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Information technology — Generic coding of moving pictures and associated audio information —

Part 4: Conformance testing

Technologies de l'information — Codage générique des images animées et des informations sonores associées —

Partie 4: Essais de conformité

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

ISO/IEC 13818-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition, of which it constitutes a minor revision. It also incorporates the Amendments ISO 13818-4/Amd.1:1999, ISO 13818-4/Amd.2:2000 and ISO 13818-4/Amd.3:2000 and the Technical Corrigenda ISO 13818-4/Cor.2:1998, ISO 13818-4/Amd.1:1999/Cor.1:2003 and ISO 13818-4/Amd.3:2000/Cor.1:2003.

ISO/IEC 13818 consists of the following parts, under the general title *Information technology — Generic coding of moving pictures and associated audio information*:

— *Part 1: Systems*

— *Part 2: Video*

— *Part 3: Audio*

— *Part 4: Conformance testing*

— *Part 5: Software simulation* [Technical Report]

— *Part 6: Extensions for DSM-CC*

— *Part 7: Advanced Audio Coding (AAC)*

— *Part 9: Extension for real time interface for systems decoders*

— *Part 10: Conformance extensions for Digital Storage Media Command and Control (DSM-CC)*

— *Part 11: IPMP on MPEG-2 systems*

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Introduction

Parts 1, 2, 3 and 7 of ISO/IEC 13818 specify a multiplex structure and coded representations of audio-visual information. Parts 1, 2, 3 and 7 of ISO/IEC 13818 allow for large flexibility, achieving suitability of ISO/IEC 13818 for many different applications. The flexibility is obtained by including parameters in the bitstream that define the characteristics of coded bitstreams. Examples are the audio sampling frequency, picture size, picture rate and bitrate parameters.

This part of ISO/IEC 13818 specifies how tests can be designed to verify whether bitstreams and decoders meet the requirements as specified in parts 1, 2, 3 and 7 of ISO/IEC 13818. These tests can be used for various purposes such as:

- Manufacturers of encoders, and their customers, can use the tests to verify whether the encoder produces valid bitstreams.

- Manufacturers of decoders and their customers can use the tests to verify whether the decoder meets the requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818 for the claimed decoder capabilities.

The International Organization for Standardization and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this part of ISO/IEC 13818 may involve the use of patents.

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured the ISO and IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patents right are registered with ISO and IEC. Information may be obtained from the companies listed in Annex E.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 13818 may be the subject of patent rights other than those identified in Annex E. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

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Information technology — Generic coding of moving pictures and associated audio information —

Part 4: Conformance testing

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1 Scope

This part of ISO/IEC 13818 specifies how tests can be designed to verify whether bitstreams and decoders meet requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818. In this part of ISO/IEC 13818, encoders are not addressed specifically. An encoder may be said to be an ISO/IEC 13818 encoder if it generates bitstreams compliant with the syntactic and semantic bitstream requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818.

Characteristics of coded bitstreams and decoders are defined for parts 1, 2, 3 and 7 of ISO/IEC 13818. The characteristics of a bitstream define the subset of the standard that is exploited in the bitstream. Examples are the applied values or range of the picture size and bitrate parameters. Decoder characteristics define the properties and capabilities of the applied decoding process. An example of a property is the applied arithmetic accuracy. The capabilities of a decoder specify which coded bitstreams the decoder can decode and reconstruct, by defining the subset of the standard that may be exploited in decodable bitstreams. A bitstream can be decoded by a decoder if the characteristics of the coded bitstream are within the subset of the standard specified by the decoder capabilities.

Procedures are described for testing conformance of bitstreams and decoders to the requirements defined in parts 1, 2, 3 and 7 of ISO/IEC 13818. Given the set of characteristics claimed, the requirements that must be met are fully determined by parts 1, 2, 3 and 7 of ISO/IEC 13818. This part of ISO/IEC 13818 summarises the requirements, cross references them to characteristics, and defines how conformance with them can be tested. Guidelines are given on constructing tests to verify bitstream and decoder conformance. This document gives guidelines on how to construct bitstream test suites to check or verify decoder conformance. In addition, some test bitstreams implemented according to those guidelines are provided as an electronic annex to this document.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 639 (all parts), *Codes for the representation of names of languages*

ISO 8859-1, *Information processing — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 11172-1, *Information technology — Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s — Part 1: Systems*

ISO/IEC 11172-2:1993, *Information technology — Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s — Part 2: Video*

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ISO/IEC 11172-3:1993, *Information technology — Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s — Part 3: Audio*

ISO/IEC 11172-4, *Information technology — Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s — Part 4: Compliance testing*

ISO/IEC 13818-1:2000, *Information technology — Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-2:2000, *Information technology — Generic coding of moving pictures and associated audio information: Video*

ISO/IEC 13818-3:1998, *Information technology — Generic coding of moving pictures and associated audio information — Part 3: Audio*

ISO/IEC 13818-7:2004, *Information technology — Generic coding of moving pictures and associated audio information — Part 7: Advanced Audio Coding (AAC)*

IEEE Std 1180-1990, *IEEE Standard Specifications for the Implementations of 8 by 8 Inverse Discrete Cosine Transform*, December 6, 1990

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3 Terms and definitions

For the purposes of this document, the following definitions apply.

3.1 16x8 prediction [video]: A prediction mode similar to field-based prediction but where the predicted block size is 16x8 luminance samples.

3.2 AC coefficient [video]: Any DCT coefficient for which the frequency in one or both dimensions is non-zero.

3.3 access unit [systems]: A coded representation of a presentation unit. In the case of audio, an access unit is the coded representation of an audio frame.
In the case of video, an access unit includes all the coded data for a picture, and any stuffing that follows it, up to but not including the start of the next access unit. If a picture is not preceded by a group_start_code or a sequence_header_code, the access unit begins with the picture start code. If a picture is preceded by a group_start_code and/or a sequence_header_code, the access unit begins with the first byte of the first of these start codes. If it is the last picture preceding a sequence_end_code in the bitstream all bytes between the last byte of the coded picture and the sequence_end_code (including the sequence_end_code) belong to the access unit.

3.4 adaptive bit allocation [audio]: The assignment of bits to subbands in a time and frequency varying fashion according to a psychoacoustic model.

3.5 adaptive multichannel prediction [audio]: A method of multichannel data reduction exploiting statistical inter-channel dependencies.

3.6 adaptive noise allocation [audio]: The assignment of coding noise to frequency bands in a time and frequency varying fashion according to a psychoacoustic model.

3.7 adaptive segmentation [audio]: A subdivision of the digital representation of an audio signal in variable segments of time.

3.8 alias [audio]: Mirrored signal component resulting from sub-Nyquist sampling.

3.9 analysis filterbank [audio]: Filterbank in the encoder that transforms a broadband PCM audio signal into a set of subsampled subband samples.

3.10 ancillary data [audio]: part of the bitstream that might be used for transmission of ancillary data.

3.11 audio access unit [audio]: For Layers I and II, an audio access unit is defined as the smallest part of the encoded bitstream which can be decoded by itself, where decoded means "fully reconstructed sound". For Layer III, an audio access unit is part of the bitstream that is decodable with the use of previously acquired main information.

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