**INTERNATIONAL ORGANIZATION FOR STANDARDIZATION  
ORGANISATION INTERNATIONALE DE NORMALISATION  
ISO/IEC JTC 1/SC 29/WG 5 MPEG JOINT VIDEO CODING TEAM(S) WITH ITU-T SG 16**

**ISO/IEC JTC 1 / SC 29 / WG 5 N 91**

**Online - October 2021**

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| **Title:** | **List of AHGs established at the 5th WG 5 meeting** |
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**List of AHGs established at the 5th WG 5 meeting**

WG 5 provides the following list of Ad hoc Groups were appointed by JVET to progress work in the interim period until the next JVET meeting. The duration of all AHGs is until the next JVET meeting. All JVET AHGs shall stick to the rules set up in ISO/IEC JTC 1/SC 29/AG 2 N018 “Ad hoc group rules for MPEG AGs and WGs”, available at <https://www.mpegstandards.org/adhoc/>. The discussion list for all of these Ad Hoc groups will be the main 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://lists.rwth-aachen.de/postorius/lists/jvet.lists.rwth-aachen.de/>. No separate AHG reflectors shall be maintained, and no specific membership to AHGs is set up via reflector subscription, according to the well-established practices in the joint video coding teams with ITU-T SG 16. Email subject lines relevant to an AHG should contain “[AHGX]” in subject lines, where X is the AHG number.

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| **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 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](mailto:jvet@lists.rwth-aachen.de))   * Produce and finalize draft text outputs of the meeting (JVET-X2005 and JVET-X2006). * Collect reports of errata for the VVC, VSEI, HEVC, AVC, CICP, the codepoint usage TR specification and the published HDR-related technical reports and produce the JVET-X1004 errata output collection. * Produce and finalize JVET-X2002 VVC Test Model 15 (VTM 15) Algorithm and Encoder Descriptions. * 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, J. Chen, C. Rosewarne (co-chairs), F. Bossen, J. Boyce, 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](mailto: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. * Produce documentation of software usage for distribution with the software. * Enable software support for recently standardized additional SEI messages. * Discuss and make recommendations on the software development process. * Propose improvements to the guideline document for developments of the test model software. * Perform comparative tests of test model behaviour using common test conditions. * 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 CTC documents for HM and VTM, as applicable. | F. Bossen, X. Li, K. Sühring (co-chairs), Y. He, K. Sharman, V. Seregin, A. Tourapis (vice‑chairs) | N |
| **Test material and visual assessment (AHG4)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Consider plans for additional verification testing of VVC capability, particularly target establishing a test plan for VVC scalability features by the next meeting. * 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 in relation to video test materials, including new test materials. * Identify and recommend appropriate test materials for testing the VVC standard and potential future extensions, as well as exploration activities. * Identify missing types of video material, solicit contributions, collect, and make available a variety of video sequence test material. * 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 remote expert viewing for purposes of subjective quality evaluation. * Prepare availability of viewing equipment and facilities arrangements for future meetings. | V. Baroncini, T. Suzuki, M. Wien (co-chairs), E. François, S. Liu, A. Norkin, A. Segall, P. Topiwala, S. Wenger, Y. Ye (vice-chairs) | N |
| **Conformance testing (AHG5)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study the JVET-X2026 draft conformance testing for operation rage extensions and investigate the need for improvements. * Study the JVET-X2008 draft conformance testing specification and investigate the need for extensions. * Study the requirements of VVC, HEVC, and AVC conformance testing to ensure interoperability. * Maintain and update the conformance bitstream database. * Study additional testing methodologies to fulfil the needs for VVC conformance testing. | D. Rusanovskyy and I. Moccagatta (co-chairs), F. Bossen, K. Kawamura, T. Hashimoto, H.-J. Jhu, K. Sühring, Y. Yu (vice-chairs) | N |
| **ECM software development (AHG6)**  ([jvet@lists.rwth-aachen.de](mailto: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-3.0 software version and the reference configuration encodings according to JVET-X2017 common test conditions. * Investigate encoder speedup and other encoder software optimization. * 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, F. Le Léannec, K. Zhang (vice-chairs) | N |
| **Low latency and constrained complexity (AHG7)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Identify key application scenarios (e.g. cloud gaming) and their requirements for low latency and constrained complexity, taking into account aspects of real-time encoding and decoding. * Evaluate and propose new CTC for low latency and constrained complexity application scenarios. * Conduct tests with ECM and VTM to determine the impact of discussed configurations on coding efficiency and run time. * Review current test sequences and if necessary collect new test materials that are suitable for the intended application domains, and establish an applicable dataset in coordination with AHG4. * Coordinate with AHG3 and AHG12 to discuss and recommend configuration(s) applicable to ECM and VTM, taking into account complementarity with existing CTCs. | T. Poirier, S. Liu (co-chairs), L. Wang, J. Xu (vice-chairs) | N |
| **High bit depth, high bit rate, and high frame rate coding (AHG8)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study the benefits and characteristics of VVC coding tools for high bit depth, high bit rate, and high frame rate coding. * Study lossless coding characteristics of VVC. * Identify technologies for future extension of VVC to support such application usage. * Study the JVET-U2018 testing conditions for high bit depth, high bit rate, and high frame rate coding, and suggest improvements as applicable. * Contribute to the development of software and conformance testing for operation range extensions in coordination with AHG3 and AHG5. * Study the draft text JVET-X2005 and suggest improvements in coordination with AHG 2. * Identify suitable test material for testing of high bit depth, high bit rate, and high frame rate coding in coordination with AHG4. * Study VVC entropy decoding throughput and latency in the cases of high bit depth, high bit rate, and high frame rate coding. | A. Browne and T. Ikai (co-chairs), D. Rusanovskyy, M. Sarwer, X. Xiu, Y. Yu (vice-chairs) | N |
| **SEI message studies (AHG9)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study the SEI messages in VSEI, VVC, HEVC and AVC. * Study the draft text JVET-X2006 and suggest improvements in coordination with AHG 2. * Study signalling of essential resampling phase indication and prepare draft text for such signalling. * 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. * Investigate the possible need of mandatory post processing in the context of SEI messages * Study SEI messages defined in HEVC and AVC for potential use in the VVC context. * Coordinate with AHG3 for software support of SEI messages. | J. Boyce, S. McCarthy (co-chairs), C. Fogg, P. de Lagrange, J. Samuelsson, G. J. Sullivan, A. Tourapis, Y.-K. Wang, S. Wenger (vice-chairs) | N |
| **Encoding algorithm optimization (AHG10)**  ([jvet@lists.rwth-aachen.de](mailto: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 pre processing 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. * 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. * Study the potential of defining software configuration settings optimized for subjective quality, and coordinate such efforts with AHG3. | P. de Lagrange, R. Sjöberg and A. Tourapis (co-chairs) | N |
| **Neural network-based video coding (AHG11)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Evaluate and quantify performance improvement potential of NN-based video coding technologies compared to existing video coding standards such as VVC, including both individual coding tools and novel architectures. * Finalize, conduct and discuss the EE on neural network-based video coding. * Refine the test conditions for NN-based video coding. Generate and distribute anchor encoding, and develop supporting software as needed. * Investigate technical aspects specific to NN-based video coding, such as encoding and decoding complexity of neural networks, design network representation, operation, tensor, on-the-fly network adaption (e.g. updating during encoding) etc; * Study the impact of training (including the impact of loss function) on the performance of candidate technology, and identify suitable materials for training. * Analyse complexity characteristics, perform complexity analysis, and develop complexity reductions of candidate technology. * Refine testing methods for assessment of the effectiveness and complexity of considered technology. * Study the impact of parameter quantization and fixed-point computations in NN-based video coding. * Study and collect information related to near-term and longer-term architectures for neural network-based video coding. * Study and maintain the SADL (Small Adhoc Deep Learning Library). Identify gaps in library support and develop improvements as needed. * Review the outcome of the expert viewing conducted at the meeting, refine the methodology, and prepare viewing for the next meeting. * Coordinate with AHG12 to study the interaction with ECM coding tools. * Contribute to a workshop on NN based technologies with WG 1 and WG 4. * Coordinate with other relevant groups, including SC29/AG5 on visual quality assessment. | E. Alshina, S. Liu, A. Segall, (co‑chairs), J. Chen, F. Galpin, J. Pfaff, S. S. Wang, Z. Wang, M. Wien, P. Wu, J. Xu (vice‑chairs) | Y (2 weeks notice) |
| **Enhanced compression beyond VVC capability (AHG12)**  ([jvet@lists.rwth-aachen.de](mailto: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 ECM3 algorithm description JVET-X2025. * Study the performance and complexity tradeoff of these video coding tools. * Coordinate with AHG6 on ECM software development. * Refine test conditions in JVET-X2017, generate anchors, identify new test sequences to be added, especially high resolution ones in 8K, in coordination with AHG4. * Analyse the results of exploration experiments described in JVET-X2024 in coordination with the EE coordinators. * Coordinate with AHG11 to study the interaction with neural network-based coding tools. | M. Karczewicz, Y. Ye and L. Zhang (co-chairs), B. Bross, X. Li, K. Naser, H. Yang (vice chairs) | N |
| **Film grain technologies (AHG13)**  ([jvet@lists.rwth-aachen.de](mailto:jvet@lists.rwth-aachen.de))   * Study the existing FGC SEI messages in VSEI, HEVC, and AVC. * Study the benefits and characteristics of film grain technologies, including autoregressive and frequency-filtering technologies. * Study encoder technologies for determining values for FGC SEI message syntax elements. * Prepare draft text for a technical report on the use of the FGC SEI message providing examples of different technologies including examples of encoder-side and post-decode processing while considering existing implementations. * Identify potential need for additional film grain technology SEI messages. * Coordinate development of film grain technology software and configuration files. * Study and evaluate available test content (both SDR and HDR) for use in film grain technology development in coordination with AHG4. * Coordinate with AHG3 for software support of the FGC SEI message. | W. Husak, W. Wan and M. Radosavljević (co-chairs), D. Grois, A. Tourapis (vice-chair) | N |