

EMC TEST REPORT

For

REMOTE CONTROLLER

Model Number: EG-RC600

FCC ID: XAQEG-RC600

Report Number : WT098000840

Test Laboratory	:	Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory Guangdong EMC Compliance Test Center
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TEST REPORT DECLARATION

Applicant : PV Supa Inc.
Address : 3200 West Story Road Suite 101 Irving, TX 75038 U.S.A.
Manufacturer : Shenzhen ronghua electric Co., Ltd
Address : 3rd floor, 524th building, Bagualing, Futian, Shenzhen
EUT Description : REMOTE CONTROLLER
Model Number : EG-RC600
FCC ID : XAQEG-RC600

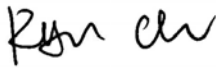
Test Standards:

FCC Part 15 15.35,15.203,15.205,15.207 15.209, 15.223

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. 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 FCC Rules Part 15.35,15.203,15.205,15.207 15.209, 15.223.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by:



(Ryan Chen)

Date:

Apr.10,2009

Checked by:



(Dewelly Yang)

Date:

Apr.10,2009

Approved by:



(Peter Lin)

Date:

Apr.10,2009

1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Conducted Disturbance	15.207	N/A
Occupied Bandwidth	15.223	Pass
Radiated Disturbance	15.209, 15.223,15.205,15.35	Pass
Antenna Requirement	15.203	Pass

N/A is not applicable

2. GENERAL INFORMATION

2.1. Report information

- 2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.
- 2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.
- 2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Committee for Laboratories (**CNAL**) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is L0579.

The Laboratory is listed in the United States of American Federal Communications Commission (**FCC**), and the registration number are **97379**(open area test site) and **274801**(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (**VCCI**), and the registration number are **R-1974**(open area test site), **R-1966**(semi anechoic chamber), **C-2117**(mains ports conducted interference measurement) and **T-180**(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (**IC**), and the registration number is **IC4174**.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is **E2024086Z02**.

Measurement Uncertainty

2.3. Measurement Uncertainty

Radiated Disturbance: 30MHz~1000MHz 4.5dB
1GHz~18GHz 4.6dB

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description	: REMOTE CONTROLLER
Manufacturer	: Shenzhen ronghua electronic co., Ltd
Model Number	: EG-RC600
Operate Frequency	: 8.192MHz
Modulation Type	: ASK
Power	: 3.0V
Antenna Designation	: Integrated

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: XAQEG-RC600 filing to comply with Section 15.209, 15.231 of the FCC Part 15, Subpart C Rules.

3.3. Block Diagram of EUT Configuration



Figure 1 EUT setup 1

3.4. Operating Condition of EUT

Mode 1: Transmitting at 8.192MHz

3.5. Test voltage

Battery: DC3.0V (new battery)

3.6. Special Accessories

Not available for this EUT intended for grant.

3.7. Equipment Modifications

Not available for this EUT intended for grant.

3.8. Support Equipment List

Table 2 Support Equipment

Name	Model Number	S/N	Manufacture
--	--	--	--

3.9. Test Conditions

Date of test: Mar.21-25,2009

Date of EUT Receive: Mar.20,2009

Temperature: 22 °C

Relative Humidity: 55%

4. TEST EQUIPMENT USED

Table 3 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.23, 2009	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Jan.23, 2009	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.23, 2009	1 Year
SB3435/01	Amplifier(1-18GHz)	Rohde & Schwarz	---	Jan.23, 2009	1 Year
SB3450/01	3m Semi-anechoic chamber	Albatross Projects	9X6X6	Jan.23, 2009	1 Year
SB3345	Loop antenna	Schwarzbeck	FMZB1516	Jan.23, 2009	1 Year

5. CONDUCTED DISTURBANCE TEST

5.1. Test Standard and Limit

5.1.1. Test Standard

FCC Part 15 15.207

5.1.2. Test Limit

Table 4 Conducted Disturbance Test Limit (Class B)

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

- Decreasing linearly with logarithm of the frequency
- The lower limit shall apply at the transition frequency.

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions form both sides of AC line. According to the requirements in Section 7 and 13 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. The bandwidth of EMI test receiver is set at 9kHz.

5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

5.4. Test Data

The device is powered by battery , the test don't need.

6. OCCUPIED BANDWIDTH

6.1. Test Standard and Limit

6.1.1. Test Standard

FCC Part 15 15.223

For the purposes of this Section, bandwidth is determined at the points 6 dB down from the modulated carrier.

6.2. Test Procedure

1. Set EUT as normal operation
2. Set EMI test receiver (ESIB26) Center Frequency = fundamental frequency,
3. $RBW \geq 1\%$ bandwidth, $VBW \geq RBW$.
4. Set EMI test receiver (ESIB26) to maxhold mode, mark the points 6dB down from the modulated carrier

6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

6.4. Test Data

6dB bandwidth is 16.0 kHz

16kHz/8.2MHz=0.195%



*RBW 10 kHz Delta 3 [T1]
VBW 30 kHz -6.78 dB
SWT 2.5 ms -8.000000000 kHz

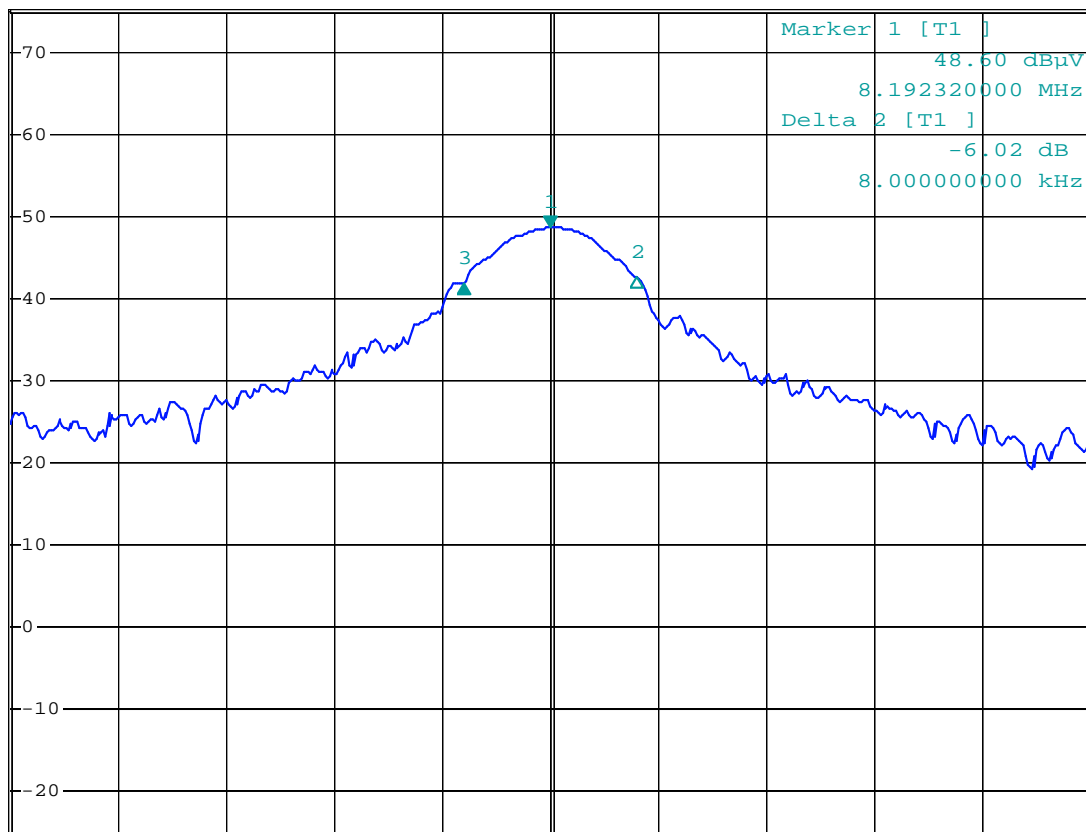
Ref 75 dBμV

Att 10 dB

SWT 2.5 ms

-8.000000000 kHz

1 PK
VIEW



Center 8.19232 MHz

10 kHz/

Span 100 kHz

Date: 19.MAR.2009 20:32:42

7. RADIATED DISTURBANCE TEST

7.1. Test Standard and Limit

7.1.1. Test Standard

FCC Part 15 15.231, 15.209

7.1.2. Test Limit

(a) The field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this Section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in Section 15.35(b) for limiting peak emissions apply.

(b) The field strength of emissions outside of the band 1.705-10.0 MHz shall not exceed the general radiated emission limits in Section 15.209.

Table 5 Radiated Disturbance Test Limit (15.209)

FREQUENCY MHz	FIELD STRENGTHS LIMITS (μ V/m)	FIELD STRENGTHS LIMITS (μ V/m)	FIELD STRENGTHS LIMITS dB (μ V/m) (3m)
0.009 ~ 0.490	2400/F(kHz)(300m)	29.2(3m)	29.3
0.490 ~ 1.705	24000/F(kHz)(30m)	29.2(3m)	29.3
1.705 ~ 30	30(30m)	300(3m)	49.5
30 ~ 40.0	100(3m)	100(3m)	40.0
88 ~ 43.5	150(3m)	150(3m)	43.5
216 ~ 46.0	200(3m)	200(3m)	46.0
960 ~ 54.0	500(3m)	500(3m)	54.0

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

Where F is the frequency in kHz, The formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 0.009-0.49MHz, μ V/m at 300 meters=2400/8192(kHz)= (300m); For the band 0.490-1.705MHz, μ V/m at 3 meters=24000/8192(kHz)= 2.92 μ V/m(30m).

the relation of the field strengths and the distance is $F_1/F_2=L_2/L_1$, for 300m field strengths change 3m field strengths, $F_2=F_1*100$. for 30m field strengths change 3m field strengths, $F_2=F_1*10$.

The limit of the band 0.009-0.49MHz =0.292 μ V/m *100=29.2 μ V/m.=29.3 dB (μ V/m)

The limit of the band 0.49-1.705MHz =2.92 μ V/m *10=29.2 μ V/m=29.3 dB (μ V/m)

The limit of the band 1.705-30MHz =30 μ V/m *10=300 μ V/m=49.5 dB (μ V/m)

Restricted Band Radiation Emission Measurement Limits According to Section 15.205 and Section 15.209

7.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

Radiated test was performed on the frequency range from 30MHz to 25GHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz, $VBW \geq RBW$. All readings above 1 GHz are AV and PK values. $RBW=1MHz$ and $VBW=10Hz$ for AV value, $RBW=1MHz$ and $VBW \geq RBW$ for peak value.

Measurements were made at 3 meters

7.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture. The EUT shall be measured in the XYZ three position, and the test data which was shown in the follow was the worst case.

7.4. Test Data

Table 6 Radiated Disturbance Test Data

Model number:EG-RC600 Test Mode:1								
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Correction Factor (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	EUT axes	Note
8.192	---	24.7	0.5	20	45.2	63.5	Y	Fundamental PK
8.192	---	18.7	0.5	20	39.2	43.5	Y	Fundamental AV
105.810	H	23.9	1.6	12.7	38.2	63.5	Y	Harmonics PK
105.810	H	17.9	1.6	12.7	32.2	43.5	Y	Harmonics AV
164.185	H	26.9	2.2	10.8	39.9	63.5	Y	Harmonics PK
164.185	H	20.3	2.2	10.8	33.3	43.5	Y	Harmonics AV
171.903	H	27.7	2.2	10.3	40.2	63.5	Y	Harmonics PK
171.903	H	21.7	2.2	10.3	34.2	43.5	Y	Harmonics AV
187.454	H	28.2	2.4	9.7	40.3	63.5	Y	Harmonics PK
187.454	H	22.2	2.4	9.7	34.3	43.5	Y	Harmonics AV
197.174	H	27.8	2.4	10.26	40.5	63.5	Y	Harmonics PK
197.174	H	21.8	2.4	10.26	34.5	43.5	Y	Harmonics AV
204.943	H	26.7	2.4	10.31	39.4	63.5	Y	Harmonics PK
204.943	H	20.7	2.4	10.31	33.4	43.5	Y	Harmonics AV
294.368	H	23.1	2.9	13.46	39.5	66.0	Y	Harmonics PK
294.368	H	17.1	2.9	13.46	33.5	46.0	Y	Harmonics AV

Note: 1. Emission level(dBuV/m)=Reading Value(dBuV) + Correction Factor(dB)+Antenna Factor (dB/m)
 2. Correction Factor(dB) = Cable Factor (dB)+Amplifier Factor(dB)
 3. The other emission levels were less than the limit 20dB
 5. duty cycle=10ms/20ms=0.5
 6. AV factor=20log duty cycle=20*log0.5=-6.0dB
 7.AV=peak-AV factor

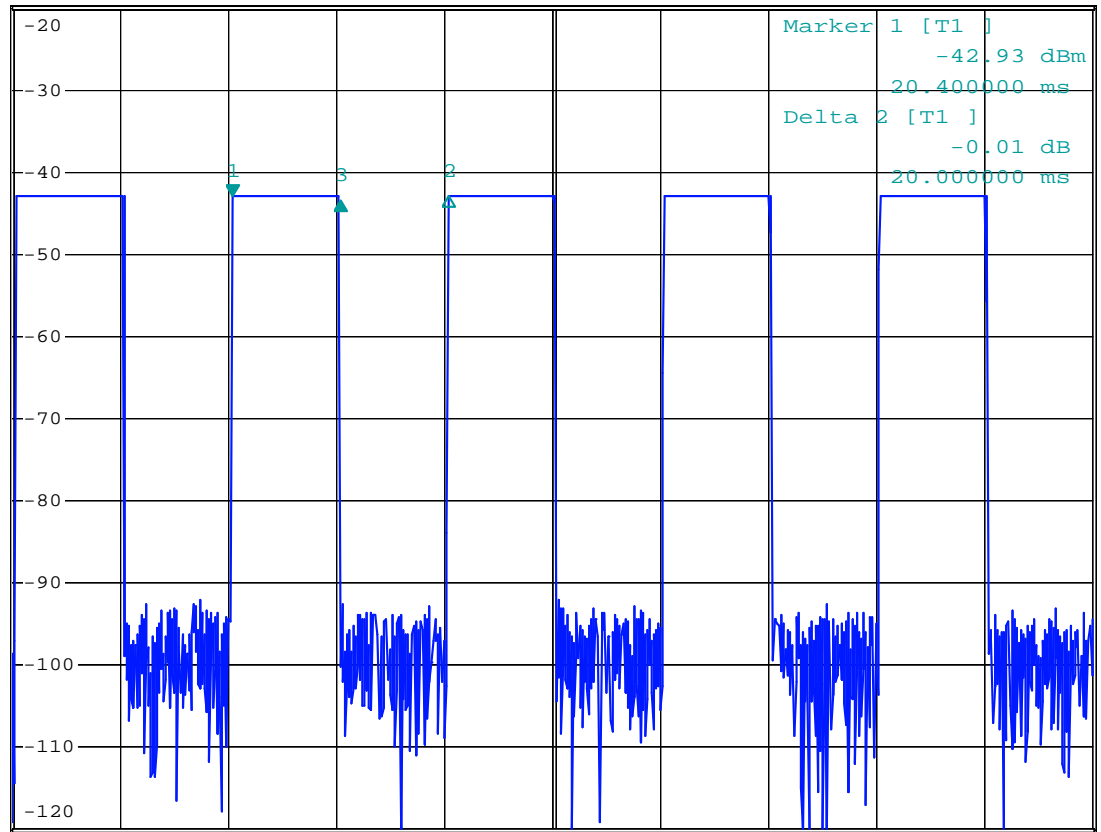


RBW 10 kHz Delta 3 [T1]
VBW 30 kHz -0.52 dB
SWT 100 ms 10.000000 ms

Ref -20 dBm

Att 10 dB

1 AP
VIEW



3DB

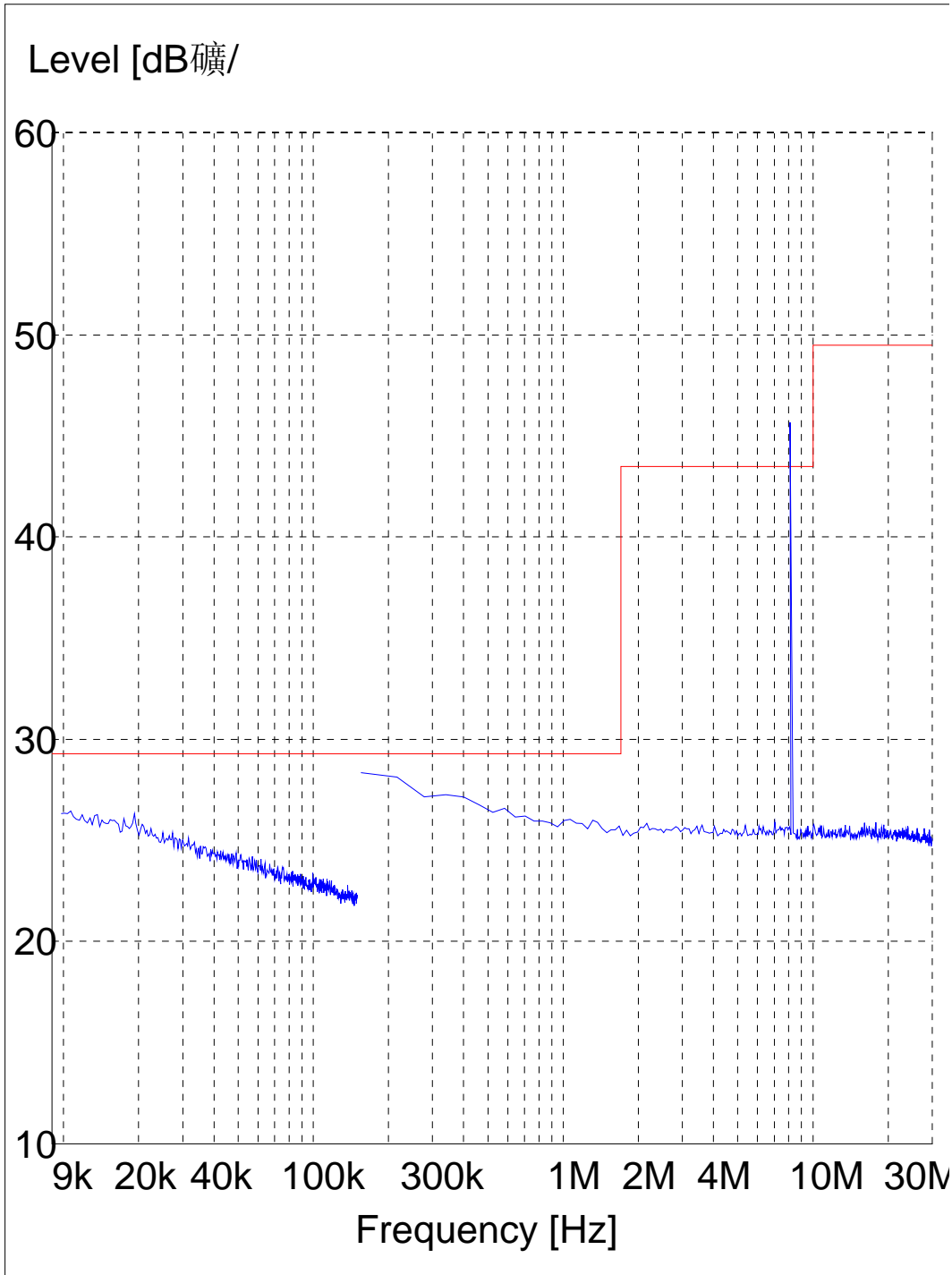
Center 8.192 MHz

10 ms/

Date: 1.APR.2009 02:04:46

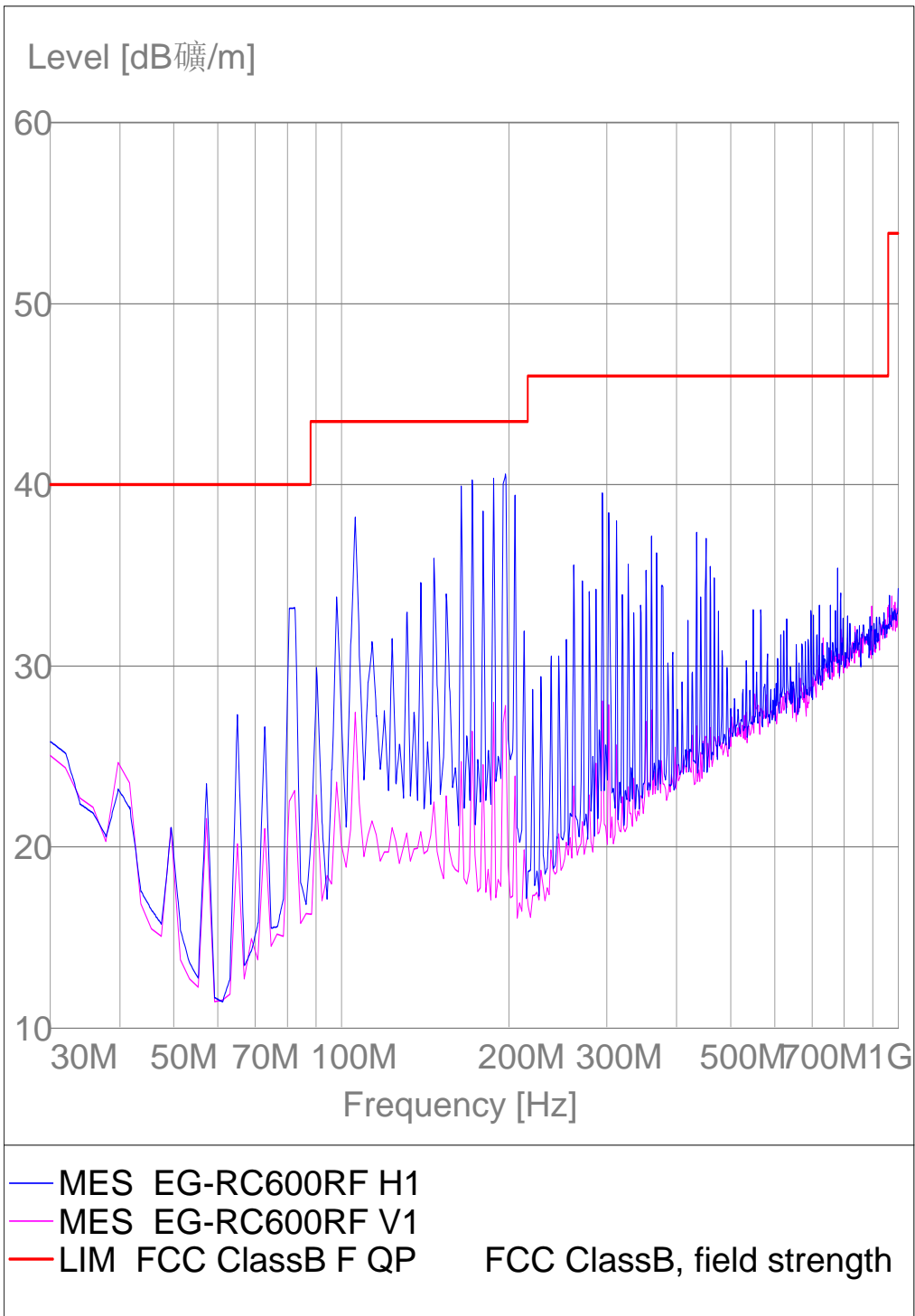
Radiated Emission

EUT: EG-RC600
Operating Condition: tx
Test Site: SMQ EMC lab SAC
Test Specification: horizontal&vertical
Comment: DC 3.0V



Radiated Emission

EUT: EG-RC600
Operating Condition: tx
Test Site: SMQ EMC lab SAC
Test Specification: horizontal&vertical
Comment: DC 3.0V





* RBW 10 kHz Marker 2 [T1]
VBW 30 kHz 24.27 dBμV
SWT 65 ms 4.707790000 MHz

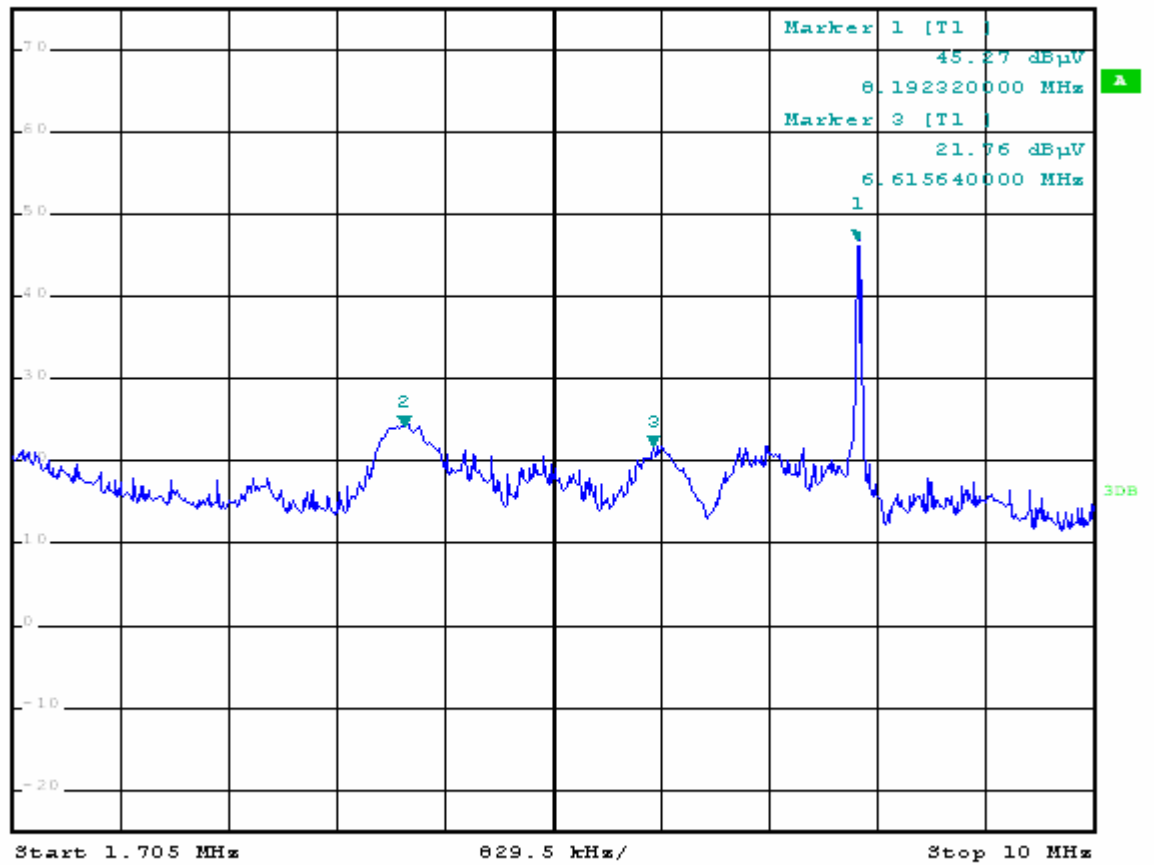
Ref 75 dBμV

Att 10 dB

SWT 65 ms

4.707790000 MHz

1 PK
VIEW



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8. ANTENNA REQUIREMENT

8.1. STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2. ANTENNA CONNECTED CONSTRUCTION

The EUT has a antenna which is soldered on the PCB, this is permanently attached antenna and meets the requirements of this section.

APPENDIX I TEST SETUP PHOTOS

Photo 1 Radiated Emission Test(X position)

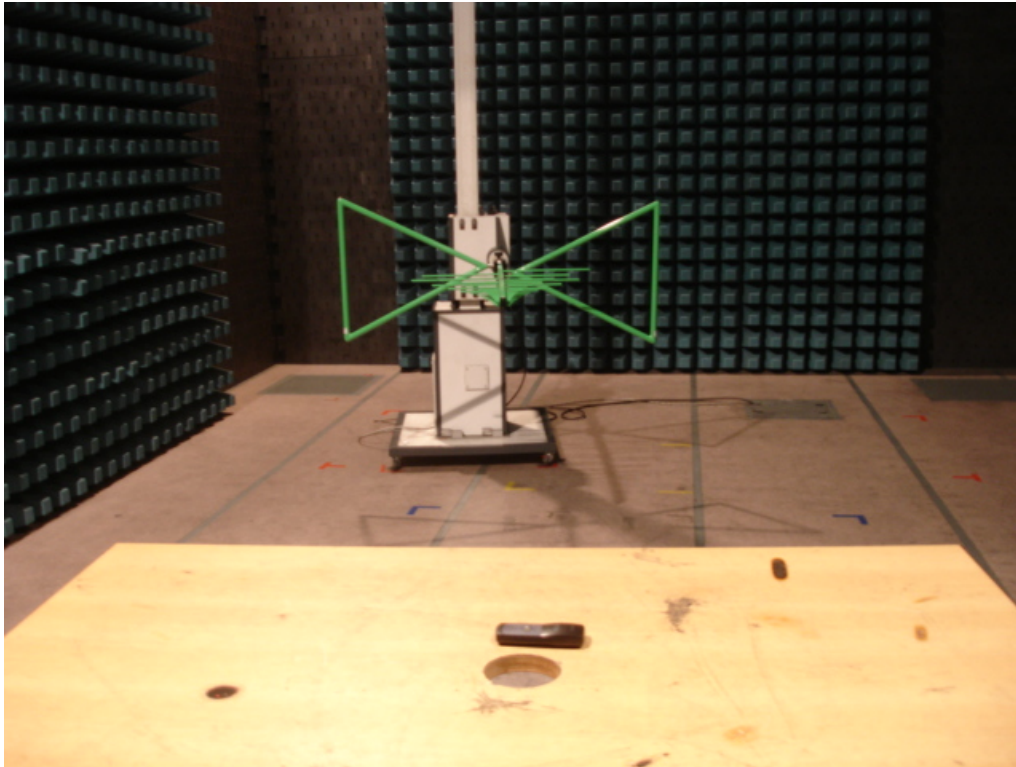


Photo 2 Radiated Emission Test(Y position)

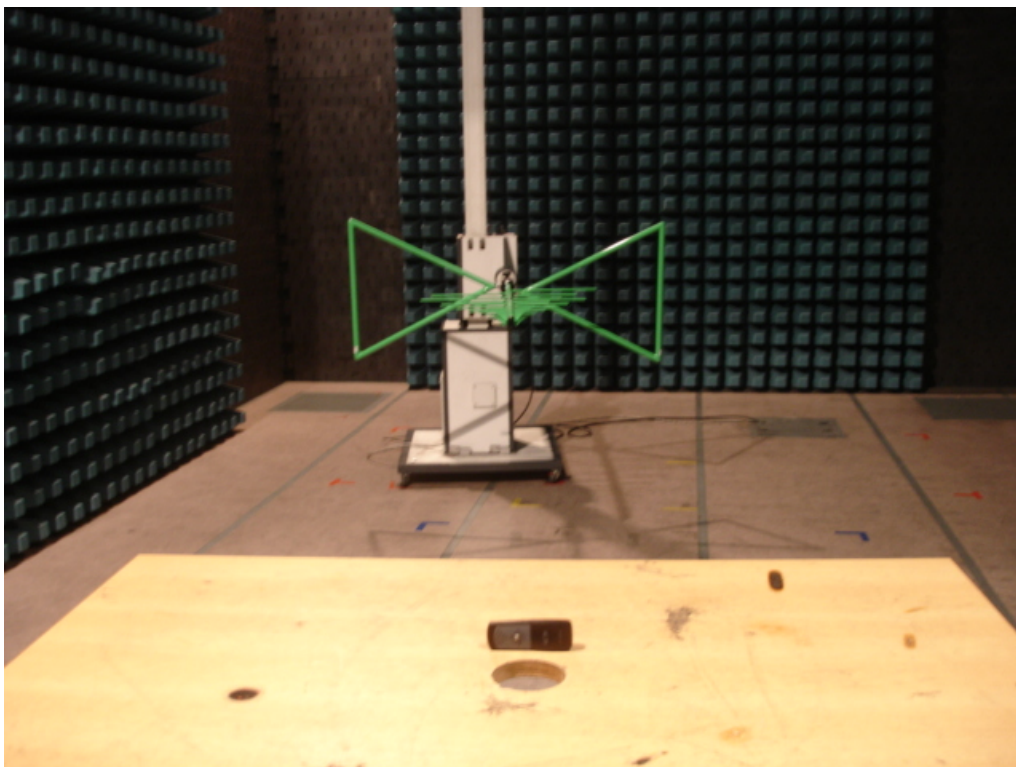


Photo 3 Radiated Emission Test(Z position)

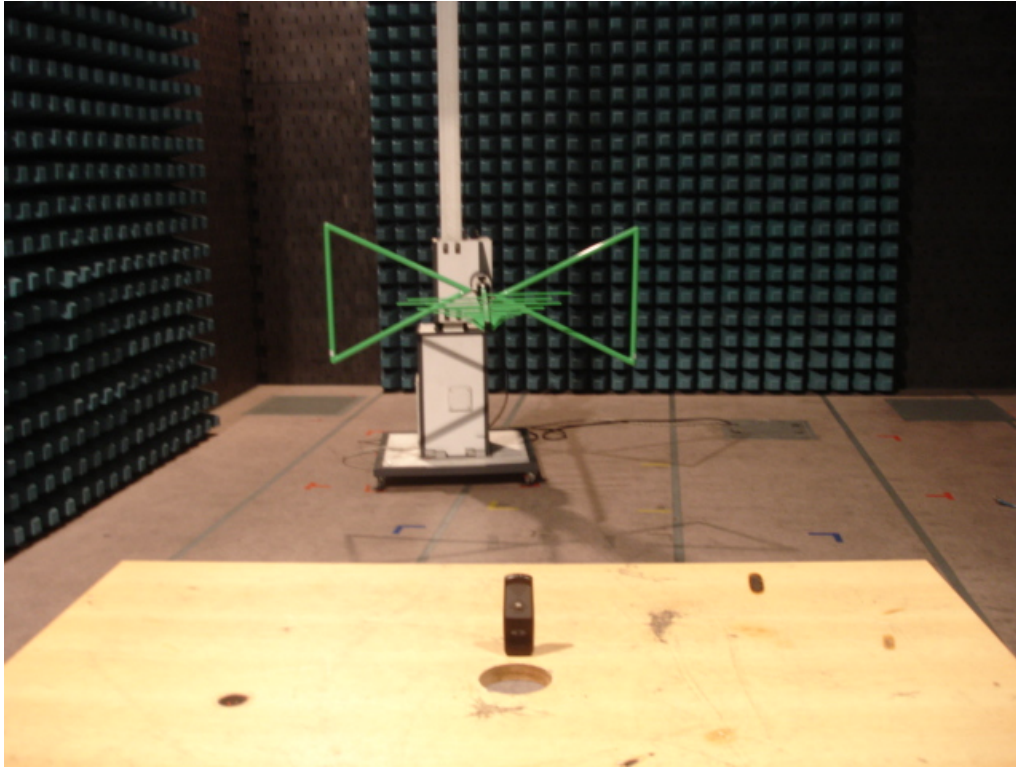


Photo 4 Radiated Emission Test(X position)

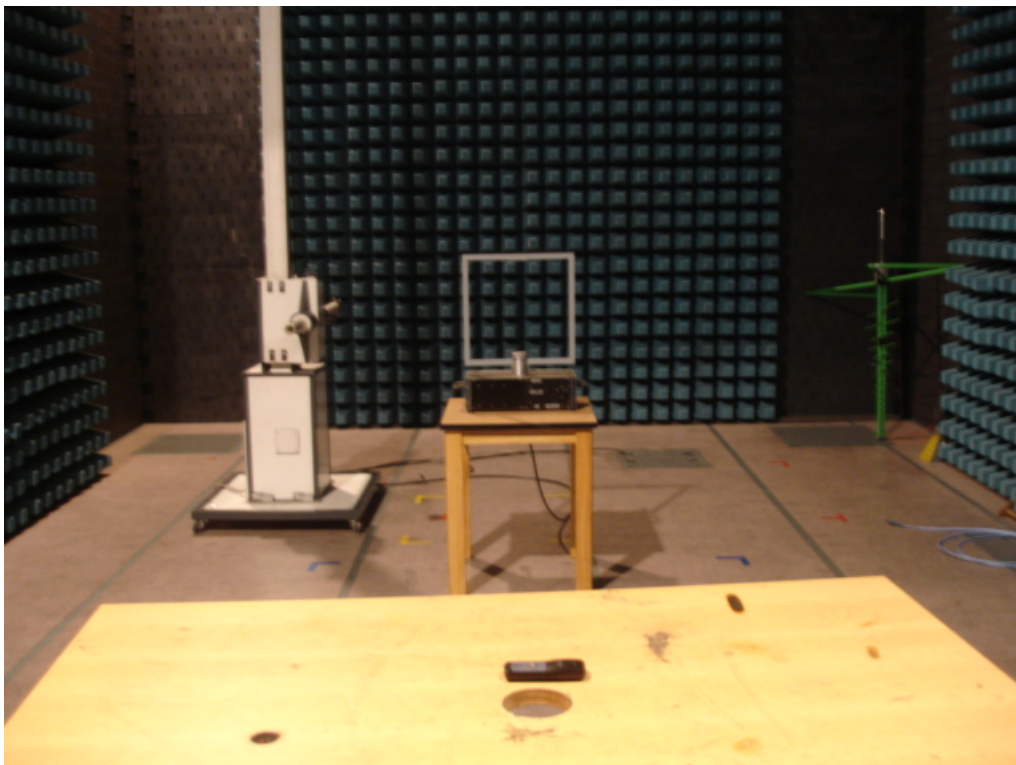


Photo 5 Radiated Emission Test(Y position)

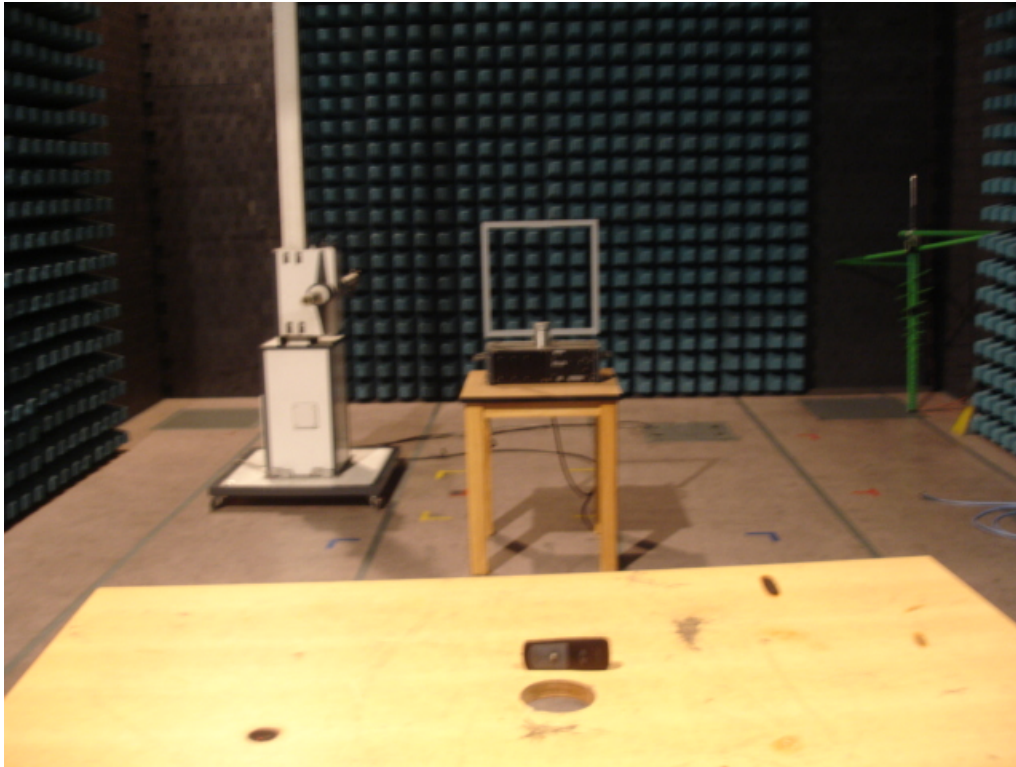
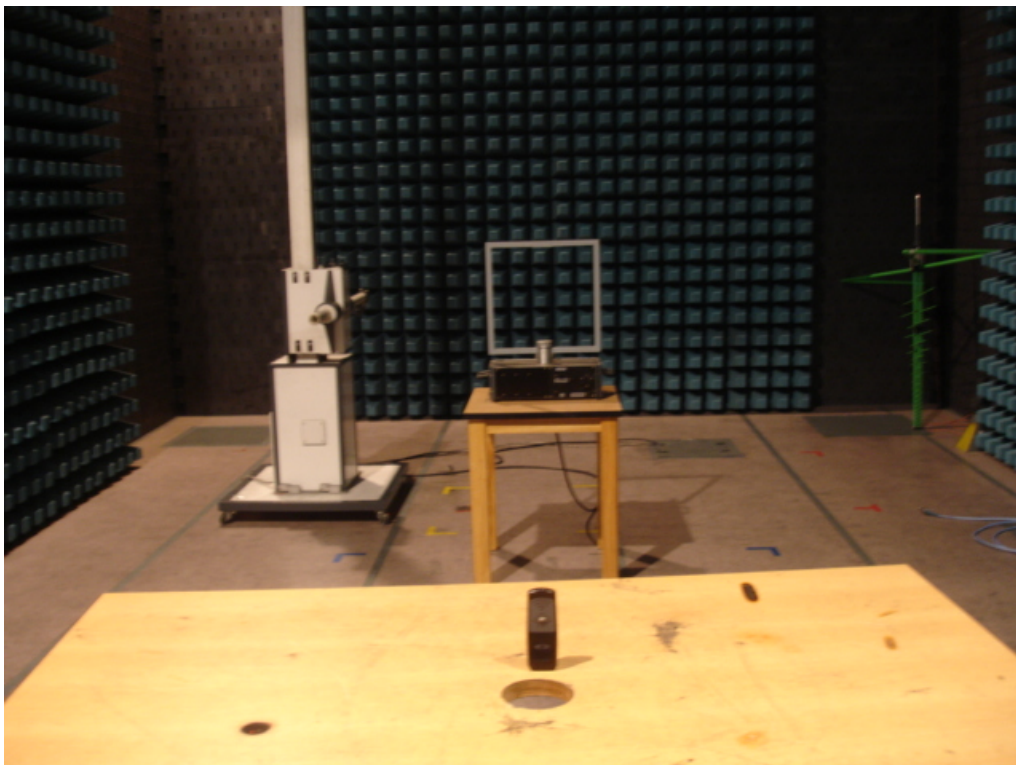


Photo 6 Radiated Emission Test(Z position)



APPENDIX II EUT PHOTOS

Photo 1 Appearance of EUT

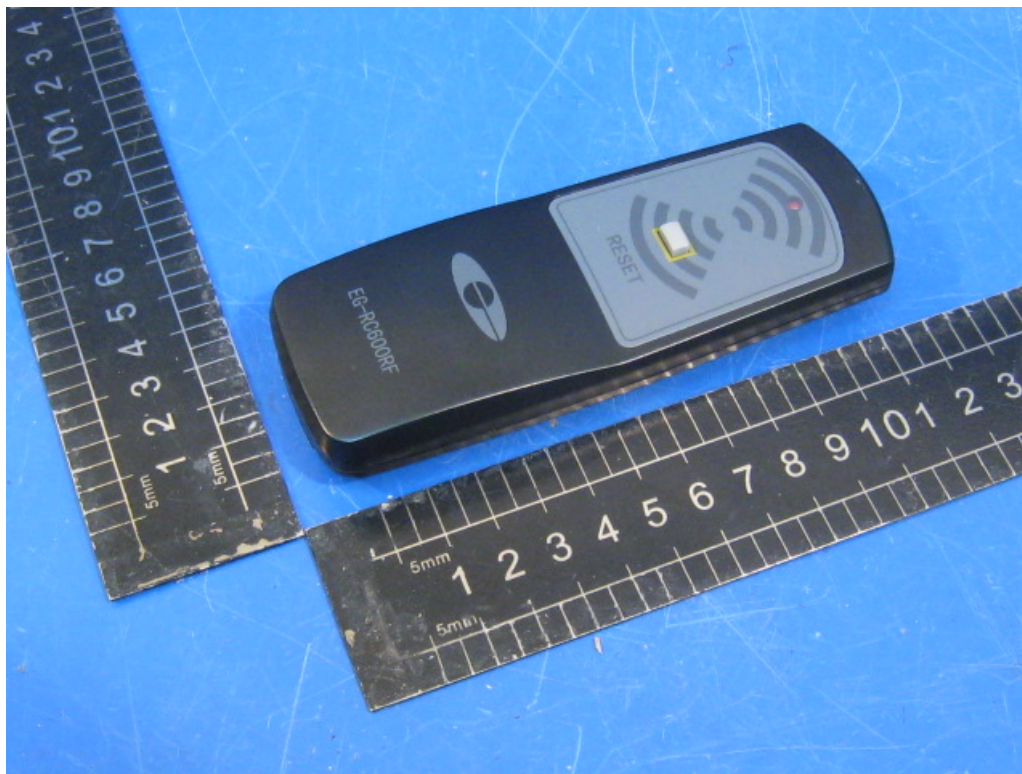


Photo 2 Appearance of EUT



Photo 3 Appearance of EUT



Photo 4 Inside of EUT

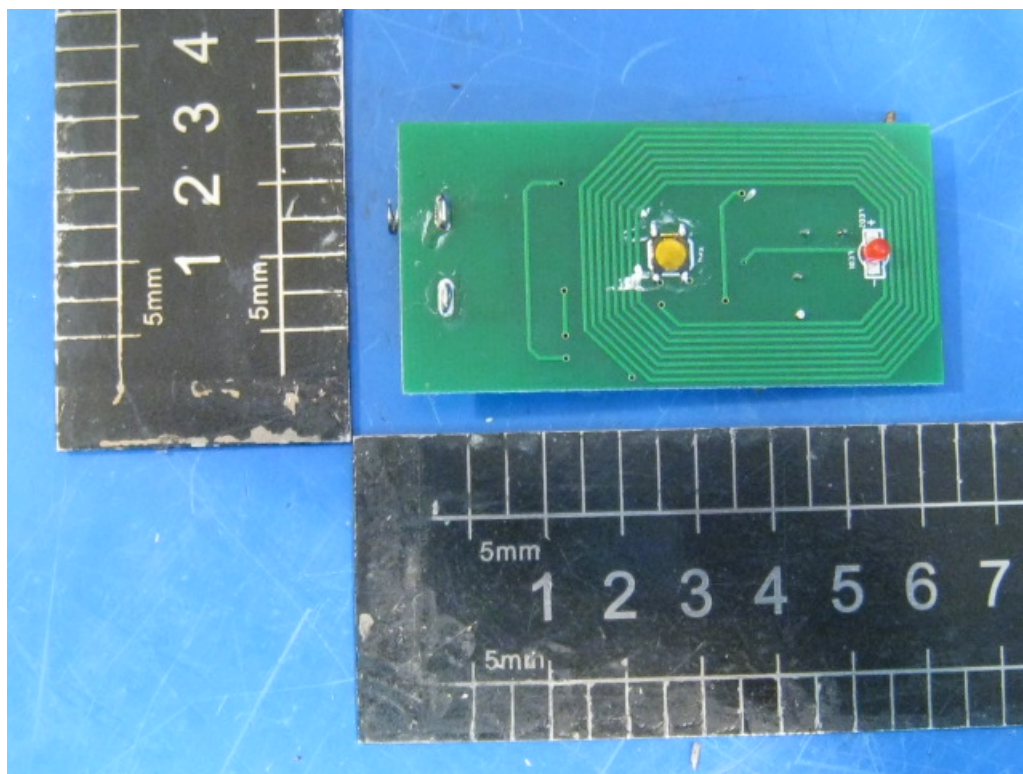


Photo 5 Inside of EUT

