FCC CFR47 PART 15 SUBPART E
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: 02U1692-4

ISSUE DATE: JANUARY 2, 2003

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

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888

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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 2, 2003

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART E	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 5.2 GHz band is applicable to this report; other bands of operation (2.4 and 5.8 GHz) are documented in a separate report.

Approved & Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

FRANK IBRAHIM
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The Proxim 8460-05 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.
The new antenna gain is 2.69 dBi.

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

The highest transmitter output power is 33.9 mW.

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	200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	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	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	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	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	8564E	3943A01643	7/22/03
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 (7.6GHz)	FSY Microwave	FM-7600-9SS	002	N.C.R.
Spectrum Analyzer	HP	E4440A	US42221737	9/24/03
Environmental Chamber	Thermotron	SE-600-10-10	29800	4/26/03
Variable AC Power Supply	APC	AFP20080-C	J5061	N.C.R.
Microwave Detector	Agilent	8474C	2905A04047	6/4/03
Oscilloscope	HP	54601A	3106A00123	11/6/03

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

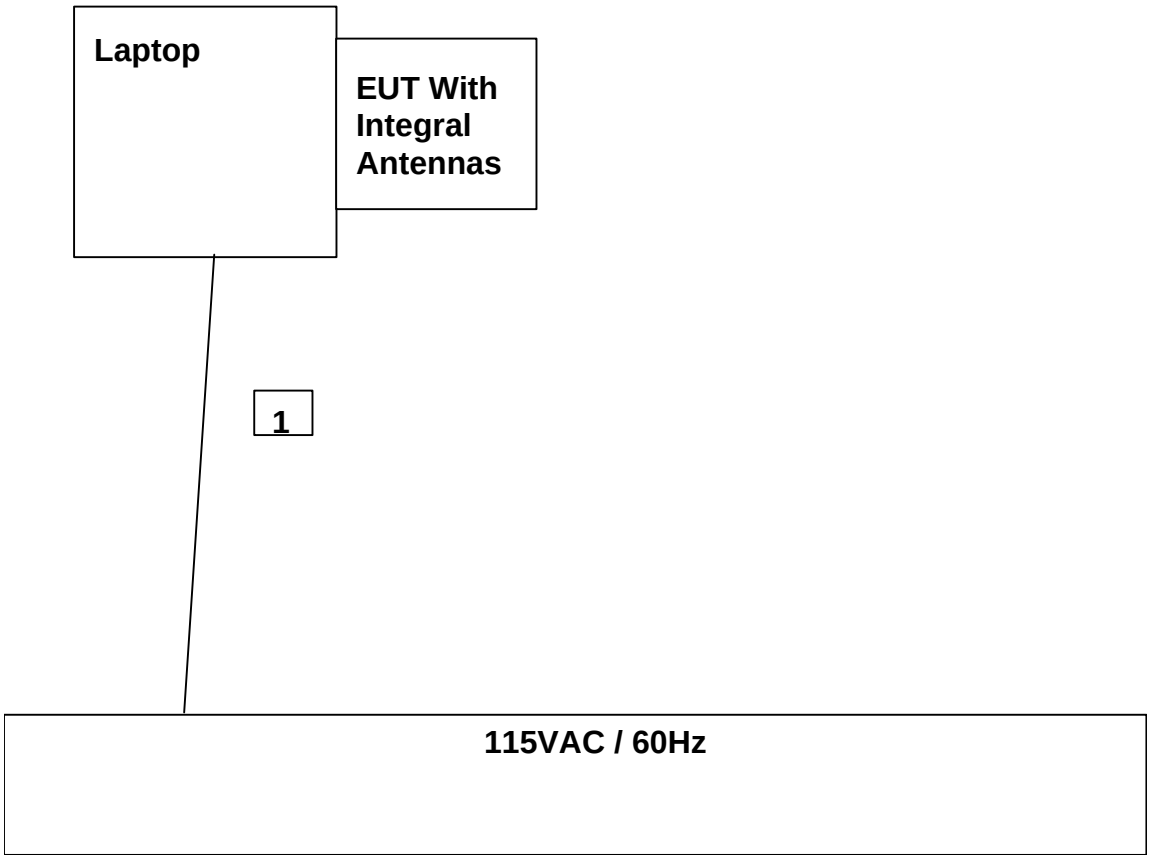
I/O CABLES

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

§15.403- EMISSION BANDWIDTH

(c) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

§15.407(a)- POWER LIMIT

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW (17 dBm) or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW (24 dBm) or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.407(a)- PEAK POWER SPECTRAL DENSITY

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.407(a)- PEAK EXCURSION

(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

§15.407(b)- UNDESIRABLE EMISSION LIMITS

(1 & 2) For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm / MHz.

(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(6) The provisions of §15.205 apply to intentional radiators operating under this section.

§15.407(d)- ANTENNA TYPE

Any U-NII device that operates in the 5.15-5.25 GHz band shall use a transmitting antenna that is an integral part of the device.

§15.407(f)- RADIO FREQUENCY EXPOSURE

U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

§15.407(g)- 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.

§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			

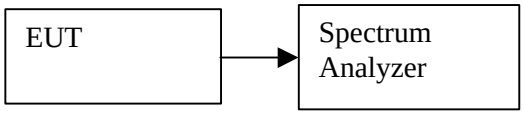
[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

(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. EMISSION BANDWIDTH

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 26 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

No non-compliance noted:

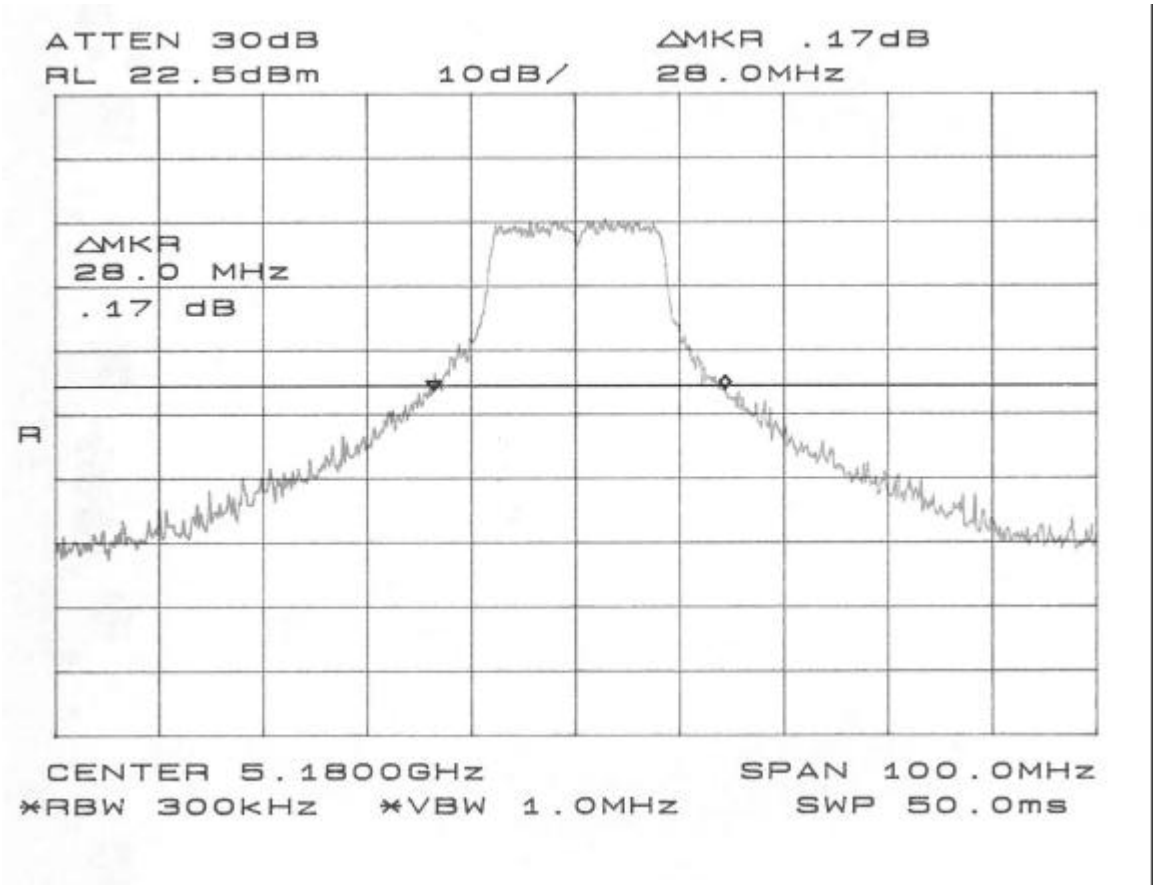
Base Mode

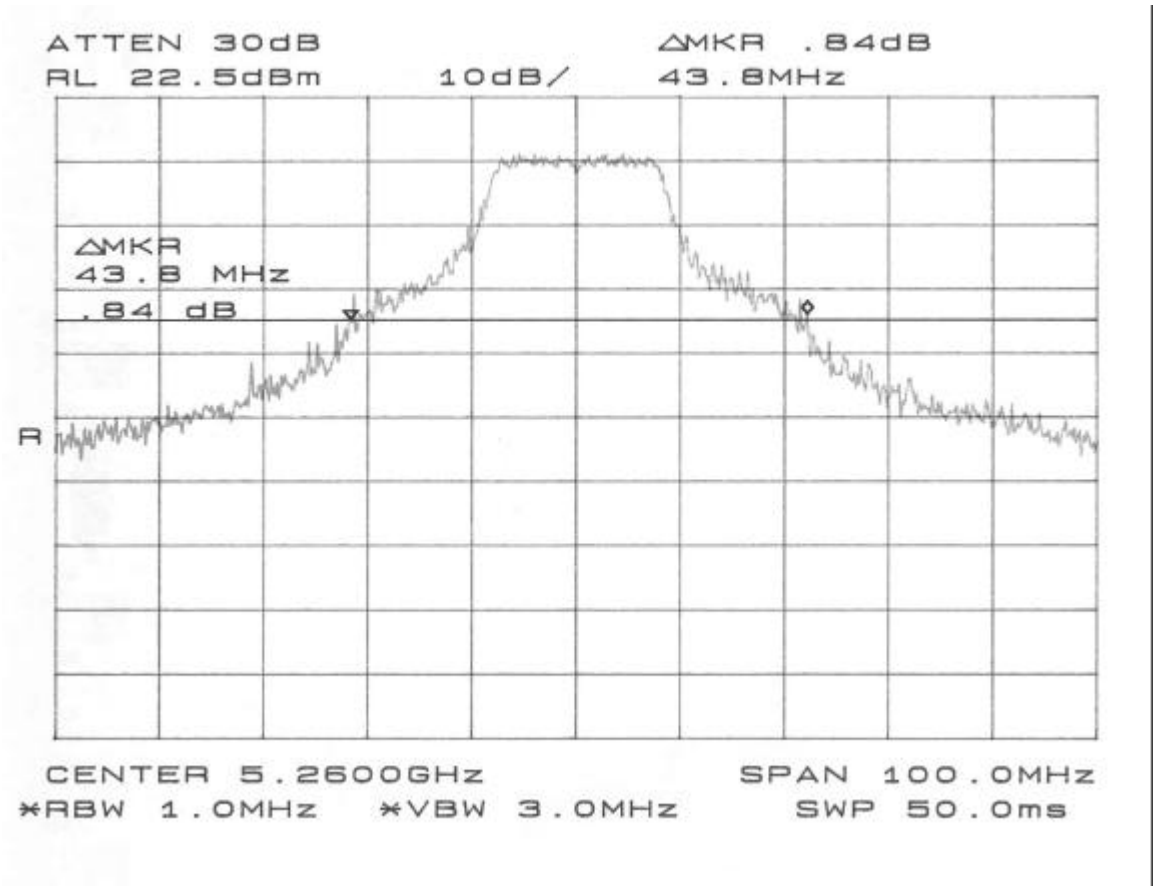
Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5180	28.0	14.5
Middle	5260	43.8	16.4
High	5320	28.3	14.5

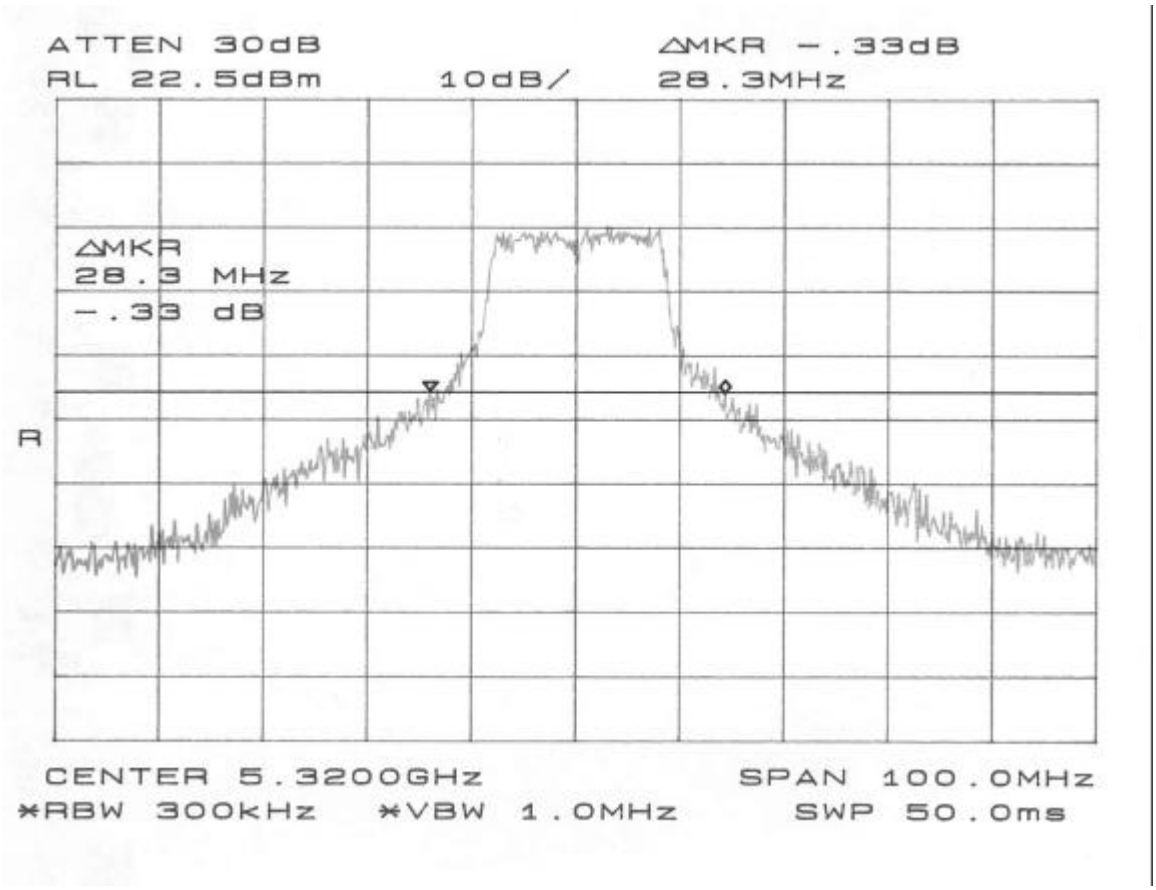
Turbo Mode

Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5210	68.3	18.3
Middle	5250	59.0	17.7
High	5290	78.8	19.0

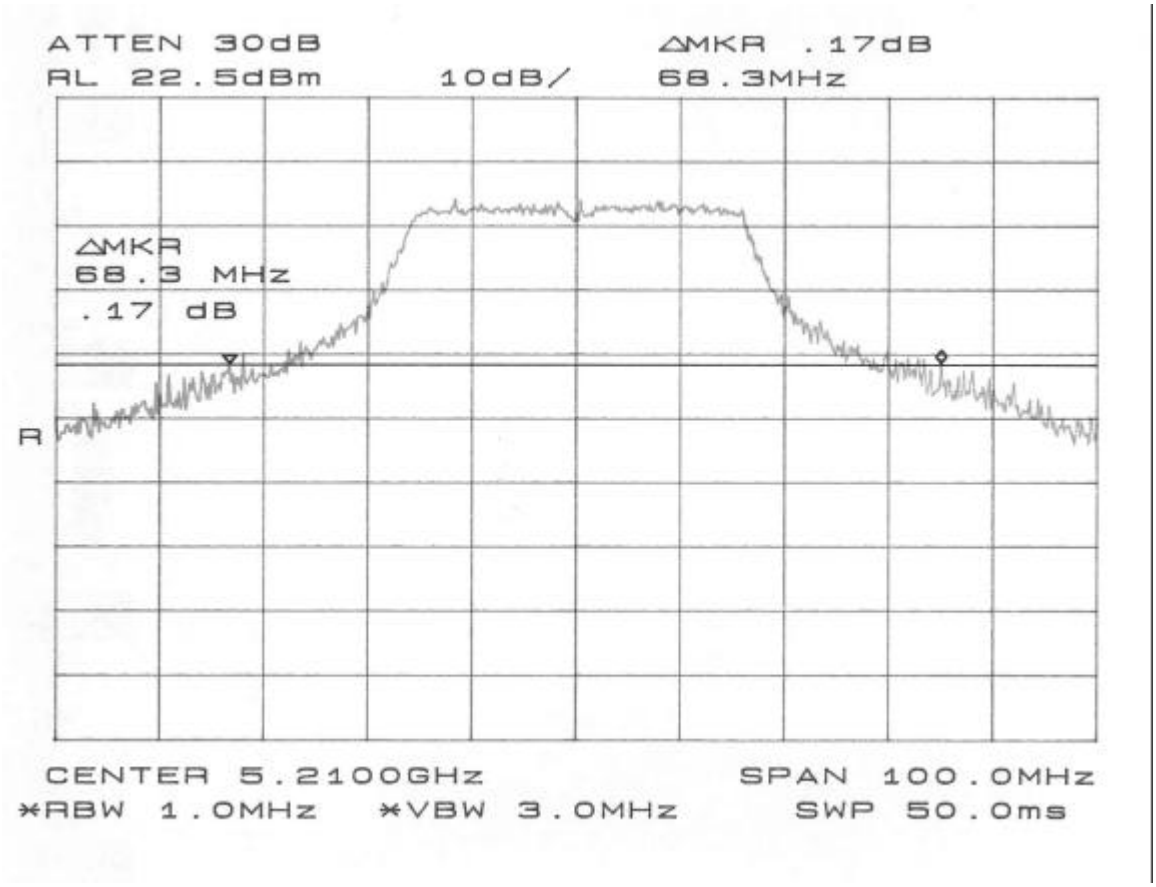
EMISSION BANDWIDTH (NORMAL MODE)

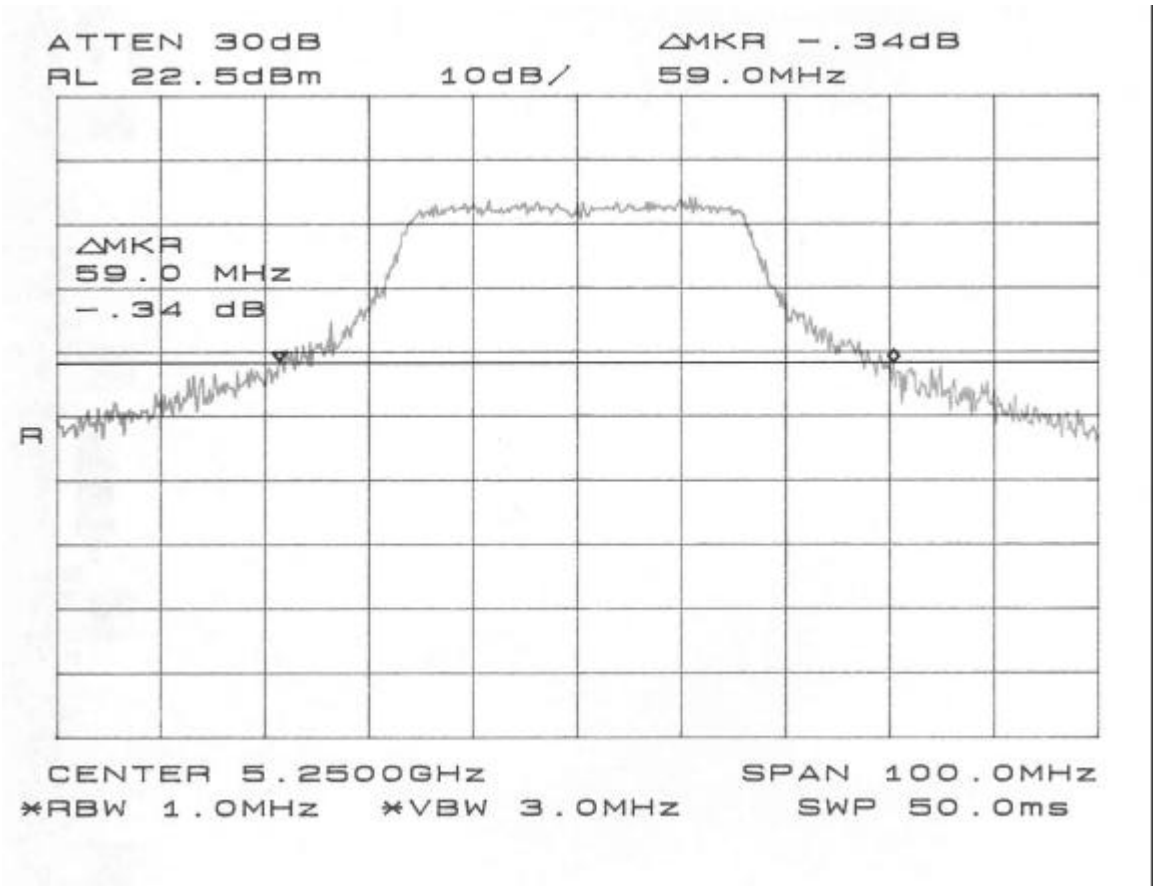


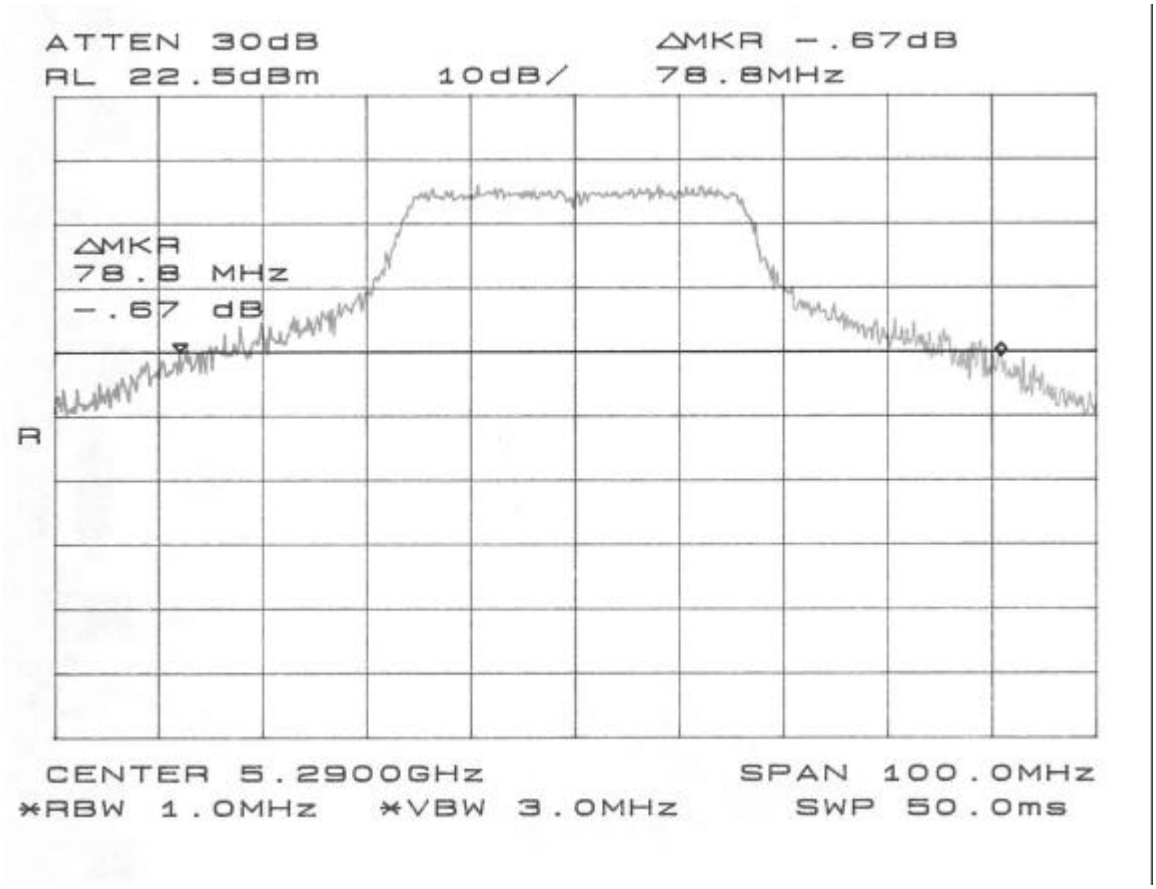




EMISSION BANDWIDTH (TURBO MODE)

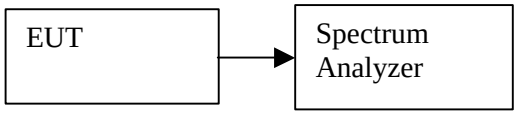






9.2. PEAK POWER

TEST SETUP



TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output is initially connected to a microwave detector and oscilloscope to measure the pulse duration, T.

Normal mode pulse duration = 1.57 ms
Normal mode pulse duration = 3.14 ms

The automatic analyzer settings yield a sweep time of 50 msec. Sweep time > T and EBW > largest available RBW, therefore Method # 3 is used.

Specification Limit:

Base Mode

Channel	Frequency (MHz)	10 Log B (dB)	4 + 10 Log B or 11 + 10 Log B (dBm)	Power Limit (dBm)
Low	5180	14.5	18.5	17
Middle	5260	16.4	27.4	24
High	5320	14.5	25.4	24

Turbo Mode

Channel	Frequency (MHz)	10 Log B (dB)	4 + 10 Log B or 11 + 10 Log B (dBm)	Power Limit (dBm)
Low	5210	18.3	22.3	17
Middle	5250	17.7	21.7	17
High	5290	19.0	30.0	24

Maximum antenna gain = 2.69 dBi, therefore there is no reduction due to antenna gain.

RESULTS

No non-compliance noted:

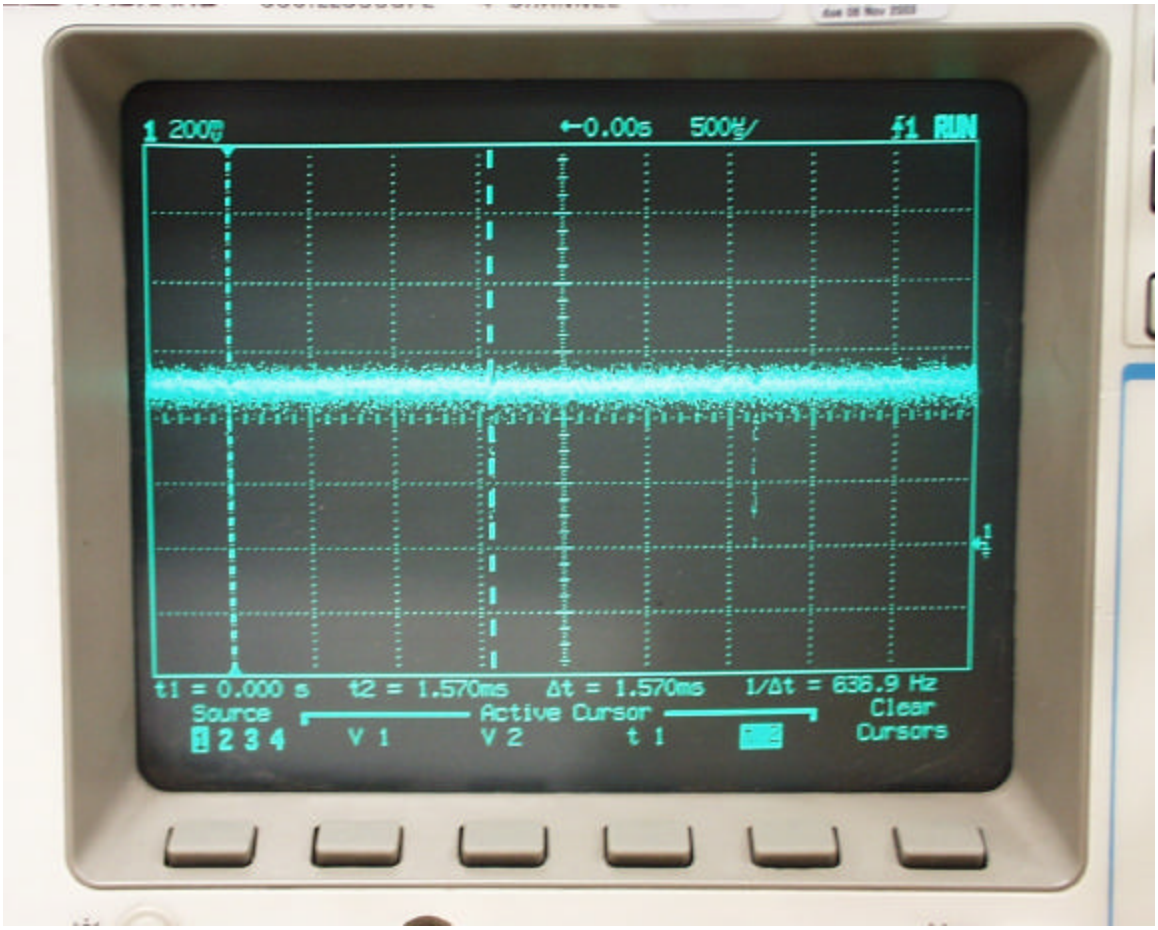
Base Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	12.1	17	-4.9
Middle	5260	15.3	24	-8.7
High	5320	10.3	24	-13.7

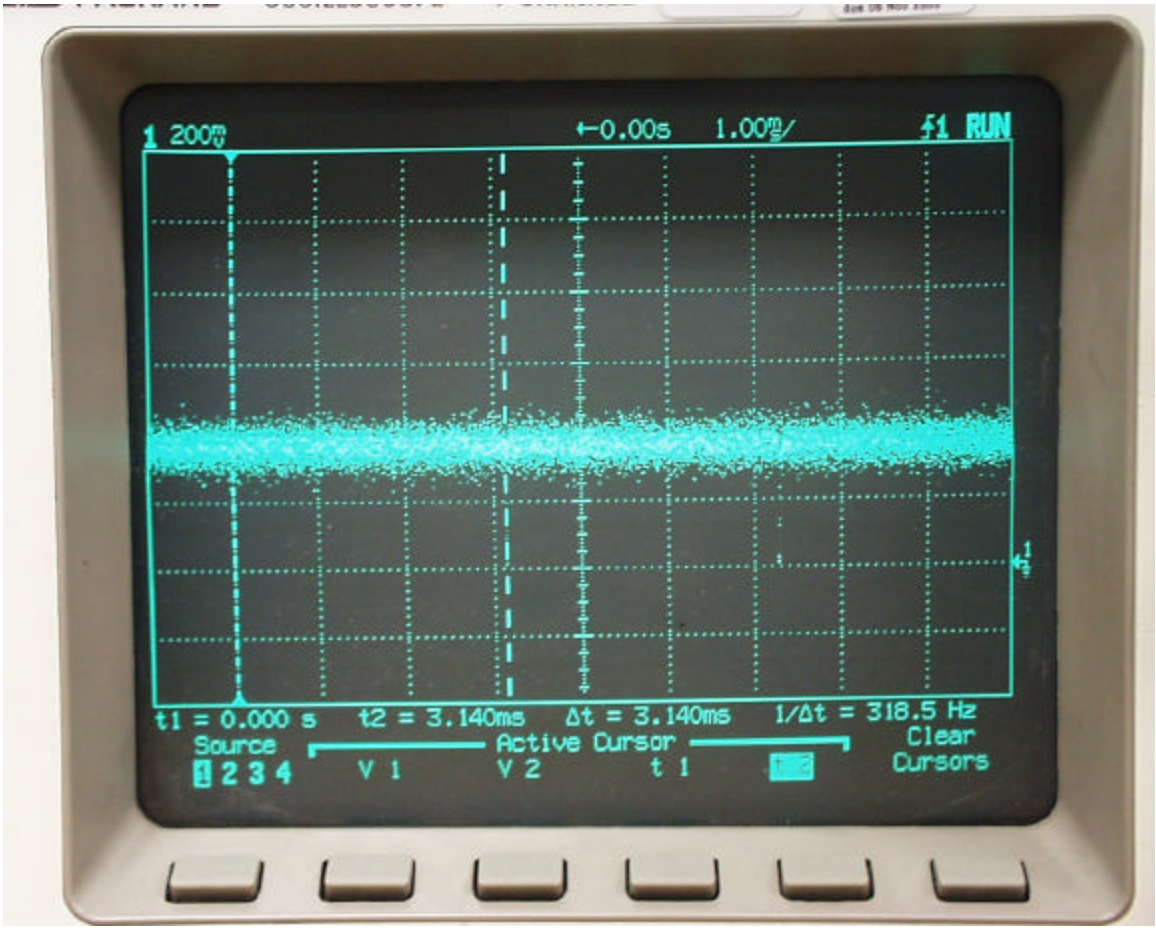
Turbo Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5210	12.9	17	-4.1
Middle	5250	12.3	17	-4.7
High	5290	13.7	24	-10.3

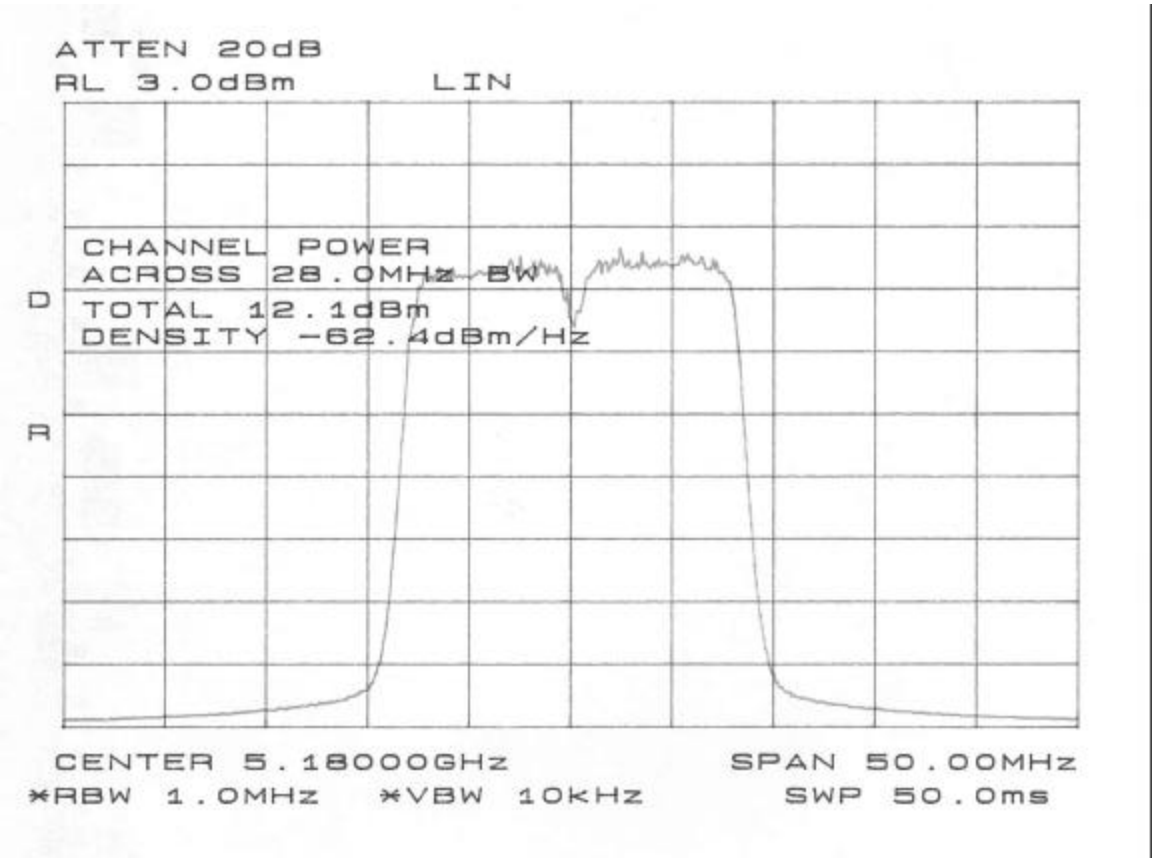
PULSE DURATION (NORMAL MODE)

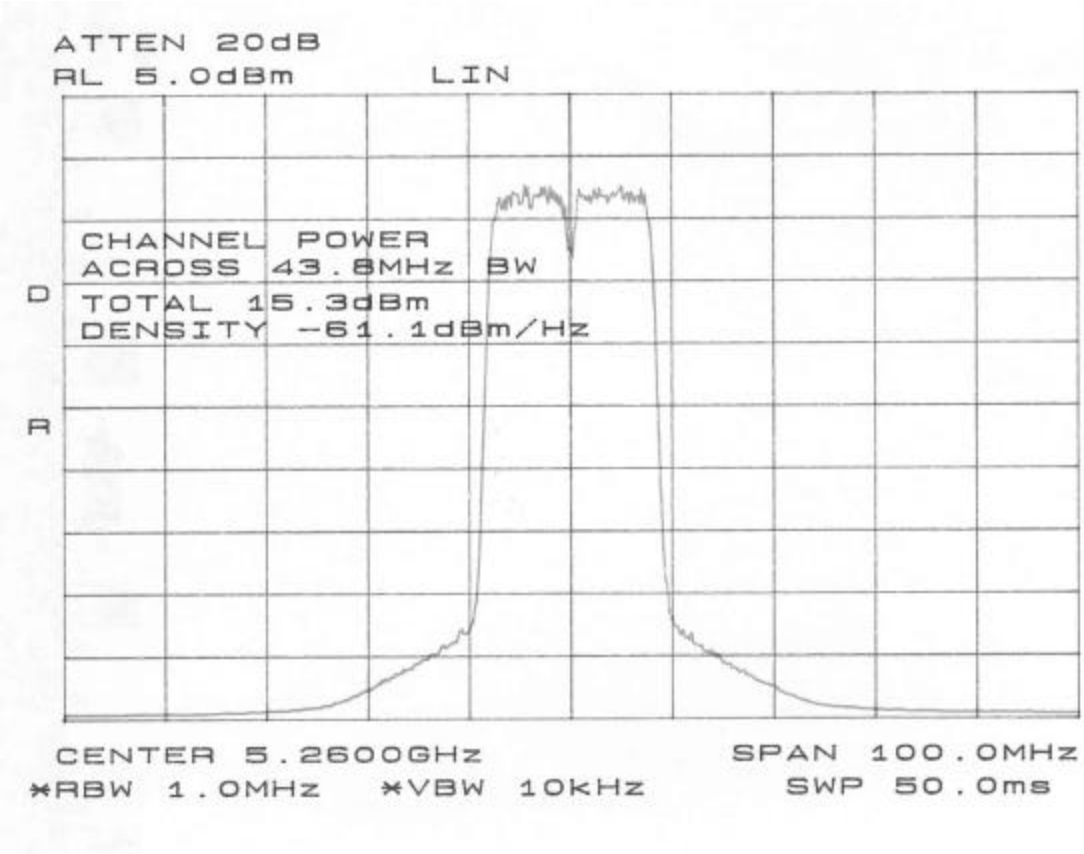


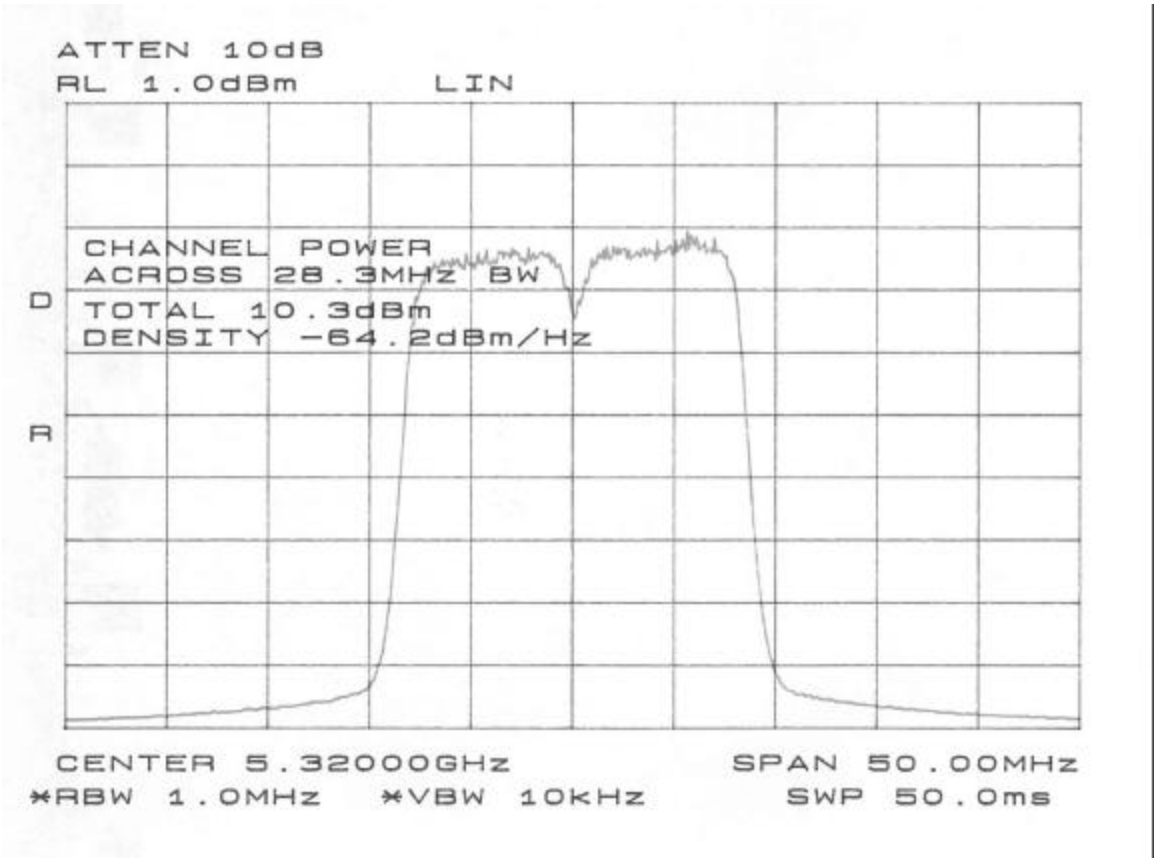
PULSE DURATION (TURBO MODE)



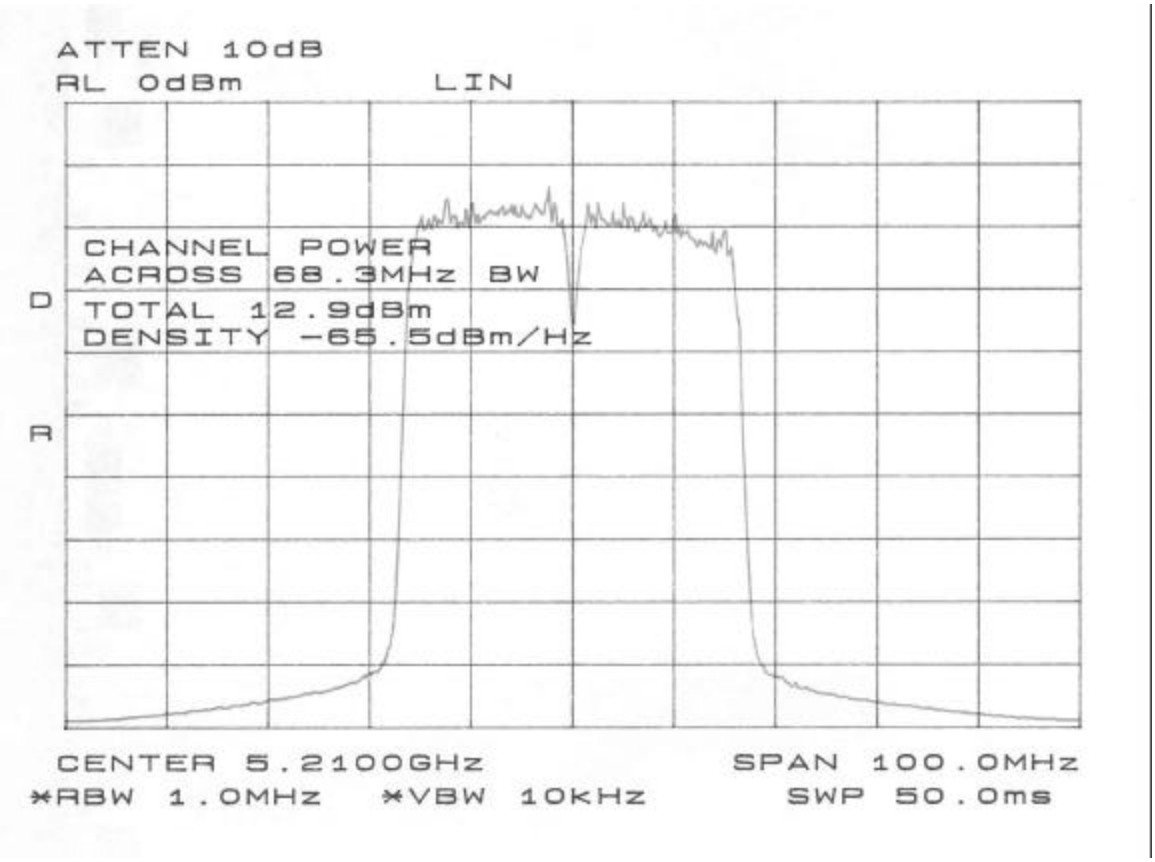
PEAK POWER (NORMAL MODE)

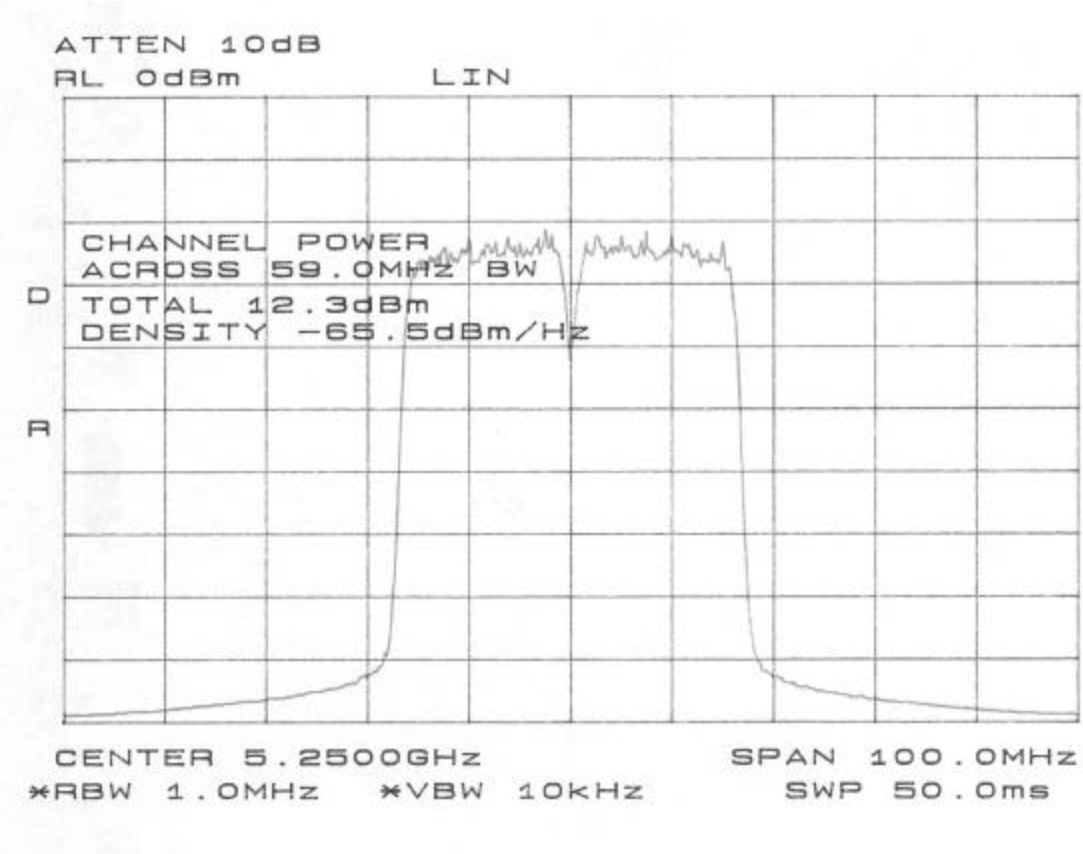


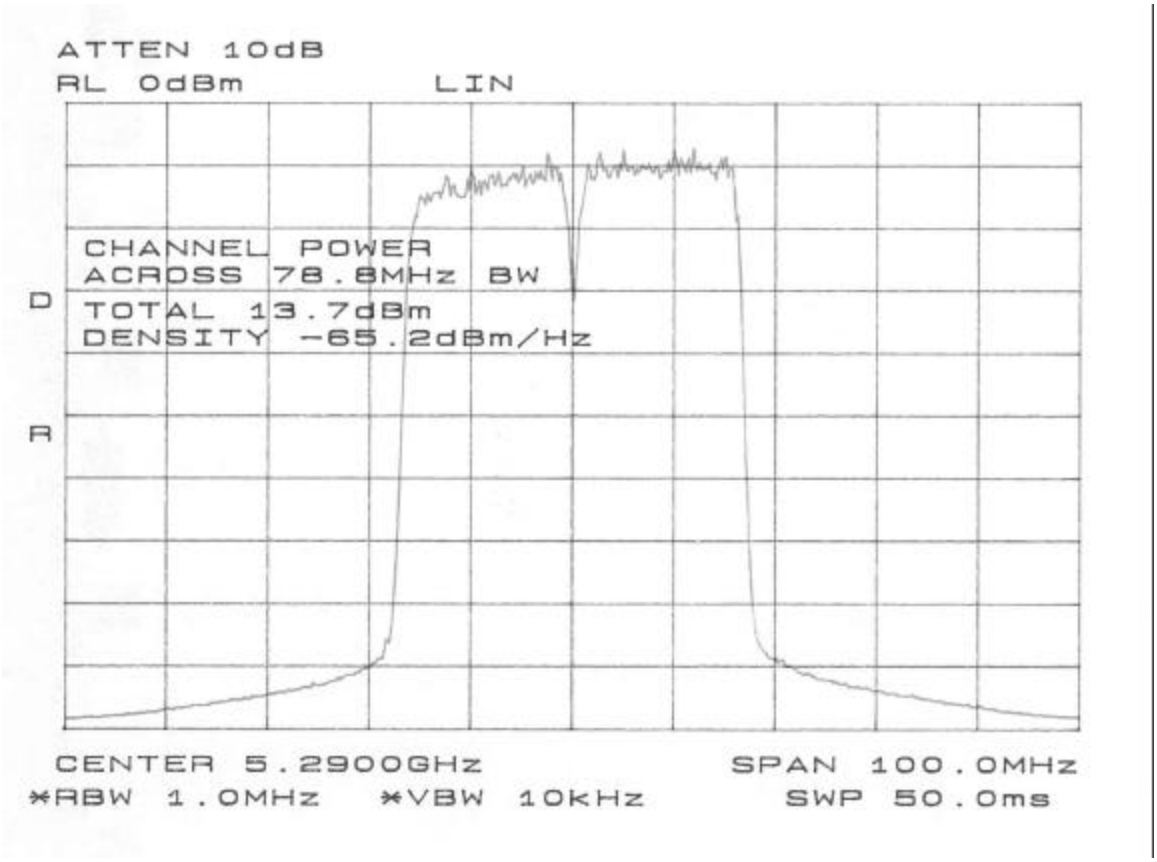




PEAK POWER (TURBO MODE)

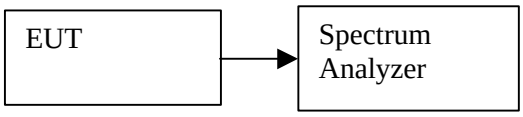






9.3. PEAK POWER SPECTRAL DENSITY

TEST SETUP



TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002, Method 2.

Specification Limit:

Maximum antenna gain = 2.69 dBi, therefore there is no reduction due to antenna gain.

RESULTS

No non-compliance noted:

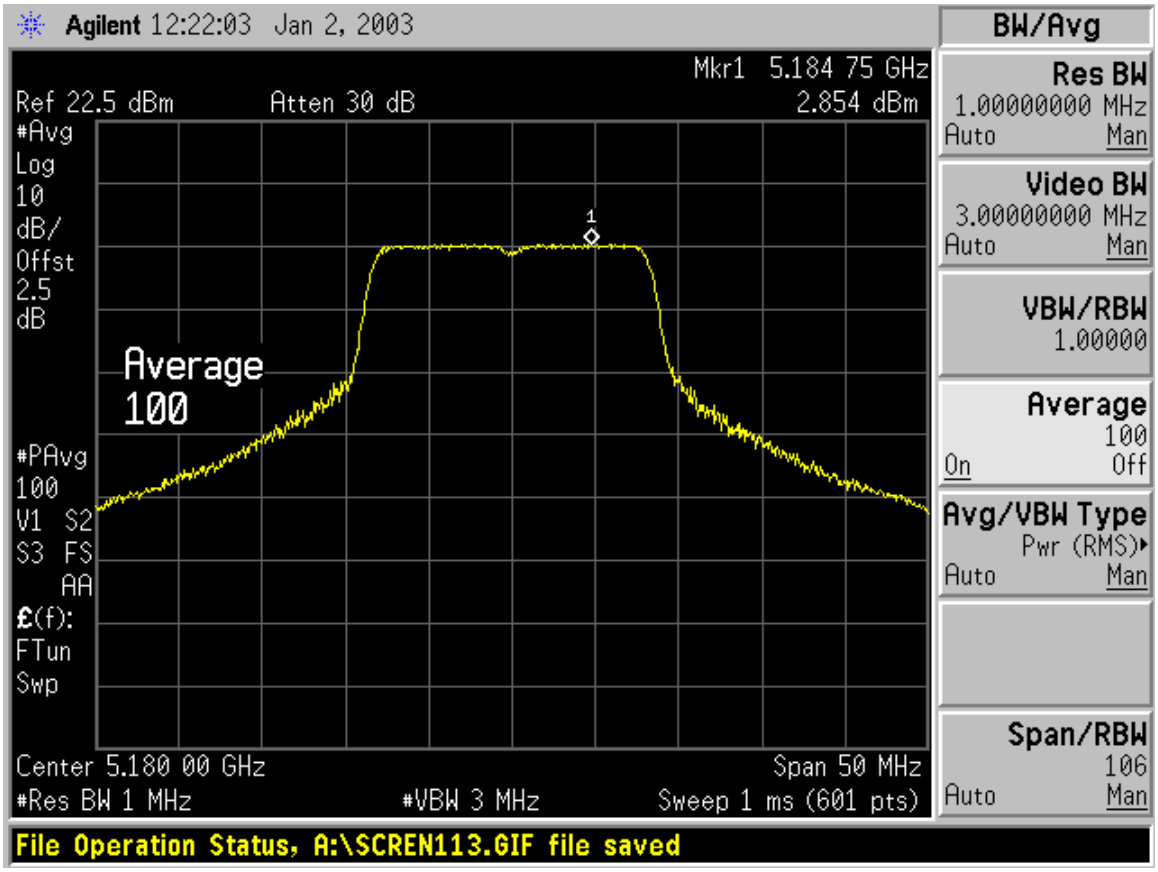
Base Mode

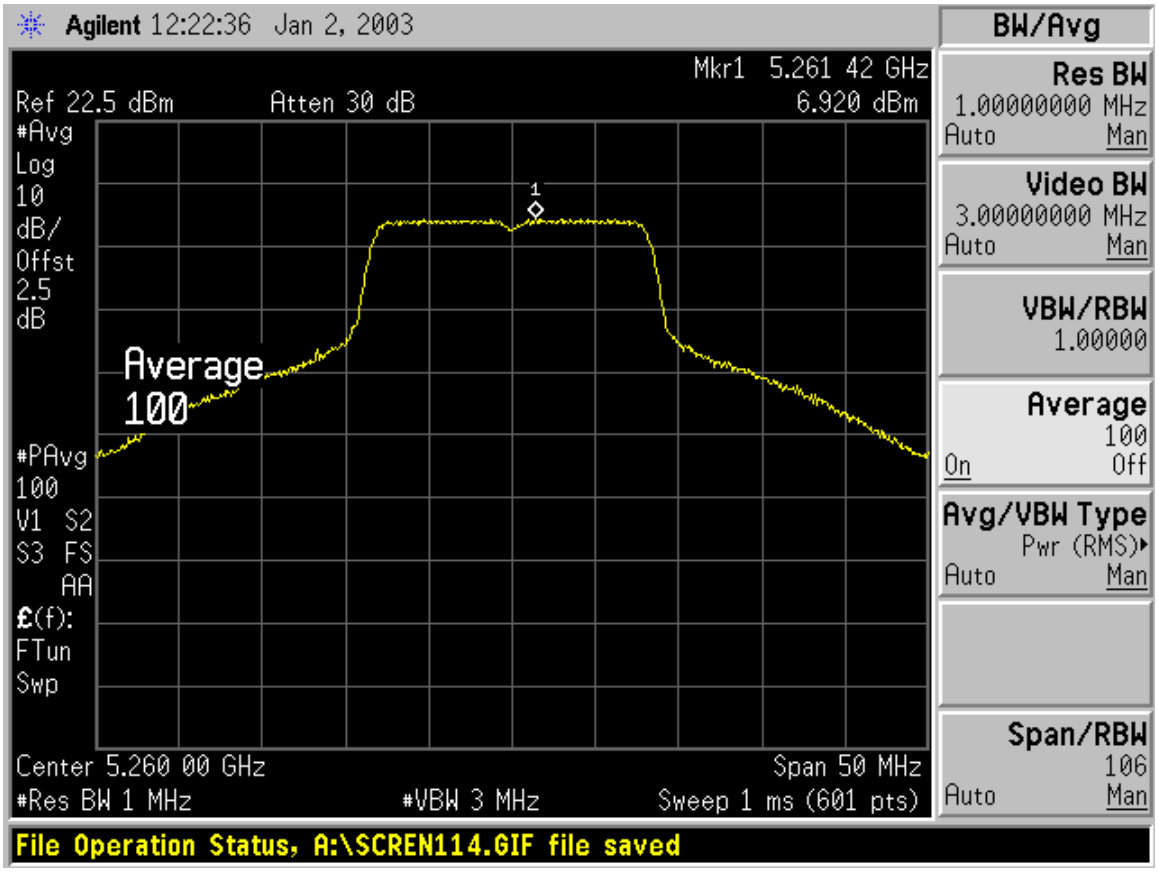
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	2.854	4	-1.146
Middle	5260	6.920	11	-4.080
High	5320	2.397	11	-8.603

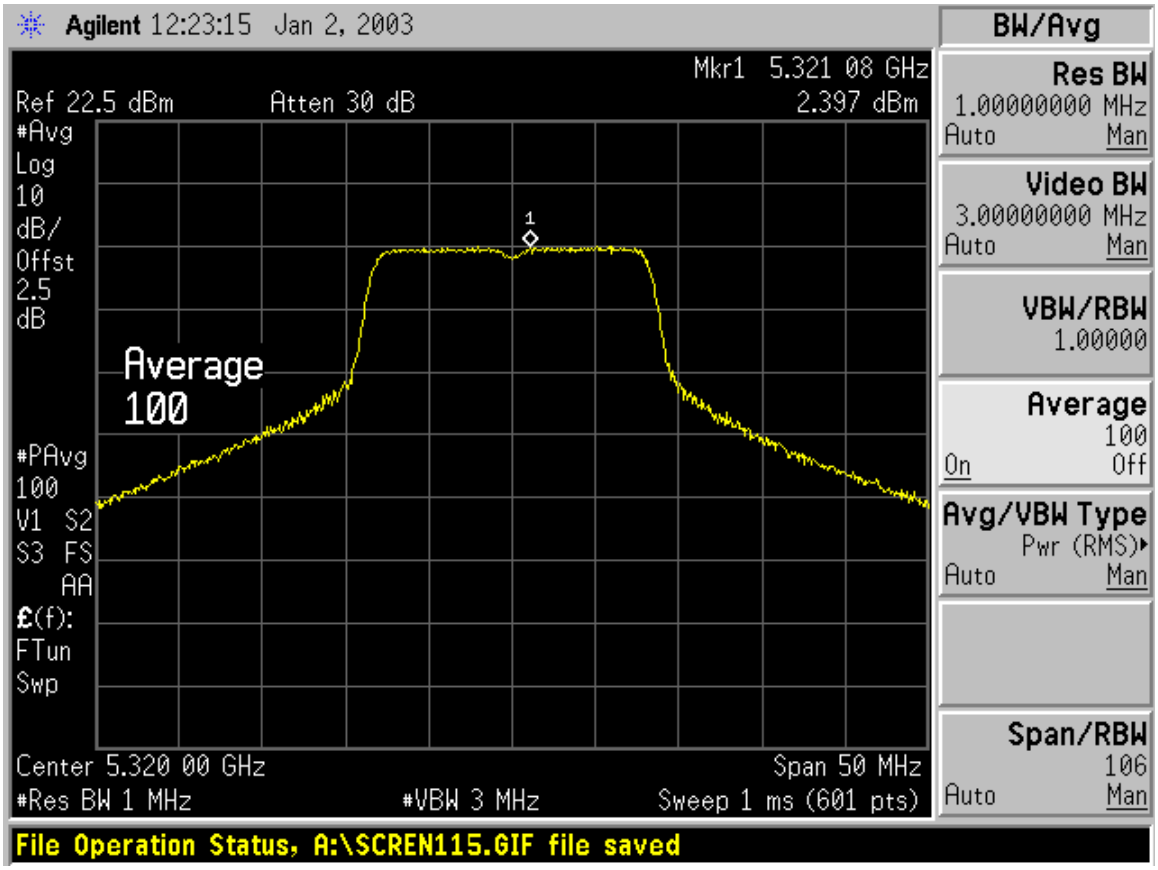
Turbo Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5210	0.907	4	-3.093
Middle	5250	0.868	4	-3.132
High	5290	2.970	11	-8.030

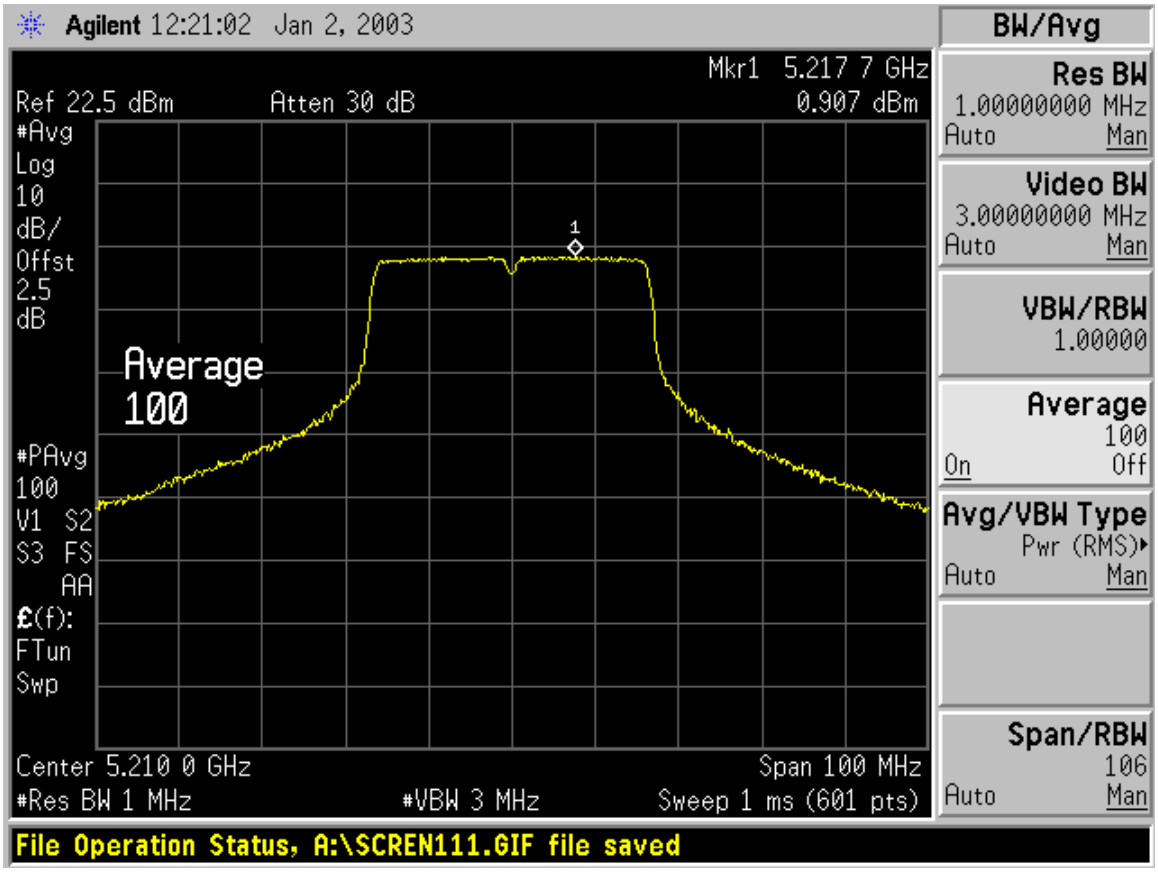
PPSD (NORMAL MODE)

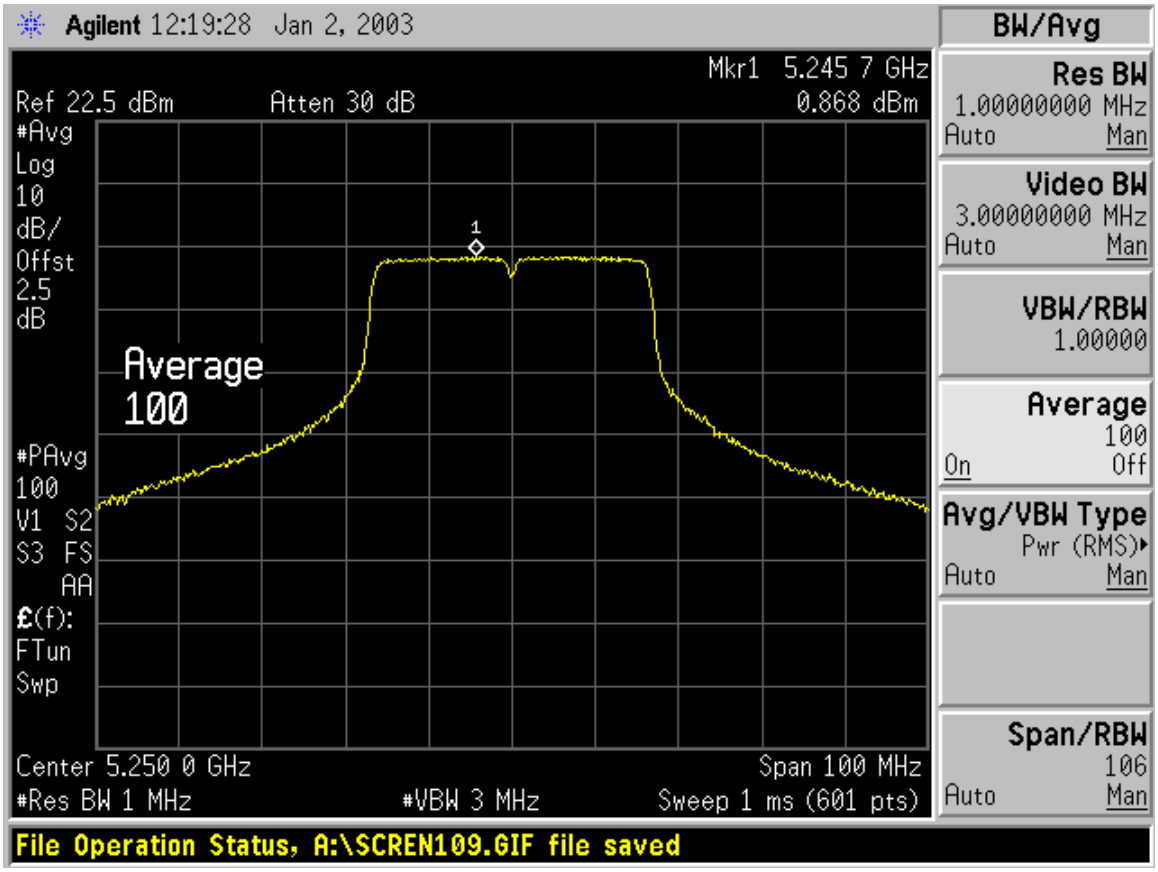


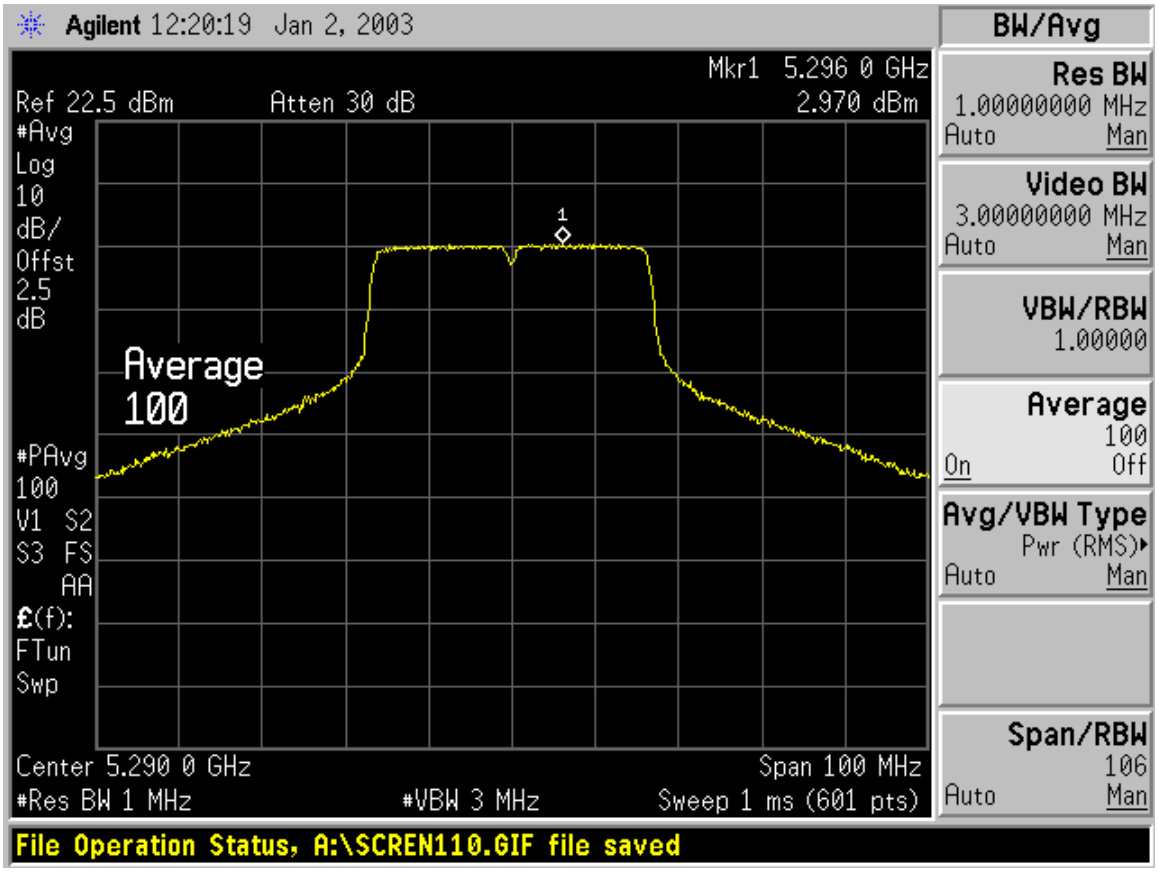




PPSD (TURBO MODE)

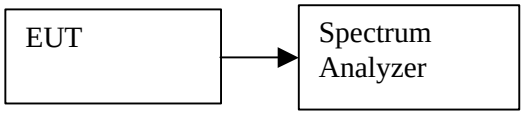






9.4. PEAK EXCURSION

TEST SETUP



TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 3 was used for peak power measurements, Method # 3 is used for the second PPSD trace.

RESULTS

No non-compliance noted:

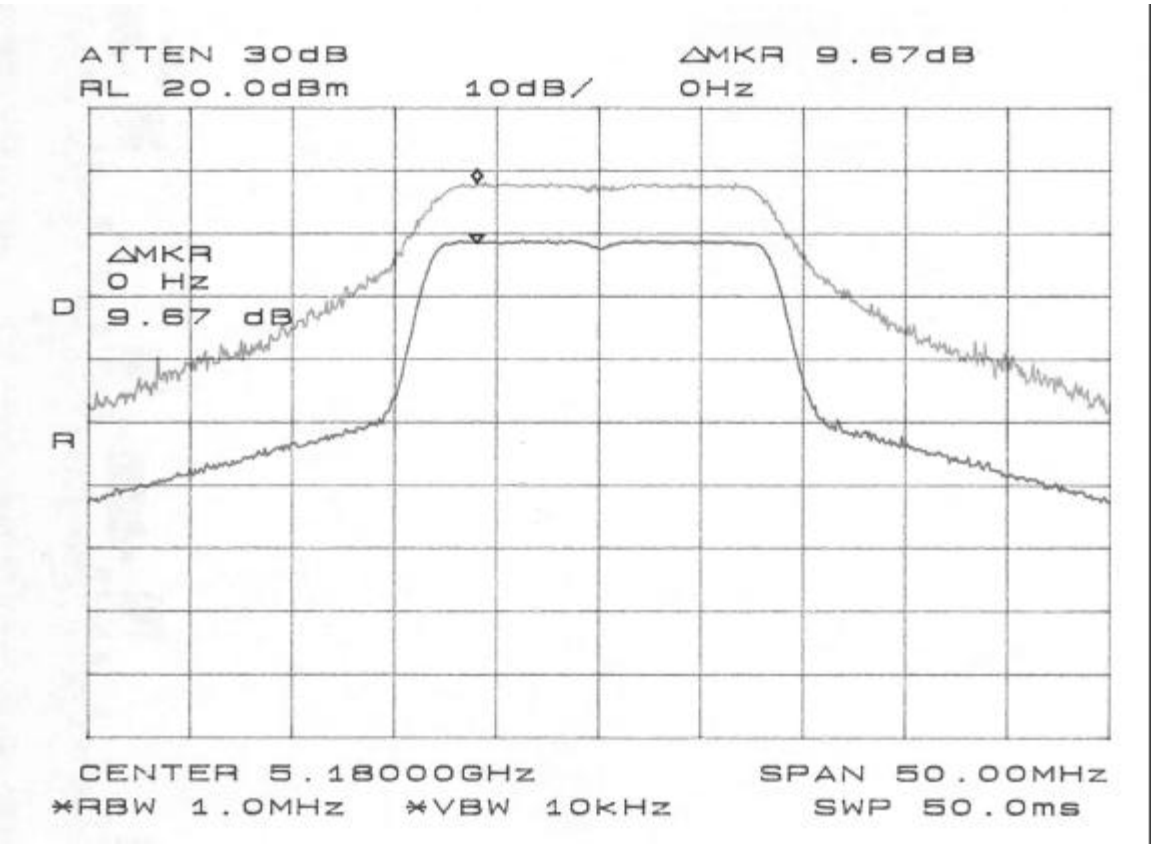
Base Mode

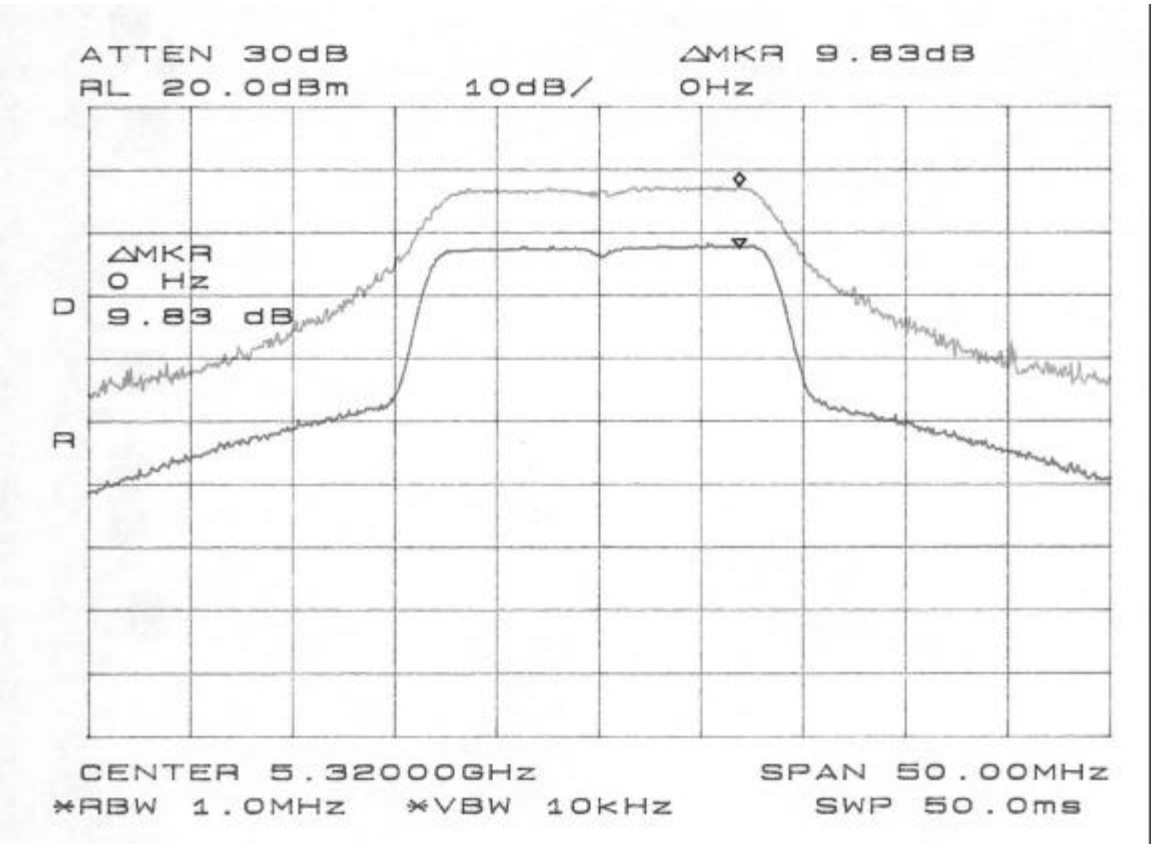
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.67	13	-3.33
Middle	5260	10.0	13	-3.0
High	5320	9.83	13	-3.17

Turbo Mode

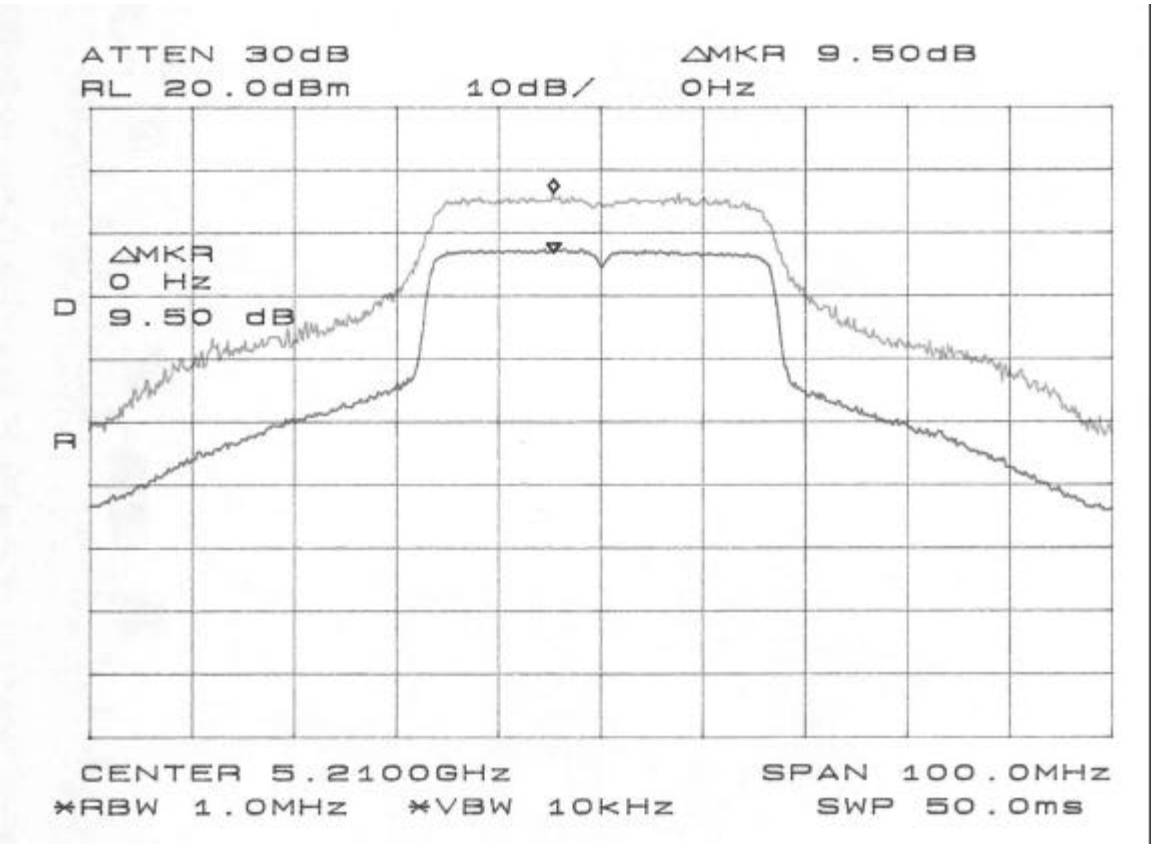
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5210	9.5	13	-3.5
Middle	5250	9.33	13	-3.67
High	5290	9.83	13	-3.17

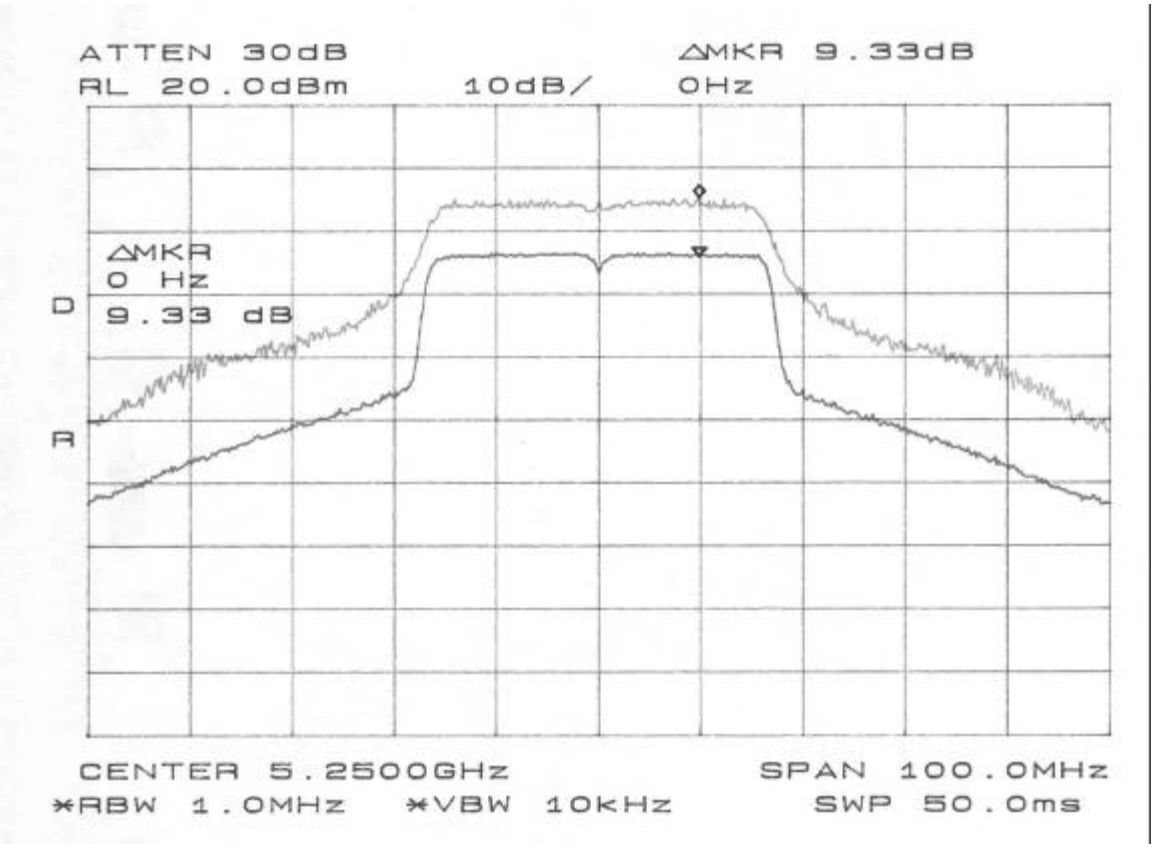
PEAK EXCURSION (NORMAL MODE)

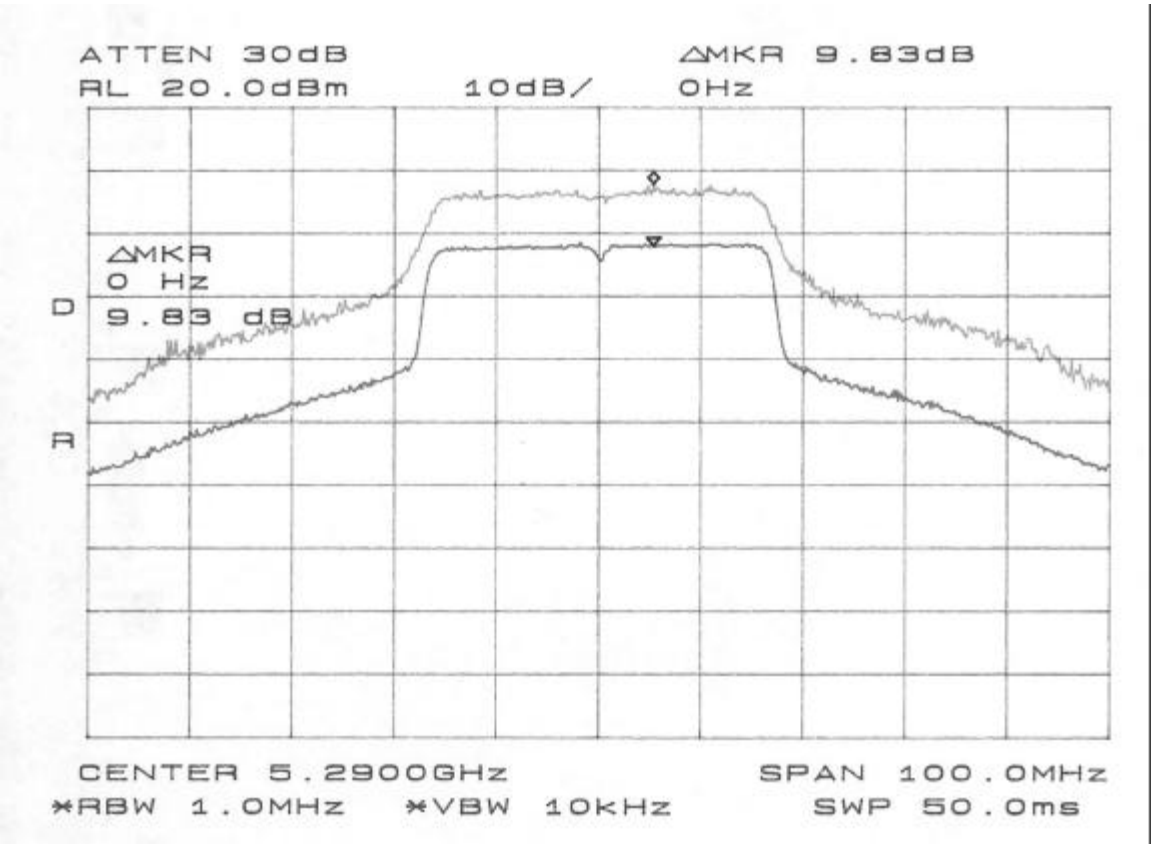




PEAK EXCURSION (TURBO MODE)







9.5. TYPE OF ANTENNA

RESULTS

No non-compliance noted:

The antenna is integral.

9.6. MAXIMUM PERMISSIBLE 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 mW and 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

$$d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$$ 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:

EUT output power = 15.3 dBm
Antenna Gain = 2.69 dBi
S = 1.0 mW / cm^2 from 1.1310 Table 1

Substituting these parameters into Equation (1) above:

MPE Safe Distance = 2.2 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.

9.7. FREQUENCY STABILITY

RESULTS

No non-compliance noted:

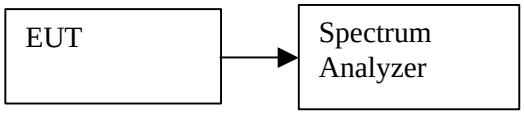
Referring to the theory of operation, the crystal used to set the frequency has a temperature coefficient of +/- 20 ppm over the specified rated temperature range. For a transmitter fundamental frequency of 5.35 GHz, this corresponds to +/- 107 kHz.

An examination of the band edge plots shows that the emission will stay within the authorized band over the entire temperature range.

9.8. UNDESIRABLE 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

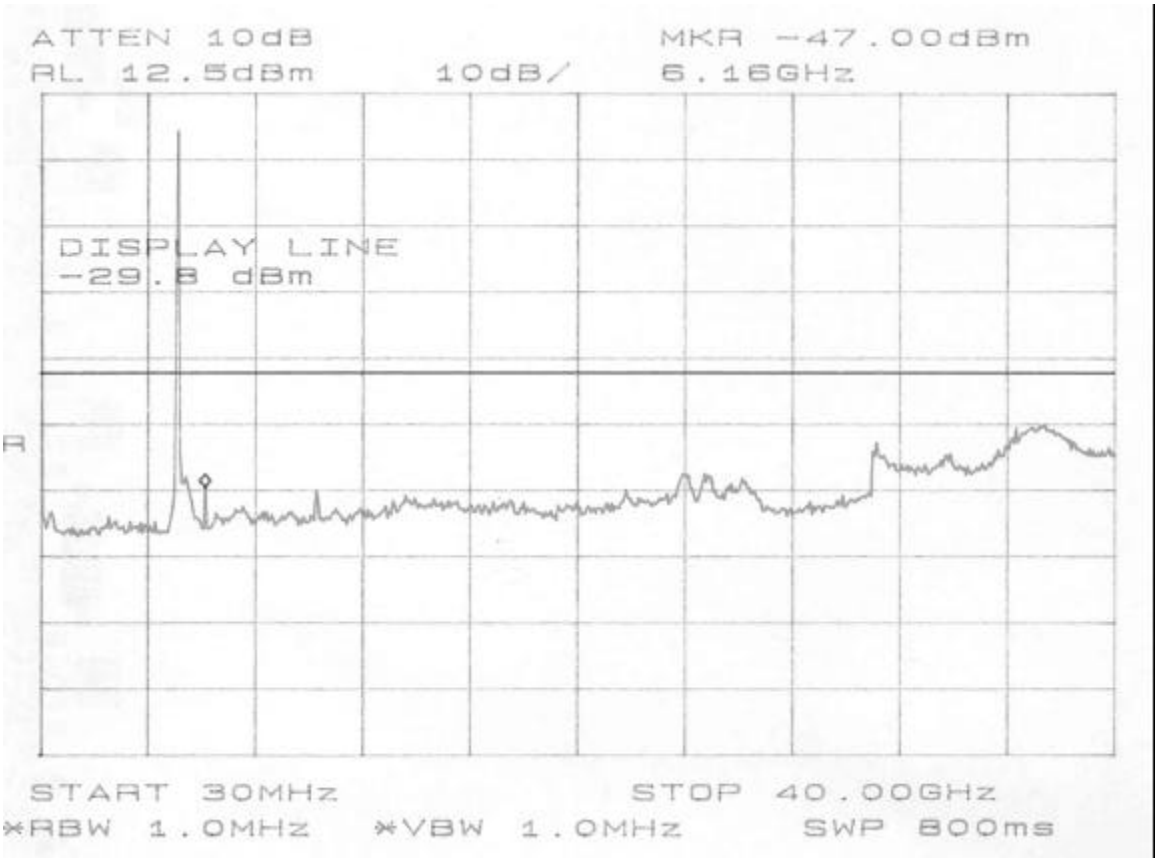
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

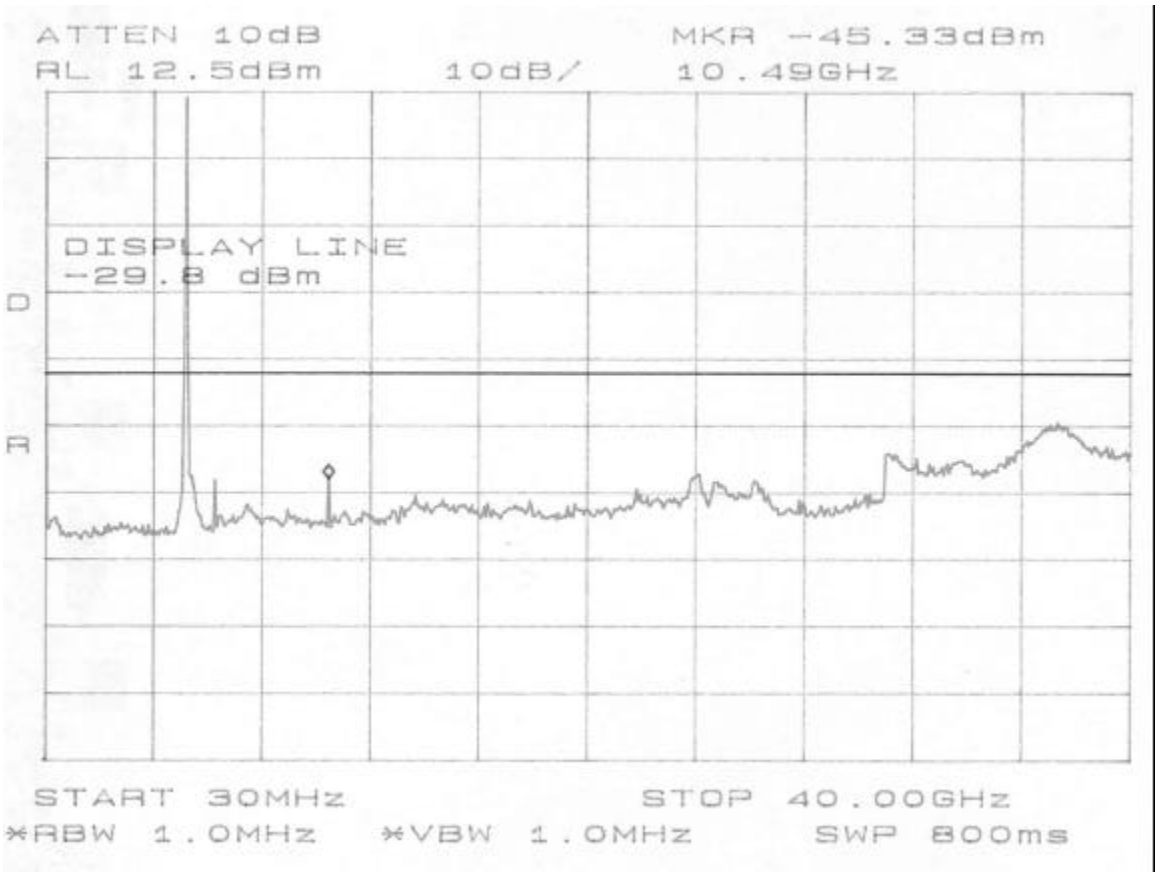
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

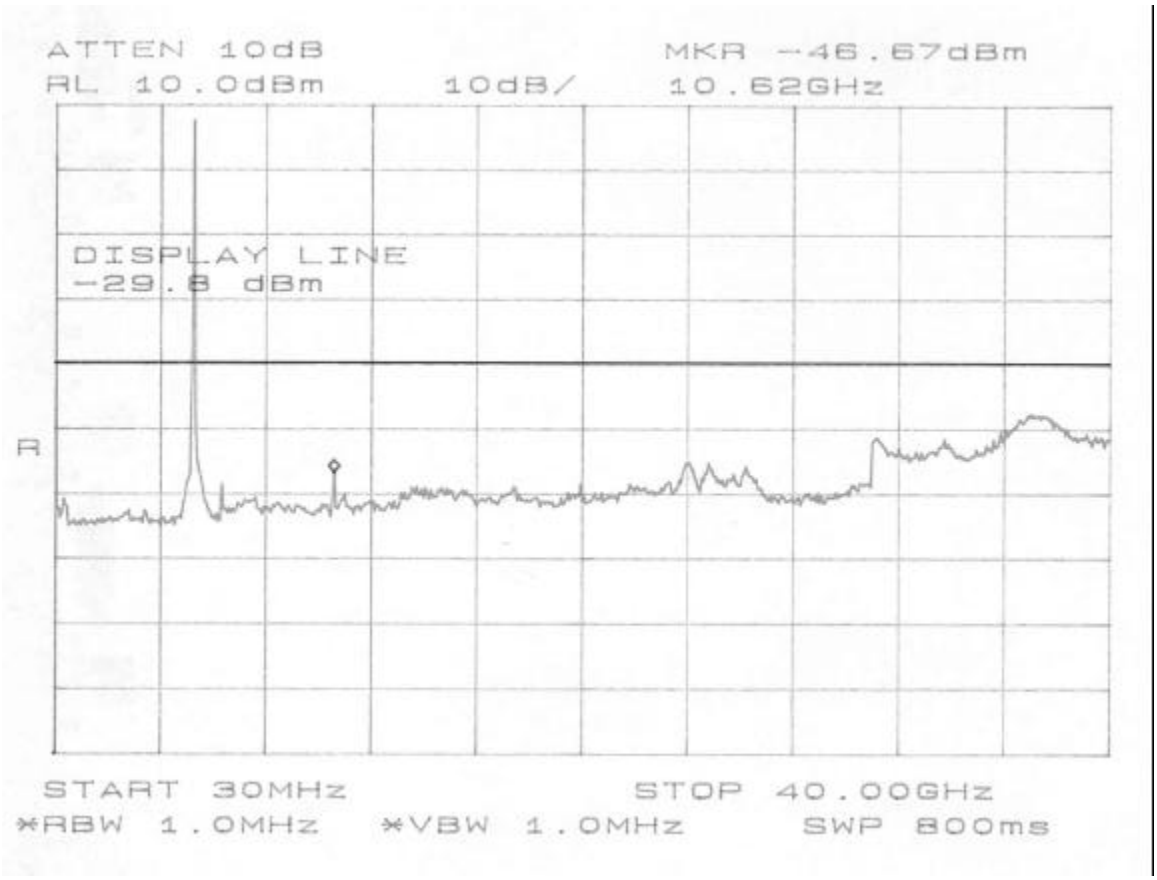
RESULTS

No non-compliance noted:

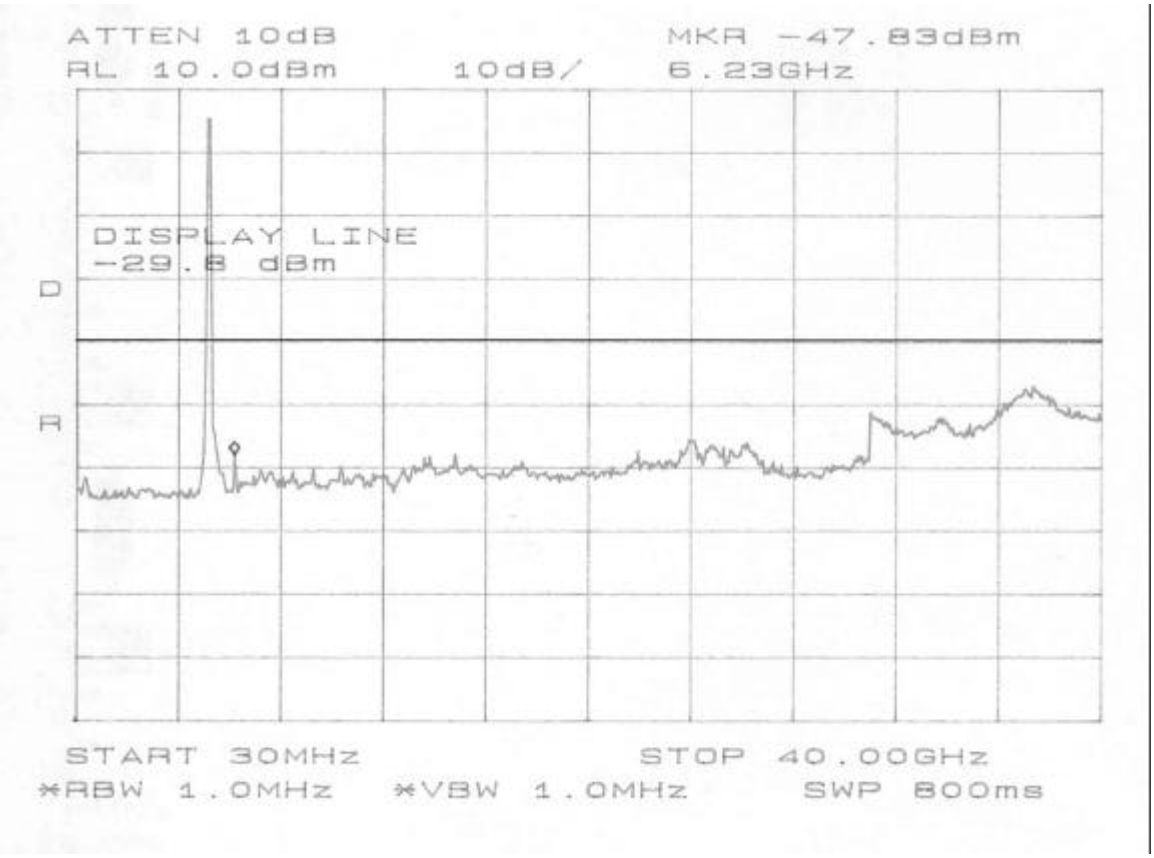
CONDUCTED SPURIOUS (NORMAL MODE)

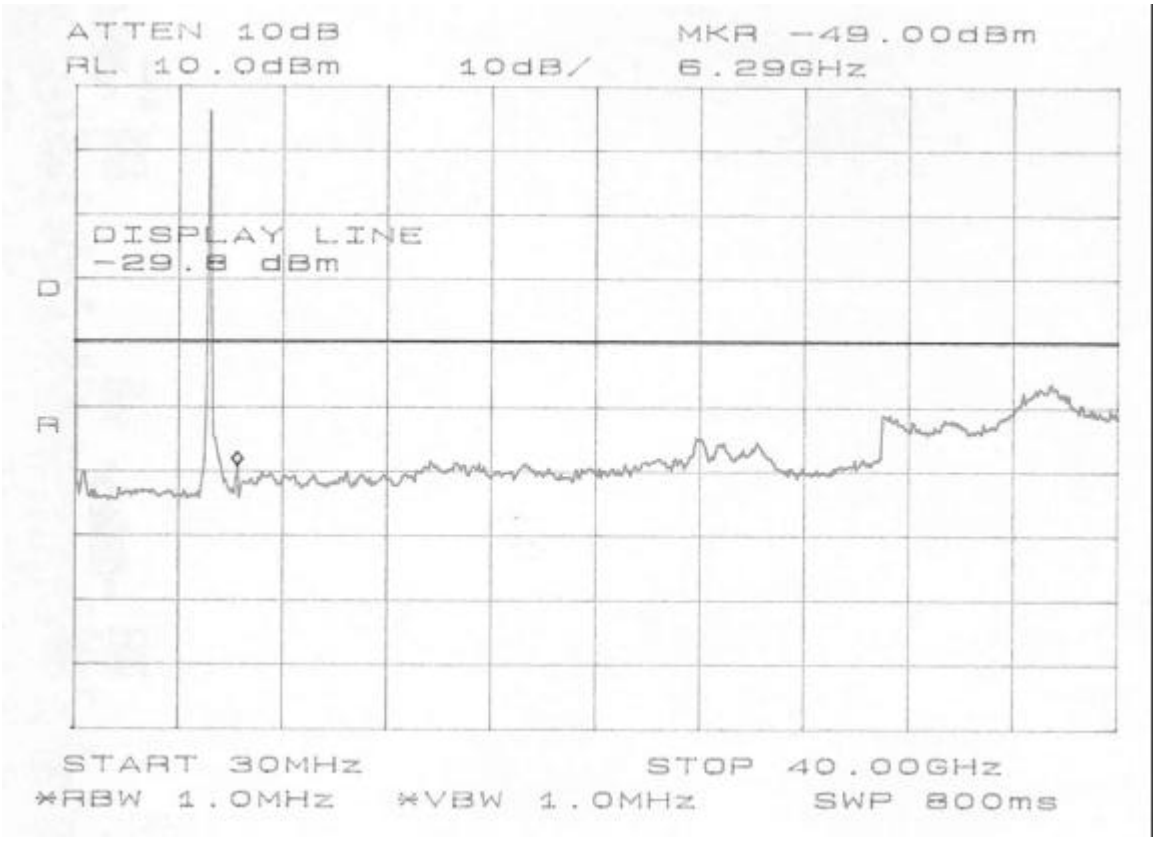


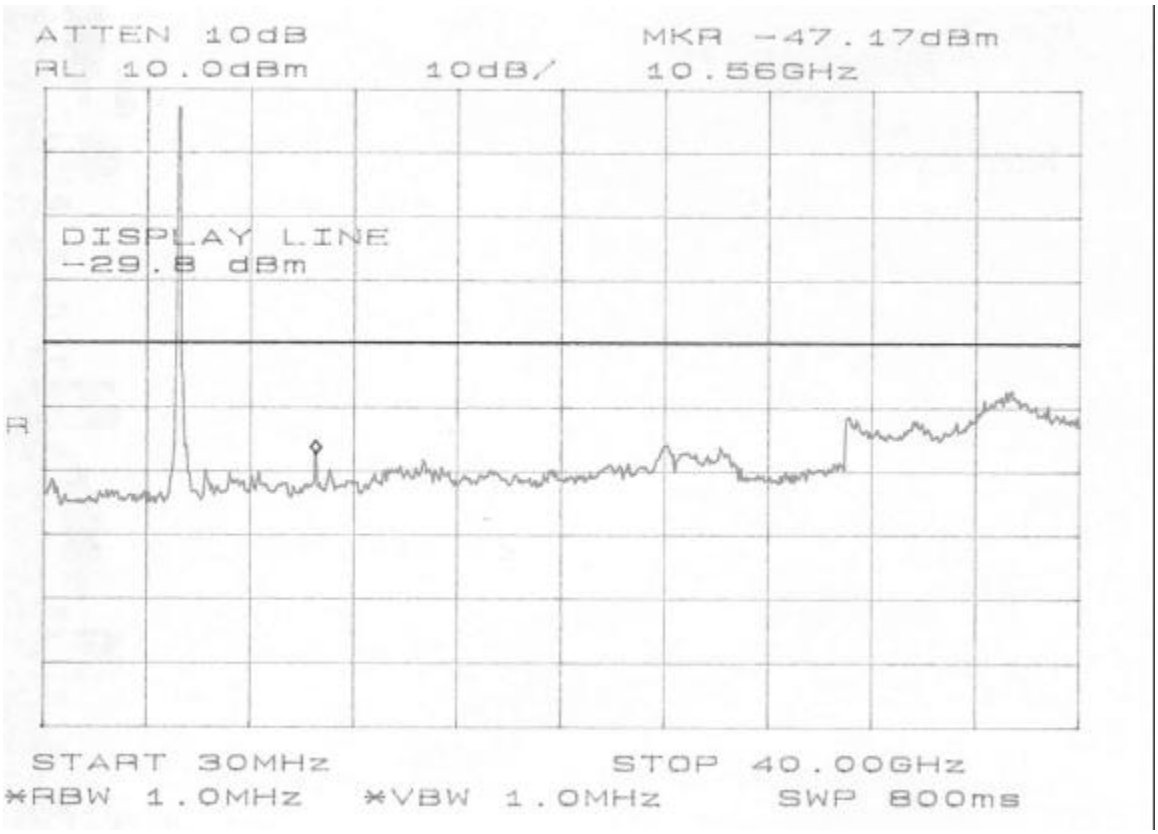




CONDUCTED SPURIOUS (TURBO MODE)







9.9. UNDESIRABLE 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 within restricted bands 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 all other measurements, 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.

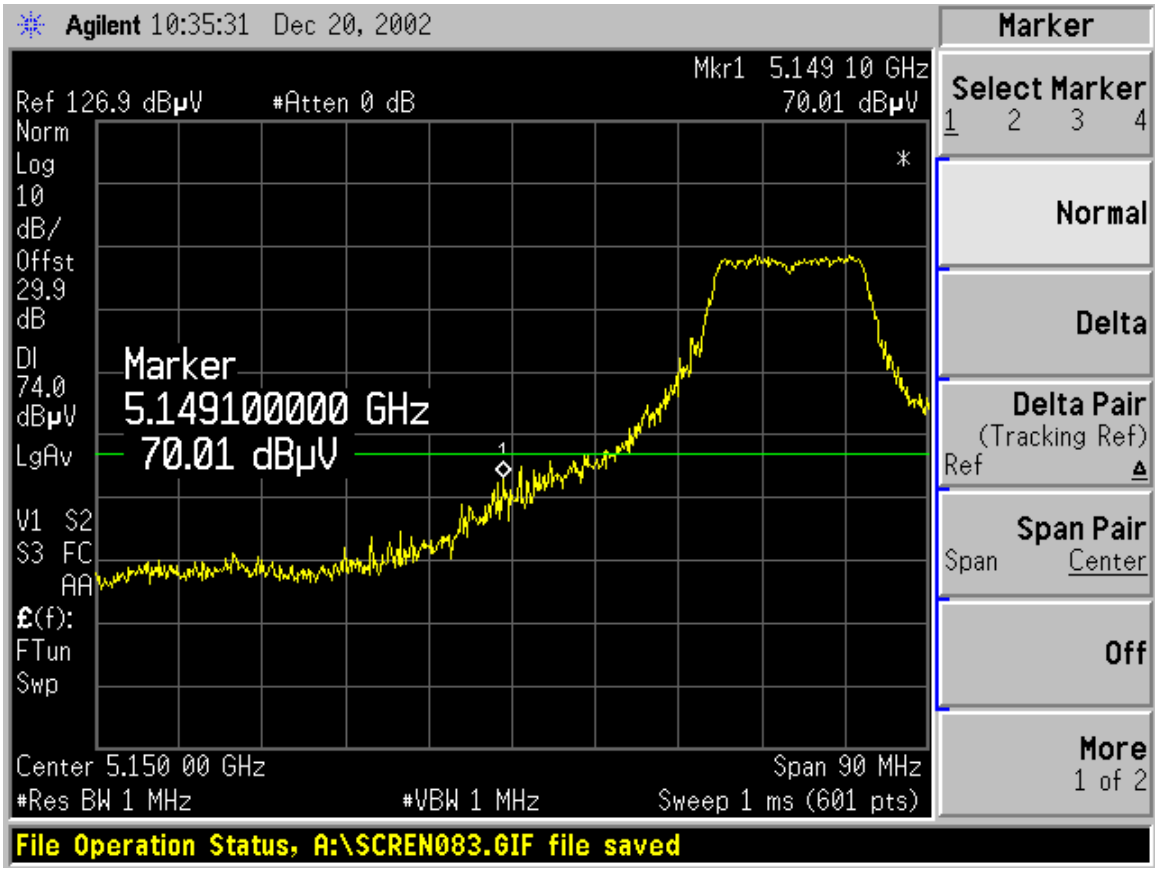
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

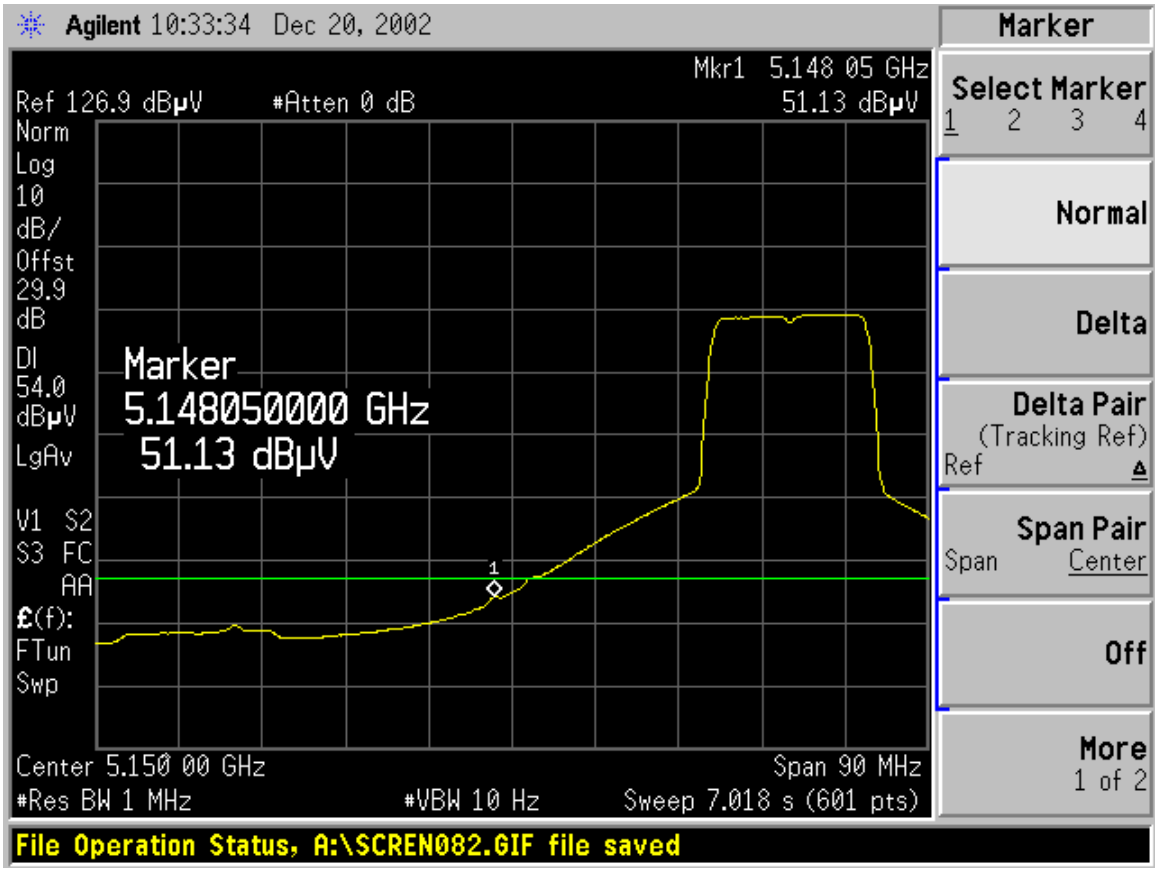
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The 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

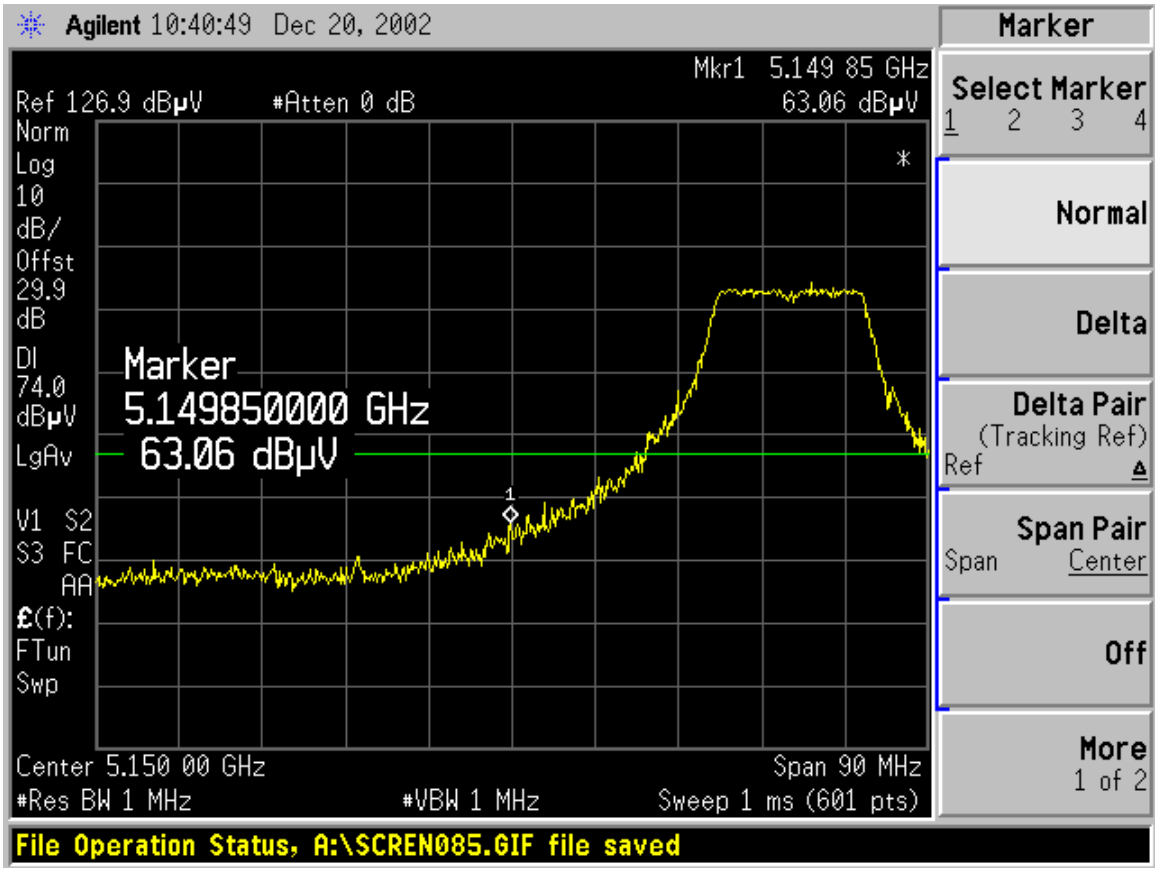
No non-compliance noted:

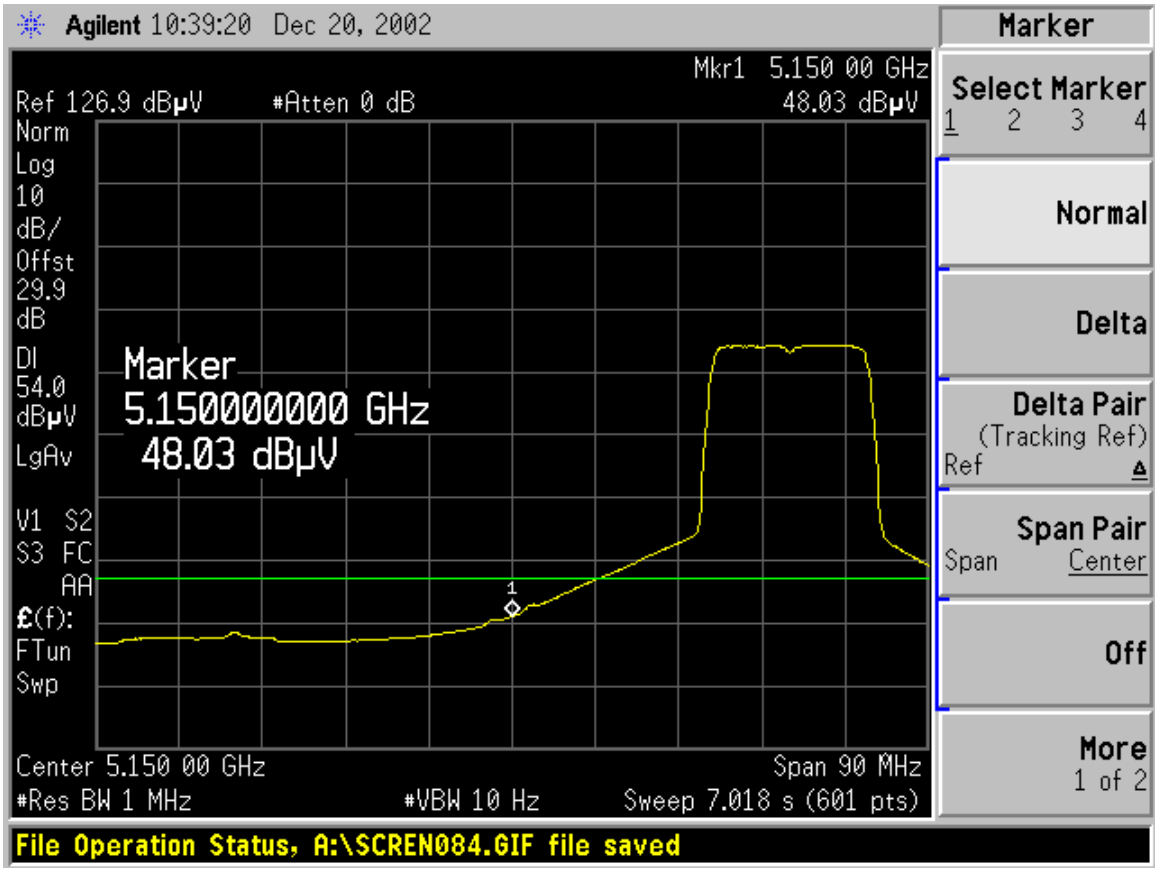
LOWER RESTRICTED BAND RADIATED EMISSIONS (NORMAL MODE, VERTICAL)



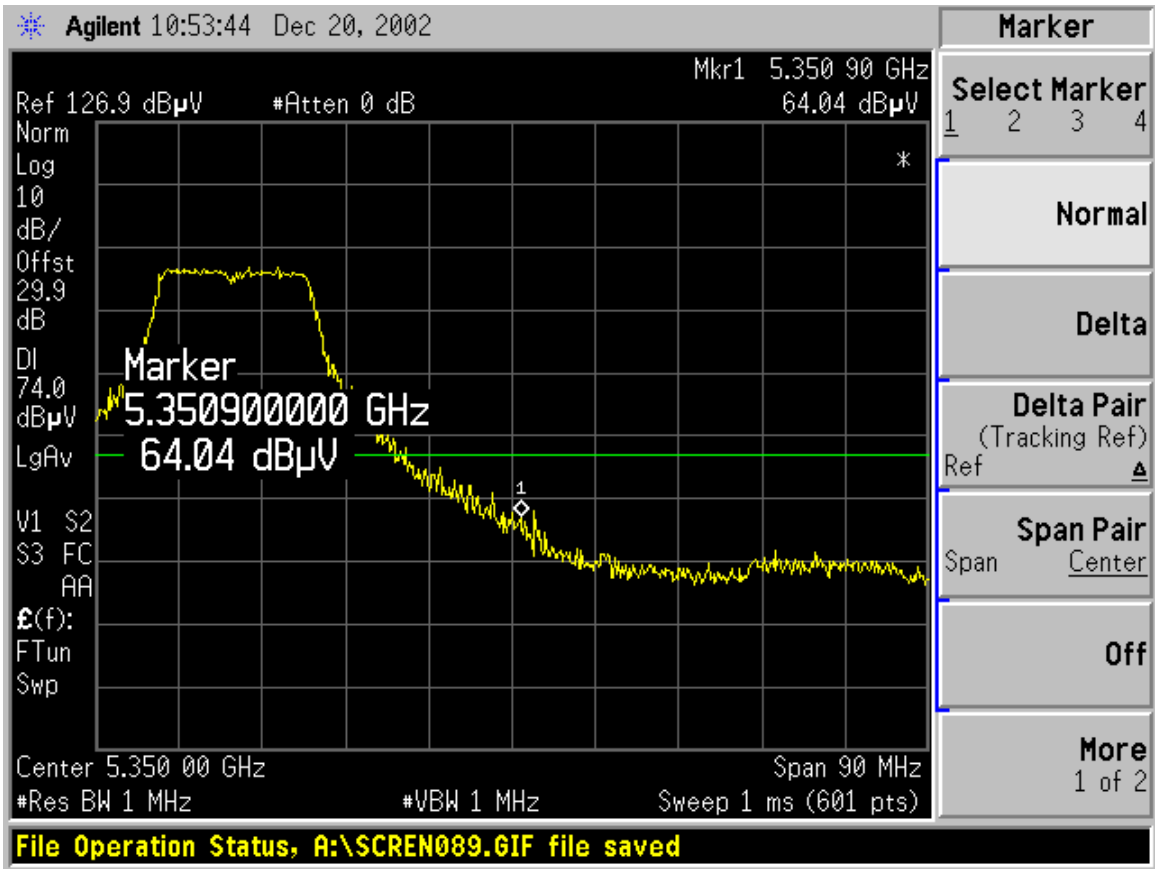


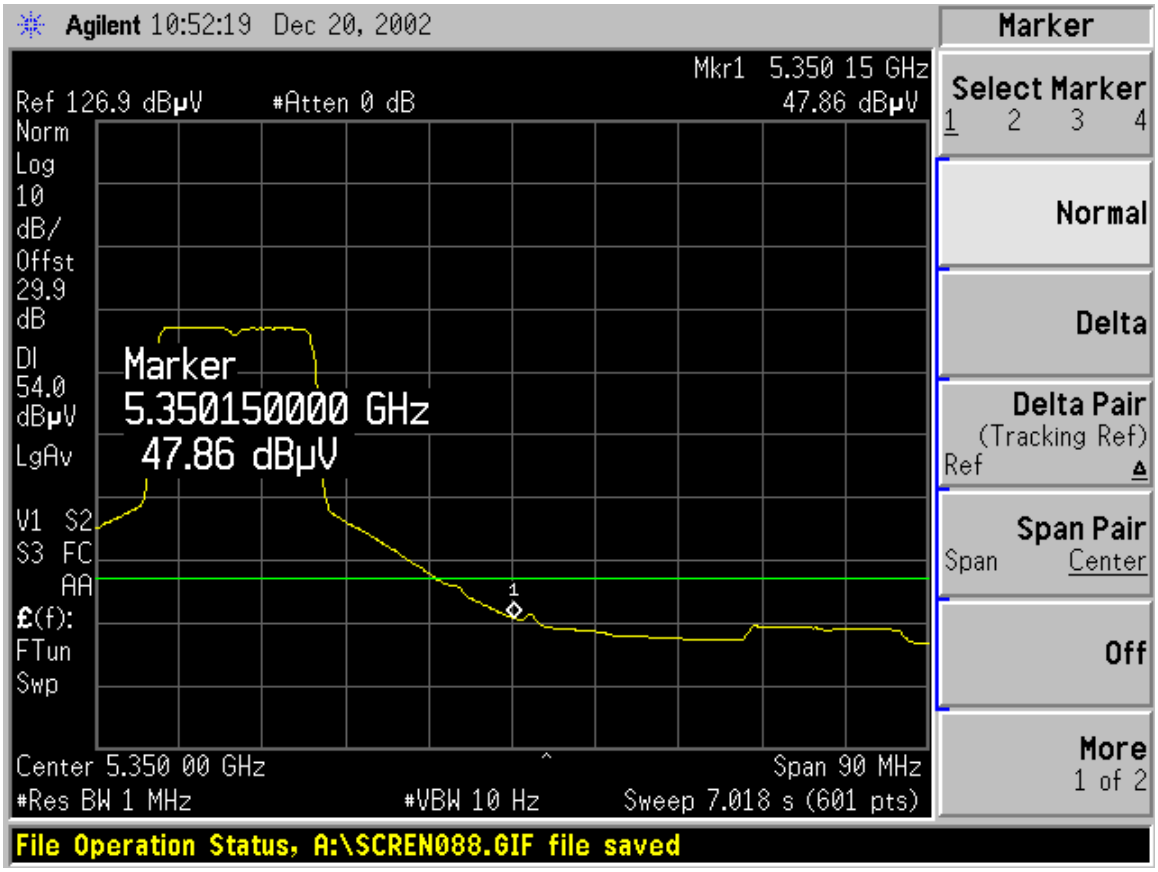
LOWER RESTRICTED BAND RADIATED EMISSIONS (NORMAL MODE, HORIZONTAL)



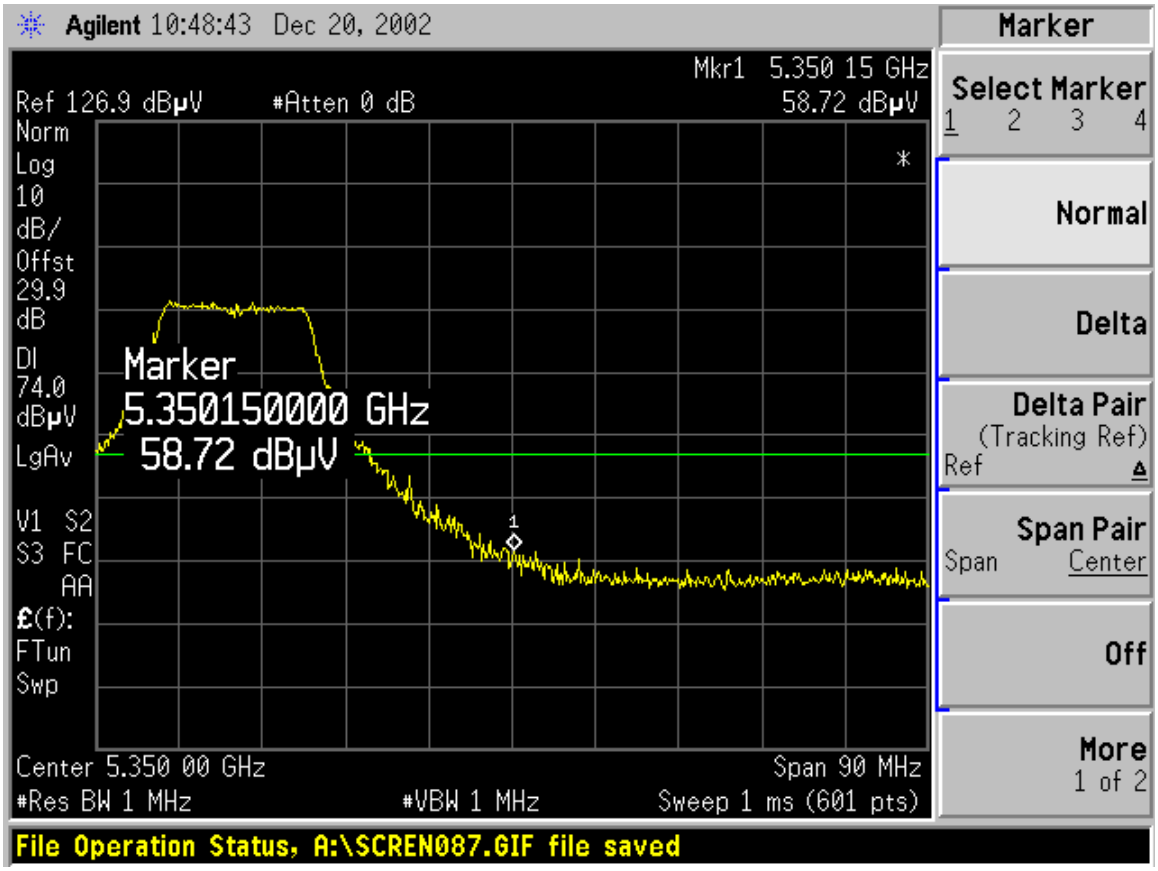


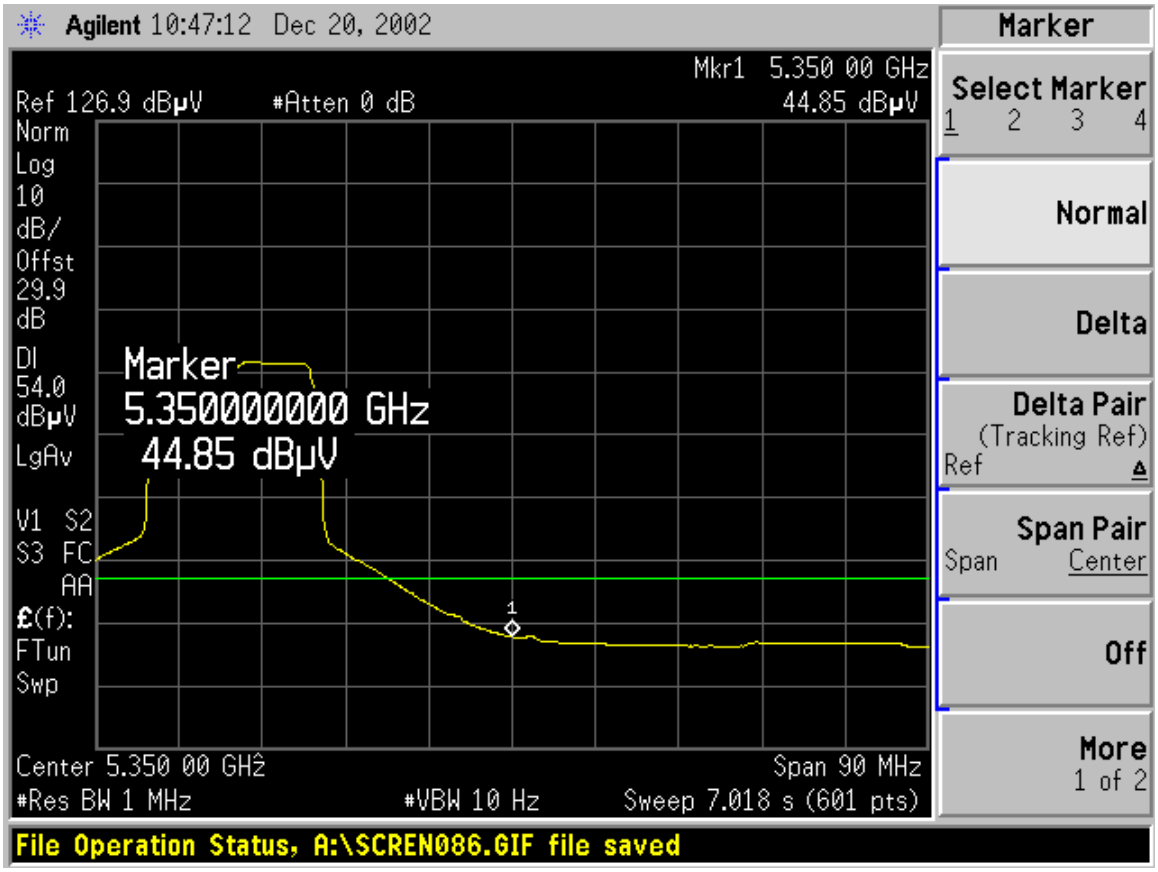
UPPER RESTRICTED BAND RADIATED EMISSIONS (NORMAL MODE, VERTICAL)



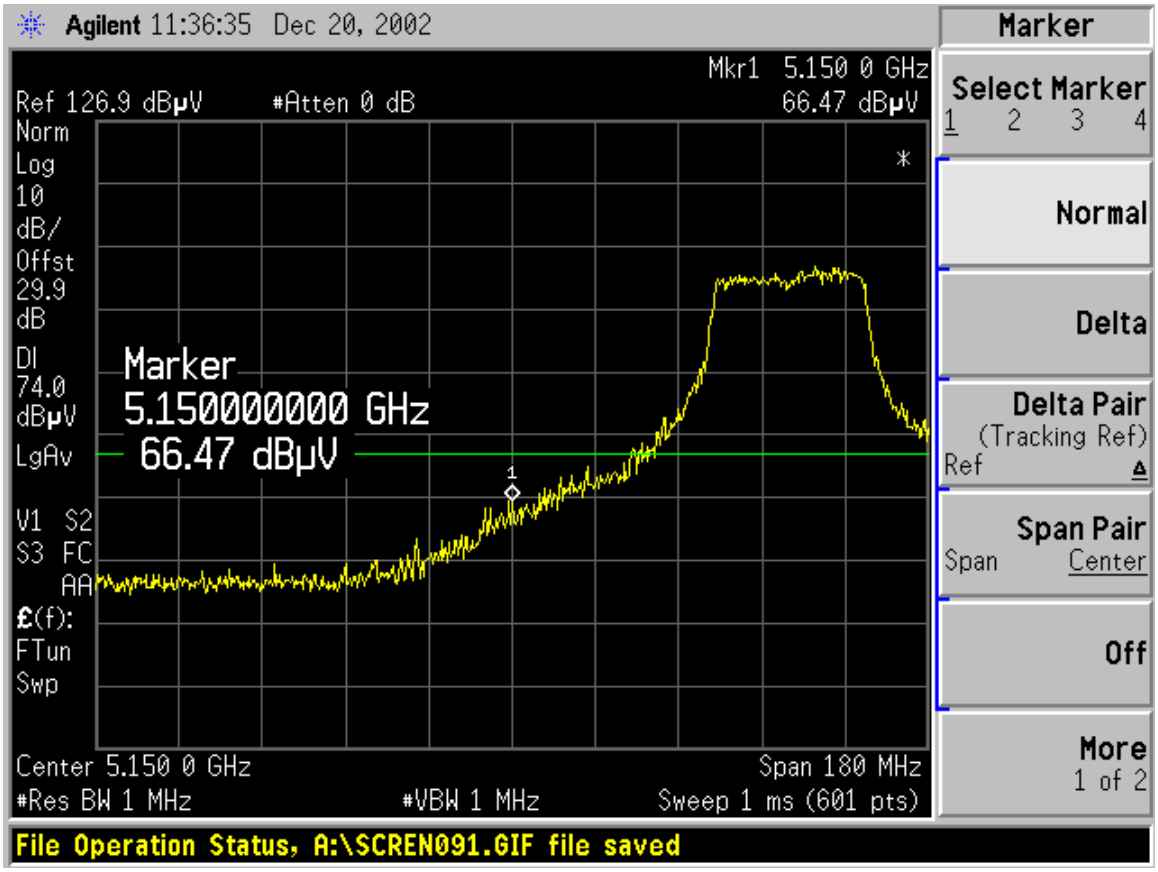


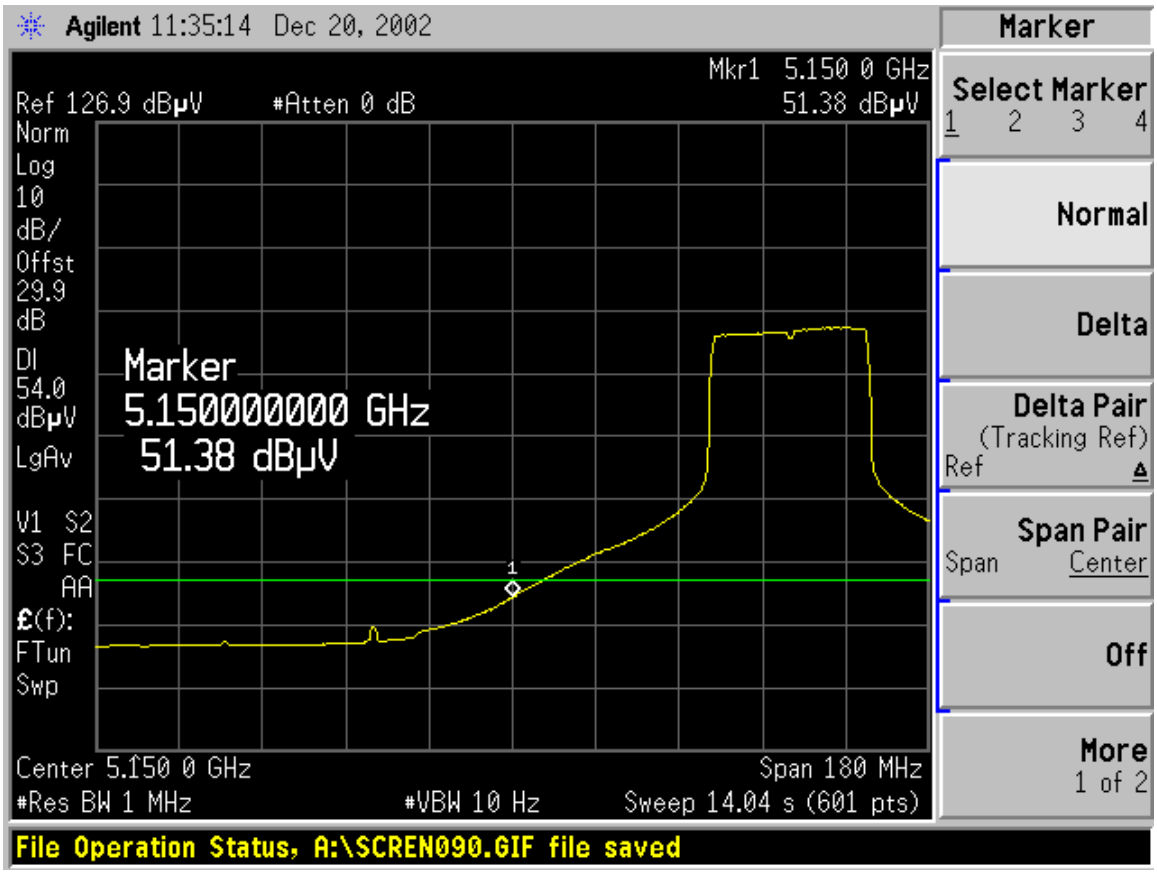
UPPER RESTRICTED BAND RADIATED EMISSIONS (NORMAL MODE, HORIZONTAL)



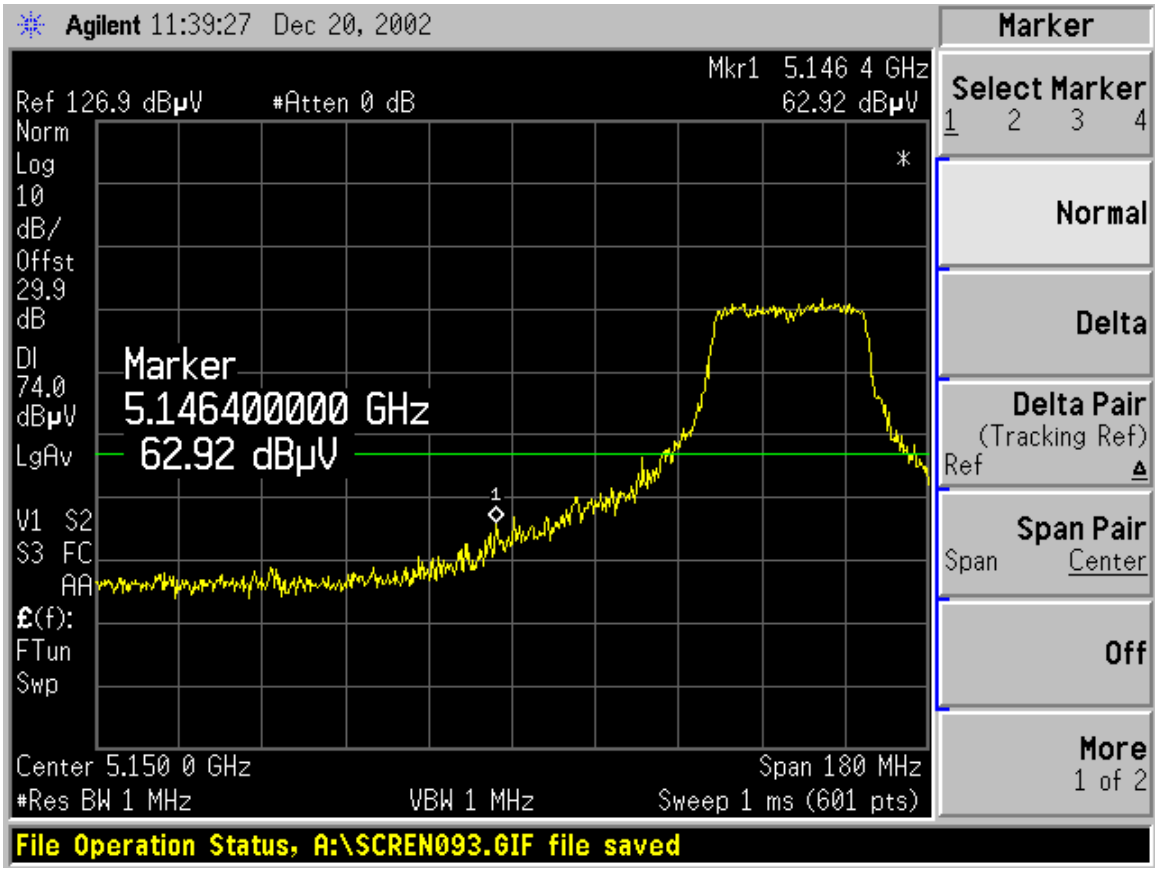


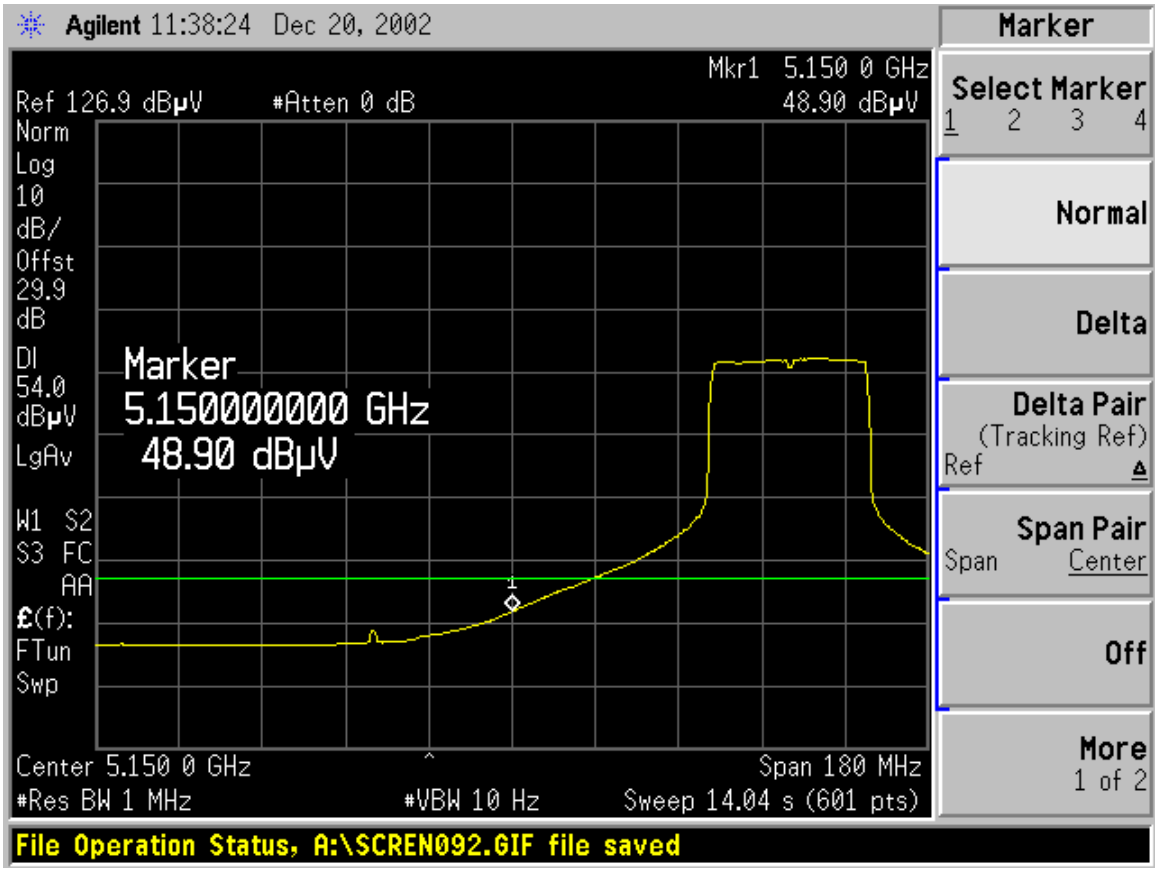
LOWER RESTRICTED BAND RADIATED EMISSIONS (TURBO MODE, VERTICAL)



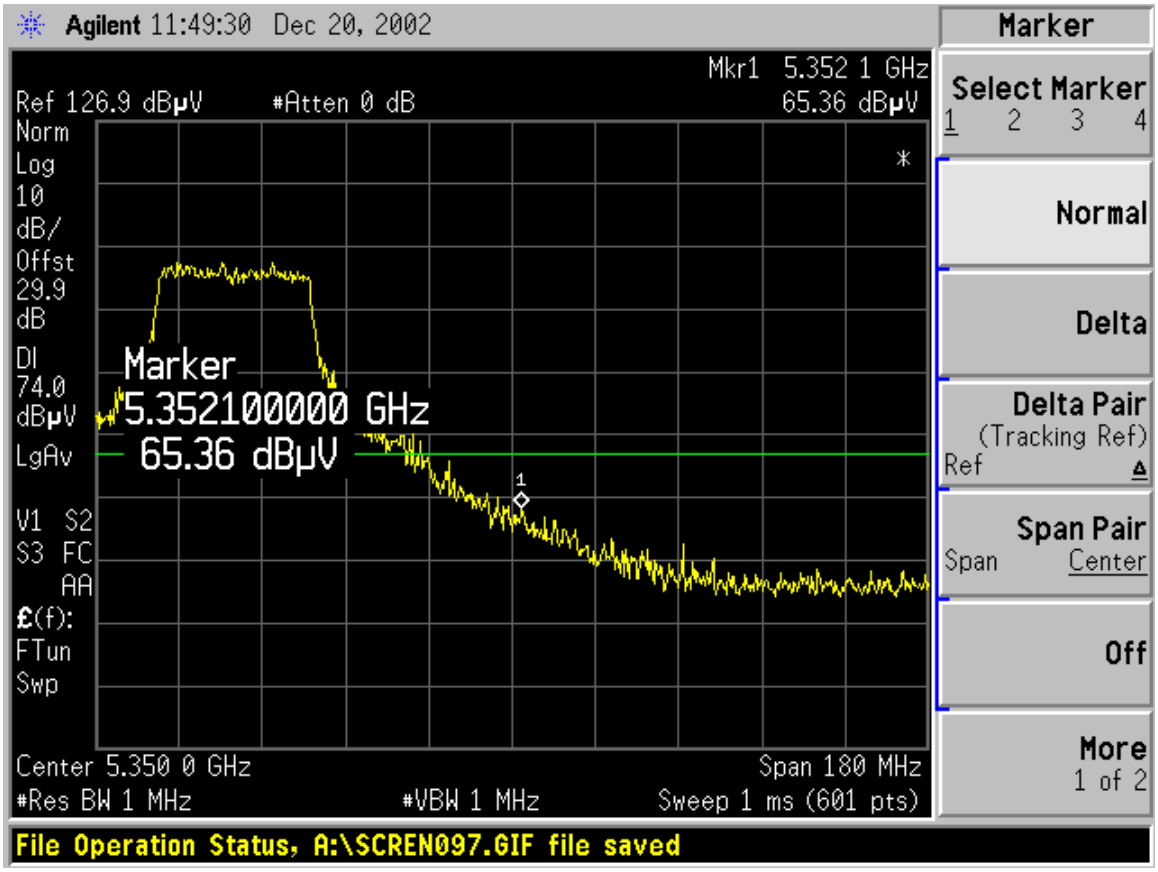


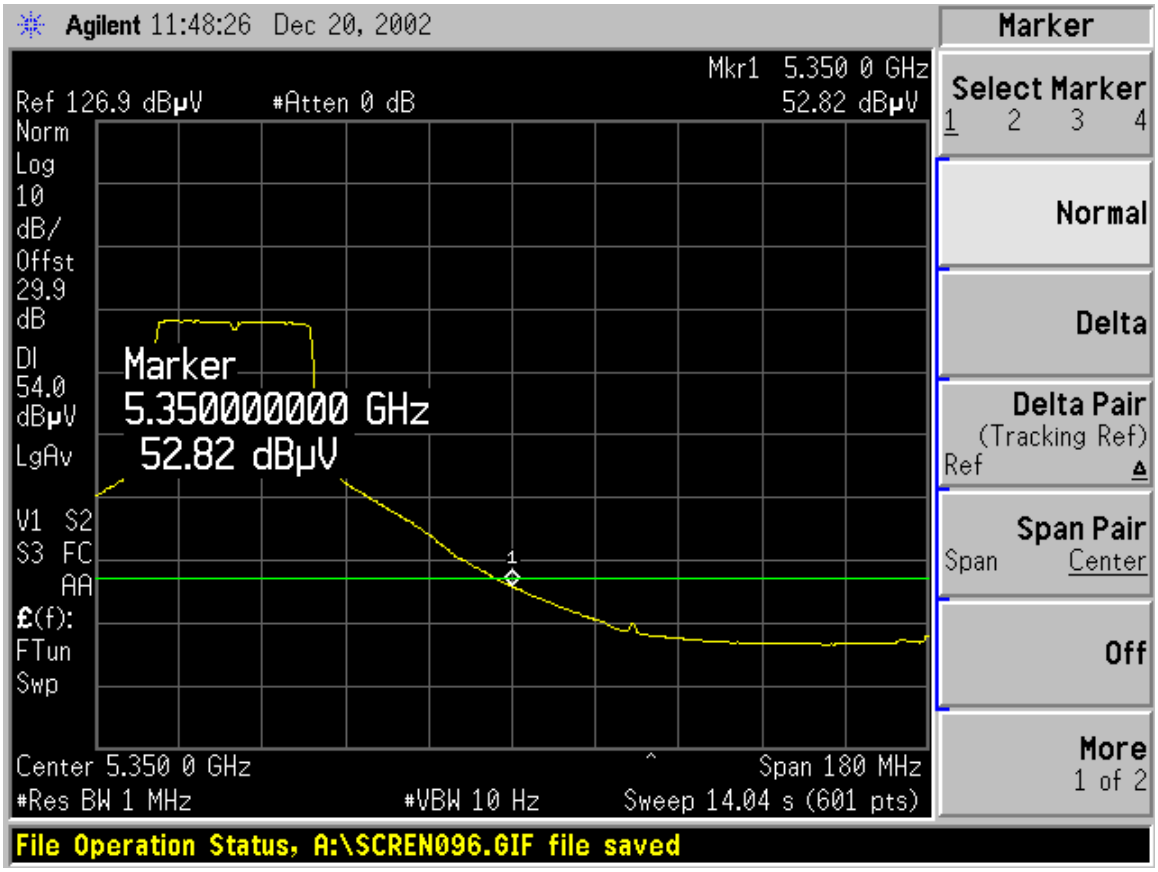
LOWER RESTRICTED BAND RADIATED EMISSIONS (TURBO MODE, HORIZONTAL)



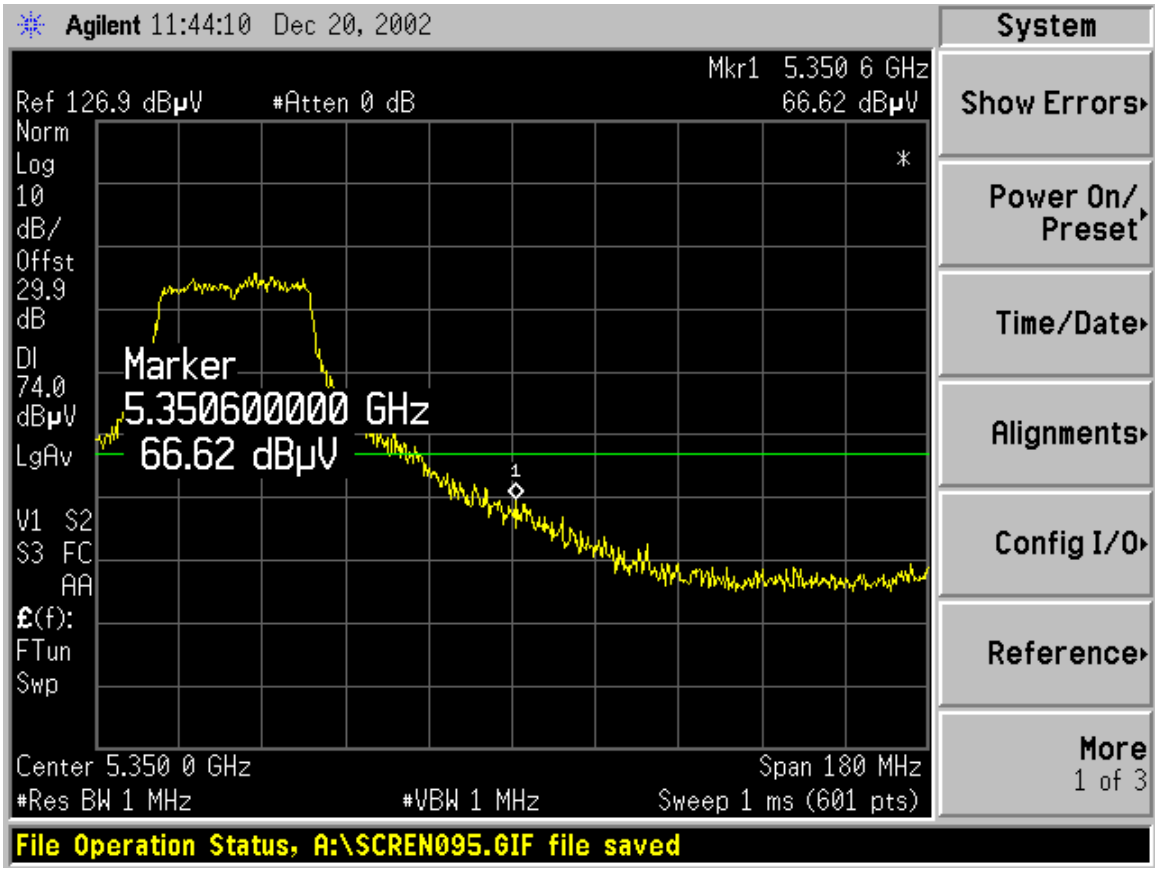


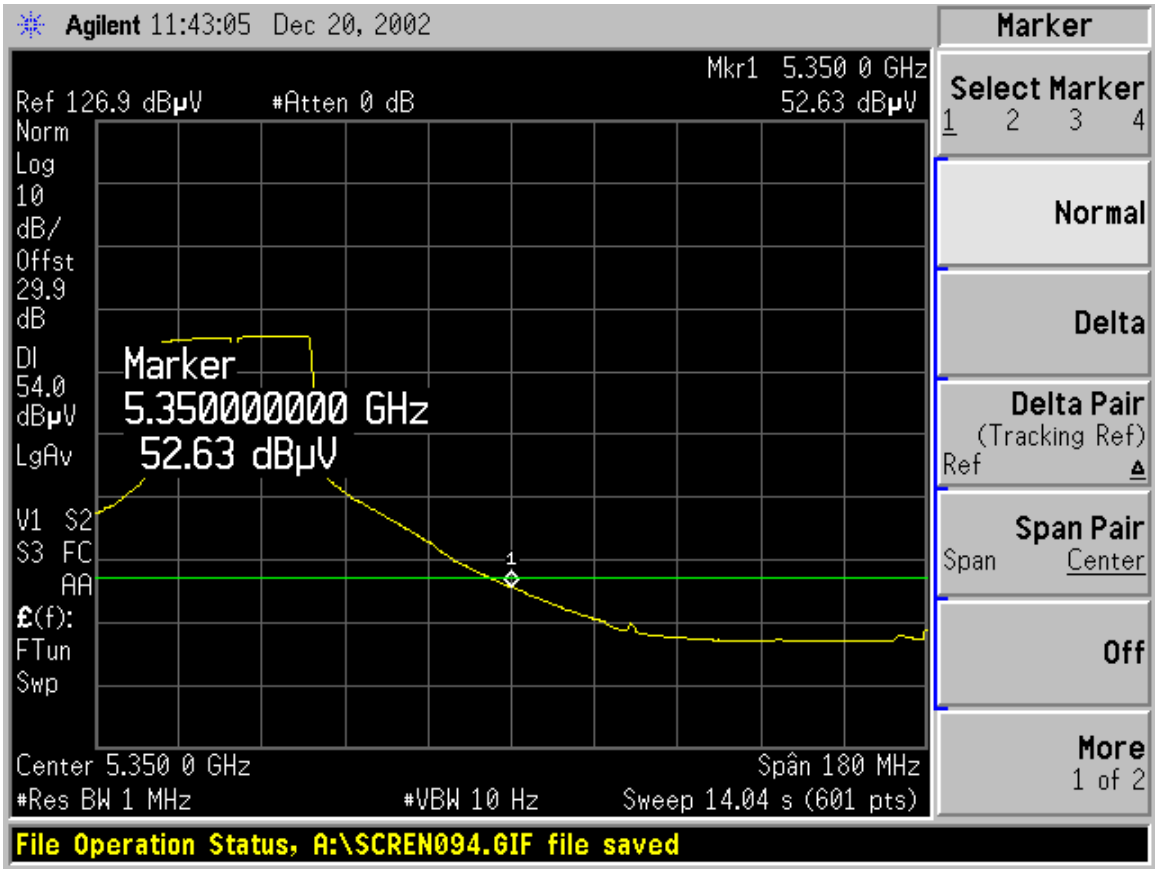
UPPER RESTRICTED BAND RADIATED EMISSIONS (TURBO MODE, VERTICAL)





UPPER RESTRICTED BAND RADIATED EMISSIONS (TURBO MODE, HORIZONTAL)





HARMONIC AND SPURIOUS RADIATED EMISSIONS (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 = 5.18 GHz, Normal Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 15.0 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
Note 1: See plots for Tx emissions in adjacent restricted bands.											
Note 2: No Tx emissions detected above the system noise floor in other restricted bands.											

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 = 5.26 GHz, Normal Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 15.0 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
Note: No Tx emissions detected above the system noise floor in restricted bands.											

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 = 5.32 GHz, Normal Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 15.0 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
Note 1: See plots for Tx emissions in adjacent restricted bands.											
Note 2: No Tx emissions detected above the system noise floor in other restricted bands.											

HARMONIC AND SPURIOUS RADIATED EMISSIONS (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 = 5.21 GHz, Turbo Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 15.0 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
Note 1: See plots for Tx emissions in adjacent restricted bands.											
Note 2: No Tx emissions detected above the system noise floor in other restricted bands.											

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 = 5.25 GHz, Turbo Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 15.0 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
Note: No Tx emissions detected above the system noise floor in restricted bands.											

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 = 5.29 GHz, Turbo Mode

Specification Distance: 3.0 meters
Actual Distance: 3.0 meters Cable Length: 15.0 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
Note 1: See plots for Tx emissions in adjacent restricted bands.											
Note 2: No Tx emissions detected above the system noise floor in other restricted bands.											

10. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

RADIATED RF MEASUREMENT SETUP

END OF REPORT