FCC CFR47 PART 15 SUBPART C

Test Report

5.8 GHz Fixed Wireless LAN CPE Transceiver

Model Numbers:

FCC ID: PS6PM58-SS

Report Number: 08PR005 REV 1

Issue Date: 2 April 2008

Prepared for

Aperto Networks
598 Gibraltar Drive
Milpitas CA 95035

Prepared by

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TABLE OF CONTENTS

TEST AND TEST LOCATION INFORMATION

COMPANY NAME: APERTO NETWORKS
598 GIBRALTAR DRIVE
MILPITAS CA 95035

EUT DESCRIPTION: 5.8 GHz Base Station for Fixed Wireless LAN

FCC ID: **PS6PM58-SS**
MODEL: PM-100-58

DATE TESTED: 4 February – 10 April 2008

All radiated and AC line conducted tests were performed by

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538

All antenna port output conducted test were performed by

Aperto Networks
598 Gibraltar Drive
Milpitas CA 95035

12 April 2008

T.N. Cokenias
Agent for Aperto Networks

REPORT REVISION RECORD

Rev No.	Date	Details of Revision	Revised By
-	3/26/08	Original issue	T.N. Cokenias
1	4/2/08	Correct antenna gain p. 23	T.N. Cokenias
2	4/12/08	Add 3.5 MHz channel bandwidth data	T.N. Cokenias

1. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

2. EQUIPMENT UNDER TEST

2.1. DESCRIPTION OF EUT

The EUT is a fixed wireless WLAN transceiver operating in the unlicensed 5.725-5.875 GHz band. Modulation is 802.16d/e in 5 MHz and 7 MHz channel bandwidths.

2.2. MAXIMUM OUTPUT POWER

5 MHz EBW

	(MHz)	(dBm)	(mW)
Low	5727.5	20.29	106.9
Middle	5787.5	20.66	116.4
High	5847.5	19.85	96.6

7 MHz EBW

	(MHz)	(dBm)	(mW)
Low	5728.5	19.70	93.3
Middle	5787.5	19.49	88.9
High	5846.5	19.05	80.4

2.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral flat panel antenna, gain 18 dBi.

2.4. WORST-CASE CONFIGURATION AND MODE

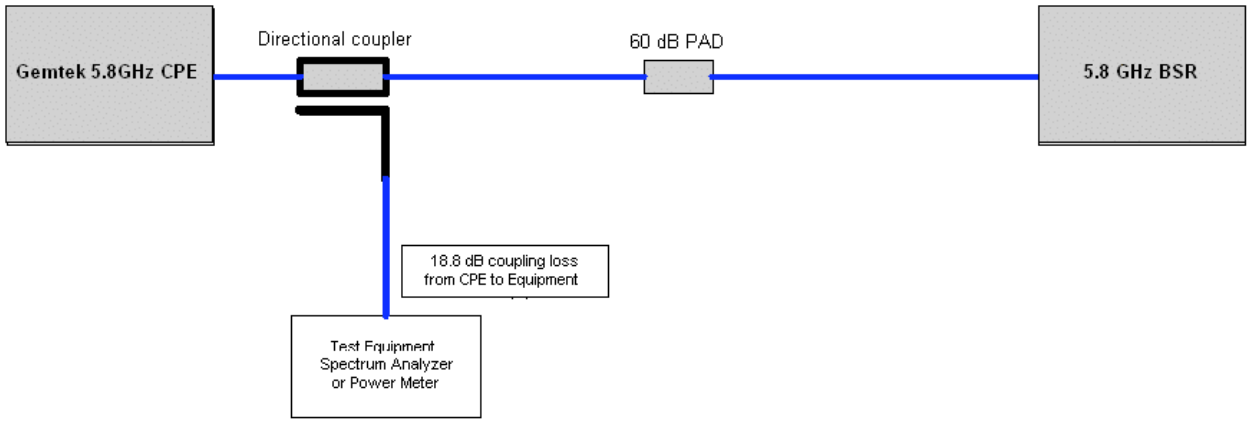
Radiated and conducted emissions tests were performed for 3.5 MHz, 5 MHz and 7 MHz emission bandwidth channels. Worst-case emissions are reported.

2.5. DESCRIPTION OF TEST SETUP

TEST SETUP

The EUT is an outdoor radio (ODR) which obtains DC power and data via standard CAT5 cable from an indoor power over Ethernet (POE) unit. A base station radio (BSR) establishes a communications line with the EUT. The BSR sends commands to the EUT to determine operating channel, emission bandwidth, and output power. A laptop controls the BSR operation during tests.

SETUP DIAGRAM FOR TESTS



3.7 Modifications to EUT

NONE.

3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report

CCS Test Equipment: Radiated and Line Conducted Tests

TEST EQUIPMENT LIST					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent	E4446A	C01159	10/27/07	10/27/08
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	2/6/07	6/12/08
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	2/6/07	6/12/08
Bilog Antenna	Sunol Sciences	JB1	C01016	9/28/07	9/28/08
Antenna, Horn, 18 GHz	EMCO	3115	C00872	4/15/07	4/15/08
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	8/3/07	9/27/08
Preamplifier, 9Khz-1GHz	Sonoma	310N	N02891	1/20/07	1/20/08
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/07	10/25/08
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/25/07	10/25/08
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02677	CNR	CNR

Aperto Networks Test Equipment: Antenna Port Conducted Tests

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer	Agilent	E4440A	MY46186111	8/21/08

4. LIMITS AND RESULTS

4.1. ANTENNA PORT CHANNEL TESTS

4.1.1. 6 dB BANDWIDTH

LIMIT

Section 15.247(2): The 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 20 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

No non-compliance noted:

3.5 MHz EBW

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5727.0	3.156	3.171
Middle	5787.5	3.164	3.171
High	5848.0	3.165	3.175

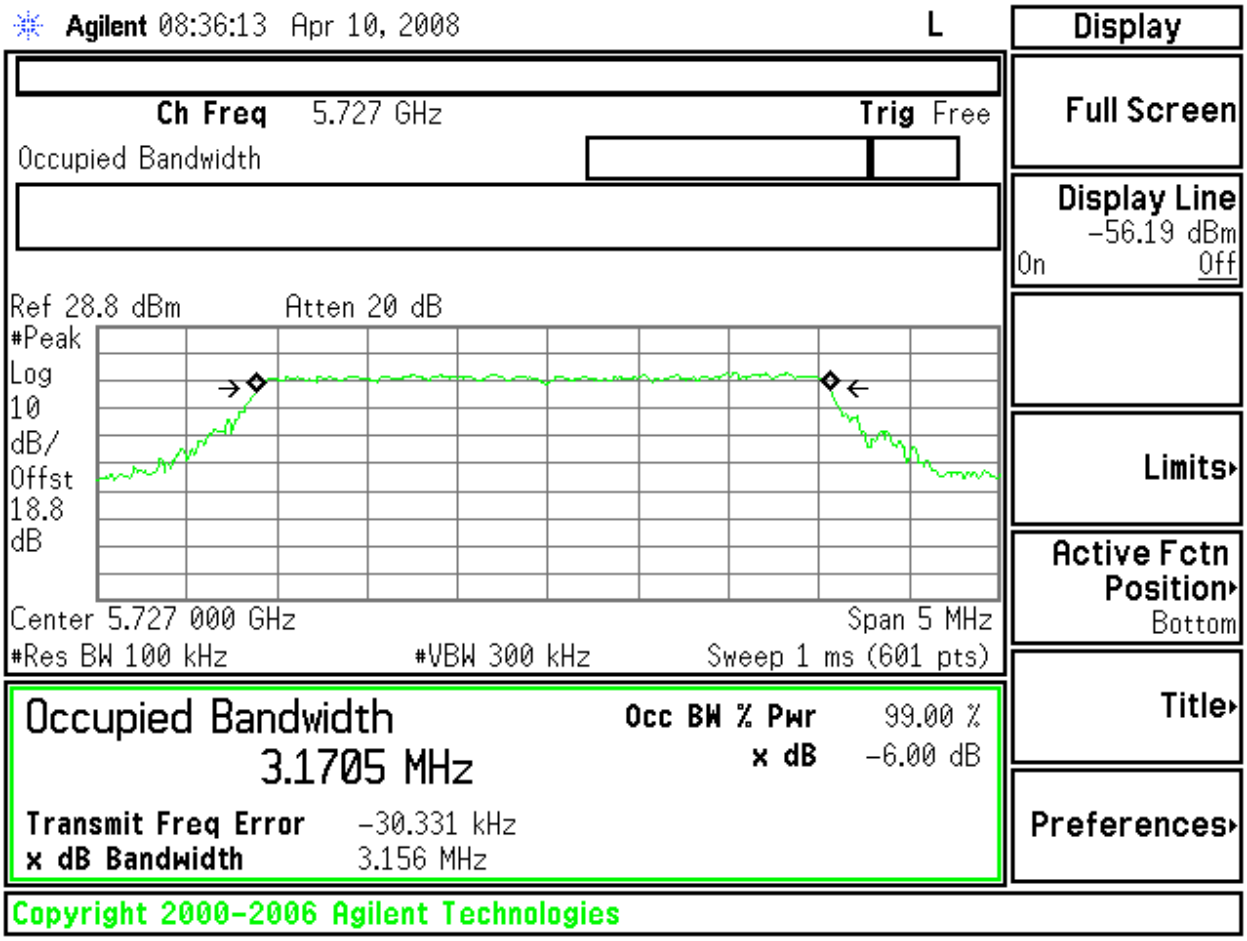
5 MHz EBW

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5727.5	4.572	4.56
Middle	5787.5	4.55	4.55
High	5874.5	4.535	4.57

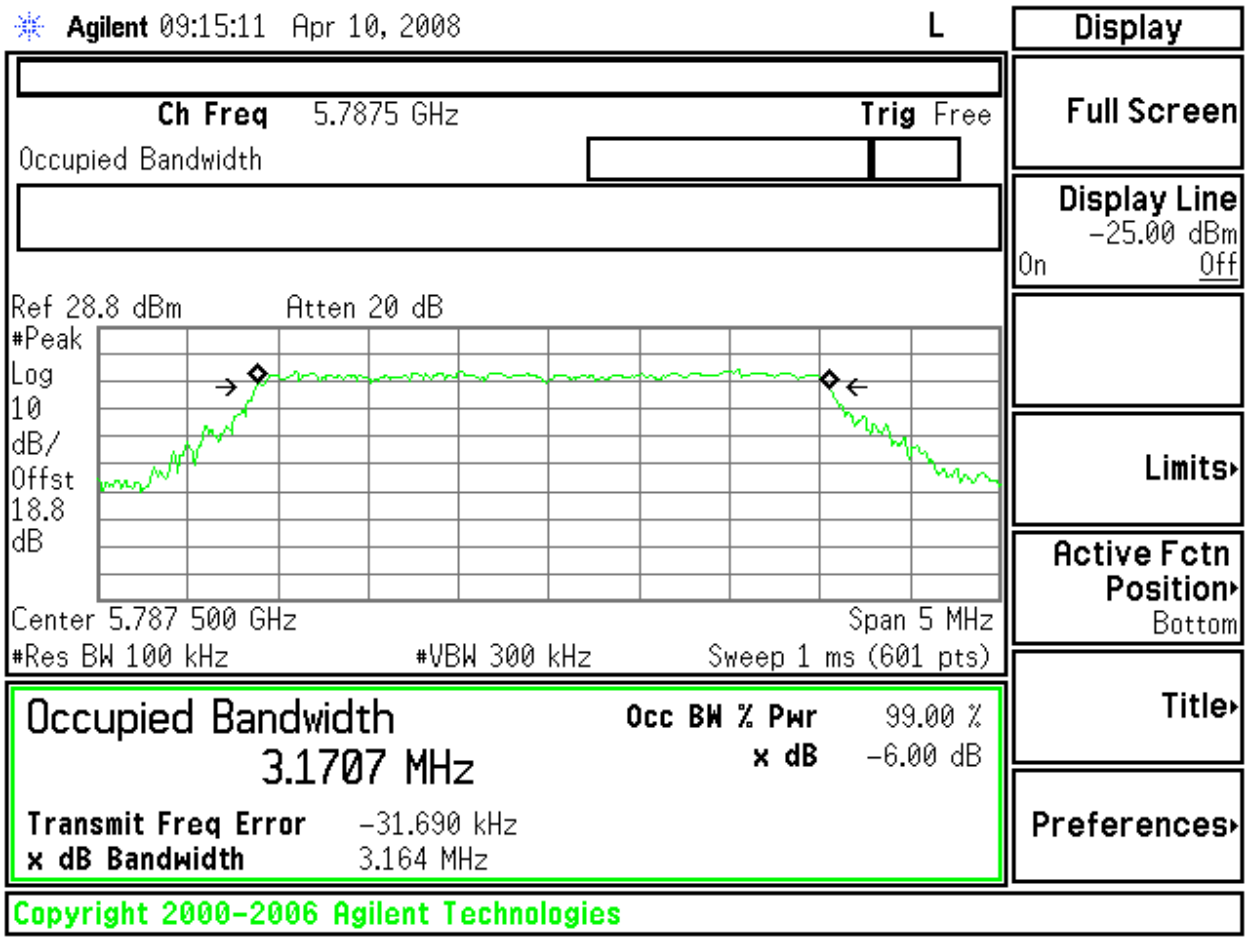
7 MHz EBW

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	5728.5	6.29	6.3
Middle	5787.5	6.29	6.31
High	5846.5	6.28	6.303

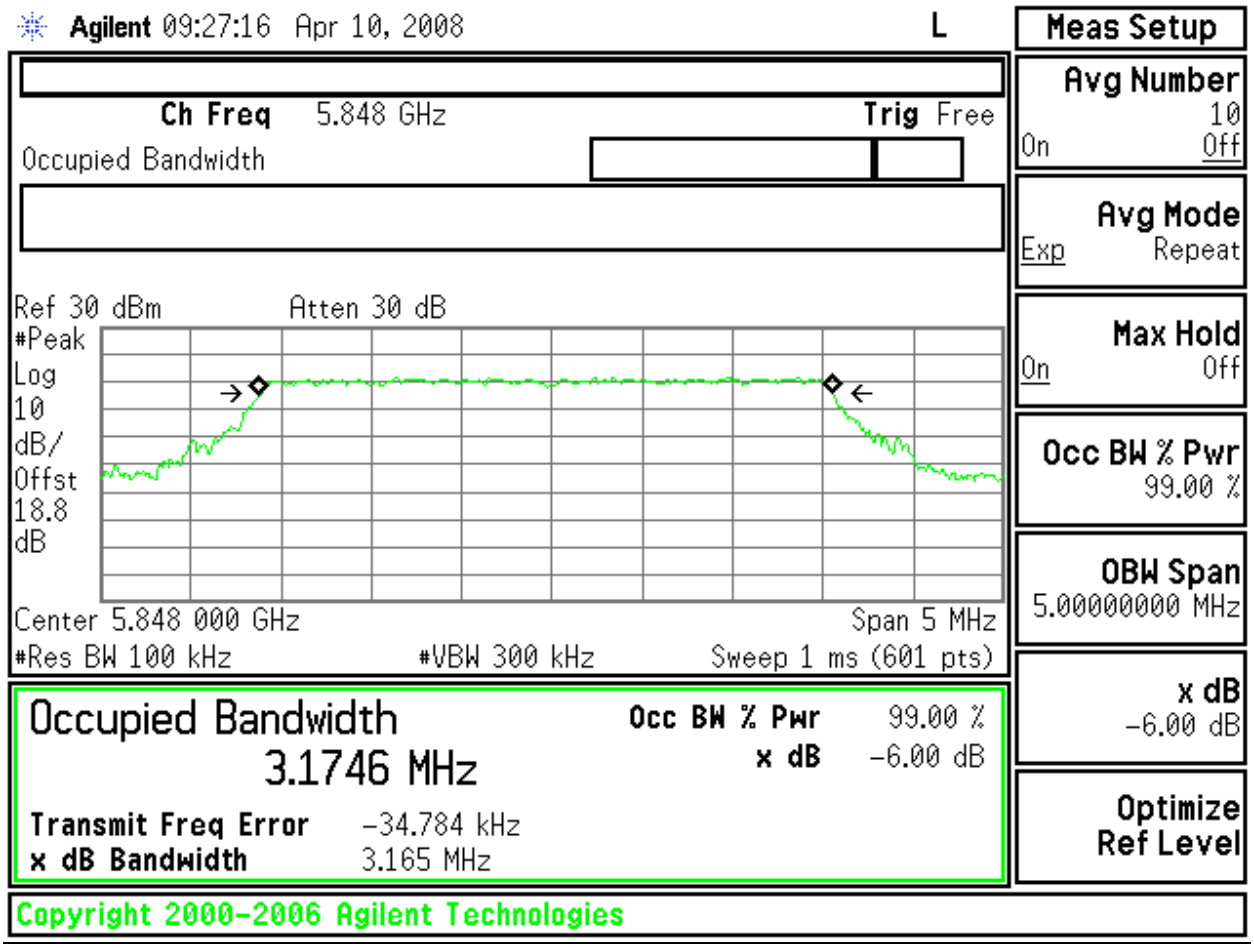
6 dB BANDWIDTH LOW CHANNEL 3.5 MHz EBW



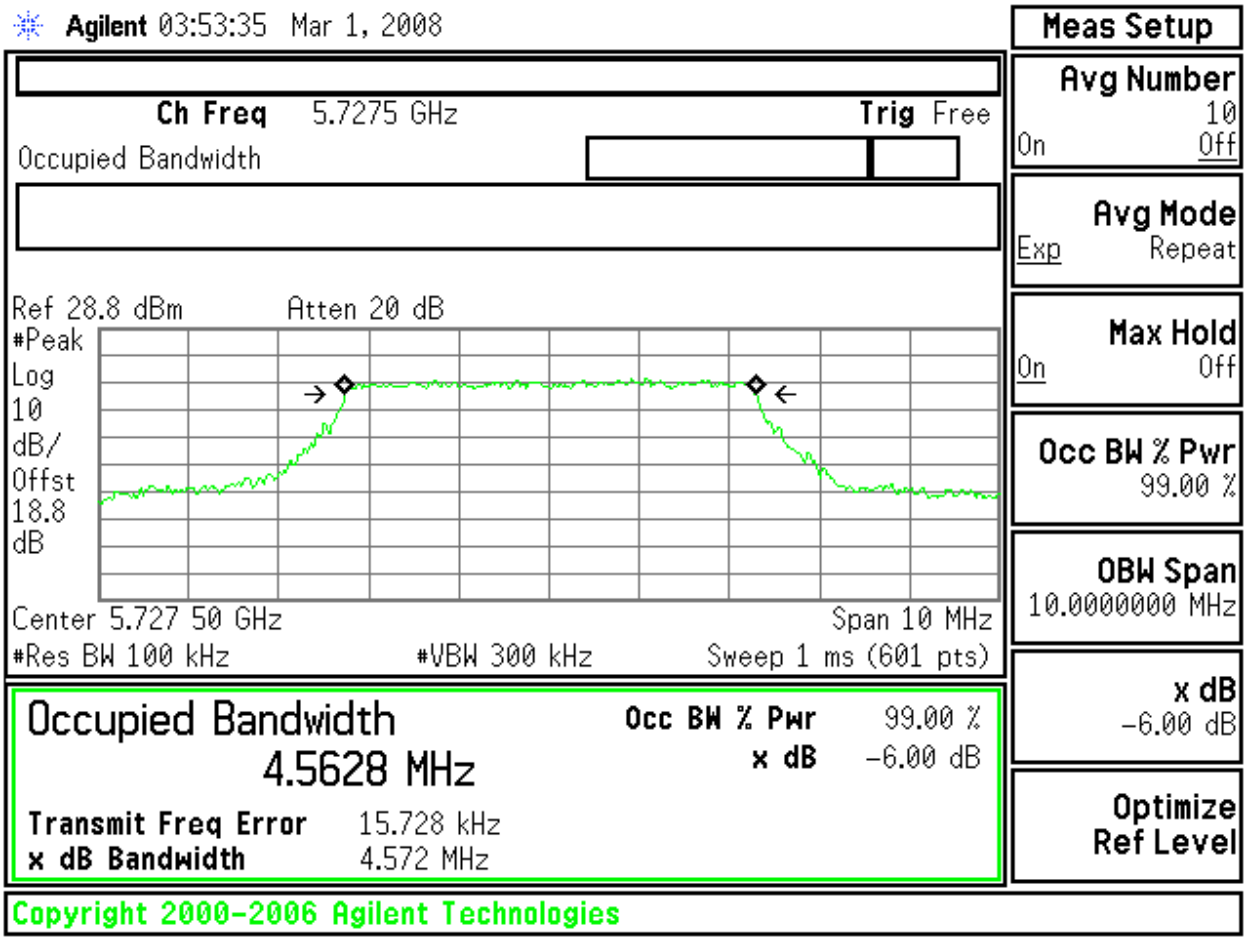
6 dB BANDWIDTH MID CHANNEL 3.5 MHz EBW



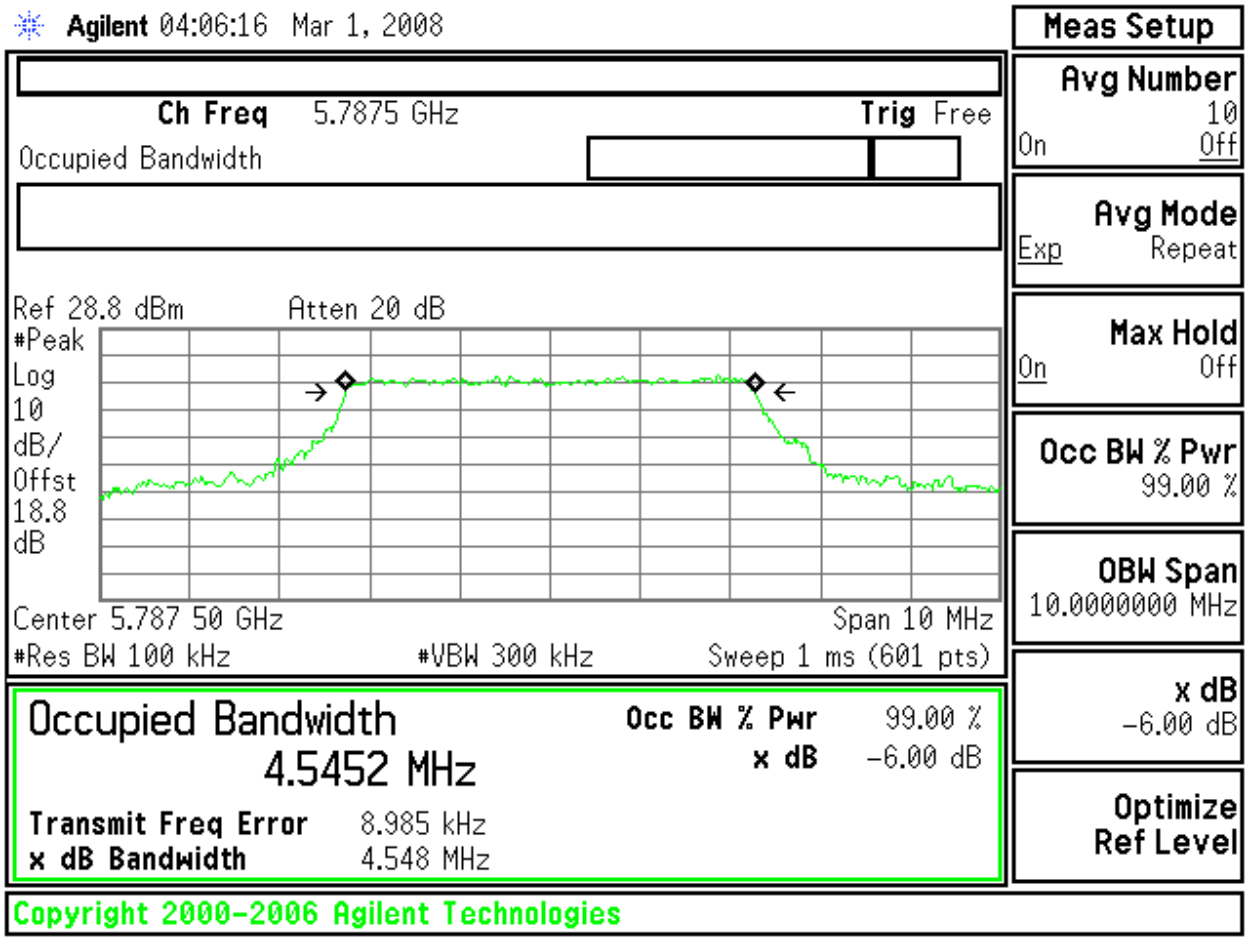
6 dB BANDWIDTH HIGH CHANNEL 3.5 MHz EBW



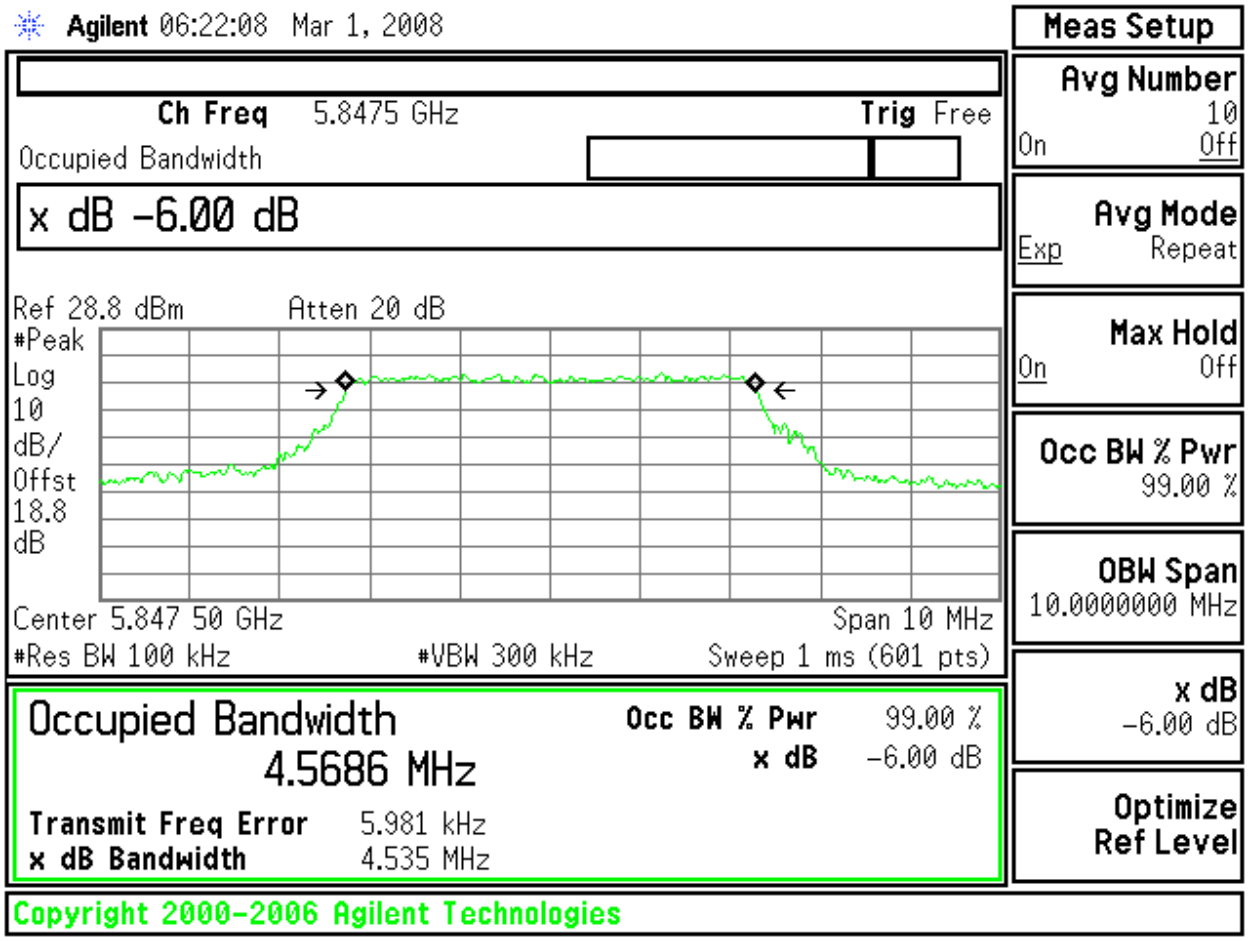
6 dB BANDWIDTH LOW CHANNEL 5 MHz EBW



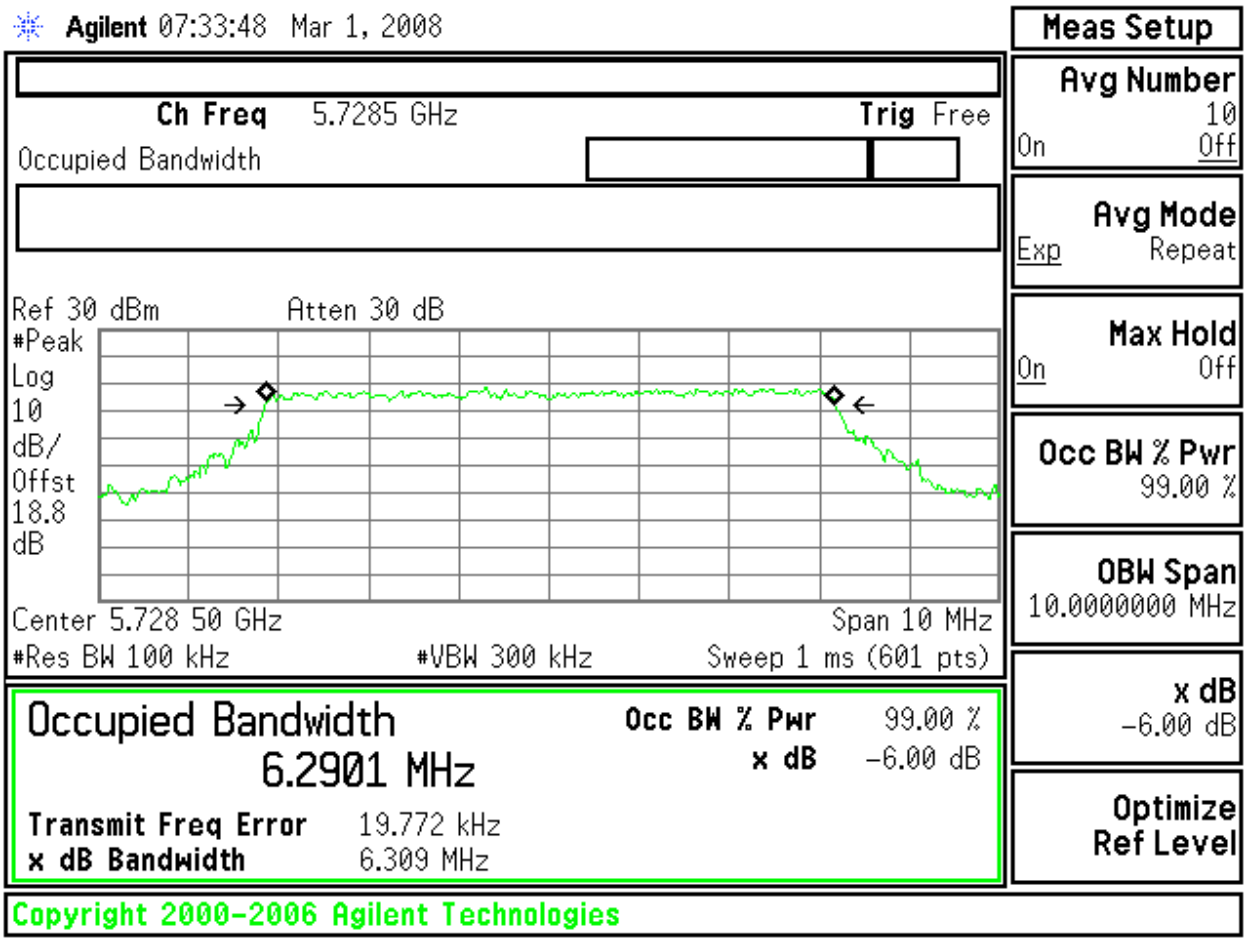
6 dB BANDWIDTH MID CHANNEL 5 MHz EBW



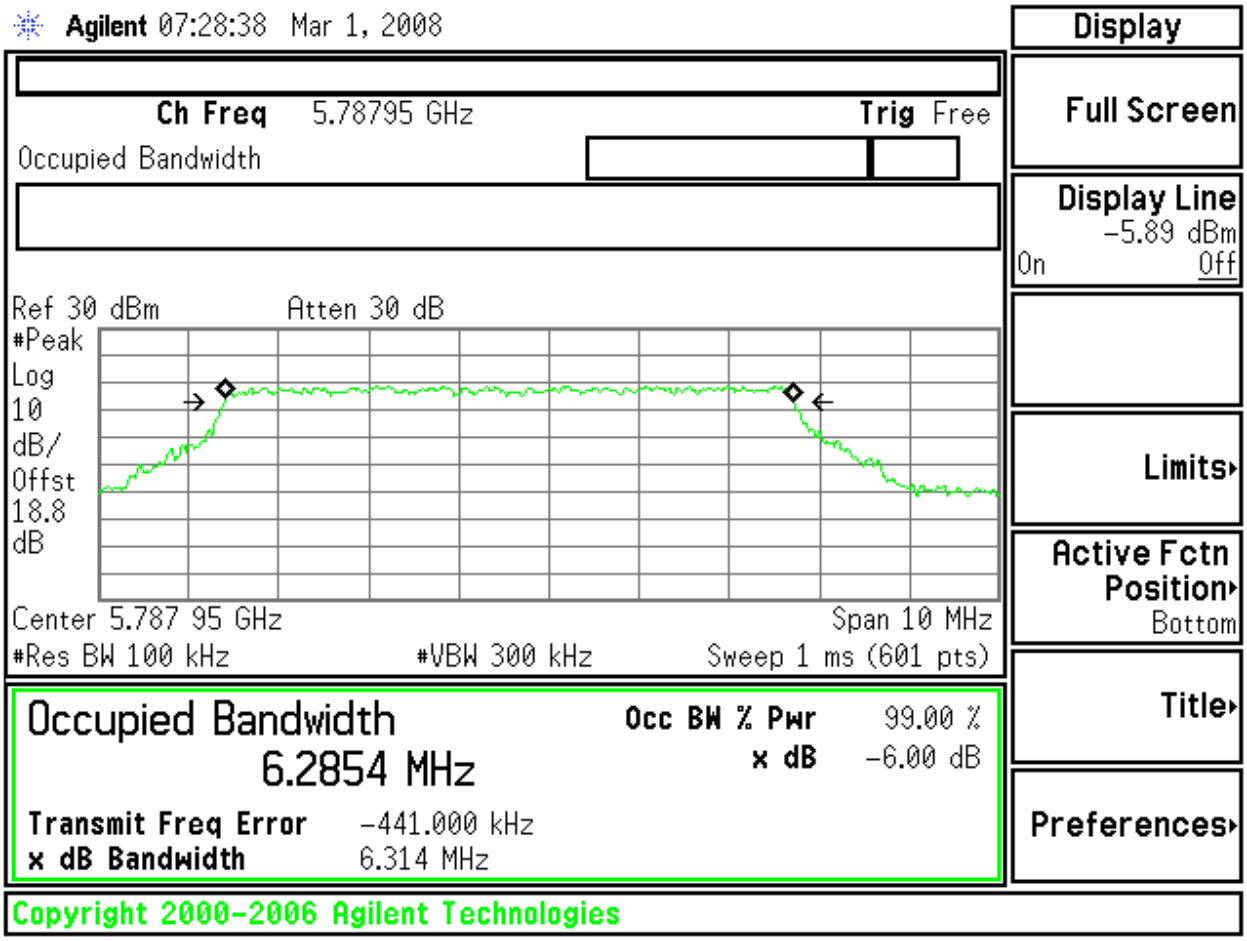
6 dB BANDWIDTH HIGH CHANNEL 5 MHz EBW



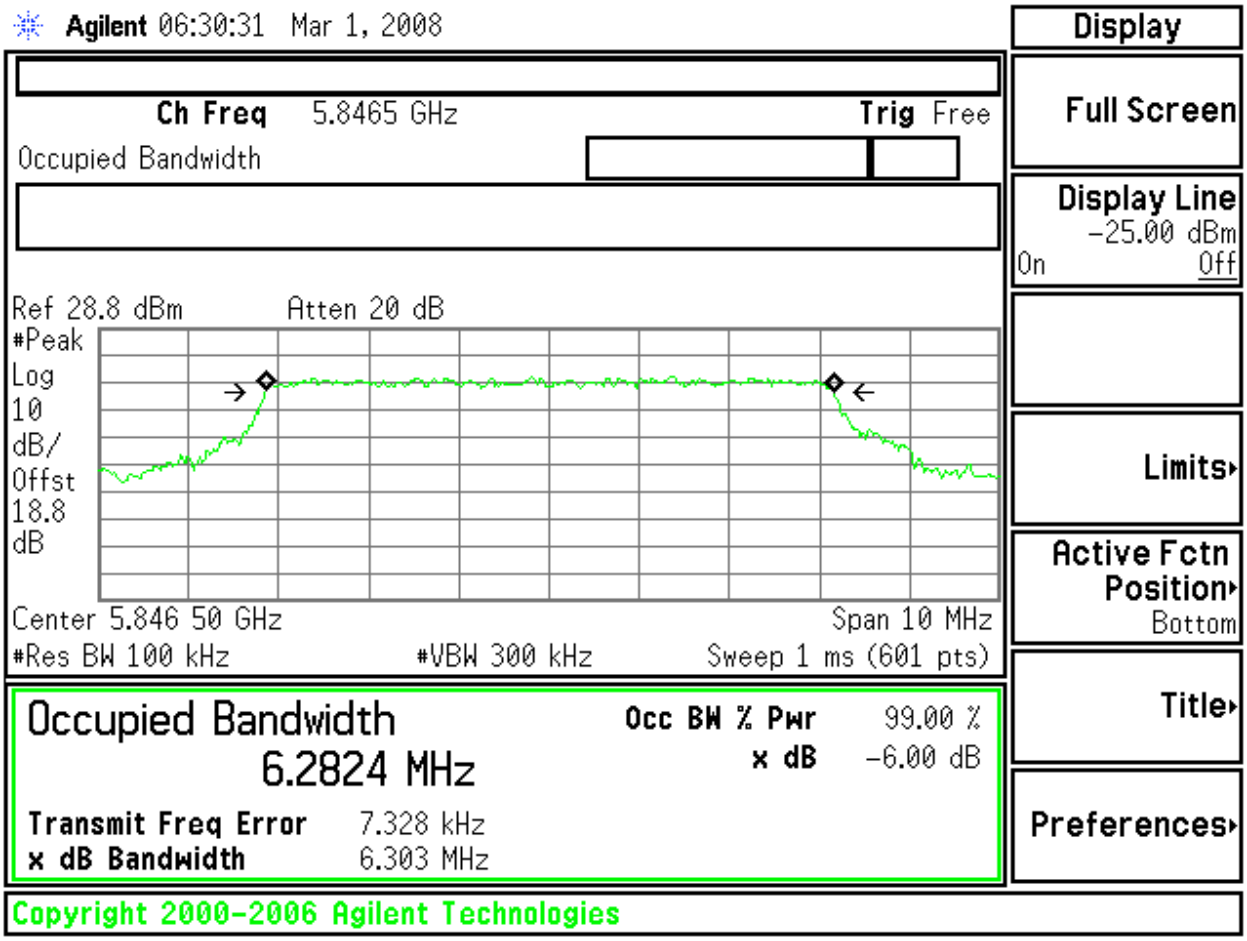
6 dB BANDWIDTH LOW CHANNEL 7 MHz EBW



6 dB BANDWIDTH MID CHANNEL 7 MHz EBW



6 dB BANDWIDTH HIGH CHANNEL 7 MHz EBW



4.1.2. POWER SPECTRAL DENSITY

LIMIT

15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

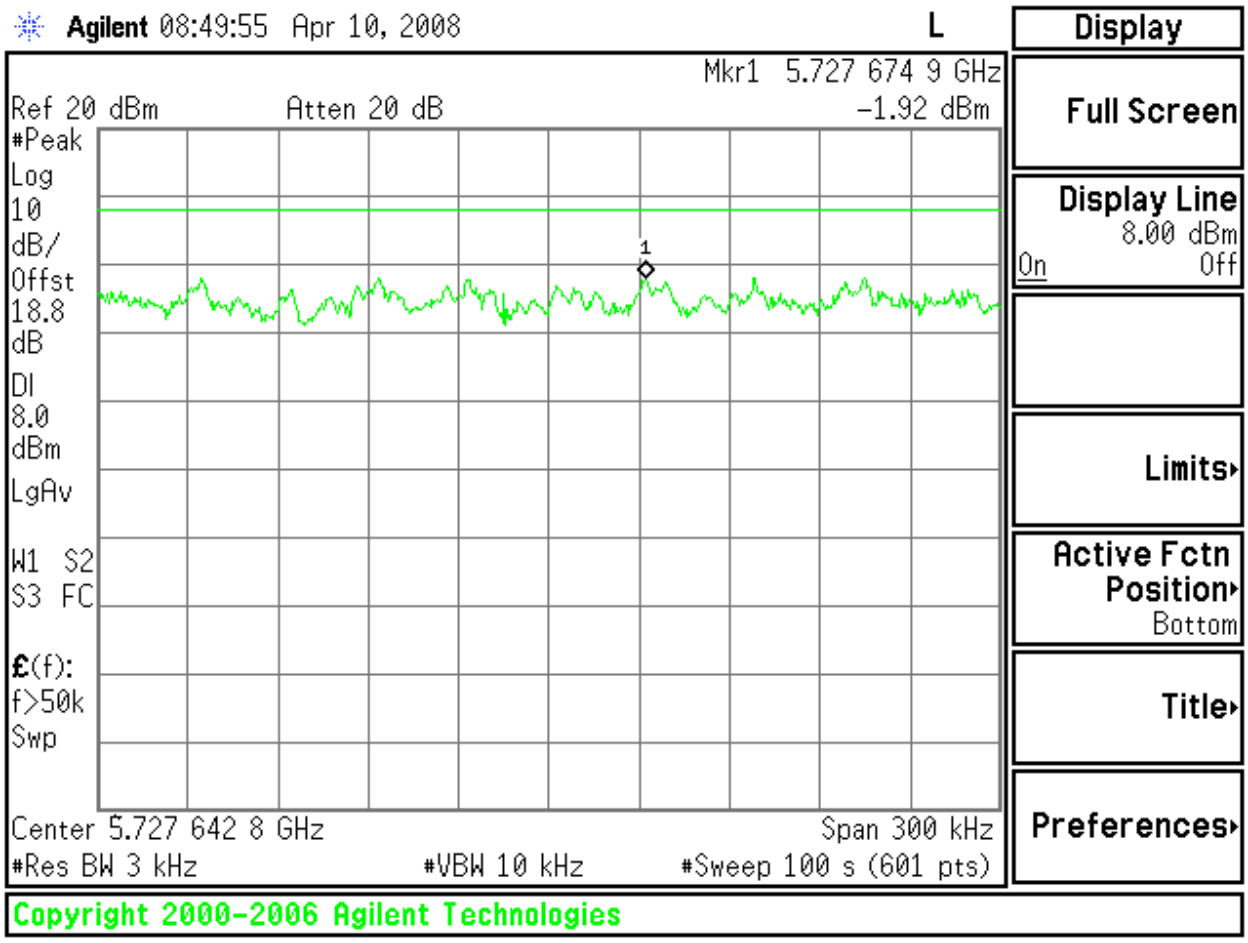
TEST PROCEDURE

Locate and zoom in on emission peak(s) within the passband. Set RBW = 3 kHz, VBW > RBW, sweep= (SPAN/3 kHz) = 300 kHz span/3kHz = 100 seconds. Record highest level using PEAK detector and PEAK SEARCH function.

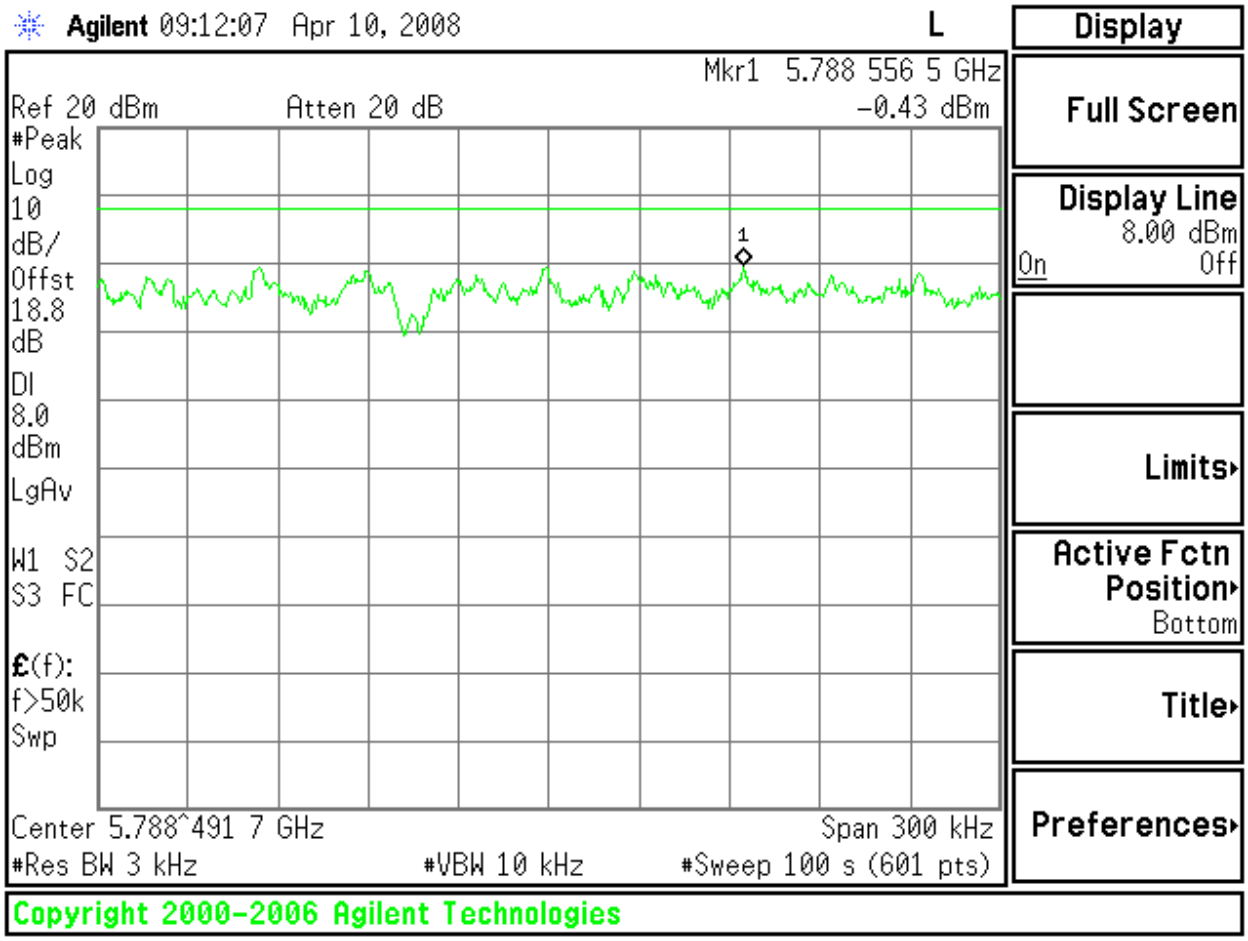
RESULTS

No non-compliance noted:

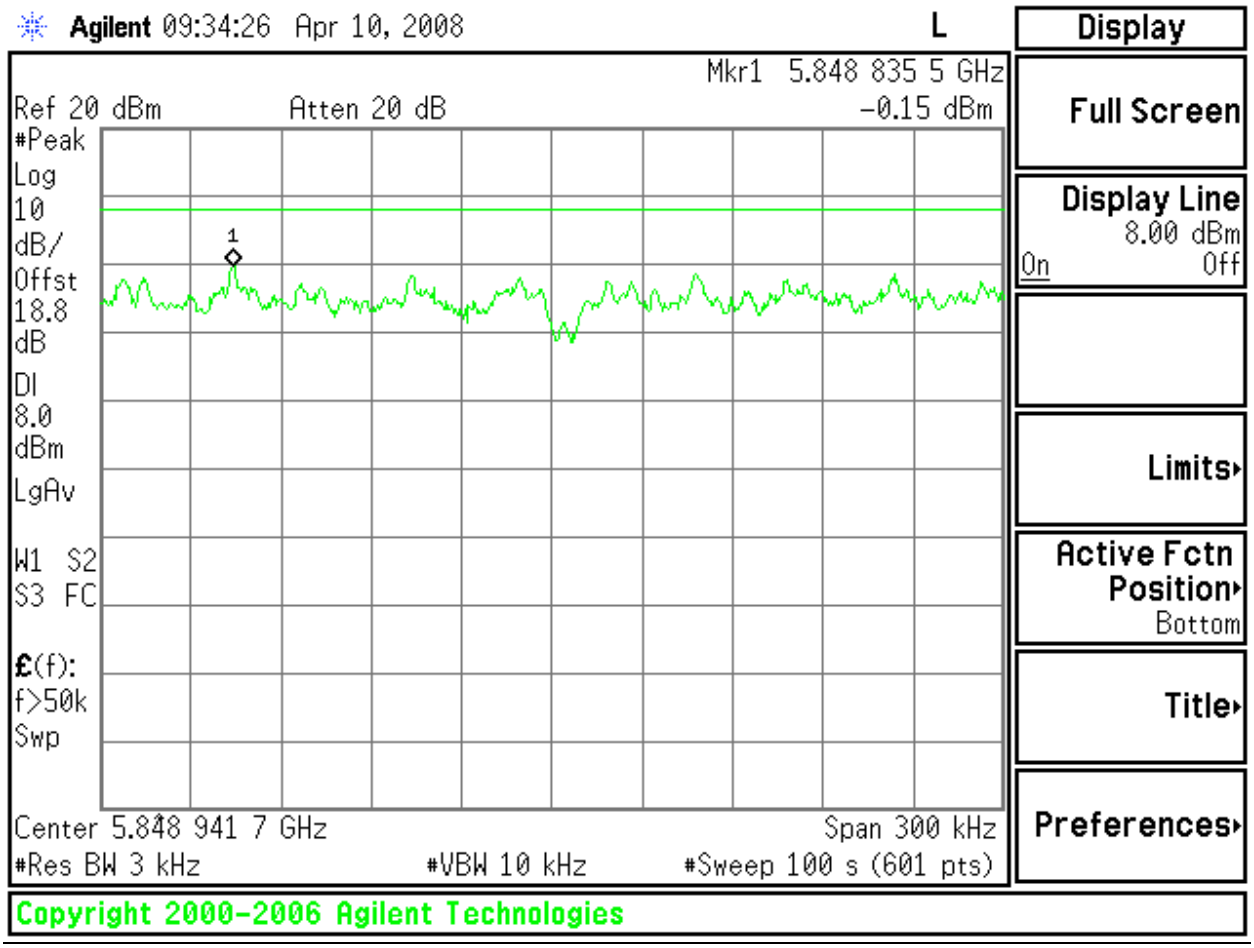
PSD LOW CHANNEL 3.5 MHZ EBW



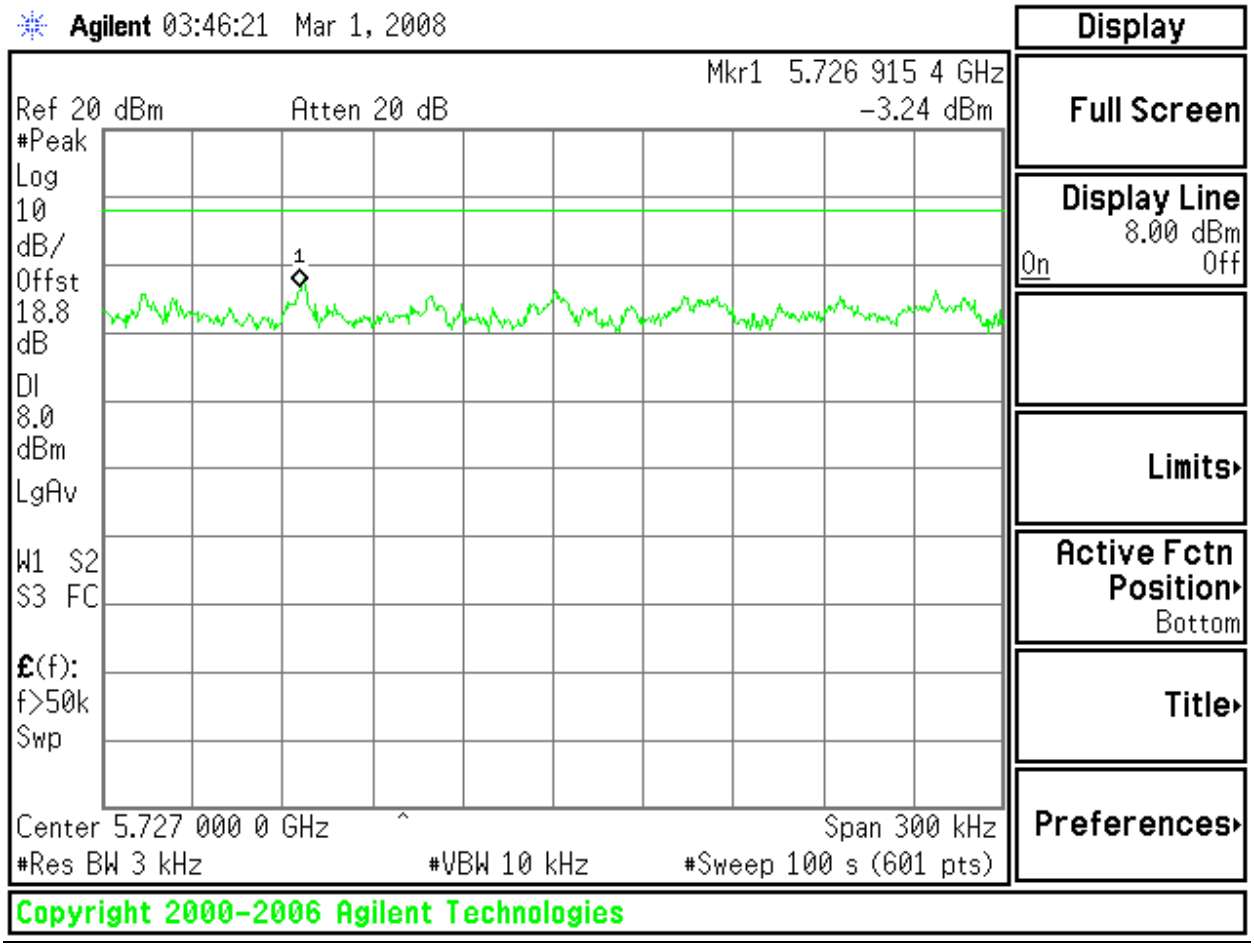
PSD MID CHANNEL 3.5 MHZ EBW



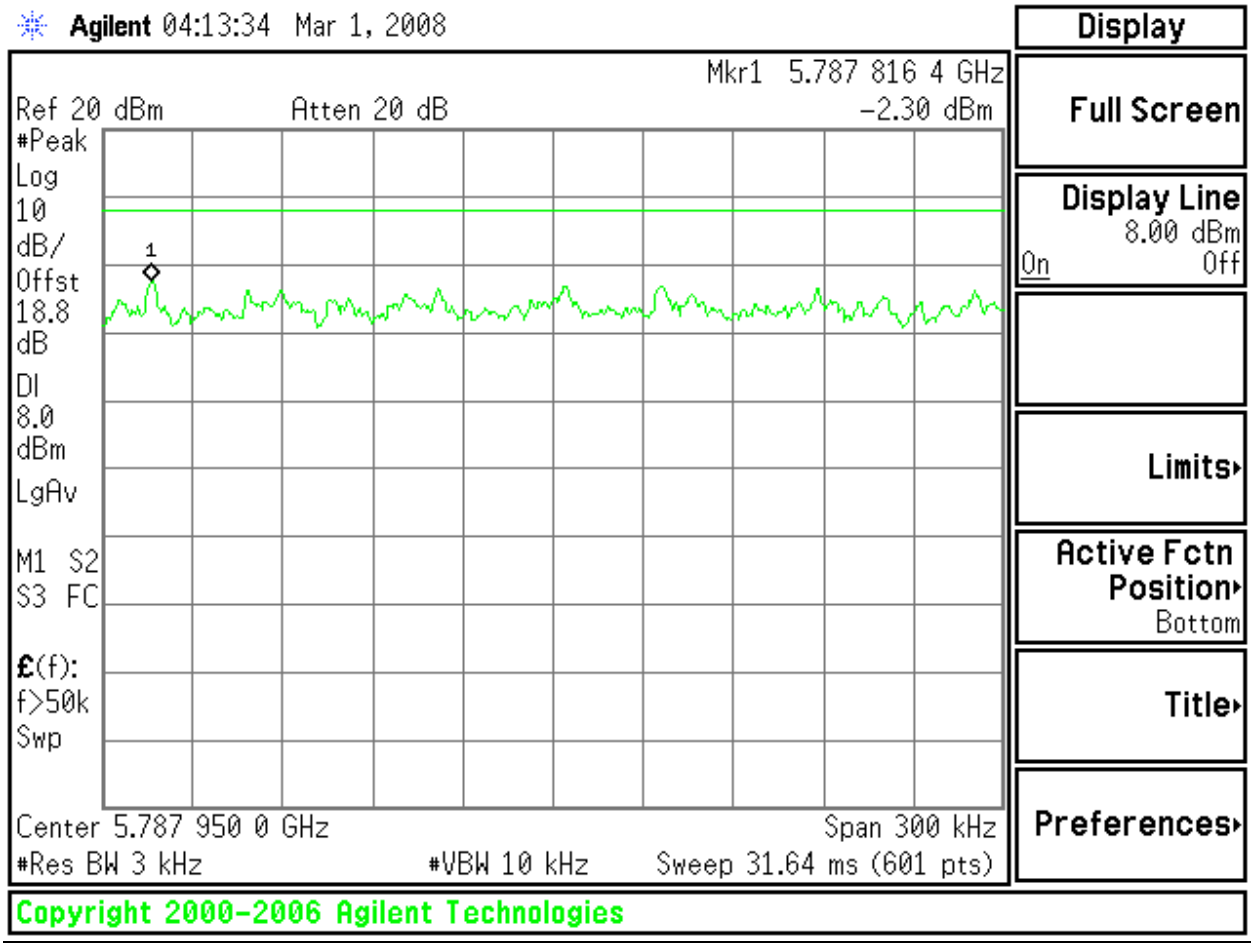
PSD HIGH CHANNEL 3.5 MHZ EBW



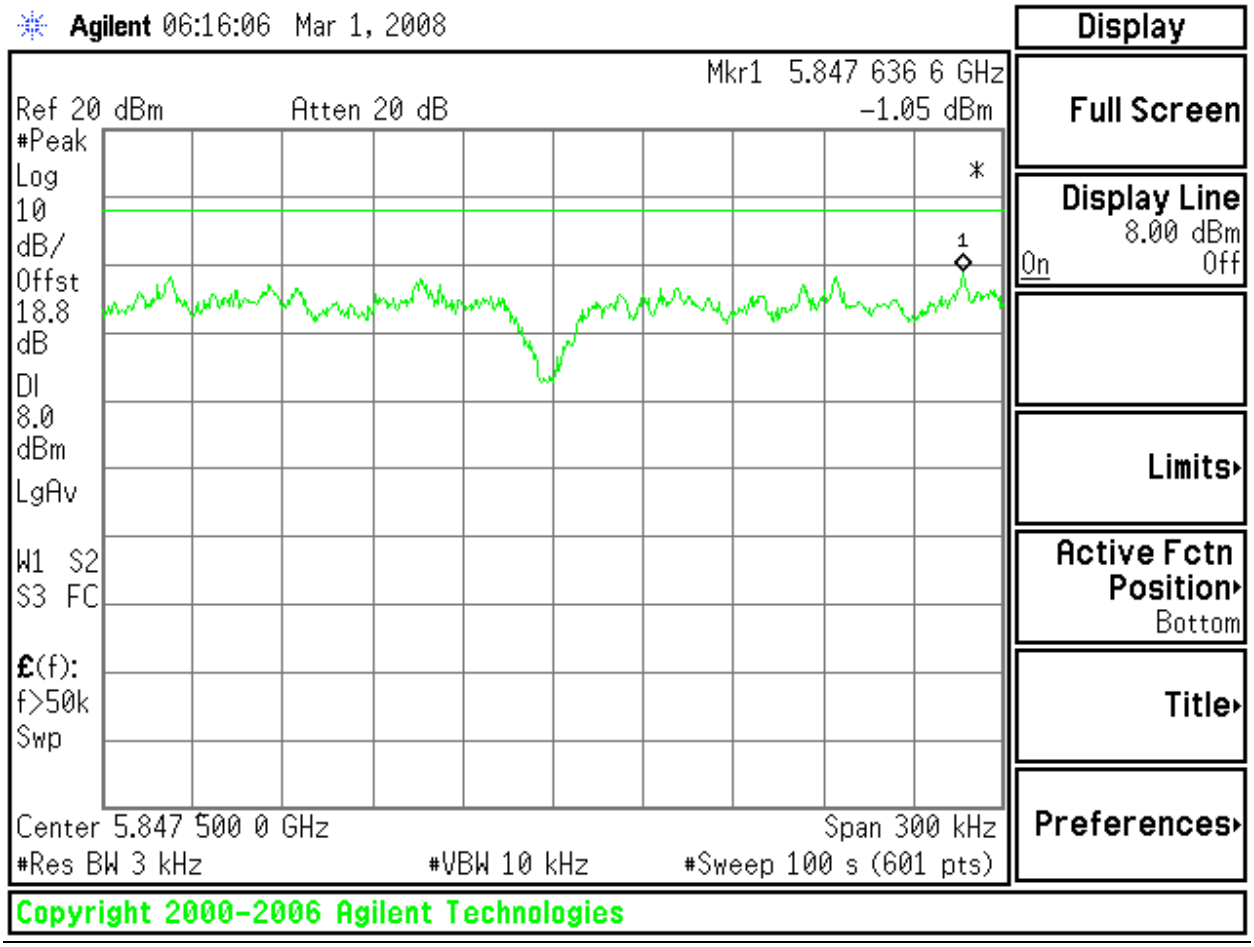
PSD LOW CHANNEL 5 MHZ EBW



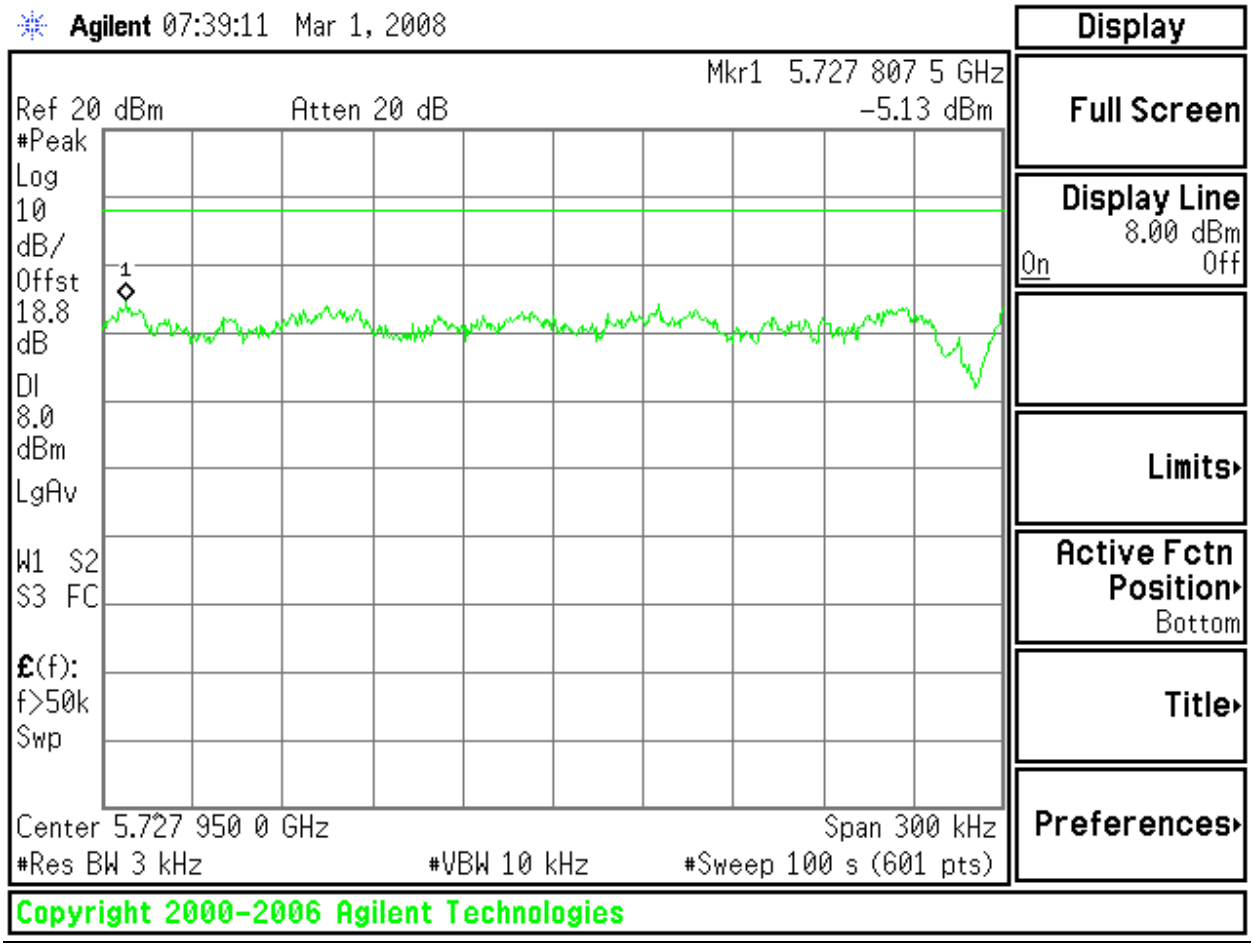
PSD MID CHANNEL 5 MHZ EBW



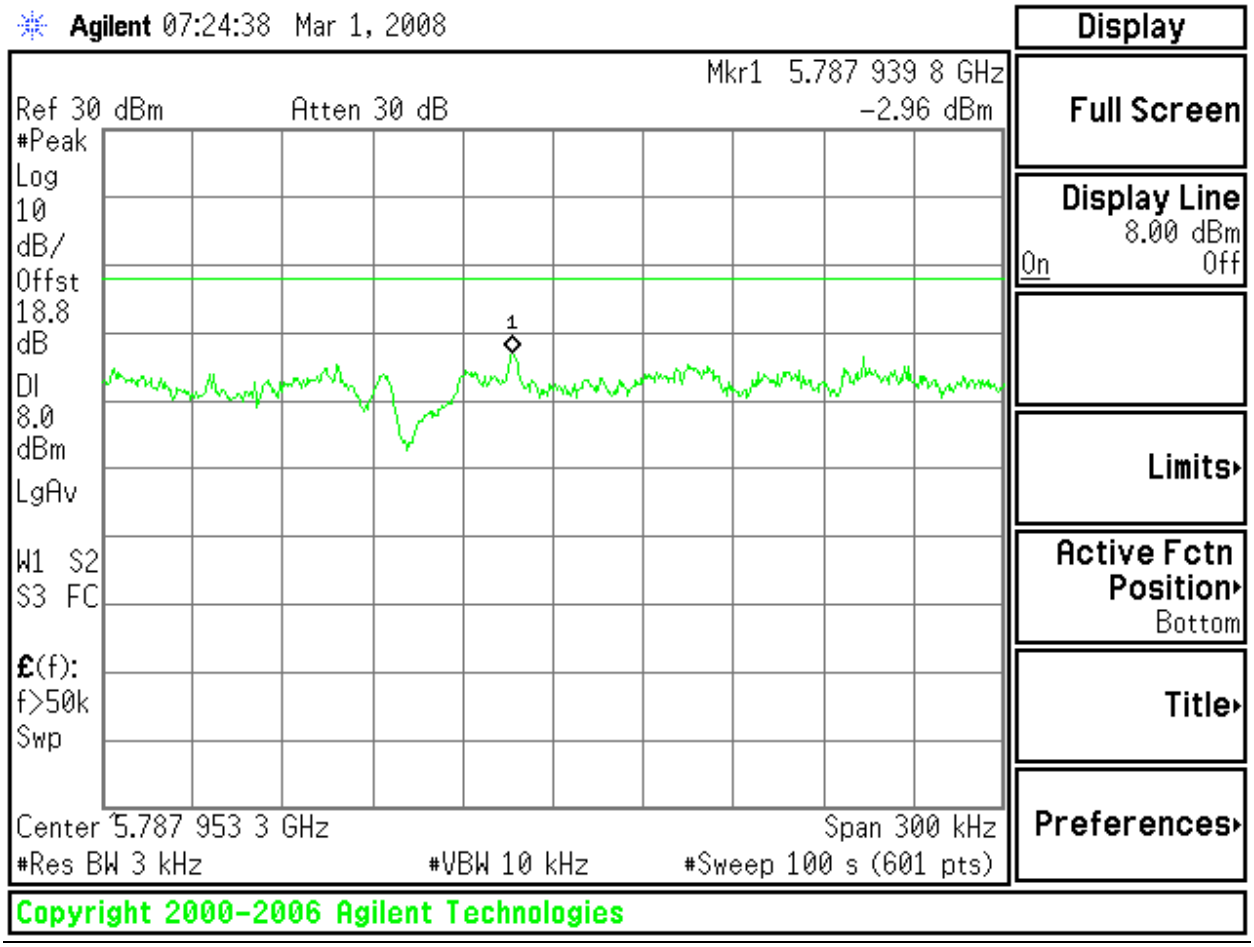
PSD HIGH CHANNEL 5 MHZ EBW



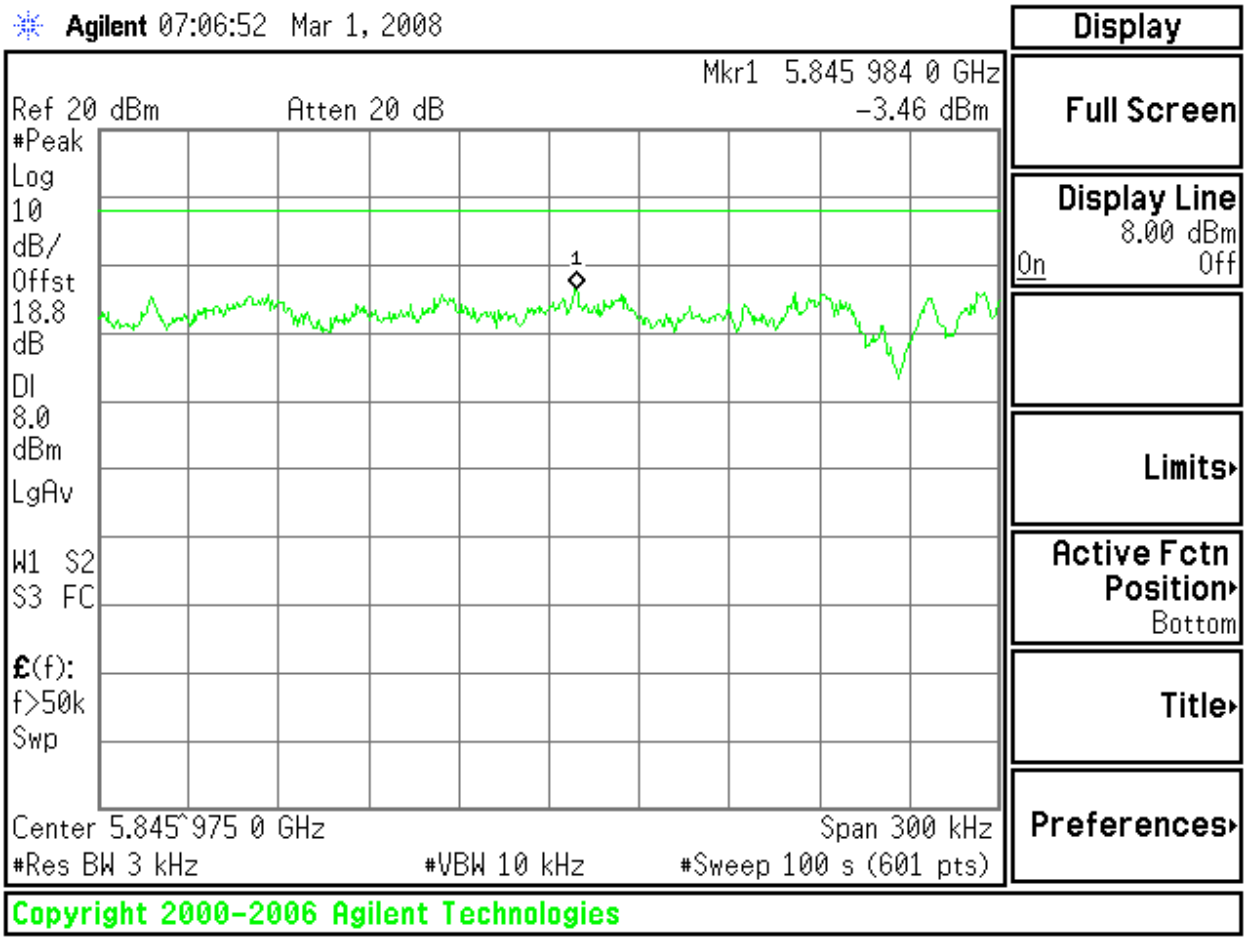
PSD LOW CHANNEL 7 MHZ EBW



PSD MID CHANNEL 7 MHZ EBW



PSD HIGH CHANNEL 7 MHZ EBW



4.1.3. PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Maximum antenna gain is 18 dBi. For point to point operation in the 5.725-5.850 MHz band the eirp is not limited, so up to 30 dBm power input to the antenna is allowed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The built-in Channel Power function was used to measure peak output power.

RESULTS

No non-compliance noted:

3.5 MHz EBW

	(MHz)	(dBm)	(mW)
Low	5727.0	17.51	56.4
Middle	5787.5	18.68	73.8
High	5848.0	18.32	67.9

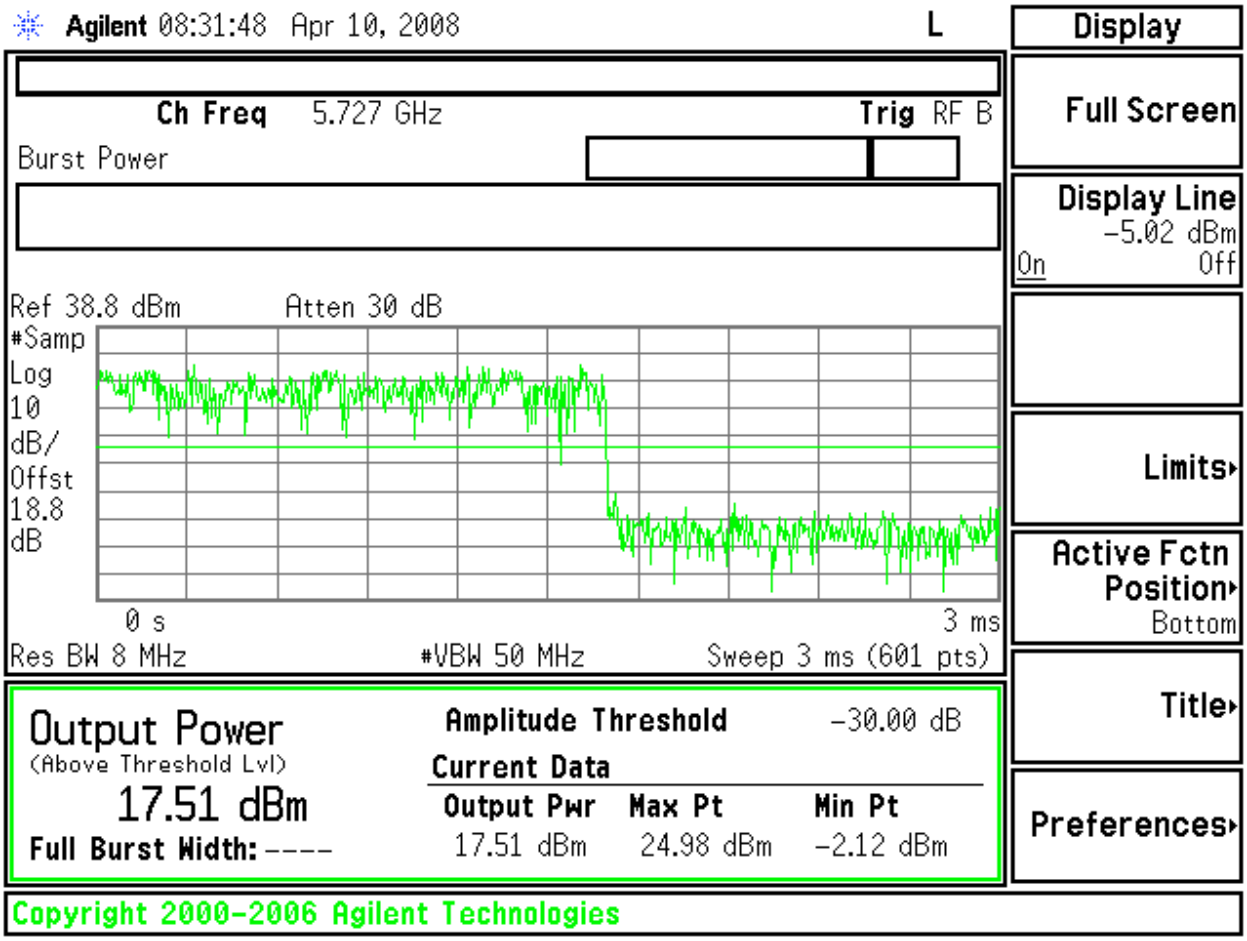
5 MHz EBW

	(MHz)	(dBm)	(mW)
Low	5727.5	17.06	50.8
Middle	5787.5	17.84	60.8
High	5847.5	19.08	80.9

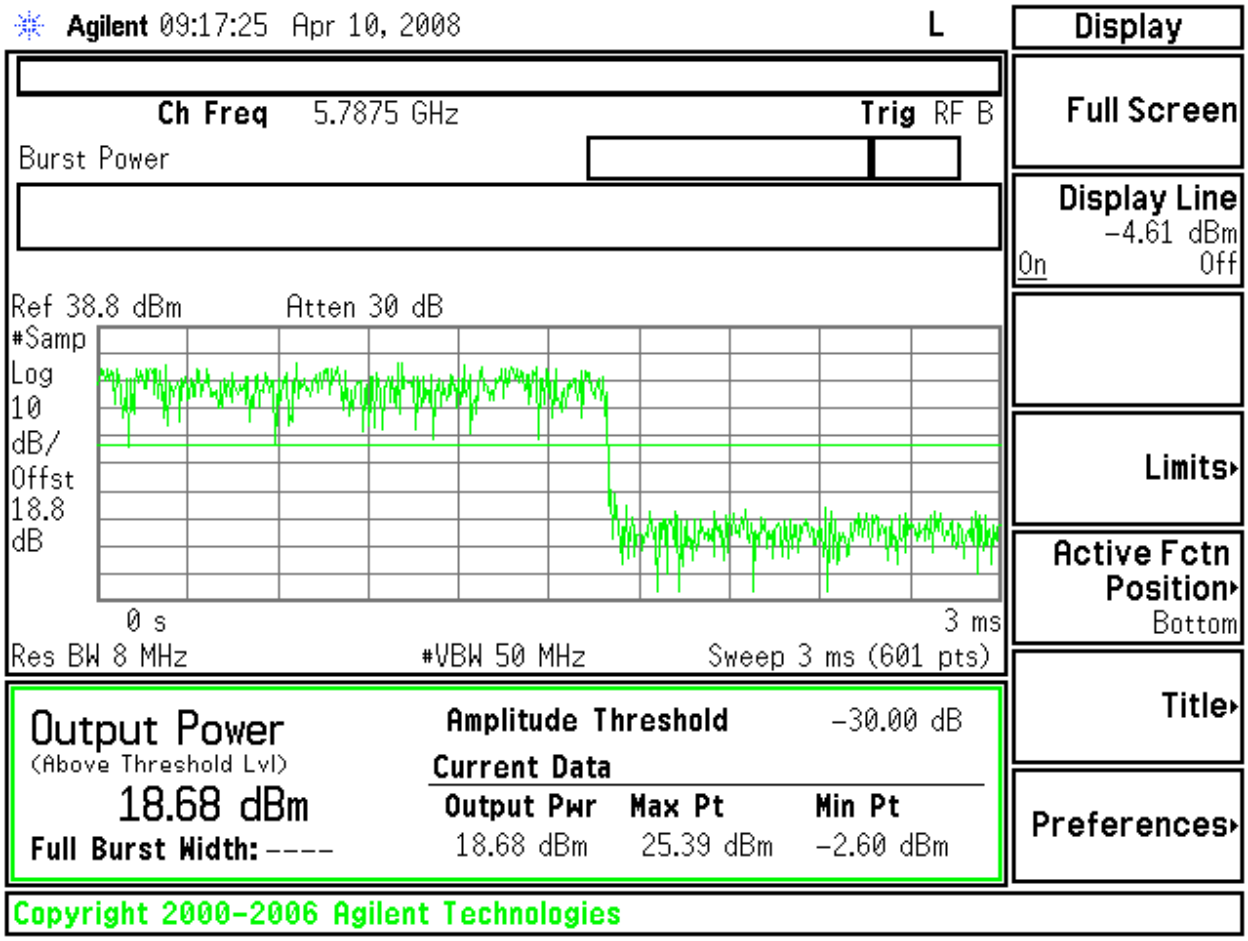
7 MHz EBW

	(MHz)	(dBm)	(mW)
Low	5728.5	17.07	50.9
Middle	5787.5	17.66	58.3
High	5846.5	18.48	70.5

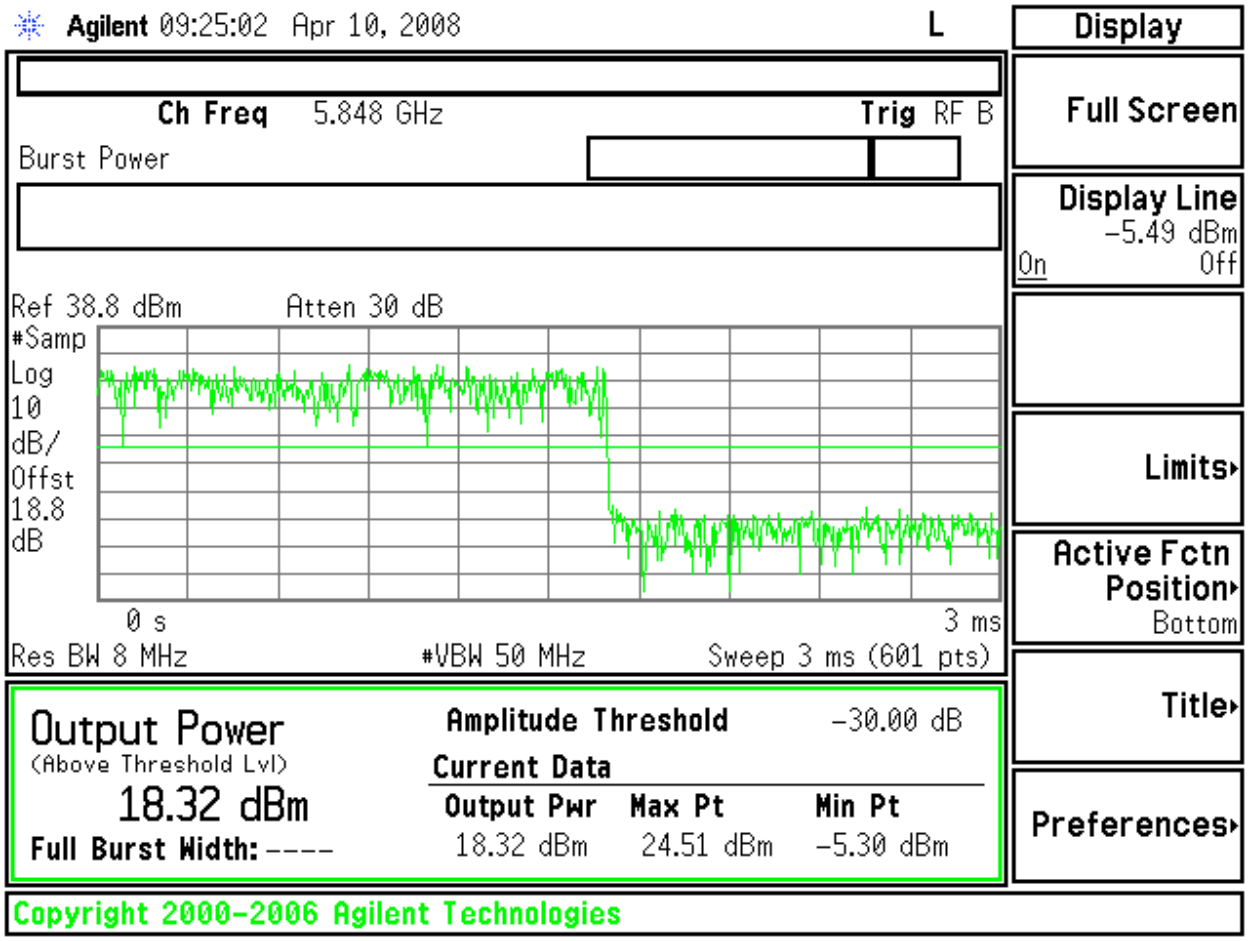
OUTPUT POWER LOW CHANNEL 3.5 MHZ EBW



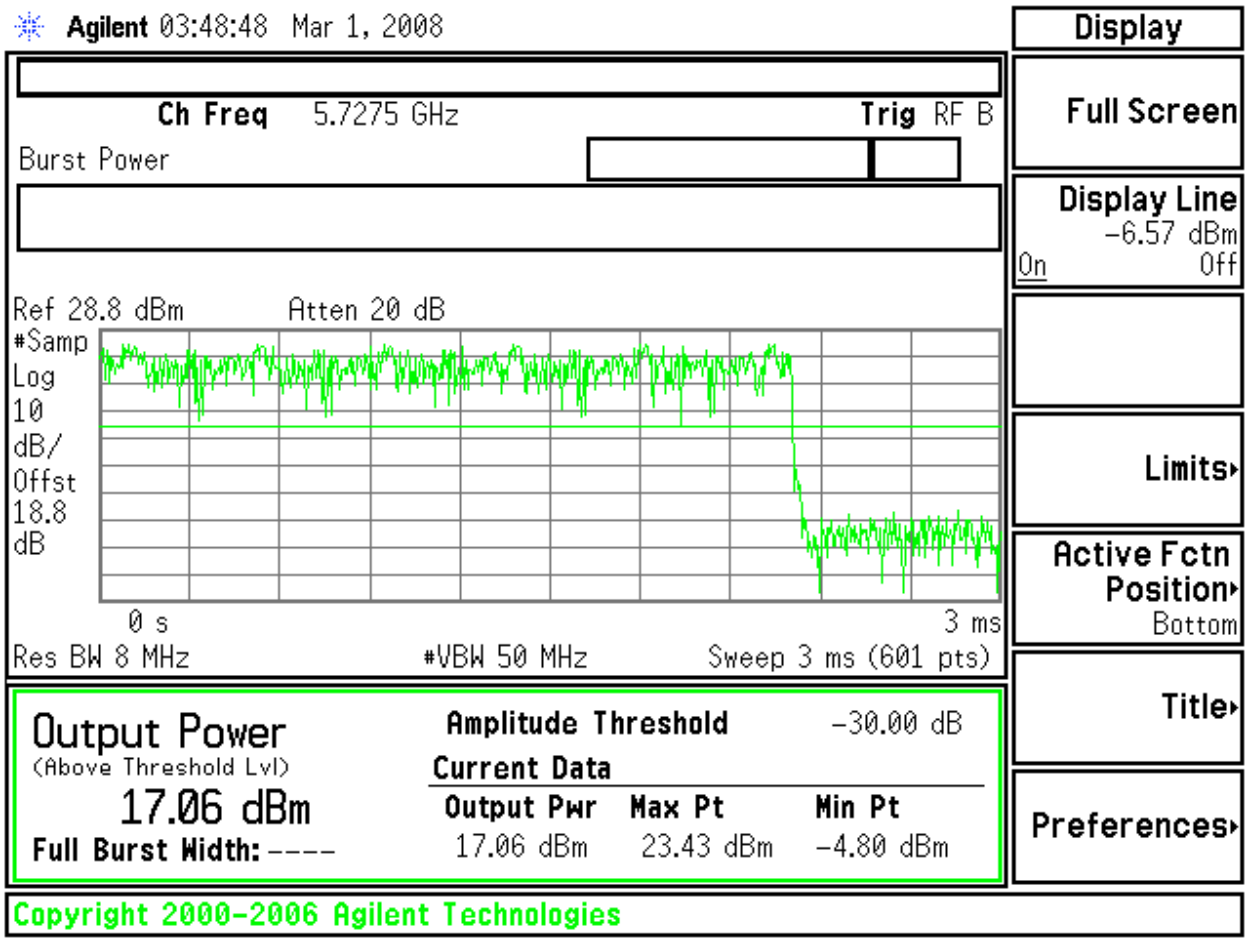
OUTPUT POWER MID CHANNEL 3.5 MHZ EBW



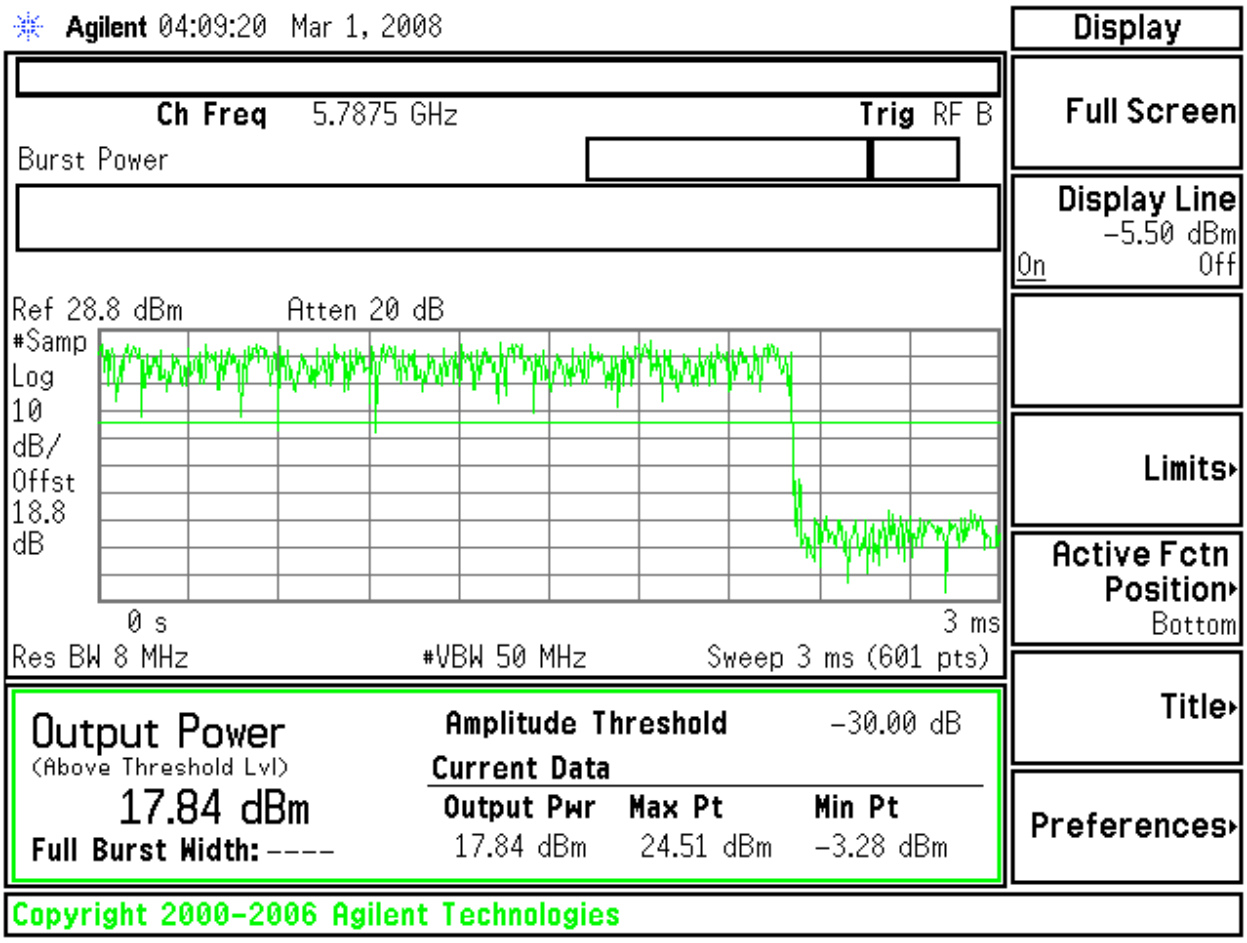
OUTPUT POWER HIGH CHANNEL 3.5 MHZ EBW



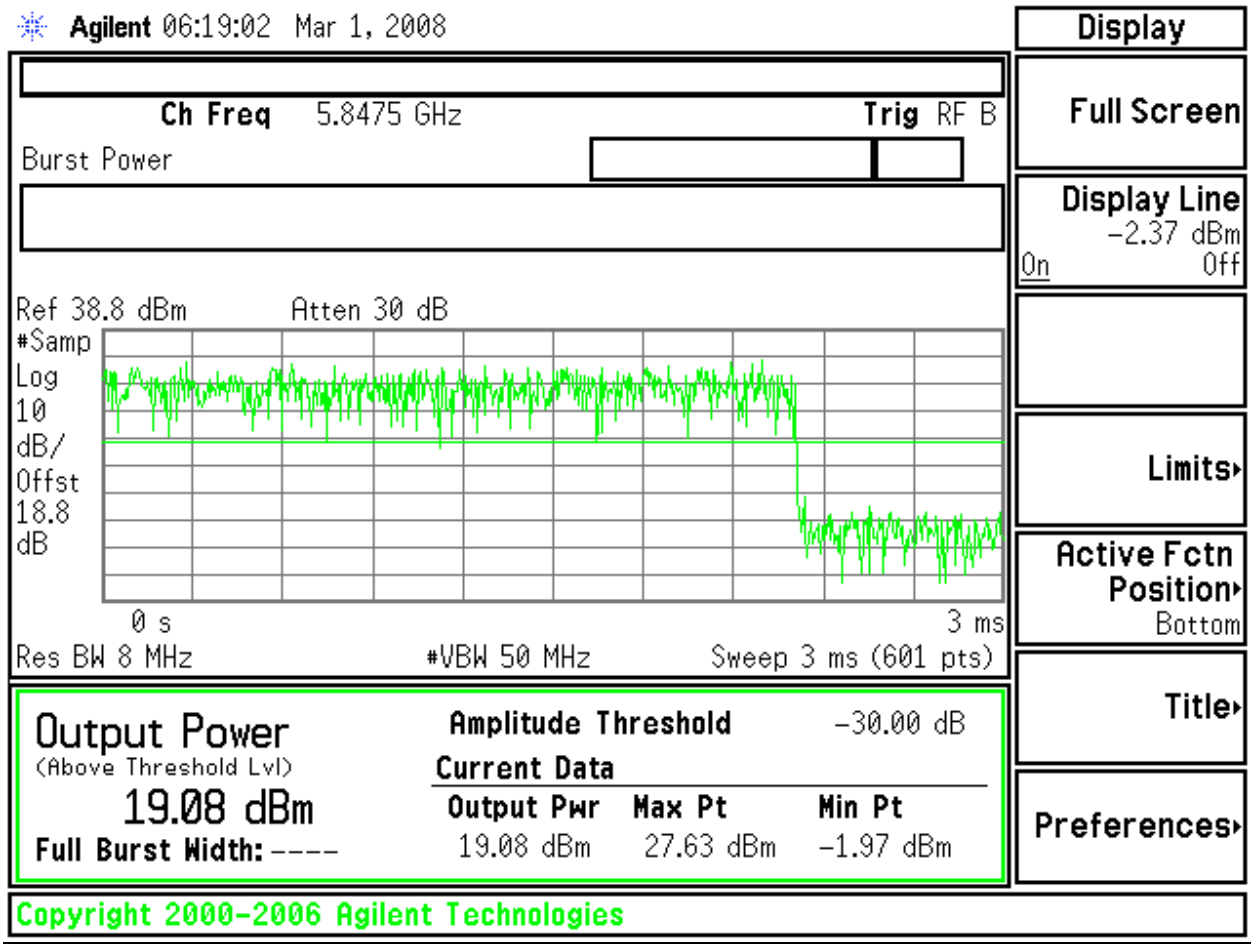
OUTPUT POWER LOW CHANNEL 5MHZ EBW



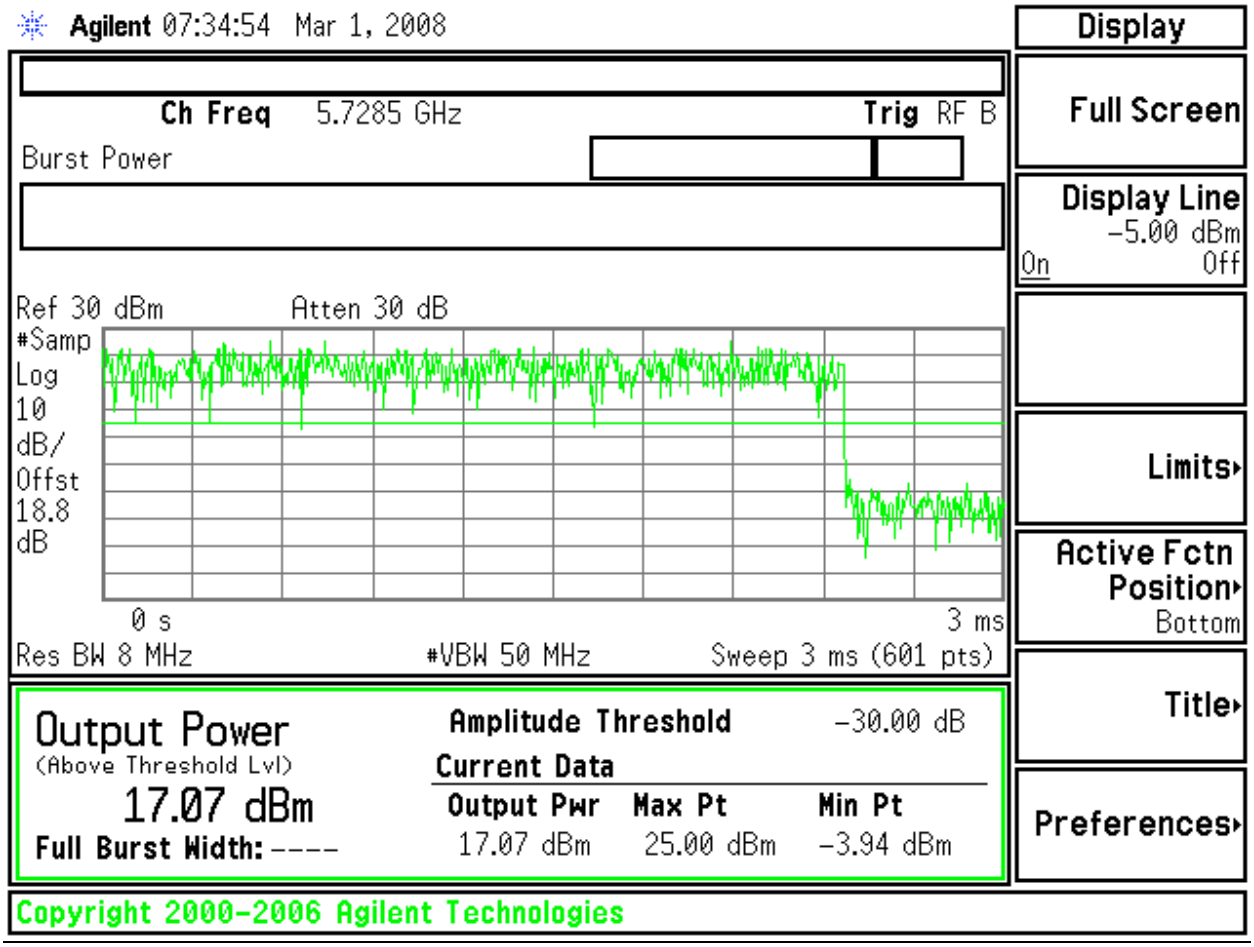
OUTPUT POWER MID CHANNEL 5 MHZ EBW



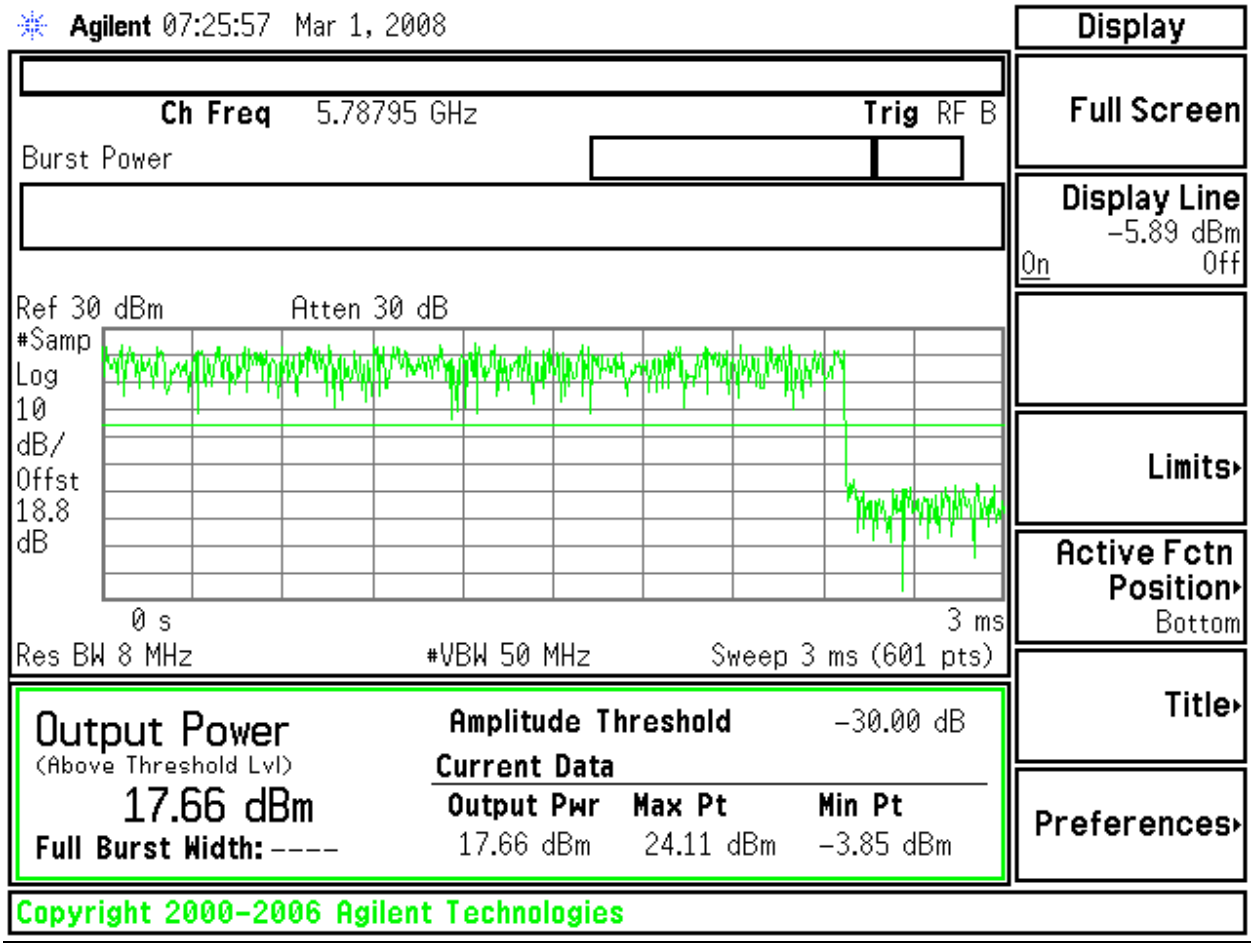
OUTPUT POWER HIGH CHANNEL 5 MHZ EBW



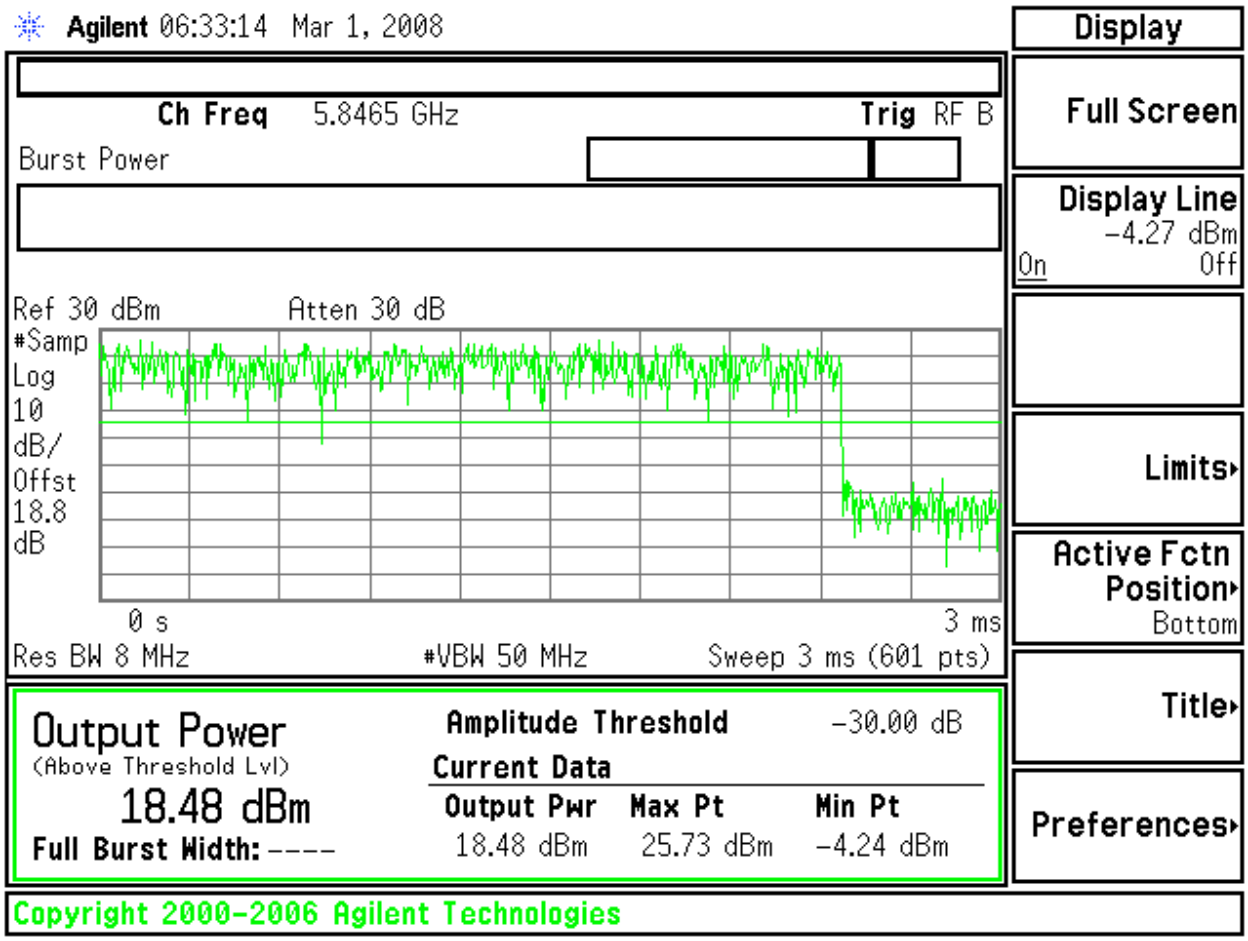
OUTPUT POWER LOW CHANNEL 7 MHZ EBW



OUTPUT POWER MID CHANNEL 7 MHZ EBW



OUTPUT POWER HIGH CHANNEL 7 MHZ EBW



4.1.4. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

CALCULATIONS

Given

$E = \sqrt{(30 * P * G) / d}$

and

$S = E \wedge 2 / 3770$

where

E = Field Strength in Volts/meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$d = \sqrt{((30 * P * G) / (3770 * S))}$

Changing to units of Power to mW and Distance to cm, using:

P (mW) = P (W) / 1000 and
d (cm) =100 * d (m)

yields

$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$
$d = 0.282 * \sqrt{(P * G / S)}$

where

d = distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P (mW) = 10 ^ (P (dBm) / 10) and
G (numeric) = 10 ^ (G (dBi) / 10)

yields

$d = 0.282 * 10 \wedge ((P + G) / 20) / \sqrt{S}$ Equation (1)

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

Equation (1) and the measured peak power is used to calculate the MPE distance.

LIMITS

From §1.1310 Table 1 (B), S = 0.6 mW/cm^2

RESULTS

No non-compliance noted:

Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
1.0	19.08	18.00	20.15

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

4.1.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

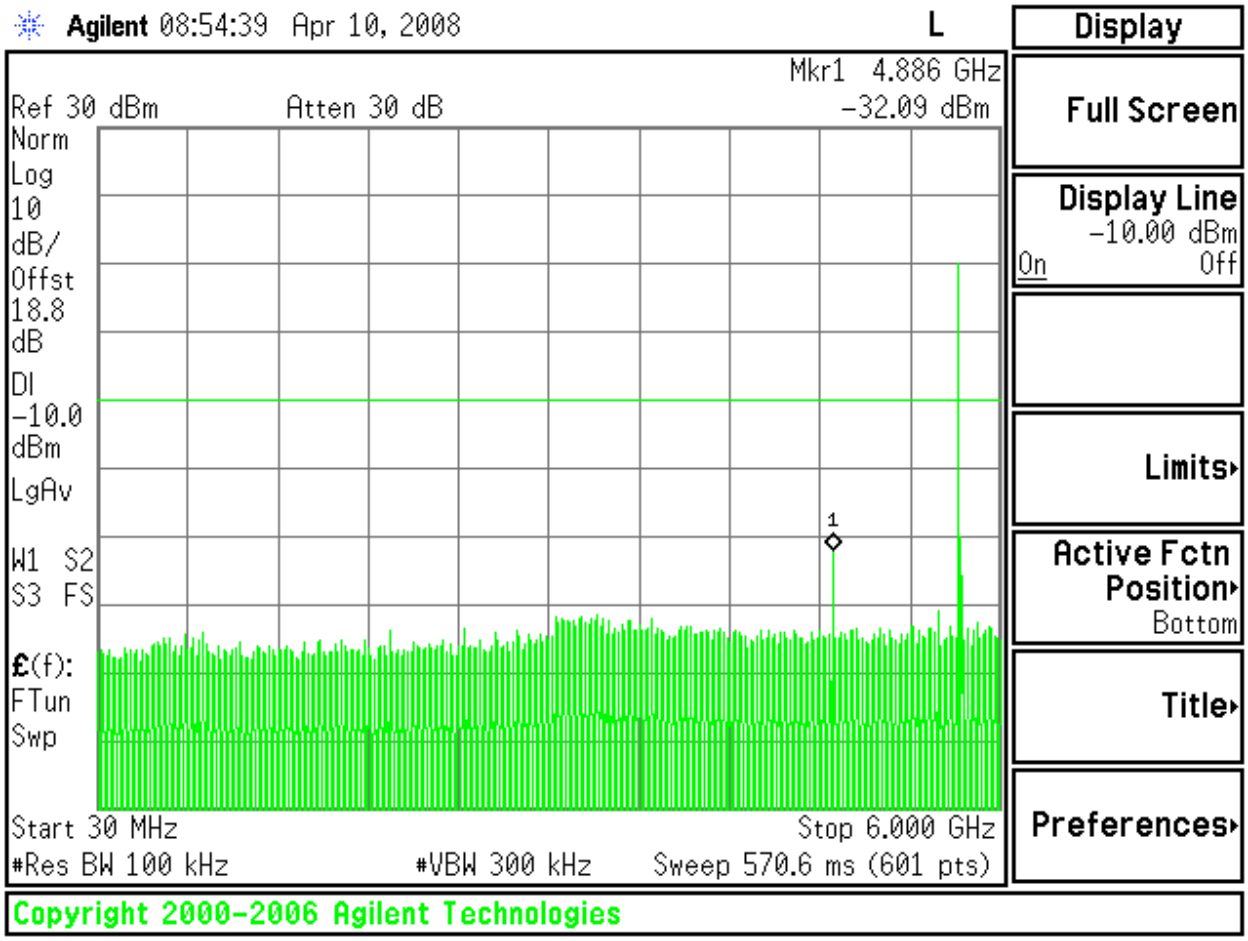
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

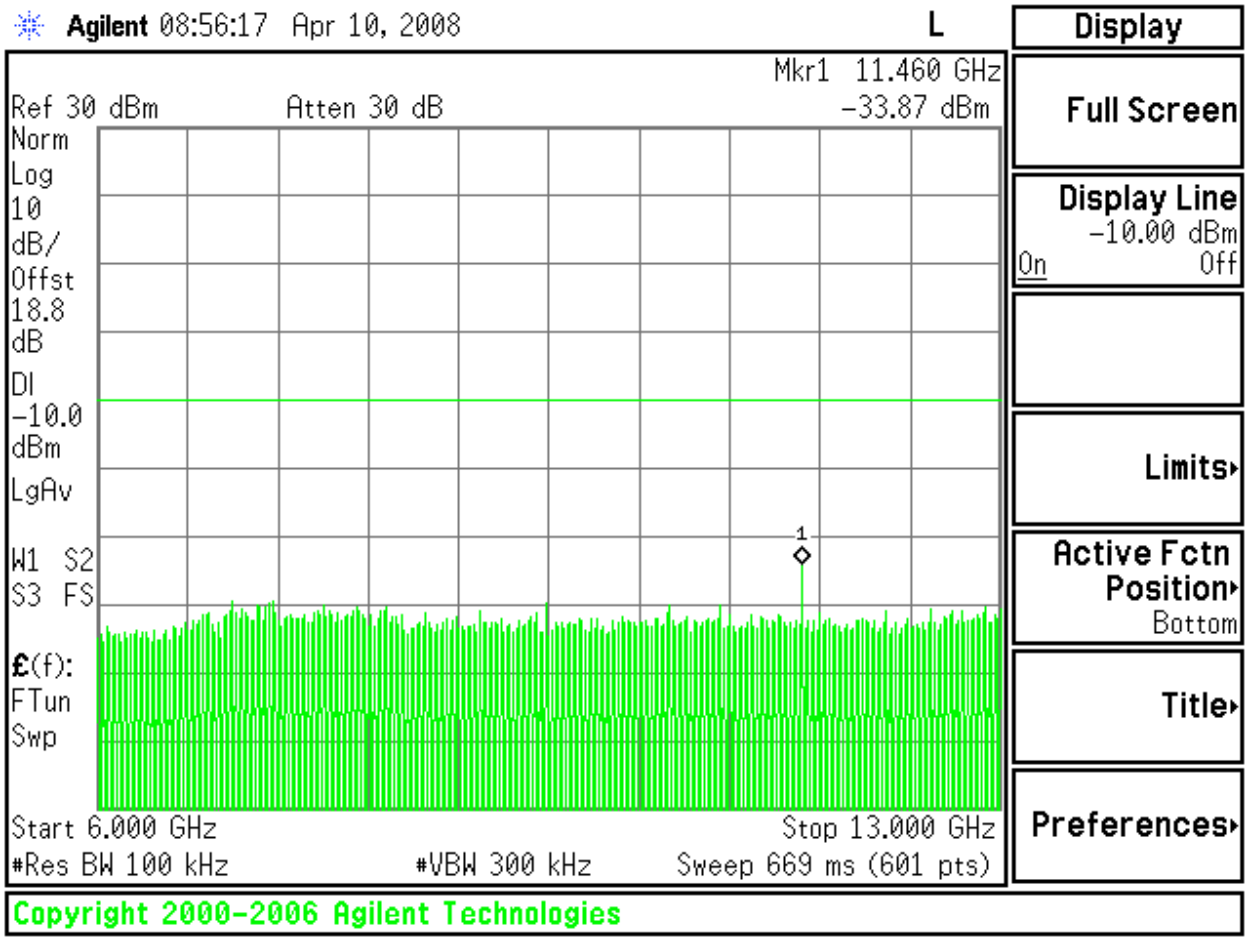
RESULTS

No non-compliance noted:

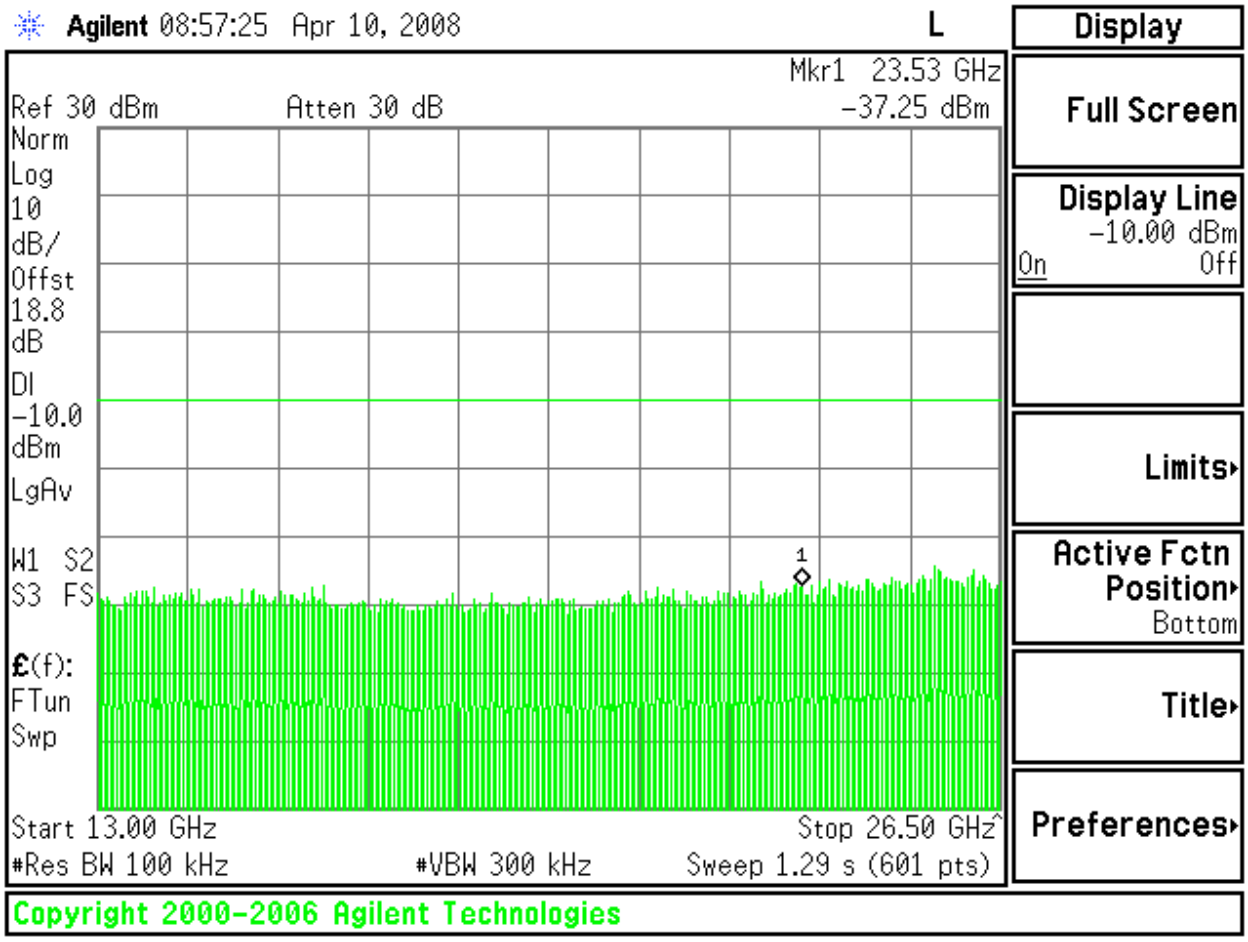
SPURIOUS EMISSIONS, LOW CHANNEL 3.5 MHZ EBW 1/3



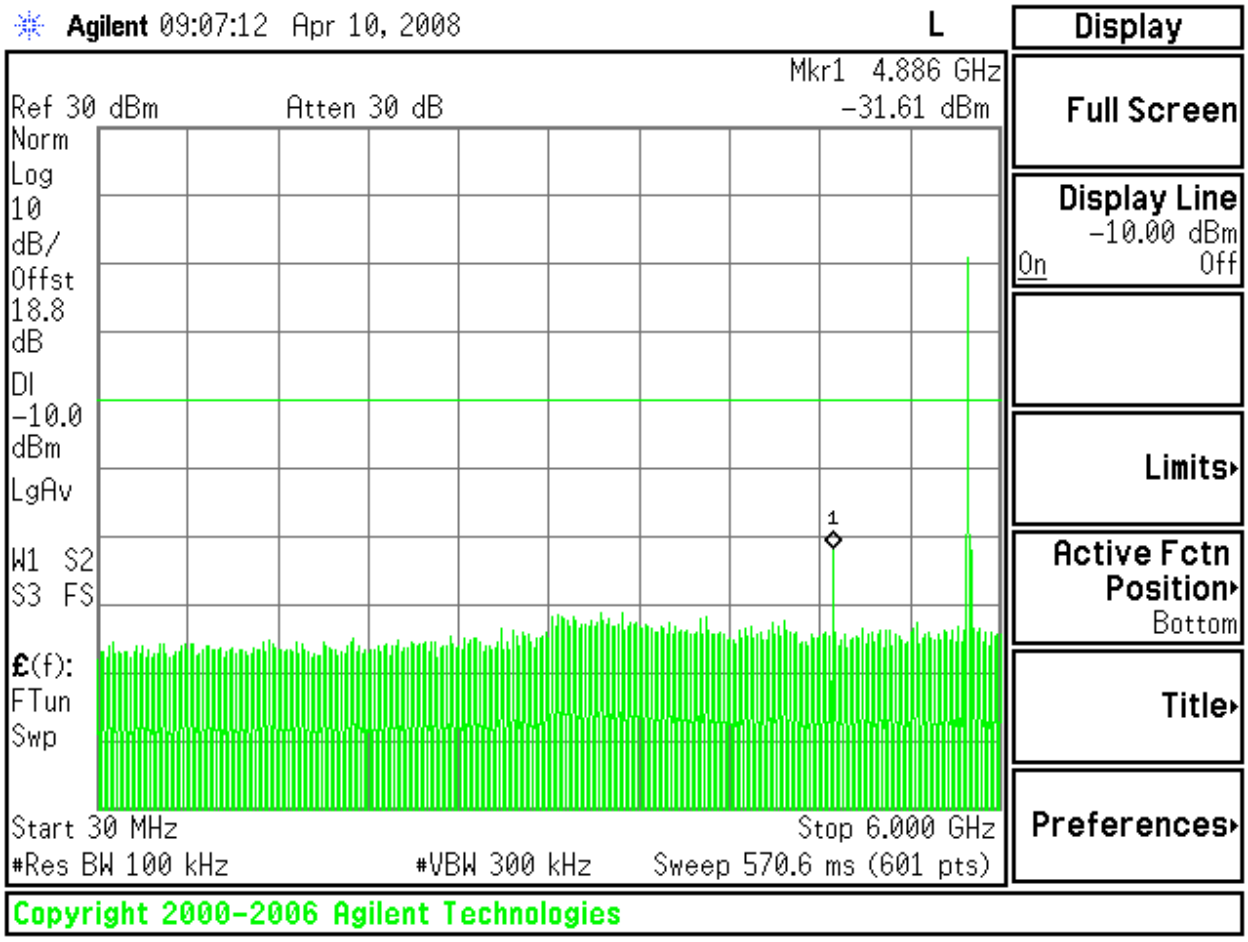
SPURIOUS EMISSIONS, LOW CHANNEL 3.5 MHZ EBW 2/3



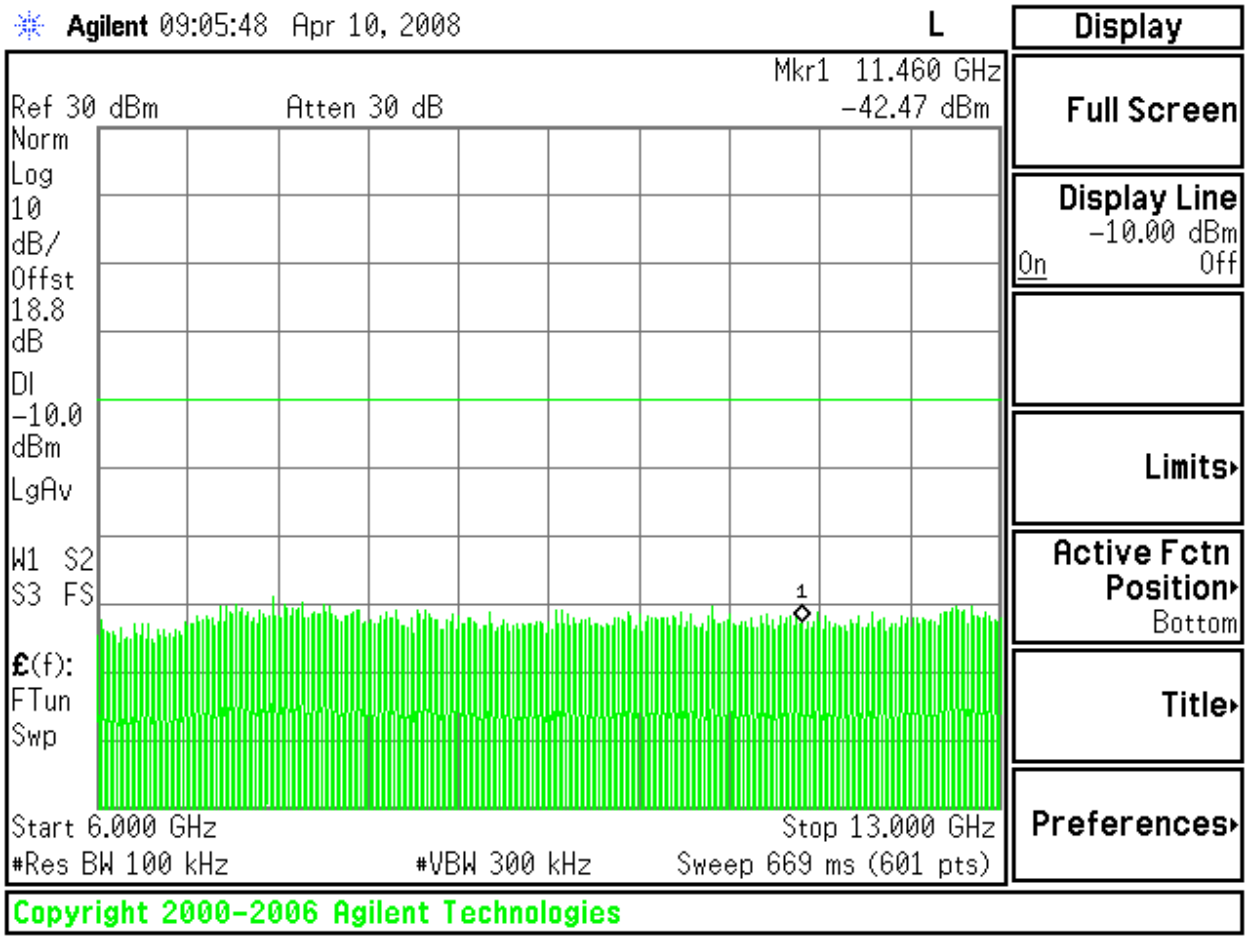
SPURIOUS EMISSIONS, LOW CHANNEL 3.5 MHZ EBW 3/3



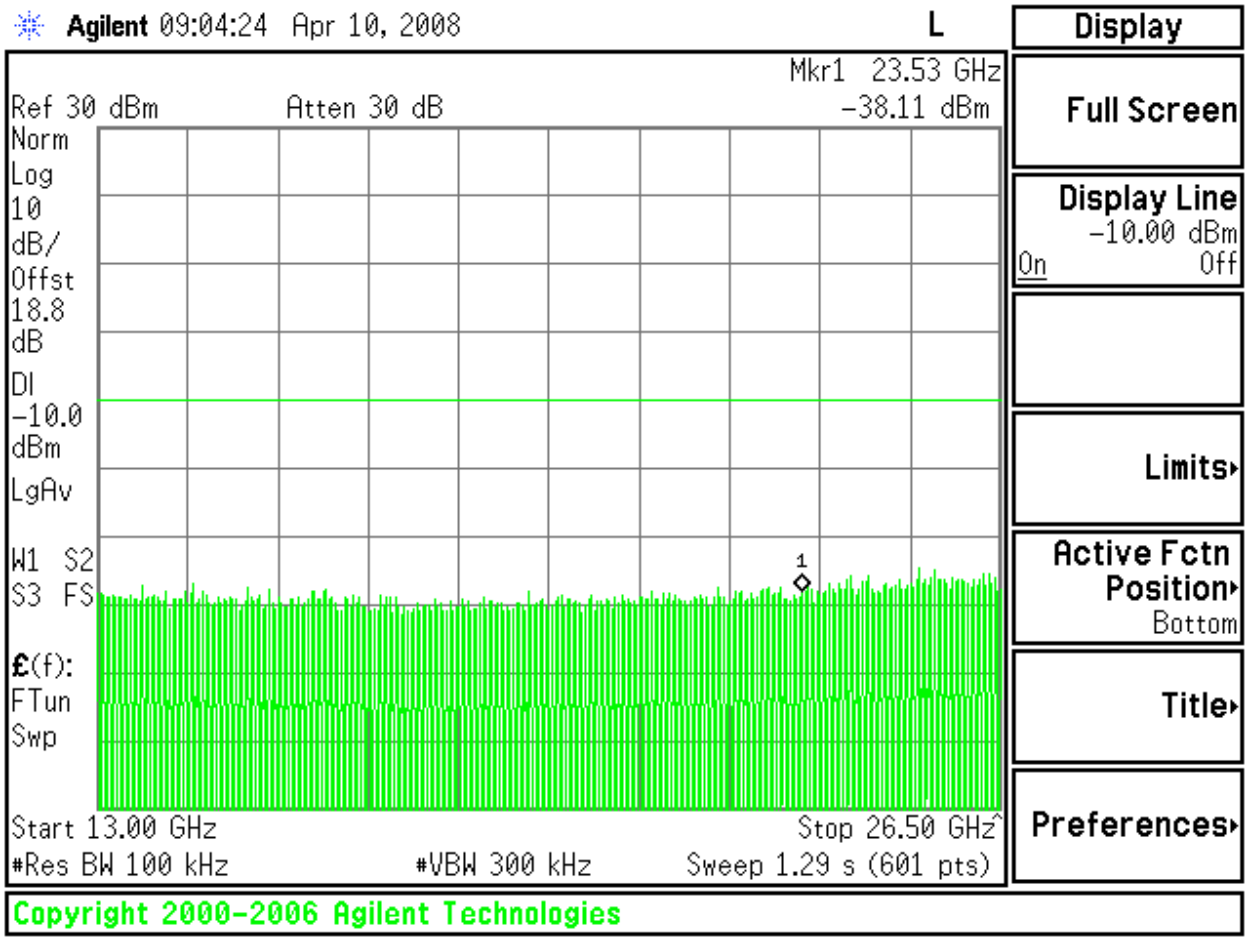
SPURIOUS EMISSIONS, MID CHANNEL 3.5 MHZ EBW 1/3



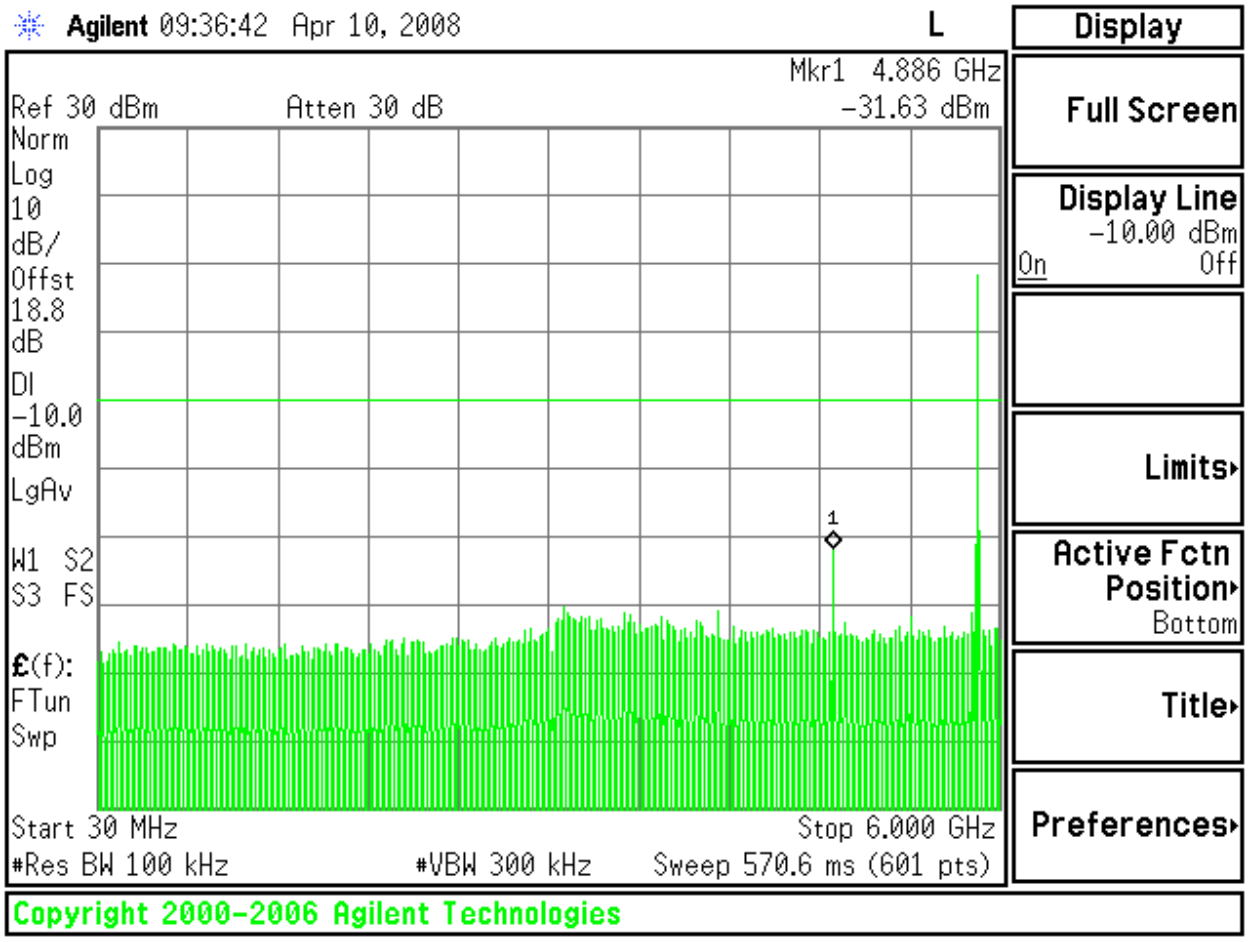
SPURIOUS EMISSIONS, MID CHANNEL 3.5 MHZ EBW 2/3



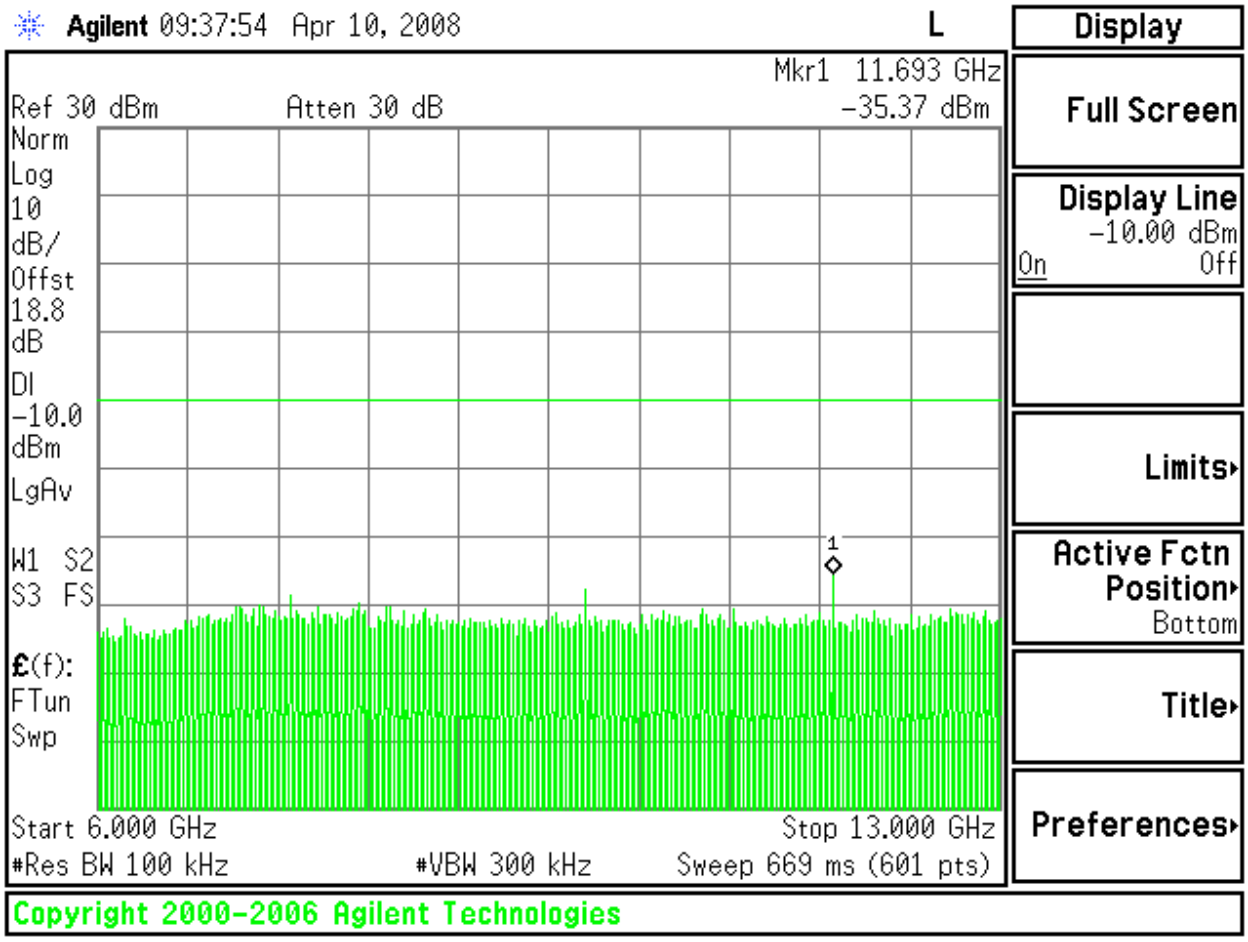
SPURIOUS EMISSIONS, MID CHANNEL 3.5 MHZ EBW 3/3



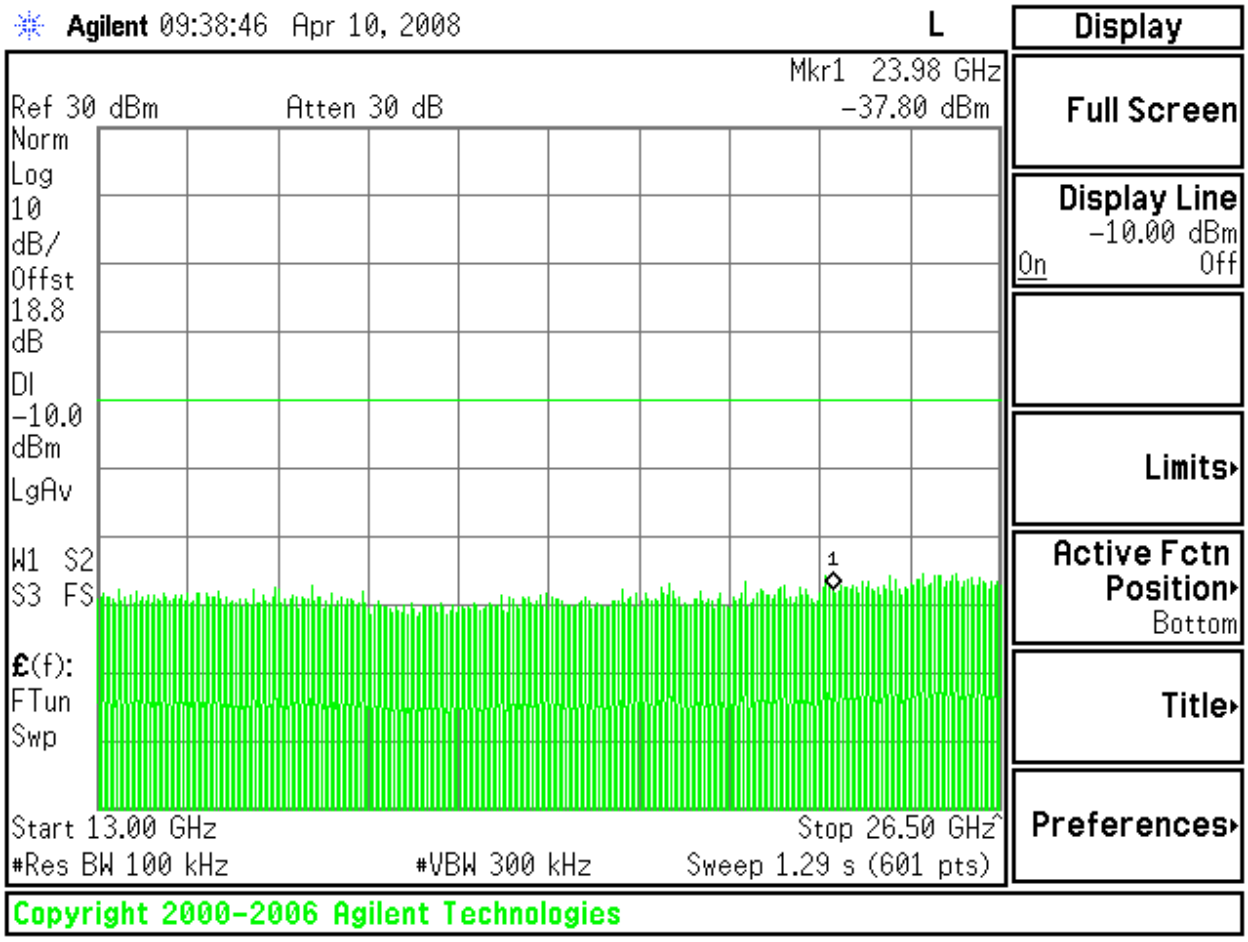
SPURIOUS EMISSIONS, HIGH CHANNEL 3.5 MHZ EBW 1/3



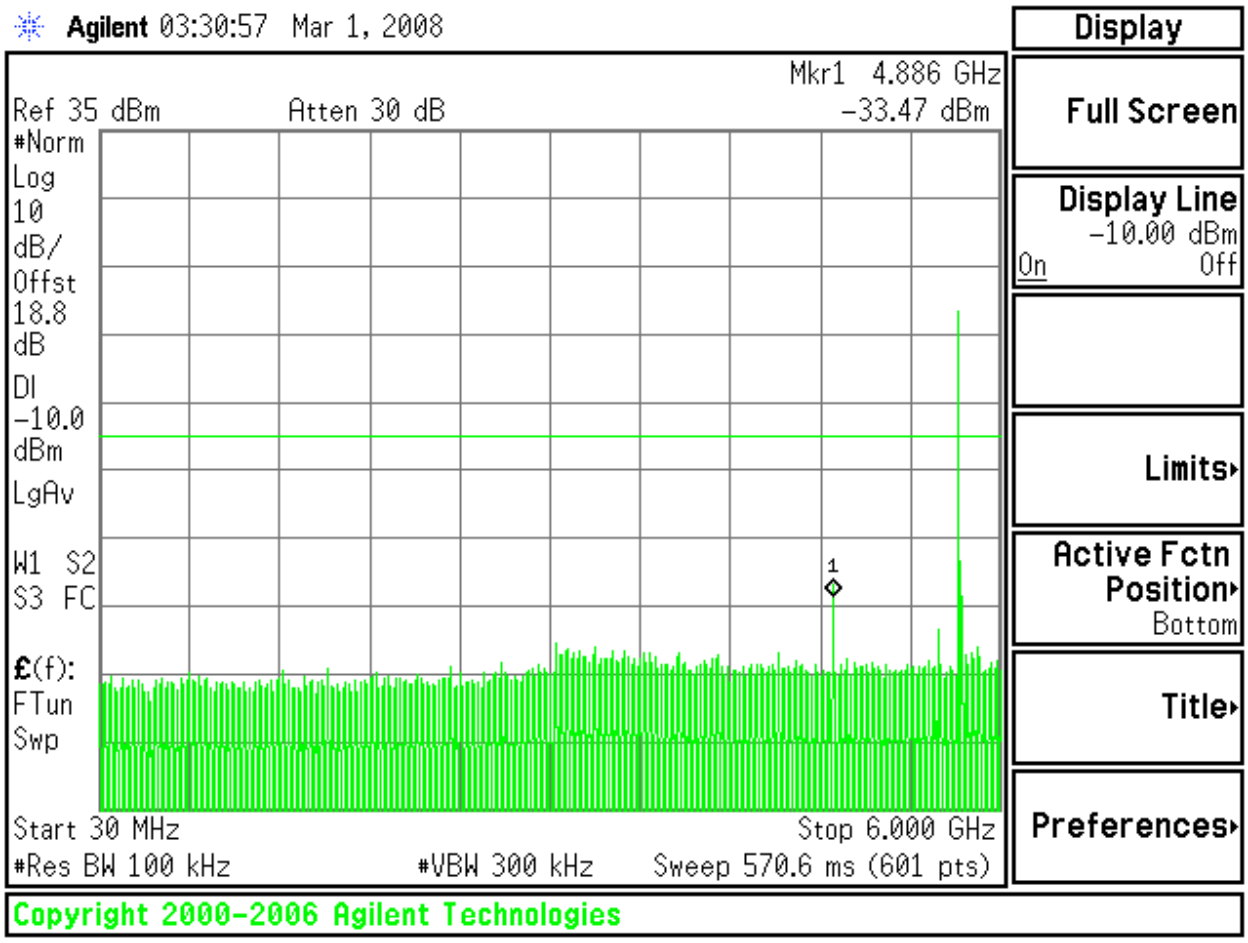
SPURIOUS EMISSIONS, HIGH CHANNEL 3.5 MHZ EBW 2/3



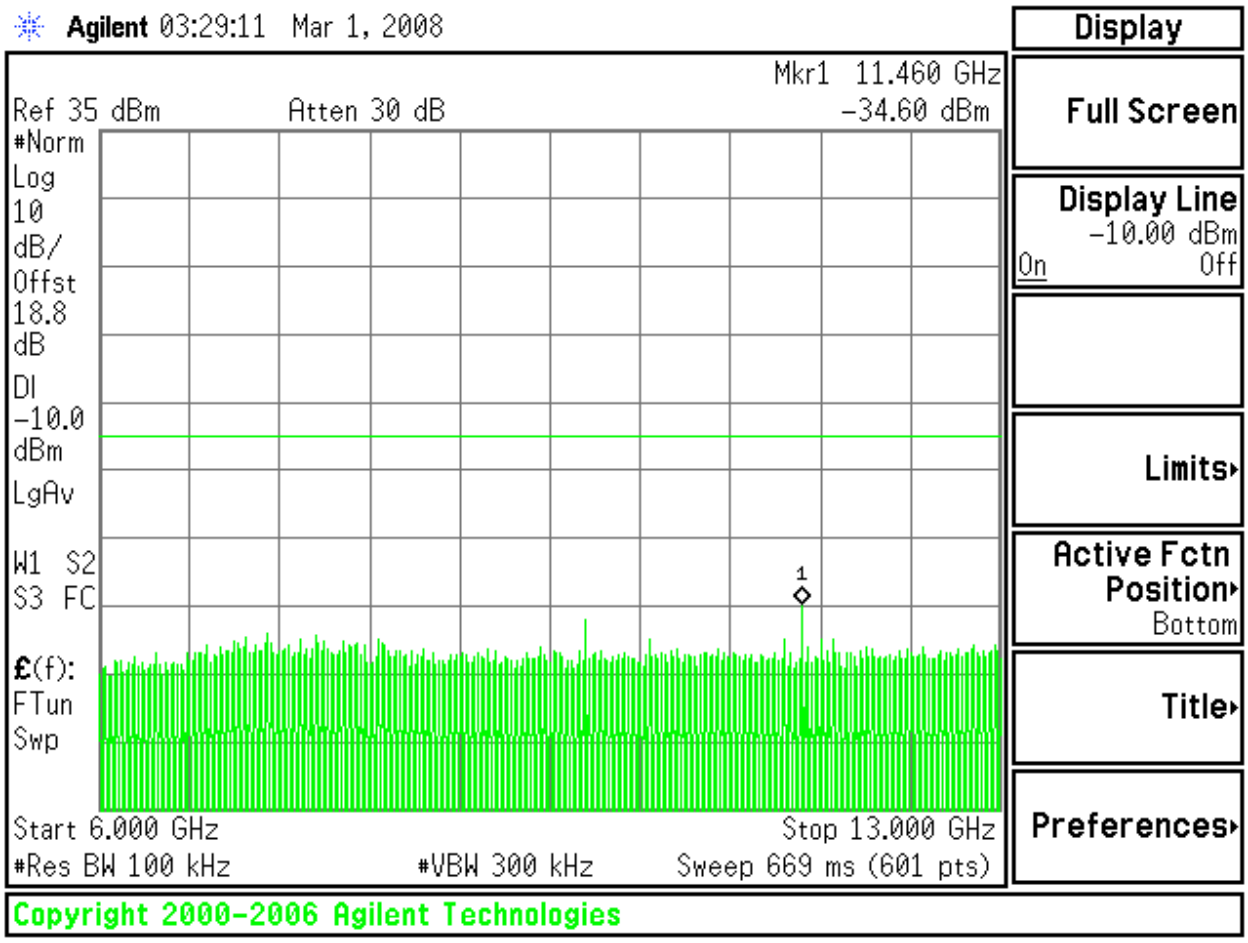
SPURIOUS EMISSIONS, HIGH CHANNEL 3.5 MHZ EBW 3/3



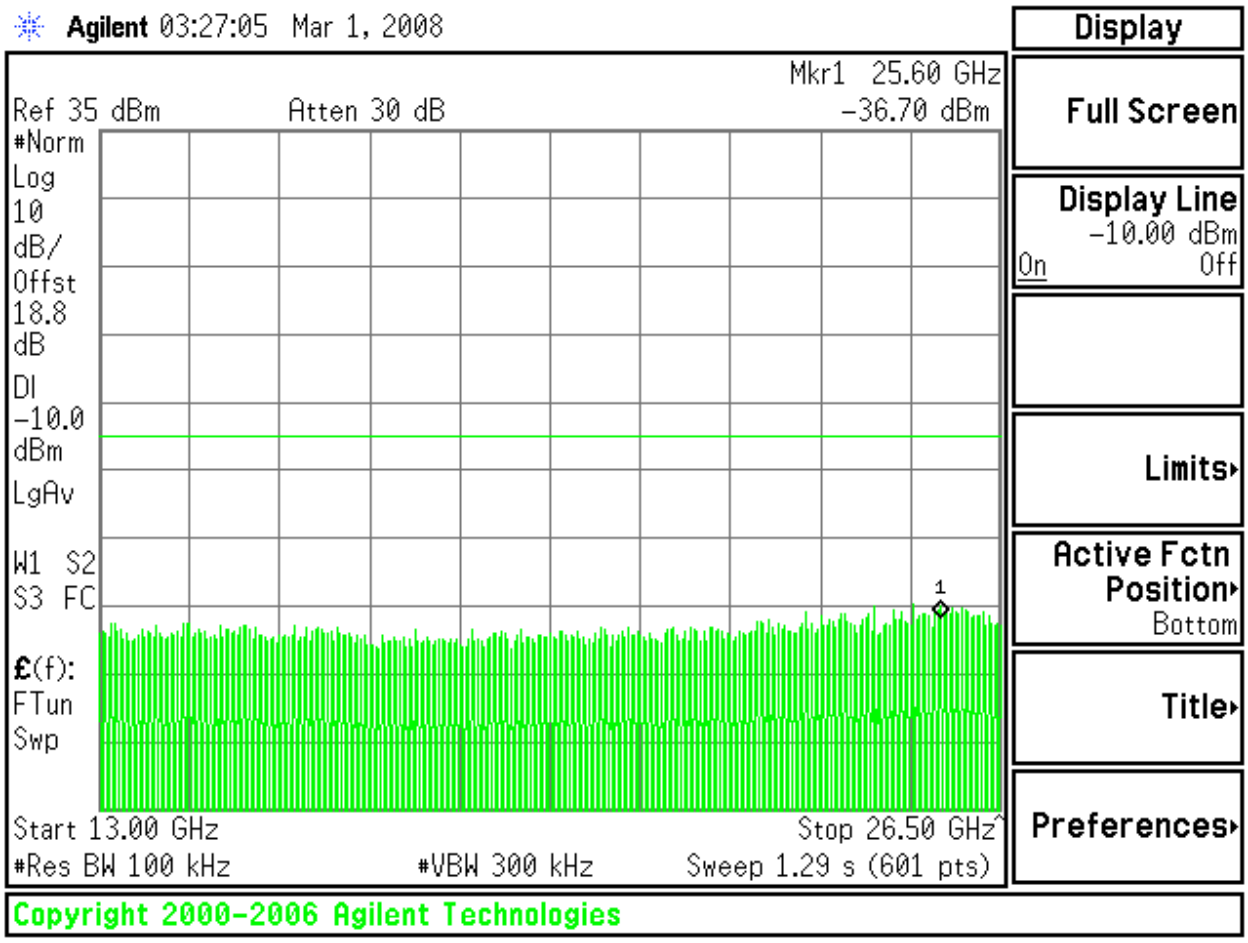
SPURIOUS EMISSIONS, LOW CHANNEL 5 MHZ EBW 1/3



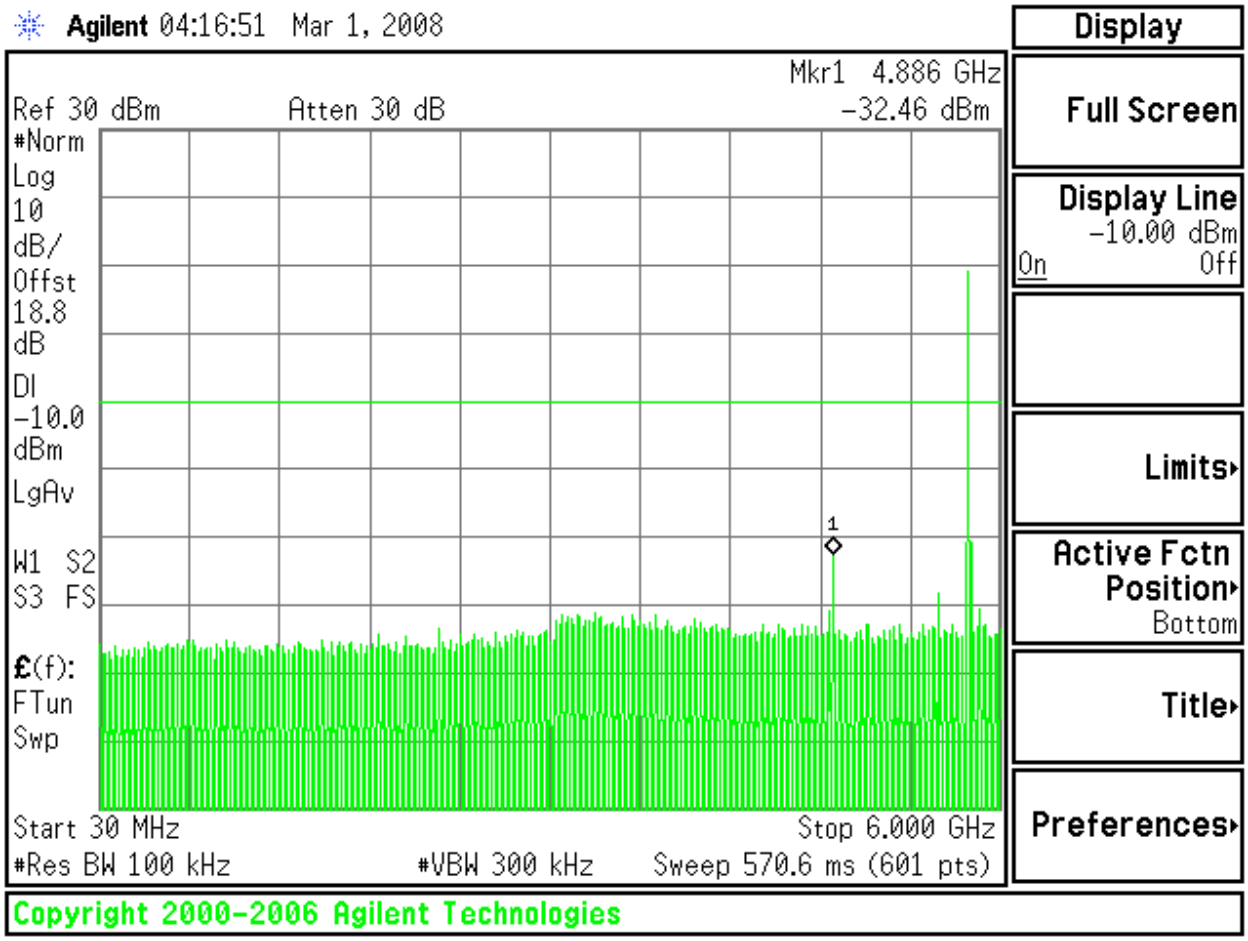
SPURIOUS EMISSIONS, LOW CHANNEL5 MHZ EBW 2/3



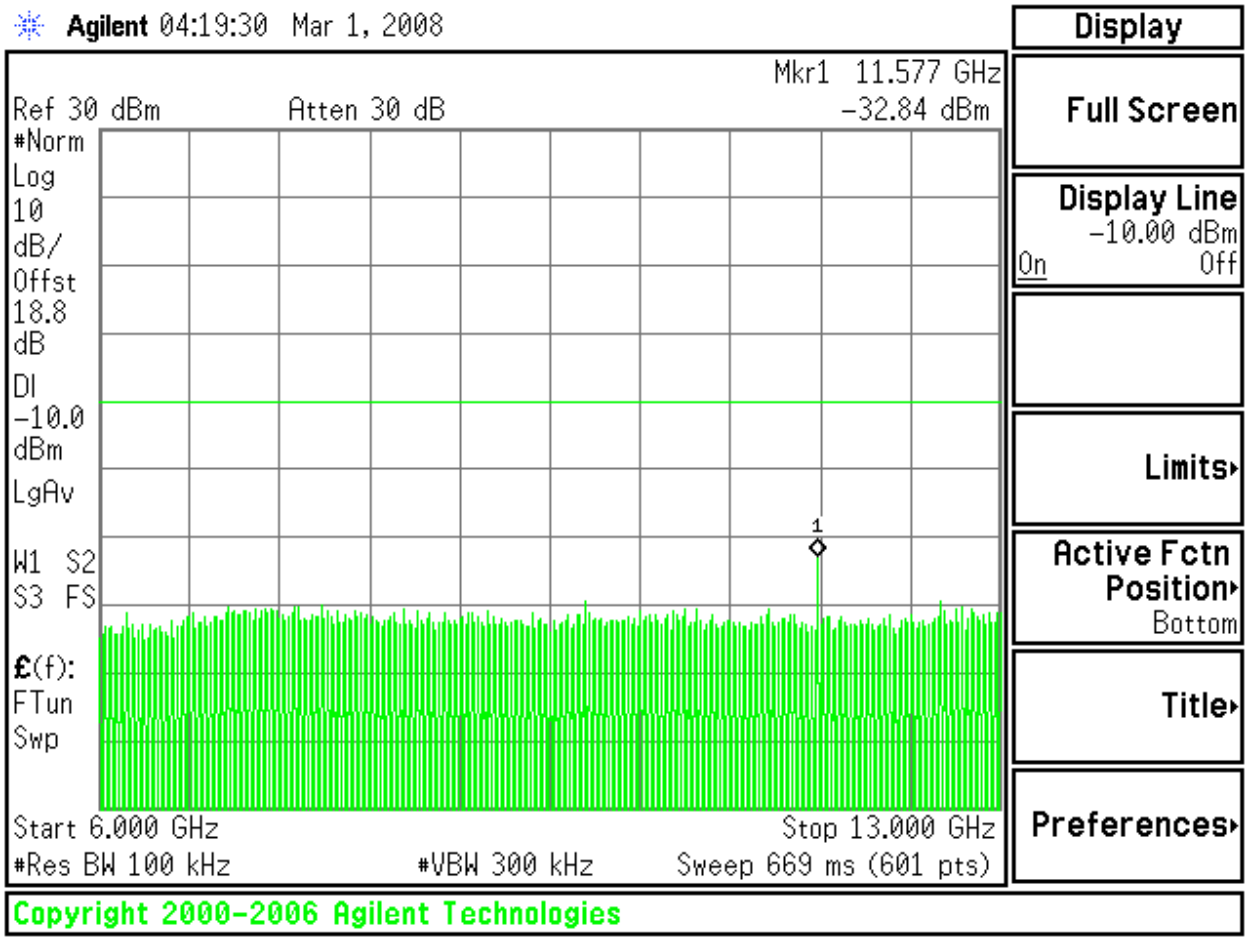
SPURIOUS EMISSIONS, LOW CHANNEL EBW 5 MHZ 3/3



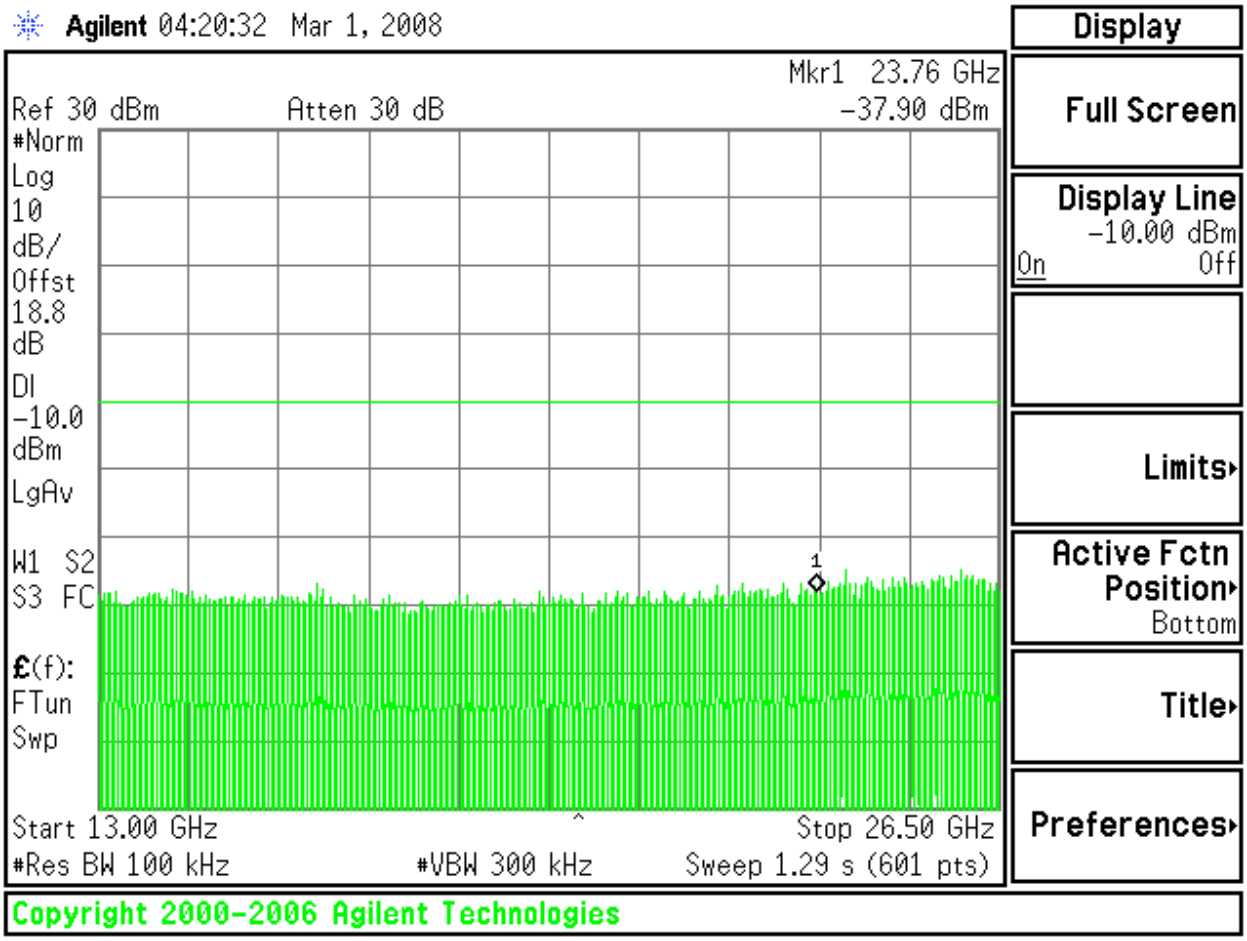
SPURIOUS EMISSIONS, MID CHANNEL 5 MHZ EBW 1/3



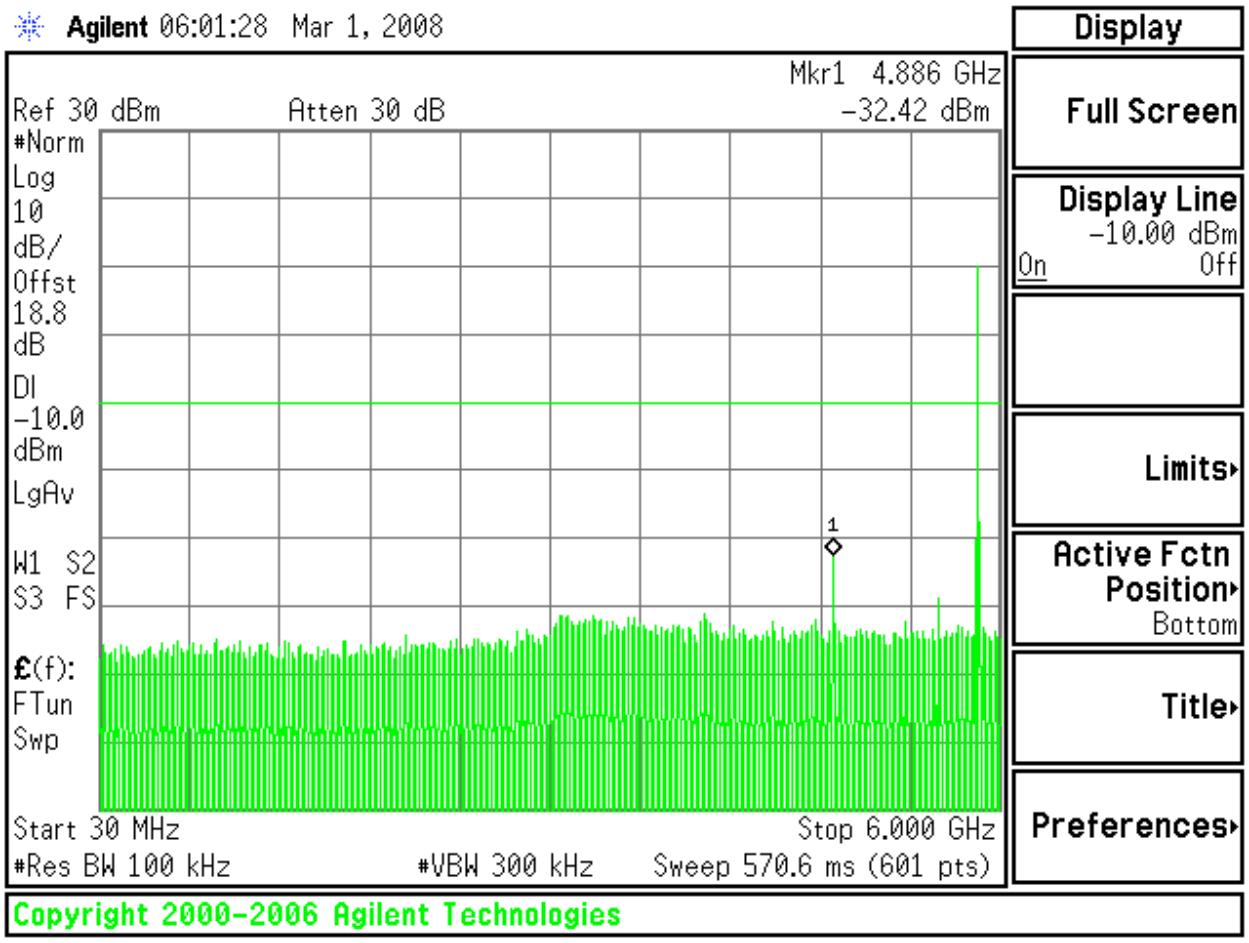
SPURIOUS EMISSIONS, MID CHANNEL 5 MHZ EBW 2/3



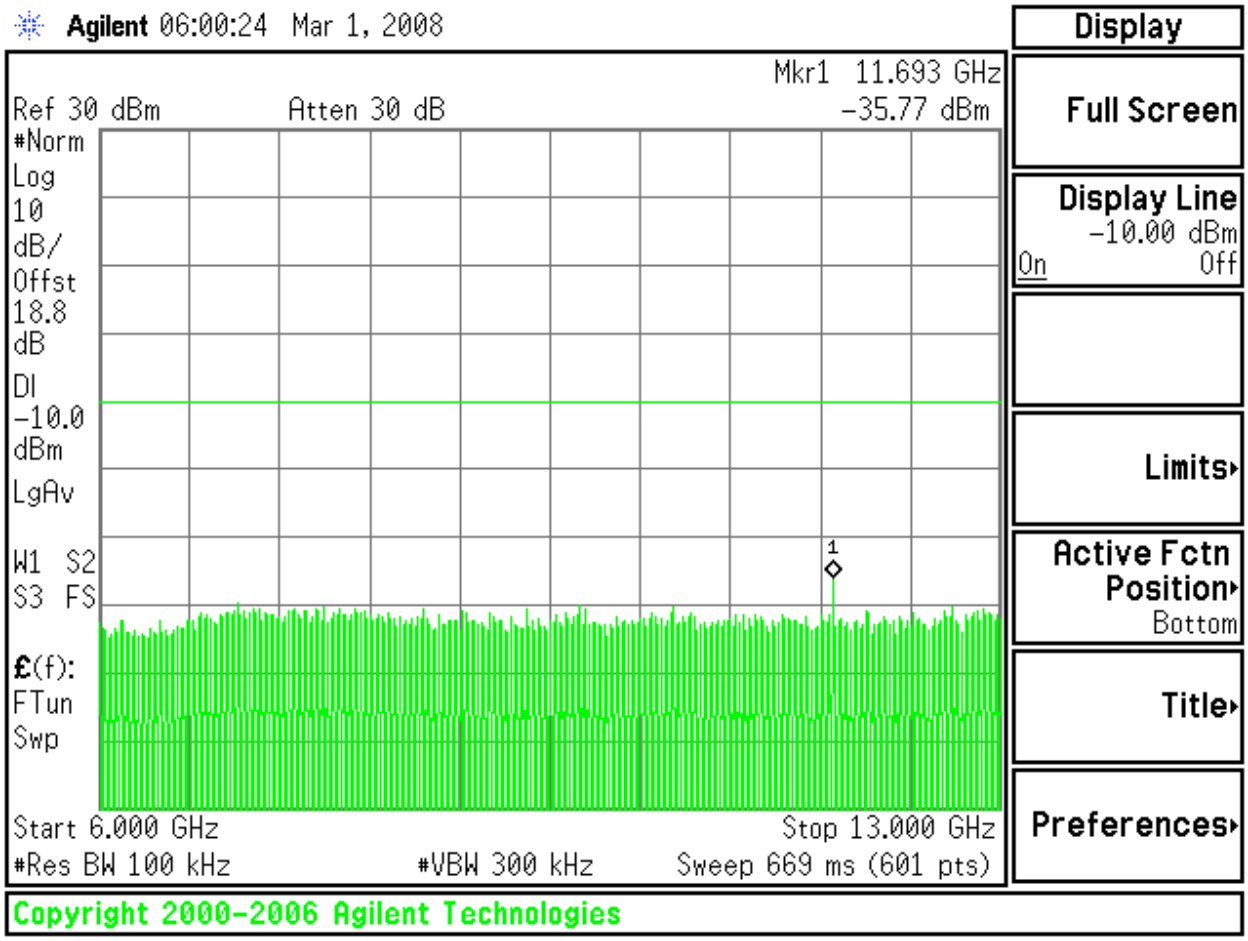
SPURIOUS EMISSIONS, MID CHANNEL 5 MHZ EBW 3/3



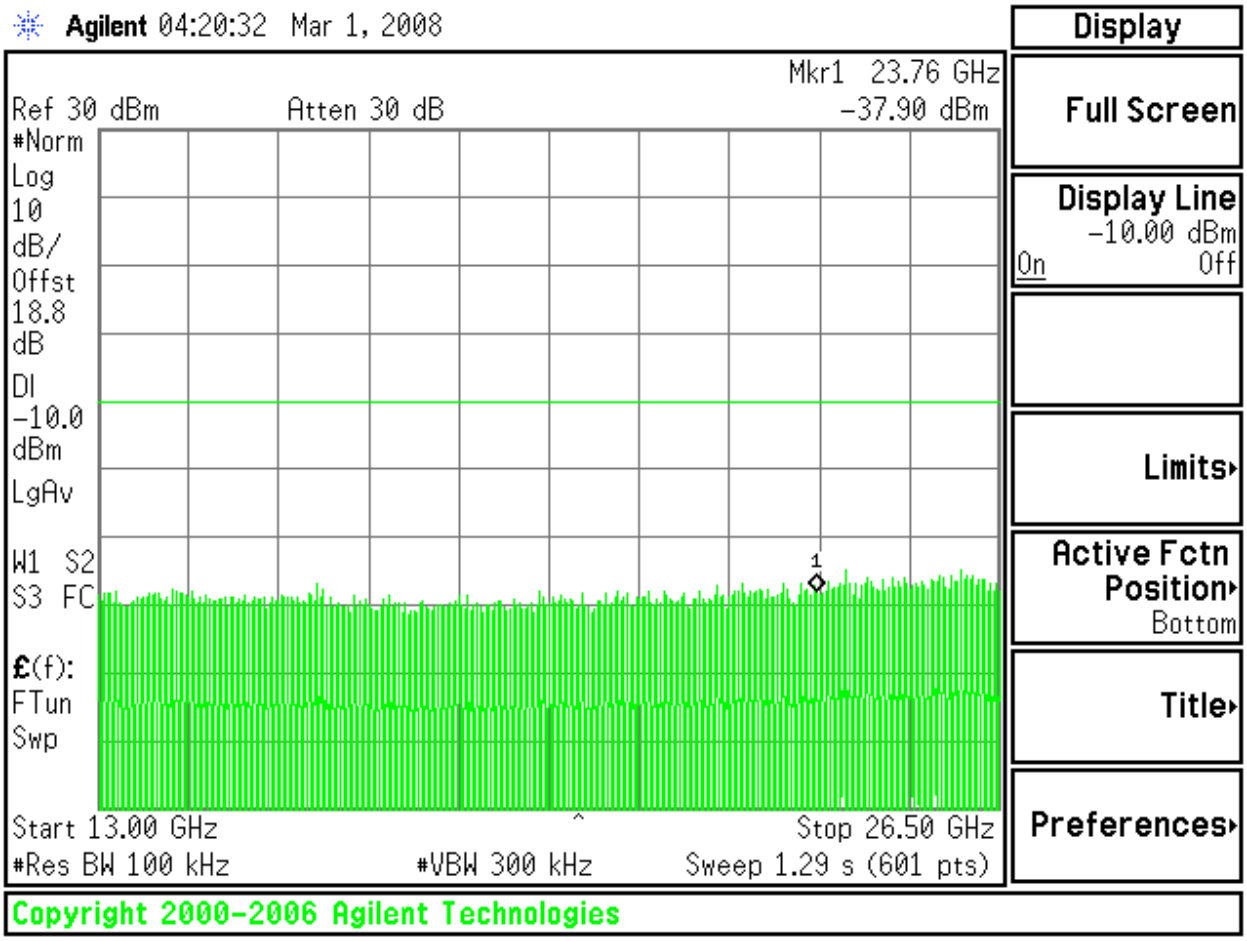
SPURIOUS EMISSIONS, HIGH CHANNEL 5 MHZ EBW 1/3



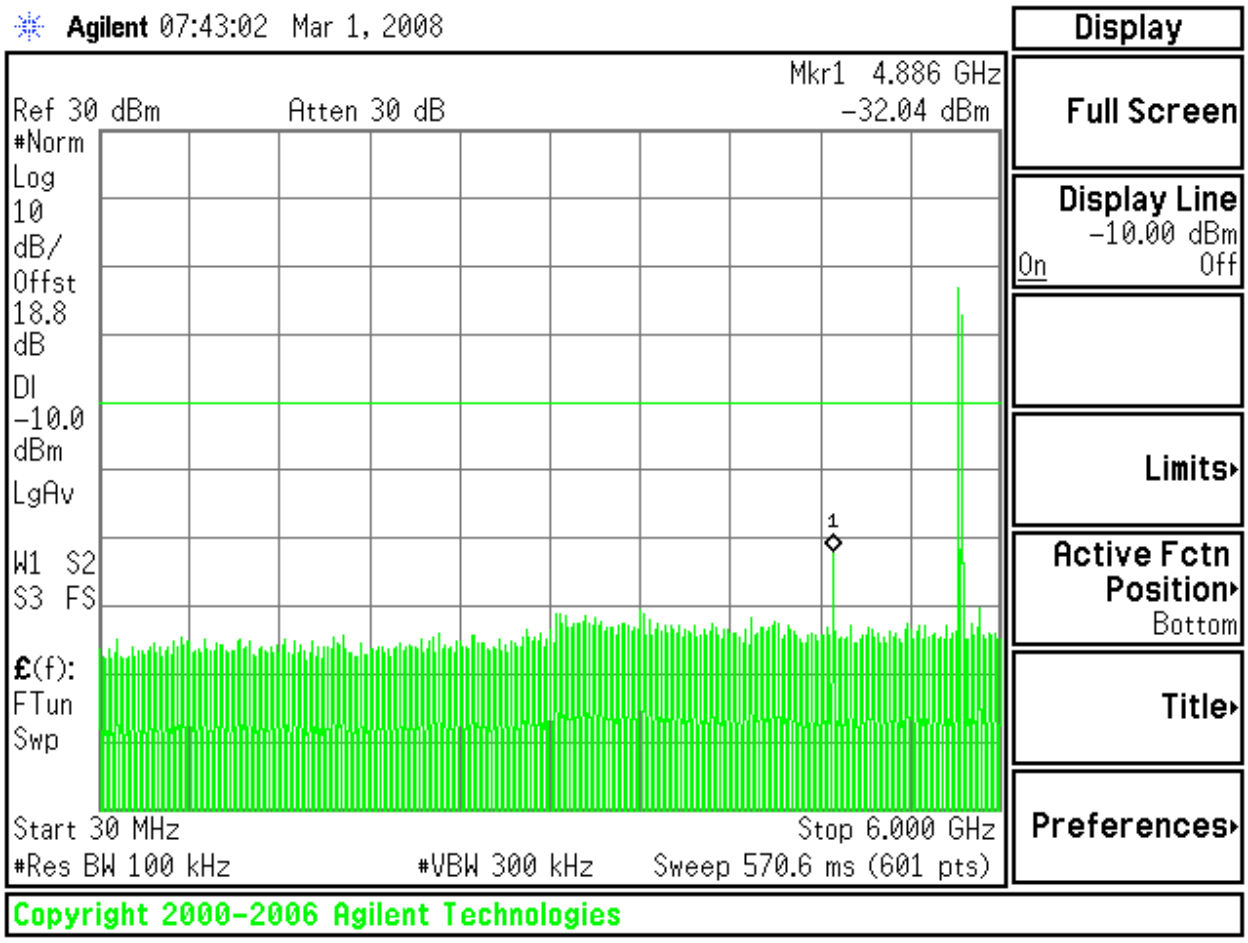
SPURIOUS EMISSIONS, HIGH CHANNEL 5 MHZ EBW 2/3



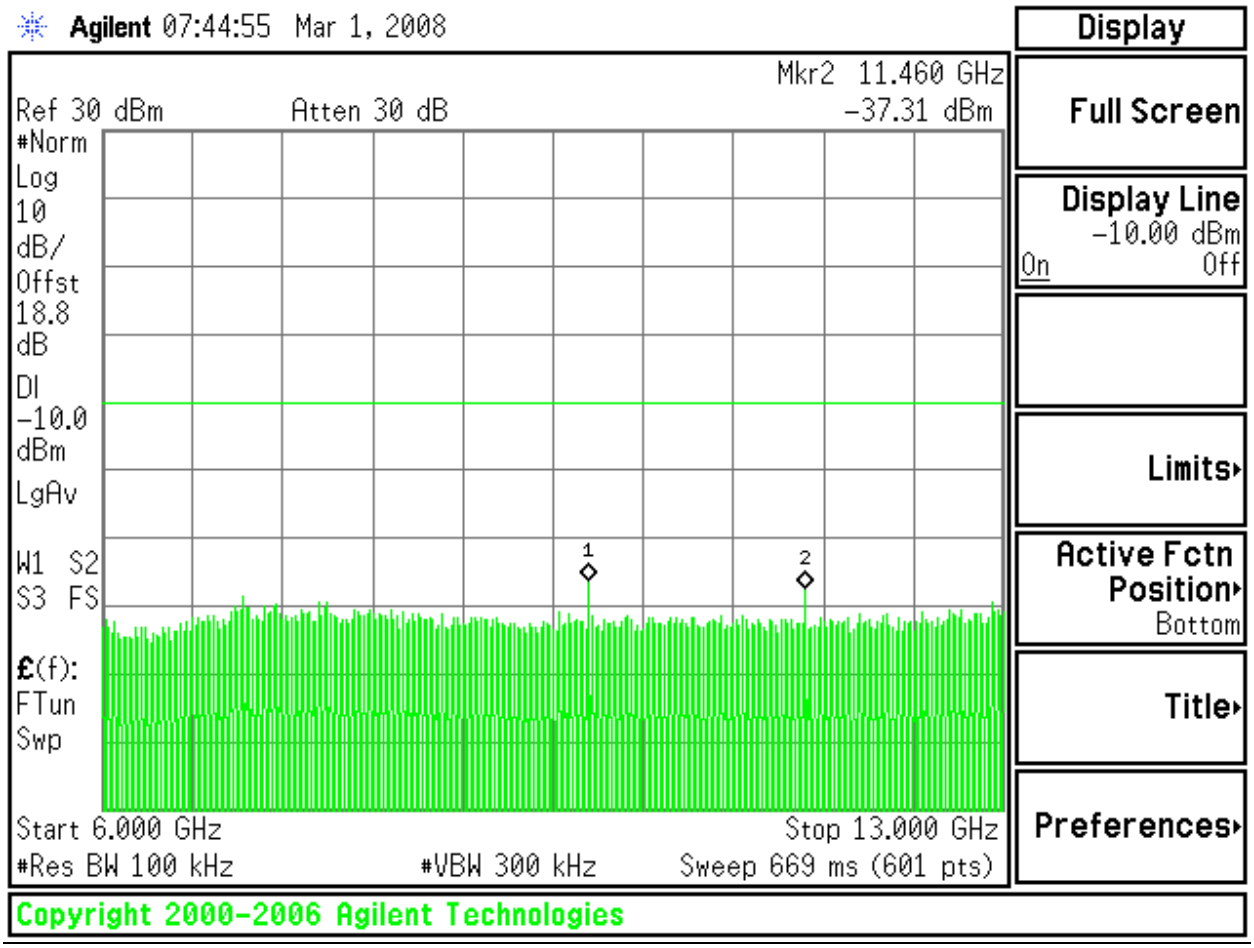
SPURIOUS EMISSIONS, HIGH CHANNEL 5 MHZ EBW 3/3



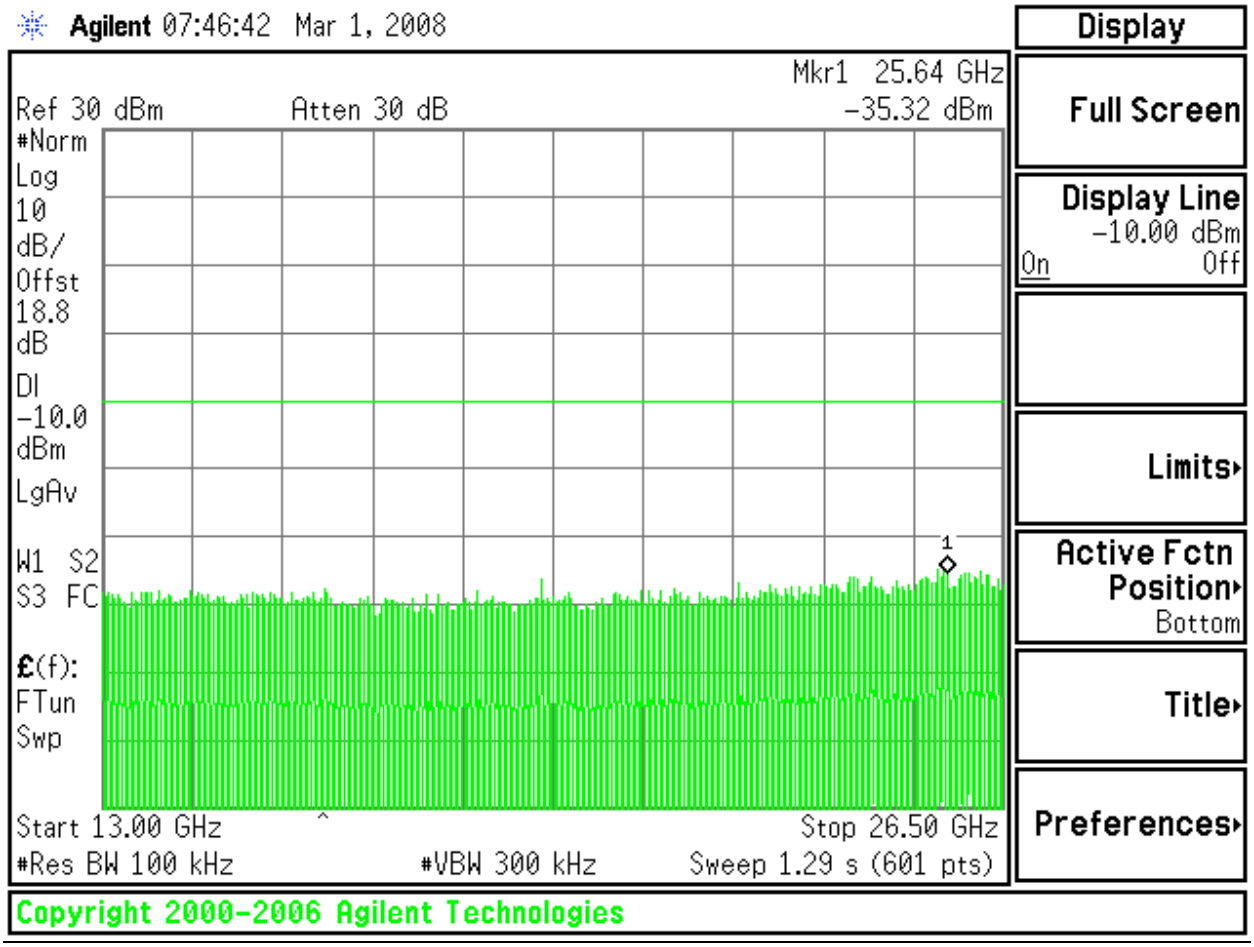
SPURIOUS EMISSIONS, LOW CHANNEL 7 MHZ EBW 1/3



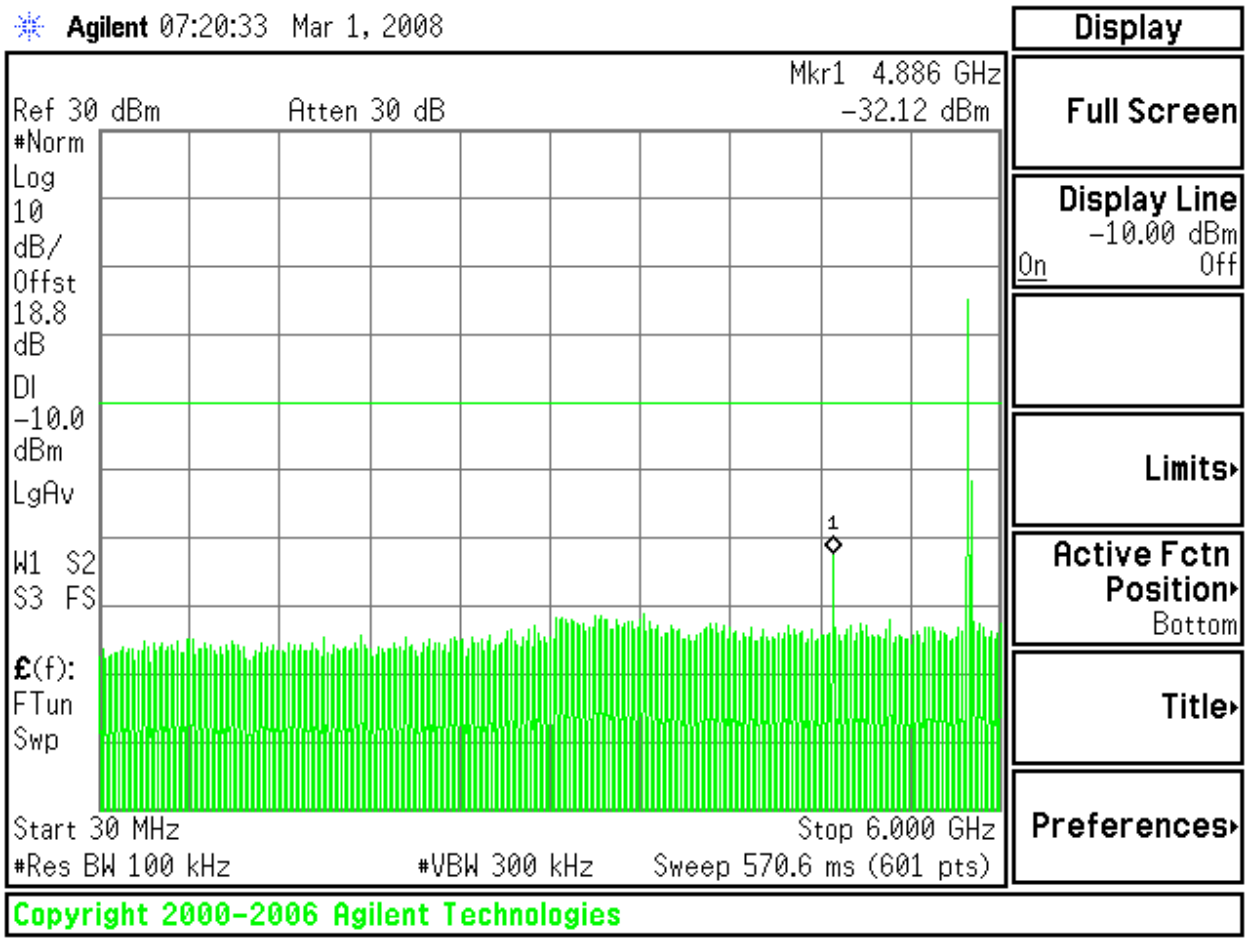
SPURIOUS EMISSIONS, LOW CHANNEL 7 MHZ EBW 2/3



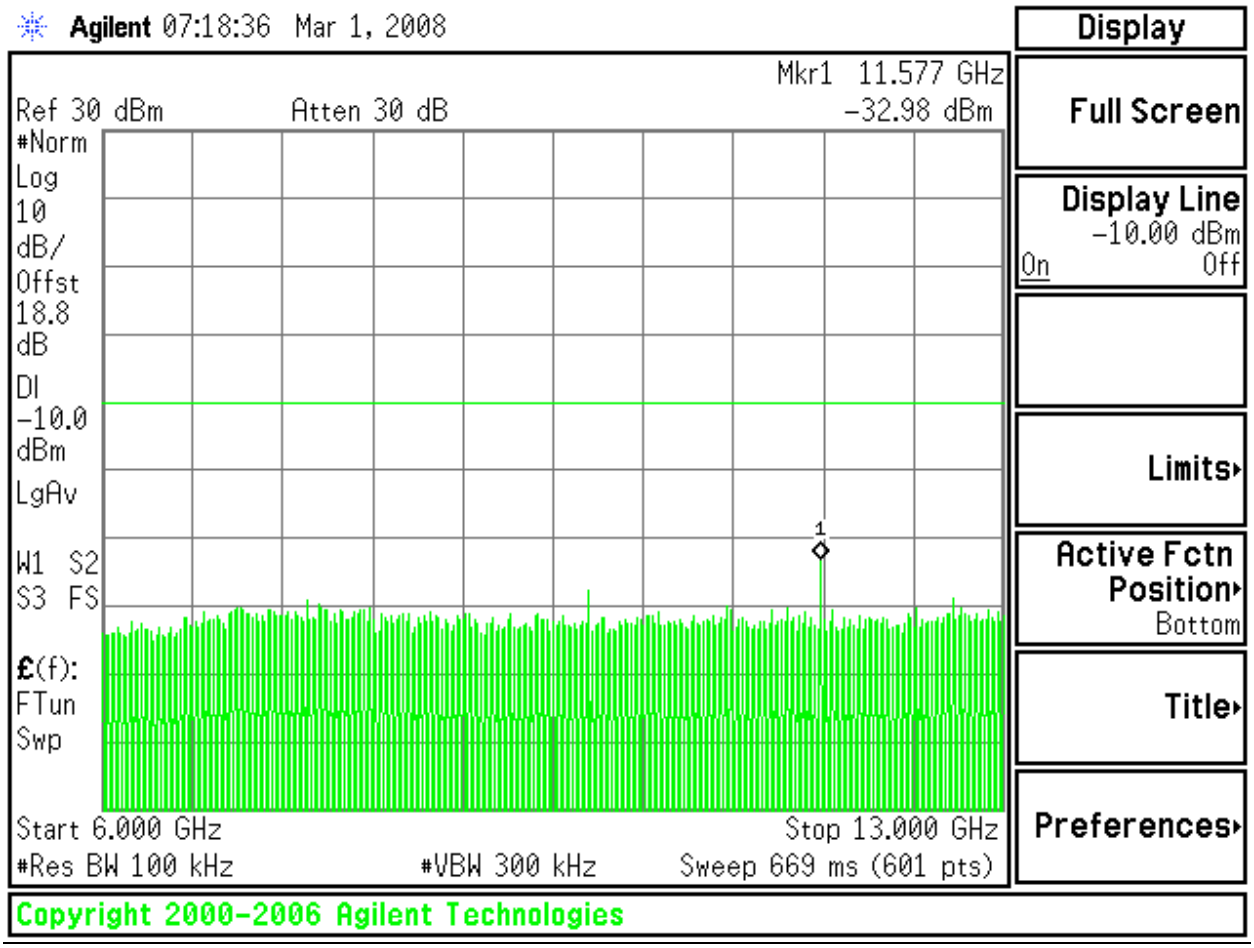
SPURIOUS EMISSIONS, LOW CHANNEL 7 MHZ EBW 3/3



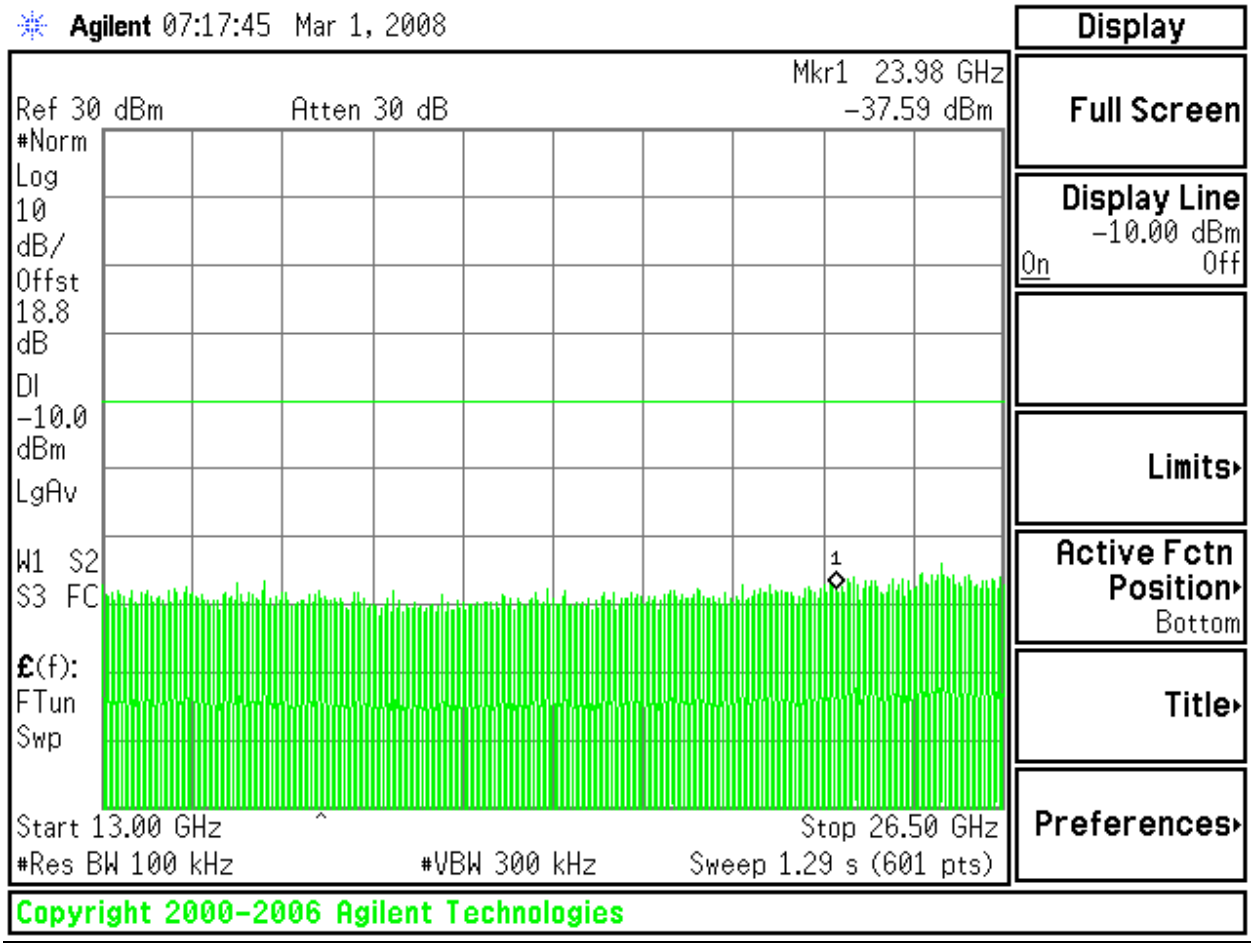
SPURIOUS EMISSIONS, MID CHANNEL 7 MHZ EBW 1/3



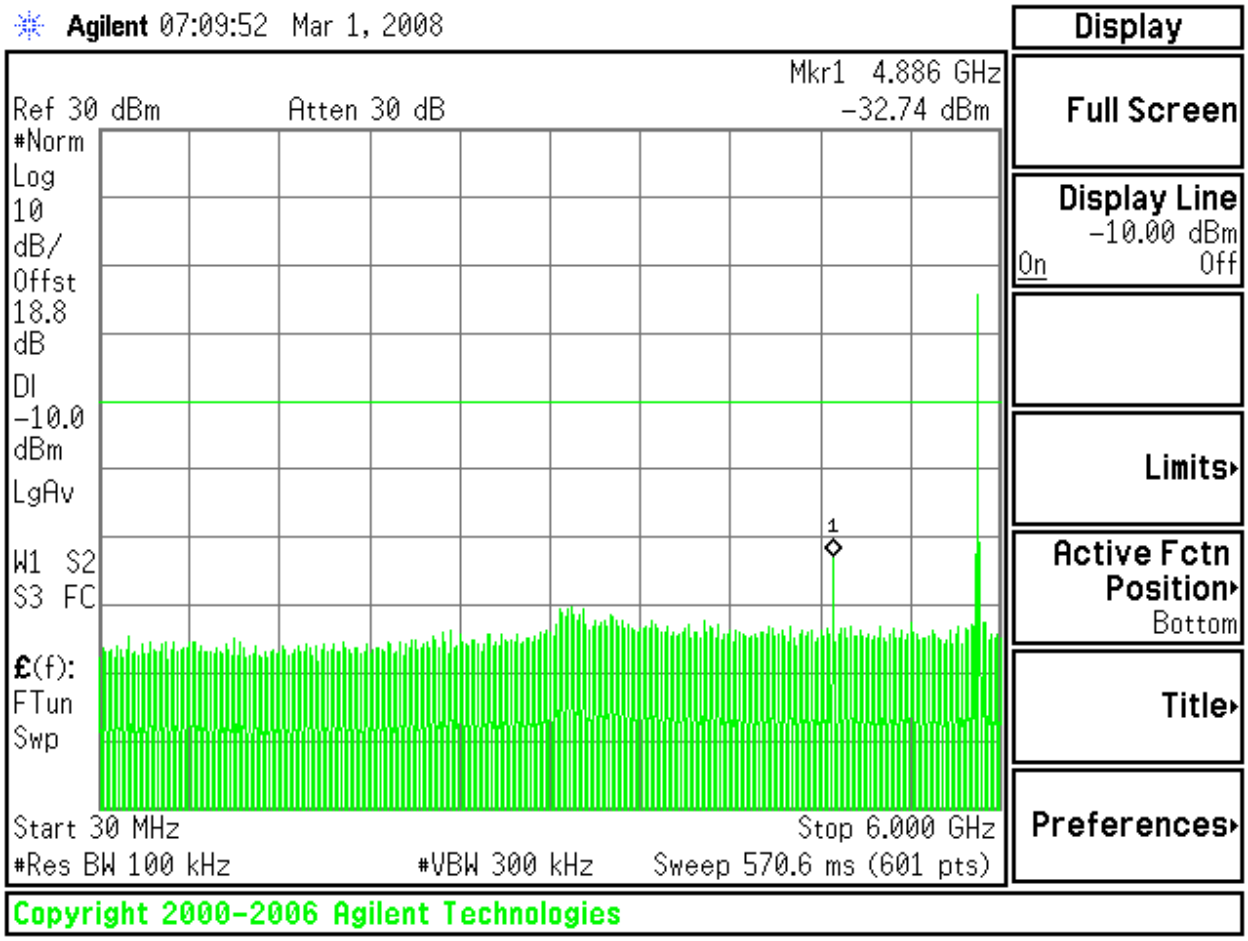
SPURIOUS EMISSIONS, MID CHANNEL 7 MHZ EBW 2/3



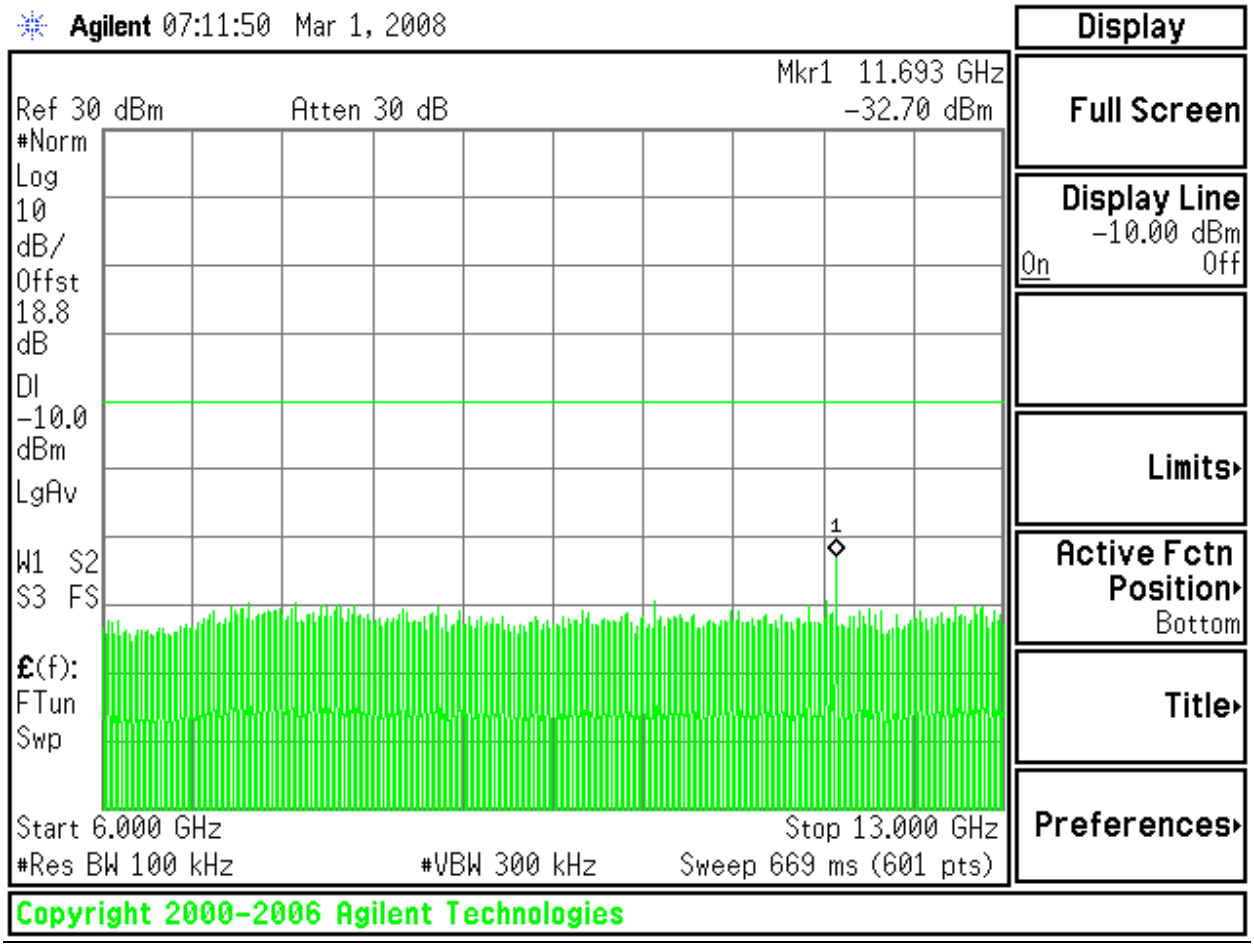
SPURIOUS EMISSIONS, MID CHANNEL 7 MHZ EBW 3/3



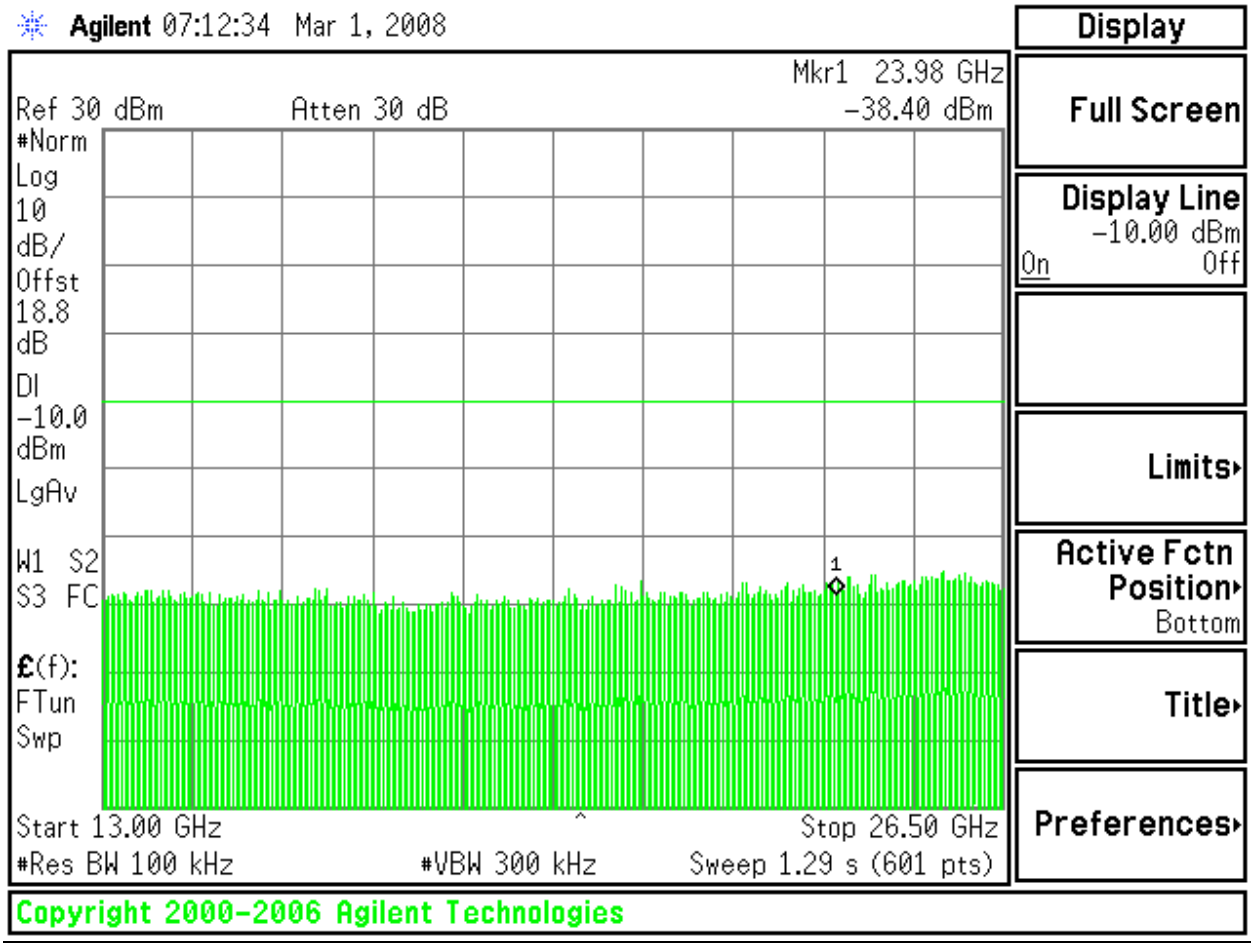
SPURIOUS EMISSIONS, HIGH CHANNEL 7 MHZ EBW 1/3



SPURIOUS EMISSIONS, HIGH CHANNEL 7 MHZ EBW 2/3



SPURIOUS EMISSIONS, HIGH CHANNEL 7 MHZ EBW 3/3



4.2. RADIATED EMISSIONS

4.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Based on preliminary testing, worst-case emissions were found at 7 MHz EBW.

4.2.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Company: APERTO Networks
Project #: 08U11585
Date: 02/04/2008
Test Operator: Thanh Nguyen
Configuration: EUT CPE PM100 w/ remote Base Station
Mode: transmit 64QAM, 7MHz Ch BW

Test Equipment:

Horn 1-18GHz: T60; S/N: 2238 @3m
Pre-amplifer 1-26GHz: T34 HP 8449B
Pre-amplifer 26-40GHz:
Horn > 18GHz:

Hi Frequency Cables

2 foot cable:
3 foot cable:
12 foot cable: A-5m Chamber
HPF:
Reject Filter:

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Tx Low channel 5727.5MHz															
11.455	3.0	48.2	30.0	37.4	11.6	-32.5	0.0	0.0	64.7	46.4	74	54	-9.3	-7.6	H
17.182	3.0	38.6	23.6	41.5	13.3	-32.0	0.0	0.0	61.3	46.4	74	54	-12.7	-7.6	H
22.910	3.0	34.7	23.2	24.1	14.4	-32.9	0.0	0.0	40.3	28.7	74	54	-33.7	-25.3	Noise floor
11.455	3.0	44.4	29.2	37.4	11.6	-32.5	0.0	0.0	60.8	45.6	74	54	-13.2	-8.4	V
17.182	3.0	38.3	23.6	41.5	13.3	-32.0	0.0	0.0	61.0	46.4	74	54	-13.0	-7.6	V
22.910	3.0	34.6	23.5	24.1	14.4	-32.9	0.0	0.0	40.1	29.0	74	54	-33.9	-25.0	Noise floor
Tx Mid Channel 5787.5MHz															
11.575	3.0	46.4	25.3	37.4	11.7	-32.5	0.0	0.0	62.9	41.9	74	54	-11.1	-12.1	V
17.362	3.0	35.3	23.4	42.2	13.3	-32.1	0.0	0.0	58.7	46.8	74	54	-15.3	-7.2	V
23.150	3.0	36.3	23.4	24.2	14.6	-32.9	0.0	0.0	42.3	29.3	74	54	-31.7	-24.7	Noise floor
11.575	3.0	41.4	25.4	37.4	11.7	-32.5	0.0	0.0	57.9	42.0	74	54	-16.1	-12.0	H
17.362	3.0	37.3	23.5	42.2	13.3	-32.1	0.0	0.0	60.7	46.9	74	54	-13.3	-7.1	H
23.150	3.0	36.8	23.4	24.2	14.6	-32.9	0.0	0.0	42.7	29.4	74	54	-31.3	-24.6	Noise floor
Tx High Ch. 5847.5MHz															
11.695	3.0	45.9	25.4	37.4	11.8	-32.5	0.0	0.0	62.6	42.1	74	54	-11.4	-11.9	V
17.543	3.0	34.3	23.6	42.8	13.4	-32.1	0.0	0.0	58.3	47.6	74	54	-15.7	-6.4	V
23.390	3.0	35.5	24.4	24.3	14.9	-32.8	0.0	0.0	41.8	30.7	74	54	-32.2	-23.3	Noise floor
11.695	3.0	43.4	25.3	37.4	11.8	-32.5	0.0	0.0	60.1	42.0	74	54	-13.9	-12.0	H
17.543	3.0	37.3	24.5	42.8	13.4	-32.1	0.0	0.0	61.3	48.6	74	54	-12.7	-5.4	H
23.390	3.0	35.3	23.5	0.0	14.9	-32.8	0.0	0.0	17.3	5.5	74	54	-56.7	-48.5	Noise floor
Spurious Emissions															
1.000	3.0	66.1	45.3	25.4	3.0	-38.3	0.0	0.0	56.3	35.5	74	54	-17.7	-18.5	H
1.400	3.0	59.9	49.1	26.4	3.5	-37.7	0.0	0.0	52.2	41.3	74	54	-21.8	-12.7	H
1.467	3.0	56.6	46.5	26.6	3.6	-37.6	0.0	0.0	49.2	39.1	74	54	-24.8	-14.9	H
1.611	3.0	53.9	46.5	27.0	3.8	-37.4	0.0	0.0	47.2	39.8	74	54	-26.8	-14.2	H
1.000	3.0	62.9	40.9	25.4	3.0	-38.3	0.0	0.0	53.1	31.1	74	54	-20.9	-22.9	H
1.267	3.0	59.8	48.8	26.1	3.3	-37.9	0.0	0.0	51.3	40.4	74	54	-22.7	-13.6	V
1.400	3.0	56.2	53.5	26.4	3.5	-37.7	0.0	0.0	48.4	45.7	74	54	-25.6	-8.3	V
1.733	3.0	56.6	46.7	27.3	4.0	-37.2	0.0	0.0	50.6	40.7	74	54	-23.4	-13.3	V

Rev. 4.12.7

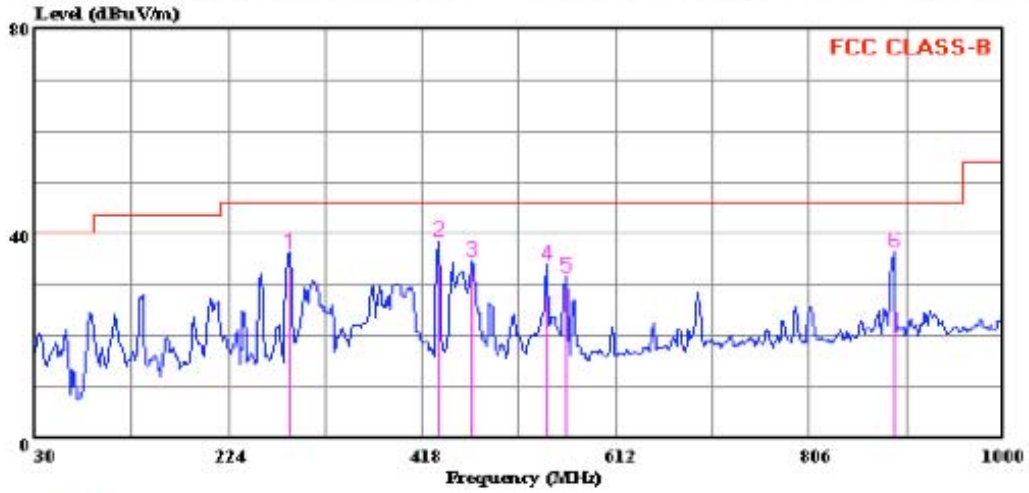
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 21 File#: 08U11585.EMI Date: 02-05-2008 Time: 15:01:29



Trace: 22 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: Thanh Nguyen
Project # : 08U11585
Company : APERTO NETWORKS
Config : EUT with remote support equipment
Mode : TX worst Case
Target : FCC Class B
: CPE and BSK Power on w/ GND

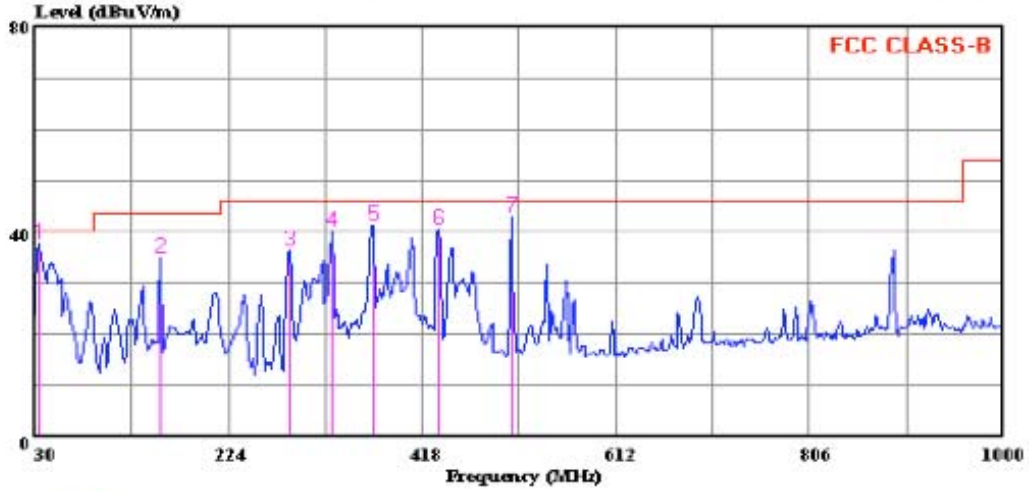
Data#: 22 File#: 08U11585.EMI Date: 02-05-2008 Time: 15:02:16

Condition: FCC CLASS-B HORIZONTAL
Test Operator: Thanh Nguyen
Project # : 08U11585
Company : APERTO NETWORKS
Config : EUT with remote support equipment
Mode : TX worst Case
Target : FCC Class B
: CPE and BSK Power on w/ GND

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 19 File#: 08U11585.EMI Date: 02-05-2008 Time: 14:56:14



Trace: 20 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: Thanh Nguyen
Project # : 08U11585
Company : APERTO NETWORKS
Config : EUT with remote support equipment
Mode : TX worst Case
Target : FCC Class B
: CPE and BSK Power on w/ GND

Data#: 20 File#: 08U11585.EMI Date: 02-05-2008 Time: 14:57:10

Condition: FCC CLASS-B VERTICAL
Test Operator: Thanh Nguyen
Project # : 08U11585
Company : APERTO NETWORKS
Config : EUT with remote support equipment
Mode : TX worst Case
Target : FCC Class B
: CPE and BSK Power on w/ GND

4.3. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

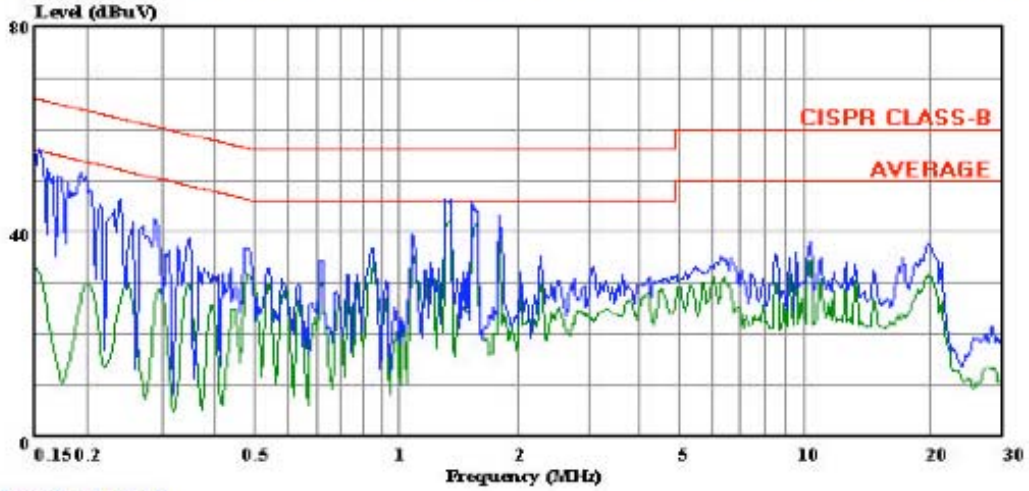
RESULTS

No non-compliance noted:

LINE 1 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 1 File#: 08U11585 LC.EMI Date: 02-05-2008 Time: 16:32:35



(Line Conduction)

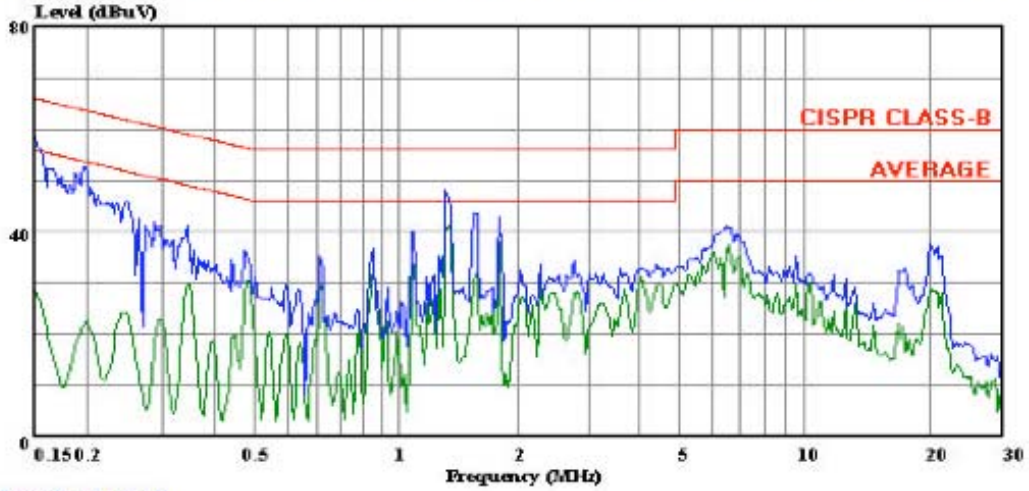
Trace: 2 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: : 08U11585
Company: : APERTO NETWORKS
Configuration:: EUT and remote Support Base station
Mode: : Transmit worst case
Target: : FCC Class B
Voltage: : 115 VAC / 60Hz
: Line 1: Peak (Blue)

LINE 2 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 4 File#: 08U11585 LC.EMI Date: 02-05-2008 Time: 16:48:13



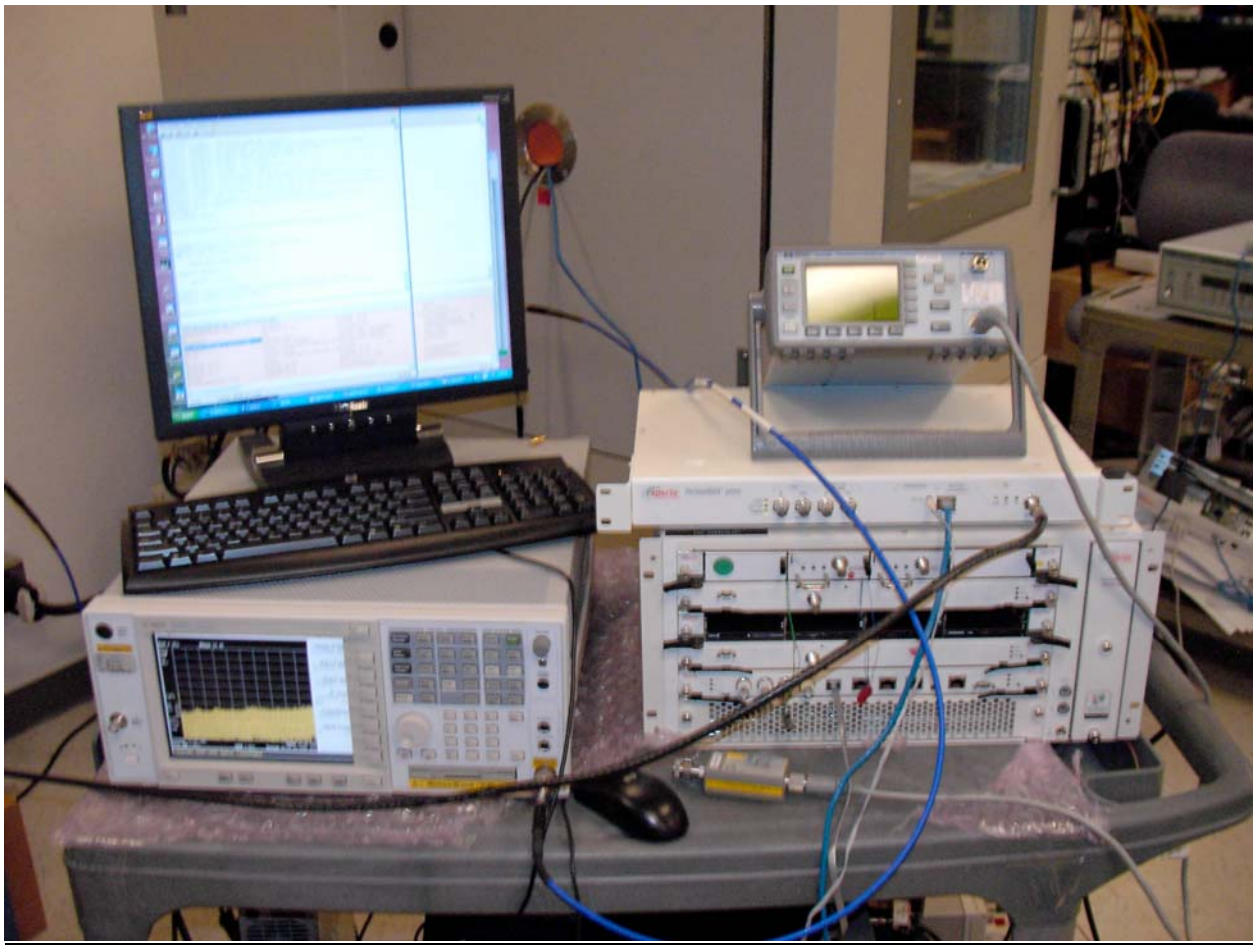
(Line Conduction)

Trace: 3 Ref Trace:

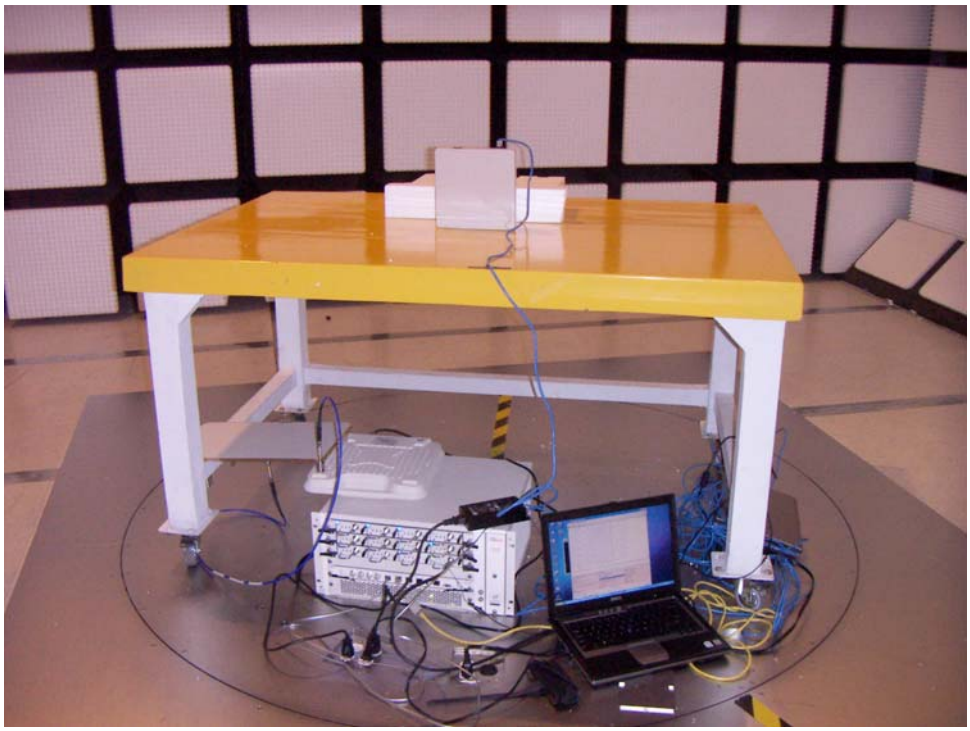
Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: : 08U11585
Company: : APERTO NETWORKS
Configuration:: EUT and remote Support Base station
Mode: : Transmit worst case
Target: : FCC Class B
Voltage: : 115 VAC / 60Hz
: Line 2: Peak (Blue); AVG (Green)

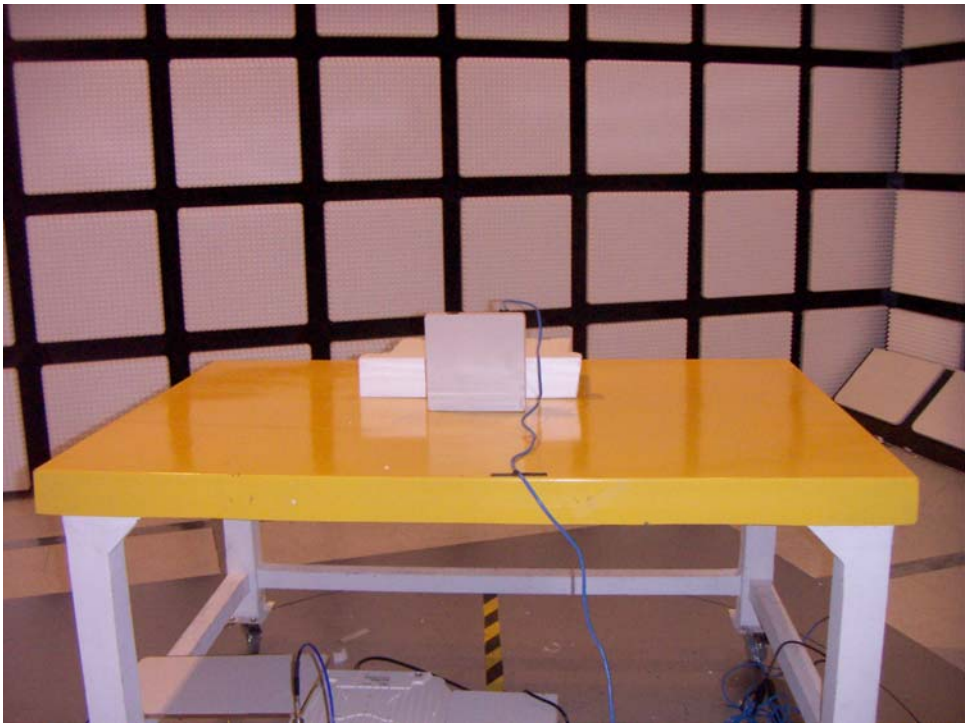
5. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

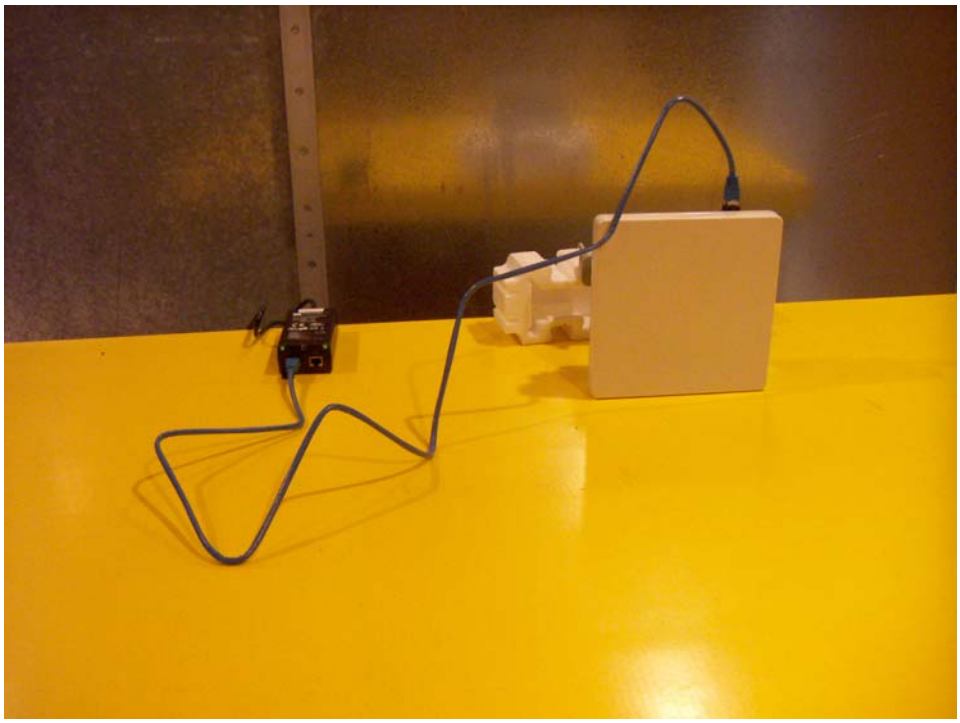


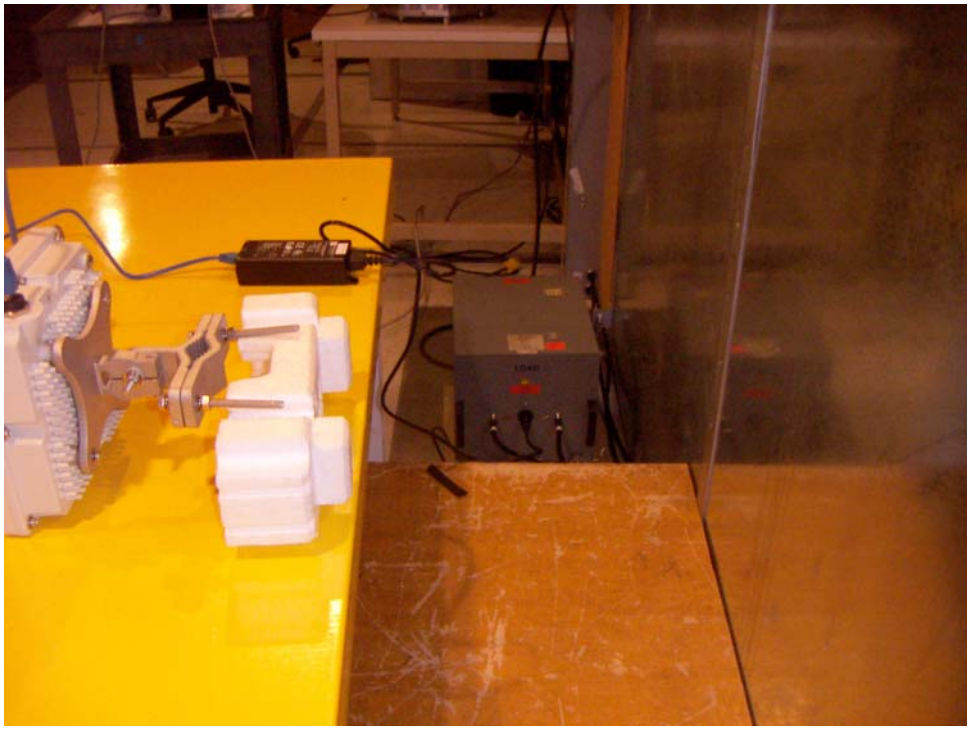
RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT