



NVLAP LAB CODE 200707-0

FCC PART 15.249

EMI MEASUREMENT AND TEST REPORT

For

Cooper Wiring Devices Inc.

203 Cooper Circle, Peachtree City, GA 30269, USA

FCC ID: UH2-RF9501

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: RF Single Pole Switch
Test Engineer: Deny Xiong	<i>Deny Xiong</i>
Report No.: RSH07012451	
Test Date: 2007-02-01	
Report Date: 2007-04-09	
Reviewed By: EMC Manager: Boni Baniqued	<i>Boni Baniqued</i>
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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.

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	3
SYSTEM TEST CONFIGURATION.....	4
JUSTIFICATION	4
EQUIPMENT MODIFICATIONS	4
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	11
§15.205 §15.209(A) §15.249(A) §15.249(C) - 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	16
STANDARD APPLICABLE	16
TEST PROCEDURE	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST DATA	16

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Cooper Wiring Devices Inc.*'s product, model number: *RF9501* or the "EUT" as referred to in this report is a *RF Single Pole Switch*, which measures approximately 10.8cmL x 4.6cmW x 4.2cmH, rated input voltage: AC 120V/60Hz.

** The test data gathered are from production sample, serial number: 0701102 provided by the manufacturer, we receive the EUT on 2007-01-24.*

Objective

This Type approval report is prepared on behalf of *Cooper Wiring Devices Inc.* 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). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>.

SYSTEM TEST CONFIGURATION

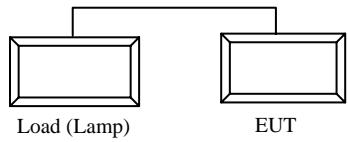
Justification

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

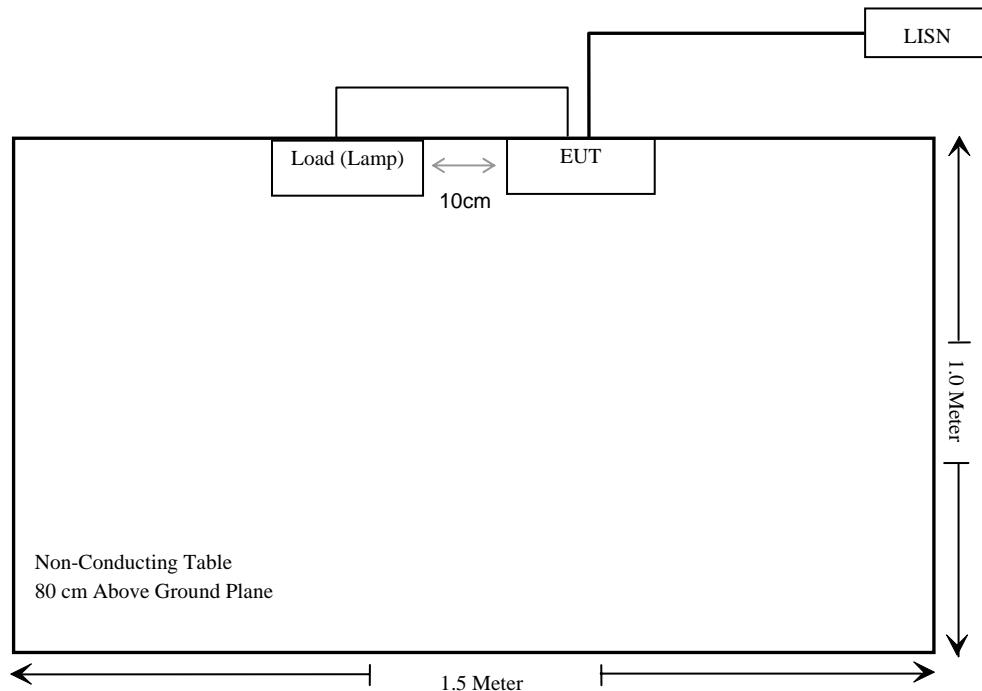
Equipment Modifications

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

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 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.

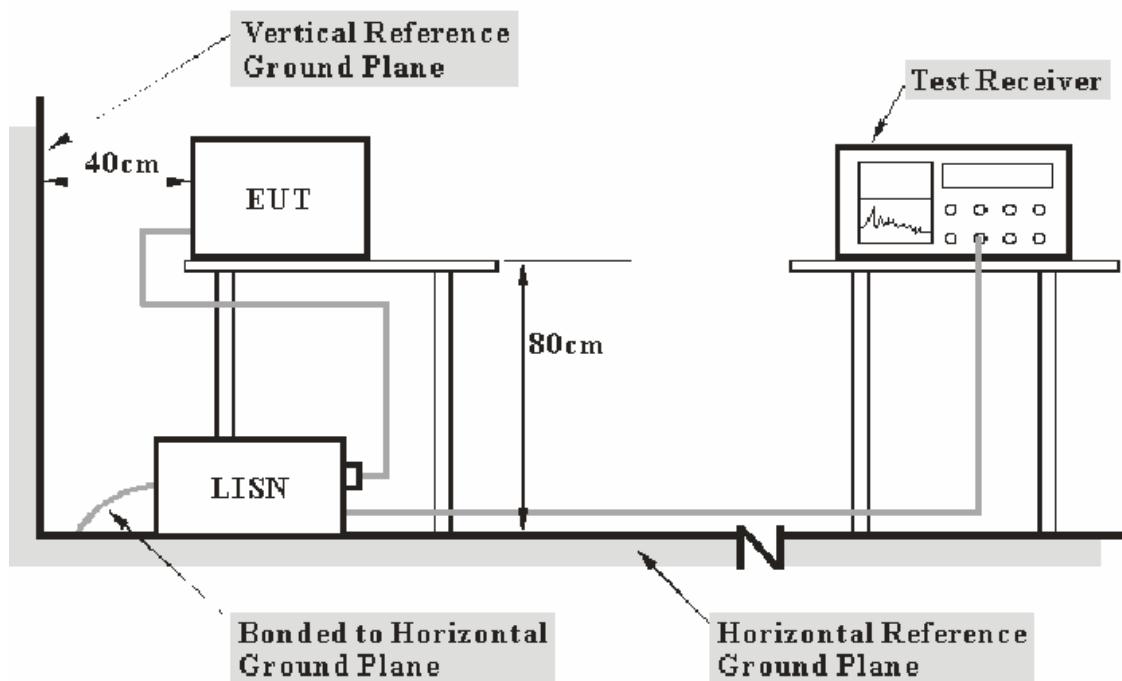
§15.207 - CONDUCTED EMISSIONS

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 (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 EUT 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	2006-03-20	2007-03-19
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-01	2008-03-01

* 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 EUT 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:

14.10 dB at 29.0800 MHz in the **Live** conductor mode.

Test Data**Environmental Conditions**

Temperature:	22 ° C
Relative Humidity:	55%
ATM Pressure:	1000mbar

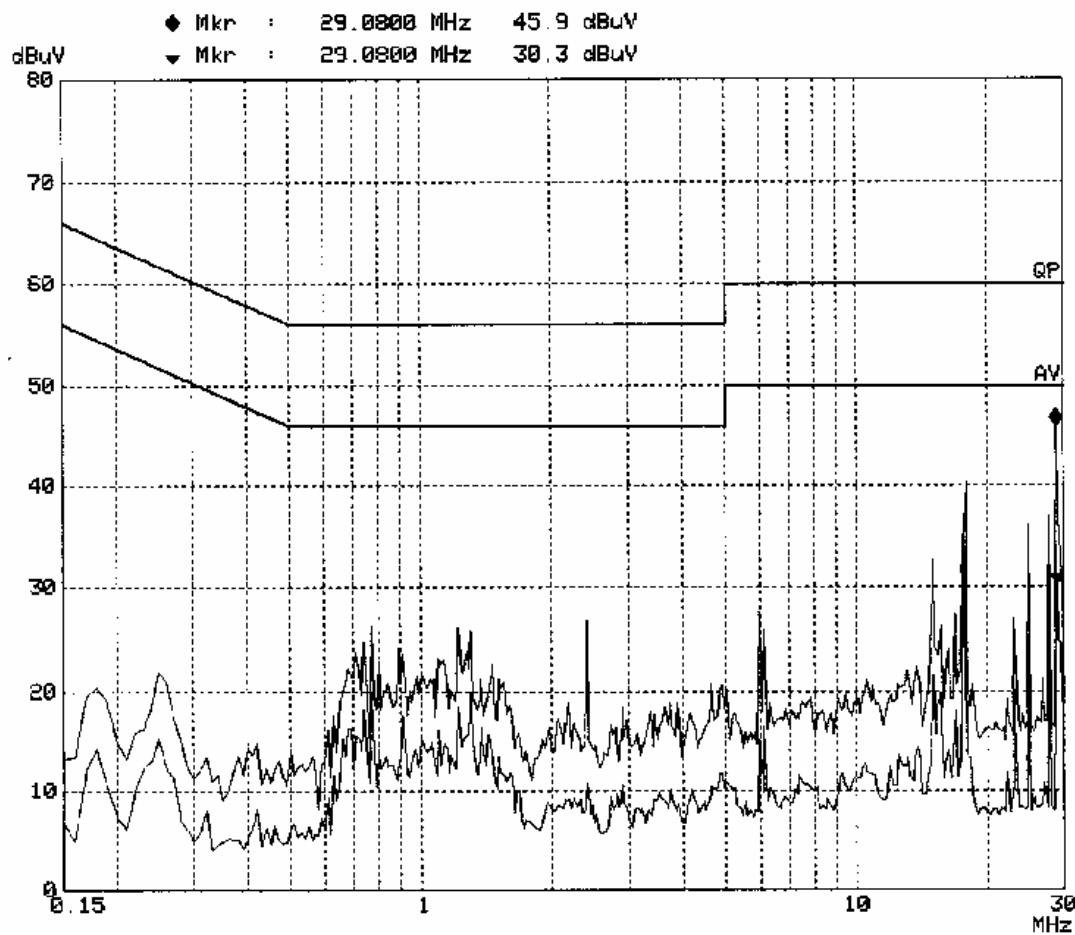
The testing was performed by Deny Xiong on 2007-02-01.

Test Mode: Transmitting

Line Conducted Emissions				FCC PART 15 .207	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Phase (Live/Neutral)	Limit (dB μ V)	Margin (dB)
29.0800	45.90	QP	Live	60.00	14.10
17.8900	34.90	AV	Live	50.00	15.10
26.8900	41.90	QP	Neutral	60.00	18.10
17.8800	31.20	AV	Neutral	50.00	18.80
17.8900	40.40	QP	Live	60.00	19.60
26.8900	30.30	AV	Neutral	50.00	19.70
29.0800	30.30	AV	Live	50.00	19.70
1.2300	22.60	AV	Neutral	46.00	23.40
17.8800	35.60	QP	Neutral	60.00	24.40
1.2300	30.00	QP	Neutral	56.00	26.00
1.3000	19.90	AV	Live	46.00	26.10
0.7500	19.80	AV	Neutral	46.00	26.20
0.7700	19.80	AV	Live	46.00	26.20
4.3900	29.40	QP	Neutral	56.00	26.60
0.7500	28.00	QP	Neutral	56.00	28.00
4.3900	17.60	AV	Neutral	46.00	28.40
0.7700	26.40	QP	Live	56.00	29.60
1.3000	25.80	QP	Live	56.00	30.20
6.1400	16.50	AV	Live	50.00	33.50
6.1400	26.00	QP	Live	60.00	34.00
0.1800	19.90	AV	Neutral	54.49	34.59
0.2500	15.40	AV	Live	51.76	36.36
0.1800	26.60	QP	Neutral	64.49	37.89
0.2500	21.90	QP	Live	61.76	39.86

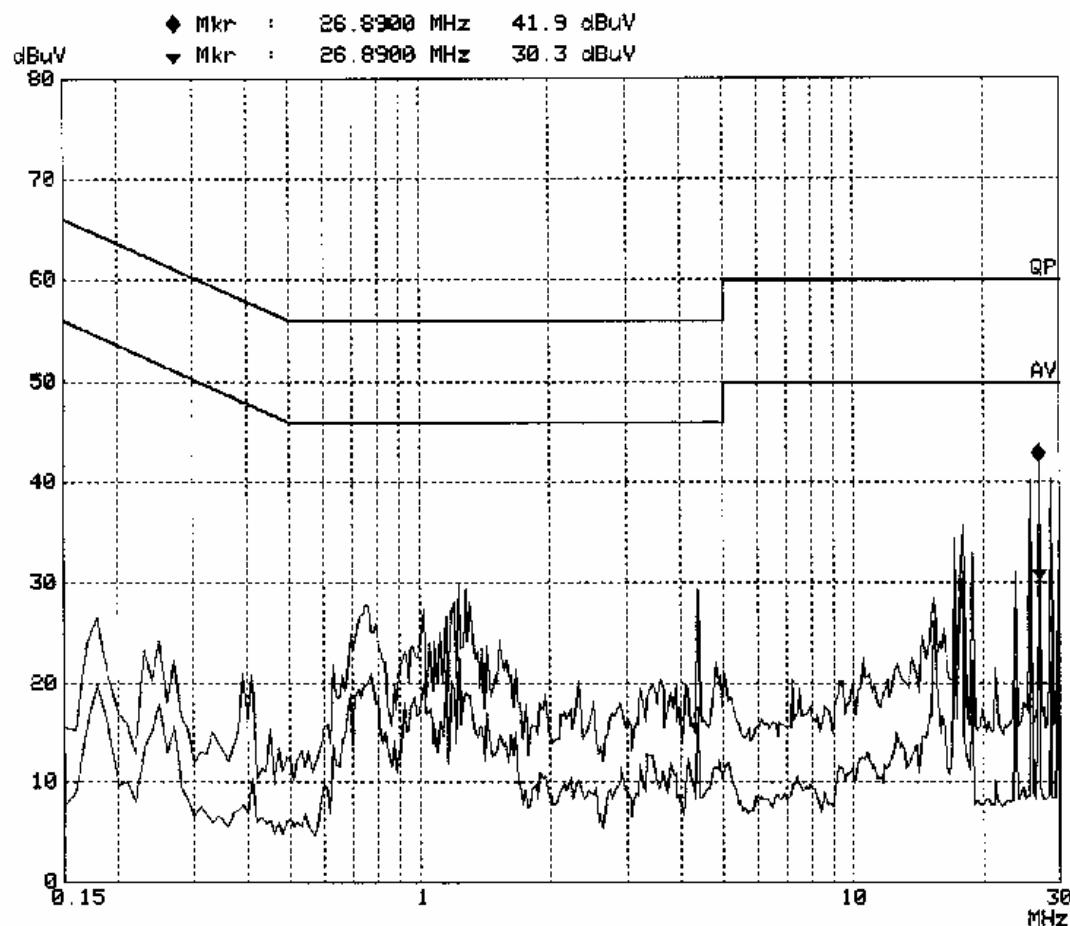
Plot(s) of Test Data**Conducted Disturbance test
FCC Part 15**

EUT: RF Single Pole Switch M/N:RF9501
Manuf: COOPER
Op Cond: Transmitting
Operator: deny
Test Spec: AC 120V/60Hz L
Comment: Temp:25'C Humi:56%
Date: 01. Feb 07 11:56



Conducted Disturbance test FCC Part 15

EUT: RF Single Pole Switch M/N:RF9501
Manuf: COOPER
Op Cond: Transmitting
Operator: deny
Test Spec: AC 120V/60Hz N
Comment: Temp:25'C Humi:56%
Date: 01. Feb 07 11:41

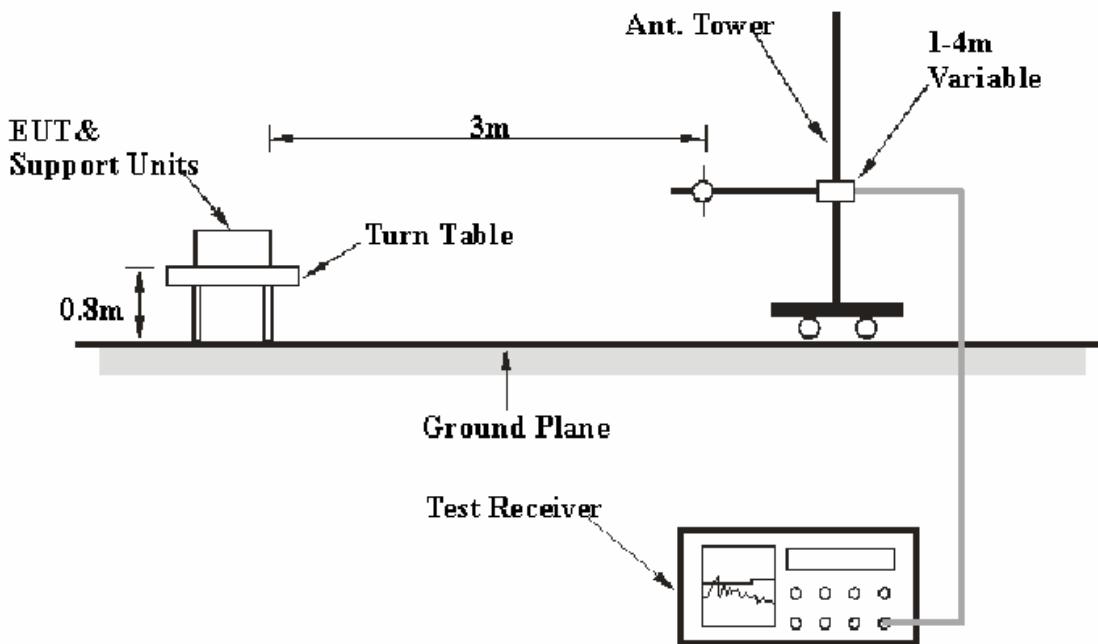


§15.205 §15.209(a) §15.249(a) §15.249(c) - RADIATED EMISSIONS

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 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 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 EUT 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	100224	2006-09-29	2007-09-29
HP	Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2006-08-14	2007-08-14
HP	Amplifier	8449B	3008A00277	2006-09-29	2007-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2006-07-20	2007-07-20
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 was connected to 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:

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

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 maximum limit. The equation for margin calculation is as follows:

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

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 -1000MHz: **5.08 dB** at **908.4 MHz** in the **Horizontal** polarization.
 Above 1GHz: **19.47 dB** at **5847 MHz** in the **Horizontal** polarization.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1009mbar

The testing was performed by Deny Xiong on 2007-02-01.

Test Mode: Transmitting

Frequency (MHz)	Meter Reading (dB μ V)	Detector PK/QP/AV	Direction Degree	Height (m)	Polar H / V	Antenna Factor (dB/m)	Cable loss (dB)	Pre-Amp. Gain (dB)	Corr. Ampl. (dB μ V/m)	FCC Part 15.209 & 15.249		
										Limit (dB μ V/m)	Margin (dB)	Comment
30 -1000MHz												
908.4	87.65	AV	105	1.3	H	22.9	4.87	26.5	88.92	94	5.08	Fundamental
908.4	84.35	AV	135	1.2	V	22.9	4.87	26.5	85.62	94	8.38	Fundamental
760.7	39.27	QP	149	1.2	H	21.4	3.61	26.9	37.38	46	8.62	Spurious
34.76	37.4	QP	52	1.4	H	18.2	0.47	26.8	29.27	40	10.73	Spurious
31.29	31.09	QP	158	1.2	V	21.8	0.37	26.8	26.46	40	13.54	Spurious
122.83	37.93	QP	186	1.2	H	14.1	1.03	26.6	26.46	43.5	17.04	Spurious
531.96	30.27	QP	146	1.4	V	18.6	2.85	27.1	24.62	46	21.38	Spurious
908.4	90.41	PK	128	1.6	H	22.9	4.87	26.5	91.68	114	22.32	Fundamental
908.4	88.57	PK	156	1.5	V	22.9	4.87	26.5	89.84	114	24.16	Fundamental
124.56	28.91	QP	235	1.2	V	14.6	1.03	26.6	17.94	43.5	25.56	Spurious
Above 1000MHz												
5847	31.83	AV	56	1.8	H	32.4	4.70	34.4	34.53	54	19.47	Spurious
4342	31.67	AV	324	1.3	V	30.7	4.04	32.5	33.91	54	20.09	Spurious
2440	34.83	AV	148	1.2	V	27.4	3.61	35.0	30.84	54	23.16	Spurious
2440	34.67	AV	230	1.6	H	27.4	3.61	35.0	30.68	54	23.32	Spurious
1808	34.57	AV	166	1.6	V	27.1	2.82	35.0	29.49	54	24.51	Spurious
1816.8	34.5	AV	148	1.5	H	27.1	2.82	35.0	29.42	54	24.58	Harmonic
4342	44.83	PK	324	1.3	V	30.7	4.04	32.5	47.07	74	26.93	Spurious
5847	44.3	PK	56	1.8	H	32.4	4.70	34.4	47	74	27.00	Spurious
1808	49.83	PK	166	1.6	V	27.1	2.82	35.0	44.75	74	29.25	Spurious
1816.8	48.83	PK	148	1.5	H	27.1	2.82	35.0	43.75	74	30.25	Harmonic
2440	47.5	PK	230	1.6	H	27.4	3.61	35.0	43.51	74	30.49	Spurious
2440	46.17	PK	148	1.2	V	27.4	3.61	35.0	42.18	74	31.82	Spurious

§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 the RBW to 10 kHz and VBW of spectrum analyzer to 30 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	2006-07-20	2007-07-20

*** 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

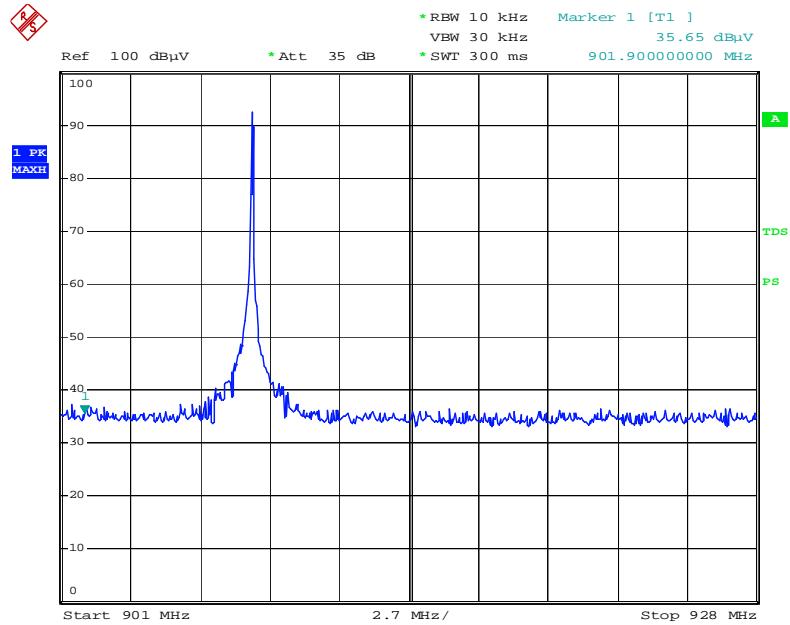
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1009mbar

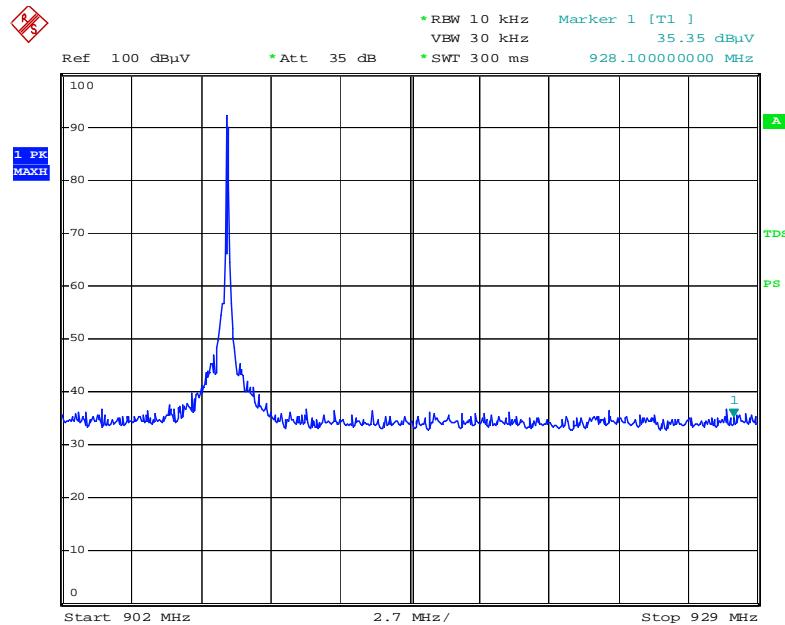
The testing was performed by Deny Xiong on 2007-02-01.

Test Mode: Transmitting

Test Result: Pass



M/N:RF9501 bandedge1
Date: 1.FEB.2007 08:51:42



M/N:RF9501 bandedge2
Date: 1.FEB.2007 08:52:33