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AMENDMENT 6
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Information technology — Coding of audio-visual objects —

Part 3: **Audio**

AMENDMENT 6: Profiles, levels and downmixing method for 22.2 channel programs

Technologies de l'information — Codage des objets audiovisuels —

Partie 3: Codage audio

AMENDEMENT 6: .

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Part 3: Audio

AMENDMENT 6: Profiles, levels and downmixing method for 22.2 channel programs

Page 31, 1.5.2.3

Replace:

Table 1.10 — Levels for the AAC Profile

Level	Max. channels/ object	Max. sampling rate [kHz]	Max. PCU	Max. RCU
1	2	24	3	5
2	2	48	6	5
3	NA	NA	NA	NA
4	5	48	19	15
5	5	96	38	15
6	7	48	25	19
7	7	96	50	19

with:

Table 1.10 — Levels for the AAC Profile

Level	Max. channels/ object	Max. sampling rate [kHz]	Max. PCU	Max. RCU
1	2	24	3	5
2	2	48	6	5
3	NA	NA	NA	NA
4	5	48	19	15
5	5	96	38	15
6	7	48	25	19
7	7	96	50	19
8	22	48	73	56
9	22	96	146	56

Page 36, 1.5.2.4

Insert the following new entries into Table 1.14 “audioProfileLevelIndication values” and adapt the “reserved for ISO use” range accordingly:

0x5D	AAC Profile	L8
0x5E	AAC Profile	L9
0x5F - 0x7F	reserved for ISO use	-

Page 13, 4.4.2.1

Replace:

Table AMD4.3 — Syntax of MPEG4_ancillary_data

Syntax	No. of Bits	Mnemonic
MPEG4_ancillary_data() {		
ancillary_data_sync;	**8**	**bslbf**
mpeg_audio_type	**2**	**bslbf**
dolby_surround_mode	**2**	**bslbf**
drc_presentation_mode	**2**	**bslbf**
stereo_downmix_mode;	**1**	**bslbf**
bs_info_reserved, set to “0”	**1**	**bslbf**
anc_data_status_reserved, set to “000”	**3**	**bslbf**
downmixing_levels_MPEG4_status	**1**	**bslbf**
ancillary_data_extension_status;	**1**	**bslbf**
audio_coding_and_compression_status	**1**	**bslbf**
coarse_grain_timecode_status	**1**	**bslbf**
fine_grain_timecode_status	**1**	**bslbf**
if (downmixing_levels_MPEG4_status == 1) {		
center_mix_level_on	**1**	**bslbf**
center_mix_level_value	**3**	**bslbf**
surround_mix_level_on	**1**	**bslbf**
surround_mix_level_value	**3**	**bslbf**
}		
If (audio_coding_mode_and_compression_status == 1) {		
audio_coding_mode_reserved	**7**	**bslbf**
compression_on	**1**	**bslbf**
compression_value	**8**	**bslbf**
}		
if(coarse_grain_timecode_status == 1)		
coarse_grain_timecode	**16**	**bslbf**
if(fine_grain_timecode_status == 1)		
fine_grain_timecode	**16**	**bslbf**
if (ancillary_data_extension_status == 1){		
reserved, set to “0”	**1**	**bslbf**
ext_downmixing_levels_status;	**1**	**bslbf**
ext_downmixing_global_gains_status;	**1**	**bslbf**
ext_downmixing_lfe_level_status;	**1**	**bslbf**
reserved, set to “0000”	**4**	**bslbf**
if (ext_downmixing_levels_status == 1){		
dmix_a_idx;	**3**	**bslbf**
dmix_b_idx;	**3**	**bslbf**
reserved, set to “00”	**2**	**bslbf**
}		

Table *(continued)*

Syntax	No. of Bits	Mnemonic
if (ext_downmixing_global_gains_status == 1) {		
dmx_gain_5_sign;	**1**	**bslbf**
dmx_gain_5_idx;	**6**	**bslbf**
reserved, set to "0"	**1**	**bslbf**
dmx_gain_2_sign;	**1**	**bslbf**
dmx_gain_2_idx;	**6**	**bslbf**
reserved, set to "0"	**1**	**bslbf**
}		
if (ext_downmixing_lfe_level_status == 1) {		
dmix_lfe_idx;	**4**	**bslbf**
reserved, set to "0000"	**4**	**bslbf**
}		
}		
}		

with:

Table AMD4.3 — Syntax of MPEG4_ancillary_data

Syntax	No. of Bits	Mnemonic
MPEG4_ancillary_data() {		
ancillary_data_sync;	**8**	**bslbf**
mpeg_audio_type	**2**	**bslbf**
dolby_surround_mode	**2**	**bslbf**
drc_presentation_mode	**2**	**bslbf**
stereo_downmix_mode;	**1**	**bslbf**
bs_info_reserved, set to "0"	**1**	**bslbf**
anc_data_status_reserved, set to "000"	**3**	**bslbf**
downmixing_levels_MPEG4_status	**1**	**bslbf**
ancillary_data_extension_status;	**1**	**bslbf**
audio_coding_and_compression_status	**1**	**bslbf**
coarse_grain_timecode_status	**1**	**bslbf**
fine_grain_timecode_status	**1**	**bslbf**
}		
if (downmixing_levels_MPEG4_status == 1) {		
center_mix_level_on	**1**	**bslbf**
center_mix_level_value	**3**	**bslbf**
surround_mix_level_on	**1**	**bslbf**
surround_mix_level_value	**3**	**bslbf**
}		
If (audio_coding_mode_and_compression_status == 1) {		
audio_coding_mode_reserved	**7**	**bslbf**
compression_on	**1**	**bslbf**
compression_value	**8**	**bslbf**
}		
if(coarse_grain_timecode_status == 1)		
coarse_grain_timecode	**16**	**bslbf**
if(fine_grain_timecode_status == 1)		
fine_grain_timecode	**16**	**bslbf**
if (ancillary_data_extension_status == 1){		

Table *(continued)*

Syntax	No. of Bits	Mnemonic
reserved, set to "0"	1	bslbf
ext_downmixing_levels_status;	1	bslbf
ext_downmixing_global_gains_status;	1	bslbf
ext_downmixing_lfe_level_status;	1	bslbf
reserved, set to "0000"	4	bslbf
if (ext_downmixing_levels_status == 1){		
dmix_a_idx;	3	bslbf
dmix_b_idx;	3	bslbf
reserved, set to "00"	2	bslbf
}		
if (ext_downmixing_global_gains_status == 1) {		
dmx_gain_5_sign;	1	bslbf
dmx_gain_5_idx;	6	bslbf
reserved, set to "0"	1	bslbf
dmx_gain_2_sign;	1	bslbf
dmx_gain_2_idx;	6	bslbf
reserved, set to "0"	1	bslbf
}		
if (ext_downmixing_lfe_level_status == 1) {		
dmix_lfe_idx;	4	bslbf
reserved, set to "0000"	4	bslbf
}		
}		
ancillary_data_sync2;	8	bslbf
ext_downmixing_level_status2;	1	bslbf
if (ext_downmixing_levels_status2 == 1) {		
dmix_c_idx;	3	bslbf
dmix_d_idx;	3	bslbf
dmix_e_idx;	3	bslbf
dmix_f_idx;	3	bslbf
dmix_g_idx;	3	bslbf
dmix_l_idx;	4	bslbf
reserved, set to "0000"	4	bslbf
} else {		
reserved, set to "0000000"	7	bslbf
}		
byte_alignment();		
}		

Page 56, 4.5.2

In 4.5.2.14.1.1 “Data elements”, add the following elements:

ancillary_data_sync2	indicates the presence of MPEG-4 Audio ancillary data 2 and shall be set to 0xBD
ext_downmixing_levels_status2	indicates if downmixing coefficients for channelConfiguration = 13 exist
dmix_c_idx	indicates an index for the generation of a 5-channel downmix from 22-channel as shown in Tables AMD4.8 and AMD6.1
dmix_d_idx	indicates an index for the generation of a 5-channel downmix from 22-channel as shown in Tables AMD4.8 and AMD6.1
dmix_e_idx	indicates an index for the generation of a 5-channel downmix from 22-channel as shown in Tables AMD4.8 and AMD6.1
dmix_f_idx	indicates an index for the generation of a 5-channel downmix from 22-channel as shown in Tables AMD4.8 and AMD6.1
dmix_g_idx	indicates an index for the generation of a 5-channel downmix from 22-channel as shown in Tables AMD4.8 and AMD6.1
dmix_l_idx	indicates an index for LFE for the generation of a 5-channel downmix from 22-channel as shown in Tables AMD4.9 and AMD6.1

In 4.5.2.14.2 “Decoding process”, replace:

If a 2-channel stereo downmix is to be derived from a 6.1 or 7.1 stream,

with:

If a 2-channel stereo downmix is to be derived from a 6.1, 7.1 or 22.2 stream,

In 4.5.2.14.2.1 “Downmixing from 5.1 to Stereo/Mono”, replace:

Table AMD4.8 — Definition of mix level value

dmix_a_idx, dmix_b_idx surround_mix_level, “a” center_mix_level, “b”	Multiplication factor
000	1.0 (0dB)
001	0.841 (-1.5dB)
010	0.707 (-3dB)
011	0.596 (-4.5dB)
100	0.500 (-6dB)
101	0.422 (-7.5dB)
110	0.355 (-9dB)
111	0.000 (-∞dB)

with:

Table AMD4.8 — Definition of mix level value

dmix_a_idx dmix_b_idx dmix_c_idx dmix_d_idx dmix_e_idx dmix_f_idx dmix_g_idx surround_mix_level, “a” center_mix_level, “b”	Multiplication factor
000	1.0 (0dB)
001	0.841 (-1.5dB)
010	0.707 (-3dB)
011	0.596 (-4.5dB)
100	0.500 (-6dB)
101	0.422 (-7.5dB)
110	0.355 (-9dB)
111	0.000 (-∞dB)

In 4.5.2.14.2.1 “Downmixing from 5.1 to Stereo/Mono”, replace:

Table AMD4.9 — Definition of LFE mix level value

dmix_lfe_idx	Multiplication factor
0000	3.162 (+10dB)
0001	2.000 (+6dB)
0010	1.679 (+4.5dB)
0011	1.413 (+3 dB)
0100	1.189 (+1.5dB)
0101	1.0 (0dB)
0110	0.841 (-1.5dB)
0111	0.707 (-3dB)
1000	0.596 (-4.5dB)
1001	0.500 (-6dB)
1010	0.316 (-10 dB)
1011	0.178 (-15dB)
1100	0.100 (-20dB)
1101	0.032 (-30dB)
1110	0.010 (-40dB)
1111	0.000 (-∞dB)

with:

Table AMD4.9 — Definition of LFE mix level value

dmix_l_idx dmix_lfe_idx	Multiplication factor
0000	3.162 (+10dB)
0001	2.000 (+6dB)
0010	1.679 (+4.5dB)
0011	1.413 (+3 dB)
0100	1.189 (+1.5dB)
0101	1.0 (0dB)
0110	0.841 (-1.5dB)
0111	0.707 (-3dB)
1000	0.596 (-4.5dB)
1001	0.500 (-6dB)
1010	0.316 (-10 dB)
1011	0.178 (-15dB)
1100	0.100 (-20dB)
1101	0.032 (-30dB)
1110	0.010 (-40dB)
1111	0.000 (-∞dB)

After 4.5.2.14.2.2, insert the following subclause:

4.5.2.14.2.3 Downmixing from 22.2 to 5.1

Table AMD6.1 — Definition of downmixing_levels

Channel configuration	dmix_c_idx	dmix_d_idx	dmix_e_idx	dmix_f_idx	dmix_g_idx	dmix_l_idx
22.2 ch	g1	g2	g3	g4	g5	g6

C' = FC + g1 × FLc+g1 × FRc+g3 × (TpFC + g4 × TpC + BtFC)

L' = FL + g1 × FLc + g2 × SiL + g3 × (TpFL + g2 × TpSiL + BtFL)

R' = FR + g1 × FRc + g2 × SiR + g3 × (TpFR + g2 × TpSiR + BtFR)

Ls' = BL + g5 × BC + g2 × SiL + g3 × (TpBL + g5 × TpBC + g2 × TpSiL + g4 × TpC)

Rs' = BR + g5 × BC + g2 × SiR + g3 × (TpBR + g5 × TpBC + g2 × TpSiR + g4 × TpC)

LFE' = g6 × (LFE1 + LFE2)

FLc and FRc mix level "g1", side mix level "g2", height mix level "g3", TpC mix level "g4" and BC mix level "g5" are shown in Table AMD4.8. The LFE mix level "g6" shall be derived as shown in table AMD4.9.

FL, FR, FC, LFE1, BL, BR, FLc, FRc, BC, LFE2, SiL, SiR, TpFL, TpFR, TpFC, TpC, TpBL, TpBR, TpSiL, TpSiR, TpBC, BtFC, BtFL, and BtFR are the source signals and C', L', R', Ls', Rs', LFE' are the derived 5.1ch.

In 4.5.2.14.2.5 “Persistence of MPEG-4 ancillary data”, replace:

Table AMD4.12 — Default values after synchronization

Data field	Default value
dolby_surround_mode	“00”
drc_presentation_mode	“00”
center_mix_level_value	“010”
surround_mix_level_value	“010”
compression_on	“0”
compression_value	“0000 0000”
coarse_grain_timecode	“00 00000000000000”
fine_grain_timecode	“00 00000000000000”
dmix_a_idx	“010”
dmix_b_idx	“010”
dmx_gain_5	“000000”
dmix_gain_2	“000000”
dmix_lfe_idx	“1111”

with:

Table AMD4.12 — Default values after synchronization

Data field	Default value
dolby_surround_mode	“00”
drc_presentation_mode	“00”
center_mix_level_value	“010”
surround_mix_level_value	“010”
compression_on	“0”
compression_value	“0000 0000”
coarse_grain_timecode	“00 00000000000000”
fine_grain_timecode	“00 00000000000000”
dmix_a_idx	“010”
dmix_b_idx	“010”
dmix_c_idx	“011”
dmix_d_idx	“011”
dmix_e_idx	“000”
dmix_f_idx	“100”
dmix_g_idx	“010”
dmix_l_idx	“0111”
dmx_gain_5	“000000”
dmix_gain_2	“000000”
dmix_lfe_idx	“1111”

Page 277, 4.6.20.3

Extend Table 4.180 “Syntax of ELDSpecificConfig()” as follows:

4.6.20.3 ELDSpecificConfig

Table 4.180 — Syntax of ELDSpecificConfig()

Syntax	No. of bits	Mnemonic
ELDSpecificConfig (channelConfiguration)		
{		
frameLengthFlag;	**1**	**bslbf**
aacSectionDataResilienceFlag;	**1**	**bslbf**
aacScalefactorDataResilienceFlag;	**1**	**bslbf**
aacSpectralDataResilienceFlag;	**1**	**bslbf**
ldSbrPresentFlag;	**1**	**bslbf**
If (ldSbrPresentFlag) {		
ldSbrSamplingRate;	**1**	**bslbf**
ldSbrCrcFlag;	**1**	**bslbf**
ld_sbr_header(channelConfiguration);		
}		
useLDQMFTimeAligment = 0;		
while (**eldExtType** != ELDEXT_TERM) {	**4**	**bslbf**
eldExtLen;	**4**	**uimsbf**
len = eldExtLen;		
if (eldExtLen == 15) {		
eldExtLenAdd;	**8**	**uimsbf**
len += eldExtLenAdd;		
}		
if (eldExtLenAdd == 255) {		
eldExtLenAddAdd;	**16**	**uimsbf**
len += eldExtLenAddAdd;		
}		
switch (eldExtType) {		
case ELDEXT_SAOC:		
saocPresentFlag = 1;		
useLDQMFTimeAligment = 1;		
SAOCSpecificConfig();		Note 1
break;		
case ELDEXT_LDSAC:		
ldmpsPresentFlag = 1;		
useLDQMFTimeAligment = 1;		
LDSpatialSpecificConfig();		Note 1
break;		
case ELDEXT_DOWNSCALEINFO:		Note 2
downscaledSamplingFrequencyIndex	**4**	**bslbf**
if (downscaleSamplingFrequencyIndex == 0xf) {		**uimsbf**
downscaledSamplingFrequency	**24**	
}		