

# **Globalstar Portable User Terminal Car Kit (CK) 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 Car Kit 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 Car Kit 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 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 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 and Figure 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 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. 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 very low emissions, with greater than 15 dB margin with respect to the test limits at all frequencies from 1559 to 1605 MHz.

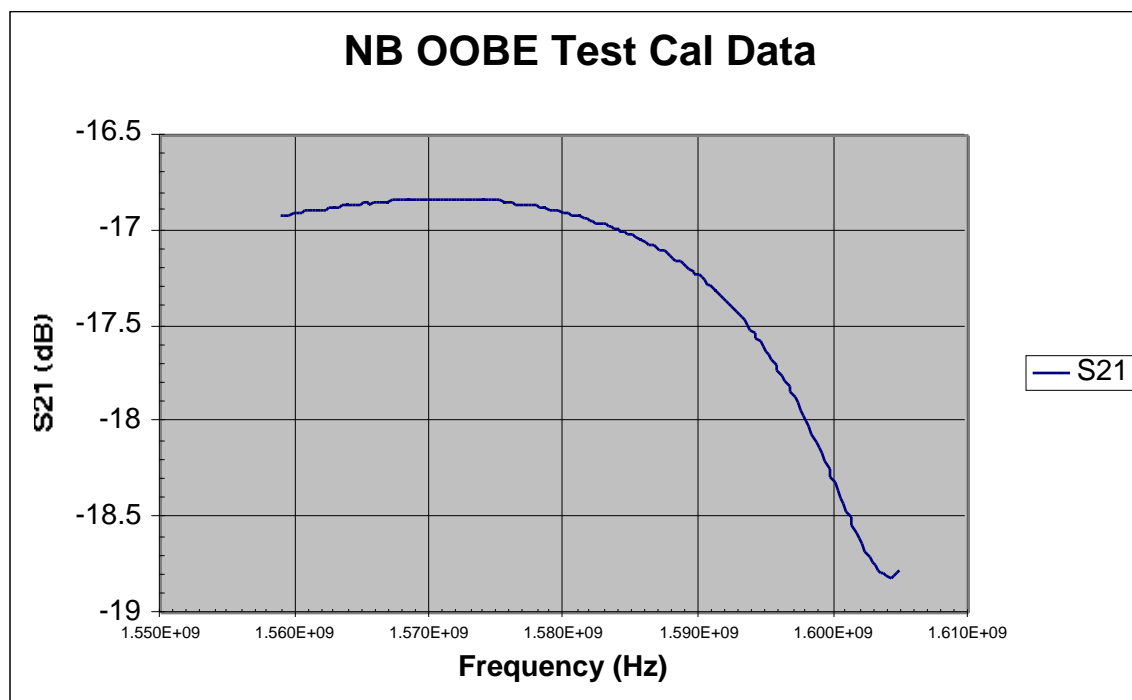
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**Table 1. Loss Calibration Measurement: Combined Splitter, Attenuators, Notch Filter and Cable Losses**

**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).**



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**Table 2. Loss-Corrected FCC OOB 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 OOB Meas. Limits (dBm)
<b>Conducted</b>	<b>dBW/700 Hz</b>				
1559-1590	-80	1000	1.5	-16.9 to -17.3	-65.4 to -65.8
1590-1605	-80	1000	1.5	-17.3 to -18.8	-65.8 to -67.3
1559 - 1562	-80	300	-3.7	-16.9	-70.6
1562 - 1565	-80	300	-3.7	-16.9	-70.6
1565 - 1568	-80	300	-3.7	-16.8	-70.5
1598 - 1571	-80	300	-3.7	-16.8	-70.5
1571 - 1574	-80	300	-3.7	-16.8	-70.5
1574 - 1577	-80	300	-3.7	-16.9	-70.6
1577 - 1580	-80	300	-3.7	-16.9	-70.6
1580 - 1583	-80	300	-3.7	-17.0	-70.7
1583 - 1586	-80	300	-3.7	-17.1	-70.8
1586 - 1589	-80	300	-3.7	-17.2	-70.9
1589 - 1592	-80	300	-3.7	-17.4	-71.1
1592 - 1595	-80	300	-3.7	-17.6	-71.3
1595 - 1598	-80	300	-3.7	-18.0	-71.7
1598 - 1601	-80	300	-3.7	-18.4	-72.1
1601 - 1604	-80	300	-3.7	-18.8	-72.5
1604 - 1605	-80	300	-3.7	-18.8	-72.5
<b>Radiated (1)</b>	<b>dBW/600 Hz</b>				
1574.397-1576.443	-85	1000	2.2	-16.9	-69.7
1574.397-1576.443	-85	300	-3.0	-16.9	-74.9

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

**Table 4. OOB Emission 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

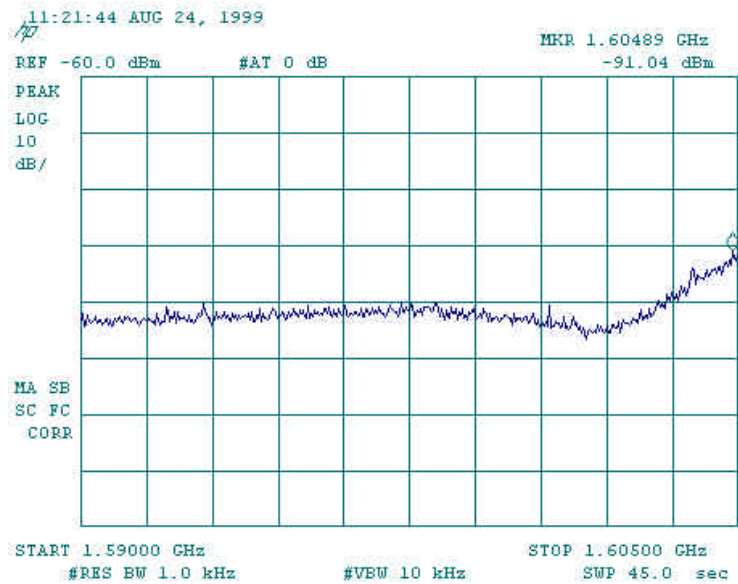
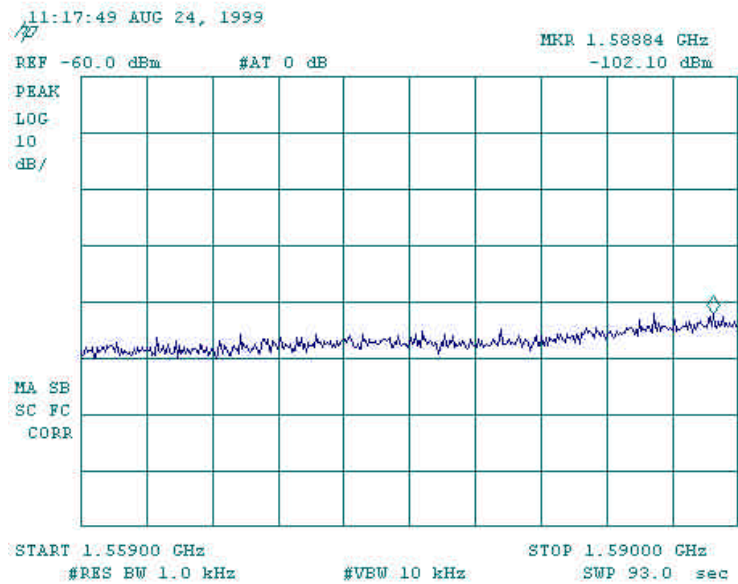
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**Appendix A. Narrowband OOBE Measurements**

Date/Time	8/24/99 10:59:56 AM
Title	G* Carkit Part 25 OOBE Retest
Job Number	99062
Test Name	CE 1559 MHz - 1605 MHz
EUT Name	G* Carkit (full setup: mic, spkr, handset, cradle, mod. ODU)
EUT Model Number	
EUT Serial Number	ODU: N106457D6, Tri Mode: N1068XV7C, Gem #3:
N1068P7VR	
Analyzer Model Number	HP8595E
Analyzer Serial Number	2287
Site Description	12V DC (with gnd), 1.6A, UT TX Ch. 1, RX Ch. 7, Anritsu: ref sig 24 dBm, beam sig -114 dBm, UT TX power on SA 18.38 dBm (approx. 3.9 dB loss, 10 dB pad)
Operator Name	Suzanne Galati

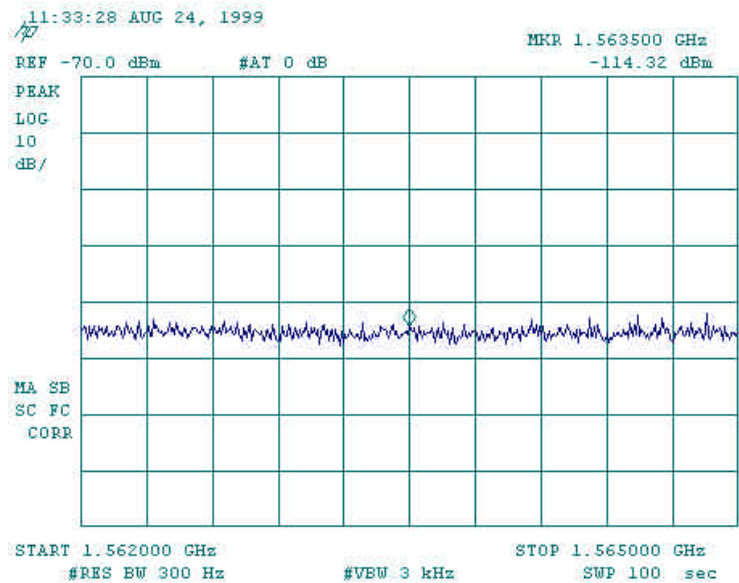
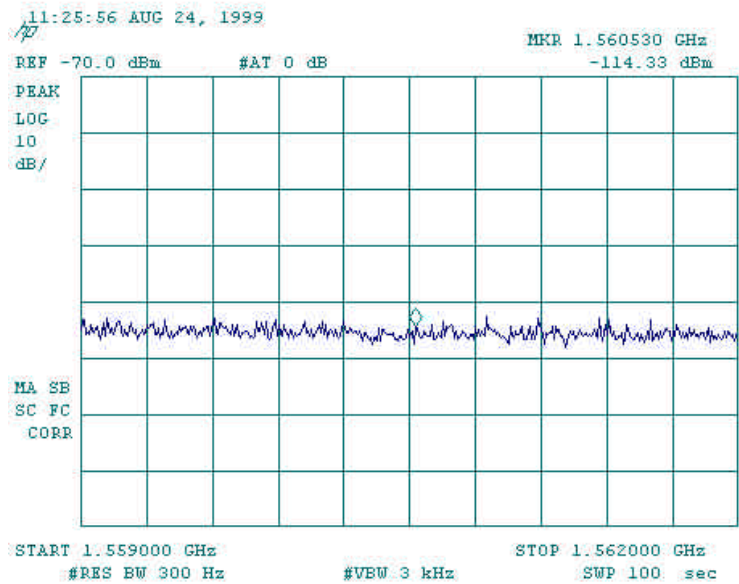
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1 KHz Bandwidth:

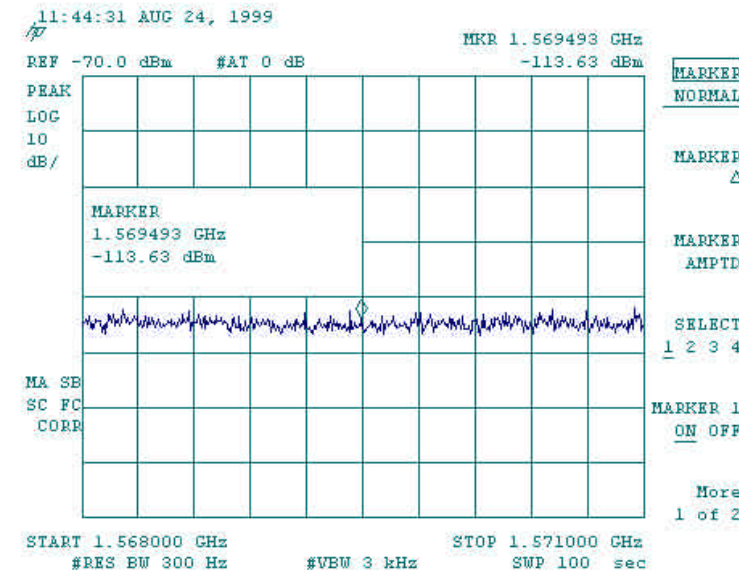
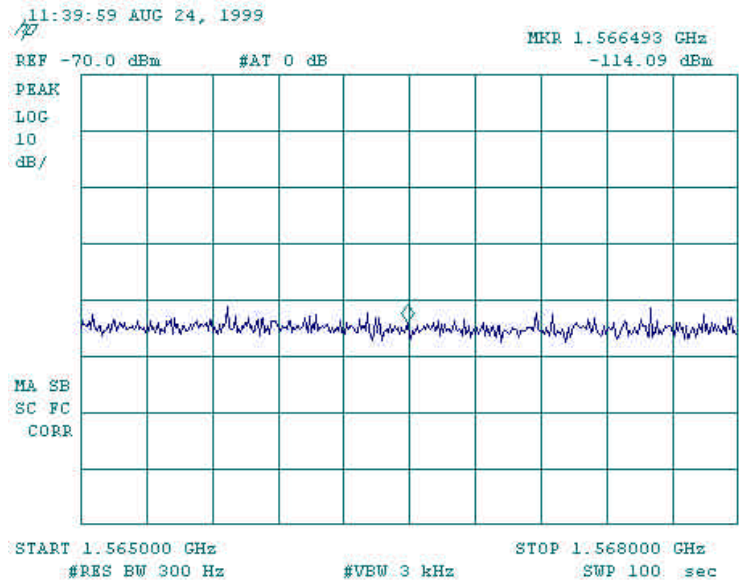


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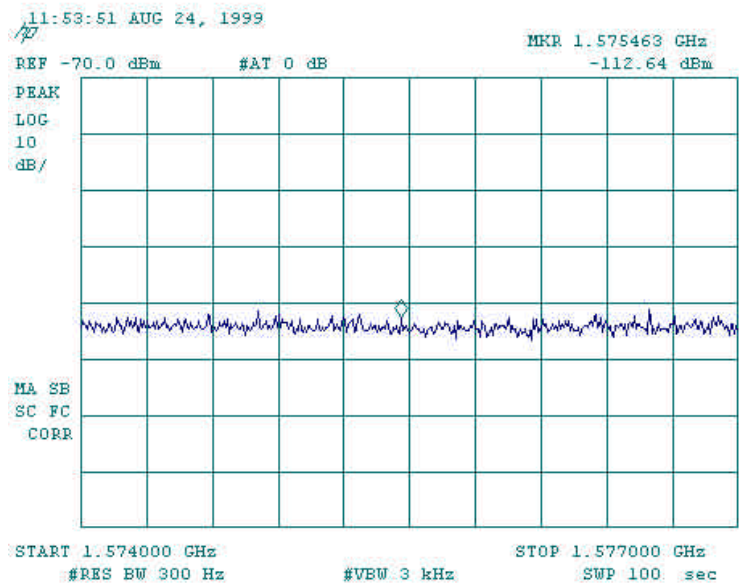
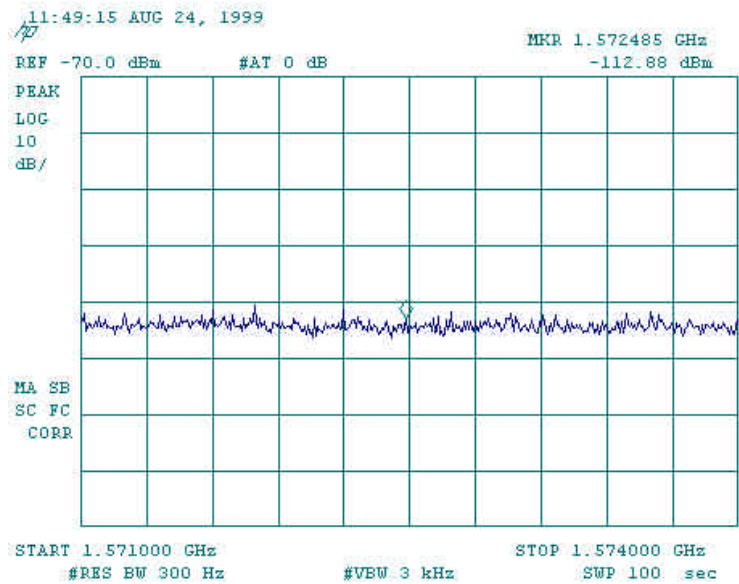
300 Hz Bandwidth:



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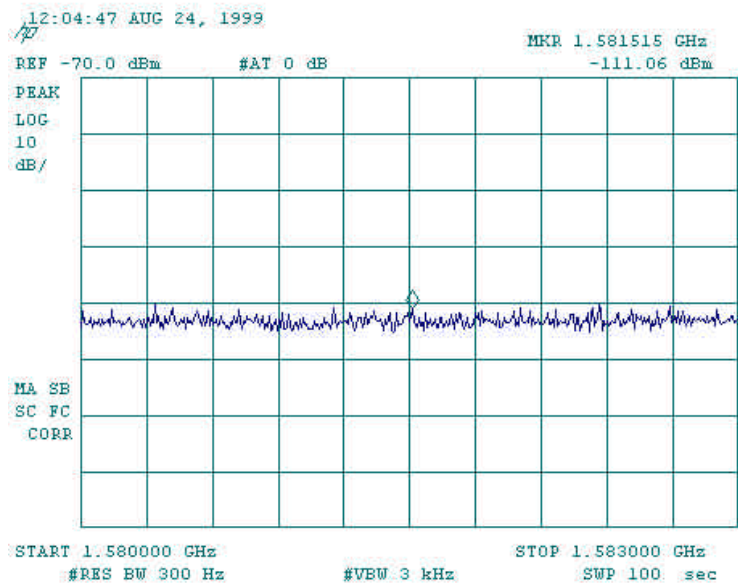
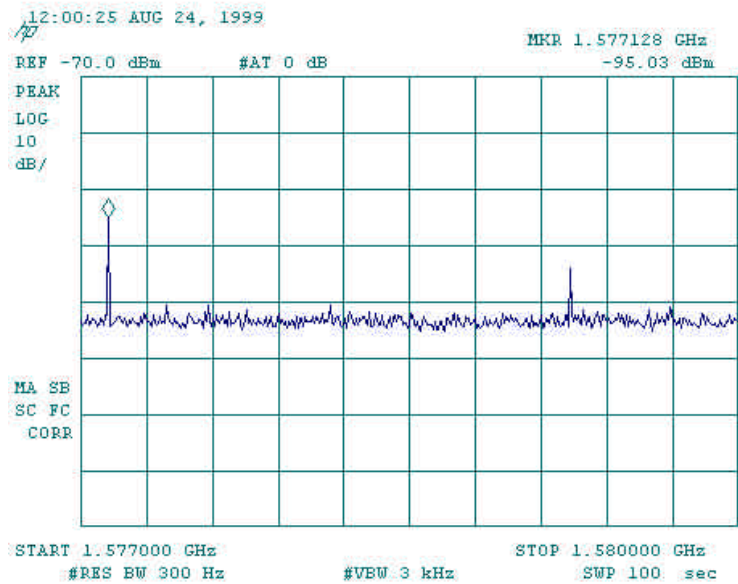


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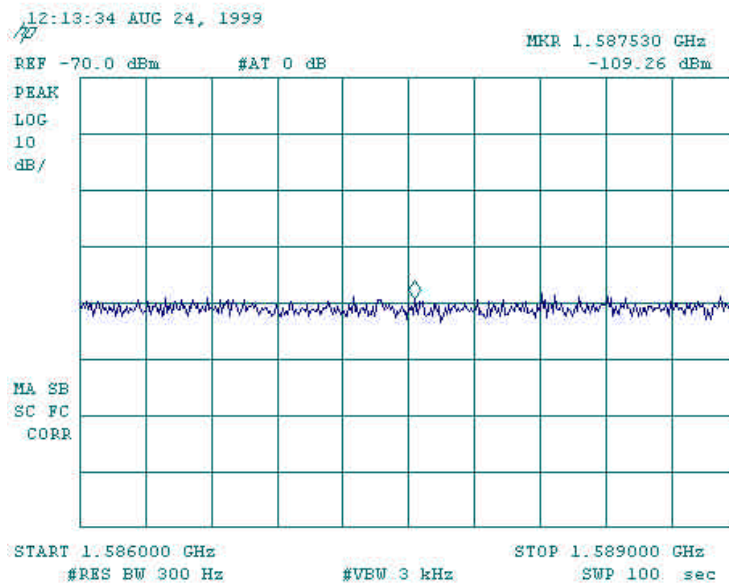
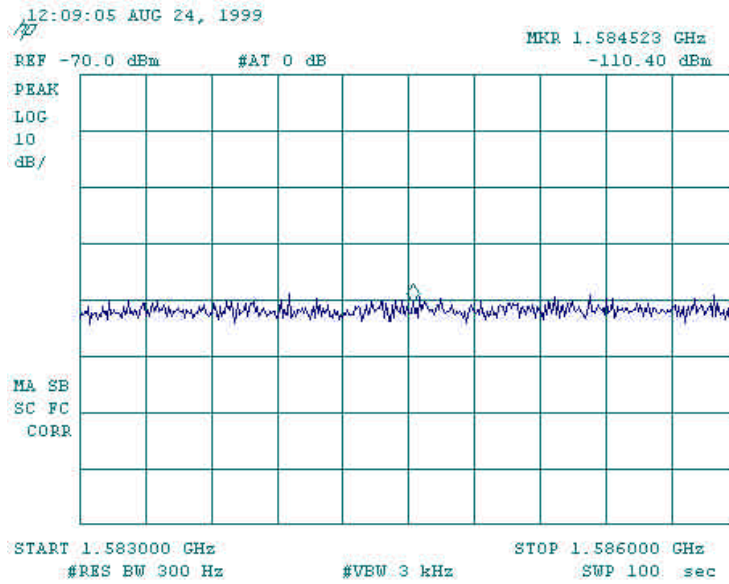




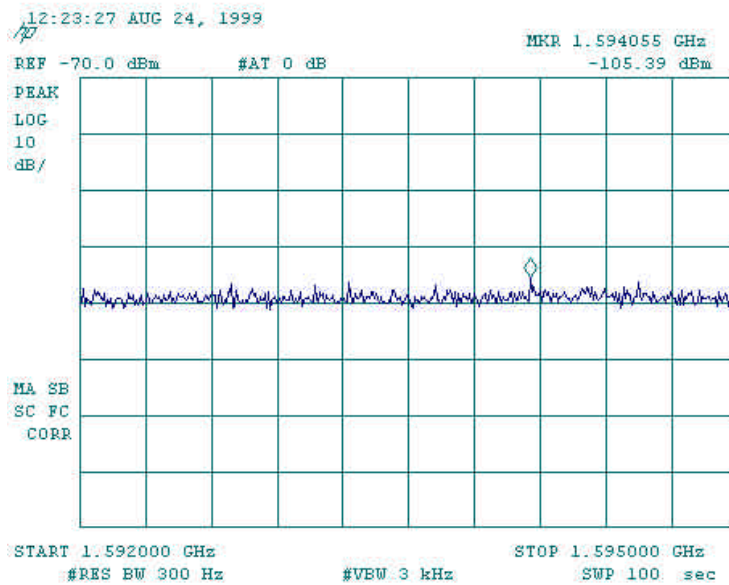
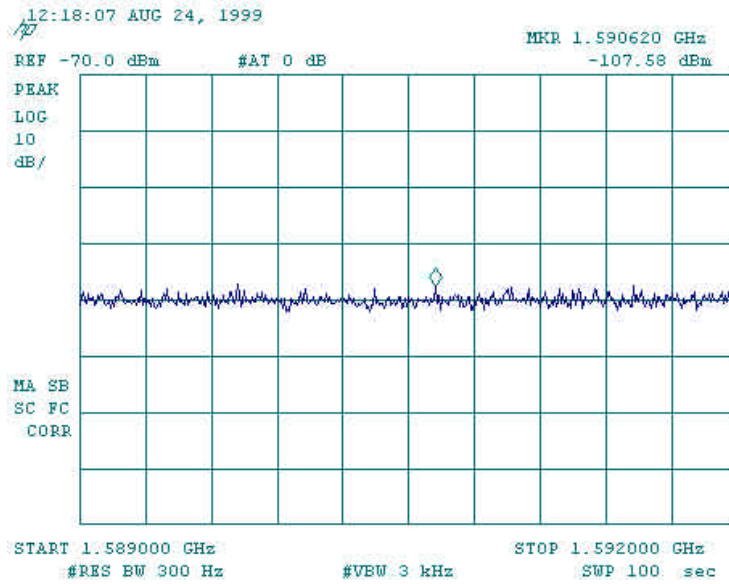
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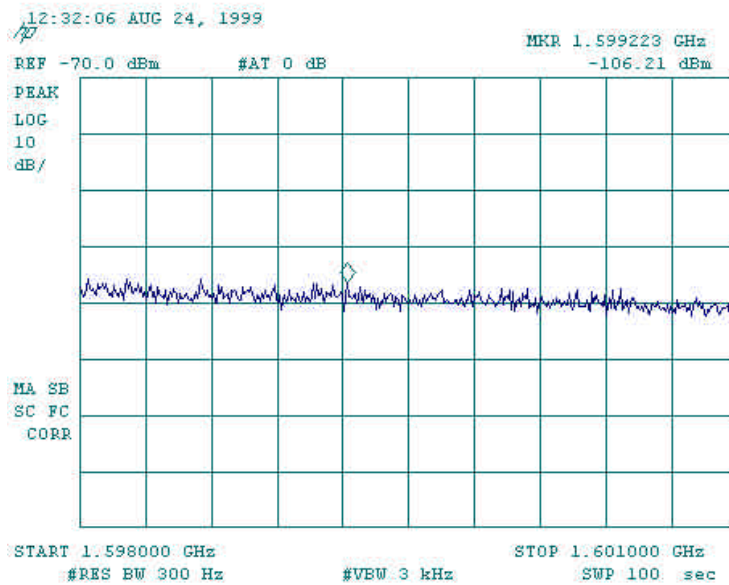
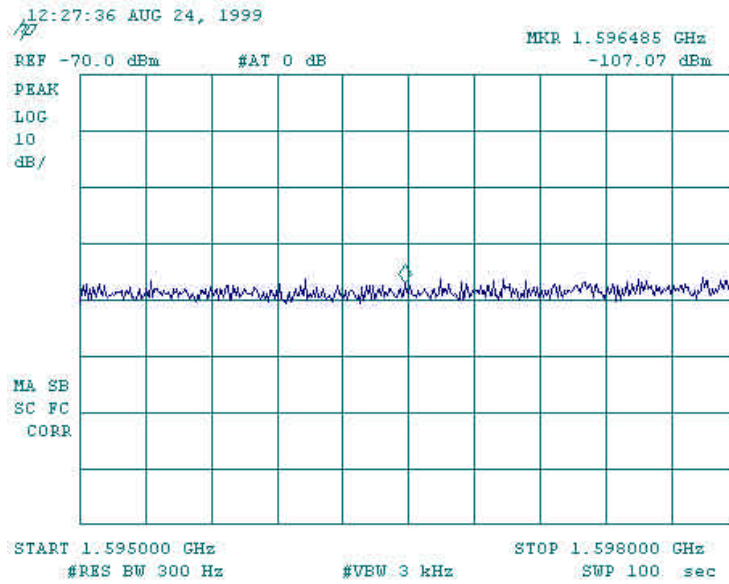
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