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| *Title:* | **Cross-verification of JCTVC-N202 on key picture concept and single loop decoding** | | |
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# Abstract

This document reports the cross-verification results of JCTVC-N0202 on key picture concept and single loop decoding. The software provided from the proponents is studied and is compliant with technical description in JCTVC-N0202. The experimental results are also verified. In the proposed method, as the EL pictures are used to predict the BL pictures, it involves drifting errors when only decoding the BL bit-stream. The corresponding BL drifting errors are also verified.

# Introduction

In JCTVC-N0202, the concept of key pictures, which is similar to H.264 SVC, is studied and implemented for the RA configuration based on the SHM-2.0 reference software. More specifically, the BL pictures are classified to categories: key pictures and non-key pictures. The first picture in each GOP is key picture, and can only be predicted from other BL key pictures. All other BL pictures in each GOP are non-key pictures, and are predicted using the reconstructed EL pictures. Given that BL non-key pictures use reconstructed EL pictures for inter prediction, drifting error could be introduced when only decoding the BL bit-stream.

In JCTVC-N0202, the key picture concept is applied for multi-loop decoding and single-loop decoding of SHM-2.0. In order to fulfill the single-loop decoding requirement, the following constraints are applied to the BL coding of the single-loop decoding based scheme:

1. The de-blocking filter and SAO are deactivated in the base layer.
2. The constrained intra prediction is enabled in the base layer

Using the single-loop decoding scheme, for the decoding of EL PUs that refer to BL key pictures, the corresponding BL block has to be fully reconstructed through motion compensation. For the decoding of EL PUs that refer to BL non-key pictures, BL motion compensation could be skipped.

# Experimental results

The common test conditions of RA configurations in [2] are followed for the cross-verification of the experimental results. The results of SHM-2.0 reference index based framework are used as anchor. And, both the encoding and decoding times are inaccurate, which are measured from one heterogeneous cluster system.

## Multi-loop decoding results

Table 1. Performance of key picture based multi-loop decoding scheme

|  |  |  |
| --- | --- | --- |
| **RA HEVC SNR** | | |
| Y | U | V |
| -3.5% | -10.2% | -10.4% |
| -2.9% | -8.4% | -10.1% |
| -3.1% | -8.9% | -10.2% |
| 10.8% | 19.7% | 19.8% |
| 14.4% | 32.1% | 34.1% |
| -6.0% | -12.1% | -13.5% |

Table 2. Performance of BL decoding for key picture based multi-loop decoding scheme

|  |  |  |
| --- | --- | --- |
| **BL Drift** | | |
| Y | U | V |
| 4.0% | 2.0% | 1.8% |
| 4.7% | 2.4% | 2.4% |
| 4.5% | 2.3% | 2.2% |

## Single-loop decoding results

Table 3. Performance of key picture based single-loop decoding scheme

|  |  |  |
| --- | --- | --- |
| **RA HEVC SNR** | | |
| Y | U | V |
| 2.1% | -6.8% | -6.9% |
| 1.4% | -5.4% | -7.6% |
| 1.6% | -5.8% | -7.4% |
| 16.2% | 23.5% | 23.2% |
| 14.4% | 32.1% | 34.1% |
| 1.8% | -6.2% | -8.0% |

Table 4. Performance of BL decoding for key picture based single-loop decoding scheme

|  |  |  |
| --- | --- | --- |
| **BL Drift** | | |
| Y | U | V |
| 15.3% | 11.2% | 11.3% |
| 13.3% | 11.7% | 12.0% |
| 13.9% | 11.5% | 11.8% |

# Conclusion

In this cross-check report, the results of JCTVC-N0202 on key picture concept and single loop decoding have been verified. The software implementation is compliant with the corresponding description in the proposal and the simulation results also perfectly match the results provided from proponents.

# References

1. C. Feldmann, F. Jager, M. Wien, “[AHG16] Key picture concept and single loop decoding”, JCTVC document JCTVC-N0202, Vienna, Austria, July, 2013.
2. X. Li, J. Boyce, P. Onno and Y. Ye, “Common Test Conditions and Software Reference Configurations for the Scalable Test Model”, JCTVC document JCTVC-M1009, Incheon, Korea, April, 2013.