

## FCC REPORT

**Applicant:** Guangzhou Chiyuan Electronic Co.,Ltd

**Address of Applicant:** 2/F,NO.1 Bldg,Boyl Industrial Garden 4th Gongye Rd, zhicun,  
Dashi Street, Panyu Dis Guangzhou China

**Equipment Under Test (EUT)**

Product Name: Quadcopter

Model No.: HMX50, ETHOS PQ

**FCC ID:** V6KHM50

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.249:2013

**Date of sample receipt:** July 01, 2014

**Date of Test:** July 03-08, 2014

**Date of report issued:** July 08, 2014

**Test Result :** PASS \*

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

Authorized Signature:

A circular blue ink stamp from GTS (Global United Technology Services) is visible. The stamp contains the text "GLOBAL UNITED TECHNOLOGY SERVICES", "GTS", and "HONG KONG". Overlaid on the stamp is a handwritten signature in black ink, which appears to be "Robinson Lo".

**Robinson Lo**  
**Laboratory Manager**

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. 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 GTS or testing done by GTS in connection with, distribution or use of the product described in this report must be approved by GTS in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

## 2 Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | July 08, 2014 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

Prepared By:

*Edward Pan*

Date:

July 08, 2014

Project Engineer

Check By:

*Hank Yan*

Date:

July 08, 2014

Reviewer

## 3 Contents

|                                                       | Page |
|-------------------------------------------------------|------|
| 1 COVER PAGE.....                                     | 1    |
| 2 VERSION .....                                       | 2    |
| 3 CONTENTS .....                                      | 3    |
| 4 TEST SUMMARY .....                                  | 4    |
| 5 GENERAL INFORMATION .....                           | 5    |
| 5.1 CLIENT INFORMATION .....                          | 5    |
| 5.2 GENERAL DESCRIPTION OF EUT .....                  | 5    |
| 5.3 TEST MODE .....                                   | 7    |
| 5.4 DESCRIPTION OF SUPPORT UNITS .....                | 7    |
| 5.5 TEST FACILITY.....                                | 7    |
| 5.6 TEST LOCATION .....                               | 7    |
| 5.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER ..... | 7    |
| 6 TEST INSTRUMENTS LIST .....                         | 8    |
| 7 TEST RESULTS AND MEASUREMENT DATA.....              | 9    |
| 7.1 ANTENNA REQUIREMENT:.....                         | 9    |
| 7.2 RADIATED EMISSION METHOD.....                     | 10   |
| 7.2.1 Field Strength of The Fundamental Signal .....  | 12   |
| 7.2.2 Spurious emissions.....                         | 13   |
| 7.2.3 Bandedge emissions.....                         | 17   |
| 7.3 20dB OCCUPY BANDWIDTH .....                       | 18   |
| 8 TEST SETUP PHOTO .....                              | 20   |
| 9 EUT CONSTRUCTIONAL DETAILS .....                    | 21   |

## 4 Test Summary

| Test Item                                | Section in CFR 47     | Result |
|------------------------------------------|-----------------------|--------|
| Antenna requirement                      | 15.203                | Pass   |
| AC Power Line Conducted Emission         | 15.207                | N/A    |
| Field strength of the fundamental signal | 15.249 (a)            | Pass   |
| Spurious emissions                       | 15.249 (a) (d)/15.209 | Pass   |
| Band edge                                | 15.249 (d)/15.205     | Pass   |
| 20dB Occupied Bandwidth                  | 15.215 (c)            | Pass   |

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

|                                  |                                                                                                     |
|----------------------------------|-----------------------------------------------------------------------------------------------------|
| Applicant:                       | Guangzhou Chiyuan Electronic Co.,Ltd                                                                |
| Address of Applicant:            | 2/F,NO.1 Bldg,Boyl Industrial Garden 4th Gongye Rd, zhicun, Dashi Street, Panyu Dis Guangzhou China |
| Manufacturer/Factory:            | Guangzhou Chiyuan Electronic Co.,Ltd                                                                |
| Address of Manufacturer/Factory: | 2/F,NO.1 Bldg,Boyl Industrial Garden 4th Gongye Rd, zhicun, Dashi Street, Panyu Dis Guangzhou China |

### 5.2 General Description of EUT

|                      |                  |
|----------------------|------------------|
| Product Name:        | Quadcopter       |
| Model No.:           | HMX50, ETHOS PQ  |
| Operation Frequency: | 2405MHz~2475MHz  |
| Channel numbers:     | 20               |
| Modulation type:     | GFSK             |
| Antenna Type:        | Integral Antenna |
| Antenna gain:        | 2dBi             |
| Power supply:        | DC 3.0V          |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2405MHz   |
| The middle channel  | 2440MHz   |
| The Highest channel | 2475MHz   |

## 5.3 Test mode

|                                                                                                                                                                                                                                              |                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                            | Keep the EUT in continuously transmitting mode with GFSK modulation. |
| <i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i> |                                                                      |

### Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

| Axis                   | X     | Y     | Z     |
|------------------------|-------|-------|-------|
| Field Strength(dBuV/m) | 96.23 | 97.73 | 95.14 |

### Final Test Mode:

The EUT was tested in GFSK, Pi/4QPSK,8DPSK modulation, and found the GFSK modulation is the worst case.

According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup":

Y axis (see the test setup photo)

## 5.4 Description of Support Units

N/A

## 5.5 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

## 5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

## 5.7 Other Information Requested by the Customer

None.

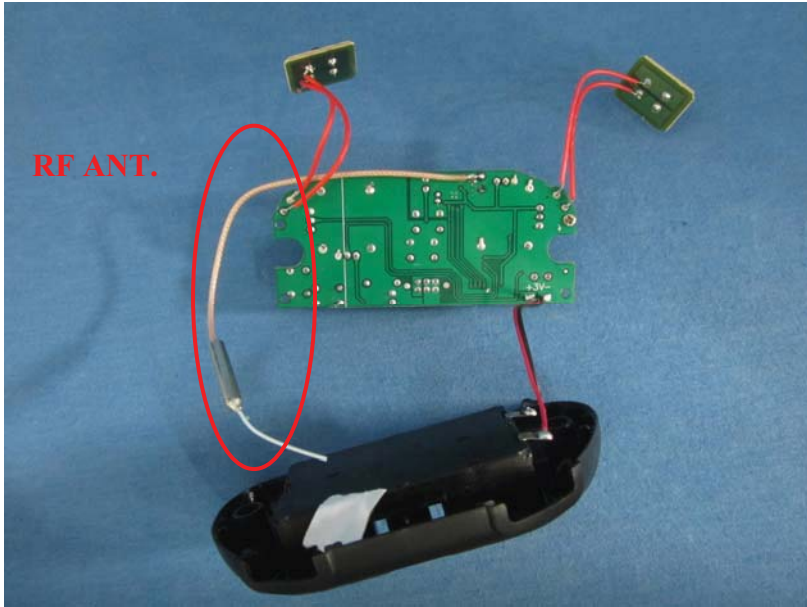
## 6 Test Instruments list

| Radiated Emission: |                               |                                |                             |               |                     |                         |
|--------------------|-------------------------------|--------------------------------|-----------------------------|---------------|---------------------|-------------------------|
| Item               | Test Equipment                | Manufacturer                   | Model No.                   | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                  | 3m Semi- Anechoic Chamber     | ZhongYu Electron               | 9.2(L)*6.2(W)* 6.4(H)       | GTS250        | Mar. 28 2014        | Mar. 27 2015            |
| 2                  | Control Room                  | ZhongYu Electron               | 6.2(L)*2.5(W)* 2.4(H)       | GTS251        | N/A                 | N/A                     |
| 3                  | Spectrum Analyzer             | Agilent                        | E4440A                      | GTS533        | Dec. 05 2013        | Dec. 04 2014            |
| 4                  | EMI Test Receiver             | Rohde & Schwarz                | ESU26                       | GTS203        | Jul. 01 2014        | Jun. 30, 2015           |
| 5                  | BiConiLog Antenna             | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | Feb. 23 2014        | Feb. 22 2015            |
| 6                  | Double -ridged waveguide horn | SCHWARZBECK<br>MESS-ELEKTRONIK | 9120D-829                   | GTS208        | June 28 2014        | June 28 2015            |
| 7                  | Horn Antenna                  | ETS-LINDGREN                   | 3160                        | GTS217        | Mar. 28 2014        | Mar. 27 2015            |
| 8                  | EMI Test Software             | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 9                  | Coaxial Cable                 | GTS                            | N/A                         | GTS213        | Mar. 29 2014        | Mar. 28 2015            |
| 10                 | Coaxial Cable                 | GTS                            | N/A                         | GTS211        | Mar. 29 2014        | Mar. 28 2015            |
| 11                 | Coaxial cable                 | GTS                            | N/A                         | GTS210        | Mar. 29 2014        | Mar. 28 2015            |
| 12                 | Coaxial Cable                 | GTS                            | N/A                         | GTS212        | Mar. 29 2014        | Mar. 28 2015            |
| 13                 | Amplifier(100kHz-3GHz)        | HP                             | 8347A                       | GTS204        | Jul. 01 2014        | Jun. 30, 2015           |
| 14                 | Amplifier(2GHz-20GHz)         | HP                             | 8349B                       | GTS206        | Jul. 01 2014        | Jun. 30, 2015           |
| 15                 | Amplifier (18-26GHz)          | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June 27 2014        | June 26 2015            |
| 16                 | Band filter                   | Amindeon                       | 82346                       | GTS219        | Mar. 29 2014        | Mar. 28 2015            |

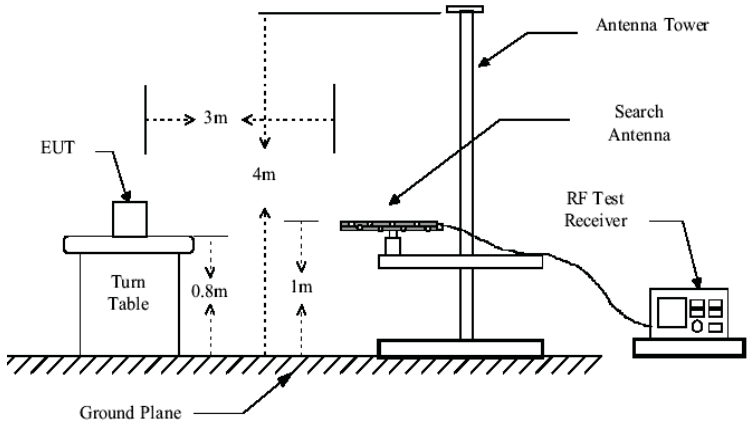


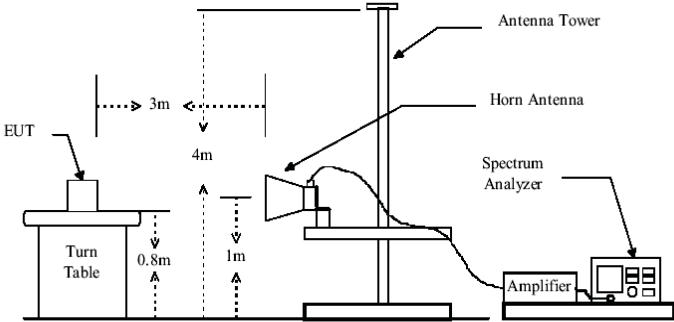
## 7 Test results and Measurement Data

### 7.1 Antenna requirement:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FCC Part15 C Section 15.203 |
| <b>15.203 requirement:</b><br><p>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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> |                             |
| <b>E.U.T Antenna:</b><br><p><i>The antenna is Integral Antenna, the best case gain of the antenna is 2dBi</i></p>                                                                                                                                                                                                                                                                                                                                                                       |                             |
|                                                                                                                                                                                                                                                                                                                                                                                                      |                             |

## 7.2 Radiated Emission Method

|                                                      |                                                                                                                                                                                                                                                                |            |                    |        |                  |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|--------|------------------|
| Test Requirement:                                    | FCC Part15 C Section 15.209                                                                                                                                                                                                                                    |            |                    |        |                  |
| Test Method:                                         | ANSI C63.4:2003                                                                                                                                                                                                                                                |            |                    |        |                  |
| Test Frequency Range:                                | 30MHz to 25GHz                                                                                                                                                                                                                                                 |            |                    |        |                  |
| Test site:                                           | Measurement Distance: 3m                                                                                                                                                                                                                                       |            |                    |        |                  |
| Receiver setup:                                      | Frequency                                                                                                                                                                                                                                                      | Detector   | RBW                | VBW    | Remark           |
|                                                      | 30MHz-1GHz                                                                                                                                                                                                                                                     | Quasi-peak | 120KHz             | 300KHz | Quasi-peak Value |
|                                                      | Above 1GHz                                                                                                                                                                                                                                                     | Peak       | 1MHz               | 3MHz   | Peak Value       |
|                                                      |                                                                                                                                                                                                                                                                | Peak       | 1MHz               | 10Hz   | Average Value    |
| Limit:<br>(Field strength of the fundamental signal) | Frequency                                                                                                                                                                                                                                                      |            | Limit (dBuV/m @3m) |        | Remark           |
|                                                      | 2400MHz-2483.5MHz                                                                                                                                                                                                                                              |            | 94.00              |        | Average Value    |
|                                                      |                                                                                                                                                                                                                                                                |            | 114.00             |        | Peak Value       |
| Limit:<br>(Spurious Emissions)                       | Frequency                                                                                                                                                                                                                                                      |            | Limit (dBuV/m @3m) |        | Remark           |
|                                                      | 30MHz-88MHz                                                                                                                                                                                                                                                    |            | 40.00              |        | Quasi-peak Value |
|                                                      | 88MHz-216MHz                                                                                                                                                                                                                                                   |            | 43.50              |        | Quasi-peak Value |
|                                                      | 216MHz-960MHz                                                                                                                                                                                                                                                  |            | 46.00              |        | Quasi-peak Value |
|                                                      | 960MHz-1GHz                                                                                                                                                                                                                                                    |            | 54.00              |        | Quasi-peak Value |
|                                                      | Above 1GHz                                                                                                                                                                                                                                                     |            | 54.00              |        | Average Value    |
|                                                      |                                                                                                                                                                                                                                                                |            | 74.00              |        | Peak Value       |
| Limit:<br>(band edge)                                | 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 Section 15.209, whichever is the lesser attenuation. |            |                    |        |                  |
| Test setup:                                          | Below 1GHz                                                                                                                                                                                                                                                     |            |                    |        |                  |
|                                                      |                                                                                                                                                                            |            |                    |        |                  |
|                                                      | Above 1GHz                                                                                                                                                                                                                                                     |            |                    |        |                  |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |  <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a Turn Table at a height of 0.8m. The Turn Table is rotated 360 degrees. The EUT is positioned 3m away from the Antenna Tower. The Antenna Tower has a Horn Antenna at a height of 4m. The Spectrum Analyzer is connected to the Antenna Tower via an Amplifier. The Spectrum Analyzer is also connected to the Antenna Tower. The Antenna Tower is positioned 1m away from the Turn Table.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol> |
| Test Instruments: | Refer to section 6.0 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Measurement data:

### 7.2.1 Field Strength of The Fundamental Signal

#### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2405.00         | 95.54             | 27.57                 | 5.40            | 33.99                    | 94.52          | 114.00              | -19.48          | Vertical     |
| 2405.00         | 98.52             | 27.57                 | 5.40            | 33.99                    | 97.50          | 114.00              | -16.50          | Horizontal   |
| 2440.00         | 95.20             | 27.55                 | 5.43            | 33.96                    | 94.22          | 114.00              | -19.78          | Vertical     |
| 2440.00         | 98.14             | 27.55                 | 5.43            | 33.96                    | 97.16          | 114.00              | -16.84          | Horizontal   |
| 2475.00         | 95.47             | 27.52                 | 5.47            | 33.92                    | 94.54          | 114.00              | -19.46          | Vertical     |
| 2475.00         | 98.66             | 27.52                 | 5.47            | 33.92                    | 97.73          | 114.00              | -16.27          | Horizontal   |

#### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2405.00         | 84.55             | 27.57                 | 5.40            | 33.99                    | 83.53          | 94.00               | -10.47          | Vertical     |
| 2405.00         | 87.61             | 27.57                 | 5.40            | 33.99                    | 86.59          | 94.00               | -7.41           | Horizontal   |
| 2440.00         | 84.22             | 27.55                 | 5.43            | 33.96                    | 83.24          | 94.00               | -10.76          | Vertical     |
| 2440.00         | 87.18             | 27.55                 | 5.43            | 33.96                    | 86.20          | 94.00               | -7.80           | Horizontal   |
| 2475.00         | 84.53             | 27.52                 | 5.47            | 33.92                    | 83.60          | 94.00               | -10.40          | Vertical     |
| 2475.00         | 87.81             | 27.52                 | 5.47            | 33.92                    | 86.88          | 94.00               | -7.12           | Horizontal   |

## 7.2.2 Spurious emissions

### ■ Below 1GHz

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 34.04           | 40.65             | 14.31                 | 0.60            | 32.06                    | 23.50          | 40.00               | -16.50          | Vertical     |
| 46.34           | 38.56             | 15.46                 | 0.73            | 31.99                    | 22.76          | 40.00               | -17.24          | Vertical     |
| 59.23           | 39.07             | 14.74                 | 0.85            | 31.94                    | 22.72          | 40.00               | -17.28          | Vertical     |
| 95.76           | 37.60             | 14.90                 | 1.16            | 31.74                    | 21.92          | 43.50               | -21.58          | Vertical     |
| 636.13          | 36.49             | 20.59                 | 3.86            | 31.10                    | 29.84          | 46.00               | -16.16          | Vertical     |
| 972.34          | 36.42             | 23.55                 | 5.12            | 31.22                    | 33.87          | 54.00               | -20.13          | Vertical     |
| 44.59           | 36.40             | 15.55                 | 0.72            | 32.01                    | 20.66          | 40.00               | -19.34          | Horizontal   |
| 60.28           | 36.88             | 14.69                 | 0.86            | 31.94                    | 20.49          | 40.00               | -19.51          | Horizontal   |
| 107.51          | 36.80             | 14.49                 | 1.26            | 31.80                    | 20.75          | 43.50               | -22.75          | Horizontal   |
| 348.03          | 37.19             | 16.25                 | 2.61            | 32.03                    | 24.02          | 46.00               | -21.98          | Horizontal   |
| 582.74          | 36.09             | 20.14                 | 3.66            | 31.12                    | 28.77          | 46.00               | -17.23          | Horizontal   |
| 968.93          | 37.27             | 23.55                 | 5.11            | 31.22                    | 34.71          | 54.00               | -19.29          | Horizontal   |

## ■ Above 1GHz

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 53.29             | 31.78                 | 8.60            | 32.09                    | 61.58          | 74.00               | -12.42          | Vertical     |
| 7215.00         | 48.96             | 36.15                 | 11.65           | 32.00                    | 64.76          | 74.00               | -9.24           | Vertical     |
| 9620.00         | 29.39             | 37.95                 | 14.14           | 31.62                    | 49.86          | 74.00               | -24.14          | Vertical     |
| 12025.00        | *                 |                       |                 |                          |                | 74.00               |                 | Vertical     |
| 14430.00        | *                 |                       |                 |                          |                | 74.00               |                 | Vertical     |
| 4810.00         | 52.84             | 31.78                 | 8.60            | 32.09                    | 61.13          | 74.00               | -12.87          | Horizontal   |
| 7215.00         | 49.19             | 36.15                 | 11.65           | 32.00                    | 64.99          | 74.00               | -9.01           | Horizontal   |
| 9620.00         | 30.90             | 37.95                 | 14.14           | 31.62                    | 51.37          | 74.00               | -22.63          | Horizontal   |
| 12025.00        | *                 |                       |                 |                          |                | 74.00               |                 | Horizontal   |
| 14430.00        | *                 |                       |                 |                          |                | 74.00               |                 | Horizontal   |

### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 41.06             | 31.78                 | 8.60            | 32.09                    | 49.35          | 54.00               | -4.65           | Vertical     |
| 7215.00         | 36.68             | 36.15                 | 11.65           | 32.00                    | 52.48          | 54.00               | -1.52           | Vertical     |
| 9620.00         | 17.10             | 37.95                 | 14.14           | 31.62                    | 37.57          | 54.00               | -16.43          | Vertical     |
| 12025.00        | *                 |                       |                 |                          |                | 54.00               |                 | Vertical     |
| 14430.00        | *                 |                       |                 |                          |                | 54.00               |                 | Vertical     |
| 4810.00         | 40.63             | 31.78                 | 8.60            | 32.09                    | 48.92          | 54.00               | -5.08           | Horizontal   |
| 7215.00         | 36.92             | 36.15                 | 11.65           | 32.00                    | 52.72          | 54.00               | -1.28           | Horizontal   |
| 9620.00         | 18.62             | 37.95                 | 14.14           | 31.62                    | 39.09          | 54.00               | -14.91          | Horizontal   |
| 12025.00        | *                 |                       |                 |                          |                | 54.00               |                 | Horizontal   |
| 14430.00        | *                 |                       |                 |                          |                | 54.00               |                 | Horizontal   |

### Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*”, means this data is the too weak instrument of signal is unable to test.

|               |                |
|---------------|----------------|
| Test channel: | Middle channel |
|---------------|----------------|

## Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 4880.00         | 52.94             | 31.85                 | 8.66            | 32.12                    | 61.33          | 74.00               | -12.67          | Vertical     |
| 7320.00         | 49.60             | 36.41                 | 11.72           | 31.89                    | 65.84          | 74.00               | -8.16           | Vertical     |
| 9760.00         | 28.90             | 38.35                 | 14.25           | 31.62                    | 49.88          | 74.00               | -24.12          | Vertical     |
| 12200.00        | *                 |                       |                 |                          |                | 74.00               |                 | Vertical     |
| 14640.00        | *                 |                       |                 |                          |                | 74.00               |                 | Vertical     |
| 4880.00         | 47.87             | 31.85                 | 8.66            | 32.12                    | 56.26          | 74.00               | -17.74          | Horizontal   |
| 7320.00         | 49.97             | 36.41                 | 11.72           | 31.89                    | 66.21          | 74.00               | -7.79           | Horizontal   |
| 9760.00         | 31.55             | 38.35                 | 14.25           | 31.62                    | 52.53          | 74.00               | -21.47          | Horizontal   |
| 12200.00        | *                 |                       |                 |                          |                | 74.00               |                 | Horizontal   |
| 14640.00        | *                 |                       |                 |                          |                | 74.00               |                 | Horizontal   |

## Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 4880.00         | 40.25             | 31.85                 | 8.67            | 32.12                    | 48.65          | 54.00               | -5.35           | Vertical     |
| 7320.00         | 36.13             | 36.37                 | 11.72           | 31.89                    | 52.33          | 54.00               | -1.67           | Vertical     |
| 9760.00         | 16.61             | 38.35                 | 14.25           | 31.62                    | 37.59          | 54.00               | -16.41          | Vertical     |
| 12200.00        | *                 |                       |                 |                          |                | 54.00               |                 | Vertical     |
| 14640.00        | *                 |                       |                 |                          |                | 54.00               |                 | Vertical     |
| 4880.00         | 39.71             | 31.85                 | 8.67            | 32.12                    | 48.11          | 54.00               | -5.89           | Horizontal   |
| 7320.00         | 36.31             | 36.37                 | 11.72           | 31.89                    | 52.51          | 54.00               | -1.49           | Horizontal   |
| 9760.00         | 18.06             | 38.35                 | 14.25           | 31.62                    | 39.04          | 54.00               | -14.96          | Horizontal   |
| 12200.00        | *                 |                       |                 |                          |                | 54.00               |                 | Horizontal   |
| 14640.00        | *                 |                       |                 |                          |                | 54.00               |                 | Horizontal   |

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*”, means this data is the too weak instrument of signal is unable to test.

|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 4950.00         | 53.14             | 31.93                 | 8.73            | 32.16                    | 61.64          | 74.00               | -12.36          | Vertical     |
| 7425.00         | 49.88             | 36.59                 | 11.79           | 31.78                    | 66.48          | 74.00               | -7.52           | Vertical     |
| 9900.00         | 29.50             | 38.81                 | 14.38           | 31.88                    | 50.81          | 74.00               | -23.19          | Vertical     |
| 12375.00        | *                 |                       |                 |                          |                | 74.00               |                 | Vertical     |
| 14850.00        | *                 |                       |                 |                          |                | 74.00               |                 | Vertical     |
| 4950.00         | 48.53             | 31.93                 | 8.73            | 32.16                    | 57.03          | 74.00               | -16.97          | Horizontal   |
| 7425.00         | 50.62             | 36.59                 | 11.79           | 31.78                    | 67.22          | 74.00               | -6.78           | Horizontal   |
| 9900.00         | 31.76             | 38.81                 | 14.38           | 31.88                    | 53.07          | 74.00               | -20.93          | Horizontal   |
| 12375.00        | *                 |                       |                 |                          |                | 74.00               |                 | Horizontal   |
| 14850.00        | *                 |                       |                 |                          |                | 74.00               |                 | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 4950.00         | 40.69             | 31.93                 | 8.73            | 32.16                    | 49.19          | 54.00               | -4.81           | Vertical     |
| 7425.00         | 36.43             | 36.59                 | 11.79           | 31.78                    | 53.03          | 54.00               | -0.97           | Vertical     |
| 9900.00         | 16.88             | 38.81                 | 14.38           | 31.88                    | 38.19          | 54.00               | -15.81          | Vertical     |
| 12375.00        | *                 |                       |                 |                          |                | 54.00               |                 | Vertical     |
| 14850.00        | *                 |                       |                 |                          |                | 54.00               |                 | Vertical     |
| 4950.00         | 40.21             | 31.93                 | 8.73            | 32.16                    | 48.71          | 54.00               | -5.29           | Horizontal   |
| 7425.00         | 36.64             | 36.59                 | 11.79           | 31.78                    | 53.24          | 54.00               | -0.76           | Horizontal   |
| 9900.00         | 18.37             | 38.81                 | 14.38           | 31.88                    | 39.68          | 54.00               | -14.32          | Horizontal   |
| 12375.00        | *                 |                       |                 |                          |                | 54.00               |                 | Horizontal   |
| 14850.00        | *                 |                       |                 |                          |                | 54.00               |                 | Horizontal   |

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*”, means this data is the too weak instrument of signal is unable to test.



## 7.2.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2390.00         | 43.31             | 27.59                 | 5.38            | 30.18                    | 46.10          | 74.00               | -27.90          | Horizontal   |
| 2400.00         | 46.57             | 27.58                 | 5.39            | 30.18                    | 49.36          | 74.00               | -24.64          | Horizontal   |
| 2390.00         | 43.14             | 27.59                 | 5.38            | 30.18                    | 45.93          | 74.00               | -28.07          | Vertical     |
| 2400.00         | 45.23             | 27.58                 | 5.39            | 30.18                    | 48.02          | 74.00               | -25.98          | Vertical     |

### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2390.00         | 34.03             | 27.59                 | 5.38            | 30.18                    | 36.82          | 54.00               | -17.18          | Horizontal   |
| 2400.00         | 35.80             | 27.58                 | 5.39            | 30.18                    | 38.59          | 54.00               | -15.41          | Horizontal   |
| 2390.00         | 33.85             | 27.59                 | 5.38            | 30.18                    | 36.64          | 54.00               | -17.36          | Vertical     |
| 2400.00         | 35.18             | 27.58                 | 5.39            | 30.18                    | 37.97          | 54.00               | -16.03          | Vertical     |

|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

### Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 41.50             | 27.53                 | 5.47            | 29.93                    | 44.57          | 74.00               | -29.43          | Horizontal   |
| 2500.00         | 43.48             | 27.55                 | 5.49            | 29.93                    | 46.59          | 74.00               | -27.41          | Horizontal   |
| 2483.50         | 44.89             | 27.53                 | 5.47            | 29.93                    | 47.96          | 74.00               | -26.04          | Vertical     |
| 2500.00         | 44.41             | 27.55                 | 5.49            | 29.93                    | 47.52          | 74.00               | -26.48          | Vertical     |

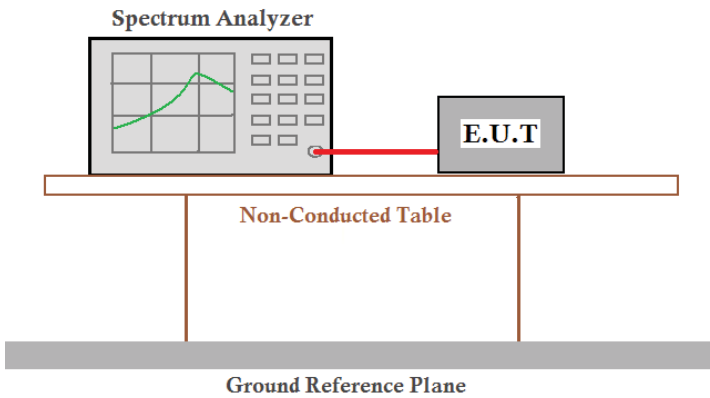
### Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 31.49             | 27.53                 | 5.47            | 29.93                    | 34.56          | 54.00               | -19.44          | Horizontal   |
| 2500.00         | 33.79             | 27.55                 | 5.49            | 29.93                    | 36.90          | 54.00               | -17.10          | Horizontal   |
| 2483.50         | 36.84             | 27.53                 | 5.47            | 29.93                    | 39.91          | 54.00               | -14.09          | Vertical     |
| 2500.00         | 33.65             | 27.55                 | 5.49            | 29.93                    | 36.76          | 54.00               | -17.24          | Vertical     |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

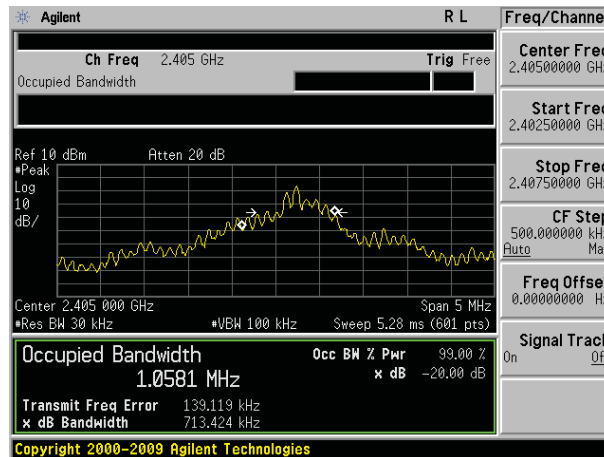
## 7.3 20dB Occupy Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                                                            |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.249/15.215                                                                                                                                                                                                                                                                                                                         |
| Test Method:      | ANSI C63.4:2003                                                                                                                                                                                                                                                                                                                                            |
| Limit:            | Operation Frequency range 2400MHz~2483.5MHz                                                                                                                                                                                                                                                                                                                |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 6.0 for details                                                                                                                                                                                                                                                                                                                           |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                           |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                       |

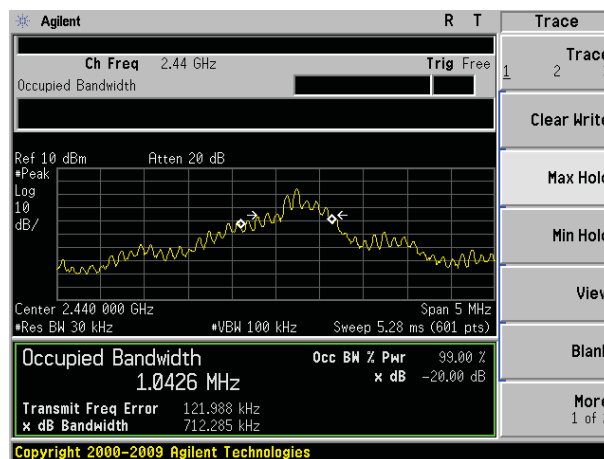
### Measurement Data

| Test channel | 20dB bandwidth(MHz) | Result |
|--------------|---------------------|--------|
| Lowest       | 0.713               | Pass   |
| Middle       | 0.712               | Pass   |
| Highest      | 0.717               | Pass   |

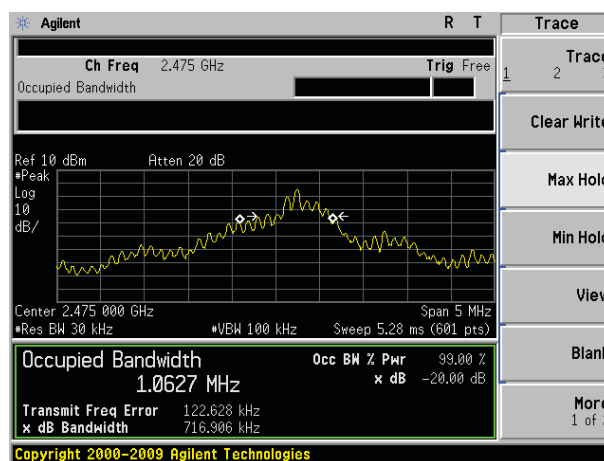
Test plot as follows:



Lowest channel



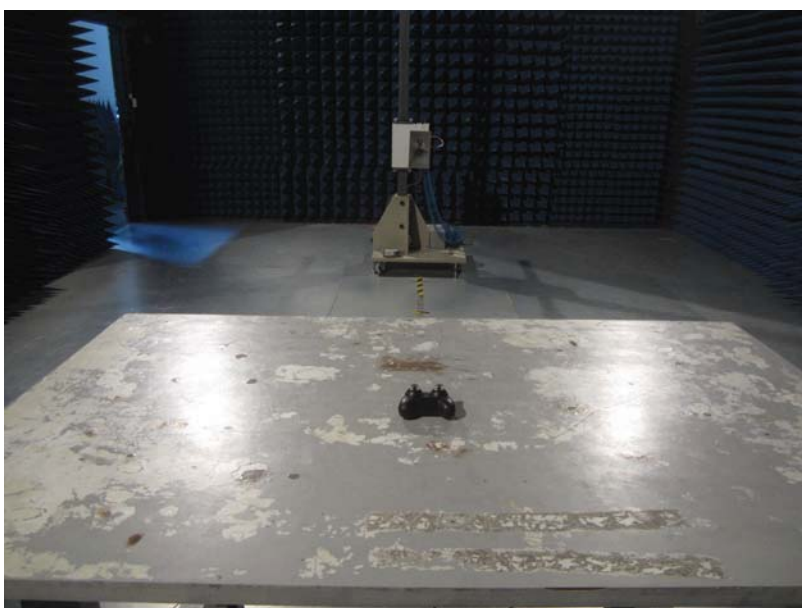
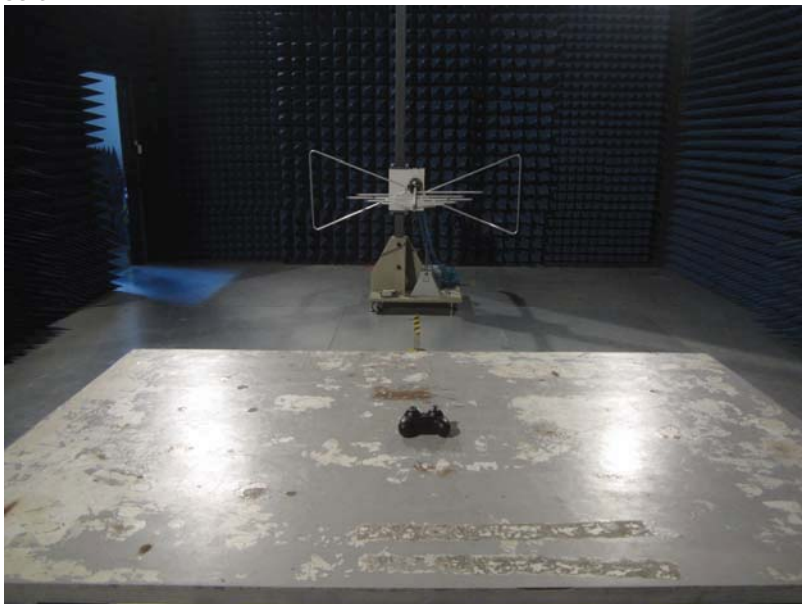
Middle channel



Highest channel

## 8 Test Setup Photo

Radiated Emission



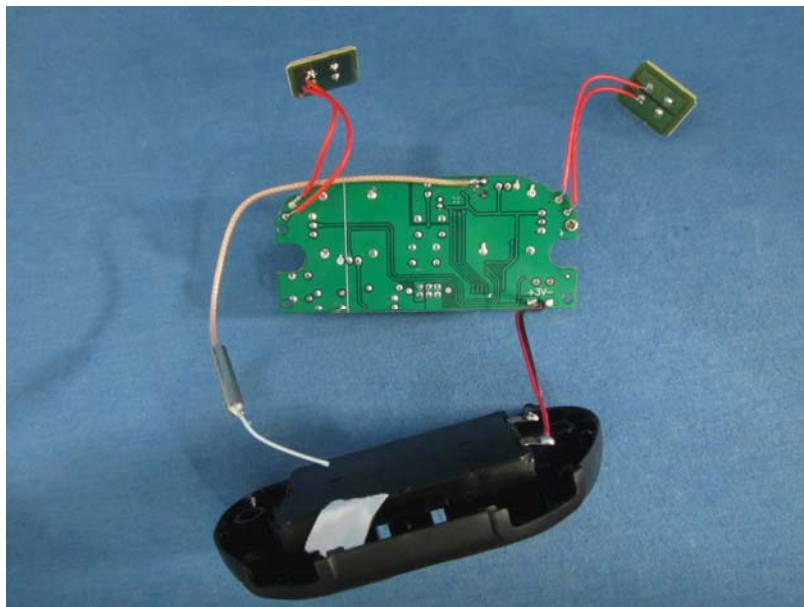
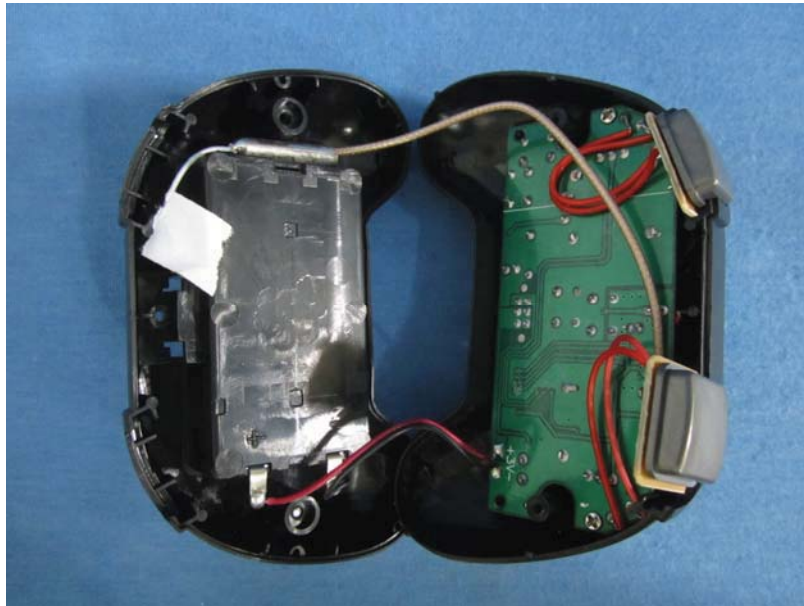
## 9 EUT Constructional Details



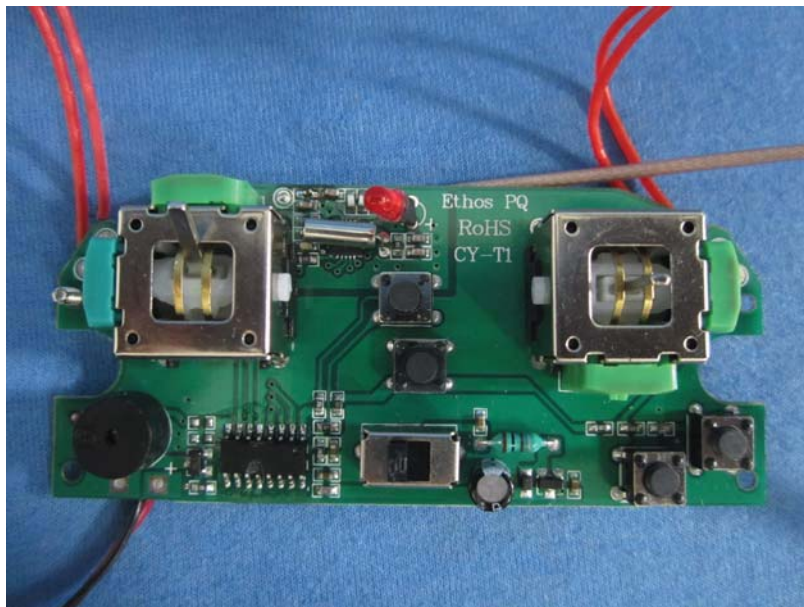
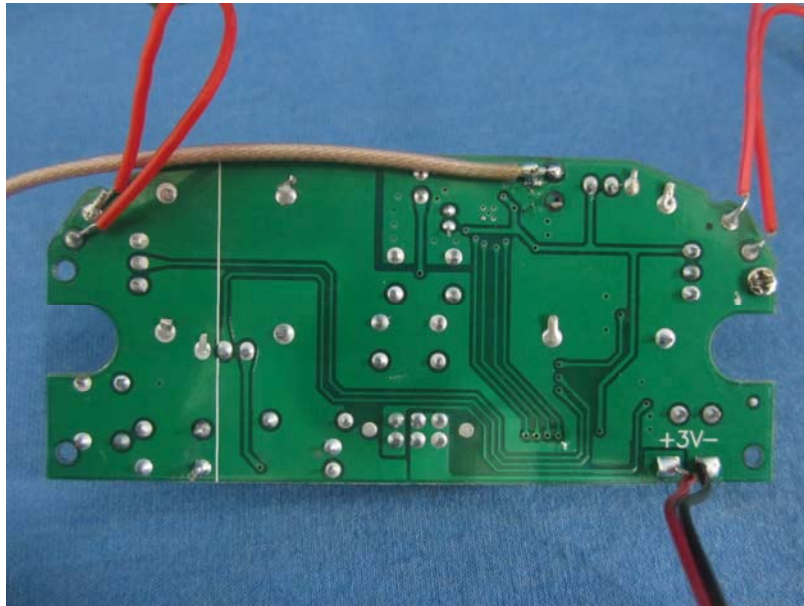


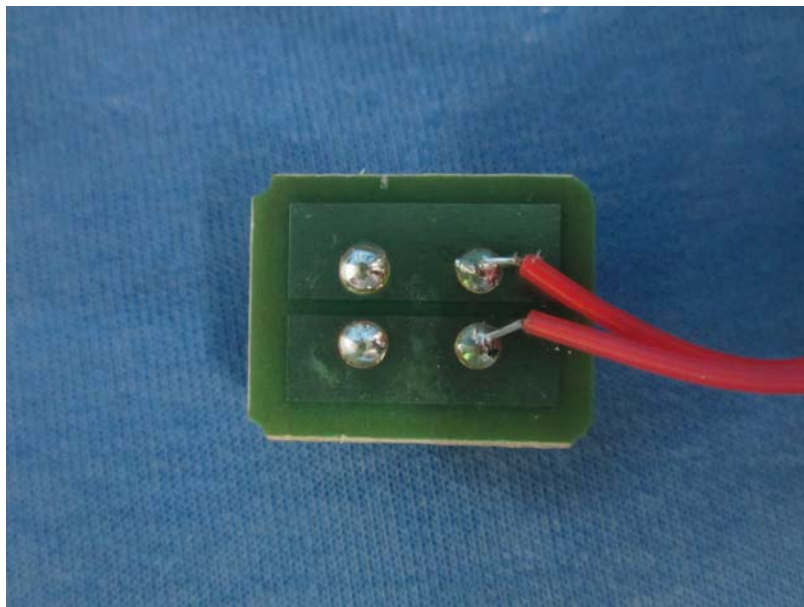
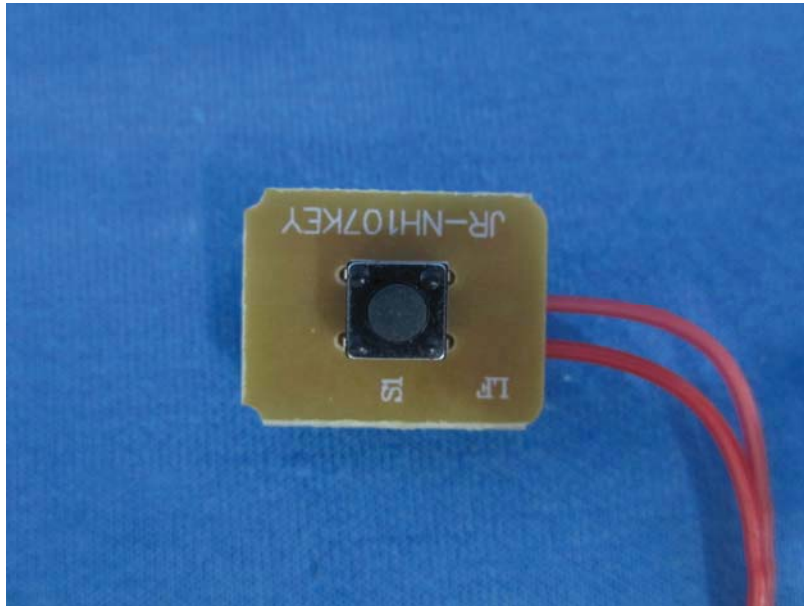


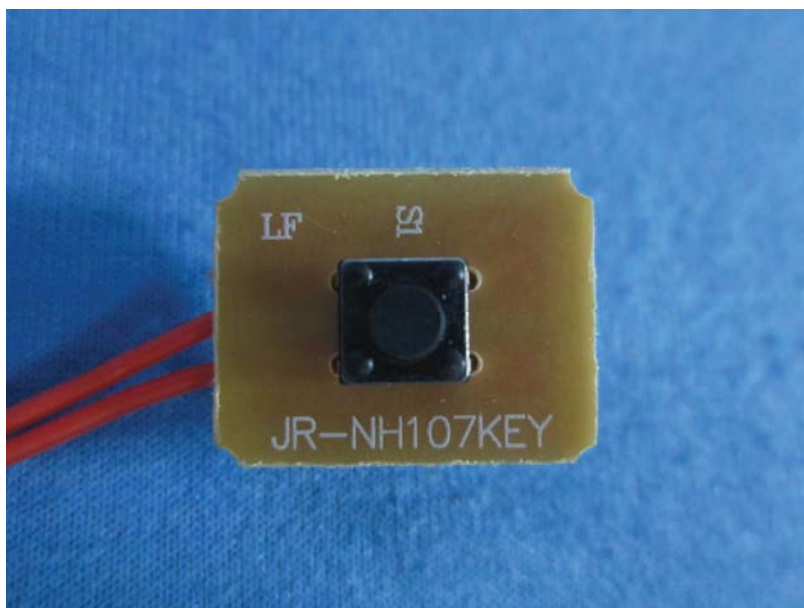
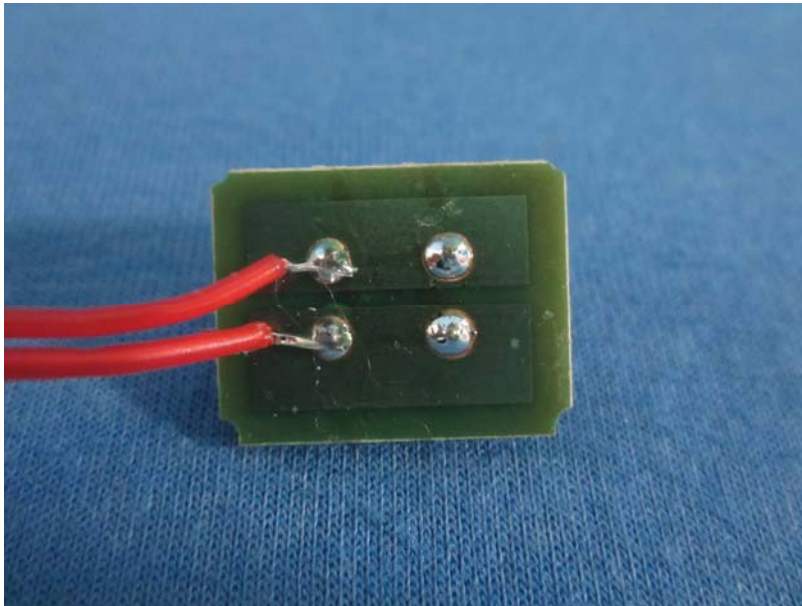












-----End-----