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-RFTDC

This Report Concerns:	Equipment Type:
☒ Original Report	RF Tabletop Controller

Test Engineer:	Henry Yang
Report No.:	RSH07041852
Test Date:	2007-01-30 to 2007-04-26
Report Date:	2007-04-30
Reviewed By:	EMC Manager: Boni Baniqued
Prepared By:	Bay Area Compliance Laboratory Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Cooper Wiring Devices Inc.*'s product, model number: *RFTDC* or the "EUT" as referred to in this report is a *RF Tabletop Controller*, which measures approximately 15.4cmL x 11.0cmW x 4.2cmH, rated input voltage: DC 5V adapter.

Adapter Manufacturer: Switching AC/DC Adapter, Model: GFD051U-0505
Input: AC 100-240V 50/60Hz 0.2A, Output: DC 5V 0.5A

** The test data gathered are from production sample, serial number: 0701120, provided by the manufacturer, we receive the EUT on 2007-04-18.*

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.

External I/O Cable

Cable Description	Length (M)	From/Port	To
Unshielded Detachable Power Cable	1.6	EUT	Adapter

SYSTEM TEST CONFIGURATION

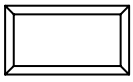
Justification

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

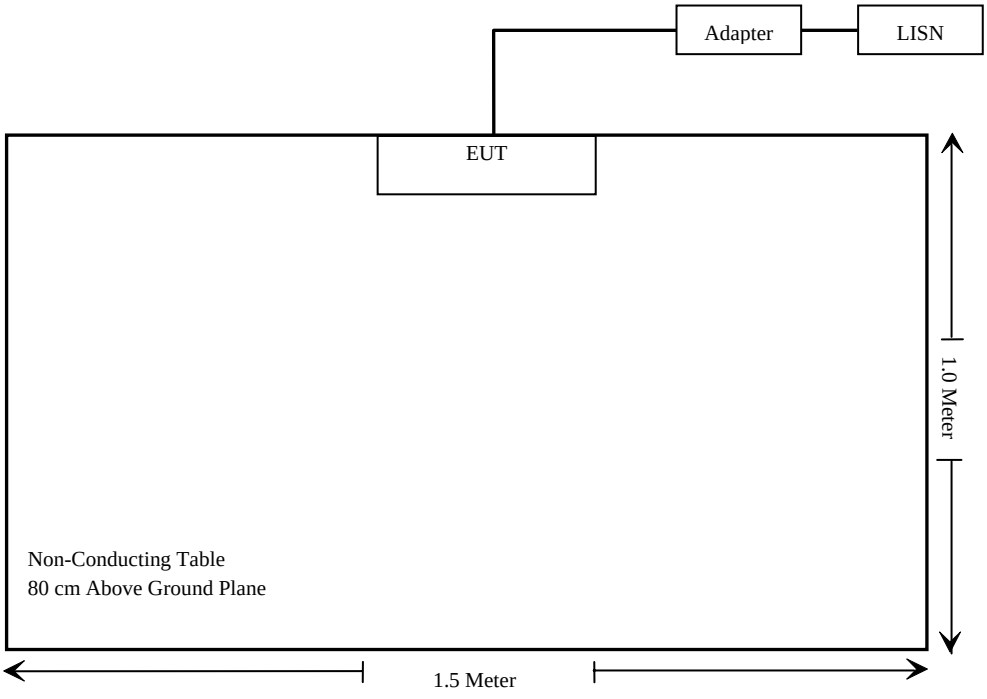
Equipment Modifications

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.

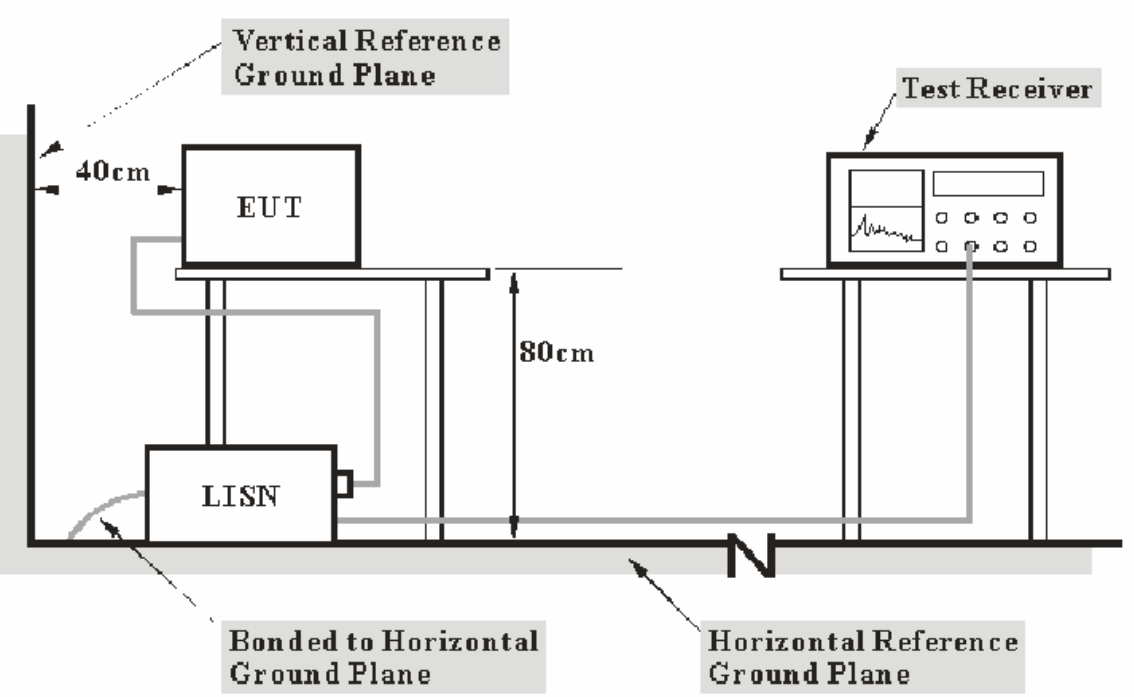
§15.207 - CONDUCTED EMISSIONS

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 (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 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 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:

Frequency Range	***IFBW***
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	2007-03-20	2008-03-19
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-01	2008-03-01

*** 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:

7.50 dB at **0.5800 MHz** in the **Neutral** conductor mode.

Test Data

Environmental Conditions

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

The testing was performed by Henry Yang on 2007-04-26.

Test Mode: Transmitting

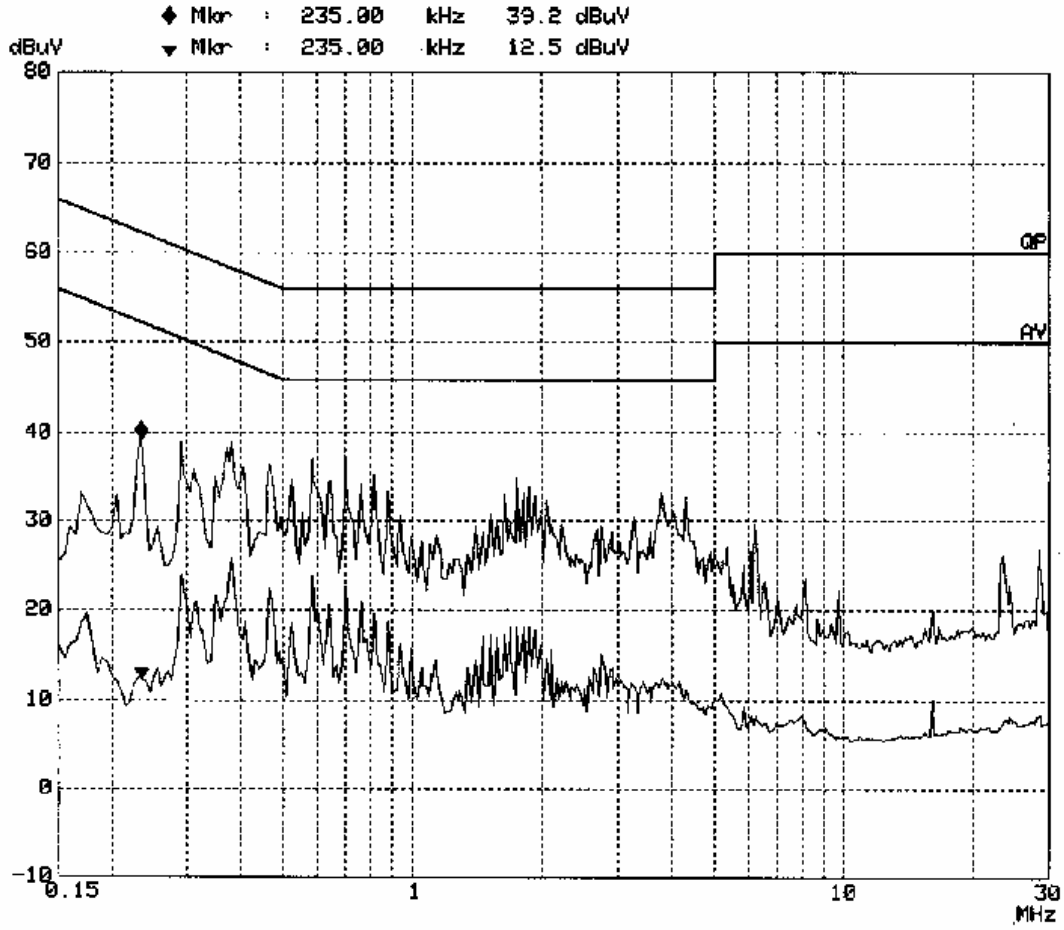
LINE CONDUCTED EMISSIONS				FCC PART 15 .207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Phase (Live/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
0.5800	48.50	QP	Neutral	56.00	7.50
0.7000	47.90	QP	Neutral	56.00	8.10
0.3800	48.40	QP	Neutral	58.28	9.88
0.7600	44.10	QP	Neutral	56.00	11.90
1.6900	43.90	QP	Neutral	56.00	12.10
0.5850	32.60	AV	Neutral	46.00	13.40
0.3800	34.10	AV	Neutral	48.28	14.18
0.7000	31.50	AV	Neutral	46.00	14.50
2.1350	41.10	QP	Neutral	56.00	14.90
0.7600	29.00	AV	Neutral	46.00	17.00
0.7000	37.60	QP	Live	56.00	18.40
0.5850	37.20	QP	Live	56.00	18.80
1.6900	25.70	AV	Neutral	46.00	20.30
1.7500	34.90	QP	Live	56.00	21.10
0.5850	23.90	AV	Live	46.00	22.10
1.9510	33.10	QP	Live	56.00	22.90
0.2350	39.20	QP	Live	62.27	23.07
1.9780	32.90	QP	Live	56.00	23.10
0.7000	22.70	AV	Live	46.00	23.30
2.1350	22.30	AV	Neutral	46.00	23.70
1.9510	18.20	AV	Live	46.00	27.80
1.7500	18.10	AV	Live	46.00	27.90
1.9780	17.90	AV	Live	46.00	28.10
0.2350	12.50	AV	Live	52.27	39.77

Plot(s) of Test Data

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

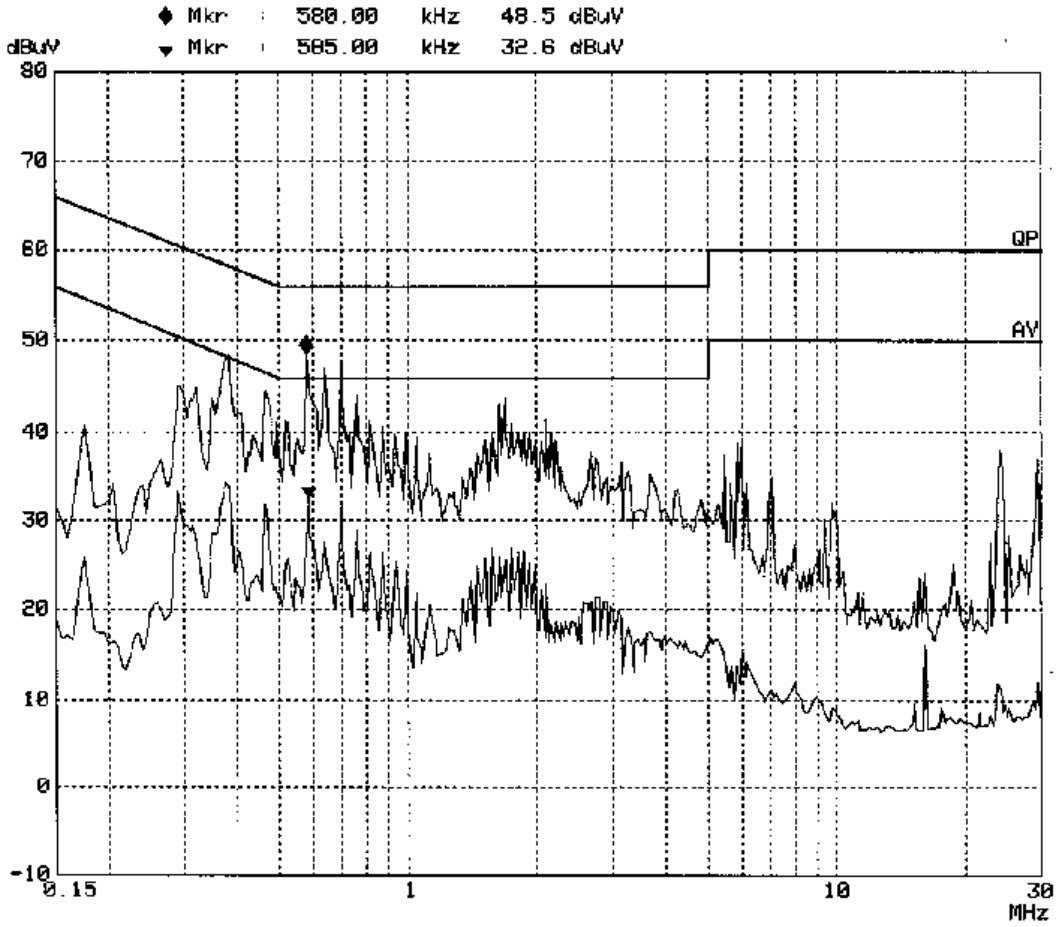
Conducted Emission Test
FCC Part15

EUT:	RF Tabletop Controller M/N:RFTDC
Manuf:	Cooper
Op Cond:	Transmitting
Operator:	Henry
Test Spec:	AC 120V/60Hz L
Comment:	Temp:25'C Humi:56%
Date:	26. Apr 07 08:52



Conducted Emission Test
FCC Part 15

EUT: RF Tabletop Controller M/N:RFTDC
Manuf: Cooper
Op Cond: Transmitting
Operator: Henry
Test Spec: AC 120V/60Hz N
Comment: Temp:25'C Humi:56%
Date: 26. Apr 07 09:17



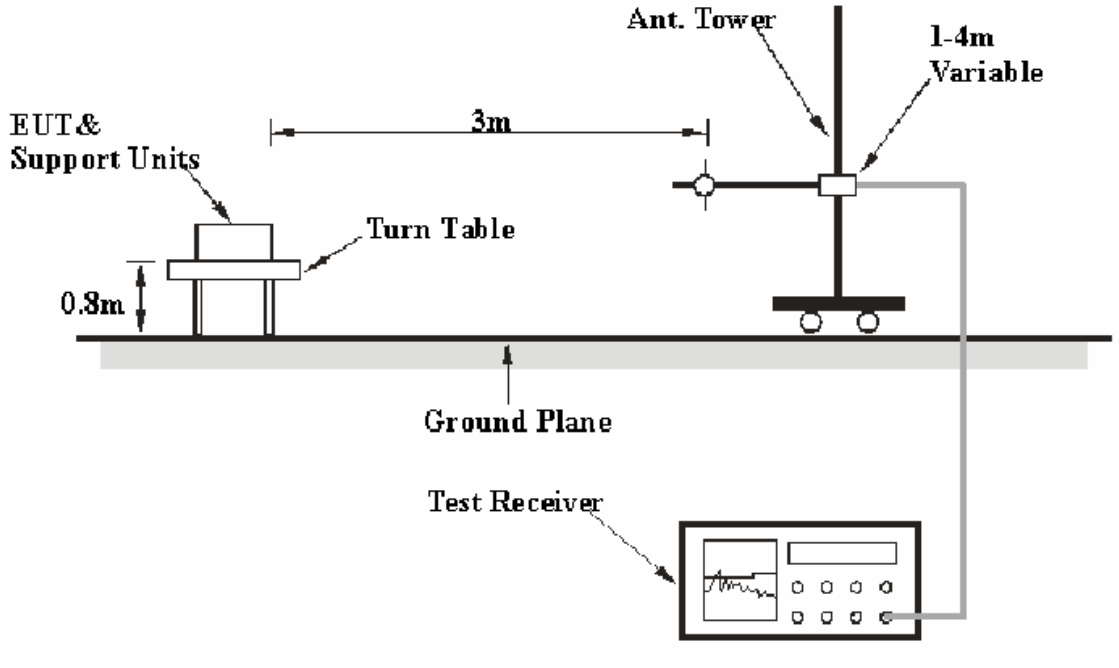
§15.205 §15.209(a) §15.249(a) §15.249(c) - RADIATED EMISSIONS

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 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:

Frequency Range	***RBW***	***Video B/W***
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 adapter 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:

Corr. Ampl. = Meter Reading + Antenna Loss + Cable Loss- 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:

Margin = Limit - 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: **18.1 dB** at **41.081150 MHz** in the **Vertical** polarization.

Above 1GHz: **18.27 dB** at **5170 MHz** in the **Vertical** polarization.

Test Data

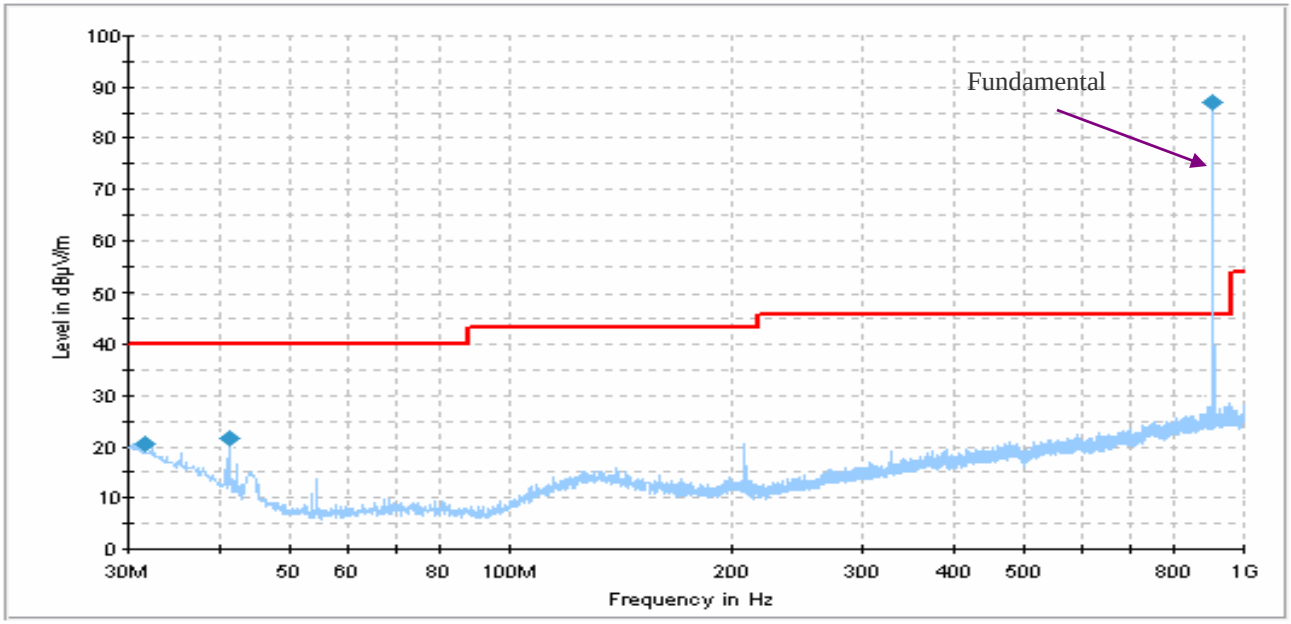
Environmental Conditions

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

The testing was performed by Henry Yang on 2007-02-01.

Test Mode: Transmitting

Auto Test (FCC 15.209)



Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
41.081150	21.9	266.0	V	167.0	-5.6	40.0	18.1
30.992650	20.5	381.0	V	160.0	-6.0	40.0	19.4

Frequency (MHz)	Meter Reading (dBuV)	Detector PK/QP/AV	Direction Degree	Height (m)	Polar H / V	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amplifier Gain (dB)	Corr. Ampl. (dBuV/m)	FCC Part 15.209 & 15.249		
										Limit (dBuV/m)	Margin (dB)	Comment
Above 1000MHz												
908.4	83.5	QP	155	1.0	V	22.9	6.6	26.5	86.5	94	7.5	Fundamental
908.4	79.4	QP	90	1.5	H	22.9	6.6	26.5	82.4	94	11.6	Fundamental
5710	32.03	AV	324	1.3	V	32.4	4.70	33.4	35.73	54	18.27	Spurious
5690	31.0	AV	56	1.8	H	32.4	4.70	33.4	34.7	54	19.30	Spurious
3975	31.23	AV	148	1.2	V	31.6	4.12	32.5	34.45	54	19.55	Spurious
3980	30.83	AV	230	1.6	H	31.6	4.12	32.5	34.05	54	19.95	Spurious
2705	30.87	AV	166	1.6	V	28.3	4.02	35.0	28.19	54	25.81	Spurious
2705	30.50	AV	148	1.5	H	28.3	4.02	35.0	27.82	54	26.18	Spurious
5690	42.83	PK	56	1.8	H	32.4	4.70	33.4	46.53	74	27.47	Spurious
5710	42.5	PK	324	1.3	V	32.4	4.70	33.4	46.2	74	27.80	Spurious
3980	42.5	PK	230	1.6	H	31.6	4.12	32.5	45.72	74	28.28	Spurious
3975	42.33	PK	148	1.2	V	31.6	4.12	32.5	45.55	74	28.45	Spurious
2705	46.33	PK	148	1.5	H	28.3	4.02	35.0	43.65	74	30.35	Spurious
2705	46.3	PK	166	1.6	V	28.3	4.02	35.0	43.62	74	30.38	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

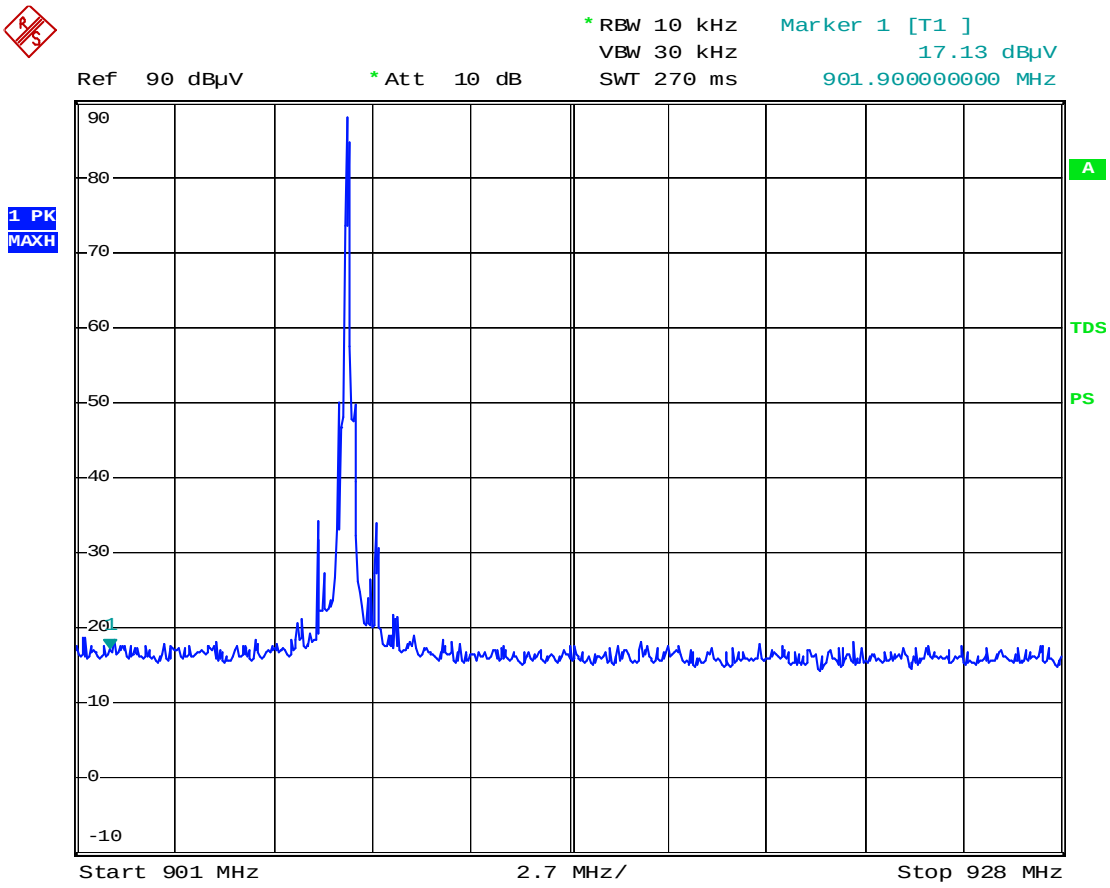
Environmental Conditions

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

The testing was performed by Henry Yang on 2007-01-30.

Test Mode: Transmitting

Test Result: Compliant. Please refer to the plots attached.



bandedge1

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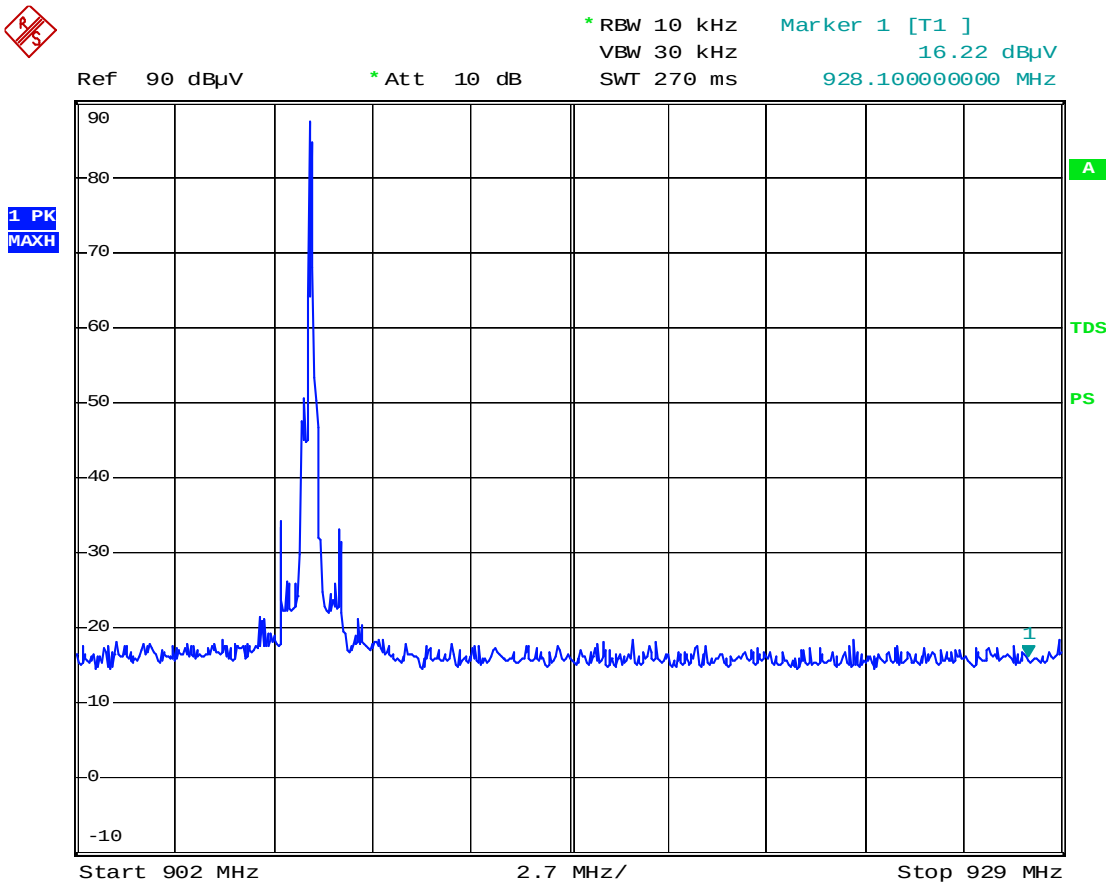

bandedge2

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