

FCC TEST REPORT
for
Shenzhen Tongfang Multimedia Technology Co., Ltd

Limepc(Wireless Network Card only)
Model No.: X1

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APPENDIX I (Photos of EUT) (6 Pages)

TEST REPORT

Applicant : Shenzhen Tongfang Multimedia Technology Co., Ltd
Manufacturer : Shenzhen Tongfang Multimedia Technology Co., Ltd
EUT : Limepc(Wireless Network Card only)
Model No. : X1
Serial No. : N/A
Rating : DC 9V (via AC adapter)
Trade Mark : N/A

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.247: 2007

The device described above is tested by Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek Compliance Laboratory Limited

Date of Test : Sep 19~24, 2008

Prepared by : Jacky
(Engineer)

Reviewer : Jim
(Project Manager)

Approved & Authorized Signer : Richi
(Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Limepc(Wireless Network Card only)

Model Number : X1

Test Power Supply : DC 9V (via AC adapter)

Frequency : 2400 ~ 2483.5 MHz

Input Line : Non-shielded, Detachable, <3.0m

Applicant : Shenzhen Tongfang Multimedia Technologly Co., Ltd
Address : 9F Sector D of Tongfang Information Harbor,Hi-tech Industrial
Park(North) Nanshan District, Shenzhen, China

Manufacturer : Shenzhen Tongfang Multimedia Technologly Co., Ltd
Address : 9F Sector D of Tongfang Information Harbor,Hi-tech Industrial
Park(North) Nanshan District, Shenzhen, China

Date of receiver : Sep 18, 2008
Date of Test : Sep 19~24, 2008

1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

VCCI-Registration No.: R-2197 and C-2383

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (VCCI) Voluntary Control Council for Interference by Information Technology Equipment. The acceptance letter from the VCCI is maintained in our files. Registration R-2197 and C-2383, September 29, 2005.

FCC-Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 556682, August 04, 2005.

IC-Registration No.: 6002

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 6002, August 25, 2005.

Test Location

All Emissions tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. at No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China

1.3. Measurement Uncertainty

Radiation Uncertainty : $U_r = \pm 4.26\text{dB}$

Conduction Uncertainty : $U_c = \pm 2.66\text{dB}$

2. MEASURING DEVICE AND TEST EQUIPMENT

Equipment	Manufacturer	Model #	Serial #	Data of Cal.	Due Data
EMI Test Receiver	Rohde & Schwarz	ESCI	100119	Mar.03, 2008	Mar.02, 2009
EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	Aug.22, 2008	Aug.21, 2009
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Aug.22, 2008	Aug.21, 2009
Signal Generator	Rohde & Schwarz	SMR27	100124	Jul.06, 2007	Jul.25, 2009
Signal Generator	Rohde & Schwarz	SML03	102319	Aug.01, 2007	Aug.01, 2009
AC Power Source	All Power Electronic Co.	APW-1100N	890869	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS21	100218	Apr.30, 2007	Apr.29, 2009
Power Meter	Rohde & Schwarz	NRVD	101287	Jul.19, 2007	Jul.18, 2009
Coaxial Cable	N/A	N/A	N/A	May.31, 2008	May.30, 2009
Coaxial Cable	N/A	N/A	N/A	May.31, 2008	May.30, 2009
Coaxial Cable	N/A	N/A	N/A	May.31, 2008	May.30, 2009
Universal radio Communication tester	Rohde & Schwarz	CMU200	101724	Sept.08, 2007	Sept.07, 2009
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
BiConilog Antenna	ETS-LINDGREN	3142C	00042670	Mar.03, 2008	Mar.02, 2009
BiConilog Antenna	ETS-LINDGREN	3142C	00042673	Mar.03, 2008	Mar.02, 2009
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00035926	Dec.30, 2007	Dec.29, 2009
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00041545	Dec.30, 2007	Dec.29, 2009
Pre-amplifier	Rohde & Schwarz	AFS42-00101800-25-S-42	1091457	Jul.17, 2007	Jul.16, 2009
Thermo-/Hygrometer	N/A	TH01	N/A	May.03, 2008	Mar.03, 2010
Shielding Room	Zhong Yu Electron	GB-88	N/A	N/A	N/A
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	N/A	Apr.28, 2007	Apr.27, 2009

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC Part 15, Paragraph 15.247

3.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Test	-	N/A
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

* The digital circuit porting of the EUT has been tested and verified to comply with FCC Part 15, Subpart B., Class B Digital Devices and the associated Radio Receiver has also been tested and found to comply with FCC Part 15, Subpart B – Radio Receivers.

3.2. 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.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 1Mbps highest data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 6Mbps data rate (the worst case) are chosen for the final testing.

4. Conducted Power Line Test

4.1 Test Equipment

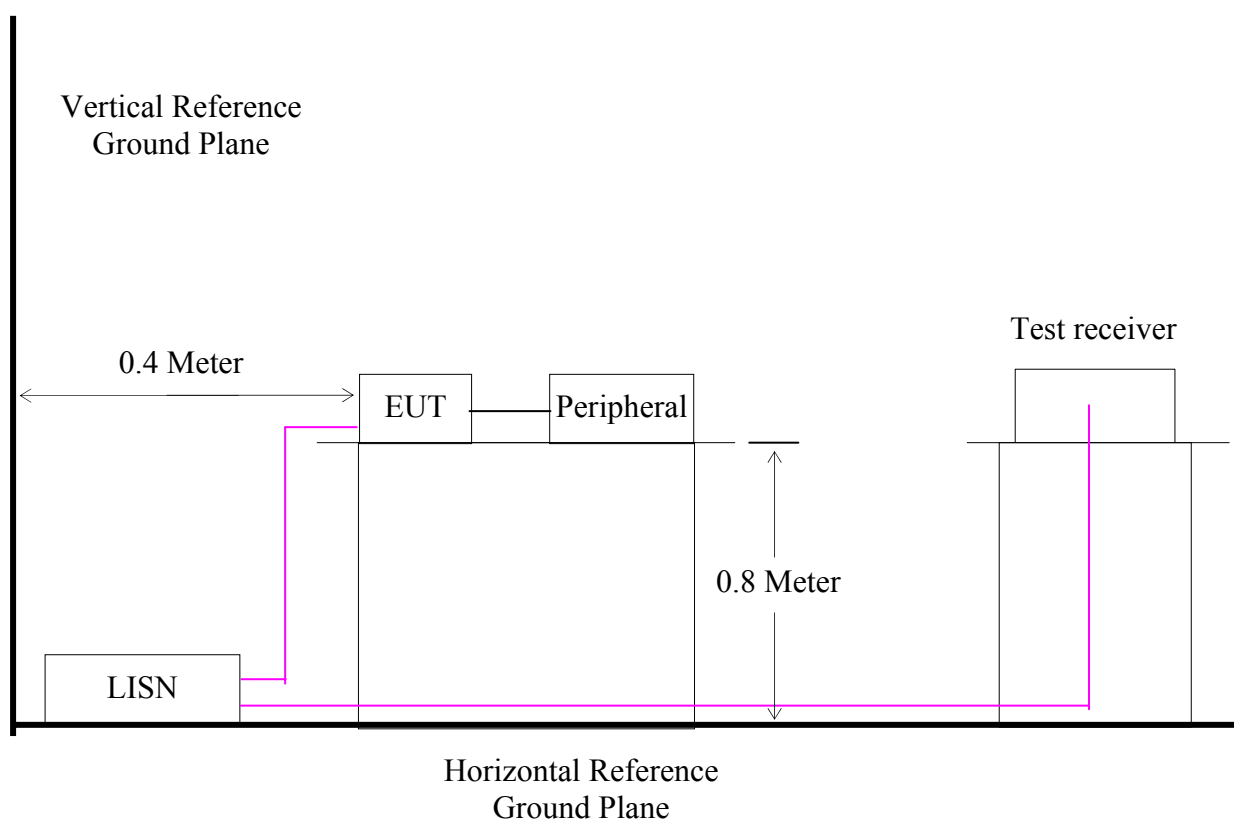
Please refer to Section 2 this report

4.2 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50 μ H coupling impedance with 50ohm termination.

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2003 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4.3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

4.4 Configuration of the EUT

The EUT was configured according to ANSI C63.4-2003. EUT was used DC source. The operational frequency is from 2400MHz~2483.5MHz. Enable the signal transmitted from the EUT. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

Note:

- 1) Operating Modes: Each of lowest, middle and highest channel frequencies transmits continuously for emissions measurements. The EUT operates in normal DSSS.
- 2) Special Test Software & Hardware: Special firmware and hardware provided by the Applicant are installed to allow the EUT to operate in DSSS at each channel frequency continuously. For example, the transmitter will be operated at each of lowest, middle and highest frequencies individually continuously during testing.
- 3) Transmitter Test Antenna: The EUT is tested with the antenna fitted in a manner typical of normal intended use as an integral / non-integral antenna equipment as describe with the test results.
- 4) Frequency(ies) Tested: 2412MHz, 2437MHz and 2462MHz were pre-tested, The worst case one, was chosen for conducted emission test.
- 5) Above 1GHz, the 2412MHz, 2437MHz and 2462MHz were tested individually.
- 6) Normal Test Modulation: DSSS
- 7) Modulating Signal Source: Internal

* Associated Antenna Descriptions: The antenna used in this product is embedded antenna

4.5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2003

4.5.1 Setup the EUT and simulator as shown as Section 4.3.

4.5.2 Turn on the power of all equipment.

4.5.3 Let the EUT work in test mode (On) and measure it.

4.6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207		
Frequency Range	Limits (dBμV)	
	Class A QP/AV	Class B QP/AV
0.15 ~ 0.50	79/66	66 ~ 56 / 56 ~ 46*
0.50 ~ 5.00	73/60	56/46
5.00 ~ 30.00	73/60	60/50

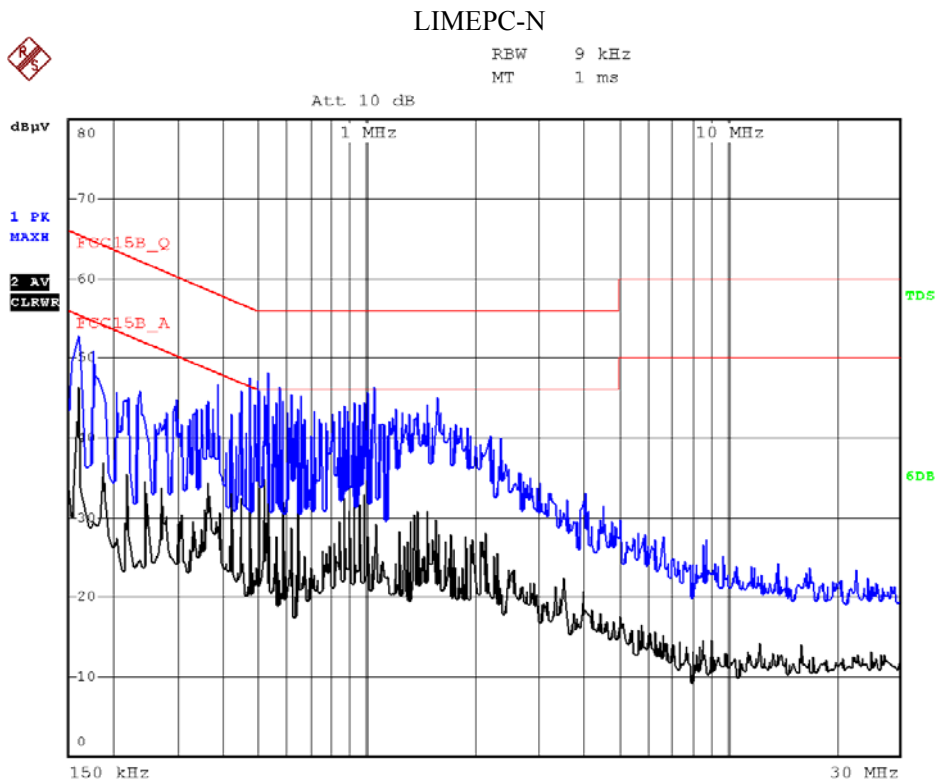
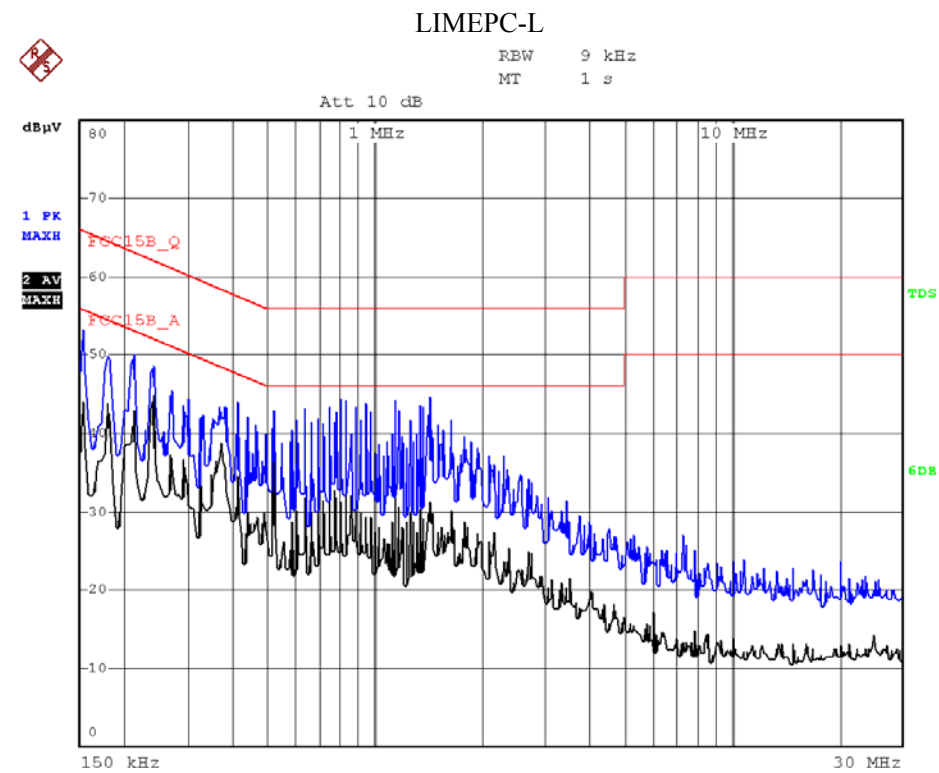
Notes: 1. *Decreasing linearly with logarithm of frequency.

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

4.7 Conducted Power Line Test Result

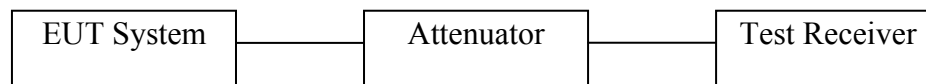
Pass

4.8 Test Plot



5. FCC Part 15.247 Requirements for DSSS Systems

5.1 Test Setup



5.2 6dB Bandwidth

a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

b. Test Procedure

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

c. Test Setup

See 5.1

d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	11.4	>500	Pass
Mid	2437	11.5		Pass
High	2462	11.4		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Results
Low	2412	16.5	>500	Pass
Mid	2437	16.5		Pass
High	2462	16.6		Pass

5.3 Peak Power

a. Limit

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

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt.
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

b. Test Procedure

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

c. Test Setup

See 5.1

d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)	Factor (dB)	Output Power (dBm)	Limit (dBm)	Result
Low	2412	15.55	2.00	17.55	30	Pass
Mid	2437	15.79	2.00	17.79		Pass
High	2462	15.91	2.00	17.91		Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)	Factor (dB)	Output Power (dBm)	Limit (dBm)	Result
Low	2412	18.41	2.00	20.41	30	Pass
Mid	2437	18.56	2.00	20.56		Pass
High	2462	18.46	2.00	20.46		Pass

5.4 Band Edges Measurement

a. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. 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).

b. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

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

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

5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

c. Test Setup

See 5.1

d. Test Results

Pass

5.5 Peak Power Spectral Density

a. Limit

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

b. Test Procedure

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

c. Test Setup

See 5.1

d. Test Results

Pass

e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-6.5	2.00	-4.5	8.00	Pass
Mid	2437	-8.5	2.00	-6.5		Pass
High	2462	-10.7	2.00	-8.7		Pass

Test mode: IEEE 802.11g

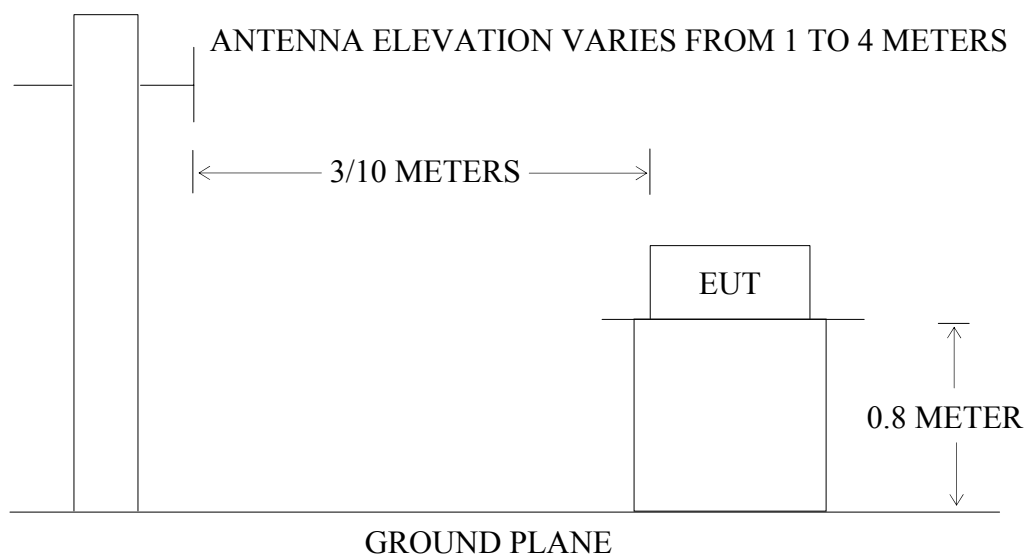
Channel	Frequency (MHz)	Reading (dBm)	Factor (dB)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-12.5	2.00	-10.5	8.00	Pass
Mid	2437	-11.9	2.00	-9.9		Pass
High	2462	-12.1	2.00	-10.1		Pass

5.6 Spurious Emissions**a. Limit**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

b. Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site. The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 100 KHz. Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

c. Test Setup

For the actual test configuration, Please refer to the related items – Photos of Testing

d. Test Results

Pass

5.7 Radiated Emissions

a. Limit

1. 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)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

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

2. In the above emission table, 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

b. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

c. Test Results

Below 1 GHz

Operation Mode: Normal link

Temperature: 25°C

Humidity: 70 % RH

Test Date: Sep 24, 2008

Tested by: Jim

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Detector Mode (PK/QP)	Factor (dB)	Actual FS (dB μ V/m)	Limit 3m (dB μ V/m)	Safe Margin (dB)
101.100	V	Peak	55.01	-15.49	39.52	43.50	-3.98
222.150	V	Peak	53.93	-13.17	40.76	46.00	-5.24
399.166	V	Peak	49.39	-8.58	40.81	46.00	-5.19
454.000	V	Peak	49.60	-8.13	41.47	46.00	-4.53
496.000	V	Peak	48.46	-7.56	40.90	46.00	-5.10
658.166	V	Peak	45.33	-4.84	40.49	46.00	-5.51
133.050	H	Peak	54.52	-16.59	37.93	43.50	-5.57
161.400	H	Peak	55.42	-15.01	40.41	43.50	-3.09
178.950	H	Peak	55.44	-14.78	40.66	43.50	-2.84
323.333	H	Peak	51.42	-10.15	41.27	46.00	-4.73
332.666	H	Peak	51.46	-9.87	41.59	46.00	-4.41
598.666	H	Peak	45.62	-5.68	39.94	46.00	-6.06

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz and the IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. 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.

FCC ID: WLVLIMEPC200808

Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low

Temperature: 25°C

Humidity: 70 % RH

Test Date: Sep 24, 2008

Tested by: Jim

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CLCF (dB)	Actual Fs		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
					Peak (dBuV/)	AV (dBuV/)				
1593.33	V	58.73	---	-9.05	49.68	---	74.00	54.00	-4.32	Peak
1860.00	V	52.91	---	-8.01	44.90	---	74.00	54.00	-9.10	Peak
2270.00	V	52.51	---	-6.39	46.12	---	74.00	54.00	-7.88	Peak
4825.00	V	48.55	---	0.68	49.23	---	74.00	54.00	-4.77	Peak
7236.00	V	---	---	---	---	---	---	---	---	---
9648.00	V	---	---	---	---	---	---	---	---	---
12060.00	V	---	---	---	---	---	---	---	---	---
14472.00	V	---	---	---	---	---	---	---	---	---
16884.00	V	---	---	---	---	---	---	---	---	---
19296.00	V	---	---	---	---	---	---	---	---	---
21708.00	V	---	---	---	---	---	---	---	---	---
24120.00	V	---	---	---	---	---	---	---	---	---
1060.00	H	56.31	---	-11.84	44.47	---	74.00	54.00	-9.53	Peak
1590.00	H	55.30	---	-9.07	46.23	---	74.00	54.00	-7.77	Peak
1906.66	H	51.14	---	-7.83	43.31	---	74.00	54.00	-10.69	Peak
4825.00	H	50.15	---	0.68	50.83	---	74.00	54.00	-3.17	Peak
7236.00	H	---	---	---	---	---	---	---	---	---
9648.00	H	---	---	---	---	---	---	---	---	---
12060.00	H	---	---	---	---	---	---	---	---	---
14472.00	H	---	---	---	---	---	---	---	---	---
16884.00	H	---	---	---	---	---	---	---	---	---
19296.00	H	---	---	---	---	---	---	---	---	---
21708.00	H	---	---	---	---	---	---	---	---	---
24120.00	H	---	---	---	---	---	---	---	---	---

Operation Mode: TX / IEEE 802.11b / CH Mid

Temperature: 25°C

Humidity: 70 % RH

Test Date: Sep 24, 2008

Tested by: Jim

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CLCF (dB)	Actual Fs		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
					Peak (dBuV/)	AV (dBuV/)				
1593.33	V	59.67	---	-9.05	50.62	---	74.00	54.00	-2.35	Peak
1856.66	V	52.19	---	-8.02	44.17	---	74.00	54.00	-8.50	Peak
2193.33	V	53.56	---	-6.69	46.87	---	74.00	54.00	-6.17	Peak
4875.00	V	54.12	52.20	0.77	54.88	52.97	74.00	54.00	-1.03	AVG
7311.00	V	---	---	---	---	---	---	---	---	---
9748.00	V	---	---	---	---	---	---	---	---	---
12185.00	V	---	---	---	---	---	---	---	---	---
14622.00	V	---	---	---	---	---	---	---	---	---
17059.00	V	---	---	---	---	---	---	---	---	---
19496.00	V	---	---	---	---	---	---	---	---	---
21933.00	V	---	---	---	---	---	---	---	---	---
24370.00	V	---	---	---	---	---	---	---	---	---

FCC ID: WLVLIMEPC200808

1590.00	H	55.25	---	-9.07	46.18	---	74.00	54.00	-7.82	Peak
2190.00	H	50.81	---	-6.71	44.10	---	74.00	54.00	-9.90	Peak
2703.33	H	51.37	---	-4.91	46.46	---	74.00	54.00	-7.54	Peak
4875.00	H	54.34	52.57	0.77	55.11	53.34	74.00	54.00	-0.66	AVG
7311.00	H	---	---	---	---	---	---	---	---	---
9748.00	H	---	---	---	---	---	---	---	---	---
12185.00	H	---	---	---	---	---	---	---	---	---
14622.00	H	---	---	---	---	---	---	---	---	---
17059.00	H	---	---	---	---	---	---	---	---	---
19496.00	H	---	---	---	---	---	---	---	---	---
21933.00	H	---	---	---	---	---	---	---	---	---
24370.00	H	---	---	---	---	---	---	---	---	---

Operation Mode: TX / IEEE 802.11b / CH Hig

Temperature: 25°C

Humidity: 70 % RH

Test Date: Sep 24, 2008

Tested by: Jim

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CLCF (dB)	Actual Fs		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
					Peak (dBuV/)	AV (dBuV/)				
1590.00	V	59.62	---	-9.07	50.55	---	74.00	54.00	-3.45	Peak
2220.00	V	53.80	---	-6.59	47.21	---	74.00	54.00	-6.79	Peak
2336.66	V	53.25	---	-6.13	47.12	---	74.00	54.00	-6.88	Peak
4925.00	V	53.30	51.18	0.85	54.15	52.03	74.00	54.00	-1.97	AVG
7386.00	V	---	---	---	---	---	---	---	---	---
9848.00	V	---	---	---	---	---	---	---	---	---
12310.00	V	---	---	---	---	---	---	---	---	---
14772.00	V	---	---	---	---	---	---	---	---	---
17234.00	V	---	---	---	---	---	---	---	---	---
19696.00	V	---	---	---	---	---	---	---	---	---
22158.00	V	---	---	---	---	---	---	---	---	---
24620.00	V	---	---	---	---	---	---	---	---	---
1063.33	H	55.32	---	-11.82	46.18	---	74.00	54.00	-10.50	Peak
1860.00	H	51.61	---	-8.01	44.10	---	74.00	54.00	-10.40	Peak
2100.00	H	51.16	---	-7.06	46.46	---	74.00	54.00	-9.90	Peak
4925.00	H	50.79	---	0.85	55.11	---	74.00	54.00	-2.36	Peak
7386.00	---	---	---	---	---	---	---	---	---	---
9848.00	---	---	---	---	---	---	---	---	---	---
12310.00	---	---	---	---	---	---	---	---	---	---
14772.00	---	---	---	---	---	---	---	---	---	---
17234.00	---	---	---	---	---	---	---	---	---	---
19696.00	---	---	---	---	---	---	---	---	---	---
22158.00	---	---	---	---	---	---	---	---	---	---
24620.00	---	---	---	---	---	---	---	---	---	---

FCC ID: WLVLIMEPC200808

Operation Mode: TX / IEEE 802.11g/ CH Low
 Temperature: 25°C
 Humidity: 70 % RH

Test Date: Sep 24, 2008
 Tested by: Jim
 Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CLCF (dB)	Actual Fs		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
					Peak (dBuV/)	AV (dBuV/)				
1590.00	V	61.00	---	-9.07	51.93	---	74.00	54.00	-2.07	Peak
2100.00	V	51.98	---	-7.06	44.92	---	74.00	54.00	-9.08	Peak
2333.33	V	54.43	---	-6.14	48.29	---	74.00	54.00	-5.71	Peak
4808.33	V	46.41	---	0.65	47.06	---	74.00	54.00	-6.94	Peak
7236.00	---	---	---	---	---	---	---	---	---	---
9648.00	---	---	---	---	---	---	---	---	---	---
12060.00	---	---	---	---	---	---	---	---	---	---
14472.00	---	---	---	---	---	---	---	---	---	---
16884.00	---	---	---	---	---	---	---	---	---	---
19296.00	---	---	---	---	---	---	---	---	---	---
21708.00	---	---	---	---	---	---	---	---	---	---
24120.00	---	---	---	---	---	---	---	---	---	---
1593.33	H	56.83	---	-9.05	47.78	---	74.00	54.00	-6.22	Peak
2136.66	H	50.64	---	-6.92	43.72	---	74.00	54.00	-10.28	Peak
2826.66	H	51.08	---	-4.57	46.51	---	74.00	54.00	-7.49	Peak
4725.00	H	46.92	---	0.51	47.43	---	74.00	54.00	-6.57	Peak
7236.00	---	---	---	---	---	---	---	---	---	---
9648.00	---	---	---	---	---	---	---	---	---	---
12060.00	---	---	---	---	---	---	---	---	---	---
14472.00	---	---	---	---	---	---	---	---	---	---
16884.00	---	---	---	---	---	---	---	---	---	---
19296.00	---	---	---	---	---	---	---	---	---	---
21708.00	---	---	---	---	---	---	---	---	---	---
24120.00	---	---	---	---	---	---	---	---	---	---

Operation Mode: TX / IEEE 802.11g/ CH Mid
 Temperature: 25°C
 Humidity: 70 % RH

Test Date: Sep 24, 2008
 Tested by: Jim
 Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CLCF (dB)	Actual Fs		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
					Peak (dBuV/)	AV (dBuV/)				
1590.00	V	60.17	---	-9.07	51.10	---	74.00	54.00	-2.90	Peak
1856.66	V	52.95	---	-8.02	44.93	---	74.00	54.00	-9.07	Peak
2190.00	V	52.78	---	-6.71	46.07	---	74.00	54.00	-7.93	Peak
4866.66	V	49.16	---	0.75	49.91	---	74.00	54.00	-4.09	Peak
7311.00	V	---	---	---	---	---	---	---	---	---
9748.00	V	---	---	---	---	---	---	---	---	---
12185.00	V	---	---	---	---	---	---	---	---	---
14622.00	V	---	---	---	---	---	---	---	---	---
17059.00	V	---	---	---	---	---	---	---	---	---
19496.00	V	---	---	---	---	---	---	---	---	---
21933.00	V	---	---	---	---	---	---	---	---	---
24370.00	V	---	---	---	---	---	---	---	---	---

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1063.33	H	55.24	---	-11.82	43.42	---	74.00	54.00	-10.58	Peak
1596.66	H	55.81	---	-9.04	46.77	---	74.00	54.00	-7.23	Peak
2746.66	H	51.02	---	-4.79	46.23	---	74.00	54.00	-7.77	Peak
4875.00	H	50.58	---	0.77	51.35	---	74.00	54.00	-2.65	Peak
7311.00	H	---	---	---	---	---	---	---	---	---
9748.00	H	---	---	---	---	---	---	---	---	---
12185.00	H	---	---	---	---	---	---	---	---	---
14622.00	H	---	---	---	---	---	---	---	---	---
17059.00	H	---	---	---	---	---	---	---	---	---
19496.00	H	---	---	---	---	---	---	---	---	---
21933.00	H	---	---	---	---	---	---	---	---	---
24370.00	H	---	---	---	---	---	---	---	---	---

Operation Mode: TX / IEEE 802.11g/ CH Hig
 Temperature: 25°C
 Humidity: 70 % RH

Test Date: Sep 24, 2008
 Tested by: Jim
 Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CLCF (dB)	Actual Fs		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
					Peak (dBuV/)	AV (dBuV/)				
1590.00	V	60.28	---	-9.07	51.21	---	74.00	54.00	-2.79	Peak
2103.33	V	52.40	---	-7.05	45.35	---	74.00	54.00	-8.65	Peak
2213.33	V	53.46	---	-6.62	46.84	---	74.00	54.00	-7.16	Peak
4925.00	V	49.28	---	0.85	50.13	---	74.00	54.00	-3.87	Peak
7386.00	V	---	---	---	---	---	---	---	---	---
9848.00	V	---	---	---	---	---	---	---	---	---
12310.00	V	---	---	---	---	---	---	---	---	---
14772.00	V	---	---	---	---	---	---	---	---	---
17234.00	V	---	---	---	---	---	---	---	---	---
19696.00	V	---	---	---	---	---	---	---	---	---
22158.00	V	---	---	---	---	---	---	---	---	---
24620.00	V	---	---	---	---	---	---	---	---	---
1060.00	H	58.79	---	-11.84	46.95	---	74.00	54.00	-7.05	Peak
1590.00	H	56.57	---	-9.07	47.50	---	74.00	54.00	-6.50	Peak
2543.33	H	51.79	---	-5.36	46.43	---	74.00	54.00	-7.57	Peak
4916.66	H	46.73	---	0.84	47.57	---	74.00	54.00	-6.43	Peak
7386.00	H	---	---	---	---	---	---	---	---	---
9848.00	H	---	---	---	---	---	---	---	---	---
12310.00	H	---	---	---	---	---	---	---	---	---
14772.00	H	---	---	---	---	---	---	---	---	---
17234.00	H	---	---	---	---	---	---	---	---	---
19696.00	H	---	---	---	---	---	---	---	---	---
22158.00	H	---	---	---	---	---	---	---	---	---
24620.00	H	---	---	---	---	---	---	---	---	---

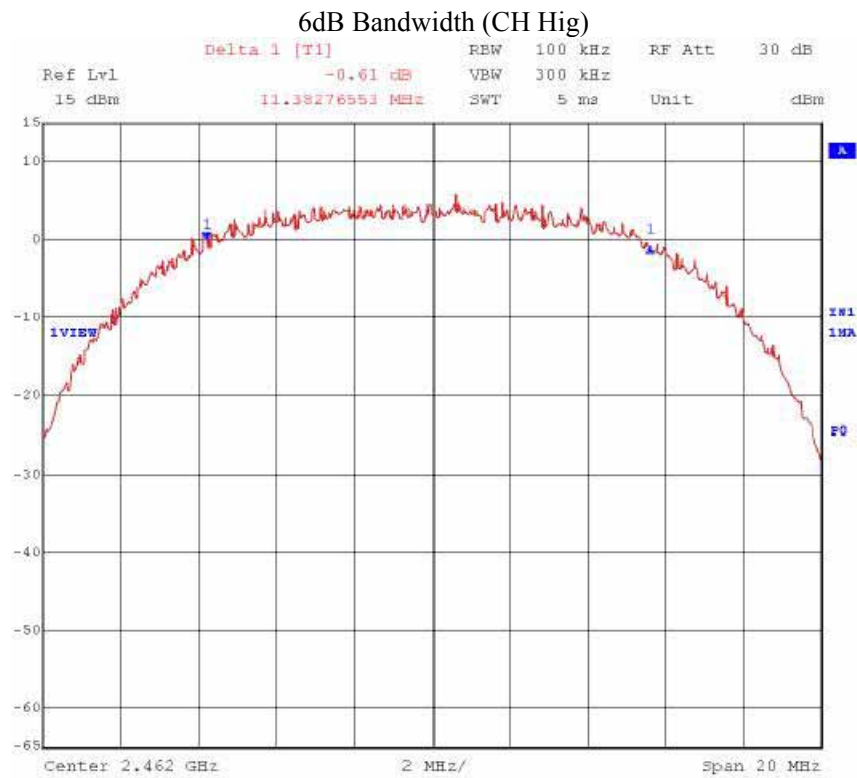
Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
 - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
 - b. AV Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. 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.

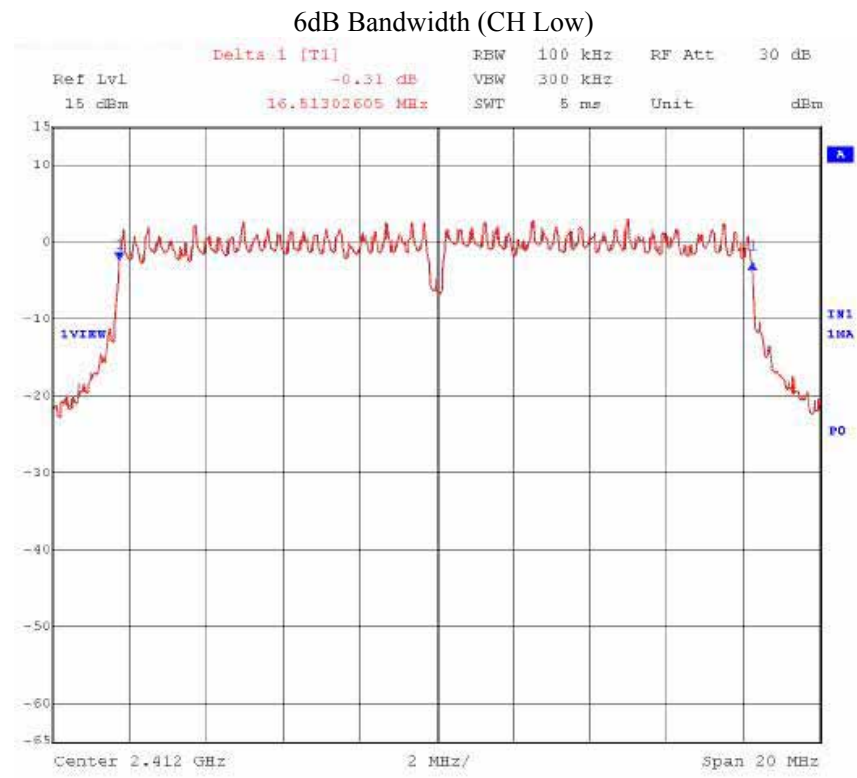
6. Test Plot

6.1 6dB Bandwidth
a.802.11b mode

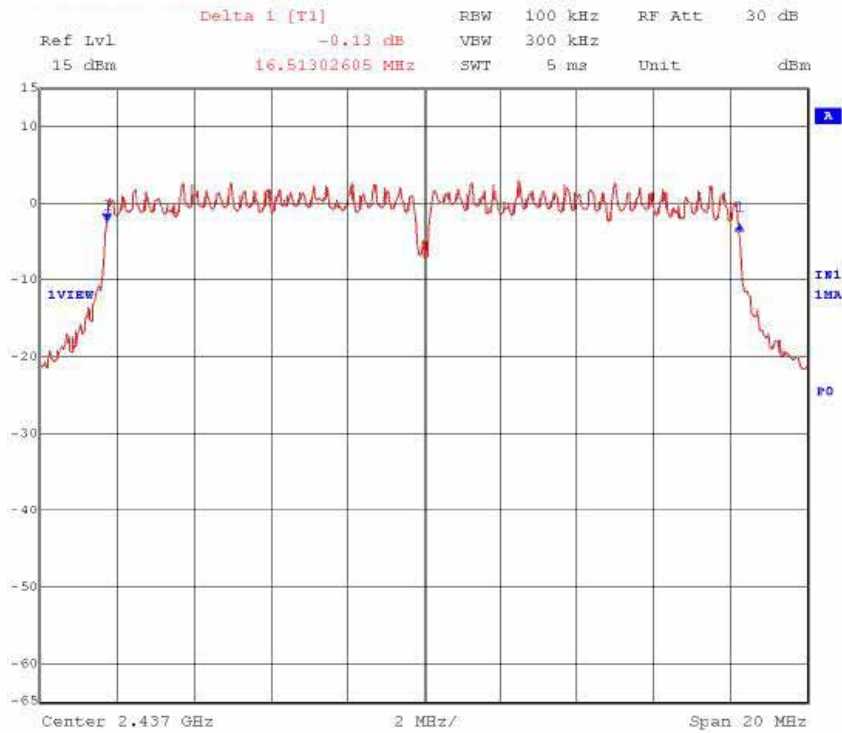




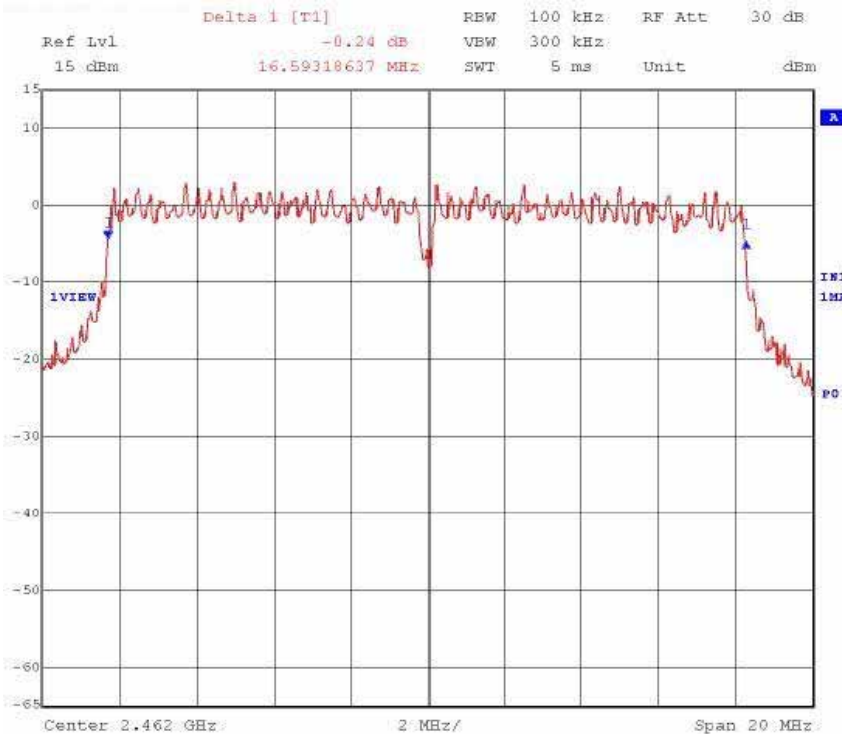
b.802.11g mode



6dB Bandwidth (CH Mid)

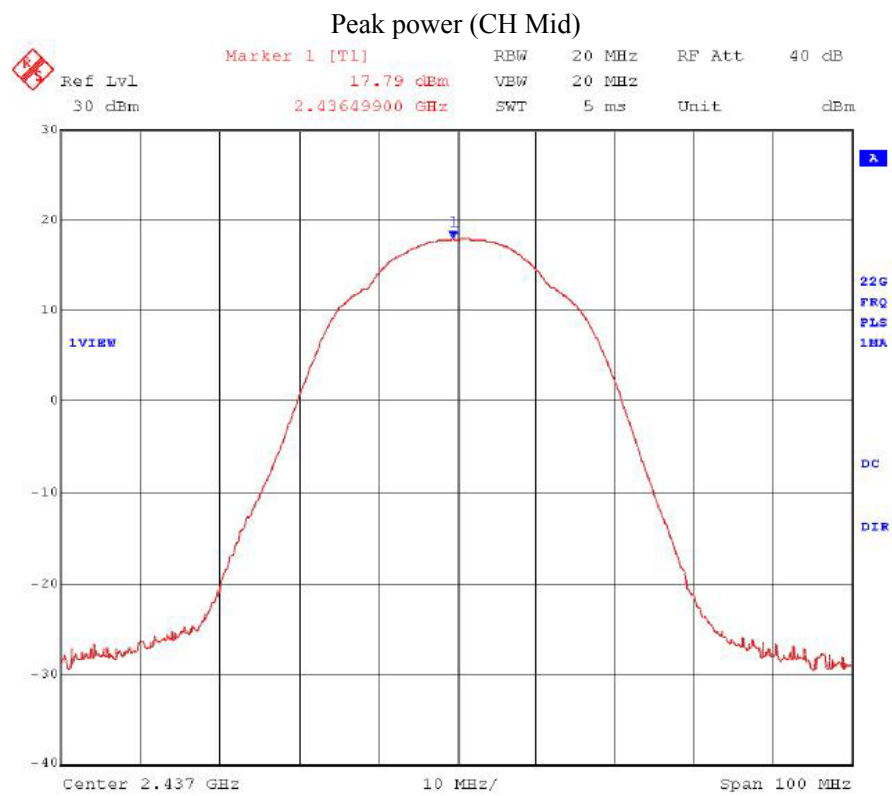


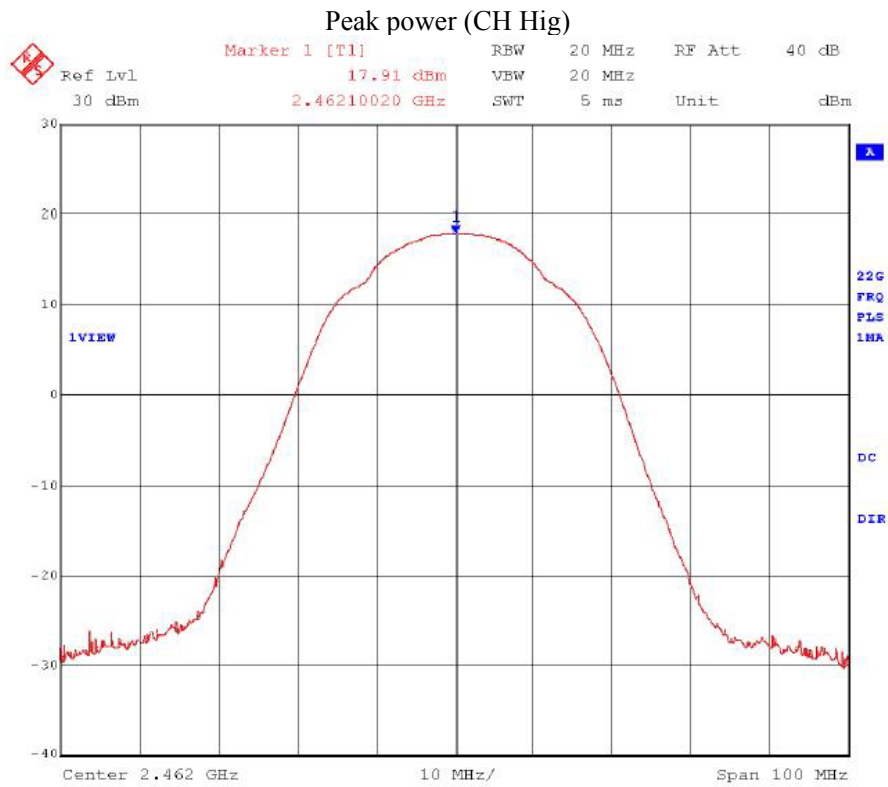
6dB Bandwidth (CH Hig)



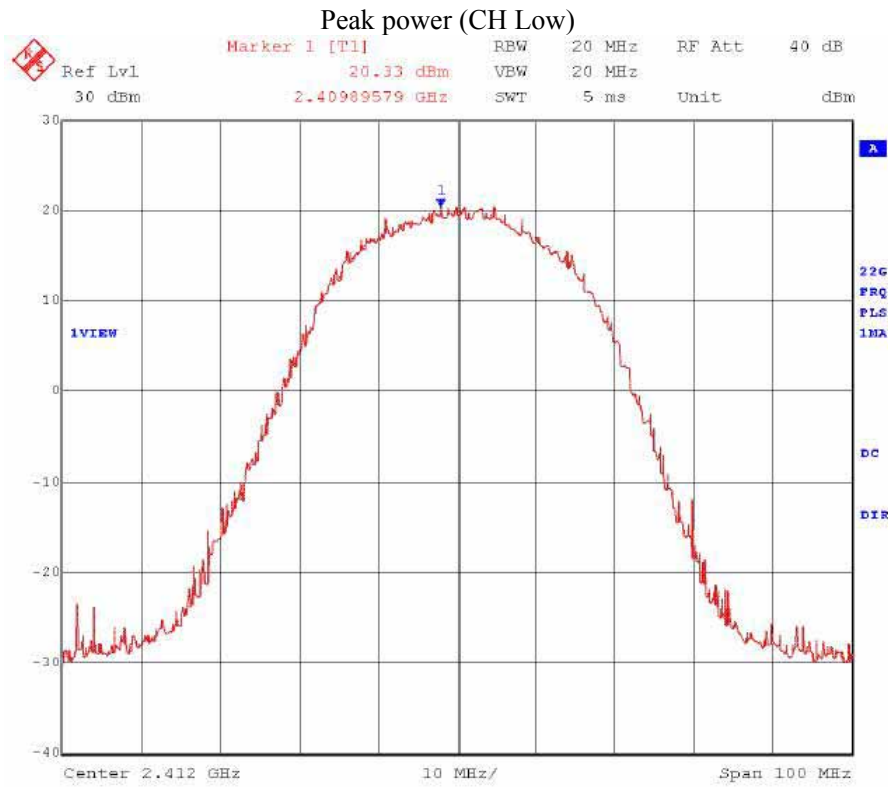
6.2 Peak Power

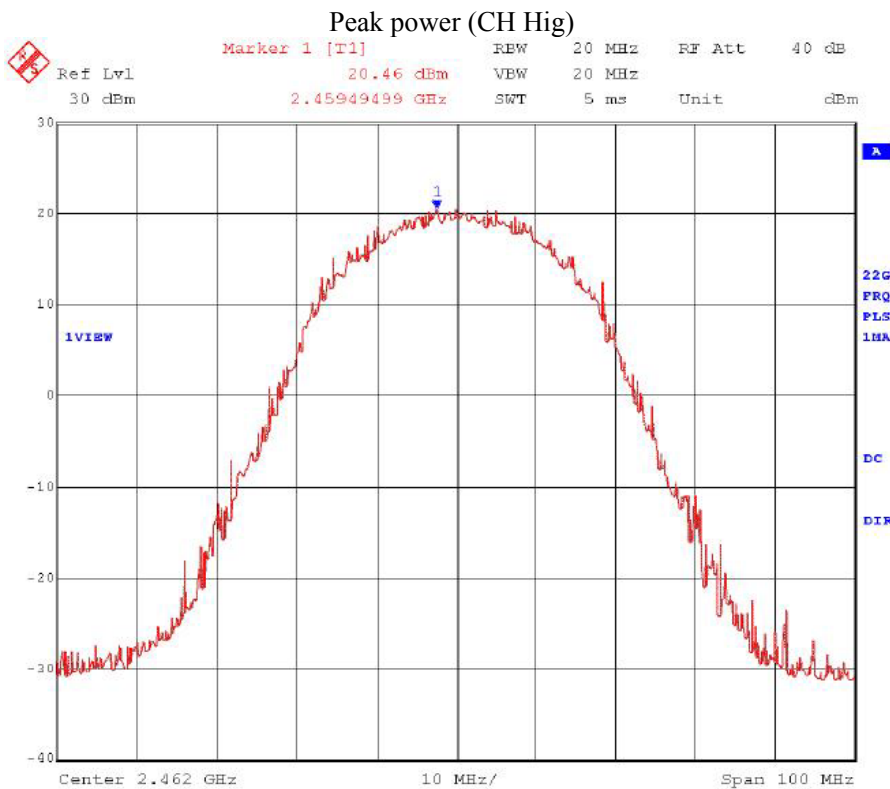
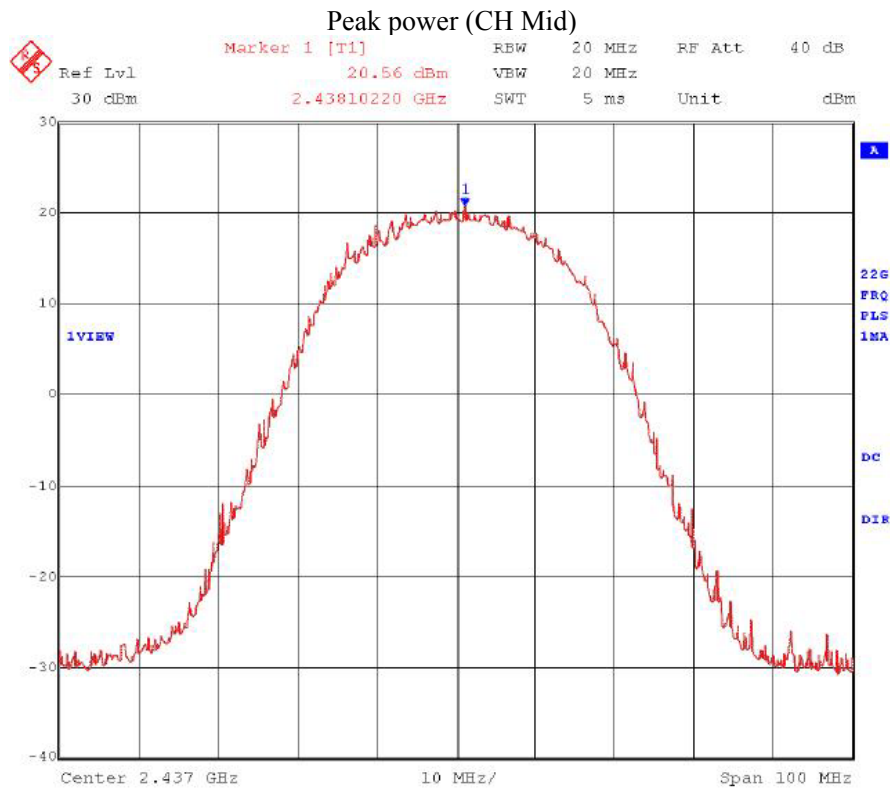
a.802.11b mode





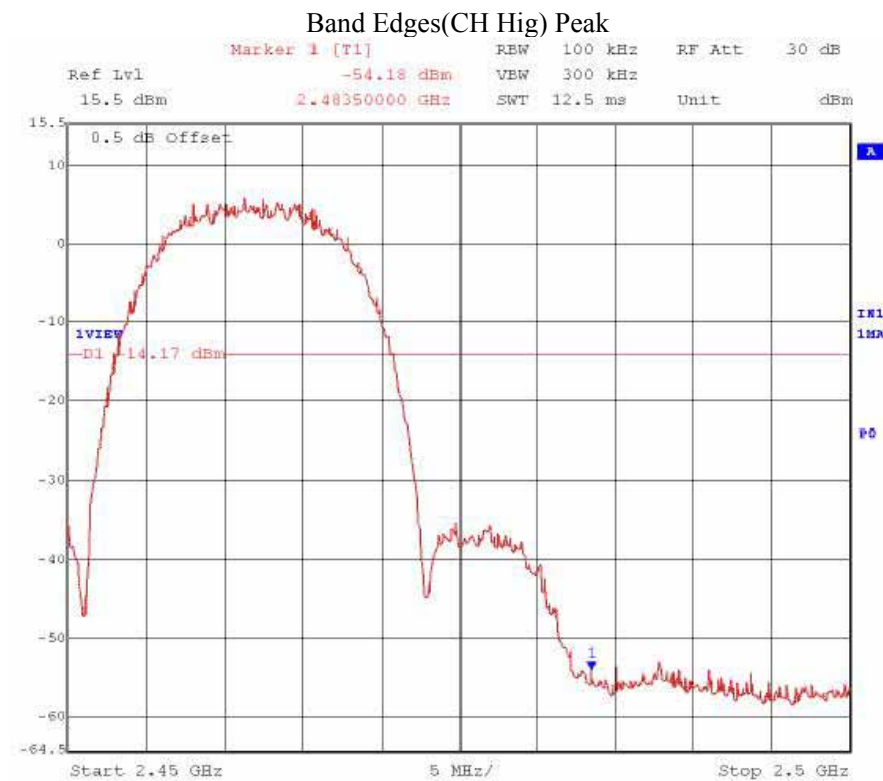
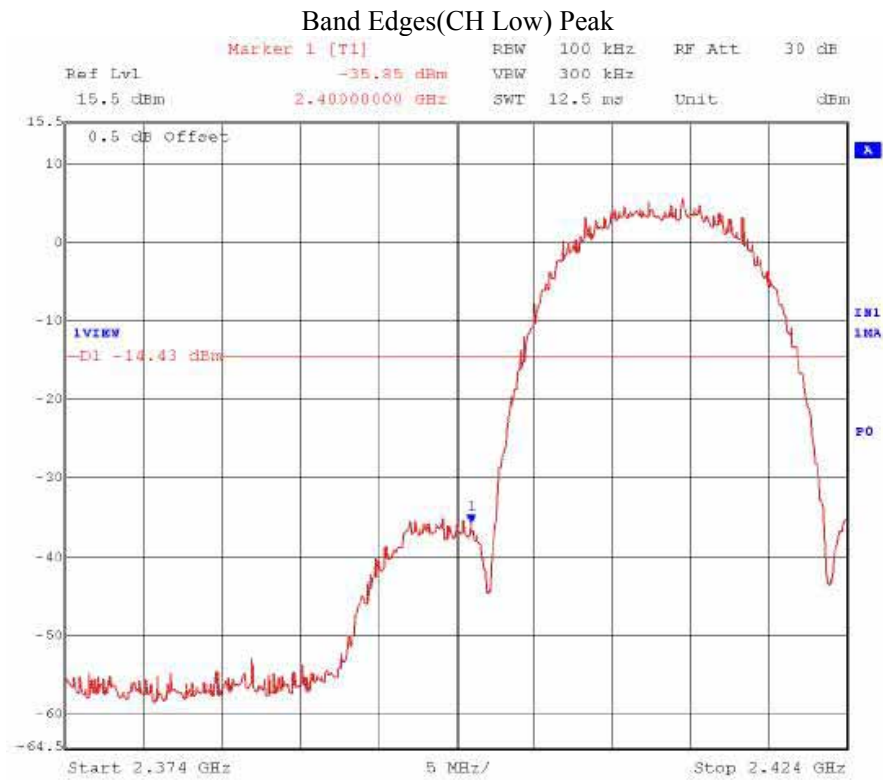
b.802.11g mode



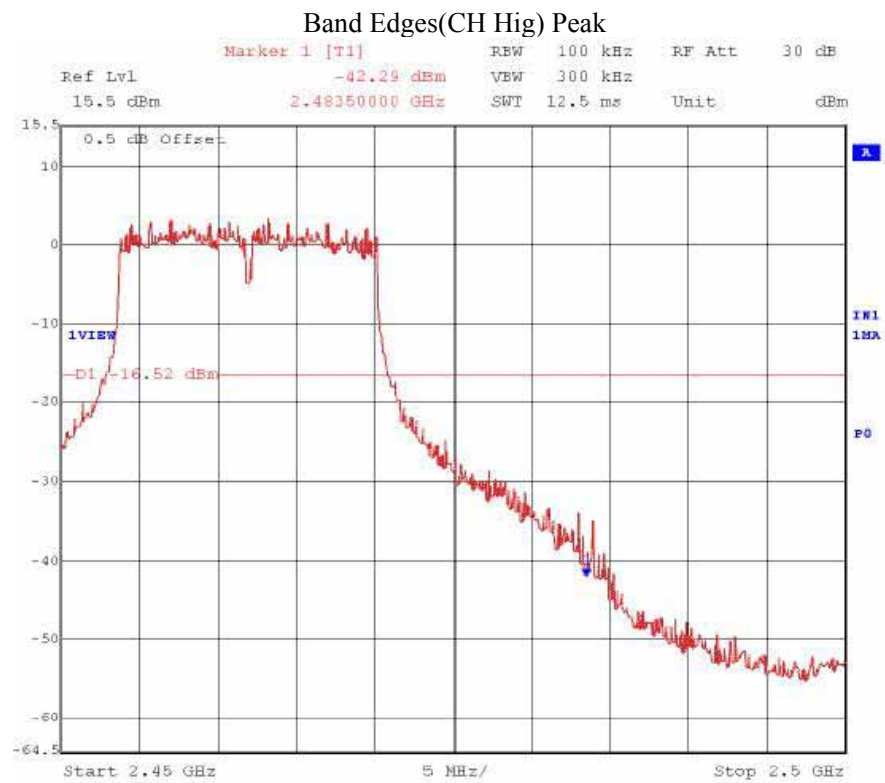
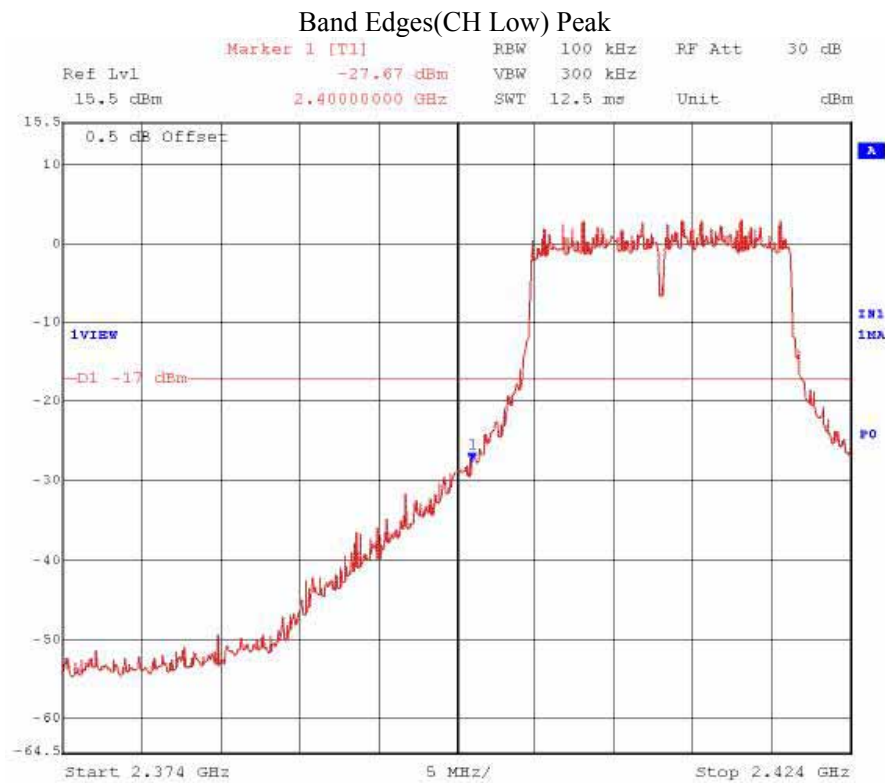


6.3 Band Edges Measurement

a.802.11b mode



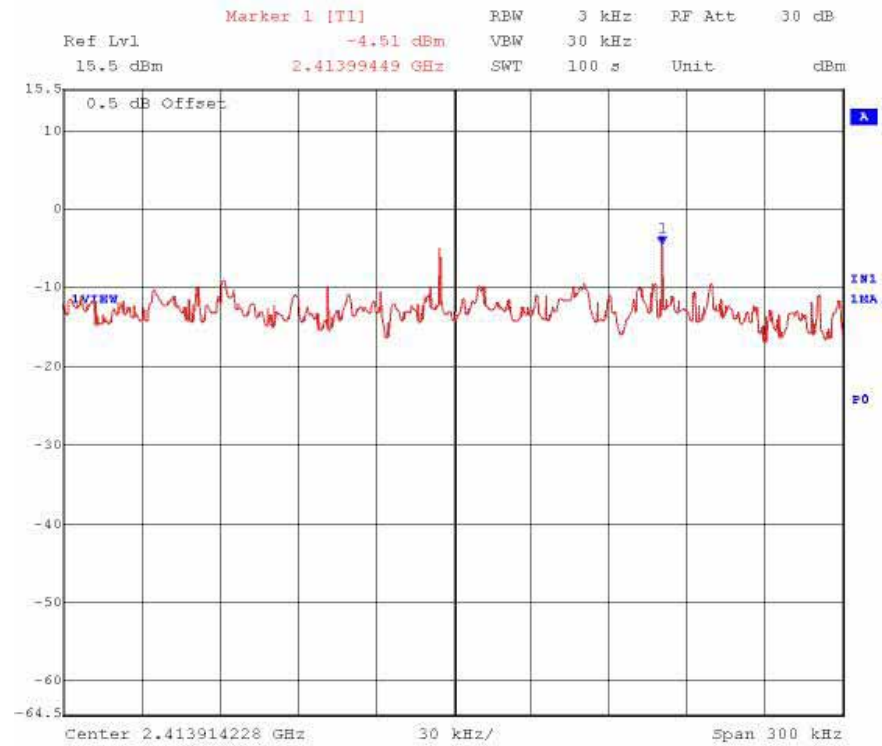
b.802.11g mode



6.4 Peak Power Spectral Density

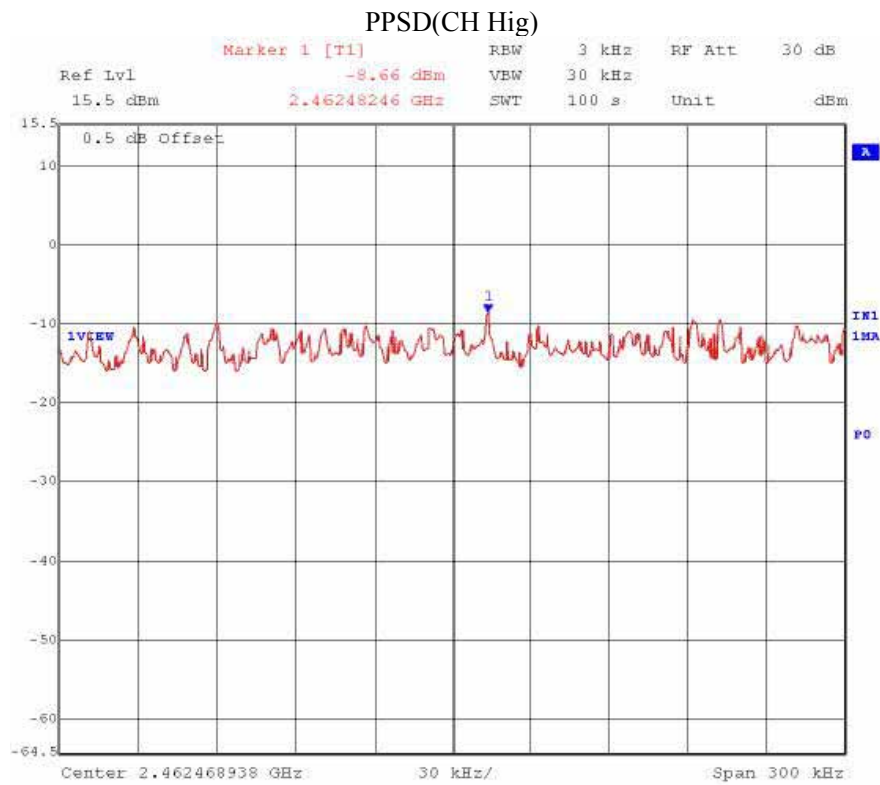
a.802.11b mode

PPSD(CH Low)

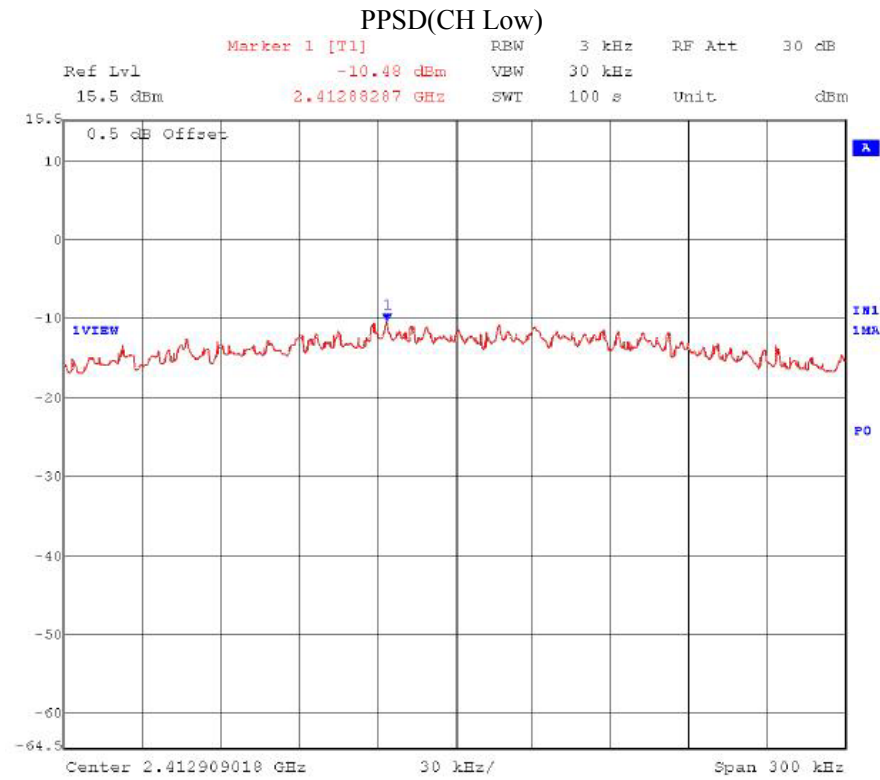


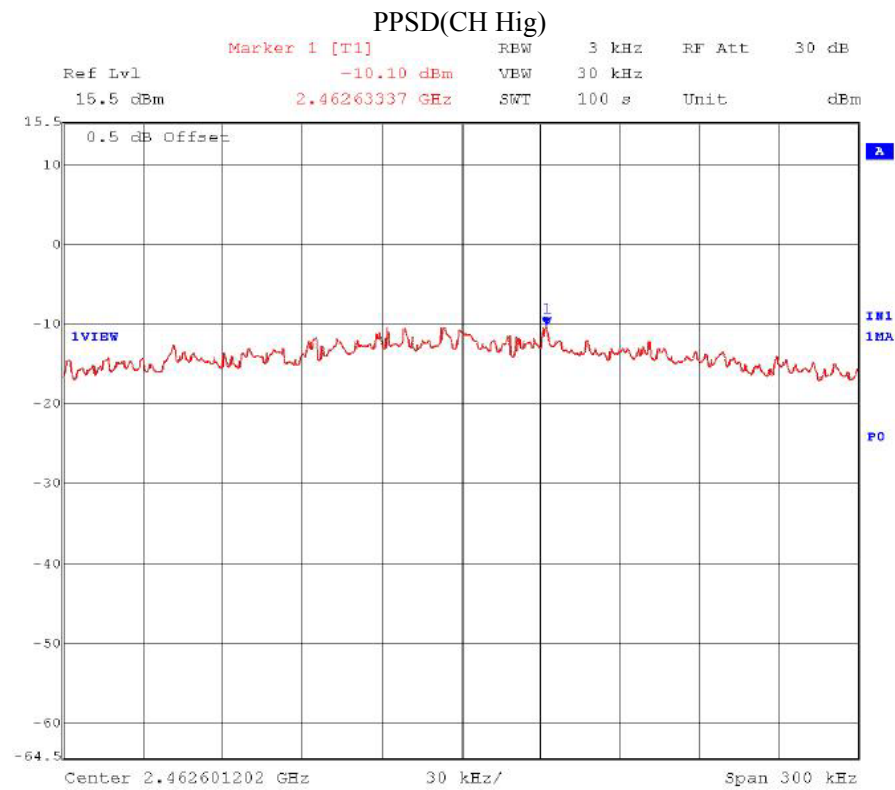
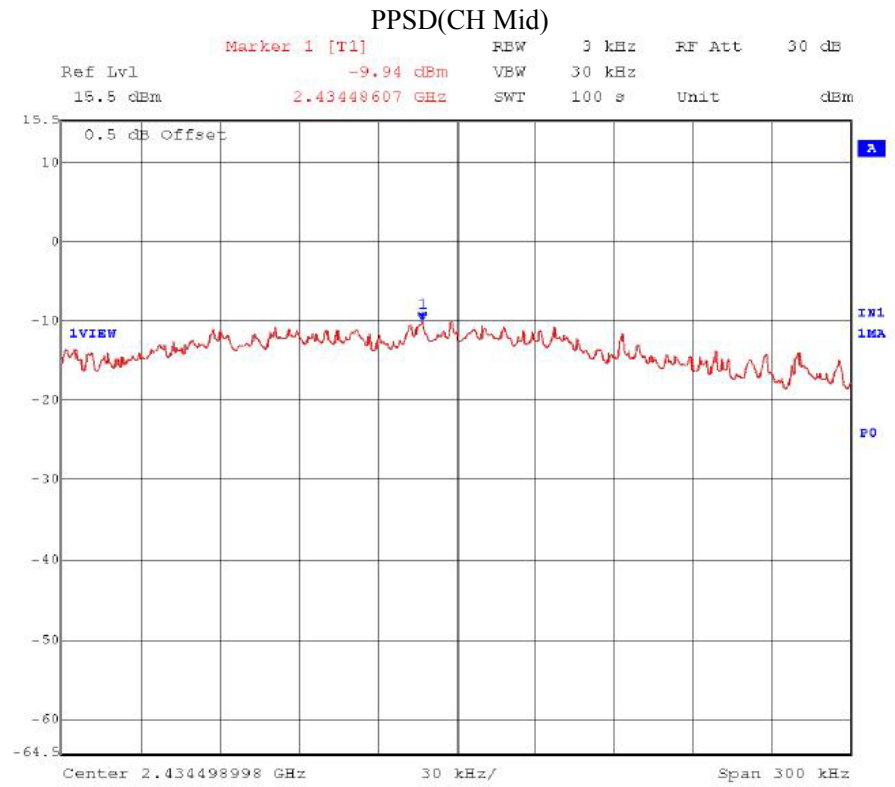
PPSD(CH Mid)





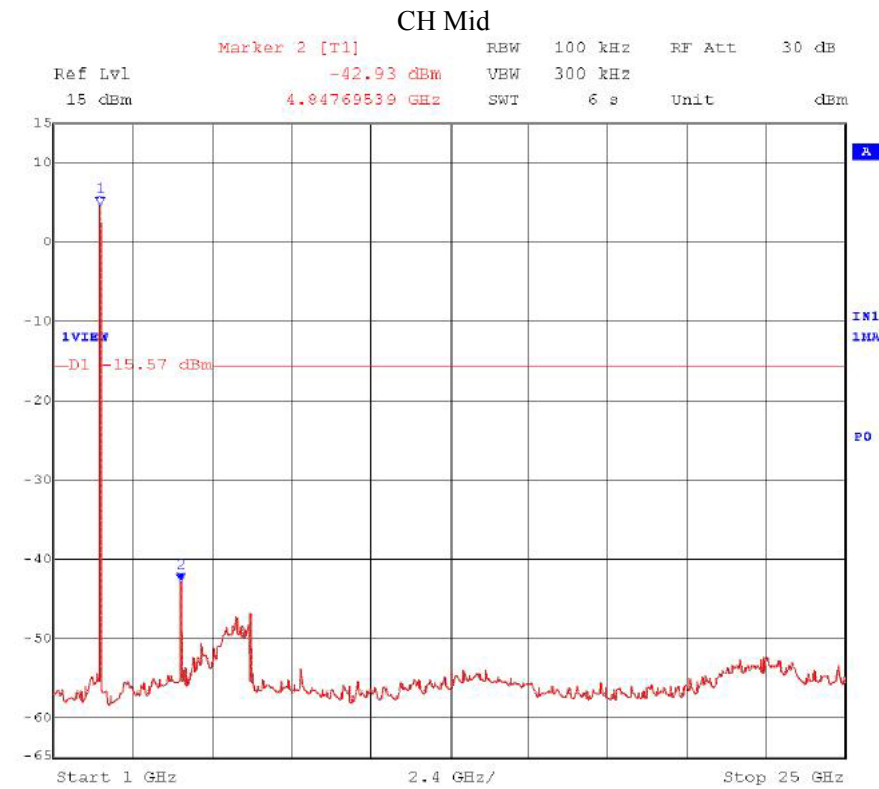
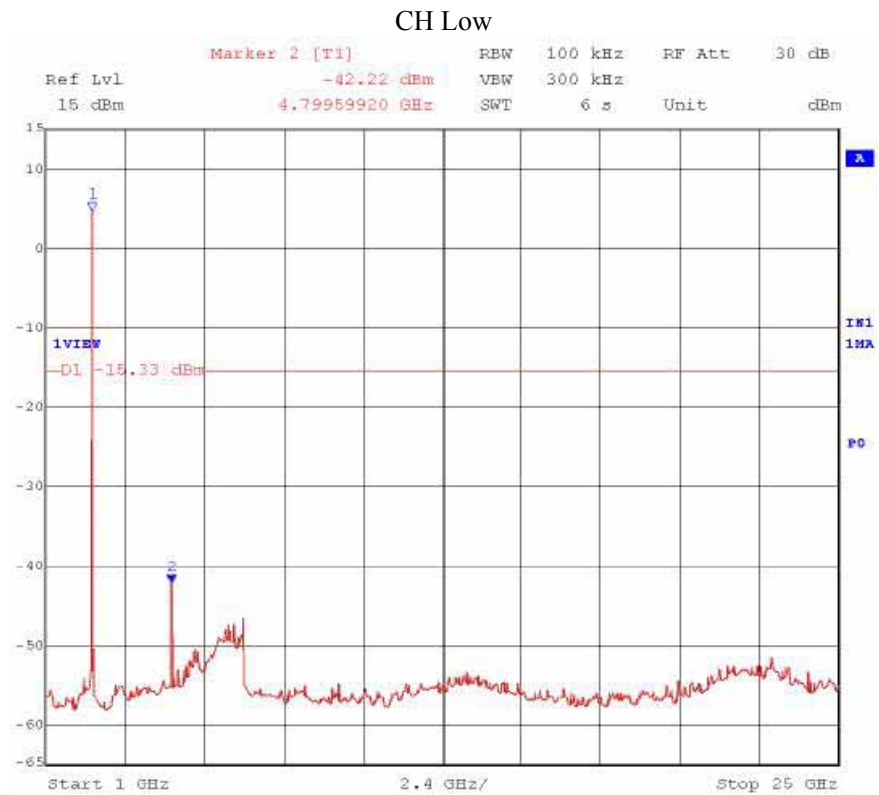
b.802.11g mode

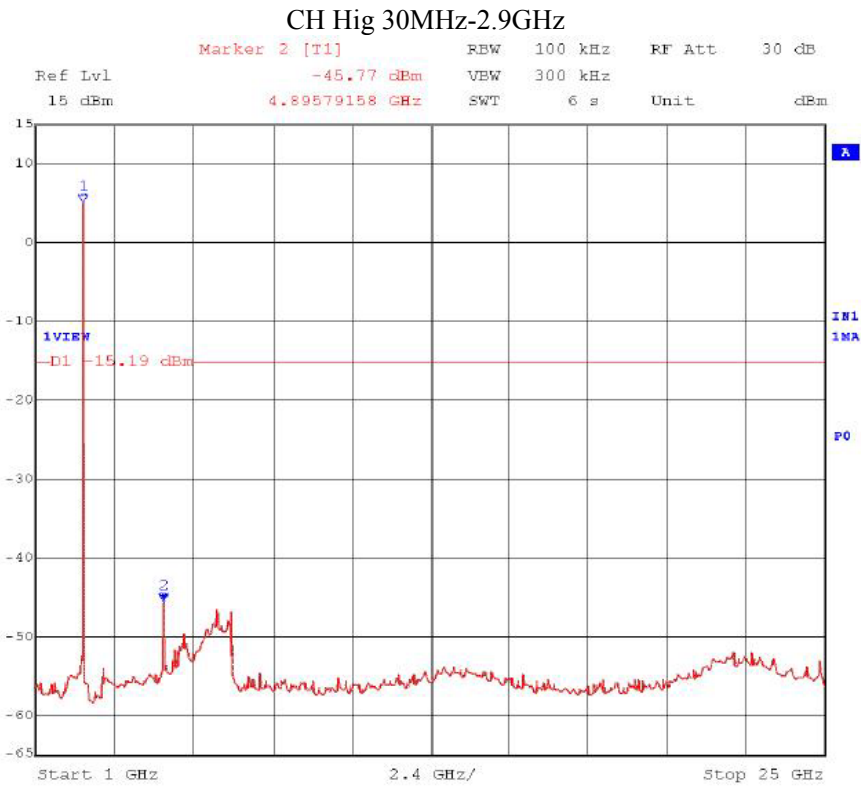




6.5 Spurious Emissions

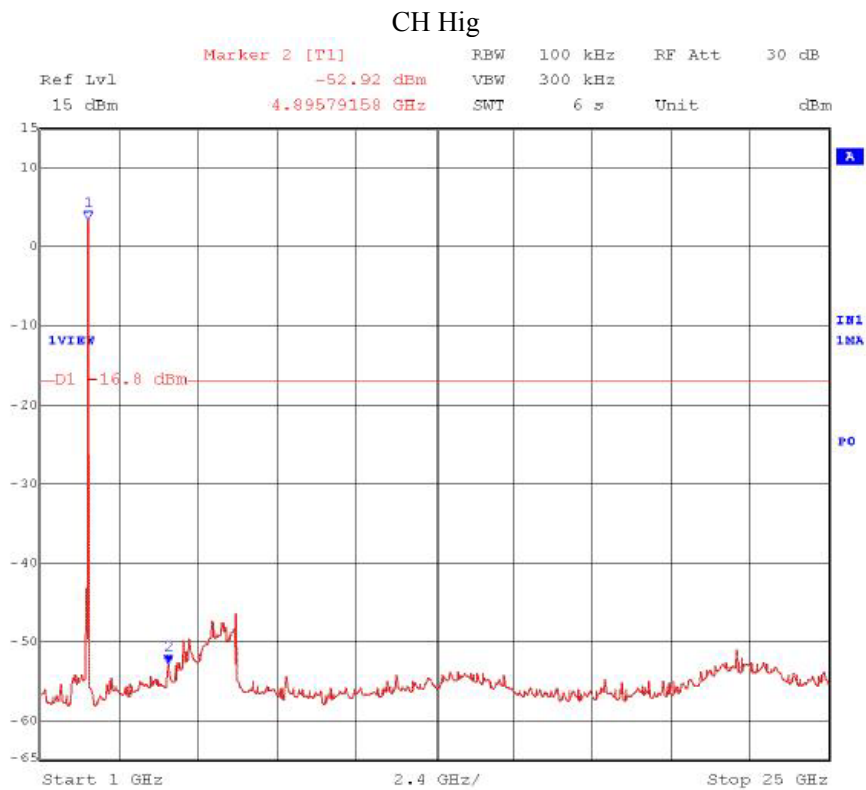
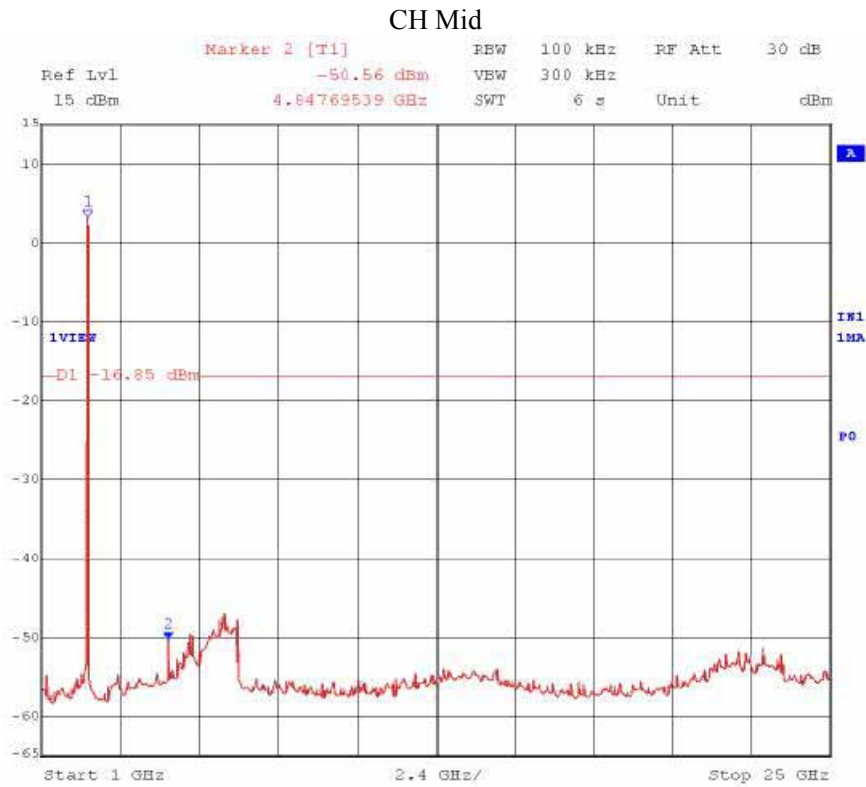
a.802.11b mode





b.802.11g mode





7. RF Exposure Requirements

7.1 Test Equipment

Please refer to Section 2 this report

7.2 Limit

According to FCC 15.247(i), Systems operating under provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commissions guidelines.

FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)(1) of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

7.3 Test Result

Product	: Limepc	Test Mode	: CH Low ~ CH High
Test Item	: RF Exposure	Temperature	: 24
Test Voltage	: DC 9V (via adapter)	Humidity	: 55%RH
Test Result	: PASS		

Evaluation of RF Exposure Compliance Requirements

MPE Prediction of MPE according to equation from page 19 of OET Bulletin 65, Edition 97-01

RF Exposure Requirements

Compliance with FCC Rules

Maximum output power at antenna input terminal:

-4.71 dBm = 0.339 mW

Prediction distance: <20 cm

Antenna gain: 0 dBi

Prediction frequency: 2441MHz

MPE limit for uncontrolled exposure at prediction frequency: 1.0 mW/cm²

$$S = PG/4\pi R^2$$

Where:

S = Power density

P = Power input to antenna

G = Power gain of the antenna relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Remark: No non-compliance noted.

(SAR evaluation is not required for the portable device while its maximum output power is low than the general population low threshold:

$$60/f_{(GHz)} = 60/2.441 = 24.58mW$$