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Information technology — Scalable compression and coding of continuous-tone still images —

Part 4:
Conformance testing

Technologies de l'information — Compression échelonnable et codage d'images plates en ton continu —

Partie 4: Essai 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.

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 ISO documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

A list of all parts in the ISO/IEC 18477 series can be found on the ISO website.

Introduction

The ISO/IEC 18477 series, also known under the term JPEG XT, specifies lossy and lossless codestream formats for storage of continous-tone high and low dynamic range photographic content. All parts of the ISO/IEC 18477 series are compatible to the Recommendation ITU-T T.81 | ISO/IEC 10918, also commonly known as JPEG. That is, any decoder conforming to the latter standard will be able to reconstruct codestreams from the ISO/IEC 18477 series to an 8 bits/sample image. Additional features offered by ISO/IEC 18477, such as representation of intermediate or high-dynamic range images, or lossless reconstruction require an extended decoder that implements, in addition to the Rec. ITU-T T.81 | ISO/IEC 10918-1, also one or multiple members of ISO/IEC 18477.

This document provides the framework, concepts and methodology for testing codestreams and implementations, and the criteria to be achieved to claim conformance to the parts and profiles of ISO/IEC 18477. The objective of this document is to promote interoperability between JPEG XT decoders, and to test these systems for conformance to one or multiple specifications that are part of the JPEG XT. Conformance testing is the testing of a candidate implementation for the existence of specific characteristics required by a standard. It involves testing the capabilities of an implementation against the conformance requirements in the relevant standard.

The purpose of this document is to define a common test methodology, to provide a framework for specific abstract test suites (ATS) and to define the procedures to be followed during conformance testing.

Any organization contemplating the use of the test methods defined in this document should carefully consider the constraints on their applicability. Conformance testing does not include robustness testing, acceptance testing, and performance testing, all of which are outside the scope of this text.

Information technology — Scalable compression and coding of continuous-tone still images —

Part 4:
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1 Scope

This document specifies the framework, concepts, methodology for testing, and criteria to be achieved to claim conformance to one or multiple parts of ISO/IEC 18477 as listed below. It provides a framework for specifying abstract test suites and for defining the procedures to be followed during conformance testing.

This document

— specifies conformance testing procedures for decoding of ISO/IEC 18477-1, 18477-2, ISO/IEC 18477-6, ISO/IEC 18477-7, ISO/IEC 18477-8 and ISO/IEC 18477-9,

— specifies conformance testing procedures for codestreams to the above International Standards,

— specifies codestreams, decoded images, and error metrics to be used within the decoder testing procedures, and

— specifies abstract test suites.

This document does not include the following tests:

— testing **decoders** for conformance to ISO/IEC 18477-3 only. ISO/IEC 18477-6, ISO/IEC 18477-7, ISO/IEC 18477-8 and ISO/IEC 18477-9 are extensions of ISO/IEC 18477-3 and the required functionality of ISO/IEC 18477-3 is tested as part of the former standards. Testing **codestreams** for conformance to ISO/IEC 18477-3 is specified in C.2;

— testing codestreams for conformance to ISO/IEC 18477-7 beyond testing them for conformance to individual profiles of this document. Testing such codestreams ("full profile codestreams") for syntactical correctness is, however, covered by testing them for conformance to ISO/IEC 18477-3;

— testing of the composition of background and foreground for images reconstructed from ISO/IEC 18477-9 codestreams as this operation is application dependent;

— acceptance testing: the process of determining whether an implementation satisfies acceptance criteria and enables the user to determine whether or not to accept the implementation. This includes the planning and execution of several kinds of tests (e.g. functionality, quality, and speed performance testing) that demonstrate that the implementation satisfies the user requirements;

— performance testing: measures the performance characteristics of an implementation under test (IUT) such as its throughput, responsiveness, etc. under various conditions.

— robustness testing: the process of determining how well an implementation process data which contains errors.

The ISO/IEC 18477 series consists of multiple parts, each of which defines one or multiple profiles. A given IUT (implementation under test) may claim to implement various parts and profiles of ISO/IEC 18477 at once. To test such implementations, they have to be tested with the Abstract Test Suites of each part and profile they claim to conform to.

2   Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC 18477-1, *Information technology — Scalable compression and coding of continuous-tone still images — Part 1: Scalable compression and coding of continuous-tone still images*

ISO/IEC 18477-2, *Information technology — Scalable compression and coding of continuous-tone still images — Part 2: Coding of high dynamic range images*

ISO/IEC 18477-3, *Information technology — Scalable compression and coding of continuous-tone still images — Part 3: Box file format*

ISO/IEC 18477-6, *Information technology — Scalable compression and coding of continuous-tone still images — Part 6: IDR Integer Coding*

ISO/IEC 18477-7, *Information technology: Scalable compression and coding of continuous-tone still images, HDR floating point coding*

ISO/IEC 18477-8, *Information technology — Scalable compression and coding of continuous-tone still images — Part 8: Lossless and near-lossless coding*

ISO/IEC 18477-9, *Information technology — Scalable compression and coding of continuous-tone still images — Part 9: Alpha channel coding*

ISO/IEC 10918-1, *Information technology — Digital compression and coding of continuous tone still images — Requirements and guidelines*

3   Terms, definitions, abbreviated terms and symbols

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

—   IEC Electropedia: available at http://www.electropedia.org/

—   ISO Online browsing platform: available at http://www.iso.org/obp

3.1   Terms and definitions

3.1.1
abstract test suite
generic conformance testing concepts and procedures for a given requirement

3.1.2
ASCII
binary encoding of 7-bit characters defined by ISO/IEC 646

3.1.3
base decoding path
process of decoding *legacy codestream* (3.1.43) and refinement data to the *base image* (3.1.4), jointly with all further steps until residual data is added to the values obtained from the residual codestream

3.1.4
base image
collection of sample values obtained by entropy decoding the DCT coefficients of the *legacy codestream* (3.1.43) and the refinement codestream, and inversely DCT transforming them jointly