



FCC TEST REPORT

for

Mobile Internet Device

MODEL: MID8048, MID8047

Brand: COBY

Test Report Number:

C121116Z01-RP1

Issued Date: December 12, 2012

Issued for

Coby Communications Ltd.

**Unit C-E, 8/F, PO Shau Centre, 115 How Ming Street , Kwun Tong
Kowloon ,Hong Kong**

Issued by:

Compliance Certification Services (Shenzhen) Inc.

**No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd.,
Guan Lan Town, Baoan District, Shenzhen, China**

TEL: 86-755-28055000

FAX: 86-755-28055221



**Note: This report shall not be reproduced except in full, without the written approval of
Compliance Certification Services Inc. This document may be altered or revised by
Compliance Certification Services Inc. personnel only, and shall be noted in the revision
section of the document. The client should not use it to claim product endorsement by
TAF, A2LA, NVLAP, NIST or any government agencies. The test results in the report
only apply to the tested sample.**



Revision History

Rev.	Issue No.	Revisions	Effect Page	Revised By
00	C121116Z01-RP1	Initial Issue	ALL	Nancy Fu



TABLE OF CONTENTS

1 TEST CERTIFICATION.....	4
2 TEST RESULT SUMMARY.....	5
3 EUT DESCRIPTION.....	6
4 TEST METHODOLOGY.....	7
4.1. DESCRIPTION OF TEST MODES	7
5 SETUP OF EQUIPMENT UNDER TEST.....	8
5.1. DESCRIPTION OF SUPPORT UNITS.....	8
5.2. CONFIGURATION OF SYSTEM UNDER TEST	8
6 FACILITIES AND ACCREDITATIONS	9
6.1. FACILITIES	9
6.2. ACCREDITATIONS	9
6.3. MEASUREMENT UNCERTAINTY.....	9
7 FCC PART 15.247 REQUIREMENTS.....	10
7.1. POWER LINE CONDUCTED EMISSIONS MEASUREMENT.....	10
7.2. SPURIOUS EMISSIONS MEASUREMENT.....	14
7.3. 6dB BANDWIDTH MEASUREMENT	45
7.4. PEAK OUTPUT POWER	53
7.5. BAND EDGES MEASUREMENT:.....	61
7.6. PEAK POWER SPECTRAL DENSITY MEASUREMENT.....	79



1 TEST CERTIFICATION

Product	Mobile Internet Device
Model	MID8048, MID8047
Brand	COBY
Tested	November 11~ December 12, 2012
Applicant	Coby Communications Ltd. Unit C-E, 8/F, PO Shau Centre, 115 How Ming Street, Kwun Tong Kowloon, Hong Kong
Manufacturer	ShenZhen COBY Communications LTD. Block 2~3, TaoXia 2nd Industrial Zone, LongHua Town, BaoAn District, ShenZhen City GuangDong Province P.R. China

APPLICABLE STANDARDS			
Standard	Test Type	Standard	Test Type
15.207(a)	Power Line Conducted Emissions	15.247(d) 15.209(a)	● Spurious Emissions ● Conducted Measurement ● Radiated Emissions
15.247(a)(2)	6dB Bandwidth Measurement	15.247(b)(3) 15.247(b)(4)	Peak Power Measurement
15.247(d)	Band Edges Measurement	15.247(e)	Peak Power Spectral Density

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: 2009** 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:

Tom Gan
Supervisor of EMC Dept.
Compliance Certification Service Inc.

Reviewed by:

Ruby Zhang
Supervisor of Report Dept.
Compliance Certification Service Inc.



2 TEST RESULT SUMMARY

APPLICABLE STANDARDS			
Standard	Test Type	Result	Remark
15.247(a)(2)	6dB Bandwidth Measurement	Pass	Meet the requirement of limit.
15.247(b)(3) 15.247(b)(4)	Peak Power Measurement	Pass	Meet the requirement of limit.
15.247(d)	Band Edges Measurement	Pass	Meet the requirement of limit.
15.247(e)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.247(d) 15.209(a)	● Spurious Emissions ● Conducted Measurement ● Radiated Emissions	Pass	Meet the requirement of limit.
15.207(a)	Power line Conducted Emissions	Pass	Meet the requirement of limit.

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.

2. The information of measurement uncertainty is available upon the customer's request.



3 EUT DESCRIPTION

Product	Mobile Internet Device
Brand	COBY
Model Number	MID8048, MID8047
Model Discrepancy	Only their model names are different for the marketing purpose.
Serial Number	C121116Z01-RP1
Received Date	November 16, 2012
Power Supply	DC5V supplied by the adapter or PC DC3.7V supplied by the battery
Adapter Manufacturer / Model No.	PS12K0502000UE I/P: 100-240Vac, 50-60Hz, 0.35A max O/P: 5Vdc, 2000mA DC Output Cable: Unshielded, 1.80m
Frequency Range	IEEE 802.11b/g: 2412 ~ 2462 MHz IEEE 802.11n HT20 : 2412 ~ 2462 MHz IEEE 802.11n HT40 : 2422MHz~ 2452MHz
Transmit Power	IEEE 802.11b mode: 11.39dBm IEEE 802.11g mode: 7.62dBm IEEE 802.11n HT20 MHz mode: 7.53dBm IEEE 802.11n HT40 MHz mode: 7.14dBm
Modulation Technique	IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QsAM) IEEE 802.11n HT20 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE 802.11n HT40 MHz mode: OFDM (BPSK/QPSK/16QAM/64QAM)
Transmit Data Rate	802.11b: 11Mbps(CCK) with fall back rates of 5.5/2/1Mbps 802.11g: 54Mbps with fall back rates of 48/36/24/18/12/9/6Mbps IEEE 802.11n HT20: 135.0Mbps with fall back rates of 121.5/ 108.0/81.0 /65.0/58.5/54.0/52.0/40.5/39.0/27.0/26.0/19.5/13.5/13.0/6.5 Mbps IEEE 802.11n HT40: 135.0Mbps with fall back rates of 121.5/ 108.0/81.0 /65.0/58.5/54.0/52.0/40.5/39.0/27.0/26.0/19.5/13.5 Mbps
Number of Channels	IEEE 802.11b mode: 11 Channels IEEE 802.11g mode: 11 Channels IEEE 802.11n HT20 MHz mode: 11 Channels IEEE 802.11n HT40 MHz mode: 7 Channels
Antenna Specification	PIFA Antenna with 2dBi gain (Max)

Note:

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: **S71MID8048-8047** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



4 TEST METHODOLOGY

4.1. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Test Item	Test mode	Worse mode
Conducted Emission	Mode 1: Adapter+HDMI	<input checked="" type="checkbox"/>
	Mode 2: Copy Data	<input type="checkbox"/>
Radiated Emission	Mode 1: TX	<input checked="" type="checkbox"/>

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

IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High(2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT20 MHz mode: Channel Low (2412MHz), Channel Mid(2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT40 MHz mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

The field strength of spurious radiation emission was measured in the following position: EUT stand-up position (Y mode) and lie-down position (X, Z mode) The following data show only the worst case setup.

The worst case (Y axis) was reported.



5 SETUP OF EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Brand	Data Cable	Power Cord
1	PC	CLRDY2X	F0-4D-A2-24-0 8-28	N/A	DELL	Shielded, 1.80m	N/A
2	Printer	P310B	DLRE217030	N/A	EPSON	Unshielded, 1.20m	Unshielded, 2.00m
3	Mouse	WB365PA#A B2	2HTJMB101178 -317	N/A	DELL	Unshielded, 1.45m	N/A
4.	Keyboard	KU-9985	2D4150005SB	N/A	DELL	Unshielded, 1.45m	N/A
5.	Modem	MODEM1414	9013592	N/A	ACEEX	Unshielded, 1.20m	Unshielded, 2.0m
6.	Monitor	ST2420Lb	CN-OVTTD2-74 261-110-2D2U	N/A	DELL	Unshielded, 1.50m	Unshielded, 1.50m
7.	SD Card	N/A	N/A	N/A	N/A	N/A	N/A
8.	Notebook	PP24L	R349CA00	N/A	DELL	Unshielded, 1.20m	Unshielded, 2.00m

Note:

- 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.

5.2. CONFIGURATION OF SYSTEM UNDER TEST

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



6 FACILITIES AND ACCREDITATIONS

6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at
**No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town,
Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

USA	A2LA
China	CNAS

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

USA	FCC
Japan	VCCI(C-3478, R-3135, T-652, G-624)
Canada	INDUSTRY CANADA
Taiwan	BSMI
Norway	Nemko

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	+/- 3.18dB
Radiated emissions	30MHz ~ 200MHz	+/- 3.79dB
	200MHz ~1000MHz	+/- 3.62dB
	Above 1000MHz	+/- 5.04dB
Band Edges		+/-0.182 dB

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

The measured result is above (below) the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95% level of confidence. However, the result indicates that compliance (non-compliance) is more probable than non-compliance) with the specification limit.



7 FCC PART 15.247 REQUIREMENTS

7.1. POWER LINE CONDUCTED EMISSIONS MEASUREMENT

7.1.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

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 μ 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 μ 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

NOTE:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

7.1.2. TEST INSTRUMENTS

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/17/2012	03/17/2013
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543	09/20/2012	09/20/2013
LISN	EMCO	3825/2	8901-1459	03/19/2012	03/19/2013
Temp. / Humidity Meter	VICTOR	HTC-1	2	03/20/2012	03/20/2013
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R = No Calibration Request.

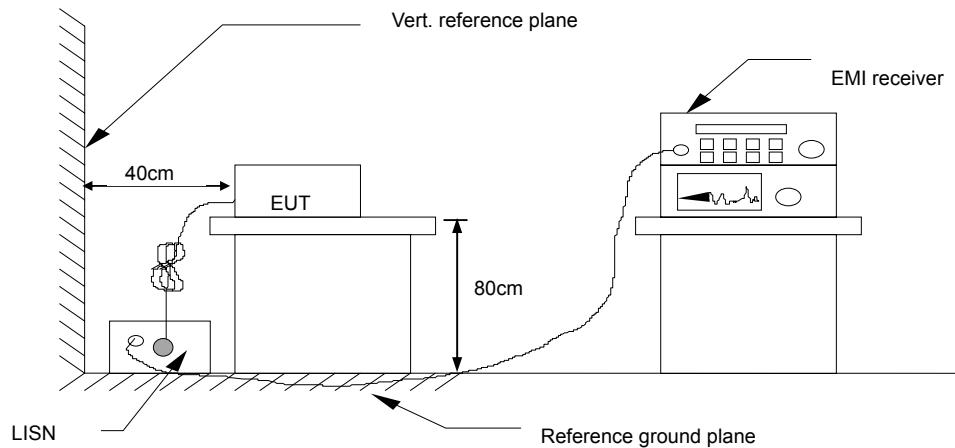


7.1.3. TEST PROCEDURES (please refer to measurement standard)

- The EUT and Support equipment, if needed, was placed on a non-conducted table, which is 0.8m above the ground plane and 0.4m away from the conducted wall.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane. All support equipment power received from a second LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The frequency range from 150 kHz to 30 MHz was searched. The test data of the worst-case condition(s) was recorded. Emission levels under limit 20dB were not recorded.



7.1.4. TEST SETUP



For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.

7.1.5. DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)



7.1.6. TEST RESULTS

Model No.	MID8048				RBW,VBW	9 kHz			
Environmental Conditions	22°C, 45% RH				Test Mode	Mode 1			
Tested by	Leevin Li				Line	L1			

(The chart below shows the highest readings taken from the final data.)

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
0.2758	45.93	30.09	9.64	55.57	39.73	60.94	50.94	-5.37	-11.21	Pass
0.3307	43.15	31.12	9.66	52.81	40.78	59.43	49.43	-6.62	-8.65	Pass
0.4028	43.42	31.00	9.68	53.10	40.68	57.79	47.80	-4.69	-7.12	Pass
0.4698	40.36	27.59	9.70	50.06	37.29	56.52	46.52	-6.46	-9.23	Pass
0.5153	40.68	22.37	9.71	50.39	32.08	56.00	46.00	-5.61	-13.92	Pass
0.5835	38.64	22.16	9.70	48.34	31.86	56.00	46.00	-7.66	-14.14	Pass

REMARKS: L1 = Line One (Live Line)

Model No.	MID8048				RBW,VBW	9 kHz			
Environmental Conditions	22°C, 45% RH				Test Mode	Mode 1			
Tested by	Leevin Li				Line	L2			

(The chart below shows the highest readings taken from the final data.)

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
0.2580	47.37	29.14	9.63	57.00	38.77	61.49	51.50	-4.49	-12.73	Pass
0.3422	40.09	26.54	9.66	49.75	36.20	59.15	49.15	-9.40	-12.95	Pass
0.3938	41.61	27.74	9.68	51.29	37.42	57.98	47.98	-6.69	-10.56	Pass
0.4793	38.57	22.27	9.71	48.28	31.98	56.35	46.35	-8.07	-14.37	Pass
0.5185	39.71	22.21	9.71	49.42	31.92	56.00	46.00	-6.58	-14.08	Pass
0.5860	40.87	23.57	9.70	50.57	33.27	56.00	46.00	-5.43	-12.73	Pass

REMARKS: L2 = Line Two (Neutral Line)



7.2. SPURIOUS EMISSIONS MEASUREMENT

7.2.1. LIMITS OF CONDUCTED EMISSIONS MEASUREMENT

§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3) requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3) requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

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)).

7.2.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2012	03/19/2013

7.2.3. TEST PROCEDURE (please refer to measurement standard)

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 300 kHz.

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

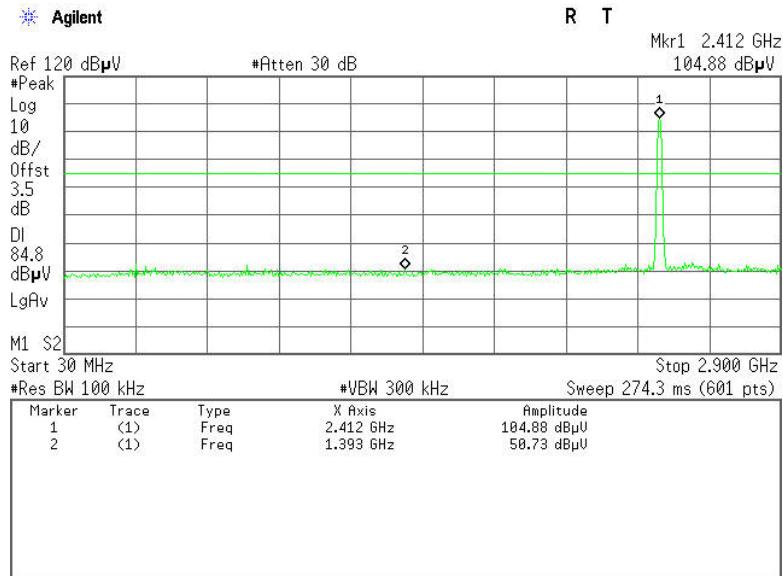


7.2.4. TEST RESULTS

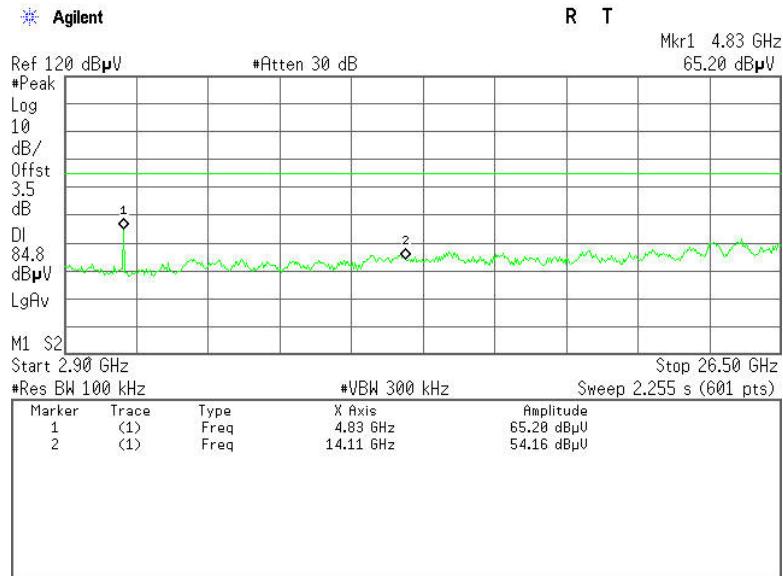
Test Plot

IEEE 802.11b mode

CH Low (30MHz ~2.9GHz)

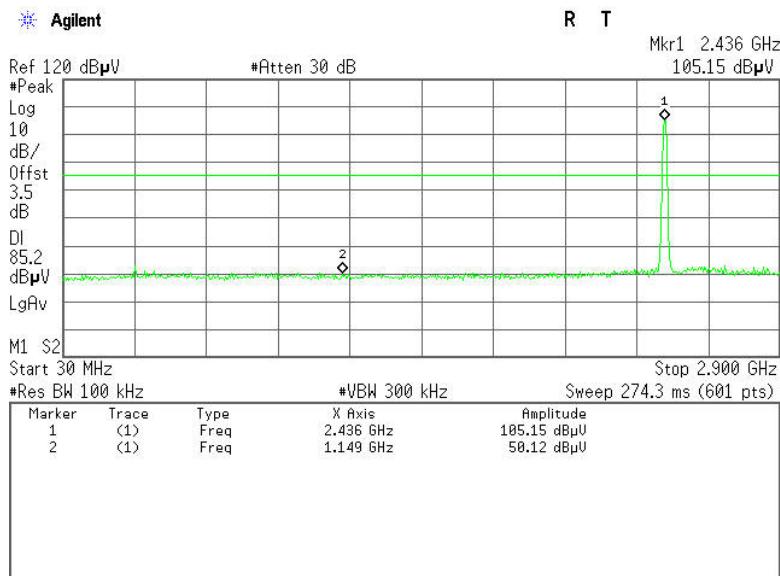


CH Low (2.9GHz ~26.5GHz)

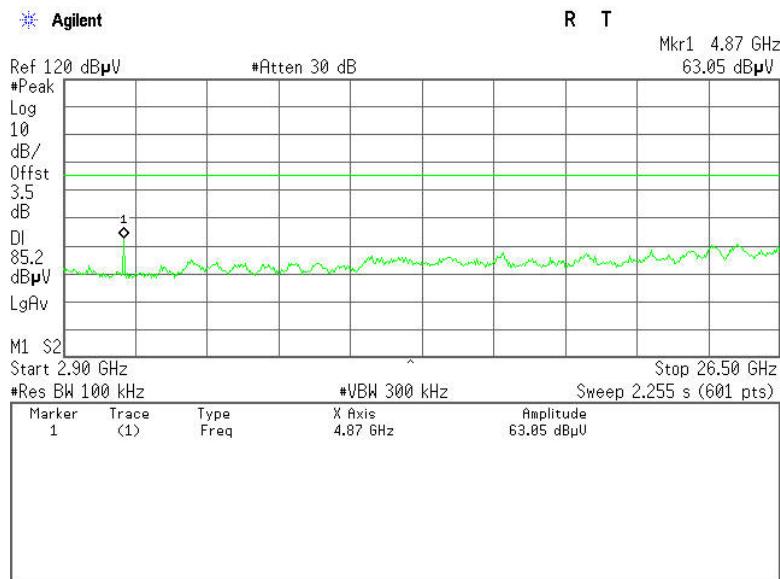




CH Mid (30MHz ~2.9GHz)

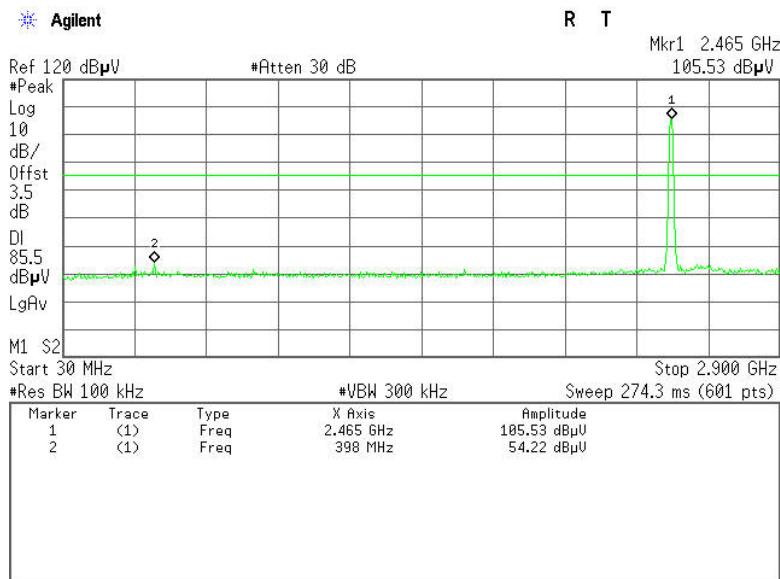


CH Mid (2.9GHz ~26.5GHz)

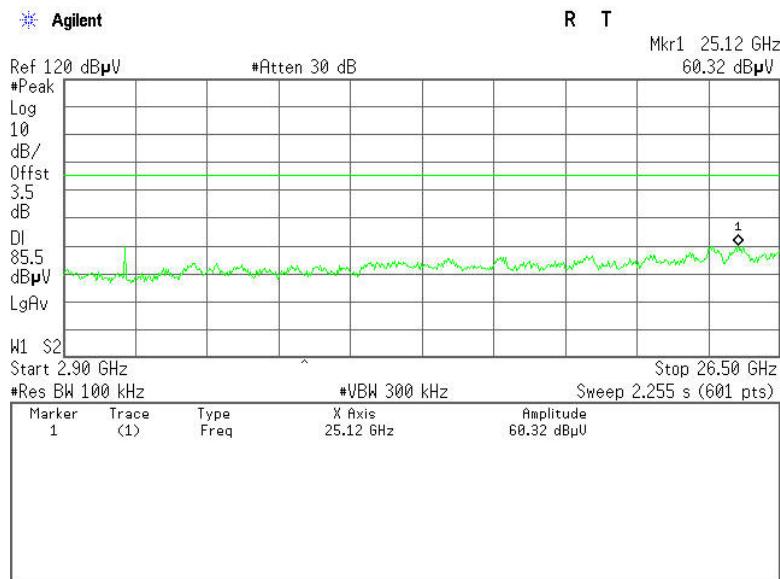




CH High (30MHz ~2.9GHz)

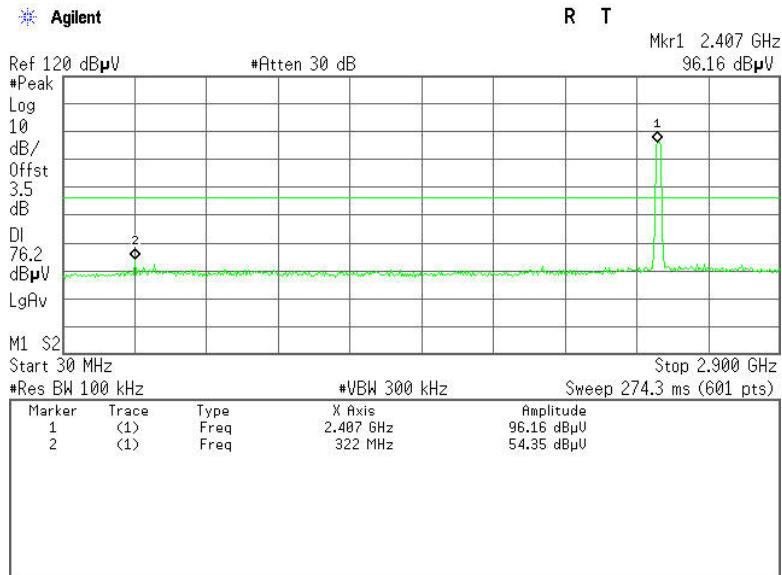


CH High (2.9GHz ~26.5GHz)

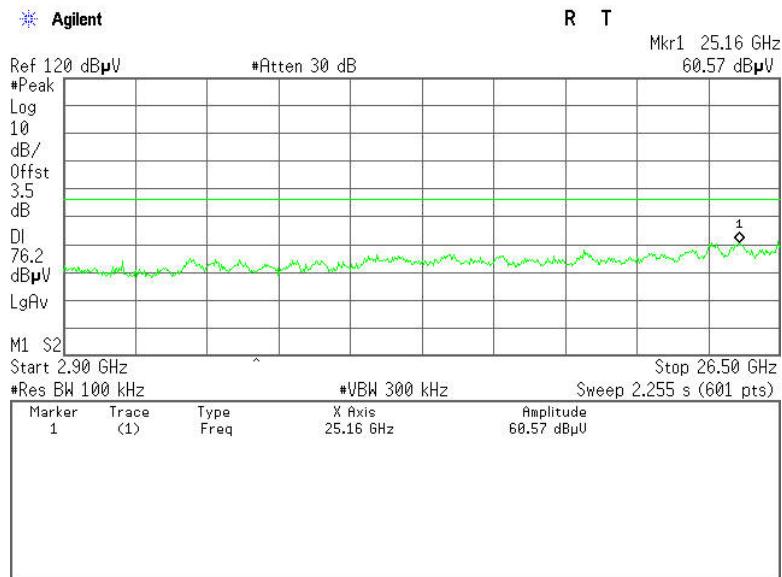




IEEE 802.11g mode CH Low (30MHz ~2.9GHz)

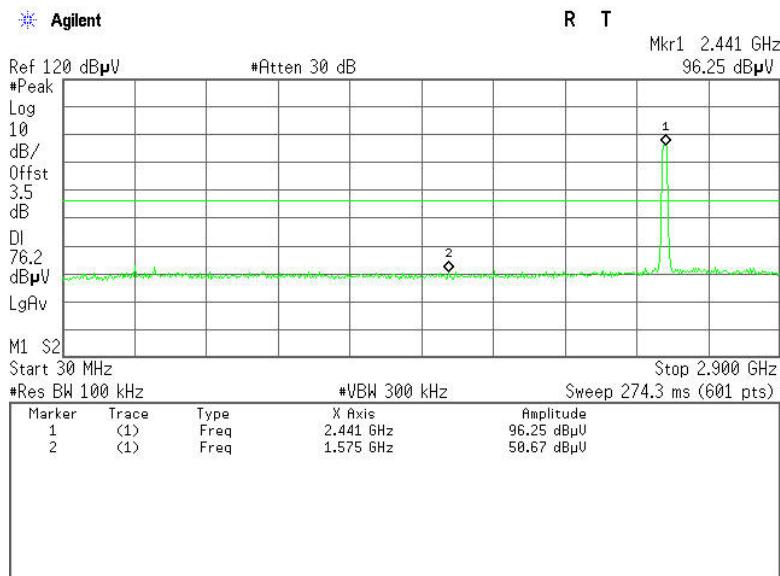


CH Low (2.9GHz ~26.5GHz)

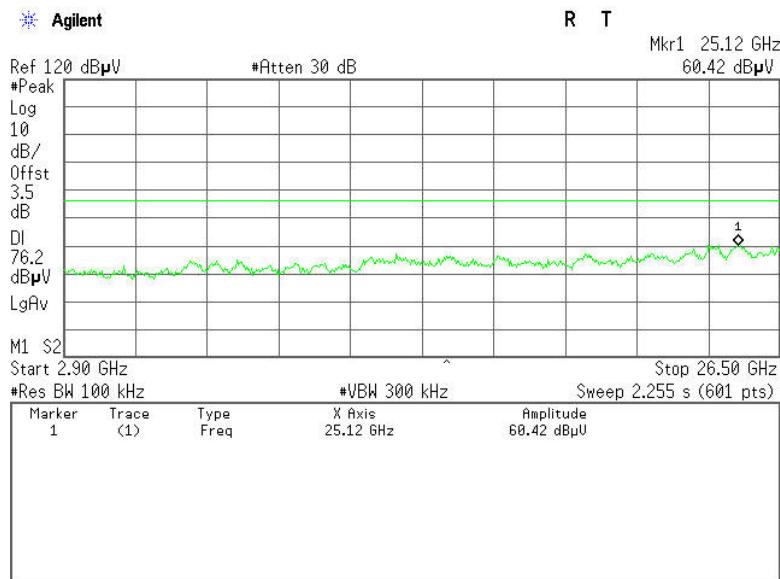




CH Mid (30MHz ~2.9GHz)

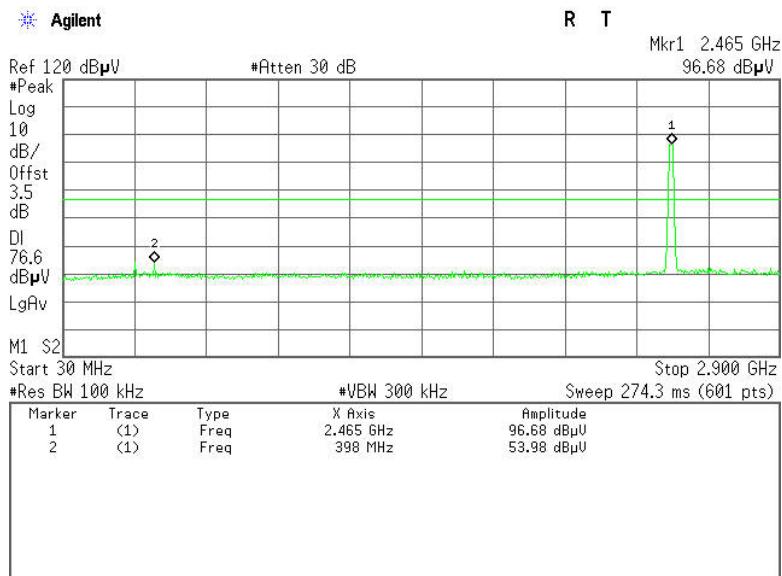


CH Mid (2.9GHz ~26.5GHz)

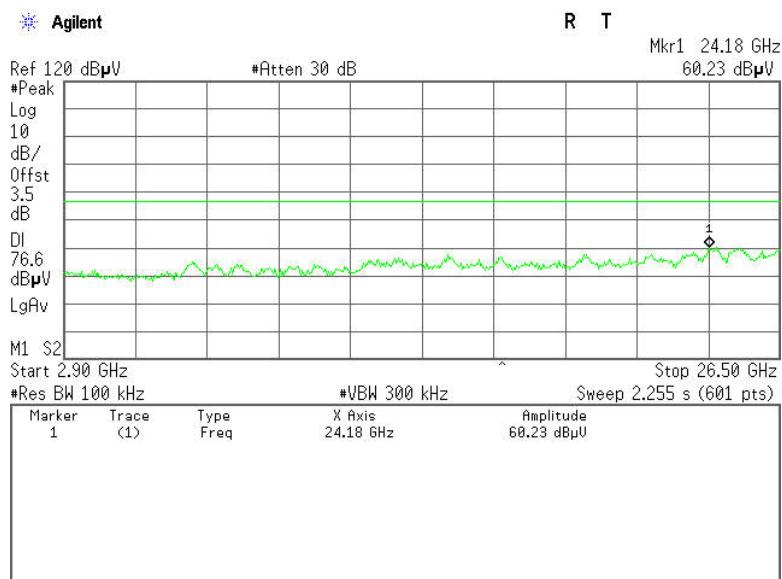


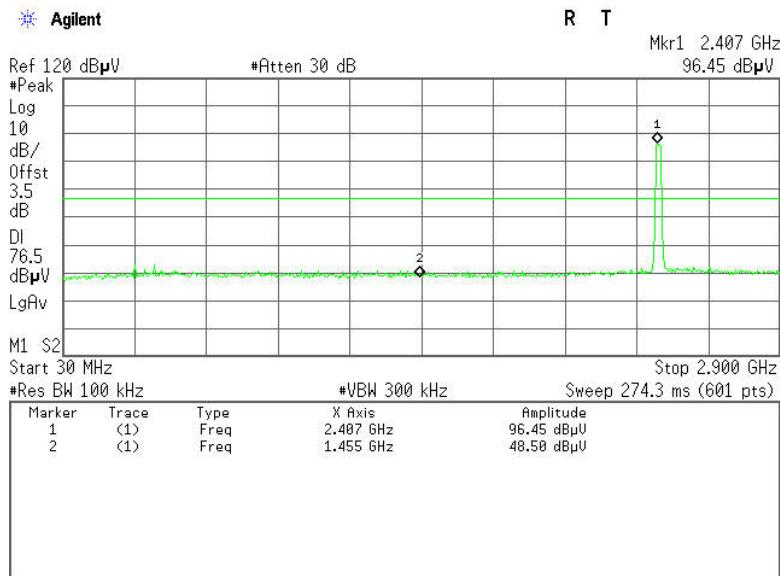
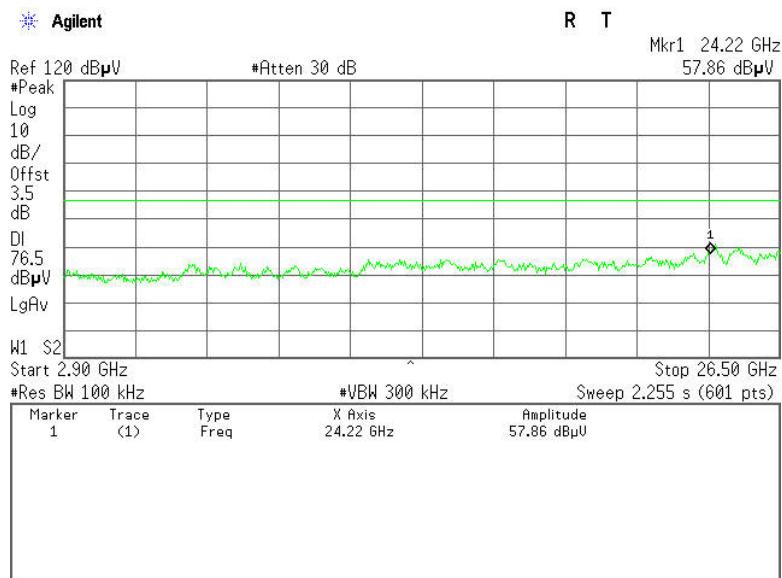


CH High (30MHz ~2.9GHz)



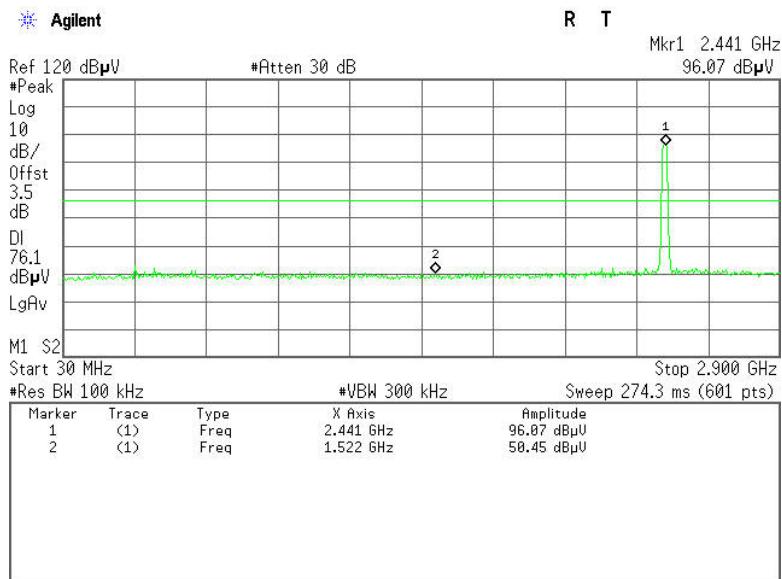
CH High (2.9GHz ~26.5GHz)



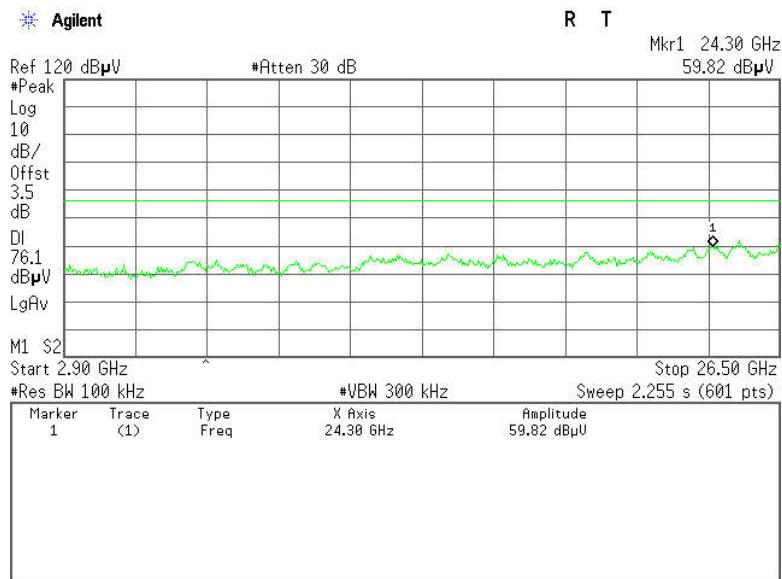
**Test Plot****IEEE 802.11n HT20 MHz mode****CH Low (30MHz ~2.9GHz)****CH Low (2.9GHz ~26.5GHz)**



CH Mid (30MHz ~2.9GHz)

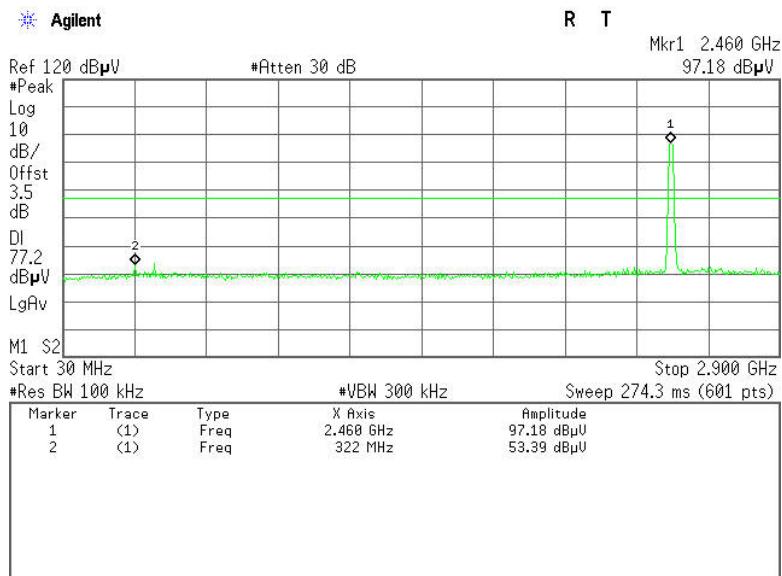


CH Mid (2.9GHz ~26.5GHz)

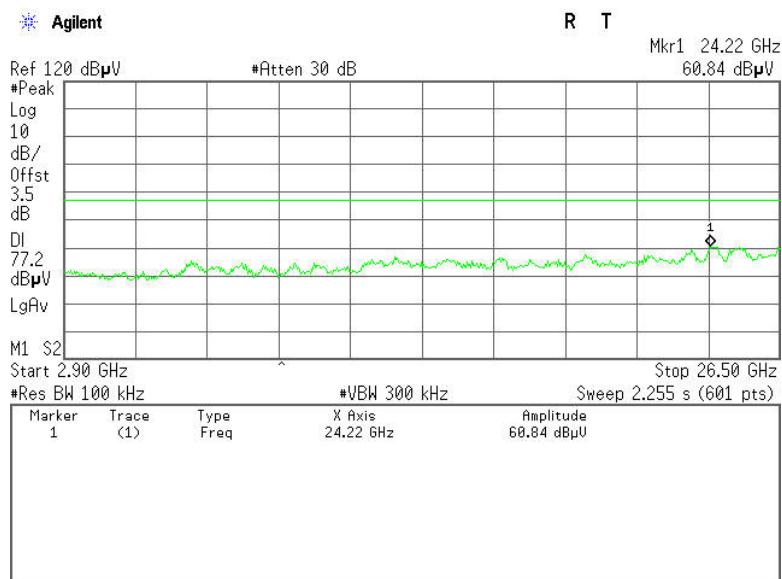




CH High (30MHz ~2.9GHz)



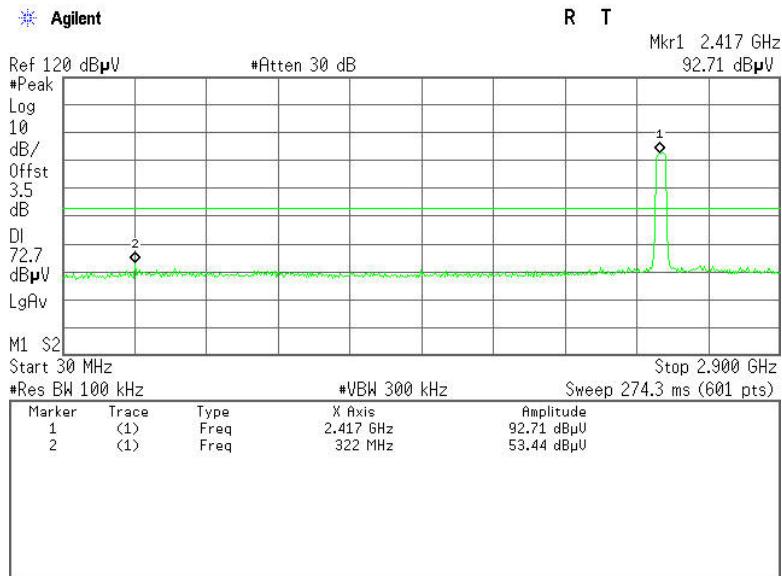
CH High (2.9GHz ~26.5GHz)



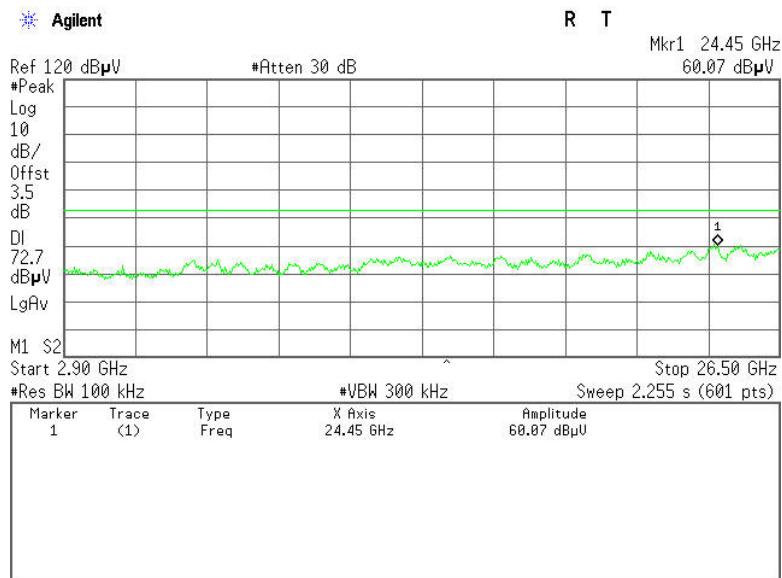


IEEE 802.11n HT40 MHz mode

CH Low (30MHz ~2.9GHz)

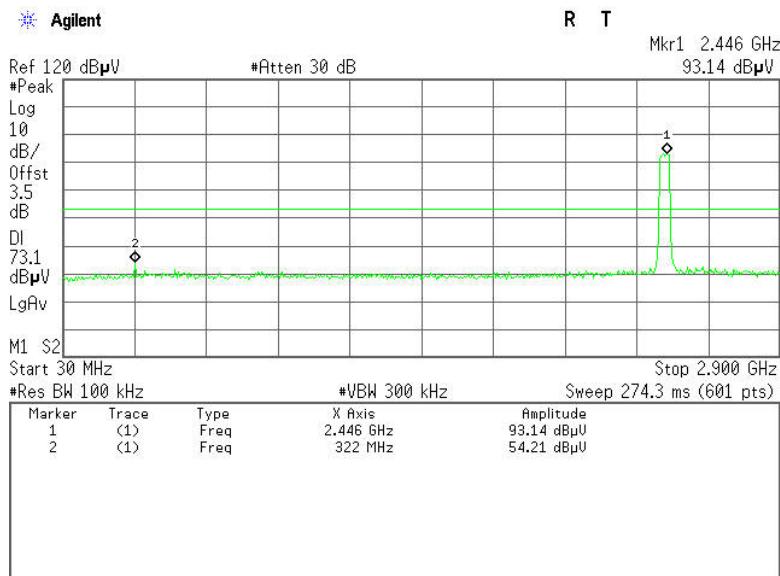


CH Low (2.9GHz ~26.5GHz)

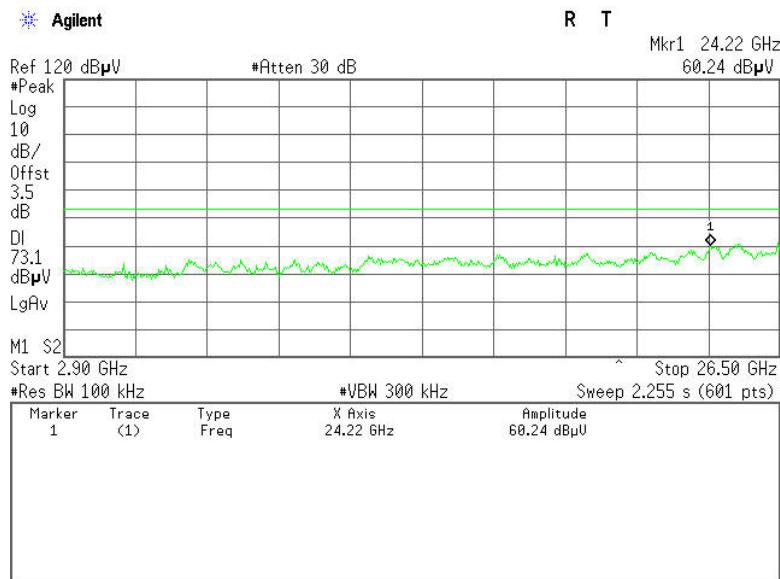




CH Mid (30MHz ~2.9GHz)

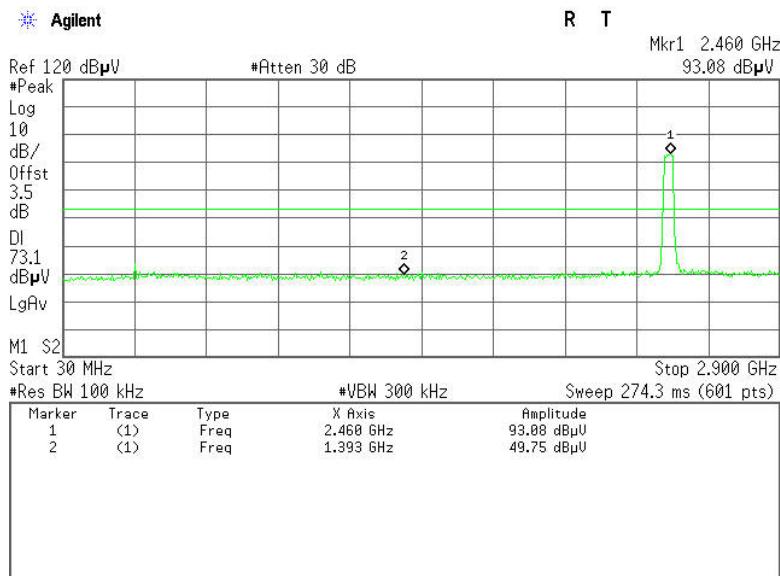


CH Mid (2.9GHz ~26.5GHz)

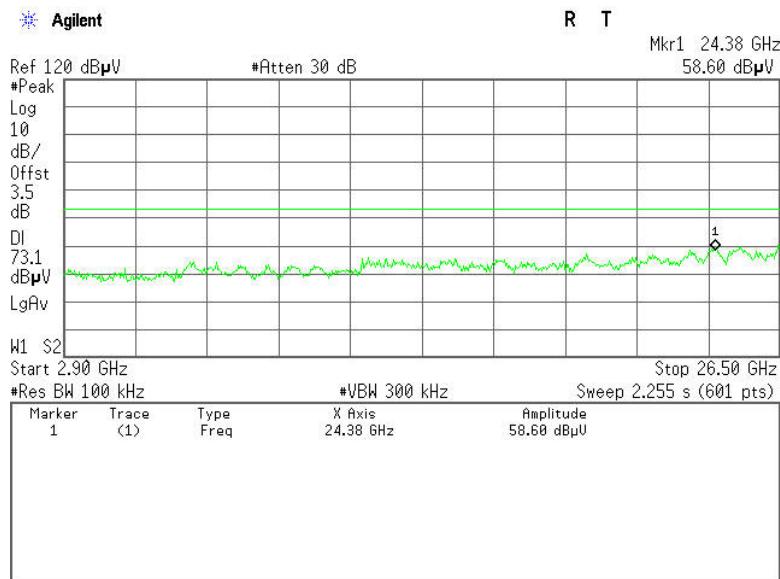




CH High (30MHz ~2.9GHz)



CH High (2.9GHz ~26.5GHz)





7.2.4.1. LIMITS OF RADIATED EMISSIONS MEASUREMENT

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 (mV/m)	Measurement Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
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.

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

Frequency (MHz)	Field Strength (μ V/m at 3-meter)	Field Strength (dB μ V/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

NOTE:(1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dB μ V/m) = 20 log Emission level (μ V/m).



7.2.4.2. TEST INSTRUMENTS

Radiated Emission Test Site 966(2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2012	03/19/2013
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/17/2012	03/17/2013
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2012	03/18/2013
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2012	03/18/2013
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/17/2012	03/17/2013
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/17/2012	03/17/2013
Loop Antenna	A. R. A	PLA-1030/B	1029	03/23/2012	03/23/2013
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/19/2012	03/19/2013
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The FCC Site Registration number is 101879.
3. N.C.R = No Calibration Required.

7.2.4.3. TEST PROCEDURE (please refer to measurement standard)

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:

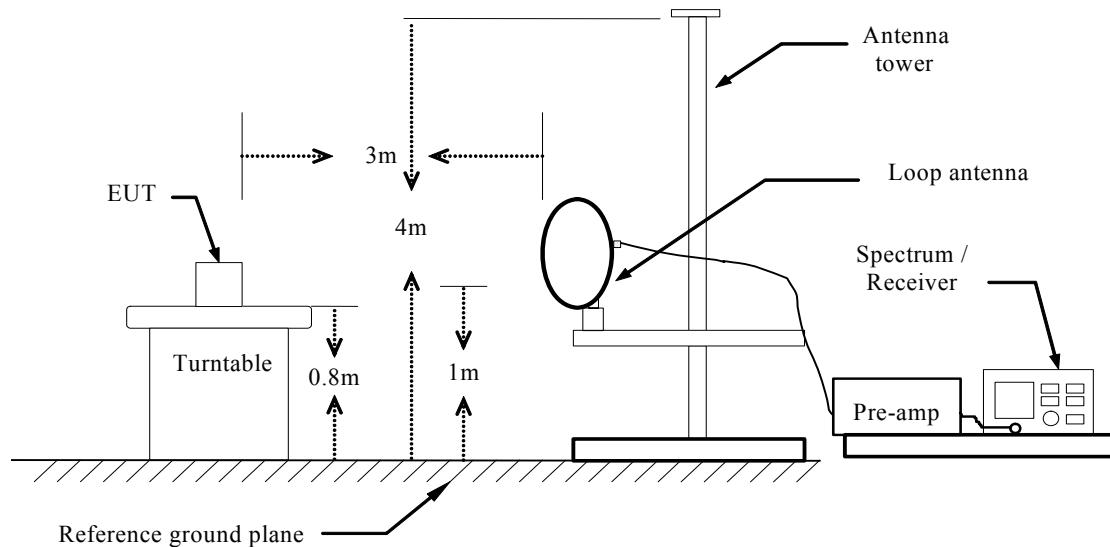
(a) PEAK: RBW=1MHz,VBW=3MHz / Sweep=AUTO

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

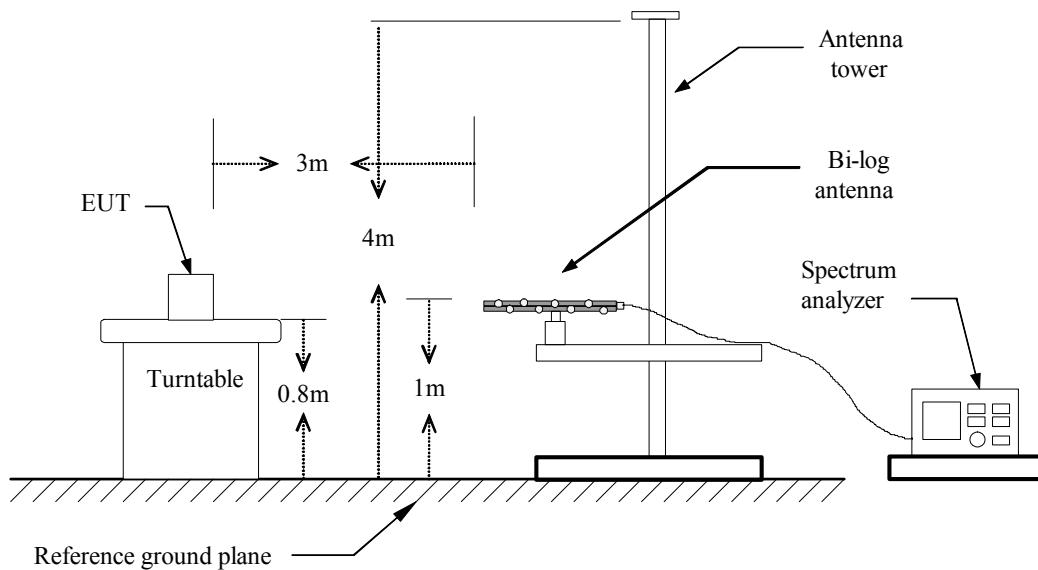
7. Repeat above procedures until the measurements for all frequencies are complete.

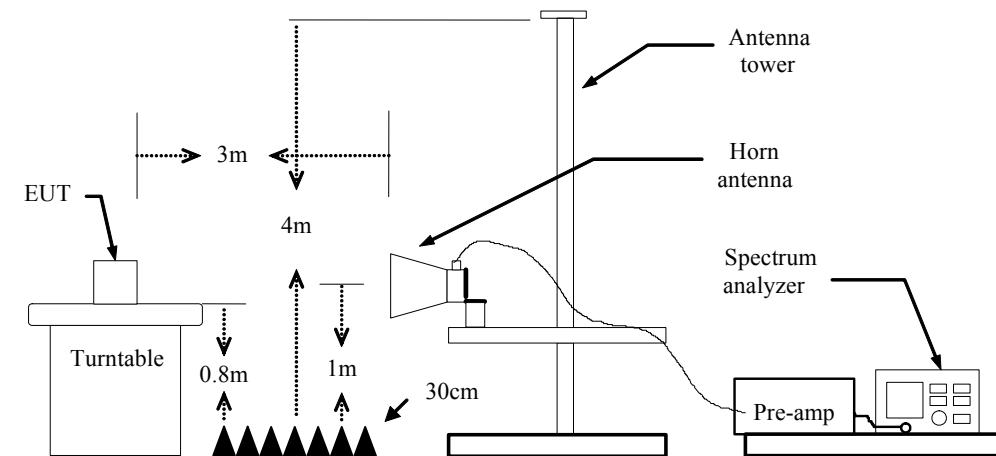
7.2.4.4. TEST SETUP

Below 30MHz



Below 1 GHz



Above 1 GHz

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

**7.2.4.5. DATA SAMPLE****Below 1GHz**

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXX.XXXX	36.37	-12.20	24.17	40.00	-15.83	V	QP

Frequency (MHz)

= Emission frequency in MHz

Reading (dBuV)

= Uncorrected Analyzer / Receiver reading

Correct Factor (dB/m)

= Antenna factor + Cable loss – Amplifier gain

Result (dBuV/m)

= Reading (dBuV) + Corr. Factor (dB/m)

Limit (dBuV/m)

= Limit stated in standard

Margin (dB)

= Result (dBuV/m) – Limit (dBuV/m)

Q.P.

= Quasi-peak Reading

Above 1GHz

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
XXXX.XXXX	62.09	-11.42	50.67	74.00	-23.33	V	Peak
XXXX.XXXX	49.78	-11.42	38.36	54.00	-15.64	V	AVG

Frequency (MHz)

= Emission frequency in MHz

Reading (dBuV)

= Uncorrected Analyzer / Receiver reading

Correction Factor (dB/m)

= Antenna factor + Cable loss – Amplifier gain

Result (dBuV/m)

= Reading (dBuV) + Corr. Factor (dB/m)

Limit (dBuV/m)

= Limit stated in standard

Margin (dB)

= Result (dBuV/m) – Limit (dBuV/m)

Peak

= Peak Reading

AVG

= Average Reading

Calculation Formula

$$\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{Limits (dBuV/m)}$$

$$\text{Result (dBuV/m)} = \text{Reading (dBuV)} + \text{Correction Factor}$$



7.2.4.6. TEST RESULTS

Below 1 GHz

Operation Mode: TX

Test Date: December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

(The chart below shows the highest readings taken from the final data.)

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
104.6900	54.04	-15.22	38.82	43.50	-4.68	V	QP
296.7500	52.93	-10.84	42.09	46.00	-3.91	V	QP
600.3600	45.35	-4.35	41.00	46.00	-5.00	V	QP
742.9500	43.33	-1.70	41.63	46.00	-4.37	V	QP
806.9700	43.37	-0.47	42.90	46.00	-3.10	V	QP
848.6800	39.59	0.03	39.62	46.00	-6.38	V	QP
<hr/>							
296.7500	53.38	-10.84	42.54	46.00	-3.46	H	QP
594.5400	44.88	-4.41	40.47	46.00	-5.53	H	QP
636.2500	46.33	-3.03	43.30	46.00	-2.70	H	QP
742.9500	42.26	-1.70	40.56	46.00	-5.44	H	QP
806.9700	43.63	-0.47	43.16	46.00	-2.84	H	QP
848.6800	40.71	0.03	40.74	46.00	-5.26	H	QP

****Remark:** No emission found between lowest internal used/generated frequency to 30MHz.

Notes:

1. Radiated emissions measured in frequency range from 9kHz to 1GHz were made with an instrument using Quasi-peak detector mode.
2. 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.
3. The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
4. Frequency (MHz).
Reading (dB μ V/m)
Correction Factor (dB)
Limit (dB μ V/m)
Margin (dB)
Antenna Pol e(H/V) = Emission frequency in MHz
= Receiver reading
= Antenna factor + Cable loss – Amplifier gain
= Limit stated in standard
= Measured (dB μ V/m) – Limits (dB μ V/m)
= Current carrying line of reading

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** December 11, 2012**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.63	-10.33	44.30	74.00	-29.70	V	Peak
1570.0000	52.85	-8.76	44.09	74.00	-29.91	V	Peak
2110.0000	49.84	-6.76	43.08	74.00	-30.92	V	Peak
3805.0000	46.12	-0.72	45.40	74.00	-28.60	V	Peak
4165.0000	46.31	-0.06	46.25	74.00	-27.75	V	Peak
4825.0000	48.66	2.86	51.52	74.00	-22.48	V	Peak
1645.0000	49.10	-8.37	40.73	74.00	-33.27	H	Peak
2110.0000	49.06	-6.76	42.30	74.00	-31.70	H	Peak
3460.0000	47.07	-1.41	45.66	74.00	-28.34	H	Peak
3685.0000	46.60	-0.84	45.76	74.00	-28.24	H	Peak
4165.0000	45.93	-0.06	45.87	74.00	-28.13	H	Peak
4825.0000	54.44	2.86	57.30	74.00	-16.70	H	Peak
4825.0000	49.94	2.86	52.80	54.00	-1.20	H	AVG

REMARKS:

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 11, 2012**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.17	-10.33	43.84	74.00	-30.16	V	Peak
1570.0000	51.61	-8.76	42.85	74.00	-31.15	V	Peak
2020.0000	49.89	-6.63	43.26	74.00	-30.74	V	Peak
3655.0000	45.97	-0.88	45.09	74.00	-28.91	V	Peak
4165.0000	45.55	-0.06	45.49	74.00	-28.51	V	Peak
4870.0000	48.15	3.13	51.28	74.00	-22.72	V	Peak
1555.0000	49.76	-8.95	40.81	74.00	-33.19	H	Peak
2080.0000	48.60	-6.72	41.88	74.00	-32.12	H	Peak
3475.0000	46.23	-1.27	44.96	74.00	-29.04	H	Peak
3880.0000	46.31	-0.65	45.66	74.00	-28.34	H	Peak
4165.0000	46.44	-0.06	46.38	74.00	-27.62	H	Peak
4870.0000	54.06	3.13	57.19	74.00	-16.81	H	Peak
4870.0000	49.37	3.13	52.50	54.00	-1.50	H	AVG

REMARKS:

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 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.18	-10.33	43.85	74.00	-30.15	V	Peak
1570.0000	52.68	-8.76	43.92	74.00	-30.08	V	Peak
1915.0000	52.00	-7.34	44.66	74.00	-29.34	V	Peak
3490.0000	46.07	-1.13	44.94	74.00	-29.06	V	Peak
3775.0000	45.88	-0.76	45.12	74.00	-28.88	V	Peak
4930.0000	48.25	3.49	51.74	74.00	-22.26	V	Peak
1570.0000	48.96	-8.76	40.20	74.00	-33.80	H	Peak
2140.0000	48.03	-6.80	41.23	74.00	-32.77	H	Peak
2815.0000	48.52	-6.39	42.13	74.00	-31.87	H	Peak
3265.0000	47.17	-3.29	43.88	74.00	-30.12	H	Peak
3655.0000	46.46	-0.88	45.58	74.00	-28.42	H	Peak
4930.0000	50.49	3.49	53.98	74.00	-20.02	H	Peak
4930.0000	48.61	3.49	52.10	54.00	-1.90	H	AVG

REMARKS:

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 11, 2012**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	53.72	-10.33	43.39	74.00	-30.61	V	Peak
1915.0000	50.29	-7.34	42.95	74.00	-31.05	V	Peak
3475.0000	45.55	-1.27	44.28	74.00	-29.72	V	Peak
3835.0000	46.18	-0.70	45.48	74.00	-28.52	V	Peak
4825.0000	46.54	2.86	49.40	74.00	-24.60	V	Peak
5995.0000	44.60	7.56	52.16	74.00	-21.84	V	Peak
1240.0000	50.70	-10.33	40.37	74.00	-33.63	H	Peak
1990.0000	48.24	-6.69	41.55	74.00	-32.45	H	Peak
3655.0000	45.64	-0.88	44.76	74.00	-29.24	H	Peak
3925.0000	45.68	-0.60	45.08	74.00	-28.92	H	Peak
4555.0000	45.52	1.21	46.73	74.00	-27.27	H	Peak
4825.0000	46.84	2.86	49.70	74.00	-24.30	H	Peak

REMARKS:

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 11, 2012**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.71	-10.33	44.38	74.00	-29.62	V	Peak
1465.0000	53.79	-10.10	43.69	74.00	-30.31	V	Peak
1915.0000	50.58	-7.34	43.24	74.00	-30.76	V	Peak
3655.0000	45.98	-0.88	45.10	74.00	-28.90	V	Peak
4870.0000	45.99	3.13	49.12	74.00	-24.88	V	Peak
5830.0000	44.65	6.50	51.15	74.00	-22.85	V	Peak
2140.0000	48.11	-6.80	41.31	74.00	-32.69	H	Peak
3475.0000	46.48	-1.27	45.21	74.00	-28.79	H	Peak
3715.0000	46.21	-0.82	45.39	74.00	-28.61	H	Peak
4420.0000	45.16	0.65	45.81	74.00	-28.19	H	Peak
4870.0000	45.49	3.13	48.62	74.00	-25.38	H	Peak
5305.0000	45.51	4.19	49.70	74.00	-24.30	H	Peak

REMARKS:

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 11, 2012**Temperature:** 24°C**Tested by:** Leevin Li**Humidity:** 52 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.65	-10.33	44.32	74.00	-29.68	V	Peak
1570.0000	51.81	-8.76	43.05	74.00	-30.95	V	Peak
1915.0000	50.33	-7.34	42.99	74.00	-31.01	V	Peak
3580.0000	46.39	-0.95	45.44	74.00	-28.56	V	Peak
4930.0000	45.18	3.49	48.67	74.00	-25.33	V	Peak
5650.0000	44.56	5.34	49.90	74.00	-24.10	V	Peak
2140.0000	49.18	-6.80	42.38	74.00	-31.62	H	Peak
3535.0000	46.55	-0.99	45.56	74.00	-28.44	H	Peak
3910.0000	46.55	-0.62	45.93	74.00	-28.07	H	Peak
4345.0000	45.86	0.44	46.30	74.00	-27.70	H	Peak
4930.0000	45.56	3.49	49.05	74.00	-24.95	H	Peak
5305.0000	45.40	4.19	49.59	74.00	-24.41	H	Peak

REMARKS:

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 HT20 MHz / CH Low **Test Date:** December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.61	-10.33	44.28	74.00	-29.72	V	Peak
1465.0000	53.92	-10.10	43.82	74.00	-30.18	V	Peak
1990.0000	50.99	-6.69	44.30	74.00	-29.70	V	Peak
3685.0000	46.45	-0.84	45.61	74.00	-28.39	V	Peak
4825.0000	46.87	2.86	49.73	74.00	-24.27	V	Peak
5815.0000	45.02	6.40	51.42	74.00	-22.58	V	Peak
1615.0000	48.65	-8.38	40.27	74.00	-33.73	H	Peak
1990.0000	48.84	-6.69	42.15	74.00	-31.85	H	Peak
3505.0000	45.16	-1.03	44.13	74.00	-29.87	H	Peak
3865.0000	47.61	-0.67	46.94	74.00	-27.06	H	Peak
4825.0000	46.71	2.86	49.57	74.00	-24.43	H	Peak
5785.0000	45.27	6.21	51.48	74.00	-22.52	H	Peak

REMARKS:

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 HT20 MHz / CH Mid **Test Date:** December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	55.00	-10.33	44.67	74.00	-29.33	V	Peak
1465.0000	53.77	-10.10	43.67	74.00	-30.33	V	Peak
1915.0000	50.48	-7.34	43.14	74.00	-30.86	V	Peak
3790.0000	46.26	-0.74	45.52	74.00	-28.48	V	Peak
4270.0000	45.31	0.23	45.54	74.00	-28.46	V	Peak
5230.0000	44.99	4.13	49.12	74.00	-24.88	V	Peak
<hr/>							
1735.0000	48.31	-8.35	39.96	74.00	-34.04	H	Peak
2155.0000	48.14	-6.82	41.32	74.00	-32.68	H	Peak
3985.0000	46.57	-0.55	46.02	74.00	-27.98	H	Peak
4375.0000	46.17	0.53	46.70	74.00	-27.30	H	Peak
4870.0000	47.98	3.13	51.11	74.00	-22.89	H	Peak
5710.0000	45.62	5.72	51.34	74.00	-22.66	H	Peak

REMARKS:

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 HT20 MHz / CH High **Test Date:** December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	53.66	-10.33	43.33	74.00	-30.67	V	Peak
1465.0000	53.39	-10.10	43.29	74.00	-30.71	V	Peak
1915.0000	49.78	-7.34	42.44	74.00	-31.56	V	Peak
3880.0000	45.98	-0.65	45.33	74.00	-28.67	V	Peak
4975.0000	44.63	3.77	48.40	74.00	-25.60	V	Peak
5590.0000	44.22	4.95	49.17	74.00	-24.83	V	Peak
1240.0000	50.98	-10.33	40.65	74.00	-33.35	H	Peak
2140.0000	48.80	-6.80	42.00	74.00	-32.00	H	Peak
3460.0000	45.44	-1.41	44.03	74.00	-29.97	H	Peak
3865.0000	46.23	-0.67	45.56	74.00	-28.44	H	Peak
4600.0000	45.93	1.49	47.42	74.00	-26.58	H	Peak
4930.0000	45.66	3.49	49.15	74.00	-24.85	H	Peak

REMARKS:

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 HT40 MHz / CH Low

Test Date: December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.67	-10.33	44.34	74.00	-29.66	V	Peak
1570.0000	51.69	-8.76	42.93	74.00	-31.07	V	Peak
1915.0000	49.69	-7.34	42.35	74.00	-31.65	V	Peak
3865.0000	45.57	-0.67	44.90	74.00	-29.10	V	Peak
4840.0000	46.10	2.95	49.05	74.00	-24.95	V	Peak
5875.0000	44.85	6.79	51.64	74.00	-22.36	V	Peak
1570.0000	49.04	-8.76	40.28	74.00	-33.72	H	Peak
2155.0000	48.49	-6.82	41.67	74.00	-32.33	H	Peak
3880.0000	46.10	-0.65	45.45	74.00	-28.55	H	Peak
4255.0000	46.07	0.19	46.26	74.00	-27.74	H	Peak
4840.0000	46.00	2.95	48.95	74.00	-25.05	H	Peak
5305.0000	44.85	4.19	49.04	74.00	-24.96	H	Peak

REMARKS:

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 HT40 MHz / CH Mid **Test Date:** December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1570.0000	52.05	-8.76	43.29	74.00	-30.71	V	Peak
1915.0000	51.02	-7.34	43.68	74.00	-30.32	V	Peak
3490.0000	45.36	-1.13	44.23	74.00	-29.77	V	Peak
3910.0000	46.44	-0.62	45.82	74.00	-28.18	V	Peak
5140.0000	44.90	4.05	48.95	74.00	-25.05	V	Peak
5995.0000	44.79	7.56	52.35	74.00	-21.65	V	Peak
1465.0000	51.36	-10.10	41.26	74.00	-32.74	H	Peak
2140.0000	48.61	-6.80	41.81	74.00	-32.19	H	Peak
3310.0000	46.89	-2.86	44.03	74.00	-29.97	H	Peak
3880.0000	45.91	-0.65	45.26	74.00	-28.74	H	Peak
4465.0000	44.80	0.78	45.58	74.00	-28.42	H	Peak
4870.0000	47.62	3.13	50.75	74.00	-23.25	H	Peak

REMARKS:

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 HT40 MHz / CH High **Test Date:** December 11, 2012

Temperature: 24°C

Tested by: Leevin Li

Humidity: 52% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1240.0000	54.74	-10.33	44.41	74.00	-29.59	V	Peak
1465.0000	53.60	-10.10	43.50	74.00	-30.50	V	Peak
1990.0000	51.84	-6.69	45.15	74.00	-28.85	V	Peak
3535.0000	45.41	-0.99	44.42	74.00	-29.58	V	Peak
4180.0000	45.85	-0.02	45.83	74.00	-28.17	V	Peak
4975.0000	44.54	3.77	48.31	74.00	-25.69	V	Peak
1675.0000	48.03	-8.36	39.67	74.00	-34.33	H	Peak
2140.0000	49.13	-6.80	42.33	74.00	-31.67	H	Peak
3460.0000	46.66	-1.41	45.25	74.00	-28.75	H	Peak
3925.0000	46.79	-0.60	46.19	74.00	-27.81	H	Peak
4255.0000	45.92	0.19	46.11	74.00	-27.89	H	Peak
5005.0000	44.90	3.92	48.82	74.00	-25.18	H	Peak

REMARKS:

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).



7.3. 6dB BANDWIDTH MEASUREMENT

7.3.1. LIMITS

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

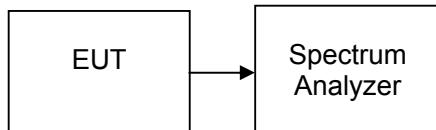
7.3.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2012	03/19/2013

7.3.3. TEST PROCEDURES (please refer to measurement standard)

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 = 1-5 % of the emission bandwidth (EBW), VBW = $\geq 3 \times$ RBW, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

7.3.4. TEST SETUP





7.3.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	10196	>500	PASS
Mid	2437	10200		PASS
High	2462	10204		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	16434	>500	PASS
Mid	2437	16446		PASS
High	2462	16437		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	17661	>500	PASS
Mid	2437	17657		PASS
High	2462	17648		PASS

Test mode: IEEE 802.11n HT40 MHz

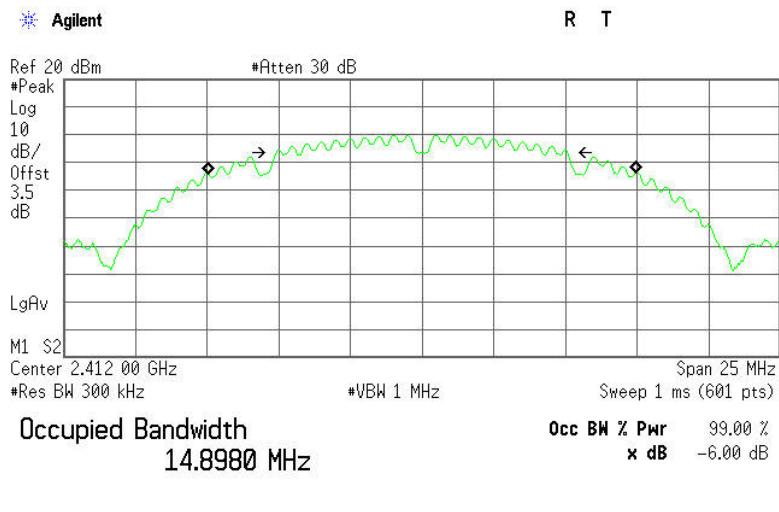
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	36428	>500	PASS
Mid	2437	36449		PASS
High	2452	36396		PASS



Test Plot

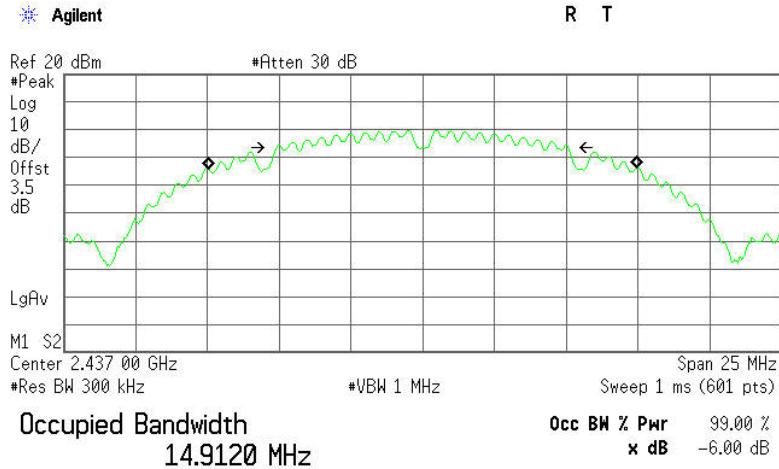
IEEE 802.11b mode

6dB Bandwidth (CH Low)



Transmit Freq Error 5.871 kHz
x dB Bandwidth 10.196 MHz

6dB Bandwidth (CH Mid)



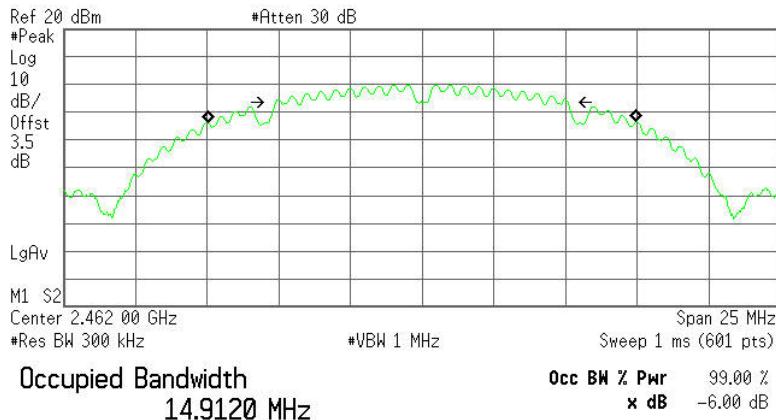
Transmit Freq Error 4.610 kHz
x dB Bandwidth 10.200 MHz



6dB Bandwidth (CH High)

Agilent

R T



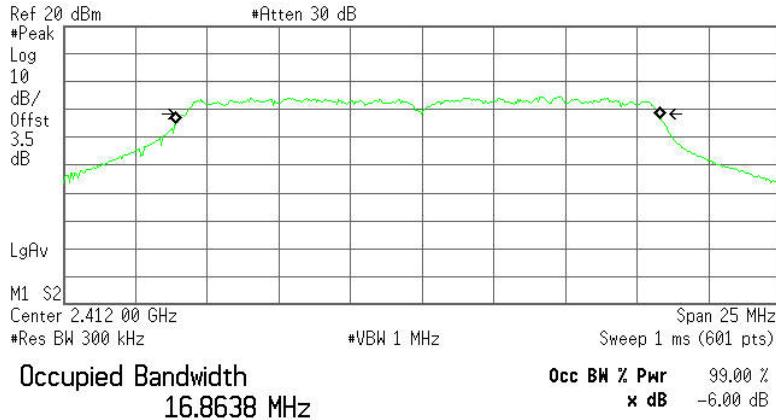
Transmit Freq Error 3.349 kHz
x dB Bandwidth 10.204 MHz

IEEE 802.11g mode

6dB Bandwidth (CH Low)

Agilent

R T



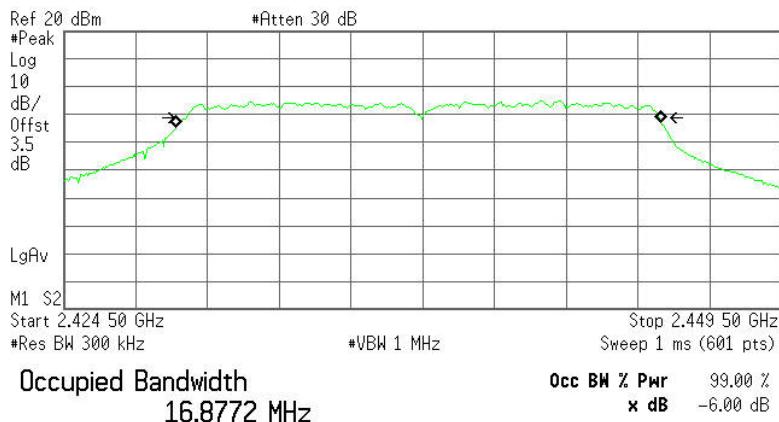
Transmit Freq Error -133.982 kHz
x dB Bandwidth 16.434 MHz



6dB Bandwidth (CH Mid)

Agilent

R T

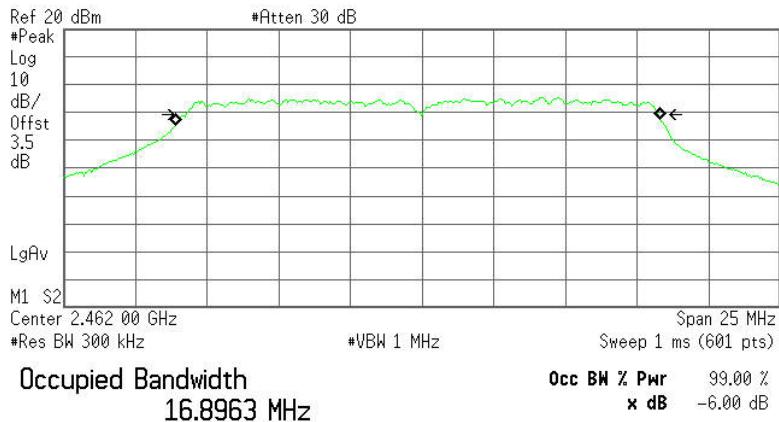


Transmit Freq Error -147.475 kHz
x dB Bandwidth 16.446 MHz

6dB Bandwidth (CH High)

Agilent

R T

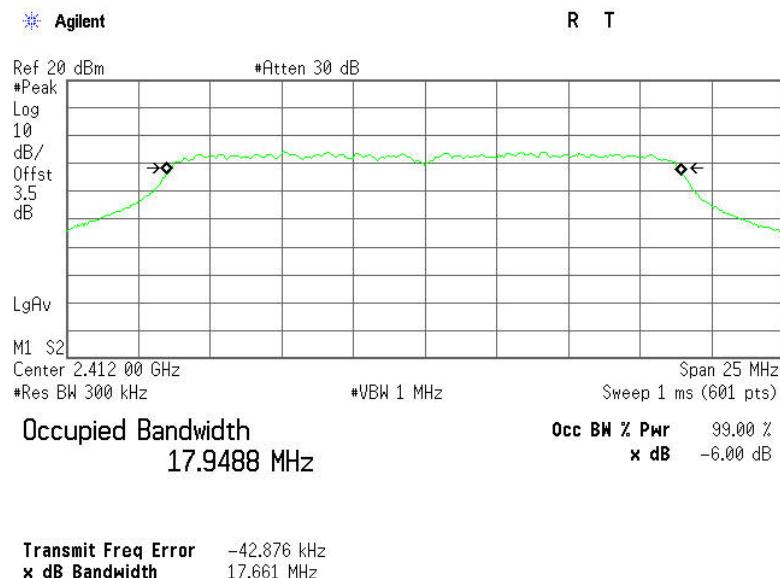


Transmit Freq Error -154.169 kHz
x dB Bandwidth 16.437 MHz

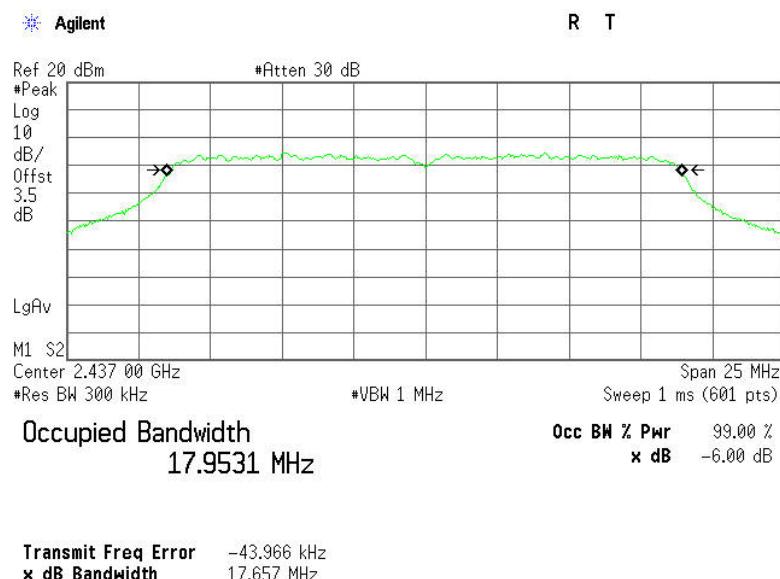


IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)



6dB Bandwidth (CH Mid)

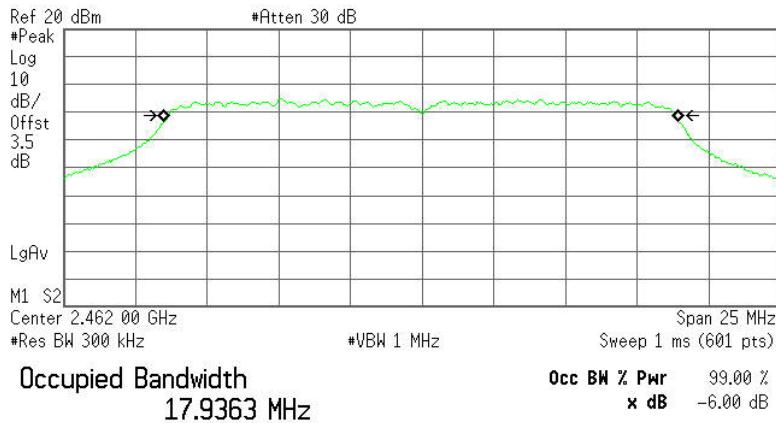




6dB Bandwidth (CH High)

Agilent

R T



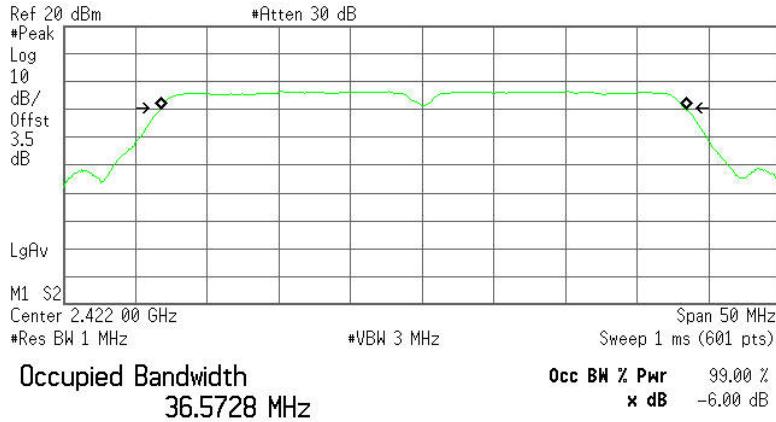
Transmit Freq Error -44.044 kHz
x dB Bandwidth 17.648 MHz

IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)

Agilent

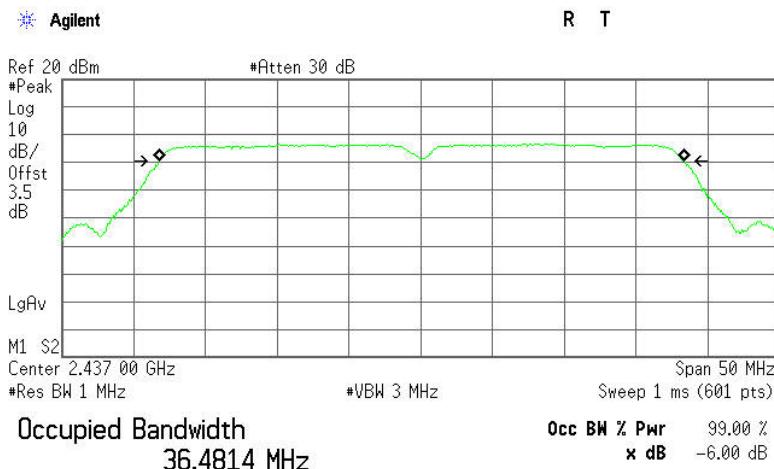
R T



Transmit Freq Error 92.506 kHz
x dB Bandwidth 36.428 MHz

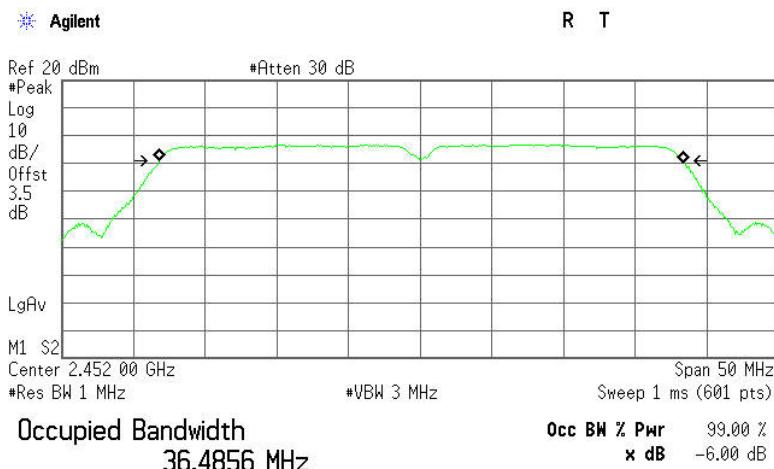


6dB Bandwidth (CH Mid)



Transmit Freq Error 80.959 kHz
x dB Bandwidth 36.449 MHz

6dB Bandwidth (CH High)



Transmit Freq Error 76.724 kHz
x dB Bandwidth 36.396 MHz



7.4. PEAK OUTPUT POWER

7.4.1. LIMITS

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.

7.4.2. TEST INSTRUMENTS

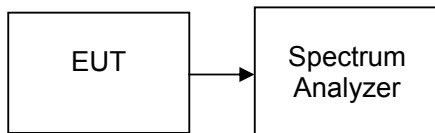
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2012	03/19/2013

7.4.3. TEST PROCEDURES (please refer to measurement standard)

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges(for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.



7.4.4. TEST SETUP



7.4.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	11.03	0.01268	1	PASS
Mid	2437	11.23	0.01327		PASS
High	2462	11.39	0.01377		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	7.11	0.00514	1	PASS
Mid	2437	7.39	0.00548		PASS
High	2462	7.62	0.00578		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	7.34	0.00542	1	PASS
Mid	2437	7.22	0.00527		PASS
High	2462	7.53	0.00566		PASS

Test mode: IEEE 802.11n HT40 MHz

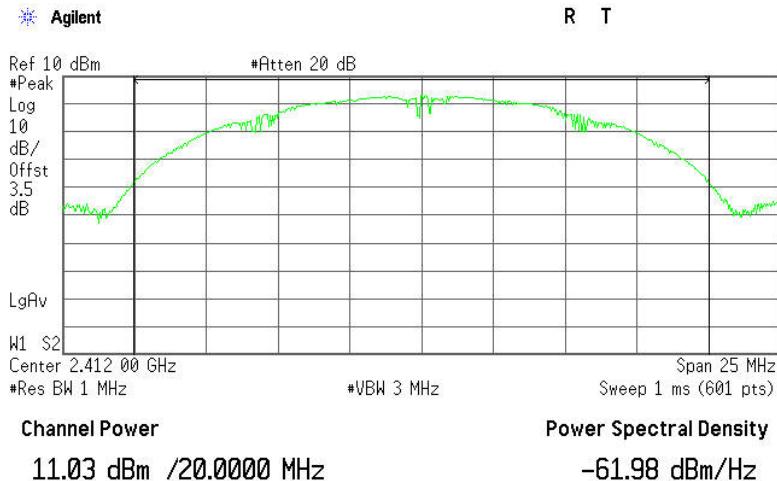
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	6.83	0.00482	1	PASS
Mid	2437	6.93	0.00493		PASS
High	2452	7.14	0.00518		PASS



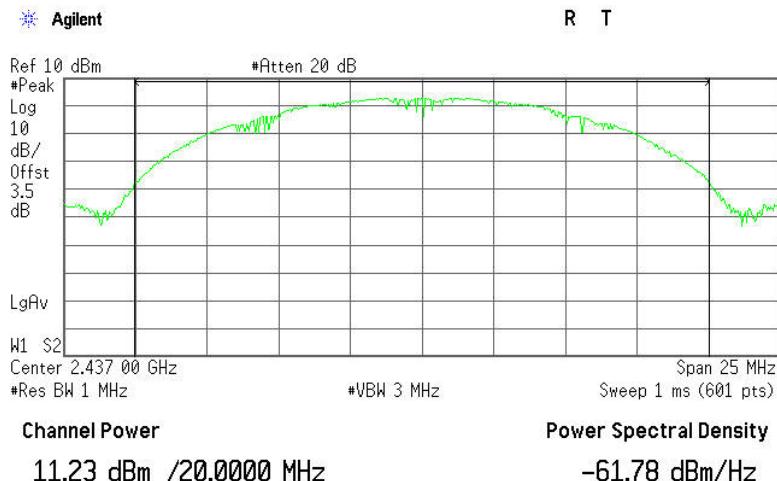
Test Plot

IEEE 802.11b mode

Peak power (CH Low)

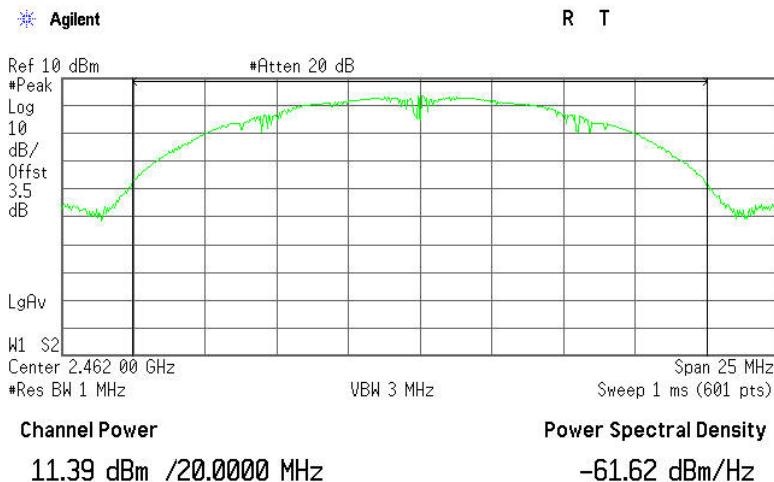


Peak power (CH Mid)



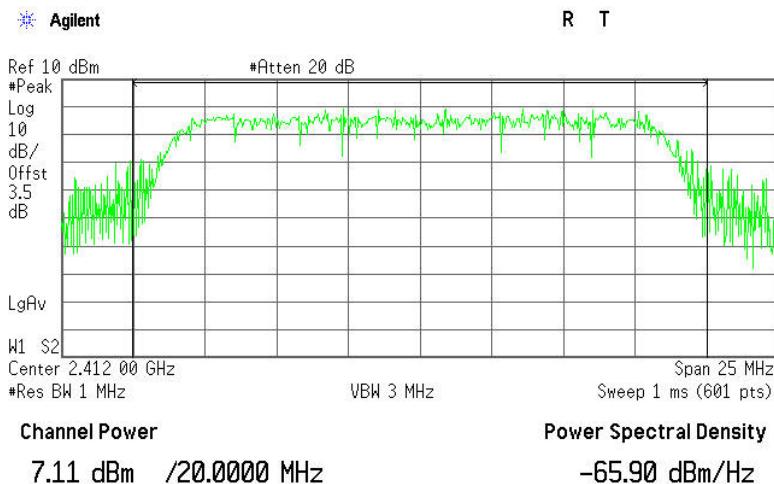


Peak power (CH High)



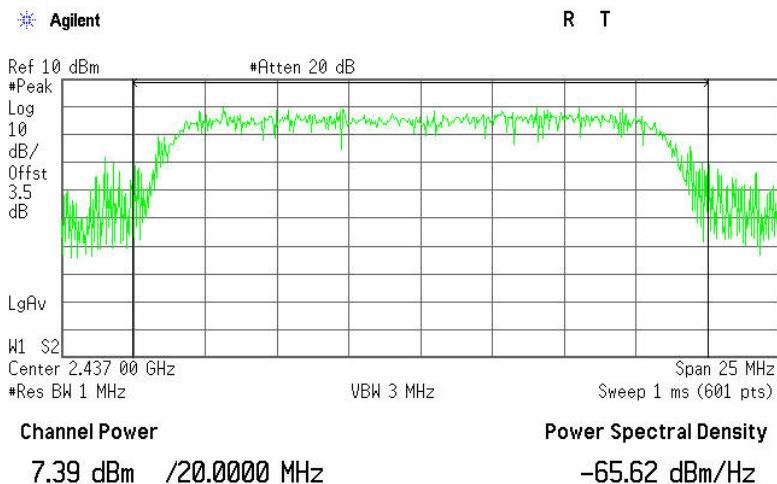
IEEE 802.11g mode

Peak power (CH Low)

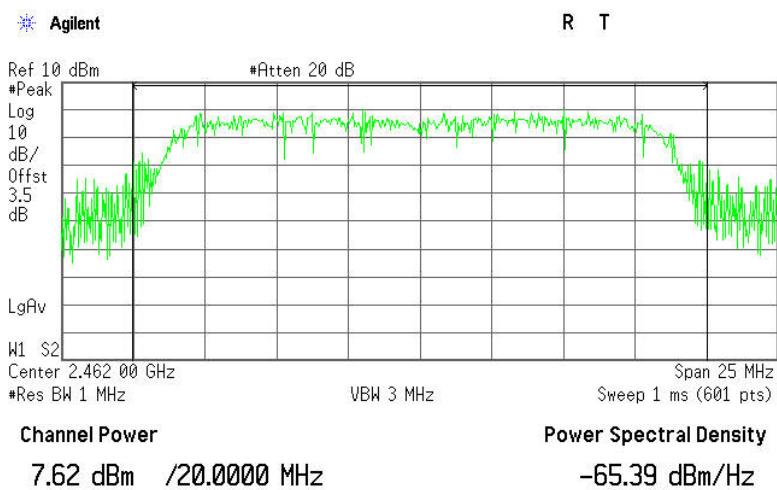




Peak power (CH Mid)



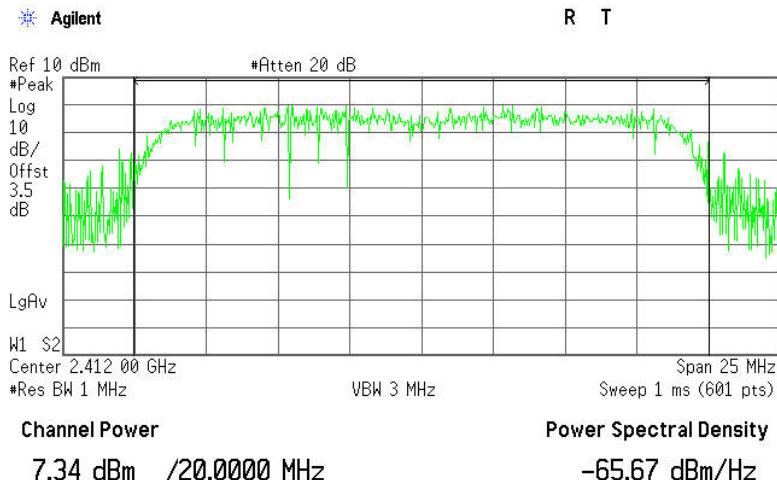
Peak power (CH High)



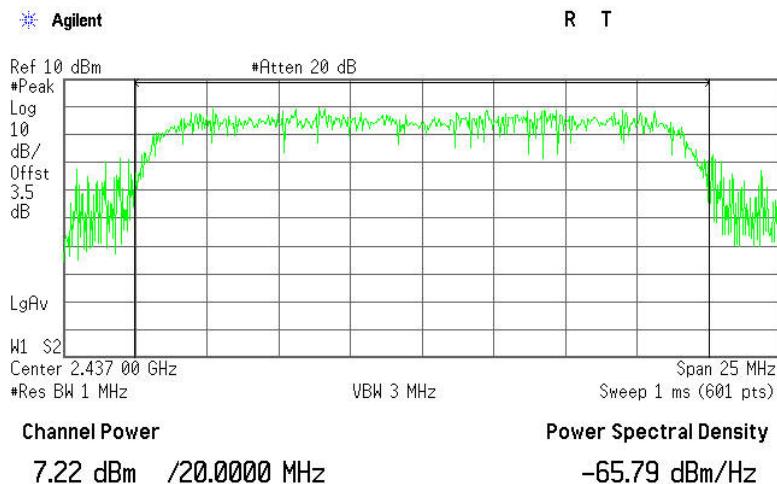


IEEE 802.11n HT20 MHz mode

Peak power (CH Low)

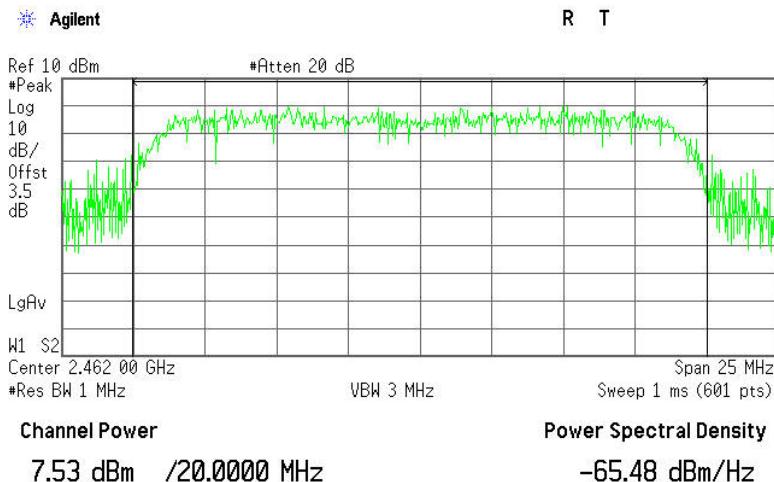


Peak power (CH Mid)



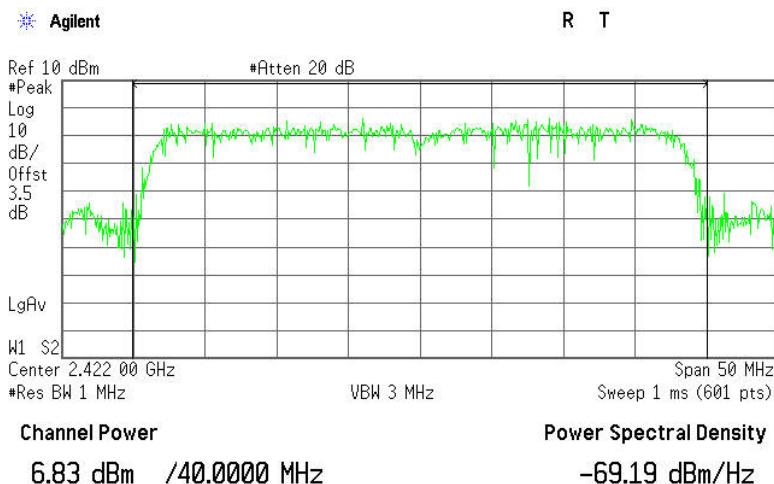


Peak power (CH High)



IEEE 802.11n HT40 MHz mode

Peak power (CH Low)

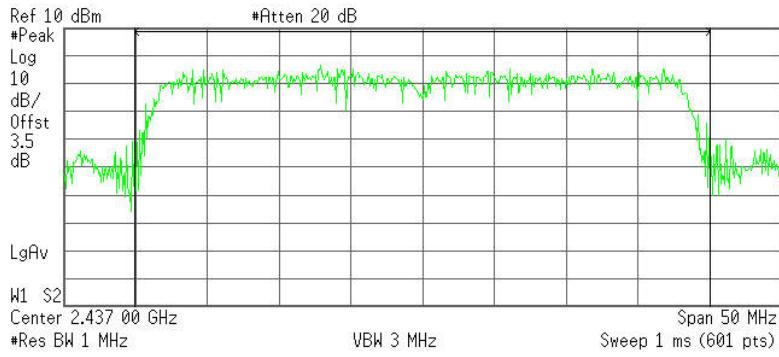




Peak power (CH Mid)

Agilent

R T



Peak power (CH High)

Agilent

R T

