



ATSC

ADVANCED TELEVISION
SYSTEMS COMMITTEE

ATSC Standard: A/53 Part 3:2013 Amendment No. 1, “AVC Signal Transport”

Doc. A/53 Part 3 Amend. No. 1
15 February 2023

Advanced Television Systems Committee
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Revision History

Version	Date
Amendment approved	15 February 2023

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1. OVERVIEW

1.1 Definition

An Amendment is generated to document an enhancement, an addition, or a deletion of functionality to previously agreed technical provisions in an existing ATSC document. Amendments shall be published as attachments to the original ATSC document. Distribution by ATSC of existing documents shall include any approved Amendments.

1.2 Scope

This document aligns ATSC A/53 Part 3 with the method of implementing AVC compression of multicast programs that have been implemented in broadcast transmissions and are anecdotally reported to be received successfully on a large majority of “smart” DTV sets. This amendment is in response to New Project Proposal N-038r1, “Revision of relevant ATSC DTV Standards to facilitate reception of MPEG-4-coded ATSC-1 multicast streams on legacy and future TV sets.”

1.3 Rationale for Changes

In conjunction with channel sharing techniques, using AVC in DTV transmissions potentially allows more RF broadcast channels to be available for ATSC 3.0 transmissions. The changes described in this document are being proposed because the DTV signal protocol that is reported to achieve AVC reception successfully on many legacy and current ATSC DTV sets is non-compliant with the signaling constraints in ATSC A/53 Part 3. If DTV transmissions with AVC signals do comply with the existing constraints in A/53 Part 3, it is likely that some legacy DTV sets may not be able to render the AVC streams. Amending relevant ATSC DTV Standards to match successful implementation of AVC in the marketplace is appropriate and incentivizes receiver manufacturers to include and test standards-compliant broadcast reception of AVC streams in their current and future products that include DTV reception capability. Increased standards-compliant AVC capability in TV receivers would encourage more widespread use of AVC by broadcasters (noting that the FCC requires the broadcaster’s primary signal to use MPEG-2 compression). With broad use of AVC in DTV transmissions, channel sharing may allow additional RF broadcast channels to be made available for ATSC 3.0 transmissions, with the consequent potential for increasing the number and quality of ATSC 3.0 services.

1.4 Compatibility Considerations

The changes described in this document are backward-compatible relative to the currently published version of the standard to which this Amendment pertains and any previously approved Amendments for that standard. The Amendment extends the A/53 Part 3:2013 standard to allow the AVC `stream_type` to be signaled as the “ATSC digital television” `service_type`.

2. LIST OF CHANGES

Change instructions are given below in *italics*. Unless otherwise noted, inserted text, tables, and drawings are shown in **blue**; deletions of existing text are shown in ~~red-strikeout~~. The text “[ref]” indicates that a cross reference to a cited referenced document should be inserted.

2.1 Normative References

Add the following new Normative References:

- [6] ATSC: “Video System Characteristics of AVC in the ATSC Digital Television System,” Doc. A/72 Part 1:2015, Advanced Television Systems Committee, Washington, D.C., 19 May 2015.
- [7] ITU-T Rec. H.264 | ISO/IEC 14496-10, (09/2014), “Information Technology – Coding of audio visual objects – Part 10: Advanced Video Coding.”
- [8] SCTE: “AVC Video Constraints for Cable Television, Part 1 – Coding,” Doc. ANSI/SCTE 128-1 2020, Society of Cable Telecommunications Engineers, Exton, PA.

2.2 Change Instructions

Update the standard as follows:

5.1.1 Video T-STD

5.1.1.1 Video Streams of stream_type 0x02 (MPEG-2 Video)

For video streams of stream_type 0x02, the video shall conform to the T-STD as defined in Sections 2.4.2.2 and 2.4.2.3 of ISO/IEC 13818-1 [3] and shall follow the constraints for the level encoded in the video elementary stream. When there is a video stream of stream_type 0x02 in the TS, the T-STD buffer B_n defined in ISO/IEC 13818-1 [3], Section 2.4.2 shall apply for such a stream.

Any elementary stream containing Still Picture data shall include a video_stream_descriptor() in accordance with ISO/IEC 13818-1 [3] Section 2.6.2 and shall have the value of the field still_picture_flag set to ‘1’ and the interval between I frames shall not be greater than 60 seconds.

5.1.1.2 Video Streams of stream_type 0x1B (AVC Video)

For video streams of stream_type 0x1B, the video shall conform to the T-STD for AVC as defined in Section 2.14.3.1 of ISO/IEC 13818-1 [3] and shall follow the constraints for the profile and level encoded in the video elementary stream in Appendix A of AVC [7].

5.1.3.1 Service Type 0x02 – ATSC Digital Television

This service type indicates video coded with the MPEG-2 or AVC video codec and audio coded with the AC-3 audio codec, with optional associated data.

This service type shall be identified by the value 0x02 in the field service_type in the Virtual Channel Table of A/65 [11]. Virtual channels (see A/65 [11]) associated with this service type carry television programming (audio, video and optional associated data) as constrained by ATSC Standards A/53 Part 4 [8] or A/72 Part 1 [6] for video, and A/53 Part 5 [9] for audio, and other ATSC standards for the optional data.

5.4.1 General Constraints

When an elementary stream of stream_type 0x02 (MPEG-2 video) or stream_type 0x1B (AVC video) is present in the Transport Stream, the data_stream_alignment_descriptor() (described in Section 2.6.10 of ISO/IEC 13818-1 [3]) shall be included in the descriptor loop that immediately follows the ES_info_length field in the TS_program_map_section() describing that elementary stream. The

descriptor_tag value is set to 0x06; the descriptor_length value shall be set to 0x01, and the alignment_type value shall be set to 0x02 (video access unit).

5.5.1 MPEG-2 Video PES Constraints (for Streams of stream_type 0x02)

For video streams of stream_type 0x02, each PES packet shall begin with a video access unit, as defined in Section 2.1.1 of ISO/IEC 13818-1 [3], which shall be aligned with the PES packet header. The first byte of a PES packet payload shall be the first byte of a video access unit. Each PES header shall contain a PTS. Additionally, it shall contain a DTS as appropriate. For terrestrial broadcast, the PES packet shall not contain more than one coded video frame, and shall be void of video picture data only when transmitted in conjunction with the discontinuity_indicator to signal that the continuity_counter may be discontinuous.

Within the PES packet header, the following restrictions apply:

- The PES_packet_length shall be coded as 0x0000
- data_alignment_indicator shall be coded as '1'

Add the following new section:

5.5.3 AVC Video PES Constraints (for Streams of stream_type 0x1B)

For video streams of stream_type 0x1B, the video shall conform to SCTE 128-1 Sec. 6.5 [8]

Add the following new section:

5.7.4 AVC Video Stream Type

The stream_type value for AVC video program elements shall be as defined in [6]. This value is 0x1B.

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