INTERNATIONAL STANDARD ISO/IEC 14496-3:2005
TECHNICAL CORRIGENDUM 4

Published 2008-04-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION
INTERNATIONAL ELECTROTECHNICAL COMMISSION • МЕЖДУНАРОДНАЯ ЭЛЕКТРОТЕХНИЧЕСКАЯ КОМИССИЯ • COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

Information technology — Coding of audio-visual objects —

Part 3:
Audio

TECHNICAL CORRIGENDUM 4

Technologies de l'information — Codage des objets audiovisuels —

Partie 3: Codage audio

RECTIFICATIF TECHNIQUE 4

Technical Corrigendum 4 to ISO/IEC 14496-3:2005 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information.*

ICS 35.040 **Ref. No. ISO/IEC 14496-3:2005/Cor.4:2008(E)**

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Published in Switzerland

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Replace subclause 1.6.5 with the following:

1.6.5 Signaling of SBR

1.6.5.1 Generating and signaling AAC+SBR content

The SBR tool in combination with the AAC coder provides a significant increase of audio compression efficiency. At the same time it allows for compatibility with existing AAC-only decoders. However, the audio quality for decoders without the SBR tool will of course be significantly lower than for those supporting the SBR tool. Therefore, depending on the application, a content provider or content creator may wish to choose between the two alternatives given below. In general, the SBR data is always embedded in the AAC stream in an AAC compatible way (in the extension_payload), and SBR is a pure post processing step in the decoder. Therefore, compatibility can be achieved. However, by means of different signaling the content creator can select between the full-quality mode and the backward compatibility mode as follows.

1.6.5.1.1 Ensuring full audio quality of AAC+SBR for the listener

To ensure that all listeners get the full audio quality of AAC+SBR, the stream should indicate the HE AAC profile and use the explicit, hierarchical signalling (signaling 2.A. as described below), so that it is played by HE AAC Profile decoders. With regard to AAC-only streams, an HE AAC Profile decoder will decode all AAC Profile streams of the appropriate level, as the HE AAC Profile is a superset of the AAC Profile.

1.6.5.1.2 Achieving backward compatibility with existing AAC-only decoders

The aim of this mode is to get all AAC-based decoders to play the stream, even if they don't support the SBR tool. Compatible streams can be created using the following two signaling methods:

a) indicating a profile containing AAC (e.g. the AAC Profile), except the HE AAC Profile, and using the explicit backward compatible signalling (2.B. as described below). This method is recommended for all MPEG-4 based systems in which the length of the AudioSpecificConfig() is known in the decoder. As this is not the case for LATM with audioMuxVersion==0 (see subclause 1.7), this method cannot be used for LATM with audioMuxVersion==0. In explicit backward compatible signaling, SBR-specific configuration data is added at the end of the AudioSpecificConfig(). Decoders that do not know about SBR will ignore these parts, while HE AAC Profile decoders will detect its presence and configure the decoder accordingly.

b) indicating a profile containing AAC (e.g. the AAC Profile, or an MPEG-2 AAC profile), except the HE AAC Profile, and using implicit signalling. In this mode, there is no explicit indication of the presence of SBR data. Instead, decoders check the presence while decoding the stream and use the SBR tool if SBR data is found. This is possible because SBR can be decoded without SBR-specific configuration data if a certain way of handling decoder output sample rate is obeyed, as described below for HE AAC Profile decoders.

Both methods lead to the result that the AAC part of an AAC+SBR streams will be decoded by AAC-only decoders. AAC+SBR decoders will detect the presence of SBR and decode the full quality AAC+SBR stream.

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1.6.5.2 Implicit and explicit signaling of SBR

This subclause outlines the different signaling methods of SBR, and the decoder behavior for different types of signaling.

There are several ways to signal the presence of SBR data:

1. **implicit signaling:** If EXT_SBR_DATA or EXT_SBR_DATA_CRC extension_payload() elements are detected in the bitstream payload, this implicitly signals the presence of SBR data. The ability to detect and decode implicitly signaled SBR is mandatory for all High Efficiency AAC Profile (HE AAC Profile) decoders.

2. **explicit signaling:** The presence of SBR data is signaled explicitly by means of the SBR Audio Object Type in the AudioSpecificConfig(). When explicit signaling is used, implicit signaling shall not occur. Two different types of explicit signaling are available:

2.A. **hierarchical signaling:** If the first audioObjectType (AOT) signaled is the SBR AOT, a second audio object type is signaled which indicates the underlying audio object type. This signaling method is not backward compatible. This method may be needed in systems that do not convey the length of the AudioSpecificConfig(), such as LATM with audioMuxVersion==0, and content authors are encouraged to use it only when thus needed.

2.B. **backward compatible signaling:** The extensionAudioObjectType is signaled at the end of the AudioSpecificConfig(). This method shall only be used in systems that convey the length of the AudioSpecificConfig(). Hence, it shall not be used for LATM with audioMuxVersion==0.

Table 1.22 shows the decoder behavior depending on profile and audio object type indication when implicit or explicit signaling is used.

Table 1.22 — SBR Signaling and Corresponding Decoder Behavior

<table>
<tr><th colspan="4">Bitstream payload characteristics</th><th colspan="2">Decoder behavior</th></tr>
<tr><th>Profile indication</th><th>extension AudioObjectType</th><th>sbrPresent Flag</th><th>raw_data_block</th><th>AAC Profile decoders</th><th>HE AAC Profile decoders</th></tr>
<tr><td rowspan="4">Profiles with AAC support other than High Efficiency AAC Profile</td><td rowspan="2">!= SBR (signaling 1)</td><td rowspan="2">-1</td><td>AAC</td><td>Play AAC</td><td>Play AAC (Note 1)</td></tr>
<tr><td>AAC+SBR</td><td>Play AAC</td><td>Play at least AAC, should play AAC+SBR (Note 1)</td></tr>
<tr><td rowspan="2">== SBR (signaling 2.B)</td><td>0</td><td>AAC</td><td>Play AAC</td><td>Play AAC (Note 2)</td></tr>
<tr><td>1</td><td>AAC+SBR</td><td>Play AAC</td><td>Play at least AAC, should play AAC+SBR (Note 3)</td></tr>
<tr><td>High Efficiency AAC Profile</td><td>== SBR (signaling 2.A or 2.B)</td><td>1</td><td>AAC+SBR</td><td>Undefined</td><td>Play AAC+SBR (Note 3)</td></tr>
<tr><td colspan="6">Note 1: Implicit signaling, check payload in order to determine output sampling frequency, or assume the presence of SBR data in the payload, giving an output sampling frequency of twice the sampling frequency indicated by samplingFrequency in the AudioSpecificConfig() (unless the down sampled SBR Tool is operated, or twice the sampling frequency indicated by samplingFrequency exceeds the maximum allowed output sampling frequency of the current level, in which case the output sampling frequency is the same as indicated by samplingFrequency).
Note 2: Explicitly signals that there is no SBR data, hence no implicit signaling is present, and the output sampling frequency is given by samplingFrequency in the AudioSpecificConfig().
Note 3: Output sampling frequency is the extensionSamplingFrequency in AudioSpecificConfig().</td></tr>
</table>

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