



## FCC 47 CFR PART 15 SUBPART C

### TEST REPORT

**For**

**802.11b/g /n USB dongle**

**Model: Wiprince 11n**

**Trade Name: ARGtek**

*Issued to*

**ARGtek Communication Inc.  
8F-9, No. 4, Lane 609, Sec. 5, Chung Hsin Rd.,  
San Chung City, Taipei Hsien 241, Taiwan, R.O.C**

*Issued by*

**Compliance Certification Services Inc.  
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## 1. TEST RESULT CERTIFICATION

**Applicant:** ARGtek Communication Inc.  
8F-9, No. 4, Lane 609, Sec. 5, Chung Hsin Rd.,  
San Chung City, Taipei Hsien 241, Taiwan, R.O.C

**Equipment Under Test:** 802.11b/g /n USB dongle

**Trade Name:** ARGtek

**Model Number:** Wiprince 11n

**Date of Test:** September 30 ~ October 15, 2009

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:

Rex Lai  
Section Manager  
Compliance Certification Services Inc.

Gina Lo  
Section Manager  
Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	802.11b/g /n USB dongle
<b>Trade Name</b>	ARGtek
<b>Model Number</b>	Wiprince 11n
<b>Model Discrepancy</b>	N/A
<b>Power Adapter</b>	Powered from host device.
<b>Frequency Range</b>	2412 ~ 2462 MHz
<b>Transmit Power</b>	IEEE 802.11b mode: 14.67 dBm IEEE 802.11g mode: 18.56 dBm draft 802.11n Standard-20 MHz Channel mode: 18.83 dBm draft 802.11n Wide-40 MHz Channel mode: 18.57 dBm
<b>Modulation Technique</b>	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) draft 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33, 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) draft 802.11n Wide-40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)
<b>Number of Channels</b>	IEEE 802.11b/g mode: 11 Channels draft 802.11n Standard-20 MHz Channel mode: 11 Channels draft 802.11n Wide-40 MHz Channel mode: 7 Channels
<b>Antenna Specification</b>	Gain: -1.54 dBi
<b>Antenna Designation</b>	Printed Antenna

**Remark:**

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: VYXWIFI-003 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: Wiprince 11n) 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 Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate and cyclic delay diversity were chosen for full testing.

**IEEE 802.11g mode:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate and cyclic delay diversity were chosen for full testing.

**draft 802.11n Standard-20 MHz Channel mode:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

**draft 802.11n Wide-40 MHz Channel mode:**

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full 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	01/28/2010

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	09/09/2010
Test Receiver	Rohde&Schwarz	ESCI	100064	11/29/2009
Switch Controller	TRC	Switch Controller	SC94050010	05/02/2010
4 Port Switch	TRC	4 Port Switch	SC94050020	05/02/2010
Loop Antenna	EMCO	6502	8905/2356	05/28/2010
Horn-Antenna	TRC	HA-0502	06	06/03/2010
Horn-Antenna	TRC	HA-0801	04	06/18/2010
Horn-Antenna	TRC	HA-1201A	01	08/10/2010
Horn-Antenna	TRC	HA-1301A	01	08/10/2010
Bilog- Antenna	Sunol Sciences	JB3	A030205	03/27/2010
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 MRA: TW1039 IC: 2324G-1/-2	10/17/2010 11/04/2010
Test S/W	LABVIEW (V 6.1)			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	10/30/2009
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/10/2010
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	03/17/2010
Test S/W	LABVIEW (V 6.1)			





### 4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 2.81
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	+/-3.7046
3M Semi Anechoic Chamber / Above 1GHz	+/-3.0958

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .



## 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



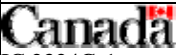
Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

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	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

\* 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	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	LCD Monitor	Samsung	710V	GS17H9NXA05864E	FCC DoC	Shielded, 1.8m with two cores	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2	Notebook PC	DELL	PP19L	GK102 A00	QDS-BRCM1021	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	USB Mouse	Logitech	M-UAG96B	HC8500L	FCC DoC	Shielded, 1.8m	N/A
4.	Wireless Pre-N Router (Remote)	BELKIN	F5D8230-4	N/A	SA3-AGNO901APO100	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.



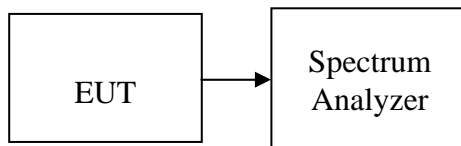
## 7. FCC PART 15.247 REQUIREMENTS

### 7.1 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 6dB 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 = 100 kHz, VBW = RBW, Span = 50 MHz, 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 Data****Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.25	>500	PASS
Mid	2437	10.17		PASS
High	2462	10.17		PASS

**Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.58	>500	PASS
Mid	2437	16.58		PASS
High	2462	16.58		PASS

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.75	>500	PASS
Mid	2437	17.75		PASS
High	2462	17.75		PASS

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.40	>500	PASS
Mid	2437	36.40		PASS
High	2452	36.40		PASS



## Test Plot

### IEEE 802.11b mode

#### 6dB Bandwidth (CH Low)

Agilent 13:06:41 Oct 15, 2009

R T

6dB BW, b Mode Low Ch.

 $\Delta$  Mkr1 10.25 MHz

Ref 20 dBm

Atten 10 dB

0.93 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-5.6

dBm

LgAv

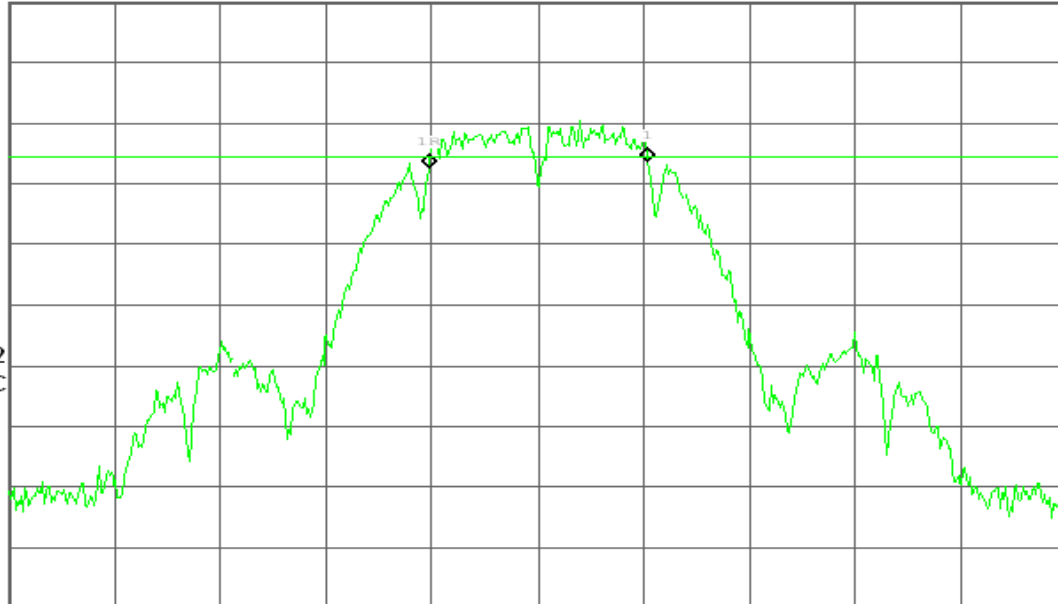
V1 S2

S3 FC

 $\square(f)$ :

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 13:15:59 Oct 15, 2009

R T

6dB BW, b Mode Mid Ch.

 $\Delta$  Mkr1 10.17 MHz

Ref 20 dBm

Atten 10 dB

0.20 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-5.8

dBm

LgAv

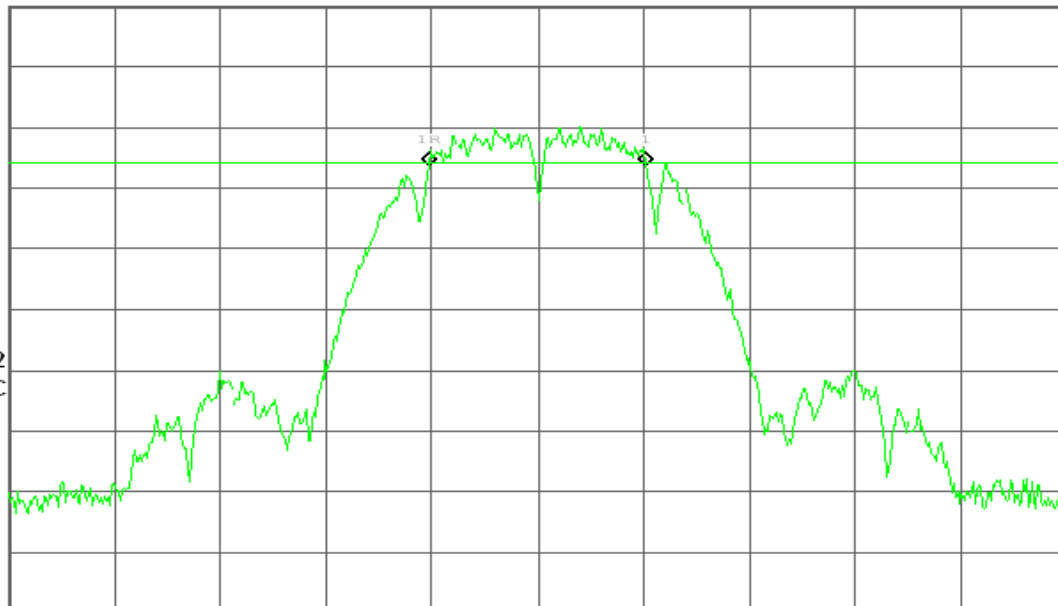
V1 S2

S3 FC

 $\square(f)$ :

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 13:20:36 Oct 15, 2009

R T

6dB BW, b Mode High Ch.

 $\Delta$  Mkr1 10.17 MHz

Ref 20 dBm

Atten 10 dB

-0.85 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-5.9

dBm

LgAv

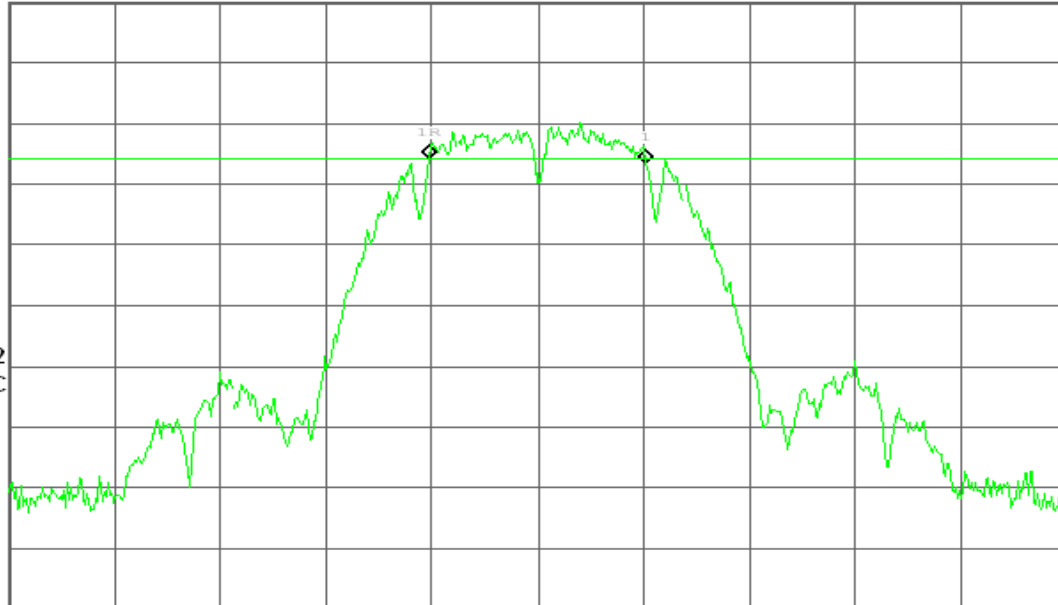
V1 S2

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 mode****6dB Bandwidth (CH Low)**

Agilent 13:25:09 Oct 15, 2009

R T

6dB BW, g Mode Low Ch.

 $\Delta$  Mkr1 16.58 MHz

Ref 20 dBm

Atten 10 dB

-1.52 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-9.9

dBm

LgAv

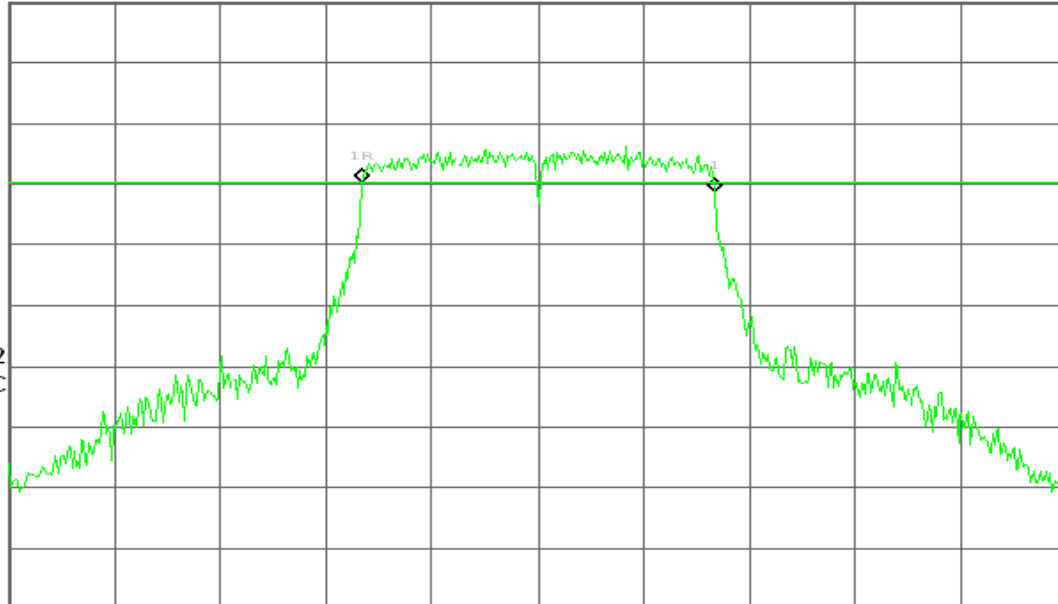
V1 S2

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 13:34:12 Oct 15, 2009

R L

6dB BW, g Mode Mid Ch.

 $\Delta$  Mkr1 16.58 MHz

Ref 20 dBm

Atten 10 dB

0.11 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-10.0

dBm

LgAv

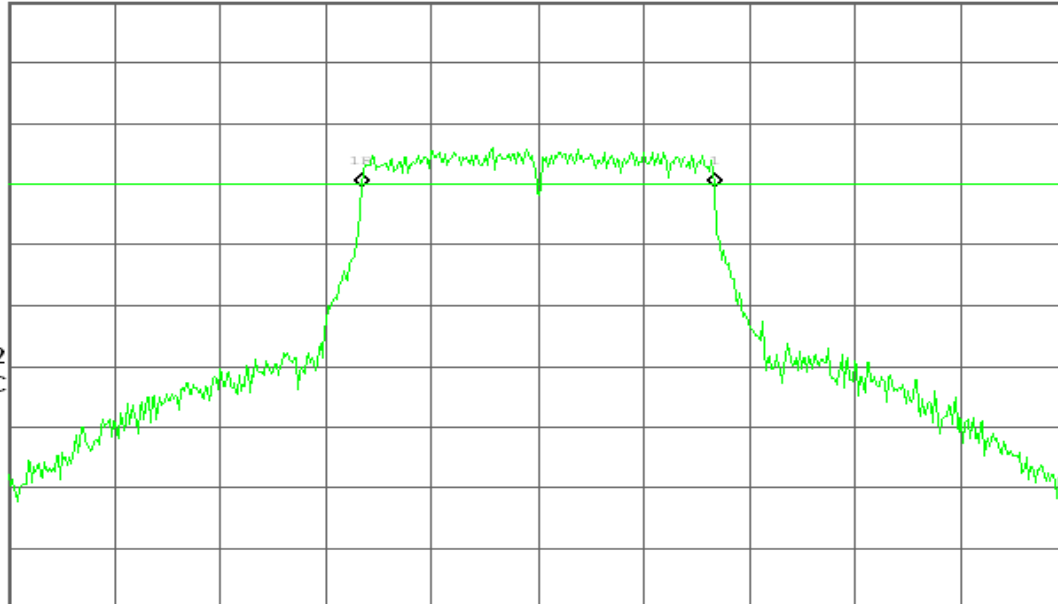
V1 S2

S3 FC

 $\square(f)$ :

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 13:39:25 Oct 15, 2009

R T

6dB BW, g Mode High Ch.

 $\Delta$  Mkr1 16.58 MHz

Ref 20 dBm

Atten 10 dB

-0.83 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-9.8

dBm

LgAv

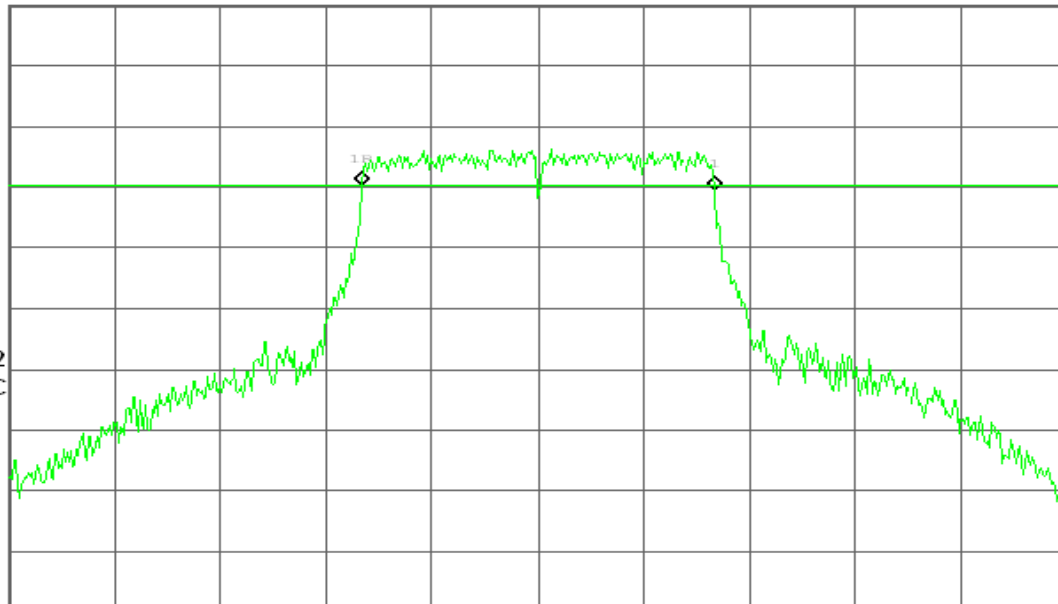
V1 S2

S3 FC

 $\square(f)$ :

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

**draft 802.11n Standard-20 MHz Channel mode****6dB Bandwidth (CH Low)**

\* Agilent 14:09:59 Oct 15, 2009

R L

6dB BW, g Mode Low Ch.

 $\Delta$  Mkr1 17.75 MHz

Ref 20 dBm

Atten 10 dB

-1.61 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-9.4

dBm

LgAv

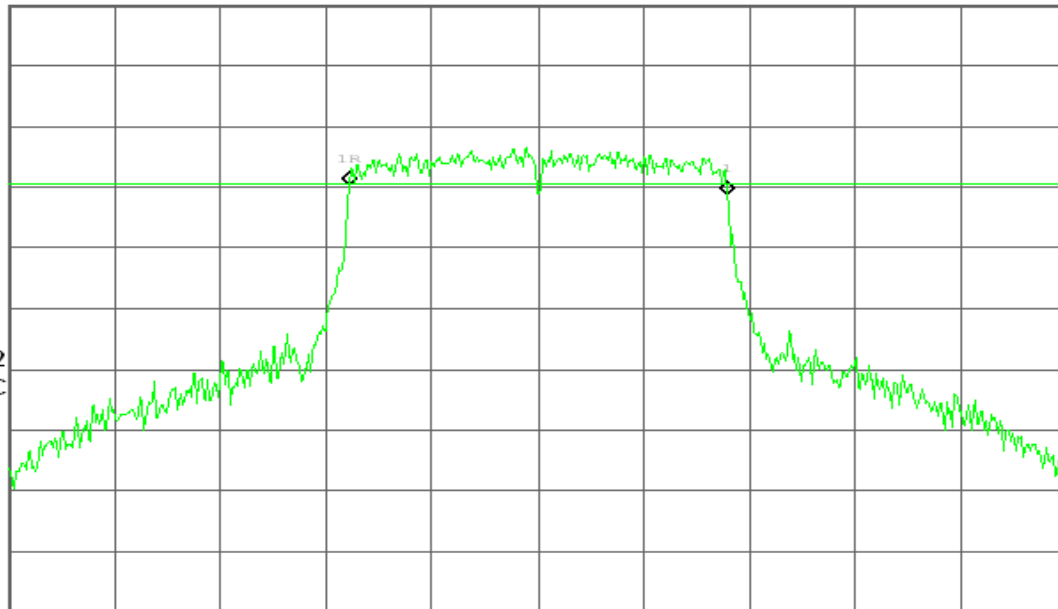
V1 S2

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 14:28:58 Oct 15, 2009

R T

6dB BW, g Mode Mid Ch.

 $\Delta$  Mkr1 17.75 MHz

Ref 20 dBm

Atten 10 dB

-1.23 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-9.3

dBm

LgAv

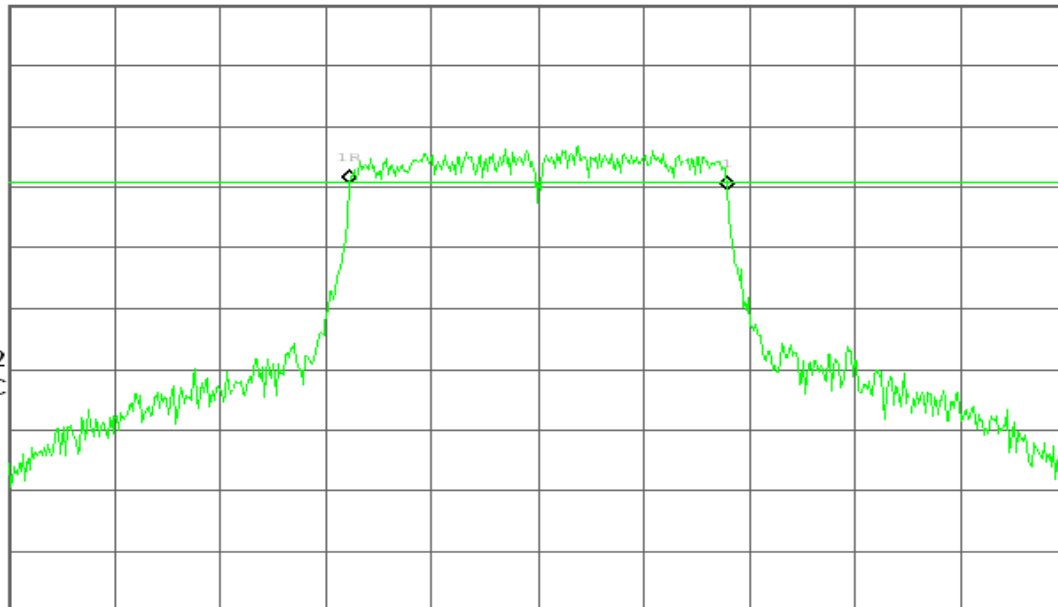
V1 S2

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 14:34:36 Oct 15, 2009

R T

6dB BW, g Mode High Ch.

 $\Delta$  Mkr1 17.75 MHz

Ref 20 dBm

Atten 10 dB

-0.02 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-9.0

dBm

LgAv

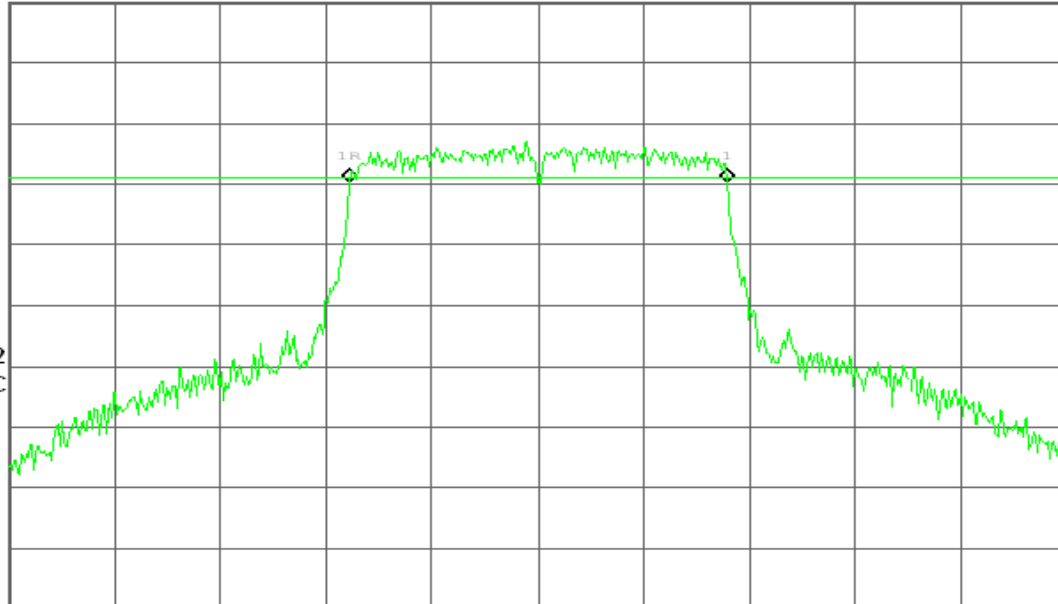
V1 S2

S3 FC

 $\square(f)$ :

FTun

Swp



Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 6.04 ms (601 pts)

## draft 802.11n Wide-40 MHz Channel mode

## 6dB Bandwidth (CH Low)

\* Agilent 14:45:48 Oct 15, 2009

R T

6dB BW, g Mode Low Ch.

 $\Delta$  Mkr1 36.40 MHz

Ref 20 dBm

Atten 10 dB

1.25 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-13.0

dBm

LgAv

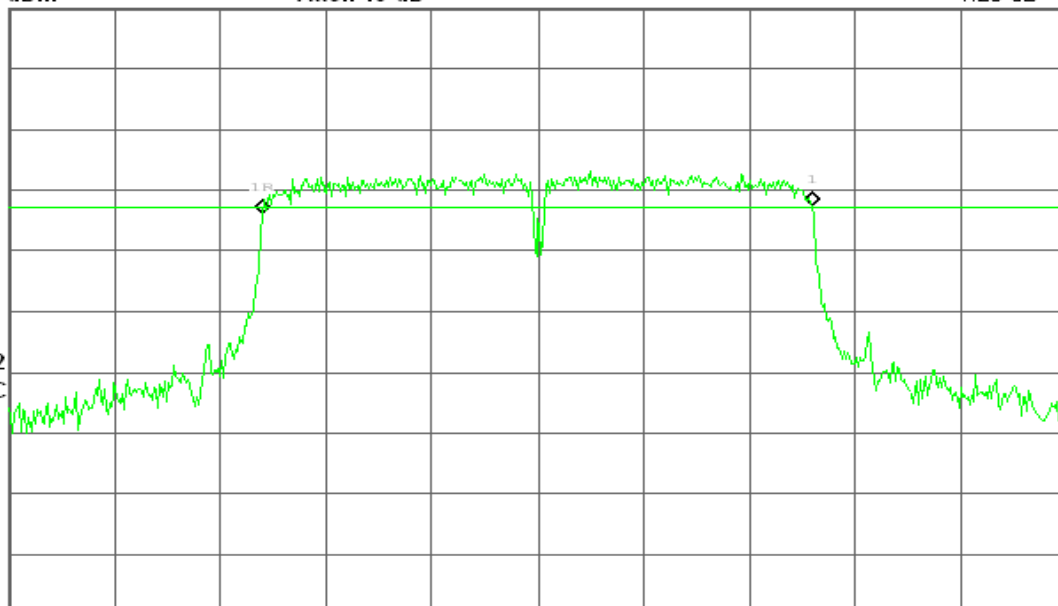
V1 S2

S3 FC

 $\square(f)$ :

FTun

Swp



Center 2.422 00 GHz

Span 70 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 8.44 ms (601 pts)



## 6dB Bandwidth (CH Mid)

Agilent 14:49:51 Oct 15, 2009

R T

6dB BW, g Mode Mid Ch.

 $\Delta$  Mkr1 36.40 MHz

Ref 20 dBm

Atten 10 dB

-2.33 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-12.7

dBm

LgAv

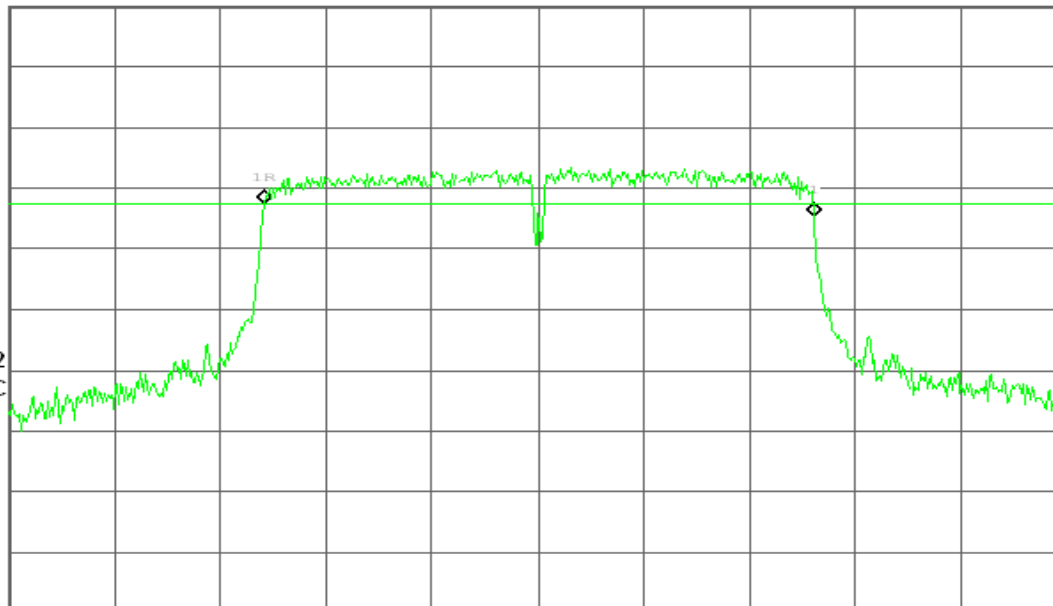
V1 S2

S3 FC

 $\square(f)$ :

FTun

Swp



Center 2.437 00 GHz

Span 70 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 8.44 ms (601 pts)

## 6dB Bandwidth (CH High)

Agilent 14:53:50 Oct 15, 2009

R T

6dB BW, g Mode High Ch.

 $\Delta$  Mkr1 36.40 MHz

Ref 20 dBm

Atten 10 dB

-1.51 dB

#Peak

Log

10

dB/

Offst

20.5

dB

DI

-12.4

dBm

LgAv

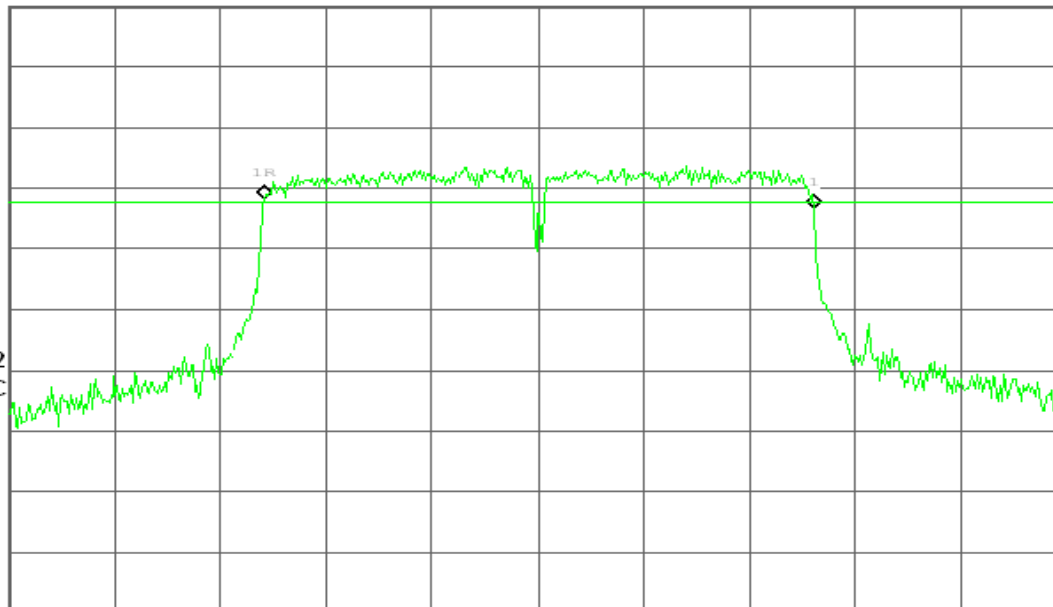
V1 S2

S3 FC

 $\square(f)$ :

FTun

Swp



Center 2.452 00 GHz

Span 70 MHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 8.44 ms (601 pts)



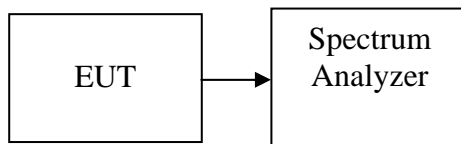
## 7.2 PEAK POWER

### 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

1. Peak power is measured using the spectrum analyzer's internal channel power integration function.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

### TEST RESULTS

*No non-compliance noted.*

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

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.03	0.0290	1.00	PASS
Mid	2437	14.67	0.0290		PASS
High	2462	14.62	0.0290		PASS

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	17.79	0.0601	1.00	PASS
Mid	2437	18.02	0.0634		PASS
High	2462	18.56	0.0718		PASS

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	18.58	0.0721	1.00	PASS
Mid	2437	18.56	0.0718		PASS
High	2462	18.83	0.0764		PASS

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	18.10	0.0646	1.00	PASS
Mid	2437	18.47	0.0703		PASS
High	2452	18.57	0.0719		PASS

**Test Plot****IEEE 802.11b mode****Peak Power (CH Low)**

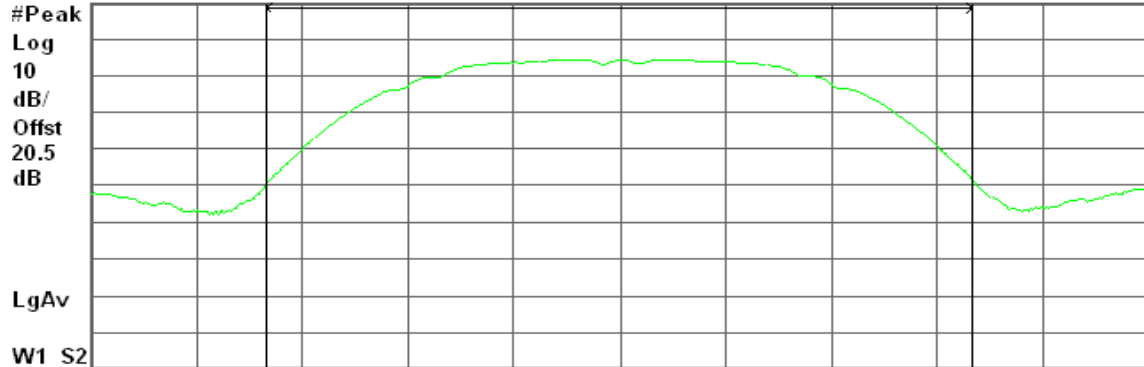
\* Agilent 13:08:00 Oct 15, 2009

R T

Peak Output Power (DTS), b Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Center 2.412 00 GHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

14.03 dBm / 20.0000 MHz

-58.98 dBm/Hz

**Peak Power (CH Mid)**

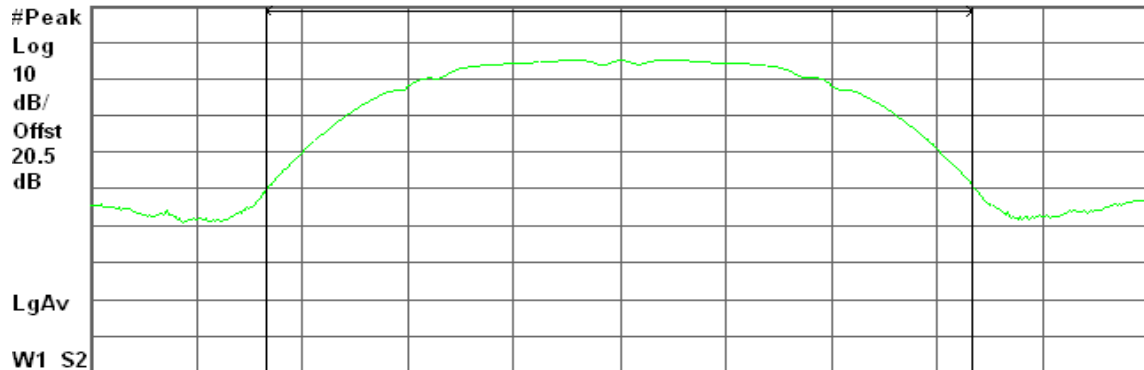
\* Agilent 13:16:40 Oct 15, 2009

R T

Peak Output Power (DTS), b Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Center 2.437 00 GHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

14.67 dBm / 20.0000 MHz

-58.34 dBm/Hz



## Peak Power (CH High)

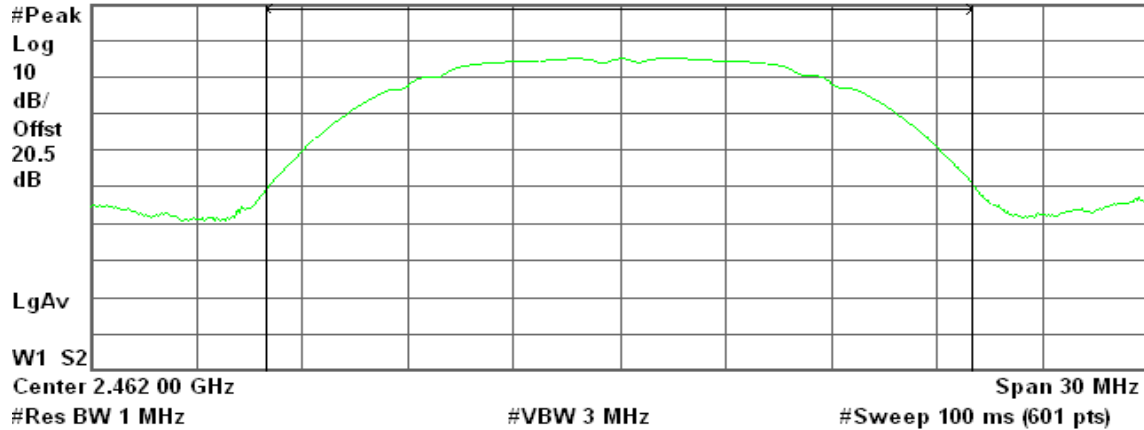
\* Agilent 13:21:16 Oct 15, 2009

R T

Peak Output Power (DTS), b Mode High Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

14.62 dBm / 20.0000 MHz

Power Spectral Density

-58.39 dBm/Hz

## IEEE 802.11g mode

### Peak Power (CH Low)

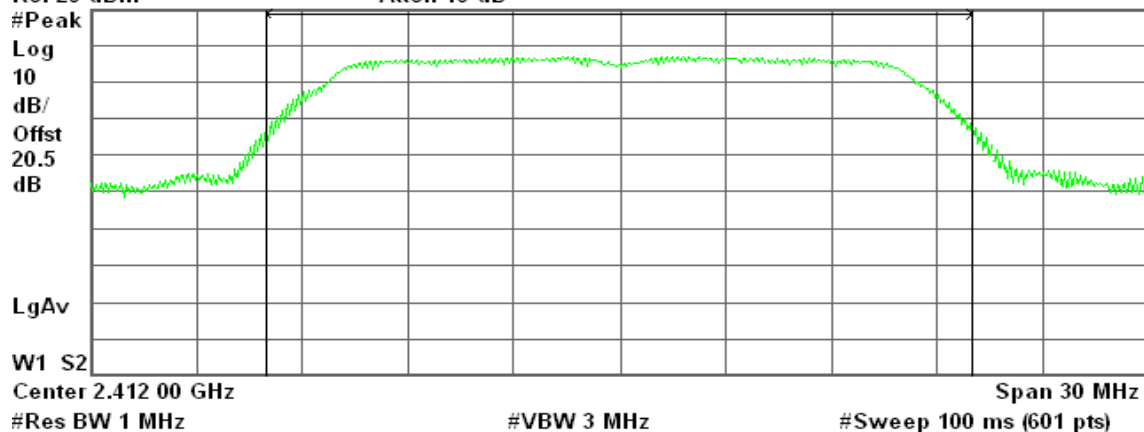
\* Agilent 13:25:48 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

17.79 dBm / 20.0000 MHz

Power Spectral Density

-55.22 dBm/Hz





## Peak Power (CH Mid)

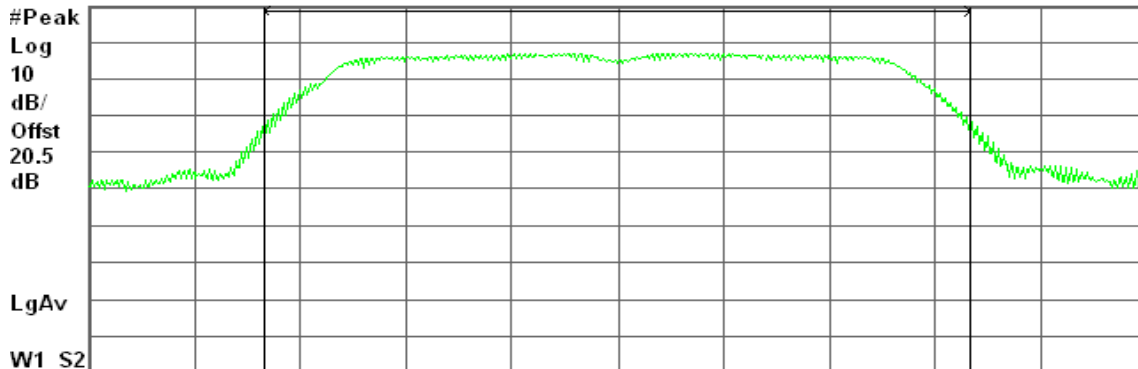
\* Agilent 13:34:59 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Center 2.437 00 GHz

Span 30 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

18.02 dBm / 20.0000 MHz

-54.99 dBm/Hz

## Peak Power (CH High)

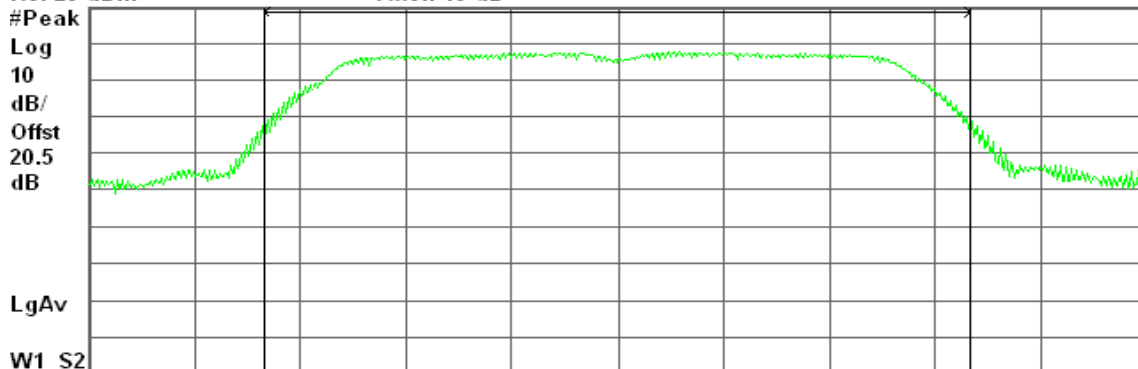
\* Agilent 13:40:02 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode High Ch.

Ref 20 dBm

Atten 10 dB



Center 2.462 00 GHz

Span 30 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

18.56 dBm / 20.0000 MHz

-54.45 dBm/Hz

**draft 802.11n Standard-20 MHz Channel mode****Peak Power (CH Low)**

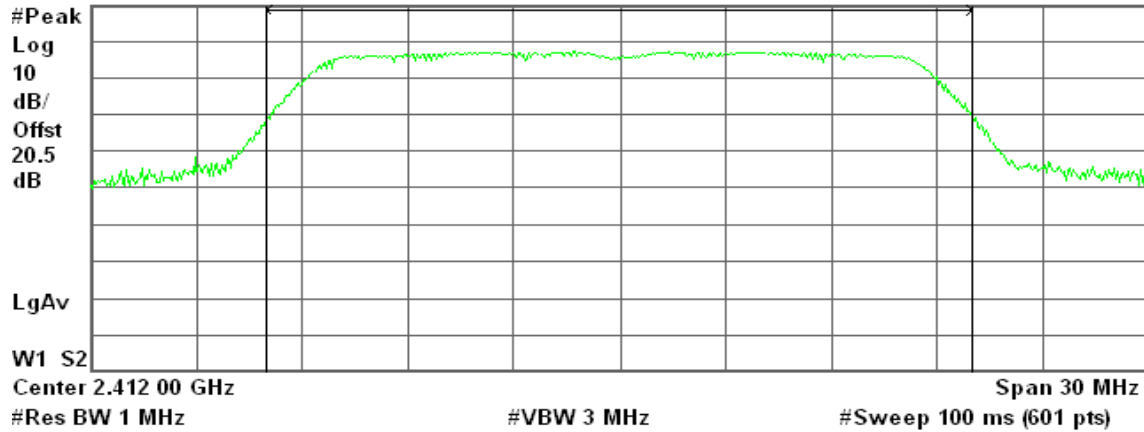
\* Agilent 14:12:06 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

Power Spectral Density

18.58 dBm / 20.0000 MHz

-54.43 dBm/Hz

**Peak Power (CH Mid)**

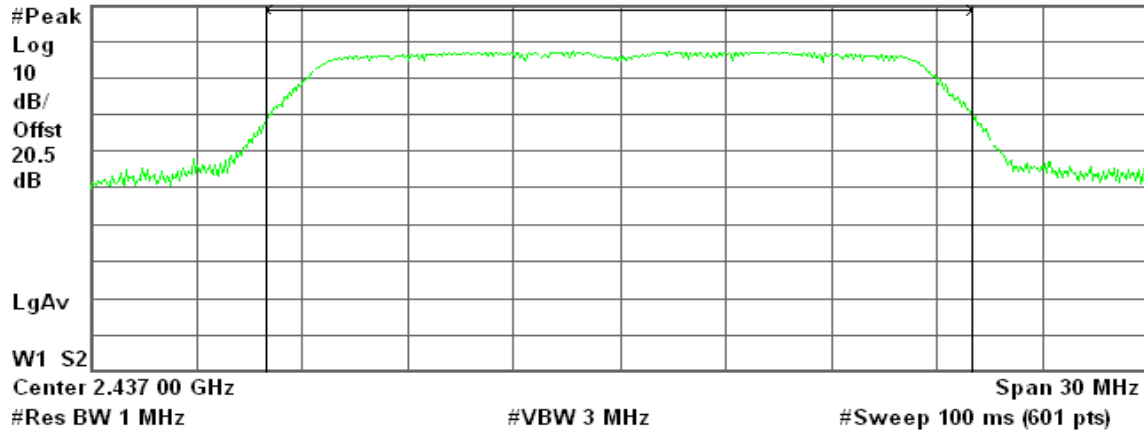
\* Agilent 14:30:45 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

Power Spectral Density

18.56 dBm / 20.0000 MHz

-54.45 dBm/Hz

**Peak Power (CH High)**

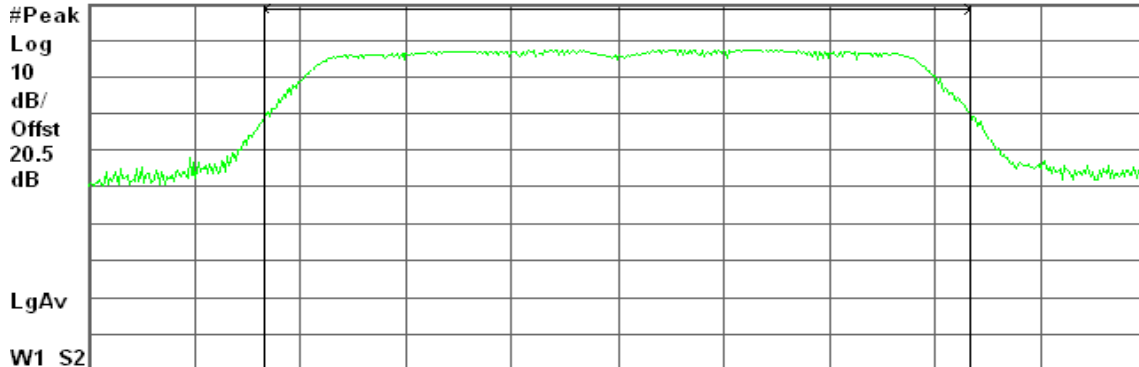
\* Agilent 14:35:10 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode High Ch.

Ref 20 dBm

Atten 10 dB



Center 2.462 00 GHz

Span 30 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

18.83 dBm / 20.0000 MHz

-54.18 dBm/Hz

**draft 802.11n Wide-40 MHz Channel mode****Peak Power (CH Low)**

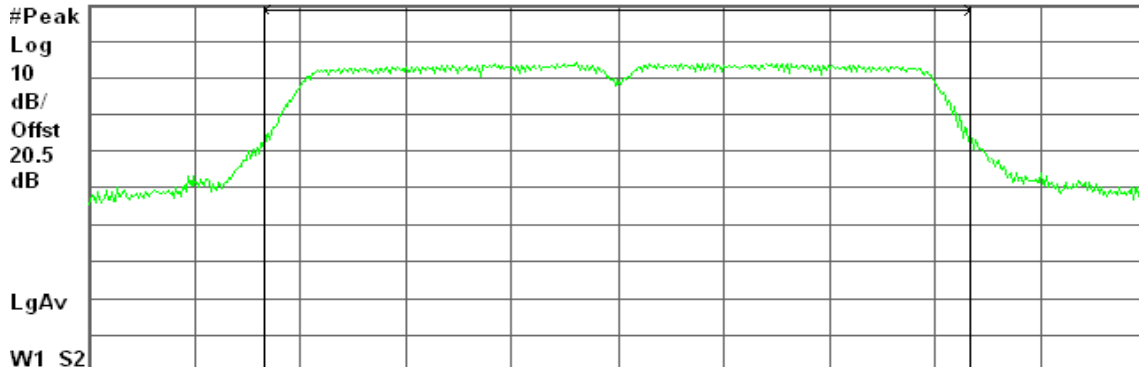
\* Agilent 14:46:20 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Center 2.422 00 GHz

Span 60 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

18.10 dBm / 40.0000 MHz

-57.92 dBm/Hz



## Peak Power (CH Mid)

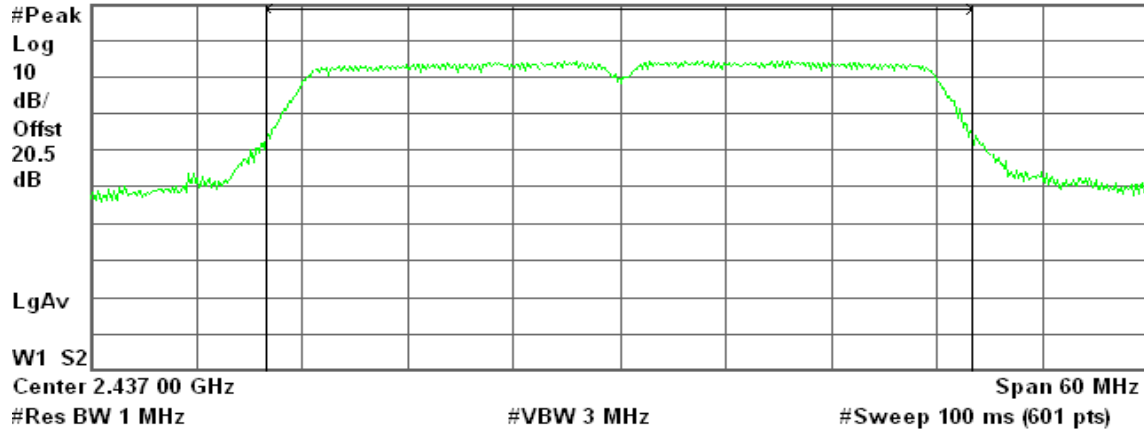
\* Agilent 14:50:19 Oct 15, 2009

R L

Peak Output Power (DTS), g Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

18.47 dBm / 40.0000 MHz

Power Spectral Density

-57.55 dBm/Hz

## Peak Power (CH High)

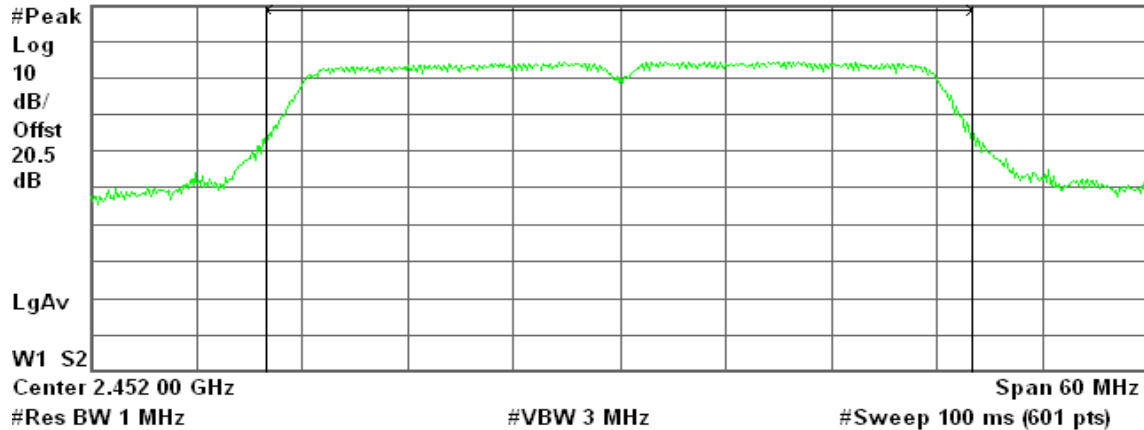
\* Agilent 14:55:39 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode High Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

18.57 dBm / 40.0000 MHz

Power Spectral Density

-57.45 dBm/Hz

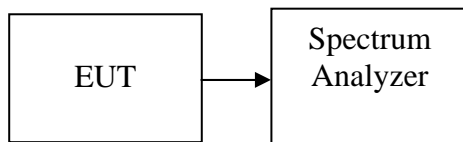


## 7.3 AVERAGE POWER

### 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)	Limit (W)	Result
Low	2412	10.89	0.0123	1.00	PASS
Mid	2437	11.72	0.0149		PASS
High	2462	11.68	0.0147		PASS

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	10.57	0.0114	1.00	PASS
Mid	2437	10.64	0.0116		PASS
High	2462	11.18	0.0131		PASS

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	10.76	0.0119	1.00	PASS
Mid	2437	11.69	0.0148		PASS
High	2462	11.04	0.0127		PASS

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

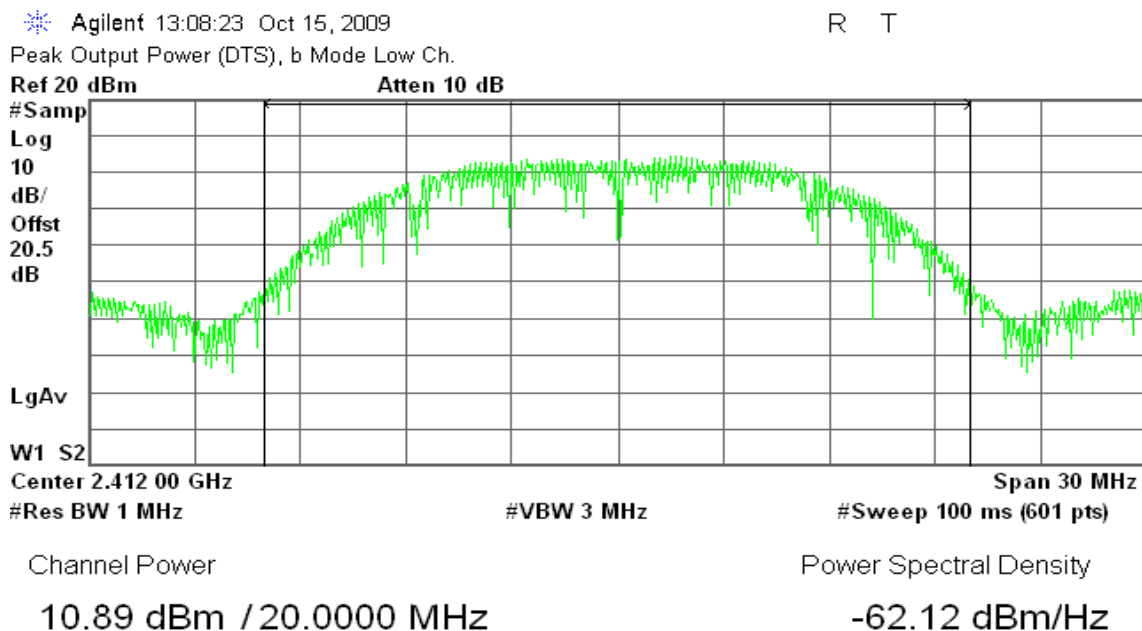
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	10.79	0.0120	1.00	PASS
Mid	2437	11.09	0.0129		PASS
High	2452	11.42	0.0139		PASS



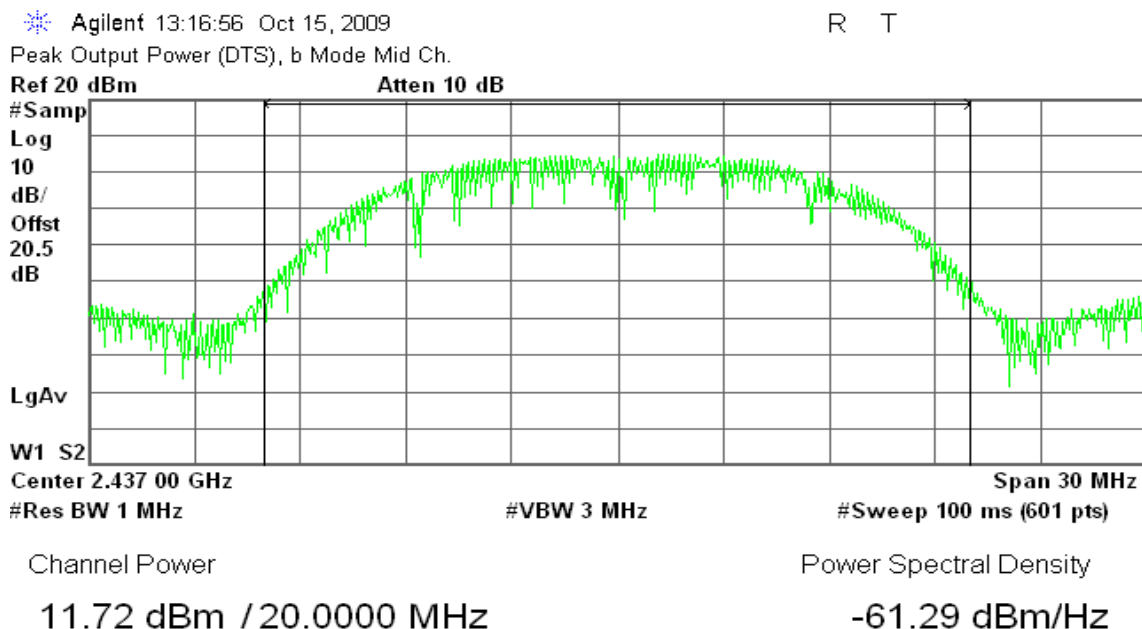
## Test Plot

### IEEE 802.11b mode

#### Average Power (CH Low)



#### Average Power (CH Mid)





### Average Power (CH High)

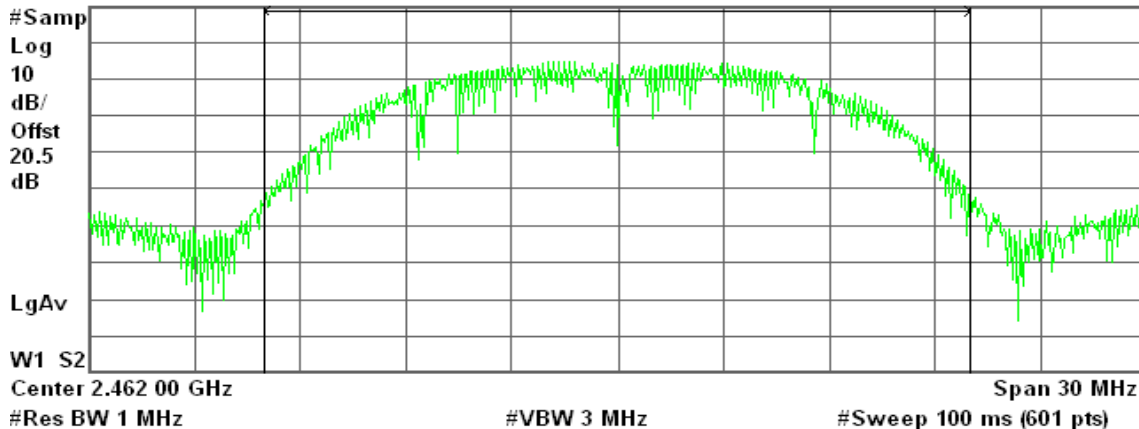
\* Agilent 13:21:30 Oct 15, 2009

R L

Peak Output Power (DTS), b Mode High Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

11.68 dBm / 20.0000 MHz

Power Spectral Density

-61.33 dBm/Hz

### IEEE 802.11g mode

#### Average Power (CH Low)

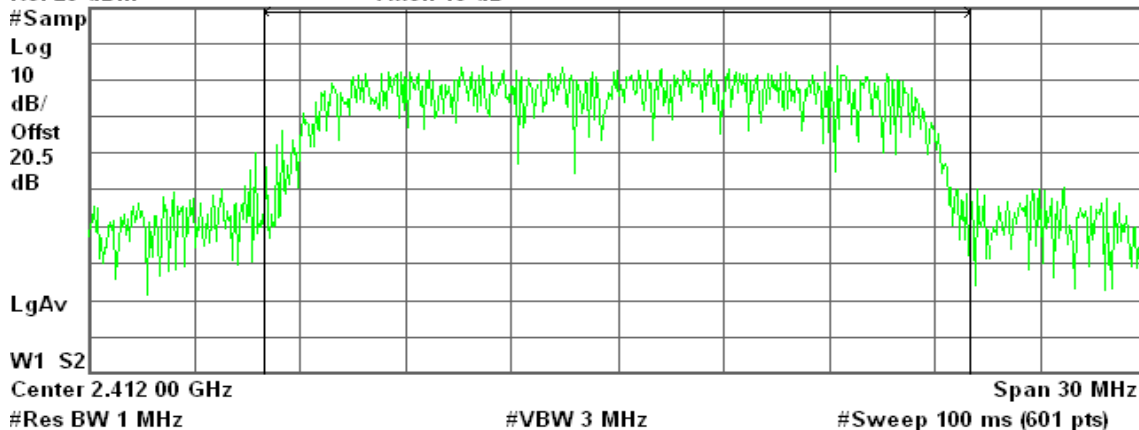
\* Agilent 13:26:01 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

10.57 dBm / 20.0000 MHz

Power Spectral Density

-62.44 dBm/Hz



**Average Power (CH Mid)**

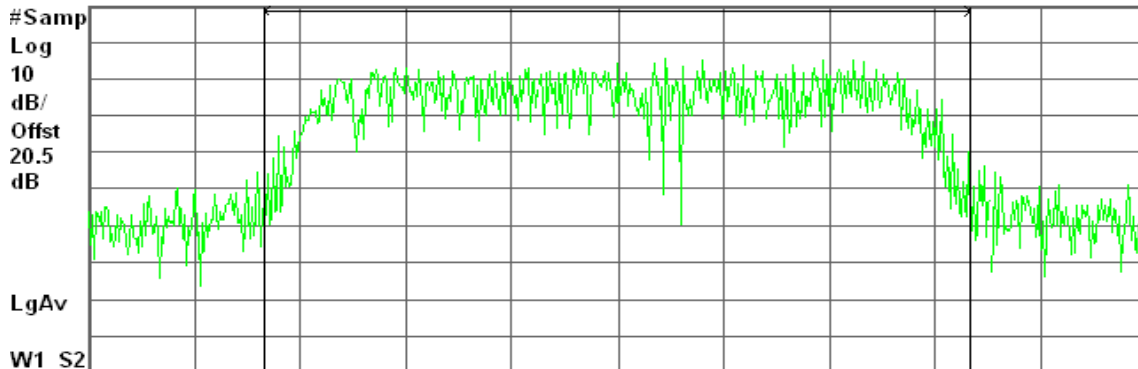
\* Agilent 13:35:12 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Center 2.437 00 GHz

Span 30 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

10.64 dBm / 20.0000 MHz

-62.38 dBm/Hz

**Average Power (CH High)**

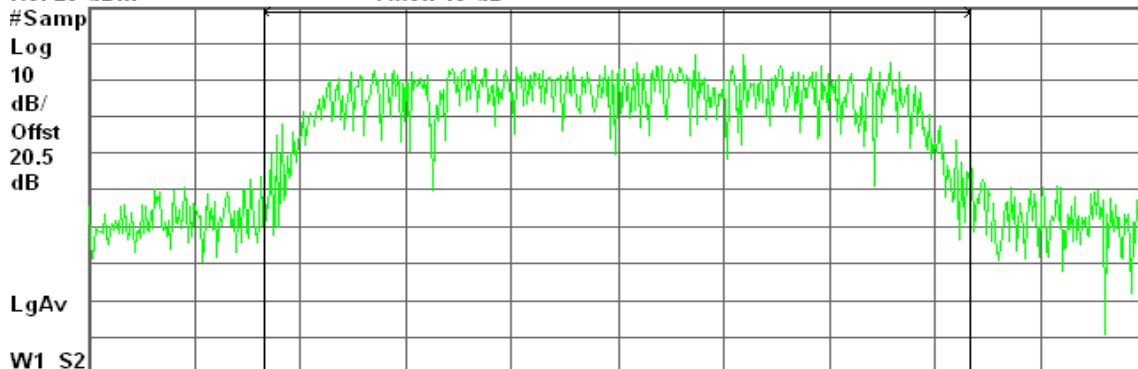
\* Agilent 13:40:16 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode High Ch.

Ref 20 dBm

Atten 10 dB



Center 2.462 00 GHz

Span 30 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

11.18 dBm / 20.0000 MHz

-61.83 dBm/Hz

**draft 802.11n Standard-20 MHz Channel mode****Average Power (CH Low)**

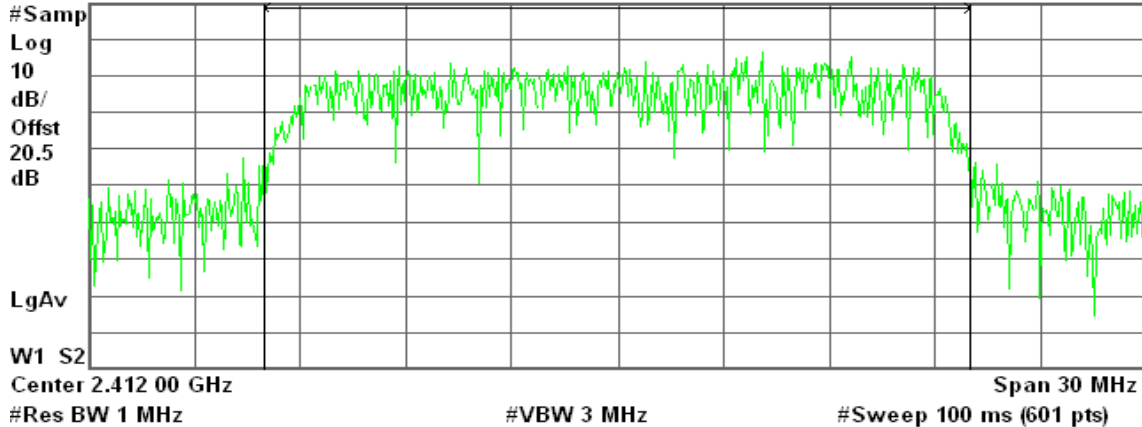
\* Agilent 14:12:22 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

10.76 dBm / 20.0000 MHz

Power Spectral Density

-62.25 dBm/Hz

**Average Power (CH Mid)**

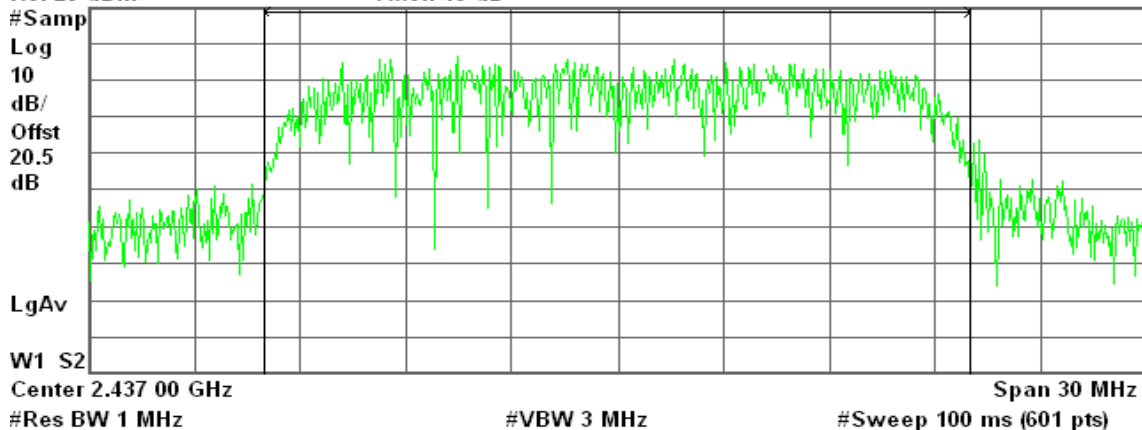
\* Agilent 14:30:57 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

11.69 dBm / 20.0000 MHz

Power Spectral Density

-61.32 dBm/Hz

**Average Power (CH High)**

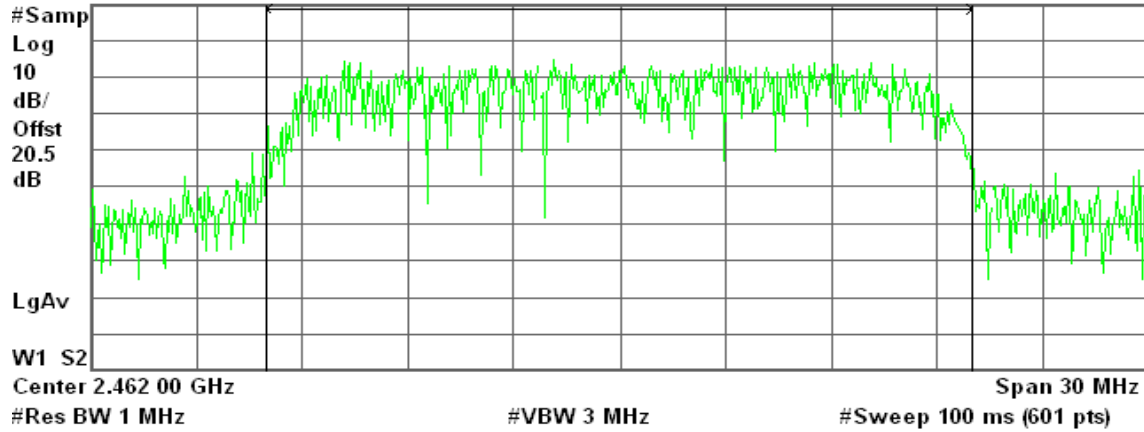
\* Agilent 14:35:22 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode High Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

Power Spectral Density

11.04 dBm / 20.0000 MHz

-61.97 dBm/Hz

**draft 802.11n Wide-40 MHz Channel mode****Average Power (CH Low)**

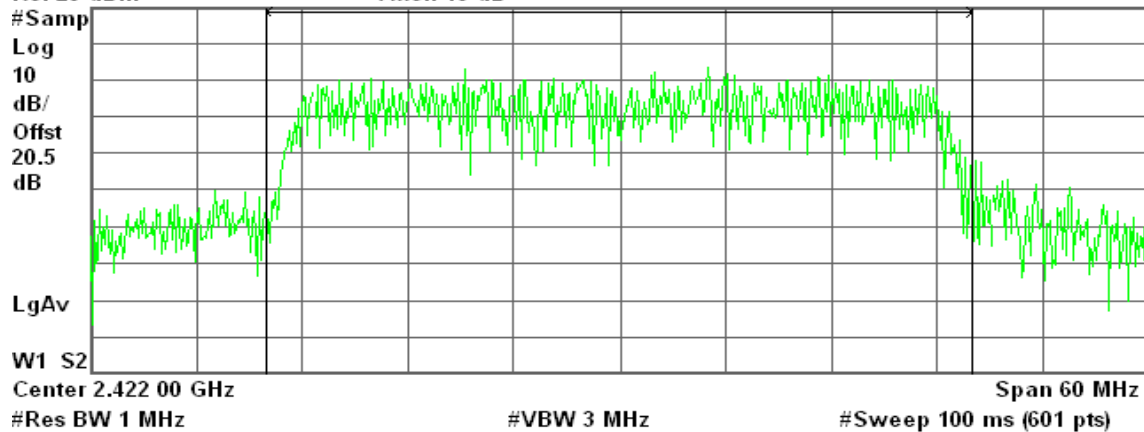
\* Agilent 14:46:32 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Low Ch.

Ref 20 dBm

Atten 10 dB



Channel Power

Power Spectral Density

10.79 dBm / 40.0000 MHz

-65.23 dBm/Hz

**Average Power (CH Mid)**

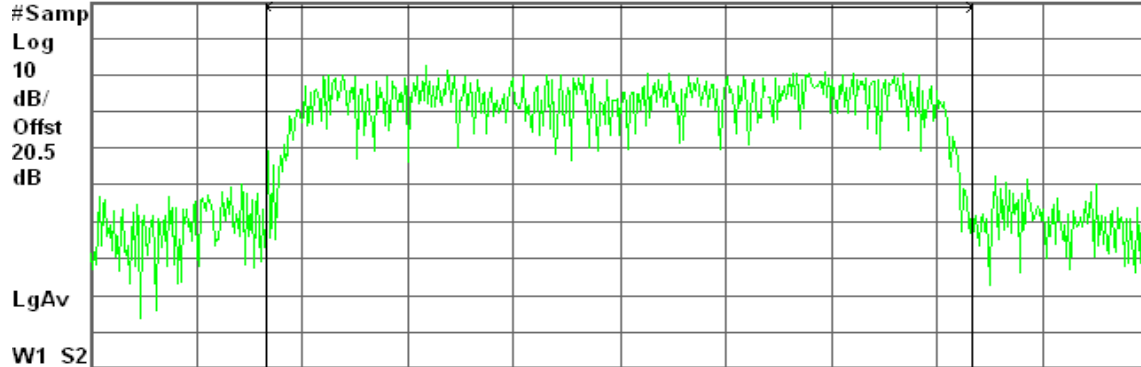
\* Agilent 14:50:31 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode Mid Ch.

Ref 20 dBm

Atten 10 dB



Center 2.437 00 GHz

Span 60 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

11.09 dBm / 40.0000 MHz

-64.93 dBm/Hz

**Average Power (CH High)**

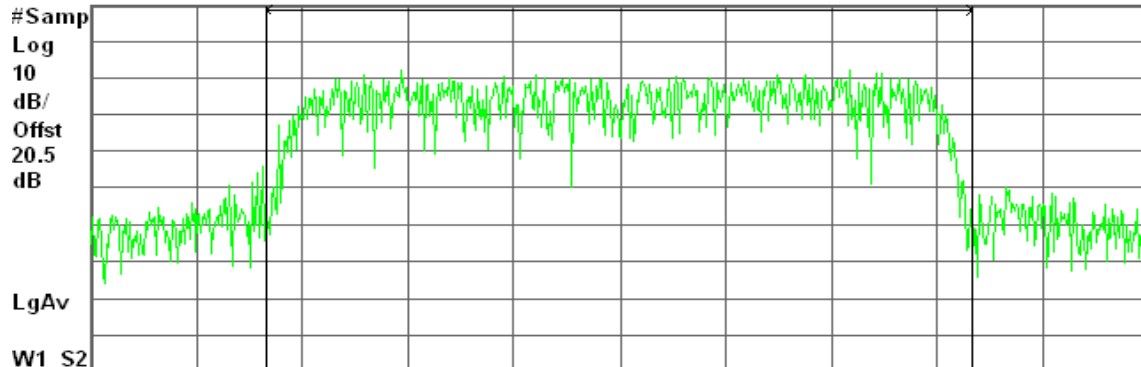
\* Agilent 14:55:50 Oct 15, 2009

R T

Peak Output Power (DTS), g Mode High Ch.

Ref 20 dBm

Atten 10 dB



Center 2.452 00 GHz

Span 60 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Channel Power

Power Spectral Density

11.42 dBm / 40.0000 MHz

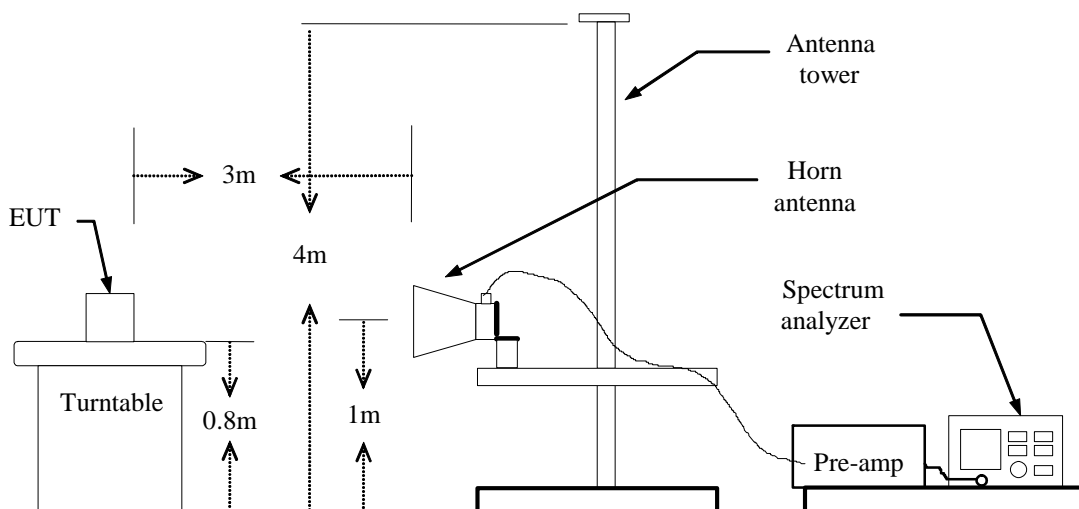
-64.60 dBm/Hz

## 7.4 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

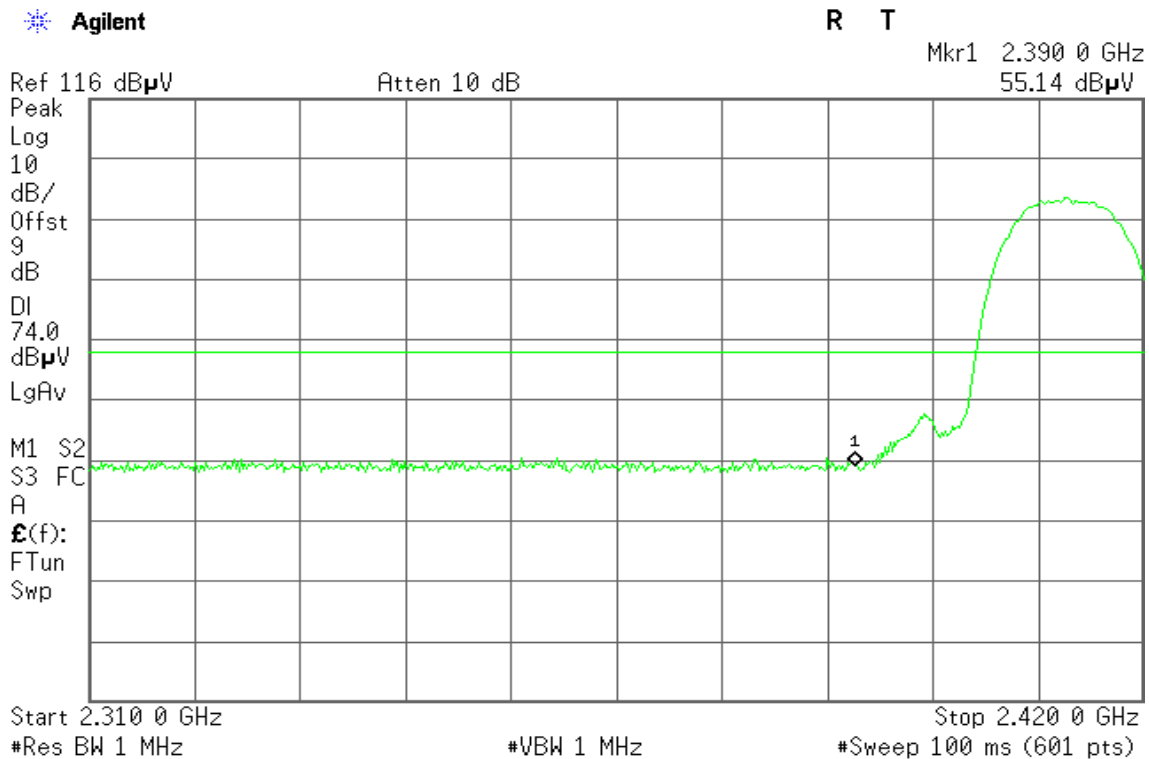
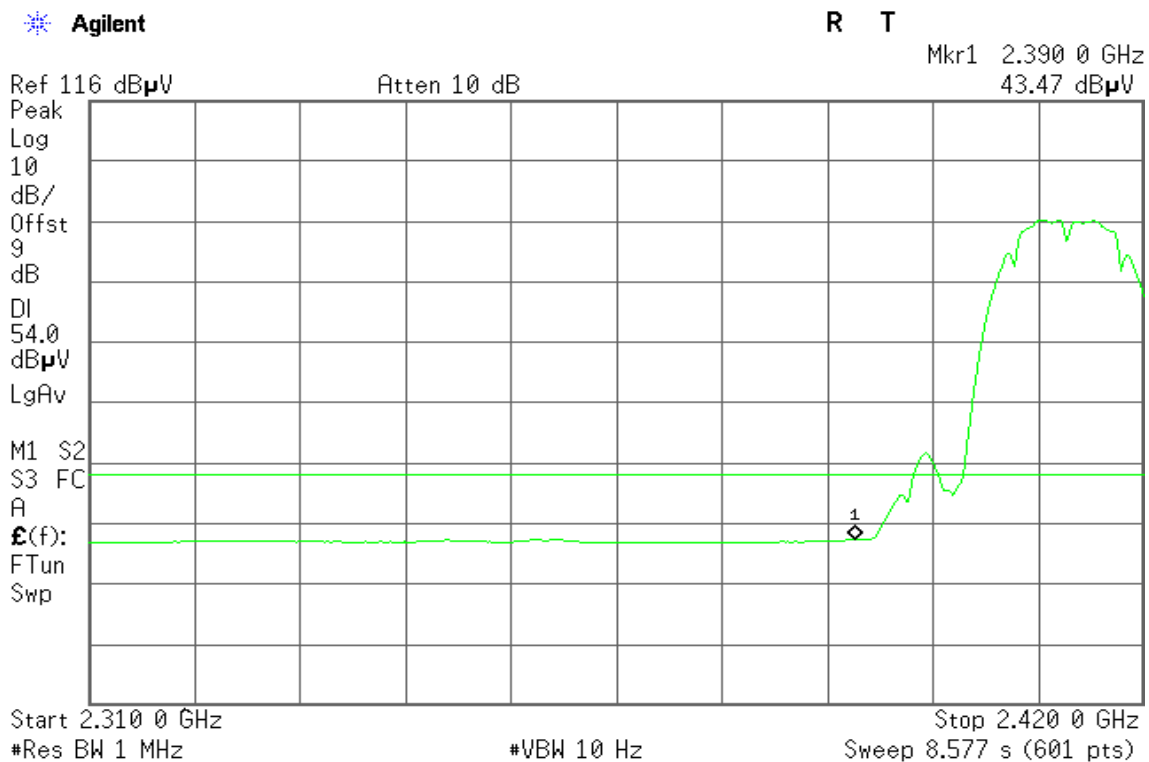


### TEST PROCEDURE

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 mode / CH Low)****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

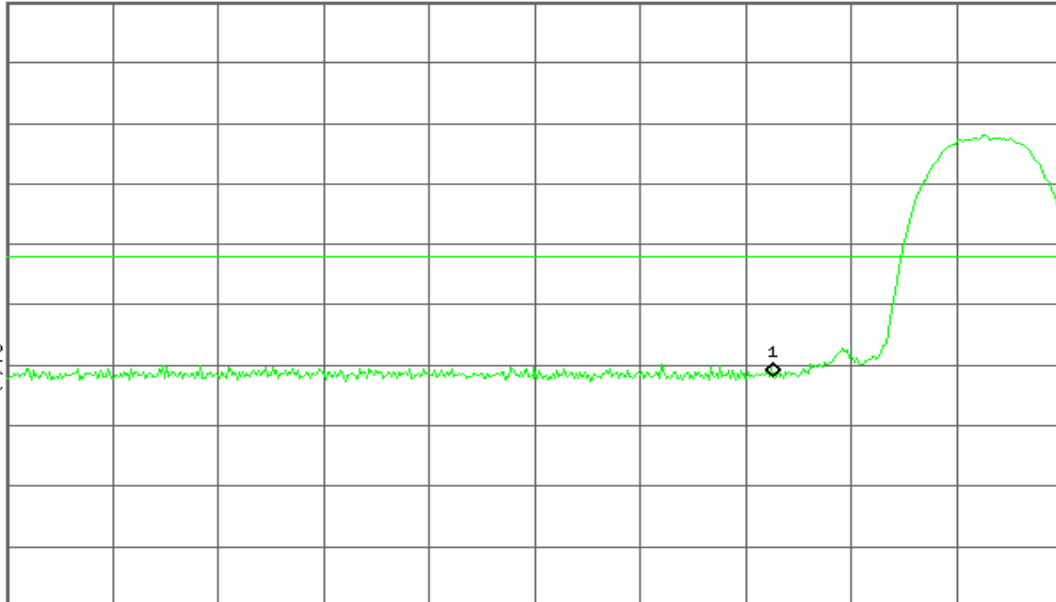
**Detector mode: Peak****Polarity: Horizontal**

\* Agilent

R T

Ref 116 dB $\mu$ V

Atten 10 dB

Mkr1 2.390 0 GHz  
54.05 dB $\mu$ VPeak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
74.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
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)

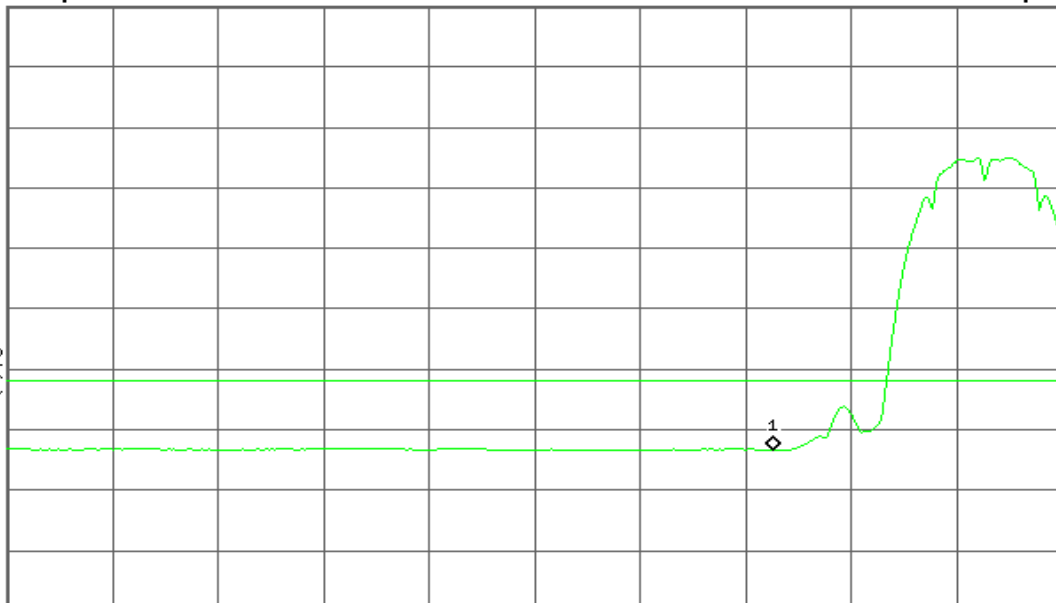
**Detector mode: Average****Polarity: Horizontal**

\* Agilent

R T

Ref 116 dB $\mu$ V

Atten 10 dB

Mkr1 2.390 0 GHz  
42.73 dB $\mu$ VPeak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
54.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
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 802.11b mode / CH High)****Detector mode: Peak****Polarity: Vertical**

Agilent

R T

Mkr1 2.483 50 GHz  
55.81 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak

Log

10

dB/

Offst

9

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

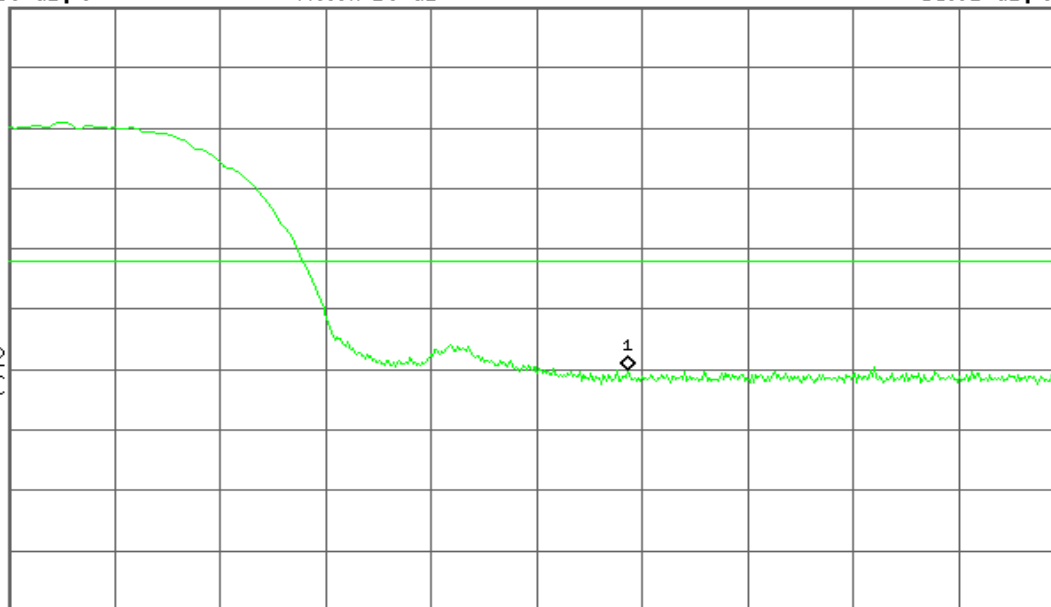
S3 FC

A

 $\mathcal{E}(f)$ :

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: Vertical**

Agilent

R T

Mkr1 2.483 50 GHz  
43.06 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak

Log

10

dB/

Offst

9

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A

 $\mathcal{E}(f)$ :

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)





Detector mode: Peak

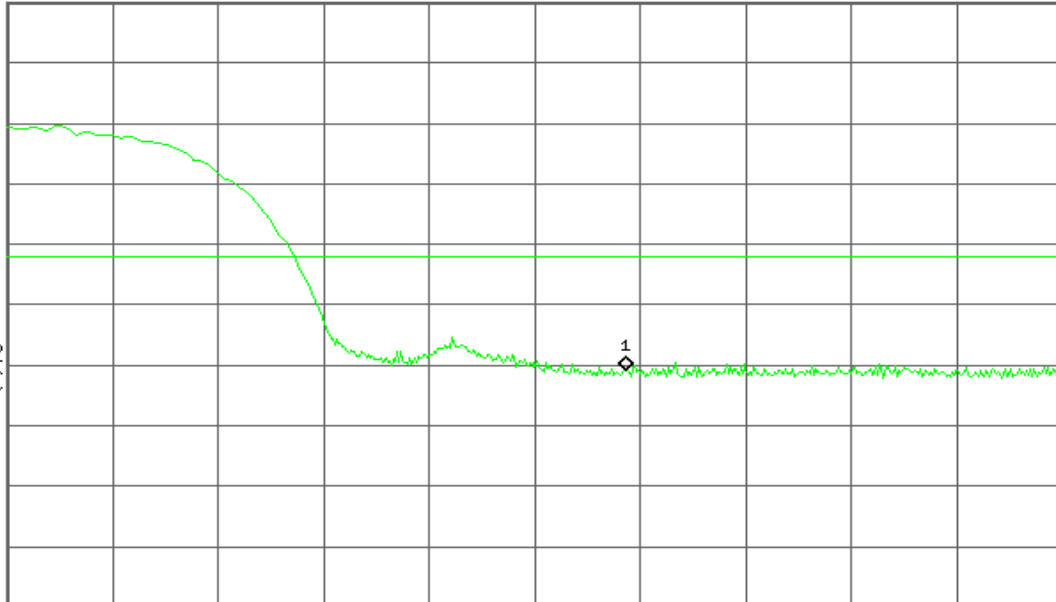
Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
55.25 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
74.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
£(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

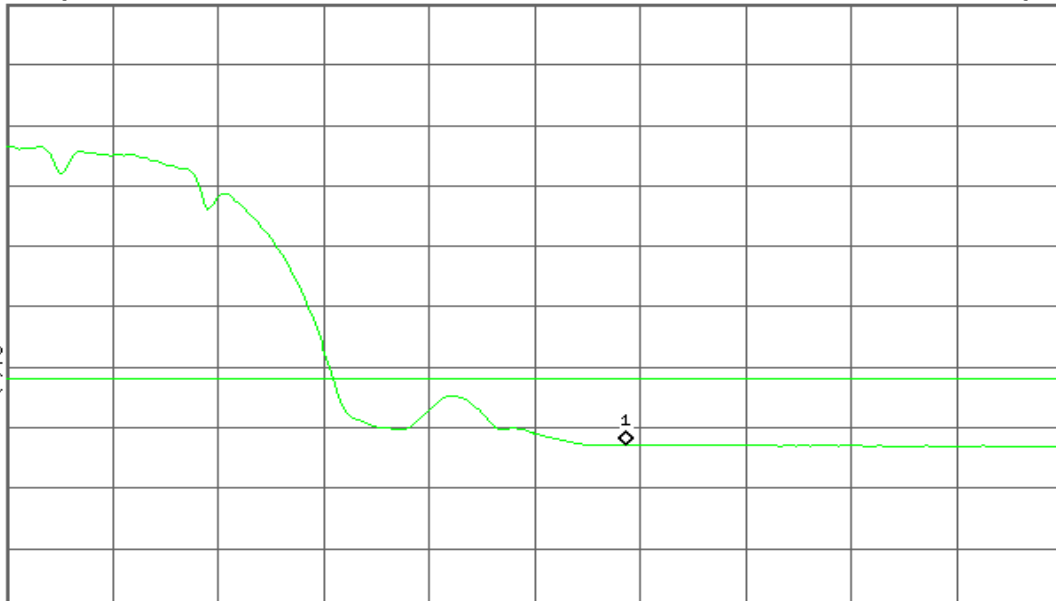
Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
43.14 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
54.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
£(f):  
FTun  
Swp

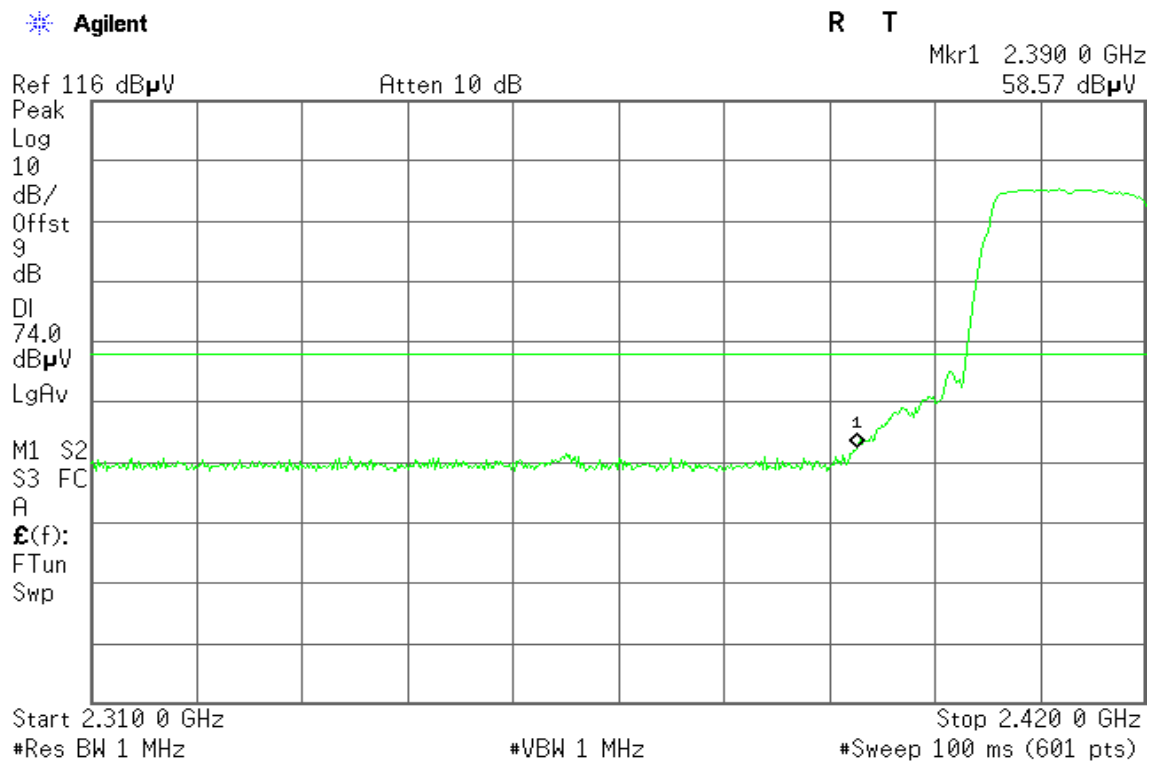
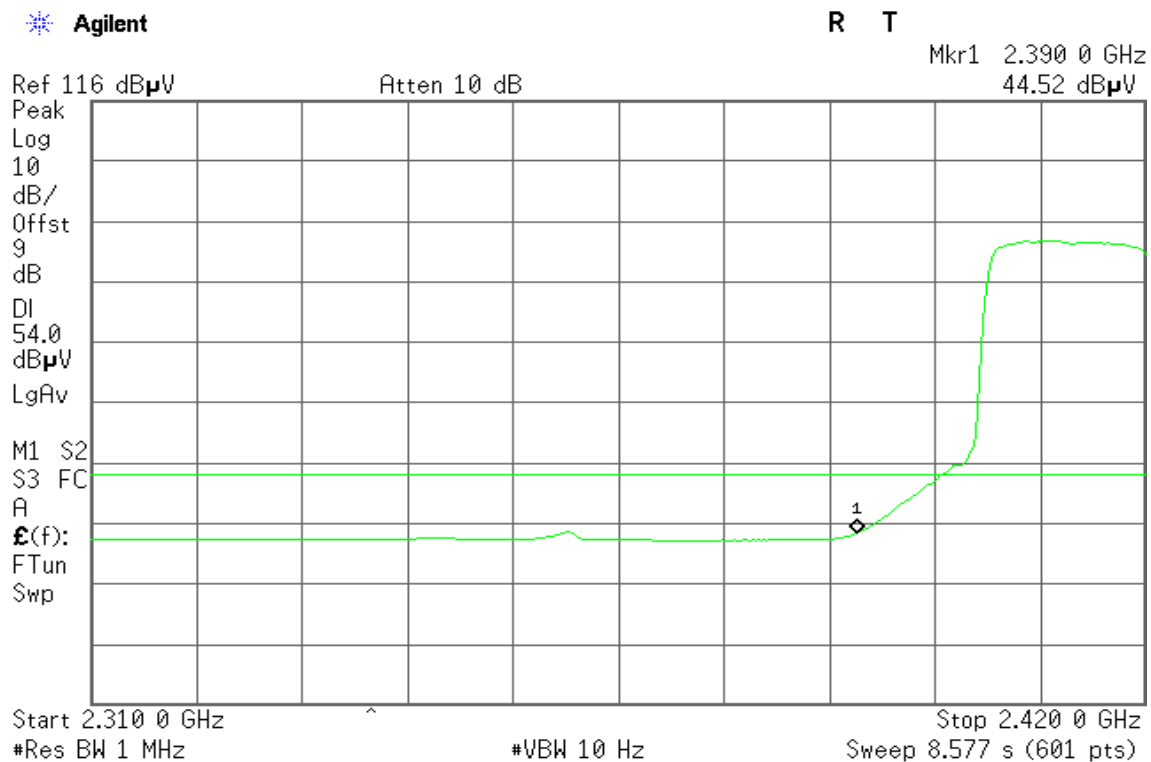
Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

^ Stop 2.500 00 GHz

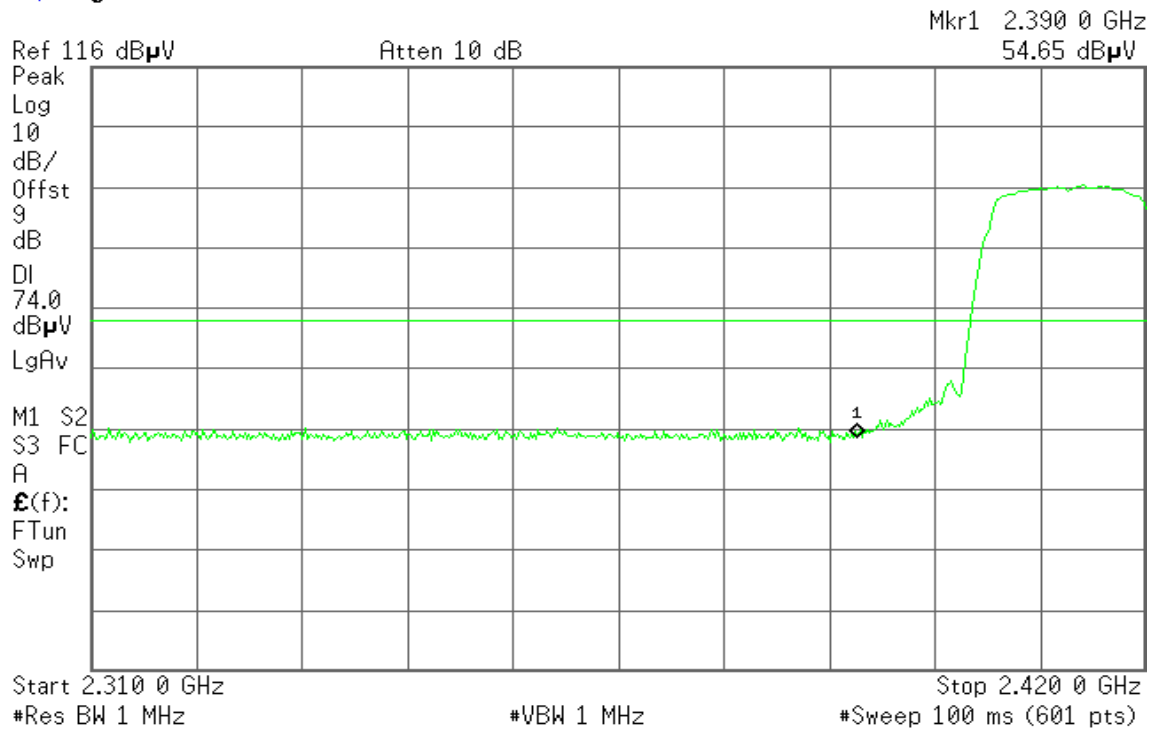
Sweep 3.119 s (601 pts)

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

**Detector mode: Peak****Polarity: Horizontal**

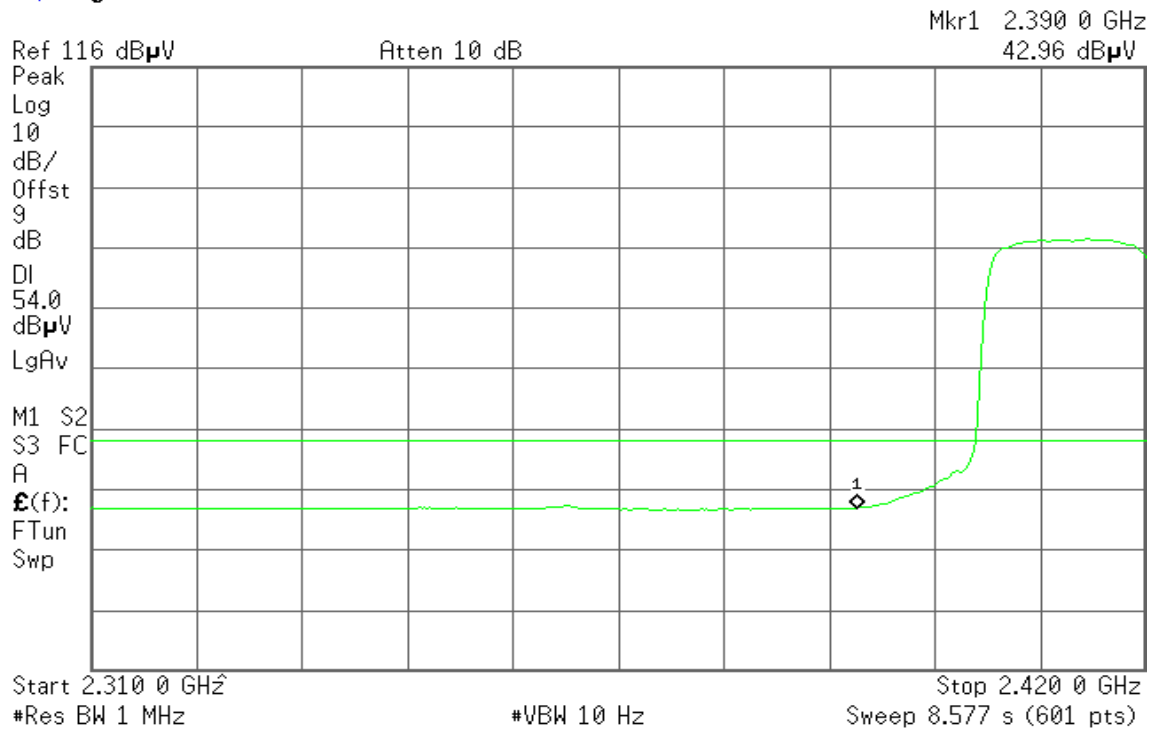
\* Agilent

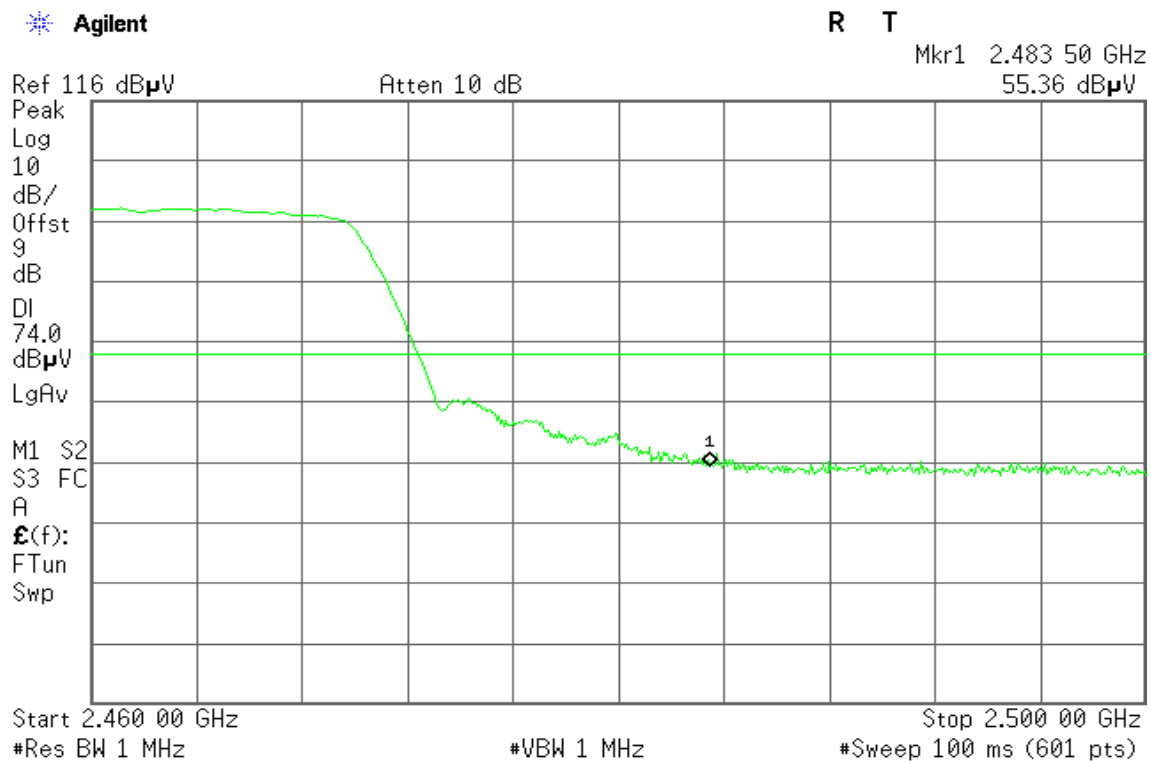
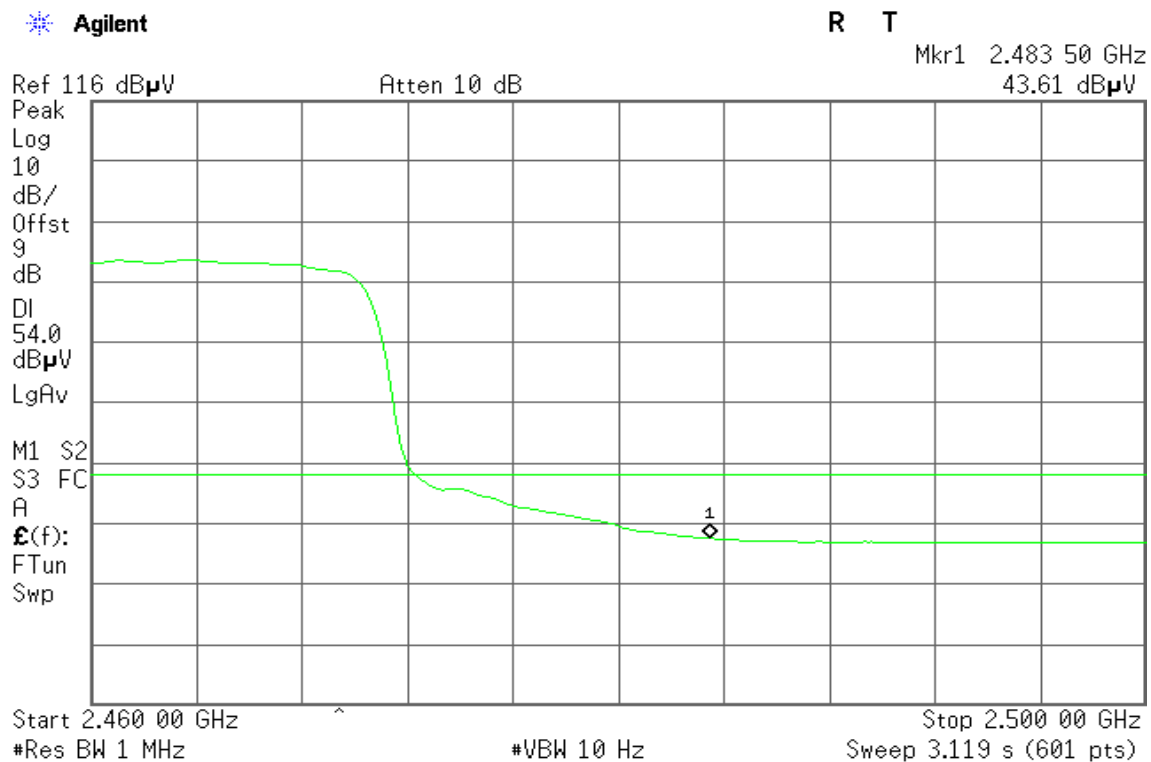
R T

**Detector mode: Average****Polarity: Horizontal**

\* Agilent

R T



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



Detector mode: Peak

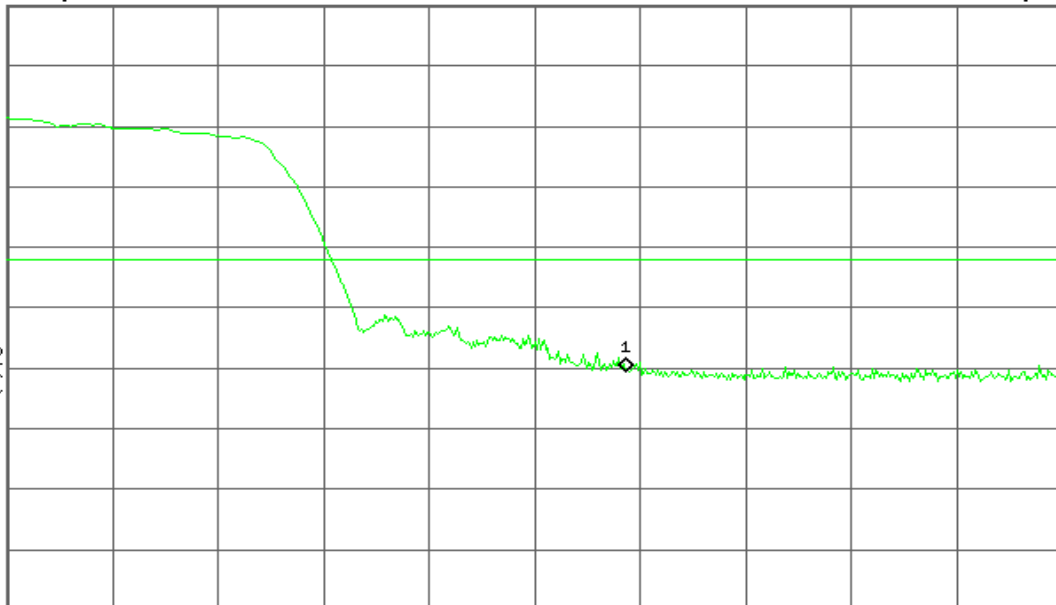
Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
55.42 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
74.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
£(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

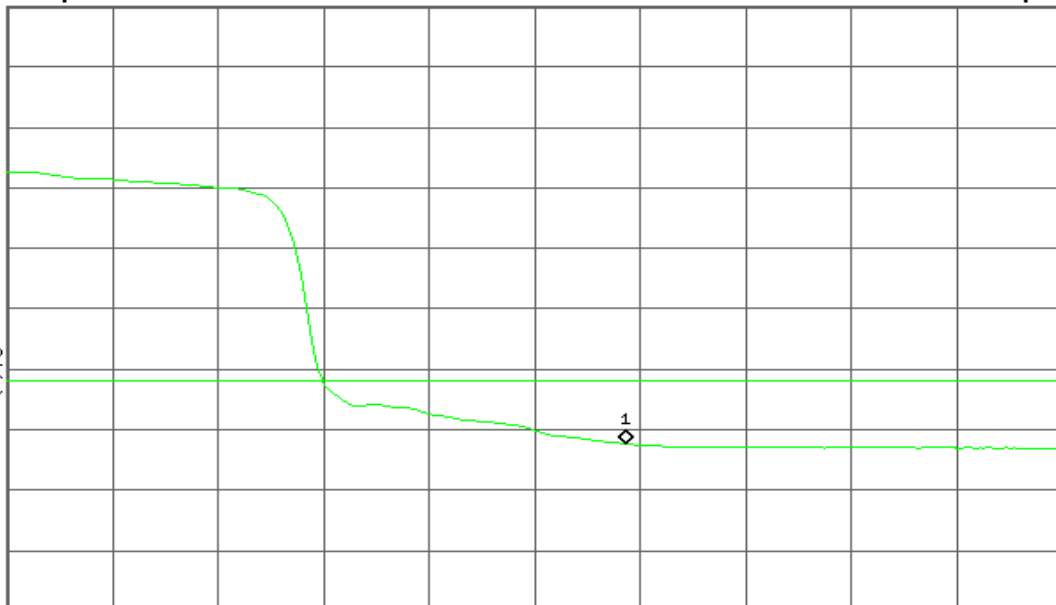
Polarity: Horizontal

Agilent

R T

Mkr1 2.483 50 GHz  
43.67 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
54.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
£(f):  
FTun  
Swp

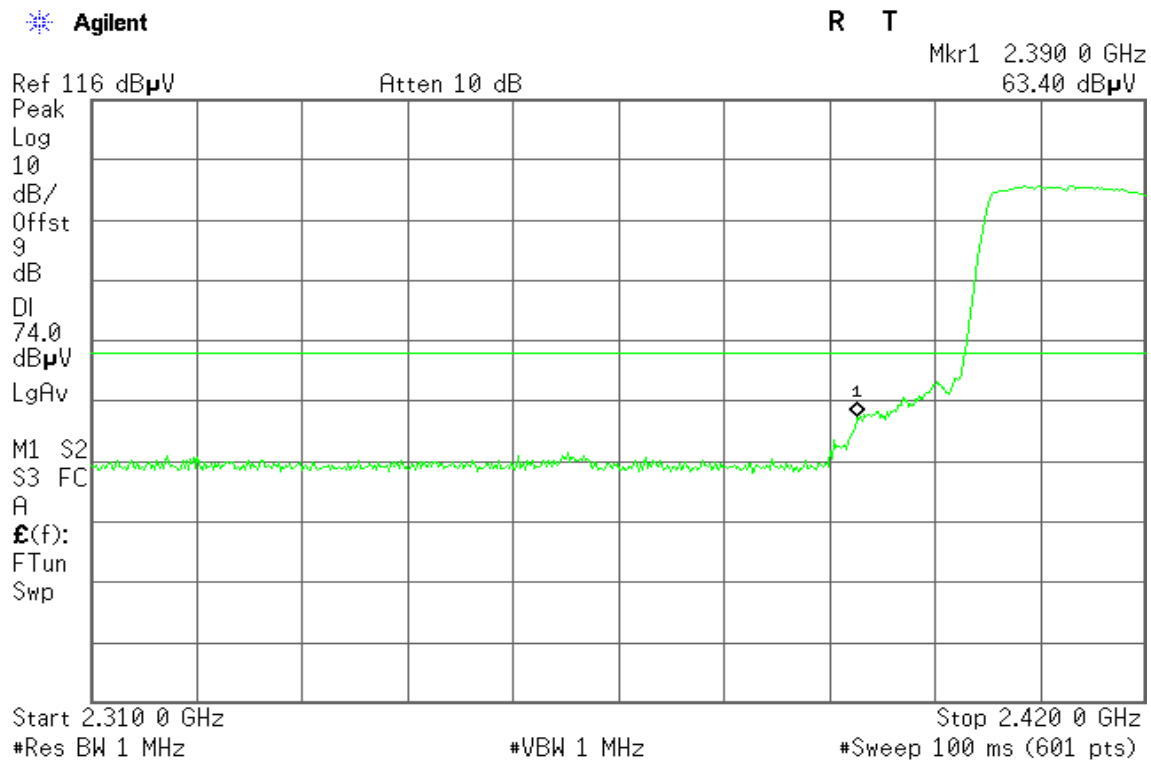
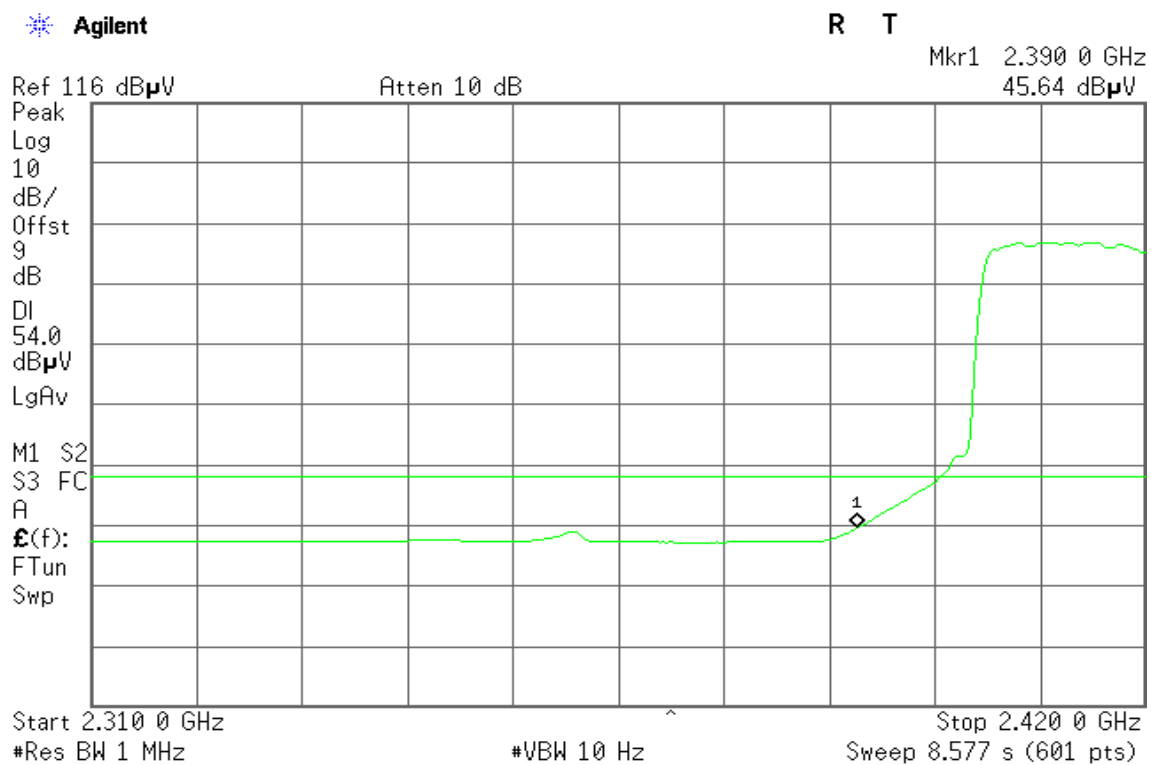
Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

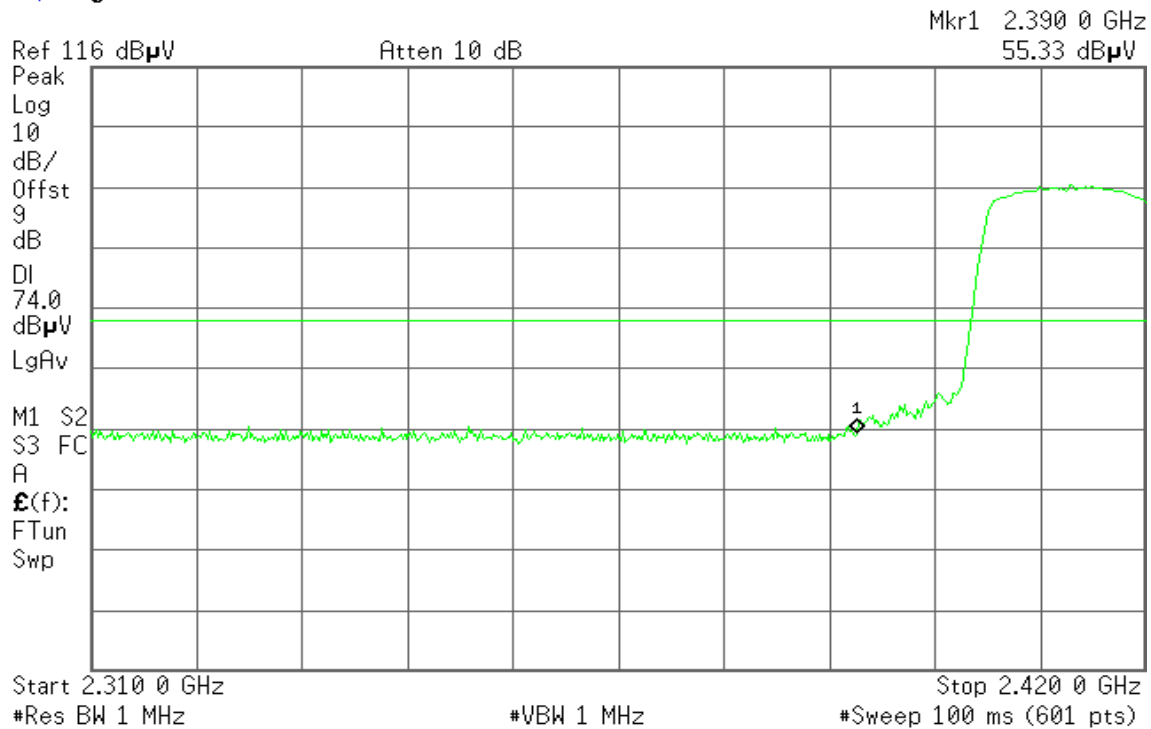
Sweep 3.119 s (601 pts)

**Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH Low)****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**

**Detector mode: Peak****Polarity: Horizontal**

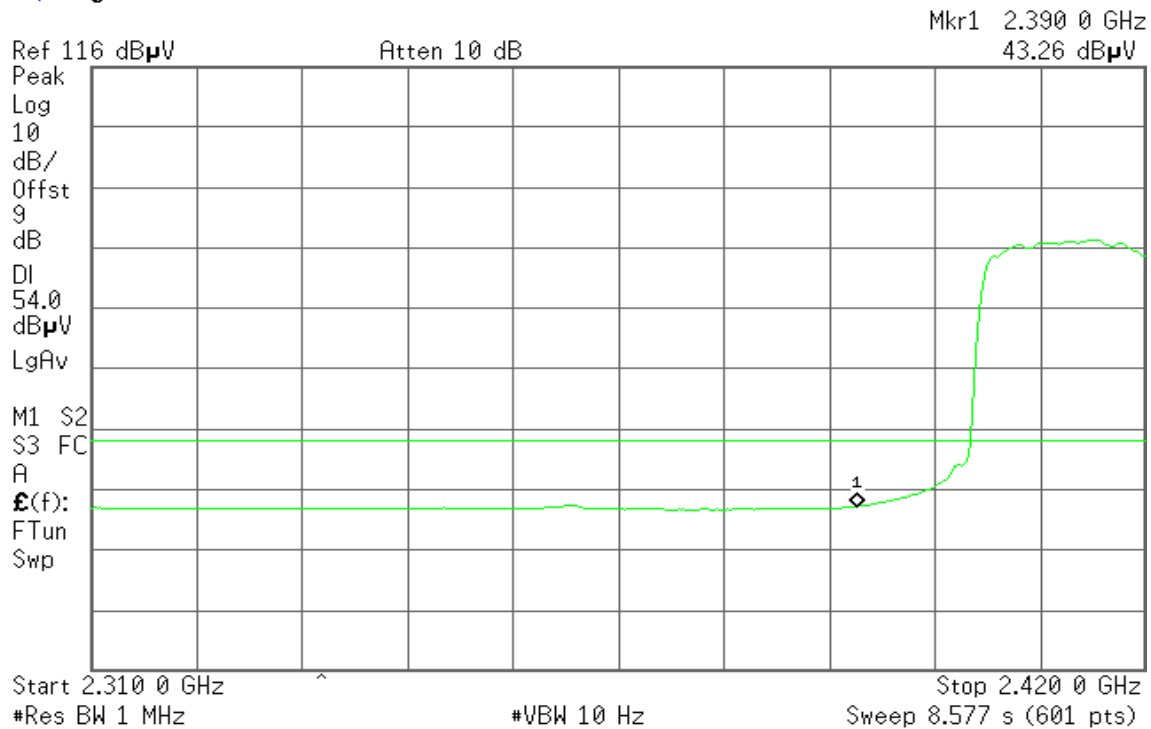
\* Agilent

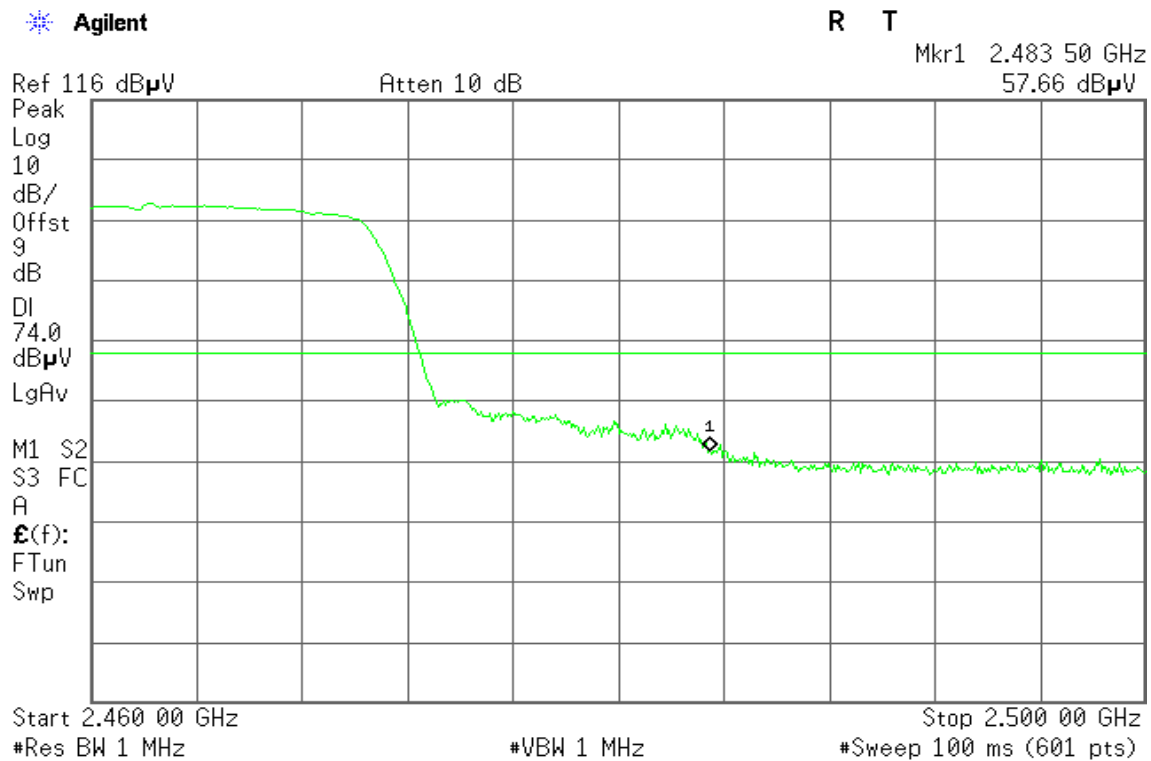
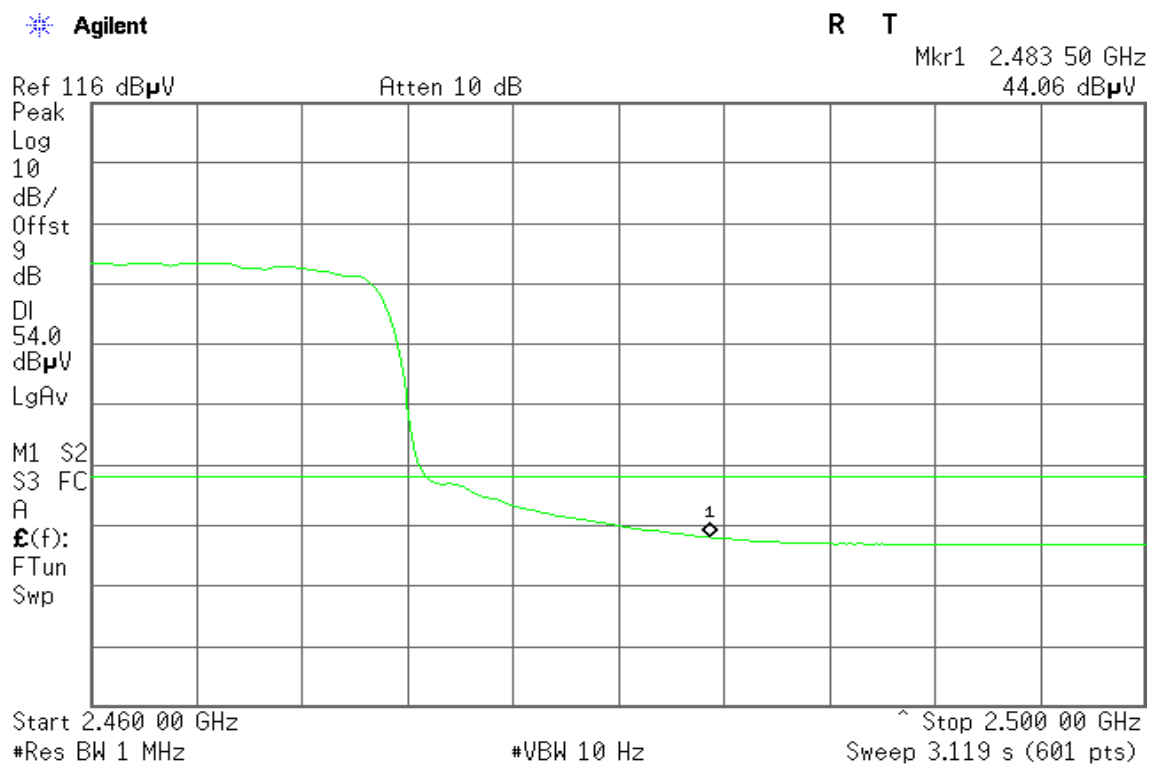
R T

**Detector mode: Average****Polarity: Horizontal**

\* Agilent

R T



**Band Edges (draft 802.11n Standard-20 MHz Channel mode / CH High)****Detector mode: Peak****Polarity: Vertical****Detector mode: Average****Polarity: Vertical**



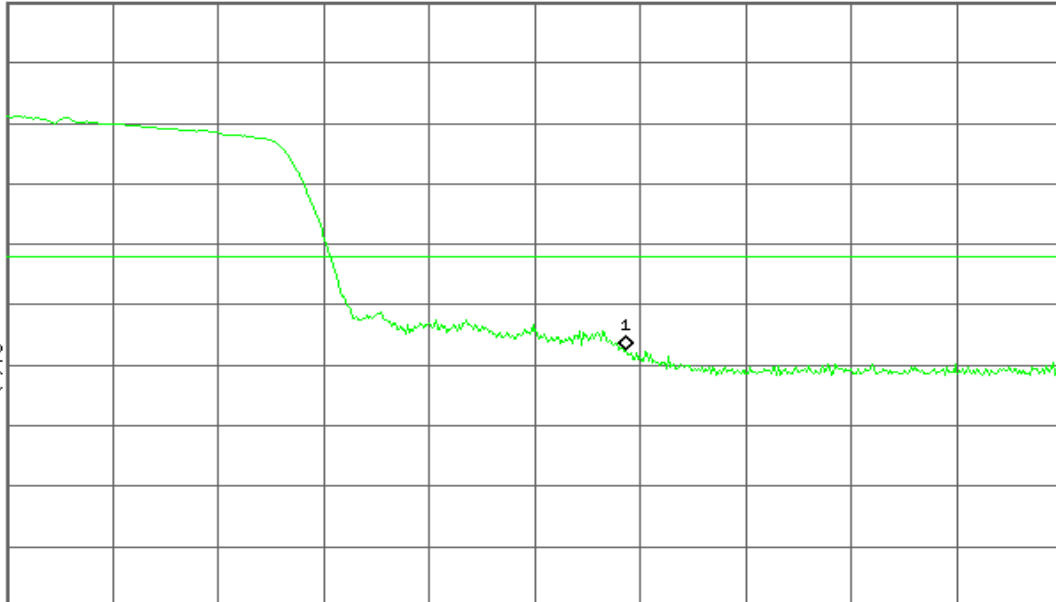
**Detector mode: Peak****Polarity: Horizontal**

\* Agilent

R T

Mkr1 2.483 50 GHz  
58.57 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
74.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
£(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)

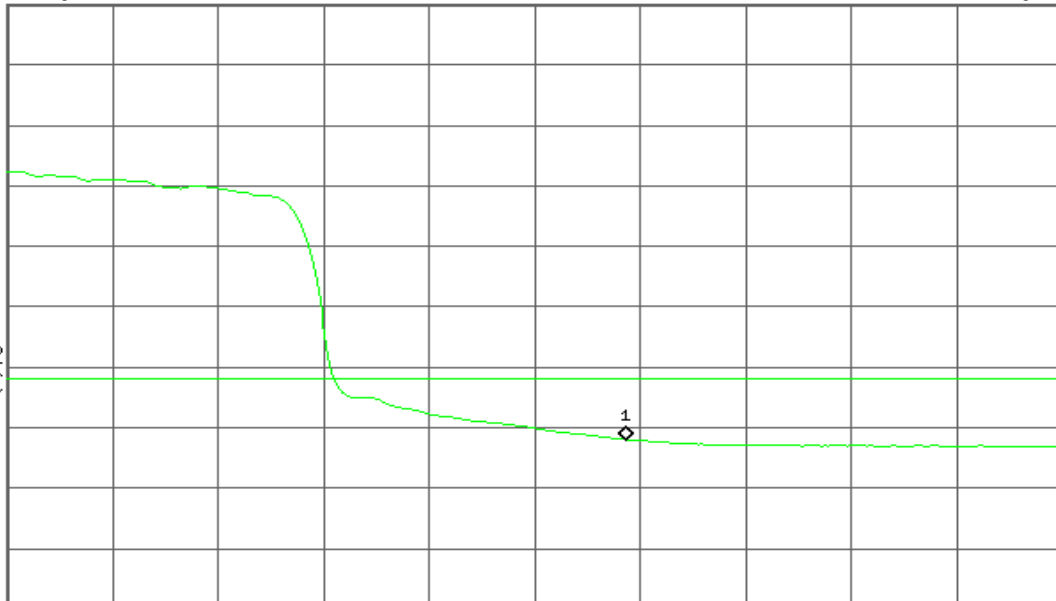
**Detector mode: Average****Polarity: Horizontal**

\* Agilent

R T

Mkr1 2.483 50 GHz  
44.04 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak  
Log  
10  
dB/  
Offst  
9  
dB  
DI  
54.0  
dB $\mu$ V  
LgAvM1 S2  
S3 FC  
A  
£(f):  
FTun  
Swp

Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

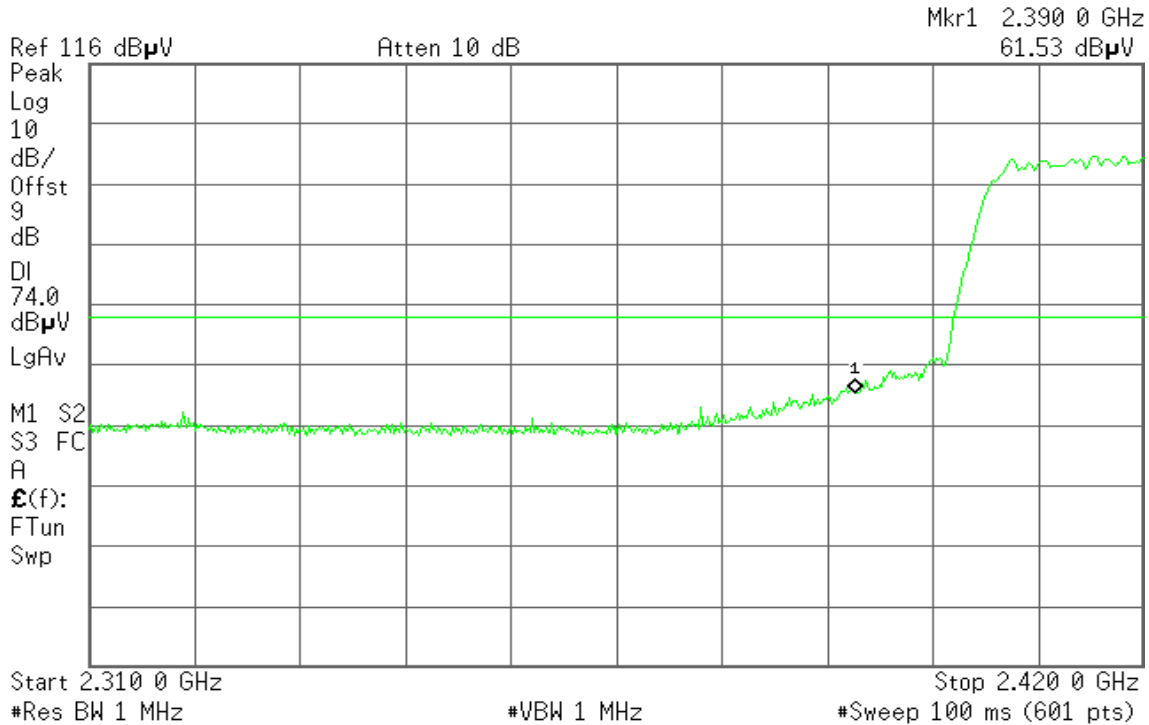
Stop 2.500 00 GHz

Sweep 3.119 s (601 pts)

**Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH Low)****Detector mode: Peak****Polarity: Vertical**

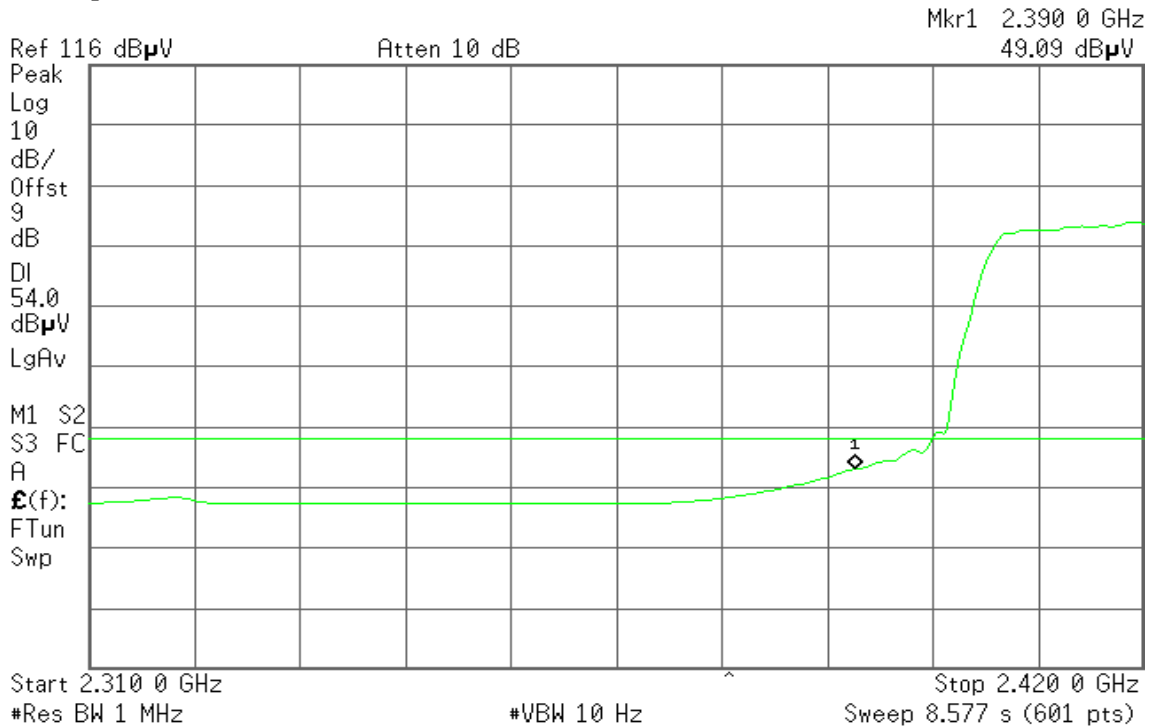
\* Agilent

R T

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

\* Agilent

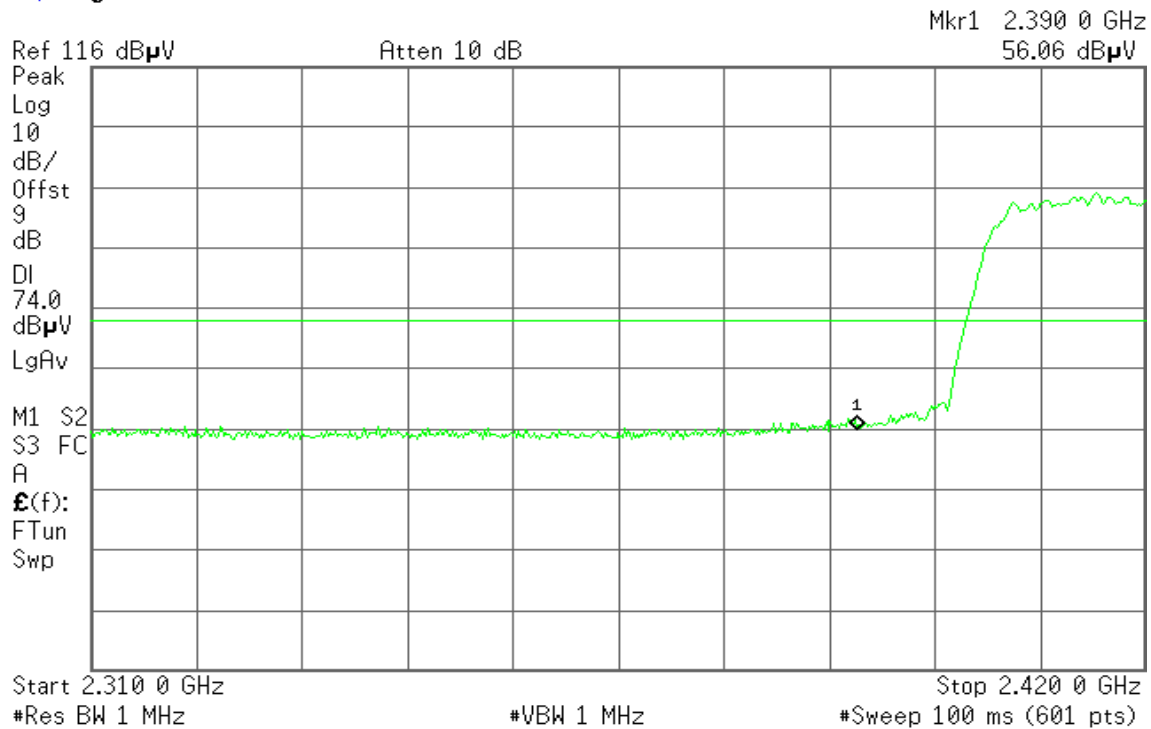
R T



**Detector mode: Peak****Polarity: Horizontal**

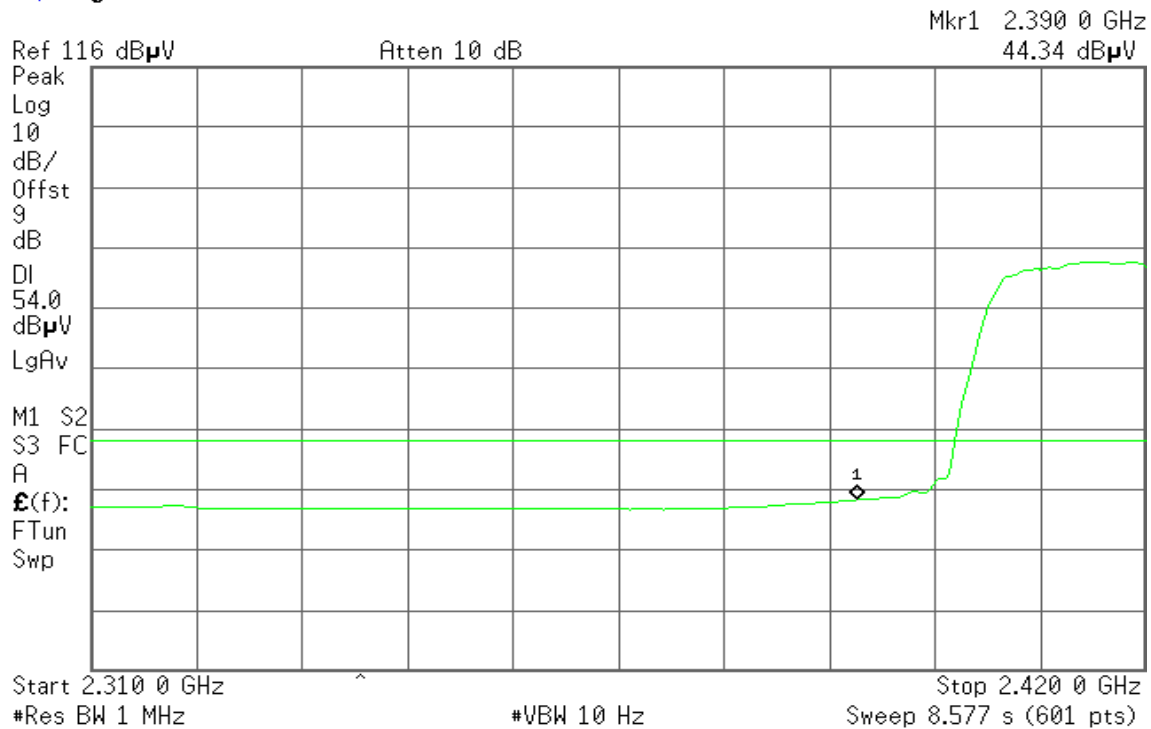
\* Agilent

R T

**Detector mode: Average****Polarity: Horizontal**

\* Agilent

R T



**Band Edges (draft 802.11n Wide-40 MHz Channel mode / CH High)****Detector mode: Peak****Polarity: Vertical**

\* Agilent

R T

Mkr1 2.483 50 GHz

58.84 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak

Log

10

dB/

Offst

9

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A

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: Vertical**

\* Agilent

R T

Mkr1 2.483 50 GHz

45.88 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Norm

Log

10

dB/

Offst

9

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

S3 FC

A

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)

**Detector mode: Peak****Polarity: Horizontal**

\* Agilent

R T

Mkr1 2.483 50 GHz  
58.77 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak

Log

10

dB/

Offst

9

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

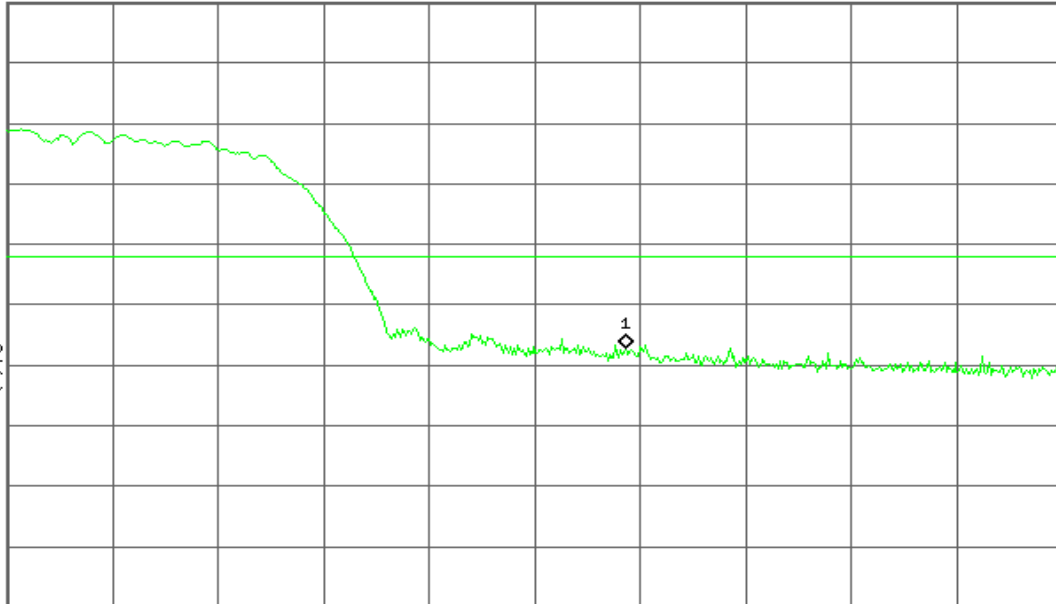
S3 FC

A

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  
45.42 dB $\mu$ VRef 116 dB $\mu$ V

Atten 10 dB

Peak

Log

10

dB/

Offst

9

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

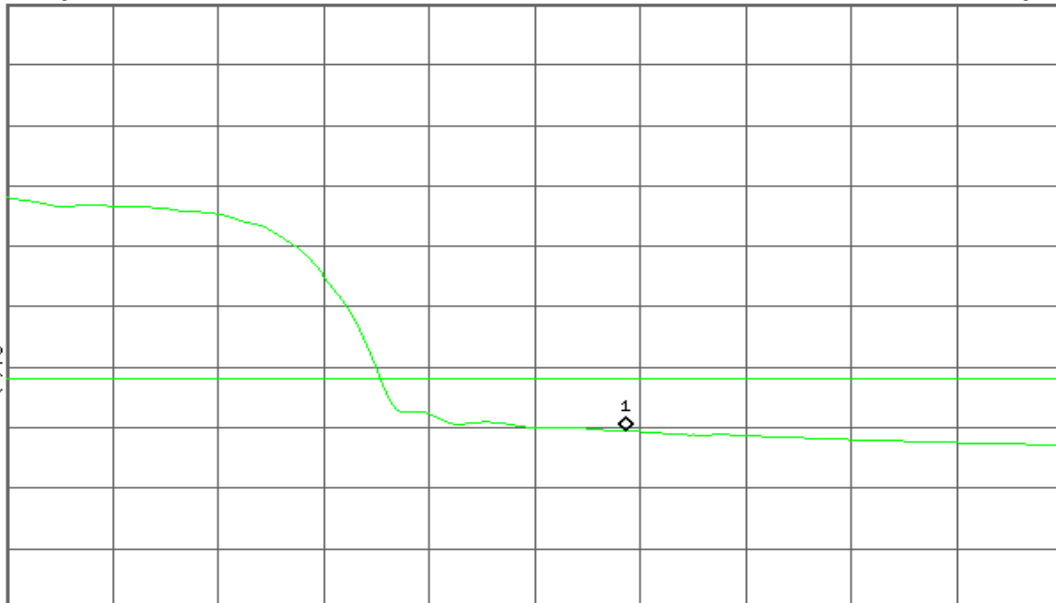
S3 FC

A

E(f):

FTun

Swp



Start 2.460 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Stop 2.500 00 GHz

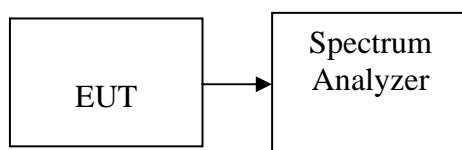
Sweep 3.119 s (601 pts)

## 7.5 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 = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep time = 100 s
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 mode**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-19.01	8.00	PASS
Mid	2437	-17.95		PASS
High	2462	-17.93		PASS

**Test mode: IEEE 802.11g mode**

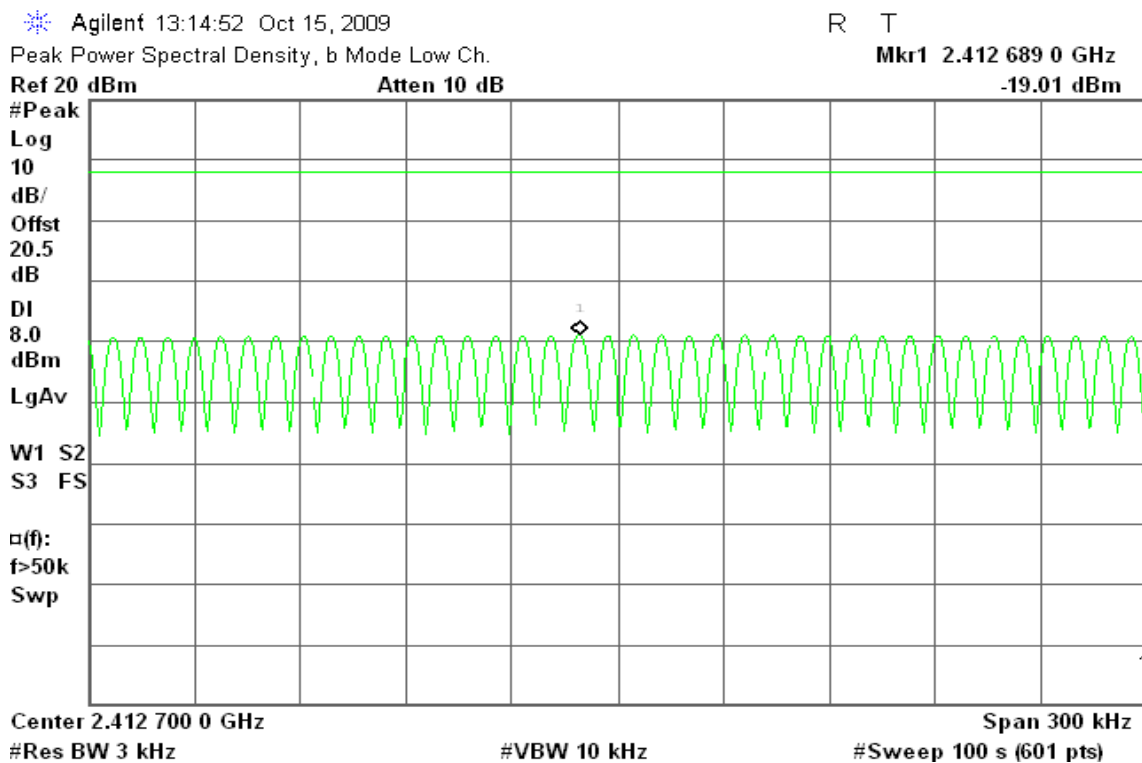
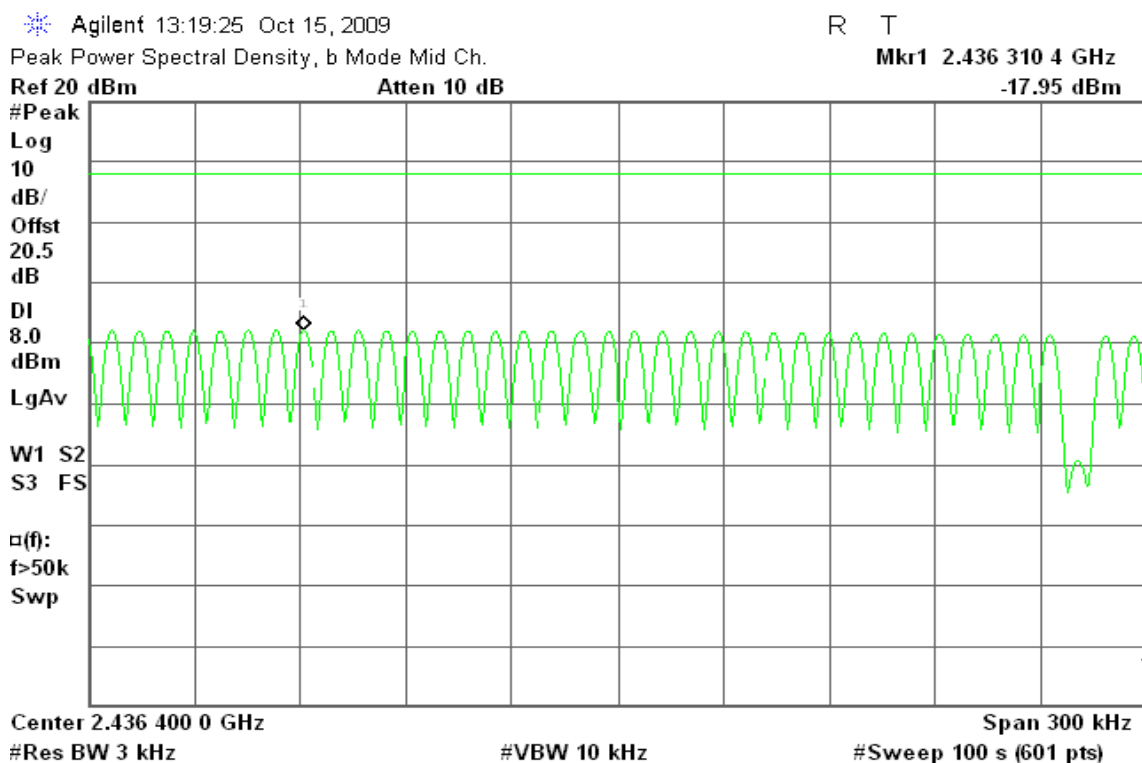
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-18.35	8.00	PASS
Mid	2437	-18.40		PASS
High	2462	-17.86		PASS

**Test mode: draft 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-17.00	8.00	PASS
Mid	2437	-16.79		PASS
High	2462	-16.45		PASS

**Test mode: draft 802.11n Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-18.14	8.00	PASS
Mid	2437	-17.91		PASS
High	2452	-17.92		PASS

**Test Plot****IEEE 802.11b mode****PPSD (CH Low)****PPSD (CH Mid)**



**PPSD (CH High)**

\* Agilent 13:23:44 Oct 15, 2009

R T

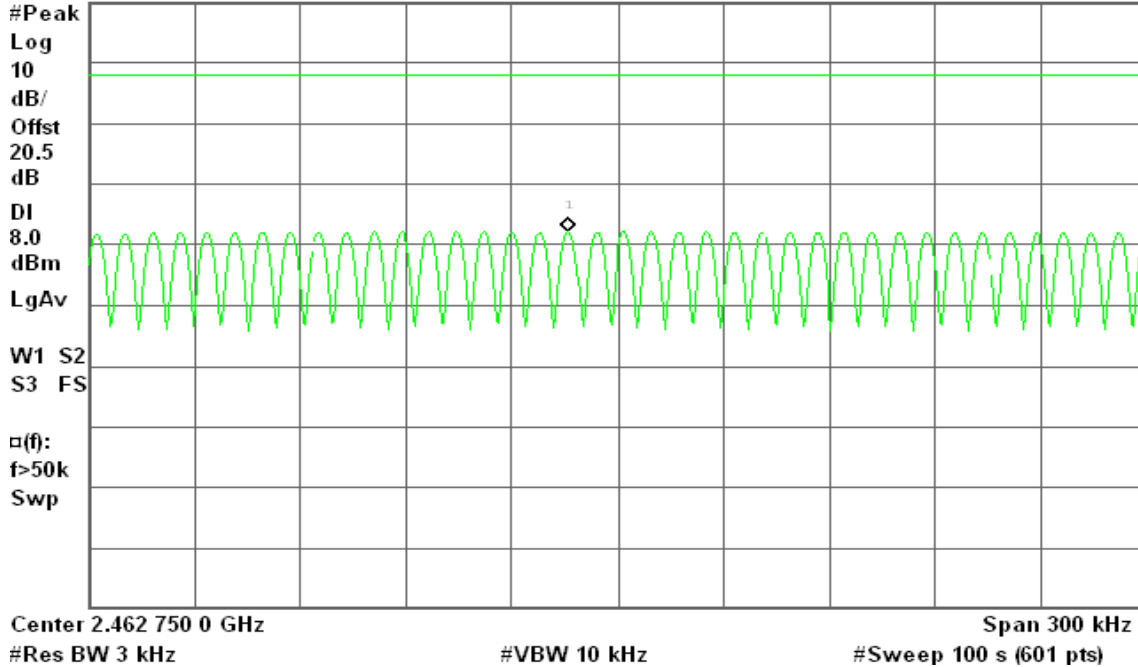
Peak Power Spectral Density, b Mode High Ch.

Mkr1 2.462 735 9 GHz

Ref 20 dBm

Atten 10 dB

-17.93 dBm

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

\* Agilent 13:28:15 Oct 15, 2009

R T

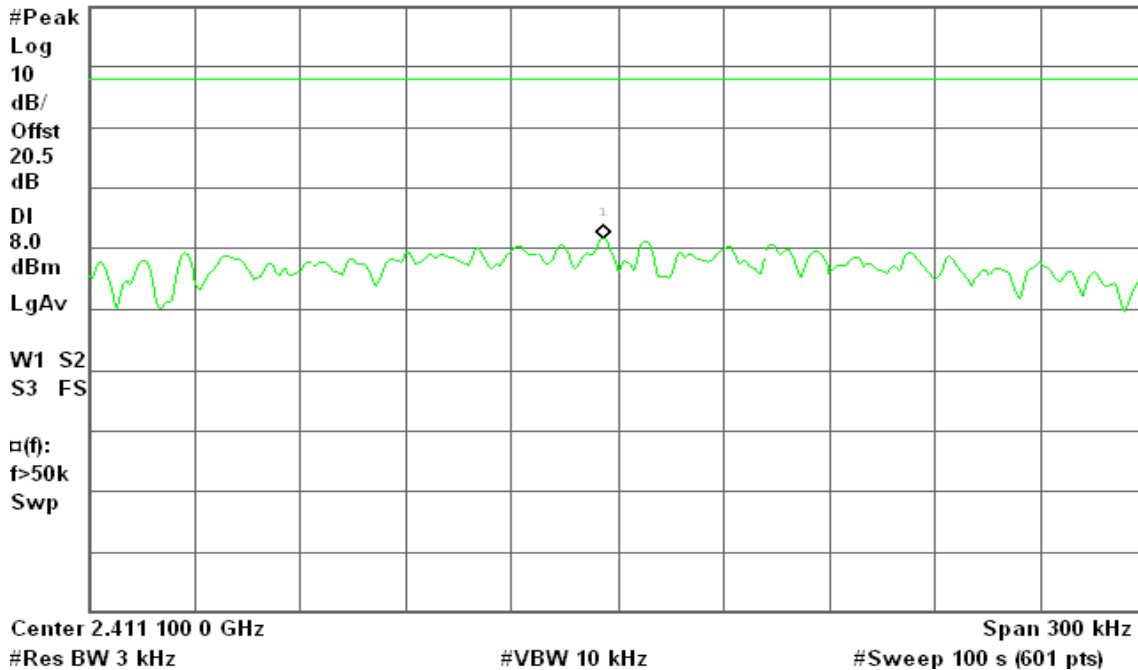
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.411 095 5 GHz

Ref 20 dBm

Atten 10 dB

-18.35 dBm



**PPSD (CH Mid)**

\* Agilent 13:37:29 Oct 15, 2009

R T

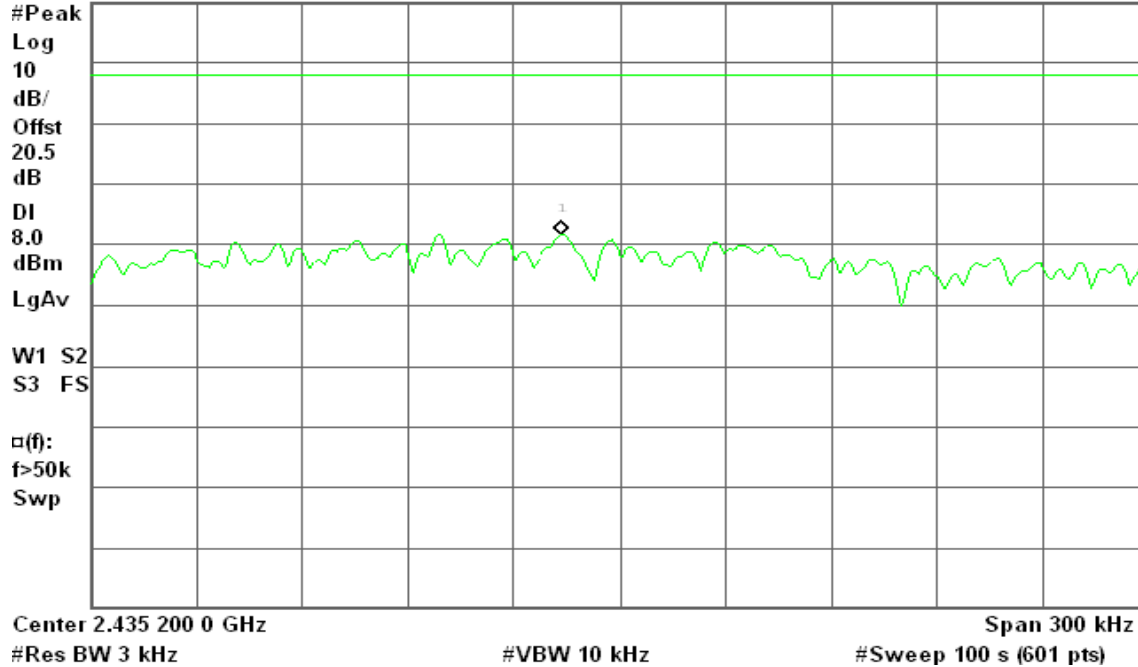
Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.435 183.4 GHz

Ref 20 dBm

Atten 10 dB

-18.40 dBm

**PPSD (CH High)**

\* Agilent 13:45:52 Oct 15, 2009

R L

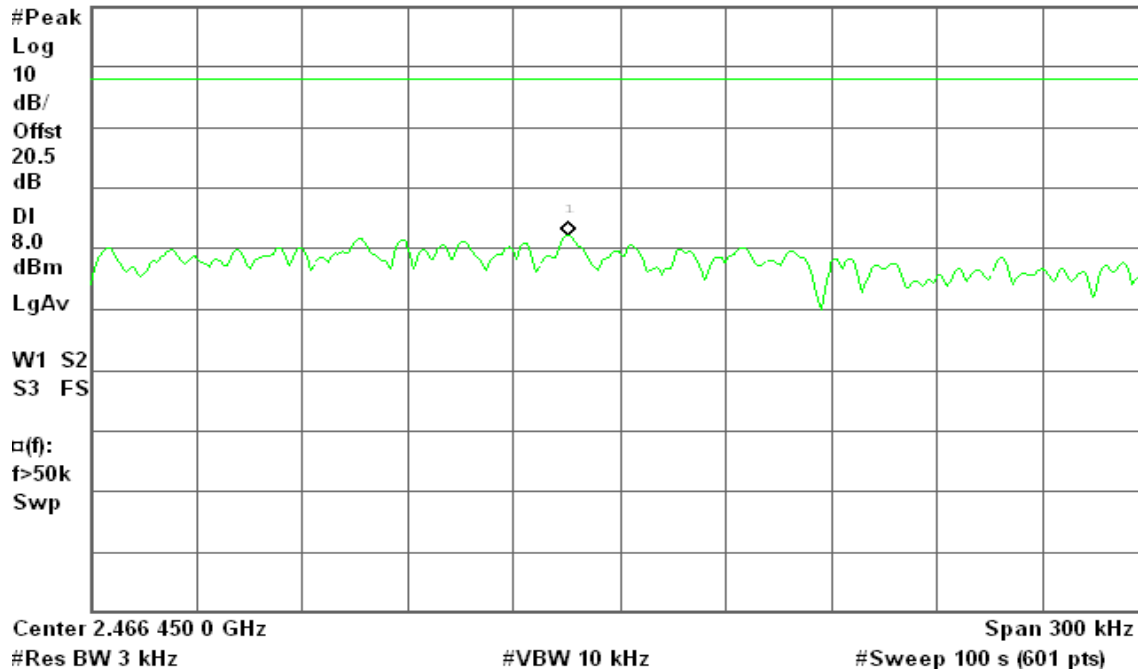
Peak Power Spectral Density, g Mode High Ch.

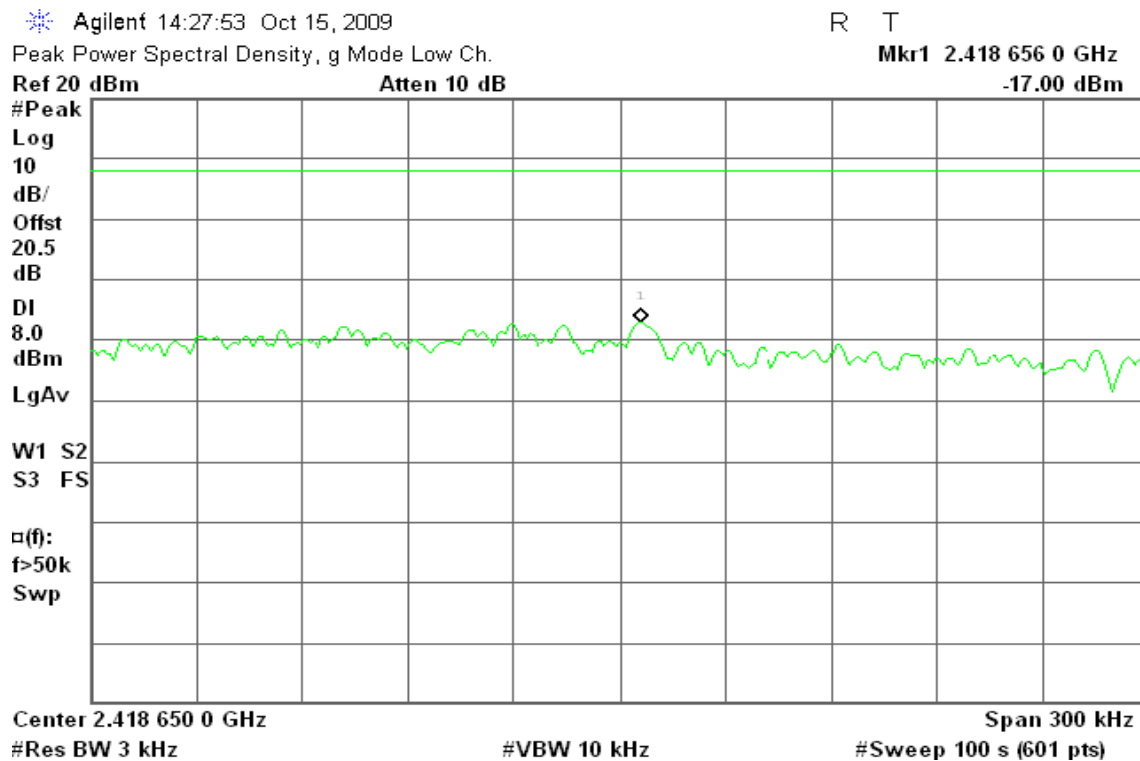
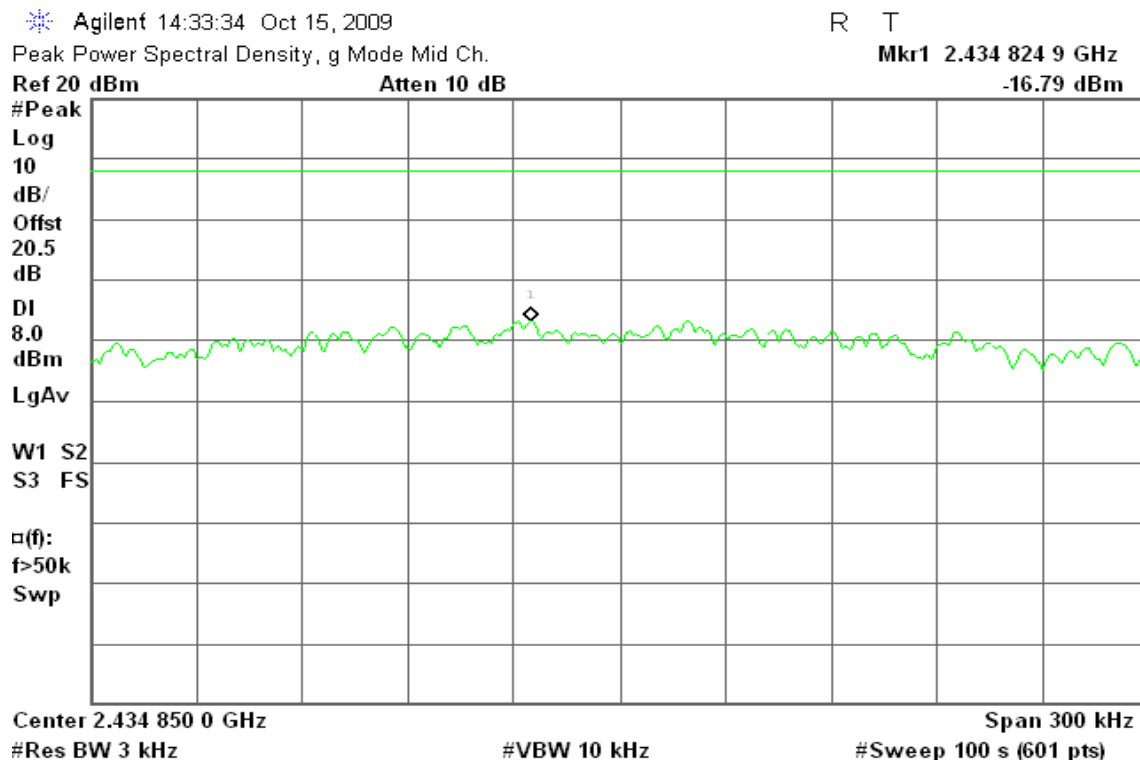
Mkr1 2.466 435.4 GHz

Ref 20 dBm

Atten 10 dB

-17.86 dBm



**draft 802.11n Standard-20 MHz Channel mode****PPSD (CH Low)****PPSD (CH Mid)**

**PPSD (CH High)**

Agilent 14:38:48 Oct 15, 2009

R T

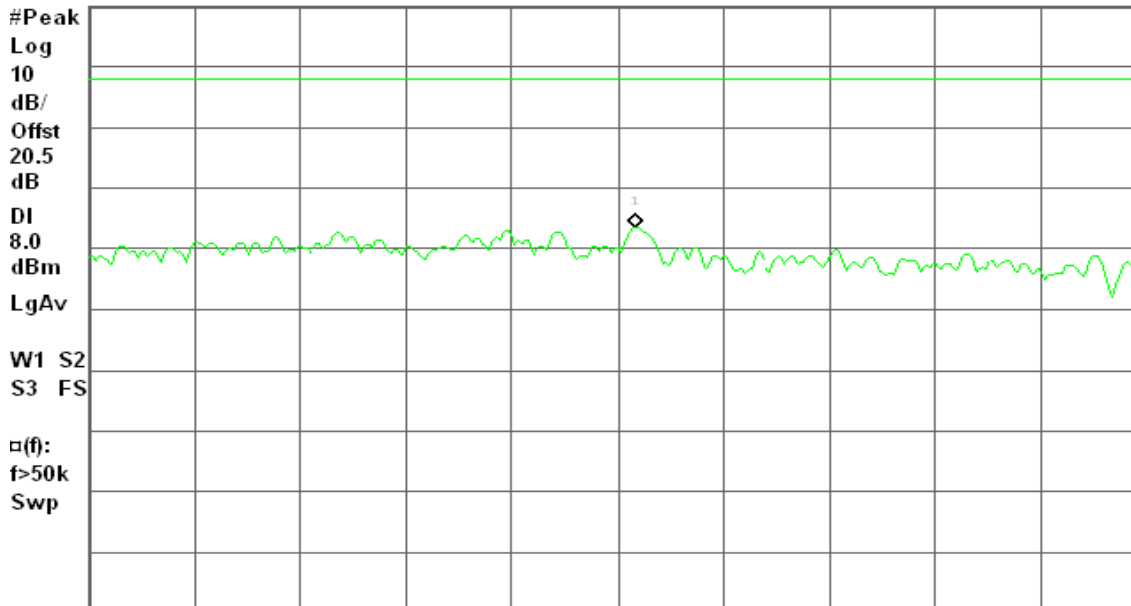
Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.468 655 0 GHz

Ref 20 dBm

Atten 10 dB

-16.45 dBm



Center 2.468 650 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

**draft 802.11n Wide-40 MHz Channel mode****PPSD (CH Low)**

Agilent 14:48:45 Oct 15, 2009

R T

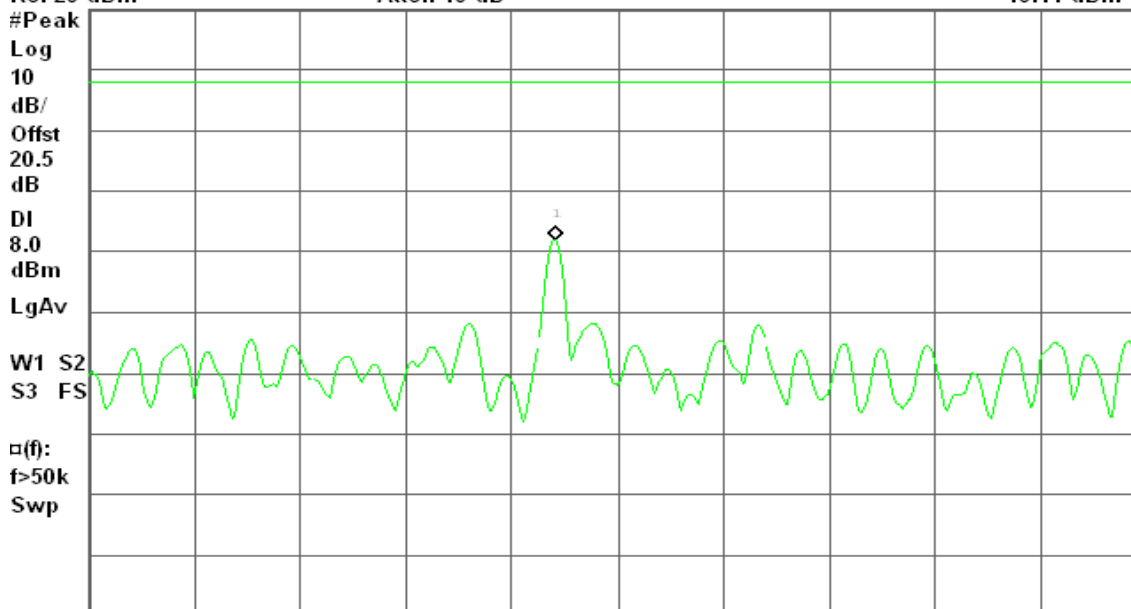
Peak Power Spectral Density, g Mode Low Ch.

Mkr1 2.422 032 4 GHz

Ref 20 dBm

Atten 10 dB

-18.14 dBm



Center 2.422 050 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

**PPSD (CH Mid)**

\* Agilent 14:52:43 Oct 15, 2009

R L

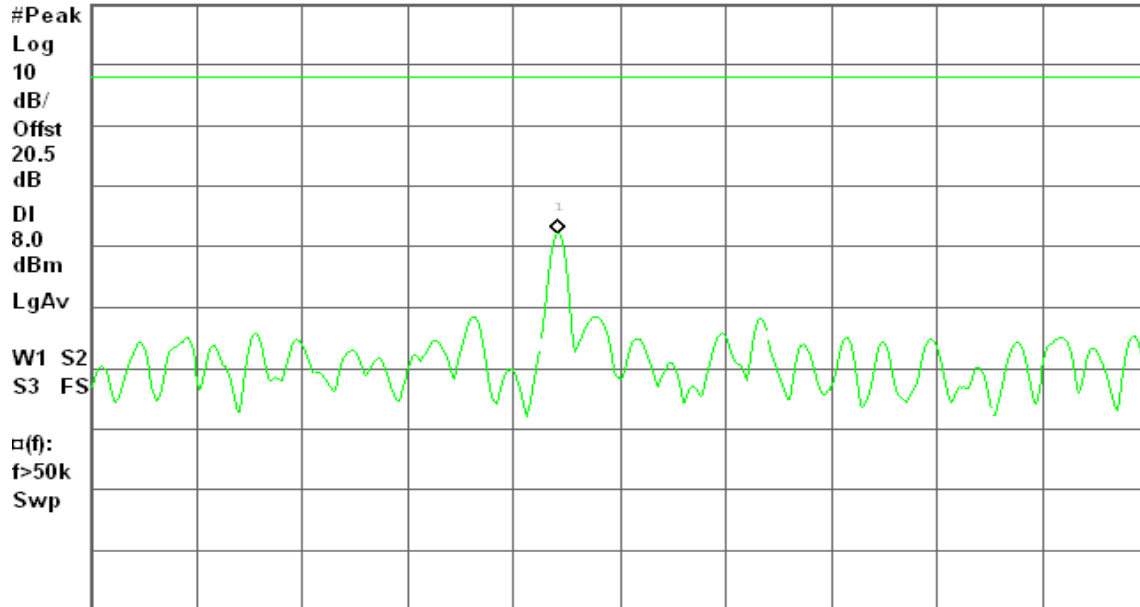
Peak Power Spectral Density, g Mode Mid Ch.

Mkr1 2.437 032 4 GHz

Ref 20 dBm

Atten 10 dB

-17.91 dBm



Center 2.437 050 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)

**PPSD (CH High)**

\* Agilent 14:58:32 Oct 15, 2009

R T

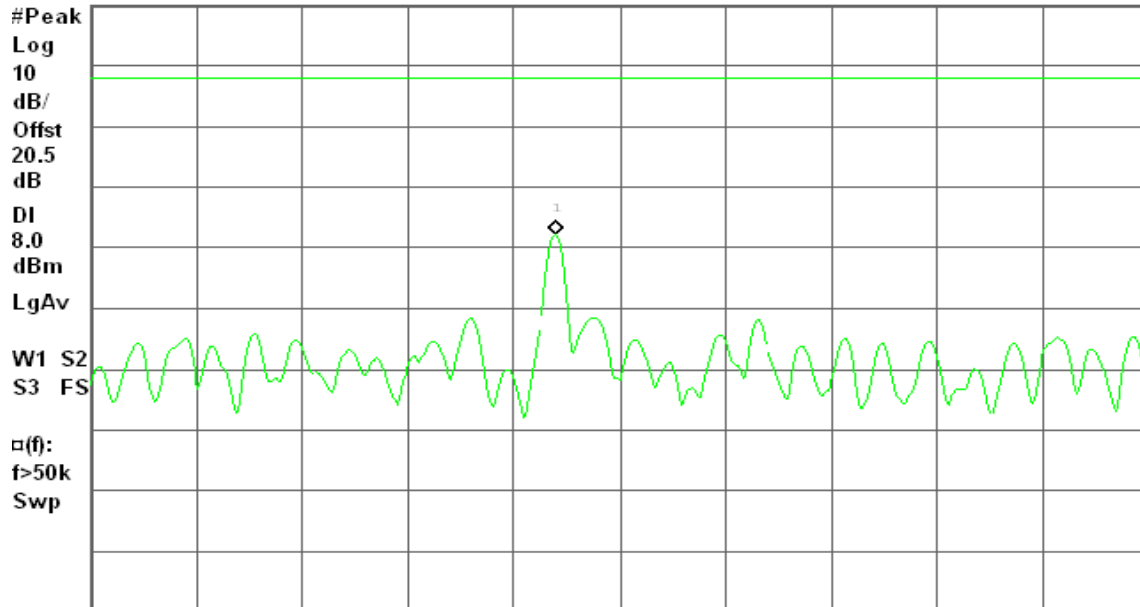
Peak Power Spectral Density, g Mode High Ch.

Mkr1 2.452 031 9 GHz

Ref 20 dBm

Atten 10 dB

-17.92 dBm



Center 2.452 050 0 GHz

Span 300 kHz

#Res BW 3 kHz

#VBW 10 kHz

#Sweep 100 s (601 pts)



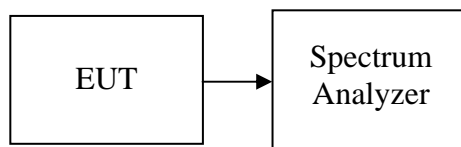
## 7.6 SPURIOUS EMISSIONS

### 7.6.1 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 13GHz 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 mode

#### CH Low

\* Agilent 13:15:31 Oct 15, 2009

R T

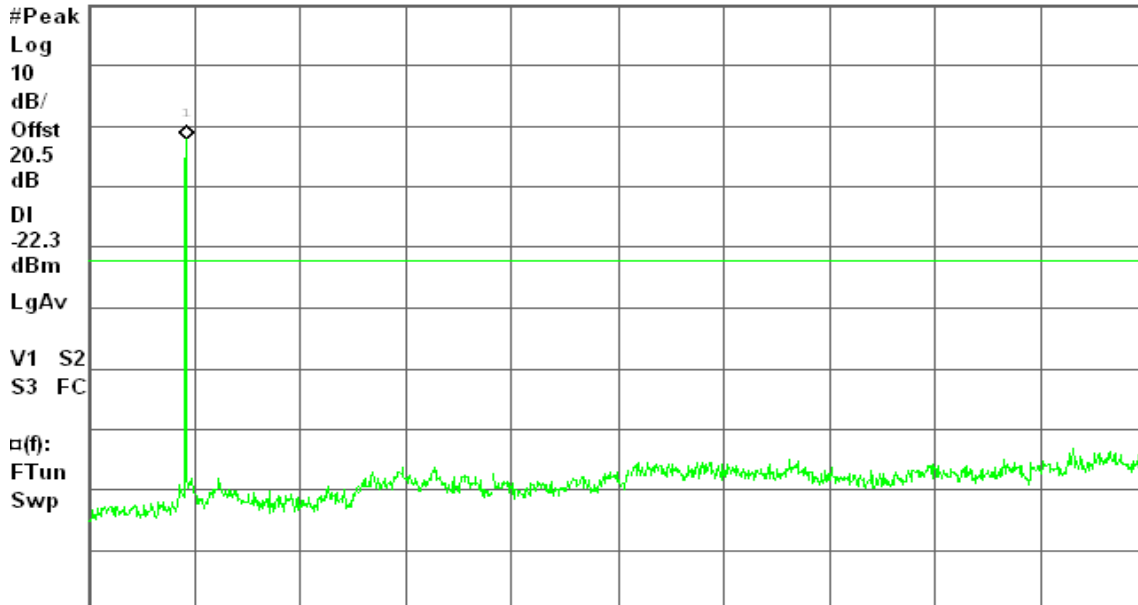
Spurious, b Mode Low Ch.

Ref 20 dBm

Atten 10 dB

Mkr1 2.42 GHz

-2.32 dBm



Center 13.02 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 25.97 GHz  
Sweep 3.131 s (1001 pts)

#### CH Mid

\* Agilent 13:20:03 Oct 15, 2009

R T

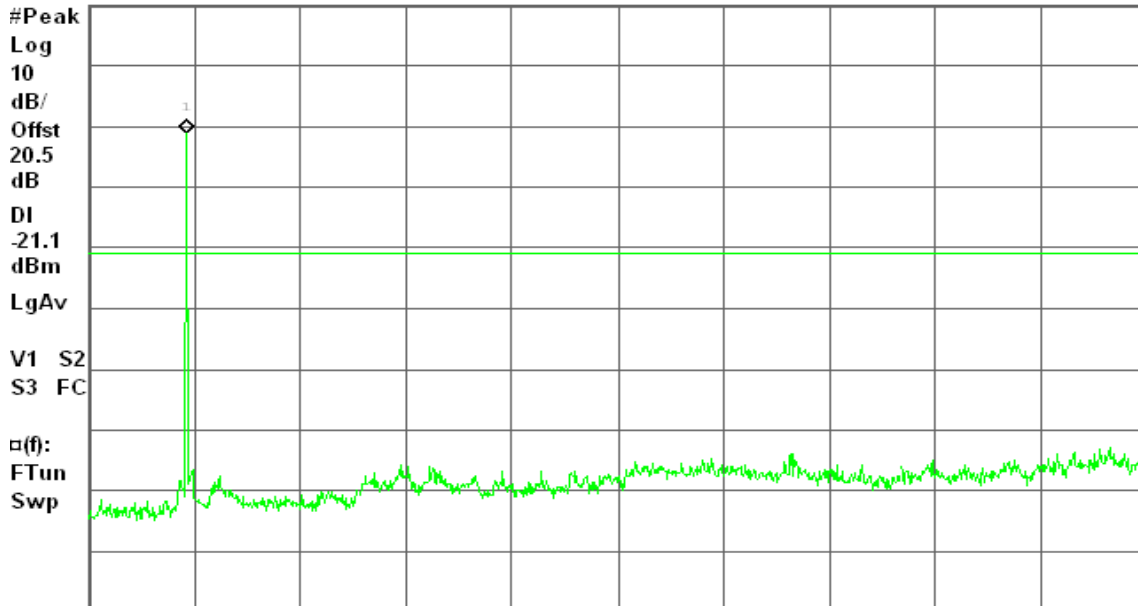
Spurious, b Mode Mid Ch.

Ref 20 dBm

Atten 10 dB

Mkr1 2.45 GHz

-1.12 dBm



Center 13.02 GHz

#Res BW 100 kHz

#VBW 100 kHz

Span 25.97 GHz  
Sweep 3.131 s (1001 pts)



## CH High

\* Agilent 13:24:24 Oct 15, 2009

R T

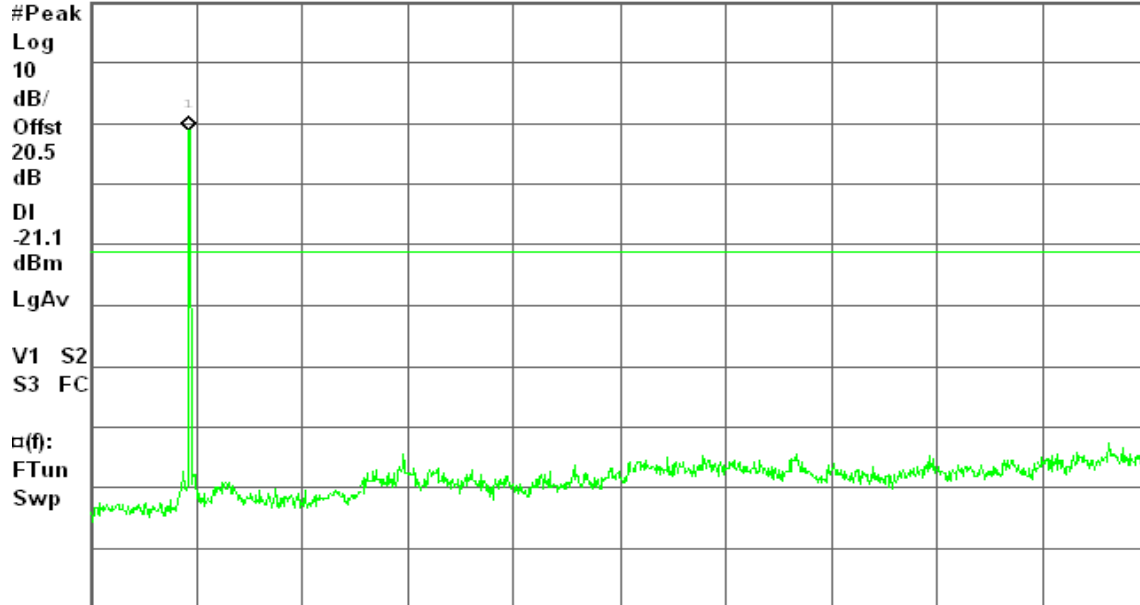
Spurious, b Mode High Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-1.14 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 mode

### CH Low

\* Agilent 13:29:54 Oct 15, 2009

R T

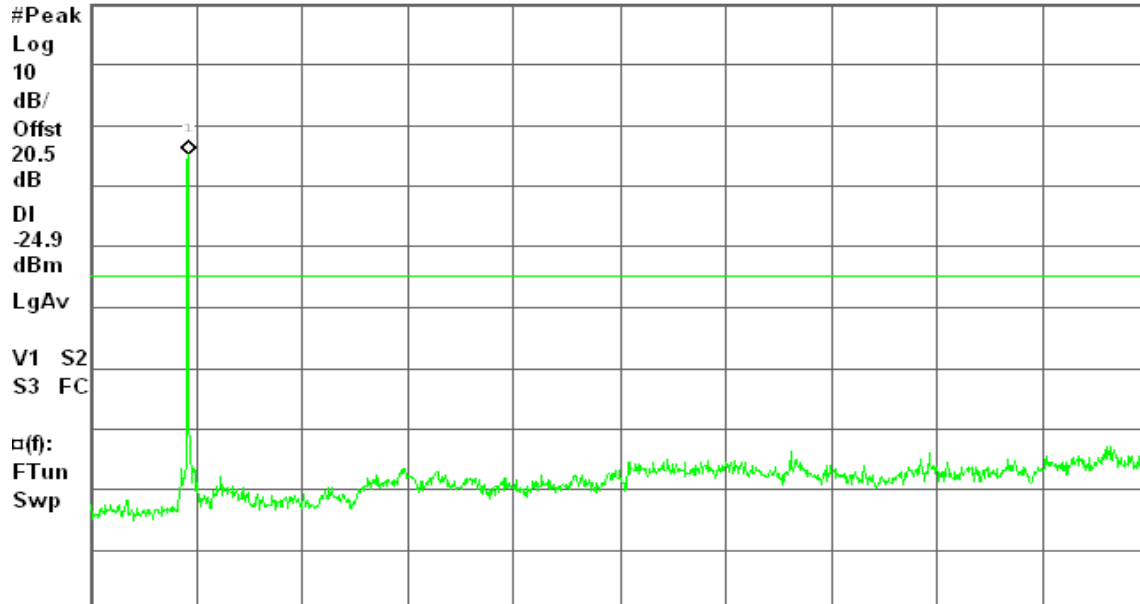
Spurious, g Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 10 dB

-4.93 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 13:38:07 Oct 15, 2009

R T

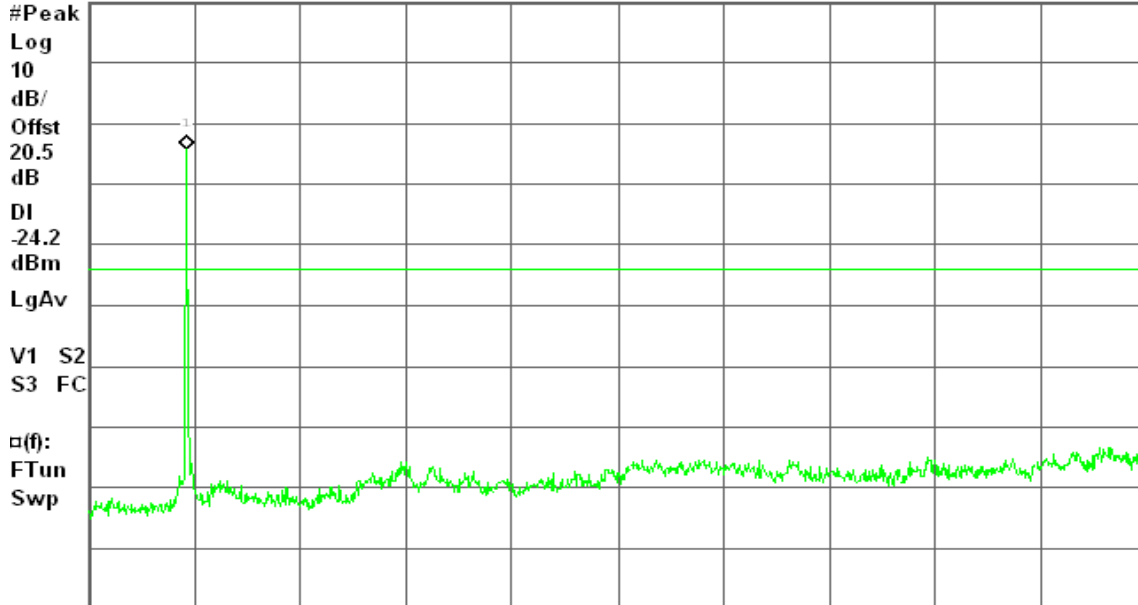
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-4.22 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 13:46:55 Oct 15, 2009

R T

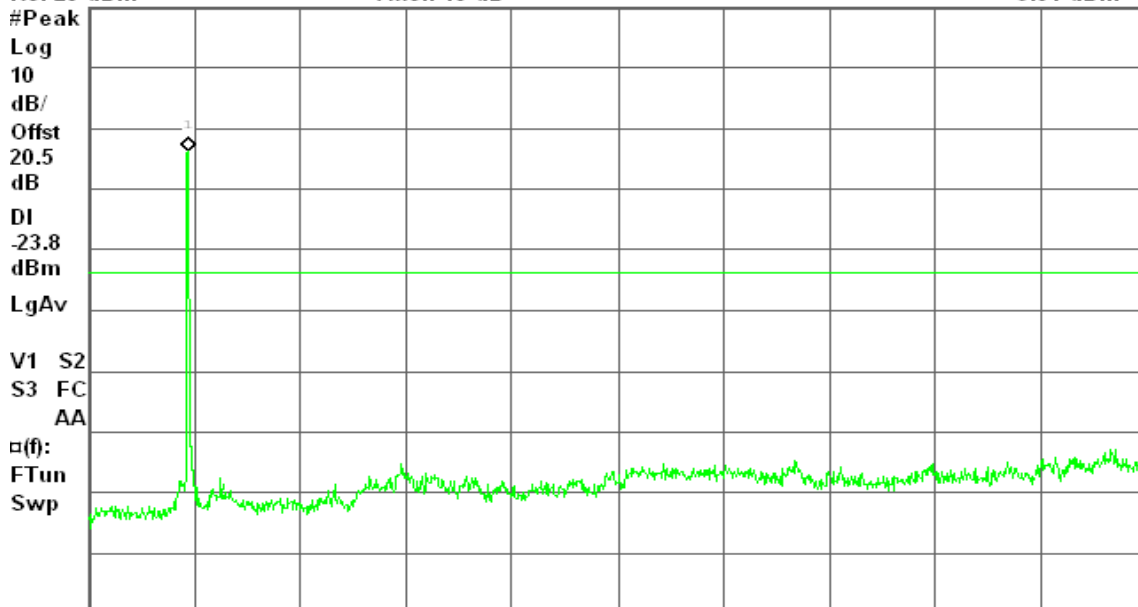
Spurious, g Mode High Ch.

Mkr1 2.47 GHz

Ref 20 dBm

Atten 10 dB

-3.81 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

**draft 802.11n Standard-20 MHz Channel mode****CH Low**

\* Agilent 14:28:33 Oct 15, 2009

R T

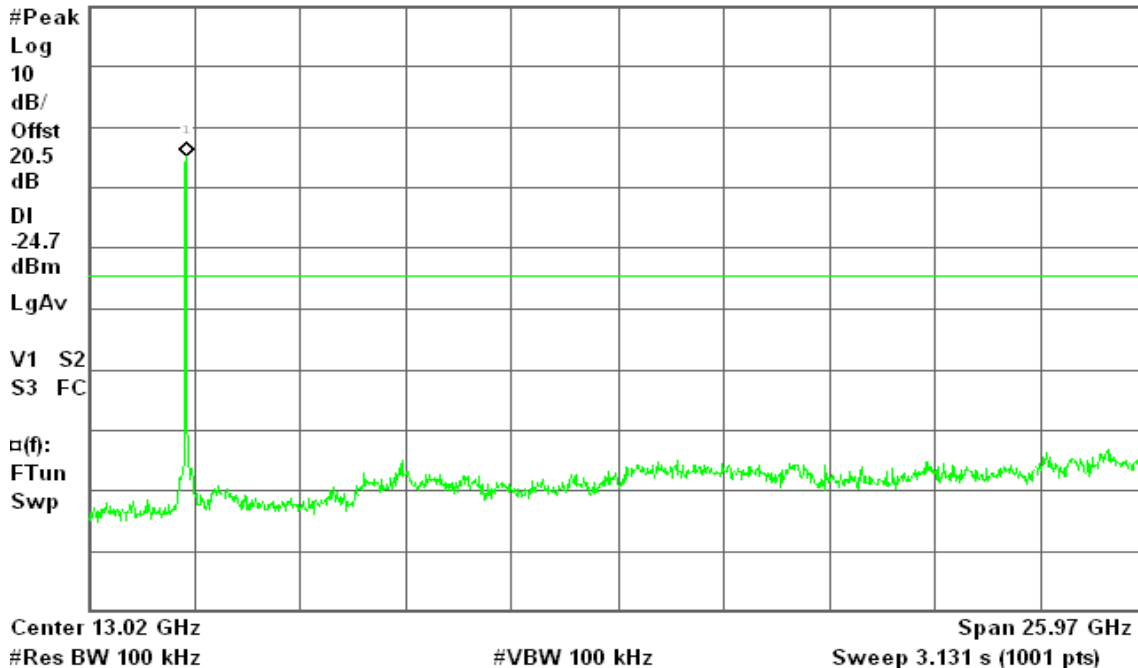
Spurious, g Mode Low Ch.

Mkr1 2.42 GHz

Ref 20 dBm

Atten 10 dB

-4.74 dBm

**CH Mid**

\* Agilent 14:34:11 Oct 15, 2009

R T

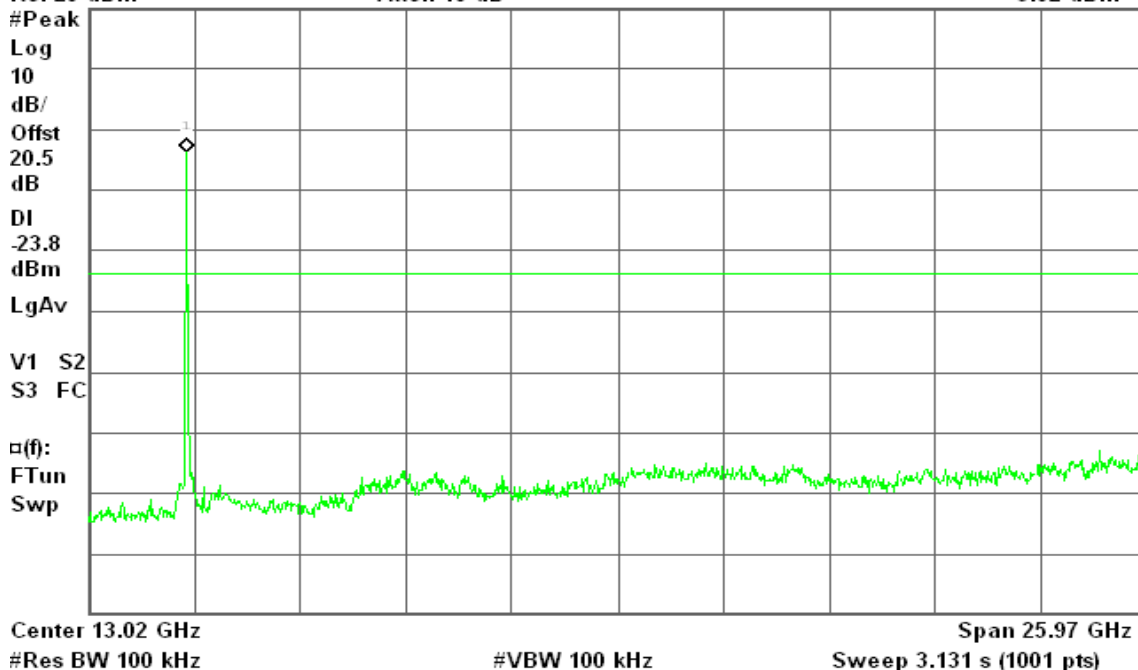
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-3.82 dBm



**CH High**

\* Agilent 14:39:27 Oct 15, 2009

R T

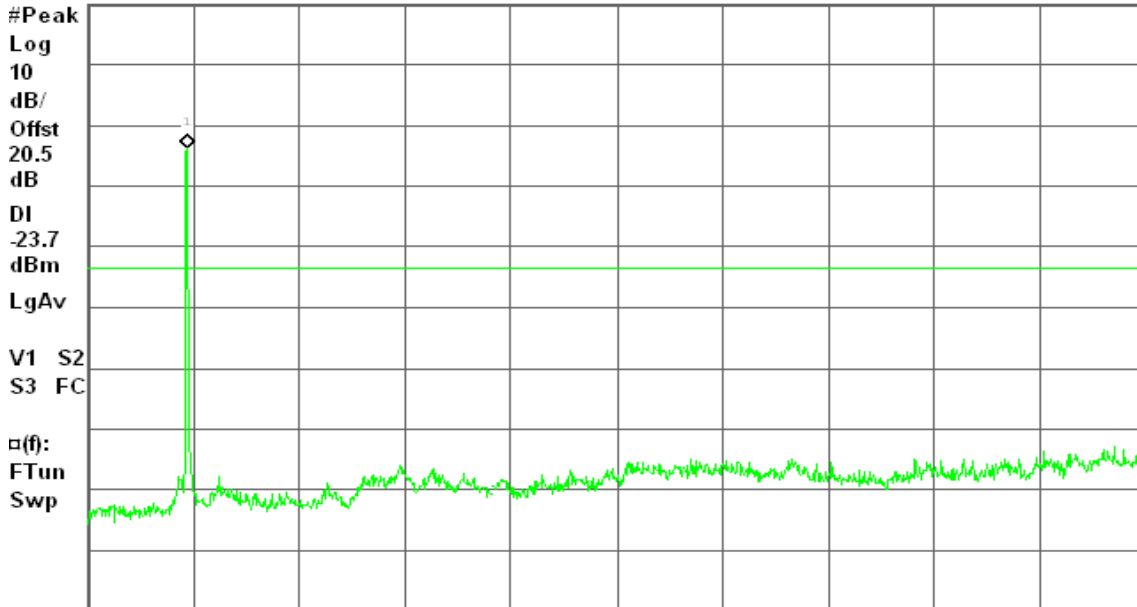
Spurious, g Mode High Ch.

Mkr1 2.47 GHz

Ref 20 dBm

Atten 10 dB

-3.68 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)

**draft 802.11n Wide-40 MHz Channel mode****CH Low**

\* Agilent 14:49:25 Oct 15, 2009

R T

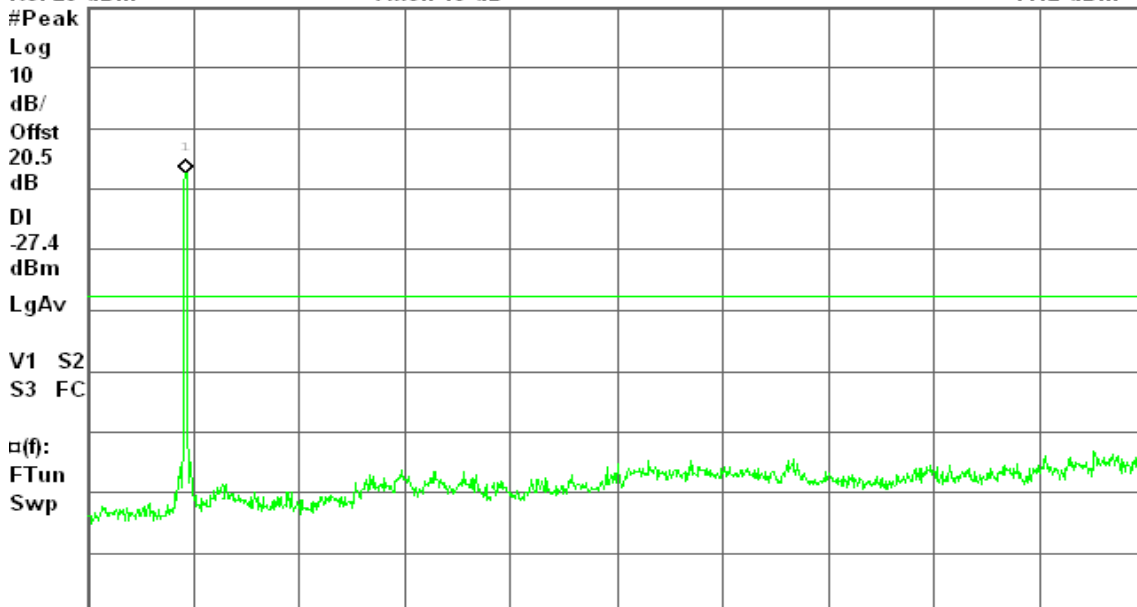
Spurious, g Mode Low Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-7.42 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 14:53:24 Oct 15, 2009

R L

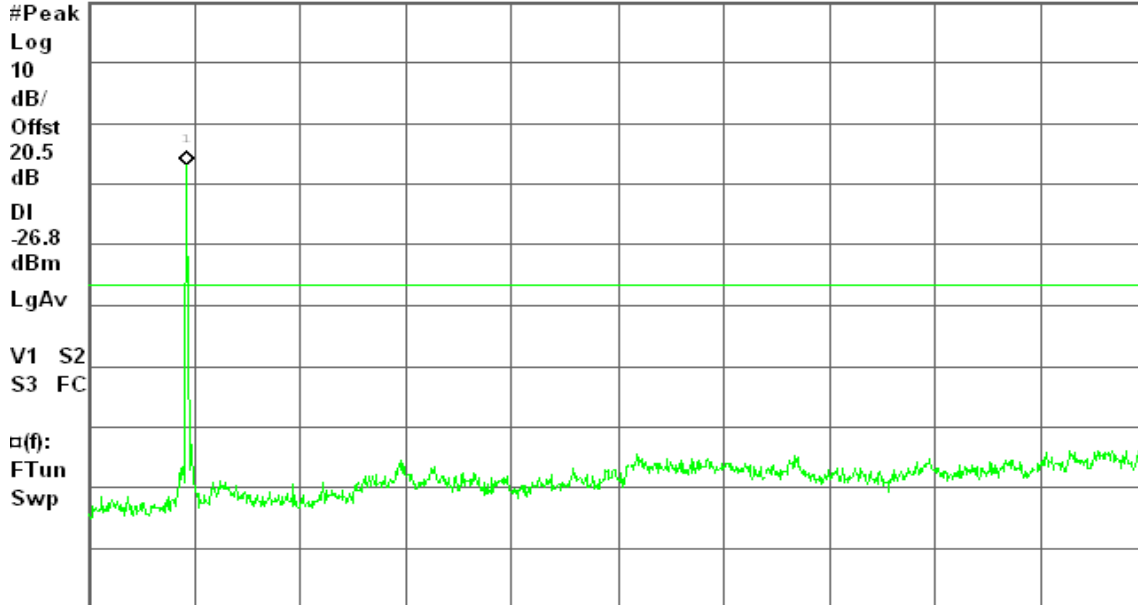
Spurious, g Mode Mid Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-6.79 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 14:59:13 Oct 15, 2009

R L

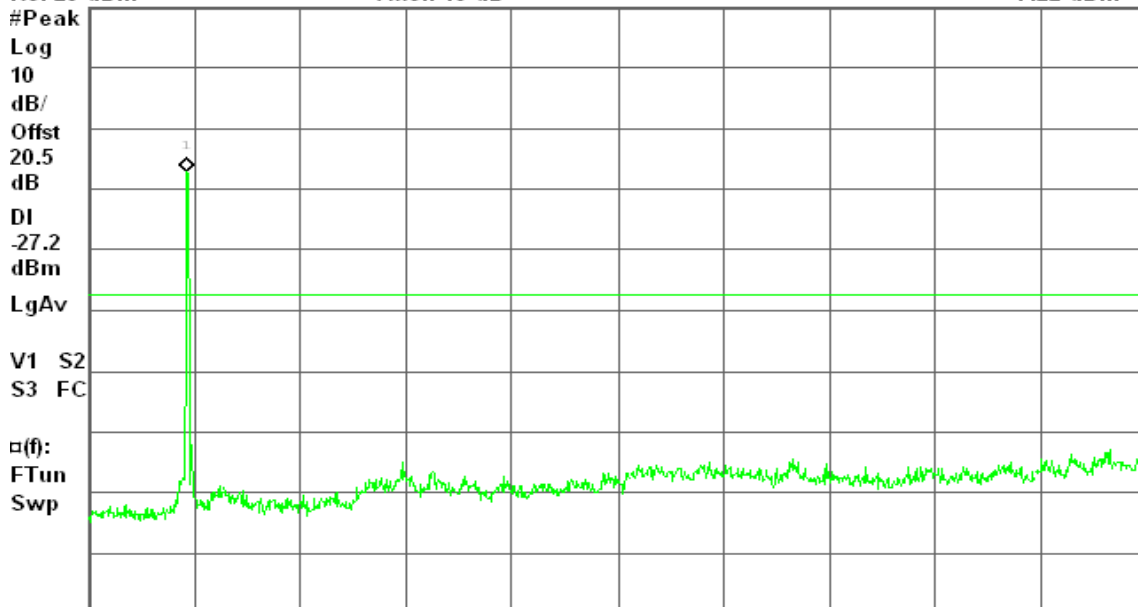
Spurious, g Mode High Ch.

Mkr1 2.45 GHz

Ref 20 dBm

Atten 10 dB

-7.22 dBm



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

#VBW 100 kHz

Sweep 3.131 s (1001 pts)



## 7.7 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

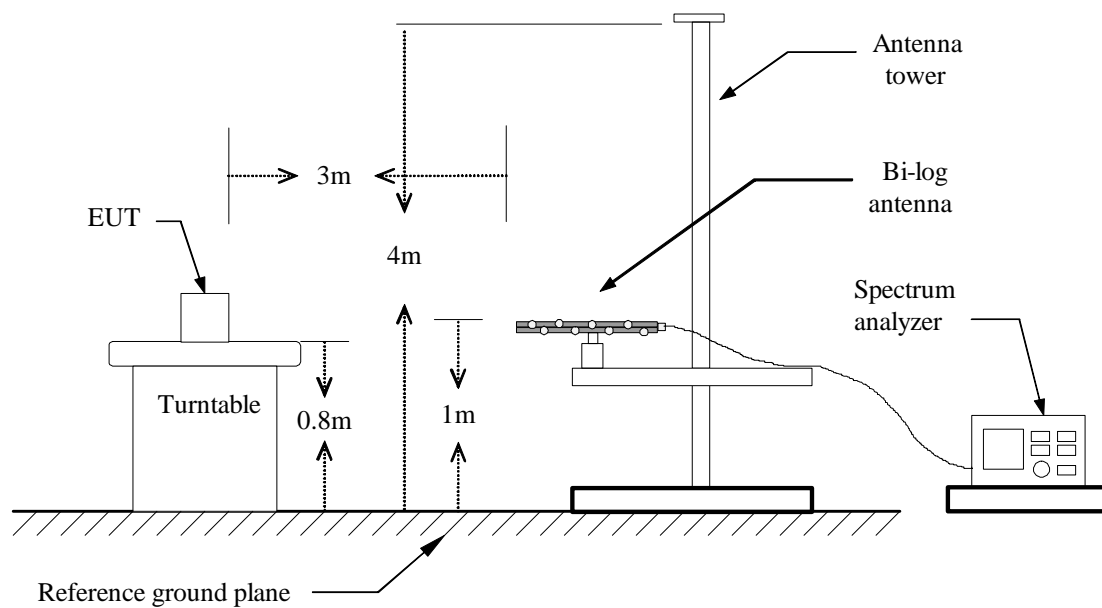
**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections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

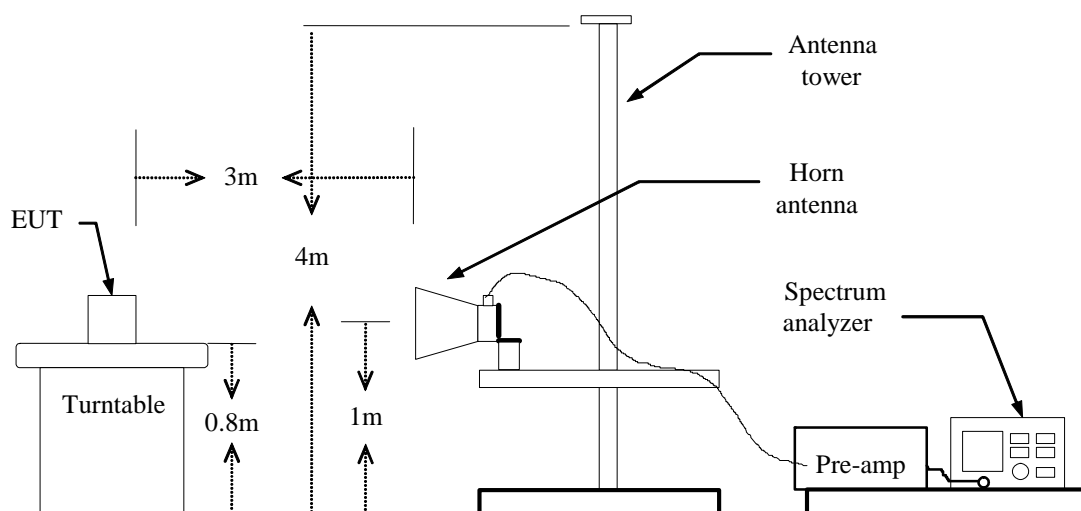
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

## 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.

## **TEST RESULTS**

*No non-compliance noted.*

**Below 1GHz****Operation Mode:** Normal Link**Test Date:** October 9, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53% 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
120.53	V	48.52	-9.37	39.15	43.50	-4.35	QP
398.60	V	41.91	-6.43	35.49	46.00	-10.51	Peak
665.35	V	43.93	-1.59	42.34	46.00	-3.66	Peak
856.12	V	39.79	0.66	40.45	46.00	-5.55	Peak
951.50	V	38.37	1.95	40.32	46.00	-5.68	Peak
975.75		41.60	2.27	43.86	54.00	-10.14	Peak
335.55	H	49.65	-7.79	41.86	46.00	-4.14	Peak
366.27	H	50.19	-7.09	43.10	46.00	-2.90	QP
393.75	H	45.68	-6.53	39.16	46.00	-6.84	Peak
665.35	H	40.21	-1.59	38.62	46.00	-7.38	QP
951.50	H	34.62	1.95	36.57	46.00	-9.43	QP
975.75	H	43.65	2.27	45.91	54.00	-8.09	Peak

**Remark:**

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. 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.
4.  $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{Limit (dBuV/m)}$ .



**Above 1 GHz****Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** October 12, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53 % 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
1023.33	V	62.69	43.16	-7.92	54.77	35.24	74.00	54.00	-18.76	AVG
1283.33	V	58.56	---	-7.43	51.13	---	74.00	54.00	-2.87	Peak
1306.67	V	57.03	---	-7.39	49.64	---	74.00	54.00	-4.36	Peak
1330.00	V	61.58	43.85	-7.35	54.23	36.50	74.00	54.00	-17.50	AVG
1663.33	V	59.67	42.35	-5.47	54.20	36.88	74.00	54.00	-17.12	AVG
N/A										
1023.33	H	63.84	43.60	-7.92	55.92	35.68	74.00	54.00	-18.32	AVG
4825.00	H	57.33	51.20	1.04	58.37	52.24	74.00	54.00	-1.76	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:** TX / IEEE 802.11b / CH Mid**Test Date:** October 12, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53 % 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
1026.67	V	58.50	---	-7.91	50.59	---	74.00	54.00	-3.41	Peak
1663.33	V	60.48	41.86	-5.47	55.01	36.39	74.00	54.00	-17.61	AVG
N/A										
1046.67	H	58.79	---	-7.87	50.92	---	74.00	54.00	-3.08	Peak
4875.00	H	54.46	51.72	1.02	55.48	52.74	74.00	54.00	-1.26	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:** TX / IEEE 802.11b / CH High**Test Date:** October 12, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53 % 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
1046.67	V	59.24	---	-7.87	51.36	---	74.00	54.00	-2.64	Peak
1306.67	V	58.40	---	-7.39	51.01	---	74.00	54.00	-2.99	Peak
1663.33	V	60.06	42.45	-5.47	54.59	36.98	74.00	54.00	-17.02	AVG
N/A										
1020.00	H	62.58	43.46	-7.92	54.66	35.54	74.00	54.00	-18.46	AVG
4925.00	H	55.65	51.41	1.01	56.66	52.42	74.00	54.00	-1.58	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:** TX / IEEE 802.11g / CH Low**Test Date:** October 12, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53 % 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
1020.00	V	62.45	43.12	-7.92	54.53	35.20	74.00	54.00	-18.80	AVG
1306.67	V	59.38	---	-7.39	51.99	---	74.00	54.00	-2.01	Peak
1666.67	V	57.64	---	-5.44	52.20	---	74.00	54.00	-1.80	Peak
N/A										
1023.33	H	63.40	43.15	-7.92	55.48	35.23	74.00	54.00	-18.77	AVG
1046.67	H	61.64	42.84	-7.87	53.76	34.97	74.00	54.00	-19.03	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:** TX / IEEE 802.11g / CH Mid**Test Date:** October 12, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53 % 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
1020.00	V	63.76	43.20	-7.92	55.84	35.28	74.00	54.00	-18.72	AVG
1046.67	V	59.15	---	-7.87	51.27	---	74.00	54.00	-2.73	Peak
1306.67	V	59.05	---	-7.39	51.66	---	74.00	54.00	-2.34	Peak
N/A										
1046.67	H	62.60	41.67	-7.87	54.73	33.80	74.00	54.00	-20.20	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:** TX / IEEE 802.11g / CH High**Test Date:** October 12, 2009**Temperature:** 23°C**Tested by:** Mimic Yang**Humidity:** 53 % 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
1020.00	V	65.53	42.95	-7.92	57.60	35.03	74.00	54.00	-18.97	AVG
1306.67	V	61.41	42.38	-7.39	54.02	34.99	74.00	54.00	-19.01	AVG
1663.33	V	59.94	43.47	-5.47	54.47	38.00	74.00	54.00	-16.00	AVG
N/A										
1333.33	H	57.26	---	-7.34	49.92	---	74.00	54.00	-4.08	Peak
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:** TX / draft 802.11n Standard-20 MHz Channel  
mode / CH Low

**Test Date:** October 12, 2009

**Temperature:** 23°C

**Tested by:** Mimic Yang

**Humidity:** 53 % 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
1023.33	V	63.20	43.34	-7.92	55.28	35.42	74.00	54.00	-18.58	AVG
1046.67	V	59.47	---	-7.87	51.59	---	74.00	54.00	-2.41	Peak
1286.67	V	59.06	---	-7.43	51.63	---	74.00	54.00	-2.37	Peak
1310.00	V	61.85	42.84	-7.38	54.47	35.46	74.00	54.00	-18.54	AVG
N/A										
1030.00	H	59.33	---	-7.90	51.42	---	74.00	54.00	-2.58	Peak
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:** TX / draft 802.11n Standard-20 MHz Channel mode / CH Mid

**Test Date:** October 12, 2009

**Temperature:** 23°C

**Tested by:** Mimic Yang

**Humidity:** 53 % 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
1023.33	V	62.02	43.64	-7.92	54.10	35.72	74.00	54.00	-18.28	AVG
1283.33	V	57.90	---	-7.43	50.47	---	74.00	54.00	-3.53	Peak
1666.67	V	59.59	42.67	-5.44	54.15	37.23	74.00	54.00	-16.77	AVG
N/A										
1023.33	H	67.60	44.67	-7.92	59.68	36.75	74.00	54.00	-17.25	AVG
1046.67	H	62.76	40.11	-7.87	54.89	32.24	74.00	54.00	-21.76	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:** TX / draft 802.11n Standard-20 MHz Channel mode / CH High

**Test Date:** October 12, 2009

**Temperature:** 23°C

**Tested by:** Mimic Yang

**Humidity:** 53 % 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
1020.00	V	62.83	42.64	-7.92	54.91	34.72	74.00	54.00	-19.28	AVG
1046.67	V	63.98	43.33	-7.87	56.11	35.46	74.00	54.00	-18.54	AVG
1306.67	V	58.87	---	-7.39	51.48	---	74.00	54.00	-2.52	Peak
1666.67	V	59.44	42.35	-5.44	54.00	36.91	74.00	54.00	-17.09	AVG
N/A										
1023.33	H	66.25	45.10	-7.92	58.33	37.18	74.00	54.00	-16.82	AVG
1046.67	H	59.33	---	-7.87	51.46	---	74.00	54.00	-2.54	Peak
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:** TX / draft 802.11n Wide-40 MHz Channel mode  
/ CH Low

**Test Date:** October 12, 20097

**Temperature:** 25°C

**Tested by:** Mimic Yang

**Humidity:** 53 % 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
1020.00	V	62.73	43.76	-7.92	54.81	35.84	74.00	54.00	-18.16	AVG
1043.33	V	61.88	42.67	-7.88	54.00	34.79	74.00	54.00	-19.21	AVG
1310.00	V	58.58	---	-7.38	51.19	---	74.00	54.00	-2.81	Peak
1330.00	V	58.61	---	-7.35	51.26	---	74.00	54.00	-2.74	Peak
1663.33	V	59.82	42.22	-5.47	54.35	36.75	74.00	54.00	-17.25	AVG
N/A										
1023.33	H	64.17	43.72	-7.92	56.26	35.80	74.00	54.00	-18.20	AVG
1046.67	H	62.43	42.66	-7.87	54.56	34.79	74.00	54.00	-19.21	AVG
1116.67	H	59.04	---	-7.74	51.29	---	74.00	54.00	-2.71	Peak
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:** TX / draft 802.11n Wide-40 MHz Channel mode  
/ CH Mid

**Test Date:** October 12, 2009

**Temperature:** 23°C

**Tested by:** Mimic Yang

**Humidity:** 53 % 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
1023.33	V	65.36	43.82	-7.92	57.44	35.90	74.00	54.00	-18.10	AVG
1046.67	V	62.74	41.86	-7.87	54.87	33.99	74.00	54.00	-20.01	AVG
1333.33	V	58.59	---	-7.34	51.25	---	74.00	54.00	-2.75	Peak
N/A										
1020.00	H	62.46	43.85	-7.92	54.54	35.93	74.00	54.00	-18.07	AVG
1046.67	H	61.95	43.55	-7.87	54.07	35.68	74.00	54.00	-18.32	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:** TX / draft 802.11n Wide-40 MHz Channel mode  
/ CH High

**Test Date:** October 12, 2009

**Temperature:** 23°C

**Tested by:** Mimic Yang

**Humidity:** 53 % 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
1023.33	V	62.87	43.54	-7.92	54.95	35.62	74.00	54.00	-18.38	AVG
1046.67	V	63.58	42.71	-7.87	55.71	34.84	74.00	54.00	-19.16	AVG
1306.67	V	61.55	41.13	-7.39	54.16	33.74	74.00	54.00	-20.26	AVG
1666.67	V	59.83	42.35	-5.44	54.39	36.91	74.00	54.00	-17.09	AVG
N/A										
1023.33	H	68.18	43.69	-7.92	60.26	35.77	74.00	54.00	-18.23	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).



## 7.8 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

\* Decreases with the logarithm of the frequency.

### **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:** September 30, 2009  
**Temperature:** 22°C      **Tested by:** Mark Yang  
**Humidity:** 45% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1600	42.28	33.58	0.12	42.40	33.70	65.46	55.46	-23.06	-21.76	L1
0.1900	33.20	11.10	0.10	33.30	11.20	64.04	54.04	-30.74	-42.84	L1
0.2800	36.92	32.72	0.08	37.00	32.80	60.82	50.82	-23.82	-18.02	L1
2.0600	42.14	36.24	0.06	42.20	36.30	56.00	46.00	-13.80	-9.70	L1
2.3400	41.64	31.54	0.06	41.70	31.60	56.00	46.00	-14.30	-14.40	L1
3.7900	46.64	32.04	0.06	46.70	32.10	56.00	46.00	-9.30	-13.90	L1
0.1624	49.07	41.97	0.13	49.20	42.10	65.34	55.34	-16.14	-13.24	L2
0.2100	32.70	20.10	0.10	32.80	20.20	63.21	53.21	-30.41	-33.01	L2
0.2800	39.71	34.91	0.09	39.80	35.00	60.82	50.82	-21.02	-15.82	L2
1.7300	40.52	35.12	0.08	40.60	35.20	56.00	46.00	-15.40	-10.80	L2
2.2300	42.52	33.92	0.08	42.60	34.00	56.00	46.00	-13.40	-12.00	L2
3.7900	48.11	33.51	0.09	48.20	33.60	56.00	46.00	-7.80	-12.40	L2

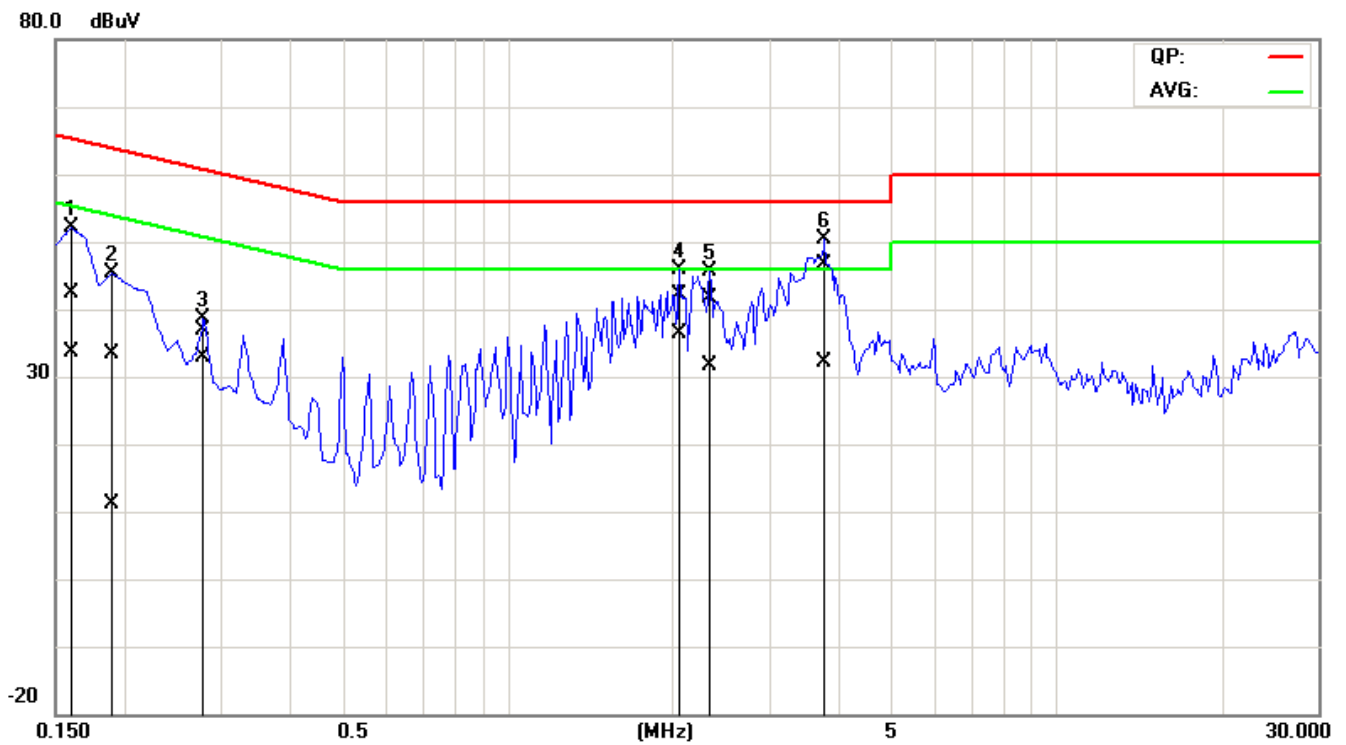
### Remark:

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 and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9 kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



## Test Plots

### Conducted emissions (Line 1)



### Conducted emissions (Line 2)

