NVLAP LAB CODE 200707-0

FCC PART 15.249
MEASUREMENT AND TEST REPORT

For

Shenzhen Gospell Smarthome Electronic Co., Ltd

West, 5F/Block2, Vision (SZ) Park, South HI-Tech Park,
Nanshan, Shenzhen, P. R. of China

FCC ID: TW5GA8009

This Report Concerns:	Equipment Type:
☒ Original Report	900MHz Ultra-small Wireless Camera

Test Engineer:	Andy Yan
Report No.:	RSZ07080602
Test Date:	2007-08-09 to 2007-10-08
Report Date:	2007-10-12
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

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.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Gospell Smarthome Electronic Co., Ltd*'s product, model number: *GA8009 t*he "EUT" as referred to in this report is a *900MHz Ultra-small Wireless Camera,* which measures approximately 4.4 cmL x 2.4cmW x 5.5cmH, rated input voltage: DC 8V adapter.

AC/DC Adapter:
Manufacturer: Shenzhen Gospell Smarthome Electronic Co., Ltd
Model: SY-08020
Input: 120V AC 60 Hz 100mA
Output: 8V DC 200 mA

** The test data gathered are from production sample, serial number: 0708003 provided by the manufacturer, we receive the EUT on 2007-08-06.*

Objective

This Type approval report is prepared on behalf of *Shenzhen Gospell Smarthome Electronic 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 emissions measurement data is located at it's facility in Sunnyvale, California, USA.

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).

NVLAP 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).

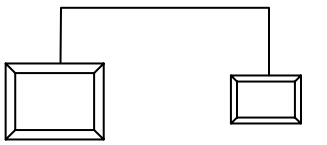
Equipment Modifications

Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

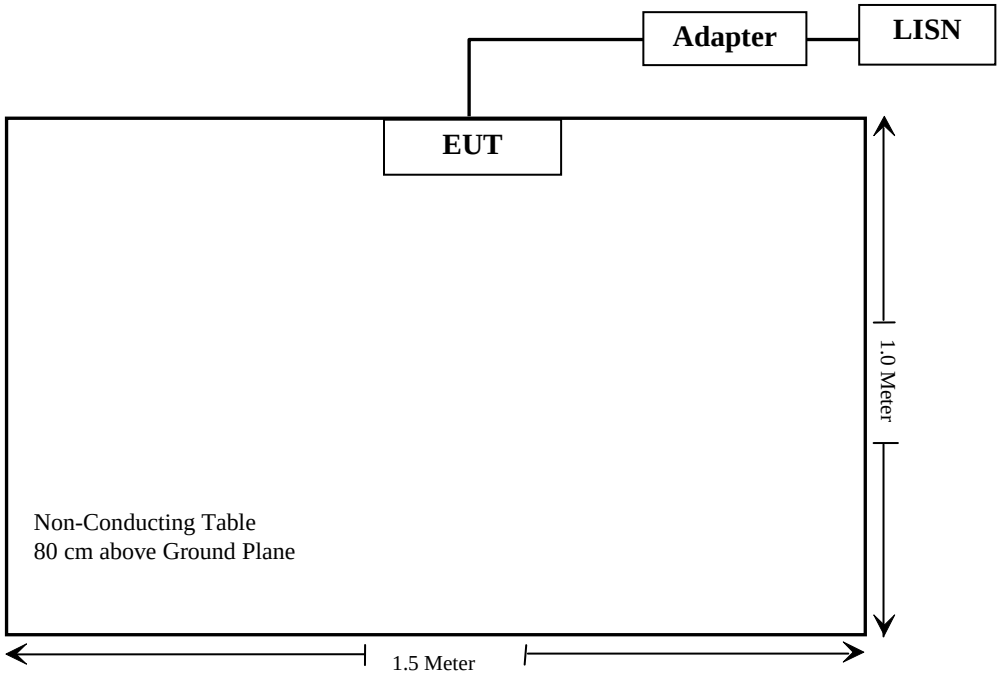
External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded adapter Cable	1.85	Adapter	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

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.

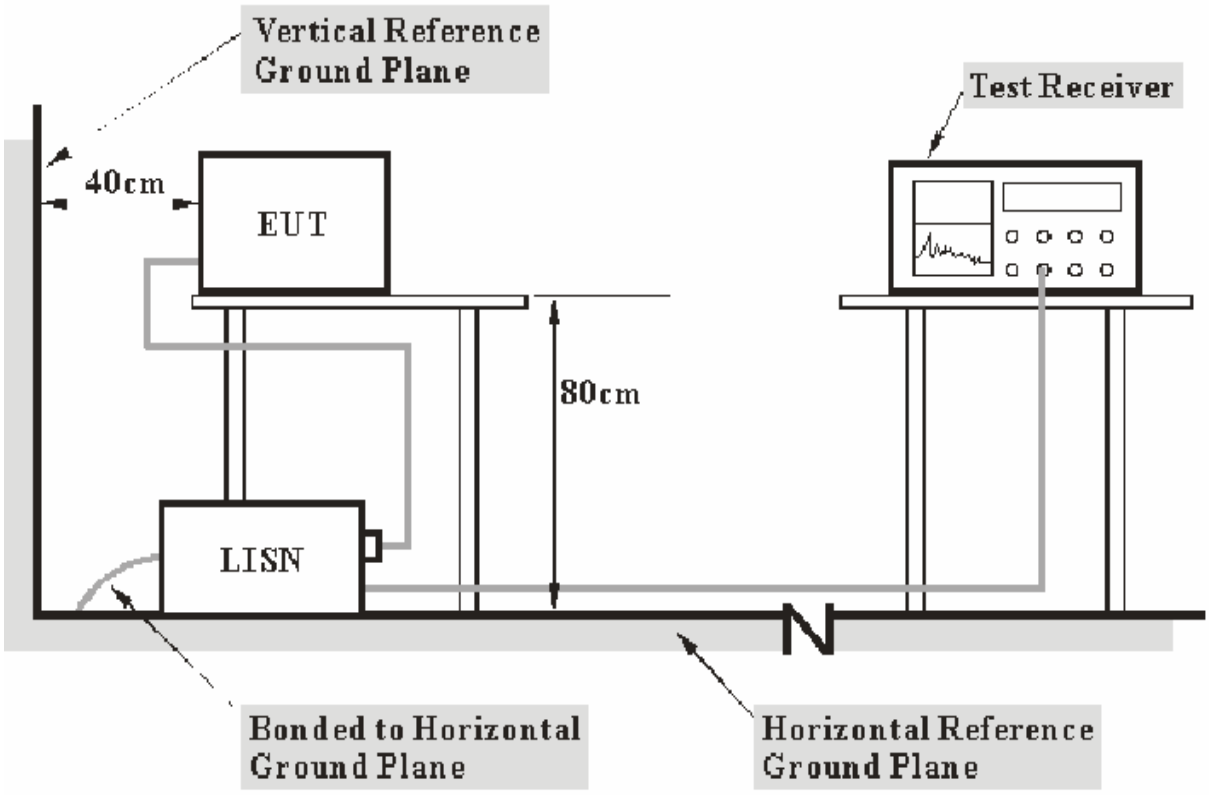
§15.207 - CONDUCTED EMISSIONS

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:

Frequency Range	***IFBW***
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	2007-03-26	2008-03-26
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2007-03-26	2008-03-26

***** 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:

6.50 dB at **28.715 MHz** in the **Neutral** conductor mode.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	100.0 kPa

The testing was performed by Andy Yan on 2007-08-09.

Test Mode: Transmitting

Line Conducted Emissions				FCC Part 15 .207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Phase (Live/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
28.715	53.50	QP	Neutral	60.00	6.50
28.585	49.20	QP	Live	60.00	10.80
0.335	45.80	QP	Live	59.33	13.53
14.320	34.70	AV	Neutral	50.00	15.30
14.320	34.20	AV	Live	50.00	15.80
1.125	29.20	AV	Live	46.00	16.80
1.125	38.50	QP	Live	56.00	17.50
0.335	40.80	QP	Neutral	59.33	18.53
6.315	38.50	QP	Live	60.00	21.50
3.750	32.20	QP	Live	56.00	23.80
0.590	32.10	QP	Neutral	56.00	23.90
14.315	35.90	QP	Neutral	60.00	24.10
14.320	35.50	QP	Live	60.00	24.50
5.390	35.40	QP	Neutral	60.00	24.60
28.725	23.70	AV	Neutral	50.00	26.30
0.590	19.10	AV	Neutral	46.00	26.90
28.650	22.30	AV	Live	50.00	27.70
2.765	27.50	QP	Neutral	56.00	28.50
0.335	20.60	AV	Live	49.33	28.73
0.335	20.30	AV	Neutral	49.33	29.03
3.755	8.40	AV	Live	46.00	37.60
2.770	7.70	AV	Neutral	46.00	38.30
6.340	10.40	AV	Live	50.00	39.60
5.390	9.70	AV	Neutral	50.00	40.30

Plot(s) of Test Data

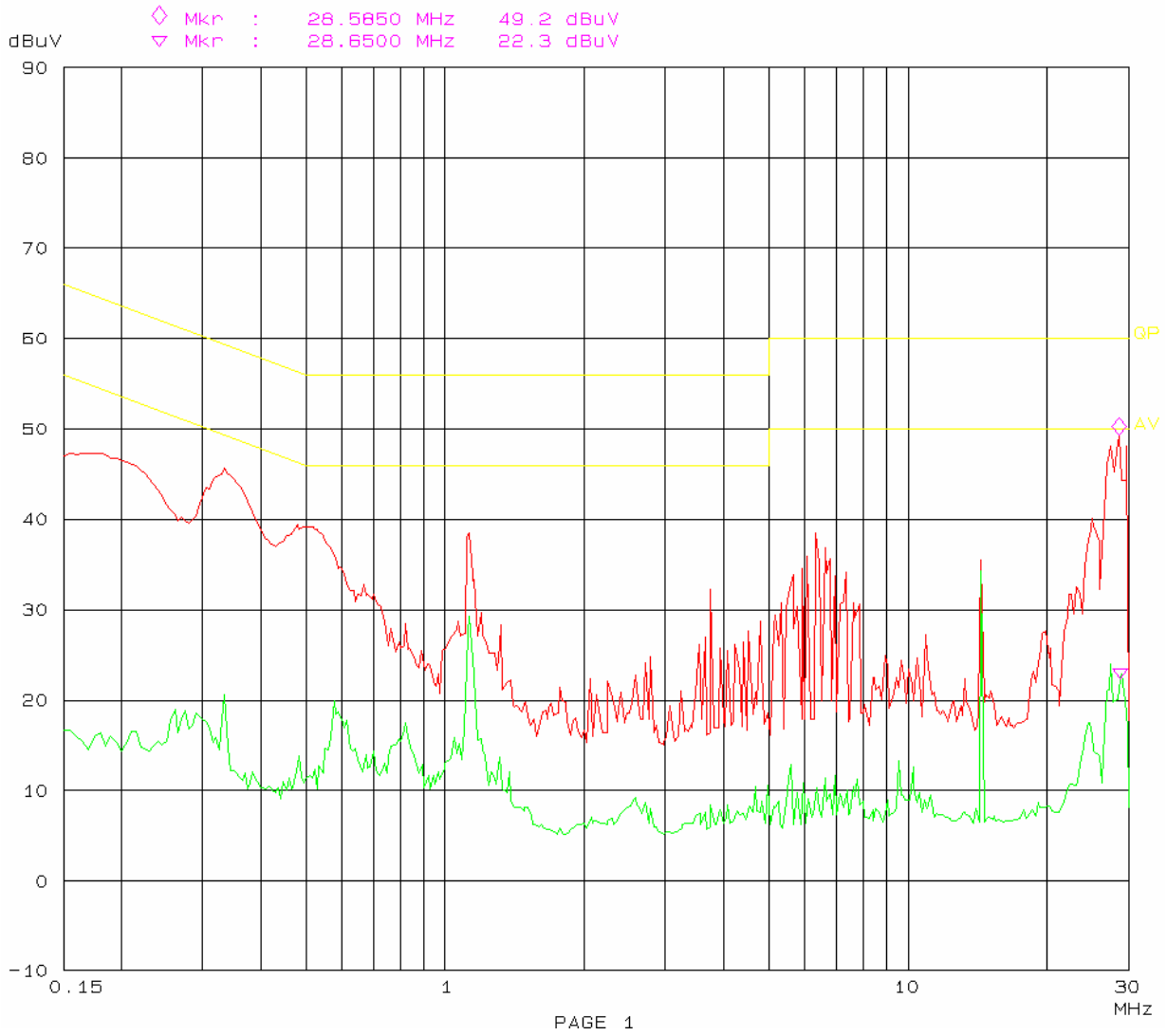
Plot(s) of Test Data is presented hereinafter as reference.

Conducted Emission Test

09. Aug 07 15:34

FCC Part15 B

EUT: 900MHz Ultra-small Wireless Camera
Manuf: Gospell M/N: GA8009
Op Cond: Transmitting
Operator: Andy
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Humi: 56%

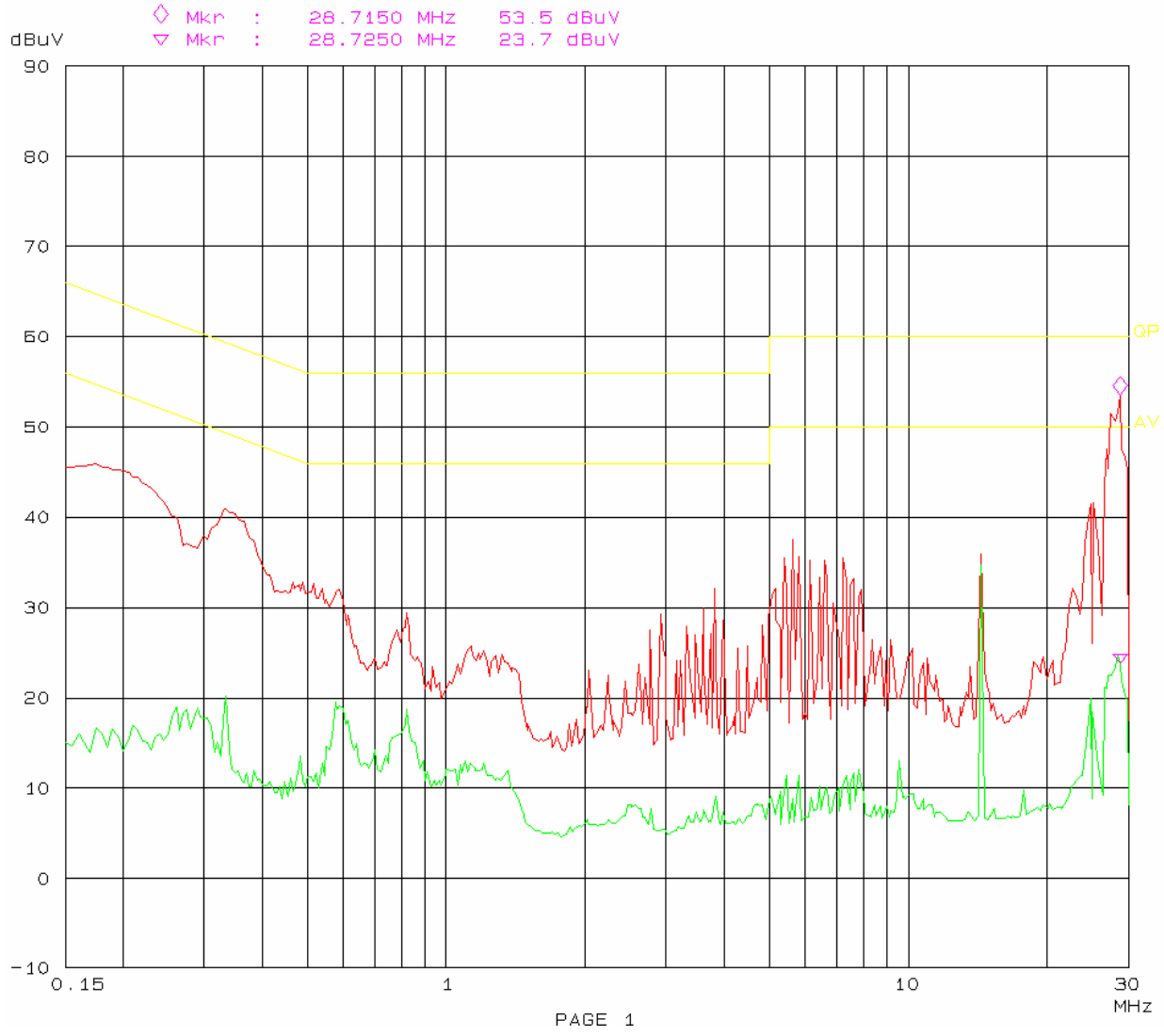


Conducted Emission Test

09. Aug 07 15:53

FCC Part15 B

EUT: 900MHz Ultra-small Wireless Camera
Manuf: Gospell M/N: GA8009
Op Cond: Transmitting
Operator: Andy
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Humi: 56%



§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 Laboratory Corp. (Shenzhen) is $\pm$4.0 dB.

Test Equipment Setup

The spectrum analyzer or receiver is set as:

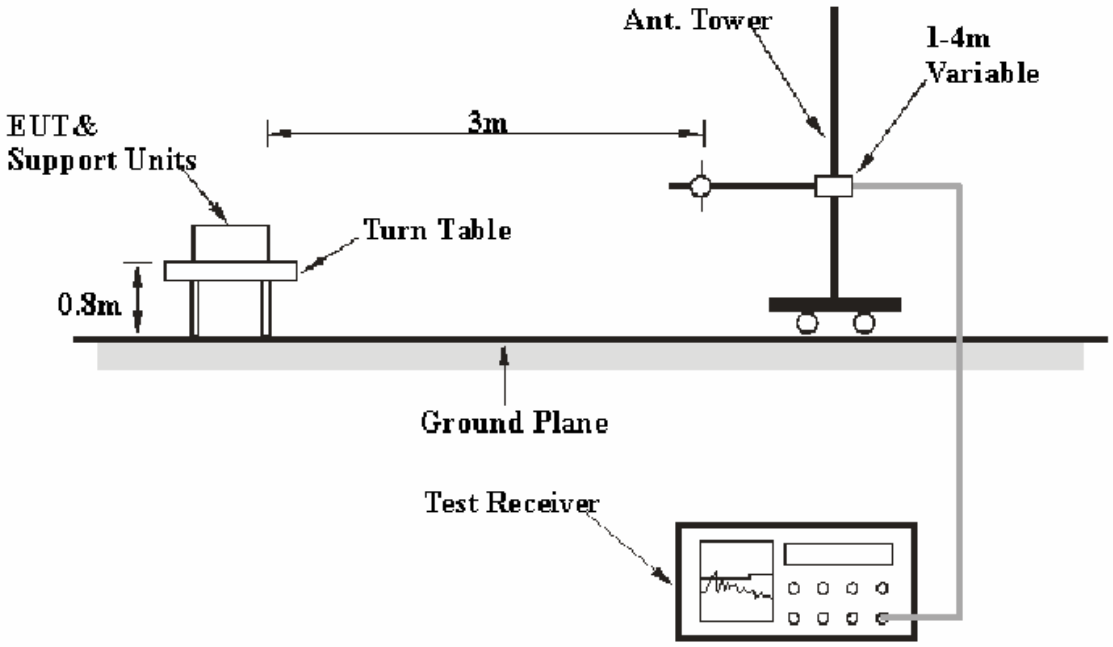
Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = 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
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2007-09-29	2008-09-29
HP	Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2007-08-14	2008-08-14
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
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, 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 meter, 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:

Corr. Amp. = Meter Reading + Antenna Factor + 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. 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:

30-1000MHz:

1.70 dB at **42.951200 MHz** in the **Vertical** polarization

Above 1GHz:

3.14 dB at **906 MHz** in the **Horizontal** polarization, for Low CH
4.08 dB at **922 MHz** in the **Horizontal** polarization, for High CH

Test Data

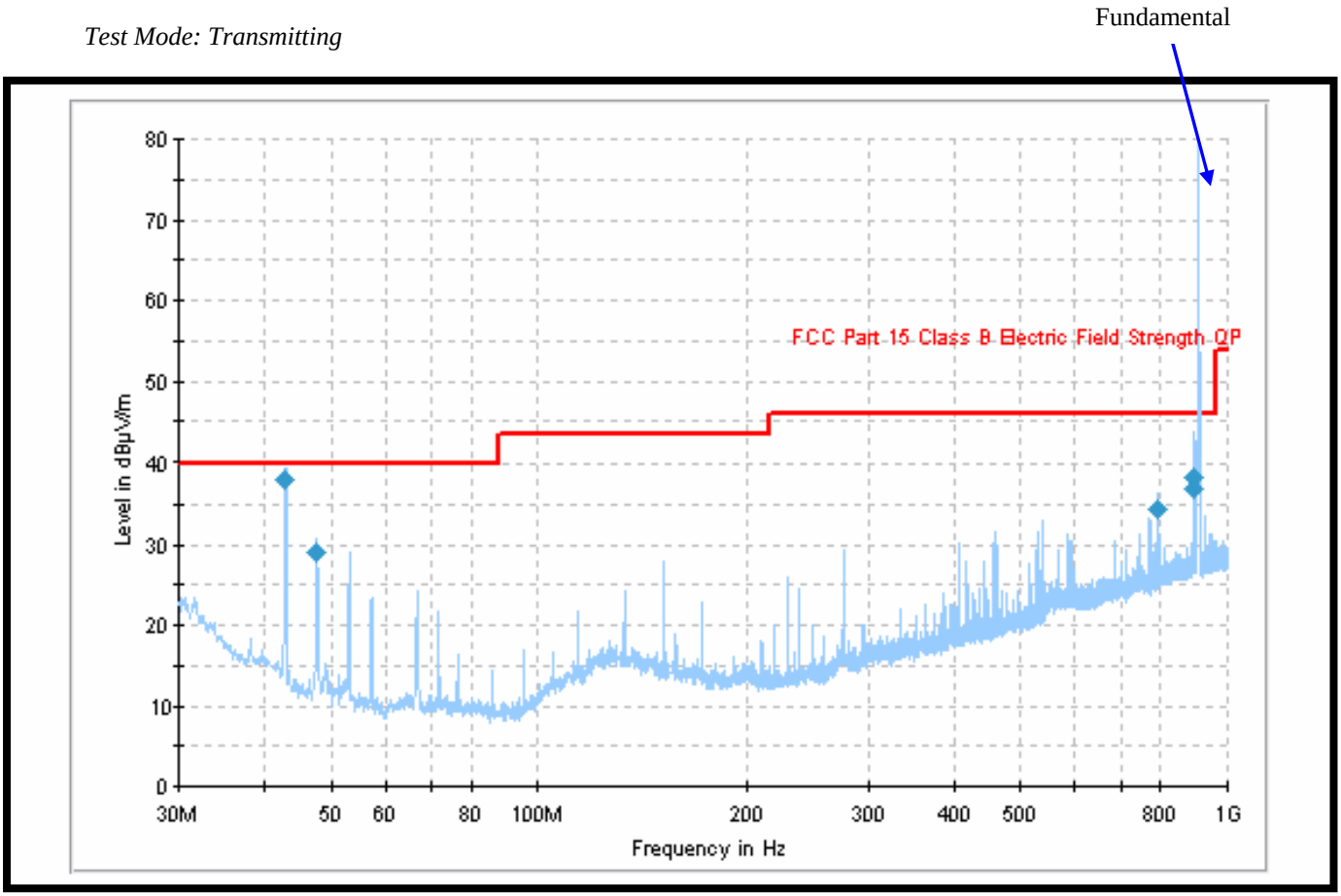
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	100.9 kPa

The testing was performed by Andy Yan on 2007-09-18.

30-1000 MHz

Test Mode: Transmitting



Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corr. (dB)	Limit (dBµV/m)	Margin (dB)
42.951200	38.3	103.0	V	111.0	-13.4	40.0	1.7
894.331225	38.4	103.0	V	260.0	1.1	46.0	7.6
890.653925	36.9	103.0	V	3.0	1.0	46.0	9.1
47.728900	28.9	102.0	V	2.0	-16.1	40.0	11.1
788.536750	34.5	400.0	H	144.0	-0.5	46.0	11.5

Above 1GHz:

Freq. (MHz)	Receiver Reading (dBuV)	Detector PK/AV	Direction Degree	Antenna		Ant Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dB uV/m)	FCC Part 15.209 & 15.249		
				Height (m)	Polar H / V					Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel (908 MHz)												
2724	48.69	AV	180	1.2	H	30.60	4.40	33.40	50.29	54	3.71	Harmonic
2724	47.74	AV	90	1.0	V	30.60	4.40	33.40	49.34	54	4.66	Harmonic
1816	51.48	AV	90	1.0	H	29.70	2.82	35.00	49.00	54	5.00	Harmonic
1816	50.86	AV	90	1.0	V	29.70	2.82	35.00	48.38	54	5.62	Harmonic
1816	69.48	PK	180	1.2	H	29.70	2.82	35.00	67.00	74	7.00	Harmonic
1816	67.97	PK	180	1.2	V	29.70	2.82	35.00	65.49	74	8.51	Harmonic
4540	39.63	AV	180	1.2	H	33.80	4.64	33.60	44.47	54	9.53	Harmonic
3632	41.44	AV	180	1.2	H	31.80	4.04	32.90	44.38	54	9.62	Harmonic
2724	62.69	PK	45	1.2	H	30.60	4.40	33.40	64.29	74	9.71	Harmonic
3632	40.54	AV	180	1.2	V	31.80	4.04	32.90	43.84	54	10.16	Harmonic
4540	38.93	AV	180	1.2	V	33.80	4.64	33.60	43.77	54	10.23	Harmonic
2724	61.93	PK	180	1.2	V	30.60	4.40	33.40	63.53	74	10.47	Harmonic
3632	60.45	PK	45	1.2	H	31.80	4.04	32.90	63.39	74	10.61	Harmonic
3632	59.95	PK	45	1.0	V	31.80	4.04	32.90	62.89	74	11.11	Harmonic
4540	54.62	PK	45	1.2	H	33.80	4.64	33.60	59.46	74	14.54	Harmonic
4540	53.68	PK	45	1.0	V	33.80	4.64	33.60	58.52	74	15.48	Harmonic

Fundamental:

Freq. (MHz)	Receiver Reading (dBuV)	Detector PK/AV	Direction Degree	Antenna		Ant Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dB uV/m)	FCC Part 15.249		
				Height (m)	Polar H / V					Limit (dBuV/m)	Margin (dB)	Remarks
Low Channel (908 MHz)												
908	90.85	QP	90	1.0	H	22.90	3.55	26.44	90.86	94	3.14	Fundamental
908	89.31	QP	45	1.0	V	22.90	3.55	26.44	89.32	94	4.68	Fundamental

Freq. (MHz)	Receiver Reading (dBuV)	Detector PK/AV	Direction Degree	Antenna		Ant Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dB uV/m)	FCC Part 15.209 & 15.249		
				Height (m)	Polar H / V					Limit (dBuV/m)	Margin (dB)	Remarks
High Channel (922 MHz)												
2766	47.54	AV	324	1.2	H	30.60	4.40	33.40	49.14	54	4.86	Harmonic
2766	46.52	AV	135	1.3	V	30.60	4.40	33.40	48.12	54	5.88	Harmonic
1844	49.92	AV	142	1.5	H	29.70	2.82	35.00	47.44	54	6.56	Harmonic
1844	48.95	AV	142	1.6	V	29.70	2.82	35.00	46.47	54	7.53	Harmonic
1844	66.71	PK	142	1.4	H	29.70	2.82	35.00	64.23	74	9.77	Harmonic
4610	38.67	AV	210	1.2	H	33.80	4.64	33.60	43.51	54	10.49	Harmonic
1844	65.86	PK	234	1.8	V	29.70	2.82	35.00	63.38	74	10.62	Harmonic
2766	61.75	PK	324	1.3	H	30.60	4.40	33.40	63.35	74	10.65	Harmonic
3688	39.57	AV	210	1.2	H	31.80	4.04	32.90	42.51	54	11.49	Harmonic
2766	60.80	PK	156	1.4	V	30.60	4.40	33.40	62.4	74	11.6	Harmonic
4610	37.52	AV	256	1.8	V	33.80	4.64	33.60	42.36	54	11.64	Harmonic
3688	58.54	PK	240	1.4	H	31.80	4.04	32.90	61.48	74	12.52	Harmonic
3688	38.52	AV	243	1.4	V	31.80	4.04	32.90	41.46	54	12.54	Harmonic
3688	57.13	PK	153	1.5	V	31.80	4.04	32.90	60.07	74	13.93	Harmonic
4610	52.84	PK	240	1.3	H	33.80	4.64	33.60	57.68	74	16.32	Harmonic
4610	51.73	PK	145	1.4	V	33.80	4.64	33.60	56.57	74	17.43	Harmonic

Fundamental:

Freq. (MHz)	Receiver Reading (dBuV)	Detector PK/AV	Direction Degree	Antenna		Ant Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corr. Amp. (dB uV/m)	FCC Part 15.249		
				Height (m)	Polar H / V					Limit (dBuV/m)	Margin (dB)	Remarks
High Channel (922 MHz)												
922	89.91	QP	65	1.4	H	22.90	3.55	26.44	89.92	94	4.08	Fundamental
922	88.78	QP	60	1.4	V	22.90	3.55	26.44	88.79	94	5.21	Fundamental

§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

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 100 kHz and VBW of spectrum analyzer to 300 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	2007-09-29	2008-09-29
HP	Amplifier	8449B	3008A00277	2007-09-29	2008-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25

*** 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:	53 %
ATM Pressure:	100.9 kPa

The testing was performed by Andy Yan on 2007-10-08

Test Mode: Transmitting

Frequency (MHz)	Reading (dBuV/m)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amplitude (dBuV/m)	Limit (dBuV)	Margin (dB)
902	42.1	22.90	3.55	26.44	42.11	46	3.89
928	40.81	22.90	3.55	26.44	40.82	46	5.18

Test Result: Compliant.

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