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AMENDMENT 3
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**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

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

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Foreword

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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.

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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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Information technology — Coding of audio-visual objects —

Part 3: Audio

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

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 | uimsbf |
| 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.