Globalstar Single-Mode Portable User Terminal (SMP UT) 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 Single-Mode Portable User Terminal narrowband conducted out-of-band emissions (1559-1605 MHz) at the antenna port, per the preceding test plan. This report and the data it presents demonstrates compliance of the SMP UT 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), the new Section 25.216 (a) (3) (proposed in Notice of Proposed Rule Making FCC 99-37, adopted Feb. 25, 1999), 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) to demonstrate compliance with the applicable narrowband OOBE limits.

2.0 Test Measurement Considerations

Emissions were measured at the coaxial transmit output port of the UT antenna, 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, cable losses, and the other test methodology correction factors described in the Test Plan were applied against the FCC OOBE limit to derive the measurement bandwidth dependent test limits to which the measured emissions were compared. For conservatism, bandwidth correction factors were calculated based on the slightly more stringent 700 Hz narrowband limit bandwidth specified in Sections 25.200 (c) and 25.216 (a) (3), in preference to the 600 Hz narrowband limit bandwidth specified in Section 25.213 (b).

3.0 Test Results

Calibration measurement test results showing the combined test instrumentation and cable losses are presented in Table 1 and Figure 1. Measurements of narrowband OOBE were performed using 2 bandwidths, 1 kHz and 300 Hz; the latter in successive 3 MHz frequency spans. Table 2 presents the loss-corrected conservative lower-bound OOBE test limits in each frequency band using the measured loss correction factors from Table 1. Plots of the measured antenna port OOBE are presented in Appendix A. Table 3 presents the calibration data for the test instruments employed.

The OOBE test data for the lowest frequency channel, Channel 1 (center frequency

1610.73 MHz) shows only very low emissions, with greater than 10 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 (MHz)	**S21** (dB)
1559	-16.9
1562	-16.9
1565	-16.9
1568	-16.8
1571	-16.8
1574	-16.8
1577	-16.9
1580	-16.9
1583	-17.0
1586	-17.1
1589	-17.2
1592	-17.4
1595	-17.6
1598	-18.0
1601	-18.4
1604	-18.8
1605	-18.8

Figure 1. Network Analyzer S21 Plot of Combined Splitter, Attenuators, Filter , and Cable Losses (1559-1605 MHz).

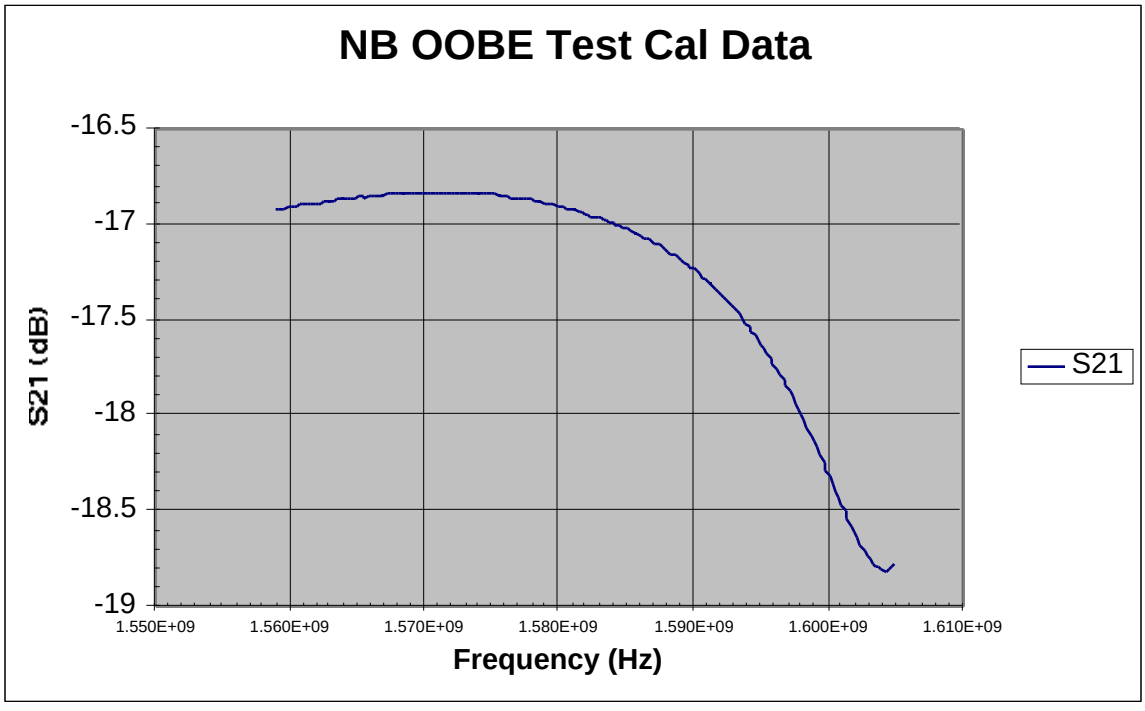


Table 2. Loss-Corrected FCC OOBE Emissions Test Limits

[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	1000	1.5	-16.9 to -18.8	-65.4 to -67.3
1559 - 1605	-80	300	-3.7	-16.9 to -18.8	-70.6 to -72.5
Conducted (1)	**dBW/700 Hz**				
1559-1590	-83.5	1000	1.5	-16.9 to -17.3	-68.9 to -69.3
1590-1605	-83.5	1000	1.5	-17.3 to -18.8	-69.3 to -70.8
1559 - 1562	-83.5	300	-3.7	-16.9	-74.1
1562 - 1565	-83.5	300	-3.7	-16.9	-74.1
1565 - 1568	-83.5	300	-3.7	-16.8	-74.0
1598 - 1571	-83.5	300	-3.7	-16.8	-74.0
1571 - 1574	-83.5	300	-3.7	-16.8	-74.0
1574 - 1577	-83.5	300	-3.7	-16.9	-74.1
1577 - 1580	-83.5	300	-3.7	-16.9	-74.1
1580 - 1583	-83.5	300	-3.7	-17.0	-74.2
1583 - 1586	-83.5	300	-3.7	-17.1	-74.3
1586 - 1589	-83.5	300	-3.7	-17.2	-74.4
1589 - 1592	-83.5	300	-3.7	-17.4	-74.6
1592 - 1595	-83.5	300	-3.7	-17.6	-74.8
1595 - 1598	-83.5	300	-3.7	-18.0	-75.2
1598 - 1601	-83.5	300	-3.7	-18.4	-75.6
1601 - 1604	-83.5	300	-3.7	-18.8	-76.0
1604 - 1605	-83.5	300	-3.7	-18.8	-76.0

(1) Equivalent Conducted Limit for 5 dB Out-of-Band Antenna Gain

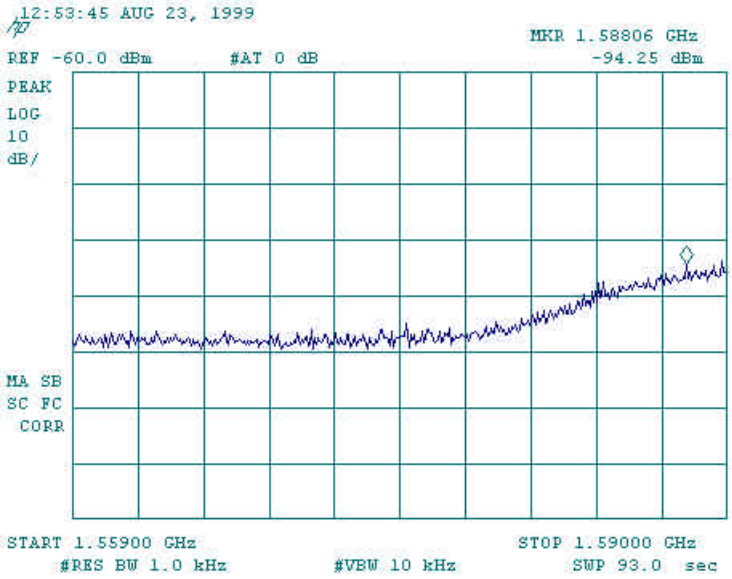
Table 3. OOBE Test Instrumentation Calibration Data Record

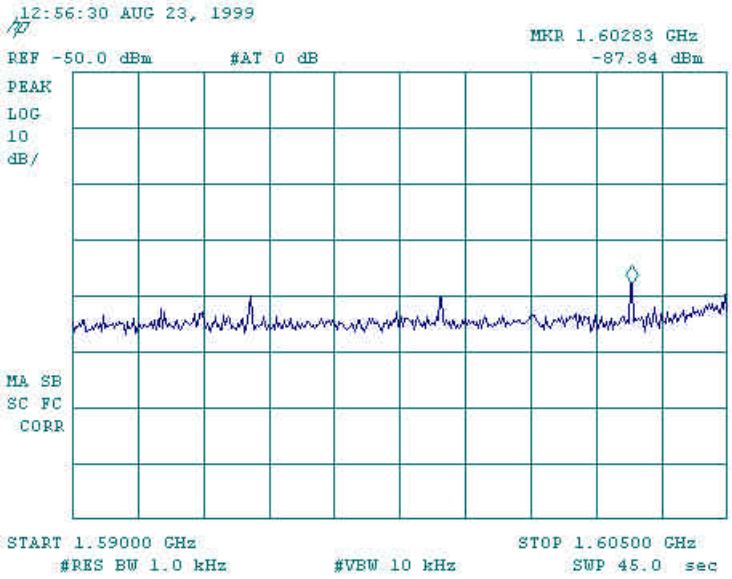
Test Instrument	Manuf. Model No.	Serial No.	Last Cal	Cal Due
Spectrum Analyzer (9 kHz – 6.5 GHz)	HP 8595 E	2287 K 36631	10-19-98	10-19-99
Network Analyzer (30 kHz – 6 GHz)	HP 8753 D	K 72063	6-14-99	6-14-00
RF Power Splitter (0.5 – 18 GHz)	Narda Model 4426-2	02164	N/A	N/A
Channel 1 Notch Filter	Lorch Microwave 6CN-1610.73/X2-SM/SM	1221-17131-1610 29971 S/N Y2	N/A	N/A
Globalstar UT Tester	Anritsu MT 8803G	K 73709	N/A	N/A

Appendix A. Narrowband Conducted OOBE Measurements

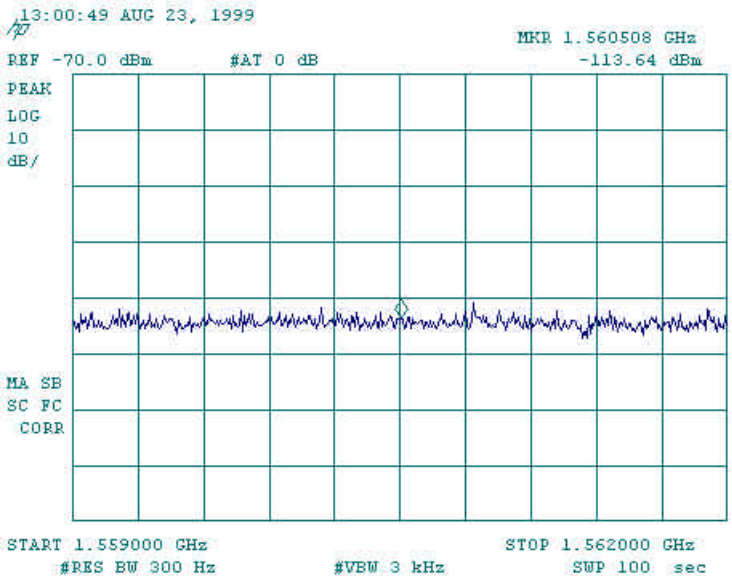
Date/Time	8/23/99 12:53:44 AM
Title	G* Single Mode Part 25 OOBE Re-test
Job Number	99061
Test Name	CE 1559 MHz - 1605 MHz
EUT Name	G* Single Mode UT with charger
EUT Model Number	GSP-1610
EUT Serial Number	N10650WH7
Analyzer Model Number	HP8595E
Analyzer Serial Number	2287
Site Description	UT TX Ch. 1, UT RX Ch. 7. Anritsu settings: ref sig 29 dBm, beam sig -114 dBm, UT TX power approx. 28 dBm
Operator Name	Suzanne Galati

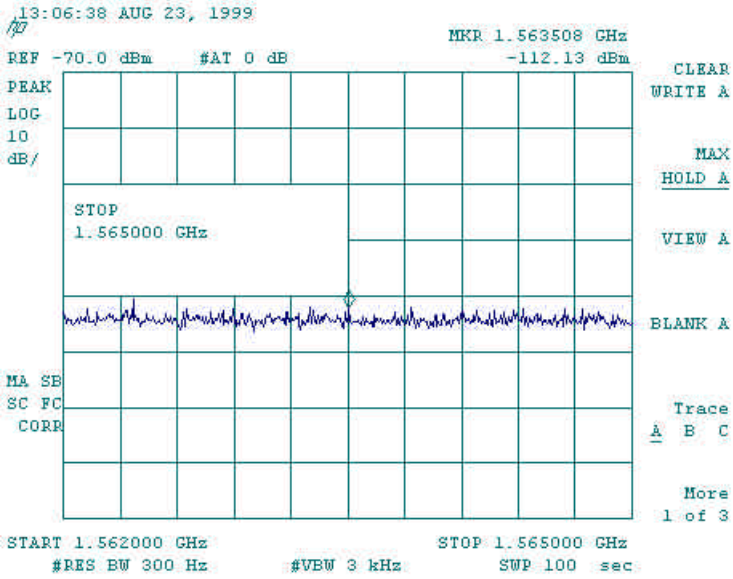
1 kHz Bandwidth:

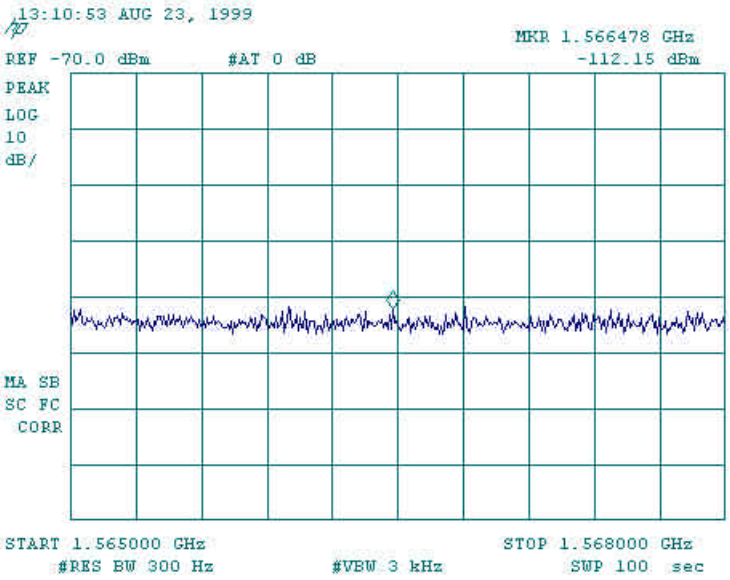




300 Hz Bandwidth:



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LOG
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dB/
MA SB
SC FC
CORR
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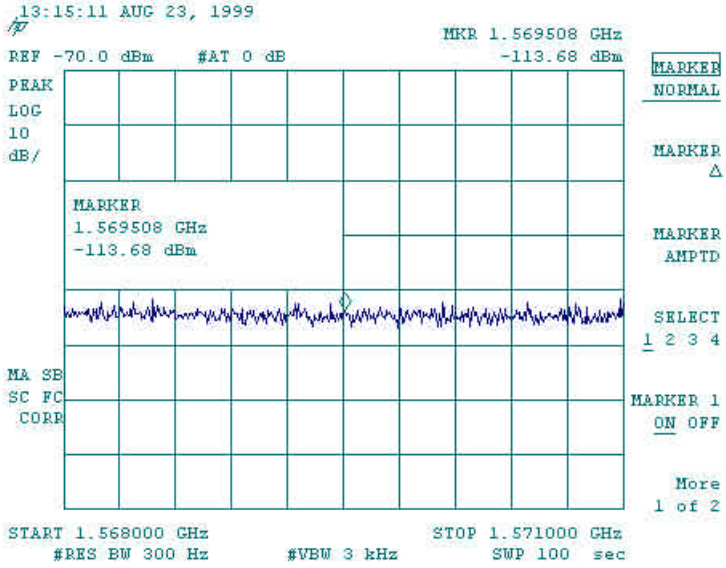
STOP 1.568000 GHz
#RES BW 300 Hz
#VBW 3 kHz
SWP 100 sec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LOG
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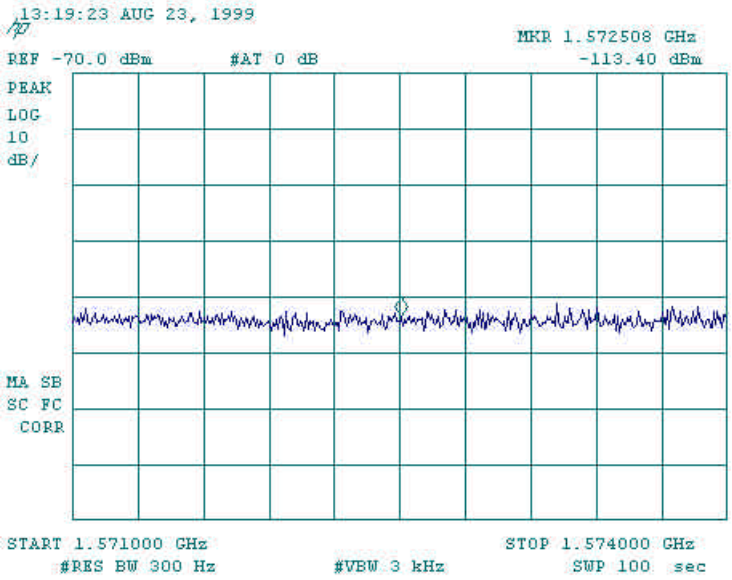
dB/
MARKER
1.569508 GHz
-113.68 dBm
MA SB
SC FC
CORR
START 1.568000 GHz
STOP 1.571000 GHz
#RES BW 300 Hz
#VBW 3 kHz
SWP 100 sec
MARKER
NORMAL
MARKER
Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2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dB/
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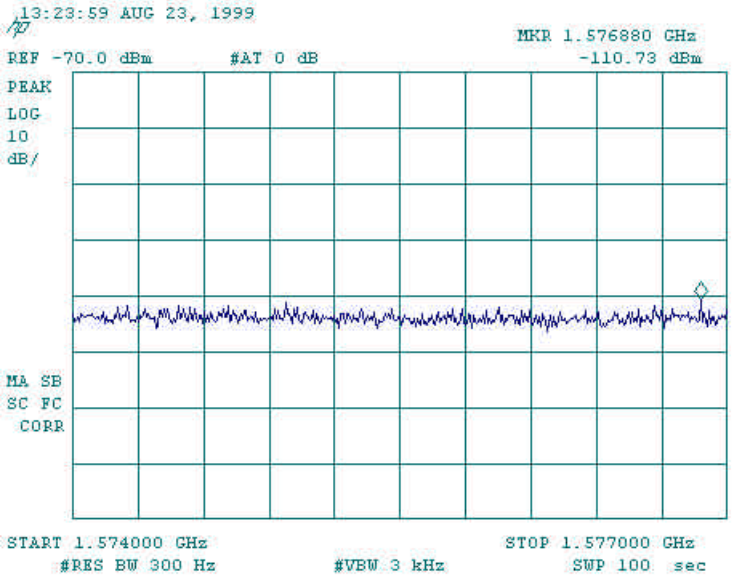
SWP 100 sec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dB/
MA SB
SC FC
CORR
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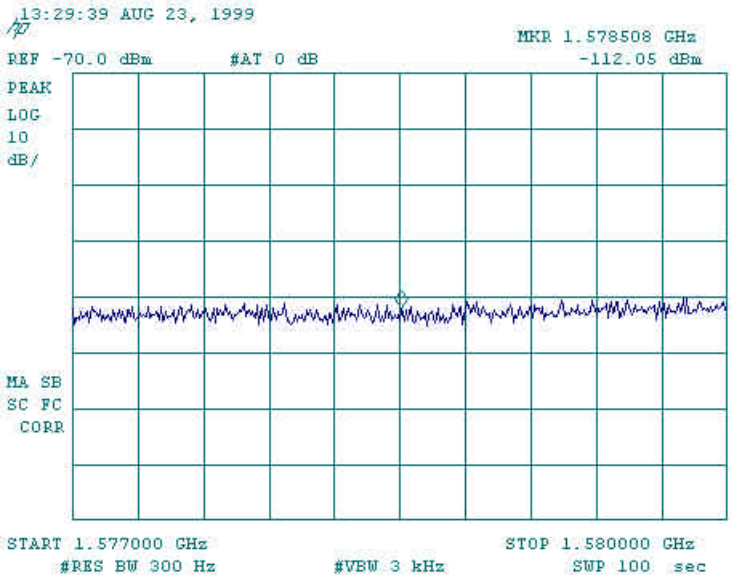
#VBW 3 kHz
SWP 100 sec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LOG
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dB/
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SC FC
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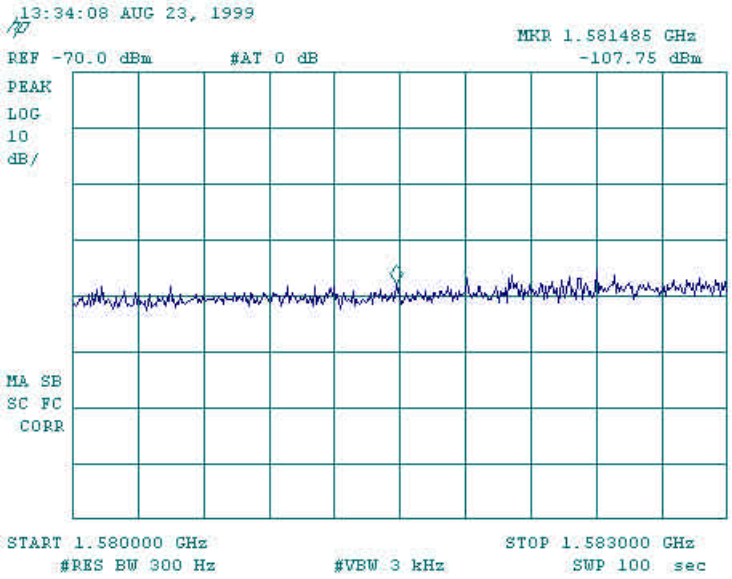
SWP 100 sec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10
dB/
MA SB
SC FC
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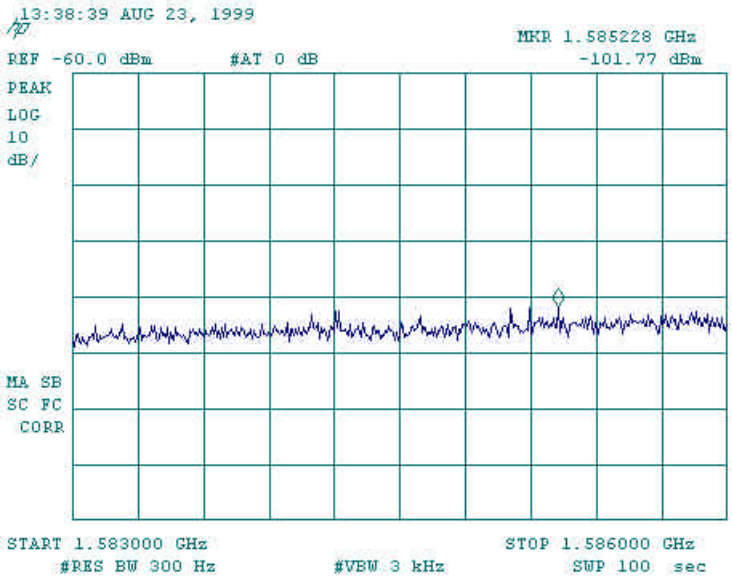
SWP 100 sec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dB/
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SC FC
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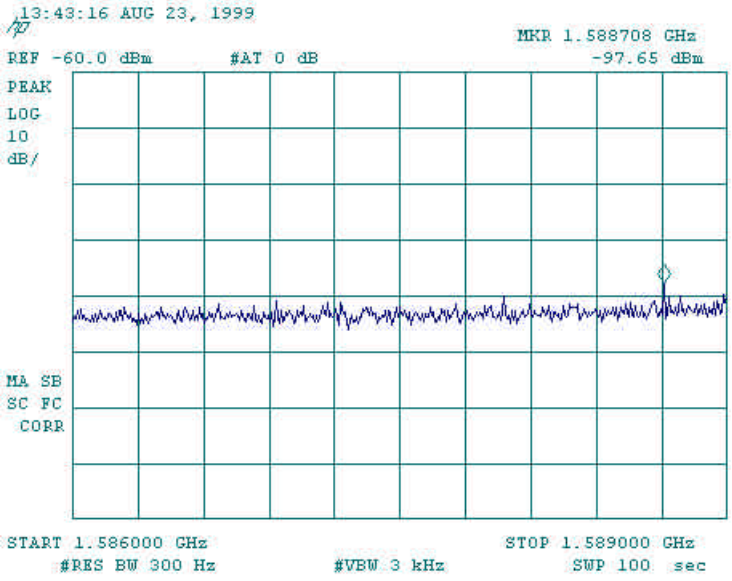
SWP 100 sec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PEAK
LOG
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dB/
MA SB
SC FC
CORR
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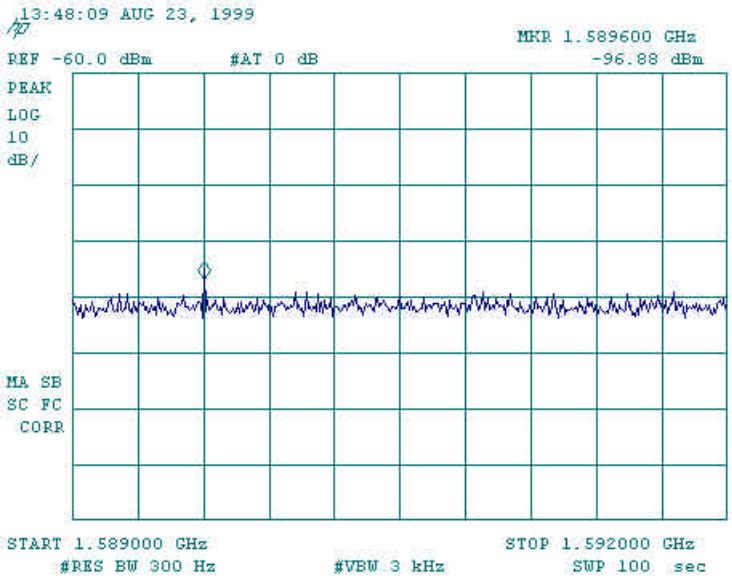
STOP 1.589000 GHz
#RES BW 300 Hz
#VBW 3 kHz
SWP 100 sec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PEAK
LOG
10
dB/
MA SB
SC FC
CORR
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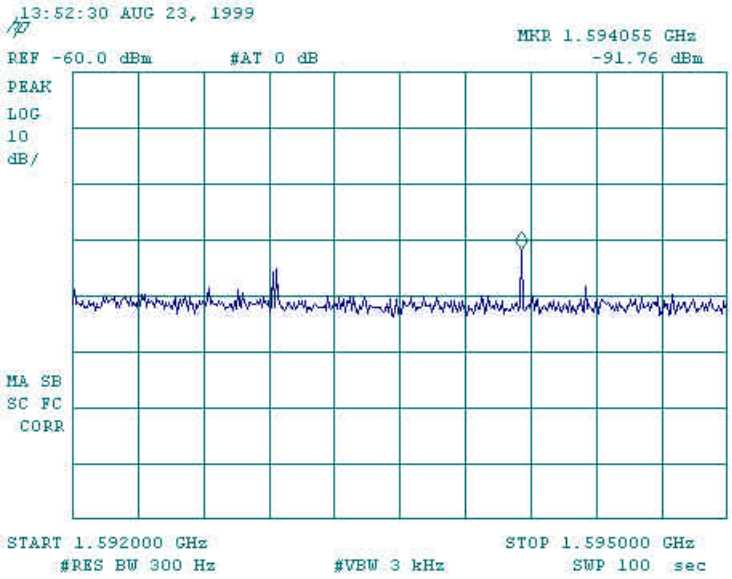
STOP 1.592000 GHz
#RES BW 300 Hz
#VBW 3 kHz
SWP 100 sec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PEAK
LOG
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dB/
MA SB
SC FC
CORR
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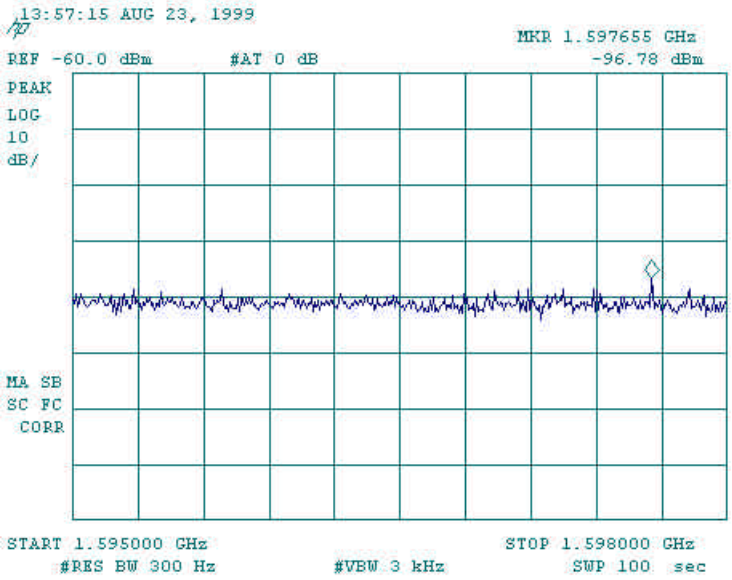
#VBW 3 kHz
SWP 100 sec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PEAK
LOG
10
dB/
MA SB
SC FC
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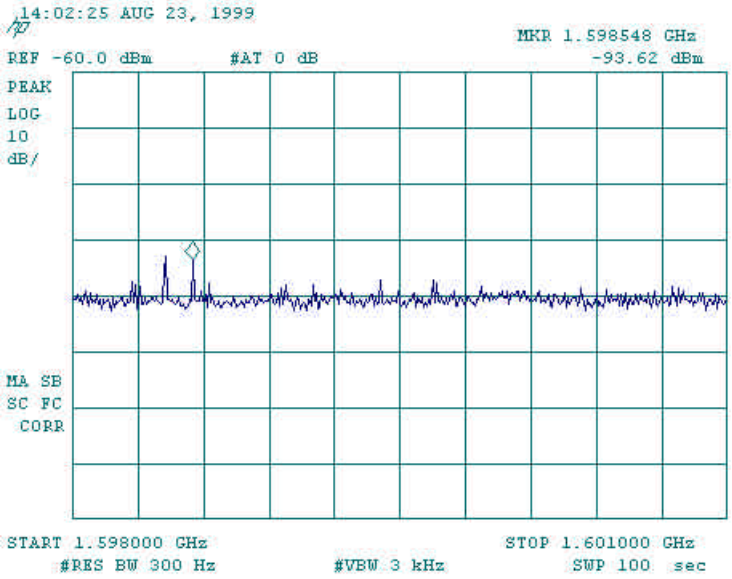
#VBW 3 kHz
SWP 100 sec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LOG
10
dB/
MA SB
SC FC
CORR
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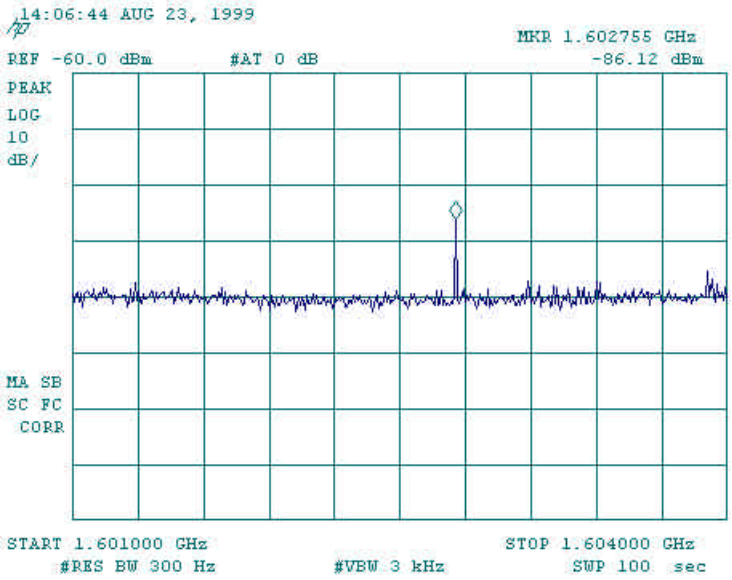
SWP 100 sec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PEAK
LOG
10
dB/
MA SB
SC FC
CORR
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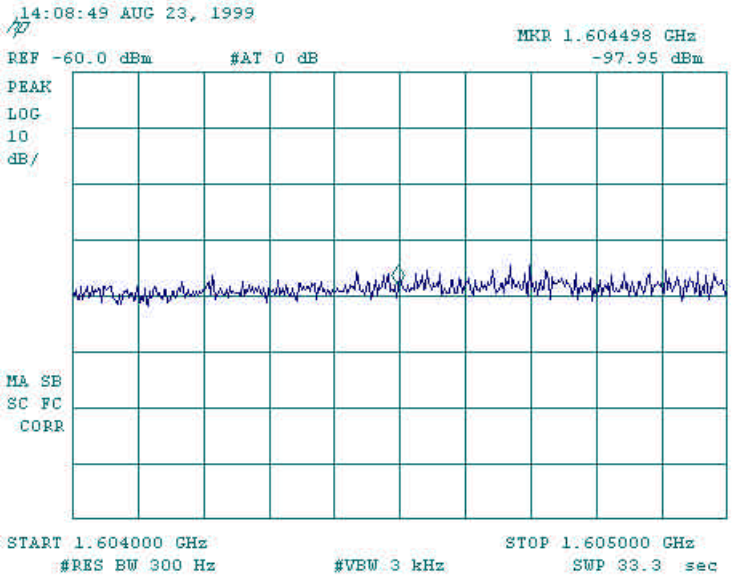
STOP 1.604000 GHz
#RES BW 300 Hz
#VBW 3 kHz
SWP 100 sec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LOG
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dB/
MA SB
SC FC
CORR
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STOP 1.605000 GHz
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SWP 33.3 sec