

SCTE | **STANDARDS**

Digital Video Subcommittee

AMERICAN NATIONAL STANDARD

ANSI/SCTE 242-2 2022

**Next Generation Audio Coding Constraints for Cable
Systems: Part 2 – AC-4 Audio Coding Constraints**

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Document Types and Tags

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Note: Standards that are released multiple times in the same year use: a, b, c, etc. to indicate normative balloted updates and/or r1, r2, r3, etc. to indicate editorial changes to a released document after the year.

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1. Introduction

1.1. Executive Summary

This document is part of a suite documenting coding constraints of Next Generation Audio (NGA) systems for cable television. It is intended to be used in conjunction with the specific audio technologies described in subsequent Parts of this standard [SCTE 242-1].

1.2. Scope

This document is part two of a three-part standard that specifies the coding constraints of Next Generation Audio system for cable television. In conjunction with [SCTE 242-1], this document defines the coding constraints on AC-4 for cable television.

The carriage of the streams described in this specification is defined in [SCTE 243-2] in conjunction with [SCTE 243-1].

1.3. Benefits

The Next Generation Audio (NGA) system audio system provides immersive and personalizable sound for television. It is not compatible with the audio system used in [SCTE 54]-era service.

AC-4 is a highly efficient audio Codec that supports legacy channel-based content, object-based and channel-based immersive content, personalized content, and advanced metadata as defined in ETSI [TS 103 190-2].

The AC-4 audio system has several features specific to AC-4 that are utilized in the ATSC 3.0 audio system.

The A/V frame alignment feature of AC-4 avoids complex problems that can occur when trying to keep content in sync at segment boundaries, without compromising the audio at switching points. When enabled, this feature simplifies splicing workflows. It also simplifies transcoding from or to formats that use video-based data frame alignment, such as HD-SDI.

AC-4 supports the generation of coded audio frames that represent the same time interval as the associated video frame.

2. Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this document. The editions indicated were valid at the time of subcommittee approval. All documents are subject to revision and, while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1. SCTE References

[SCTE 242-1] SCTE 242-1 202x, Next Generation Audio Coding Constraints for Cable Systems: Part 1 – Introduction and Common Constraints

2.2. Standards from Other Organizations

- [A342_1] ATSC A/342:2021 Part 1, Audio Common Elements
- [A342_2] ATSC A/342:2021 Part 2, AC-4 System
- [A85] ATSC A/85:2013, ATSC Recommended Practice: Techniques for Establishing and Maintaining Audio Loudness for Digital Television
- [TS 103 190-1] ETSI TS 103 190-1 V1.2.1 (2015-06), Digital Audio Compression (AC-4) Standard; Part 1: Channel based coding
- [TS 103 190-2] ETSI TS 103 190-2 V1.1.1 (2015-08-30), Digital Audio Compression (AC-4) Standard; Part 2: Immersive and personalized audio

2.3. Other Published Materials

No normative references are applicable.

3. Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

3.1. SCTE References

- [SCTE 54] ANSI/SCTE 54 2020, Digital Video Service Multiplex and Transport Subsystem Standard for Cable Television
- [SCTE 243-1] SCTE 243-1, Next Generation Audio Carriage Constraints for Cable Systems: Part 1 – Common Transport Signaling
- [SCTE 243-2] SCTE 243-2, Next Generation Audio Carriage Constraints: Part 2 – AC-4 Audio Carriage Constraints

3.2. Standards from Other Organizations

No informative references are applicable.

3.3. Other Published Materials

No informative references are applicable.

4. Compliance Notation

<i>shall</i>	This word or the adjective “ <i>required</i> ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
<i>forbidden</i>	This word means the value specified <i>shall</i> never be used.
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<i>may</i>	This word or the adjective “ <i>optional</i> ” indicate a course of action permissible within the limits of the document.
deprecated	Use is permissible for legacy purposes only. Deprecated features <i>may</i> be removed from future versions of this document. Implementations <i>should</i> avoid use of deprecated features.

5. Abbreviations

NGA	Next Generation Audio
SCTE	Society of Cable Telecommunications Engineers

6. AC-4 System Overview

AC-4 is a highly efficient audio codec that supports legacy channel-based content, object-based and channel-based immersive content, personalized content, and advanced metadata as defined in ETSI TS 103 190-2 0.

A complete description of the AC-4 system features is available in ATSC [A342_1] section 5.1 and [A342_2] section 4.

7. AC-4 Coding Specifications

AC-4 audio elementary streams *shall* comply with the syntax and semantics contained in ETSI [TS 103 190-2], as well as the parts of ETSI [TS 103 190-1] referenced by ETSI [TS 103 190-2], as constrained in the following sections.

7.1. General Coding Constraints

AC-4 audio elementary streams *shall* comply with the constraints defined in ATSC [A342_2], Section 5.2.

7.2. Loudness and DRC Constraints

In order to comply with the loudness recommendations in ATSC [A85], AC-4 audio elementary streams *shall* comply with the constraints defined in ATSC [A342_2], Section 5.3.

7.3. Personalized Audio Constraints

In order to provide a consistent listener experience, AC-4 audio elementary streams *shall* comply with the constraints defines in ATSC [A342_2], Section 5.4.

7.4. Multi-Stream (Hybrid) Constraints

When AC-4 presentations reference audio elements that are contained in more than one elementary stream, the relevant AC-4 audio elementary streams *shall* comply with the constraints defined in ATSC [A342_2], Section 5.5.