



NVLAP LAB CODE 200707-0



FCC PART 15.249
EMI MEASUREMENT AND TEST REPORT

For

Shenzhen Lian Yi Da Science Co., Ltd.

F5, A Building of Cunnan Industrial Estate, Shuidou 2Road, Shuidou,
Yousong, Longhua Town, Bao'an District, Shenzhen, China

FCC ID: RAWLYD240CA

This Report Concerns:	Equipment Type:
<input checked="" type="checkbox"/> Original Report	Wireless camera
Test Engineer:	Charmi Peng <i>Charmi. Peng</i>
Report No.:	RSZ06111304
Test Date:	2007-01-02 to 2007-01-03
Report Date:	2007-04-05
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TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S)	3
TEST METHODOLOGY	3
TEST FACILITY	4
EXTERNAL I/O CABLE.....	4
SYSTEM TEST CONFIGURATION.....	5
JUSTIFICATION	5
EQUIPMENT MODIFICATIONS	5
CONFIGURATION OF TEST SETUP	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS	6
§15.203 - ANTENNA REQUIREMENT.....	7
STANDARD APPLICABLE	7
ANTENNA CONNECTOR CONSTRUCTION	7
§15.207 - CONDUCTED EMISSIONS	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP	8
EMI TEST RECEIVER SETUP.....	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
TEST RESULTS SUMMARY	9
TEST DATA	10
PLOT(S) OF TEST DATA.....	10
§15.205 §15.209(A) §15.249(A) - RADIATED EMISSIONS.....	13
MEASUREMENT UNCERTAINTY	13
EUT SETUP	13
EMI TEST RECEIVER SETUP.....	14
TEST EQUIPMENT LIST AND DETAILS.....	14
TEST PROCEDURE	14
CORRECTED AMPLITUDE & MARGIN CALCULATION	14
TEST RESULTS SUMMARY	15
TEST DATA	15
§15.249(D) – OUT OF BAND EMISSIONS	18
STANDARD APPLICABLE	18
TEST PROCEDURE	18
TEST EQUIPMENT LIST AND DETAILS.....	18
TEST DATA	18
APPENDIX A- DECLARATION LETTER	19

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Lian Yi Da Science Co., Ltd.*'s product, model number: *CM240C* or the "EUT" as referred to in this report is a *Wireless camera*. The EUT is measured approximately 7.50 cm L x 5.00 cm W x 11.00 cm H, rated input voltage: DC 5V adapter and 3.7V Battery.

Adapter:

Model: XP20-050050
Input: 100~240V 50/60Hz
Output: 5V 500mA

** The test data gathered are from production sample, serial number: 0611020 provided by the manufacturer, we received EUT on 2006-11-13.*

Objective

This Type approval report is prepared on behalf of *Shenzhen Lian Yi Da Science Co., Ltd.* 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 radiated and conducted emission measurement 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 and Industrial Canada registration test site No.: 5500A. 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). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded Detachable DC Cable with a core	1.0	AC adapter	EUT

SYSTEM TEST CONFIGURATION

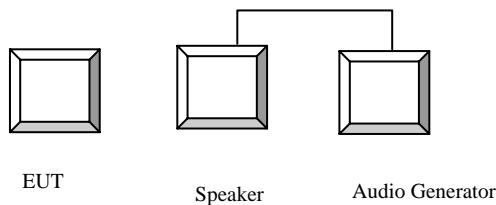
Justification

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

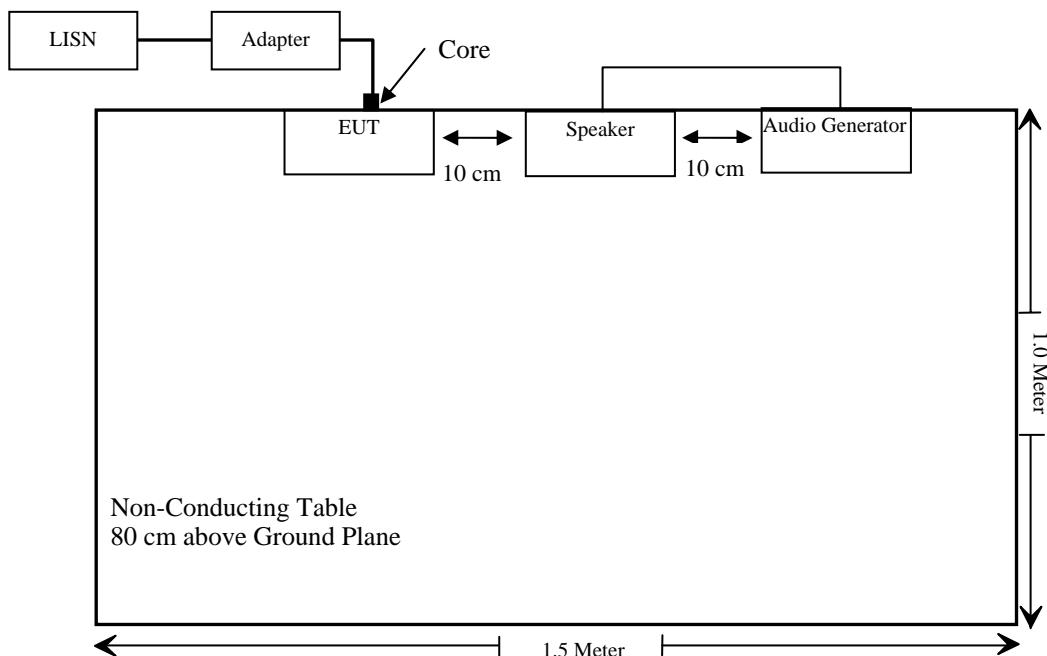
Equipment Modifications

Shenzhen Lian Yi Da Science Co., Ltd. has done modification by adding copper foil in the enclosure in the final product, please refer to the declaration on page 19.

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 Emission	Compliant*
§15.205(a), §15.209(a), §15.249(a)	Radiated Emission	Compliant
§15.249(d)	Out of band emission	Compliant

*Within the measurement uncertainty

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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

Result: Compliant.

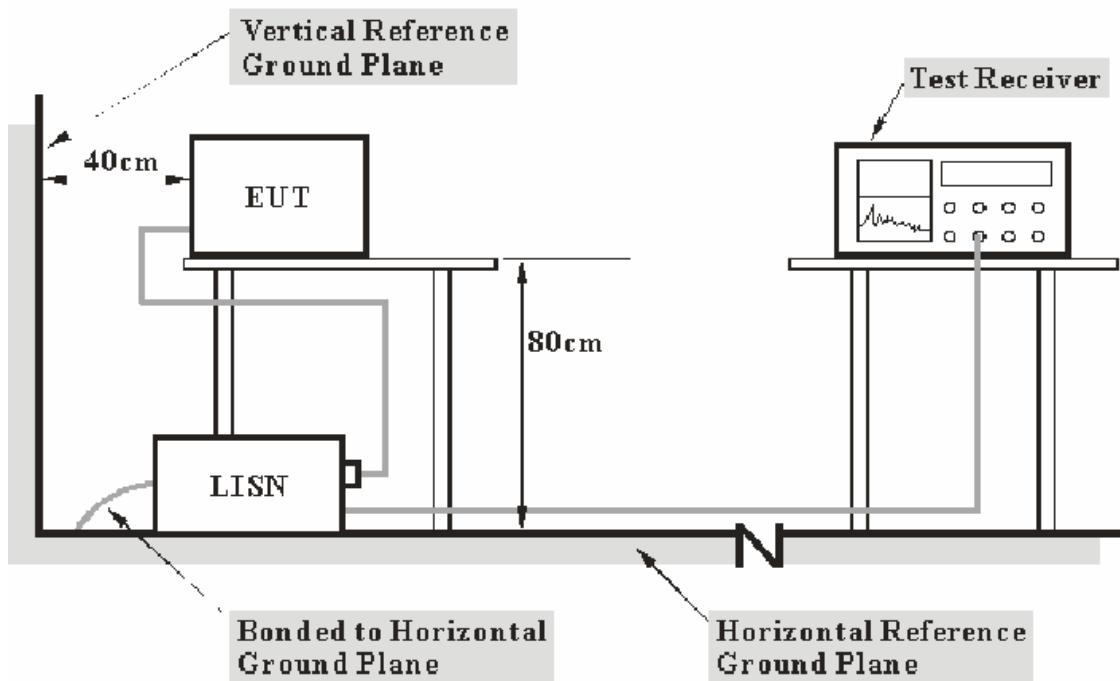
§15.207 - CONDUCTED EMISSIONS

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 .207 limits.

The adapter 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:

<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
Rohde & Schwarz	EMI Test Receiver	ESCS30	DE25330 or 830245/006	2006-03-20	2007-03-19
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-03-01	2007-03-01

* 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 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:

0.45 dB at 0.415 MHz in the **Neutral** conductor mode.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	60%
ATM Pressure:	1002mbar

The testing was performed by Charmi Peng on 2007-01-02.

Test mode: Transmitting

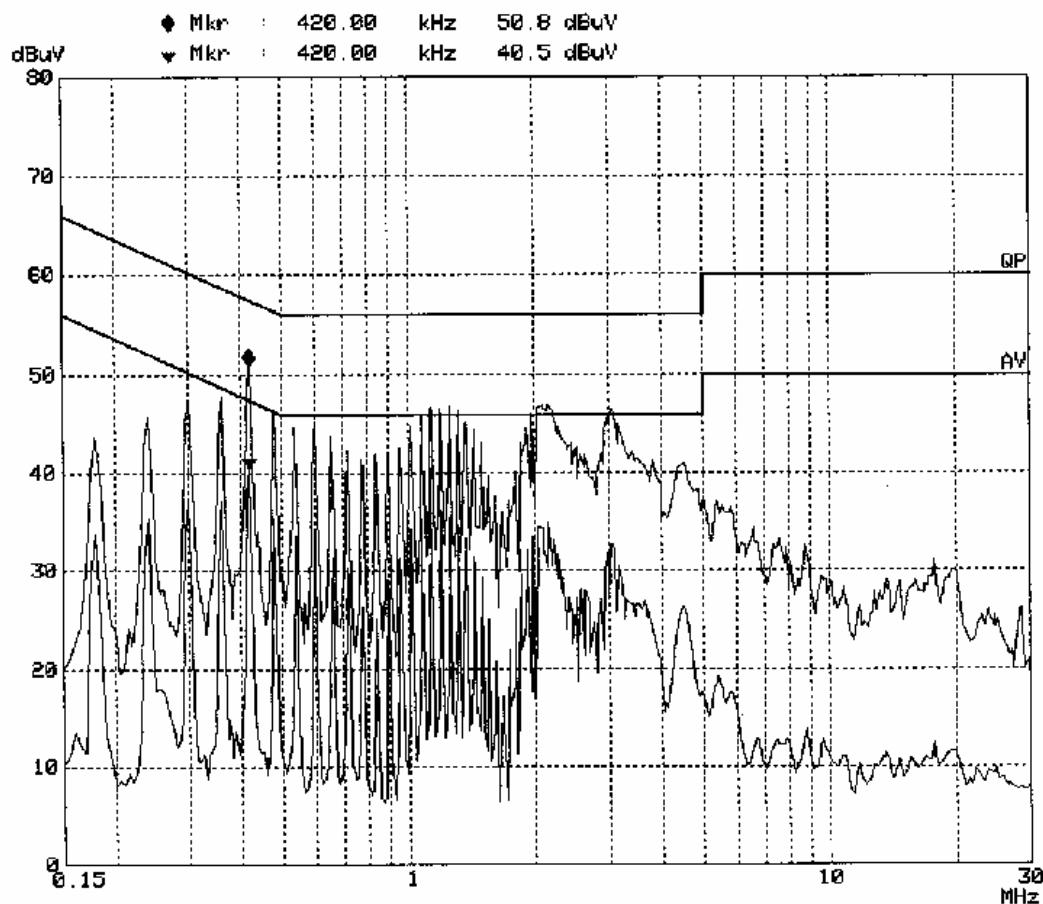
LINE CONDUCTED EMISSIONS				FCC PART 15.207	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Phase (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.415	47.10	AV	Neutral	47.55	0.45
1.190	42.60	AV	Neutral	46.00	3.40
0.415	54.10	QP	Neutral	57.55	3.45
1.965	42.10	AV	Neutral	46.00	3.90
0.595	41.80	AV	Neutral	46.00	4.20
2.915	50.40	QP	Neutral	56.00	5.60
2.915	40.40	AV	Neutral	46.00	5.60
1.965	50.10	QP	Neutral	56.00	5.90
1.190	49.40	QP	Neutral	56.00	6.60
0.420	50.80	QP	Line	57.45	6.65
0.420	40.50	AV	Line	47.45	6.95
0.595	48.10	QP	Neutral	56.00	7.90
0.295	41.60	AV	Neutral	50.38	8.78
2.150	47.00	QP	Line	56.00	9.00
1.195	46.60	QP	Line	56.00	9.40
3.045	46.50	QP	Line	56.00	9.50
1.195	36.10	AV	Line	46.00	9.90
0.600	45.30	QP	Line	56.00	10.70
2.150	35.00	AV	Line	46.00	11.00
0.295	49.10	QP	Neutral	60.38	11.28
0.600	33.90	AV	Line	46.00	12.10
0.300	47.20	QP	Line	60.24	13.04
0.300	37.00	AV	Line	50.24	13.24
3.045	32.70	AV	Line	46.00	13.30

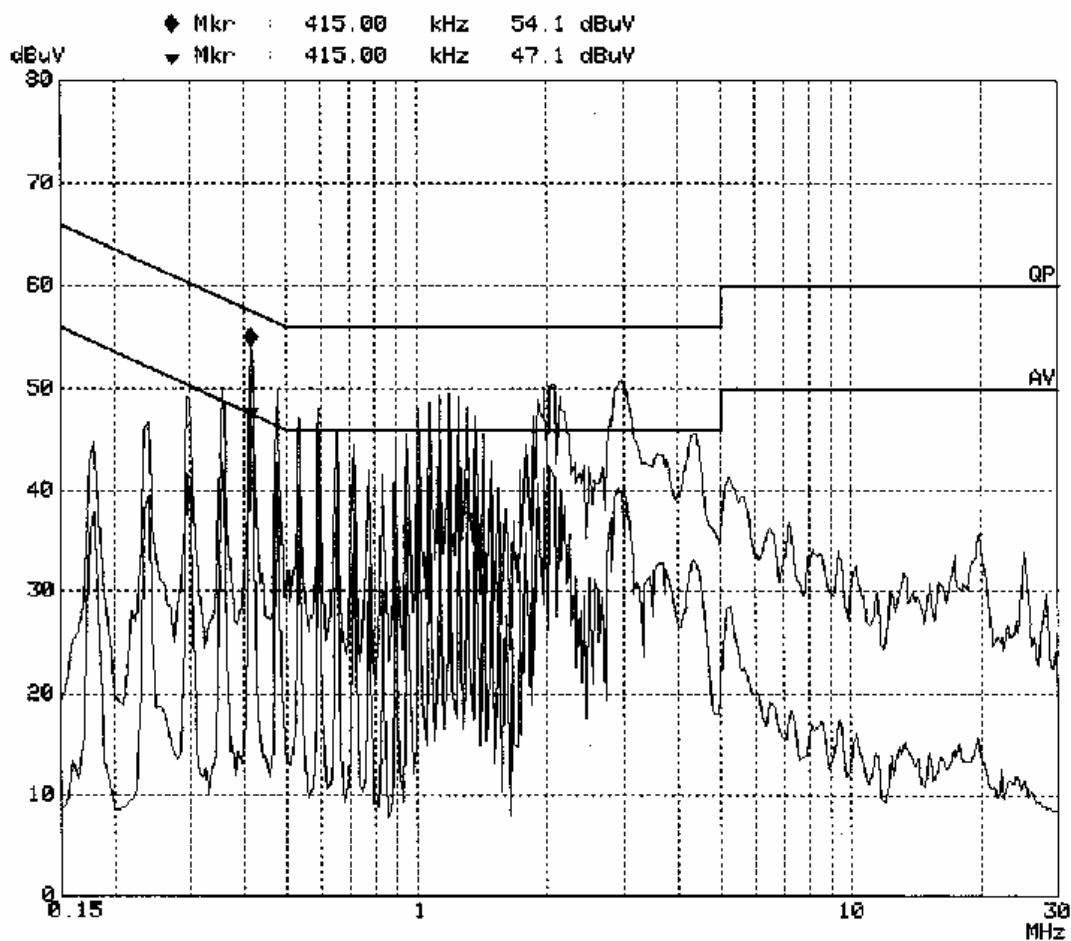
*Within the measurement uncertainty

Plot(s) of Test Data

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

Line:

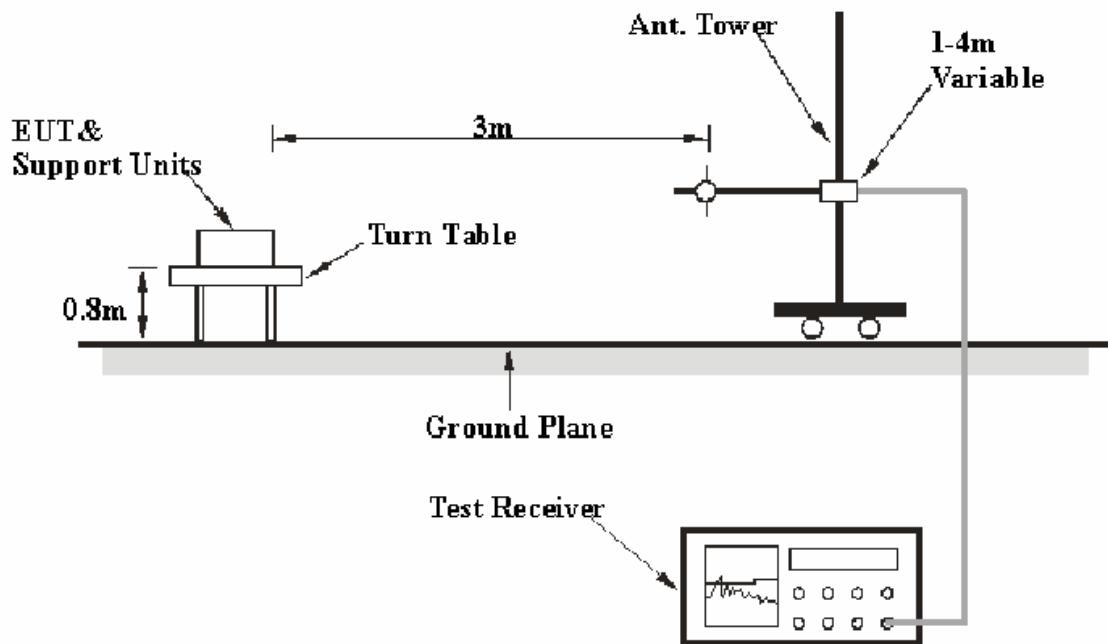


Neutral:

§15.205 §15.209(a) §15.249(a) - RADIATED 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 best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup

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

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

EMI Test Receiver Setup

The system was investigated from 30 MHz to 25000 MHz.

During the radiated emission and out of band emission test, the test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
30 – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25000 MHz	1MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-08-17	2007-08-17
HP	Amplifier	HP8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-08-14	2007-08-14
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
HP	Preamplifier	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) 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.

All data was recorded in the peak and average detection mode.

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:

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

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

4.69 dB at 4828 MHz in the **Vertical** polarization, Low Channel
4.25 dB at 4936 MHz in the **Vertical** polarization, High Channel
14.6 dB at 63.832312 MHz in the **Vertical** polarization, 30MHz-1000MHz

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1000mbar

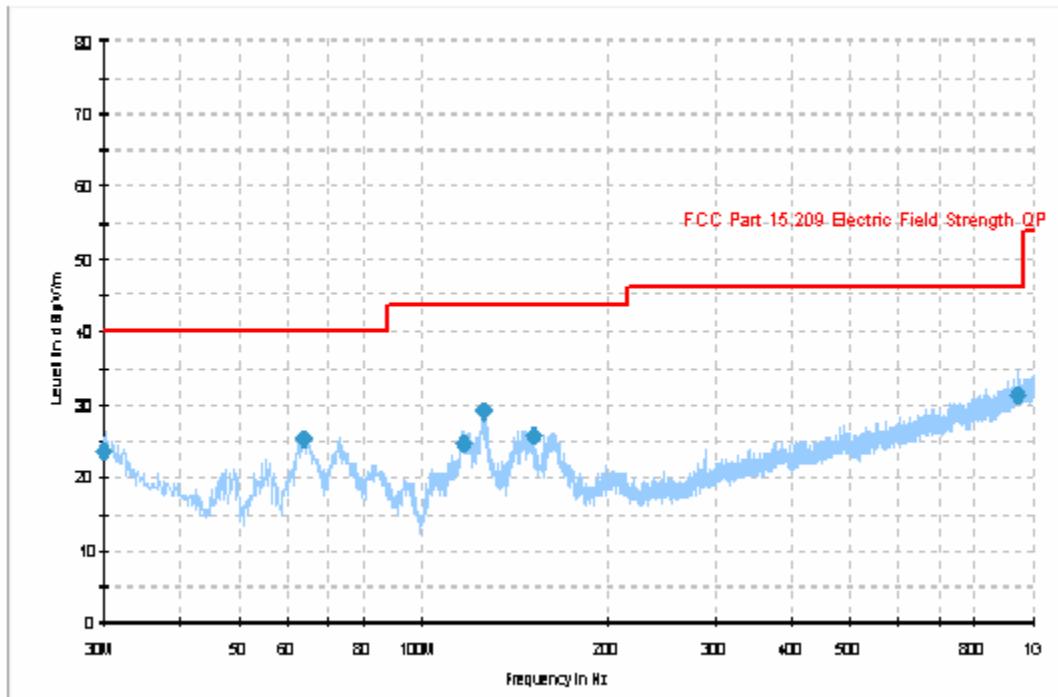
The testing was performed by Charmi Peng on 2007-01-03.

Test mode: Transmitting

Freq. (MHz)	Receiver Reading (dB μ V)	Detector PK/QP/AV	Table Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp Gain (dB)	Corr. Amp. (dB μ V/m)	Part15.249/209		
										Limit (dB μ V/m)	Margin (dB)	Note
Low Channel (2414MHz)												
4828	43.07	AV	180	1.6	V	35.0	4.64	33.4	49.31	54	4.69	Harmonic
2414	85.2	AV	45	1.0	V	30.6	3.61	35.0	84.41	94	9.59	Fundamental
9656	32.86	AV	360	1.6	V	40.0	5.35	34.1	44.11	54	9.89	Harmonic
9656	33.53	AV	149	1.8	H	38.5	5.35	34.1	43.28	54	10.72	Harmonic
2414	85.33	AV	263	1.4	H	28.9	3.61	35.0	82.84	94	11.16	Fundamental
7242	34.23	AV	263	1.8	V	37.8	4.51	33.7	42.84	54	11.16	Harmonic
7242	34.86	AV	268	1.6	H	36.3	4.51	33.7	41.97	54	12.03	Harmonic
4828	34.83	AV	270	1.6	H	33.8	4.64	33.4	39.87	54	14.13	Harmonic
7242	48.65	PK	268	1.6	V	37.8	4.51	33.7	57.26	74	16.74	Harmonic
7242	48.87	PK	168	1.6	H	36.3	4.51	33.7	55.98	74	18.02	Harmonic
9656	44.25	PK	358	1.3	V	40.0	5.35	34.1	55.5	74	18.5	Harmonic
9656	44.37	PK	230	1.8	H	38.5	5.35	34.1	54.12	74	19.88	Harmonic
4828	47.83	PK	250	1.0	V	35.0	4.64	33.4	54.07	74	19.93	Harmonic
4828	44.67	PK	49	1.2	H	33.8	4.64	33.4	49.71	74	24.29	Harmonic
2414	87.35	PK	18	1.6	V	30.6	3.61	35.0	86.56	114	27.44	Fundamental
2414	86.67	PK	20	1.2	H	28.9	3.61	35.0	84.18	114	29.82	Fundamental

Freq. (MHz)	Receiver Reading (dB μ V)	Detector PK/QP/AV	Table Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre- Amp Gain (dB)	Corr. Amp. (dB μ V/m)	Part15.249/209		
										Limit (dB μ V/m)	Margin (dB)	Note
High Channel (2468MHz)												
4936	43.2	AV	180	1.6	V	35.4	4.55	33.4	49.75	54	4.25	Harmonic
9872	34.6	AV	360	1.6	V	40.0	5.77	34.1	46.27	54	7.73	Harmonic
4936	39.6	AV	270	1.6	H	34.6	4.55	33.4	45.35	54	8.65	Harmonic
9872	33.4	AV	149	1.8	H	38.4	5.77	34.1	43.47	54	10.53	Harmonic
2468	84.20	AV	45	1.0	V	30.6	3.61	35.0	83.41	94	10.59	Fundamental
7404	34.62	AV	263	1.8	V	37.7	4.75	33.7	43.37	54	10.63	Harmonic
7404	35.37	AV	268	1.6	H	36.4	4.75	33.7	42.82	54	11.18	Harmonic
2468	83.03	AV	263	1.4	H	28.9	3.61	35.0	80.54	94	13.46	Fundamental
9872	47.37	PK	358	1.3	V	40.0	5.77	34.1	59.04	74	14.96	Harmonic
9872	45.5	PK	230	1.8	H	38.4	5.77	34.1	55.57	74	18.43	Harmonic
4936	48.03	PK	250	1.0	V	35.4	4.55	33.4	54.58	74	19.42	Harmonic
7404	45.8	PK	268	1.6	V	37.7	4.75	33.7	54.55	74	19.45	Harmonic
7404	46.2	PK	168	1.6	H	36.4	4.75	33.7	53.65	74	20.35	Harmonic
4936	43.7	PK	49	1.2	H	34.6	4.55	33.4	49.45	74	24.55	Harmonic
2468	85.37	PK	18	1.6	V	30.6	3.61	35.0	84.58	114	29.42	Fundamental
2468	83.53	PK	20	1.2	H	28.9	3.61	35.0	81.04	114	32.96	Fundamental

30 MHz-1000 MHz:



Frequency (MHz)	Quasi Peak (dB μ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Limit (dB μ V/m)	Margin (dB)
63.832312	25.4	100.0	V	199.0	-18.6	40.0	14.6
125.785688	28.9	100.0	V	60.0	-12.1	43.5	14.6
940.232812	31.2	176.0	H	8.0	0.8	46.0	14.8
30.060607	23.6	179.0	V	330.0	-5.5	40.0	16.4
150.691688	25.6	99.0	V	243.0	-13.4	43.5	17.9
116.676875	24.7	99.0	V	78.0	-13.8	43.5	18.8

§15.249(d) – OUT OF BAND EMISSIONS

Standard Applicable

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 RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
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
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
HP	Preamplifier	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:	55%
ATM Pressure:	1006mbar

The testing was performed by Charmi Peng on 2007-01-02.

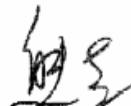
Test Mode: Transmitting

Frequency (MHz)	Emission (dBuV/m)	Limit (dBuV/m)	Result
2399.9	30.5	54	Pass
2483.6	31.6	54	Pass

APPENDIX A- DECLARATION LETTER

Declaration letter

We Shenzhen LianYiDa Science Co.,Ltd , hereby
agreed that we will have copper foil on the enclosure in
the final product, the FCC ID was RAWLYD240CA .

signature: 

stamp:

2007-04-05