



NVLAP LAB CODE 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Zhongshan K-mate Electronics Co. Ltd.

Fu Wan Industrial Zone Sun Wen East Road Zhongshan, China

FCC ID: RLQSB2008

This Report Concerns:		Equipment Type:
<input checked="" type="checkbox"/> Original Report		Bluetooth Speaker
Test Engineer:	Phoenix Liu <u>Phoenix Liu</u>	
Report No.:	RSZ07110701	
Test Date:	2008-01-16 to 2008-03-05	
Report Date:	2008-03-06	
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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 Laboratories 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 *Zhongshan K-mate Electronics Co. Ltd.* 's product, model number: *SB2008* or the "EUT" as referred to in this report is a *Bluetooth Speaker*, which measures approximately: 11.3 cm L x 11.3 cm W x 5.2 cm H, rated input voltage: AC 120V/60Hz.

The series products, the all models have same circuit diagram, PCB, only appearance have difference, so, we select white one to test.

**All measurement and test data in this report was gathered from production sample serial number: 0711010 (Assigned by BACL, Shenzhen). The EUT was received on 2007-11-07.*

Objective

This Type approval report is prepared on behalf of *Zhongshan K-mate Electronics 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, 15.209 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 Laboratories 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 Laboratories Corp. (Shenzhen) to collect test 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 Laboratories 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. 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 Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at
<http://ts.nist.gov/Standards/scopes/2007070.htm>.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

N/A.

Special Accessories

The special accessories were provided by Bay Area Compliance Laboratories Corp. (Shenzhen).

Equipment Modifications

No modification was made to the unit tested.

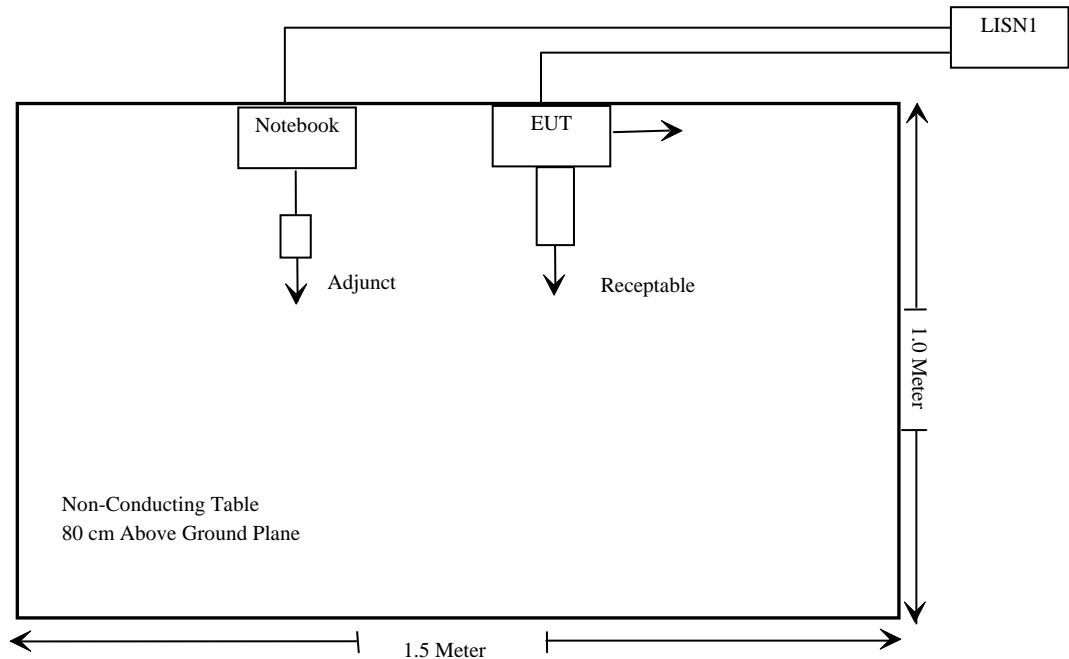
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Compaq	Notebook	PP2040	N/A	DoC

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
CFR47 §15.203	Antenna Requirement	Compliant
CFR47 §15.207 (a)	Conducted Emissions	Compliant
CFR47 §15.205	Restricted Band	Compliant
CFR47 §15.205, §15.209, §15.247(d)	Radiated Emission	Compliant
CFR47 §15.247 (a)(1)	20 dB Bandwidth	Compliant
CFR47 §15.247(a)(1)	Channel Separation Test	Compliant
CFR47 §15.247(a)(1)(iii)	Time of occupancy (Dwell Time)	Compliant
CFR47 §15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliant
CFR47 §15.247(b)(1)	Peak Output Power Measurement	Compliant
CFR47 §15.247(d)	Band edges	Compliant

CFR47 §15.203 - ANTENNA REQUIREMENT

Standard Applicable

According to CFr47 § 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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has a printed antenna on PCB. The maximum gain is 0 dBi.

Result: Compliance.

Please refer to the EUT internal photos.

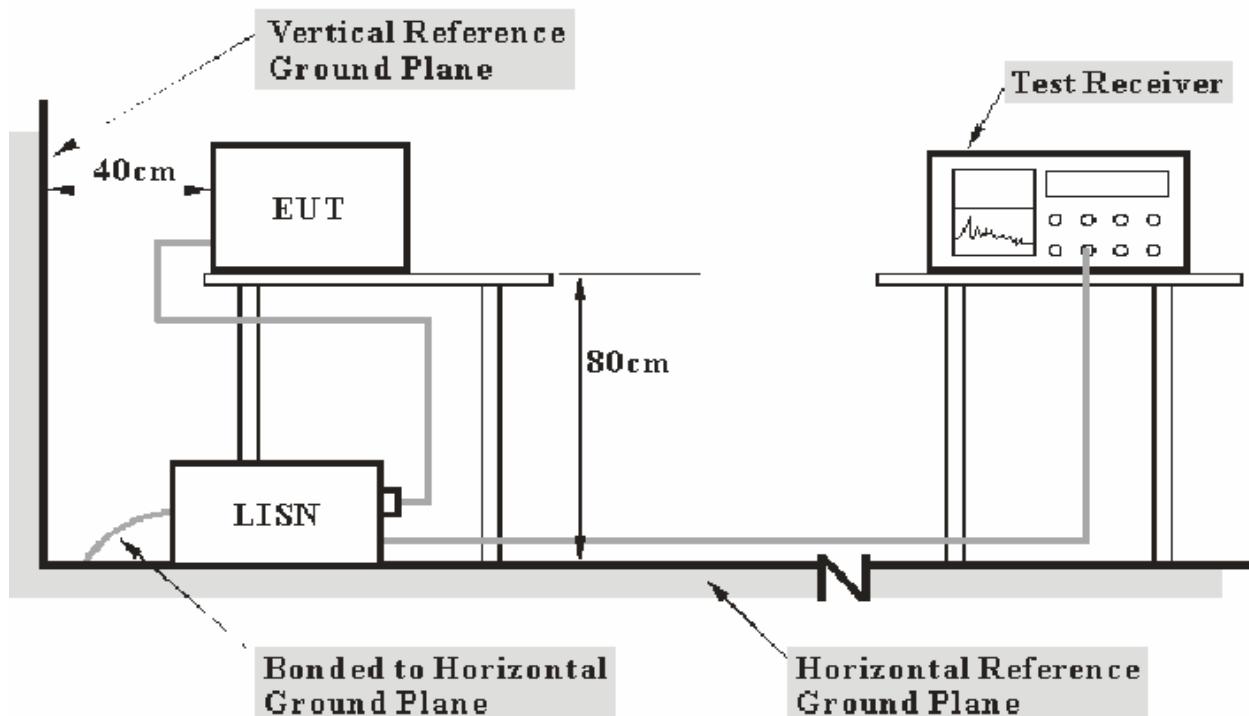
CFR47 §15.207 (a) - CONDUCTED EMISSIONS

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 Laboratories Corp. (Shenzhen) is ± 2.4 dB.

EUT Setup



Note:

1. Support units were connected to second LISN.
2. Both of LISNs (AMIN) 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 Notebook 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	100035	2007-10-16	2008-10-16
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 Laboratories 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 notebook was 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:

8.14 dB at 0.355 MHz in the **Hot** conductor mode.

Test Data**Environmental Conditions**

Temperature:	24 ° C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-01-16.

Test Mode: Transmitting

Line Conducted Emissions				FCC PART 15.207	
Frequency (MHz)	Amplitude (dB μ V)	Detector QP/AV	Conductor Hot/Neutral	Limit (dB μ V)	Margin (dB)
0.355	50.70	QP	Hot	58.84	8.14
0.355	49.30	QP	Neutral	58.84	9.54
0.355	39.30	AV	Neutral	48.84	9.54
0.355	37.70	AV	Hot	48.84	11.14
26.465	47.40	QP	Hot	60.00	12.60
0.825	41.90	QP	Hot	56.00	14.10
1.295	41.60	QP	Hot	56.00	14.40
1.240	40.60	QP	Neutral	56.00	15.40
0.650	40.10	QP	Neutral	56.00	15.90
0.825	29.20	AV	Hot	46.00	16.80
0.295	43.30	QP	Hot	60.38	17.08
1.240	28.60	AV	Neutral	46.00	17.40
1.295	27.20	AV	Hot	46.00	18.80
0.650	27.10	AV	Neutral	46.00	18.90
0.295	29.40	AV	Hot	50.38	20.98
0.235	31.20	AV	Neutral	52.27	21.07
0.175	43.10	QP	Neutral	64.72	21.62
0.235	40.10	QP	Neutral	62.27	22.17
0.175	40.60	QP	Hot	64.72	24.12
0.175	29.90	AV	Neutral	54.72	24.82
25.080	24.50	AV	Neutral	50.00	25.50
0.175	28.90	AV	Hot	54.72	25.82
26.470	18.90	AV	Hot	50.00	31.10
25.080	25.80	QP	Neutral	60.00	34.20

Plot(s) of Test Data

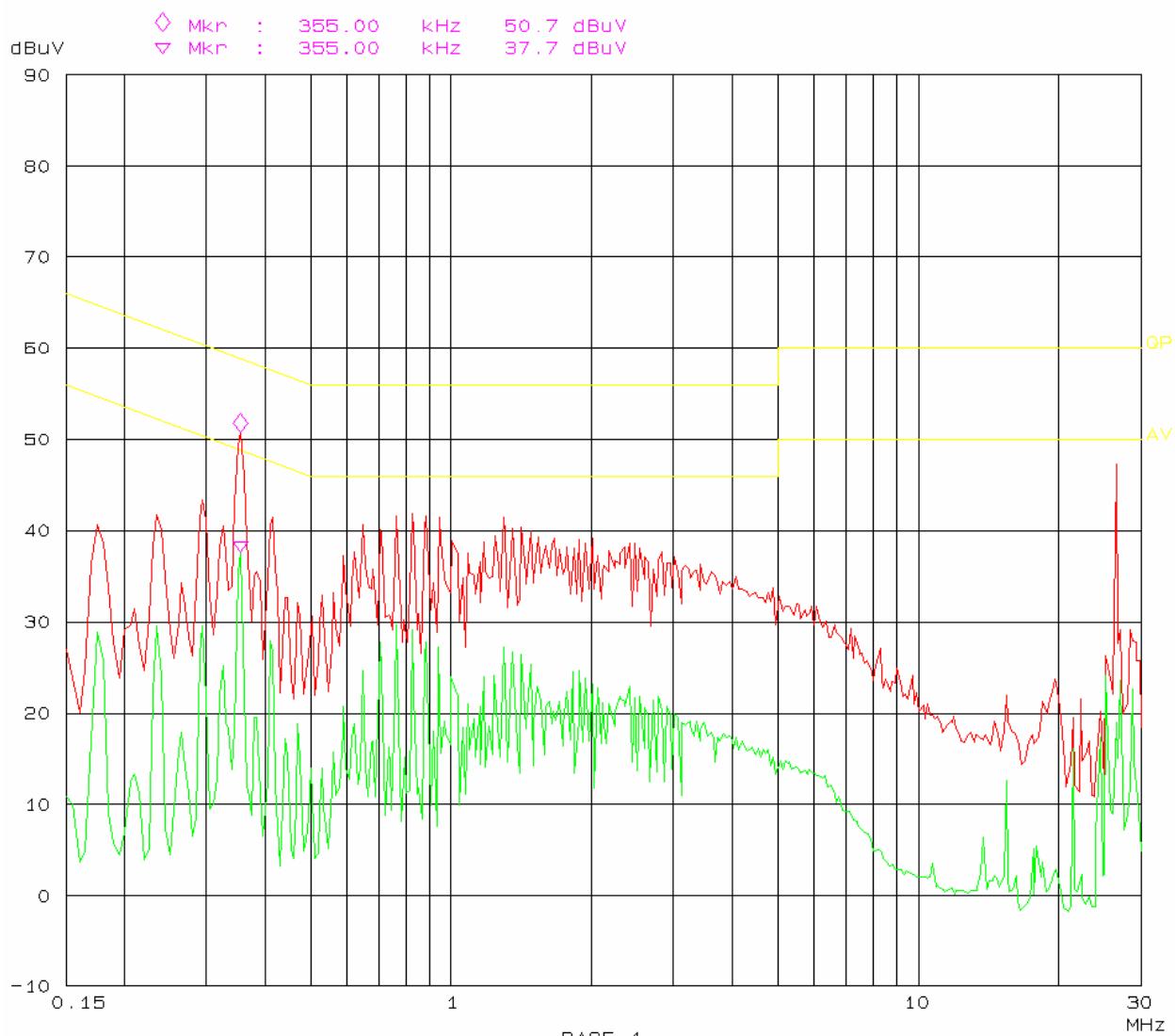
Plot(s) of Test Data is presented hereinafter as reference.

CONDUCTED EMISSION TEST

16. Jan 08 15:10

FCC Part 15 B

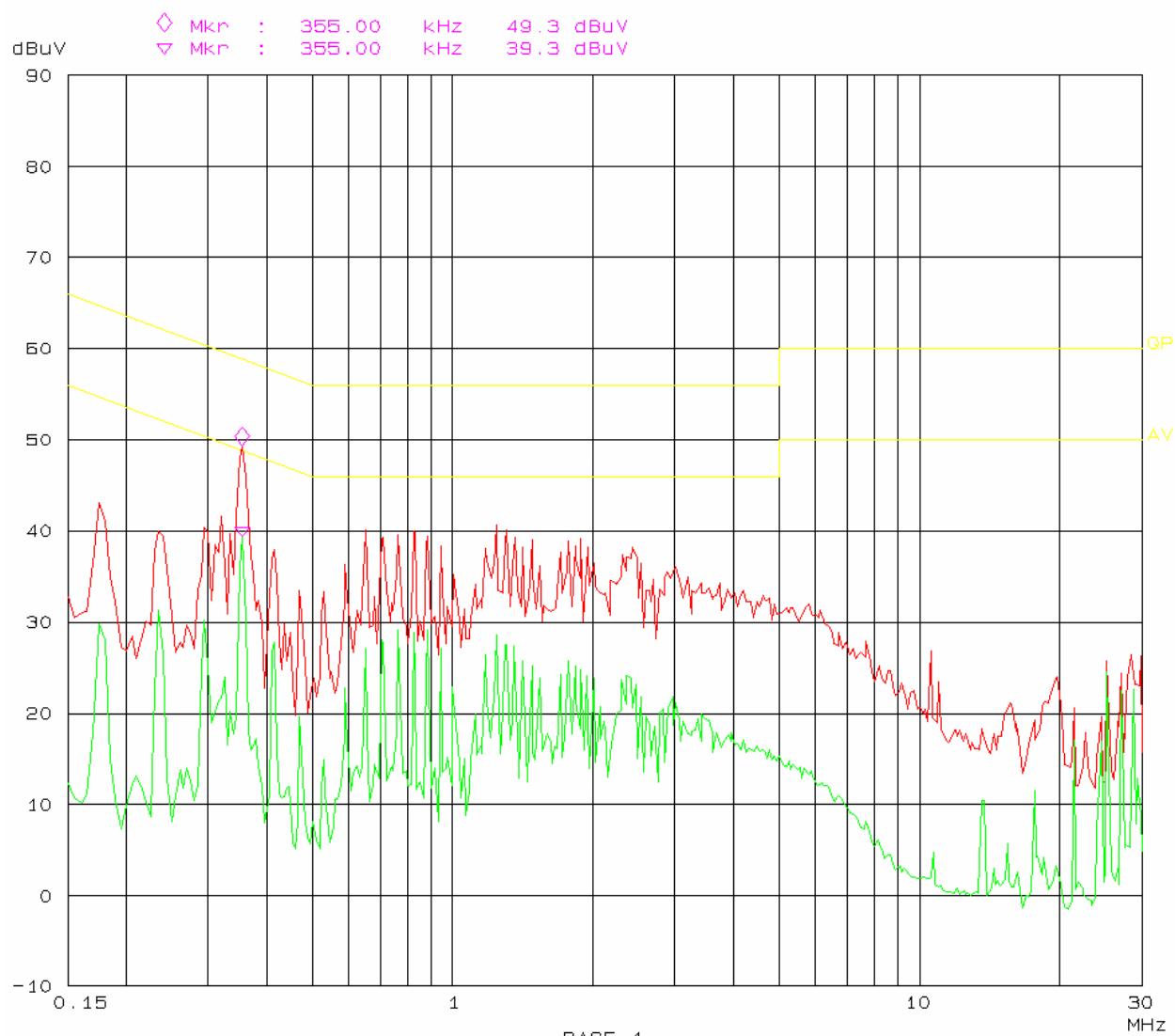
EUT: Bluetooth Speaker M/N: SB2008
Manuf: K-mate
Op Cond: Transmitting
Operator: Phoenix
Test Spec: AC 120V/60Hz H
Comment: Temp: 24%Humi: 50%



CONDUCTED EMISSION TEST
FCC Part 15 B

16, Jan 08 14:55

EUT: Bluetooth Speaker M/N: SB2008
Manuf: K-mate
Op Cond: Transmitting
Operator: Phoenix
Test Spec: AC 120V/60Hz N
Comment: Temp: 24%Hum: 50%



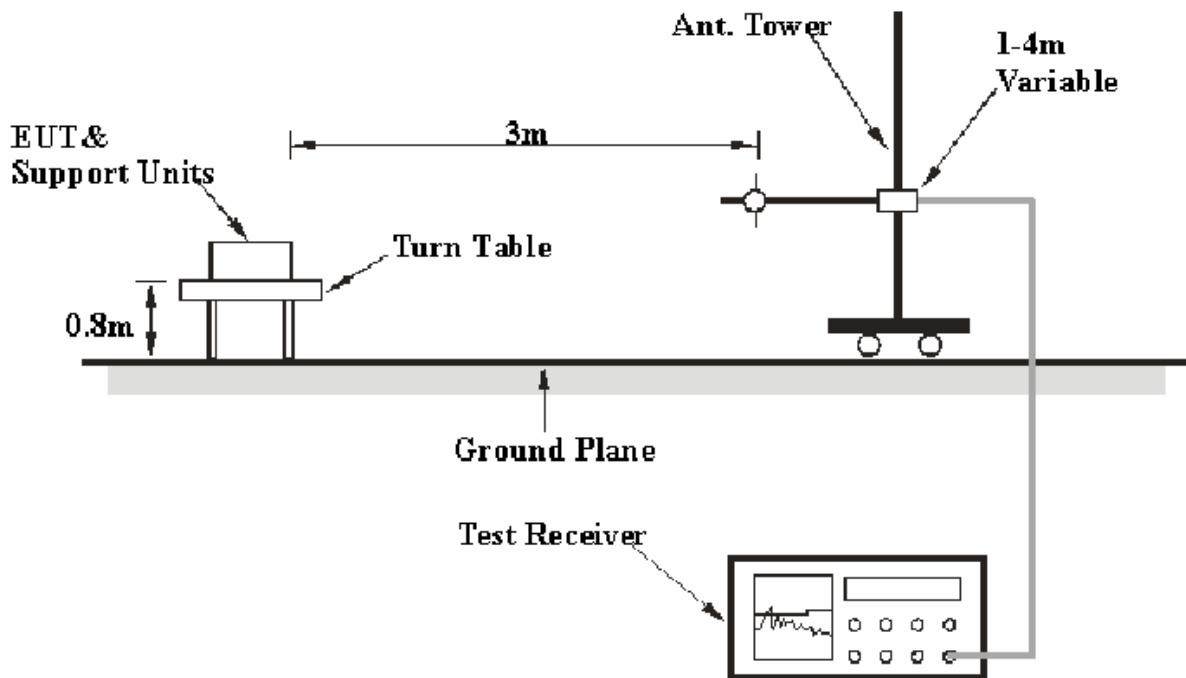
CFR47 §15.205, §15.209, §15.247 - RADIATED EMISSIONS**Applicable Standard**

CFR47 §15.205; §15.209; §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 Laboratories Corp. (Shenzhen) is ± 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 C63.4-2003. The specification used was the FCC 15.109, 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 Notebook 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:

<u>Frequency Range</u>	<u>RBW</u>	<u>Video B/W</u>
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	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2007-08-14	2008-08-14
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories 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 notebook 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-1GHz and peak and Average detection modes for frequencies above 1GHz.

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 maximum 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 15.109, 15.205, 15.209, and 15.247, with the worst margin reading of:

- 7.60 dB at 124.372315 MHz in the Horizontal polarization, for below 1GHz (Low Channel)**
- 7.18 dB at 4804 MHz in the Vertical polarization, for above 1GHz (Low Channel)**
- 4.83 dB at 4882 MHz in the Vertical polarization, for above 1GHz (Middle Channel)**
- 5.18dB at 4960 MHz in the Horizontal polarization, for above 1GHz (High Channel)**

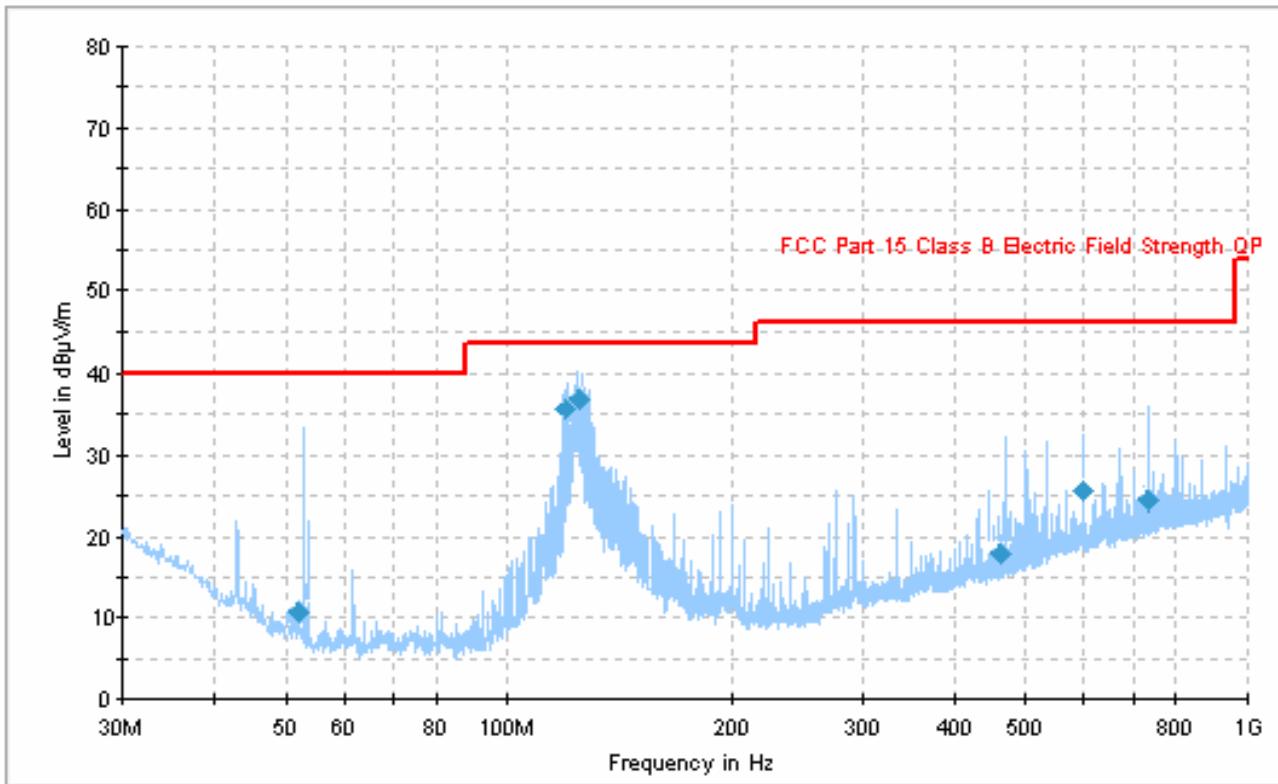
Test Data

Environmental Conditions

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

The testing was performed by Phoenix Liu on 2008-01-22.

Test Mode: Transmitting (Below 1G)



Frequency (MHz)	Corrected Amp. (dB μ V/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dB μ V/m)	Margin (dB)
124.372315	35.9	103.0	H	278.0	-9.6	43.5	7.6
123.847500	35.3	247.0	H	8.0	-0.1	43.5	8.2
735.068750	23.6	104.0	H	330.0	1.9	46.0	22.4
52.731200	15.7	104.0	V	0.0	-4.0	40.0	24.3
463.713250	20.8	198.0	H	203.0	-4.2	46.0	25.2
598.420000	20.7	105.0	H	215.0	0.5	46.0	25.3

Test Mode: Transmitting (Above 1GHz)

Freq. (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Antenna			Cable Loss (dB)	Pre- Amp. Gain (dB)	Corr. Amp. (dBuV/m)	FCC Part 15.247/209		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel												
4804	40.88	AV	90	1.0	V	34.7	4.64	33.4	46.82	54	7.18	Harmonic
4804	40.79	AV	90	1.0	H	34.6	4.64	33.4	46.63	54	7.37	Harmonic
1601	50.24	AV	180	1.2	V	26.0	2.77	35.0	44.01	54	9.99	Harmonic
1601	48.56	AV	180	1.2	H	26.5	2.77	35.0	42.83	54	11.17	Harmonic
4804	46.93	PK	180	1.2	V	34.7	4.64	33.4	52.87	74	21.13	Harmonic
4804	46.54	PK	180	1.2	H	34.6	4.64	33.4	52.38	74	21.62	Harmonic
1601	54.47	PK	45	1.2	V	26.0	2.77	35.0	48.24	74	25.76	Harmonic
1601	53.57	PK	45	1.2	H	26.5	2.77	35.0	47.84	74	26.16	Harmonic
Middle Channel												
4882	43.33	AV	243	1.4	V	34.6	4.64	33.4	49.17	54	4.83	Harmonic
4882	40.98	AV	142	1.6	H	34.7	4.64	33.4	46.92	54	7.08	Harmonic
1627	52.01	AV	135	1.3	H	26.0	2.77	35.0	45.78	54	8.22	Harmonic
1627	51.28	AV	85	1.5	V	26.5	2.77	35.0	45.55	54	8.45	Harmonic
4882	47.03	PK	153	1.5	V	34.6	4.64	33.4	52.87	74	21.13	Harmonic
4882	46.01	PK	234	1.8	H	34.7	4.64	33.4	51.95	74	22.05	Harmonic
1627	54.65	PK	265	1.4	V	26.5	2.77	35.0	48.92	74	25.08	Harmonic
1627	54.58	PK	156	1.4	H	26.0	2.77	35.0	48.35	74	25.65	Harmonic
High Channel												
4960	43.07	AV	256	1.8	H	34.6	4.55	33.4	48.82	54	5.18	Harmonic
4960	42.35	AV	142	1.5	V	34.7	4.55	33.4	48.2	54	5.80	Harmonic
1653	53.76	AV	210	1.2	V	26.0	2.77	35.0	47.53	54	6.47	Spurious
1653	52.28	AV	156	1.2	H	26.5	2.77	35.0	46.55	54	7.45	Spurious
4960	46.23	PK	142	1.4	V	34.7	4.55	33.4	52.08	74	21.92	Harmonic
4960	46.11	PK	145	1.4	H	34.6	4.55	33.4	51.86	74	22.14	Harmonic
1653	56.95	PK	128	1.5	H	26.5	2.77	35.0	51.22	74	22.78	Spurious
1653	56.04	PK	240	1.4	V	26.0	2.77	35.0	49.81	74	24.19	Spurious

CFR47 §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	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories 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.

Test Data**Environmental Conditions**

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

The testing was performed by Phoenix Liu on 2008-03-05.

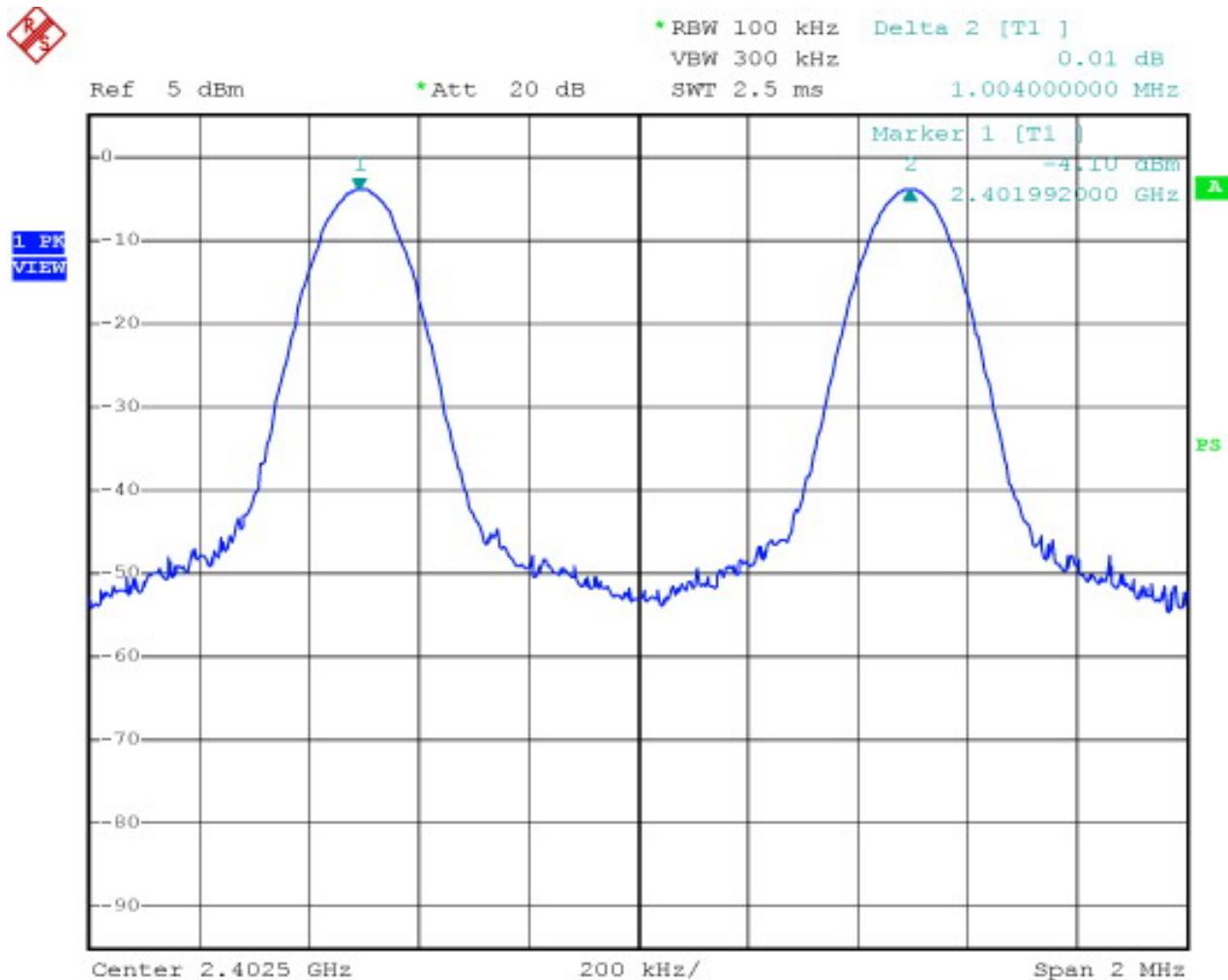
Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low Channel	2402	1004	181	Pass
Adjacency Channel	2403			
Middle Channel	2441	1004	181	Pass
Adjacency Channel	2442			
High Channel	2480	1004	181	Pass
Adjacency Channel	2479			

Test Result: Compliance.

Please refer to following plots

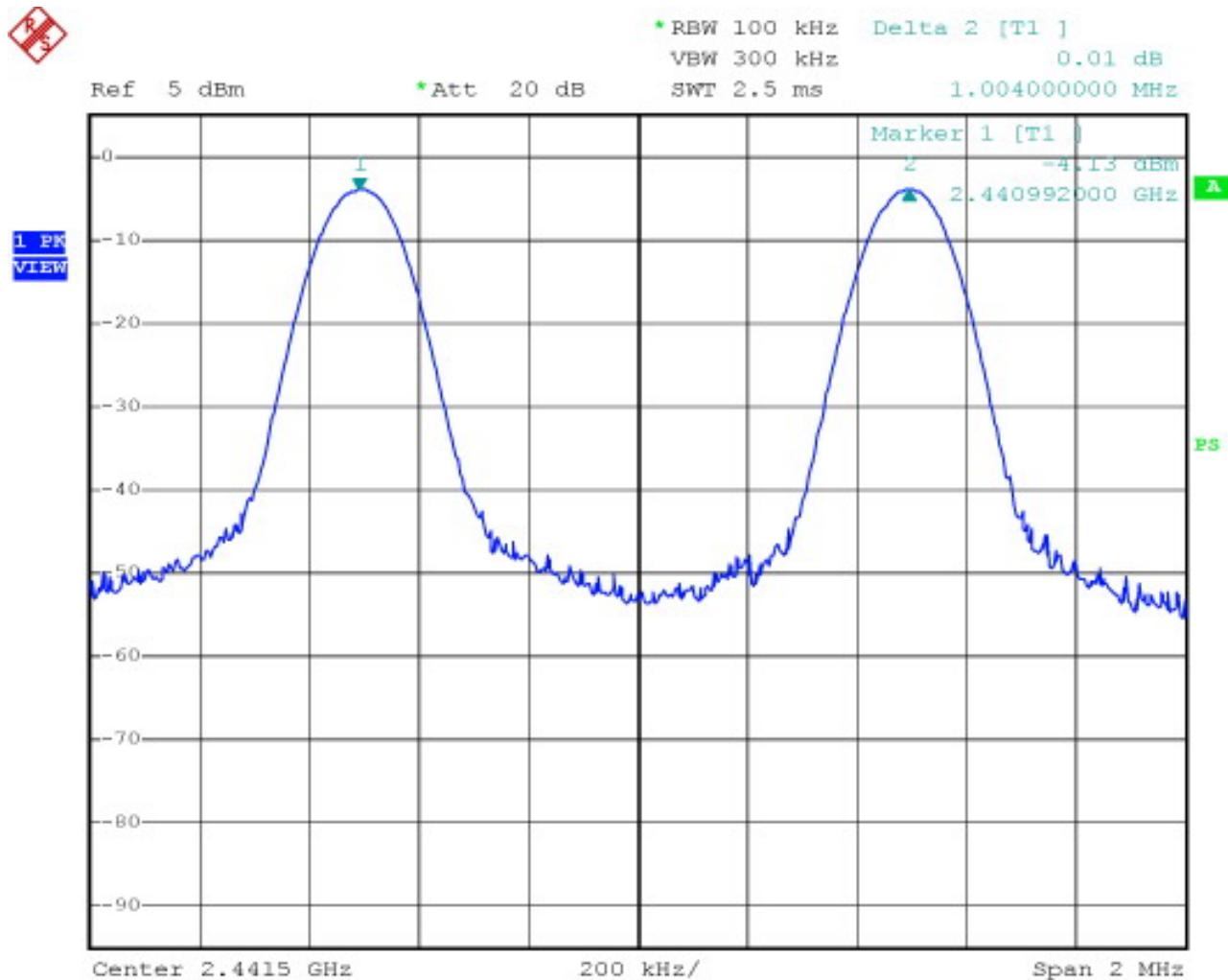
Low Channel



CHANNEL SEPARATION L

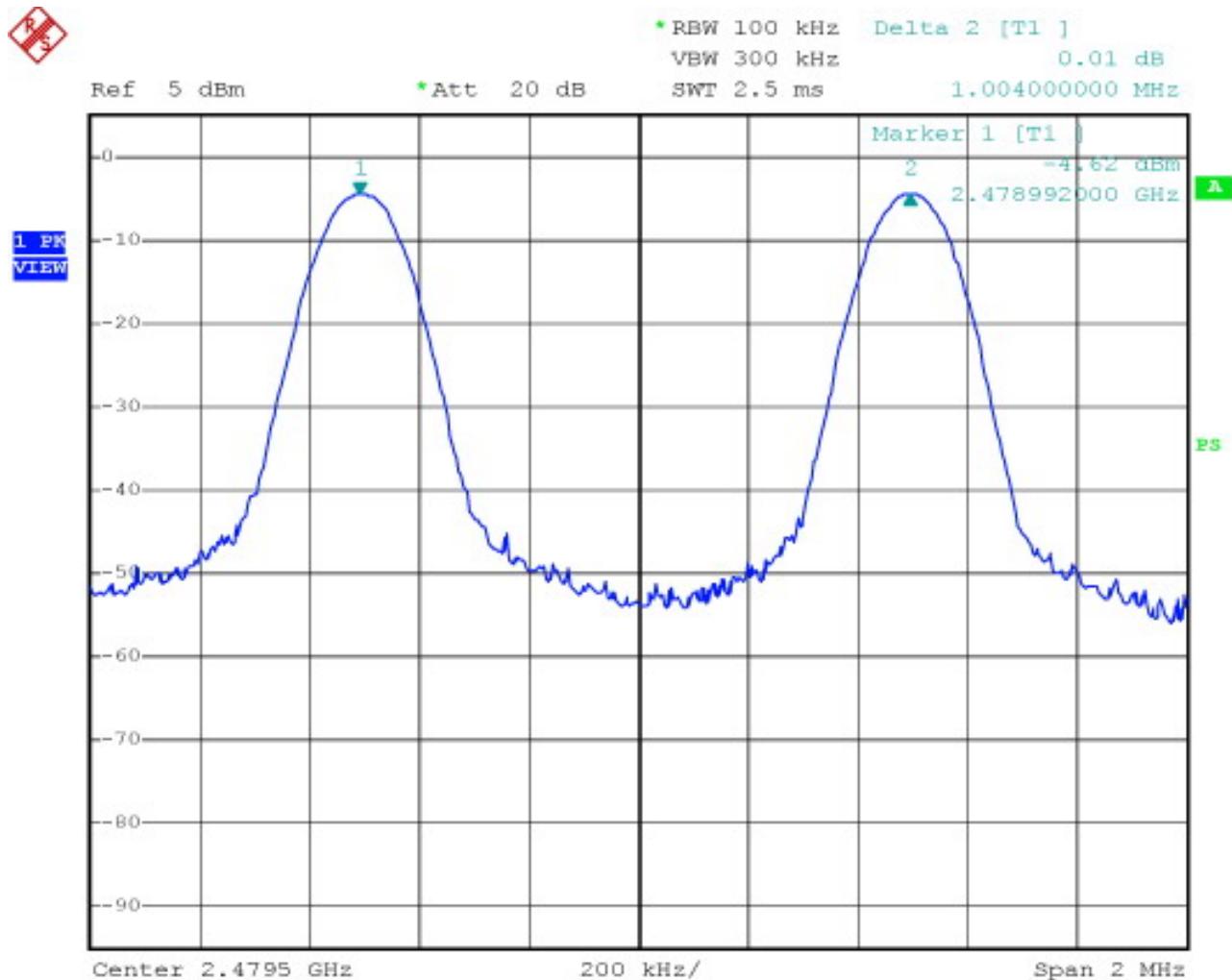
Date: 5.MAR.2008 17:40:08

Middle Channel



CHANNEL SEPARATION M

Date: 5.MAR.2008 17:41:36

High Channel

CHANNEL SEPARATION H

Date: 5.MAR.2008 17:42:54

CFR47 §15.247(a) (1) –20dB BANDWIDTH TESTING**Applicable Standard**

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 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories 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:	27 °C
Relative Humidity:	50 %
ATM Pressure:	100.9 kPa

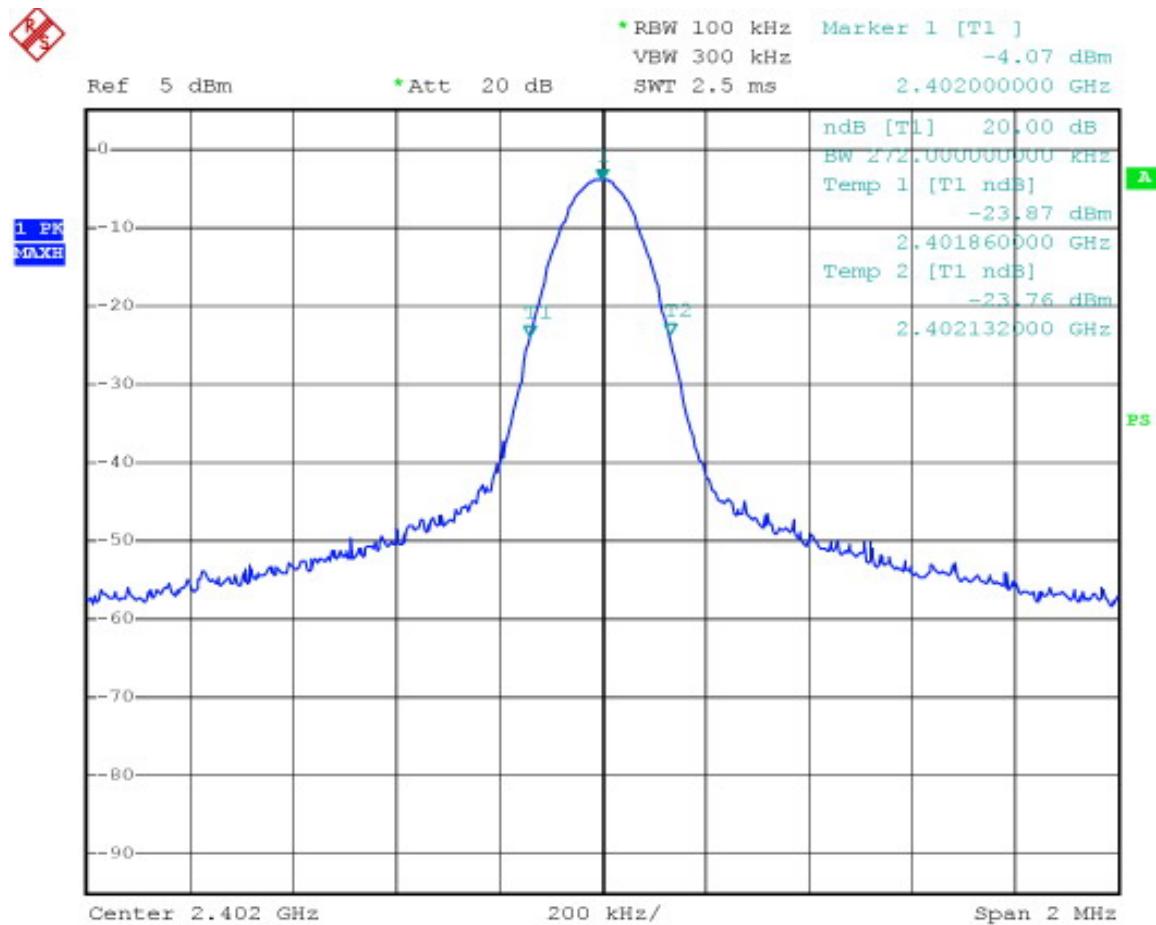
The testing was performed by Phoenix Liu on 2008-03-05.

Test Result: Please refer to the following table and plots.

Test Mode: Transmitting

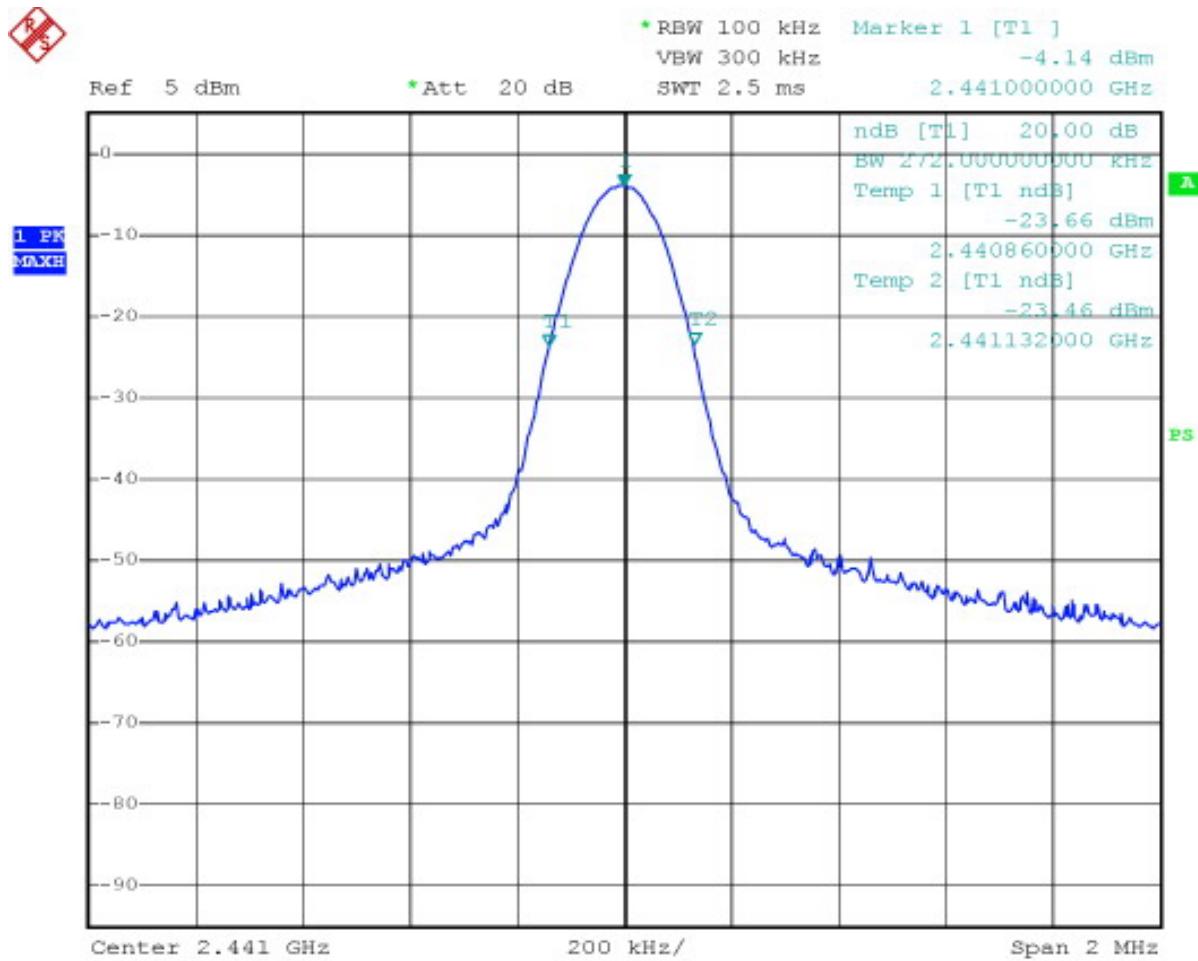
Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low Channel	2402	272
Middle Channel	2441	272
High Channel	2480	272

Low Channel



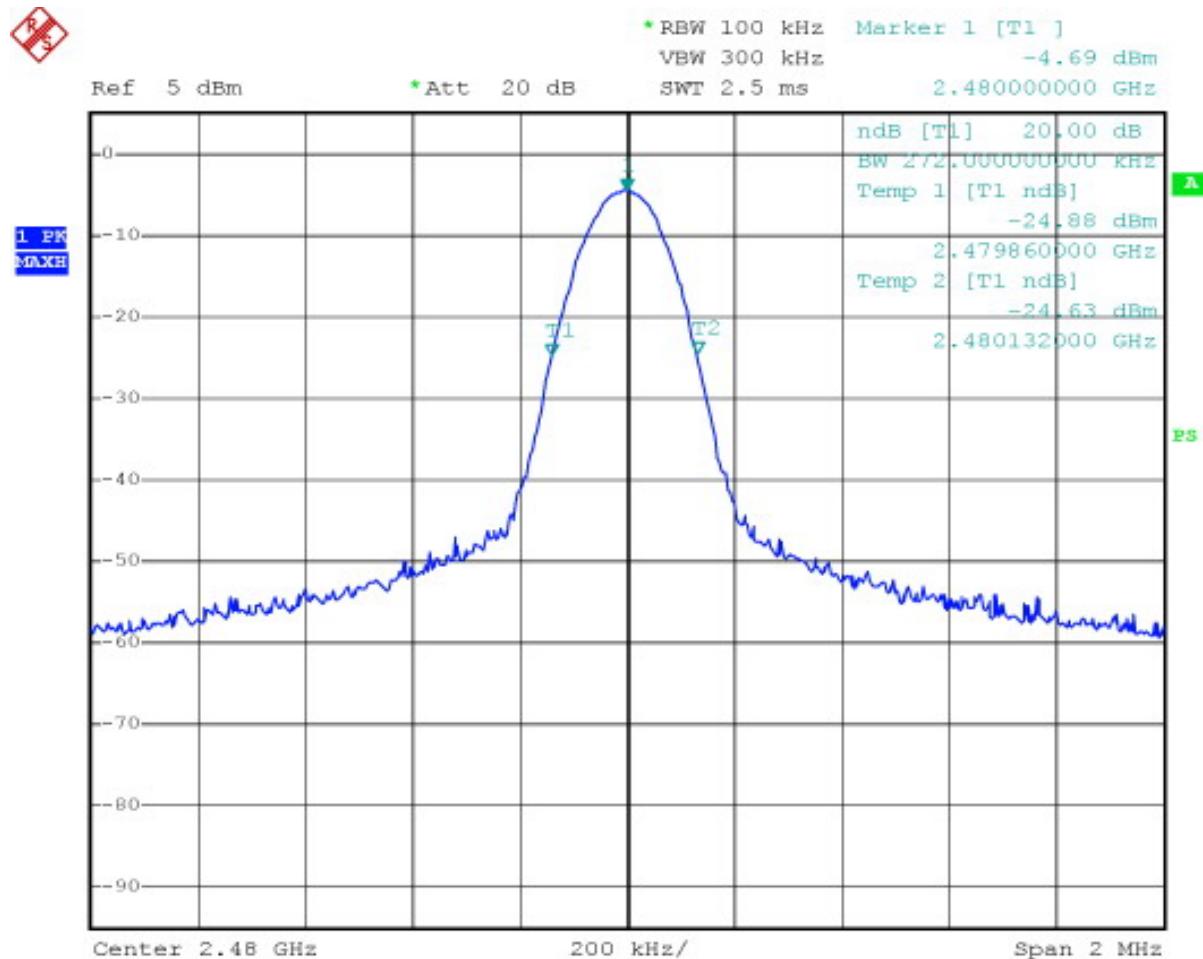
20dB Bandwidth 1

Date: 5.MAR.2008 17:05:46

Middle Channel

20dB Bandwidth M

Date: 5.MAR.2008 17:06:26

High Channel

20dB Bandwidth H

Date: 5.MAR.2008 17:07:15

CFR47 §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	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories 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.

Test Data**Environmental Conditions**

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

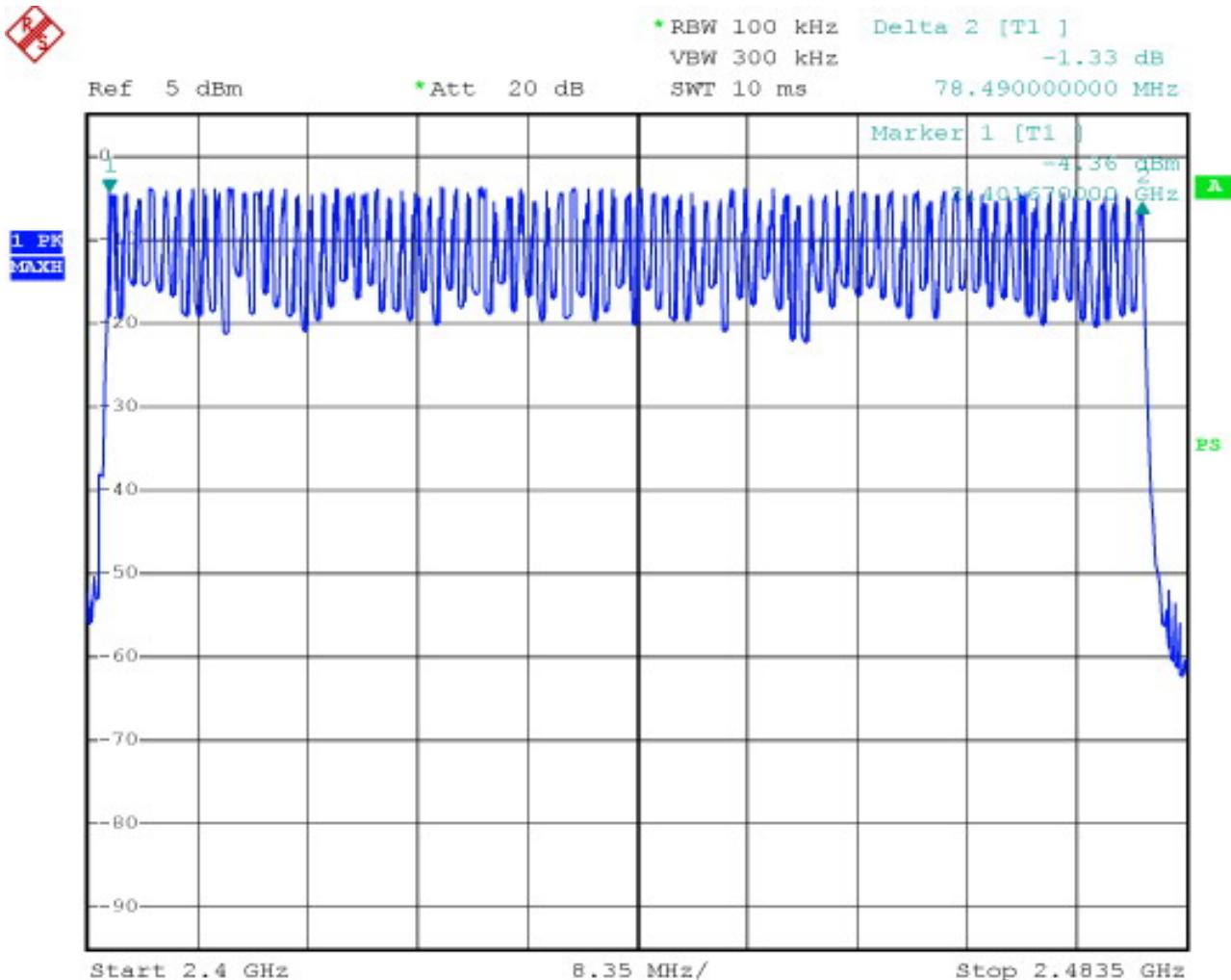
The testing was performed by Phoenix Liu on 2008-03-05.

Test Mode: Transmitting

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

Test Result: Compliance.

Please refer to following plot.

Number of Hopping Channels**HOPPING CHANNELS**

Date: 5 MAR.2008 17:09:00

CFR47 §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	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories 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 pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hop rate/ number of hopping channels * 31.6s
 Hop rate=1600/s

Test Data**Environmental Conditions**

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

The testing was performed by Phoenix Liu on 2008-03-05.

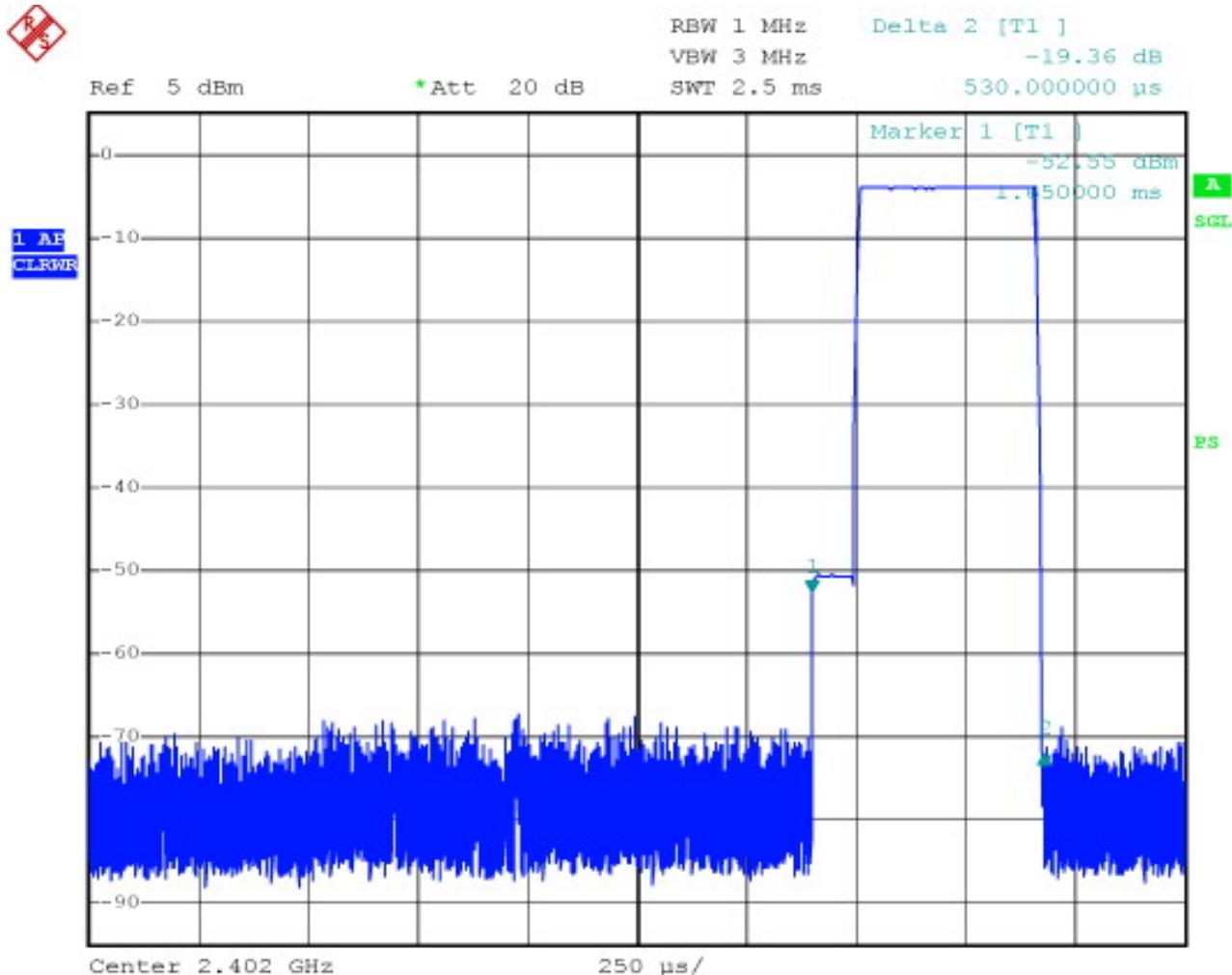
Test Mode: Transmitting

Test Result: Compliance. Please refer to following tables and plots

Channel	Pulse width (msec)	Dwell time (sec)	Limit (sec)	Result
Low	0.53	0.1696	0.4	Pass
Middle	0.53	0.1696	0.4	Pass
High	0.53	0.1696	0.4	Pass

NOTE: Pulse time*(1600/2/79)*31.6S

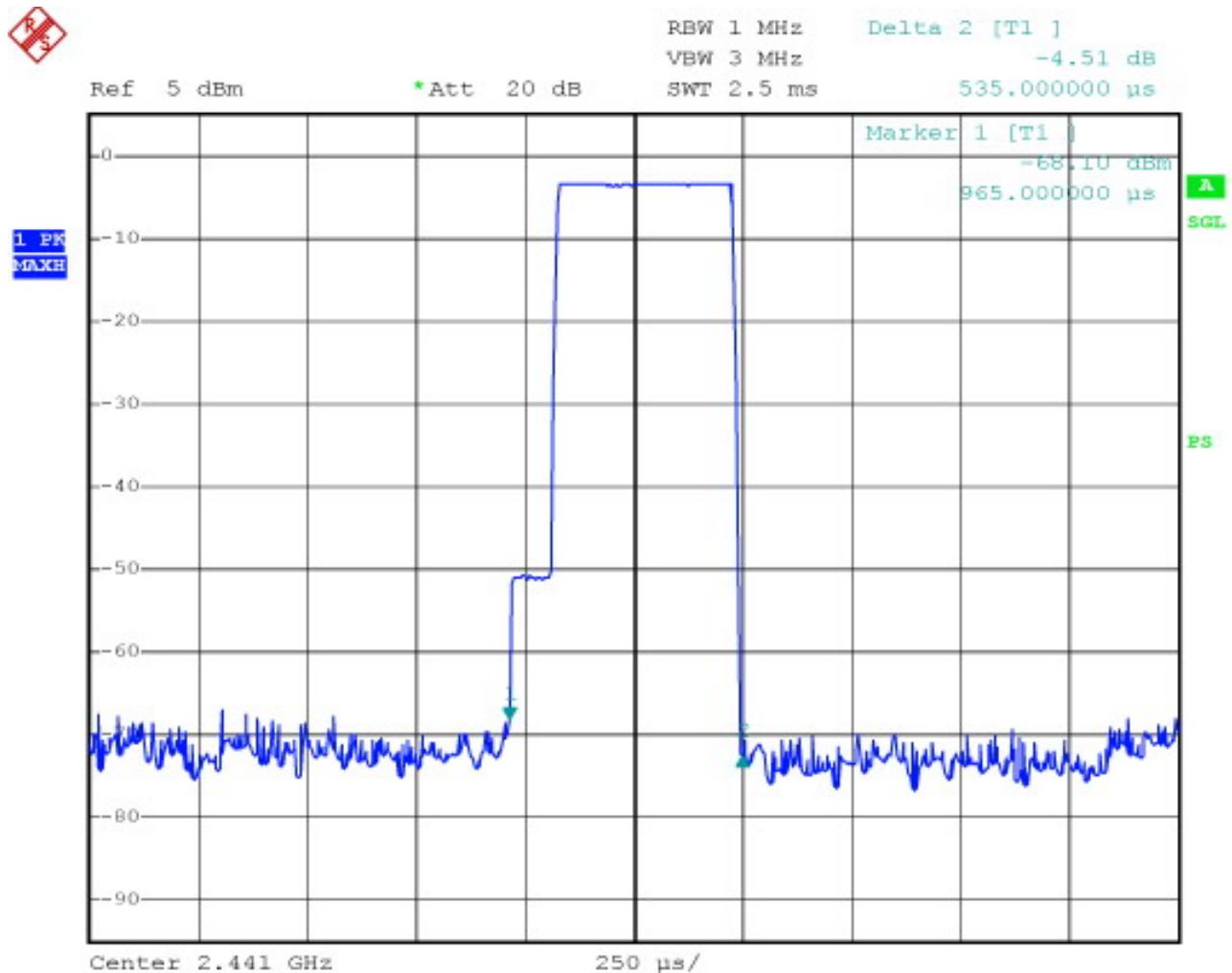
Low Channel



dwell time low

Date: 5.MAR.2008 17:03:01

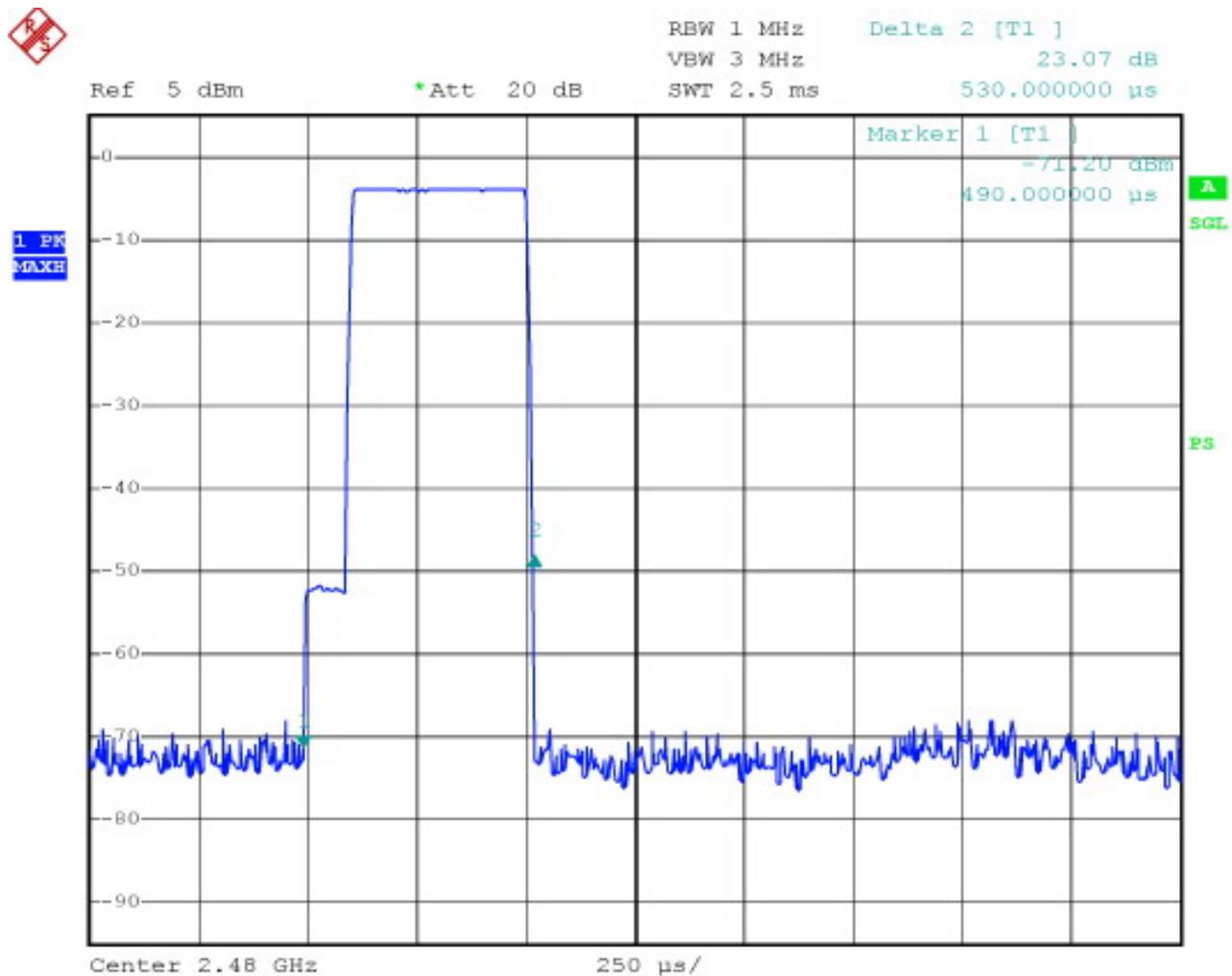
Middle Channel



dwell time middle

Date: 5.MAR.2008 16:57:25

High Channel



dwell time high

Date: 5.MAR.2008 16:55:36

CFR47 §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
HP	Amplifier	HP8447D	2944A09795	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories 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 Notebook 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-1GHz and peak and Average detection modes for frequencies above 1GHz.

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:

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

Test Data**Environmental Conditions**

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

The testing was performed by Phoenix Liu on 2008-03-05.

Test Mode: Transmitting

Freq. (MHz)	Receiver Reading (dBuV/m)	Detector PK/AV	Table Direction Degree	Antenna		Cable Loss (dB)	Pre- Amp. (dB)	Cord. Amp. (dBuV/m)	Trans. Factor (dB)	EIRP (dBm)	EIRP (mW)	Part 15C Limit (W)
				Height (m)	Factor (dB/m)							
Low Channel												
2402	93.26	PK	90	1.0	30.6	3.61	35	92.47	95.27	-2.80	0.525	1
Middle Channel												
2441	93.19	PK	128	1.5	30.6	3.61	35	92.40	95.27	-2.87	0.516	1
High Channel												
2480	92.63	PK	65	1.4	30.6	3.61	35	91.84	95.27	-3.43	0.454	1

Note: P (dBm) = E (dB μ V/m) - 95.27

CFR47 §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	2007-10-16	2008-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories 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. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel 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, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
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**

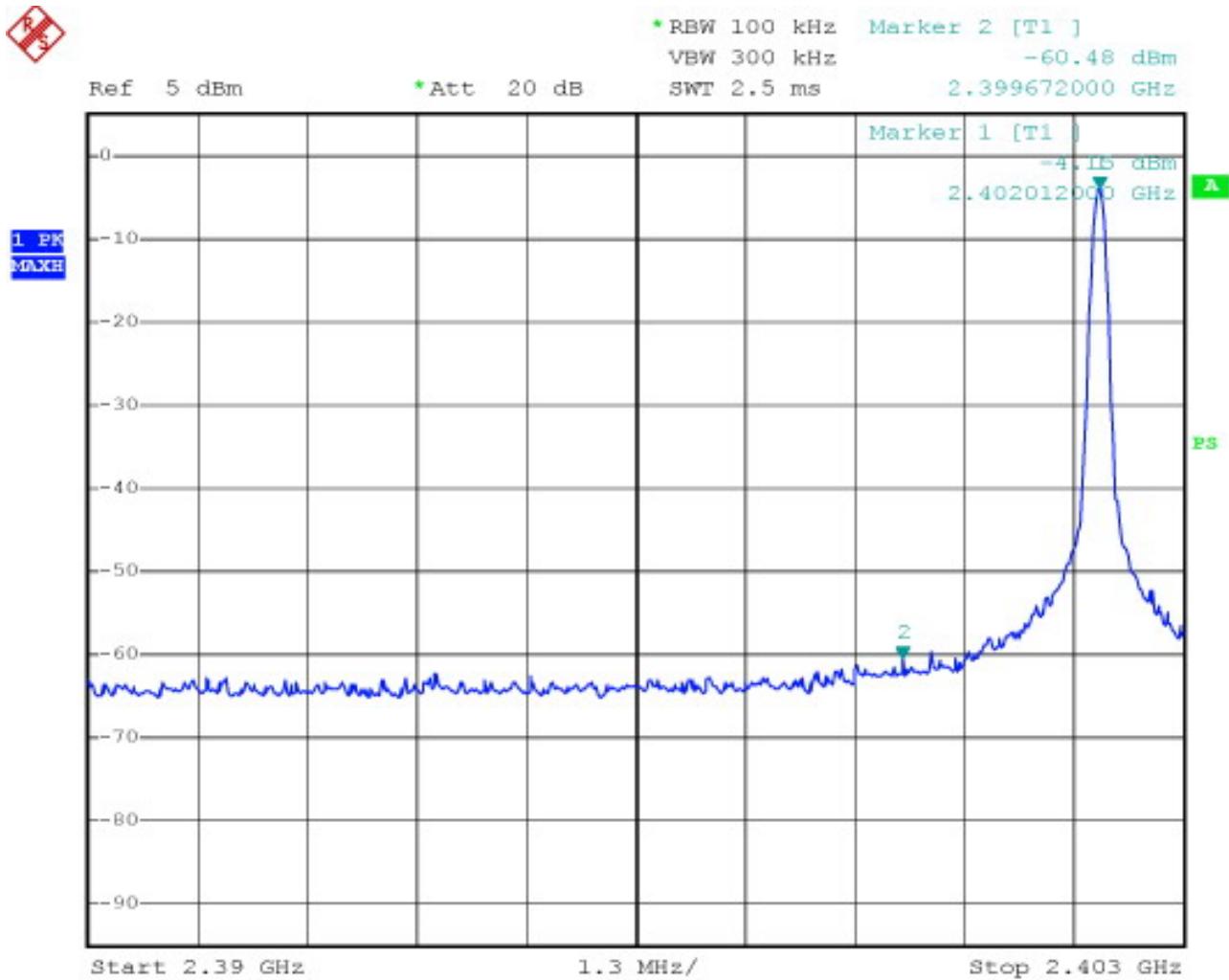
Temperature:	27 °C
Relative Humidity:	50 %
ATM Pressure:	100.9 kPa

The testing was performed by Phoenix Liu on 2008-03-05.

Test Mode: Transmitting

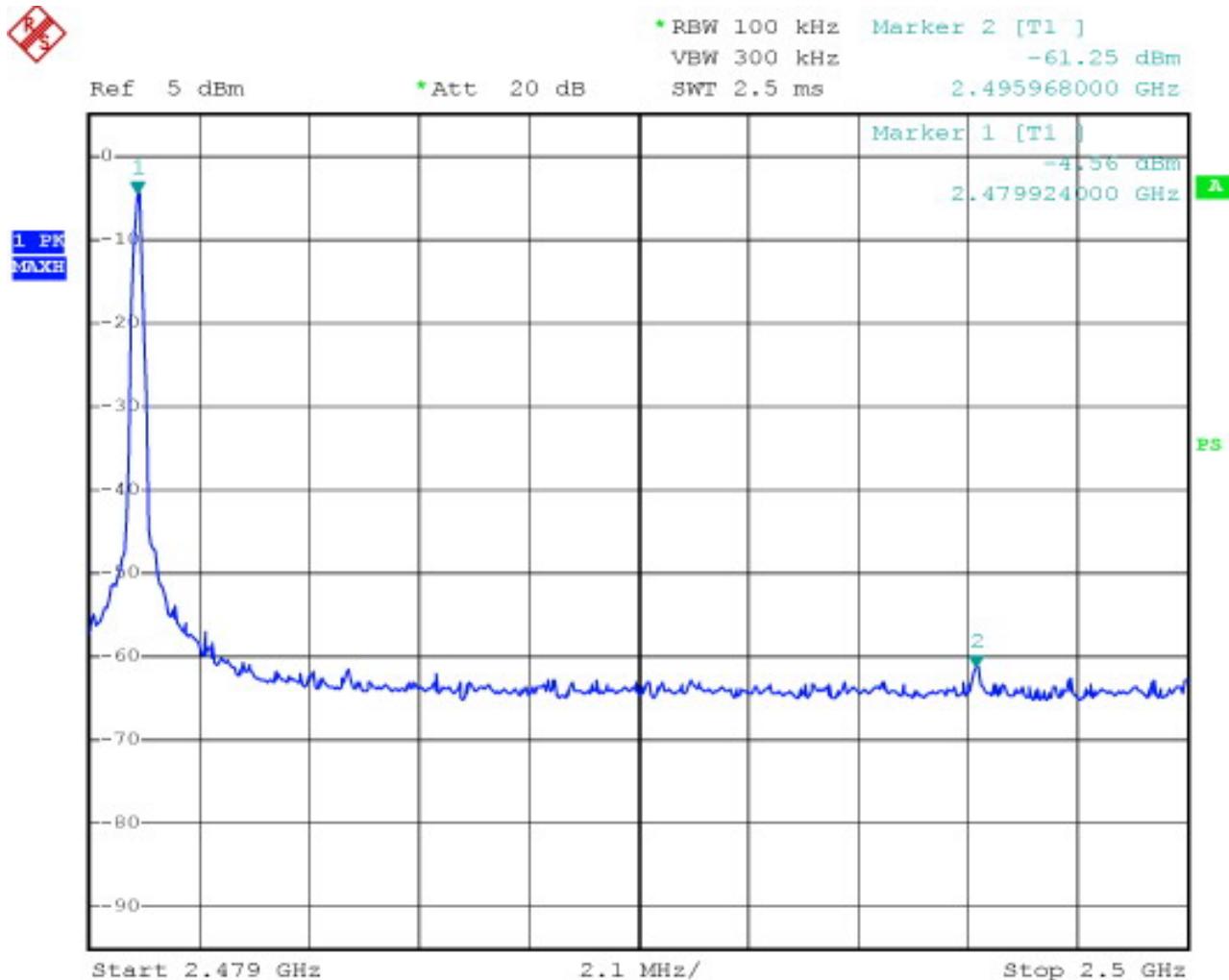
Frequency (MHz)	Delta Peak to band emission (dBc)	Limit (dBc)
2399.672	56.32	20
2495.968	56.69	20

Test Result: Pass

Low Band Edge

OUT OF BAND-LEFT

Date: 5.MAR.2008 17:13:39

High Band Edge

OUT OF BAND-RIGHT

Date: 5.MAR.2008 17:11:51

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