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Agenda Item: **7.4.3**

Presentation of Specification to TSG SA Plenary

Presentation to: **TSG SA Meeting #27**

Document for presentation: **TS 26.406 "General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing", Version 1.0.0 (Release 6)**

Presented for: **Information**

Abstract of document:

The present document specifies the digital test sequences and conformance criteria for the Enhanced aacPlus audio codec.

An electronic copy of the ANSI-C code for the Fixed-point Enhanced aacPlus codec is included in TS 26.411. Alternatively, a floating-point ANSI-C code is specified in 3GPP TS 26.410. The fixed-point codec/encoder/decoder or the fixed-point codec/encoder/decoder may be used depending on if the implementation platform is better suited for a floating-point or a fixed-point implementation. It has been verified that the fixed-point and floating-point codecs interoperate with each other without any artifacts.

Standard conformance of the Enhanced aacPlus codec is enforced by meeting the conformance criteria defined in this document.

The present document includes information applicable to network operators, service providers and manufacturers.

Changes since last presentation:

This specification is presented to TSG SA Plenary for the first time (for information).

Outstanding Issues:

None.

Contentious Issues:

None.

Comment(s):

None.

3GPP TS 26.406 V1.0.0 (2005-03)

Technical Specification

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General audio codec audio processing functions; Enhanced aacPlus general audio codec; Conformance testing (Release 6)

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3GPP

Postal address

3GPP support office address
650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Internet
http://www.3gpp.org

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Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document specifies the digital test sequences and conformance criteria for the Enhanced aacPlus audio codec.

2 Normative references

This document incorporates, by dated and undated reference, provisions from other publications. These normative references are cited in the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this document only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1] 3GPP TS 26.401 : Enhanced aacPlus general audio codec; General description

[2] 3GPP TS 26.403 : Enhanced aacPlus general audio codec; Encoder Specification AAC part.

[3] 3GPP TS 26.404 : Enhanced aacPlus general audio codec; Encoder Specification SBR part.

[4] 3GPP TS 26.405 : Enhanced aacPlus general audio codec; Encoder Specification Parametric Stereo part.

[5] 3GPP TS 26.410 : Enhanced aacPlus general audio codec; Floating-point ANSI-C Code.

[6] 3GPP TS 26.411 : Enhanced aacPlus general audio codec; Fixed-point ANSI-C Code.

[7] ISO/IEC 14496-4:2003, Information technology - Coding of audio-visual objects - Part 4: Conformance testing.

[8] ISO/IEC 14496-4:2004/FDAM 8:2004, Information technology - Coding of audio-visual objects - Part 4: Conformance testing – Amendment 8

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1] to [6] shall apply.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AAC-LC	Advanced Audio Coding, Low Complexity audio object type
ODG	Objective Diff Grade
PEAQ	Perceptual Evaluation of Audio Quality
SBR	Spectral Band Replication

4 General

Conformance testing is an important tool to verify that implementations of Enhanced aacPlus match the relevant specifications. It is also helpful in verifying the proper use of the source code provided in [5] and [6]. Conformance testing focuses on the core algorithm, therefore no criteria are defined for error concealment, downsampling and file I/O.

Clause 5 describes the proposed method of conformance testing for the decoder. Clause 6 discusses encoder conformance.

5 Decoder conformance testing

Decoder conformance for both fixed-point and floating-point implementations shall be tested in accordance with section 5.1 and section 5.2 below. Conformance shall be verified by either bit-exact behaviour to the reference output or by meeting the objective criteria defined below. Bit-exact behaviour should be preferred for fixed-point implementations where it can be achieved without undue penalty on computational complexity.

5.1 AAC-LC and SBR conformance testing

Conformance testing for AAC-LC and SBR shall be performed according to the relevant sections in [7] and [8]. The reference output shall be the output created by the respective 3GPP reference code (floating- or fixed-point).

5.2 Parametric Stereo conformance testing

The floating-point implementation shall be used as the reference implementation. Conformance of the fixed-point implementation shall be tested via objective quality assessments, using PEAQ. An Objective Difference Grade comparison for a set of test vectors shall result in a given maximum deviation per test vector according to the following table:

Test vector	**Max. allowed ODG deviation**
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD
TBD	+/- TBD

6 Encoder conformance

6.1 Floating point encoder

No specific routines for floating-point encoder conformance testing are defined. It is recommended to use the floating-point code from [5]. In addition, it is recommended to verify that the implementation meets the criteria defined in 6.2 (Fixed-point encoder). If the floating-point code is used for an implementation in mobile equipment, the criteria defined in 6.2 shall be met.

6.2 Fixed point encoder

Conformance of fixed-point encoder implementations for use in mobile equipment shall be verified by bit-exact behaviour to the fixed-point reference code [6], or by meeting the objective criteria defined below, or by performing subjective tests as described below. Fixed-point encoder implementations which are not used in mobile equipment, should meet the conformance criteria defined in this section.

Bit-exact behaviour should be preferred for fixed-point implementations where it can be achieved without undue penalty on computational complexity.

If an implementor chooses to implement only a mono-encoder functionality (or other functionality FFS), then conformance of only this functionality shall be tested. This shall apply irrespective of the conformance testing method chosen.

Objective criteria FFS

Subjective tests shall cover the encoder configurations tested during the characterization phase. The requirement for passing the subjective tests is that the encoder under test does not perform worse in a statistically significant sense in any test case when compared to the fixed-point reference encoder. (Further details: FFS)

Annex A (informative): Change history

Change history							
Date	TSG SA#	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2005-03	27	SP-050085			Presented to TSG SA#27 for information		1.0.0