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| **ITU – Telecommunications Standardization Sector**  STUDY GROUP 16 Question 6  **Video Coding Experts Group (VCEG)**  74th Meeting: 12-19 July 2024, Sapporo, JP | Document VCEG-BV01 |

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| Question: | Q.6/SG16 (VCEG) | | |
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| Title: | **Report of AHG on coding of medical and general waveform data** | | |
| Purpose: | AHG report | | |

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1. **Introduction**

The mandates of the AHG are:

* Perform gap analysis
* Study requirements
* Collect example signal data for experimentation
* Produce a draft A.1 justification for development of a Recommendation on the subject
* Communicate with DICOM on the above goals

1. **Activities**

At the 15–26 April 2024 meeting of ITU-T SG16, a Call for Proposals (CfP) SG16-TD286-R1/PLEN on the coding of biomedical waveform data as well as a A.1 justification for proposed draft new Recommendation for ITU-T H.BWC "Biomedical and general waveform signal coding" have been issued and publicly released. A need for the coding of such time-based neurophysiology signal data was reported to Q6/16 in the liaison statement SG16-TD103/Gen from DICOM WG32. It has since been demonstrated in the response VCEG-BU03 to the Q6/16 Call for Evidence (CfE) VCEG-BT07 on the coding of biomedical waveform data that compression technology exists with significantly higher compression performance than the identified benchmark set.

According to the A.1 justification, the new ITU-T Recommendation shall provide a compressed coding format for medical waveform data, (e.g. neurophysiology, electrocardiography, and so on), targeted towards medical applications in DICOM and other organizations. Moreover, it may also address the coding of more general waveform signals (e.g. seismographic data).

The updated Call for Proposals as approved by SG16 (with the A.1 justification as an annex) can be found at <https://www.itu.int/en/ITU-T/studygroups/2022-2024/16/Documents/docs/CfP-H.BWC-TD-PLEN-0286-R1-Clean.pdf>.

The Call for Proposals specifies three categories of input signals (EEG, EMG and ECG data) which are to be used in the submitted response. It also defines error measures, based on the mean squared error, and specifies the required rate-points. Responses to the call shall be submitted to the Q6/16 meeting in October/November 2024. Experts of Q6/16 discussed the CfP document with experts from DICOM WG32 in multiple teleconferences and email exchanges. In order to further disseminate the Call for Proposals and the new activities on ITU-T H.BWC, an announcement and description of the call have been published by DICOM WG32 and Q6/16 experts in the journal “Clinical Neurophysiology”, which is the official journal of DICOM WG32’s parent society.

A slight inconsistency within the use of the dataset MIT\_ECG\_Dataset has been observed for the document VCEG-BU03. More precisely, in VCEG-BU03, only the first 650,000 samples of the 650,160 samples per channel are encoded. The reason for this inconsistency is that an update of this dataset by DICOM took place between the time at which the CfE was issued and the time at which the CfP was issued and that the last 160 samples were not present during the preparation of VCEG-BU03.

# Recommendations

The AHG recommends

* To study existing lossy audio codecs with respect to their suitability for compression of biomedical and general waveform data
* To further disseminate the Call for Proposals on the compression of biomedical waveform data
* To evaluate responses to the Call for Proposals at the Antalya meeting and to then start with the technical work on the new ITU-T Recommendation H.BWC
* To communicate with DICOM on the above goals

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