



## SGS-CSTC Standards Technical Services Ltd.

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**FEDERAL COMMUNICATIONS COMMISSION**  
Registration number: 282399

Report No.: SZEMO081206076RFF  
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FCC ID: TW5GT4065

# TEST REPORT

**Application No. :** SZEMO081206076RF  
**Applicant/ Manufacturer/ Factory:** Shenzhen Gospel Smarthome Electronic Co., LTD.  
**FCC ID:** TW5GT4065  
**Fundamental Carrier Frequency :** 2.414GHz to 2.468GHz  
**Equipment Under Test (EUT):**  
Name: 2.4G Wireless Rearview Camera and Receiver  
Model: GT4065  
Trade Mark: Goscam  
**Standards:** FCC PART 15: 2008  
**Date of Receipt:** 10 December 2008  
**Date of Test:** 10 December 2008 to 12 March 2009  
**Date of Issue:** 21 March 2009

<b>Test Result :</b>	<b>PASS *</b>
----------------------	---------------

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo  
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Flie Strength of Fundamental	FCC PART 15 : 2008	Section 15.249 (a)	PASS
Flie Strength of Harmonics or other Frequency Emission	FCC PART 15 : 2008	Section 15.249 (a) Section 15.209/15.205	PASS
Occupied Bandwidth	FCC PART 15 : 2008	Section 15.249	PASS

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## **4 General Information**

### **4.1 Client Information**

Applicant Name: Shenzhen Gospell Smarthome Electronic Co., LTD.  
Applicant Address: West, 5F/ Block2, Vision(SZ) Park, South Hi-Tech, Industrial Park,  
Nanshan, Shenzhen, P.R.China  
Manufacturer/ Factory Address: 3F/ Block A2, Xinghong Industrial Park, Fenghuanggang, Xixiang Town,  
Baoan, District, Shenzhen, P.R.China

### **4.2 General Description of E.U.T**

Product Name: 2.4G Wireless Rearview Camera and Receiver  
Model: GT4065  
Power Supply: DC 12V  
Power Cord: N/A-

### **4.3 Description of Support Units**

The EUT was tested as an independent unit: a 2.4G Wireless Rearview Camera and Receiver

### **4.4 Standards Applicable for Testing**

The customer requested FCC tests for a 2.4G Wireless Rearview Camera and Receiver  
The standard used was FCC PART 15, SUBPART C ( 2008) section 15.249.

### **4.5 Test Location**

All tests were performed at:  
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, District Shenzhen, China 518057  
Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594  
No tests were sub-contracted.

### **4.6 Other Information Requested by the Customer**

None.

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#### **4.7 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200811-0**  
SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200811-0. Effective through December 31, 2008.
- **ACA**  
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**  
The 3m Semi-anechoic chamber and Shielded Room (11.5m x 4m x 4m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1599 and C-1706 respectively.  
Date of Registration: June 01, 2005. Valid until February 22, 2008
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**  
Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**  
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01: 2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 282399**  
SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorised test laboratory for the DoC process.
- **Industry Canada (IC)**  
The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5169.

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## 5 Test Results

### 5.1 Test Instruments

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2007	15-06-2009
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	12-12-2008	11-12-2009
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2008	17-06-2009
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2008	11-08-2009
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2008	17-06-2009
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2008	11-08-2009
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2008	11-08-2009
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2008	17-06-2009
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33- 18002650-30- 8P-44	SEL0080	18-06-2008	17-06-2009
11	Band filter	Amindeon	82346	SEL0094	18-06-2008	17-06-2009
12	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	15-06-2008	14-06-2009
13	UNIVERSAL RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMU200	SEL0091	18-06-2008	17-06-2009

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### 5.2 E.U.T. Operation

Input voltage:	DC 12V
Operating Environment:	
Temperature:	24°C
Humidity:	50 % RH
Atmospheric Pressure:	1010 mbar
EUT Operation:	Test in transmitting mode:
	1. For channel 1: 2.414GHz.
	2. For channel 3: 2.450GHz.
	3. For channel 4: 2.468GHz.

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## 5.3 Test Procedure & Measurement Data

### 5.3.1 Radiated Emissions

#### 5.3.1.1 Test in transmitting mode

Test Requirement: FCC Part15.249,15.209 and 15.205

Test Method: ANSI C63.4:2003

Measurement Distance: 3m (Semi-Anechoic Chamber)

Frequency range 30 MHz – 25GHz

Test instrumentation resolution bandwidth

Frequency Range	Detector	RBW/VBW
30MHz to 1000MHz	Quasi-Peak	120KHz/300KHz
1GHz to 25GHz	Peak	1MHz/3MHz
	Average	1MHz/10Hz

Operation: Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

The fundamental frequency of the EUT is 2.414GHz to 2.468GHz

The limit for average field strength dBuV/m for the fundamental frequency = 94.0 dBuV/m.

No fundamental is allowed in the restricted bands.

#### Test Procedure:

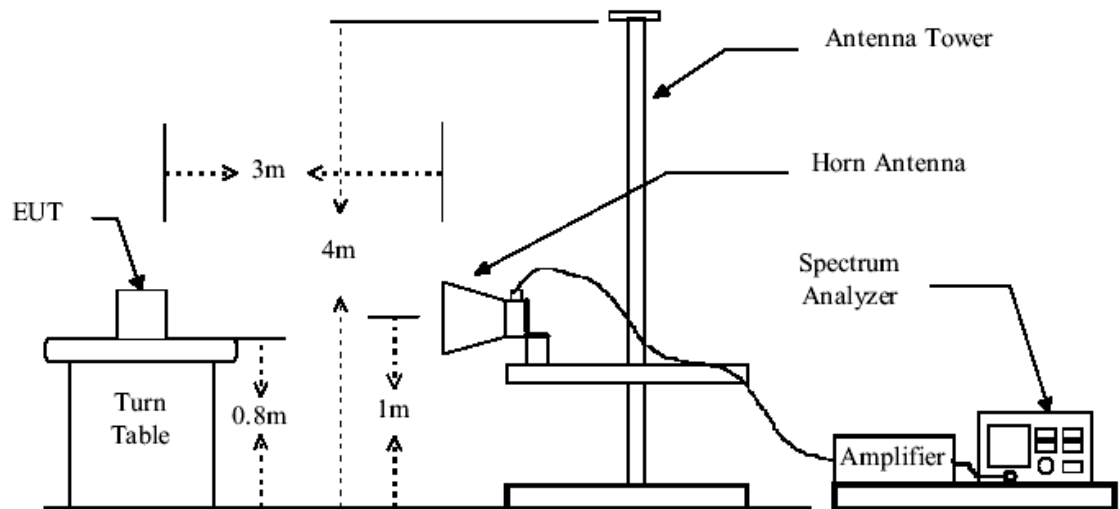
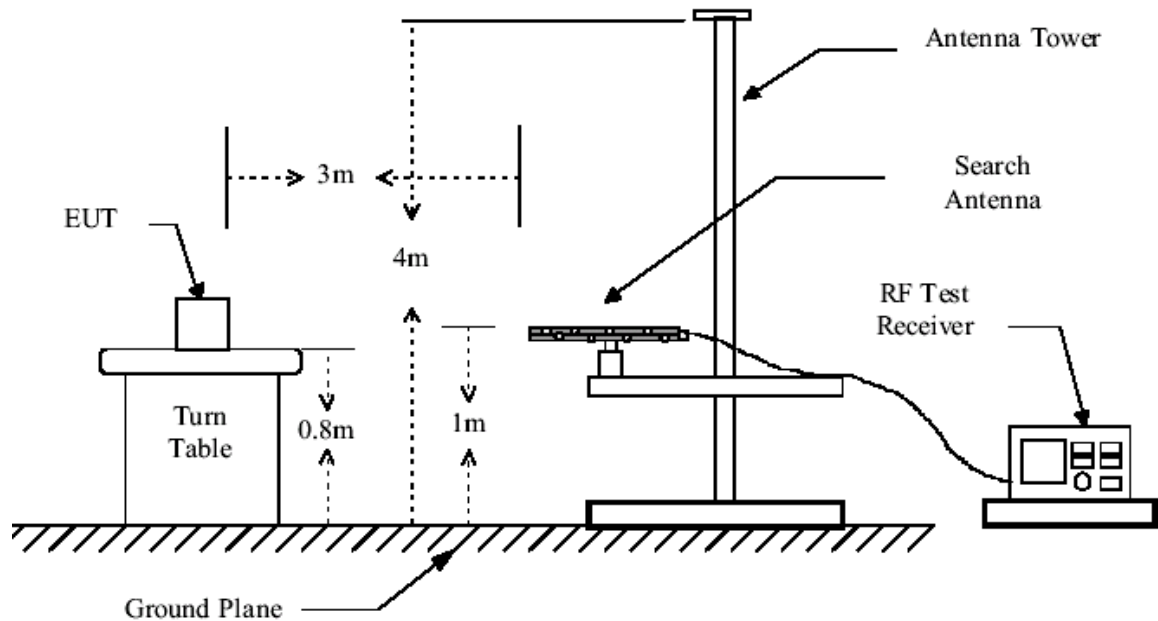
1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
- 7 The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

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### Test Configuration:



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The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

The following test results were performed on the EUT:

1. The following test results were performed at 30MHz—1GHz

Model GB6904

Vertical:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
40.670	0.62	10.93	28.09	42.20	25.66	40.00	-14.34
140.580	1.30	8.15	27.52	46.21	28.14	43.50	-15.36
183.260	1.37	9.97	27.24	46.46	30.56	43.50	-12.94
191.990	1.39	10.12	27.20	48.05	32.36	43.50	-11.14
277.350	1.80	12.89	26.80	39.90	27.79	46.00	-18.21
479.110	2.52	17.80	27.65	38.85	31.52	46.00	-14.48

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
122.150	1.26	7.85	27.67	46.88	28.32	43.50	-15.18
140.580	1.30	8.15	27.52	55.46	37.39	43.50	-6.11
183.260	1.37	9.97	27.24	53.41	37.51	43.50	-5.99
193.608	1.39	10.14	27.19	53.00	37.34	43.50	-6.16
277.350	1.80	12.89	26.80	51.21	39.10	46.00	-6.90
381.140	2.15	16.08	27.29	44.88	35.82	46.00	-10.18

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Model GL4013

Vertical:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
40.670	0.62	10.93	28.09	44.43	27.89	40.00	-12.11
51.340	0.80	7.89	28.10	42.25	22.84	40.00	-17.16
140.580	1.30	8.15	27.52	48.62	30.55	43.50	-12.95
191.990	1.39	10.12	27.20	48.18	32.49	43.50	-11.01
211.390	1.47	10.81	27.09	44.55	29.74	43.50	-13.76
277.350	1.80	12.89	26.80	42.15	30.04	46.00	-15.96

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
140.580	1.30	8.15	27.52	54.77	36.70	43.50	-6.80
183.260	1.37	9.97	27.24	53.63	37.73	43.50	-5.77
193.554	1.39	10.14	27.19	54.40	38.74	43.50	-4.76
225.940	1.55	11.53	27.02	52.08	38.14	46.00	-7.86
277.350	1.80	12.89	26.80	53.91	41.80	46.00	-4.20
381.140	2.15	16.08	27.29	44.40	35.34	46.00	-10.66

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2. The following test results were performed at above 1GHz

For 2414MHz:

Harmonics & Spurious Emissions

Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamplifier factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	polarization
2414	4.99	32.25	0	40.99	78.23	114	-35.77	Vertical
2390	4.97	32.24	0	19.73	56.94	74.00	-17.06	Vertical
2400	4.97	32.25	0	21.41	58.63	74.00	-15.37	Vertical
4828	6.62	34.03	45.40	47.15	42.40	74.00	-31.60	Vertical
7242	7.62	36.25	44.48	35.27	34.66	74.00	-39.34	Vertical
9656	8.55	37.03	42.17	35.10	38.51	74.00	-35.49	Vertical
12070	10.12	38.84	43.40	34.74	40.30	74.00	-33.70	Vertical
2414	4.99	32.25	0	44.45	81.69	114	32.31	Horizontal
2390	4.97	32.24	0	20.29	57.5	74.00	-16.50	Horizontal
2400	4.97	32.25	0	20.66	57.88	74.00	-16.12	Horizontal
4828	6.62	34.03	45.40	46.40	41.65	74.00	-32.35	Horizontal
7242	7.62	36.25	44.48	36.62	36.01	74.00	-37.99	Horizontal
9656	8.55	37.03	42.17	34.91	38.32	74.00	-35.68	Horizontal
12070	10.12	38.84	43.40	33.34	38.90	74.00	-35.10	Horizontal

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### Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamplifier factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	polarization
2414	4.99	32.25	0	20.92	58.16	94	-35.84	Vertical
2390	4.97	32.24	0	8.62	45.83	54.00	-8.17	Vertical
2400	4.97	32.25	0	8.94	46.16	54.00	-7.84	Vertical
4828	6.62	34.03	45.40	27.97	23.22	54.00	-30.78	Vertical
7242	7.62	36.25	44.48	24.34	23.73	54.00	-30.27	Vertical
9656	8.55	37.03	42.17	23.78	27.19	54.00	-26.81	Vertical
12070	10.12	38.84	43.40	22.39	27.95	54.00	-26.05	Vertical
2414	4.99	32.25	0	24.52	61.76	94	-32.24	Horizontal
2390	4.97	32.24	0	8.61	45.82	54.00	-8.18	Horizontal
2400	4.97	32.25	0	8.92	46.14	54.00	-7.86	Horizontal
4828	6.62	34.03	45.40	28.55	23.80	54.00	-30.20	Horizontal
7242	7.62	36.25	44.48	24.41	23.80	54.00	-30.20	Horizontal
9656	8.55	37.03	42.17	23.94	27.35	54.00	-26.65	Horizontal
12070	10.12	38.84	43.40	22.51	28.07	54.00	-25.93	Horizontal

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For 2450MHz:

. Harmonics & Spurious Emissions

### Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamplifier factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	polarization
2450	5.03	32.27	0	42.72	80.02	114	-33.98	Vertical
4899	6.65	34.02	45.42	48.02	43.27	74.00	-30.73	Vertical
4900	6.65	34.02	45.42	45.74	40.99	74.00	-33.01	Vertical
7350	7.57	36.06	44.35	34.22	33.50	74.00	-40.50	Vertical
9800	8.68	37.14	42.03	32.66	36.45	74.00	-37.55	Vertical
2450	5.03	32.27	0	40.85	78.15	114	-35.85	Horizontal
4899	6.65	34.02	45.42	47.26	42.51	74.00	-31.49	Horizontal
4900	6.65	34.02	45.42	43.24	38.49	74.00	-35.51	Horizontal
7350	7.57	36.06	44.35	32.99	32.27	74.00	-41.73	Horizontal
9800	8.68	37.14	42.03	32.62	36.41	74.00	-37.59	Horizontal

### Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamplifier factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	polarization
2450	5.03	32.27	0	27.89	65.19	94	-28.81	Vertical
4900	6.65	34.02	45.42	28.29	23.54	54.00	-30.46	Vertical
7350	7.57	36.06	44.35	22.17	21.45	54.00	-32.55	Vertical
9800	8.68	37.14	42.03	21.17	24.96	54.00	-29.04	Vertical
12250	10.18	38.95	43.63	20.96	26.46	54.00	-27.54	Vertical
2450	5.03	32.27	0	19.18	56.48	94	-37.52	Horizontal
4900	6.65	34.02	45.42	28.22	23.47	54.00	-30.53	Horizontal
7350	7.57	36.06	44.35	22.21	21.49	54.00	-32.51	Horizontal
9800	8.68	37.14	42.03	21.14	24.93	54.00	-29.07	Horizontal
12250	10.18	38.95	43.63	21.01	26.51	54.00	-27.49	Horizontal

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For 2468MHz:

Harmonics & Spurious Emissions

Peak Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamplifier factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	polarization
2468	5.06	32.28	0	34.84	72.18	114	-41.82	Vertical
2483.5	5.08	32.29	0	19.47	56.84	74.00	-17.16	Vertical
2500	5.1	32.3	0	19.69	57.09	74.00	-16.91	Vertical
4936	6.67	34.01	45.44	39.47	34.71	74.00	-39.29	Vertical
7404	7.54	35.95	44.30	38.15	37.34	74.00	-36.66	Vertical
9872	8.73	37.19	41.97	32.62	36.57	74.00	-37.43	Vertical
12340	10.21	38.99	43.74	35.92	41.38	74.00	-32.62	Vertical
2468	5.06	32.28	0	32.19	69.53	114	-44.47	Horizontal
2483.5	5.08	32.29	0	19.97	57.34	74.00	-16.66	Horizontal
2500	5.1	32.3	0	19.96	57.36	74.00	-16.64	Horizontal
4936	6.67	34.01	45.44	41.71	36.95	74.00	-37.05	Horizontal
7404	7.54	35.95	44.30	39.95	39.14	74.00	-34.86	Horizontal
9872	8.73	37.19	41.97	32.52	36.47	74.00	-37.53	Horizontal
12340	10.21	38.99	43.74	35.34	40.80	74.00	-33.20	Horizontal

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### Average Measurement

Frequency (MHz)	Cable loss (dB)	Antenna factors (dB/m)	Preamplifier factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over limit	polarization
2468	5.06	32.28	0	14.45	51.79	94	-42.21	Vertical
2483.5	5.08	32.29	0	8.22	45.59	54.00	-8.41	Vertical
2500	5.1	32.3	0	8.25	45.65	54.00	-8.35	Vertical
4936	6.67	34.01	45.44	27.84	23.08	54.00	-30.92	Vertical
7404	7.54	35.95	44.30	25.82	25.01	54.00	-28.99	Vertical
9872	8.73	37.19	41.97	21.05	25.00	54.00	-29.00	Vertical
12340	10.21	38.99	43.74	24.23	29.69	54.00	-24.31	Vertical
2468	5.06	32.28	0	15.92	53.26	94	-40.74	Horizontal
2483.5	5.08	32.29	0	8.24	45.61	54.00	-8.39	Horizontal
2500	5.1	32.3	0	8.25	45.65	54.00	-8.35	Horizontal
4936	6.67	34.01	45.44	28.06	23.30	54.00	-30.70	Horizontal
7404	7.54	35.95	44.30	26.05	25.24	54.00	-28.76	Horizontal
9872	8.73	37.19	41.97	20.88	24.83	54.00	-29.17	Horizontal
12340	10.21	38.99	43.74	24.18	29.64	54.00	-24.36	Horizontal

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N/A: refer to remark 1).

Remark:

- 1). For this intentional radiator operates below 10 GHz, the spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the fifth harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 4<sup>th</sup> harmonic.
- 2). According to 15.249 (e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

TEST RESULTS: The unit does meet the FCC requirements.

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### 5.3.2 Occupied Bandwidth

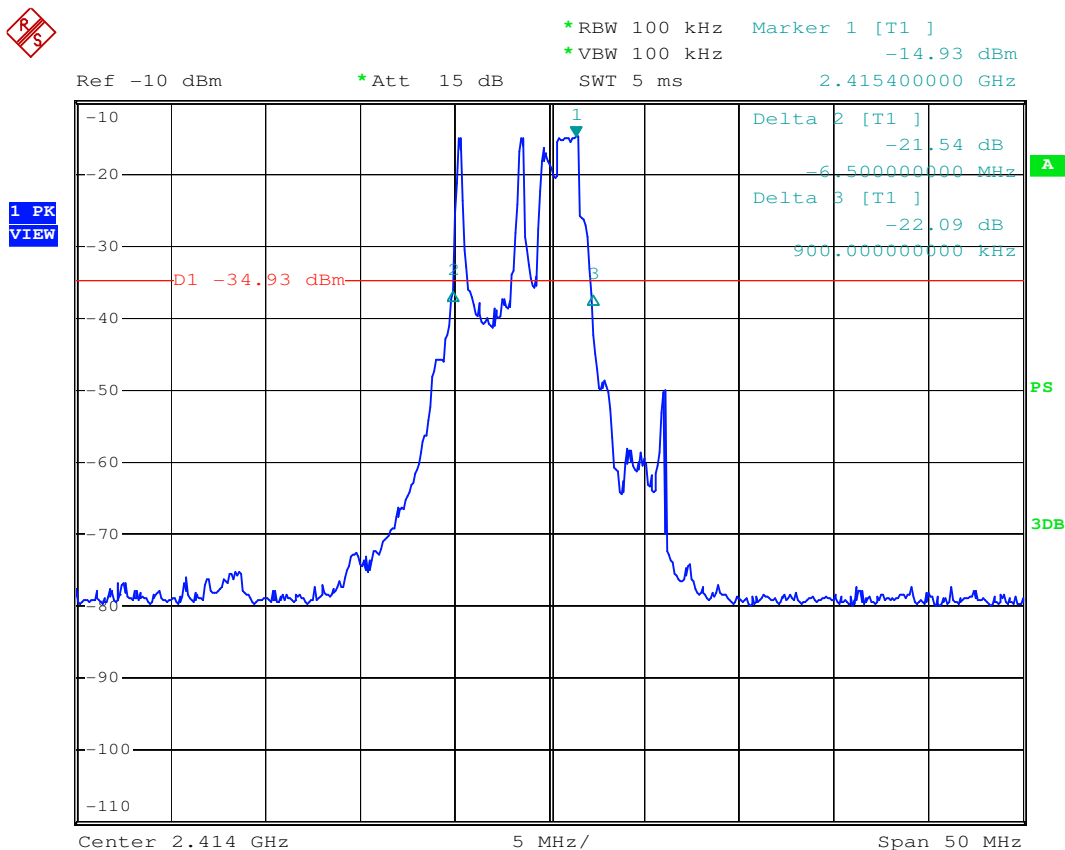
Test Requirement: FCC Part 15.249

Test Method: ANSI C63.4:2003

Operation within the band 2.414 – 2.468GHz

The occupied bandwidth as below:

1. For 2414MHz:



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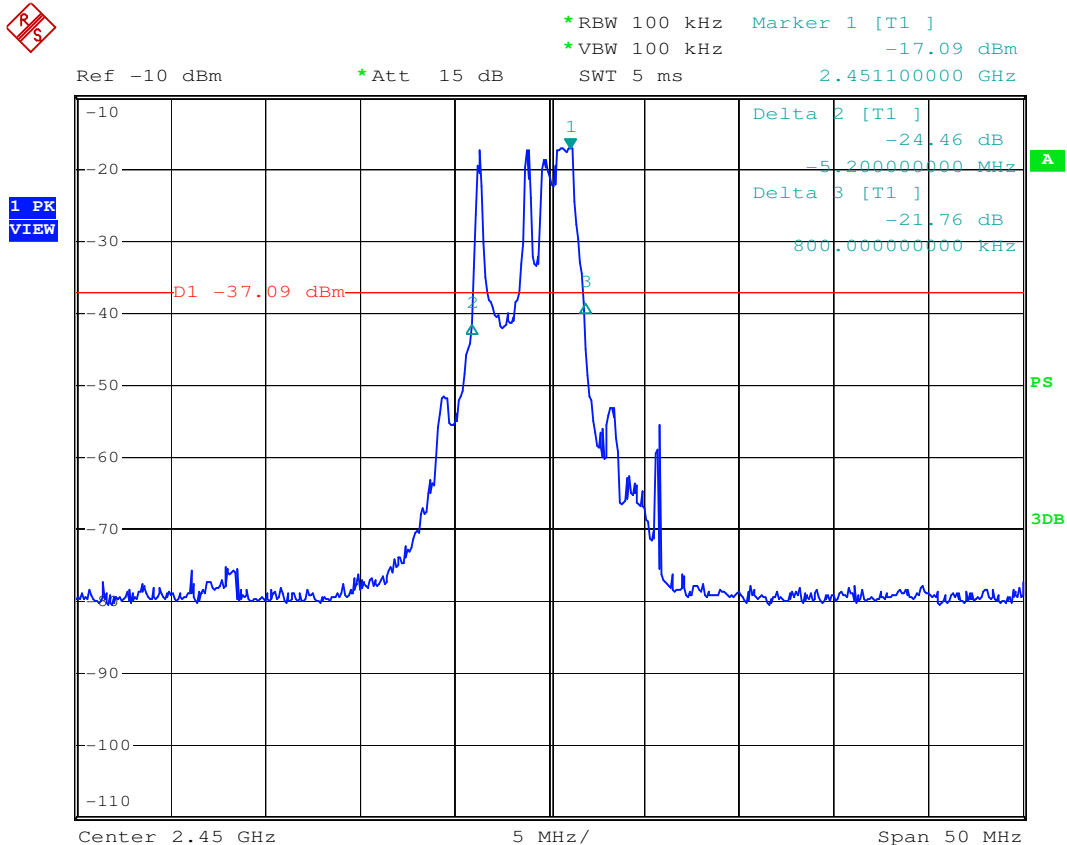


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### 2. For 2450MHz:



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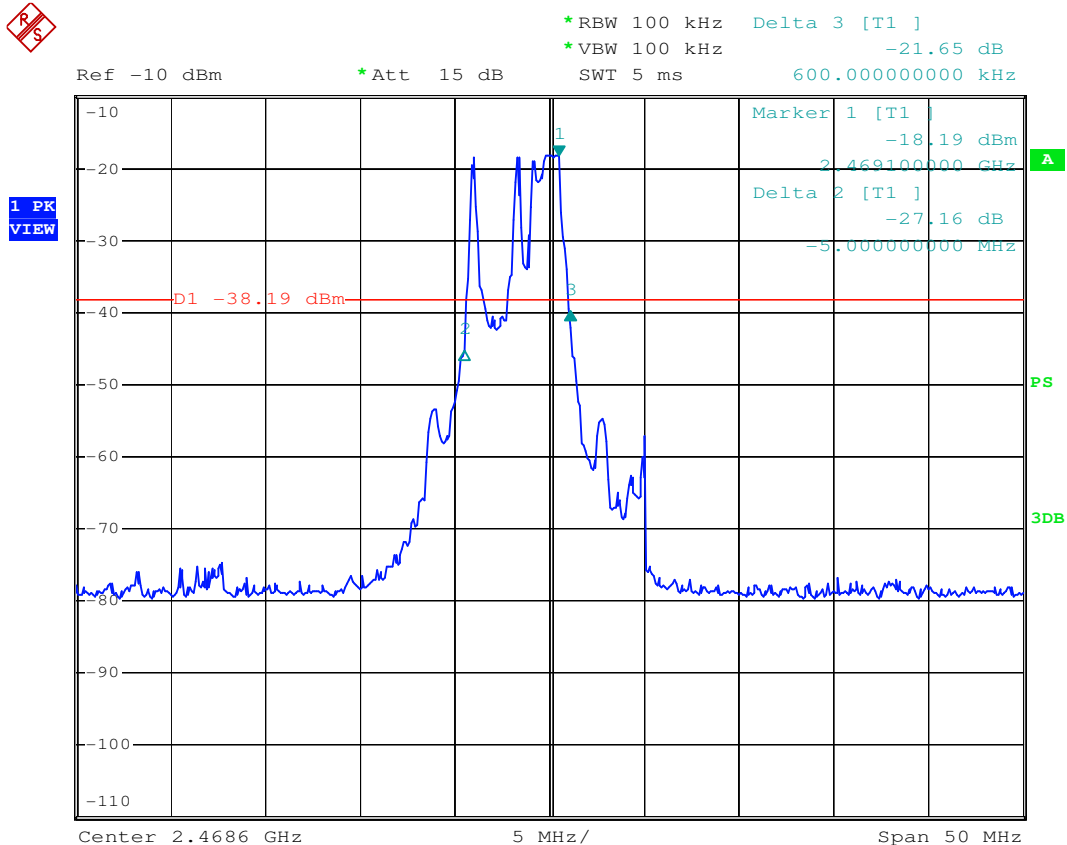


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### 3. For 2468MHz:



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