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Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 3: 3D audio

AMENDMENT 2: 3D Audio baseline profile, corrections and improvements

Technologies de l'information — Codage à haute efficacité et livraison des medias dans des environnements hétérogènes —

Partie 3: Audio 3D

AMENDEMENT 2: Profil de base audio 3D, corrections et améliorations

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Information technology — High efficiency coding and media delivery in heterogeneous environments —

Part 3:
3D audio

AMENDMENT 2: 3D Audio baseline profile, corrections and improvements

Subclause 4.8.2 (Profiles)

After list item 3, add:

4) The baseline profile is a subset of the low-complexity profile which supports channel and object signals.

Replace Table 2 with:

Table 2 — Summary of the location of and normative reference to the definitions of MPEG-H 3D audio profiles

Tool/Module		Defined in ISO/IEC	Sub-clause	USAC 23003-3	MPEG-H 3D audio High profile	MPEG-H 3D audio Low-complexity profile	MPEG-H 3D audio Baseline profile
block switching		14496-3	4.6.11	**X**	X	X	X
window shapes	AAC based	14496-3	4.6.11	**X**	X	X	X
	Additional windows	23003-3	6.2.9.3	**X**	X	X	X
filter bank	AAC based	14496-3	4.6.11	**X**	X	X	X
	additional USAC	23003-3	7.9	**X**	X	X	X
TNS		14496-3	4.6.9	**X**	X	X	X
intensity		14496-3	4.6.8.2				
coupling		14496-3	4.6.8.3				
perceptual noise synthesis	PNS	14496-3	4.6.13				
	noise filling	23003-3	7.2	**X**	X	X	X

[a] Restrictions apply dependent on the levels.

[b] Implementation of binaural rendering is only mandated if headphone reproduction is supported.

[c] Multi-band DRC-1 shall be applied in the STFT domain of the TD format converter.

[d] The TD format converter downmix shall be applied for downmixing.

[e] In order to achieve target complexity for the LC profile at a given level, study Annex G.

[f] File format encapsulation is independent of the profile that is used for the bitstream. A profile level indicator is part of the file format specification (see subclause 20.4).

Table 2 *(continued)*

Tool/Module		Defined in ISO/IEC	Sub-clause	USAC 23003-3	MPEG-H 3D audio High profile	MPEG-H 3D audio Low-complexity profile	MPEG-H 3D audio Baseline profile
MS	basic mid/side coding	14496-3	4.6.8.1	**X**	X	X	X
	MDCT based complex prediction	23003-3	7.7.2	**X**	X	X	X
quantization	non-uniform	14496-3	4.6.1	**X**	X	X	X
	uniform	23003-3	7.1	**X**	X	X	
entropy coding	Huffman	14496-3	4.6.3				
	context adaptive arithmetic coding	23003-3	7.4	**X**	X	X	X
SBR	base	14496-3	4.6.18	**X**	X		
	enhanced	23003-3	7.5	**X**	X		
parametric stereo extension	parametric stereo	14496-3	8.6.4 / 8.A				
	MPEG surround 2-1-2 (incl. residual coding)	23003-3	6.2.13	**X**	X		
	quad channel element	23008-3	5,5		X		
ACELP		23003-3	7.14	**X**	X	X	
frequency domain noise shaping	scale factor based	14496-3	4.6.2	**X**	X	X	X
	LPC based	23003-3		**X**	X	X	
intelligent gap filling	IGF for FD	23008-3			X	X	X
improved LPD coding	IGF for TCX and TBE in ACELP	23008-3			X	X	
	LPD stereo	23008-3			X	X	
predictors for FD	frequency-domain prediction and time-domain post-filtering	23008-3			X	X	X
predictors for TCX	frequency-domain prediction and time-domain post-filtering	23008-3			X	X	

[a] Restrictions apply dependent on the levels.

[b] Implementation of binaural rendering is only mandated if headphone reproduction is supported.

[c] Multi-band DRC-1 shall be applied in the STFT domain of the TD format converter.

[d] The TD format converter downmix shall be applied for downmixing.

[e] In order to achieve target complexity for the LC profile at a given level, study Annex G.

[f] File format encapsulation is independent of the profile that is used for the bitstream. A profile level indicator is part of the file format specification (see subclause 20.4).

Table 2 *(continued)*

Tool/Module		Defined in ISO/IEC	Sub-clause	USAC 23003-3	MPEG-H 3D audio High profile	MPEG-H 3D audio Low-complexity profile	MPEG-H 3D audio Baseline profile
discrete multi-channel coding	MCT	23008-3			X	X	X
format converter	generic downmix	23008-3	10, 24		X	X[d]	X[d]
immersive rendering	immersive rendering within format converter	23008-3	11, 25		X	X[d]	X[d]
static metadata	metadata audio elements (MAE) and audio scene information (ASI)	23008-3	15		X	X	X
	decoder and renderer						
dynamic object metadata	object audio metadata (OAM)	23008-3	7, 8		X	X	X
	decoder and renderer						
MPS	MPEG surround extension	23003-1	10		X		
SAOC-3D	decoder and renderer	23008-3	9		X		
HOA	decoder and renderer	23008-3	12		X	X[e]	
	near field compensation	23008-3			X	X[a]	
	subband directional prediction	23008-3			X		
	parametric ambiance replication (PAR)	23008-3			X		
	phase-based decorrelation	23008-3			X		
Binaural	FD-binaural, TD-binaural	23008-3	13		X	X[b]	X[b]
	HOA2Binaural H2B	23008-3			X	X[b]	

[a] Restrictions apply dependent on the levels.

[b] Implementation of binaural rendering is only mandated if headphone reproduction is supported.

[c] Multi-band DRC-1 shall be applied in the STFT domain of the TD format converter.

[d] The TD format converter downmix shall be applied for downmixing.

[e] In order to achieve target complexity for the LC profile at a given level, study Annex G.

[f] File format encapsulation is independent of the profile that is used for the bitstream. A profile level indicator is part of the file format specification (see subclause 20.4).

Table 2 *(continued)*

Tool/Module		Defined in ISO/IEC	Sub-clause	USAC 23003-3	MPEG-H 3D audio High profile	MPEG-H 3D audio Low-complexity profile	MPEG-H 3D audio Baseline profile
DRC	DRC-1	23003-4			X	X[c]	X[c]
	DRC-2 (single band)	23003-4			X	X	X
	DRC-2 (multi band)	23003-4					
	DRC-3 (single band)	23003-4			X	X	X
sample rate converter		23008-3			X	X	X
peak limiter	unguided clipping prevention	23008-3 23003-4	D		X	X	X
loudness	loudness metadata and handling	23003-4	6		X	X	X
	loudness compensation	23008-3			X	X	X
MHAS	MPEG-H 3D Audio stream	23008-3	14		X	X	X
	truncation message and CRC packet type, ASI packet type	23008-3			X	X	X
file format	carriage of MPEG-H 3D audio in ISO base media file format	23008-3			f		
interfaces and processing	interfaces and processing for interaction data and local setup info	23008-3	17,18		X	X	X
carriage of generic data	carriage of generic data for the interaction with system engine	23008-3			X	X	
TCC	tonal component coding	23008-3			X		
IC	internal channel	23008-3			X		
HREP	high resolution envelope processing	23008-3			X		

[a] Restrictions apply dependent on the levels.

[b] Implementation of binaural rendering is only mandated if headphone reproduction is supported.

[c] Multi-band DRC-1 shall be applied in the STFT domain of the TD format converter.

[d] The TD format converter downmix shall be applied for downmixing.

[e] In order to achieve target complexity for the LC profile at a given level, study Annex G.

[f] File format encapsulation is independent of the profile that is used for the bitstream. A profile level indicator is part of the file format specification (see subclause 20.4).

The baseline profile is a subset of the low-complexity profile. If a decoder implementation supports decoding of low complexity profile level 3 bitstreams and supports the configuration extension CompatibleProfileLevelSet(), then the decoder shall support decoding of bitstreams encoded according to the baseline profile level 3. Bitstreams complying to the baseline profile may be signalled using:

— the mpegh3daProfileLevelIndication field set to indicate baseline profile as specified in Table 64, or alternatively,

— the mpegh3daProfileLevelIndication field set to indicate low complexity profile as specified in Table 64 and the CompatibleProfileLevelSet configuration extension for indicating compatibility to baseline profile, as described in Annex P.

Additionally, it is strongly recommended that low complexity profile bitstreams conforming to the baseline profile, are signalled using the profile and level values for mpegh3daProfileLevelIndication and CompatibleSetIndication given in Table P.1.

Subclause 4.8.2.4

Add new subclauses 4.8.2.5, 4.8.2.6 and 4.8.2.7 after subclause 4.8.2.4:

4.8.2.5 Levels of the baseline profile

4.8.2.5.1 General

Table AMD2.1 — Levels and their corresponding restrictions for the baseline profile

Level	Max. sampling rate	Max. number of core channels in compressed data stream	Max. number of decoder processed core channels	Max. number of channels in referenceLayout
1	48000	10	5	5
2	48000	18	9	9
3	48000	32	16[a] or 24[b]	16[a] or 24[b]
4	48000	56	28	24
5	96000	56	28	24

[a] No additional complexity restrictions are applied.

[b] Additional complexity restrictions given in 4.8.2.5.1 are applied.

— The use of switch groups determines the subset of core channels from the core channels in the bitstream that shall be decoded.

— If the mae_AudioSceneInfo() contains switch groups (mae_numSwitchGroups>0), then the elementLengthPresent flag shall be 1.

— The number of channels of the signalled referenceLayout shall not exceed the values defined in the levels in Table AMD2.1.

— Object renderer and binaural renderer that perform at least as well as the object and binaural renderer specified in Clauses 8 and 13 may be integrated using the output interfaces for un-rendered channels and objects described in subclause 17.10.

NOTE The performance recommendation covers the behaviour of the decoder over the complete decoding and rendering chain, especially for the case of configuration changes as described in subclause 5.5.6, mixing of channel and object content or DRC processing, loudness compensation and user interactivity.

— For Level 3 the maximum number of decoder processed core channels and maximum number of channels signalled in referenceLayout is:

  a) 16 if no additional complexity restrictions are applied,

  b) 24 if all the complexity restrictions in 4.8.2.5.1 are applied.

4.8.2.5.2 Complexity restrictions for Level 3 with more than 16 decoder processed core channels

— **signalGroupType** in Signals3d() shall indicate SignalGroupTypeObject (Objects only).

— **usacElementType[elemIdx]** in mpegh3daDecoderConfig() shall indicate ID_USAC_SCE or ID_USAC_EXT.

— **noiseFilling** and **enhancedNoiseFilling** in mpegh3daCoreConfig() shall be set to "0".

— **usacExtElementType** in mpegh3daExtElementConfig() shall not be set to ID_EXT_ELE_MCT.

— Long term prediction filter shall not be used, i.e., **ltpf_data_present** and **common_ltpf** shall be set to "0".

— Frequency domain predictor shall not be used, i.e., **fdp_data_present** shall be set to "0".

4.8.2.6 Restrictions for the baseline profile and levels

All restrictions defined for low complexity profile in subclause 4.8.2.2 shall apply.

The LPD path of the core coder and HOA path are not supported.

Restrictions defined in Table AMD2.2 shall apply.

Table AMD2.2 — Baseline profile restrictions

MPEG-H 3D audio bit field	Structure	Use description
phaseAlignStrength	*downmixConfig()*	Shall have the value “0”
SignalGroupType[grp]	*Signals3d()*	Shall have the value "*SignalGroupTypeChannels*" or "*SignalGroupTypeObject*"
qceIndex	*mpegh3daChannelPairElementConfig()*	Shall have the value “0”
lpdStereoIndex	*mpegh3daChannelPairElementConfig()*	Shall have the value “0”
tw_mdct	*mpegh3daCoreConfig()*	Shall have the value “0”
fullbandLpd	*mpegh3daCoreConfig()*	Shall have the value “0”
core_mode[ch]	*mpegh3daCoreCoderData()*	Shall have the value “0”
common_max_sfb	*StereoCoreToolInfo()*	Shall have the value “1”
tns_on_lr	*StereoCoreToolInfo()*	Shall have the value “1”
common_tw	*StereoCoreToolInfo()*	Shall have the value “0”
fac_data_present	*fd_channel_stream()*	Shall have the value “0”

4.8.2.7 Signalling of profile and level compatibility sets

MPEG-H 3d audio bitstreams may comply with multiple profiles and levels and the CompatibleProfileLevelSet() syntax element defined in Table AMD2.3 may be used to signal the compatibility to multiple profiles.

The CompatibleProfileLevelSet() syntax element contains a list of profile-level numbers the content is compatible with. Only the lowest level per profile needs to be present, as higher level decoders are inherently compatible with lower level content.

Table AMD2.3 — Syntax of CompatibleProfileLevelSet()

Syntax	No. of bits	Mnemonic
CompatibleProfileLevelSet()		
{		
bsNumCompatibleSets;	**4**	**uimsbf**
numCompatibleSets = bsNumCompatibleSets + 1;		
reserved;	**4**	**uimsbf**
for (idx = 0; idx < numCompatibleSets; idx++) {		
CompatibleSetIndication;	**8**	**uimsbf**
}		
}		

Subclause 5.2.2.3

Replace Table 24 with:

Table 24 — Syntax of mpegh3daConfigExtension()

Syntax	No. of bits	Mnemonic
mpegh3daConfigExtension()		
{		
numConfigExtensions = escapedValue(2,4,8) + 1;		
for (confExtIdx=0; confExtIdx<numConfigExtensions; confExtIdx++) {		
usacConfigExtType[confExtIdx] = escapedValue(4,8,16);		
usacConfigExtLength[confExtIdx] = escapedValue(4,8,16);		
switch (usacConfigExtType[confExtIdx]) {		
case ID_CONFIG_EXT_FILL:		
while (usacConfigExtLength[confExtIdx]--) {		
fill_byte[i]; /* should be '10100101' */	**8**	**uimsbf**
}		
break;		
case ID_CONFIG_EXT_DOWNMIX:		
downmixConfig();		
break;		
case ID_CONFIG_EXT_LOUDNESS_INFO:		
mpegh3daLoudnessInfoSet();		

Table 24 *(continued)*

Syntax	No. of bits	Mnemonic
break;		
case ID_CONFIG_EXT_AUDIOSCENE_INFO:		
mae_AudioSceneInfo();		
break;		
case ID_CONFIG_EXT_HOA_MATRIX:		
HoaRenderingMatrixSet();		
break;		
case ID_CONFIG_EXT_ICG:		
ICGConfig();		
break;		
case ID_CONFIG_EXT_SIG_GROUP_INFO:		
SignalGroupInformation();		
break;		
case ID_CONFIG_EXT_COMPATIBLE_PROFILELVL_SET:		
CompatibleProfileLevelSet();		
break;		
default:		
while (usacConfigExtLength[confExtIdx]--) {		
tmp;	**8**	**uimsbf**
}		
break;		
}		
}		
}		

Subclause 5.3.2

Replace Table 64 with:

Table 64 — Value of mpegh3daProfileLevelIndication and CompatibleSetIndication

Value	Indication of profile	Indication of level
0x00	reserved for ISO use	-
0x01	main profile	L1
0x02	main profile	L2
0x03	main profile	L3
0x04	main profile	L4
0x05	main profile	L5
0x06	high profile	L1
0x07	high profile	L2
0x08	high profile	L3
0x09	high profile	L4
0x0A	high profile	L5
0x0B	low complexity profile	L1

Table 64 *(continued)*

Value	Indication of profile	Indication of level
0x0C	low complexity profile	L2
0x0D	low complexity profile	L3
0x0E	low complexity profile	L4
0x0F	low complexity profile	L5
0x10	baseline profile	L1
0x11	baseline profile	L2
0x12	baseline profile	L3
0x13	baseline profile	L4
0x14	baseline profile	L5
0x15-0xFF	reserved for future profile definition	

Subclause 5.3.4

Replace Table 77 with:

Table 77 — Value of usacConfigExtType

usacConfigExtType	Value
ID_CONFIG_EXT_FILL	0
ID_CONFIG_EXT_DOWNMIX	1
ID_CONFIG_EXT_LOUDNESS_INFO	2
ID_CONFIG_EXT_AUDIOSCENE_INFO	3
ID_CONFIG_EXT_HOA_MATRIX	4
ID_CONFIG_EXT_ICG	5
ID_CONFIG_EXT_SIG_GROUP_INFO	6
ID_CONFIG_EXT_COMPATIBLE_PROFILELVL_SET	7
/* reserved for ISO use */	8-127
/* reserved for use outside of ISO scope */	128 and higher

Subclause 5.3.8

Add a new subclause 5.3.9 after subclause 5.3.8:

5.3.9 Compatible profile and levels sets

bsNumCompatibleSet This field defines the number of compatible profile sets present in the bitstream. The number of compatible profile sets is defined as: *numCompatibleSets* = *bsNumCompatibleSets* + 1.

CompatibleSetIndication Indication of the profile and level according to Table 64.

Subclause 5.7

Replace paragraph 7 with the following:

In an MHAS stream, an independently decodable frame containing audio pre-roll (IPF) as in subclause 5.5.6 may be signalled by means of a previously transmitted MHAS packet of type PACTYP_MARKER as defined in subclause 14.4.6.3.

Subclause 7.3.4, Table 141

Replace:

}			
else {			
position_azimuth;	**8**	**tcimsbf**	
position_elevation;	**6**	**tcimsbf**	
position_radius;	**4**	**uimsbf**	
gain_factor;	**7**	**tcimsbf**	

with:

}			
else {			
fixed_azimuth = 0;			
fixed_elevation = 0;			
fixed_radius = 0;			
fixed_gain = 0;			
fixed_spread = 0;			
position_azimuth;	**8**	**tcimsbf**	
position_elevation;	**6**	**tcimsbf**	
position_radius;	**4**	**uimsbf**	
gain_factor;	**7**	**tcimsbf**	

Subclause 10.3.4.7, Table 164

Replace:

CH_U_000	CH_U_L030, CH_U_R030	1.0	0 (off)

with:

CH_U_000	CH_U_L030, CH_U_R030	1.0	1

Subclause 11.4.1.7, Table 182

Replace:

CH_U_000	CH_U_L030, CH_U_R030	1.0	0 (off)

with:

CH_U_000	CH_U_L030, CH_U_R030	1.0	1

Subclause 14.3.1

Replace the definition of MHASPacketLabel with:

MHASPacketLabel This element provides an indication on which packets belong together. For example, with using different labels, different MPEG-H 3D audio configuration structures may be assigned to particular sequences of MPEG-H 3D audio access units.

Conditions and restrictions as defined in subclauses 14.4.15 and 14.6 shall apply to the value of MHASPacketLabel.

Subclause 14.4.14

Add a new subclause 14.4.15 after subclause 14.4.14:

14.4.15 *MHASPacketType specific requirements for MHASPacketLabel*

The value of MHASPacketLabel shall be restricted depending on the MHASPacketType it is contained in according to Table AMD2.4. In single stream environments, the sole existing stream shall be considered as "main stream", i.e. MHASPacketLabel shall be in the range of 0x01 to 0x10 for the applicable MHAS packets.

Table AMD2.4 — MHASPacketType specific requirements for MHASPacketLabel

MHASPacketType	Value	Value of MHASPacketLabel		
		0	0x01 – 0x10 (main stream)	0x11 and larger (sub-streams)
PACTYP_FILLDATA	0	required	not allowed	not allowed
PACTYP_MPEGH3DACFG	1	not allowed	no restriction	no restriction
PACTYP_MPEGH3DAFRAME	2	not allowed	no restriction	no restriction
PACTYP_AUDIOSCENEINFO	3	not allowed	no restriction	no restriction
/ reserved for ISO use */*	4-5	—	—	—
PACTYP_SYNC	6	required	not allowed	not allowed
PACTYP_SYNCGAP	7	required	not allowed	not allowed
PACTYP_MARKER	8	no restriction	no restriction	no restriction
PACTYP_CRC16	9	shall be identical to MHASPacketLabel of MHAS packet immediately following the present MHAS packet		
PACTYP_CRC32	10			
PACTYP_DESCRIPTOR	11	required	not allowed	not allowed
PACTYP_USERINTERACTION	12	not allowed	required	not allowed
PACTYP_LOUDNESS_DRC	13	not allowed	required	not allowed
PACTYP_BUFFERINFO	14	no restriction	no restriction	no restriction
PACTYP_GLOBAL_CRC16	15	required	not allowed	not allowed
PACTYP_GLOBAL_CRC32	16	required	not allowed	not allowed
PACTYP_AUDIOTRUNCATION	17	not allowed	no restriction	no restriction
PACTYP_GENDATA	18	no restriction	no restriction	no restriction

Key:

—: undefined

required: MHASPacketLabel shall have (one of) the value(s) listed in the title row of this column if packet is present

no restriction: MHASPacketLabel may have (one of) the value(s) listed in the title row of this column if packet is present

not allowed: MHASPacketLabel shall not have (any of) the value(s) listed in the title row of this column

Table AMD2.4 *(continued)*

MHASPacketType	Value	Value of MHASPacketLabel		
		0	0x01 – 0x10 (main stream)	0x11 and larger (sub-streams)
PACTYP_ EARCON	19	shall be identical to MHASPacketLabel of MHAS packets containing the audio addressed by the earcon		
PACTYP_ PCMCONFIG	20	not allowed	not allowed	> 2048
PACTYP_ PCMDATA	21	not allowed	not allowed	> 2048
PACTYP_ LOUDNESS	22	not allowed	no restriction	no restriction
/ reserved for ISO use */*	23-127	—	—	—
/ reserved for use outside of ISO scope */*	128-261	—	—	—
/ reserved for ISO use */*	262-389	—	—	—
/ reserved for use outside of ISO scope */*	390-517	—	—	—

Key:

—: undefined

required: MHASPacketLabel shall have (one of) the value(s) listed in the title row of this column if packet is present

no restriction: MHASPacketLabel may have (one of) the value(s) listed in the title row of this column if packet is present

not allowed: MHASPacketLabel shall not have (any of) the value(s) listed in the title row of this column

Application-specific MHASPacketType values are mandated to be in the space "reserved for use outside of ISO scope". Decoders that do not know how to process the respective packets shall ignore these packets.

Additionally, adaptive streaming within MPEG-DASH transporting MPEG-H 3D audio payloads requires the following with respect to MHASPacketLabel. Here, each representation, i.e. each stream of the adaptation set, shall have a unique MHASPacketLabel at the same instance of time. Additionally, the MHASPacketLabel for a specific representation shall change with each signalled random access point compliant to subclause 5.5.6.

Subclause 14.6

Delete the fifth paragraph:

As specified in subclause 14.3.1 incoming packets with **MHASPacketLabel** set to '0' are related to the complete stream, at least packets of type PACTYP_MPEGH3DAFRAME shall not be labelled with '0' when more than one sub-stream is present in the MHAS stream.

Subclause 15.2, Table 231

Replace:

Syntax	No. of bits	Mnemonic

mae_GroupDefinition(numGroups)
{
for (grp = 0; grp < numGroups; grp++) {		

with:

Syntax	No. of bits	Mnemonic
mae_GroupDefinition(mae_numGroups)		
{		
for (grp = 0; grp < mae_numGroups; grp++) {		

Table 236

Replace:

Syntax	No. of bits	Mnemonic
mae_GroupPresetDefinition(numGroupPresets)		
{		
for (gp = 0; gp < numGroupPresets; gp++) {		
mae_groupPresetID[gp];	**5**	**uimsbf**

with:

Syntax	No. of bits	Mnemonic
mae_GroupPresetDefinition(mae_numGroupPresets)		
{		
for (gp = 0; gp < mae_numGroupPresets; gp++) {		
mae_groupPresetID[gp];	**5**	**uimsbf**

Table 238

Replace:

Syntax	No. of bits	Mnemonic
mae_LoudnessCompensationData(numGroups,numGroupPresets)		
{		
mae_loudnessCompGroupLoudnessPresent;	**1**	**bslbf**
if (mae_loudnessCompGroupLoudnessPresent == 1) {		
for(grp=0; grp<numGroups; grp++) {		
[...]		
if (mae_loudnessCompDefaultParamsPresent == 1) {		
for(grp=0; grp<numGroups; grp++) {		
[...]		
}		
for (gp=0; gp<numGroupPresets; gp++) {		
groupPresetID = mae_groupPresetID[gp];		
mae_loudnessCompPresetParamsPresent[gp];	**1**	**bslbf**
if (mae_loudnessCompPresetParamsPresent[gp] == 1) {		
for (grp=0; grp<numGroups; grp++) {		

with:

Syntax	No. of bits	Mnemonic
mae_LoudnessCompensationData(mae_numGroups, mae_numGroupPresets)		
{		
mae_loudnessCompGroupLoudnessPresent;	**1**	**bslbf**
if (mae_loudnessCompGroupLoudnessPresent == 1) {		
for(grp=0; grp<mae_numGroups; grp++) {		
[...]		
if (mae_loudnessCompDefaultParamsPresent == 1) {		
for(grp=0; grp<mae_numGroups; grp++) {		
[...]		
}		
for (gp=0; gp<mae_numGroupPresets; gp++) {		
groupPresetID = mae_groupPresetID[gp];		
mae_loudnessCompPresetParamsPresent[gp];	**1**	**bslbf**
if (mae_loudnessCompPresetParamsPresent[gp] == 1) {		
for (grp=0; grp<mae_numGroups; grp++) {		

Subclause 20.3

Replace subclause 20.3 with:

20.3 Overview of new box structures

m h a 1 , mha2, mhm1, mhm2			*	*sample entry*
	mhaC			*configuration*
	mhaD			*dynamic range and loudness*
	mhaP			profile and level compatibility sets
	maeM			*multi-stream*
	maeI			*audio scene information*
		maeG	*	*group definition*
		maeS		*switch group definition*
		maeP		*preset definition*
		maeL		*text label definition*

Subclause 20.10

Add a new subclause 20.11 after subclause 20.10:

20.11 MPEG-H Audio profile and level compatibility sets

20.11.1 Definition

Box Type: `mhaP'

Container: MHA sample entry (`mha1', 'mha2', 'mhm1', 'mhm2')

Mandatory: No

Quantity: Zero or one

As specified in 4.8.2.7 a MPEG-H 3d audio bitstreams may comply with multiple profiles and levels. This box defines a way of signalling the compatibility to different profiles and levels on file format level.

20.11.2 Syntax

```
class MHAProfileAndLevelCompatibilitySetBox() extends Box('mhaP') {
   unsigned int(8)   numCompatibleSets;
   for (i=0; i < numCompatibleSets; i++)  {
      unsinged int(8) CompatibleSetIndication;
   }
}
```

20.11.3 Semantics

`numCompatibleSets` This field defines the number of compatible profile sets present in the current box.

`CompatibleSetIndication` Defined in 5.3.9.

Subclause 24.3.4.6.3

Replace the sixth bullet item with:

— search the first entry of this channel in the Source column of Table 280, for which the channels in the corresponding row of the Destination column exist. The ALL_U destination shall be considered valid (i.e. the relevant output channels exist) if the output format contains at least one "CH_U_" channel. The ALL_M destination shall be considered valid (i.e. the relevant output channels exist) if the output format contains at least one "CH_M_" channel. If for no entry in Table 280 corresponding to the input channel the channels in the Destination column exist, the rules-based initialization shall terminate and the downmix gains shall be derived according to subclause 24.3.4.6.7

Subclause 24.3.4.7, Table 280

Replace:

CH_U_000	CH_U_L030, CH_U_R030	1.0	0 (off)

with:

CH_U_000	CH_U_L030, CH_U_R030	1.0	1