



## FCC PART 15B, CLASS B

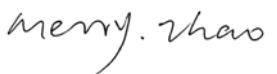
### TEST REPORT

For

### SPX Service Solutions

655 Eisenhower Drive, Owatonna, MN 55060, USA

**FCC ID: Z2NJ-50079-5**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Wireless Inspection Receiver
<b>Test Engineer:</b> <u>Jimmy Xiao</u> 	
<b>Report Number:</b> <u>RSZ110909003-00</u>	
<b>Report Date:</b> <u>2011-09-21</u>	
<b>Reviewed By:</b> <u>EMC Engineer</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\*, or any agency of the Federal Government.

\* This report contains 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 *SPX Service Solutions*'s product, model number: J-50079-5, FCC ID: Z2NJ-50079-5 or the "EUT" in this report was a USB receiver of the wireless inspection system, which was measured approximately: 7.5 cm (W) x 3.4 cm (D) x 1.3 cm (H), rated input voltage: USB Port 5 V. The highest operating frequency is less than 108 MHz.

*\*All measurement and test data in this report was gathered from production sample serial number: 1109035 (Assigned by BACL, Shenzhen). The EUT was received on 2011-09-09.*

### Objective

This type approval report is prepared on behalf of *SPX Service Solutions* in accordance with Part 2, Subpart J, Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15 B.

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

N/A

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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 an ISO/IEC 17025 accredited laboratory, and is accredited by 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

### Description of Test Configuration

The system was configured for testing in a manufacturer testing fashion.

### EUT Exercise Software

No exercise software.

### Equipment Modifications

No modification was made to the unit tested.

### Local Support Equipment List and Details

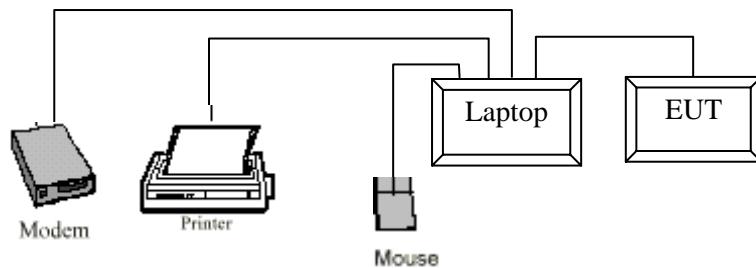
Manufacturer	Device Name	Model	Serial Number
DELL	Laptop	PP05L	N/A
SAST	Modem	AEM-2100	6588D51200013
DELL	Mouse	MOC5UO	G1B0096D
HP	Laser Jet5L	C3941A	JPTVOB2337

### External I/O Cable

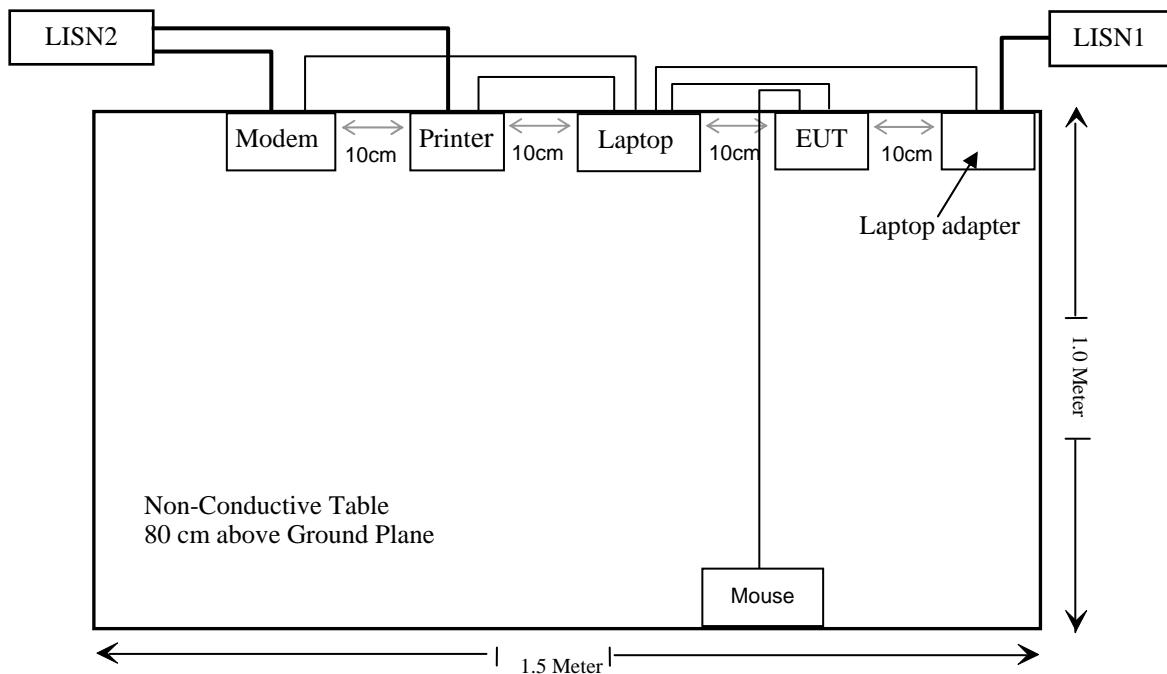
Cable Description	Length (m)	From/Port	To
Shielded Detachable Printer Cable	1.8	Parallel Port	Printer
Shielded Detachable Serial Cable	1.8	Serial Port	Modem
Unshielded Detachable USB Cable	1.0	USB Port	EUT

## Configuration of Test Setup

For Test mode 1 (conducted disturbance):



## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance
§15.109	Radiated Spurious Emissions	Compliance

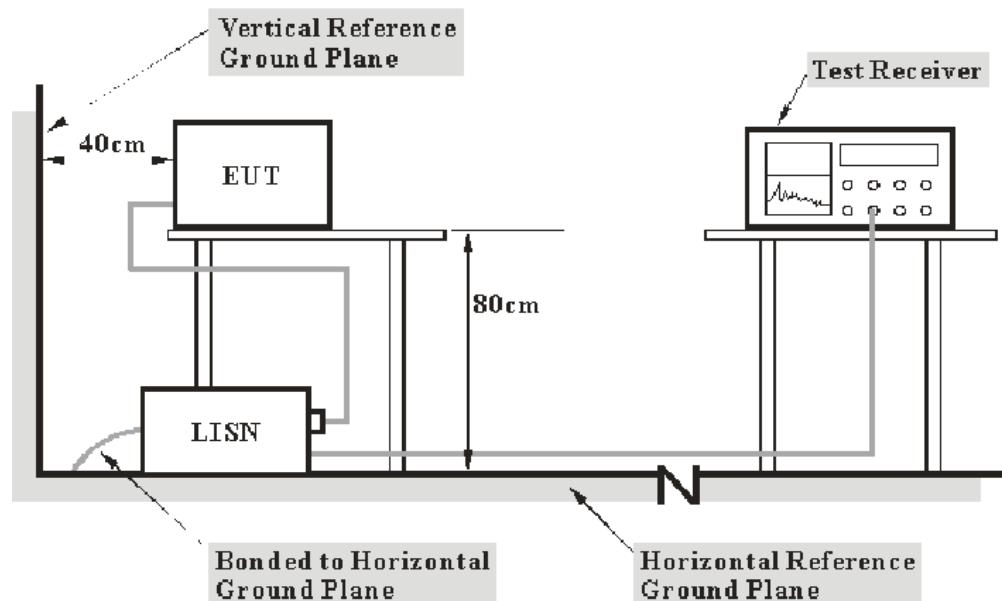
## FCC §15.107 – AC LINE CONDUCTED EMISSIONS

### 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  $\pm 2.4$  dB.(k=2, 95% level of confidence)

### 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 C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.107 Class B limits.

The spacing between the peripherals was 10 cm.

The laptop adapter was connected to an AC 120V/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:

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

## Test Procedure

During the conducted emission test, the laptop 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2011-03-03	2012-03-02
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2011-03-09	2012-03-08

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

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, with the worst margin reading of:

**7.91 dB at 0.220 MHz in the Line conducted mode**

## Test Data

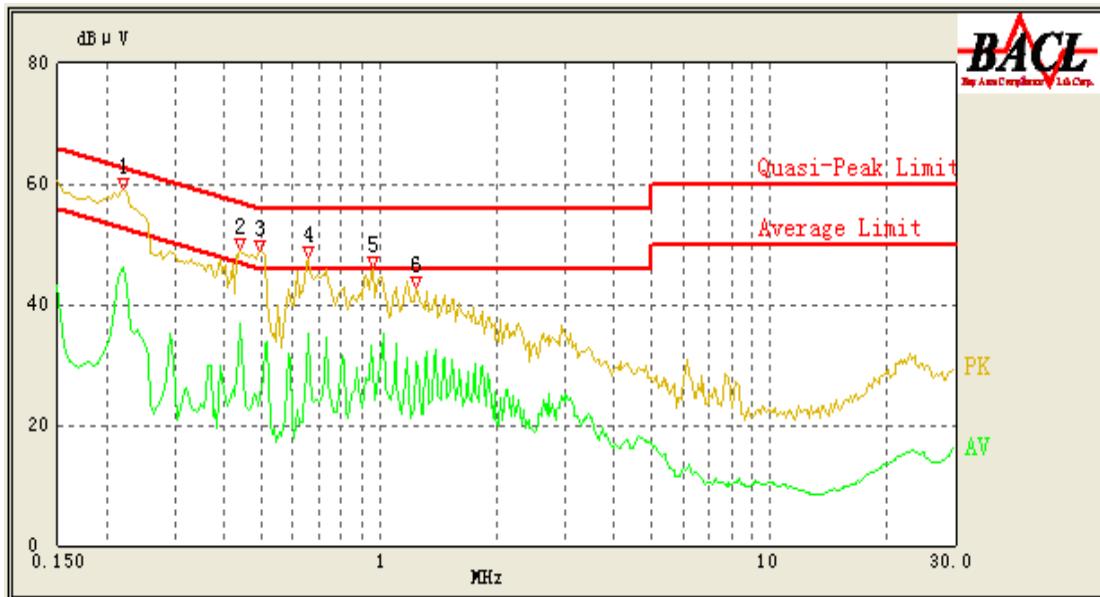
### Environmental Conditions

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	48 %
<b>ATM Pressure:</b>	100.0 kPa

*The testing was performed by Jimmy Xiao on 2011-09-11.*

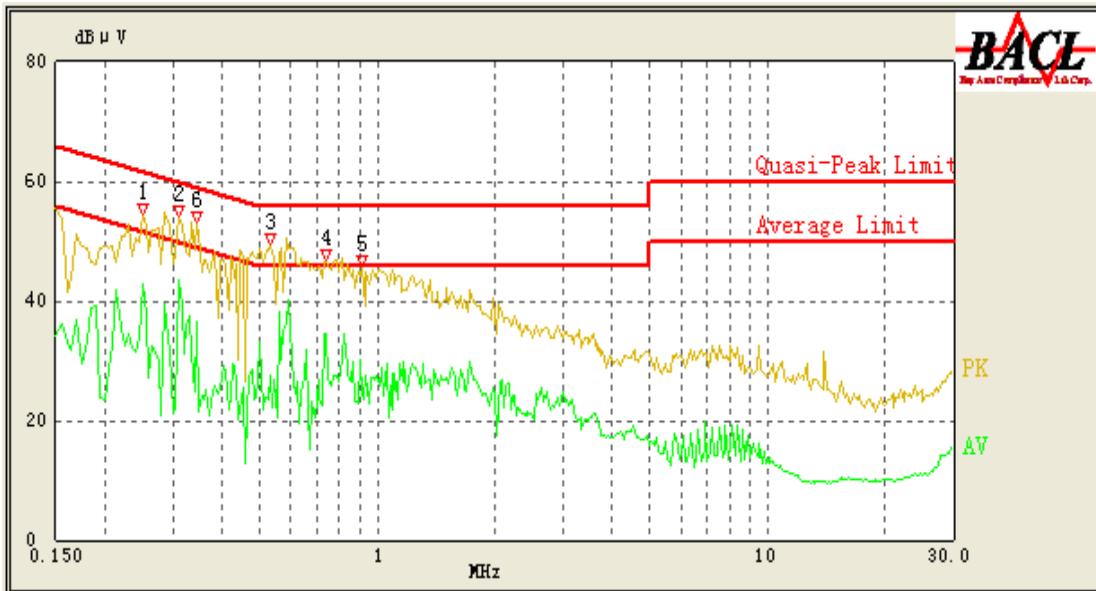
*Test Mode: Operating*

**AC 120V/60 Hz, Line**



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Corrected Amplitude (dB $\mu$ V)	Correction Factor (dB)	Limit (dB $\mu$ V)	Margin (dB)	Detector (PK/Ave./QP)
0.220	46.09	10.10	54.00	7.91	Ave.
0.660	35.28	10.10	46.00	10.72	Ave.
0.440	36.74	10.10	47.71	10.97	Ave.
0.495	43.38	10.10	56.14	12.76	QP
0.220	50.64	10.10	64.00	13.36	QP
0.440	44.11	10.10	57.71	13.60	QP
1.245	30.62	10.10	46.00	15.38	Ave.
0.960	29.91	10.10	46.00	16.09	Ave.
0.660	39.71	10.10	56.00	16.29	QP
0.960	37.33	10.10	56.00	18.67	QP
0.495	24.68	10.10	46.14	21.46	Ave.
1.245	34.51	10.10	56.00	21.49	QP

## AC 120V/60 Hz, Neutral



Conducted Emissions			FCC Part 15.107, Class B		
Frequency (MHz)	Corrected Amplitude (dB $\mu$ V)	Correction Factor (dB)	Limit (dB $\mu$ V)	Margin (dB)	Detector (PK/Ave./QP)
0.310	43.49	10.10	51.43	7.94	Ave.
0.250	42.92	10.10	53.14	10.22	Ave.
0.740	34.38	10.10	46.00	11.62	Ave.
0.530	42.94	10.10	56.00	13.06	QP
0.310	48.14	10.10	61.43	13.29	QP
0.345	36.56	10.10	50.43	13.87	Ave.
0.345	44.81	10.10	60.43	15.62	QP
0.250	47.16	10.10	63.14	15.98	QP
0.740	39.14	10.10	56.00	16.86	QP
0.910	38.20	10.10	56.00	17.80	QP
0.530	27.35	10.10	46.00	18.65	Ave.
0.910	24.96	10.10	46.00	21.04	Ave.

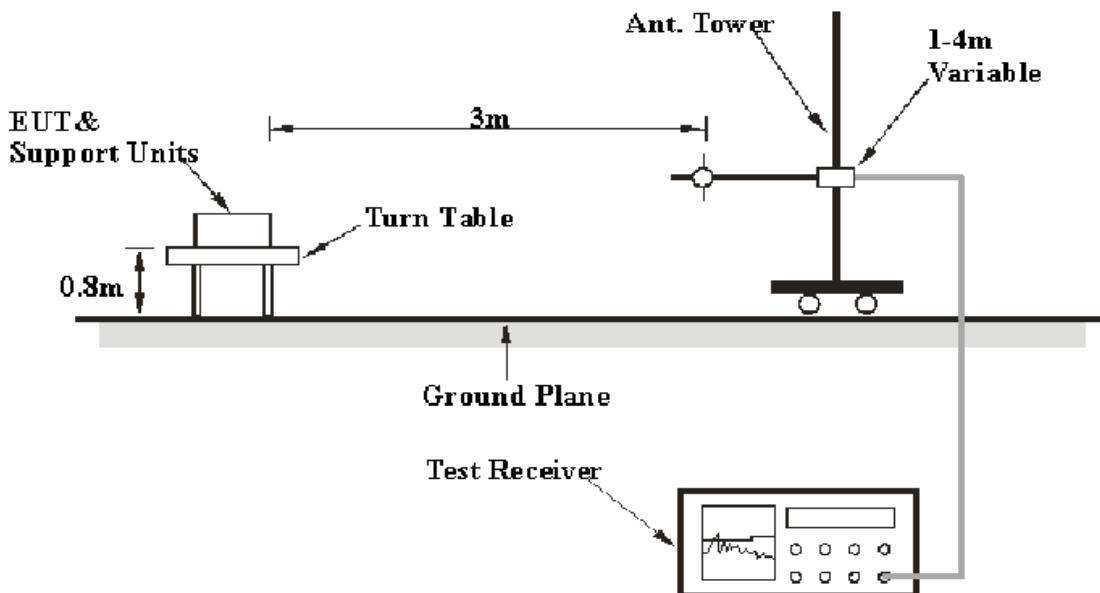
## FCC §15.109 - RADIATED SPURIOUS EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, 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 estimation of the uncertainty of radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is  $\pm 4.0$  dB. (k=2, 95% level of confidence)

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15.109 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 adapter was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

<b><i>Frequency</i></b>	<b><i>RB/W</i></b>	<b><i>VB/W</i></b>	<b><i>IF B/W</i></b>	<b><i>Detection</i></b>
30 MHz-1 GHz	100 kHz	300 kHz	120 kHz	Quasi-peak

## Test Procedure

For the radiated emissions test, the laptop adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All the data was recorded in the Quasi-peak detection mode from 30 MHz to 1 GHz.

## Test Equipment List and Details

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
HP	Amplifier	HP8447E	1937A01046	2011-08-02	2012-08-02
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04

\* **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.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

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

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. 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 §15.109 Class B, with the worst margin reading of:

**8.4 dB at 901.935500 MHz in the Horizontal polarization**

## Test Data

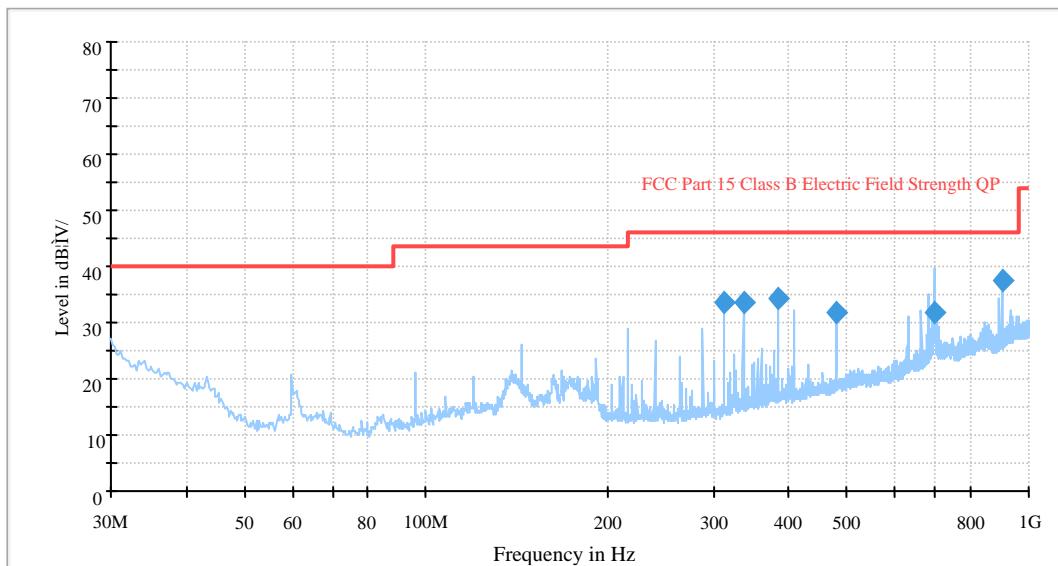
### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	48 %
ATM Pressure:	100.0 kPa

The testing was performed by Jimmy Xiao on 2011-09-11.

Test Mode: Operating

Auto Test (FCC Part 15 Class B)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Test Antenna		Turntable Position (degree)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polarity (H/V)				
901.935500	37.6	104.0	H	60.0	-0.8	46.0	8.4
383.995250	34.3	104.0	H	243.0	-10.3	46.0	11.7
312.006000	33.7	104.0	H	262.0	-12.1	46.0	12.3
336.015750	33.6	104.0	H	270.0	-11.4	46.0	12.4
479.806500	31.9	104.0	V	311.0	-8.7	46.0	14.1
699.470250	31.7	104.0	V	94.0	-3.1	46.0	14.3

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