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Part 3: Conformance testing

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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.

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 or www.iec.ch/members_experts/refdocs).

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For an explanation of 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 www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint 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 21794 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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Introduction

This document is part of a series of standards for a system known as JPEG Pleno. The ISO/IEC 21794 series aims to provide a standard framework for representing new imaging modalities. It facilitates the capture, representation, exchange and visualization of plenoptic imaging modalities. A plenoptic image modality can be a light field, point cloud or hologram, which are sampled representations of the plenoptic function in the form of, respectively, a vector function that represents the radiance of a discretized set of light rays, a collection of points with position and attribute information, or a complex wavefront. The plenoptic function describes the radiance in time and in space obtained by positioning a pinhole camera at every viewpoint in 3D spatial coordinates, every viewing angle and every wavelength, resulting in a 7D function.

JPEG Pleno is designed primarily to facilitate the capture, representation, exchange and visualization of point cloud, light field and holographic imaging modalities. It specifies tools for coding these modalities while providing advanced functionality at the system level, such as support for data and metadata manipulation, editing, random access and interaction, protection of privacy and ownership rights, as well as other security mechanisms.

This document provides the framework, concepts and methodology for testing codestreams and implementations, and the criteria to be achieved to claim conformance to the ISO/IEC 21794 series. The objective of this document is to promote interoperability between JPEG Pleno decoders, and to test these systems for conformance to one or multiple specifications that are part of the JPEG Pleno. 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 test cases 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 or performance testing, all of which are outside the scope of this document.

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Information technology — Plenoptic image coding system (JPEG Pleno) —

Part 3: Conformance testing

1 Scope

This document provides the conformance testing of the ISO/IEC 21794 series, also known as JPEG Pleno.

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 21794-1, *Information technology — Plenoptic image coding system (JPEG Pleno) — Part 1: Framework*

ISO/IEC 21794-2:2021, *Information technology — Plenoptic image coding system (JPEG Pleno) — Part 2: Light field coding*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 21794-1 and ISO/IEC 21794-2 and the following apply.

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

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

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

3.1
baseline block-based profile
BBBP
4D transform mode coding tools

3.2
baseline view-based profile
BVBP
4D prediction mode coding tools

3.3
box
structured collection of data describing a portion of the file format defined by a length and unique box type

3.4
conformance
fulfilment of the specified requirements for a given profile

Note 1 to entry: The specified requirements are those defined in this document.

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3.5
conformance test procedure
steps for assessing *conformance* (3.4)

3.6
executable test suite
ETS
set of executable test cases that support the abstract test cases

3.7
file format
codestream and its additional support information encoded for storage in a computer file

3.8
header
part of the codestream that contains only markers and marker segments

3.9
image
set of all components

3.10
implementation
realization of a specification

3.11
mean squared error
MSE
average squared difference between the decoded values and the pristine value

3.12
parser
program for syntax analysis

3.13
precision
number of binary digits allocated to a given sample

3.14
prediction mode codestream
ISO/IEC 21794-2 codestream obtained using the 4DPM coding tools

3.15
peak signal-to-noise ratio
PSNR
fidelity measurement between the original and decompressed signal

3.16
test codestream
TCS
available codestream designed to test specific tools

3.17
testing
process of evaluating conformance

3.18
transform mode codestream
ISO/IEC 21794-2 codestream obtained using the 4DTM coding tools

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