INTERNATIONAL STANDARD

ISO/IEC 13818-1

Fifth edition
2015-07-01

AMENDMENT 3
2016-07-15

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

Part 1: **Systems**

AMENDMENT 3: Carriage of green metadata in MPEG2 systems

Technologies de l'information — Codage générique des images animées et du son associé —

Partie 1: Systèmes

AMENDEMENT 3: Transport des métadonnées vertes dans les systèmes MPEG2

Reference number
ISO/IEC 13818-1:2015/Amd.3:2016(E)

ISO copyright office
Case postale 401 • CH-1214 Vernier, Geneva
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

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.

Amendment 3 to ISO/IEC 13818-1:2015 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 H.222.0 (12/2015).

INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – Generic coding of moving pictures and associated audio information: Systems

Amendment 3

Carriage of green metadata in MPEG-2 systems

1) Clause 1.2.3

In clause 1.2.3 add

– ISO/IEC 23001-11:2015, *Information technology – MPEG systems technologies – Part 11: Energy-efficient media consumption (Green Metadata)*.

2) Clause 2.1.128

Add the following clause after clause 2.1.127

2.1.128 Green access unit – An access unit that contains dynamic metadata as defined in clause 6.2.1 of ISO/IEC 23001-11.

Table 2-31

Replace Table 2-31 with the following

Table 2-31 – Table_id assignment values

Value	Description
0x00	program_association_section
0x01	conditional_access_section (CA_section)
0x02	TS_program_map_section
0x03	TS_description_section
0x04	ISO_IEC_14496_scene_description_section
0x05	ISO_IEC_14496_object_descriptor_section
0x06	Metadata_section
0x07	IPMP_Control_Information_section (defined in ISO/IEC 13818-11)
0x08	ISO_IEC_14496_section
0x09	Green access unit (ISO/IEC 23001-11) section
0x0A-0x37	Rec. ITU-T H.222.0 | ISO/IEC 13818-1 reserved
0x38-0x3F	Defined in ISO/IEC 13818-6
0x40-0xFE	User private
0xFF	Forbidden

Table 2-34

In Table 2-34, add the following:

0x2C	Green access units carried in MPEG-2 sections
0x2D-0x7E	Rec. ITU-T H.222.0 | ISO/IEC 13818-1 reserved

3) Clause 2.6.90

Replace Table 2-105 with:

Table 2-105 – Extension descriptor

Syntax	No. of bits	Mnemonic
Extension_descriptor () {		
descriptor_tag	**8**	**uimsbf**
descriptor_length	**8**	**uimsbf**
extension_descriptor_tag	**8**	**uimsbf**
if (extension_descriptor_tag == 0x02) {		
ObjectDescriptorUpdate()		
}		
else if (extension_descriptor_tag == 0x03) {		
HEVC_timing_and_HRD_descriptor()		
}		
else if (extension_descriptor_tag == 0x04) {		
af_extension_descriptor()		
}		
else if (extension_descriptor_tag == 0x05) {		
HEVC_operation_point_descriptor()		
}		
else if (extension_descriptor_tag == 0x06) {		
hierachy_extension_descriptor()		
}		
else if (extension_descriptor_tag == 0x07) {		
Green_extension_descriptor ()		
}		
else {		
for (i=0; i<N; i++) {		
reserved	**8**	**bslbf**
}		
}		
}		

4) Clause 2.6.91

Add the following immediately before Table 2-106:

Green_extension_descriptor() – This structure is defined in 2.6.104 and 2.6.105.

Replace Table 2-106 with:

Table 2-106 – Extension descriptor tag values

Extension_descriptor_tag	TS	PS	Identification
0	n/a	n/a	Reserved
1	n/a	X	Forbidden
2	X	X	ODUpdate_descriptor
3	X	n/a	HEVC_timing_and_HRD_descriptor()
4	X	n/a	af_extensions_descriptor()
5	X	n/a	HEVC_operation_point_descriptor()
6	X	n/a	hierarchy_extension_descriptor()
7	X	n/a	Green_extension_descriptor()
8-255	n/a	n/a	Rec. ITU-T H.222.0 | ISO/IEC 13818-1 Reserved

5) Clause 2.6.103

Add the following clauses after 2.6.103

2.6.104 Green extension descriptor

The syntax of the green extension descriptor containing static metadata is shown in Table 2-111*quinquies*.

Table 2-111*quinquies* – Green extension descriptor

Syntax	No. bits	Mnemonic
Green_extension_descriptor() {		
descriptor_tag	**8**	**uimsbf**
num_constant_backlight_voltage_time_intervals	**2**	**uimsbf**
reserved	**6**	**bslbf**
for (i=0; i < num_constant_backlight_voltage_time_intervals; i++) {		
constant_backlight_voltage_time_interval[i]	**16**	**uimsbf**
}	**2**	**uimsbf**
num_max_variations		
reserved	**6**	**bslbf**
for (j=0; j < num_max_variations; j++) {		
max_variation[j]	**16**	**uimsbf**
}		
}		

2.6.105 Semantics for green extension descriptor

Semantics for all the syntax elements above are specified in clause 6.4 of ISO/IEC 23001-11.

6) Clause 2.18

Add the following clauses after clause 2.18:

2.18 Carriage of green access units

2.18.1 Carriage of green access units in MPEG-2 sections

Green access units are carried using the MPEG-2 private section syntax with the section_syntax_indicator element set to '0'.

Table 2-111*sexies* – Green access unit section syntax

Syntax	Bits	Mnemonic / description
Green_access_unit_section_message(){		
table_ID	**8**	**uimsbf**
section_syntax_indicator	**1**	**bslbf**
private_indicator	**1**	**bslbf**
reserved	**2**	**bslbf**
private_section_length	**12**	**uimsbf**
'00100	**4**	**bslbf**
Display_in_PTS [32..30]	**3**	**bslbf**
marker_bit	**1**	**bslbf**
Display_in_PTS [29..15]	**15**	**bslbf**
marker_bit	**1**	**bslbf**
Display_in_PTS [14..0]	**15**	**bslbf**
marker_bit	**1**	**bslbf**
Green_Au()		
CRC_32	**32**	**rpchof**
}		
}		

2.18.2 Semantics of green access unit section

table_id – This shall be set to 0x09.

section_syntax_indicator – This shall be set to '0'.

Display_in_PTS – This is the 33-bit PTS specified similar to that defined in the PES header and is used with the associated video access unit.

Green_Au() – Defined in 2.18.3.

2.18.3 Green access unit

The format of the green access unit is defined in Table 2-111*septies*. Green access units contain dynamic metadata and are carried in MPEG private section format.

Table 2-111*septies* – Green access unit

Syntax	No. bits	Mnemonic
Green_Au {		
num_quality_levels	**4**	**uimsbf**
reserved	**4**	**bslbf**
for (k=0; k < num_constant_backlight_voltage_time_intervals; k++) {		
for (j=0; j < num_max_variations; j++) {		
lower_bound	**8**	**uimsbf**
if (lower_bound > 0)		
upper_bound	**8**	**uimsbf**
rgb_component_for_infinite_psnr	**8**	**uimsbf**
for (i=1; i <= num_quality_levels; i++){		
max_rgb_component	**8**	**uimsbf**
scaled_psnr_rgb	**8**	**uimsbf**
}		
}		
}		

As explained in clause 6.4 of ISO/IEC 23001-11, each combination of constant_backlight_voltage_time_interval and max_variation is associated with contrast-enhancement metadata and a set of quality levels defined in Table 2-111*septies*.

The metadata in the Green_AU is applicable to the presentation subsystem until the next Green_AU containing metadata arrives.