

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-GBDA90

This Report Concerns: <input checked="" type="checkbox"/> Original Report		Equipment Type: Bluetooth Dongle for iPod	
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Report No.:	RSZ08030504		
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Report Date:	2008-04-30		
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Weifang GoerTek Electronics Co.,Ltd* 's product, model number: *GBDA90* or the "EUT" as referred to in this report is a *Bluetooth dongle for iPod* , which measures approximately: 4.2 cm L x 3.3 cm W x 0.92 cm H, rated input voltage: iPod 3.0V.

The series products, the all model 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: 0803013 (Assigned by BACL, Shenzhen). The EUT was received on 2008-03-05.*

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).



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 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.

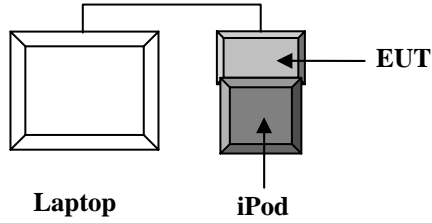
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
COMPAQ	Laptop	PP2040	470037-722	DoC
iPod	iPod	A0099	TJ702B49VQ5	DoC

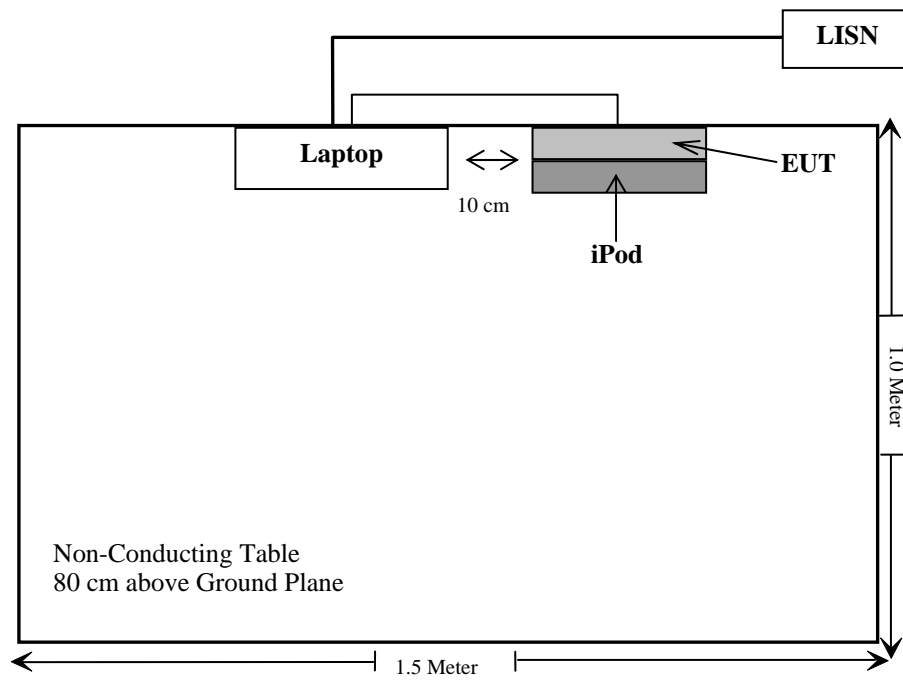
External I/O Cable

Cable Description	Length (m)	From Port	To
Shielded Detachable USB Cable	1.0	EUT	PC(Laptop)

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	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 §15.247 (i) and §1.1310 §2.1091 - RF EXPOSURE

Standard Applicable

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.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance

$$S = \frac{EIRP}{4\pi R^2}$$

Where: EIRP = equivalent (or effective) isotropically radiated power

S = power density (in appropriate units, e.g. mW/cm²)

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

EIRP: 12.80 (dBm)

EIRP: 19.05 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2402 (MHz)

The worst case is power density at predication frequency at 20 cm: 0.0038 (mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0038 (mW/cm²) < 1 (mW/cm²)

Result: 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 integral antenna. The maximum gain is 2.03 dBi.

Result: Compliance.

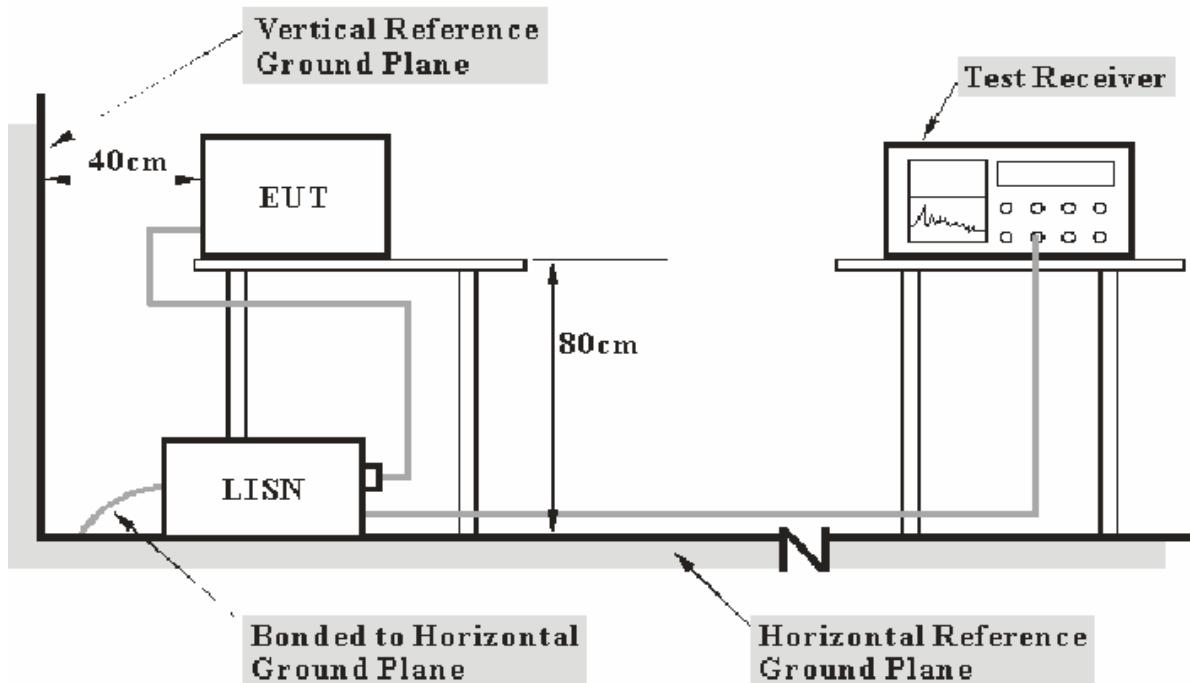
CFR47 §15.207 (a) - CONDUCTED EMISSIONS

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 (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 laptop 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
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

* 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 laptop 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:

10.9 dB at 2.50 MHz in the **Neutral** conductor mode.

Test Data**Environmental Conditions**

Temperature:	22 ° C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-04-07.

Test Mode: PC Charging

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)
2.500	35.10	AV	Neutral	46.00	10.90
3.160	31.70	AV	Hot	46.00	14.30
4.880	30.00	AV	Hot	46.00	16.00
1.100	38.00	QP	Hot	56.00	18.00
5.070	31.80	AV	Neutral	50.00	18.20
3.160	37.70	QP	Hot	56.00	18.30
1.100	27.60	AV	Hot	46.00	18.40
2.500	37.00	QP	Neutral	56.00	19.00
4.880	36.50	QP	Hot	56.00	19.50
1.080	26.10	AV	Neutral	46.00	19.90
1.080	34.70	QP	Neutral	56.00	21.30
5.000	38.30	QP	Neutral	60.00	21.70
0.200	41.80	QP	Neutral	63.60	21.80
0.470	24.50	AV	Neutral	46.50	22.00
0.210	40.20	QP	Hot	63.20	23.00
0.200	30.50	AV	Neutral	53.60	23.10
8.520	26.50	AV	Hot	50.00	23.50
8.450	34.80	QP	Hot	60.00	25.20
0.150	40.50	QP	Hot	66.00	25.50
0.270	25.20	AV	Neutral	51.10	25.90
0.210	27.30	AV	Hot	53.20	25.90
0.270	34.10	QP	Neutral	61.10	27.00
0.470	28.10	QP	Neutral	56.50	28.40
0.150	20.30	AV	Hot	56.00	35.70

Plot(s) of Test Data

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

Conduction emission test
FCC Part 15

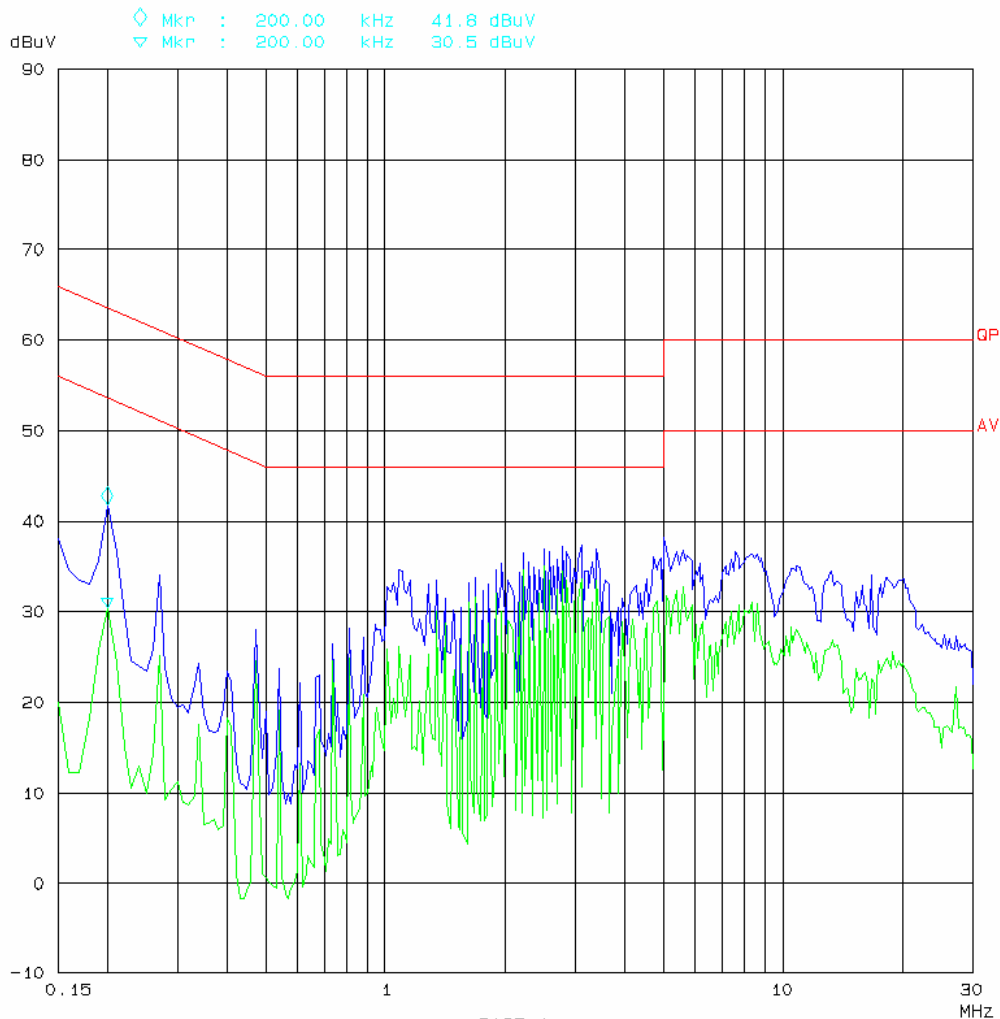
07. Apr 08 11:10

EUT: Bluetooth Dongle for iPod M/N: GBDA90
 Manuf: Goertek
 Op Cond: PC charging
 Operator: Phoenix
 Test Spec: AC 120V/60HZ N
 Comment: Temp: 25 Humi: 56%

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	10k	9k	PK+AV	20ms	AUTO LN	OFF

Final Measurement:	x QP / + AV	Transducer	No.	Start	Stop	Name
Meas Time:	1 s		5	150k	30M	ESH2_Z5
Subranges:	8					
Acc Margin:	6dB					



Conduction emission test
FCC Part 15

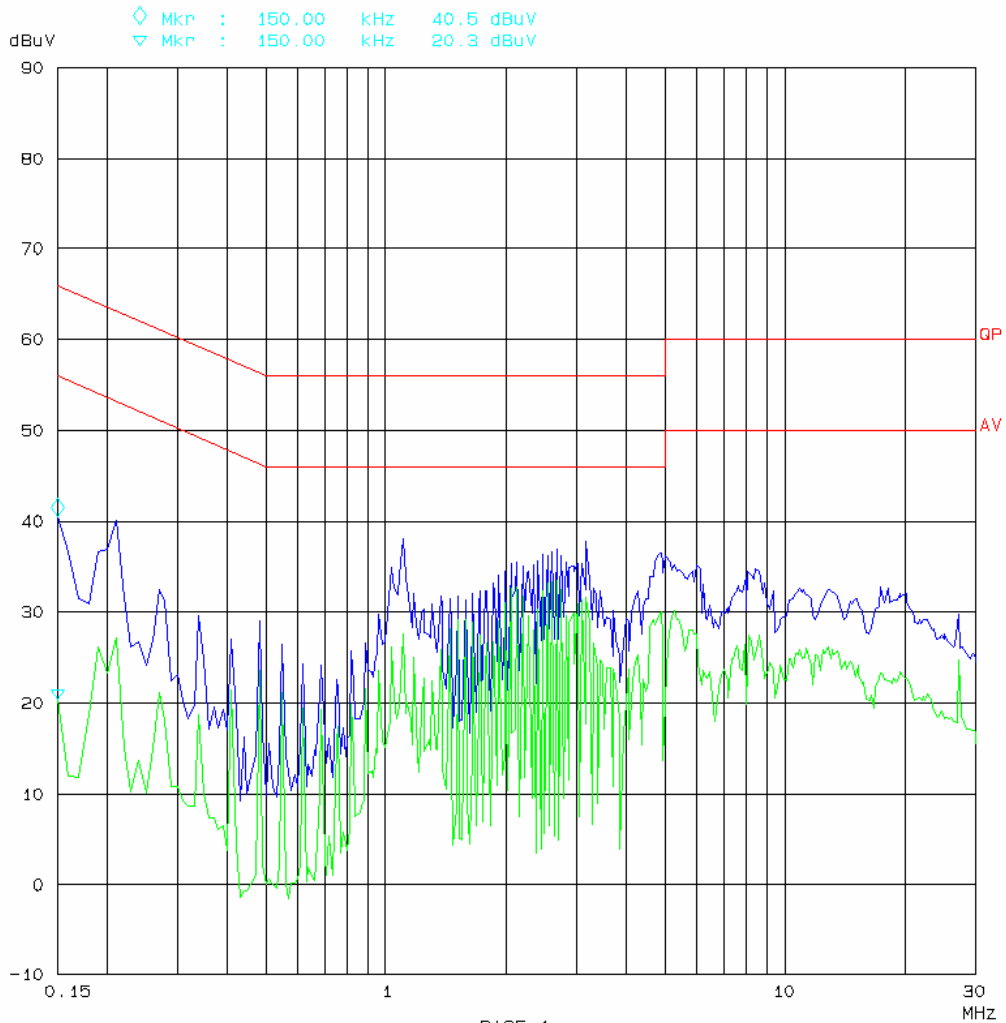
07. Apr 08 11:23

EUT: Bluetooth Dongle for iPod M/N: GBDA90
 Manuf: Goertek
 Op Cond: PC charging
 Operator: Phoenix
 Test Spec: AC 120V/60HZ H
 Comment: Temp: 25 Humi: 56%

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	10k	9k	PK+AV	20ms	AUTO LN	OFF

Final Measurement:	x GP / + AV	Transducer	No.	Start	Stop	Name
Meas Time:	1 s		5	150k	30M	ESH2_Z5
Subranges:	8					
Acc Margin:	6dB					



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

Applicable Standard

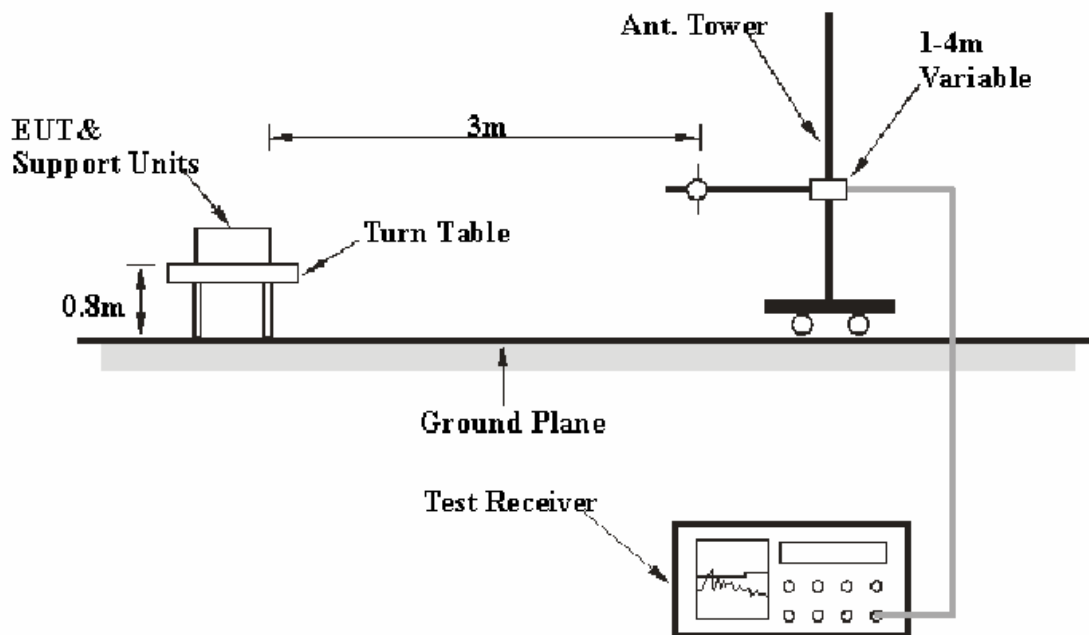
CFR47 §15.205; §15.209; §15.247 (d).

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 laptop 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 laptop 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:

- 3.90 dB** at **533.325100 MHz** in the **Horizontal** polarization, **for below 1GHz (Charging Mode)**
- 4.30 dB** at **599.989950 MHz** in the **Vertical** polarization, **for below 1GHz (Transmitting Mode)**
- 1.19 dB** at **7206 MHz** in the **Horizontal** polarization, **for above 1GHz (Low Channel)**
- 0.93 dB** at **7324 MHz** in the **Vertical** polarization, **for above 1GHz (Middle Channel)**
- 0.51dB** at **7440 MHz** in the **Horizontal** polarization, **for above 1GHz (High Channel)**

Test Data

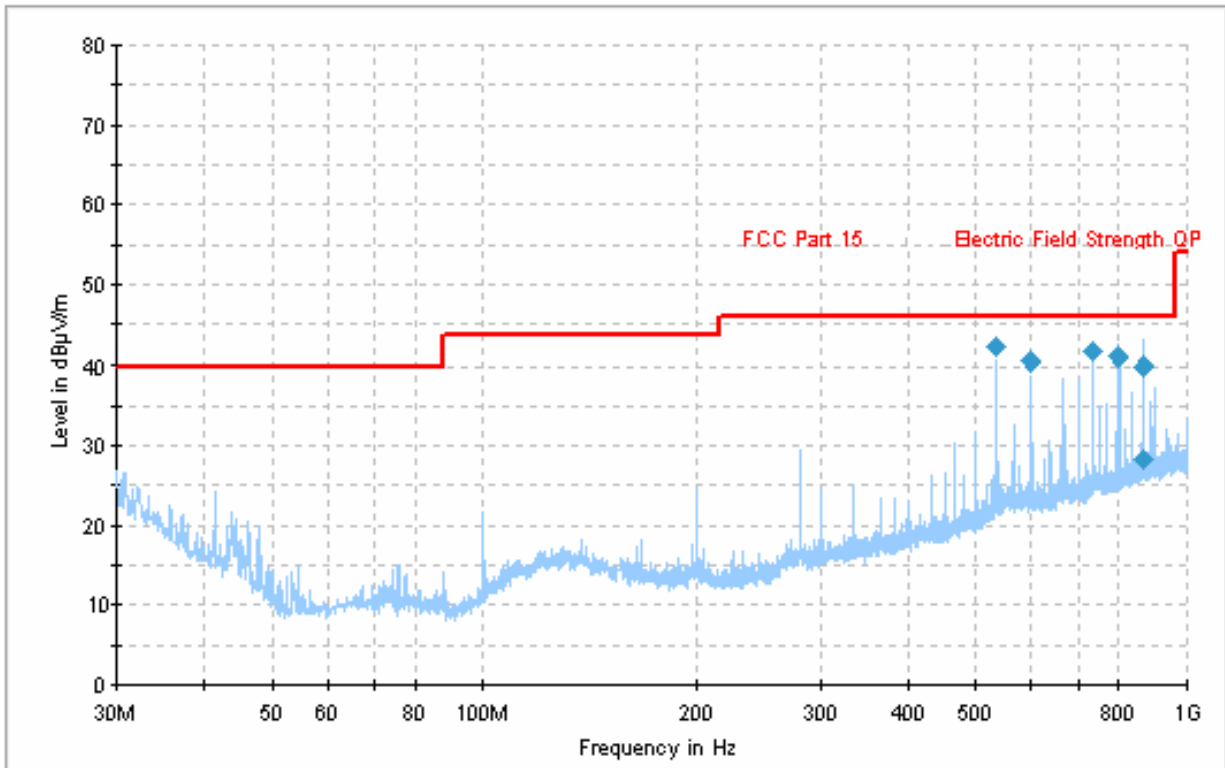
Environmental Conditions

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

The testing was performed by Phoenix Liu on 2008-04-22.

Below 1 GHz:

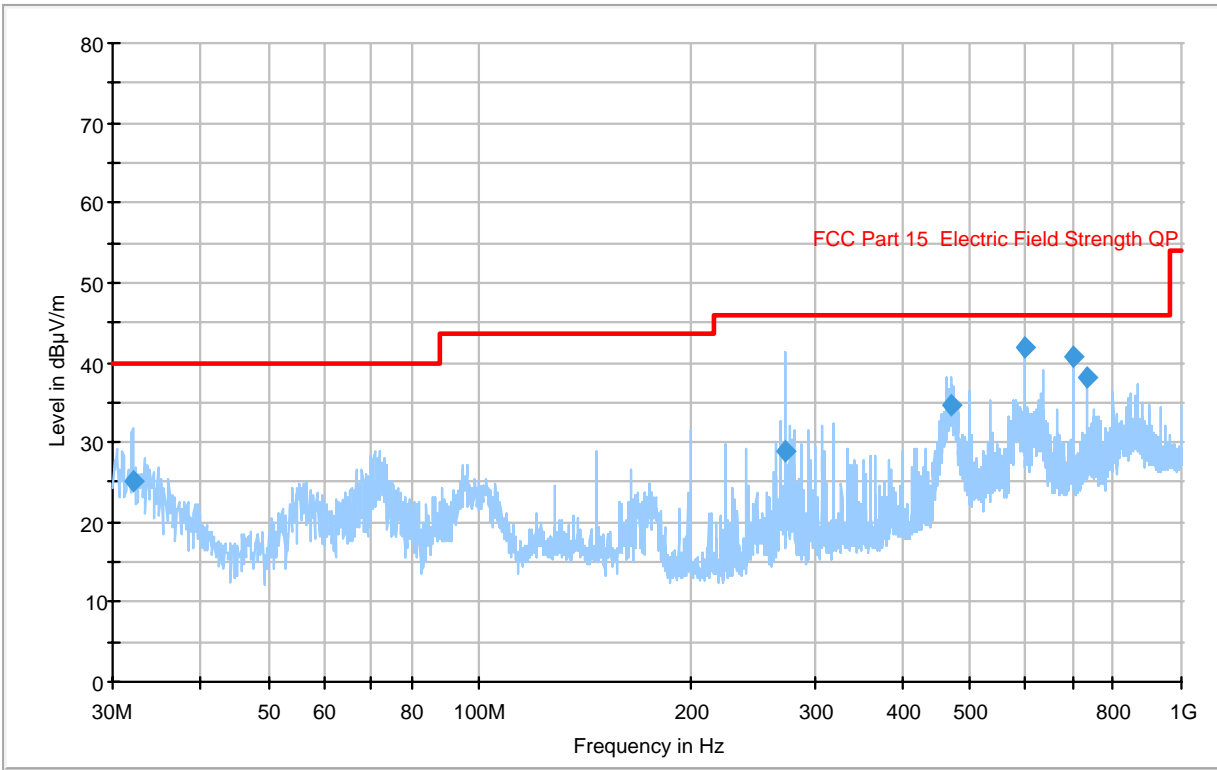
Test Mode: Charging



Frequency (MHz)	Corrected Amp. (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
533.325100	42.1	136.0	H	0.0	-4.5	46.0	3.9*
733.338775	41.7	102.0	H	0.0	-1.2	46.0	4.3
800.007600	41.1	102.0	H	335.0	-0.3	46.0	4.9
600.002025	40.3	177.0	H	173.0	-3.7	46.0	5.7
863.512900	28.4	118.0	V	0.0	0.5	46.0	23.5

* Within measurement uncertainty.

Test Mode: Transmitting



Frequency (MHz)	Corrected Amp. (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
599.989950	41.7	179.0	V	174.0	-3.7	46.0	4.3
700.026450	40.6	104.0	H	334.0	-2.0	46.0	5.4
733.282525	38.1	189.0	H	256.0	-1.2	46.0	7.9
469.379800	34.7	194.0	V	162.0	-6.8	46.0	11.3
32.061675	25.0	104.0	V	309.0	-5.6	40.0	15.0
272.062250	28.9	121.0	V	87.0	-9.5	46.0	17.1

Above 1 GHz

Test Mode: Transmitting

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
Frequency in Low Channel = 2402 MHz												
7206	42.71	AV	90	1.2	H	36.1	6.10	32.1	52.81	54	1.19*	Harmonic
4804	46.05	AV	90	1.0	V	34.7	4.64	33.4	51.99	54	2.01*	Harmonic
4804	46.14	AV	90	1.0	H	34.6	4.64	33.4	51.98	54	2.02*	Harmonic
7206	40.36	AV	90	1.2	V	36.1	6.10	32.1	50.46	54	3.54*	Harmonic
7206	53.07	PK	60	1.2	V	36.1	6.10	32.1	63.17	74	10.83	Harmonic
4804	54.85	PK	180	1.2	H	34.6	4.64	33.4	60.69	74	13.31	Harmonic
7206	50.42	PK	60	1.2	H	36.1	6.10	32.1	60.52	74	13.48	Harmonic
4804	53.76	PK	180	1.2	V	34.7	4.64	33.4	59.70	74	14.30	Harmonic
1198	44.14	AV	180	1.2	V	26.0	2.77	35.0	37.91	54	16.09	Spurious
1198	41.84	AV	180	1.2	H	26.5	2.77	35.0	36.11	54	17.89	Spurious
1198	51.85	PK	45	1.2	V	26.0	2.77	35.0	45.62	74	28.38	Spurious
1198	48.55	PK	45	1.2	H	26.5	2.77	35.0	42.82	74	31.18	Spurious

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
Frequency in Middle Channel = 2441 MHz												
7324	42.97	AV	90	1.2	V	36.1	6.10	32.1	53.07	54	0.93*	Harmonic
7324	42.28	AV	90	1.2	H	36.1	6.10	32.1	52.38	54	1.62*	Harmonic
4882	45.93	AV	243	1.4	V	34.6	4.64	33.4	51.77	54	2.23*	Harmonic
4882	45.43	AV	142	1.6	H	34.7	4.64	33.4	51.37	54	2.63*	Harmonic
7324	50.99	PK	60	1.2	H	36.1	6.10	32.1	61.09	74	12.91	Harmonic
7324	50.68	PK	60	1.2	V	36.1	6.10	32.1	60.78	74	13.22	Harmonic
4882	54.64	PK	153	1.5	V	34.6	4.64	33.4	60.48	74	13.52	Harmonic
4882	53.14	PK	234	1.8	H	34.7	4.64	33.4	59.08	74	14.92	Harmonic
1196	44.22	AV	135	1.3	H	26.0	2.77	35.0	37.99	54	16.01	Spurious
1196	41.16	AV	85	1.5	V	26.5	2.77	35.0	35.43	54	18.57	Spurious
1196	50.93	PK	156	1.4	H	26.0	2.77	35.0	44.70	74	29.30	Spurious
1196	47.87	PK	265	1.4	V	26.5	2.77	35.0	42.14	74	31.86	Spurious

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
Frequency in High Channel = 2480 MHz												
7440	43.39	AV	90	1.2	H	36.1	6.10	32.1	53.49	54	0.51*	Harmonic
7440	42.02	AV	90	1.5	V	36.1	6.10	32.1	52.12	54	1.88*	Harmonic
4960	46.23	AV	142	1.5	V	34.7	4.55	33.4	52.08	54	1.92*	Harmonic
4960	44.66	AV	256	1.8	H	34.6	4.55	33.4	50.41	54	3.59*	Harmonic
2484.92	42.10	AV	180	1.3	V	36.46	4.2	35.0	47.76	54	6.24	Spurious
7440	52.73	PK	60	1.5	V	36.1	6.10	32.1	62.83	74	11.17	Harmonic
4960	53.94	PK	142	1.4	V	34.7	4.55	33.4	59.79	74	14.21	Harmonic
1192	45.89	AV	210	1.2	V	26.0	2.77	35.0	39.66	54	14.34	Spurious
1192	43.99	AV	156	1.2	H	26.5	2.77	35.0	38.26	54	15.74	Spurious
7440	48.1	PK	60	1.2	H	36.1	6.10	32.1	58.20	74	15.80	Harmonic
4960	49.37	PK	145	1.4	H	34.6	4.55	33.4	55.12	74	18.88	Harmonic
2484.92	47.50	PK	145	1.3	V	36.46	4.2	35.0	53.16	74	20.84	Spurious
2484.92	46.80	PK	180	1.3	H	36.46	4.2	35.0	52.46	74	21.54	Spurious
2484.92	39.60	AV	125	1.3	H	36.46	4.2	35.0	45.26	74	21.54	Spurious
1192	50.6	PK	240	1.4	V	26.0	2.77	35.0	44.37	74	29.63	Spurious
1192	48.7	PK	128	1.5	H	26.5	2.77	35.0	42.97	74	31.03	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:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-03-11.

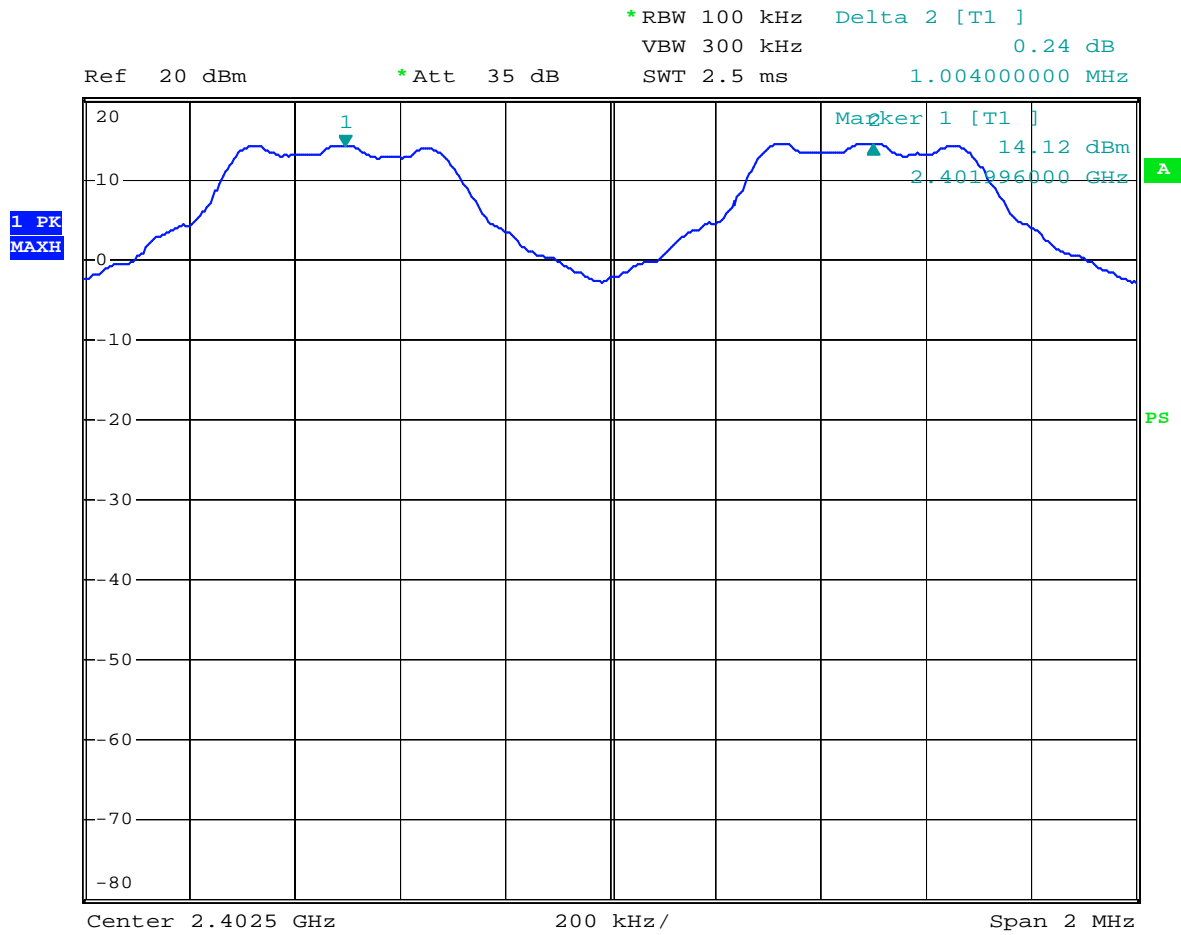
Test Mode: Transmitting

Channel	Channel Frequency (MHz)	Channel Separation (kHz)	Limit (kHz)	Result
Low Channel	2402	1004	520	Pass
Adjacency Channel	2403			
Middle Channel	2441	1008	509	Pass
Adjacency Channel	2442			
High Channel	2480	1004	528	Pass
Adjacency Channel	2479			

Test Result: Compliance.

Please refer to following plots

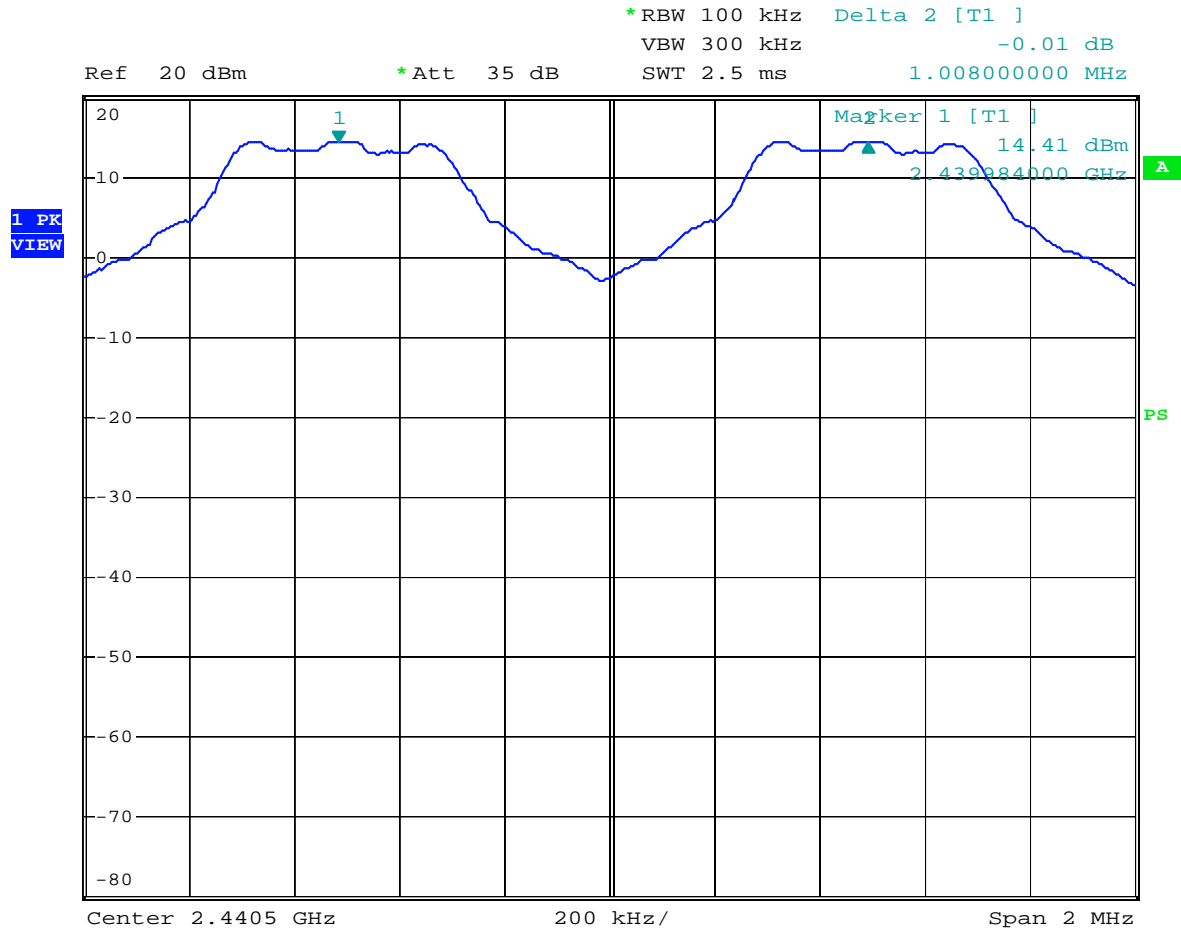
Low Channel



Goertec channel separation low channel

Date: 11.MAR.2008 20:37:18

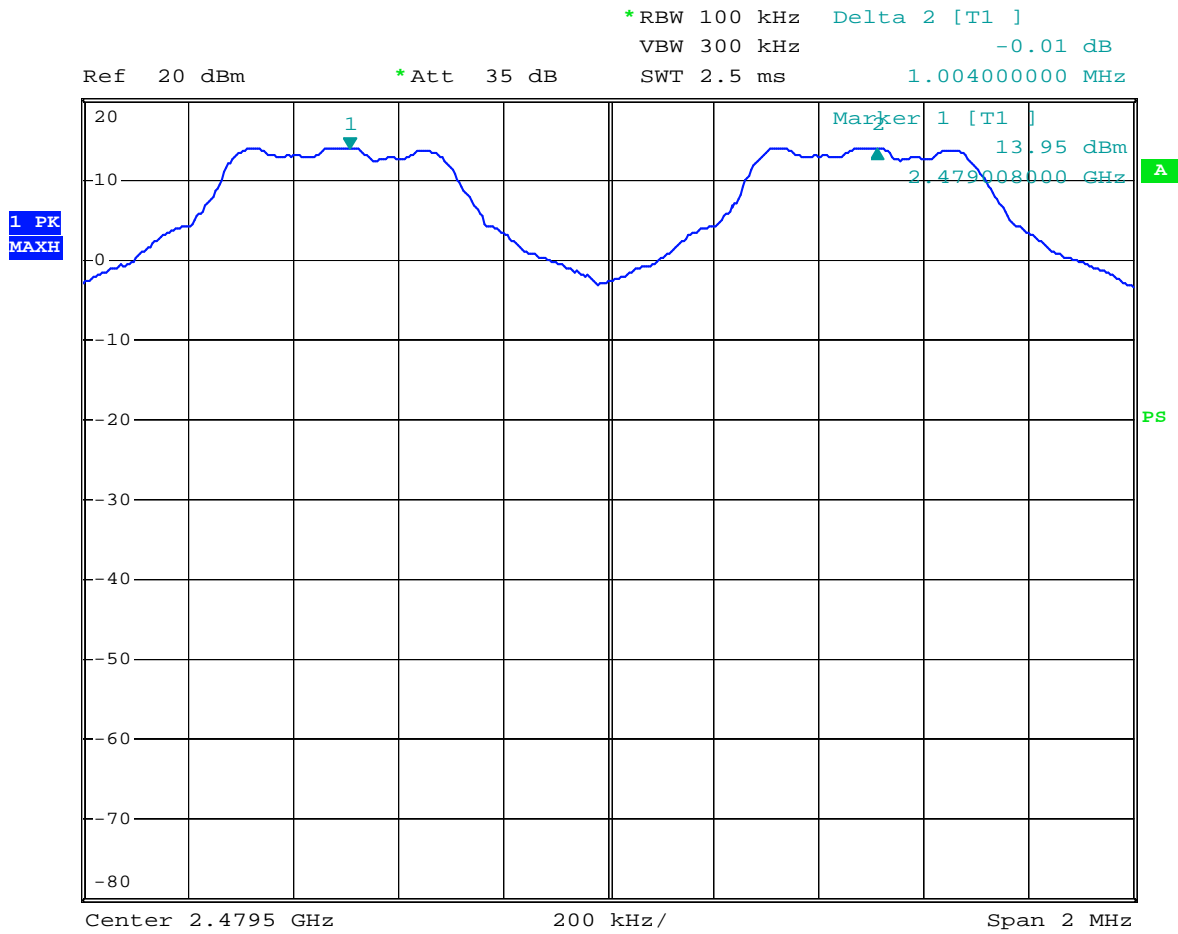
Middle Channel



Goertec channel separation middle channel

Date: 11.MAR.2008 20:35:23

High Channel



Goertec channel separation high channel

Date: 11.MAR.2008 20:38:37

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:	56 %
ATM Pressure:	100.0 kPa

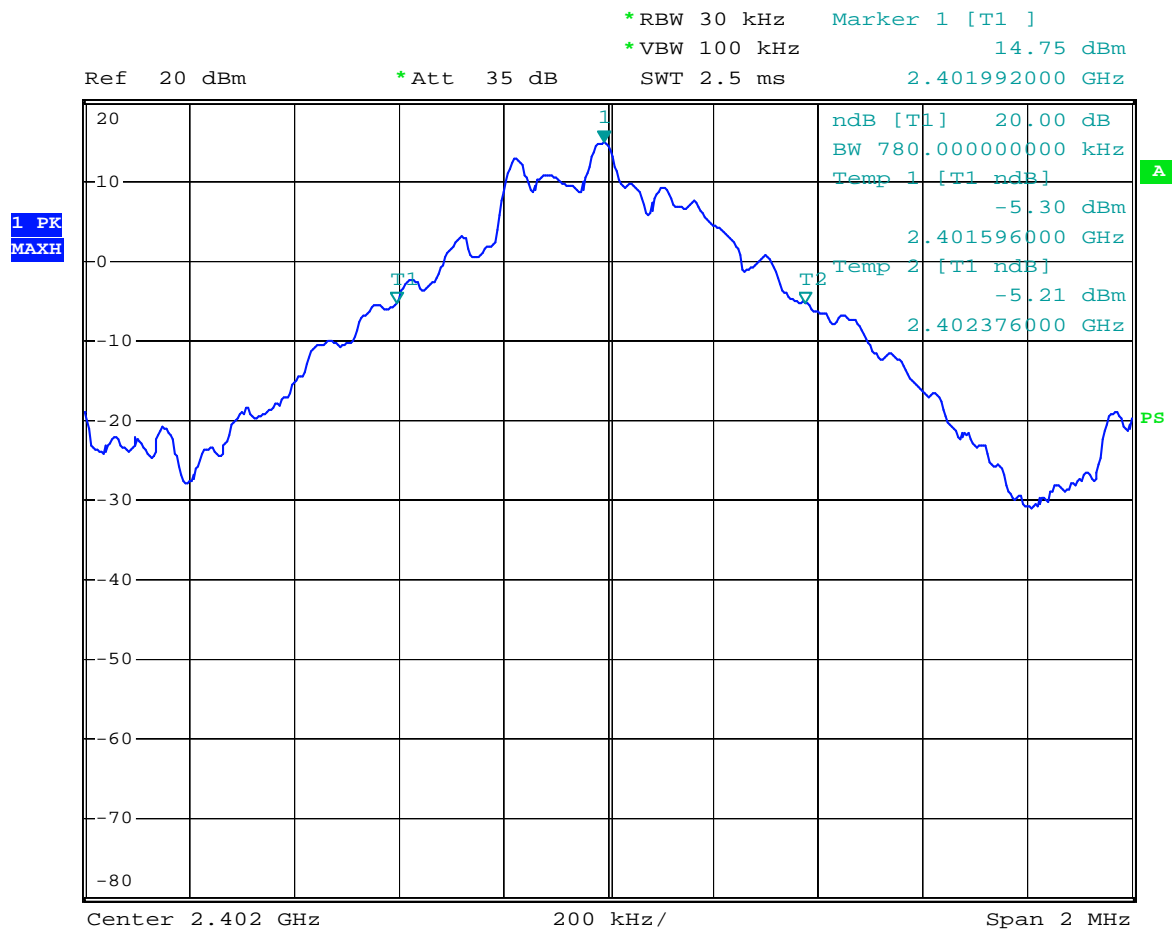
The testing was performed by Phoenix Liu on 2008-03-11.

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

Test Mode: Transmitting

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)
Low	2402	780
Middle	2441	764
High	2480	792

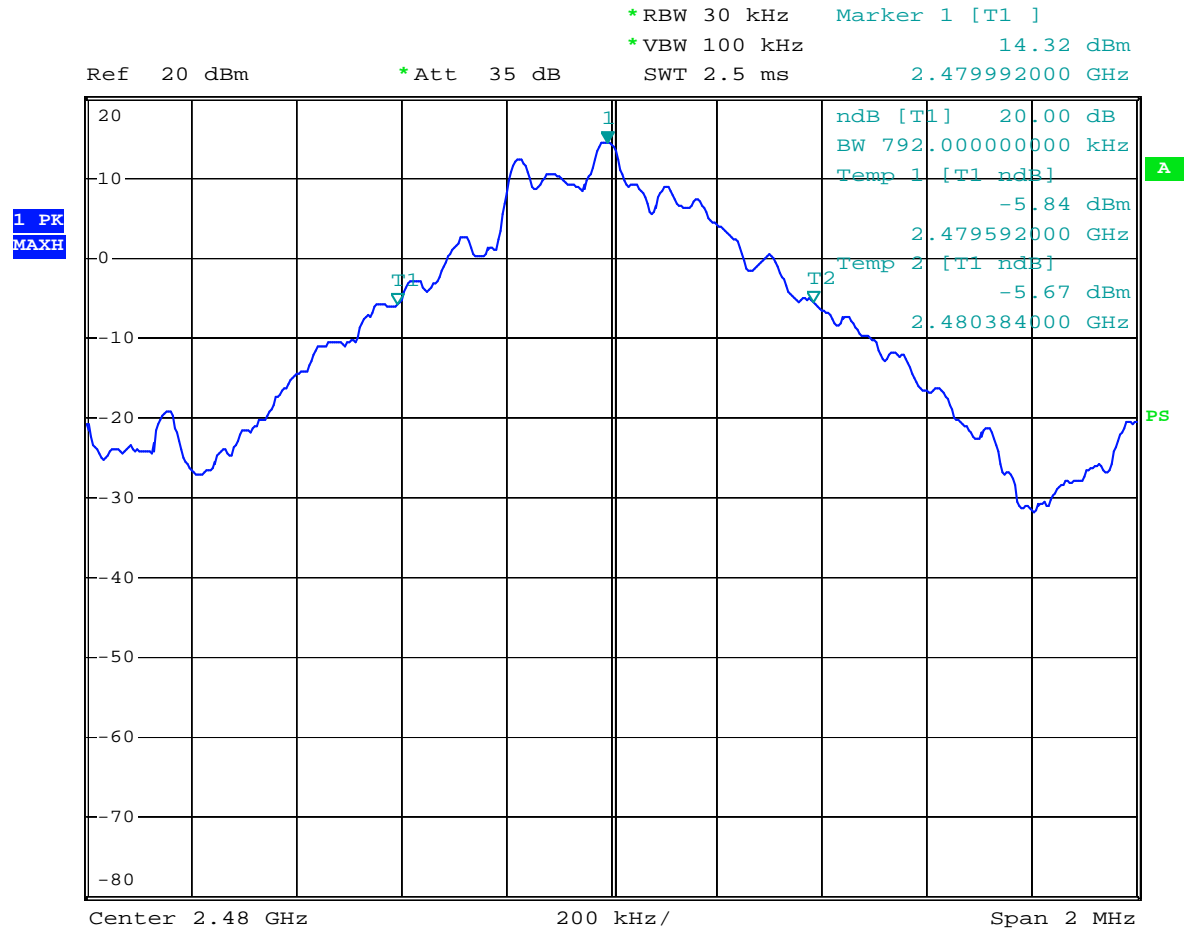
Low Channel



Goertec 20dB bandwidth low channel

Date: 11.MAR.2008 20:42:32

High Channel



Goertec 20dB bandwidth high channel

Date: 11.MAR.2008 20:40:36

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:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-02-16.

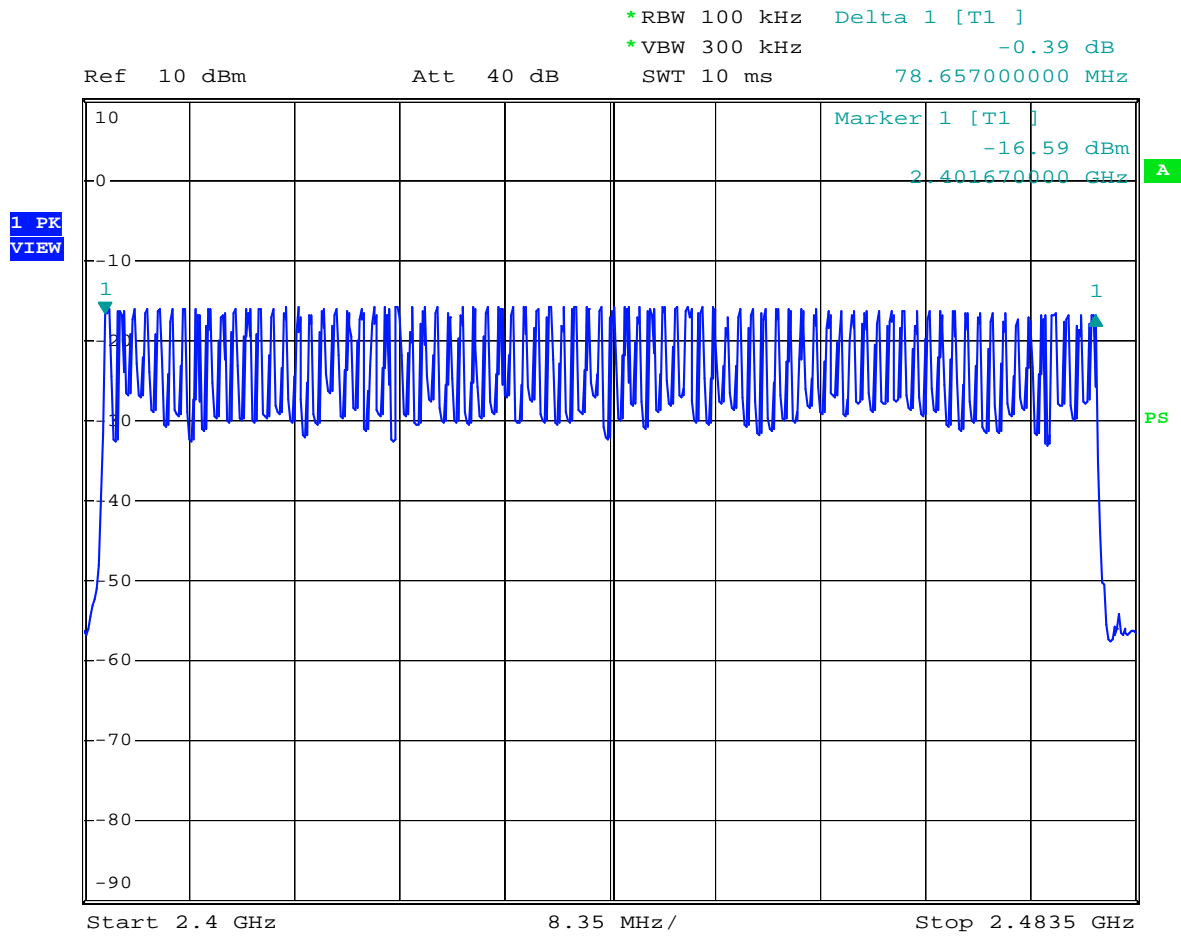
Test Mode: Transmitting

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

Test Result: Compliance.

Please refer to following plot.

Number of Hopping Channels



hopping channels

Date: 16.FEB.2008 02:54:48

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:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-03-11.

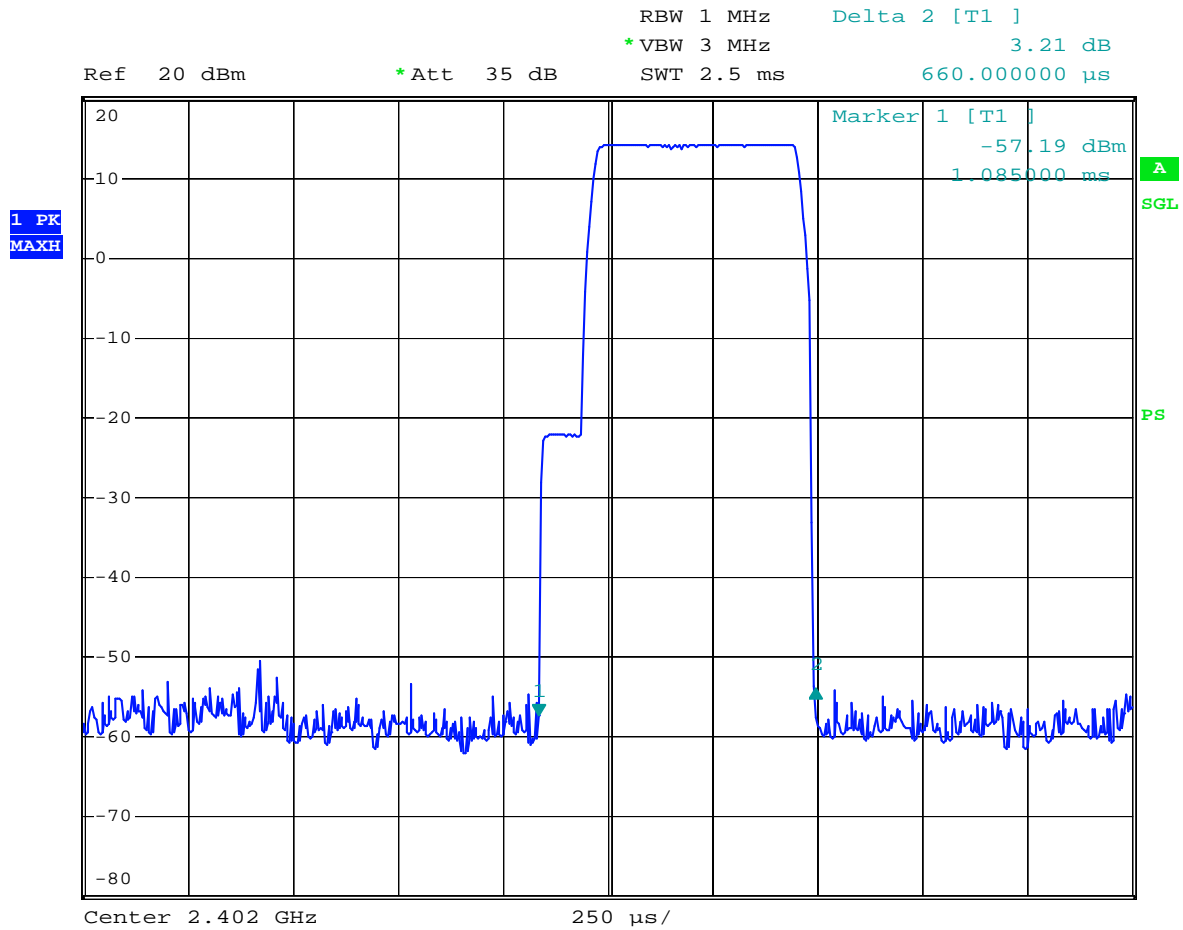
Test Mode: Transmitting

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

Channel	Pulse width (ms)	Dwell time (Sec.)	Limit (Sec.)	Result
Low	0.655	0.2096	0.4	Pass
Middle	0.660	0.2112	0.4	Pass
High	0.660	0.2112	0.4	Pass

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

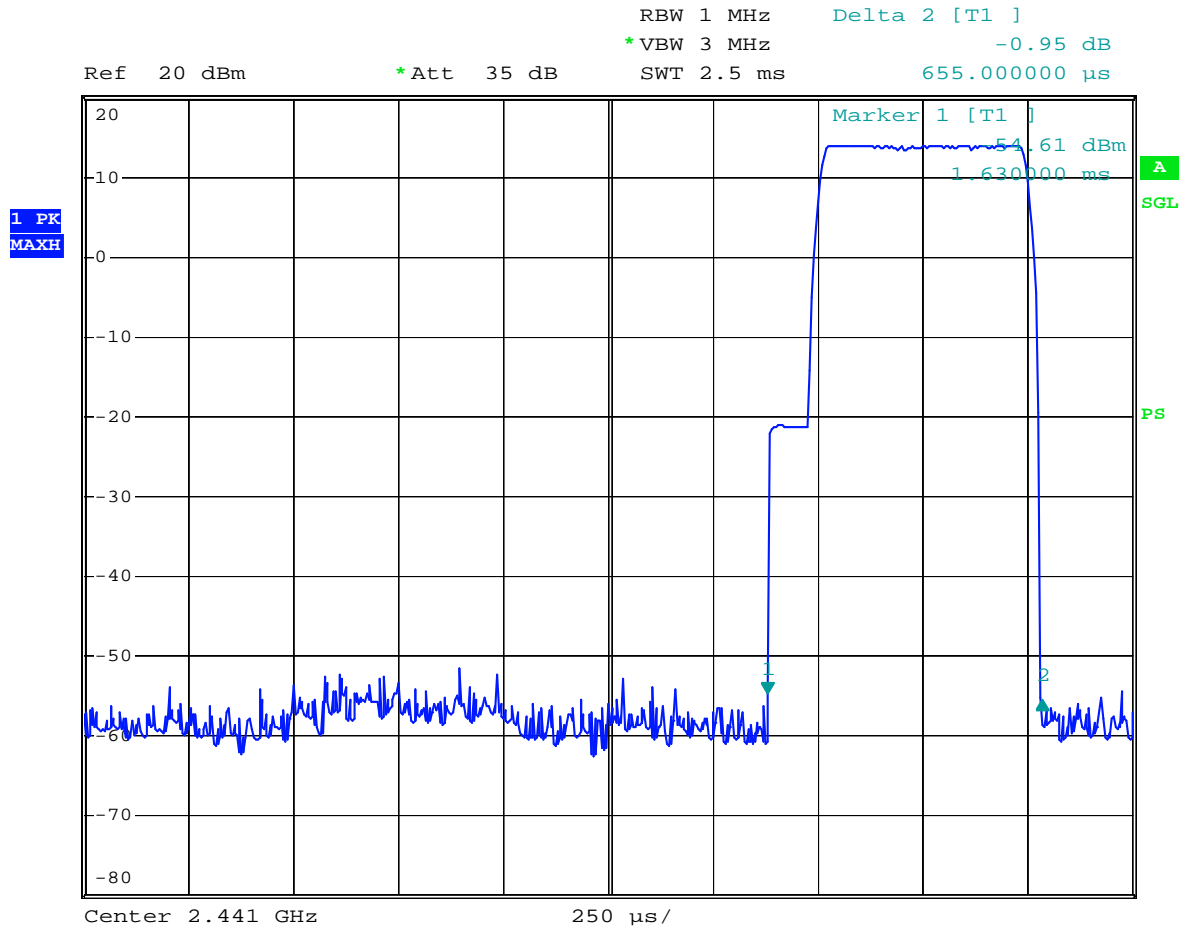
Low Channel



Goertec dwell time low channel

Date: 11.MAR.2008 20:44:57

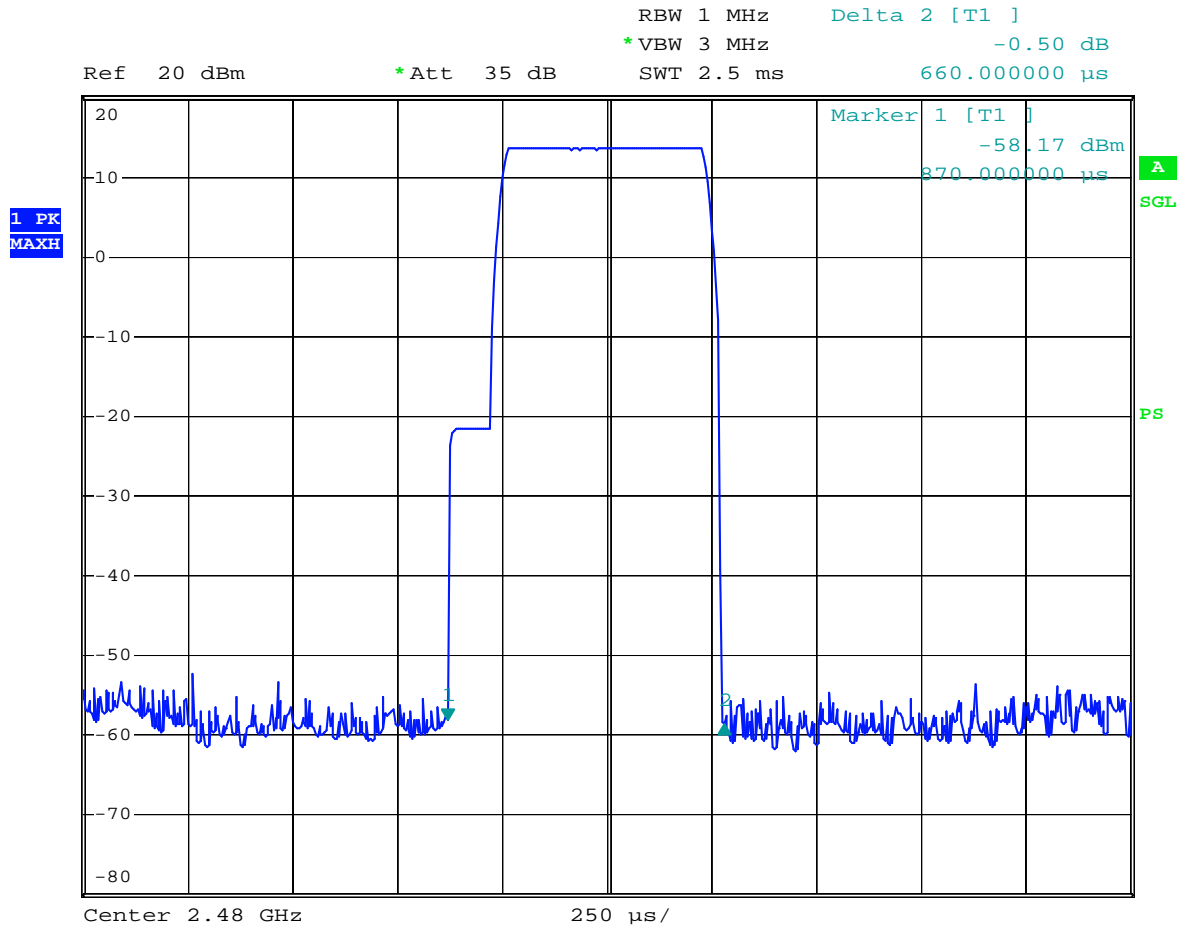
Middle Channel



Goertec dwell time middle channel

Date: 11.MAR.2008 20:46:23

High Channel



Goertec dwell time high channel

Date: 11.MAR.2008 20:47:26

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 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.

Data was recorded in peak detection modes.

Calculate the transmitter's peak power using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

where: E is the measured maximum fundamental field strength in V/m, utilizing a RBW \geq the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-1992 with respect to maximizing the emission.

G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

$$P = \frac{(E*d)^2}{30G}$$

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:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-04-29.

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)	Transducer Factor (dB)	EIRP (dBm)	Limit (dBm)
				Height (m)	Factor (dB/m)						
Low Channel											
2402	102.82	PK	90	1	36.25	4.0	35	108.07	95.27	12.80	30
Middle Channel											
2441	100.50	PK	128	1.5	36.15	4.1	35	105.75	95.27	10.48	30
High Channel											
2480	99.11	PK	65	1.4	36.46	4.2	35	94.66	95.27	9.50	30

Note: P (dBm) = E (dBuV/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:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Phoenix Liu on 2008-03-11.

Test Mode: Transmitting

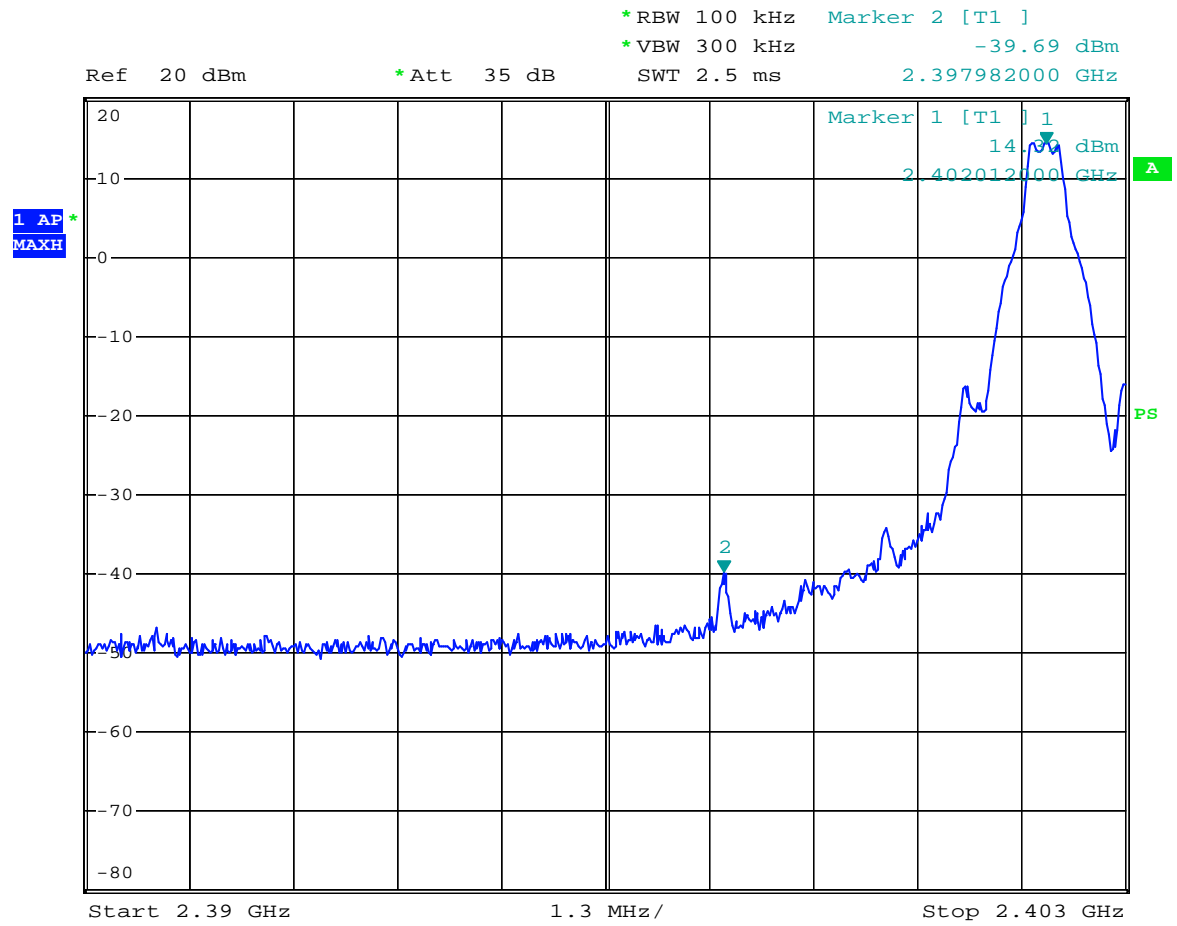
Frequency (MHz)	Delta Peak to band emission (dBc)	Limit (dBc)
2397.982	55.01	>20
2484.922*	57.21	>20

Note: Field strength of high channel is 94.66 dB μ V/m.

Test Result: Pass

Please refer to the following plots.

Low Band Edge



Goertec band edge left

Date: 11.MAR.2008 21:01:52

Declare Letter

Weifang GoerTek Electronics Co.,Ltd

To: Bay Area Compliance Laboratories Corp

Declaration letter

Dear Sir,

For our business issue and marketing requirement, we would like to list two color types on the FCC, CE certificates and reports (see the attached pictures), as following:

Color: black, white

We declare that there is no electrical change has been made to the equipment that alters the compliance characteristics. Please kindly handle on the project.

Thank you!

Signature:



Printed name/ title: George Yang / certification engineer

Tel: (86)532 88997277

Fax: (86)532 88997217

Address: Dongfang North Road, Hi-tech Industry Development District

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