RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting #15

Proposed Test Procedure to verify that the Sliding Window Error Correction Is Not Being Used

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And modified by Greg Stayton and Bill Harman

SUMMARY

This Working Paper is in response to Action Item 9-9 and proposes a test procedure to verify that the sliding window error correction technique is not being used.

Action Item 9-9 Write a test to verify that the sliding window error correction technique is not used.

Since the sliding window error correction technique tends to produce a high undetected error rate it is not appropriate for use in high fruit rate environments. Part one of the following test verifies that the Error Correction is performed. Part two of the test verifies that the Sliding Window technique is not used.

Error Detection and Correction

Verification of Conservative Error Detection and Correction Technique (subparagraph I.4.3.2)

Purpose/Introduction:

This test verifies that error correction is performed when all low confidence bits are contained within a single 24 bit window. This test is only applicable for ADS-B receivers utilizing the conservative method of error correction.

Input:
Equipment:

Provide a method of supplying the UUT with:
Any Valid ADS-B Message having:

"DF"	=	17
"CA"	=	0
"AA"	=	Any discrete address
Message Rate	=	1 Hz
Frequency	=	1090 MHz
Power	=	-50 dBm

Measurement Procedure:

The ADS-B message will be transmitted to the ADS-B receiver unit under test with specific data bits (as specified in the test steps) corrupted with RF energy in both chips of the data bit. For the corrupted bits the RF energy will be 3 db higher in the chip that would normally contain no energy. It will be verified that the ADS-B receiver unit under test properly corrects the message when it qualifies for error correction or discards the message when it doesn't qualify for error correction.

Step 1: Apply ADS-B Input Message with 12 corrupted data bits all within a single 24 bit window.

Apply Input at the receiver input port.

Step 2: Verify ADS-B Input Message Reception.

Verify that the ADS-B messages are correctly received.

Step 3: Apply ADS-B Input Message with 2 corrupted data bits the second bit being 25 bits away from the first.

Apply Input at the receiver input port.

Step 4: Verify ADS-B Input Message Reception

Verify that the ADS-B messages are discarded.

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BELOW: Revised version by W. Harman and Greg Stayton (14 Nov. 02)

Purpose/Introduction:

This test verifies that the sliding window error correction technique, which is used in TCAS, is not being used in the unit under test.

Input:
Equipment:

Provide a method of supplying the UUT with:
Any Valid ADS-B Message having:

"DF"	=	17
"CA"	=	0
"AA"	=	Any discrete address
Message Rate	=	1 Hz
Frequency	=	1090 MHz
Power	=	-50 dBm

Also provide an interference generator that can add as many as nine 0.5-microsecond interference pulses.

Measurement Procedure:

The ADS-B message will be transmitted to the ADS-B receiving unit under test with a message having certain bit errors and low confidence bits. To cause a low-confidence bit, the interference pulse will be positioned in the 0.5 microsecond time interval that would normally contain no energy and will be near in power level to the signal. To make this a bit error, the interference power will be 1 dB stronger than the signal. To make this a correct bit (while being low confidence) the interference power will be 1 dB weaker than the signal.

Step 1: Apply ADS-B Input Message without interference. Normally message acceptance is reliable under this condition.

Step 2: Add interfering pulses that cause six (6) bit errors, flagged with low-confidence within a 24 bit window, and also, away from that 24 bit window, cause 3 additional low-confidence bits for which the message bits are correct.

Step 3: Verify that the ADS-B message is not accepted under this condition.