

Technical Description

The Boeing Company

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By

Allen S. Lindsay, SR

The Boeing Company

Global Spectrum Management MC: 1K-105

P.O. Box 3707

Seattle, WA 98124-2207

(425)237-9168

PURPOSE:

The Boeing Company is requesting an experimental license conduct VDB Interference and SATCOM PIM Tests.

OBJECTIVE & TEST DESCRIPTION

This procedure includes two separate test.

VDB Interference Test is a test which demonstrates that aircraft transmitting systems will not inject signals into the MMR which interfere with the reception of the VDB signal. The VDB signal is the Ground Based Augmentation System (GBAS) which enables aircraft GPS Landing System (GLS) capability.

This test is a measurement of the power received at the MMR through the VDB antennas (Localizer and VOR) when transmitting on aircraft transmitters. The intent is to show that these received power levels are well below the RTCA/DO-253 interference thresholds spelled out in Table 2-2. The actual aircraft transmitters are used to perform the test, with a spectrum analyzer used to measure the power levels at the input ports to the MMR.

For the SATCOM system, we will use the Honeywell INMARSAT SDU to transmit a +20 dBW clear carrier with the beam steered towards the two VDB antennas. First the beam is steered forward, at low elevation angle, to provide maximum signal at the localizer antenna. Then the beam is steered aft towards the VOR antenna. In each case, the aircraft heading is set such that the transmitted power from the SDU is sent away from the GEO satellite belt. For the localizer antenna test, the aircraft is oriented with the nose pointed due north, since the localizer antenna is forward of the SATCOM antenna. For the VOR antenna test, the aircraft is oriented with the nose pointed due south, since the VOR antenna is aft of the SATCOM antenna. **Testing will be conducted IAW RTCA/DO-253.**

The SATCOM PIM test is to show that Passive Intermods (PIM) from two SATCOM carriers do not interfere with GPS reception on the airplane. Because the INMARSAT system is a dual channel system, it will generate passive intermodulation (PIM) products. And because INMARSAT does not restrict these two carriers to prevent PIM

products landing in the GPS L1 band, the hardware has strict PIM requirements to limit these PIM levels. This test is a demonstration that for the tested cases, no interference to the GPS reception on the airplane is found. The test is similar to the VDB Interference Test with the aircraft facing due north. In this case, two 20 dBW clear carriers are transmitted on specific frequencies to land a PIM product on 1575 MHz are transmitted. The SATCOM beam is oriented forward at low elevation angles. The team monitors the aircraft position and time information while transmitting the two carriers. The beam is steered in a few directions, forward and low. The MMR has the capability to provide data on how many GPS satellite signals are received, and the S/N of each satellite versus time. The team will monitor review this data after the completion of the test. **Testing will be conducted IAW RTCA/DO-262.**

OPERATION OVERVIEW

Manufacturer:	Honeywell INMARSAT Satellite Data Unit (SDU)
Model:	90402651-000
Manufacturer:	Honeywell INMARSAT High Power Amp (HPA)
Model:	90404514-000
Manufacturer:	Chelton High Gain Antenna (HGA-7001)
Model:	804-10-0015
Frequencies (MHz):	1626-1660.5 MHz
Emissions:	NON,
Effective Radiated Output:	100 W
Station Class:	FX

STOP BUZZER POINT OF CONTACT:

Tom Jessett, (206) 544-8587

LOCATIONS:

Boeing Field
47-32-11N; 122-18-51W
Radius: 1km

Paine Field, WA
47-53-49N; 122-16-45W
Radius: 1km

Moses Lake, WA
47-13-03N; 119-17-18W
Radius: 1km