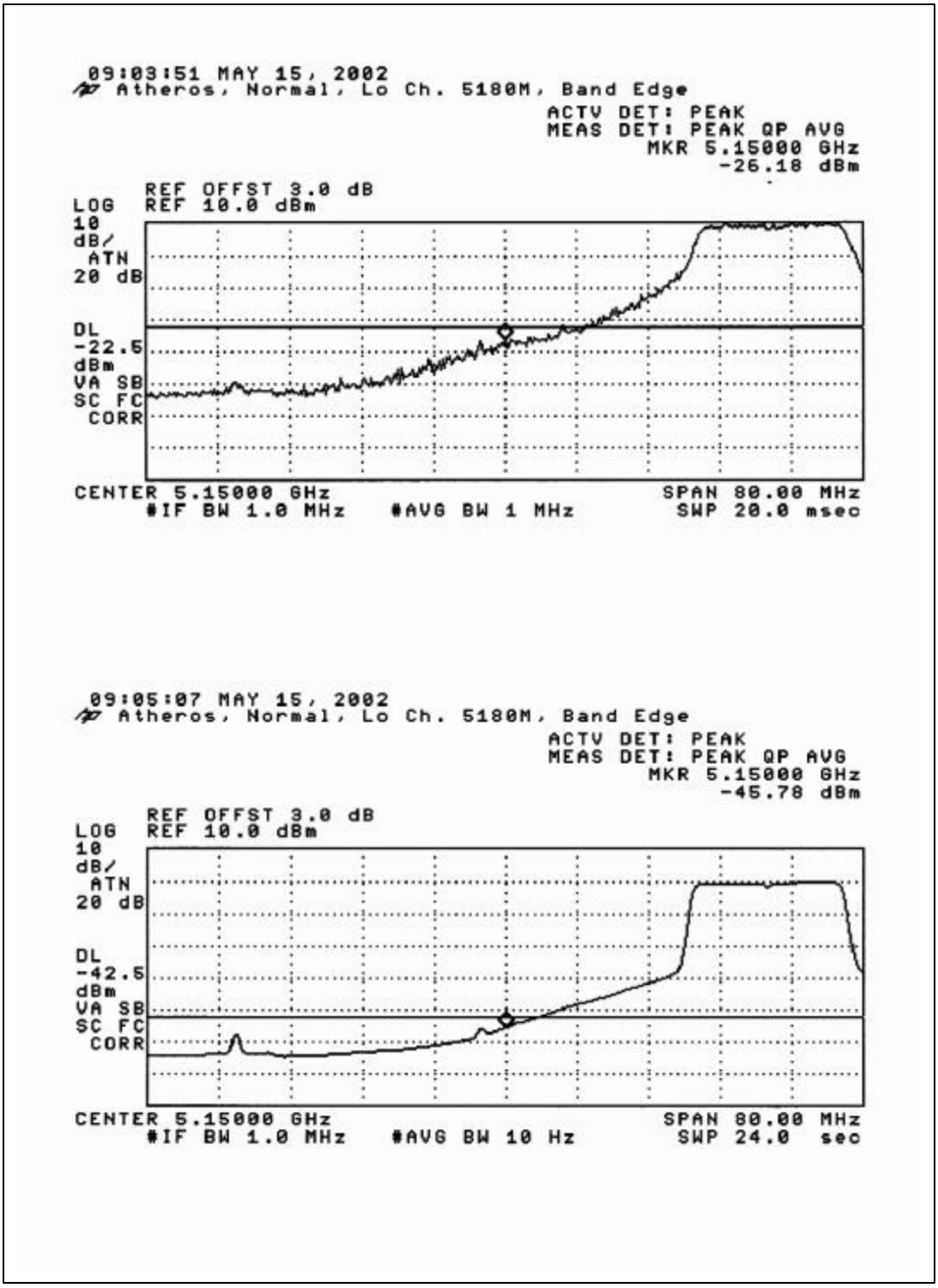
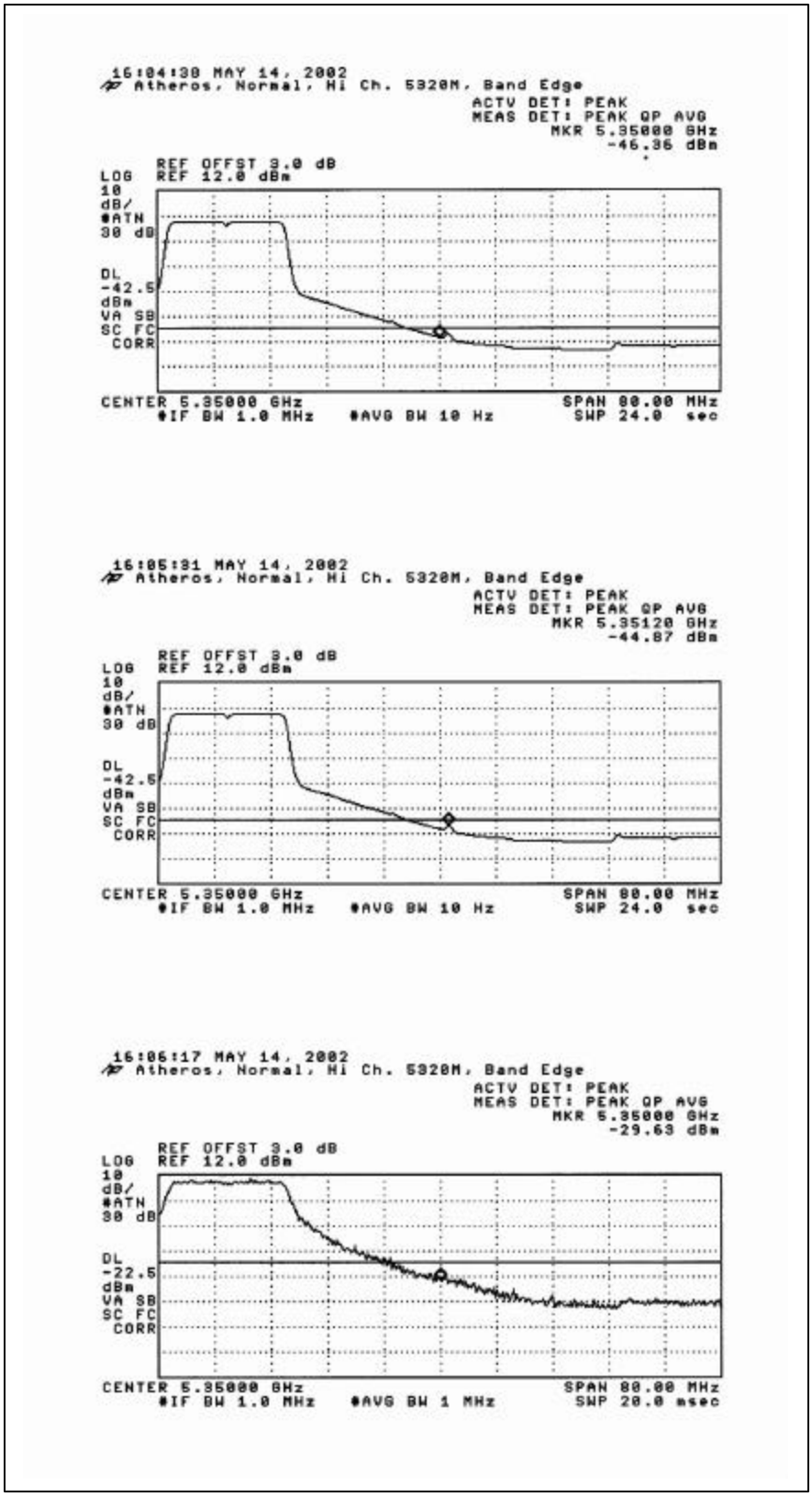
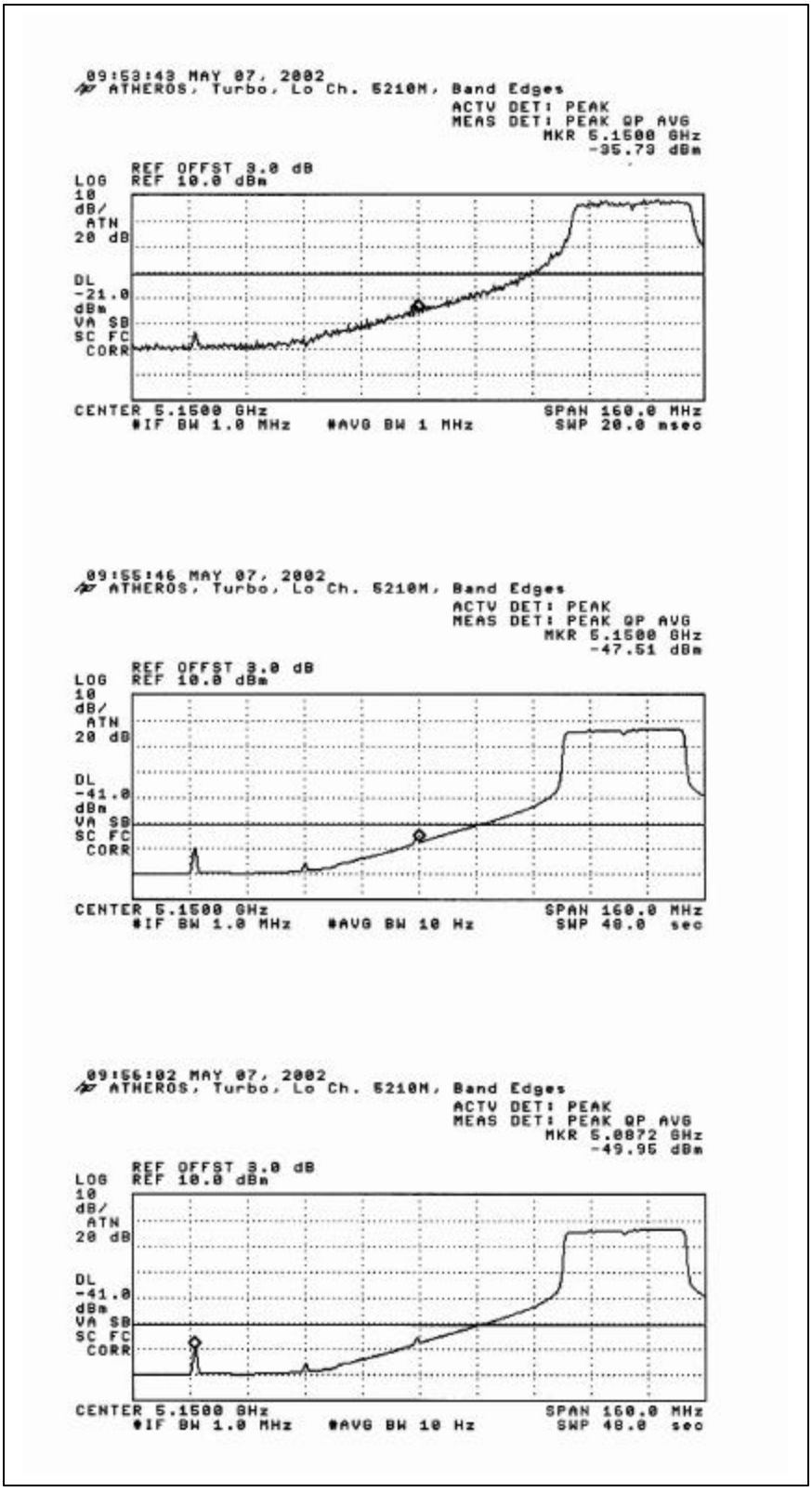
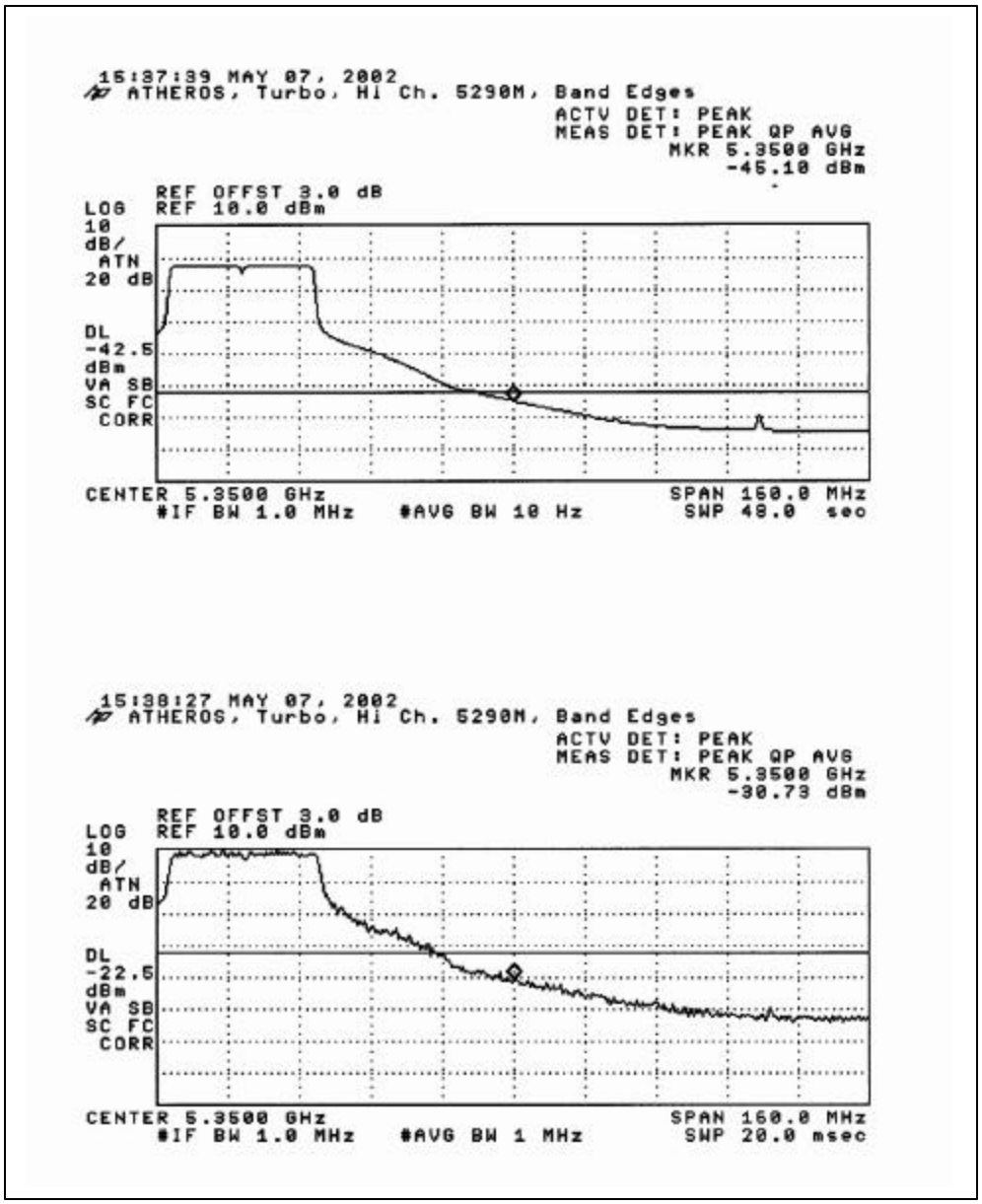
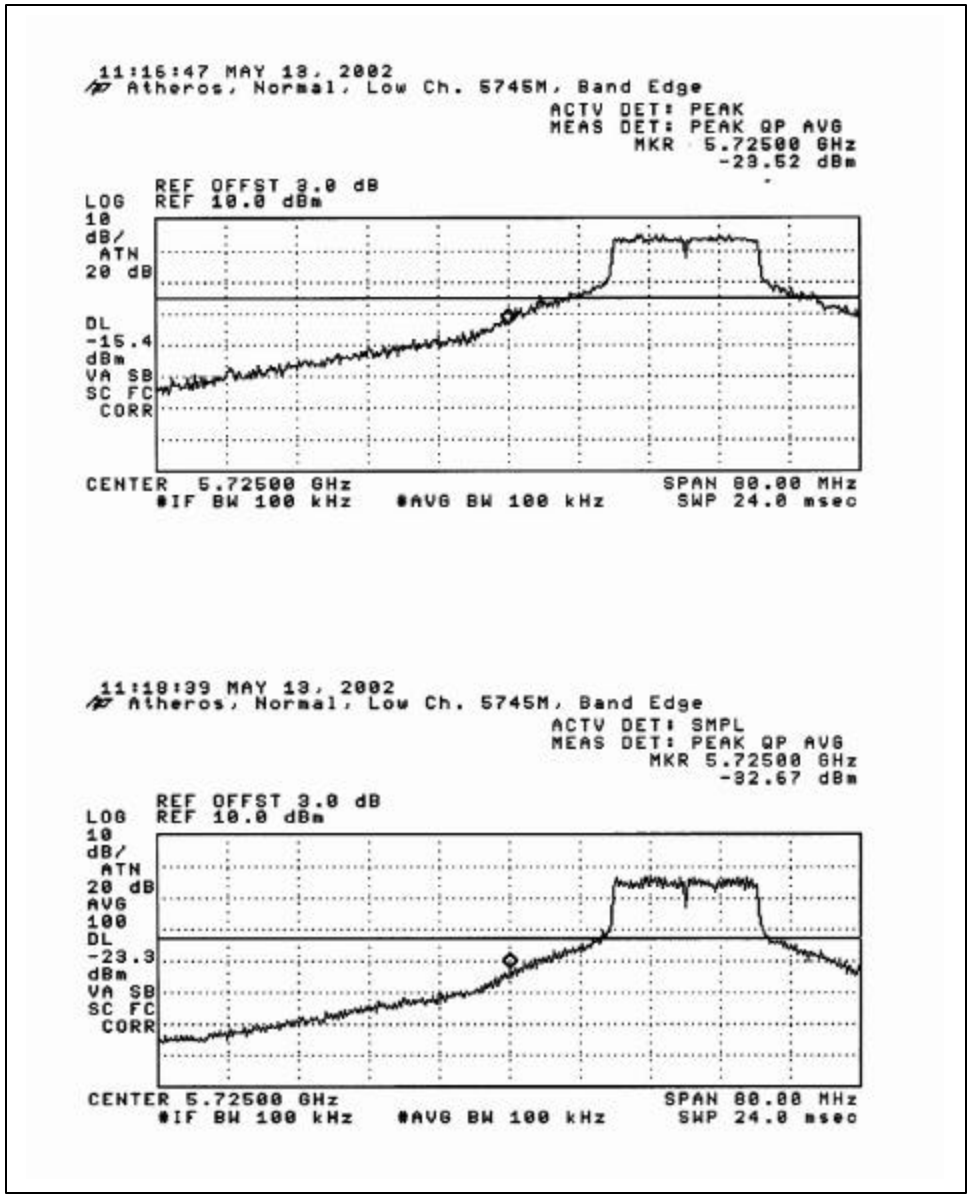
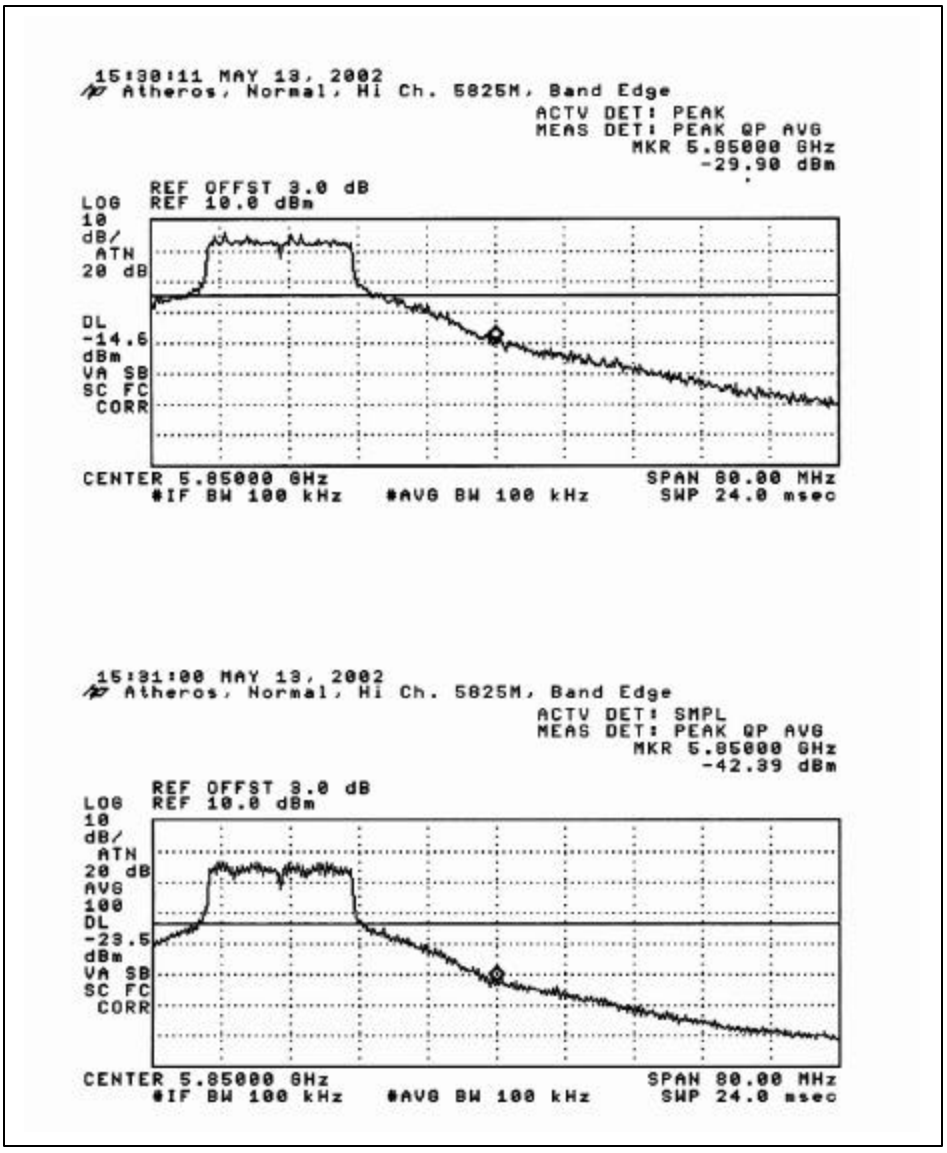


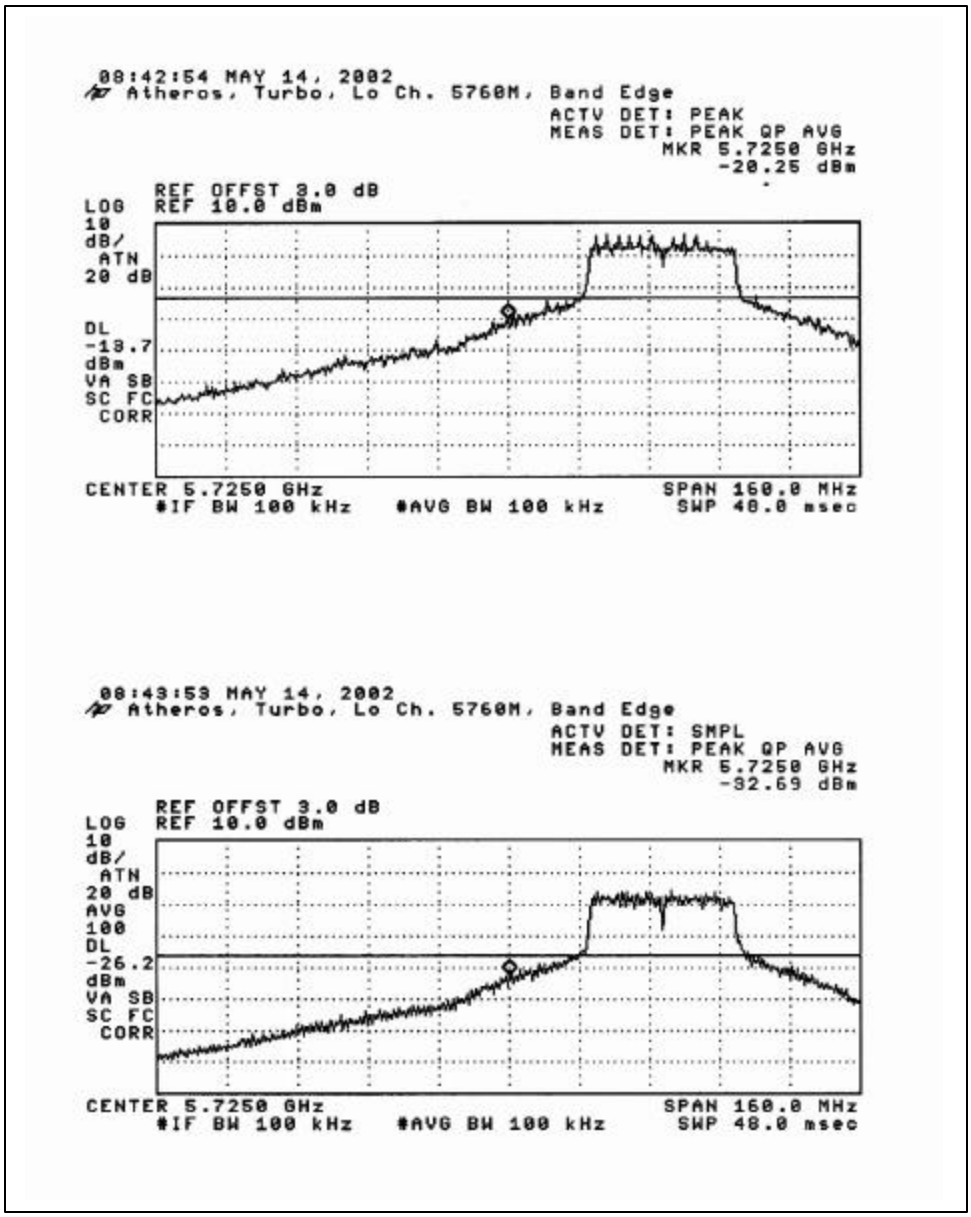


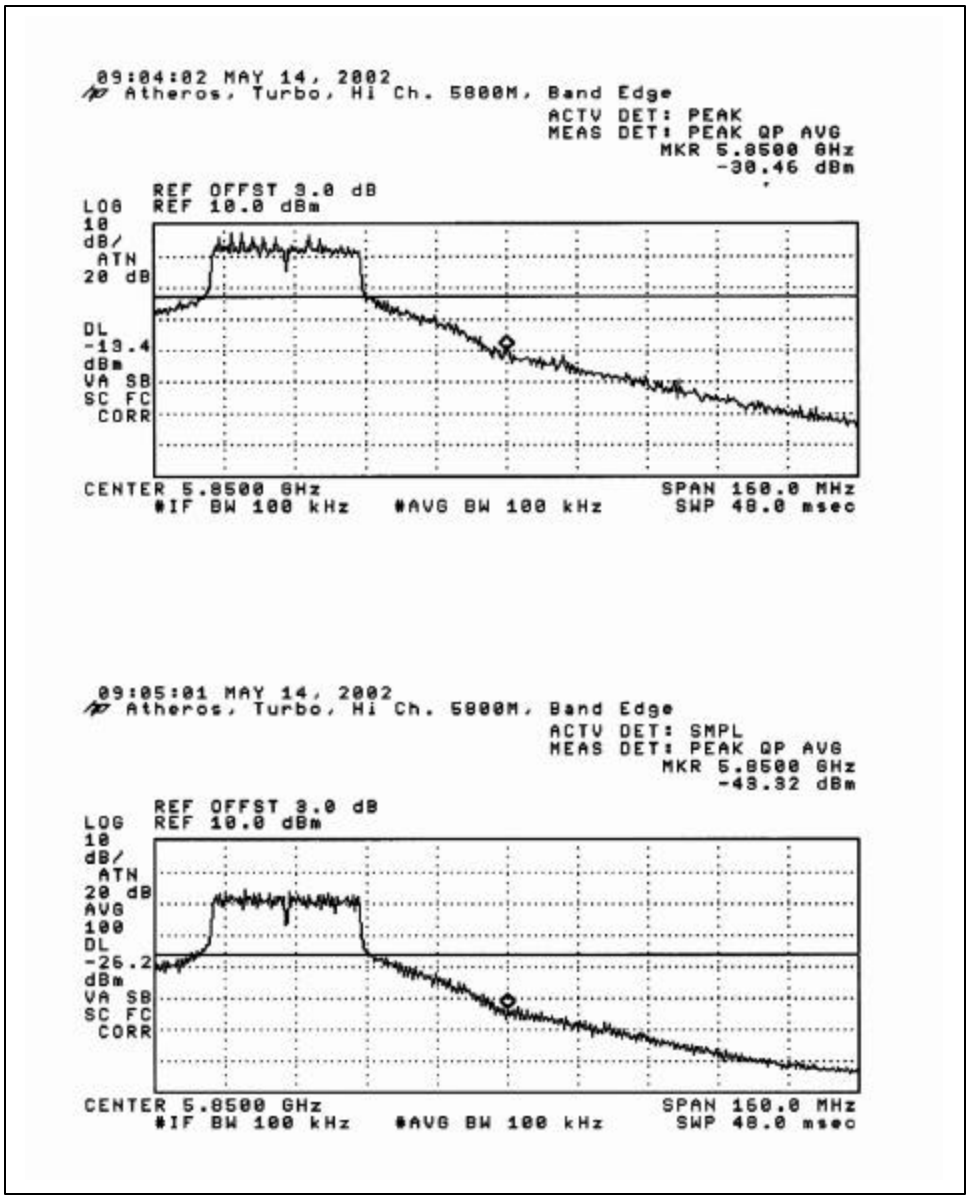












9.6. FREQUENCY STABILITY

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Refer to Theory of Operations for compliance.

Discontinue Transmitting with absence of Data or operational failure 15.407 (C)

(c) The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

Refer to Theory of Operations for compliance.

9.7. UNDESIRABLE EMISSION

Conducted RF measurements of the transmitter output were made over the 0 to 2.9 GHz band and the 2.75 to 26 GHz band in order to identify any spurious signals that require further investigation or measurements on the radiated emissions site. Signals that are outside the 15.205 restricted bands are measured for compliance with the out-of-band EIRP limit using the substitution method. Signals that are within the 15.205 restricted bands are measured for compliance with 15.209 limits.

MEASUREMENT PROCEDURE (Substitution Method)

1). On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.

2). The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.

3). The output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

4). The transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

5). The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

6). The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7). The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

8). The maximum signal level detected by the measuring receiver shall be noted.

9). The transmitter shall be replaced by a tuned dipole (substitution antenna). For frequencies above 1 GHz, at which a tuned dipole is impracticable, a horn antenna shall be used.

10). The substitution antenna shall be oriented for vertical polarization and the length of the dipole substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

11). The substitution antenna shall be connected to a calibrated signal generator.

12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

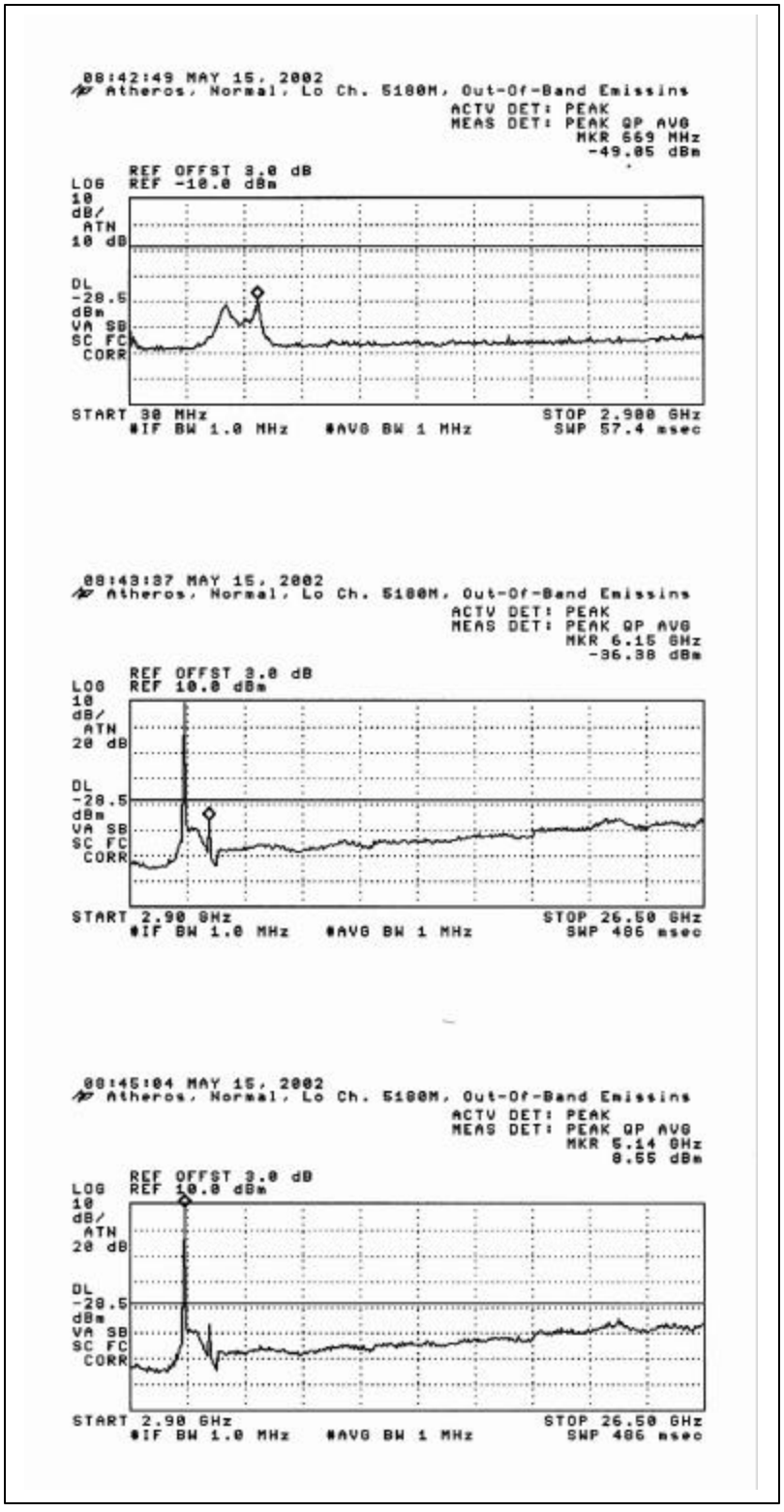
13). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

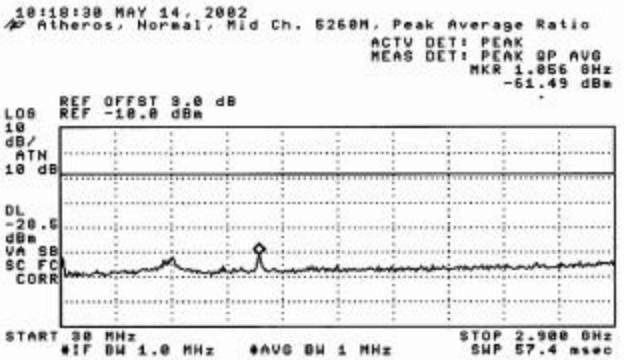
14). The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

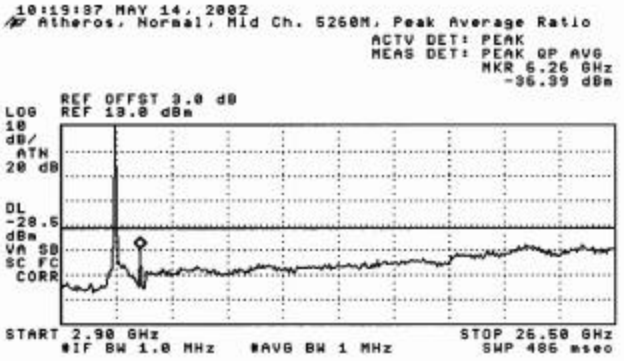
15). The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

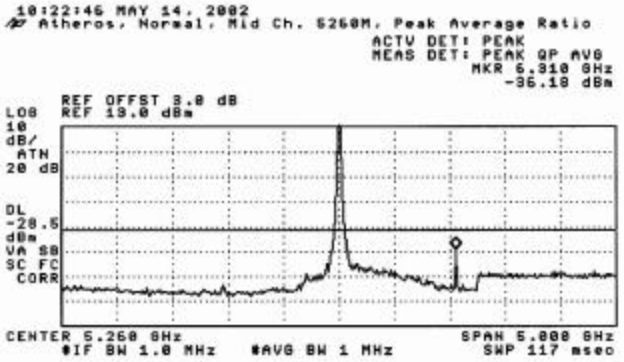
16). The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

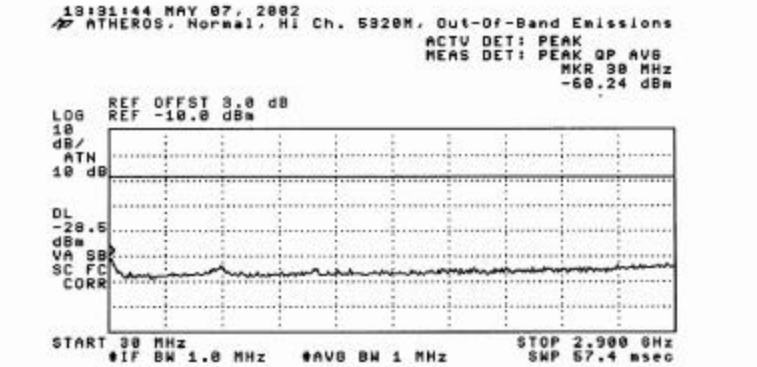
17). The measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

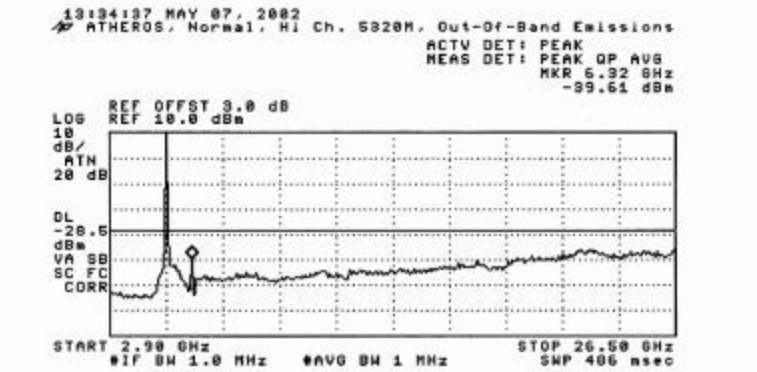


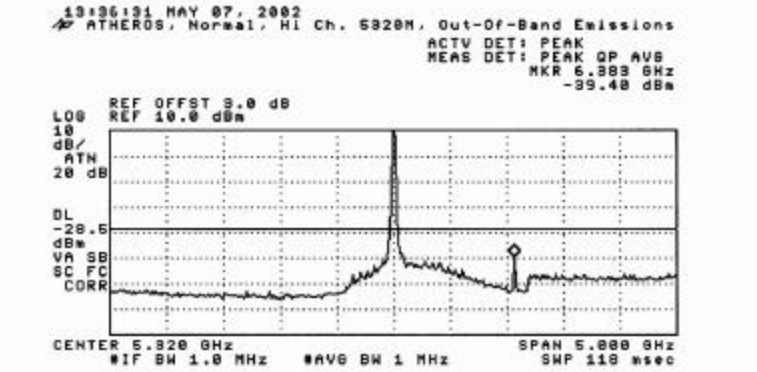


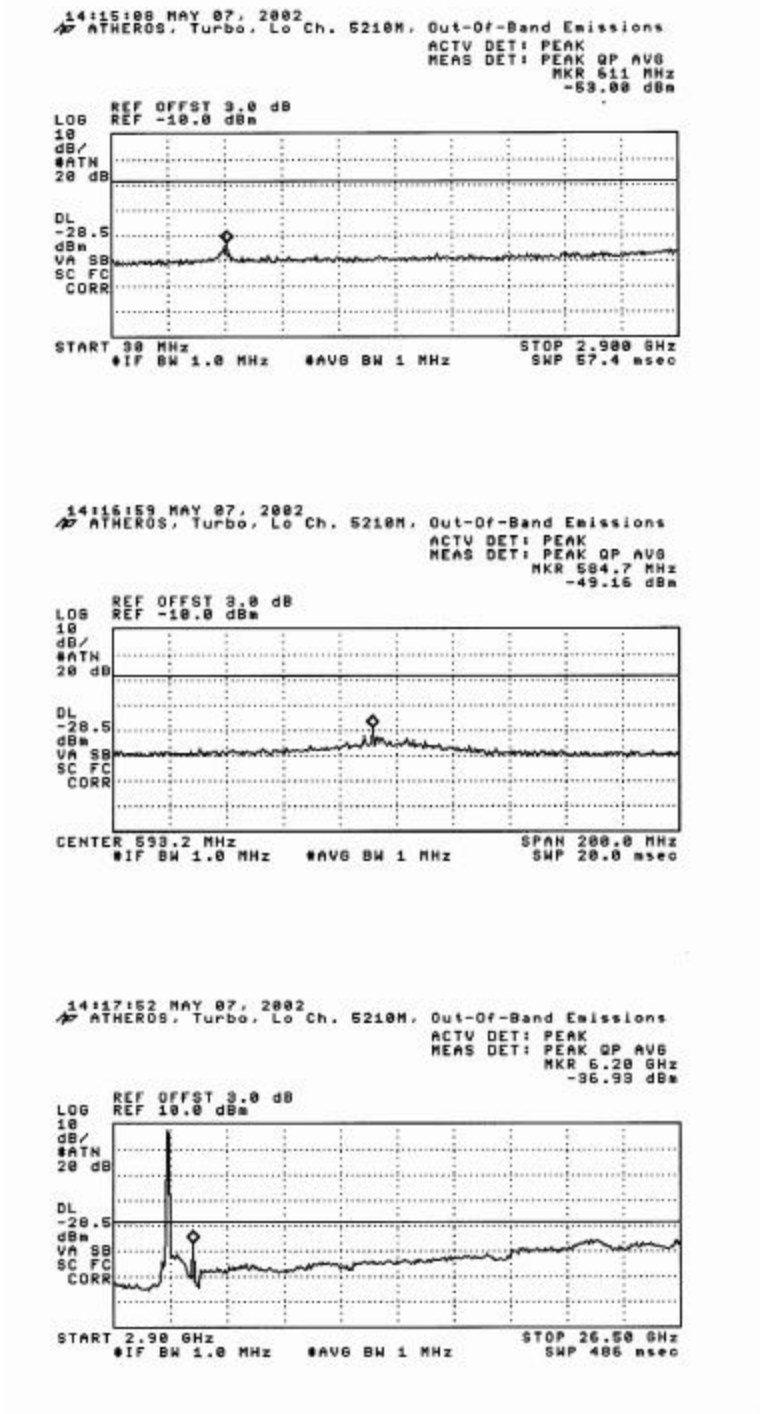


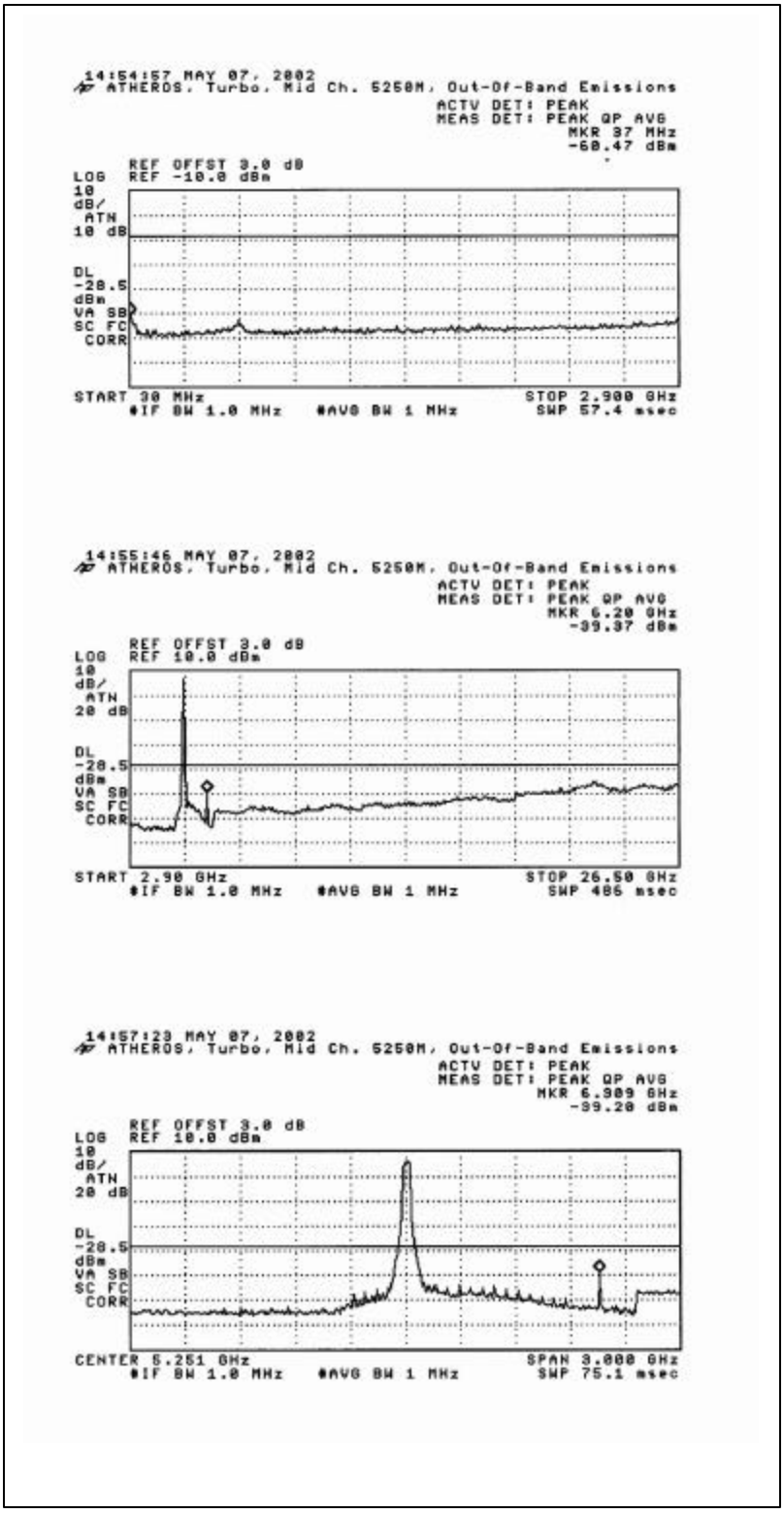


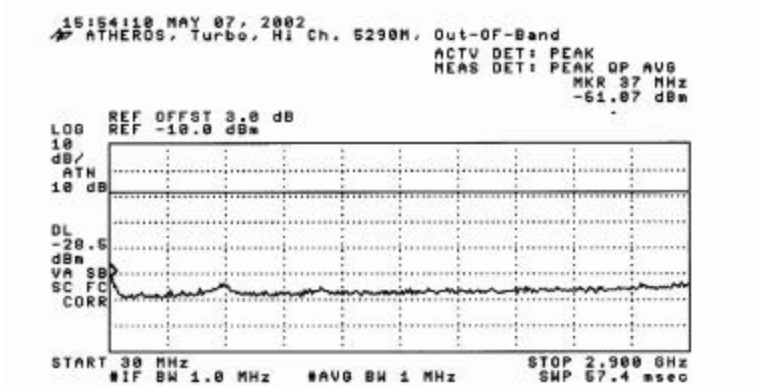


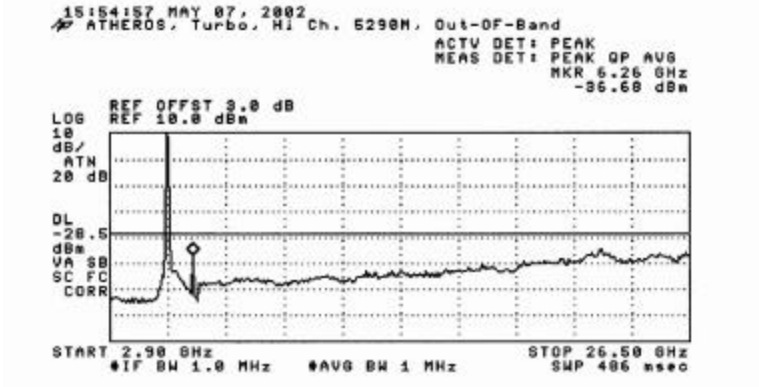


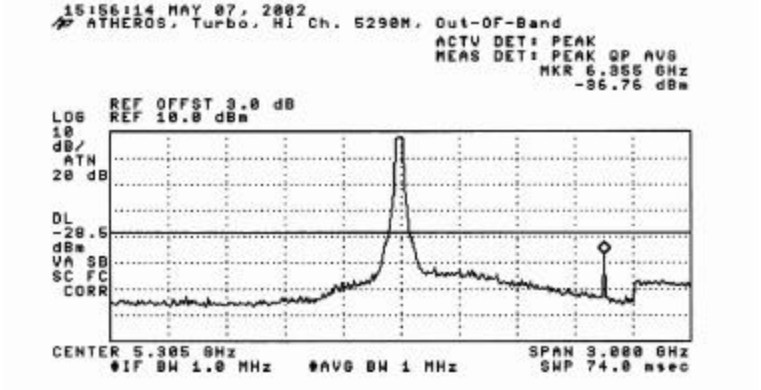


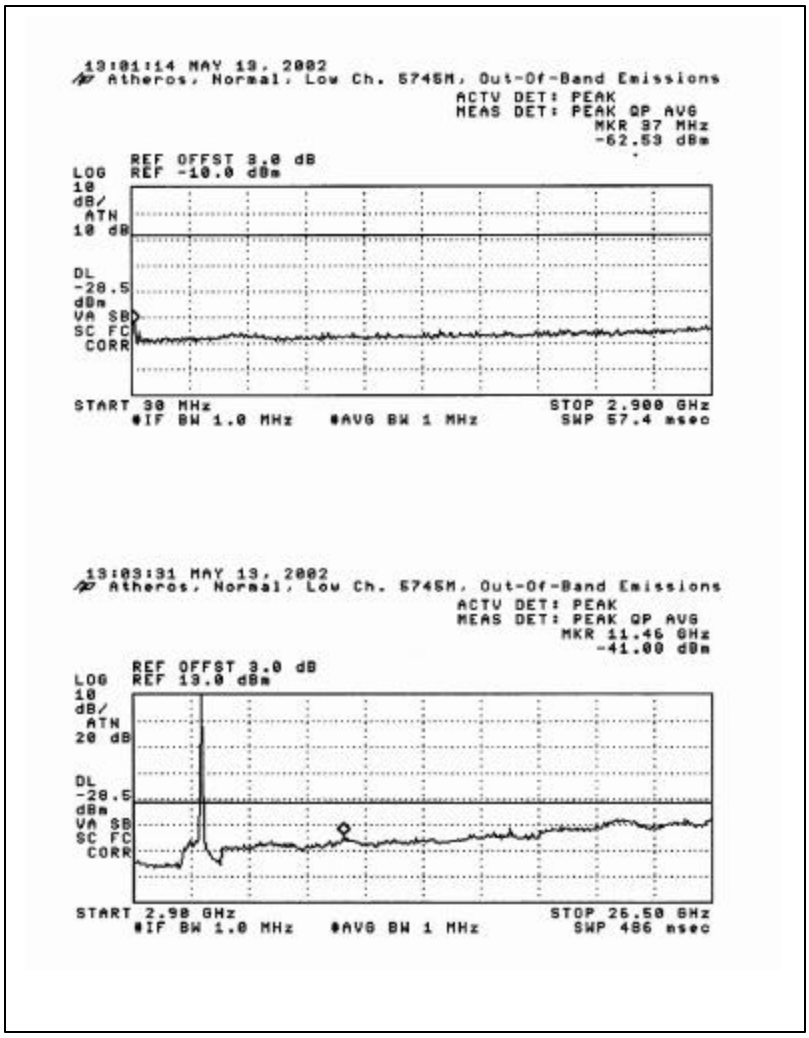


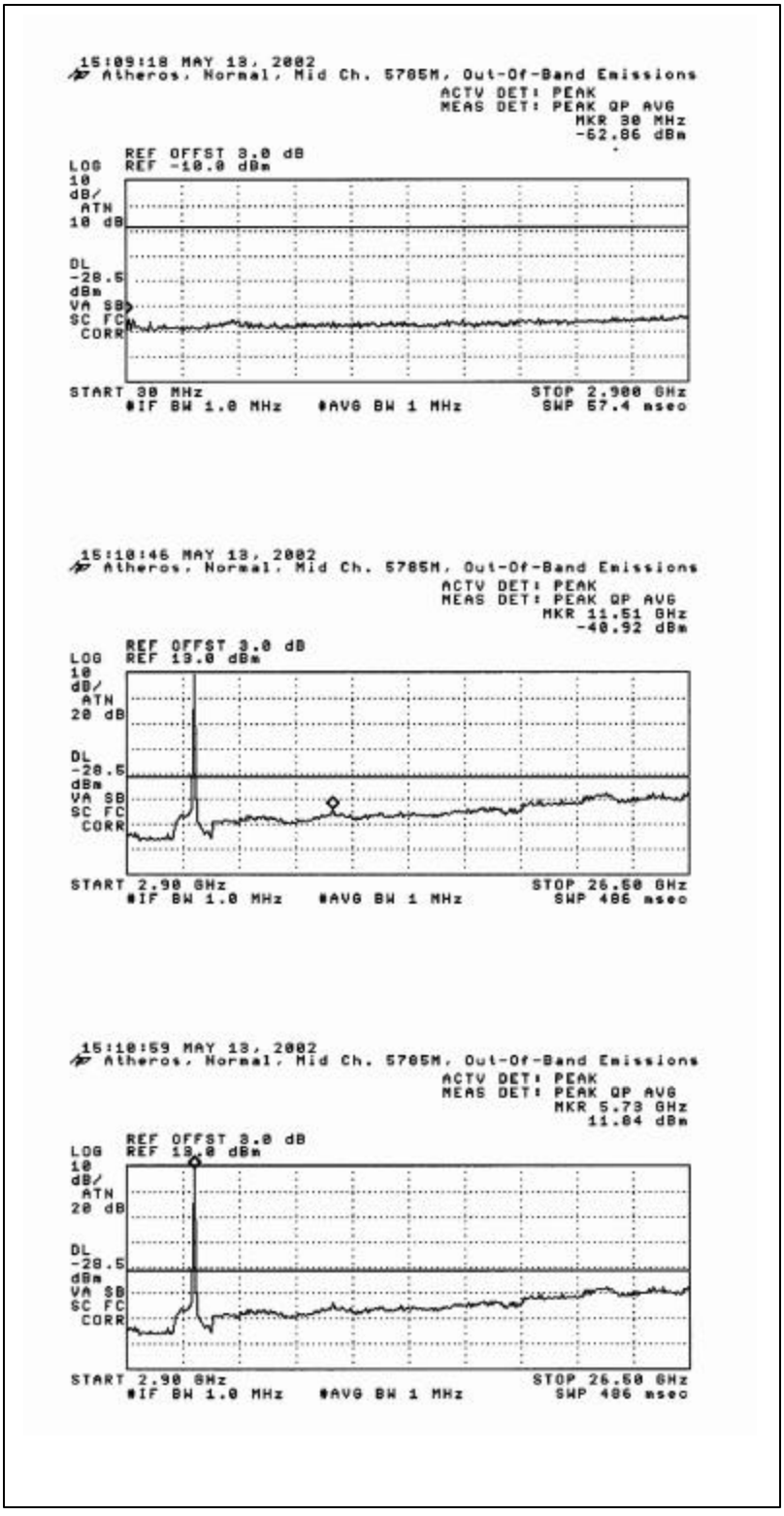


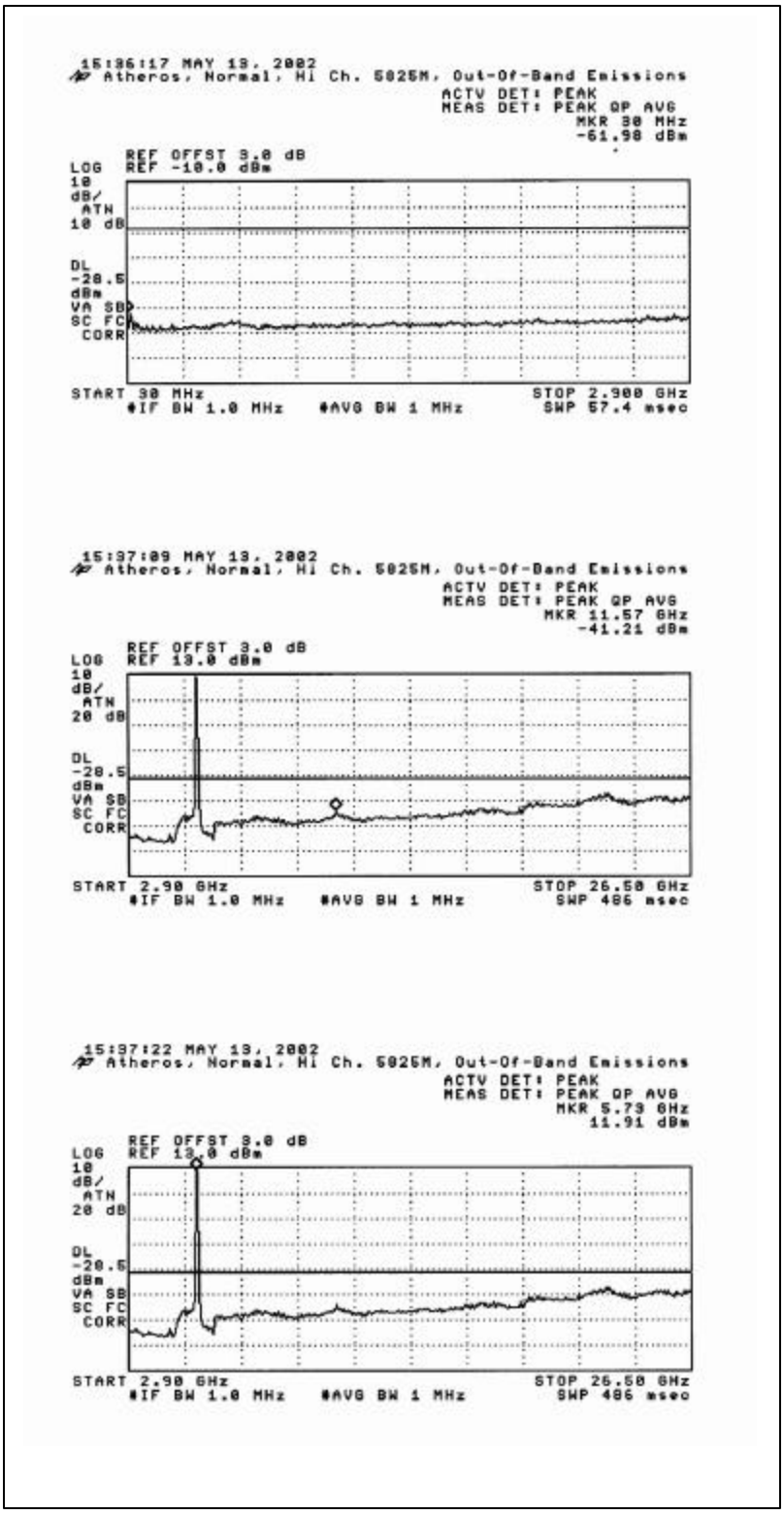


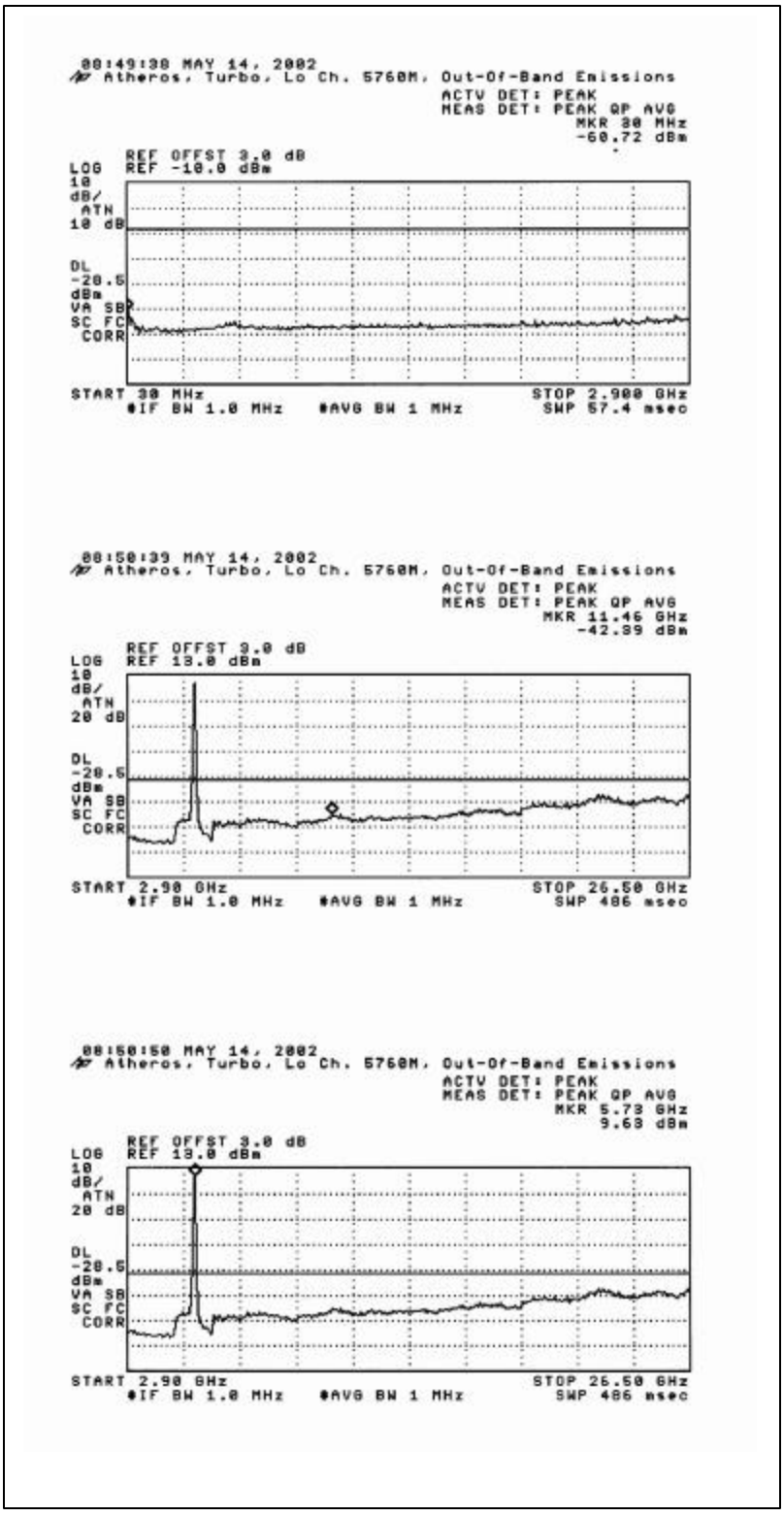


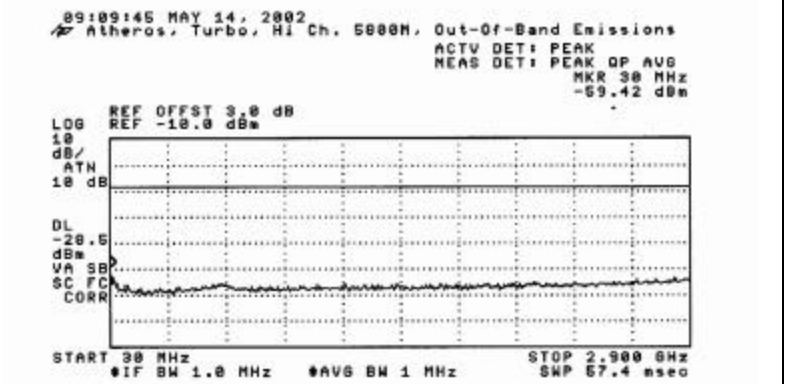


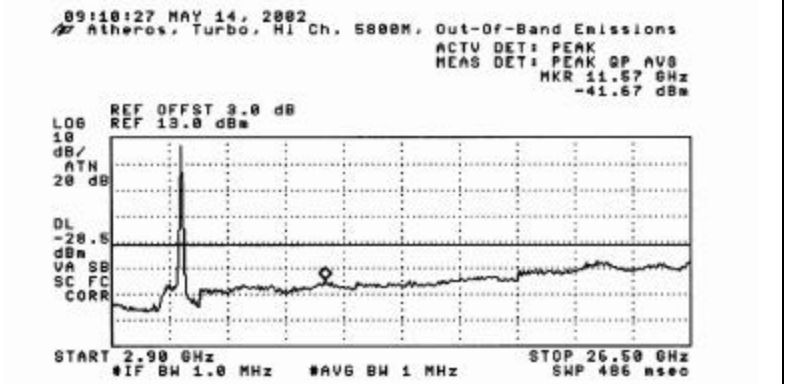


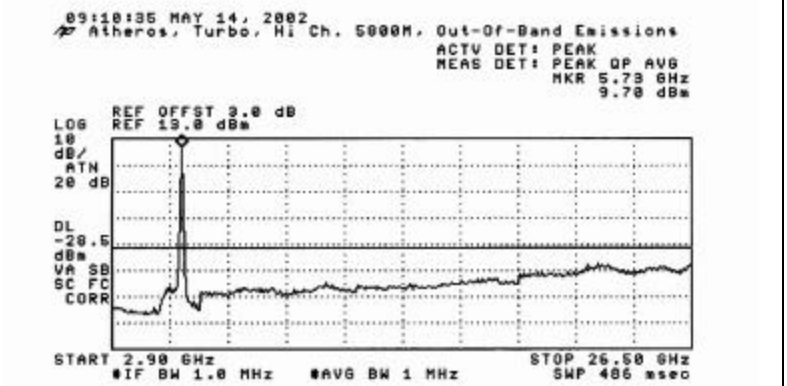








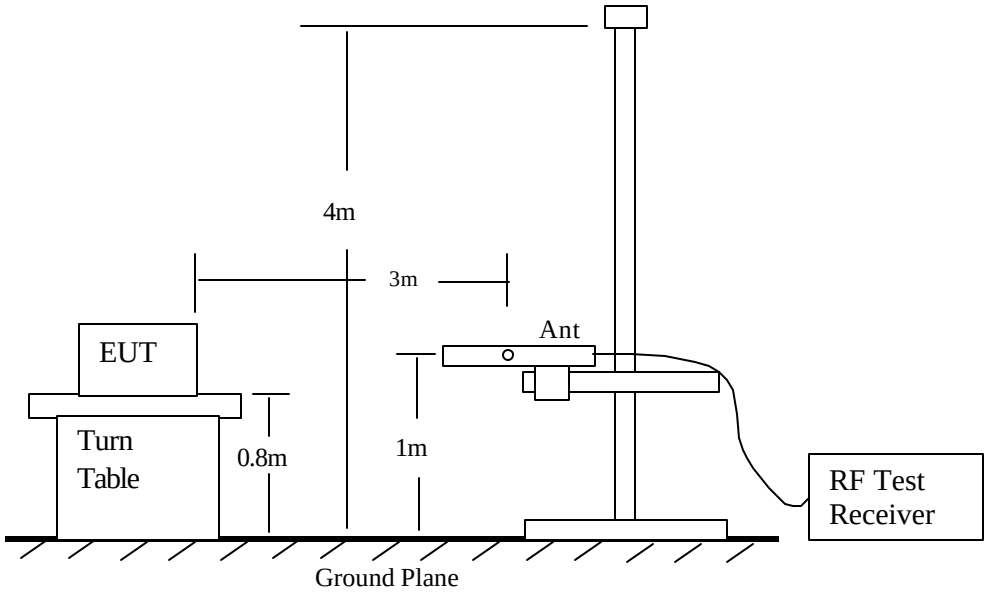




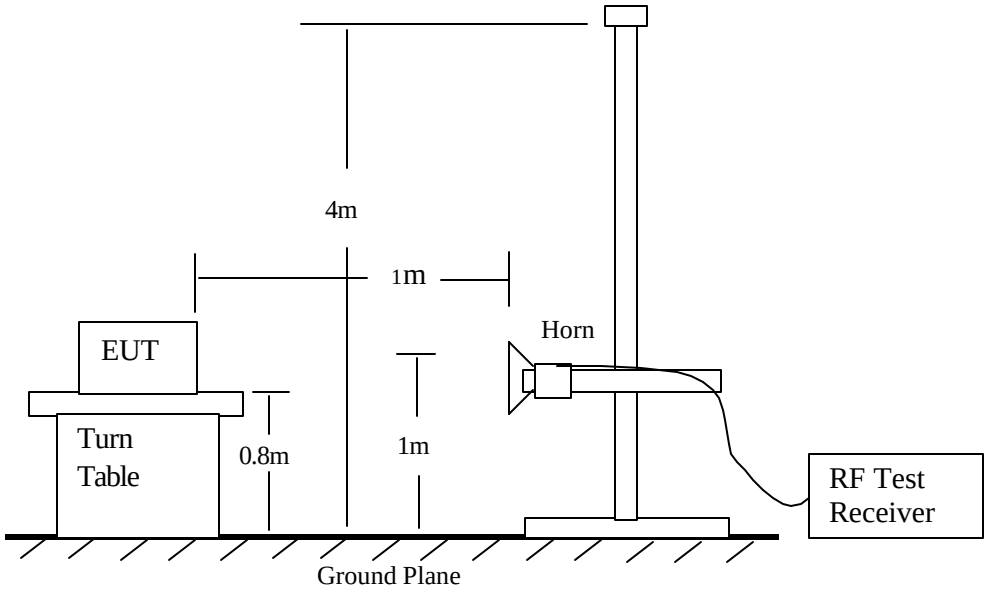
Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Below 1000	☒ Peak ☐ Q.P.	☒ 100 kHz ☐ 1 MHz	☒ 100 kHz ☐ 10 Hz
Above 1000	☒ Peak ☐ Average	☒ 1 MHz ☐ 1 MHz	☒ 1 MHz ☐ 10 Hz

TEST SETUP



Radiated Emission Measurement 30 to 1000MHz.



Radiated Emission Above 1000MHz

TEST PROCEDURE

The EUT and all other support equipment were placed on a wooden table 80 cm above the ground screen. The antenna to EUT distance was 10 meters During the test, the table was rotated 360 degrees to maximize emissions and the antenna was positioned from 1 to 4 meters above the ground screen to further maximize emissions. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

The EUT test configuration was according to Section 8 of ANSI C63.4/1992.

The following procedure was used to make the measurements: The frequency range of interest was monitored at a fixed antenna height and EUT azimuth. The Frequency span was set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT was rotated through 360 degrees to maximize emissions received. During the rotation if emission increased by more than 1 dB, or if another emission appeared that was greater by 1 dB, the EUT was returned to the azimuth where the maximum occurred, and additional cable manipulation was performed to further maximize received emissions.

The antenna was moved up and down to further maximize the suspected highest amplitude signal. If the emission increased by 1 dB or more, or if another emission appeared that was greater by 1dB or more, the antenna was returned to the height where maximum signal was observed, and, cables were manipulated to produce highest emissions, noting frequency and amplitude.

Specification Limits and Sample Calculations:

E = Õ30*P*G / d

Where d = distance = 3m
P=Power in EIRP in watts; -27dBm = 1.99526 x10^{-6}W
G=Numeric gain
E=Volts / meter

Assume Power = -27dBm = 1.99526x10^{-6}W
Gain in numeric = 1

Then, E(V/m) = Õ30*(1.99526 x10^{-6}W)*(1) / 3
= 2.579 x10^{-3}V/m
E(uV/m) = 2579uV/m
E (dBuV/m) = 20*log (2579uV/m) = 68.23dBuV /m

So, -27dBm(EIRP) is equivalent to 68.23dBuV/m @ 3m

RESULT
No non-compliance noted.

05/14/02 **FCC Measurement**

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Thu Chan
Project #: 02U1295
Company: AtherosCommunications, Inc.
EUT Descrip.: 802.11a Wireless LAN Cardbus Card
EUT M/N: Tecra 8200 Laptop Computer
Test Target: FCC 15.407 UNII
Mode Oper: Normal, Low Channel, 5180MHz
(Frequency Range 5.15 - 5.35GHz)

Equipment for 1-26 GHz:
HP8593EM Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Horn Antenna
ARA MWH 1826/B
Cable: 15.0 feet

Equipment for 26 - 40 GHz:
HP8566B Analyzer
HP 11975A Amplifier (LO)
HP 11970A External mixer/antenna
Dico 1149 Horn Antenna
Cable: IF Only (321 MHz)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Delta 37.50 Ave Delta 45.35

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
5.180	5.0	75.4	65.1	34.7	4.8	0.0	-5.9	0.0	109.0	98.7					V (Fundamental)
5.180	5.0	63.2	52.5	34.7	4.8	0.0	-5.9	0.0	96.8	86.1					H (Fundamental)
Band Edge:															
5.150	Using Peak Delta = 37.50 and Average Delta = 45.35								71.5	53.3	74.0	54.0	-2.5	-0.7	* V (Band Edge)
5.150	Using Peak Delta = 37.50 and Average Delta = 45.35								59.3	40.7	74.0	54.0	-14.7	-13.3	* H (Band Edge)
Harmonic:															
10.360	5.0	49.0	33.5	38.9	8.8	-35.6	-5.9	1.0	56.2	40.7	68.2		-12.0		** V
15.540	5.0	49.7	38.0	38.3	11.4	-38.6	-5.9	1.0	55.9	44.2	74.0	54.0	-18.1	-9.8	* V
20.720	2.5	51.0	41.5	32.3	14.2	-38.7	-11.9	0.0	47.0	37.5	74.0	54.0	-27.0	-16.5	* V (Noise Floor)
25.960	2.5	54.0	43.5	33.0	18.0	-40.0	-11.9	0.0	53.0	42.5	68.2		-15.2		** V (Noise Floor)
31.080	1.0	37.1	26.2	44.1	0.0	0.0	-19.9	0.0	61.3	50.4	68.2		-6.9		** V (Noise Floor)
36.260	1.0	37.2	26.2	44.1	0.0	0.0	-19.9	0.0	61.4	50.4	68.2		-6.8		** V (Noise Floor)
10.360	5.0	44.7	33.2	38.9	8.8	-35.6	-5.9	1.0	51.9	40.4	68.2		-16.3		** H
15.540	5.0	48.8	37.3	38.3	11.4	-38.6	-5.9	1.0	55.0	43.5	74.0	54.0	-19.0	-10.5	* H
20.720	2.5	51.0	41.5	32.3	14.2	-38.7	-11.9	0.0	47.0	37.5	74.0	54.0	-27.0	-16.5	* H (Noise Floor)
25.960	2.5	54.0	43.5	33.0	18.0	-40.0	-11.9	0.0	53.0	42.5	68.2		-15.2		** H (Noise Floor)
31.080	1.0	37.1	26.1	44.1	0.0	0.0	-19.9	0.0	61.3	50.3	68.2		-6.9		** H (Noise Floor)
36.260	1.0	37.2	26.2	44.1	0.0	0.0	-19.9	0.0	61.4	50.4	68.2		-6.8		** H (Noise Floor)
Spurious:															
6.216	5.0	62.0	60.3	35.4	6.7	-36.3	-5.9	0.0	62.0	60.2	68.2		-6.2		** V (w/ 10dB attn)
4.121	5.0	55.4	47.0	33.2	5.2	-36.1	-5.9	0.0	51.8	43.4	74.0	54.0	-22.2	-10.6	* V (w/ 10dB attn)
4.202	5.0	57.1	49.0	33.1	5.3	-36.1	-5.9	0.0	53.5	45.4	74.0	54.0	-20.5	-8.6	* V (w/ 10dB attn)
4.304	5.0	59.0	48.0	33.1	5.3	-36.1	-5.9	0.0	55.4	44.4	74.0	54.0	-18.6	-9.6	* V (w/ 10dB attn)
4.392	5.0	58.0	49.0	33.0	5.4	-36.1	-5.9	0.0	54.4	45.4	74.0	54.0	-19.6	-8.6	* V (w/ 10dB attn)
4.596	5.0	65.2	45.5	33.2	5.5	-36.1	-5.9	0.0	62.0	42.3	74.0	54.0	-12.0	-11.7	* V (w/ 10dB attn)
5.247	5.0	59.0	48.0	34.8	6.0	-36.1	-5.9	0.0	57.9	46.9	68.2		-10.3		** V (w/ 10dB attn)
6.056	4.0	67.7	50.0	35.4	6.6	-36.3	-7.8	0.0	65.7	48.0	68.2		-2.5		** V (w/ 20dB attn)
6.215	5.0	65.0	59.8	35.4	6.7	-36.3	-5.9	0.0	65.0	59.8	68.2		-3.3		** V (w/ 10dB attn)
6.056	4.0	62.0	50.0	35.4	6.6	-36.3	-7.8	0.0	60.0	48.0	68.2		-8.3		** H (w/ 20dB attn)
6.215	5.0	54.0	47.5	35.4	6.7	-36.3	-5.9	0.0	54.0	47.5	68.2		-14.3		** H (w/ 10dB attn)
4.569	5.0	62.4	42.5	33.1	5.5	-36.1	-5.9	0.0	59.0	39.2	74.0	54.0	-15.0	-14.8	* H (w/ 10dB attn)

Note: * Restricted Band Limit
** Non Restricted Band Liimit = -27dBm = 68.2dBuV

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter