

Globalstar Satellite Packet Data Modem Module Antenna Port Narrowband Conducted Out-of-Band Emissions Test Report

1.0 Introduction

This test report documents the test results obtained by Qualcomm in measuring the Modem Module out-of-band narrowband conducted emissions (1559-1605 MHz) at the antenna port, per the preceding test plan. This report and the data it presents demonstrates compliance of the Module with the FCC Part 25 out-of-band emissions (OOBE) limits specified in 47 CFR Ch. 1 (10-1-98 Edition), Part 1, Section 25.213 (b), and (per Report and Order FCC 98-338, adopted 12-17-98) Section 25.200 (c).

Sufficient margins were seen with respect to all CDMA signal out-of-band emissions in the radionavigation band (1559-1605 MHz) and the global positioning satellite (GPS) subband within that band (1574.397-1576.443 MHz) to demonstrate compliance with the applicable narrowband OOB limits.

2.0 Test Measurement Considerations

Emissions were measured at the Tx output port of the Module's RF Board, using a modified UT antenna, short lengths of coaxial cable, RF power splitter/divider, and a step attenuator, as described in the Globalstar UT Antenna Port Conducted Narrowband Out-of-Band Emissions (OOBE) Test Plan.

The correction factors for the test instrumentation and cable losses and the other test methodology correction factors described in the Test Plan were applied against the FCC out-of-band emissions limits to derive the measurement bandwidth dependent test limits to which the measured emissions were compared.

3.0 Test Results

Calibration measurement test results showing the combined test instrumentation and cable losses are presented in Table 1. Measurements of narrowband OOB were performed using 2 bandwidths, 1 kHz and 300 Hz; the latter in successive 3 MHz frequency spans. Table 2 presents the OOB antenna gain and loss-corrected conservative lower-bound OOB test limits in each frequency band using the measured loss correction factors from Table 1. Plots of the measured antenna port OOB are presented in Appendix A. (Note that the plot display line values do not include the nominal OOB antenna gain correction factor of 5 dB.) Table 3 presents the calibration data for the test instruments employed.

The OOB test data for the lowest frequency channel, Channel 1 (center frequency 1610.73 MHz) shows only low emissions levels, with greater than 9.5 dB margin with respect to the test limits at all frequencies from 1559 to 1605 MHz.

Table 1. Loss Calibration Measurement: Combined Splitter, Attenuators, Notch Filter and Cable Losses

Insertion Loss	
Frequency	S21
(MHz)	(dB)
1559	-17.1
1562	-17.1
1565	-17.1
1568	-17.0
1571	-17.0
1574	-17.0
1577	-17.0
1580	-17.0
1583	-17.1
1586	-17.2
1589	-17.3
1592	-17.5
1595	-17.7
1598	-18.1
1601	-18.6
1604	-19.0
1605	-19.3

Table 2. Loss-Corrected FCC OOBE Emissions Test Limits

[Corrected Limit (dBm) = Norm. Limit (dBW) + BW Corr. Factor (dB) + Splitter, Attenuator and Additional Cable Losses Corr. Factor (dB) + 30 dB]

Frequency Range (MHz)	FCC Pt. 25 Limits (dBW)	Spectrum Analyzer Meas.BW (Hz)	Bandwidth Correction Factor (dB)	Filter + Splitter+ Atten + Cable Loss Corr. Factor (dB)	Corrected FCC Pt. 25 OOBE Meas. Limits (dBm)
Radiated	dBW/700 Hz				
1559 - 1605	-80.0	1000	1.5	-17.1 to -19.3	-65.4 to -67.3
1559 - 1605	-80.0	300	-3.7	-17.1 to -19.3	-70.8 to -72.9
Conducted (1)	dBW/700 Hz				
1559-1590	-85.0	1000	1.5	-17.1 to -17.4	-70.6 to -70.8
1590-1605	-85.0	1000	1.5	-17.4 to -19.3	-70.8 to -72.7
1559 - 1562	-85.0	300	-3.7	-17.1	-75.8
1562 - 1565	-85.0	300	-3.7	-17.1	-75.7
1565 - 1568	-85.0	300	-3.7	-17.0	-75.7
1598 - 1571	-85.0	300	-3.7	-17.0	-75.7
1571 - 1574	-85.0	300	-3.7	-17.0	-75.7
1574 - 1577	-85.0	300	-3.7	-17.0	-75.7
1577 - 1580	-85.0	300	-3.7	-17.0	-75.7
1580 - 1583	-85.0	300	-3.7	-17.1	-75.8
1583 - 1586	-85.0	300	-3.7	-17.2	-75.8
1586 - 1589	-85.0	300	-3.7	-17.3	-76.0
1589 - 1592	-85.0	300	-3.7	-17.5	-76.1
1592 - 1595	-85.0	300	-3.7	-17.7	-76.4
1595 - 1598	-85.0	300	-3.7	-18.1	-76.8
1598 - 1601	-85.0	300	-3.7	-18.6	-77.2
1601 - 1604	-85.0	300	-3.7	-19.0	-77.7
1604 - 1605	-85.0	300	-3.7	-19.3	-77.9

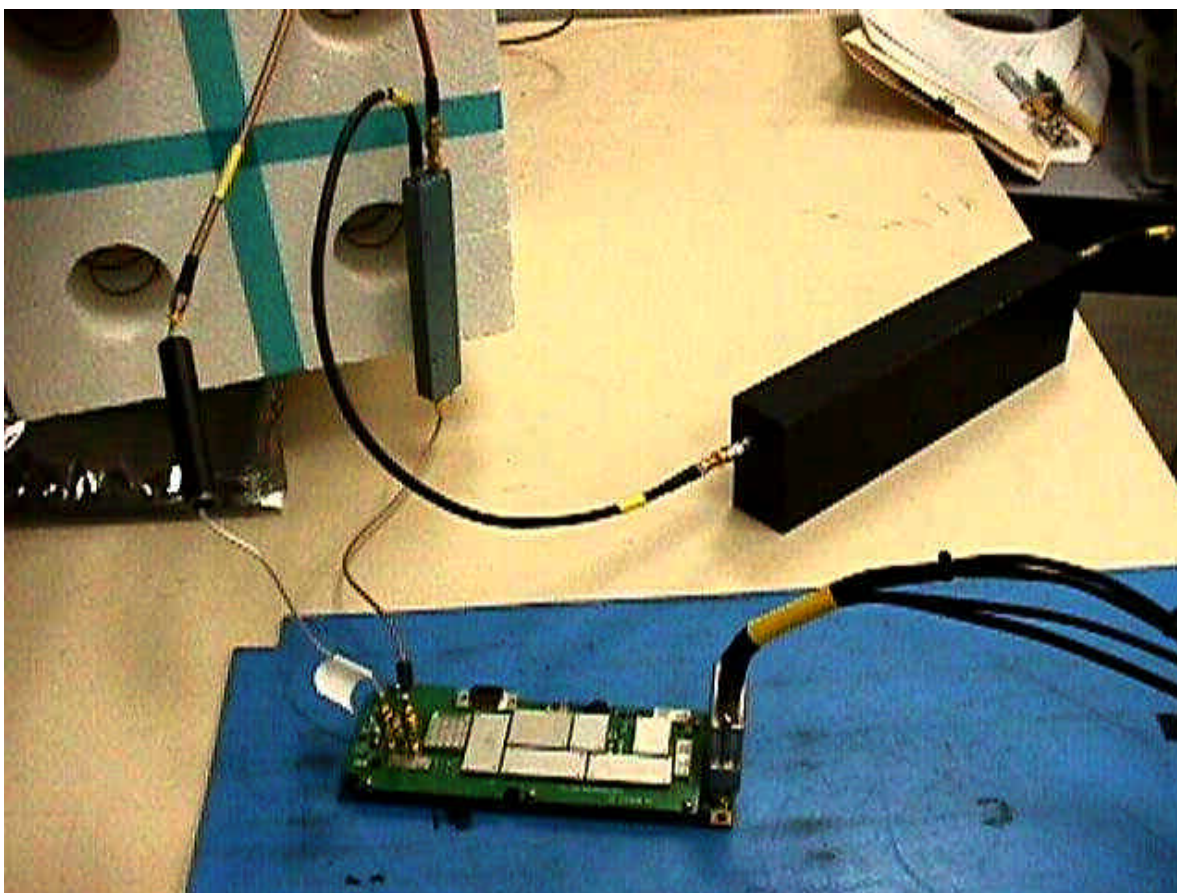
(1) Equivalent Conducted Limit for 5.0 dB Out-of-Band Antenna Gain

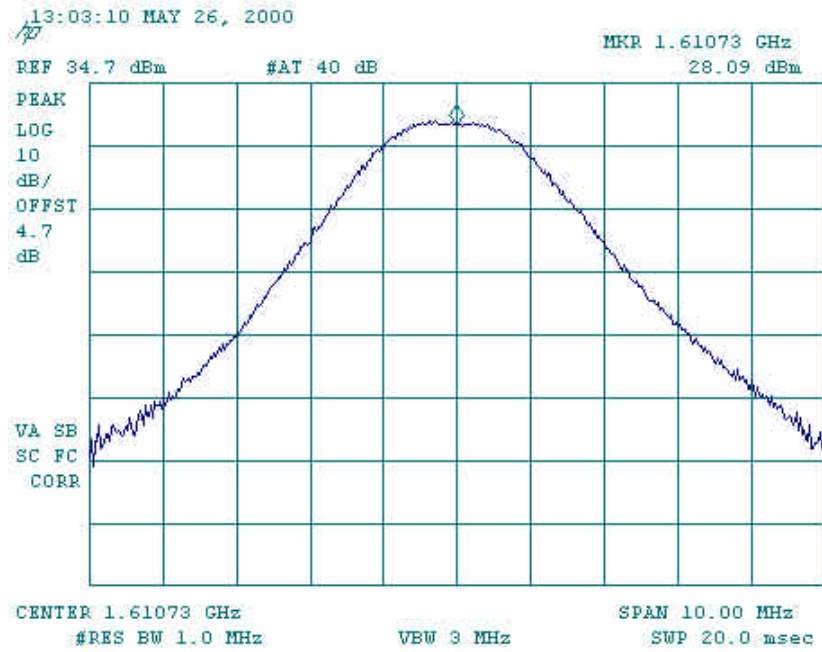
Table 3. OOBE Test Instrumentation Calibration Data Record

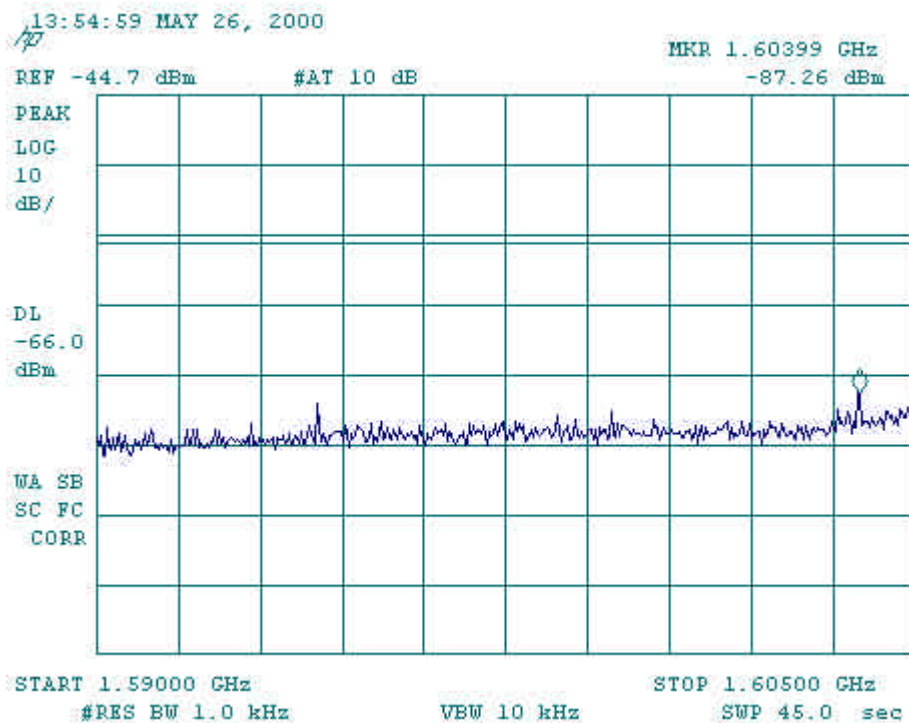
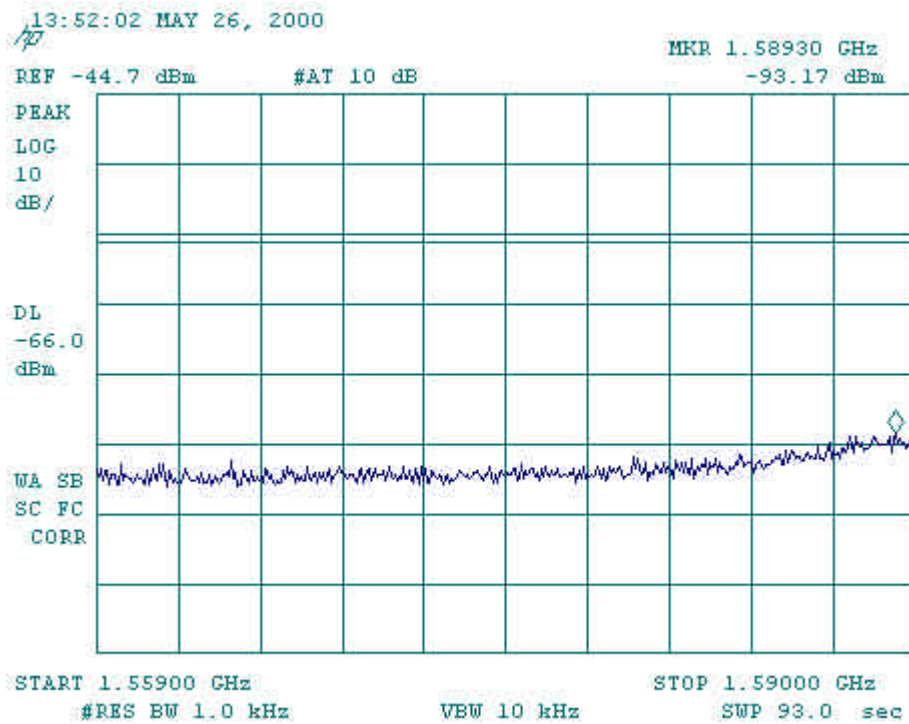
Test Instrument	Manufacturer's Model No.	Serial No.	Last Cal	Cal Due
Spectrum Analyzer (9 kHz – 6.5 GHz)	HP 8595 E	3639 A 02287	11-9-99	11-9-00
Network Analyzer (30 kHz – 6 GHz)	HP 8753 D	3410 A 04157	06-14-99	06-14-00
RF Power Splitter (0.5 – 18 GHz)	Narda Model 4426-2	02164	N/A	N/A
Channel 1 Notch Filter	Lorch Microwave 6CN-1610.73/X2-SM/SM	1221-17131-1610 29971 S/N Y2	N/A	N/A
Globalstar UT Tester	Anritsu MT 8803G	MB 06986	01-21-00	01-21-01

Appendix A. Narrowband OOB E Measurements

Date/Time	5/26/2000 10:59:56 AM
Title	G* Module Part 25 OOB E
Job Number	00061
Test Name	CE 1559 MHz - 1605 MHz
EUT Name	G* Module
EUT Serial Number	N10741GP7
Analyzer Model Number	HP8595E (Spec. An), HP8753D (Net. An)
Analyzer Serial Number	3639A02287 (Spec An), 3410A04157 (Net. An)
Site Description	12V DC (with gnd), 370 mA, UT TX Ch. 1, RX Ch. 7, Anritsu: ref sig 30 dBm, beam sig -80 dBm, UT TX power on SA 23.39 dBm plus 4.7 dB loss = 28.09 dBm
Operator Name	Suzanne Galati





1 kHz Bandwidth:

300 Hz Bandwidth: