



NVLAP LAB CODE 200707-0



# FCC PART 15 SUBPART C MEASUREMENT AND TEST REPORT

For

## Scosche Industries, Inc.

P.O. Box 2901 Oxnard, CA 93034

**FCC ID: IKQBTHP**

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Bluetooth HeadPhones
<b>Test Engineer:</b> Andy Yan <i>Andy Yan</i> Lisa Zhu <i>Lisa Zhu</i>	
<b>Report Number:</b> R0611155	
<b>Test Date:</b> 2007-04-25 to 2007-04-27	
<b>Report Date:</b> 2007-04-29	
<b>Reviewed By:</b> EMC Manager: Boni Baniqued <i>Boni 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 Federal Government

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## GENERAL INFORMATION

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

The *Scosche Industries, Inc.*'s product, *FCC ID: IKQBTHP*, model number: *UBHP* or the "EUT" as referred to in this report is marketed as *Universal Wireless Bluetooth Headphones*. The EUT is designed for home use in conjunction with either an iPod® or any music player featuring a mini phono type output jack. It is powered by a lithium ion battery pack that is recharged via USB connection to 5 VDC provided from PC/laptop. The EUT will receive or "pair"(silmulantious hopping communication) with any bluetooth audio transmitter employing Bluetooth V1.2 supporting A2DP profile.



### Mechanical Description

The Scosche Industries, Inc. product *FCC ID: IKQBTHP* are frequency hopping Bluetooth Headphones which measure approximately: 16.0 cm L x 11.0 cm W x 3.0 cm H, rated input voltage: 5V (from PC USB).

*\* The test data gathered are from production sample, serial number: 061114. Provided by the manufacturer, the EUT was received on 2006-11-15.*

### 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>

## SYSTEM TEST CONFIGURATION

### 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

N/A

### 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.

### 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	N/A	CN-0N8893-69802-54Q-02P0	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

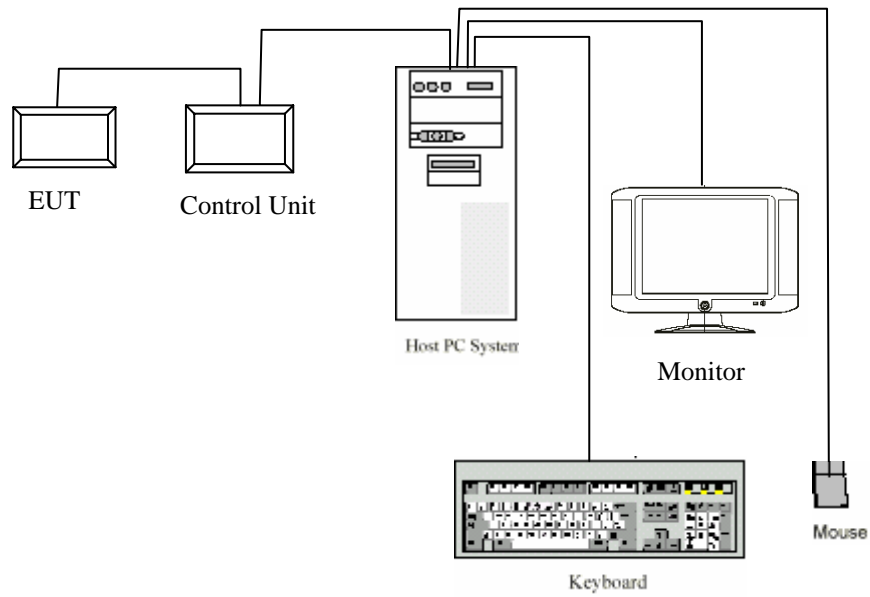
### Local Support Equipment List and Details

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	N/A	DoC

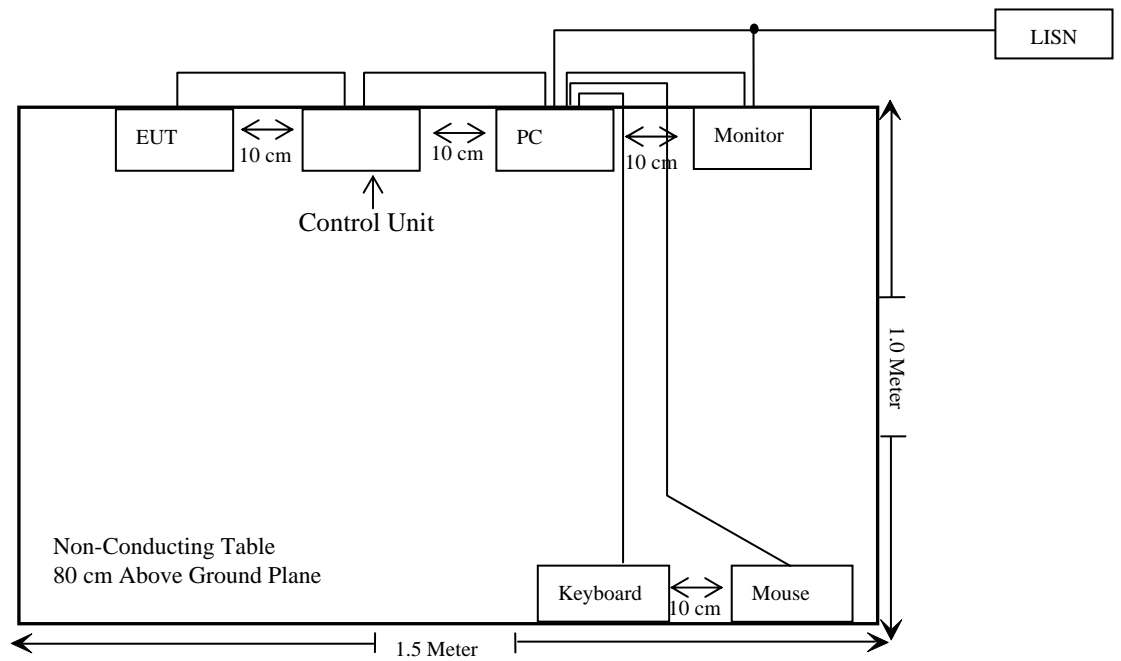
**External I/O Cable**

<b>Cable Description</b>	<b>Length (M)</b>	<b>From/Port</b>	<b>To</b>
Shielded Detachable Keyboard Cable	1.50	Keyboard Port / Host	Keyboard
Shielded Detachable Mouse Cable	1.50	PS/2 Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port/Host	Monitor
Shielded Detachable USB Cable	1.20	Control Unit	PC
Shielded Detachable Serial Cable	1.50	Control Unit	PC
Unshielded Undetachable Control Cable	0.10	Control Unit	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 Test	Compliant
§15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
§15.247(b)(1)	Peak Output Power Measurement	Compliant
§15.247(d)	Band-Edge Test	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 0.001072 W which was under the requirement of 10 mW it exempt the RF Exposure Requirement.

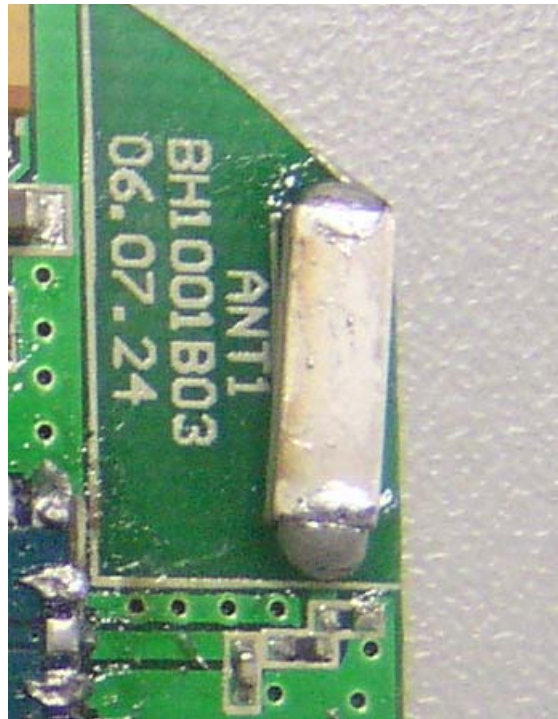
## §15.203 - ANTENNA REQUIREMENT

### 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 Equipment has an integrally attached antenna which cannot be accessed or replaced by the end user and is permanently affixed to the EUT PCB. The antenna is in accordance to section 15.203, which is considered sufficient to comply with the provisions of this section. Please see photo below



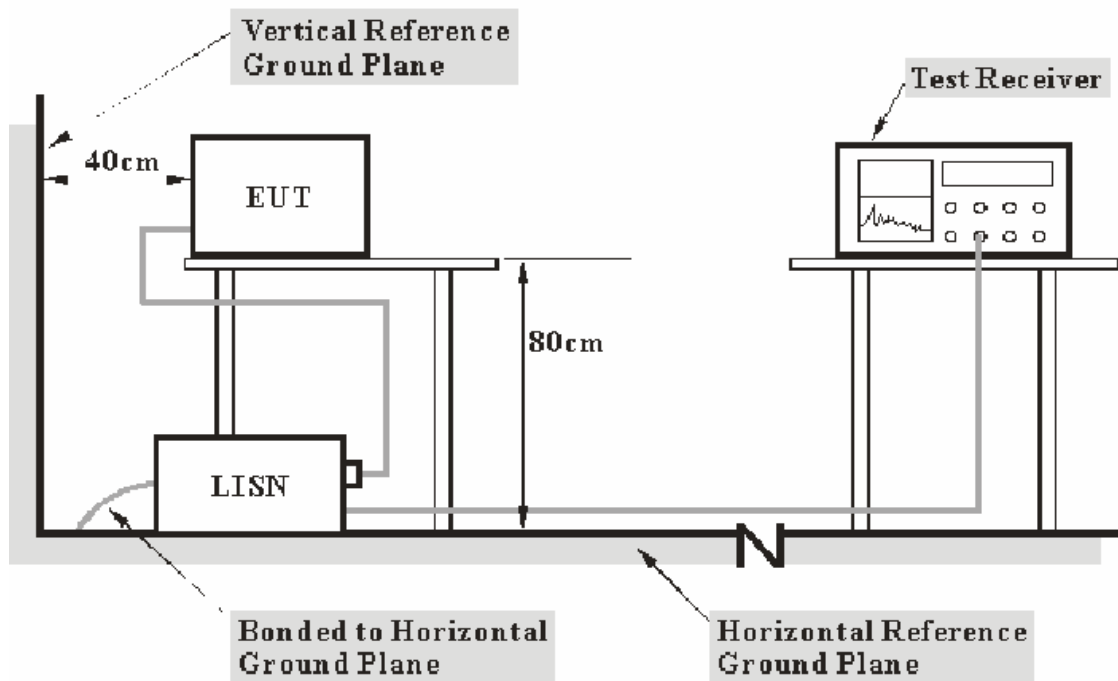
## §15.207 (a)- CONDUCTED EMISSIONS

### 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 host PC was connected to a 120 VAC/60 Hz power source and the EUT drew 5 VDC from the PC's USB port.

## 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:

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

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12008	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-26	2008-03-26

\* 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:

**10.10 dB at 15.360 MHz** in the **Live** conductor mode.

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

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Andy Yan on 2007-04-27

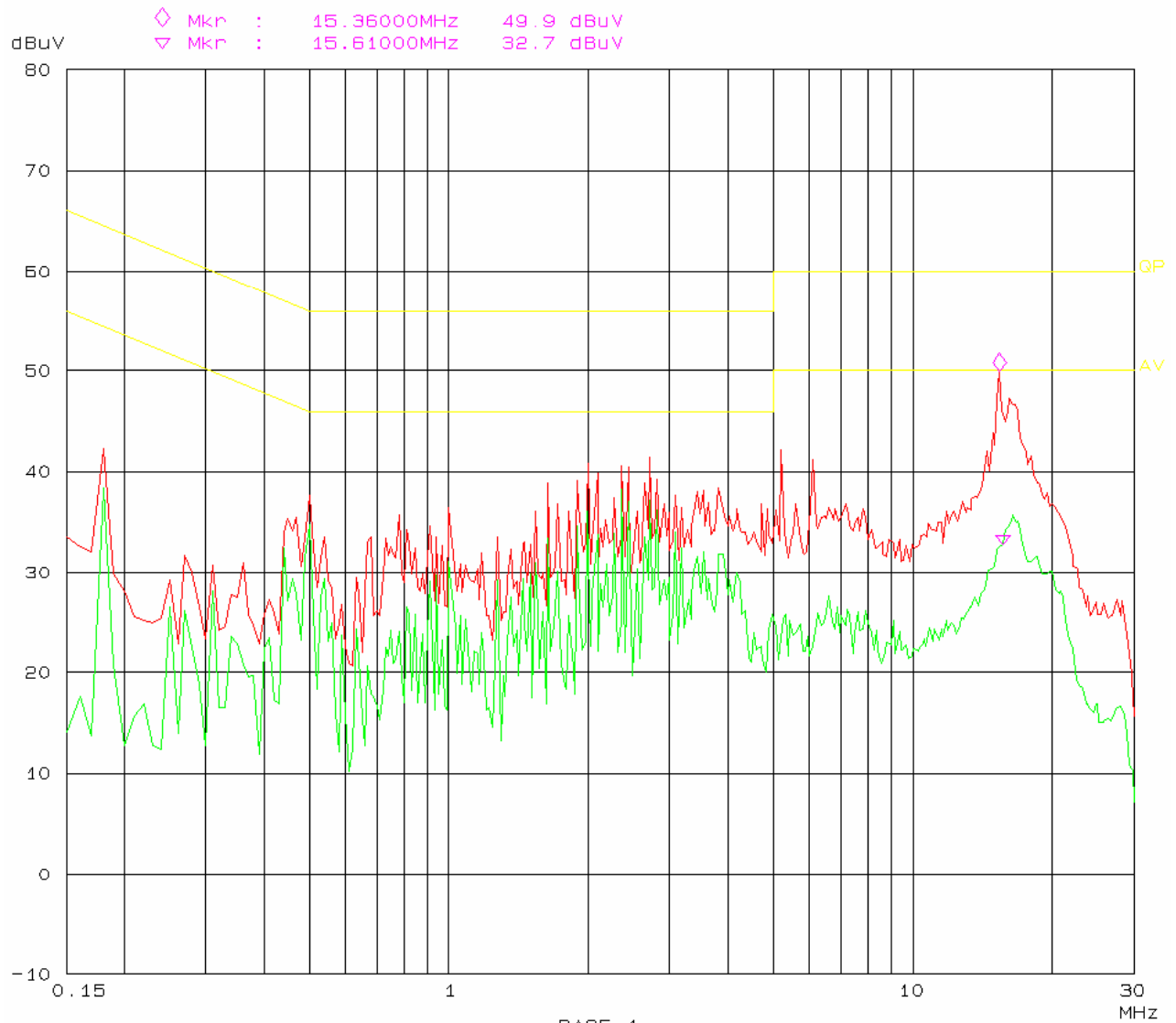
Test Mode: Charging

Frequency MHz	LINE CONDUCTED EMISSIONS			FCC PART 15 CLASS B	
	Amplitude dB $\mu$ V	Detector QP/AV	Phase Live/Neutral	Limit dB $\mu$ V	Margin dB
15.360	49.90	QP	Live	60.00	10.10
0.500	34.80	AV	Live	46.00	11.20
5.600	47.60	QP	Neutral	60.00	12.40
0.180	41.20	AV	Neutral	54.49	13.29
15.540	46.50	QP	Neutral	60.00	13.50
1.000	31.00	AV	Neutral	46.00	15.00
1.000	31.00	AV	Live	46.00	15.00
2.000	40.80	QP	Live	56.00	15.20
5.200	44.60	QP	Neutral	60.00	15.40
0.180	38.40	AV	Live	54.49	16.09
15.610	32.70	AV	Live	50.00	17.30
5.180	42.20	QP	Live	60.00	17.80
0.500	37.60	QP	Live	56.00	18.40
1.000	36.50	QP	Live	56.00	19.50
0.470	26.30	AV	Neutral	46.51	20.21
15.600	29.40	AV	Neutral	50.00	20.60
0.470	35.90	QP	Neutral	56.51	20.61
0.180	43.50	QP	Neutral	64.49	20.99
0.180	42.20	QP	Live	64.49	22.29
12.000	36.90	QP	Neutral	60.00	23.10
2.020	22.70	AV	Live	46.00	23.30
5.260	24.60	AV	Neutral	50.00	25.40
5.620	24.60	AV	Neutral	50.00	25.40
5.170	23.40	AV	Live	50.00	26.60

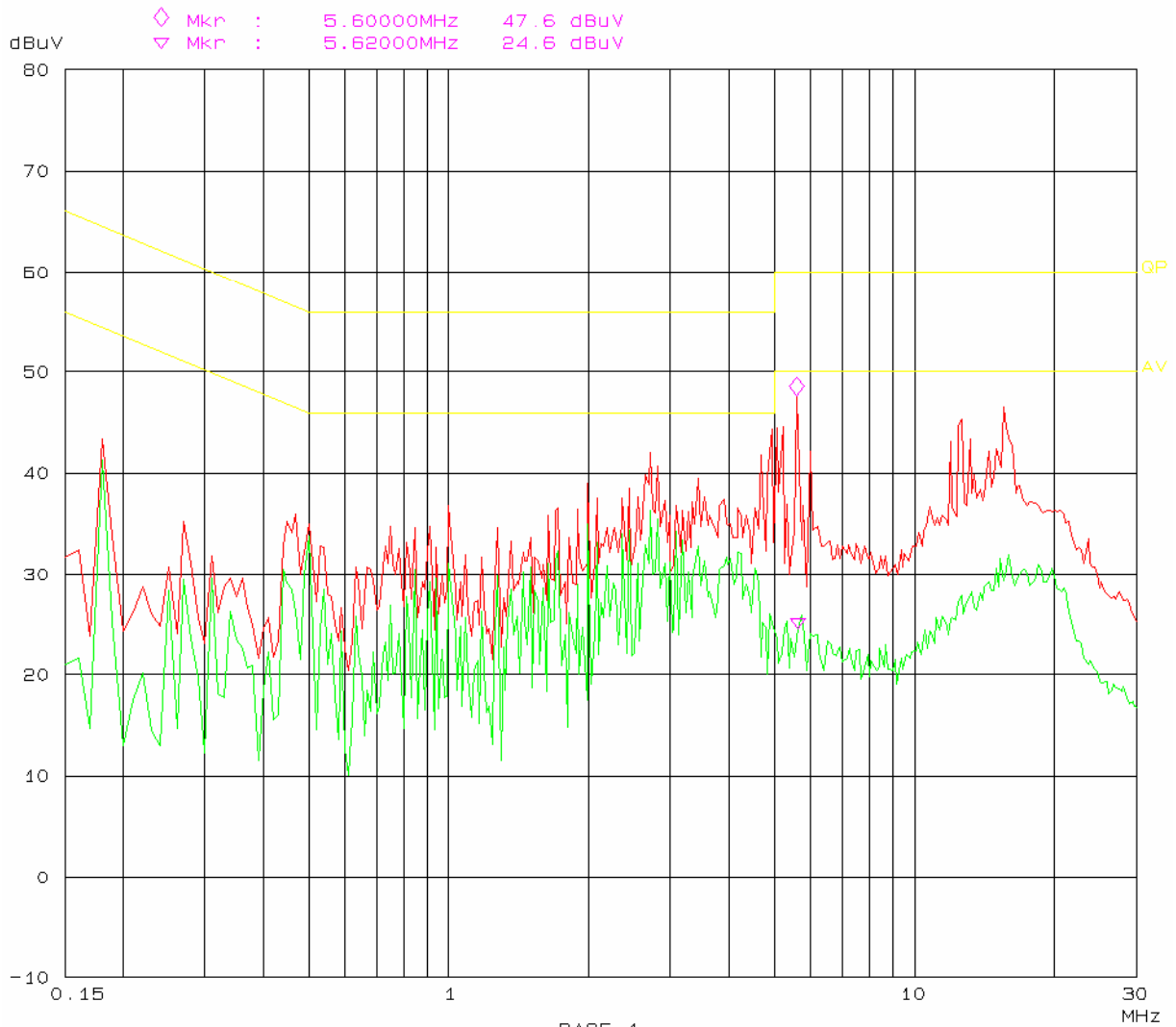
**Plot(s) of Test Data**

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

EUT: Bluetooth HeadPhone  
Manuf: Scosche  
Op Cond: charging  
Operator: Andy  
Test Spec: AC 120V/60Hz L  
Comment: Temp: 25°C Humi: 56%



EUT: Bluetooth HeadPhone  
Manuf: Scosche  
Op Cond: charging  
Operator: Andy  
Test Spec: AC 120V/60Hz N  
Comment: Temp: 25°C Humi: 56%





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

### Applicable Standard

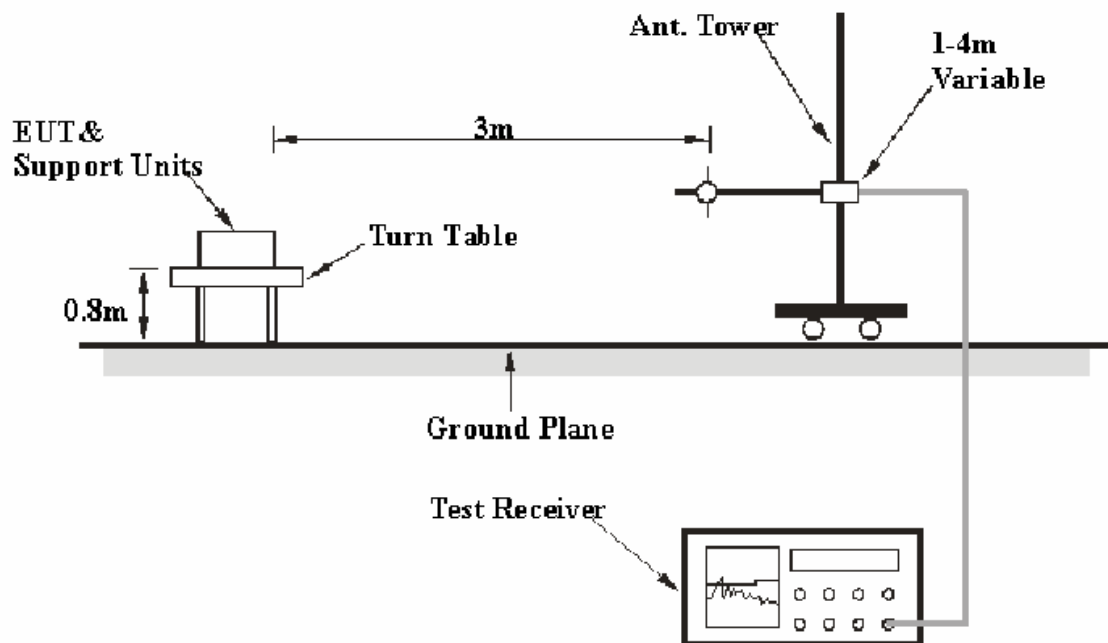
According to FCC §15.247 (d)

### 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 spacing between the peripherals was 10 cm.

The host PC was connected to a 120 VAC/60 Hz power source and the EUT drew 5 VDC from the PC's USB port.

## 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 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.

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:

- 5.14 dB** at **7206 MHz** in the **Horizontal** polarization, for Low Channel (Above 1 GHz)
- 5.45 dB** at **7323 MHz** in the **Horizontal** polarization, for Middle Channel (Above 1 GHz)
- 4.98 dB** at **7440 MHz** in the **Horizontal** polarization, for High Channel (Above 1 GHz)
- 6.2 dB** at **797.898225MHz** in the **Horizontal** polarization for FCC 15.209

## Test Data

### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52 %
ATM Pressure:	100.9 kPa

The testing was performed by Lisa Zhu on 2007-04-27.

Test Mode: Transmitting (Above 1GHz)

Low Channel:

Frequency MHz	Meter Reading dBuV	Detector PK/QP/AV	Direction Degree	Height Meter	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier Gain dB	Corr. Ampl. dBuV/m	FCC Part 15.247		
										Limit dBuV/m	Margin dB	Remarks
2402	92.33	PK	20	1.2	H	30.6	3.61	35	91.54			fundamental
2402	91.56	AV	263	1.4	H	30.6	3.61	35	90.77			fundamental
2402	94.67	PK	18	1.6	V	30.6	3.61	35	93.88			fundamental
2402	93.99	AV	45	1.0	V	30.6	3.61	35	93.20			fundamental
7206	38.95	AV	261	1.0	H	39.1	4.51	33.7	48.86	54	5.14	harmonic
7206	39.48	AV	90	1.2	V	37.8	4.51	33.7	48.09	54	5.91	harmonic
4804	35.69	AV	270	1.6	H	36.0	4.64	33.4	42.93	54	11.07	harmonic
4804	34.61	AV	180	1.6	V	35.0	4.64	33.4	40.85	54	13.15	harmonic
7206	47.10	PK	180	1.3	H	39.1	4.51	33.7	57.01	74	16.99	harmonic
7206	47.33	PK	180	1.0	V	37.8	4.51	33.7	55.94	74	18.06	harmonic
4804	44.17	PK	49	1.2	H	36.0	4.64	33.4	51.41	74	22.59	harmonic
4804	43.67	PK	250	1.0	V	35.0	4.64	33.4	49.91	74	24.09	harmonic

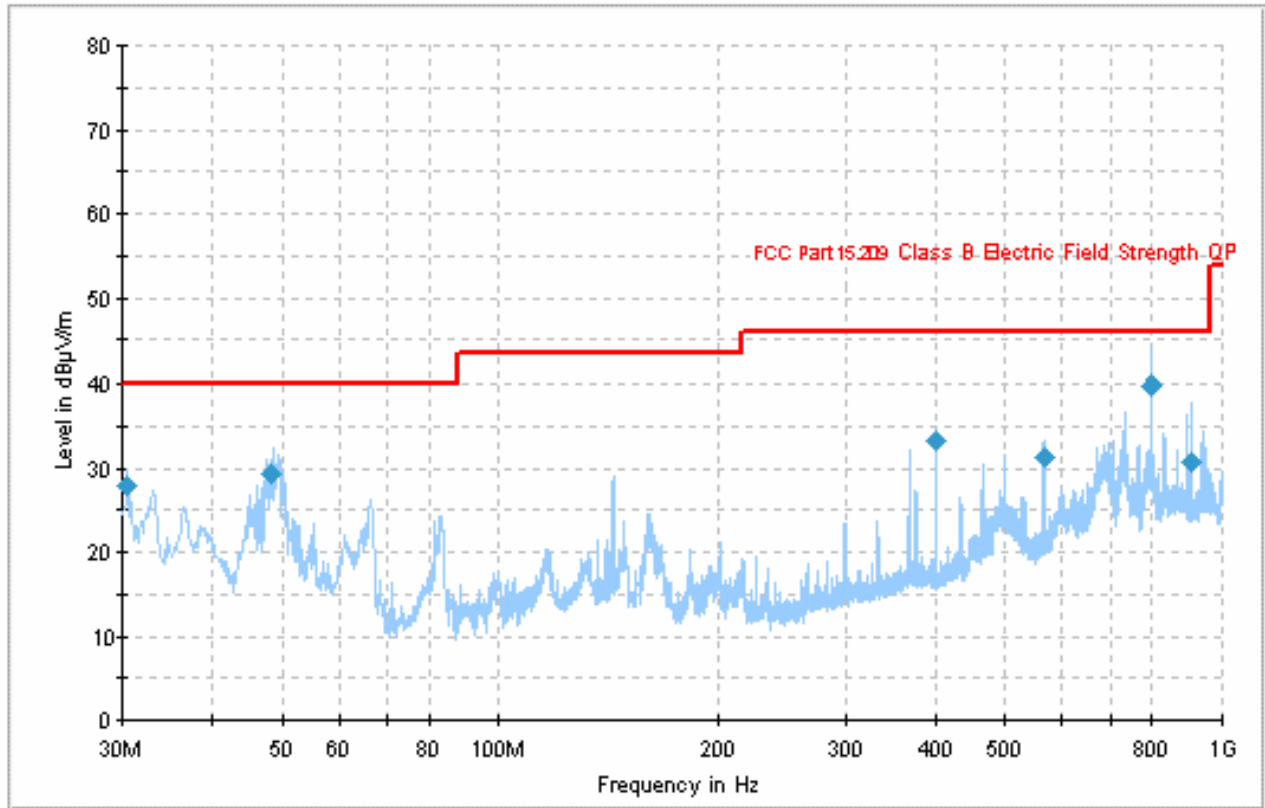
## Middle Channel:

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.247		
										Limit	Margin	Remarks
MHz	dBuV	PK/QP/AV	Degrees	Meters	H / V	dB	dB	dB	dBuV/m	dBuV/m	dB	Remarks
2441	88.17	PK	197	1.6	H	30.6	3.61	35	87.38			fundamental
2441	87.55	AV	197	1.6	H	30.6	3.61	35	86.76			fundamental
2441	92.50	PK	182	1.2	V	30.6	3.61	35	91.71			fundamental
2441	91.96	AV	182	1.2	V	30.6	3.61	35	91.17			fundamental
7323	38.64	AV	45	1.0	H	39.1	4.51	33.7	48.55	54	5.45	harmonic
7323	38.11	AV	90	1.2	V	37.8	4.51	33.7	46.72	54	7.28	harmonic
4882	34.15	AV	109	1.2	H	36.0	4.64	33.4	41.39	54	12.61	harmonic
4882	34.58	AV	180	1.6	V	35.0	4.64	33.4	40.82	54	13.18	harmonic
7323	47.33	PK	180	1.0	H	39.1	4.51	33.7	57.24	74	16.76	harmonic
7323	47.17	PK	90	1.2	V	37.8	4.51	33.7	55.78	74	18.22	harmonic
4882	43.33	PK	109	1.2	H	36.0	4.64	33.4	50.57	74	23.43	harmonic
4882	43.67	PK	45	1.0	V	35.0	4.64	33.4	49.91	74	24.09	harmonic

## High Channel:

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier Gain	Corr. Ampl.	FCC Part 15.247		
										Limit	Margin	Remarks
MHz	dBuV	PK/QP/AV	Degrees	Meters	H / V	dB	dB	dB	dBuV/m	dBuV/m	dB	Remarks
2480	88.10	PK	197	1.6	H	30.6	3.61	35	87.31			fundamental
2480	87.31	AV	197	1.6	H	30.6	3.61	35	86.52			fundamental
2480	90.01	PK	182	1.2	V	30.6	3.61	35	89.22			fundamental
2480	89.21	AV	182	1.2	V	30.6	3.61	35	88.42			fundamental
7440	39.11	AV	45	1.0	H	39.1	4.51	33.7	49.02	54	4.98	harmonic
7440	38.55	AV	90	1.2	V	37.8	4.51	33.7	47.16	54	6.84	harmonic
4960	36.88	AV	180	1.6	V	35.0	4.64	33.4	43.12	54	10.88	harmonic
4960	35.16	AV	109	1.2	H	36.0	4.64	33.4	42.40	54	11.6	harmonic
7440	47.01	PK	180	1.0	H	39.1	4.51	33.7	56.92	74	17.08	harmonic
7440	47.17	PK	90	1.2	V	37.8	4.51	33.7	55.78	74	18.22	harmonic
4960	44.33	PK	109	1.2	H	36.0	4.64	33.4	51.57	74	22.43	harmonic
4960	45.02	PK	45	1.0	V	35.0	4.64	33.4	51.26	74	22.74	harmonic

Test Mode: Transmitting



Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
797.898225	39.8	101.0	H	225.0	-1.2	46.0	6.2
48.301875	29.4	147.0	V	260.0	-17.0	40.0	10.6
30.444800	28.0	129.0	V	129.0	-5.1	40.0	12.0
400.941325	33.3	202.0	H	123.0	-7.6	46.0	12.7
907.059825	30.7	113.0	V	220.0	0.1	46.0	15.3
565.329250	31.4	100.0	H	5.0	-5.0	46.0	15.6

## §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:	100.9 kPa

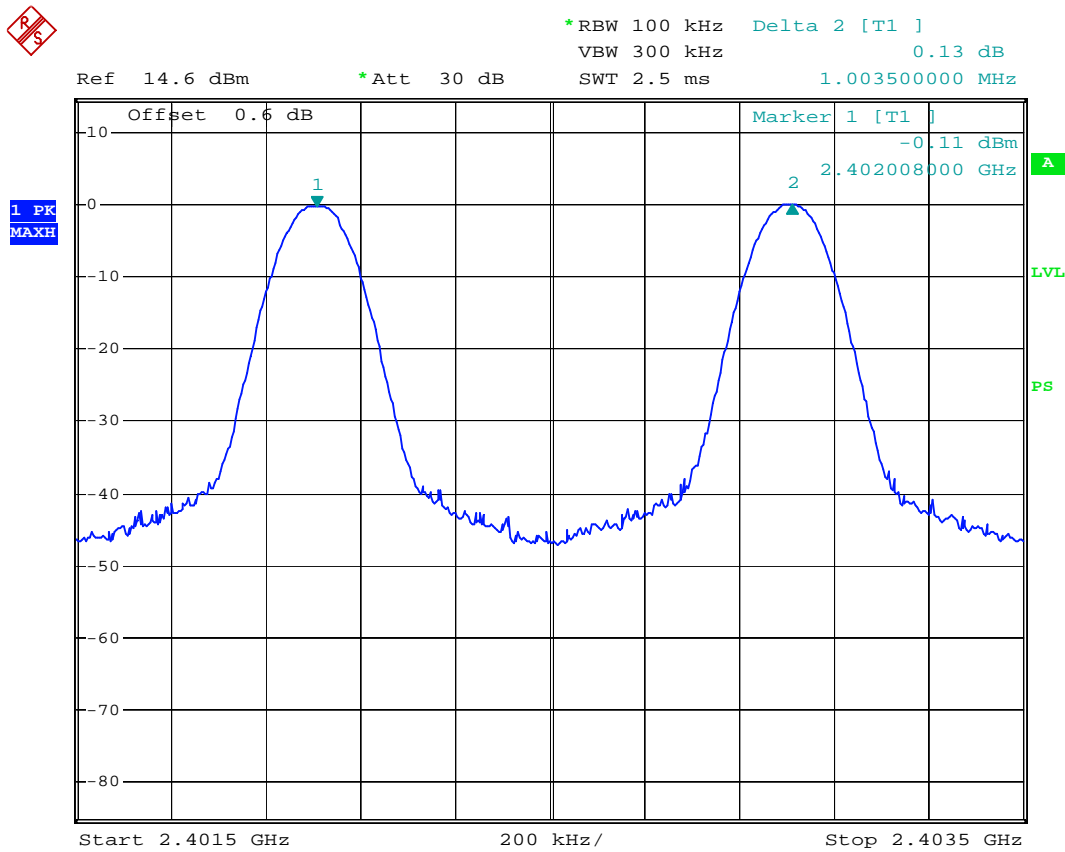
*The testing was performed by Lisa Zhu on 2007-04-25.*

Test mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (KHz)	Limit (kHz)	Result
Low Channel	2402	1003.50	182.67	Compliant
Adjacency Channel	2403			
Mid Channel	2441	1000.00	182.67	Compliant
Adjacency Channel	2442			
High Channel	2480	1000.00	181.33	Compliant
Adjacency Channel	2479			

Test result: Compliant, Please refer to the following plots

Low channel:



channel separation low channel

Date: 25.APR.2007 11:26:45

Middle channel:

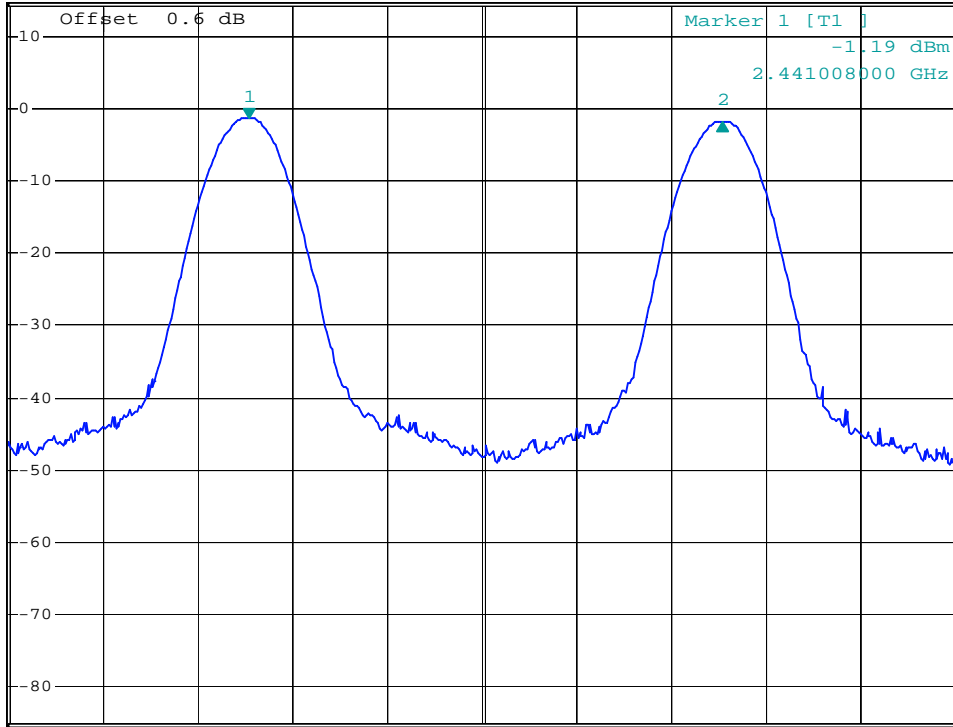


\*RBW 100 kHz Delta 2 [T1 ]  
VBW 300 kHz -0.49 dB  
SWT 2.5 ms 1.000000000 MHz

Ref 14.6 dBm

\*Att 30 dB

1 PK  
MAXH



Start 2.4405 GHz 200 kHz/ Stop 2.4425 GHz

channel separation mid channel

Date: 25.APR.2007 11:30:47



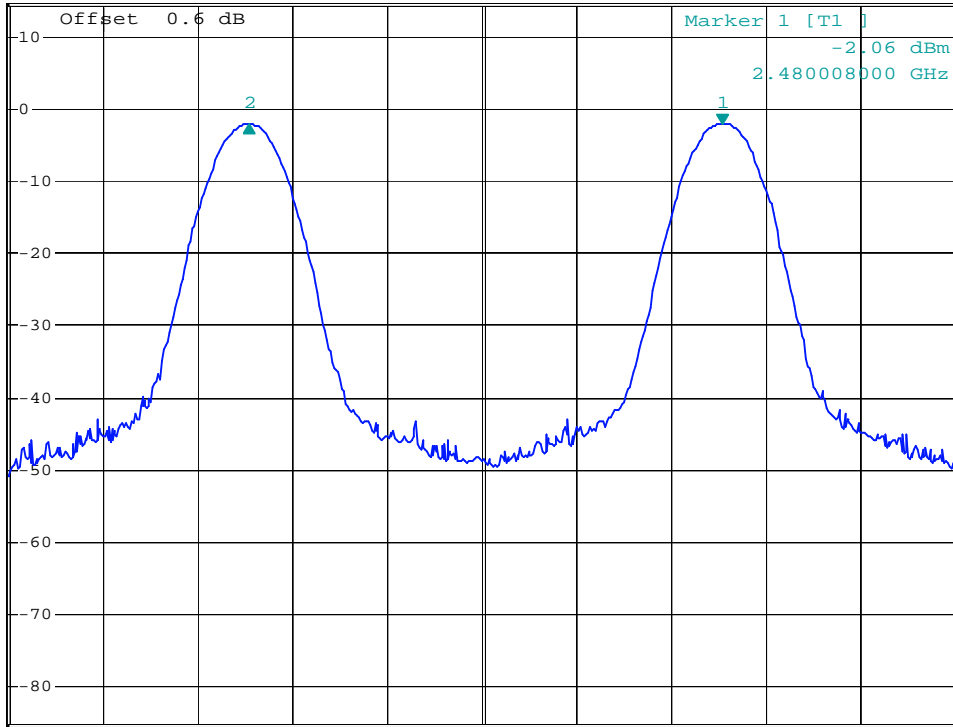
High channel:



\*RBW 100 kHz Delta 2 [T1 ]  
VBW 300 kHz -0.06 dB  
SWT 2.5 ms -1.000000000 MHz

Ref 14.6 dBm \*Att 30 dB

1 PK VIEW



Start 2.4785 GHz 200 kHz/ Stop 2.4805 GHz

channel separation high channel

Date: 25.APR.2007 11:34:26

## §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:	100.9 kPa

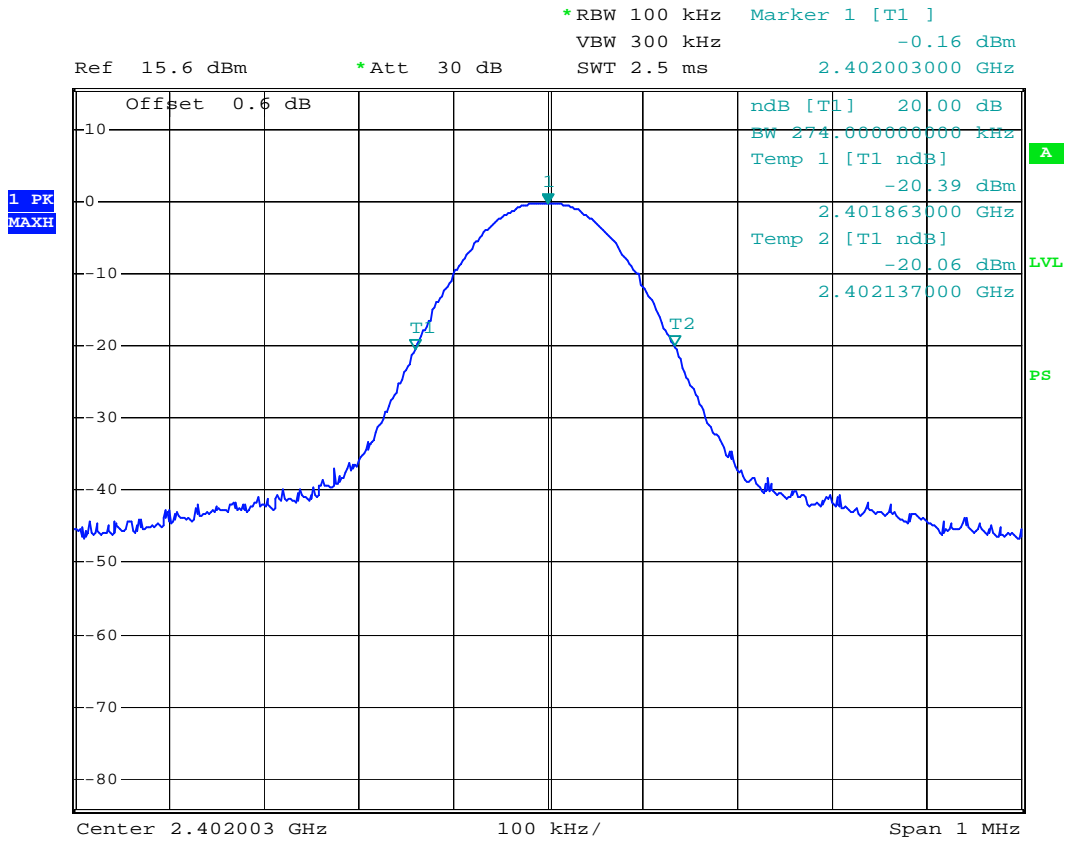
*The testing was performed by Lisa Zhu on 2007-04-23.*

*Test Mode: Transmitting*

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low Channel	2402	274
Mid Channel	2441	274
High Channel	2480	272

**Test result:** Compliant, Please refer to the following plots

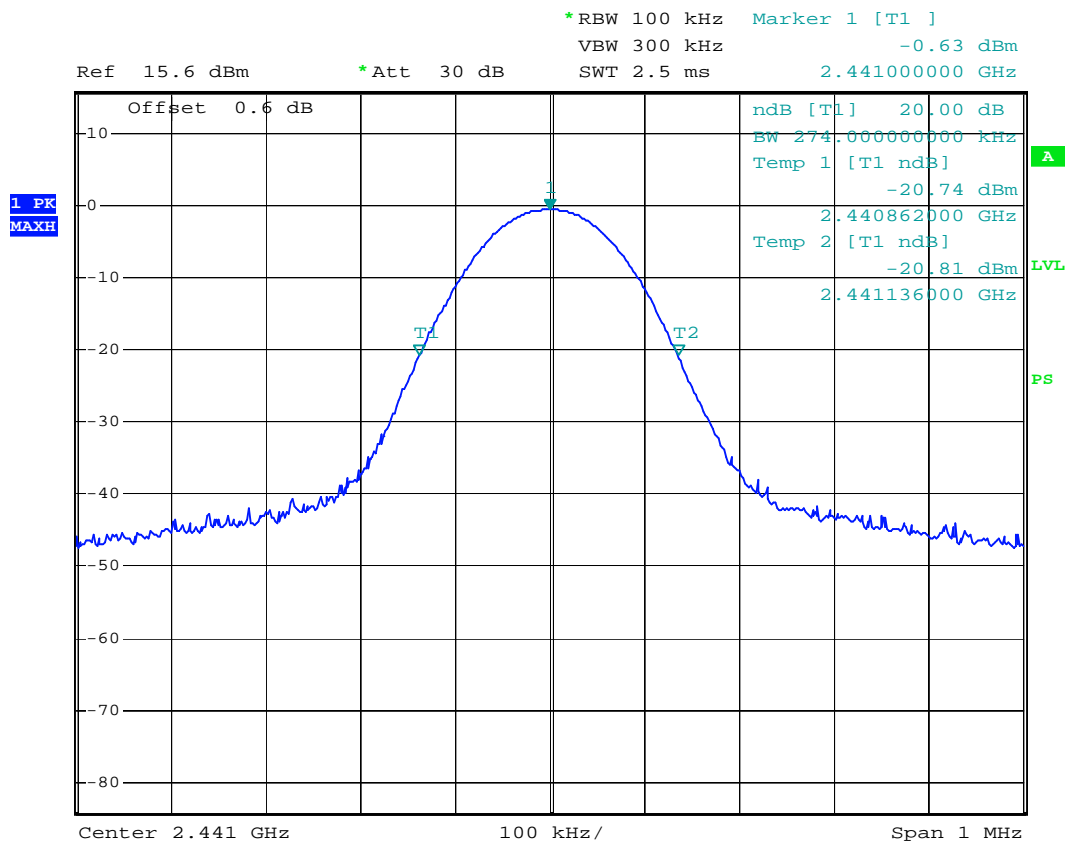
Low channel:



20dB BANDWIDTH -LOW CHANNEL

Date: 23.APR.2007 18:05:29

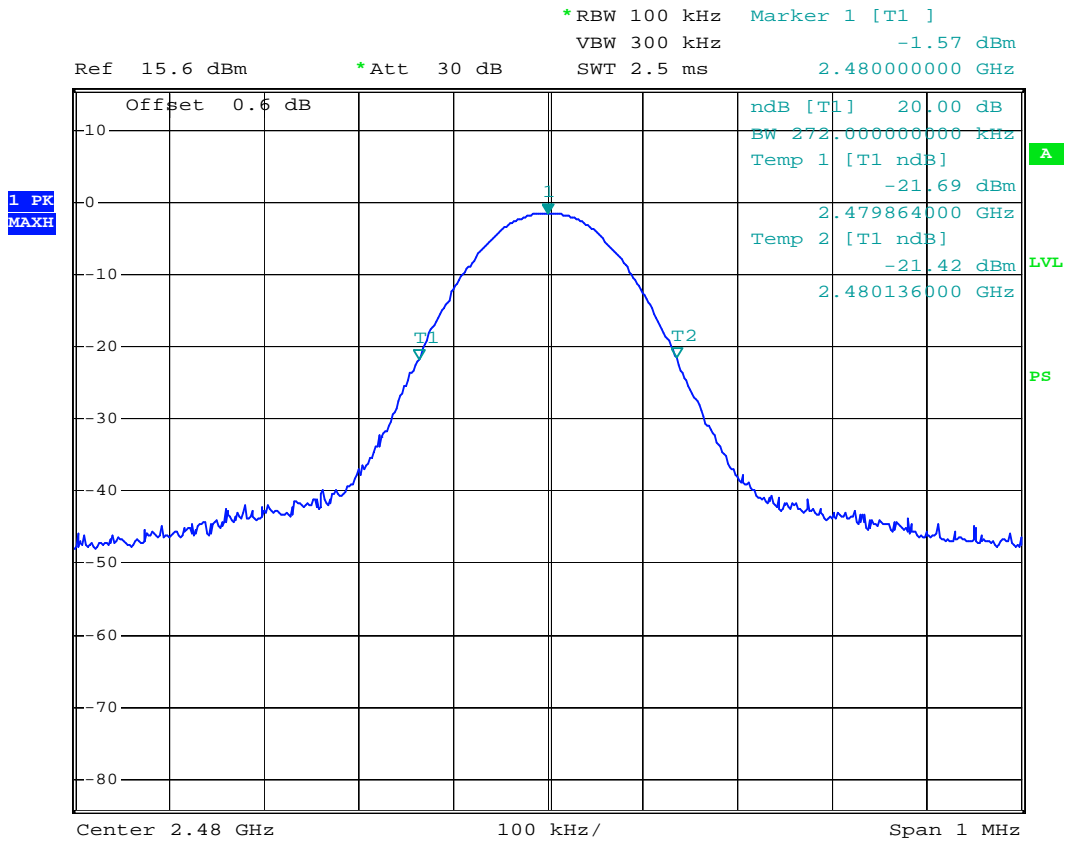
Middle channel:



20dB BANDWIDTH -MID CHANNEL

Date: 23.APR.2007 18:07:10

High channel:



20dB BANDWIDTH -HIGH CHANNEL

Date: 23.APR.2007 18:08:45

## §15.247(a) (1) (iii)-QUANTITY 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	Quantity of Hopping Channel (CH)	Limit (CH)
2402-2480	79	>15

### Test Data

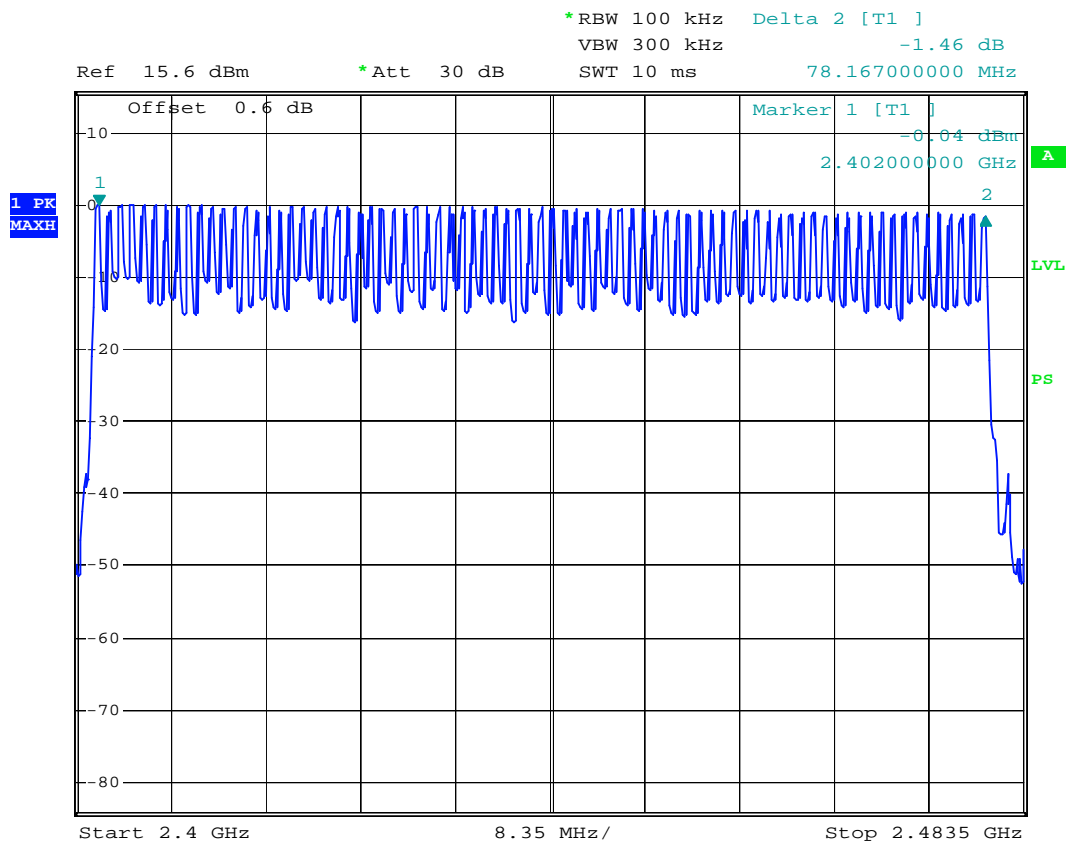
#### Environmental Conditions

Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	100.9 kPa

The testing was performed by Lisa Zhu on 2007-04-23.

Test mode: Transmitting

**Test Result:** Compliant, Please refer to the following plot



quantity of channel

Date: 23.APR.2007 18:02:24

## §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	N/A	N/A	N/A
2400-2483.5	N/A	N/A	31.6s
5725-5850	N/A	N/A	N/A

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:	100.9 kPa

*The testing was performed by Lisa Zhu on 2007-04-25.*

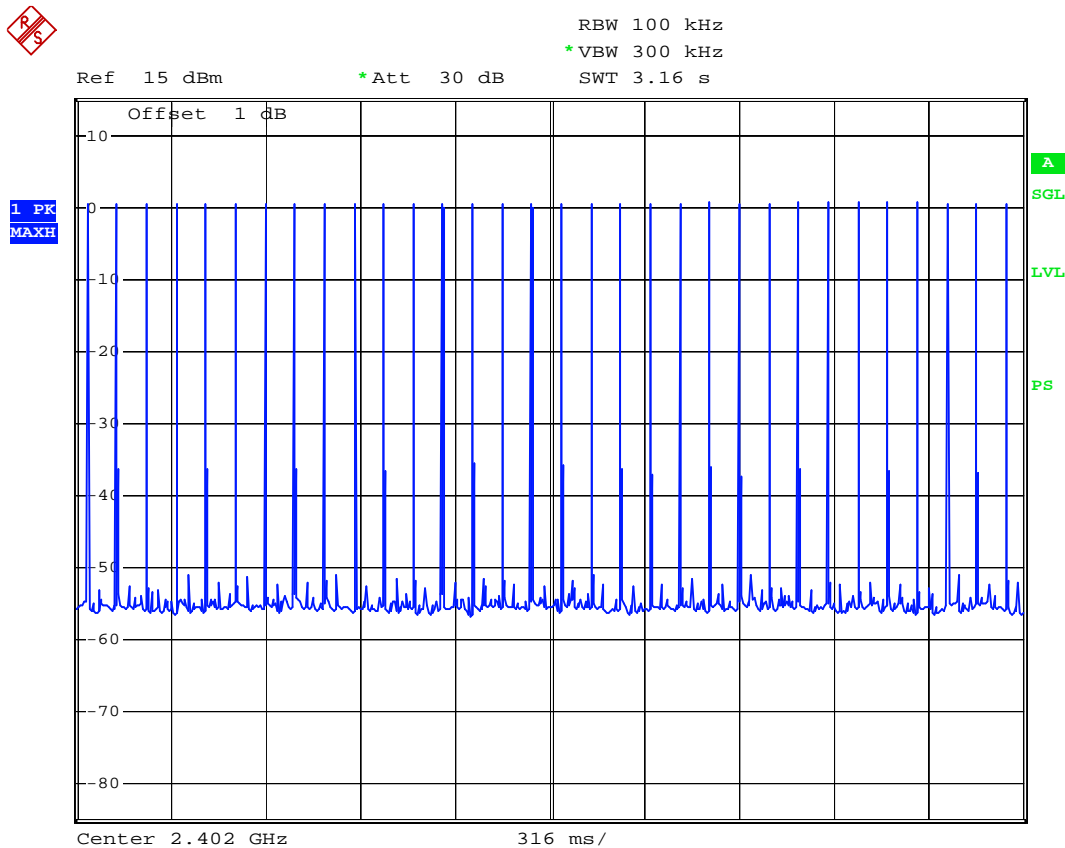
*Test mode: Transmitting*



Channel	Pulse wide (msec)	Number of Hopping Pulses in 31.6sec	Dwell time (sec)	Limit (sec)	Result
Low Channel	0.400	320	0.128	0.4	Compliant
Mid Channel	0.400	320	0.128	0.4	Compliant
High Channel	0.400	320	0.128	0.4	Compliant

**Test Result:** Compliant, Please refer to the following plots

Low channel:

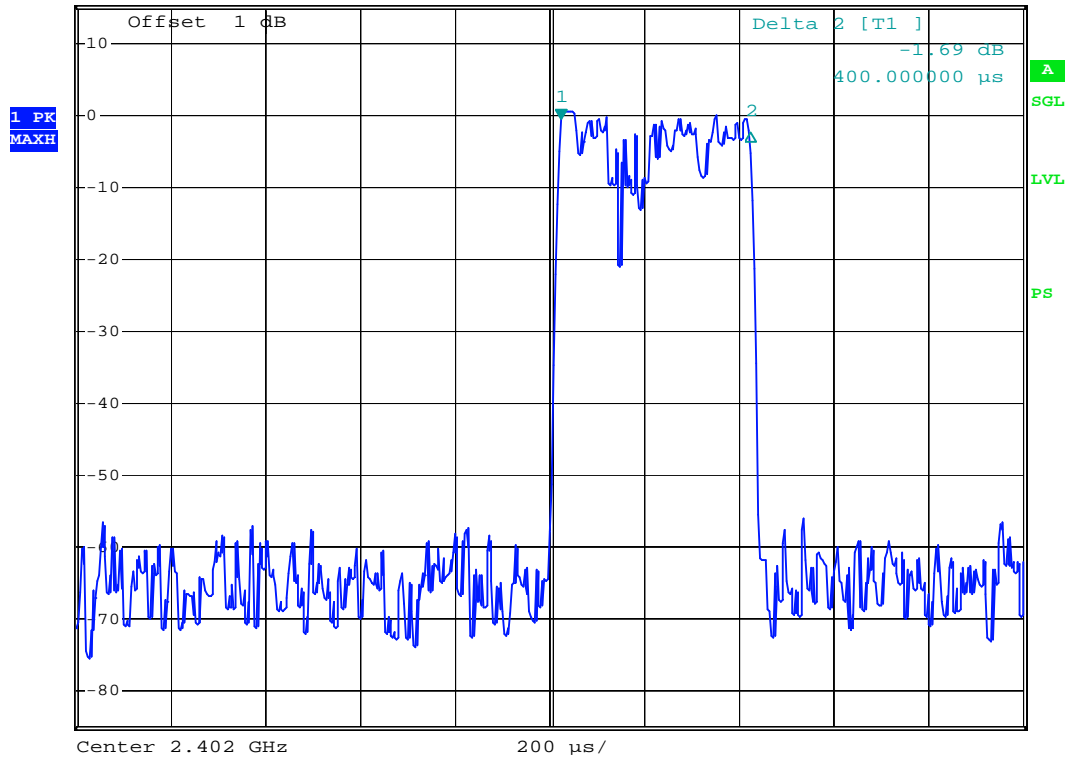


occupied time No.of pulse - low channel

Date: 25.APR.2007 11:08:42



RBW 100 kHz Marker 1 [T1 ]  
\*VBW 300 kHz -0.70 dBm  
Ref 15 dBm \*Att 30 dB SWT 2 ms 1.024000 ms



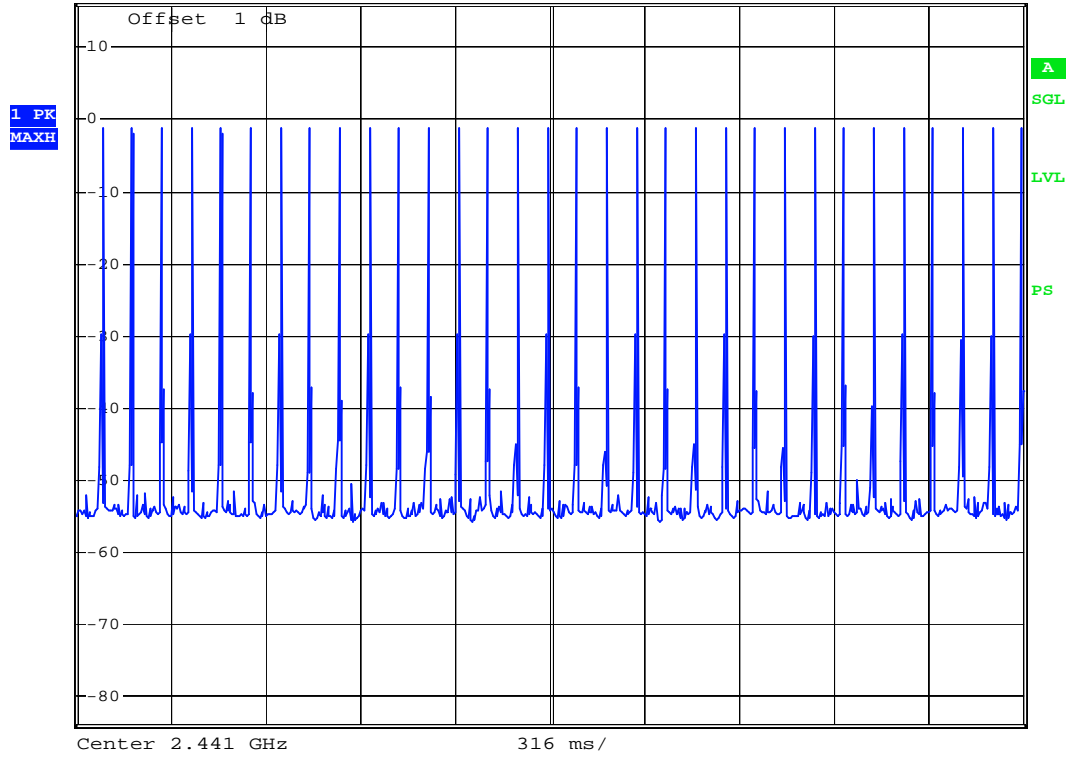
occupied time pulse width - low channel

Date: 25.APR.2007 11:11:27

Middle channel



RBW 100 kHz  
\*VBW 300 kHz  
Ref 16 dBm \*Att 30 dB SWT 3.16 s

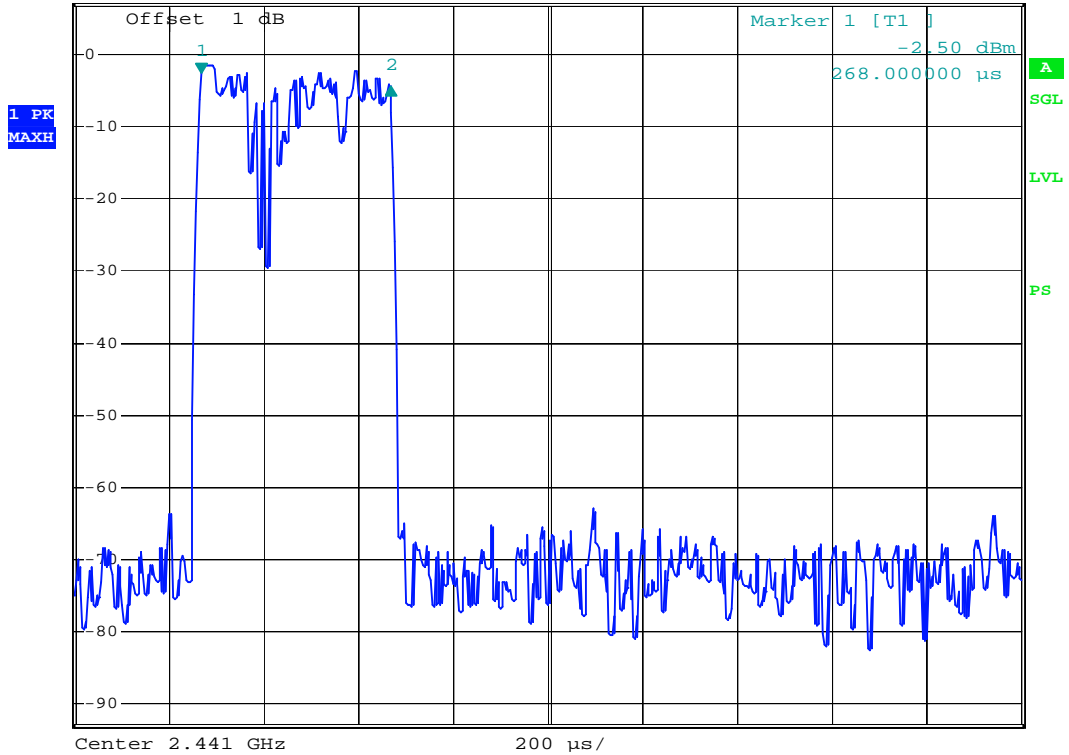


occupied time No.of pulse mid channel

Date: 25.APR.2007 10:55:51



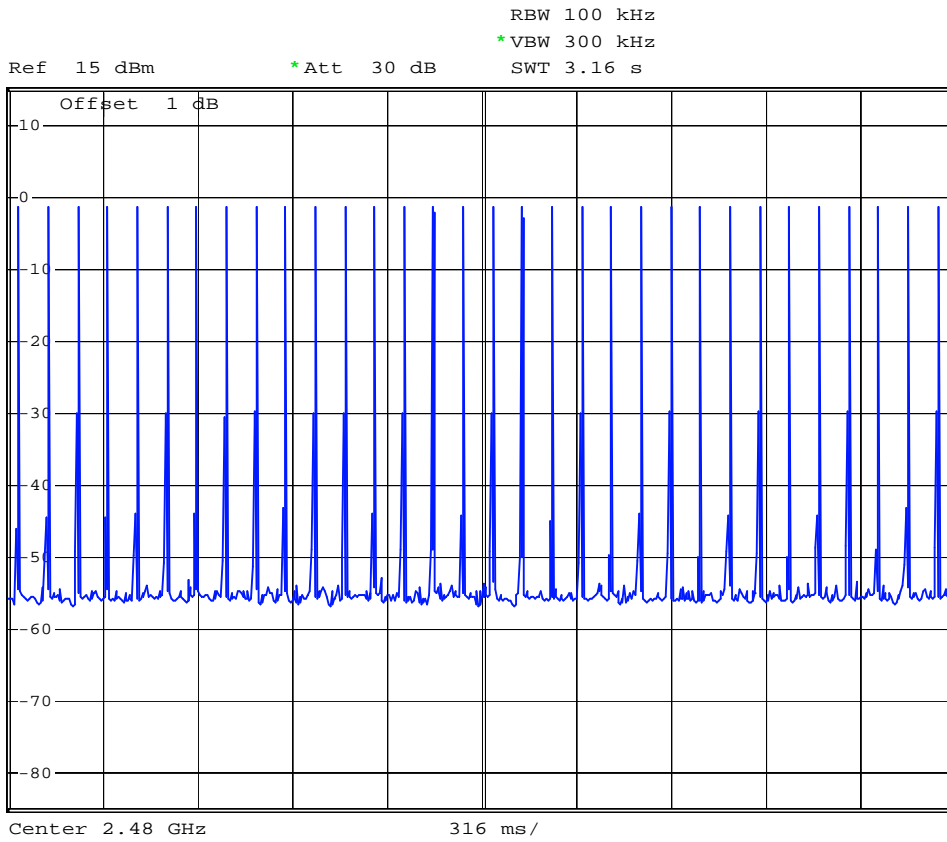
RBW 100 kHz Delta 2 [T1 ]  
\*VBW 300 kHz -2.03 dB  
Ref 7 dBm \*Att 30 dB SWT 2 ms 400.000000 μs



occupied time pulse width - mid channel

Date: 25.APR.2007 11:05:48

High channel

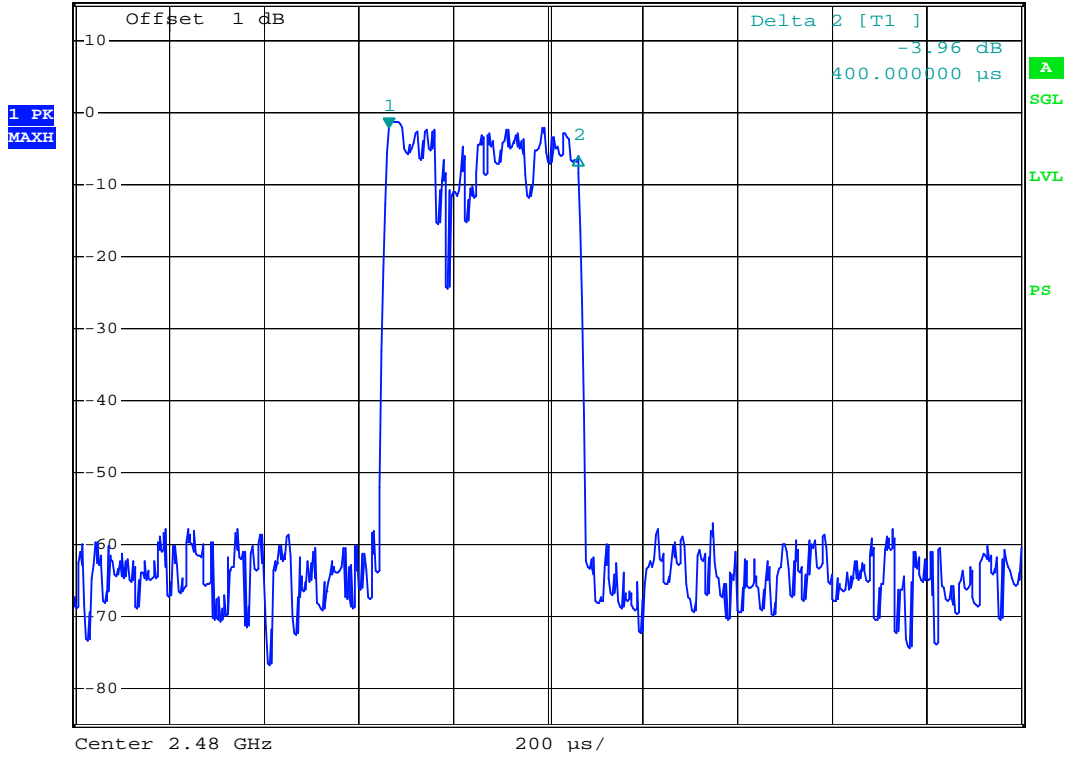


occupied time No.of pulse - high channel

Date: 25.APR.2007 11:13:15



RBW 100 kHz Marker 1 [T1 ]  
\*VBW 300 kHz -2.17 dBm  
Ref 15 dBm \*Att 30 dB SWT 2 ms 664.000000 μs



occupied time pulse width - high channel

Date: 25.APR.2007 11:14:46

## §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.

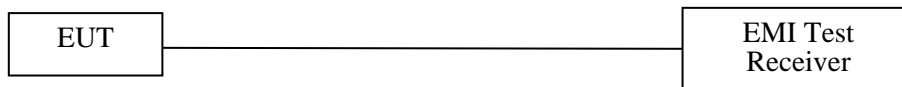
### Test Equipment List and Details

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:	100.9 kPa

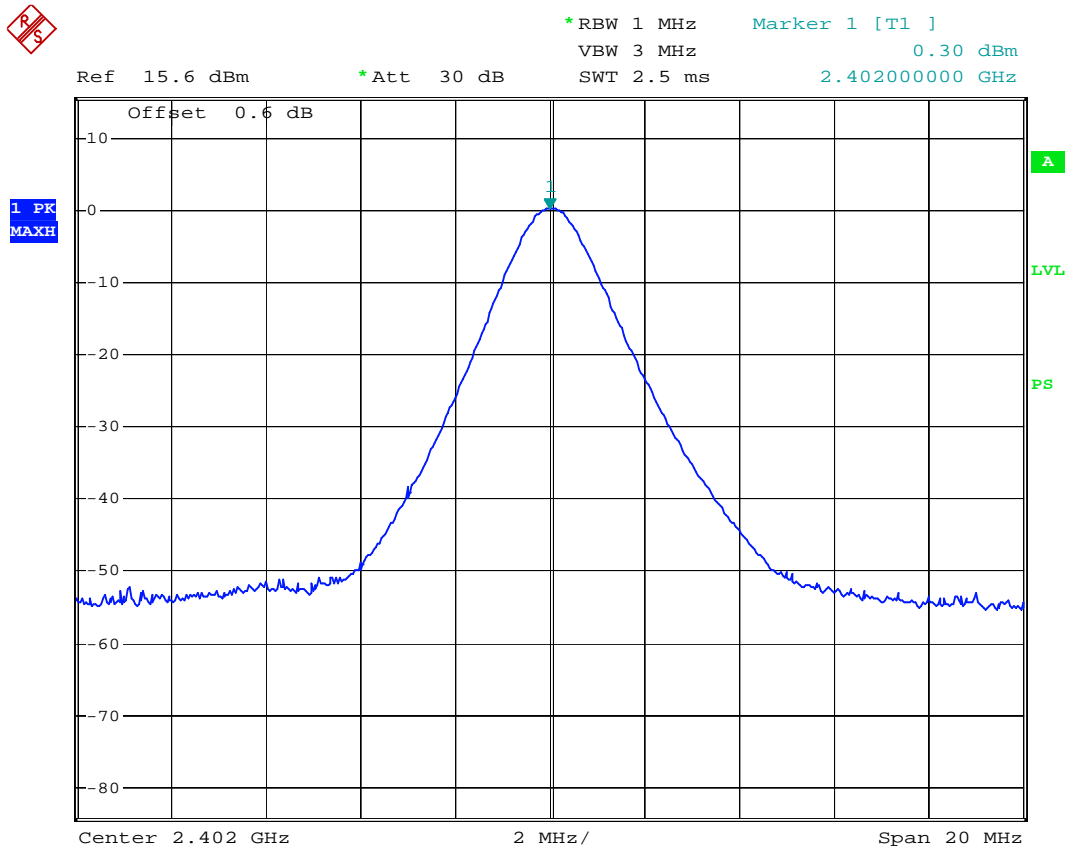
*The testing was performed by Lisa Zhu on 2007-04-25*

*Test mode: Transmitting*

Channel	Channel Frequency (MHz)	Power Output		Limit (w)
		(dBm)	(w)	
Low Channel	2402	0.30	0.001072	1
Mid Channel	2441	-1.86	0.000652	1
High Channel	2480	-2.23	0.000598	1

**Test Result:** Compliant, Please refer to the following plots.

Low channel



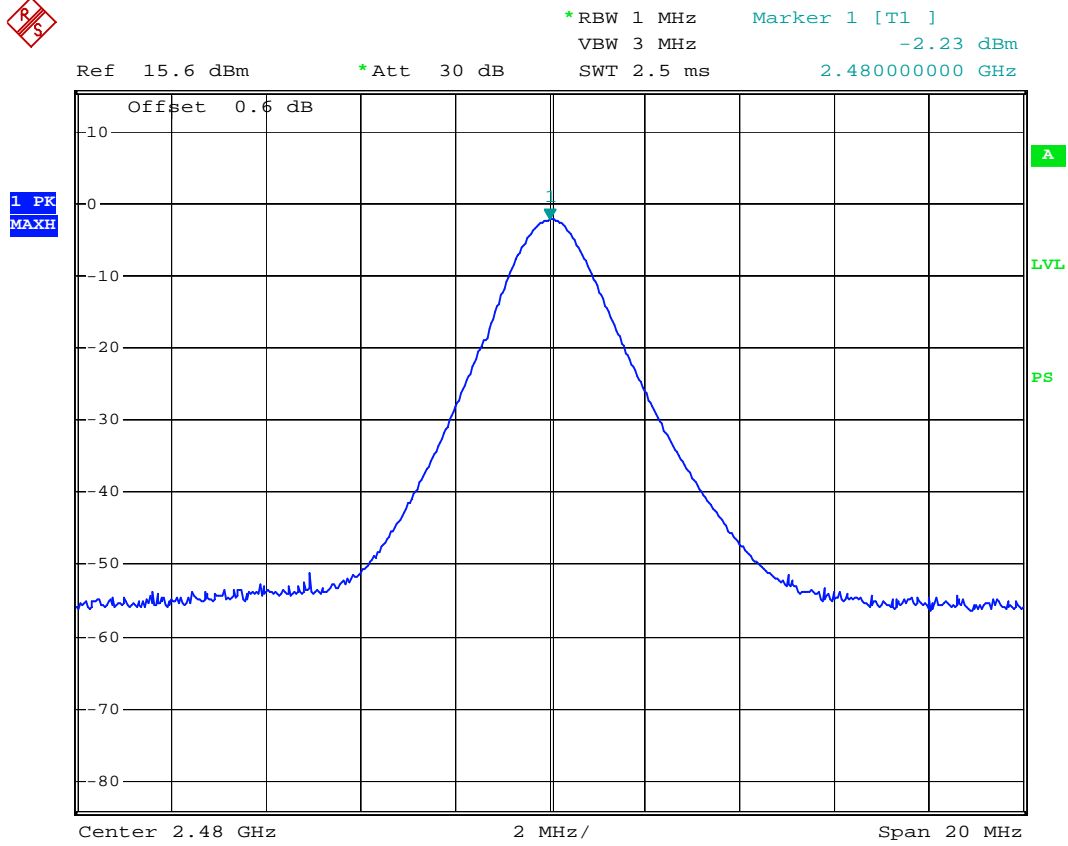
output power low channel

Date: 25.APR.2007 10:43:15





High channel:



output power high channel

Date: 25.APR.2007 10:46:37

## §15.247(d) - BAND EDGE TEST

### 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:	100.9 kPa

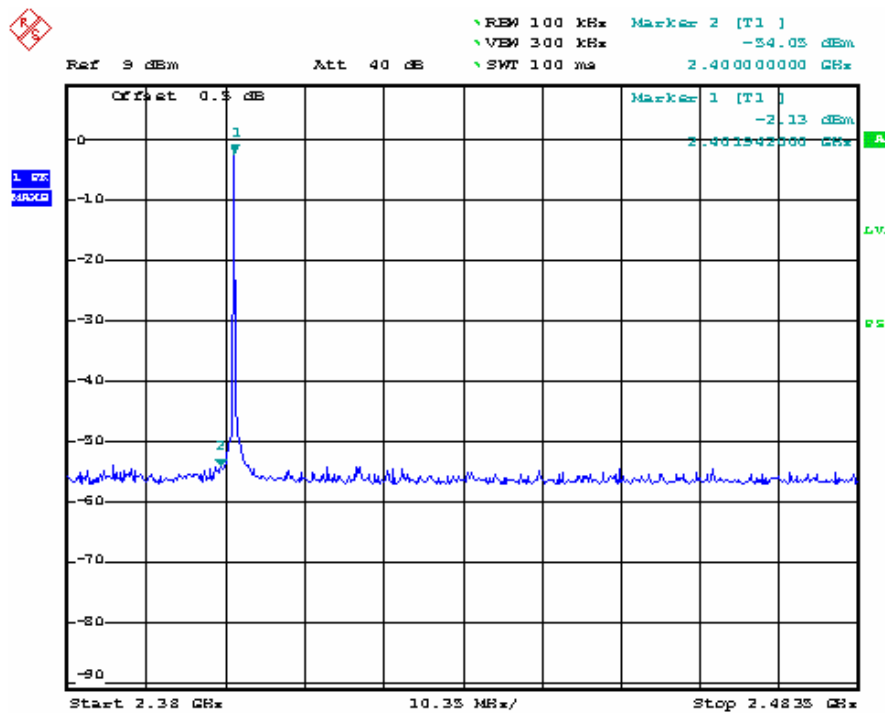
The testing was performed by Lisa Zhu on 2007-04-25.

Test Mode: Transmitting

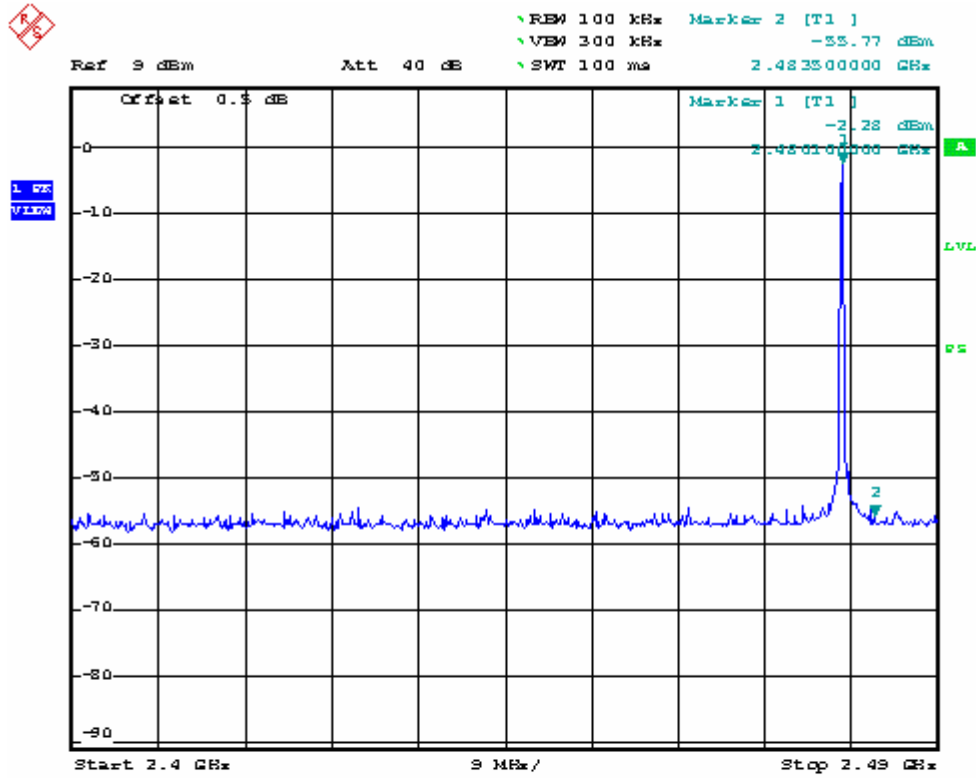
Frequency MHz	Emission (dBuV/m)	Limit (\$15.209) (dBuV/m)
2399.9	43.43	54
2483.6	41.99	54

**Test Result:** Compliant

Please see the following plots for test results



Date: 25.APR.2007 1:07:11



Date: 25.APR.2007 1:09:50