



# FCC Test Report

**Product Name: HSDPA/UMTS/GPRS/GSM/EDGE  
Mobile Phone with Bluetooth**

**Model Number: HUAWEI U8100-7/U8100-7/IVY**

**Report No: SYBHZ(R)E029032010EB-6  
FCC ID: QISU8100-7**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

Tel: +86 755 28780808 Fax: +86 755 89652518



## Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
2. The laboratory has obtained the accreditation of THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION (A2LA), and Accreditation Council Certificate Number: 2174.01.
3. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
4. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-1.
5. The laboratory also has been listed by the VCCI to perform EMC measurements. The accreditation number is R2364, C2583, and T256.
6. The test report is invalid if not marked with "exclusive stamp for the test report".
7. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
8. The test report is invalid if there is any evidence of erasure and/or falsification.
9. If there is any dissidence for the test report, please file objection to the test centre within 15 days from the date of receiving the test report.
10. Normally, the test report is only responsible for the samples that have undergone the test.
11. Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.





# Contents

<b>1</b>	<b><u>Summary</u></b> .....	<b>5</b>
<b>2</b>	<b><u>Product Description</u></b> .....	<b>6</b>
2.1	PRODUCTION INFORMATION .....	6
2.2	MODIFICATION INFORMATION.....	6
<b>3</b>	<b><u>Test Site Description</u></b> .....	<b>7</b>
3.1	TESTING PERIOD .....	7
3.2	GENERAL SET UP DESCRIPTION .....	7
<b>4</b>	<b><u>Product Description</u></b> .....	<b>8</b>
4.1	TECHNICAL CHARACTERISTICS .....	8
4.2	EUT IDENTIFICATION LIST .....	10
<b>5</b>	<b><u>Main Test Instruments</u></b> .....	<b>11</b>
<b>6</b>	<b><u>Transmitter Measurements</u></b> .....	<b>12</b>
6.1	6dB BANDWIDTH MEASUREMENT .....	12
6.2	PEAK OUTPUT POWER .....	14
6.3	BAND EDGE SPURIOUS EMISSION .....	16
6.4	CONDUCTED RF SPURIOUS .....	18
6.5	POWER SPECTRAL DENSITY.....	20
6.6	RADIATED SPURIOUS EMISSION & SPURIOUS IN RESTRICTED BAND .....	22
6.7	CONDUCTED EMISSION AT POWER PORT .....	26
<b>7</b>	<b><u>System Measurement Uncertainty</u></b> .....	<b>28</b>
<b>8</b>	<b><u>Appendices</u></b> .....	<b>29</b>



# 1 Summary

The table below summarizes the measurements and results for the Wireless Modem HUAWEI U8100-7/U8100-7/IVY. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

<b>FCC Measurement Specification</b>	<b>Description</b>	<b>Result</b>
15.247 (a) (2)	6dB bandwidth measurement	PASS
15.247 (b) (3)	Conducted Peak output power	PASS
15.247 (d)	Band edge compliance measurement	PASS
15.247 (d)	Conducted RF spurious	PASS
15.247 (e)	Power spectral density	PASS
15.247 (d) / 15.205 & 15.209	Radiated spurious emission & Radiated restricted band measurement	PASS
15.207	Conducted emission test for power port	PASS



## 2 Product Description

### 2.1 Production Information

#### 2.1.1 General Description

HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth- HUAWEI U8100-7/U8100-7/IVY is subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band I and Band V. GSM/GPRS/EDGE frequency band includes GSM850 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, and WIFI etc. Externally it provides micro SD card interface, earphone port(to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

**Note: Only WLAN function was considered in this report.**

#### 2.1.2 Support function and Service

The Wireless Modem T-Mobile Pulse Mini/Pulse Mini/ (EUT) support the function and service as follows:

Table 2 Service and Test mode List

Service Name	mode	Characteristic	Corresponding Test Mode	Note
Data	DSSS	Modulation: QPSK	TM1	
Data	OFDM	Modulation: 64QAM	TM2	

### 2.2 Modification Information

For original equipment, following table is not application.

Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable!				
Not applicable!				
Not applicable!				



### **3 Test Site Description**

The test site of:

***Huawei Technologies Co. Ltd.  
P.O. Box 518129  
Huawei base, bantian,  
Longgang District, Shenzhen, China***

#### **3.1 Testing Period**

The test have been performed during the period of

Mar. 22, 2010 – Mar. 24, 2010

#### **3.2 General Set up Description**

The WLAN digitally modulated systems of the EUT can Support 2.4GHz Band. For compliance with FCC regulation 47CFR part15 subpart C, we set the EUT as following test modes to do all compliance tests.

##### **WLAN MODE:**

**TM1:** DSSS mode ,QPSK Modulation,11Mbps data rate

**TM2:** OFDM mode,64QAM Modulation,54 Mbps data rate



## 4 Product Description

### 4.1 Technical Characteristics

#### 4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	2400 to 2483.5 MHz	
Downlink band:	2400 to 2483.5 MHz	
Hop frequency support:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

#### 4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / raster

Channel spacing:	22 MHz
Channel raster:	5 MHz

#### 4.1.3 Type of Emission

Table 6 Type of Emission

Emission Designation:	-
-----------------------	---

According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

#### 4.1.4 Antenna Information

Table 7 Antenna Information

Type:	Integrated / Internal
Maximum Gain(dBi):	1.0 (from 2400MHz to 2500MHz)



#### 4.1.5 Environmental Requirements

Table 8 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%

#### 4.1.6 Power Source

Table 9 Power Source

AC voltage nominal:	~120V
AC voltage range	~100V-240V
AC current maximal:	650mA

#### 4.1.7 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

#### 4.1.8 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Table 10 Applied RF module DC Voltages and Currents

Voltage:	 +3.3V
Current:	100mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)



## 4.2 EUT Identification List

### 4.2.1 Board Information

Table 11 Board Information

HUAWEI U8100-7/U8100-7/IVY Wireless Modem		
Board and Module		
Equipment Designation / Description	Hardware Version	Remarks
MAINBOARD	HD1U811M Ver.B	HUAWEI U8100-7/U8100-7/IVY

### 4.2.2 Adapter Technical Data

AC/DCAdapter Model	:	HS-050040U6
Manufacturer	:	Huawei Technologies Co., Ltd.
Input Voltage	:	~100-240V 50/60Hz 0.2A
Output Voltage	:	 +5.0V, 400mA
Rated Power	:	2W
S/N	:	HKA9B1451079

### 4.2.3

Type:	Rechargeable Li-ion
Manufacturer:	Huawei Technologies Co., Ltd.
Battery Model:	HB5A2H
Rated capacity:	1150mAh
Nominal Voltage:	 +3.7V
Charging Voltage:	 +4.2V

### 4.2.4 FCC Identification

Grantee Code: QIS  
 Product Code: U8100-7  
 FCC Identification: QISU8100-7



## 5 Main Test Instruments

Table 12 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Signal Analyzer	R&S	FSP	3604100094	02.21.2011
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	04.22.2010
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	04.22.2010
Receiver	R&S	ESIB 26	100318	05.29.2010
Receiver	R&S	ESCS30	830245/018	05.29.2010
Pre-Amplifier	Agilent	8447D	2944A10146	05.20.2010
Pre-Amplifier	Agilent	83017A	3950M00246	04.06.2010
BiLog Antenna	Schaffner	CBL 6112B	2536	06.07.2010
Horn Antenna	R&S	HF906	359287/005	03.26.2010
Horn Antenna	ETS-Lindgren	3117	3606061621	07.15.2010
Horn Antenna	ETS-Lindgren	3160	3606061623	07.15.2010
Signal Generator	R&S	SMU200A	3604100093	02.21.2011
Artificial Mains Network	R&S	ENV4200	100001	05.20.2010
Signal Analyzer	Agilent	E4440A	3608031630	01.14.2011



## 6 Transmitter Measurements

### 6.1 6dB bandwidth measurement

#### 6.1.1 Test Conditions

Table 13 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.8°C
Relative humidity:	48%
Test Configurations:	TM1/TM2 at channel No.1, 6, 11

#### 6.1.2 Test Specifications and Limits

##### 6.1.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (2) and KDB 558074

##### 6.1.2.2 Supporting Standards

Table 14 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
---------------------	---

##### 6.1.2.3 Limits

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Table 15 Limits

Limits	≥ 500kHz
--------	----------

#### 6.1.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power at 2.4GHz, then set the measured frequency number and test the 6dB bandwidth with spectrum analyzer.

**Test setup**

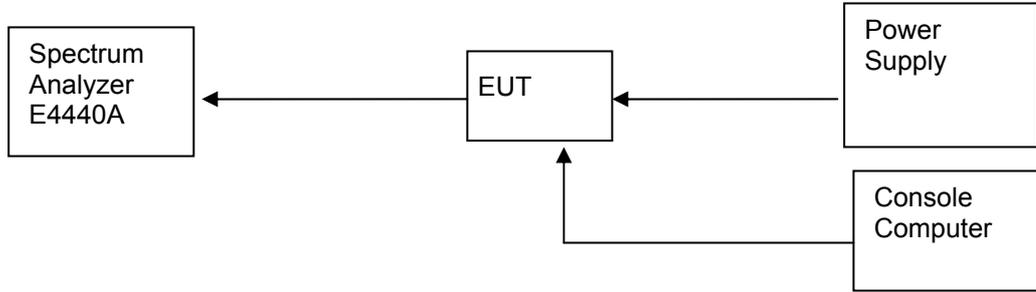


Figure 1. Test Set-up

**6.1.4 Measurement Results**

Table 16 Measurement Results

Test condition	Channel Position	Bandwidth Type	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
TM1	B	6dB Bandwidth	1	2.412	15.384	Pass
	M	6dB Bandwidth	6	2.437	15.502	Pass
	T	6dB Bandwidth	11	2.462	15.634	Pass
TM2	B	6dB Bandwidth	1	2.412	16.491	Pass
	M	6dB Bandwidth	6	2.437	16.472	Pass
	T	6dB Bandwidth	11	2.462	16.451	Pass

**6.1.5 Conclusion**

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix A.



## 6.2 Peak output power

### 6.2.1 Test Conditions

Table 17 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.8°C
Relative humidity:	48%
Test Configurations:	TM1/TM2 at channel No.1, 6, 11

### 6.2.2 Test Specifications and Limits

#### 6.2.2.1 Specification

CFR 47 (FCC) part 15.247 (b) (3) and KDB 558074

#### 6.2.2.2 Supporting Standards

Table 18 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
----------------------	---

#### 6.2.2.3 Limits

Compliance with part 15.247 (b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.

Table 19 Limits

2.4GHz and 5.8GHz system using digital modulation	1 Watt / 30 dBm
---	-----------------

### 6.2.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer.
- (b) Set the EUT to transmit maximum output power.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

**Test setup**

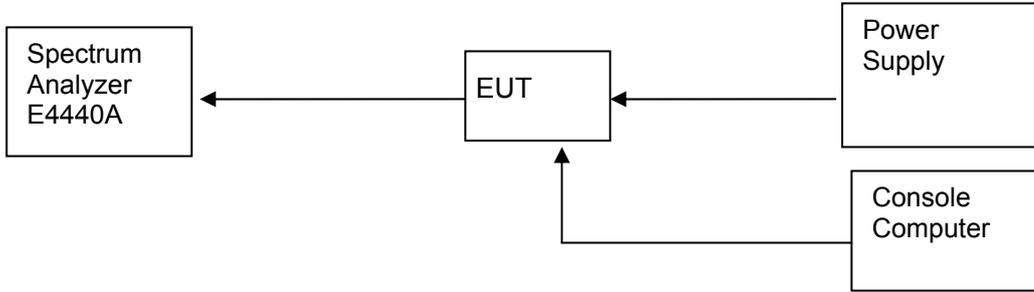


Figure 2. Test Set-up

**6.2.4 Measurement Results**

Table 20 Measurement Results

Test condition	Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
TM1	Bottom	1	2412	11.34	< 30	Pass
	Middle	6	2437	11.95	< 30	Pass
	Top	11	2462	11.13	< 30	Pass
TM2	Bottom	1	2412	11.43	< 30	Pass
	Middle	6	2437	11.79	< 30	Pass
	Top	11	2462	11.39	< 30	Pass

**6.2.5 Conclusion**

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix B.



## 6.3 Band edge spurious emission

### 6.3.1 Test Conditions

Table 21 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.8°C
Relative humidity:	48%
Test Configurations:	TM1/TM2 at channel No. 1, 11

### 6.3.2 Test Specifications and Limits

#### 6.3.2.1 Specification

CFR 47 (FCC) part 15.247(d) and KDB 558074

#### 6.3.2.2 Supporting Standards

Table 22 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
----------------------	---

#### 6.3.2.3 Limits

Compliance with part 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

Table 23 Limits

Band edge spurious:	20 dBc/100kHz
---------------------	---------------

### 6.3.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz
- (c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.

**Test setup**

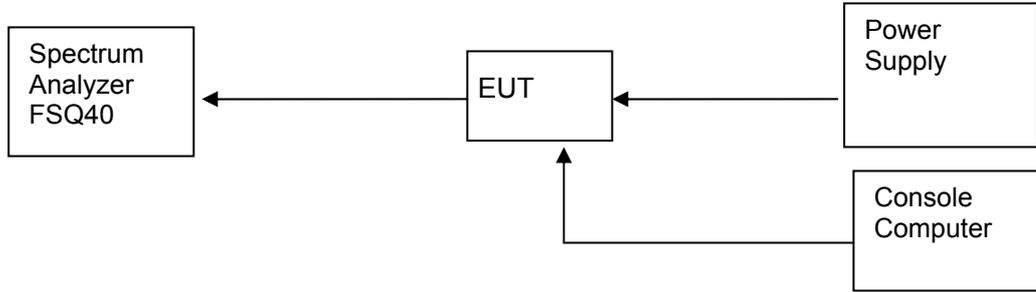


Figure 3. Test Set-up

**6.3.4 Measurement Results**

Table 24 Measurement Results

Test condition		Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Result
TM1	Low Edge	1	2412	2.76	-36.19	-17.24	Pass
	High Edge	11	2462	2.71	-34.17	-17.29	Pass
TM2	Low Edge	1	2412	1.63	-31.19	-18.37	Pass
	High Edge	11	2462	2.18	-28.28	-17.82	Pass

**6.3.5 Conclusion**

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix C.



## 6.4 Conducted RF spurious

### 6.4.1 Test Conditions

Table 25 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.8°C
Relative humidity:	48%
Test Configurations:	TM1/TM2 at channel No.1, 6, 11

### 6.4.2 Test Specifications and Limits

#### 6.4.2.1 Specification

CFR 47 (FCC) part 15.247 (d) and KDB 558074

#### 6.4.2.2 Supporting Standards

Table 26 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
----------------------	---

#### 6.4.2.3 Limits

Compliance with part 15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

Table 27 Limits

Band edge spurious:	20 dBc/100kHz
---------------------	---------------

### 6.4.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz and.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.

## Test setup

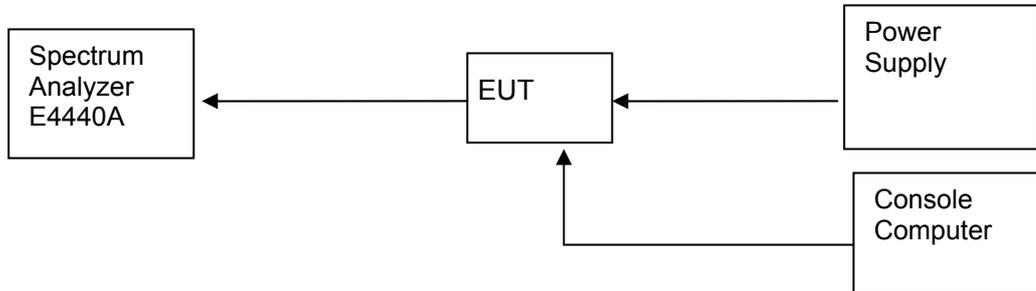


Figure 4. Test Set-up

## 6.4.4 Measurement Results

Table 28 Measurement Results

Test condition	Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Result
TM1	9kHz-26GHz	1	2412	1.91	-52.13	-18.09	Pass
	9kHz-26GHz	6	2437	2.64	-52.40	-17.36	Pass
	9kHz-26GHz	11	2462	1.65	-51.83	-18.35	Pass
TM2	9kHz-26GHz	1	2412	1.19	-52.06	-18.81	Pass
	9kHz-26GHz	6	2437	1.29	-51.43	-18.71	Pass
	9kHz-26GHz	11	2462	0.88	-52.07	-19.12	Pass

## 6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix D.



## 6.5 Power spectral density

### 6.5.1 Test Conditions

Table 29 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25.8°C
Relative humidity:	48%
Test Configurations:	TM1/TM2 at channel No.1, 6, 11

### 6.5.2 Test Specifications and Limits

#### 6.5.2.1 Specification

CFR 47 (FCC) part 15.247 (e) and KDB 558074

#### 6.5.2.2 Supporting Standards

Table 30 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
----------------------	---

#### 6.5.2.3 Limits

Compliance with part 15.247 (e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. The same method of determining the conducted output power shall be used to determine the power spectral density.

Table 31 Limits

Band edge spurious:	8 dBm/3kHz
---------------------	------------

### 6.5.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer
- (b) Set the EUT to transmit maximum output power at 2.4GHz and.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.

**Test setup**

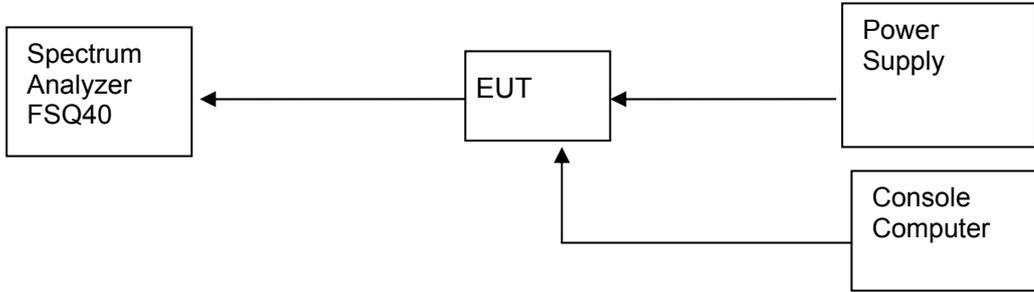


Figure 5. Test Set-up

**6.5.4 Measurement Results**

Table 32 Measurement Results

Test condition	Channel No.	Carrier Frequency [MHz]	Measured Power spectral density [dBm]	Limit [dBm]	Result
TM1	1	2412	-11.63	8	Pass
	6	2437	-11.45	8	Pass
	11	2462	-11.97	8	Pass
TM2	1	2412	-13.21	8	Pass
	6	2437	-13.30	8	Pass
	11	2462	-13.42	8	Pass

**6.5.5 Conclusion**

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix E.



## 6.6 Radiated spurious emission & spurious in restricted band

### 6.6.1 Test Conditions

Table 33 Test Conditions

Preconditioning:	0.5 hour
Measured at:	enclosure
Ambient temperature:	25.2 °C
Relative humidity:	56.8%
Test Configurations:	TM1/TM2 at channel No.1, 6, 11

### 6.6.2 Test Specifications and Limits

#### 6.6.2.1 Specification

CFR 47 (FCC) part 15.247 (d), 15.205 & 15.209 and KDB 558074

#### 6.6.2.2 Supporting Standards

Table 34 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

#### 6.6.2.3 Limits

According to part 15.247 (d) / 15.205 & 15.209, all spurious emission in the frequency range from 30MHz to 10<sup>th</sup> harmonics of carrier frequency should be meet the requirement of following table.

Table 35 Limits

Frequency (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)	Detector
0.009 - 0.490	2400/F(kHz)	20*lg(2400/F(kHz))	300	QP
0.490 - 1.705	24000/F(kHz)	20*lg(24000/F(kHz))	30	QP
1.705 - 30	30	29.5	30	QP
30 – 88	100	40	3	QP
88 – 216	150	43.5	3	QP
216 – 960	200	46	3	QP
960 -1000	500	54	3	QP
Above 1000	500	54	3	PK

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table 42).

### 6.6.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were

made using a Rohde and Schwarz Test Receiver and control software.

A preliminary scan and a final scan of the emissions were made by using test script of software; the emissions were measured using a Quasi-Peak Detector below 1GHz, and AV detector above 1GHz. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

The EUT was communicated with the BTS simulator through Air interface. The EUT operated on the typical channel.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 kHz

Measurement bandwidth: 1000 MHz – 10<sup>th</sup> Carrier Frequency: 1 MHz

**Test set up**

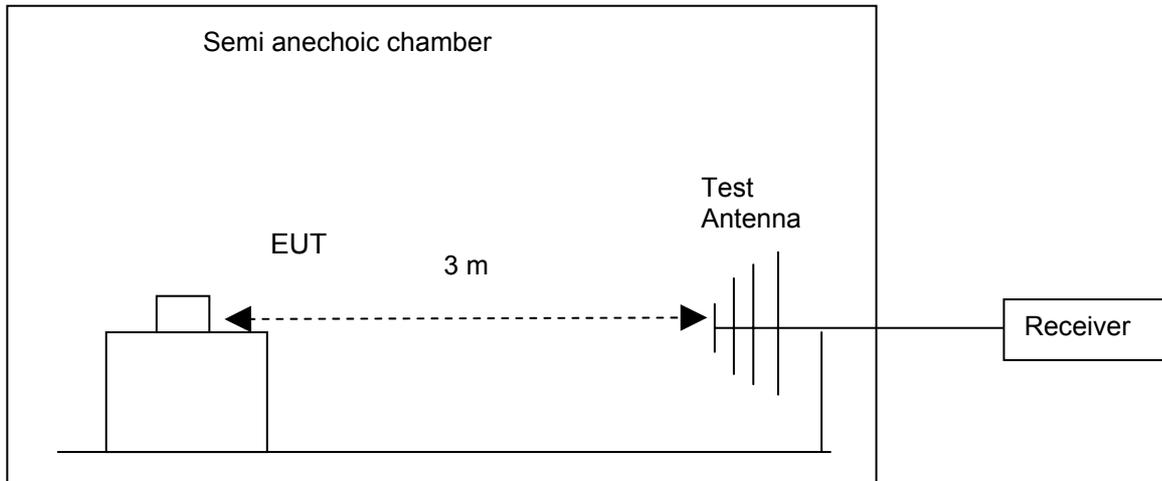


Figure 6. Test Set up

**6.6.4 Measurement Results**

Note 1: The following measurement results exceed the limit line is the carrier frequency.

Note 2: This test was carried out in all the test modes, here only the worst test result was shown.

**Measured Result of channel: 1 (2412MHz)**

Table 36 MEASUREMENT RESULT

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
33.420000	28.90	11.7	40.0	11.1	100.0	78.00	VERTICAL
53.340000	25.30	12.7	40.0	14.7	158.0	0.00	VERTICAL
100.020000	22.70	13.1	43.5	20.8	154.0	359.00	HORIZONTAL
199.980000	20.90	12.1	43.5	22.6	300.0	221.00	VERTICAL
541.980000	29.60	20.9	46.0	16.4	100.0	99.00	VERTICAL
941.220000	37.00	26.5	46.0	9.0	283.0	309.00	VERTICAL
3652.000000	29.10	-6.8	54.0	24.9	100.0	202.00	VERTICAL
4515.000000	29.00	-5.6	54.0	25.0	100.0	195.00	VERTICAL
5611.000000	30.20	-2.3	54.0	23.8	100.0	241.00	HORIZONTAL
11183.000000	28.80	7.0	54.0	25.2	138.0	342.00	HORIZONTAL
14570.000000	42.70	12.2	54.0	11.3	129.0	335.00	VERTICAL
17999.500000	46.80	17.3	54.0	7.2	119.0	282.00	HORIZONTAL
18724.000000	31.10	18.6	54.0	22.9	160.0	318.00	HORIZONTAL
19486.000000	30.20	18.9	54.0	23.8	160.0	307.00	HORIZONTAL



21005.500000	32.00	20.2	54.0	22.0	116.0	104.00	HORIZONTAL
22452.000000	32.90	20.3	54.0	21.1	188.0	4.00	VERTICAL
24587.000000	32.40	22.0	54.0	21.6	122.0	36.00	HORIZONTAL
26497.500000	34.20	27.9	54.0	19.8	122.0	315.00	HORIZONTAL
2310.000000	33.40	-11.7	54.0	20.6	161.0	250.00	VERTICAL
2390.000000	33.40	-11.5	54.0	20.6	177.0	221.00	HORIZONTAL
2412.000000	73.40	-11.5	54.0	-19.4	117.0	7.00	VERTICAL
2483.500000	32.40	-11.3	54.0	21.6	152.0	225.00	VERTICAL

**Measured Result of channel: 7 (2442MHz)**

Table 37 MEASUREMENT RESULT

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
33.720000	29.30	11.7	40.0	10.7	100.0	42.00	VERTICAL
53.340000	25.20	12.7	40.0	14.8	190.0	15.00	VERTICAL
100.020000	22.80	13.1	43.5	20.7	170.0	257.00	VERTICAL
199.200000	20.60	12.1	43.5	22.9	200.0	17.00	VERTICAL
546.900000	29.60	20.9	46.0	16.4	199.0	358.00	HORIZONTAL
941.280000	35.80	26.5	46.0	10.2	137.0	315.00	VERTICAL
3231.500000	27.10	-8.2	54.0	26.9	179.0	9.00	HORIZONTAL
5582.500000	30.90	-2.3	54.0	23.1	121.0	353.00	HORIZONTAL
6923.500000	32.30	0.0	54.0	21.7	134.0	57.00	VERTICAL
9286.000000	35.80	4.6	54.0	18.2	100.0	155.00	VERTICAL
14617.500000	44.60	12.1	54.0	9.4	125.0	242.00	HORIZONTAL
17994.500000	48.20	17.3	54.0	5.8	149.0	99.00	HORIZONTAL
18776.000000	30.60	18.5	54.0	23.4	113.0	43.000	VERTICAL
19492.000000	30.00	18.9	54.0	24.0	194.0	21.00	HORIZONTAL
21782.000000	32.10	20.5	54.0	21.9	112.0	163.00	VERTICAL
24188.000000	30.90	21.5	54.0	23.1	143.0	5.00	VERTICAL
25289.000000	30.80	23.1	54.0	23.2	196.0	350.00	VERTICAL
26492.000000	38.30	27.9	54.0	15.7	140.0	332.00	HORIZONTAL

**Measured Result of channel: 11 (2462MHz)**

Table 38 MEASUREMENT RESULT

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
33.480000	30.20	11.7	40.0	9.8	100.0	45.00	VERTICAL
53.340000	25.00	12.7	40.0	15.0	198.0	316.00	VERTICAL
100.020000	22.60	13.1	43.5	20.9	155.0	275.00	VERTICAL
202.020000	20.50	12.1	43.5	23.0	200.0	209.00	HORIZONTAL
549.120000	29.70	20.9	46.0	16.3	102.0	81.00	VERTICAL
950.340000	36.10	26.5	46.0	9.9	100.0	113.00	VERTICAL
3199.000000	26.10	-8.3	54.0	27.9	120.0	63.00	HORIZONTAL
4297.000000	28.70	-5.2	54.0	25.3	100.0	39.00	VERTICAL
5543.000000	29.80	-2.3	54.0	24.2	153.0	23.00	VERTICAL
7646.000000	31.40	1.7	54.0	22.6	179.0	177.00	HORIZONTAL
14618.000000	40.10	12.1	54.0	13.9	144.0	166.00	HORIZONTAL
17922.000000	46.60	16.8	54.0	7.4	136.0	170.00	HORIZONTAL
19484.000000	30.50	18.9	54.0	23.5	135.0	147.00	HORIZONTAL
20481.000000	30.90	19.7	54.0	23.1	146.0	157.00	HORIZONTAL
21782.000000	31.10	20.5	54.0	22.9	110.0	117.00	VERTICAL
23536.000000	30.70	20.5	54.0	23.3	187.0	292.00	VERTICAL
24216.000000	30.30	21.5	54.0	23.7	175.0	102.00	HORIZONTAL
26497.000000	34.30	27.9	54.0	19.7	117.0	101.00	VERTICAL
2310.000000	34.60	-11.7	54.0	19.4	175.0	89.00	HORIZONTAL



2390.000000	33.40	-11.5	54.0	20.6	104.0	178.00	HORIZONTAL
2462.000000	73.50	-11.5	54.0	-19.5	272.0	38.00	VERTICAL
2483.500000	32.70	-11.3	54.0	21.3	207.0	168.00	VERTICAL
2500.000000	32.80	-11.2	54.0	21.2	142.0	255.00	HORIZONTAL

Note: Because the PK value is smaller than AV Limit line, so the AV value is certainly smaller than AV limit line.

### 6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
For the measurement results refer to appendix F.



## 6.7 Conducted Emission at Power Port

### 6.7.1 Test Conditions

Table 39 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	24.6°C
Relative humidity:	55.7 %
Test Configurations:	TM1 at channel No. 7

### 6.7.2 Test Specifications and Limits

#### 6.7.2.1 Specification

CFR 47 (FCC) part 15.207 and KDB 558074

#### 6.7.2.2 Supporting Standards

Table 40 Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
------------------	--

#### 6.7.2.3 Limits

Compliance with part15.207, conducted emission must meet the requirement of following table.

Table 41 Limits

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: \* Decreases with the logarithm of the frequency.

### 6.7.3 Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The EUT was communicated with the BTS simulator through Air interface, the BTS simulator controls the Wireless Modem to transmitter the maximum power which defined in specification of product. The Wireless Modem operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

## Test Set-up

The EUT was setup in the screened chamber and operated under nominal conditions.

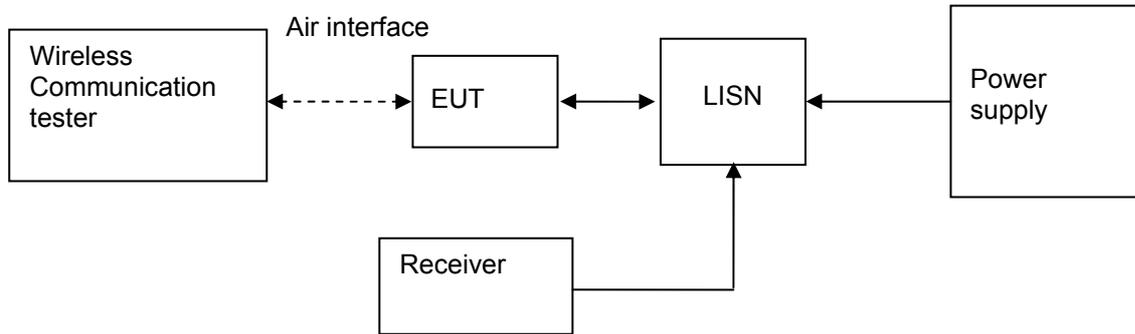


Figure 7. Test Set-up

## 6.7.4 Measurement Results

Table 42 MEASUREMENT RESULT:QP DECTER

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.177000	46.00	10.1	65	19.0	N	FLO
0.451500	45.60	10.1	57	11.4	N	FLO
0.996000	38.50	10.1	56	17.5	N	FLO
1.626000	38.10	10.1	56	17.9	N	FLO
2.350500	41.00	10.1	56	15.0	N	FLO
3.880500	45.50	10.2	56	10.5	N	FLO

Table 43 MEASUREMENT RESULT:AV DECTER

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.177000	38.60	10.1	55	16.4	L1	FLO
0.447000	32.50	10.1	47	14.5	N	FLO
0.991500	33.70	10.1	46	12.3	N	FLO
1.621500	32.20	10.1	46	13.8	N	FLO
2.346000	36.50	10.1	46	9.5	N	FLO
3.700500	37.10	10.2	46	8.9	N	FLO

## 6.7.5 Conclusion

The equipment **PASSED** the requirement of this clause.  
 For the measurement results refer to appendix G.



## 7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Table 44 System Measurement Uncertainty

Items		Extended Uncertainty
20dB bandwidth measurement	Magnitude (%)	U=0.2%; k=2
Carrier frequency separation measurement	Magnitude (%)	U=0.2%; k=2
Time of occupancy	Magnitude (%)	U=0.2%; k=2
Peak output power	Power(dBm)	U=0.39dB; k=2
Band edge compliance measurement	Disturbance Power(dBm)	U=2.0dB; k=2
Conducted RF spurious	Disturbance Power(dBm)	U=2.0dB; k=2
Radiated spurious emission & Radiated restricted band measurement	Field strength (dB $\mu$ V/m)	U=2.2dB; k=2 U=5dB; k=2
Conducted emission test for power port	Disturbance Voltage(dB $\mu$ V)	U=3.3dB; k=2



## 8 Appendices

Appendix A	Measurement Results 6dB bandwidth measurement	7 pages
Appendix B	Measurement Results Peak output power	7 pages
Appendix C	Measurement Results Band edge compliance measurement	5 pages
Appendix D	Measurement Results Conducted RF spurious	13 pages
Appendix E	Measurement Results Power spectral density	7 pages
Appendix F	Measurement Results Radiated spurious emission	15 pages
Appendix G	Measurement Results Conducted emission test for power port	2 pages
Appendix H	Photos of Test Setup	3 pages

(END OF REPORT)



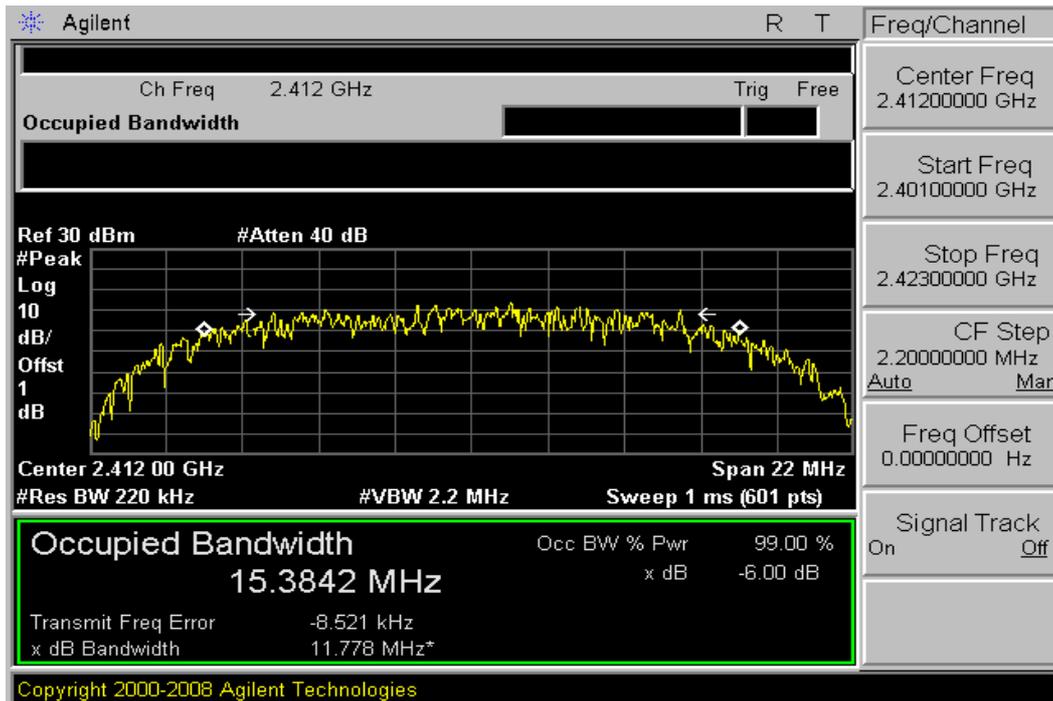
# Appendix A

## 6dB bandwidth measurement

According to FCC Part 15.247 (a) (2)

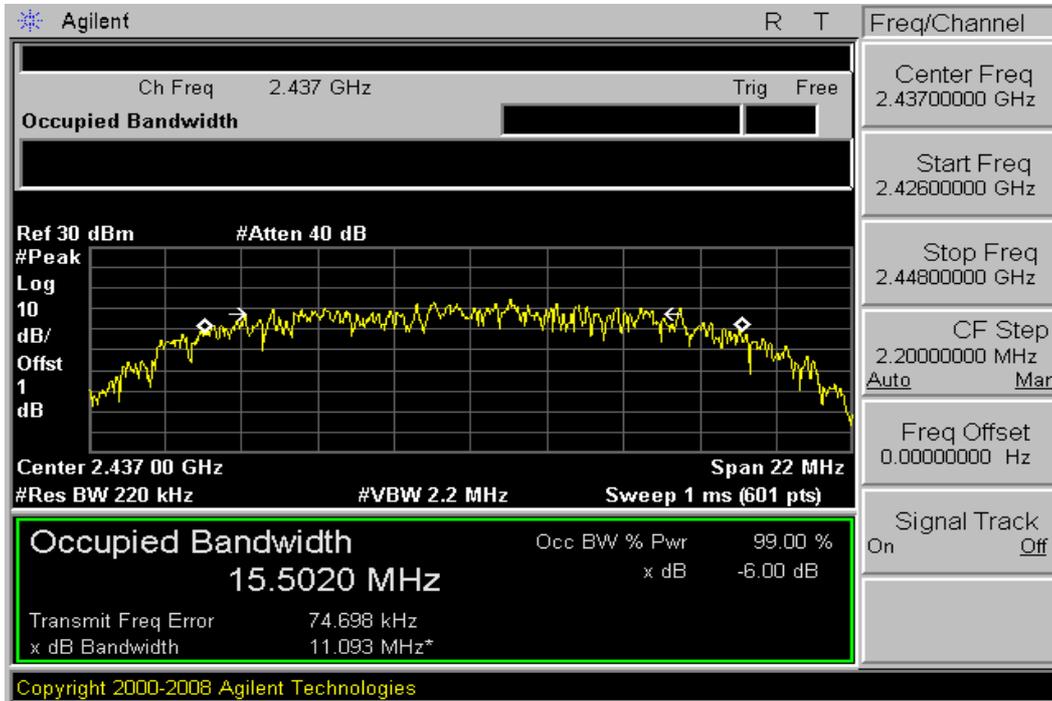


# TM1 Channel 1 (2412MHz)



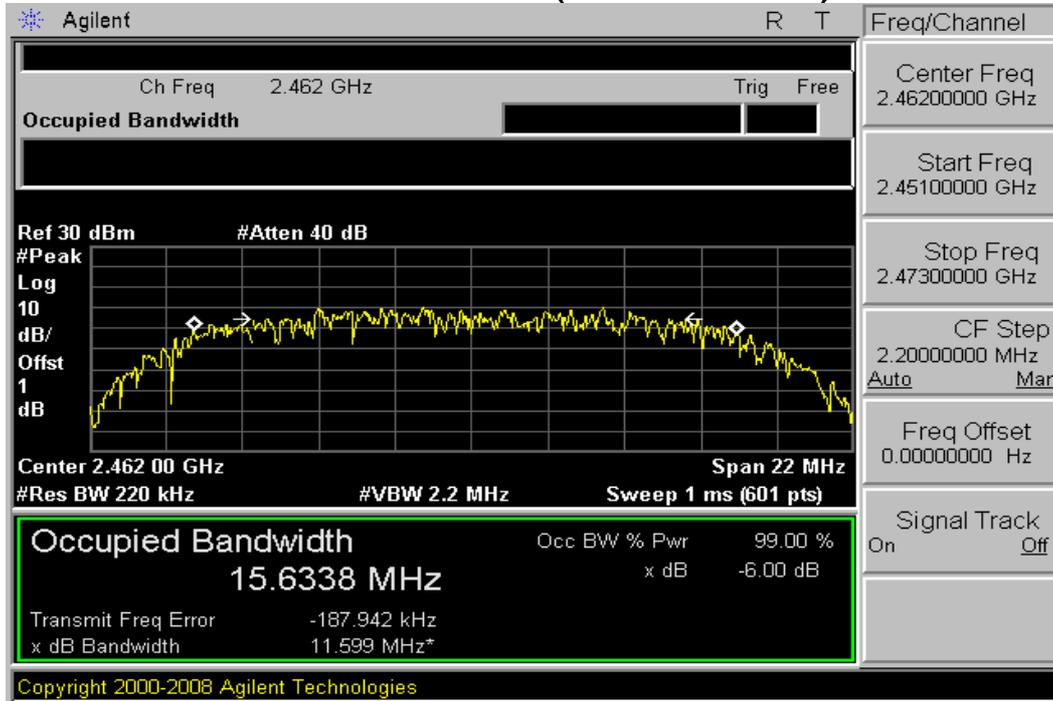


# Channel 6 (2437MHz)





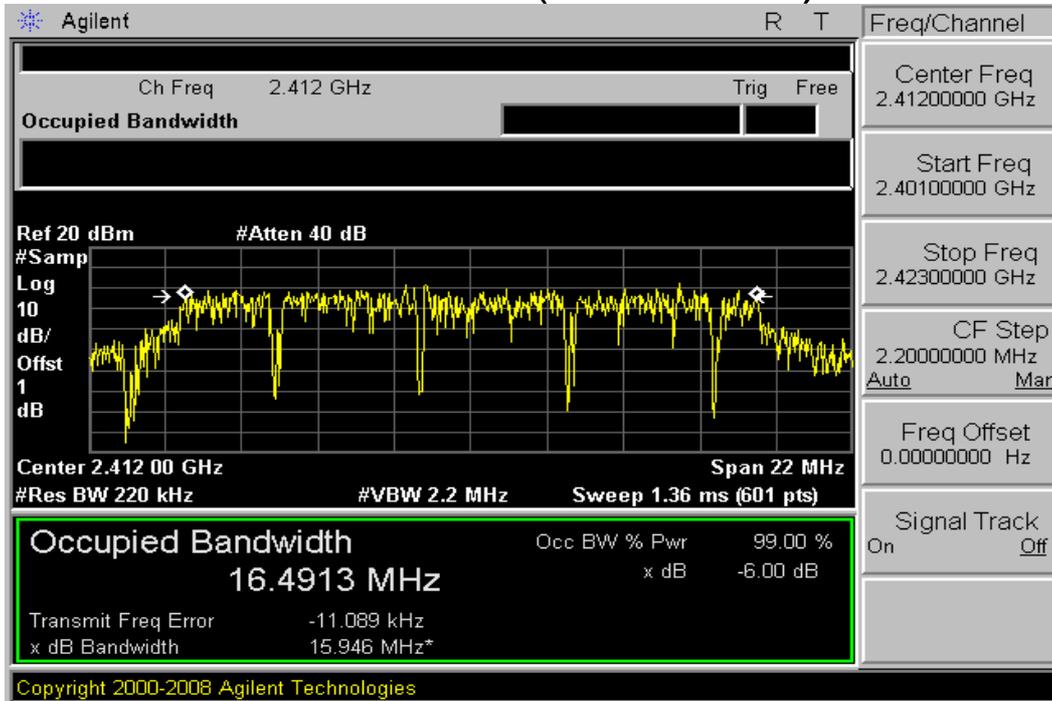
# Channel 11 (2462MHz)





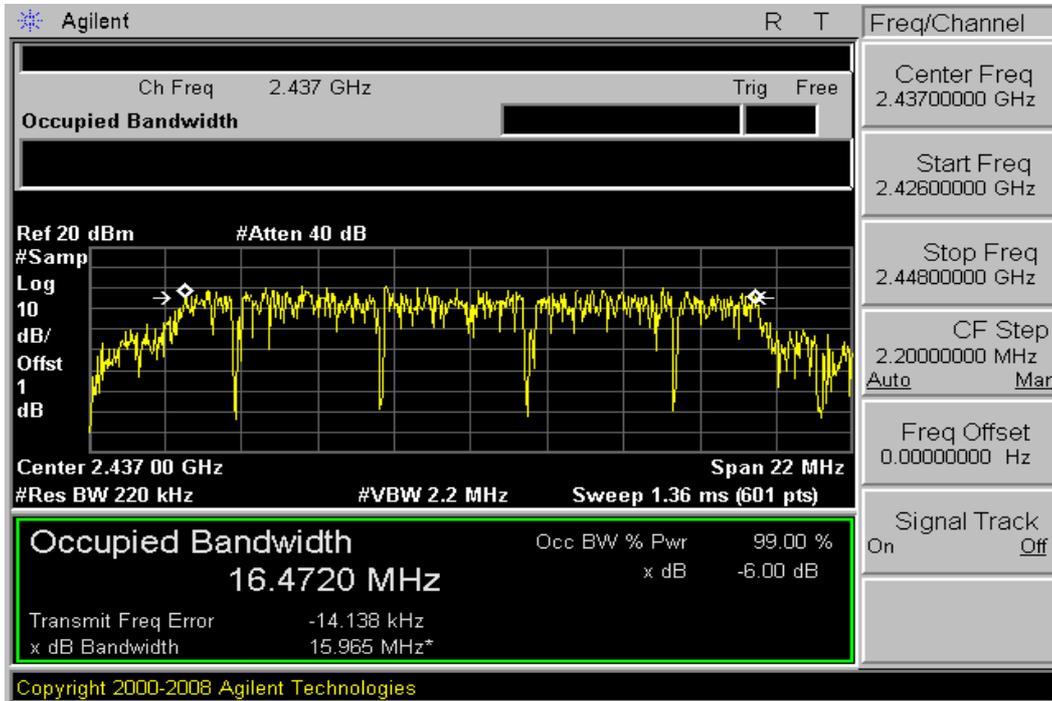
# TM2

## Channel 1 (2412MHz)



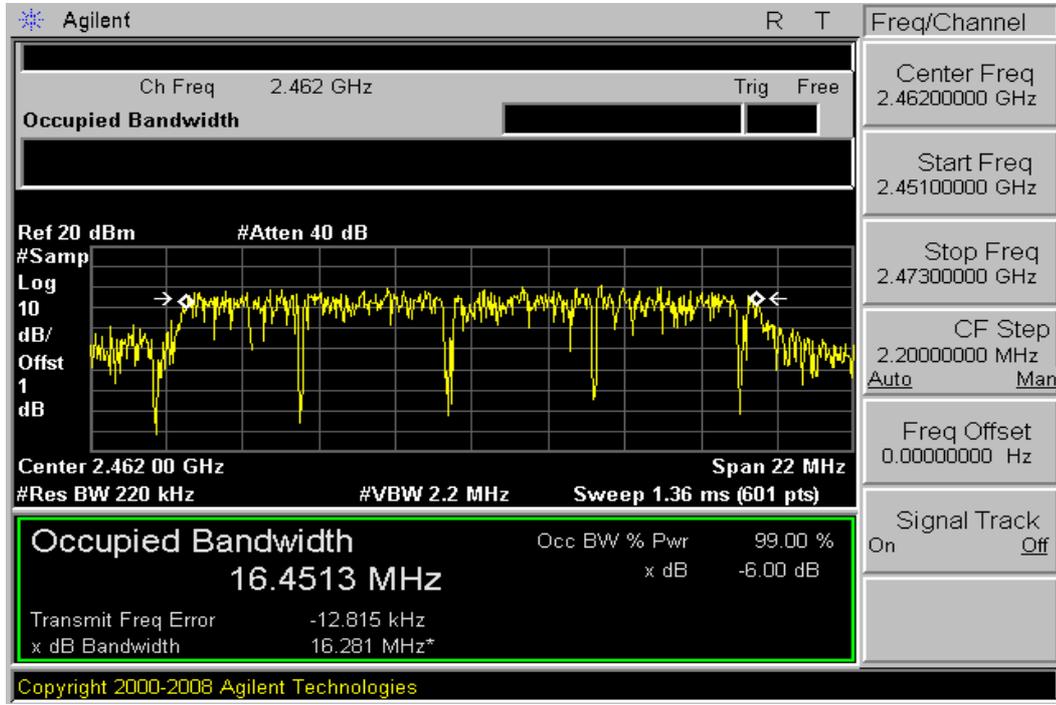


# Channel 6 (2437MHz)





# Channel 11 (2462MHz)





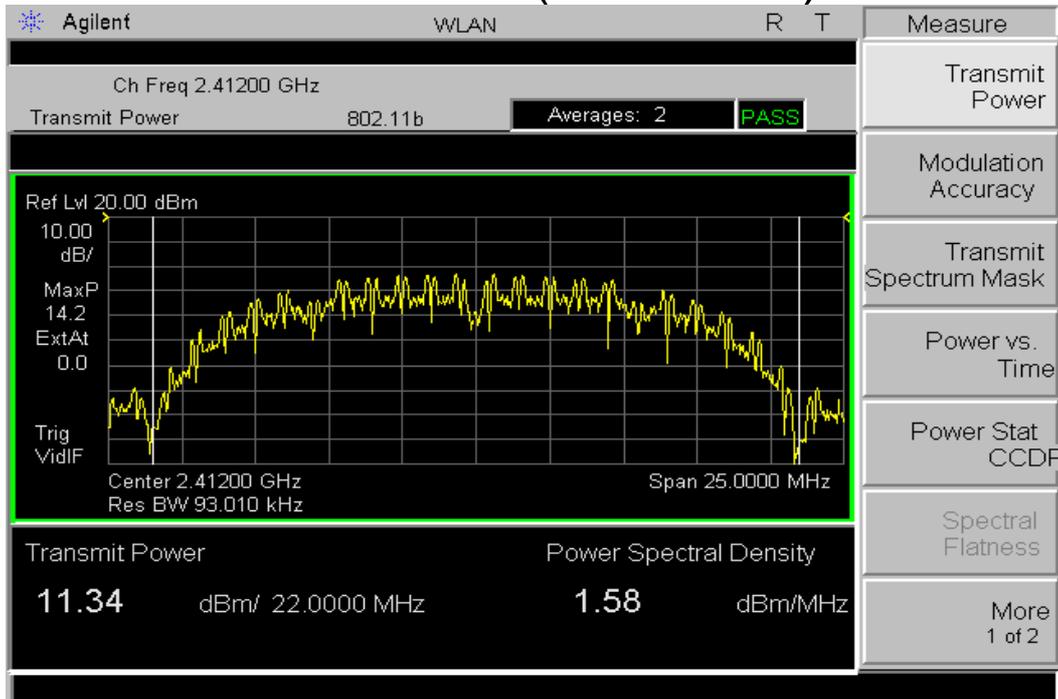
## **Appendix B**

# Conducted Peak output power

According to FCC Part 15.247 (b) (3)

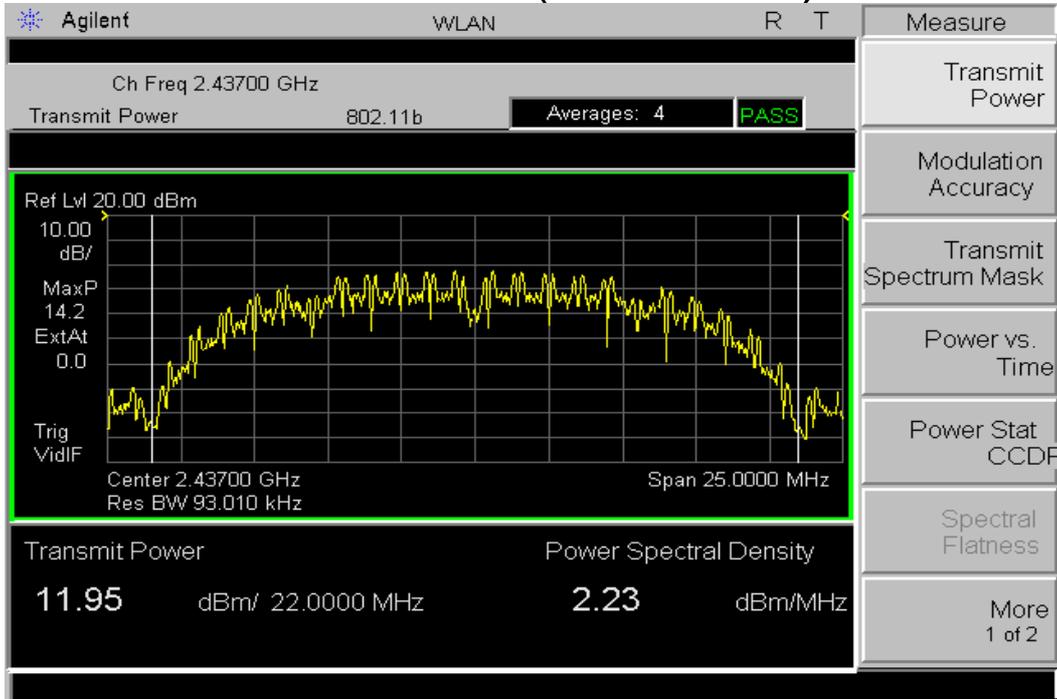


# TM1 Channel 1 (2412MHz)



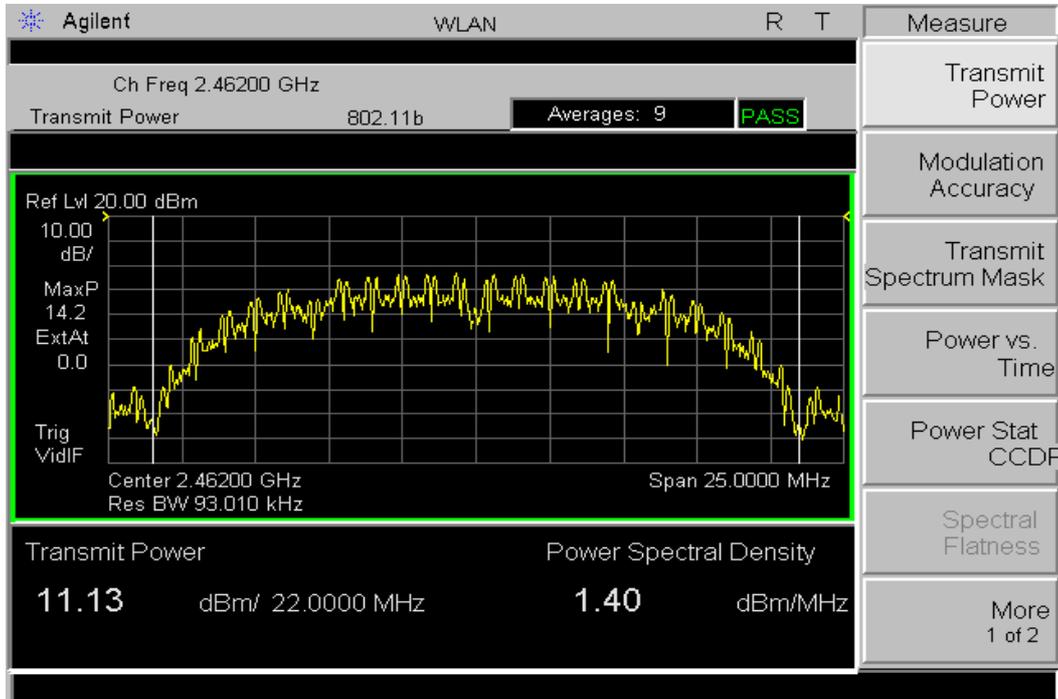


# Channel 6 (2437MHz)



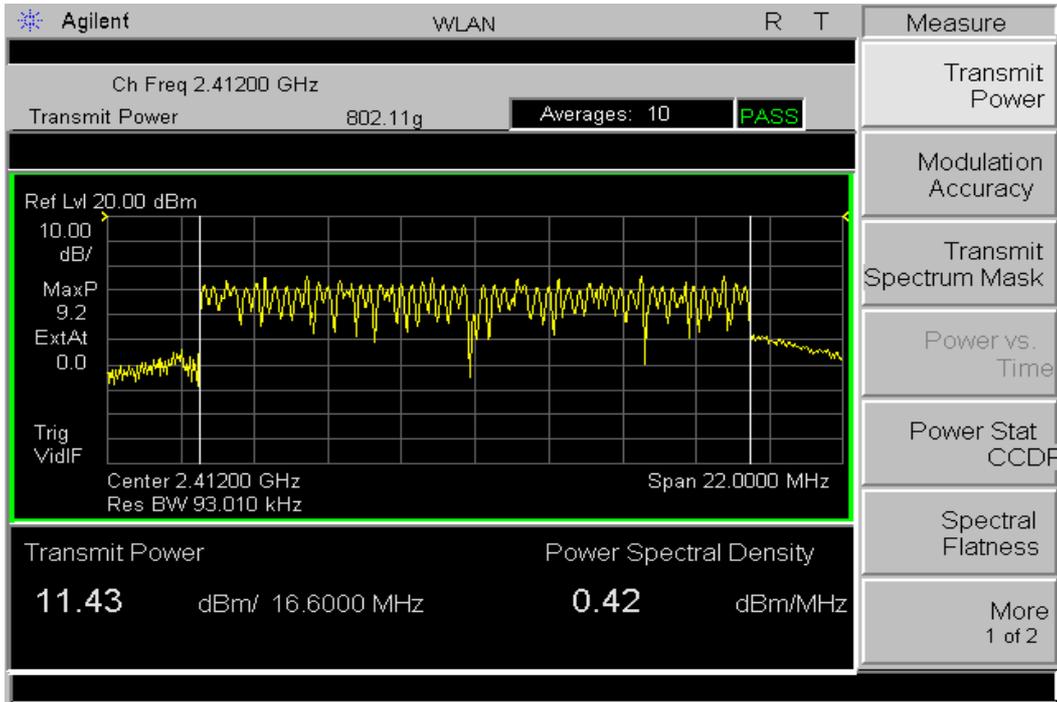


# Channel 11 (2462MHz)



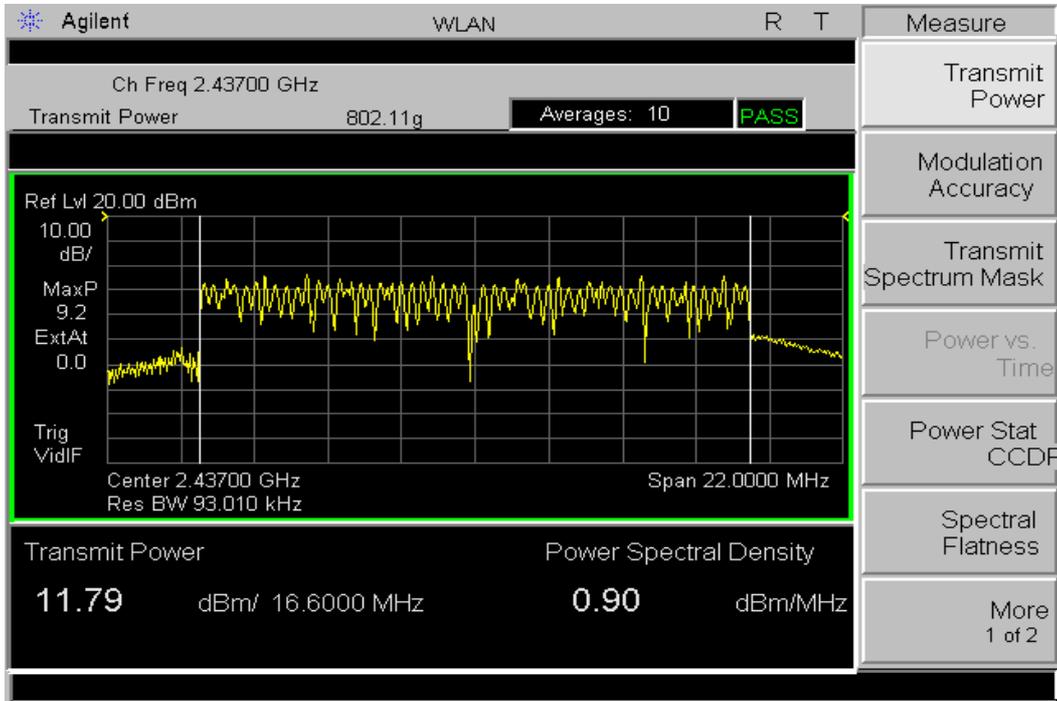


# TM2 Channel 1 (2412MHz)



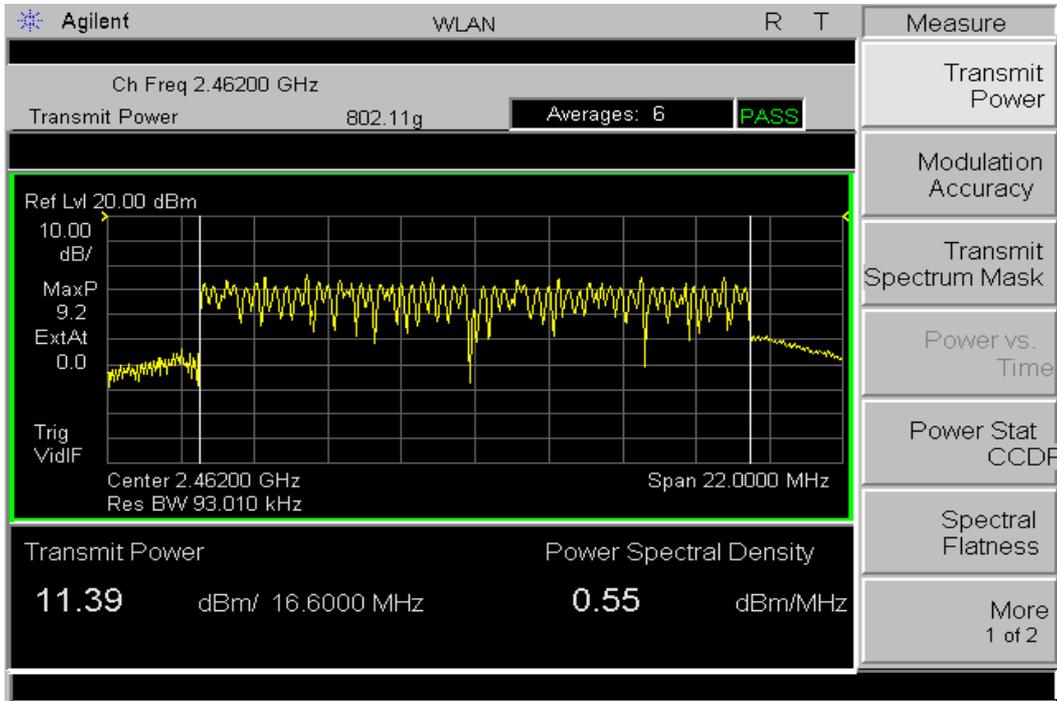


# Channel 6 (2437MHz)





# Channel 11 (2462MHz)





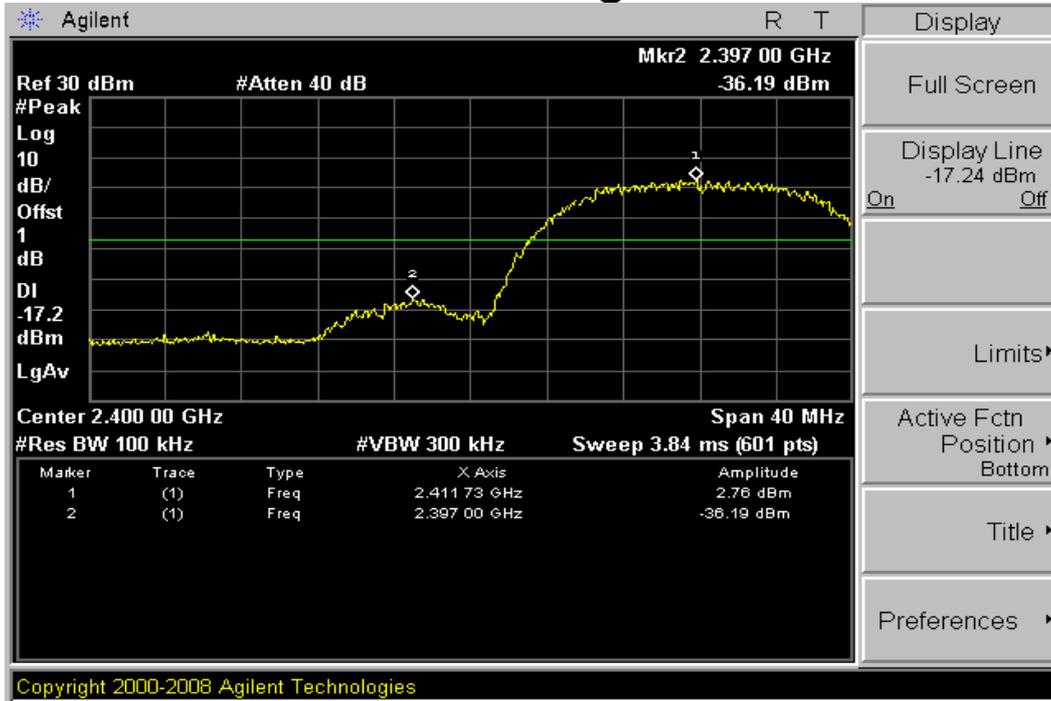
# **Appendix C**

## **Band edge spurious emission**

**According to FCC Part 15.247 (d)**

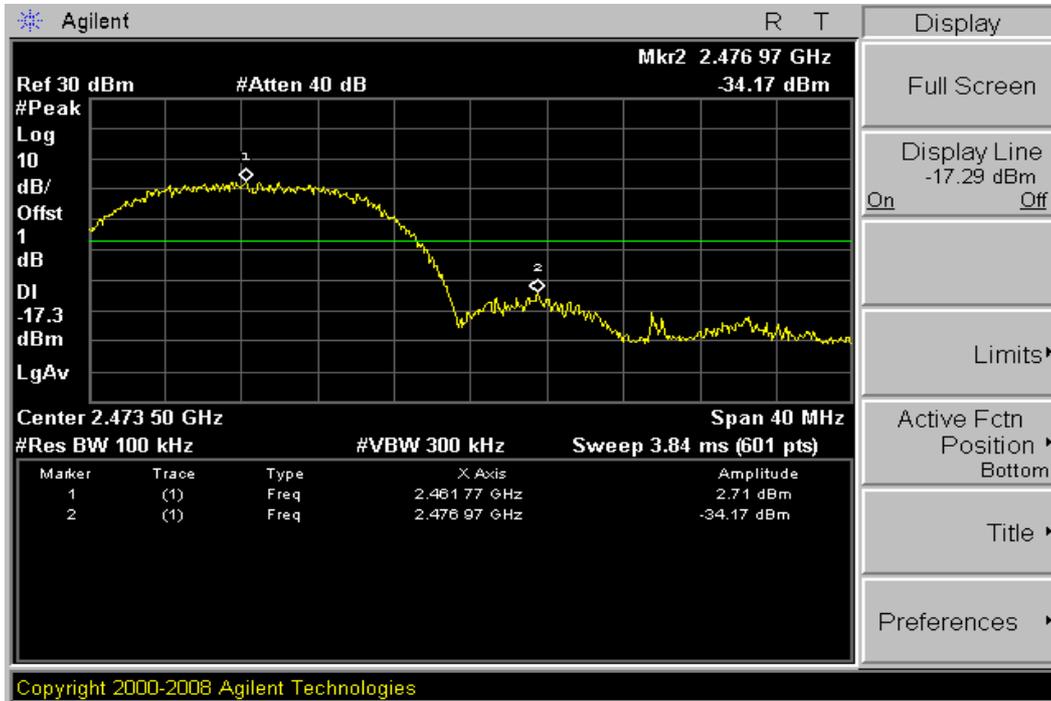


# TM1 Low edge



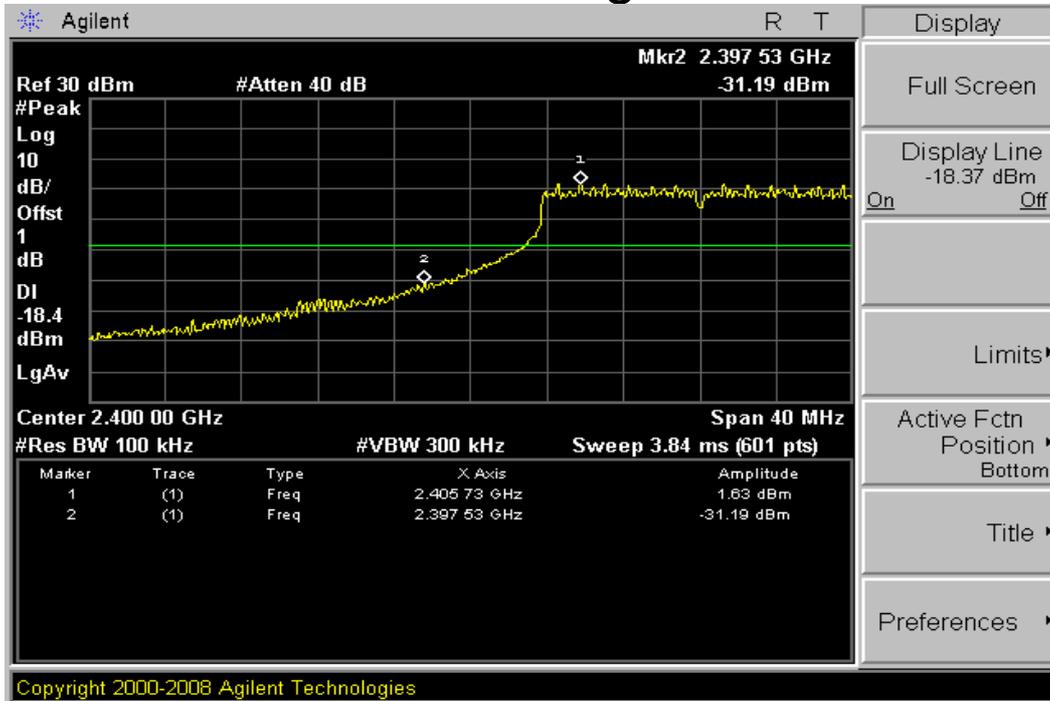


# High edge



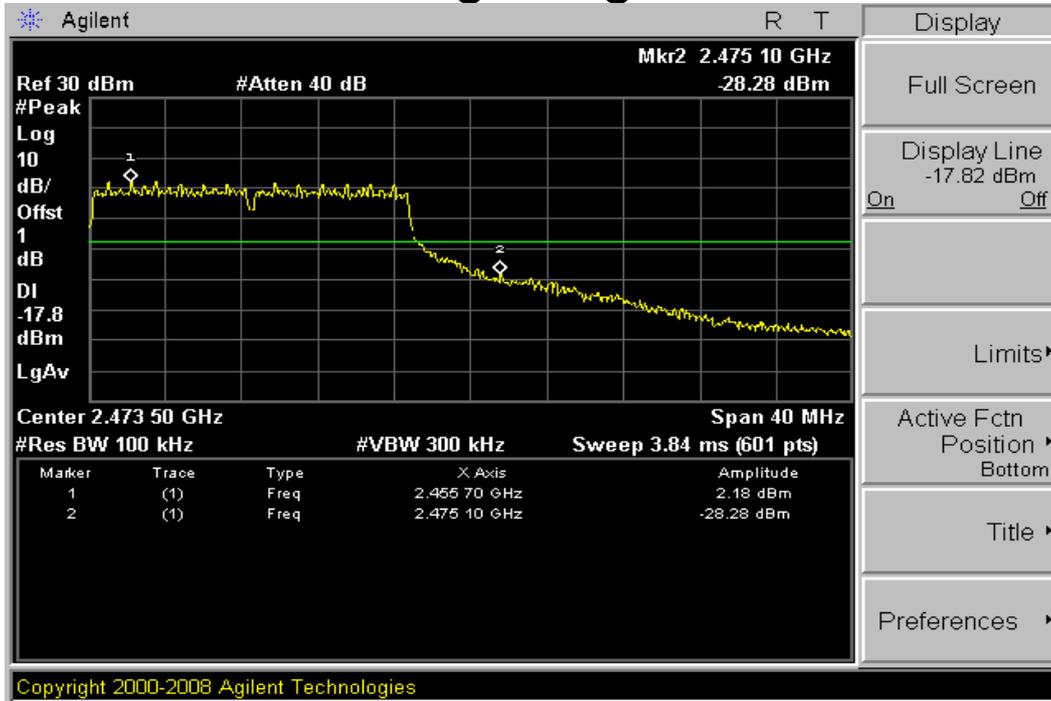


# TM2 Low edge





# High edge





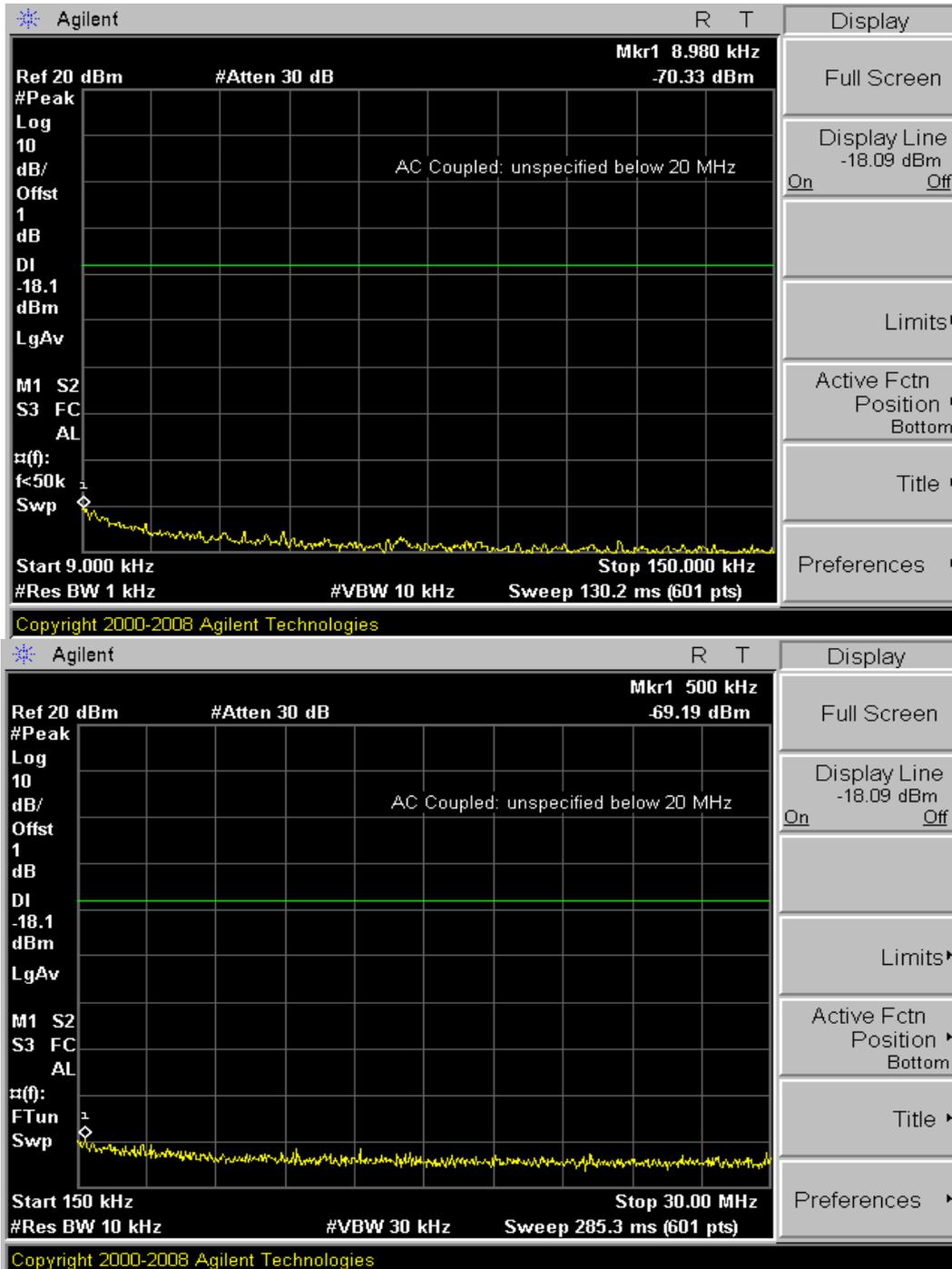
## **Appendix D**

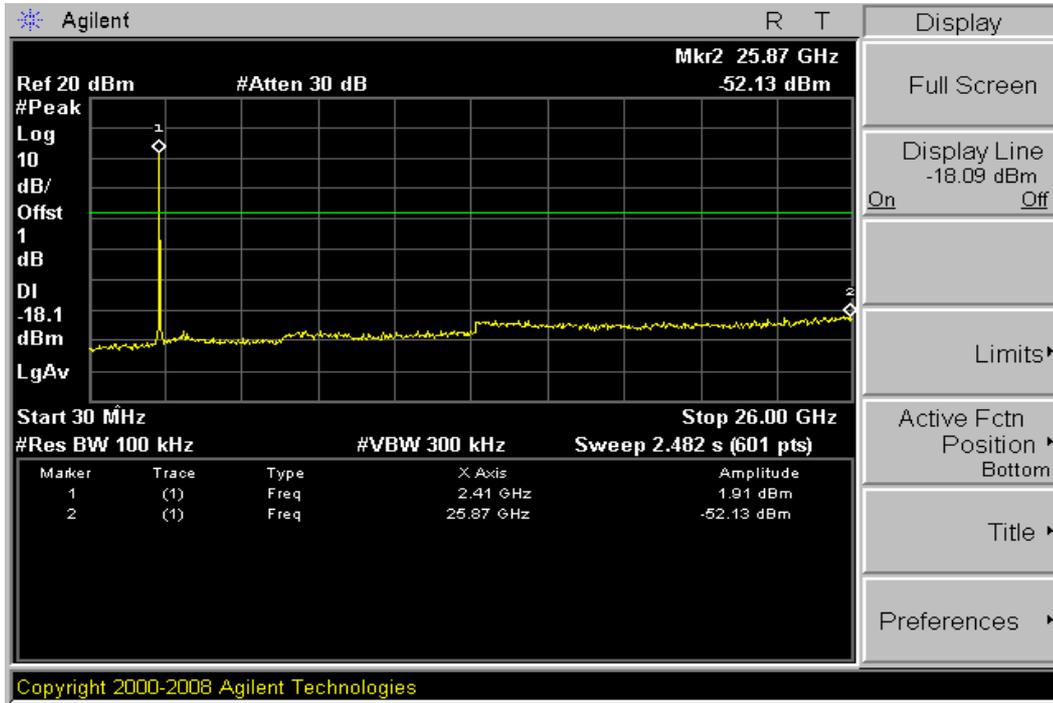
# Conducted RF spurious

According to FCC Part 15.247 (d)



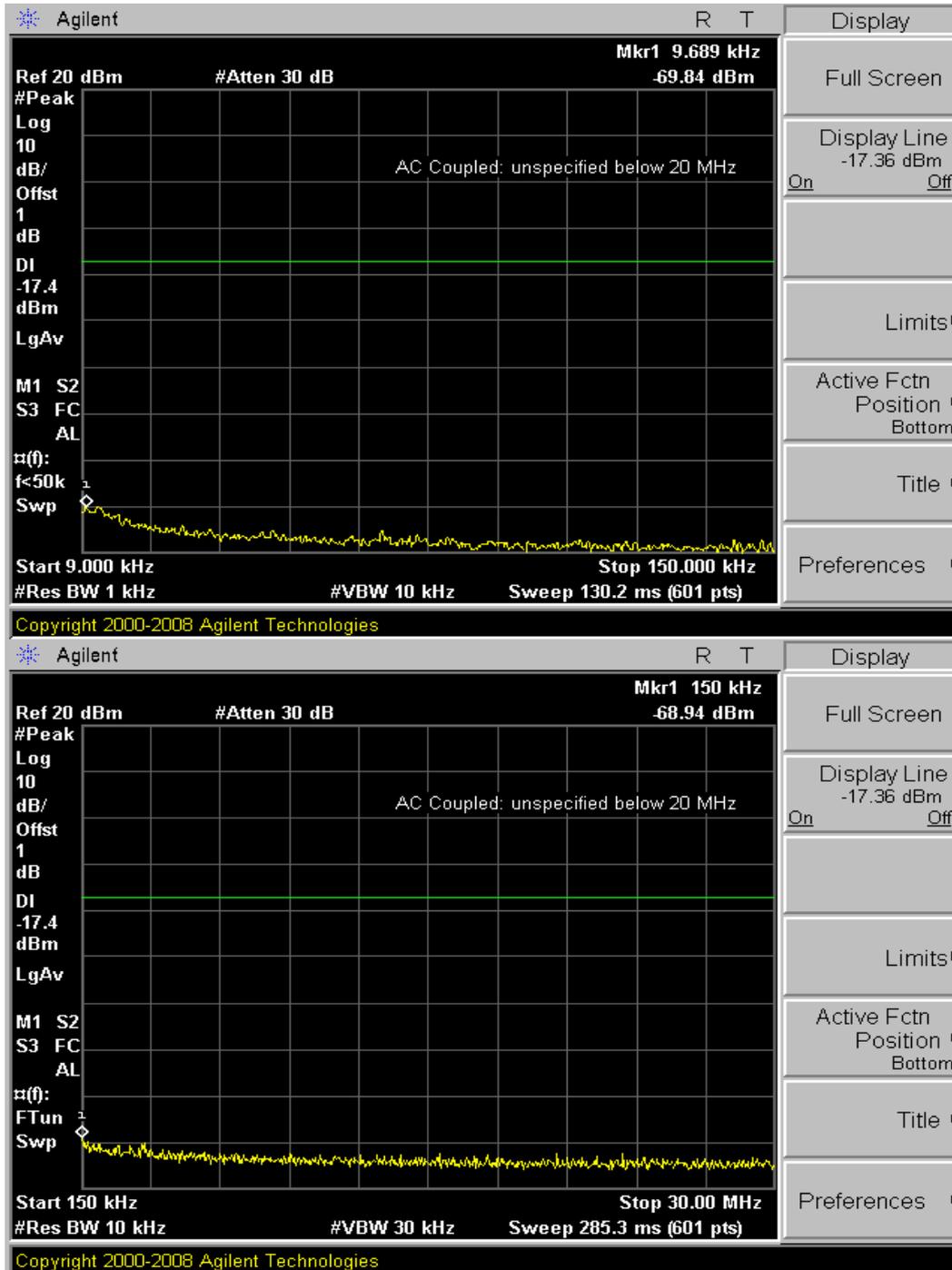
# TM1 Channel 1

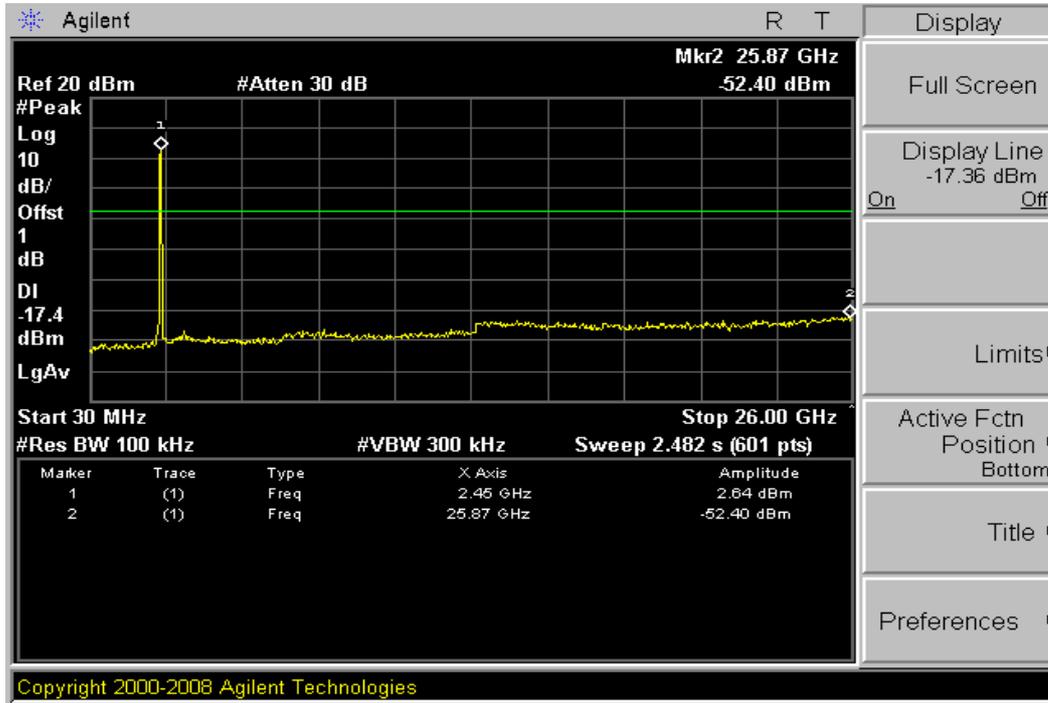






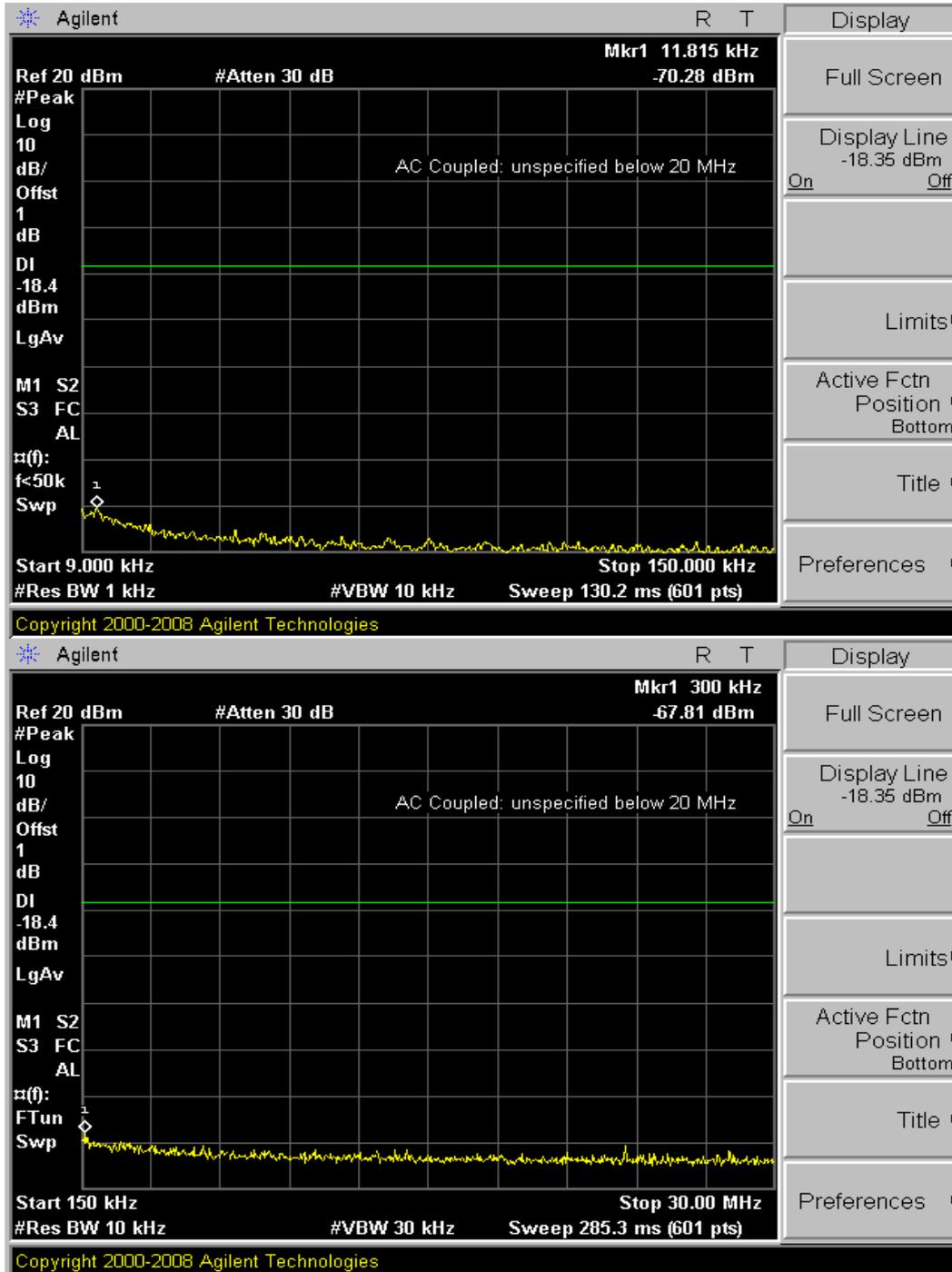
# Channel 6

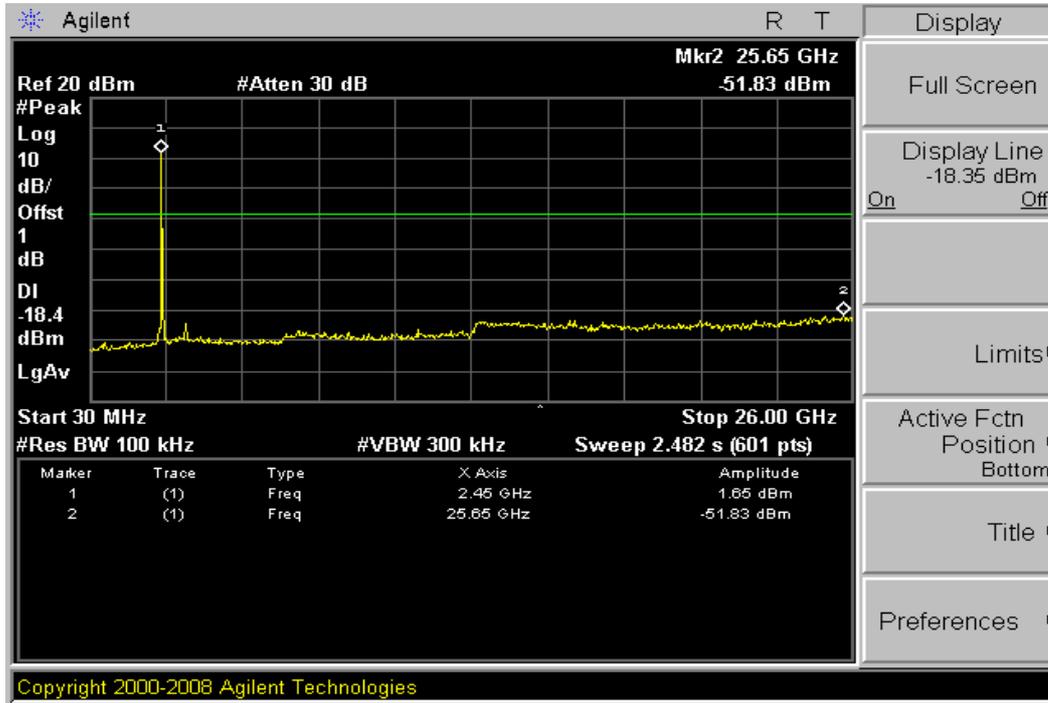






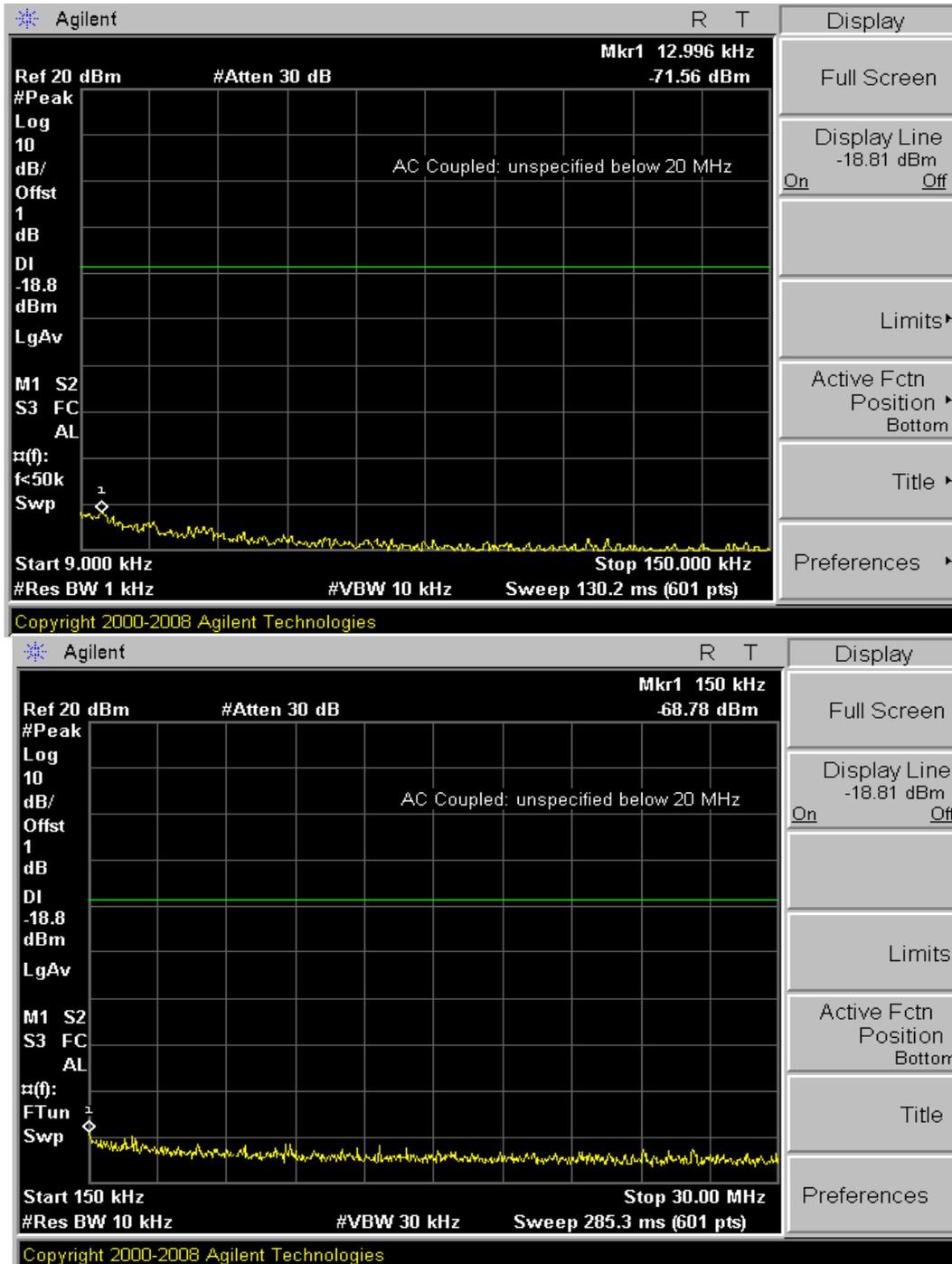
# Channel 11

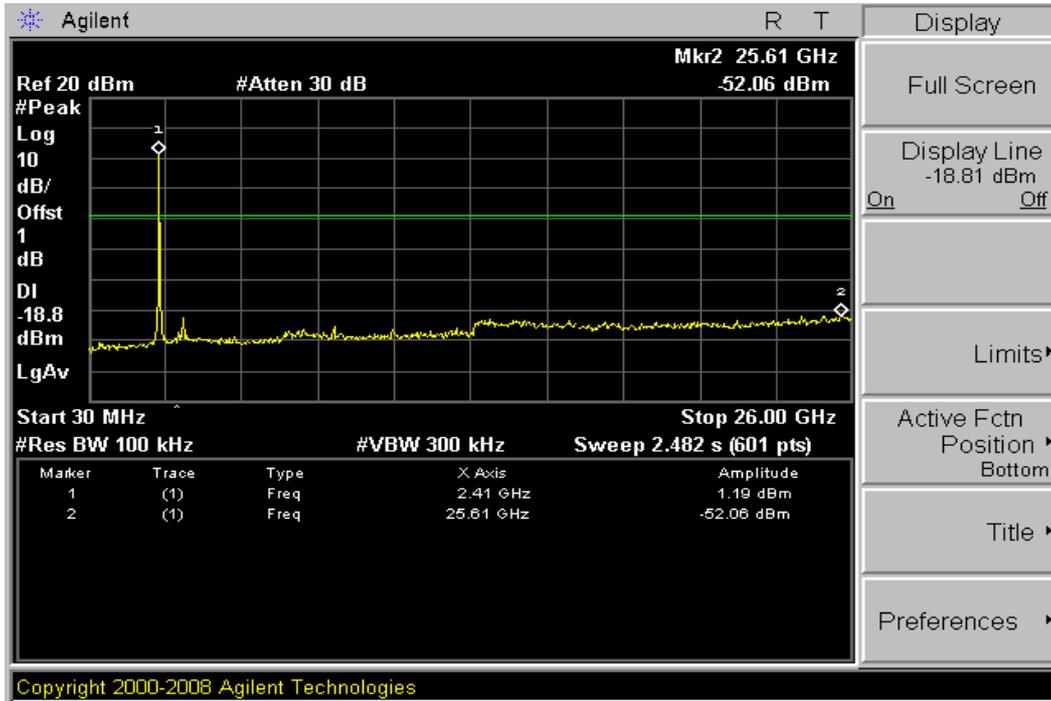






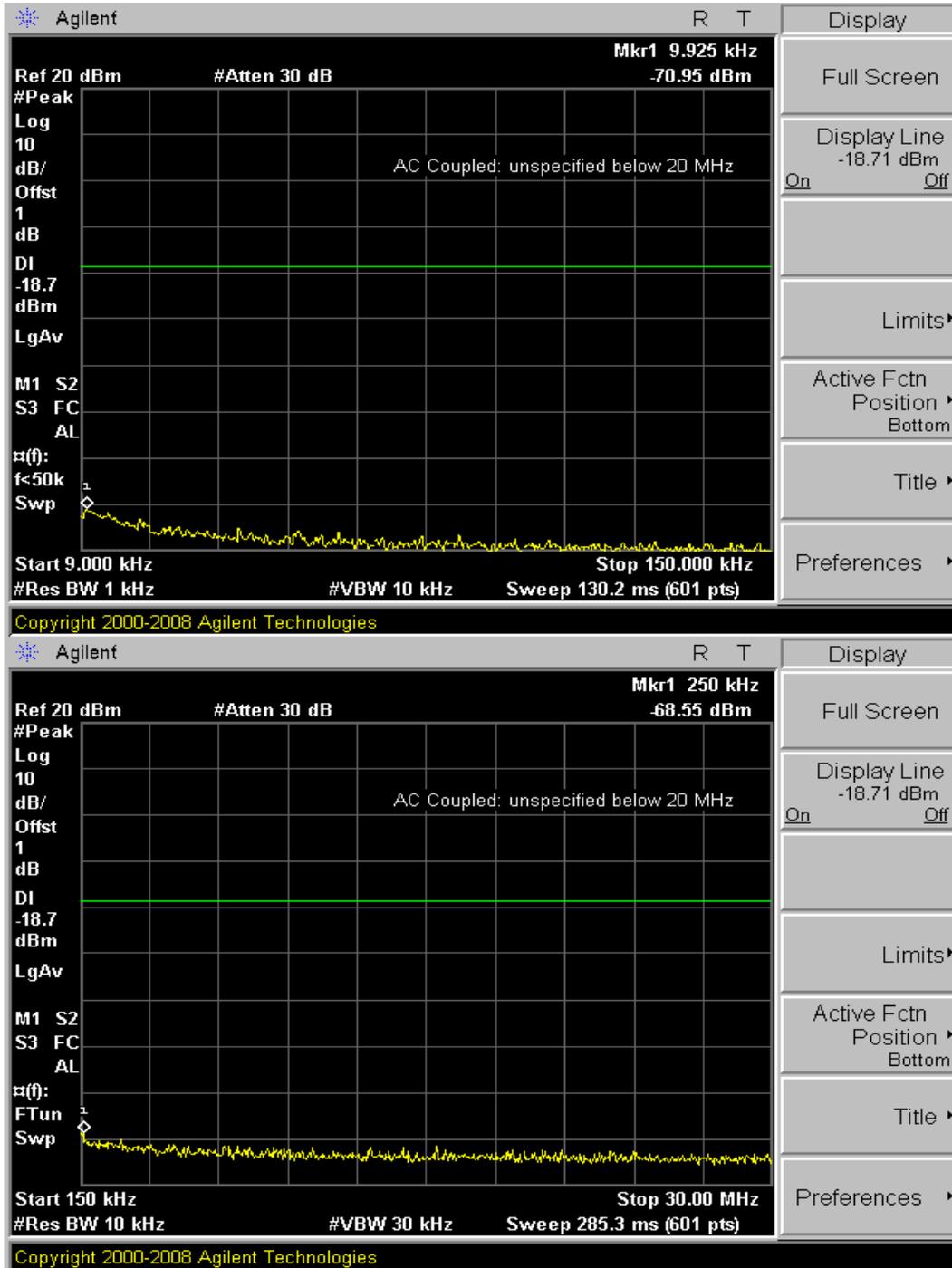
# TM2 Channel 1

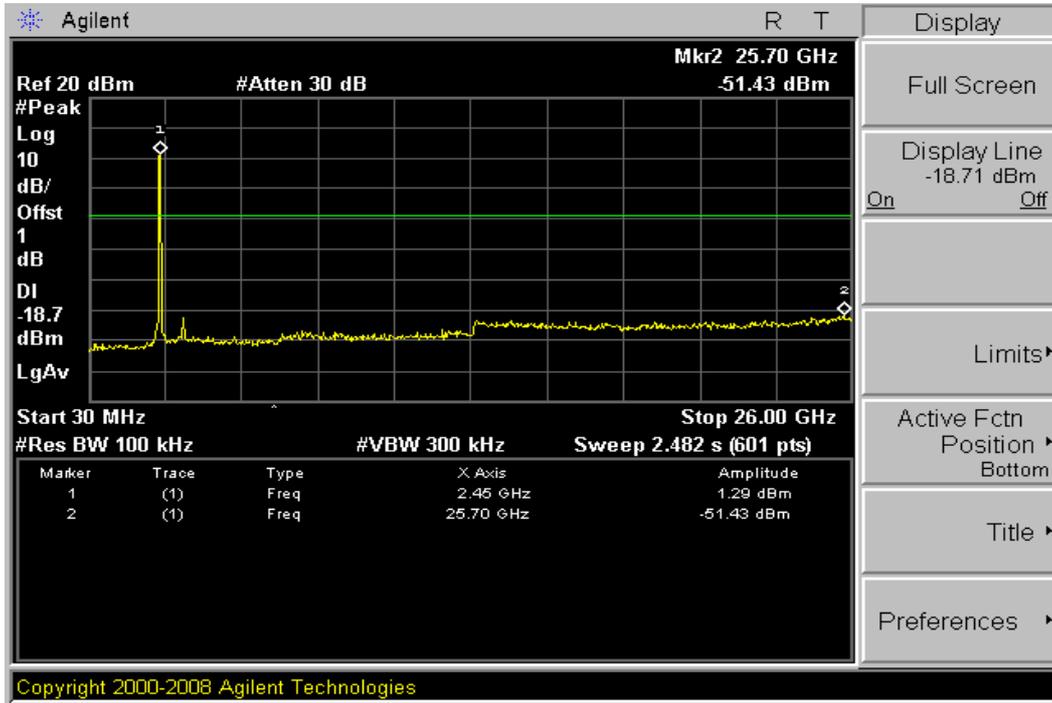






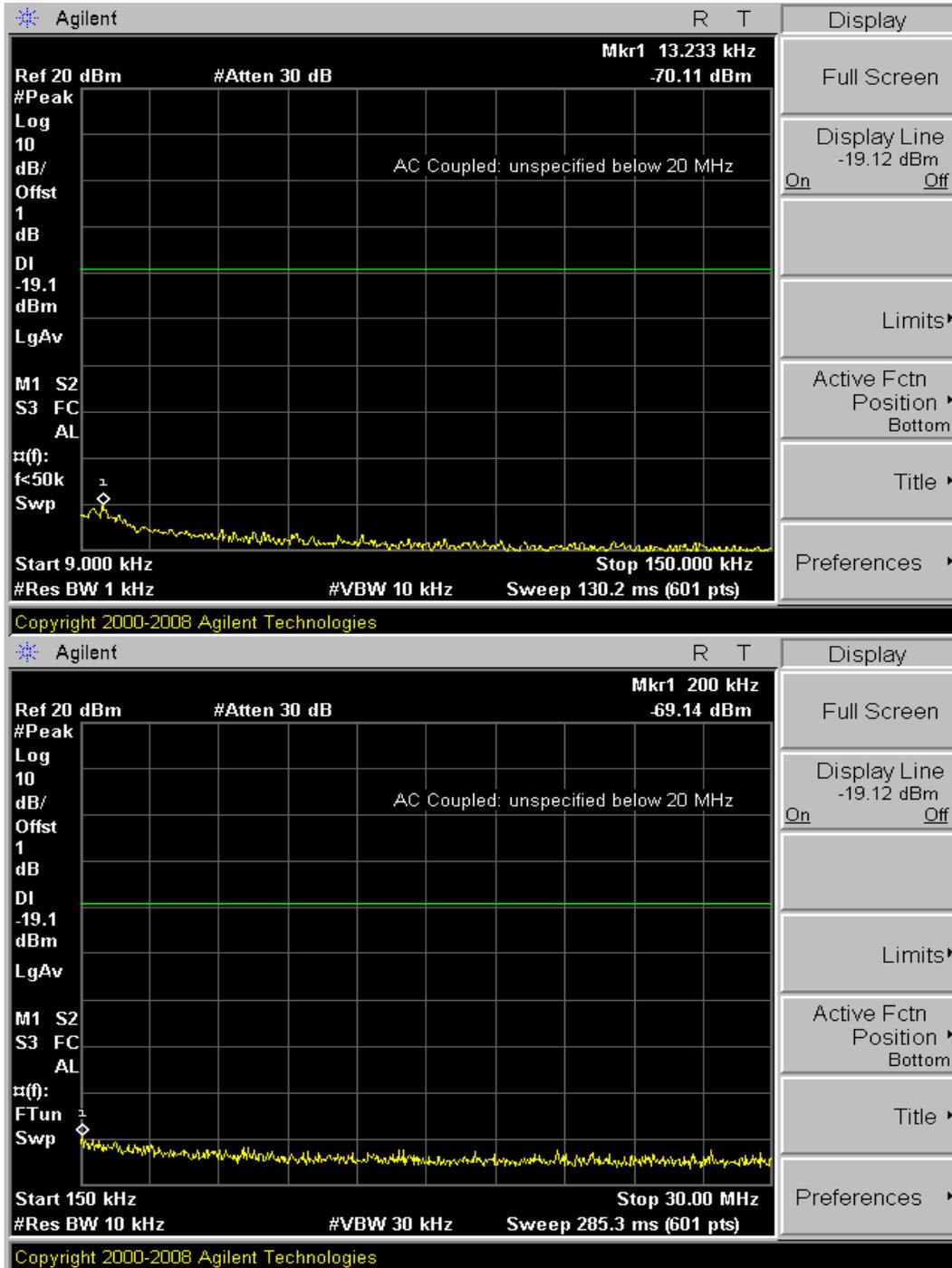
# Channel 6

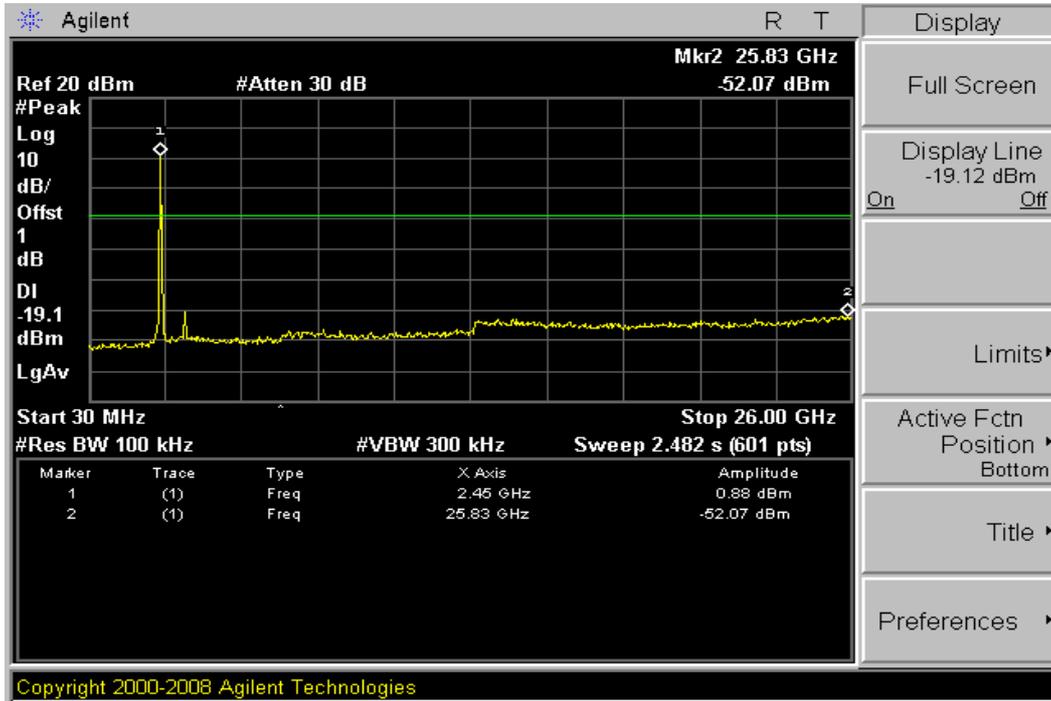






# Channel 11







# Appendix E

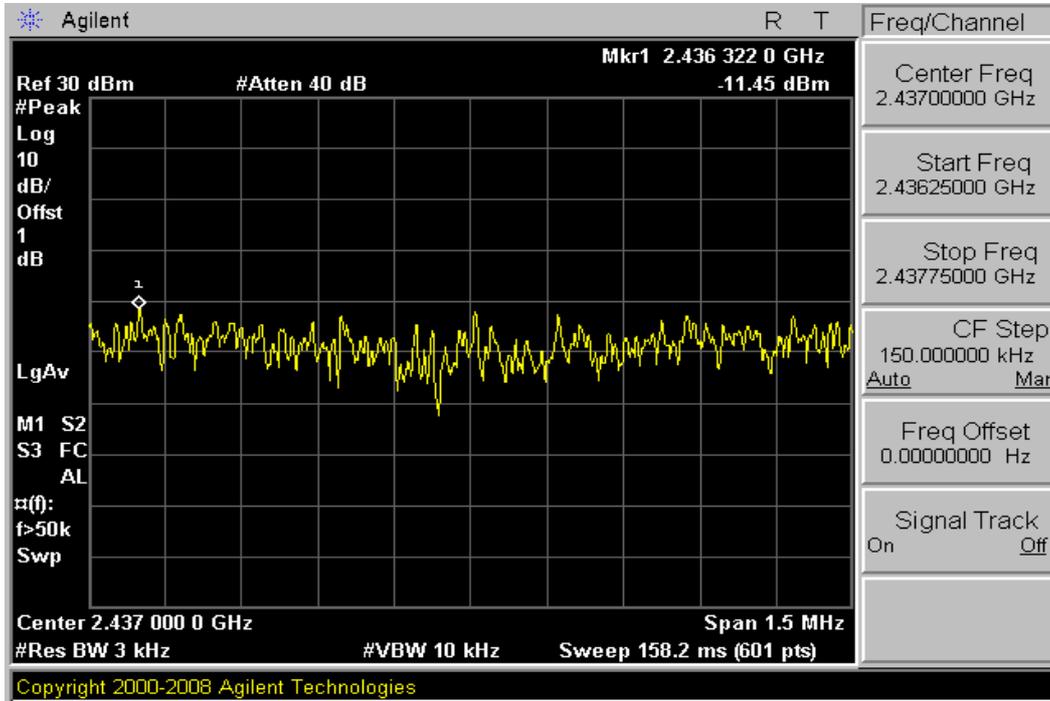
## Power spectral density

According to FCC Part 15.247 (e)



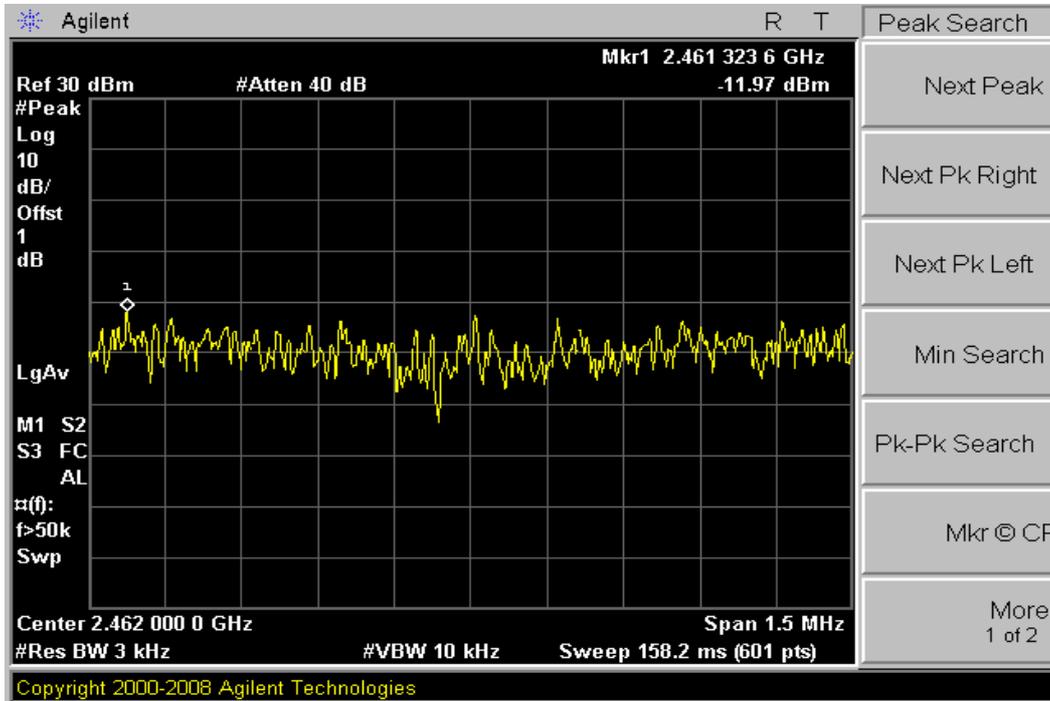


# Channel 6



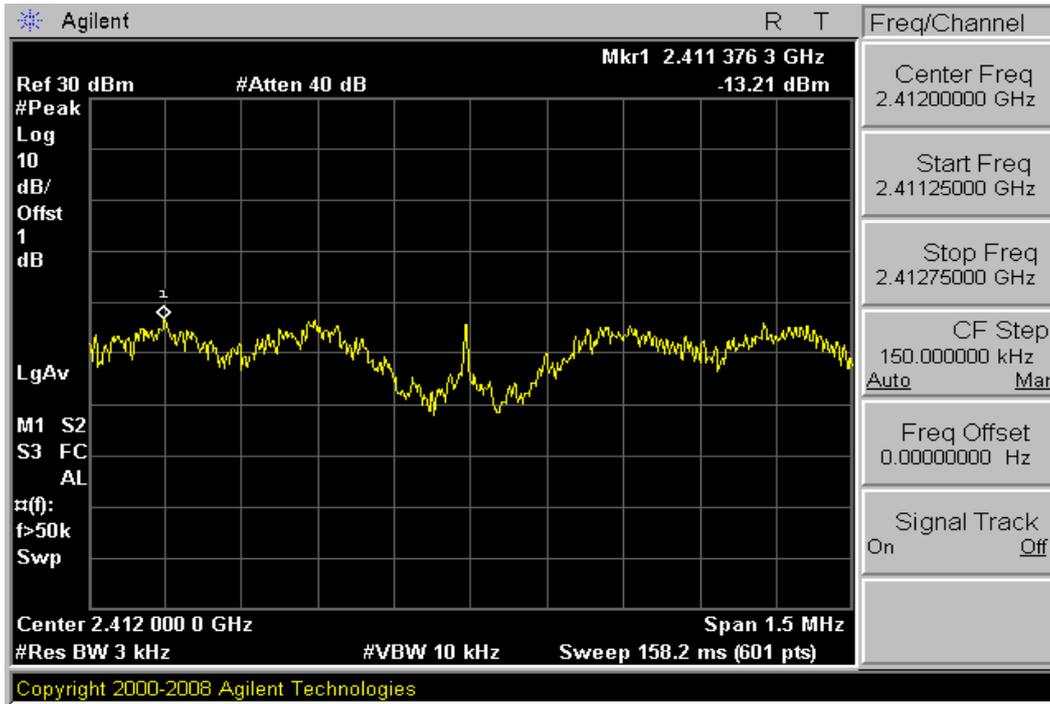


# Channel 11



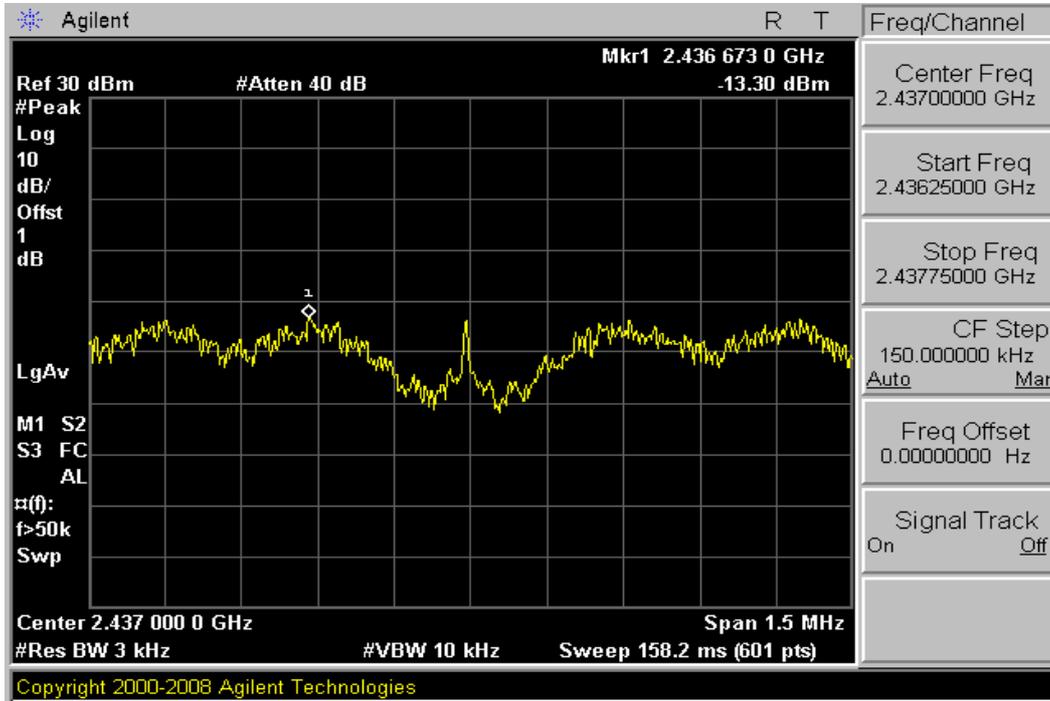


# TM2 Channel 1



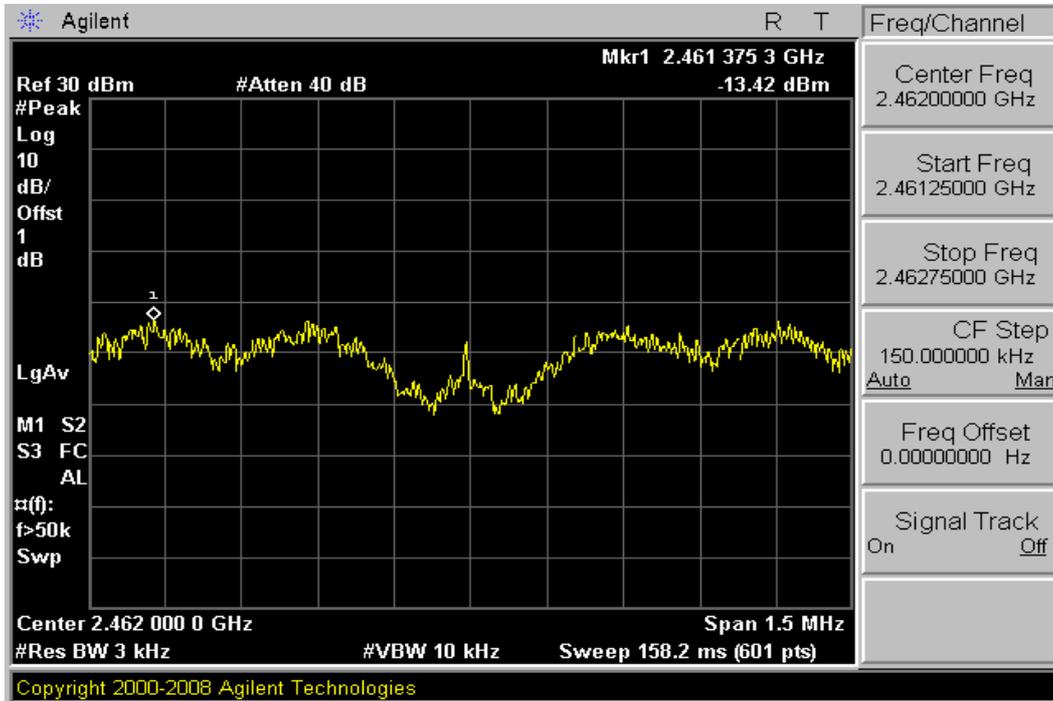


# Channel 6





# Channel 11





## Appendix F

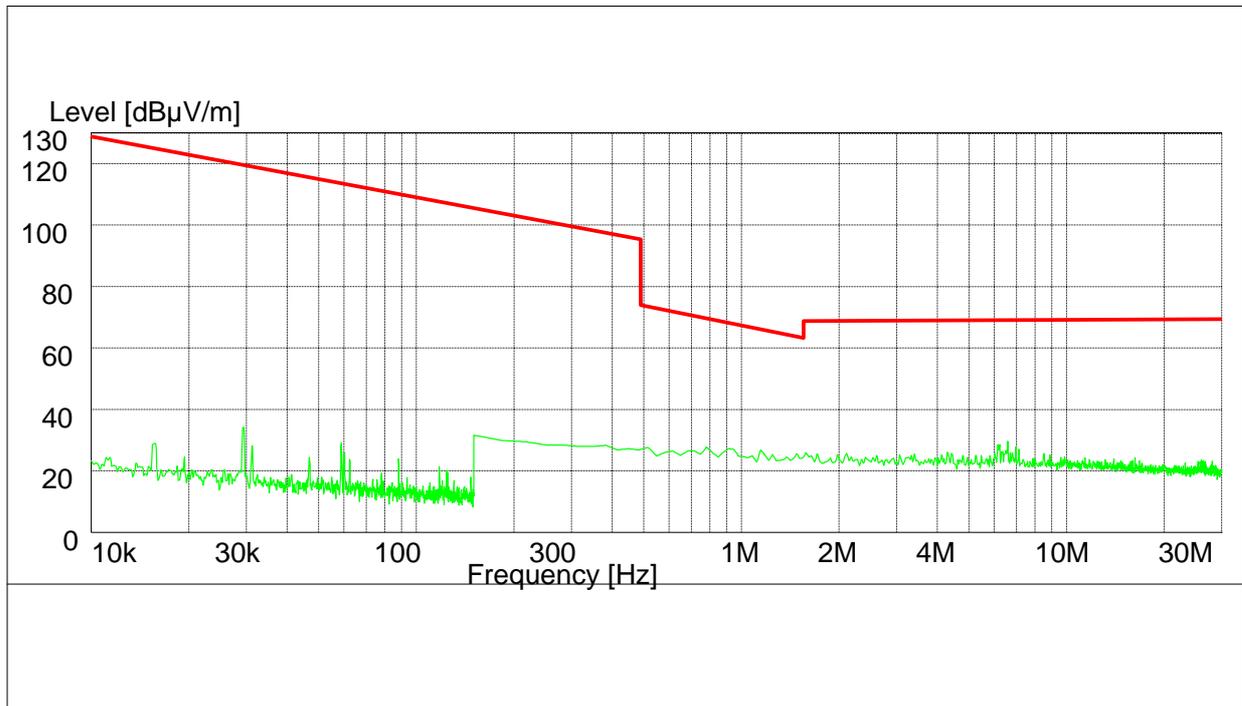
# Radiated spurious emission & spurious in restricted band

According to FCC Part 15.247 (d) & 15.205 & 15.209



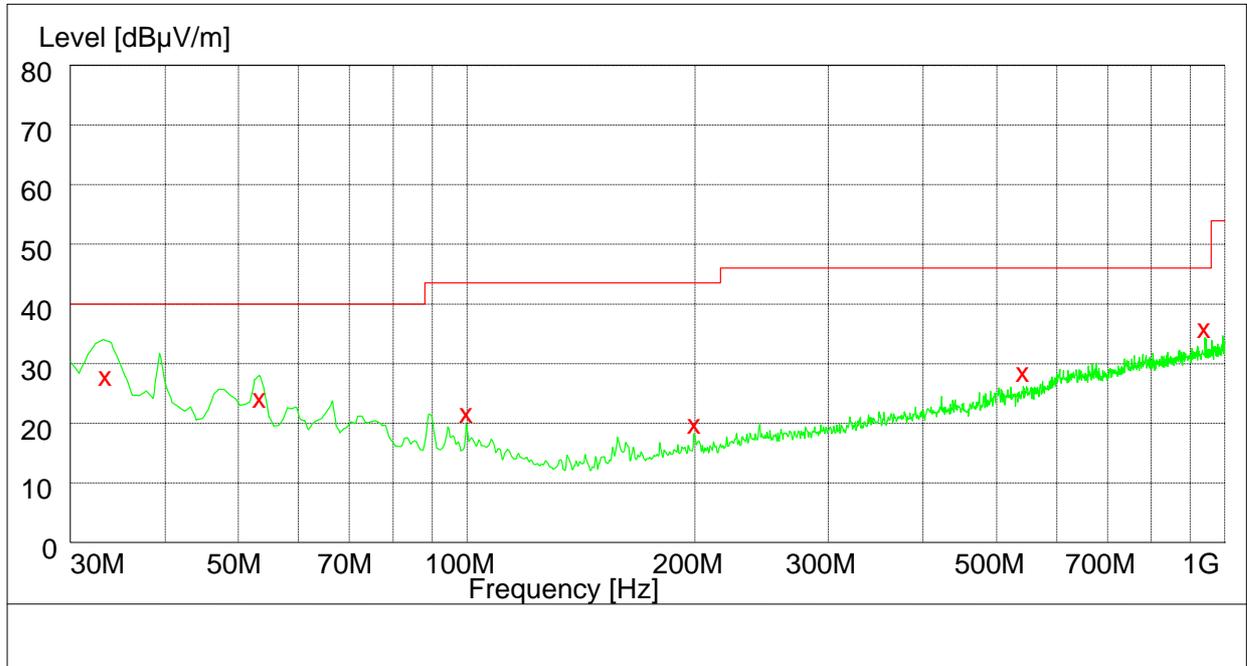
Note: This test was carried out in all the test modes, here only the worst test result was shown.

## Channel 1 10kHz to 30MHz





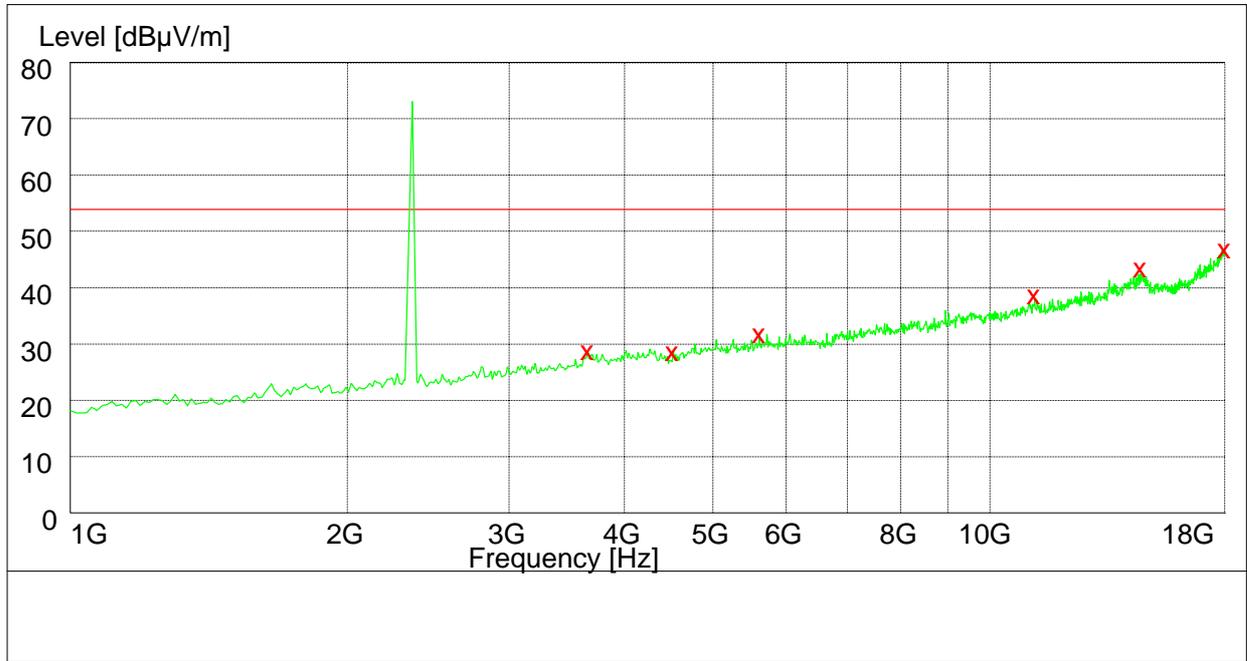
## 30MHz to 1GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Plarization
33.420000	28.90	11.7	40.0	11.1	100.0	78.00	VERTICAL
53.340000	25.30	12.7	40.0	14.7	158.0	0.00	VERTICAL
100.020000	22.70	13.1	43.5	20.8	154.0	359.00	HORIZONTAL
199.980000	20.90	12.1	43.5	22.6	300.0	221.00	VERTICAL
541.980000	29.60	20.9	46.0	16.4	100.0	99.00	VERTICAL
941.220000	37.00	26.5	46.0	9.0	283.0	309.00	VERTICAL



# 1GHz to 18GHz

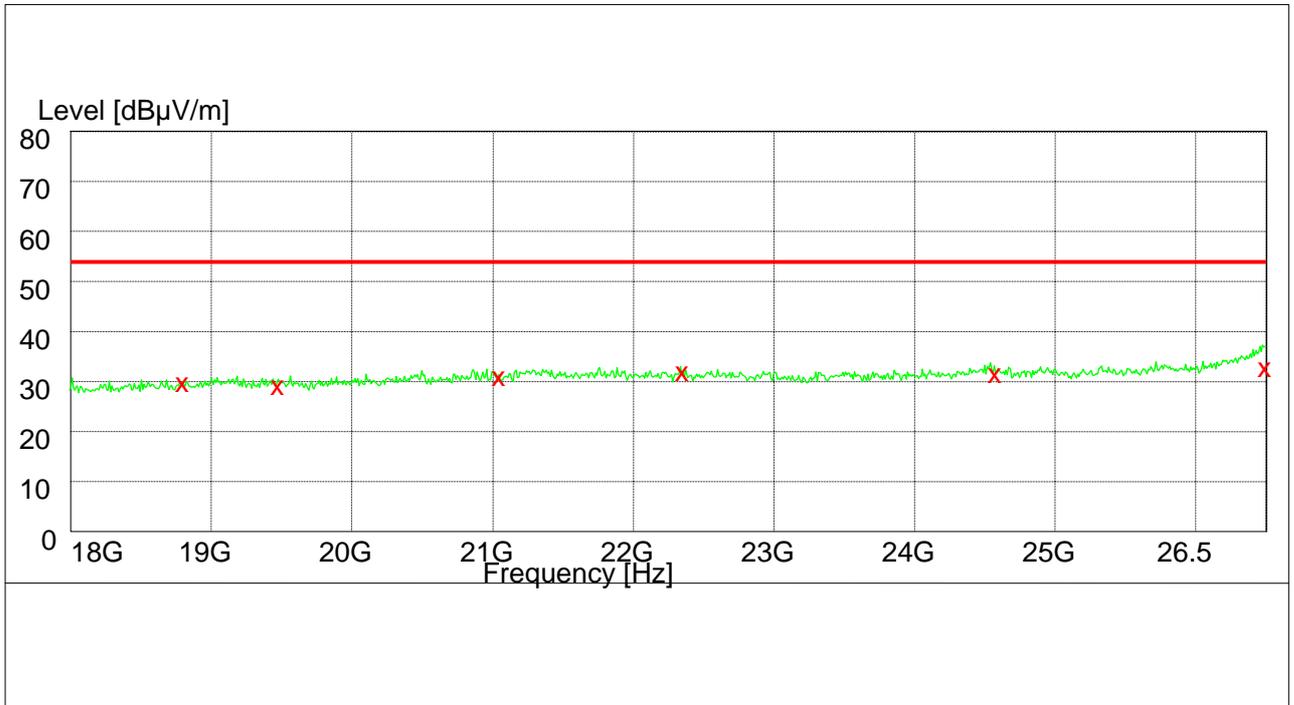


Note: The peak exceeds the limit line is carrier frequency.

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
3652.000000	29.10	-6.8	54.0	24.9	100.0	202.00	VERTICAL
4515.000000	29.00	-5.6	54.0	25.0	100.0	195.00	VERTICAL
5611.000000	30.20	-2.3	54.0	23.8	100.0	241.00	HORIZONTAL
11183.000000	28.80	7.0	54.0	25.2	138.0	342.00	HORIZONTAL
14570.000000	42.70	12.2	54.0	11.3	129.0	335.00	VERTICAL
17999.500000	46.80	17.3	54.0	7.2	119.0	282.00	HORIZONTAL



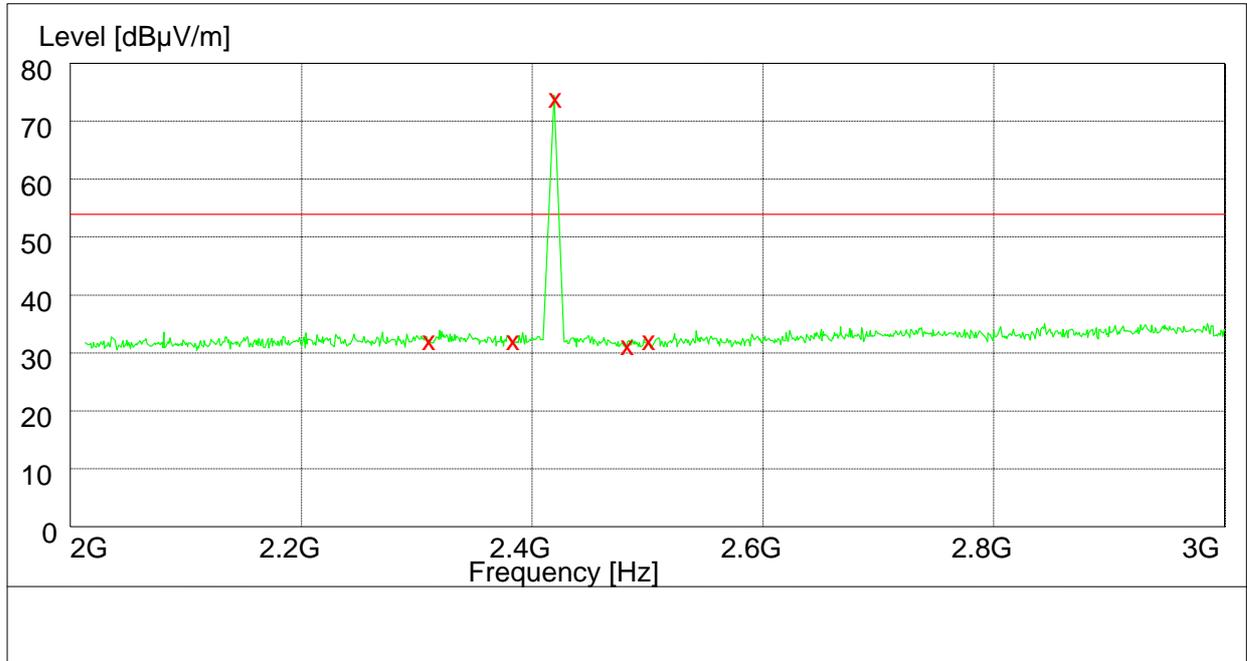
# 18GHz to 26GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
18724.000000	31.10	18.6	54.0	22.9	160.0	318.00	HORIZONTAL
19486.000000	30.20	18.9	54.0	23.8	160.0	307.00	HORIZONTAL
21005.500000	32.00	20.2	54.0	22.0	116.0	104.00	HORIZONTAL
22452.000000	32.90	20.3	54.0	21.1	188.0	4.00	VERTICAL
24587.000000	32.40	22.0	54.0	21.6	122.0	36.00	HORIZONTAL
26497.500000	34.20	27.9	54.0	19.8	122.0	315.00	HORIZONTAL



## 2GHz to 3GHz



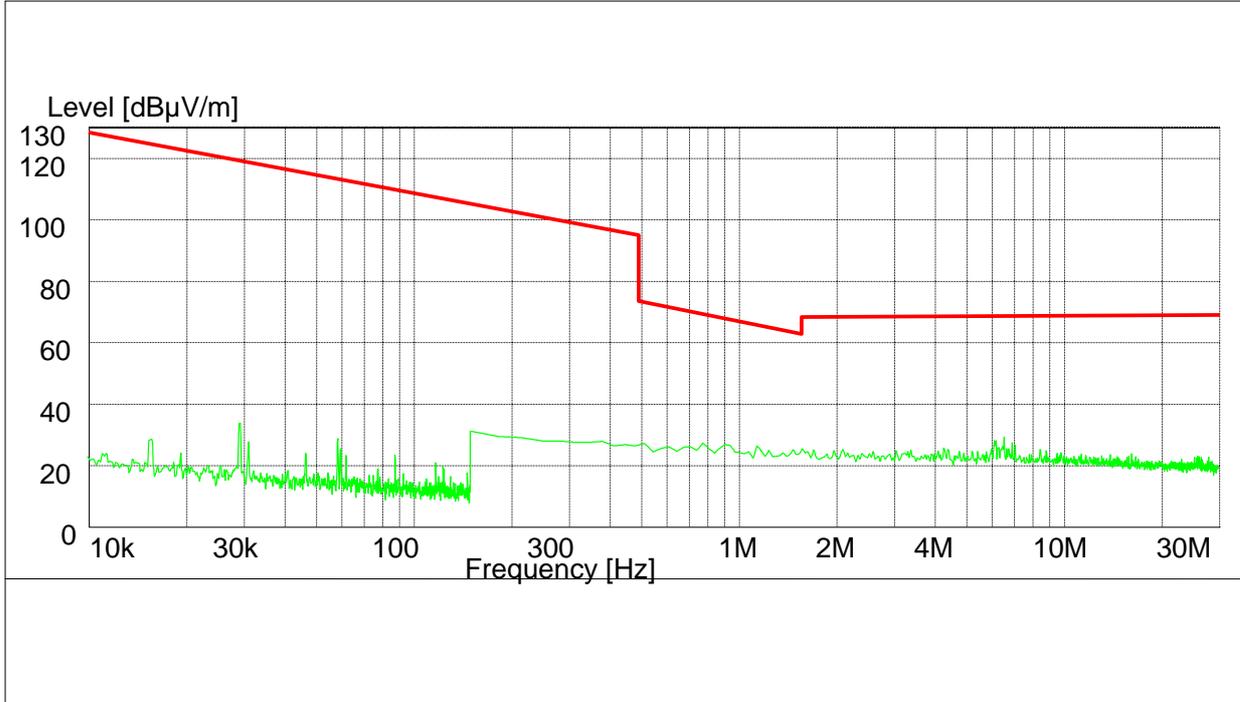
Note: The peak exceeds the limit line is carrier frequency.

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2310.000000	33.40	-11.7	54.0	20.6	161.0	250.00	VERTICAL
2390.000000	33.40	-11.5	54.0	20.6	177.0	221.00	HORIZONTAL
2412.000000	73.40	-11.5	54.0	-19.4	117.0	7.00	VERTICAL
2483.500000	32.40	-11.3	54.0	21.6	152.0	225.00	VERTICAL
2500.000000	33.30	-11.2	54.0	21.7	191.0	30.00	VERTICAL



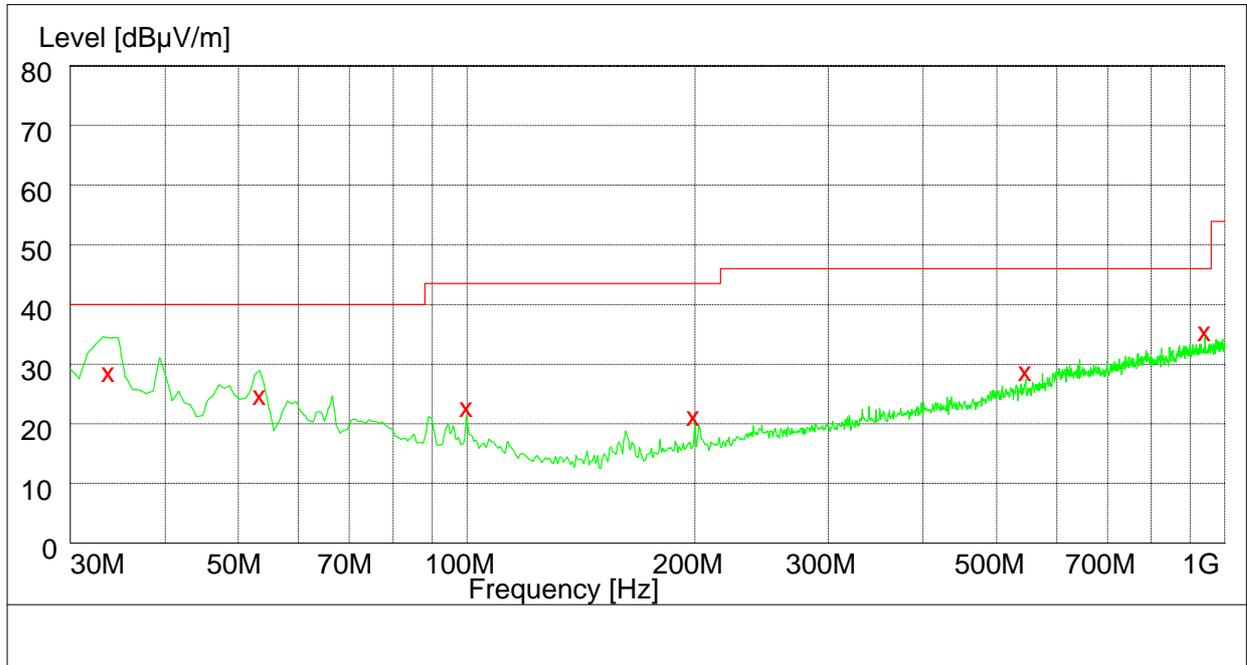
# Channel 7

## 10 kHz to 30MHz





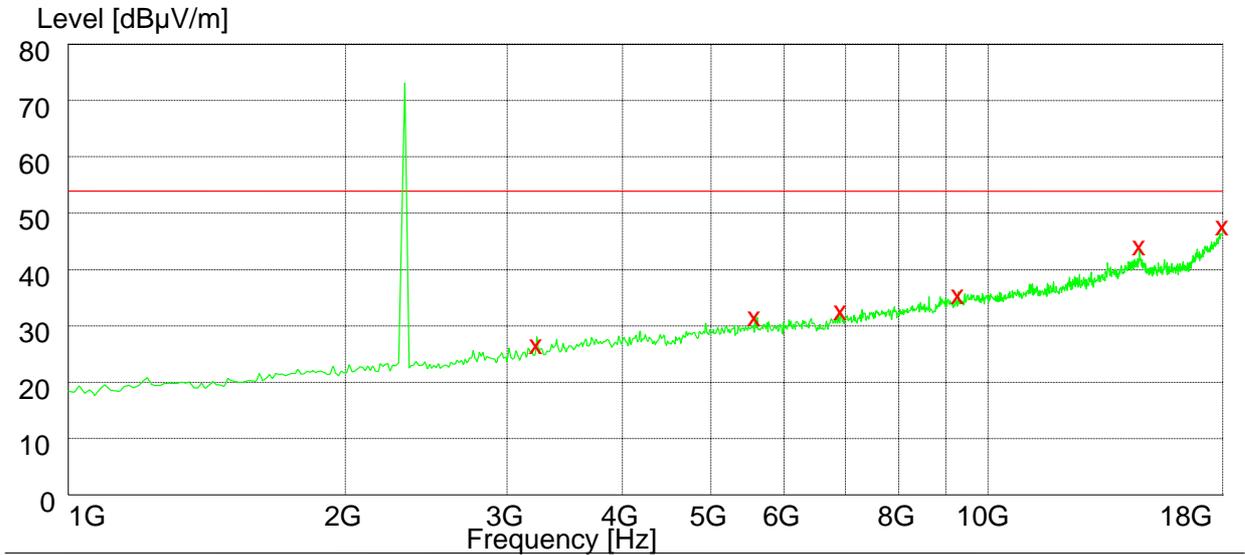
## 30MHz to 1GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
33.720000	29.30	11.7	40.0	10.7	100.0	42.00	VERTICAL
53.340000	25.20	12.7	40.0	14.8	190.0	15.00	VERTICAL
100.020000	22.80	13.1	43.5	20.7	170.0	257.00	VERTICAL
199.200000	20.60	12.1	43.5	22.9	200.0	17.00	VERTICAL
546.900000	29.60	20.9	46.0	16.4	199.0	358.00	HORIZONTAL
941.280000	35.80	26.5	46.0	10.2	137.0	315.00	VERTICAL



# 1GHz to 18GHz

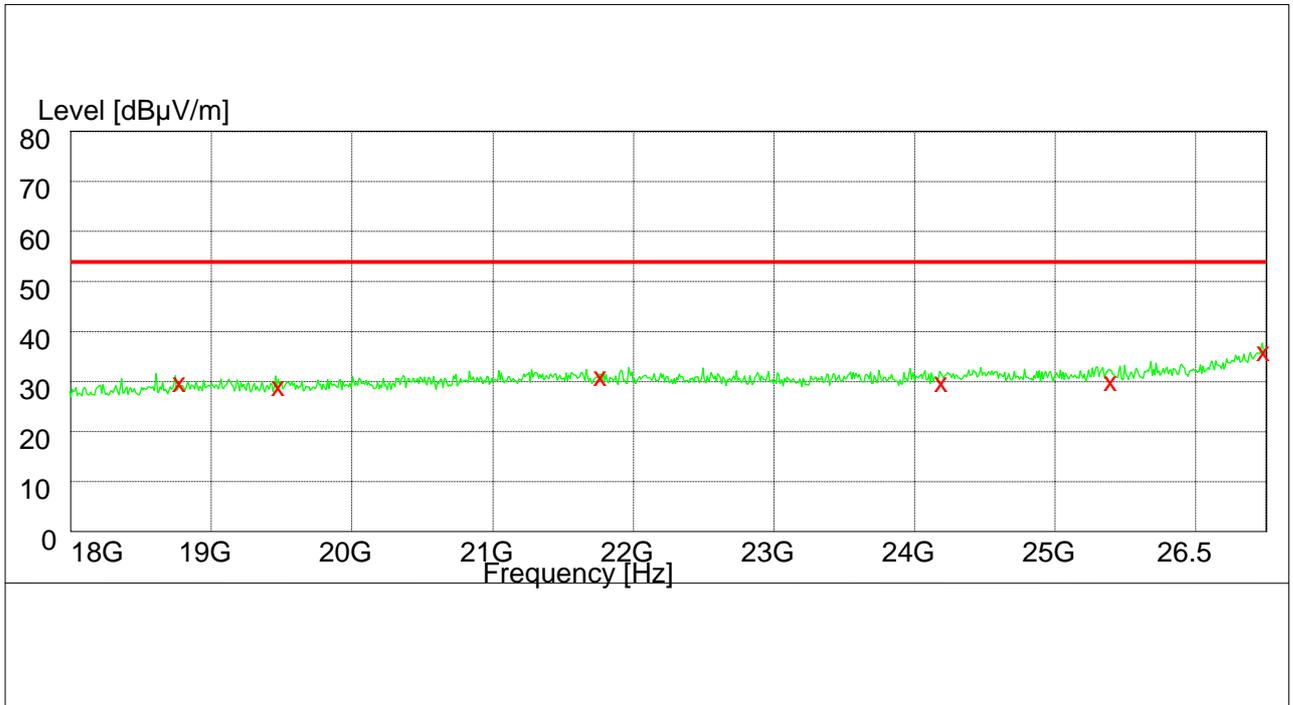


Note: The peak exceeds the limit line is carrier frequency.

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
3231.500000	27.10	-8.2	54.0	26.9	179.0	9.00	HORIZONTAL
5582.500000	30.90	-2.3	54.0	23.1	121.0	353.00	HORIZONTAL
6923.500000	32.30	0.0	54.0	21.7	134.0	57.00	VERTICAL
9286.000000	35.80	4.6	54.0	18.2	100.0	155.00	VERTICAL
14617.500000	44.60	12.1	54.0	9.4	125.0	242.00	HORIZONTAL
17994.500000	48.20	17.3	54.0	5.8	149.0	99.00	HORIZONTAL



# 18GHz to 26GHz

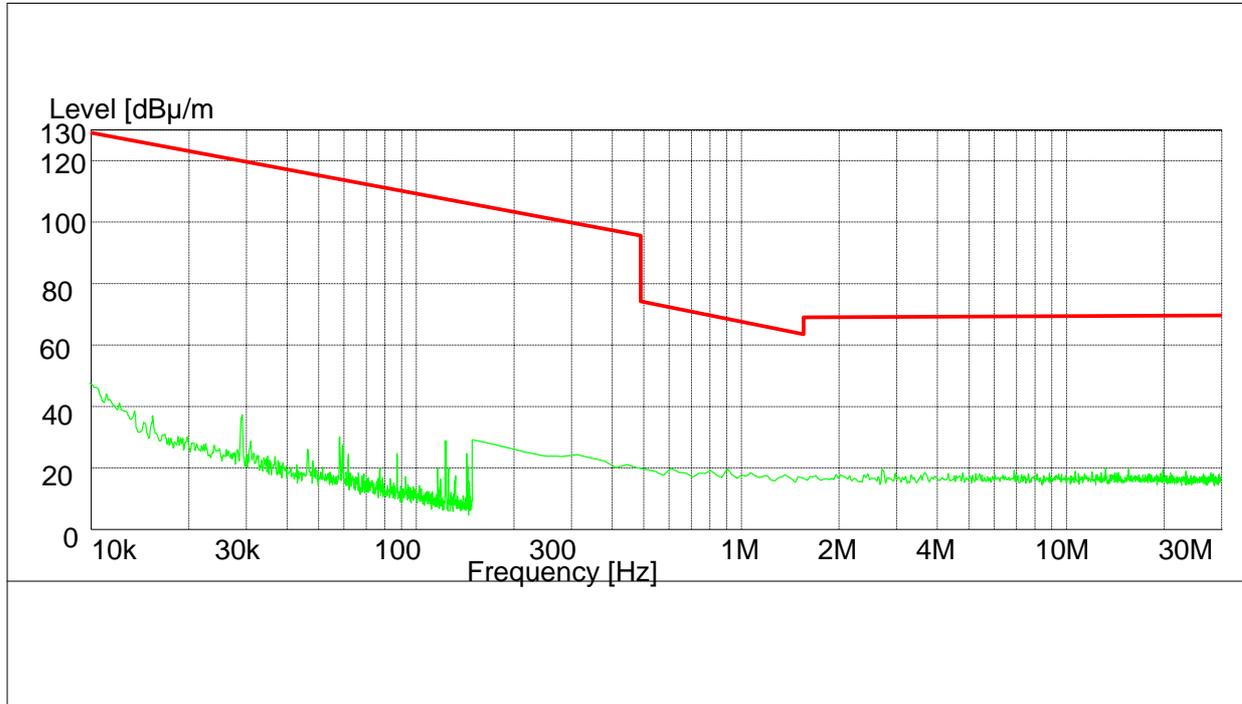


Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
18776.000000	30.60	18.5	54.0	23.4	113.0	43.000	VERTICAL
19492.000000	30.00	18.9	54.0	24.0	194.0	21.00	HORIZONTAL
21782.000000	32.10	20.5	54.0	21.9	112.0	163.00	VERTICAL
24188.000000	30.90	21.5	54.0	23.1	143.0	5.00	VERTICAL
25289.000000	30.80	23.1	54.0	23.2	196.0	350.00	VERTICAL
26492.000000	38.30	27.9	54.0	15.7	140.0	332.00	HORIZONTAL



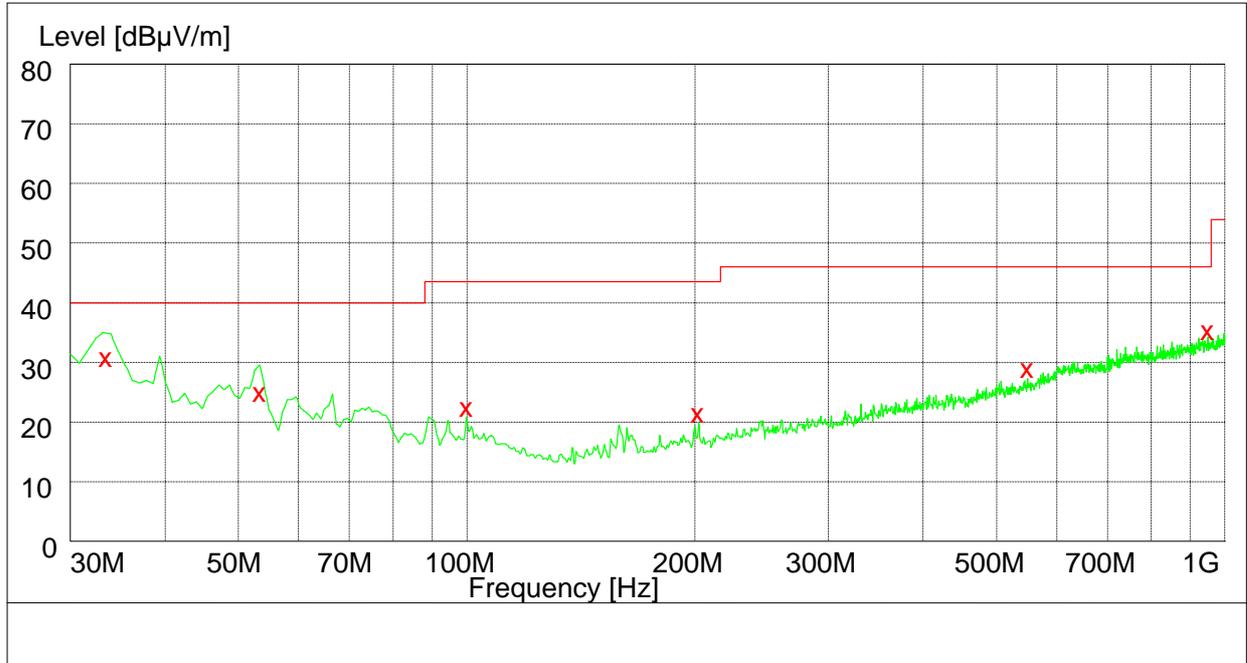
# Channel 11

## 10 kHz to 30 MHz





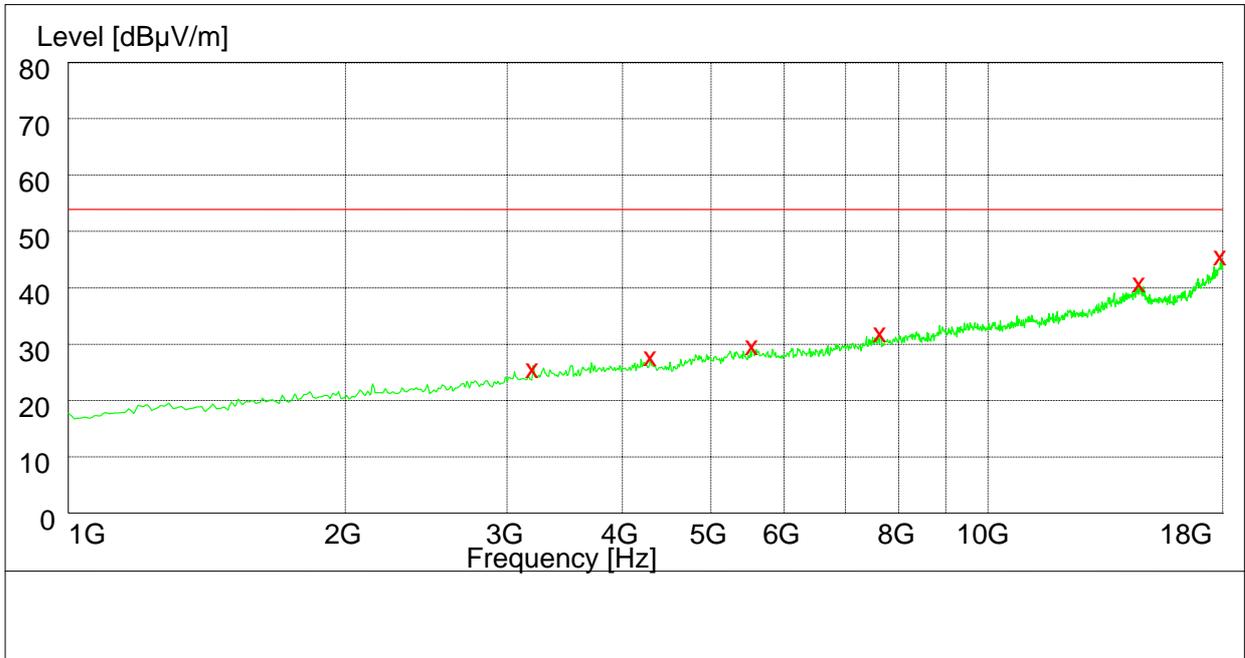
## 30MHz to 1GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
33.480000	30.20	11.7	40.0	9.8	100.0	45.00	VERTICAL
53.340000	25.00	12.7	40.0	15.0	198.0	316.00	VERTICAL
100.020000	22.60	13.1	43.5	20.9	155.0	275.00	VERTICAL
202.020000	20.50	12.1	43.5	23.0	200.0	209.00	HORIZONTAL
549.120000	29.70	20.9	46.0	16.3	102.0	81.00	VERTICAL
950.340000	36.10	26.5	46.0	9.9	100.0	113.00	VERTICAL



# 1GHz to 18GHz

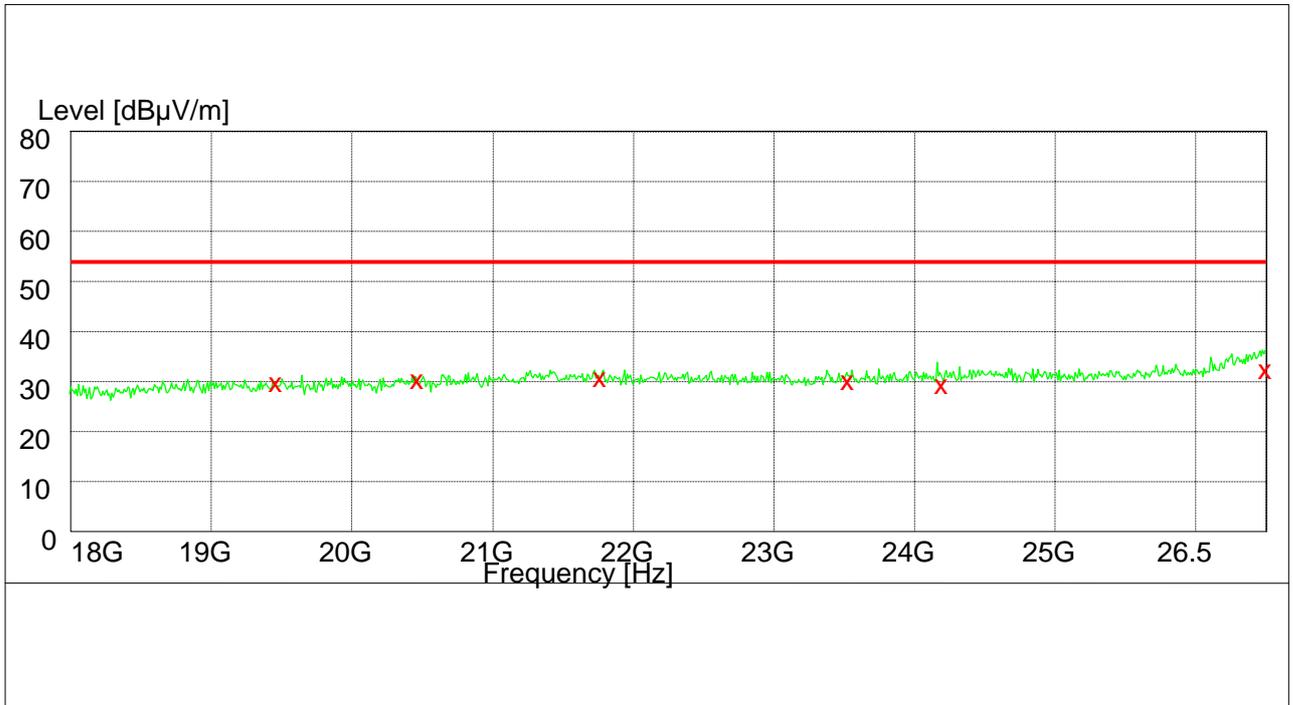


Note: The peak exceeds the limit line is carrier frequency.

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
3199.000000	26.10	-8.3	54.0	27.9	120.0	63.00	HORIZONTAL
4297.000000	28.70	-5.2	54.0	25.3	100.0	39.00	VERTICAL
5543.000000	29.80	-2.3	54.0	24.2	153.0	23.00	VERTICAL
7646.000000	31.40	1.7	54.0	22.6	179.0	177.00	HORIZONTAL
14618.000000	40.10	12.1	54.0	13.9	144.0	166.00	HORIZONTAL
17922.000000	46.60	16.8	54.0	7.4	136.0	170.00	HORIZONTAL



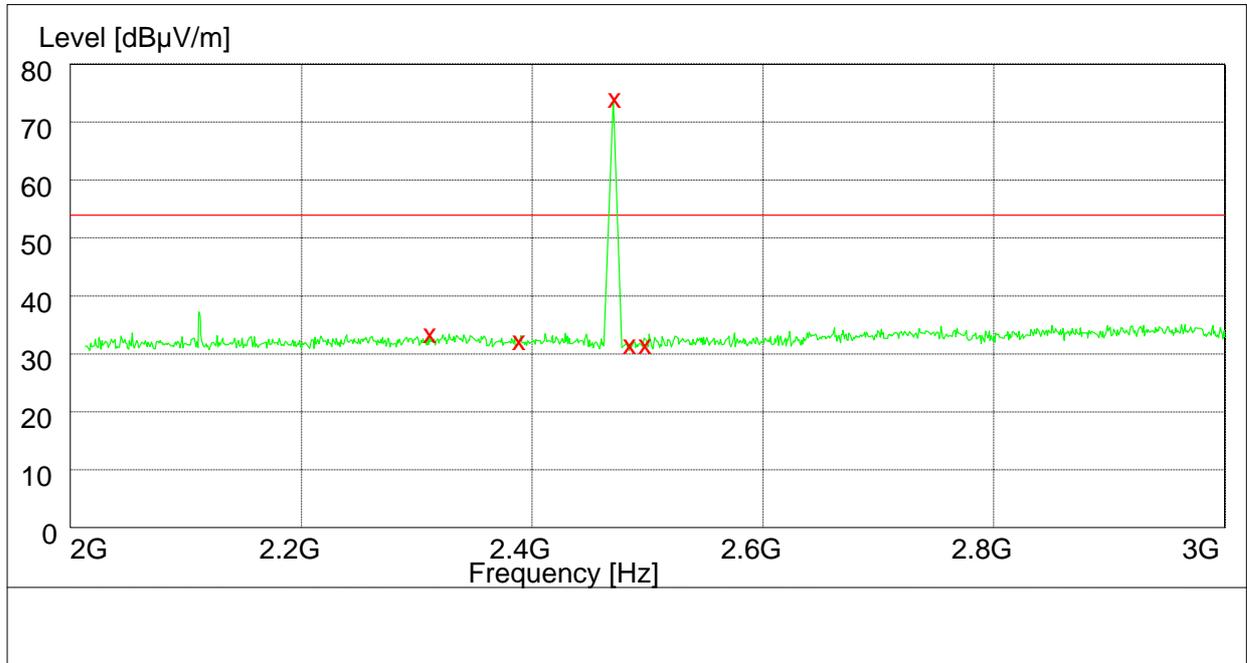
# 18GHz to 26GHz



Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
19484.000000	30.50	18.9	54.0	23.5	135.0	147.00	HORIZONTAL
20481.000000	30.90	19.7	54.0	23.1	146.0	157.00	HORIZONTAL
21782.000000	31.10	20.5	54.0	22.9	110.0	117.00	VERTICAL
23536.000000	30.70	20.5	54.0	23.3	187.0	292.00	VERTICAL
24216.000000	30.30	21.5	54.0	23.7	175.0	102.00	HORIZONTAL
26497.000000	34.30	27.9	54.0	19.7	117.0	101.00	VERTICAL



## 2GHz to 3GHz



Note: The peak exceeds the limit line is carrier frequency.

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarization
2310.000000	34.60	-11.7	54.0	19.4	175.0	89.00	HORIZONTAL
2390.000000	33.40	-11.5	54.0	20.6	104.0	178.00	HORIZONTAL
2462.000000	73.50	-11.5	54.0	-19.5	272.0	38.00	VERTICAL
2483.500000	32.70	-11.3	54.0	21.3	207.0	168.00	VERTICAL
2500.000000	32.80	-11.2	54.0	21.2	142.0	255.00	HORIZONTAL



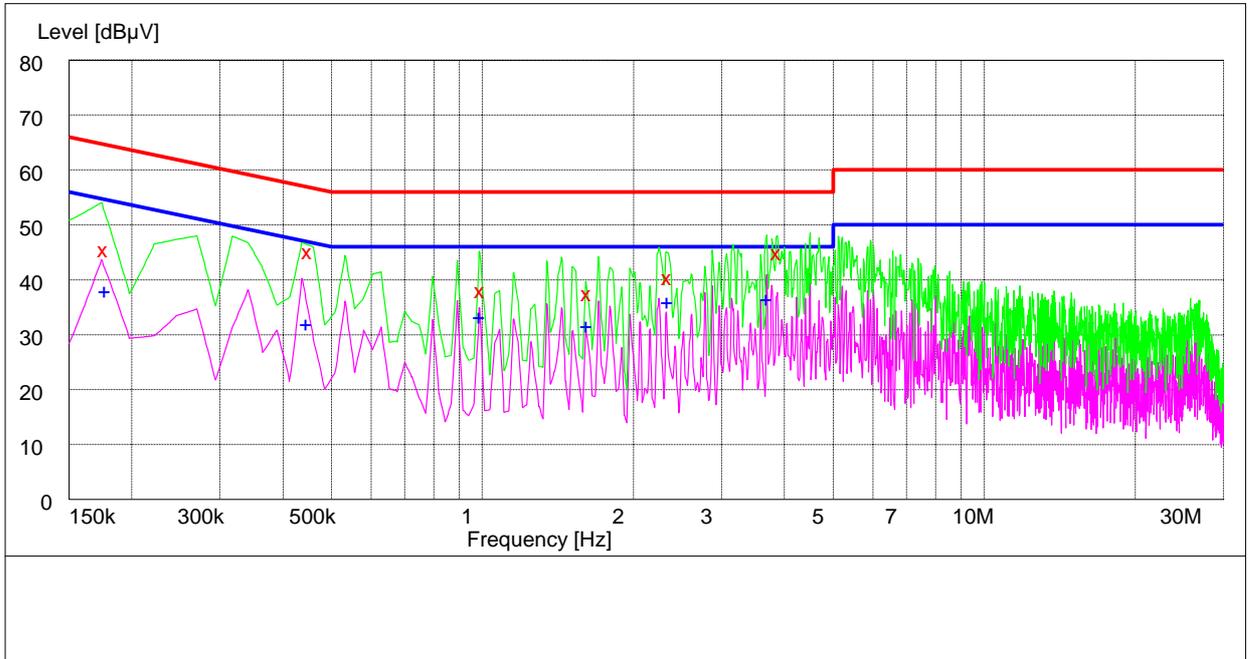
# Appendix G

## Conducted Emission at Power Port

According to FCC Part 15.207



# Channel 7



**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.177000	46.00	10.1	65	19.0	N	FLO
0.451500	45.60	10.1	57	11.4	N	FLO
0.996000	38.50	10.1	56	17.5	N	FLO
1.626000	38.10	10.1	56	17.9	N	FLO
2.350500	41.00	10.1	56	15.0	N	FLO
3.880500	45.50	10.2	56	10.5	N	FLO

**MEASUREMENT RESULT:**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.177000	38.60	10.1	55	16.4	L1	FLO
0.447000	32.50	10.1	47	14.5	N	FLO
0.991500	33.70	10.1	46	12.3	N	FLO
1.621500	32.20	10.1	46	13.8	N	FLO
2.346000	36.50	10.1	46	9.5	N	FLO
3.700500	37.10	10.2	46	8.9	N	FLO



# Appendix H

## Photos of Test Setup



# 1 Radiated Spurious Emissions



Radiated Spurious Emission (below 1GHz)



Radiated Spurious Emission (1GHz to18GHz)



Radiated Spurious Emission (above 18GHz)

## 2 Conducted Emissions



Conducted Emissions for AC Ports