



**INTERNATIONAL STANDARD ISO/IEC 23003-1:2007/Amd.1:2008**  
**TECHNICAL CORRIGENDUM 3**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION • МЕЖДУНАРОДНАЯ ЭЛЕКТРОТЕХНИЧЕСКАЯ КОМИССИЯ • COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**Information technology — MPEG audio technologies —**  
**Part 1:**  
**MPEG Surround**

AMENDMENT 1: Conformance testing

TECHNICAL CORRIGENDUM 3

*Technologies de l'information — Technologies audio MPEG —*

*Partie 1: Ambiance MPEG*

*AMENDEMENT 1: Essai de conformité*

*RECTIFICATIF TECHNIQUE 3*

Technical Corrigendum 3 to ISO/IEC 23003-1:2007/Amd.1:2008 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

Replace all conformance sequences attached to ISO/IEC 23003-1:2007/Amd.1:2008 with the sequences attached to this document.

In 8.5.2.2 MPEG Surround decoders replace the descriptions of the modules of Figure AMD1.2 — Block diagram of the MPEG Surround conformance test procedure with the following text below, where the changes are highlighted in grey background:

The relevant modules are:

- QMF inversion filtering: This module applies a polyphase correction filter that approximates the inverse of the equivalent QMF filterbank in the decoder under test. The delay imposed by this module is given by:  $delay = 64 \cdot \left( \frac{K-1}{2} \right)$ , where  $K = 25$  is the length of the polyphase filter. The polyphase filter matrix  $\mathbf{H}(k, l)$  of size  $64 \times K$  is tabulated in Table AMD1.2. The polyphase filtering step consists of the operation which maps a time signal  $x(n)$  to  $y(n)$ , where  $y(k + 64i) = \sum_{l=0}^{K-1} \mathbf{H}(k, l) x(k + 64(i-l))$ ,  $k = 0, 1, \dots, 63$ . This module is not active for conformance bitstreams that use PCM as downmix signal.
- store / read: for the first half of the conformance test sequences this module stores the output of the QMF and in parallel routes it to the reference MPEG Surround decoder. For the second half of the conformance test sequences the signal that was stored from the first half is fed to the reference MPEG Surround decoder again.
- MPEG Surround payload extraction: This module extracts the MPEG Surround bitstream from the conformance test sequence and feeds it to the reference MPEG Surround decoder.
- Reference MPEG Surround decoder: This module is the reference MPEG Surround decoder according to clause 1 through 7 and annexes A and B.
- comparison test: This module calculates the difference signals between the output from the decoder under test and the internal reference. The maximum amplitude of the difference signal as well as the RMS of the difference signal are calculated. The conformance criteria are specified with respect to PCM-sample in the range  $-32768 \dots 32767$ .

Replace Tables AMD1.5, AMD1.6, AMD1.7 and AMD1.8 with the corrected versions below, where the changes are highlighted by gray background:

**Table AMD1.5 — List of MPEG Surround conformance test sequences with MPEG-4 AAC profile downmix**

| Sequence           |                      | aac_mps_oneicc | aac_mps_param_4 | aac_mps_param_5 | aac_mps_param_7 | aac_mps_param_10 | aac_mps_param_14 | aac_mps_param_20 | aac_mps_param_28 | aac_mps_qmf | aac_mps_quant_0 |
|--------------------|----------------------|----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|-------------|-----------------|
| downmix coder      | AOT                  | 2              | 2               | 2               | 2               | 2                | 2                | 2                | 2                | 2           | 2               |
|                    | extAOT               | --             | --              | --              | --              | --               | --               | --               | --               | --          | --              |
|                    | backwards compatible | --             | --              | --              | --              | --               | --               | --               | --               | --          | --              |
|                    | SBR present          | --             | --              | --              | --              | --               | --               | --               | --               | --          | --              |
|                    | SSC Embedding        | --             | --              | --              | --              | --               | --               | --               | --               | --          | --              |
|                    | number of channels   | 2              | 2               | 2               | 2               | 2                | 2                | 2                | 2                | 1           | 2               |
|                    | sampling frequency   | 48000          | 48000           | 48000           | 48000           | 48000            | 48000            | 48000            | 48000            | 48000       | 48000           |
|                    | frame length         | 1024           | 1024            | 1024            | 1024            | 1024             | 1024             | 1024             | 1024             | 1024        | 1024            |
| time slots / frame |                      | 16             | 16              | 16              | 16              | 16               | 16               | 16               | 16               | 16          | 16              |
| parameter bands    |                      | 28             | 4               | 5               | 7               | 10               | 14               | 20               | 28               | 28          | 28              |
| tree configuration |                      | 2              | 2               | 2               | 2               | 2                | 2                | 2                | 2                | 0           | 2               |
| quantization mode  |                      | 0              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |
| one ICC            |                      | 1              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |
| arbitrary downmix  |                      | 0              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |
| arbitrary tree     |                      | 0              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |
| surround gain      |                      | 2              | 2               | 2               | 2               | 2                | 2                | 2                | 2                | 2           | 2               |
| LFE gain           |                      | 1              | 1               | 1               | 1               | 1                | 1                | 1                | 1                | 1           | 1               |
| downmix gain       |                      | 4              | 4               | 4               | 4               | 4                | 4                | 4                | 4                | 4           | 4               |
| matrix comp. mode  |                      | 0              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |
| temp shape config  |                      | 0              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |
| decorr config      |                      | 0              | 0               | 0               | 0               | 0                | 0                | 0                | 0                | 0           | 0               |

|                            |          |               |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|----------------------------|----------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| energy based qu.           |          | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 3D stereo                  |          | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| number of LFE bands        |          | 2             | 1     | 1     | 1     | 1     | 1     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| residual coding            |          | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary downmix residual |          | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| residual sampling rate     |          | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| number of residual frames  |          | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| number of residual bands   |          | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| tttModeLow                 |          | 1             | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| tttLow start band          |          | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| tttLow stop band           |          | 28            | 4     | 5     | 7     | 10    | 14    | 20    | 28    | --    | --    | --    | --    | --    | --    | --    |
| tttModeHigh                |          | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| tttHigh start band         |          | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| tttHigh stop band          |          | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| test procedure             |          | maxDiff / RMS |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| High<br>Quality            | Diff max | 14            | 16    | 16    | 14    | 14    | 14    | 14    | 14    | 14    | 14    | 14    | 14    | 14    | 14    | 14    |
|                            | RMS max  | 0.819         | 0.819 | 0.824 | 0.905 | 0.821 | 0.819 | 0.816 | 0.819 | 0.816 | 0.819 | 0.816 | 0.819 | 0.816 | 0.818 | 0.818 |
| Low<br>Power               | Diff max | 86            | 54    | 54    | 62    | 108   | 56    | 194   | 102   | 194   | 102   | 194   | 102   | 194   | 102   | 194   |
|                            | RMS max  | 1.713         | 1.644 | 1.635 | 1.674 | 1.817 | 1.671 | 2.360 | 1.698 | 2.360 | 1.698 | 2.360 | 1.698 | 2.360 | 1.698 | 2.360 |

Table AMD1.6 — List of MPEG Surround conformance test sequences with MPEG-4 AAC profile downmix (ctd.)

| Sequence      |        |                 |                 |                 |             |                   |                   |                |                   |                   |                  |
|---------------|--------|-----------------|-----------------|-----------------|-------------|-------------------|-------------------|----------------|-------------------|-------------------|------------------|
| downmix coder | AOT    | aac_mps_quant_1 | aac_mps_quant_2 | aac_mps_quant_3 | aac_mps_res | aac_mps_shape_ges | aac_mps_shape_stp | aac_mps_smooth | aac_mps_tree_5151 | aac_mps_tree_5152 | aac_mps_tree_525 |
|               | extAOT | --              | --              | --              | --          | --                | --                | --             | --                | --                | --               |

|                            |                      |       |       |       |       |       |       |       |       |       |       |
|----------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                            | backwards compatible | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
|                            | SBR present          | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
|                            | SSC Embedding        | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
|                            | number of channels   | 2     | 1     | 1     | 2     | 2     | 2     | 2     | 1     | 1     | 2     |
|                            | sampling frequency   | 48000 | 48000 | 48000 | 48000 | 48000 | 48000 | 48000 | 48000 | 48000 | 48000 |
|                            | frame length         | 1024  | 1024  | 1024  | 1024  | 1024  | 1024  | 1024  | 1024  | 1024  | 1024  |
| time slots / frame         |                      | 16    | 16    | 16    | 16    | 16    | 16    | 16    | 16    | 16    | 16    |
| parameter bands            |                      | 28    | 28    | 28    | 28    | 28    | 28    | 28    | 28    | 28    | 28    |
| tree configuration         |                      | 2     | 0     | 0     | 2     | 2     | 2     | 2     | 0     | 1     | 2     |
| quantization mode          |                      | 0     | 1     | 2     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| one ICC                    |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary downmix          |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary tree             |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| surround gain              |                      | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| LFE gain                   |                      | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| downmix gain               |                      | 4     | 4     | 4     | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| matrix comp. mode          |                      | 0     | 0     | 0     | 0     | 0     | 1     | 0     | 0     | 0     | 0     |
| temp shape config          |                      | 0     | 0     | 0     | 0     | 2     | 1     | 0     | 0     | 0     | 0     |
| decorr config              |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 2     | 0     |
| energy based qu.           |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 3D stereo                  |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| number of LFE bands        |                      | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| residual coding            |                      | 0     | 0     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary downmix residual |                      | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| residual sampling rate     |                      | -     | -     | -     | 48000 | -     | -     | -     | -     | -     | -     |
| number of residual frames  |                      | -     | -     | -     | 1     | -     | -     | -     | -     | -     | -     |

|                          |          |               |       |       |         |       |       |       |       |       |
|--------------------------|----------|---------------|-------|-------|---------|-------|-------|-------|-------|-------|
| number of residual bands |          | --            | --    | --    | 7,7,7,7 | --    | --    | --    | --    | --    |
| tttModeLow               |          | 1             | --    | --    | 1       | 1     | 1     | 1     | --    | 1     |
| tttLow start band        |          | 0             | --    | --    | 0       | 0     | 0     | 0     | --    | 0     |
| tttLow stop band         |          | 28            | --    | --    | 28      | 28    | 28    | 28    | --    | 28    |
| tttModeHigh              |          | 0             | --    | --    | 0       | 0     | 0     | 0     | --    | 0     |
| tttHigh start band       |          | --            | --    | --    | --      | --    | --    | --    | --    | --    |
| tttHigh stop band        |          | --            | --    | --    | --      | --    | --    | --    | --    | --    |
| test procedure           |          | maxDiff / RMS |       |       |         |       |       |       |       |       |
| High<br>Quality          | Diff max | 12            | 10    | 10    | 18      | 32    | 14    | 14    | 12    | 16    |
|                          | RMS max  | 0.836         | 0.843 | 0.845 | 0.825   | 0.833 | 0.848 | 0.821 | 0.843 | 0.875 |
| Low<br>Power             | Diff max | 50            | 168   | 106   | 20      | 74    | 18    | 40    | 166   | 36    |
|                          | RMS max  | 1.710         | 1.847 | 1.793 | 1.221   | 1.832 | 1.251 | 1.658 | 1.664 | 1.595 |
|                          |          |               |       |       |         |       |       |       |       | 1.698 |

Table AMD1.7 — List of MPEG Surround conformance test sequences with MPEG-4 High Efficiency AAC profile downmix

| Sequence           |                      | heaac_mps_oneicc | heaac_mps_param_4 | heaac_mps_param_5 | heaac_mps_param_7 | heaac_mps_param_10 | heaac_mps_param_14 | heaac_mps_param_20 | heaac_mps_param_28 | heaac_mps_qmf | heaac_mps_quant_0 |
|--------------------|----------------------|------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|---------------|-------------------|
| downmix coder      | AOT                  | 2                | 2                 | 2                 | 2                 | 2                  | 2                  | 2                  | 2                  | 2             | 2                 |
|                    | extAOT               | 5                | 5                 | 5                 | 5                 | 5                  | 5                  | 5                  | 5                  | 5             | 5                 |
|                    | backwards compatible | --               | --                | --                | --                | --                 | --                 | --                 | --                 | --            | --                |
|                    | SBR present          | 1                | 1                 | 1                 | 1                 | 1                  | 1                  | 1                  | 1                  | 1             | 1                 |
|                    | SSC Embedding        | --               | --                | --                | --                | --                 | --                 | --                 | --                 | --            | --                |
|                    | number of channels   | 2                | 2                 | 2                 | 2                 | 2                  | 2                  | 2                  | 2                  | 1             | 2                 |
|                    | sampling frequency   | 48000            | 48000             | 48000             | 48000             | 48000              | 48000              | 48000              | 48000              | 48000         | 48000             |
|                    | frame length         | 2048             | 2048              | 2048              | 2048              | 2048               | 2048               | 2048               | 2048               | 2048          | 2048              |
| time slots / frame |                      | 32               | 32                | 32                | 32                | 32                 | 32                 | 32                 | 32                 | 32            | 32                |

|                               |               |       |       |       |       |       |       |       |       |       |
|-------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| parameter bands               | 20            | 4     | 5     | 7     | 10    | 14    | 20    | 28    | 20    | 20    |
| tree configuration            | 2             | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 0     | 2     |
| quantization mode             | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| one ICC                       | 1             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary downmix             | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary tree                | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| surround gain                 | 2             | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     | 2     |
| LFE gain                      | 1             | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| downmix gain                  | 4             | 4     | 4     | 4     | 4     | 4     | 4     | 4     | 4     | 4     |
| matrix comp. mode             | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| temp shape config             | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| decorr config                 | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| energy based qu.              | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| 3D stereo                     | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| number of LFE bands           | 2             | 1     | 1     | 1     | 1     | 2     | 2     | 2     | 2     | 2     |
| residual coding               | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| arbitrary<br>downmix residual | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |
| residual sampling rate        | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| number of<br>residual frames  | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| number of<br>residual bands   | --            | --    | --    | --    | --    | --    | --    | --    | --    | --    |
| tttModeLow                    | 1             | 1     | 1     | 1     | 1     | 1     | 1     | 1     | --    | 1     |
| tttLow start band             | 0             | 0     | 0     | 0     | 0     | 0     | 0     | 0     | --    | 0     |
| tttLow stop band              | 19            | 4     | 5     | 7     | 10    | 13    | 19    | 22    | --    | 19    |
| tttModeHigh                   | 5             | 0     | 0     | 0     | 0     | 5     | 5     | 5     | --    | 5     |
| tttHigh start band            | 19            | --    | --    | --    | --    | 13    | 19    | 22    | --    | 19    |
| tttHigh stop band             | 20            | --    | --    | --    | --    | 14    | 20    | 28    | --    | 20    |
| test procedure                | maxDiff / RMS |       |       |       |       |       |       |       |       |       |
| High<br>Quality               | Diff max      | 14    | 18    | 18    | 18    | 16    | 16    | 14    | 26    | 14    |
|                               | RMS max       | 0.920 | 0.912 | 0.834 | 0.831 | 0.930 | 0.935 | 0.827 | 0.920 | 0.917 |
| Low<br>Power                  | Diff max      | 80    | 108   | 42    | 56    | 108   | 98    | 110   | 118   | 88    |
|                               | RMS max       | 1.781 | 1.940 | 1.818 | 1.716 | 1.946 | 1.803 | 1.985 | 1.946 | 1.773 |