



# FCC PART 15.247 MEASUREMENT AND TEST REPORT

For

**EYO ASIA ELECTRONIC CO.,LTD**

Room 2128,Block A,QunXing Plaza, HuaQiangNorth Road,  
Futian District,Shenzhen

<b>Report Type:</b> Original Report	<b>Product Type:</b> GSM Mobile Phone
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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *EYO ASIA ELECTRONIC CO.,LTD*'s product, model number: *A060* or the "EUT" as referred to in this report is a *GSM Mobile Phone*, which measures approximately:  
111.0 mm (L) x 61.0 mm (W) x 15.0 mm (H), rated input voltage: DC 3.7V Rechargeable Li-ion battery or DC 5.0 V adapter for charging.

Frequency Range:

Cellular Band: 824-849 MHz (TX), 869-894 MHz (RX)  
PCS Band: 1850-1910 MHz (TX), 1930-1990 MHz (RX)  
Bluetooth: 2402-2480MHz (TX/ RX)  
WI-FI IEEE 802.11b/g: 2412-2462MHz (TX/RX)

Modulation Mode: GSM/PCS: GMSK; Bluetooth: GFSK; WI-FI: DSSS/OFDM

Transmitter Output Power:

Cellular Band: 32±2dBm  
PCS Band: 30±2dBm  
Bluetooth: -6~4dBm  
WI-FI IEEE 802.11b: 16±2dBm; IEEE 802.11g: 13±2dBm

Adapter information:

Input: 100-240VAC 50/60Hz 150mA;

Output: 5.0V 600mA

### Objective

This Type approval report is prepared on behalf of *EYO ASIA ELECTRONIC CO.,LTD* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurements were performed at ShenZhen Emtex Co.,Ltd . The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

**Test Facility**

The Test site used by ShenZhen Emtex Co.,Ltd to collect test data is located in Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China.

Test site at ShenZhen Emtex Co.,Ltd has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on March 18, 2008 and October 28, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 709623 and 406365. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

For 802.11b and 802.11g mode, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT for 802.11b and 802.11g mode were tested with Channel 1, 6 and 11.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

### EUT Exercise Software

The test was performed under:

802.11b: Data rate: 1 Mbps.

802.11g: Data rate: 6 Mbps.

### Equipment Modifications

No modification was made to the unit tested.

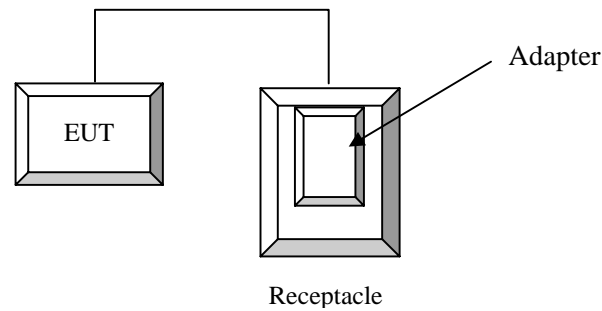
### Local Support Equipment List and Details

N/A

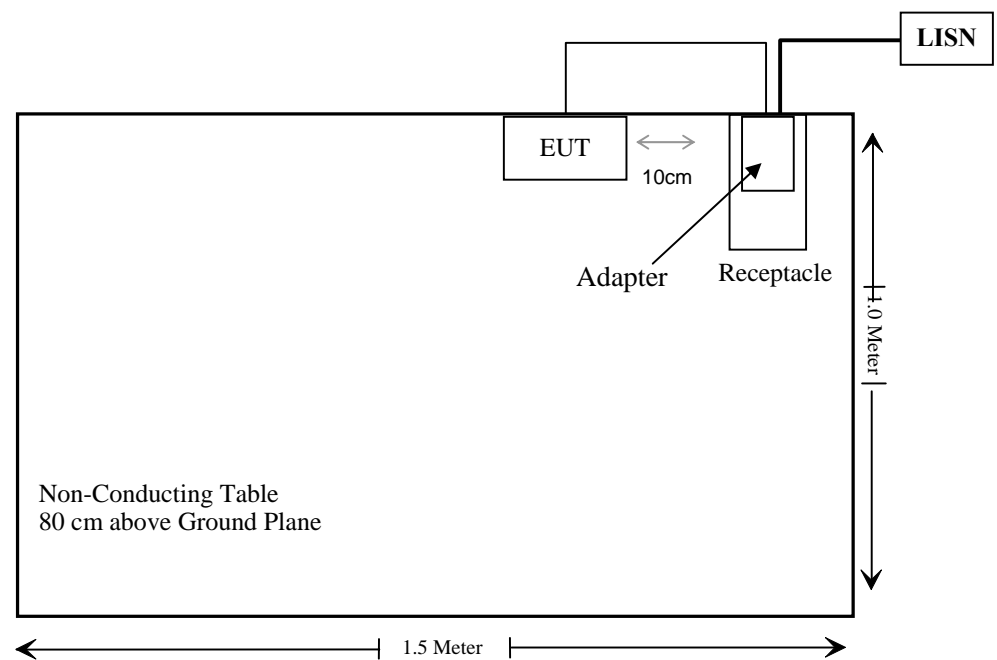
### External I/O Cable

Cable Description	Length (m)	From Port	To
Unshielded Detachable Power Cable	0.8	EUT	Adapter

Configuration of Test Setup



Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a),	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

Note: The uncertainty of any RF test which use conducted method measurement is  $\pm 1.0$  dB.

The uncertainty of any radiation emissions measurement is  $\pm 4.0$  dB.



## CFR47 §15.247 (i) and §2.1093 – RF EXPOSURE

### Applicable Standard

According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

**Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters**

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	<u>Routine evaluation required</u>	<b>SAR not required:</b> <u>Unlicensed only</u> <ul style="list-style-type: none"> <li>when stand-alone 1-g SAR is not required and antenna is <math>\geq 5</math> cm from other antennas</li> </ul> <b>Licensed &amp; Unlicensed</b> <ul style="list-style-type: none"> <li>when the sum of the 1-g SAR is <math>&lt; 1.6</math> W/kg for all simultaneous transmitting antennas</li> <li>when SAR to peak location separation ratio of simultaneous transmitting antenna pair is <math>&lt; 0.3</math></li> </ul> <b>SAR required:</b> <u>Licensed &amp; Unlicensed</u> antenna pairs with SAR to peak location separation ratio $\geq 0.3$ ; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition <b>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</b>
Unlicensed Transmitters	<p><b>When there is no simultaneous transmission –</b></p> <ul style="list-style-type: none"> <li>output <math>\leq 60</math> mW: SAR not required</li> <li>output <math>&gt; 60</math> mW: stand-alone SAR required</li> </ul> <p><b>When there is simultaneous transmission –</b> <u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> <li>output <math>\leq 2 \cdot P_{Ref}</math> and antenna is <math>\geq 5.0</math> cm from other antennas</li> <li>output <math>\leq P_{Ref}</math> and antenna is <math>\geq 2.5</math> cm from other antennas</li> <li>output <math>\leq P_{Ref}</math> and antenna is <math>&lt; 2.5</math> cm from other antennas, each with either output power <math>\leq P_{Ref}</math> or 1-g SAR <math>&lt; 1.2</math> W/kg</li> </ul> <p><u>Otherwise stand-alone SAR is required</u></p> <p><b>When stand-alone SAR is required</b></p> <ul style="list-style-type: none"> <li>test SAR on highest output channel for each wireless mode and exposure condition</li> <li>if SAR for highest output channel is <math>&gt; 50\%</math> of SAR limit, evaluate all channels according to normal procedures</li> </ul>	
Jaw, Mouth and Nose	<p><u>Flat phantom SAR required</u></p> <ul style="list-style-type: none"> <li>when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues</li> <li>position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations</li> </ul>	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

**Result:**

Please refer to SAR report released by *Compliance Certification Service Inc.*, Report No: KS110623B03.

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**FCC §15.203 - ANTENNA REQUIREMENT**

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**Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Antenna Connector Construction**

The EUT has a PIFA antenna of WI-FI, the maximum gain is 0 dBi, which in accordance to section 15.203, Please see EUT photo for details.

**Result:** Compliance.

## FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

### Applicable Standard

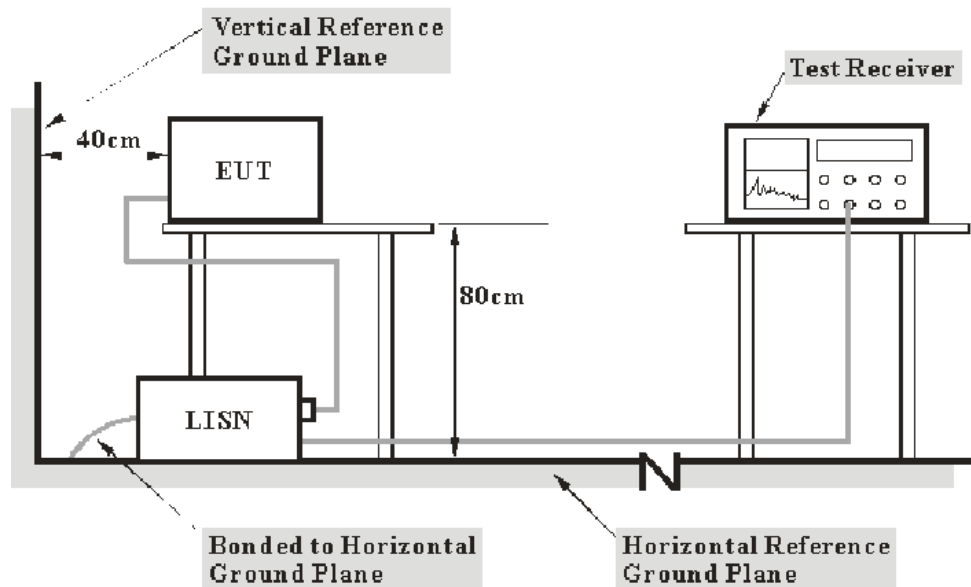
FCC§15.207

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at ShenZhen Emtex Co.,Ltd is  $\pm 2.4$  dB.

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

**EMI Test Receiver Setup**

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<b><i>Frequency Range</i></b>	<b><i>IF B/W</i></b>
150 kHz – 30 MHz	9 kHz

**Test Equipment List and Details**

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	834549/006	2010-09-07	2011-09-06
Rohde & Schwarz	L.I.S.N.	ENV216	834548/112	2010-09-07	2011-09-06
Rohde & Schwarz	EMI Test Receiver	ESCS30	828985/018	2010-09-07	2011-09-06

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

**Test Procedure**

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

**5.96 dB at 16.375 MHz in the Neutral** conducted mode

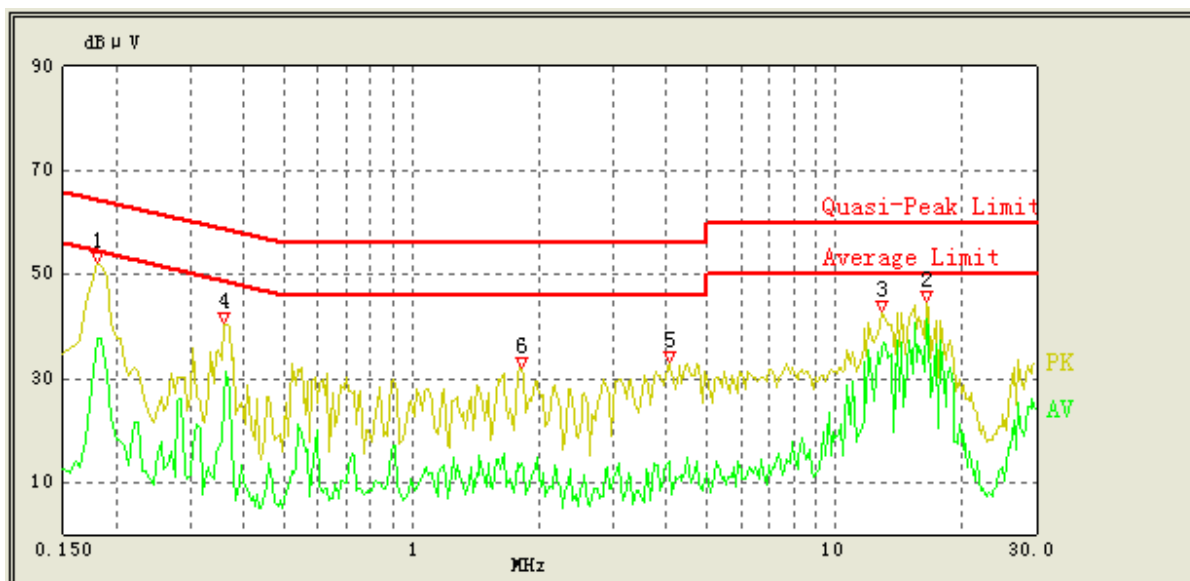
## Test Data

### Environmental Conditions

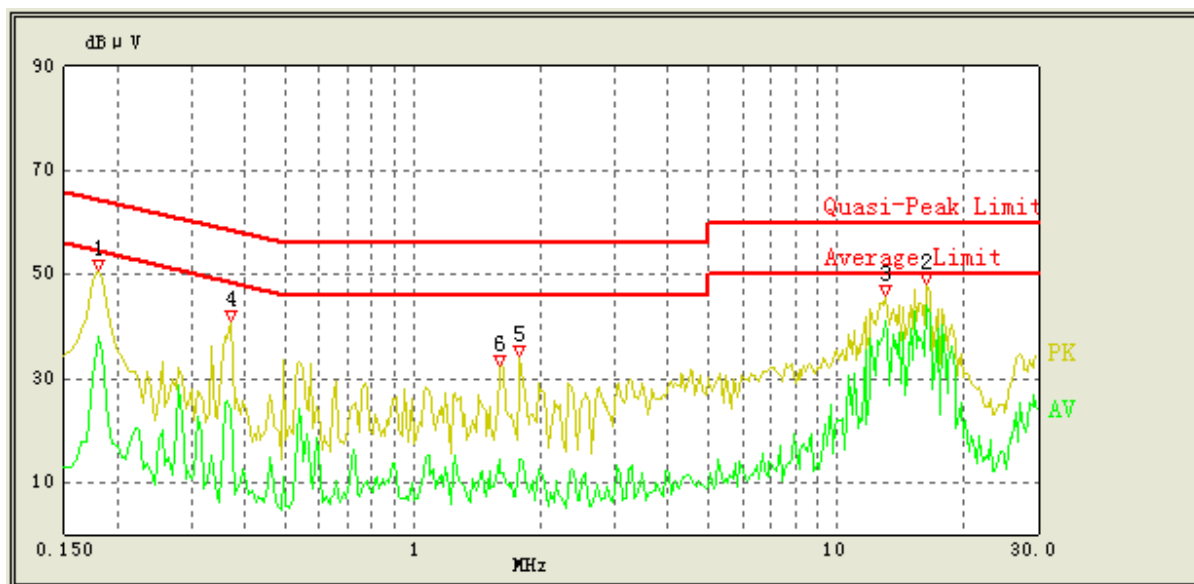
<b>Temperature:</b>	26 ° C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	100.0 kPa

*\*The testing was performed by Simon Mo on 2011-06-23.*

*Test Mode: Charging &Communication (worst case)*

**AC 120V / 60Hz Line:**

Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Correct Result (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.180	38.07	10.08	65.14	27.07	QP
0.180	37.64	10.08	55.14	17.50	Ave
16.400	44.39	10.16	60.00	15.61	QP
16.400	41.29	10.16	50.00	8.71	Ave
12.925	39.39	10.13	60.00	24.61	QP
12.925	35.58	10.13	50.00	14.42	Ave
0.360	26.32	10.06	60.00	33.68	QP
0.360	25.21	10.06	50.00	24.79	Ave
4.055	22.99	10.10	56.00	33.01	QP
4.055	14.18	10.10	46.00	31.82	Ave
1.810	16.66	10.18	56.00	39.34	QP
1.810	13.70	10.18	46.00	32.30	Ave

**AC 120V / 60Hz Neutral:**

Conducted Emissions			FCC Part 15.207		
Frequency (MHz)	Correct Result (dBμV)	Corrected Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.180	40.50	10.08	65.14	24.64	QP
0.180	38.11	10.08	55.14	17.03	Ave
16.380	46.19	10.16	60.00	13.81	QP
16.375	44.04	10.16	50.00	5.96	Ave
13.035	43.57	10.13	60.00	16.43	QP
13.035	40.90	10.13	50.00	9.10	Ave
0.370	30.34	10.07	59.71	29.37	QP
0.370	23.77	10.07	49.71	25.94	Ave
1.790	15.09	10.18	56.00	40.91	QP
1.790	14.53	10.18	46.00	31.47	Ave
1.610	17.65	10.16	56.00	38.35	QP
1.610	11.75	10.16	46.00	34.25	Ave



## FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

### Applicable Standard

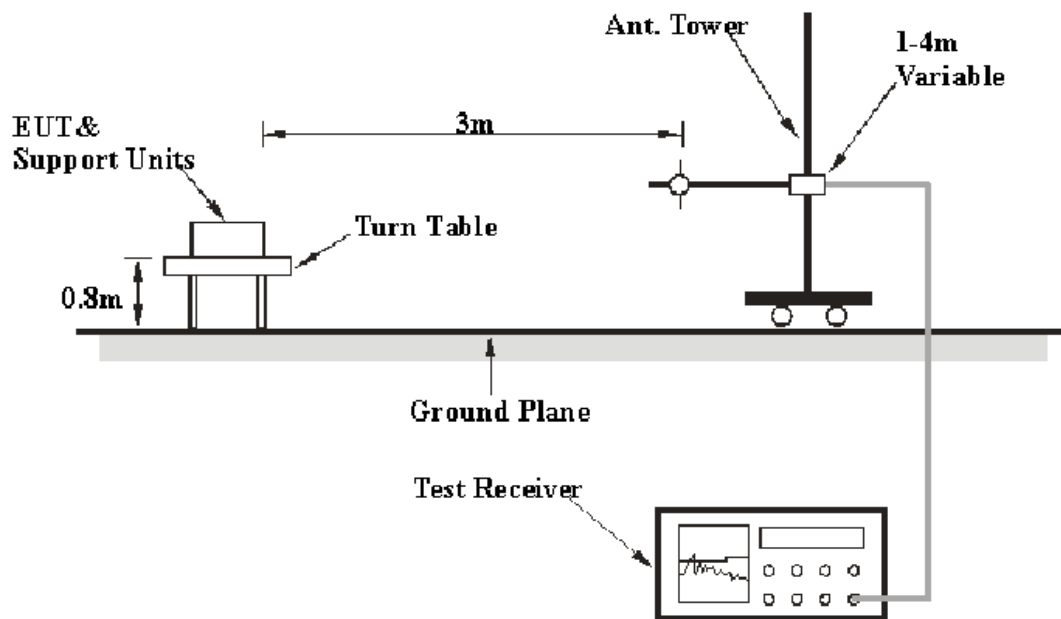
FCC §15.247 (d); §15.209; §15.205;

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at ShenZhen Emtek Co.,Ltd is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

<i><b>Frequency Range</b></i>	<i><b>RBW</b></i>	<i><b>Video B/W</b></i>	<i><b>Detector</b></i>
30MHz – 1000 MHz	100 kHz	300 kHz	QP
1000 MHz – 25 GHz	1 MHz	3 MHz	PK
1000 MHz – 25 GHz	1 MHz	10 Hz	Ave

## Test Equipment List and Details

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
HP	Spectrum Analyzer	8564E	3943A01781	2011-03-14	2012-03-13
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07
HP	Amplifier	8447D	2944A07999	2010-10-02	2011-10-02
HP	Amplifier	8449B	2624A00116	2011-03-03	2012-03-02
Schwarzbeck	Horn Antenna	BBHA 9120	D143	2010-09-04	2011-09-03
Schwarzbeck	Bilog Antenna	VULB9163	142	2011-04-12	2012-04-12
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-03-11	2012-03-10

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

## Test Procedure

For the radiated emissions test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes for frequencies above 1 GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, with the worst margin reading of:

### Below 1 GHz:

**10.4 dB** at **819.105250 MHz** in the **Vertical** polarization

### Above 1 GHz:

**5.86 dB** at **4924 MHz** in the **Horizontal** polarization for mode 802.11g at High Channel

## Test Data

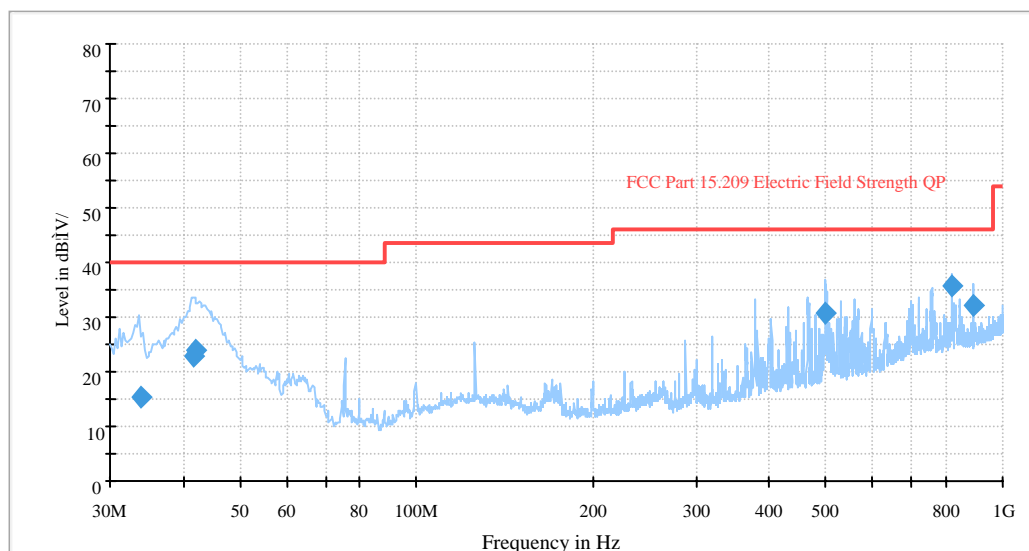
### Environmental Conditions

<b>Temperature:</b>	26 ° C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	100.0 kPa

*\*The testing was performed by Simon Mo on 2011-06-25.*

**Below 1 GHz:***Test Mode: Charging & Transmitting (worst case)*

Auto Test (FCC 15.209)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
33.834000	15.5	100.0	V	336.0	-3.14	40.0	24.5
41.671000	22.8	100.0	V	43.0	-14.48	40.0	17.2
42.177250	24.0	100.0	V	179.0	-11.03	40.0	16.0
498.377000	30.8	100.0	V	353.0	-12.9	46.0	15.2
819.105250	35.6	136.0	V	2.0	-18.51	46.0	10.4
890.706500	32.0	400.0	H	271.0	-18.67	46.0	25.0

**Above 1 GHz:**

802.11b Mode:

Indicated		Detector (PK/Ave.)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	S.A. Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin(dB)
Low Channel (2412 MHz)											
4824	46.81	PK	180	1.7	H	36.6	4.30	26.75	60.96	74	13.04
4824	33.48	Ave.	180	1.7	H	36.6	4.30	26.75	47.63	54	6.37
4824	47.42	PK	190	1.2	V	35.4	4.30	26.75	60.37	74	13.63
4824	33.27	Ave.	190	1.2	V	35.4	4.30	26.75	46.22	54	7.78
Middle Channel (2437 MHz)											
4874	46.72	PK	56	1.2	H	36.6	4.36	26.75	60.93	74	13.07
4874	33.42	Ave.	56	1	H	36.6	4.36	26.75	47.63	54	6.37
4874	47.12	PK	180	1.2	V	35.4	4.36	26.75	60.13	74	13.87
4874	33.63	Ave.	180	1.2	V	35.4	4.36	26.75	46.64	54	7.36
High Channel (2462 MHz)											
4924	46.29	PK	160	1.7	H	36.6	4.40	26.75	60.54	74	13.46
4924	33.89	Ave.	160	1.7	H	36.6	4.40	26.75	48.14	54	5.86
4924	47.07	PK	76	1.2	V	35.4	4.40	26.75	60.12	74	13.88
4924	33.73	Ave.	76	1.2	V	35.4	4.40	26.75	46.78	54	7.22

## Radiated spurious emission in restricted band

Freq. (MHz)	S.A. Reading (dBμV)	Detector (PK /Ave.)	Direction Degree	Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.247/205/209	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)
2387.550	47.64	PK	150	1.6	H	30.6	2.98	26.83	54.39	74	19.61
2387.550	33.16	Ave.	150	1.6	H	30.6	2.98	26.83	39.91	54	14.09
2387.460	47.56	PK	0	1.2	V	30.6	2.98	26.83	54.31	74	19.69
2387.460	31.78	Ave.	0	1.2	V	30.6	2.98	26.83	38.53	54	15.47
2486.200	46.49	PK	120	1.8	H	30.6	3.11	26.88	53.32	74	20.68
2486.200	31.82	Ave.	120	1.8	H	30.6	3.11	26.88	38.65	54	15.35
2486.200	46.21	PK	130	1.2	V	30.6	3.11	26.88	53.04	74	20.96
2486.200	31.64	Ave.	130	1.2	V	30.6	3.11	26.88	38.47	54	15.53

802.11g Mode:

Indicated		Detector (PK/Ave)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	S.A. Reading (dBμV)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin(dB)
Low Channel (2412 MHz)											
4824	45.64	PK	230	1.6	H	36.6	4.30	26.75	59.79	74	14.21
4824	33.13	Ave.	230	1.6	H	36.6	4.30	26.75	47.28	54	6.72
4824	45.49	PK	120	1.2	V	35.4	4.30	26.75	58.44	74	15.56
4824	33.57	Ave.	120	1.2	V	35.4	4.30	26.75	46.52	54	7.48
Middle Channel (2437 MHz)											
4874	44.74	PK	12	1.6	H	36.6	4.36	26.75	58.95	74	15.05
4874	31.82	Ave.	12	1.6	H	36.6	4.36	26.75	46.03	54	7.97
4874	45.29	PK	156	1.2	V	35.4	4.36	26.75	58.3	74	15.7
4874	32.10	Ave.	156	1.2	V	35.4	4.36	26.75	58.95	74	15.05
High Channel (2462 MHz)											
4924	46.11	PK	120	1.7	H	36.6	4.40	26.75	60.36	74	13.64
4924	31.42	Ave.	120	1.7	H	36.6	4.40	26.75	45.67	54	8.33
4924	46.27	PK	360	1.2	V	35.4	4.40	26.75	59.32	74	14.68
4924	32.00	Ave.	360	1.2	V	35.4	4.40	26.75	45.05	54	8.95

Radiated spurious emission in restricted band

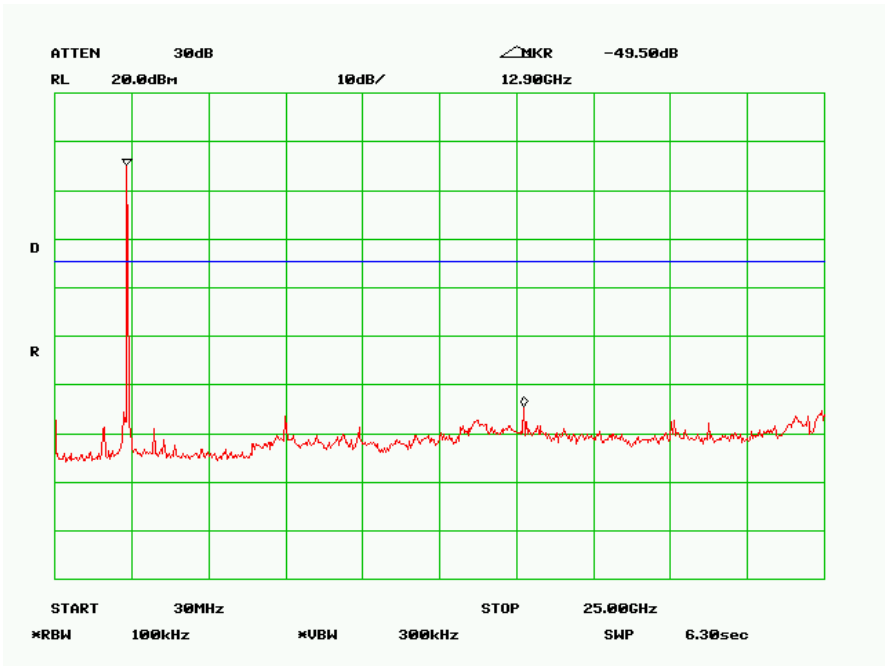
Freq. (MHz)	S.A. Reading (dBμV)	Detector PK /Ave	Direction Degree	Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.247/205/209	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)
2389.130	47.86	PK	245	1.8	H	30.6	2.98	26.83	54.61	74	19.39
2389.130	33.32	Ave.	245	1.8	H	30.6	2.98	26.83	40.07	54	13.93
2389.130	47.78	PK	15	1.3	V	30.6	2.98	26.83	54.53	74	19.47
2389.130	32.28	Ave.	15	1.3	V	30.6	2.98	26.83	39.03	54	14.97
2484.600	46.75	PK	76	1.6	H	30.6	3.11	26.88	53.58	74	20.42
2484.600	32.22	Ave.	76	1.6	H	30.6	3.11	26.88	39.05	54	14.95
2484.600	47.15	PK	168	1.2	V	30.6	3.11	26.88	53.98	74	20.02
2484.600	32.35	Ave.	168	1.2	V	30.6	3.11	26.88	39.18	54	14.82

**Antenna Port Conducted Spurious Emissions**

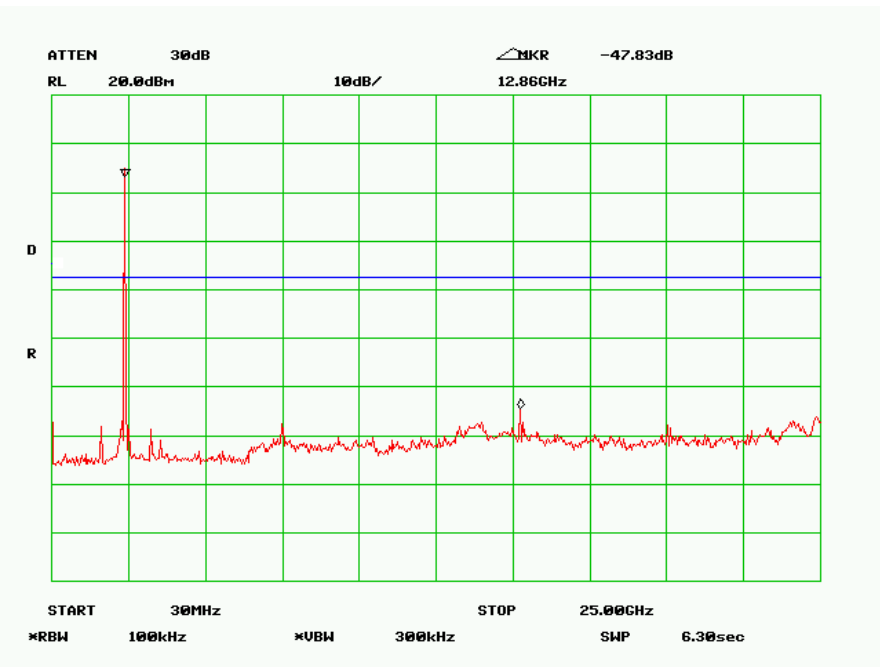
Channel Frequency (MHz)	Delta Value (dBc)	Limit (dBc)	Ref. Plot	Result
<b>802.11b mode</b>				
2412	49.50	20	Plot1	PASS
2437	47.83	20	Plot2	PASS
2462	48.83	20	Plot3	PASS
<b>802.11g mode</b>				
2412	44.17	20	Plot4	PASS
2437	45.66	20	Plot5	PASS
2462	44.33	20	Plot6	PASS

Please refer to the following plots.

Plot1-802.11b Low Channel

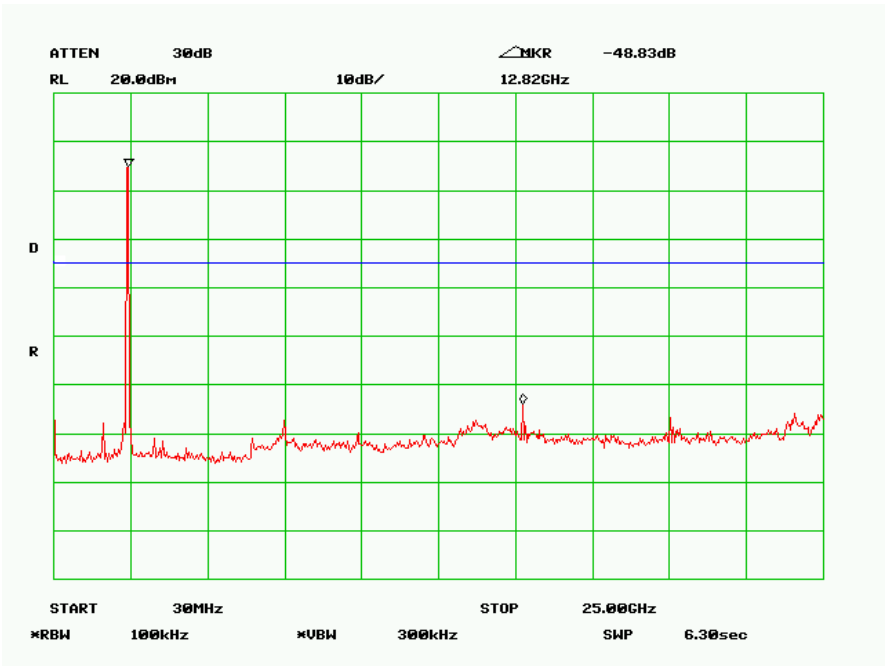


Plot2-802.11b Middle Channel

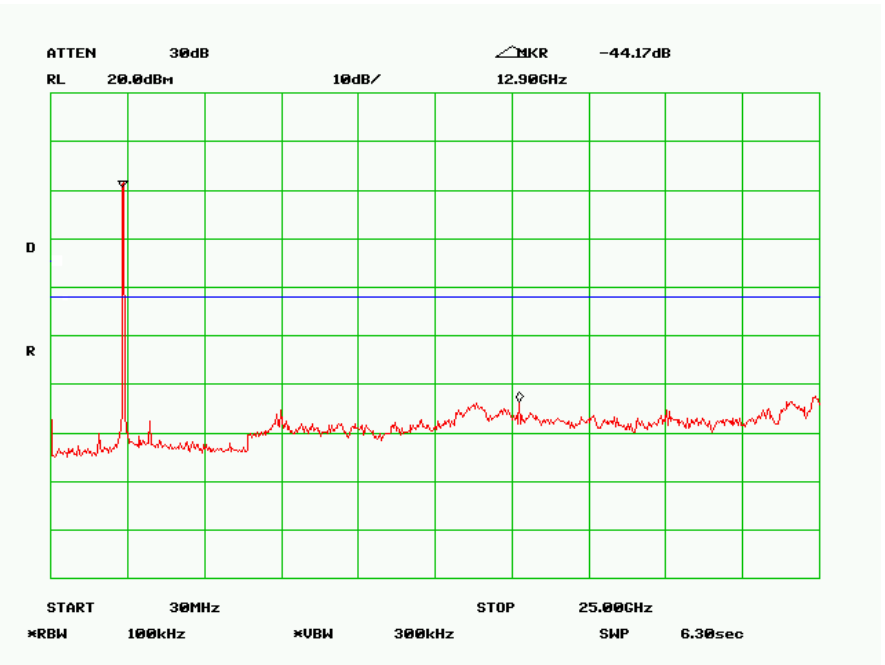




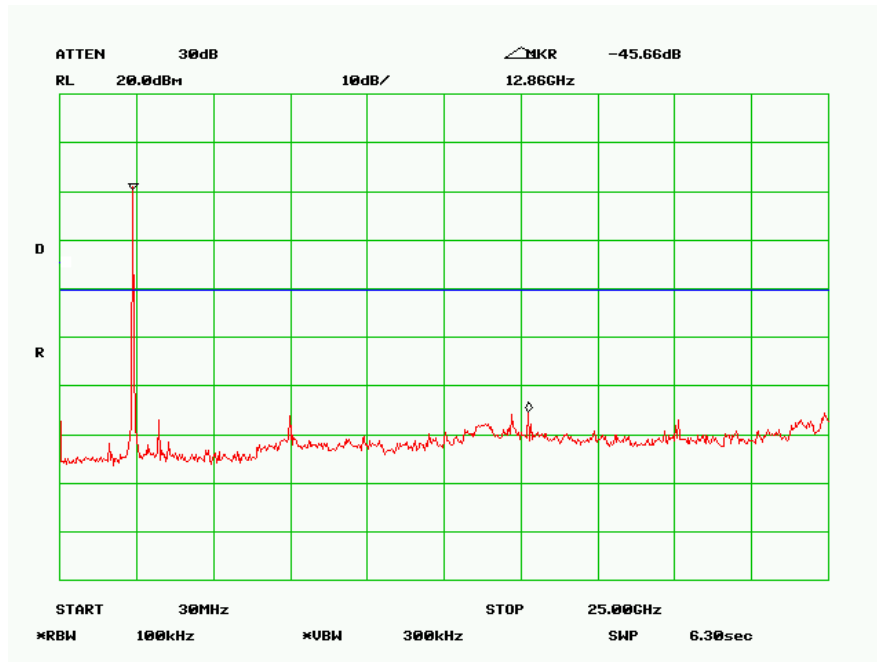
Plot3-802.11b High Channel



Plot4-802.11g Low Channel



Plot5-802.11g Middle Channel



Plot6-802.11g High Channel



## FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING

### Applicable Standard

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.

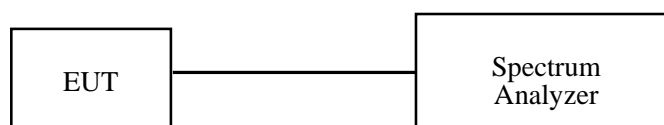
### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	100.0kPa

*\*The testing was performed by Simon Mo on 2011-06-26.*

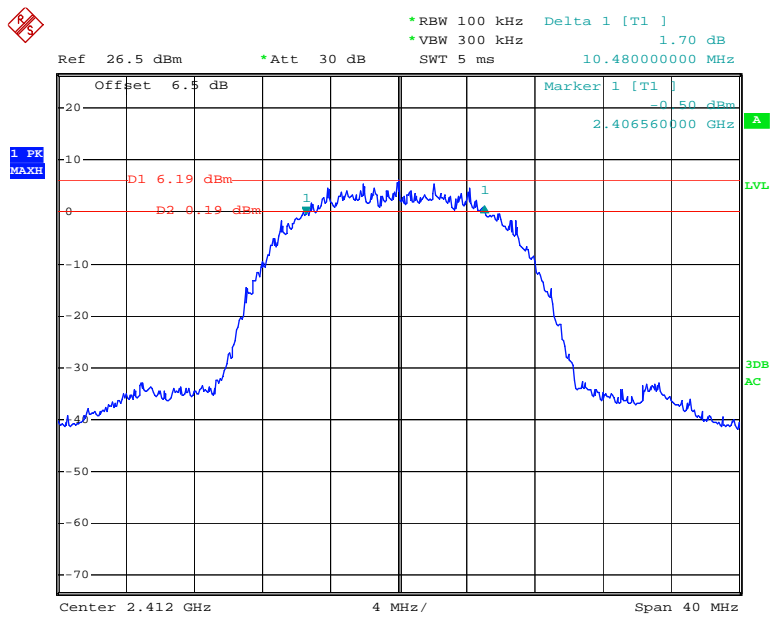
*Test Mode: Transmitting*

*Test Result: Compliance*

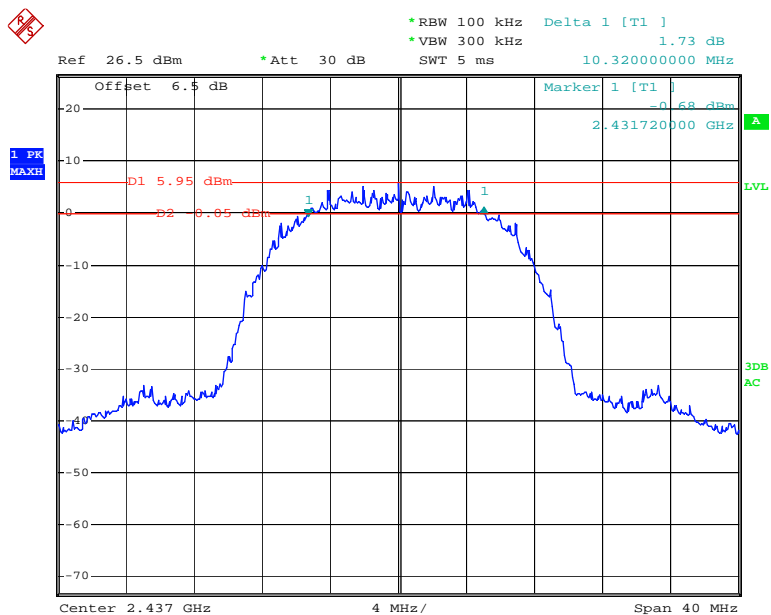
Please refer to the following tables and plots.

Channel	Channel Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (MHz)	FCC Part 15.247 Limit (kHz)
802.11b mode				
Low	2412	1	10.48	>500
Middle	2437	1	10.32	>500
High	2462	1	10.32	>500
802.11g mode				
Low	2412	6	16.24	>500
Middle	2437	6	16.24	>500
High	2462	6	16.24	>500

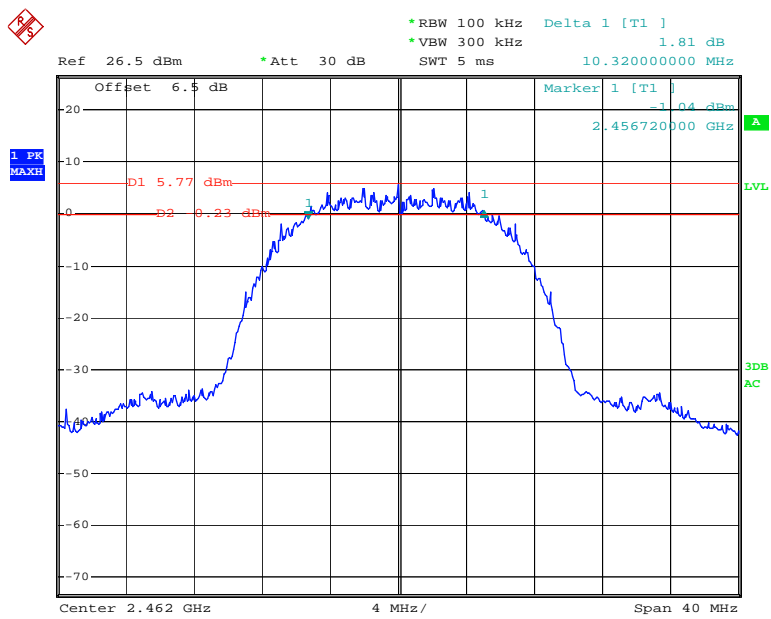
802.11b Low Channel



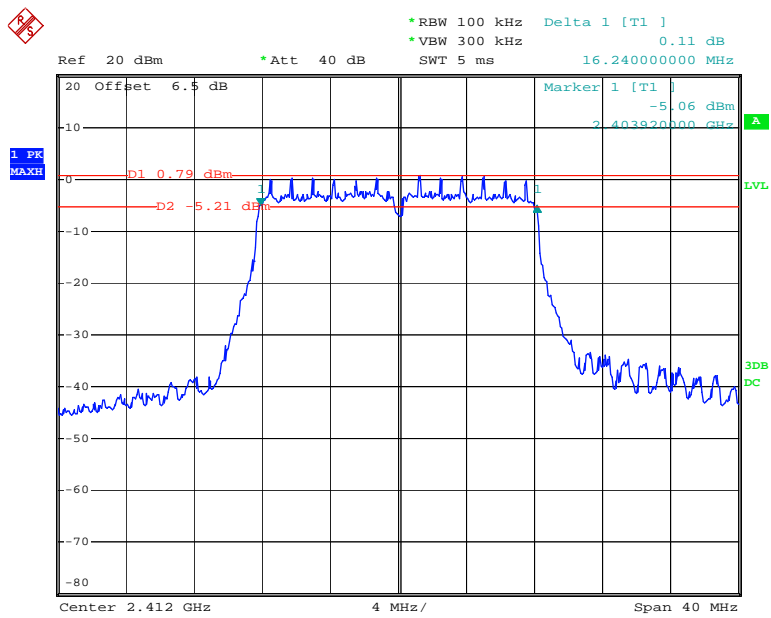
802.11b Middle Channel



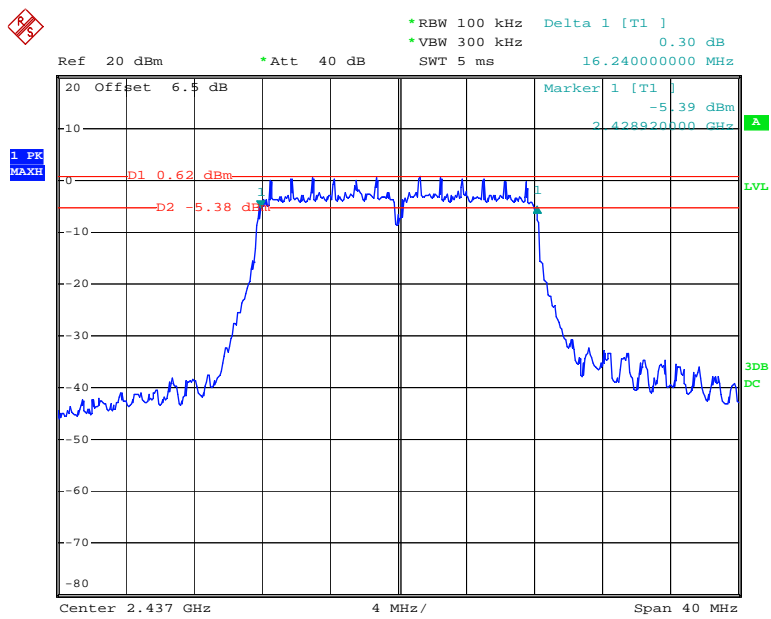
802.11b High Channel



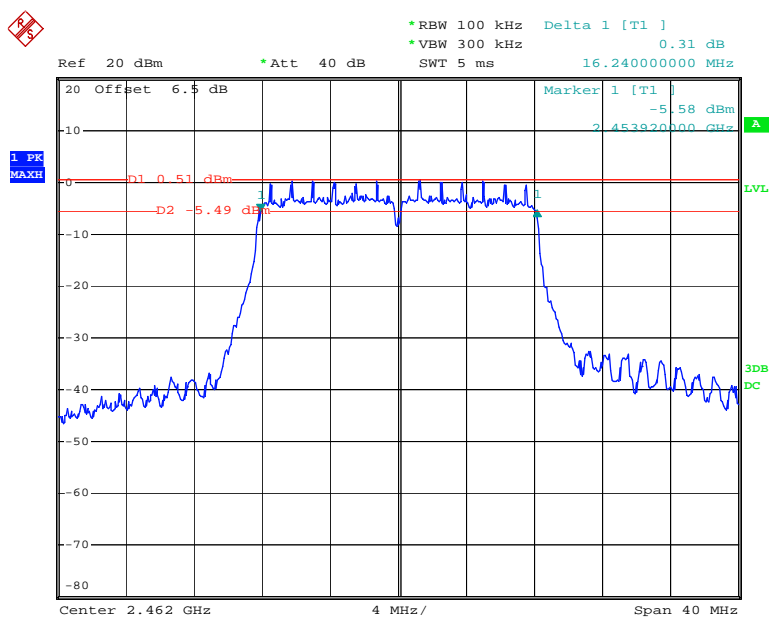
802.11g Low Channel



802.11g Middle Channel



802.11g High Channel



## FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

### Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

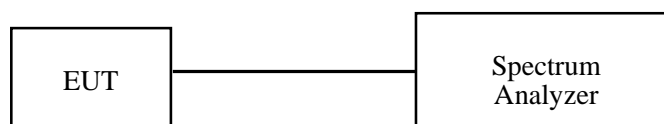
### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

### Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



### Test Data

#### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

*\*The testing was performed by Simon Mo on 2011-06-26.*

*Test Mode: Transmitting*

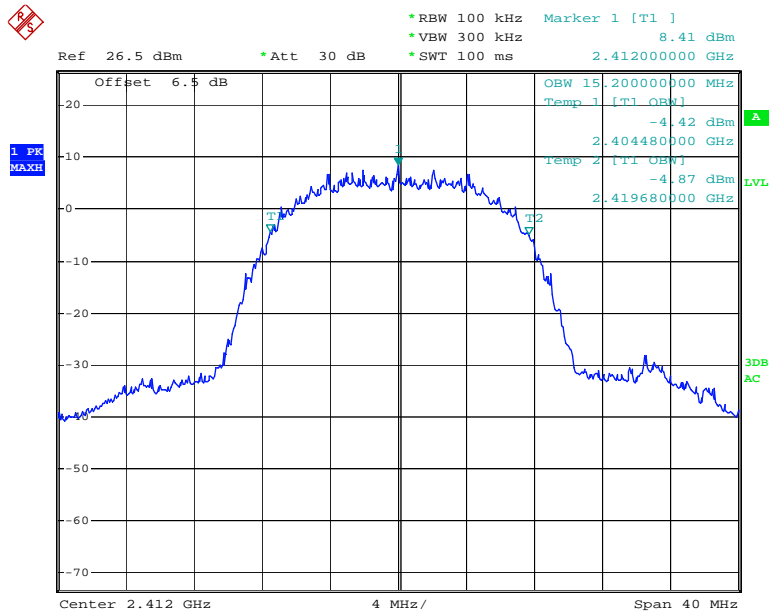
*Test Result: Compliance*



Please refer to the following tables and plots.

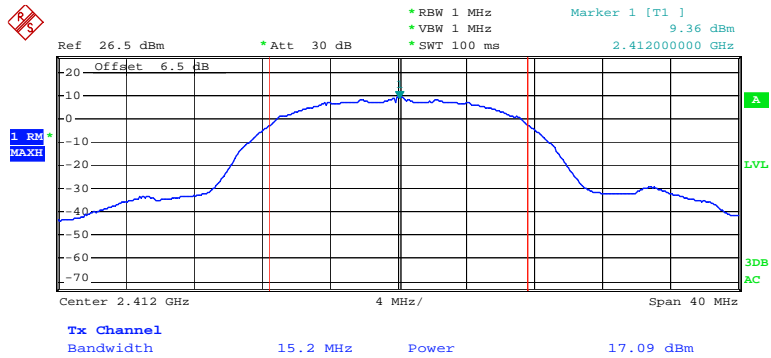
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Output Power (dBm)	Limit (dBm)
<b>802.11b</b>				
Low	2412	1	17.09	30
Middle	2437	1	17.25	30
High	2462	1	17.05	30
<b>802.11g</b>				
Low	2412	6	13.82	30
Middle	2437	6	13.37	30
High	2462	6	13.29	30

802.11b 99% Occupied Bandwidth, Low Channel

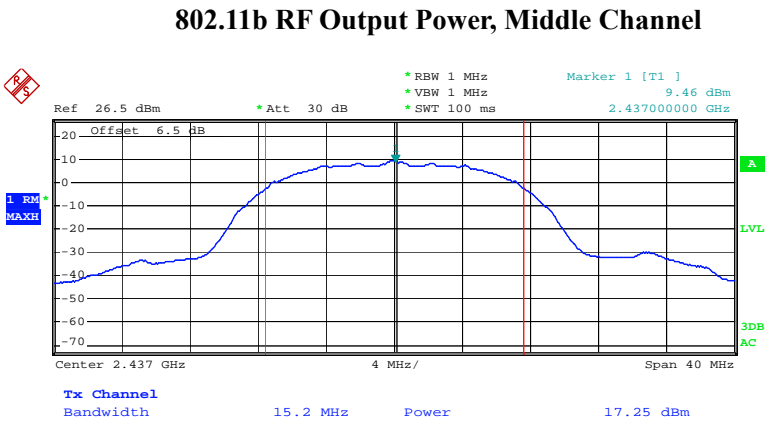
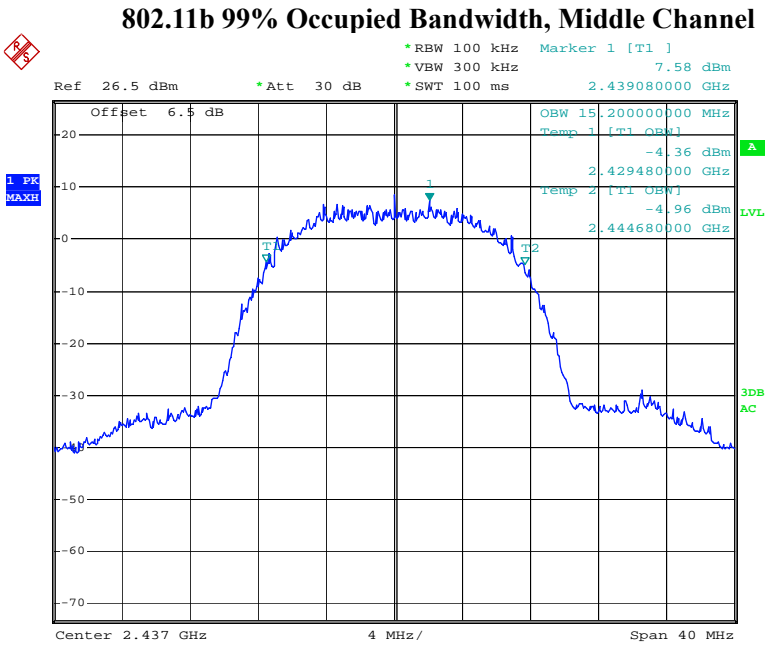


File: 00\_0000000000\_00\_00\_00

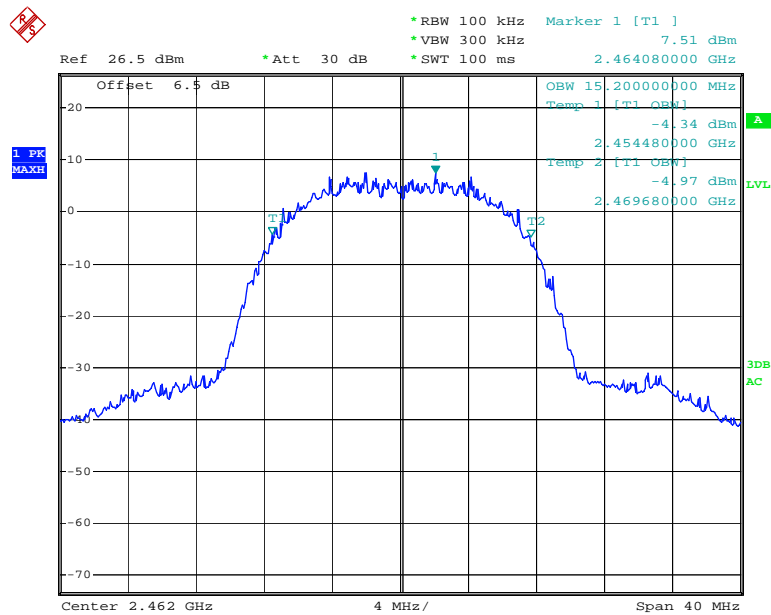
802.11b RF Output Power, Low Channel



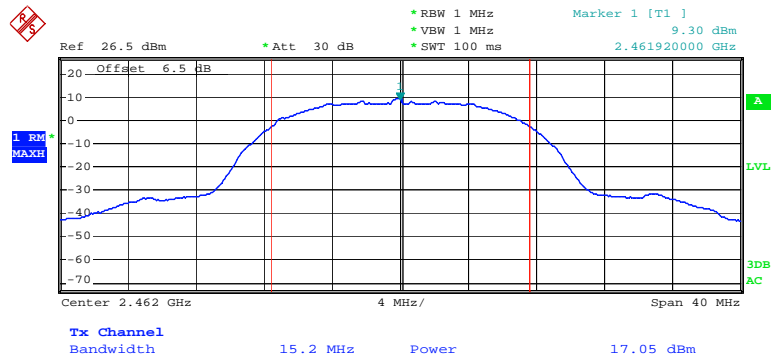
File: 00\_0000000000\_00\_00\_00



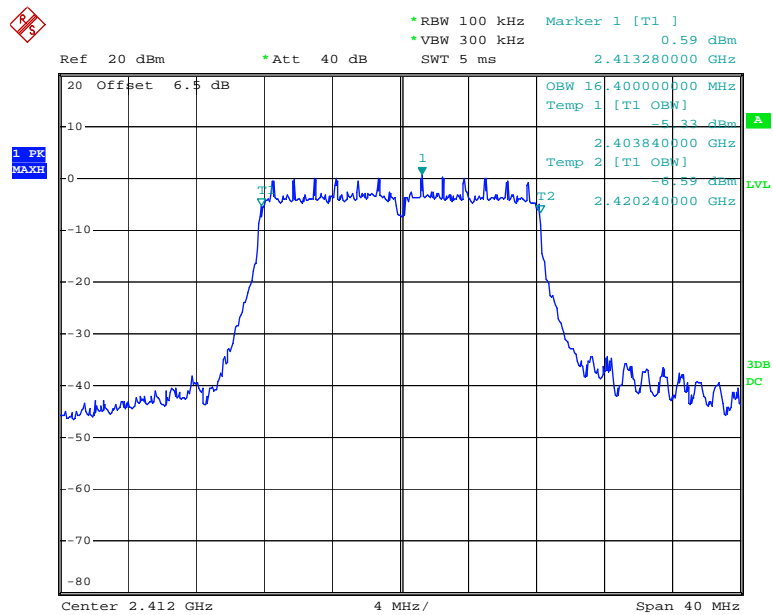
802.11b 99% Occupied Bandwidth, High Channel



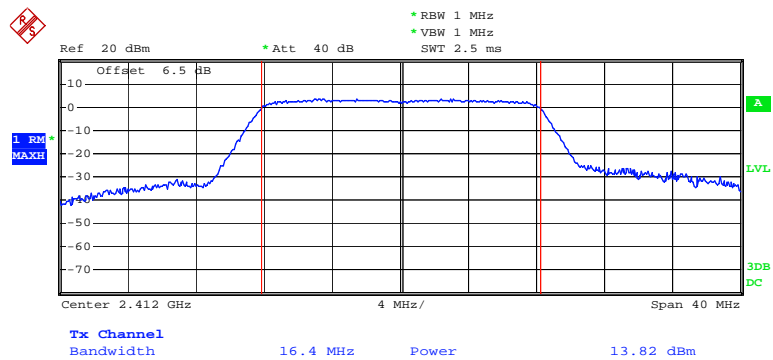
802.11b RF Output Power, High Channel



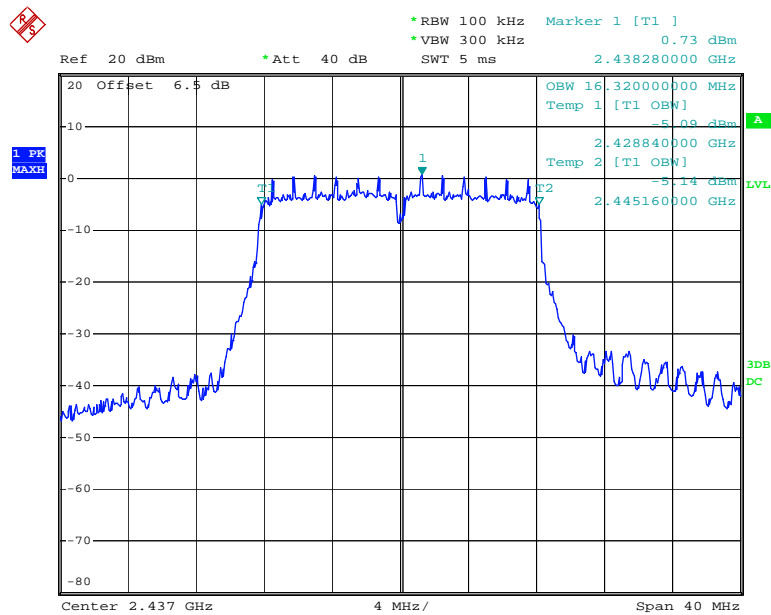
802.11g 99% Occupied Bandwidth, Low Channel



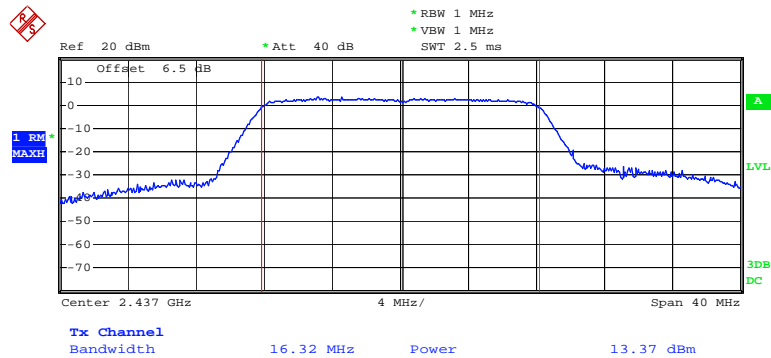
802.11g RF Output Power, Low Channel



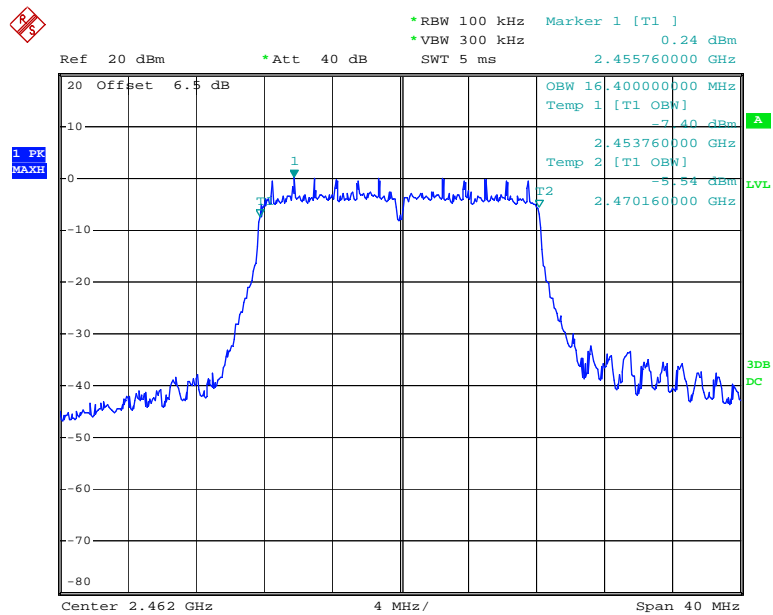
802.11g 99% Occupied Bandwidth, Middle Channel



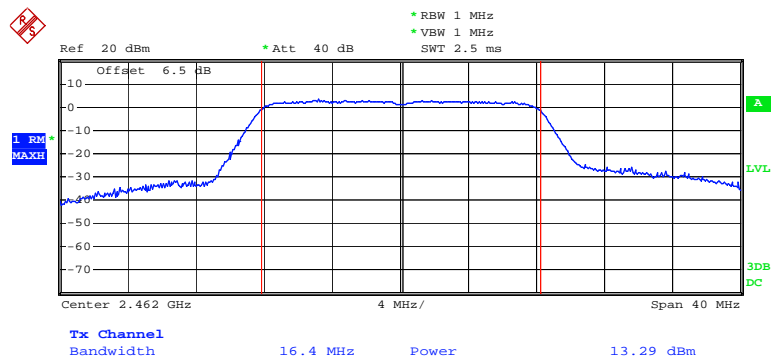
802.11g RF Output Power, Middle Channel



802.11g 99% Occupied Bandwidth, High Channel



802.11g RF Output Power, High Channel



**FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE****Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

**Test Procedure**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 1 MHz and VBW of spectrum analyzer to 1 MHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

**Test Data****Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

*\*The testing was performed by Simon Mo on 2011-06-26.*

*Test Mode: Transmitting*

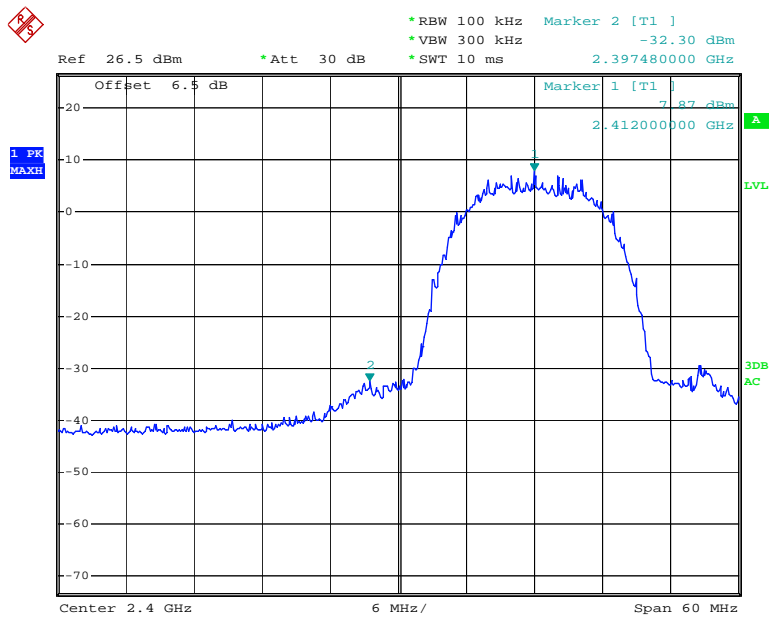
*Test Result: Compliance*



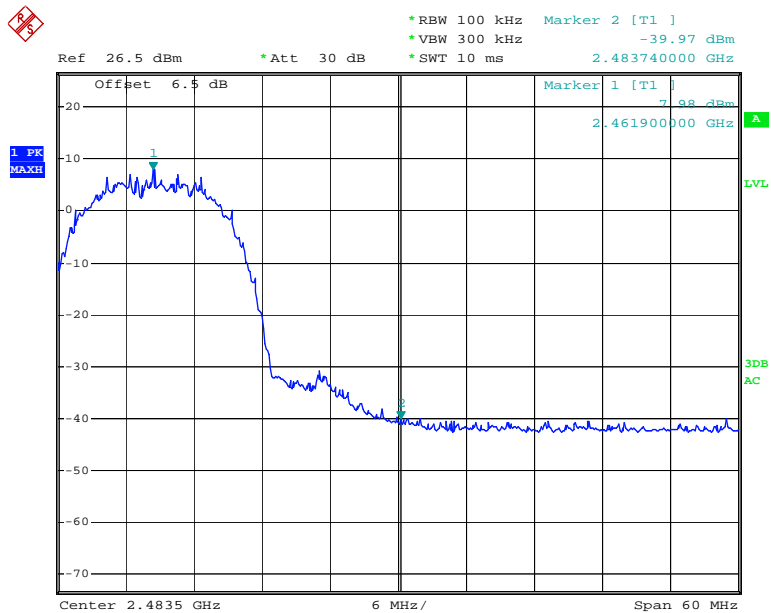
Please refer to the following tables and plots.

Frequency (MHz)	Delta Value (dBc)	Limit (dBc)	Result
<b>802.11b mode</b>			
2397.48	40.17	20	Pass
2383.74	47.95	20	Pass
<b>802.11g mode</b>			
2399.04	35.32	20	Pass
2484.82	42.33	20	Pass

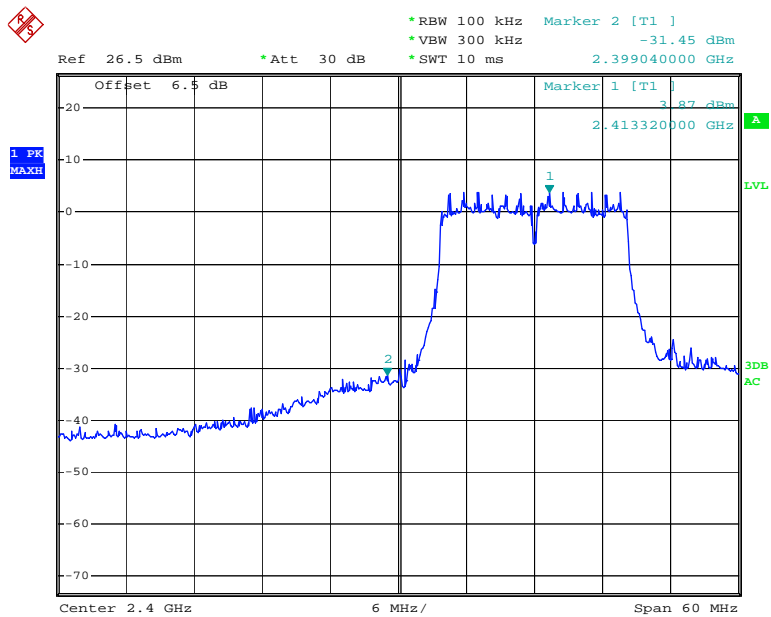
802.11b: Band Edge, Left Side



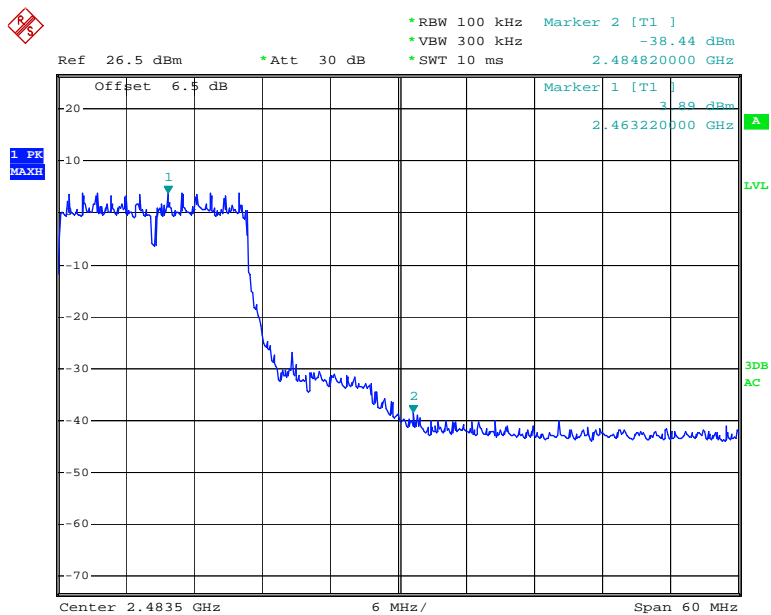
802.11b: Band Edge, Right Side



802.11g: Band Edge, Left Side



802.11g: Band Edge, Right Side



## FCC §15.247(e) - POWER SPECTRAL DENSITY

### Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100005	2011-03-08	2012-03-07

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.

### Test Data

#### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

*\*The testing was performed by Simon Mo on 2011-06-26.*

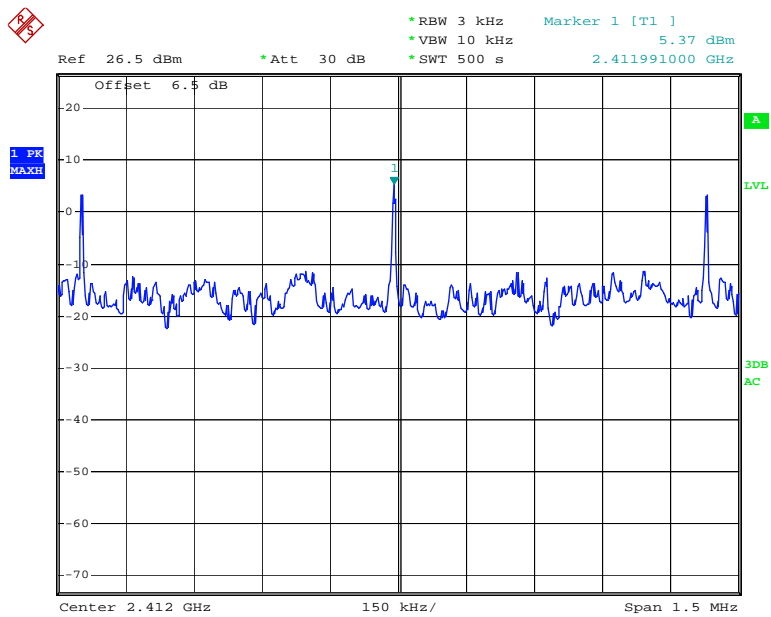
*Test Mode: Transmitting*

*Test Result: Compliance*

Please refer to the following tables and plots.

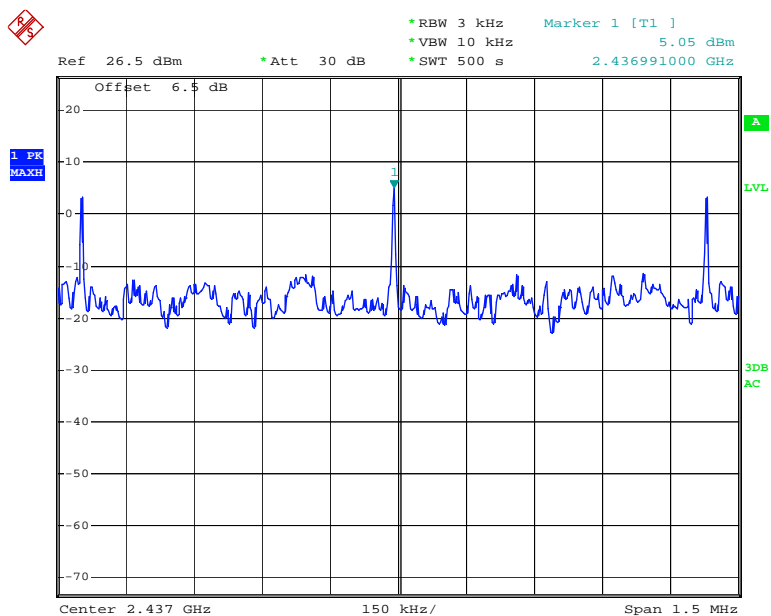
Channel	Frequency (MHz)	Data Rate	Power Spectral Density (dBm/3kHz)	Part 15.247 Limit (dBm/3kHz)	Result
802.11b mode					
Low	2412	1	5.37	8	Pass
Middle	2437	1	5.05	8	Pass
High	2462	1	5.05	8	Pass
802.11g mode					
Low	2412	6	-12.10	8	Pass
Middle	2437	6	-12.00	8	Pass
High	2462	6	-12.11	8	Pass

Power Spectral Density, 802.11b Low Channel



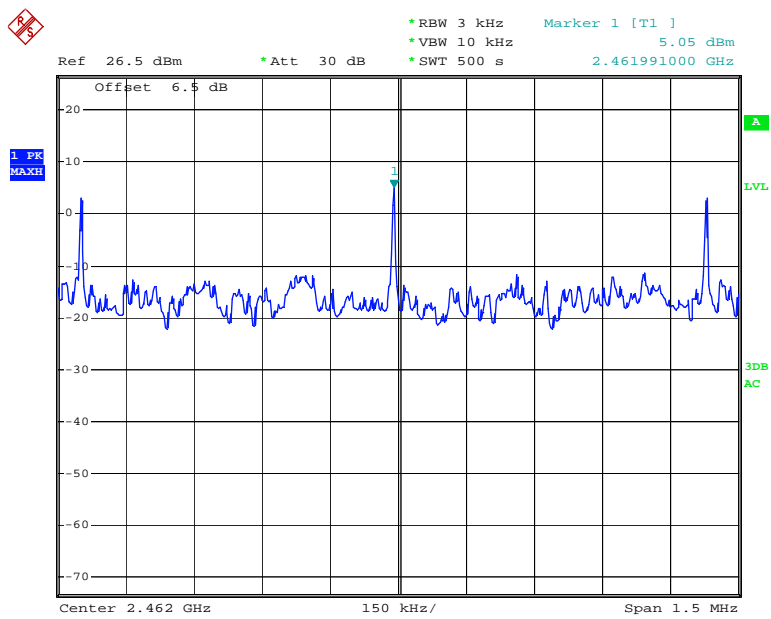
2.411991000 GHz

Power Spectral Density, 802.11b Middle Channel

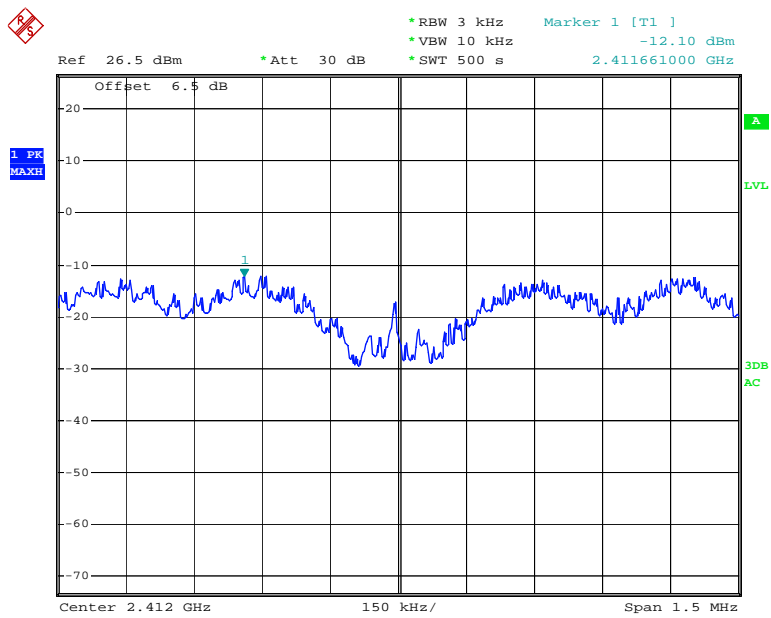


2.436991000 GHz

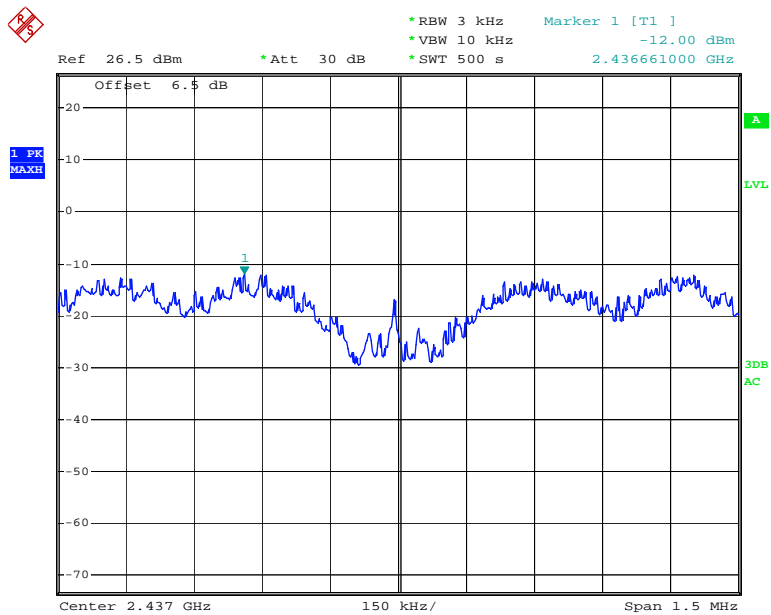
Power Spectral Density, 802.11b High Channel



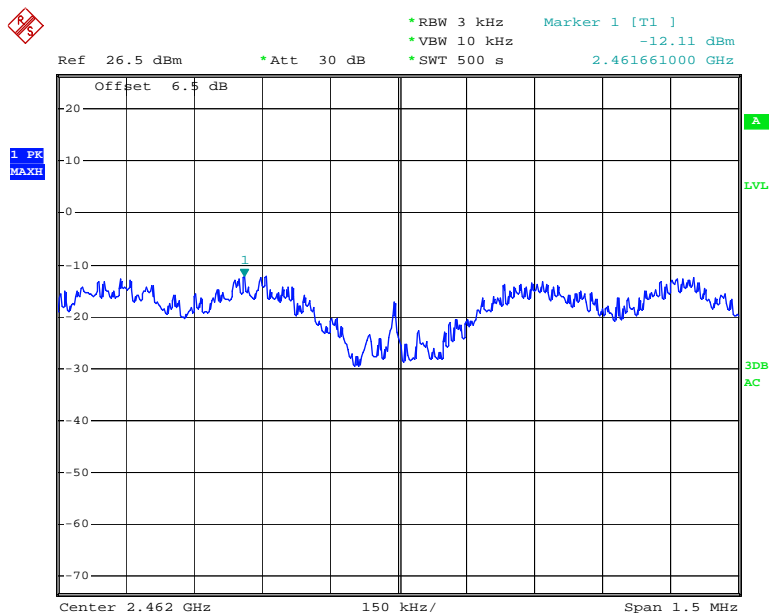
Power Spectral Density, 802.11g Low Channel



Power Spectral Density, 802.11g Middle Channel



Power Spectral Density, 802.11g High Channel



\*\*\*\*\* END OF REPORT \*\*\*\*\*