

FCC PART 15.249 MEASUREMENT AND TEST REPORT

For

Swann Communications Pty Ltd (Swann Global Limited - HK office)

Room 1601, Tung Ning Building, 249-255 Des Voeux Rd,
Central, Hong Kong

FCC ID: VIMSCK001

Report Type: Original Report	Equipment Type: 2.4GHz Wireless Camera and Receiver
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Report No.: RSZ08062451	
Report Date: 2008-10-27	
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories 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.

* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" ..

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Swann Communications Pty Ltd (Swann Global Limited - HK office)* 's product, model SW232-MC33, or the "EUT" as referred to in this report is a *2.4GHz Wireless Camera and Receiver* which measures approximately 4 cm L x 3 cm W x 6 cm H, rated input voltage: DC 12V adapter.

Adapter:

Model: AK01G-1200030U

Input: 100 ~ 240 V – 50/60Hz 0.2A

Output: 12V 0.3A

** All measurement and test data in this report was gathered from production sample serial number: 08006548 (Assigned by BACL, Shenzhen). The EUT was received on 2008-06-24.*

Objective

This Type approval report is prepared on behalf of *Swann Communications Pty Ltd (Swann Global Limited - HK office)* 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 Laboratories 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 Laboratories 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 Laboratories 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 Laboratories 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/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

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

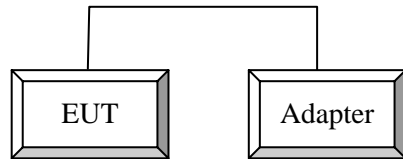
Equipment Modifications

No modifications were made to the unit tested.

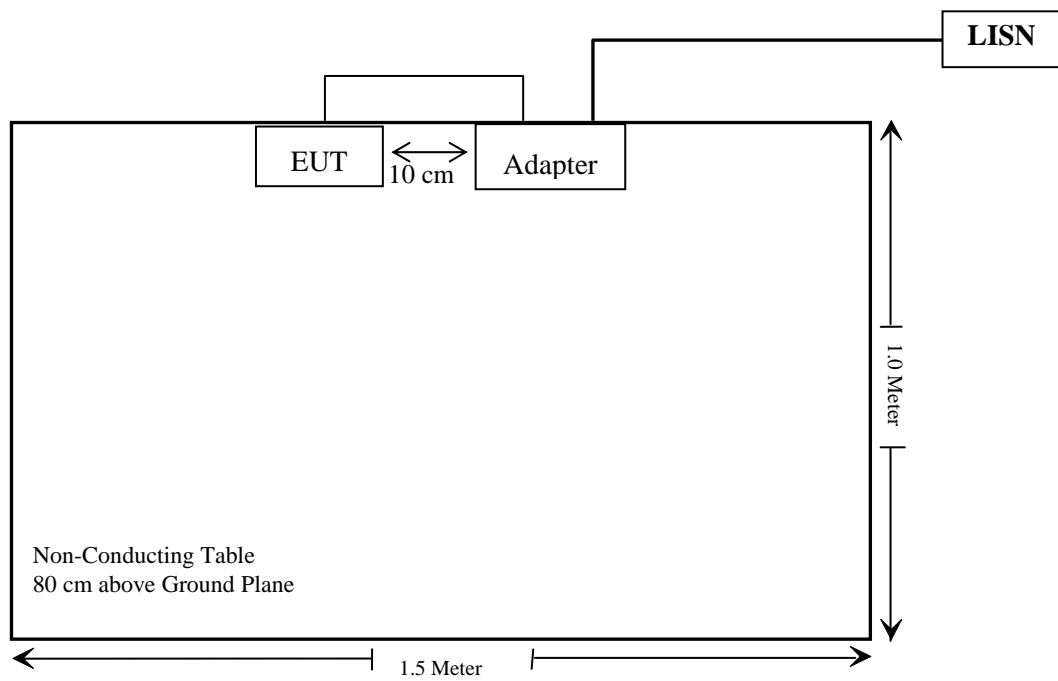
External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded Detachable DC Power Cable	1.9	Adapter	EUT
Unshielded Detachable AC Cable	1.2	Adapter	LISN

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

Note:* Within measurement uncertainty.

CFR47 §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.

Please refer to the EUT photos.

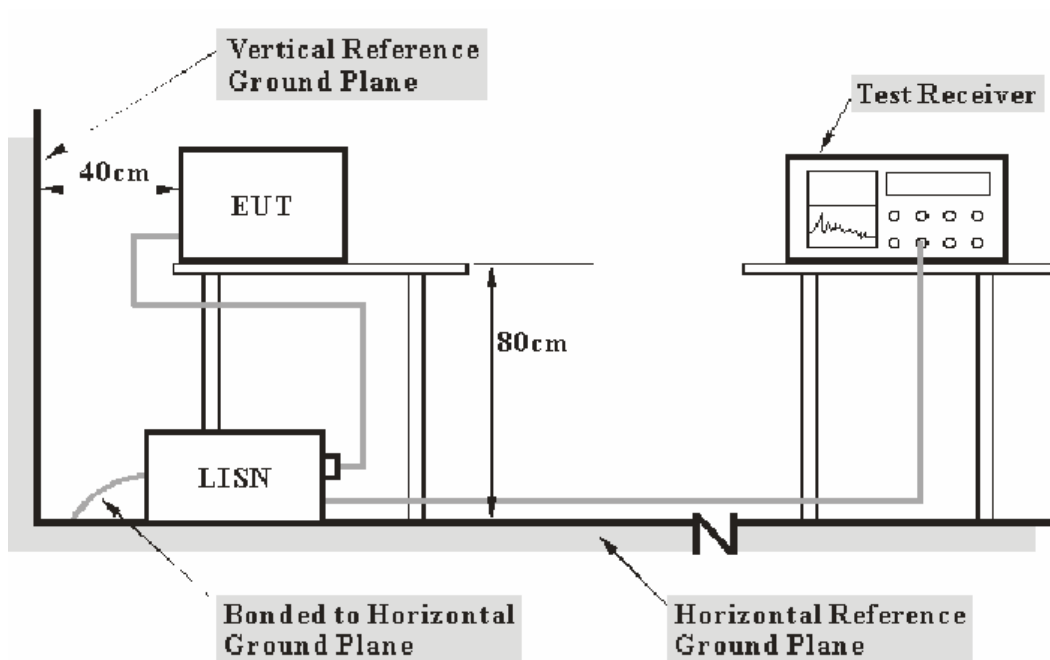
CFR47 §15.207(a) - CONDUCTED EMISSIONS

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 Laboratories 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:

<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	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

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

* **Statement of Traceability:** Bay Area Compliance Laboratories 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(a), with the worst margin reading of:

8.20 dB at **2.8800 MHz** in the **Line** conductor mode

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.2 kPa

The testing was performed by Alvin Huang on 2008-09-25.

Test Mode: Transmitting

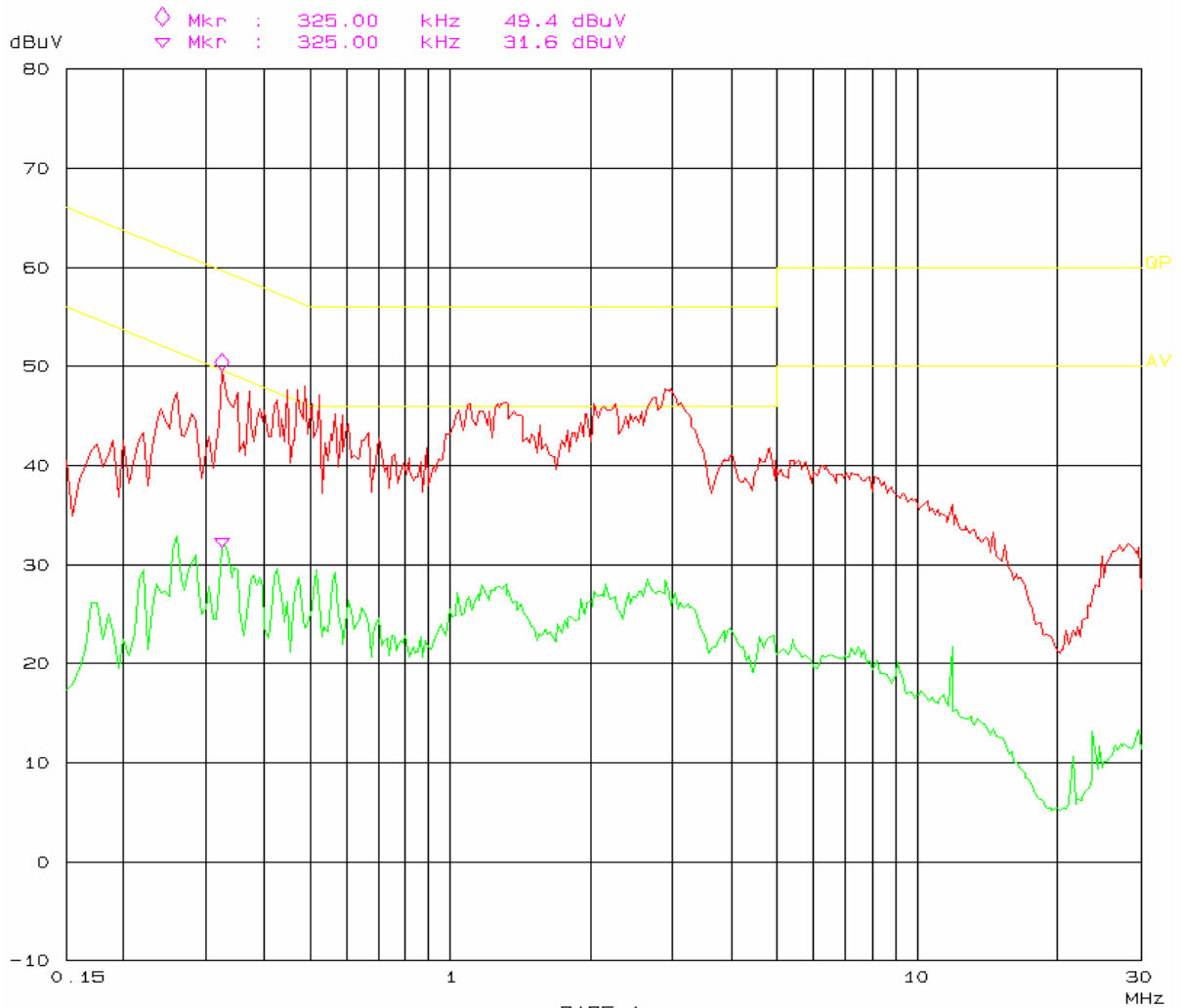
Line Conducted Emissions				FCC Part15.207	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Conductor (Hot/Neutral)	Limit (dB μ V)	Margin (dB)
2.8800	47.80	QP	Line	56.00	8.20
2.2950	46.10	QP	Neutral	56.00	9.90
0.3250	49.40	QP	Line	59.58	10.18
1.1800	45.50	QP	Line	56.00	10.50
0.4250	46.60	QP	Line	57.35	10.75
0.5700	45.20	QP	Line	56.00	10.80
0.2600	47.30	QP	Line	61.43	14.13
0.5250	41.70	QP	Neutral	56.00	14.30
1.3600	40.20	QP	Neutral	56.00	15.80
0.5650	29.20	AV	Line	46.00	16.80
2.8800	28.50	AV	Line	46.00	17.50
0.3350	41.80	QP	Neutral	59.33	17.53
0.4250	29.60	AV	Line	47.35	17.75
0.3250	31.60	AV	Line	49.58	17.98
1.1700	28.00	AV	Line	46.00	18.00
0.2600	33.00	AV	Line	51.43	18.43
0.1950	42.00	QP	Neutral	63.82	21.82
0.5250	23.20	AV	Neutral	46.00	22.80
1.3600	21.70	AV	Neutral	46.00	24.30
2.3250	21.30	AV	Neutral	46.00	24.70
0.3350	24.60	AV	Neutral	49.33	24.73
27.1200	24.70	AV	Neutral	50.00	25.30
27.1200	34.20	QP	Neutral	60.00	25.80
0.1950	22.90	AV	Neutral	53.82	30.92

Plot(s) of Test Data

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

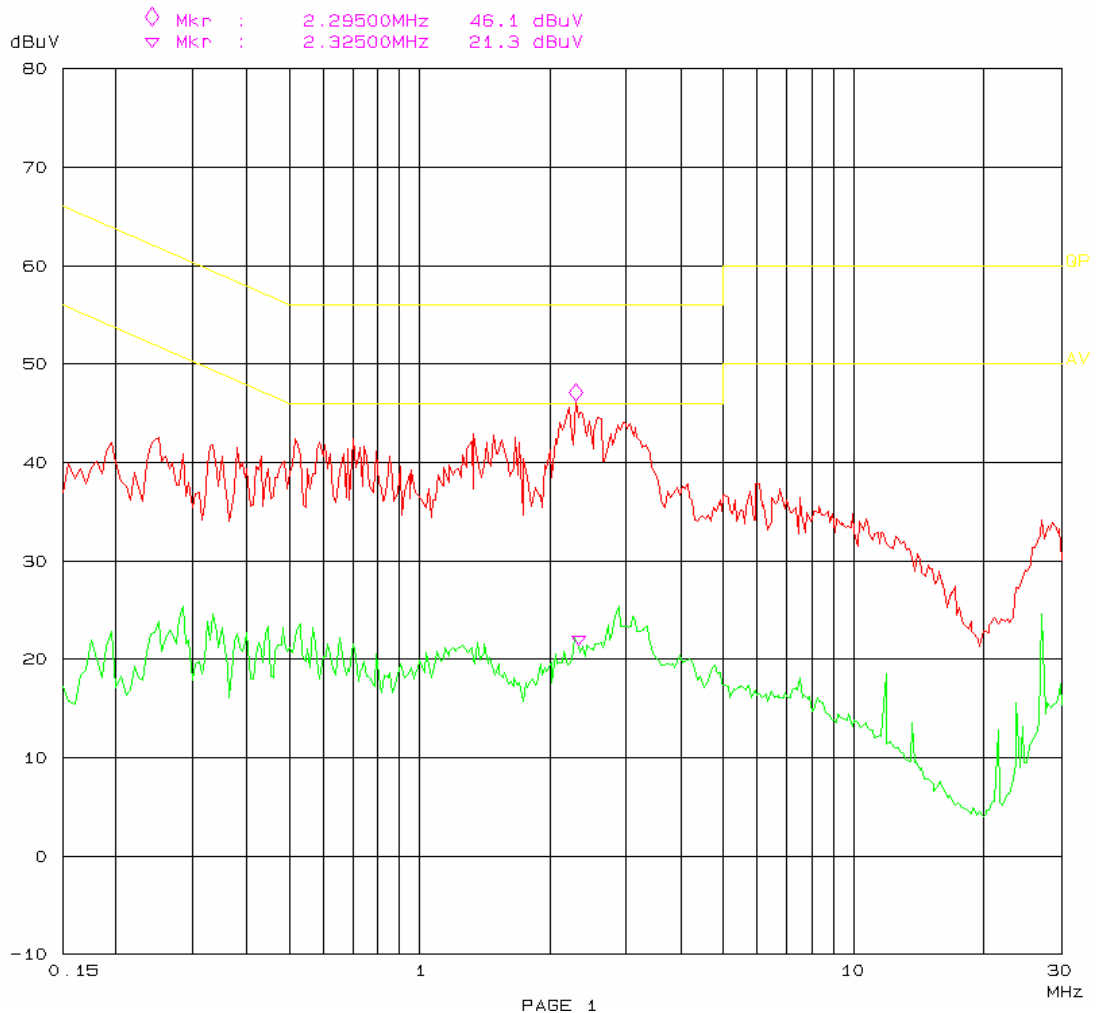
Conduction Emission FCC PART 15

EUT: wireless security camera-MicroCamM/N: 3.3
Manuf: Swann Communications
Op Cond: Transmitting
Operator: Alvin Huang
Test Spec: AC 120V/60HZ line
Comment: Temp: 25 Hum: 56%



Conduction Emission FCC PART 15

EUT: wireless security camera-MicroCamM/N: 3.3
Manuf: Swann Communications
Op Cond: Transmitting
Operator: Alvin Huang
Test Spec: AC 120V/60HZ Neutral
Comment: Temp: 25 Hum: 56%



CFR47 §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 Laboratories Corp. (Shenzhen) is ± 4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

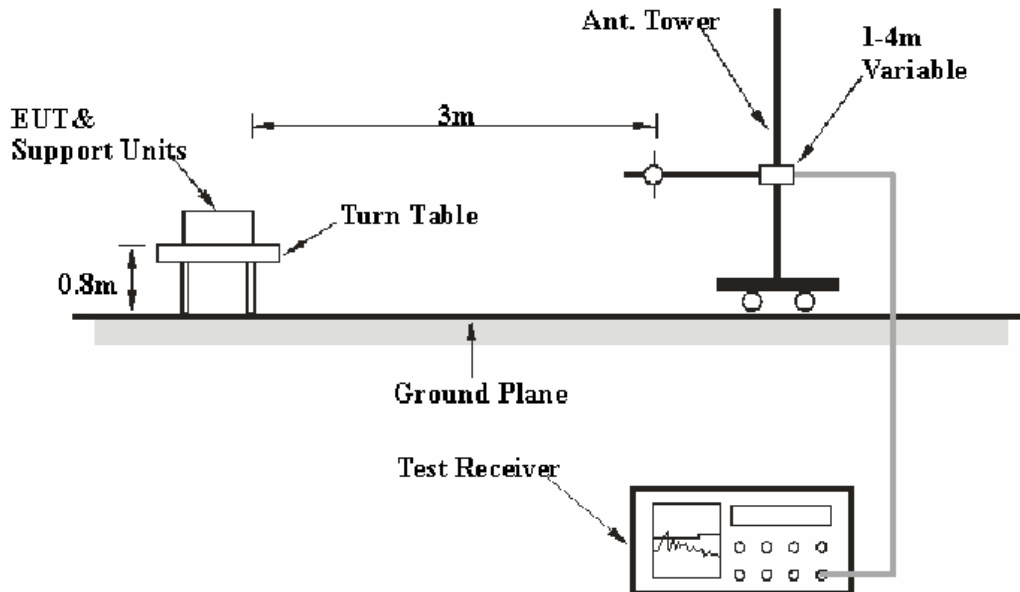
Below 1000MHz:

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

Above 1000MHz:

- (1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
- (2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = 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
HP	Amplifier	8447E	1937A01046	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-10-16	2009-10-16
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2008-08-14	2009-08-14
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories 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 mete, 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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

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:

Below 1GHz:

Transmitting Mode: **15.3 dB** at **38.165600 MHz** in the **Vertical** polarization.

Above 1GHz:

Transmitting Mode (channel 1): **2.13 dB** at **7242 MHz** in the **Horizontal** polarization.

Transmitting Mode (channel 3): **2.66 dB** at **9800 MHz** in the **Horizontal** polarization.

Transmitting Mode (channel 4): **3.43 dB** at **7404 MHz** in the **Horizontal** polarization.

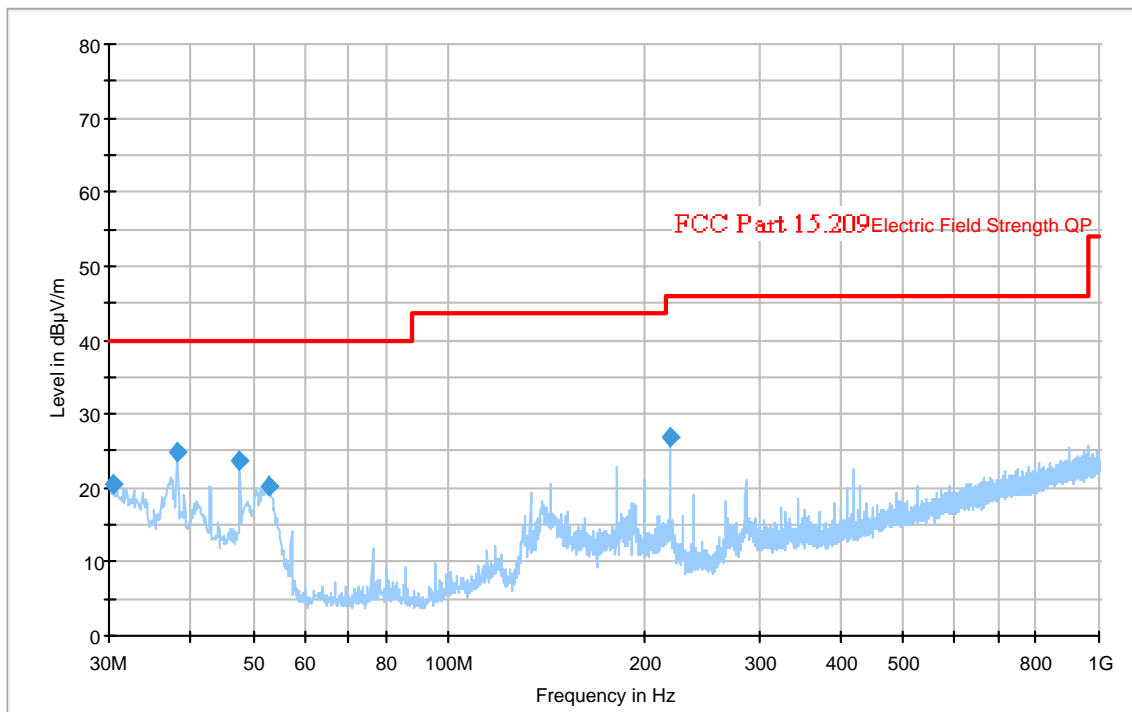
Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.2 kPa

The testing was performed by Alvin Huang on 2008-10-22.

30 -1000 MHz:



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
38.165600	24.7	120.0	V	102.0	-14.2	40.0	15.3
47.735275	23.8	360.0	V	24.0	-19.3	40.0	16.2
219.540225	26.9	154.0	H	172.0	-17.2	46.0	19.1
30.554675	20.5	401.0	V	152.0	-9.0	40.0	19.5
52.762450	20.3	392.0	V	39.0	-20.8	40.0	19.7

Above 1GHz:

Freq. (MHz)	S.A. Reading (dBµV/m)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Loss (dB/m)	Cable Loss (dB)	Amp. (dB)	Cord. Amp. (dBµV/m)	FCC 15.249/209		
										Limit (dBµV/m)	Margin (dB)	Comment
Channel 1 (2414 MHz)												
7242	37.12	AV	268	1.6	H	39.2	9.15	33.6	51.87	54	2.13	Harmonic
4828	42.67	AV	180	1.6	V	35.0	7.56	33.7	51.53	54	2.47	Harmonic
9656	33.01	AV	149	1.8	H	41.4	10.79	34.0	51.2	54	2.8	Harmonic
9656	34.25	AV	360	1.6	V	40.1	10.79	34.0	51.14	54	2.86	Harmonic
7242	37.57	AV	263	1.8	V	38.0	9.15	33.6	51.12	54	2.88	Harmonic
4828	37.56	AV	270	1.6	H	36.3	7.56	33.7	47.72	54	6.28	Harmonic
2414	74.65	AV	263	1.4	H	30.9	7.9	33.9	79.55	94	14.45	Fund.
9656	41.68	PK	358	2.0	V	40.1	10.79	34.0	58.57	74	15.43	Harmonic
9656	40.09	PK	230	1.8	H	41.4	10.79	34.0	58.28	74	15.72	Harmonic
7242	44.25	PK	268	1.6	V	38.0	9.15	33.6	57.8	74	16.2	Harmonic
4828	48.71	PK	250	1	V	35.0	7.56	33.7	57.57	74	16.43	Harmonic
7242	42.67	PK	168	1.6	H	39.2	9.15	33.6	57.42	74	16.58	Harmonic
2414	71.34	AV	45	1	V	30.3	7.9	33.9	75.64	94	18.36	Fund.
4828	43	PK	49	1.2	H	36.3	7.56	33.7	53.16	74	20.84	Harmonic
2414	80.92	PK	20	1.5	H	30.9	7.9	33.9	85.82	114	28.18	Fund.
2414	78.58	PK	18	1.2	V	30.3	7.9	33.9	82.88	114	31.12	Fund.

Freq. (MHz)	S.A. Reading (dB μ V/m)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Loss (dB/m)	Cable Loss (dB)	Amp. (dB)	Cord. Amp. (dB μ V/m)	FCC 15.249/209		
										Limit (dB μ V/m)	Margin (dB)	Comment
Channel 3 (2450 MHz)												
9800	33.15	AV	90	1.2	H	41.4	10.79	34.0	51.34	54	2.66	Harmonic
7350	36.30	AV	90	1.5	H	39.2	9.15	33.6	51.05	54	2.95	Harmonic
9800	33.97	AV	0	1.5	V	40.1	10.79	34.0	50.86	54	3.14	Harmonic
4900	41.57	AV	0	1.3	V	35.0	7.56	33.7	50.43	54	3.57	Harmonic
7350	36.58	AV	0	1.3	V	38.0	9.15	33.6	50.13	54	3.87	Harmonic
4900	37.40	AV	10	1.5	H	36.3	7.56	33.7	47.56	54	6.44	Harmonic
2450	75.61	AV	90	1.2	H	30.9	7.9	33.9	80.51	94	13.49	Fund.
9800	41.36	PK	90	1.3	H	41.4	10.79	34.0	59.55	74	14.45	Harmonic
7350	43.01	PK	180	1.6	H	39.2	9.15	33.6	57.76	74	16.24	Harmonic
9800	40.64	PK	0	1.5	V	40.1	10.79	34.0	57.53	74	16.47	Harmonic
7350	43.97	PK	0	1.5	V	38.0	9.15	33.6	57.52	74	16.48	Harmonic
2450	72.65	AV	0	1.3	V	30.3	7.9	33.9	76.95	94	17.05	Fund.
4900	47.69	PK	0	1.5	V	35.0	7.56	33.7	56.55	74	17.45	Harmonic
4900	42.3	PK	360	1.3	H	36.3	7.56	33.7	52.46	74	21.54	Harmonic
2450	81.56	PK	180	1.3	H	30.9	7.9	33.9	86.46	114	27.54	Fund.
2450	79.86	PK	180	1.2	V	30.3	7.9	33.9	84.16	114	29.84	Fund.

Freq. (MHz)	S.A. Reading (dB μ V/m)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Loss (dB/m)	Cable Loss (dB)	Amp. (dB)	Cord. Amp. (dB μ V/m)	FCC 15.249/209		
										Limit (dB μ V/m)	Margin (dB)	Comment
Channel 4 (2468 MHz)												
7404	35.82	AV	268	1.6	H	39.2	9.15	33.6	50.57	54	3.43	Harmonic
9872	32.11	AV	149	1.8	H	41.4	10.79	34.0	50.3	54	3.7	Harmonic
9872	33.33	AV	360	1.6	V	40.1	10.79	34.0	50.22	54	3.78	Harmonic
7404	35.54	AV	263	1.8	V	38.0	9.15	33.6	49.09	54	4.91	Harmonic
4936	39.46	AV	180	1.6	V	35.0	7.56	33.7	48.32	54	5.68	Harmonic
4936	38.01	AV	270	1.6	H	36.3	7.56	33.7	48.17	54	5.83	Harmonic
2468	75.49	AV	263	1.4	H	30.9	7.9	33.9	80.39	94	13.61	Fund.
9872	39.89	PK	230	1.8	H	41.4	10.79	34.0	58.08	74	15.92	Harmonic
9872	40.01	PK	358	2.0	V	40.1	10.79	34.0	56.9	74	17.1	Harmonic
2468	72.54	AV	45	1	V	30.3	7.9	33.9	76.84	94	17.16	Fund.
7404	42.46	PK	268	1.6	V	38.0	9.15	33.6	56.01	74	17.99	Harmonic
7404	41.15	PK	168	1.6	H	39.2	9.15	33.6	55.9	74	18.1	Harmonic
4936	46.71	PK	250	1	V	35.0	7.56	33.7	55.57	74	18.43	Harmonic
4936	43.9	PK	49	1.2	H	36.3	7.56	33.7	54.06	74	19.94	Harmonic
2468	82.28	PK	20	1.5	H	30.9	7.9	33.9	87.18	114	26.82	Fund.
2468	79.75	PK	18	1.2	V	30.3	7.9	33.9	84.05	114	29.95	Fund.

CFR47 §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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, 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 at the band edge. The receiving antenna should be changed the polarization both of horizontal and vertical.

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2007-11-15	2008-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-10-16	2009-10-16
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2008-08-14	2009-08-14
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratories 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:	56%
ATM Pressure:	100.2 kPa

The testing was performed by Alvin Huang on 2008-10-22.

Test Mode: Transmitting

Freq. (MHz)	Meter Reading (dB μ V)	Detector PK/QP/AV	Direction Degree	Ant. Height (m)	Ant. Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dB μ V/m)	Part 15.209/15.249	
										Limit (dB μ V/m)	Margin (dB)
2484	35.92	AV	180	1.4	H	30.9	7.9	33.9	40.82	54	13.18
2399.6	35.81	AV	20	1.2	H	30.9	7.8	33.9	40.61	54	13.39
2484.1	35.28	AV	185	1.5	V	30.9	7.9	33.9	40.18	54	13.82
2398.7	35.34	AV	0	1.1	V	30.9	7.8	33.9	40.14	54	13.86
2399.6	45.61	PK	20	1.2	H	30.9	7.8	33.9	50.41	74	23.59
2398.7	45.37	PK	0	1.1	V	30.9	7.8	33.9	50.17	74	23.83
2484	44.33	PK	180	1.4	H	30.9	7.9	33.9	49.23	74	24.77
2484.1	43.67	PK	185	1.5	V	30.9	7.9	33.9	48.57	74	25.43

Note: Above test result is the worse case in all polarity direction (horizontal and vertical).

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