

**FCC PART 15.249**  
**MEASUREMENT AND TEST REPORT**  
**FOR**  
**Shenzhen SQT Electronics CO., Ltd.**

**Block B4, Hengji industrial Park, Heyi Village, Shajing Town, Baoan Area,  
Shenzhen, China**

**FCC ID: WOXSM-506AGL**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> Wireless mouse
<b>Model:</b>	<u>SM-506AGL</u>
<b>Report No.:</b>	<u>STR080980171</u>
<b>Test/Witness Engineer:</b>	<i>Susan Su</i>
<b>Test Date:</b>	<u>2008-09-05 to 2008-09-10</u>
<b>Issued Date:</b>	<u>2008-09-12</u>
<b>Prepared By:</b>	<b>SEM.Test Compliance Service Co., Ltd.</b> 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101)
<b>Approved &amp; Authorized By:</b>	<i>Jandy So</i> _____ Jandy So / PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

**TABLE OF CONTENTS**

**1. GENERAL INFORMATION.....3**

- 1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....3
- 1.2 TEST STANDARDS .....3
- 1.3 RELATED SUBMITTAL(S)/GRANT(S).....3
- 1.4 TEST METHODOLOGY .....4
- 1.5 TEST FACILITY .....4
- 1.6 EUT EXERCISE SOFTWARE.....4
- 1.7 ACCESSORIES EQUIPMENT LIST AND DETAILS .....4
- 1.8 EUT CABLE LIST AND DETAILS .....4

**2. SUMMARY OF TEST RESULTS .....5**

**3. §15.203 - ANTENNA REQUIREMENT.....6**

- 3.1 STANDARD APPLICABLE .....6
- 3.2 TEST RESULT .....6

**4. §15.205, §15.209, §15.249 (A)- RADIATED EMISSION.....7**

- 4.1 MEASUREMENT UNCERTAINTY .....7
- 4.2 STANDARD APPLICABLE .....7
- 4.3 TEST EQUIPMENT LIST AND DETAILS.....8
- 4.4 TEST PROCEDURE.....8
- 4.5 CORRECTED AMPLITUDE & MARGIN CALCULATION .....9
- 4.6 ENVIRONMENTAL CONDITIONS.....9
- 4.7 SUMMARY OF TEST RESULTS/PLOTS .....9

**5. §15.249(B) OUT OF BAND EMISSIONS .....14**

- 5.1 STANDARD APPLICABLE .....14
- 5.2 TEST EQUIPMENT LIST AND DETAILS.....14
- 5.3 TEST PROCEDURE.....14
- 5.4 ENVIRONMENTAL CONDITIONS.....14
- 5.5 SUMMARY OF TEST RESULTS/PLOTS.....15

## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Shenzhen SQT Electronics CO., Ltd.  
 Address of applicant: Block B4, Hengji industrial Park, Heyi Village, Shajing Town, Baoan Area, Shenzhen, China

Manufacturer: Shenzhen SQT Electronics CO., Ltd.  
 Address of manufacturer: Block B4, Hengji industrial Park, Heyi Village, Shajing Town, Baoan Area, Shenzhen, China

#### General Description of E.U.T

Items	Description
EUT Description:	Wireless mouse
Trade Name:	/
Model No.:	SM-506AGL
Rated Voltage:	DC 3V battery
Output Power:	<0dBm
Frequency Range:	2402.8~2478MHz
No. of Channel:	/
Channel Separation:	/
Antenna Type:	Integral Antenna
Size:	9.9x6.1x3.0 cm
For more information refer to the circuit diagram form and the user's manual.	

*The test data is gathered from a production sample, provided by the manufacturer.*

### 1.2 Test Standards

The following report is prepared on behalf of the Shenzhen SQT Electronics CO., Ltd. in accordance with FCC Part 15, Subpart B, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.107,15.203, 15.205, 15.207, 15.209 and 15.249 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

### 1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

## 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the Operating Instructions and let the EUT keep transmitting.

## 1.5 Test Facility

### FCC – Registration No.: 994117

SEM.Test Compliance 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 and the Registration is 994117.

### Industry Canada (IC) Registration No.: 7673A

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

## 1.6 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components. The test software is started while the whole system is on.

## 1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

## 1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

## 2. SUMMARY OF TEST RESULTS

---

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emission	N/A
§15.205	Restricted Band of Operation	Compliant
§15.209	Radiated Emission	Compliant
§15.249(a)	Field Strength	Compliant
§15.249(d)	Out of Band Emission	Compliant

### **3. §15.203 - ANTENNA REQUIREMENT**

---

#### **3.1 Standard Applicable**

According to FCC 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.

#### **3.2 Test Result**

This product has an integral antenna, fulfill the requirement of this section.

## 4. §15.205, §15.209, §15.249 (a)- RADIATED EMISSION

---

### 4.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 3.0$  dB.

### 4.2 Standard Applicable

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 20 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209,WHICHEVER IS THE LESSER ATTENUATION.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

### 4.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-01-25	2009-01-24
Positioning Controller	C&C	CC-C-1F	N/A	2008-01-25	2009-01-24
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-01-25	2009-01-24
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-01-25	2009-01-24
RF Switch	EM	EMSW18	SW060023	2008-01-25	2009-01-24
Amplifier	Agilent	8447F	3113A06717	2008-01-25	2009-01-24
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-01-25	2009-01-24
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-01-25	2009-01-24

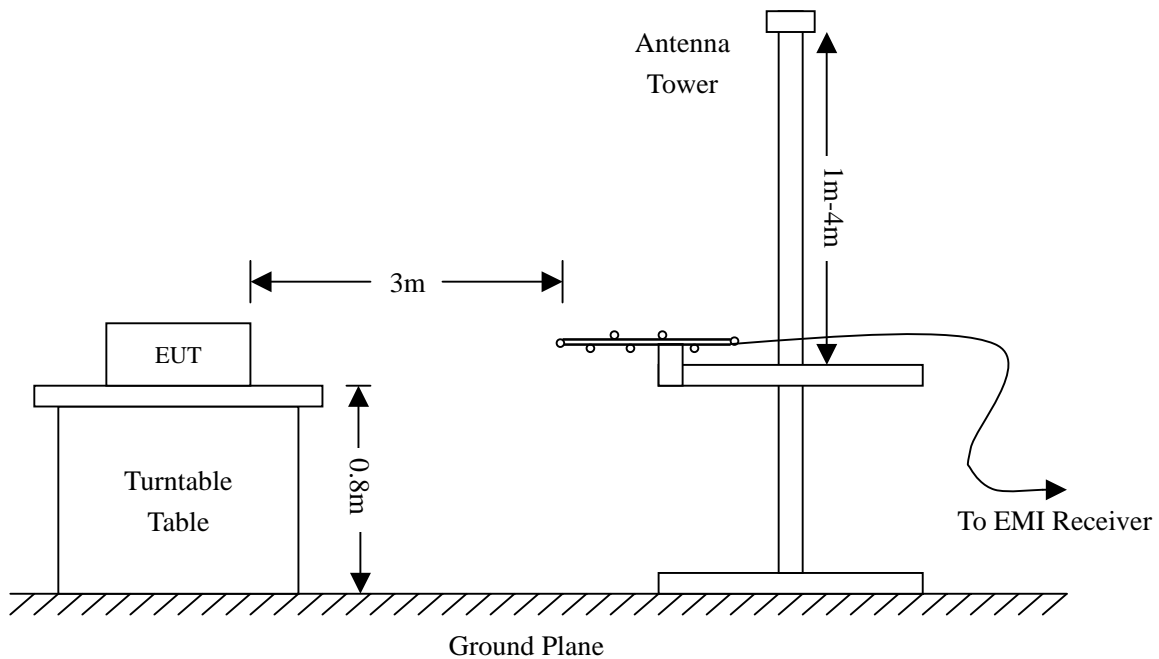
**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 4.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

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.





#### 4.5 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

#### 4.6 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

#### 4.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

**-2.1 dB $\mu$ V at 4879.4 MHz in the Horizontal polarization, 30 MHz to 25 GHz, 3Meters**

**Plot of Radiation Emissions Test**

*Radiated Disturbance*

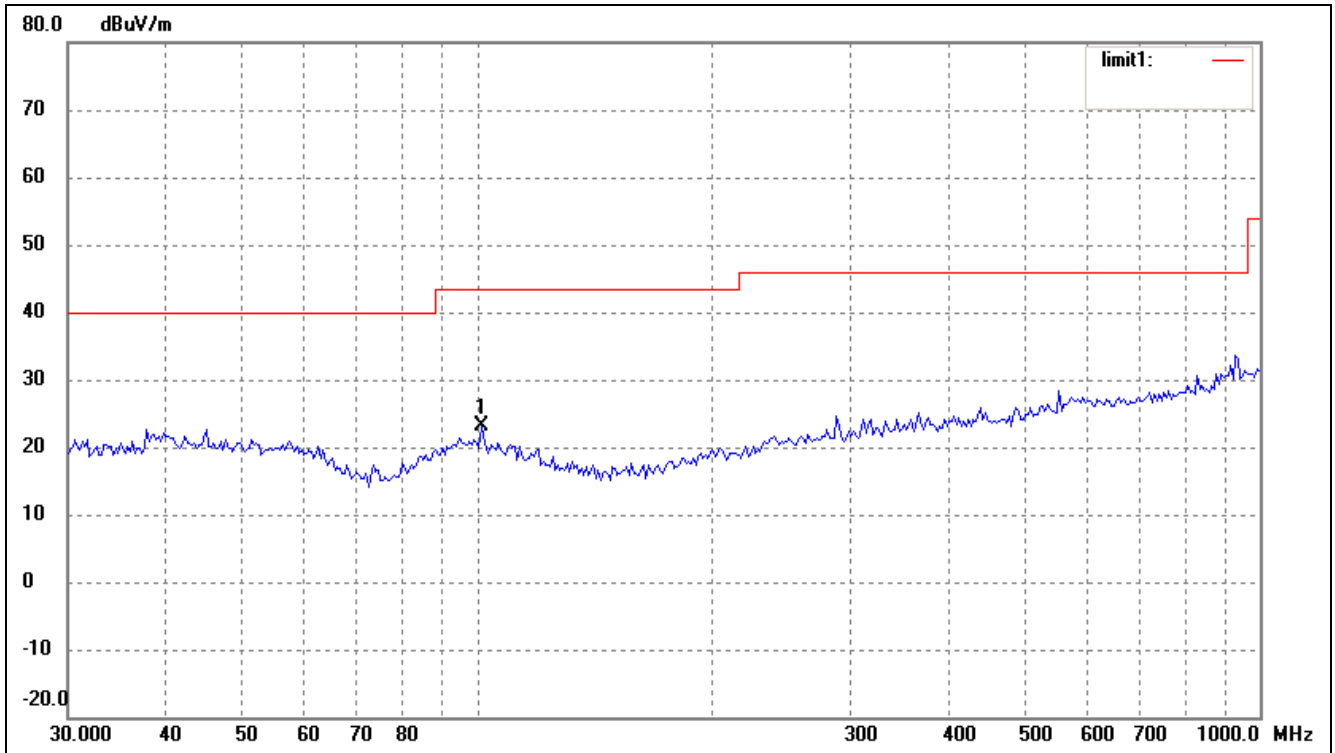
*EUT: Wireless mouse*

*M/N: SM-506AGL*

*Operating Condition: Transmitting below 1GHz*

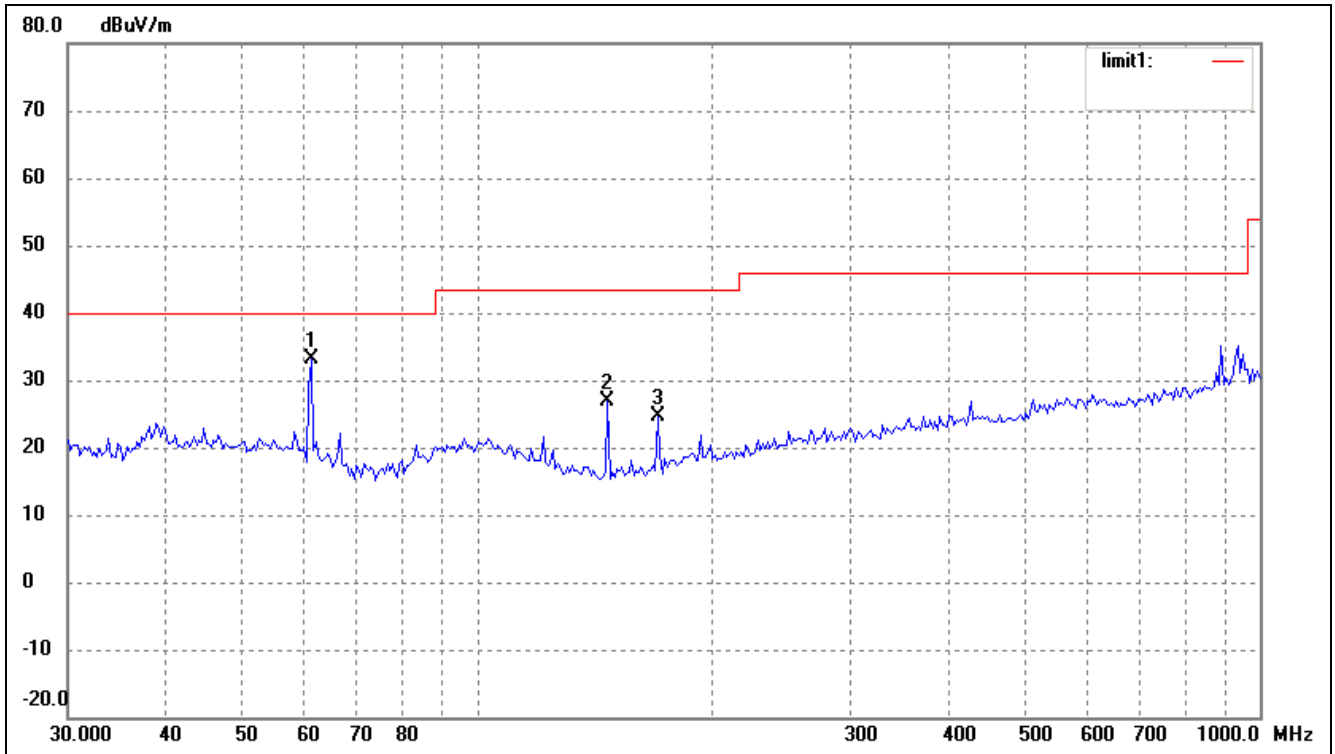
*Test Specification: Horizontal & Vertical*

*Horizontal:*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	101.1797	15.49	7.71	23.20	43.50	-20.30	0	100	peak

Vertical:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	61.4343	26.50	6.62	33.12	40.00	-6.88	349	120	peak
2	146.8392	23.53	3.28	26.81	43.50	-16.69	230	100	peak
3	170.1888	20.54	4.06	24.60	43.50	-18.90	116	100	peak

## Spurious Emission Above 1GHz

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4805.6	AV	45.3	270	h	34.1	5.2	33.0	51.6	54	-2.4
4805.6	AV	42.3	270	v	34.1	5.2	33.0	48.6	54	-5.4
4805.6	PK	54.4	270	h	34.1	5.2	33.0	60.7	74	-13.3
4805.6	PK	51.1	270	v	34.1	5.2	33.0	57.4	74	-16.6
7208.4	AV	40.4	90	h	37.4	6.1	33.5	50.4	54	-3.6
7208.4	AV	36.9	45	v	37.4	6.1	33.5	46.9	54	-7.1
7208.4	PK	49.7	270	h	37.4	6.1	33.5	59.7	74	-14.3
7208.4	PK	46.1	180	v	37.4	6.1	33.5	56.1	74	-17.9
2402.8	AV	75.0	60	h	29.1	3.7	34.0	73.8	94	-20.2
2402.8	AV	72.8	270	v	29.1	3.7	34.0	71.6	94	-22.4
2402.8	PK	93.7	45	h	29.1	3.7	34.0	92.5	114	-21.5
2402.8	PK	91.3	90	v	29.1	3.7	34.0	90.1	114	-23.9
Middle Channel (1G to 25GHz)										
4879.4	AV	45.4	90	h	34.1	5.2	33.0	51.7	54	-2.3
4879.4	AV	41.5	270	v	34.1	5.2	33.0	47.8	54	-6.2
4879.4	PK	55.1	45	h	34.1	5.2	33.0	61.4	74	-12.6
4879.4	PK	52.0	60	v	34.1	5.2	33.0	58.3	74	-15.7
7319.1	AV	49.2	270	h	37.4	6.1	33.5	59.2	54	5.2
7319.1	AV	46.2	45	v	37.4	6.1	33.5	56.2	54	2.2
7319.1	PK	57.4	180	h	37.4	6.1	33.5	67.4	74	-6.6
7319.1	PK	54.5	45	v	37.4	6.1	33.5	64.5	74	-9.5
2439.7	AV	75.7	45	h	29.1	3.7	34.0	74.5	94	-19.5
2439.7	AV	72.5	90	v	29.1	3.7	34.0	71.3	94	-22.7
2439.7	PK	93.0	90	h	29.1	3.7	34.0	91.8	114	-22.2
2439.7	PK	89.8	60	v	29.1	3.7	34.0	88.6	114	-25.4

High Channel (1G to 25GHz)										
4956	AV	45.6	90	h	34.1	5.2	33.0	51.9	54	-2.1
4956	AV	41.4	270	v	34.1	5.2	33.0	47.7	54	-6.3
4956	PK	53.3	60	h	34.1	5.2	33.0	59.6	74	-14.4
4956	PK	50.5	60	v	34.1	5.2	33.0	56.8	74	-17.2
7434	AV	38.6	270	h	37.4	6.1	33.5	48.6	54	-5.4
7434	AV	35.7	180	v	37.4	6.1	33.5	45.7	54	-8.3
7434	PK	46.3	45	h	37.4	6.1	33.5	56.3	74	-17.7
7434	PK	45.8	45	v	37.4	6.1	33.5	55.8	74	-18.2
2478	AV	77.6	45	h	29.1	3.7	34.0	76.4	94	-17.6
2478	AV	72.7	90	v	29.1	3.7	34.0	71.5	94	-22.5
2478	PK	90.9	90	h	29.1	3.7	34.0	89.7	114	-24.3
2478	PK	87.4	90	v	29.1	3.7	34.0	86.2	114	-27.8

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4. Emissions 20dB lower than the limit are not reported.

## 5. §15.249(b) OUT OF BAND EMISSIONS

### 5.1 Standard Applicable

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### 5.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-01-25	2009-01-24
Positioning Controller	C&C	CC-C-1F	N/A	2008-01-25	2009-01-24
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-01-25	2009-01-24
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-01-25	2009-01-24
RF Switch	EM	EMSW18	SW060023	2008-01-25	2009-01-24
Amplifier	Agilent	8447F	3113A06717	2008-01-25	2009-01-24
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-01-25	2009-01-24
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-01-25	2009-01-24
Agilent	Spectrum Analyzer	E4402B	US41192821	2008-01-25	2009-01-24

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 5.3 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, than mark the higher-level emission for comparing with the FCC rules.

### 5.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1012 mbar

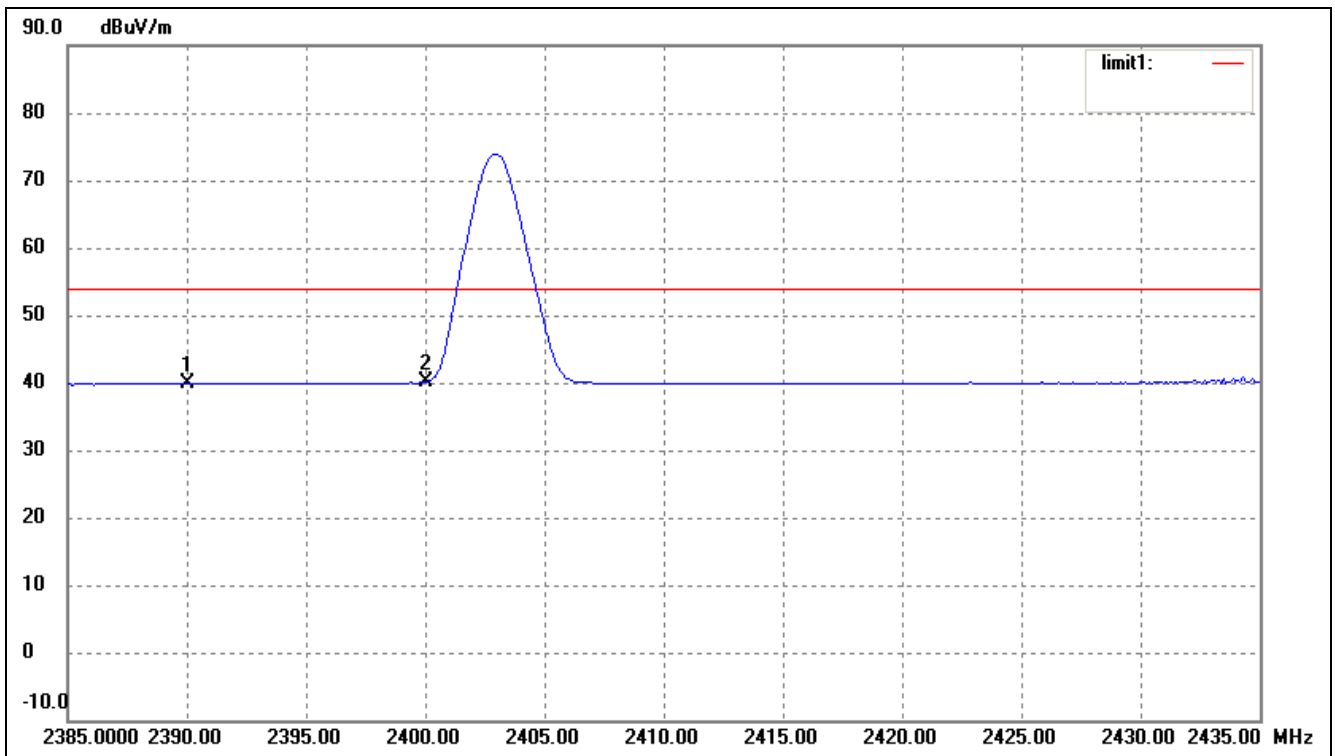
**5.5 Summary of Test Results/Plots**

Frequency MHz	Emission dB $\mu$ V/m	Limit dB $\mu$ V/m
2390.0	39.83	54
2400.0	40.11	54
2483.5	40.22	54

**Test Result Pass**

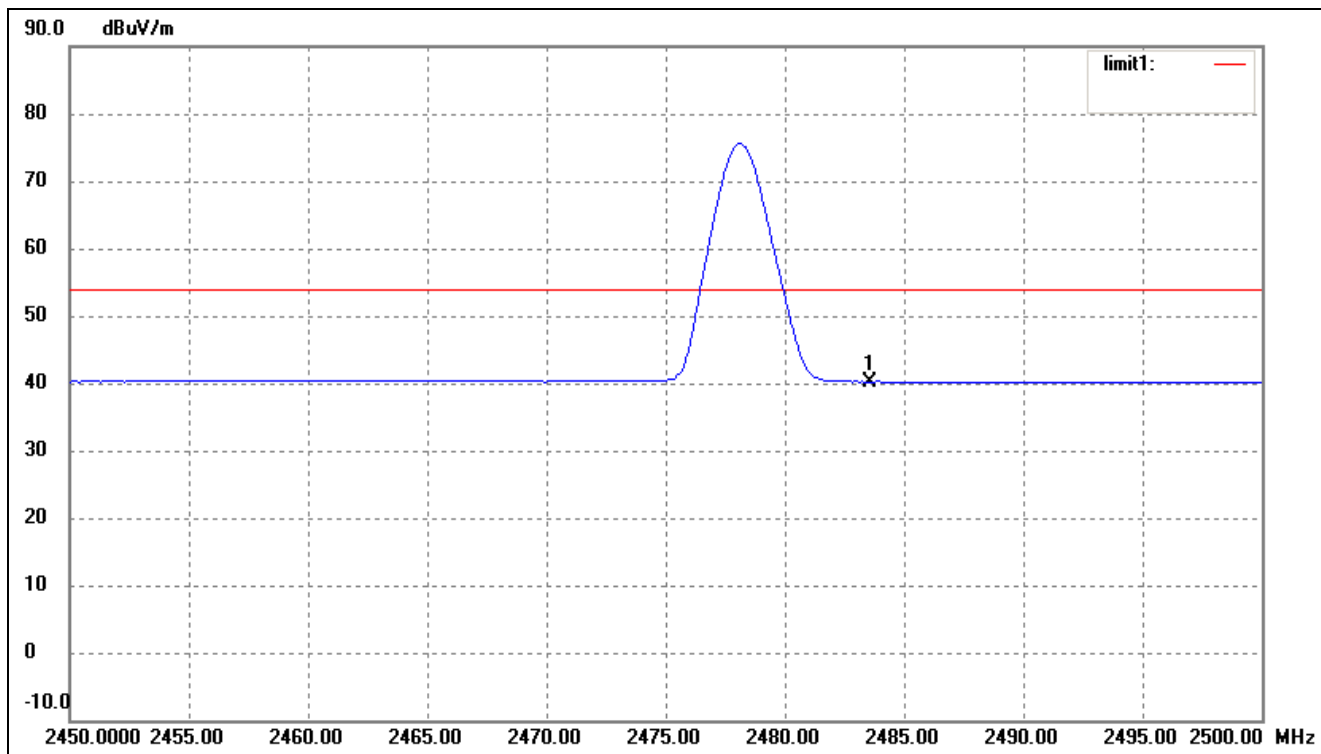
Refer to the attached plots.

*Lower Bandedge*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	2390.000	7.24	32.59	39.83	54.00	-14.17	0	100	Ave
2	2400.000	7.43	32.68	40.11	54.00	-13.89	0	100	Ave

Upper Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	2483.500	7.25	32.97	40.22	54.00	-13.78	0	100	Ave

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