



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Applicant : Wease Electrical & Information Engineering Ltd.

Address : Rm23D2,Electronic Science and Technology Building C,Futian District,ShenZhen

Product Name : Miracast Dongle

Model Name : E800

Brand Name : Wease

FCC ID : 2ABHKE800G001

Report No. : STS131206F1

Date of Issue : December 12,2013

Issued by : Shenzhen Super Test Service Technology Co., Ltd.

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1. VERIFICATION OF CONFORMITY

Equipment Under Test: Miracast Dongle
Brand Name: Wease
Model Number: E800
Series Model Name: N/A
Difference description: N/A
FCC ID: 2ABHKE800G001
Applicant: Wease Electrical & Information Engineering Ltd.
Rm23D2, Electronic Science and Technology Building C, Futian District, ShenZhen
Manufacturer: Wease Electrical & Information Engineering Ltd.
Rm23D2, Electronic Science and Technology Building C, Futian District, ShenZhen
Technical Standards: 47 CFR Part 15 Subpart C
File Number: STS131206F1
Date of test: December 2, 2013 ~ December 11, 2013
Deviation: None
Condition of Test Sample: Normal
Test Result: PASS

The above equipment was tested by STS for compliance with the requirements set forth in FCC rules and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

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

Tested by (+ signature):

Petter Ping

Petter Ping December 12, 2013

Review by (+ signature):

Jerry Wen

July Wen December 12, 2013

Approved by (+ signature):

Terry Yang

Terry Yang December 12, 2013

2. GENERAL INFORMATION

2.1 Product Information

Product	Miracast Dongle
Brand Name	Wease
Model Number	E800
Frequency Range	2412MHz – 2462MHz
Modulation Technique	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mpbs) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mpbs) IEEE 802.11n Standard-20 MHz Channel mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65.0Mbps)
Channel Number	IEEE 802.11b/g/n mode: 11 Channels
Antenna Type:	0.0 dBi, PCB Antenna
Power Supply	DC 3.7V by battery (charged by DC 5V form Adapter)
Temperature Range:	0°C ~ 35°C

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 Objective

The objective of the report is to perform tests according to 47 CFR Part 15 C for the EUT FCC Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-05 Edition)	Radio Frequency Devices

2.3 Test Standards and Results

Test items and the results are as bellow:

No.	Section	Description	Result	Date of Test
1	15.247(a)(2)	6dB Bandwidth	PASS	2013-12-03
2	15.247(b)(3)	Peak Output Power	PASS	2013-12-03
3	15.247(d)	Conducted Spurious Emission	PASS	2013-12-03
4	15.247(d)	Band Edge	PASS	2013-12-03
5	15.247(e)	Power Spectral Density	PASS	2013-12-03
6	15.207	Conducted Emission	PASS	2013-12-04
7	15.247(d) 15.205 15.209	Radiated Emission	PASS	2013-12-04

Note: 1. The test result judgment is decided by the limit of measurement standard
2. The information of measurement uncertainty is available upon the customer's request.

2.4 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3. TEST FACILITY

3.1 TEST FACILITY

Test Site: Compliance Certification Services Inc. (Kun shan) Laboratory

Location: No.10 Weiye Rd, Innovation park, Eco&Tec,Development Zone, Kunshan City, Jiangsu, China

Description: There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009 and CISPR 16 requirements.

The FCC Registration Number is **238958**.

The **CNAS** Registration Number is **CNAS L4354**.

Site Filing: The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Instrument Tolerance: All measuring equipment is in accord with ANSI C63.4:2009 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.

Ground Plane: Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

3.2 GENERAL TEST PROCEDURES

EUT Function and Test Mode

The EUT has been tested under normal operating (TX) and standby (RX) condition.

The field strength of radiation emission was measured in the following position: EUT stand-up position (Y axis), lie-down position (X, Z axis).

The following data show only with the worst case setup.

The worst case of Y axis was reported.

Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is recorded by this report.

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 C63.4:2009, 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 C63.4:2009.

Test Procedure

The test procedure is refer to KDB 558074 D01 DTS Measurement Guidance v03r01 dated 09-04-2013.

3.3 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
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

4. TEST EQUIPMENT LIST

4.1 SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
POWER ADAPTOR	Honey Bee	SEB0902000P	N/A	2.0-Shield	
Notebook	DELL	E4446A	E5430		N/A

Remark:

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

4.2 TEST EQUIPMENT LIST

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	RS	FSU26	200789	2014-6-30
Bluetooth Tester	RS	CBT	100189	N.C.R
OSCILLOSCOPE	Agilent	DSO6104A	MY44002585	2014-3-14
Peak and Avg Power Sensor	Agilent	E9327A	US40441788	2014-3-14
EPM-P Series Power Meter	Agilent	E4416A	GB41292714	2014-3-14
Power SPLITTER	Mini-Circuits	ZN2PD-9G	SF078500430	N.C.R
DC POWER SUPPLY	AGILENT	E3632A	MY50340053	2014-3-14
Temp. / Humidity Chamber	TERCHY	MHK-120AK	X30109	2014-1-24
Test Software	EZ-EMC			

977 Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	2014-4-16
Pre-Amplifier	MITEQ	JS41-00101800-32-10P	1675713	2013-10-8
Pre-Amplifier	MITEQ	NSP400-NF	870731	2014-4-26
Bilog Antenna	Sunol Sciences	JB1	A062604	2014-5-2
Horn-antenna	SCHWARZBECK	BBHA9120D	267	2014-4-28
Horn-antenna	SCHWARZBECK	BBHA9170	171	2014-4-28
Loop Antenna	Hengwei	HOPEV39501C	20051	2014-4-5
Turn Table	CT	CT123	4165	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R
Controller	CT	CT100	95637	N.C.R
Test Software	EZ-EMC			

Conducted Emission				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER	R&S	ESCI3	100781	2014-3-14
V (V-LISN)	Schwarzbeck	NNLK 8129	8129-143	2014-3-14
LISN (EUT)	FCC	FCC-LISN-50/250-50-2-02	SN:05012	2014-3-14
TRANSIENT LIMITER	SCHAFFNER	CFL9206	1710	2014-3-14
Test Software		EZ-EMC		

NOTE: Equipments listed above have been calibrated and are in the period of validation.

47 CFR Part 15 C 15.247 Requirements

4.1 6dB Bandwidth

4.1.1 Definition

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

4.1.2 Test Description

The EUT is powered by the Battery, is coupled to the Spectrum Analyzer (SA) through the Attenuator/DC Block. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power. The RF load attached to the EUT antenna terminal is 50Ω.

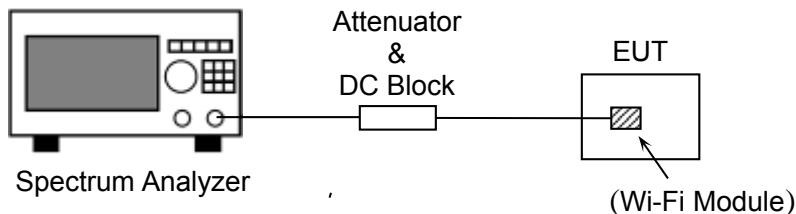


Figure 1: RF Test Setup

4.1.3 Test Result

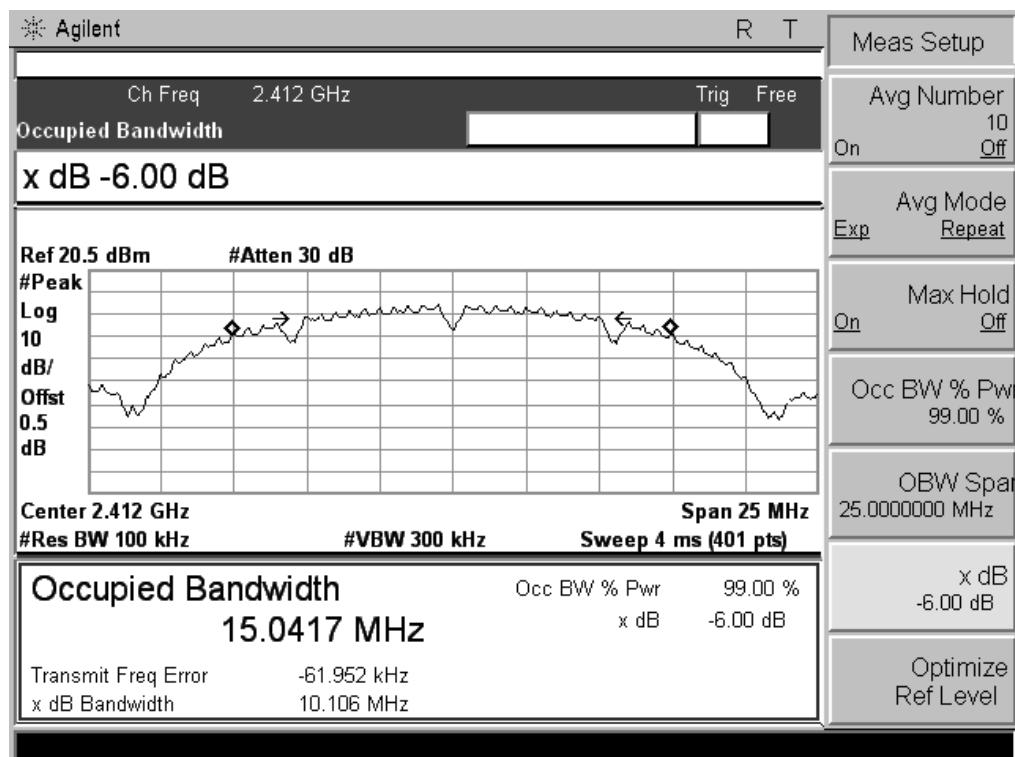
The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

5.1.3.1 802.11b Test Mode

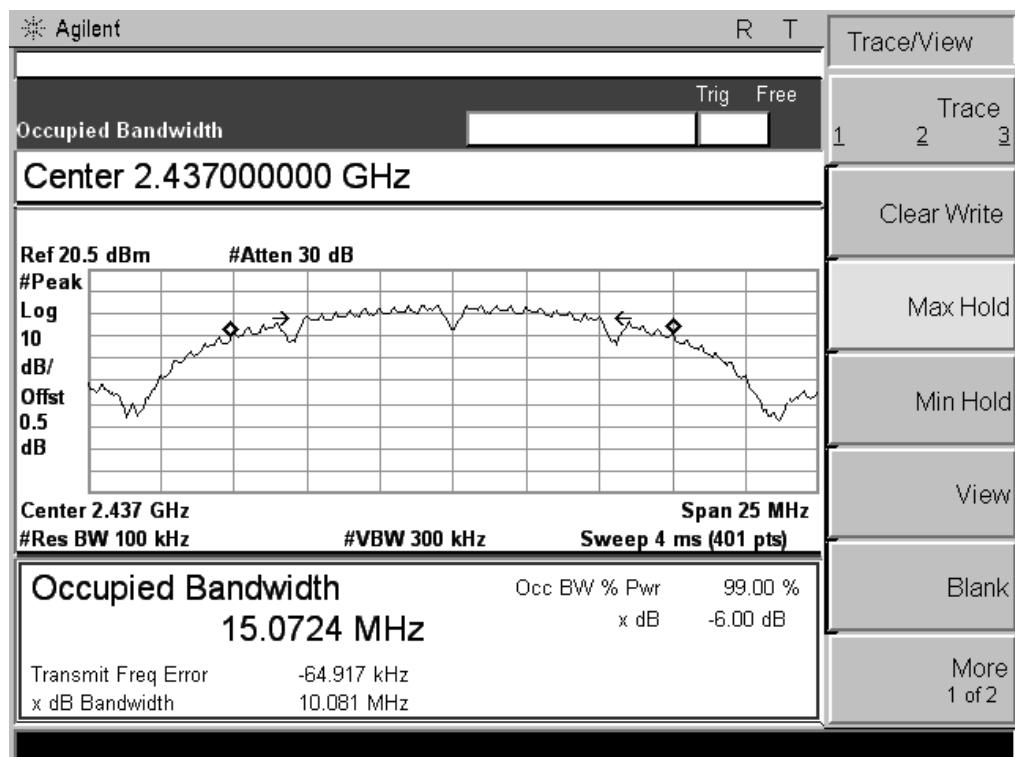
The minimum occupied bandwidth for the fundamental frequency 2437MHz is 10.11MHz. This occupied bandwidth complies with the FCC requirement.

A. Test Verdict:

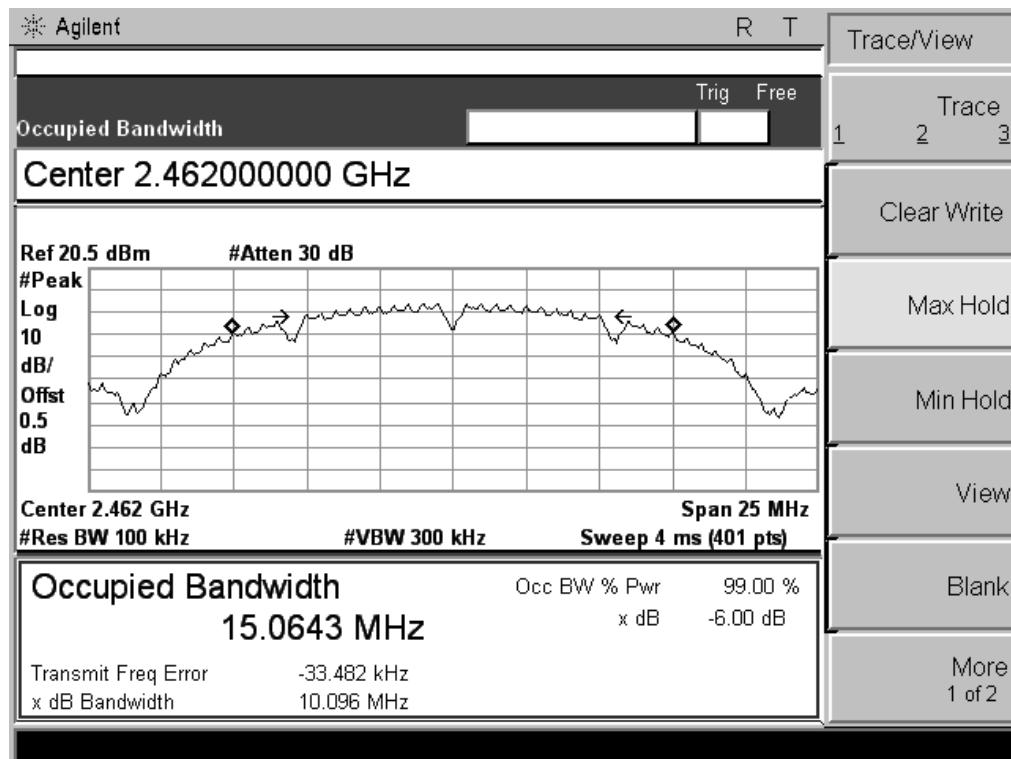
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	10.11	≥500	PASS
6	2437	10.08	≥500	PASS
11	2462	10.10	≥500	PASS

Test Plot:

(CH Low)



(CH Mid)



(CH High)

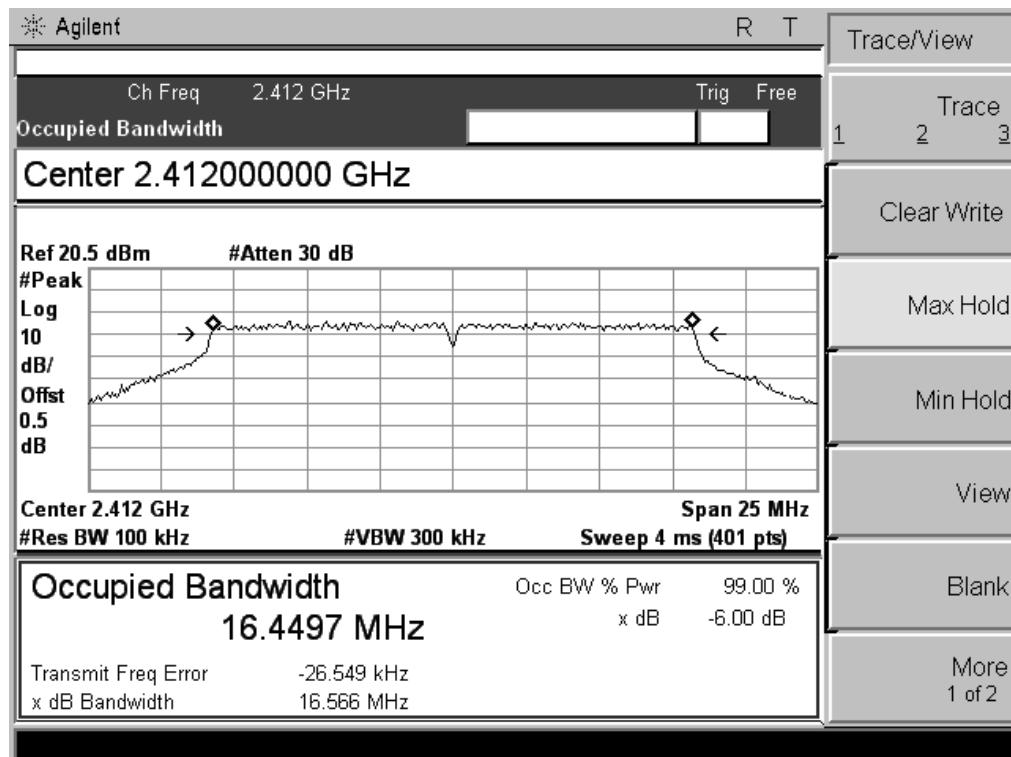
5.1.3.2 802.11g Test Mode

The minimum occupied bandwidth for the fundamental frequency 2437MHz is 16.59MHz. This occupied bandwidth complies with the FCC requirement.

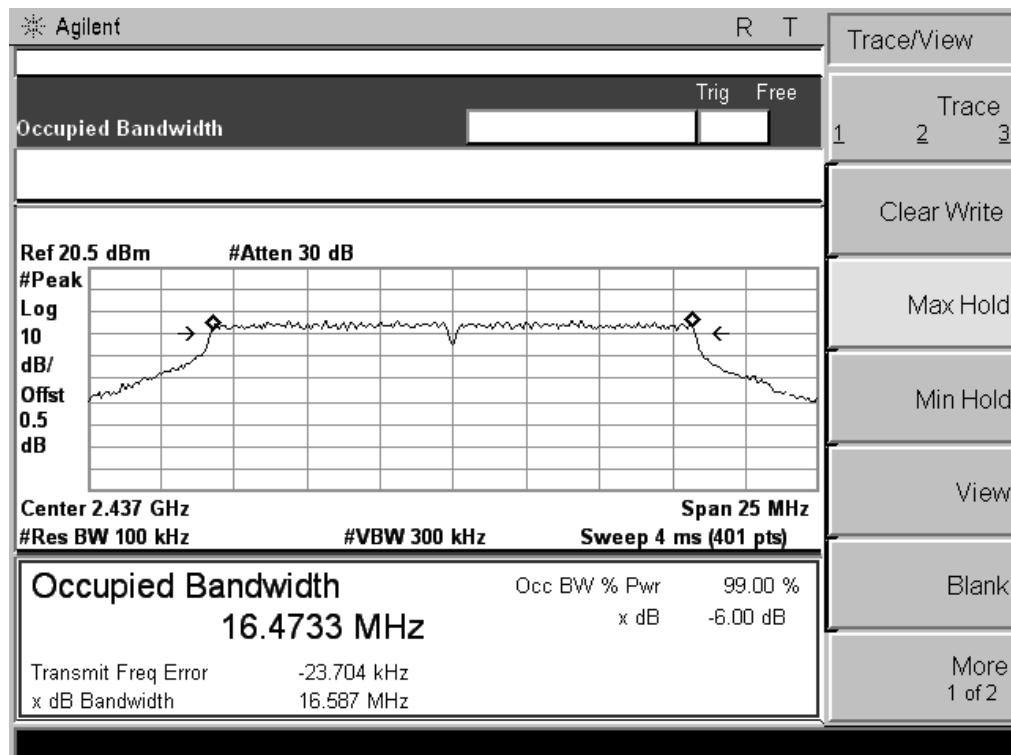
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	16.57	≥500	PASS
6	2437	16.59	≥500	PASS
11	2462	16.58	≥500	PASS

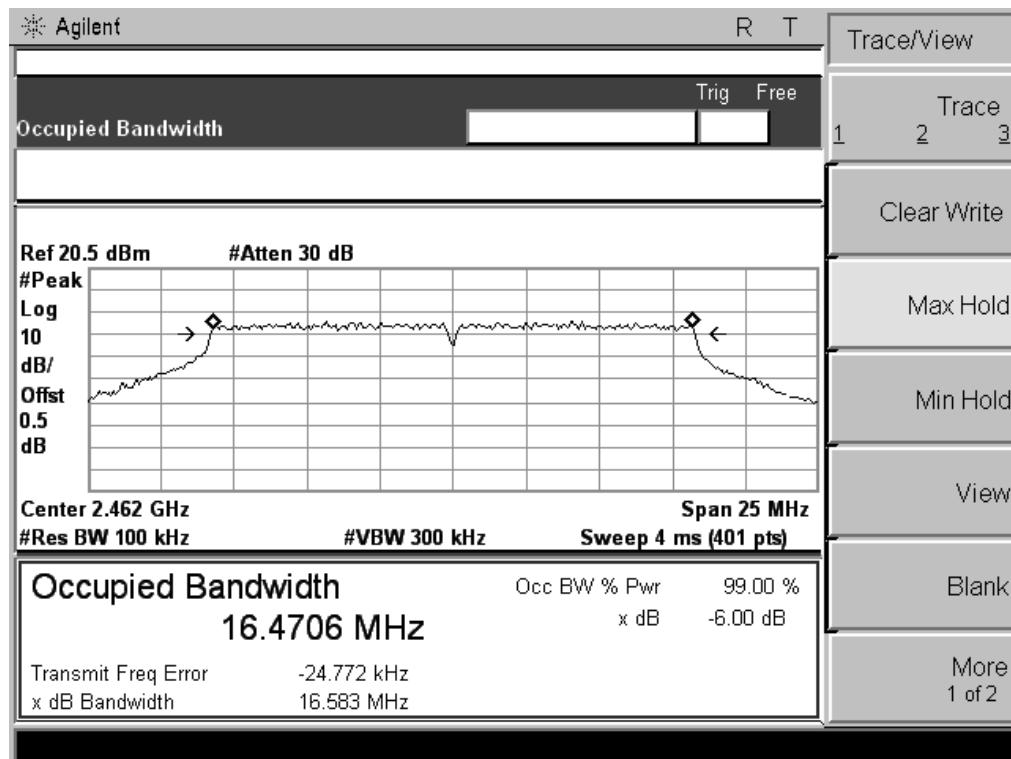
B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

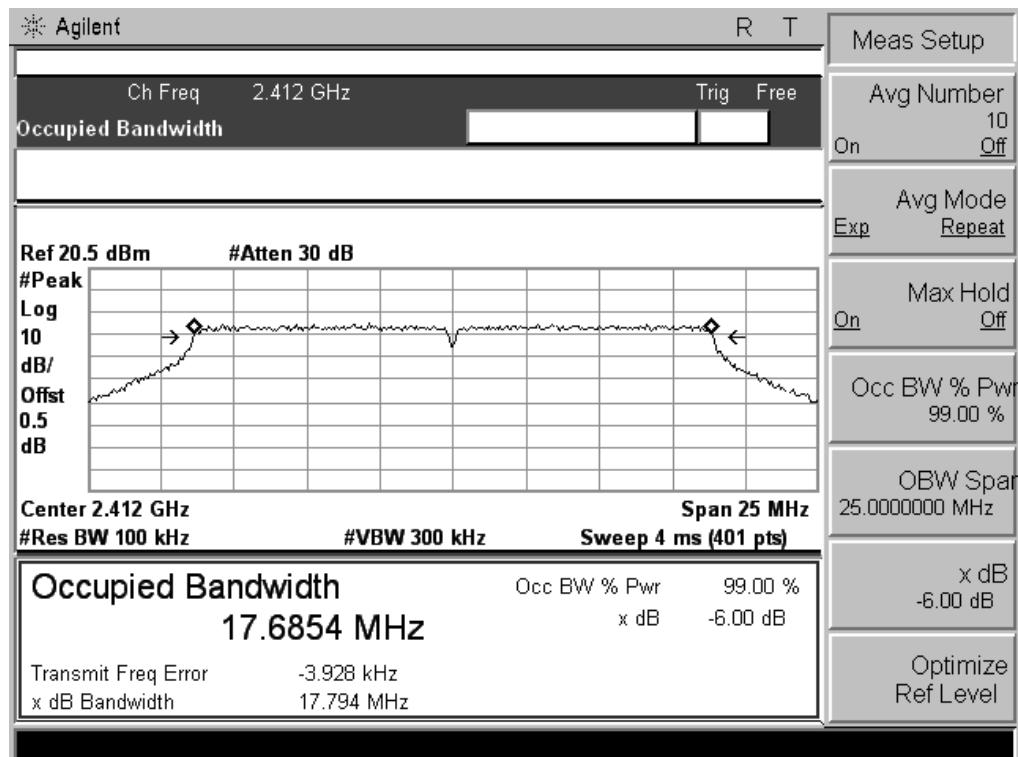
5.1.3.3 802.11n Test Mode

The minimum occupied bandwidth for the fundamental frequency 2462MHz is 17.85MHz. This occupied bandwidth complies with the FCC requirement.

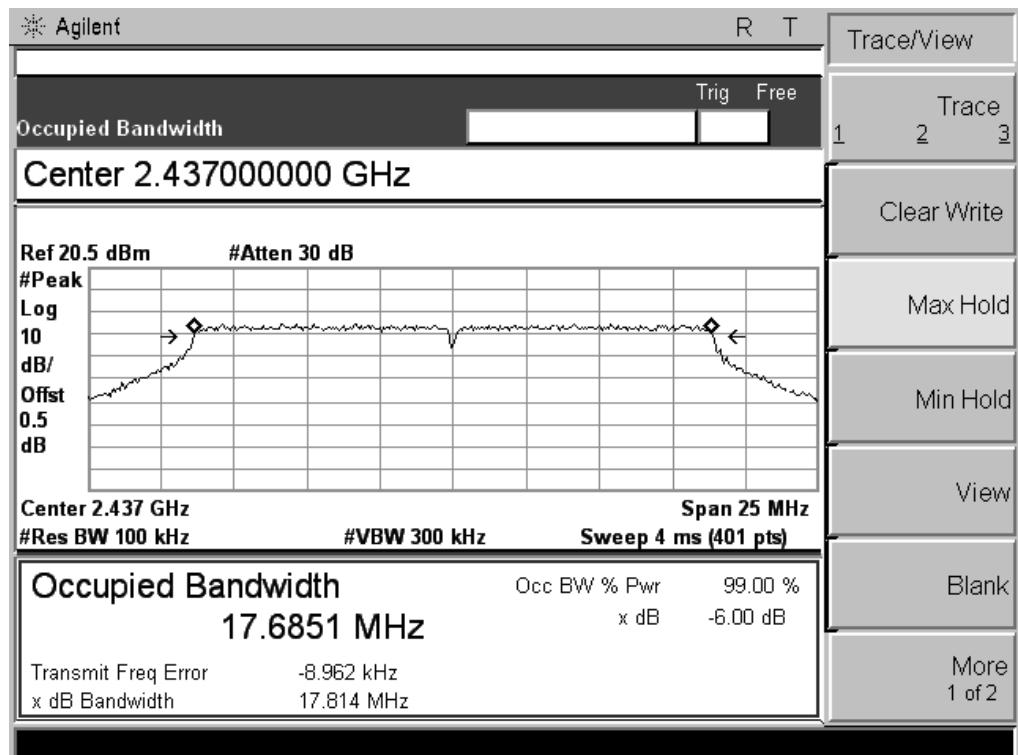
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Limits (kHz)	Result
1	2412	17.79	≥500	PASS
6	2437	17.81	≥500	PASS
11	2462	17.85	≥500	PASS

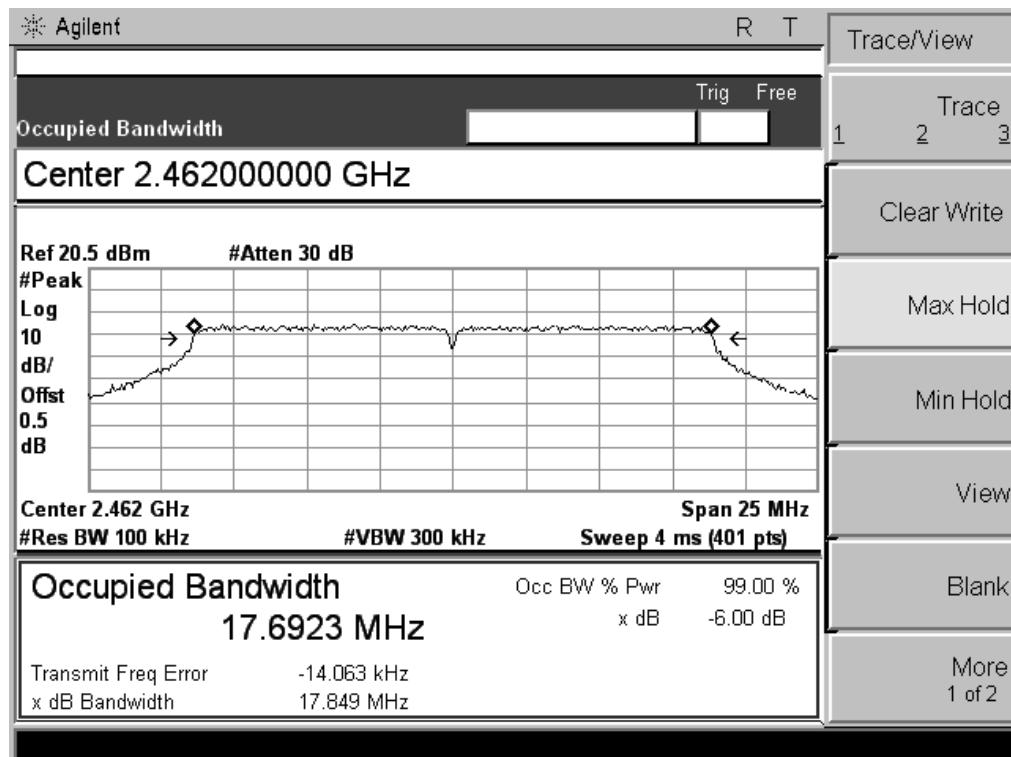
B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

4.2 Peak Output Power

4.2.1 Definition

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

4.2.2 Test Description

See section 5.1.2 of this report.

4.2.3 Test Result

The EUT operates at maximum output power mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

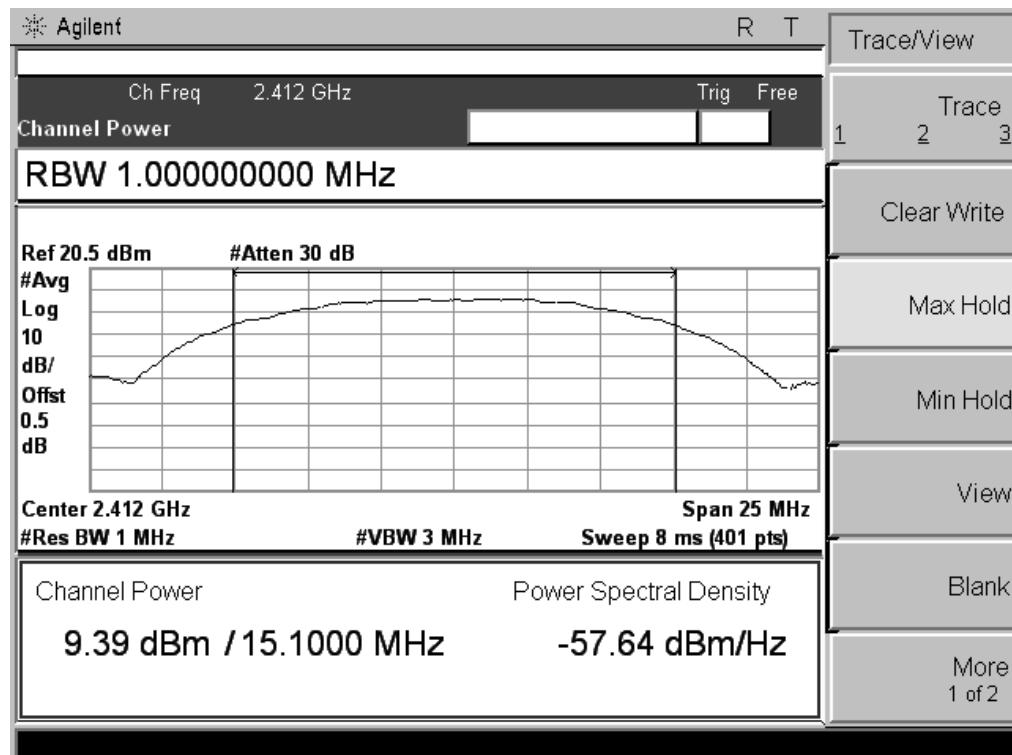
5.2.3.1 802.11b Test Mode

The maximum output power for the fundamental frequency 2462MHz is 9.89dBm. This power complies with the FCC requirement.

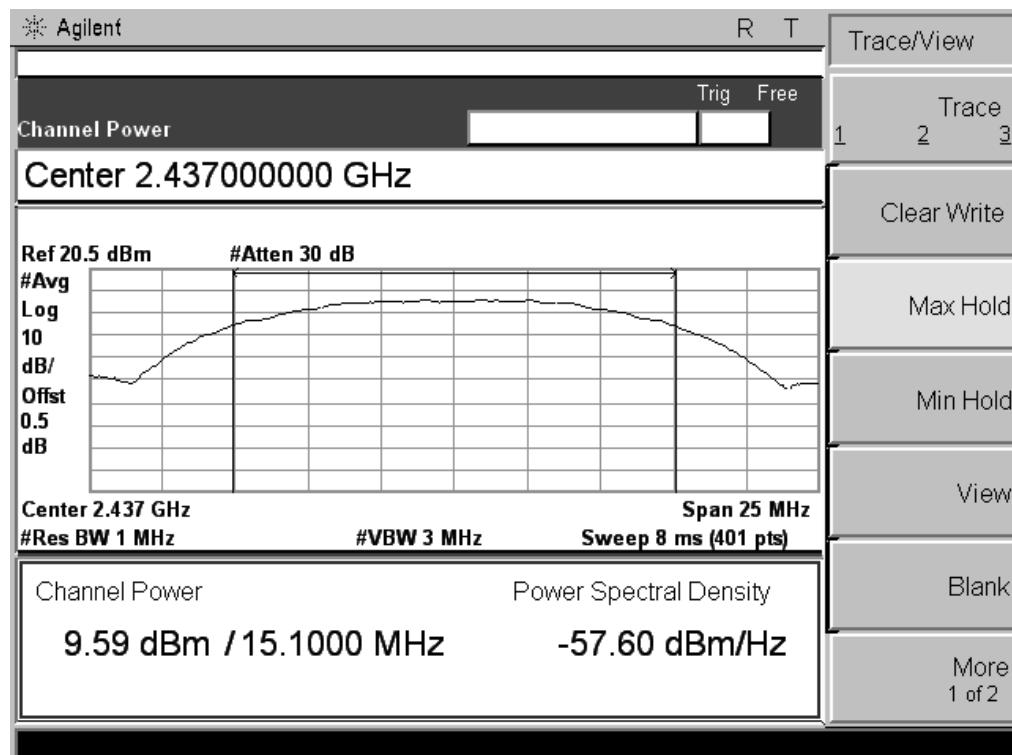
A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	9.39	0.00869	30	1	PASS
6	2437	9.59	0.00910			PASS
11	2462	9.89	0.00975			PASS

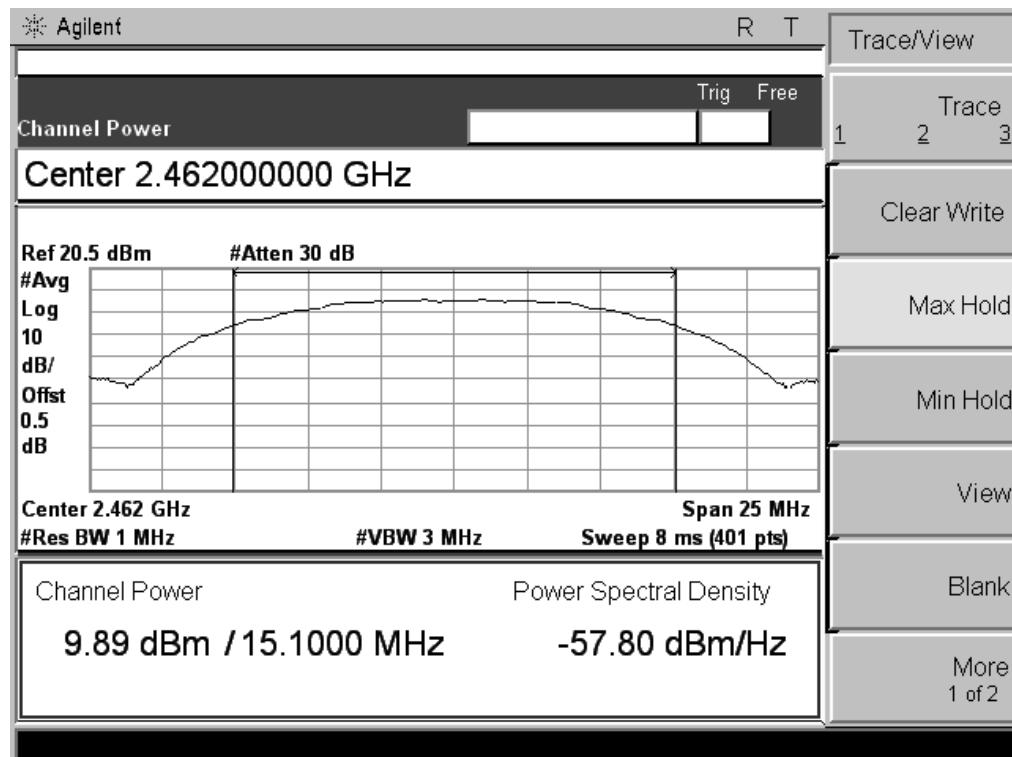
B. Test Plot:



(CH Low)



(CH Mid)



(CH High)

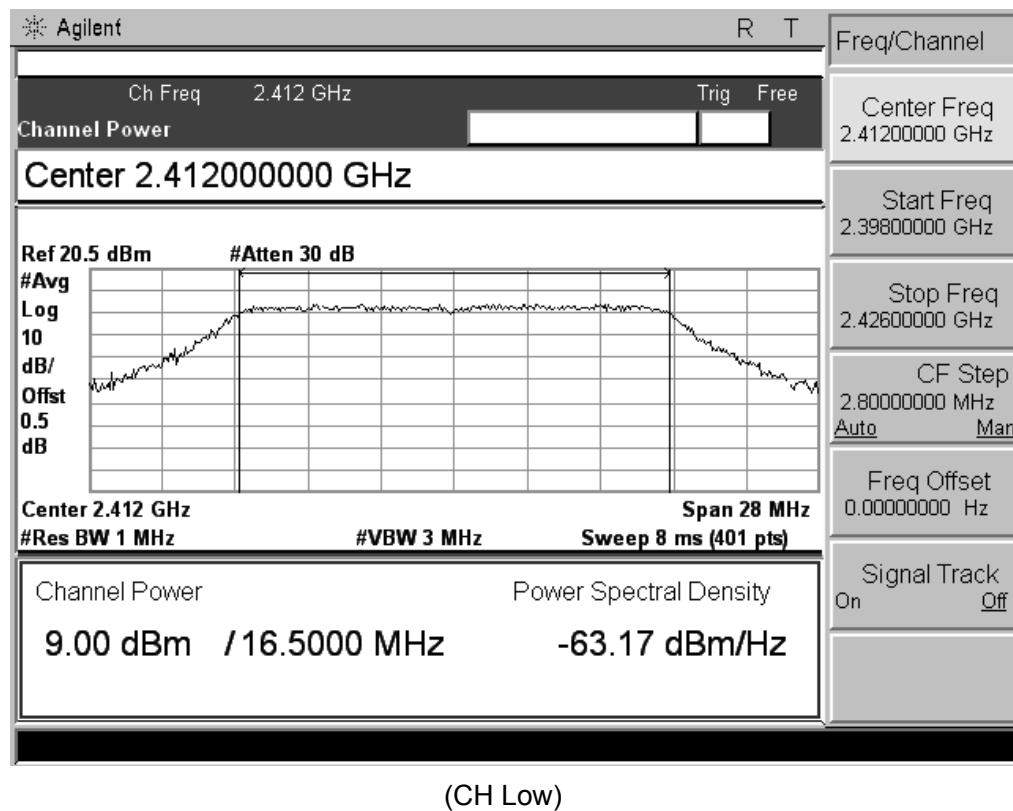
5.2.3.2 802.11g Test Mode

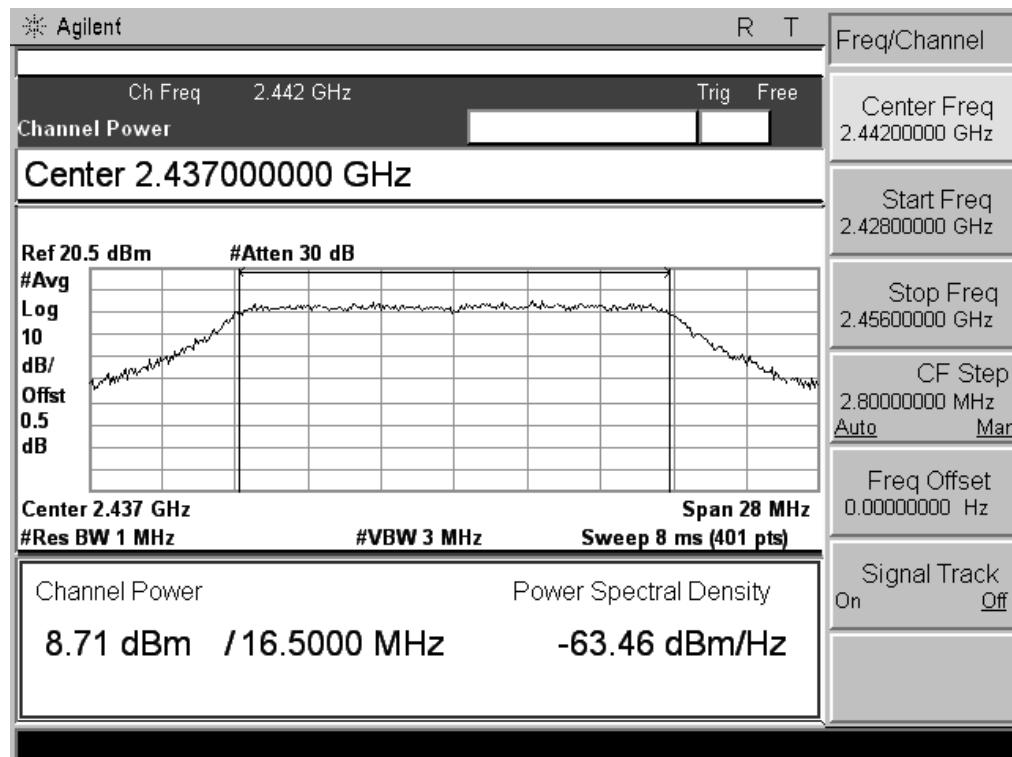
The maximum output power for the fundamental frequency 2412 MHz is 9.00dBm. This power complies with the FCC requirement.

A. Test Verdict:

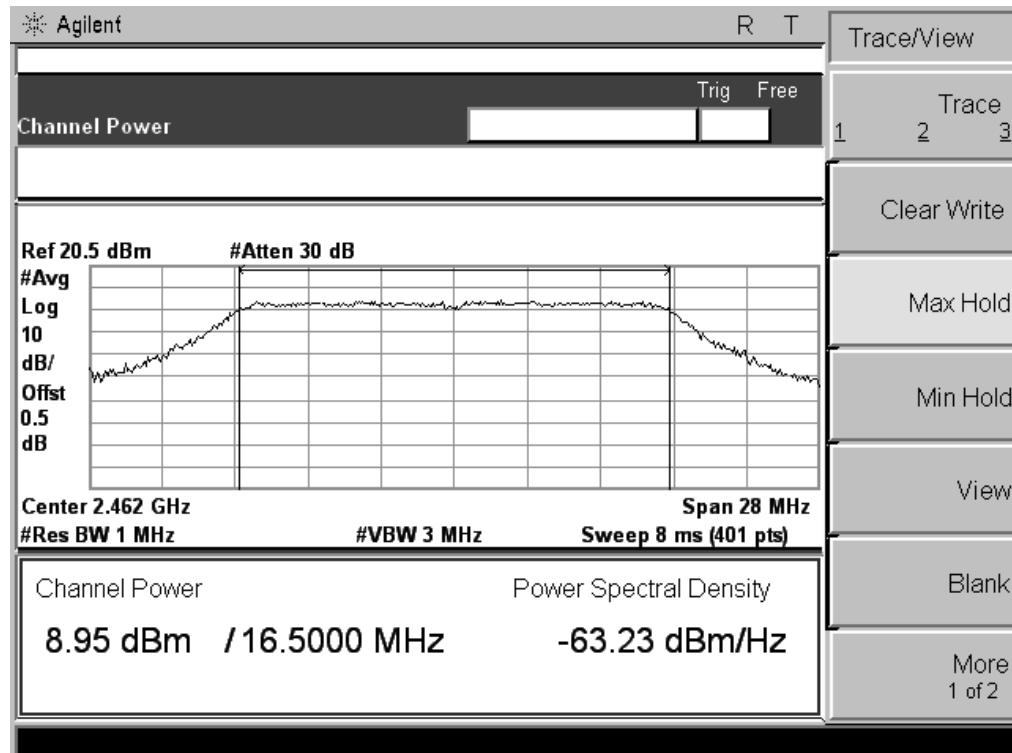
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	9.00	0.00794	30	1	PASS
6	2437	8.71	0.00743			PASS
11	2462	8.95	0.00785			PASS

B. Test Plot:





(CH Mid)



(CH High)

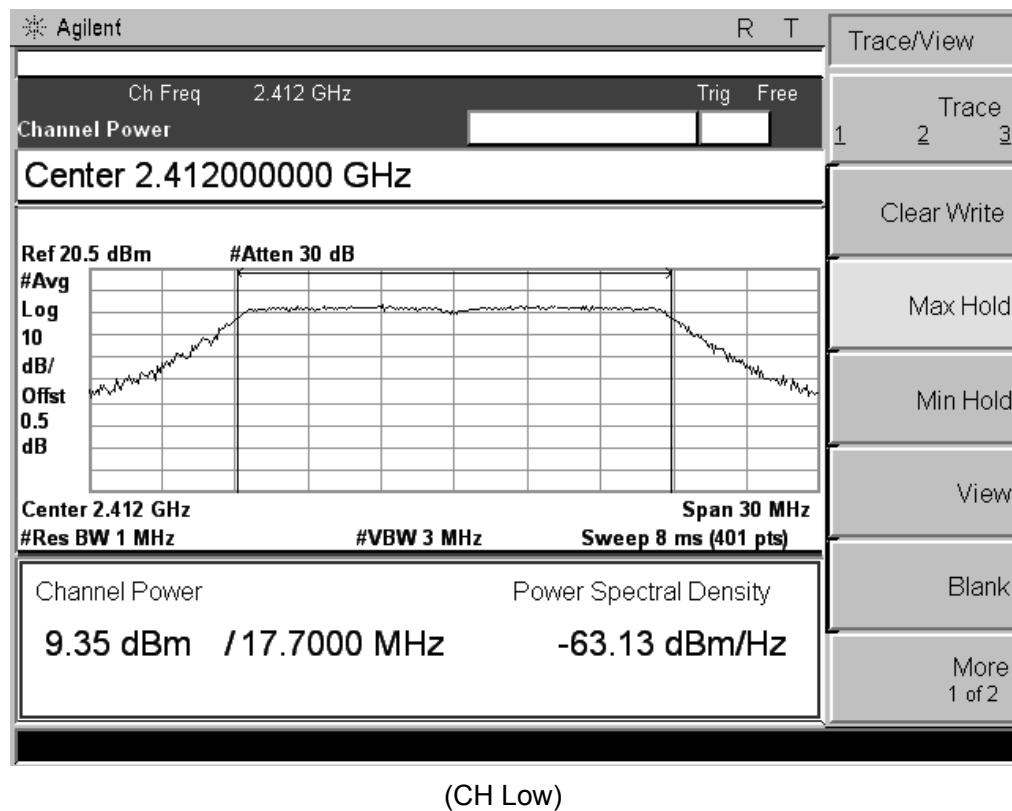
5.2.3.3 802.11n-20 Test Mode

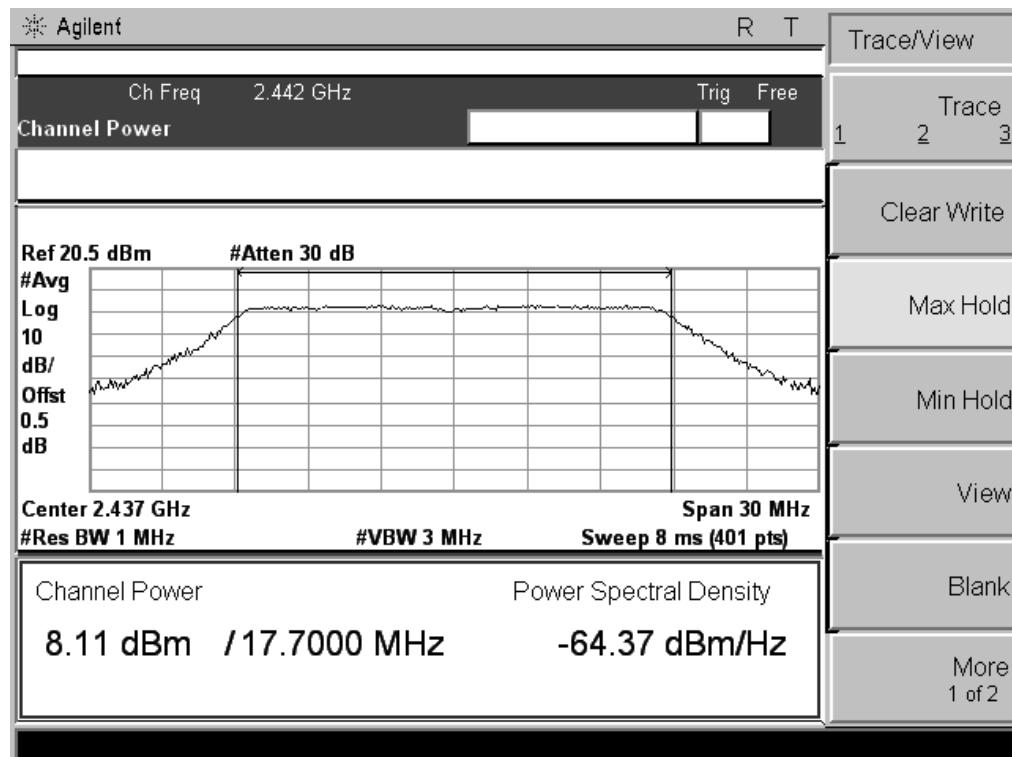
The maximum output power for the fundamental frequency 2412 MHz is 11.92dBm. This power complies with the FCC requirement.

A. Test Verdict:

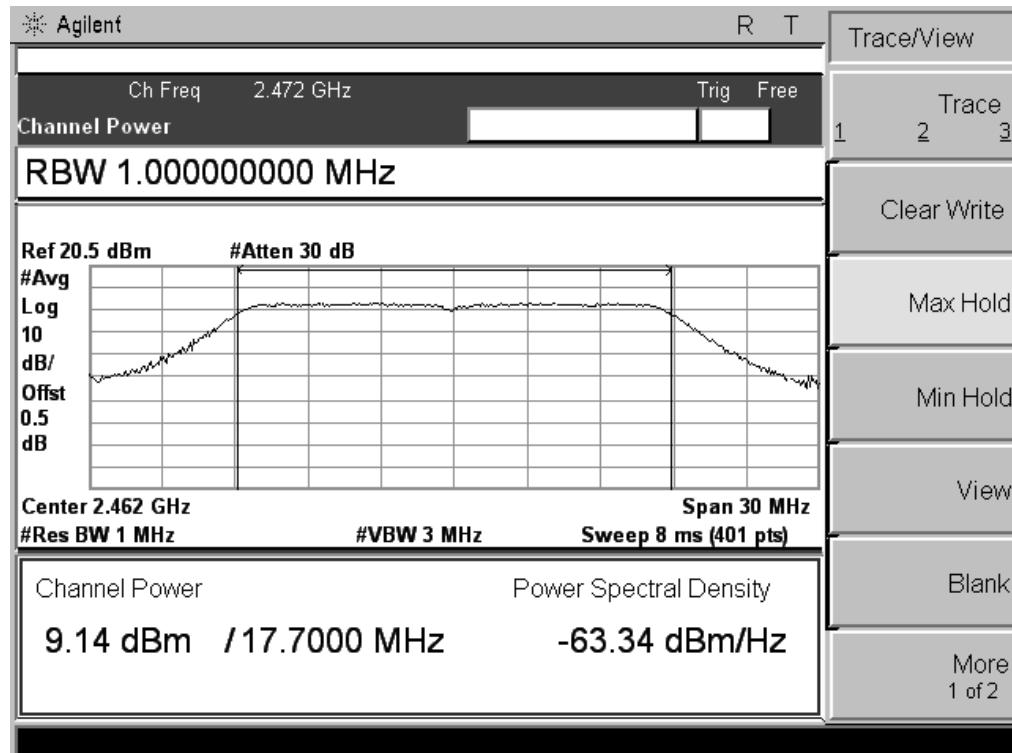
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	W	dBm	W	
1	2412	9.35	0.00861	30	1	PASS
6	2437	8.11	0.00647			PASS
11	2462	9.14	0.00820			PASS

B. Test Plot:





(CH Mid)



(CH High)

4.3 Conducted Spurious Emission

4.3.1 Definition

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

4.3.2 Test Description

See section 5.1.2 of this report.

4.3.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

5.3.3.1 802.11b Test Mode

1. Table for the Harmonics:

No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Low Channel			
1	4824.20	-26.46	-10.61
2	7236.10	-38.95	-10.61
Middle Channel			
1	4874.20	-28.21	-10.41
2	7311.10	-39.67	-10.41
High Channel			
1	4924.10	-25.13	-10.11
2	7386.20	-36.52	-10.11

1.3.3.2 802.11g Test Mode

1. Table for the Harmonics:

No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Low Channel			
1	4824.20	-26.02	-11.00
2	7236.10	-37.46	-11.00
Middle Channel			
1	4874.20	-28.38	-11.29
2	7311.10	-39.45	-11.29
High Channel			
1	4924.10	-28.89	-11.05
2	7386.20	-39.76	-11.05

1.3.3.3 802.11n Test Mode

1. Table for the Harmonics:

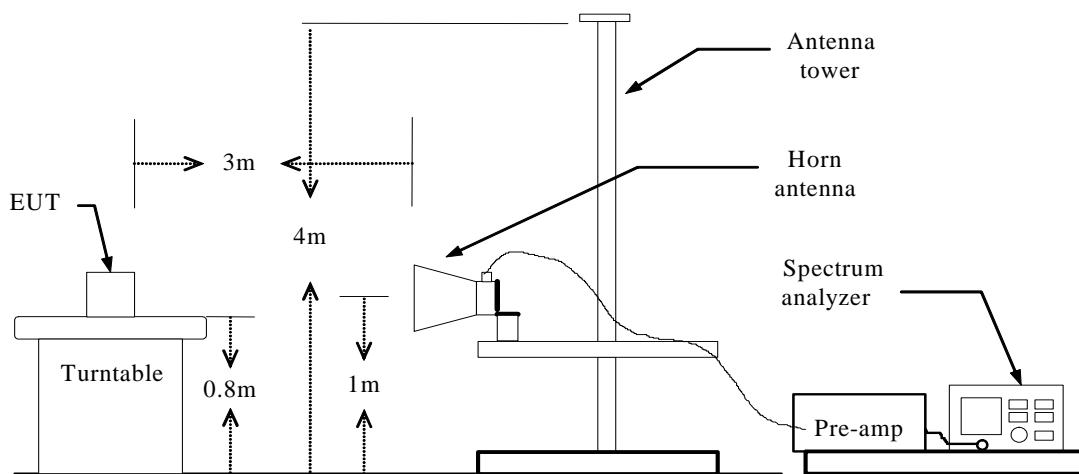
No.	Frequency (MHz)	Emission Power (dBm)	Limit (dBm)
Low Channel			
1	4824.20	-29.12	-10.65
2	7236.10	-36.82	-10.65
Middle Channel			
1	4874.20	-30.15	-11.89
2	7311.10	-39.48	-11.89
High Channel			
1	4924.10	-30.82	-10.86
2	7386.20	-40.21	-10.86

4.4 Band Edge

4.4.1 Definition

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

4.4.2 Test Description

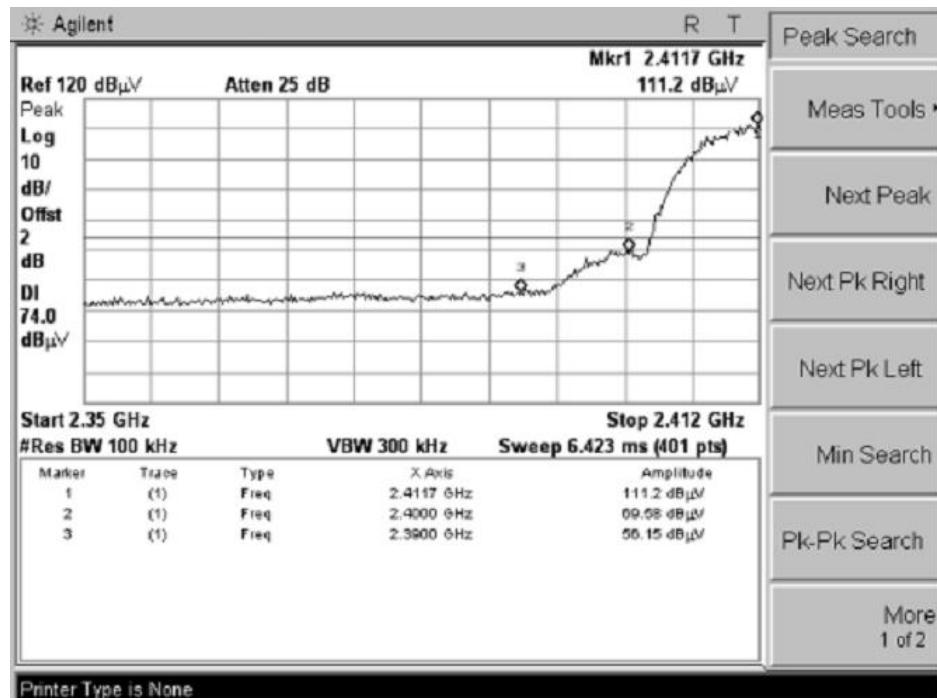


4.4.3 Test Result

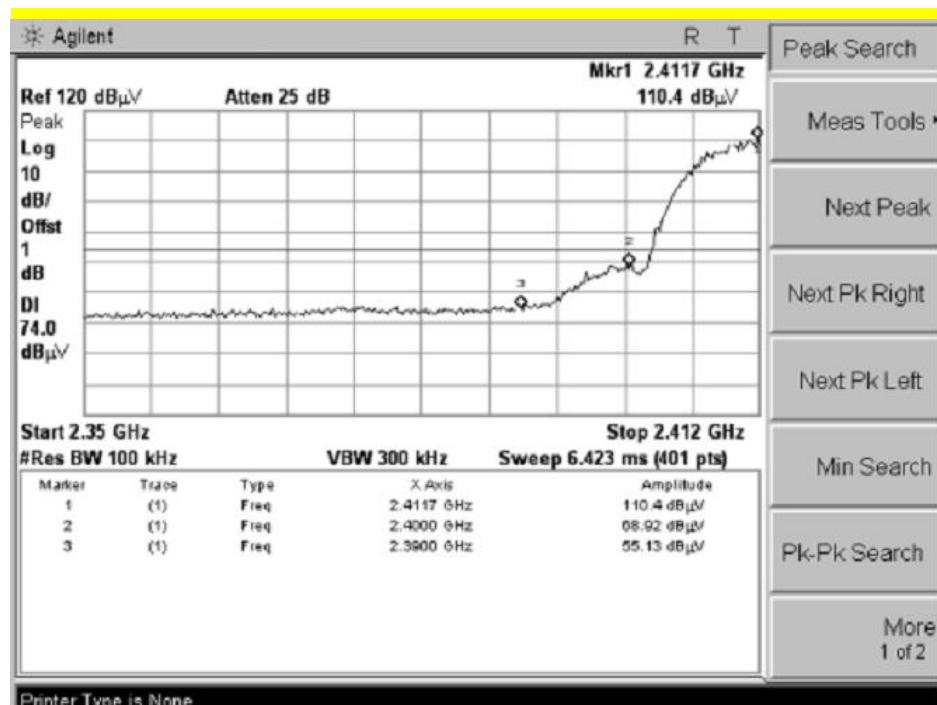
The EUT operates at continuous transmit test mode. The lowest and highest channels are tested to verify the band edge emissions.

5.4.3.1 802.11b Test Mode

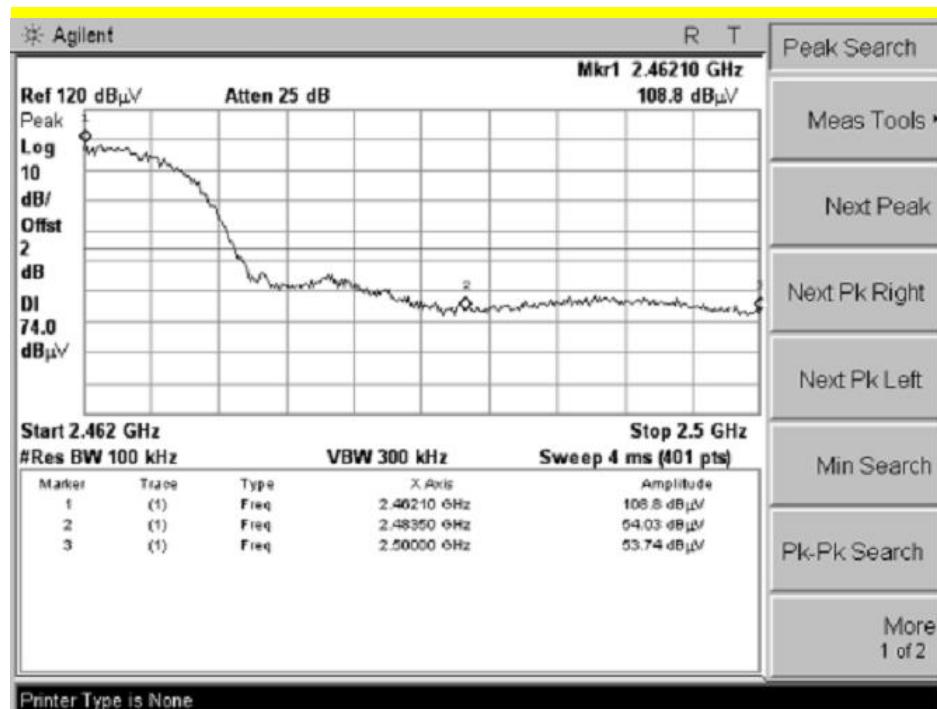
Test Mode		Channel Marked Frequency	Limit (dBuv/m)	Test Result Highest Emission (dBuv/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
WIFI	Low Channel	2390MHz	74(Peak) 54(Average)	56.15	36.78.	55.13	36.13
		2400MHz		69.58	45.59	68.92	45.07
	High Channel	2483.5MHz		54.03	35.37	56.49	37.14
		2500MHz		53.74	33.61	54.73	33.97

Test Plot:

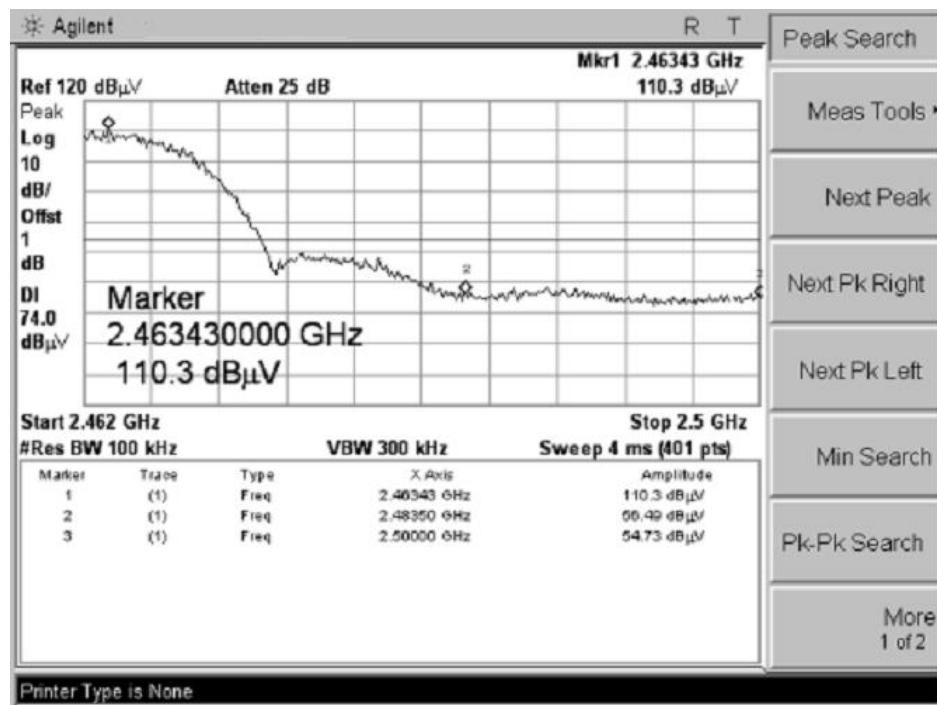
(CH Low, Vertical, Peak)



(CH Low, Horizontal, Peak)



(CH High, Vertical, Peak)

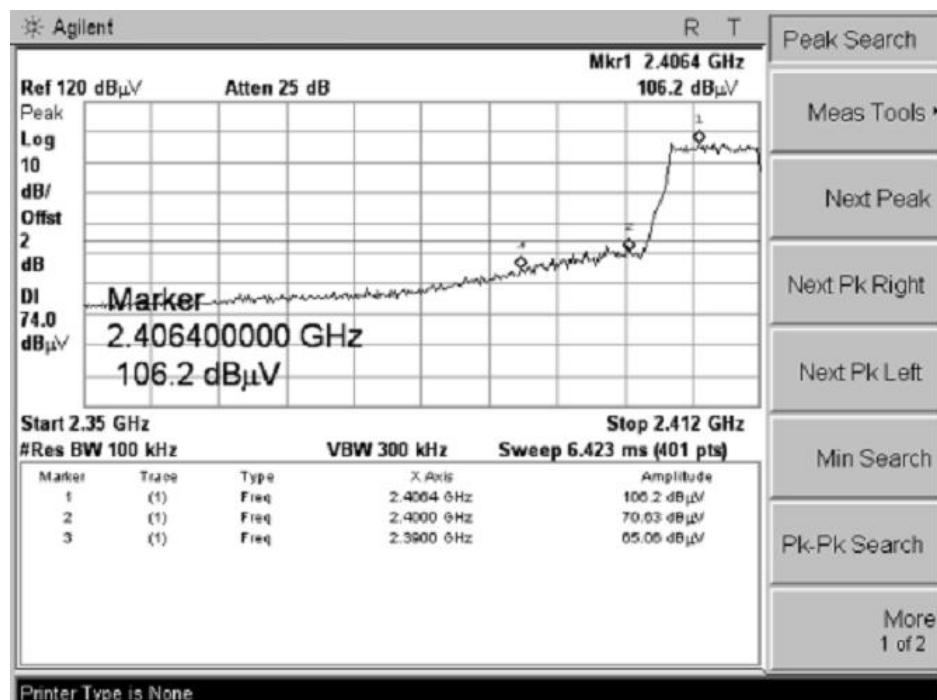


(CH High, Horizontal, Peak)

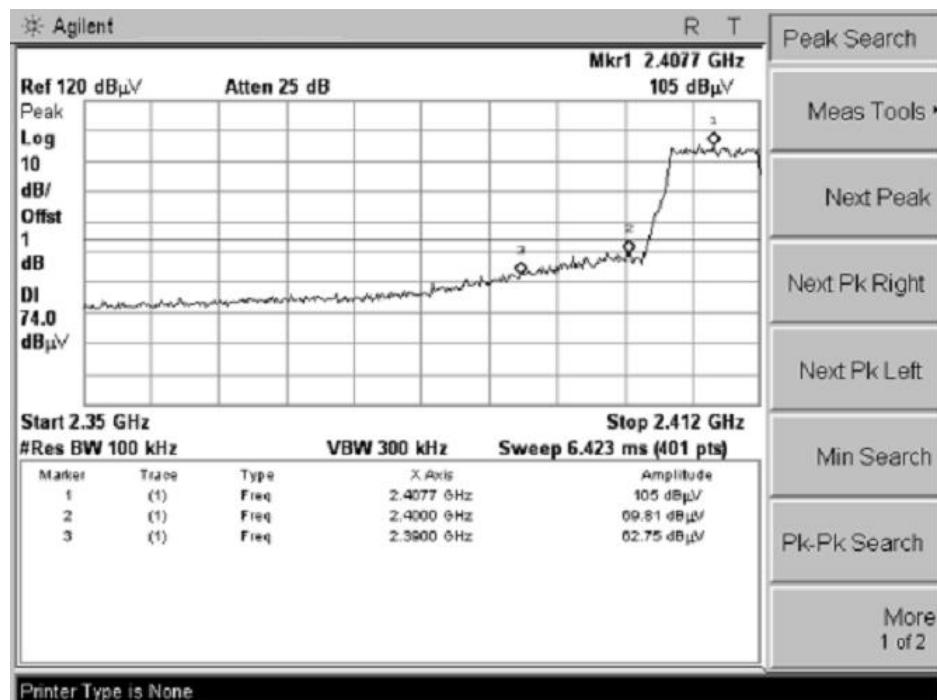
5.4.3.2 802.11g Test Mode

Test Mode		Channel Marked Frequency	Limit (dBuv/m)	Test Result Highest Emission (dBuv/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
WIFI	Low Channel	2390MHz	74(Peak) 54(Average)	65.06	43.92	62.75	40.86
		2400MHz		70.63	51.84	69.81	49.63
	High Channel	2483.5MHz		61.29	42.87	60.98	41.54
		2500MHz		54.65	38.77	54.05	39.02

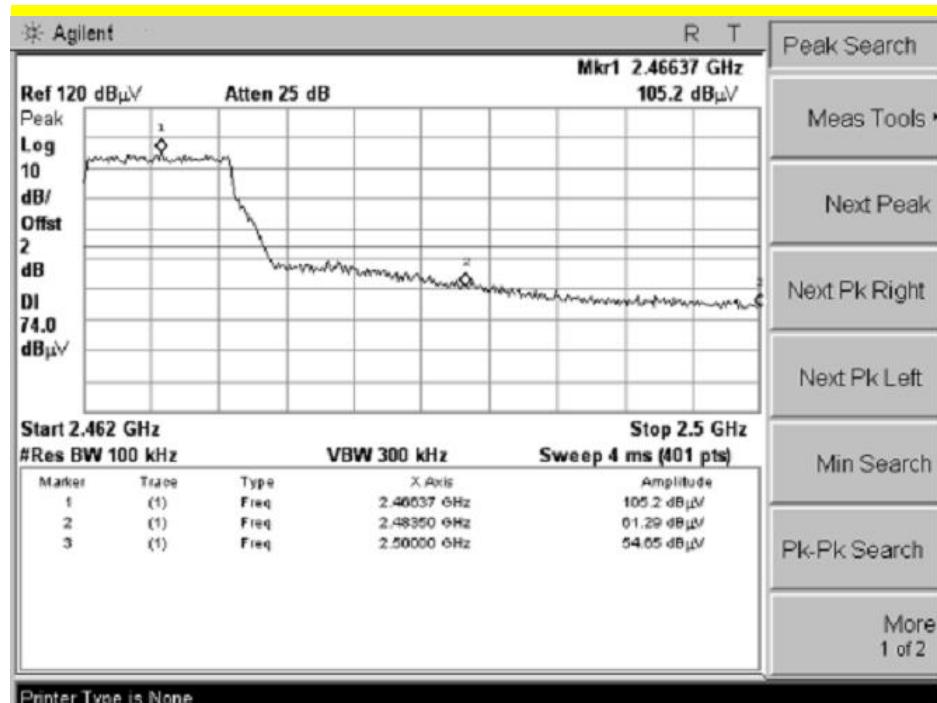
Test Plot:



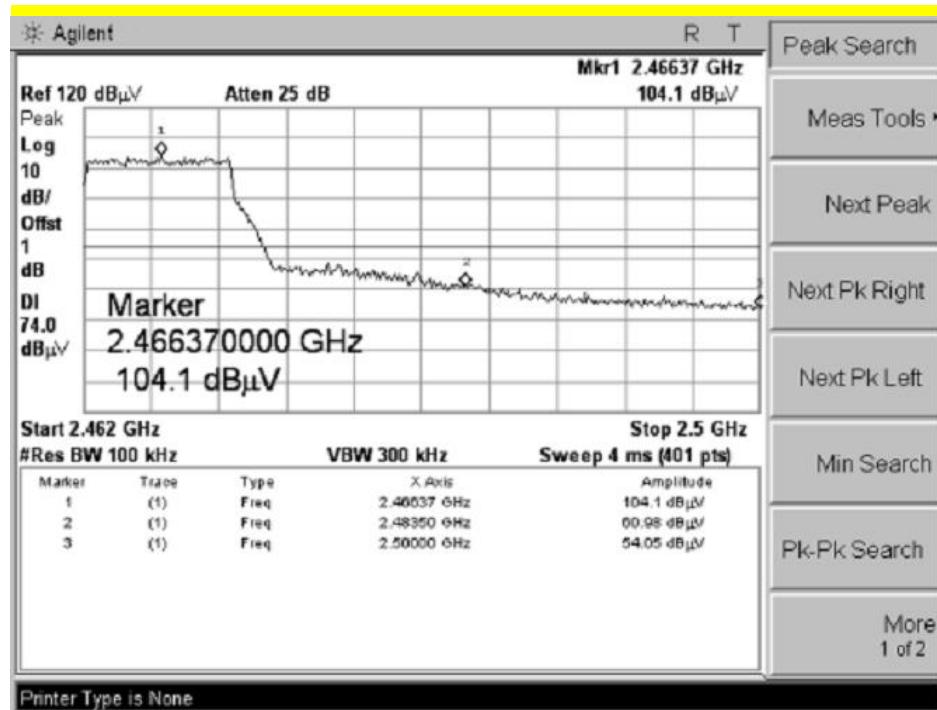
(CH Low, Vertical, Peak)



(CH Low, Horizontal, Peak)



(CH High, Vertical, Peak)

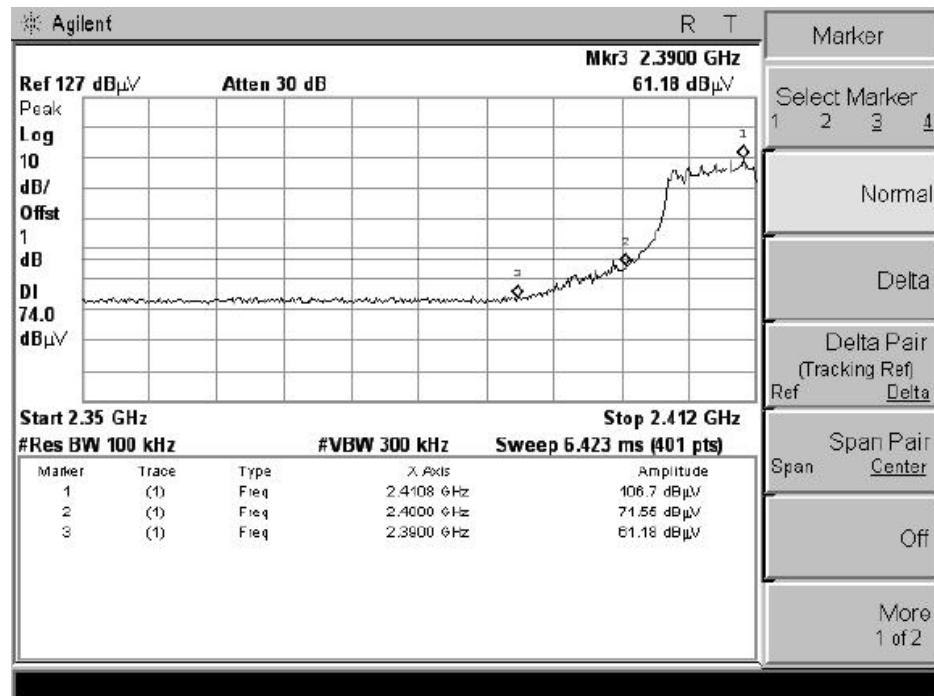


(CH High, Horizontal, Peak)

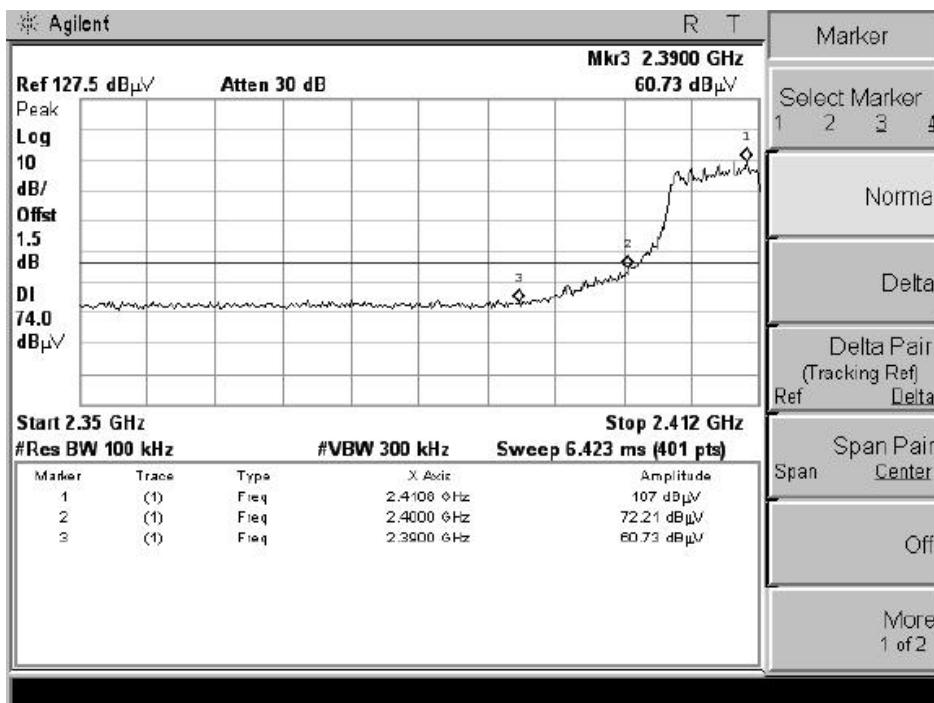
5.4.3.3 802.11n-20 Test Mode

Test Mode		Channel Marked Frequency	Limit (dB μ V/m)	Test Result Highest Emission (dB μ V/m)			
				Vertical		Horizontal	
				Peak	Average	Peak	Average
WIFI	Low Channel	2390MHz	74(Peak) 54(Average)	60.73	36.57	61.18	37.17
		2400MHz		72.21	50.25	71.55	50.53
	High Channel	2483.5MHz		72.79	49.08	71.16	48.38
		2500MHz		60.27	39.73	59.77	38.14

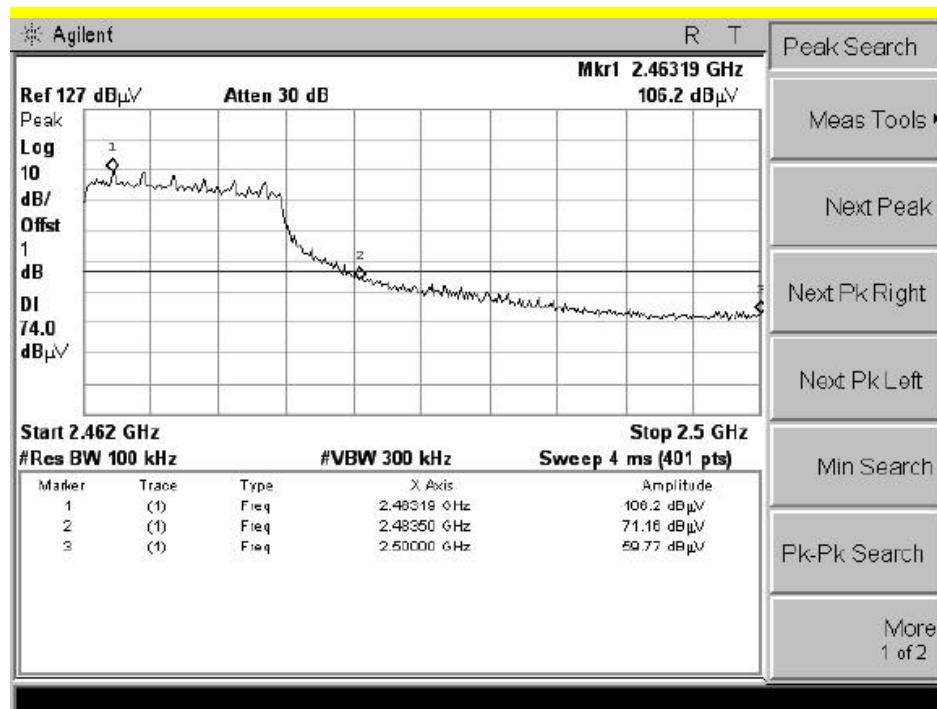
Test Plot:



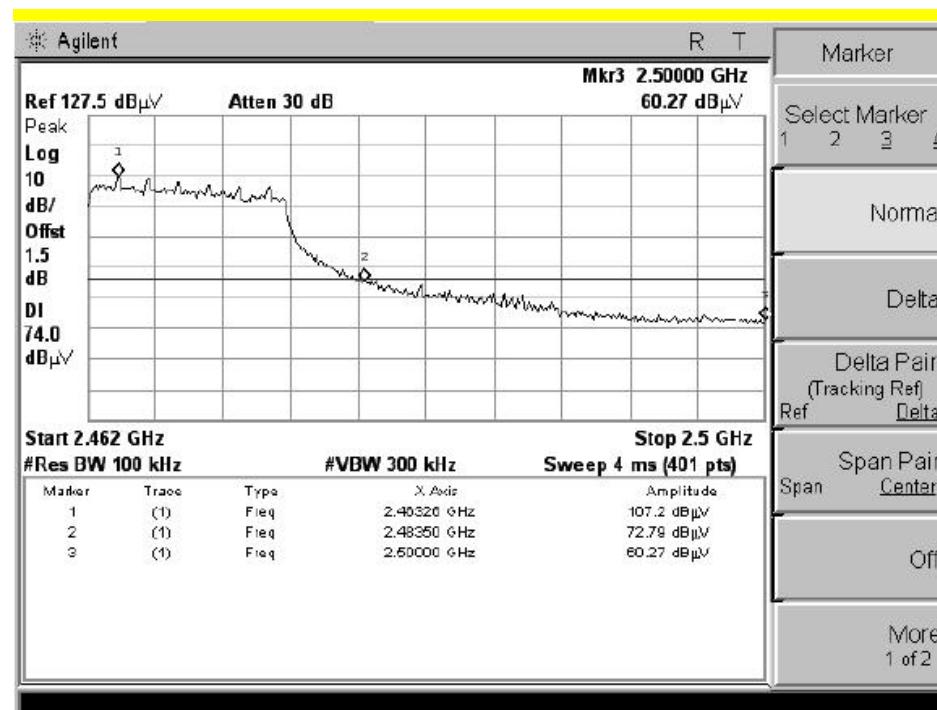
(CH Low, Vertical, Peak)



(CH Low, Horizontal, Peak)



(CH High, Vertical, Peak)



(CH High, Horizontal, Peak)

4.5 Power Spectral Density (PSD)

4.5.1 Definition

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.

4.5.2 Test Description

See section 5.1.2 of this report.

4.5.3 Test Result

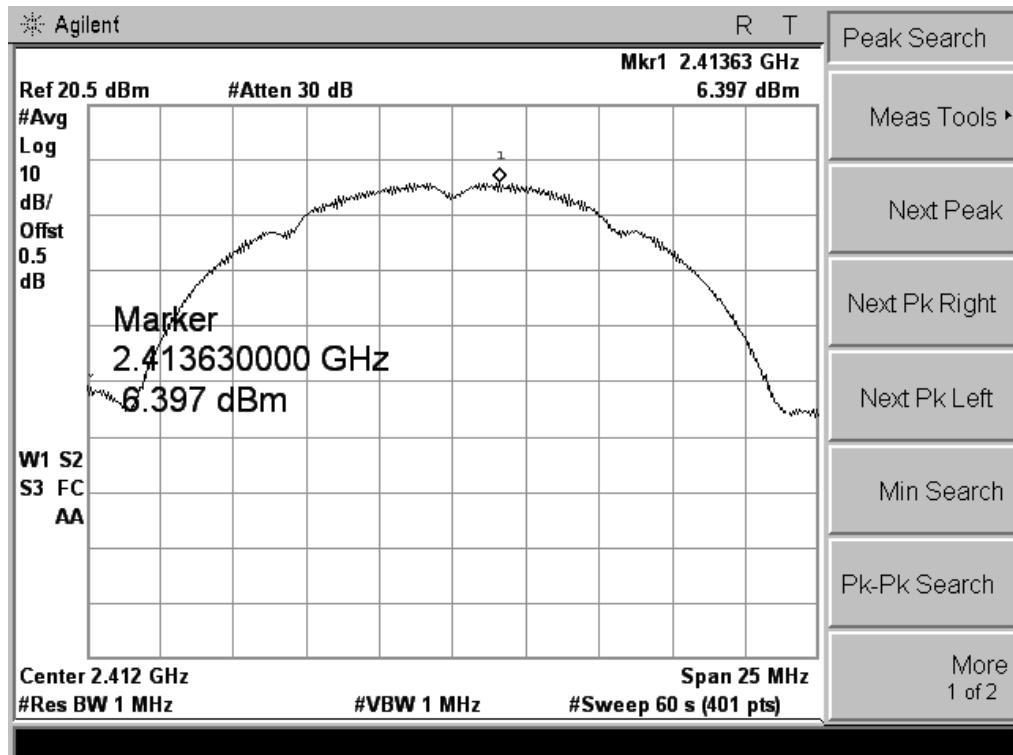
The lowest, middle and highest channels are tested to verify the power spectral density.

5.5.3.1 802.11b Test Mode

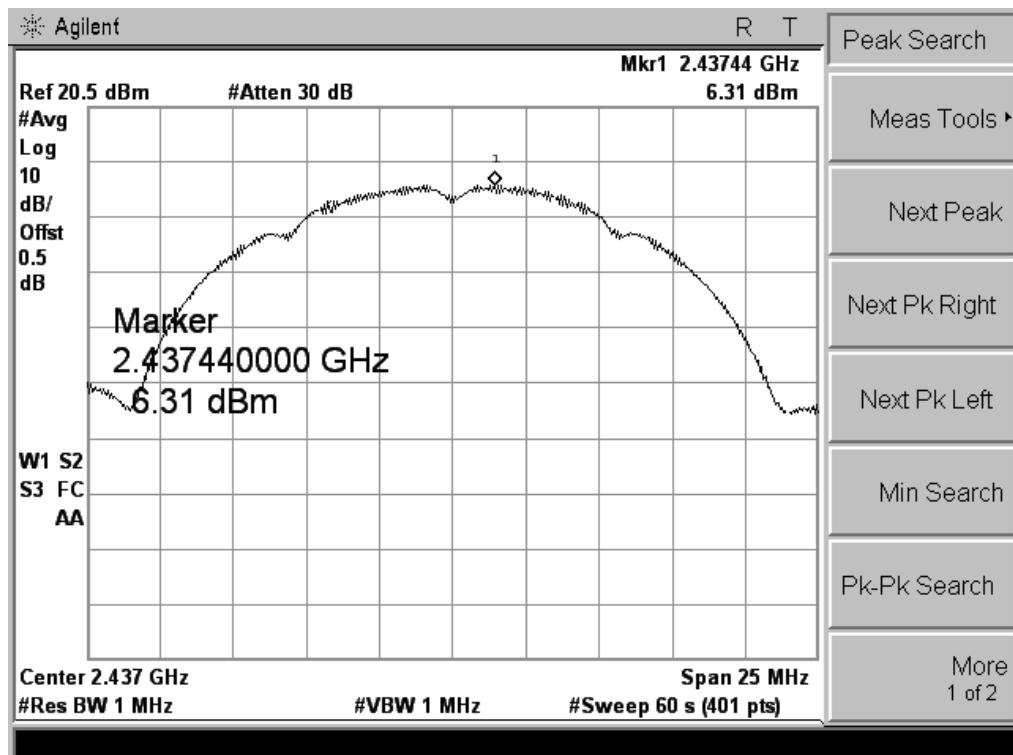
A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	6.397	≤8	PASS
6	2437	6.310	≤8	PASS
11	2462	6.035	≤8	PASS

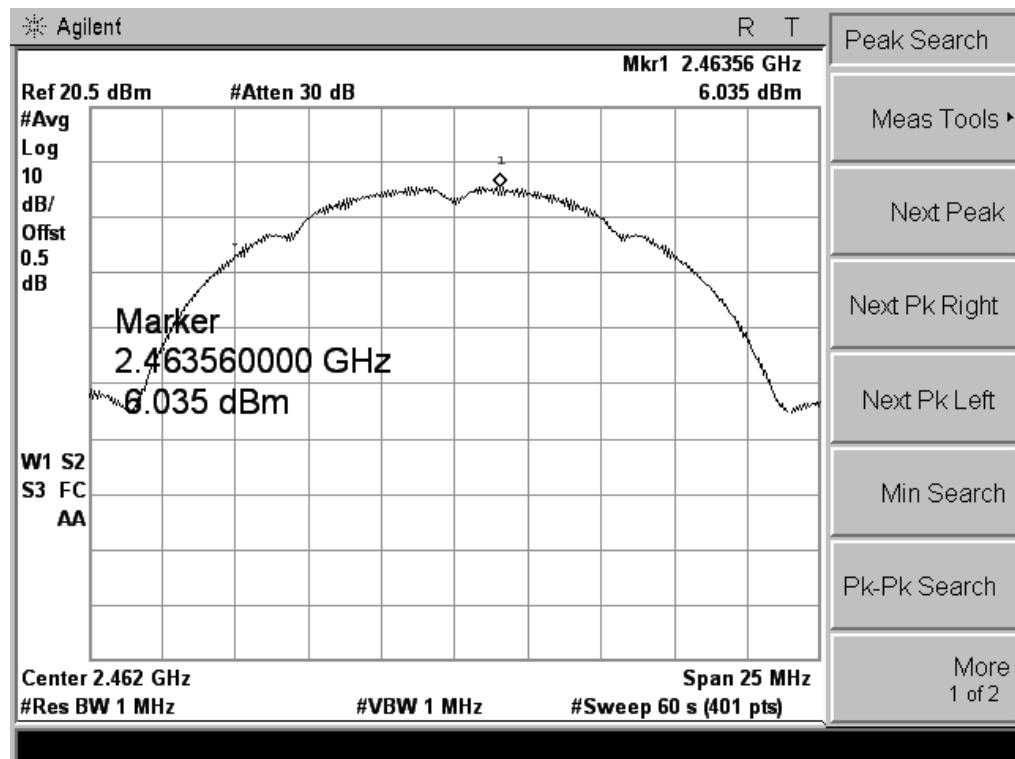
B. Test Plot:



(CH Low)



(CH Mid)



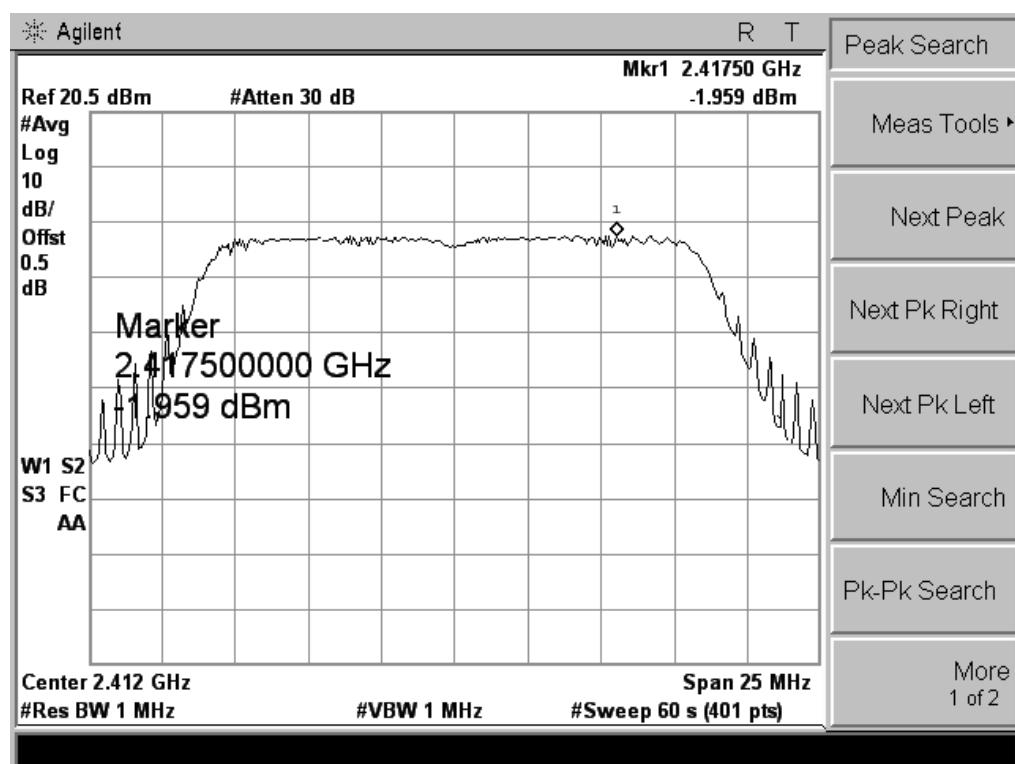
(CH High)

5.5.3.2 802.11g Test Mode

A. Test Verdict:

Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-1.959	≤8	PASS
6	2437	-1.747	≤8	PASS
11	2462	-1.927	≤8	PASS

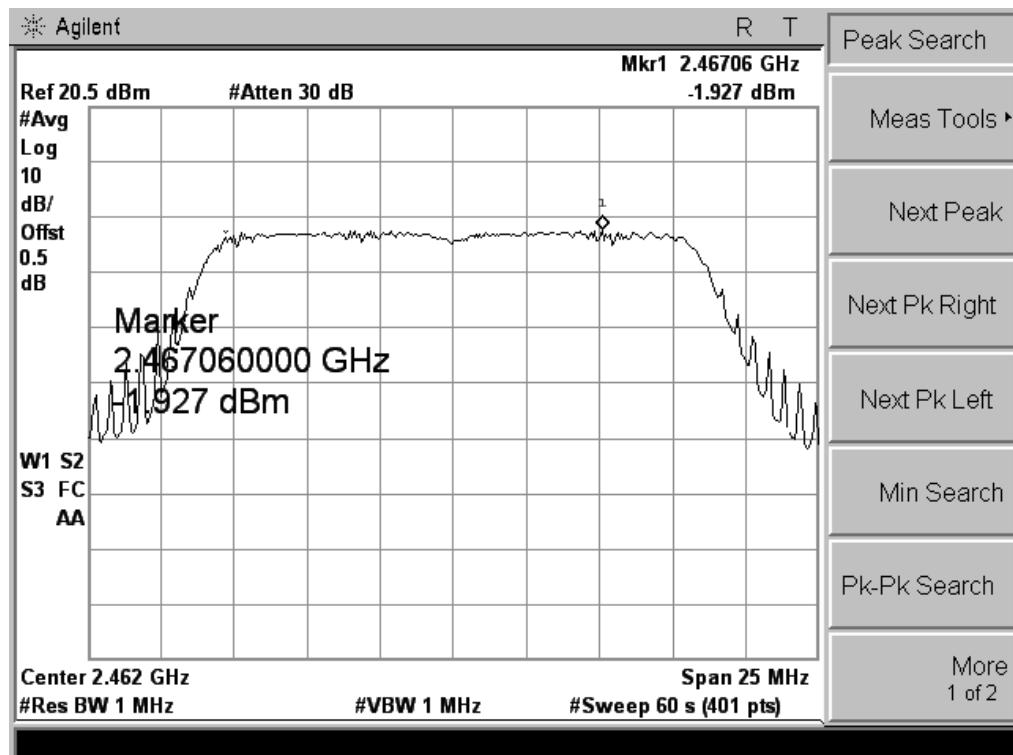
B. Test Plot:



(CH Low)



(CH Mid)



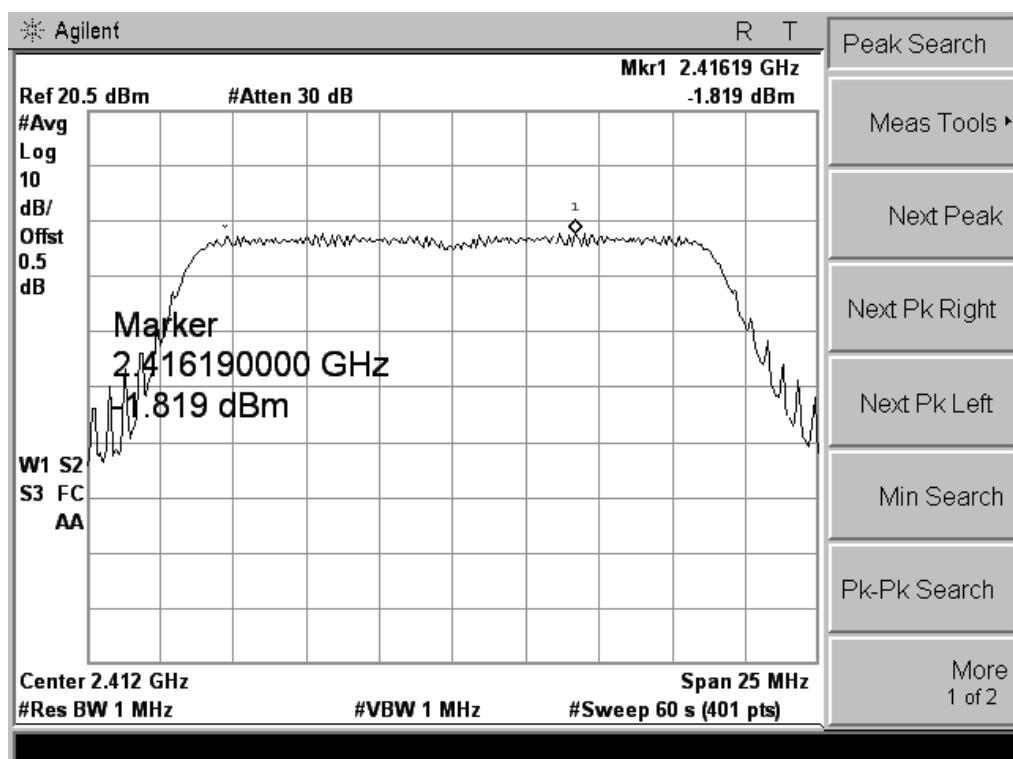
(CH High)

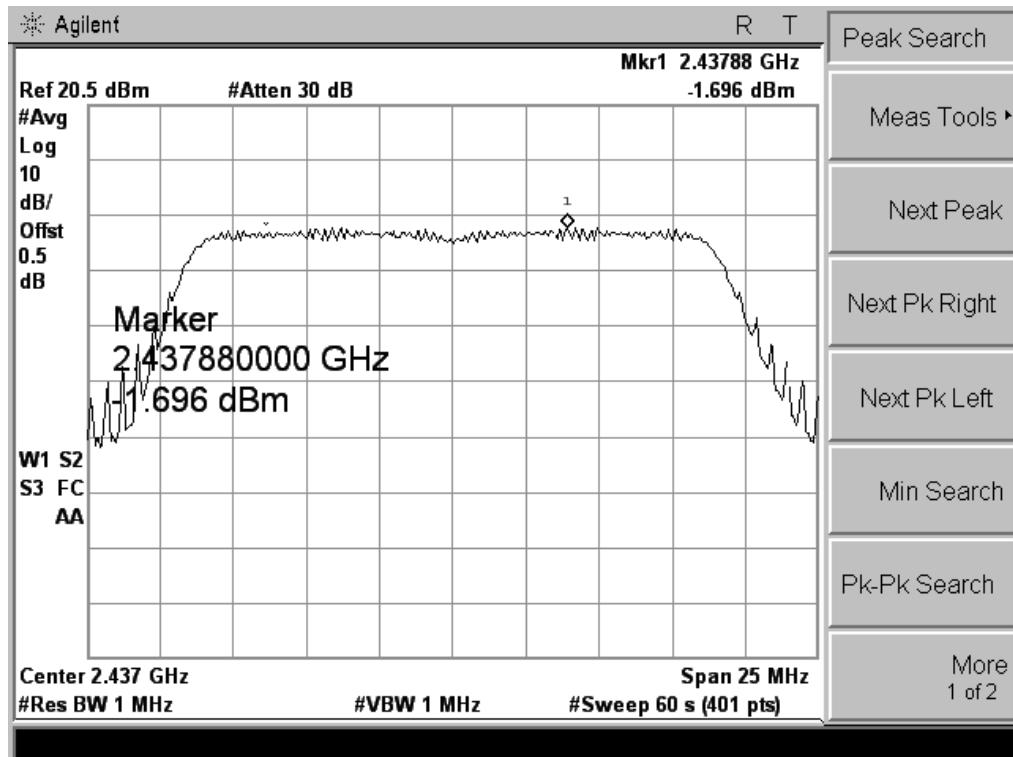
5.5.3.3 802.11n-20 Test Mode

A. Test Verdict:

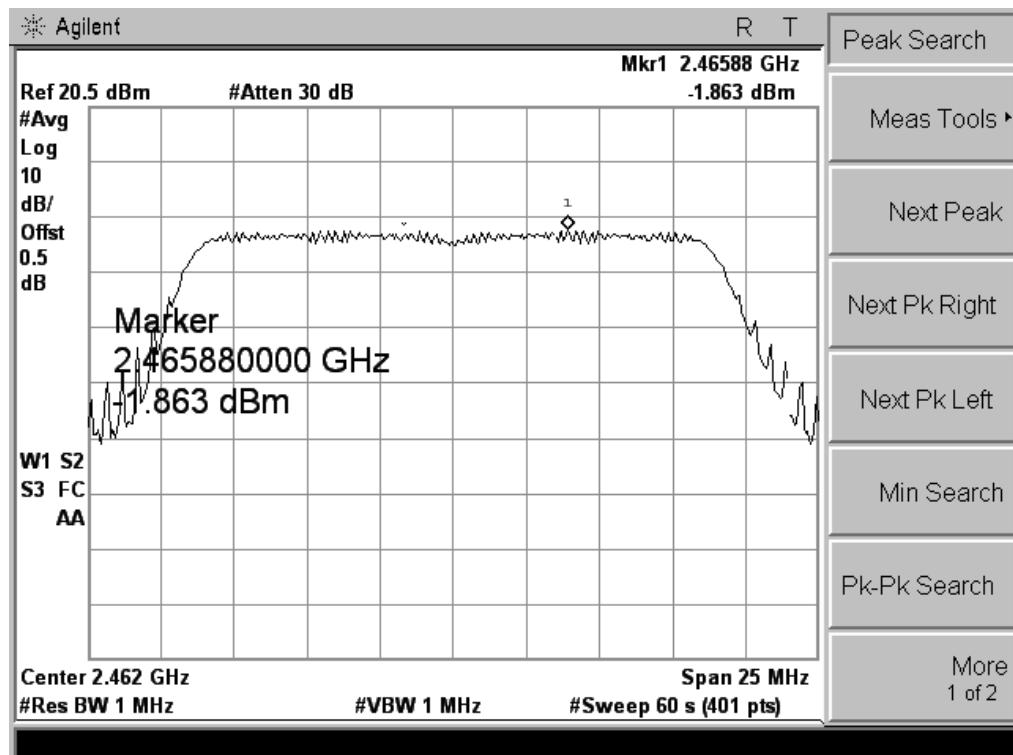
Channel	Frequency (MHz)	PSD (dBm)	Limits(dBm)	Result
1	2412	-1.819	≤8	PASS
6	2437	-1.696	≤8	PASS
11	2462	-1.863	≤8	PASS

B. Test Plot:





(CH Mid)



(CH High)

4.6 Conducted Emission

4.6.1 Definition

According to FCC section 15.207, 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 μ H/50 ohms line impedance stabilization network (LISN).

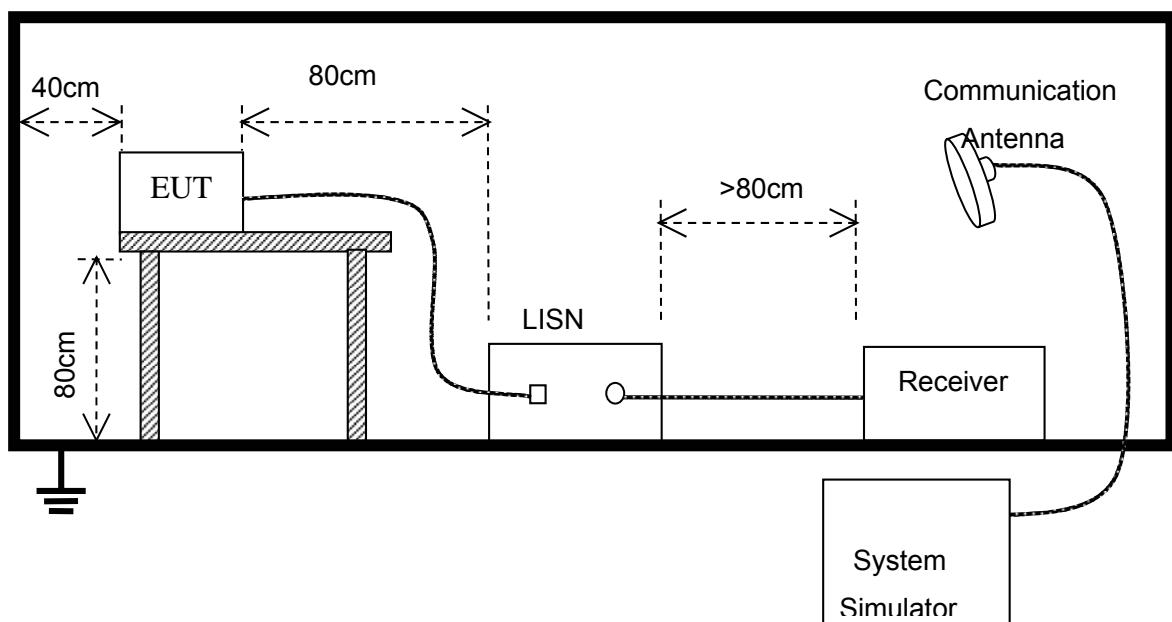
Frequency	Maximum RF Line Voltage	
	Q.P. (dBuV)	Average (dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:

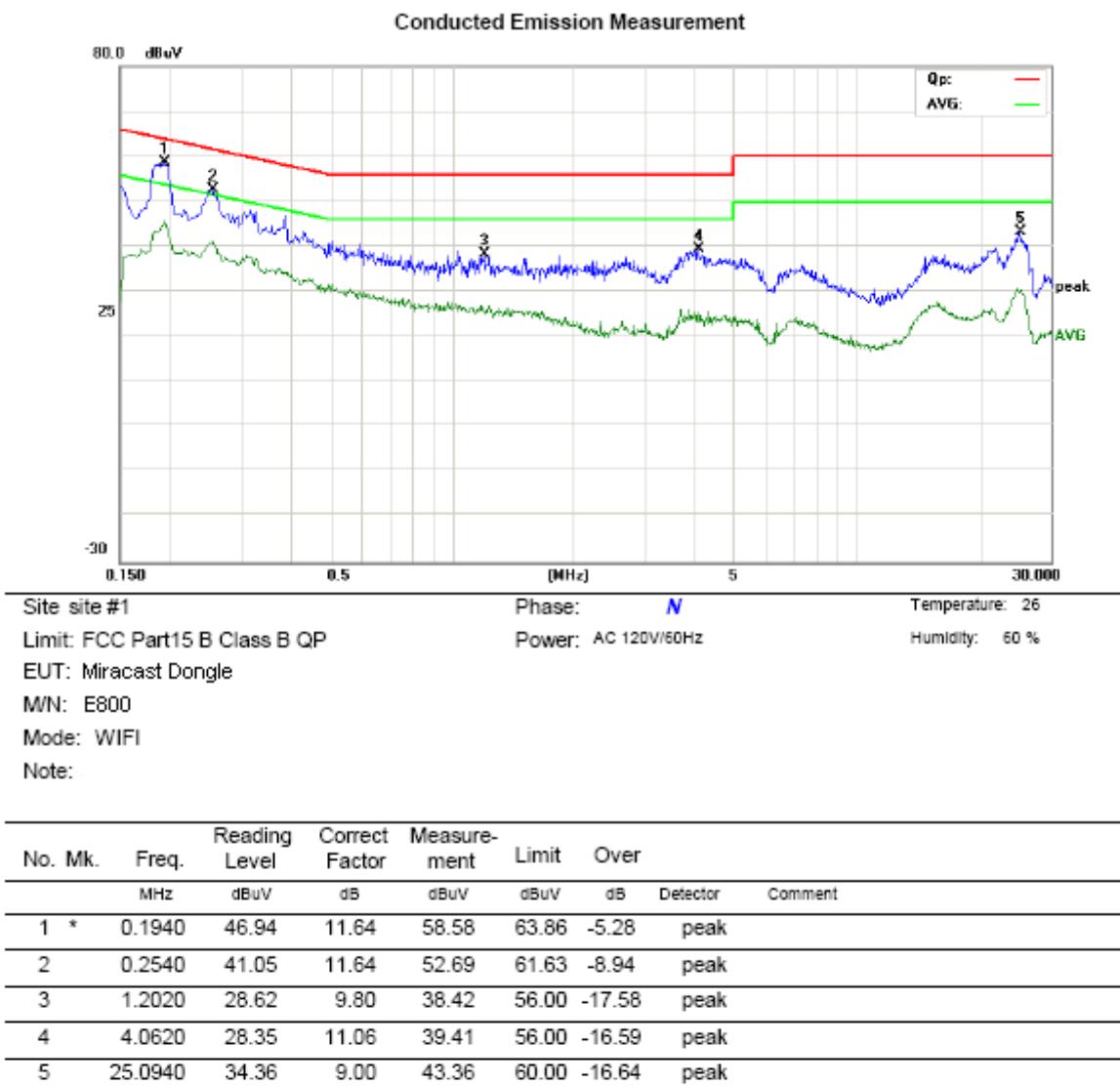
1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

4.6.2 Test Description

The EUT is powered by the Battery charged with the AC Adapter which is powered by 120V, 60Hz AC mains supply. The path loss as the factor is calibrated to correct the reading. During the measurement, the EUT is activated and is set to operate at maximum power.

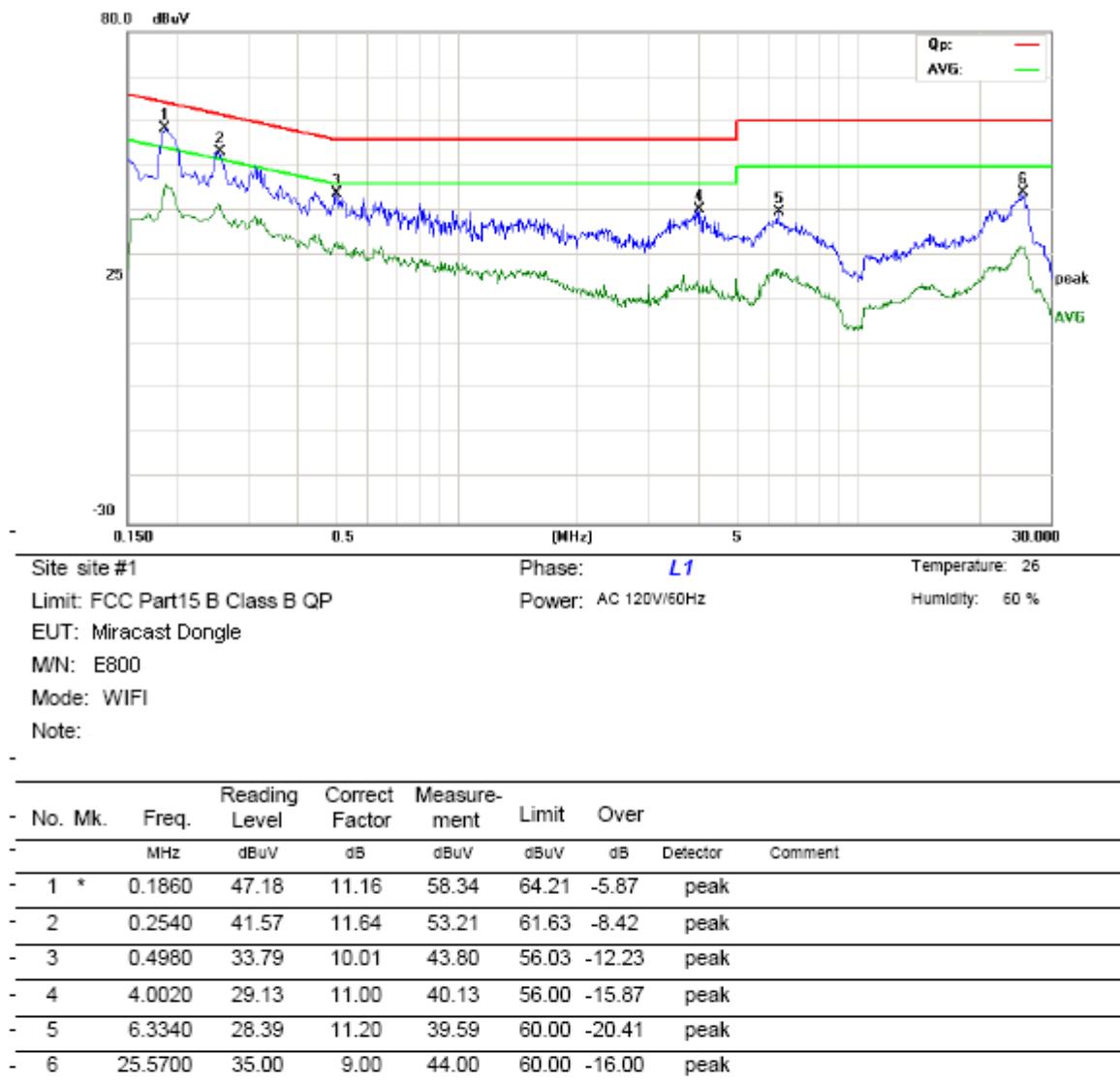


4.6.3 Test Result



*:Maximum data x:Over limit !:over margin

Conducted Emission Measurement



*:Maximum data x:Over limit !:over margin

4.7 Radiated Emission

4.7.1 Definition

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

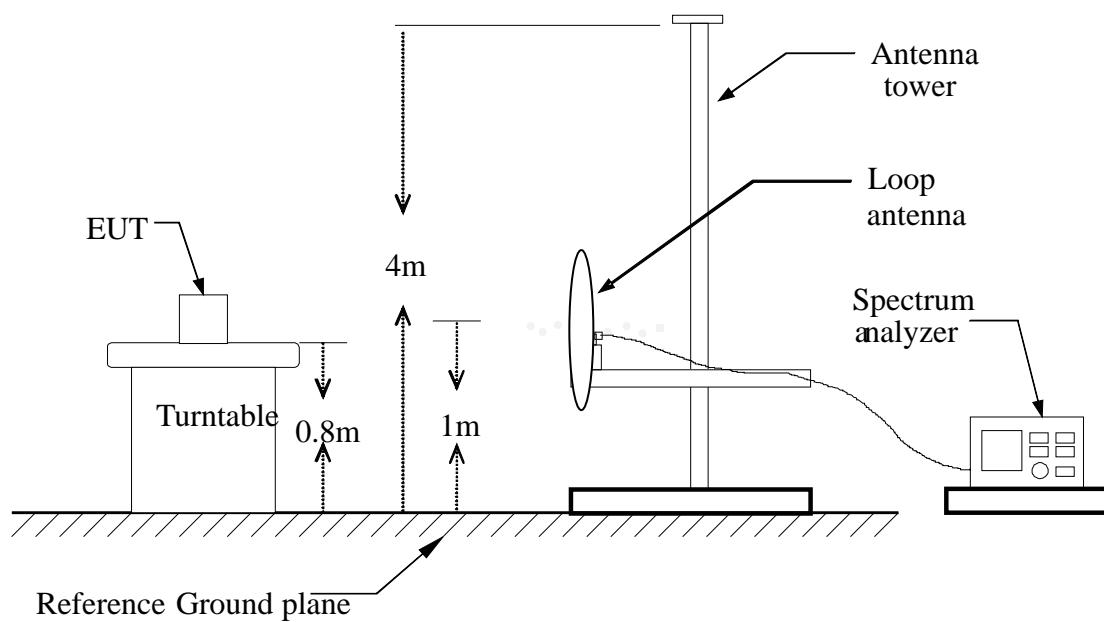
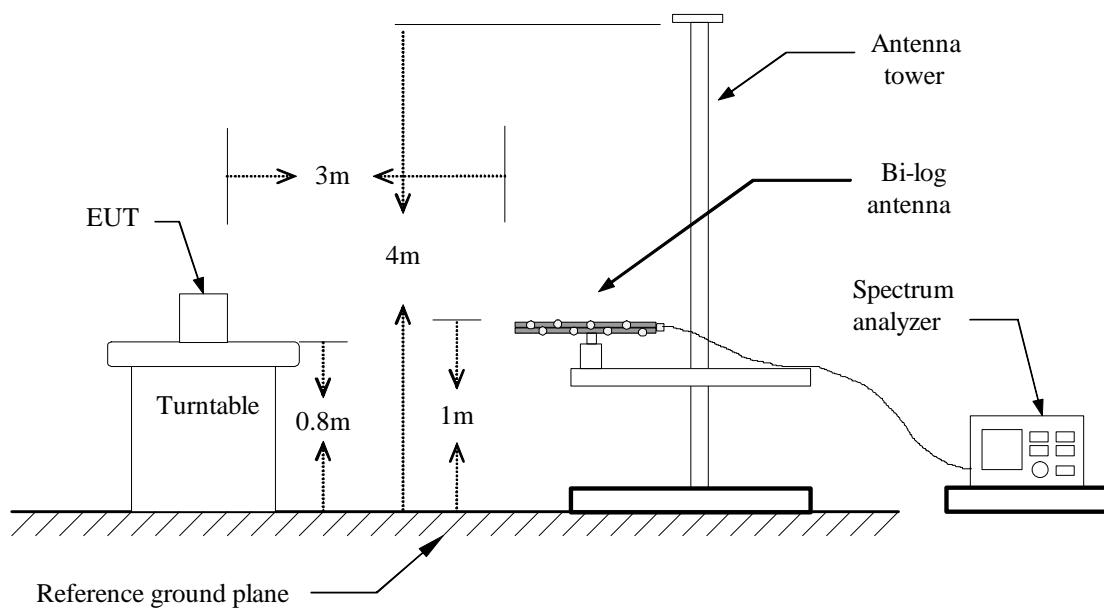
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

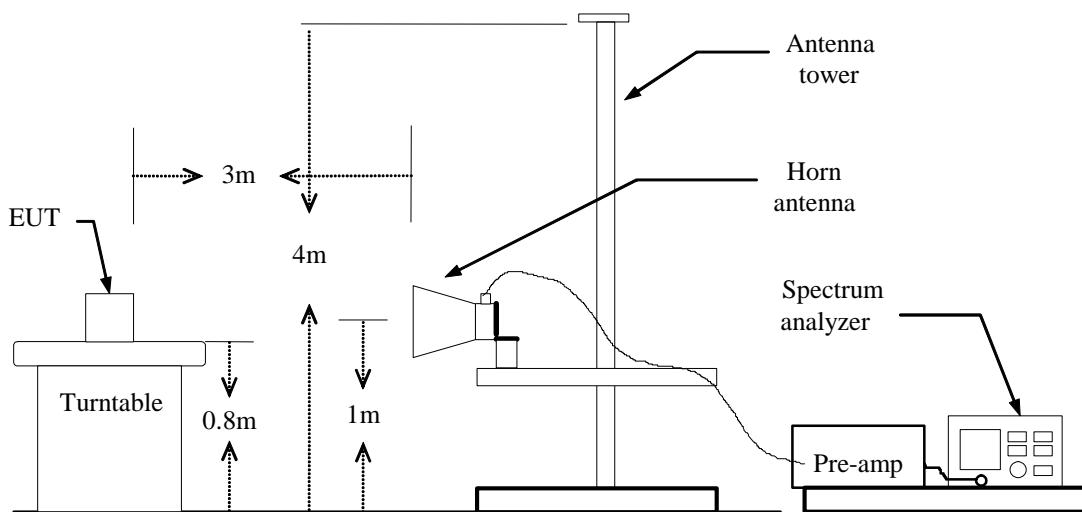
Frequency (MHz)	Field Strength (μ V/m)	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

4.7.2 Test Description

A. Test Setup:

**Below 1GHz:****Above 1GHz:**



B. Test procedures

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=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz : (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

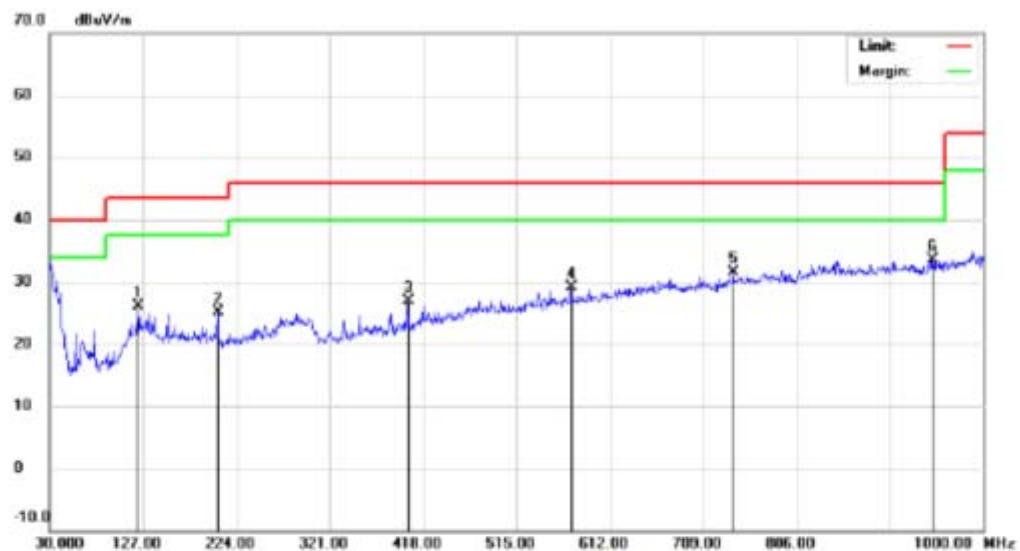
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

4.7.3 Test Result

Form 9 KHz to 30MHz:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

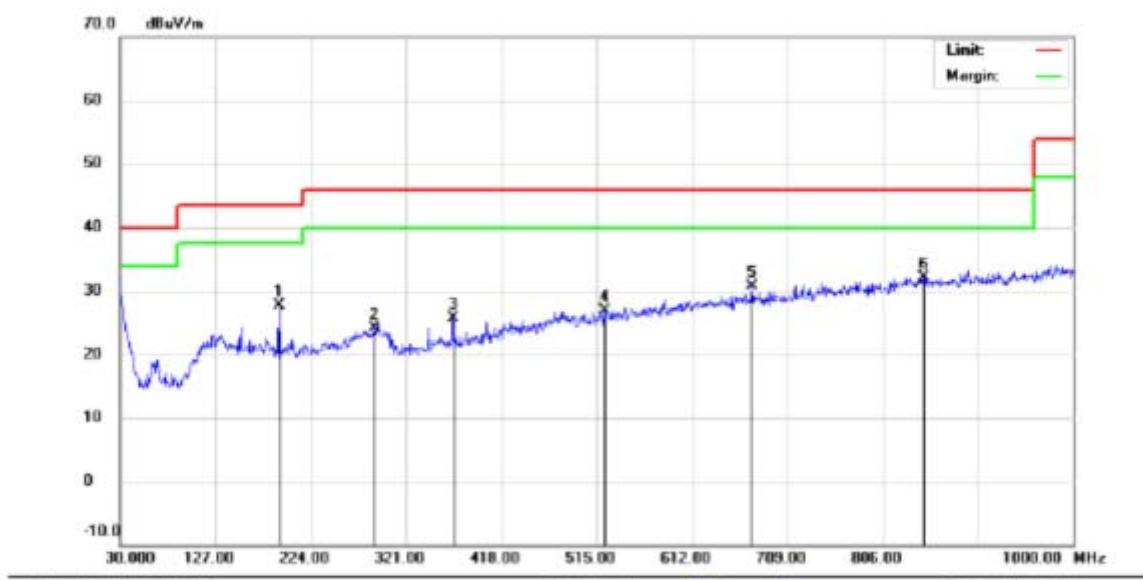
Form 30MHz to 1000MHz:**Radiated Emission Measurement**

Site: site MOST 3M Polarization: **Vertical** Temperature: 26
 Limit: FCC Part15 B 3M Radiation Power: AC 120V/60Hz Humidity: 61 %
 EUT: Miracast Dongle Distance:
 M/N: E800
 Mode: WIFI
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table		
			Level	Factor	ment					Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	
1		122.1500	8.45	17.59	26.04	43.50	-17.46	peak			
2		204.6000	7.84	17.17	25.01	43.50	-18.49	peak			
3		401.5100	8.23	18.73	26.96	46.00	-19.04	peak			
4		571.2600	6.31	22.87	29.18	46.00	-16.82	peak			
5		740.0400	5.96	25.50	31.46	46.00	-14.54	peak			
6	*	946.6500	5.74	27.77	33.51	46.00	-12.49	peak			

*:Maximum data x:Over limit :Over margin

Radiated Emission Measurement



Site site MOST 3M
 Polarization: **Horizontal**
 Temperature: 26
 Limit: FCC Part15 B 3M Radiation
 Power: AC 120V/60Hz
 Humidity: 61 %
 EUT: Miracast Dongle
 Distance:
 M/N: E800
 Mode: WIFI
 Note:

No.	Mk.	Freq. MHz	Reading	Correct	Measure-	Limit	Over	Antenna	Table
			Level dBuV	Factor dB	ment dBuV/m			Height cm	Degree
1		191.9900	10.95	16.70	27.65	43.50	-15.85	peak	
2		288.9900	4.76	19.41	24.17	46.00	-21.83	peak	
3		368.5299	7.49	18.21	25.70	46.00	-20.30	peak	
4		522.7599	4.88	21.94	26.82	46.00	-19.18	peak	
5		673.1100	6.12	24.53	30.65	46.00	-15.35	peak	
6	*	847.7100	5.07	27.13	32.20	46.00	-13.80	peak	

*:Maximum data x:Over limit !:over margin

5.7.3.2 Above 1 GHz

Operation Mode: TX/ IEEE 802.11b/CH Low **Test Date:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak (dBuV)	AV (dBuV)	Ant. / CL CF	Actual Fs		Peak	AV	AV
							Limit	Limit	Margin
					Peak	AV	(dBuV/m)	(dBuV/m)	(dB)
					(dBuV/m)	(dBuV/m)			
4824.5	V	44.98	25.69	23.05	68.03	48.74	74.00	54.00	-5.26
N/A	V								
4824.5	H	45.37	26.38	23.05	68.42	49.43	74.00	54.00	-4.57
N/A	H								

Notes:

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:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	AV Margin (dB)
							Peak (dBuV/m)	AV (dBuV/m)	
4874.5	V	43.52	23.83	23.31	66.83	47.14	74.00	54.00	-6.86
N/A	V								
4874.5	H	44.60	24.42	23.31	67.91	47.73	74.00	54.00	-6.27
N/A	H								

Notes:

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:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak (dBuV)	AV (dBuV)	Ant. / CL CF	Actual Fs		Peak	AV	AV
							Limit	Limit	Margin
					Peak (dBuV/m)	AV (dBuV/m)			
4924.5	V	46.08	25.19	23.53	69.61	48.72	74.00	54.00	-5.28
N/A	V								
4924.5	H	45.65	24.08	23.53	69.18	47.61	74.00	54.00	-6.39
N/A	H								

Notes:

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:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak	AV	AV
							Limit (dBuV/m)	Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4824.5	V	43.71	23.61	23.05	66.76	46.66	74.00	54.00	-7.34
N/A	V								
4824.5	H	44.97	25.08	23.05	68.02	48.13	74.00	54.00	-5.87
N/A	H								

Notes:

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:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak	AV	AV
							Limit (dBuV/m)	Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4874.5	V	45.84	24.23	23.31	69.15	47.54	74.00	54.00	-6.46
N/A	V								
4874.5	H	44.17	25.79	23.31	67.48	49.10	74.00	54.00	-4.90
N/A	H								

Notes:

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:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak	AV	AV
							Limit (dBuV/m)	Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4924.5	V	46.29	25.34	23.53	69.82	48.87	74.00	54.00	-5.13
N/A	V								
4924.5	H	44.35	24.20	23.53	67.88	47.73	74.00	54.00	-6.27
N/A	H								

Notes:

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 802.11n/CH Low **Test Date:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4824.02	H	47.71	22.21	23.08	70.79	45.29	74.00	54.00	-8.71
	N/A								>20
<hr/>									
4824.02	V	46.99	22.65	23.93	70.92	46.58	74.00	54.00	-7.42
	N/A								>20

Notes:

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 802.11n/CH Mid **Test Date:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4874.15	H	47.56	24.48	23.23	70.79	47.71	74.00	54.00	-6.29
N/A									>20
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4874.15	V	47.69	24.92	23.23	70.92	48.15	74.00	54.00	-5.85
N/A									>20

Notes:

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 802.11n/CH High **Test Date:** December 04,2013
Temperature: 20°C **Tested by:** Habby Guo
Humidity: 70 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
4920.05	H	47.44	25.36	23.35	70.79	48.71	74.00	54.00	-5.29
N/A									>20
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4920.05	V	47.57	25.61	23.35	70.92	48.96	74.00	54.00	-5.04
N/A									>20

Notes:

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).

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