FCC CFR47 PART 15 SUBPART C
CLASS II PERMISSIVE CHANGE
TEST REPORT

FOR

802.11a/b/g WIRELESS LAN CARDBUS CARD

MODEL NUMBER: 8460-05

FCC ID: HZB-8460

REPORT NUMBER: 02U1692-3

ISSUE DATE: JANUARY 14, 2003

Prepared for
PROXIM CORPORATION
ZADELSTEDE 1-10
3431JZ NIEUWEGIAN
THE NETHERLANDS

Prepared by
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1. TEST RESULT CERTIFICATION

COMPANY NAME: PROXIM CORPORATION
ZADELSTEDE 1-10
3431JZ NIEUWEGIAN
THE NETHERLANDS

EUT DESCRIPTION: 802.11a/b/g WIRELESS LAN CARDBUS CARD

MODEL NAME: 8460-05

DATE TESTED: DECEMBER 9, 2002 - JANUARY 14, 2003

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Note: The 2.4 and 5.8 GHz bands are applicable to this report; another band of operation (5.2 GHz) is documented in a separate report

Approved & Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

NEELESH RAJ
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The Proxim 8460 is a high performance 802.11a/b/g WLAN client product intended for laptop applications. It operates in the 2.4 – 2.4835 GHz, 5.15 - 5.35 GHz and 5.725 - 5.850 GHz bands. The product uses two symmetric integral antennas for diversity operation.

The 8460 design is based on an Atheros AR5001X three-chip solution. The three chips include:

AR5211: Multiprotocol MAC/baseband processor, and CardBus/PCI bus interface.

AR5111 Radio-on-a-Chip (RoC): An all-CMOS single-chip radio transceiver that includes a power amplifier, and integrated dual conversion filters to convert signals from 5 GHz to the baseband range for use by the AR5211. The AR5111 offers fully integrated transmitter, receiver, and frequency synthesizer functions; eliminating the need for external voltage controlled oscillators (VCOs) and surface acoustic wave (SAW) filters.

AR2111 Radio-on-a-Chip (RoC): An all-CMOS single-chip radio transceiver that, when combined with the AR5111,implements a 2.4 GHz 802.11 b/g radio solution. The AR2111 offers fully integrated transmitter, receiver, and frequency synthesizer functions. Like the AR5111, the AR2111 does not require external VCOs or SAW filters.

3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

1. The transmitter output filter is modified to provide improved spurious performance.

Due to the change of the filter, the antenna port conducted RF signals are retested.

2. The antennas are changed to higher gain.

The original antennas gain was 1.0 dBi for both bands.
The new antenna gain is 4.27 dBi for 2.4GHz band, and 0.24 dBi for 5.8GHz band.

Due to the change of the antenna, the highest radiated spurious signals are retested.

The transmitter output power is 178 mW in the 2.4 – 2.4835 GHz band and 129 mW in the 5.725 - 5.850 GHz band.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.

5. FACILITIES AND ACCREDITATION

5.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2. LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2)).

5.3. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548,IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	NVLAP LAB CODE:200065-0 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	N ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	N ELA-171
Taiwan	BSMI	CNS 13438	商 檢 SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	Canada IC2324 A,B,C, and F

* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

6. CALIBRATION AND UNCERTAINTY

6.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

6.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

6.3. TEST AND MEASUREMENT EQUIPMENT

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

TEST AND MEASUREMENT EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8566B	3014A06685	6/1/03
Spectrum Display	HP	85662A	2152A03066	6/1/03
Quasi-Peak Detector	HP	85650A	3145A01654	6/1/03
Power Meter	Agilent	E4416A	GB41291160	8/9/2003
Peak / Average Power Sensor	Agilent	E9327A	US40440755	9/5/2003
Spectrum Analyzer	HP	E4446A	US42070220	1/13/04
Preamplifier (1 - 26.5GHz)	Miteq	NSP10023988	646456	4/26/03
Horn Antenna (1 - 18GHz)	EMCO	3115	6717	1/31/03
Horn Antenna (18 – 26.5GHz)	ARA	MWH 1826/B	1013	1/31/03
High Pass Filter (4.57GHz)	FSY Microwave	FM-4570-9SS	003	N.C.R.
High Pass Filter (7.6GHz)	FSY Microwave	FM-7600-9SS	002	N.C.R.
Spectrum Analyzer	HP	E4440A	US42221737	9/24/03

7. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Laptop	Personal Computer	N340S8	PB344S811902382	DoC
AC Adapter	Lishin International	LSE9802A2060	010810241A1	N/A

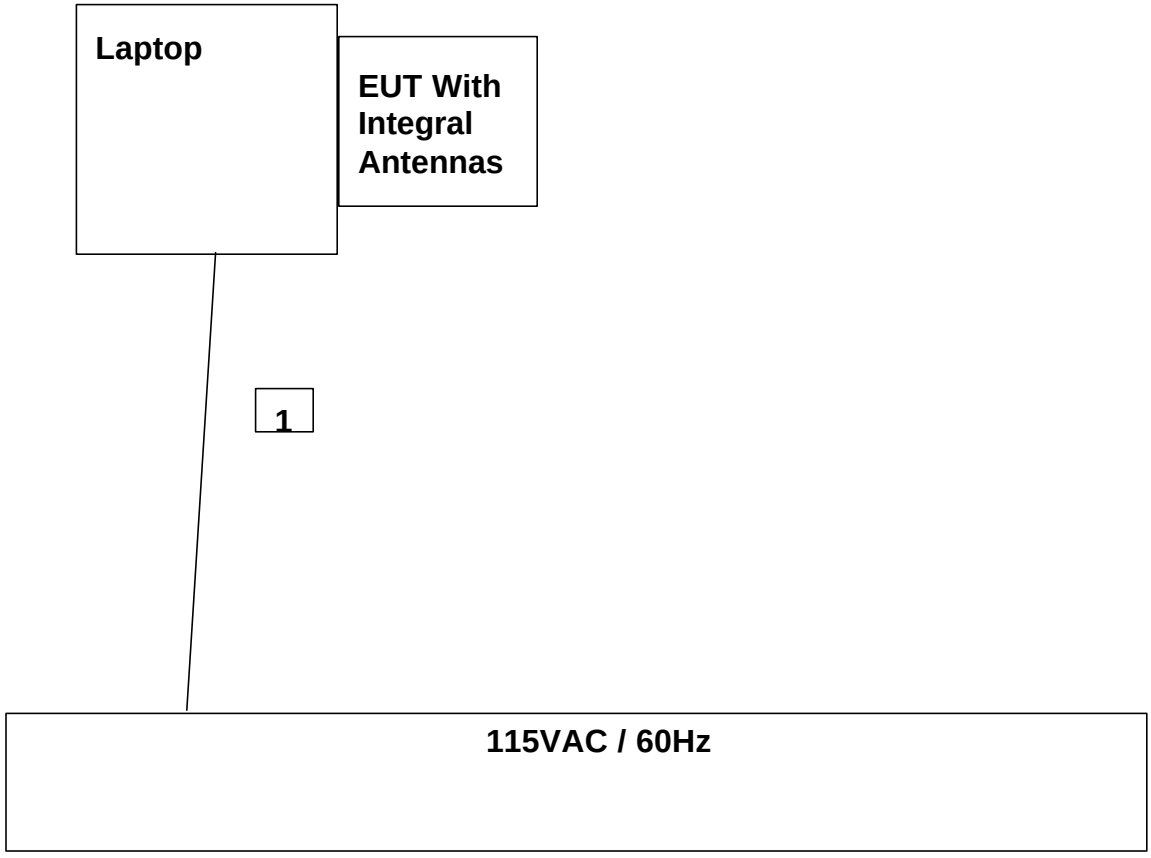
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115	Unshielded	2 m	Laptop cable is integrated with AC Adapter

TEST SETUP

The EUT is installed in the laptop computer.

SETUP DIAGRAM FOR TRANSMITTER TESTS



8. APPLICABLE RULES

§15.247 (a)- BANDWIDTH

(2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

§15.247 (b)- POWER OUTPUT

The maximum peak output power of the intentional radiator shall not exceed the following:

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

(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.

§15.247 (b)- RADIO FREQUENCY EXPOSURE

(5) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

§15.247 (c)- SPURIOUS EMISSIONS

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)).

§15.247 (d)- PEAK POWER SPECTRAL DENSITY

(d) For direct sequence systems, the peak 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.

§15.205- RESTRICTED BANDS OF OPERATIONS

(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			

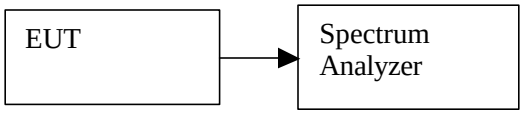
[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

(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.

9. TEST SETUP, PROCEDURE AND RESULT

9.1. 6 dB BANDWIDTH

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

2.4 GHz Band, 11b Mode

Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	9777	500	9277
Middle	2437	10642	500	10142
High	2462	8617	500	8117

2.4 GHz Band, 11g Mode

Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16425	500	15925
Middle	2437	16072	500	15572
High	2462	16415	500	15915

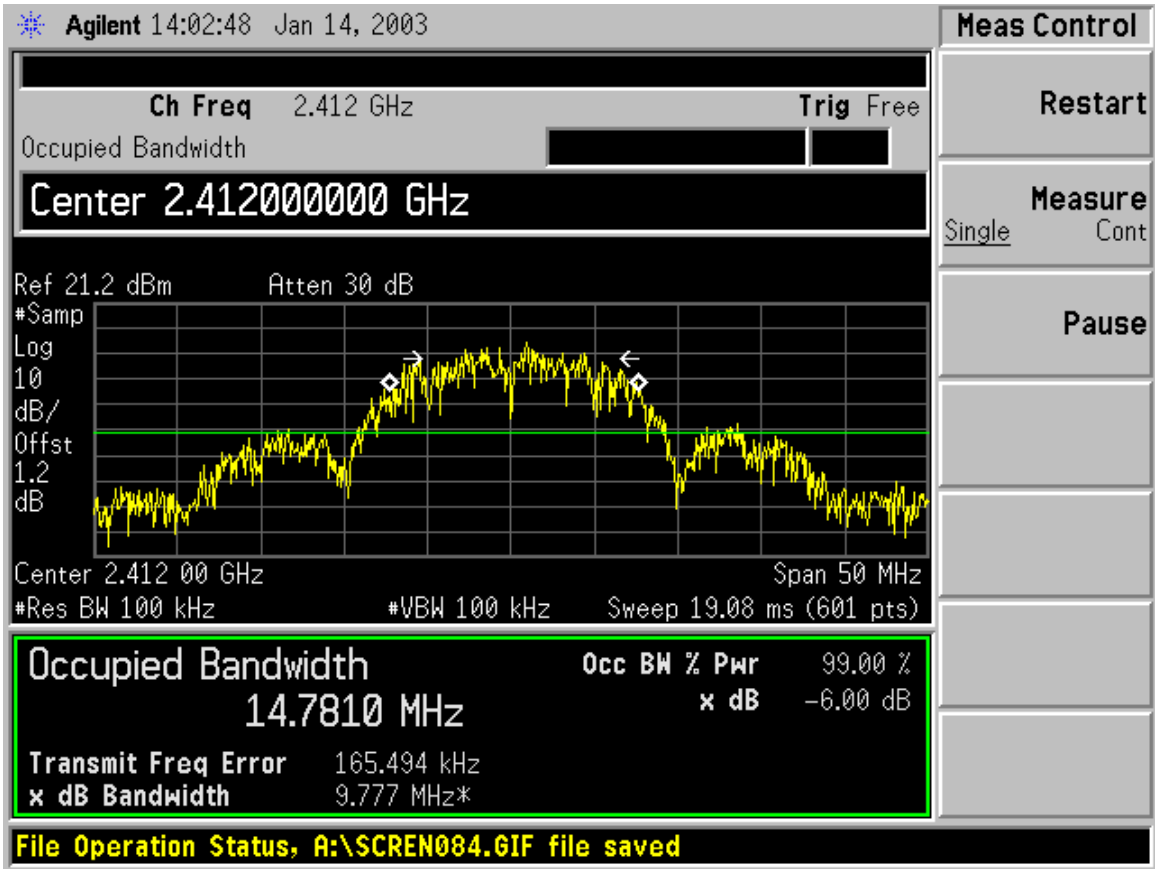
5.8 GHz Band Normal Mode

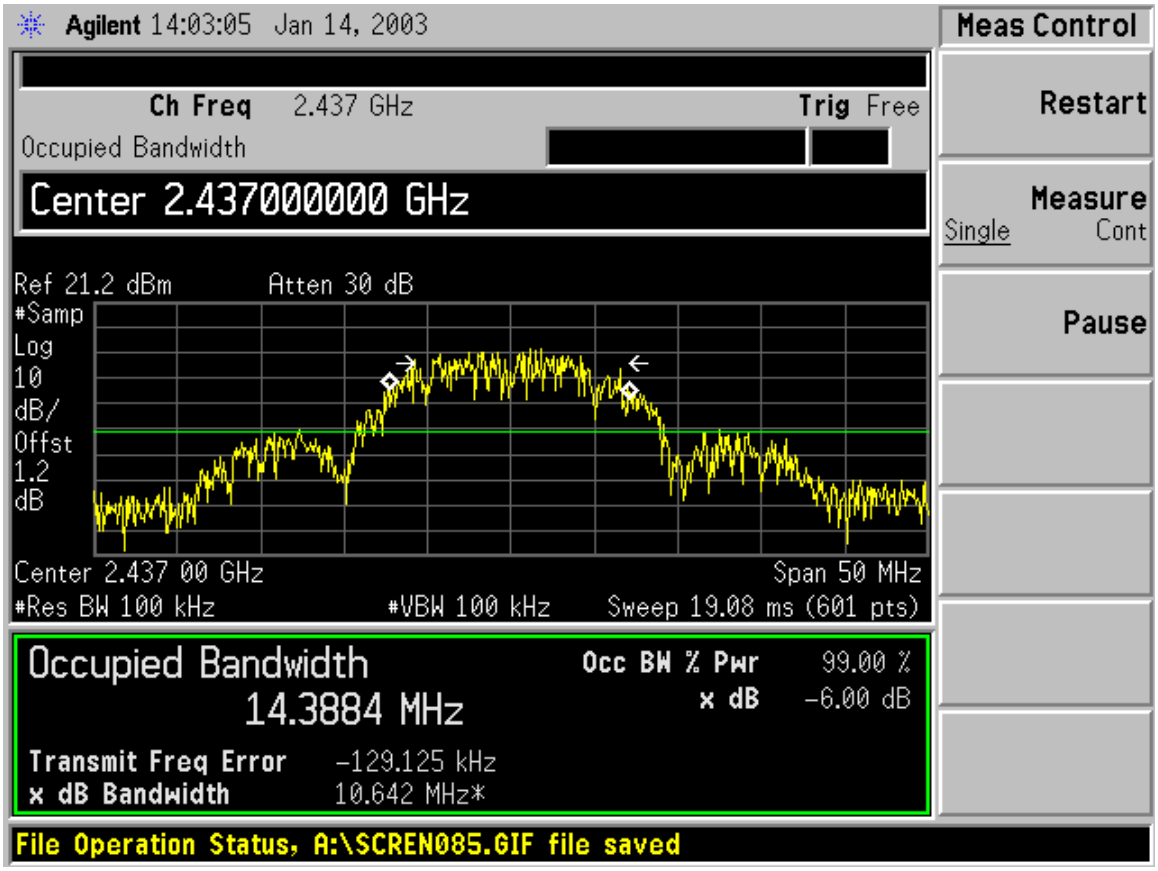
Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	5745	16315	500	15815
Middle	5785	16263	500	15763
High	5825	15981	500	15481

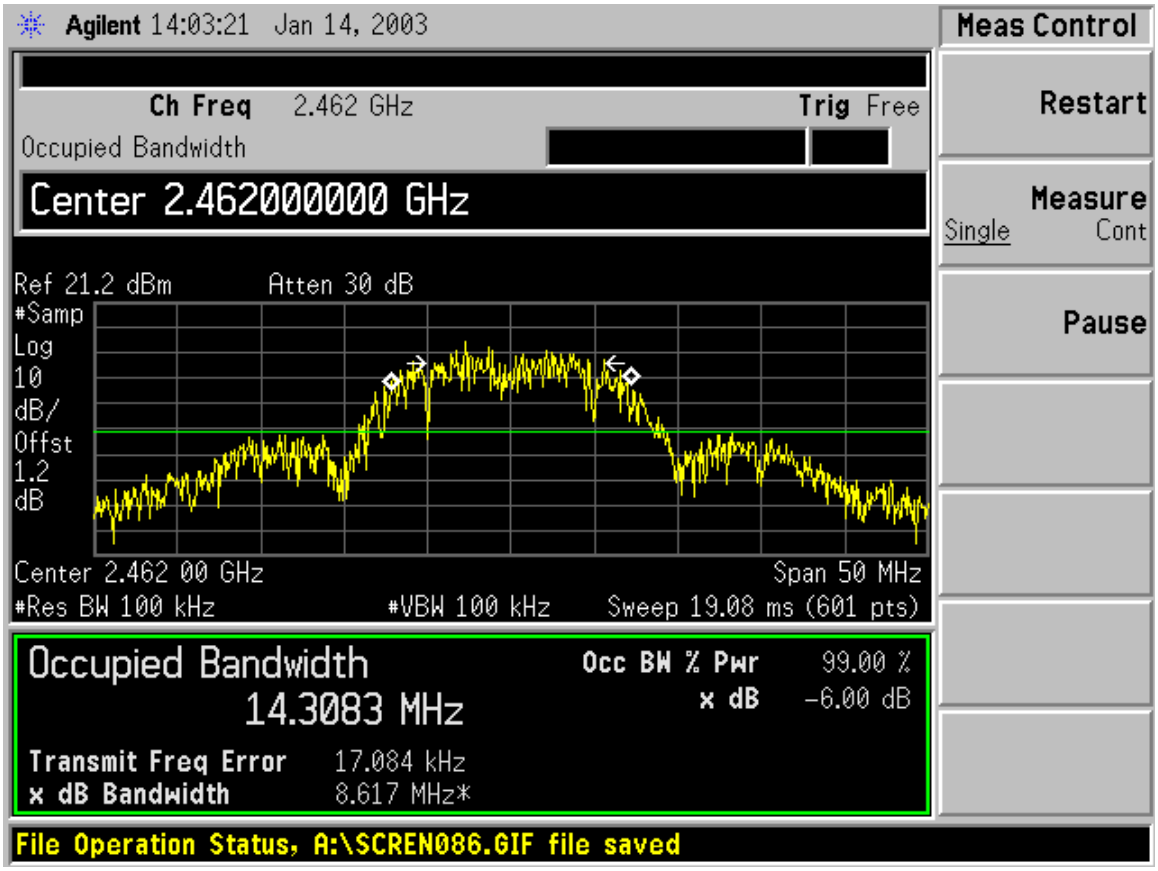
5.8 GHz Band Turbo Mode

Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	5760	31838	500	31338
High	5800	32261	500	31761

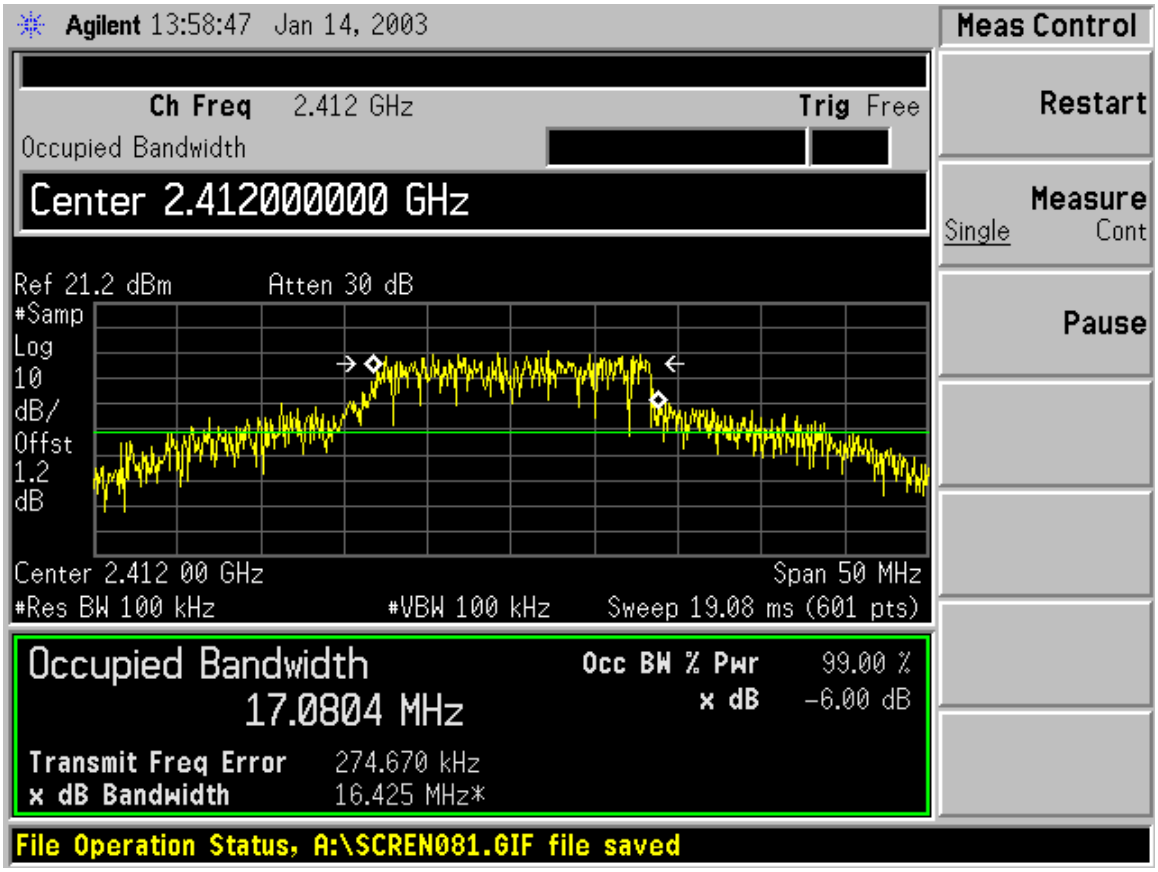
6 DB BANDWIDTH (2.4 GHZ BAND 11B MODE)

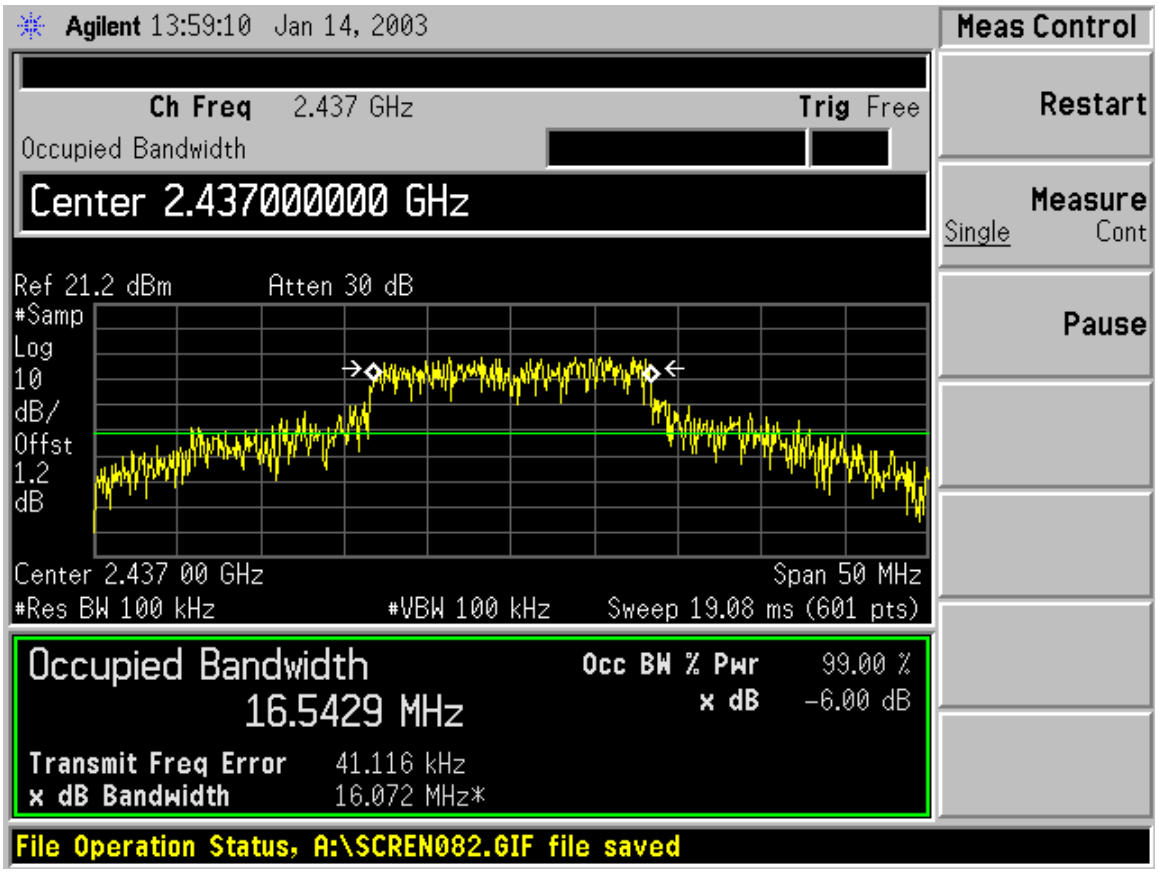


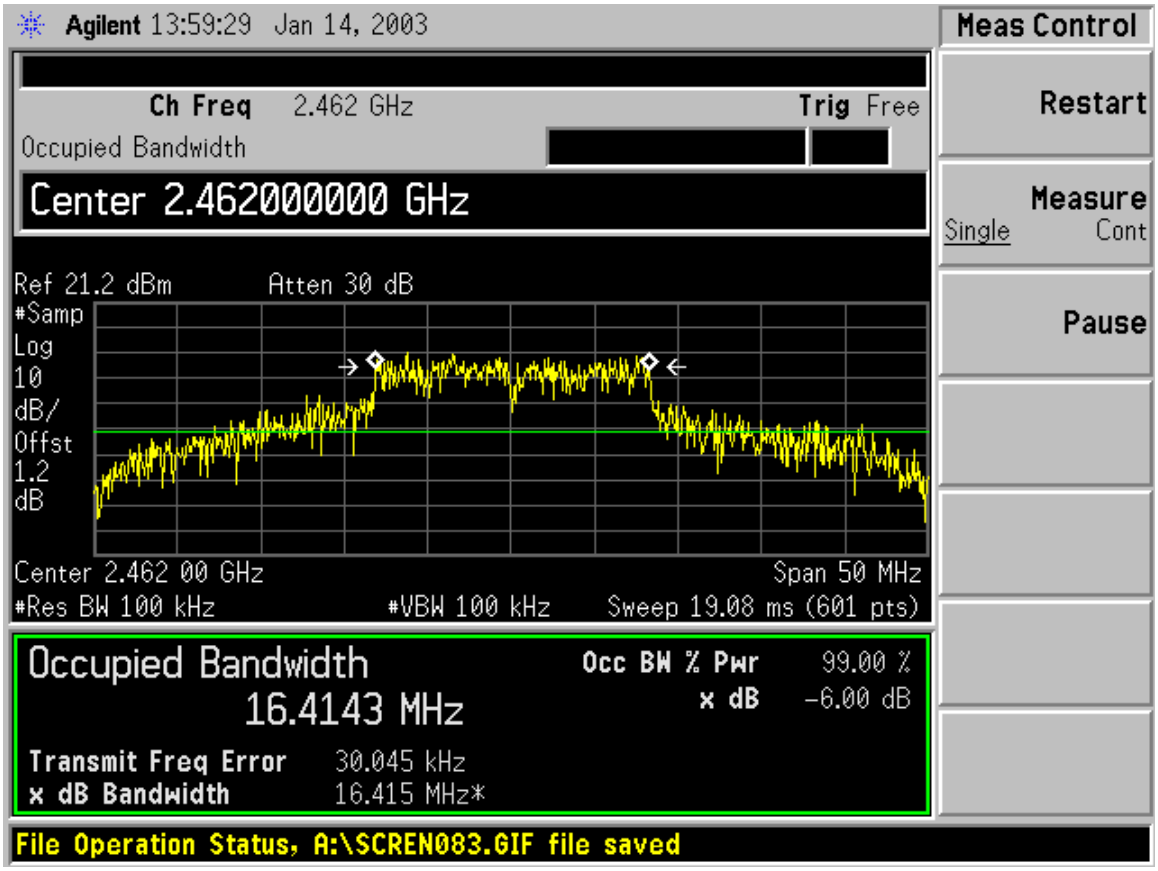




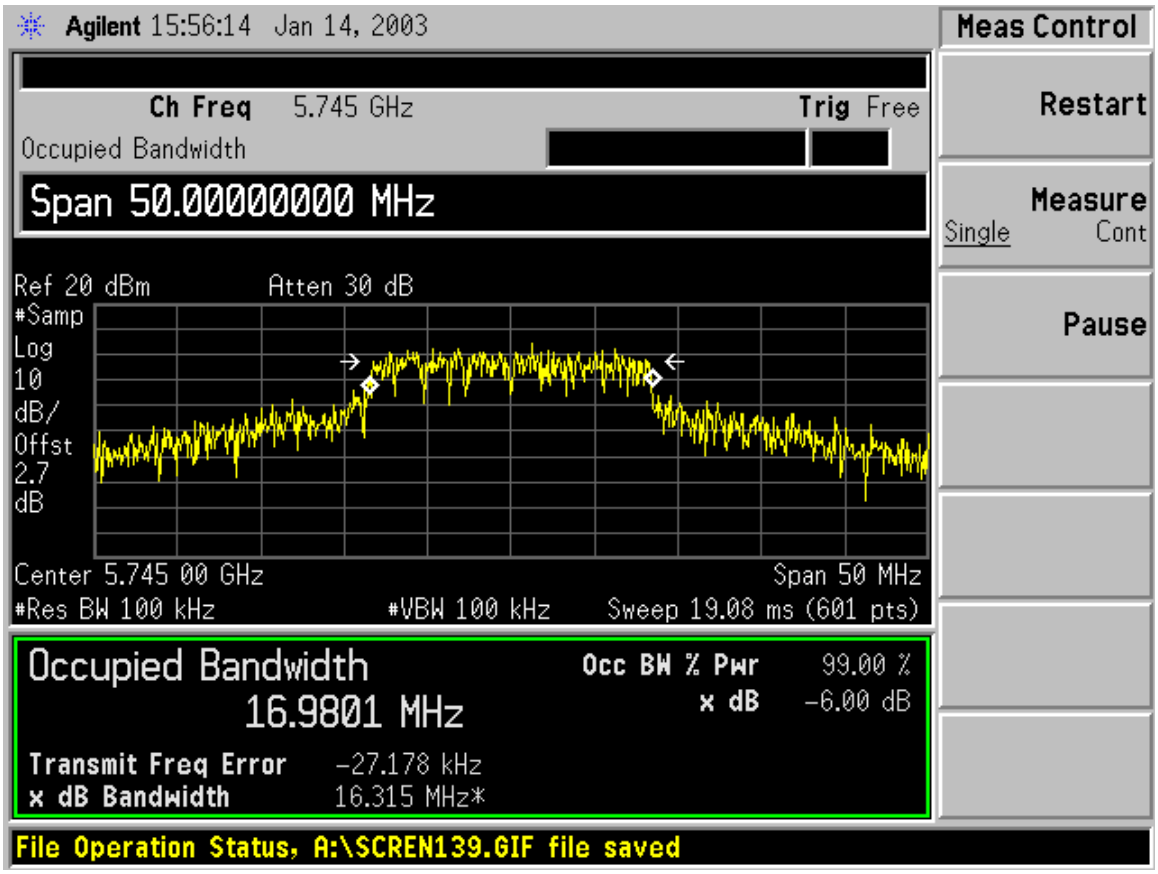
6 DB BANDWIDTH (2.4 GHZ BAND 11G MODE)

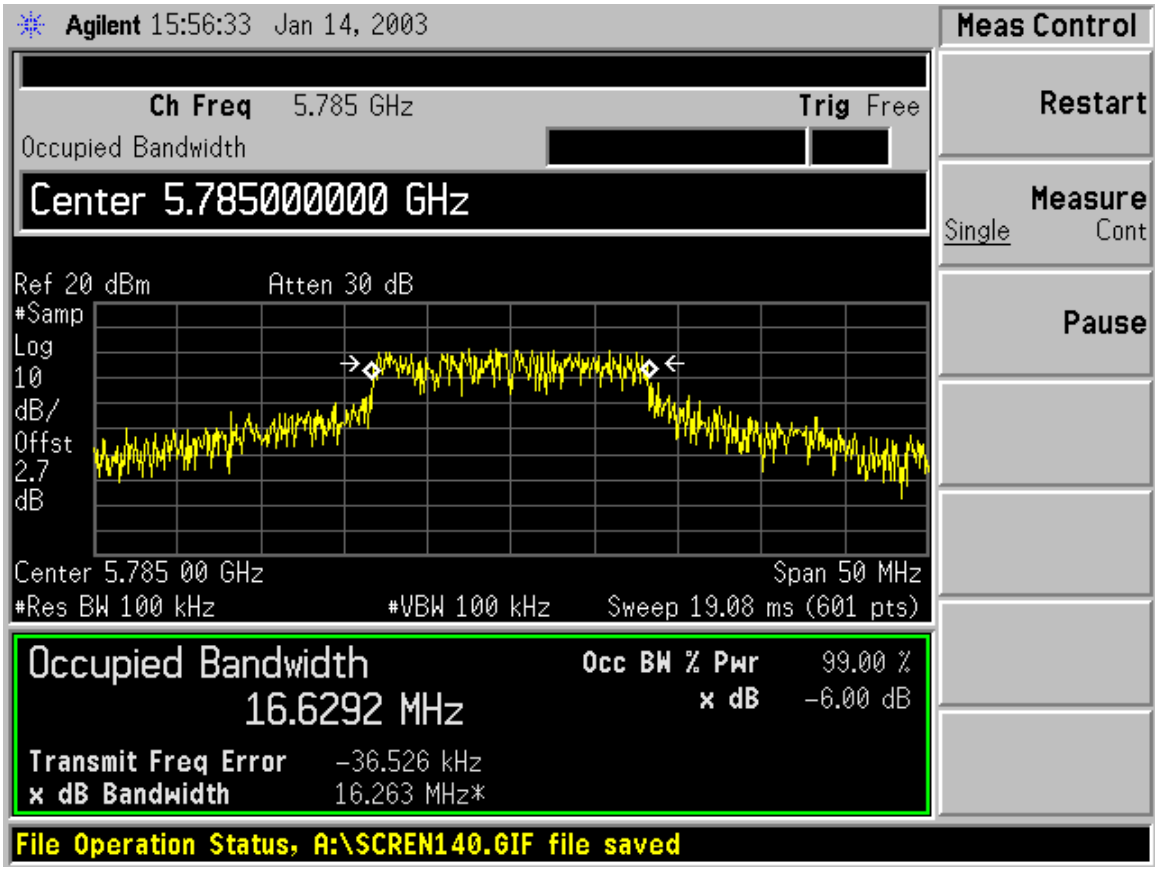


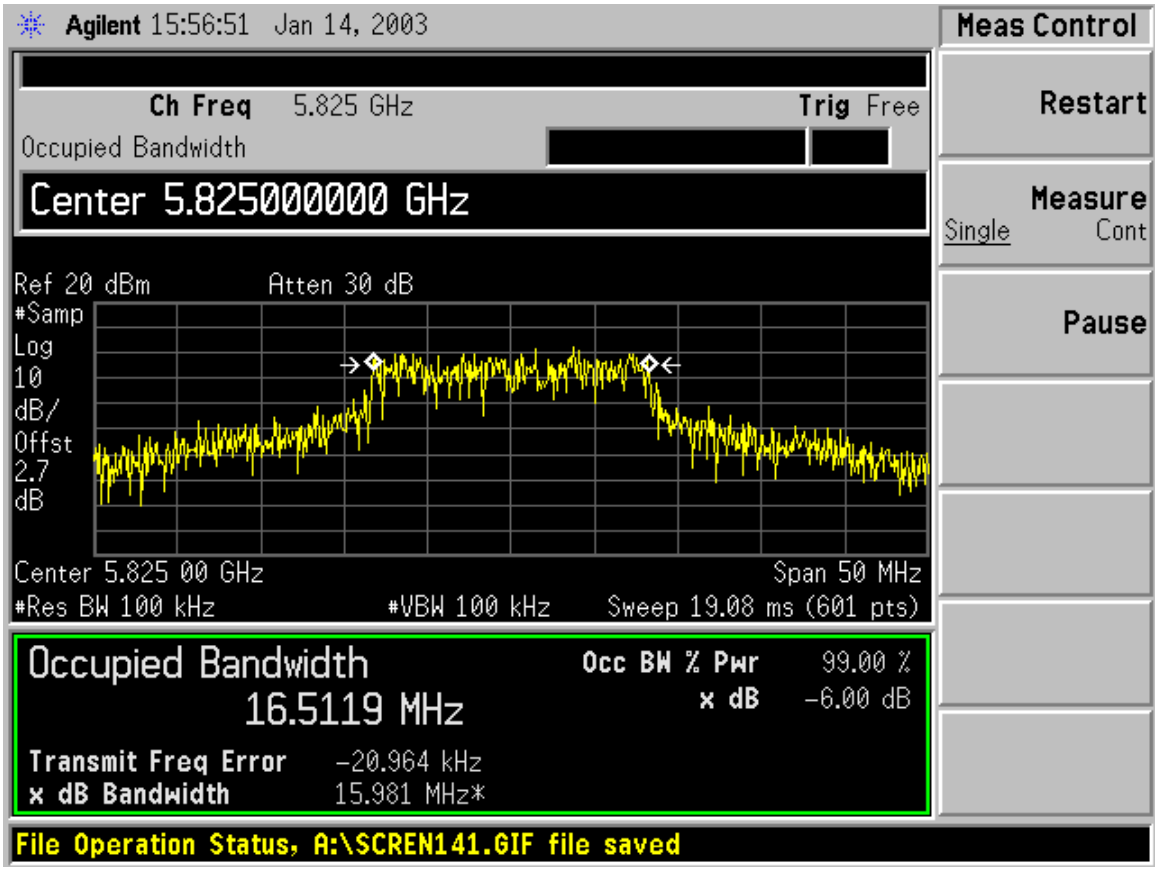




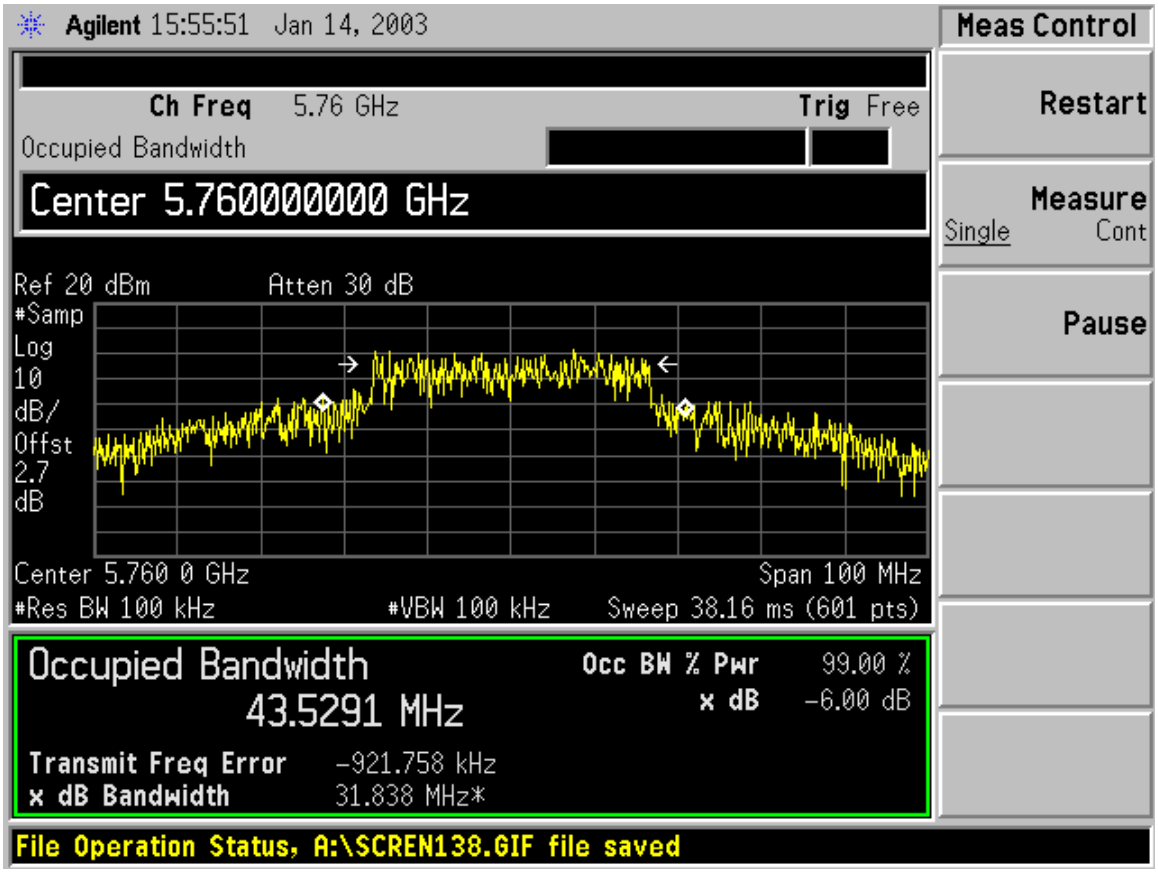
6 DB BANDWIDTH (5.8 GHZ BAND, NORMAL MODE)

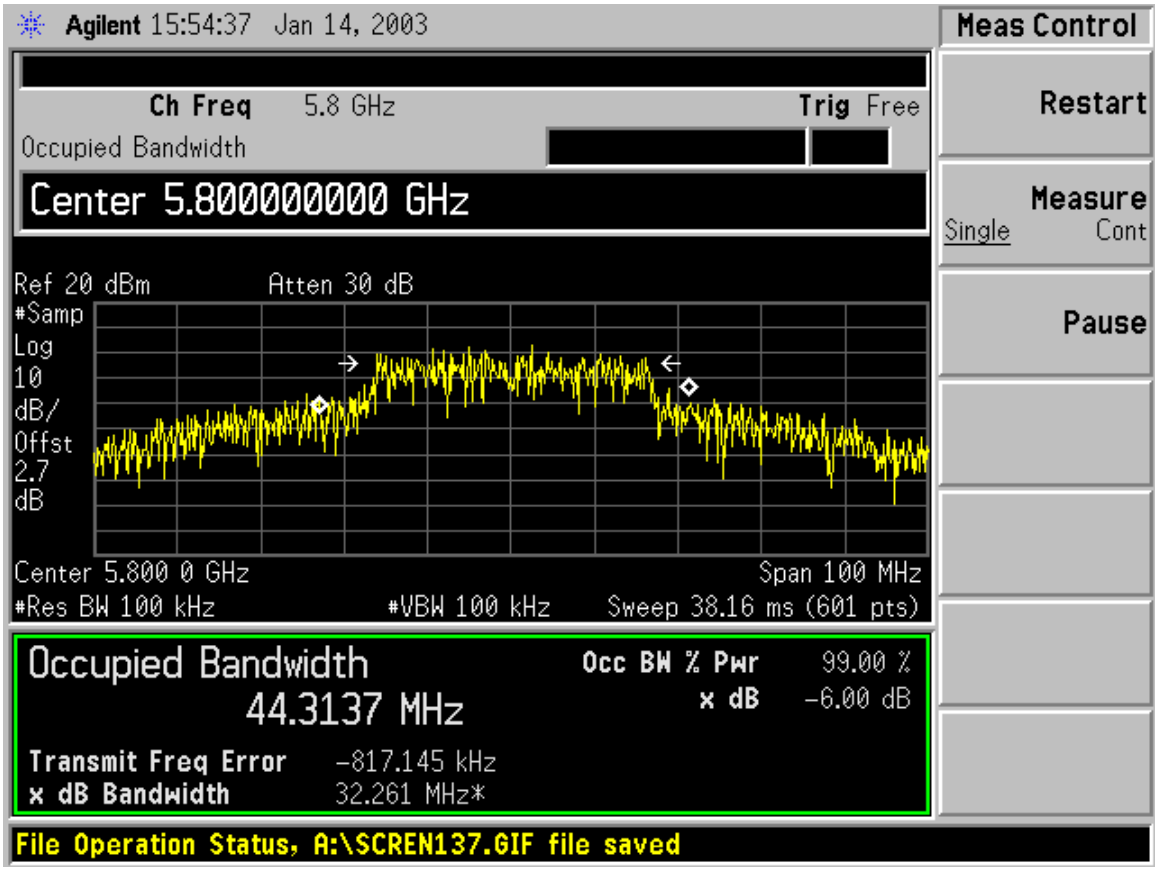






6 DB BANDWIDTH (5.8 GHZ BAND, TURBO MODE)

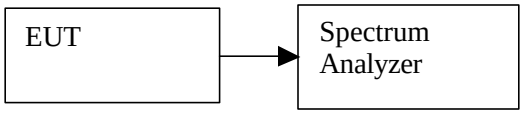




9.2. EMISSION BANDWIDTH

This measurement is used to determine the channel bandwidth for the peak power measurement.

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to approximately 1% of the emission bandwidth and peak detection is used. The emission bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 26 dB.

RESULTS

2.4 GHz Band, Base Mode

Channel	Frequency (MHz)	B (MHz)
Low	2412	20.13
Middle	2437	19.63
High	2462	19.75

2.4 GHz Band, OFDM Mode

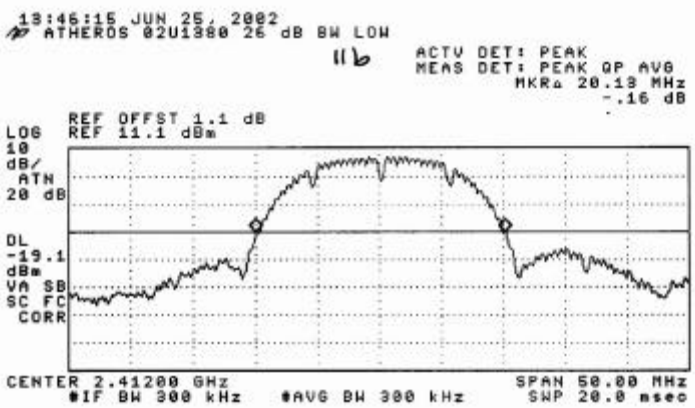
Channel	Frequency (MHz)	B (MHz)
Low	2412	32.5
Middle	2437	30.25
High	2462	32.5

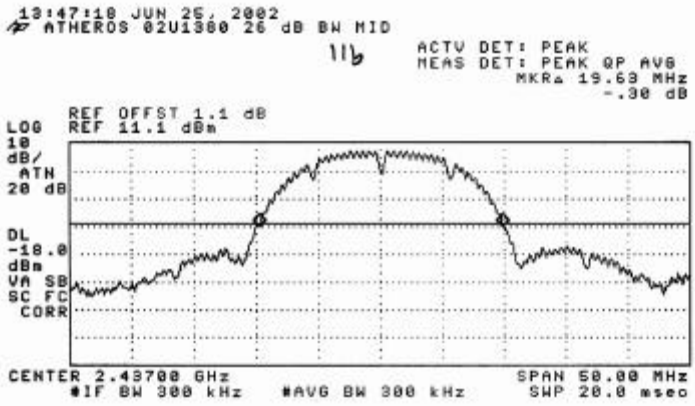
5.8 GHz Band, Base Mode

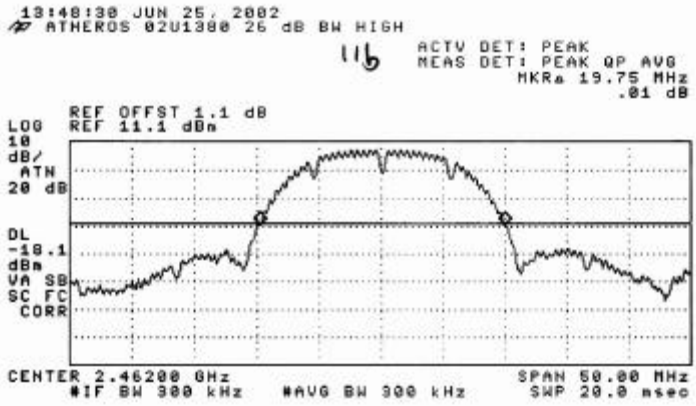
Channel	Frequency (MHz)	B (MHz)
Low	5745	36.13
Middle	5785	37.38
High	5825	33.5

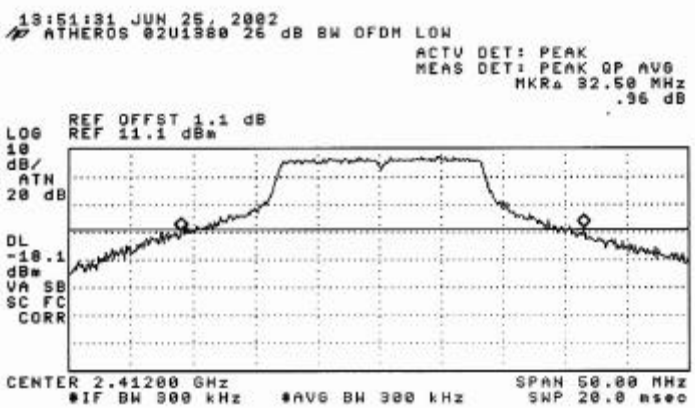
5.8 GHz Band, Turbo Mode

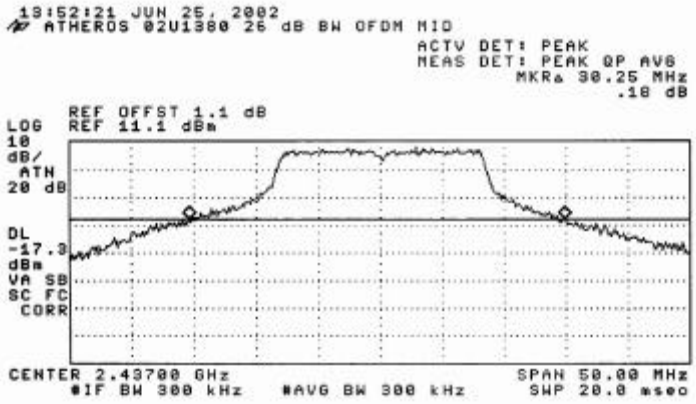
Channel	Frequency (MHz)	B (MHz)
Low	5760	65.3
Middle	N/A	N/A
High	5800	67.8

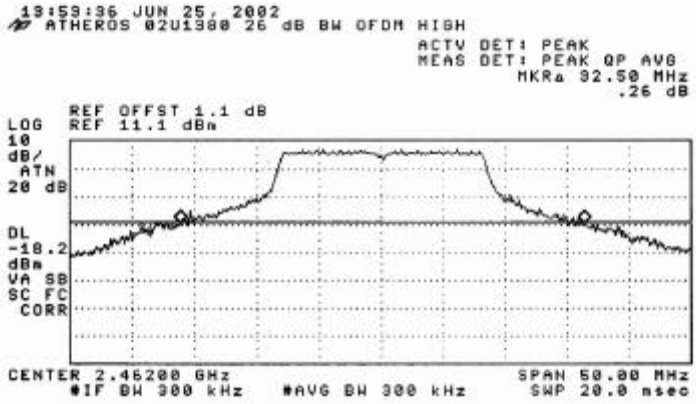


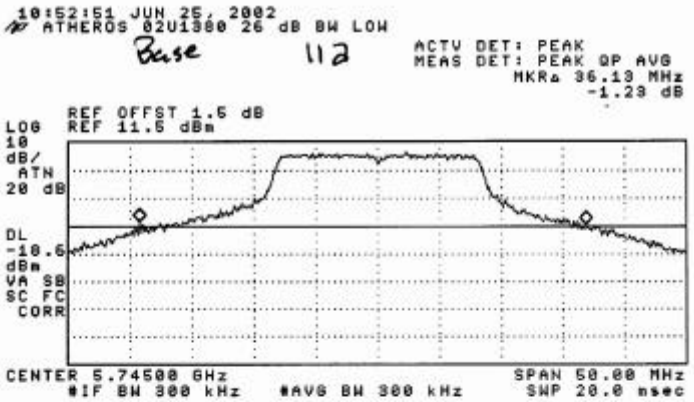


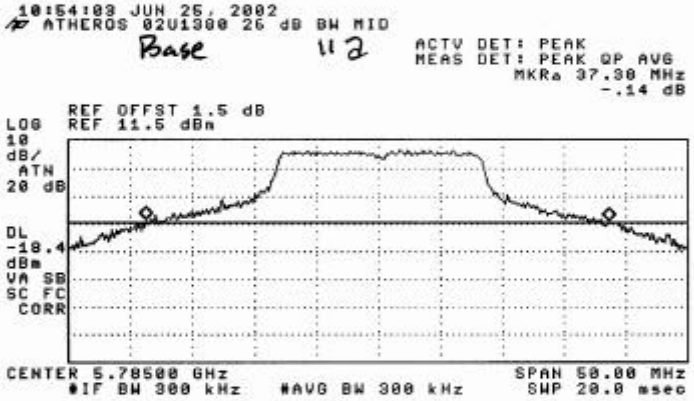


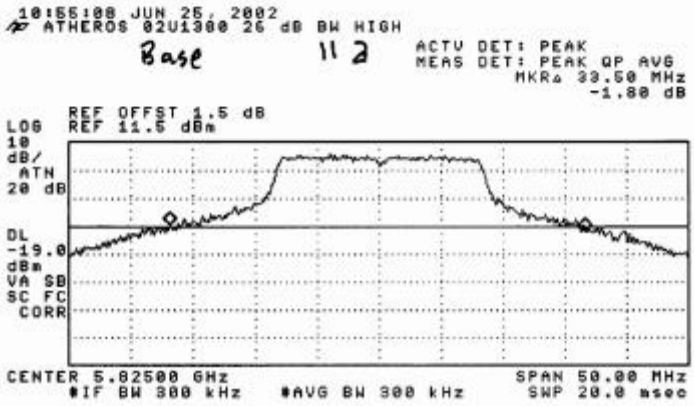




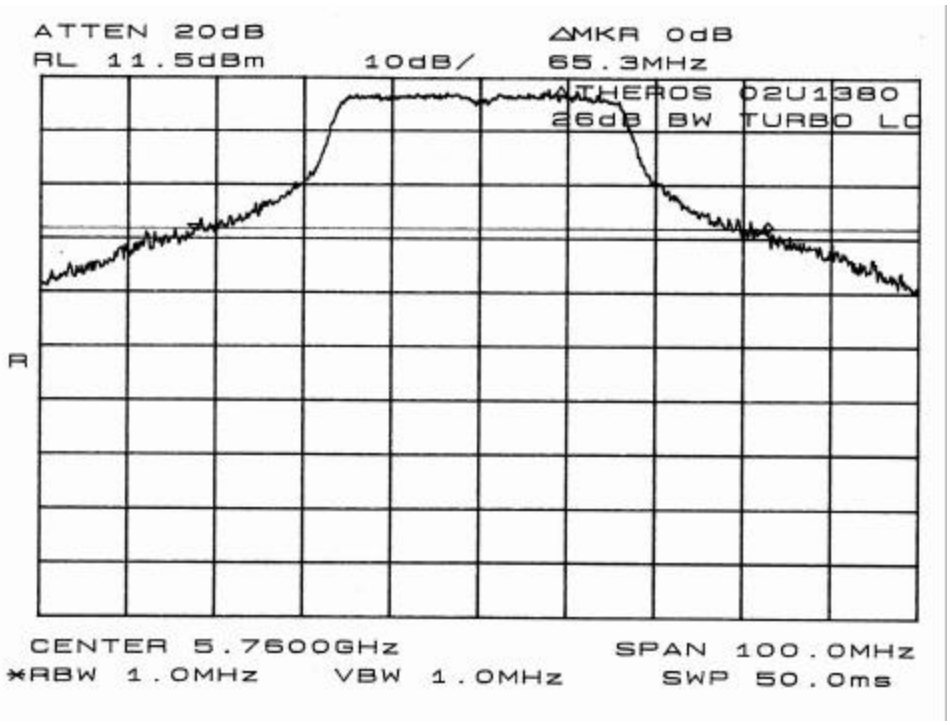


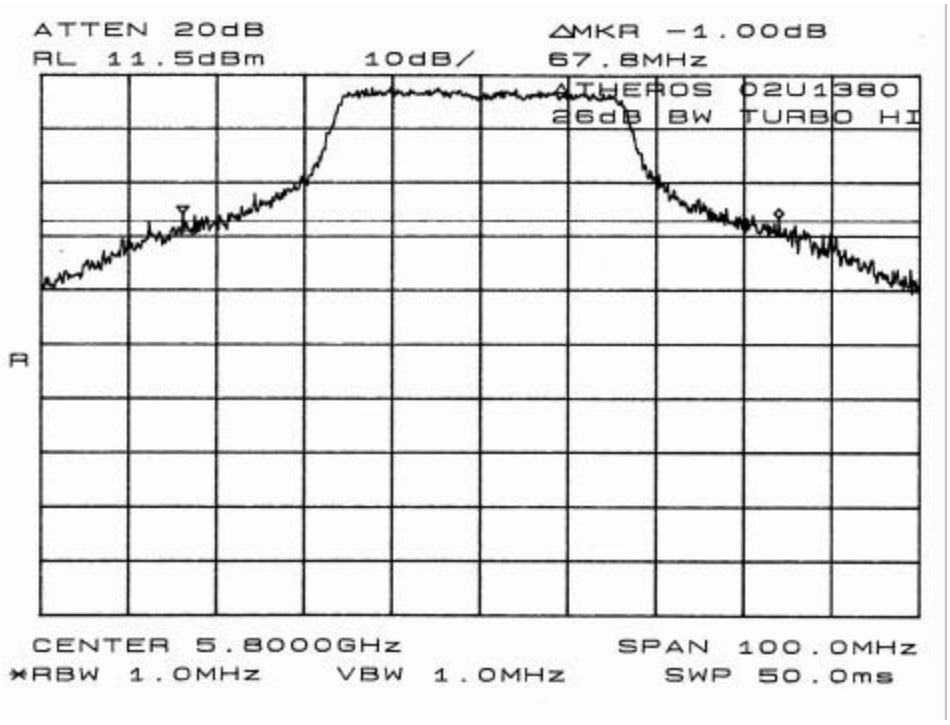






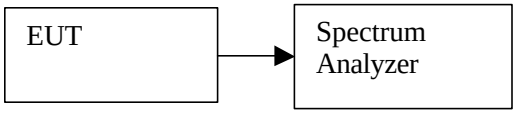
TURBO





9.3. PEAK POWER

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 MHz, and channel power is integrated over the emission bandwidth.

LIMIT

The maximum antenna gain = 4.3 dBi, therefore the limit is 30 dBm.

RESULTS

No non-compliance noted:

2.4 GHz Band, 11b Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	18.16	30	-11.84
Middle	2437	17.33	30	-12.67
High	2462	17.23	30	-12.77

2.4 GHz Band, 11g Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	18.8	30	-11.2
Middle	2437	19.49	30	10.51
High	2462	18.23	30	11.77

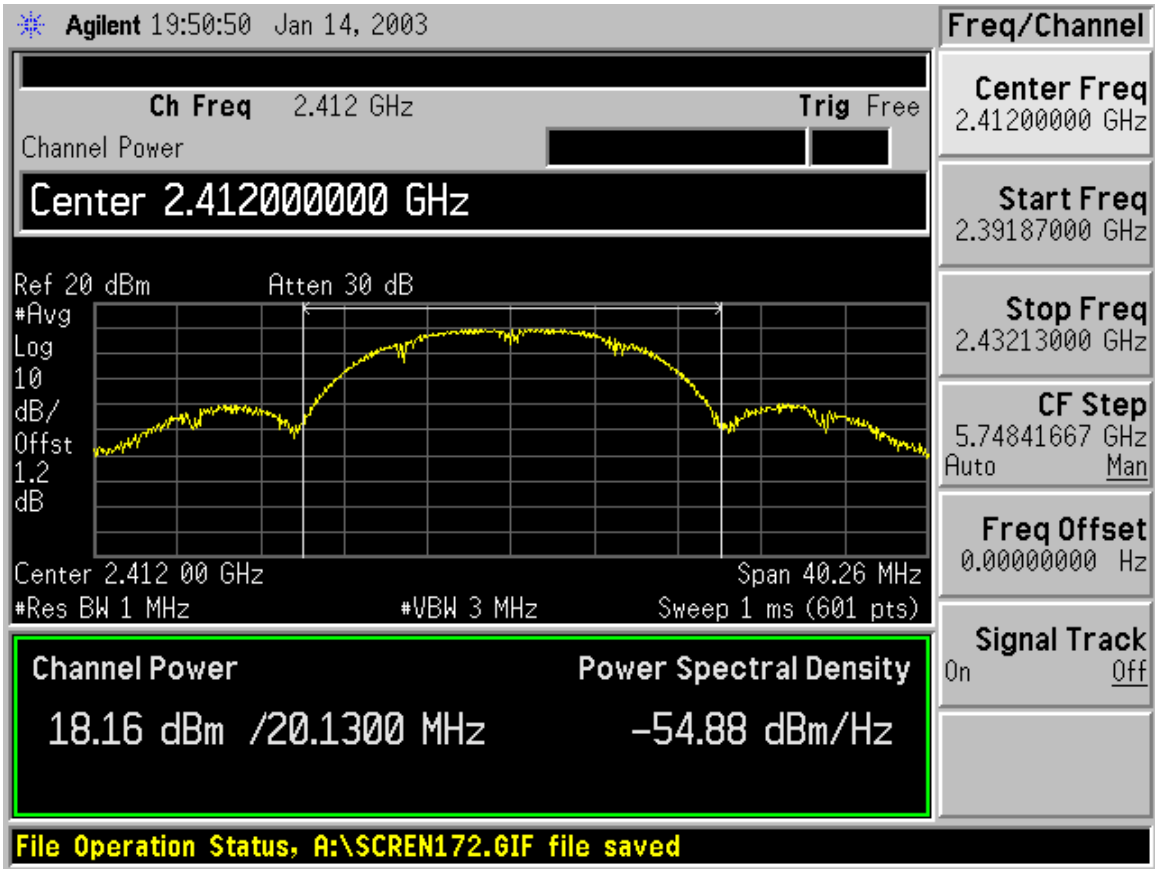
5.8 GHz Band Normal Mode

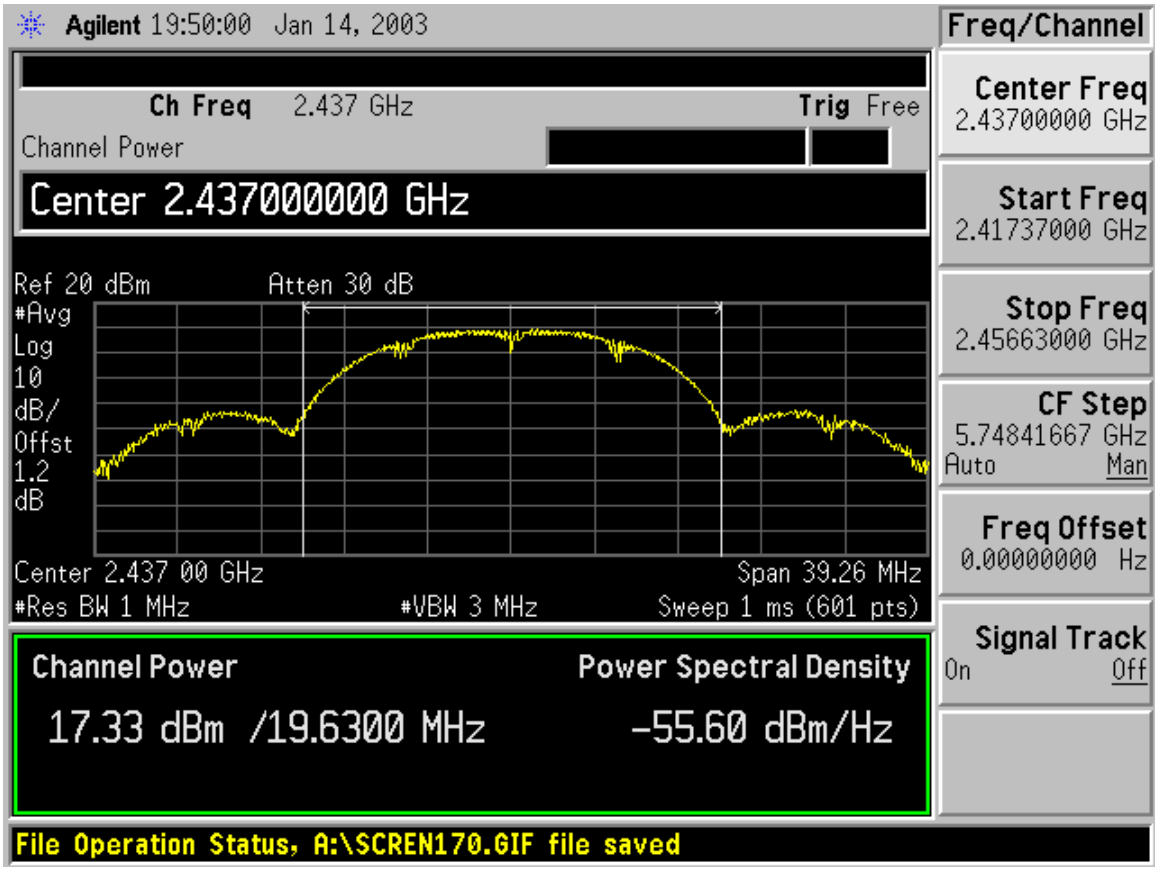
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	19.17	30	-10.83
Middle	5785	19.52	30	-10.48
High	5825	18.82	30	-11.18

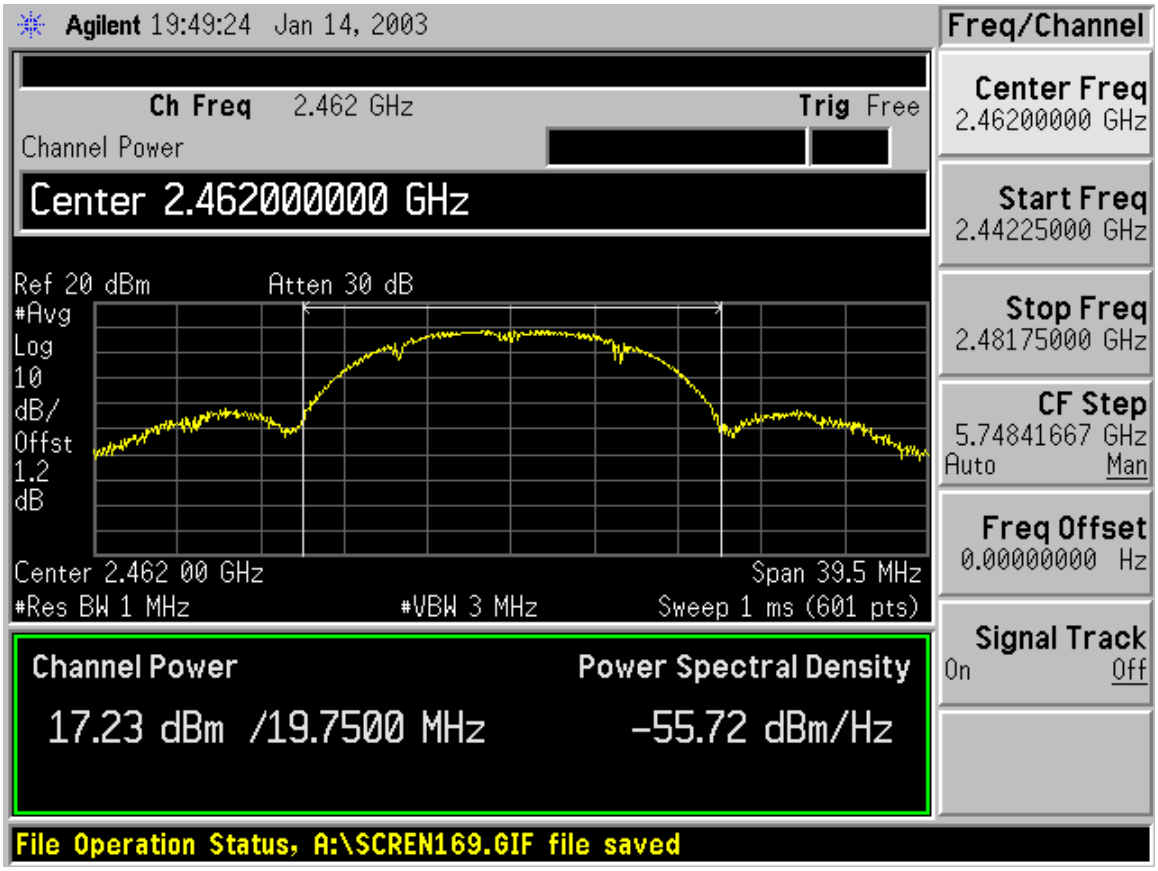
5.8 GHz Band Turbo Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5760	20.38	30	-9.62
High	5800	20.34	30	-9.66

PEAK POWER (2.4 GHZ BAND, 11B MODE)







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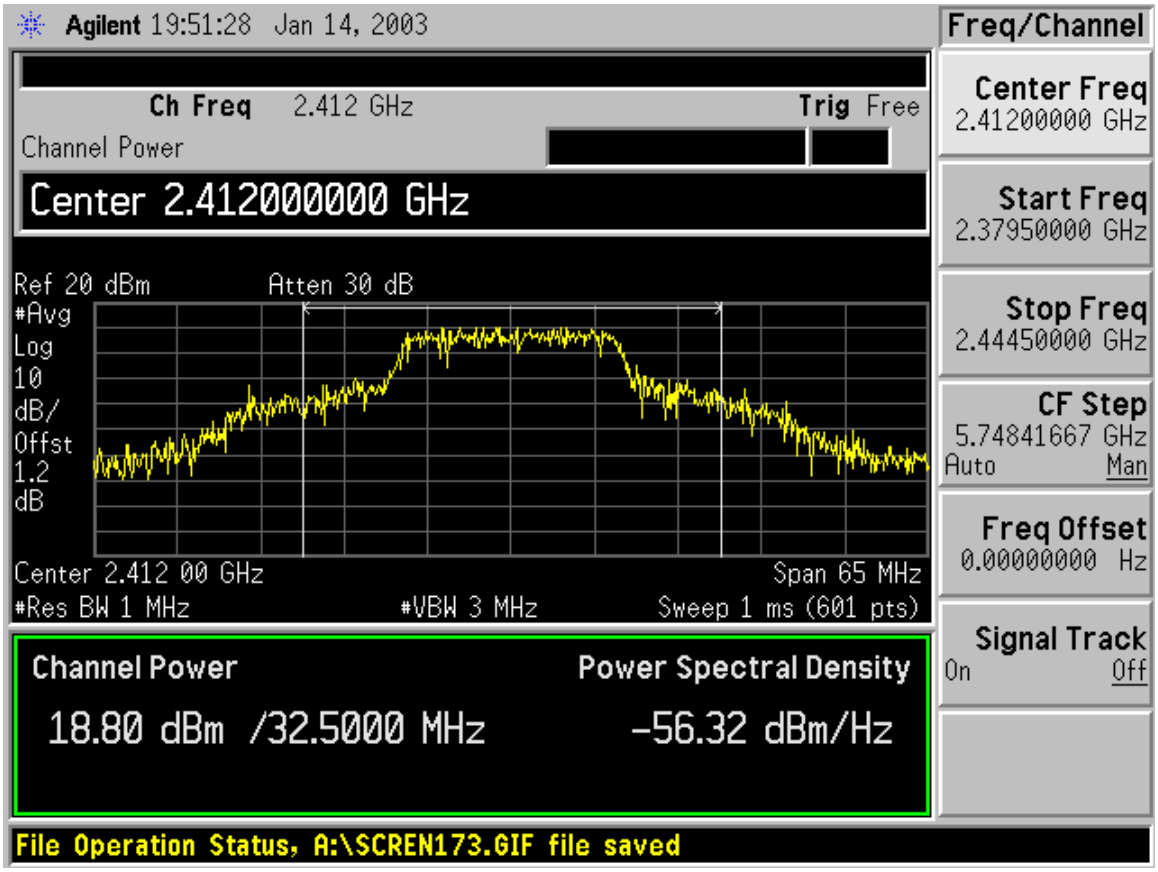
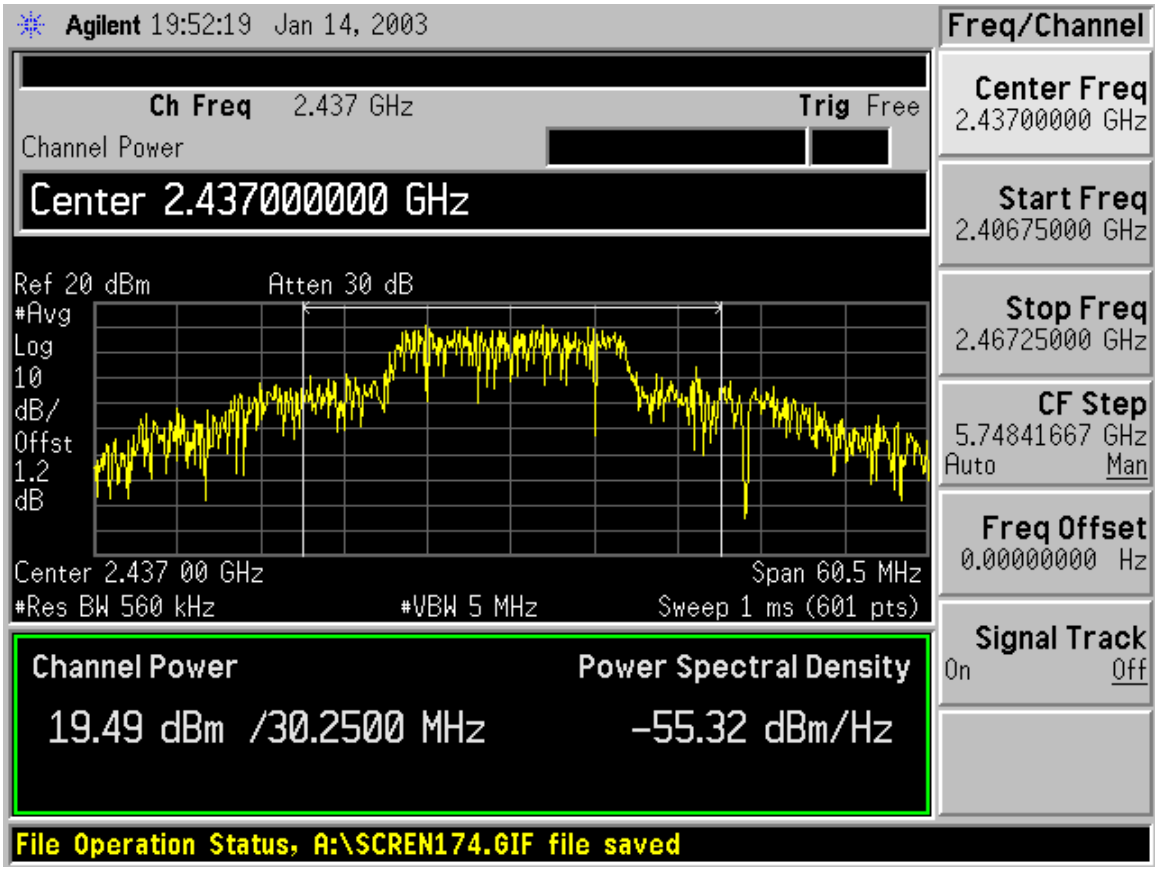
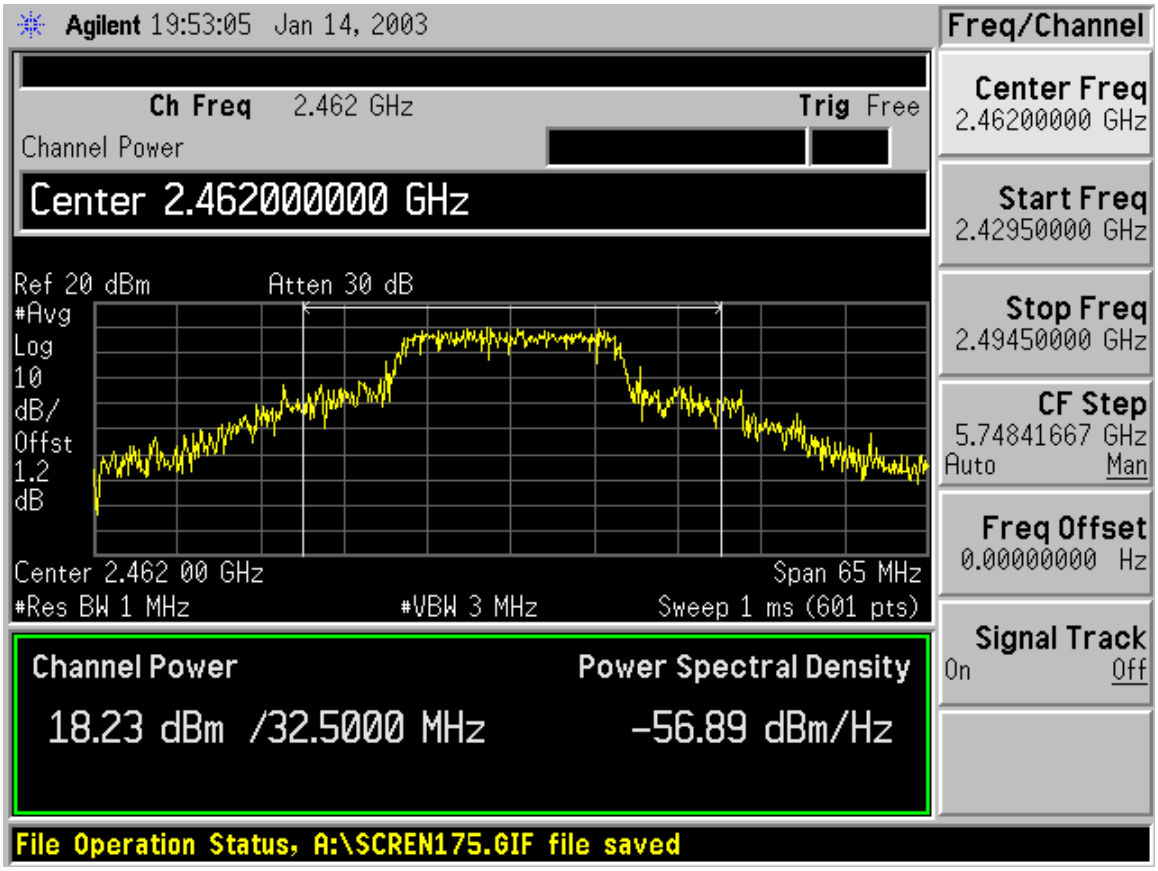
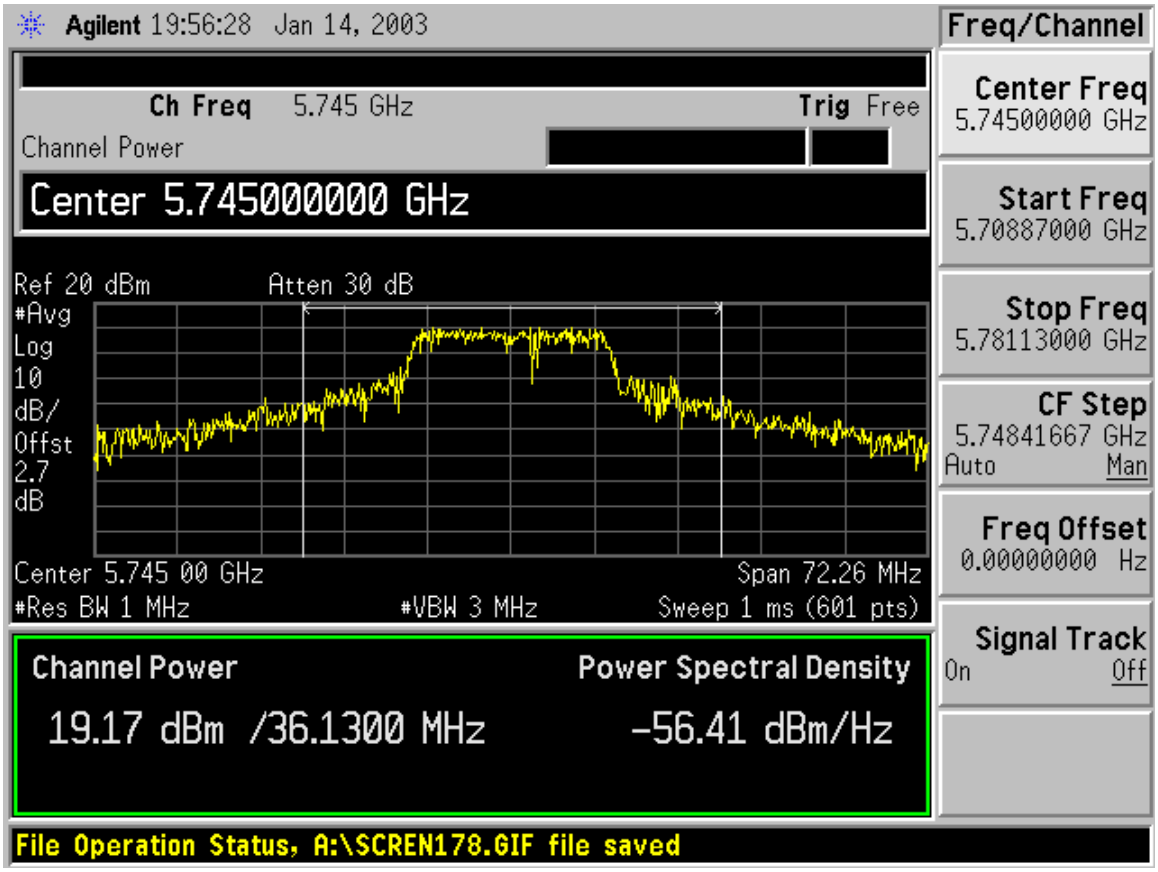
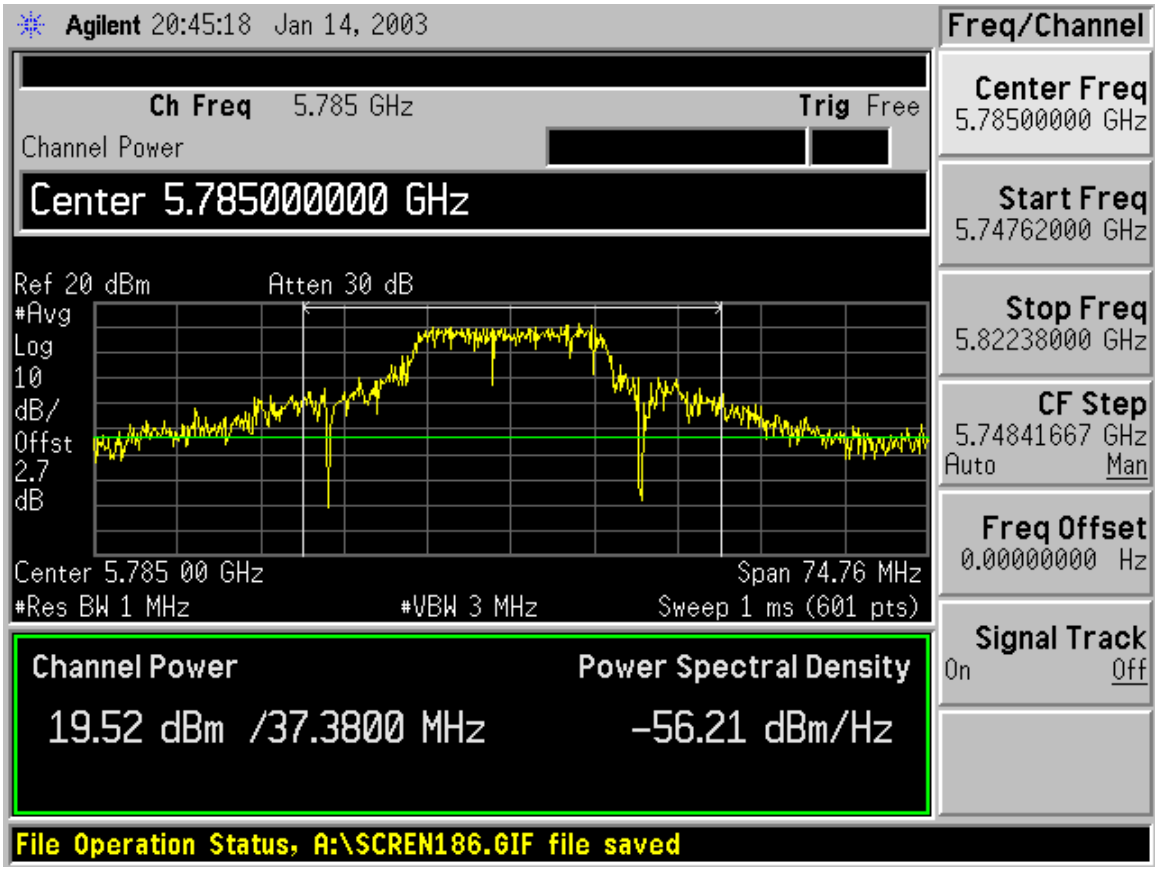


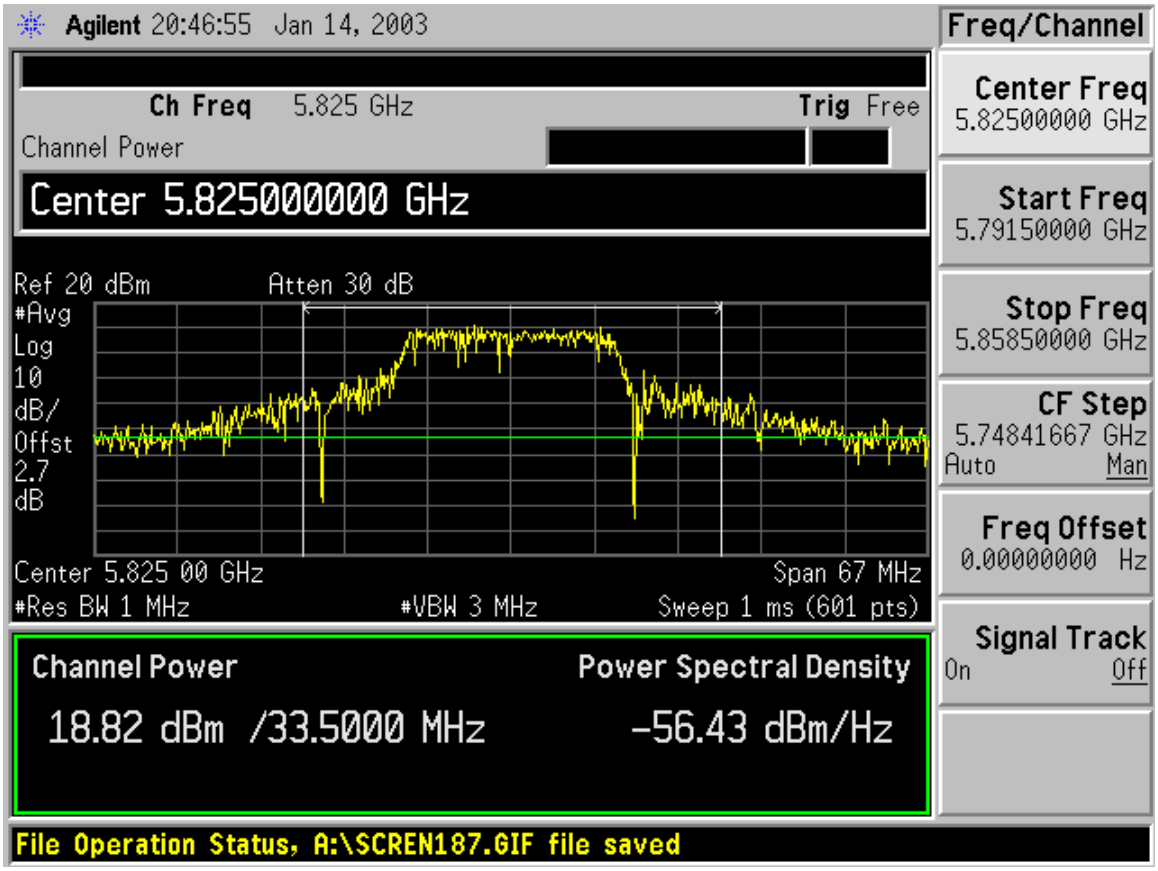




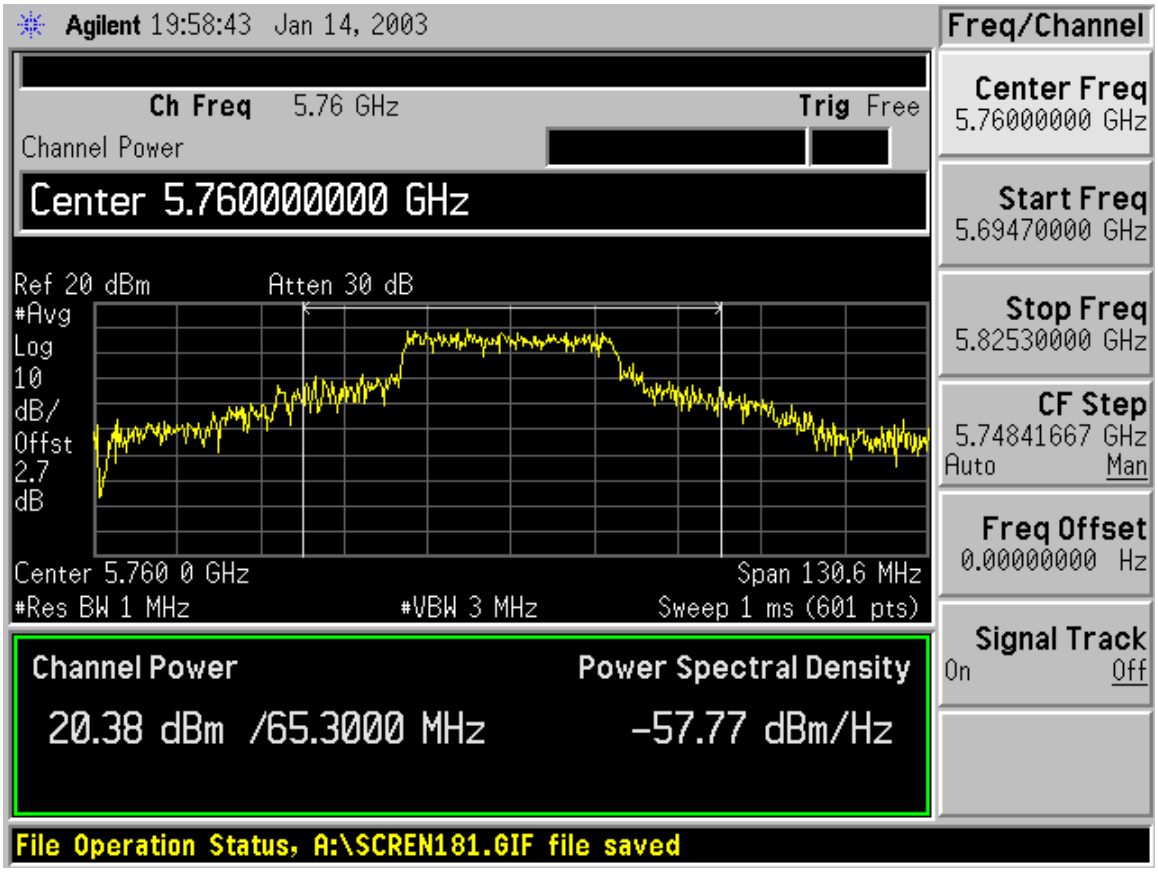
PEAK POWER (5.8 BAND, NORMAL MODE)

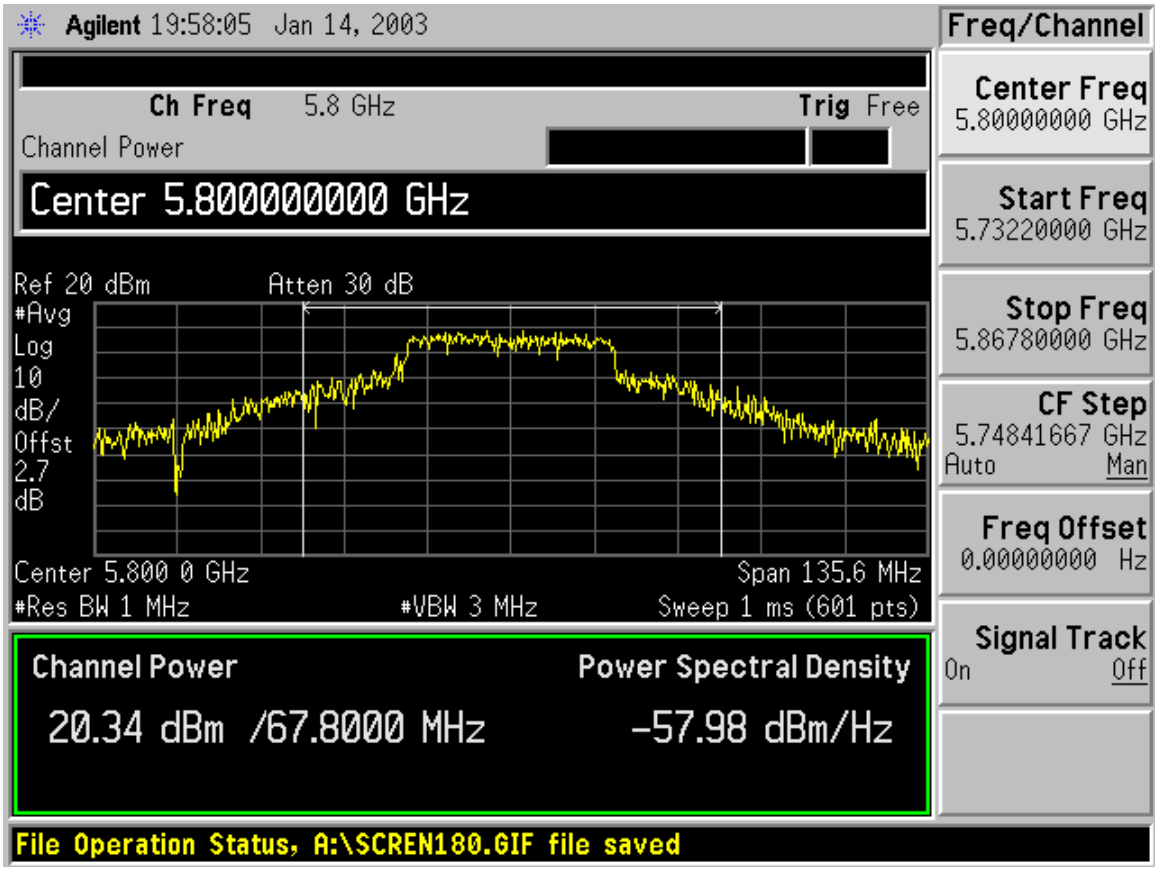






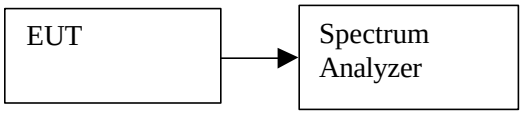
PEAK POWER (5.8 GHZ BAND, TURBO MODE)





9.4. PEAK POWER SPECTRAL DENSITY

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW >= 3KHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

RESULTS

No non-compliance noted:

2.4 GHz Band, 11b Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.47	8	-13.47
Middle	2437	-5.72	8	-13.72
High	2462	-5.94	8	-13.94

2.4 GHz Band, 11g Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-6.12	8	-14.12
Middle	2437	-5.24	8	-13.24
High	2462	-6.94	8	-14.94

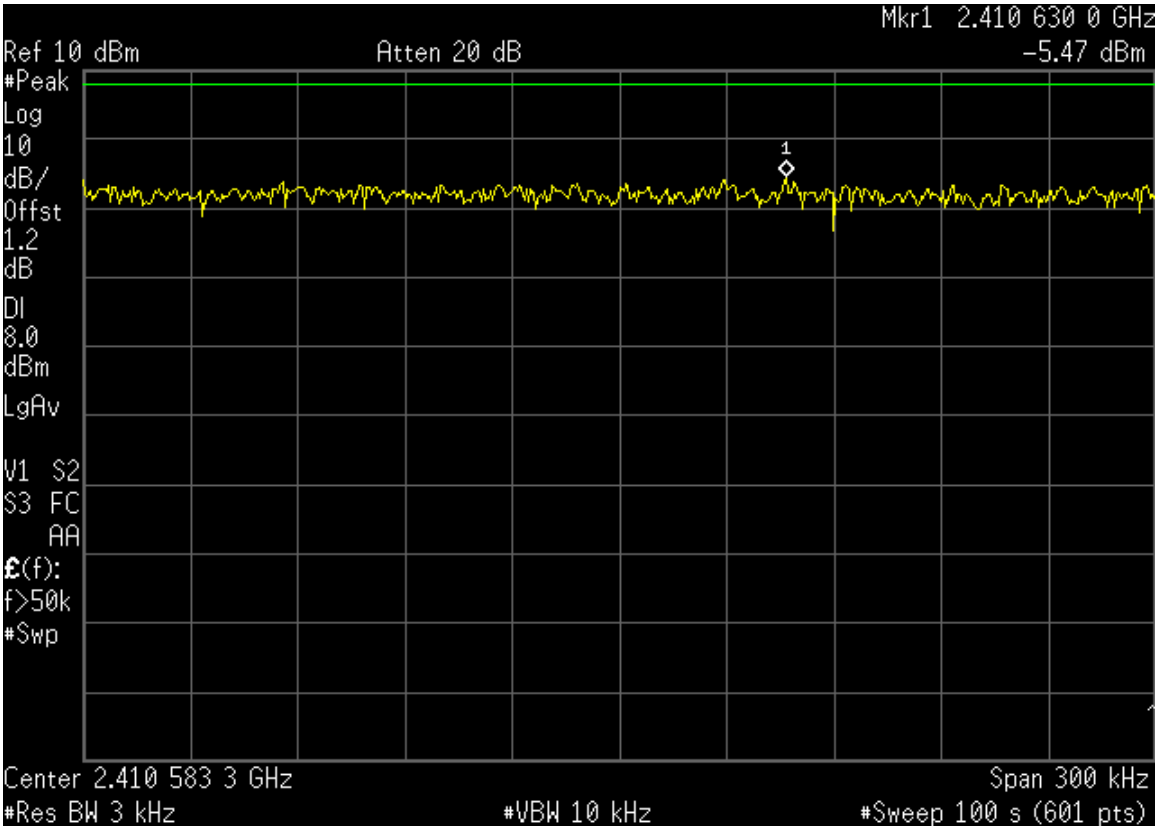
5.8 GHz Band Normal Mode

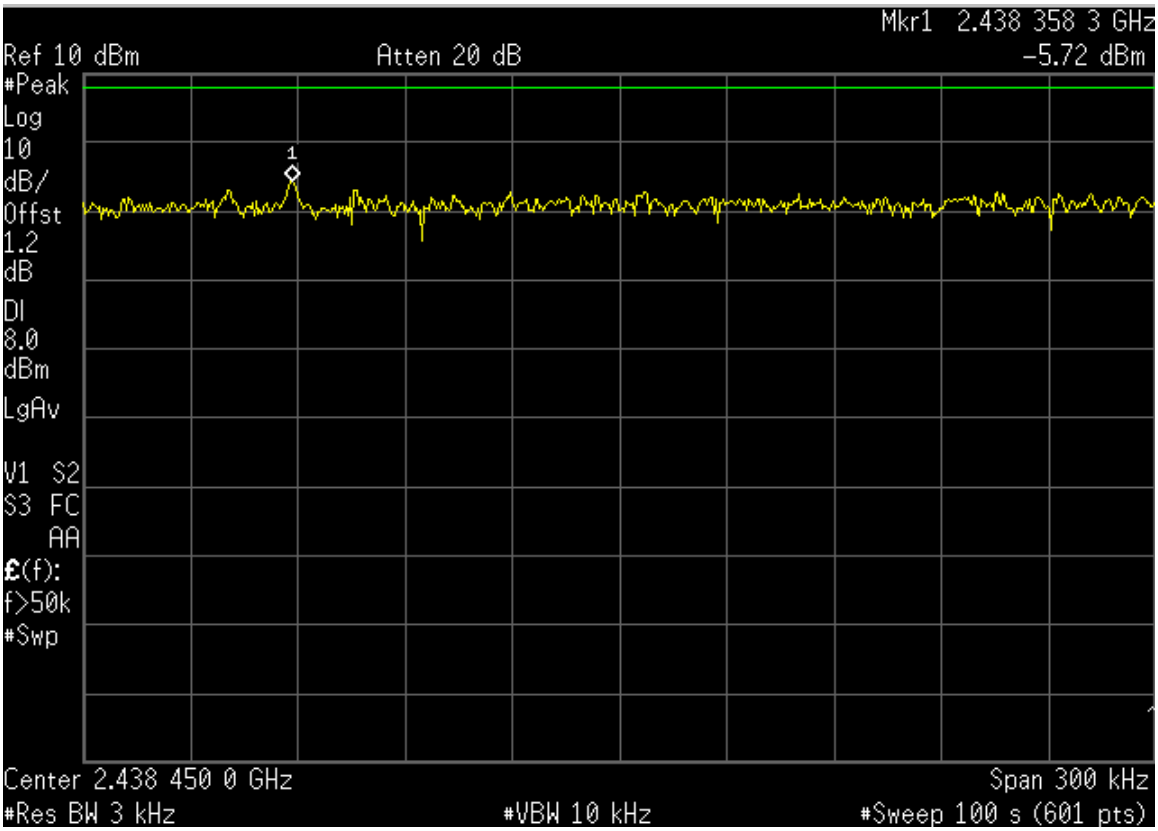
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-5.35	8	-13.35
Middle	5785	-8.4	8	-16.4
High	5825	-8.4	8	-16.4

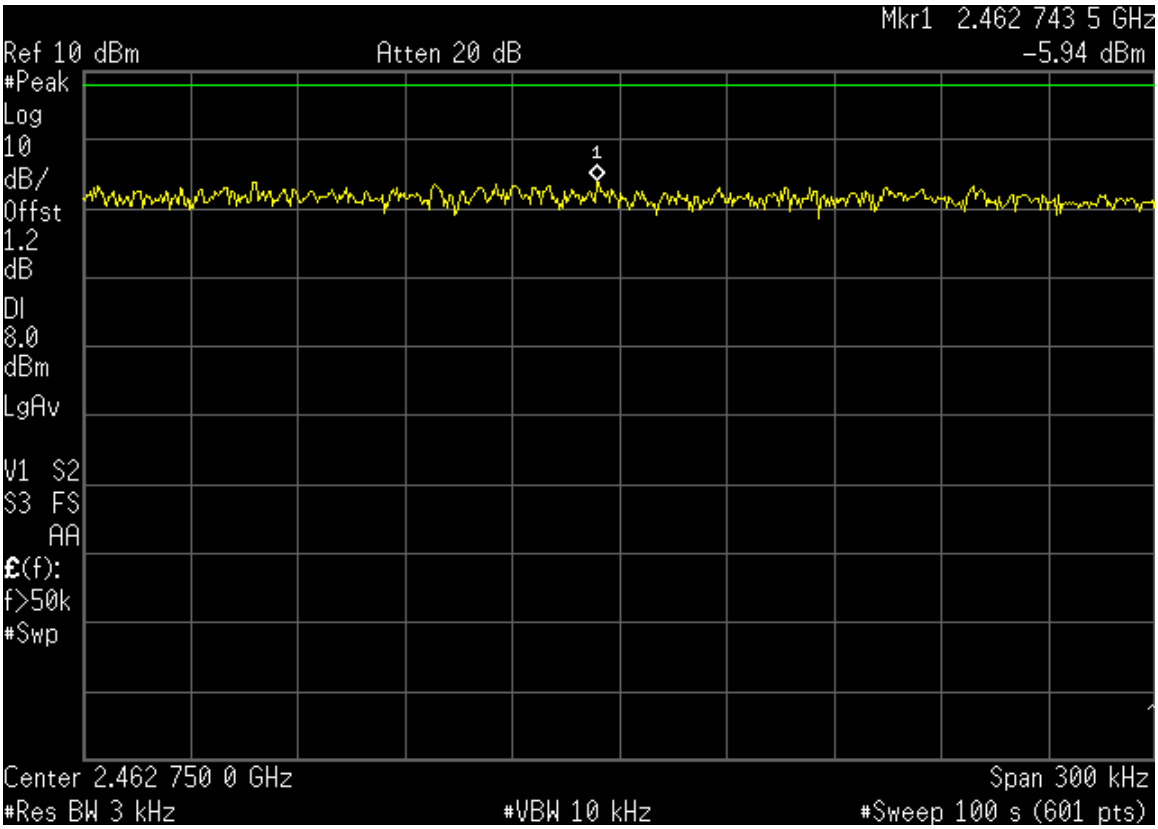
5.8 GHz Band Turbo Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5760	-6.15	8	-14.15
High	5800	-7.46	8	-15.46

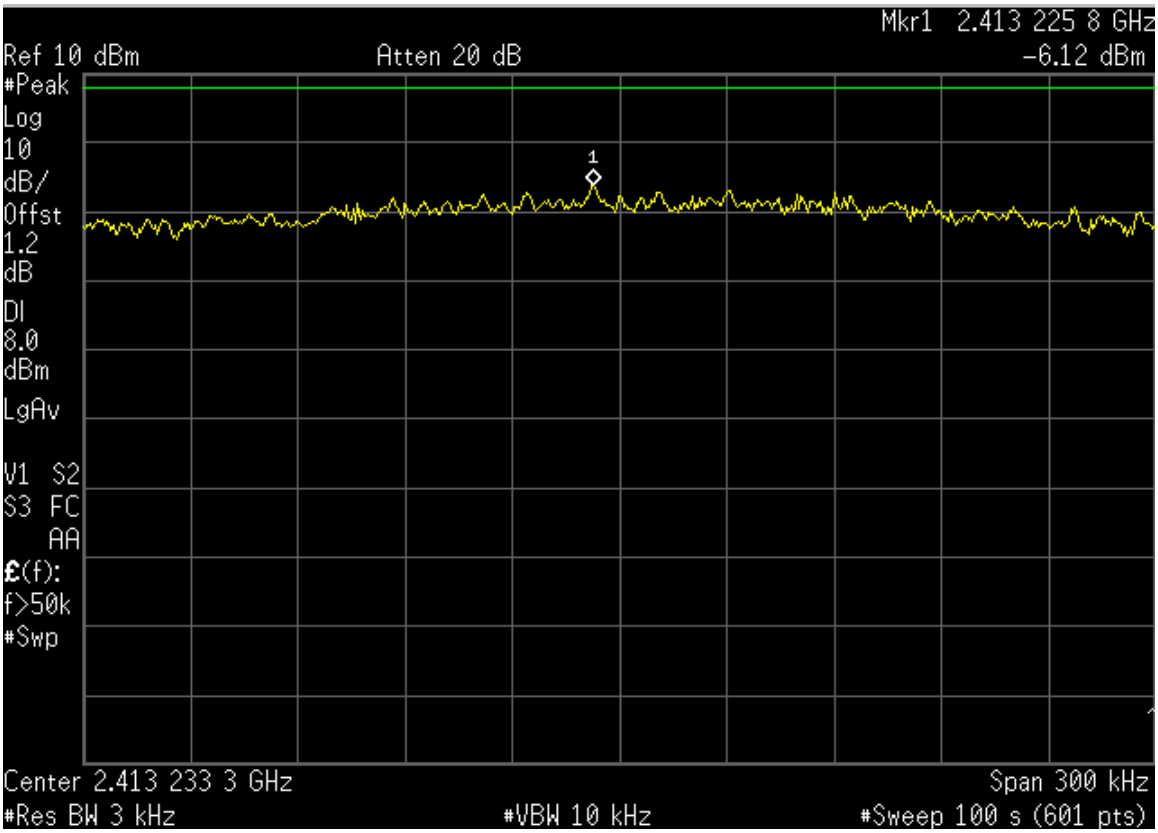
PPSD (2.4 GHZ BAND, 11b MODE)

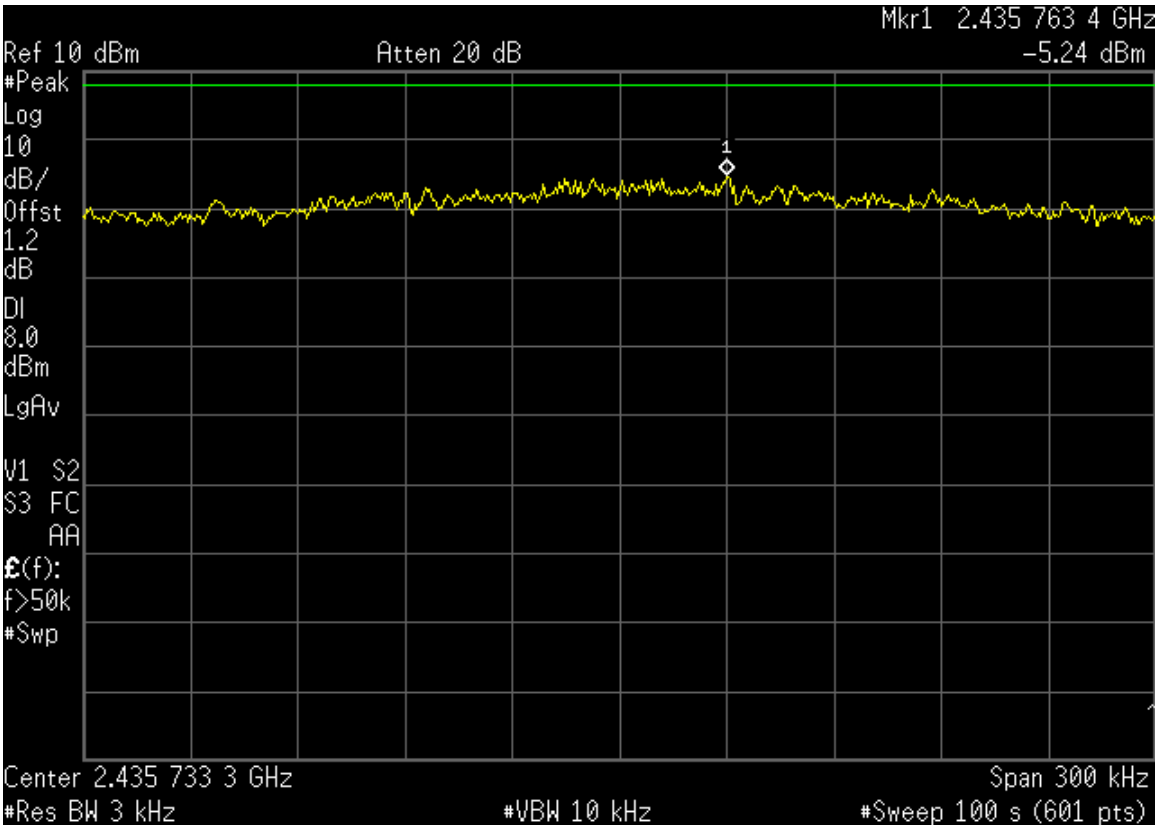


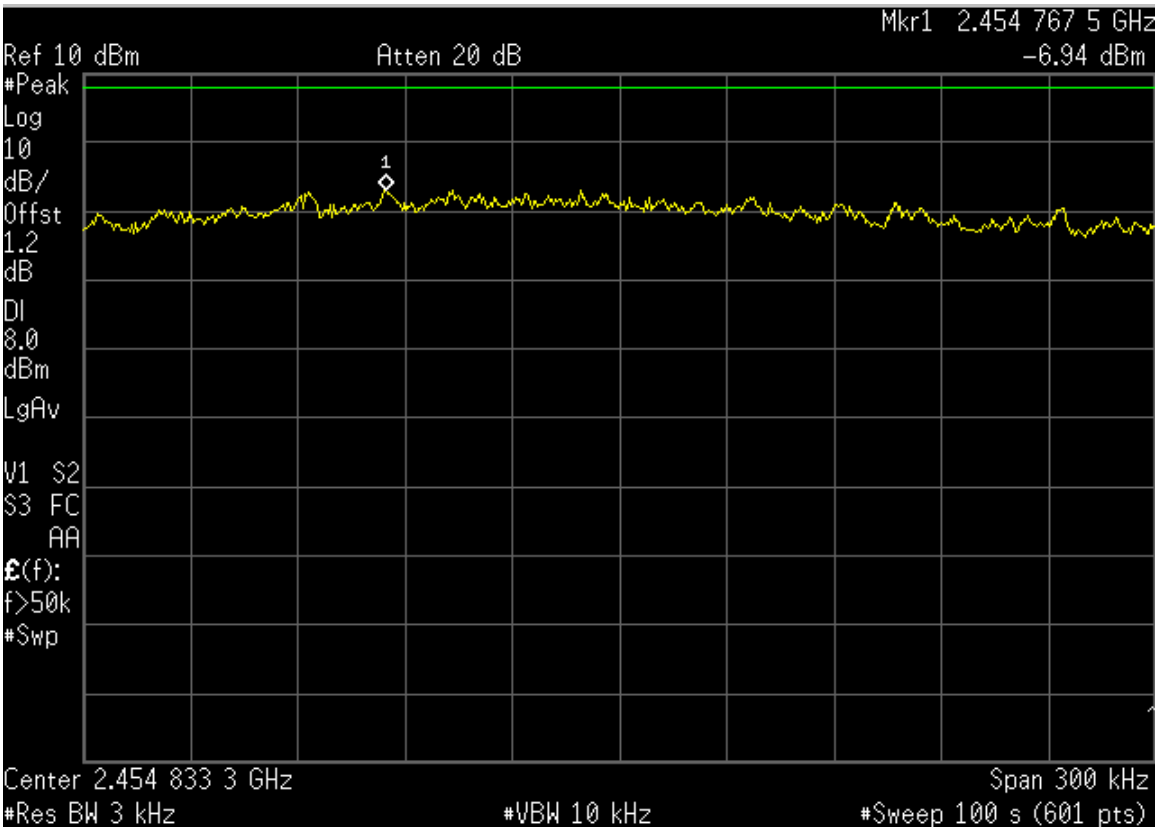




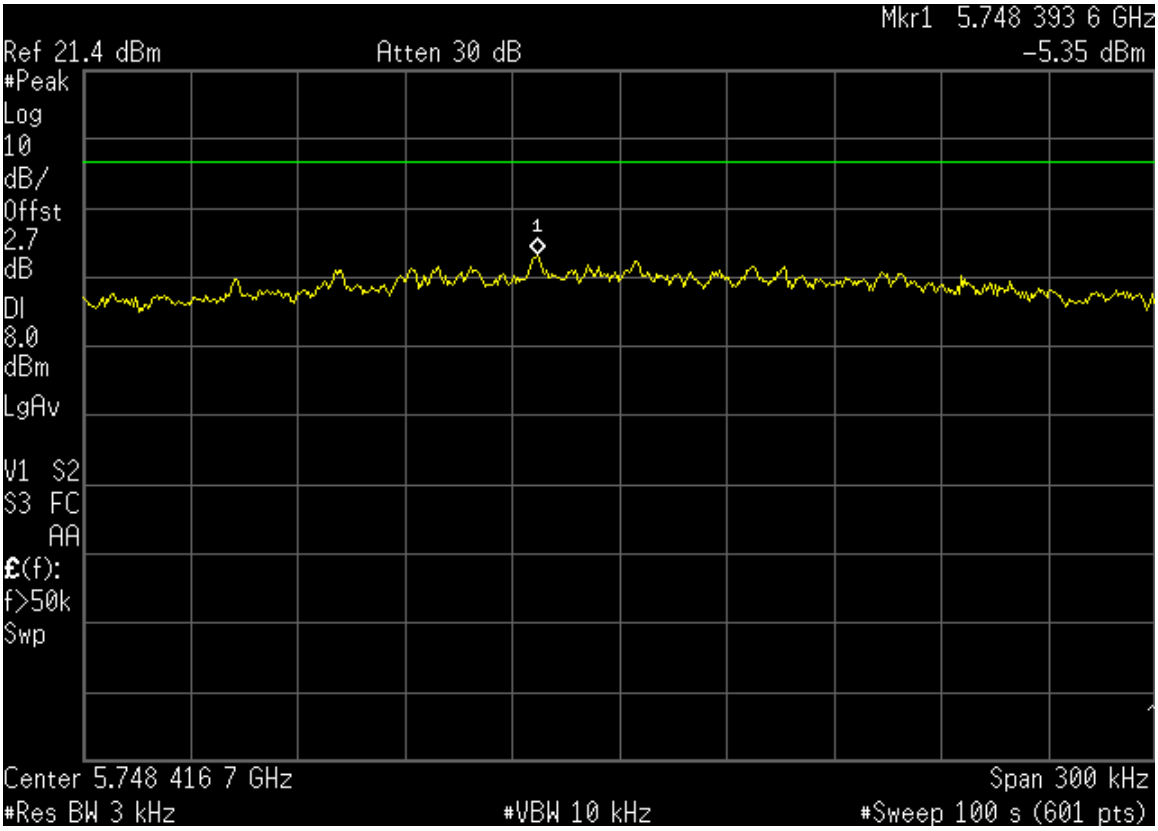
PPSD (2.4 GHZ BAND, 11g MODE)

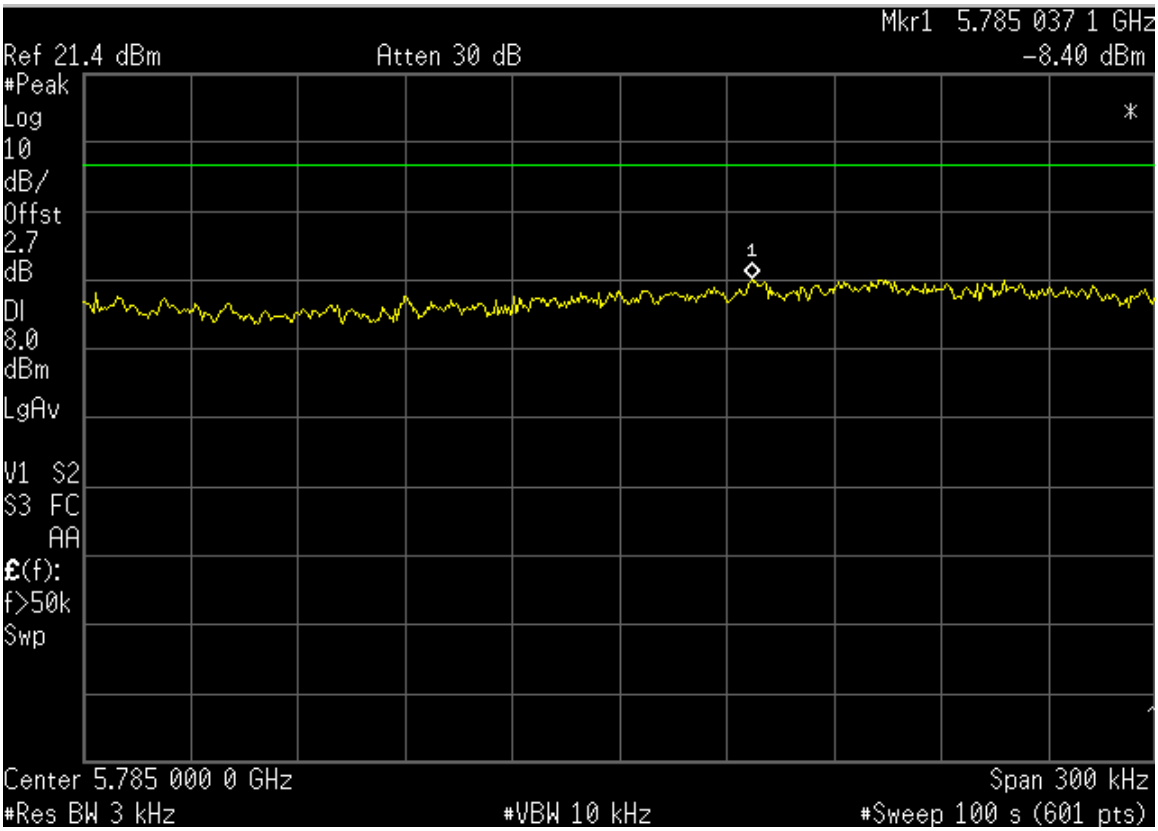


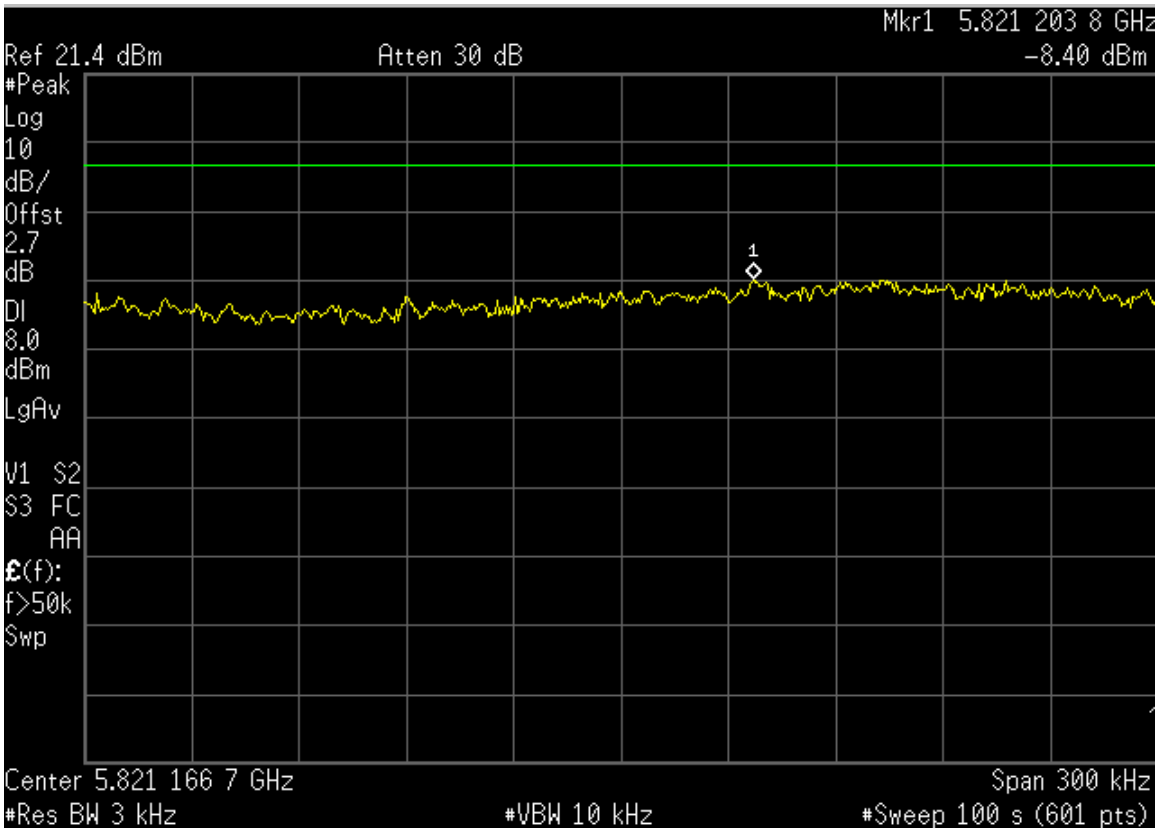




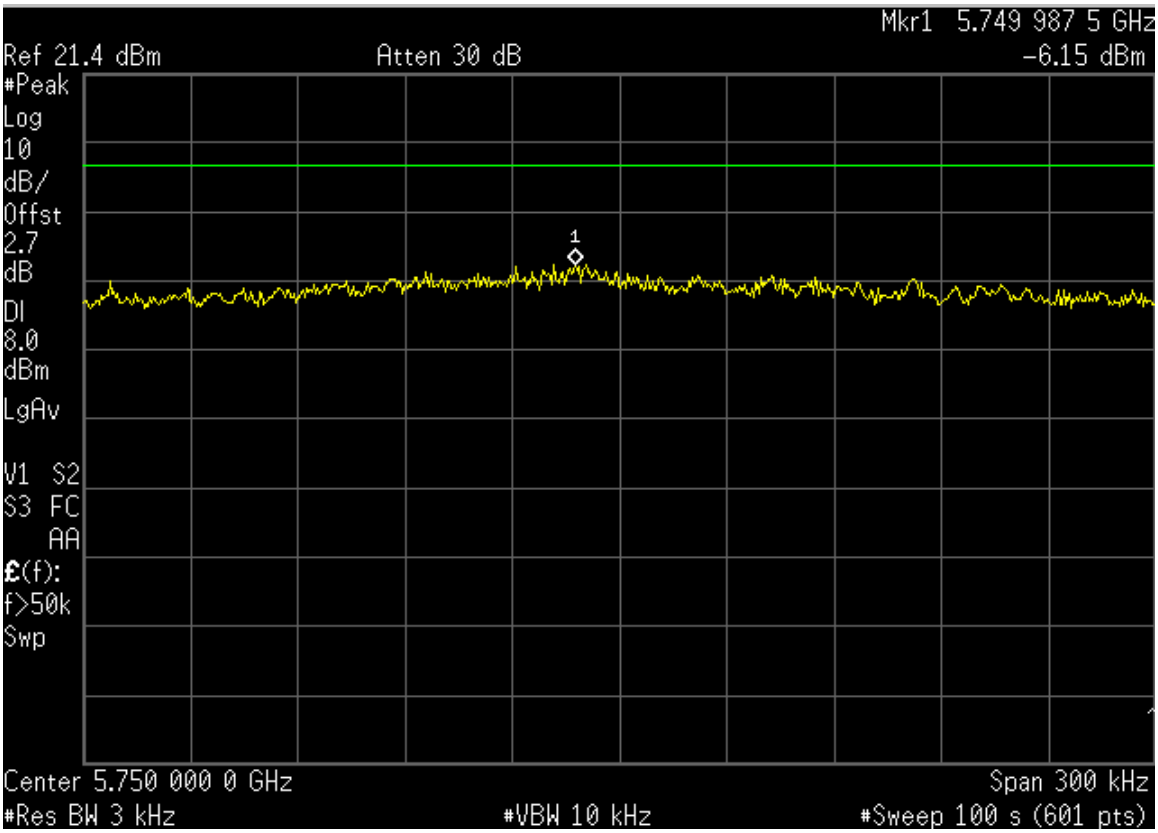
PPSD (5.8 GHZ BAND, NORMAL MODE)

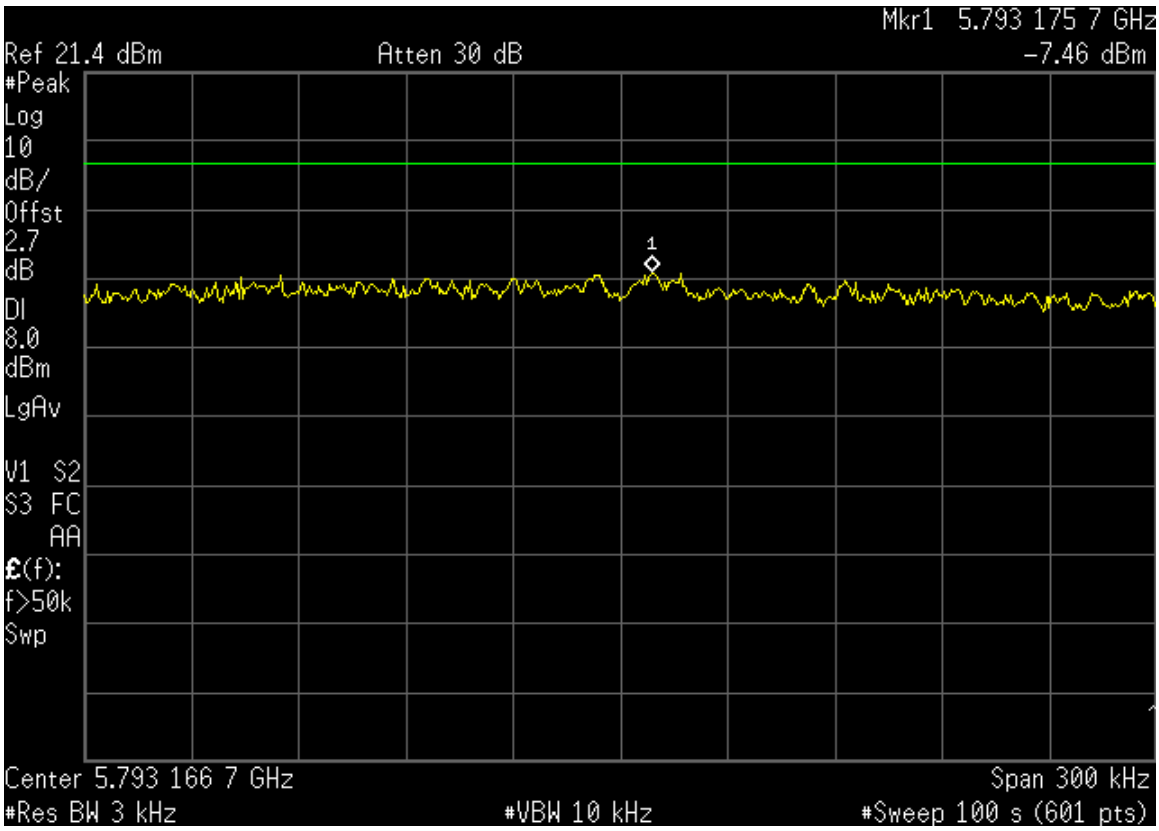






PPSD (5.8 GHZ BAND, TURBO MODE)





9.5. MAXIMUM PERMISSIBLE EXPOSURE

CALCULATIONS

Given

E = ? (30 * P * G) / d

and

S = E ^ 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 = ? ((30 * P * G) / (3770 * S))

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) =100 * d (m)

yields

d = 100 * ? ((30 * (P / 1000) * G) / (3770 * S))

d = 0.282 * ? (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 ^ ((P + G) / 20) / ? S Equation (1)

where

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

RESULTS

No non-compliance noted:

MAXIMUM PERMISSIBLE EXPOSURE (2.4 GHZ BAND)

EUT output power = 22.5 dBm
Antenna Gain = 4.27 dBi
S = 1.0 mW / cm^2 from 1.1310 Table 1

Substituting these parameters into Equation (1) above:

MPE Safe Distance = 6.15 cm

MAXIMUM PERMISSIBLE EXPOSURE (5.8 GHZ BAND)

EUT output power = 21.1 dBm
Antenna Gain = 0.24 dBi
S = 1.0 mW / cm^2 from 1.1310 Table 1

Substituting these parameters into Equation (1) above:

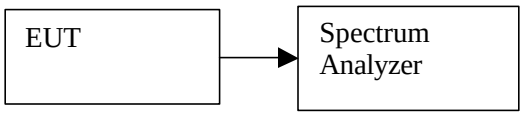
MPE Safe Distance = 11.66 cm

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.

9.6. OUT OF BAND EMISSIONS – CONDUCTED MEASUREMENTS

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

TEST SETUP



TEST PROCEDURE

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

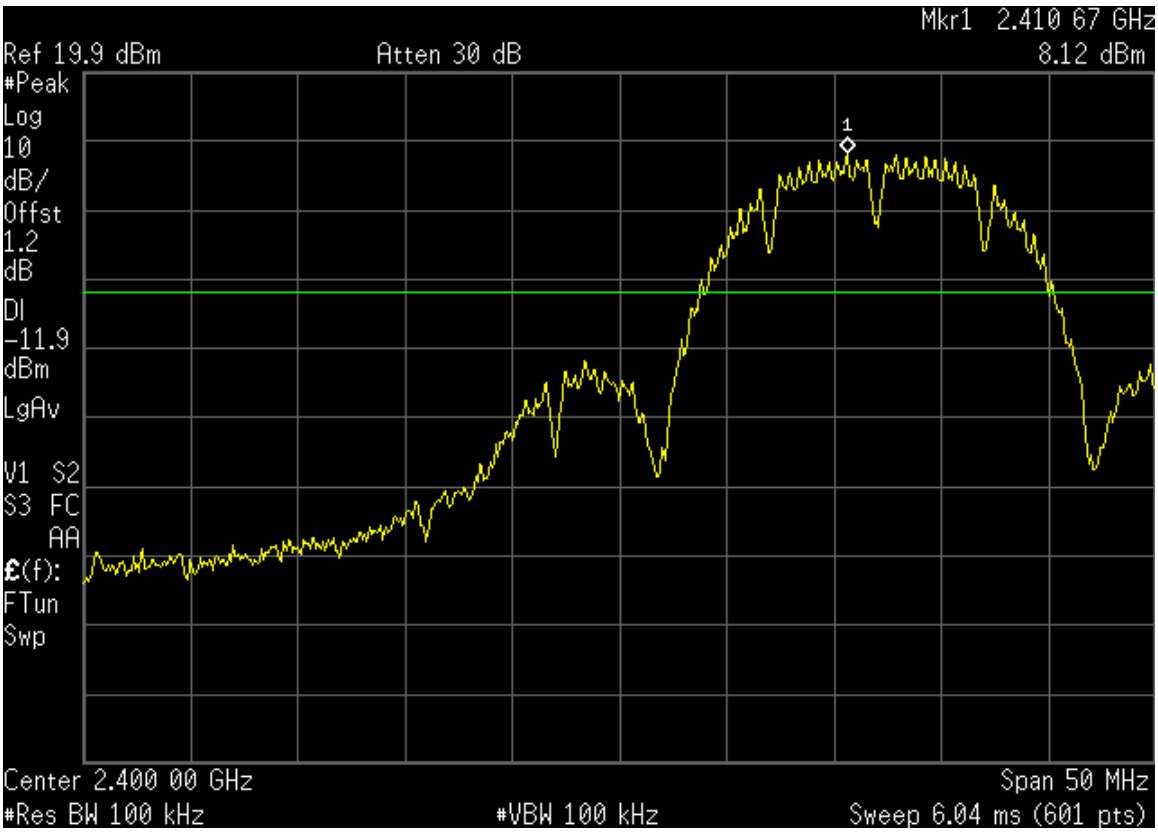
Measurements are made over the 30 MHz to 26.5 GHz range with the transmitter set to the lowest, middle, and highest channels within the 2.4 GHz band.

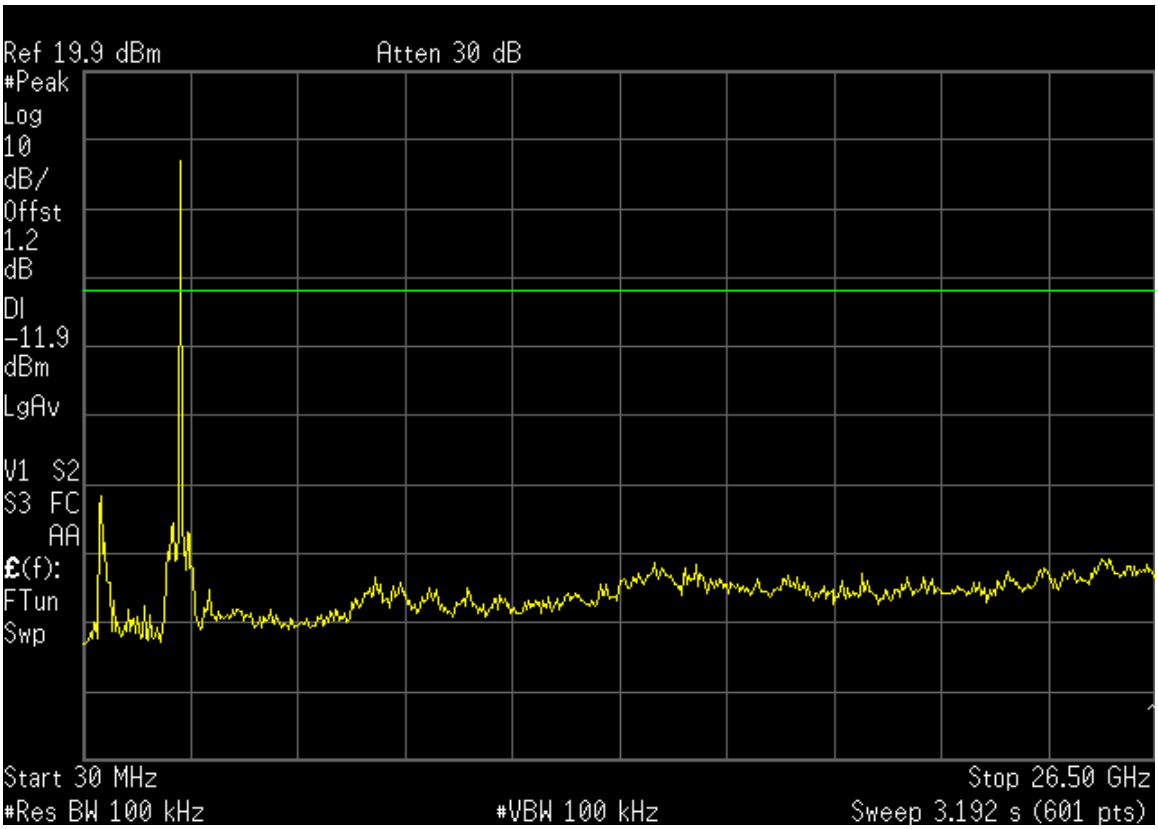
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels within the 5.8 GHz band.

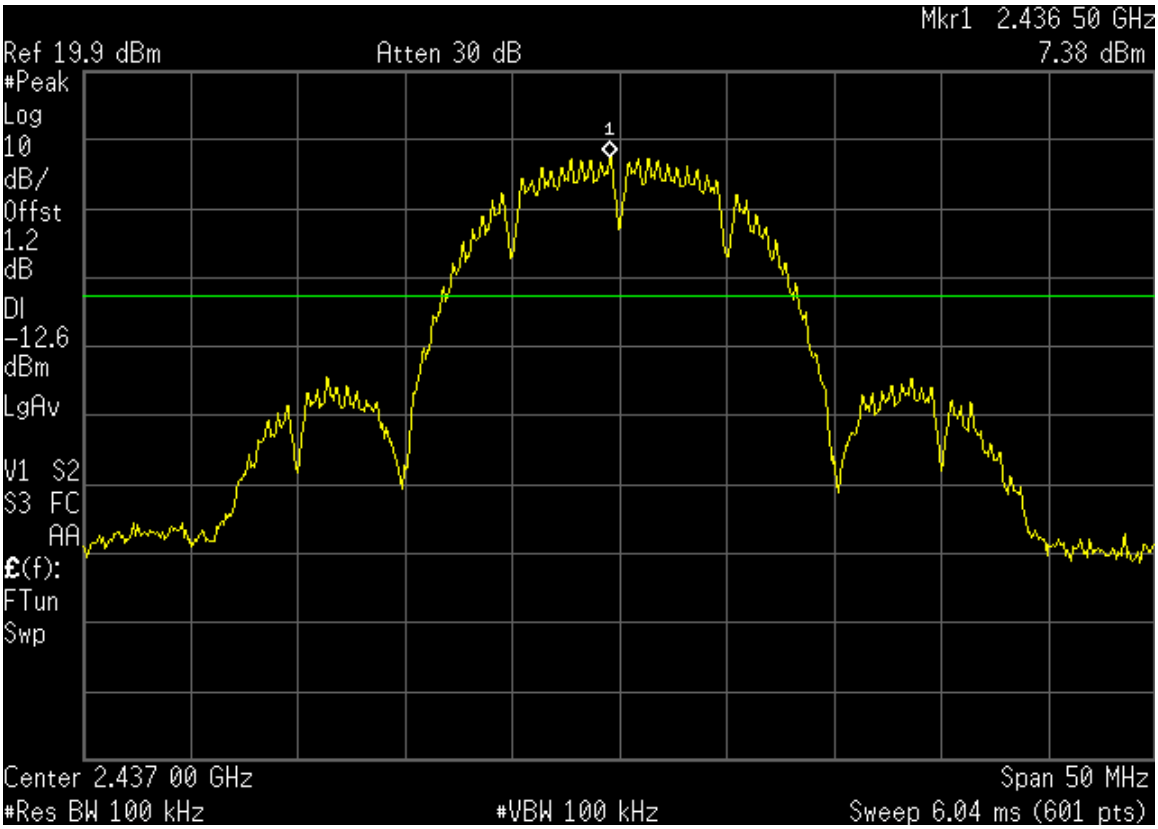
RESULTS

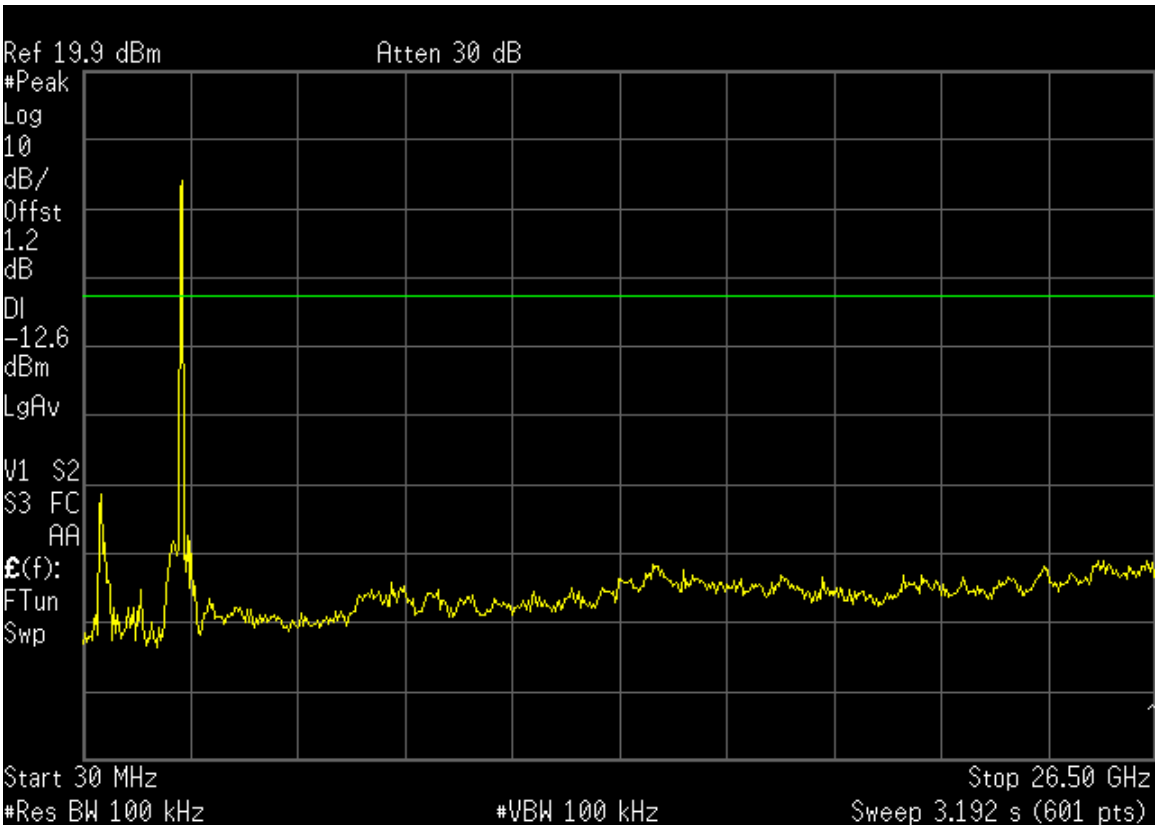
No non-compliance noted:

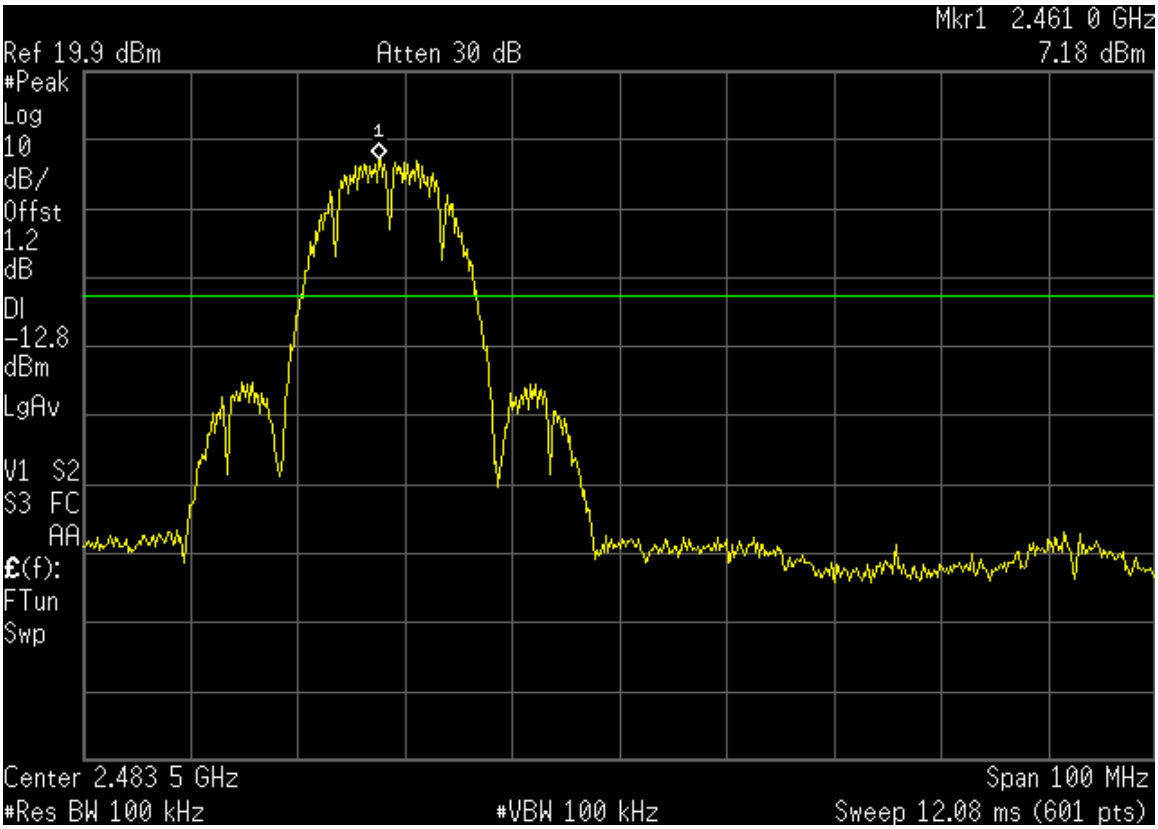
CONDUCTED SPURIOUS EMISSIONS (2.4 GHZ BAND, 11B MODE)

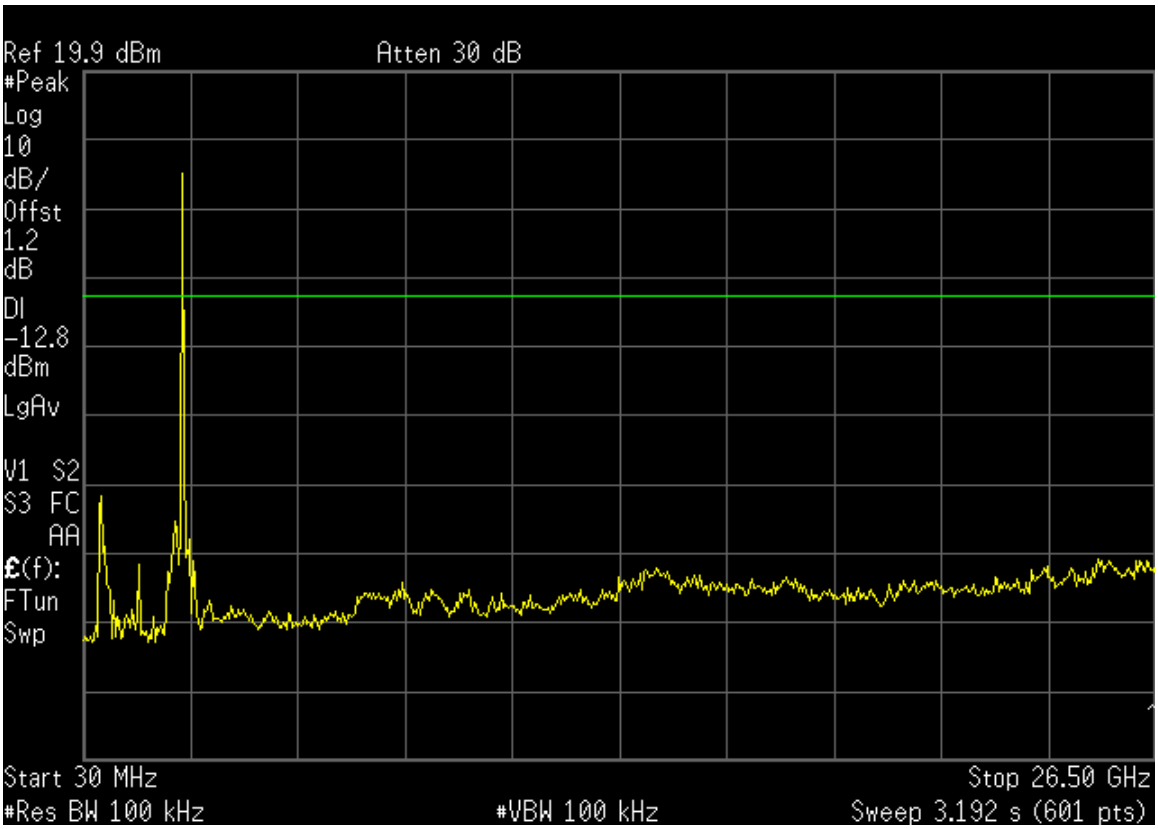




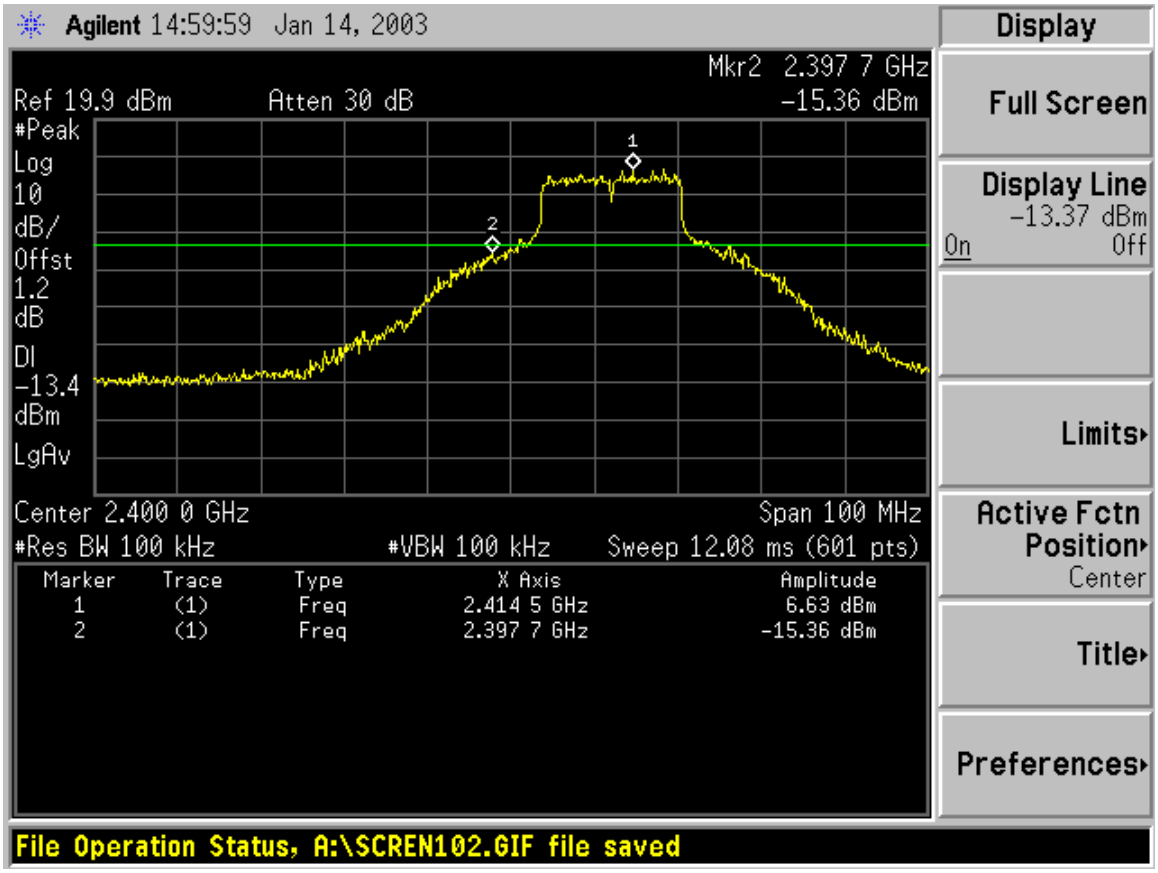


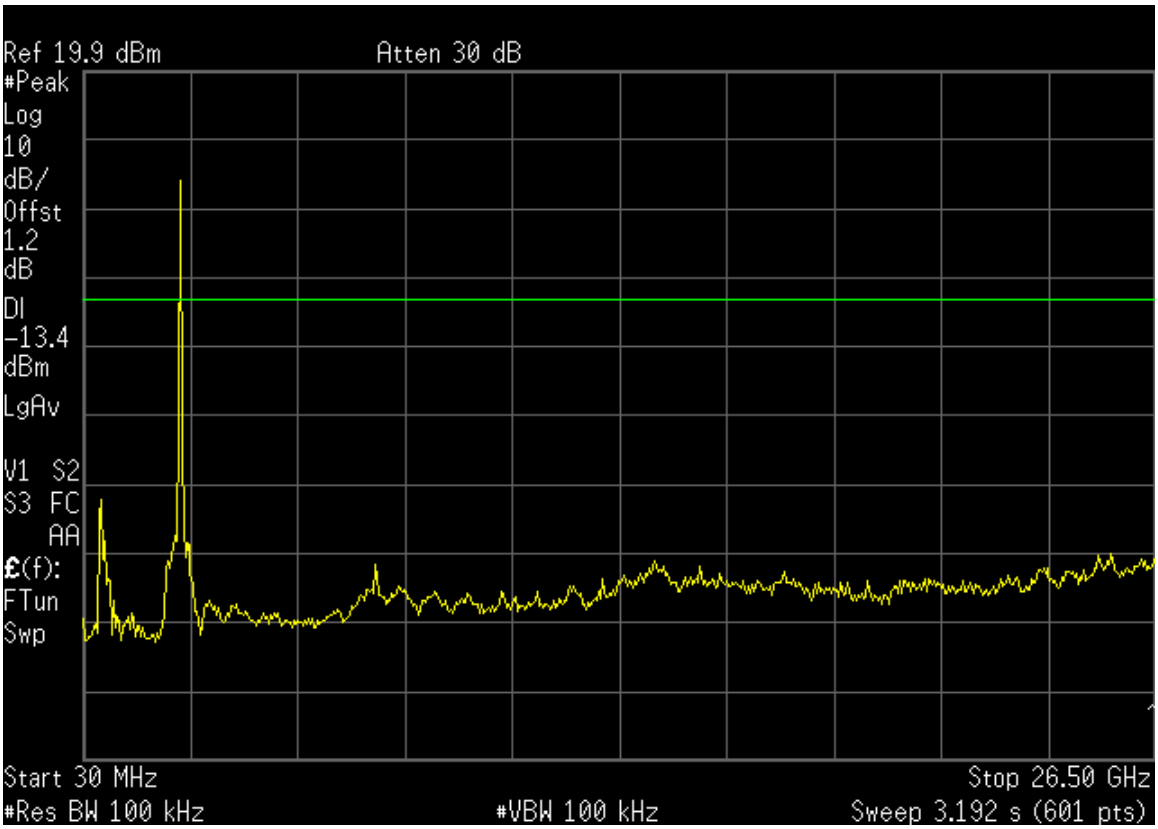


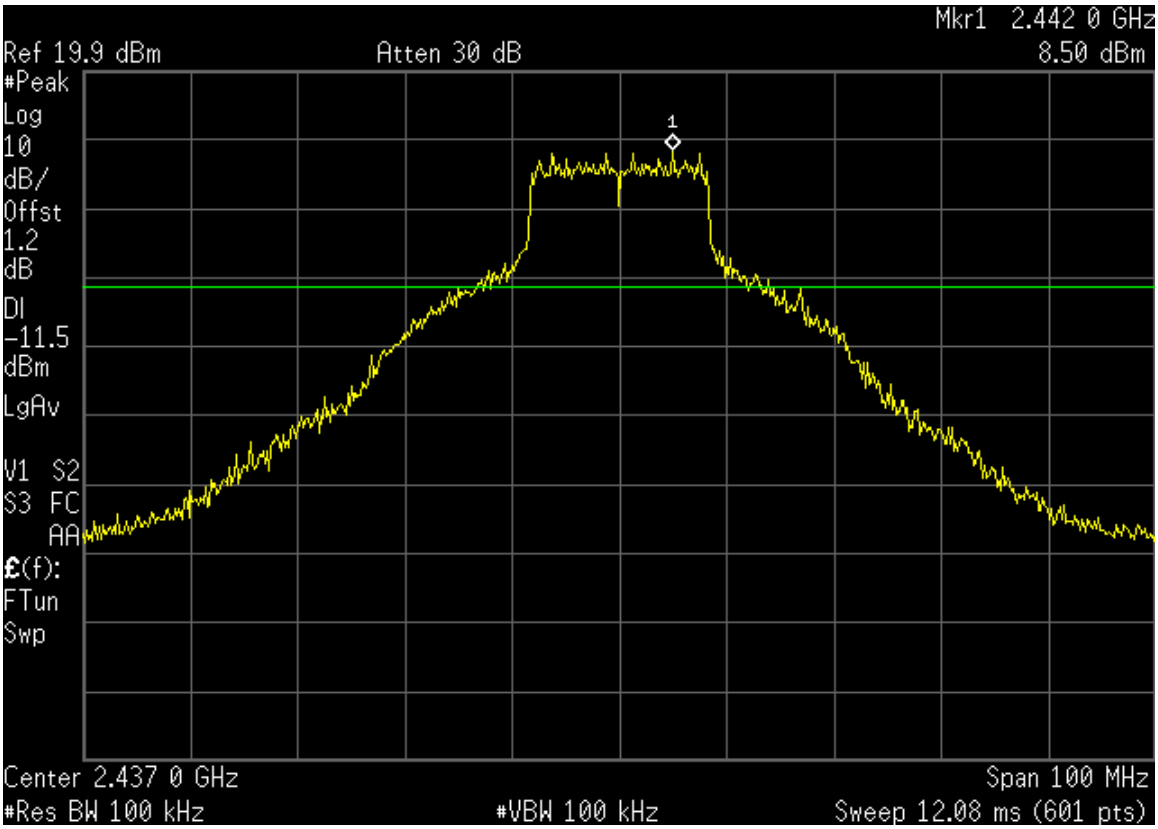


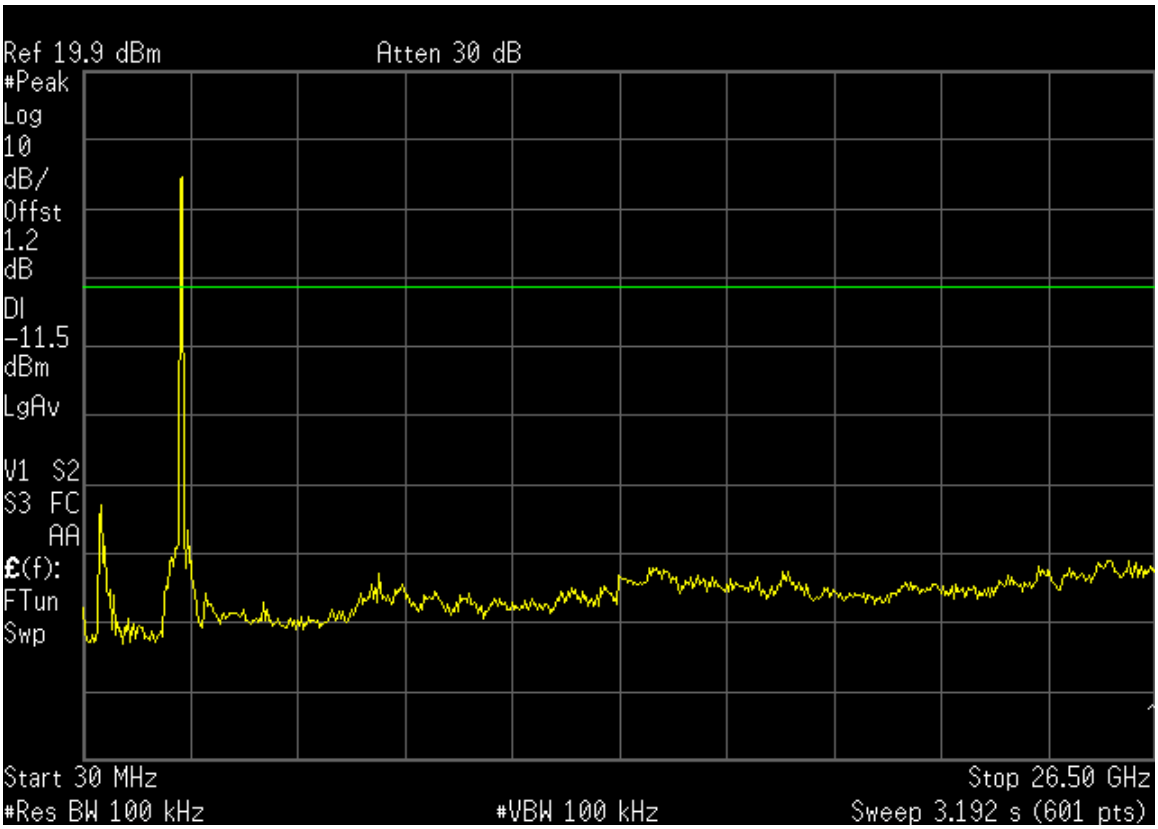


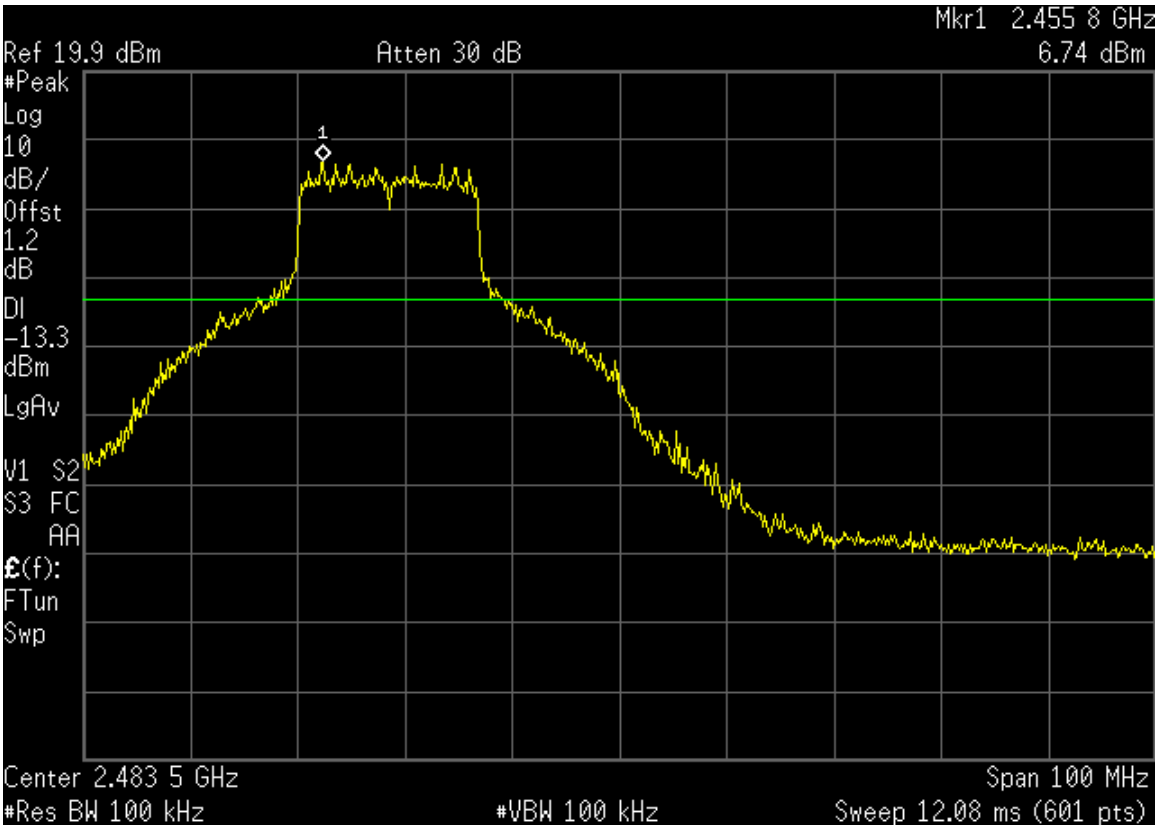
CONDUCTED SPURIOUS EMISSIONS (2.4 GHZ BAND, 11B MODE)

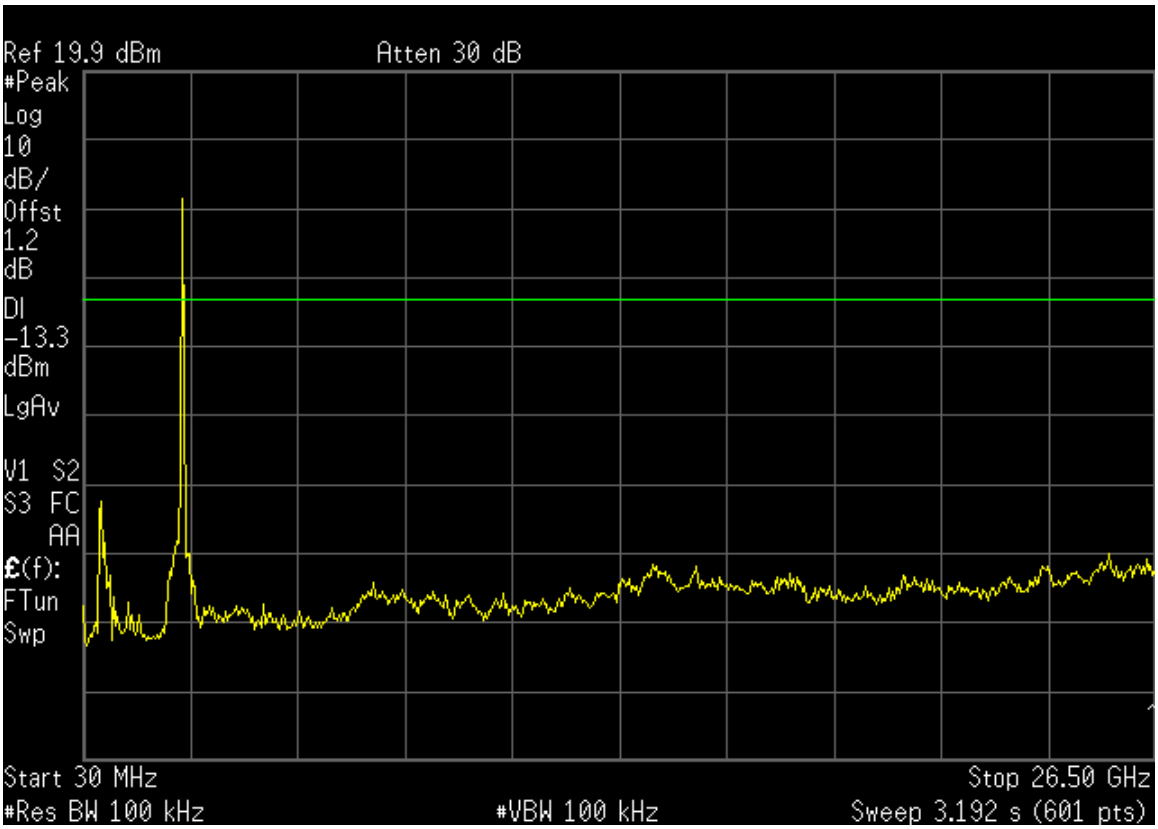




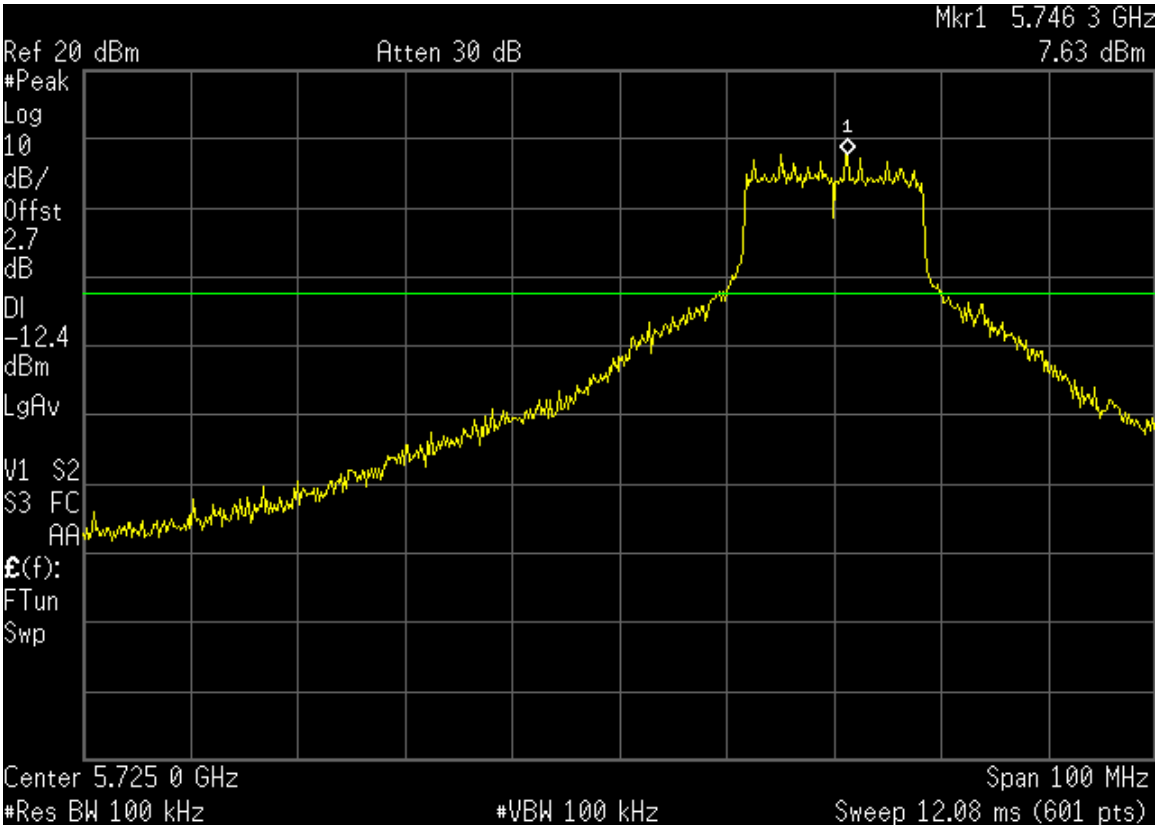


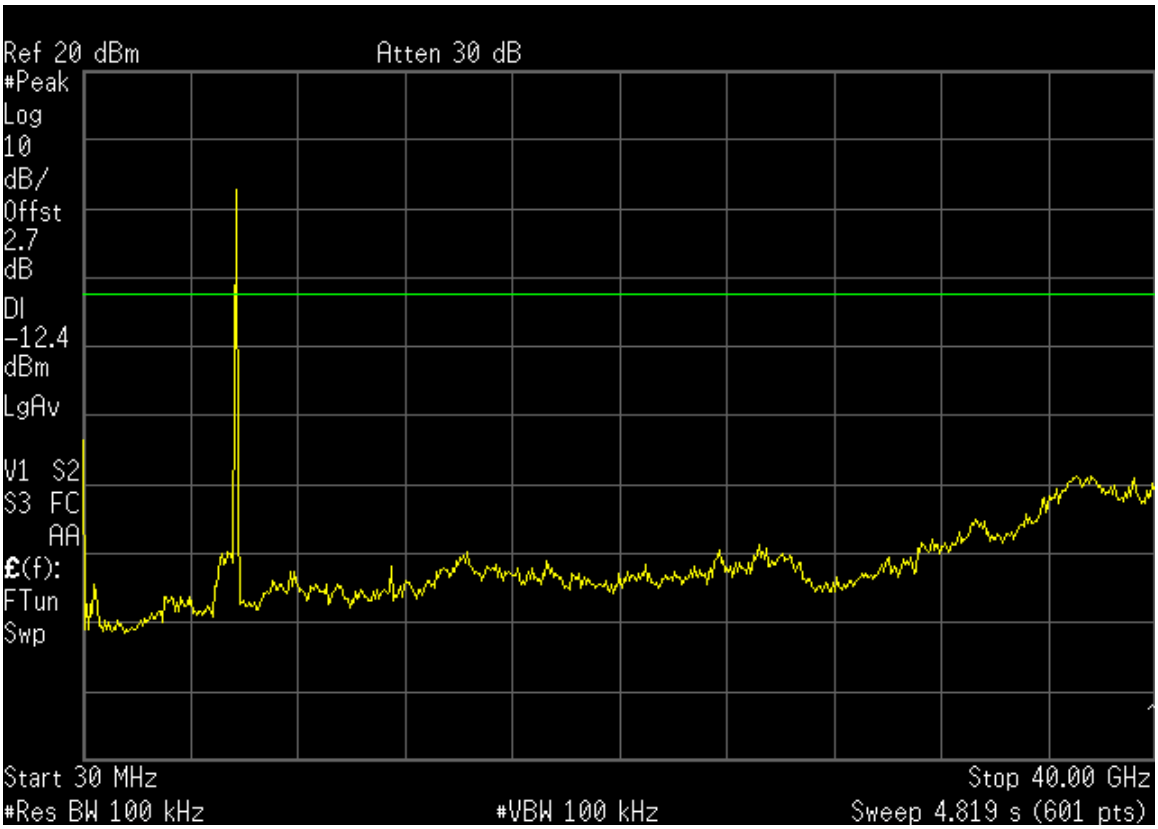


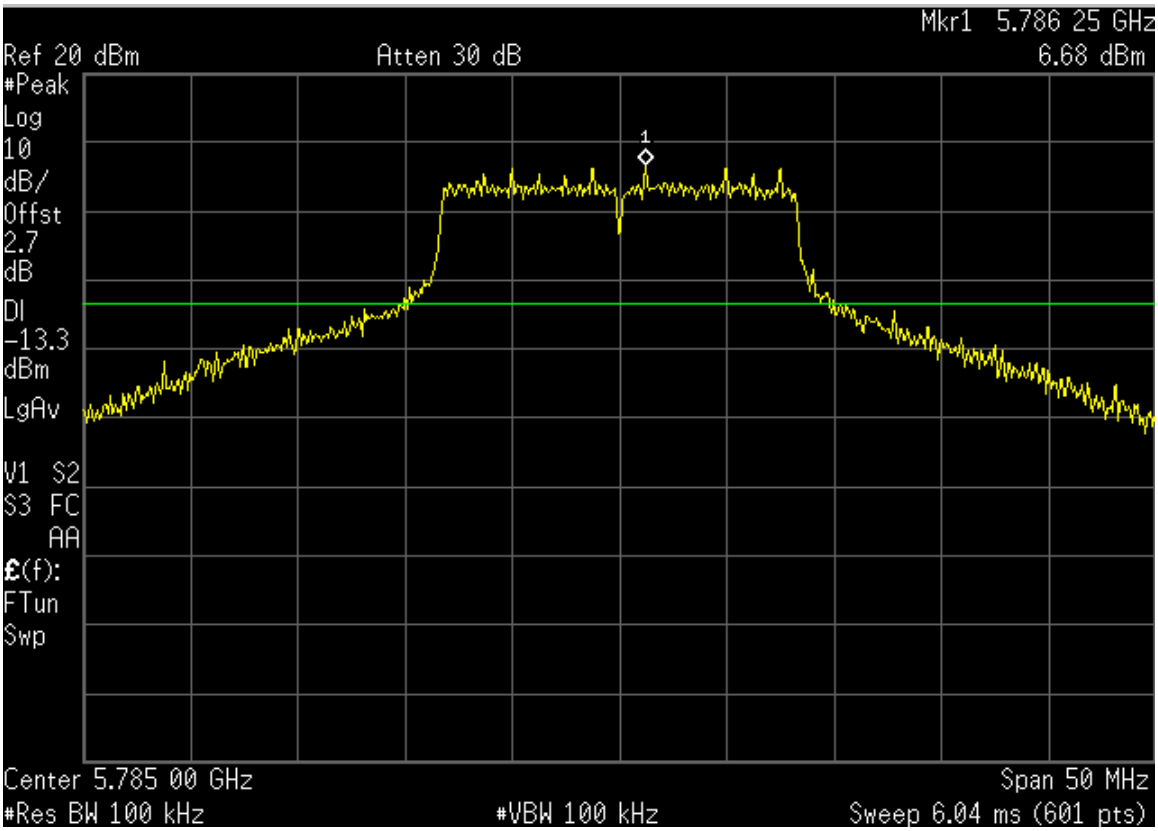


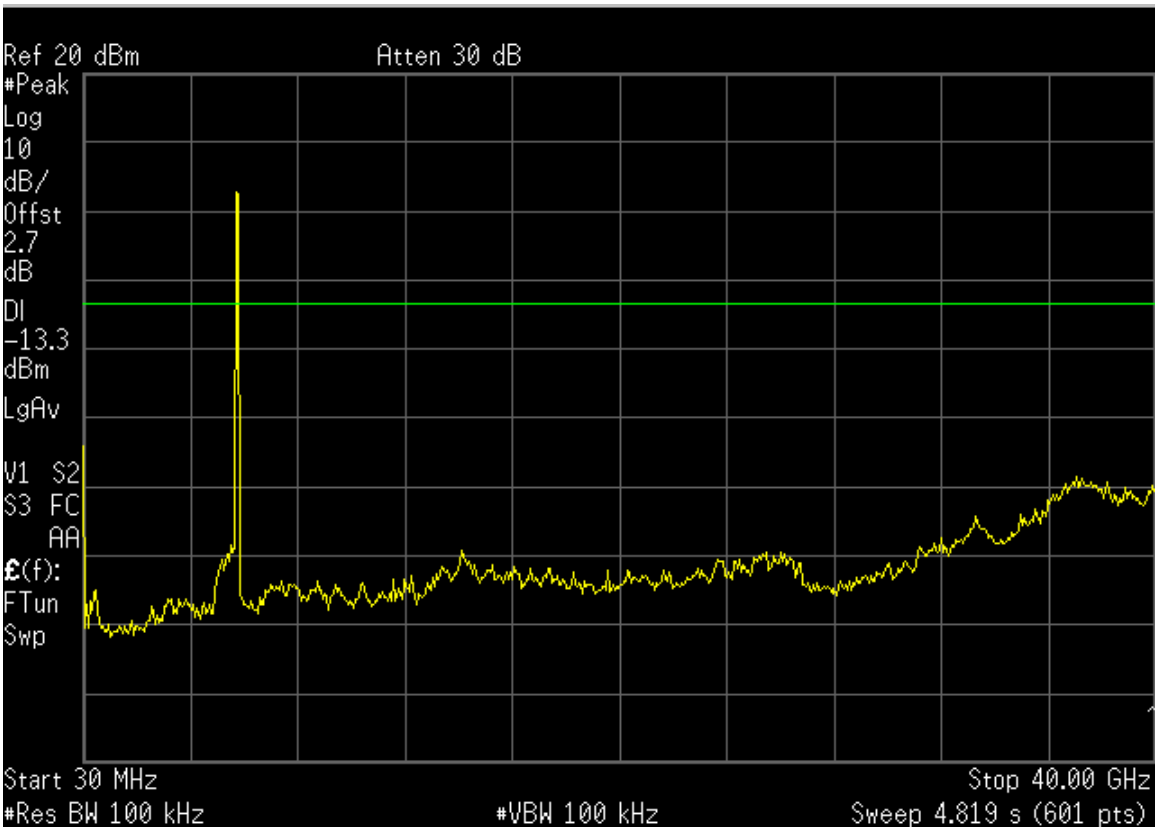


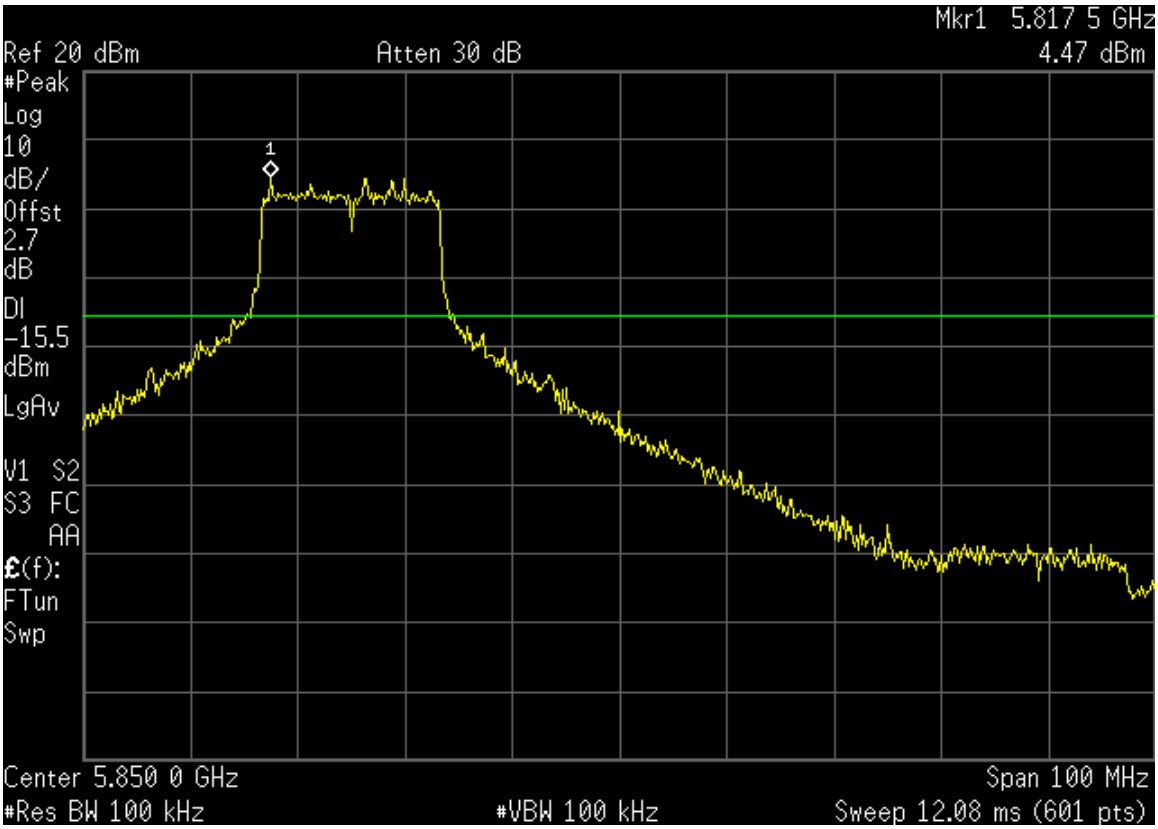
CONDUCTED SPURIOUS EMISSIONS (5.8 GHZ BAND, NORMAL MODE)

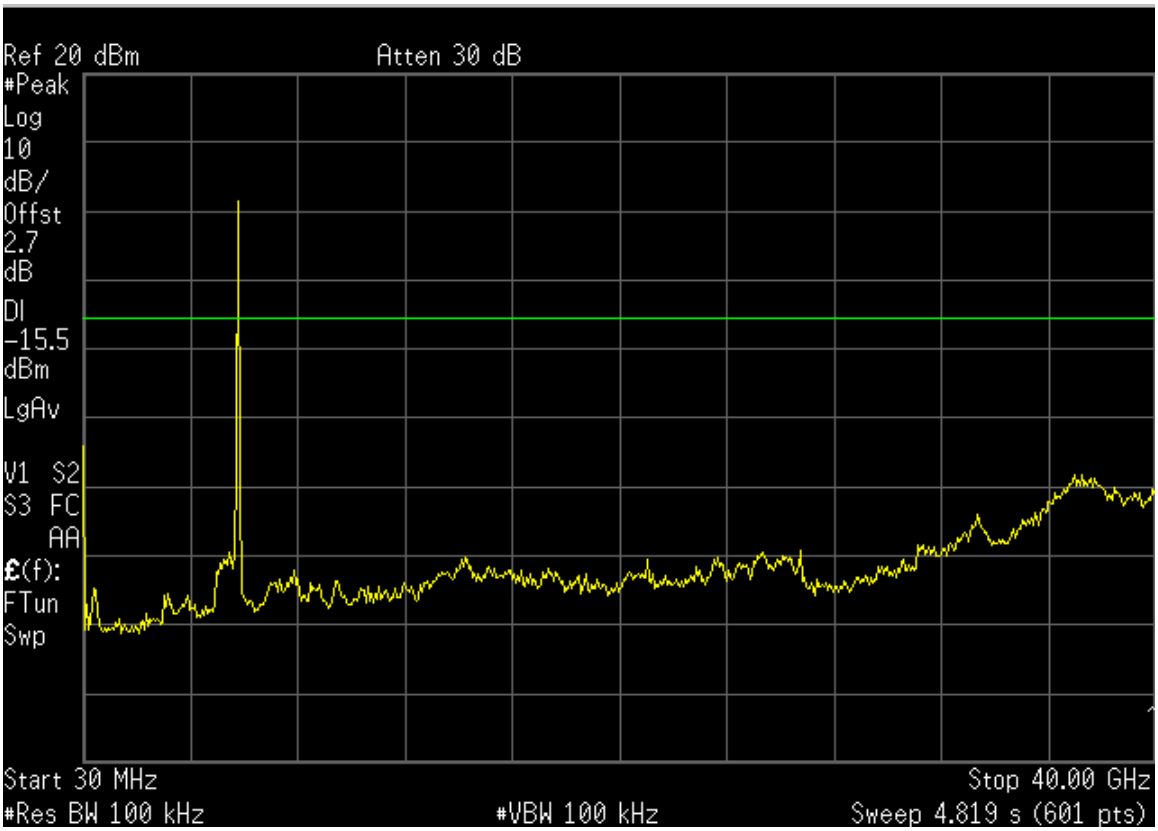




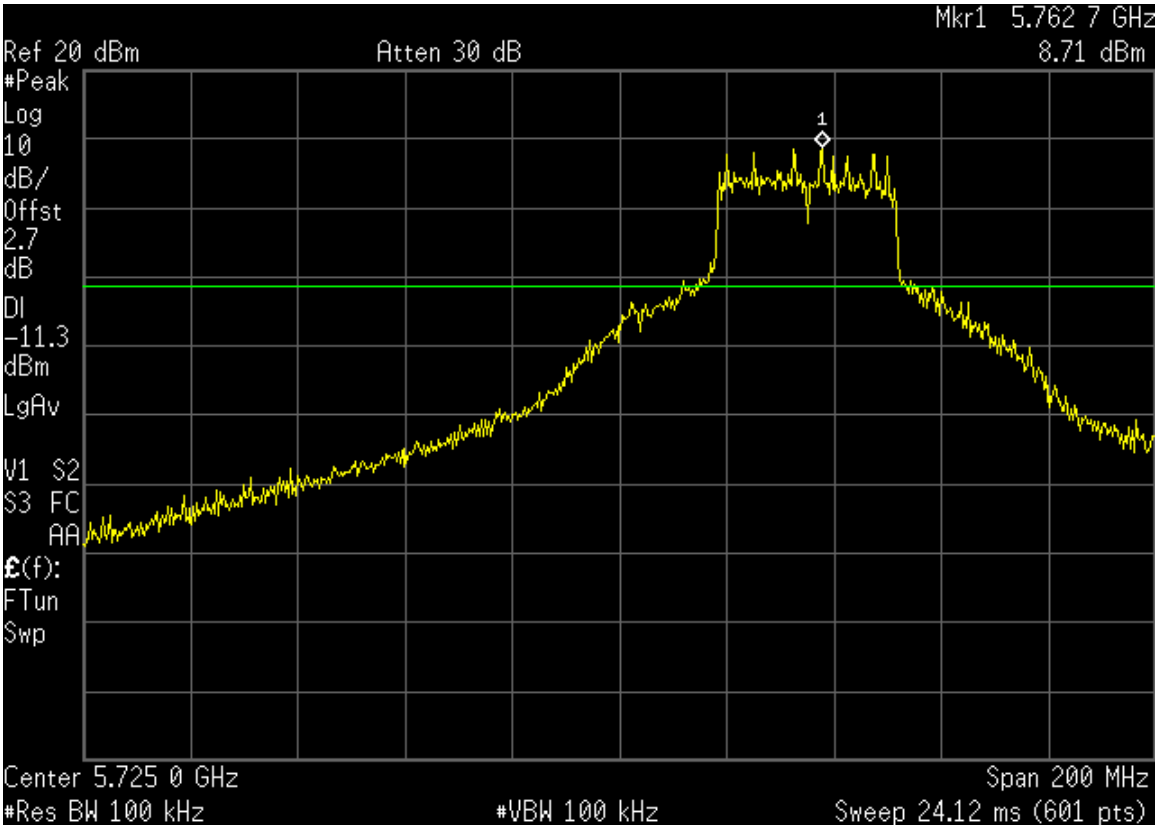


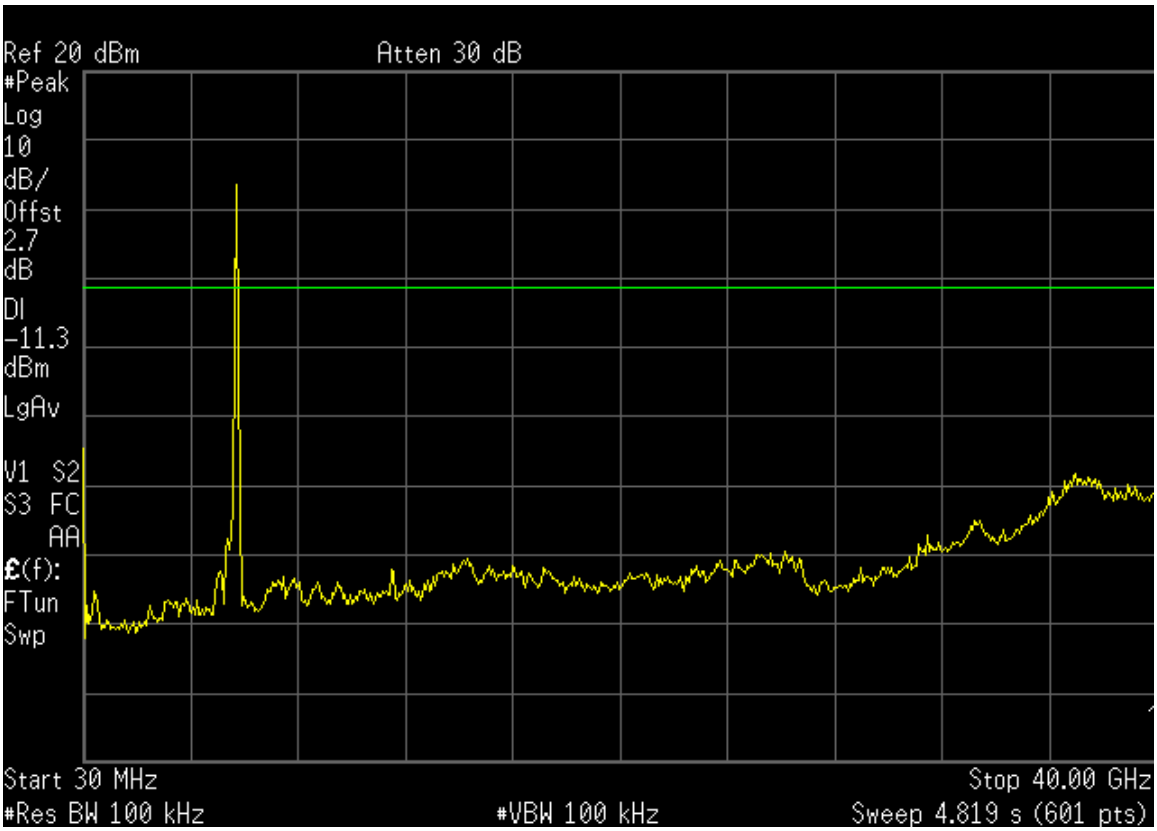


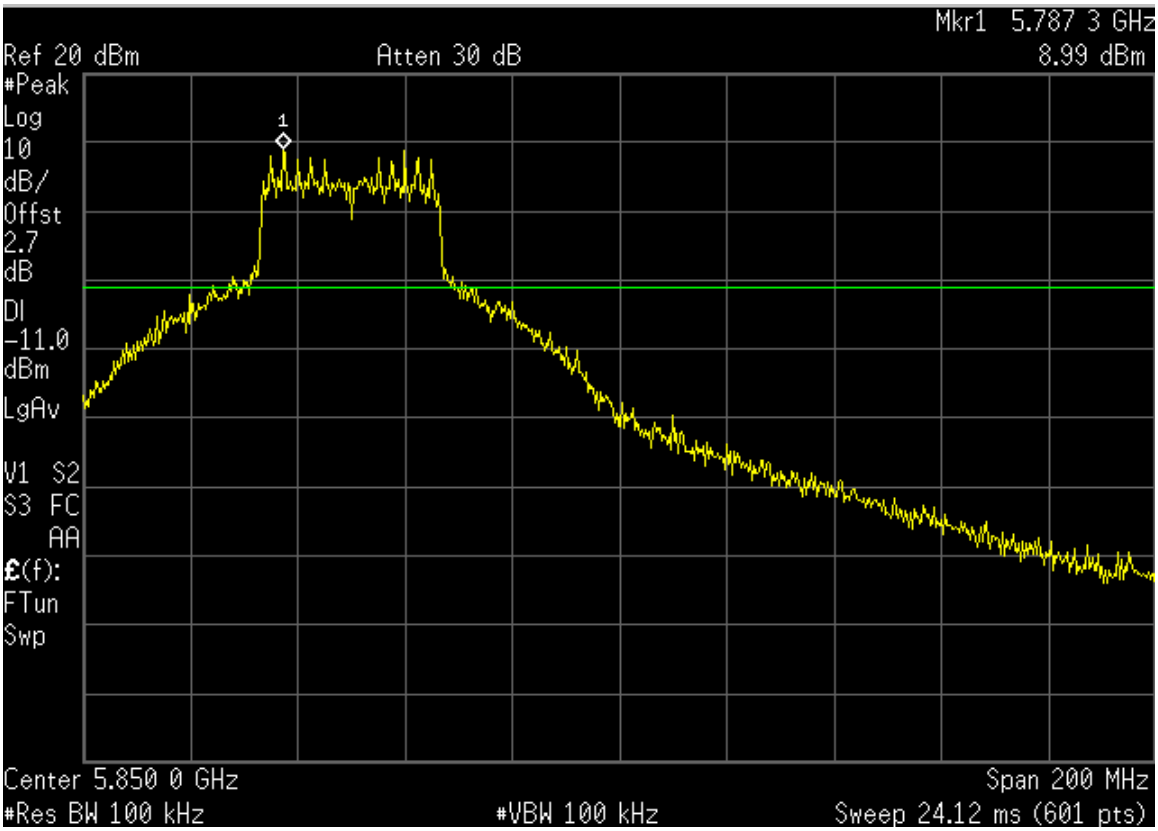


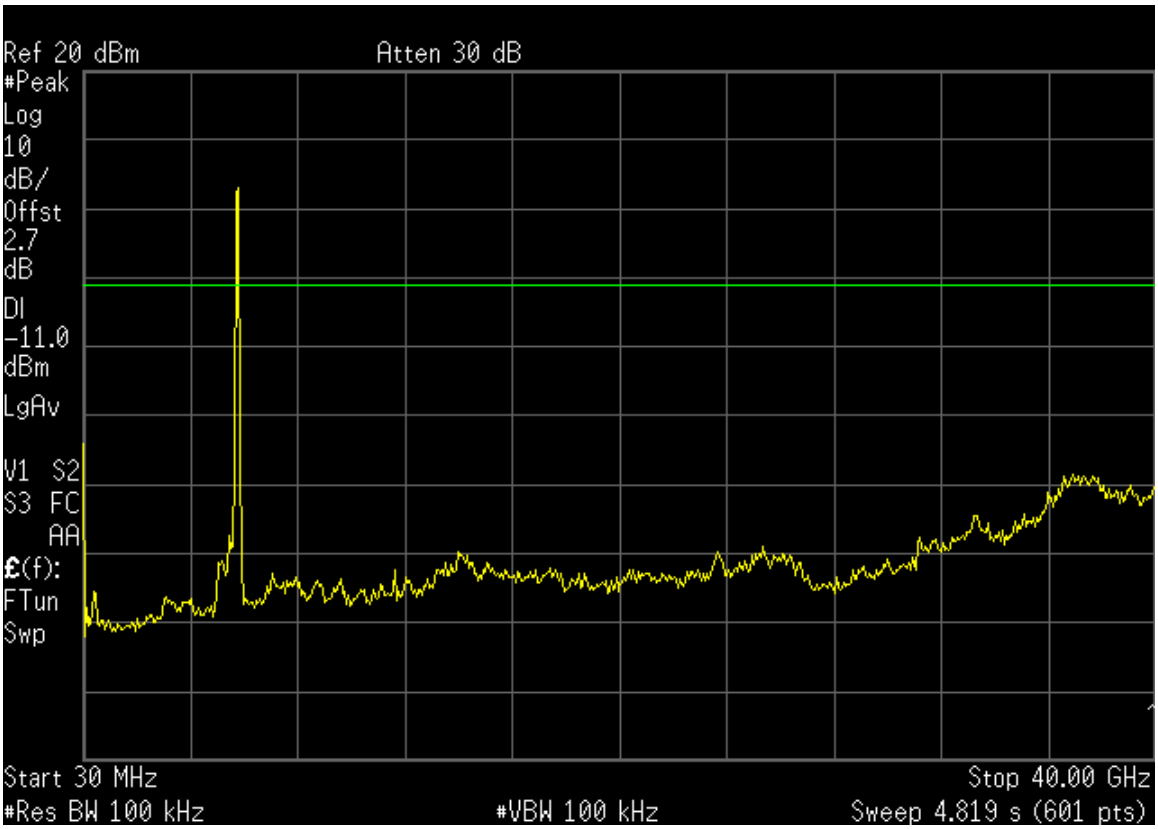


CONDUCTED SPURIOUS EMISSIONS (5.8 GHZ BAND, TURBO MODE)









9.7. OUT OF BAND EMISSIONS – RADIATED MEASUREMENTS

TEST SETUP

The EUT is placed on the wooden table. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4/1992.

The EUT is set to transmit in a continuous mode.

TEST PROCEDURE

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 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels within the 2.4 GHz band.

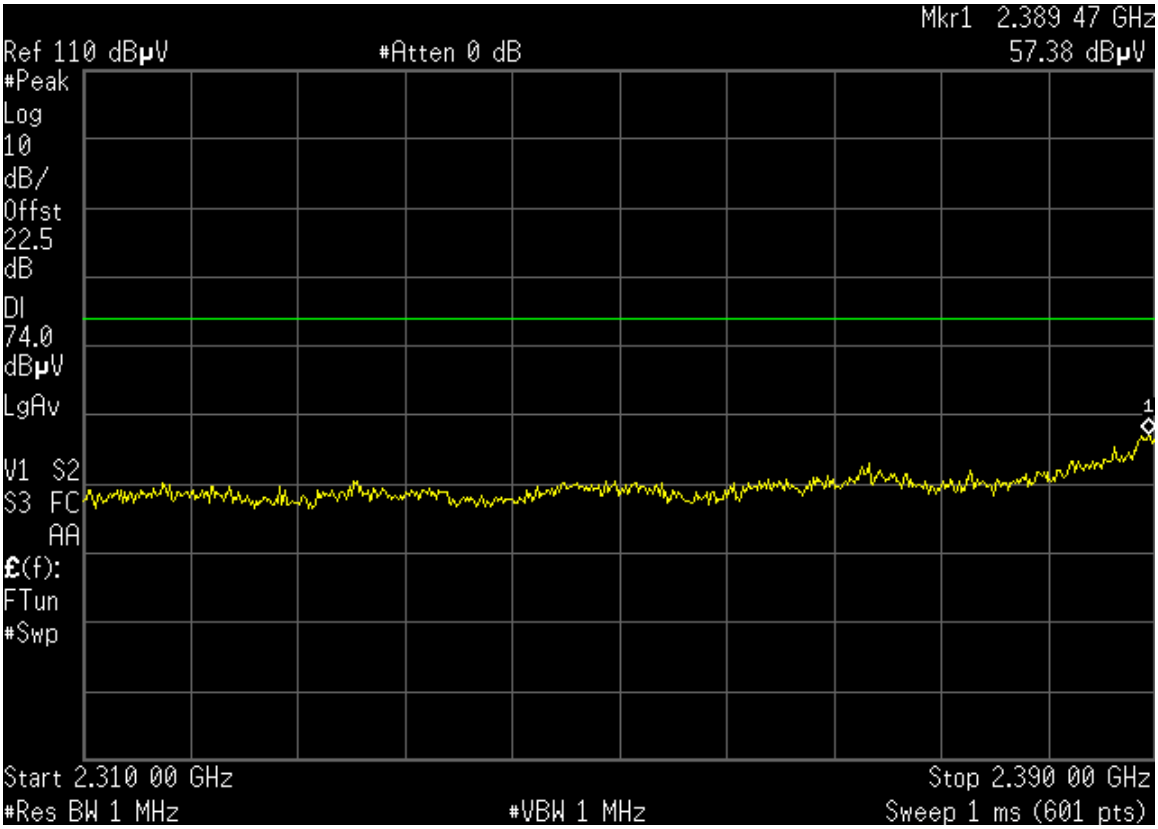
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels within the 5.8 GHz band.

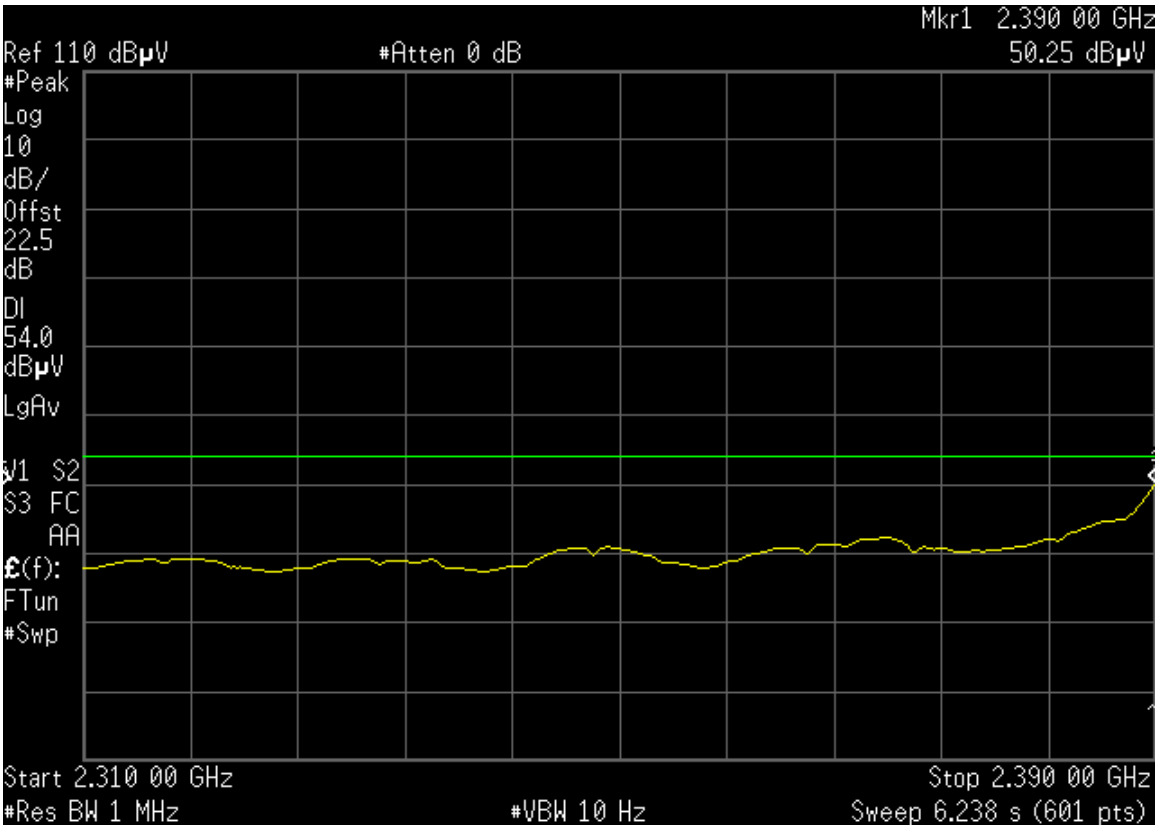
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the suspected signal. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

TEST RESULTS

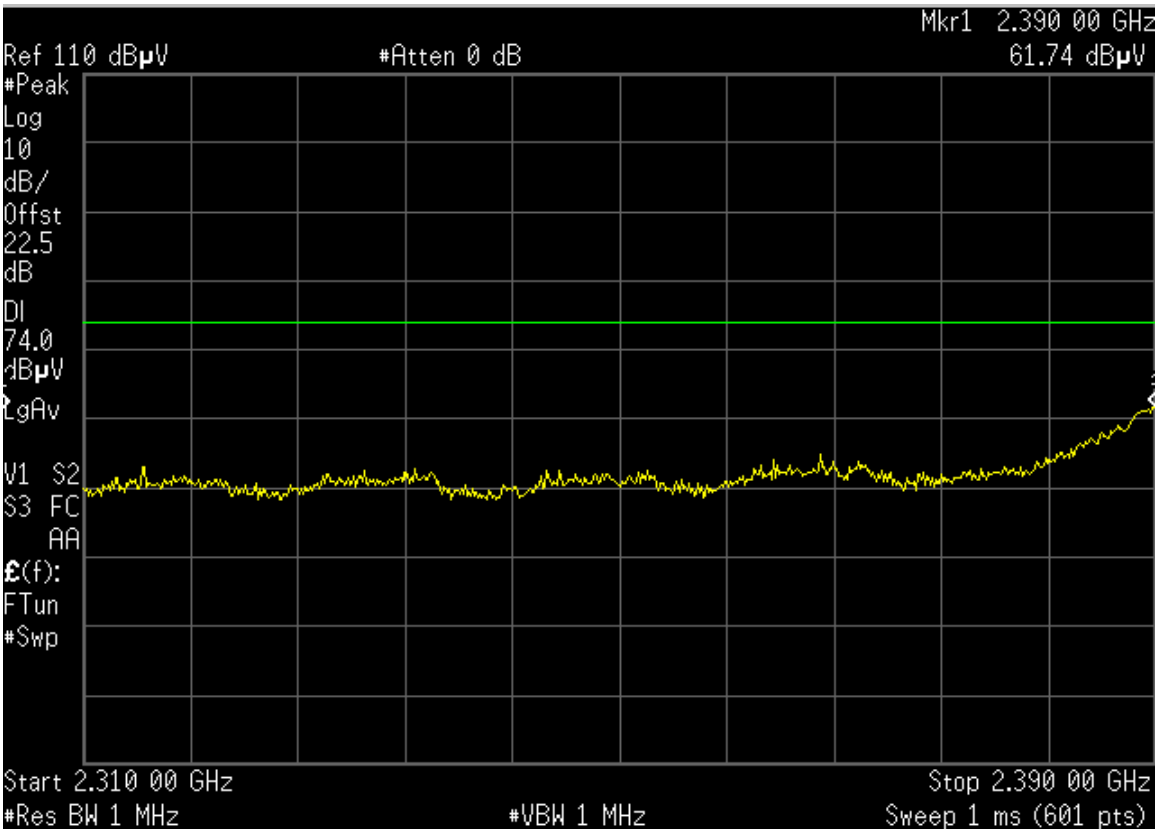
No non-compliance noted:

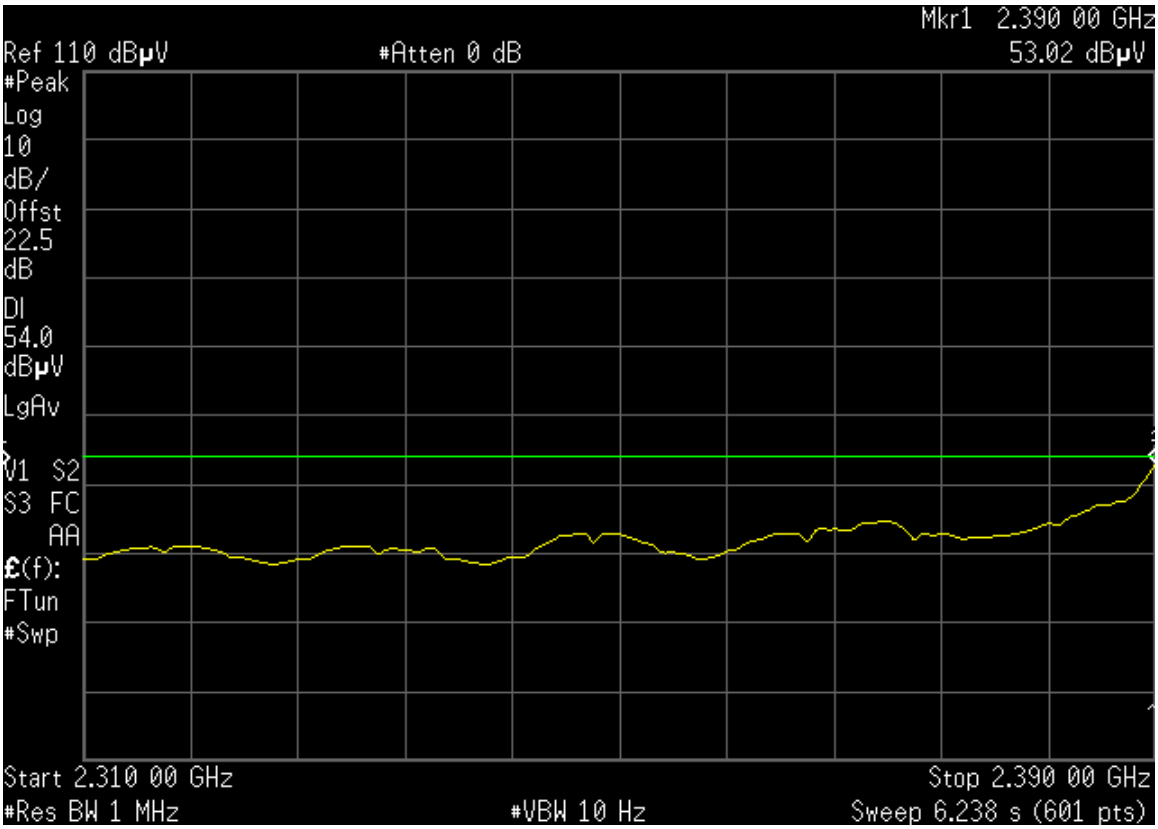
LOWER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, HORIZONTAL)



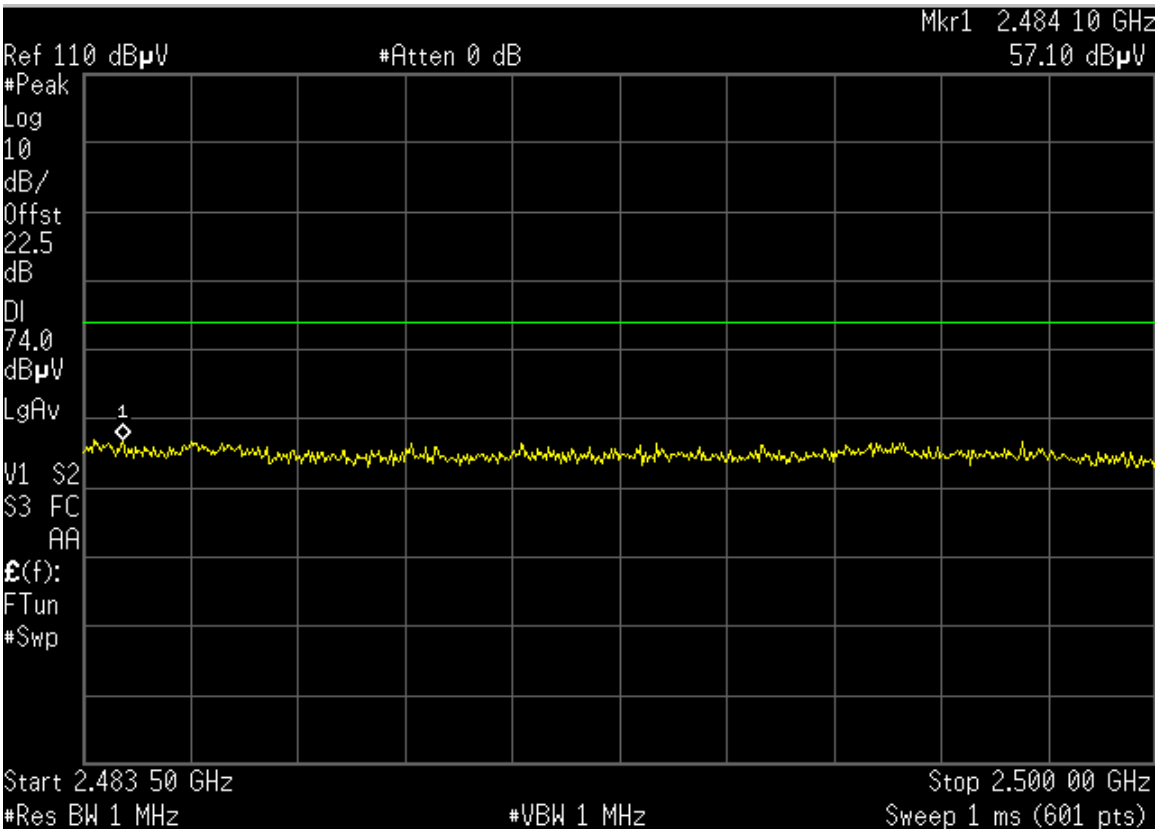


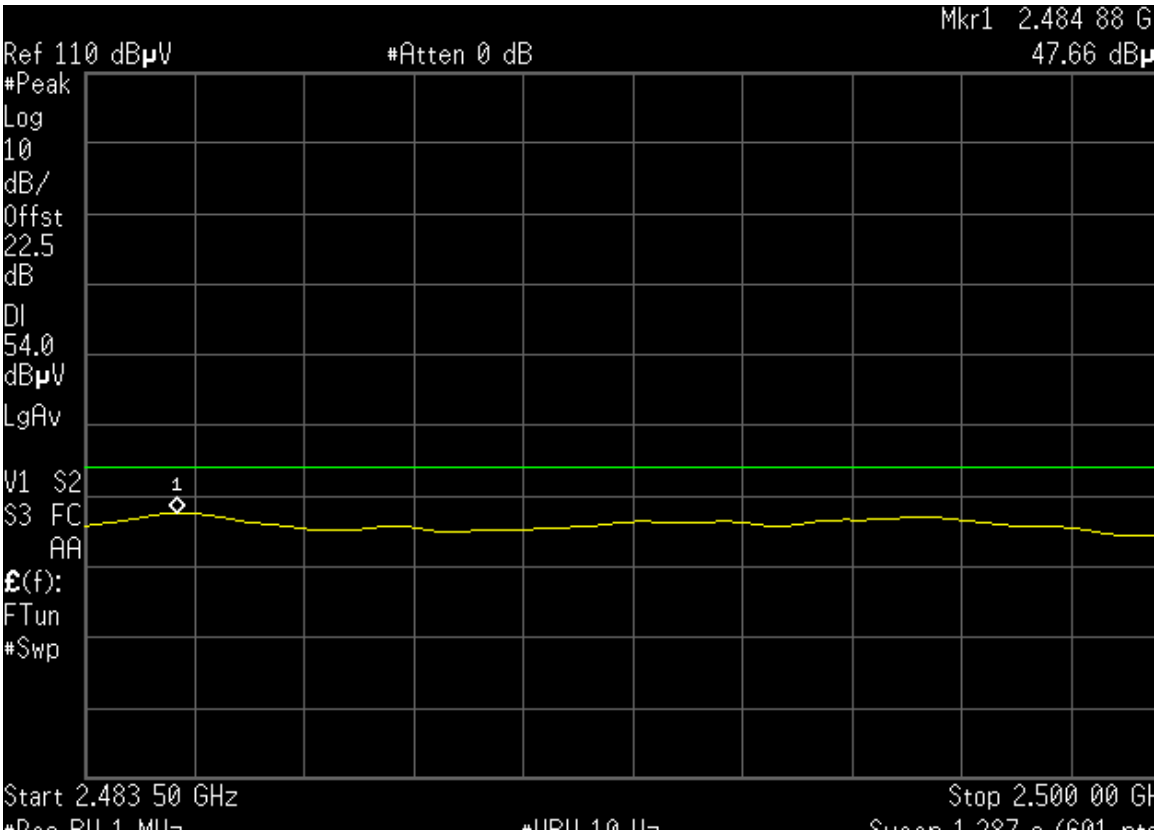
LOWER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, VERTICAL)



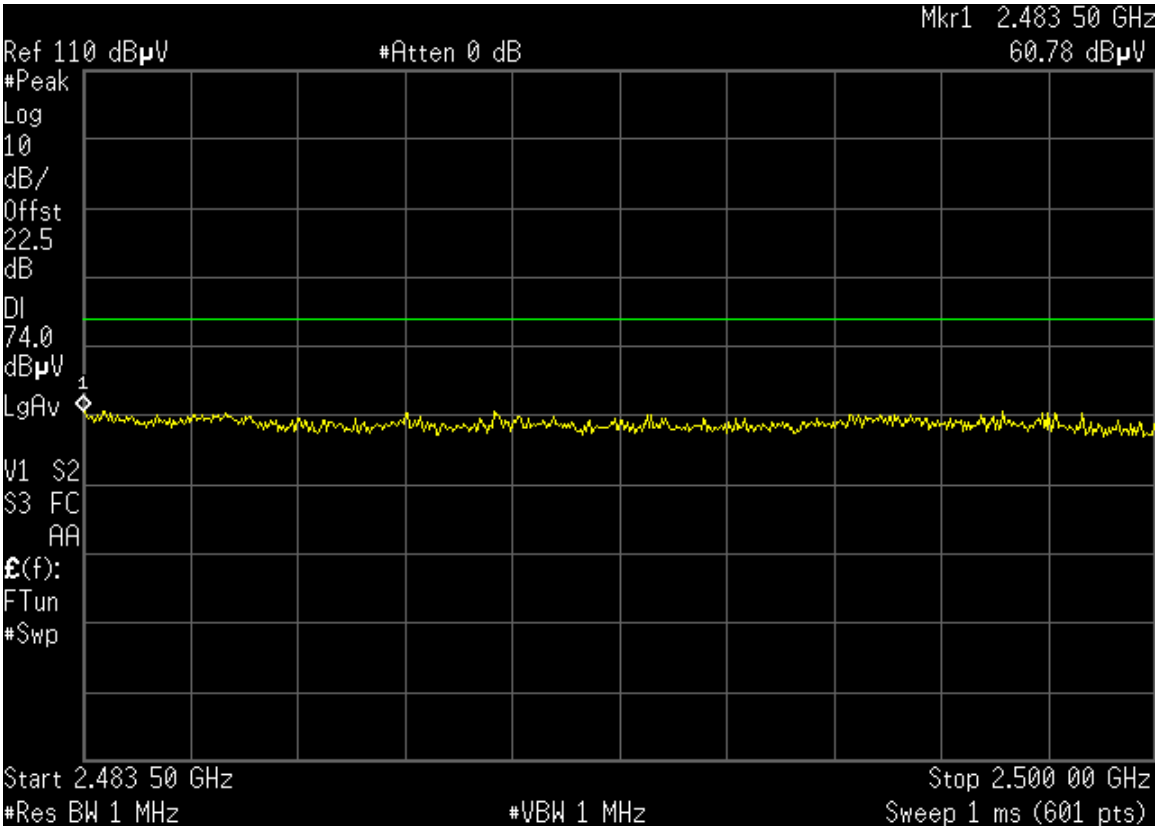


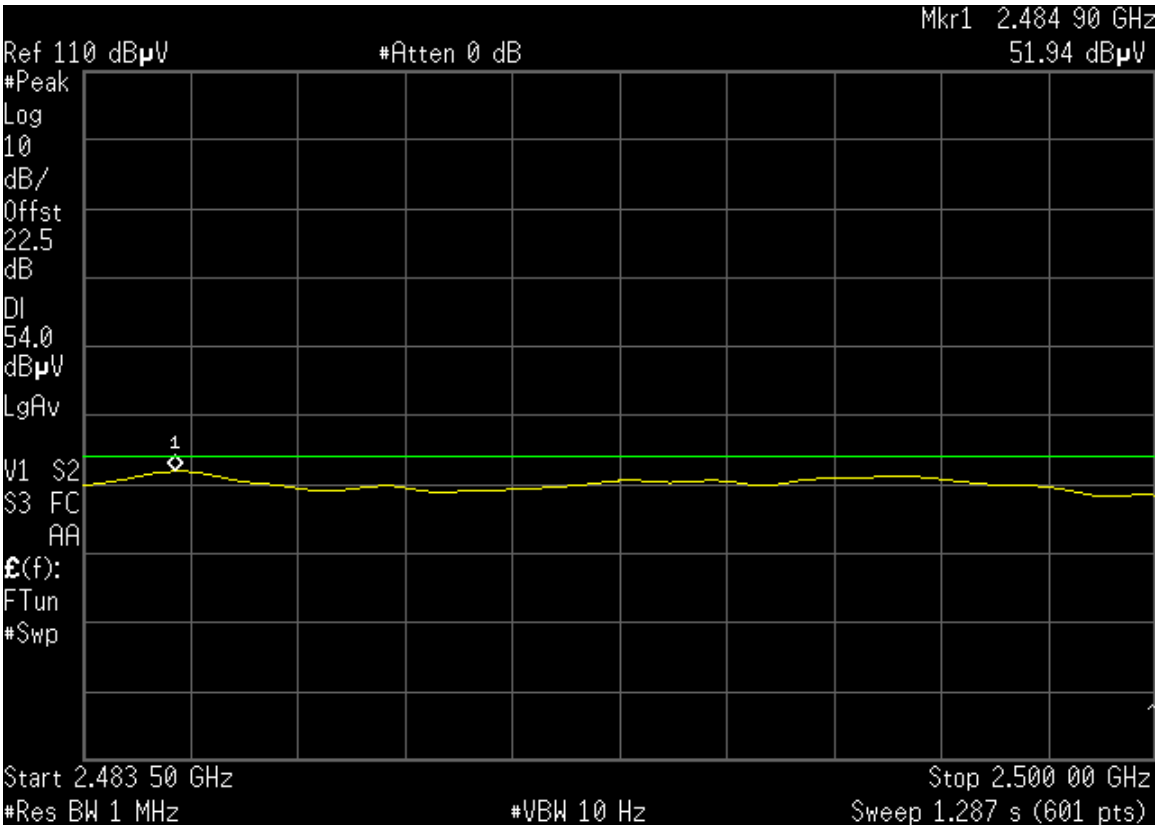
UPPER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, HORIZONTAL)



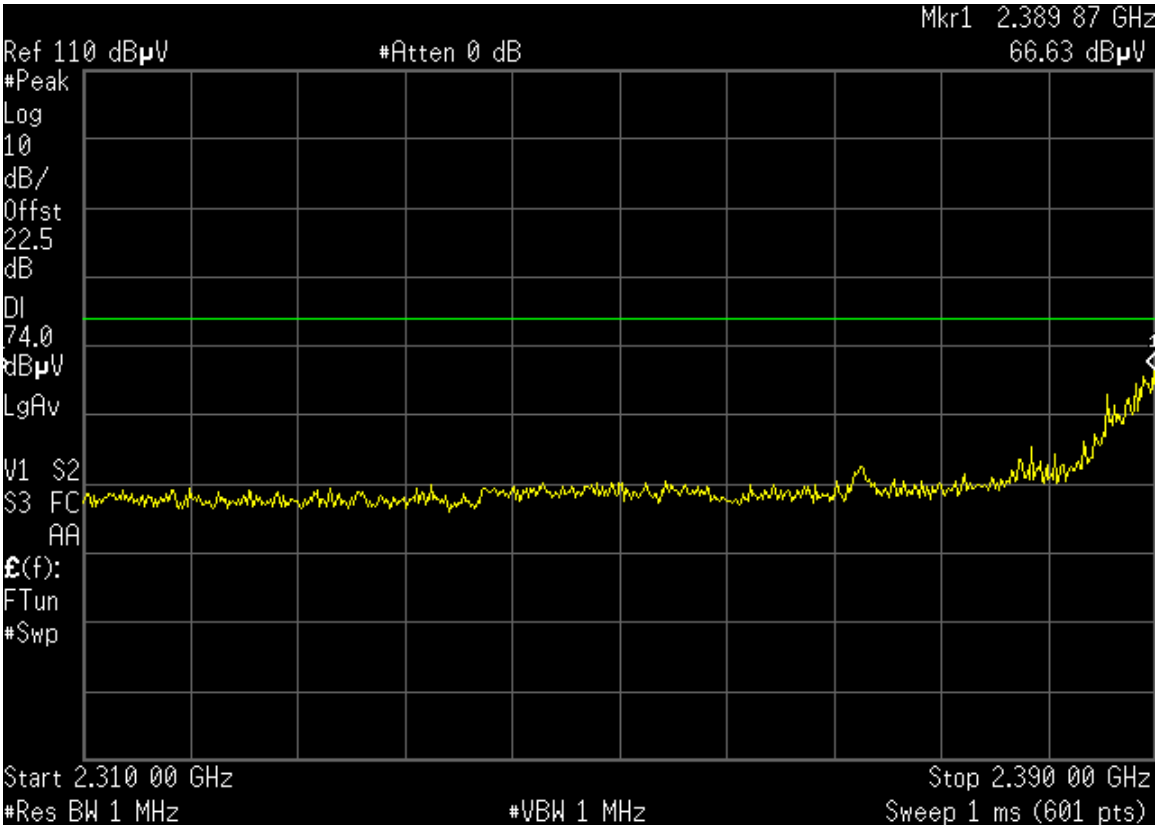


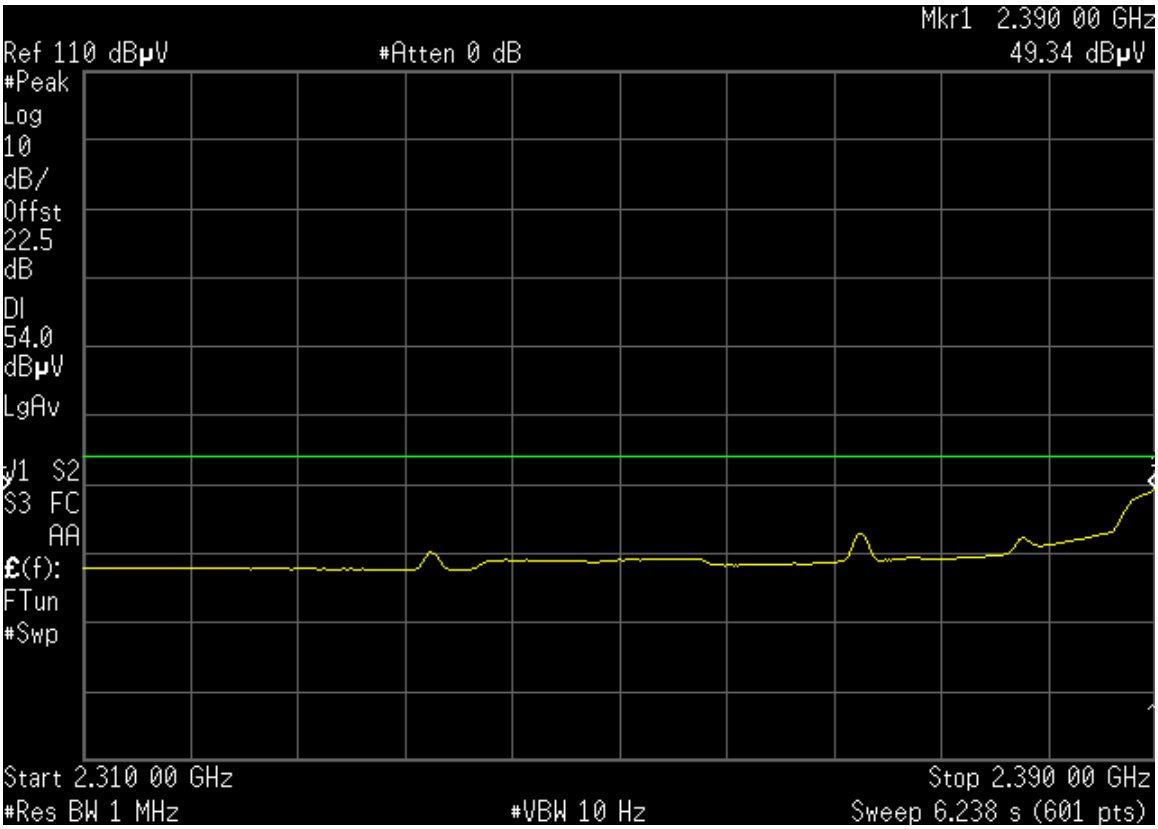
UPPER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, VERTICAL)



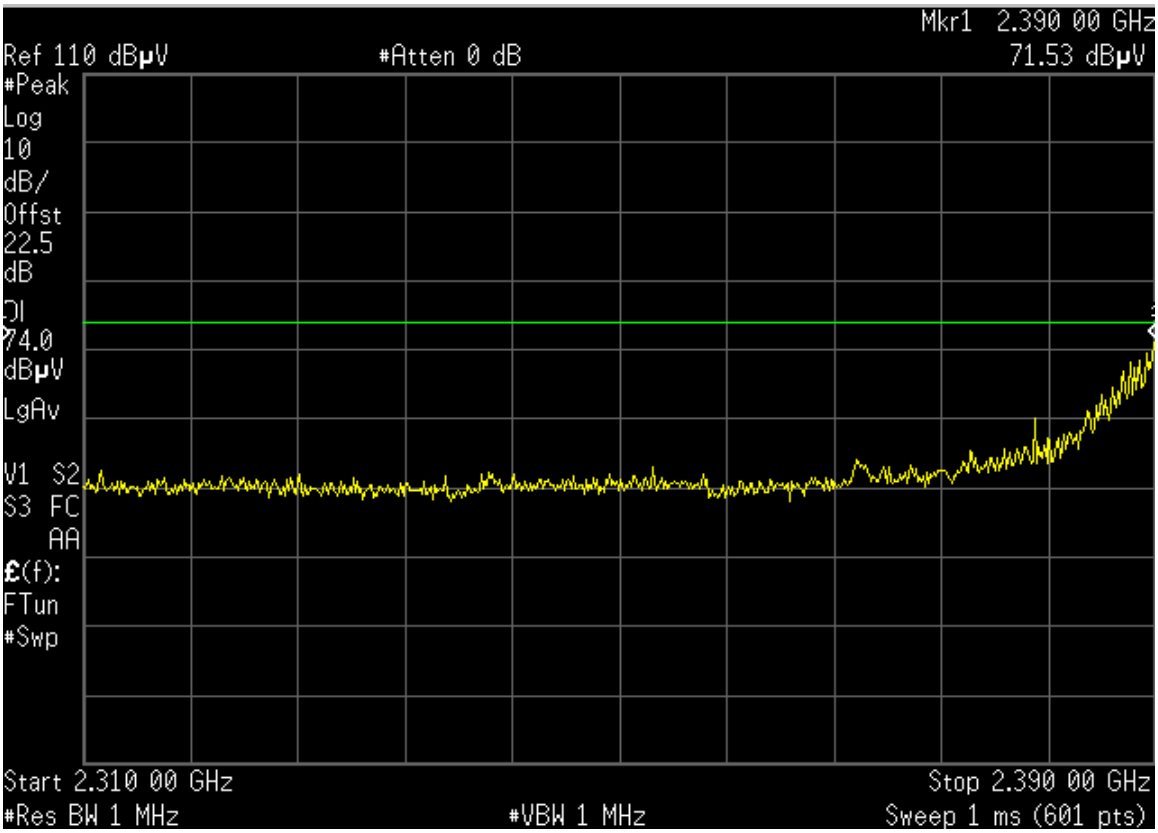


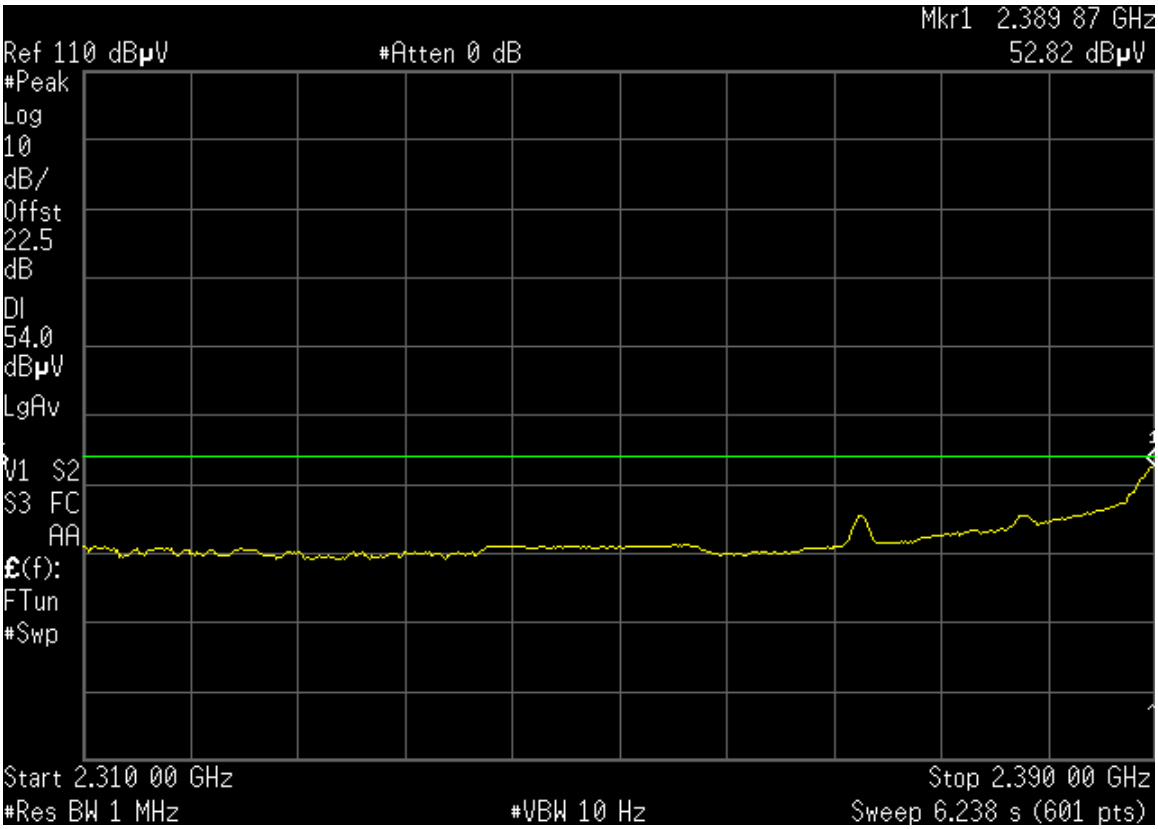
LOWER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, HORIZONTAL)



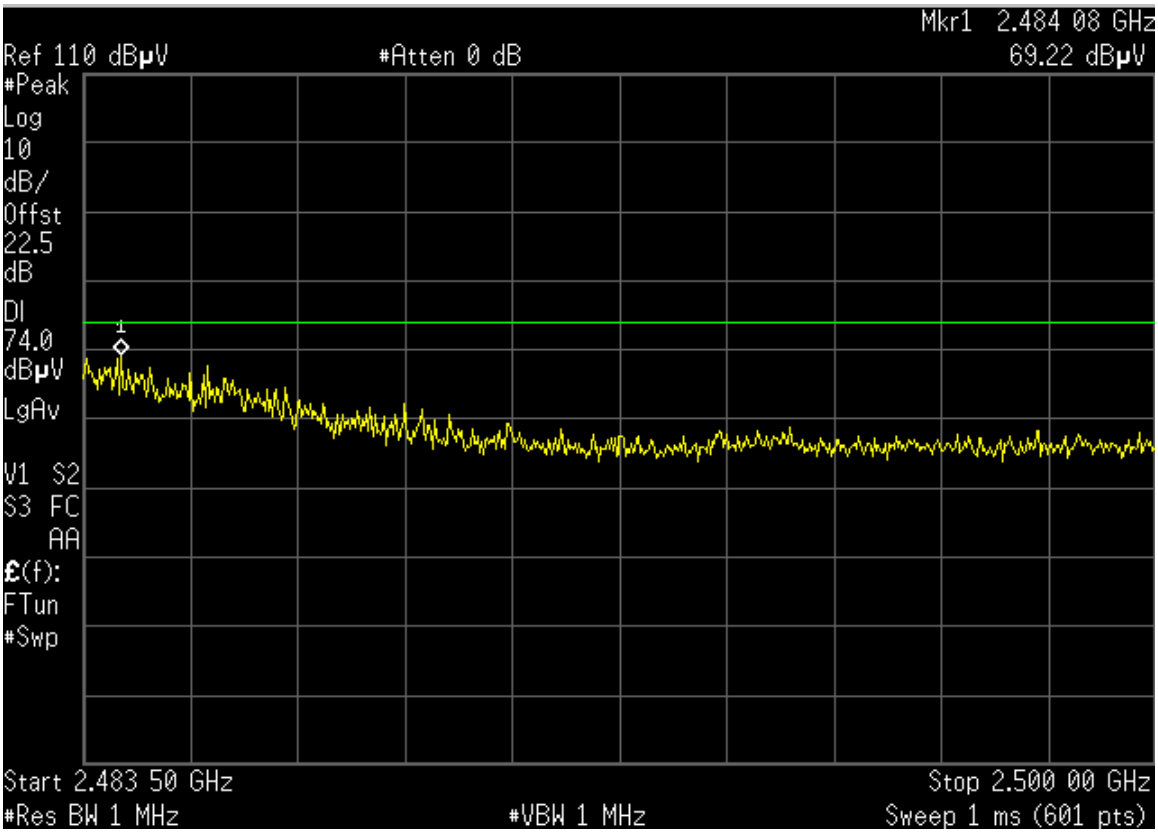


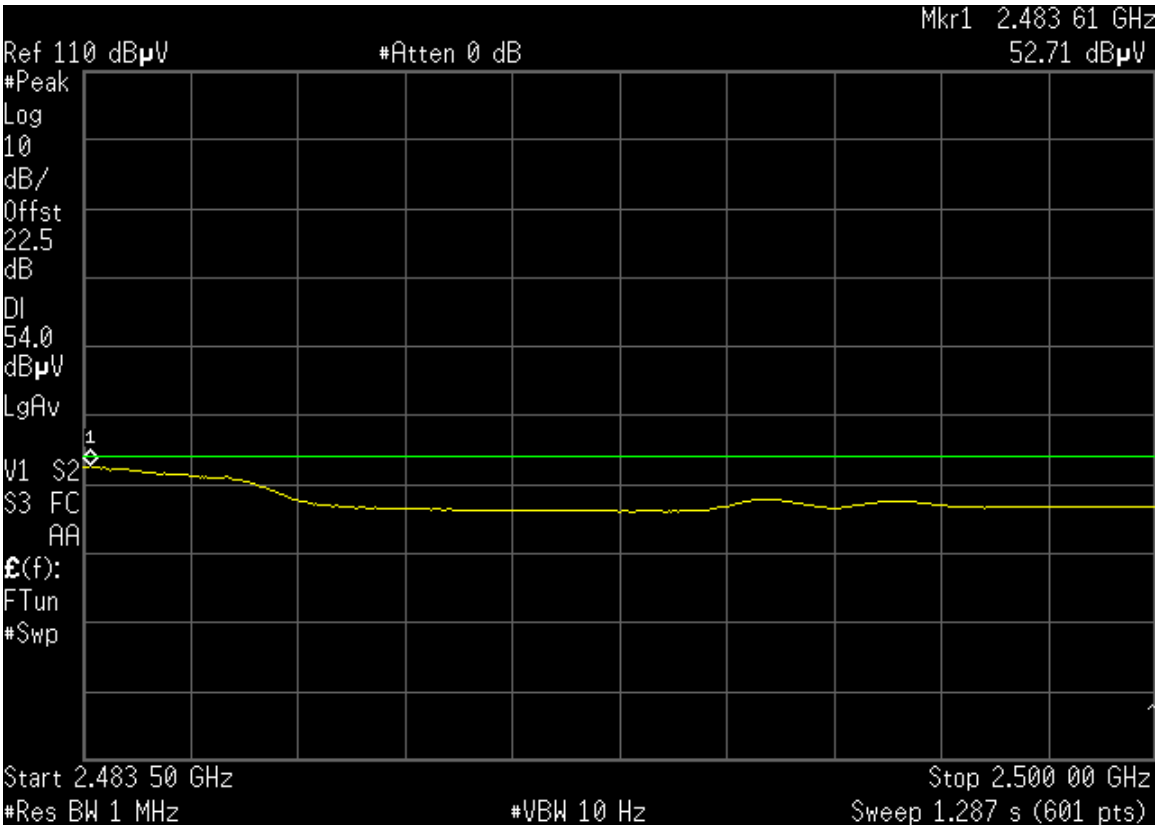
LOWER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, VERTICAL)



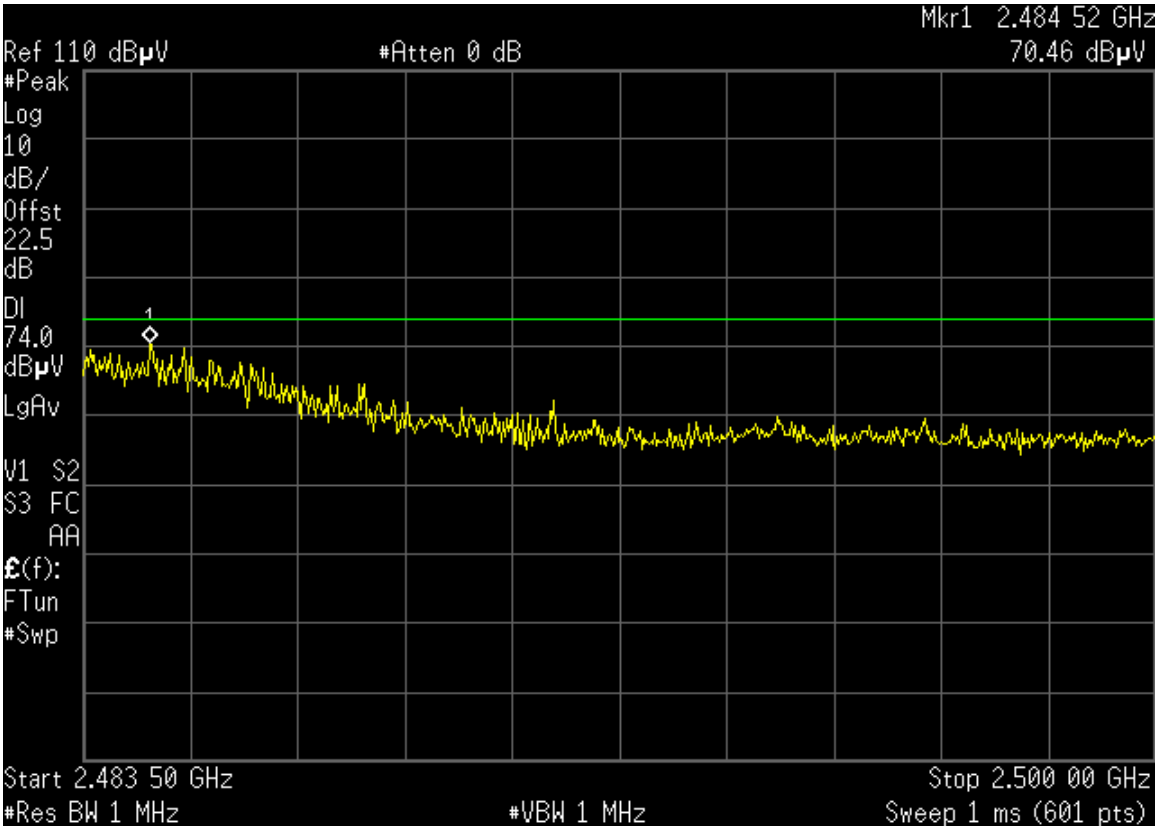


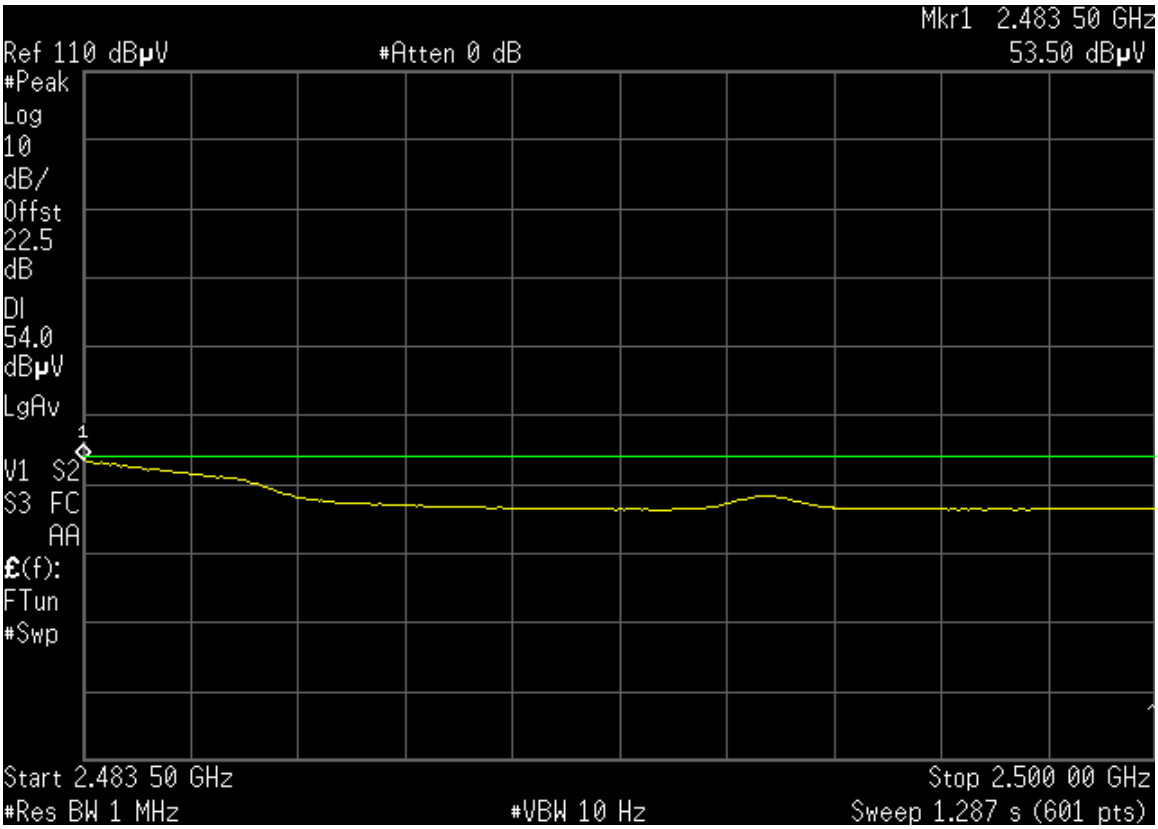
UPPER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, HORIZONTAL)





UPPER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, VERTICAL)





HARMONIC AND SPURIOUS RADIATED EMISSIONS (2.4 GHZ BAND, 11B MODE)

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/11/02
Test Engineer: Frank Ibrahim

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 2.412 GHz, 11b Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 12.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
4.824	V	Peak	37.2	0.0	33.9	36.0	1.0	4.6	40.6	74.0	-33.4
4.824	V	Avg	31.2	0.0	33.9	36.0	1.0	4.6	34.6	54.0	-19.4
4.824	H	Peak	38.7	0.0	33.9	36.0	1.0	4.6	42.1	74.0	-31.9
4.824	H	Avg	34.0	0.0	33.9	36.0	1.0	4.6	37.4	54.0	-16.6

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/11/02
Test Engineer: Frank Ibrahim

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 2.437 GHz, 11b Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 12.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
4.874	V	Peak	39.8	0.0	34.0	36.0	1.0	4.6	43.4	74.0	-30.6
4.874	V	Avg	35.2	0.0	34.0	36.0	1.0	4.6	38.8	54.0	-15.2
4.874	H	Peak	39.0	0.0	34.0	36.0	1.0	4.6	42.6	74.0	-31.4
4.874	H	Avg	34.0	0.0	34.0	36.0	1.0	4.6	37.6	54.0	-16.4

Description of Test:	Radiated Emissions - Restricted Bands
Project Number:	02U1692
Date:	12/11/02
Test Engineer:	Frank Ibrahim
Company:	Ambit Microsystems Corporation
EUT Description:	802.11 a/b/g WLAN Card, Model A460-05
Test Configuration:	EUT, Laptop
Mode of Operation:	TX ON , Freq = 2.462 GHz, 11b Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 12.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
4.924	V	Peak	39.0	0.0	34.2	36.0	1.0	4.6	42.8	74.0	-31.2
4.924	V	Avg	34.2	0.0	34.2	36.0	1.0	4.6	38.0	54.0	-16.0
4.924	H	Peak	43.0	0.0	34.2	36.0	1.0	4.6	46.8	74.0	-27.2
4.924	H	Avg	40.8	0.0	34.2	36.0	1.0	4.6	44.6	54.0	-9.4

HARMONIC AND SPURIOUS RADIATED EMISSIONS (2.4 GHZ BAND, 11G MODE)

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/23/02
Test Engineer: Neelesh Raj

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 2.412 GHz, 11g Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 12.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
4.824	V	Peak	38.9	0.0	33.9	36.0	1.0	4.6	42.3	74.0	-31.7
4.824	V	Avg	32.8	0.0	33.9	36.0	1.0	4.6	36.2	54.0	-17.8
4.824	H	Peak	40.6	0.0	33.9	36.0	1.0	4.6	44.0	74.0	-30.0
4.824	H	Avg	36.1	0.0	33.9	36.0	1.0	4.6	39.5	54.0	-14.5

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/23/02
Test Engineer: Neelesh Raj

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 2.437 GHz, 11g Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 12.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
4.874	V	Peak	42.1	0.0	34.0	36.0	1.0	4.6	45.7	74.0	-28.3
4.874	V	Avg	37.7	0.0	34.0	36.0	1.0	4.6	41.3	54.0	-12.7
4.874	H	Peak	44.5	0.0	34.0	36.0	1.0	4.6	48.1	74.0	-25.9
4.874	H	Avg	39.6	0.0	34.0	36.0	1.0	4.6	43.2	54.0	-10.8

Description of Test:	Radiated Emissions - Restricted Bands
Project Number:	02U1692
Date:	12/23/02
Test Engineer:	Neelesh Raj
Company:	Ambit Microsystems Corporation
EUT Description:	802.11 a/b/g WLAN Card, Model A460-05
Test Configuration:	EUT, Laptop
Mode of Operation:	TX ON , Freq = 2.462 GHz, 11g Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 12.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
4.924	V	Peak	40.1	0.0	34.2	36.0	1.0	4.6	43.9	74.0	-30.1
4.924	V	Avg	35.4	0.0	34.2	36.0	1.0	4.6	39.2	54.0	-14.8
4.924	H	Peak	44.3	0.0	34.2	36.0	1.0	4.6	48.1	74.0	-25.9
4.924	H	Avg	42.1	0.0	34.2	36.0	1.0	4.6	45.9	54.0	-8.1

HARMONIC AND SPURIOUS RADIATED EMISSIONS (5.8 GHZ BAND, NORMAL MODE)

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/23/02
Test Engineer: Neelesh Raj

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 5.745 GHz, Normal Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 14.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
11.490	V	Peak	51.1	0.0	39.5	36.0	1.0	8.6	64.2	74.0	-9.8
11.490	V	Avg	39.1	0.0	39.5	36.0	1.0	8.6	52.2	54.0	-1.8
11.490	H	Peak	50.3	0.0	39.5	36.0	1.0	8.6	63.4	74.0	-10.6
11.490	H	Avg	37.2	0.0	39.5	36.0	1.0	8.6	50.3	54.0	-3.7

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/23/02
Test Engineer: Neelesh Raj

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 5.785 GHz, Normal Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 14.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
11.570	V	Peak	53.7	0.0	39.5	36.0	1.0	8.7	66.8	74.0	-7.2
11.570	V	Avg	39.6	0.0	39.5	36.0	1.0	8.7	52.7	54.0	-1.3
11.570	H	Peak	49.9	0.0	39.5	36.0	1.0	8.7	63.0	74.0	-11.0
11.570	H	Avg	36.8	0.0	39.5	36.0	1.0	8.7	49.9	54.0	-4.1

Description of Test:	Radiated Emissions - Restricted Bands
Project Number:	02U1692
Date:	12/23/02
Test Engineer:	Neelesh Raj
Company:	Ambit Microsystems Corporation
EUT Description:	802.11 a/b/g WLAN Card, Model A460-05
Test Configuration:	EUT, Laptop
Mode of Operation:	TX ON , Freq = 5.825 GHz, Normal Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 14.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
11.650	V	Peak	54.3	0.0	39.4	36.1	1.0	8.7	67.3	74.0	-6.7
11.650	V	Avg	40.3	0.0	39.4	36.1	1.0	8.7	53.3	54.0	-0.7
11.650	H	Peak	51.4	0.0	39.4	36.1	1.0	8.7	64.4	74.0	-9.6
11.650	H	Avg	39.7	0.0	39.4	36.1	1.0	8.7	52.7	54.0	-1.3

HARMONIC AND SPURIOUS RADIATED EMISSIONS (5.8 GHZ BAND, TURBO MODE)

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/23/02
Test Engineer: Neelesh Raj

Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 5.76 GHz, Turbo Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 14.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
11.520	V	Peak	46.0	0.0	39.5	36.0	1.0	8.7	59.1	74.0	-14.9
11.520	V	Avg	33.1	0.0	39.5	36.0	1.0	8.7	46.2	54.0	-7.8
11.520	H	Peak	48.4	0.0	39.5	36.0	1.0	8.7	61.5	74.0	-12.5
11.520	H	Avg	36.4	0.0	39.5	36.0	1.0	8.7	49.5	54.0	-4.5

Description of Test: Radiated Emissions - Restricted Bands
Project Number: 02U1692
Date: 12/23/02
Test Engineer: Neelesh Raj

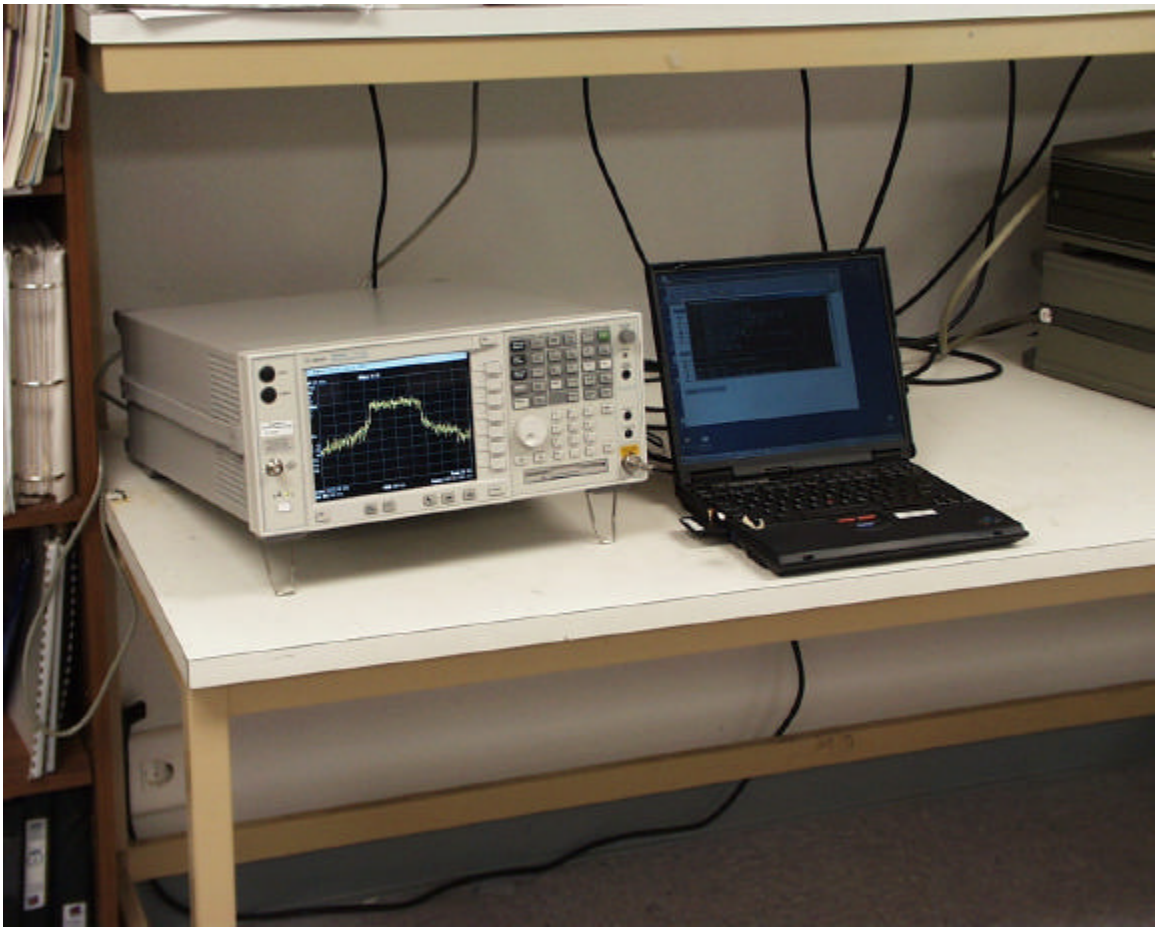
Company: Ambit Microsystems Corporation
EUT Description: 802.11 a/b/g WLAN Card, Model A460-05
Test Configuration: EUT, Laptop
Mode of Operation: TX ON , Freq = 5.80 GHz, Turbo Mode setting = 15

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 14.0 feet

Freq GHz	Pol V/H	Det	SA dBuV	Dist dB	AF dB/m	Preamp dB	Filter dB	Cable dB	Field dBuV/m	Limit dBuV/m	Margin dB
11.600	V	Peak	49.5	0.0	39.5	36.1	1.0	8.7	62.6	74.0	-11.4
11.600	V	Avg	38.7	0.0	39.5	36.1	1.0	8.7	51.8	54.0	-2.2
11.600	H	Peak	53.7	0.0	39.5	36.1	1.0	8.7	66.8	74.0	-7.2
11.600	H	Avg	40.1	0.0	39.5	36.1	1.0	8.7	53.2	54.0	-0.8

10. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



RADIATED RF MEASUREMENT SETUP

END OF REPORT