



NVLAP LAB CODE 200707-0



FCC PART 15.249

EMI MEASUREMENT AND TEST REPORT

For

TWINPRO INTERNATIONAL HOLDINGS LIMITED

Flat 2, Floor 15, Foo Tat Building, 50 Soy Street, Kowloon, Hong Kong

FCC ID: SLCTP256AHM

This Report Concerns:	Equipment Type:
<input checked="" type="checkbox"/> Original Report	Wireless Outdoor/Indoor Rechargeable Speakers (2.4GHz Transmitter)
Test Engineer:	Green Xu <i>Green. Xu</i>
Report No.:	RSZ07070305
Test Date:	2007-09-12 to 2007-09-14
Report Date:	2007-09-17
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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *TWINPRO INTERNATIONAL HOLDINGS LIMITED*'s product, model number: 256 or the "EUT" as referred to in this report is a Wireless Outdoor/Indoor Rechargeable Speakers (2.4GHz Transmitter), which measures approximately 11.0 cmL x 11.0 cmW x 2.5 cmH, rated input voltage: DC 10V adapter.

AC/DC Adapter:

Manufacturer: Twinpro

Model: ALT-1003

Input voltage: 100-240VAC/50-60Hz

Output voltage: 10VDC, 300mA

** The test data gathered are from production sample, serial number: 0707005 provided by the manufacturer, we receive the EUT on 2007-07-03.*

Objective

This Type approval report is prepared on behalf of *TWINPRO INTERNATIONAL HOLDINGS 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 Laboratory 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 Laboratory 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 Laboratory 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 Laboratory 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/ts/htdocs/210/214/scopes/2007070.htm>.

SYSTEM TEST CONFIGURATION

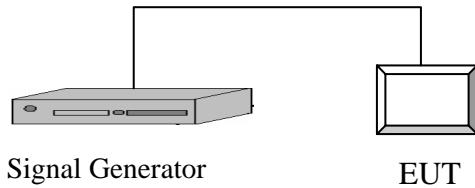
Justification

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

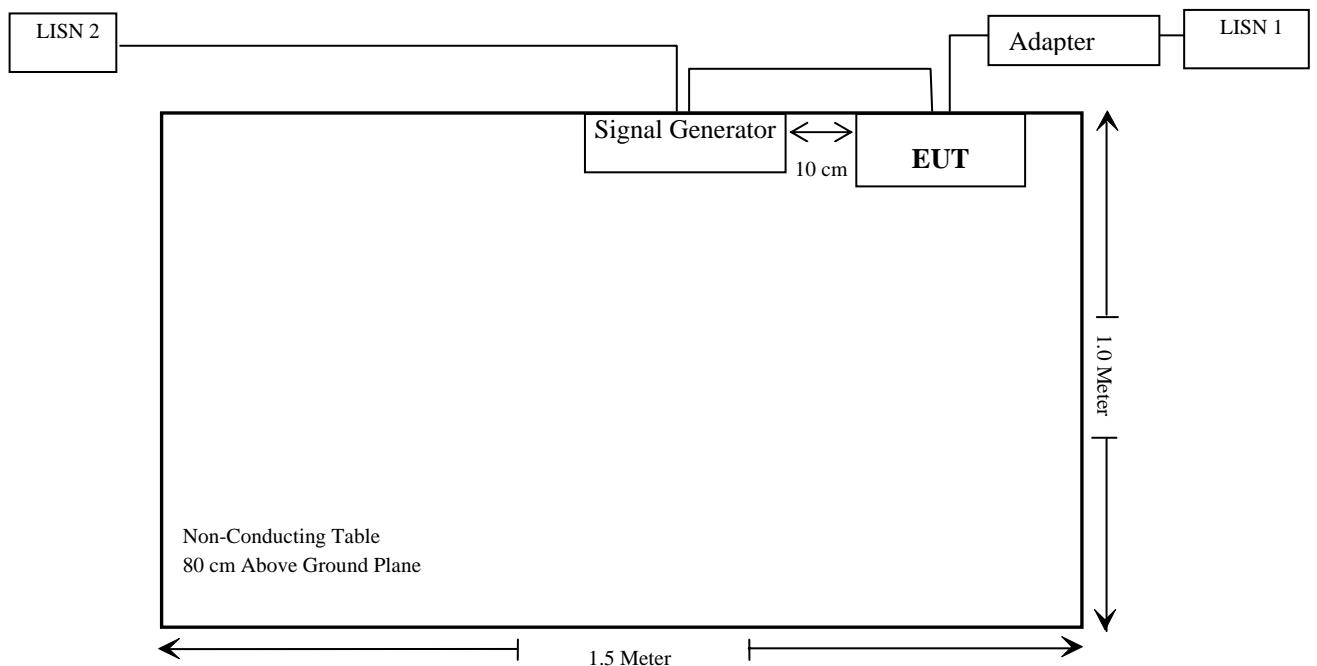
Equipment Modifications

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

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

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 permanently attached antenna, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

Result: Compliant.

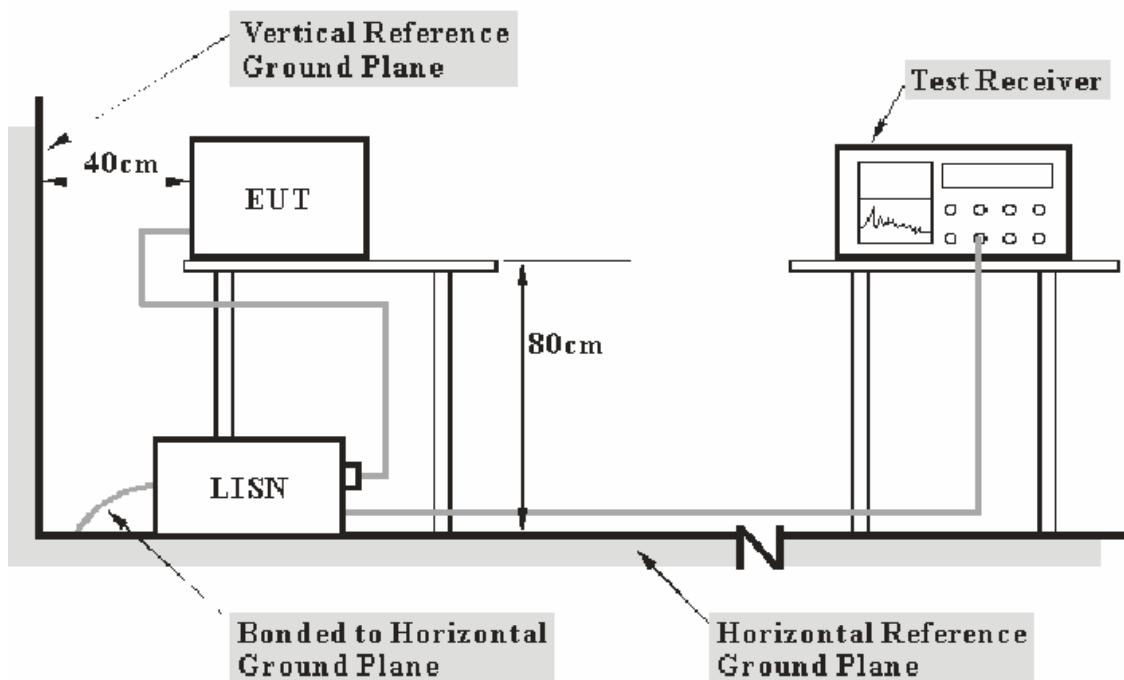
§15.207 - CONDUCTED EMISSION

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 (AMIN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 .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 adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

<u>Frequency Range</u>	<u>IFBW</u>
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	2007-03-26	2008-03-26
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-26	2008-03-26

* Com-Power's LISN were used as the supporting equipment.

* **Statement of Traceability:** Bay Area Compliance Laboratory 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 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 were 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:

2.07 dB at 0.235 MHz in the **Neutral** conductor mode, running mode

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	65%
ATM Pressure:	1000mbar

The testing was performed by Green Xu on 2007-09-12.

Test mode: Running

Line Conducted Emissions				FCC PART 15 .207	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Phase (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.235	50.20	AV	Neutral	52.27	2.07
0.475	42.10	AV	Neutral	46.43	4.33
0.235	57.60	QP	Neutral	62.27	4.67
0.235	56.40	QP	Live	62.27	5.87
0.475	40.00	AV	Live	46.43	6.43
0.235	44.10	AV	Live	52.27	8.17
0.475	47.10	QP	Neutral	56.43	9.33
0.475	46.30	QP	Live	56.43	10.13
2.595	45.50	QP	Live	56.00	10.50
13.150	48.30	QP	Neutral	60.00	11.70
2.580	43.20	QP	Neutral	56.00	12.80
1.435	42.70	QP	Live	56.00	13.30
1.425	41.00	QP	Neutral	56.00	15.00
13.430	44.40	QP	Live	60.00	15.60
26.580	42.50	QP	Neutral	60.00	17.50
1.435	28.40	AV	Live	46.00	17.60
27.335	41.40	QP	Live	60.00	18.60
2.595	24.80	AV	Live	46.00	21.20
1.425	24.20	AV	Neutral	46.00	21.80
2.580	18.40	AV	Neutral	46.00	27.60
13.150	20.10	AV	Neutral	50.00	29.90
13.430	20.00	AV	Live	50.00	30.00
26.580	13.40	AV	Neutral	50.00	36.60
27.335	9.60	AV	Live	50.00	40.40

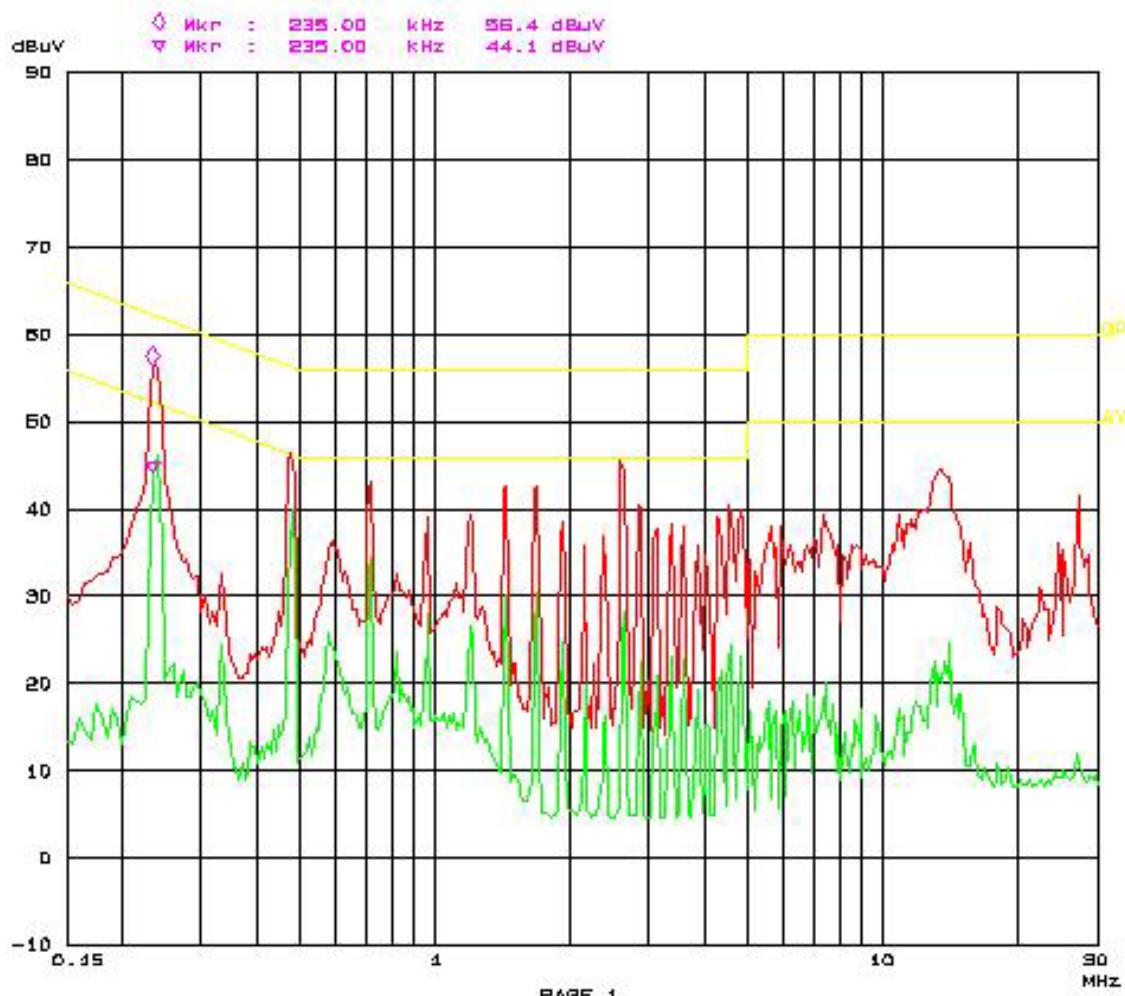
Plot(s) of Test Data

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

Conducted Emission Test
FCC Part 15

12. Sep 07 13:40

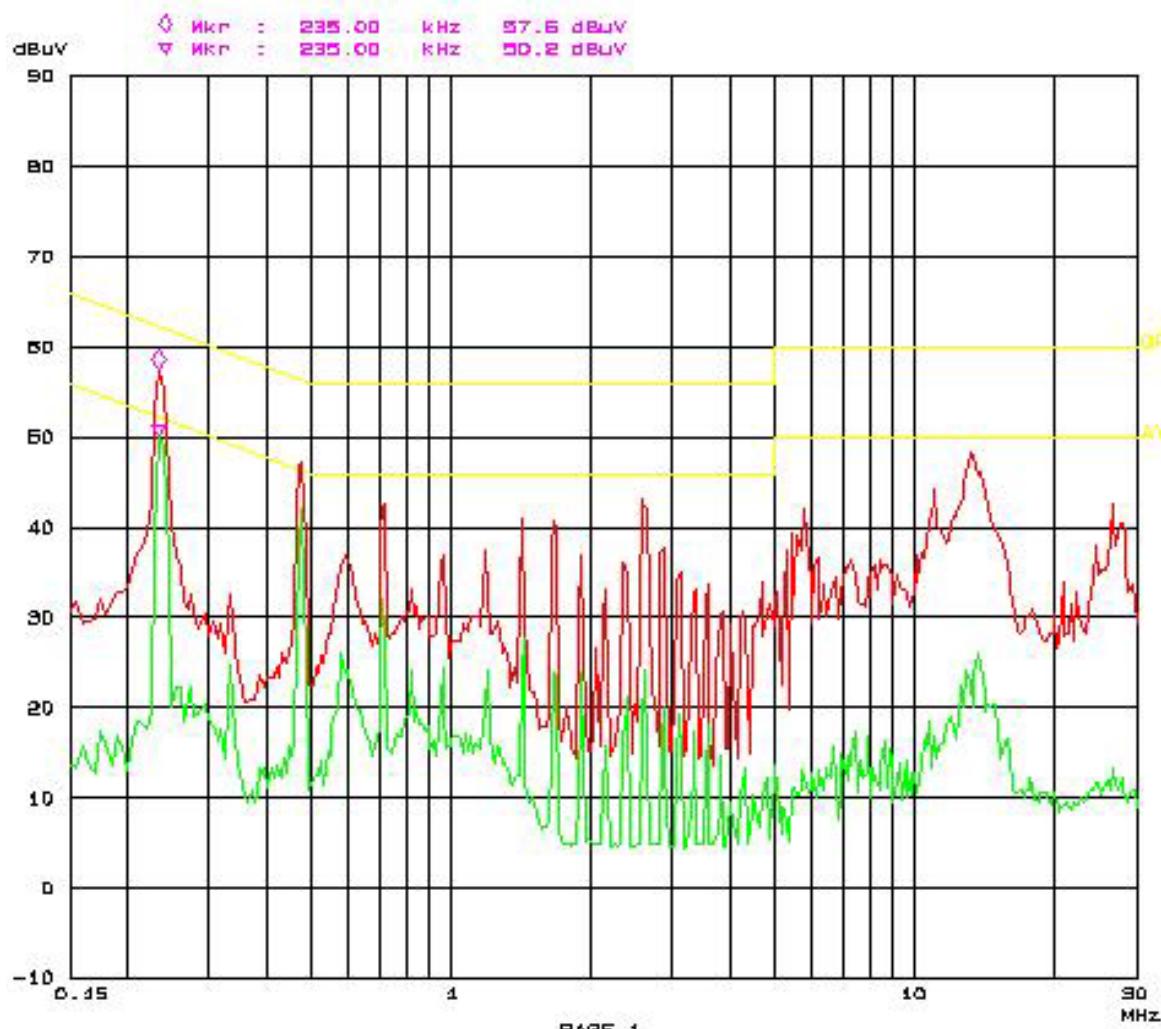
EUT: Wireless outdoor/indoor speaker
Manuf: Twinpro
Op Cond: Running
Operator: Green
Test Spec: AC120V/60Hz L
Comment: Temp: 27.5 humi 56%



Conducted Emission Test
FCC Part 15

12. Sep 07 14:10

EUT: Wireless outdoor/indoor speaker
Manuf: Twinpro
Op. Cond: Running
Operator: Green
Test Spec: AC120V/60Hz N
Comment: Temp: 27.5 humi 56%



§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 Laboratory Corp. (Shenzhen) is ± 4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

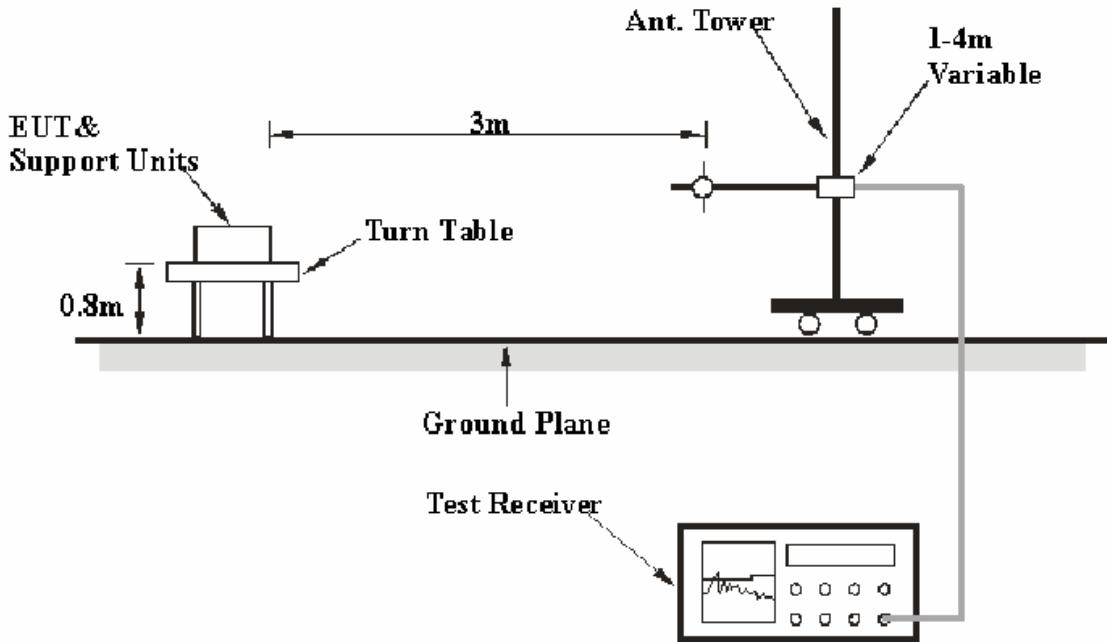
Below 1000MHz:

$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000MHz:

- (1) Peak: $\text{RBW} = 1\text{MHz} / \text{VBW} = 1\text{MHz} / \text{Sweep} = \text{Auto}$
- (2) Average: $\text{RBW} = 1\text{MHz} / \text{VBW} = 10\text{Hz} / \text{Sweep} = \text{Auto}$

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
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2006-09-29	2007-09-29
HP	Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
HP	Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22

*** 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

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:

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

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:

$$\text{Margin} = \text{Limit} - \text{Corr. Amp.}$$

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:

4.9 dB at 41.485925 MHz in the Vertical polarization, 30 -1000MHz
0.4 dB at 4804.50 MHz in the Horizontal polarization, above 1 GHz (Low Channel)
0.3 dB at 4808.50 MHz in the Vertical polarization, above 1 GHz (Middle Channel)
0.4 dB at 4816.50 MHz in the Vertical polarization, above 1 GHz (High Channel)

Test Data

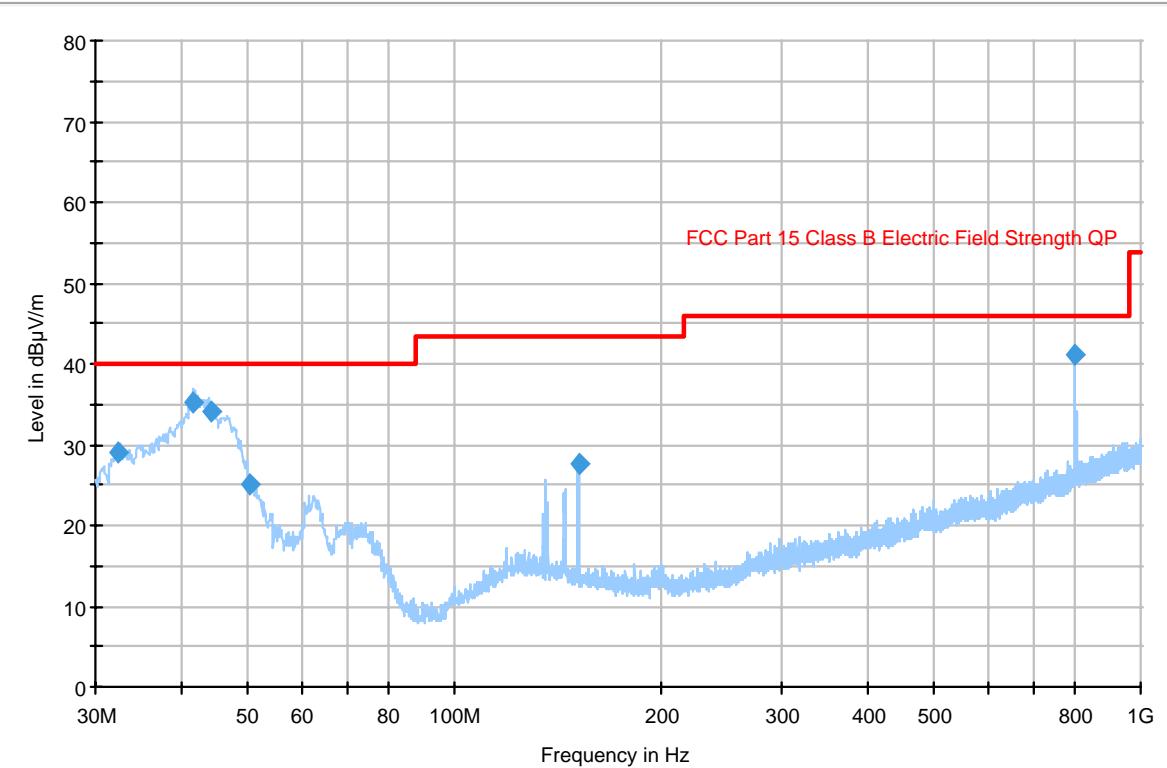
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	100.9kPa

The testing was performed by Green Xu on 2007-09-14.

Test Mode: Transmitting

30-1000 MHz



Frequency (MHz)	Quasi Peak (dB μ V/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dB μ V/m)	Margin (dB)
41.485925	35.1	102.0	V	4.0	-11.8	40.0	4.9
800.751075	41.1	102.0	V	101.0	1.6	46.0	4.9
44.226650	34.1	102.0	V	185.0	-13.6	40.0	5.9
32.470725	29.0	101.0	V	321.0	-5.4	40.0	11.0
50.570450	25.1	102.0	V	133.0	-16.4	40.0	14.9
151.673900	27.6	129.0	H	124.0	-10.7	43.5	15.9

Above 1 GHz:

Radiated Emission (Low Channel):2402.25MHz

Frequency (MHz)	Receive Antenna Polarity (H/V)	Uncorrected Field Strength (dBuV/m)	Pre-amp (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Field Strength (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
4804.50	H	46.34	33.4	36.0	4.6	53.6	54	0.4	AV
7206.75	H	43.41	33.7	39.1	4.5	53.3	54	0.7	AV
4804.50	V	46.34	33.4	35.0	4.6	52.6	54	1.4	AV
7206.75	V	43.41	33.7	37.8	4.5	52.0	54	2.0	AV
2402.25	V	91.66	34.2	30.6	3.6	91.7	94	2.3	AV
2402.25	H	84.08	34.2	30.6	3.6	84.1	94	9.9	AV
7206.75	H	48.52	33.7	39.1	4.5	58.4	74	15.6	PK
4804.50	H	50.02	33.4	36.0	4.6	57.3	74	16.7	PK
7206.75	V	48.52	33.7	37.8	4.5	57.1	74	16.9	PK
4804.50	V	50.02	33.4	35.0	4.6	56.3	74	17.7	PK
2402.25	V	92.82	34.2	30.6	3.6	92.8	114	21.2	PK
2402.25	H	88.69	34.2	30.6	3.6	88.7	114	25.3	PK

Radiated Emission (Middle Channel):2404.25MHz

Frequency (MHz)	Receive Antenna Polarity (H/V)	Uncorrected Field Strength (dBuV/m)	Pre-amp (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Field Strength (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
4808.50	V	47.43	33.4	35.0	4.6	53.7	54	0.3	AV
7212.75	H	43.41	33.7	39.1	4.5	53.3	54	0.7	AV
4808.50	H	45.50	33.4	36.0	4.6	52.7	54	1.3	AV
7212.75	V	43.41	33.7	37.8	4.5	52.0	54	2.0	AV
2404.25	V	90.32	34.2	30.6	3.6	90.3	94	3.7	AV
2404.25	H	85.32	34.2	30.6	3.6	85.3	94	8.7	AV
4808.50	H	53.52	33.4	36.0	4.6	60.8	74	13.2	PK
4808.50	V	53.04	33.4	35.0	4.6	59.3	74	14.7	PK
7212.75	H	48.52	33.7	39.1	4.5	58.4	74	15.6	PK
7212.75	V	48.52	33.7	37.8	4.5	57.1	74	16.9	PK
2404.25	V	93.48	34.2	30.6	3.6	93.5	114	20.5	PK
2404.25	H	88.28	34.2	30.6	3.6	88.3	114	25.7	PK

Radiated Emission (High Channel):2408.25MHz

Frequency (MHz)	Receive Antenna Polarity (H/V)	Uncorrected Field Strength (dBuV/m)	Pre-amp (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Field Strength (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
4816.50	V	47.36	33.4	35.0	4.6	53.6	54	0.4	AV
4816.50	H	46.06	33.4	36.0	4.6	53.3	54	0.7	AV
7224.75	H	43.41	33.7	39.1	4.5	53.3	54	0.7	AV
2408.25	V	92.42	34.2	30.6	3.6	92.4	94	1.6	AV
7224.75	V	43.41	33.7	37.8	4.5	52.0	54	2.0	AV
2408.25	H	86.09	34.2	30.6	3.6	86.1	94	7.9	AV
4816.50	H	54.50	33.4	36.0	4.6	61.7	74	12.3	PK
4816.50	V	54.04	33.4	35.0	4.6	60.3	74	13.7	PK
7224.75	H	48.52	33.7	39.1	4.5	58.4	74	15.6	PK
7224.75	V	48.52	33.7	37.8	4.5	57.1	74	16.9	PK
2408.25	V	93.84	34.2	30.6	3.6	93.9	114	20.2	PK
2408.25	H	89.09	34.2	30.6	3.6	89.1	114	24.9	PK

§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

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 its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including the specified frequencies of band edges.
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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2006-09-29	2007-09-29
HP	Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratory 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:	53%
ATM Pressure:	100.9kPa

The testing was performed by Green Xu on 2007-09-13.

Test Mode: Transmitting

Frequency (MHz)	Reading (dBuV/m)	Detector Type	Pre-amp (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Amplitude (dBuV/m)	FCC 15.209 Limit (dBuV/m)	Margin (dB)	Result
Low Channel (2404.25MHz)									
2385.0	36.34	AV	34.2	30.6	3.6	39.44	54	14.56	Pass
2385.0	37.43	PK	34.2	30.6	3.6	37.44	74	36.56	Pass
High Channel (2408.25MHz)									
2490.0	36.00	AV	34.2	30.6	3.6	36.01	54	17.99	Pass
2490.0	39.43	PK	34.2	30.6	3.6	39.44	74	34.56	Pass

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