y/U/V)
    - -0.8%/-0.5%/-0.5% (AI-MT), -0.8%/-0.6%/-0.6% (AI-HT), -0.8%/-0.6%/-0.6% (AI-SHT)
    - -0.6%/-0.4%/-0.4% (AI-MT), -0.7%/-0.5%/-0.5% (AI-HT),
    - -0.4%/-0.3%/-0.4% (AI-MT), -0.5%/-0.3%/-0.4% (AI-HT),
  + Encoding/Decoding Time Increase
    - AI-MT: 15%/-1%, AI-HT: 16%/0%, AI-SHT:16%/0%
    - RA-MT: 1%/0%, RA-HT: 1%/0%
    - LB-MT: 1%/0%, LB-HT: 1%/0%
* Test 3: Lossless, Threshold based nearest neighbour prediction decision + extended angular SAP
  + Bit Rate Saving:
    - 0.1% (Total), 0.2% (Average) for LB
  + Encoding/Decoding Time Increase
    - LB: 0%/2%
* Test 4: Lossy, Threshold based nearest neighbour prediction decision + extended angular SAP
  + BD-Rate Gain (Y/U/V)
    - -0.2%/-0.1%/-0.1% (AI-MT), -0.2%/-0.2%/-0.1% (AI-HT), -0.3%/-0.2%/-0.2% (AI-SHT)
    - -0.2%/-0.1%/-0.1% (AI-MT), -0.2%/-0.2%/-0.2% (AI-HT),
    - -0.2%/-0.2%/-0.1% (AI-MT), -0.2%/-0.2%/-0.2% (AI-HT),
  + Encoding/Decoding Time Increase
    - AI-MT: 2%/0%, AI-HT: 2%/0%, AI-SHT:2%/0%
    - RA-MT: 0%/0%, RA-HT: 0%/0%
    - LB-MT: 0%/-1%, LB-HT: 0%/0%

Since the heterogeneous computing nodes deployed in cross-checker’s local cluster, the time information is not reliable. However, it is asserted that the timing information should be reliable from the proponent. Hence, the timing information shown above is from the proponent’s data.

More data for each test sequence categories are shown in the following tables.

Table 1: Crosscheck results for Test 1 (lossless)







Table 2: Crosscheck results for Test 2 (lossy)



Table 3: Crosscheck results of test 3 LB case (Lossles)



**Table 4:** Lossy. Apply SAP for strictly diagonal modes; and Threshold based variant nearest neighbor prediction for oblique modes.



# Conclusion

This document reports the crosscheck results for RCE 3 B.1. Crosscheck results match the proponent’s data perfectly. Meanwhile, experimental data are summarized and highlighted above.

# References

1. A. Saxena, H. Chen and F. Fernadnes, “RCE 3: Combination of sample adaptive prediction and nearest neighbor prediction for oblique modes,” JCTVC-O0051, Geneva, CH, Oct. 2013.
2. A. Saxena, D. Kwon, M. Naccari and C. Pang, “HEVC Range Extensions Core Experiment 3 (RCE3): Intra Prediction techniques,” JCTVC-N1123, Vienna, Austria, July 2013.