

Title: **JCT-VC AHG report: Subjective impact of quantization (AHG16)**

Status: Input Document to JCT-VC

Purpose: Report

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Source: AHG on Subjective impact of quantization

Abstract

This report summarizes the activities of the Ad Hoc Group on Subjective impact of quantization between the 8th JCT-VC meeting held in San Jose in February 2012 and the current meeting in Geneva.

1 Mandates

- Investigate tools for intensity dependent quantization and related impact on bit-rate.
- Study the impact of varying QPs on affected tools and rate control.
- Study the subjective impact of quantization matrices in relation to CE4.
- Investigate solutions for adapting the deblocking filter under varying QPs.

2 Status

Core experiment related to the mandates of this AHG, i.e. CE4 on Quantization matrices, was withdrawn in March, as all proponents withdrawn their proposals to be tested. However, inputs to this meeting include 3 non-CE4 proposals on quantization matrices. Other reported activities directly related to subjective quality include investigation of tools for intensity dependant quantization and harmonisation of quantization matrices and deblocking filtering.

This report also lists contributions that are related to quantization, but do not have obvious impact or results on subjective quality. These tools include coding and signalling of quantization matrices, as well as simplification of dequantization by removal of clipping.

3 Related contributions

Intensity dependent quantization (1 proposal, 2 cross-checks)

- JCTVC-I0257 AHG16: On Intensity Dependent Quantization in the HEVC codec
M. Naccari, M. Mrak, D. Flynn, A. Gabriellini (BBC)
- JCTVC-I0482 Crosscheck of JCTVC_I0257 - On Intensity Dependent Quantization in the HEVC codec
Rik Allen, Vivek Gowri-Shankar (Altera)
- JCTVC-I0495 Cross-check of Intensity Dependent Quantization (JCTVC-I0257)
Glenn Van Wallendael, Sebastiaan Van Leuven, Jan De Cock, Rik Van de Walle (Ghent University)

Quantization matrices (3 proposals, 2 cross-checks)

- JCTVC-I0126 Newer Quantization Matrices for HEVC
S. Jeong, B. Jeon (LG Electronics)
- JCTVC-I0451 Cross-check on newer quantization matrices for HEVC (JCTVC-I0126)
I.-K Kim (Samsung)
- JCTVC-I0268 Quantization matrices for 4x4 DSTs in HEVC
J. Lou, L. Wang (Motorola Mobility)
- JCTVC-I0429 Cross-check of JCTVC-I0268: Quantization matrices for 4x4 DSTs in HEVC
X. Zhang, S. Liu (MediaTek)
- JCTVC-I0518 HVS-based Generalized Quantization Matrices
S. Jeong, Hendry, B. Jeon, J. Kim

Coding and signalling of quantization matrices (8 proposals, 2 cross-checks)

- JCTVC-I0101 Simplification on default quantization matrix signalling
S.-C. Lim, H. Y. Kim, J. Lee, J. S. Choi (ETRI)
- JCTVC-I0102 Diagonal scan for quantization matrix coefficients
S.-C. Lim, H. Y. Kim, J. Lee, J. S. Choi (ETRI)
- JCTVC-I0505 Cross-check of JCTVC-I0102 on diagonal scan for quantization matrix coefficients
V. Sze (TI)
- JCTVC-I0284 Quantization matrix entries as QP offsets
R. Joshi, J. Sole, M. Karczewicz (Qualcomm)
- JCTVC-I0364 Investigate of sub-sampling representation methods for quantization matrices
J. Zheng (HiSilicon), J. Chen (UCLA)

- JCTVC-I0369 Compact representation method for quantization matrices
J. Zheng (HiSilicon), J. Chen (UCLA)
- JCTVC-I0370 Removal of zigzag scan from quantization matrices coding
M. Shima (Canon)
- JCTVC-I0435 Cross-verification report on removal of zigzag scan from quantization matrices coding (JCTVC-I0370)
S.-C. Lim, H. Y. Kim, J. Lee (ETRI)
- JCTVC-I0419 Syntax for supporting 4x4 DST quantization matrices
R. Cohen, A. Vetro (MERL)
- JCTVC-I0465 Signaling of quantization matrices in SPS and PPS
M. Zhou (TI)

Other quantization-related contribution (2 contributions, 1 cross-check)

- JCTVC-I0285 Elimination of clipping before dequantization
R. Joshi, J. Sole, X. Li, M. Karczewicz (Qualcomm)
- JCTVC-I0280 AHG6: Quantization Matrices and Deblocking Filtering
G. Van der Auwera, R. Joshi, M. Karczewicz (Qualcomm)
- JCTVC-I0470 AHG6: Crosscheck Report for Quantization Matrices and Deblocking Filtering in JCTVC-I0280
J. An, X. Guo (MediaTek)

4 Recommendations

The recommendations of the AHG are:

- Review tools for intensity dependent quantization.
- Review interaction of quantization matrices and deblocking filters.
- Review new quantization matrices proposed at this meeting, considering the subjective impact.
- Organize visual tests, if needed, after review of proposals.
- Then review other related proposals as an enhancement.