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| **Joint Video Experts Team (JVET)**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  12th Meeting: Macao, CN, 03–12 Oct. 2018 | Document: JVET-L\_Notes\_d0 |

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| *Title:* | **Meeting Report of the 12th meeting of the Joint Video Experts Team (JVET), Macao, CN, 3–12 October 2018** | | |
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| *Purpose:* | Report | | |
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| *Source:* | Chairs of JVET | | |

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# Summary

The Joint Video Experts Team (JVET) of ITU-T WP3/16 and ISO/IEC JTC 1/ SC 29/ WG 11 held its twelfth meeting during 3–12 October 2018 at the Venetian Macao Resort Hotel (Estrada da Baía de N. Senhora da Esperança, s/n Taipa, Macao S.A.R., China). The JVET meeting was held under the chairmanship of Dr Gary Sullivan (Microsoft/USA) and Dr Jens-Rainer Ohm (RWTH Aachen/Germany). For rapid access to particular topics in this report, a subject categorization is found (with hyperlinks) in section 2.13 of this document. It is further noted that the unabbreviated name of JVET was formerly known as “Joint Video *Exploration* Team”, but the parent bodies had modified it when entering the phase of formal development of a new standard by the previous meeting. The name Versatile Video Coding (VVC) was chosen as the informal nickname for the new standard.

The JVET meeting began at approximately 0900 hours on Wednesday 03 October 2018. Meeting sessions were held on all days (including weekend days) until the meeting was closed at approximately XXXX hours on Friday 12 October 2018. Approximately XXX people attended the JVET meeting, and approximately XXX input documents and 16 AHG reports were discussed. The meeting took place in a collocated fashion with a meeting of WG11 – one of the two parent bodies of the JVET. The subject matter of the JVET meeting activities consisted of developing video coding technology with a compression capability that significantly exceeds that of the current HEVC standard, or otherwise gives better support regarding the requirements of future application domains of video coding. As a primary goal, the JVET meeting reviewed the work that was performed in the interim period since the eleventh JVET meeting in producing a second draft of the VVC standard and the second version of the associated VVC test model (VTM). Further important goals were reviewing the results of 15 Core Experiments (CE), reviewing other technical input on novel aspects of video coding technology, and producing the next versions of draft text and VTM, and plan next steps for further investigation of candidate technology towards the formal standard development.

The JVET produced XX output documents from the meeting (update):

* JVET-K1001 Versatile Video Coding specification text (Draft 2)
* JVET-K1002 Algorithm description for Versatile Video Coding and Test Model 2 (VTM 2)
* JVET-K1003 Guidelines for VVC reference software development
* JVET-K1004 Algorithm descriptions of projection format conversion and video quality metrics in 360Lib Version 7
* JVET-K1005 Methodology and reporting template for tool testing
* JVET-K1010, JVET-K1011, and JVET-K1012 JVET common test conditions and software reference configurations for SDR, HDR/WCG, and 360° video
* JVET-K1021 through JVET-K1035, Description of Core Experiments 1 through 15

For the organization and planning of its future work, the JVET established XX “ad hoc groups” (AHGs) to progress the work on particular subject areas. At this meeting, XX Core Experiments (CE) were defined. The next four JVET meetings were planned for 9–18 January 2019 under WG11 auspices in Marrakesh, MA, during 19–27 March 2019 under ITU-T auspices in Geneva, CH, during 3–12 July 2019 under WG11 auspices in Gothenburg, SE, and during 1–9 October 2019 under ITU-T auspices in Geneva, CH.

The document distribution site <http://phenix.it-sudparis.eu/jvet/> was used for distribution of all documents.

The reflector to be used for discussions by the JVET and all its AHGs is the JVET reflector:  
[jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de) hosted at RWTH Aachen University. For subscription to this list, see  
<https://mailman.rwth-aachen.de/mailman/listinfo/jvet>.

# Administrative topics

## Organization

The ITU-T/ISO/IEC Joint Video Experts Team (JVET) is a group of video coding experts from the ITU-T Study Group 16 Visual Coding Experts Group (VCEG) and the ISO/IEC JTC 1/ SC 29/ WG 11 Moving Picture Experts Group (MPEG). The parent bodies of the JVET are ITU-T WP3/16 and ISO/IEC JTC 1/SC 29/WG 11.

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It is further noted that the unabbreviated name of JVET was formerly known as “Joint Video *Exploration* Team”, but the parent bodies had modified it when entering the phase of formal development of a new standard by the previous meeting. The name Versatile Video Coding (VVC) was chosen as the informal nickname for the new standard.

## Meeting logistics

Information regarding logistics arrangements for the meeting had been provided via the email reflector [jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de) and at <http://wftp3.itu.int/av-arch/jvet-site/2018_10_L_Macao/>.

## Primary goals

As a primary goal, the JVET meeting reviewed the work that was performed in the interim period since the eleventh JVET meeting in producing a secomd draft of the VVC standard and the second version of the associated VVC test model (VTM). Further important goals were reviewing the results of 15 Core Experiments (CE), reviewing other technical input on novel aspects of video coding technology, and producing the next versions of draft text and VTM, and plan next steps for further investigation of candidate technology towards the formal standard development.

## Documents and document handling considerations

### General

The documents of the JVET meeting are listed in Annex A of this report. The documents can be found at <http://phenix.it-sudparis.eu/jvet/>.

Registration timestamps, initial upload timestamps, and final upload timestamps are listed in Annex A of this report.

The document registration and upload times and dates listed in Annex A and in headings for documents in this report are in Paris/Geneva time. Dates mentioned for purposes of describing events at the meeting (other than as contribution registration and upload times) follow the local time at the meeting facility.

Highlighting of recorded decisions in this report is practised as follows:

* Decisions made by the group that might affect the normative content of a future standard are identified in this report by prefixing the description of the decision with the string “Decision:”.
* Decisions that affect the JEM software but have no normative effect are marked by the string “Decision (SW):”.
* Decisions that fix a “bug” in the JEM description (an error, oversight, or messiness) or in the software are marked by the string “Decision (BF):”.

This meeting report is based primarily on notes taken by the JVET chairs. The preliminary notes were also circulated publicly by ftp and http during the meeting on a daily basis. It should be understood by the reader that 1) some notes may appear in abbreviated form, 2) summaries of the content of contributions are often based on abstracts provided by contributing proponents without an intent to imply endorsement of the views expressed therein, and 3) the depth of discussion of the content of the various contributions in this report is not uniform. Generally, the report is written to include as much information about the contributions and discussions as is feasible (in the interest of aiding study), although this approach may not result in the most polished output report.

### Late and incomplete document considerations

The formal deadline for registering and uploading non-administrative contributions had been announced as Monday, 24 September 2018. Any documents uploaded after 1159 hours Paris/Geneva time on Tuesday 25 September were considered “officially late”, giving a grace period of 12 hours to accommodate those living in different time zones of the world. The deadline does not apply to AHG reports, CE summaries, and other such reports which can only be produced after the availability of other input documents.

All contribution documents with registration numbers JVET-L0430 and higher were registered after the “officially late” deadline (and therefore were also uploaded late). However, some documents in the “K0430+” range might include break-out activity reports that were generated during the meeting, and are therefore better considered as report documents rather than as late contributions. Also, many cross-check reports were uploaded late.

In many cases, contributions were also revised after the initial version was uploaded. The contribution document archive website retains publicly-accessible prior versions in such cases. The timing of late document availability for contributions is generally noted in the section discussing each contribution in this report.

One suggestion to assist with the issue of late submissions was to require the submitters of late contributions and late revisions to describe the characteristics of the late or revised (or missing) material at the beginning of discussion of the contribution. This was agreed to be a helpful approach to be followed at the meeting.

The following technical design proposal contributions were registered and/or uploaded late:

* JVET-L0XXX (a proposal on …), uploaded XX-XX.
* ….

It may be observed that some of the above-listed contributions were submissions made in response to issues that arose in discussions during the meeting or from the study of other contributions, and thus could not have been submitted by the ordinary deadline. For example, some of them were proposing combinations or simplifications of other proposals.

The following other document not proposing normative technical content, but with some need for consideration, were registered and/or uploaded late:

* JVET-L0XXX (a document on …), uploaded XX-XX.
* ….

The following cross-verification reports were registered before the deadline and uploaded late: JVET-L0XXX [uploaded XX-XX], … . Cross-verification reports that were both registered late and uploaded late (those with numbers higher than JVET-L0XXX) are not specifically identified here, in the interest of brevity. Initial upload times for each document are recorded in Annex A of this report.

The following contribution registrations were later cancelled, withdrawn, never provided, were cross-checks of a withdrawn contribution, or were registered in error: JVET-L0XXX, … .

“Placeholder” contribution documents that were basically empty of content, with perhaps only a brief abstract and some expression of an intent to provide a more complete submission as a revision, had been agreed to be considered unacceptable and rejected in the document management system. There were no initial uploads of contribution documents that were rejected as “placeholders” at the current meeting.

As a general policy, missing documents were not to be presented, and late documents (and substantial revisions) could only be presented when there was a consensus to consider them and there was sufficient time available for their review. Again, an exception is applied for AHG reports, CE summaries, and other such reports which can only be produced after the availability of other input documents. There were no objections raised by the group regarding presentation of late contributions, although there was some expression of annoyance and remarks on the difficulty of dealing with late contributions and late revisions.

It was remarked that documents that are substantially revised after the initial upload can also be a problem, as this becomes confusing, interferes with study, and puts an extra burden on synchronization of the discussion. This can especially be a problem in cases where the initial upload is clearly incomplete, and in cases where it is difficult to figure out what parts were changed in a revision. For document contributions, revision marking is very helpful to indicate what has been changed. Also, the “comments” field on the web site can be used to indicate what is different in a revision although participants tend to seldom notice what is recorded there.

A few contributions may have had some problems relating to IPR declarations in the initial uploaded versions (missing declarations, declarations saying they were from the wrong companies, etc.). These issues were corrected by later uploaded versions in a reasonably timely fashion in all cases (to the extent of the awareness of the responsible coordinators).

Some other errors were noticed in other initial document uploads (wrong document numbers or meeting dates or meeting locations in headers, etc.) which were generally sorted out in a reasonably timely fashion. The document web site contains an archive of each upload.

### Outputs of the preceding meeting

All output documents of the previous meeting, particularly the meeting report JVET-K1000, the Versatile Video Coding specification text (Draft 2) JVET-K1001, the Algorithm description for Versatile Video Coding and Test Model 2 (VTM 2) JVET-K1002, the Guidelines for VVC Software Development JVET-K1003, the Algorithm descriptions of projection format conversion and video quality metrics in 360Lib Version 7 JVET-K1004, the Methodology and reporting template for tool testing JVET-K1005, the JVET common test conditions and software reference configurations for SDR, HDR/WCG, and 360° video (JVET-K1010, JVET-K1011, and JVET-K1012), and the Description of Core Experiments 1 through 15 (JVET-K1021 through JVET-K1035), had been completed and were approved. The software implementations of VTM (versions 2.0 and 2.1), BMS (versions 2.0 and 2.1), and the 360Lib software implementation (version 7.0) were also approved. Furthermore, one last missing output document of the 10th meeting, the Report of results from the Call for Proposals on Video Compression with Capability beyond HEVC JVET-J1003, had been finally delivered and was approved.

The group had initially been asked to review the meeting report of the previous meeting for finalization. The meeting report was later approved without modification.

The available output documents of the previous meeting and the software had been made available in a reasonably timely fashion.

## Attendance

The list of participants in the JVET meeting can be found in Annex B of this report.

The meeting was open to those qualified to participate either in ITU-T WP3/16 or ISO/IEC JTC 1/‌SC 29/‌WG 11 (including experts who had been personally invited as permitted by ITU-T or ISO/IEC policies).

Participants had been reminded of the need to be properly qualified to attend. Those seeking further information regarding qualifications to attend future meetings may contact the responsible coordinators.

## Agenda

The agenda for the meeting was as follows:

* Opening remarks and review of meeting logistics and communication practices
* IPR policy reminder and declarations
* Contribution document allocation
* Review of results of the previous meeting
* Reports of *ad hoc* group (AHG) activities
* Reports of core experiments planned at the previous meeting
* Consideration of contributions and communications on project guidance
* Consideration of video coding technology contributions
* Consideration of information contributions
* Coordination activities
* Approval of output documents and associated editing periods
* Future planning: Determination of next steps, discussion of working methods, communication practices, establishment of coordinated experiments, establishment of AHGs, meeting planning, other planning issues
* Other business as appropriate for consideration

## IPR policy reminder

Participants were reminded of the IPR policy established by the parent organizations of the JVET and were referred to the parent body websites for further information. The IPR policy was summarized for the participants.

The ITU-T/ITU-R/ISO/IEC common patent policy shall apply. Participants were particularly reminded that contributions proposing normative technical content shall contain a non-binding informal notice of whether the submitter may have patent rights that would be necessary for implementation of the resulting standard. The notice shall indicate the category of anticipated licensing terms according to the ITU-T/ITU-R/ISO/IEC patent statement and licensing declaration form.

This obligation is supplemental to, and does not replace, any existing obligations of parties to submit formal IPR declarations to ITU-T/ITU-R/ISO/IEC.

Participants were also reminded of the need to formally report patent rights to the top-level parent bodies (using the common reporting form found on the database listed below) and to make verbal and/or document IPR reports within the JVET necessary in the event that they are aware of unreported patents that are essential to implementation of a standard or of a draft standard under development.

Some relevant links for organizational and IPR policy information are provided below:

* <http://www.itu.int/ITU-T/ipr/index.html> (common patent policy for ITU-T, ITU-R, ISO, and IEC, and guidelines and forms for formal reporting to the parent bodies)
* <http://ftp3.itu.int/av-arch/jvet-site> (JVET contribution templates)
* <http://www.itu.int/ITU-T/dbase/patent/index.html> (ITU-T IPR database)
* <http://www.itscj.ipsj.or.jp/sc29/29w7proc.htm> (JTC 1/‌SC 29 Procedures)

It is noted that the ITU TSB director’s AHG on IPR had issued a clarification of the IPR reporting process for ITU-T standards, as follows, per SG 16 TD 327 (GEN/16):

“TSB has reported to the TSB Director’s IPR Ad Hoc Group that they are receiving Patent Statement and Licensing Declaration forms regarding technology submitted in Contributions that may not yet be incorporated in a draft new or revised Recommendation. The IPR Ad Hoc Group observes that, while disclosure of patent information is strongly encouraged as early as possible, the premature submission of Patent Statement and Licensing Declaration forms is not an appropriate tool for such purpose.

In cases where a contributor wishes to disclose patents related to technology in Contributions, this can be done in the Contributions themselves, or informed verbally or otherwise in written form to the technical group (e.g. a Rapporteur’s group), disclosure which should then be duly noted in the meeting report for future reference and record keeping.

It should be noted that the TSB may not be able to meaningfully classify Patent Statement and Licensing Declaration forms for technology in Contributions, since sometimes there are no means to identify the exact work item to which the disclosure applies, or there is no way to ascertain whether the proposal in a Contribution would be adopted into a draft Recommendation.

Therefore, patent holders should submit the Patent Statement and Licensing Declaration form at the time the patent holder believes that the patent is essential to the implementation of a draft or approved Recommendation.”

The responsible coordinators invited participants to make any necessary verbal reports of previously-unreported IPR in technology that might be considered as prospective candidate for inclusion in future standards, and opened the floor for such reports: No such verbal reports were made.

## Software copyright disclaimer header reminder

It was noted that the VTM software implementation package uses the same software copyright license header as the HEVC reference software, where the latter had been agreed at the 5th meeting of the JCT-VC and approved by both parent bodies at their collocated meetings at that time. This license header language is based on the BSD license with a preceding sentence declaring that other contributor or third party rights, including patent rights, are not granted by the license, as recorded in N10791 of the 89th meeting of ISO/IEC JTC 1/‌SC 29/‌WG 11. Both ITU and ISO/IEC will be identified in the <OWNER> and <ORGANIZATION> tags in the header. This software is used in the process of designing the VTM software, and for evaluating proposals for technology to be potentially included in the design. This software or parts thereof might be published by ITU-T and ISO/IEC as an example implementation of a future video coding standard and for use as the basis of products to promote adoption of such technology.

Different copyright statements shall not be committed to the committee software repository (in the absence of subsequent review and approval of any such actions). As noted previously, it must be further understood that any initially-adopted such copyright header statement language could further change in response to new information and guidance on the subject in the future.

These considerations apply to the 360Lib video conversion software and and HDRtools as well.

## Communication practices

The documents for the meeting can be found at <http://phenix.it-sudparis.eu/jvet/>.

It was reminded to send a notice to the chairs in cases of changes to document titles, authors etc.

JVET email lists are managed through the site <https://mailman.rwth-aachen.de/mailman/options/jvet>, and to send email to the reflector, the email address is [jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de). Only members of the reflector can send email to the list. However, membership of the reflector is not limited to qualified JVET participants.

It was emphasized that reflector subscriptions and email sent to the reflector must use real names when subscribing and sending messages and subscribers must respond to inquiries regarding the nature of their interest in the work. The current number of subscribers was 928.

For distribution of test sequences, a password-protected ftp site had been set up at RWTH Aachen University, with a mirror site at FhG-HHI. Accredited members of JVET may contact the responsible JVET coordinators to obtain the password information (but the site is not open for use by others).

## Terminology

Some terminology used in this report is explained below:

* **ACT**: Adaptive colour transform.
* **AI**: All-intra.
* **AIF**: Adaptive interpolation filtering.
* **ALF**: Adaptive loop filter.
* **AMP**: Asymmetric motion partitioning – a motion prediction partitioning for which the sub-regions of a region are not equal in size (in HEVC, being N/2x2N and 3N/2x2N or 2NxN/2 and 2Nx3N/2 with 2N equal to 16 or 32 for the luma component).
* **AMVP**: Adaptive motion vector prediction.
* **AMT**: Adaptive multi-core transform.
* **AMVR**: (Locally) adaptive motion vector resolution.
* **APS**: Active parameter sets.
* **ARC**: Adaptive resolution conversion (synonymous with DRC, and a form of RPR).
* **ARSS**: Adaptive reference sample smoothing.
* **ATMVP**: Alternative temporal motion vector prediction.
* **AU**: Access unit.
* **AUD**: Access unit delimiter.
* **AVC**: Advanced video coding – the video coding standard formally published as ITU-T Recommendation H.264 and ISO/IEC 14496-10.
* **BA**: Block adaptive.
* **BC**: See CPR or IBC.
* **BD**: Bjøntegaard-delta – a method for measuring percentage bit rate savings at equal PSNR or decibels of PSNR benefit at equal bit rate (e.g., as described in document VCEG-M33 of April 2001).
* **BIO**: Bi-directional optical flow.
* **BL**: Base layer.
* **BMS**: Bench-mark set, a compilation of coding tools on top of VTM, which provide somewhat better compression performance, but are not deemed mature for standardzation.
* **BoG**: Break-out group.
* **BR**: Bit rate.
* **BV**: Block vector (used for intra BC prediction).
* **CABAC**: Context-adaptive binary arithmetic coding.
* **CBF**: Coded block flag(s).
* **CC**: May refer to context-coded, common (test) conditions, or cross-component.
* **CCLM**: Cross-component linear model.
* **CCP**: Cross-component prediction.
* **CG**: Coefficient group.
* **CGS**: Colour gamut scalability (historically, coarse-grained scalability).
* **CL-RAS**: Cross-layer random-access skip.
* **CPMVP**: Control-point motion vector prediction (used in affine motion model).
* **CPR**: Current-picture referencing, also known as IBC – a technique by which sample values are predicted from other samples in the same picture by means of a displacement vector called a block vector, in a manner conceptually similar to motion-compensated prediction.
* **CTC**: Common test conditions.
* **CVS**: Coded video sequence.
* **DCT**: Discrete cosine transform (sometimes used loosely to refer to other transforms with conceptually similar characteristics).
* **DCTIF**: DCT-derived interpolation filter.
* **DF**: Deblocking filter.
* **DMVR**: Decoder-side motion vector refinement.
* **DRC**: Dynamic resolution conversion (synonymous with ARC, and a form of RPR).
* **DT**: Decoding time.
* **ECS**: Entropy coding synchronization (typically synonymous with WPP).
* **EE**: Exploration Experiment – a coordinated experiment conducted toward assessment of coding technology.
* **EMT**: Explicit multiple-core transform.
* **EOTF**: Electro-optical transfer function – a function that converts a representation value to a quantity of output light (e.g., light emitted by a display.
* **EPB**: Emulation prevention byte (as in the emulation\_prevention\_byte syntax element).
* **ECV**: Extended Colour Volume (up to WCG).
* **EL**: Enhancement layer.
* **ET**: Encoding time.
* **FRUC**: Frame rate up conversion (pattern matched motion vector derivation).
* **HDR**: High dynamic range.
* **HEVC**: High Efficiency Video Coding – the video coding standard developed and extended by the JCT-VC, formalized by ITU-T as Rec. ITU-T H.265 and by ISO/IEC as ISO/IEC 23008-2.
* **HLS**: High-level syntax.
* **HM**: HEVC Test Model – a video coding design containing selected coding tools that constitutes our draft standard design – now also used especially in reference to the (non-normative) encoder algorithms (see WD and TM).
* **HyGT**: Hyper-cube Givens transform (a type of NSST).
* **IBC** (also **Intra BC**): Intra block copy, also known as CPR – a technique by which sample values are predicted from other samples in the same picture by means of a displacement vector called a block vector, in a manner conceptually similar to motion-compensated prediction.
* **IBDI**: Internal bit-depth increase – a technique by which lower bit-depth (8 bits per sample) source video is encoded using higher bit-depth signal processing, ordinarily including higher bit-depth reference picture storage (ordinarily 12 bits per sample).
* **IBF**: Intra boundary filtering.
* **ILP**: Inter-layer prediction (in scalable coding).
* **IPCM**: Intra pulse-code modulation (similar in spirit to IPCM in AVC and HEVC).
* **JEM**: Joint exploration model – the software codebase for future video coding exploration.
* **JM**: Joint model – the primary software codebase that has been developed for the AVC standard.
* **JSVM**: Joint scalable video model – another software codebase that has been developed for the AVC standard, which includes support for scalable video coding extensions.
* **KLT**: Karhunen-Loève transform.
* **LB** or **LDB**: Low-delay B – the variant of the LD conditions that uses B pictures.
* **LD**: Low delay – one of two sets of coding conditions designed to enable interactive real-time communication, with less emphasis on ease of random access (contrast with RA). Typically refers to LB, although also applies to LP.
* **LIC**: Local illumination compensation.
* **LM**: Linear model.
* **LP** or **LDP**: Low-delay P – the variant of the LD conditions that uses P frames.
* **LUT**: Look-up table.
* **LTRP**: Long-term reference pictures.
* **MC**: Motion compensation.
* **MCP**: Motion compensated prediction.
* **MDNSST**: Mode dependent non-separable secondary transform.
* **MMLM**: Multi-model (cross component) linear mode.
* **MPEG**: Moving picture experts group (WG 11, the parent body working group in ISO/IEC JTC 1/‌SC 29, one of the two parent bodies of the JVET).
* **MPM**: Most probable mode (in intra prediction).
* **MV**: Motion vector.
* **MVD**: Motion vector difference.
* **NAL**: Network abstraction layer (as in AVC and HEVC).
* **NSQT**: Non-square quadtree.
* **NSST**: Non-separable secondary transform.
* **NUH**: NAL unit header.
* **NUT**: NAL unit type (as in AVC and HEVC).
* **OBMC**: Overlapped block motion compensation (e.g., as in H.263 Annex F).
* **OETF**: Opto-electronic transfer function – a function that converts to input light (e.g., light input to a camera) to a representation value.
* **OOTF**: Optical-to-optical transfer function – a function that converts input light (e.g. l,ight input to a camera) to output light (e.g., light emitted by a display).
* **PDPC**: Position dependent (intra) prediction combination.
* **PMMVD**: Pattern-matched motion vector derivation.
* **POC**: Picture order count.
* **PoR**: Plan of record.
* **PPS**: Picture parameter set (as in AVC and HEVC).
* **QM**: Quantization matrix (as in AVC and HEVC).
* **QP**: Quantization parameter (as in AVC and HEVC, sometimes confused with quantization step size).
* **QT**: Quadtree.
* **BT**: Binary tree.
* **TT**: Ternary tree.
* **RA**: Random access – a set of coding conditions designed to enable relatively-frequent random access points in the coded video data, with less emphasis on minimization of delay (contrast with LD).
* **RADL**: Random-access decodable leading.
* **RASL**: Random-access skipped leading.
* **R-D**: Rate-distortion.
* **RDO**: Rate-distortion optimization.
* **RDOQ**: Rate-distortion optimized quantization.
* **ROT**: Rotation operation for low-frequency transform coefficients.
* **RPLM**: Reference picture list modification.
* **RPR**: Reference picture resampling (e.g., as in H.263 Annex P), a special case of which is also known as ARC or DRC.
* **RPS**: Reference picture set.
* **RQT**: Residual quadtree.
* **RRU**: Reduced-resolution update (e.g. as in H.263 Annex Q).
* **RVM**: Rate variation measure.
* **SAO**: Sample-adaptive offset.
* **SD**: Slice data; alternatively, standard-definition.
* **SDT**: Signal dependent transform.
* **SEI**: Supplemental enhancement information (as in AVC and HEVC).
* **SH**: Slice header.
* **SHM**: Scalable HM.
* **SHVC**: Scalable high efficiency video coding.
* **SIMD**: Single instruction, multiple data.
* **SPS**: Sequence parameter set (as in AVC and HEVC).
* **STMVP**: Spatial-temporal motion vector prediction.
* **TBA/TBD/TBP**: To be announced/determined/presented.
* **TGM**: Text and graphics with motion – a category of content that primarily contains rendered text and graphics with motion, mixed with a relatively small amount of camera-captured content.
* **UCBDS**: Unrestricted center-biased diamond search.
* **UWP**: Unequal weight prediction.
* **VCEG**: Visual coding experts group (ITU-T Q.6/16, the relevant rapporteur group in ITU-T WP3/16, which is one of the two parent bodies of the JVET).
* **VPS**: Video parameter set – a parameter set that describes the overall characteristics of a coded video sequence – conceptually sitting above the SPS in the syntax hierarchy.
* **VTM**: VVC Test Model.
* **VVC**: Versatile Video Coding, the standardization project developed by JVET.
* **WCG**: Wide colour gamut.
* **WG**: Working group, a group of technical experts (usually used to refer to WG 11, a.k.a. MPEG).
* **WPP**: Wavefront parallel processing (usually synonymous with ECS).
* Block and unit names in HEVC:
  + **CTB**: Coding tree block (luma or chroma) – unless the format is monochrome, there are three CTBs per CTU.
  + **CTU**: Coding tree unit (containing both luma and chroma, synonymous with LCU), with a size of 16x16, 32x32, or 64x64 for the luma component.
  + **CB**: Coding block (luma or chroma), a luma or chroma block in a CU.
  + **CU**: Coding unit (containing both luma and chroma), the level at which the prediction mode, such as intra versus inter, is determined in HEVC, with a size of 2Nx2N for 2N equal to 8, 16, 32, or 64 for luma.
  + **PB**: Prediction block (luma or chroma), a luma or chroma block of a PU, the level at which the prediction information is conveyed or the level at which the prediction process is performed in HEVC.
  + **PU**: Prediction unit (containing both luma and chroma), the level of the prediction control syntax within a CU, with eight shape possibilities in HEVC:
    - **2Nx2N**: Having the full width and height of the CU.
    - **2NxN (or Nx2N)**: Having two areas that each have the full width and half the height of the CU (or having two areas that each have half the width and the full height of the CU).
    - **NxN**: Having four areas that each have half the width and half the height of the CU, with N equal to 4, 8, 16, or 32 for intra-predicted luma and N equal to 8, 16, or 32 for inter-predicted luma – a case only used when 2N×2N is the minimum CU size.
    - **N/2x2N** paired with **3N/2x2N** or **2NxN/2** paired with **2Nx3N/2**: Having two areas that are different in size – cases referred to as AMP, with 2N equal to 16 or 32 for the luma component.
  + **TB**: Transform block (luma or chroma), a luma or chroma block of a TU, with a size of 4x4, 8x8, 16x16, or 32x32.
  + **TU**: Transform unit (containing both luma and chroma), the level of the residual transform (or transform skip or palette coding) segmentation within a CU (which, when using inter prediction in HEVC, may sometimes span across multiple PU regions).
* Block and unit names in JEM (Note: Need to put VVC terminology here):
  + **CTB**: Coding tree block (luma or chroma) – there are three CTBs per CTU in P/B slice, and one CTB per luma CTU and two CTBs per chroma CTU in I slice.
  + **CTU**: Coding tree unit (synonymous with LCU, containing both luma and chroma in P/B slice, containing only luma or chroma in I slice), with a size of 16x16, 32x32, 64x64, or 128x128 for the luma component.
  + **CB**: Coding block, a luma or chroma block in a CU.
  + **CU**: Coding unit (containing both luma and chroma in P/B slice, containing only luma or chroma in I slice), a leaf node of a QTBT. It’s the level at which the prediction process and residual transform are performed in JEM. A CU can be square or rectangle shape.
  + **PB**: Prediction block, a luma or chroma block of a PU.
  + **PU**: Prediction unit, has the same size to a CU.
  + **TB**: Transform block, a luma or chroma block of a TU.
  + **TU**: Transform unit, has the same size to a CU.

## Opening remarks

Remarks during the opening session of the meeting 0900 Wednesday 3 Oct (chaired by GJS and JRO) were as follows.

* The meeting logistics, agenda, working practices, policies, and document allocation were reviewed.
* The results of the previous meeting were reviewed.
* The primary goal of the meeting was to review the results of CEs, identify promising technology directions and potential adoptions to the VVC draft text and VTM.
* Due to high number of input contributions, parallelization and breakout work were expected to be needed.
* Principles of standards development were discussed.

## Scheduling of discussions

Scheduling: Generally meeting time was scheduled during 0900–2000+ hours, with coffee and lunch breaks as convenient. Ongoing scheduling refinements were announced on the group email reflector as needed. Some particular scheduling notes are shown below, although not necessarily 100% accurate or complete:

* Wed. 03 Oct, 1st day
  + 0900–XXXX Opening, AHG reports (chaired by GJS & JRO)
  + …
* …

## Contribution topic overview (update)

The approximate subject categories and quantity of contributions per category for the meeting were summarized as follows:

* AHG reports (16) (section 3) (Plenary)
* Project development (2) (section 4) (Plenary)
* Test material (1) (section 4.3) (Plenary)
* Core Experiments (xx) (section 6) with subtopics
  + CE1: Partitioning (6) (section 6.1) (Track A)
  + CE2: Loop filters (7) (section 6.2) (Track B)
  + CE3: Intra prediction and mode coding (36) (section 6.3) (Track A)
  + CE4: Inter prediction and motion vector coding (50) (section 6.4) (Track B)
  + CE5: Arithmetic coding engine (9) (section 6.5) (Track A)
  + CE6: Transforms and transform signalling (19) (section 6.6) (Track A)
  + CE7: Quantization and coefficient coding (7) (section 6.7) (Track A)
  + CE8: Current picture referencing (6) (section 6.8) (Track A)
  + CE9: Decoder side motion vector derivation (15) (section 6.9) (Track B)
  + CE10: Combined and multi-hypothesis prediction (16) (section 6.10) (Track B)
  + CE11: Deblocking (19) (section 6.11) (Track A)
  + CE12: Mapping functions (5) (section 6.12) (BoG)
  + CE13: Coding tools for 360° video (21) (section 6.13) (BoG)
  + CE14: Post reconstruction filtering (4) (section 6.14) (Track A)
  + CE15: Palette mode (3) (section 6.15) (Track A)
* Non-CE technology proposals (xx) (section 7) with subtopics
  + CE1 related – Partitioning (26) (section 7.1) (Track A)
  + CE2 related – Adaptive loop filter (4) (section 7.2) (Track B)
  + CE3 related – Intra prediction and mode coding (36) (section 7.3) (Track A)
  + CE4 related – Inter prediction and motion vector coding (91) (section 7.4) (Track B)
  + CE5 related – Arithmetic coding engine (5) (section 7.5) (Track A)
  + CE6 related – Transforms and transform signalling (23) (section 7.6) (Track A)
  + CE7 related – Quantization and coefficient coding (18) (section 7.7) (Track A)
  + CE8 related – Current picture referencing (7) (section 7.8) (Track A)
  + CE9 related – Decoder side motion vector derivation (17) (section 7.9) (Track B)
  + CE10 related – Combined and multi-hypothesis prediction (2) (section 7.10) (Track B)
  + CE11 related – Deblocking (9) (section 7.11) (Track A)
  + CE12 related – Mapping functions (2) (section 7.12) (BoG)
  + CE13 related – Coding tools for 360° content (4) (section 7.13) (BoG)
  + CE14 related – Post reconstruction filtering (5) (section 7.14) (Track A)
  + CE15 related – Palette mode (9) (section 7.15) (Track A)
  + NN technology related (3) (section 7.14) (Track A)
  + Screen content tools (2) (section 7.17) (Track A)
  + HL syntax (27) (section 7.17) (Track B)
  + Other (14) (section 7.18) (Track A)
* Complexity analysis and reduction (4) (section 8) (Track A)
* Encoder optimization (2) (section 9) (Track A)
* Metrics and evaluation criteria (2) (section 10) (TrackA)
* Joint meetings, plenary discussions, BoG reports, Summary of actions (section 11)
* Project planning (section 12)
* Establishment of AHGs (section 13)
* Output documents (section 14)
* Future meeting plans and concluding remarks (section 15)

# AHG reports (16)

These reports were discussed Wednesday 03 Oct 0900–XXXX (chaired by GJS and JRO).

[JVET-L0001](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4251) JVET AHG report: Project management (AHG1) [J.-R. Ohm, G. J. Sullivan]

[JVET-L0002](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4252) JVET AHG report: Draft text and test model algorithm description editing (AHG2) [B. Bross, J. Chen, J. Boyce, S. Kim, S. Liu, Y. Ye]

[JVET-L0003](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4253) JVET AHG report: Test model software development (AHG3) [F. Bossen, X. Li, K. Sühring]

[JVET-L0004](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4254) JVET AHG report: Test material and visual assessment (AHG4) [V. Baroncini, R. Chernyak, P. Hanhart, A. Norkin, T. Suzuki, J. Ye]

[JVET-L0005](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4665) JVET AHG Report: Memory bandwidth consumption of coding tools (AHG5) [R. Hashimoto, Y. He, T. Ikai, X. Li, H. Yang]

[JVET-L0006](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4346) JVET AHG Report: 360 video conversion software development (AHG6) [Y. He, K. Choi]

JVET-L0007 JVET AHG report: Coding of HDR/WCG material (AHG7) [A. Segall, E. François, W. Husak, D. Rusanovskyy]

[JVET-L0008](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4692) JVET AHG report: 360° video coding tools and test conditions (AHG8) [J. Boyce, K. Choi, P. Hanhart, J.-L. Lin]

[JVET-L0009](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4636) JVET AHG report: Neural Networks in Video Coding (AHG9) [S. Liu, B. Choi, K. Kawamura, Y. Li, L. Wang, P. Wu, H. Yang]

[JVET-L0010](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4654) JVET AHG report: Encoding algorithm optimizations (AHG10) [A. Duenas, A. M. Tourapis, C. Helmrich, S. Ikonin, A. Norkin, R. Sjöberg]

[JVET-L0011](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4638) JVET AHG report: Screen Content Coding (AHG11) [S. Liu, J. Boyce, Y. Sun, M. Zhou]

[JVET-L0012](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4502) JVET AHG report: High-level parallelism and coded picture regions (AHG12) [T. Ikai, M. Coban, M. M. Hannuksela, H. M. Jang, R. Sjöberg, R. Skupin, Y.-K. Wang]

JVET-L0013 JVET AHG report: Tool reporting procedure (AHG13) [W.-J. Chien, J. Boyce (co-chairs), R. Chernyak, K. Choi, R. Hashimoto, Y. He, Y.-W. Huang, S. Liu]

[JVET-L0014](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4548) JVET AHG report: Low-latency random access (AHG14) [J.-M. Thiesse, A. Duenas, K. Kazui, A. Tourapis]

[JVET-L0015](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4121) JVET AHG report: Bitstream decoding properties signalling (AHG15) [J. Boyce, J. Chen, S. Deshpande, M. Karczewicz, A. Tourapis, Y.-K. Wang, S. Wenger]

[JVET-L0016](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4343) JVET AHG report: Implementation studies (AHG16) [M. Zhou, E. Chai, K. Choi, S. Sethuraman, O. Hugosson, T. Hsieh, X. Xiu]

# Project development (2)

Contributions in this category were discussed XXday XX July XXXX–XXXX (chaired by XXX).

## Text and general standard development (X)

## Software development (1)

[JVET-L0238](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4329) AHG8: Chroma sample location type support for 360Lib [P. Hanhart, Y. He, Y. Ye (InterDigital)]

## Common test conditions (X)

## Coding studies (1)

[JVET-L0201](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4292) AHG13 - Weighted Prediction vs Generalized Bi-prediction with Fade sequences [P.Bordes, E.François (Technicolor)]

# Test material (1)

[JVET-L0547](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4656) Blender Foundation/Animation Studio test sequences [F. Siddi (Blender Animation Studio), T. Roosendaal (Blender Foundation)] [late] [miss]

# Core Experiments

## CE1: Partitioning (6)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0021](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4561) CE1: Summary report on partitioning [J. Ma, F. Le Léannec, M. W. Park]

[JVET-L0080](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4161) CE1.1.1.1: CU partitioning along picture boundaries [S.-T. Hsiang, S.-M. Lei (MediaTek)]

[JVET-L0081](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4162) CE1.2.1: Constraint for binary and ternary partitions [C.-M. Tsai, C.-W. Hsu, T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0268](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4363) CE1: Zero-Unit with uniform paring process (Test 1.2.1 and Test 1.2.2) [K. Zhang, L. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0310](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4405) CE1-1.3.1: Partial CU for picture boundary handling [M. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0424](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4523) CE1 tests 3.1.1, 3.1.2, 3.2.1, 3.2.2: Separate intra trees [K. Misra, A. Segall, F. Bossen (Sharp)]

## CE2: Adaptive loop filter (7)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0022](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4596) CE2: Summary report on Adaptive Loop Filter [V. Seregin, C.-Y. Chen]

[JVET-L0082](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4163) CE2.2.1 and CE2.2.2: ALF coefficient coding and range constraints [Y.-C. Su, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0147](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4228) CE2: Subsampled Laplacian calculation (Test 6.1, 6.2, 6.3, and 6.4) [S.-C. Lim, J. Kang, H. Lee, J. Lee, H. Y. Kim (ETRI)]

[JVET-L0162](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4243) CE2: ALF with Multiplication Replaced by Bit-Shifting (Test 2.5.1) [S. Esenlik, B. Wang, H. Gao, A.M. Kotra, J. Chen (Huawei)]

[JVET-L0530](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4637) Crosscheck of JVET-L0162: CE2.5.1 ALF with Multiplication Replaced by Bit-Shifting [R. Vanam (Interdigital)] [late] [miss]

[JVET-L0240](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4331) CE2: Subsampled gradient calculation for highest temporal layer (Test 2.7.1) [R. Vanam, Y. He, Y. Ye (InterDigital)]

[JVET-L0391](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4488) CE2.3 and CE2.4: Fixed filters, temporal filters, CU-level control and low-latency encoder for ALF [N. Hu, H. Egilmez, V. Seregin, A. Gadde, M. Karczewicz (Qualcomm)]

## CE3: Intra prediction and mode coding (36)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0023](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4420) CE3: Summary Report on Intra Prediction and Mode Coding [G. Van der Auwera, J. Heo, A. Filippov]

[JVET-L0052](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4133) CE3: Results on Multiple 4-tap filter (Test 3.3.1) [N. Choi, M. W. Park, K. Choi (Samsung)]

[JVET-L0076](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4157) CE3: Line-based intra coding mode (Tests 2.1.1 and 2.1.2) [S. De Luxán Hernández, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0084](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4165) CE3.2.5: Generation of right-column and bottom-row predictors for planar mode [M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0085](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4166) CE3.5.8: Line buffer reduction for LM chroma [C.-M. Tsai, C.-W. Hsu, C.-Y. Chen, T.-D. Chuang, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0086](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4167) CE3.6.4: Intra mode coding with 6 MPMs with bypass coding bins and non-MPMs with FLC coding [M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0130](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4211) CE3-3.1.1: Interpolation filter selection regarding intra mode and block size [S. Yoo, J. Heo, J. Choi, L. Li, J. Lim (LGE)]

[JVET-L0131](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4212) CE3-4.1: Harmonization of Linear interpolation intra prediction (LIP) with Simplified position dependent intra prediction combination (PDPC) and wide-angle intra prediction (WAIP) [J. Heo, J. Choi, J. Choi, S. Yoo, L. Li, J. Lim (LGE)]

[JVET-L0136](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4217) CE3: CCLM with line buffer restriction (Test 5.2.7) [J. Choi, J. Heo, S. Yoo, L. Li, J. Choi, J. Lim, S. Kim (LGE)]

[JVET-L0150](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4231) CE3: Multiple reference line prediction (Test 1.2.3 and Test 1.2.4) [J. Lee, H. Lee, S.-C. Lim, J. Kang, H. Y. Kim (ETRI)]

[JVET-L0151](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4232) CE3: Intra reference sample interpolation (Test 3.1.3) [J. Lee, H. Lee, S.-C. Lim, J. Kang, H. Y. Kim (ETRI)]

[JVET-L0165](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4256) CE3-6.2.1: Extended MPM list [L. Li, J. Heo, J. Choi, J. Choi, S. Yoo, J. Lim (LGE)]

[JVET-L0179](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4270) CE3: 4-tap interpolation filter combined with bilateral reference sample filter (Tests 3.2.1 and 3.2.2) [P. Merkle, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0180](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4271) Crosscheck for CE3-1.1.1 and CE3-1.1.2 [E. Mora, A. Nasrallah, M. Raulet (ATEME)]

[JVET-L0191](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4282) CE3: Cross-component linear model simplification (Test 5.1) [G. Laroche, J. Taquet, C. Gisquet, P. Onno (Canon)]

[JVET-L0199](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4290) CE3: Non-linear weighted intra prediction (tests 2.2.1 and 2.2.2) [P. Helle, J. Pfaff, M. Schäfer, R. Rischke, T. Hinz, P. Merkle, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0219](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4310) CE3 6.3.1: Intra mode coding with 6 modes in MPM list and Non-MPM modes coded with truncated binarization [B. Wang, A.M. Kotra, S. Esenlik, H. Gao, J. Chen (Huawei)]

[JVET-L0220](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4311) CE3 6.3.2: Intra mode coding with 6 MPM and remapping strategy for non-MPM signalling [A.M. Kotra, B. Wang, S. Esenlik, H. Gao, J. Chen (Huawei)]

[JVET-L0221](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4312) CE3 6.5.1: 6-MPM list with Intra mode independent CABAC context [A.M. Kotra, B. Wang, S. Esenlik, H. Gao, J. Chen (Huawei), M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek), L. Li, J. Heo, J. Choi, S. Yoo, J. Lim (LGE), A.K. Ramasubramonian, G. Van der Auwera, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0222](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4313) CE3 6.6.1: A simple 6-MPM list construction with truncated binary coding for non-MPM signalling [A.M. Kotra, B. Wang, S. Esenlik, H. Gao, J. Chen (Huawei), M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek), L. Li, J. Heo, J. Choi, S. Yoo, J. Lim (LGE), A.K. Ramasubramonian, G. Van der Auwera, M. Karczewicz (Qualcomm)]

[JVET-L0250](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4344) CE3: 6 MPM with truncated binary code for non-MPM and CTU-row constraint (Test 6.1.1) [A. K. Ramasubramonian, G. Van der Auwera, T. Hsieh, N. Hu, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0251](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4345) CE3: Extended LM modes (Tests 5.2.1, 5.2.2, 5.2.3, and 5.2.4) [A. K. Ramasubramonian, G. Van der Auwera, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0275](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4366) CE3: Intra reference sample interpolation filter (Test 3.1.4) [A. Filippov, V. Rufitskiy, J. Chen (Huawei)]

[JVET-L0277](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4372) CE3: Simplifications for chroma intra coding (Test 2.3.1 and 2.3.2) [L. Zhao, X. Zhao, X. Li, S. Liu (Tencent)]

[JVET-L0283](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4379) CE3: Multiple reference line intra prediction (Test 1.1.1, 1.1.2, 1.1.3 and 1.1.4) [B. Bross, P. Keydel, H. Schwarz, D. Marpe, T. Wiegand (HHI), L. Zhao, X. Zhao, X. Li, S. Liu (Tencent), Y.-J. Chang, H.-Y. Jiang (Foxconn), P.-H. Lin, C.-C. Lin (ITRI)]

[JVET-L0284](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4378) CE3: Distance-weighted directional intra-prediction (Tests 4.2.1 and 4.2.2) [A. Filippov, V. Rufitskiy, J. Chen (Huawei)]

[JVET-L0324](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4419) CE3: Intra reference sample interpolation filter selection using MDIS conditions (Test 3.1.2) [G. Van der Auwera, A. K. Ramasubramonian, V. Seregin, T. Hsieh, M. Karczewicz (Qualcomm)]

[JVET-L0338](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4435) CE3: Multi-directional LM (MDLM) (Test 5.4.1 and 5.4.2) [X. Ma, H. Yang, J. Chen (Huawei)]

[JVET-L0339](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4436) CE3: CCLM/MDLM coefficients derivation method using one luma line buffer (Test 5.5.1 and 5.5.2) [X. Ma, H. Yang, J. Chen (Huawei)]

[JVET-L0340](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4437) CE3: CCLM/MDLM using simplified coefficients derivation method (Test 5.6.1, 5.6.2 and 5.6.3) [X. Ma, H. Yang, J. Chen (Huawei)]

[JVET-L0378](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4475) CE3: Adaptive inter-residual prediction (CE3-5.7.2) [K. Kawamura, Y. Kidani, S. Naito (KDDI)]

[JVET-L0388](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4485) CE3: Multiple neighbor-based linear model (Test 5.3.1) [H.-Y. Jiang, H.-J. Jhu, Y.-J. Chang (Foxconn)]

[JVET-L0412](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4510) CE3: Multiple Reference Intra Prediction (tests 1.2.5) [G. Rath, F. Urban, F. Racapé (Technicolor)]

[JVET-L0419](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4518) CE3: Adaptive multiple cross-component linear model (Test 5.9.1) [S.-P. Wang, P.-H. Lin, C.-H. Yau, C.-L. Lin, C.-C. Lin (ITRI)]

[JVET-L0420](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4519) CE3: Chroma intra prediction simplification (Test 2.4.1 and 2.4.2) [C.-H. Yau, P.-H. Lin, C.-C. Lin, B.-J. Fuh, C.-L. Lin]

[JVET-L0431](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4530) CE3: Multiple Reference Line Intra Prediction (Tests 1.2.1 and 1.2.2) [S. Keating (Sony)] [late]

## CE4: Inter prediction and motion vector coding (50)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0024](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4552) CE4: Summary report on inter prediction and motion vector coding [H. Yang, S. Liu, K. Zhang]

[JVET-L0045](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4126) CE4: Test results of CE4.1.11 on line buffer reduction for affine mode [M. Zhou (Broadcom)]

[JVET-L0054](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4135) CE4 Ultimate motion vector expression (Test 4.5.4) [S. Jeong, M. W. Park, Y. Piao, M. Park, K. Choi (Samsung)]

[JVET-L0056](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4137) CE4: Test 4.7.1 and Test 4.7.2 - Non-Temporal Illumination Compensation [A. Tamse, M. W. Park, K. Choi (Samsung)]

[JVET-L0070](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4151) CE4.3.1: Planar Motion Vector Prediction [N. Zhang, J. Zheng, Y.Lin (HiSilicon)]

[JVET-L0071](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4152) CE4.4.11: Combined Average Merge Candidates [N. Zhang, X. Chen, Y. Lin, J. Zheng (HiSilicon)]

[JVET-L0088](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4169) CE4.2.3: Affine merge mode [Z.-Y. Lin, T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0089](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4170) CE4.4.4: Non-adjacent merge candidates with buffer size reduction [Y.-L. Hsiao, T.-D. Chuang, C.-Y. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0090](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4171) CE4.4.12: Pairwise average candidates [Y.-L. Hsiao, T.-D. Chuang, C.-Y. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0141](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4222) CE4: Simplified affine MVP list construction (Test 4.1.4) [J. Lee, J. Nam, N. Park, H. Jang, J. Lim, S. Kim (LGE)]

[JVET-L0142](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4223) CE4: Simplification of the common base for affine merge (Test 4.2.2) [J. Lee, J. Nam, N. Park, H. Jang, J. Lim, S. Kim (LGE)]

[JVET-L0143](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4224) CE4: Slice-level 4/6 parameters affine model switching (Test 4.1.8) and bypass coding of 4/6 parameter indication flag (Test 4.1.15) [J. Lee, J. Nam, N. Park, H. Jang, J. Lim, S. Kim (LGE)]

[JVET-L0156](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4237) CE4.2.4 Affine merge mode [F. Galpin, A. Robert, F. Leleannec (Technicolor)]

[JVET-L0580](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4690) Cross-check of contribution JVET-L0156 on CE4.2.4 (Affine merge mode) [H. Huang, Y. Zhang (Qualcomm)] [late] [miss]

[JVET-L0169](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4260) CE4.8.1 Temporal motion data storage reduction [H. Jang, J. Nam, S. Kim, J. Lim (LGE)]

[JVET-L0471](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4575) Cross check report for JVET-L0169: CE4.8.1 Temporal motion data storage reduction [X. Xu (Tencent)] [late] [miss]

[JVET-L0175](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4266) CE4: Extended Non-adjacent Spatial Merge Candidates (Test 4.4.3) [X. Chen, J. Zheng (HiSilicon)]

[JVET-L0176](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4267) CE4: Merge Offset Extension (Test 4.4.8) [X. Chen, J. Zheng (HiSilicon)]

[JVET-L0186](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4277) CE4: Candidate List Reordering (Test 4.4.13) [L. Xu, F. Chen, L. Wang (Hikvision)] [late]

[JVET-L0223](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4314) CE4.6: Intra and Inter/Intra Boundary Padding [J. Brandenburg, R. Skupin, H. Schwarz, D. Marpe, T. Schierl, T. Wiegand (HHI)]

[JVET-L0258](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4353) CE4.1.7: Shape dependent control point selection for affine mode [Y. He, X. Xiu, Y. Ye (InterDigital)]

[JVET-L0265](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4360) CE4: Affine Prediction with 4×4 Sub-blocks for Chroma Components (Test 4.1.16) [K. Zhang, L. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0266](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4361) CE4: History-based Motion Vector Prediction (Test 4.4.7) [L. Zhang, K. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0271](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4367) CE4.1.6: Simplification of affine AMVP candidate list construction [H. Huang, W.-J. Chien, Y. Han, Y. Zhang, M. Karczewicz (Qualcomm)]

[JVET-L0273](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4369) CE4: Test results of CE4.1.10 and CE4.1.13 [H. Huang, W.-J. Chien, Y. Han, Y. Zhang, M. Karczewicz (Qualcomm)]

[JVET-L0278](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4373) CE4.2.5: Simplification of affine merge list construction and move ATMVP to affine merge list [H. Huang, W.-J. Chien, Y. Han, M. Karczewicz (Qualcomm)]

[JVET-L0519](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4625) CE4: Cross-check of contribution JVET-L0278 on CE4.2.5 (simplification of affine merge list construction and move ATMVP to affine merge list) [F. Galpin, F. Leleannec, A. Robert (technicolor)] [late]

[JVET-L0298](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4393) CE4: Bilinear Motion Vector Prediction (Test 4.5.2, Test 4.5.3) [B. Choi (Sharp)] [late]

[JVET-L0315](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4410) CE4 - Extension of merge and AMVP candidates for inter prediction (Test CE4.4.10) [G. Li, X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0318](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4413) CE4 - ranking based spatial merge candidate list for inter prediction (Test CE4.4.14) [G. Li, X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0321](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4416) CE4: Combined test of CE4.4.2 and CE4.4.7 [M. Gao, J. Ye, X. Li, X. Xu, S. Liu (Tencent), L. Zhang, K. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0323](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4418) CE4.4.2: Long distance merge candidates [M. Gao, J. Ye, X. Li, X. Xu, S. Liu (Tencent)]

[JVET-L0343](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4440) CE4: Adaptive multi parameter motion model (Test 4.1.17) [K. Kondo, T. Suzuki (Sony)]

[JVET-L0354](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4451) CE4.4.1: Spatial-temporal merge mode [T. Zhou, T. Ikai (Sharp)]

[JVET-L0363](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4460) CE4: Cross-model inheritance for affine candidate derivation (Test 4.1.1) [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0478](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4582) Cross-check of JVET-L0363: CE4.1.1 Cross-model inheritance for affine candidate derivation [Y. He (InterDigital)] [late] [miss]

[JVET-L0364](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4461) CE4: Simplification of affine AMVP list construction (Test 4.1.3 and 4.1.12) [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0366](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4463) CE4: Common base for affine merge mode (Test 4.2.1) [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0521](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4627) CE4: Cross-check of contribution JVET-L0366 on CE4.2.1 (Common base for affine merge mode) [F. Galpin, F. Leleannec, A. Robert (technicolor)] [late] [miss]

[JVET-L0368](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4465) CE4: Affine merge enhancement with simplification (Test 4.2.2) [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0369](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4466) CE4: Separate list for sub-block merge candidates (Test 4.2.8) [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0370](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4467) CE4: Symmetrical MVD mode (Test 4.5.1) [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0554](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4663) Crosscheck of JVET-L0370 [S. Jeong (Samsung)] [late]

[JVET-L0376](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4473) Crosscheck for CE4.1.6 and CE4.1.13 [J. An (Alibaba)] [late]

[JVET-L0399](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4496) CE4.4.6: Improvement on Merge/Skip mode [Y. Han, W.-J. Chien, H. Huang, M. Karczewicz (Qualcomm)]

[JVET-L0413](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4511) CE4-3.3: MVPlanar prediction [S. Iwamura, S. Nemoto, A. Ichigaya (NHK)]

[JVET-L0430](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4529) CE4: Merge mode modification (Test 4.4.5) [T. Solovyev, J. Chen, S. Ikonin (Huawei)] [late]

[JVET-L0507](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4613) Crosscheck of CE4.4.11 [J. An (Alibaba)] [late] [miss]

[JVET-L0514](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4620) Cross check of CE4.4.12: "Pairwise average candidates" [F. Le Léannec (Technicolor)] [late]

[JVET-L0581](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4691) Crosscheck of CE4.1.14 on bypass coding of 4/6 parameter indication flag [H. Huang, Y. Zhang (Qualcomm) [late]

## CE5: Arithmetic coding engine (9)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0025](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4591) CE5: Summary report on the Arithmetic Coding Engine [H. Kirchhoffer, A. Said]

[JVET-L0057](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4138) CE5: Counter-based probability estimation (Test 5.1.2) [K. Choi, Y. Piao, M. W. Park, K. P. Choi (Samsung)]

[JVET-L0094](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4175) CE5.2.2: CABAC range sub-interval derivation [T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0115](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4196) CE5: Per-context CABAC initialization with double windows (Test 5.1.6) [A. Said, J. Dong, H. Egilmez, Y.-H. Chao, M. Karczewicz, V. Seregin (Qualcomm)]

[JVET-L0116](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4197) CE5: Per-context CABAC initialization with single window (Test 5.1.7) [A. Said, J. Dong, H. Egilmez, Y.-H. Chao, M. Karczewicz, V. Seregin (Qualcomm)]

[JVET-L0117](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4198) CE5: Binary arithmetic coding range update with small table or short multiplications (Test 5.2.4) [A. Said, J. Dong, H. Egilmez, Y.-H. Chao, M. Karczewicz, V. Seregin (Qualcomm)]

[JVET-L0335](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4431) CE5: probability update (5.1.1) and range computation (5.2.1) tests [F. Bossen (Sharp)]

[JVET-L0461](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4565) CE5: Counter-based probability estimation and CABAC coding interval subdivision (CE5.1.3 and CE5.2.3) [P. Haase, J. Stegemann, H. Kirchhoffer, H. Schwarz, D. Marpe, T. Wiegand (HHI)] [late]

[JVET-L0462](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4566) CE5: State-based probability estimation (CE5.1.4, CE5.1.5) and coding interval subdivision (CE5.3.1) [H. Kirchhoffer, C. Bartnik, P. Haase, S. Matlage, Jan Stegemann, D. Marpe, H. Schwarz, T. Wiegand (HHI)] [late]

## CE6: Transforms and transform signalling (19)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0026](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4553) CE6: Summary Report on Transforms and Transform Signalling [A. Said, X. Zhao]

[JVET-L0058](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4139) CE6: NSST with modified NSST sets and signaling (Test 6.2.3) [K. Choi, M. Park, M. W. Park, K. P. Choi (Samsung)]

[JVET-L0118](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4199) CE6: Type4 MTS and index alignment (Test 6.1.7-b, 6.1.7-c) [K. Abe, T. Toma (Panasonic)]

[JVET-L0132](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4213) CE6-1.1 (c,d): Fast DST-7/DCT-8 based on DFT and 32 point MTS based on skipping high frequency coefficients [M. Koo, M. Salehifar, J. Lim, S. Kim (LGE)]

[JVET-L0133](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4214) CE6-2.1: Reduced Secondary Transform (RST) [M. Koo, M. Salehifar, J. Lim, S. Kim (LGE)]

[JVET-L0135](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4216) CE6: Further simplification of AMT with adjustment stages (Test CE6.1.6b) [P. Philippe (Orange), V. Lorcy (bcom)]

[JVET-L0261](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4356) CE6 – Set of Transforms (Tests 6.3.1) [M. Siekmann, C. Bartnik, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0262](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4357) CE6-1.7a: MTS simplification by reusing DCT-2 partial butterfly - Change MTS transform to DST-4/DCT-4 [K. Abe, T. Toma (Panasonic), M. Ikeda, T. Tsukuba (Sony), K. Naser, F. Le Leannec, E. François (Technicolor)]

[JVET-L0263](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4358) CE6-1.8: MTS with DCT-II [K. Naser, F. Le Leannec, E. François (Technicolor)]

[JVET-L0285](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4380) CE6: On 8-bit primary transform core (Test 6.1.3) [X. Zhao, X. Li, S. Liu (Tencent)]

[JVET-L0286](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4381) CE6: Fast DST-7/DCT-8 with dual implementation support (Test 6.1.4) [X. Zhao, X. Li, Y. Luo, S. Liu (Tencent)]

[JVET-L0287](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4382) CE6: Compound Orthonormal Transform (Test 6.1.7 f/g) [X. Zhao, X. Li, S. Liu (Tencent)]

[JVET-L0288](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4383) CE6: Coupled primary and secondary transform (Test 6.3.2) [X. Zhao, X. Li, S. Liu (Tencent)]

[JVET-L0292](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4387) CE6-1.1 (a,b): Selection of MTS Candidates [M. Salehifar, M. Koo, J. Lim, S. Kim (LGE)]

[JVET-L0358](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4455) CE6: Sub-block transform for inter blocks (CE6.1.2) [Y. Zhao, H. Yang, J. Chen (Huawei)] [late]

[JVET-L0386](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4483) CE6.1.6: Efficient Implementations of AMT with Transform Adjustment Filters (TAF) [A. Said, H. Egilmez, Y.-H. Chao, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0512](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4618) Crosscheck of JVET-L0386 (Approximation of 32x32 DCT-4 in DCT-2 implementation) [P. Philippe (Orange), V. Lorcy (bcom)] [late]

[JVET-L0387](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4484) CE6.3.3: Secondary Transforms Coupled with a Simplified Primary Transformation [H. Egilmez, A. Said, Y.-H. Chao, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0486](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4590) CE6: Add DST-2/DCT-2 and switch AMT candidate depending on intra direction (CE6-1.7d and CE6-1.7e) [T. Tsukuba, M. Ikeda, T. Suzuki (Sony), K. Naser, E. Francois (Technocolor)] [late]

## CE7: Quantization and coefficient coding (7)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0027](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4563) CE7: Summary report on quantization and coefficient coding [H. Schwarz, M. Coban, C. Auyeng]

[JVET-L0210](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4301) CE7: Adaptive quantization via perceptually optimized QP adaptation (Test 7.2.6) [C. Helmrich (HHI)]

[JVET-L0274](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4370) CE7: Transform coefficient coding with reduced number of regular-coded bins (tests 7.1.3a, 7.1.3b) [H. Schwarz, T. Nguyen, D. Marpe, T. Wiegand (Fraunhofer HHI), M. Karczewicz, M. Coban, J. Dong (Qualcomm)]

[JVET-L0360](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4457) CE7: Adaptive residual scaling (CE7.2.1, CE7.2.2, CE7.2.3) [Y. Zhao, H. Yang, J. Chen (Huawei)] [late]

[JVET-L0379](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4476) CE7: Block size dependent coefficient scanning (CE7.3) [Y. Kidani, K. Kawamura, S. Naito (KDDI)]

[JVET-L0384](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4481) CE7: Entropy Coding for Dependent Quantization (test 7.1.2) [J. Dong, M. Coban, M. Karczewicz (Qualcomm)]

[JVET-L0397](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4494) CE7: Complexity reduction of context model selection of transform coefficient levels [C. Auyeung, J. Chen (Huawei)]

## CE8: Current picture referencing (6)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0028](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4433) CE8: Summary Report on Current Picture Referencing [X. Xu, K. Müller, L. Wang]

[JVET-L0077](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4158) CE8: Intra Region-based Template Matching (Test 8.1) [G. Venugopal, K. Müller, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0290](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4385) CE8: CPR mode with dual-tree support (Test CE8.2) [X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0293](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4388) CE8: CPR mode with local search ranges (Test CE8.3.1 and CE8.3.2) [X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0295](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4390) CE8: CPR mode with non local search ranges (Test CE8.3.3, CE8.3.4, CE8.3.5 and CE8.3.6) [X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0508](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4614) Cross-check report of CE8.3.5 and CE8.3.6 [W.Zhu, A. Segall(Sharp)] [late] [miss]

## CE9: Decoder side motion vector derivation (15)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0029](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4340) CE9: Summary report on decoder side motion vector derivation [S. Esenlik, Y.-W. Chen, F. Chen]

[JVET-L0163](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4244) CE9: Report on the results of tests CE9.2.15 and CE9.2.16 [S. Esenlik, A.M. Kotra, B. Wang, H. Gao, J. Chen (Huawei), C. Chen, W. Chen, M. Karczewicz (Qualcomm), H. Liu, L. Zhang, K. Zhang (Bytedance), D. Luo, X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0173](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4264) CE9: Test 9.2.6 (combines CE9.2.15/9.2.16 with elements of 9.1.4 and 9.2.5) [S. Sethuraman (Ittiam)]

[JVET-L0177](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4268) CE9: DMVR Simplifications (Test 9.2.8) [X. Chen, J. Zheng (HiSilicon)]

[JVET-L0178](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4269) CE9: Refined MVs Partial Usage for Spatial (Test 9.1.5) [X. Chen, J. Zheng (HiSilicon)]

[JVET-L0188](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4279) CE9: Unidirectional Template based DMVR and its Combination with Simplified Bidirectional DMVR (Test 9.2.10 and Test 9.2.11) [F. Chen, L. Wang (Hikvision)] [late]

[JVET-L0196](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4287) CE9.2.7 Complexity reduction on decoder-side motion vector refinement (DMVR) [J. Luo, X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0215](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4306) CE9: Report on the results of tests CE9.1.1, CE9.2.1, CE9.2.2 and CE9.2.3 [S. Esenlik, A.M. Kotra, B. Wang, H. Gao, J. Chen (Huawei)]

[JVET-L0243](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4335) CE9.1.6: DMVR with Constrained Motion Vector Storage [C.-C. Chen, Y. Han, H. Huang, Y. Zhang, C.-H. Hung, W.-J. Chien, M. Karczewicz (Qualcomm)]

[JVET-L0244](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4336) CE9.2.13: MVD-based Early-skip Method and Switchable MC Filters for DMVR [C.-C. Chen, Y. Han, H. Huang, Y. Zhang, C.-H. Hung, W.-J. Chien, M. Karczewicz (Qualcomm)]

[JVET-L0253](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4348) CE9.1.2 Addressing the decoding latency issue for decoder-side motion vector refinement (DMVR) [J. Luo, X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0254](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4349) CE9.1.3 Addressing the decoding latency issue for decoder-side motion vector refinement (DMVR) [J. Luo, X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0267](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4362) CE9: Simplification of Decoder Side Motion Vector Derivation (Test 9.2.9) [H. Liu, L. Zhang, K. Zhang, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0311](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4406) CE9.1.7: Constrained decoder side motion vector derivation [M. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0312](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4407) CE9.2.14: Interpolation filters in DMVR [M. Xu, X. Li, S. Liu (Tencent)]

## CE10: Combined and multi-hypothesis prediction (16)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0030](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4245) CE10: Summary report on combined and multi-hypothesis prediction [C.-W. Hsu, M. Winken, X. Xiu]

[JVET-L0100](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4181) CE10.1.1: Multi-hypothesis prediction for improving AMVP mode, skip or merge mode, and intra mode [M.-S. Chiang, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0101](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4182) CE10.2.1: OBMC [Z.-Y. Lin, C.-C. Chen, T.-D. Chuang, C.-Y. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0124](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4205) CE10.3.1.b: Triangular prediction unit mode [R.-L. Liao, C. S. Lim (Panasonic)]

[JVET-L0463](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4567) Crosscheck of JVET-L0124: CE10.3.1.b Triangular prediction unit mode [M. Bläser (RWTH Aachen University)] [late]

[JVET-L0125](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4206) CE10: Diagonal motion partitions with uni-prediction constraint (Test 10.3.3) [Y. Ahn, D. Sim (Digital Insights)]

[JVET-L0126](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4207) CE10: Combined test of CE10.3.1.b and CE10.3.3.b (Test 10.3.4) [Y. Ahn, D. Sim (Digital Insights), R.-L. Liao, S. C. Lim (Panasonic)]

[JVET-L0148](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4229) CE10: Multi-hypothesis inter prediction (Tests 1.2.a - 1.2.c) [M. Winken, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0157](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4238) CE10: Uniform Directional Diffusion Filters For Video Coding [J. Rasch, A. Henkel, J. Pfaff, M. Schaefer, H. Schwarz, M. Siekmann, P. Helle, M. Winken, D. Marpe, T. Wiegand (HHI)]

[JVET-L0252](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4347) CE10.2.2: Overlapped block motion compensation (OBMC) early termination [X. Xiu, Y. He, Y. Yan (InterDigital)]

[JVET-L0255](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4350) CE10.2.3: A simplified design of overlapped block motion compensation based on the combination of CE10.2.1 and CE10.2.2 [Z.-Y. Lin, T.-D. Chuang, C.-Y. Chen, C.-C. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek), X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0269](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4364) CE10: Interweaved Prediction for Affine Motion Compensation (Test 10.5.1 and Test 10.5.2) [K. Zhang, L. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0479](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4583) Cross-check of JVET-L0269: CE10.5.1 and CE10.5.2 Interweaved Prediction for Affine Motion Compensation [Y. He (InterDigital)] [late] [miss]

[JVET-L0385](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4482) CE10.1.3: Multi-hypothesis prediction [M.-S. Chiang, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (Mediatek), M. Winken, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0417](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4515) CE10: Results on Geometric Partitioning (Experiments 3.2.a - 3.2.c) [M. Bläser, J. Sauer (RWTH Aachen University)]

[JVET-L0524](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4630) Cross-check report of CE10.1.3 [B. Choi (??)] [late] [miss]

## CE11: Deblocking (19)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0031](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4247) CE11: Summary report on deblocking [A. Norkin, A. M. Kotra]

[JVET-L0062](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4143) CE11: Test results of CE11.1.5 long-tap deblocking filter [W. Choi, K. Choi (Samsung)]

[JVET-L0072](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4153) CE11: Long deblocking filters for luma (CE11.1.1) and for both luma and chroma (CE11.1.9) [K. Andersson, Z. Zhang, R. Sjöberg (Ericsson)]

[JVET-L0073](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4154) CE11: Non-recursive deblocking of luma on 4x4 grid (CE11.3.1) [K. Andersson, Z. Zhang, R. Sjöberg (Ericsson)]

[JVET-L0074](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4155) CE11: Deblocking of sub-block boundaries for luma (CE11.3.2) [K. Andersson, Z. Zhang, R. Sjöberg (Ericsson)]

[JVET-L0102](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4183) CE11.1.3: Long deblocking filters [C.-M. Tsai, T.-D. Chuang, C.-W. Hsu, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0103](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4184) CE11.3.4: Parallel deblocking for 4 x N and N x 4 block boundaries [C.-M. Tsai, C.-W. Hsu, T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0140](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4221) CE11: Combination of CE11.1.6 and CE11.1.7 (CE11.1.10) [W. Zhu, K. Misra, P. Cowan, A. Segall (Sharp), M. Ikeda, T. Suzuki (Sony)]

[JVET-L0170](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4261) CE11.3.5 Parallel deblocking filter [H. Jang, J. Nam, S. Kim, J. Lim (LGE)]

[JVET-L0192](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4283) CE11: Higher precision modification for VVC deblocking filter (Test 2.1) [C. Gisquet, P. Onno, G. Laroche, J. Taquet (Canon)]

[JVET-L0224](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4315) CE11.1.8 Longer tap Luma deblocking filter [A.M. Kotra, B. Wang, S. Esenlik, H. Gao, Z. Zhao, J. Chen (Huawei)]

[JVET-L0225](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4316) CE11.3.3 Deblocking for 4 x N and N x 4 block boundaries [A.M. Kotra, S. Esenlik, B. Wang, H. Gao, Z. Zhao, J. Chen (Huawei)]

[JVET-L0327](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4423) CE11: Long-tap deblocking filter for luma and chroma (CE11.1.6) [M. Ikeda, T. Suzuki (Sony)]

[JVET-L0337](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4434) CE11.1.11: Combination of CE11.1.1 and CE11.1.7 [W. Zhu, K. Misra, P. Cowan, A. Segall (Sharp), K. Andersson, Z. Zhang, R. Sjöberg (Ericsson)]

[JVET-L0380](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4477) CE11: Extended Deblocking Filter (CE11.1.2) [K. Unno, K. Kawamura, S. Naito (KDDI)]

[JVET-L0398](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4495) Cross-check of CE11.1.11 [J. Zhao, S. Kim (LGE)] [late]

[JVET-L0403](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4500) CE11: Test on long deblocking filtering from JVET-J0021/K0334 (CE11.1.4) [D. Rusanovskyy, M.Karczewicz (Qualcomm)]

[JVET-L0405](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4503) CE11: Deblocking modifications for Large CUs both luma and chroma (Test 11.1.7a and CE11.1.7b) [W. Zhu, K. Misra, P. Cowan, A. Segall (Sharp)]

[JVET-L0414](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4512) CE11: Luma-adaptive deblocking filter (CE11.2.2) [A. Ichigaya, S. Iwamura, S. Nemoto (NHK)]

## CE12: Mapping functions (5)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0032](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4248) CE12: Summary report on mapping functions [E. François, D. Rusanovskyy, P. Yin]

[JVET-L0205](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4296) CE12: report of CE12-1 on out-of-loop dynamic range adaptation [E. François, C. Chevance, F. Hiron (Technicolor), D. Rusanovskyy, A.K. Ramasubramonian, M. Karczewicz (Qualcomm)]

[JVET-L0206](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4297) CE12: report of CE12-3 and CE12-5 on in-loop refinement [E. François, C. Chevance, F. Hiron (Technicolor)]

[JVET-L0245](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4337) CE12-2: HDR In-loop Reshaping [T. Lu, F. Pu, P. Yin, W. Husak, S. McCarthy, T. Chen (Dolby)]

[JVET-L0246](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4338) CE12-4: SDR In-loop Reshaping [F. Pu, T. Lu, P. Yin, W. Husak, S. McCarthy, T. Chen (Dolby)]

## CE13: Coding tools for 360° omnidirectional video (21)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0033](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4249) CE13: Summary report on coding tools for 360° omnidirectional video [P. Hanhart, J.-L. Lin, C. Pujara]

[JVET-L0075](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4156) CE13: Hybrid Cubemap with Pre-rotation (Test 6.2) [C. Pujara, A. Konda, A. Singh, R. Gadde, W. Choi, K. Choi, K.P. Choi(Samsung)]

[JVET-L0211](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4302) CE13: Results on CE13.3.2, CE13.4.3 and CE13.7.7 [J. Sauer, M. Bläser (RWTH Aachen University)

[JVET-L0228](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4319) CE13: HEC with 8 samples padding around face row (Test 1.1.a) [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0229](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4320) CE13: HEC with intra prediction disabled across face discontinuities (Test 2.1) [P. Hanhart, Y. He, Y. Ye (InterDigital), C.-H. Shih, J.-L. Lin, C.-C. Ju (MediaTek)]

[JVET-L0230](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4321) CE13: HEC with face row based geometry padding using projection with bilinear interpolation (Test 3.1.b) [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0231](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4322) CE13: PERP with horizontal geometry padding of reference pictures (Test 3.3) [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0232](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4323) CE13: HEC with deblocking and ALF disabled across face discontinuities (Test 4.1.c) [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0233](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4324) CE13: HEC with adaptive frame packing (Test 6.1) [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0234](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4325) CE13: Combined test 7.5 [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0235](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4326) CE13: Combined test 7.6 [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0236](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4327) CE13: Combined test 7.8.b [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0345](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4442) CE13: Intra prediction using spherical neighbors (Test 2.2) [C.-H. Shih, J.-L. Lin, H.-C. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0346](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4443) CE13: Face row based geometry padding of reference pictures (Test 3.1.a and Test 3.1.c) [C.-H. Shih, J.-L. Lin, H.-C. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0347](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4444) CE13: De-blocking filter disabled across face discontinuities (Test 4.1.a) [S.-Y. Lin, J.-L. Lin, H.-C. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0348](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4445) CE13: In-loop filters disabled across face discontinuities (Test 4.1.b and Test 4.1.d) [S.-Y. Lin, L. Liu, J.-L. Lin, H.-C. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0349](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4446) CE13: In-loop filters using spherical neighbors (Test 4.2) [S.-Y. Lin, L. Liu, J.-L. Lin, H.-C. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0350](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4447) CE13: Padding and in-loop filters disabled across face discontinuities (Test 7.1) [S.-Y. Lin, L. Liu, J.-L. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0351](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4448) CE13: Intra prediction and in-loop filters disabled across face discontinuities, and unfolding-based padding (Test 7.3 and 7.4) [C.-H. Shih, S.-Y. Lin, L. Liu, J.-L. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0352](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4449) CE13: Intra prediction and in-loop filters using spherical neighbors, and geometry padding (Test 7.8.a) [C.-H. Shih, S.-Y. Lin, L. Liu, J.-L. Lin, S.-K. Chang, Y.-C. Chang, C.-C. Ju (MediaTek)]

[JVET-L0422](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4521) CE13: In-loop filters disabled across face discontinuities and post-filtering of seam artifacts (Test 7.2.a) [X. Huangfu, Y. Sun, L. Yu (Zhejiang Univ.)] [late]

## CE14: Post-reconstruction filtering (4)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0034](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4250) CE14: Summary report on post-reconstruction filtering [L. Zhang, S. Ikonin]

[JVET-L0172](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4263) CE14: Reduced latency, LUT-free bilateral filter [J. Ström, P. Wennersten, J. Enhorn, D. Liu, K. Andersson, R. Sjöberg]

[JVET-L0326](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4422) CE14: Hadamard transform domain filter (Test 3) [S. Ikonin, V. Stepin, D. Kuryshev, J. Chen (Huawei)]

[JVET-L0406](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4504) CE14: Test on in-loop bilateral filter from JVET-J0021/JVET-K0384 with parametrization (CE14.2) [D. Rusanovskyy, N. Shlyakhov, M. Karczewicz (Qualcomm)]

## CE15: Palette mode (3)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0035](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4517) CE15: Summary report on palette mode [Y.-C. Sun, Y.-H. Chao, X. Xu]

[JVET-L0336](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4432) CE15-2: Palette mode of HEVC SCC [Y.-H. Chao, H. Wang, V. Seregin, M. Karczewicz (Qualcomm), Y.-C. Sun, J. An, J. Lou (Alibaba)]

[JVET-L0344](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4441) CE15-1: Palette mode [Y.-C. Sun, J. An, J. Lou (Alibaba), Y.-H. Chao, H. Wang, V. Seregin, M. Karczewicz (Qualcomm)]

# Non-CE Technology proposals

## CE1 related – Partitioning (26)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0050](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4131) CE1-related: Split Constraint Considering Picture Boundary Condition [M. W. Park, M. Park, K. Choi (Samsung)]

[JVET-L0452](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4554) Crosscheck of JVET-L0050 (CE1-related: Split Constraint Considering Picture Boundary Condition) [Y. Zhao (Huawei)] [late] [miss]

[JVET-L0051](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4132) CE1-related: Partitioning Clean-ups [M. Park, M. W. Park, K. Choi (Samsung)]

[JVET-L0485](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4589) Cross-check of JVET-L0051: CE1-related: Partitioning Clean-ups [J. Ma (HHI)] [late] [miss]

[JVET-L0063](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4144) CE1-related: Split Unit Coding Order [Y. Piao, J. Chen, A. Tamse, M. Park, K. Choi, K.P. Choi (Samsung)]

[JVET-L0585](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4696) Crosscheck of JVET-L0063 (CE1-related: Split Unit Coding Order) [Y. Zhao (Huawei)] [late] [miss]

[JVET-L0128](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4209) CE1-related: Transform tiling for pipelined processing of large CUs [C. Rosewarne, A. Dorrell (Canon)]

[JVET-L0576](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4686) Crosscheck of JVET-L0128 (CE1-related: Transform tiling for pipelined processing of large CUs) [C.-M. Tsai (MediaTek)] [late] [miss]

[JVET-L0129](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4210) CE1-related: Chroma block coding and size restriction [C. Rosewarne, A. Dorrell (Canon)]

[JVET-L0137](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4218) CE1-related: Minimum block size restriction [J. Choi, J. Heo, S. Yoo, L. Li, J. Choi, J. Lim, S. Kim (LGE)]

[JVET-L0482](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4586) Crosscheck of JVET-L0137 (CE1-related: Minimum block size restriction) [M. G. Sarwer (MediaTek)] [late] [miss]

[JVET-L0184](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4275) CE1-related: Flexible Luma and Chroma Block Partitioning Trees Separation [J. An, Y.-C. Sun, J. Lou (Alibaba)]

[JVET-L0578](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4688) Crosscheck of JVET-L0184 (CE1-related: Flexible luma and chroma block partitioning trees separation) [C.-M. Tsai (MediaTek)] [late] [miss]

[JVET-L0185](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4276) AHG11 & CE1-related: Luma 2xN and Nx2 Block Partitions Support [J. An, Y.-C. Sun, J. Lou (Alibaba)]

[JVET-L0217](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4308) Non-CE1: Relation Between QT/BT/TT Split Constraint Syntax Elements [H. Gao, S. Esenlik, J. Chen, B. Wang, A.M. Kotra (Huawei)]

[JVET-L0540](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4648) Cross-check of L0217: Non-CE1: Relation Between QT/BT/TT Split Constraint Syntax Elements [J. Ma (HHI)] [late] [miss]

[JVET-L0218](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4309) Non-CE1: Overriding QT/BT/TT Split Constraint Syntax Elements [H. Gao, S. Esenlik, J. Chen, B. Wang, A.M. Kotra (Huawei)]

[JVET-L0541](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4649) Cross-check of L0218: Non-CE1: Overriding QT/BT/TT Split Constraint Syntax Elements [J. Ma (HHI)] [late] [miss]

[JVET-L0313](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4408) CE1-related: Non-square virtual pipeline data unit [M. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0509](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4615) Cross-check of JVET-L0313: CE1-related: Non-square virtual pipeline data unit [J. Ma (HHI)] [late] [miss]

[JVET-L0361](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4458) CE1-related: Context modeling of CU split modes [Y. Zhao, H. Yang, J. Chen (Huawei)] [late]

[JVET-L0487](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4592) Cross check of CE1-related: Context modeling of CU split modes (JVET-L0361) [M. W. Park (Samsung)] [late]

[JVET-L0372](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4469) CE1-related: Constrained chroma block partitioning [Y. Zhao, H. Yang, J. Chen (Huawei)] [late]

[JVET-L0539](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4647) Cross-check of L0372: CE1-related: Constrained chroma block partitioning [J. Ma (HHI)] [late] [miss]

[JVET-L0548](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4657) CE1-related: On maximum/minimum allowed QT/BT/TT sizes for chroma [C.-M. Tsai, C.-W. Hsu, C.-Y. Chen, T.-D. Chuang, Y.-W. Huang, S.-M. Lei (MediaTek)] [late] [miss]

[JVET-L0551](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4660) CE1-related: fix on ternary split restriction [Y. Zhao, J. Chen (Huawei)] [late] [miss]

## CE2 related – Adaptive loop filter (4)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0083](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4164) CE2-related: Reduction of bits for ALF coefficient fractional part [Y.-C. Su, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0464](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4568) Crosscheck of JVET\_L0083 on CE2-related: Reduction of bits for ALF coefficient fractional part [G. Clare, F. Henry (Orange)] [late]

[JVET-L0392](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4489) CE2-related: Test results for corrected initial context states for ALF [N. Hu, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0409](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4507) Non-CE2: Filter Coefficients simplification for filtering complexity reduction in ALF [S. Sethuraman (Ittiam)] [late]

## CE3 related – Intra prediction and mode coding (36)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0053](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4134) CE3-related: Chroma DM modification [N. Choi, M. W. Park, K. Choi (Samsung)]

[JVET-L0498](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4604) Crosscheck for L0053 (CE3-related: Chroma DM modification) [?? (??)][late] [miss]

[JVET-L0065](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4146) CE3-related: One-line CCLM for reduction of reference sample lines [J. Lee, J. Byeon, S. Park, D. Sim (KWU)]

[JVET-L0066](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4147) CE3-related: One-line MMLM for reduction of reference sample lines [J. Lee, J. Byeon, S. Park, D. Sim (KWU)] [late] [miss]

[JVET-L0087](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4168) CE3-related: Boundary PDPC [M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0499](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4605) Crosscheck for JVET-L0087 (CE3-related: Boundary PDPC) [?? (??)] [late] [miss]

[JVET-L0107](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4188) Non-CE3: CCLM Performance Of Extended Neighboring Region [S. Wan (NPU), J.-Y. Huo, X.-Y. Chai, Y.-Z. Ma (Xidian Univ.), Y.-F. Yu, Y. Liu (OPPO)]

[JVET-L0108](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4189) Non-CE3: Enhanced-CCLM based on current reconstructed luma (E-CCLM) [J.-Y. Huo, X.-W. Li, J.-L. Wang, Y.-Z. Ma, F.-Z. Yang (Xidian Univ.), S. Wan (NPU), Y.-F. Yu, Y. Liu (OPPO)]

[JVET-L0109](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4190) Non-CE3: (LM only) + (E-CCLM) coding performance [J.-Y. Huo, J.-L. Wang, X.-Y. Chai, F.-Z. Yang (Xidian Univ.), S. Wan (NPU), Y.-F. Yu, Y. Liu (OPPO)]

[JVET-L0138](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4219) CE3-related: Reduced number of reference samples for CCLM parameter calculation [J. Choi, J. Heo, S. Yoo, L. Li, J. Choi, J. Lim, S. Kim (LGE)]

[JVET-L0568](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4678) Crosscheck of JVET-L0138 (CE3-related: Reduced number of reference samples for CCLM parameter calculation) [Y. Ahn, D. Sim (Digital Insights)] [late] [miss]

[JVET-L0139](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4220) CE3-related: Simplified MDMS [J. Choi, J. Heo, S. Yoo, L. Li, J. Choi, J. Lim (LGE)]

[JVET-L0152](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4233) CE3-related: Simplification of PDPC [J. Lee, H. Lee, S.-C. Lim, J. Kang, H. Y. Kim (ETRI)]

[JVET-L0154](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4235) CE3-related: MPM Modifications for Intra Mode Coding [Y. -U. Yoon, D. -H. Park, J. -G. Kim (KAU), J. Lee, J. Kang (ETRI)]

[JVET-L0457](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4559) Crosscheck of JVET-L0154 on CE3-related: MPM Modifications for Intra Mode Coding [T. Ikai (Sharp)] [late] [miss]

[JVET-L0155](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4236) CE3-related: Most Frequent Mode (MFM) for Intra Mode Coding [Y. -U. Yoon, D. -H. Park, J. -G. Kim (KAU), J. Lee, J. Kang (ETRI)]

[JVET-L0458](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4560) Crosscheck of JVET-L0155 on CE3-related: Most Frequent Mode (MFM) for Intra Mode Coding [T. Ikai (Sharp)] [late] [miss]

[JVET-L0164](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4255) CE3-related: Decoder-side Intra Mode Derivation [E. Mora, A. Nasrallah, M. Raulet (ATEME)]

[JVET-L0204](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4295) CE3-related: Disabling PDPC based on availability of reference samples [V. Drugeon (Panasonic)]

[JVET-L0239](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4330) CE3-related: Enabling different chroma sample location types in CCLM [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0272](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4368) CE3-related: Modified chroma derived mode [L. Zhang, K. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0557](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4667) Crosscheck of JVET-L0272 (CE3-related: Modified chroma derived mode) [N. Choi (Samsung)] [late] [miss]

[JVET-L0279](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4374) CE3-related: Unification of angular intra prediction for square and non-square blocks [L. Zhao, X. Zhao, S. Liu, X. Li (Tencent)]

[JVET-L0534](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4642) Crosscheck of L0279: CE3-related: Unification of angular intra prediction for square and non-square blocks [Y.-W. Chen, X. Wang (Kwai Inc.)] [late] [miss]

[JVET-L0280](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4375) CE3-related: Intra mode coding [L. Zhao, X. Zhao, X. Li, S. Liu (Tencent)]

[JVET-L0549](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4658) Crosscheck of JVET-L0280 (CE3-related: Intra mode coding) [M. G. Sarwer (MediaTek)] [late] [miss]

[JVET-L0291](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4386) CE3 Related: Extended reference sample construction for longer interpolation filter in intra prediction [S.Yoo, J. Heo, J. Choi, L. Li, J. Choi, J. Lim (LGE)]

[JVET-L0329](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4425) CE3-related: CCLM prediction with single-line neighbouring luma samples [K. Zhang, L. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0341](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4438) CE3-related: CCLM coefficients derivation method without down-sampling operation [X. Ma, H. Yang, J. Chen (Huawei)]

[JVET-L0342](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4439) CE3-related: Classification-based mean value for CCLM coefficients derivation [X. Ma, F. Mu, H. Yang, J. Chen (Huawei)]

[JVET-L0381](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4478) CE3-related: 4-tap interpolation filter selection with quantization parameter [Y. Kidani, K. Kawamura, K. Unno, S. Naito (KDDI)]

[JVET-L0520](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4626) Crosscheck for JVET-L0381 [Hendry (Huawei)] [late] [miss]

[JVET-L0561](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4671) Crosscheck of JVET-L0381 (CE3-related: 4-tap interpolation filter selection with quantization parameter) [S. Yoo, J. Lim (LGE)] [late] [miss]

[JVET-L0515](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4621) CE3-related: Non-zero reference lines padding method on the top-line of CTU [P.-H. Lin, C.-C. Kuo, C.-C. Lin, C.-L. Lin (ITRI)] [late]

[JVET-L0537](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4645) Cross-check of JVET-L0515: CE3-related: Non-zero reference lines padding method on the top-line of CTU [X. Ma (Huawei)] [late] [miss]

[JVET-L0564](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4674) CE3-related: Joint test of JVET-L0087 and JVET-L0152 for PDPC simplification [M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek), J. Lee, H. Lee, S.-C. Lim, J. Kang, H. Y. Kim (ETRI)] [late] [miss]

## CE4 related – Inter prediction and motion vector coding (91)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0046](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4127) CE4-related: On line buffer reduction for affine mode [M. Zhou (Broadcom)]

[JVET-L0418](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4516) Crosscheck of JVET-L0046 (CE4-related: On line buffer reduction for affine mode) [H. Chen (??)] [late] [miss]

[JVET-L0047](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4128) CE4-related: A clean up for affine mode [M. Zhou, B. Heng (Broadcom)]

[JVET-L0504](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4610) Cross-check of JVET-L0047: CE4-related: A clean up for affine mode [S. Bandyopadhyay (InterDigital)] [late] [miss]

[JVET-L0048](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4129) CE4-related: Combined tests of JVET-L0046 and JVET-L0047 [M. Zhou (Broadcom)]

[JVET-L0055](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4136) CE4-related: Redundant Removal for ATMVP [A. Tamse, M. W. Park, S. Jeong, K. Choi (Samsung)]

[JVET-L0456](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4558) Crosscheck of JVET-L0055 on CE4-related: Redundant Removal for ATMVP [T. Ikai (Sharp)] [late] [miss]

[JVET-L0068](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4149) CE4-related: Modified LIC [J. Lee, J. Byeon, S. Park, D. Sim (KWU), G. Bang, H. Kim (ETRI)] [late] [miss]

[JVET-L0091](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4172) CE4-related: Shared merge list [C.-C. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0582](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4693) Crosscheck of JVET-L0091 (CE4-related: shared merge list) [?? (Huawei)] [late] [miss]

[JVET-L0092](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4173) CE4-related: A simplification algorithm for ATMVP [C.-C. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0474](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4578) Cross Check report of JVET-L0092: CE4-related: A simplification algorithm for ATMVP [X. Xu (Tencent)] [late] [miss]

[JVET-L0093](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4174) CE4-related: Simplified pruning in merge mode [C.-C. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0555](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4664) Cross-check of JVET-L0093 (CE4-related: Simplified pruning in merge mode) [K. Abe, T. Toma (Panasonic)] [late] [miss]

[JVET-L0105](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4186) CE4-related: A second ATMVP candidate [Y.-W. Chen, X. Wang (Kwai Inc.)]

[JVET-L0516](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4622) Crosscheck of JVET-L0105 (CE4-related: A second ATMVP candidate) [N. Zhang (HiSilicon)] [late]

[JVET-L0106](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4187) CE4-related: Modified History-based MVP to support parallel processing [Y.-W. Chen, X. Wang (Kwai Inc.)]

[JVET-L0506](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4612) Crosscheck of JVET-L0106 (CE4-related: Modified History-based MVP to support parallel processing) [L. Zhang (Bytedance)] [late] [miss]

[JVET-L0119](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4200) CE4-related: Non-sub-block ATMVP [K. Abe, T. Toma (Panasonic)]

[JVET-L0454](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4556) Crosscheck of JVET-L0119 on CE4-related: Non-sub-block ATMVP [T. Zhou, T. Ikai (Sharp)] [late] [miss]

[JVET-L0120](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4201) CE4-related: Low pipeline latency LIC [K. Abe, T. Toma, J. Li (Panasonic)]

[JVET-L0144](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4225) CE4-related: Simplified average merge candidate [J. Lee, J. Nam, N. Park, H. Jang, J. Lim, S. Kim (LGE)]

[JVET-L0158](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4239) CE4-related: History-Based Motion Vector Prediction considering parallel processing [N. Park, H. Jang, J. Nam, J. Lee, J. Lim, S. Kim (LGE)]

[JVET-L0525](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4631) Crosscheck report of L0158 (CE4-related: History-Based Motion Vector Prediction considering parallel processing) [B. Choi (??)] [late] [miss]

[JVET-L0171](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4262) CE4-related: Merge mode with Regression based Motion Vector Field (RMVF) [R. Ghaznavi-Youvalari, A. Aminlou, J. Lainema (Nokia)]

[JVET-L0187](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4278) CE4-related: Combined P List for Merge Candidate List [L. Xu, F. Chen, L. Wang (Hikvision)] [late]

[JVET-L0543](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4651) Crosscheck for L0187 (CE4-related: Combined P List for Merge Candidate List) [S. H. Wang, S. S. Wang, S. Ma (Peking University)] [late] [miss]

[JVET-L0193](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4284) CE4-related: On Affine mode restriction [G. Laroche, J. Taquet, C. Gisquet, P. Onno (Canon)]

[JVET-L0505](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4611) Crosscheck of JVET-L0193 (CE4-related: On Affine mode restriction) [H. Lee, J. Lee, S.-C. Lim, J. Kang (ETRI)] [late] [miss]

[JVET-L0194](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4285) CE4-related: On Merge Index coding [G. Laroche, J. Taquet, C. Gisquet, P. Onno (Canon)]

[JVET-L0197](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4288) CE4-related: Generalized bi-prediction improvements [Y.-C. Su, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0513](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4619) Crosscheck of JVE-L0197: CE4-related: Generalized bi-prediction [R.-L. Liao, H. Sun (Panasonic)] [late] [miss]

[JVET-L0198](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4289) CE4-related: Simplification of ATMVP candidate derivation [S. H. Wang, S. S. Wang, S. Ma (Peking University), X. Zheng (DJI)]

[JVET-L0203](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4294) CE4-related: LIC with reduced memory buffer [P. Bordes, F. Le Léannec, F. Galpin, E. Francois (Technicolor)]

[JVET-L0503](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4609) Cross-check of JVET-L0203: CE4-related: LIC with reduced memory buffer [S. Bandyopadhyay (InterDigital)] [late] [miss]

[JVET-L0569](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4679) Crosscheck for L0203 (CE4-related: LIC with reduced memory buffer) [A. Tamse (Samsung)] [late] [miss]

[JVET-L0207](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4298) CE4 related: simplified non-sub-block STMVP [F. Le Léannec, T. Poirier, F. Galpin (Technicolor)]

[JVET-L0491](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4597) Crosscheck of JVET-L0207 (CE4 related: simplified non-sub-block STMVP) [L. Zhang (Bytedance)] [late] [miss]

[JVET-L0214](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4305) CE4-related: Motion predictor pruning [A. Robert, F. Le Léannec, F. Galpin, T. Poirier (Technicolor)]

[JVET-L0477](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4581) Crosscheck of JVET-L0214 (CE4-related: Motion predictor pruning) [H. Chen (Huawei)] [late] [miss]

[JVET-L0216](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4307) Non-CE4: Parallel Merge Estimation for VVC [S. Esenlik, H. Gao, B. Wang, A.M. Kotra, J. Chen (Huawei)]

[JVET-L0459](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4562) Crosscheck of JVET-L0216 on Non-CE4: Parallel Merge Estimation for VVC [T. Ikai (Sharp)] [late] [miss]

[JVET-L0257](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4352) CE4-related: Mismatch between text specification and reference software on clipping the positions of collocated blocks for alternative temporal motion vector prediction (ATMVP) [X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0259](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4354) CE4-related: Adaptive precision for affine MVD coding [Y. He, X. Xiu, Y. Ye (InterDigital)]

[JVET-L0502](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4608) Crosscheck of JVET-L0259 (CE4-related: Adaptive precision for affine MVD coding) [H. Liu (Bytedance)] [late] [miss]

[JVET-L0260](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4355) CE4-related: Affine motion estimation improvements [Y. He, X. Xiu, Y. Ye (InterDigital)]

[JVET-L0536](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4644) Crosscheck of JVET-L0260 (CE4-related: Affine motion estimation improvements) [H. Chen (Huawei)] [late] [miss]

[JVET-L0281](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4376) CE4-related: Size constrain for inherited affine motion prediction [H. Huang, W.-J. Chien, M. Karczewicz (Qualcomm)]

[JVET-L0475](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4579) Crosscheck of JVET-L0281 (CE4-related: Size constrain for inherited affine motion prediction) [H. Chen (Huawei)] [late] [miss]

[JVET-L0282](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4377) CE4-related: Merge List Simplification [S. Paluri, J. Zhao, S. Kim (LGE)]

[JVET-L0296](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4391) CE4-related: encoder speed up and bug fix for generalized bi-prediction in BMS-2.1 [Y. He, J. Luo, X. Xiu, Y. Ye (InterDigital)] [late]

[JVET-L0573](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4683) Crosscheck of JVET-L0296 (CE4-related: Encoder speed-up and bug fix for generalized bi-prediction in BMS-2.1) [Y.-C. Su (MediaTek)] [late] [miss]

[JVET-L0300](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4395) CE4-related: Generic Vector Coding of Motion Vector Difference [S. Paluri, M. Salehifar, S. Kim (LGE)]

[JVET-L0301](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4396) CE4-related: Updated results of BIMVP [B. Choi (Sharp)] [late]

[JVET-L0302](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4397) CE4-related: History based spatial-temporal MV prediction [X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0483](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4587) Crosscheck of JVET-L0302 (CE4-related: History based spatial-temporal MV prediction) [C.-C. Chen (MediaTek)] [late] [miss]

[JVET-L0305](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4400) CE4-related: History Based Affine Merge Candidate [J. Zhao, S. Paluri, S. Kim (LGE)]

[JVET-L0492](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4598) Crosscheck of JVET-L0305 (CE4-related: History Based Affine Merge Candidate) [L. Zhang (Bytedance)] [late] [miss]

[JVET-L0309](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4404) CE4-related: Simplification to HMVP [J. Zhao, S. Paluri, S. Kim (LGE)]

[JVET-L0493](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4599) Crosscheck of JVET-L0309 (CE4-related: Simplification to History Based Motion Vector Prediction) [L. Zhang (Bytedance)] [late] [miss]

[JVET-L0317](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4412) CE4-related: Sub-block MV clipping in affine prediction [M. Gao, X. Li, M. Xu, S. Liu (Tencent)]

[JVET-L0319](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4414) CE4-related: Sub-block MV clipping in planar motion vector prediction [M. Gao, X. Li, M. Xu, S. Liu (Tencent)]

[JVET-L0517](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4623) Crosscheck of JVET-L0319 (CE4-related: Sub-block MV clipping in planar motion vector prediction) [N. Zhang (HiSilicon)] [late]

[JVET-L0320](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4415) CE4-related: affine merge mode with prediction offsets [G. Li, X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0563](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4673) Crosscheck of JVET-L0320 (CE4-related: affine merge mode with prediction offsets) [T.-H. Li, Y.-C. Yang, Y.-J. Chang (Foxconn)] [late] [miss]

[JVET-L0322](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4417) CE4 related – constrained model-based affine merge [G. Li, X. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0497](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4603) Cross-check of JVET-L0322 (CE4 related: constrained model-based affine merge) [J. Zhao (LGE)] [late] [miss]

[JVET-L0330](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4426) CE4-related: Affine model inheritance from single-line motion vectors [K. Zhang, L. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0332](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4428) CE4-related: Adaptive Motion Vector Resolution for Affine Inter Mode [H. Liu, L. Zhang, K. Zhang, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0480](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4584) Cross-check of JVET-L0332: Adaptive Motion Vector Resolution for Affine Inter Mode [Y. He (InterDigital)] [late] [miss]

[JVET-L0355](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4452) Non-CE4: Enhanced ultimate motion vector expression [T. Hashimoto, E. Sasaki, T. Ikai (Sharp)]

[JVET-L0488](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4593) Cross check of Non-CE4: Enhanced ultimate motion vector expression (JVET-L0355) [M. W. Park (Samsung)] [late]

[JVET-L0371](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4468) CE4-related: Reducing worst case memory bandwidth in inter prediction [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0373](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4470) CE4-related: Unification for affine motion buffer [H. Chen, H. Yang, J. Chen (Huawei)]

[JVET-L0375](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4472) CE4-related: Inter prediction sample filtering [W. Xu, H. Yang, Y. Zhao, J. Chen (Huawei)]

[JVET-L0389](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4486) CE4-related: Control point MV offsets for Affine merge mode [Y.-C. Yang, Y.-J. Chang (Foxconn)]

[JVET-L0545](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4653) Crosscheck of JVET-L0389 [G. Li (Tencent)] [late] [miss]

[JVET-L0390](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4487) CE4-related: Simplification of Affine merge common codebase [Y.-J. Chang, Y.-C. Yang (Foxconn)] [late]

[JVET-L0484](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4588) Crosscheck of JVET-L0390 (CE4-related: Simplification of Affine merge common codebase) [C.-Y. Lai (MediaTek)] [late] [miss]

[JVET-L0396](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4493) CE4-related: Affine restrictions for the worst-case bandwidth reduction [L. Pham Van, W.-J. Chien, H. Huang, V. Seregin, M. Karczewicz (Qualcomm)]

[JVET-L0400](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4497) CE4-related: Simplification on Non-Adjacent Merge/Skip mode [Y. Han, W.-J. Chien, H. Huang, M. Karczewicz (Qualcomm)]

[JVET-L0401](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4498) CE4-related: Modification on History-based Mode Vector Prediction [W.-J. Chien, Y. Han, H. Huang, M. Karczewicz (Qualcomm)]

[JVET-L0408](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4506) CE4-related: Improvement on ultimate motion vector expression [J. Li, R.-L. Liao, C. S. Lim (Panasonic)] [late]

[JVET-L0411](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4509) CE4-related: Angular merge prediction [S. Iwamura, S. Nemoto, A. Ichigaya (NHK)]

[JVET-L0565](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4675) Crosscheck of JVET-L0411 (CE4-related: Angular merge prediction) [T.Chujoh (Sharp)] [late] [miss]

[JVET-L0425](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4524) CE4-related: History-based MVP without using the last lookup table entry [T. Solovyev, J. Chen, A. Karabutov, S. Ikonin (Huawei)]

[JVET-L0448](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4547) Constraint of pruning in history-based motion vector prediction [W. Xu, H. Yang, Y. Zhao, J. Chen (Huawei)] [late]

[JVET-L0468](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4572) CE4-related: Fixed sub-block size and restriction for ATMVP [H. Lee, J. Kang, S.-C. Lim, J. Lee, H. Y. Kim (ETRI)] [late]

[JVET-L0470](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4574) CE4-related: Hash-based pruning for merge list construction [T. Solovyev, J. Chen, S. Ikonin (Huawei)] [late]

[JVET-L0522](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4628) CE4-related: simplified constructed temporal affine merge candidates [F. Galpin, F. Leleannec, A. Robert (technicolor)] [late] [miss]

[JVET-L0575](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4685) CE4-related: CTU-level Initialization of History-based Motion Vector Prediction [W. Xu, H. Yang, Y. Zhao, J. Chen (Huawei)] [late]

## CE5 related – Arithmetic coding engine (5)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0426](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4525) CE5-related: Alternative implementation of CABAC range sub-interval derivation for test CE 5.1.4 [P. Haase, H. Kirchhoffer, S. Matlage, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0527](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4633) Crosscheck of L0426 (CE5-related: Alternative implementation of CABAC range sub-interval derivation for test CE 5.1.4) [J. Dong (Qualcomm)] [late] [miss]

[JVET-L0429](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4528) CE5-related: lookup table-free implementation of the probability update for tests CE5.1.4 and CE5.1.5 [S. Matlage, H. Kirchhoffer, P. Haase, H. Schwarz, D. Marpe, T. Wiegand (HHI)]

[JVET-L0528](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4634) Crosscheck of L0429 (CE5-related: lookup table-free implementation of the probability update for tests CE5.1.4 and CE5.1.5) [J. Dong (Qualcomm)] [late] [miss]

[JVET-L0552](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4661) Training initial CABAC states [F. Bossen (Sharp)] [late]

## CE6 related – Transforms and transform signalling (23)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0059](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4140) CE6-related: Simplification on MTS kernel derivation [K. Choi, K. P. Choi (Samsung)]

[JVET-L0494](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4600) Crosscheck of JVET-L0059: (CE6-related: Simplification on MTS kernel derivation) [X. Zhao (Tencent)] [late] [miss]

[JVET-L0060](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4141) CE6-related: Unified matrix for transform [K. Choi, K. P. Choi (Samsung)]

[JVET-L0495](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4601) Crosscheck of JVET-L0060: (CE6-related: Unified matrix for transform) [X. Zhao (Tencent)] [late] [miss]

[JVET-L0111](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4192) CE6-related: Transform Skip Condition on Transform Block size [Jeeyoon Park, Byeungwoo Jeon (SKKU)] [late]

[JVET-L0134](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4215) CE6-related: Shape adaptive transform selection [J. Lainema (Nokia)]

[JVET-L0149](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4230) CE6-related: Complexity reduction method based on skipping high frequency coefficients for inter MTS [M. Koo, M. Salehifar, J. Lim, S. Kim (LGE)]

[JVET-L0559](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4669) Cross-check of L0149 [K. Choi (Samsung)] [late]

[JVET-L0153](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4234) CE6-related: NSST modification for wide angle intra prediction [M. Koo, M. Salehifar, J. Lim, S. Kim (LGE)]

[JVET-L0190](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4281) CE6-related: Simplification of Intra 4-Point Multiple Transforms Selection [J. An, Y.-C. Sun, J. Lou (Alibaba)]

[JVET-L0195](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4286) CE6-related: MTS for non-square CUs [J. Jung, D. Kim, G. Ko, J. Son, J. Kwak (WILUS), Y. Lee (Humax)]

[JVET-L0579](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4689) Cross-check of JVET-L0195 (CE6-related: MTS for non-square CUs) [Bumshik Lee (Chosun Univ.)] [late]

[JVET-L0264](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4359) CE6-related: Removed MTS CU-Flag and Reduced MTS Pairs [K. Naser, F. Galpin, T. Poirier (Technicolor)]

[JVET-L0496](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4602) Crosscheck of JVET-L0264: (CE6-related: Removed MTS CU-Flag and Reduced MTS Pairs) [X. Zhao (Tencent)] [late] [miss]

[JVET-L0289](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4384) CE6-related: Unification of Transform Skip mode and MTS [X. Zhao, X. Li, S. Liu (Tencent)]

[JVET-L0304](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4399) CE6-Related: Multiplication Free Transform [M. Salehifar, M. Koo, S. Paluri, J. Lim, S. Kim (LGE)]

[JVET-L0331](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4427) CE6 related: On Index Signalling of Multiple Transform Selection [L. Zhang, K. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0353](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4450) CE6-related: MTS using DST-4 and transposed DCT-2 [Y. Lin, J. Zheng, Q. Yu, N. Zhang (HiSilicon), C. Zhu (UESTC)]

[JVET-L0560](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4670) Cross-check of JVET-L0353 (CE6-related: MTS using DST-4 and transposed DCT-2) [K. Abe, T. Toma (Panasonic)] [late] [miss]

[JVET-L0395](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4492) CE6-related: MTS with 4-point DST/DCT-4 and large block support [H. Egilmez, A. Gadde, V. Seregin, M. Karczewicz, A. Said (Qualcomm)]

[JVET-L0407](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4505) CE6-related: Transform skip for 2x2 chroma blocks and disable 2x2 chroma blocks in intra slices [L. Pham Van, W.-J. Chien, V. Seregin, T. Hsieh, M. Karczewicz (Qualcomm)]

[JVET-L0421](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4520) CE6-related: fast implementation of MTS transforms using matrix multiplication [K. Naser, G. Rath, E. François (Technicolor)] [late]

[JVET-L0489](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4594) CE6-related: Transform Simplification [C. Hollmann, P. Wennersten, J. Ström, R. Sjöberg (Ericsson)] [late]

## CE7 related – Quantization and coefficient coding (18)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0095](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4176) CE7-related: Modified dequantization scaling [S.-T. Hsiang, S.-M. Lei (MediaTek)]

[JVET-L0567](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4677) Crosscheck for L0095 (CE7-related: Modified dequantization scaling) [A. Tamse (Samsung)] [late] [miss]

[JVET-L0096](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4177) CE7-related: Context modeling of the position of last significant coefficient coding [M. G. Sarwer, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0501](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4607) Crosscheck for JVET-L0096 (CE7-related: Context modeling of the position of last significant coefficient coding) [?? (??)] [late] [miss]

[JVET-L0097](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4178) CE7-related: Context modeling using quantization index for dependent quantization [Z.-Y. Lin, T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0121](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4202) CE7-related: Support of quantization matrices [T. Toma, K. Abe (Panasonic)]

[JVET-L0500](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4606) Crosscheck of JVET-L0121 (CE7-related: Support of quantization matrices) [M. Ikeda (Sony)] [late] [miss]

[JVET-L0145](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4226) CE7-related: Constraints on context-coded bins for coefficient coding [T.-D. Chuang, S.-T. Hsiang, Z.-Y. Lin, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0146](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4227) CE7-related: Context variable reduction for coefficient coding [Z.-Y. Lin, T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0531](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4639) Crosscheck of L0146: CE7-related: Context variable reduction for coefficient coding [Y.-W. Chen, X. Wang (Kwai Inc.)] [late] [miss]

[JVET-L0276](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4371) CE7-related: Analysis of padding bytes for VTM-2 [H. Schwarz, T. Nguyen (Fraunhofer HHI)]

[JVET-L0316](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4411) CE7-related: Reduced context models for transform coefficients coding [M. Gao, X Li, S. Liu (Tencent)]

[JVET-L0577](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4687) Crosscheck of JVET-L0316 (CE7-related: Reduced context models for transform coefficients coding) [C.-M. Tsai (MediaTek)] [late] [miss]

[JVET-L0325](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4421) CE7-related: High throughput coefficient coding depending on the sub-block size [J. Choi, J. Heo, S. Yoo, J. Choi, J. Lim, S. Kim (LGE)]

[JVET-L0570](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4680) Cross check of CE7-related: High throughput coefficient coding depending on the sub-block size (JVET-L0325) [M. W. Park (Samsung)] [late] [miss]

[JVET-L0328](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4424) CE7-related: modified binarization for reduced bin-to-bit ratio [F. Bossen (Sharp)]

[JVET-L0402](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4499) CE7-related: Complexity reduction of significance map coding and bypass of greater than 4 flags [C. Auyeung, J. Chen (Huawei)]

[JVET-L0542](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4650) Cross check of JVET-L0402 (CE7-related: Complexity reduction of significance map coding and bypass of greater than 4 flags) [H. Schwarz (Fraunhofer HHI)] [late]

## CE8 related – Current picture referencing (7)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0041](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4122) Non-CE8: Rotate Intra Block Copy [Z. Zhang, V. Sze (MIT)]

[JVET-L0159](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4240) Non-CE8: Block vector predictor for IBC [J. Nam, J. Lim, S. Kim (LGE)]

[JVET-L0472](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4576) Cross Check report of JVET-L0159: Non-CE8: Block vector predictor for IBC [X. Xu (Tencent)] [late] [miss]

[JVET-L0297](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4392) CE8-related: CPR mode with local search range optimization [X. Xu, X. Li, S. Liu (Tencent), E. Chai (Ubilinx)]

[JVET-L0518](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4624) Cross check of JVET-L0297 (CE8-related: CPR mode with local search range optimization) [G. Venugopal (HHI)] [late] [miss]

[JVET-L0299](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4394) CE8-related: CPR mode with merge mode improvements [X. Xu, X. Li, M. Gao, J. Ye, S. Liu (Tencent)]

[JVET-L0404](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4501) CE8-related: Restrictions for the search area of the IBC blocks in CPR [L. Pham Van, V. Seregin, W.-J. Chien, T. Hsieh, M. Karczewicz (Qualcomm)]

## CE9 related – Decoder-side motion vector derivation (17)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0061](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4142) CE9-related: Bi-directional optical flow for VTM [K. Choi, M. W. Park, A. Tamse, K. P. Choi (Samsung)]

[JVET-L0098](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4179) CE9-related: Simplified DMVR with reduced internal memory [C.-C. Chen, C.-W. Hsu, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0099](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4180) CE9-related: BIO simplifications [C.-Y. Lai, Y.-C. Su, T.-D. Chuang, C.-Y. Chen, Y.-W. Huang, S.-M. Lei (MediaTek)]

[JVET-L0562](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4672) Crosscheck of JVET-L0099 (CE9-related: BIO simplifications) [T.-H. Li, Y.-C. Yang, Y.-J. Chang (Foxconn)] [late] [miss]

[JVET-L0123](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4204) CE9-related: Simplification of BIO [J. Li, C. S. Lim (Panasonic)]

[JVET-L0174](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4265) Non-CE9: Simplifications related to cost function in DMVR [S. Sethuraman (Ittiam)]

[JVET-L0532](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4640) Crosscheck of L0174: Non-CE9: Simplifications related to cost function in DMVR [Y.-W. Chen, X. Wang (Kwai Inc.)] [late] [miss]

[JVET-L0189](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4280) CE9-related: Improved Unidirectional Template based DMVR [F. Chen, L. Wang (Hikvision)] [late]

[JVET-L0544](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4652) Crosscheck for L0189 (CE9-related: Improved Unidirectional Template based DMVR) [S. H. Wang, S. S. Wang, S. Ma (Peking University)] [late] [miss]

[JVET-L0256](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4351) CE9-related: Complexity reduction and bit-width control for bi-directional optical flow (BIO) [X. Xiu, Y. He, Y. Ye (InterDigital)]

[JVET-L0314](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4409) CE9-related: Constrained intra prediction with decoder side motion vector derivation [M. Xu, X. Li, S. Liu (Tencent)]

[JVET-L0510](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4616) Cross-check of JVET-L0314: CE9-related: Constrained intra prediction with decoder side motion vector derivation [J. Ma (HHI)] [late] [miss]

[JVET-L0333](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4429) CE9-related: Motion Vector Refinement in Bi-directional Optical Flow [H. Liu, L. Zhang, K. Zhang, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0511](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4617) Cross-check result for JVET-L0333 [Y. Piao, K. Choi, K.P. Choi (Samsung)] [late]

[JVET-L0367](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4464) CE9-related: An early termination of DMVR [T. Chujoh, T. Ikai (Sharp)]

[JVET-L0538](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4646) Crossheck of L0367: CE9-related: An early termination of DMVR [S. Esenlik (Huawei)] [late] [miss]

[JVET-L0382](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4479) CE9-related: DMVR with Coarse-to-Fine Search and Block Size Limit [K. Unno, K. Kawamura, S. Naito (KDDI)]

## CE10 related – Combined and multi-hypothesis prediction (2)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0208](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4299) CE10 related: multiple prediction unit shapes [T. Poirier, F. Le Léannec, P. Bordes (Technicolor)]

[JVET-L0571](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4681) Crosscheck of JVET-L0208: CE10 related: multiple prediction unit shapes [R.-L. Liao, C. S. Lim (Panasonic)] [late] [miss]

## CE11 related – Deblocking (9)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0226](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4317) CE11- related: Position dependent adaptive Tc clipping range for deblocking filter [A.M. Kotra, S. Esenlik, B. Wang, H. Gao, Z. Zhao, J. Chen (Huawei)]

[JVET-L0393](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4490) CE11-related: Improvement of Extended Deblocking Filter [K. Unno, K. Kawamura, S. Naito (KDDI)]

[JVET-L0566](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4676) Crosscheck for JVET-L0393 (CE11-related: Improvement of Extended Deblocking Filter) [W. Choi, K. Choi (Samsung)] [late] [miss]

[JVET-L0410](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4508) CE11-related: On deblocking tC table [A. Norkin (Netflix)]

[JVET-L0460](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4564) CE11.1.11 related: Improvements to smoothness decision for long luma filters [K. Andersson, Z. Zhang, R. Sjöberg, W. Zhu (Ericsson), K. Misra, P. Cowan, A. Segall (Sharp Corporation)] [late]

[JVET-L0523](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4629) CE11-related: Very strong deblocking filtering with conditional activation signaling [C. Helmrich (HHI)] [late]

[JVET-L0529](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4635) CE11.1.10-related: Smoothness threshold modification for long tap deblocking [W. Zhu, K. Misra, A. Segall (Sharp), M. Ikeda, T. Suzuki (Sony)] [late]

[JVET-L0558](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4668) CE2/CE11-related: Deblocking TC offset for VTM [N. Hu, V. Seregin, M. Karczewicz (Qualcomm)] [late]

[JVET-L0572](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4682) CE11-related: CTU line buffer reduction for long filter deblocking [A.M. Kotra, S. Esenlik, B. Wang, J. Chen (Huawei), W. Zhu, K. Misra, P. Cowan, A. Segall (Sharp)] [late]

## CE12 related – Mapping functions (2)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0247](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4339) CE12-related: Universal low complexity reshaper for SDR and HDR video [T. Lu, S. McCarthy, F.n Pu, P. Yin, W. Husak, T. Chen (Dolby)]

[JVET-L0490](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4595) CE12-related: HDR Coding with Backward Compatibility Options [P. Topiwala, M. Krishnan, W. Dai (FastVDO)] [late] [miss]

## CE13 related – Coding tools for 360° omnidirectional video (4)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0166](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4257) CE13-related: Subjective Quality Improvement for RSP [A. Singh (Samsung)] [late] [miss]

[JVET-L0212](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4303) CE13-related: Results for experiments as CE13.3.2, CE13.4.3 and CE13.7.7 with PHEC and impact of rotation on the coding performance of PHEC [J. Sauer, M. Bläser (RWTH Aachen University)]

[JVET-L0237](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4328) CE13-related: Adaptive frame packing using chroma sample location type 1 [P. Hanhart, Y. He, Y. Ye (InterDigital)]

[JVET-L0423](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4522) CE13-related: HEC with in-loop filters using spherical neighbors [Xuchang Huangfu, Yule Sun, Lu Yu (Zhejiang Univ.) [late]

## CE14 related – Post-reconstruction filtering (5)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0357](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4454) CE14 related: Adaptive colour space clipping filter [T. Chujoh, T. Ikai (Sharp)]

[JVET-L0583](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4694) Crosscheck of JVET-L0357 (CE14 related: Adaptive colour space clipping filter) [?? (Huawei)] [late] [miss]

[JVET-L0465](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4569) Cross-check of JVET\_L0357 - CE14 related: Adaptive colour space clipping filter [P. Bordes (Technicolor)] [late] [miss]

[JVET-L0049](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4130) AHG16: An architecture study of bilateral filters [Y. Hu, M. Zhou (Broadcom)]

[JVET-L0584](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4695) CE14.2-related: Extended applicability of bilateral filter (CE14.2.c) [D. Rusanovskyy, N. Shlyakhov, M. Karczewicz (Qualcomm)] [late] [miss]

## CE15 related – Palette mode (9)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0213](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4304) CE15-related: Combination of palette mode and intra prediction [Y.-C. Sun, J. An, J. Lou (Alibaba)]

[JVET-L0574](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4684) Crosscheck of JVET-L0213 (CE15-related: Combination of palette mode and intra prediction) [C.-M. Tsai (MediaTek)] [late] [miss]

[JVET-L0307](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4402) CE15-related: Palette index map scan order constraints [J. Ye, X. Li, S. Liu, X. Xu (Tencent)]

[JVET-L0556](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4666) Crosscheck of JVET-L0307 on CE15-related: Palette index map scan order constraints [J. Nam (LGE)] [late] [miss]

[JVET-L0308](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4403) CE15-related: Palette mode when dual-tree is enabled [J. Ye, X. Li, S. Liu, X. Xu (Tencent)]

[JVET-L0526](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4632) Crosscheck report of L0308 (CE15-related: Palette mode when dual-tree is enabled) [B. Choi (??)] [late] [miss]

[JVET-L0427](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4526) CE15-related: Separate Palette Coding for Luma and Chroma components [R. Chernyak, S. Ikonin, J. Chen (Huawei)]

[JVET-L0451](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4551) CE15-related: Palette predictor list enhancement [J. Ye, X. Li, X. Xu, S. Liu (Tencent)] [late]

[JVET-L0550](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4659) Crosscheck of JVET-L0451 (CE15-related: Palette predictor list enhancement) [Y.-C. Sun (Alibaba)] [late] [miss]

## NN technology related (3)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0242](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4334) AHG9: Dense Residual Convolutional Neural Network based In-Loop Filter [Y. Wang, Z. Chen, Y. Li (Wuhan Univ.), L. Zhao, S. Liu, X. Li (Tencent)]

[JVET-L0546](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4655) Crosscheck of JVET-L0242: AHG9: Dense Residual Convolutional Neural Network based In-Loop Filter [X. Song, L. Wang (Hikvision)] [late] [miss]

[JVET-L0383](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4480) AHG9: Convolution Neural Network Filter [K. Kawamura, Y. Kidani, S. Naito (KDDI)]

## Screen content tools (2)

[JVET-L0078](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4159) AHG11: Block DPCM for Screen Content Coding [M. Abdoli, G. Clare, F. Henry, P. Philippe (Orange)]

[JVET-L0481](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4585) Crosscheck of JVET-L0078 (AHG11: Block DPCM for Screen Content Coding) [C.-Y. Chen (MediaTek)] [late] [miss]

## High-level syntax (27)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

### General high-level syntax (1)

[JVET-L0110](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4191) On VVC HLS architecture and bitstream structure [S. Wenger (Tencent), Y.-K. Wang (Huawei), M. M. Hannuksela (Nokia), R. Sjöberg (Ericsson), S. Deshpande (Sharp)]

### Interoperability and capability points definition and signalling (4)

[JVET-L0042](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4123) Example restriction flags for VVC [J. Samuelsson (Divideon)]

[JVET-L0043](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4124) AHG15: Hierarchical decoding property indications [M. M. Hannuksela (Nokia)]

[JVET-L0044](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4125) AHG15: Proposed interoperability point syntax [J. Boyce, Z. Deng, S. Wong, L. Xu (Intel)]

[JVET-L0270](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4365) Suggested restriction flag criteria [J. Samuelsson (Divideon)]

### Picture partitioning − slicing and tiling (11)

[JVET-L0114](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4195) On slicing and tiling in VVC [Y.-K. Wang, Hendry, J. Chen, M. Sychev (Huawei), M. M. Hannuksela (Nokia)]

[JVET-L0127](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4208) On VVC tile design [Yong He, Yan Ye, Ahmed Hamza (InterDigital)]

[JVET-L0182](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4273) Design goals for tiles [M. M. Hannuksela, A. Zare, M. Homayouni, R. Ghaznavi-Youvalari, A. Aminlou (Nokia)]

[JVET-L0183](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4274) Header parameter set (HPS) [M. M. Hannuksela, K. Kammachi-Sreedhar (Nokia)]

[JVET-L0202](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4293) HLS for spatial relation between independent VVC sub bitstreams [E. Thomas, A. Gabriel (TNO)]

[JVET-L0227](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4318) AHG 12: Sub-bitstream extraction/merging friendly slice address signalling [R. Skupin, Y. Sanchez, K. Sühring, T. Schierl, T. Wiegand (HHI)]

[JVET-L0306](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4401) On slices and tiles [M. M. Hannuksela (Nokia)]

[JVET-L0359](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4456) AHG12: Flexible tile partitioning [Y. Yasugi, T. Ikai (Sharp)]

[JVET-L0374](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4471) On Tile Information Signaling for VVC [S. Deshpande, Y. Yasugi (Sharp)]

[JVET-L0394](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4491) On Conflicting Use of Tiles [Stephan Wenger (??)]

[JVET-L0415](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4513) Tile groups for VVC [R.Sjöberg, M. Damghanian, M. Pettersson (Ericsson)]

### Reference picture management (6)

[JVET-L0112](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4193) On reference picture management for VVC [Y.-K. Wang, Hendry (Huawei)]

[JVET-L0113](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4194) On final reference picture lists in the CTC random access simulation [Hendry, Y.-K. Wang, J. Chen (Huawei)]

[JVET-L0249](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4342) Picture order count for VVC [R. Sjöberg, M. Damghanian, M. Pettersson (Ericsson)]

[JVET-L0416](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4514) Simplified RPS for VVC [R.Sjöberg, M. Damghanian, M. Pettersson (Ericsson)]

[JVET-L0449](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4549) On Picture Order Count Signaling for VVC [S. Deshpande, B. Choi (Sharp)] [late]

[JVET-L0450](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4550) On Reference Pictures Signaling and Management for VVC [S. Deshpande (Sharp)] [late]

### Intra refresh (3)

[JVET-L0079](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4160) AHG14: Study of methods for progressive intra refresh [K. Kazui (Fujitsu)]

[JVET-L0160](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4241) AHG14: Intra Refresh Anchor Proposal [J.-M. Thiesse, D. Nicholson, D. Gommelet] [late]

[JVET-L0161](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4242) AHG14: Normative Intra Refresh Proposal [J.-M. Thiesse, D. Nicholson, D. Gommelet] [late] [miss]

### Misc. HLS topics (2)

[JVET-L0064](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4145) Simplified NAL Unit Header and IRAP pictures [G. Ryu, W. Choi, M. W. Park, K. Choi, Y. Park, K. P. Choi (Samsung)]

[JVET-L0248](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4341) TemporalId restrictions [R. Sjöberg, M. Damghanian, M. Pettersson (Ericsson)]

## Other (14)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0168](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4259) Motion vector representing bit reduction [H. Jang, J. Nam, S. Kim, J. Lim (LGE)]

[JVET-L0473](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4577) Cross Check report of JVET-L0168: Motion vector representing bit reduction [X. Xu (Tencent)] [late] [miss]

[JVET-L0209](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4300) PCM mode with dual tree partition [Y.-C. Sun, J. An, J. Lou (Alibaba)]

[JVET-L0533](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4641) Crosscheck of L0209: PCM mode with dual tree partition [[Y.-W. Chen](mailto:yiwenchen@kwai.com), X. Wang (Kwai Inc.)] [late] [miss]

[JVET-L0334](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4430) AHG 16: Transform-free coding for 2×N or N×2 chroma blocks [K. Zhang, L. Zhang, H. Liu, Y. Wang, P. Zhao, D. Hong (Bytedance)]

[JVET-L0535](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4643) Crosscheck of L0334: AHG 16: Transform-free coding for 2×N or N×2 chroma blocks [Y.-W. Chen, X. Wang (Kwai Inc.)] [late] [miss]

[JVET-L0362](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4459) Quantization parameter signaling [Y. Zhao, H. Yang, J. Chen (Huawei)]

[JVET-L0377](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4474) Rounding Align of Adaptive Motion Vector Resolution [Y. Zhang, C.-C. Chen, H. Huang, Y. Han, W.-J. Chien, M. Karczewicz (Qualcomm)]

[JVET-L0476](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4580) Crosscheck of JVET-L0377 (Rounding Align of Adaptive Motion Vector Resolution) [H. Chen (Huawei)] [late] [miss]

[JVET-L0428](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4527) Delta QP and Chroma QP Offset for Separate Tree [R. Chernyak, A. Karabutov, S. Ikonin, T. Solovyev, J. Chen (Huawei)]

[JVET-L0453](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4555) Bugfix for restrictions of bi-prediction for small CUs [Y. Ahn, D. Sim (Digital Insights)] [late]

[JVET-L0469](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4573) Cross-check of JVET-L0453 (Bugfix for restrictions of bi-prediction for small CUs) [S.-C. Lim, J. Kang, H. Lee, J. Lee (ETRI)] [late]

[JVET-L0467](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4571) Multi-component video coding: an extension for truly versatile video/image compression [A.M. Tourapis, Y. Su, K. Mammou, J. Kim, D. Singer, F. Robinet (Apple)] [late]

[JVET-L0553](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4662) Fix of Initial QP Signaling [X. Li, X. Xu, S. Liu (Tencent), Y. Li, Z. Liu, Z. Chen (Wuhan Univ.)] [late]

# Complexity analysis and reduction (4)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0104](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4185) AHG5: Reducing VVC worst-case memory bandwidth by restricting bi-directional 4x4 inter CUs/Sub-blocks [Y.-W. Chen, X. Wang (Kwai Inc.)]

[JVET-L0455](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4557) Crosscheck of JVET-L0104 on AHG5: Reducing VVC worst-case memory bandwidth by restricting bi-directional 4x4 inter CUs/Sub-blocks [T. Zhou, T. Ikai (Sharp)] [late] [miss]

[JVET-L0122](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4203) AHG5: Reduction of worst case memory bandwidth [J. Li, R.-L. Liao, C. S. Lim (Panasonic)]

[JVET-L0466](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4570) Crosscheck of JVET-L0122 (AHG5: Reduction of worst case memory bandwidth) [M. Winken (HHI)] [late]

# Encoder optimization (2)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0181](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4272) AHG10: Corrected operation of ALF encoding with perceptually optimized QP adaptation [C. Helmrich, B. Bross, J. Erfurt (HHI)]

[JVET-L0241](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4333) AHG10: Adaptive lambda ratio estimation for rate control in VVC [Z. Liu, Y. Li, Z. Chen (Wuhan Univ.), X. Li, S. Liu (Tencent)]

# Metrics and evaluation criteria (2)

Contributions in this category were discussed XXday XX Oct XXXX–XXXX (chaired by XXX).

[JVET-L0167](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4258) AHG7: Subjective Quality Evaluation of VVC HDR sequences on UHD TV [A. DSouza (Samsung)]

[JVET-L0365](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4462) MS-SSIM as an additional metric [Y. Zhao, H. Yang, J. Chen (Huawei), M . Pettersson, R. Sjöberg, P. Wennersten (Ericsson)]

# Withdrawn (23)

JVET-L0067 Withdrawn

JVET-L0069 Withdrawn

JVET-L0200 Withdrawn

JVET-L0294 Withdrawn

JVET-L0303 Withdrawn

JVET-L0356 Withdrawn

JVET-L0432 Withdrawn

JVET-L0433 Withdrawn

JVET-L0434 Withdrawn

JVET-L0435 Withdrawn

JVET-L0436 Withdrawn

JVET-L0437 Withdrawn

JVET-L0438 Withdrawn

JVET-L0439 Withdrawn

JVET-L0440 Withdrawn

JVET-L0441 Withdrawn

JVET-L0442 Withdrawn

JVET-L0432 Withdrawn

JVET-L0443 Withdrawn

JVET-L0444 Withdrawn

JVET-L0445 Withdrawn

JVET-L0446 Withdrawn

JVET-L0447 Withdrawn

# Plenary meetings, joint Meetings, BoG Reports, and Summary of Actions Taken

## Plenary meeting XXday XX Oct XXXX

## …

## Closing plenary sessions

## Joint meetings

## BoGs (XX)

## List of actions taken affecting Draft 2 of VVC, VTM 2, BTM and 360Lib

The following is a summary, in the form of a brief list, of the actions taken at the meeting that affect the text of the VVC draft text, VTM or 360Lib description. Both technical and editorial issues are included. This list is provided only as a summary – details of specific actions are noted elsewhere in this report and the list provided here may not be complete and correct. The listing of a document number only indicates that the document is related, not that it was adopted in whole or in part.

### Encoder only or CTC/software changes

JVET-L0XXX: …

As a general rule, sophisticated speedups such as dedicated SIMD optimization need final approval, to be made at the discretion of software coordinators

### Syntax/semantics/decoding process changes VTM/WD

JVET-L0XXX: …

### BMS

All modifications from VTM

JVET-L0XXX: …

### Changes in 360Lib

JVET-L0XXX: …

This does not have normative status – to be used as reference in CE13 as a best-known solution that would not affect the decoding loop.

# Project planning

## Core experiment planning (update)

The following CEs were initially planned (Wed 18th 1630) It was emphasized that this was an initial list, and it was still to be decided after a presentation of an initial CE description if the respective CE will be finally established:

1. Partitioning (J. Ma (primary), M. W. Park, [Thu: Add per document])
2. In-loop filters (L. Zhang, K. Andersson, [Thu: added Y. Tung])
3. Intra prediction and mode coding (G. Auwera, J. Heo)
4. Inter prediction and MV coding (H. Yang, S. Liu)
5. Arithmetic coding engine (T. Nguyen, A. Said)
6. Transforms and transform signalling (A. Said, X. Zhao)
7. Quantization and coefficient coding (M. Coban, H. Schwarz)
8. Current picture referencing (X. Xu, K. Müller)
9. Decoder side MV derivation (S. Esenlik, Y.W. Chen)
10. Combined and multi-hypothesis prediction (C.W. Hsu, M. Winken)
11. Composite reference pictures (X. Zheng)

CE draft developers shall present initial versions of CE proposals Thu. afternoon, containing

* list of sub-experiments, origin of the technology to be investigated (e.g., CfP response document number), expected results, method of investigation
* Participating parties and cross-checkers
* Expected interdependency with other CEs

Interested parties were asked to get in contact with CE draft developers as listed above.

Initial descriptions of CEs 1 and 2 were orally reviewed Thursday 19 April 1600–1630.

For CE1: transform coefficient coding should be used from test (or with minor alignments when necessary by the partitioning); estimated number of configurations that will be tested to be reported on Friday. JVET-J1021

For CE2: It was noted that deblocking in the BMS is already parallelizable. It was suggested to include HDR test sequences in deblocking tests.

Regarding the general rule applying to CE plans established at this meeting, it was confirmed on Friday 20 April (1200, GJS and JRO) that each CE is planned based on technology provided in responses to the CfP, there may be subtests within each CE that are based on other contributions (or hypothetical combinations, etc.), provided there is agreement to include such testing.

It was discussed on 1230 Friday 20 whether the adaptive-resolution CNN technology should be in the intra prediction CE. This seemed to be different from mere intra prediction, as the resolution reduction is also applied to the residual in that scheme. It seemed too late in the meeting to try to define another CE. It was commented that the proposed technology is certainly interesting and should be studied in the AHG 9.

It was furthermore agreed in the Friday plenary that each CE should have a maximum of 3 coordinators. The role of CE coordinators is again clarified. It is not necessary that each sub-CE has an own coordinator. People in sub-CEs should communicate with each other about how to compare if each other and agree on a compiled version of their part before sending it to the overall coordinator.

## JEM description drafting and software

The following agreement has been established: the editorial team has the discretion to not integrate recorded adoptions for which the available text is grossly inadequate (and cannot be fixed with a reasonable degree of effort), if such a situation hypothetically arises. In such an event, the text would record the intent expressed by the committee without including a full integration of the available inadequate text.

## Plans for improved efficiency and contribution consideration

The group considered it important to have the full design of proposals documented to enable proper study.

Adoptions need to be based on properly drafted working draft text (on normative elements) and HM encoder algorithm descriptions – relative to the existing drafts. Proposal contributions should also provide a software implementation (or at least such software should be made available for study and testing by other participants at the meeting, and software must be made available to cross-checkers in EEs).

Suggestions for future meetings included the following generally-supported principles:

* No review of normative contributions without draft specification text
* JEM text is strongly encouraged for non-normative contributions
* Early upload deadline to enable substantial study prior to the meeting
* Using a clock timer to ensure efficient proposal presentations (5 min) and discussions

The document upload deadline for the next meeting was planned to be Thursday 11 Jan. 2018.

As general guidance, it was suggested to avoid usage of company names in document titles, software modules etc., and not to describe a technology by using a company name.

## General issues for experiments

Move to appropriate place in notes: It was agreed that proponents should not publish specific claims or precise measurements about the subjective performance of their proposal in the CfP test.

This section was reviewed Thursday 19 April afternoon.

Group coordinated experiments have been planned as follows:

* “Core experiments” (CEs) are the coordinated experiments on coding tools which are deemed to be interesting but require more investigation and could potentially become part of the main branch of JEM by the next meeting.
* A description of each experiment is to be approved at the meeting at which the experiment plan is established. This should include the issues that were raised by other experts when the tool was presented, e.g., interference with other tools, contribution of different elements that are part of a package, etc. The experiment description document should provide the names of individual people, not just company names.
* Software for tools investigated in a CE will be provided in one or more separate branches of the software repository. The software coordinator will coordinate the creation of these branches. All JVET members can obtain read access to the CE software branches. The access method will be announced on the JVET reflector within two weeks after the meeting.
* During the experiment, further improvements of the planned experiment can be made
* By the next meeting it is expected that at least one independent cross-checker will report a detailed analysis of each proposed feature that has been tested and confirm that the implementation is correct. Commentary on the potential benefits and disadvantages of the proposed technology in cross-checking reports is highly encouraged. Having multiple cross-checking reports is also highly encouraged (especially if the cross-checking involves more than confirmation of correct test results). The reports of cross-checking activities may (and generally should) be integrated into the CE report rather than submitted as separate documents.

It is possible to define sub-experiments within particular CEs, for example designated as CEX.a, CEX.b, etc., where X is the basic CE number.

As a general rule, it was agreed that each CE should be run under the same testing conditions using one software codebase, which should be based on the group test model software codebase. An experiment is not to be established as a CE unless there is access given to the participants in (any part of) the CE to the software used to perform the experiments.

The general agreed common conditions for single-layer coding efficiency experiments are described in the output document JVET-J1010.

Experiment descriptions should be written in a way such that it is understood as a JVET output document (written from an objective “third party perspective”, not a company proponent perspective – e.g. referring to methods as “improved”, “optimized” etc.). The experiment descriptions should generally not express opinions or suggest conclusions – rather, they should just describe what technology will be tested, how it will be tested, who will participate, etc. Responsibilities for contributions to CE work should identify individuals in addition to company names.

CE descriptions contain a basic description of the technology under test, but should not contain excessively verbose descriptions of a technology (at least not unless the technology is not adequately documented elsewhere). Instead, the CE descriptions should refer to the relevant proposal contributions for any necessary further detail. However, the complete detail of what technology will be tested must be available – either in the CE description itself or in referenced documents that are also available in the JVET document archive.

Any technology must have at least one cross-check partner to establish an CE – a single proponent is not enough. It is highly desirable have more than just one proponent and one cross-checker.

Some agreements relating to CE activities were established as follows:

* Only qualified JVET members can participate in an CE.
* Participation in an CE is possible without a commitment of submitting an input document to the next meeting. Participation is requested by contacting the CE coordinator.
* All software, results, and documents produced in the CE should be announced and made available to JVET in a timely manner.
* All substantial communications about a CE, other than logistics arrangements, exchange of data, minor refinement of the test plans, and preparation of documents shall be conducted on the main JVET reflector. In the case that large amounts of data are to be distributed is recommended to send an announcement to the JVET reflector without attaching the materials, and send the materials to those who have requested it directly, or provide a link to it, or upload the data as an input contribution to the next meeting.

General timeline

T1= 3 weeks after the JVET meeting: To revise EE description and refine questions to be answered. Questions should be discussed and agreed on JVET reflector.

T2 = Test model SW release + 2 weeks: Integration of all tools into separate EE branch of JEM is completed and announced to JVET reflector.

Initial study by cross-checkers can begin.

Proponents may continue to modify the software in this branch until T3

3rd parties encouraged to study and make contributions to the next meeting with proposed changes

T3: 3 weeks before the next JVET meeting: Any changes to the exploration branches software must be frozen, so the cross-checkers can know exactly what they are cross-checking. A software version tag should be created at this time and announced on the JVET reflector. The name of the cross-checkers and list of specific tests for each tool under study in the EE will be announced in JVET reflector by this time. Full test results must be provided at this time (at least for proposals targeting to be promoted to JEM at the next meeting).

New branches may be created which combine two or more tools included in the EE document or the JEM. Requests for new branches should be made to the software coordinators.

Don’t need to formally name cross-checkers in the EE document. To adopt a proposed feature at the next meeting, we would like see comprehensive cross-checking done, with analysis that the description matches the software, and recommendation of value of the tool given tradeoffs.

The establishment of a CE does not indicate that a proposed technology is mature for adoption or that the testing conducted in the CE is fully adequate for assessing the merits of the technology, and a favorable outcome of CE does not indicate a need for adoption of the technology.

## Software development and anchor generation (update)

The planned timeline for software releases was established as follows:

* VTM2.0 will be released by 2018-08-15. This version will include all adoptions necessary for CTC. By the same time, also an implementation of BMS2.0 configuration (with only VTM adoptions) will be provided in a separate branch. BMS2.1 with BMS-only adoption will be released by 2018-08-31. VTM2.1 with non-CTC adoptions will be released later.
* Further versions of VTM may be released for additional bug fixing, as appropriate.

Timeline of 360lib7.0: 1 week after the release of VTM1.0 (2018-08-22). Further versions may be released as appropriate for bug fixing.

# Establishment of ad hoc groups

The ad hoc groups established to progress work on particular subject areas until the next meeting are described in the table below. The discussion list for all of these ad hoc groups was agreed to be the main JVET reflector ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de)).

|  |  |  |
| --- | --- | --- |
| **Title and Email Reflector** | **Chairs** | **Mtg** |
| **Project Management (AHG1)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Coordinate overall JVET interim efforts. * Supervise CE and AHG studies. * Report on project status to JVET reflector. * Provide a report to next meeting on project coordination status. | J.-R. Ohm, G. Sullivan | N |
| **Draft text and test model algorithm description editing (AHG2)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Produce and finalize JVET-K1001 VVC text specification Working Draft 2. * Produce and finalize JVET-K1002 VVC Test Model 2 (VTM 2) Algorithm and Encoder Description. * Gather and address comments for refinement of these documents. * Coordinate with Test model software development AhG to address issues relating to mismatches between software and text. | B. Bross, J. Chen (co-chairs), J. Boyce, S. Kim, S. Liu, Y. Ye (vice-chairs) | N |
| **Test model software development (AHG3)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Coordinate development of test model (VTM) and benchmark set (BMS) software based on the NextSoftware package and release software packages with associated configuration files (repository to be announced via reflector). * Produce documentation of software usage for distribution with the software. * Discuss and make recommendations on the software development process. * Propose improvements to the guideline document for developments of the test model software. * Coordinate with AHG on Draft text and test model algorithm description editing (AHG2) to identify any mismatches between software and text, and make further updates and cleanups to the software as appropriate. * Coordinate with AHG6 for integration with 360lib software. | F. Bossen, X. Li, K. Sühring (co-chairs) | N |
| **Test material and visual assessment (AHG4)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Maintain the video sequence test material database for development of the VVC standard. * Identify and recommend appropriate test materials for use in the development of the VVC standard. * Identify missing types of video material, solicit contributions, collect, and make available a variety of video sequence test material. * Evaluate new test sequences, and prepare for the visual assessment and availability of viewing equipment in the next meeting. | V. Baroncini, R. Chernyak, P. Hanhart, A. Norkin, T. Suzuki, J. Ye (co-chairs) | N |
| **Memory bandwidth consumption of coding tools (AHG5)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Develop improved software tools for measuring both average and worst case of memory bandwidth, and provide information for usage of these tools. * Study cache configurations for measuring decoder memory bandwidth consumption. * Identify coding tools in CEs, VTM, and BMS with significant memory bandwidth impact. * Study the impact of memory bandwidth on specific application cases. | R. Hashimoto (chair), Y. He, T. Ikai, X. Li, H. Yang, M. Zhou (vice-chairs) | N |
| **360° video conversion software development (AHG6)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Prepare and deliver the 360Lib-7.0 software version and common test condition configuration files according to JVET-K1012. * Generate CTC VTM and BMS anchors according to JVET-K1012, and finalize the reporting template for the common test conditions. * Produce documentation of software usage for distribution with the software. | Y. He and K. Choi (co-chairs) | N |
| **Coding of HDR/WCG material (AHG7)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study and evaluate available HDR/WCG test content. * Study objective metrics for quality assessment of HDR/WCG material, including investigation of the correlation between subjective and objective results of the CfP responses. * Compare the performance of the VTM, BMS, and HM for HDR/WCG content. * Prepare for expert viewing of HDR content at the 12th JVET meeting. * Coordinate implementation of HDR anchor aspects in the test model software with AHG3. * Study additional aspects of coding HDR/WCG content. | A. Segall (chair), E. François, W. Husak, D. Rusanovskyy (vice-chairs) | N |
| **360° video coding tools and test conditions (AHG8)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study the effect on compression and subjective quality of different projections formats, resolutions, and packing layouts. * Discuss refinements of common test conditions, test sequences, and evaluation criteria. * Solicit additional test sequences, and evaluate suitability of test sequences on head-mounted displays and normal 2D displays. * Study coding tools dedicated to 360° video, their impact on compression, and implications to the core codec design. * Study the effect of viewport resolution, field of view, and viewport speed/direction on visual comfort. * Study complexity of GPU rendering of projection formats * Study syntax for signalling of projection formats | J. Boyce (chair), K. Choi, P. Hanhart, J.-L. Lin (vice chairs) | N |
| **Neural networks in video coding (AHG9)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Investigate the benefit of using neural networks in video compression such as CNN loop filter, intra prediction, re-sampling in adaptive resolution coding, and encoder side partition mode decisions. * Investigate the complexity impact of using neural networks in video compression. * Investigate the complexity measurement of neural network coding tools. * Investigate the impact of training materials on the performance of neural network coding tools. * Investigate the impact of the training process on performance and complexity. | S. Liu (chair), B. Choi, K. Kawamura, Y. Li, L. Wang, P. Wu, H. Yang (vice-chairs) | N |
| **Encoding algorithm optimizations (AHG10)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study the impact of using techniques such as GOP structures and perceptually optimized adaptive quantization for encoder optimization. * Study the impact of adaptive quantization on individual tools in the test model. * Study the quantization adaptation tool in the test model. * Investigate the feasibility of adding a CTC test category in which adaptive quantization is turned on. * Study quality metrics for measuring subjective quality using e.g. the CfP response MOS scores. * Investigate other methods of improving objective and/or subjective quality, including adaptive coding structures, adaptive quantization without signalling, and multi-pass encoding. * Study methods of rate control and their impact on performance, subjective and objective quality. | A. Duenas and A. Tourapis (co-chairs), C. Helmrich, S. Ikonin, A. Norkin, R. Sjöberg (vice-chairs) | N |
| **Screen content coding (AHG11)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Investigate coding tools targeted at screen content in terms of compression benefit and implementation complexity. * Identify test materials and discuss testing conditions for screen content coding. | S. Liu (chair), J. Boyce, A. Filippov, Y.-C. Sun, M. Zhou (vice-chairs) | N |
| **High-level parallelism and coded picture regions (AHG12)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study high-level parallelism techniques. * Study concepts and proposed methods of representation of coded picture regions such as tiles and slices. * Study usage and additional functionalities for coded regions that may be beneficial beyond what has been done in existing standards * Prepare software and configurations for the test model to facilitate parallel processing tests. * Study the coding efficiency impact of parallel processing and coded picture regions. | T. Ikai (chair), M. Coban, M. M. Hannuksela, H. M. Jang, R. Sjöberg, R. Skupin, Y.-K. Wang (vice-chairs) | N |
| **Tool reporting procedure (AHG13)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Prepare output document JVET-K1005, which describes the methodology of tool-on/tool-off testing, provides a reporting template, and a list of tools to be tested by identified testers. * Provide configurations files, bitstreams, and results of the tool-on/tool-off testing. * Use the tool usage counts and memory bandwidth usage to study the decoder complexity of features in on/off testing. * Prepare a report with results of the tests. | W.-J. Chien, J. Boyce (co-chairs), R. Chernyak, K. Choi, R. Hashimoto, Y. He, Y.**-**W. Huang, S. Liu (vice-chairs) | N |
| **Low-latency random access (AHG14)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Define relevant test conditions to evaluate low-latency encoding with progressive intra refresh for random access without intra frames. * Study non-normative ways to produce progressive intra refresh with minimum losses in coding efficiency. * Propose software modifications for integrating encoder-only intra refresh in the VTM and BMS model. * Characterize progressive intra refresh performance objectively and subjectively. * Study normative solutions to improve intra refresh performance against encoder-only intra refresh. | J.-M. Thiesse (chair), A. Duenas, K. Kazui, A. Tourapis (vice-chairs) | N |
| **Bitstream decoding properties signalling (AHG15)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study syntax alternatives for interoperability point signalling * Study selection of constraint flags to be included in the VTM and their impact on syntax, semantics, and decoding process | J. Boyce (chair), J. Chen, S. Deshpande, M. Karczewicz, A. Tourapis, Y.-K. Wang, S. Wenger (vice-chairs) | Tel. TBA  (approx. monthly, at least two weeks notice for each) |
| **Implementation studies (AHG16)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study draft and proposed coding tools to identify implementation issues relating to decoder pipelines, decoder throughput, and other aspects of implementation difficulty. * Solicit hardware analysis of complex tools. * Provide feedback on potential solutions to address identified issues. | M. Zhou (chair), E. Chai, K. Choi, S. Ethuraman, O. Hugosson, T. Hsieh, X. Xiu (vice-chairs) | N |

# Output documents

The following documents were agreed to be produced or endorsed as outputs of the meeting. Names recorded below indicate the editors responsible for the document production. Where applicable, dates of planned finalization and corresponding parent-body document numbers are also noted.

It was reminded that in cases where the JVET document is also made available as MPEG output document, a separate version under the MPEG document header should be generated. This version should be sent to GJS and JRO for upload.

[JVET-K1000](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4116) Meeting Report of the 11th JVET Meeting [G. J. Sullivan, J.-R. Ohm] (2018-09-15, near next meeting)

(Initial versions of the meeting notes (d0 … d8) were made available on a daily basis during the meeting.)

[JVET-K1001](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4114) Versatile Video Coding (Draft 2) [B. Bross, J. Chen, S. Liu] [WG11 N17732] (2018-08-31)

(Initial version planned to be made available by 2018-08-10.)

See list of elements under section 11.6.2, as agreed by Wed. 18 plenary.

[JVET-K1002](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4117) Algorithm description for Versatile Video Coding and Test Model 2 (VTM 2) [J. Chen, Y. Ye, S. Kim] [WG11 N17733] (2018-08-31)

(Initial version planned to be made available by 2018-08-10.)

See list of elements under section 11.6.2, as agreed by Wed. 18 plenary.

[JVET-K1003](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4112) Guidelines for VVC reference software development [K. Sühring] (2018-07-31)

[JVET-K1004](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4118) Algorithm descriptions of projection format conversion and video quality metrics in 360Lib Version 7 [Y. Ye, J. Boyce] (2018-08-31)

(Identifying as version number 7 to match the software version, although the previous issued document (JVET-H1004) was identified as version 5.)

See list of elements under section 11.6.4, as agreed by the Wed. 18 July plenary.

[JVET-K1005](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4115) Methodology and reporting template for tool testing [AHG13 chairs] (2018-07-27)

[JVET-K1010](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4119) JVET common test conditions and software reference configurations for SDR video [F. Bossen, J. Boyce, X. Li, V. Seregin, K. Sühring] (2018-07-31)

[JVET-K1011](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4120) JVET common test conditions and evaluation procedures for HDR/WCG video [A. Segall, E. François, D. Rusanovskyy] (2018-07-31)

[JVET-K1012](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4113) JVET common test conditions and evaluation procedures for 360° video [P. Hanhart, J. Boyce, K. Choi] (2018-07-31)

For CEs, individual CEs may determine whether testing relative to the BMS is necessary or not. [Move note to a general section.]

[JVET-K1021](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4103) Description of Core Experiment 1 (CE 1): Partitioning [J. Ma, F. Le Léannec, M. W. Park]

Discussion Monday 1830 (GJS & JRO)

* Boundary handling
* Implementation-friendly modifications (e.g., 64x64 pipeline friendly)
* Separate tree for intra regions in inter slices

(Initial version presented Wednesday 1200 (GJS & JRO.)

Discussion - the testing is expected to consider alternative content and variations of test conditions to try to better measure the impact for intra CTUs in inter slices.

[JVET-K1022](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4101) Description of Core Experiment 2 (CE2): Adaptive Loop Filter [V. Seregin, C.-Y. Chen]

Discussion Monday 1840 (GJS & JRO)

* ALF (filter shapes, CTU-based, filter parameter coding, classification, low-latency aspects) []

(Initial version presented Wednesday 1230 (GJS & JRO.)

Some suggested additional things to test may be considered in finalization.

It was agreed during the presentation that no more granular classification finer than 4x4 should be used, as the main complexity impact is switching of the filters, not the classification itself.

[JVET-K1023](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4108) Description of Core Experiment 3 (CE3): Intra Prediction and Mode Coding [G. Van der Auwera, J. Heo, A. Filippov]

Discussion Monday 1850 (GJS & JRO)

* Multiple reference lines
* Interpolation
* Line-based prediction
* Nonlinear weighted intra prediction
* Modified cross-component prediction
* Intra mode coding (e.g., 6 MPM)
* Bidirectional prediction

(Initial version presented Wednesday 1240 (GJS & JRO.)

It was commented that it may be desirable to reduce the number of variations to test.

It was commented that, in the finalization of the plans, it should be considered how to ensure that differences in encoder search techniques and search exhaustiveness are not causing the differences in measured compression performance, e.g. by restricting the number of candidates checked.

[JVET-K1024](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4099) Description of Core Experiment 4 (CE4): Inter prediction and motion vector coding [H. Yang, S. Liu, K. Zhang]

Discussion Monday 1900 (GJS & JRO)

* Merging (affine & non-affine)
* Other affine aspects?
* Padding
* MVD coding
* Illumination compensation
* Motion field compression

(Initial version presented Wednesday 1310 (GJS & JRO.)

[JVET-K1025](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4102) Description of Core Experiment 5 (CE5): Arithmetic Coding Engine [H. Kirchhoffer, A. Said]

Discussion Monday 1910 (GJS & JRO)

* Table-based probability estimation, single & double window, custom window size

(Initial version presented Wednesday 1255 (GJS & JRO.)

The primary comparison reference in the test will be the BMS CABAC engine.

[JVET-K1026](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4105) Description of Core Experiment 6 (CE6): Transforms and transform signalling [A. Said, X. Zhao]

Discussion Monday 1920 (GJS & JRO)

* Primary transform (factorization, precision, selection of the transform, spatial coverage of transform, additional or alternative transform types, handling of chroma)
* Secondary transform

(Initial version presented Wednesday 1320 (GJS & JRO.)

[JVET-K1027](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4104) Description of Core Experiment 7 (CE 7): Quantization and coefficient coding [H. Schwarz, M. Coban, C. Auyeung]

Discussion Monday 1930 (GJS & JRO)

* Context selection
* Reduced number of context models
* Reduced number of context-coded bins
* Alternative state machine dependent quantization
* Scanning order
* Modified residual sign prediction
* Spatial-domain residual scaling

(Initial version presented Wednesday 1330 (GJS & JRO.)

[JVET-K1028](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4098) Description of Core Experiment 8 (CE8): Current Picture Referencing [X. Xu, K. Müller, L. Wang]

Discussion Monday 1940 (GJS & JRO)

* Constraints
* Template matching

(Initial version presented Wednesday 1340 (GJS & JRO.)

[JVET-K1029](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4107) Description of Core Experiment 9 (CE9): Decoder-Side Motion Vector Derivation [S. Esenlik, Y. W. Chen, F. Chen]

Discussion Monday 1945 (GJS & JRO)

* DMVR interpolation filters, padding, search range, partial usage of refined MVs
* Matching method

(Initial version presented Wednesday 1345 (GJS & JRO.)

It was commented that the use of SIMD optimization in this test might affect the ability to use the runtime as an approximation of the complexity impact of the feature (since the rest of the design does not use such low-level optimization). It would be desirable to try to take this into account in the work.

BIO will not be tested in this CE.

[JVET-K1030](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4111) Description of Core Experiment 10 (CE10): Combined and multi-hypothesis prediction [C.-W. Hsu, M. Winken, X. Xiu]

Discussion Monday 1955 (GJS & JRO)

* OBMC, non-rectangular partitions, diffusion filtering, prediction with more than two hypotheses, other blending of multiple predictors

(Initial version presented Wednesday 1350 (GJS & JRO.)

It was requested that test cases should include testing the tools with uni prediction.

[JVET-K1031](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4106) Description of Core Experiment 11 (CE11): Deblocking [A. Norkin, A. M. Kotra]

Discussion Monday (GJS & JRO)

* longer filters,
* 4x4 deblocking, …

(Initial version presented Wednesday 1355 (GJS & JRO.)

This will include some testing with ALF disabled. The primary focus of the test will be relative to the VTM.

Add more detailed description of what parameters are to be provided for complexity analysis.

Use 10s sequences

[JVET-K1032](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4097) Description of Core Experiment 12 (CE12): Mapping functions [E. François, D. Rusanovskyy, P. Yin]

(Initial version presented Wednesday 1410 (GJS & JRO.)

[JVET-K1033](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4110) Description of Core Experiment 13 (CE13): Coding tools for 360° omnidirectional video [P. Hanhart, J.-L. Lin, C. Pujara]

Discussion Monday 2010 (GJS & JRO)

* Intra prediction, inter prediction, in-loop filters, padding, post-filtering, blending

(Initial version presented Wednesday 1415 (GJS & JRO.)

For pre- and post-processing, different amount of padding, blending, and post-filtering of seam artefacts will be tested. The tested solutions will be implemented for the hybrid equi-angular cubemap (HEC) projection and compared to the HEC with padding of 4 samples around face row with blending (PHEC) anchor.

Decision (CTC): The CTC will be changed to set the face size for cube projection to 1280x1280 and the ERP will be changed to 4432x2216.

[JVET-K1034](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4100) Description of Core Experiment 14 (CE14): Post-reconstruction filtering [L. Zhang, S. Ikonin]

Discussion Monday (GJS & JRO)

* Bilateral
* Hadamard-based

(Initial version presented Wednesday 1430 (GJS & JRO.)

[JVET-K1035](http://phenix.it-sudparis.eu/jvet/doc_end_user/current_document.php?id=4109) Description of Core Experiment 15 (CE15): Palette mode [Y.-C. Sun, Y. H. Chao, X. Xu]

Discussion Tuesday morning Track B (JRO)

* Investigate the palette variant proposed in JVET-K0411 and HEVC-SCC palette mode
* Investigate interrelationship with CPR
* Study the complexity impact of the two palette variants and CPR (in coordination with CE8)

(Initial version presented Wednesday 1430 (GJS & JRO.)

# Future meeting plans, expressions of thanks, and closing of the meeting

Future meeting plans were established according to the following guidelines:

* Meeting under ITU-T SG 16 auspices when it meets (starting meetings on the Tuesday or Wednesday of the first week and closing it on the Tuesday or Wednesday of the second week of the SG 16 meeting – a total of 6–7.5 meeting days), and
* Otherwise meeting under ISO/IEC JTC 1/SC 29/WG 11 auspices when it meets (starting meetings on the Wednesday or Thursday prior to such meetings and closing it on the last day of the WG 11 meeting – a total of 8.5 meeting days).

In cases where high workload is expected for a meeting, an earlier starting date may be defined.

Some specific future meeting plans (to be confirmed) were established as follows:

* Wed. 9 – Fri. 18 January 2019, 13th meeting under WG11 auspices in Marrakesh, MA.
* Tue. 19 – Wed. 27 March 2019, 14th meeting under ITU-T auspices in Geneva, CH.
* Wed. 3 – Fri. 12 July 2019, 15th meeting under WG11 auspices in Gothenburg, SE.
* Tue. 1 – Wed. 9 October 2019, 16th meeting under ITU-T auspices in Geneva, CH.

The agreed document deadline for the 13th JVET meeting is Monday 31 Dec. 2018. Plans for scheduling of agenda items within that meeting remain TBA.

XXXX were thanked for the excellent hosting and organization of the 12th meeting of the JVET.

XXXX were thanked for providing viewing equipment used during the 12th JVET meeting.

XXXX was thanked for providing new test material for usage in standardization efforts.

The 12th JVET meeting was closed at approximately XXXX hours on Friday 12 October 2018.

# Annex A to JVET report: List of documents

# Annex B to JVET report: List of meeting participants

The participants of the twelfth meeting of the JVET, according to a sign-in sheet circulated during the meeting sessions (approximately XXX people in total), were as follows: