
**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*



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Published in Switzerland

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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).

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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

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

Replace Table 2-105 with:

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
}		
}		

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	rpchbf
}		
}		

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.