INTERNATIONAL STANDARD
ISO/IEC 14496-3:2001/Amd.1:2003/Cor.1:2004(E)

TECHNICAL CORRIGENDUM 1

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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

AMENDMENT 1: Bandwidth extension

TECHNICAL CORRIGENDUM 1

Technologies de l'information — Codage des objets audiovisuels —

Partie 3: Codage audio

AMENDEMENT 1: Extension de largeur de bande

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to ISO/IEC 14496-3:2001/Amd.1:2003 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

NOTE This document specifies the first corrigendum to ISO/IEC 14496-3:2001/Amd.1:2003. With the exception of the correction for Table 4.54 which is only relevant for multi-channel decoding of ER streams, all the corrections strive to correct errors in the standard text and thus aligning the standard text with the reference software.

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In ISO/IEC 14496-3:2001/Amd.1, 4.4.2.8 Payloads for the audio object type SBR, replace Table 4.54 by the table below (modified parts are marked in gray):

Table 4.54A – Syntax of sbr_extension_data()

Syntax	No. of bits	Mnemonic
sbr_extension_data(id_aac, crc_flag) { num_sbr_bits = 0; if (crc_flag) { **bs_sbr_crc_bits**; num_sbr_bits += 10; } if (sbr_layer != SBR_STEREO_ENHANCE) { num_sbr_bits += 1; if (**bs_header_flag**) num_sbr_bits += sbr_header(); } num_sbr_bits += sbr_data(id_aac, bs_amp_res); num_align_bits = (8*cnt - 4 - num_sbr_bits) % 8; **bs_fill_bits**; return ((num_sbr_bits + num_align_bits + 4) / 8) }	 **10** **1** num_align_bits	 **uimsbf** Note 1 Note 2 Note 2 **uimsbf**
Note 1: When the SBR tool is used with a non-scalable AAC core coder, the value of the helper variable sbr_layer is SBR_NOT_SCALABLE. When the SBR tool is used with a scalable AAC core coder, the value of the helper variable sbr_layer depends on the current layer and the scalability configuration of the AAC core coder as defined in Table 4.86 in subclause 4.5.2.8.2.4. Note 2: sbr_header() and sbr_data() return the number of bits read (cnt is a parameter in extension_payload()).		

In ISO/IEC 14496-3:2001/Amd.1:2003, subclause 4.4.2.8 Payloads for the Audio Object Type SBR, Table 4.55A, replace:

Note 3: If this bit is not set the default values for the underlying bitstream elements should be used.

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Note 3: If this bit is not set the default values for the underlying bitstream elements shall be used disregarded any previous value.

In ISO/IEC 14496-3:2001/Amd.1, 4.4.2.8 Payloads for the audio object type SBR, Table 4.58, Table 4.59, and Table 4.60, add the part marked in gray:

if (**bs_extended_data**) {	**1**	
cnt = **bs_extension_size**;	**4**	**uimsbf**
if (cnt == 15)		
cnt += **bs_esc_count**;	**8**	**uimsbf**
num_bits_left = 8 * cnt;		
while (num_bits_left > 7) {		
bs_extension_id;	**2**	**uimsbf**
num_bits_left -= 2;		
sbr_extension(bs_extension_id, num_bits_left);		Note 1
}		
bs_fill_bits	num_bits_left	
}		

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.5.2.8.2.3 SBR Extension Payload for the Audio Object Types ER AAC LC and ER AAC LTP replace:

The extension payload shall not include both DRC extension elements and SBR extension elements simultaneously. If SBR extension elements are used, DRC extension elements are prohibited.

by:

The SBR extension elements shall be placed after any other extension elements.

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.5.2.8.2.4 SBR Extension Payload for the Audio Object Types AAC Scalable and ER AAC Scalable, replace:

The scalable SBR data is embedded into the MPEG-4 stream in the same way as for non-scalable SBR data elements, by means of using the extension_payload().

by:

The scalable SBR data is embedded into the MPEG-4 stream in the same way as for non-scalable SBR data elements, by means of using the extension_payload(). The SBR extension elements shall be placed after any other extension elements.

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.2.2 SBR specific notation, replace:

$$\mathbf{Q}_{Mapped}(m-lsb,l)=\mathbf{Q}_{Orig}(i,k(l)),\mathbf{f}_{TableNoise}(i)\le m<\mathbf{f}_{TableNoise}(i+1),0\le i<N_Q,0\le l<L_E$$

where $k(l)$ is defined by $\mathbf{t}(l)\ge\mathbf{t}_Q(k(l)),\mathbf{t}(l+1)\le\mathbf{t}_Q(k(l)+1)$

should be interpreted as follows. $\mathbf{Q}_{Mapped}(m-lsb,l)$ equals $\mathbf{Q}_{Orig}(i,k(l))$

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by:

$$\mathbf{Q}_{Mapped}\left(m-k_x,l\right)=\mathbf{Q}_{Orig}\left(i,k\left(l\right)\right),\mathbf{f}_{TableNoise}(i)\le m<\mathbf{f}_{TableNoise}(i+1),0\le i<N_Q,0\le l<L_E$$

where $k\left(l\right)$ is defined by $\mathbf{t}\left(l\right)\ge\mathbf{t}_Q\left(k\left(l\right)\right),\mathbf{t}\left(l+1\right)\le\mathbf{t}_Q\left(k\left(l\right)+1\right)$

should be interpreted as follows. $\mathbf{Q}_{Mapped}\left(m-k_x,l\right)$ equals $\mathbf{Q}_{Orig}\left(i,k\left(l\right)\right)$

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.2.5 Constants, replace:

ε	A constant to avoid division by zero, e.g. 96 dB below maximum signal input.

by:

$\varepsilon=1$	A constant to avoid division by zero, e.g. 96 dB below maximum signal input.

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.2.6, add:

$\mathbf{W}$	is the subband matrix where the QMF filtered subband samples are stored.

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.4 and 4.6.18.8.2, replace all instances (in text flowcharts and pictures) of

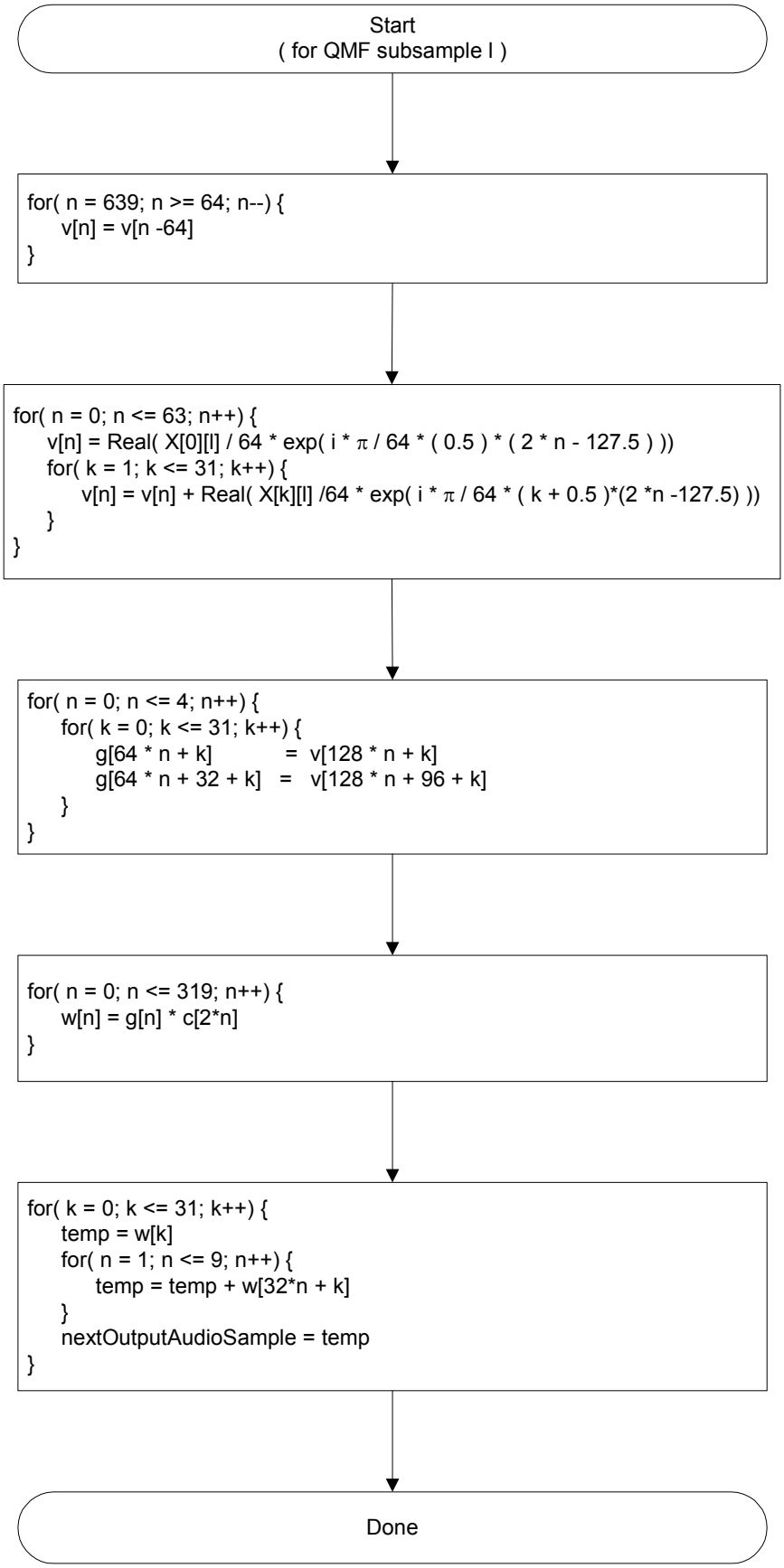
$\mathbf{X}_{Low}$

by:

$\mathbf{W}$

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In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.4.3 Down sampled synthesis filterbank, in Figure 4.44, where it says "127", it should say "127.5", hence replace it by the following figure:



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In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.5 SBR tool overview, replace:

start-up l_{Temp} , lsb' and $bsco'$ are set to zero. And where
$bsco = \max\left(INT\left(maxAACLine \cdot 32 / frameLength\right) - lsb, 0\right)$, and where

by:

start-up l_{Temp} , k_x' and $bsco'$ are set to zero. Where $bsco = 0$ unless a scalable core coder is used, for which
$bsco = \max\left(INT\left(maxAACLine \cdot 32 / frameLength\right) - k_x, 0\right)$, and where

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.5 SBR Tool overview, replace:

The output from the filtering is stored in the matrix:

$$\mathbf{X}_{Low}\left(k,\ l\ +\ t_{HFGen}\right),\ 0\ \le\ k\ <\ 32,\ 0\ \le\ l\ <\ numTimeSlots \cdot RATE$$

by:

The subband filtered low band is defined by $\mathbf{X}_{Low}$ according to:

$$\mathbf{X}_{Low}\left(k,\ l\ \right) = \begin{cases} \mathbf{W}(k, l - t_{HFGen}) & , 0 \le k < k_x,\ t_{HFGen} \le l < l_f + t_{HFGen} \\ 0 & , k_x \le k < 32,\ t_{HFGen} \le l < l_f + t_{HFGen} \\ \mathbf{W}'(k, l + l_f - t_{HFGen}) & , 0 \le k < k'_x,\ 0 \le l < t_{HFGen} \\ 0 & , k'_x \le k < 32,\ 0 \le l < t_{HFGen} \end{cases}$$

where $\mathbf{W}'$ is the $\mathbf{W}$ matrix from the previous frame, and k'_x is the k_x value from the previous frame, and where $l_f = numTimeSlots \cdot RATE$. If scalable SBR is used the following apply instead of the equation above:

$$\mathbf{X}_{Low}\left(k,\ l\ \right) = \begin{cases} \mathbf{W}(k, l - t_{HFGen}) & , 0 \le k < 32,\ t_{HFGen} \le l < l_f + t_{HFGen} \\ \mathbf{W}'(k, l + l_f - t_{HFGen}) & , 0 \le k < 32,\ 0 \le l < t_{HFGen} \end{cases}$$

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.5 SBR Tool overview, replace:

$$\mathbf{X}(k,l) = \begin{cases} \mathbf{X}_{Low}\left(k, l + t_{HFAdj}\right) & , 0 \le k < k_x' + bsco',\ 0 \le l < l_{Temp} \\ \mathbf{X}_{Low}\left(k, l + t_{HFAdj}\right) & , 0 \le k < k_x + bsco,\ l_{Temp} \le l < numTimeSlots \cdot RATE \\ \mathbf{Y}\left(k, l + t_{HFAdj}\right) & , k_x' + bsco' \le k < k_x + M,\ 0 \le l < l_{Temp} \\ \mathbf{Y}\left(k, l + t_{HFAdj}\right) & , k_x + bsco \le k < k_x + M,\ l_{Temp} \le l < numTimeSlots \cdot RATE \\ 0 & , \max\left(k_x + bsco, k_x + M\right) + M \le k < 64,\ 0 \le l < numTimeSlots \cdot RATE \end{cases}$$ "

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$$\mathbf{X}(k,l)=\begin{cases}\mathbf{X}_{Low}\left(k,l+t_{HFAdj}\right) & ,0 \le k < k_x'+bsco',\ 0 \le l < l_{Temp} \\ \mathbf{Y}'\left(k,l+t_{HFAdj}+l_f\right) & ,k_x'+bsco' \le k < k_x'+M',\ 0 \le l < l_{Temp} \\ 0 & ,\max\left(k'_x+bsco',k'_x+M'\right) \le k < 64,\ 0 \le l < l_{Temp} \\ \mathbf{X}_{Low}\left(k,l+t_{HFAdj}\right) & ,0 \le k < k_x+bsco,\ l_{Temp} \le l < l_f \\ \mathbf{Y}\left(k,l+t_{HFAdj}\right) & ,k_x+bsco \le k < k_x+M,\ l_{Temp} \le l < l_f \\ 0 & ,\max\left(k_x+bsco,k_x+M\right) \le k < 64,\ l_{Temp} \le l < l_f \end{cases}$$

where

$l_f = numTimeSlots \cdot RATE$

and

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.6.2 Inverse filtering , replace:

where **bs_invf_mode´** are the **bs_invf_mode** values from the previous SBR frame.

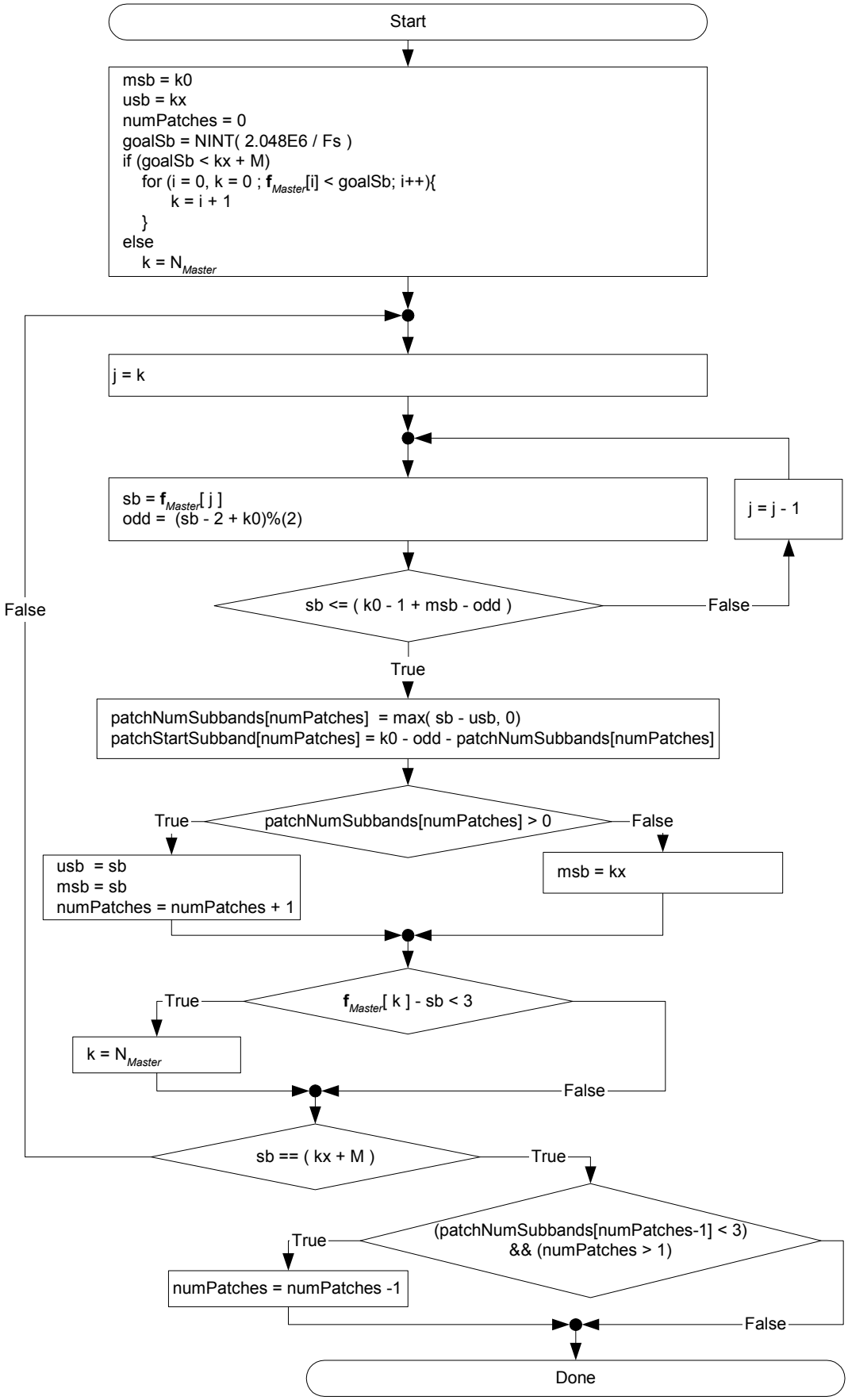
by:

where **bs_invf_mode´** are the **bs_invf_mode** values from the previous SBR frame, and are assumed to be zero for the first frame.

In ISO/IEC 14496-3:2001/Amd.1, subclause 4.6.18.6.3 HF generator, replace Figure 4.46 by the following figure:

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