ATSC Standard: A/324:2022-03 Amendment #1, "MIMO Configuration in Broadcast Gateway"

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Revision History

Version	Date
A/324:2022-03 Amendment No. 1 approved	13 June 2022

ATSC Standard:
A/324:2022-03 Amendment No. 1:
MIMO Configuration in Broadcast Gateway

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 to A/324:2021 that provides a guideline for MIMO configurations from Broadcast Gateway. The guideline described in this amendment includes STLTP and L1 signaling instruction from Broadcast Gateway to conform with the existing MIMO specification defined in A/322:2021 Annex L.

1.3 Rationale for Changes

The new Annex in this document is in response to the request from Broadcast Gateway and Exciter manufacturers who started implementing the MIMO option specified in A/322:2021 Annex L. A guideline and clear instruction on STLTP and L1 signaling from Broadcast Gateway is needed in order to fully conform with the existing MIMO specification in A/322:2021.

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.

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. Yellow highlighted references indicate the document editor should insert the appropriate internal document references.

2.1 Change Instructions

Add a new Annex F as follows:

Annex F Preamble Data for MIMO Operation

When MIMO is used, as specified in Annex L of [3], a Broadcast Gateway generates a single STLTP Tunnel Data Stream that contains a single set of inner Tunneled Packet Streams intended for emission on a single channel (as opposed to the cases of Channel Bonding, in which two separate sets of Tunneled Packet Streams are sent to two functional exciters). In the current version of MIMO, two transmission chains are used after the generation of the bit-interleaved FEC Frames. Therefore, a Baseband Packet carried by a single STLTP Tunnel Data Stream is spread over the two transmission chains within a MIMO exciter, as depicted in Figure L.1.

For the parallel Framing & Interleaving stages that construct physical layer frames for transmitting antenna #1 (Tx1) and transmitting antenna #2 (Tx2), a Broadcast Gateway generates the same Preamble data and Timing & Management data for forming the signals to be emitted by Tx1 and Tx2. Since the data for a Baseband Packet is spread over two simultaneous physical layer frames emitted by Tx1 and Tx2, with equal amounts of data in each emission, care is required so that the Broadcast Gateway configures L1-Basic and L1-Detail parameters for the physical layer frames of only Tx1 or Tx2 but not both, rather than for the total of the input formatting data. (I.e., the values included in L1-Basic and L1-Detail will represent half of the total data transmitted within the combination of the two parallel physical layer frames.) For example, when MIMO is enabled (i.e., indicated via **L1B_first_sub_mimo** and **L1D_mimo**), **L1D_plp_size** configured by a Broadcast Gateway would indicate a PLP size contained in a physical layer frame of Tx1 (or Tx2) only, which represents half of the total input formatting data.
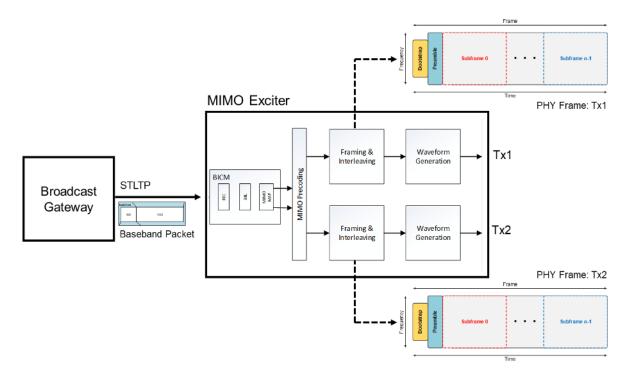
Figure F.1 MIMO Configuration in Broadcast Gateway and Exciter.

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