



NVLAP LAB CODE 200707-0



FCC PART 15.249 EMI MEASUREMENT AND TEST REPORT

For

Shenzhen Lian Yi Da Science Co., Ltd.

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Yousong, Longhua Town, Bao'an District, Shenzhen, China

FCC ID: RAWLYD801CA

This Report Concerns: ☒ Original Report	Equipment Type: Wireless camera
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Report No.: RSZ06111302	
Test Date: 2006-11-15 to 2006-12-18	
Report Date: 2006-12-19	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Lian Yi Da Science Co., Ltd.*'s product, model number: *CM801CWAS* or the "EUT" as referred to in this report is a *Wireless camera*. The EUT is measured approximately 26.0 cm L x 26.0 cm W x 7.0 cm H, rated input voltage: DC 12V adapter.

Adapter: Manufacturer: Sxin GPU Adapter
Model: XP20-120050
Input: 100-240V 50/60 Hz
Output: 12V DC 500mA

** The test data gathered are from production sample, serial number: 0611018 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 of the adapter	1.2	AC adapter	EUT

SYSTEM TEST CONFIGURATION

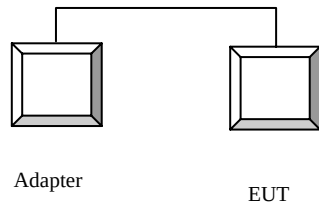
Justification

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

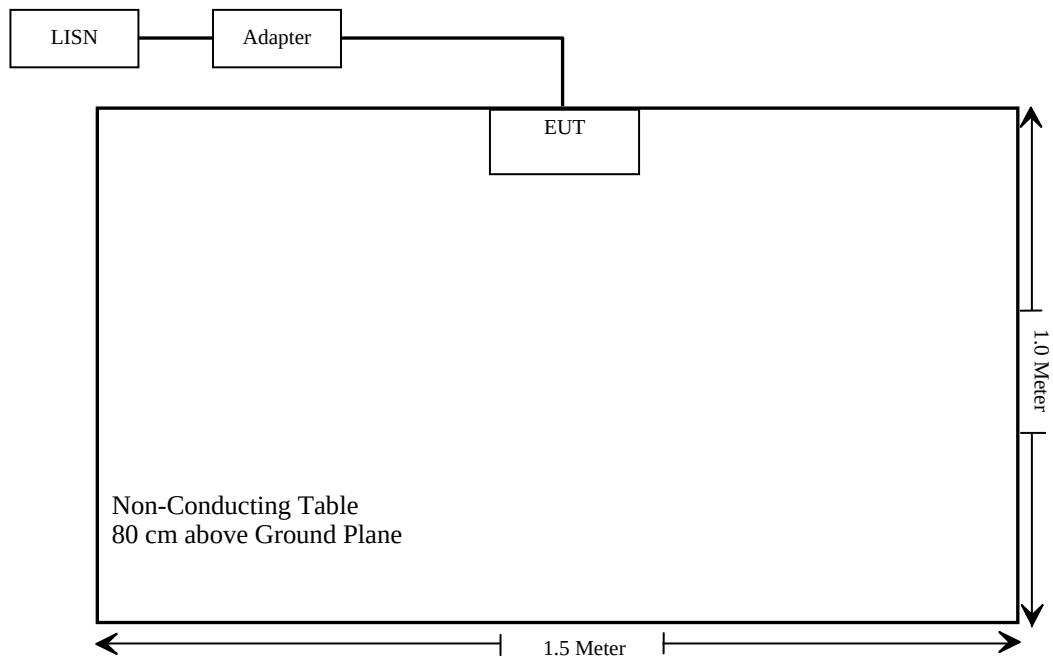
Equipment Modifications

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 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.

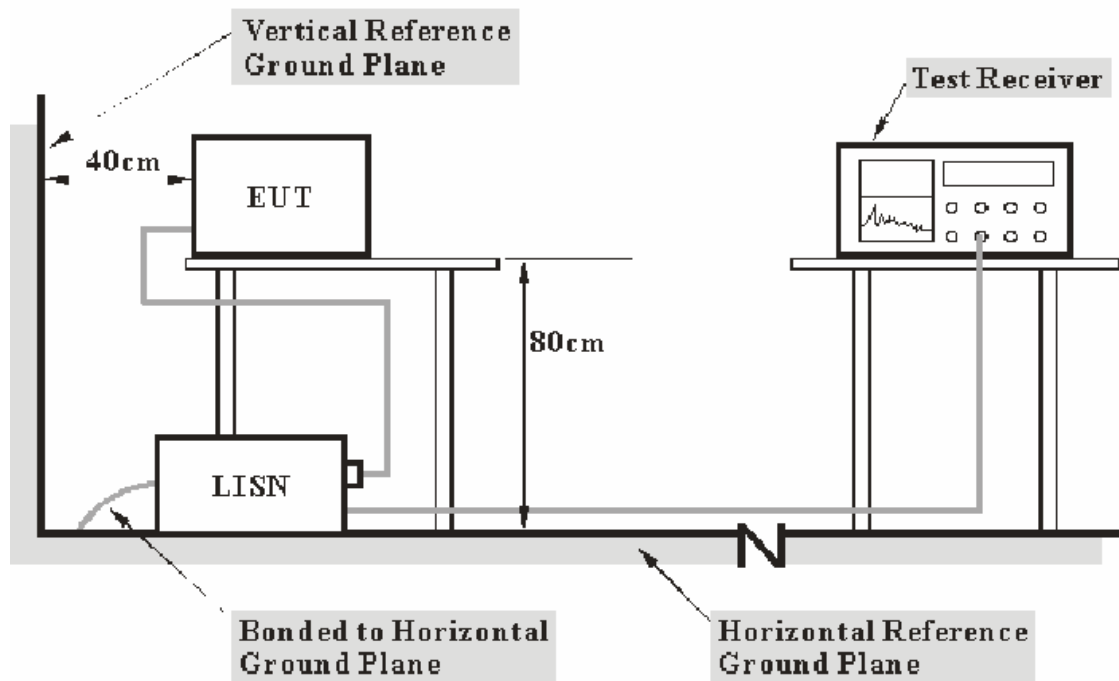
§15.207 - CONDUCTED EMISSION

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 (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
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 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:

3.3 dB at 0.530 MHz in the **Neutral** conductor mode.

Test Data**Environmental Conditions**

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

The testing was performed by William Chan on 2006-12-18.

Test mode: Transmitting

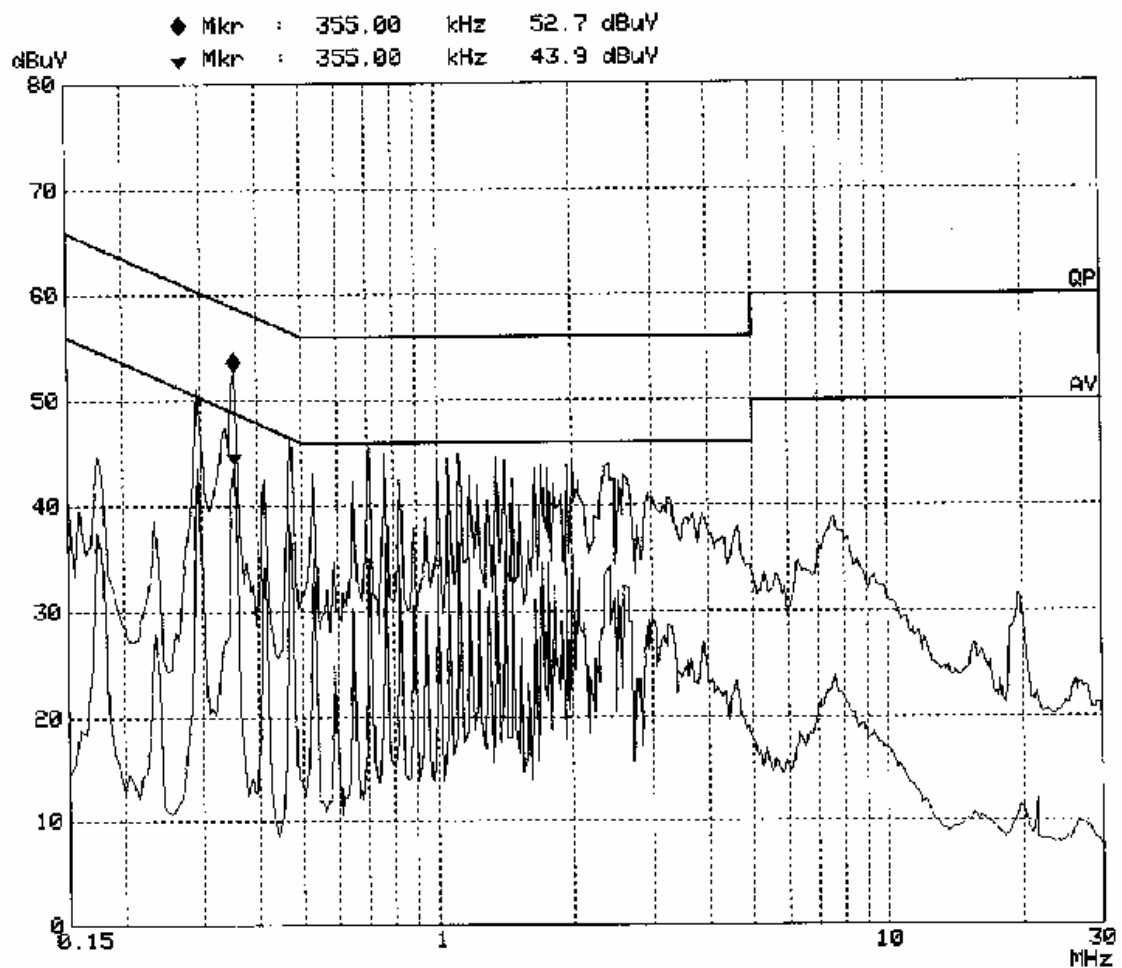
Frequency MHz	LINE CONDUCTED EMISSIONS			FCC PART 15 .207	
	Amplitude dBμV	Detector QP/AV	Phase Live/Neutral	Limit dBμV	Margin dB
0.530	42.70	AV	Neutral	46.00	3.30
0.355	44.00	AV	Live	48.84	4.84
0.355	52.70	QP	Live	58.84	6.14
0.295	43.40	AV	Live	50.38	6.98
0.355	51.40	QP	Neutral	58.84	7.44
0.470	38.30	AV	Live	46.51	8.21
0.295	51.50	QP	Neutral	60.38	8.88
0.295	51.10	QP	Live	60.38	9.28
1.120	36.60	AV	Live	46.00	9.40
0.355	39.40	AV	Neutral	48.84	9.44
0.470	46.20	QP	Live	56.51	10.31
0.295	40.00	AV	Neutral	50.38	10.38
0.710	45.40	QP	Live	56.00	10.60
1.235	45.20	QP	Neutral	56.00	10.80
0.710	35.10	AV	Live	46.00	10.90
0.470	45.40	QP	Neutral	56.51	11.11
1.120	44.80	QP	Live	56.00	11.20
1.360	44.50	QP	Live	56.00	11.50
0.530	44.40	QP	Neutral	56.00	11.60
1.120	44.40	QP	Neutral	56.00	11.60
0.470	34.00	AV	Neutral	46.51	12.51
1.120	32.20	AV	Neutral	46.00	13.80
1.235	31.00	AV	Neutral	46.00	15.00
1.360	17.70	AV	Live	46.00	28.30

Plot(s) of Test Data

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

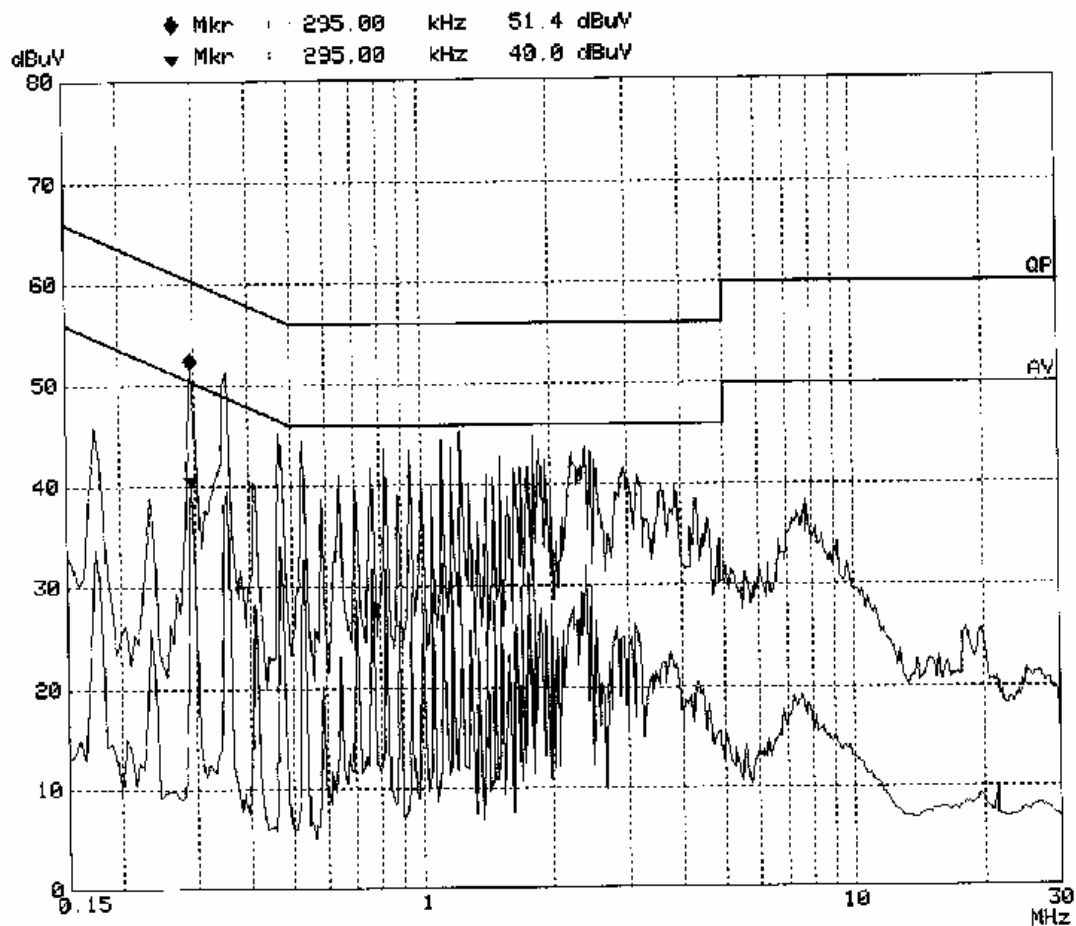
conducted emission test FCC Part 15

EUT: Wireless camera
Manuf: Lian Yi Da
Op Cond: Transmitting
Operator: William
Test Spec: AC 120V/60Hz L
Comment: Temp:25°C Humi:56%
Date: 18. Dec 06 21:34



conducted emission test FCC Part 15

EUT: Wireless camera
Manuf: Lian Yi Da
Op Cond: Transmitting
Operator: William
Test Spec: AC 120V/60Hz N
Comment: Temp:25°C Humi:56%
Date: 18. Dec 06 21:54



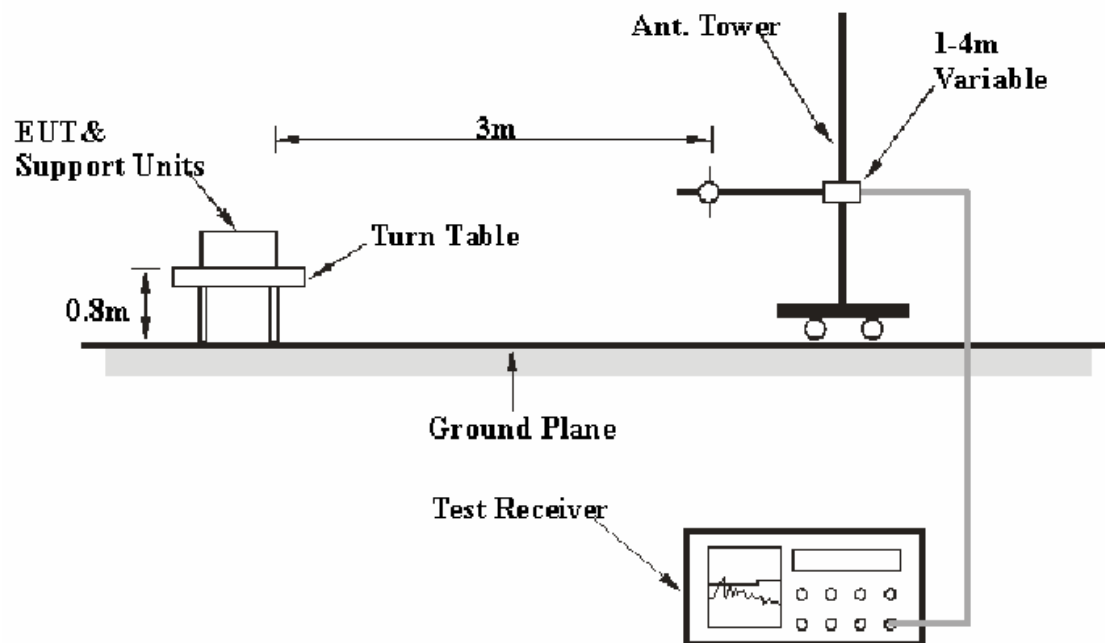
§15.205 §15.209(a) §15.249(a) - RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, 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	100028	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:

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

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. 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:

3.42 dB at 4828 MHz in the **Vertical** polarization, above 1GHz (Low Channel)
4.85 dB at 4864 MHz in the **Vertical** polarization, above 1GHz (Middle Channel)
3.84 dB at 4936 MHz in the **Vertical** polarization, above 1GHz (High Channel)
11.7 dB at 411.362541 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 William Chan on 2006-11-15.

Test mode: Transmitting (Low channel)

Frequency MHz	Meter Reading dBuV/m	Detector PK/QP/AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor dB/m	Cable loss dB	Amplifier Gain dB	Corr. Amp. dBuV/m	FCC Part 15.209 & 15.249		
										Limit dBuV/m	Margin dB	Comment
Low Channel												
4828	44.01	AV	0	1.2	V	33.8	6.17	33.4	50.58	54	3.42*	harmonic
7242	38.97	AV	180	1.2	V	36.8	8.17	33.7	50.24	54	3.76*	harmonic
4828	43.27	AV	0	1.2	H	33.8	6.17	33.4	49.84	54	4.16	harmonic
7242	38.56	AV	180	1.2	H	36.8	8.17	33.7	49.83	54	4.17	harmonic
9656	36.94	AV	360	1	V	38	8.5	34.1	49.34	54	4.66	harmonic
4828	62.06	PK	0	1.2	V	33.8	6.17	33.4	68.63	74	5.37	harmonic
9656	35.12	AV	360	1	H	38	8.5	34.1	47.52	54	6.48	harmonic
2414	88.37	AV	180	1.2	V	28.1	2.17	35	83.64	94	10.36	fundamental
7242	50.5	PK	180	1.2	V	36.8	8.17	33.7	61.77	74	12.23	harmonic
4828	54.15	PK	0	1.2	H	33.8	6.17	33.4	60.72	74	13.28	harmonic
2414	84.46	AV	180	1.2	H	28.1	2.17	35	79.73	94	14.27	fundamental
9656	46.75	PK	360	1	V	38	8.5	34.1	59.15	74	14.85	harmonic
7242	46.21	PK	180	1.2	H	36.8	8.17	33.7	57.48	74	16.52	harmonic
9656	44.25	PK	360	1	H	38	8.5	34.1	56.65	74	17.35	harmonic
2414	100.33	PK	180	1.2	V	28.1	2.17	35	95.6	114	18.4	fundamental
2414	96.33	PK	180	1.2	H	28.1	2.17	35	91.6	114	22.4	fundamental

Test mode: Transmitting (Middle channel)

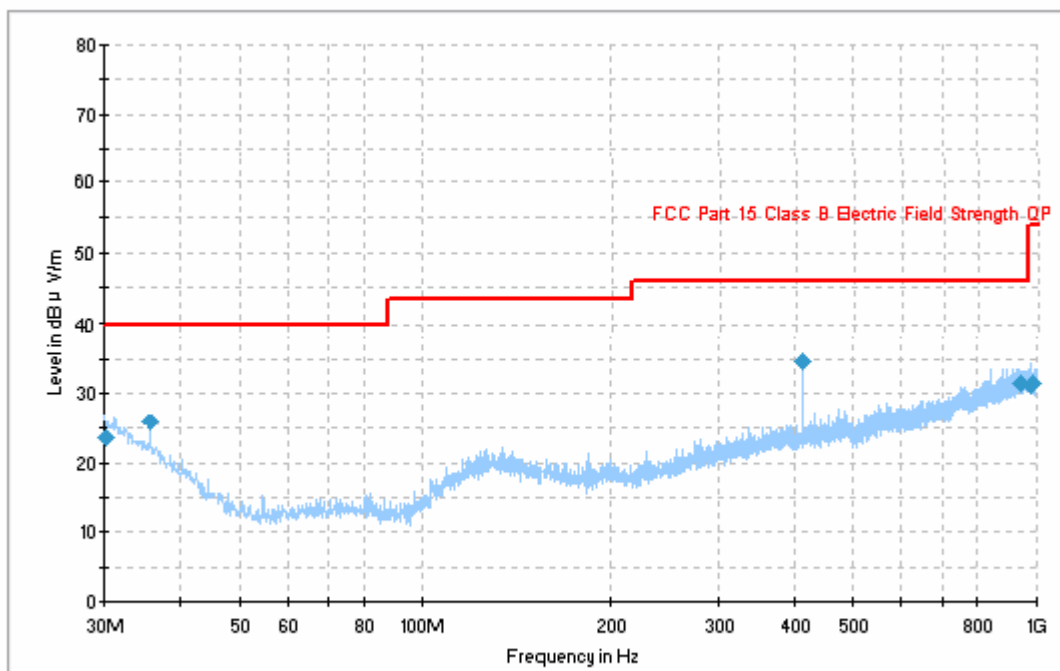
Frequency MHz	Meter Reading dBuV/m	Detector PK/QP/AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor dB/m	Cable loss dB	Amplifier Gain dB	Corr. Amp. dBuV/m	FCC Part 15.209 & 15.249		
										Limit dBuV/m	Margin dB	Comment
Middle Channel												
4864	42.58	AV	360	1	V	33.8	6.17	33.4	49.15	54	4.85	harmonic
7296	37.02	AV	180	1.2	V	36.8	8.17	33.7	48.29	54	5.71	harmonic
9728	35.14	AV	0	1	V	38	8.5	34.1	47.54	54	6.46	harmonic
7296	36.19	AV	180	1.2	H	36.8	8.17	33.7	47.46	54	6.54	harmonic
4864	40.27	AV	360	1	H	33.8	6.17	33.4	46.84	54	7.16	harmonic
4864	59.86	PK	360	1	V	33.8	6.17	33.4	66.43	74	7.57	harmonic
9728	33.68	AV	0	1	H	38	8.5	34.1	46.08	54	7.92	harmonic
2432	86.51	AV	360	1.2	V	28.1	2.17	35	81.78	94	12.22	fundamental
7296	47.98	PK	180	1.2	V	36.8	8.17	33.7	59.25	74	14.75	harmonic
4864	51.78	PK	360	1	H	33.8	6.17	33.4	58.35	74	15.65	harmonic
2432	82.77	AV	360	1.2	H	28.1	2.17	35	78.04	94	15.96	fundamental
9728	44.31	PK	0	1.2	V	38	8.5	34.1	56.71	74	17.29	harmonic
7296	44.17	PK	180	1.2	H	36.8	8.17	33.7	55.44	74	18.56	harmonic
9728	42.66	PK	0	1.2	H	38	8.5	34.1	55.06	74	18.94	harmonic
2432	98.76	PK	360	1	V	28.1	2.17	35	94.03	114	19.97	fundamental
2432	95.14	PK	360	1	H	28.1	2.17	35	90.41	114	23.59	fundamental

Test mode: Transmitting (High channel)

Frequency MHz	Meter Reading dBuV/m	Detector PK/QP/AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor dB/m	Cable loss dB	Amplifier Gain dB	Corr. Amp. dBuV/m	FCC Part 15.209 & 15.249		
										Limit dBuV/m	Margin dB	Comment
High Channel												
4936	43.59	AV	360	1.2	V	33.8	6.17	33.4	50.16	54	3.84*	harmonic
7404	38.46	AV	0	1.2	V	36.8	8.17	33.7	49.73	54	4.27	harmonic
9872	36.12	AV	180	1.2	V	38	8.5	34.1	48.52	54	5.48	harmonic
4936	41.87	AV	360	1.2	H	33.8	6.17	33.4	48.44	54	5.56	harmonic
7404	36.08	AV	0	1.2	H	36.8	8.17	33.7	47.35	54	6.65	harmonic
9872	34.52	AV	180	1.2	H	38	8.5	34.1	46.92	54	7.08	harmonic
4936	60.22	PK	360	1.2	V	33.8	6.17	33.4	66.79	74	7.21	harmonic
2468	87.54	AV	360	1.2	V	28.1	2.17	35	82.81	94	11.19	fundamental
4936	54.81	PK	360	1.2	H	33.8	6.17	33.4	61.38	74	12.62	harmonic
7404	48.63	PK	0	1.2	V	36.8	8.17	33.7	59.9	74	14.1	harmonic
2468	84.61	AV	360	1.2	H	28.1	2.17	35	79.88	94	14.12	fundamental
7404	46.77	PK	0	1.2	H	36.8	8.17	33.7	58.04	74	15.96	harmonic
9872	45.18	PK	180	1.2	V	38	8.5	34.1	57.58	74	16.42	harmonic
9872	43.66	PK	180	1.2	H	38	8.5	34.1	56.06	74	17.94	harmonic
2468	99.52	PK	360	1.2	V	28.1	2.17	35	94.79	114	19.21	fundamental
2468	96.73	PK	360	1.2	H	28.1	2.17	35	92	114	22.00	fundamental

*Within the measurement uncertainty

30 MHz-1000 MHz:



Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Limit (dBuV/m)	Margin (dB)
411.362541	34.3	216.0	V	183.0	-7.1	46.0	11.7
45.084525	27.2	219.0	V	68.0	-15.9	40.0	12.8
37.215474	26.2	18.0	H	145.0	-5.0	40.0	13.8
943.257451	32.1	86.0	V	53.0	-0.8	46.0	13.9
983.254658	32.3	212.0	V	263.0	1.2	54.0	21.7
976.235125	31.8	101.0	V	157.0	1.0	54.0	22.2

*Within the measurement uncertainty

§15.249(d) – OUT OF BAND EMISSION

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 100KHz and VBW to 300KHz with a convenient frequency span including 100kHz 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

*** 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 William Chan on 2006-11-15.

Test Mode: Transmitting

Frequency (MHz)	Reading (dBuV/m)	Antenna Factor (dB/m)	Cable loss (dB)	Amplifier (dB)	Correct Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2399.9	36.2	27.4	3.61	35.0	32.21	54	-21.79
2483.6	37.4	27.4	3.61	35.0	33.41	54	-20.59