

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**H.222.0**

**Amendment 5**  
(07/2016)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS  
Infrastructure of audiovisual services – Transmission  
multiplexing and synchronization

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Information technology – Generic coding of moving  
pictures and associated audio information: Systems  
**Amendment 5: Carriage of MPEG-H 3D audio  
over MPEG-2 systems**

Recommendation ITU-T H.222.0 (2014) – Amendment 5

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*For further details, please refer to the list of ITU-T Recommendations.*

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

**Amendment 5**

**Carriage of MPEG-H 3D audio over MPEG-2 systems**

**Summary**

Amendment 5 to Rec. ITU-T H.222.0 (2014) | ISO/IEC 13818-1:2015 adds support for carriage of ISO/IEC 23008-3 3D audio. The amendment does not cover carriage in program streams.

**History**

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2.2	ITU-T H.222.0 (2000) Technical Cor. 2	2002-03-29	16	<a href="http://handle.itu.int/11.1002/1000/5675">11.1002/1000/5675</a>
2.3	ITU-T H.222.0 (2000) Amd. 1	2002-12-14	16	<a href="http://handle.itu.int/11.1002/1000/6190">11.1002/1000/6190</a>
2.4	ITU-T H.222.0 (2000) Amd. 1/Cor. 1	2003-06-29	16	<a href="http://handle.itu.int/11.1002/1000/6449">11.1002/1000/6449</a>
2.5	ITU-T H.222.0 (2000) Amd. 2	2003-06-29	16	<a href="http://handle.itu.int/11.1002/1000/6363">11.1002/1000/6363</a>
2.6	ITU-T H.222.0 (2000) Amd. 3	2004-03-15	16	<a href="http://handle.itu.int/11.1002/1000/7208">11.1002/1000/7208</a>
2.7	ITU-T H.222.0 (2000) Technical Cor. 3	2005-01-08	16	<a href="http://handle.itu.int/11.1002/1000/7435">11.1002/1000/7435</a>
2.8	ITU-T H.222.0 (2000) Amd. 4	2005-01-08	16	<a href="http://handle.itu.int/11.1002/1000/7436">11.1002/1000/7436</a>
2.9	ITU-T H.222.0 (2000) Amd. 5	2005-01-08	16	<a href="http://handle.itu.int/11.1002/1000/7437">11.1002/1000/7437</a>
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3.1	ITU-T H.222.0 (2006) Amd. 1	2007-01-13	16	<a href="http://handle.itu.int/11.1002/1000/9024">11.1002/1000/9024</a>
3.2	ITU-T H.222.0 (2006) Amd. 2	2007-08-29	16	<a href="http://handle.itu.int/11.1002/1000/9214">11.1002/1000/9214</a>
3.3	ITU-T H.222.0 (2006) Cor. 1	2008-06-13	16	<a href="http://handle.itu.int/11.1002/1000/9471">11.1002/1000/9471</a>
3.4	ITU-T H.222.0 (2006) Cor. 2	2009-03-16	16	<a href="http://handle.itu.int/11.1002/1000/9692">11.1002/1000/9692</a>
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\* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

3.6	ITU-T H.222.0 (2006) Cor. 3	2009-12-14	16	<a href="#">11.1002/1000/10621</a>
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5.0	ITU-T H.222.0	2014-10-14	16	<a href="#">11.1002/1000/12359</a>
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5.5	ITU-T H.222.0 (2014) Amd. 1 Cor. 2	2016-07-14	16	<a href="#">11.1002/1000/12899</a>
5.6	ITU-T H.222.0 (2014) Cor. 1	2016-07-14	16	<a href="#">11.1002/1000/12903</a>
5.7	ITU-T H.222.0 (2014) Amd. 4	2016-07-14	16	<a href="#">11.1002/1000/12900</a>
5.8	ITU-T H.222.0 (2014) Amd. 5	2016-07-14	16	<a href="#">11.1002/1000/12901</a>
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## FOREWORD

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INTERNATIONAL STANDARD  
ITU-T RECOMMENDATION**Information technology – Generic coding of moving pictures and associated audio  
information: Systems****Amendment 5****Carriage of MPEG-H 3D audio over MPEG-2 systems****1) Clause 1.2.3**

In clause 1.2.3, add:

- ISO/IEC 23001-8:2016, *Information technology – MPEG systems technologies – Part 8: Coding-independent code-points.*
- ISO/IEC 23003-3:2012, *Information technology – MPEG audio technologies – Part 3: Unified speech and audio coding.*
- ISO/IEC 23003-4:2015, *Information technology – MPEG audio technologies – Part 4: Dynamic Range Control.*
- ISO/IEC 23008-3:2105, *Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 3: 3D audio.*

**2) Table 2-22**

Replace 2-22 with the following:

**Table 2-22 – Stream\_id assignments**

Stream_id	Note	stream coding
1011 1100	1	program_stream_map
1011 1101	2,9	private_stream_1
1011 1110		padding_stream
1011 1111	3	private_stream_2
110x xxxx		ISO/IEC 13818-3 or ISO/IEC 11172-3 or ISO/IEC 13818-7 or ISO/IEC 14496-3 or ISO/IEC 23008-3 audio stream number x xxxx
1110 xxxx		Rec. ITU-T H.262   ISO/IEC 13818-2, ISO/IEC 11172-2, ISO/IEC 14496-2, Rec. ITU-T H.264   ISO/IEC 14496-10 or Rec. ITU-T H.265   ISO/IEC 23008-2 video stream number xxxx
1111 0000	3	ECM_stream
1111 0001	3	EMM_stream
1111 0010	5	Rec. ITU-T H.222.0   ISO/IEC 13818-1 Annex A or ISO/IEC 13818-6_DSMCC_stream
1111 0011	2	ISO/IEC_13522_stream
1111 0100	6	Rec. ITU-T H.222.1 type A
1111 0101	6	Rec. ITU-T H.222.1 type B
1111 0110	6	Rec. ITU-T H.222.1 type C
1111 0111	6	Rec. ITU-T H.222.1 type D
1111 1000	6	Rec. ITU-T H.222.1 type E
1111 1001	7	ancillary_stream
1111 1010		ISO/IEC 14496-1_SL-packetized_stream
1111 1011		ISO/IEC 14496-1_FlexMux_stream
1111 1100		metadata stream
1111 1101	8	extended_stream_id

**Table 2-22 – Stream\_id assignments**

Stream_id	Note	stream coding
1111 1110		reserved data stream
1111 1111	4	program_stream_directory

The notation x means that the values '0' or '1' are both permitted and results in the same stream type. The stream number is given by the values taken by the x's.

NOTE 1 – PES packets of type program\_stream\_map have unique syntax specified in 2.5.4.1.

NOTE 2 – PES packets of type private\_stream\_1 and ISO/IEC\_13552\_stream follow the same PES packet syntax as those for Rec. ITU-T H.262 | ISO/IEC 13818-2 video and ISO/IEC 13818-3 audio streams.

NOTE 3 – PES packets of type private\_stream\_2, ECM\_stream and EMM\_stream are similar to private\_stream\_1 except no syntax is specified after PES\_packet\_length field.

NOTE 4 – PES packets of type program\_stream\_directory have a unique syntax specified in 2.5.5.

NOTE 5 – PES packets of type DSM-CC\_stream have a unique syntax specified in ISO/IEC 13818-6.

NOTE 6 – This stream\_id is associated with stream\_type 0x09 in Table 2-34.

NOTE 7 – This stream\_id is only used in PES packets, which carry data from a program stream or an ISO/IEC 11172-1 System Stream, in a transport stream (refer to 2.4.3.8).

NOTE 8 – The use of stream\_id 0xFD (extended\_stream\_id) identifies that this PES packet employs an extended syntax to permit additional stream types to be identified.

NOTE 9 – JPEG 2000 video streams (stream\_type = 0x21) are carried using the same PES packet syntax as private\_stream\_1.

**3) Table 2-34**

In Table 2-34 add the following:

**Table 2-34 – Stream type assignments**

Value	Description
0x2D	ISO/IEC 23008-3 Audio with MHAS transport syntax – main stream
0x2E	ISO/IEC 23008-3 Audio with MHAS transport syntax – auxiliary stream
0x2F-0x7E	Rec. ITU-T H.222.0   ISO/IEC 13818-1 Reserved

**4) Clause 2.6.90**

Replace Table 2-105 with:

**Table 2-105 – Extension descriptor**

Syntax	No. of bits	Mnemonic
<pre> Extension_descriptor () {     <b>descriptor_tag</b>     <b>descriptor_length</b>     <b>extension_descriptor_tag</b>     if ( extension_descriptor_tag == 0x02) {         <b>ObjectDescriptorUpdate()</b>     }     else if ( extension_descriptor_tag == 0x03) {         <b>HEVC_timing_and_HRD_descriptor()</b>     }     else if ( extension_descriptor_tag == 0x04) { </pre>	<p>8</p> <p>8</p> <p>8</p>	<p><b>uimsbf</b></p> <p><b>uimsbf</b></p> <p><b>uimsbf</b></p>



Table 2-105 – Extension descriptor

Syntax	No. of bits	Mnemonic
<pre> <b>af_extension_descriptor()</b> } else if ( extension_descriptor_tag == 0x05) {     <b>HEVC_operation_point_descriptor()</b> } else if ( extension_descriptor_tag == 0x06) {     <b>HEVC_hierachy_extension_descriptor()</b> } else if ( extension_descriptor_tag == 0x07) {     <b>Green_extension_descriptor ()</b> } else if ( extension_descriptor_tag == 0x08) {     <b>MPEG-H_3dAudio_descriptor()</b> } else if ( extension_descriptor_tag == 0x09) {     <b>MPEG-H_3dAudio_config_descriptor()</b> } else if ( extension_descriptor_tag == 0x0A) {     <b>MPEG-H_3dAudio_scene_descriptor()</b> } else if ( extension_descriptor_tag == 0x0B) {     <b>MPEG-H_3dAudio_text_label_descriptor()</b> } else if ( extension_descriptor_tag == 0x0C) {     <b>MPEG-H_3dAudio_multi-stream_descriptor()</b> } else if ( extension_descriptor_tag == 0x0D) {     <b>MPEG-H_3dAudio_drc_loudness_descriptor()</b> } else if ( extension_descriptor_tag == 0x0E) {     <b>MPEG-H_3dAudio_command_descriptor()</b> } else {     for ( i=0; i&lt;N; i++) {         <b>reserved</b>     } } </pre>	<b>8</b>	<b>bslbf</b>

## 5) Clause 2.6.91

Add the following immediately before Table 2-106:

**MPEG-H\_3dAudio\_descriptor()** – This structure is defined in 2.6.106 and 2.6.107.

**MPEG-H\_3dAudio\_config\_descriptor()** – This structure is defined in 2.6.108 and 2.6.109.

**MPEG-H\_3dAudio\_scene\_descriptor()** – This structure is defined in 2.6.110 and 2.6.111.

**MPEG-H\_3dAudio\_text\_label\_descriptor()** – This structure is defined in 2.6.112 and 2.6.113.

**MPEG-H\_3dAudio\_multi-stream\_descriptor()** – This structure is defined in 2.6.114 and 2.6.115.

**MPEG-H\_3dAudio\_drc\_loudness\_descriptor()** – This structure is defined in 2.6.116 and 2.6.117.

MPEG-H\_3dAudio\_command\_descriptor() – This structure is defined in 2.6.118.

Replace Table 2-106 with the following:

**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	X	n/a	MPEG-H_3dAudio_descriptor()
9	X	n/a	MPEG-H_3dAudio_config_descriptor()
0x0A	X	n/a	MPEG-H_3dAudio_scene_descriptor()
0x0B	X	n/a	MPEG-H_3dAudio_text_label_descriptor()
0x0C	X	n/a	MPEG-H_3dAudio_multi-stream_descriptor()
0x0D	X	n/a	MPEG-H_3dAudio_drc_loudness_descriptor()
0x0E	X	n/a	MPEG-H_3dAudio_command_descriptor()
0x0F-0xFF	n/a	n/a	Rec. ITU-T H.222.0   ISO/IEC 13818-1 Reserved

**6) Clauses 2.6.106 to 2.6.118**

Add the following clauses after 2.6.105:

**2.6.106 MPEG-H 3D audio descriptor**

The MPEG-H 3D audio descriptor provides information on basic coding information in the associated ISO/IEC 23008-3 stream. This descriptor shall be present in the associated PMT for MPEG-H 3D audio content with stream\_type equal to 0x2D.

**Table 2-111sexies– MPEG-H 3D audio descriptor**

Syntax	No of bits	Mnemonic
MPEG-H_3dAudio_descriptor() { <b>mpegh3daProfileLevelIndication</b>	<b>8</b>	<b>uimsbf</b>
<b>interactivityEnabled</b>	<b>1</b>	<b>bslbf</b>
<b>reserved</b>	<b>9</b>	<b>bslbf</b>
<b>referenceChannelLayout</b>	<b>6</b>	<b>uimsbf</b>
for (i=0; i<N; i++) { <b>reserved</b>	<b>8</b>	<b>bslbf</b>
} }		

**2.6.107 Semantics for MPEG-H 3D audio descriptor**

**mpegh3daProfileLevelIndication** – The audio profile and level of the associated ISO/IEC 23008-3 audio stream, encoded as specified for the mpegh3daProfileLevelIndication field in clause 5.3.2 in ISO/IEC 23008-3.

**referenceChannelLayout** – Reference channel configuration value as defined as "ChannelConfiguration" in ISO/IEC 23001-8 ("Codec Independent Code Points").

**interactivityEnabled** – If set to 1, this flag indicates that the 3D audio stream contains elements with associated metadata which enables user interactivity. If this flag is set to 0, no user interactivity of any kind is available. This flag may be used to determine the need for initializing the user interactivity interface in the Systems decoder.

### 2.6.108 MPEG-H 3D audio config descriptor

The MPEG-H 3D audio config descriptor provides information on the complete configuration data of one ISO/IEC 23008-3 stream.

**Table 2-111septies – MPEG-H 3D audio config descriptor**

Syntax	No of bits	Mnemonic
MPEG-H_3dAudio_config_descriptor() { <b>mpegh3daConfig()</b> }		

### 2.6.109 Semantics for MPEG-H 3D audio config descriptor

**mpegh3daConfig()** – The mpegh3daConfig() of the associated ISO/IEC 23008-3 audio stream, as specified in clause 5.2.2.1 in ISO/IEC 23008-3.

### 2.6.110 MPEG-H 3D audio scene descriptor

The MPEG-H 3D audio scene descriptor provides information on user selectable and/or modifiable audio objects in an ISO/IEC 23008-3 stream.

**Table 2-111octies – MPEG-H 3d audio scene descriptor**

Syntax	No of bits	Mnemonic
MPEG-H_3dAudio_scene_descriptor() {		
<b>groupDefinitionPresent</b>	1	bslbf
<b>switchGroupDefinitionPresent</b>	1	bslbf
<b>presetGroupDefinitionPresent</b>	1	bslbf
<b>reserved</b>	5	bslbf
<b>3dAudioSceneInfoID</b>	8	bslbf
if (groupDefinitionPresent) {		
<b>reserved</b>	1	bslbf
<b>numGroups</b>	7	uimsbf
for ( i=0; i < numGroups; i++) {		
<b>reserved</b>	1	bslbf
<b>mae_groupID</b>	7	uimsbf
<b>reserved</b>	3	bslbf
<b>mae_allowOnOff</b>	1	bslbf
<b>mae_defaultOnOff</b>	1	bslbf
<b>mae_allowPositionInteractivity</b>	1	bslbf
<b>mae_allowGainInteractivity</b>	1	bslbf
<b>mae_hasContentLanguage</b>	1	bslbf
<b>reserved</b>	4	bslbf
<b>mae_contentKind</b>	4	uimsbf
if ( mae_allowPositionInteractivity ) {		
<b>reserved</b>	1	bslbf
<b>mae_interactivityMinAzOffset</b>	7	uimsbf
<b>reserved</b>	1	bslbf
<b>mae_interactivityMaxAzOffset</b>	7	uimsbf
<b>reserved</b>	3	bslbf
<b>mae_interactivityMinElOffset</b>	5	uimsbf
<b>reserved</b>	3	bslbf
}		
}		
}		

Table 2-111octies – MPEG-H 3d audio scene descriptor

Syntax	No of bits	Mnemonic
<b>mae_interactivityMaxElOffset</b>	5	<b>uimsbf</b>
<b>mae_interactivityMinDistOffset</b>	4	<b>uimsbf</b>
<b>mae_interactivityMaxDistOffset</b>	4	<b>uimsbf</b>
}		
if ( mae_allowGainInteractivity ) {		
<b>reserved</b>	2	<b>bslbf</b>
<b>mae_interactivityMinGain</b>	6	<b>uimsbf</b>
<b>reserved</b>	3	<b>bslbf</b>
<b>mae_interactivityMaxGain</b>	5	<b>uimsbf</b>
}		
if ( mae_hasContentLanguage ) {		
<b>mae_contentLanguage</b>	24	<b>uimsbf</b>
}		
}		
if (switchGroupDefinitionPresent) {		
<b>reserved</b>	3	<b>bslbf</b>
<b>numSwitchGroups</b>	5	<b>uimsbf</b>
for ( i=0; i < numSwitchGroups; i++) {		
<b>reserved</b>	1	<b>bslbf</b>
<b>mae_switchGroupID</b>	5	<b>uimsbf</b>
<b>mae_switchGroupAllowOnOff</b>	1	<b>bslbf</b>
<b>mae_switchGroupDefaultOnOff</b>	1	<b>bslbf</b>
<b>reserved</b>	3	<b>bslbf</b>
<b>mae_bsSwitchGroupNumMembers</b>	5	<b>uimsbf</b>
for ( i = 0; i < mae_bsSwitchGroupNumMembers + 1; i++) {		
<b>reserved</b>	1	<b>bslbf</b>
<b>mae_switchGroupMemberID</b>	7	<b>uimsbf</b>
}		
<b>reserved</b>	1	<b>bslbf</b>
<b>mae_switchGroupDefaultGroupID</b>	7	<b>uimsbf</b>
}		
}		
if (presetGroupDefinitionPresent) {		
<b>reserved</b>	3	<b>bslbf</b>
<b>mae_numGroupPresets</b>	5	<b>uimsbf</b>
for ( i = 0; i < mae_numGroupPresets; i++) {		
<b>reserved</b>	3	<b>bslbf</b>
<b>mae_groupPresetID</b>	5	<b>uimsbf</b>
<b>reserved</b>	3	<b>bslbf</b>
<b>mae_groupPresetKind</b>	5	<b>uimsbf</b>
<b>reserved</b>	4	<b>bslbf</b>
<b>mae_numGroupPresetConditions</b>	4	<b>uimsbf</b>
for ( j = 0; j < mae_numGroupPresetConditions+1; j++) {		
<b>mae_groupPresetGroupID</b>	7	<b>uimsbf</b>
<b>mae_groupPresetConditionOnOff</b>	1	<b>bslbf</b>
if (mae_groupPresetConditionOnOff) {		

Table 2-111octies – MPEG-H 3d audio scene descriptor

Syntax	No of bits	Mnemonic
reserved	4	bslbf
mae_groupPresetDisableGainInteractivity	1	bslbf
mae_groupPresetGainFlag	1	bslbf
mae_groupPresetDisablePositionInteractivity	1	bslbf
mae_groupPresetPositionFlag	1	bslbf
if ( mae_groupPresetGainFlag ) { mae_groupPresetGain	8	uimsbf
}		
if( mae_groupPresetPositionFlag ){ mae_groupPresetAzOffset	8	uimsbf
reserved	2	bslbf
mae_groupPresetElOffset	6	uimsbf
reserved	4	bslbf
mae_groupPresetDistFactor	4	uimsbf
}		
}		
}		
}		
for (i=0; i<N; i++) { reserved	8	bslbf
}		
}		

2.6.111 Semantic definition of fields in MPEG-H 3D audio scene descriptor

**groupDefinitionPresent** – A one-bit flag signalling the presence of interactivity information of one group in this descriptor.

**switchGroupDefinitionPresent** – A one-bit flag signalling the presence of switch group information in this descriptor.

**presetGroupDefinitionPresent** – A one-bit flag signalling the presence of preset group information in this descriptor.

**3dAudioSceneInfoID** – See ISO/IEC 23008-3, clause 15.3.

**numGroups** – This field signals the number of groups in the audio scene description. This field can take values between 1 and 127, and shall be less or equal to the value of mae\_numGroups present in the associated ISO/IEC 23008-3 stream.

**mae\_groupID** – See ISO/IEC 23008-3, clause 15.3.

**mae\_allowOnOff** – See ISO/IEC 23008-3, clause 15.3.

**mae\_defaultOnOff** – See ISO/IEC 23008-3, clause 15.3.

**mae\_allowPositionInteractivity** – See ISO/IEC 23008-3, clause 15.3.

**mae\_allowGainInteractivity** – See ISO/IEC 23008-3, clause 15.3.

**mae\_hasContentLanguage** – See ISO/IEC 23008-3, clause 15.3.

**mae\_contentKind** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMinAzOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMaxAzOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMinElOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMaxElOffset** – See ISO/IEC 23008-3, clause 15.3.

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**mae\_interactivityMinDistOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMaxDistOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMinGain** – See ISO/IEC 23008-3, clause 15.3.

**mae\_interactivityMaxGain** – See ISO/IEC 23008-3, clause 15.3.

**mae\_contentLanguage** – See ISO/IEC 23008-3, clause 15.3.

**numSwitchGroups** – This field signals the number of switch groups minus one in the overall scene. This field can take values between 0 and 31, resulting in a maximum number of 32 switch groups. It shall be less than or equal to the value of **mae\_numSwitchGroups** present in the associated ISO/IEC 23008-3 stream.

**mae\_switchGroupID** – See ISO/IEC 23008-3, clause 15.3.

**mae\_switchGroupAllowOnOff** – See ISO/IEC 23008-3, clause 15.3.

**mae\_switchGroupDefaultOnOff** – See ISO/IEC 23008-3, clause 15.3; if **mae\_switchGroupAllowOnOff** is '0', then **mae\_switchGroupDefaultOnOff** shall be set to '0'.

**mae\_bsSwitchGroupNumMembers** – See ISO/IEC 23008-3, clause 15.3.

**mae\_switchGroupMemberID** – See ISO/IEC 23008-3, clause 15.3.

**mae\_switchGroupDefaultGroupID** – See ISO/IEC 23008-3, clause 15.3.

**mae\_numGroupPresets** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetID** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetKind** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetNumConditions** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetGroupID** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetConditionOnOff** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetDisableGainInteractivity** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetGainFlag** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetDisablePositionInteractivity** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetPositionFlag** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetGain** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetAzOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetEIOffset** – See ISO/IEC 23008-3, clause 15.3.

**mae\_groupPresetDistFactor** – See ISO/IEC 23008-3, clause 15.3.

Data fields provided both in this descriptor and as in-band information in the ISO/IEC 23008-3 stream shall be set to the same value.

### 2.6.112 MPEG-H 3D audio text label descriptor

The MPEG-H 3D audio scene descriptor provides text labels for the audio objects and presets in an ISO/IEC 23008-3 stream.

Table 2-111 *novies* – MPEG-H 3d audio text label descriptor

Syntax	No of bits	Mnemonic
MPEG-H_3dAudio_text_label_descriptor() {		
<b>3dAudioSceneInfoID</b>	8	uimsbf
<b>reserved</b>	4	bslbf
<b>numDescLanguages</b>	4	uimsbf
for (i=0; i< numDescLanguage; i++) {		
<b>descriptionLanguage</b>	24	uimsbf
<b>reserved</b>	1	bslbf
<b>numGroupDescriptions</b>	7	uimsbf
for ( n = 0; n < numGroupDescriptions; n++ ) {		
<b>reserved</b>	1	bslbf
<b>mae_descriptionGroupID;</b>	7	uimsbf
<b>groupDescriptionDataLength</b>	8	uimsbf
for ( c = 0; c < groupDescriptionDataLength; c++ ) {		
<b>groupDescriptionData</b>	8	uimsbf
}		
}		
<b>reserved</b>	3	bslbf
<b>numSwitchGroupDescriptions</b>	5	uimsbf
for ( n = 0; n < numSwitchGroupDescriptions; n++ ) {		
<b>reserved</b>	3	bslbf
<b>mae_descriptionSwitchGroupID;</b>	5	uimsbf
<b>switchGroupDescriptionDataLength</b>	8	uimsbf
for ( c = 0; c < switchGroupDescriptionDataLength; c++ ) {		
<b>switchGroupDescriptionData</b>	8	uimsbf
}		
}		
<b>reserved</b>	3	bslbf
<b>numGroupPresetsDescriptions</b>	5	uimsbf
for ( n = 0; n < numGroupPresetsDescriptions; n++ ) {		
<b>reserved</b>	3	bslbf
<b>mae_descriptionGroupPresetID</b>	5	uimsbf
<b>groupPresetDescriptionDataLength</b>	8	uimsbf
for ( c = 0; c < groupPresetDescriptionLength; c++ ) {		
<b>groupPresetDescriptionData</b>	8	uimsbf
}		
}		
}		
for (i=0; i<N; i++) {		
<b>reserved</b>	8	bslbf
}		
}		

### 2.6.113 Semantic definition of fields in MPEG-H 3D audio text label descriptor

**3dAudioSceneInfoID** – see ISO/IEC 23008-3, clause 15.3.

**maeGroupDescriptionPresent** – A one-bit flag signalling the presence of description text for groups.

**maeSwitchgroupDescriptionPresent** – A one-bit flag signalling the presence of description text for switch groups.

**maeGroupPresetDescriptionPresent** – A one-bit flag signalling the presence of description text for group presets.

**numDescLanguages** – The number of available languages for description text.

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**descriptionLanguage** – Identifies the language or languages used by the description text of a metadata element group. It contains a 3-character code as specified by ISO 639-2. Both ISO 639-2/B and ISO 639-2/T may be used. Each character is coded into 8 bits according to ISO/IEC 8859-1 and inserted in order into the 24-bit field.

**numGroupDescriptions** – The number of available descriptions for groups.

**mae\_descriptionGroupID** – See ISO/IEC 23008-3, clause 15.3.

**groupDescriptionDataLength** – The length, specified in bytes, of the following group description.

**groupDescriptionData** – This field contains a description of a metadata element group, i.e., a string describing the content by a high-level description. The format shall follow UTF-8 according to ISO/IEC 10646.

**numSwitchGroupDescriptions** – The number of available descriptions for switch groups.

**mae\_descriptionSwitchGroupID** – See ISO/IEC 23008-3, clause 15.3.

**switchGroupDescriptionDataLength** – The length, specified in bytes, of the following switch group description.

**switchGroupDescriptionData** – This field contains a description of a switch group, i.e., a string describing the content by a high-level description. The format shall follow UTF-8 according to ISO/IEC 10646.

**numGroupPresetsDescriptions** – The number of available descriptions for group presets.

**mae\_descriptionGroupPresetID** – See ISO/IEC 23008-3, clause 15.3.

**groupPresetDescriptionDataLength** – The length, specified in bytes, of the following group preset description.

**groupPresetDescriptionData** – This field contains a description of a metadata element group, i.e., a string describing the content by a high-level description. The format shall follow UTF-8 according to ISO/IEC 10646.

Data fields provided both in this descriptor and as in-band information in the IS/IEC 23008-3 stream shall be set to the same value.

**2.6.114 MPEG-H 3D audio multi-stream descriptor**

The MPEG-H 3D audio multi-stream descriptor provides information on the location of each `mae_groupID` in case of transmission over multiple streams.

In combination with this descriptor, an MPEG-H 3D audio scene descriptor explaining the actual representation of the overall audio scene is required to be present in the descriptor loop of the main stream.

**Table 2-111decies – MPEG-H 3D audio multi-stream descriptor**

Syntax	No of bits	Mnemonic
MPEG-H_3dAudio_multi-stream_descriptor() {		
<b>thisIsMainStream</b>	1	<b>bslbf</b>
<b>thisStreamID</b>	7	<b>uimsbf</b>
if ( thisIsMainStream ) {		
<b>reserved</b>	1	<b>slbf</b>
<b>numAuxiliaryStreams</b>	7	<b>uimsbf</b>
<b>reserved</b>	1	<b>bslbf</b>
<b>mae_numGroups</b>	7	<b>uimsbf</b>
for (i=0; i< mae_numGroups; i++) {		
<b>mae_groupID</b>	7	<b>uimsbf</b>
<b>isInMainStream</b>	1	<b>bslbf</b>
if ( thisIsMainStream == '0' ) {		
<b>isInTS</b>	1	<b>bslbf</b>
<b>auxiliaryStreamID</b>	7	<b>uimsbf</b>
}		
}		
}		
}		



**Table 2-111decies – MPEG-H 3D audio multi-stream descriptor**

Syntax	No of bits	Mnemonic
<pre> for (i=0; i&lt;N; i++) {     reserved } </pre>	8	bslbf

**2.6.115 Semantic definition of fields in MPEG-H 3D audio multi-stream descriptor**

**thisIsMainStream** – If this flag is one, the stream is a main stream, otherwise it is an auxiliary stream.

**thisStreamID** – This integer provides a unique ID of all available ISO/IEC 23008-3 Audio streams with MHAS transport syntax, both main and auxiliary streams (stream\_type 0x2D and 0x2E).

**numAuxiliaryStreams** – This integer provides information on how many auxiliary streams are available.

**mae\_numGroups** – This field signals the number of groups in the overall audio scene (complete number of groups in the main stream plus all possible additional streams). This field can take values between 1 and 127. It shall be set to the same value as the corresponding field in the associated ISO/IEC 23008-3 stream.

**mae\_groupID** – This integer provides information on the mae\_groupID (as described in ISO/IEC 23008-3, section 15) the loop instance refers to.

**isInMainStream** – If this flag is set to 1, the audio data related to the group (as indicated through mae\_groupID) is present in the main stream, otherwise the encoded data is transmitted in an auxiliary stream.

**isInTS** – If this flag is set to 1, the audio data related to the group (as indicated through mae\_groupID) is present in the same transport stream. If this flag is set to 0, the data must be retrieved from an external source.

**auxiliaryStreamID** – In case of transmission of encoded audio data as identified by groupID in an auxiliary stream, this integer identifies the used auxiliary stream.

The location of the 'external source' may be signaled using the TEMI location descriptor and/or the TEMI BaseURL\_descriptor as defined in clause U.3.

When the TEMI descriptor(s) are conveyed in a TEMI\_AU as a separate elementary stream on a separated PID, an MPEG-H\_3dAudio\_extStreamID\_descriptor() shall be present in the associated descriptor loop of the TEMI elementary stream which provides an ID in the field "auxiliaryStreamID" that is matching the "auxiliaryStreamID" provided in the MPEG-H\_3dAudio\_multi-stream\_descriptor() of the main stream.

**2.6.116 MPEG-H 3D audio DRC and Loudness descriptor**

The MPEG-H 3D Audio Dynamic Range Control (DRC) and Loudness descriptor provides information on DRC and Loudness information contained in an ISO/IEC 23008-3 stream.

**Table 2-111undecies – MPEG-H 3d audio DRC and Loudness descriptor()**

Syntax	No of bits	Mnemonic
MPEG-H_3dAudio_drc_loudness_descriptor () {		
<b>reserved</b>	7	bslbf
<b>mpegh3daDrcAndLoudnessInfoPresent</b>	1	bslbf
if (mpegh3daDrcAndLoudnessInfoPresent) {		
<b>reserved</b>	2	bslbf
<b>drcInstructionsUniDrcCount</b>	6	uimsbf
<b>reserved</b>	2	bslbf
<b>loudnessInfoCount</b>	6	uimsbf
<b>reserved</b>	3	bslbf
<b>downmixIdCount</b>	5	uimsbf
}		
}		

Table 2-111undecies – MPEG-H 3d audio DRC and Loudness descriptor()

Syntax	No of bits	Mnemonic
for (i=0; i<drcInstructionsUniDrcCount; i++) {		
<b>reserved</b>	6	bslbf
<b>drcInstructionsType</b>	2	uimsbf
if (drcInstructionsType == 2) {		
<b>reserved</b>	1	bslbf
<b>mae_groupID</b>	7	uimsbf
} else if (drcInstructionsType == 3) {		
<b>reserved</b>	3	bslbf
<b>mae_groupPresetID</b>	5	uimsbf
}		
<b>reserved</b>	2	bslbf
<b>drcSetId</b>	6	uimsbf
<b>reserved</b>	1	bslbf
<b>downmixId</b>	7	uimsbf
<b>reserved</b>	3	bslbf
<b>additionalDownmixIdCount</b>	3	uimsbf
<b>limiterPeakTargetPresent</b>	1	bslbf
<b>drcSetTargetLoudnessPresent</b>	1	bslbf
for (j=0; j<additionalDownmixIdCount; j++) {		
<b>reserved</b>	1	bslbf
<b>additionalDownmixId</b>	7	uimsbf
}		
<b>drcSetEffect</b>	16	uimsbf
if ( limiterPeakTargetPresent ) {		
<b>bsLimiterPeakTarget</b>	8	uimsbf
}		
if ( drcSetTargetLoudnessPresent ) {		
<b>reserved</b>	1	bslbf
<b>bsDrcSetTargetLoudnessValueUpper</b>	6	uimsbf
<b>drcSetTargetLoudnessValueLowerPresent</b>	1	bslbf
if(drcSetTargetLoudnessValueLowerPresent) {		
<b>reserved</b>	2	bslbf
<b>bsDrcSetTargetLoudnessValueLower</b>	6	uimsbf
}		
}		
<b>reserved</b>	1	bslbf
<b>dependsOnDrcSet</b>	6	uimsbf
if (dependsOnDrcSet == 0) {		
<b>noIndependentUse</b>	1	bslbf
} else {		
<b>reserved</b>	1	bslbf
}		
}		
for (i=0; i<loudnessInfoCount; i++) {		
<b>reserved</b>	6	bslbf
<b>loudnessInfoType</b>	2	uimsbf
if (loudnessInfoType == 1    loudnessInfoType == 2) {		
<b>reserved</b>	1	bslbf
<b>mae_groupID</b>	7	uimsbf
} else if (loudnessInfoType == 3) {		
<b>reserved</b>	3	bslbf
<b>mae_groupPresetID</b>	5	uimsbf
}		
<b>loudnessInfo_size</b>	8	uimsbf
loudnessInfo()		
}		

Table 2-111undecies – MPEG-H 3d audio DRC and Loudness descriptor()

Syntax	No of bits	Mnemonic
<pre> for (i=0; i&lt;downmixIdCount; i++) {     reserved     downmixId     downmixType     CICPSpeakerLayoutIdx } } </pre>	<p>1</p> <p>7</p> <p>2</p> <p>6</p>	<p>bslbf</p> <p>uimsbf</p> <p>uimsbf</p> <p>uimsbf</p>
<pre> for (i=0; i&lt;N; i++) {     reserved } } </pre>	<p>8</p>	<p>bslbf</p>

### 2.6.117 Semantic definition of fields in MPEG-H 3D audio DRC and loudness descriptor

**mpegh3daDrcAndLoudnessInfoPresent** – A one-bit flag signalling the presence of dynamic range control and loudness information in this descriptor.

**drcInstructionsUniDrcCount** – This field signals the number of DRC sets in the stream. This field can take values between 0 and 63, resulting in a maximum number of 63 DRC sets.

**loudnessInfoCount** – This field signals the number of loudness info blocks in the stream. This field can take values between 0 and 63, resulting in a maximum number of 63 loudness info blocks.

**downmixIdCount** – This field signals the number of downmixId definitions in the stream. This field can take values between 0 and 31, resulting in a maximum number of 31 downmixId definitions.

**drcInstructionsType** – See ISO/IEC 23008-3.

**mae\_groupID** – See ISO/IEC 23008-3.

**mae\_groupPresetID** – see ISO/IEC 23008-3.

**drcSetId** – See ISO/IEC 23003-4.

**downmixId** – See ISO/IEC 23003-4 and ISO/IEC 23008-3.

**additionalDownmixIdCount** – See ISO/IEC 23003-4.

**limiterPeakTargetPresent** – See ISO/IEC 23003-4.

**drcSetTargetLoudnessPresent** – See ISO/IEC 23003-4.

**additionalDownmixId** – See ISO/IEC 23003-4.

**drcSetEffect** – See ISO/IEC 23003-4.

**bsLimiterPeakTarget** – See ISO/IEC 23003-4.

**bsDrcSetTargetLoudnessValueUpper** – See ISO/IEC 23003-4.

**drcSetTargetLoudnessValueLowerPresent** – See ISO/IEC 23003-4.

**bsDrcSetTargetLoudnessValueLower** – See ISO/IEC 23003-4.

**dependsOnDrcSet** – See ISO/IEC 23003-4.

**noIndependentUse** – See ISO/IEC 23003-4.

**loudnessInfoType** – See ISO/IEC 23008-3.

**loudnessInfo\_size** – The number of bytes of the immediately following loudnessInfo().

**loudnessInfo()** – One loudnessInfo() structure as defined in ISO/IEC 23003-4.

**downmixType** – See ISO/IEC 23008-3.

**CICPSpeakerLayoutIdx** – See ISO/IEC 23008-3.

Data fields provided both in this descriptor and as in-band information in the IS/IEC 23008-3 stream shall be set to the same value.

**2.6.118 MPEG-H 3D audio command descriptor**

The MPEG-H 3D audio command descriptor encapsulates an MHAS packet of the type PACTYP\_USERINTERACTION that contains an interaction command or type PACTYP\_AUDIOSCENEINFO that contains the audio scene information. Both types are supported by a MPEG-H 3D audio decoder.

By inserting the MHAS packet contained in this descriptor into the MHAS elementary stream, a receiver can send this command to the MPEG-H 3D audio decoder. As the descriptor contains a complete MHAS packet including MHAS header, nothing else needs to be added when multiplexing these bytes, consecutively, on an MHAS packet boundary in the MHAS stream.

**Table 2-111duodecies – MPEG-H 3D audio command descriptor**

Syntax	No of bits	Mnemonic
<pre> MPEG-H_3dAudio_command_descriptor(){     for (i = 0; i &lt; N; i++) {         data     } }                     </pre>	<b>8</b>	<b>bslbf</b>

**data** – Data bytes shall be contiguous bytes of data from a complete MHAS packet (including the MHAS header) of the type PACTYP\_USERINTERACTION.

**7) Clause 2.19**

*Add the following after clause 2.18:*

**2.19 Carriage of ISO/IEC 23008-3 MPEG-H 3D audio data**

**2.19.1 Introduction**

A Rec. ITU-T H.222.0 | ISO/IEC 13818-1 stream may carry ISO/IEC 23008-3 audio elementary streams. Typically, an ISO/IEC 23008-3 stream will be an element of an ITU-T Rec. H.222.0 | ISO/IEC 13818-1 program, as defined by the PMT in a transport stream and the PSM in a program stream.

**2.19.2 Carriage in PES packets**

Individual ISO/IEC 23008-3 elementary streams shall be carried in PES packets as PES\_packet\_data\_bytes. For PES packetization no specific data alignment constraints apply. For synchronization PTS is encoded in the header of the PES packet that carries the ISO/IEC 23008-3 elementary stream data; for PTS encoding the same constraints apply as for ISO/IEC 13818 elementary streams.

Before PES packetization the elementary stream data shall be first encapsulated in the MHAS transport syntax defined in clause 14 of ISO/IEC 23008-3. If a PTS is present in the PES packet header, it shall refer to the first mpegHAudioStreamPacket (MHAS packet) of MHASPacketType PACTYP\_MPEGH3DAFRAME that commences in the payload of the PES packet. This MHAS packet shall occur after the first MHAS packet of MHASPacketTypes PACTYP\_SYNC and PACTYPE\_MPEGH3DACFG that commences in the payload of the PES packet, if any are present. Note that additional MHAS packets of other packet types may be present between those MHAS packets (PACTYP\_SYNC, PACTYPE\_MPEGH3DACFG and PACTYP\_MPEGH3DAFRAME), e.g., PACTYP\_SYNCGAP, PACTYP\_AUDIOSCENEINFO or PACTYP\_AUDIOTRUNCATION.

It is recommended, but not mandatory, that in this case the first byte of the PES\_packet\_data\_bytes is the first byte of an mpegHAudioStreamPacket with MHASPacketType set to PACTYP\_SYNC. In this case, the data\_alignment\_indicator in the PES packet header is set to '1'. According to clause 14.4.4 of ISO/IEC 23008-3, the mpegHAudioStreamPacket yields an overall syncword of 0xC001A5.

To provide appropriate specific information, it is strongly recommended that each MPEG-H 3D audio stream carries audio scene information data with sufficient information to ensure that the decoded and rendered MPEG-H 3D audio stream can be presented correctly by receivers.

Carriage of ISO/IEC 23008-3 elementary streams in PES packets shall be identified by appropriate `stream_id` and `stream_type` values, indicating the use of ISO/IEC 23008-3 3D audio. In addition, an `MPEG-H_3dAudio_descriptor()` shall be present in the descriptor loop for the respective elementary stream entry in the program map table in case of a transport stream.

### 2.19.3 STD extensions for ISO/IEC 23008-3 elementary streams

The T-STD model as defined in clause 2.4.2 includes a transport buffer  $TB_n$  and a multiplex buffer  $B_n$  prior to decoding of each ISO/IEC 23008-3 3D audio elementary stream  $n$ . For buffers  $TB_n$  and  $B_n$  and the rate  $R_{X_n}$  between  $TB_n$  and  $B_n$  the following constraints apply for the carriage of an ISO/IEC 23008-3 3D audio stream:

The size  $BS_n$  of the buffer  $B_n$ , is defined as  $BS_n = BS_{\text{mux}} + BS_{\text{dec}} + BS_{\text{oh}}$  with:

$BS_n = 3584$  bytes for 1-2 encoded audio channel signals

Here, the size of the access unit decoding buffer  $BS_{\text{dec}}$ , and the PES packet overhead buffer  $BS_{\text{oh}}$  are constrained by:  $BS_{\text{dec}} + BS_{\text{oh}} \leq 2848$  bytes; a portion (736 bytes) of the 3584 byte buffer is allocated for buffering to allow multiplexing. The rest, 2848 bytes, are shared for access unit buffering  $BS_{\text{dec}}$ ,  $BS_{\text{oh}}$  and additional multiplexing.

$BS_n = 8976$  bytes for 3-8 encoded audio channel signals

$BS_n = 12804$  bytes for 9-12 encoded audio channel signals

$BS_n = 51216$  bytes for 13-48 encoded audio channel signals

$BS_n = 136576$  bytes for 49-128 encoded audio channel signals

Rate  $R_{X_n}$ :

$R_{X_n} = 2\,000\,000$  bit/s for 1-2 encoded audio channel signals

$R_{X_n} = 5\,529\,600$  bit/s for 3-8 encoded audio channel signals

$R_{X_n} = 8\,294\,400$  bit/s for 9-12 encoded audio channel signals

$R_{X_n} = 33\,177\,600$  bit/s for 13-48 encoded audio channel signals

$R_{X_n} = 88\,473\,600$  bit/s for 49-128 encoded audio channel signals

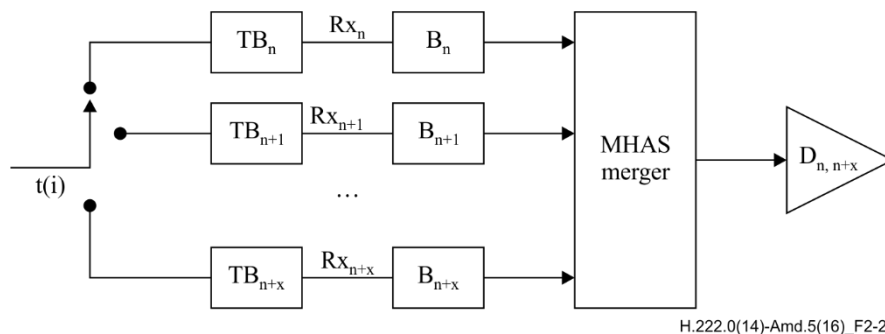
### 2.19.4 STD extensions for multiple ISO/IEC 23008-3 elementary streams

ISO/IEC 23008-3 MPEG-H 3D audio allows encoding an audio program as several elementary streams. One single audio decoder decodes all elementary streams to one audio presentation. Each of those elementary streams carries one or more encoded audio channel signals.

For every single elementary stream the constraints for the buffer size  $BS_n$  and the rate  $R_{X_n}$  apply as described in clause 2.19.3 above.

As described in clause 14.6 of ISO/IEC 23008-3, the MHAS packets of each elementary stream are merged into one single stream before forwarding the data to the decoder. Note that based on user interactivity only a subset of the elementary streams may be merged into this single stream instead of the complete set of elementary streams.

Figure 2-22 illustrates an example of multiple elementary streams. Those streams are merged into one single intermediate stream and decoded by a single ISO/IEC 23008-3 3D audio decoder.



**Figure 2-22 – Transport stream system target decoder for multiple audio elementary streams**

In addition to the notation used and described in clause 2.4.2 to describe Figure 2-1, the following notation is used in Figure 2-22:

$D_{n,n+x}$  is the audio decoder for all x audio elementary streams n to n+x.

**2.19.5 MPEG-2 Transport stream random access constraints and signalling**

A TS packet containing the PES packet header of a 3D Audio Random Access Point (RAP) shall have an adaptation field. The payload\_unit\_start\_indicator bit shall be set to '1' in the TS packet header and the adaptation\_field\_control bits shall be set to '11' (as per section 2.4.3.3). In addition, the random\_access\_indicator bit in the Adaptation field of the TS packet that contains the PES packet header of the 3D Audio RAP shall be set to '1' and follow the constraints specified in clause 2.4.3.5.

If the PES packet contains a RAP, then the MHAS packet of type PACTYP\_MPEGH3DAFRAME containing the RAP shall be the first MHAS packet of that type that commences in the PES packet. The audio data encapsulated in this MHAS packet shall follow the rules for a random access point as defined in clause 5.7 of ISO/IEC 23008-3.

**8) Table U.2**

Replace Table U.2 with the following:

**Table U.2 – AF descriptor tags**

AF descriptor tag	Identification
0x00-0x03	Rec. ITU-T H.222.0   ISO/IEC 13818-1 reserved
0x04	Timeline descriptor
0x05	Location descriptor
0x06	BaseURL descriptor
0x07	Cets_byte_range_descriptor (see Note)
0x08	AF_MPEG-H_3dAudio_extStreamID_descriptor
0x09	AF_MPEG-H_3dAudio_multi-stream_descriptor
0x0A	AF_MPEG-H_3dAudio_command_descriptor
0x0B - 0x7F	Rec. ITU-T H.222.0   ISO/IEC 13818-1 reserved
0x80 – 0xFF	User Private
NOTE – See clause 6.4 in ISO/IEC 23001-9 (Common encryption of MPEG-2 transport streams) for description and usage.	

**9) Clauses U.3.8 to U.3.10**

Add the following clauses after clause U.3.7:

**U.3.8 MPEG-H\_3dAudio extStreamID Descriptor**

The MPEG-H\_3dAudio extStreamID descriptor is used to provide unique identification of streams. This descriptor shall be directly followed by either a location descriptor or a base URL descriptor which indicates the location of the external auxiliary stream.

The used auxiliaryStreamID in this descriptor value shall match the value of auxiliaryStreamID of the MPEG-H 3D audio multi-stream descriptor.

**Table U.8 – TEMI MPEG-H\_3dAudio\_extStreamID Descriptor**

Syntax	Nb bits	Mnemonic
AF_MPEG-H_3dAudio_extStreamID_descriptor {		
af_descr_tag	8	uimsbf
af_descr_length	8	uimsbf
reserved	1	bslbf
auxiliaryStreamID	7	uimsbf
}		

**U.3.9 Semantic definition of fields in AF\_MPEG-H\_3dAudio\_extStreamID Descriptor**

**auxiliaryStreamID:** Provides a unique identifier for an external data stream that can be synchronized with the program.

**U.3.10 MPEG-H\_3dAudio Multi-Stream and Command Descriptors**

The following MPEG-H\_3dAudio descriptors may be present in the AF descriptor field:

**AF\_MPEG-H\_3dAudio\_multi-stream\_descriptor()** – The syntax and semantics of this descriptor is identical to the MPEG-H\_3dAudio\_multi-stream\_descriptor() as defined in clauses 2.6.114 and 2.6.115.

**AF\_MPEG-H\_3dAudio\_command\_descriptor()** – The syntax and semantics of this descriptor is identical to the MPEG-H\_3dAudio\_command\_descriptor() as defined in clause 2.6.118.

NOTE – The descriptors **MPEG-H\_3dAudio\_multi-stream\_descriptor()** as defined in clause 2.6.114 and **MPEG-H\_3dAudio\_command\_descriptor()** as defined in clause 2.6.118 are optionally part of the PMT. In case of dynamic updates of those descriptors an update of the PMT would be required. In case PMT updates are not desirable, the corresponding AF\_descriptors **AF\_MPEG-H\_3dAudio\_multi-stream\_descriptor()** respectively **AF\_MPEG-H\_3dAudio\_command\_descriptor()** can be distributed in the AF descriptor field.







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