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ADVANCED TELEVISION
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ATSC Recommended Practice: A/327:2022-03 Amendment No. 1: “Field Issues Annex”

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Advanced Television Systems Committee
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Revision History

Version	Date
Amendment approved	1 December 2022

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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 describes an Annex (*Annex D: Field Issues*) to be added to A/327. No other changes to the document are involved besides the addition of this Annex. This amendment is in response to New Project Proposal N-044r0, “A/327 Amendment on ‘Field Issues.’”

1.3 Rationale for Changes

The changes described in this document are presented because certain performance issues in fielded ATSC 3.0 receivers have been observed, and the listing of these issues—along with potential solutions that broadcasters can adopt to avoid the issues’ occurrence—will be useful to optimize the user experience of consumers who own such receivers.

1.4 Compatibility Considerations

The changes described in this document are backward-compatible relative to the currently published version of the Recommended Practice to which this Amendment pertains and any previously approved Amendments for that standard.

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

None.

2.2 Informative References

None.

2.3 Acronyms and Abbreviations

None.

2.4 Terms

None.

2.5 Change Instructions

Add the following at the end of the current document, as Annex D:

Annex D: Field Issues

D.1 INTRODUCTION

This Annex reports issues that have been found in some fielded ATSC 3.0 receivers and suggests methods that broadcasters may take to resolve or avoid the issues from occurring in those receivers.

D.2 HYBRID TIME INTERLEAVER BLOCK-SIZE ISSUE

2.0 Brief Summary of Issue

A limited number of receivers are unable to demodulate the broadcast correctly under conditions using multiple PLPs where TI Block sizes in the Hybrid Time Interleaver (HTI) that differ beyond a certain level are applied to each PLP, and a complete delivered product is carried by the multiple PLPs.

2.1 Scope

2.1.1 Affected Receivers

The issue occurs with a limited number of receiver models made between 2020 and 2021. The implementation described in Section 6.3.2.2.2 leads to the need for a delay before the de-interleaver memory, and this was not sufficient in these receiver models. The implementation issue in these receivers has been identified as a hardware memory issue that cannot be fixed with a software update. The problem has subsequently been fixed and does not occur in receivers sold after 2021.

2.1.1.1 Conditions Under Which the Issue Occurs

The problem occurs only in HTI Mode, where differing TI Block sizes are applied to each PLP (and that difference between TI Block sizes exceeds a certain value), and a complete delivered product is carried by multiple PLPs. Note that when a complete delivered product is carried by multiple PLPs, simultaneous decoding of the multiple PLPs is required at receivers, and therefore, the multiple PLPs share TI memory up to 2^{19} cells.

2.2 Recommendations to Broadcasters

Most receivers will not require any broadcaster considerations on TI Block size. However, if the broadcaster wants to make sure affected legacy receivers can also receive their multi-PLP broadcasts using different TI Block sizes successfully, the following workarounds may be considered.

Workaround 1:

Use HTI without applying differing TI Block sizes to each PLP.

Workaround 2:

Use HTI applying differing TI Block sizes, but ensure that the TI Block sizes of the PLPs satisfy the following condition:

$$N_{cells(n)} \cdot N_{FEC_TI(n, \text{last TI Block})} \leq N_{cells(n+1)} \cdot N_{FEC_TI(n+1, \text{first TI Block})} + 2^{17}$$

where $N_{cells(n)}$ and $N_{FEC_TI(n, first/last\ TI\ Block)}$ denote the FEC Block size (cells) and the number of FEC Blocks in the first or last TI Block of the n^{th} PLP respectively. That is, the difference in TI Block size between adjacent PLPs should not exceed 2^{17} (128K) cells. This includes adjacent PLPs that cross frame or subframe boundaries.

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