



## **FCC 47 CFR PART 15 SUBPART C**

### **TEST REPORT**

**For**

**Wireless Module**

**Model: J27H010**

**Trade Name: Foxconn**

*Issued to*

**Hon Hai Precision Ind. Co., Ltd.**

**5F-1, 5 Hsin-An Road, HsinChu Science-Based Industrial Park  
Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**

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## 1. TEST RESULT CERTIFICATION

**Applicant:** Foxconn Informatics Ltd.  
5F-1, 5 Hsin-An Road, HsinChu Science-Based Industrial Park  
Taiwan, R.O.C.

**Equipment Under Test:** Wireless Module

**Trade Name:** Foxconn

**Model:** J27H010

**Date of Test:** April 16 ~ 24, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.4: 2003** and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

*Approved by:*

*Reviewed by:*

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Rex Lai  
Section Manager  
Compliance Certification Services Inc.

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Amanda Wu  
Section Manager  
Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	Wireless Module
<b>Trade Name</b>	Foxconn
<b>Model Number</b>	J27H010
<b>Model Discrepancy</b>	N/A
<b>Power Supply</b>	Powered from host device
<b>Frequency Range</b>	2412 ~ 2462 MHz
<b>Transmit Power</b>	IEEE 802.11b: 14.09 dBm IEEE 802.11g: 14.90 dBm
<b>Modulation Technique</b>	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK, DBPSK) + OFDM (QPSK, BPSK, 16-QAM, 64-QAM)
<b>Transmit Data Rate</b>	IEEE 802.11b Mode: 11, 5.5, 2, 1 Mbps IEEE 802.11g Mode: 54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1Mbps
<b>Number of Channels</b>	11 Channels
<b>Antenna Specification</b>	Whayu / Mitsumi: Gain: 2.01 dBi
<b>Antenna Designation</b>	Omni-Directional Antenna

**Remark:**

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **MCLJ27H010** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



### **3. 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, 15.207, 15.209 and 15.247.

#### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### **3.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



### 3.4 FCC PART 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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<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.



### **3.5 DESCRIPTION OF TEST MODES**

The EUT (model: J27H010) comes with two sets of antennas (Whayu & Mitsumi) same type for sale. After the preliminary test, the antenna with trade name Wayu was found to eliminate the worst emissions and therefore had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

IEEE 802.11b mode:

Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 11Mbps data rate were chosen for the final testing.

IEEE 802.11g mode:

Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 54Mbps data rate were chosen for the final testing.



## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

*Remark: Each piece of equipment is scheduled for calibration once a year.*

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	02/24/2009

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	09/11/2008
Test Receiver	Rohde&Schwarz	ESCI	100064	11/30/2008
Switch Controller	TRC	Switch Controller	SC94050010	05/03/2009
4 Port Switch	TRC	4 Port Switch	SC94050020	05/03/2009
Horn-Antenna	TRC	HA-0502	06	06/05/2008
Horn-Antenna	TRC	HA-0801	04	06/20/2008
Horn-Antenna	TRC	HA-1201A	01	08/12/2008
Horn-Antenna	TRC	HA-1301A	01	08/12/2008
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/28/2009
Turn Table	Max-Full	MFT-120S	T120S940302	N.C.R.
Antenna Tower	Max-Full	MFA-430	A440940302	N.C.R.
Controller	Max-Full	MF-CM886	CC-C-1F-13	N.C.R.
Site NSA	CCS	N/A	FCC: 965860 IC: IC 6106	09/25/2008
Test S/W	LABVIEW (V 6.1)			

*Remark: The measurement uncertainty is less than +/-2.0065dB (30MHz ~ 1GHz), +/-3.0958dB (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver 9kHz-30MHz	Rohde & Schwarz	ESHS30	828144/003	11/19/2008
Two-Line V-Network 9kHz-30MHz	Schaffner	NNB41	03/10013	06/12/2008
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	03/30/2009
Test S/W	LABVIEW (V 6.1)			

*Remark: The measurement uncertainty is less than +/- 2.81dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.*





## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### **5.2 EQUIPMENT**







Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

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

### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, IEC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/ EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	 ACCREDITED TESTING CERT #0824.01
USA	FCC	3/10 meter Open Area Test Sites (93105, 90471) / 3M Semi Anechoic Chamber (965860) to perform FCC Part 15/18 measurements	 93105, 90471 965860
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	<b>VCCI</b> R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	TAF	EN 300 328, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	 Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	3/10 meter Open Area Test Sites (IC 2324C-3, IC 2324C-5) / 3M Semi Anechoic Chamber (IC 6106)	 IC 2324C-3 IC 2324C-5 IC 6106

\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	PC	Dell	DCTA	21G1K1S	FCC DoC	N/A	Unshielded, 1.8m
2.	LCD Monitor	Samsung	173P	DI17H4JXB04968Y	FCC DoC	Shielded, 1.8m with 2 cores	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	Printer	EPSON	STYLUS C60	DR3K039633	FCC DoC	Shielded, 1.8m	Unshielded, 1.8m
4.	Modem	ACEEX	DM-1414	304012269	IFAXDM1414	Shielded, 1.8m	Unshielded, 1.8m
5.	Multimedia Earphone	Labtec	Axis-301	N/A	FCC DoC	Unshielded, 1.8m*2	N/A
6.	USB Keyboard	DELL	Sk-8115	N/A	FCC DoC	Shielded, 1.8m	N/A
7.	USB Keyboard	BTC	5211	6001710013	FCC DoC	Shielded, 1.8m	N/A
8.	USB Mouse	DELL	MO56UO	408031121	FCC DoC	Shielded, 1.8m	N/A
9.	Standard SD/SDIO Host Hardware Development Kit	Rev1.2C	H10733 VER2.0	P-1238M	N/A	N/A	N/A
7.	Test Kit	N/A	N/A	N/A	N/A	N/A	N/A
8.	Super a/g 108Mbps Wireless Lan Router (Remote)	PLANEX	BLW-04SAG	40DDA0421	SJ9-BLW54SAG	N/A	Unshielded, 1.8m

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



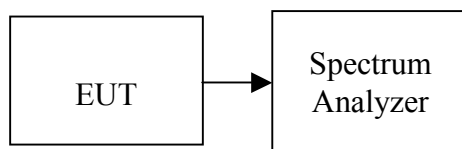
## 9. FCC PART 15.247 REQUIREMENTS

### 9.1 6DB BANDWIDTH

#### LIMIT

According to §15.247(a)(2), 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.

#### Test Configuration



#### TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Span = 20MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

#### TEST RESULTS

*No non-compliance noted.*

**Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	9920	>500	PASS
Mid	2437	10250		PASS
High	2462	10080		PASS

**Test mode: IEEE 802.11g**

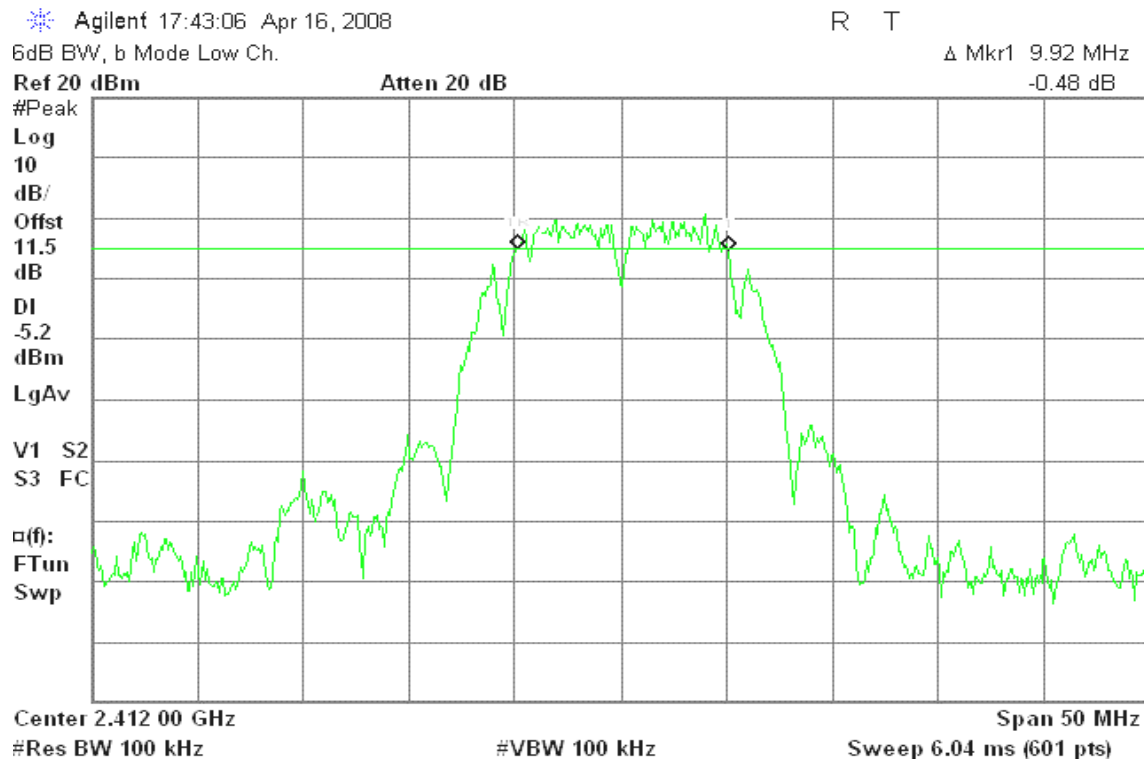
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
Low	2412	16500	>500	PASS
Mid	2437	16500		PASS
High	2462	16500		PASS



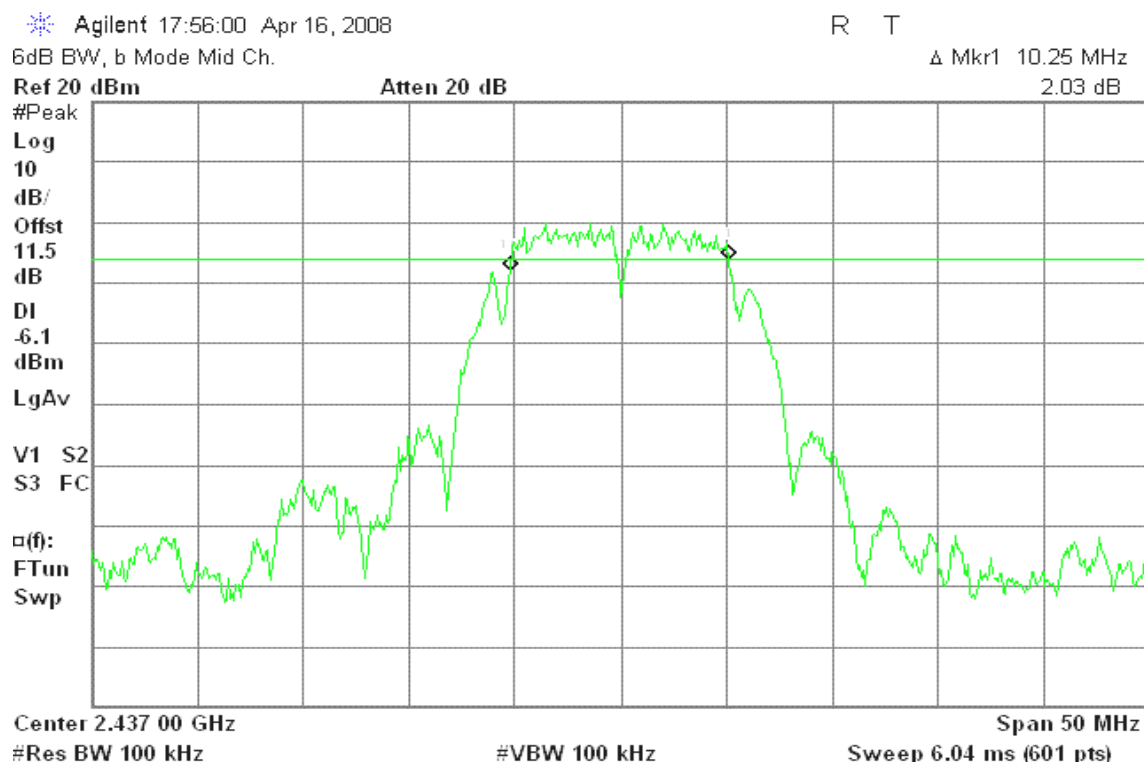
## Test Plot

### IEEE 802.11b

#### 6dB Bandwidth (CH Low)



#### 6dB Bandwidth (CH Mid)





## 6dB Bandwidth (CH High)

Agilent 18:01:14 Apr 16, 2008

R T

6dB BW, b Mode High Ch.

$\Delta$  Mkr1 10.08 MHz

Ref 20 dBm

Atten 20 dB

-1.05 dB

#Peak

Log

10

dB/

Offst

11.5

dB

DI

-4.9

dBm

LgAv

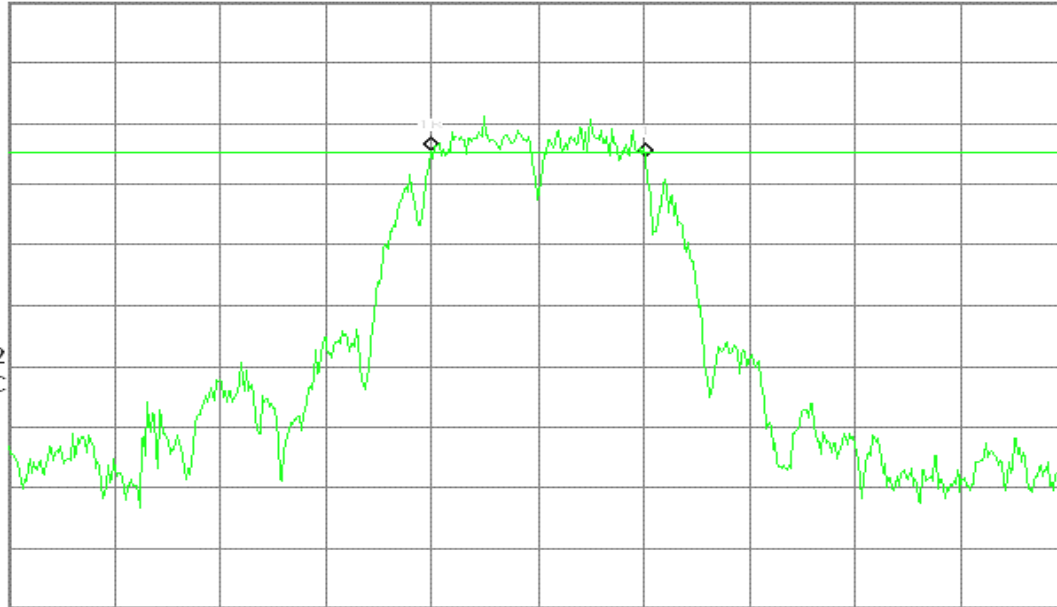
V1 S2

S3 FC

$\alpha(f)$ :

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

## IEEE 802.11g

## 6dB Bandwidth (CH Low)

Agilent 18:07:53 Apr 16, 2008

R L

6dB BW, g Mode Low Ch.

$\Delta$  Mkr1 16.50 MHz

Ref 20 dBm

Atten 20 dB

-0.02 dB

#Peak

Log

10

dB/

Offst

11.5

dB

DI

-7.7

dBm

LgAv

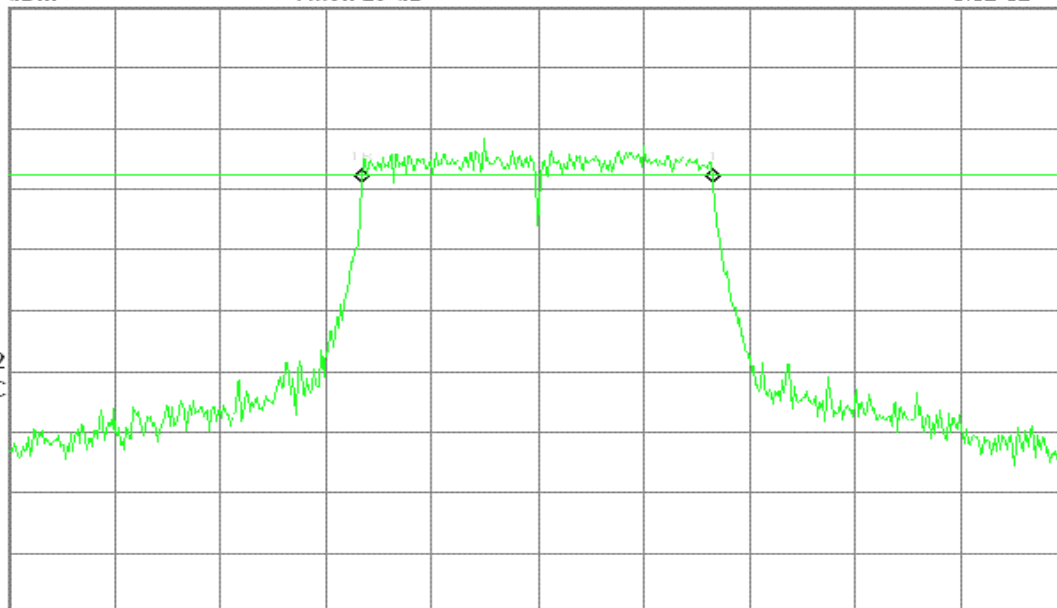
V1 S2

S3 FC

$\alpha(f)$ :

FTun

Swp



Center 2.412 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)



## 6dB Bandwidth (CH Mid)

Agilent 18:16:04 Apr 16, 2008

R T

6dB BW, g Mode Mid Ch.

$\Delta$  Mkr1 16.50 MHz

Ref 20 dBm

Atten 20 dB

-0.76 dB

#Peak

Log

10

dB/

Offst

11.5

dB

DI

-7.6

dBm

LgAv

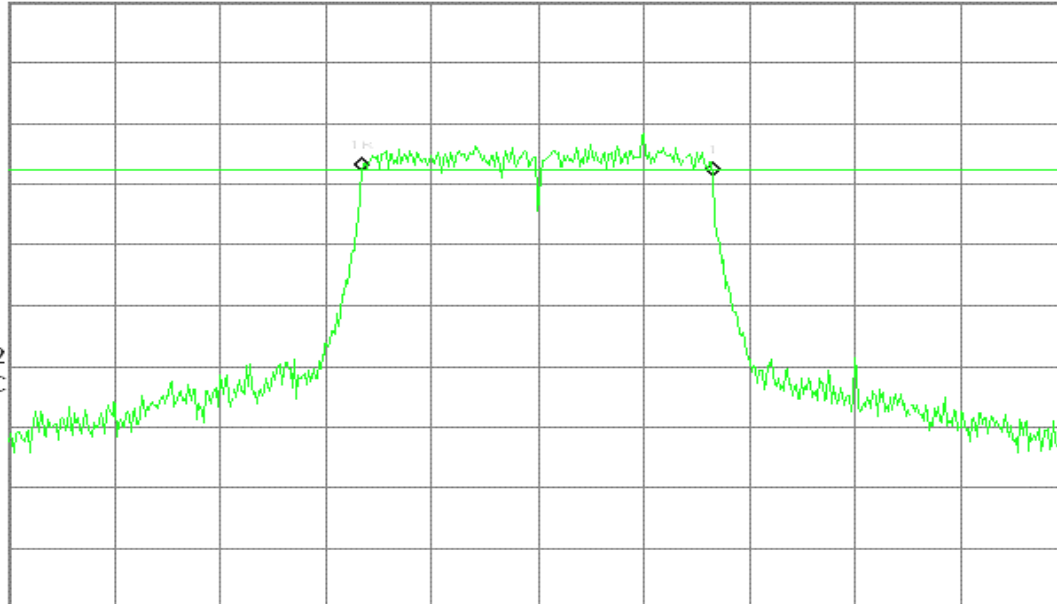
V1 S2

S3 FC

$\alpha(f)$ :

FTun

Swp



Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

## 6dB Bandwidth (CH High)

Agilent 18:28:47 Apr 16, 2008

R T

6dB BW, g Mode High Ch.

$\Delta$  Mkr1 16.50 MHz

Ref 20 dBm

Atten 20 dB

-0.30 dB

#Peak

Log

10

dB/

Offst

11.5

dB

DI

-7.9

dBm

LgAv

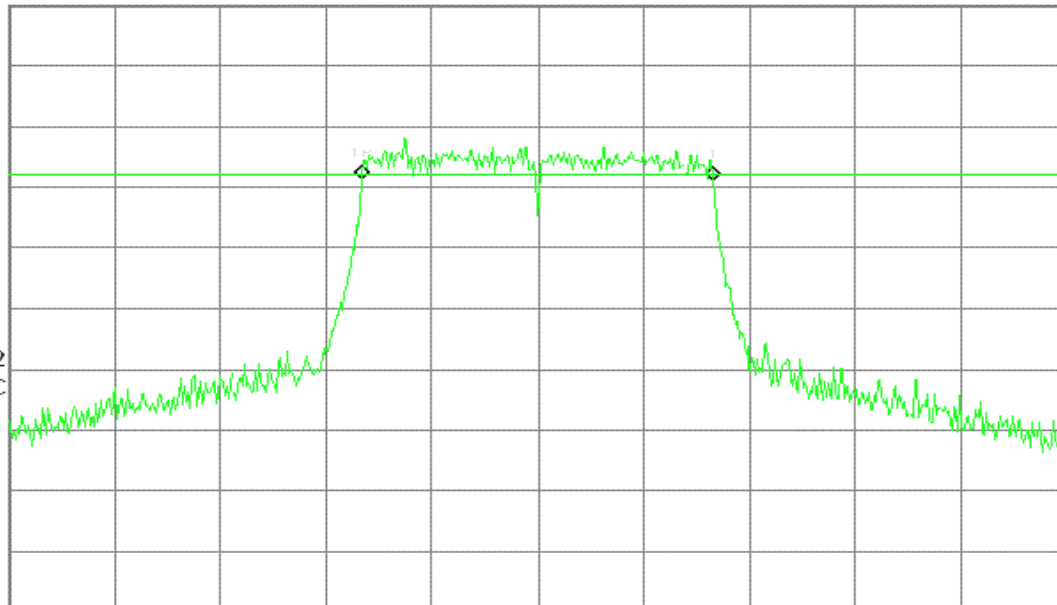
V1 S2

S3 FC

$\alpha(f)$ :

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)





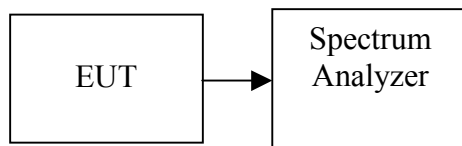
## 9.2 PEAK POWER

### LIMIT

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

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### Test Configuration



### TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the peak power detection.

### TEST RESULTS

*No non-compliance noted.*

#### **Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	13.90	0.02455	1.00	PASS
Mid	2437	13.56	0.02270		PASS
High	2462	14.09	0.02564		PASS

#### **Test mode: IEEE 802.11g**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.45	0.02786	1.00	PASS
Mid	2437	14.77	0.02999		PASS
High	2462	14.90	0.03090		PASS



## Test Plot

### IEEE 802.11b

#### Peak Power (CH Low)

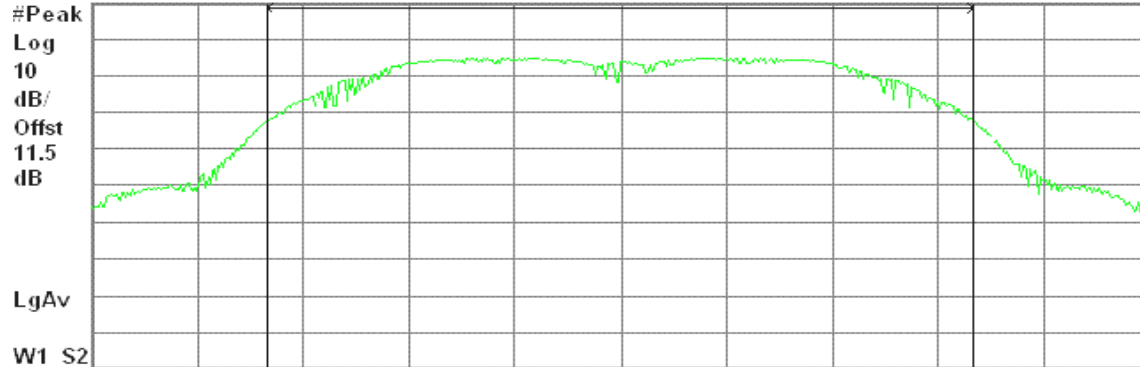
Agilent 17:44:08 Apr 16, 2008

R T

Peak Output Power , b Mode Low Ch.

Ref 20 dBm

Atten 20 dB



#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

13.90 dBm / 14.2450 MHz

-57.63 dBm/Hz

#### Peak Power (CH Mid)

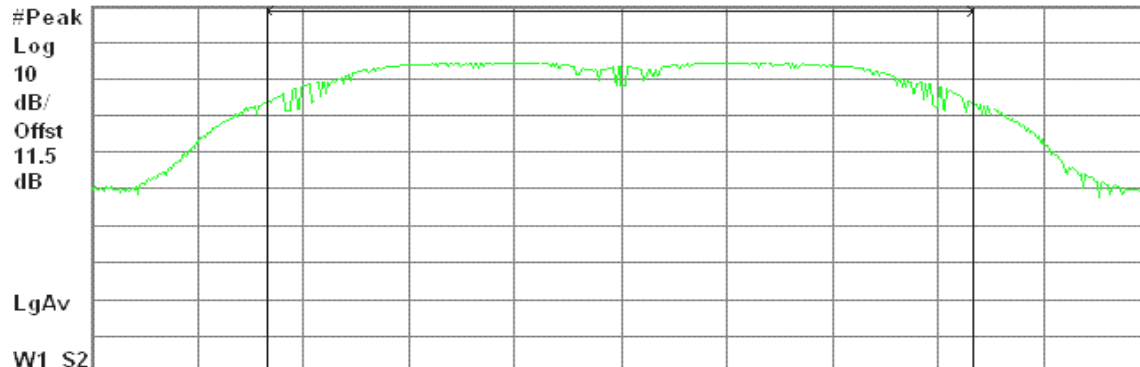
Agilent 17:56:34 Apr 16, 2008

R T

Peak Output Power , b Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

13.56 dBm / 12.5410 MHz

-57.43 dBm/Hz



## Peak Power (CH High)

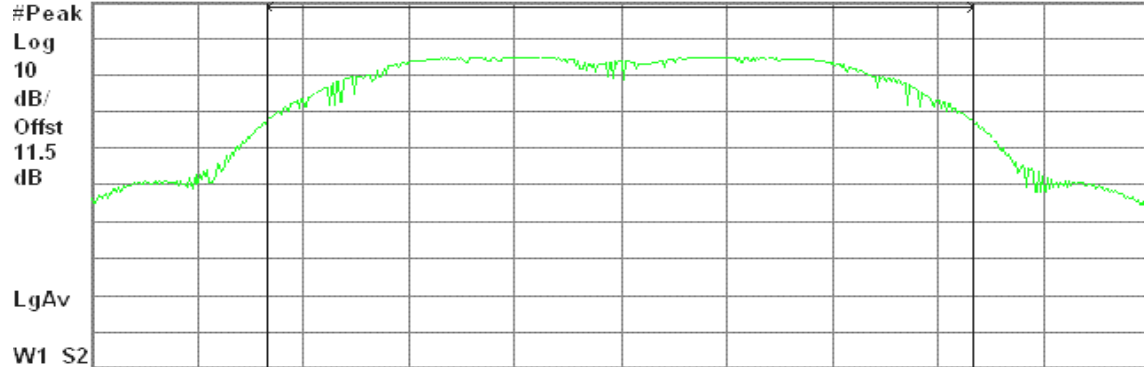
Agilent 18:01:51 Apr 16, 2008

R T

Peak Output Power , b Mode High Ch.

Ref 20 dBm

Atten 20 dB



Center 2.462 00 GHz

Span 21.41 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

14.09 dBm / 14.2720 MHz

-57.45 dBm/Hz

## IEEE 802.11g

### Peak Power (CH Low)

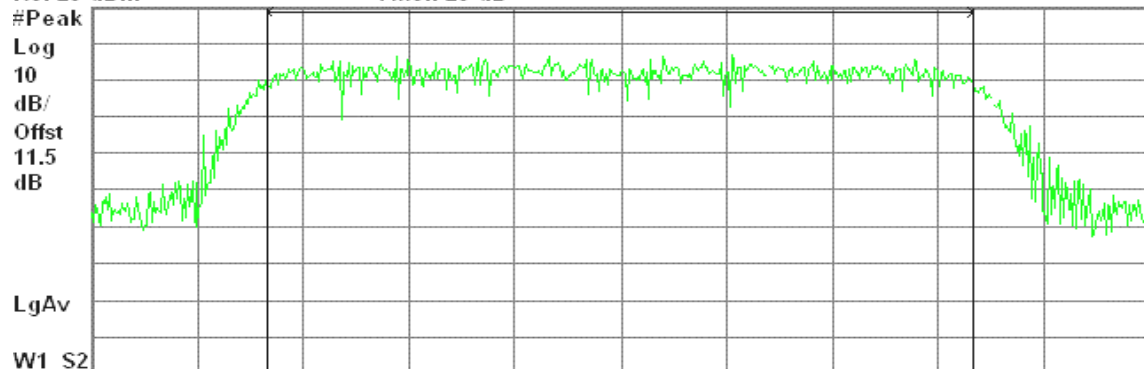
Agilent 18:08:32 Apr 16, 2008

R T

Peak Output Power , g Mode Low Ch.

Ref 20 dBm

Atten 20 dB



Center 2.412 00 GHz

Span 24.53 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

14.45 dBm / 16.3530 MHz

-57.69 dBm/Hz



## Peak Power (CH Mid)

Agilent 18:17:32 Apr 16, 2008

R T

Peak Output Power , g Mode Mid Ch.

Ref 20 dBm

Atten 20 dB



Center 2.437 00 GHz

Span 24.59 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

14.77 dBm / 16.3930 MHz

-57.38 dBm/Hz

## Peak Power (CH High)

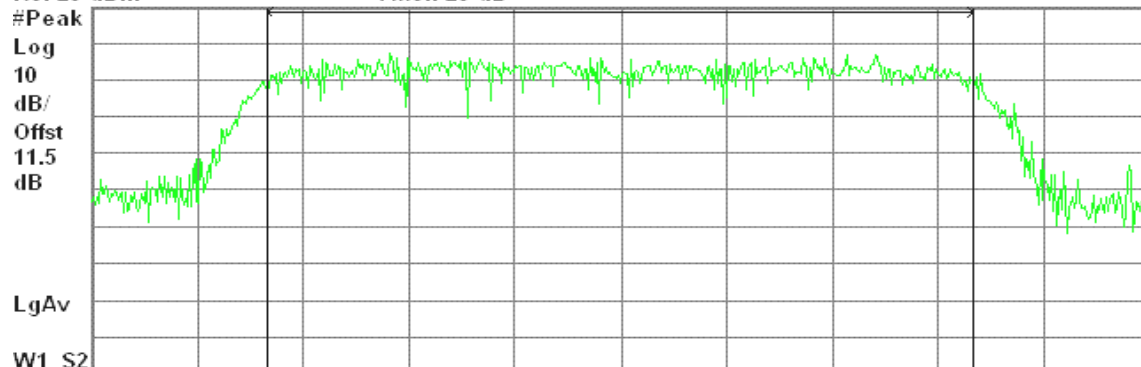
Agilent 18:29:24 Apr 16, 2008

R T

Peak Output Power , g Mode High Ch.

Ref 20 dBm

Atten 20 dB



Center 2.462 00 GHz

Span 24.62 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

14.90 dBm / 16.4140 MHz

-57.25 dBm/Hz

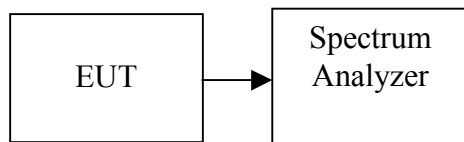


## 9.3 AVERAGE POWER

### LIMIT

None; for reporting purposes only.

### Test Configuration



### TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the average power detection.

### TEST RESULTS

*No non-compliance noted.*

#### Test Data

##### Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	11.53	0.01422
Mid	2437	11.57	0.01435
High	2462	11.66	0.01466

##### Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	11.13	0.01297
Mid	2437	11.78	0.01507
High	2462	11.30	0.01349



## Test Plot

### IEEE 802.11b

#### Average Power (CH Low)

Agilent 17:44:47 Apr 16, 2008

R T

avg Output Power, b Mode Low Ch.

Ref 30 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

11.5

dB

#PAvg

100

V1 S2

Center 2.412 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 21.37 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.53 dBm / 14.2450 MHz

-60.01 dBm/Hz

#### Average Power (CH Mid)

Agilent 17:57:10 Apr 16, 2008

R T

avg Output Power, b Mode Mid Ch.

Ref 30 dBm

Atten 30 dB

#Samp

Log

10

dB/

Offst

11.5

dB

#PAvg

65

V1 S2

Center 2.437 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 18.81 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.57 dBm / 12.5410 MHz

-59.41 dBm/Hz



## Average Power (CH High)

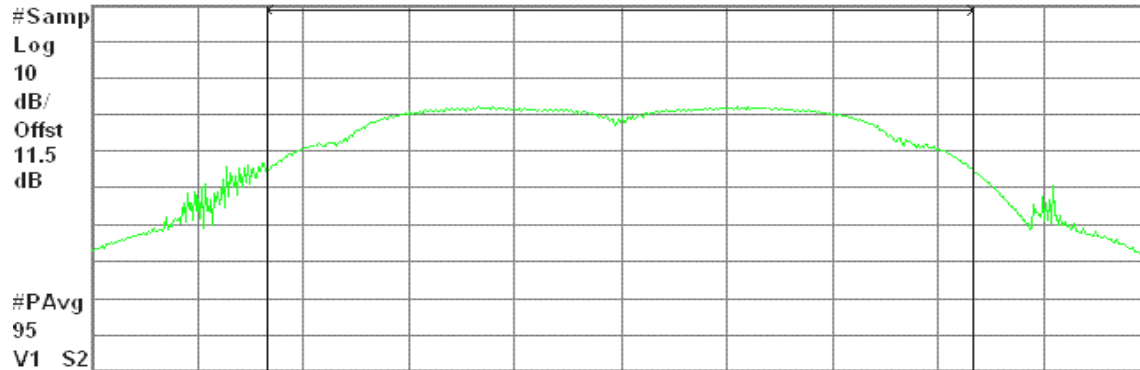
Agilent 18:02:36 Apr 16, 2008

R T

avg Output Power , b Mode High Ch.

Ref 30 dBm

Atten 30 dB



Center 2.462 00 GHz

Span 21.41 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.66 dBm / 14.2720 MHz

-59.88 dBm/Hz

## IEEE 802.11g

### Average Power (CH Low)

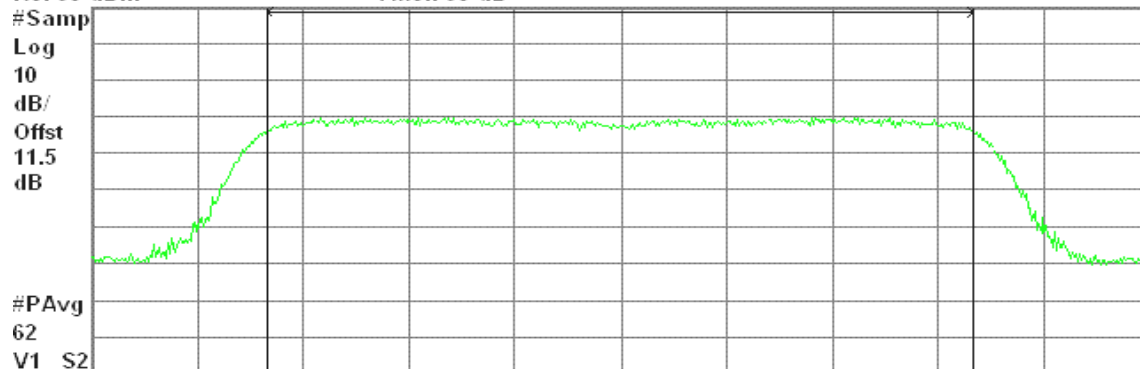
Agilent 18:09:57 Apr 16, 2008

R T

avg Output Power , g Mode Low Ch.

Ref 30 dBm

Atten 30 dB



Center 2.412 00 GHz

Span 24.53 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.13 dBm / 16.3530 MHz

-61.01 dBm/Hz



### Average Power (CH Mid)

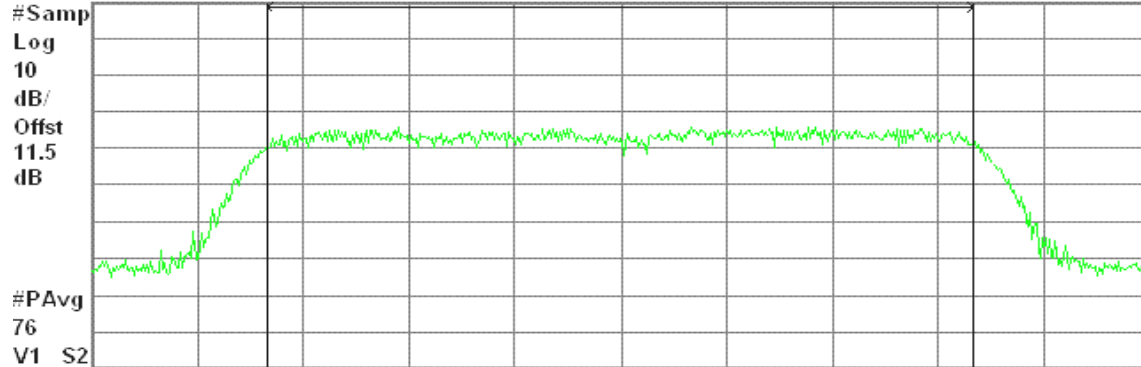
Agilent 18:19:08 Apr 16, 2008

R T

avg Output Power , g Mode Mid Ch.

Ref 30 dBm

Atten 30 dB



Center 2.437 00 GHz

Span 24.59 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.78 dBm / 16.3930 MHz

-60.37 dBm/Hz

### Average Power (CH High)

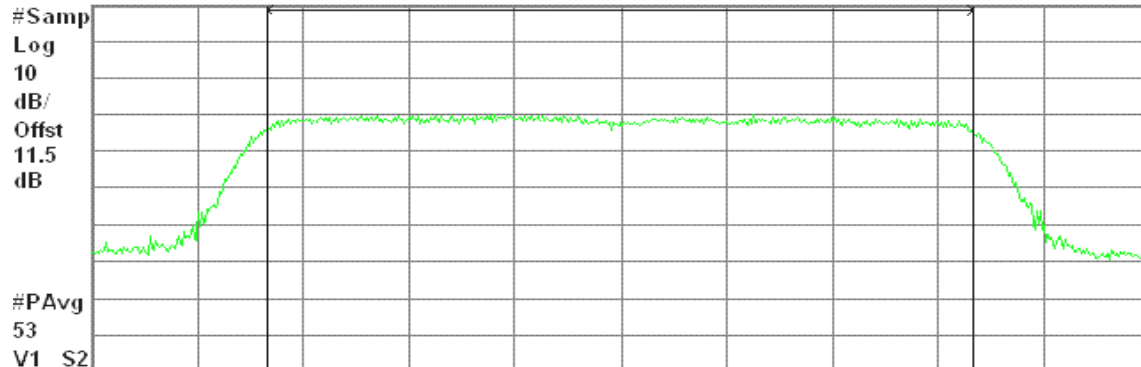
Agilent 18:31:40 Apr 16, 2008

R L

avg Output Power , g Mode High Ch.

Ref 30 dBm

Atten 30 dB



Center 2.462 00 GHz

Span 24.62 MHz

#Res BW 1 MHz

#VBW 3 MHz

Sweep 1 ms (601 pts)

Channel Power

Power Spectral Density

11.30 dBm / 16.4140 MHz

-60.85 dBm/Hz

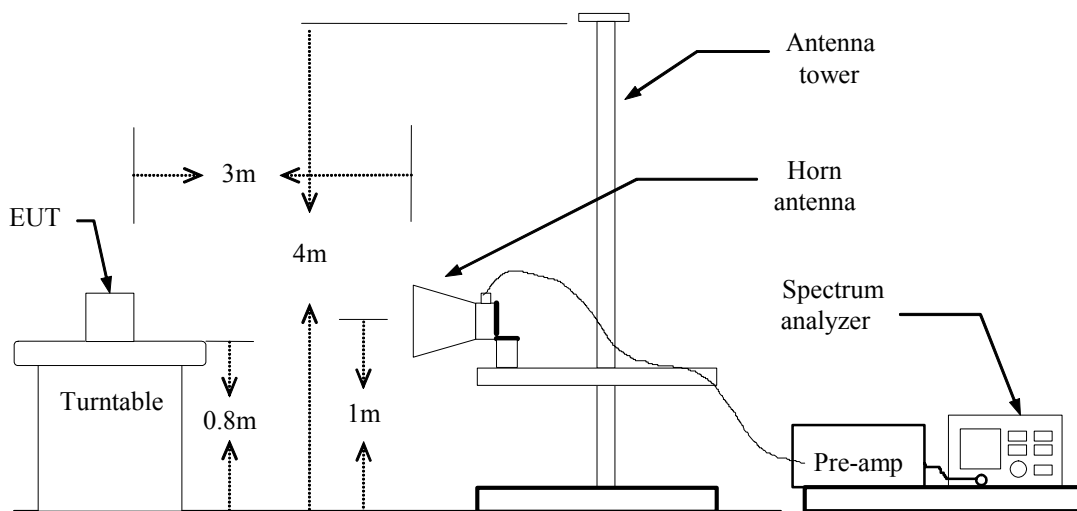


## 9.4 BAND EDGES MEASUREMENT

### LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands 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, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 Section 15.205(c)).

### Test Configuration

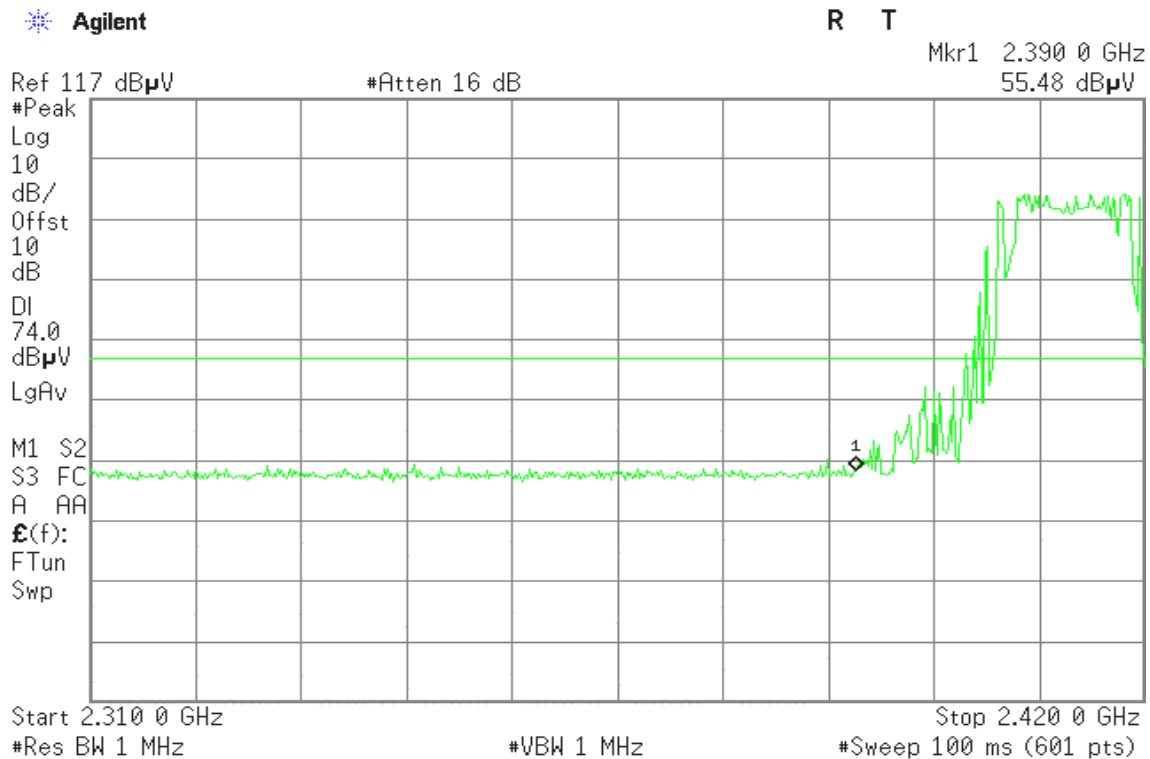
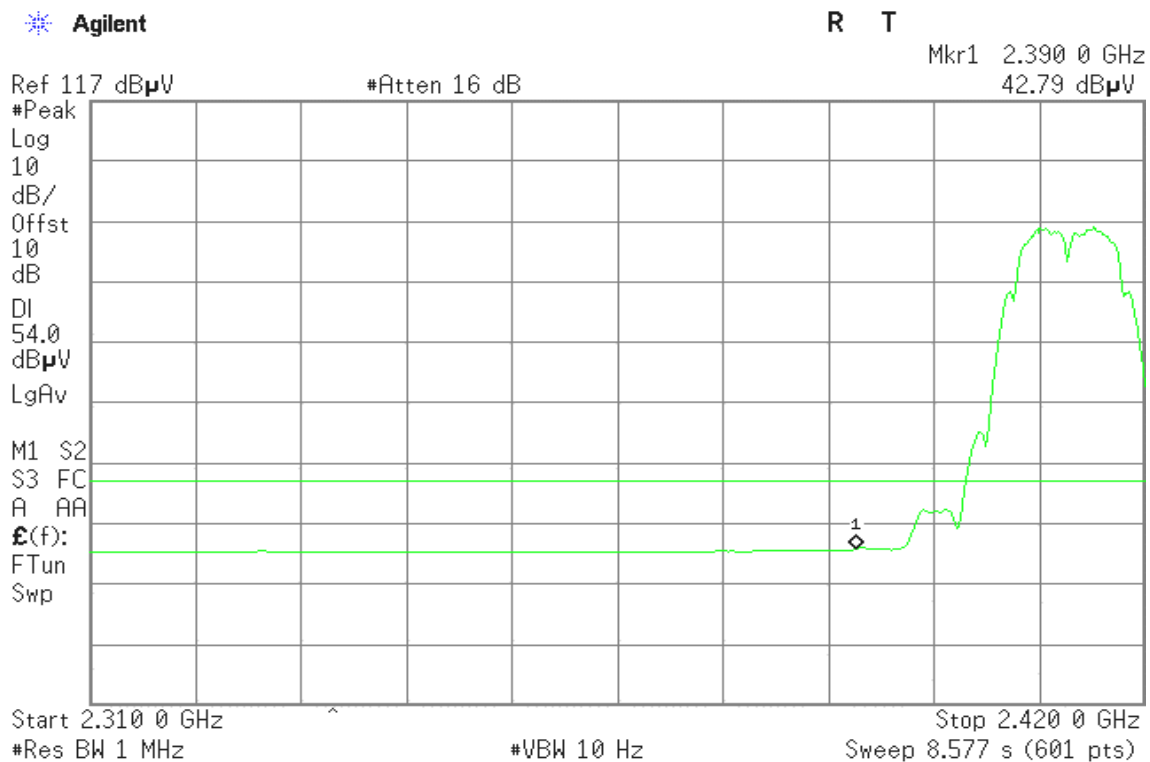


### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

### TEST RESULTS

Refer to attach spectrum analyzer data chart.

**Band Edges (IEEE 802.11b / CH Low)****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

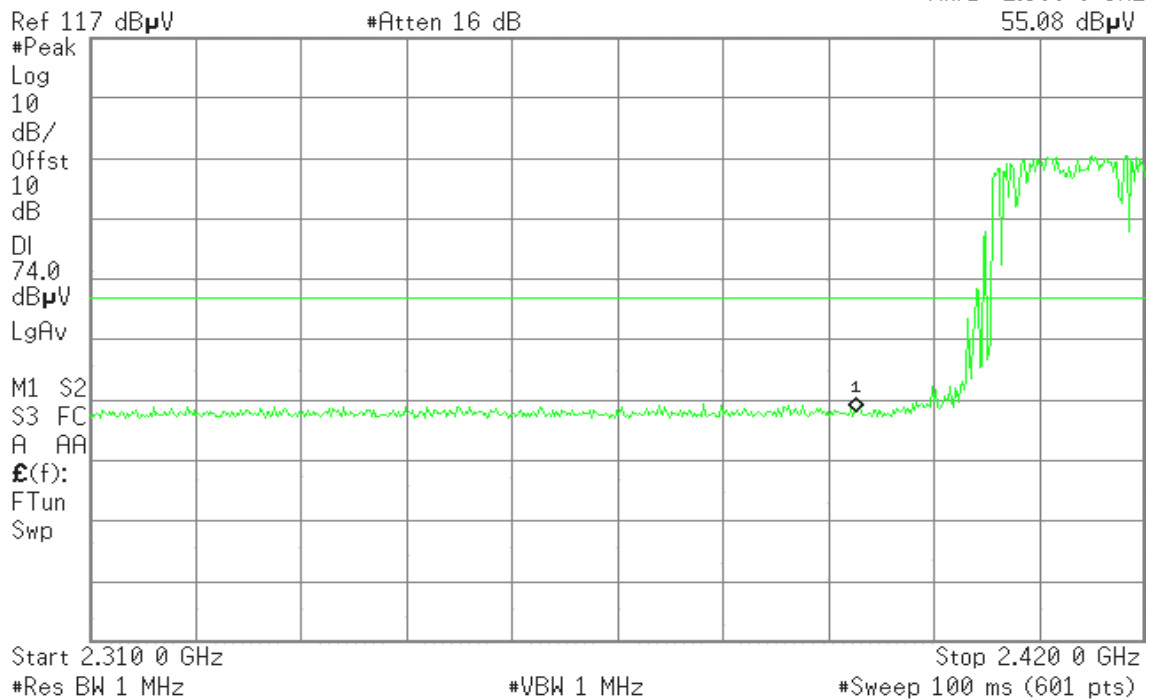


Detector mode: Peak

Polarity: Horizontal

Agilent

R T

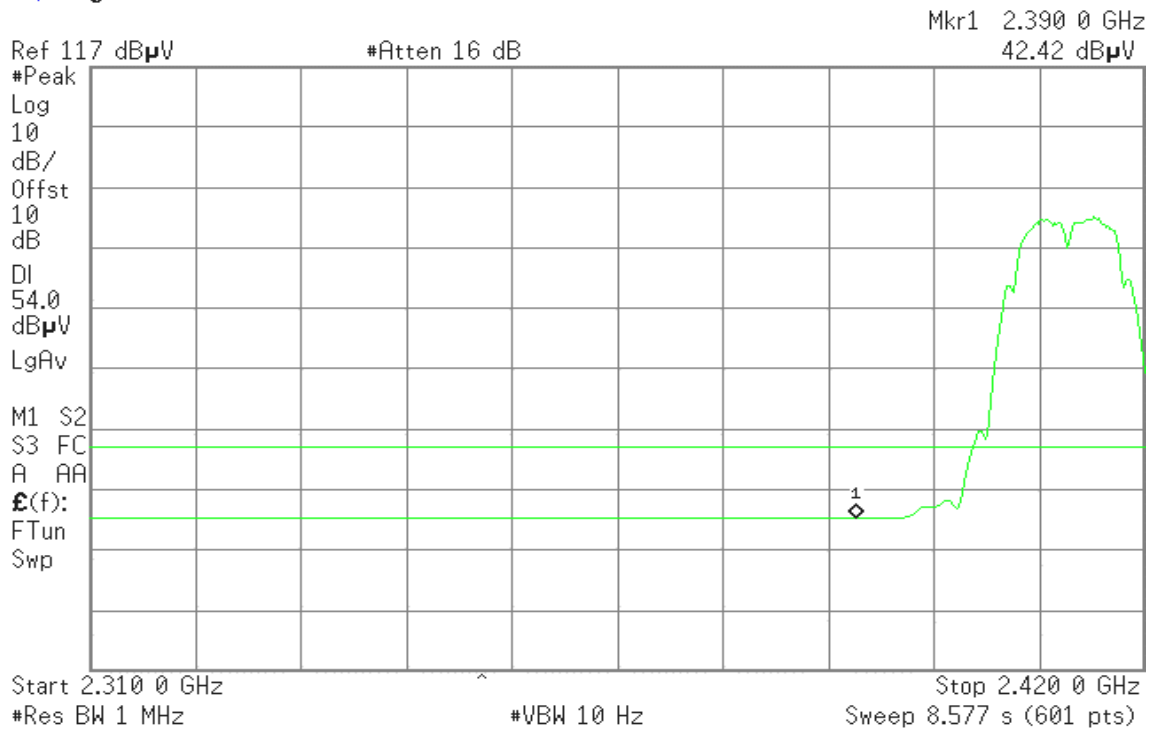


Detector mode: Average

Polarity: Horizontal

Agilent

R T

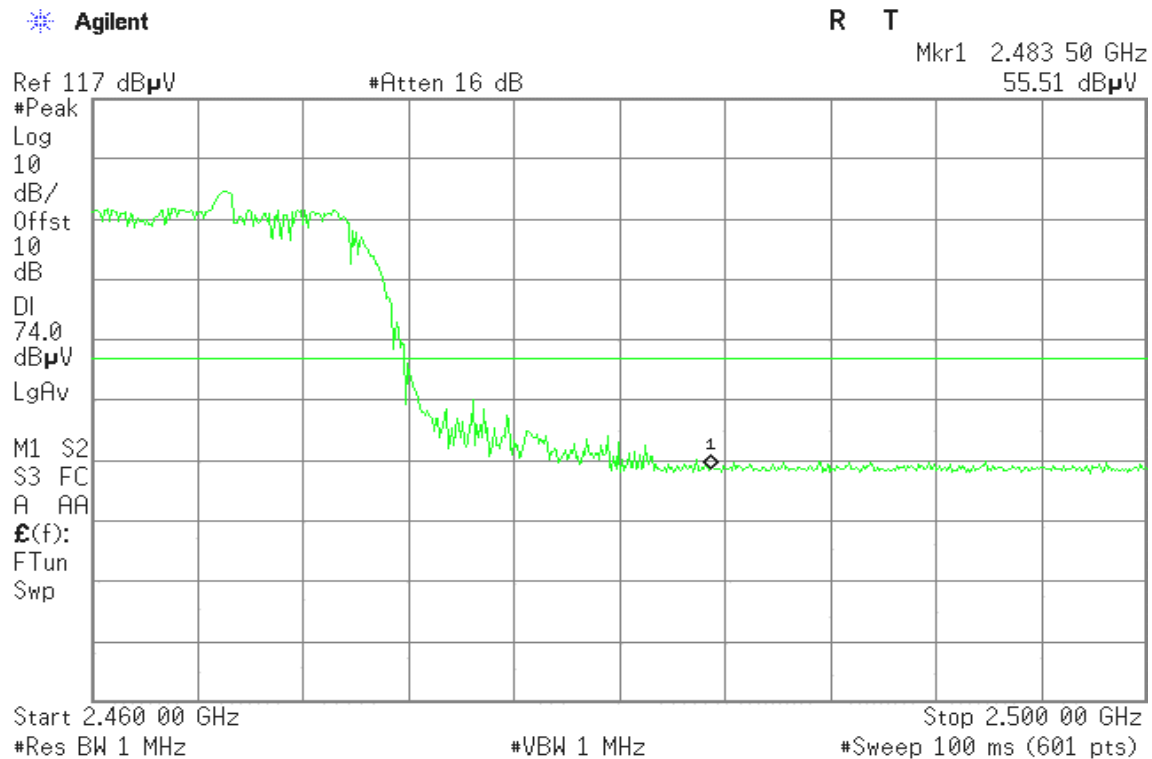




## Band Edges (IEEE 802.11b / CH High)

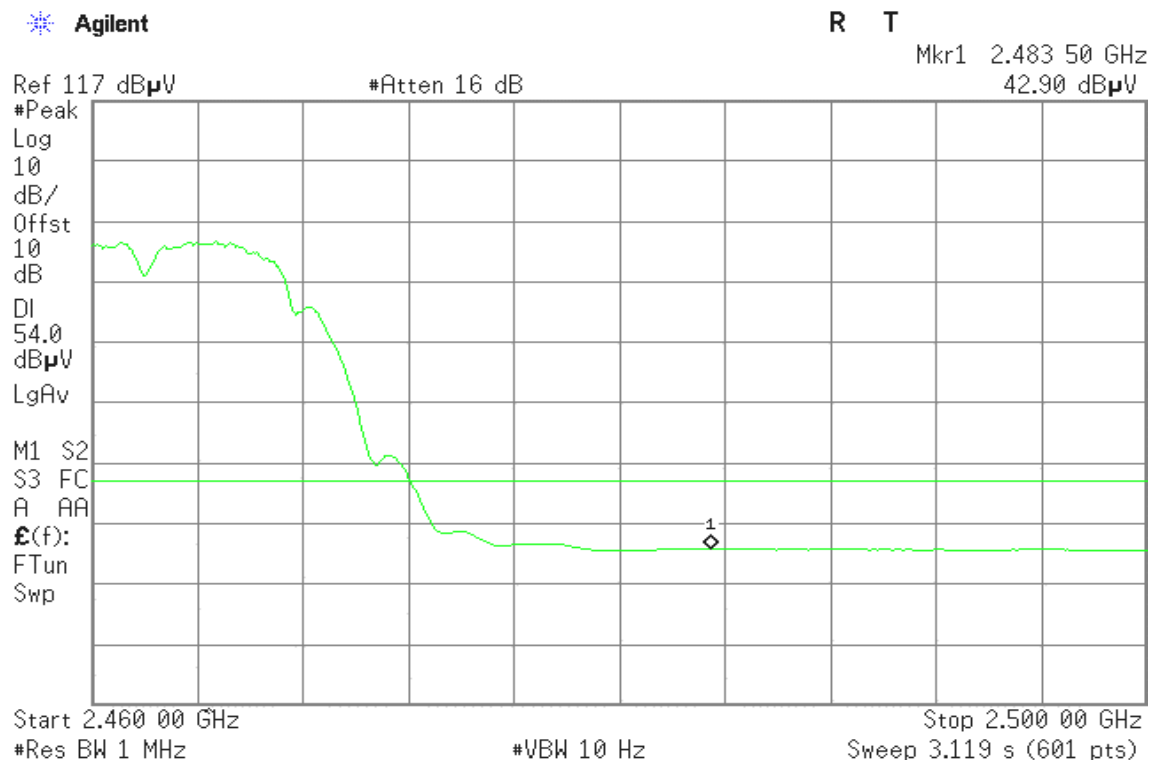
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical





Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
55.63 dB $\mu$ VRef 117 dB $\mu$ V

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
43.19 dB $\mu$ VRef 117 dB $\mu$ V

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

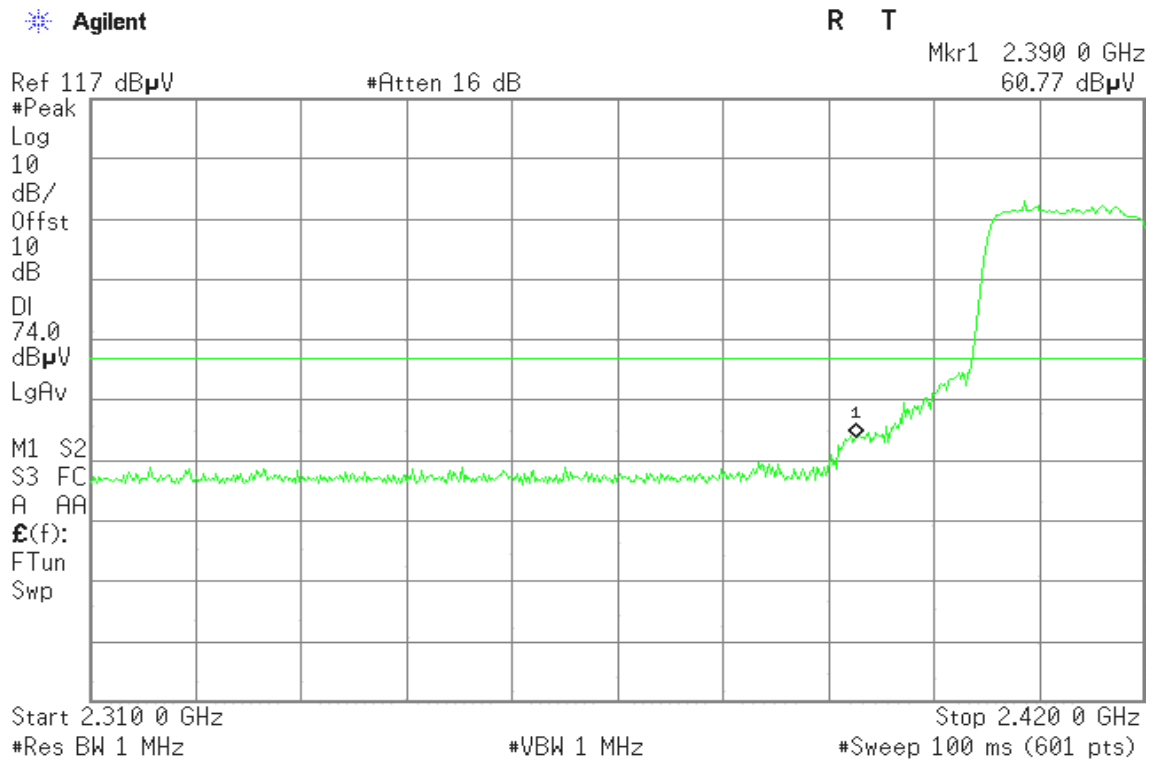
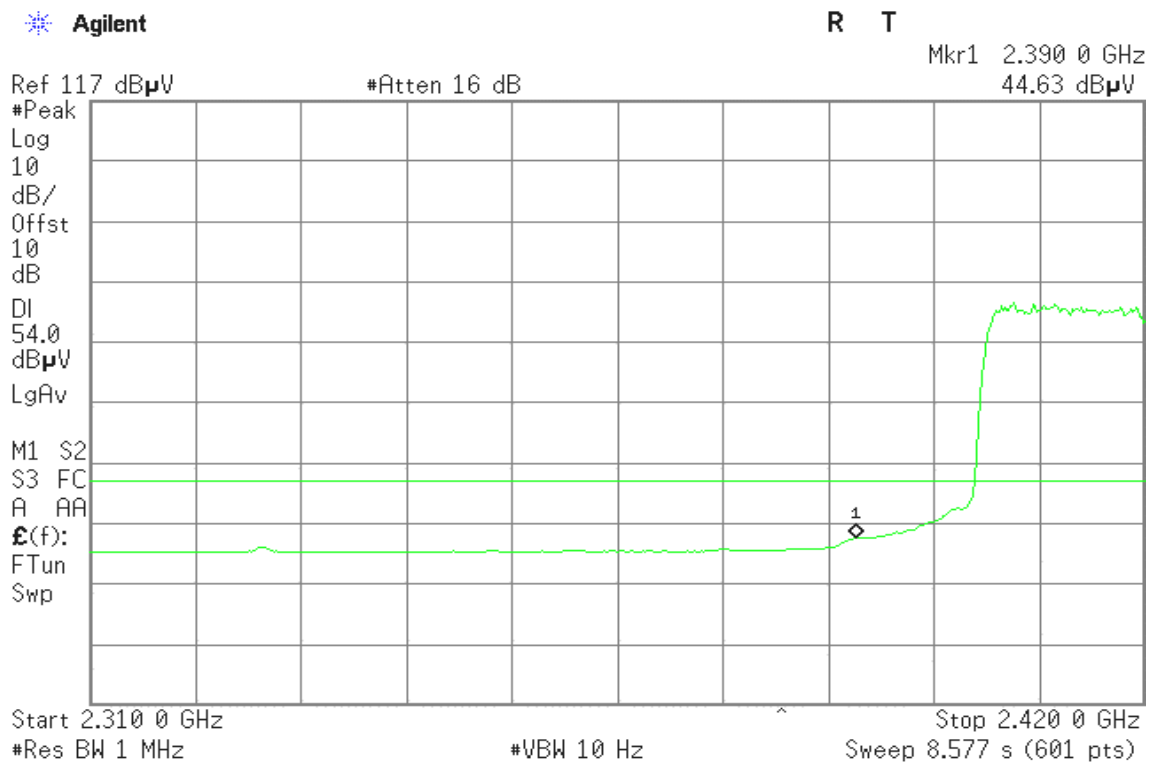
Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

^ Stop 2.500 00 GHz

Sweep 3.119 s (601 pts)

**Band Edges (IEEE 802.11g / CH Low)****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**



Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Ref 117 dB $\mu$ V

#Atten 16 dB

Mkr1 2.390 0 GHz  
58.52 dB $\mu$ V

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.420 0 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Ref 117 dB $\mu$ V

#Atten 16 dB

Mkr1 2.390 0 GHz  
43.32 dB $\mu$ V

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.310 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.420 0 GHz

Sweep 8.577 s (601 pts)

**Band Edges (IEEE 802.11g / CH High)****Detector mode: Peak****Polarity: Vertical**

Agilent

R T

Mkr1 2.483 50 GHz  
58.20 dB $\mu$ VRef 117 dB $\mu$ V

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

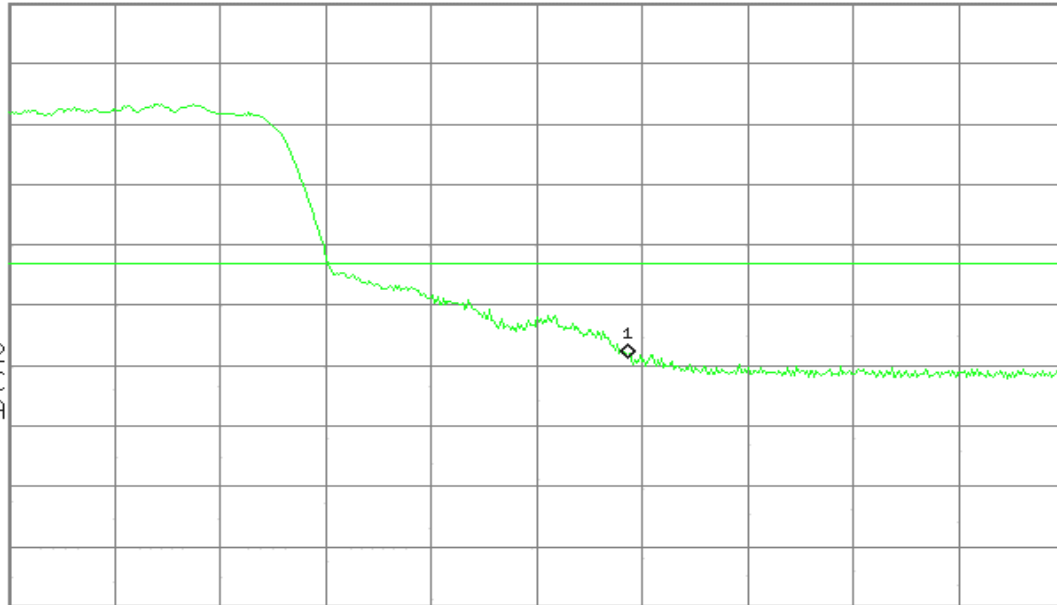
S3 FC

A AA

 $\mathcal{E}(f)$ :

FTun

Swp



Start 2.460 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (601 pts)

**Detector mode: Average****Polarity: Vertical**

Agilent

R T

Mkr1 2.483 50 GHz  
43.73 dB $\mu$ VRef 117 dB $\mu$ V

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

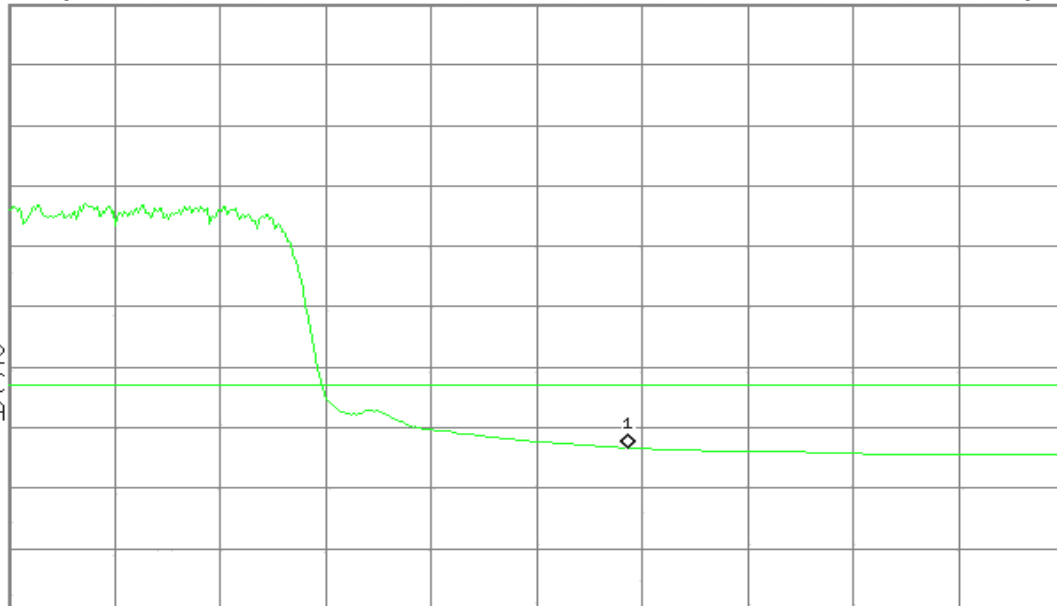
S3 FC

A AA

 $\mathcal{E}(f)$ :

FTun

Swp



Start 2.460 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.119 s (601 pts)





Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
61.12 dB $\mu$ VRef 117 dB $\mu$ V

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
44.67 dB $\mu$ VRef 117 dB $\mu$ V

#Atten 16 dB

#Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A AA

E(f):

FTun

Swp

Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

Sweep 3.119 s (601 pts)

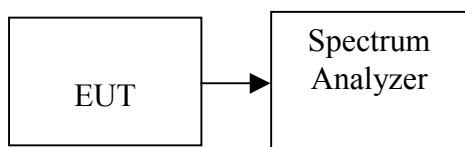


## 9.5 PEAK POWER SPECTRAL DENSITY

### LIMIT

1. According to §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.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

### Test Configuration



### TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.  
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

### TEST RESULTS

*No non-compliance noted.*

**Test Data****Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-10.58	8.00	PASS
Mid	2437	-10.35		PASS
High	2462	-10.25		PASS

**Test mode: IEEE 802.11g**

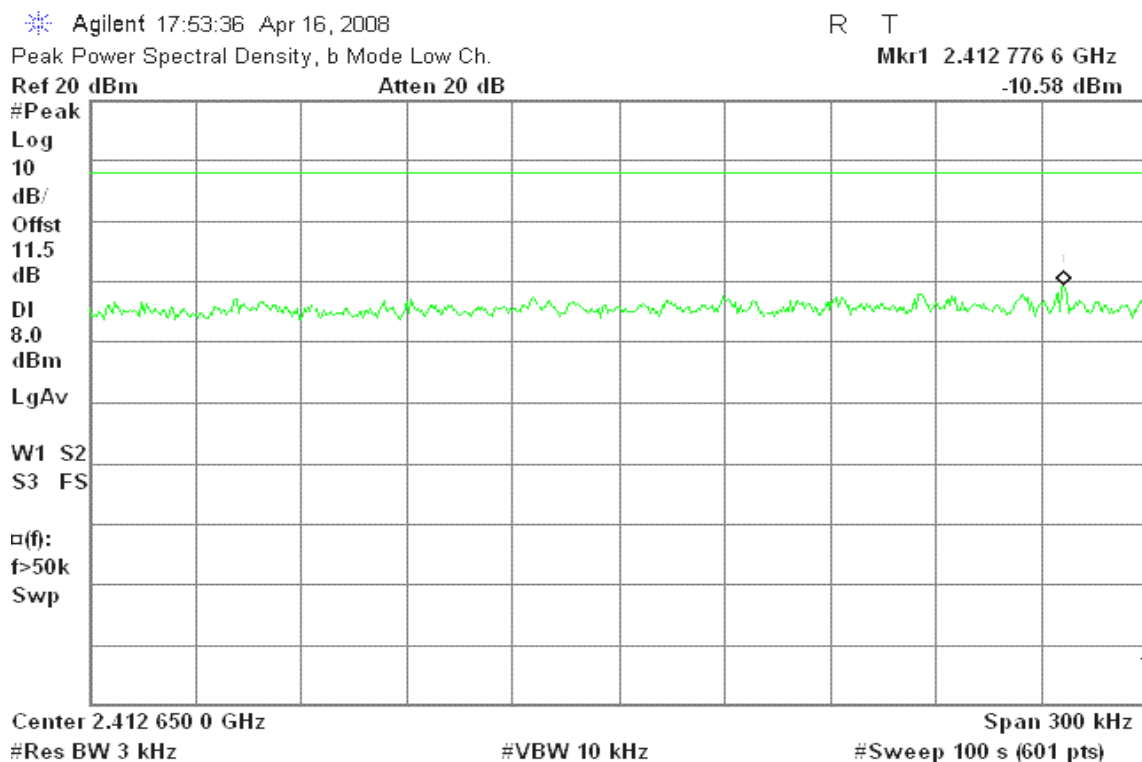
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-14.00	8.00	PASS
Mid	2437	-13.72		PASS
High	2462	-14.26		PASS



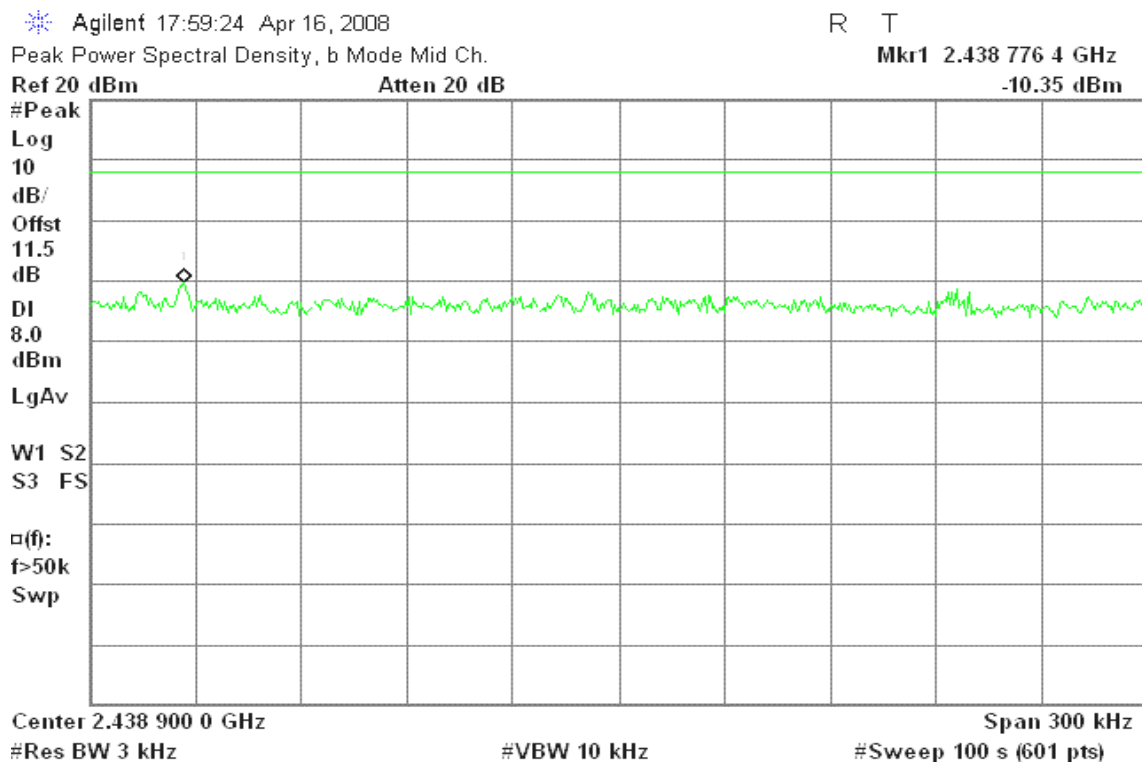
## Test Plot

### IEEE 802.11b

#### PPSD (CH Low)



#### PPSD (CH Mid)



**PPSD (CH High)**

\* Agilent 18:05:11 Apr 16, 2008

R T

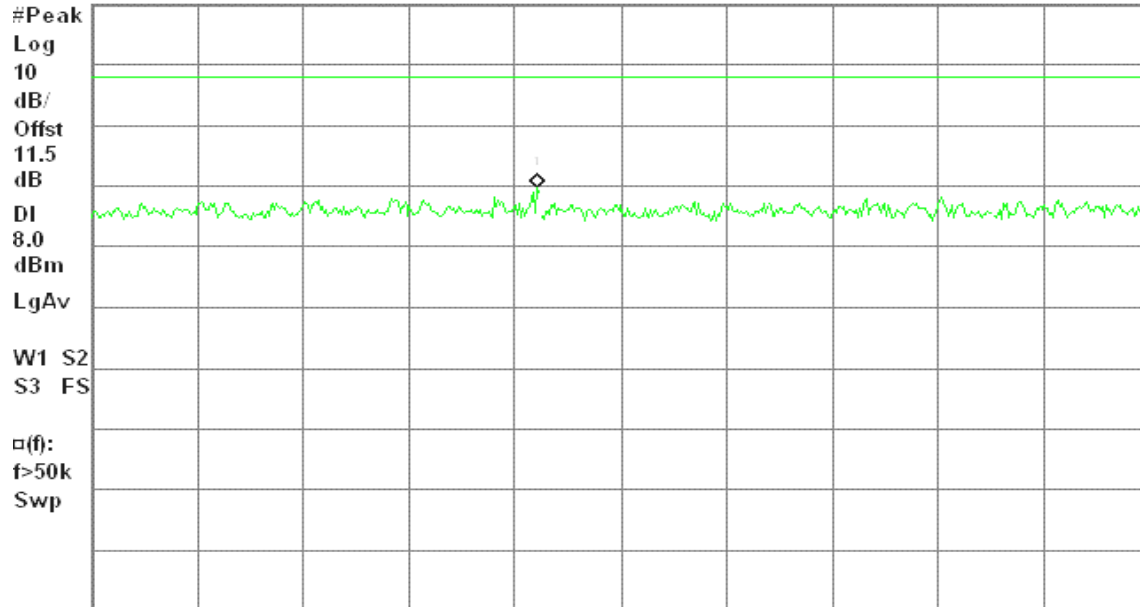
Peak Power Spectral Density, b Mode High Ch.

Mkr1 2.463 776 4 GHz

Ref 20 dBm

Atten 20 dB

-10.25 dBm



Center 2.463 800 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

**IEEE 802.11g****PPSD (CH Low)**

\* Agilent 18:12:47 Apr 16, 2008

R T

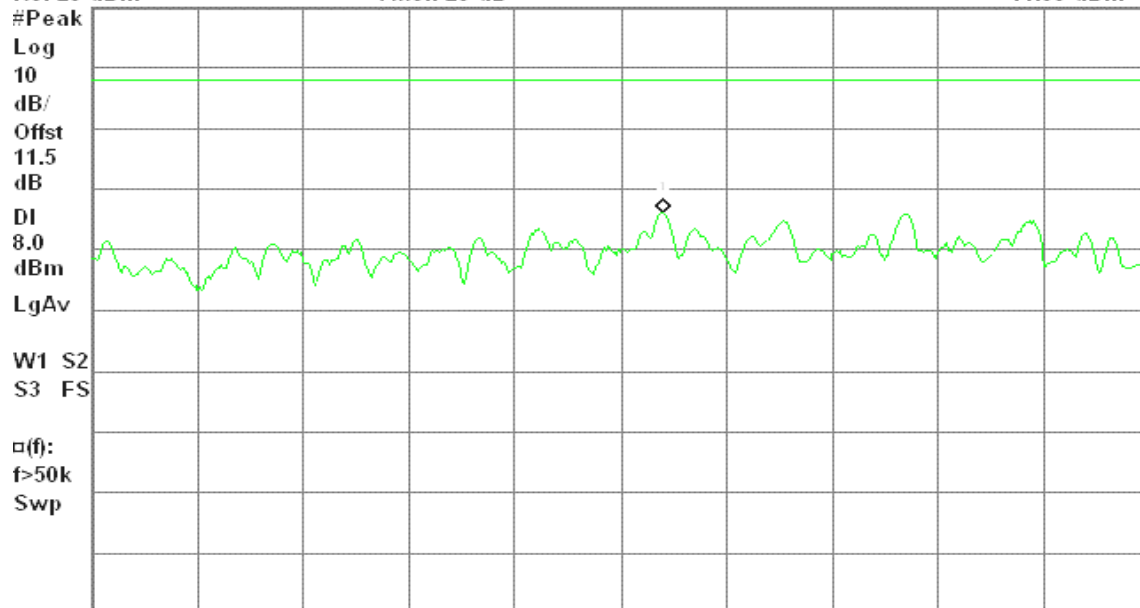
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.413 212 0 GHz

Ref 20 dBm

Atten 20 dB

-14.00 dBm



Center 2.413 200 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



## PPSD (CH Mid)

Agilent 18:23:23 Apr 16, 2008

R L

Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.438 281 0 GHz

Ref 20 dBm

Atten 20 dB

-13.72 dBm

#Peak

Log

10

dB/

Offst

11.5

dB

DI

8.0

dBm

LgAv

W1 S2

S3 FS

□(f):

f>50k

Swp

Center 2.438 200 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

## PPSD (CH High)

Agilent 18:43:06 Apr 16, 2008

R L

Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.458 851 5 GHz

Ref 20 dBm

Atten 20 dB

-14.26 dBm

#Peak

Log

10

dB/

Offst

11.5

dB

DI

8.0

dBm

LgAv

W1 S2

S3 FS

□(f):

f>50k

Swp

Center 2.458 850 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



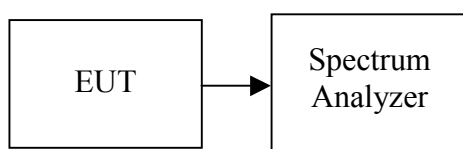
## 9.6 SPURIOUS EMISSIONS

### 9.6.1 Conducted Measurement

#### LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands 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, provided the transmitter demonstrates compliance with the peak conducted power limits. 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 Section 15.205(c)).

#### Test Configuration



#### TEST PROCEDURE

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.

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

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

#### TEST RESULTS

*No non-compliance noted.*

**Test Plot****IEEE 802.11b****(CH Low)**

\* Agilent 17:54:23 Apr 16, 2008

R T

Spurious, b Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 20 dB

-0.92 dBm

#Peak

Log

10

dB/

Offst

11.5

dB

DI

-20.9

dBm

LgAv

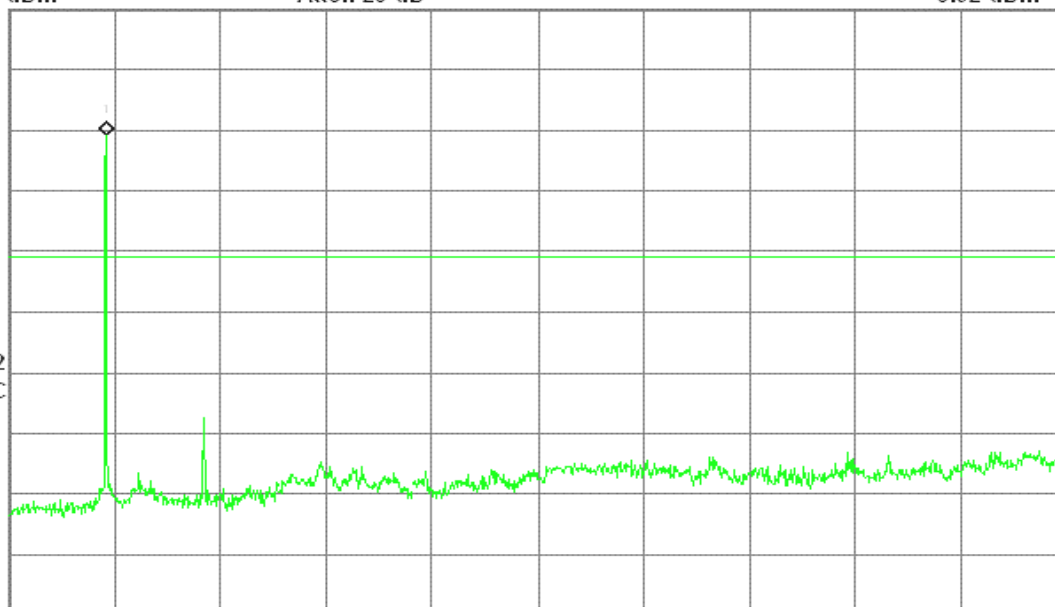
V1 S2

S3 FC

□(f):

FTun

Swp



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

**(CH Mid)**

\* Agilent 18:00:14 Apr 16, 2008

R T

Spurious, b Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 20 dB

1.02 dBm

#Peak

Log

10

dB/

Offst

11.5

dB

DI

-19.0

dBm

LgAv

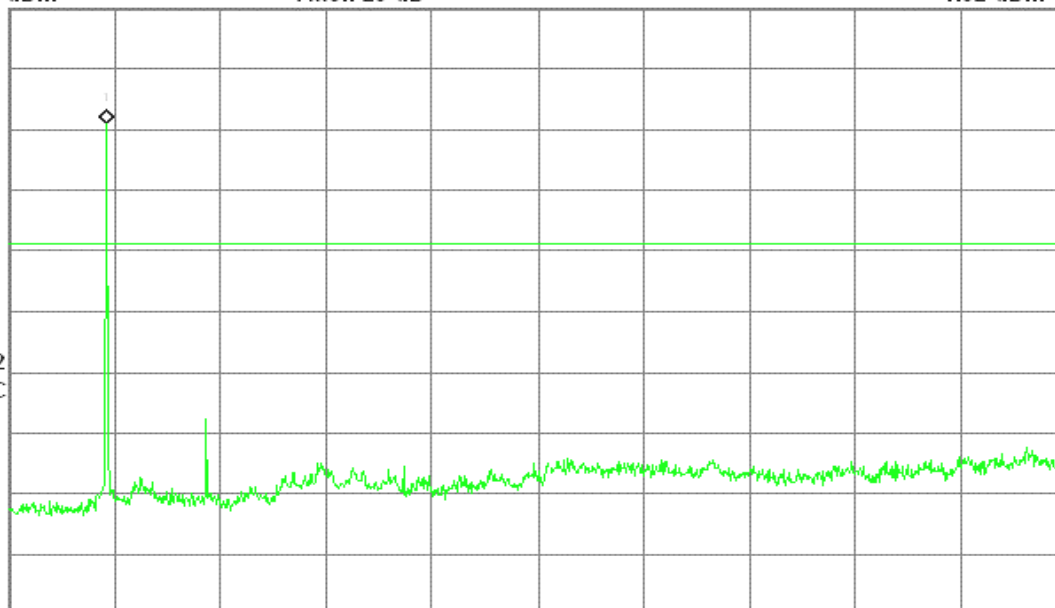
V1 S2

S3 FC

□(f):

FTun

Swp



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)





### (CH High)

Agilent 18:06:09 Apr 16, 2008

R T

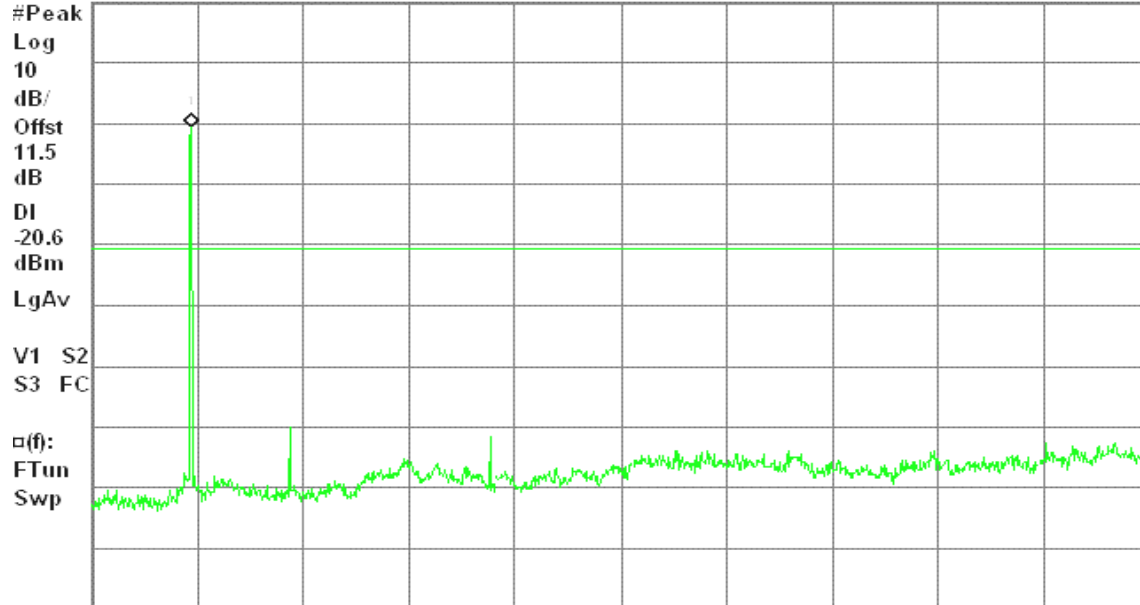
Spurious, b Mode High Ch.

Mkr1 2.47 GHz

Ref 20 dBm

Atten 20 dB

-0.62 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

### IEEE 802.11g

### (CH Low)

Agilent 18:13:44 Apr 16, 2008

R T

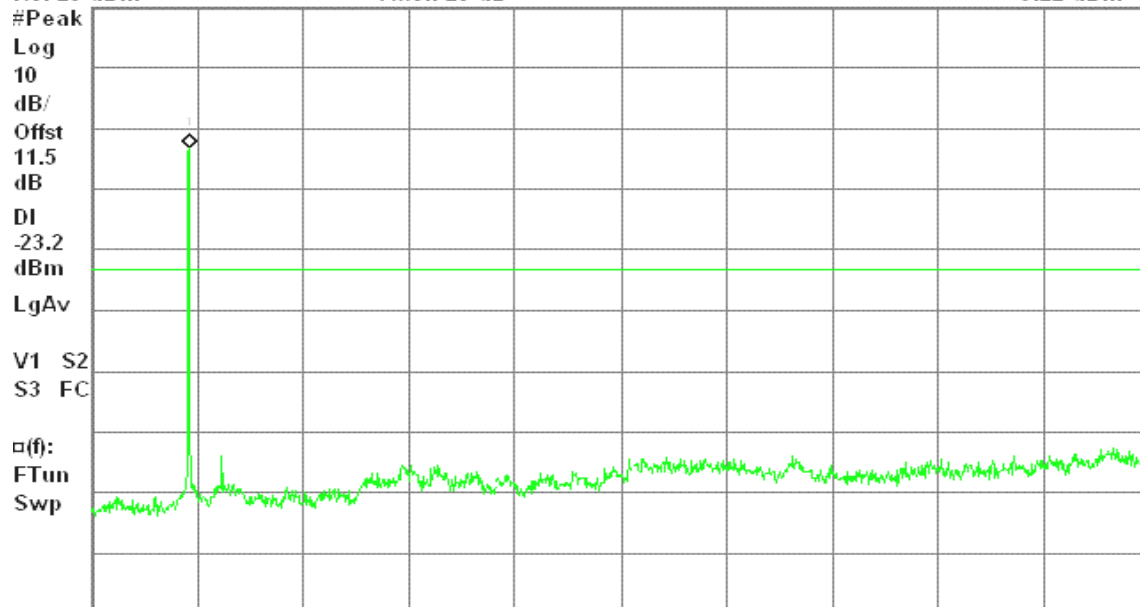
Spurious, g Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 20 dB

-3.22 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



### (CH Mid)

Agilent 18:24:27 Apr 16, 2008

R T

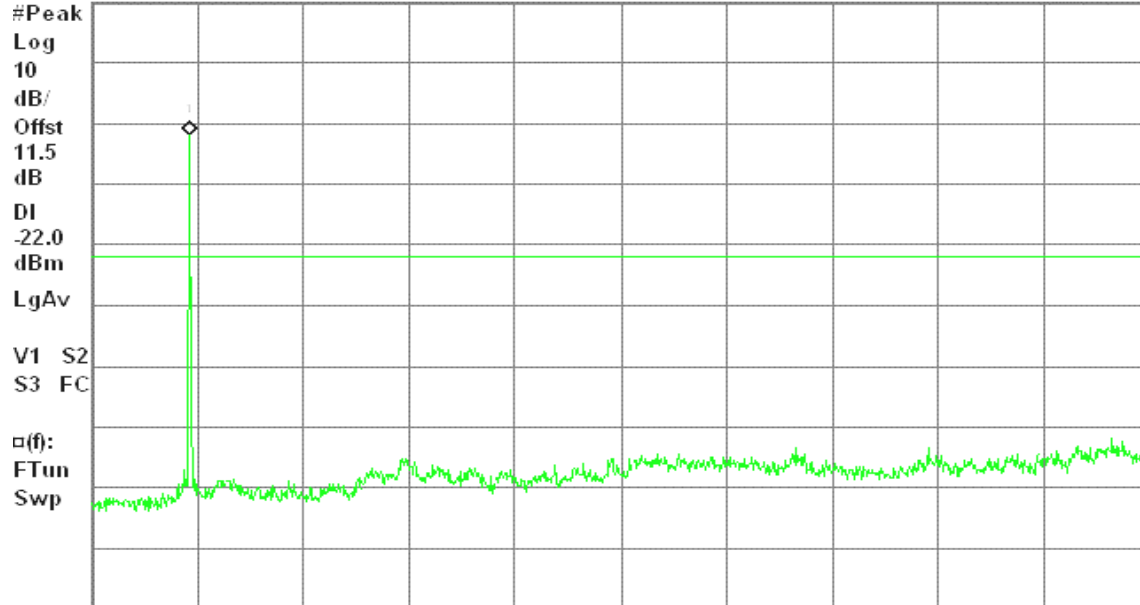
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 20 dB

-1.95 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

### (CH High)

Agilent 18:43:51 Apr 16, 2008

R T

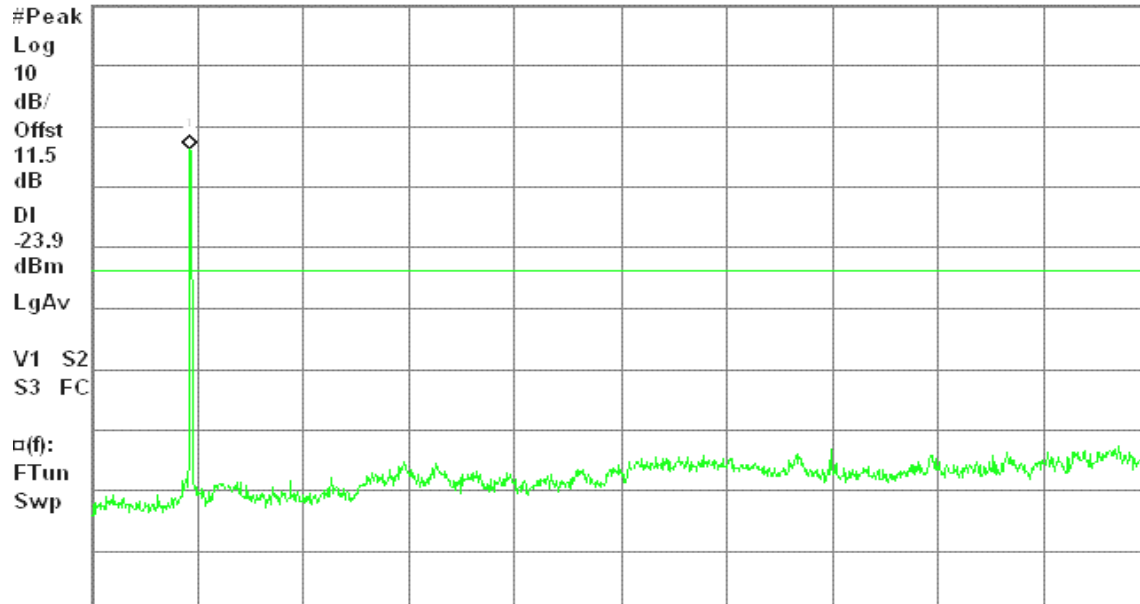
Spurious, g Mode High Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 20 dB

-3.87 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



## 9.6.2 Radiated Emissions

### LIMIT

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

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

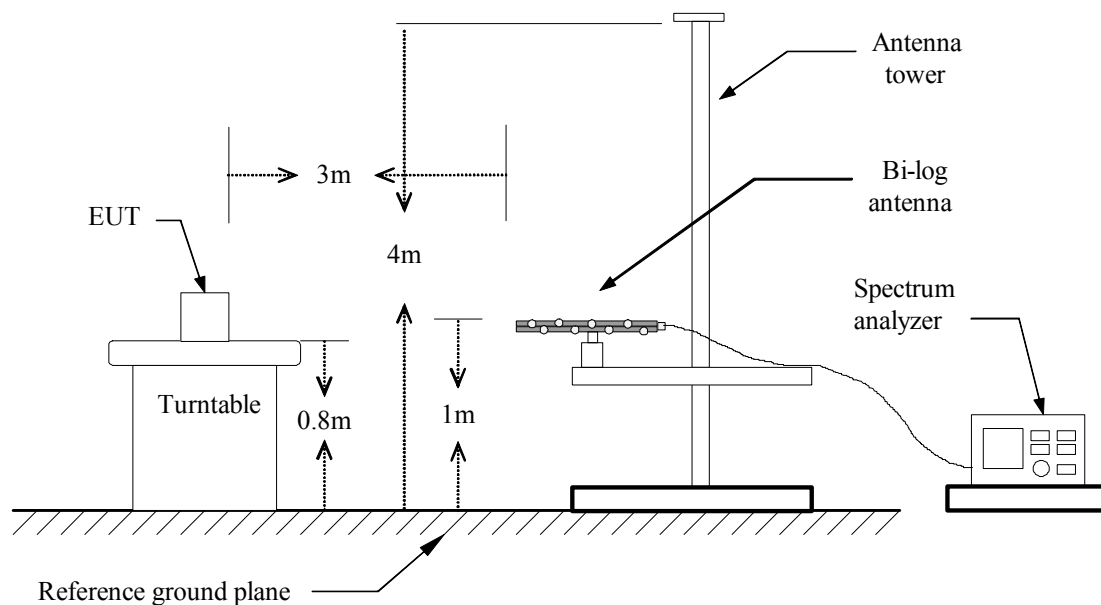
**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections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

2. In the emission table above, the tighter limit applies at the band edges.

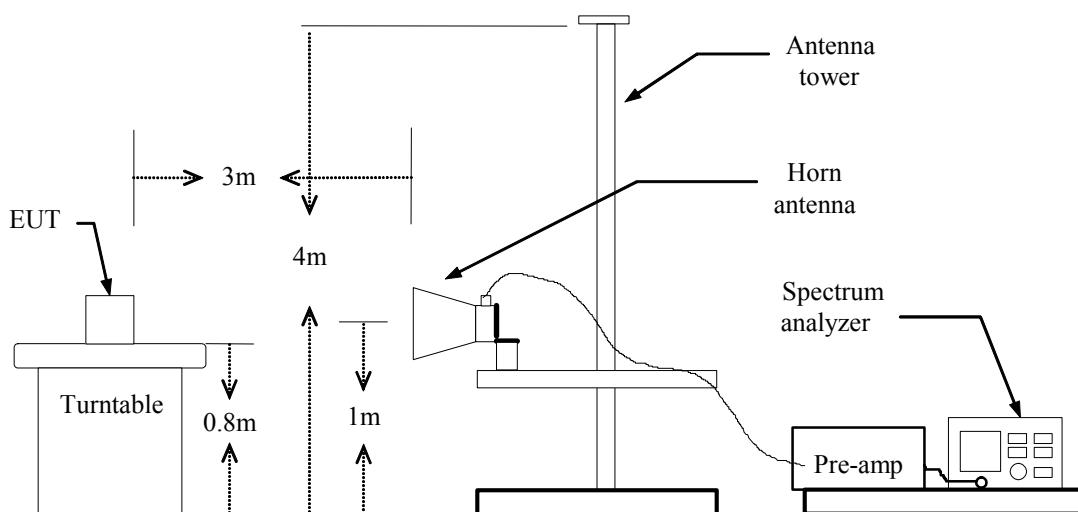
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

## Test Configuration

### Below 1 GHz



### Above 1 GHz





## **TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:  
Below 1GHz:  
RBW=100kHz / VBW=300kHz / Sweep=AUTO  
Above 1GHz:  
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**Below 1 GHz****Operation Mode:** Normal Link**Test Date:** April 18, 2008**Temperature:** 25°C**Tested by:** Mimic Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
143.17	V	48.51	-13.80	34.71	43.50	-8.79	Peak
165.80	V	50.18	-14.55	35.63	43.50	-7.87	Peak
749.42	V	39.03	-4.15	34.88	46.00	-11.12	Peak
860.97	V	38.05	-2.55	35.50	46.00	-10.50	Peak
907.85	V	41.31	-1.93	39.37	46.00	-6.63	Peak
966.05	V	43.93	-0.93	43.00	54.00	-11.00	Peak
138.32	H	49.90	-13.60	36.31	43.50	-7.19	Peak
165.80	H	49.91	-14.55	35.37	43.50	-8.13	Peak
384.05	H	45.01	-10.08	34.93	46.00	-11.07	Peak
712.23	H	39.14	-4.57	34.57	46.00	-11.43	Peak
749.42	H	47.55	-4.15	43.40	46.00	-2.60	Peak
959.58	H	39.26	-1.04	38.22	46.00	-7.78	Peak

**Remark:**

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

**Above 1 GHz****Operation Mode:** IEEE 802.11b / TX / CH Low**Test Date:** April 14, 2008**Temperature:** 25°C**Tested by:** Mimic Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2413.33	V	108.14	101.88	-3.97	104.17	97.91	Fundamental			
3741.67	V	52.67	---	-1.24	51.43	---	74.00	54.00	-2.57	Peak
9650.00	V	49.65	43.09	11.54	61.19	54.63	84.17	77.91	-23.28	20dBc AVG Fundamental
N/A										
2413.33	H	108.15	102.98	-3.97	104.18	99.01	Fundamental			
3750.00	H	49.82	---	-1.22	48.60	---	74.00	54.00	-5.40	Peak
4491.67	H	49.75	---	0.22	49.97	---	74.00	54.00	-4.03	Peak
4825.00	H	50.77	---	0.55	51.33	---	74.00	54.00	-2.67	Peak
9650.00	H	50.46	44.45	11.54	62.00	55.99	84.18	79.01	-23.02	20dBc AVG Fundamental
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. 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.

**Operation Mode:** IEEE 802.11b / TX / CH Mid**Test Date:** April 14, 2008**Temperature:** 25°C**Tested by:** Mimic Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2436.67	V	106.92	101.75	-3.91	103.01	97.84	Fundamental			
3000.00	V	53.24	---	-2.45	50.80	---	74.00	54.00	-3.20	Peak
3075.00	V	47.03	---	-2.35	44.68	---	74.00	54.00	-9.32	Peak
3750.00	V	50.31	---	-1.22	49.09	---	74.00	54.00	-4.91	Peak
9750.00	V	50.32	45.09	11.75	62.07	56.84	83.01	77.84	-21.00	20dBc AVG Fundamental
N/A										
2436.67	H	106.81	99.98	-3.91	102.90	96.07	Fundamental			
3750.00	H	45.49	---	-1.22	44.27	---	74.00	54.00	-9.73	Peak
4500.00	H	46.02	---	0.24	46.26	---	74.00	54.00	-7.74	Peak
4875.00	H	47.93	---	0.60	48.54	---	74.00	54.00	-5.46	Peak
6000.00	H	45.81	---	2.09	47.91	---	74.00	54.00	-6.09	Peak
9750.00	H	50.89	45.51	11.75	62.64	57.26	82.90	76.07	-18.81	20dBc AVG Fundamental
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. 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.



**Operation Mode:** IEEE 802.11b / TX / CH High**Test Date:** April 14, 2008**Temperature:** 25°C**Tested by:** Mimic Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
2463.33		104.68	98.51	-3.85	100.83	94.66	Fundamental			
3000.00	V	53.28	---	-2.45	50.83	---	74.00	54.00	-3.17	Peak
3075.00	V	46.60	---	-2.35	44.25	---	74.00	54.00	-9.75	Peak
3741.67	V	49.33	---	-1.24	48.09	---	74.00	54.00	-5.91	Peak
7383.33	V	44.83	---	3.27	48.10	---	74.00	54.00	-5.90	Peak
9850.00	V	48.73	42.92	11.97	60.70	54.89	80.83	74.66	-19.77	20dBc AVG Fundamental
N/A										
2463.33		106.47	101.32	-3.85	102.62	97.47	Fundamental			
3741.67	H	45.08	---	-1.24	43.84	---	74.00	54.00	-10.16	Peak
4491.67	H	45.71	---	0.22	45.94	---	74.00	54.00	-8.06	Peak
4925.00	H	46.80	---	0.65	47.45	---	74.00	54.00	-6.55	Peak
6000.00	H	45.65	---	2.09	47.74	---	74.00	54.00	-6.26	Peak
6691.67	H	44.73	---	3.37	48.10	---	74.00	54.00	-5.90	Peak
9850.00	H	48.75	43.82	11.97	60.72	55.79	82.62	77.47	-21.68	20dBc AVG Fundamental

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).
7. 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.

**Operation Mode:** IEEE 802.11g / TX / CH Low**Test Date:** April 14, 2008**Temperature:** 25°C**Tested by:** Wolf Huang**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
3750.00	V	49.89	---	-1.22	48.68	---	74.00	54.00	-5.32	Peak
9650.00	V	40.37	---	11.54	51.91	---	74.00	54.00	-2.09	Peak
N/A										
3750.00	H	46.48	---	-1.22	45.26	---	74.00	54.00	-8.74	Peak
4500.00	H	46.22	---	0.24	46.46	---	74.00	54.00	-7.54	Peak
5241.67	H	45.90	---	1.05	46.95	---	74.00	54.00	-7.05	Peak
9650.00	H	46.46	34.42	11.54	58.00	45.96	74.00	54.00	-8.04	AVG
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** IEEE 802.11g / TX / CH Mid**Test Date:** April 14, 2008**Temperature:** 25°C**Tested by:** Wolf Huang**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
3000.00	V	52.92	---	-2.45	50.48	---	74.00	54.00	-3.52	Peak
3075.00	V	46.97	---	-2.35	44.62	---	74.00	54.00	-9.38	Peak
3116.67	V	46.67	---	-2.30	44.37	---	74.00	54.00	-9.63	Peak
3741.67	V	49.98	---	-1.24	48.75	---	74.00	54.00	-5.25	Peak
9750.00	V	44.89	32.29	11.75	56.64	44.04	74.00	54.00	-9.96	AVG
N/A										
3750.00	H	46.03	---	-1.22	44.82	---	74.00	54.00	-9.18	Peak
4491.67	H	45.99	---	0.22	46.21	---	74.00	54.00	-7.79	Peak
9750.00	H	49.05	35.69	11.75	60.80	47.44	74.00	54.00	-6.56	AVG
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** IEEE 802.11g / TX / CH High**Test Date:** April 14, 2008**Temperature:** 25°C**Tested by:** Wolf Huang**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
3000.00	V	52.52	---	-2.45	50.08	---	74.00	54.00	-3.92	Peak
3750.00	V	48.51	---	-1.22	47.29	---	74.00	54.00	-6.71	Peak
9850.00	V	41.58	---	11.97	53.55	---	74.00	54.00	-0.45	Peak
N/A										
3000.00	H	47.85	---	-2.45	45.40	---	74.00	54.00	-8.60	Peak
3750.00	H	46.55	---	-1.22	45.33	---	74.00	54.00	-8.67	Peak
4500.00	H	45.22	---	0.24	45.46	---	74.00	54.00	-8.54	Peak
6000.00	H	45.51	---	2.09	47.60	---	74.00	54.00	-6.40	Peak
9850.00	H	45.77	33.81	11.97	57.74	45.78	74.00	54.00	-8.22	AVG
N/A										

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



## 9.7 POWERLINE CONDUCTED EMISSIONS

### **LIMIT**

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

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

### **Test Configuration**

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### **TEST PROCEDURE**

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.



## TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

### Test Data

**Operation Mode:** Normal Link      **Test Date:** April 24, 2008  
**Temperature:** 26°C      **Tested by:** Eddy Cheng  
**Humidity:** 45% RH

Frequency (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.5950	36.70	35.80	0.00	36.70	35.80	56.00	46.00	-19.30	-10.20	L1
0.7150	34.60	33.40	0.00	34.60	33.40	56.00	46.00	-21.40	-12.60	L1
1.0700	37.60	36.50	0.00	37.60	36.50	56.00	46.00	-18.40	-9.50	L1
4.2600	34.82	32.72	0.08	34.90	32.80	56.00	46.00	-21.10	-13.20	L1
18.7700	40.83	38.63	0.47	41.30	39.10	60.00	50.00	-18.70	-10.90	L1
28.1500	43.52	37.92	0.58	44.10	38.50	60.00	50.00	-15.90	-11.50	L1
0.1500	37.75	17.95	0.15	37.90	18.10	65.99	56.00	-28.09	-37.90	L2
0.2350	40.11	39.31	0.09	40.20	39.40	62.27	52.27	-22.07	-12.87	L2
2.1000	36.09	35.09	0.01	36.10	35.10	56.00	46.00	-19.90	-10.90	L2
4.2550	35.42	31.82	0.08	35.50	31.90	56.00	46.00	-20.50	-14.10	L2
18.7650	40.63	33.43	0.47	41.10	33.90	60.00	50.00	-18.90	-16.10	L2
28.4400	43.93	41.93	0.57	44.50	42.50	60.00	50.00	-15.50	-7.50	L2

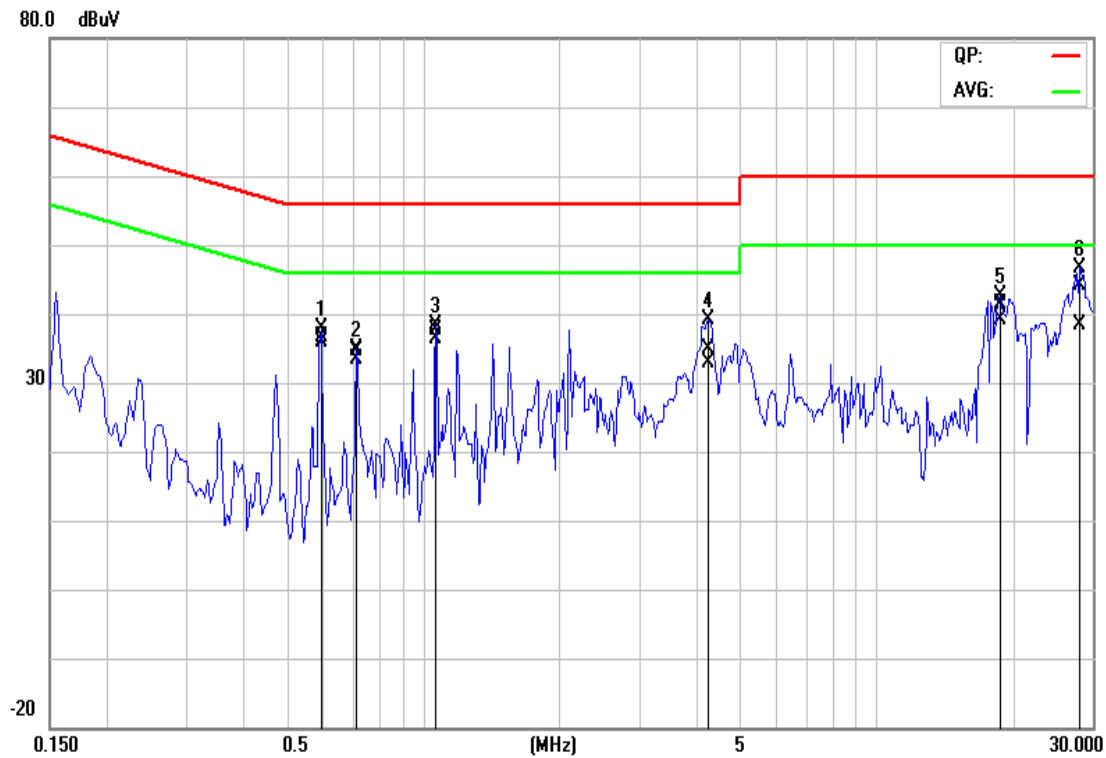
### Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



## Test Plots

### Conducted emissions (Line 1)



### Conducted emissions (Line 2)

