



NVLAP LAB CODE 200707-0



FCC PART 15.249

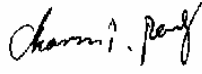

EMI MEASUREMENT AND TEST REPORT

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: TW5GB8901

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: 2.4GHz wireless back-up camera system
Test Engineer: Charmi Peng 	
Report No.: RSZ06122803	
Test Date: 2007-01-15	
Report Date: 2007-01-16	
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.

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
§15.205 §15.209(A) §15.249(A) - RADIATED EMISSION.....	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP	8
EMI TEST RECEIVER SETUP.....	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	9
CORRECTED AMPLITUDE & MARGIN CALCULATION	9
TEST RESULTS SUMMARY.....	10
TEST DATA	10
§15.249(D) – OUT OF BAND EMISSION	13
STANDARD APPLICABLE	13
TEST EQUIPMENT LIST AND DETAILS.....	13
TEST PROCEDURE	13
TEST DATA	13

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen Gospell Smarthome Electronic Co., Ltd*'s product, model number: *GB8901* or the "EUT" as referred to in this report is a *2.4GHz wireless back-up camera system*. The EUT is measured approximately 26.0 cm L x 3.5 cm W x 4.0 cm H, rated input voltage: DC 12V battery.

** The test data gathered are from production sample, serial number: 0612032 provided by the manufacturer, we received EUT on 2006-12-28.*

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 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

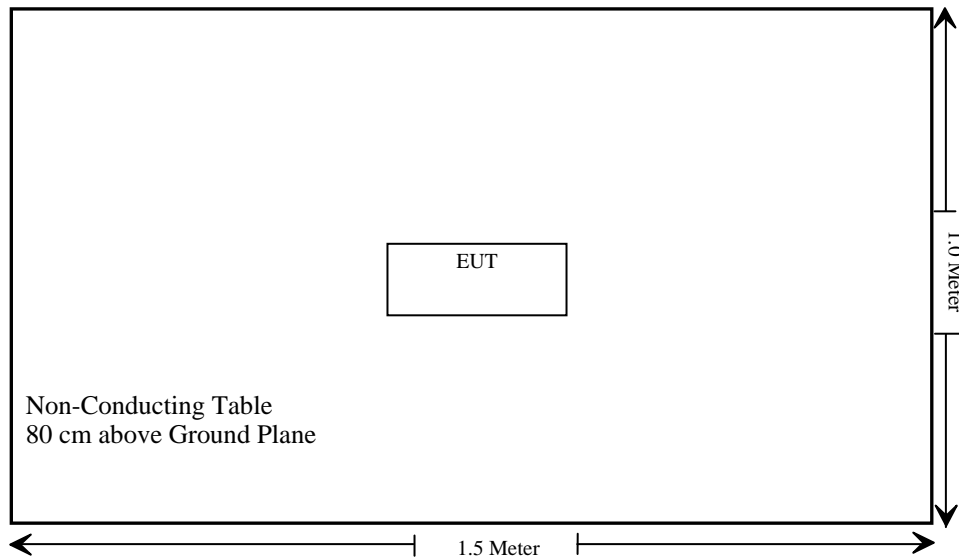
Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

Configuration of Test Setup



EUT

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	N/A
§15.205(a), §15.209(a), §15.249(a)	Radiated Emission	Compliant*
§15.249(d)	Out of band emission	Compliant

* Within 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 antenna is a permanently attached antenna, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

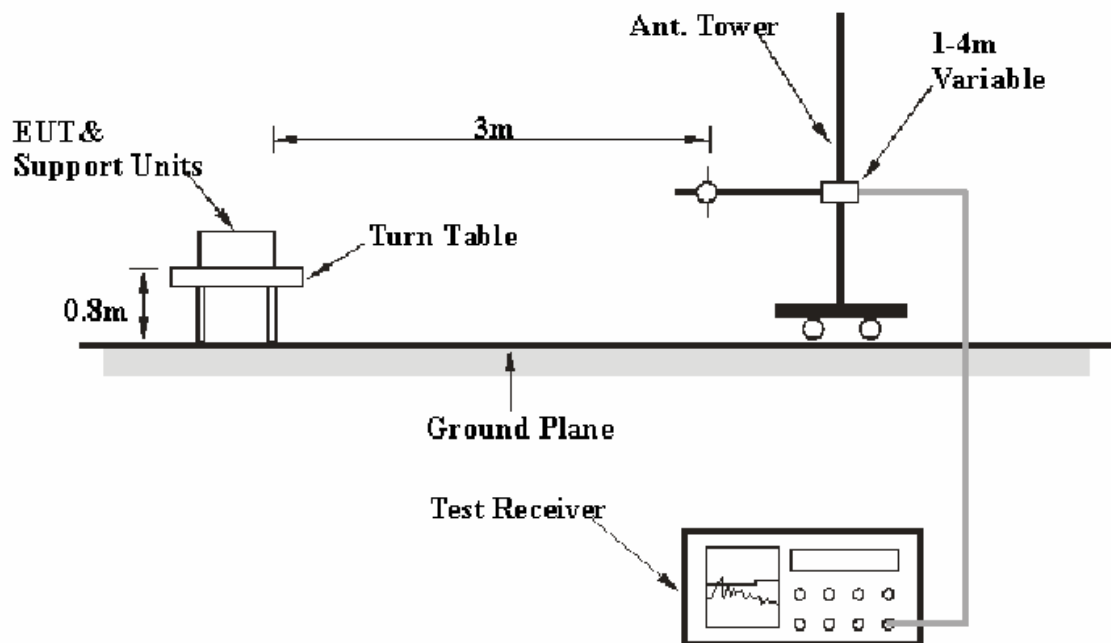
§15.205 §15.209(a) §15.249(a) - RADIATED EMISSION

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 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 EUT is powered by DC 12V battery.

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	100035	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
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
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) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

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, average and Quasi-Peak 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 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:

30-1000 MHz: 2.0 dB at 351.003275 MHz in the **Horizontal polarization.**

Above 1GHz:

Channel 1 (2414MHz): 4.96 dB at 4828 MHz in the **Horizontal polarization.**

Channel 2 (2432MHz): 3.04 dB at 4864 MHz in the **Vertical polarization.**

Channel 4 (2468MHz): 3.62 dB at 4936 MHz in the **Horizontal polarization.**

Test Data

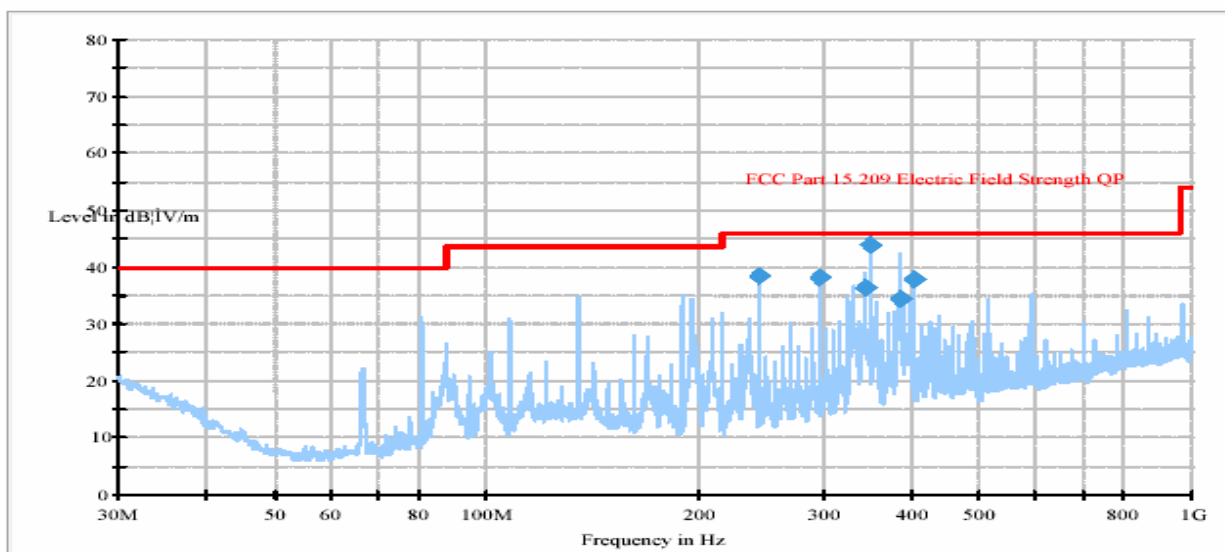
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1000mbar

The testing was performed by Charmi Peng on 2007-01-15.

Test Mode: Transmitting

30-1000MHz:



Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	Polarity	Turntable Position (deg)	Corr. (dB)	Limit (dBμV/m)	Margin (dB)
351.003275	44.0	100.0	H	52.0	-8.1	46.0	2.0*
243.002675	38.5	132.0	H	74.0	-11.5	46.0	7.5
296.990175	38.2	99.0	H	92.0	-9.5	46.0	7.8
405.009850	38.0	100.0	H	45.0	-7.4	46.0	8.0
344.222950	36.3	100.0	H	62.0	-8.3	46.0	9.7
384.847175	34.2	100.0	H	107.0	-7.2	46.0	11.8

* Within measurement uncertainty.

Above 1GHz:

Frequency (MHz)	Meter Reading dBuV/m	Detector PK/ AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Ampl. dBuV/m	FCC Part 15.209 & 15.249		
										Limit (dBuV/m)	Margin (dB)	Comment
Channel 1 (2414MHz)												
4828	41.80	AV	270	1.6	H	36.0	4.64	33.4	49.04	54	4.96	Harmonic
4828	41.14	AV	180	1.6	V	36.0	4.64	33.4	48.38	54	5.62	Harmonic
7242	36.30	AV	261	1.0	H	39.1	4.51	33.7	46.21	54	7.79	Harmonic
7242	35.47	AV	90	1.2	V	39.1	4.51	33.7	45.38	54	8.62	Harmonic
4828	52.14	PK	250	1.0	V	36.0	4.64	33.4	59.38	74	14.62	Harmonic
7242	48.47	PK	180	1.0	V	39.1	4.51	33.7	58.38	74	15.62	Harmonic
7242	47.80	PK	180	1.3	H	39.1	4.51	33.7	57.71	74	16.29	Harmonic
4828	50.30	PK	49	1.2	H	36.0	4.64	33.4	57.54	74	16.46	Harmonic
2414	65.30	AV	45	1.0	V	30.6	3.61	35.0	64.51	94	29.49	Fundamental
2414	62.57	AV	263	1.4	H	30.6	3.61	35.0	61.78	94	32.22	Fundamental
2414	71.37	PK	18	1.6	V	30.6	3.61	35.0	70.58	114	43.42	Fundamental
2414	68.73	PK	20	1.2	H	30.6	3.61	35.0	67.94	114	46.06	Fundamental

Frequency (MHz)	Meter Reading dBuV/m	Detector PK/ AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Ampl. dBuV/m	FCC Part 15.209 & 15.249		
										Limit (dBuV/m)	Margin (dB)	Comment
Channel 2 (2432MHz)												
4864	43.72	AV	180	1.6	V	36.0	4.64	33.4	50.96	54	3.04*	Harmonic
4864	41.47	AV	270	1.6	H	36.0	4.64	33.4	48.71	54	5.29	Harmonic
7296	37.33	AV	90	1.2	V	39.1	4.51	33.7	47.24	54	6.76	Harmonic
4864	53.31	PK	250	1.0	V	36.0	4.64	33.4	60.55	74	13.45	Harmonic
7296	29.97	AV	261	1.0	H	39.1	4.51	33.7	39.88	54	14.12	Harmonic
4864	50.30	PK	49	1.2	H	36.0	4.64	33.4	57.54	74	16.46	Harmonic
7296	47.17	PK	180	1.0	V	39.1	4.51	33.7	57.08	74	16.92	Harmonic
7296	43.63	PK	180	1.3	H	39.1	4.51	33.7	53.54	74	20.46	Harmonic
2432	65.50	AV	45	1.0	V	30.6	3.61	35.0	64.71	94	29.29	Fundamental
2432	60.57	AV	263	1.4	H	30.6	3.61	35.0	59.78	94	34.22	Fundamental
2432	73.51	PK	18	1.6	V	30.6	3.61	35.0	72.72	114	41.28	Fundamental
2432	66.73	PK	20	1.2	H	30.6	3.61	35.0	65.94	114	48.06	Fundamental

* Within measurement uncertainty.

Frequency (MHz)	Meter Reading dBuV/m	Detector PK/ AV	Direction Degree	Height Meter	Polar H / V	Antenna Factor (dB/m)	Cable loss (dB)	Amplifier Gain (dB)	Corr. Ampl. dBuV/m	FCC Part 15.209 & 15.249		
										Limit (dBuV/m)	Margin (dB)	Comment
Channel 4 (2468MHz)												
4936	42.63	AV	270	1.6	H	36.6	4.55	33.4	50.38	54	3.62*	Harmonic
4936	40.30	AV	180	1.6	V	36.6	4.55	33.4	48.05	54	5.95	Harmonic
7404	37.63	AV	261	1.0	H	39.0	4.75	33.7	47.68	54	6.32	Harmonic
7404	34.47	AV	90	1.2	V	39.0	4.75	33.7	44.52	54	9.48	Harmonic
4936	51.66	PK	49	1.2	H	36.6	4.55	33.4	59.41	74	14.59	Harmonic
4936	51.13	PK	250	1.0	V	36.6	4.55	33.4	58.88	74	15.12	Harmonic
7404	48.63	PK	180	1.3	H	39.0	4.75	33.7	58.68	74	15.32	Harmonic
7404	46.80	PK	180	1.0	V	39.0	4.75	33.7	56.85	74	17.15	Harmonic
2468	69.97	AV	45	1.0	V	30.6	3.61	35.0	69.18	94	24.82	Fundamental
2468	59.97	AV	263	1.4	H	30.6	3.61	35.0	59.18	94	34.82	Fundamental
2468	76.30	PK	18	1.6	V	30.6	3.61	35.0	75.51	114	38.49	Fundamental
2468	67.13	PK	20	1.2	H	30.6	3.61	35.0	66.34	114	47.66	Fundamental

* Within 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 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 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 both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure and record the value of the edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55%
ATM Pressure:	1016mbar

The testing was performed by Charmi Peng on 2007-01-15.

Test Result: Pass

Test Mode: Transmitting

Frequency (MHz)	Emission (dBuV/m)	Limit (dBuV/m)	Result
2399.9	32.4	54	Pass
2483.6	32.2	54	Pass