

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
INTENTIONAL RADIATOR CERTIFICATION TO  
FCC PART 15 SUBPART C REQUIREMENT**

*OF*

**2.4 GHz Wireless Camera and Receiver**

**FCC ID: TW5GP-819T**

**MODEL No.: GP-819T**

**BRAND NAME: GOSCAM**

**REPORT NO: WE06100002**

**ISSUE DATE: Oct 25, 2006**

*Prepared for*

**SHENZHEN GOSPELL SMARTHOME ELECTRONIC CO., LTD  
5/W, BLOCK 2, VISION BUSINESS PARK, SOUTH KEJI ROAD,  
SOUTHERN HI-TECH PARK, NANSHAN,  
SHENZHEN, P.R. CHINA**

*Prepared by*

**SHENZHEN HUATONGWEI INTERNATIONAL  
INSPECTION CO., LTD**

*d.b.a.*

**SHENZHEN HUATONGWEI INTERNATIONAL INSPECTION CO., LTD  
HUATONGWEI BUILDING, KEJI RD. 12 S., HIGH-TECH PARK,  
NANSHAN DISTRICT, SHENZHEN,  
GUANGDONG, P.R.CHINA**

**TEL: 86-755-26748099**

**FAX: 86-755-26748005**

**VERIFICATION OF COMPLIANCE**

Applicant:	Shenzhen Gopell Smarthome Electronic Co., Ltd. 5/W, Block 2, Vision Business park, South Keji Road, Southern Hi-tech Park, Nanshan, Shenzhen, P.R. China
Product Description:	2.4 GHz Wireless Camera and Receiver
Brand Name:	GOSCAM
Model Number:	GP-819T
Serial Number:	N/A
File Number:	WE06100002
Date of Test:	Oct 15, 2006 ~ Oct 20, 2006

**We hereby certify that:**

The above equipment was tested by SHENZHEN HUA TONG WEI INTERNATIONAL INSPECTION CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.249.

The test results of this report relate only to the tested sample identified in this report.

**Approved By**

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**Jimmy Li / Executive Manager**  
**SHENZHEN HUA TONG WEI**  
**INTERNATIONAL INSPECTION CO., LTD**

**Reviewed By**

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**Tracy Qi / Testing Engineer**  
**SHENZHEN HUA TONG WEI**  
**INTERNATIONAL INSPECTION CO., LTD**

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## **1. GENERAL INFORMATION**

### **1.1 Product Description**

The EUT is a short range, lower power, 2.4 GHz Wireless AV Sender designed as an "Input Device". It is designed by way of utilizing the FM modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2.414 GHz, 2.432 GHz, 2.450 GHz, 2.468 GHz
- B). Modulation: FM
- C). Antenna Designation: Non-User Replaceable (Integral without external RF Port)
- D). Power Supply: 8V DC Powered by AC/DC adapter.

### **1.2 Related Submittal(s) / Grant (s)**

This submittal(s) (test report) is intended for FCC ID: TW5GP-819T filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules. The composite system (receiver) is compliance with Subpart B is authorized under a Declaration of Conformity procedure.

### **1.3 Test Methodology**

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

### **1.4 Test Facility**

The fully anechoic chamber test site and conducted measurement facility used to collect the radiated data is located on the address of SHENZHEN HUA TONG WEI INTERNATIONAL INSPECTION CO., LTD Huatongwei Building, Keji Rd. 12 S., High-tech Park, Nan Shan District, Shenzhen, Guangdong, P.R.China

The fully anechoic chamber Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements.

### **1.5 Special Accessories**

Not available for this EUT intended for grant.

## 1.6 Equipment Modifications

Not available for this EUT intended for grant.

## 1.7. Laboratory Accreditations and listings

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

### **NEMKO-Aut. No.: ELA125**

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

### **CNAL-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed and proved to be in compliance with CNAL/AC01: 2003 Accreditation Criteria for Testing and Calibration Laboratories(identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing and Calibration Laboratories.

### **FCC-Registration No.: 662850**

Shenzhen Huatongwei International Inspection 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 662850, November 17,2003.

### **VCCI**

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1920 and C-2067 respectively. Date of Registration: July 28, 2004. Valid time is until November 16,2006.

The Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-175 respectively. Date of Registration: July 28, 2004. Valid time is unit July 27, 2007.

**A2LA-Lab Cert. No. 2243.01**

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 1999 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is from Aug 24, 2005 to Sept 30, 2007

**IC-Registration No.: 5377**

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377 on November 28th, 2005.

**ACA**

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

## **2. SYSTEM TEST CONFIGURATION**

### **2.1 EUT Configuration**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### **2.2 EUT Exercise**

The Transmitter was operated in the normal operating mode. the TX frequency was fixed which was for the purpose of the measurements.

### **2.3 Test Procedure**

#### **2.3.1 Conducted Emissions**

The EUT is placed on support table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

#### **2.3.2 Radiated Emissions**

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

## 2.4 Limitation

### (1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

### (2) Radiated Emission

- a. The field strength of fundamental frequency within this band (section 15.249 frequency operating between 2.4 GHz –2.4835 GHz) shall not exceed 50 millivolts/meter at 3 meters. (93.98 dB $\mu$ V/m at 3m) The field strength of harmonics shall not exceed 500 microvolts/meter at 3 meters.(53.98 dB $\mu$ V/m at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.
- b. The field strength of any emissions which appear outside of this band except harmonics shall be attenuated by at least 50 dB below the fundamental or shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit).as below.

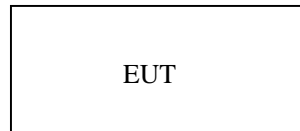
Frequency (MHz)	Field strength $\mu$ V/m	Distance(m)	Field strength at 3m dB $\mu$ V/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

- Remark:
1. Emission level in dBuV/m=20 log ( $\mu$ V/m)
  2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
  3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
  4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of §15.205, then the general radiated emission limits in § 15.209 applies.



## 2.5 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



### 3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	Compliant
§15.249	Radiated Emission	Compliant
§15.249	26 dB Bandwidth	Compliant

### 4. DESCRIPTION OF TEST MODES

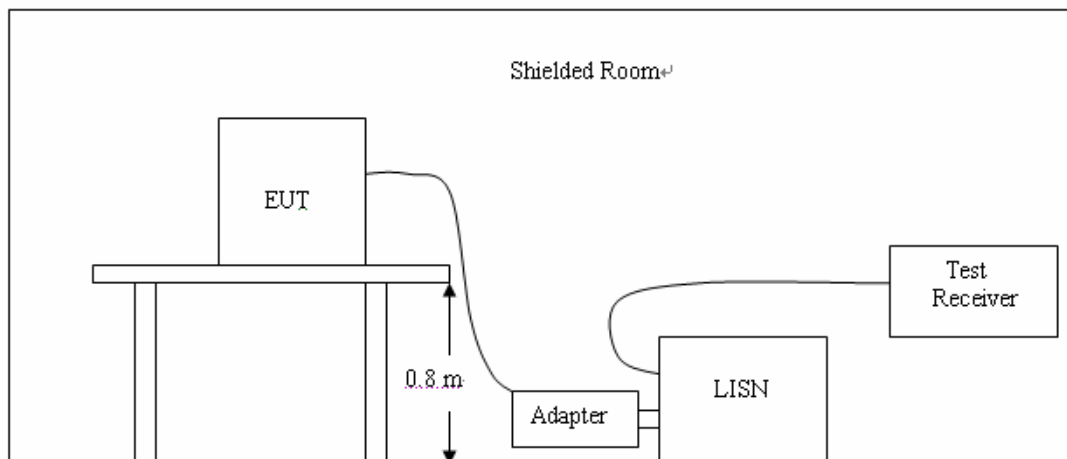
1. The EUT (2.4 GHz Wireless Camera) has been tested under normal operating condition.
2. The EUT stay in continuous transmitting mode for testing. Three channels (The top, The middle, The bottom) are chosen for testing.

## 5. CONDUCTED EMISSIONS TEST

### 5.1 Measurement Procedure:

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT received DC8V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

### 5.2 Test SET-UP (Block Diagram of Configuration)



**5.3 Measurement Equipment Used:**

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI TEST RECEIVER	ROHDE &SCHWARZ	ESCS30	100038	2005/11	2006/11
ARTIFICIAL MAINS	ROHDE &SCHWARZ	ESH2-Z5	100028	2005/11	2006/11
PULSE LIMITER	ROHDE &SCHWARZ	ESHSZ2	100044	2005/11	2006/11
EMI TEST SOFTWARE	ROHDE &SCHWARZ	ES-K1 V1.71	N/A	2005/11	2006/11

**5.4 Measurement Results:**

(The chart below shows the highest readings taken from the final data)

FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.168	36.80	---	---	65.00	55.00	---	-18.20	L1
Others	---					---		L1
0.168	37.50	---	---	65.00	55.00	---	-17.50	L2
Others	---					---		L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

**\*\*NOTE:** “---” denotes the peak emission level was or more than 2dB below the Average limit, so no re-check anymore.

“Others” denotes the reading of emissions are attenuated more than 20dB below the permissible limits or the emission is too small to be measured.

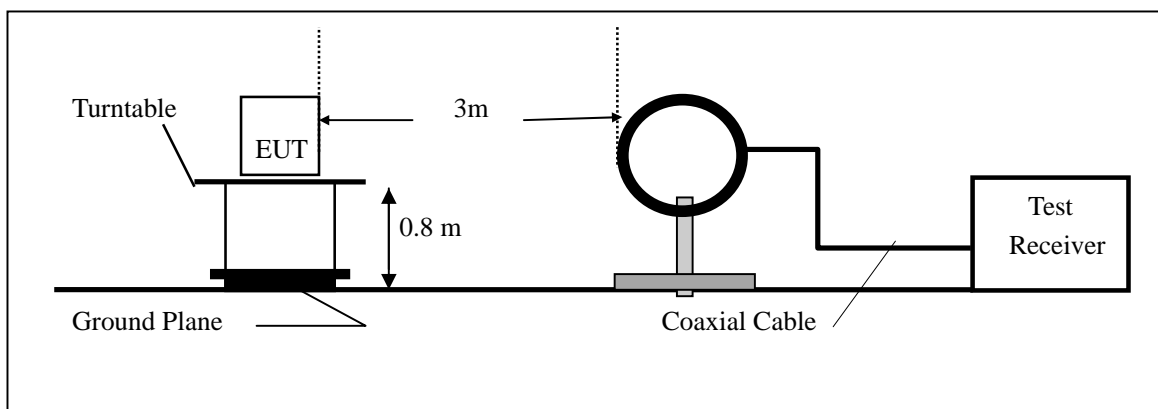
## 6. RADIATED EMISSION TEST

### 6.1 Measurement Procedure

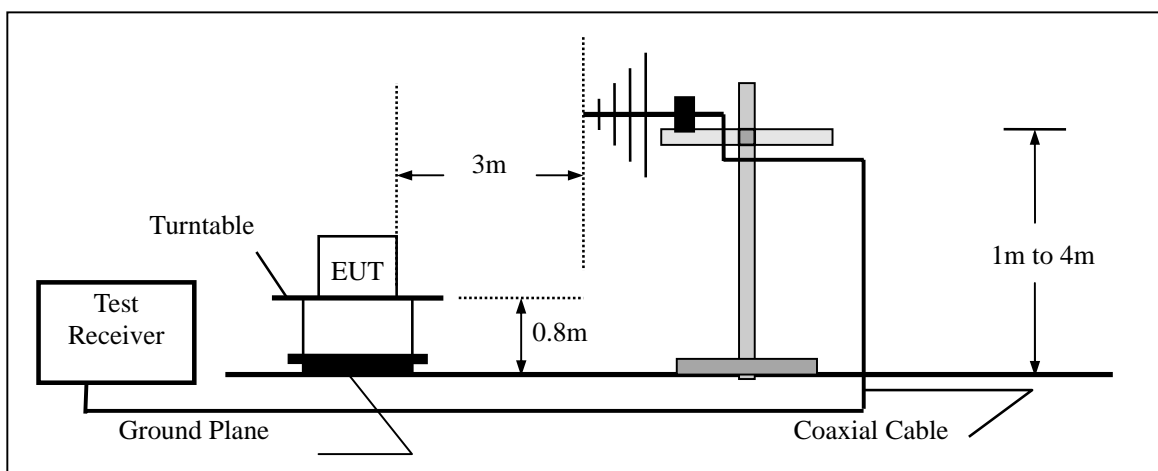
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

### 6.2 Test SET-UP (Block Diagram of Configuration)

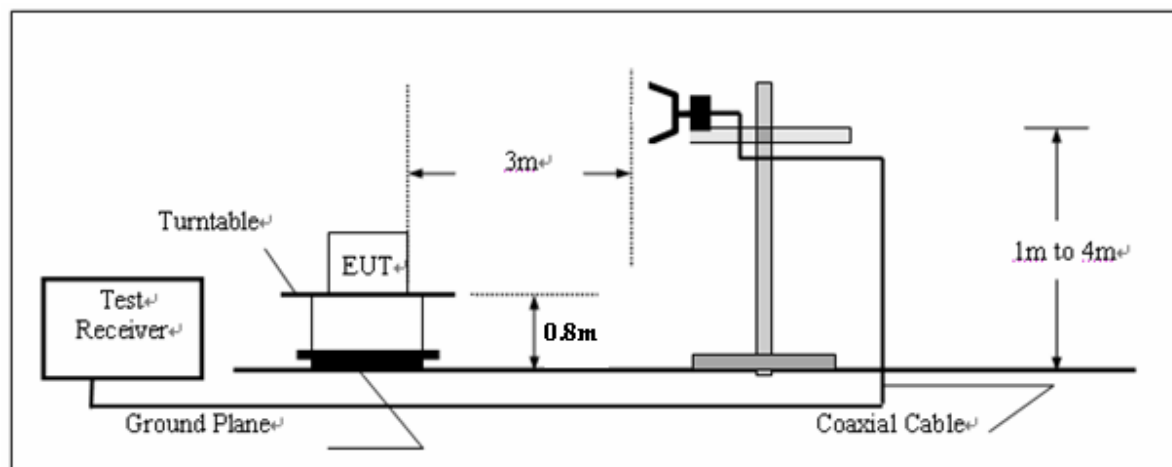
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



## (C) Radiated Emission Test Set-Up, Frequency above 1000MHz



## 6.3 Measurement Equipment Used:

3/5 Anechoic Chamber Radiation Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
ULTRA-BROADBAND ANTENNA	ROHDE &SCHWARZ	HL562	100015	2005/11	2006/11
EMI TEST RECEIVER	ROHDE &SCHWARZ	ESI 26	100009	2005/11	2006/11
RF TEST PANEL	ROHDE &SCHWARZ	TS / RSP	335015/ 0017	N/A	N/A
TURNTABLE	ETS	2088	2149	N/A	N/A
ANTENNA MAST	ETS	2075	2346	N/A	N/A
HORN ANTENNA	ROHDE &SCHWARZ	HF906	100039	2005/11	2006/11
EMI TEST SOFTWARE	ROHDE &SCHWARZ	ES-K1 V1.71	N/A	2005/11	2006/11

## 6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

## 6.5 Measurement Results

Operation Mode: Transmitting Mode On Top Channel Test Date : Oct 17,2006  
 Fundamental 2468 MHz Test By: Tracy Qi  
 Frequency:  
 Temperature : 23 °C Humidity : 53 %  
 Judgment: Passed by -11.00 dB at 105.81 MHz Ant.Pol. Hor

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBUV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBUV/m)	Limit3m (dBUV/m)	Safe Margin (dB)	Note
2468	V	Peak	75.90	-3.30	72.60	93.98	-21.38	F
2468	H	Peak	76.10	-3.30	72.80	93.98	-21.18	F
4936	V	Peak	47.40	3.80	51.20	73.98	-22.78	H
4936	H	Peak	49.30	3.80	53.10	73.98	-20.88	H
7404	V		---					H
7404	H		---					H
105.81	H	Peak	20.70	11.80	32.50	43.50	-11.00	
150.52	V	Peak	20.30	10.90	31.20	43.50	-12.30	
Others			---					

### Remark:

- (1) Measuring frequencies from 30 MHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz

**Shenzhen Huatongwei International Inspection Co., Ltd**

REPORT NO: WE06100002

FCC ID: TW5GP-819T

DATE: 10/25/2006

Operation Mode: Transmitting Mode On Middle Channel Test Date : Oct 17, 2006

Fundamental 2432 MHz

Test By: Tracy Qi

Frequency:

Temperature : 23 °C

Humidity : 53 %

 Judgement: Passed by -13.60 dB at 158.30 MHz Ant.Pol. Vertical

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBUV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBUV/m)	Limit3m (dBUV/m)	Safe Margin (dB)	Note
2432	V	Peak	75.80	-3.40	72.40	93.98	-21.58	F
2432	H	Peak	77.20	-3.40	73.80	93.98	-20.18	F
4864	V	Peak	48.00	3.90	51.90	73.98	-22.08	H
4864	H	Peak	48.60	3.90	52.50	73.98	-21.48	H
7296	V		---					H
7296	H		---					H
158.30	H	Peak	15.30	10.80	26.10	43.50	-17.40	
158.30	V	Peak	19.10	10.80	29.90	43.50	-13.60	
Others			---					

**Remark:**

- (1) Measuring frequencies from 30 MHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz



Operation Mode: Transmitting Mode On Bottom Channel Test Date : Oct 17,2006  
 Fundamental 2414 MHz Test By: Tracy Qi  
 Frequency:  
 Temperature : 23 °C Humidity : 53 %  
 Judgement: Passed by -12.30 dB at 150.52 MHz Ant.Pol. Vertical

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBUV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBUV/m)	Limit3m (dBUV/m)	Safe Margin (dB)	Note
2414	V	Peak	75.70	-3.50	72.20	93.98	-21.78	F
2414	H	Peak	75.80	-3.50	72.30	93.98	-21.68	F
4828	V	Peak	48.80	3.60	52.40	73.98	-21.58	H
4828	H	Peak	49.60	3.60	53.20	73.98	-20.78	H
7242	V		---					H
7242	H		---					H
150.52	H	Peak	16.20	10.90	27.10	43.50	-16.40	
150.52	V	Peak	20.30	10.90	31.20	43.50	-12.30	
Others			---					

## Remark:

- (1) Measuring frequencies from 30 MHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver was 120KHz for measuring from 30 MHz to 1 GHz and 1 MHz for measuring above 1 GHz

## 7. OCCUPIED BANDWIDTH

### 7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 1MHz.
4. Set SPA Max hold. Mark peak, -26dB.

### 7.2 Test SET-UP (Block Diagram of Configuration)

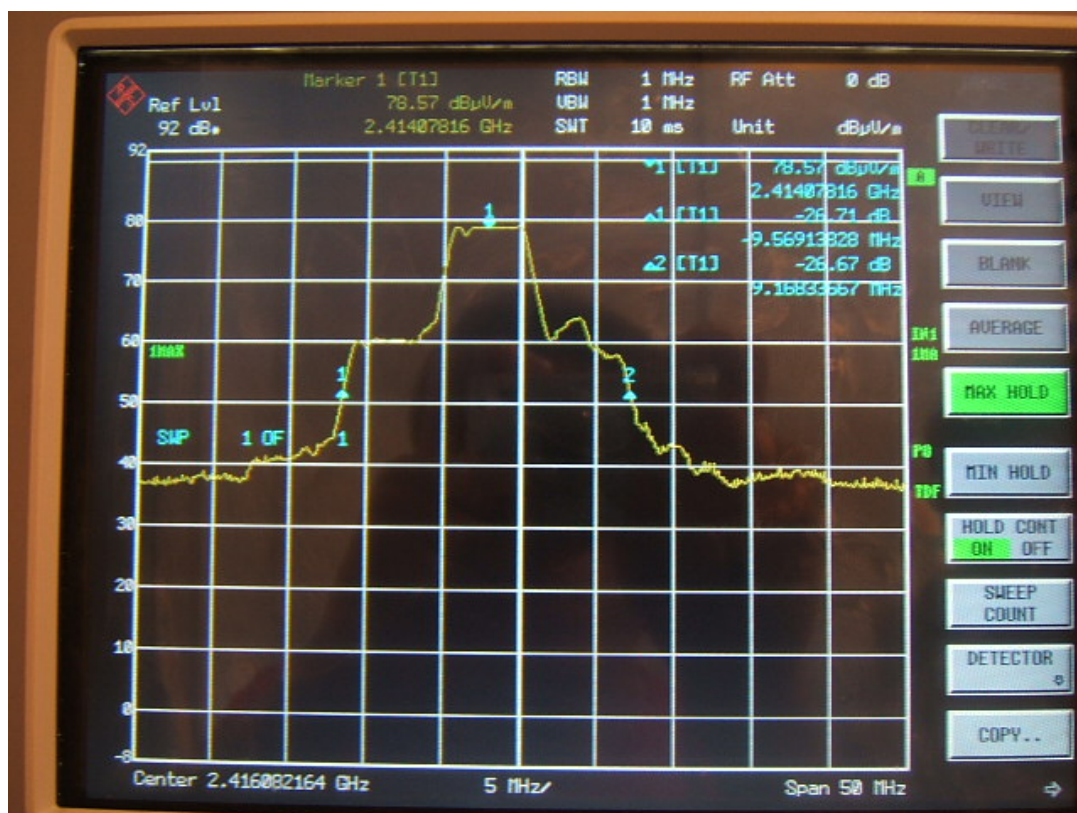
Same as 4.2 Radiated Emission Measurement.

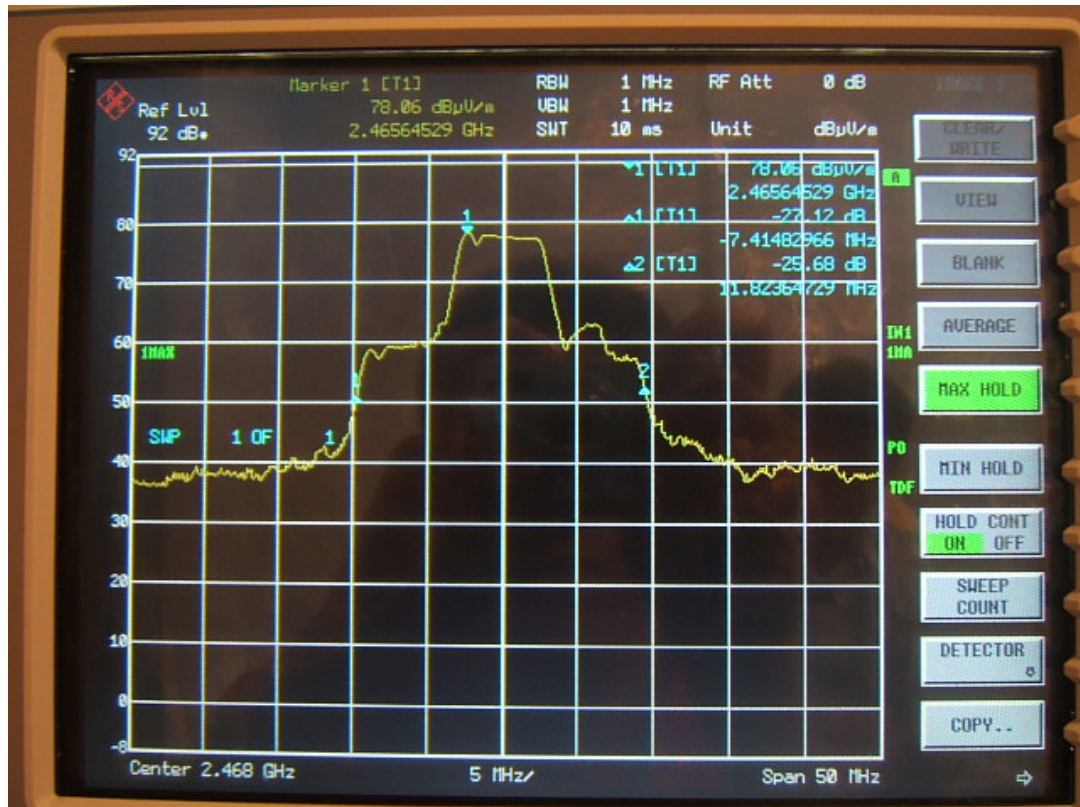
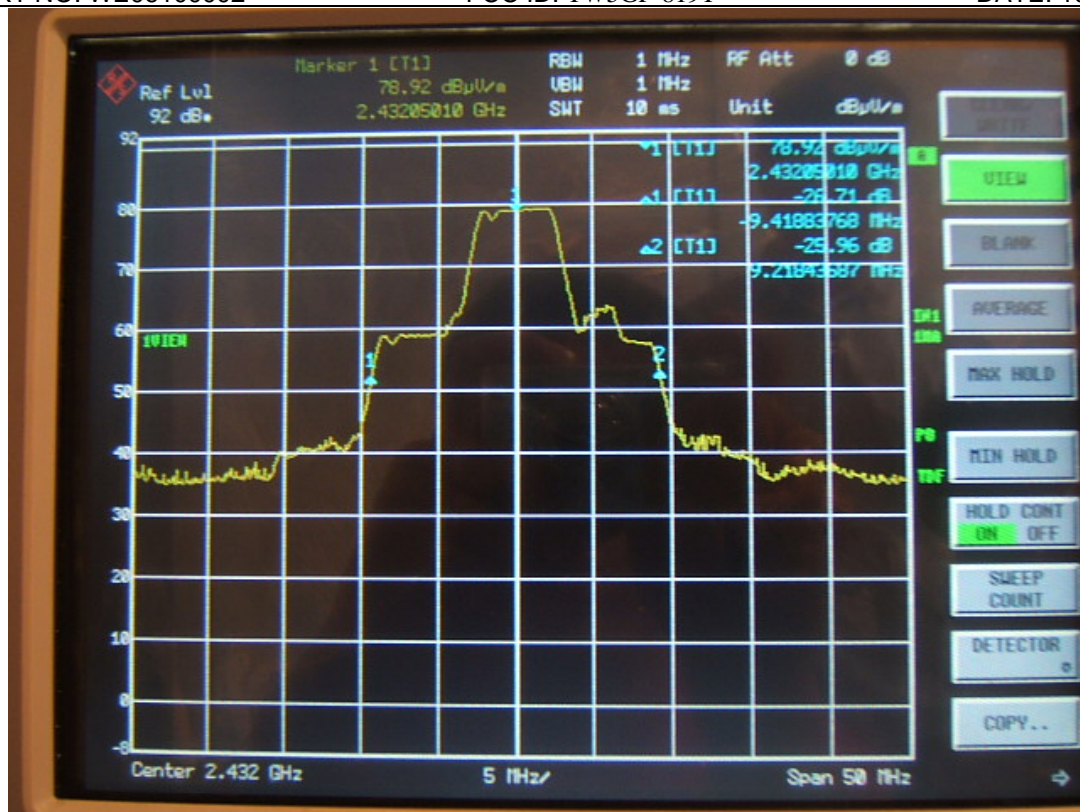
### 7.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

### 7.4 Measurement Results:

#### 26 dB Bandwidth Test Plot:



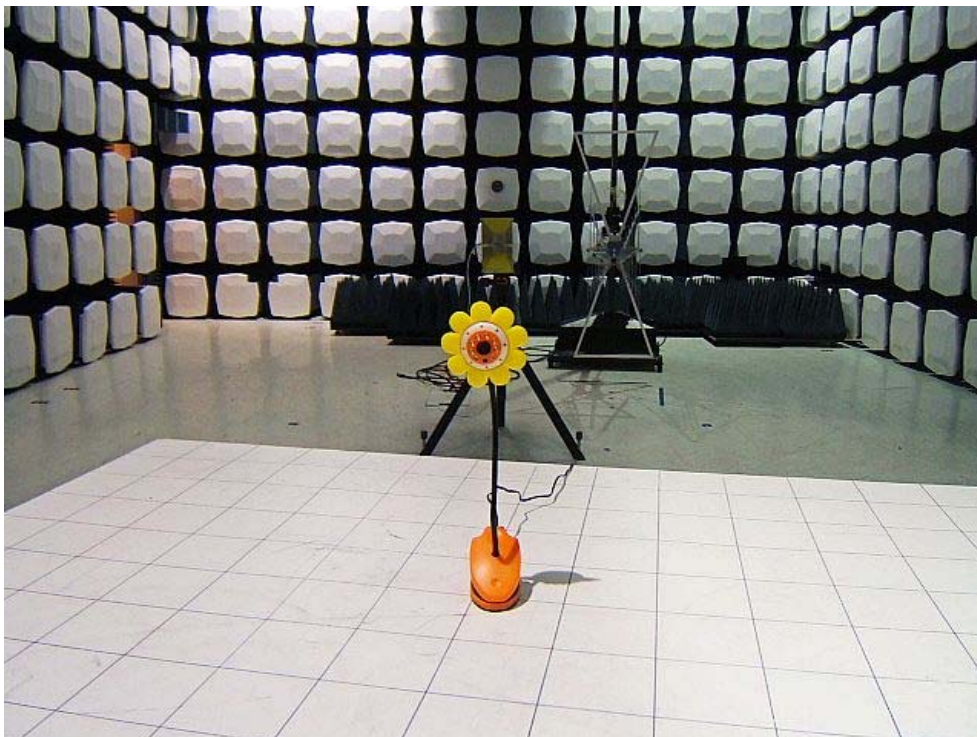
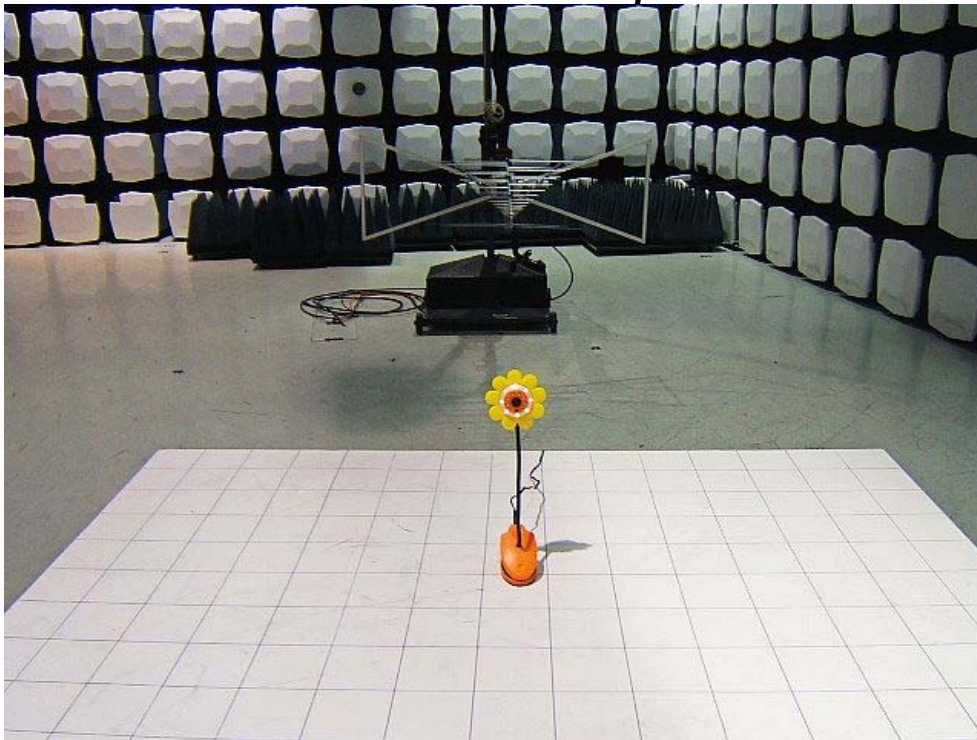


## **APPENDIX 1**

### **PHOTOGRAPHS OF SET UP**



***Radiated Emission Setup Photo***



***Conducted Emission Setup Photo***



## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**

**GP-819T**





