
**Information technology — Coding of
audio-visual objects —**

**Part 3:
Audio**

**AMENDMENT 3: Transport of unified speech
and audio coding (USAC)**

Technologies de l'information — Codage des objets audiovisuels —

Partie 3: Codage audio

AMENDEMENT 3: Transport de discours unifié et codage audio (USAC)



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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

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Amendment 3 to ISO/IEC 14496-3:2009 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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1.2 Normative references

Add the following reference:

ISO/IEC 23003-3, *Information technology — MPEG audio technologies — Part 3: Unified speech and audio coding*

1.3 Terms and definitions

Insert the following term at the appropriate place and align numbering:

x.y.z. **USAC:** Unified Speech and Audio Coding.

1.5.1.1, Table 1.1

Add a new row for USAC audio object type:

Object Type ID	Audio Object Type	gain control	[...]	BPGC/CBAC/LEMC	Remark
0	Null				
[...]	[...]				
41	SMR Main				
42	USAC				
43	SAOC				
44	LD MPEG Surround				
45 - 95	(reserved)				

1.5.1.2

Add the following subclause describing the USAC audio object type:

1.5.1.2.40 USAC object type

The USAC object type conveys Unified Speech and Audio Coding payload (see ISO/IEC 23003-3) in the MPEG-4 Audio framework.

1.5.2.1

Add the following list item:

15. The **Low Delay AAC v2 Profile** contains the audio object types 23 (ER AAC LD), 39 (ER AAC ELD) and 44 (LD MPEG Surround).

Table 1.3, Audio Profiles definition

Add a column with the term “Low Delay AAC v2 Profile” in the first (header) row, and an “X” in the rows with the Object Type IDs 23, 39 and 44, as follows:

Object Type ID	Audio Object Type	...	Low Delay AAC v2 Profile
...			
23	ER AAC LD		X
...			
39	ER AAC ELD		X
...			
44	LD MPEG Surround		X

1.5.2.3 Levels within the profiles

Add the following paragraph:

Levels for Low Delay AAC v2 Profile

The following levels are specified:

Table AMD3.1 — Levels for the Low Delay AAC v2 profile

Level	AOT of Core Coder	Max. number output channels	Max. sampling rate[kHz] ¹	MPEG Surround	Max. PCU
1	ER AAC (E)LD ⁴	1.0	48	n/a	5
2	ER AAC (E)LD ⁴	2.0	48	LD MPEG Surround 2-1-2	11.5
3	ER AAC (E)LD ⁴	5.1	48	LD MPEG Surround 2-1-2	30 ²
4	ER AAC (E)LD ⁴	5.1	48	LD MPEG Surround 5-x-5 ³	30 ²

1: It is mandatory to operate the SBR tool in downsampled mode if the sampling rate of the AAC core is higher than 24kHz.

2: Complexity of discrete 5.1 ER AAC ELD without LD MPS. (Complexity of ER AAC ELD core with LD MPS is lower than discrete 5.1 ER AAC ELD).

3: with $1 \leq x \leq 2$.

4: epconfig = 0.

Only applicable for ER AAC LD: LTP is not permitted. Pulse data is not permitted.

1.5.2.4 *audioProfileLevelIndication*

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

Value	Profile	Level
	...	
0x44	Baseline USAC Profile	L1
0x45	Baseline USAC Profile	L2
0x46	Baseline USAC Profile	L3
0x47	Baseline USAC Profile	L4
0x48	Extended HE AAC Profile	L1
0x49	Extended HE AAC Profile	L2
0x4A	Extended HE AAC Profile	L3
0x4B	Extended HE AAC Profile	L4
0x4C	Low Delay AAC v2 Profile	L1
0x4D	Low Delay AAC v2 Profile	L2
0x4E	Low Delay AAC v2 Profile	L3
0x4F	Low Delay AAC v2 Profile	L4
0x50 - 0x7F	reserved for ISO use	-
	...	

1.6.2.1 *AudioSpecificConfig*

Amend Table 1.15 as follows:

Table 1.15 — Syntax of AudioSpecificConfig()

Syntax	No. of bits	Mnemonic
<pre> AudioSpecificConfig () { audioObjectType = GetAudioObjectType(); [...] switch (audioObjectType) { [...] case 41: SymbolicMusicSpecificConfig(); break; case 42: UsacConfig(); break; case 43: saocPresentFlag = 1; saocPayloadEmbedding; SaocSpecificConfig(); break; [...] } [...] }</pre>	NOTE	
	1	uimbsf
NOTE: In the Baseline USAC profile defined in ISO/IEC 23003-3 4.5.2, the backwards compatible signaling of SBR, PS, MPS, or SAOC at the end of the AudioSpecificConfig() (i.e., using the extensionIdentifier bitstream element) is not permitted.		

Add the following subclause after 1.6.2.1.19:

1.6.2.1.20 UsacConfig

Defined in ISO/IEC 23003-3, Clause 5.

1.6.2.2.1

Amend Table 1.17 “Audio Object Types” as follows:

Object Type ID	Audio Object Type	definition of elementary stream payloads and detailed syntax	Mapping of audio payloads to access units and elementary streams
0	NULL		
[...]	[...]	[...]	[...]
41	SMR Main	ISO/IEC 14496-23	
42	USAC	ISO/IEC 23003-3	see 1.6.2.2.2.5
43	SAOC	ISO/IEC 23003-2	
44	LD MPEG Surround	ISO/IEC 23003-2	

Add the following subclause after 1.6.2.2.2.4:

1.6.2.2.2.5 USAC

One top level payload (UsacFrame()) is mapped into one access unit. A sequence of access units forms one elementary stream.