Information technology — MPEG audio technologies —
Part 3: Unified speech and audio coding

TECHNICAL CORRIGENDUM 1

Technologies de l'information — Technologies audio MPEG —
Partie 3: Discours unifié et codage audio

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to ISO/IEC 23003-3:2012 was prepared by Joint Technical Committee ISO/IEC JTC 1, Information technology, Subcommittee SC 29, Coding of audio, picture, multimedia and hypermedia information.

In 3.2 add at the end:

\[ v[] = \{a\} \]

This expression indicates that all elements of the array \( v \) shall be set to the value \( a \).
In 4.1 replace the diagram:
In 4.2. replace:

The filterbank / block switching tool applies the inverse of the frequency mapping that was carried out in the encoder. An inverse modified discrete cosine transform (IMDCT) is used for the filterbank tool. The IMDCT can be configured to support 120, 128, 240, 256, 480, 512, 960 or 1024 spectral coefficients.

with:

The filterbank / block switching tool applies the inverse of the frequency mapping that was carried out in the encoder. An inverse modified discrete cosine transform (IMDCT) is used for the filterbank tool. The IMDCT can be configured to support 96, 128, 192, 256, 384, 512, 768, or 1024 spectral coefficients.

In 5.2 in Table 6, replace:

<table>
<thead>
<tr>
<th>[...]</th>
</tr>
</thead>
</table>
| case: ID_USAC_EXT
  UsacExtElementConfig();
  break; |
| } |

NOTE: UsacSingleChannelElementConfig(), UsacChannelPairElementConfig(), UsacLfeElement-Config() and UsacExtElementConfig() signaled at position elemIdx refer to the corresponding elements in UsacFrame() at the respective position elemIdx.

with

<table>
<thead>
<tr>
<th>[...]</th>
</tr>
</thead>
</table>
| case: ID_USAC_EXT
  UsacExtElementConfig();
  break; |
| } |

NOTE: UsacSingleChannelElementConfig(), UsacChannelPairElementConfig(), UsacLfeElement-Config() and UsacExtElementConfig() signaled at position elemIdx refer to the corresponding elements in UsacFrame() at the respective position elemIdx.

In 5.3.1 in Table 17 replace:

<table>
<thead>
<tr>
<th>[...]</th>
</tr>
</thead>
</table>
| case: ID_USAC_EXT
  UsacExtElement(usacIndependencyFlag);
  break; |
| } |

with

<table>
<thead>
<tr>
<th>[...]</th>
</tr>
</thead>
</table>
| case: ID_USAC_EXT
  UsacExtElement(usacIndependencyFlag);
  break; |
| } |
In 5.3.1 in Table 21 replace:

```
[...] if (usacExtElementUseDefaultLength) {
    usacExtElementPayloadLength = usacExtElementDefaultLength;
} else {
    usacExtElementPayloadLength = escapedValue(8,16,0);
}
[...]
```

with:

```
[...] if (usacExtElementUseDefaultLength) {
    usacExtElementPayloadLength = usacExtElementDefaultLength;
} else {
    usacExtElementPayloadLength; 8 uimsbf
    if (usacExtElementPayloadLength==255) {
        valueAdd 16 uimsbf
        usacExtElementPayloadLength += valueAdd - 2;
    }
}
[...]
```

In 5.3.2 in Table 23 replace:

```
[...] if (nrChannels == 2) {
    StereoCoreToolInfo(core_mode);
}
[...]
```

with

```
[...] if (nrChannels == 2) {
    StereoCoreToolInfo(core_mode, indepFlag);
}
[...]
```

In 5.3.2 in Table 24 replace:

<table>
<thead>
<tr>
<th>Syntax</th>
<th>No. of bits</th>
<th>Mnemonic</th>
</tr>
</thead>
<tbody>
<tr>
<td>StereoCoreToolInfo(core_mode)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| {
  if (core_mode[0] == 0 && core_mode[1] == 0) {
  tns_active; 1 uimsbf
  common_window; 1 uimsbf
  if (common_window) {
    ics_info();
    common_max_sfb; 1 uimsbf
    if (common_max_sfb == 0) {
```
if (window_sequence == EIGHT_SHORT_SEQUENCE) {
    max_sfb1; 4 uimsbf
} else {
    max_sfb1; 6 uimsbf
}
else {
    max_sfb1 = max_sfb;
}
max_sfb_ste = max(max_sfb, max_sfb1);
ms_mask_present; 2 uimsbf
if (ms_mask_present == 1) {
    for (g = 0; g < num_window_groups; g++) {
        for (sfb = 0; sfb < max_sfb; sfb++) {
            ms_used[g][sfb]; 1 uimsbf
        }
    }
}
if (ms_mask_present == 3) {
    cplx_pred_data();
} else {
    alpha_q_re[g][sfb] = 0;
    alpha_q_im[g][sfb] = 0;
}
[...]

Syntax | No. of bits | Mnemonic
--- | --- | ---
StereoCoreToolInfo(core_mode, indepFlag) { | | |
    if (core_mode[0] == 0 & core_mode[1] == 0) {
        tns_active; 1 uimsbf
        common_window; 1 uimsbf
        if (common_window) {
            ics_info();
            common_max_sfb; 1 uimsbf
            if (common_max_sfb == 0) {
                if (window_sequence == EIGHT_SHORT_SEQUENCE) {
                    max_sfb1; 4 uimsbf
                } else {
                    max_sfb1;
                }
            } else {
                max_sfb1 = max_sfb;
            }
        }
    }
    max_sfb_ste = max(max_sfb, max_sfb1);
    ms_mask_present; 2 uimsbf
    if (ms_mask_present == 1) {
        for (g = 0; g < num_window_groups; g++) {
            for (sfb = 0; sfb < max_sfb_ste; sfb++) {
                ms_used[g][sfb]; 1 uimsbf
            }
        }
    }
    if (ms_mask_present == 3) {
        cplx_pred_data(max_sfb_ste, indepFlag);
    } else {
alpha_q_re[][] = {0};
alpha_q_im[][] = {0};
}

In 5.3.2 in Table 38 – Syntax of arith_data, replace:
pki = arith_get_pk(c + esc_nb<<17)
with:
pki = arith_get_pk(c + (esc_nb<<17));

In 6.1.1.1 replace:

usacSamplingFrequency Output sampling frequency of the decoder coded as unsigned integer value in case usacSamplingFrequencyIndex equals zero.
with:
usacSamplingFrequency Output sampling frequency of the decoder coded as unsigned integer value in case usacSamplingFrequencyIndex is equal to the escape value.

In 6.1.1.1 add definition of bs_pvc by replacing:

bs_interTes This flag signals the usage of the inter-TES tool in SBR.
with

bs_interTes This flag signals the usage of the inter-TES tool in SBR.
bs_pvc This flag signals the usage of the PVC tool in SBR.

In 6.1.1.2, replace:

bsStereoSbr This flag signals the usage of the stereo SBR in combination with MPEG Surround decoding.
with

bsStereoSbr This flag signals the usage of the stereo SBR in combination with MPEG Surround decoding. The value of bsStereoSbr is defined by stereoConfigIndex (see Table 72).
In 6.2.9.2.1 and in the headline of 6.2.9.2.3 replace:

scalefactor_data

with

scale_factor_data

In 6.2.9.2.4 replace:

fd_channelffeh_stream()

with

fd_channel_stream()

In 6.2.9.4 replace:

As explain in ISO/IEC 14496-3:2009, 4.5.2.3.4, the width of the scalefactor bands is built in imitation of the critical bands of the human auditory system. For that reason the number of scalefactor bands in a spectrum and their width depend on the transform length and the sampling frequency. Table 4.129 to Table 4.147, in ISO/IEC 14496-3:2009, 4.5.4, list the offset to the beginning of each scalefactor band on the transform lengths 1024 (960) and 128 (120) and on the sampling frequencies.

For a transform length of 768 samples, the scale factor bands at \( \frac{4}{3} \cdot \text{sampling frequency} \) are used. In case a shorter transform length (dependent on \text{coreCoderFrameLength}) is used, \text{swb_offset_long_window} and \text{swb_offset_short_window} are limited to the size of the transform length, and \text{num_swb_long_window} and \text{num_swb_short_window} is determined according to the following pseudo code:

\[
\text{with:}
\]

As explained in ISO/IEC 14496-3:2009, 4.5.2.3.4, the width of the scalefactor bands is built in imitation of the critical bands of the human auditory system. For that reason the number of scalefactor bands in a spectrum and their width depend on the transform length and the sampling frequency. Table 4.129 to Table 4.147, in ISO/IEC 14496-3:2009, 4.5.4, list the offset to the beginning of each scalefactor band on the transform lengths 1024 and 128 and on the sampling frequencies (window length of 2048 and 256).

For a transform length of 768 samples, the same 1024-based scalefactor band tables are used, but those corresponding to \( \frac{4}{3} \cdot \text{sampling frequency} \). In case a shorter transform length (dependent on \text{coreCoderFrameLength}) is used, \text{swb_offset_long_window} and \text{swb_offset_short_window} are limited to the size of the transform length, and \text{num_swb_long_window} and \text{num_swb_short_window} is determined according to the following pseudo code:

In 6.2.13.2 replace the text block:

\text{bsOttBandsPhase} \quad \text{defines the number of IPD parameter bands. If } \text{bsOttBandsPhasePresent}==0, ... \quad \text{with:}

\text{bsOttBandsPhase} \quad \text{defines the number of MPS parameter bands where phase coding is used. If } \text{bsOttBandsPhasePresent}==0, ...
In 7.4.3 replace the pseudo code:

```c
/*Input variables*/
c /* old state context */
i /* Index of the 2-tuple to decode in the vector */
N /* Window Length */

/*Output value*/
c /*updated state context*/
c = arith_get_context(c,i,N) {
    c = c>>4;
    if (i<N/4-1)
        c = c + (q[0][i+1]<<12);
    c = (c&0xFFF0);
    if (i>0)
        c = c + (q[1][i-1]);
    if (i > 3) {
        if ((q[1][i-3] + q[1][i-2] + q[1][i-1]) < 5)
            return(c+0x10000);
    }
    return (c);
}
```

Further in 7.4.3 replace the following pseudo code:

```c
/*input variables*/
offset /* number of decoded 2-tuples */
N   /* Window length */
x_ac_dec /* vector of decoded spectral coefficients */

arith_finish(x_ac_dec,offset,N) {
    for (i=offset ;i<N/4;i++) {
        x_ac_dec[2*i] = 0;
        x_ac_dec[2*i+1] = 0;
        q[1][i] = 1;
    }
}
```

Further in 7.4.3 replace the pseudo code:

```c
/*helper function*/
void arith_rewind_bitstream(offset);
/* move the bitstream position indicator backward by ‘offset’ bits*/
```

/*input variables*/
offset /* number of decoded 2-tuples */
N   /* Window length */
x_ac_dec /* vector of decoded spectral coefficients */
```
In 7.4.3 in function arith_decode(), replace:

value = (val<<1)...

with:

value = (value<<1)...

Further in 7.4.3, replace:

high = low +(range*cum_freq[symbol-1])>>14 – 1

with:

high = low +((range*cum_freq[symbol-1])>>14) – 1;

In 7.4.3 replace:

...with the value c&esc_nb<<17 as input argument,...

with

...with the value c + (esc_nb<<17) as input argument,...

In 7.4.3 replace:

...the function get_pk()...

with:

...the function arith_get_pk()...

Also in 7.4.3 replace:

...If the condition (esc_nb>0 && m==0) is true ... 

with:

...If the condition (m==0 && lev>0) is true,...
Further down in the same subclause 7.4.3, replace:

\[
arith\_finish(x\_ace\_dec, offset, N)
\]

with:

\[
arith\_finish(x\_ac\_dec, offset, N)
\]

In 7.5.1 replace:

The general description of the SBR tool can be found in ISO/IEC 14496-3:2009, 4.6.18. The above mentioned SBR tool shall be modified as described below.

with:

The general description of the SBR tool can be found in ISO/IEC 14496-3:2009, 4.6.18. The complex-exponential phase-shifting is outlined in ISO/IEC 14496-3:2009, 4.6.18.4.4. In USAC it shall be fixed to the default standard operation as defined in 4.6.18.4.1. The above mentioned SBR tool shall be modified as described below.

In 7.5.1.1 add the following line:

\[
num\text{TimeSlots} \quad \text{number of SBR envelope time slots; is always 16.}
\]

In 7.5.1.4 replace:

Within one SBR frame there can be either one or two noise floors. The noise floor time borders are derived from the SBR envelope time border vector according to: …

with:

Independent of bs\_pvc\_mode within one SBR frame there can be either one or two noise floors. If bs\_pvc\_mode is zero, the noise floor time borders are derived from the SBR envelope time border vector according to: …

In 7.5.1.5.2 replace the following text:

If bs\_pvc\_mode is not zero, the SBR envelope time border vector of the current SBR frame, \( t_E \) is calculated according to:

\[
\begin{cases}
[bs\_var\_len', num\text{TimeSlots} + bs\_var\_len] & , bs\_num\_env = 1 \\
[bs\_var\_len', bs\_noise\_position, num\text{TimeSlots} + bs\_var\_len] & , bs\_num\_env = 2
\end{cases}
\]

where

\[ bs\_var\_len' \] is \( bs\_var\_len \) of the previous SBR frame.

\[
bs\_num\_env = \begin{cases}
1 & \text{if } bs\_noise\_position = 0 \\
2 & \text{otherwise}
\end{cases}
\]

with:

If bs\_pvc\_mode is not zero, the SBR envelope time border vector of the current SBR frame, \( t_E \) is calculated according to:
ISO/IEC 23003-3:2012/Cor.1:2012(E)

\[ L_E = \begin{cases} 1 & \text{if } \text{bs\_noise\_position} = 0 \\ 2 & \text{otherwise} \end{cases} \]

\[ t_E = \begin{cases} [\text{var\_len}', \text{numTimeSlots} + \text{bs\_var\_len}] & , L_E = 1 \\ [\text{var\_len}', \text{bs\_noise\_position}, \text{numTimeSlots} + \text{bs\_var\_len}] & , L_E = 2 \end{cases} \]

where

\[ \text{var\_len}' = t_E' [L_E'] - \text{numTimeSlots} \]

and \( t_E' \) is the time border vector \( t_E \) of the previous SBR frame and \( L_E' \) is the number of envelopes of the previous frame respectively. Note that if \( \text{bs\_pvc\_mode}' = 1 \) (PVC active in previous frame), it follows that \( \text{var\_len}' \) is \( \text{bs\_var\_len} \) of the previous SBR frame.

In the same subclause 7.5.1.5.2 replace:

If \( \text{bs\_pvc\_mode} \) is not zero, the PVC SBR envelope time border vector of the current SBR frame, \( t_{\text{EPVC}} \), is calculated according to:

\[ t_{\text{EPVC}} = \begin{cases} [t_{\text{first}}, \text{numTimeSlots}] & , \text{bs\_num\_env} = 1 \\ [t_{\text{first}}, \text{bs\_noise\_position}, \text{numTimeSlots}] & , \text{bs\_num\_env} = 2 \end{cases} \]

where

\[ t_{\text{first}} = \begin{cases} \text{bs\_var\_bord}', & \text{bs\_pvc\_mode}' = 0 \text{ and } \text{bs\_pvc\_mode} \neq 0 \\ 0 & , \text{otherwise} \end{cases} \]

with:

If \( \text{bs\_pvc\_mode} \) is not zero, the PVC SBR envelope time border vector of the current SBR frame, \( t_{\text{EPVC}} \), is calculated according to:

\[ t_{\text{EPVC}} = \begin{cases} [t_{\text{first}}, \text{numTimeSlots}] & , L_E = 1 \\ [t_{\text{first}}, \text{bs\_noise\_position}, \text{numTimeSlots}] & , L_E = 2 \end{cases} \]

where

\[ t_{\text{first}} = \begin{cases} \text{var\_len}' & , \text{bs\_pvc\_mode}' = 0 \text{ and } \text{bs\_pvc\_mode} \neq 0 \\ 0 & , \text{otherwise} \end{cases} \]

and \( \text{var\_len}' = t_E' [L_E'] - \text{numTimeSlots} \) and \( t_E' \) is the time border vector \( t_E \) of the previous SBR frame and \( L_E' \) is the number of envelopes of the previous frame respectively.

In the same subclause 7.5.1.5.2 replace:

If \( \text{bs\_pvc\_mode} \) is not zero, the noise floor time borders vectors of the current SBR frame, \( t_{Q} \) is calculated according to:

\[ t_{Q} = \begin{cases} [t_E(0), t_E(1)] & , \text{bs\_num\_noise} = 1 \\ [t_E(0), t_E(1), t_E(2)] & , \text{bs\_num\_noise} = 2 \end{cases} \]

where

\[ \text{bs\_num\_noise} = \begin{cases} 1 & \text{if } \text{bs\_noise\_position} = 0 \\ 2 & \text{otherwise} \end{cases} \]
with:

If bs_pvc_mode is not zero, the noise floor time borders vectors of the current SBR frame, \( t_Q \) is calculated according to:

\[
L_Q = L_E
\]

\[
t_Q = \begin{bmatrix} t_E(0), t_E(1) \\ t_E(0), t_E(1), t_E(2) \end{bmatrix}, \quad L_Q = 1
\]

\[
t_Q = \begin{bmatrix} t_E(0), t_E(1) \end{bmatrix}, \quad L_Q = 2
\]

In 7.5.1.5.2 on page 96 replace equations as follows:

else, bs_pvc_mode is not zero,

\[
S_{\text{Mapped}}(m-k_x,t) = \delta_s(i,t), l_i \leq m < u_i, \begin{cases} \begin{align*}
  u_i &= F(i+1,r(l)) \\
  l_i &= F(i,r(l))
\end{align*} \end{cases}
\]

for \( 0 \leq i < n(r(l)), t_E(l) \leq t < t_E(l+1), 0 \leq l < L_E \)

where

\[
\delta_s(i,t) = \begin{cases} \begin{align*}
  1 & , i \in \{ S_{\text{IndexMapped}}(j-k_x,t) : F(i,r(l)) \leq j < F(i+1,r(l)), t_E(l) \leq t < t_E(l+1), 0 \leq l < L_E \} \\
  0 & , \text{otherwise}
\end{align*} \end{cases}
\]

with:

else, bs_pvc_mode is not zero,

\[
S_{\text{Mapped}}(m-k_x,t) = \delta_s(i,t), l_i \leq m < u_i, \begin{cases} \begin{align*}
  u_i &= F(i+1,r(l)) \\
  l_i &= F(i,r(l))
\end{align*} \end{cases}
\]

for \( 0 \leq i < n(r(l)), t_{EPVC}(l) \leq t < t_{EPVC}(l+1), 0 \leq l < L_E \)

where

\[
\delta_s(i,t) = \begin{cases} \begin{align*}
  1 & , i \in \{ S_{\text{IndexMapped}}(j-k_x,t) : F(i,r(l)) \leq j < F(i+1,r(l)), t_{EPVC}(l) \leq t < t_{EPVC}(l+1), 0 \leq l < L_E \} \\
  0 & , \text{otherwise}
\end{align*} \end{cases}
\]

In 7.5.1.5.2 replace the equation of \( Q_{\text{Mapped}} \) in case of pvc_mode is not zero as follows. Replace:

\[
Q_{\text{Mapped}}(m-k_x,t) = \begin{cases} \begin{align*}
  Q'_{\text{PreMapped}}(m-k_x,t+\text{numTimeSlots}) & , 0 \leq t < t'_E(L_E) - \text{numTimeSlots} \\
  Q_{\text{PreMapped}}(m-k_x,t) & , t_E(0) \leq t < t_E(L_E)
\end{align*} \end{cases}
\]

with:

\[
Q_{\text{Mapped}}(m-k_x,t) = \begin{cases} \begin{align*}
  Q'_{\text{PreMapped}}(m-k_x,t+\text{numTimeSlots}) & , 0 \leq t < t_E(0) \\
  Q_{\text{PreMapped}}(m-k_x,t) & , t_E(0) \leq t < t_E(L_E)
\end{align*} \end{cases}
\]
In 7.5.1.5.2 replace the equation for $S_{IndexMapped}$ in case of pvc_mode is not zero as follows. Replace:

$$S_{IndexMapped}(m-k_x,t) = \begin{cases} 
S'_{IndexPreMapped}(m-k_x,t + numTimeSlots), & 0 \leq t < t'_E(L'_E) - numTimeSlots \\
S_{IndexPreMapped}(m-k_x,t) & , t'_E(0) \leq t < t'_E(L'_E) 
\end{cases}$$

with:

$$S_{IndexMapped}(m-k_x,t) = \begin{cases} 
S'_{IndexPreMapped}(m-k_x,t + numTimeSlots), & 0 \leq t < t'_E(0) \\
S_{IndexPreMapped}(m-k_x,t) & , t'_E(0) \leq t < t'_E(L'_E) 
\end{cases}$$

In 7.5.1.5.4 replace equations as follows:

else, bs_pvc_mode is not zero,

$$Q_M(m,t) = \sqrt{E_{OrigMapped}(m,t) \cdot Q_{Mapped}(m,t) \over 1 + Q_{Mapped}(m,t)}, \quad 0 \leq m < M, t_E(l) \leq t < t_E(l+1), 0 \leq l < L_E$$

with:

else, bs_pvc_mode is not zero,

$$Q_M(m,t) = \sqrt{E_{OrigMapped}(m,t) \cdot Q_{Mapped}(m,t) \over 1 + Q_{Mapped}(m,t)}, \quad 0 \leq m < M, t_{EPVC}(l) \leq t < t_{EPVC}(l+1), 0 \leq l < L_E$$

Further, replace:

else, bs_pvc_mode is not zero,

$$S_M(m,t) = \sqrt{E_{OrigMapped}(m,t) \cdot S_{IndexMapped}(m,t) \over 1 + Q_{Mapped}(m,t)}, \quad 0 \leq m < M, t_E(l) \leq t < t_E(l+1), 0 \leq l < L_E$$

with:

else, bs_pvc_mode is not zero,

$$S_M(m,t) = \sqrt{E_{OrigMapped}(m,t) \cdot S_{IndexMapped}(m,t) \over 1 + Q_{Mapped}(m,t)}, \quad 0 \leq m < M, t_{EPVC}(l) \leq t < t_{EPVC}(l+1), 0 \leq l < L_E$$
In 7.5.2.2 replace:

\[ \text{polyfit}(3,k_0,x\_\text{lowband},\text{lowEnv},\text{lowEnvSlope}); \]

with:

\[ \text{polyfit}(3,k_0,x\_\text{lowband},\text{lowEnv},\text{polyCoeffs}); \]

\[ \text{lowEnvSlope}(k) = \sum_{i=0}^{3} \text{polyCoeffs}(3-i) \cdot x\_\text{lowband}(k) \]

In 7.5.5.2 replace:

\[ \log_{10} \left( \frac{\phi_k(0,0)}{\text{numTimeSlots} \cdot \text{RATE} + 6} \right), 0 \leq k < k_0 \]

with:

\[ \log_{10} \left( \frac{\phi_k(0,0)}{(\text{numTimeSlots} + 3) \cdot \text{RATE}} \right), 0 \leq k < k_0 \]

In 7.5.6.3 replace

\[ \sum_{i=t_{\text{HFGen}}}^{\text{RATE}-1-t_{\text{HFGen}}} X_{\text{low}}(ib,\text{RATE} \cdot t + i) \cdot X^*(ib,\text{RATE} \cdot t + i) \]
\[ E(ib,t) = \frac{\sum_{i=t_{\text{HFAdj}}}^{\text{RATE}-1-t_{\text{HFAdj}}} X_{\text{low}}(ib,\text{RATE} \cdot t + i) \cdot X^*(ib,\text{RATE} \cdot t + i)}{\text{RATE}} \]

with

\[ \sum_{i=t_{\text{HFAdj}}}^{\text{RATE}-1-t_{\text{HFAdj}}} X_{\text{low}}(ib,\text{RATE} \cdot t + i) \cdot X^*(ib,\text{RATE} \cdot t + i) \]
\[ E(ib,t) = \frac{\sum_{i=t_{\text{HFAdj}}}^{\text{RATE}-1-t_{\text{HFAdj}}} X_{\text{low}}(ib,\text{RATE} \cdot t + i) \cdot X^*(ib,\text{RATE} \cdot t + i)}{\text{RATE}} \]

In 7.5.6.5 replace:

\[ \hat{E}(k,t + \frac{t_{\text{HFGen}} - t_{\text{HFAdj}}}{\text{RATE}}) = 10^{\frac{\hat{E}_{\text{seq}}(kg, t)}{10}} \]

with

\[ \hat{E}(k,t) = 10^{\frac{\hat{E}_{\text{seq}}(kg, t)}{10}} \]

In 7.9.3.2 replace:

Depending on the \texttt{window\_sequence} and \texttt{window\_shape} element different transform windows are used. A combination of the window halves described as follows offers all possible \texttt{window\_sequences}. Window lengths specified below are dependent on the core-coder frame length. Numbers are listed for \texttt{coreCoderFrameLength} of 1024 (960, 768).
Depending on the window_sequence and window_shape element different transform windows are used. A combination of the window halves described as follows offers all possible window_sequences. Window lengths specified below are dependent on the core-coder frame length. Numbers are listed for coreCoderFrameLength of 1024 (768).

Further below in 7.9.3.2 replace:

$$\alpha = \text{kernel window alpha factor, } \alpha = \begin{cases} 4 & \text{for } N = 2048 \text{ (1920, 1536)} \\ 6 & \text{for } N = 256 \text{ (240, 192)} \end{cases}$$

with:

$$\alpha = \text{kernel window alpha factor, } \alpha = \begin{cases} 4 & \text{for } N = 2048 \text{ (1536)} \\ 6 & \text{for } N = 256 \text{ (192)} \end{cases}$$

In all of 7.9.3.2 remove the mentioning of 1920 and 240 sample window lengths.

In the rest of the document remove all further references to 960/120 based frame length or 1920/240 based window length and add reference to the 768/96 transform length (1536/192 window length) coding if appropriate and if not already present. Do so also in formulas, equations and figures.

In 7.11.1, add to the end:

Unlike the delay introduced by MPEG Surround decoder as defined in ISO/IEC 23003-1:2007, 4.5, only High Quality decoding is supported in MPS212. It is noted that this implies that the delay of 5 QMF samples prior to the Nyquist analysis filterbanks shall not be inserted.

In 7.11.2.3.4, replace:

If bsPhaseCoding == 1 and bsResidualCoding == 1, the matrix $R^{l,m}_2$ is defined as following:

with

If bsResidualCoding == 1, the matrix $R^{l,m}_2$ is defined as follows (where, if bsPhaseCoding == 1, the transmitted $IPD^{l,m}$ values are used, and where, if bsPhaseCoding == 0, the value $IPD = 0$ is used for all parameter sets $l$ and processing bands $m$):

In 7.11.2.3.4, add a sentence after the equation to calculate $CLD^{l,m}_{lin}$ as follows:

using

$$CLD^{l,m}_{lin} = 10 \cdot \frac{CLD^{l,m}}{10}$$

It is noted that resBands refers to the value of bsResidualBands, i.e. the number of MPS parameter bands where residual coding is used.

In 7.11.2.5 replace:

For the 2-1-2 configuration, the frequency axis is divided into four different regions according to bsDecorrelConfig. = 0 and only one decorrelator is used, $X = 0$.

with:
For the 2-1-2 configuration, the frequency axis is divided into up to four different regions according to \textit{bsDecorrConfig} but only one decorrelator is used, \( X = 0 \).

\textbf{At the end of 7.13 add a new subclause:}

\textbf{7.13.12 LPC initialization at decoder start-up}

In frames where the first decoded frame is LPD and the initial filter LPC0 is not transmitted within the bitstream, the LPD core decoder is reset as for a regular start-up. In particular, the ACELP decoder is initialized as described in 7.14.3. Additionally, the LSF vector corresponding to the LPC filter LPC0 is set to the value specified in Table COR1.2 before inverse LPC quantization.

Right after inverse LPC quantization, the LSF vector corresponding to LPC0 is reset as follows:

\[
\text{LSF}_0 = \frac{\text{mean}_\text{lsf} + \text{LSF}_i}{2},
\]

where \( \text{mean}_\text{lsf} \) is the mean LSF vector specified in Table COR1.2 and \( \text{LSF}_i \) is the LSF vector corresponding to the LPC filter of frame \( i \), \( i \) being determined as follows:

\begin{table}[h]
\centering
\caption{Value of \textit{i} for calculating \textit{LSF}_0}
\begin{tabular}{|c|c|}
\hline
\textbf{Condition} & \textbf{Value of \textit{i}} \\
\hline
\text{mod}[0]<2 & 1 \\
\text{mod}[0]=2 & 2 \\
\text{mod}[0]=3 & 4 \\
\hline
\end{tabular}
\end{table}

This operation corresponds to setting the LSF vector corresponding to LPC0 to average between the mean LSF vector and the nearest decoded LSF vector (which depends on the coding mode).

\begin{table}[h]
\centering
\caption{Mean LSF vector for initialization}
\begin{tabular}{|c|c|}
\hline
\textbf{j} & \textbf{mean}_\text{lsf}(j) \\
\hline
1 & 394.21 \\
2 & 754.45 \\
3 & 1209.89 \\
4 & 1580.47 \\
5 & 1953.97 \\
6 & 2325.80 \\
7 & 2684.41 \\
8 & 3038.39 \\
9 & 3392.56 \\
10 & 3744.71 \\
11 & 4118.14 \\
12 & 4483.09 \\
13 & 4862.21 \\
14 & 5219.69 \\
15 & 5594.41 \\
16 & 5945.73 \\
\hline
\end{tabular}
\end{table}
Amend 7.16.3, list item 4, as follows:

4. Compute the inverse DCT-IV to the gain-scaled FAC data to obtain the equivalent time-domain samples.
   - The FAC transform length, fac_length, is by default equal to coreCoderFrameLength/8
   - For transitions with short blocks, this length is reduced to coreCoderFrameLength/16

In the case of transitions between ACELP and FD mode, a multiplicative factor of \(2/fac\_length\) is applied to the output of the inverse DCT-IV.

In Annex B.1 replace diagram:

with:
In Annex B.16.3, Figure B.8 replace:
Quantized LSFs

with:
Quantized weighted residual LSFs

In Annex B.21 replace:

- mpegsMuxMode = 2

with

- bsResidualCoding = 1

Furthermore, throughout the whole document replace “ari_” with “arith_”