



NVLAP LAB CODE 200707-0



FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Weifang GoerTek Electronics Co., Ltd

Dongfang North Road Hi-tech Industry Development District,
Weifang, Shandong, China

FCC ID: SZG-GBH909

This Report Concerns: <input checked="" type="checkbox"/> Original Report		Equipment Type: Bluetooth Headset	
Test Engineer:	Phoenix Liu <i>Phoenix Liu</i>		
Report No.:	RSZ08010903 Rev.		
Test Date:	2008-01-27 to 2008-02-15		
Report Date:	2008-02-18		
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Weifang GoerTek Electronics Co.,Ltd* 's product, model number: *GBH909* or the "EUT" as referred to in this report is a *Bluetooth headset*, which measures approximately: 6.0 cm L x 3.0 cm W x 2.5 cm H, rated input voltage: DC 3.7 V Battery..

** All measurement and test data in this report was gathered from production sample serial number: 0801017 (Assigned by BACL, Shenzhen). The EUT was received on 2008-01-09.*

Objective

This Type approval report is prepared on behalf of *Weifang GoerTek 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.

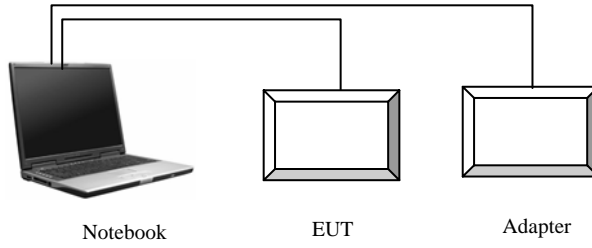
Local Support Equipment List and Details

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

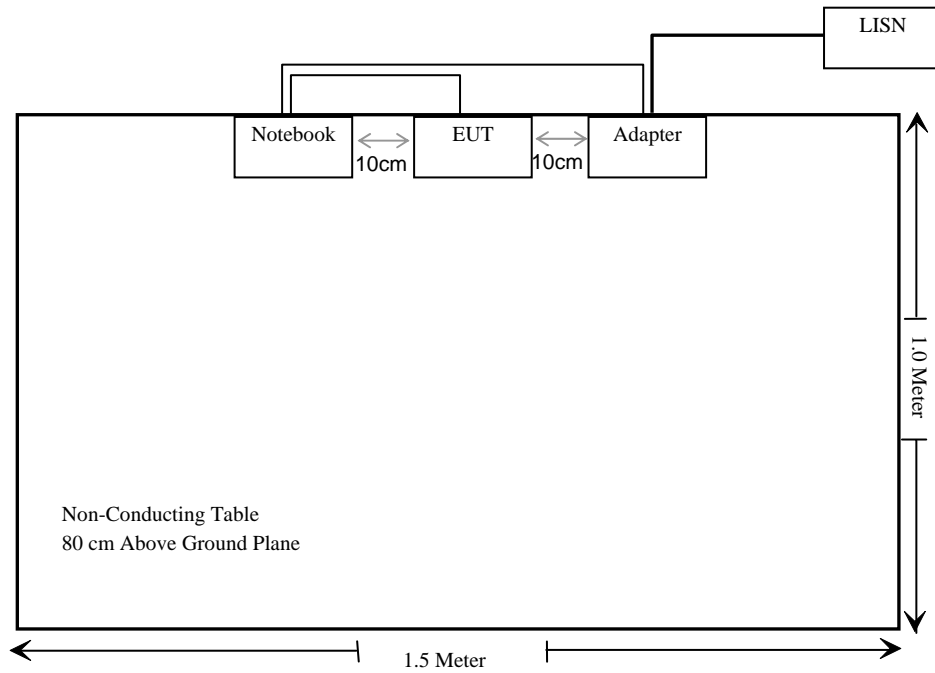
External I/O Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable USB Cable	1.20	EUT	PC

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
CFR47 §15.247 (i), §1.1307 (b)(1)	RF exposure	Compliant
CFR47 §15.203	Antenna Requirement	Compliant
CFR47 §15.207 (a)	Conducted Emissions	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 §15.247 (i) and §1.1310 §2.1093 - RF EXPOSURE

Standard Applicable

According to CFR47 § 1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to FCC Exclusion list, In the following table, f_{GHz} is mid-band frequency in GHz, and d is the distance to a person's body, excluding hands, wrists, feet, and ankles.

Exposure category	<u>low threshold</u>	<u>high threshold</u>
general population	$(60/f_{\text{GHz}})$ mW, $d < 2.5$ cm $(120/f_{\text{GHz}})$ mW, $d \geq 2.5$ cm	$(900/f_{\text{GHz}})$ mW, $d < 20$ cm
occupational	$(375/f_{\text{GHz}})$ mW, $d < 2.5$ cm $(900/f_{\text{GHz}})$ mW, $d \geq 2.5$ cm	$(2250/f_{\text{GHz}})$ mW, $d < 20$ cm

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

Measurement Result:

This is a portable device and the Max peak output power is $3.741\text{mW} < 24.58\text{mW} = (60/2.441\text{GHz}) \text{mW}$

The SAR measurement is not necessary.

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.

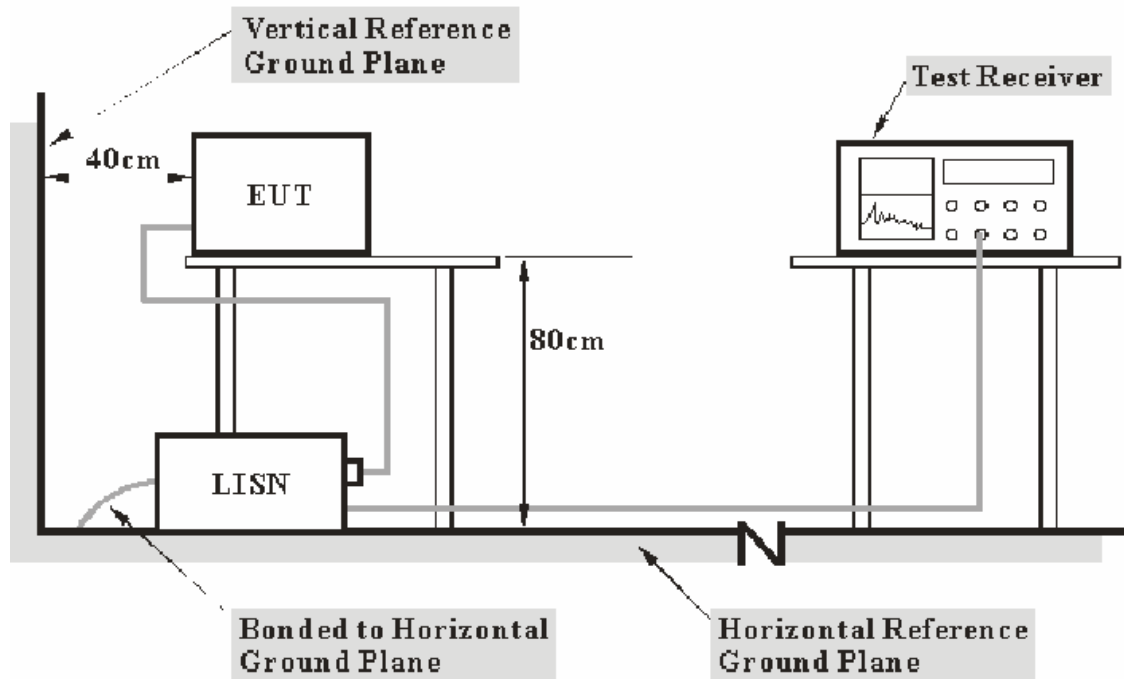
§15.207 (a) - CONDUCTED EMISSIONS

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 ± 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 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:

<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	2007-09-29	2008-09-29
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-26	2008-03-26
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2007-05-09	2008-05-09

* 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 was connected to the outlet of the first LISN, and all other support equipment power cords were connected to the outlet of the second 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:

10.40 dB at 18.590 MHz in the **Neutral** 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 2008-02-15

Test Mode: Charging

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	Amplitude (dBμV)	Detector (QP/AV)	Conductor (Live/Neutral)	Limit (dBμV)	Margin (dB)
18.590	49.60	QP	Neutral	60.00	10.40
18.555	48.30	QP	Hot	60.00	11.70
18.765	36.40	AV	Neutral	50.00	13.60
18.830	35.10	AV	Hot	50.00	14.90
0.245	36.60	AV	Neutral	51.92	15.32
0.240	34.80	AV	Hot	52.10	17.30
11.415	42.40	QP	Neutral	60.00	17.60
13.210	41.00	QP	Hot	60.00	19.00
13.225	30.00	AV	Hot	50.00	20.00
11.555	29.60	AV	Neutral	50.00	20.40
0.365	27.30	AV	Neutral	48.61	21.31
0.360	26.20	AV	Hot	48.73	22.53
1.465	23.20	AV	Neutral	46.00	22.80
5.805	37.10	QP	Hot	60.00	22.90
5.805	26.70	AV	Hot	50.00	23.30
0.245	38.60	QP	Neutral	61.92	23.32
0.240	37.30	QP	Hot	62.10	24.80
1.575	31.00	QP	Hot	56.00	25.00
1.465	30.50	QP	Neutral	56.00	25.50
1.570	19.40	AV	Hot	46.00	26.60
0.650	28.60	QP	Neutral	56.00	27.40
0.365	31.00	QP	Neutral	58.61	27.61
0.360	30.00	QP	Hot	58.73	28.73
0.650	10.10	AV	Neutral	46.00	35.90

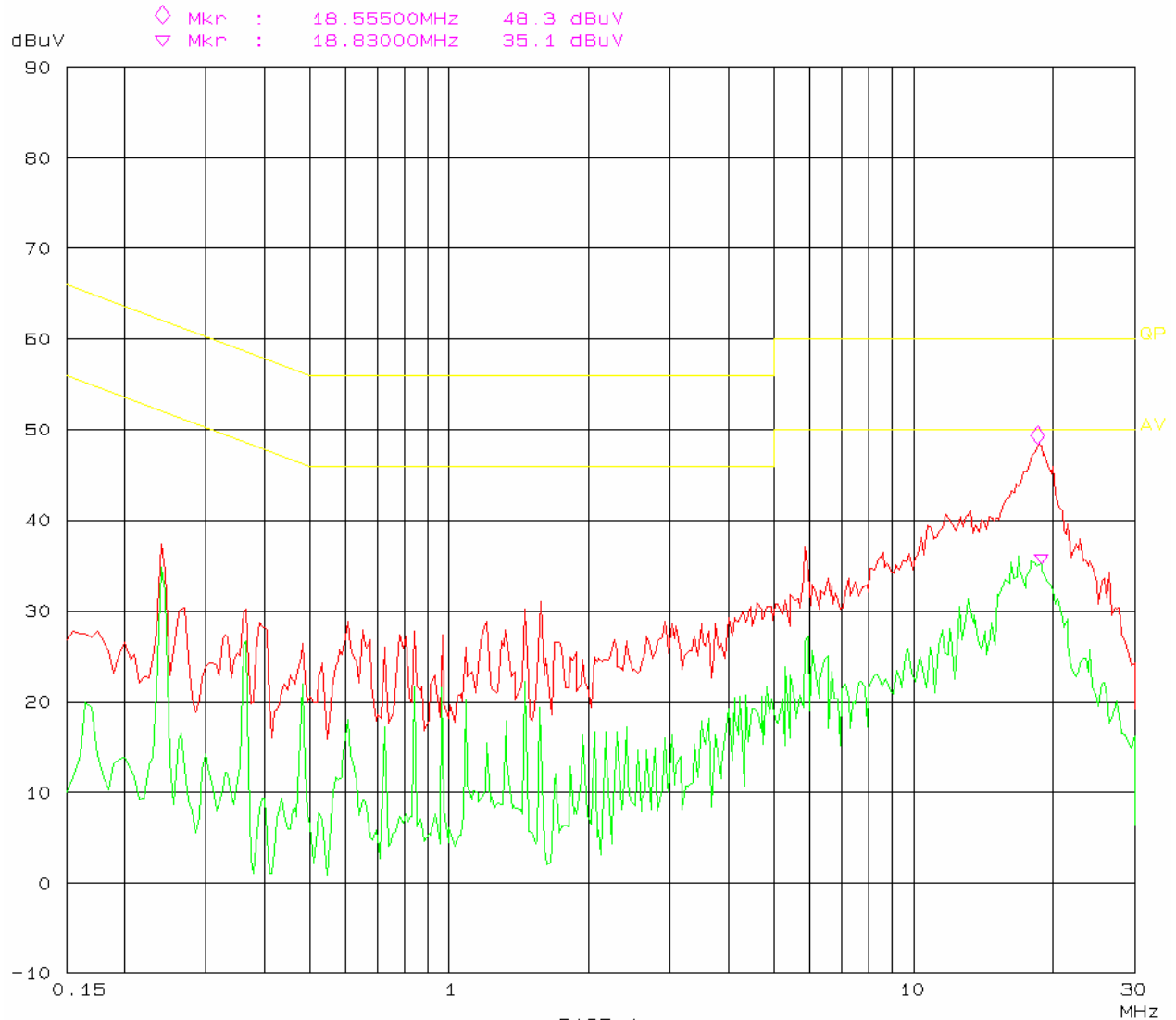
Plot(s) of Test Data

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

CONDUCTED EMISSION TEST
FCC Part15 B

15. Feb 08 23: 03

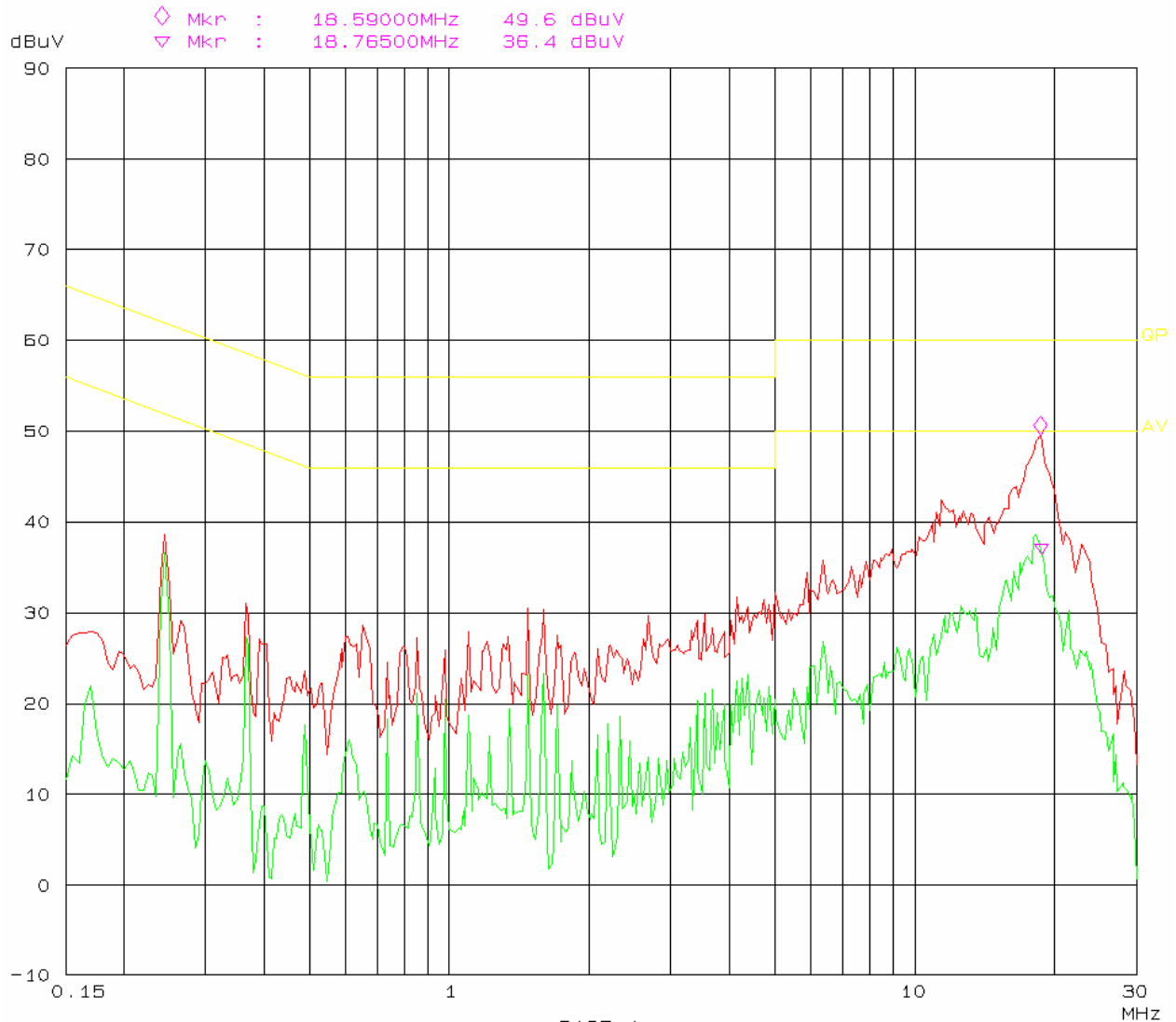
EUT: Bluetooth Headset M/N: GBH909
Manuf: WEIFANG
Op Cond: CHARGING
Operator: PHOENIX
Test Spec: AC120V/60HZ H
Comment: Temp: 25 Humi: 56%



CONDUCTED EMISSION TEST
FCC Part15 B

15. Feb 08 22: 46

EUT: Bluetooth Headset M/N: GBH909
Manuf: WEIFANG
Op Cond: CHARGING
Operator: PHOENIX
Test Spec: AC120V/60HZ N
Comment: Temp: 25 Humi: 56%



CFR47 §15.205, §15.209, §15.247 - RADIATED EMISSIONS

Applicable Standard

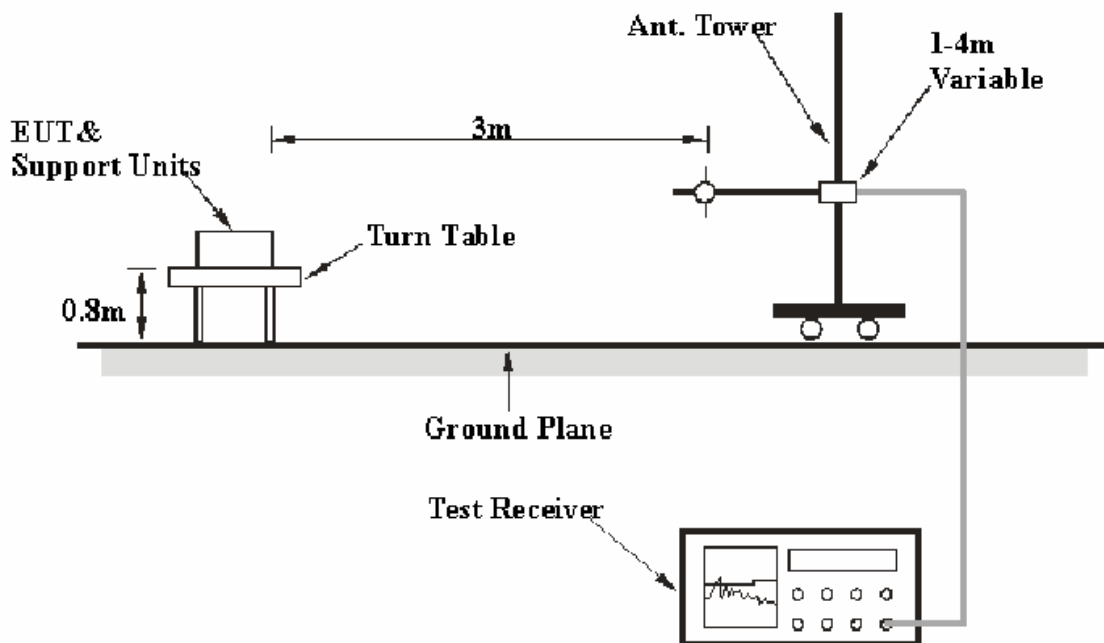
CFR47 §15.205; §15.209; §15.247 (d).

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:

<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	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:

30MHz-1000MHz:

1.6 dB at 215.872225 MHz in the Horizontal polarization

Above 1 GHz:

7.18dB 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)

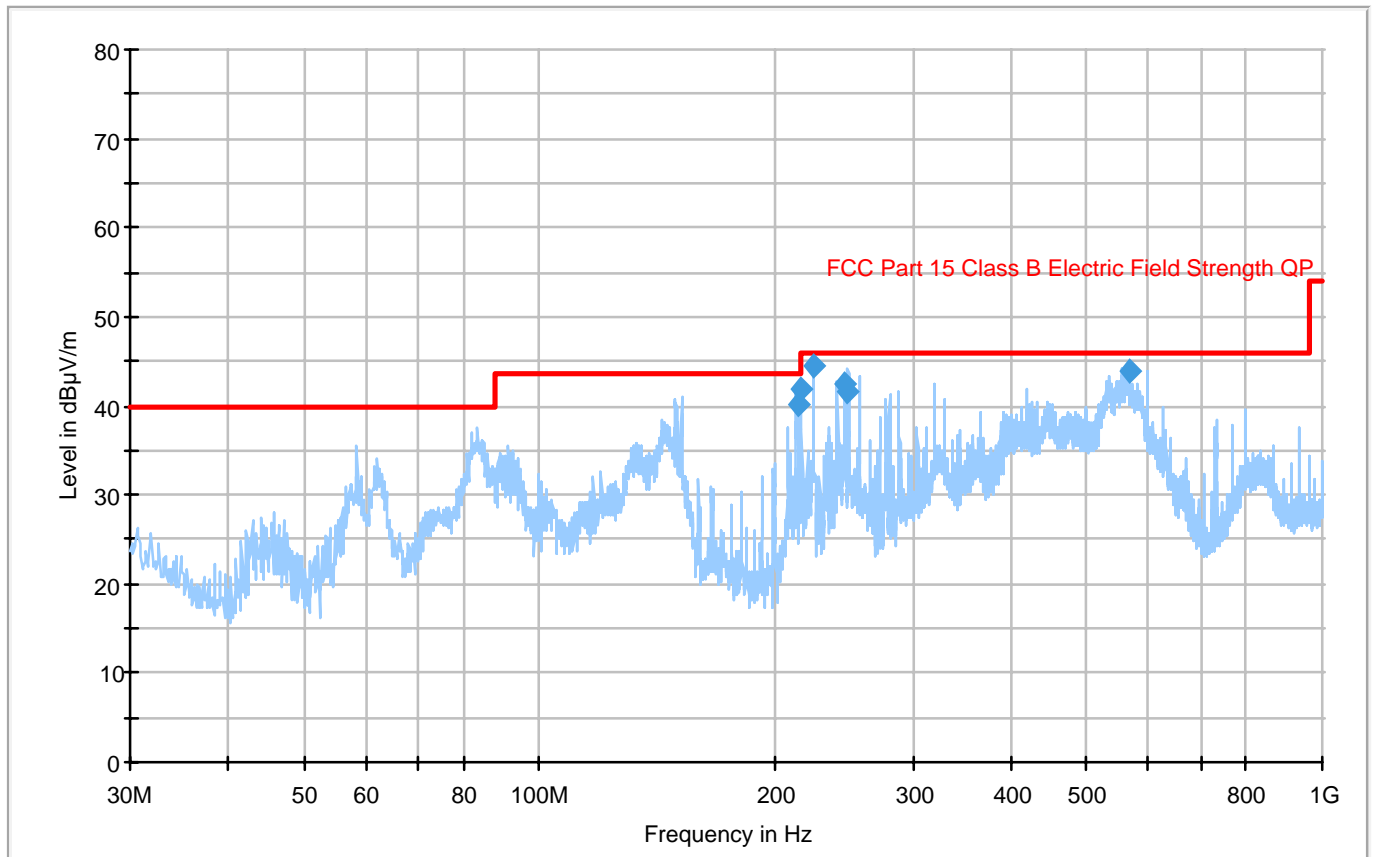
Test Data

Environmental Conditions

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

The testing was performed by Phoenix Liu on 2008-01-27

Test Mode: Transmitting



Frequency (MHz)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
215.872225	41.9	172.0	H	206.0	-12.8	43.5	1.6*
223.971200	44.3	117.0	H	120.0	-12.6	46.0	1.7*
566.306575	43.9	172.0	H	191.0	-3.8	46.0	2.1*
213.292025	40.2	185.0	H	207.0	-12.8	43.5	3.3*
245.334200	42.5	167.0	H	126.0	-11.8	46.0	3.5*
247.848300	41.6	151.0	H	125.0	-11.8	46.0	4.4

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 (2402 MHz)												
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
1190	45.21	AV	180	1.2	V	26.0	2.77	35.0	38.98	54	15.02	harmonic
1190	42.56	AV	180	1.2	H	26.5	2.77	35.0	36.83	54	17.17	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
1190	48.57	PK	45	1.2	H	26.5	2.77	35.0	42.84	74	31.16	harmonic
1190	48.49	PK	45	1.2	V	26.0	2.77	35.0	42.26	74	31.74	harmonic
Middle Channel (2441 MHz)												
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
1660	48.01	AV	135	1.3	H	26.0	2.77	35.0	41.78	54	12.22	harmonic
1660	47.21	AV	85	1.5	V	26.5	2.77	35.0	41.48	54	12.52	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
1660	49.84	PK	265	1.4	V	26.5	2.77	35.0	44.11	74	29.89	harmonic
1660	50.00	PK	156	1.4	H	26.0	2.77	35.0	43.77	74	30.23	harmonic
High Channel (2480 MHz)												
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	48.20	54	5.80	harmonic
1690	49.50	AV	210	1.2	V	26.0	2.77	35.0	87.68	54	10.73	spurious
1690	45.78	AV	156	1.2	H	26.5	2.77	35.0	40.05	54	13.95	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
1690	50.85	PK	240	1.4	V	26.0	2.77	35.0	44.62	74	29.38	spurious
1690	48.75	PK	128	1.5	H	26.5	2.77	35.0	43.02	74	30.98	spurious

* Within measurement uncertainty.

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 2008-01-27.

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low Channel	2402	1004	549	Pass
Adjacent Channel	2403			
Mid Channel	2441	1004	565	Pass
Adjacent Channel	2442			
High Channel	2480	1004	570	Pass
Adjacent Channel	2479			

Test Result: Compliance.

Please refer to following plots

Low Channel

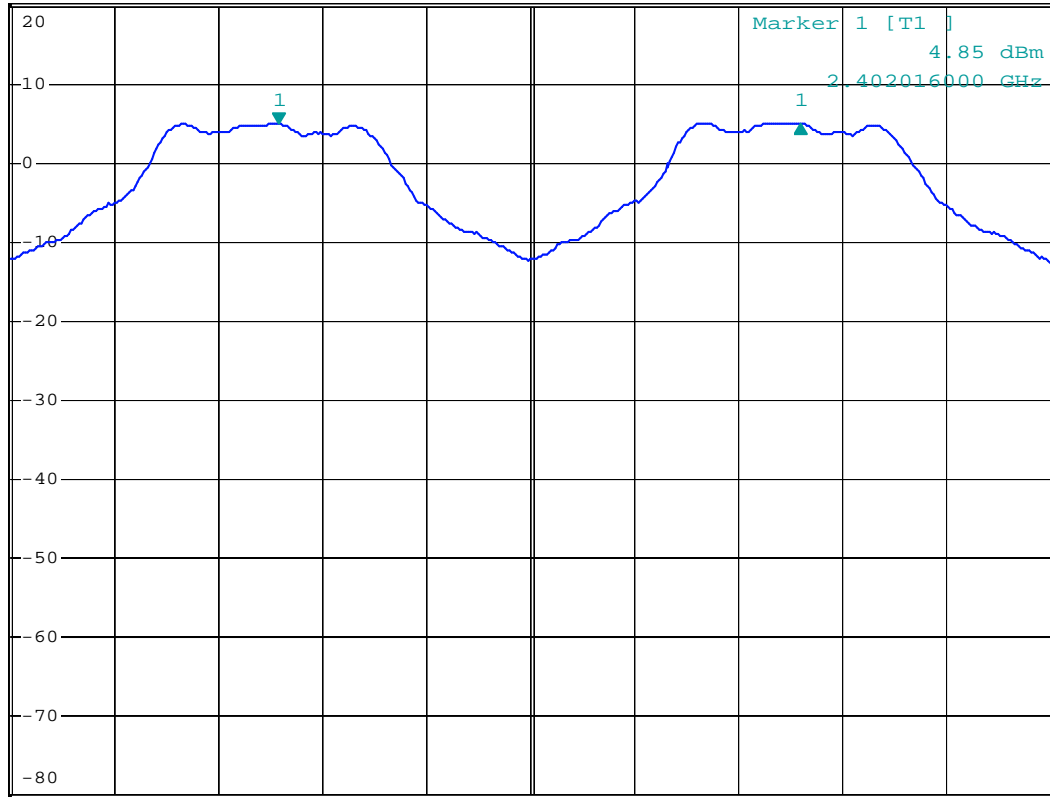


*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz 0.09 dB
SWT 2.5 ms 1.004000000 MHz

Ref 20 dBm

*Att 35 dB

1 PK
MAXH



Center 2.4025 GHz

200 kHz/

Span 2 MHz

channel separation low channel

Date: 27.JAN.2008 23:03:44

Middle Channel

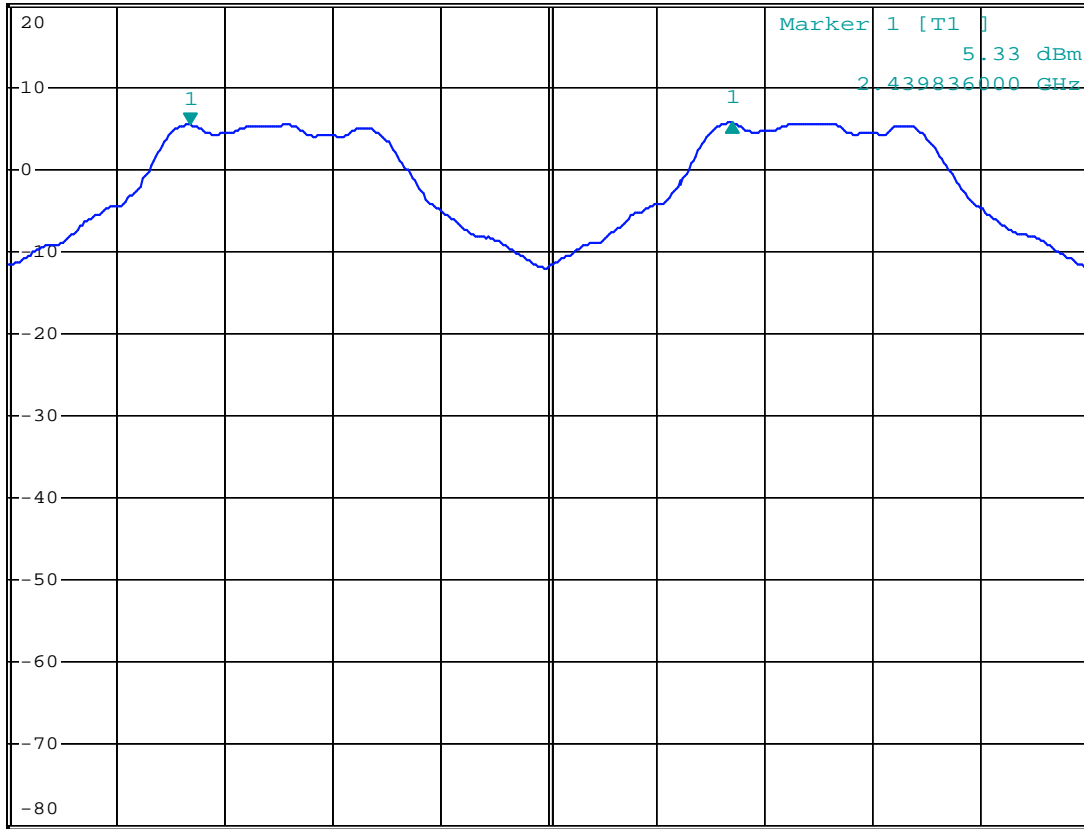


*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz 0.25 dB
SWT 2.5 ms 1.004000000 MHz

Ref 20 dBm

*Att 35 dB

1 PK
MAXH



Center 2.4405 GHz

200 kHz/

Span 2 MHz

channel separation middle channel

Date: 27.JAN.2008 23:05:53

High Channel

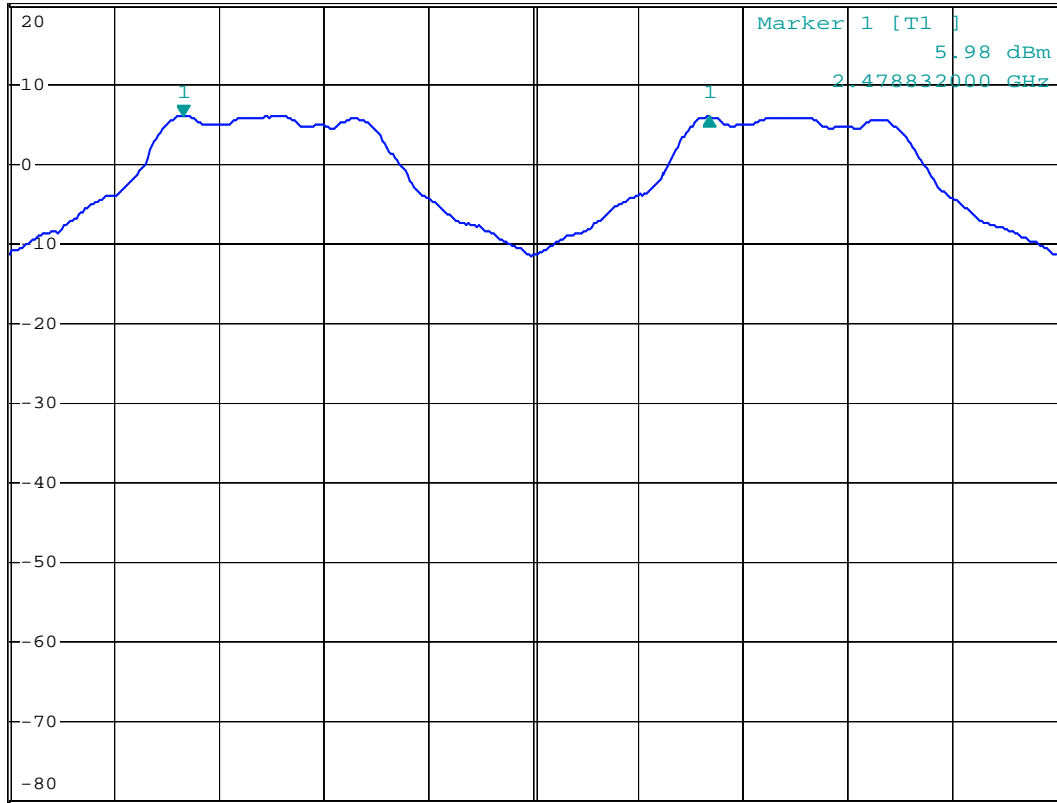


*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.15 dB
SWT 2.5 ms 1.004000000 MHz

Ref 20 dBm

*Att 35 dB

1 PK
MAXH



Center 2.4795 GHz

200 kHz/

Span 2 MHz

channel separation high channel

Date: 27.JAN.2008 23:07:03

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

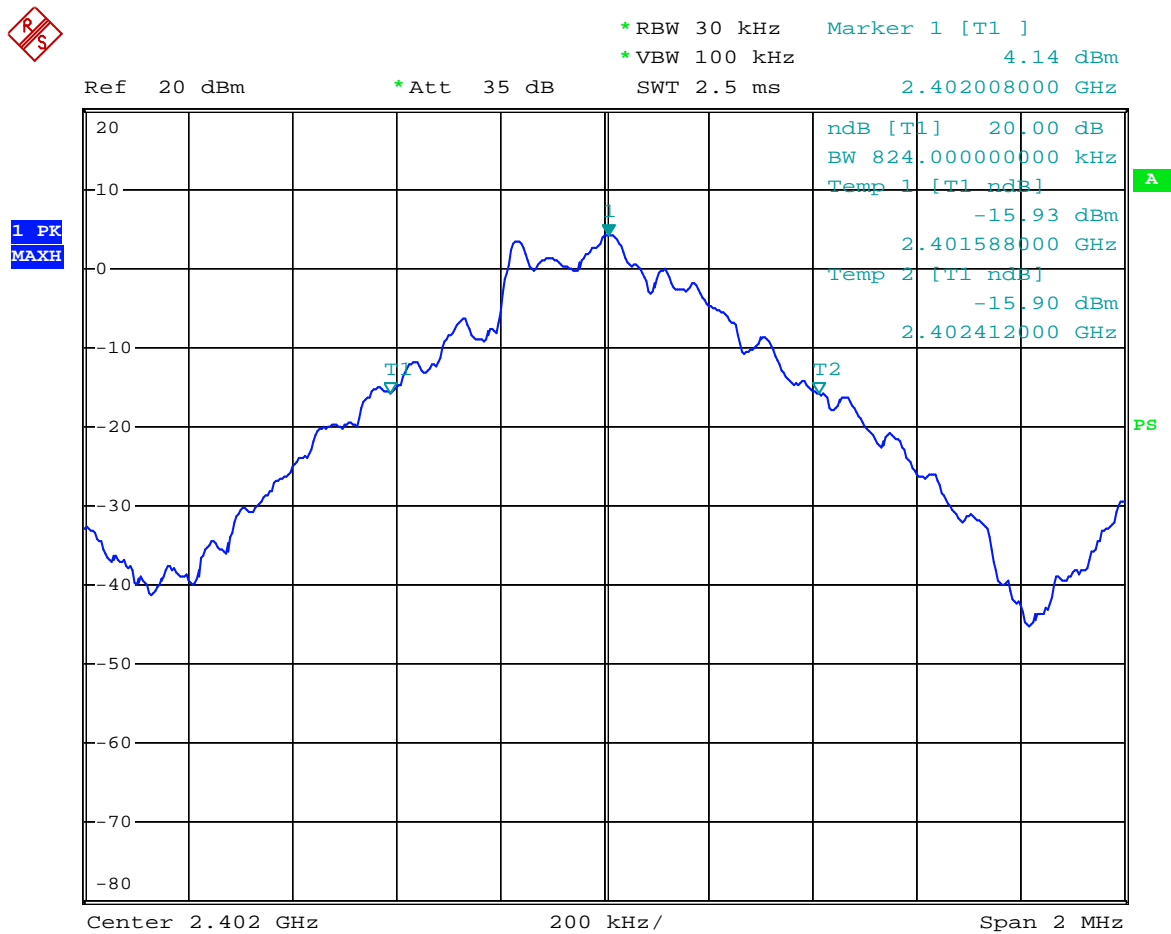
The testing was performed by Phoenix Liu on 2008-01-27.

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

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low	2402	824
Middle	2441	848
High	2480	856

Low Channel



20dB band width low channel

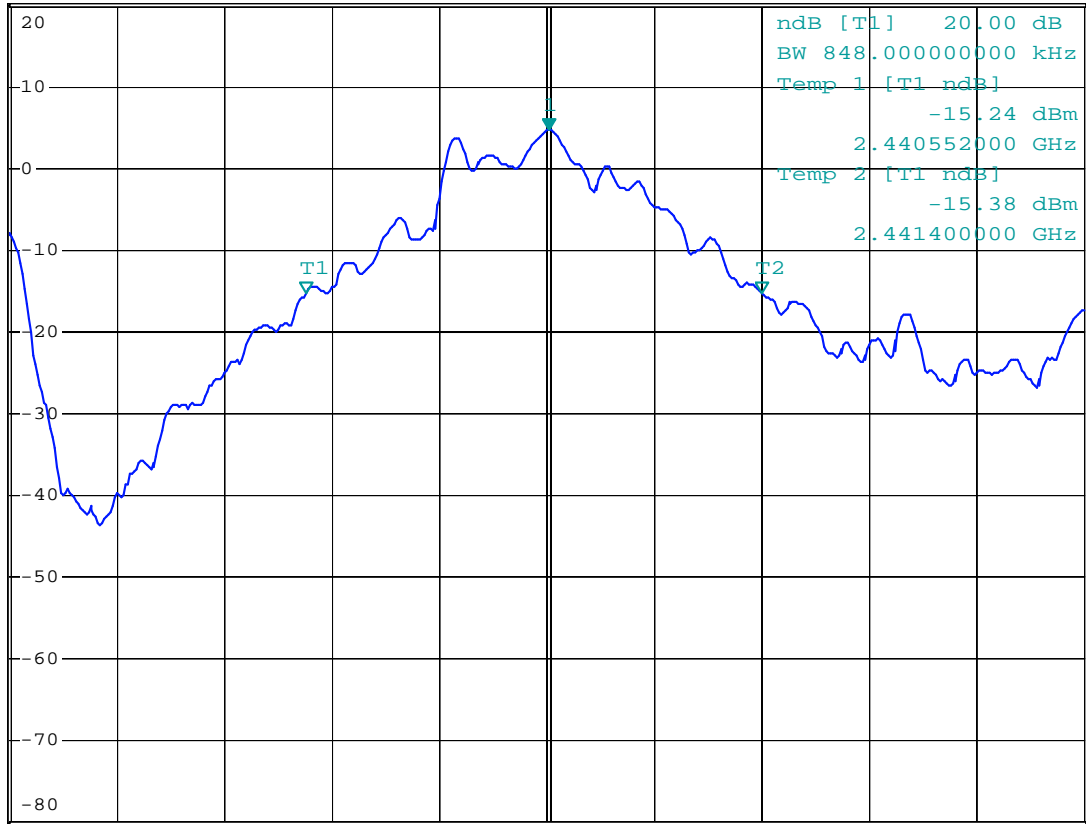
Date: 27.JAN.2008 23:20:37

Middle Channel



Ref 20 dBm *Att 35 dB *RBW 30 kHz Marker 1 [T1] 4.57 dBm
*VBW 100 kHz 2.441004000 GHz
SWT 2.5 ms

1 PK
MAXH



Center 2.441 GHz 200 kHz/ Span 2 MHz

20dB band width middle channel

Date: 27.JAN.2008 23:19:44

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 2008-01-27.

Test Mode: Transmitting

Test Result: Compliance.

Please refer to following plot.

Number of Hopping Channels



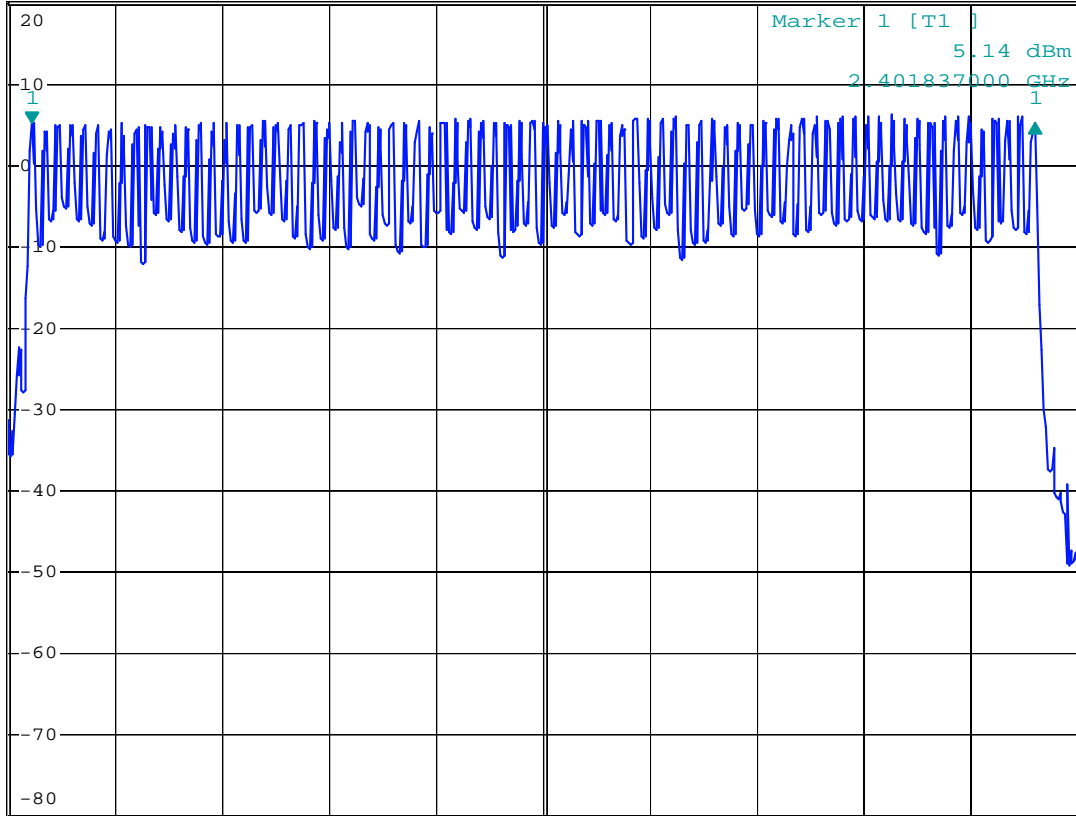
*RBW 100 kHz Delta 1 [T1]
*VBW 300 kHz -0.03 dB
78.32300000 MHz

Ref 20 dBm

*Att 35 dB

SWT 10 ms

1 PK
VIEW



Start 2.4 GHz

8.35 MHz/

Stop 2.4835 GHz

hopping channels

Date: 27.JAN.2008 22:25:38

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 * hope 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 2008-01-27.

Test Mode: Transmitting

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

Channel	Pulse width (msec)	Dwell time (sec)	Limit (sec)	Result
Low	0.545	0.174	0.4	Pass
Middle	0.540	0.173	0.4	Pass
High	0.540	0.173	0.4	Pass

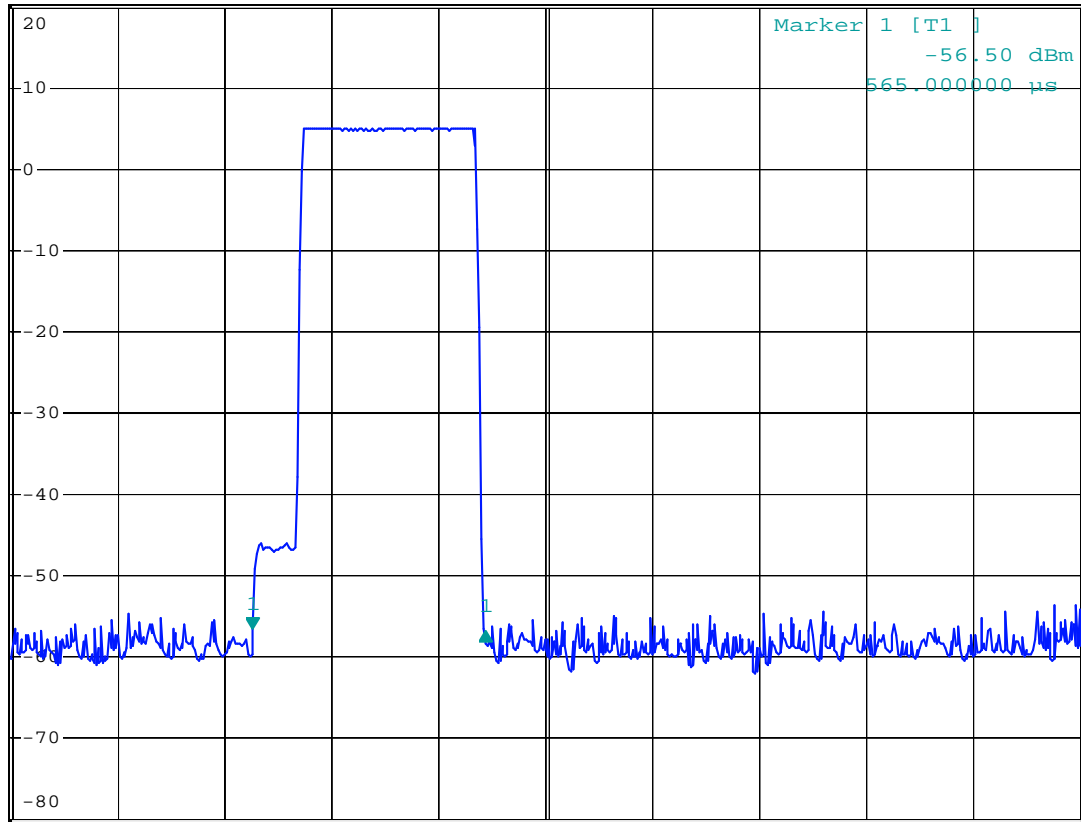
NOTE: Dwell time=Pulse width (ms) × (1600 ÷ 2 ÷ 79) × 31.6 Second

Low Channel



Ref 20 dBm *Att 35 dB RBW 1 MHz Delta 1 [T1]
*VBW 3 MHz -0.14 dB
SWT 2.5 ms 545.000000 μs

1 PK
MAXH



Center 2.402 GHz 250 μs/

dwll time low channel

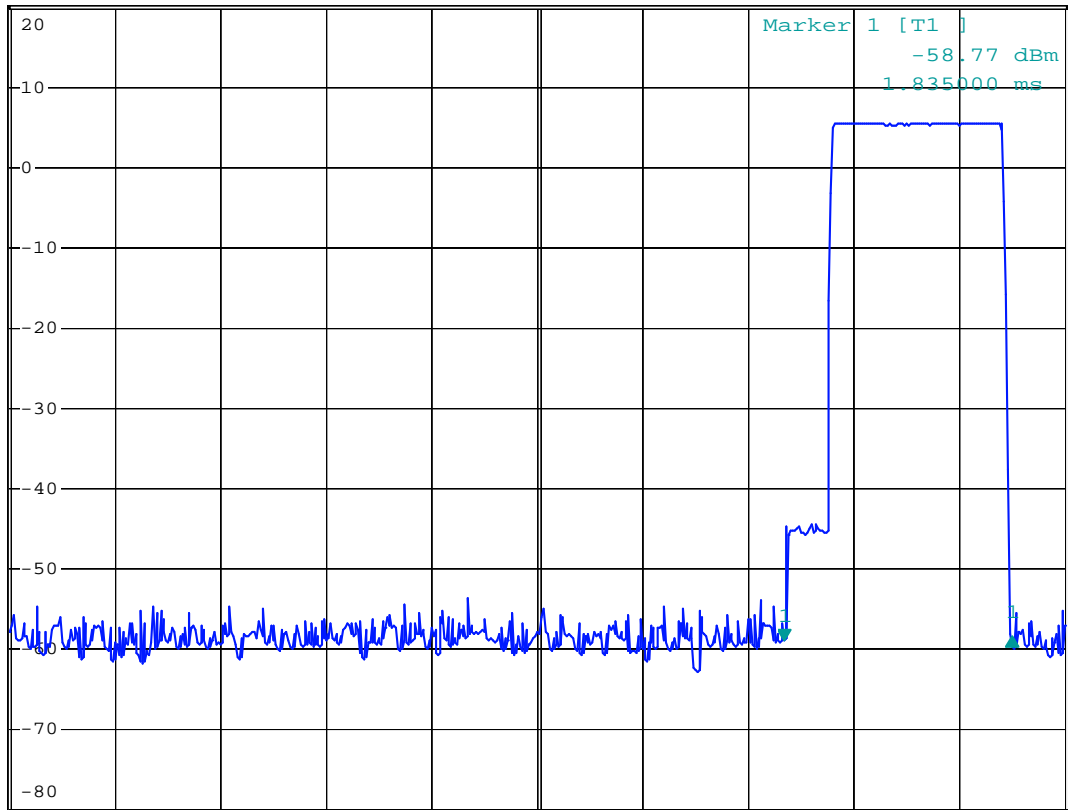
Date: 27.JAN.2008 23:15:51

Middle Channel



RBW 1 MHz Delta 1 [T1]
*VBW 3 MHz 0.47 dB
Ref 20 dBm *Att 35 dB SWT 2.5 ms 540.000000 μ s

1 PK
MAXH



Center 2.441 GHz 250 μ s/

dwll time middle channel

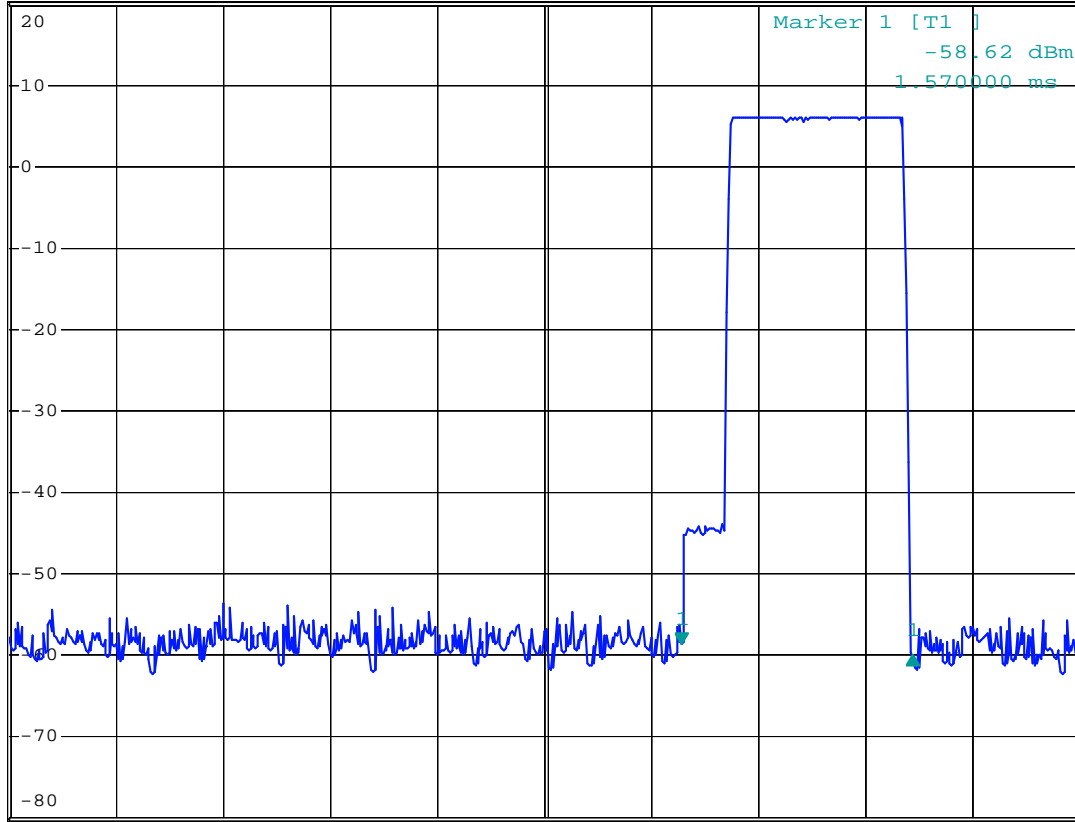
Date: 27.JAN.2008 23:13:49

High Channel



Ref 20 dBm *Att 35 dB RBW 1 MHz Delta 1 [T1]
*VBW 3 MHz -1.42 dB
SWT 2.5 ms 540.000000 μs

1 PK
MAXH



Center 2.48 GHz 250 μs/

dwll time high channel

Date: 27.JAN.2008 23:12:33

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 2008-01-27.

Test Mode: Transmitting

Test Result: Compliance.

Freq. (MHz)	Receiver Reading (dB μ V)	Detector (PK/AV)	Table Direction Degree	Antenna		Cable Loss (dB/m)	Pre-Amp. (dB)	Cord. Amp. (dB μ V/m)	Trans. Factor (dB)	EIRP		FCC 15.247 Limit (mW)
				Height (m)	Factor (dB)					(dBm)	(mW)	
Low Channel												
2402	98.4	PK	90	1	29.6	2.5	35	95.5	95.27	0.23	1.054	125
Middle Channel												
2441	97.06	PK	128	1.5	29.6	2.5	35	94.16	95.27	-1.11	0.774	125
High Channel												
2480	95.45	PK	65	1.4	29.6	2.5	35	92.55	95.27	-2.72	0.535	125

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 2008-01-27.

Test Mode: Transmitting

Frequency (MHz)	Delta Peak to band emission (dBc)	Limit (dBc)
2402	-32.84	20
2480	-46.71	20

Test Result: Pass

Please refer to the following plots.

Band Edge Left Side



*RBW 100 kHz Marker 2 [T1]
*VBW 300 kHz -32.84 dBm
SWT 2.5 ms 2.399516000 GHz

Ref 20 dBm

*Att 35 dB

1 PK
VIEW



Start 2.39 GHz

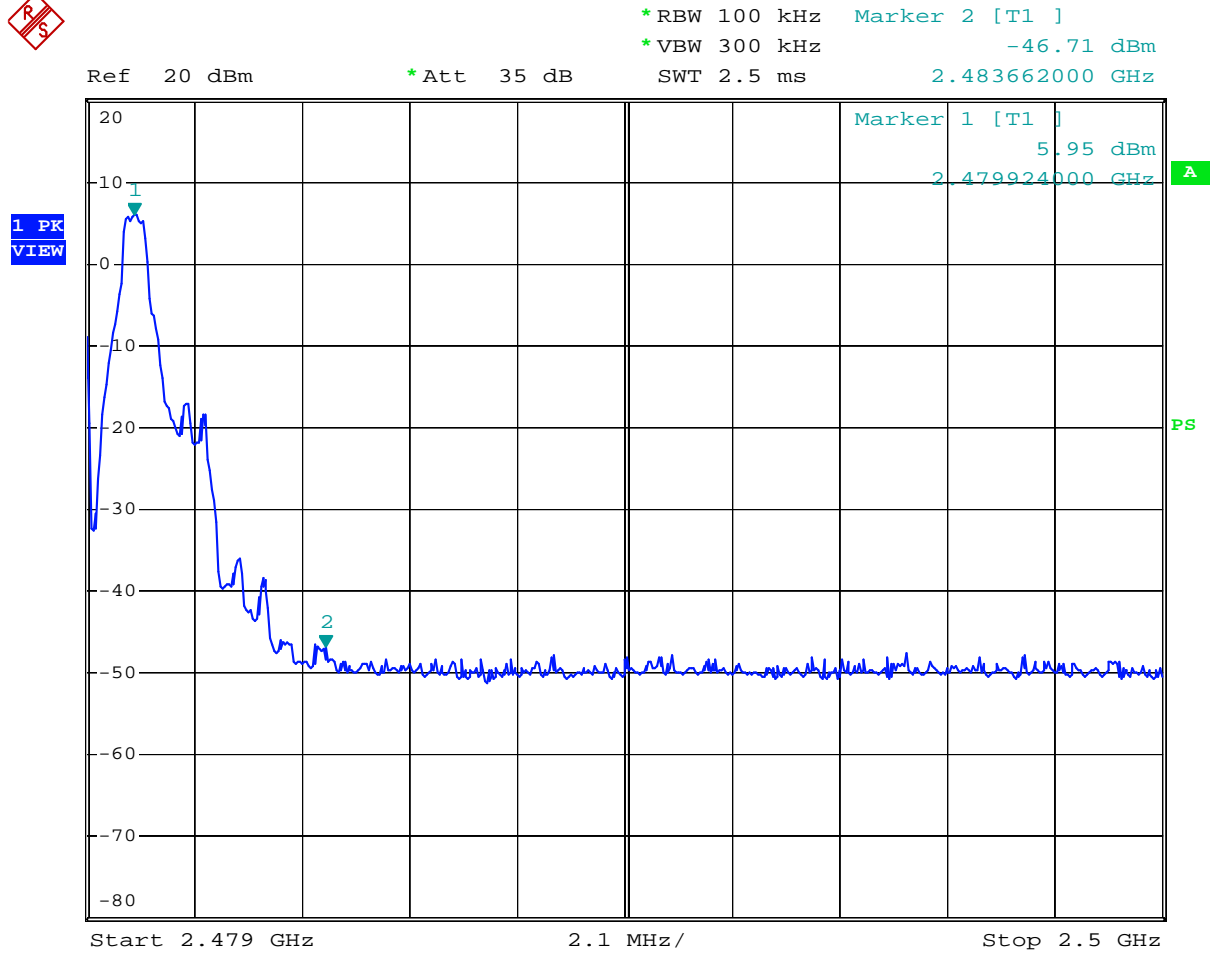
1.3 MHz/

Stop 2.403 GHz

out of band edge left

Date: 27.JAN.2008 23:39:34

Band Edge Right Side



out of band edge right

Date: 27.JAN.2008 23:42:02

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