

TEST REPORT

For

**Shenzhen Gospell Smarthome Electronic Co., Ltd.**

5Floor/Block 2, Vision (SZ) Park, Hi-Tech Industrial Park,  
Shenzhen, Guangdong, China

**FCC ID: TW5GB8843-GB8849**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Wireless Inspection Camera
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<b>Report Number:</b>	RSZ110802003-00
<b>Report Date:</b>	2011-08-31
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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 contains data that are not covered by the NVLAP accreditation and are marked with an asterisk "★" (Rev.2)

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *Shenzhen Gospell Smarthome Electronic Co., Ltd.* 's product, model *GB8842 (FCC ID: TW5GB8843-GB8849)* ( the "EUT") in this report is a *WIRELESS INSPECTION CAMERA*, which was measured approximately: 26.0 cm (L) x 10.8 cm (W) x 7.1 cm (H) rated input voltage: DC 1.5 V\*4 AA battery.

*Note: The series product, model GB8842, GB8843, GB8846 and GB8849 are electrically identical, we select GB8842 for fully testing, which was explained for details in the attached declaration letter.*

*All measurement and test data in this report was gathered from production sample serial number: 1107142(Assigned by BACL, Shenzhen). The EUT was received on 2011-08-02.*

### 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)

N/A.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, 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 December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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 an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (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).

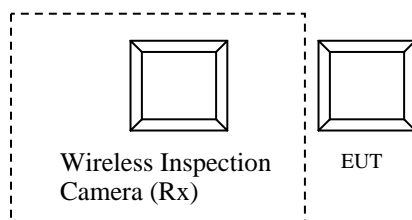
### Equipment Modifications

No modifications were made to the unit tested.

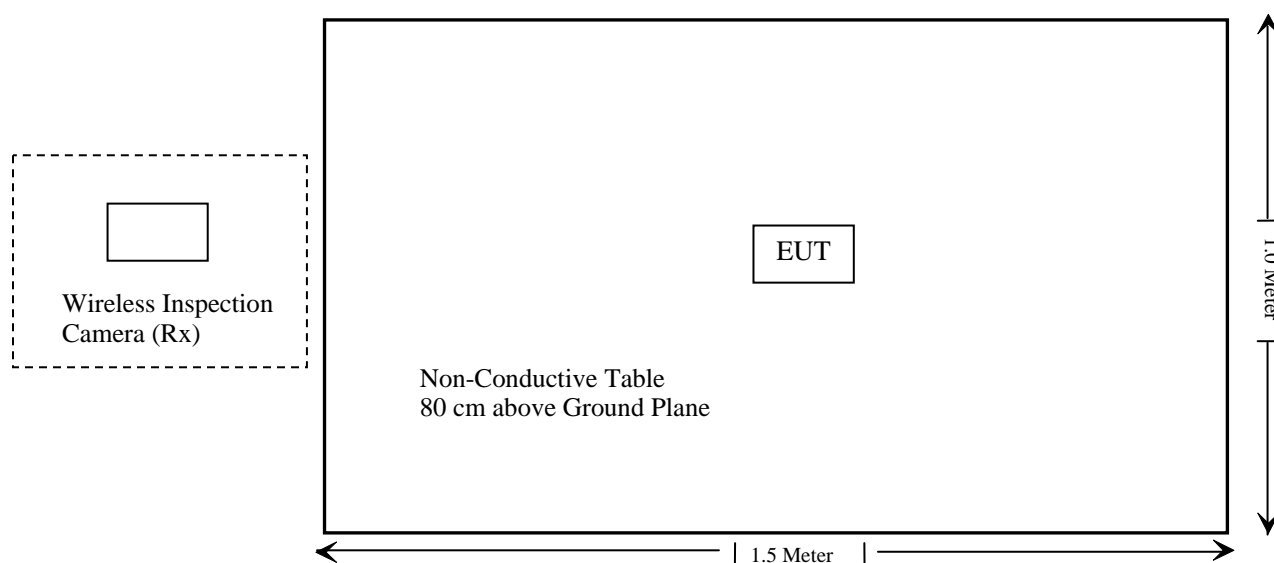
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Gospell	Wireless Inspection Camera(Rx)	GB7316	N/A

### Configuration of Test Setup



### Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	N/A*
15.205, §15.209, §15.249	Radiated Emissions	Compliance
§15.215(c)	20 dB Emission Bandwidth	Compliance

Note: EUT is battery operation.

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## **FCC§15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

For intentional device, according to FCC §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 has an omni-directional antenna soldered to PCB, 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.

## FCC §15.205, §15.209 & §15.249 - RADIATED EMISSIONS

### Applicable Standard

As per FCC§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 FCC§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  $\pm 4.0$  dB.

### Test Equipment Setup

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

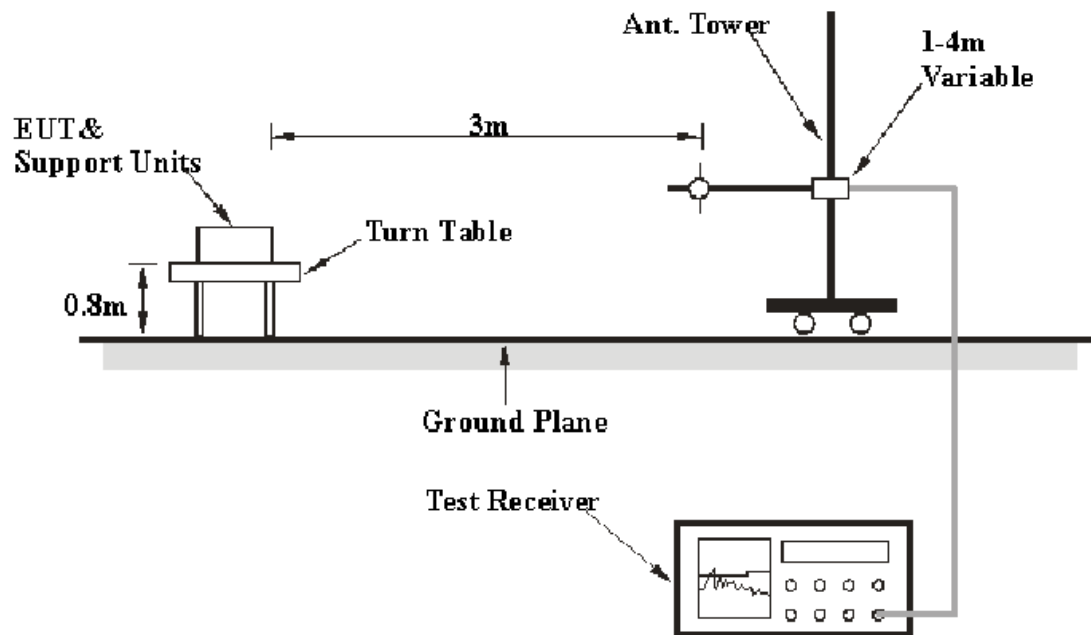
$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

$$\begin{aligned} \text{Peak: RBW} &= 1\text{MHz} / \text{VBW} = 1\text{MHz} / \text{Sweep} = \text{Auto} \\ \text{Average: RBW} &= 1\text{MHz} / \text{VBW} = 10\text{Hz} / \text{Sweep} = \text{Auto} \end{aligned}$$



## EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

## Test Procedure

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 Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2011-08-02	2012-08-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2010-11-11	2011-11-10
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2011-07-05	2012-07-04
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2011-07-08	2012-07-07

\* **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 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:

**0.16 dB at 2468 MHz in the Vertical polarization**

**Test Data****Environmental Conditions**

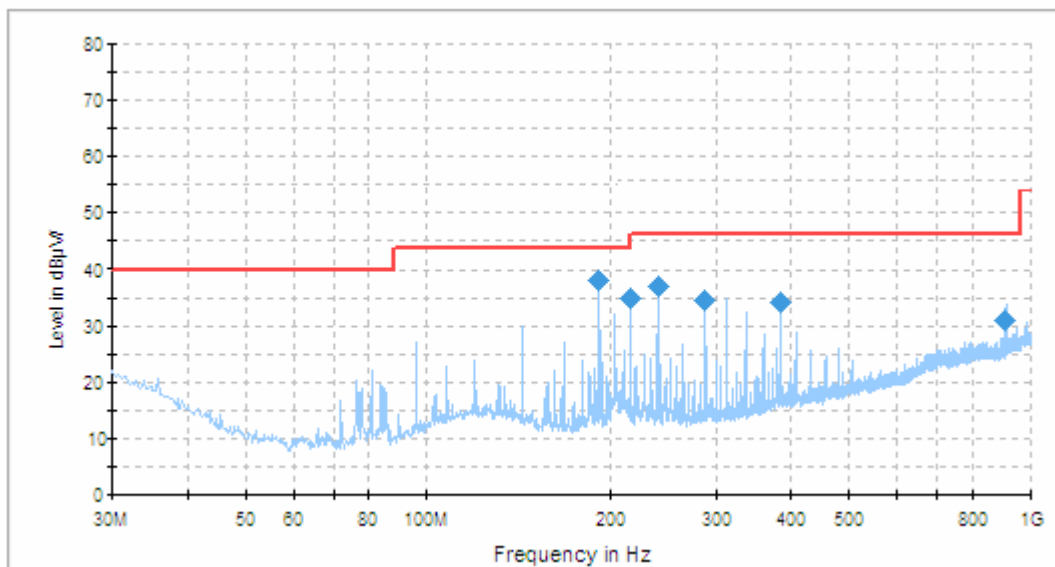
<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	100.2 kPa

*The testing was performed by Eric Lee on 2011-08-15.*

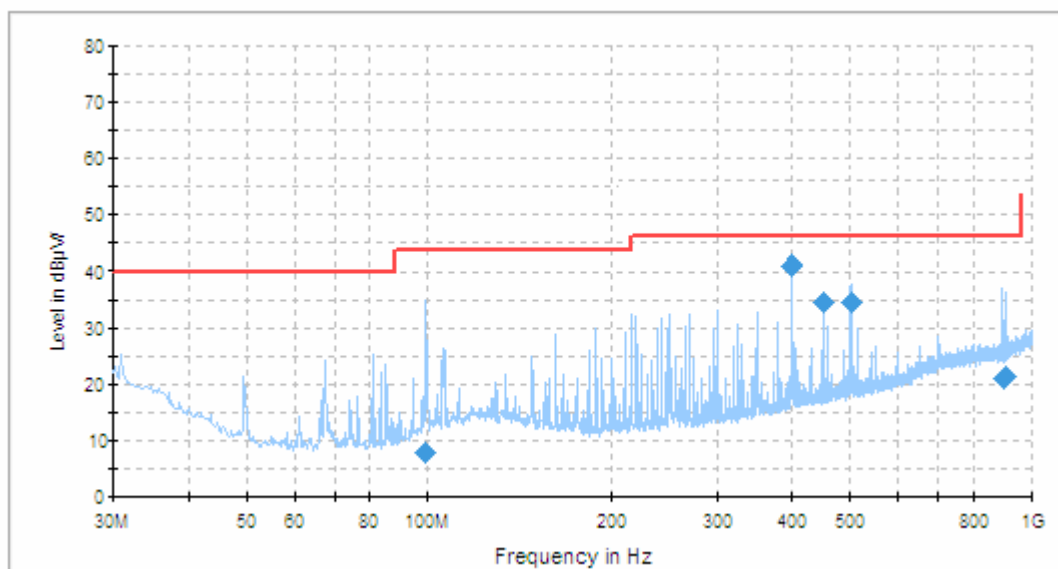
Test Mode: Transmitting

### 1) 30-1000 MHz

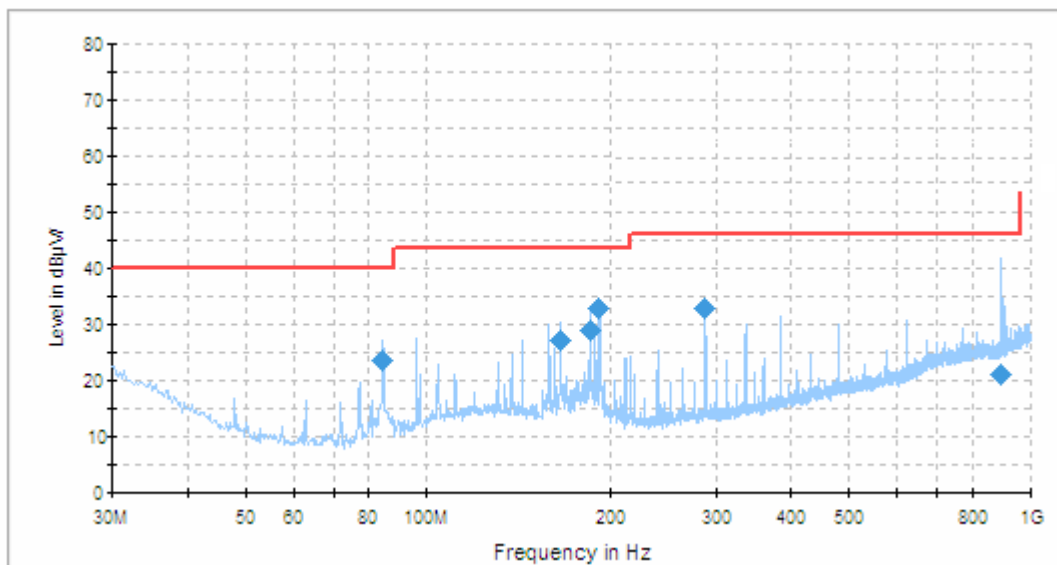
Model GB8842



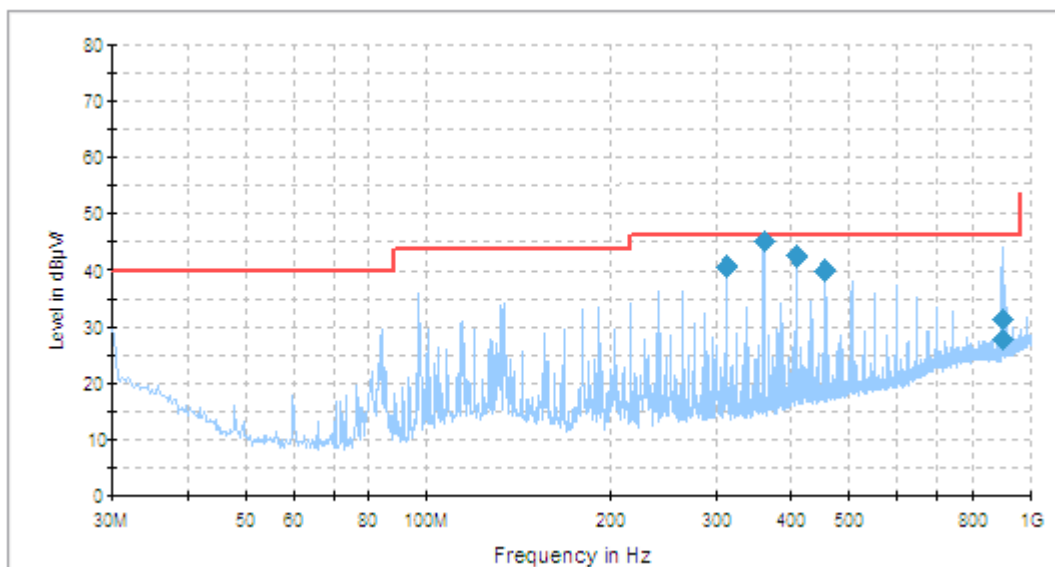
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
192.007750	38.4	132.0	H	316.0	-14.7	43.5	5.1
215.994500	35.1	150.0	H	1.0	-14.1	43.5	8.4
240.004000	37.0	138.0	H	340.0	-13.7	46.0	9.0
288.018500	34.6	100.0	H	59.0	-12.6	46.0	11.4
384.039000	34.2	100.0	H	225.0	-10.3	46.0	11.8
902.006500	30.9	269.0	H	319.0	-0.8	46.0	15.1

**Model GB8843**

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
400.040250	41.0	134.0	V	240.0	-10.0	46.0	5.0
500.149500	34.8	100.0	V	244.0	-8.4	46.0	11.2
450.106500	34.7	100.0	V	142.0	-9.1	46.0	11.3
905.014250	21.3	170.0	H	64.0	-0.6	46.0	24.7
898.372250	20.9	205.0	H	112.0	-0.9	46.0	25.1
98.910000	7.7	203.0	H	215.0	-14.9	43.5	35.8

**Model GB8846**

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
191.978750	32.9	168.0	H	218.0	-14.7	43.5	10.6
288.003500	32.7	100.0	H	259.0	-12.6	46.0	13.3
185.315500	29.0	134.0	H	230.0	-15.0	43.5	14.5
165.559000	27.3	173.0	H	216.0	-14.6	43.5	16.2
84.576250	23.7	400.0	H	255.0	-17.9	40.0	16.3
891.376750	20.9	400.0	H	206.0	-1.2	46.0	25.1

**Model GB8849**

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (Degree)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
359.999250	45.0	100.0	H	254.0	-10.9	46.0	1.0*
408.027500	42.4	100.0	H	148.0	-9.8	46.0	3.6*
311.989500	40.6	100.0	H	200.0	-12.1	46.0	5.4
455.992250	39.9	102.0	H	1.0	-9.0	46.0	6.1
897.574000	31.6	122.0	H	323.0	-0.9	46.0	14.4
895.138250	27.9	168.0	H	293.0	-1.0	46.0	18.1

\*Within measurement uncertainty!

**2) Above 1 GHz (worst case)**

Freq. (MHz)	S.A. Reading (dBμV)	Detector QP/PK/Ave	Direction Degree	Test Antenna			Cable Loss (dB)	Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.209/15.249		
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	Comment
2468	88.05	Ave.	235	1.23	V	30.3	3.03	27.54	93.84	94	0.16*	Fund.
7404	37.49	Ave.	222	1.50	H	38.00	5.20	27.49	53.2	54	0.8*	harmonic
7404	36.14	Ave.	42	2.23	V	39.2	5.20	27.49	53.05	54	0.95*	harmonic
7404	56.44	PK	222	1.50	H	38.00	5.20	27.49	72.15	74	1.85*	harmonic
4936	38.97	Ave.	147	1.71	H	36.3	4.3	27.51	52.06	54	1.94*	harmonic
2468	82.96	Ave.	149	2.15	H	30.90	3.03	27.54	89.35	94	4.65	Fund.
7404	50.65	PK	42	2.23	V	39.2	5.20	27.49	67.56	74	6.44	harmonic
4936	35.01	Ave.	200	1.10	V	35	4.3	27.51	46.8	54	7.2	harmonic
4936	50.53	PK	147	1.71	H	36.3	4.3	27.51	63.62	74	10.38	harmonic
2468	95.87	PK	235	1.23	V	30.3	3.03	27.54	101.66	114	12.34	Fund.
4936	48.43	PK	200	1.10	V	35	4.3	27.51	60.22	74	13.78	harmonic
2468	90.78	PK	149	2.15	H	30.90	3.03	27.54	97.17	114	16.83	Fund.

**3) Spurious Emission in Restricted Bands**

Freq. (MHz)	S.A. Reading (dBμV)	Detector QP/PK/Ave.	Direction Degree	Test Antenna			Cable loss (dB)	Amp. Gain (dB)	Cod. Amp. (dBμV/m)	FCC Part 15.249/15.205	
				Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)
2489	40.95	PK	220	1.63	H	31.1	3.07	33.9	41.22	74	32.78
2490	41.34	PK	308	1.34	V	30.4	3.07	33.9	40.91	74	33.09
2369	19.70	Ave.	75	1.36	H	30.9	3.03	33.9	19.73	54	34.27
2489	19.43	Ave.	220	1.63	H	31.1	3.07	33.9	19.7	54	34.30
2357	20.24	Ave.	122	1.08	V	30.3	3.03	33.9	19.67	54	34.33
2490	19.24	Ave.	308	1.34	V	30.4	3.07	33.9	18.81	54	35.19
2369	34.25	PK	75	1.36	H	30.9	3.03	33.9	34.28	74	39.72
2357	34.19	PK	122	1.08	V	30.3	3.03	33.9	33.62	74	40.38

## FCC§15.215(c) – 20 dB EMISSION BANDWIDTH

### Applicable Standard

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in FCC §15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 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 it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that indicated 20dB bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2010-11-11	2011-11-10
Mini-Circuits	Amplifier	ZVA-213+	T-E27H	2011-03-08	2012-03-07
Sunol Sciences	Horn Antenna	DRH-118	A052604	2011-05-05	2012-05-04

\* **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 Data

#### Environmental Conditions

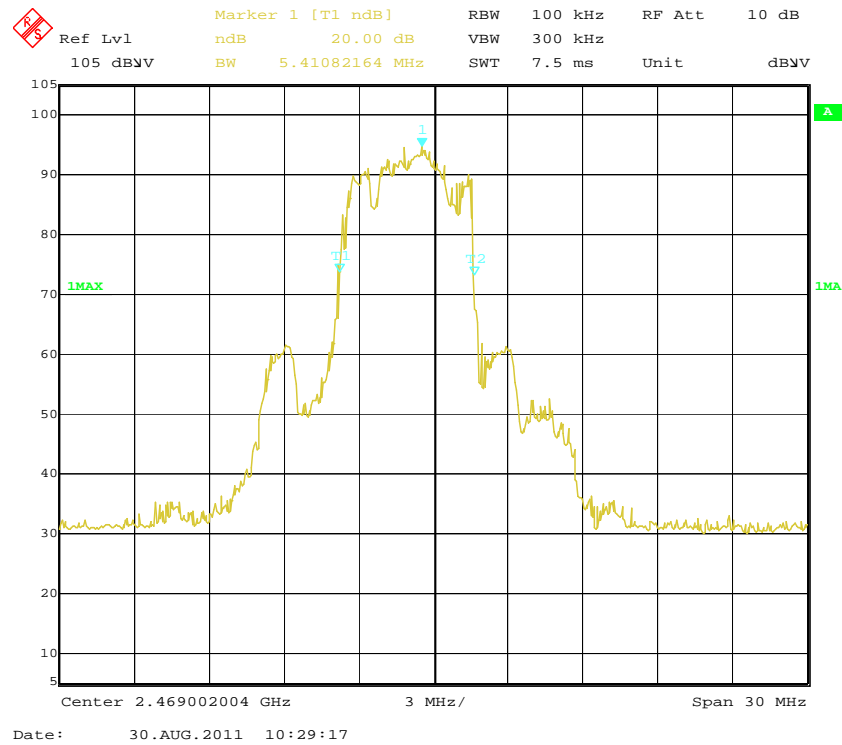
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

\*The testing was performed by Eric Lee on 2011-08-30.

Test Mode: Transmitting



Pleas refer to the following plots.



## **PRODUCT SIMILARITY DECLARATION LETTER**

---

Shenzhen Gospell Smarthome Electronic Co., LTD  
5Floor/Block 2, Vision (SZ) Park, Hi-Tech Industrial Park, Shenzhen, China  
Tel: +86+0755-29980909-8090 Fax: +755 - 27478338  
Date: 2011.08.31

### **Product Similarity Declaration**

To Whom It May Concern,

We, Shenzhen Gospell Smarthome Electronic Co., LTD hereby declare that our WIRELESS INSPECTION CAMERA Model Number:GB8843、GB8846、GB8849 are electrically identical with the Model Number GB8842 that was certified by BACL. They are just different in model names, due to the length of tube.

Please contact me if you have any question.

Signature: 

Thomas Bai  
Manager

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