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Title: **Gap analysis and suggested updates to next-generation video coding requirements draft**

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Purpose: Proposal

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Source: Sharp

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Abstract

This contribution presents a summary of a gap analysis carried out with respect to existing MPEG/VCEG video coding standards. The contribution also provides suggestions for updates of “Preliminary draft of use cases and requirements for potential next-generation video coding standard beyond VVC capability” based on the gap analysis.

Introduction

For a mature technology area such as video compression, we believe that the motivation for starting a new standardization effort should be based on analysis around existing standards. In particular, we believe it is valuable to identify gaps between existing standards and expectations by the market. Such expectations may be based on new technical demands, demonstration of new technological developments or competing approaches presented by external organizations.

Additionally, we would like to make the remark that we think it is important to be prepared to challenge conventions and traditions when developing standards serving an ever-progressing media industry. Just because something has “always been done this way” does not mean it always has to be done that way. On the contrary, a standardization process aimed at serving future market needs, should try to challenge existing conventions and practices in order to reach beyond the capabilities of existing standards. We believe an open mindset should be applied throughout the development process not only when it comes to technology but also to other areas such as ways of working and scope of the project.

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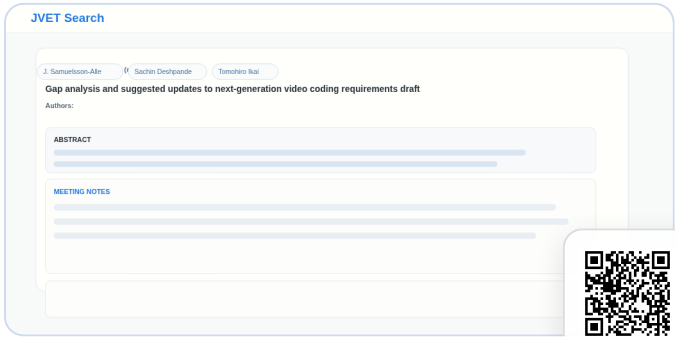

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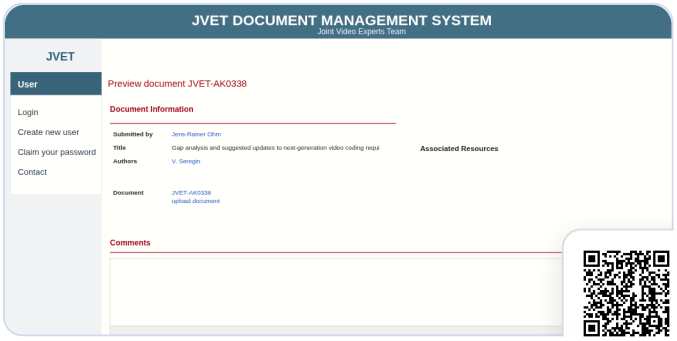

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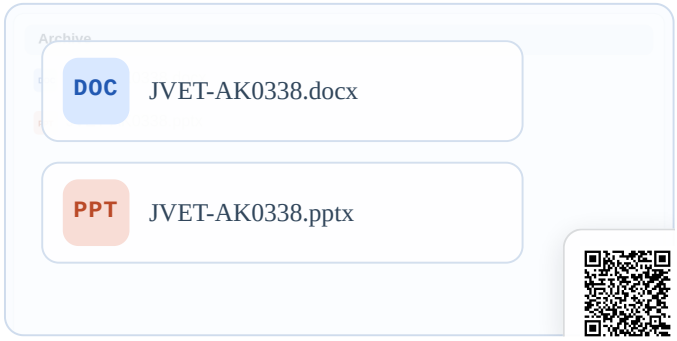

MEETING NOTES

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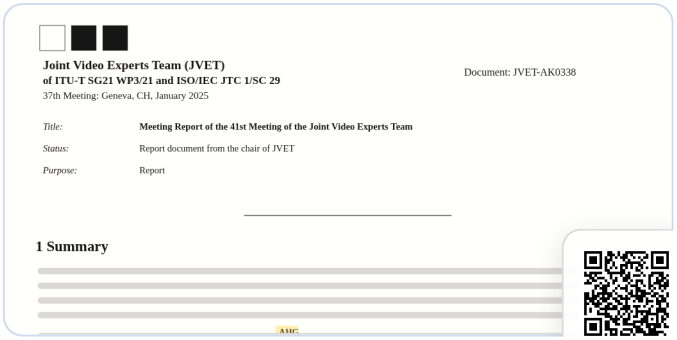

MEETING NOTES

JVET-AK0338 Gap analysis and suggested updates to next-generation video coding requirements draft [J. Samuelsson-Allendes, S. Deshpande, T. Ikai (Sharp)] [late]

It was suggested to establish a joint AHG with the following mandates:

- Consider and summarize input from workshop
- Suggest refinements of draft requirements
- Review m71221, m71598 (also available as JVET)
- Collect and study additional contributions on requirements (to be provided to both orgs)

> Mary-Luc Champel (a WG 2 member from Xiaomi) and Justin Ridge (an SG21 vice chair and WP3/21 co-chair, Nokia/USA) were planned to be the co-chairs of this AHG, which was agreed could hold teleconference meetings (with at least two weeks advance notice).

> This was agreed in the joint meeting, but it was not reflected in the AHG plans established in the meeting recommendations of MPEG WG2 (apparently by accident). WG 2 did establish an “AhG on MPEG Use Cases and Requirements” with Champel and Igor Curcio (the WG 2 Convenor from Nokia) as co-chairs. In practice, collaboration during the interim period can take place with a less formalized relationship.

> It was agreed that JVET would issue a “draft experiment on non-CTC” testing, but would not issue a document with the title “CfE” from the current meeting.

BoGs (0)

Not break-out groups were established at this meeting to conduct discussion and develop recommendations on particular subjects (this section retained for future use).

Liaison communications (0)

The following liaison statements were received at this meeting (section retained as a template for future use).

…

The liaison response WG 5 N XXX was reviewed in JVET on XXday XX at XXXX-XXXX. The draft reply was also presented in the MPEG AG 3 Communication meeting XXday XX at 1500-1800.

Project planning

Software timeline

ECM 16.0 software (including all adoptions) was planned to be available 3 weeks after the meeting (12 February).

The NNVC 12.0 codebase software was planned to be available 3 weeks after the meeting (12 February).

Extensions on top of VTM23.6 software will be released as appropriate (integration and updates of SEI messages included in JVET-AK2006 by the current meeting).

Updates on top of HM18.0 and JM19.1 software will be released as appropriate (e.g., integration and updates of SEI messages included in JVET-AK1006 and JVET-AK1017 by the current meeting).

As a general rule in software development, a person who is executing a merge shall not be from the same company as the person who submitted that merge request.

Core experiment and exploration experiment planning

An EE on neural network-based video coding was established, as recorded in output document JVET-AK2023.

An EE on enhanced compression technology beyond VVC capability using techniques other than neural-network technology was also established, as recorded in output document JVET-AK2024.

> Initial versions of these documents were presented and approved.

Drafting of specification text, encoder algorithm descriptions, 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/VTM 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:

- Normative contributions (relating to changes in bitstream/decoder) shall include draft specification text
- Proposals shall contain all details relevant for understanding and be self-contained. In cases where the document is a follow-up of a previous contribution, the overall concept and the novelties should be highlighted at minimum

- Coding tool and encoder optimization proposals shall contain Excel sheets that allow assessment on a per-sequence basis
- Algorithm description text is strongly encouraged for non-normative contributions that are intended to be included in model description documents (VTM, ECM, etc.), and that is required for inclusion in TR drafts.
- Early upload deadline to enable substantial study prior to the meeting
- Using a clock timer to ensure efficient proposal presentations (5 min) and discussions (not exercised currently)

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

It was emphasized that those rules which had been set up or refined during the 12th JVET meeting should be observed. In particular, for some CEs of some previous meetings, results were available late, and some changes in the experimental setup had not been sufficiently discussed on the JVET reflector.

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 a draft standard by the next meeting or in the near future.
- > “Exploration experiments” (EEs) are also coordinated experiments. These are conducted on technology which is not foreseen to become part of a draft standard in the near future. The investigating methodology for assessment of such technology can also be an important part of an EE. (Further general rules for EEs, as far as deviating from the CE rules below, should be discussed in a future meeting. For the current meeting, procedures as described in the EE description document are deemed to be sufficient.)
- > A CE is a test of a specific fully described technology in a specific agreed way. It is not a forum for thinking of new ideas (like an AHG). The CE coordinators are responsible for making sure that the CE description is complete and correct and has adequate detail. Reflector discussions about CE description clarity and other aspects of CE plans are encouraged.
- > 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. Each CE will have a “fork” of the software, and within the CE there may be multiple branches established by the CE coordinator. The software coordinator will help coordinate the creation of these forks and branches and their naming. All JVET members will have read access to the CE software branches (using shared read-only credentials as described below).

- During the experiment, revisions of the experiment plans can be made, but not substantial changes to the proposed technology. Withdrawing parts of experiments that were intended to show the individual benefits of a tool or parts of a tool is strongly discouraged. Combination tests may not be considered in such cases. Any changes made to individual tools in a combination shall be documented.
- The CE description must match the CE testing that is done. The CE description needs to be revised if there has been some change of plans.
- The CE summary report must describe any changes that were made in the process of finalizing the CE.
- 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 mandatory to report encoder optimizations made for the benefit of a tool, and if an equivalent optimization could be applied on the anchor, a comparison against the improved anchor shall be provided.
- A new proposal can be included in a CE based on group decision, regardless if an independent party has already performed a cross-check in the meeting when it was first proposed.

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 for SDR video are described in the prior output document JVET-T2010.

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 proponent perspective – e.g., not referring to methods as “improved”, “optimized”, “enhanced”, 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 documents that are referenced in the CE description that are also available in the JVET document archive.

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

The CE development workflow is described at:

https://vcgit.hhi.fraunhofer.de/jvet/VVCSoftware_VTM/wikis/Core-experiment-development-workflow

CE read access is available using shared accounts: One account exists for MPEG members, which uses the usual MPEG account data. A second account exists for VCEG members with account information available in the TIES informal ftp area (IFA) system at:

https://www.itu.int/ifa/t/2017/sg16/exchange/wp3/q06/vceg_account.txt

Some agreements relating to CE activities were established as follows:

- Only qualified JVET members can participate in a CE.
- Participation in a CE is possible without a commitment of submitting an input document to the next meeting. Participation was 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.
- A JVET CE reflector will be established and announced on the main JVET reflector. Discussion of logistics arrangements, exchange of data, minor refinement of the test plans, and preparation of documents shall be conducted on the JVET CE reflector, with subject lines prefixed by “[CEx:]”, where “x” is the number of the CE. All substantial communications about a CE other than such details shall take place on main JVET reflector. In the case that large amounts of data are to be distributed, it is recommended to send a link to the data rather than the data itself, or upload the data as an input contribution to the next meeting.

General timeline for CEs

> T1= 3 weeks after the JVET meeting: To revise the CE description and refine questions to be answered. Questions should be discussed and agreed on JVET reflector. Any changes of planned tests after this time need to be announced and discussed on the JVET reflector. Initially assigned description numbers shall not be changed later. If a test is skipped, it is to be marked as “withdrawn”.

T2 = Test model software release + 2 weeks: Integration of all tools into a separate CE branch of the VTM 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 are encouraged to study and make contributions to the next meeting with proposed changes

T3: 3 weeks before the next JVET meeting or T2 + 1 week, whichever is later: Any changes to the CE test branches of the 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. The name of the cross-checkers and list of

specific tests for each tool under study in the CE plan description shall be documented in an updated CE description by this time.

T4: Regular document deadline minus 1 week: CE contribution documents including specification text and complete test results shall be uploaded to the JVET document repository (particularly for proposals targeting to be promoted to the draft standard at the next meeting).

The CE summary reports shall be available by the regular contribution deadline. This shall include documentation about crosscheck of software, matching of CE description and confirmation of the appropriateness of the text change, as well as sufficient crosscheck results to create evidence about correctness (crosscheckers must send this information to the CE coordinator at least 3 days ahead of the document deadline). Furthermore, any deviations from the timelines above shall be documented. The numbers used in the summary report shall not be changed relative to the description document.

CE reports may contain additional information about tests of straightforward combinations of the identified technologies. Such supplemental testing needs to be clearly identified in the report if it was not part of the CE plan.

New branches may be created which combine two or more tools included in the CE document or the VTM (as applicable).

It is not necessary to formally name cross-checkers in the initial version of the CE description document. To adopt a proposed feature at the next meeting, JVET would like to see comprehensive cross-checking done, with analysis of whether the description matches the software, and a recommendation of the value of the tool and 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 favourable outcome of CE does not indicate a need for adoption of the technology into a standard or test model.

Availability of specification text is important to have a detailed understanding of the technology and also to judge what its impact on the complexity of the specification will be. There must also be sufficient time to study this in detail. CE contributions without sufficiently mature draft specification text in the CE input document should not be considered for adoption.

Lists of participants in CE documents should be pruned to include only the active participants. Read access to software will be available to all members.

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).

Chairs of AHGs were asked to send draft mandates to JRO before 2000 on 21 Jan, preferably copy from the table below and sending in a word file with changemarks.

Review of AHG plans was conducted during the plenary on Wednesday 22 Jan. 2025 at 1250–1330.

Title and Email Reflector	Chairs	Mtg
Project Management (AHG1) (jvet@lists.rwth-aachen.de) • Coordinate overall JVET interim efforts. • Supervise AHG and experiment studies. • Report on project status to JVET reflector. • Provide a report to the next meeting on project coordination status. • Supervise processing and delivery of output documents	J.-R. Ohm (chair), G. J. Sullivan (vice-chair)	N
Draft text and test model algorithm description editing (AHG2) (jvet@lists.rwth-aachen.de) • Produce and finalize draft text outputs of the meeting (JVET-AK1006, JVET-AK1017, JVET-AK2005 and JVET-AK2006). • Collect reports of errata for the VVC, VSEI, HEVC, AVC, CICP, and the published related technical reports and produce the JVET-AK1004 errata output collection. • Coordinate with the test model software development AhG to address issues relating to mismatches between software and text. • Collect and consider errata reports on the texts.	B. Bross, C. Rosewarne (co-chairs), F. Bossen, A. Browne, S. Kim, S. Liu, J.-R. Ohm, G. J. Sullivan, A. Tourapis, Y.-K. Wang, Y. Ye (vice-chairs)	N
Test model software development (AHG3) (jvet@lists.rwth-aachen.de) • Coordinate development of test models (VTM, HM, SCM, SHM, HTM, MFC, MFCD, JM, JSVM, JMVM, 3DV-ATM, 360Lib, and HDRTools) software and associated configuration files.	F. Bossen, X. Li, K. Sühring (co-chairs), E. François, Y. He, K. Sharman, V. Seregin, A. Tourapis (vice-chairs)	N

• Produce documentation of software usage for distribution with the software. • Enable software support for recently standardized additional SEI messages (for both VTM and HM), and SEI messages in TuC (the latter in a separate branch of VTM). • Discuss and make recommendations on the software development process. • Perform comparative tests of test model behaviour using common test conditions, including HDR, high bit depth and high bit rate. • Suggest configuration files for additional testing of tools. • Investigate how to minimize the number of separate codebases maintained for group reference 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. • Prepare drafts of merged and updated CTC documents for HM and VTM, as applicable.		
Test material and visual assessment (AHG4) (jvet@lists.rwth-aachen.de) • Consider plans for additional verification testing of VVC capability, particularly target conducting tests for VVC multi-layer features, and update the test plan accordingly. • Maintain the video sequence test material database for testing the VVC and HEVC standards and potential future extensions, as well as exploration activities. • Study coding performance and characteristics of available and proposed video test material. • Identify and recommend appropriate test material for testing the VVC standard and potential future extensions, as well as exploration activities. • Identify and characterize missing types of video material, solicit contributions, collect, and make	V. Baroncini, T. Suzuki, M. Wien (co-chairs), W. Husak, S. Iwamura, P. de Lagrange, S. Liu, X. Meng, S. Puri, A. Segall, S. Wenger (vice-chairs)	N

available a variety of video sequence test material, in coordination with other AHGs, as appropriate. • Maintain and update the directory structure for the test sequence repository, as necessary. • Collect information about test sequences that have been made available by other organizations. • Prepare and conduct expert viewing for purposes of subjective quality evaluation. • Coordinate with AG 5 in studying and developing further methods of subjective quality evaluation, e.g. based on crowd sourcing. • Coordinate with AHG15 on investigating sequences with gaming content, and make such sequences available for study. • Coordinate with AHG17 on investigating sequences outside of CTC, and making arrangements for viewing at the AHG meeting. • Prepare availability of viewing equipment and facilities arrangements for future meetings.		
Conformance testing (AHG5) (jvet@lists.rwth-aachen.de) • Prepare for a new edition of VVC conformance with new multi-layer streams (JVET-AI2028) and corrections of the existing streams. • Study the draft conformance bitstreams for new HEVC multiview profiles in JVET-AI1008, and further develop related conformance bitstreams. • Coordinate with AHG3 on implementation of the new HEVC multiview profiles. • Study the requirements of VVC, HEVC, and AVC conformance testing to ensure interoperability. • Maintain and update the conformance bitstream database, and contribute to report problems, and suggest actions to resolve these. • Study additional testing methodologies to fulfil the needs for VVC conformance testing.	I. Moccagatta (chair), F. Bossen, T. Ikai, S. Iwamura, H.-J. Jhu, K. Kawamura, P. de Lagrange, S. Paluri, K. Sühring, Y. Yu (vice-chairs)	N

ECM software development (AHG6) (jvet@lists.rwth-aachen.de) • Coordinate development of the ECM software and associated configuration files. • Produce documentation of software usage for distribution with the software. • Prepare and deliver ECM-16.0 software version (and potential updates), corresponding VTM anchor, and the reference configuration encodings according to the ECM common test conditions. • Investigate encoder speedup and other software optimization such as reduction of memory consumption. • Coordinate with ECM algorithm description editors to identify any mismatches between software and text, make further updates and cleanups to the software as appropriate.	V. Seregin (chair), J. Chen, R. Chernyak, F. Le Léannec, K. Zhang (vice-chairs)	N

ECM tool assessment (AHG7) (jvet@lists.rwth-aachen.de) • Investigate methodology of tool assessment, such as the aspects of memory access and bandwidth, number of maximum processing cycles, block decoding dependencies, number of context coded bins, pipeline and parallelization. • Coordinate with AHG6 on resolving tool-off test related software issues (missing tool controls and software bugs). • Prepare configuration files and generate bitstreams and results of tool-on/tool-off testing. • Prepare reporting of tool assessment results. • Coordinate with AHG17 to collect simulation results on non-CTC sequences (e.g., those used in previous verification tests), and identify a set of non-CTC sequences that would be appropriate for additional testing. • Develop methodology of more reliable runtime measurement	X. Li (chair), L.-F. Chen, Z. Deng, J. Gan, E. François, R. Ishimoto, H.-J. Jhu, J. Lainema, X. Li, J. Pardo, A. Stein, H. Wang (vice-chairs)	Y (tel., 2 weeks notice)
Optimization of encoders and receiving systems for machine analysis of coded video content (AHG8) (jvet@lists.rwth-aachen.de) • Solicit and study non-normative encoder and receiving systems technologies that enhance performance of machine analysis tasks on coded video content. • Identify and collect test materials that are suitable to be used by JVET for machine analysis tasks. • Discuss improvements on the evaluation framework, including evaluation procedures and methodologies. • Coordinate software development and experiments on optimization of encoders and receiving systems for machine analysis of coded video content, including combinations of proposed technologies. • Maintain the software implementation examples and develop tool combination examples in the repository,	S. Liu, J. Ström, S. Wang, M. Zhou (AHG chairs)	Y (tel., 2 weeks notice, joint with WG 4 AHG)

including sufficient documentation in terms of operation and performance. • Evaluate proposed technologies and their suitability for machine analysis applications. • Propose improvements to JVET-AK2030 on optimization of encoders and receiving systems for machine analysis of coded video content. • Study the potential of using SEI messages for the purpose of machine analysis in coordination with AHG9. • Investigate the impact of using different machine task models in the evaluation of the compression performance of tools optimized for machine analysis tasks. • Coordinate with WG 4 VCM AHG on aspects such as unified common test conditions, evaluation metrics, test and training materials, usage of SEI messages, and on studying characteristics and requirements of machine analysis tasks, etc. Provide WG 4 VCM with AHG software and scripts to experiment non-normative tools and tool combination examples, and provide bitstreams generated by running a dense set of QP points for each sequence by uploading to the mpeg.expert repository.		
SEI message studies (AHG9) (jvet@lists.rwth-aachen.de) • Study the SEI messages in VSEI, VVC, HEVC and AVC. • Study JVET-AK1006, JVET-AK1017, JVET-AK2005, and JVET-AK2006, identify any issues and propose solutions as appropriate. • Study JVET-AK2032, and propose improvements. • Collect software and showcase information for SEI messages, including encoder and decoder implementations and bitstreams for demonstration and testing. • Identify potential needs for additional SEI messages, including the study of SEI messages defined in	S. McCarthy, Y.-K. Wang (co-chairs), J. Boyce, T. Chujoh, S. Deshpande, C. Fogg, M. M. Hannuksela, P. de Lagrange, G. J. Sullivan, H. Tan, A. Tourapis, S. Wenger, P. Wu (vice-chairs)	N

HEVC and AVC for potential use in the VVC context. • Study the alignments of the same SEI messages in different standards. • Coordinate with AHG8 and WG 4 to study mechanisms for signalling metadata in the context of machine analysis of coded video content. • Coordinate with AHG3 for software support of SEI messages for JM, HM, and VTM.		
Encoding algorithm optimization (AHG10) (jvet@lists.rwth-aachen.de) • Study the impact of using techniques such as tool adaptation and configuration, and perceptually optimized adaptive quantization for encoder optimization. • Study the impact of non-normative techniques of preprocessing for the benefit of encoder optimization. • Study encoding techniques of optimization for objective quality metrics and their relationship to subjective quality. • Study optimized encoding for reference picture resampling and scalability modes in VTM, and coordinate with AHG4 on improving encoders and test settings for multi-layer verification testing. • Study optimized encoding and suitable test settings for noisy materials, such as sequences containing film grain. • Study optimized encoding and tool combinations for low latency and for low complexity. • Consider neural network-based encoding optimization technologies for video coding standards. • Investigate other methods of improving objective and/or subjective quality, including adaptive coding structures and multi-pass encoding. • Study methods of rate control and rate-distortion optimization and their impact on performance, subjective and objective quality.	K. Andersson, P. de Lagrange, A. Duenas (co-chairs), T. Ikai, T. Solovyev, A. Tourapis (vice chairs)	Y (tel., 2 weeks notice)

• Study the potential of defining default or alternate software configuration settings and test conditions optimized for either subjective quality, higher objective quality, or encoding with improved complexity/performance tradeoff, and coordinate such efforts with AHG3 and AHG6. • Study the effect of varying configuration parameters depending on temporal layer, such as those related to deblocking, partitioning, chroma QP.		
Neural network-based video coding (AHG11) (jvet@lists.rwth-aachen.de) • Evaluate and quantify the performance improvement potential of NN-based video coding technologies compared to existing video coding standards such as VVC, including both individual coding tools, architectures and content adaptation with NN parameters overfitting. • Establish logistics of training data sets, including list, location and md5sums. Generate and distribute anchor encoding, and develop supporting software as needed. • Study potential improvements of the NNVC CTC document JVET-AJ2016. • Study the impact of training (including the impact of loss functions) on the performance of candidate technologies and identify suitable material for testing and training. • Analyse complexity characteristics for technologies under study, including transformers, perform complexity analysis, and develop complexity reductions of candidate technology. • Discuss and propose improved metrics to perform complexity analysis of NN architectures, in particular also considering the impact of sparse models. • Finalize and discuss the EE on neural network-based video coding. • Promote the call for training materials, distribute it, and actively communicate with content owners.	E. Alshina, F. Galpin, S. Liu, A. Segall (co-chairs), J. Li, Y. Li, R.-L. Liao, M. Santamaria, T. Shao, M. Wien, P. Wu (vice chairs)	Y (tel., 2 weeks notice), first on Feb. 5, second on March 5

• Coordinate with other groups, including SC 29/AG 5 on the evaluation and assessment of visual quality, and AHG12 on the interaction with ECM coding tools. If possible, prepare encodings with combinations of tools included in the NNVC software for visual quality assessment at the next meeting. • Coordinate with AHG14 on items related to NNVC software development and study the impact of training set extension.		
Enhanced compression beyond VVC capability (AHG12) (jvet@lists.rwth-aachen.de) • Solicit and study non-neural-network video coding tools with enhanced compression capabilities beyond VVC. • Discuss and propose refinements to the ECM16 algorithm description JVET-AK2025. • Coordinate with AHG7 to study the performance and complexity tradeoff of these video coding tools. • Coordinate with AHG6 on ECM software development. • Support AHG6 in generating anchors according to the test conditions in JVET-AI2017. • Analyse the results of exploration experiments described in JVET-AK2024 in coordination with the EE coordinators. • Coordinate with AHG11 to study the interaction with neural network-based coding tools.	M. Karczewicz, Y. Ye, L. Zhang (co-chairs), B. Bross, R. Chernyak, X. Li, K. Naser, Y. Yu (vice-chairs)	N
Film grain technologies (AHG13) (jvet@lists.rwth-aachen.de) • Study the benefits and characteristics of film grain technologies, including autoregressive and frequency-filtering technologies. • Discuss and propose refinements to the draft of the TR 2nd ed. JVET-AK2020.	W. Husak, P. de Lagrange (co-chairs), A. Duenas, X. Meng, A. Segall, G. Teniou, A. Tourapis (vice-chairs)	Y (tel., 2 weeks notice)

• Study alternative film grain models and their associated documentation. • Discuss and enumerate updates, improvements, and additions for the second edition of the technical report. • In consultation with AHG4, study and define content characteristics and test conditions that are desirable for the study and testing of film grain technologies, and perform an assessment of newly available test materials in that regard. • Investigate metrics for measuring film grain fidelity in itself, or as present in a video. • Discuss the potential need for film grain conformance guidelines. • Given the study of desirable content characteristics, solicit or create new test material for further determining the operational characteristics of, testing, and developing any related technologies. • Study preprocessing and encoder technologies for determining values for FGC (Film Grain Characteristics) SEI message syntax elements. • Identify potential need for additional film grain technology and signalling, if needed. • Coordinate development of film grain technology software and configuration files. • Coordinate with AG 5 on improving the plan for subjective quality testing of the FGC SEI message JVET-AJ2022, and conduct preparations for such testing. • Coordinate with AHG3 for software support of the FGC SEI message.		
NNVC software development (AHG14) (jvet@lists.rwth-aachen.de) • Coordinate development of the NNVC software and associated configuration files. • Prepare and deliver NNVC-12.0 software version (and potential updates), and provide reference configuration encodings according to the NNVC common test conditions as described in JVET-	F. Galpin (chair), R. Chang, Yue Li, Yun Li, M. Santamaria, J. N. Shingala, Z. Xie (vice chairs)	Y (tel., 2 weeks notice), first on Feb. 5, second on March 5

AJ2016. Study the impact of the addition of new dataset on the already integrated models. • Investigate and bridge coding performance of NNVC VTM anchor compared to the latest VTM version and/or VTM anchor in ECM software. • Investigate combinations of tools included in the NNVC software, prepare and release anchor data for all configurations of the software, including anchors for High and Low Operation Point (HOP/LOP) and Very Low Operation Point (VLOP) configurations. • Study and maintain the SADL (Small Adhoc Deep-Learning Library). Identify gaps in functionality and develop improvements as needed. • Coordinate with NNVC algorithm and software description (JVET-AK2019) editors to identify any mismatches between software and description document, suggest further updates to the description document as appropriate. • Coordinate with AHG11 on items related to NNVC activities.		
Gaming content compression (AHG15) (jvet@lists.rwth-aachen.de) • Identify gaming content application scenarios and their requirements for codec operation. • Identify and characterize required types of content; solicit contributions, collect, and make a variety of gaming content available, in coordination with AHG4 and AG 5. • Produce VTM and ECM anchor encodings according to CTC JVET-AJ2027, and provide test results at the next meeting. • Develop and maintain interfaces for supporting use cases of camera parameters and depth maps in gaming applications, including mechanisms for efficient transporting these elements in the coded video bitstream. • Evaluate JVET test models (such as ECM, VTM, NNVC, etc.) under the proposed test conditions.	S. Puri, J. Sauer (co-chairs), R. Chernyak, A. Duenas, L. Wang, V. Zakharchenko (vice chairs)	Y (tel., 2 weeks notice)

• Investigate possibilities to enhance compression capability for gaming content. • Study conversion of depth maps using integer representation, and identifying efficient bit-depth resolution of depth maps to support identified use-cases that will be an input to compression. • Solicit contributions from industry on typical bitrate/quality/resolution used for gaming content compression.		
Generative face video compression (AHG16) (jvet@lists.rwth-aachen.de) • Maintain GFVC software tools, associated configuration files, and software usage documentation. • Study the extension of GFVC software capability to handle video content with higher resolutions. • Identify and study additional test content, including content with higher resolutions, suitable for use in GFVC performance evaluation. • Study GFVC performance under test conditions defined in JVET-AJ2035, as well as performance on additional test content, and wider bitrate ranges. • Coordinate with AHG9 on further development of the GFV and GFVE SEI messages in JVET-AK2006.	Y. Ye (chair), H.-B. Teo, Z. Lyu, S. McCarthy, S. Wang (vice chairs)	N
Testing of video coding technology beyond CTC (AHG17) (jvet@lists.rwth-aachen.de) • Identify test sequences extending the represented range of applications (i.e. beyond those defined in common test conditions documents JVET-AK2010, JVET-AC2011 and JVET-AI2017) and investigate their suitability for use in visual quality assessments. • Prepare encoded bitstreams from the identified test sequences using same VTM and ECM versions as previously.	M. Wien (chair), E. Alshina, V. Baroncini, P. de Lagrange, Y. Ye (vice chairs)	Y • tel., 2 weeks notice, first on Feb. 6 • hybrid, March 10-12 in Aachen, DE

• Make preparations for subjective viewing at the hybrid AHG meeting (for on-site participants). • Develop the output document JVET-AK2026. • Arrange and conduct a hybrid AHG meeting (with remote participation for group discussions), and prepare logistics according to JVET-AK2039.		
Ultra-low latency and packet loss resilience (AHG18) (jvet@lists.rwth-aachen.de) • Investigate and identify test conditions, evaluation criteria and evaluation methodology, supporting a set of end-to-end latency targets in a range of 25-100 ms. • Investigate creation of practical simulation software based on VTM, including network transmission aspects, and conduct performance evaluation. • Identify potential requirements and feasibility of standard based technologies to support ultra-low delay requirements, including packet loss resilient decoding. • Investigate packet loss resilient technologies beyond VVC supporting ultra-low delay coding for interactive and live broadcasting scenarios.	S. Ikonin, S. Wenger, V. Zakharchenko (co-chairs), S. Deshpande, J. Ström, X. Ma, C. Kim, S. Puri, S. Fößel (vice-chairs)	Y (tel., 2 weeks notice)

It was confirmed that the rules which can be found in document ISO/IEC JTC 1/SC 29/AG 2 N 046 “Ad hoc group rules for MPEG AGs and WGs” (available at https://www.mpegstandards.org/adhoc/), are consistent with the operation mode of JVET AHGs. It is pointed out that JVET does not maintain separate AHG reflectors, such that any JVET member is implicitly a member of any AHG. This shall be mentioned in the related WG Recommendations. The list above was also issued as a separate WG 5 document (ISO/IEC JTC 1/SC 29/WG 5 N 339) in order to make it easy to reference.

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 a WG 5 output document, a separate version under the WG 5 document header should be generated. This version should be sent to GJS and JRO for upload.

> The list of JVET ad hoc groups was also issued as a WG 5 output document WG 5 N 339, as noted in section 9.

CITATION

J. Samuelsson-Allendes, S. Deshpande, T. Ikai, "Gap analysis and suggested updates to next-generation video coding requirements draft", JVET-AK0338, 37th Meeting: Geneva, CH, January 2025.