



NVLAP LAB CODE 200707-0



# FCC PART 15.247

## EMI MEASUREMENT AND TEST REPORT

For

### Scosche Industries, Inc.

P.O. Box 2901 Oxnard, CA 93034, U.S.A.

**FCC ID: IKQCBH**

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Bluetooth Headset
<b>Test Engineer:</b> Lisa Zhu <i>Lisa Zhu</i> Henry Yang <i>Henry Yang</i>	
<b>Report No.:</b> R0608301	
<b>Test Date:</b> 2007-01-05 to 2007-02-15	
<b>Report Date:</b> 2007-02-15	
<b>Reviewed By:</b> Bonni Baniqued: EMC Manager <i>Bonni Baniqued</i>	
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**Note:** This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

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## GENERAL INFORMATION

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

The *Scosche Industries, Inc.*'s product, model number: *CBH* or the "EUT" as referred to in this report is a *Bluetooth Headset*, which measures approximately: 7.2 cm L x 2.0 cm W x 2.2 cm H, rated input voltage: 3.7V Battery.

*\* The test data gathered are from production sample, serial number: 0610138. Provided by the manufacturer, we receive the EUT on 2006-10-13.*

### Objective

This Type approval report is prepared on behalf of *Scosche Industries, Inc.* 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, 15.209 and 15.247 rules.

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

No related submittal(s).

### 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.

All emissions measurement was performed and Bay Area Compliance Laboratory Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratory Corp. (Shenzhen) 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 November 04, 2004. 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.: 382179 and Industrial Canada registration test site No.: 5500A. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

### Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-564-00NI	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E-80BM	DoC
Seagate	Hard Disk	ST340014A	5JXK3GXE	DoC
DELL	3.5' Floppy	NA	CN-0N8893-69802-54Q-02P0	DoC
Lite-ON	CD-Rom	LTN-489S	NA	DoC
Intel	Ethernet	PRO 10/100 VE	NA	DoC

### Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4Q6	DoC
DELL	Keyboard	SK-8110	CN07N244-71616-56A-1B1E	DoC
DELL	Mouse	M071KC	520027907	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-571-GBSH	DoC
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	DoC
Intel	CPU	Celeron D-2533	NA	DoC

### External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded Detachable Keyboard Cable	1.50	Keyboard Port / Host	Keyboard
Shielded Detachable Mouse Cable	1.50	Mouse Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port/Host	Monitor
Shielded Detachable data Cable	0.23	EUT	Cortrol Unit

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## **SYSTEM TEST CONFIGURATION**

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### **Description of Test Configuration**

The system was configured for testing with additional control unit as shown on the configuration of test setup on page 7.

### **EUT Exercise Software**

The exercise software is available.

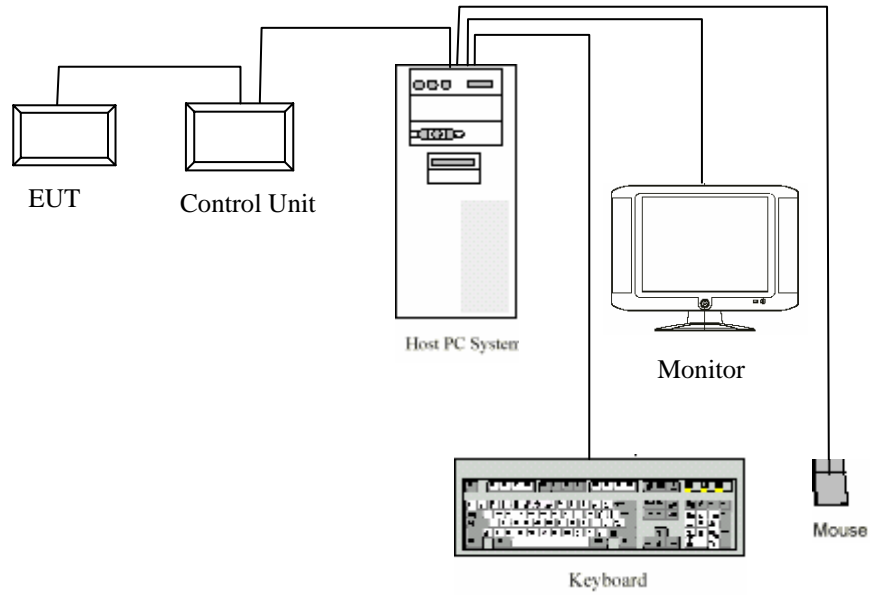
### **Special Accessories**

The special Accessories were provided by Bay Area Compliance Laboratory Corp. (Shenzhen).  
The control unit was provided by manufacturer.

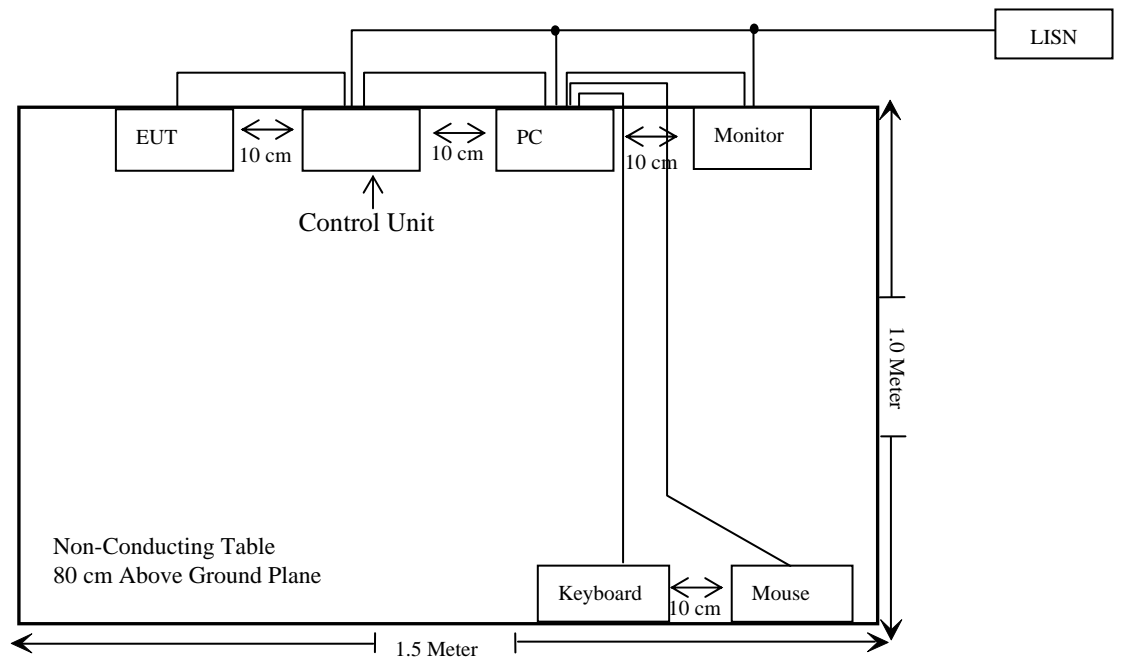
### **Equipment Modifications**

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

### Configuration of Test Setup



### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

<b>Fcc Rules</b>	<b>Description Of Test</b>	<b>Result</b>
§15.107 (a)	Conducted Emission	Compliant
§15.247 (b)	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band	Compliant
§15.205, §15.209, §15.247(d)	Radiated Emission	Compliant
§15.247 (a)(1)	20 dB Bandwidth	Compliant
§15.247(a)(1)	Channel Separation	Compliant
§15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Number of hopping channel	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band edges testing	Compliant



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## **§15.247(b) - RF EXPOSURE**

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### **Limit**

According to §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.

Since the output power of this device was so low (0.0005 Watts), it met the RF Exposure Requirement.

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## **§15.203 - ANTENNA REQUIREMENT**

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### **Standard Applicable**

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.

### **Antenna Connector Construction**

The EUT has an integral antenna which, in accordance to the above sections, is considered sufficient to comply with the provisions of these sections. Please see EUT photo for details.

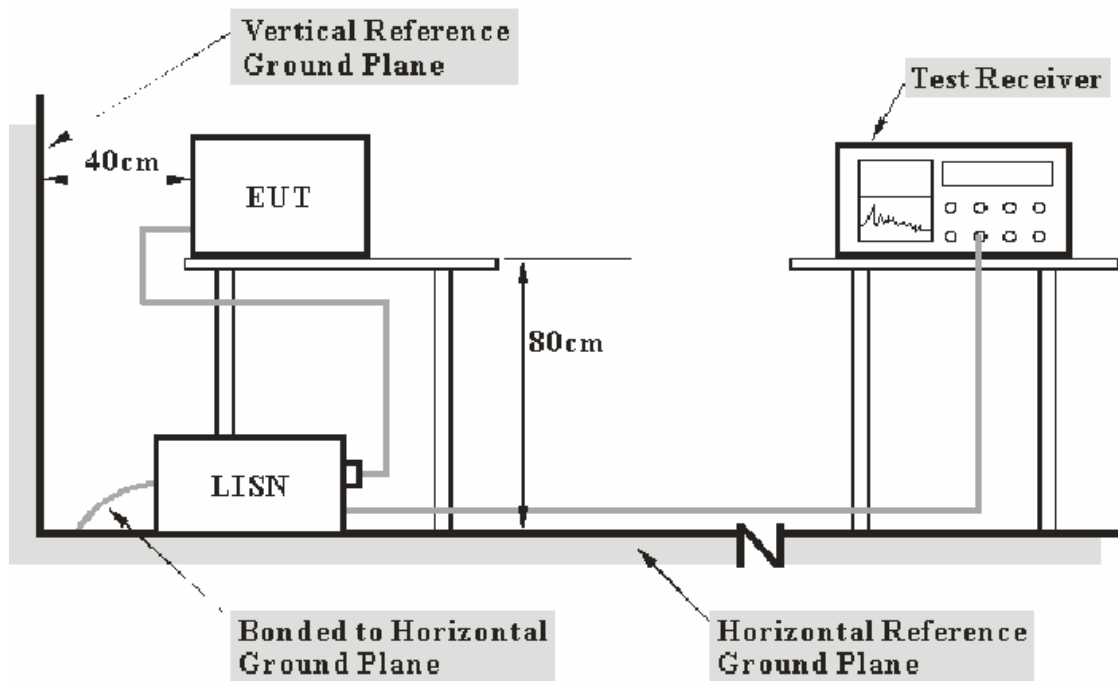
## §15.207 (a) - CONDUCTED EMISSIONS

### 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 Bay Area Compliance Laboratory Corp. (Shenzhen) 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 C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 Class B 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 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:

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

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-08-17	2006-08-17
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-03-01	2007-03-01

\* Com-Power's LISN were used as the supporting equipment.

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Procedure

During the conducted emission test, the adapter connected to the outlet of 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:

**3.70 dB** at **2.175 MHz** in the **Neutral** conductor mode.

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

Temperature:	22 ° C
Relative Humidity:	55%
ATM Pressure:	1000mbar

The testing was performed by Henry Yang on 2007-02-15.

Test Mode: Charging

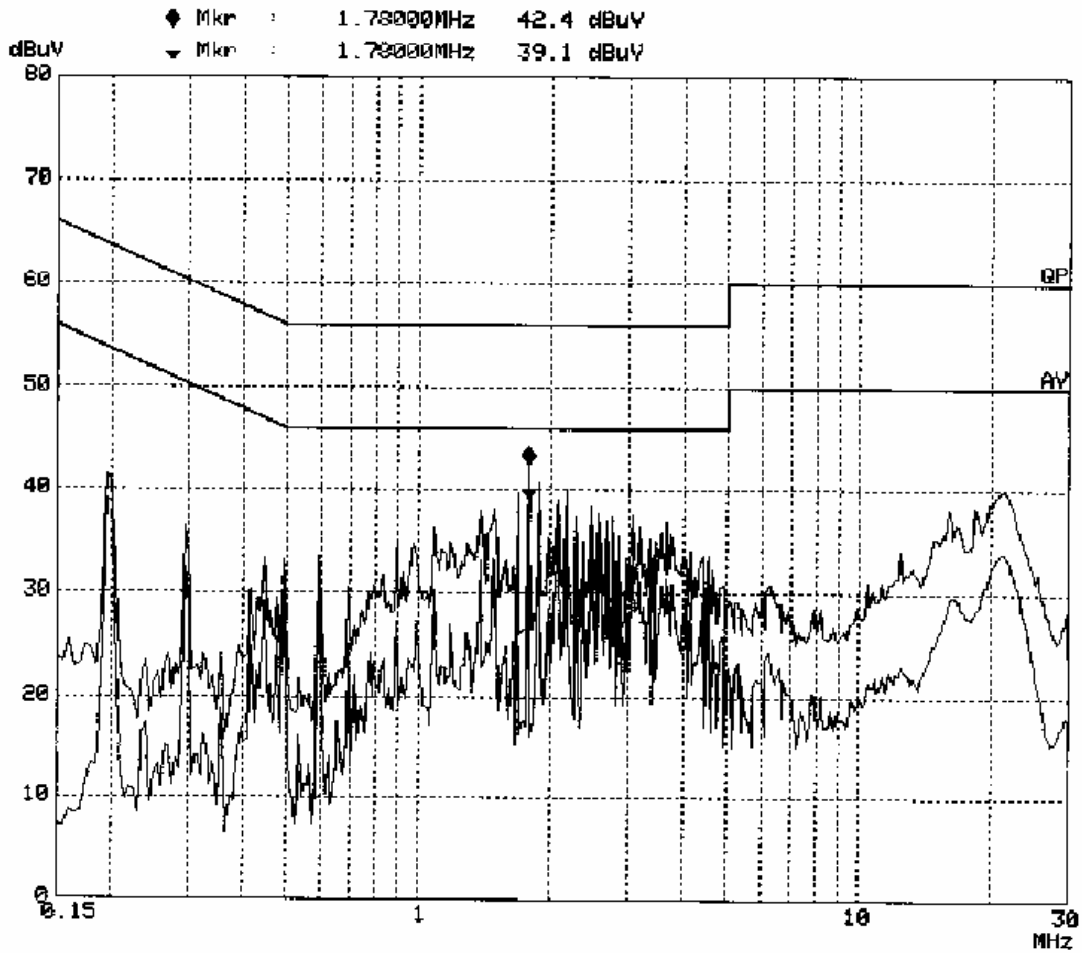
Line Conducted Emissions				FCC PART 15 Class B	
Frequency (MHz)	Amplitude (dB $\mu$ V)	Detector (QP/AV)	Phase (Live/Neutral)	Limit (dB $\mu$ V)	Margin (dB)
2.175	42.30	AV	Neutral	46.00	3.70
2.570	42.00	AV	Neutral	46.00	4.00
2.965	40.60	AV	Neutral	46.00	5.40
2.270	40.60	AV	Neutral	46.00	5.40
2.075	40.40	AV	Neutral	46.00	5.60
2.665	40.20	AV	Neutral	46.00	5.80
1.780	39.10	AV	Live	46.00	6.90
2.175	38.00	AV	Live	46.00	8.00
2.075	35.10	AV	Live	46.00	10.90
2.175	44.30	QP	Neutral	56.00	11.70
2.470	34.00	AV	Live	46.00	12.00
2.570	43.90	QP	Neutral	56.00	12.10
2.275	33.80	AV	Live	46.00	12.20
1.680	33.70	AV	Live	46.00	12.30
2.665	43.00	QP	Neutral	56.00	13.00
2.270	42.90	QP	Neutral	56.00	13.10
2.075	42.90	QP	Neutral	56.00	13.10
2.965	42.80	QP	Neutral	56.00	13.20
1.780	42.40	QP	Live	56.00	13.60
2.175	40.00	QP	Live	56.00	16.00
1.680	39.60	QP	Live	56.00	16.40
2.075	39.00	QP	Live	56.00	17.00
2.470	38.40	QP	Live	56.00	17.60
2.275	37.40	QP	Live	56.00	18.60

**Plot(s) of Test Data**

Plot(s) of Test Data is presented hereinafter as reference.

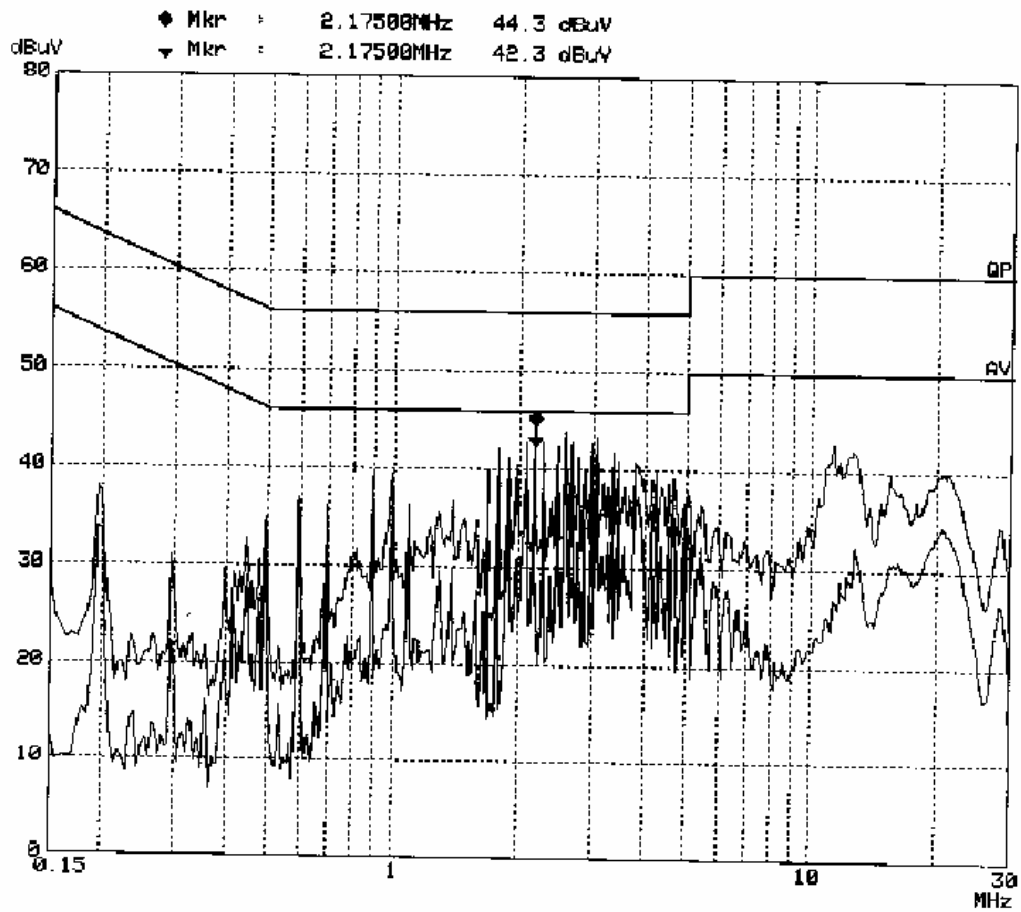
# Conduction Disturbance Test FCC Part 15

EUT: Head-free speaker phone M/N:CBH  
Manuf: Scosche  
Op Cond: Charging  
Operator: Henry.yang  
Test Spec: AC 120V/60Hz L  
Comment: Temp:25'C Humi:56%  
Date: 15. Feb 07 14:09



# Conduction Disturbance Test FCC Part 15

EUT: Head-free speaker phone M/N:CBH  
Manuf: Scosche  
Op Cond: Charging  
Operator: Henry.yang  
Test Spec: AC 120V/60Hz N  
Comment: Temp:25°C Humi:56%  
Date: 15. Feb 07 13:48



## §15.205, §15.209, §15.247 - RADIATED EMISSIONS

### Applicable Standard

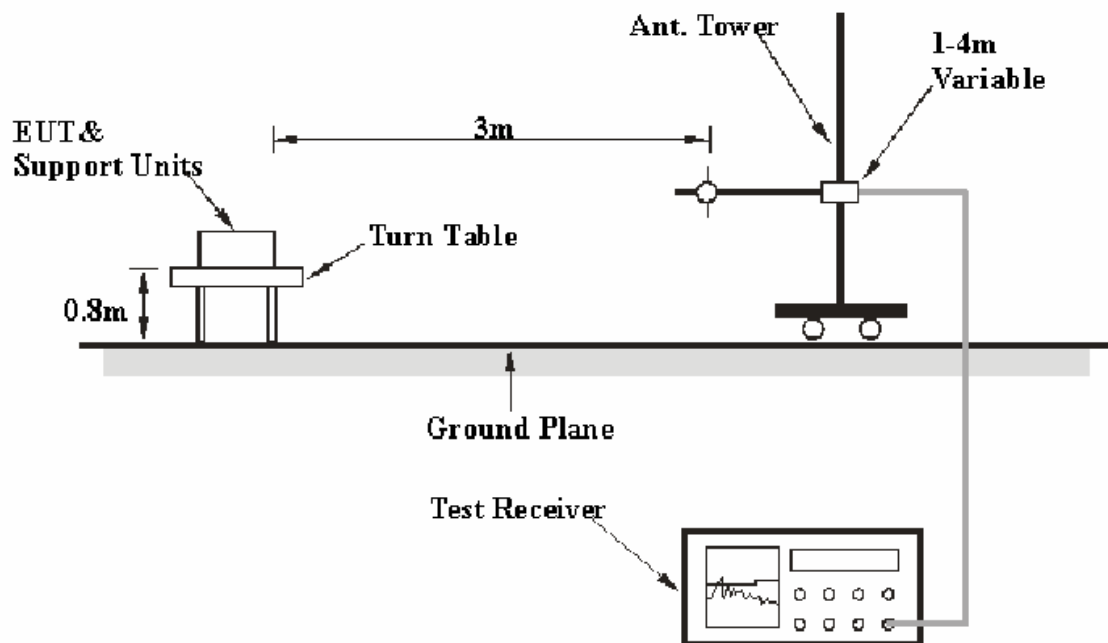
According to FCC §15.247 (d)

### 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 Bay Area Compliance Laboratory Corp. (Shenzhen) is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the ANSI C63.4-2003. 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 host PC 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>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447D	2944A09795	2006-11-15	2007-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-08-14	2007-08-14
HP	Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Procedure

For the radiated emissions test, the host PC 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.

All data was recorded in the PK&AV detection mode.

## Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 maximum limit. The equation for margin calculation is as follows:

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

## 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:

- 4.92 dB** at **9608 MHz** in the **Horizontal** polarization, for Low Channel (Above 1 GHz)
- 4.53 dB** at **9764 MHz** in the **Horizontal** polarization, for Middle Channel (Above 1 GHz)
- 4.42 dB** at **9920 MHz** in the **Horizontal** polarization, for High Channel (Above 1 GHz)
- 7.30dB** at **39.872325MHz** in the **Vertical** polarization for FCC 15.209

## Test Data

### Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	52%
ATM Pressure:	1009mbar

*The testing was performed by Lisa Zhu on 2007-01-05.*

*Test Mode: Transmitting (Above 1GHz)*

Low Channel:

Frequency (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Height (m)	Polar H / V	Antenna factor (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Ampl. (dBuV/m)	FCC Part 15.247		
										Limit (dBuV/m)	Margin (dB)	Remarks
2402	95.83	PK	90	1.0	H	30.6	3.61	35	95.04	/		fundamental
2402	95.21	AV	130	1.0	H	30.6	3.61	35	94.42			fundamental
2402	93.25	PK	45	1.0	V	30.6	3.61	35	92.46			fundamental
2402	92.87	AV	45	1.0	V	30.6	3.61	35	92.08			fundamental
9608	36.63	AV	180	1.2	H	41.2	5.35	34.1	49.08	54	4.92	harmonic
7206	37.05	AV	161	1.0	H	39.1	4.51	33.7	46.96	54	7.04	harmonic
9608	33.08	AV	180	1.2	V	40.0	5.35	34.1	44.33	54	9.67	harmonic
7206	35.21	AV	180	1.2	V	37.8	4.51	33.7	43.82	54	10.18	harmonic
4804	35.72	AV	70	1.2	H	36.0	4.64	33.4	42.96	54	11.04	harmonic
9608	48.21	PK	180	1.0	H	41.2	5.35	34.1	60.66	74	13.34	harmonic
7206	49.15	PK	280	1.0	H	39.1	4.51	33.7	59.06	74	14.94	harmonic
4804	32.78	AV	180	1.2	V	35.0	4.64	33.4	39.02	54	14.98	harmonic
9608	46.15	PK	180	1.0	V	40.0	5.35	34.1	57.40	74	16.60	harmonic
7206	47.33	PK	180	1.0	V	37.8	4.51	33.7	55.94	74	18.06	harmonic
4804	46.67	PK	69	1.2	H	36.0	4.64	33.4	53.91	74	20.09	harmonic
4804	44.37	PK	150	1.0	V	35.0	4.64	33.4	50.61	74	23.39	harmonic

## Middle Channel:

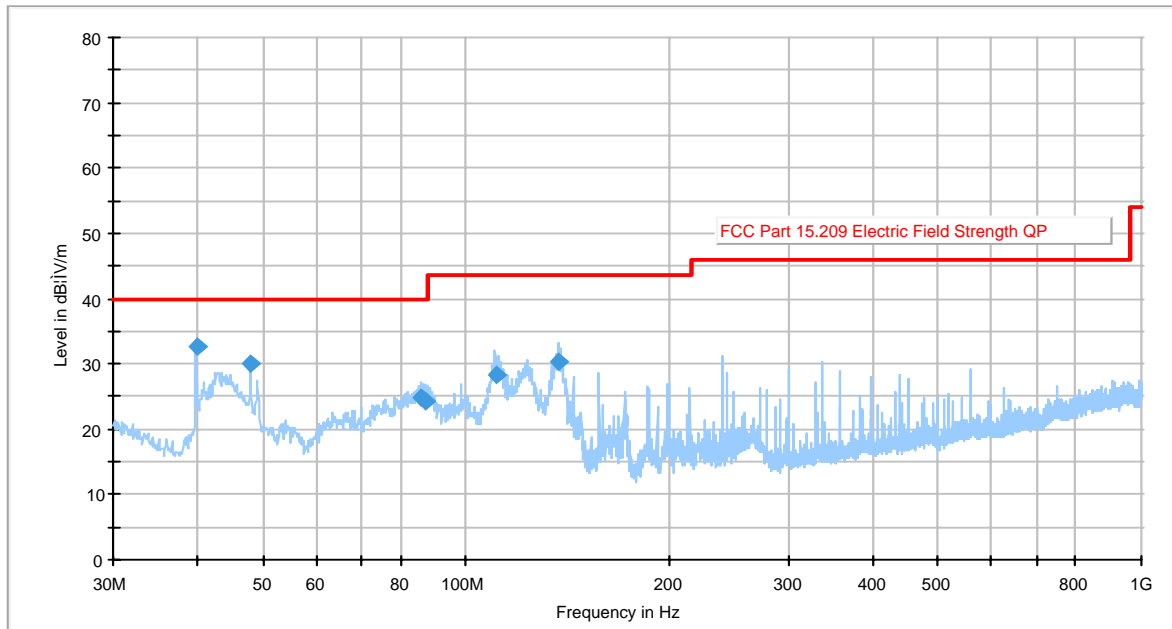
Frequency (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Height (m)	Polar H / V	Antenna factor (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Ampl. (dBuV/m)	FCC Part 15.247		
										Limit (dBuV/m)	Margin (dB)	Remarks
2441	96.78	PK	187	1.0	H	30.6	3.61	35	95.99			fundamental
2441	95.97	AV	187	1.0	H	30.6	3.61	35	95.18			fundamental
2441	94.82	PK	182	1.2	V	30.6	3.61	35	94.03			fundamental
2441	94.27	AV	182	1.2	V	30.6	3.61	35	93.48			fundamental
9764	37.02	AV	45	1.0	H	41.2	5.35	34.1	49.47	54	4.53	harmonic
9764	36.81	AV	180	1.0	V	40.0	5.35	34.1	48.06	54	5.94	harmonic
7323	36.48	AV	180	1.0	H	39.1	4.51	33.7	46.39	54	7.61	harmonic
7323	34.89	AV	90	1.2	V	37.8	4.51	33.7	43.50	54	10.50	harmonic
4882	35.85	AV	109	1.0	H	36.0	4.64	33.4	43.09	54	10.91	harmonic
9764	48.75	PK	45	1.0	H	41.2	5.35	34.1	61.20	74	12.80	harmonic
4882	33.64	AV	180	1.2	V	35.0	4.64	33.4	39.88	54	14.12	harmonic
9764	48.15	PK	180	1.0	V	40.0	5.35	34.1	59.40	74	14.60	harmonic
7323	48.77	PK	180	1.0	H	39.1	4.51	33.7	58.68	74	15.32	harmonic
7323	46.78	PK	90	1.2	V	37.8	4.51	33.7	55.39	74	18.61	harmonic
4882	46.82	PK	109	1.2	H	36.0	4.64	33.4	54.06	74	19.94	harmonic
4882	45.17	PK	180	1.0	V	35.0	4.64	33.4	51.41	74	22.59	harmonic

## High Channel:

Frequency (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Height (m)	Polar H / V	Antenna factor (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Ampl. (dBuV/m)	FCC Part 15.247		
										Limit (dBuV/m)	Margin (dB)	Remarks
2480	95.95	PK	180	1.0	H	30.6	3.61	35	95.16			fundamental
2480	95.37	AV	180	1.0	H	30.6	3.61	35	94.58			fundamental
2480	93.78	PK	182	1.0	V	30.6	3.61	35	92.99			fundamental
2480	93.09	AV	182	1.0	V	30.6	3.61	35	92.30			fundamental
9920	37.13	AV	180	1.0	H	41.2	5.35	34.1	49.58	54	4.42	harmonic
9920	36.16	AV	90	1.0	V	40.0	5.35	34.1	47.41	54	6.59	harmonic
7440	36.08	AV	180	1.0	H	39.1	4.51	33.7	45.99	54	8.01	harmonic
7440	35.81	AV	120	1.2	V	37.8	4.51	33.7	44.42	54	9.58	harmonic
4960	34.17	AV	129	1.0	H	36.0	4.64	33.4	41.41	54	12.59	harmonic
9920	48.77	PK	180	1.0	H	41.2	5.35	34.1	61.22	74	12.78	harmonic
4960	34.84	AV	45	1.0	V	35.0	4.64	33.4	41.08	54	12.92	harmonic
9920	47.85	PK	90	1.0	V	40.0	5.35	34.1	59.10	74	14.9	harmonic
7440	47.98	PK	180	1.0	H	39.1	4.51	33.7	57.89	74	16.11	harmonic
7440	46.74	PK	120	1.2	V	37.8	4.51	33.7	55.35	74	18.65	harmonic
4960	45.78	PK	129	1.0	H	36.0	4.64	33.4	53.02	74	20.98	harmonic
4960	44.32	PK	45	1.0	V	35.0	4.64	33.4	50.56	74	23.44	harmonic

Test Mode: Transmitting

Auto Test (FCC Part 15.209)



Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
39.872325	32.7	100.0	V	295.0	-11.8	40.0	7.3
48.008150	29.9	116.0	V	289.0	-16.9	40.0	10.1
136.809150	30.4	123.0	V	212.0	-10.8	43.5	13.1
86.041475	24.9	99.0	V	205.0	-18.1	40.0	15.1
110.542800	28.3	100.0	V	82.0	-13.3	43.5	15.2
86.969150	24.2	115.0	V	44.0	-18.1	40.0	15.8

## §15.247(a) (1)-CHANNEL SEPARATION TEST

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Limit

FCC Part 15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB Bandwidth of the hopping channel, whichever is greater.

FREQUENCY RANGE (MHz)	Limit (kHz)
902-928	>25kHz or the 20dB bandwidth
2400-2483.5	>25kHz or two-thirds of the 20dB bandwidth
5725-5850	>25kHz or the 20dB bandwidth

### Test Data

#### Environmental Conditions

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

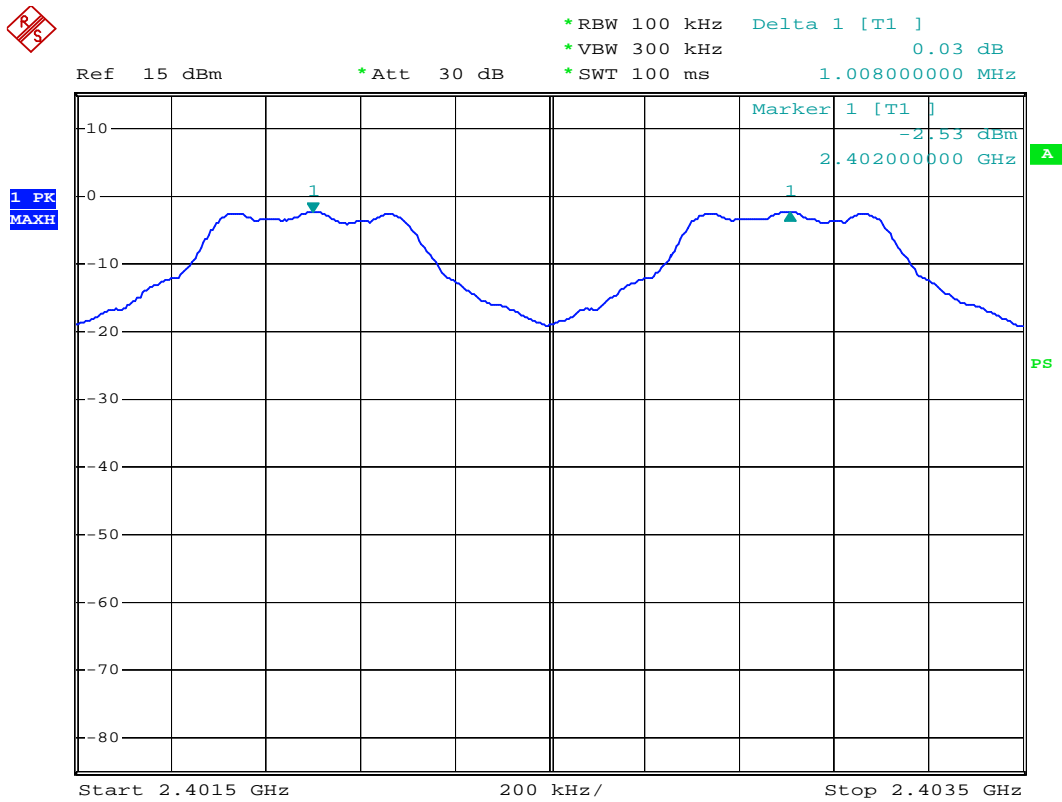
*The testing was performed by Lisa Zhu on 2007-01-05*

Test mode: Transmitting

Channel	Frequency (MHz)	Channel Separation (KHz)	Limit (kHz)	Result
Low Channel	2402	1008.00	180.00	Pass
Adjacency Channel	2403			
Mid Channel	2441	1008.00	180.00	Pass
Adjacency Channel	2442			
High Channel	2480	1004.00	181.33	Pass
Adjacency Channel	2479			

Test Result: Pass, please refer to the plots

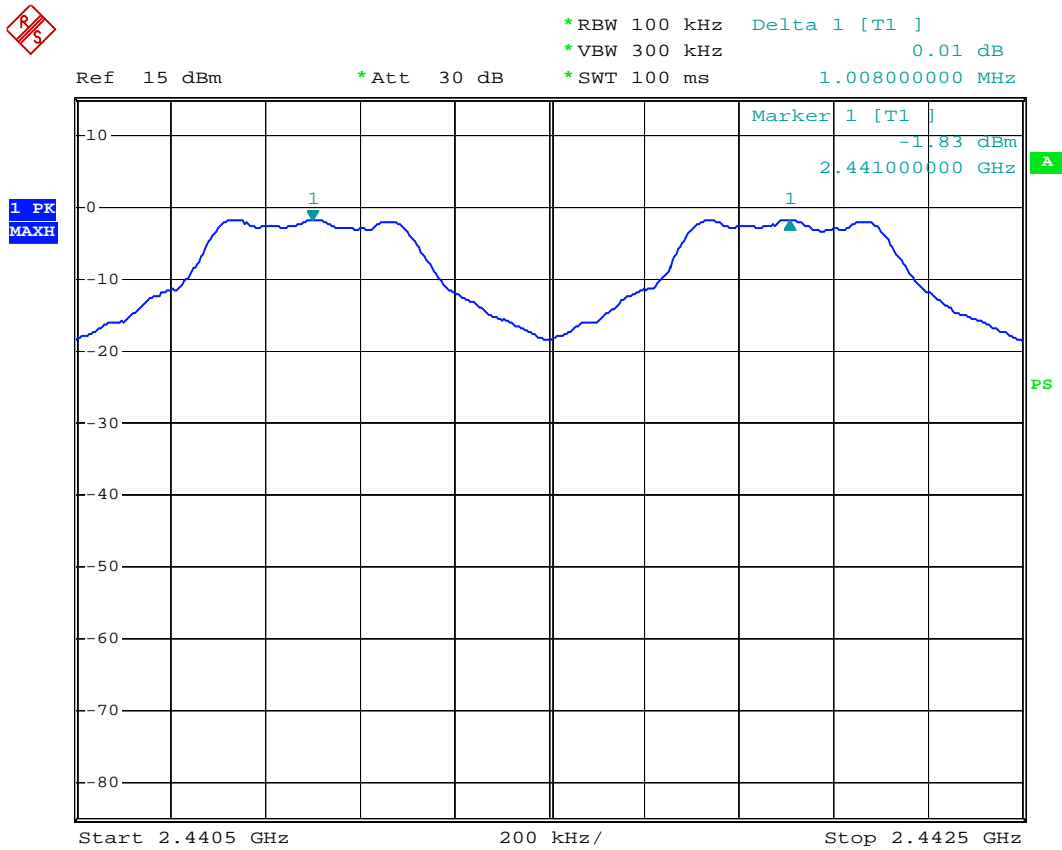
Low channel:



channel separation (Low channel)

Date: 5.JAN.2007 20:22:06

Middle channel



channel separation (Middle channel)

Date: 5.JAN.2007 20:27:40

High channel

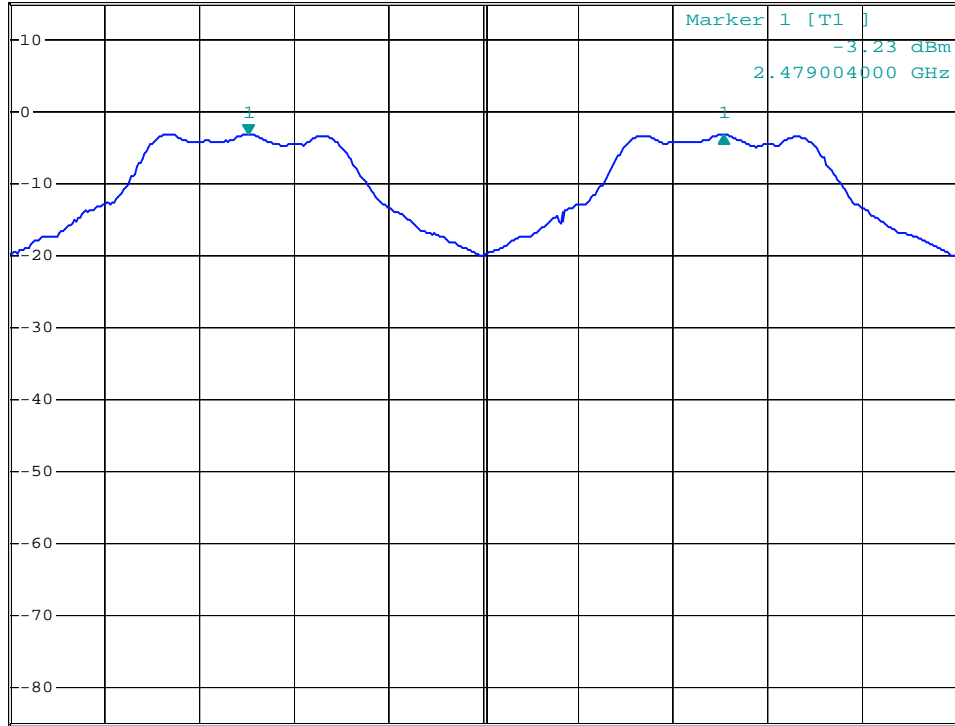


\*RBW 100 kHz Delta 1 [T1 ]  
\*VBW 300 kHz -0.06 dB  
\*SWT 100 ms 1.004000000 MHz

Ref 15 dBm

\*Att 30 dB

1 PK  
MAXH



Start 2.4785 GHz

200 kHz/

Stop 2.4805 GHz

channel separation (High channel)

Date: 5.JAN.2007 20:32:07



## §15.247(a) (1) –20dB BANDWIDTH TESTING

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB Bandwidth of the hopping channel, whichever is greater.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### 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 20 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:	53%
ATM Pressure:	1009mbar

The testing was performed by Lisa Zhu on 2007-01-05.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low	2402	270
Mid	2441	270
High	2480	272

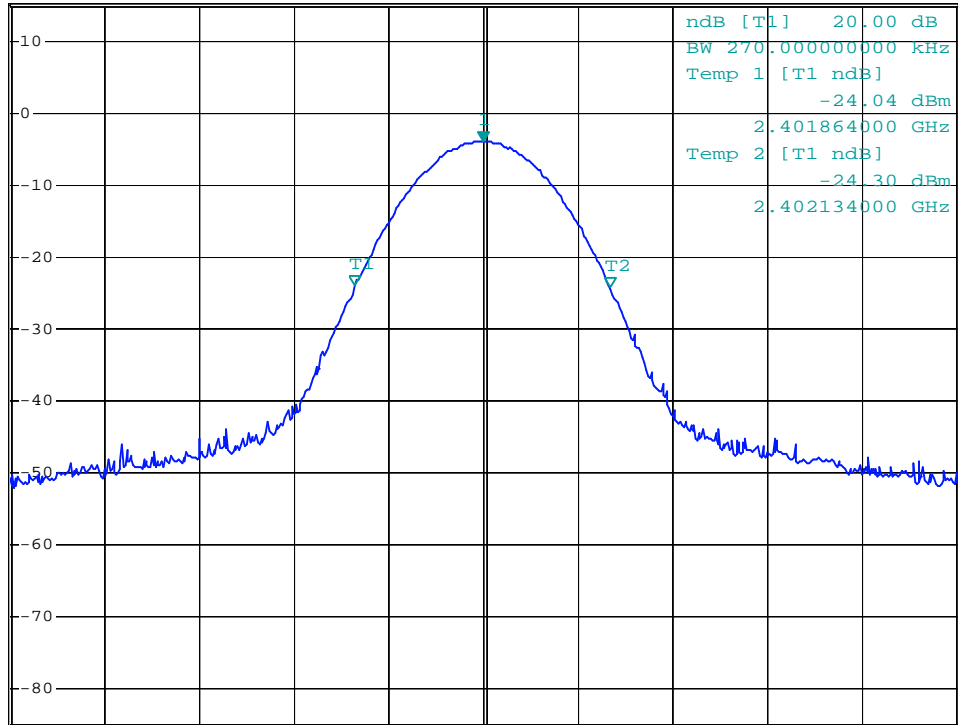
Low channel



\*RBW 100 kHz Marker 1 [T1 ]  
 VBW 300 kHz -4.09 dBm  
 \*Att 30 dB \*SWT 5 ms 2.402000000 GHz

Ref 15 dBm

1 PK  
 MAXH



Center 2.402 GHz 100 kHz/ Span 1 MHz

20 dB Bandwidth (Low channel)

Date: 5.JAN.2007 18:58:36

Middle channel

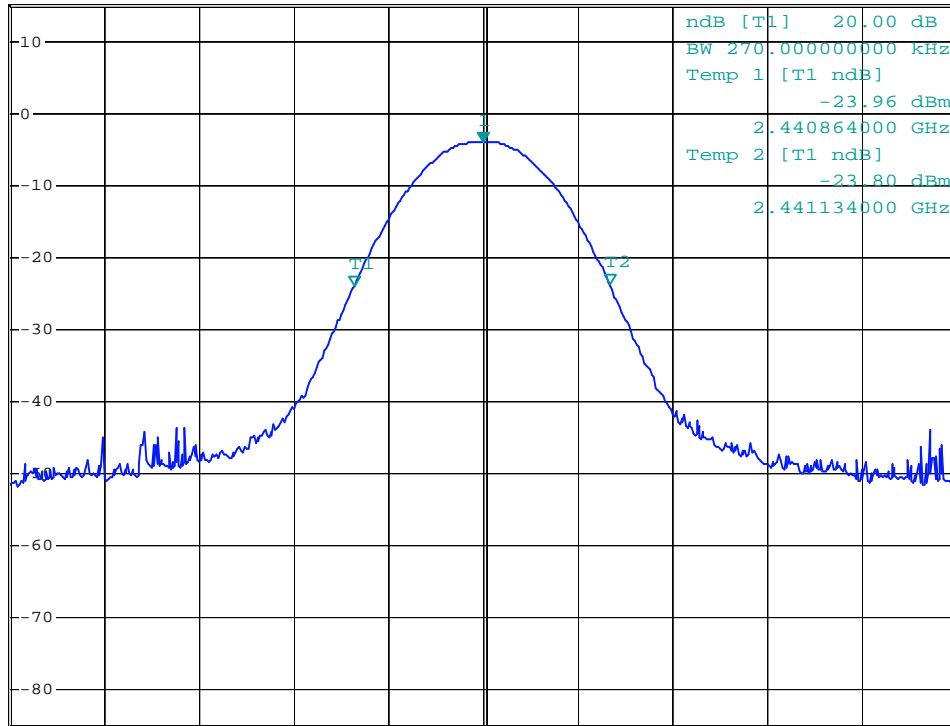


\*RBW 100 kHz    Marker 1 [T1]    -3.93 dBm  
VBW 300 kHz  
\*SWT 5 ms                    2.441000000 GHz

Ref 15 dBm

\*Att 30 dB

1 PK  
MAXH



Center 2.441 GHz

100 kHz/

Span 1 MHz

20 dB Bandwidth (Middle channel)

Date: 5.JAN.2007 19:00:14

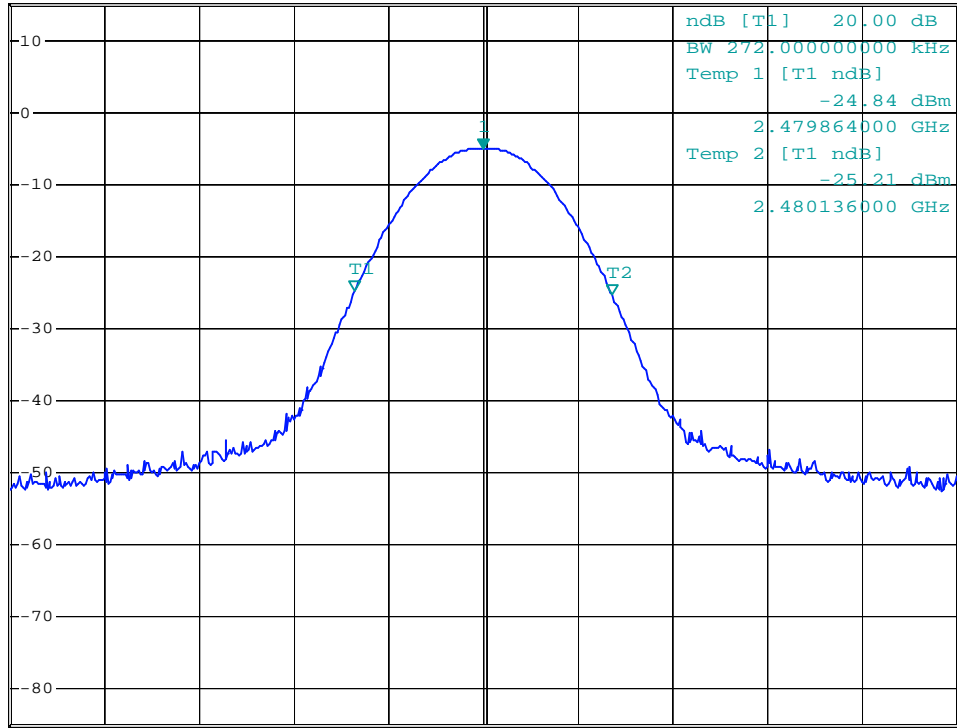
High channel



\*RBW 100 kHz Marker 1 [T1 ]  
VBW 300 kHz -4.98 dBm  
\*Att 30 dB \*SWT 5 ms 2.480000000 GHz

Ref 15 dBm

1 PK  
VIEW



Center 2.48 GHz

100 kHz/

Span 1 MHz

20 dB Bandwidth (High channel)

Date: 5.JAN.2007 19:01:53

## §15.247(a) (1) (iii)-NUMBER OF HOPPING CHANNEL TEST

### Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in transmitting mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Limit

FCC Part 15, Subpart C Section 15.247

Frequency Range	Number of Hopping Channel (CH)	Limit (CH)
2402-2480	79	>15

### Test Data

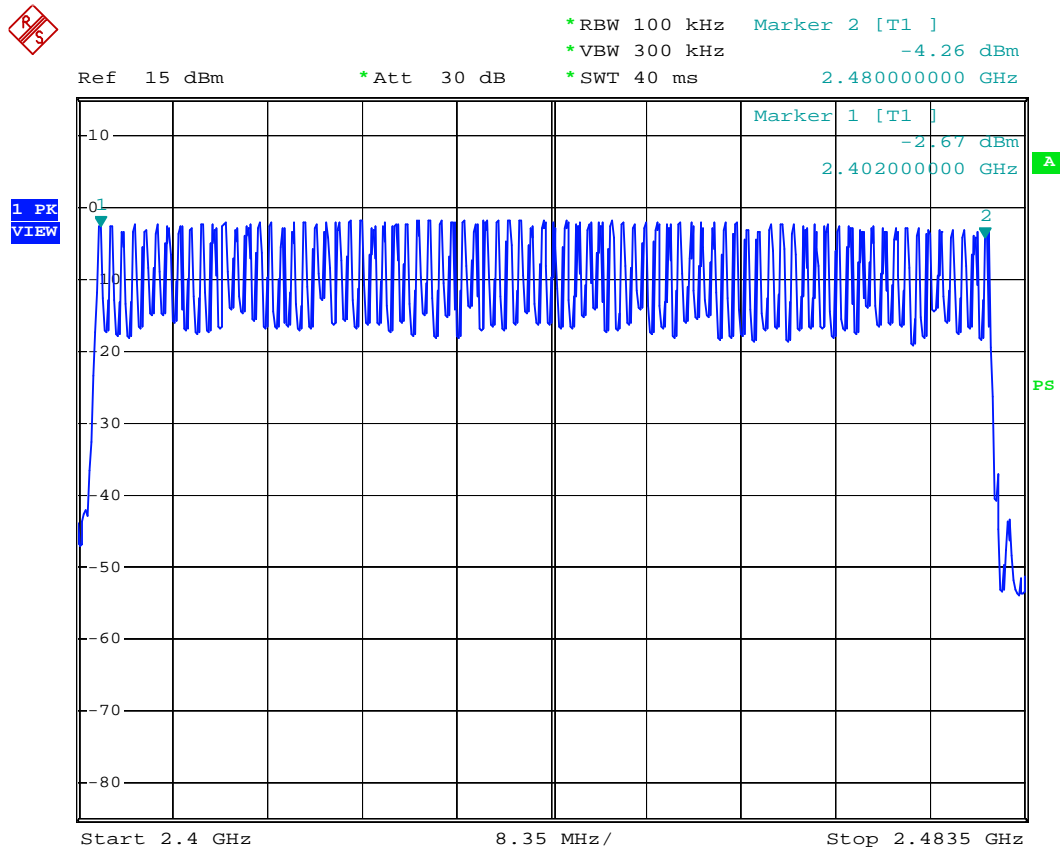
#### Environmental Conditions

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

The testing was performed by Lisa Zhu on 2007-01-05.

Test mode: Transmitting

**Test Result:** Pass, please refer to the plot.



hopping channels

Date: 5.JAN.2007 20:14:03

## §15.247(a) (1) (iii) -TIME OF OCCUPANCY (DWELL TIME)

### Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no.(s), The quantity of False was get from single sweep. In addition, the time of single Pluses was tested.

Limit

FCC Part 15, Subpart C Section 15.247.

FREQUENCY RANGE (MHz)	LIMIT (ms)		
	20dB bandwidth <250kHz (50 Channel)	20dB bandwidth >250kHz (50 Channel)	20dB bandwidth <1 MHz (79 Channel)
902-928	NA	NA	NA
2400-2483.5	NA	NA	31.6s
5725-5850	NA	NA	NA

Dwell Time= Pulse width (ms) \* number of hopping pulses in 31.6 seconds.

### Test Data

#### Environmental Conditions

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	1009 mbar

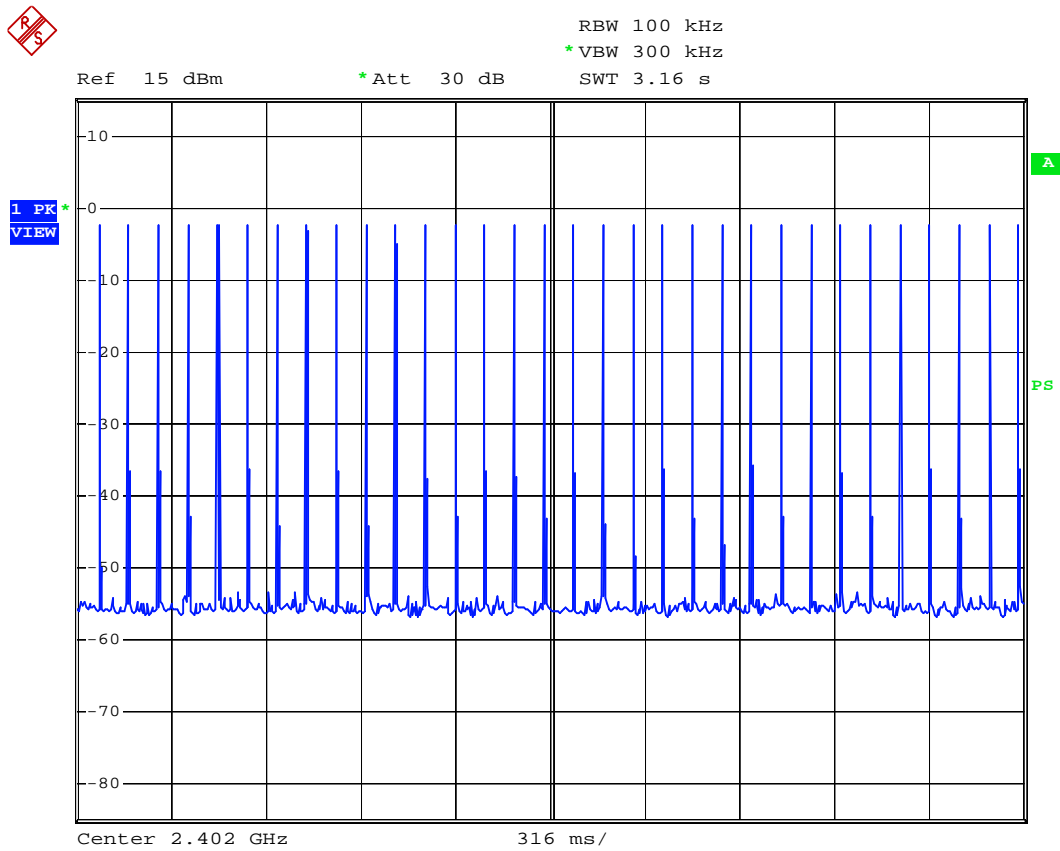
*The testing was performed by Lisa Zhu on 2007-01-05.*

*Test mode: Transmitting*

Channel	Pulse wide (msec)	Number of Hopping Pulses in 31.6sec	Dwell time (sec)	Limit (sec)	Result
Low	0.460	320	0.147	0.4	Pass
Mid	0.455	320	0.146	0.4	Pass
High	0.465	320	0.149	0.4	Pass

**Test Result:** Pass.

Low channel



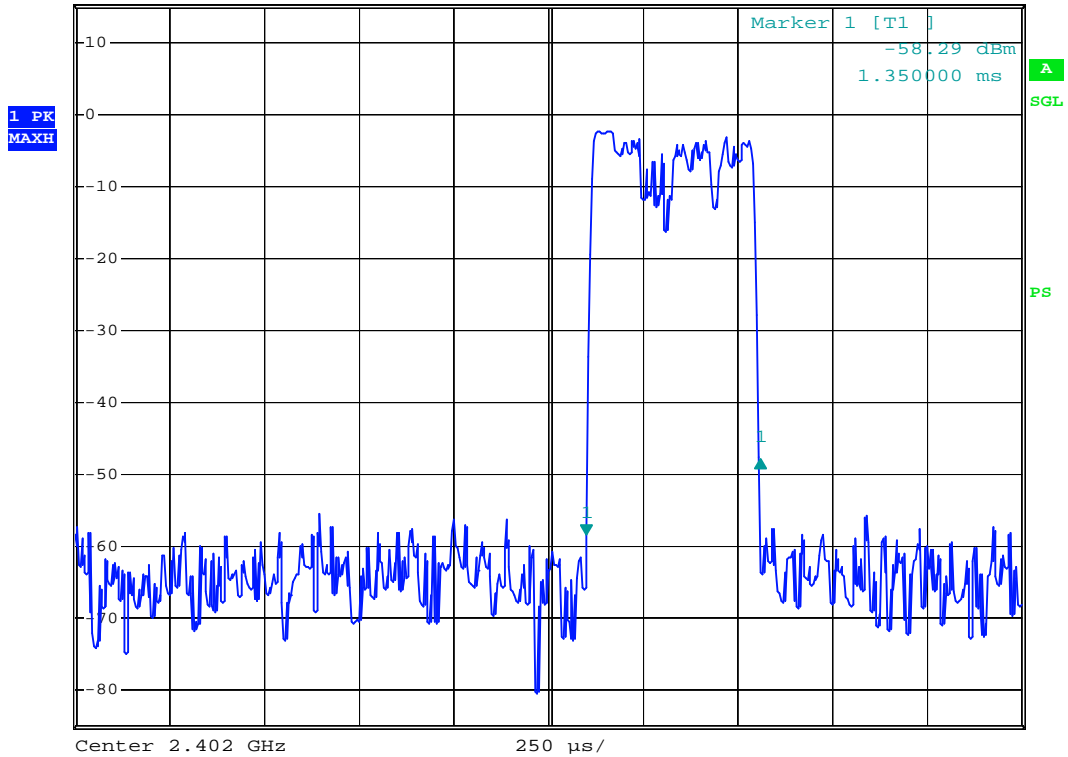
Number of Low channel

Date: 5.JAN.2007 20:45:48





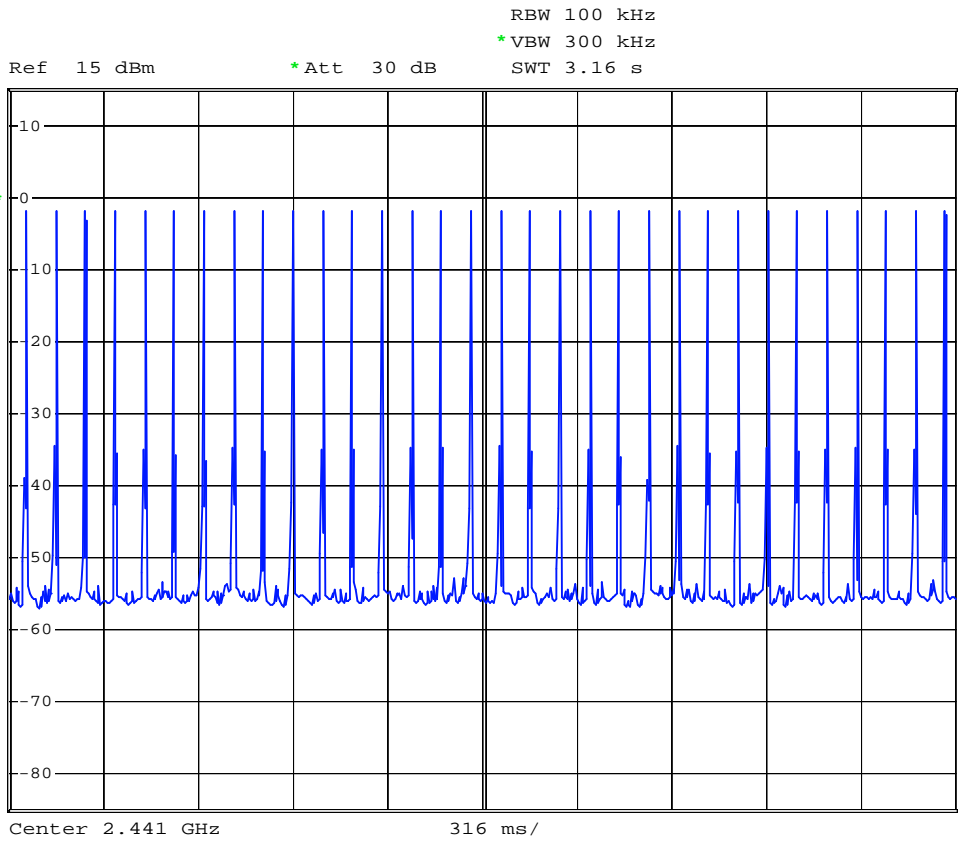
RBW 100 kHz Delta 1 [T1 ]  
\*VBW 300 kHz 10.30 dB  
Ref 15 dBm \*Att 30 dB SWT 2.5 ms 460.000000 μs



Pulse Width of Low channel

Date: 5.JAN.2007 20:43:01

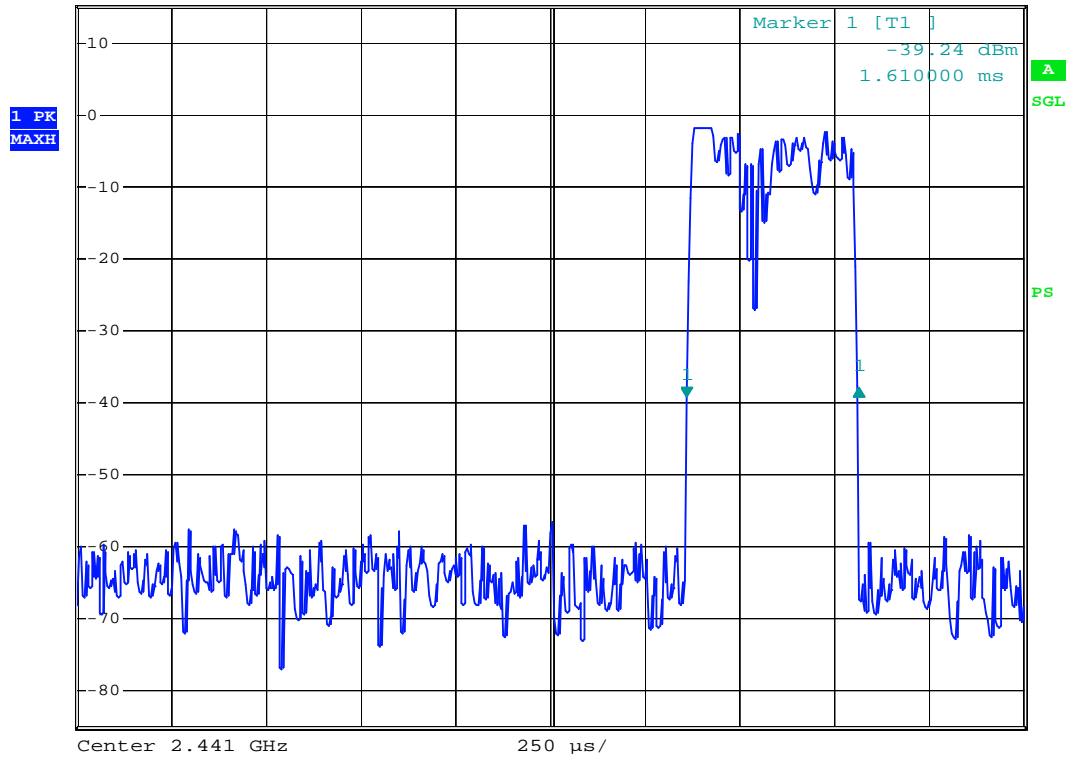
Middle channel



Number of Middle channel  
Date: 5.JAN.2007 20:46:50



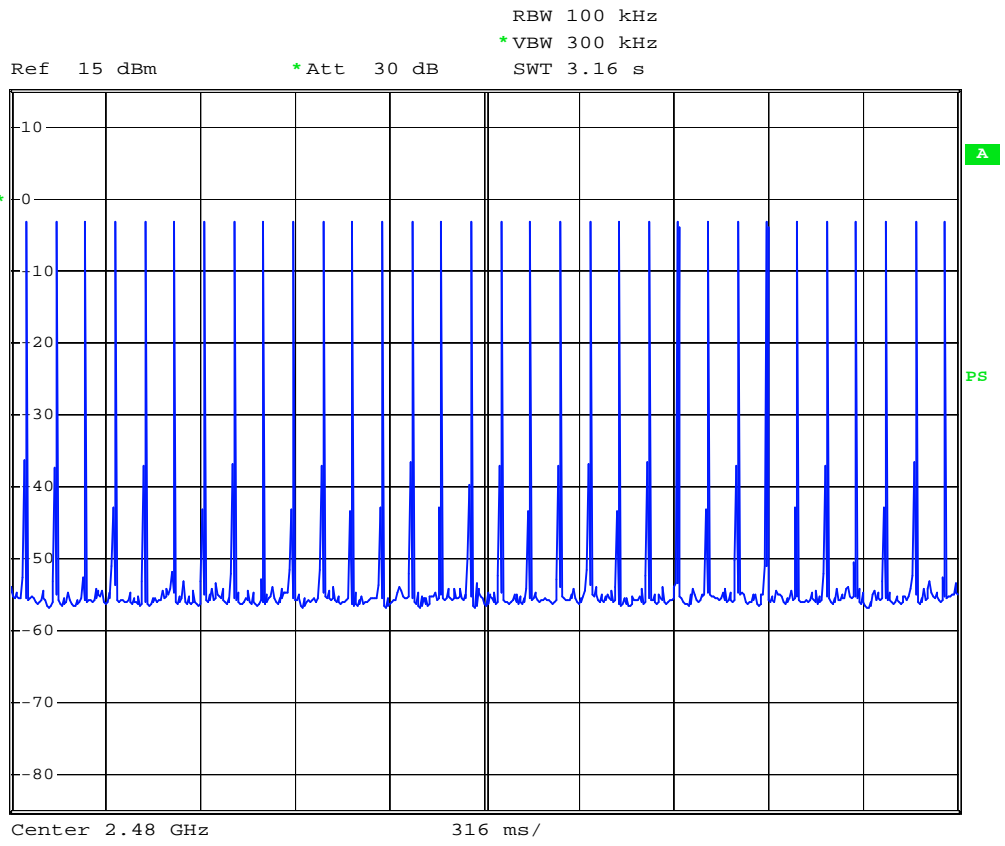
Ref 15 dBm      \*Att 30 dB      RBW 100 kHz      Delta 1 [T1 ]  
\*VBW 300 kHz      1.48 dB  
SWT 2.5 ms      455.000000 μs



Pulse Width of middle channel

Date: 5.JAN.2007 20:48:00

High channel



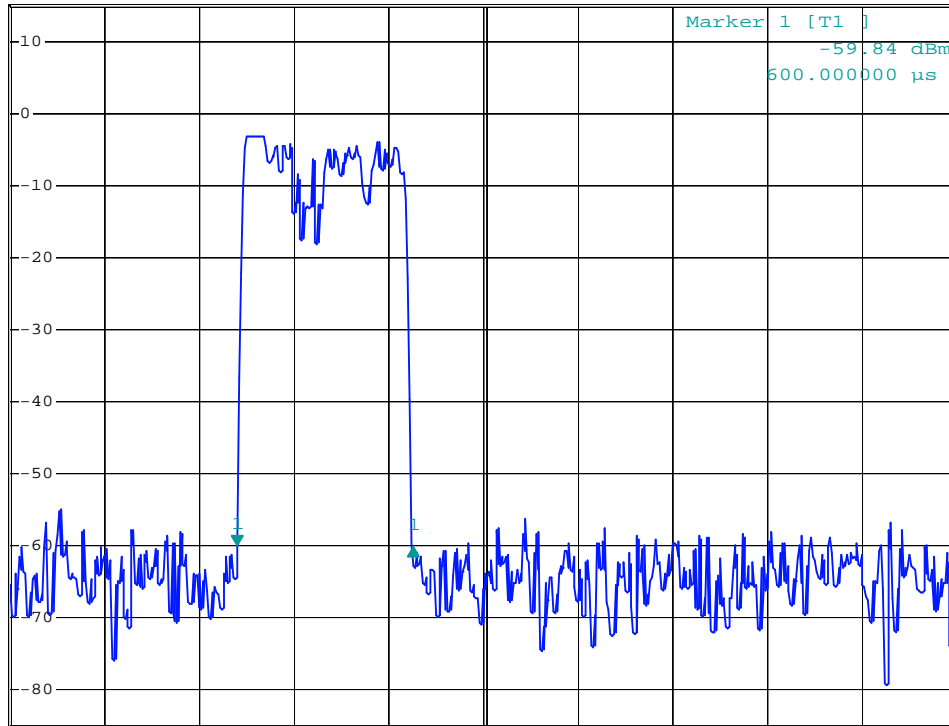
Number of High channel

Date: 5.JAN.2007 20:49:07



Ref 15 dBm      \* Att 30 dB      RBW 100 kHz      Delta 1 [T1 ]  
\* VBW 300 kHz      -0.37 dB  
SWT 2.5 ms      465.000000 μs

1 PK  
MAXH



Center 2.48 GHz      250 μs/

Pulse Width of High channel

Date: 5.JAN.2007 20:40:29

## §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

### Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

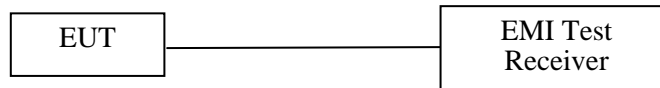
### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### 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:	53%
ATM Pressure:	1009mbar

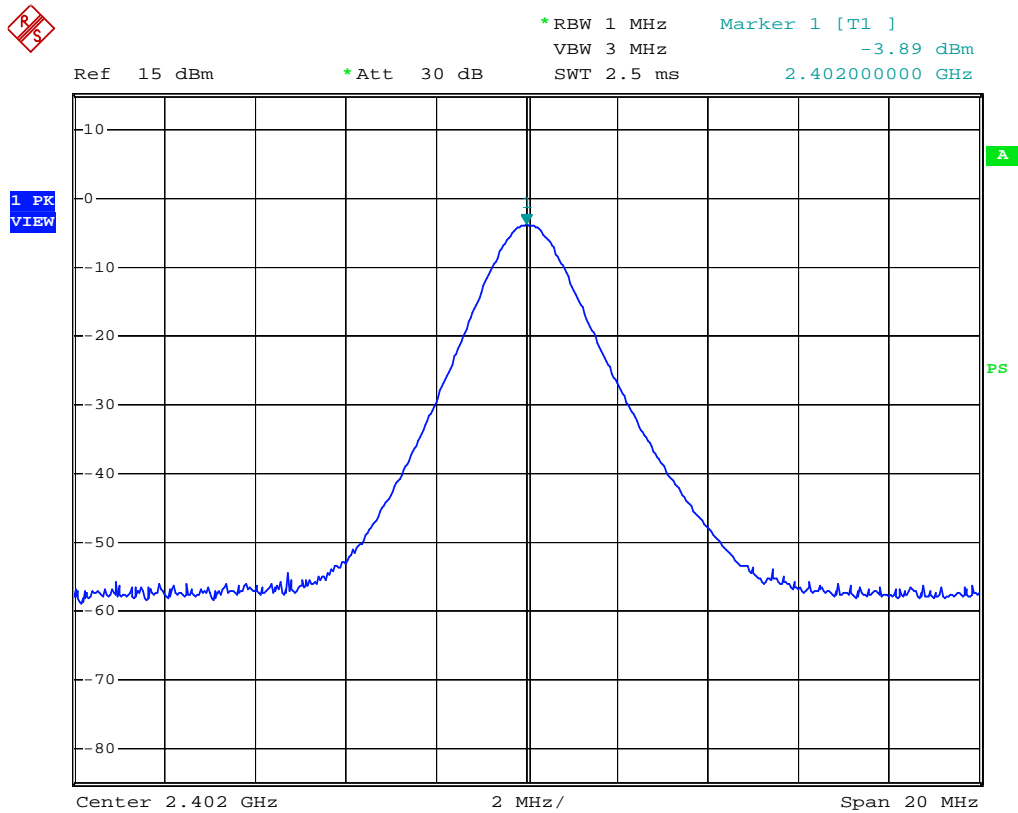
*The testing was performed by Lisa Zhu on 2007-01-05.*

*Test mode: Transmitting*

Channel	Channel Frequency (MHz)	Power Output		Limit (w)
		(dBm)	(w)	
Low	2402	-3.89	0.000408	1
Mid	2441	-3.21	0.000477	1
High	2480	-4.71	0.000338	1

**Test Result:** Pass; please refer to the following plots.

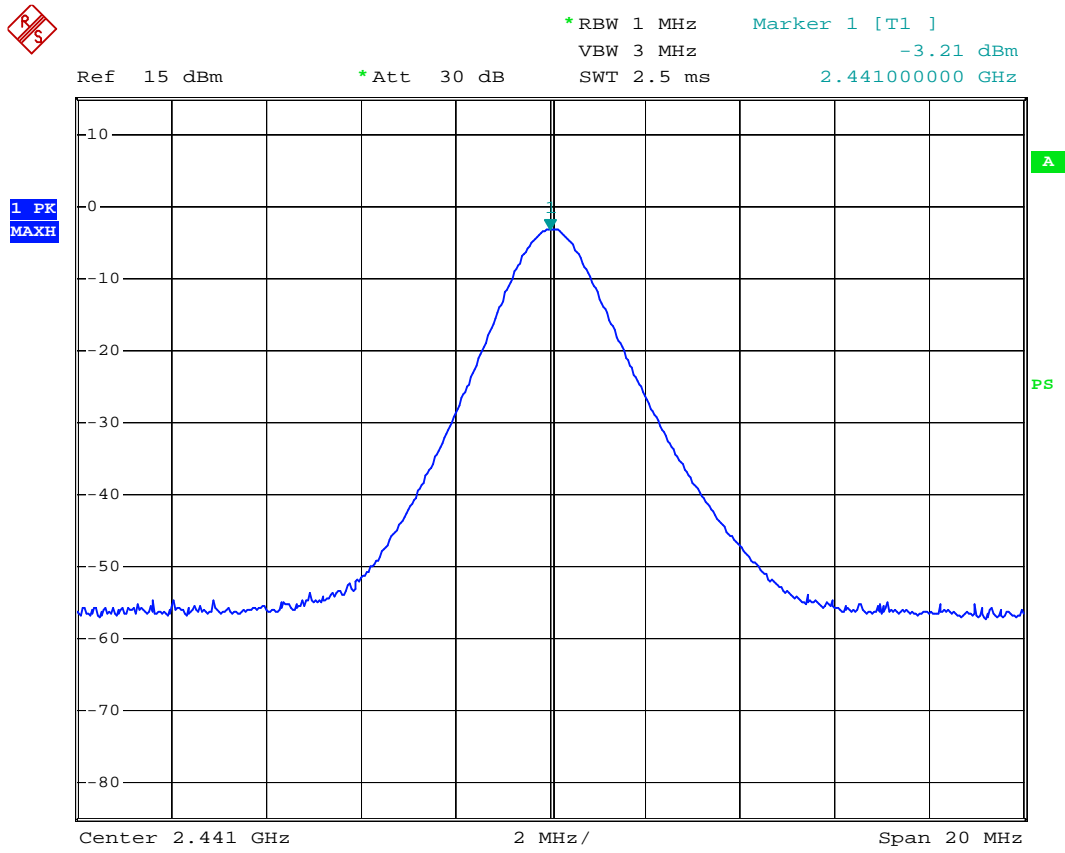
Low channel



Peak output power (low channel)

Date: 5.JAN.2007 19:38:24

Middle channel



Peak output power (middle channel)

Date: 5.JAN.2007 19:37:34



High channel

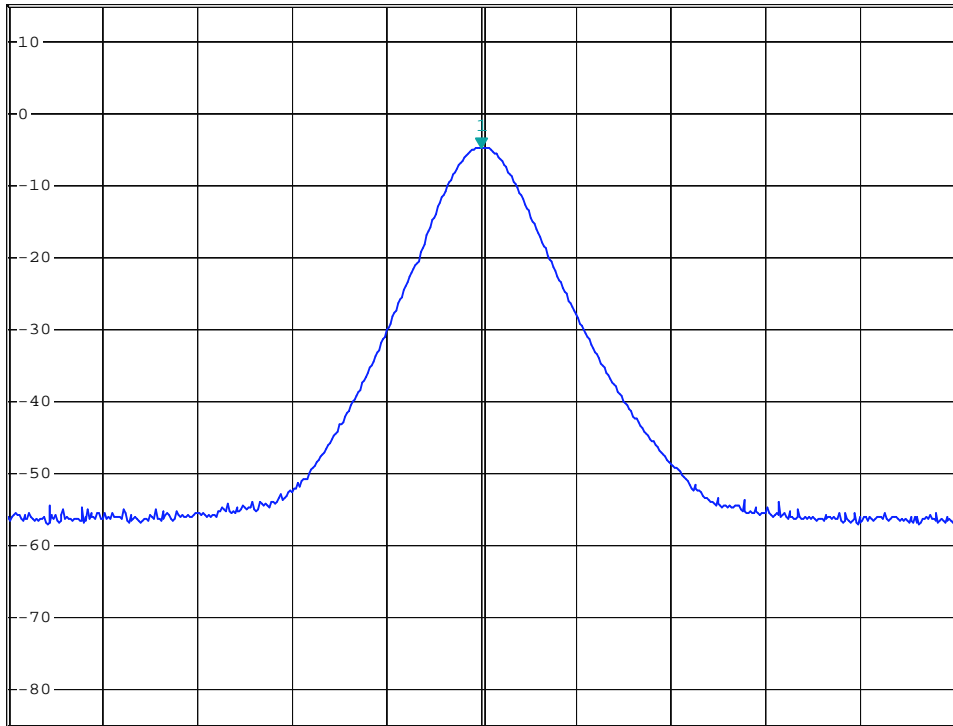


\*RBW 1 MHz      Marker 1 [T1 ]  
VBW 3 MHz      -4.71 dBm  
SWT 2.5 ms      2.480000000 GHz

Ref 15 dBm

\*Att 30 dB

1 PK  
MAXH



Center 2.48 GHz

2 MHz/

Span 20 MHz

Peak output power (high channel)

Date: 5.JAN.2007 19:36:37

## §15.247(d) - BAND EDGES TESTING

### 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	100035	2006-09-29	2007-09-29

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### 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 both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz 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:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009mbar

*The testing was performed by Lisa Zhu on 2007-01-05.*

*Test Mode: Transmitting*

Frequency MHz	Emission (dBuV/m)	Limit (§15.209) (dBuV/m)
2399.9	43.43	54
2483.6	41.99	54

**Test Result:** Pass