INTERNATIONAL STANDARD

ISO/IEC 23001-11

First edition
2015-07-15

AMENDMENT 2
2018-04

Information technology — MPEG systems technologies —

Part 11: Energy-efficient media consumption (green metadata)

AMENDMENT 2: Conformance and reference software

Technologies de l'information — Technologies des systèmes MPEG —

Partie 11: Consommation des supports éconergétiques (métadonnées vertes)

AMENDEMENT 2: Conformité et logiciel de référence

Reference number
ISO/IEC 23001-11:2015/Amd.2:2018(E)

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Published in Switzerland

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, SC 29, *Coding of audio, picture, multimedia and hypermedia information.*

A list of all parts in the ISO/IEC 23001 series can be found on the ISO website.

Information technology — MPEG systems technologies —

Part 11: Energy-efficient media consumption (green metadata)

AMENDMENT 2: Conformance and reference software

Normative references

Add the following references:

ISO/IEC 14496-5, *Information technology — Coding of audio-visual objects — Part 5: Reference software* | Rec. ITU-T H.264.2, *Reference software for* ITU-T H.264 *advanced video coding*

ISO/IEC 23008-5, *Information technology — High efficiency coding and media delivery in heterogeneous environments — Part 5: Reference software for high efficiency video coding*

Terms, definitions, symbols, abbreviated terms and conventions

Add the following abbreviated terms:

BMFF	Base Media File Format
fps	frame per second
Mbps	megabits per second

Clause 8

At the end of Clause 8 add a new Clause 9:

9 Conformance and reference software

Conformance and reference software for green metadata shall be used as specified in Annex C.

Annex C

Add a new normative annex after Annex B:

Annex C
(normative)

Conformance and reference software

C.1 Complexity metrics for decoder-power reduction

C.1.1 Conformance test vectors

The following two 4:2:0 8 bit per sample AVC conformance bitstreams with embedded Green Metadata SEI message are available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

Name	Resolution/ Frame rate (fps)	RAP period (number of frames)	Bitrate (Mbps)	Green Metadata SEI period (number of frames)	Profile	Expected value
mobcal_480p50_AVC_HP.bin	704x480p@50	15	2.798	1	High	mobcal_480p50_AVC_HP.txt
stockholm_720p5994_AVC_HP.bin	1280x720p@59.94	15	7.205	1	High	stockholm_720p5994_AVC_HP.txt

To verify conformance of a software implementation of Green Metadata SEI message parsing, the conformance streams shall be used to check that extracted values match expected values given in the side text files provided with the conformance streams.

C.1.2 Reference software

The reference decoder software as specified in ISO/IEC 14496-5 or Rec. ITU-T H.264.2 integrates a Green Metadata SEI message parser, which extracts and displays SEI messages from conformance and test bitstreams.

To enable the Green Metadata SEI message parser, the source code shall be compiled with the macro #define PRINT_GREEN_METADATA_INFO.

To verify conformance of a test Green Metadata SEI message generated from a video in a test bitstream, the reference software shall be used to extract the test SEI message from the test bitstream and then to check the message for syntactic correctness and valid ranges.

C.2 Display-power reduction using display adaptation

C.2.1 Conformance test vectors

One conformance ISO BMFF file, BasketballDrill_28_gamma.mp4m, which contains Green Metadata samples of 'dfce' Sample Entry Type, as specified in ISO/IEC 23001-10, is available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

It is composed of a sample entry which contains static metadata and samples which contain dynamic metadata.

To verify conformance of a software implementation of 'dfce' Green Metadata samples parsing in an ISO BMFF file, the conformance file shall be used to check that extracted values match expected values given in the side text file provided with the conformance file.

C.2.2 Reference software

A reference software for parsing and display of 'dfce' Green Metadata samples in ISO BMFF file is available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

It is linked with ISO BMFF reference software libraries (IsoLib), which are available in ISO/IEC 14496-5.

A readme.txt is provided to explain how to produce the executable in a Windows or Linux environment.

The reference software takes the ISO BMFF metadata file (*.mp4m) as input and produces a text file as output, which gives a full description of the metadata stored in the samples of the input file.

To verify conformance of test metadata files, the reference software shall be used to parse the test metadata files and check them for syntactic correctness and valid ranges.

C.3 Energy-efficient media selection

C.3.1 Conformance test vectors

A conformance test vector for decoder-power indication metadata is available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

It consists of a set of:

— ten ISO BMFF video files, which provide ten AVC video representations, with (sub)segments duration of 2 s, at the following resolutions and bitrates:

  — 1920x1080p50 @ 10Mbps

  — 1920x1080p50 @ 8Mbps

  — 1600x900p50 @ 8Mbps

  — 1600x900p50 @ 6Mbps

  — 1280x720p50 @ 6Mbps

  — 1280x720p50 @ 5Mbps

  — 960x540p50 @ 5Mbps

  — 960x540p50 @ 3.5Mbps

  — 768x432p50 @ 3.5Mbps

  — 768x432p25 @ 2.5Mbps

— ten ISO BMFF metadata files, which provide associated decoder-power indication ('depi') metadata representation of each video representation, and

— a manifest file, conformant to ISO/IEC 23009-1.

The ISO BMFF metadata files contain Green Metadata samples of 'depi' Sample Entry Type, as specified in ISO/IEC 23001-10.

To verify conformance of a software implementation of 'depi' Green Metadata samples parsing in an ISO BMFF file, the conformance metadata files shall be used to check that extracted values match expected values given in the side text files provided with the conformance files.

C.3.2 Reference software

A reference software for parsing and display of decoder-power ('depi') or display-power ('dipi') indication metadata in ISO BMFF file is available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

It is linked with ISO BMFF reference software libraries (IsoLib), which are available in ISO/IEC 14496-5.

A readme.txt is provided to explain how to produce the executable in Windows or Linux environment.

The reference software takes the ISO BMFF metadata file (*.mp4m) as input and produces a text file as output, which gives a full description of the metadata stored in the samples of the input file.

To verify conformance of test metadata files, the reference software shall be used to parse the test metadata files and check them for syntactic correctness and valid ranges.

C.4 Metrics for quality recovery after low-power encoding

C.4.1 Conformance test vectors

The following 4:2:0 8 bits AVC conformance bitstream with embedded Green Metadata SEI message is available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

Name	Resolution/Frame rate (fps)	Bitrate (Mbps)	Profile	Expected value
crowdrun_1080p50_AVC_HP.bin	1920x1080p@50	10	High	28.70

The bitstream embeds for the last frame a SEI message that contains PSNR value of this frame, as described in this document.

To verify conformance of a software implementation of Green Metadata SEI message parsing, the conformance stream can be used to check that the extracted PSNR value matches the expected value given in the side text file provided with the conformance stream.

The following 4:2:0 8 bit per sample HEVC conformance bitstream with embedded Green Metadata SEI message is available at http://standards.iso.org/iso-iec/23001/-11/ed-1/amd/2/en.

Name	Resolution/Frame rate (fps)	Bitrate (Mbps)	Profile	Expected value
kimono_1080p24_HEVC_MP.bin	1920x1080p@24	1	Main	37.99

The bitstream embeds for the last frame a SEI message that contains the PSNR value of this frame as described in this document.

To verify conformance of a software implementation of Green Metadata SEI message parsing, the conformance stream shall be parsed to check that the PSNR extracted value matches the expected value given in the side text file provided with the conformance stream.

C.4.2 Reference software

Reference decoder software provided in ISO/IEC 14496-5 or Rec. ITU-T H.264.2 integrates a Green Metadata SEI message parser, which extracts and displays SEI messages from conformance and test bitstreams.

To enable the Green Metadata SEI message parser, the source code shall be compiled with the macro #define PRINT_GREEN_METADATA_INFO.

Reference decoder software as specified in ISO/IEC 23008-5 integrates a Green Metadata SEI message parser, which extracts and displays SEI messages from conformance and test bitstreams.

To verify conformance of a test Green Metadata SEI message generated from a video in a test bitstream, the reference software shall be used to extract the test SEI message from the test bitstream and then check the message for syntactic correctness and valid ranges.

