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Foreword

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Information technology — MPEG audio technologies —

Part 8:
Biomedical and general waveform signal coding

1 Scope

This Recommendation | International Standard specifies an interoperable format for efficient compression, transmission, and storage of waveform signals, including biomedical waveform signals such as electrocardiography (ECG), electroencephalography (EEG), electromyography (EMG), and photoplethysmogram (PPG) data, as well as other types of general waveform data. It supports various bit depths, a broad range of sampling rates, and large numbers of channels, as required by a range of biomedical and general signal processing applications. The Specification provides for lossy, near-lossless, and lossless compression, and includes features such as optimized data blocking, indexing for rapid access, independent channel decoding, and metadata support including metadata enabling support of efficient artificial intelligence-based workflows.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

— None.

2.2 Paired Recommendations | International Standards equivalent in technical content

— None.

2.3 Additional references

ISO/IEC 10646:2020, *Information technology — Universal coded character set (UCS)*

IETF RFC 3986, *Uniform Resource Identifier (URI): Generic Syntax, DOI 10.17487/RFC3986, January 2005, https://www.rfc-editor.org/info/rfc3986*

ISO/IEC 23001-17:2024, *Information technology — MPEG systems technologies, Part 17: Carriage of uncompressed video and images in ISO base media file format*

ITU-R Recommendation TF.460-6, *(02/2022), Standard-frequency and time-signal emissions*

ITU-R Recommendation BS.2088-1, *(10/2019), Long-form file format for the international exchange of audio programme materials with metadata*

ISO 8601:2019, *Date and time — Representations for information interchange*

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ISO/IEC 23008-3:2022, *Information technology — High efficiency coding and media delivery in heterogeneous environments, Part 3: 3D audio*

ISO/IEC 11578:1996, *Information technology — Open Systems Interconnection — Remote Procedure Call (RPC), Annex A*

NIST FIPS PUB 180-4 (2015), *Secure Hash Standard (SHS)*

3 Terms and Definitions

For the purposes of this Recommendation | International Standard, the following definitions apply.

3.1
bin:
One bit of a *bin string*.

3.2
bin string:
An intermediate binary representation of values of *syntax elements* from the *binarization* of the *syntax element*.

3.3
binarization:
A set of *bin strings* for all possible values of a *syntax element*.

3.4
bitstream:
A sequence of bits that forms the representation of one or more *coded waveform sequences*.

3.5
coded waveform sequence (CWS):
A sequence of packets having the same WPS_waveform_parameter_set_id and containing at least one *independent frame.*

3.6
context variable:
A variable specified for the context-based adaptive binary arithmetic decoding process of clause 9.5 of a *bin* in a manner that depends on the values of previously decoded *bins*.

3.7
decoder:
An embodiment of a *decoding process*.

3.8
decoding order:
The order in which *syntax elements* are processed by the *decoding process*.

3.9
decoding process:
The process specified in this Specification that reads a *bitstream* and derives *decodedsamples* from it.

3.10
dependent frame (DF):
A *stream packet* with stream_packet_type equal to DF_SPT.

3.11
encoder:
An embodiment of an *encoding process*.

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3.12
encoding process:
A process that accepts waveform data as input and produces a *bitstream* conforming to this Specification.

3.13
flag:
A variable or single-bit *syntax element* that can take one of the two possible values 0 and 1.

3.14
frame:
Either an *independent frame* or a *dependent frame*.

3.15
frame sequence:
A sequence of *frames* that starts with an *independent frame* followed by zero or more *dependent frames.*

3.16
independent frame (IF):
A *stream packet* with stream_packet_type equal to IF_SPT.

3.17
stream packet:
A string of bytes containing a *stream packet header* and the *syntax structure* containing that data.

3.18
stream packet header:
A *syntax structure* specifying the header of a *stream packet*. It contains a stream_packet_type, a stream_packet_label and a stream_packet_length *syntax element* that identifies the number of bytes in the *syntax structure* that follows within the *stream packet*.

3.19
stream packet stream:
A sequence of *stream packets*.

3.20
syntax element:
An element of data represented in the *bitstream*.

3.21
syntax structure:
Zero or more *syntax elements* that are present together in the *bitstream* in a specified order.

3.22
transform:
A part of the *decoding process* by which a *block* of *transform coefficients* is converted to a *block* of time-domain values.

3.23
transform block:
A *block* of samples resulting from a *transform* in the *decoding process*.

3.24
transform coefficient:
A scalar quantity, considered to be in a frequency domain, that is associated with a particular *frequency index* in a *transform* in the *decoding process*.

3.25
transform coefficient level:
An integer quantity representing the value associated with a particular frequency index in the *decoding process* prior to *scaling* for computation of a *transform coefficient* value.

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