



FCC 47 CFR PART 15 SUBPART C

for

Pocket Projector

Model: PPX3610, X-PROJECT WiFi

Brand: PHILIPS, XSORIES

Test Report Number:

C130609Z01-RP1

Issued Date: July 1, 2013

Issued for

SAGEMCOM SAS

250 Route de l' Empereur- 92848 RUEIL MALMAISON CEDEX- FRANCE6

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



TESTING CERT #2861.01

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	C130609Z01-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..... 15

 7.3. 6dB BANDWIDTH MEASUREMENT 47

 7.4. PEAK OUTPUT POWER 55

 7.5. BAND EDGES MEASUREMENT..... 63

 7.6. PEAK POWER SPECTRAL DENSITY MEASUREMENT..... 81



1 TEST CERTIFICATION

Product	Pocket Projector
Model	PPX3610, X-PROJECT WiFi
Brand	PHILIPS, XSORIES
Tested	June 9~ June 28, 2013
Applicant	SAGEMCOM SAS 250 Route de l' Empereur- 92848 RUEIL MALMAISON CEDEX- FRANCE
Manufacturer	SAGEMCOM DOCUMENTS SAS 250 Route de l' Empereur- 92848 RUEIL MALMAISON CEDEX- FRANCE

APPLICABLE STANDARDS			
Standard	Test Type	Standard	Test Type
15.207(a)	Power Line Conducted Emissions	15.247(d) 15.209(a)	<ul style="list-style-type: none"> ● 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:

Reviewed by:

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

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)	<ul style="list-style-type: none">● 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	Pocket Projector
Model Number	PPX3610, X-PROJECT WiFi
Brand	PHILIPS, XSORIES
Model Discrepancy	The model PPX3610 has the same circuit diagram, chip and PCB layout with X-PROJECT WiFi, only different model name and encloser's color for business reason.
Serial Number	C130609Z01-RP1
Received Date	June 9, 2013
Power Supply	DC12V supplied by the adapter
Adapter Manufacturer/ Model Name	malata/MPA-630 I/P: 100-240Vac, 50/60Hz, 1.0A O/P: 12Vdc, 2A, DC Output Cable: Unshielded,1.80m
Transmit Power	IEEE 802.11b mode: 19.18dBm IEEE 802.11g mode: 22.72dBm IEEE 802.11n HT20 MHz mode: 21.42dBm IEEE 802.11n HT40 MHz mode: 24.00dBm
Modulation Technique	IEEE 802.11b mode: DSSS(CCK,QPSK, BPSK) IEEE 802.11g mode: OFDM (BPSK/QPSK/16QAM/64QAM) 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	IEEE 802.11b: 11Mbps(CCK) with fall back rates of 5.5/2/1Mbps IEEE 802.11g: 54Mbps with fall back rates of 48/36/24/18/12/9 /6Mbps IEEE 802.11n HT20: 65.0Mbps with fall back rates of 65.0/58.5/52.0/39.0/26.0/19.5/13.0/6.5 Mbps IEEE 802.11n HT40: 135.0Mbps with fall back rates of 121.5/ 108.0/81.0/54.0/40.5/27.0/13.5 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	FPC Antenna with 3.5dBi gain (Max)
Channels Spacing	IEEE 802.11b/g ,802.11n HT20/HT40 : 5MHz
Temperature Range	0°C ~ +40°C

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: **VW3PPX3610** 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: USB reading mode Mode 2: SD card mode+Station Mode 3: PC connection mode+ Station Mode 4: PC connection mode Mode 5: AV IN mode Mode 6: VGA IN mode Mode 7: YPbPr IN mode Mode 8: HDMI IN mode	Mode 5
Radiated Emission	Mode 1: TX	☒

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.



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	Dcsmif	805CV2X	N/A	DELL	N/A	Unshielded 1.80m
2	Monitor	TLM19V68	NA	N/A	HISENSE	Unshielded 1.50m	Unshielded 1.50m
3	Keyboard	SK-8115	CN-0DJ313-7161 6-82P-0YTB	N/A	DELL	Unshielded 1.50m	N/A
4	Mouse	MS111-P	J1101ANN	N/A	DELL	Unshielded 1.45m	N/A
5	Modem	MODEM-14 14	9013592	N/A	ACEEX	Unshielded 1.20m	Unshielded 2.00m
6	Printer	P310B	DLRE217030	N/A	EPSON	Unshielded 1.20m	Unshielded 2.00m
7	Headphone	N/A	N/A	N/A	N/A	Unshielded 2.20m	N/A
8	DVD	DV-410V-G	HKKD010577CN	N/A	PIONEER	N/A	Unshielded 2.00m
9	U disk	N/A	N/A	N/A	APPLE	N/A	N/A
10	SD Card	N/A	N/A	N/A	Kingston	N/A	N/A

Note:

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:

Parameter	Uncertainty
Radiated Emission, 30 to 200 MHz Test Site : 966(2)	+/-3.6880dB
Radiated Emission, 200 to 1000 MHz Test Site : 966(2)	+/-3.6695dB
Radiated Emission, 1 to 8 GHz	+/-5.1782dB
Radiated Emission, 8 to 18 GHz	+/-5.2173dB
Conducted Emissions	+/-3.6836dB
Band Width	178kHz
Peak Output Power MU	+/-1.906dB
Band Edge MU	+/-0.182dB
Channel Separation MU	416.178Hz
Duty Cycle MU	0.054ms
Frequency Stability MU	226Hz

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 μH/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 (dBμV)	
	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	03/09/2013	03/08/2014
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	04/20/2013	04/19/2014
LISN	EMCO	3825/2	8901-1459	03/09/2013	03/08/2014
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/04/2013	03/03/2014
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.

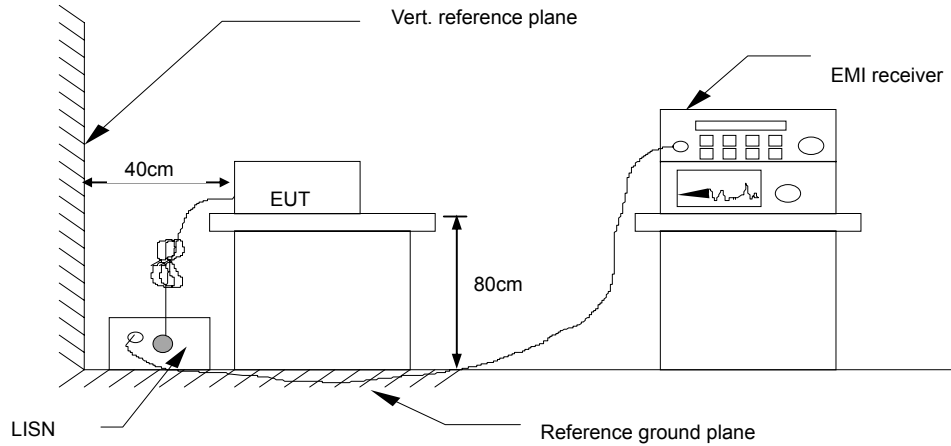


7.1.3. TEST PROCEDURES (please refer to measurement standard)

- 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)	LISN Factor (dB)	Cable Loss (dB)	Meter Reading (dBuV)	Measured Level (dBuV)	Limits (dBuV)	Over Limits (dBuV)	Detector	Line (L1/L2)
X.XX	8.93	0.07	25.96	34.96	60.00	-25.04	QP	L1

- Freq. = Emission frequency in MHz
- LISN Factor = Insertion loss of LISN and Pulse Limiter
- Cable Loss = Insertion loss of Cable (LISN to EMI Tester Receiver)
- Meter Reading = Uncorrected Analyzer/Receiver reading
- Measured Level = Read Level + Factor
- Limit = Limit stated in standard
- Over Limit = Reading in reference to limit
- Peak = Peak Reading
- QP = Quasi-peak Reading
- AV = Average Reading

Calculation Formula

1. Measured Level (dBuV) = LISN Factor (dB) + Cable Loss (dB)+ Meter Reading (dBuV)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)



7.1.6. TEST RESULTS

Model No.	PPX3610	RBW,VBW	9 kHz
Environmental Conditions	22°C, 45% RH	Test Mode	Mode 5
Tested by	Mack 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)
0.1500	50.21	32.54	9.58	59.79	42.12	65.99	56.00	-6.20	-13.88	Pass
0.1980	44.54	25.70	9.69	54.23	35.39	63.69	53.69	-9.46	-18.30	Pass
0.2460	42.05	21.08	9.69	51.74	30.77	61.89	51.89	-10.15	-21.12	Pass
0.6980	30.89	18.66	9.79	40.68	28.45	56.00	46.00	-15.32	-17.55	Pass
3.5780	31.89	24.35	9.71	41.60	34.06	56.00	46.00	-14.40	-11.94	Pass
14.1380	32.23	19.54	9.90	42.13	29.44	60.00	50.00	-17.87	-20.56	Pass

NOTE: L1 = Line One (Live Line)



Model No.	PPX3610	RBW,VBW	9 kHz
Environmental Conditions	22°C, 45% RH	Test Mode	Mode 5
Tested by	Mack 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)
0.1500	49.62	33.25	9.78	59.40	43.03	65.99	56.00	-6.59	-12.97	Pass
0.1980	41.83	23.71	9.79	51.62	33.50	63.69	53.69	-12.07	-20.19	Pass
0.2500	37.90	22.44	9.77	47.67	32.21	61.75	51.76	-14.08	-19.55	Pass
0.6980	28.06	18.25	9.69	37.75	27.94	56.00	46.00	-18.25	-18.06	Pass
3.5820	28.42	19.58	9.76	38.18	29.34	56.00	46.00	-17.82	-16.66	Pass
14.6100	30.17	18.27	9.73	39.90	28.00	60.00	50.00	-20.10	-22.00	Pass

NOTE: 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	03/09/2013	03/08/2014

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.

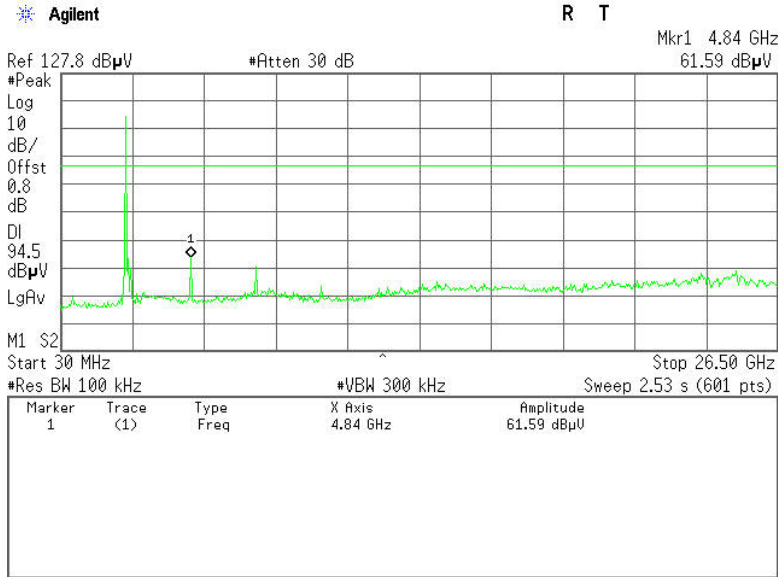


7.2.4. TEST RESULTS

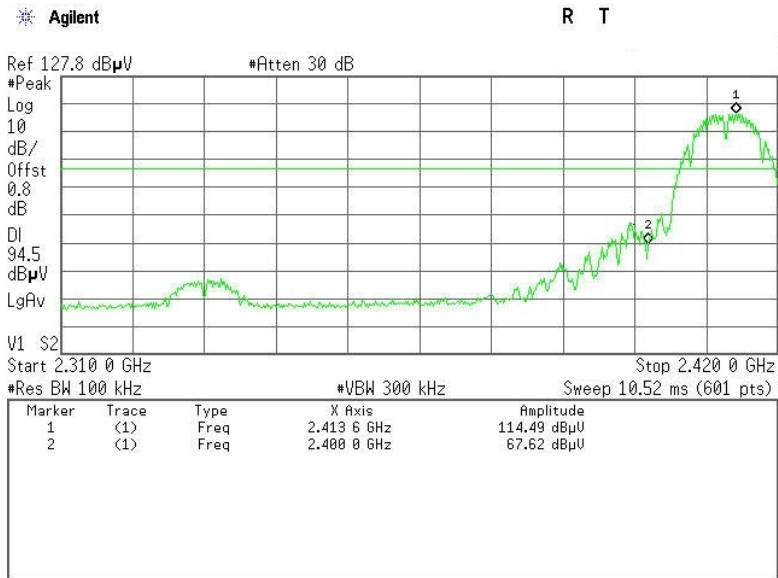
Test Plot

IEEE 802.11b mode

CH Low (30MHz ~26.5GHz)

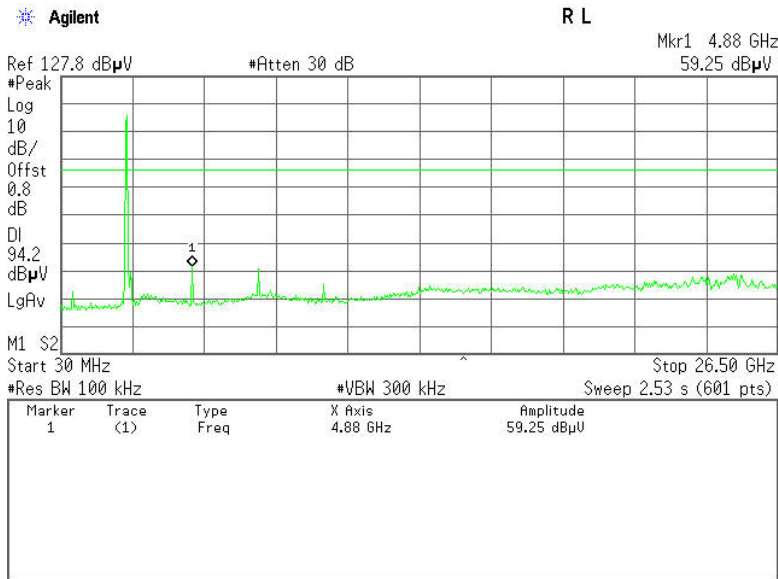


CH Low (2.31GHz ~2.45GHz)



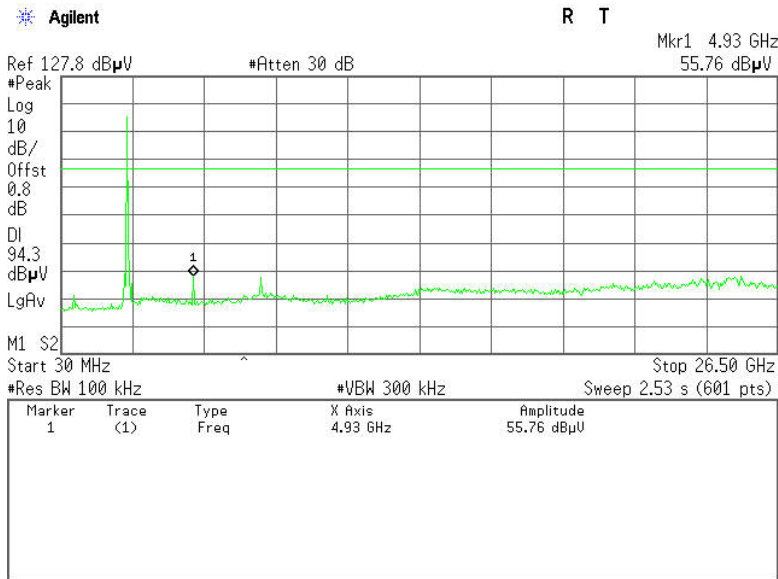


CH Mid (30MHz ~26.5GHz)

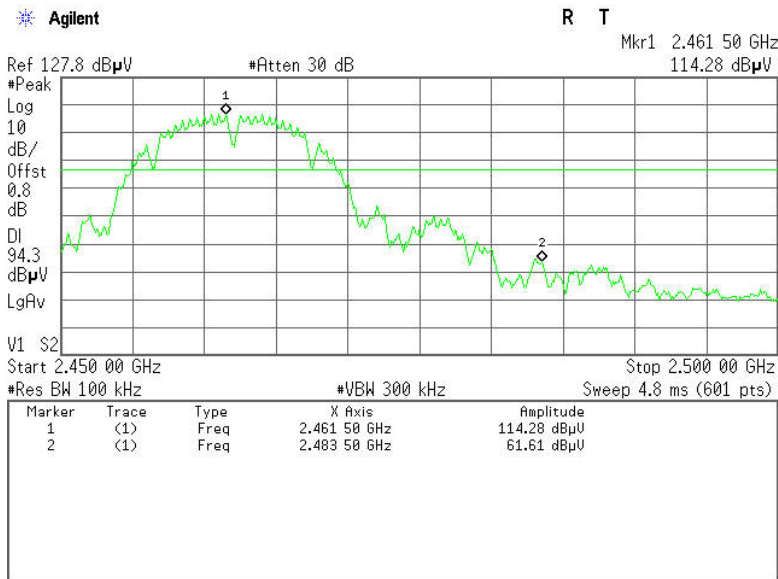




CH High (30MHz ~26.5GHz)



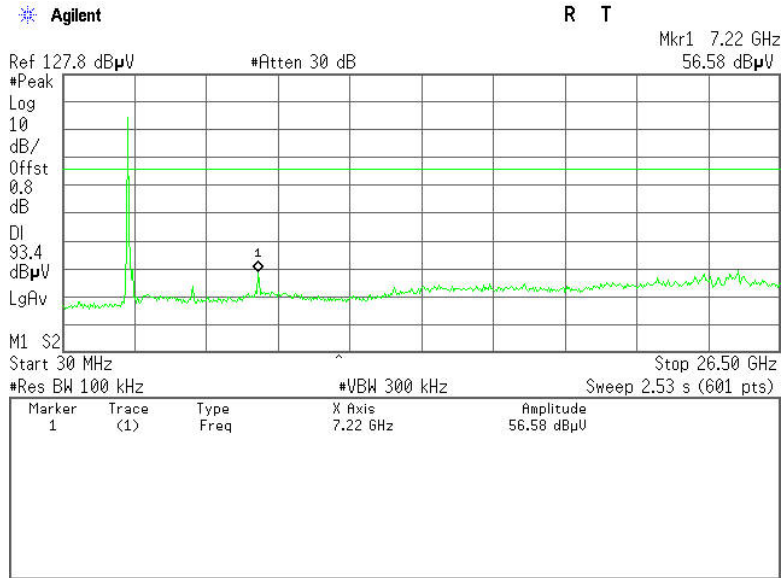
CH High(2.45GHz ~2.5GHz)



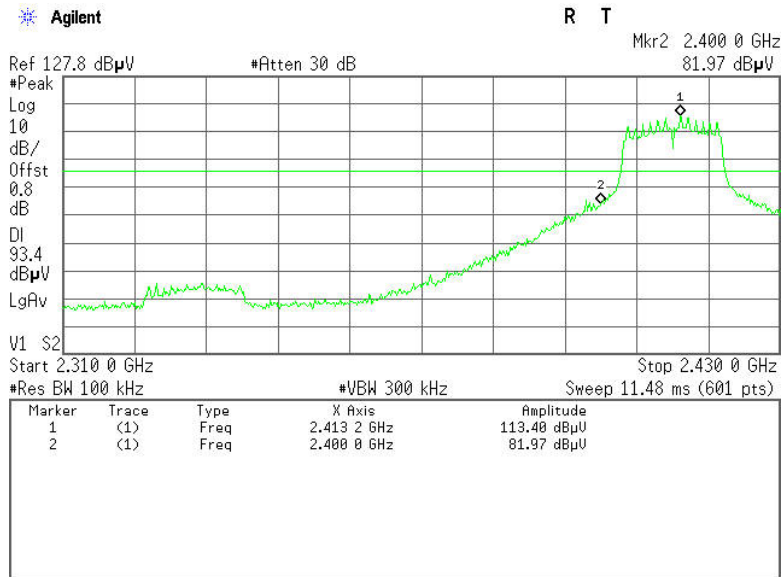


IEEE 802.11g mode

CH Low (30MHz ~26.5GHz)

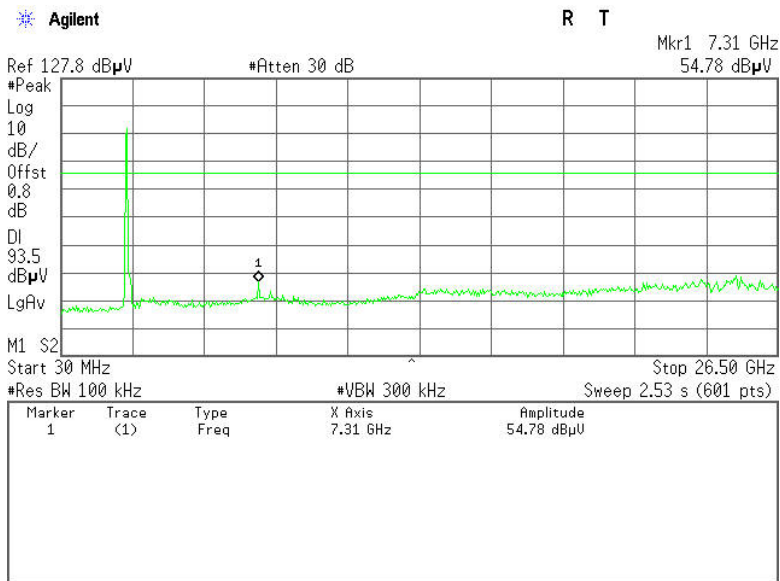


CH Low (2.31GHz ~2.45GHz)





CH Mid (30MHz ~26.5GHz)

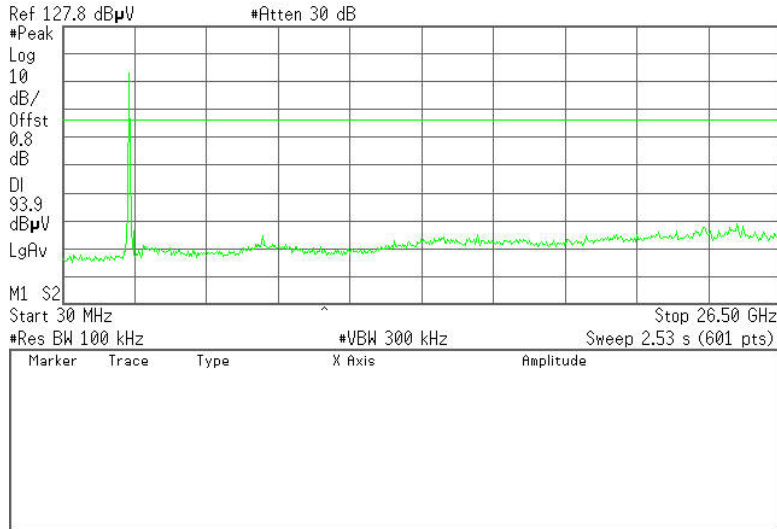




CH High (30MHz ~26.5GHz)

Agilent

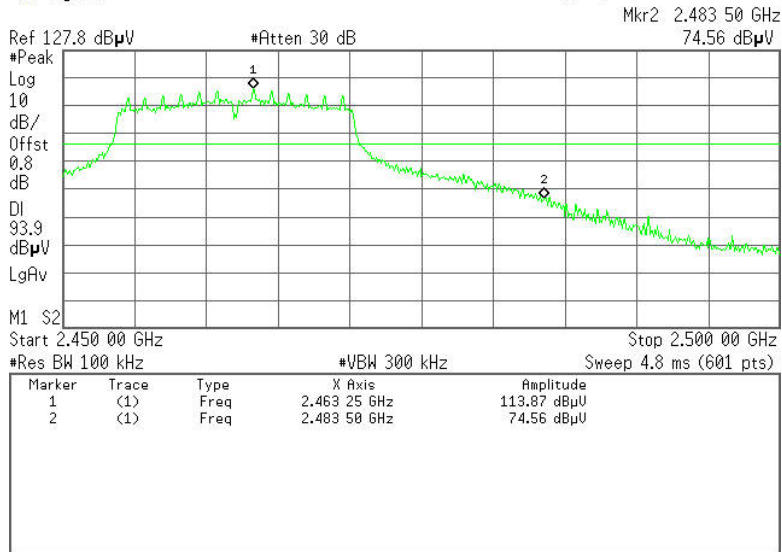
R T



CH High(2.45GHz ~2.5GHz)

Agilent

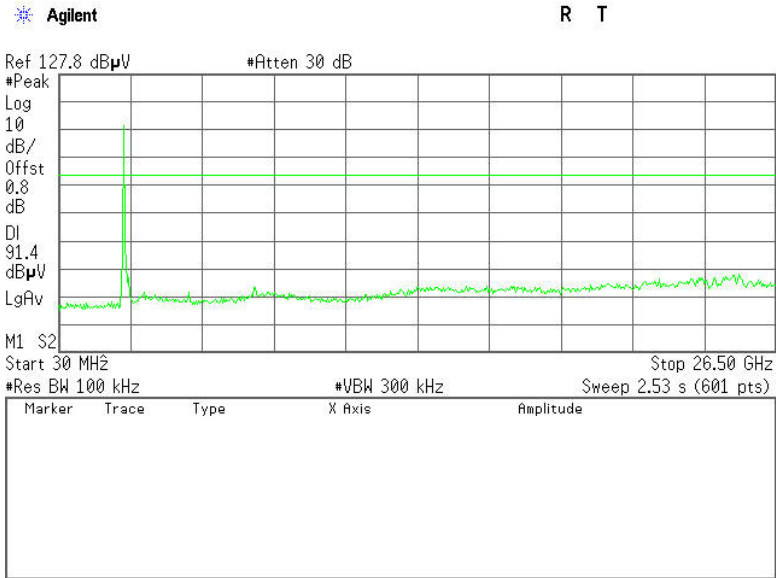
R T



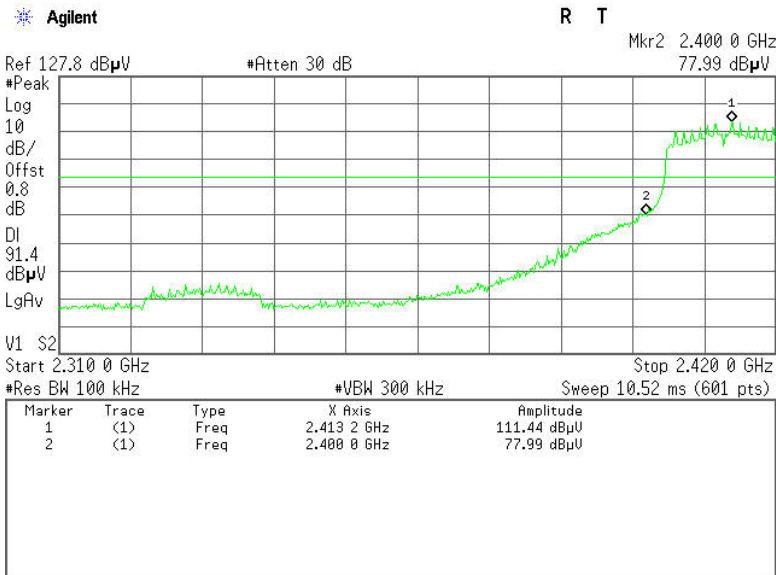


IEEE 802.11n HT20 MHz mode

CH Low (30MHz ~26.5GHz)



CH Low (2.31GHz ~2.45GHz)

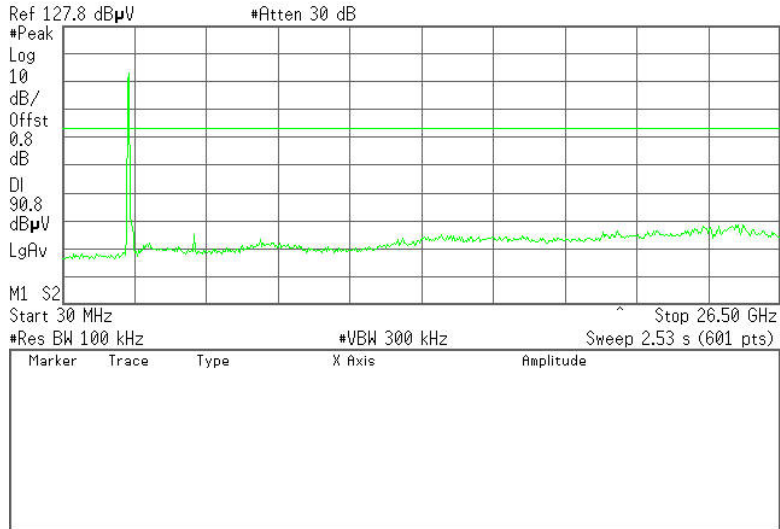




CH Mid (30MHz ~26.5GHz)

Agilent

R T

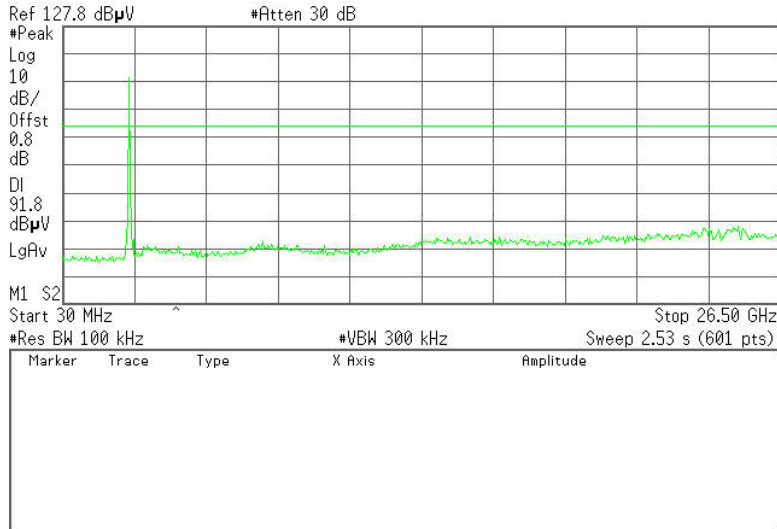




CH High (30MHz ~26.5GHz)

Agilent

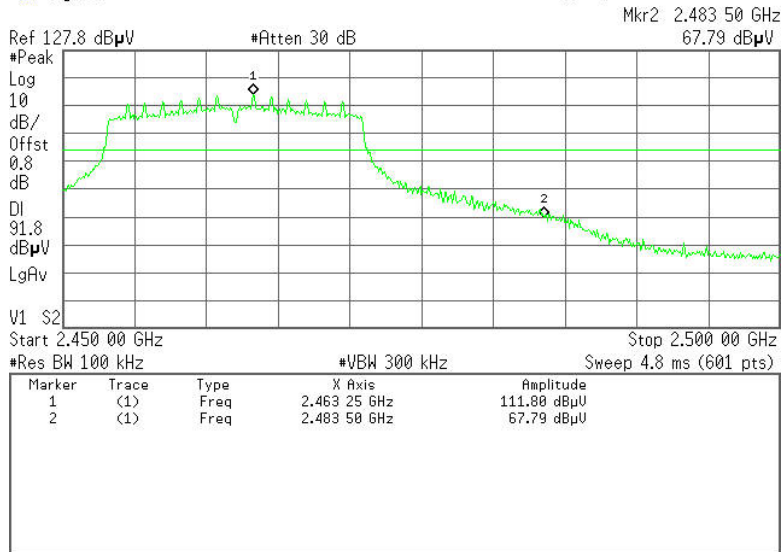
R T



CH High(2.45GHz ~2.5GHz)

Agilent

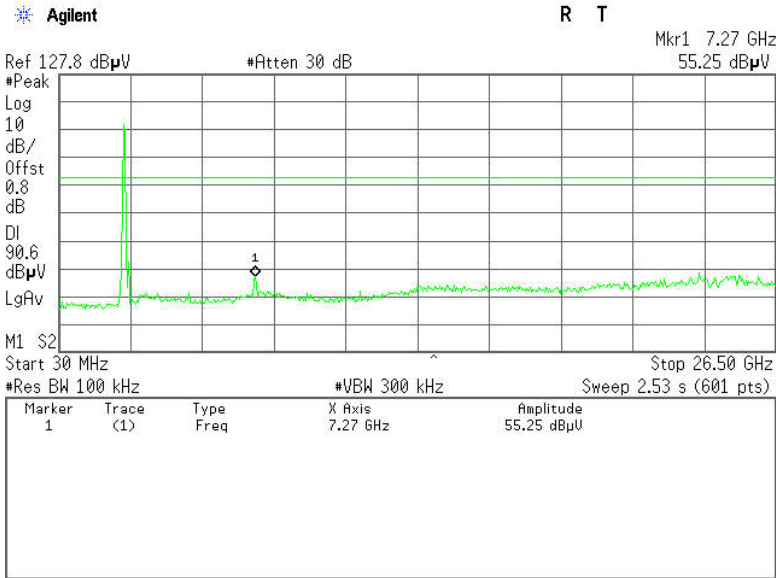
R T



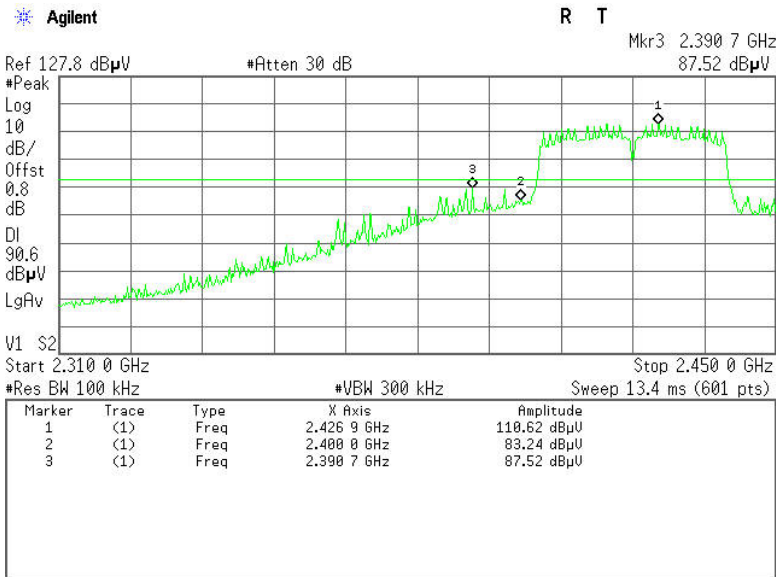


IEEE 802.11n HT40 MHz mode

CH Low (30MHz ~26.5GHz)



CH Low (2.31GHz ~2.45GHz)

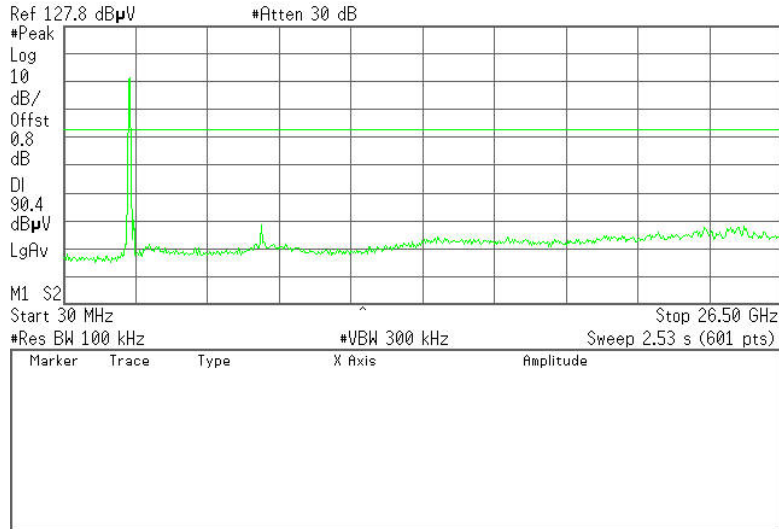




CH Mid (30MHz ~26.5GHz)

Agilent

R T

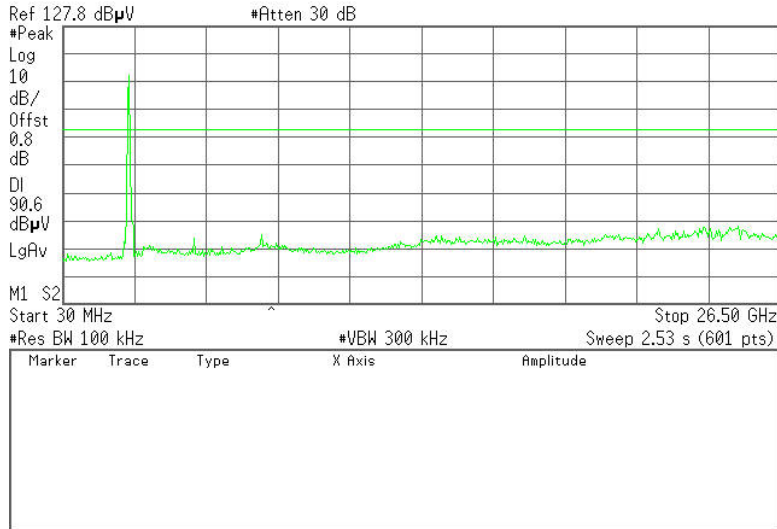




CH High (30MHz ~26.5GHz)

Agilent

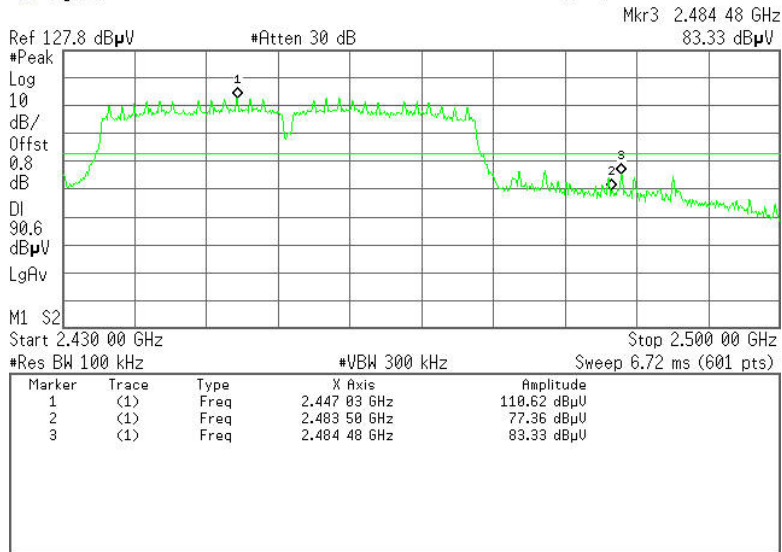
R T



CH High(2.45GHz ~2.5GHz)

Agilent

R T





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 (µV/m at 3-meter)	Field Strength (dBµV/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 (dBuV/m) = 20 log Emission level (uV/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	03/09/2013	03/08/2014
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/09/2013	03/08/2014
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2013	03/18/2014
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2013	03/18/2014
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	06/21/2013	06/21/2014
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/02/2013	03/01/2014
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/02/2013	03/01/2014
Loop Antenna	A、 R、 A	PLA-1030/B	1029	03/23/2013	03/23/2014
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	03/04/2013	03/03/2014
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.



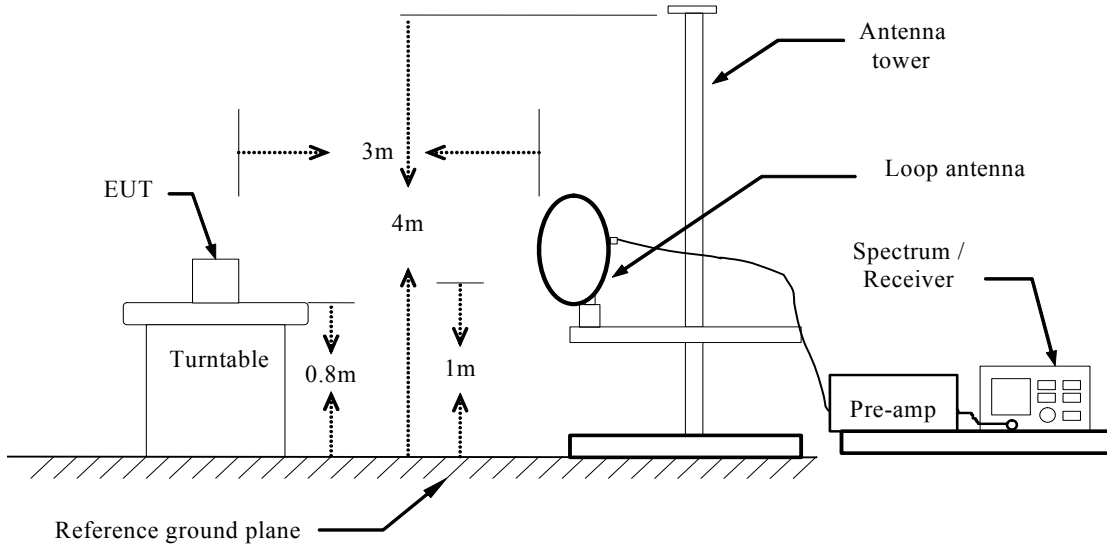
7.2.4.3. TEST PROCEDURE (please refer to measurement standard)

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.

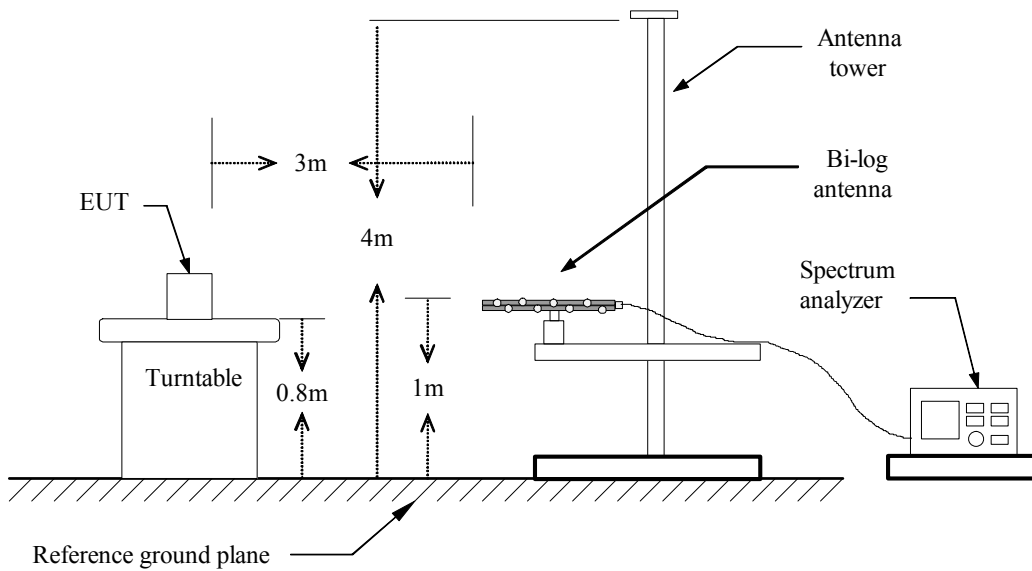


7.2.4.4. TEST SETUP

Below 30MHz

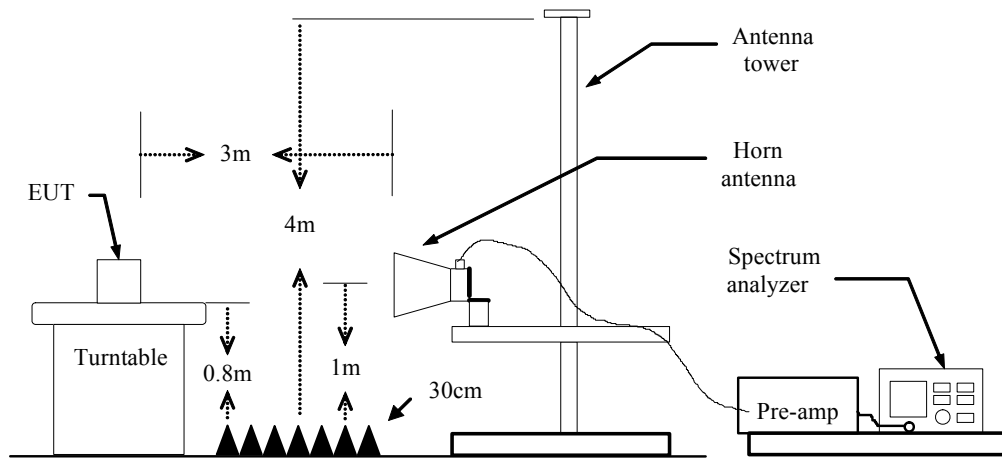


Below 1 GHz





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

Margin (dB) = Result (dBuV/m) – Limits (dBuV/m)
 Result (dBuV/m) = Reading (dBuV) + Correction Factor



7.2.4.6. TEST RESULTS

Below 1 GHz

Test Mode: TX

Test Date: June 23, 2013

Temperature: 24°C

Tested by: Mack 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
39.7000	52.24	-14.46	37.78	40.00	-2.22	V	QP
243.4000	52.88	-17.50	35.38	46.00	-10.62	V	QP
356.5667	49.27	-16.76	32.51	46.00	-13.49	V	QP
400.2167	50.27	-16.19	34.08	46.00	-11.92	V	QP
532.7833	52.84	-14.53	38.31	46.00	-7.69	V	QP
600.6833	45.81	-12.92	32.89	46.00	-13.11	V	QP
243.4000	51.26	-17.50	33.76	46.00	-12.24	H	QP
266.0333	52.29	-18.44	33.85	46.00	-12.15	H	QP
400.2167	46.83	-16.19	30.64	46.00	-15.36	H	QP
532.7833	46.68	-14.53	32.15	46.00	-13.85	H	QP
600.6833	44.48	-12.92	31.56	46.00	-14.44	H	QP
833.4833	41.97	-10.29	31.68	46.00	-14.32	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). = Emission frequency in MHz
Reading (dBuV/m) = Receiver reading
Correction Factor (dB) = Antenna factor + Cable loss – Amplifier gain
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Measured (dBuV/m) – Limits (dBuV/m)
Antenna Pol e(H/V) = Current carrying line of reading



Above 1 GHz

Operation Mode: TX / IEEE 802.11b/ CH Low

Test Date: June 23, 2013

Temperature: 24°C

Tested by: Mack 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
3205.0000	47.64	-4.09	43.55	74.00	-30.45	V	peak
3895.0000	46.95	-2.51	44.44	74.00	-29.56	V	peak
4720.0000	45.47	0.06	45.53	74.00	-28.47	V	peak
5095.0000	45.17	1.43	46.60	74.00	-27.40	V	peak
6295.0000	45.48	3.97	49.45	74.00	-24.55	V	peak
7240.0000	50.40	7.41	57.81	74.00	-16.19	V	peak
7240.0000	43.93	7.41	51.34	54.00	-2.66	V	AVG
3415.0000	46.38	-3.93	42.45	74.00	-31.55	H	Peak
3895.0000	46.53	-2.51	44.02	74.00	-29.98	H	Peak
4255.0000	45.69	-1.37	44.32	74.00	-29.68	H	Peak
5050.0000	45.07	1.38	46.45	74.00	-27.55	H	Peak
6145.0000	44.25	3.52	47.77	74.00	-26.23	H	Peak
7240.0000	51.26	7.41	58.67	74.00	-15.33	H	Peak
7240.0000	44.26	7.41	51.67	54.00	-2.33	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
Temperature: 24°C
Humidity: 52% RH

Test Date: June 23, 2013
Tested by: Mack Li
Polarity: Ver. / Hor.

Table with 8 columns: Frequency (MHz), Reading (dBuV), Correction Factor (dB/m), Result (dBuV/m), Limit (dBuV/m), Margin (dB), Antenna Pole (V/H), Remark. It contains two sets of data rows for various frequencies.

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: June 23, 2013

Temperature: 24°C

Tested by: Mack 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
4135.0000	46.99	-1.89	45.10	74.00	-28.90	V	Peak
4930.0000	45.94	1.00	46.94	74.00	-27.06	V	Peak
5470.0000	45.37	1.66	47.03	74.00	-26.97	V	Peak
6475.0000	45.67	4.47	50.14	74.00	-23.86	V	Peak
6970.0000	45.02	6.20	51.22	74.00	-22.78	V	Peak
7390.0000	50.76	7.57	58.33	74.00	-15.67	V	Peak
7390.0000	44.03	7.57	51.60	54.00	-2.40	V	AVG
3925.0000	45.95	-2.51	43.44	74.00	-30.56	H	Peak
4435.0000	45.96	-0.76	45.20	74.00	-28.80	H	Peak
4930.0000	45.56	1.00	46.56	74.00	-27.44	H	Peak
5800.0000	44.90	2.78	47.68	74.00	-26.32	H	Peak
6355.0000	44.51	4.13	48.64	74.00	-25.36	H	Peak
7390.0000	50.96	7.57	58.53	74.00	-15.47	H	Peak
7390.0000	44.32	7.57	51.89	54.00	-2.11	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: June 23, 2013

Temperature: 24°C

Tested by: Mack 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
3715.0000	46.08	-2.71	43.37	74.00	-30.63	V	Peak
4270.0000	45.66	-1.31	44.35	74.00	-29.65	V	Peak
4855.0000	45.83	0.66	46.49	74.00	-27.51	V	Peak
5725.0000	44.78	2.46	47.24	74.00	-26.76	V	Peak
6220.0000	44.73	3.74	48.47	74.00	-25.53	V	Peak
6505.0000	44.63	4.55	49.18	74.00	-24.82	V	Peak
3820.0000	46.87	-2.49	44.38	74.00	-29.62	H	Peak
4165.0000	46.85	-1.75	45.10	74.00	-28.90	H	Peak
4975.0000	44.82	1.21	46.03	74.00	-27.97	H	Peak
5605.0000	44.88	1.95	46.83	74.00	-27.17	H	Peak
5875.0000	44.33	2.90	47.23	74.00	-26.77	H	Peak
6475.0000	44.84	4.47	49.31	74.00	-24.69	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: June 23, 2013

Temperature: 24°C

Tested by: Mack 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
3220.0000	47.21	-4.08	43.13	74.00	-30.87	V	Peak
3850.0000	46.14	-2.50	43.64	74.00	-30.36	V	Peak
4480.0000	45.32	-0.68	44.64	74.00	-29.36	V	Peak
5125.0000	45.31	1.46	46.77	74.00	-27.23	V	Peak
6115.0000	45.09	3.43	48.52	74.00	-25.48	V	Peak
6745.0000	44.75	5.31	50.06	74.00	-23.94	V	Peak
3760.0000	45.94	-2.59	43.35	74.00	-30.65	H	Peak
4390.0000	44.92	-0.86	44.06	74.00	-29.94	H	Peak
5110.0000	45.20	1.45	46.65	74.00	-27.35	H	Peak
5530.0000	44.89	1.79	46.68	74.00	-27.32	H	Peak
5965.0000	45.19	3.04	48.23	74.00	-25.77	H	Peak
6505.0000	44.62	4.55	49.17	74.00	-24.83	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: June 23, 2013

Temperature: 24°C

Tested by: Mack 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
4240.0000	47.00	-1.43	45.57	74.00	-28.43	V	Peak
5050.0000	44.57	1.38	45.95	74.00	-28.05	V	Peak
5770.0000	44.99	2.65	47.64	74.00	-26.36	V	Peak
6145.0000	44.43	3.52	47.95	74.00	-26.05	V	Peak
6535.0000	44.62	4.64	49.26	74.00	-24.74	V	Peak
7375.0000	46.47	7.55	54.02	74.00	-19.98	V	Peak
7375.0000	37.73	7.55	45.28	54.00	-8.72	V	AVG
5125.0000	44.74	1.46	46.20	74.00	-27.80	H	Peak
5665.0000	44.62	2.21	46.83	74.00	-27.17	H	Peak
5980.0000	44.32	3.06	47.38	74.00	-26.62	H	Peak
6415.0000	44.42	4.30	48.72	74.00	-25.28	H	Peak
6940.0000	44.75	6.04	50.79	74.00	-23.21	H	Peak
7390.0000	47.60	7.57	55.17	74.00	-18.83	H	Peak
7390.0000	38.75	7.57	46.32	54.00	-7.68	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 802.11n HT20 MHz/ CH Low
Temperature: 24°C
Humidity: 52% RH

Test Date: June 23, 2013
Tested by: Mack Li
Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3910.0000	46.21	-2.51	43.70	74.00	-30.30	V	Peak
4270.0000	46.01	-1.31	44.70	74.00	-29.30	V	Peak
5125.0000	44.56	1.46	46.02	74.00	-27.98	V	Peak
5575.0000	44.89	1.88	46.77	74.00	-27.23	V	Peak
6385.0000	45.18	4.22	49.40	74.00	-24.60	V	Peak
7195.0000	44.28	7.34	51.62	74.00	-22.38	V	Peak
3880.0000	45.87	-2.51	43.36	74.00	-30.64	H	Peak
4870.0000	45.16	0.73	45.89	74.00	-28.11	H	Peak
5185.0000	44.72	1.53	46.25	74.00	-27.75	H	Peak
5800.0000	44.60	2.78	47.38	74.00	-26.62	H	Peak
6190.0000	44.81	3.65	48.46	74.00	-25.54	H	Peak
6895.0000	45.03	5.82	50.85	74.00	-23.15	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:** June 23, 2013
Temperature: 24°C **Tested by:** Mack 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
3835.0000	47.18	-2.50	44.68	74.00	-29.32	V	Peak
5095.0000	44.64	1.43	46.07	74.00	-27.93	V	Peak
5590.0000	45.61	1.91	47.52	74.00	-26.48	V	Peak
6280.0000	44.84	3.92	48.76	74.00	-25.24	V	Peak
6565.0000	45.19	4.72	49.91	74.00	-24.09	V	Peak
7195.0000	44.33	7.34	51.67	74.00	-22.33	V	Peak
3205.0000	46.78	-4.09	42.69	74.00	-31.31	H	Peak
4195.0000	46.06	-1.60	44.46	74.00	-29.54	H	Peak
4795.0000	45.09	0.39	45.48	74.00	-28.52	H	Peak
5185.0000	45.23	1.53	46.76	74.00	-27.24	H	Peak
5785.0000	44.37	2.72	47.09	74.00	-26.91	H	Peak
6535.0000	44.27	4.64	48.91	74.00	-25.09	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:** June 23, 2013
Temperature: 24°C **Tested by:** Mack 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
3190.0000	46.91	-4.10	42.81	74.00	-31.19	V	Peak
3850.0000	46.00	-2.50	43.50	74.00	-30.50	V	Peak
5230.0000	44.43	1.55	45.98	74.00	-28.02	V	Peak
5755.0000	44.20	2.59	46.79	74.00	-27.21	V	Peak
6340.0000	45.31	4.09	49.40	74.00	-24.60	V	Peak
7015.0000	45.29	6.43	51.72	74.00	-22.28	V	Peak
3835.0000	45.98	-2.50	43.48	74.00	-30.52	H	Peak
4330.0000	45.59	-1.09	44.50	74.00	-29.50	H	Peak
5320.0000	45.53	1.53	47.06	74.00	-26.94	H	Peak
6145.0000	44.11	3.52	47.63	74.00	-26.37	H	Peak
6580.0000	44.37	4.76	49.13	74.00	-24.87	H	Peak
6970.0000	44.66	6.20	50.86	74.00	-23.14	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:** June 23, 2013
Temperature: 24°C **Tested by:** Mack 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
4330.0000	45.11	-1.09	44.02	74.00	-29.98	V	Peak
5005.0000	44.37	1.33	45.70	74.00	-28.30	V	Peak
5605.0000	44.81	1.95	46.76	74.00	-27.24	V	Peak
6160.0000	45.07	3.56	48.63	74.00	-25.37	V	Peak
6535.0000	45.14	4.64	49.78	74.00	-24.22	V	Peak
7210.0000	44.40	7.38	51.78	74.00	-22.22	V	Peak
3880.0000	46.59	-2.51	44.08	74.00	-29.92	H	Peak
4480.0000	46.26	-0.68	45.58	74.00	-28.42	H	Peak
4885.0000	45.93	0.80	46.73	74.00	-27.27	H	Peak
5905.0000	45.64	2.94	48.58	74.00	-25.42	H	Peak
6565.0000	44.78	4.72	49.50	74.00	-24.50	H	Peak
6820.0000	44.66	5.57	50.23	74.00	-23.77	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:** June 23, 2013
Temperature: 24°C **Tested by:** Mack 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
3460.0000	47.49	-3.70	43.79	74.00	-30.21	V	Peak
4345.0000	45.52	-1.03	44.49	74.00	-29.51	V	Peak
5125.0000	44.64	1.46	46.10	74.00	-27.90	V	Peak
5830.0000	44.19	2.83	47.02	74.00	-26.98	V	Peak
6295.0000	44.61	3.97	48.58	74.00	-25.42	V	Peak
6820.0000	44.54	5.57	50.11	74.00	-23.89	V	Peak
4270.0000	45.88	-1.31	44.57	74.00	-29.43	H	Peak
4690.0000	45.08	-0.07	45.01	74.00	-28.99	H	Peak
5635.0000	44.55	2.08	46.63	74.00	-27.37	H	Peak
6010.0000	44.69	3.12	47.81	74.00	-26.19	H	Peak
6535.0000	44.50	4.64	49.14	74.00	-24.86	H	Peak
6865.0000	44.32	5.72	50.04	74.00	-23.96	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 High **Test Date:** June 23, 2013
Temperature: 24°C **Tested by:** Mack 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
3460.0000	47.49	-3.70	43.79	74.00	-30.21	V	Peak
4345.0000	45.52	-1.03	44.49	74.00	-29.51	V	Peak
4975.0000	44.50	1.21	45.71	74.00	-28.29	V	Peak
5440.0000	44.88	1.60	46.48	74.00	-27.52	V	Peak
6145.0000	44.53	3.52	48.05	74.00	-25.95	V	Peak
6820.0000	44.54	5.57	50.11	74.00	-23.89	V	Peak
3460.0000	46.49	-3.70	42.79	74.00	-31.21	H	Peak
4030.0000	46.45	-2.39	44.06	74.00	-29.94	H	Peak
4975.0000	44.95	1.21	46.16	74.00	-27.84	H	Peak
5515.0000	44.67	1.76	46.43	74.00	-27.57	H	Peak
6010.0000	44.69	3.12	47.81	74.00	-26.19	H	Peak
6535.0000	44.50	4.64	49.14	74.00	-24.86	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.

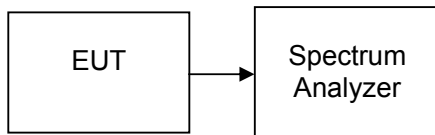
7.3.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/09/2013	03/08/2014

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	9082	>500	PASS
Mid	2437	9078		PASS
High	2462	9090		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	15322	>500	PASS
Mid	2437	15136		PASS
High	2462	15171		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2412	15435	>500	PASS
Mid	2437	15166		PASS
High	2462	15180		PASS

Test mode: IEEE 802.11n HT40 MHz

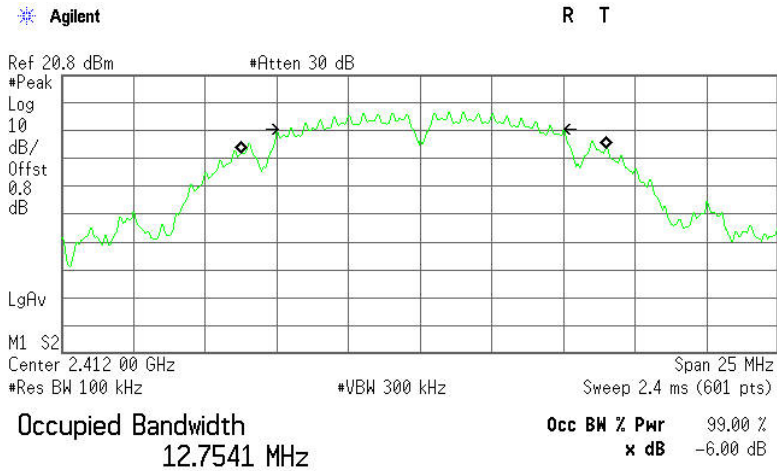
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	35243	>500	PASS
Mid	2437	35247		PASS
High	2452	35257		PASS



Test Plot

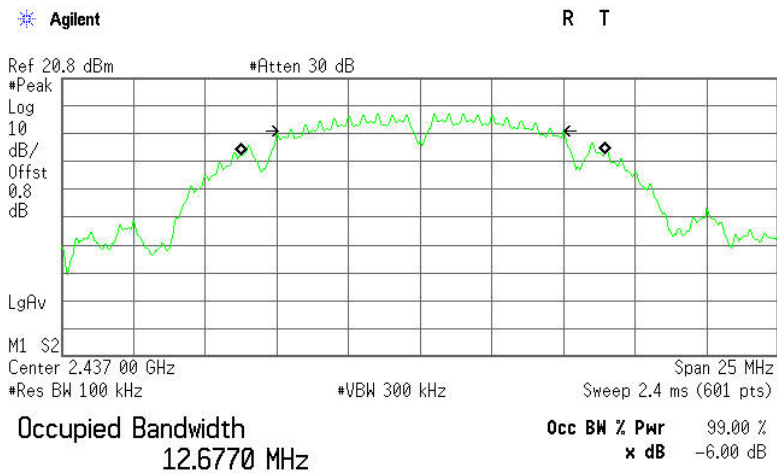
IEEE 802.11b mode

6dB Bandwidth (CH Low)



Transmit Freq Error 120.481 kHz
x dB Bandwidth 9.082 MHz

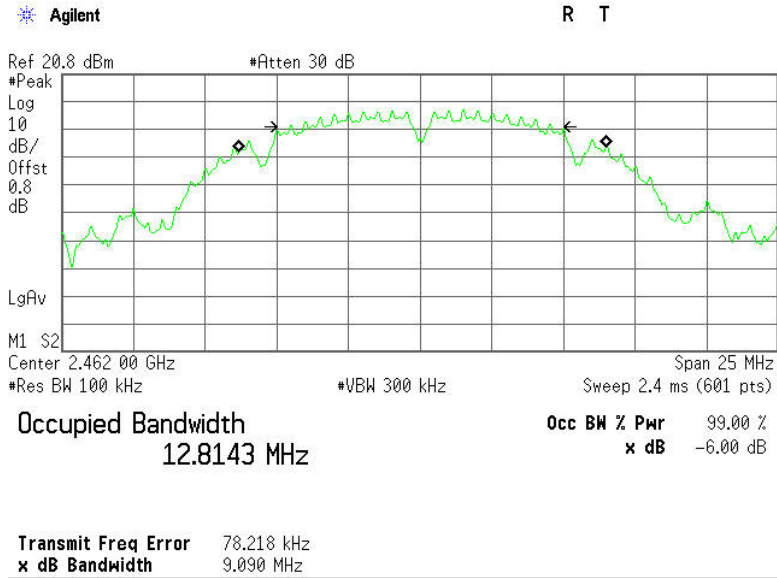
6dB Bandwidth (CH Mid)



Transmit Freq Error 104.699 kHz
x dB Bandwidth 9.078 MHz



6dB Bandwidth (CH High)



IEEE 802.11g mode

6dB Bandwidth (CH Low)

