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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.

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 patents.

The 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 patent rights are registered with the ISO and IEC. Information may be obtained from the companies listed in Annex L.

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 in Annex L. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15444-11 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. T.810.

ISO/IEC 15444 consists of the following parts, under the general title *Information technology — JPEG 2000 image coding system*:

— *Part 1: Core coding system*
— *Part 2: Extensions*
— *Part 3: Motion JPEG 2000*
— *Part 4: Conformance testing*
— *Part 5: Reference software*
— *Part 6: Compound image file format*
— *Part 8: Secure JPEG 2000*
— *Part 9: Interactivity tools, APIs and protocols*
— *Part 10: Extensions for three-dimensional data*
— *Part 11: Wireless*
— *Part 12: ISO base media file format*
— *Part 13: An entry level JPEG 2000 encoder*

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INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – JPEG 2000 image coding system: Wireless

1 Scope

This Recommendation | International Standard defines, in an extensible manner, syntaxes and methods for the protection against errors that may occur during the transmission of JPEG 2000 codestreams compliant with ITU-T Rec. T.800 | ISO/IEC 15444-1.

In this Recommendation | International Standard, these are referred to as Wireless JPEG 2000, "JPWL", and applications using JPWL are referred to as a "JPWL system".

JPWL specifies a set of tools consisting of additional data structures to JPEG 2000 codestreams and error protection techniques, necessary for error correction and signalling. This Recommendation | International Standard includes definitions of the semantics, and suggests how these may be used.

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2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

– ITU-T Recommendation T.800 (2002) | ISO/IEC 15444-1:2004, *Information technology – JPEG 2000 image coding system: Core coding system*.

3 Terms and definitions

For the purposes of this Recommendation | International Standard, the following terms and definitions apply. The definitions defined in ITU-T Rec. T.800 | ISO/IEC 15444-1 clause 3 apply to this Recommendation | International Standard.

3.1 backward compatible: Includes all techniques that produce a bitstream that will lead the Part-1 decoder to decode/display according to JPEG 2000 Part 4 (ITU-T Rec. T.803 | ISO/IEC 15444-4) specifications in case of error-free environment.

3.2 backward compatible with extensions: Includes all techniques that produce a bitstream that will not lead the Part-1 decoder to crash in case of error-free environment. A JPWL decoder is required to correctly decode/display images.

3.3 big endian: The bits of a value representation occur in order from most significant to least significant.

3.4 bitstream: The sequence of bits resulting from the coding of a sequence of symbols. It does not include the markers or marker segments in the main and tile-part headers or the EOC marker. It does include any packet headers and in stream markers and marker segments not found within the main or tile-part headers.

3.5 Bit Error Rate (BER): The BER is defined as the statistical expected value of the ratio between the number of erroneous bits in the received data and the size of the received data themselves.

3.6 code-block: A rectangular grouping of coefficients from the same subband of a tile-component.

3.7 codestream: A collection of one or more bit streams and the main header, tile-part headers, and the EOC required for their decoding and expansion into image data. This is the image data in a compressed form with all of the signalling needed to decode.