

Title: JCT-3V AHG report: MV-HEVC / 3D-HEVC Test Model editing (AHG3)

Status: AHG report input to JCT-3V

Purpose: AHG report

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Source: AHG

Abstract

This document reports on the work of the JCT-3V ad hoc group on MV-HEVC / 3D-HEVC Test Model editing (AHG3) between the 3rd JCT-3V meeting in Geneva (17-23 January 2013) and the 4th meeting in Incheon (20–26 Apr. 2013).

1 Mandates

Title and Email Reflector	Chairs	Mtg
<p>MV-HEVC / 3D-HEVC Test Model editing (AHG3) (jct-3v@lists.rwth-aachen.de)</p> <ul style="list-style-type: none"> Produce and finalize JCT3V-C1005 3D-HEVC Test Model Description draft 3. Produce and finalize JCT3V-C1004 MV-HEVC text specification draft 3 (submitted for ISO/IEC PDAM ballot). Gather and address comments for refinement of these documents. Coordinate with the 3D-HEVC Software Integration AhG to address issues relating to mismatches between software and text. Set up a bug tracking system. 	<p>G. Tech, K. Wegner (co-chairs), J. Boyce, Y. Chen, M. Hannuksela, T. Suzuki, S. Yea, J.-R. Ohm, G. Sullivan (vice chairs)</p>	<p>N</p>

2 Introduction

The third MV-HEVC working draft and the third 3D-HEVC Test Model were developed from the second MV-HEVC working draft and the second 3D-HEVC Test Model following the decisions taken at the 3rd JCT-3V meeting in Geneva (17-23 January 2013).

Two editorial teams were formed to work on the two documents that were to be produced:

- JCT3V-C1004 MV-HEVC Working Draft 3 [1]
 - Gerhard Tech
 - Miska Hannuksela
 - Ying Chen
 - Jill Boyce
 - Krzysztof Wegner
- JCT3V-C1005 3D-HEVC Test Model 3 [2]
 - Gerhard Tech
 - Ying Chen
 - Krzysztof Wegner
 - Sehoon Yea

Editing JCT3V-C1004 was assigned a higher priority than editing JCT3V-C1005.

3 Status

3.1 *MV-HEVC Working Draft*

Four versions of JCT3V-C1004 were published by the AHG following the 3rd JCT-3V meeting in Geneva. The first version was released directly after the meeting. The last version was uploaded on 27. March and corresponds to the text submitted to MPEG secretariat for ISO/IEC PDAM ballot.

3.1.1 Incorporated changes

The major changes compared to working draft JCT3V-B1004 were:

- Adoption of the unified design of the multi-view and the scalable extension. (JCT-C0238)
- Incorporation of all adopted proposals.
- Editorial update to HEVC version 1.

3.1.2 Open issues

Open issues in JCT3V-C1004 that need discussion (details can be found as editor's comments in the draft text):

- Definition of access unit/coded picture: There was a discussion and disagreement between the editors if the current definition of an access unit was adopted or if the definition as in MV-HEVC draft 2 is valid. In current design an access unit consist of a coded picture and the coded picture consist of only one layer. In MV-HEVC draft 2 the coded picture within the access unit consist of different layer components.

- ViewId: It was noticed by an editor that the current ViewId derived from DimensionIds does not support the same features as the ViewId as defined in MV-HEVC draft 2, since it needs to be assigned based on coding order or layer dependencies and cannot be selected without constraints as it was in MV-HEVC draft 2.
- Picture size in stereo main profile: An editor noticed that in the stereo main profile the size of the picture of the second view is not restricted to the size of the picture of the first view. It was not clear if this is common sense and only a defect or if this needs further input/discussion.
- Byte alignment in profile_tier_level syntax structure: A byte alignment was adopted with JCTVC-L0363, however the adoption of JCTVC-L0180 requires a reintroduction of the profilePresentFlag in the profile_tier_level structure. Hence, both proposals are not fully compatible. An intermediate fix has been added that might require further discussion.

3.2 3D-HEVC Test Model

Two versions of JCT3V-C1005 have been published by the editing AHG following the 3rd JCT-3V meeting in Geneva.

3.2.1 Incorporated changes

All adoptions of the last meeting have been incorporated. Moreover existing text has been revised and improved and missing text from previous meeting has been added. As decided the document was split into two parts. One part containing the test model text description. The other part contains the draft specification.

Changes of JCT3V-C1005 relative to JCT3V-B1005 are:

Normative changes (Adoptions):

- (3DN-20) Alignment of [JCT3V-C0152](#) + [JCT3V-C0137](#).
- (3DN-07/[JCT3V-C0137](#)) Texture motion vector candidate for depth.
- (3DN-07/[JCT3V-C0137](#)) Removal of MPI.
- (3DN-19) Camera parameters
- (3DN-08/[JCT3V-C0138](#)) Removal of parsing dependency for inter-view residual prediction.
- (3DN-18/[JCT3V-C0160](#)) QTL disabled for RAP.
- (3DN-17/[JCT3V-C0154](#)) Reference sub-sampling for SDC and DMM.
- (3DN-16/[JCT3V-C0096](#)) Removal of DMM 2 from SDC.
- (3DN-15/[JCT3V-C0034](#)) Delta DC processing for DMMs.
- (3DN-14/[JCT3V-C0044](#)) Signalling of wedgeIdx for DMM3.
- (3DN-02/[JCT3V-C0152](#)) View synthesis prediction (without disparity derivation part).
- (3DN-03/[JCT3V-C0112](#)) Restricted search of max disparity.
- (3DN-01,02/[JCT3V-C0131](#),[JCT3V-C0152](#)) Disparity derivation from depth maps.
- (3DN-13/[JCT3V-C0116](#)) Inter-view vector scaling for AMVP.
- (3DN-12/[JCT3V-C0115](#)) Signalling of inter-view motion vector scaling.
- (3DN-09/[JCT3V-C0047](#)) Alternative reference index for TMVP.
- (3DN-10/[JCT3V-C0051](#)) Unification of inter-view candidate derivation.
- (3DN-06/[JCT3V-C0129](#)) Vertical component in residual prediction.
- (3DN-05/[JCT3V-C0097](#)/[JCT3V-C0141](#)) Temporal blocks first in DV derivation.
- (3DN-04/[JCT3V-C0135](#)) Rest. on the temporal blocks for memory bandwidth reduction in DDV.
- (3DN-11/[JCT3V-C0046](#)) Extension of illumination compensation to depth.

Normative changes (Adoptions of former meetings):

- (3Dn-01) Incorporated missing intra-predicted wedgelet partition mode
- (3Dn-02) Full sample MV accuracy for depth.
- (3Dn-03) Wedgelet pattern generation process.

Editorial changes:

- Split of Test Model text and specification text.
- (3DE-01) Revised text related to residual prediction.
- (3DE-02) Incorporated TMVP text from base spec.
- (3DE-03) Incorporated derivation process for AMVP from base spec.
- (3DE-04) Reordered sub-clauses related to disparity estimation and additional motion candidates.
- (3DE-05) Alignment with MV-HEVC draft 3.

Fixes:

- (3Dc-01) Fix Illumination compensation (including ic_flag for skip).
- (3Dc-03) Fix SDC
- (3Dc-02) Incorporated missing cond. of long/short-term pictures in AMVP (related to [JCT3V-B0046](#))

3.2.2 Open issues

General issues:

- A formal decision is missing to derive the DepthFlag (and ViewId) in the sense of MV-HEVC draft 3 from the VPS. However, such a decision would cause parsing dependencies for SPS with camera parameters as adopted last meeting.
- Inter-view residual/motion prediction: With the adoption of tools related to inter-view motion prediction (JCT3V-A0126, JCT3V-A0049, JCT3V-A0097) the issue arose that inter-view motion prediction is reasonably specified for CTC only.

Editorial issues:

- Update of low-level specification to HEVC 1 is required.
- Mismatches to HTM-6.1 software exist since the 3D-HEVC “normative” Annex H is based on HEVC text specification 8 [3] and HTM-6.1 software is based on HM-6.1.
- The Test Model description includes tools not integrated in software.

Text is missing or not sufficient for the following adoptions, AHG3 kindly asks proponents to provide further input:

- For VSP the test model description is missing. Moreover text has not been provided for several modifications on AMVP and the loop filter.
- For illumination compensation the test model description needs to be extended.
- The specification of a table related to DMMs is missing.
- For Edge Intra the derivation of edge position is ambiguous.

A list of other minor issues is listed in the bug tracking system.

4 Setup of bug tracking system

The setup of the bug tracking has been carried out by Karsten Sühning and David Flynn. AHG3 wants to thank Karsten and David for their support. The bug tracking system has been announced on the reflector can be accessed at:

<https://hevc.hhi.fraunhofer.de/trac/3d-hevc/>

For MV- and 3D-HEVC editing two tracking components have been created:

- 3D draft issue: for problems in 3D-HEVC Test Model description.
- MV draft issue: for problems in the MV-HEVC Draft

Issues reported by the editors often require additional inputs or clarification by the proponents. So it is recommended that proponents of adopted tools check the tracking system, whether there is an issue with their proposal and suggest to the editors how to fix it.

5 Recommendations

The recommendations of the MV-HEVC / 3D-HEVC Test Model editing AHG are to:

- Approve the edited JCT3V-C1004 and JCT3V-C1005 documents as JCT-3V outputs.
- Continue to edit both documents to ensure that all agreed elements of 3D- and MV-HEVC are fully described.
- Compare the documents with the HTM-software and resolve any discrepancies that may exist, in collaboration with the Software AHG.
- Continue to improve the overall editorial quality of the MV-HEVC working draft 3D-HEVC test model description.
- Ensure that properly drafted candidate text for both the MV-HEVC working draft and the 3D - HEVC Test Model (if appropriate) is available prior to making any decision to change the MV-HEVC or 3D-HEVC specification.
- Discuss reported open issues.

6 References

- [1] JCT-3V, “MV-HEVC Working Draft 3”, JCT3V-C1004, JCT-3V Meeting, Geneva, January 2013
- [2] JCT-3V, “3D-HEVC Test Model 3”, JCT3V-C1005, JCT-3V Meeting, Geneva, January 2013
- [3] JCT-VC, “High Efficiency Video Coding (HEVC) text specification draft 8”, JCTVC-J1003, JCT-VC Meeting, Stockholm, July 2012