



**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**

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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 – DECEMBER 23, 2002

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

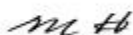
Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**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:

Tested By:



MIKE HECKROTTE  
CHIEF ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

NEELES R AJ  
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	 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 (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

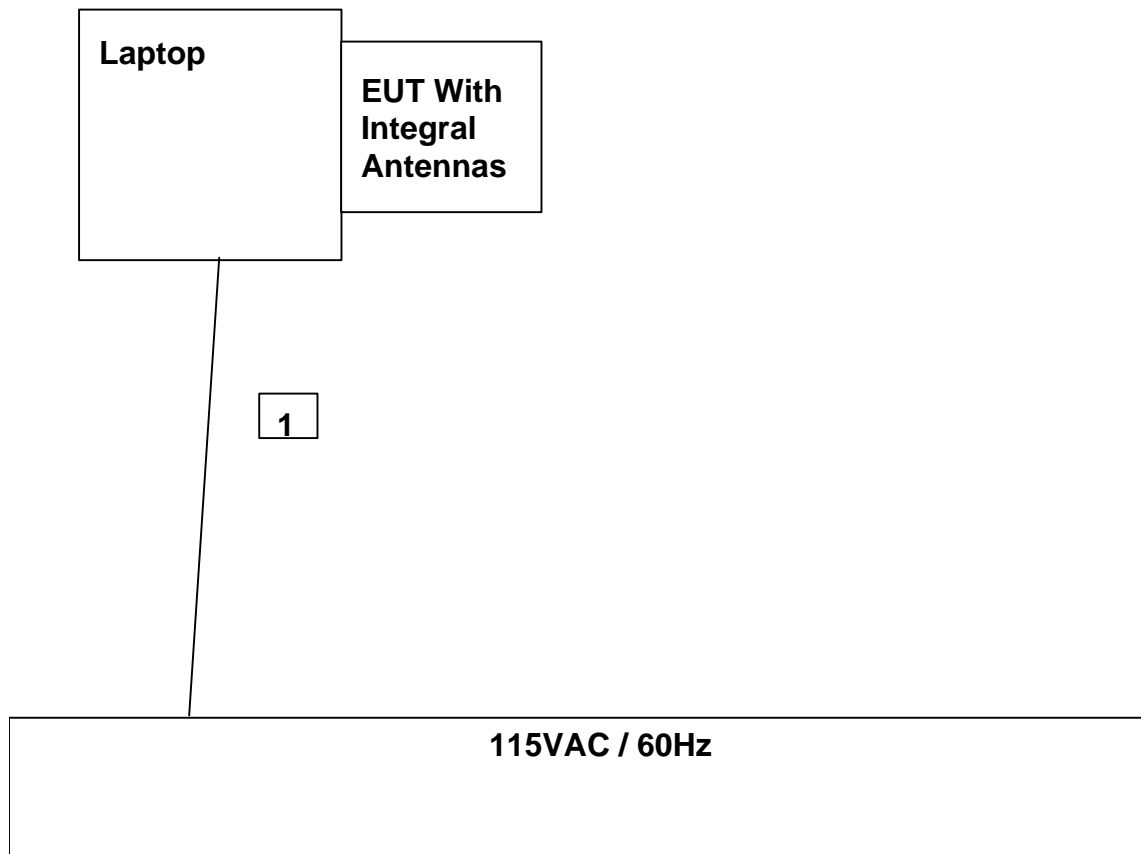
### I/O CABLES

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
<sup>1</sup> 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	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

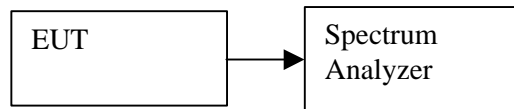
<sup>2</sup> Above 38.6

(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	11200	500	10700
Middle	2437	11170	500	10670
High	2462	11130	500	10630

### 2.4 GHz Band, 11g Mode

Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	2412	16700	500	16200
Middle	2437	16670	500	16170
High	2462	16700	500	16200

### 5.8 GHz Band Normal Mode

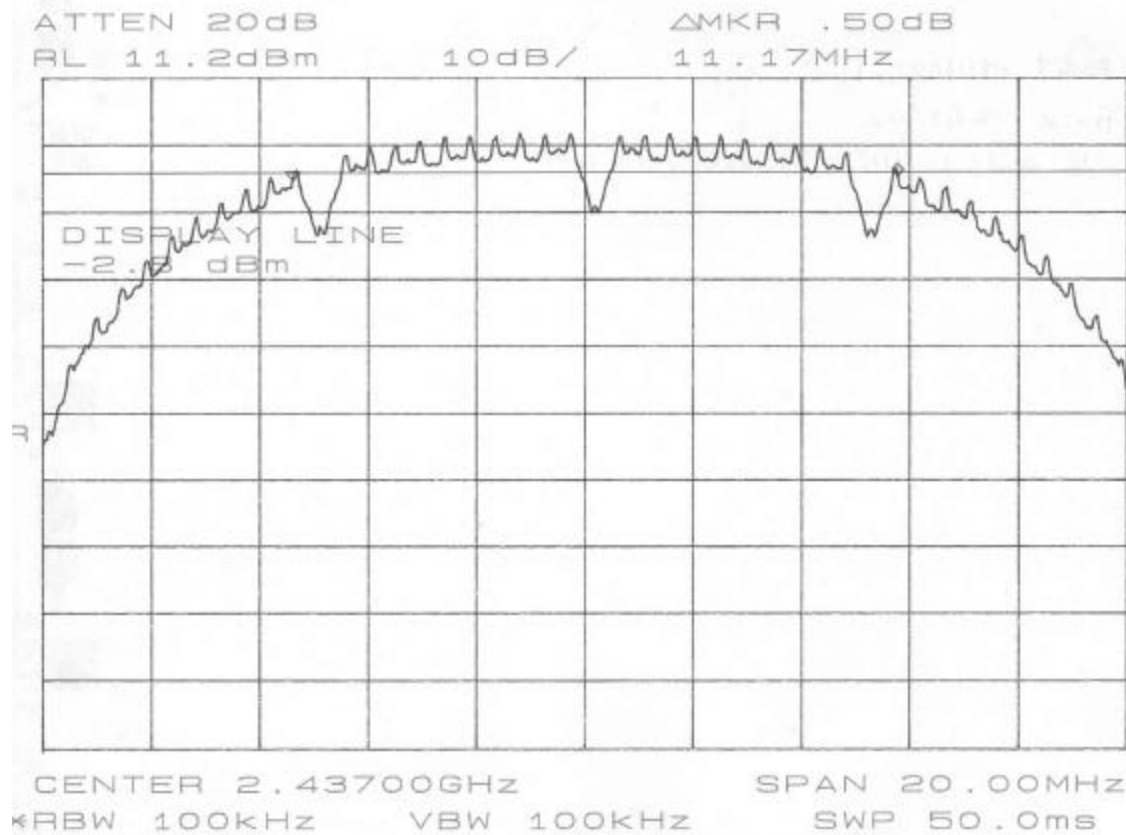
Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	5745	16570	500	16070
Middle	5785	16570	500	16070
High	5825	16430	500	15930

### 5.8 GHz Band Turbo Mode

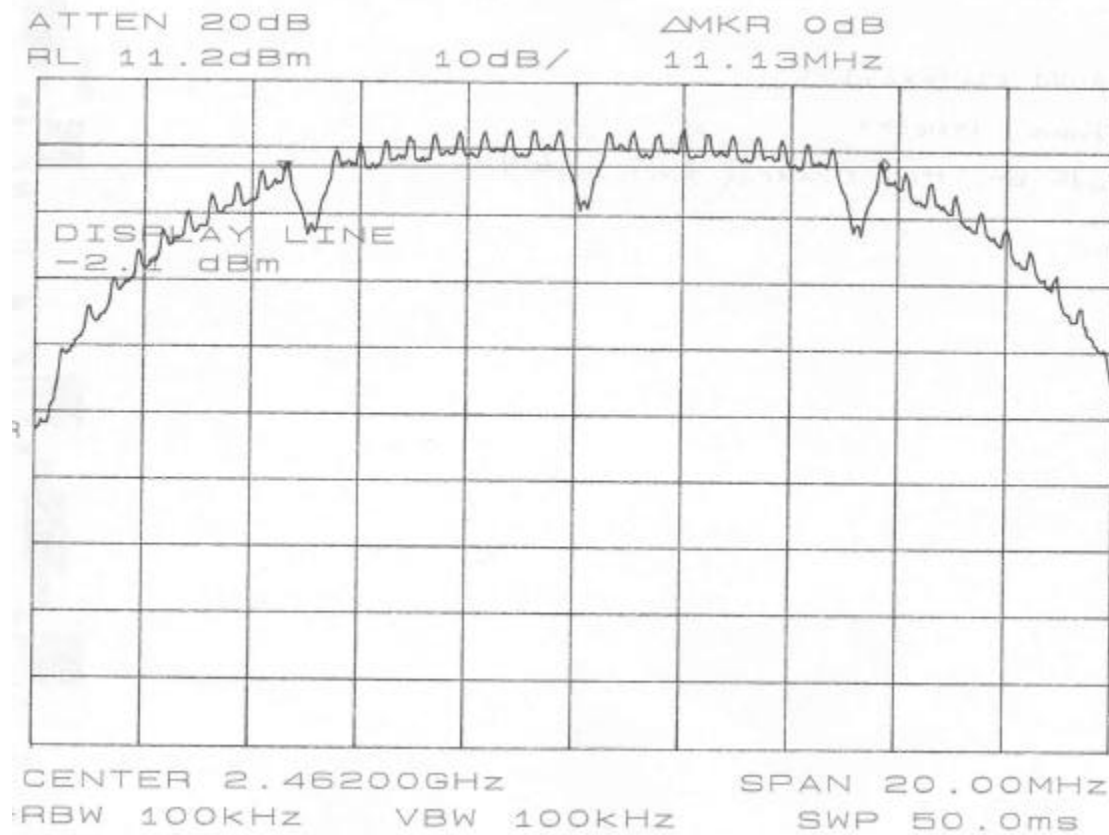
Channel	Frequency (MHz)	B (kHz)	Limit (kHz)	Margin (kHz)
Low	5760	32920	500	32420
High	5800	32830	500	32330

**6 DB BANDWIDTH (2.4 GHZ BAND 11B MODE)**

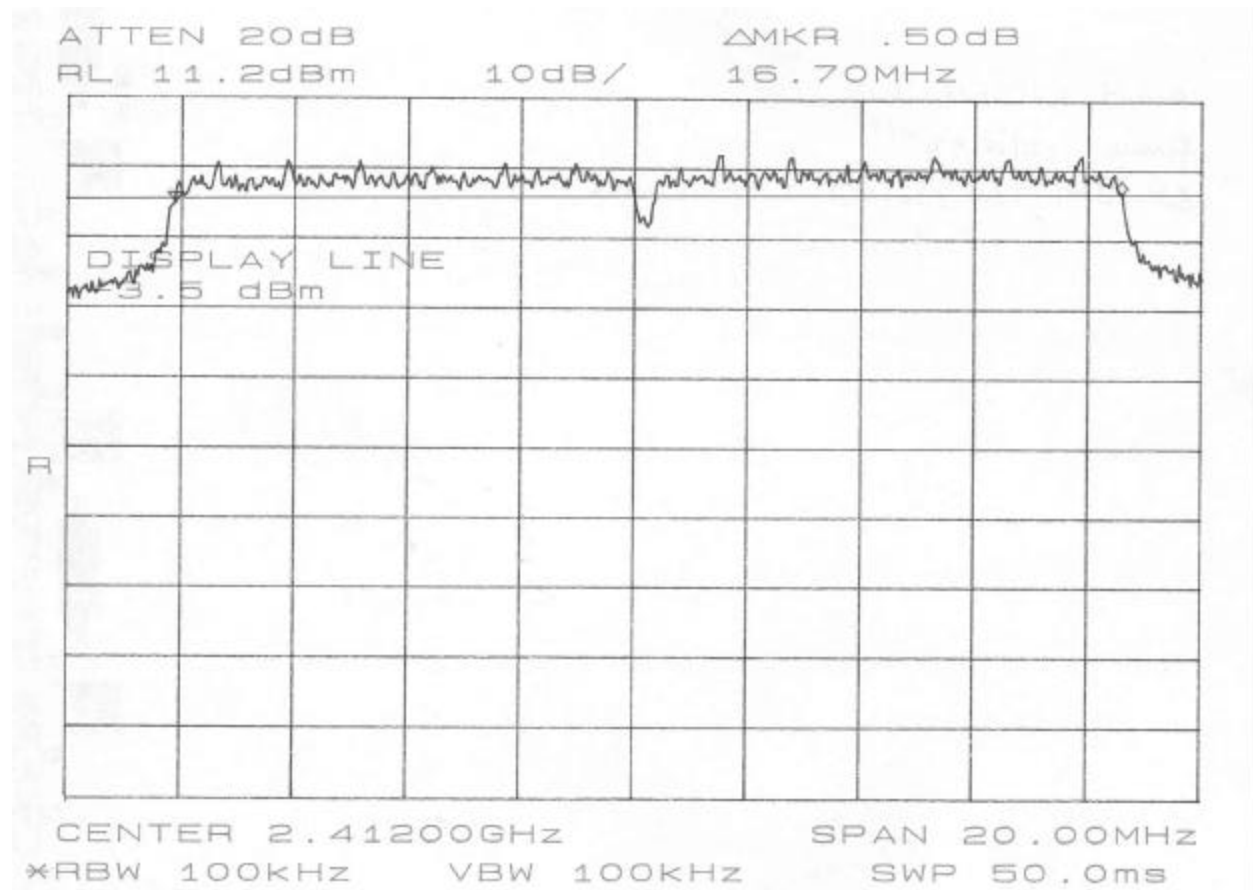


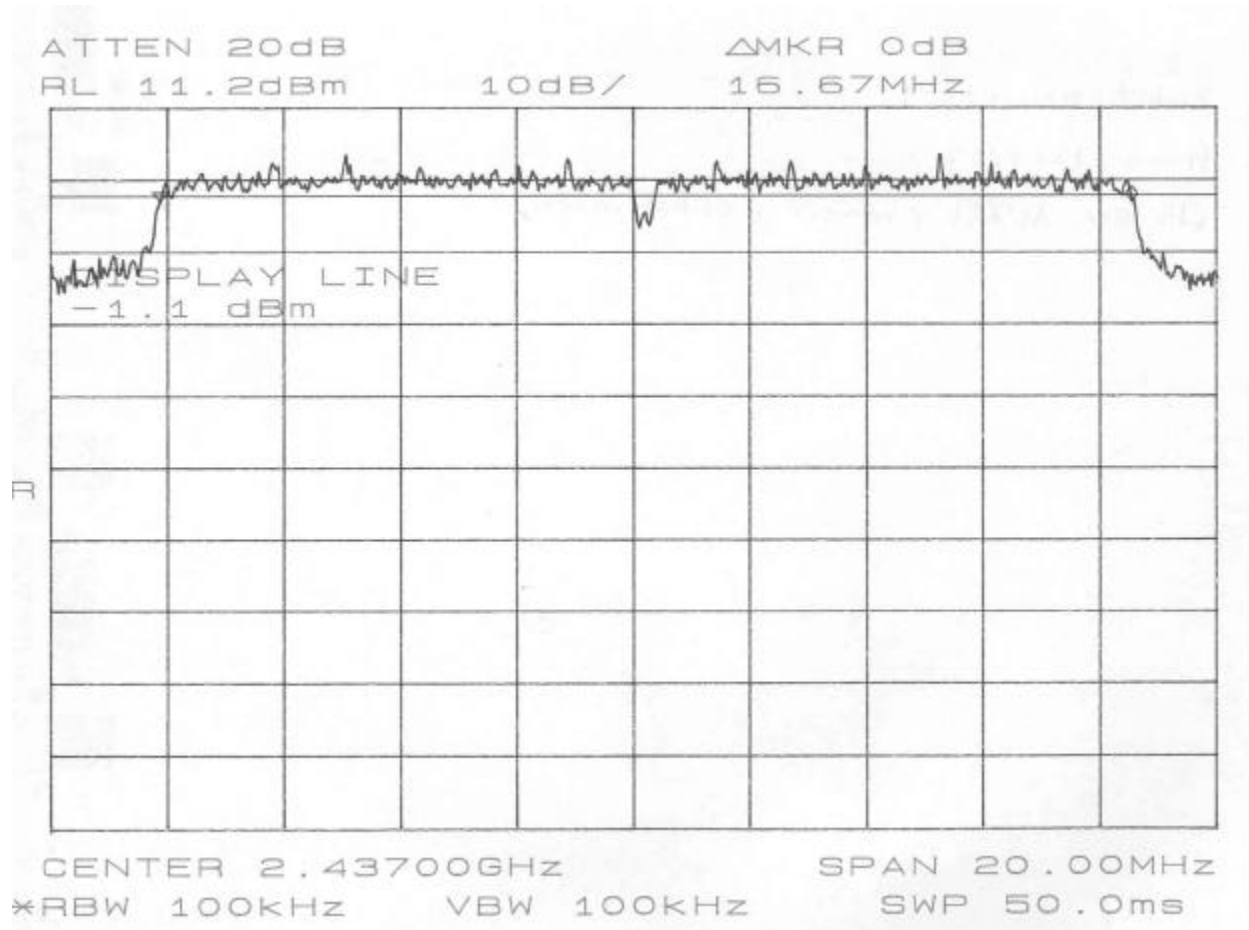


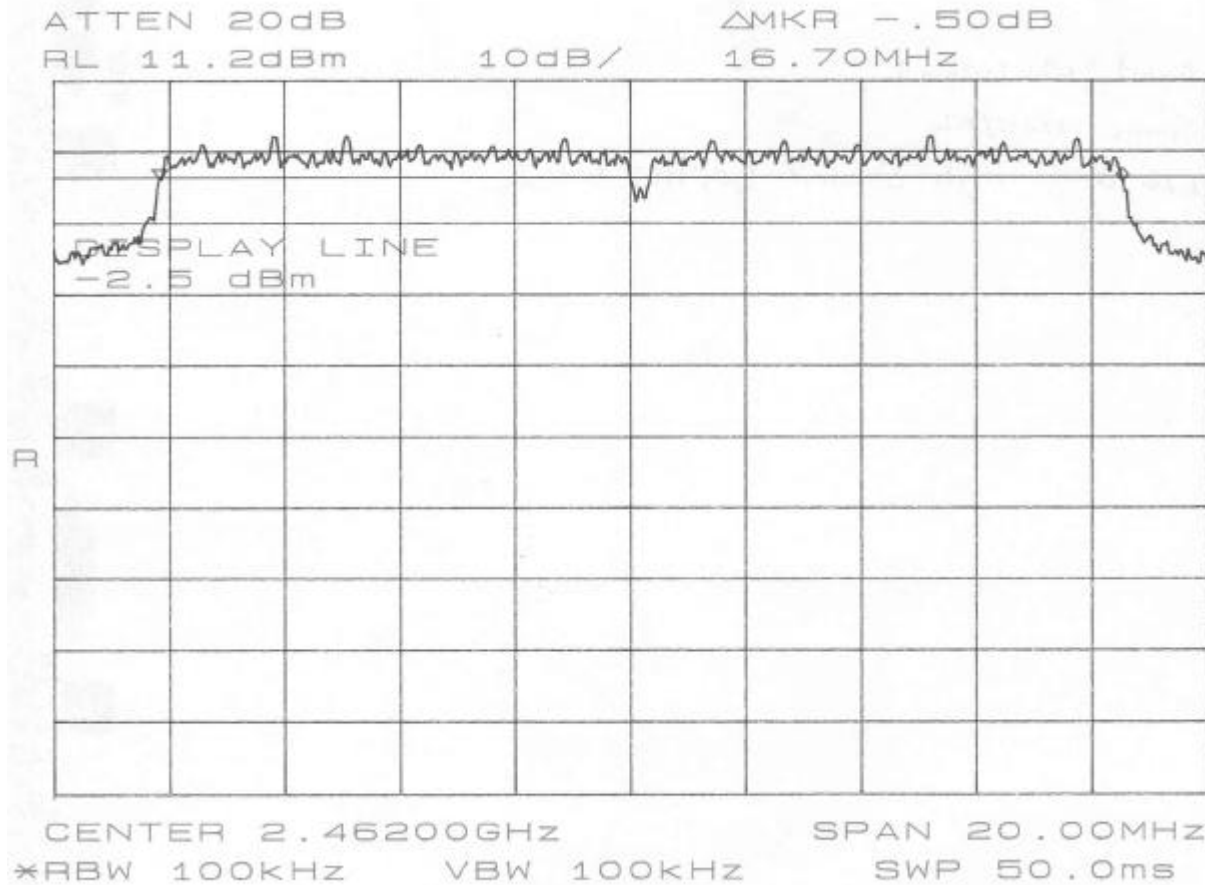




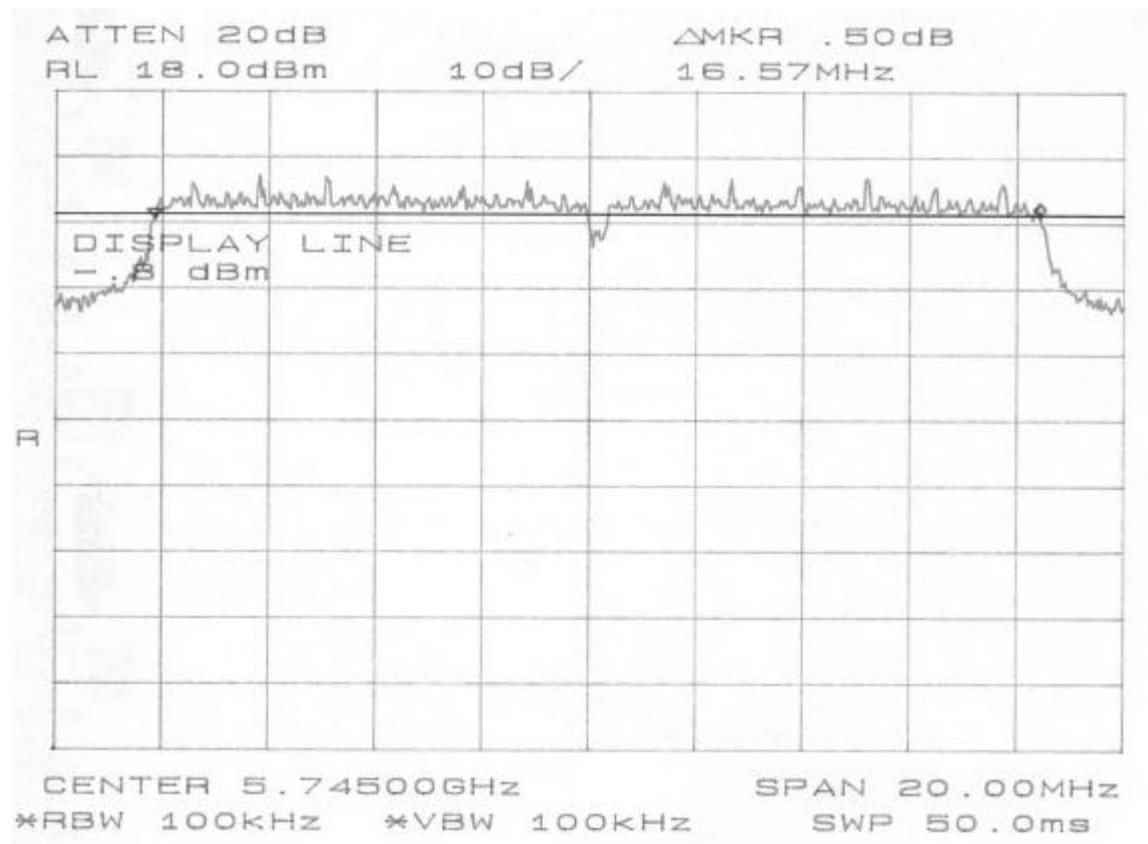
**6 DB BANDWIDTH (2.4 GHZ BAND 11G MODE)**

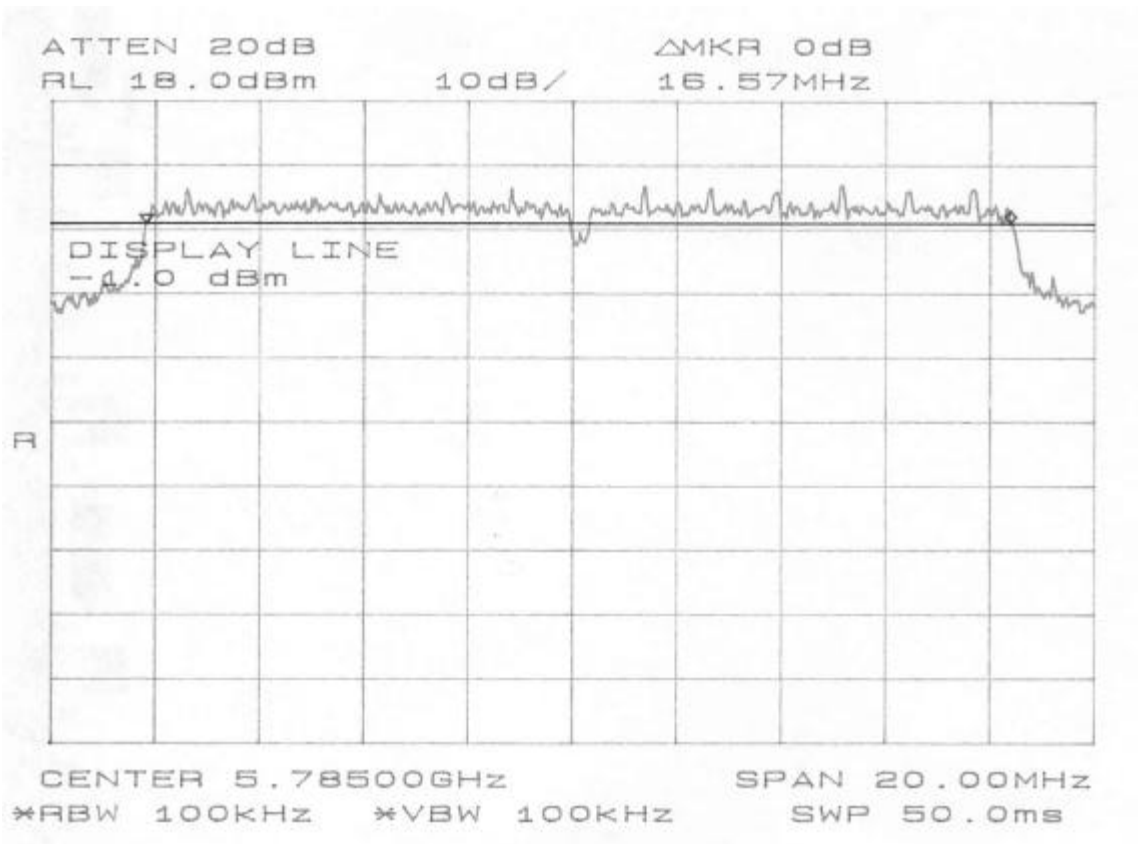


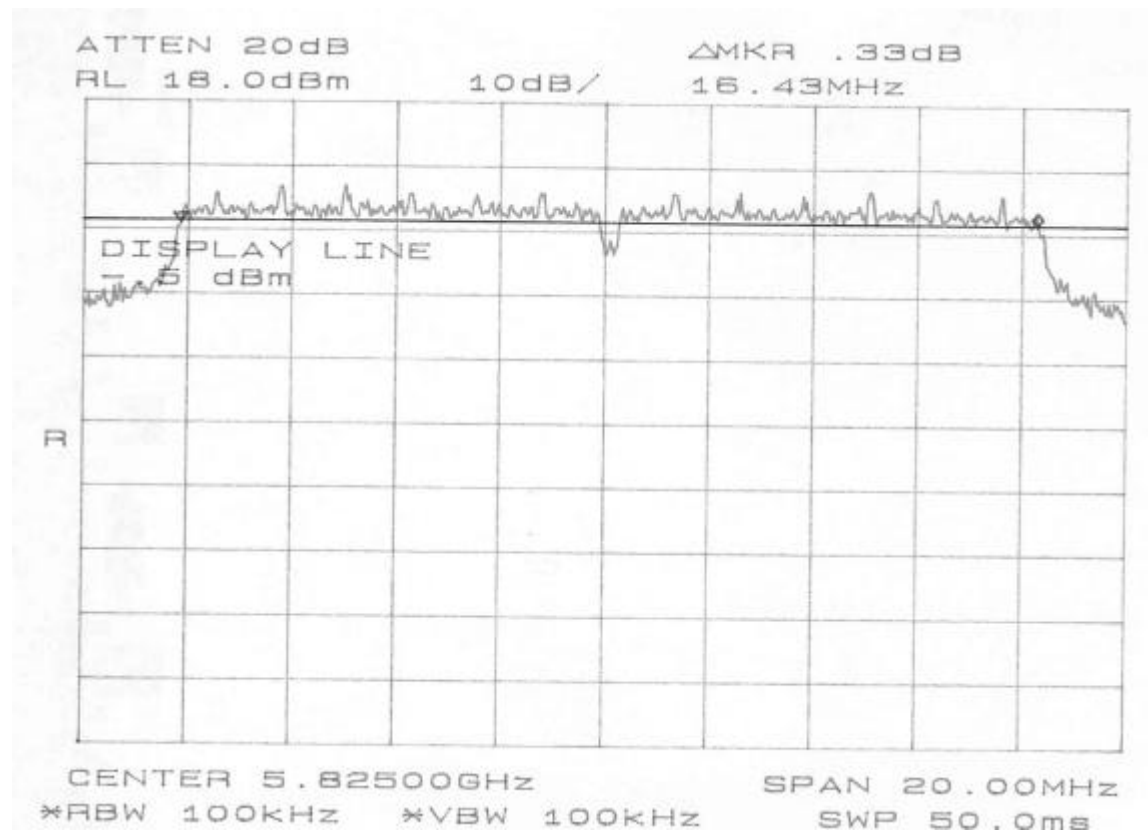




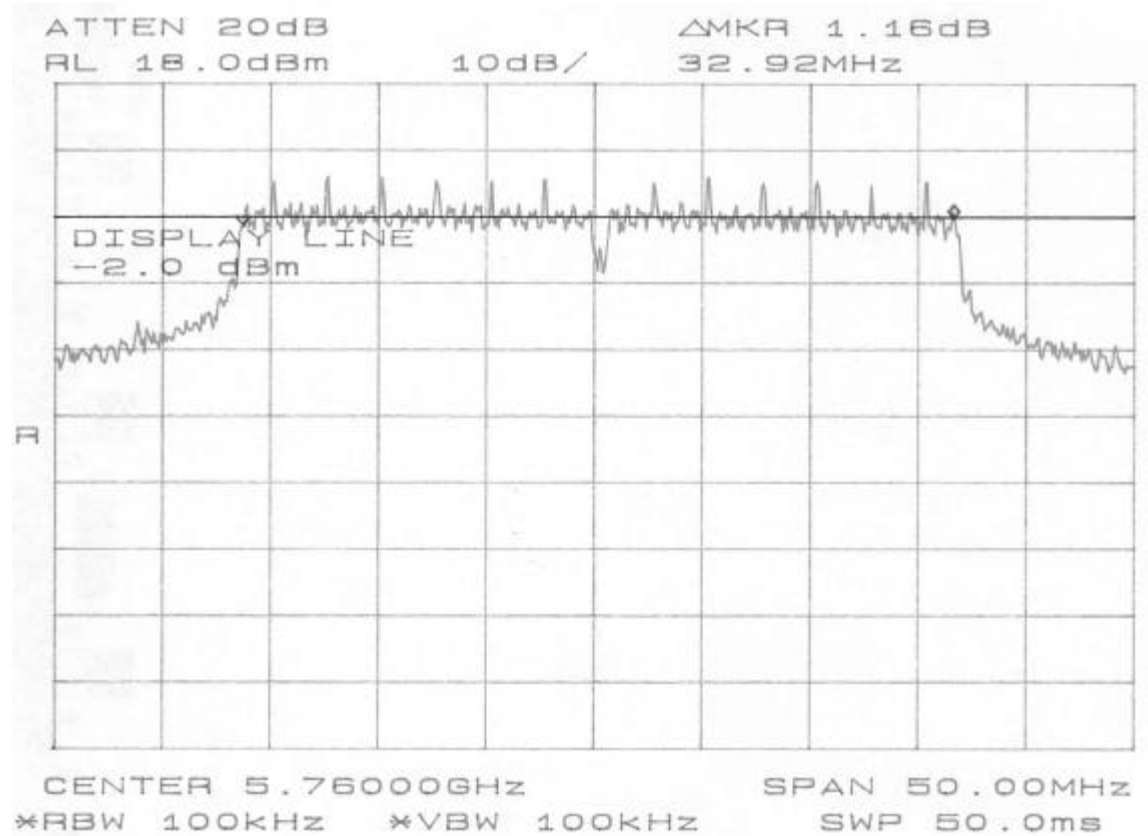
**6 DB BANDWIDTH (5.8 GHZ BAND, NORMAL MODE)**



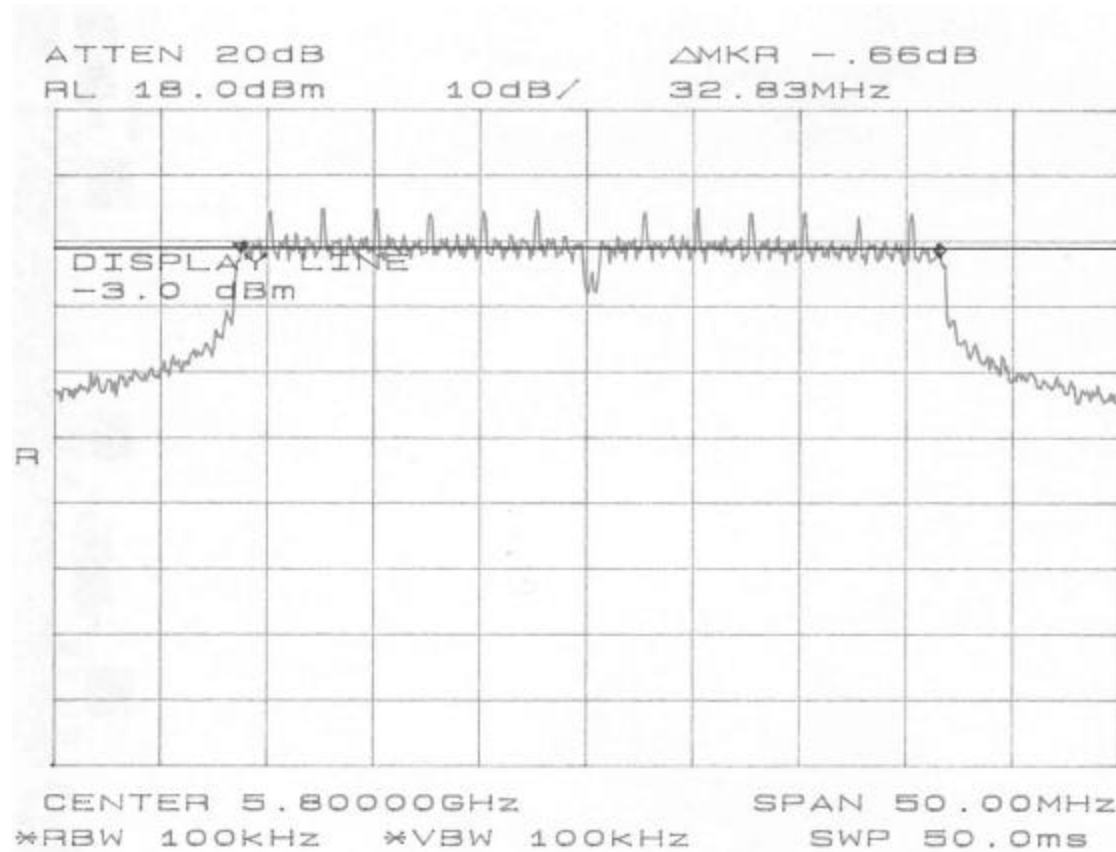




**6 DB BANDWIDTH (5.8 GHZ BAND, TURBO MODE)**

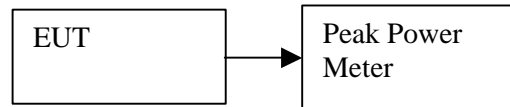






## 9.2. PEAK POWER

### TEST SETUP



### TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to read peak power.

### 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	19.4	30	-10.6
Middle	2437	19.3	30	-10.7
High	2462	19.3	30	-10.7

#### 2.4 GHz Band, 11g Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	20.6	30	-9.4
Middle	2437	22.5	30	-7.5
High	2462	20.3	30	-9.7

#### 5.8 GHz Band Normal Mode

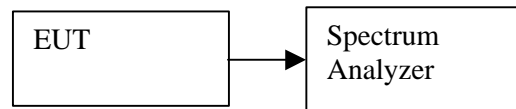
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	20.9	30	-9.1
Middle	5785	21.1	30	-8.9
High	5825	20.7	30	-9.3

#### 5.8 GHz Band Turbo Mode

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	5760	20.5	30	-9.5
High	5800	20.6	30	-9.4

### 9.3. 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  $\geq$  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	-15.13	8	-23.13
Middle	2437	-14.63	8	-22.53
High	2462	-14.47	8	-22.4

##### 2.4 GHz Band, 11g Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.47	8	-20.47
Middle	2437	-10.47	8	-18.47
High	2462	-11.63	8	-19.63

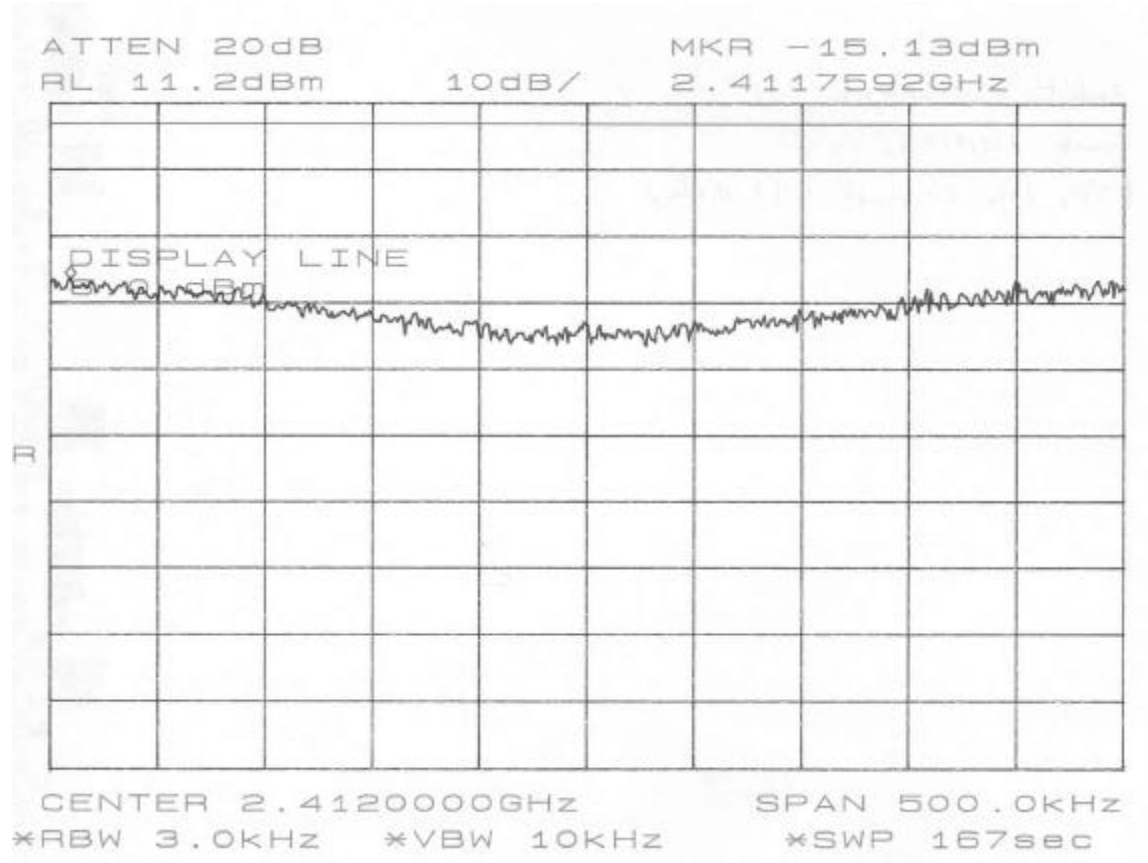
##### 5.8 GHz Band Normal Mode

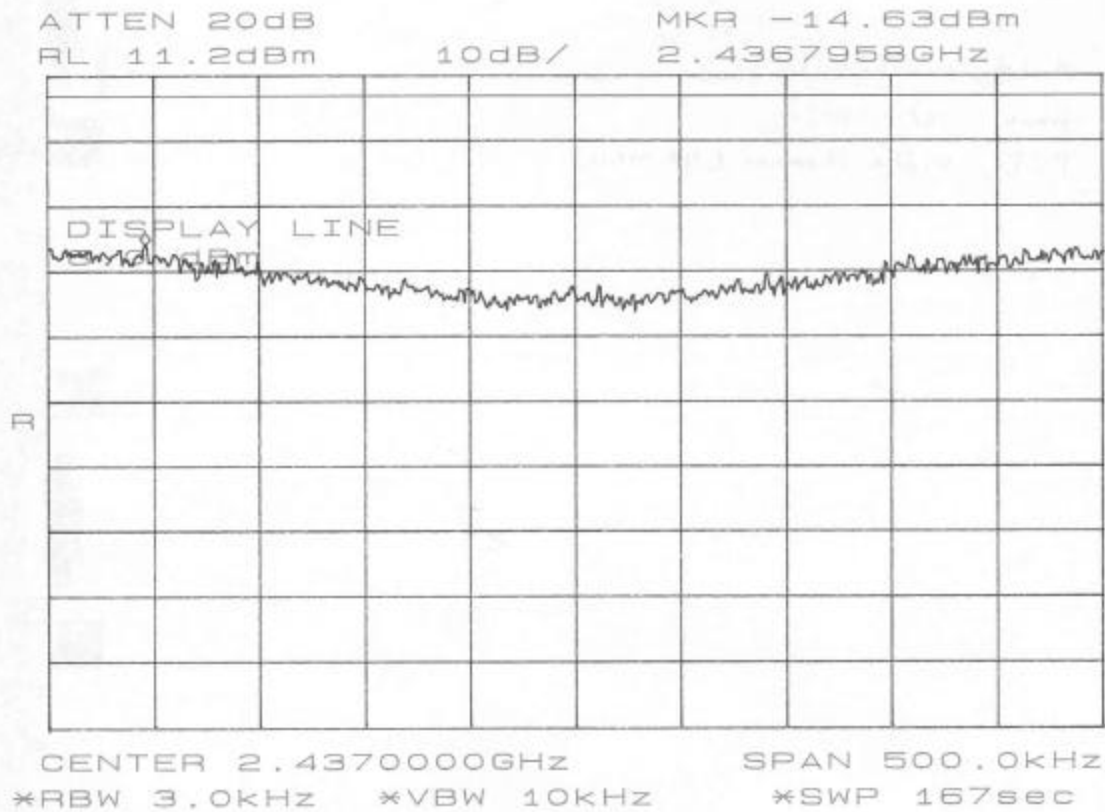
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	-7.5	8	-15.5
Middle	5785	-7.83	8	-15.83
High	5825	-7.17	8	-15.17

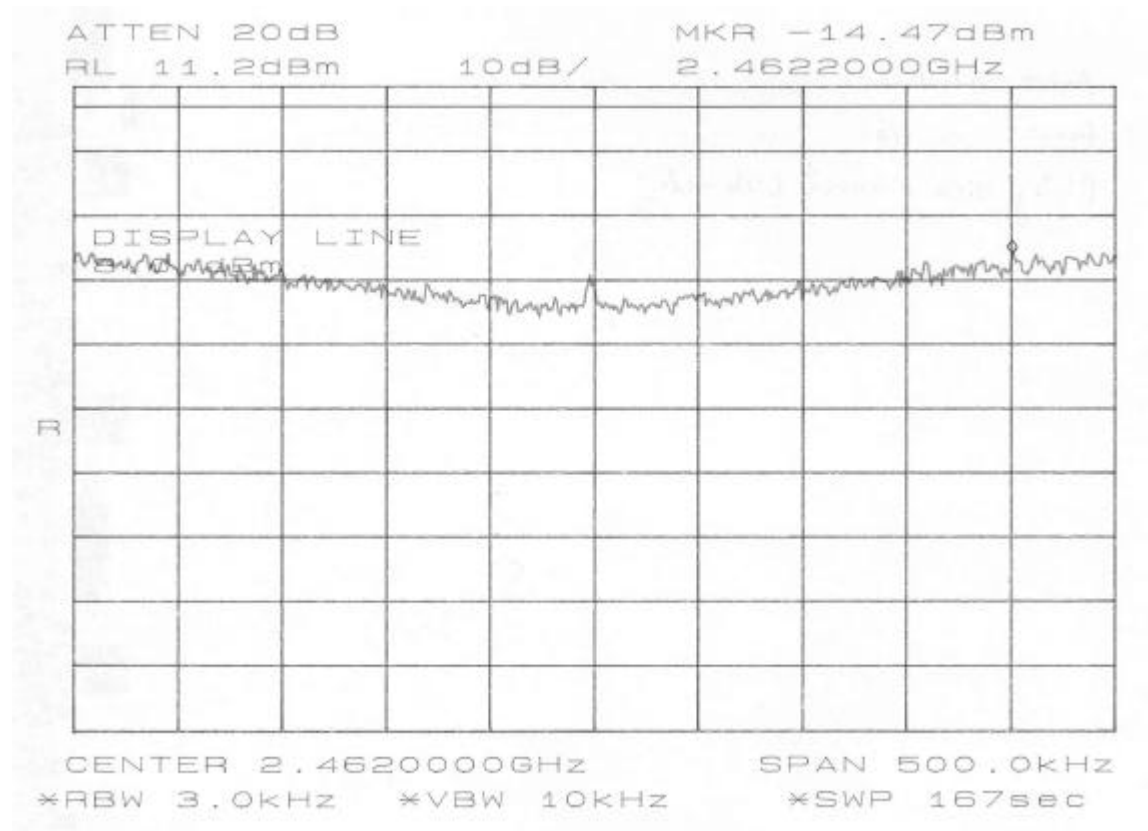
##### 5.8 GHz Band Turbo Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5760	-12.5	8	-20.5
High	5800	-12.83	8	-20.83

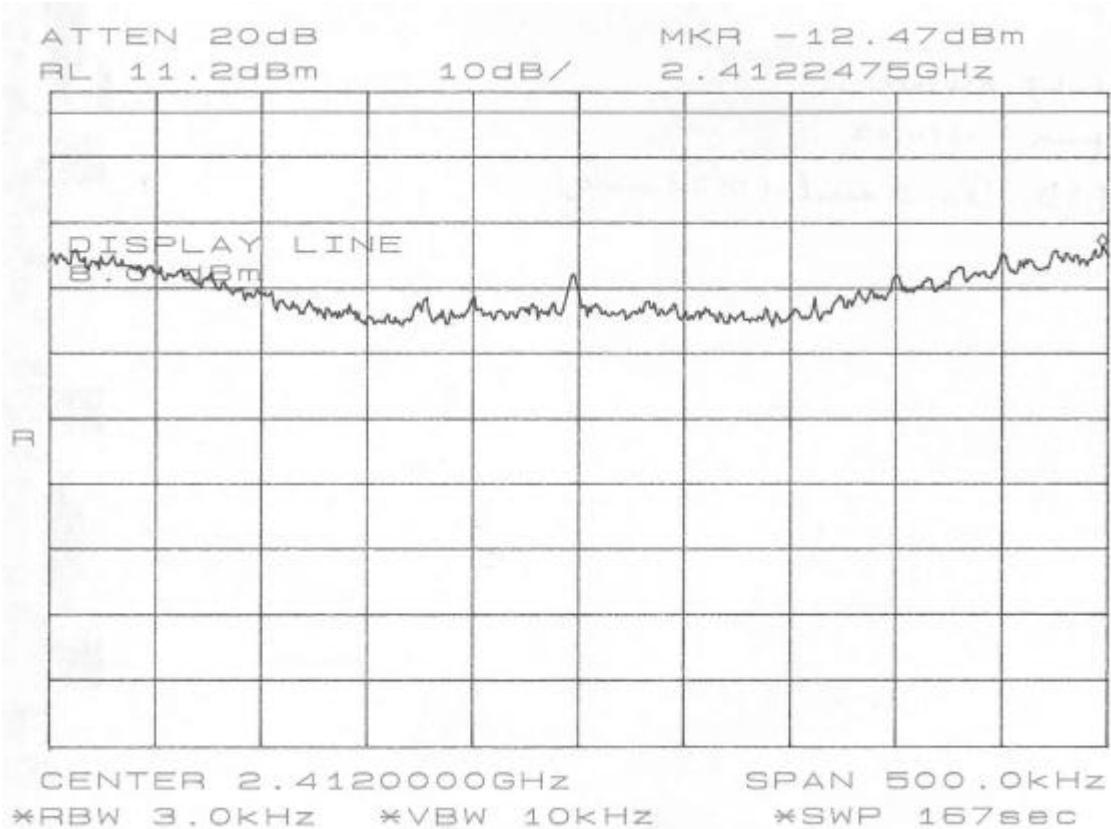
**PPSD (2.4 GHZ BAND, 11b MODE)**

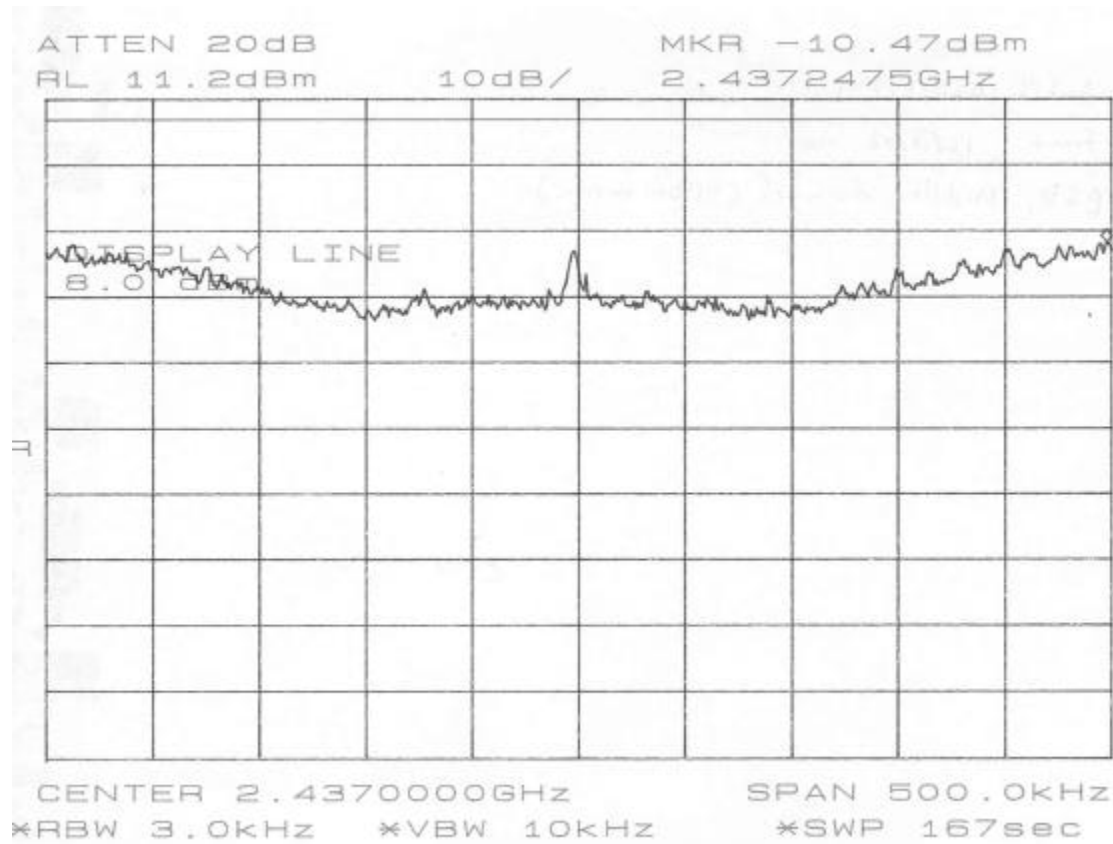




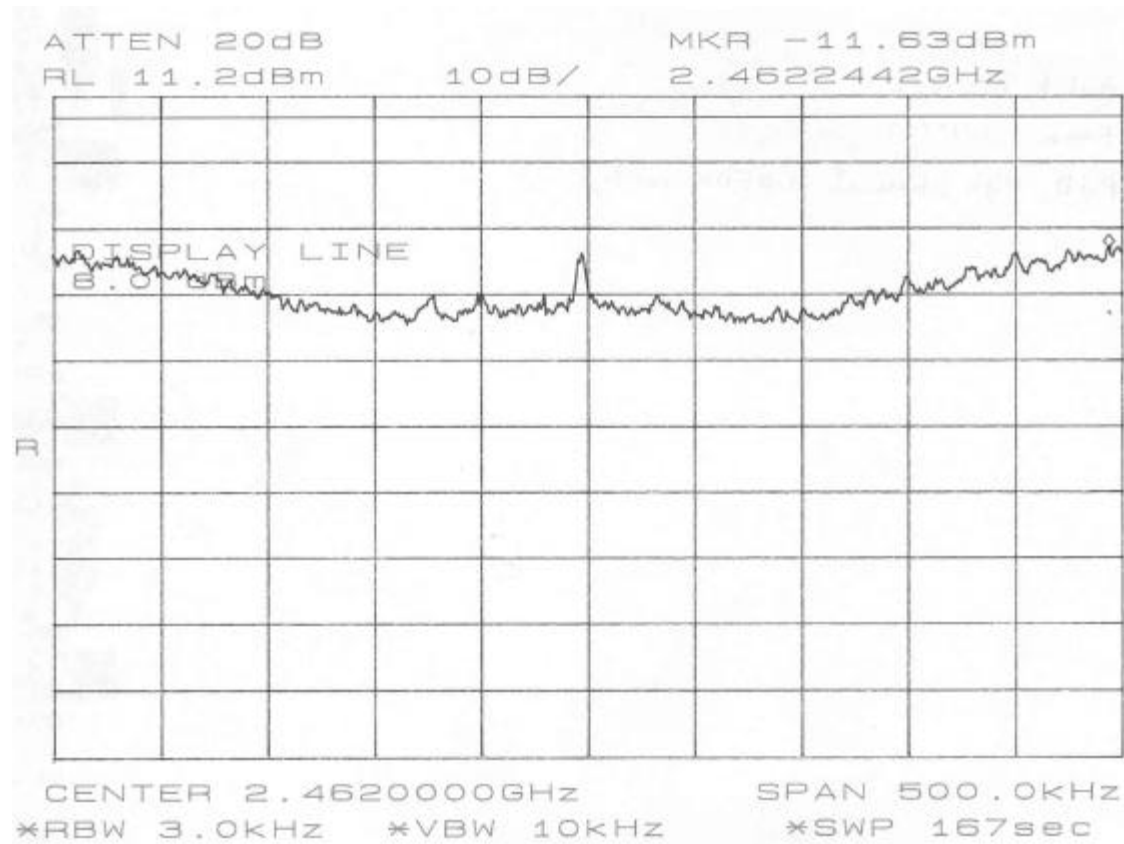


**PPSD (2.4 GHZ BAND, 11g MODE)**

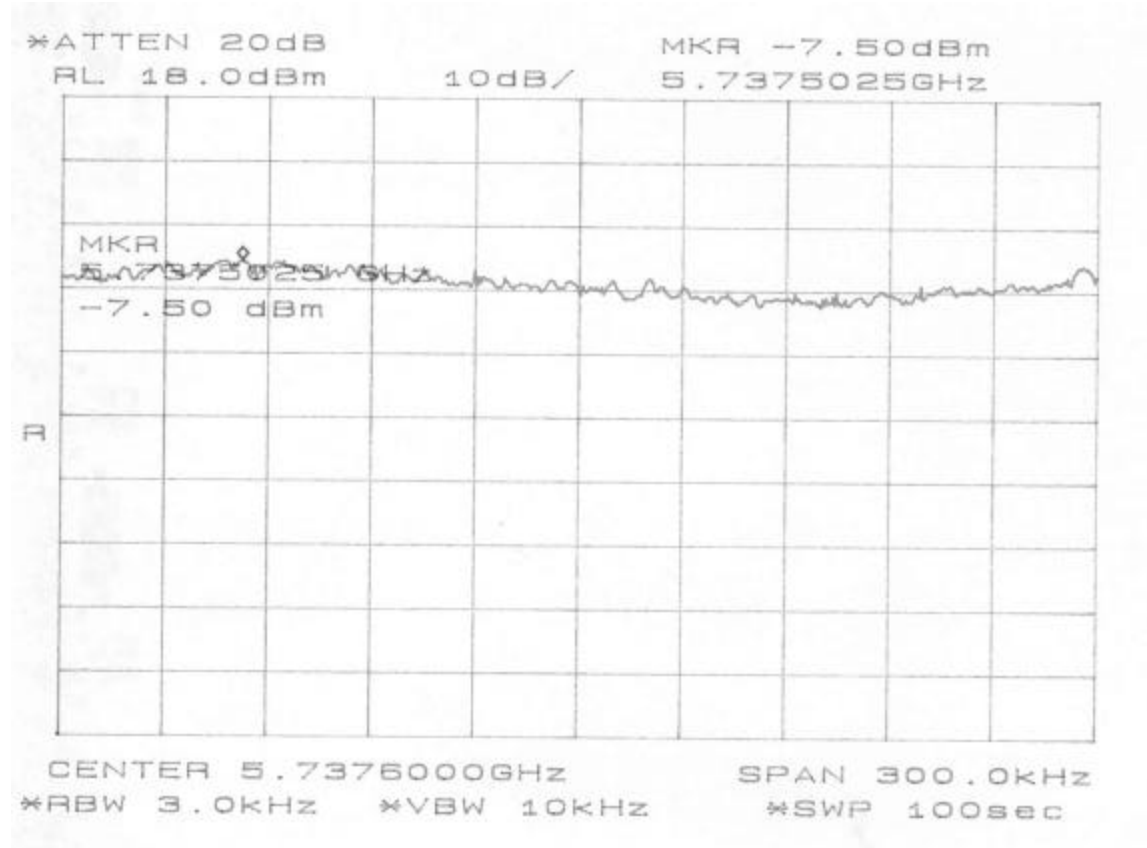


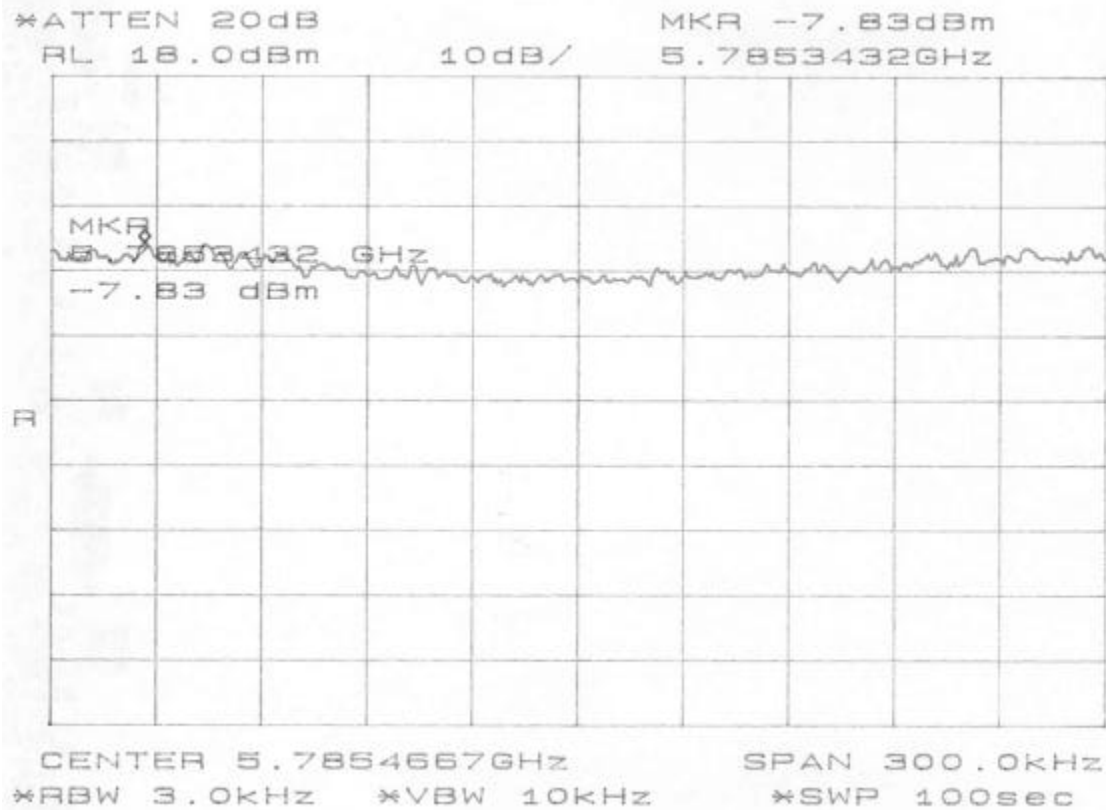


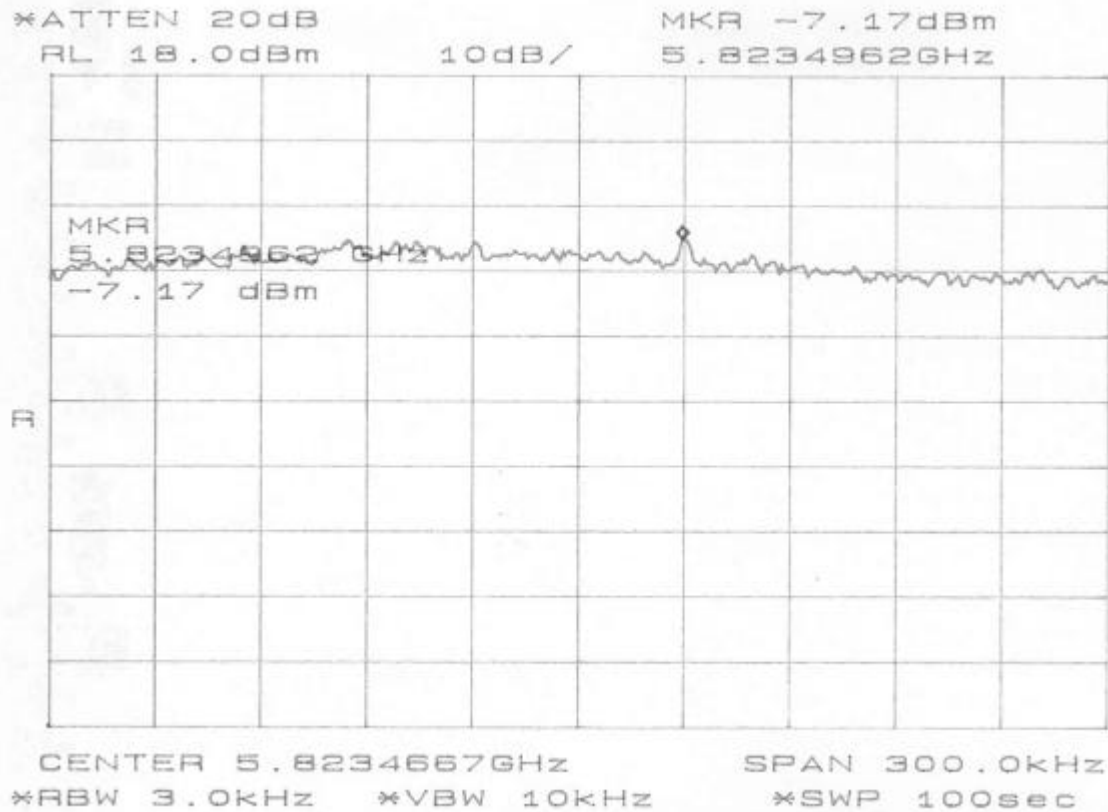




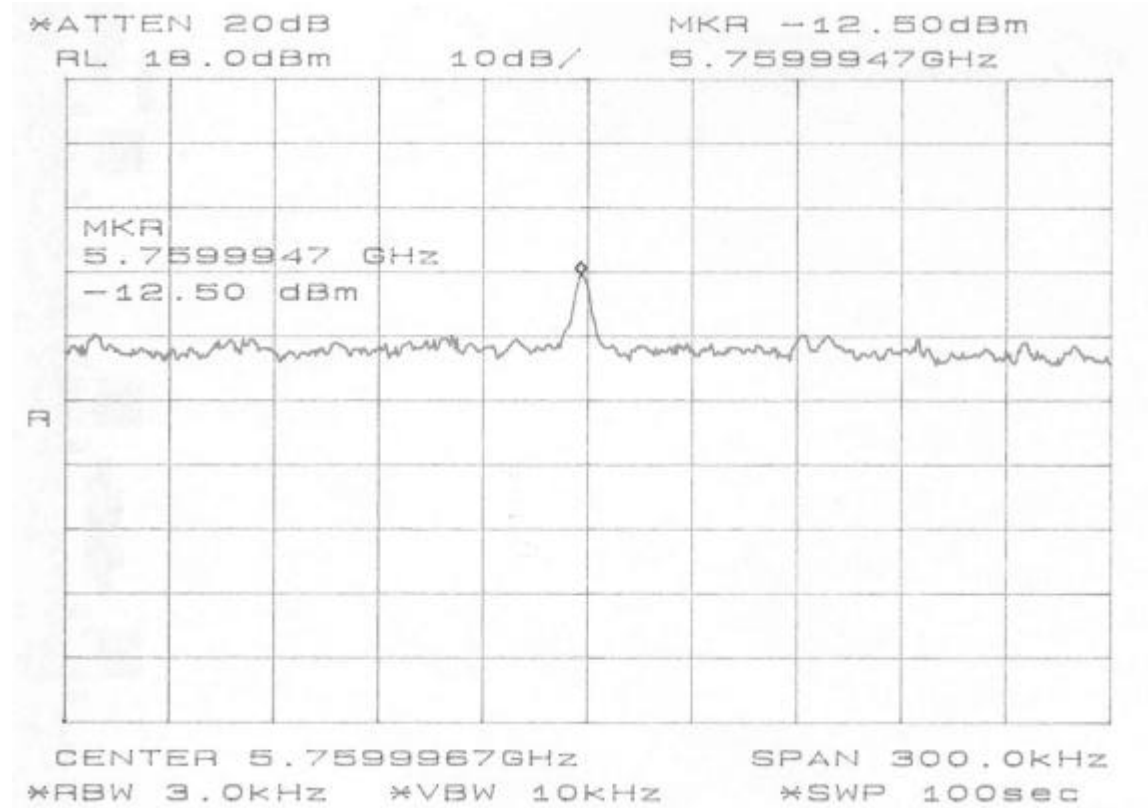
**PPSD (5.8 GHZ BAND, NORMAL MODE)**

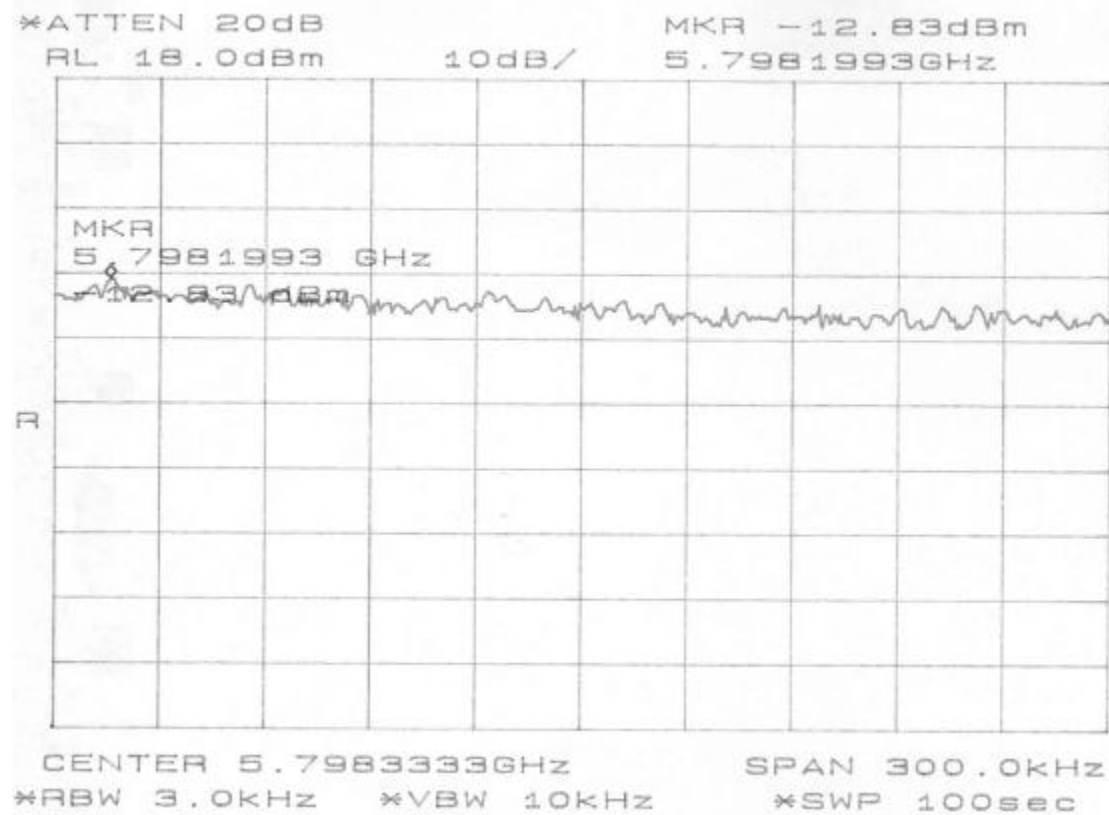






**PPSD (5.8 GHZ BAND, TURBO MODE)**





## 9.4. MAXIMUM PERMISSIBLE EXPOSURE

### CALCULATIONS

Given

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

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:

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

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

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<sup>2</sup>

Substituting the logarithmic form of power and gain using:

$$P \text{ (mW)} = 10^{(P \text{ (dBm)} / 10)} \text{ and}$$

$$G \text{ (numeric)} = 10^{(G \text{ (dBi)} / 10)}$$

yields

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

where

d = MPE safe distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW / cm<sup>2</sup>

## **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<sup>2</sup> 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<sup>2</sup> from 1.1310 Table 1

Substituting these parameters into Equation (1) above:

MPE Safe Distance = 11.66 cm

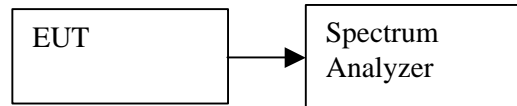
NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.



## 9.5. 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 300 kHz.

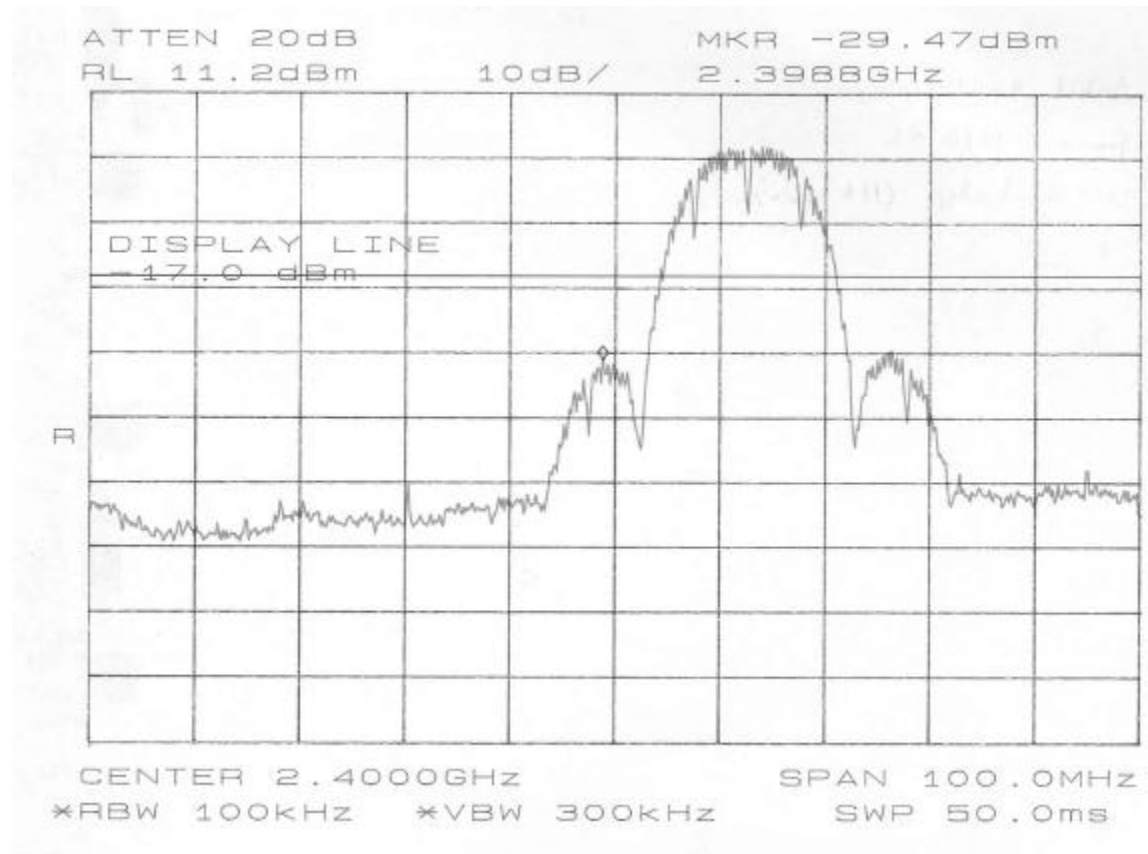
Measurements are made over the 30 MHz to 26.5 GHz range with the transmitter set to the lowest, middle, and highest channels within the 2.4 GHz band.

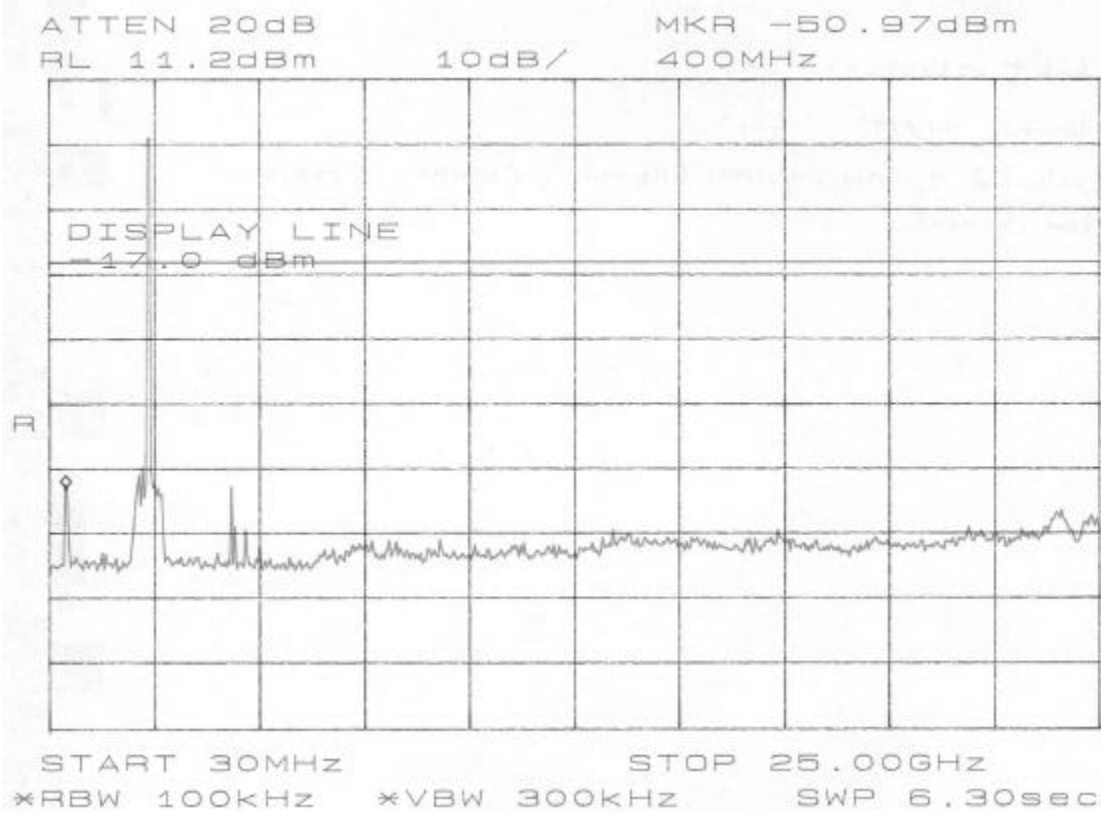
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels within the 5.8 GHz band.

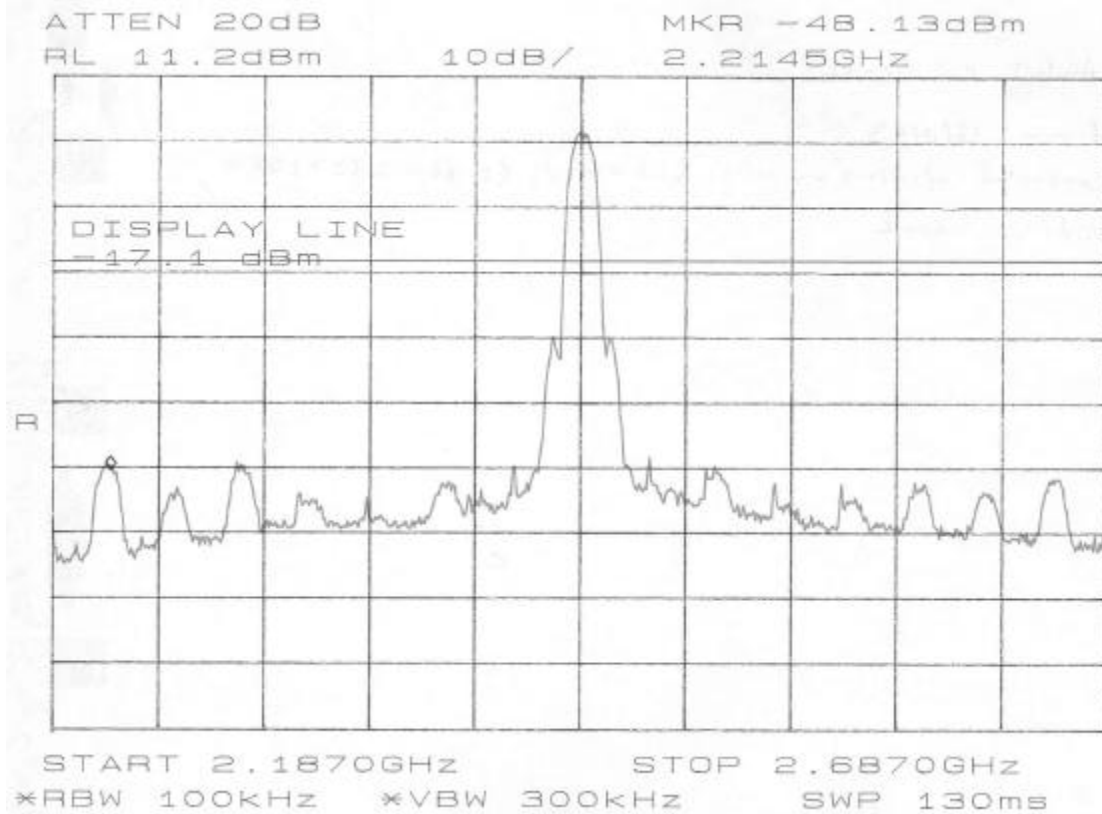
### RESULTS

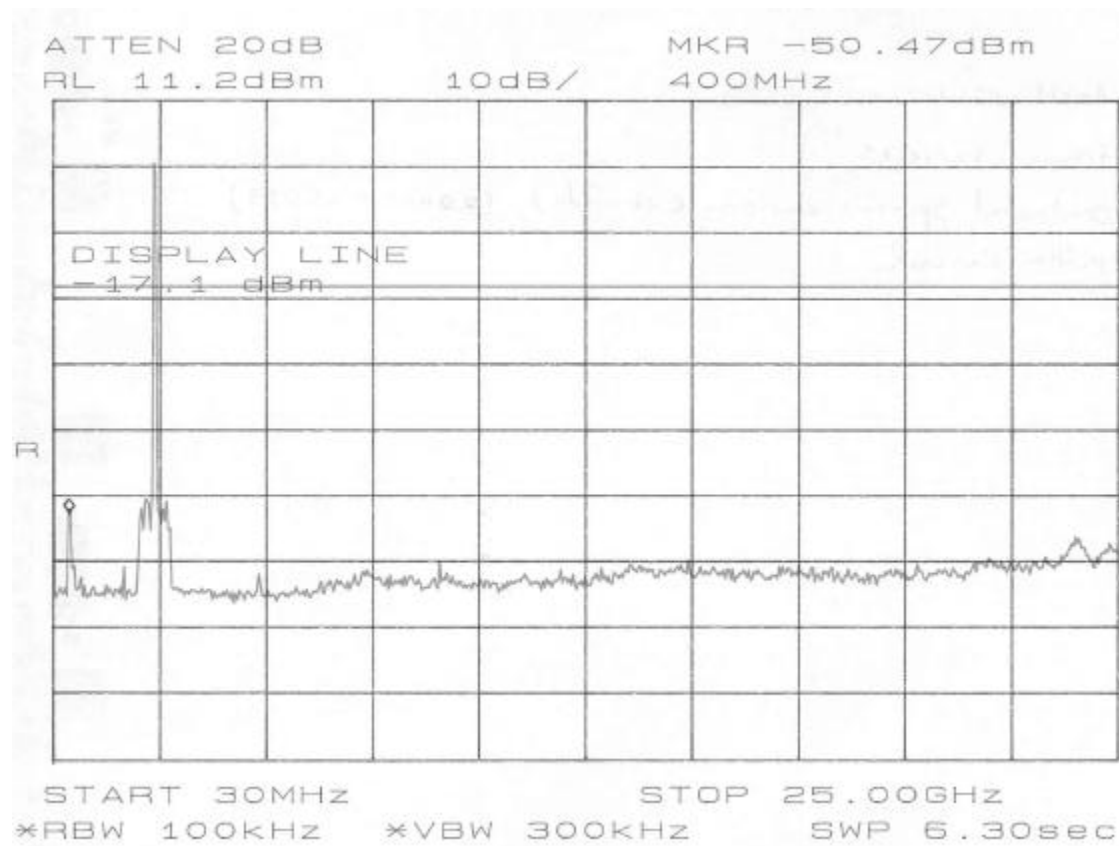
No non-compliance noted:

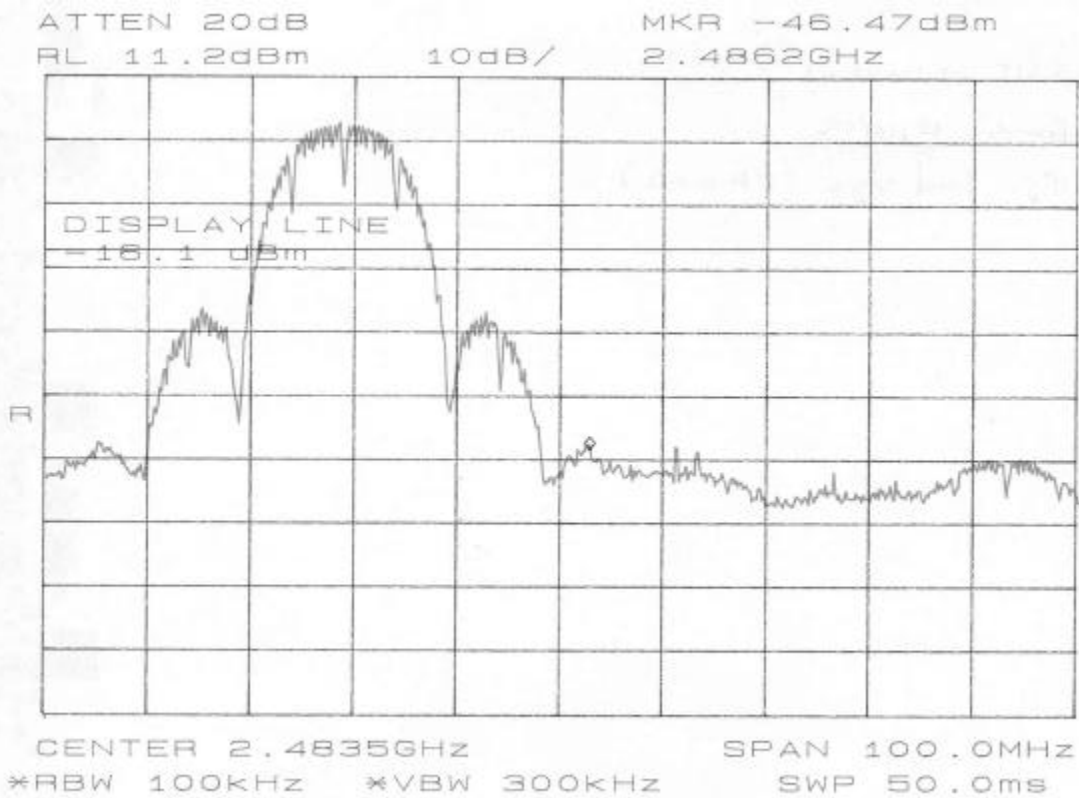
**CONDUCTED SPURIOUS EMISSIONS (2.4 GHZ BAND, 11B MODE)**

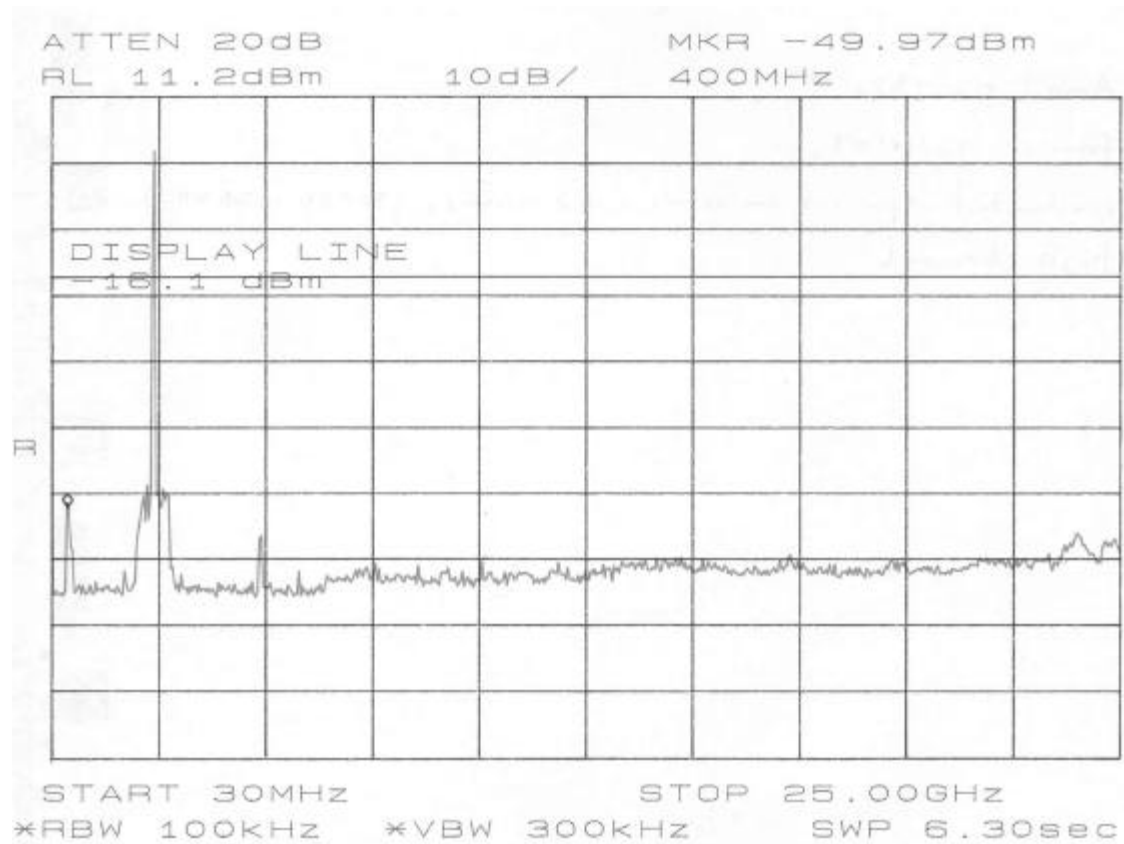








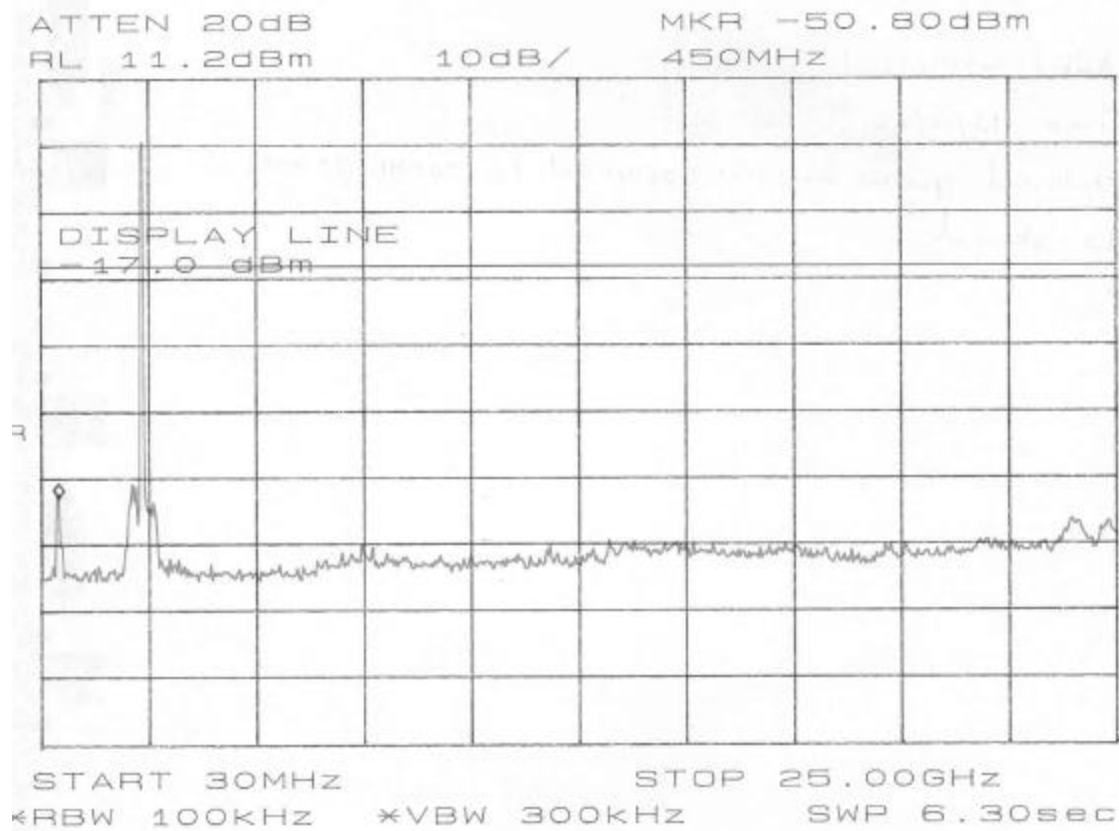


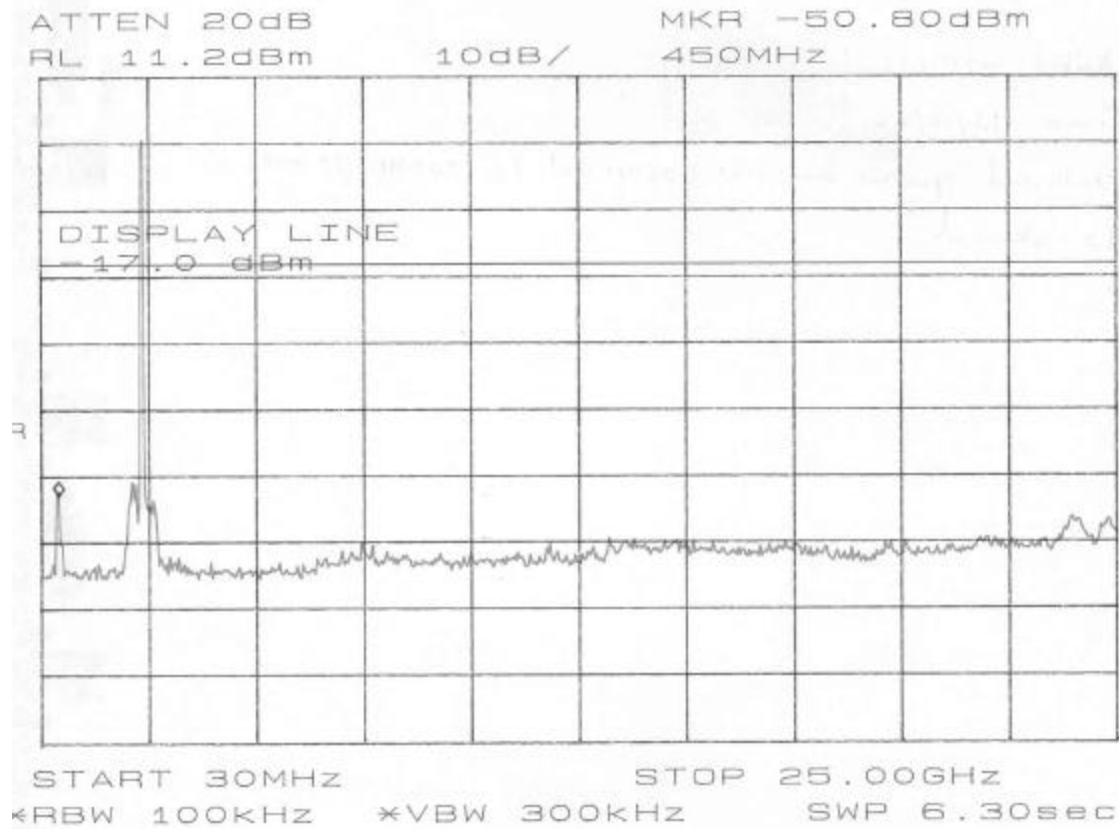


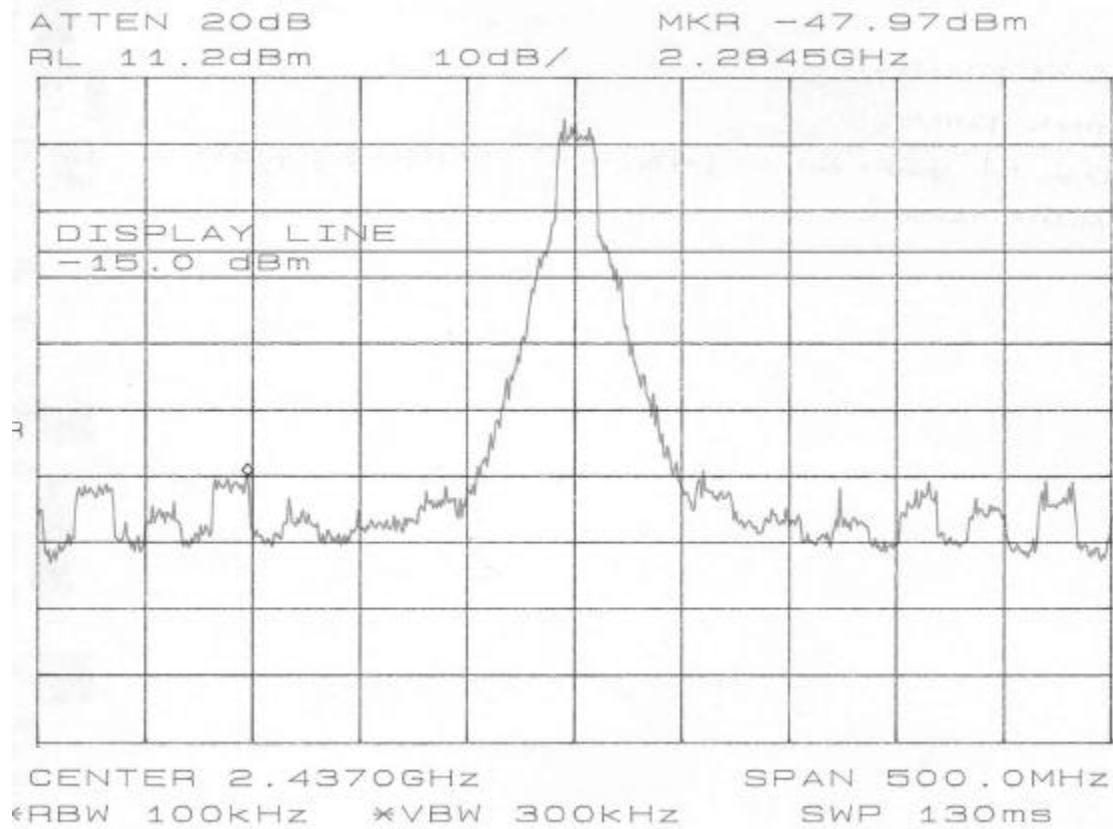
**CONDUCTED SPURIOUS EMISSIONS (2.4 GHZ BAND, 11B MODE)**

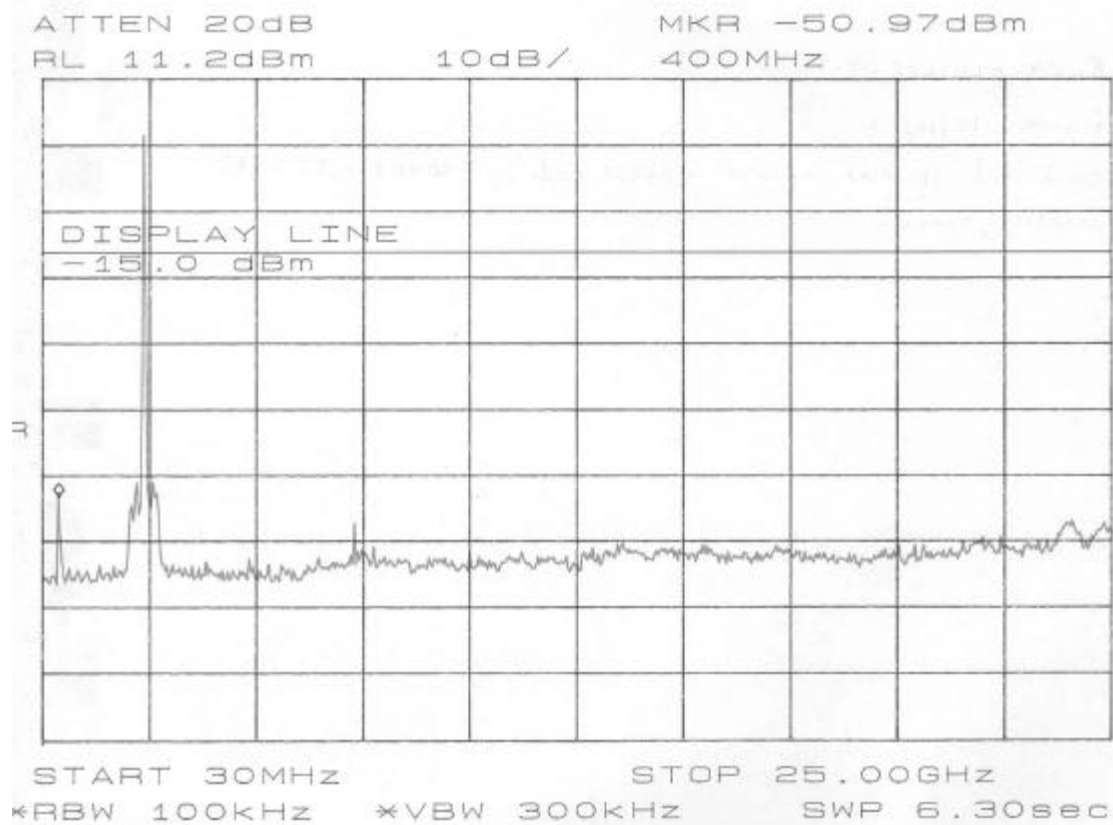


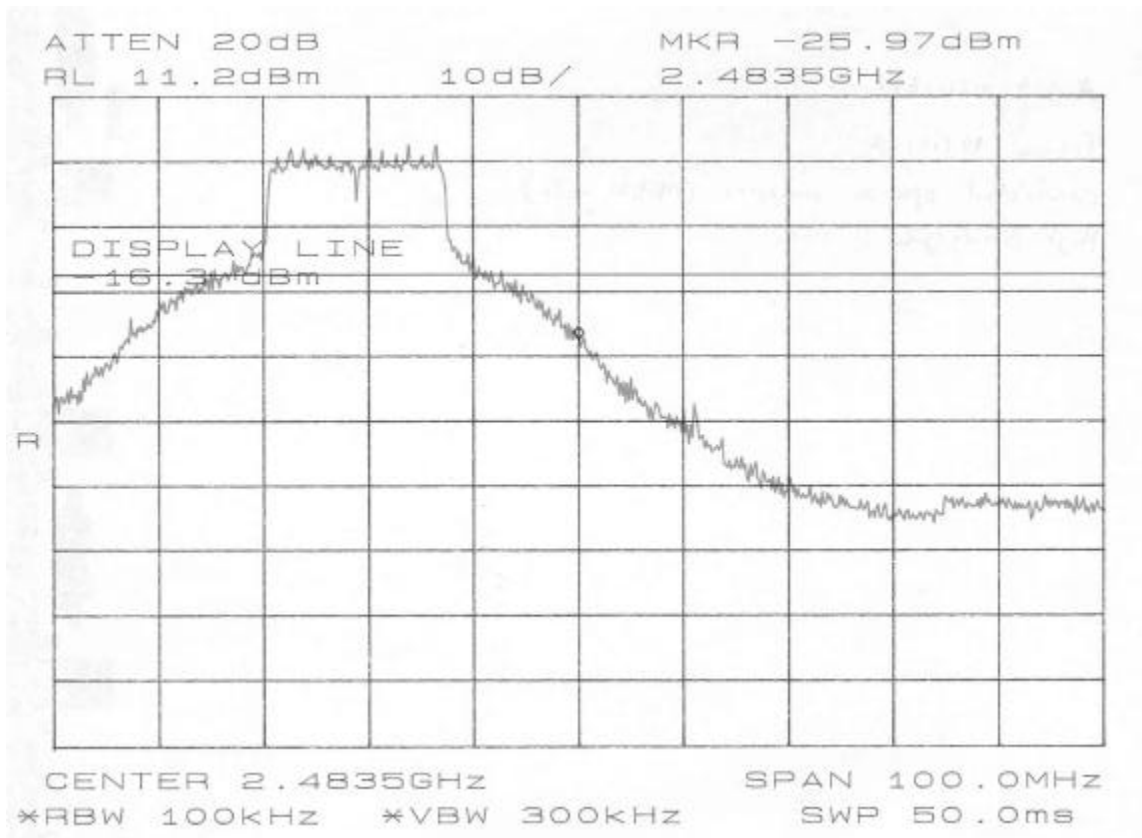


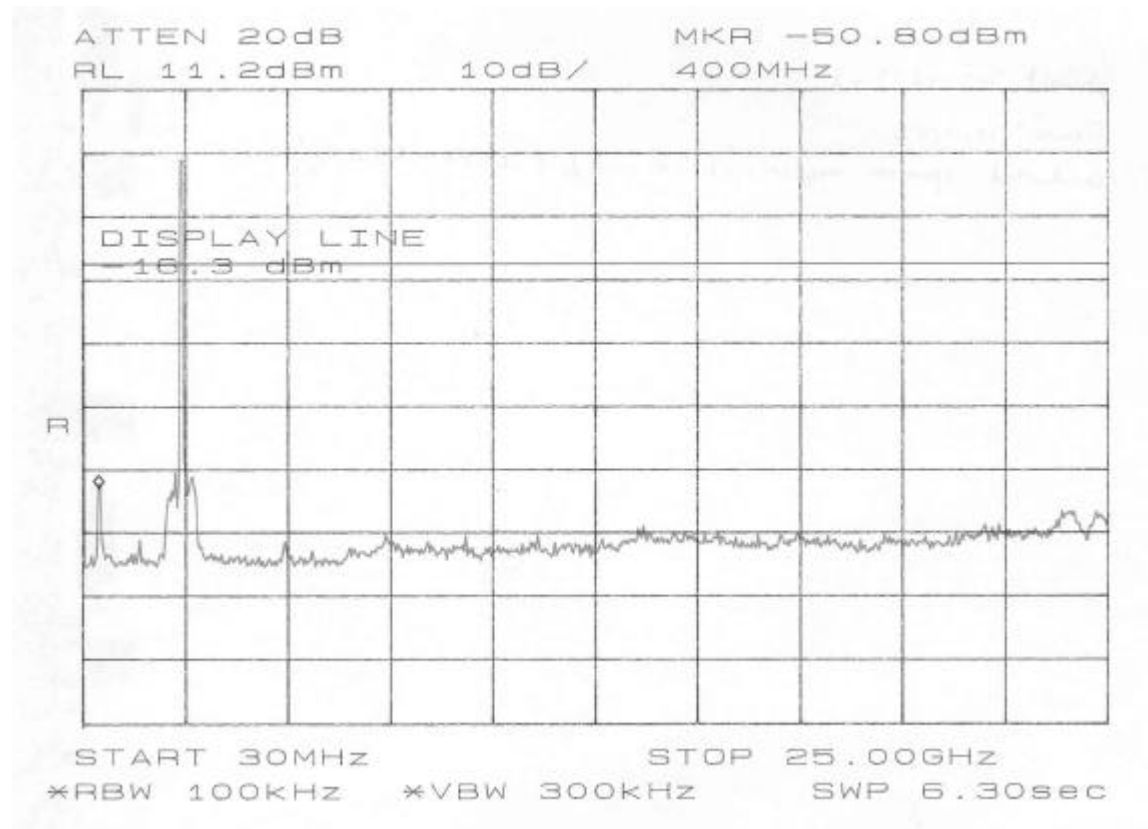




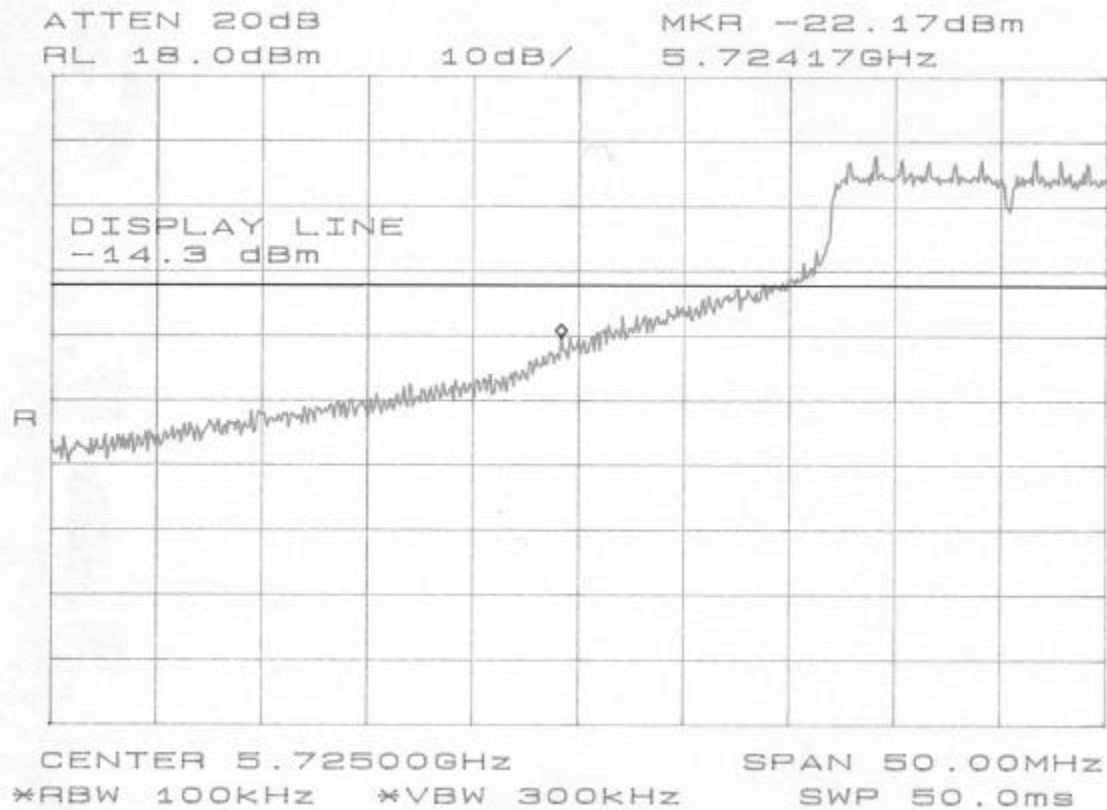


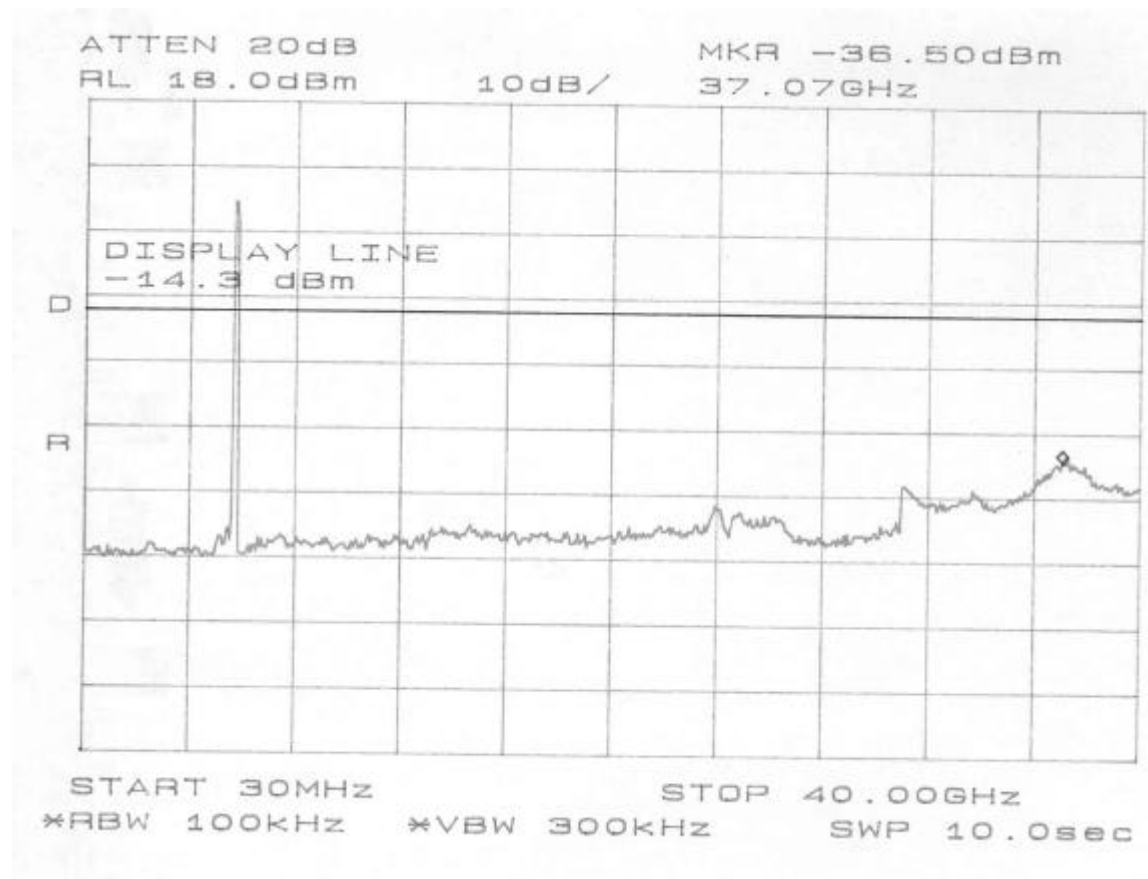




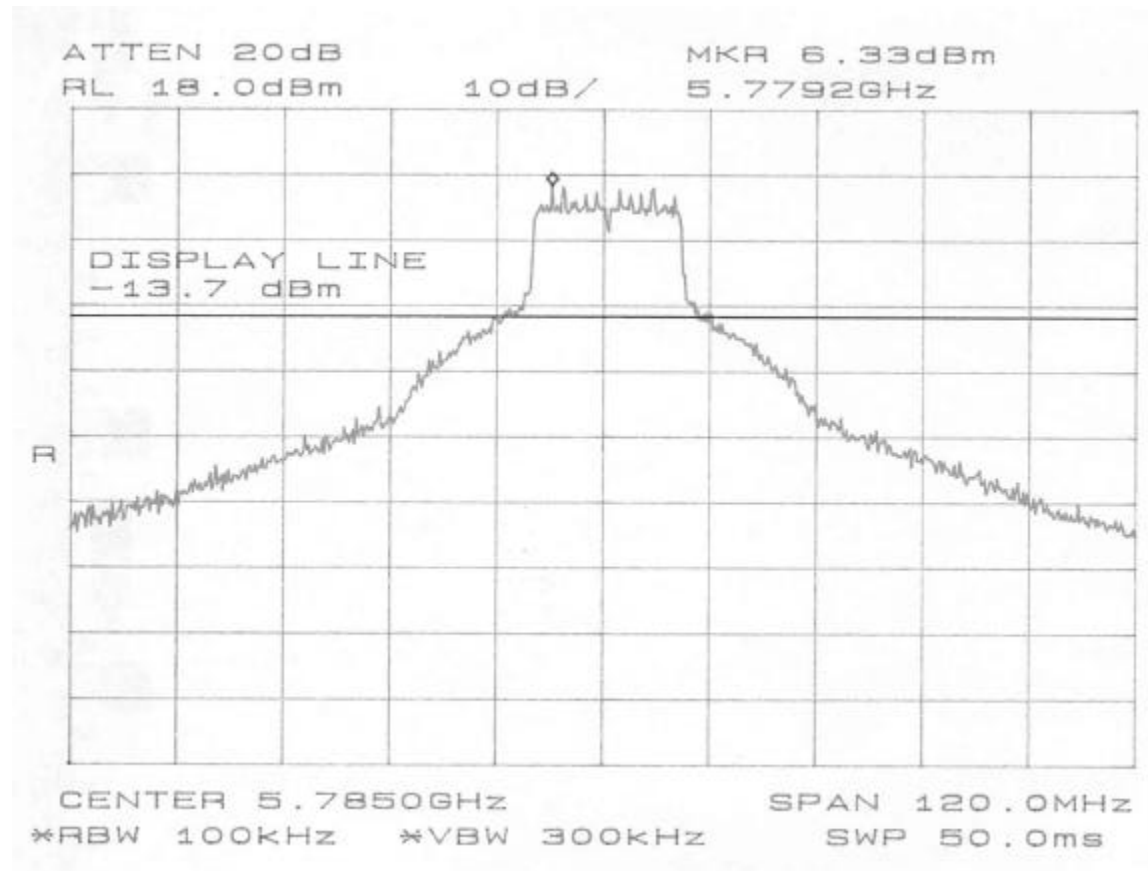


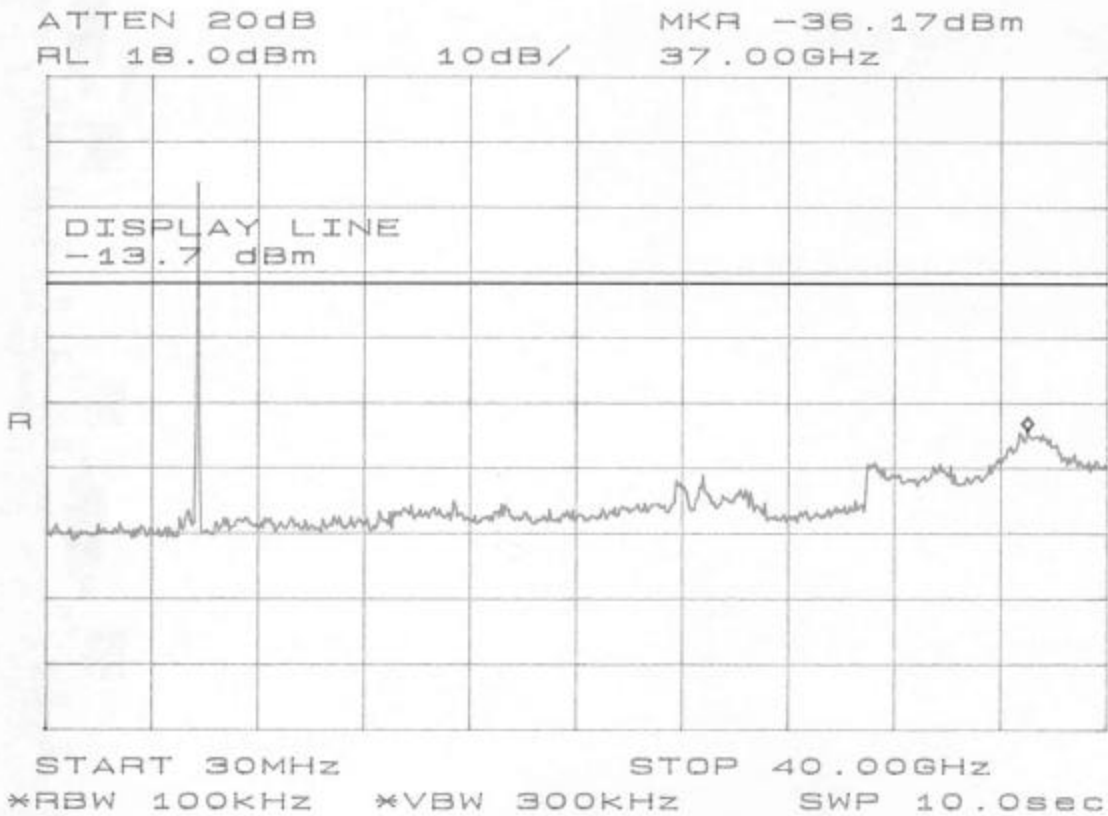
**CONDUCTED SPURIOUS EMISSIONS (5.8 GHZ BAND, NORMAL MODE)**

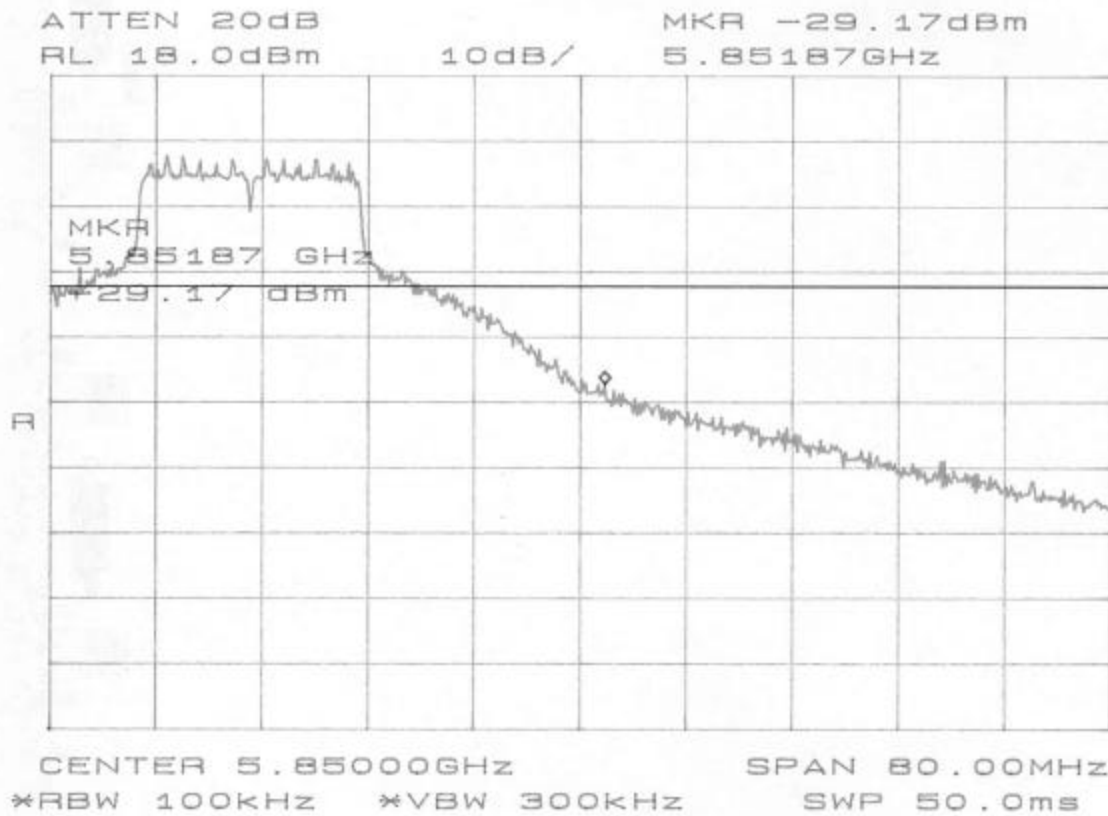


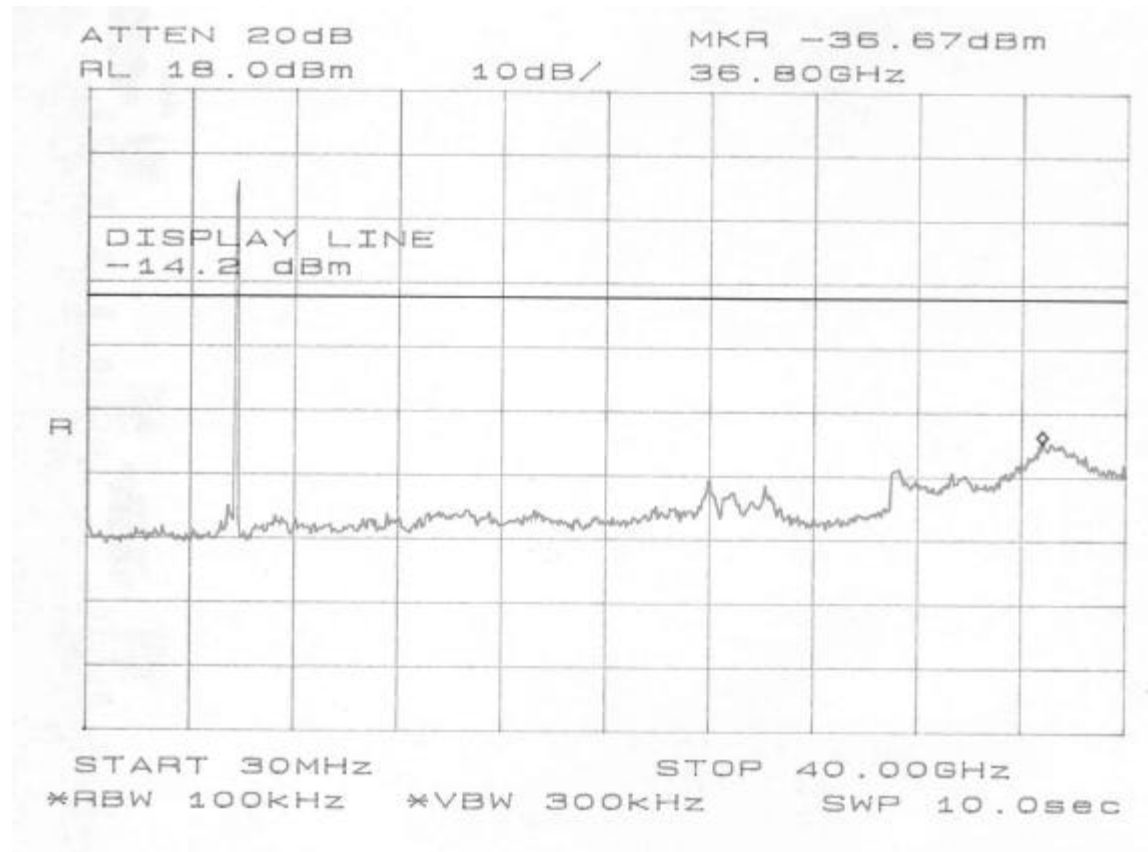


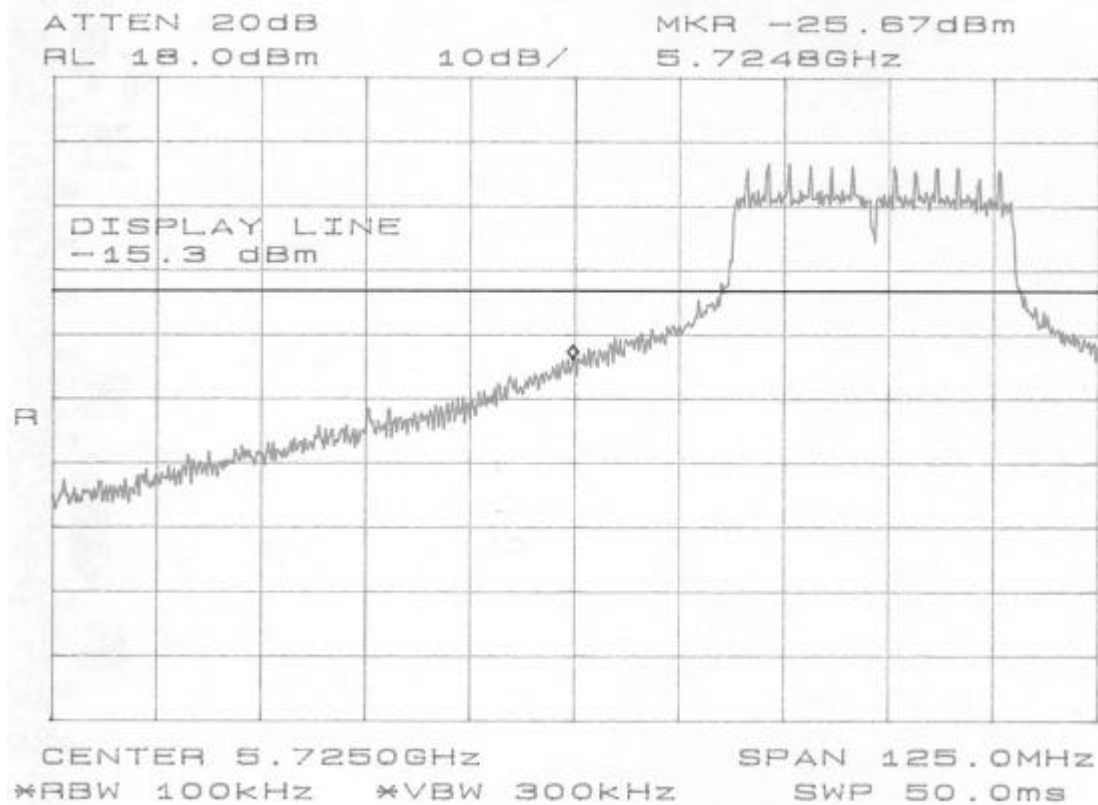


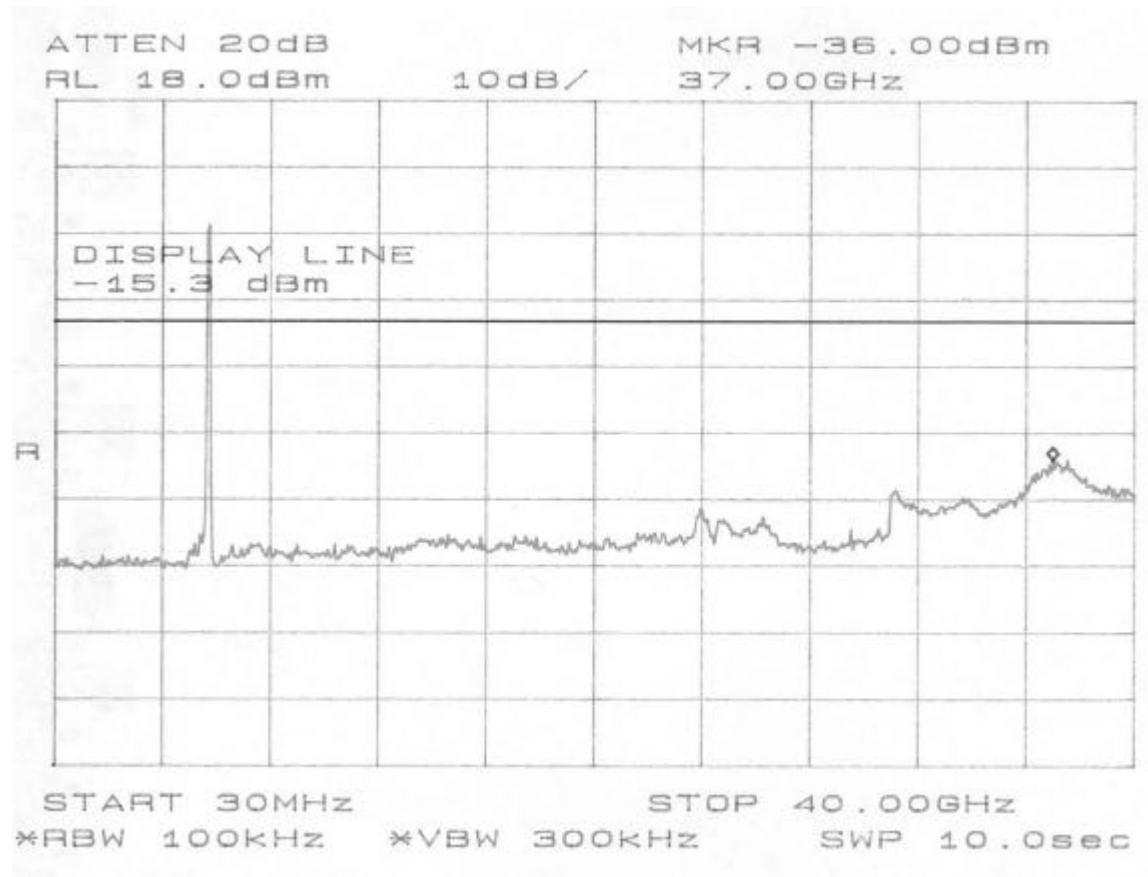


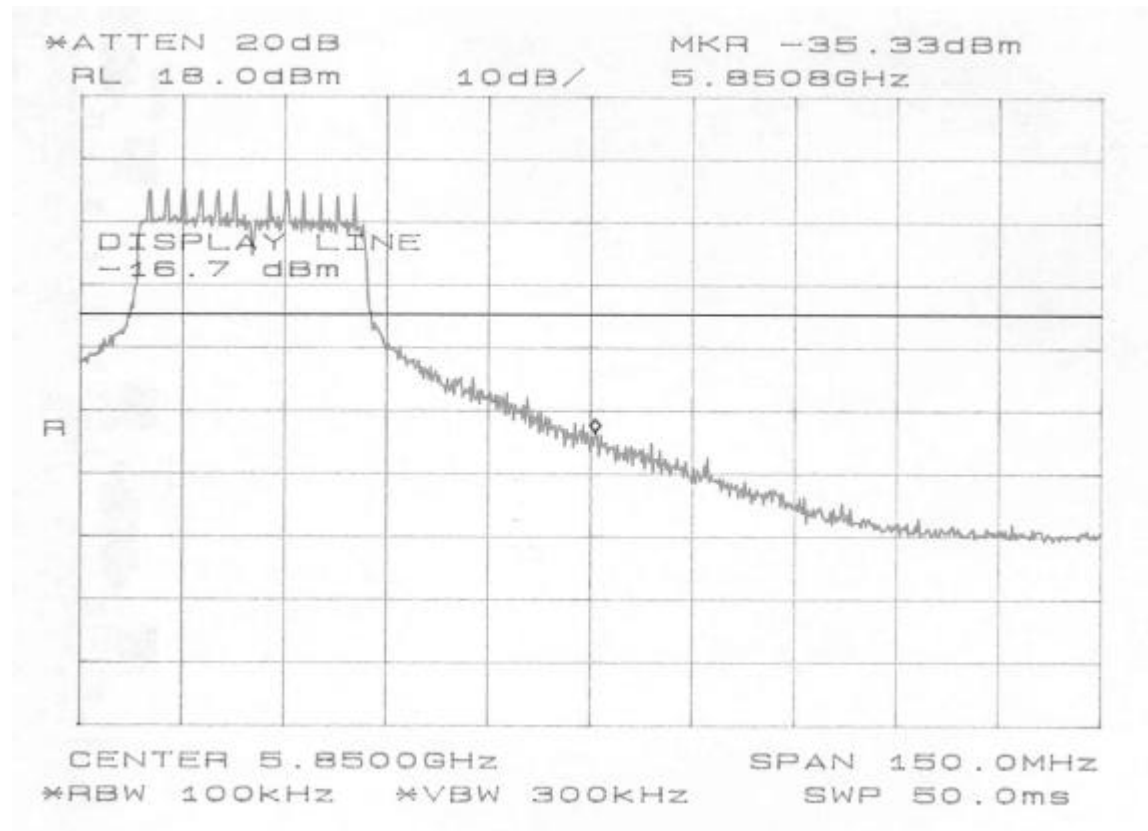


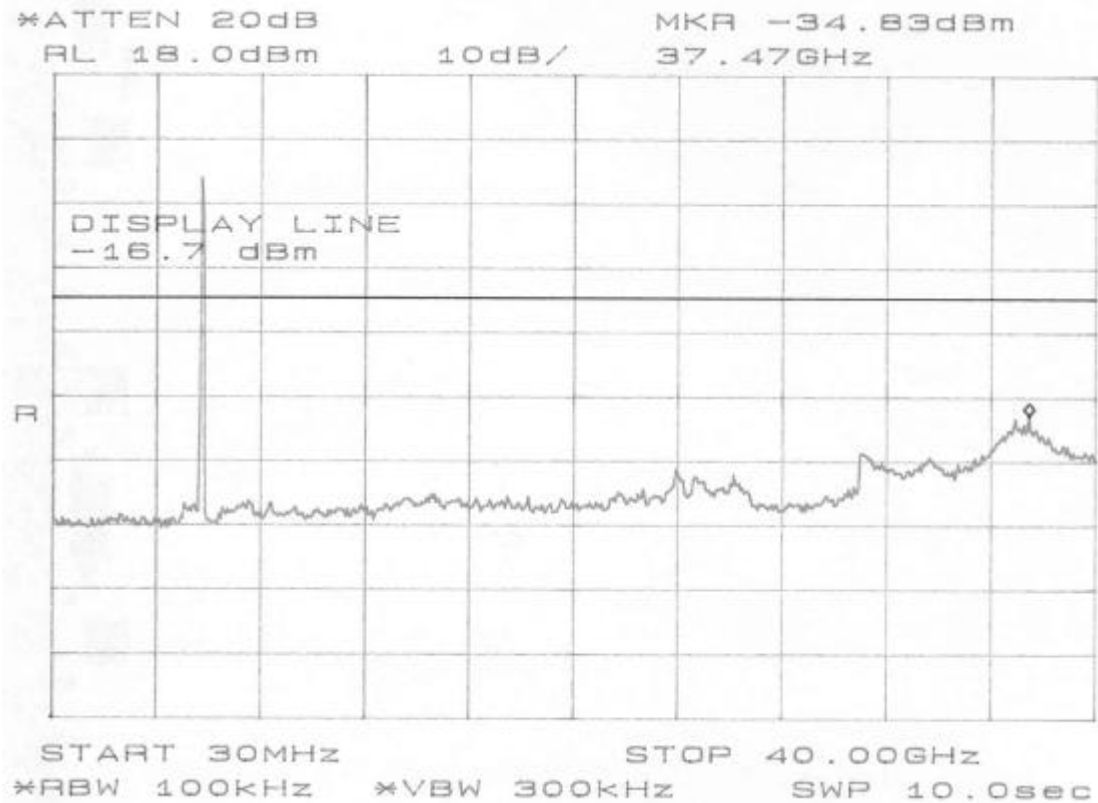




**CONDUCTED SPURIOUS EMISSIONS (5.8 GHZ BAND, TURBO MODE)**









## **9.6. 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.

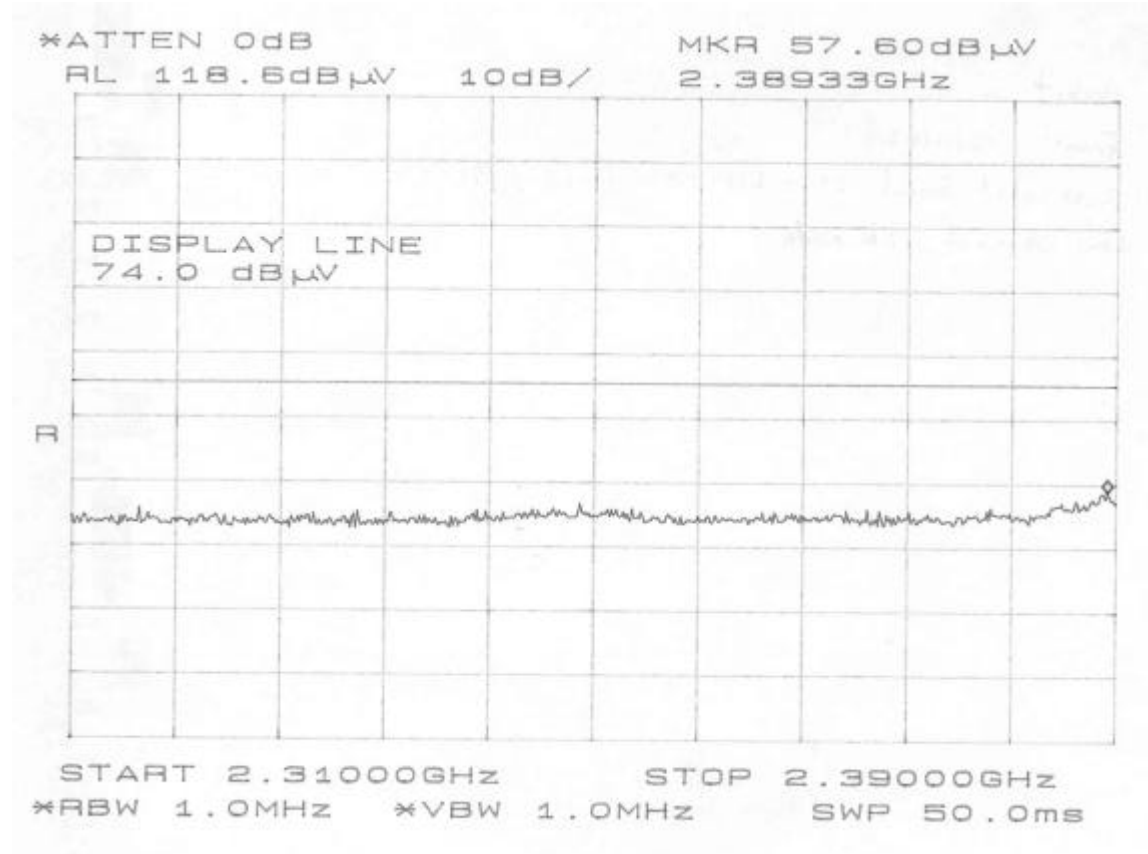
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels within the 2.4 GHz band.

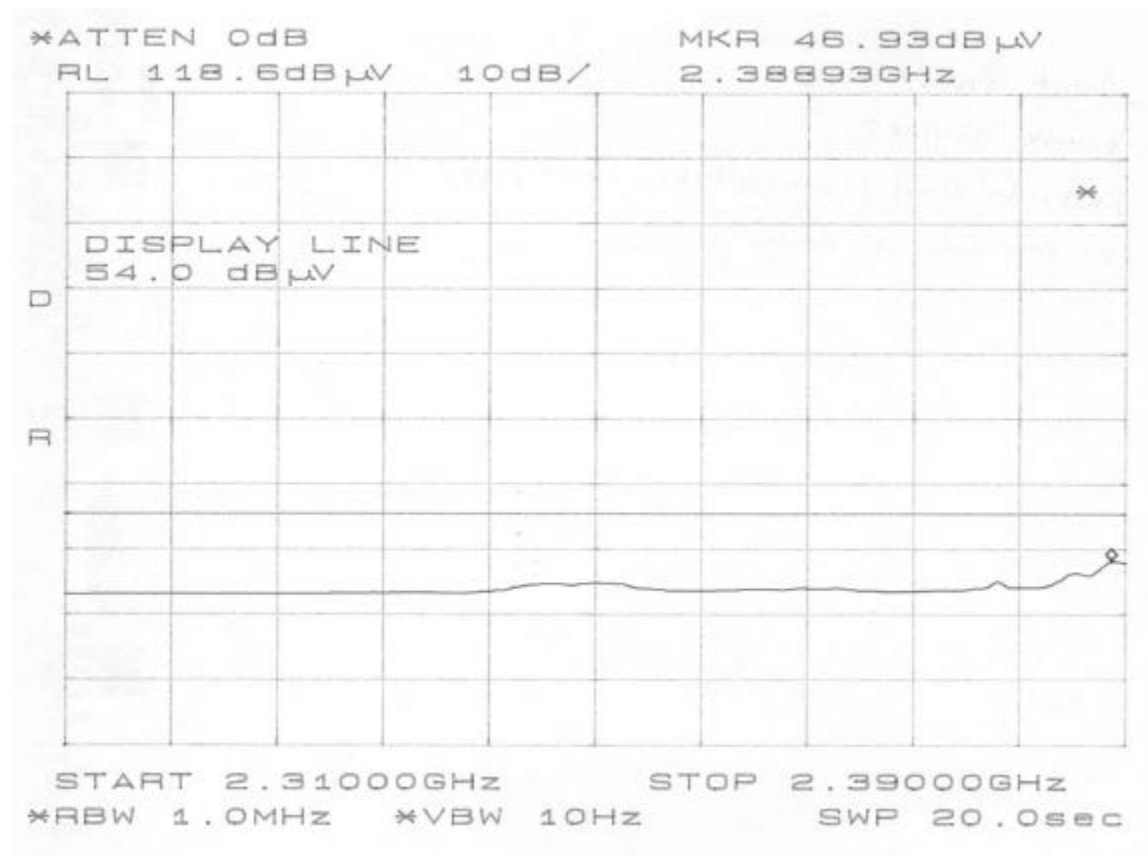
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels within the 5.8 GHz band.

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.

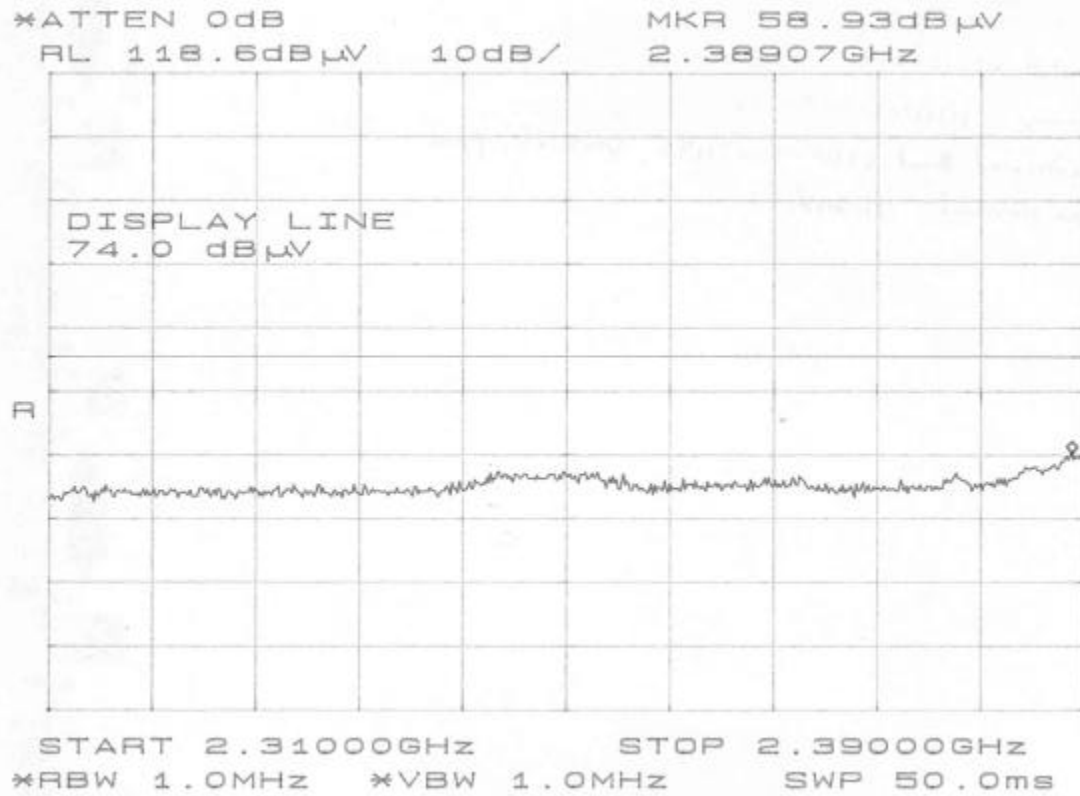
### **TEST RESULTS**

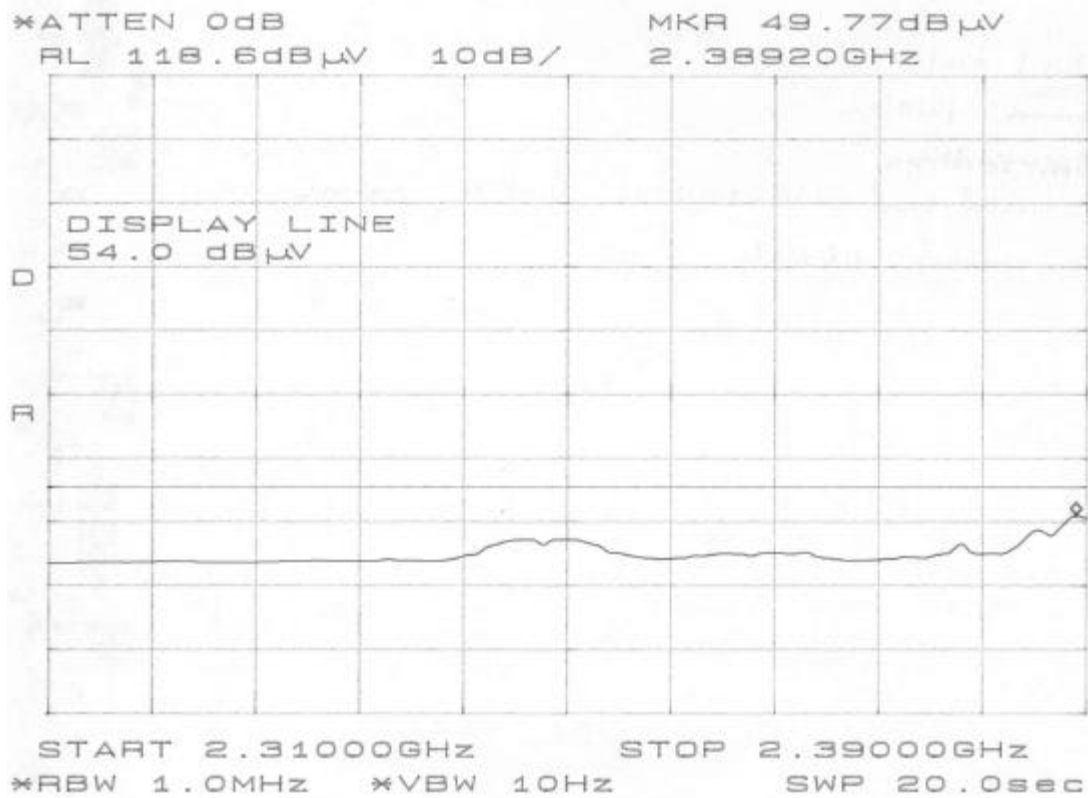
No non-compliance noted:

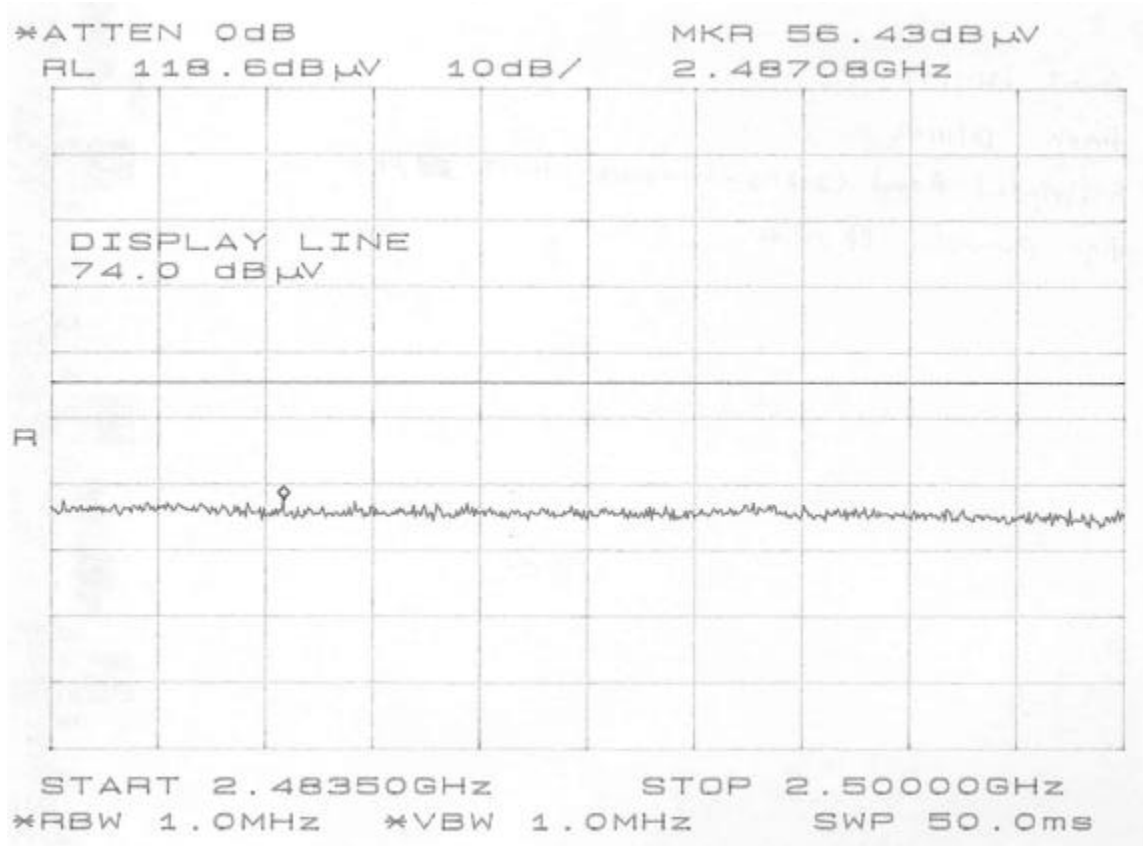
**LOWER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, HORIZONTAL)**

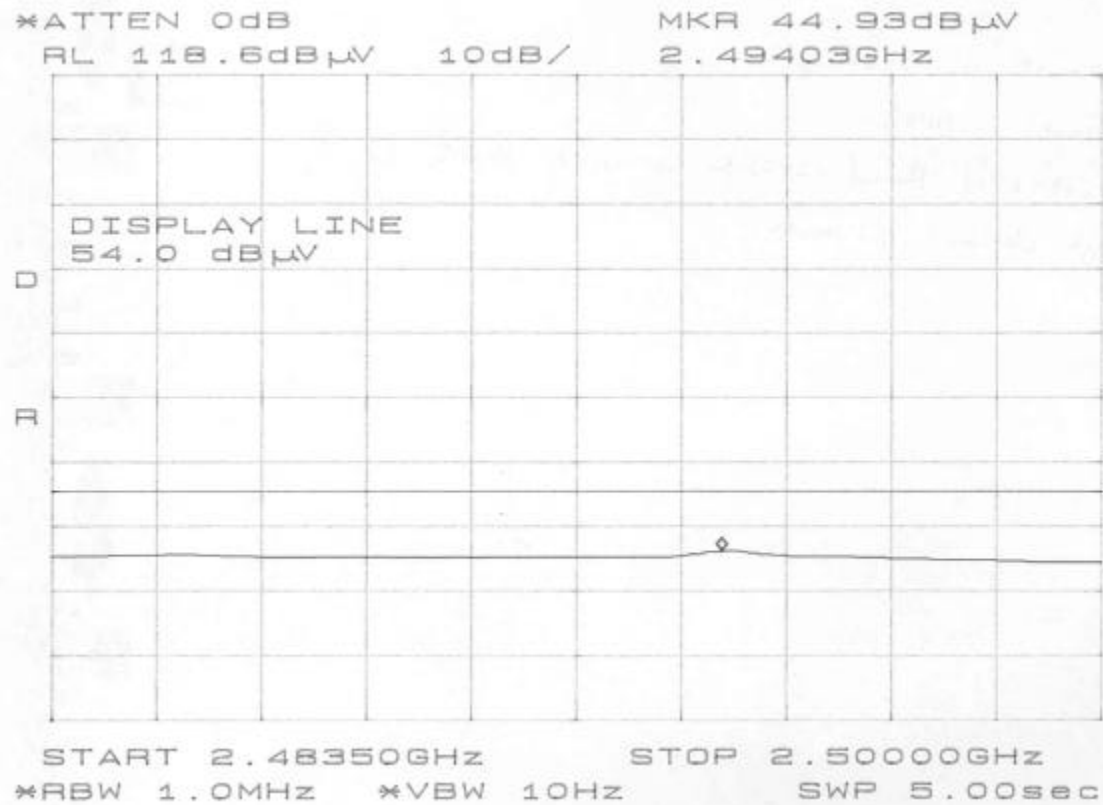


**LOWER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, VERTICAL)**

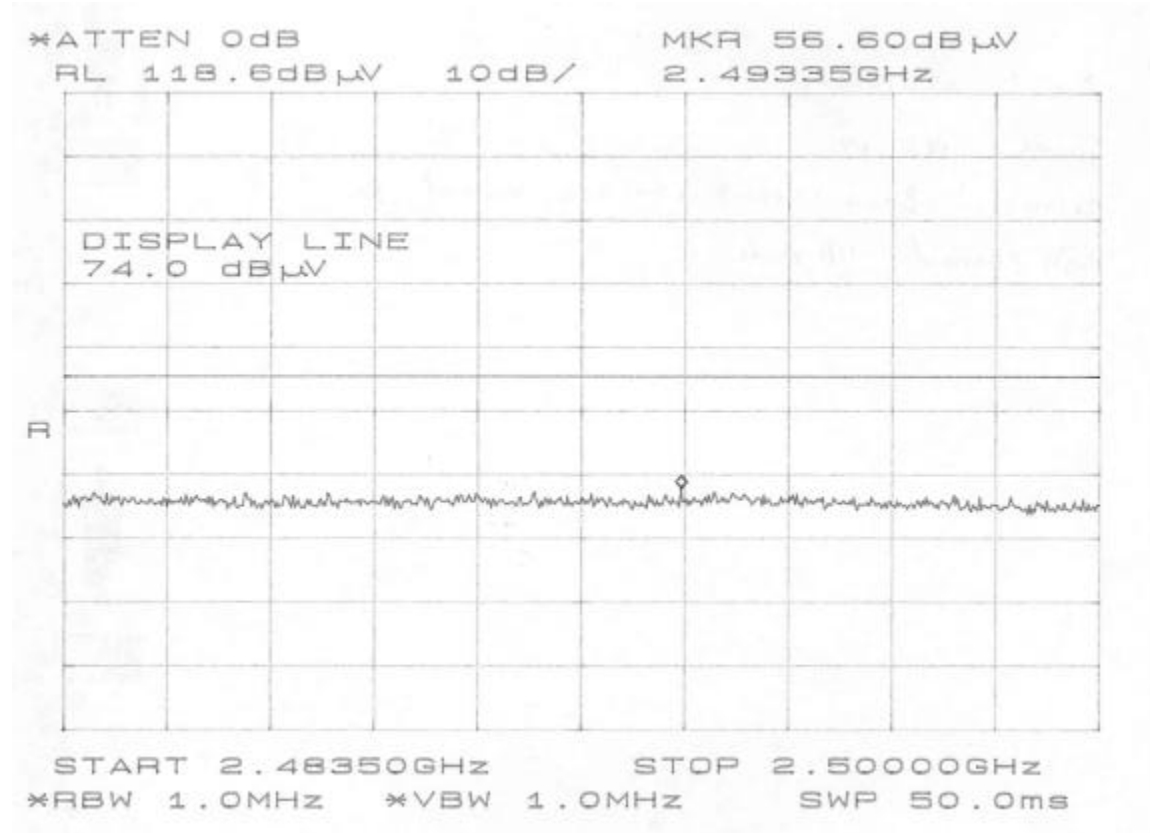




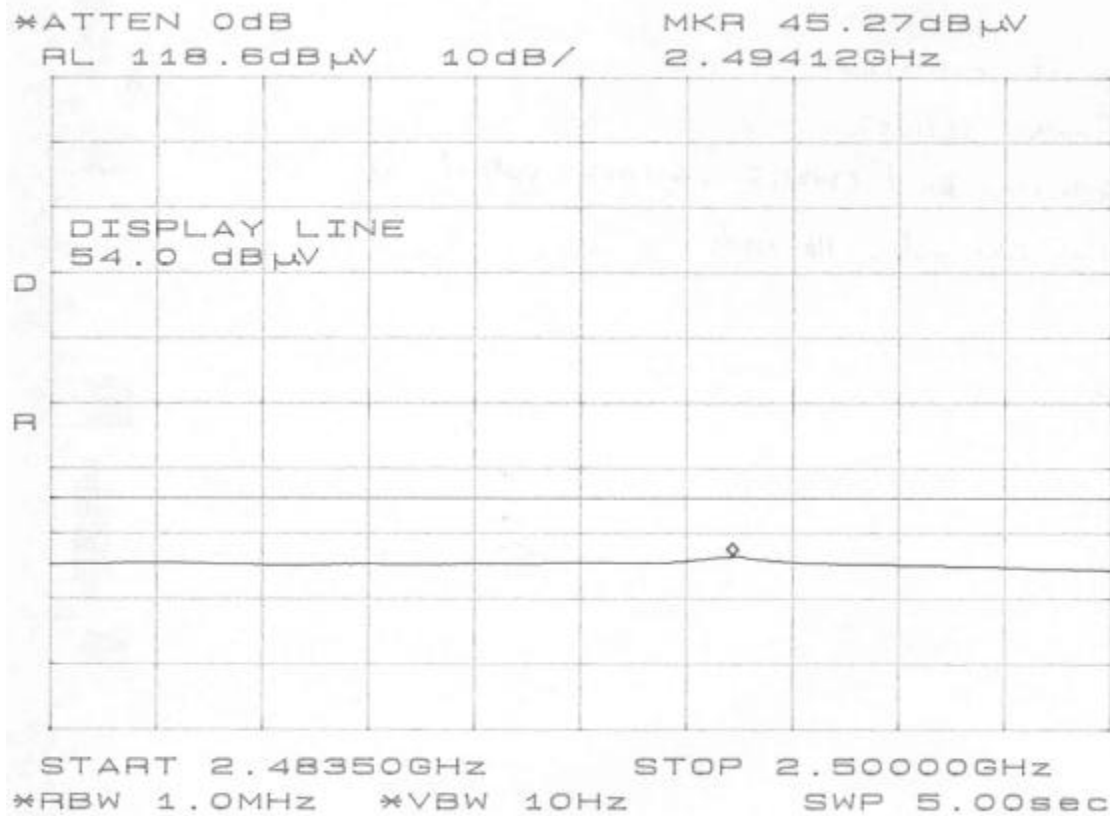
**UPPER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, HORIZONTAL)**



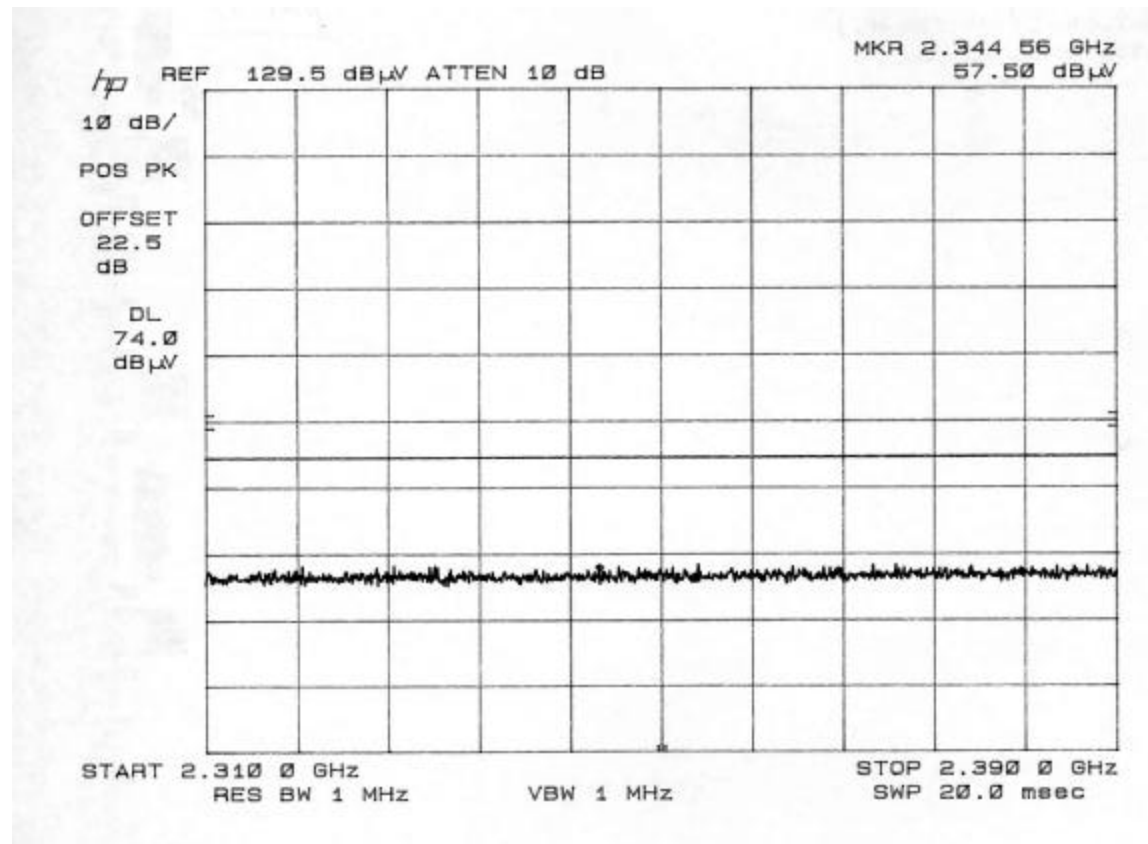
**UPPER RESTRICTED BAND RADIATED EMISSIONS (11 B MODE, VERTICAL)**

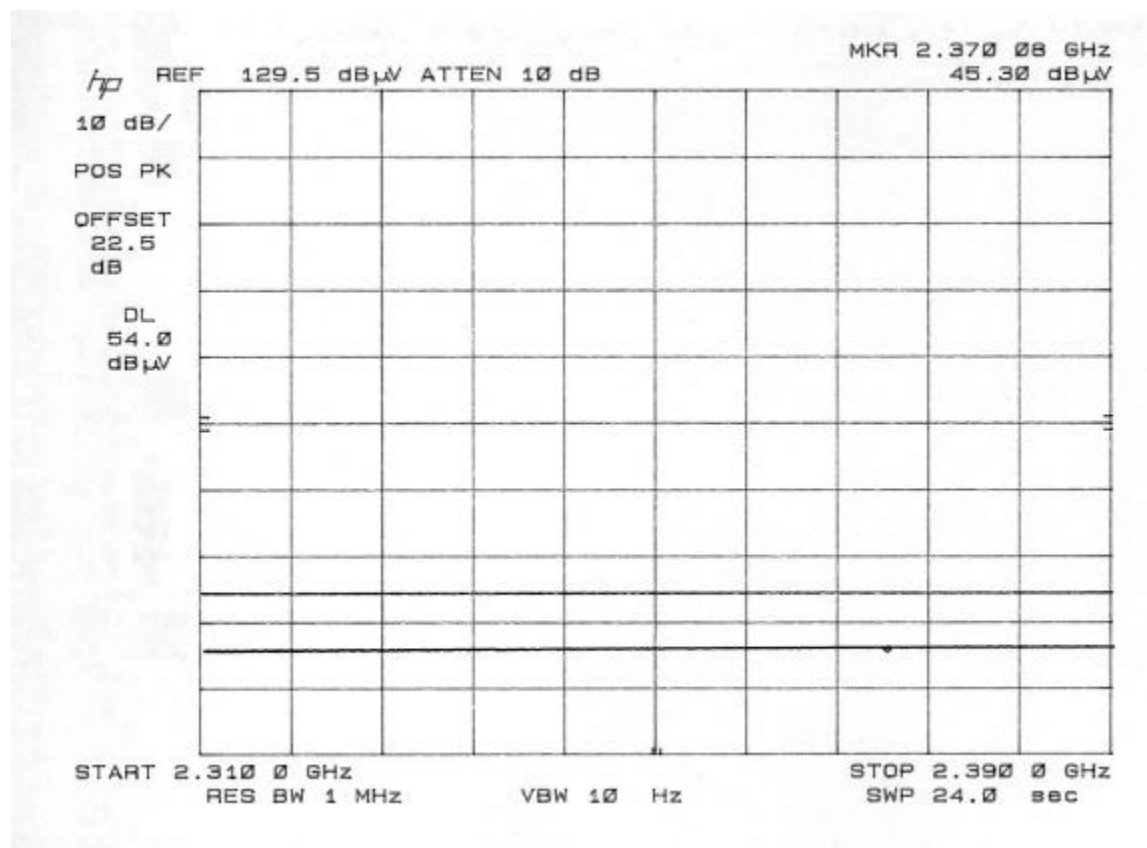




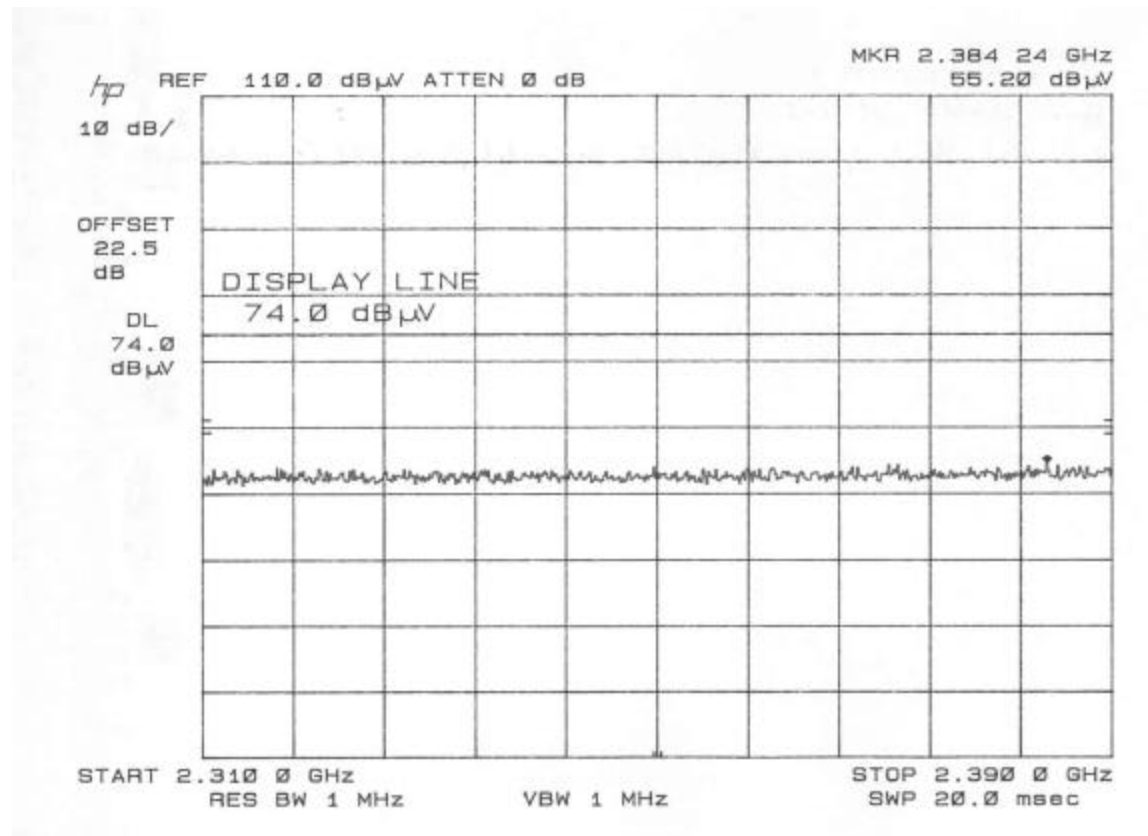


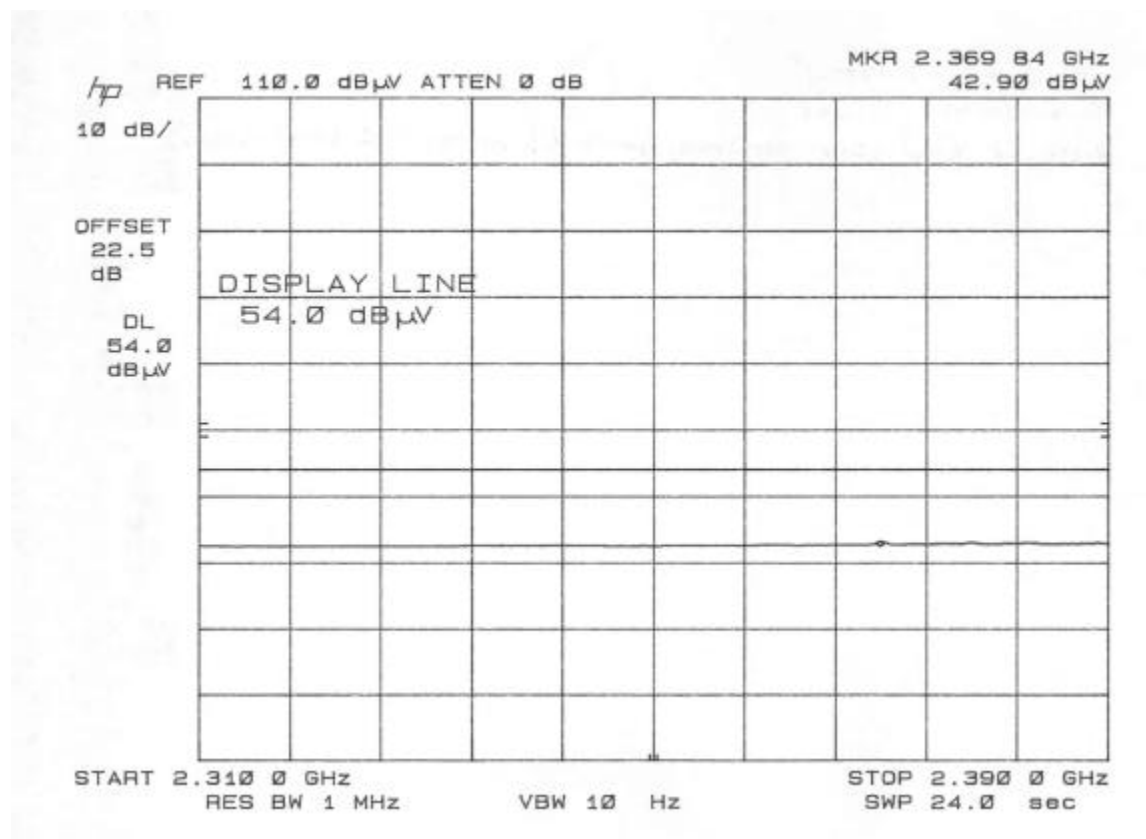
**LOWER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, HORIZONTAL)**



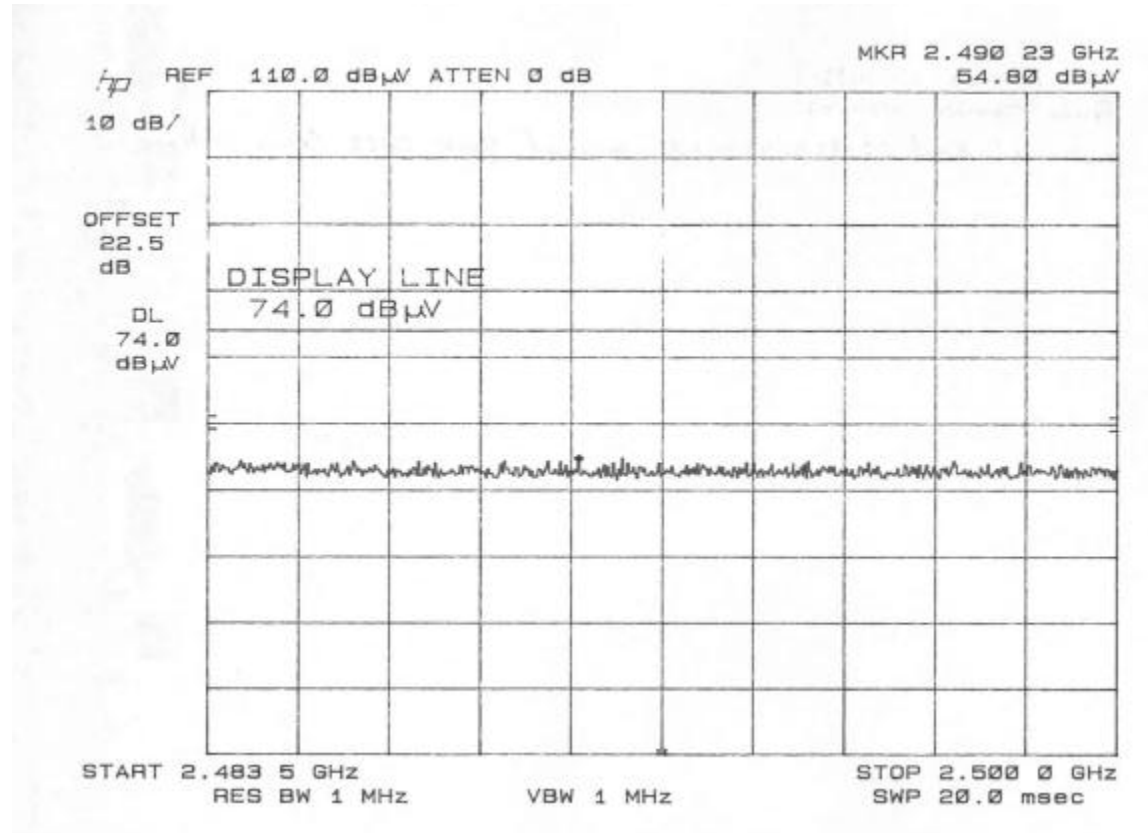


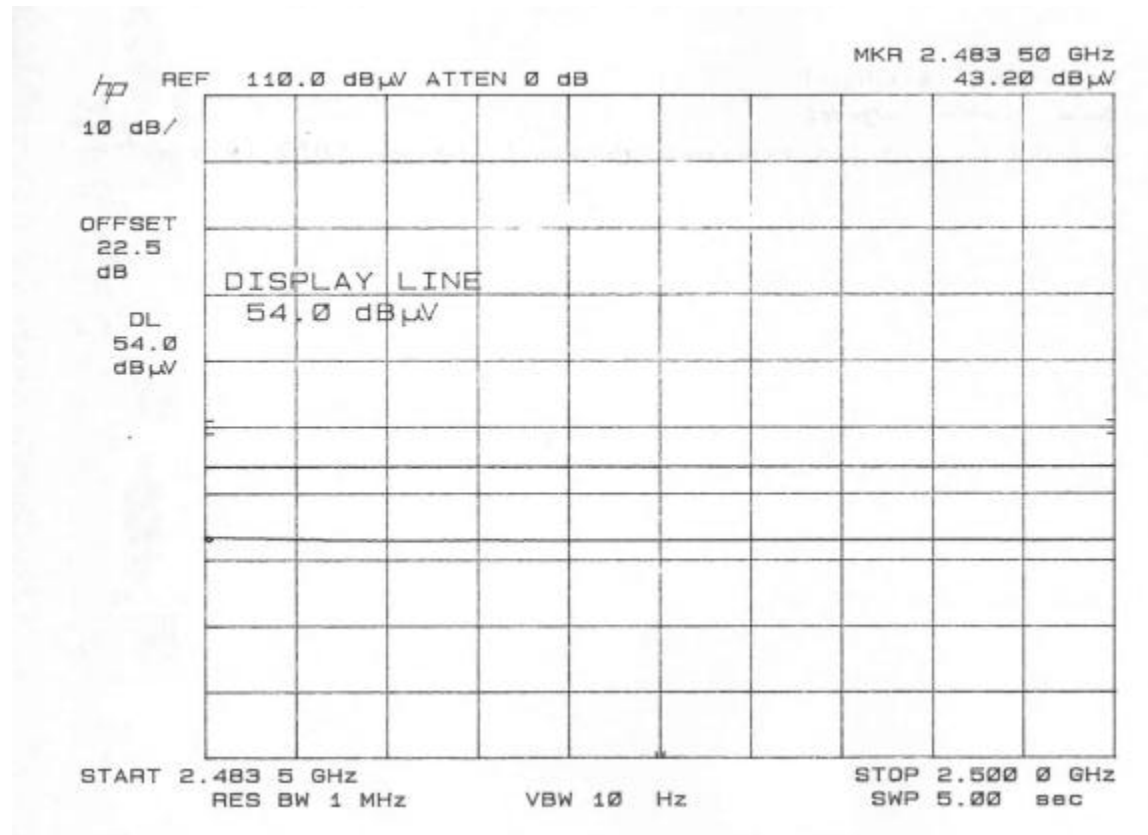
**LOWER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, VERTICAL)**



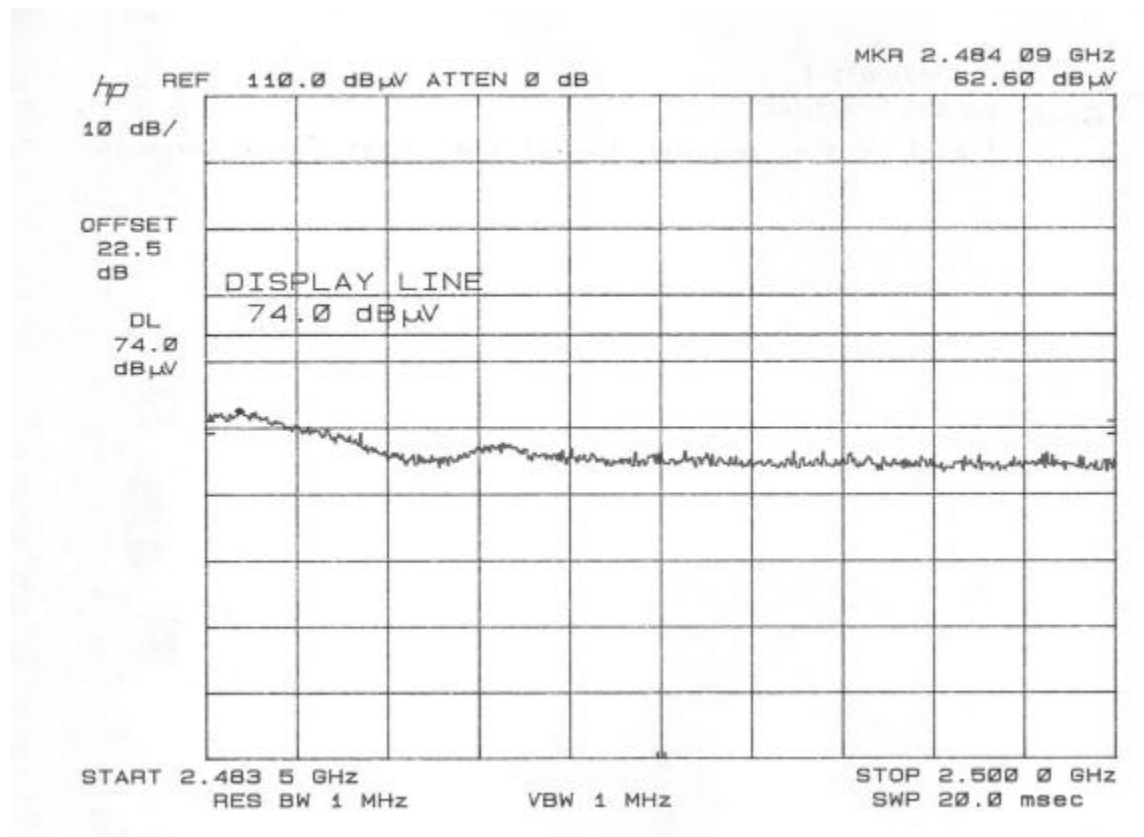


**UPPER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, HORIZONTAL)**

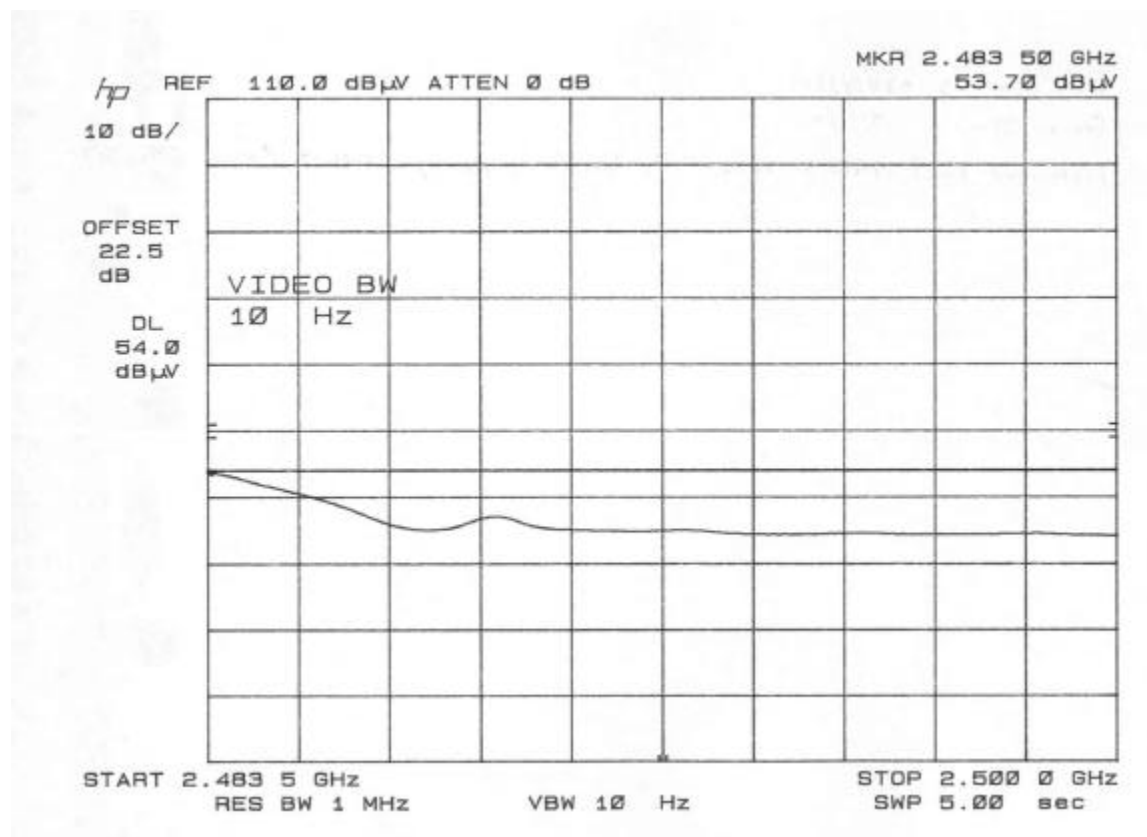




**UPPER RESTRICTED BAND RADIATED EMISSIONS (11 G MODE, VERTICAL)**







**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)**

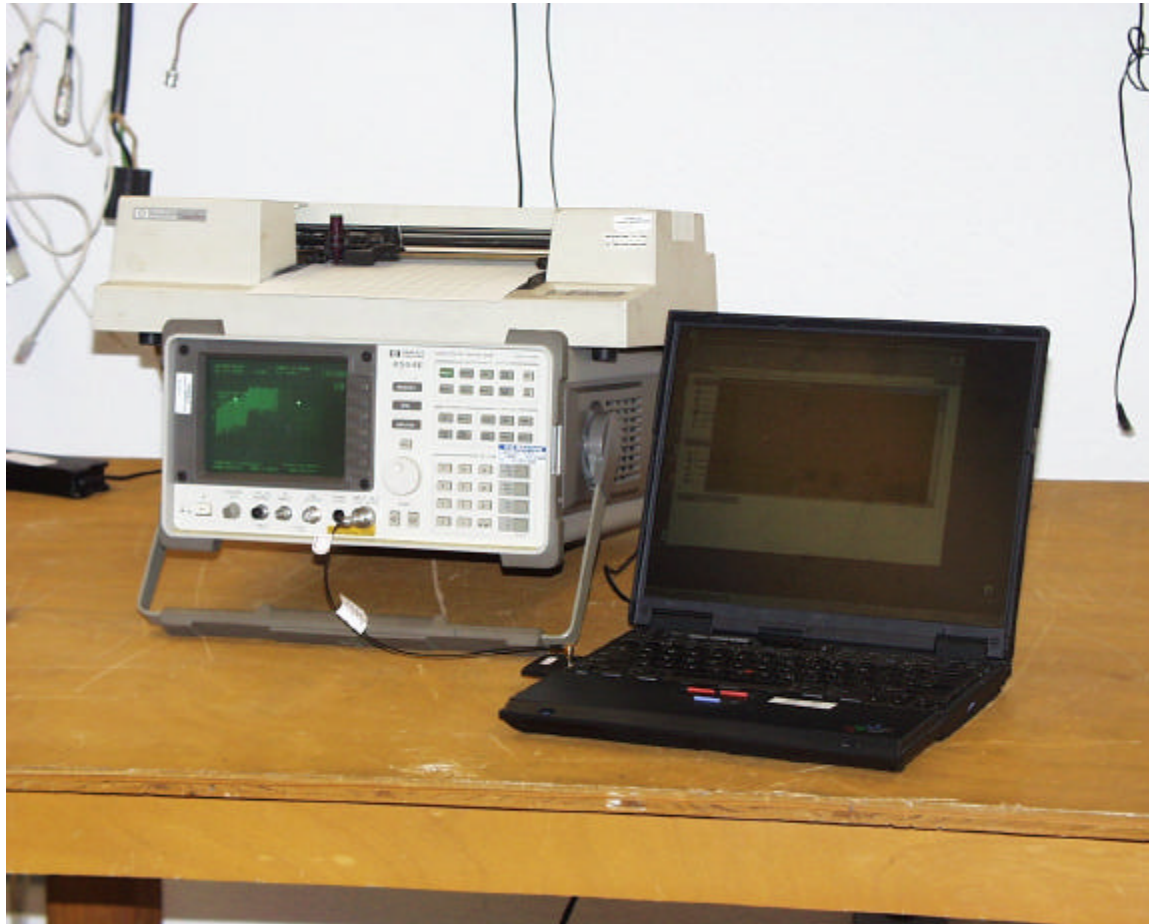
Description of Test: Radiated Emissions - Restricted Bands Project Number: 02U1692 Date: 12/23/02 Test Engineer: Neelesh Raj  Company: Ambit Microsystems Corporation EUT Description: 802.11 a/b/g WLAN Card, Model A460-05 Test Configuration: EUT, Laptop Mode of Operation: TX ON , Freq = 5.76 GHz, Turbo 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**