INTERNATIONAL STANDARD

# ISO/IEC 14496-4

Second edition
2004-12-15

**AMENDMENT 13**
2007-02-01

# Information technology — Coding of audio-visual objects —

## Part 4: Conformance testing

## AMENDMENT 13: Parametric coding for high quality audio conformance

*Technologies de l'information — Codage des objets audiovisuels —*

*Partie 4: Essai de conformité*

*AMENDEMENT 13: Codage paramétrique pour la conformité audio de haute qualité*

Reference number
ISO/IEC 14496-4:2004/Amd.13:2007(E)

Documents
Document Sharing Hub
© ISO/IEC 2007

Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO/IEC 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Documents
Document Sharing Hub



© ISO/IEC 2007 – All rights reserved

Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 13 to ISO/IEC 14496-4:2004 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

© ISO/IEC 2007 – All rights reserved


Documents
Document Sharing Hub
Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

Documents
Document Sharing Hub

Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

# Information technology — Coding of audio-visual objects —

## Part 4:
## Conformance testing

## AMENDMENT 13: Parametric coding for high quality audio conformance

*In subclause 6.5.1 File name conventions, insert the following row into Table 29 after the row for PS (+SBR +AAC LC):*

**Table 29 — File name conventions**

| | | |
|---|---|---|
| SSC | ssc_<tool>_<nchan>[_sig<sig>] | ssc_<mode>_<tool>_<nchan>[_sig<sig>][_<chan>] |

*In subclause 6.6.4.1.2.2.4 ics_info(), replace:*

Test bitstreams al03 and as17 are provided respectively for Main and Low-Complexity profiles to test decoder performance on non-meaningful transitions (see subclause 6.6.4.1.2.2.1).

*with:*

Test sequences al03 and as17 are provided respectively for Low Complexity and Scalable Sampling Rate profiles to test decoder performance on non-meaningful transitions (see subclause 6.6.4.1.2.2.1).

*In subclause 6.6.4.1.2.2.4 ics_info(), replace:*

predictor_data_present: shall be encoded with the value 0 for the audioObjectTypes 2 (AAC LC), 3 (AAC SSR) and 17 (ER AAC LC); no restrictions apply otherwise.

*with:*

predictor_data_present: shall be encoded with the value 0 for the audioObjectTypes 2 (AAC LC), 3 (AAC SSR) and 17 (ER AAC LC); shall be encoded with the value 0 when used in the Low Delay AAC profile; no restrictions apply otherwise.

*In subclause 6.6.4.1.2.2.15 (individual_channel_stream()), replace:*

pulse_data_present: shall be encoded with a value of 0 for AAC scalable or if window_sequence is EIGHT_SHORT_SEQUENCE.

*with:*

pulse_data_present: shall be encoded with a value of 0 for the audioObjectTypes 6 (AAC scalable) and 20 (ER AAC scalable); shall be encoded with a value of 0 when used in the Low Delay AAC profile; shall be encoded with a value of 0 if window_sequence is EIGHT_SHORT_SEQUENCE; no restrictions apply otherwise.

Documents
Document Sharing Hub

© ISO/IEC 2007 – All rights reserved


Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

*In subclause 6.6.4.2.3 (Test sequences), Table 30 (AAC test sequences) correct the arithmetic torture table entry for as13, samplingFrequencyIndex "0,1" from "yes" to "no".*

*In subclause 6.6.4.2.3 (Test sequences), add to table 41 (AAC Test sequences):*

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| er_ad100np | sine sweep | 64 | 23 | * | 1 | 0,1 | 0 | - | 0 | 0 | 0 | - | - | - | y | n | n | n | n | RMS |
| er_ad103np | test mix | 64 | 23 | * | 1 | 0,1 | 0 | - | 0 | 1 | 0 | - | - | - | ? | ? | n | n | fs2 | none |
| er_ad107np | test mix | 64 | 23 | * | 1 | 0,1 | 0 | - | 0 | 1 | 1 | - | - | - | ? | ? | n | n | fs1 | none |
| er_ad110np | sine sweep | 64 | 23 | * | 1 | 0,1 | 1 | - | 0 | 0 | 0 | - | - | - | y | n | n | n | n | RMS |
| er_ad111np | test mix | 64 | 23 | * | 1 | 0,1 | 1 | - | 0 | 0 | 0 | - | - | - | ? | ? | n | n | fs1 | none |
| er_ad115np | test mix | 64 | 23 | * | 1 | 0,1 | 1 | - | 0 | 0 | 1 | - | - | - | ? | ? | n | n | fs2 | none |
| er_ad202np | test mix | 128 | 23 | * | 2 | 0,1 | 0 | - | 1 | 0 | 0 | y | y | - | ? | ? | n | n | fs2 | none |
| er_ad206np | test mix | 128 | 23 | * | 2 | 0,1 | 0 | - | 1 | 0 | 1 | y | y | - | ? | ? | n | n | fs1 | none |
| er_ad214np | test mix | 128 | 23 | * | 2 | 0,1 | 1 | - | 1 | 1 | 0 | y | y | - | ? | ? | n | n | fs2 | none |
| er_ad218np | test mix | 128 | 23 | * | 2 | 0,1 | 1 | - | 1 | 1 | 1 | y | y | - | ? | ? | n | n | fs1 | none |

*In subclause 6.6.6.1.2.2.2 (bsac_header()), replace the sentence:*

**header_length**: ((header_length+8)*8) must be smaller than or equal to (frame_length*8)

*with:*

**header_length**: ((header_length+7)*8) must be smaller than or equal to (frame_length*8)

*In subclause 6.6.6.2.3, replace Table 52 with:*

**Table 52 — ER BSAC Object Type Test Compressed data for Mobile Audio Internetworking Profile Level 1-3 and Natural Audio Profile Level 1-2**

| File base name | Content | Base Layer Bitrate (kbit/s) | Top Bitrate (kbit/s) | Top Layer (n) | Number of ES | ES Bitrate (kbit/s) | Number of channel | Intensity | MS | TNS | PNS | epConfig | SBA | Highest Layer | Test Procedure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **er_bs01_ep0** | sine sweep | 16 | 40/64 | 24/48 | 1 | 40/64 | 1 | | | | | 0 | | 24/48 | RMS |
| **er_bs01_ep1** | sine sweep | 16 | 40/64 | 24/48 | 6 | BL1, BL2,6/12, 6/12, 6/12, 6/12 | 1 | | | | | 1 | | 24/48 | RMS |



© ISO/IEC 2007 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **er_bs02_ep0** | music | 16 | 40/64 | 24/48 | 25/49 | BL,1, 1, ..., 1, 1 | 1 | | | | | 0 | | 0, 1, 2, ... , 24/48 | |
| **er_bs02_ep1** | music | 16 | 40/64 | 24/48 | 6 | BL1, BL2,6 /12, 6/12, 6/12, 6/12 | 1 | | | | | 1 | | 0, 1, 2, ... , 24/48 | |
| **er_bs03_ep0** | music | 32 | 80/128 | 24/48 | 2 | BL,24 /48 | 2 | | | | | 0 | | 0, 24/48 | |
| **er_bs03_ep1** | music | 32 | 80/128 | 24/48 | 6 | BL1, BL2, 12/24, 12/24, 12/24, 12/24 | 2 | | | | | 1 | | 0, 24/48 | |
| **er_bs04_ep0** | music | 32 | 80/128 | 24/48 | 4 | BL,24 (48), 12(24), 12(24) | 2 | | Yes | Yes | | 0 | | 0, 12/24, 18/36, 24/48 | |
| **er_bs04_ep1** | music | 32 | 80/128 | 24/48 | 6 | BL1, BL2, 12/24, 12/24, 12/24, 12/24 | 2 | | Yes | Yes | | 1 | | 0, 12/24, 18/36, 24/48 | |
| **er_bs05_ep0** | music | 32 | 80/128 | 24/48 | 5 | BL,12/ 24, 12/24, 12/24, 12/24 | 2 | Yes | Yes | Yes | | 0 | | 0, 6/12, 12/24, 18/36, 24/48 | |
| **er_bs05_ep1** | music | 32 | 80/128 | 24/48 | 6 | BL1, BL2, 12/24, 12/24, 12/24, 12/24 | 2 | Yes | Yes | Yes | | 1 | | 0, 6/12, 12/24, 18/36, 24/48 | |
| **er_bs06_ep0** | music | 32 | 80/128 | 24/48 | 3 | BL, 24/48, 24/48 | 2 | Yes | Yes | Yes | | 0 | Yes | 0, 12/24, 24/48 | |
| **er_bs06_ep1** | music | 32 | 80/128 | 24/48 | 6 | BL1, BL2, 12/24, 12/24, 12/24, 12/24 | 2 | Yes | Yes | Yes | | 1 | Yes | 0, 6/12, 12/24, 18/36, 24/48 | |

© ISO/IEC 2007 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **er_bs07_ep0** | noise | 16 | 40/64 | 24/48 | 1 | 40/64 | 1 | | | | Yes | 0 | | 24/48 | PNS-1 |
| **er_bs07_ep1** | noise | 16 | 40/64 | 24/48 | 6 | BL1, BL2, 6/12, 6/12, 6/12, 6/12 | 1 | | | | Yes | 1 | | 24/48 | PNS-1 |
| **er_bs08_ep0** | noise | 16 | 40/64 | 24/48 | 1 | 40/64 | 1 | | | | Yes | 0 | | 24/48 | PNS-2/3 |
| **er_bs08_ep1** | noise | 16 | 40/64 | 24/48 | 6 | BL1, BL2, 6/12, 6/12, 6/12, 6/12 | 1 | | | | Yes | 1 | | 24/48 | PNS-2/3 |

*After subclause 6.6.18 Parametric Stereo Conformance, add the following subclauses:*

### 6.6.19 SSC (SinuSoidal Coding)

#### 6.6.19.1 Compressed data

##### 6.6.19.1.1 Characteristics

Conformant SSC compressed MPEG-4 data shall have the SSC data stored as outlined in ISO/IEC 14496-3 subpart 8 "Technical description of Parametric coding for high quality audio".

##### 6.6.19.1.2 Test procedure

Each compressed data shall meet the syntactic and semantic requirements specified in ISO/IEC 14496-3. The decoded data shall also meet the requirements defined in ISO/IEC 14496-3. If a syntactic element is not listed below, no restrictions apply to that element. The **reserved** element shall be encoded with the value zero.

###### 6.6.19.1.2.1 Compressed MPEG-4 data payload

AudioSpecificConfig

**audioObjectType:** Shall be encoded with the value 28.

**samplingFrequencyIndex:** Shall be encoded with the value 4.

**channelConfiguration:** Shall be encoded with a value in the range of [1 2].

SSCSpecificConfig

**decoder_level:** Shall be encoded with the value 1. The values 0, 2, 3 are reserved.


© ISO/IEC 2007 – All rights reserved
Documents
Document Sharing Hub
Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

**update_rate:** Shall be encoded with the value 4. The values in the ranges [0  3] and [5  7] are reserved.

**synthesis_method:** Shall be encoded with the value 0. The values 1, 2, 3 are reserved.

**mode_ext:** Shall be encoded with the value 0 or 1. The values 2, 3 are reserved.

ssc_audio_frame_header

**s_nrof_continuations:** Shall be encoded with a value not exceeding max_nrof_sinusoids[decoder_level].

**s_nrof_den:** Shall be encoded with a value not exceeding max_nrof_den[decoder_level].

subframe_transients(sf,ch)

**t_loc[sf][ch]:** Shall be encoded with a value in the range of [0  S[Update_rate]-1].

**t_type[sf][ch]:** Shall be encoded with a value in the range of [0  1]. The values 2, 3 are reserved.

**t_b_par[sf][ch]:** Shall be encoded with a value in the range of [0 3]. The values in the range of [4 7] are reserved.

**t_chi_par[sf][ch]:** Shall be encoded with a value in the range of [0 3]. The values in the range of [4 7] are reserved.

**t_freq[sf][ch][l]:** Shall be encoded with a value in the range of [0 485]. The values in the range of [486 511] are reserved.

subframe_sinusoids(sf,ch)

**bs_codeword:** Shall be encoded with the values listed in the corresponding Huffman tables, defined in ISO/IEC 14496-3, Tables 8.B.1 till 8.B.11, 8.B.15 and 8.B.16.

**s_nrof_births[sf][ch]:** Shall be encoded with a value not exceeding max_nrof_sinusoids[decoder_level] - s_nrof_confinuations[sf][ch].

subframe_noise(sf,ch)

**n_laguerre[ch]:** Shall be encoded with a value in the range of [0  2]. The value 3 is reserved.

**bs_codeword:** Shall be encoded with the values listed in the corresponding Huffman tables, defined in ISO/IEC 14496-3, Tables 8.B.12 till 8.B.14.

ps_data()

**iid_mode:** Shall be encoded with a value in the range of [0  5]. The values 6, 7 are reserved.

**icc_mode:** Shall be encoded with a value in the range of [0  5]. The values 6, 7 are reserved.

Documents
Document Sharing Hub

© ISO/IEC 2007 – All rights reserved


Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

**border_position[e]:** Shall be encoded with a value in the range of [(border_position[e-1]+1) (*numQMFSlots*-1)] if e>0 or a value in the range of [0 (*numQMFSlots*-1)] if e==0.

**iid_dt[]:** Shall be encoded with the value 0 if iid_mode of the current envelope is different from iid_mode of the previous envelope.

**icc_dt[]:** Shall be encoded with the value 0 if icc_mode of the current envelope is different from icc_mode of the previous envelope.

**ps_extension_id:** Shall be encoded with the value of 0. The values 1, 2 and 3 are reserved.

ps_extension()

**ipd_dt[]:** Shall be encoded with the value 0 if iid_mode of the current envelope is different from iid_mode of the previous envelope.

**opd_dt[]:** Shall be encoded with the value 0 if iid_mode of the current envelope is different from iid_mode of the previous envelope.

**reserved_ps:** Shall be encoded with the value of 0. The value 1 is reserved.

iid_data()

**bs_codeword:** Shall be encoded with the values listed in the corresponding Huffman table, defined in ISO/IEC 14496-3, Table 8.B.17 or Table 8.B.18.

Conformant compressed MPEG-4 data shall have coded iid_par[e][b] IID indices that are in the range [-7 7] if iid_quant==0 or in the range [-15 15] if iid_quant==1.

icc_data()

**bs_codeword:** Shall be encoded with the values listed in the corresponding Huffman table, defined in ISO/IEC 14496-3, Table 8.B.19.

Conformant compressed MPEG-4 data shall have coded icc_par[e][b] ICC indices that are in the range [0 7].

ipd_data()

**bs_codeword:** Shall be encoded with the values listed in the corresponding Huffman table, defined in ISO/IEC 14496-3, Table 8.B.20.

opd_data()

**bs_codeword:** Shall be encoded with the values listed in the corresponding Huffman table, defined in ISO/IEC 14496-3, Table 8.B.21.


© ISO/IEC 2007 – All rights reserved
Documents
Document Sharing Hub
Full document details: ISO_IEC 14496-4_2004_Amd 13_2007

#### 6.6.19.2 Decoders

##### 6.6.19.2.1 Characteristics

The object type SSC has the Object Type ID 28, and the compressed MPEG-4 data syntax is defined in ISO/IEC 14496-3. The Audio Object Type SSC contains the SSC and PS tools.

##### 6.6.19.2.2 SSC profile

A conformant SSC profile decoder of Level 2 or higher, shall support the baseline version of the PS tool, as outlined in ISO/IEC 14496-3.

A conformant SSC profile decoder of Level 3 or higher, shall support IPD/OPD synthesis and 34 frequency bands resolution, as outlined in ISO/IEC 14496-3.

A conformant SSC Profile decoder of a certain level shall always be able to operate the SSC tool for streams containing Parametric Stereo data. For streams not containing Parametric Stereo data, the SSC Profile decoder shall operate the SSC tool.

The specifications given in the level definitions must be met. The output signal of the decoder under test must meet the criteria for accuracy of deterministic signal components and statistical properties of stochastic signal components as described below. Two alternative accuracy classes for SSC decoders are defined:

- Full Accuracy SSC decoder
- Fixed Point Accuracy SSC decoder

The criteria for deterministic signal components depend on the accuracy class selected. The criteria for stochastic signal components are the same for both accuracy classes.

##### 6.6.19.2.3 SSC conformance test procedure

Test compressed data and reference decoder output signals are provided to apply the different conformance criteria using the procedures described in the following sub clauses. Software implementing the different test procedures will be made available.

The SSC object type is used only in the SSC Profile. Since Level 2 includes Level 1, a Level 2 conforming decoder must also meet the criteria for Level 1. A Level 3 conforming decoder must also meet the criteria for Level 1.

The conformance of the SSC decoder tools can be checked with compressed data for the SSC object type.

To be called a conforming SSC decoder, the required conformance criteria must be met for all test compressed data listed in subclause 6.6.19.2.4, that are applicable at the selected Profile and Level. The conformance criteria for deterministic signal components depend on the selected accuracy class.

###### 6.6.19.2.3.1 Conformance criterion for deterministic components of Full Accuracy SSC decoders

A Full Accuracy SSC decoder at an accuracy level of “K bit” has to fulfil the RMS/LSB criterion as defined in sub clause 5.6.1.2.2.1.

###### 6.6.19.2.3.2 Conformance criteria for deterministic components of Fixed-Point Accuracy SSC decoders

The conformance criteria for Fixed-Point Accuracy decoders are based on measuring the segmental SNR and the LPC Cepstral Distortion (CD) between the reference decoder output and the output of the decoder to be tested. The segment length to be used in the calculation of the SNR is equal to the audio frame length (i.e.

© ISO/IEC 2007 – All rights reserved

Documents
Document Sharing Hub
Full document details: ISO_IEC 14496-4_2004_Amd 13_2007