

RTCA Special Committee 186, Working Group 5

ADS-B UAT MOPS (DO-282), Revision A

Meeting #19

Teleconference on 1.12.04

**Proposed Test Procedure for the new paragraph
inserted as §2.2.8.2.1.2**

Presented by: Tom Pagano & Gary Furr

SUMMARY
This Working Paper contains the proposed text of a new test procedure for the paragraph that was inserted as §2.2.8.2.1.2 and entitled “Basic ADS-B Message As Desired Signal.”

INTRODUCTION

In the published UAT MOPS, paragraph §2.2.8.2.1.1 was entitled “Long ADS-B Message Is Desired Signal” and paragraph §2.2.8.2.1.2 was entitled “Ground Uplink Message Is Desired Signal.” During the discussion of the UAT SARPS Technical Manual, it was suggested that a new paragraph be inserted between the existing paragraphs, and entitled “Basic ADS-B Message As Desired Signal.” This suggestion was agreed to by Working Group 5 during a teleconference held on August 6, 2003 and it was agreed that the new paragraph would be populated by copying the requirements paragraph of §2.2.8.2.1.1 for the “Long ADS-B Message” and that the signal level would be changed from -93 dBm to -94dBm in the new paragraph.

It was the suggestion of FAA Technical Center personnel that the test procedure for the new paragraph entitled “Basic ADS-B Message” be a copy of the test procedure for the “Long ADS-B Message” with the appropriate changes in signal level and references from “Long” to “Basic.”

PROPOSAL

It is the proposal of this working paper that the Working Group accept the test procedure as suggested and copied with the appropriate changes below, which reflect other changes that have been reviewed and agreed to by the Working Group.

2.4.8.2.1.2 Verification of Basic ADS-B Message As Desired Signal (§2.2.8.2.1.2)

Purpose/Introduction:

A desired signal level of -94 dBm applied at the antenna end of the feedline **shall** produce a rate of Successful Message Reception of 90% or better under the following simultaneous conditions:

- a. The desired signal is subject to the maximum permitted signal frequency offset plus air-to-air Doppler at 1200 knots closure/opening.
- b. The desired signal is subject to the maximum modulation distortion allowed in §2.2.2.4.

Note: *The receiver criteria for Successful Message Reception of UAT ADS-B Messages are provided in §2.2.8.3.1.*

Equipment Required:

Desired Message Signal:

Provide a method of supplying the UUT with ADS-B Messages having:

- RF Power Level: -94 dBm
- Center Frequency: 978 MHz +/- 2.0 kHz +/- 19.560 kHz (see Note below)

- FM Deviation: 560 kHz (measured at the minimum eye pattern opening per §2.2.2.4)
- Message Contents: Basic ADS-B Message with pseudo-random payload data, and valid FEC Parity field per §2.2.3.1.3.
- Message Rate: 100 per second

Note: *Maximum Doppler shift at 1200 knot closing rate is derived as follows:
Velocity (m/s) = 1200 NM/hr * 1853 m/NM / 3600 sec/hr = 617 m/sec.
Doppler shift = 617 m/sec / 3e+08 m/sec = 2.06 PPM. Frequency deviation due to Doppler shift is 978 MHz * 2.06 PPM = +/- 2.01 kHz.*

Measurement Procedures:

The signal power level specified in this procedure is relative to the message source end of the transmission line used to interface the UUT receiver port to the message source. The specified RF power level applied to the UUT shall be compensated for the maximum line loss for which the UUT receiver has been designed. For example, if the line loss is 3 dB, then each of the RF message power levels specified in the test procedures shall be lowered by 3 dB.

Step 1: Apply ADS-B Input Messages at maximum negative frequency offset

Apply the **Desired Message Signal** with the Center Frequency set to the minimum value (978 MHz – 2.0 kHz – 19.56 kHz) at the UUT receiver port.

Step 2: Measure the UUT receiver sensitivity

Decrease the input power level and determine the minimum RF signal required to produce an average reception rate of 90 percent by the UUT receiver.

Verify that this RF signal level is in compliance with the limits specified in §2.2.8.2.1.2.

Step 3: Apply ADS-B Input Messages at maximum positive frequency offset

Apply the **Desired Message Signal** with the Center Frequency set to the minimum value (978 MHz + 2.0 kHz + 19.56 kHz) at the UUT receiver port.

Step 4: Repeat UUT receiver sensitivity measurement

Repeat Step 2 to measure the UUT receiver sensitivity at the maximum positive frequency offset.

Step 5: Repeat for all Applicable Receiver Input Ports

Repeat Steps 1 through 4 for each applicable receiver RF input port of the UUT.