



NVLAP LAB CODE 200707-0



# FCC PART 15.249

## MEASUREMENT AND TEST REPORT

For

### Latitude Limited

11/F, Hoi-Hung Industrial Bldg., 25-27 Lam Tin St.,

Kwai Chung, N.T., Hong Kong

**FCC ID: WM4533**

<b>Report Type:</b> Original Report	<b>Product Type:</b> 2.4GHz PC Link USB
<b>Test Engineer:</b> <u>Herith Shi</u>	
<b>Report Number:</b> <u>RSZ08081203</u>	
<b>Report Date:</b> <u>2008-08-29</u>	
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**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. 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.

\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “\*” (Rev.2)

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## GENERAL INFORMATION

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

The *Latitude Limited*'s product, model number: 92-07111 the "EUT" as referred to in this report is a *2440MHz 2.4GHz PC Link USB*, which measures approximately 7.2cmL x 2.1cmW x 0.8cmH, rated input voltage: PC 5V.

*\* All measurement and test data in this report was gathered from production sample serial number: 0808017 (Assigned by BACL, Shenzhen). The EUT was received on 2008-08-12.*

### Objective

This Type approval report is prepared on behalf of *Latitude Limited* in accordance with Part 2, Subpart J, and 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, 15.207, 15.209 and 15.249 rules.

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

No Related Submittals.

### 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 radiated and conducted emissions measurement was performed at 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/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Justification

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

### Equipment Modifications

No modifications were made to the unit tested.

### Host System Configuration List and Details

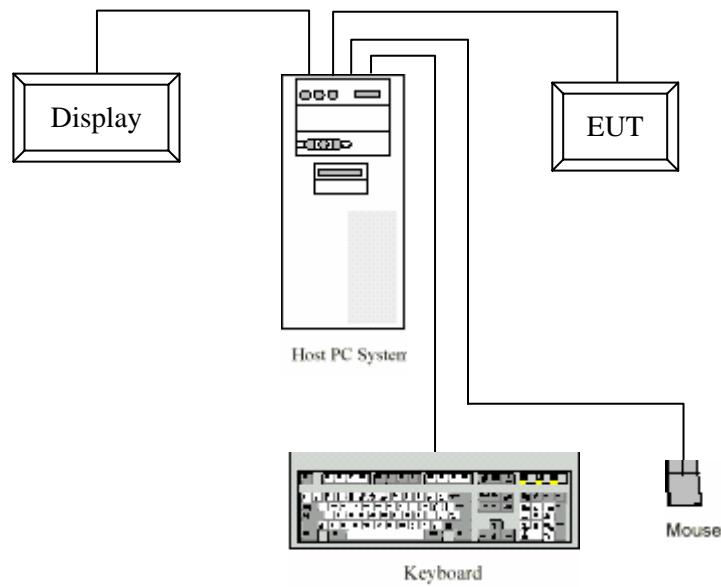
Manufacturer	Description	Model	Serial Number	FCC ID
IBM	PC	ThinkCentre A50	99Y5469	DoC
Logitech	Keyboard	Y-SM48	SY513U22305	DoC
Logitech	Mouse	M-SAW83A	HCA33800404	DoC
IBM	CRT Monitor	6737-66W	23-P3229	BEJT17HD
ProMOS	Memory	V826616J24SAT G-C0	D61A2605H	N/A
Intel	CPU	Pentium4 2800MHz	N/A	N/A

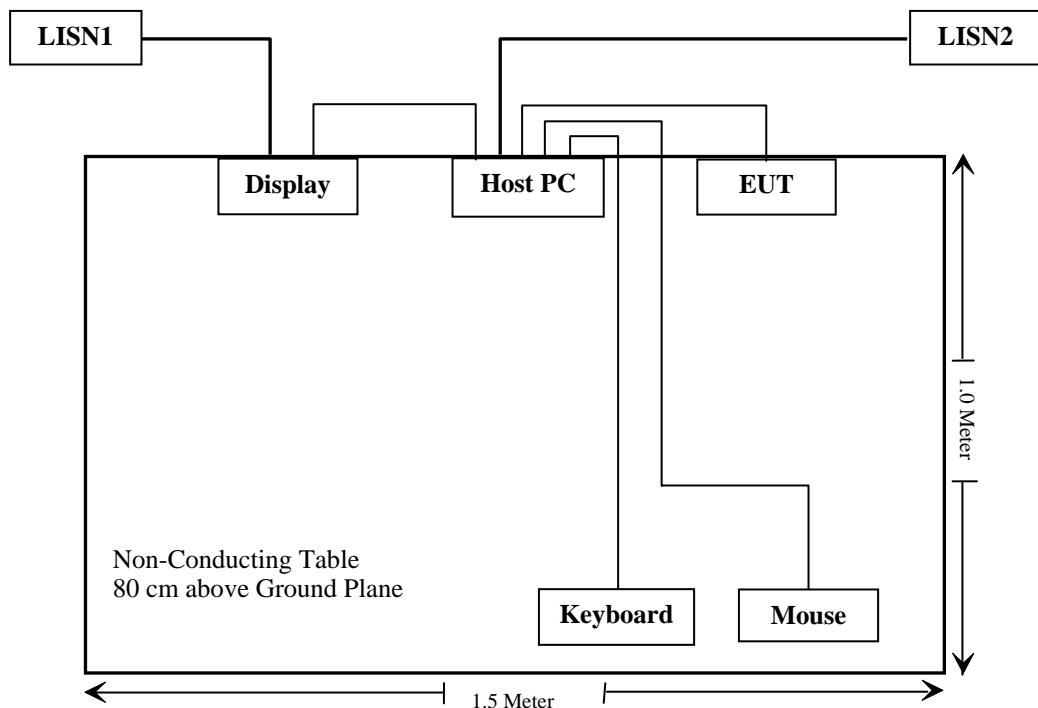
### Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Intel	Motherboard	D865GKD	11S19R1949ZJ1WCB4 6J1K8	DoC
IBM	Power	HIPRO-A2307F3T	11S49P2191ZJ1TAR47 2225	DoC
Maxtor	Hard Disk	6Y080L0	Y23QNXTE	DoC
ALPS	3.5' Floppy	06P5226	11S06P5226ZJ1W2537 3957	DoC
Lite-ON	CD-Rom	LTN-489S	11S71P7366ZJ1SYC13 0015	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

**External I/O Cable**

Cable Description	Length (m)	From/Port	To
Shielded Detachable K/B Cable	1.5	K/B Port	K/B
Shielded Detachable Mouse Cable	1.5	Mouse Port	Mouse
Shielded Detachable VGA Cable	1.5	VGA Port	VGA

**Configuration of Test Setup**

**Block Diagram of Test Setup**

**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207(a)	Conduction Emissions	Compliant
§15.205(a), §15.209(a), 15.249(a), §15.249(c)	Radiated Emissions	Compliant
§15.249(d)	Out of Band Emissions	Compliant

## **§15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

### **Antenna Connector Construction**

The EUT antenna is a printed antenna built on PCB, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

**Result:** Compliant.

Please refer to the EUT photos.

## §15.207(a) - CONDUCTED EMISSIONS

### Applicable Standard

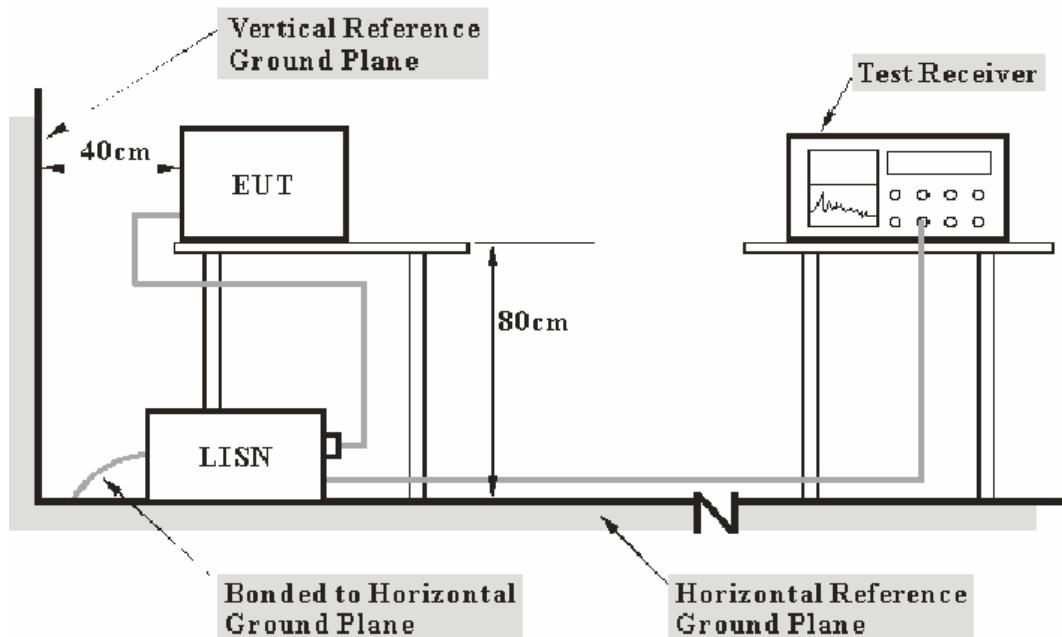
CFR47 Part15.207

### 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  $\pm 2.4$  dB.

### EUT Setup



**Note:**

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 .207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The Host PC was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

The 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:

<b>Frequency Range</b>	<b>IFBW</b>
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	12208	N/A	N/A
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 adapter 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(a), with the worst margin reading of:

**12.80 dB at 0.5250 MHz in the Neutral conductor mode.**

## Test Data

### Environmental Conditions

<b>Temperature:</b>	25 ° C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.2 kPa

The testing was performed by Herith Shi on 2008-08-28.

Test Mode: Operating

Line Conducted Emissions				FCC Part15.207	
Frequency (MHz)	Amplitude (dB $\mu$ V)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dB $\mu$ V)	Margin (dB)
0.5250	33.20	AV	Neutral	46.00	12.80
1.0350	29.60	AV	Line	46.00	16.40
0.5250	38.30	QP	Neutral	56.00	17.70
0.7300	26.60	AV	Line	46.00	19.40
17.8100	39.60	QP	Line	60.00	20.40
16.8400	39.50	QP	Neutral	60.00	20.50
15.7800	39.20	QP	Neutral	60.00	20.80
17.6450	38.90	QP	Neutral	60.00	21.10
14.6850	38.00	QP	Neutral	60.00	22.00
16.0050	37.80	QP	Line	60.00	22.20
0.7300	32.90	QP	Line	56.00	23.10
1.0350	32.00	QP	Line	56.00	24.00
13.5000	35.60	QP	Neutral	60.00	24.40
6.6850	35.20	QP	Line	60.00	24.80
6.6850	24.60	AV	Line	50.00	25.40
26.6600	34.00	QP	Line	60.00	26.00
13.5100	21.40	AV	Neutral	50.00	28.60
16.0350	18.60	AV	Line	50.00	31.40
14.7000	18.40	AV	Neutral	50.00	31.60
17.5900	14.90	AV	Neutral	50.00	35.10
16.8400	14.80	AV	Neutral	50.00	35.20
15.7450	13.30	AV	Neutral	50.00	36.70
26.6350	12.60	AV	Line	50.00	37.40
17.9150	12.40	AV	Line	50.00	37.60

### Plot(s) of Test Data

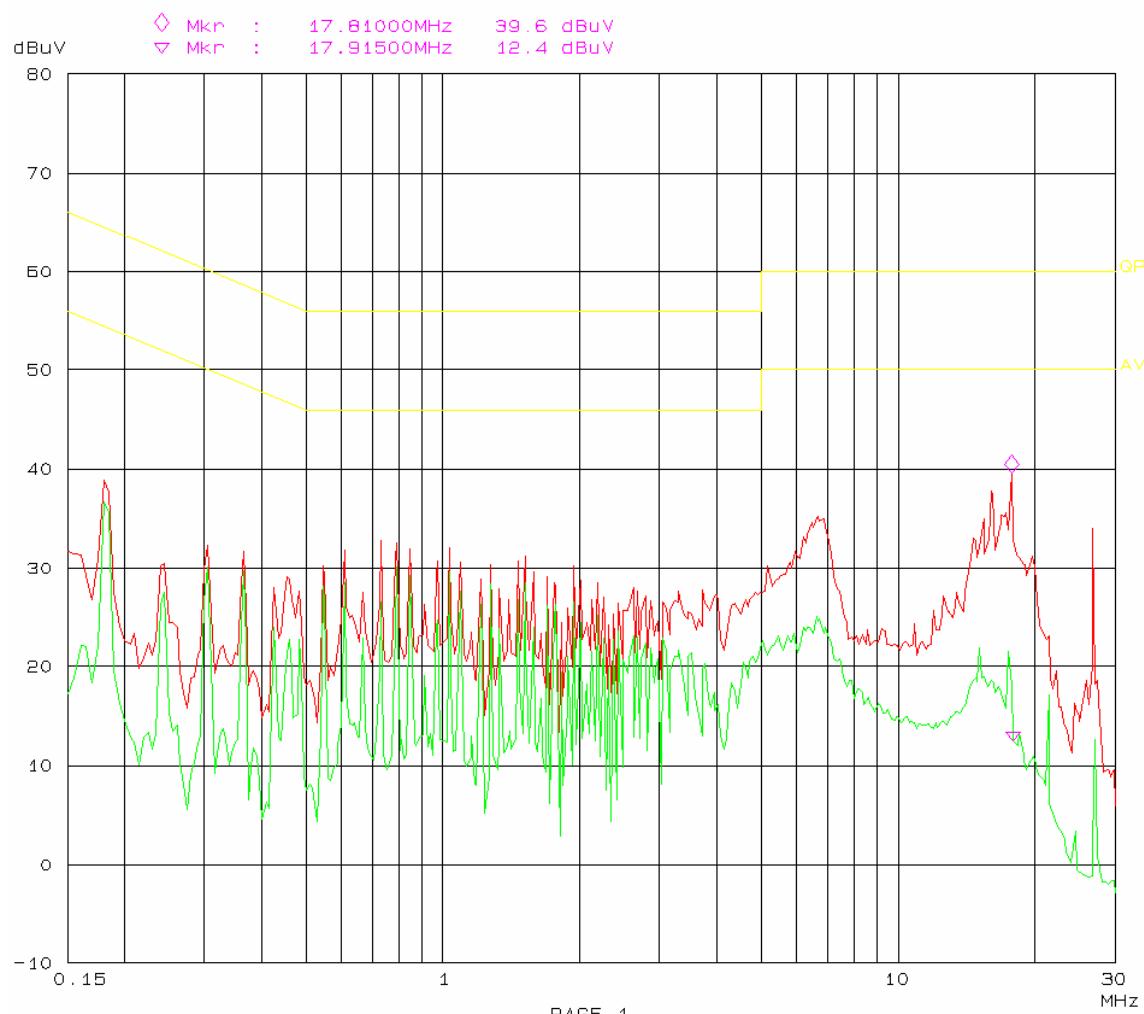
Plot(s) of Test Data is presented hereinafter as reference.

## Conducted Emission

29. Aug 08 09:32

## FCC PART 15

EUT: 2.4GHz PC Link USB M/N: 92-07111  
Manuf: Latitude  
Op Cond: Operating  
Operator: Herith  
Test Spec: AC 120V/60Hz Line  
Comment: Temp: 25 Hum: 56%

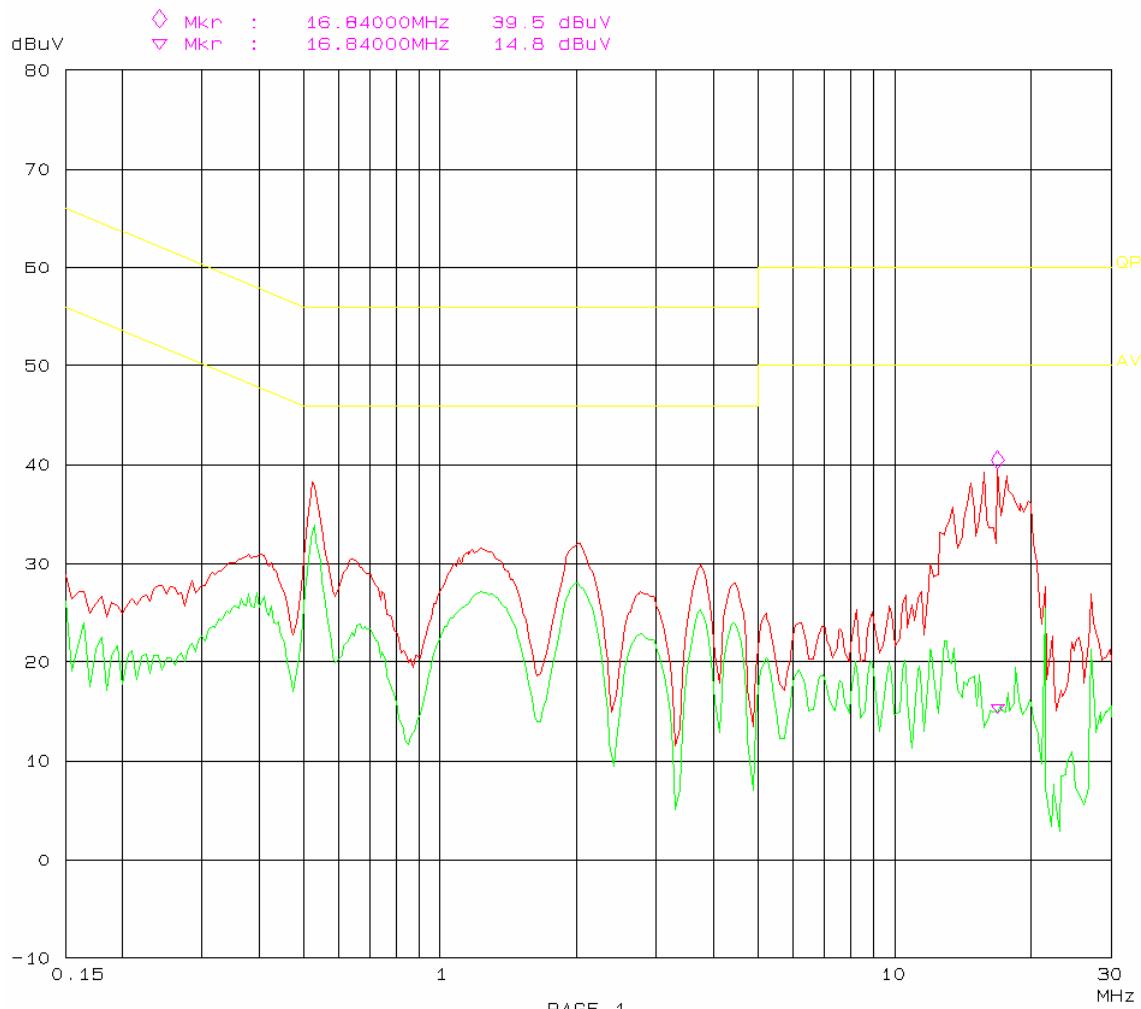
1  
1

## Conducted Emission

29. Aug 08 09:49

## FCC PART 15

EUT: 2.4GHz PC Link USB M/N: 92-07111  
Manuf: Latitude  
Op Cond: Operating  
Operator: Herith  
Test Spec: AC 120V/60Hz Neutral  
Comment: Temp: 25 Hum: 56%



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## §15.205(a) §15.209(a) §15.249(a) §15.249(d) - RADIATED EMISSIONS

### Applicable Standard

As per §15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per §15.249 (c), Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### 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  $\pm 4.0$  dB.

### Test Equipment Setup

The spectrum analyzer or receiver is set as:

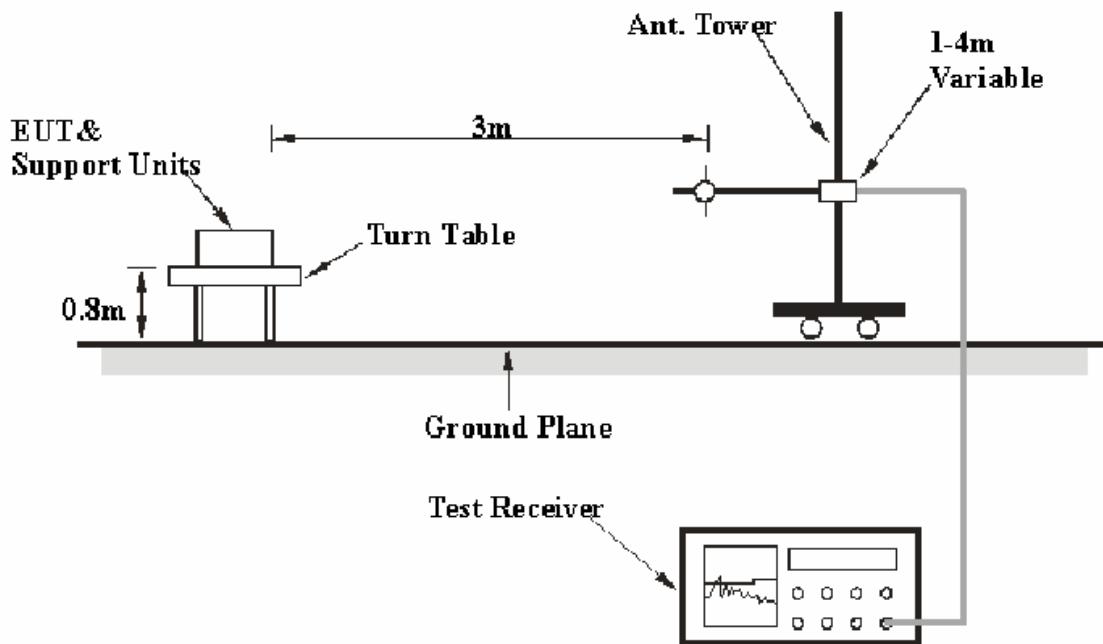
Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

- (1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
- (2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

## EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.249 limits.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2007-10-16	2008-10-16
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2008-08-14	2009-08-14
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	2008-05-09	2009-05-09

**\* 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 EUT, and all support equipment power cords 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.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

## 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 limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the data in the following table, the EUT complied with the [FCC Part 15.209 & 15.249](#), with the worst margin reading of:

### 30 -1000 MHz:

**4.7 dB** at **32.161925 MHz** in the **Vertical** polarization.

### Above 1GHz:

**4.31 dB** at **2440 MHz** in the **Horizontal** polarization.

## Test Data

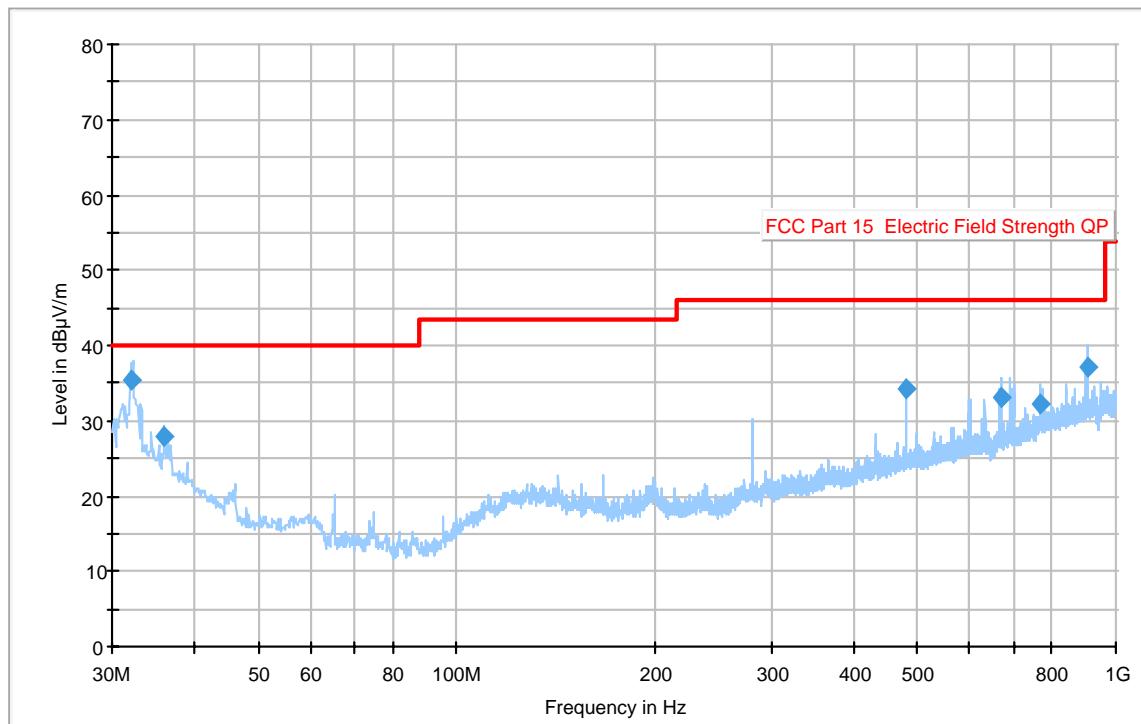
### Environmental Conditions

<b>Temperature:</b>	25 ° C
<b>Relative Humidity:</b>	56%
<b>ATM Pressure:</b>	100.2 kPa

The testing was performed by King Tang on 2008-08-22.

Test Mode: Transmitting

### 30 – 1000 MHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
32.161925	35.3	139.0	V	139.0	-10.2	40.0	4.7
905.691050	37.2	129.0	V	227.0	0.0	46.0	8.8
480.058025	34.4	99.0	V	10.0	-12.0	46.0	11.6
35.963850	27.9	155.0	V	347.0	-12.7	40.0	12.1
672.251375	33.1	228.0	H	6.0	-7.2	46.0	12.9
767.991575	32.1	100.0	H	164.0	-2.8	46.0	13.9

**Above 1GHz:**

Freq. (MHz)	Meter Reading (dB $\mu$ V)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Amp. (dB $\mu$ V/m)	Part 15.209 & 15.249	
										Limit (dB $\mu$ V/m)	Margin (dB)
<b>Fundamental</b>											
2440	84.79	AV	170	1.0	H	30.90	7.90	33.90	89.69	94	4.31
2440	81.35	AV	360	1.0	V	30.30	7.90	33.90	85.65	94	8.35
2440	88.68	PK	170	1.0	H	30.90	7.90	33.90	93.58	114	20.42
2440	85.78	PK	360	1.0	V	30.30	7.90	33.90	90.08	114	23.92
<b>Harmonics/Spurious</b>											
4880	35.80	AV	130	1.5	V	33.70	7.56	35.00	42.06	54	11.94
4880	36.32	AV	60	1.6	H	33.70	7.56	36.30	41.28	54	12.72
7320	35.67	AV	350	1.6	V	33.60	9.12	38.00	40.39	54	13.61
7320	36.12	AV	180	1.2	H	33.60	9.12	39.20	39.64	54	14.36
4880	45.53	PK	130	1.5	V	33.70	7.56	35.00	51.79	74	22.21
4880	46.20	PK	60	1.6	H	33.70	7.56	36.30	51.16	74	22.84
7320	45.98	PK	350	1.6	V	33.60	9.12	38.00	50.70	74	23.30
7320	46.08	PK	180	1.2	H	33.60	9.12	39.20	49.60	74	24.40

## §15.249(d) – OUT OF BAND EMISSIONS

### Applicable Standard

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### Test Procedure

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission at the band edge. The receiving antenna should be changed the polarization both of horizontal and vertical.

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

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	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

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

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56%
ATM Pressure:	100.2 kPa

The testing was performed by Herith Shi on 2008-08-22.

*Test mode: Transmitting*

Freq. (MHz)	Reading (dB $\mu$ V)	Detector (PK/AV)	Direction (Degree)	Ant. Height (m)	Ant. Polar (H/V)	Ant. Factor (dB)	Cable Loss (dB)	Pre- Amp. Gain (dB)	Cord. Reading (dB $\mu$ V/m)	Part15.249/15.209	
										Limit (dB $\mu$ V/m)	Margin (dB)
2495	32.69	PK	280	1.4	H	30.30	7.90	33.90	36.99	54	17.01
2397	31.87	PK	80	1.5	V	30.90	7.90	33.90	36.77	54	17.23

NOTE: Above test result is the worse case in all polarity direction (horizontal and vertical).

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