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**Information technology — MPEG
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Part 2:
Spatial Audio Object Coding (SAOC)

AMENDMENT 4: SAOC Conformance

Technologies de l'information — Technologies audio MPEG —

Partie 2: Codage d'objet audio spatial (SAOC)

AMENDEMENT 4: Conformité SAOC

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The committee responsible for this document is ISO/IEC JTC 1, *Information technology, SC 29, Coding of audio, picture, multimedia and hypermedia information*.

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Information technology — MPEG audio technologies —

Part 2: Spatial Audio Object Coding (SAOC)

AMENDMENT 4: SAOC Conformance

Add Clause 10, Conformance testing:

10 Conformance testing

10.1 Introduction

This clause specifies conformance criteria for both bitstreams and decoders compliant with the SAOC standard as defined in Clauses 1 to 9 and Annexes A to G. This is done to assist implementers and to ensure interoperability.

10.2 Terms and definitions

The terms and definitions as stated in Clause 3 apply. Furthermore, the following terms and definitions will be used throughout this clause.

bitstream	data encoded according to the SAOC standard
conformance test bitstream	bitstream used for testing the conformance of an SAOC decoder.

10.3 SAOC conformance testing

5.5 defines the SAOC profiles and levels. Some conformance criteria apply to SAOC in general, while others are specific to the specific SAOC profile and its levels. Conformance shall be tested for the level of the profile with which a given bitstream or decoder/transcoder claims to comply.

10.4 Bitstreams

10.4.1 Characteristics

The SAOC audio object type (AOT) can be used in combination with various AOTs.

10.4.2 Test procedure

10.4.2.1 Introduction

An SAOC bitstream shall have the syntax and semantics as specified in Clauses 1 to 9 and Annexes A to G. The present subclause defines the conformance criteria that shall be fulfilled by a compliant bitstream. These criteria are specified for the syntactic elements of the bitstream and for some parameters decoded from the SAOC bitstream payload.

10.4.2.2 Configuration header

10.4.2.2.1 SAOCSpecificConfig()/SAOCDESpecificConfig()

bsVersion	For restrictions, see 10.4.2.5.
bsSamplingFrequencyIndex	Shall be in the range 0x0..0xc or 0xf. For further restrictions, see 10.4.2.5.
bsSamplingFrequency	For restrictions, see 10.4.2.5.
bsLowDelayMode	For restrictions, see 10.4.2.5.
bsFreqRes	Shall not be encoded with a value of 0.
bsFrameLength	For restrictions, see 10.4.2.5.
bsNumObjects	For restrictions, see 10.4.2.5.
bsNumFGOs	For restrictions, see 10.4.2.5.
bsRelatedTo[i][j]	No restrictions apply.
bsTransmitAbsNrg	No restrictions apply.
bsNumDmxChannels	For restrictions, see 10.4.2.5.
bsTttDualMode	No restrictions apply.
bsTttBandsLow	Shall not be encoded with a value larger than the value of numBands as given by Table 33.
bsPdgFlag	No restrictions apply.
bsOneIOC	No restrictions apply.
bsDcuFlag	For restrictions, see 10.4.2.5.
bsDcuMandatory	No restrictions apply.
bsDcuDynamic	No restrictions apply.
bsDcuMode	No restrictions apply.
bsDcuParam	No restrictions apply.
bsDeLimitFlag	For restrictions, see 10.4.2.5.
bsDeLimitFgo	No restrictions apply.
bsDeLimitBgo	No restrictions apply.

10.4.2.2.2 SAOCExtensionConfigData()

bsSaocExtType	No restrictions apply. Note that in case of values indicated as “N/A” in Table 43, the parsing function SAOCExtensionConfigData(bsSaocExtType) shall return the value 0, such that possibly present data is read as bsFillBits (i.e. skipped) and correct parsing of the bitstream can continue.
bsSaocExtLen	No restrictions apply.
bsSaocExtLenAdd	No restrictions apply.
bsSaocExtLenAddAdd	No restrictions apply.
bsFillBits	No restrictions apply.

10.4.2.2.3 SAOCExtensionConfigData(0)

The syntactic element SAOCExtensionConfigData(0) shall not be present in case of Low Delay profile. This syntactic element shall not be present in case of Baseline and Dialogue Enhancement profiles of Level 1. Furthermore, this syntactic element shall not be present if the helper variable numSlots has a value that is not listed in ISO/IEC 23003-1:2007, Table 55. Furthermore, if this syntactic element is present, the bitstream shall fulfil the requirements outlined in ISO/IEC 23003-1:2007, 6.1.13. For further restrictions, see 10.4.2.5.

bsDeLimitFgoEAO	No restrictions apply.
bsDeLimitBgoEAO	No restrictions apply.
bsDcuFlag2	No restrictions apply.
bsDcuMode2	No restrictions apply.
bsDcuParam2	No restrictions apply.

10.4.2.2.3.1 ResidualConfig()

bsResidualSamplingFrequencyIndex	Shall fulfil the requirements outlined in ISO/IEC 23003-1:2007, 6.1.13 and Table 88.
bsResidualFramesPerSAOCFrame	Shall fulfil the requirements outlined in ISO/IEC 23003-1:2007, 6.1.13 and Table 87
bsNumGroupsFGO	For restrictions, see 10.4.2.5.
bsResidualPresent[i]	No restrictions apply.
bsResidualBands[i]	Shall not be encoded with a value larger than the value of bsTtnBandsLow[i] .
bsTtnDualMode[i]	No restrictions apply.
bsTtnBandsLow[i]	Shall not be encoded with a value larger than the value of numBands as given by Table 33.

10.4.2.2.4 SAOCExtensionConfigData(1)

No restrictions apply.

10.4.2.2.5 SAOCExtensionConfigData(2)

The syntactic element SAOCExtensionConfigData(2) shall not be present in case of SAOC-DE profile. Shall fulfil the requirements outlined in Table 51.

10.4.2.2.6 SAOCExtensionConfigData(3)

No restrictions apply.

10.4.2.2.7 SAOCExtensionConfigData(8)

10.4.2.2.7.1 ObjectMetaData()

bsNumByteMetaData[i] No restrictions apply.

bsMetaData[i][j] Shall be encoded in UTF-8 encoding format.

10.4.2.2.8 SAOCExtensionConfigData(9)

10.4.2.2.8.1 PresetConfig()

bsNumPresets No restrictions apply.

bsNumBytePresetLabel[i] No restrictions apply.

bsPresetLabel[i][j] Shall be encoded in UTF-8 encoding format.

bsPresetMatrix No restrictions apply.

10.4.2.2.8.2 PresetMatrixData()

bsPresetMatrixType Shall not be encoded with a value of 3.

bsPresetMatrixElements[i][j] No restrictions apply.

10.4.2.2.8.3 PresetMatrixData()

bsPresetUserDataIdentifier[i] Shall be encoded in UTF-8 encoding format.

bsPresetUserDataLen No restrictions apply.

10.4.2.2.9 SAOCExtensionConfigData(10)

The syntactic element SAOCExtensionConfigData(10) shall not be present in case of SAOC-DE profile.

10.4.2.2.9.1 SeparationMetaData()

bsNumSeparationPairs No restrictions apply.

bsSeparationMainObjectID[i] No restrictions apply.

bsSeparationSubObjectID[i] No restrictions apply.

10.4.2.3 Bitstream payload

10.4.2.3.1 SAOCFrame()/SAOCDEFrame()

bsIndependencyFlag No restrictions apply.

10.4.2.3.1.1 SAOCFramingInfo()

- bsFramingType** No restrictions apply.
- bsNumParamSets** For restrictions, see 10.4.2.5.
- bsParamSlot[i]** Shall be in the range 0...**bsFrameLength**.

10.4.2.3.1.2 EcDataSaoc()

- bsXXXdataMode[i][j]** Shall fulfil the requirements outlined in ISO/IEC 23003-1:2007, 6.1.13. Shall not be encoded with the value 2 if EAO mode (residual coding) is applied.
- bsDataPairXXX[i][j]** Shall have the value 0 if setIdx == dataSets-1. No further restrictions apply.
- bsQuantCoarseXXX[i][j]** No restrictions apply.
- bsFreqResStrideXXX[i][j]** No restrictions apply.

10.4.2.3.1.3 SAOCEcDataPair()

- bsPcmCodingXXX[i][j]** No restrictions apply.

10.4.2.3.1.4 SAOCDiffHuffData()

- bsDiffType** No restrictions apply.
- bsCodingScheme** No restrictions apply.

10.4.2.3.1.5 SAOCHuffData1D()

- hcodFirstBand_XXX** **bsCodeW** shall have a value out of a set of values as defined by column "code-word" of Tables A.2 and A.3, respectively, and shall have a length as defined by the corresponding entry in column "length".
- hcod1D_XXX_YY** **bsCodeW** shall have a value out of a set of values as defined by column "code-word" of Tables A.4 and A.5, respectively, and shall have a length as defined by the corresponding entry in column 'length'.
- bsSign** No restrictions apply.

10.4.2.3.1.6 SAOCHuffData2DFreqPair()

hcodLavIdx	bsCodeW shall have a value out of a set of values as defined by column “code-word” of Table A.24, and shall have a length as defined by the corresponding entry in column “length”.
hcodFirstBand_XXX	bsCodeW shall have a value out of a set of values as defined by column “code-word” of Tables A.2 and A.3, respectively, and shall have a length as defined by the corresponding entry in column “length”.
hcod2D_XXX_YY_FP_LL	bsCodeW shall have a value out of a set of values as defined by column “code-word” of the applicable table out of Tables A.11 to A.22, and shall have a length as defined by the corresponding entry in column “length”.
hcod1D_XXX_YY	bsCodeW shall have a value out of a set of values as defined by column “code-word” of Tables A.4 and A.5, respectively, and shall have a length as defined by the corresponding entry in column “length”.
bsSign	No restrictions apply.

10.4.2.3.2 SAOCExtensionFrame()

No restrictions apply. Note that in case of **bsSaocExtType** having values indicated as “N/A” in Table 43, the parsing function SAOCExtensionFrameData(**bsSaocExtType**) shall return the value 0, such that possibly present data is read as **bsFillBits** (i.e. skipped) and correct parsing of the bitstream can continue.

bsSaocExtLen	No restrictions apply.
bsSaocExtLenAdd	No restrictions apply.
bsFillBits	No restrictions apply.

10.4.2.3.3 SAOCExtensionFrameData(0)

bsDeLimitEaoUpdate	No restrictions apply.
bsDeLimitFgoEAO	No restrictions apply.
bsDeLimitBgoEAO	No restrictions apply.
bsDcuDynamicUpdate2	No restrictions apply.
bsDcuMode2	No restrictions apply.
bsDcuParam2	No restrictions apply.

10.4.2.4 Transport of SAOC data

10.4.2.4.1 Transport in an MPEG environment

10.4.2.4.1.1 Introduction

In case of transport of SAOC data in an MPEG-4 environment, the following restrictions apply. In case of SAOCSpecificConfig() (or SAOCDESpecificConfig() for SAOC-DE profile) is conveyed out-of-band, any in-band SAOCSpecificConfig() (or SAOCDESpecificConfig() for SAOC-DE profile) shall be identical to the out-of-band one.

In case of embedding of MPEG SAOC data in MPEG-2/4 AAC payloads, the following restrictions apply. There must be at least one `extension_payload()` element with `extension_type==EXT_SAOC_DATA` (or `extension_type==EXT_SAOC_DE_DATA` for SAOC-DE profile) in each AAC frame in order to enable immediate implicit signalling.

In case of embedding of MPEG SAOC data in MPEG-1/2 Layer I/II/III bistreams, the following restrictions apply. The first bit of the `ancSyncword` must be byte-aligned with respect to the first bit of the `0xFFF` syncword of the MPEG-1/2 frame header. The `AncDataElement()` must be completely included in the ancillary data of a single MPEG-1/2 frame. There must be at least one `AncDataElement()` in the ancillary data of each MPEG-1/2 frame in order to enable immediate implicit signalling.

10.4.2.4.1.2 AncDataElement()

ancSyncword	Shall be 0x473.
ancType	No restrictions apply.
ancStart	No restrictions apply.
ancStop	No restrictions apply.
ancLenBytes	No restrictions apply.
ancLenBytesAdd	No restrictions apply.
ancCrcWord	Shall have the value as determined by the procedure specified in 8.2.4.
ancDataSegmentByte	A data block formed by concatenation of <code>ancDataSegmentByte</code> as specified in 8.2.4 shall, if <code>ancType==0x0</code> or <code>ancType==0x1</code> , constitute one <code>SaocDataFrame()</code> syntax element, padded at the end to obtain an integer number of bytes.

10.4.2.4.1.3 SaocDataFrame(saocHeaderFlag)

saocHeaderFlag	No restrictions apply.
saocHeaderLen	No restrictions apply.
saocHeaderLenAdd	No restrictions apply.
bsFillBits	No restrictions apply.
saocTimeAlignFlag	No restrictions apply.
saocTimeAlign	Shall have an absolute value no larger than two times the number of samples in the MPEG SAOC PCM frame as defined by bsFrameLength and bsSamplingFrequencyIndex or bsSamplingFrequency .

10.4.2.4.2 Transport over PCM channels

10.4.2.4.2.1 Introduction

In case of transport of SAOC data over PCM channels, the following restrictions apply. The `BuriedData()` data shall be embedded in the LSBs of the PCM channels. Typically, 16 bit PCM samples are used. However, also other sample precisions shall be supported, e.g. 20 and 24 bits.

10.4.2.4.2.2 BuriedDataHeader()

bsBDSyncword	Shall be 0xAA95.
bsBDChannels	Shall have the value of the number of PCM channels in which the MPEG SAOC data is embedded.
bsBDFramelength	Shall define a PCM buried data frame size which is exactly the same as the MPEG SAOC PCM frame size defined by bsFrameLength and bsSamplingFrequencyIndex or bsSamplingFrequency .
bdBDSubframes	Shall fulfil the restrictions outlined for this syntactic element in 8.3.3.
bsBDReserved	Shall be 0.
bsBDAlloc[channel][subframe]	Shall not exceed the value of n for n bit PCM samples.
bsBDHeaderCrc	Shall fulfil the restrictions outlined for this syntactic element in 8.3.3.
bsBDHeaderPadding	Shall be 0.

10.4.2.4.2.3 BuriedDataFrame()

bsBDFramePadding Shall be 0.

10.4.2.4.2.4 BuriedDataElement()

bsBDType	Each BuriedDataFrame() shall at least contain one BuriedDataElement() with bsBDType set to the value of 4 or 5. In the case of file based applications, the first frame shall contain a BuriedDataElement() with bsBDType set to the value of 5.
bsBDID	Shall be set to a value in the range of 0..7, each value shall be used only once in a BuriedDataFrame().
bsBDLengthIdx	No restrictions apply.
bsBDLength	Shall fulfil the restriction outlined for this syntactic element in 8.3.3.
bsBDBytes	Shall contain exactly one SaocDataFrame().
bsBDDataCrc	Shall fulfil the restrictions outlined for this syntactic element in 8.3.3.

10.4.2.5 Restrictions depending on profiles and levels

10.4.2.5.1 Introduction

Depending on the profile and level associated with the present SAOC bitstream, further restrictions may apply.

10.4.2.5.2 Baseline SAOC profile

For the Baseline SAOC profile, the following further restrictions apply.

bsSamplingFrequencyIndex	Shall be encoded with a value listed in Table AMD1.1.
bsSamplingFrequency	Shall be encoded with a value listed in Table AMD1.1.
bsFrameLength	Shall be in the range 3..71.

bsLowDelayMode	Shall be 0.
bsNumObjects	Shall be encoded with a value listed in Table AMD1.1.
bsNumDmxChannels	Shall be in the range 0..1.
bsNumEAO	Shall be encoded with a value listed in Table AMD1.1.

Table — AMD1.1 — Restrictions for the SAOC baseline profile

	Level 1	Level 2	Level 3	Level 4
bsSamplingFrequencyIndex	0x3..0xc, 0xf	0x3..0xc, 0xf	0x3..0xc, 0xf	0x0..0xc, 0xf
bsSamplingFrequency	≤48 000	≤48 000	≤48 000	≤96 000
bsNumObjects	0..7	0..15	0..31	0..31
bsNumEAO	N/A	0..1	0..3	0..3

bsDcuFlag No restrictions apply.

10.4.2.5.3 Low Delay SAOC profile

For the Low Delay SAOC profile, the following further restrictions apply.

bsSamplingFrequencyIndex	Shall be encoded with a value listed in Table AMD1.2.
bsSamplingFrequency	Shall be encoded with a value listed in Table AMD1.2.
bsFrameLength	Shall be in the range 3..31.
bsLowDelayMode	Shall be 1.
bsNumObjects	Shall be encoded with a value listed in Table AMD1.2.
bsNumDmxChannels	Shall be encoded with a value listed in Table AMD1.2.

Table — AMD1.2 — Restrictions for the SAOC low delay profile

	Level 1	Level 2	Level 3
bsSamplingFrequencyIndex	0x3..0xc, 0xf	0x3..0xc, 0xf	0x3..0xc, 0xf
bsSamplingFrequency	≤48 000	≤48 000	≤48 000
bsNumObjects	0..7	0..31	0..31
bsNumDmxChannels	0	0..1	0..1

bsDcuFlag No restrictions apply.

10.4.2.5.4 Dialogue Enhancement SAOC profile

For the Dialogue Enhancement SAOC profile, the following further restrictions apply.

bsVersion	Shall be 0.
bsSamplingFrequencyIndex	Shall be in the range 0x3..0xc or 0xf.
bsSamplingFrequency	Shall be ≤48 000.
bsFrameLength	Shall be in the range 3..71.
bsNumObjects	Shall be in the range 0..5.

- bsNumDmxChannels** Shall be in the range 0..2.
- bsNumFGOs** Shall be in the range 0..2.
- bsDeLimitFlag** Shall be 1.
- bsNumEAO** Shall be encoded with a value listed in Table AMD1.3. If it is present, then it shall be equal to bsNumFGOs.

Table — AMD1.3 — Restrictions for the SAOC Dialogue Enhancement Profile

	Level 1	Level 2
bsNumEAO	N/A	0..2

bsDcuFlag Shall be 0.

10.5 SAOC decoder/transcoder

10.5.1 Characteristics

10.5.1.2 General

The SAOC decoder/transcoder can be implemented in two different versions:

- High Quality (HQ) SAOC
- Low Power (LP) SAOC

10.5.2 Test procedure

10.5.2.1 Downmix decoders

An SAOC decoder/transcoder can be used in combination with a downmix decoder. In this case, the downmix decoder shall fulfill the conformance criteria that are applicable to it. Nevertheless, for the conformance test procedure, the PCM coding shall be applied to a downmix signal.

10.5.2.2 SAOC decoder/transcoder test procedure

With regard to the definition and further details of the conformance criterion RMS/LSB being used to test SAOC decoders/transcoders, reference is made to ISO/IEC 14496.

The conformance test procedure for SAOC decoders/transcoders internally creates a reference for comparison, given the conformance test sequence and the output from the decoder under test as outlined in Figure AMD1.3.

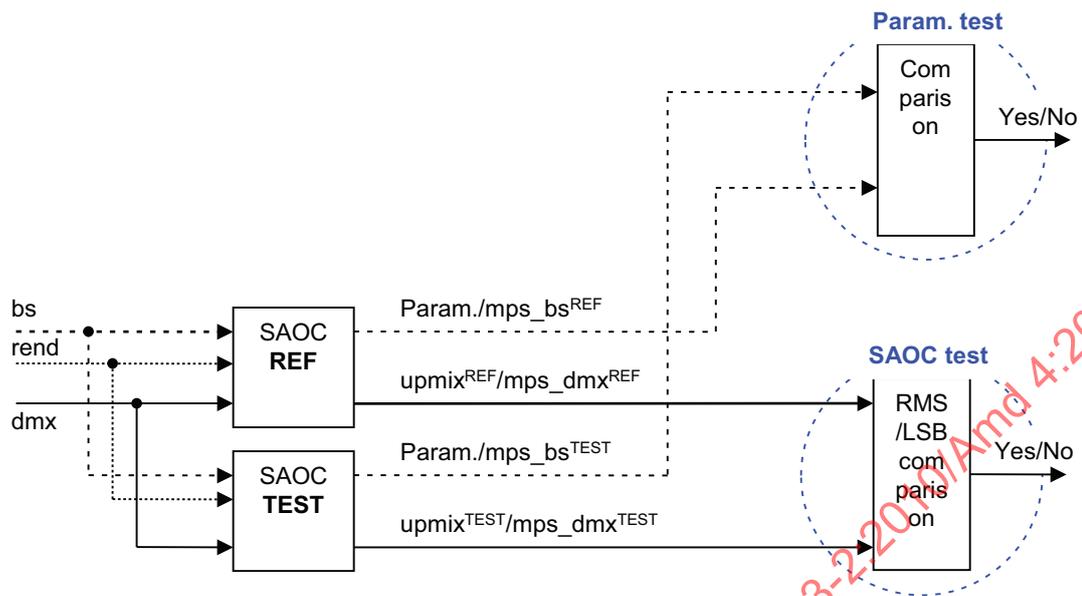


Figure — AMD1.3 — Block diagram of the SAOC decoding/transcoding conformance test procedure

The relevant signals and data are:

- Data from the conformance test sequence:
 - bs: SAOC bitstream from the conformance test sequence;
 - rend: rendering information from the conformance test sequence;
 - dmx: SAOC downmix signal from the conformance test sequence.
- Outputs for comparison from the SAOC decoder/transcoder implementation instances:
 - $upmix^{REF}/dmx_bs^{REF}$: output from the reference SAOC decoder/transcoder;
 - $upmix^{TEST}/dmx_bs^{TEST}$: output from the SAOC decoder/transcoder under test;
 - $Param./mps_bs^{REF}$: Parametric or/and MPS data from the reference SAOC decoder/transcoder;
 - $Param./mps_bs^{TEST}$: Parametric or/and MPS data from the SAOC decoder/transcoder under test.
- Conformance test modes:
 - SAOC test (RMS/LSB comparison): This module calculates the difference signals between the output from the SAOC decoder/transcoder under test and the internal reference. The maximum amplitude of the difference signal (Diff max) as well as the RMS of the difference signal are calculated. The conformance criteria are specified with respect to PCM-sample in the range $-32768 \dots 32767$.
 - Param test (ASCII comparison): This module calculates the difference between the obtained output parameters (e.g. MPS data) from the SAOC decoder/transcoder under test and the internal reference.

10.5.3 Test sequences

To test SAOC decoder/transcoder, ISO/IEC JTC 1/SC 29 supplies a number of test sequences. The naming convention of these bitstreams is as follows: The first part of the name (the part preceding the first underscore) specifies the downmix format. The second part of the name (between the first and the last underscore) specifies the properties of the test sequence in question according to Table AMD1.4. For

each test sequence, the SAOC test (RMS/LSB comparison) and/or Param test (ASCII comparison) are applied according to Table AMD1.5.

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Table — AMD1.4 — List of SAOC bitstream elements for conformance test sequences

Conformance test sequence	pcm_BLP_x-1-1	pcm_BLP_x-1-2	pcm_BLP_x-1-5	pcm_BLP_x-1-b	pcm_BLP_x-2-1	pcm_BLP_x-2-2	pcm_BLP_x-2-5	pcm_BLP_x-2-b	pcm_BLP_param_4	pcm_BLP_param_5	pcm_BLP_param_7	pcm_BLP_param_10	pcm_BLP_param_14	pcm_BLP_param_20	pcm_LDP_param_4
Downmix sampling frequency	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000
Downmix sample resolution	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
bsSamplingFrequencyIndex	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
bsLowDelayMode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsFreqRes	1	1	1	1	1	1	1	1	7	6	5	4	3	2	7
bsFrameLength	31	31	31	31	31	31	31	31	31	31	31	31	31	31	7
bsNumObjects	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
bsNumFGOs	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsRelatedTo[i][j]	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
bsTransmitAbsNrg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsNumDmxChannels	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
bsTttDualMode	n/a	n/a	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0
bsTttBandsLow	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsPdgFlag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsOnelOC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDcuFlag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDcuMandatory	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsDcuDynamic	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsDcuMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsDcuParam	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsDelLimitFlag	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsDelLimitFgo	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsDelLimitBgo	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(0)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(8)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(9)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
SAOCExtensionConfigData(10)	n/a	n/a	n/a	n/a	n/a	n/a	n/a								
bsFramingType	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table — (continued)

Conformance test sequence	pcm_LDP_param_5	pcm_LDP_param_7	pcm_LDP_param_9	pcm_LDP_param_12	pcm_LDP_param_15	pcm_LDP_param_23	pcm_BLP_ts_8	pcm_BLP_ts_15	pcm_BLP_ts_16	pcm_BLP_ts_18	pcm_BLP_ts_24	pcm_BLP_ts_30	pcm_BLP_ts_36	pcm_BLP_ts_48	pcm_BLP_ts_60
Downmix sampling frequency	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000
Downmix sample resolution	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
bsSamplingFrequencyIndex	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
bsLowDelayMode	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
bsFreqRes	6	5	4	3	2	1	1	1	1	1	1	1	1	1	1
bsFrameLength	7	7	7	7	7	7	7	14	15	17	23	29	35	47	59
bsNumObjects	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
bsNumFGOs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsRelatedTo[i][j]	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
bsTransmitAbsNrg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsNumDmxChannels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bsTtDualMode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsTtBandsLow	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsPdgFlag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsOneIOC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDcuFlag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDcuMandatory	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuDynamic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitFlag	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitEgo	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitEgo	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(0)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(8)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(9)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(10)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsFramingType	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table — (continued)

Conformance test sequence	pcm_BLP_ts_64	pcm_BLP_ts_72	pcm_BLP_32kHz	pcm_BLP_44kHz	pcm_BLP_uqMPS	pcm_BLP_coarse	pcm_BLP_one-IOC	pcm_BLP_PDG	pcm_BLP_EAO	pcm_BLP_DCU	pcm_BLP_MBO	pcm_BLP_MetaData	pcm_BLP_Pre-set	pcm_BLP_Sep-Data	pcm_BLP_NRG
Downmix sampling frequency	48 000	48 000	32 000	44 100	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000
Downmix sample resolution	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
bsSamplingFrequencyIndex	3	3	5	4	3	3	3	3	3	3	3	3	3	3	3
bsLowDelayMode	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsFreqRes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bsFrameLength	63	71	31	31	31	31	31	31	31	31	31	31	31	31	31
bsNumObjects	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
bsNumFGOs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsRelatedTo[i][j]	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a
bsTransmitAbsNrg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsNumDmxChannels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bsFttDualMode	0	0	0	0	0	n/a	0	0	0	0	0	0	0	0	0
bsFttBandsLow	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsPdgFlag	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
bsOneIOC	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
bsDcuFlag	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
bsDcuMandatory	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1	n/a	n/a	n/a	n/a	n/a
bsDcuDynamic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1	n/a	n/a	n/a	n/a	n/a
bsDcuMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	e	n/a	n/a	n/a	n/a	n/a
bsDcuParam	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	e	n/a	n/a	n/a	n/a	n/a
bsDelLimitFlag	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitFgo	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitBgo	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(0)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a	n/a	+	n/a	n/a
SAOCExtensionConfigData(2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a	n/a	n/a
SAOCExtensionConfigData(8)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a	n/a	n/a
SAOCExtensionConfigData(9)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a	n/a
SAOCExtensionConfigData(10)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+	n/a
bsFramingType	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table — (continued)

Conformance test sequence	pcm_DEP_x-3-3	pcm_DEP_param_4	pcm_DEP_param_5	pcm_DEP_param_7	pcm_DEP_param_10	pcm_DEP_param_14	pcm_DEP_param_20	pcm_DEP_ts_8	pcm_DEP_ts_15	pcm_DEP_ts_16	pcm_DEP_ts_18	pcm_DEP_ts_24	pcm_DEP_ts_30	pcm_DEP_ts_36	pcm_DEP_ts_48
Downmix sampling frequency	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000	48 000
Downmix sample resolution	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
bsSamplingFrequencyIndex	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
bsLowDelayMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsFreqRes	1	7	6	5	4	3	2	1	1	1	1	1	1	1	1
bsFrameLength	31	31	31	31	31	31	31	7	14	15	17	23	29	35	47
bsNumObjects	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
bsNumFGOs	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bsRelatedToI[j][j]	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
bsTransmitAbsNrg	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsNumDmxChannels	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
bsTtDualMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsTtBandsLow	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsPdgFlag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsOneIOC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDcuFlag	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDcuMandatory	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuDynamic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuParam	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitFlag	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
bsDelLimitFgo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
bsDelLimitBgo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAOCExtensionConfigData(0)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(8)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(9)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(10)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsFramingType	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table — (continued)

Conformance test sequence	pcm_DEP_ts_60	pcm_DEP_ts_64	pcm_DEP_ts_72	pcm_DEP_32khz	pcm_DEP_44khz	pcm_DEP_coarse	pcm_DEP_one-IOC	pcm_DEP_MRC	pcm_DEP_PDG	pcm_DEP_var-Param	pcm_DEP_EAO
Downmix sampling frequency	48 000	48 000	48 000	32 000	44 100	48 000	48 000	48 000	48 000	48 000	48 000
Downmix sample resolution	16	16	16	16	16	16	16	16	16	16	16
bsSamplingFrequencyIndex	3	3	3	5	4	3	3	3	3	3	3
bsLowDelayMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsFreqRes	1	1	1	1	1	1	1	1	1	1	1
bsFrameLength	59	63	71	31	31	31	31	31	31	31	31
bsNumObjects	4	4	4	4	4	4	4	4	4	4	4
bsNumFGOs	1	1	1	1	1	1	1	1	1	1	1
bsRelatedTo[i][j]	b	b	b	b	b	b	b	b	b	c	b
bsTransmitAbsNrg	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsNumDmxChannels	2	2	2	2	2	2	2	2	2	2	2
bsTtDualMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsTtBandsLow	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsPdgFlag	0	0	0	0	0	0	0	0	1	0	0
bsOneIOC	0	0	0	0	0	0	0	0	0	0	0
bsDcuFlag	0	0	0	0	0	0	0	0	0	0	0
bsDcuMandatory	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuDynamic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuMode	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDcuParam	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsDelLimitFlag	1	1	1	1	1	1	1	1	1	1	1
bsDelLimitFgo	0	0	0	0	0	0	0	f	0	0	0
bsDelLimitBgo	0	0	0	0	0	0	0	f	0	0	0
SAOCExtensionConfigData(0)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	+
SAOCExtensionConfigData(1)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(8)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(9)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SAOCExtensionConfigData(10)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bsFramingType	0	0	0	0	0	0	0	0	0	1	0