INTERNATIONAL STANDARD

ISO/IEC 21122-1

First edition 2019-05

Information technology — JPEG XS low-latency lightweight image coding system —

Part 1:

Core coding system



ISO/IEC 21122-1:2019(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office CP 401 • Ch. de Blandonnet 8 CH-1214 Vernier, Geneva Phone: +41 22 749 01 11 Fax: +41 22 749 09 47 Email: copyright@iso.org Website: www.iso.org

Published in Switzerland

Contents		Page
Fore	eword	iv
Intro	oduction	v
1	Scope	1
2	Normative references	
3	Terms and definitions, abbreviated terms and symbols 3.1 Terms and definitions 3.2 Abbreviated terms 3.3 Symbols	
4	Conventions 4.1 Conformance language 4.2 Operators 4.2.1 Arithmetic operators 4.2.2 Logical operators 4.2.3 Relational operators 4.2.4 Precedence order of operators 4.2.5 Mathematical functions	
5	Functional concepts 5.1 Sample grid, sampling and components 5.2 Wavelet decomposition 5.3 Codestream	10
6	Encoder requirements	11
7	Decoder7.1 Decoding process general provisions7.2 Decoder requirements	11
Ann	ex A (normative) Codestream syntax	14
Ann	ex B (normative) Image data structures	23
Ann	ex C (normative) Entropy decoding	32
Ann	ex D (normative) Quantization	48
Ann	ex E (normative) Discrete wavelet transformation	52
Ann	ex F (normative) Multiple component transformations	61
Ann	ex G (normative) DC level shifting and output clipping	63
	ex H (informative) Examples and guidelines	
Rihli	iography	70

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC 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) or the IEC list of patent declarations received (see http://patents.iec.ch).

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

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.

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 21122 series can be found on the ISO website.

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.

Introduction

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

ISO and IEC take no position concerning the evidence, validity and scope of this patent right. The holder of this patent right has assured ISO and IEC that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO and IEC. Information may be obtained from:

INTOPIX SA

Rue Emile Francqui 9

B-1435 Mont-Saint-Guibert, Belgium

Fraunhofer-Gesellschaft zur Foerderung der angewandten Forschung e.V. for its Fraunhofer Institute for Integrated Circuits IIS

Am Wolfsmantel 33

91058 Erlangen, Germany

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

Information technology — JPEG XS low-latency lightweight image coding system —

Part 1: **Core coding system**

1 Scope

This document defines a syntax (and an accompanying decompression process) that is capable to represent continuous-tone grey-scale, or continuous-tone colour digital images without visual loss at moderate compression rates. Typical compression rates are between 2:1 and 6:1 but can also be higher depending on the nature of the image. In particular, the syntax and the decoding process specified in this document allow lightweight encoder and decoder implementations that limit the end-to-end latency to a fraction of the frame size. However, the definition of transmission channel buffer models necessary to ensure such latency is beyond the scope of this document.

This document:

- specifies a decoding process for converting compressed image data to reconstructed image data;
- specifies a codestream syntax containing information for interpreting the compressed image data;
- provides guidance on encoding processes for converting source image data to compressed image data.

2 Normative references

There are no normative references in this document.