

# ***FCC TEST REPORT***

**FCC ID** : RIDGH-801

**Applicant** : **Globalsat Technology Corporation**  
16F., No.186, Jian Yi Road, Chung Ho City, Taipei Hsien ,Taiwan

**Equipment Under Test (EUT) :**

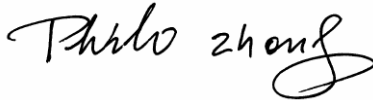
Product description : Pocketable GPS

Model No. : GH-801, GS-4303, GS-4305, GS-4306, GS-4307, GS-4308, GS-4309, GS-4310, GS-4311

**Standards** : FCC 15 Paragraph 15.247

**Date of Test** : July 3 , 2008

**Test Engineer** : Nunu.Deng

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### 3 Test Summary

| Test                                    | Test Requirement  | Test Method      | Class / Severity | Result |
|-----------------------------------------|-------------------|------------------|------------------|--------|
| Radiated Emission<br>(30MHz to 25GHz)   | FCC PART 15: 2003 | ANSI C63.4: 2003 | N/A              | PASS   |
| Conducted Emission<br>(150KHz to 30MHz) | FCC PART 15: 2003 | ANSI C63.4: 2003 | N/A              | N/A    |

## 4 General Information

### 4.1 Client Information

Applicant: **Globalsat Technology Corporation**  
Address of Applicant: 16F., No.186, Jian Yi Road, Chung Ho City, Taipei  
Hsien ,Taiwan

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

Product description: Pocketable GPS  
Model No.: GH-801, GS-4303, GS-4305, GS-4306, GS-4307, GS-4308, GS-4309, GS-4310, GS-4311

### 4.3 Details of E.U.T.

Power Supply: Car charge Input: 12V-24V  
Output:DC 6V Battery

### 4.4 Description of Support Units

The EUT has been tested as an independent unit.

### 4.5 Standards Applicable for Testing

The customer requested FCC tests for a Pocketable GPS. The standards used were FCC 15 Paragraph 15.247, Paragraph 15.205, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

#### **4.6 Test Facility**

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

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) 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 880581. June 24, 2008.

#### **4.7 Test Location**

All Emissions tests were performed at:-

1/F, Fukangtai Building, West Baima Rd., Songgang Street,  
Baoan District, Shenzhen 518105, China

## 5 Equipment Used during Test

| Equipment                                                                                            | Brand Name                        | Model          | Related standards                     | Cal.Intal<br>Months | Last Cal.<br>Date | Serial No      |
|------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|---------------------------------------|---------------------|-------------------|----------------|
| <b>3m Anechoic chamber</b>                                                                           |                                   |                |                                       |                     |                   |                |
| EMC Analyzer                                                                                         | Agilent                           | E7405A         | ISO9001:2000                          | 12                  | Jan-08            | MY4511494<br>3 |
| Trilog Broadband<br>Antenne 30-3000<br>MHz                                                           | SCHWARZB<br>ECK MESS-<br>ELEKTROM | VULB9163       | EN/ISO/IEC<br>17025 DIN<br>EN ISO9001 | 12                  | Jan-08            | 336            |
| Broad-band Horn<br>Antenna                                                                           | SCHWARZB<br>ECK MESS-<br>ELEKTROM | BBHA 9120<br>D | EN/ISO/IEC<br>17025 DIN<br>EN ISO9001 | 12                  | Jan-08            | 667            |
| Broadband<br>Preamplifier                                                                            | SCHWARZB<br>ECK MESS-<br>ELEKTROM | BBV 9718       | EN/ISO/IEC<br>17025 DIN<br>EN ISO9001 | 12                  | Jan-08            | 9718-148       |
| 10m Coaxial Cable<br>with N-male<br>Connectors usable up<br>to 18 GHz,                               | SCHWARZB<br>ECK MESS-<br>ELEKTROM | AK 9515 H      | EN/ISO/IEC<br>17025 DIN<br>EN ISO9001 | 12                  | Jan-08            | -              |
| 10m 50 Ohm Coaxial<br>Cable with N-<br>plug,individual<br>length,usable up to<br>3(5)GHz, Connectors | SCHWARZB<br>ECK MESS-<br>ELEKTROM | AK 9513        | EN/ISO/IEC<br>17025 DIN<br>EN ISO9001 | 12                  | Jan-08            | -              |
| Positioning Controller                                                                               | C&C LAB                           | CC-C-IF        | ISO9001                               | 12                  | Jan-08            | MF7802108      |
| Color Monitor                                                                                        | SUNSP0                            | SP-14C         | ISO9001                               | 12                  | Jan-08            | -              |
| <b>EMI Shielded Room</b>                                                                             |                                   |                |                                       |                     |                   |                |
| Test Receiver                                                                                        | ROHDE&SC<br>HWARZ                 | ESPI           | ISO9001                               | 12                  | Jan-08            | 101155         |
| Two-Line<br>V-Network                                                                                | ROHDE&SC<br>HWARZ                 | ENV216         | ISO9001<br>EN/ISO/IEC<br>17025        | 12                  | Jan-08            | 100115         |
| Absorbing Clamp                                                                                      | ROHDE&SC<br>HWARZ                 | MDS-21         | ISO9001<br>EN/ISO/IEC<br>17025        | 12                  | Jan-08            | 100205         |

|                                                                                                      |                                   |         |                                       |    |        |   |
|------------------------------------------------------------------------------------------------------|-----------------------------------|---------|---------------------------------------|----|--------|---|
| 10m 50 Ohm Coaxial<br>Cable with N-<br>plug,individual<br>length,usable up to<br>3(5)GHz, Connectors | SCHWARZB<br>ECK MESS-<br>ELEKTROM | AK 9514 | EN/ISO/IEC<br>17025 DIN<br>EN ISO9001 | 12 | Jan-08 | - |
|------------------------------------------------------------------------------------------------------|-----------------------------------|---------|---------------------------------------|----|--------|---|

## 6 Conducted Emission Test

|                   |                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 Paragraph 15.207                                                                                            |
| Test Method:      | Based on FCC Part15 Paragraph 15.207                                                                                   |
| Test Date:        | .....                                                                                                                  |
| Frequency Range:  | 150kHz to 30MHz                                                                                                        |
| Class:            | Class B                                                                                                                |
| Detector:         | Peak for pre-scan (9kHz Resolution Bandwidth)<br>Quasi-Peak & Average if maximised peak within 6dB of<br>Average Limit |

### 6.1 Test Equipment

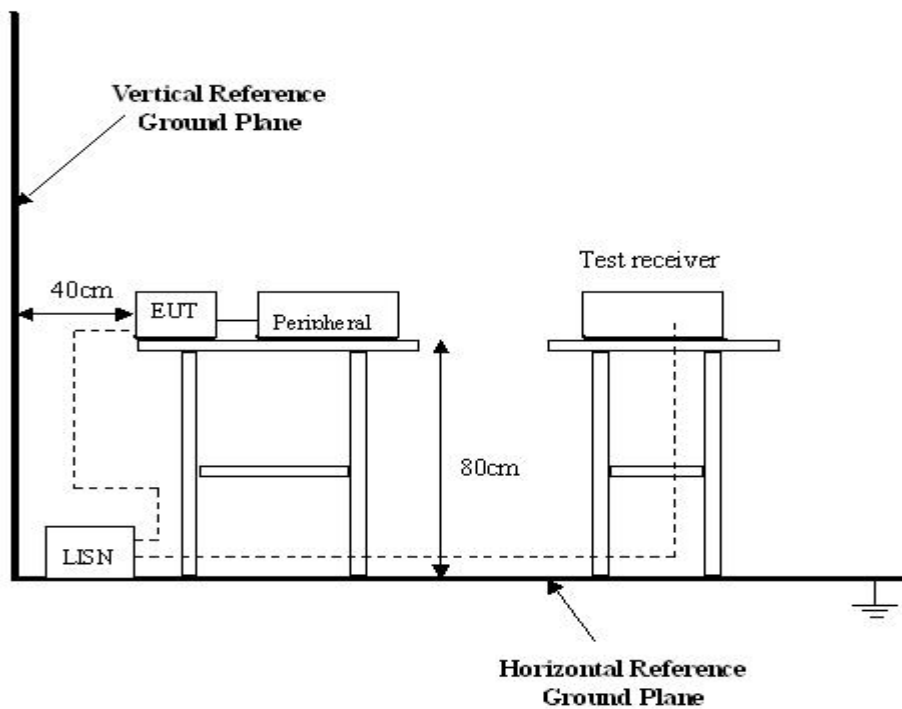
Please refer to Section 5 this report.

### 6.2 Test Procedure

1. The EUT was connected with signal generator and placed on a table.
2. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.
3. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 6.3 Conducted Test Setup

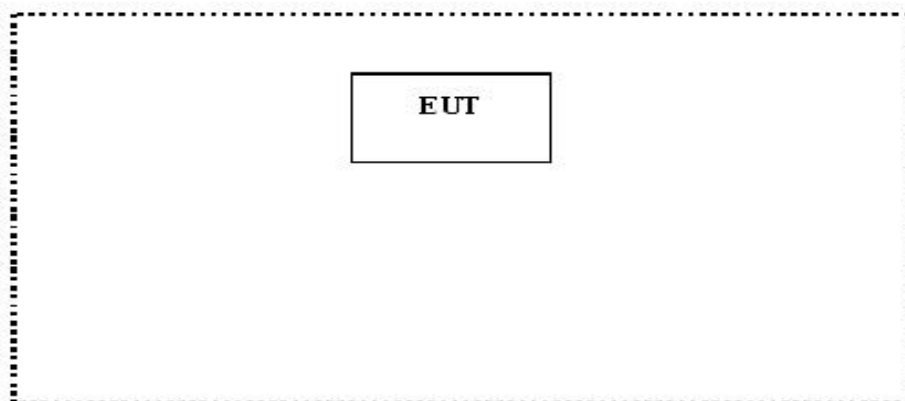
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



### 6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4:2003.

- Setup the EUT and simulators as shown on follow.
- Enable RF signal and confirm EUT active.
- Modulate output capacity of EUT up to specification.



## **6.5 Conducted Emission Limits**

66-56 dB $\mu$ V/m between 0.15MHz & 0.5MHz

56 dB $\mu$ V/m between 0.5MHz & 5MHz

60 dB $\mu$ V/m between 5MHz & 30MHz

**Note:** In the above limits, the tighter limit applies at the band edges.

## **6.6 Conducted Emission Test Data**

Owing to the DC operation of EUT, this test is not performed.

## 7 Radiation Emission Test

|                       |                                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------------------------|
| Test Requirement:     | FCC Part15 Paragraph 15.247                                                                         |
| Test Method:          | Based on ANSI 63.4:2003                                                                             |
| Test Date:            | July 3, 2008                                                                                        |
| Frequency Range:      | 30MHz to 25GHz                                                                                      |
| Measurement Distance: | 3m                                                                                                  |
| Detector:             | Peak for pre-scan (120kHz resolution bandwidth)<br>Quasi-Peak if maximised peak within 6dB of limit |

### 7.1 Test Equipment

Please refer to Section 5 this report.

### 7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

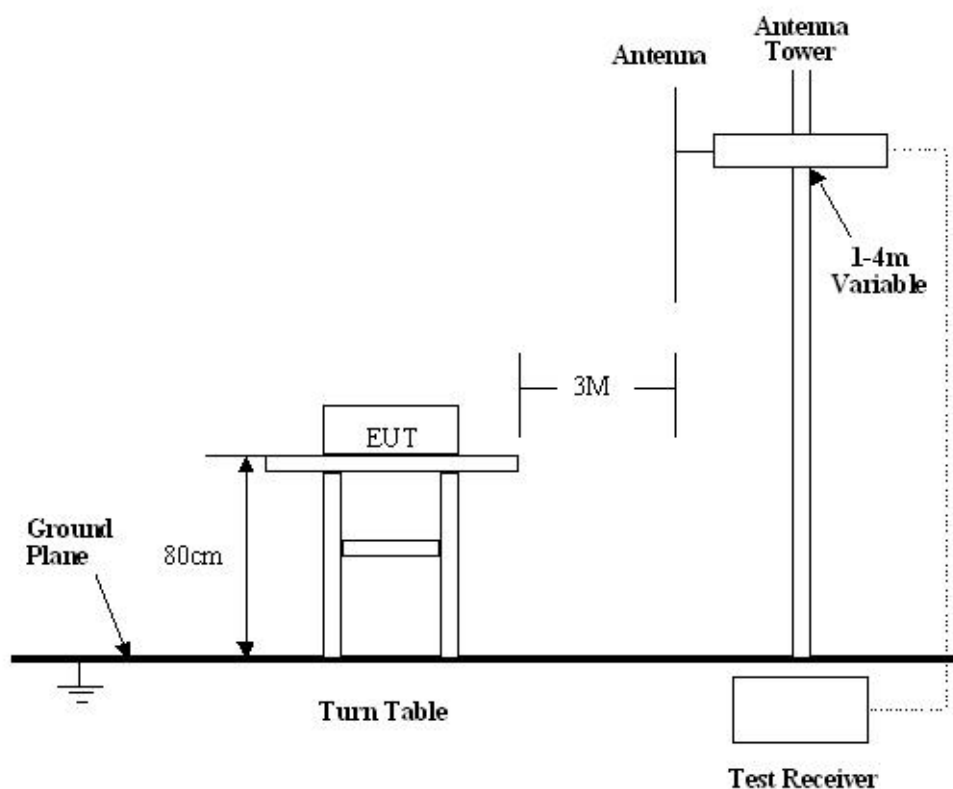
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at WALTEK SERVICES EMC Lab is +4.0 dB.

### 7.3 Test Procedure

1. The EUT was connected with signal generator and placed on a table.
2. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
3. All data was recorded in the peak and average detection mode.
4. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

## 7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.209 limits and Paragraph 15.247 limits.



## 7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.247 Rules, the system was tested to 25000 MHz.

|                                    |           |
|------------------------------------|-----------|
| Start Frequency .....              | 30 MHz    |
| Stop Frequency .....               | 25000 MHz |
| Sweep Speed                        | Auto      |
| IF Bandwidth .....                 | 100 kHz   |
| Video Bandwidth .....              | 1 MHz     |
| Quasi-Peak Adapter Bandwidth ..... | 120 kHz   |
| Quasi-Peak Adapter Mode .....      | Normal    |
| Resolution Bandwidth .....         | 1MHz      |

## 7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB $\mu$ V means the emission is 7dB $\mu$ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

## 7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.247 standards.

## 7.8 EUT Operating Condition

Same as section 6.4 of this report.

Let the EUT work in test mode and test it.

## 7.9 Radiated Emissions Limit on Paragraph 15.209

| Frequency(MHZ) | Distance(m) | Field strength(dBuV/m) |
|----------------|-------------|------------------------|
| 30-88          | 3           | 40.0                   |
| 88-216         | 3           | 43.5                   |
| 216-960        | 3           | 46.0                   |
| Above 960      | 3           | 54.0                   |

- Note:**
- (1)  $\text{RF Voltage(dBuV)} = 20 \log \text{RF Voltage(uV)}$
  - (2) In the Above Table, the tighter limit applies at the band edges.
  - (3) Distance refers to the distance in meters between the measuring instrument antenna.
  - (4) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
  - (5) Above 1GHz, do a Peak and average measurements for all emissions, Limit for peak is 74dBuV/m, According to Part 15.35(b) and average is 54BuV/m.

### 7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding  
The meter reading of the spectrum analyzer (which is set to read in units of dBuV)  
To the antenna correction factor supplied by the antenna manufacturer. The antenna  
Correction factors are stated in terms of dB. The gain of the pressletor was accounted  
For in the spectrum analyzer meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS

33 20dBuV+10.36dB=30.36dBuV/m @3m

### 7.11 Radiated Emission Data

A. Test Item: Radiated Emission Data  
Test Voltage: 120VAC  
Test Mode: TX On  
Temperature: 24 °C  
Humidity: 52%RH  
Test Result: PASS

Remarks: 30-1000MHz radiation test no significant emissions above the equipment noise floor were detected.

| Frequency (MHz) | Detector | Antenna Polarization | Emission Level (dBuV/m) | FCC 15 Subpart C Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Turntable Angle (°) |
|-----------------|----------|----------------------|-------------------------|---------------------------------|-------------|--------------------|---------------------|
| Low frequency   |          |                      |                         |                                 |             |                    |                     |
| 2402.00         | AV       | Vertical             | 90.27                   |                                 | (Fund.)     | 1.5                | 90                  |
| 4804.00         | AV       | Vertical             | 30.14                   | 54.00                           | 23.86       | 1.5                | 120                 |
| 7206.00         | AV       | Vertical             | 30.23                   | 54.00                           | 23.77       | 1.8                | 100                 |
| 9608.00         | AV       | Vertical             | 30.37                   | 54.00                           | 23.63       | 1.5                | 90                  |
| 12010.00        | AV       | Vertical             | 30.11                   | 54.00                           | 23.89       | 1.0                | 60                  |
| 14412.00        | AV       | Vertical             | 30.39                   | 54.00                           | 23.61       | 1.5                | 60                  |
| 16814.00        | AV       | Vertical             | 30.28                   | 54.00                           | 23.72       | 1.8                | 100                 |
| 19216.00        | AV       | Vertical             | 30.67                   | 54.00                           | 23.33       | 1.8                | 180                 |
| 21618.00        | AV       | Vertical             | 30.59                   | 54.00                           | 23.41       | 1.5                | 100                 |
| 24020.00        | AV       | Vertical             | 30.73                   | 54.00                           | 23.27       | 1.0                | 45                  |

|                  |    |            |        |       |         |     |     |
|------------------|----|------------|--------|-------|---------|-----|-----|
| 2402.00          | AV | Horizontal | 91.36  |       | (Fund.) | 1.5 | 45  |
| 4804.00          | AV | Horizontal | 32.55  | 54.00 | 21.45   | 1.6 | 180 |
| 7206.00          | AV | Horizontal | 32.16  | 54.00 | 21.84   | 1.5 | 60  |
| 9608.00          | AV | Horizontal | 32.03  | 54.00 | 21.97   | 1.0 | 90  |
| 12010.00         | AV | Horizontal | 34.21  | 54.00 | 19.79   | 1.8 | 45  |
| 14412.00         | AV | Horizontal | 30.36  | 54.00 | 23.64   | 1.0 | 120 |
| 16814.00         | AV | Horizontal | 30.74  | 54.00 | 23.26   | 1.8 | 180 |
| 19216.00         | AV | Horizontal | 31.22  | 54.00 | 22.78   | 1.5 | 90  |
| 21618.00         | AV | Horizontal | 31.53  | 54.00 | 22.47   | 1.5 | 60  |
| 24020.00         | AV | Horizontal | 32.36  | 54.00 | 21.64   | 1.0 | 60  |
| 2402.00          | PK | Vertical   | 101.25 |       | (Fund.) | 1.5 | 90  |
| 4804.00          | PK | Vertical   | 43.16  | 74.00 | 340.84  | 1.5 | 100 |
| 7206.00          | PK | Vertical   | 37.88  | 74.00 | 36.12   | 1.8 | 120 |
| 9608.00          | PK | Vertical   | 37.42  | 74.00 | 36.58   | 1.8 | 100 |
| 12010.00         | PK | Vertical   | 35.63  | 74.00 | 38.37   | 1.0 | 90  |
| 14412.00         | PK | Vertical   | 37.77  | 74.00 | 36.23   | 1.8 | 90  |
| 16814.00         | PK | Vertical   | 35.89  | 74.00 | 38.11   | 1.0 | 60  |
| 19216.00         | PK | Vertical   | 38.67  | 74.00 | 35.33   | 1.8 | 100 |
| 21618.00         | PK | Vertical   | 38.78  | 74.00 | 35.22   | 1.5 | 120 |
| 24020.00         | PK | Vertical   | 34.31  | 74.00 | 39.69   | 1.5 | 45  |
| 2402.00          | PK | Horizontal | 102.37 |       | (Fund.) | 1.5 | 45  |
| 4804.00          | PK | Horizontal | 40.21  | 74.00 | 39.79   | 1.6 | 60  |
| 7206.00          | PK | Horizontal | 35.76  | 74.00 | 38.24   | 1.5 | 100 |
| 9608.00          | PK | Horizontal | 37.33  | 74.00 | 36.67   | 1.0 | 90  |
| 12010.00         | PK | Horizontal | 33.19  | 74.00 | 40.81   | 1.0 | 60  |
| 14412.00         | PK | Horizontal | 33.62  | 74.00 | 40.38   | 1.5 | 60  |
| 16814.00         | PK | Horizontal | 30.73  | 74.00 | 43.27   | 1.8 | 100 |
| 19216.00         | PK | Horizontal | 33.57  | 74.00 | 40.43   | 1.8 | 120 |
| 21618.00         | PK | Horizontal | 33.59  | 74.00 | 40.41   | 1.8 | 180 |
| 24020.00         | PK | Horizontal | 35.88  | 74.00 | 38.12   | 1.0 | 120 |
| Middle frequency |    |            |        |       |         |     |     |
| 2441.00          | AV | Vertical   | 86.37  |       | (Fund.) | 1.5 | 90  |
| 4882.00          | AV | Vertical   | 30.19  | 54.00 | 23.81   | 1.5 | 45  |
| 7323.00          | AV | Vertical   | 30.24  | 54.00 | 23.76   | 1.6 | 60  |

|          |    |            |        |       |         |     |     |
|----------|----|------------|--------|-------|---------|-----|-----|
| 9764.00  | AV | Vertical   | 30.33  | 54.00 | 22.67   | 1.0 | 100 |
| 12205.00 | AV | Vertical   | 30.87  | 54.00 | 22.13   | 1.8 | 180 |
| 14646.00 | AV | Vertical   | 30.73  | 54.00 | 23.27   | 1.0 | 120 |
| 17087.00 | AV | Vertical   | 30.26  | 54.00 | 23.74   | 1.6 | 100 |
| 19528.00 | AV | Vertical   | 30.17  | 54.00 | 23.83   | 1.6 | 180 |
| 21969.00 | AV | Vertical   | 33.65  | 54.00 | 20.35   | 1.5 | 90  |
| 24410.00 | AV | Vertical   | 33.86  | 54.00 | 20.14   | 1.0 | 45  |
| 2441.00  | AV | Horizontal | 87.25  |       | (Fund.) | 1.5 | 100 |
| 4882.00  | AV | Horizontal | 33.94  | 54.00 | 20.06   | 1.5 | 180 |
| 7323.00  | AV | Horizontal | 30.33  | 54.00 | 23.67   | 1.8 | 90  |
| 9764.00  | AV | Horizontal | 32.52  | 54.00 | 21.48   | 1.0 | 100 |
| 12205.00 | AV | Horizontal | 31.45  | 54.00 | 22.55   | 1.8 | 120 |
| 14646.00 | AV | Horizontal | 30.67  | 54.00 | 23.33   | 1.6 | 90  |
| 17087.00 | AV | Horizontal | 30.24  | 54.00 | 23.76   | 1.5 | 45  |
| 19528.00 | AV | Horizontal | 31.86  | 54.00 | 22.14   | 1.8 | 180 |
| 21969.00 | AV | Horizontal | 30.59  | 54.00 | 23.41   | 1.6 | 120 |
| 24410.00 | AV | Horizontal | 30.71  | 54.00 | 23.29   | 1.0 | 120 |
| 2441.00  | PK | Vertical   | 103.87 |       | (Fund.) | 1.5 | 120 |
| 4882.00  | PK | Vertical   | 40.23  | 74.00 | 33.77   | 1.5 | 60  |
| 7323.00  | PK | Vertical   | 37.62  | 74.00 | 36.38   | 1.5 | 90  |
| 9764.00  | PK | Vertical   | 38.94  | 74.00 | 35.06   | 1.6 | 100 |
| 12205.00 | PK | Vertical   | 37.87  | 74.00 | 36.13   | 1.5 | 120 |
| 14646.00 | PK | Vertical   | 38.36  | 74.00 | 35.64   | 1.8 | 90  |
| 17087.00 | PK | Vertical   | 39.47  | 74.00 | 34.53   | 1.0 | 180 |
| 19528.00 | PK | Vertical   | 39.85  | 74.00 | 34.15   | 1.5 | 120 |
| 21969.00 | PK | Vertical   | 40.22  | 74.00 | 33.78   | 1.6 | 45  |
| 24410.00 | PK | Vertical   | 45.61  | 74.00 | 28.39   | 1.8 | 90  |
| 2441.00  | PK | Horizontal | 103.89 |       | (Fund.) | 1.5 | 100 |
| 4882.00  | PK | Horizontal | 46.68  | 74.00 | 27.32   | 1.8 | 45  |
| 7323.00  | PK | Horizontal | 41.51  | 74.00 | 32.49   | 1.5 | 60  |
| 9764.00  | PK | Horizontal | 40.14  | 74.00 | 33.86   | 1.5 | 90  |
| 12205.00 | PK | Horizontal | 39.36  | 74.00 | 34.64   | 1.6 | 100 |
| 14646.00 | PK | Horizontal | 38.74  | 74.00 | 35.26   | 1.0 | 120 |
| 17087.00 | PK | Horizontal | 36.82  | 74.00 | 37.18   | 1.8 | 180 |

|                |    |            |        |       |         |     |     |
|----------------|----|------------|--------|-------|---------|-----|-----|
| 19528.00       | PK | Horizontal | 38.86  | 74.00 | 35.14   | 1.5 | 120 |
| 21969.00       | PK | Horizontal | 40.22  | 74.00 | 33.78   | 1.5 | 100 |
| 24410.00       | PK | Horizontal | 40.67  | 74.00 |         | 1.6 | 45  |
| High frequency |    |            |        |       |         |     |     |
| 2480.00        | AV | Vertical   | 86.52  |       | (Fund.) | 1.5 | 100 |
| 4960.00        | AV | Vertical   | 30.26  | 54.00 | 23.74   | 1.5 | 45  |
| 7440.00        | AV | Vertical   | 30.73  | 54.00 | 23.27   | 1.5 | 120 |
| 9920.00        | AV | Vertical   | 30.26  | 54.00 | 23.74   | 1.6 | 90  |
| 12400.00       | AV | Vertical   | 30.55  | 54.00 | 23.45   | 1.8 | 45  |
| 14880.00       | AV | Vertical   | 30.34  | 54.00 | 23.66   | 1.5 | 100 |
| 17360.00       | AV | Vertical   | 30.62  | 54.00 | 23.38   | 1.6 | 120 |
| 19840.00       | AV | Vertical   | 30.13  | 54.00 | 23.87   | 1.8 | 90  |
| 22320.00       | AV | Vertical   | 30.27  | 54.00 | 23.73   | 1.5 | 90  |
| 24800.00       | AV | Vertical   | 30.84  | 54.00 | 23.16   | 1.5 | 60  |
| 2480.00        | AV | Horizontal | 88.72  |       | (Fund.) | 1.5 | 180 |
| 4960.00        | AV | Horizontal | 30.95  | 54.00 | 23.05   | 1.5 | 100 |
| 7440.00        | AV | Horizontal | 30.35  | 54.00 | 23.65   | 1.5 | 90  |
| 9920.00        | AV | Horizontal | 31.47  | 54.00 | 22.53   | 1.0 | 60  |
| 12400.00       | AV | Horizontal | 31.89  | 54.00 | 22.11   | 1.6 | 90  |
| 14880.00       | AV | Horizontal | 32.42  | 54.00 | 21.58   | 1.0 | 100 |
| 17360.00       | AV | Horizontal | 31.17  | 54.00 | 22.83   | 1.8 | 120 |
| 19840.00       | AV | Horizontal | 30.55  | 54.00 | 23.45   | 1.5 | 180 |
| 22320.00       | AV | Horizontal | 32.86  | 54.00 | 21.14   | 1.0 | 100 |
| 24800.00       | AV | Horizontal | 33.25  | 54.00 | 20.75   | 1.6 | 60  |
| 2480.00        | PK | Vertical   | 101.62 |       | (Fund.) | 1.5 | 60  |
| 4960.00        | PK | Vertical   | 39.94  | 74.00 | 34.06   | 1.5 | 100 |
| 7440.00        | PK | Vertical   | 36.83  | 74.00 | 37.17   | 1.5 | 180 |
| 9920.00        | PK | Vertical   | 35.35  | 74.00 | 38.65   | 1.8 | 90  |
| 12400.00       | PK | Vertical   | 35.56  | 74.00 | 38.44   | 1.0 | 90  |
| 14880.00       | PK | Vertical   | 34.72  | 74.00 | 39.28   | 1.6 | 60  |
| 17360.00       | PK | Vertical   | 36.87  | 74.00 | 37.13   | 1.8 | 45  |
| 19840.00       | PK | Vertical   | 36.26  | 74.00 | 37.74   | 1.5 | 100 |
| 22320.00       | PK | Vertical   | 36.73  | 74.00 | 37.27   | 1.5 | 90  |
| 24800.00       | PK | Vertical   | 36.33  | 74.00 | 37.67   | 1.6 | 60  |

|          |    |          |        |       |         |     |     |
|----------|----|----------|--------|-------|---------|-----|-----|
| 2480.00  | PK | Vertical | 102.75 |       | (Fund.) | 1.5 | 60  |
| 4960.00  | PK | Vertical | 40.57  | 74.00 | 33.43   | 1.5 | 90  |
| 7440.00  | PK | Vertical | 38.64  | 74.00 | 35.36   | 1.5 | 90  |
| 9920.00  | PK | Vertical | 35.37  | 74.00 | 38.63   | 1.6 | 90  |
| 12400.00 | PK | Vertical | 35.52  | 74.00 | 38.48   | 1.6 | 45  |
| 14880.00 | PK | Vertical | 35.26  | 74.00 | 38.74   | 1.5 | 60  |
| 17360.00 | PK | Vertical | 36.41  | 74.00 | 37.59   | 1.8 | 100 |
| 19840.00 | PK | Vertical | 39.25  | 74.00 | 34.75   | 1.8 | 120 |
| 22320.00 | PK | Vertical | 40.11  | 74.00 | 33.89   | 1.0 | 180 |
| 24800.00 | PK | Vertical | 40.62  | 74.00 | 33.38   | 1.6 | 60  |

## **8 Antenna Requirement.**

According to the FCC Part 15 Paragraph 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. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section

## 9 Maximum Peak Output Power

|                   |                                                                                      |
|-------------------|--------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 Paragraph 15.247                                                          |
| Test Method:      | Based on ANSI 63.4:2003                                                              |
| Test Date:        | July 3, 2008                                                                         |
| Test mode:        | Compliance test in the worse case: Tx Low/Tx Middle/Tx High                          |
| Requirements:     | Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1W(30dBm) |

### Test procedure:

The following test procedure as below:

The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyser using 1MHz RBW and 1MHz VBW.

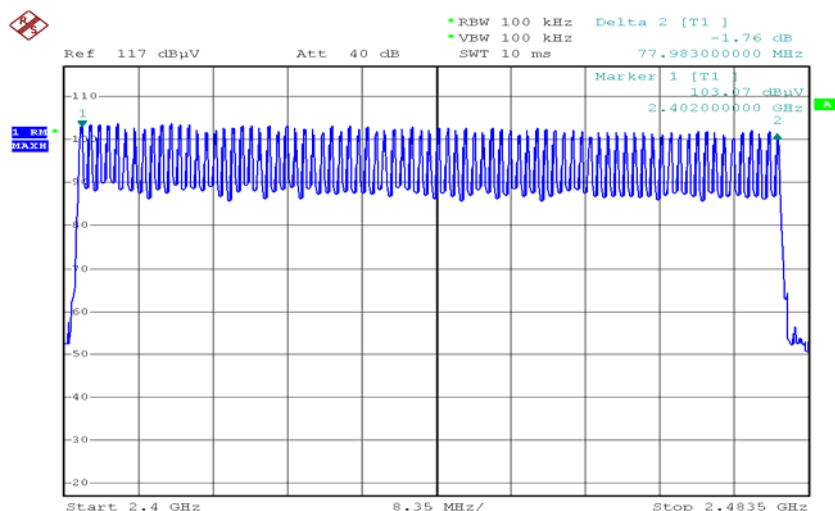
**Test Result:** The unit does meet the FCC requirements.

| Test Channel | Fundamental Frequency(GHz) | Output Power (mW) | Limit (W) | Power output level |
|--------------|----------------------------|-------------------|-----------|--------------------|
| low          | 2.402                      | 0.522             | 1         | ERP                |
| middle       | 2.441                      | 0.469             | 1         | ERP                |
| high         | 2.480                      | 0.470             | 1         | ERP                |

## 10 Hopping Channel Number

|                   |                                                                                                                                       |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 C                                                                                                                          |
| Test Method:      | Based on FCC Part15 Paragraph 15.247                                                                                                  |
| Test Date:        | July 3, 2008                                                                                                                          |
| Test mode:        | The EUT work in test mode(Tx) and test it                                                                                             |
| Requirements:     | Regulation 15.247(b) For frequency hopping systems operating<br>In the 2400-2483.5MHz band employing at least 75 hopping<br>channels. |
| Test result:      | The total number of channels would be 79 channels.<br>The unit does meet the FCC requirements.                                        |

Please refer the graph as below:



1  
Date: 3.JUL.2008 18:55:33

## 11 Carrier Frequencies Separated

Test Requirement: FCC Part15 C

Test Method: Based on FCC Part15 Paragraph 15.247

Test Date: July 3, 2008

Test mode: The EUT work in test mode(Tx) and test it

Requirements: The bandwidth of the fundamental frequency was measur by spectrum analyser with 100kHz RBW and 100kHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

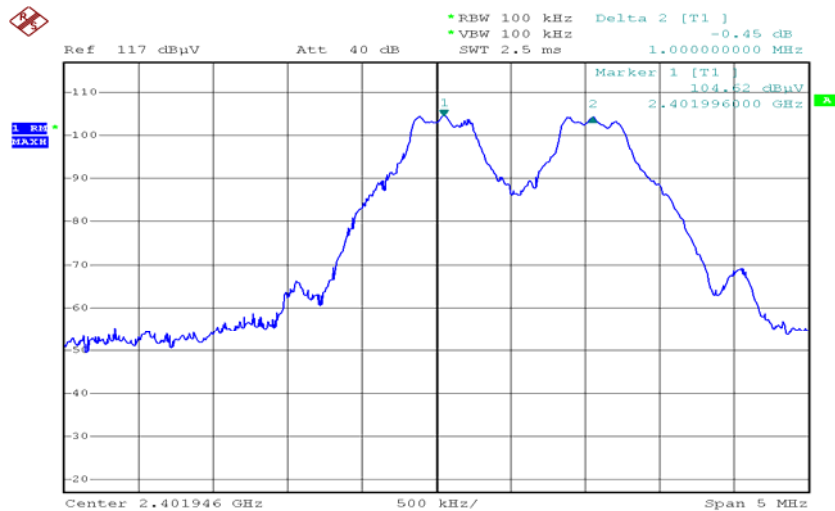
Test result: PASS

### Channel Carrier Frequency Separated

| Test Channel                                               | Carrier Frequencies Separated | PASS/FAIL |
|------------------------------------------------------------|-------------------------------|-----------|
| Lower Channels<br>(channel 2402MHZ and<br>channel 2403MHZ) | 1MHz                          | Pass      |
| Lower Channels<br>(channel 2441MHZ and<br>channel 2442MHZ) | 1MHz                          | Pass      |
| Lower Channels<br>(channel 2479MHZ and<br>channel 2480MHZ) | 1MHz                          | Pass      |

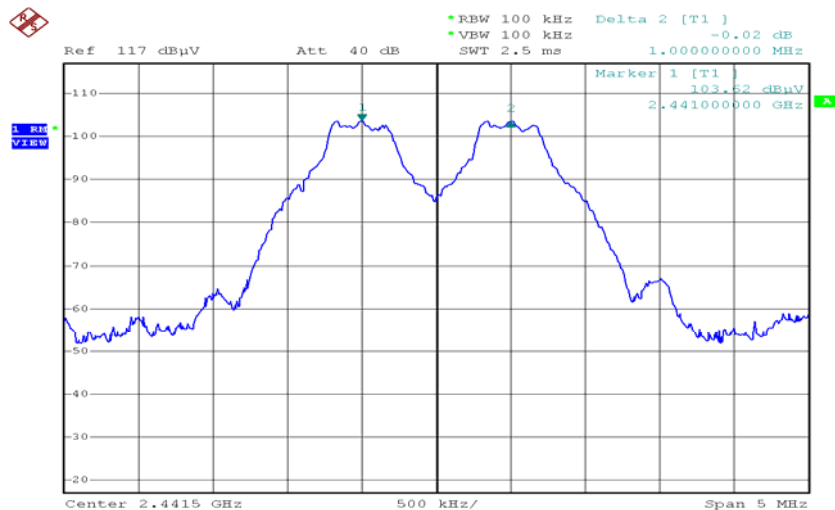
The unit does meet the FCC requirements.

## 11.1 Lower Channel: Carrier Frequencies Separated



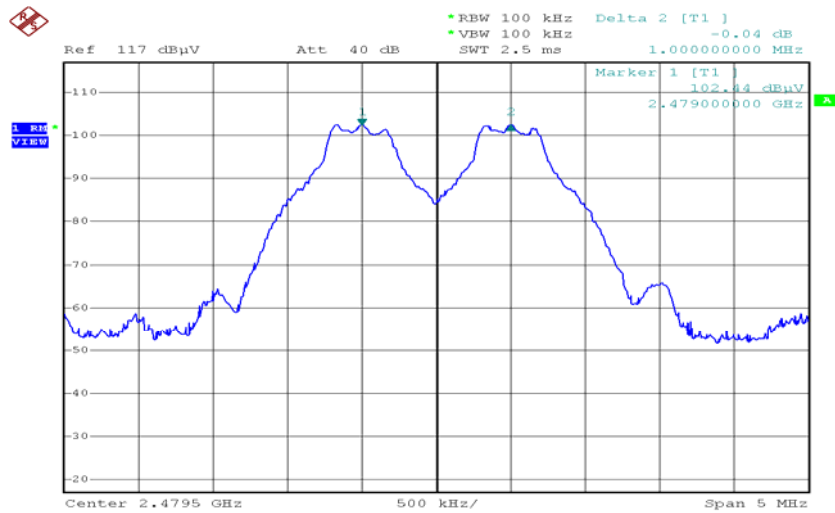
1  
Date: 3.JUL.2008 17:45:12

## 11.2 Middle Channel: Carrier Frequencies Separated



1  
Date: 3.JUL.2008 19:05:15

### 11.3 Upper Channel: Carrier Frequencies Separated



1  
Date: 3.JUL.2008 19:42:28

## 12 Dwell Time

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part15 C                              |
| Test Method:      | Based on FCC Part15 Paragraph 15.247      |
| Test Date:        | July.3 , 2008                             |
| Test mode:        | The EUT work in test mode(Tx) and test it |

Requirements: 15.247 a(1)(iii)Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 non-overlapping channels.The average time of occupancy on any channel shall not greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 12.1 Test procedure

The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyser using 100kHz RBW and 100kHz VBW,set sweep time:10 ms.Span:0Hz.

### 12.2 Test Results : PASS

Number of hopping channels is .

A channel was used 107 times within  $0.4 \times 79 = 31.6\text{S}$ .

Dwell time of each occupation in this channel a follows:

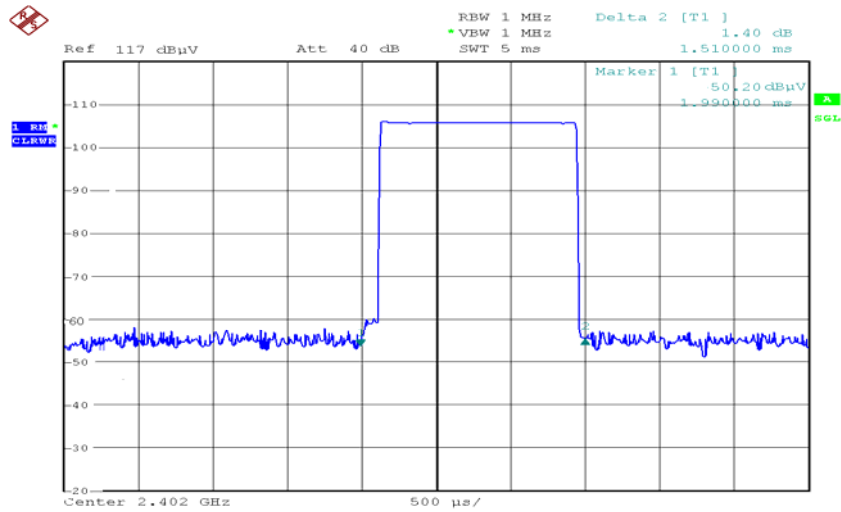
1.Low Channel:  $1.51 \text{ mS} \times 107 = 0.161 \text{ S} < 0.4 \text{ s}$

2.Middle Channel:  $1.75 \text{ mS} \times 107 = 0.187 \text{ S} < 0.4 \text{ s}$

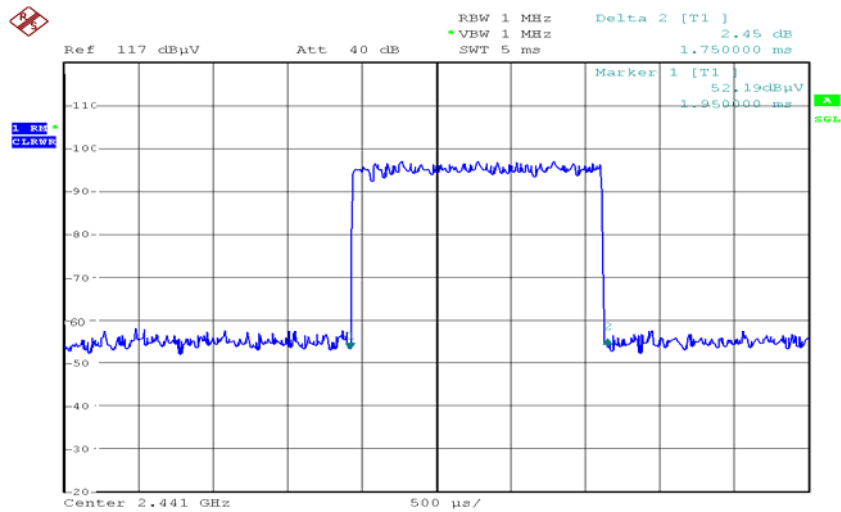
3.High Channel:  $1.755 \text{ mS} \times 107 = 0.188 \text{ S} < 0.4 \text{ s}$

The Results are not be greater than 0.4 seconds.

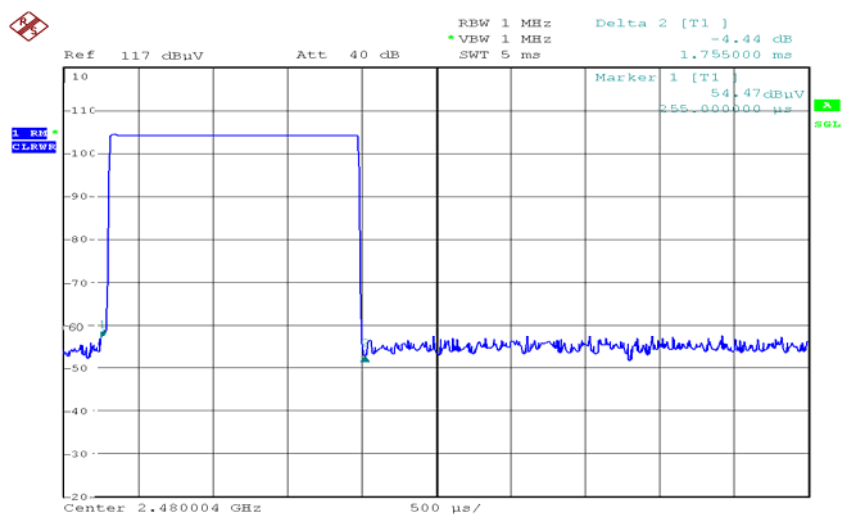
Please refer the graph as below:

**Channel 0: 2.402GHz**

Date: 3.JUL.2008 18:42:34

**Channel 27: 2.441GHz**1  
Date: 3.JUL.2008 18:44:33

# Channel 55: 2.480GHz



1  
 Date: 3.JUL.2008 18:03:54

## 13 20-dB Bandwidth

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part15 C                              |
| Test Method:      | Based on FCC Part15 Paragraph 15.247      |
| Test Date:        | July.3 , 2008                             |
| Test mode:        | The EUT work in test mode(Tx) and test it |

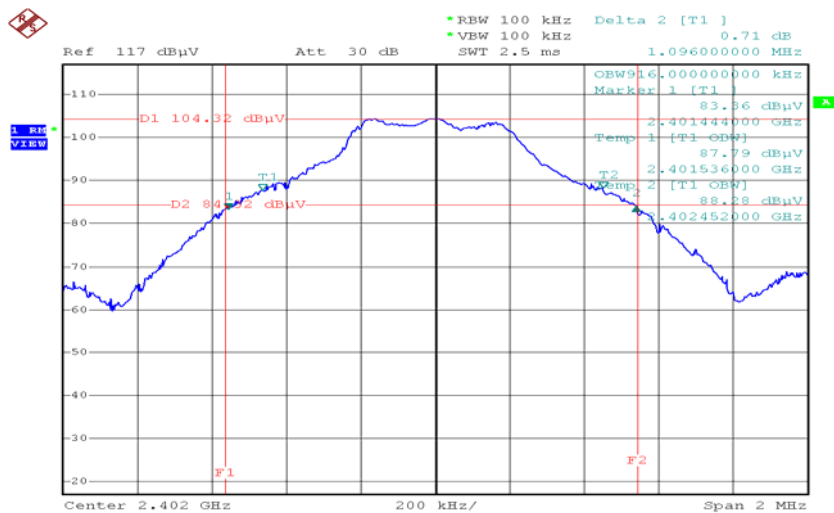
### 13.1 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 100KHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

## 13.2 Test Result

Please refer the graph as below:

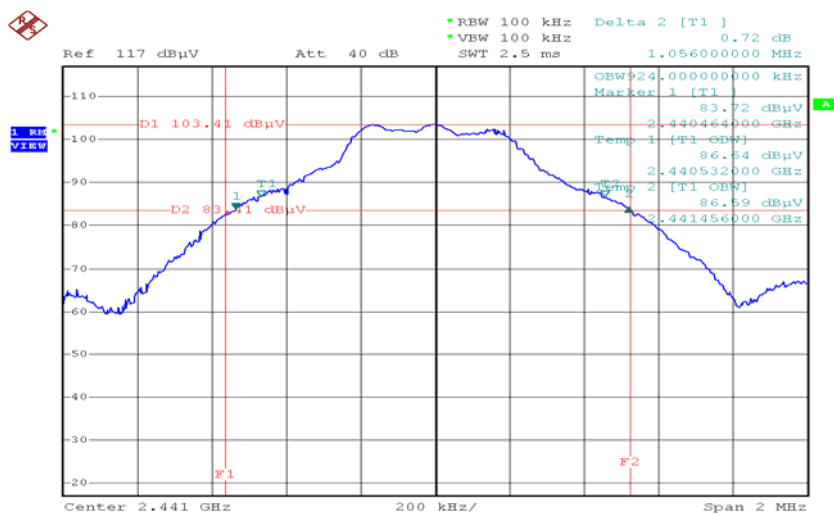
### Low



1

Date: 3.JUL.2008 17:35:36

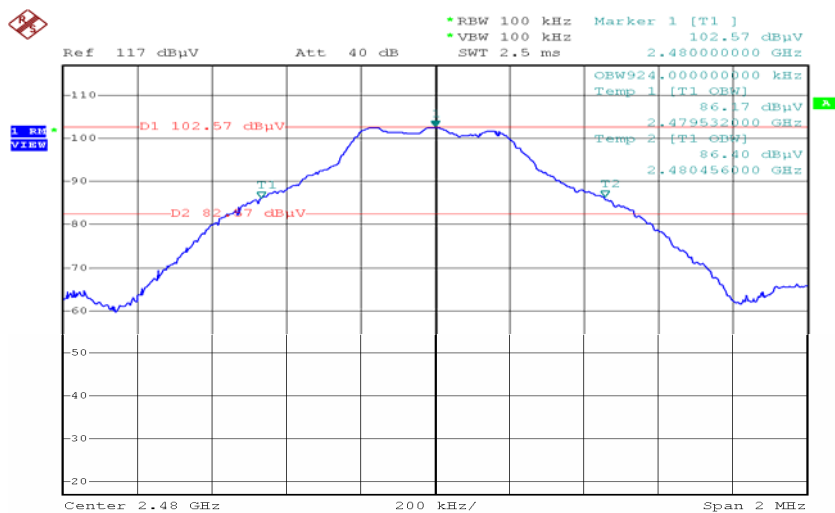
### Middle



1

Date: 3.JUL.2008 17:33:10

High



1  
Date: 3.JUL.2008 19:33:39

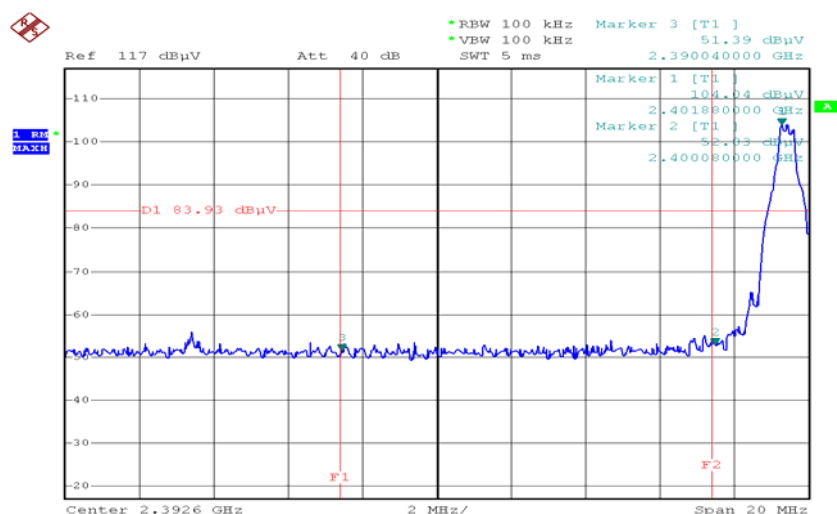
## 14 Radiated spurious emissions into adjacent restricted band

Test Requirement: FCC Part15 Paragraph 15.205  
Test Method: Based on FCC Part 15 Paragraph 15.247  
Test Date: July.3 , 2008  
Requirements: The EUT work in test mode(Tx) and test it

**Requiments:**emissions that fall in the restricted bands(15.205).Above 1000MHz, compliance with the emissions limits in section 15.209 shall be demonstrated based on the average value of the measured emissions,The provisions in section 15.35apply to these measurements.

**Test procedure:**An in band field strength measurement of the fundamental emission using the RBW and detector function required by C63.4-2003 and FCC Rules.The procedure was repeated with an average detector and a plot made.The calculated field strength in the adjacent restricted band is presented below.

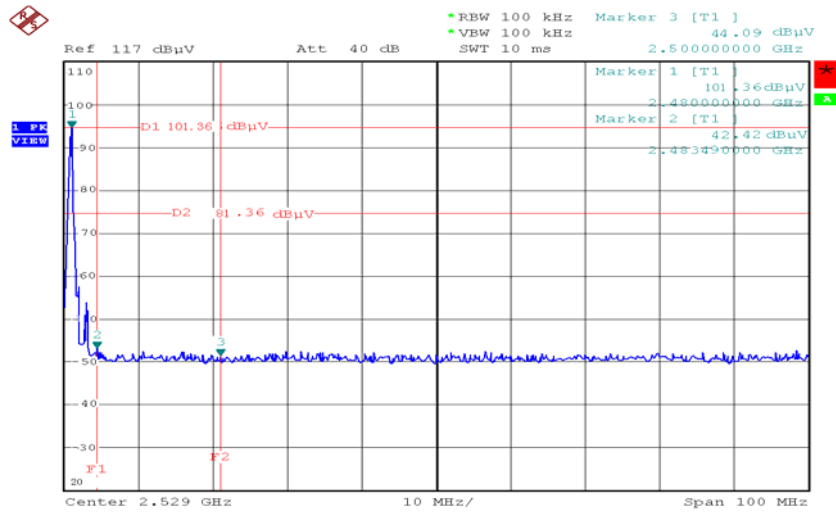
lower bandedge/ restricted band (peak value)



1

Date: 3.JUL.2008 17:39:33

upper bandedge/ restricted band (peak value)



1

Date: 22.MAY.2008 16:57:36

## 15 RF Exposure Test

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part 2 Subpart J                      |
| Test Method:      | Based on FCC Part 15 Paragraph 15.247     |
| Test Date:        | July.3 , 2008                             |
| Requirements:     | The EUT work in test mode(Tx) and test it |

**Requiments:** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

### The procedures / limit

#### (A) Limits for Occupational / Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                   | 6                                                                |
| 3.0-30                | 1842 / f                          | 4.89 / f                          | (900 / f)*                               | 6                                                                |
| 30-300                | 61.4                              | 0.163                             | 1.0                                      | 6                                                                |
| 300-1500              |                                   |                                   | F/300                                    | 6                                                                |
| 1500-100,000          |                                   |                                   | 5                                        | 6                                                                |

#### (B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|------------------------------------------|------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                   | 30                                                               |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f)*                                 | 30                                                               |
| 30-300                | 27.5                              | 0.073                             | 0.2                                      | 30                                                               |
| 300-1500              |                                   |                                   | F/1500                                   | 30                                                               |
| 1500-100,000          |                                   |                                   | 1.0                                      | 30                                                               |

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

**MPE Calculation Method**

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = Peak RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

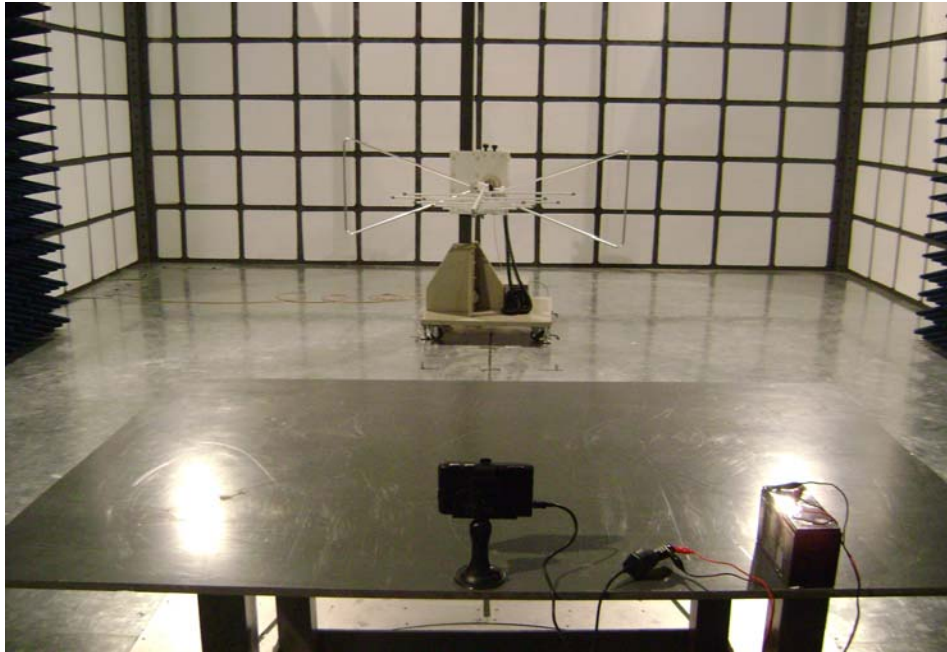
$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

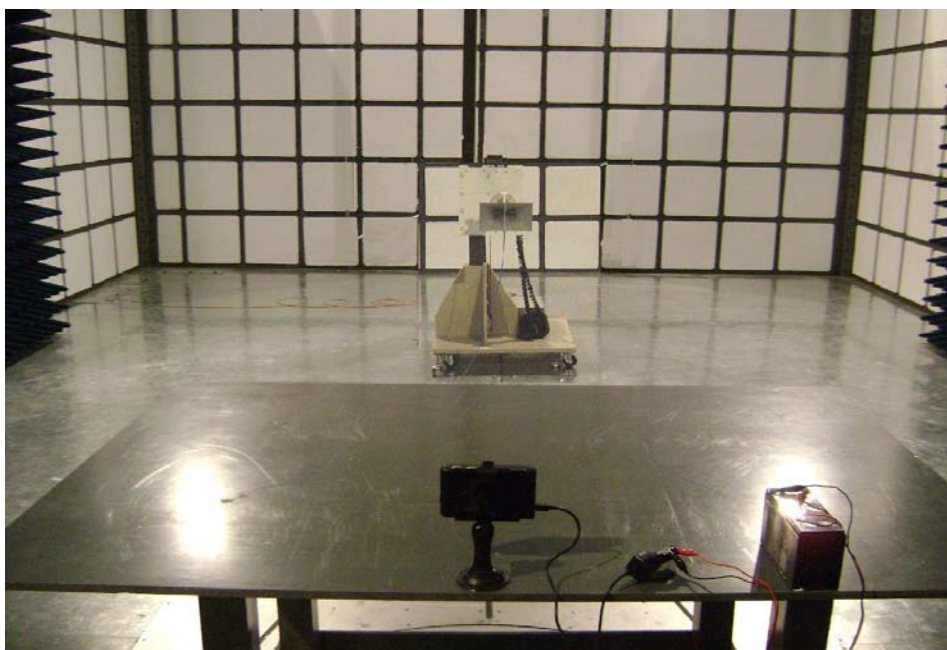
| Antenna Gain (dBi) | Antenna Gain (numeric) | Peak Output Power (dBm) | Peak Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result     |
|--------------------|------------------------|-------------------------|------------------------|-----------------------------------------|--------------------------------------------------|-----------------|
| <b>1.52</b>        | <b>1.4191</b>          | <b>-2.82</b>            | <b>0.522</b>           | <b>0.001474</b>                         | <b>1</b>                                         | <b>Complies</b> |
| 1.52               | 1.4191                 | -3.29                   | 0.469                  | 0.001324                                | 1                                                | Complies        |
| 1.52               | 1.4191                 | -3.28                   | 0.470                  | 0.00137                                 | 1                                                | Complies        |

## 16 Photographs of Testing

### 16.1 Radiation Emission Test View For 30MHz-1000MHz



### 16.2 Radiation Emission Test View For 1GHz-25GHz



## 17 Photographs - Constructional Details

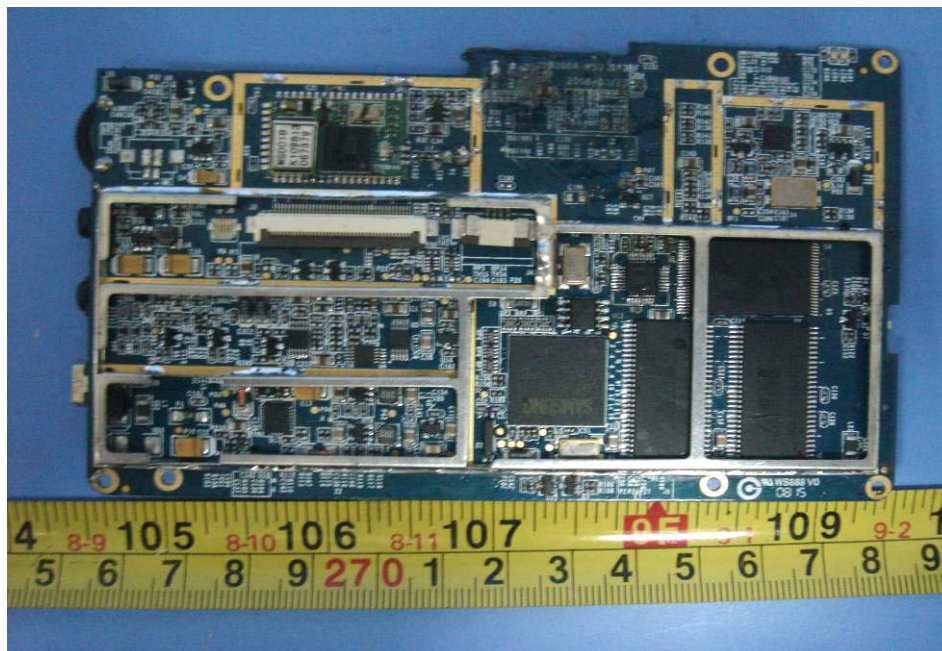
### 17.1 EUT - Front View



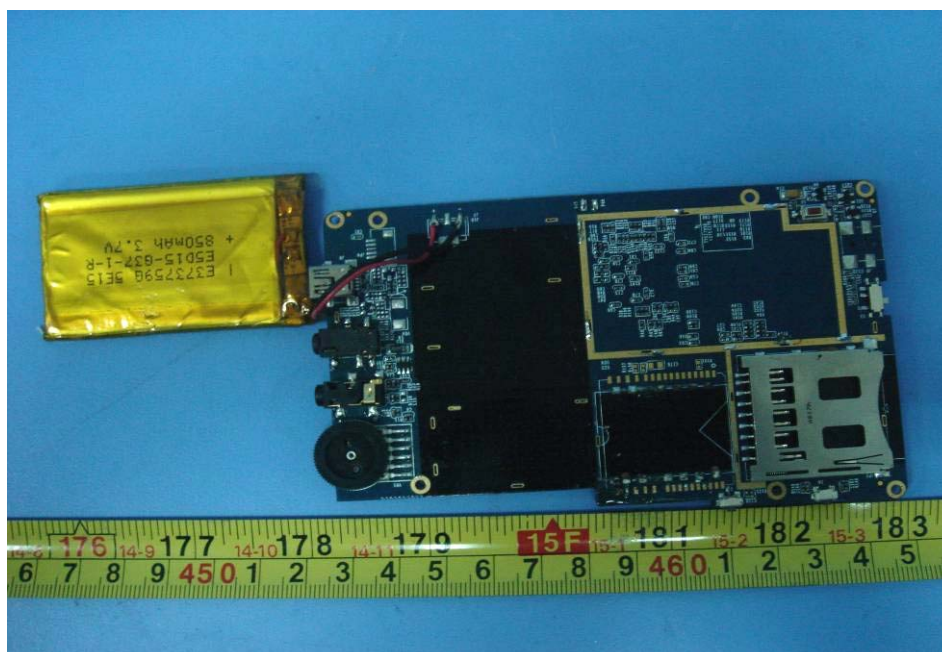
### 17.2 EUT - Back View



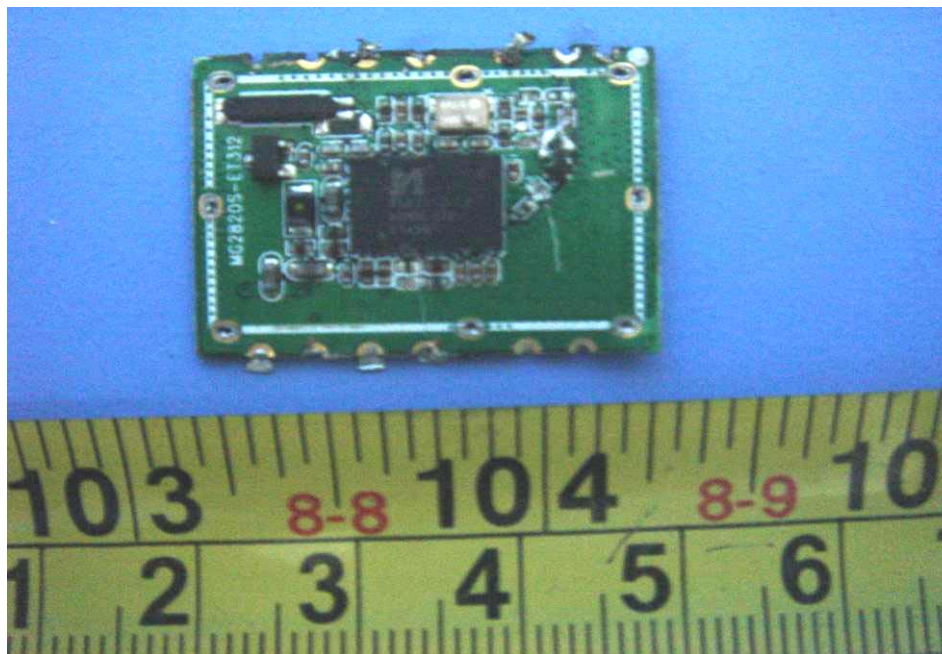
### 17.3 PCB1 – Front View



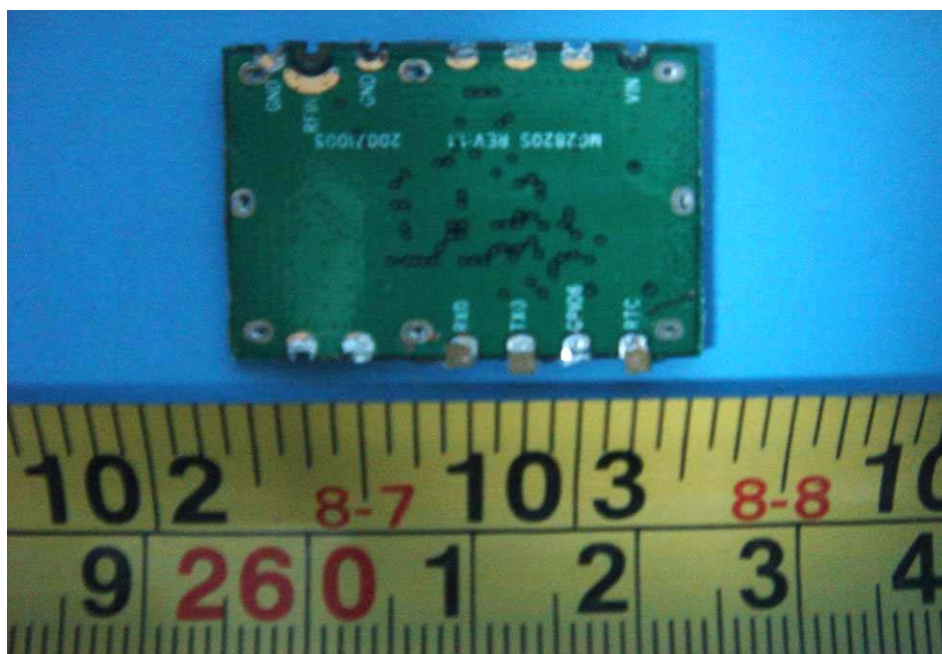
### 17.4 PCB 1- Back View



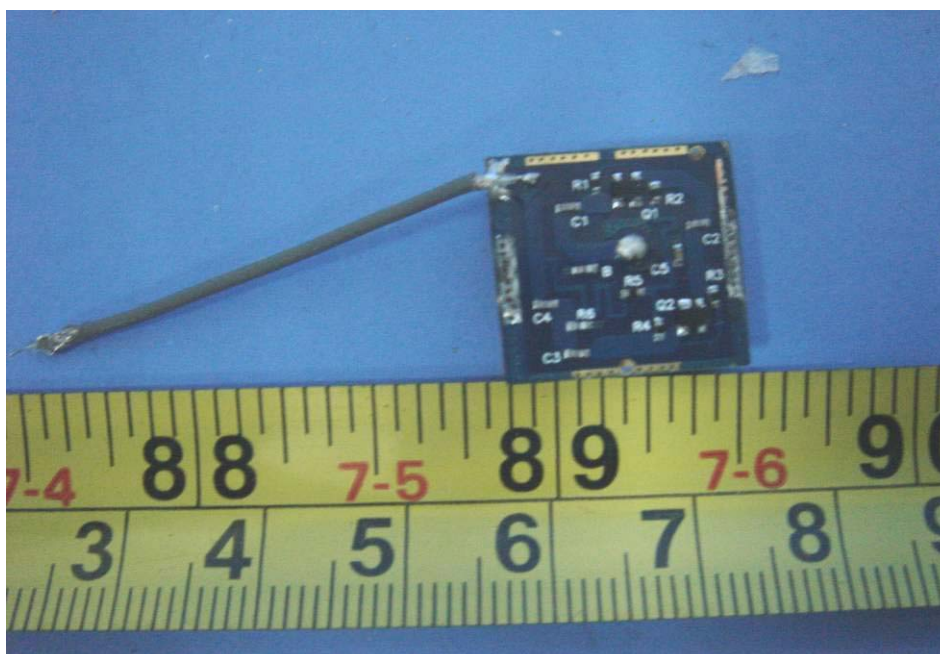
### 17.5 PCB 2- Front View



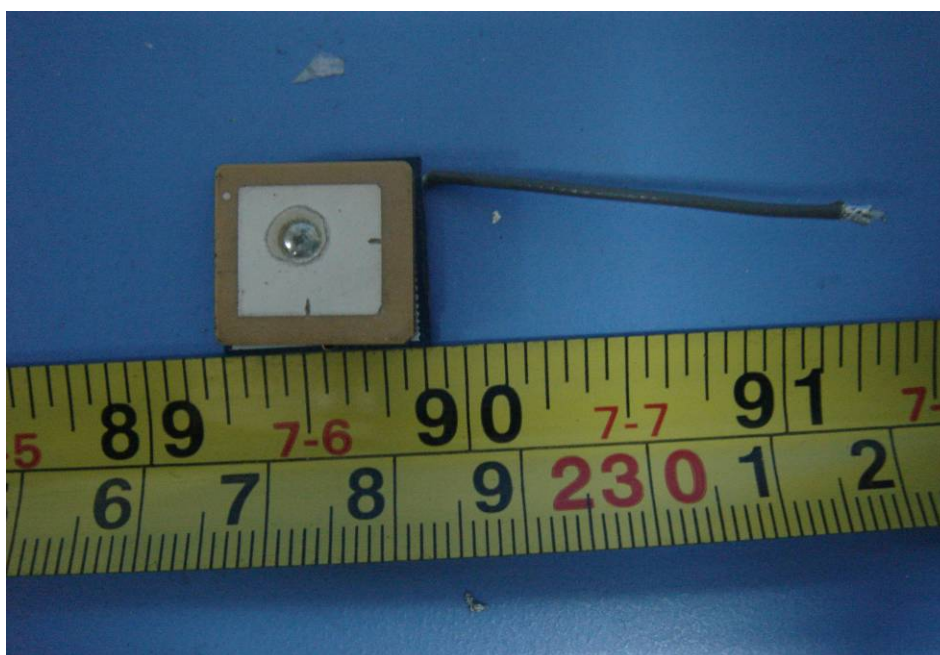
### 17.6 PCB 2- Back View



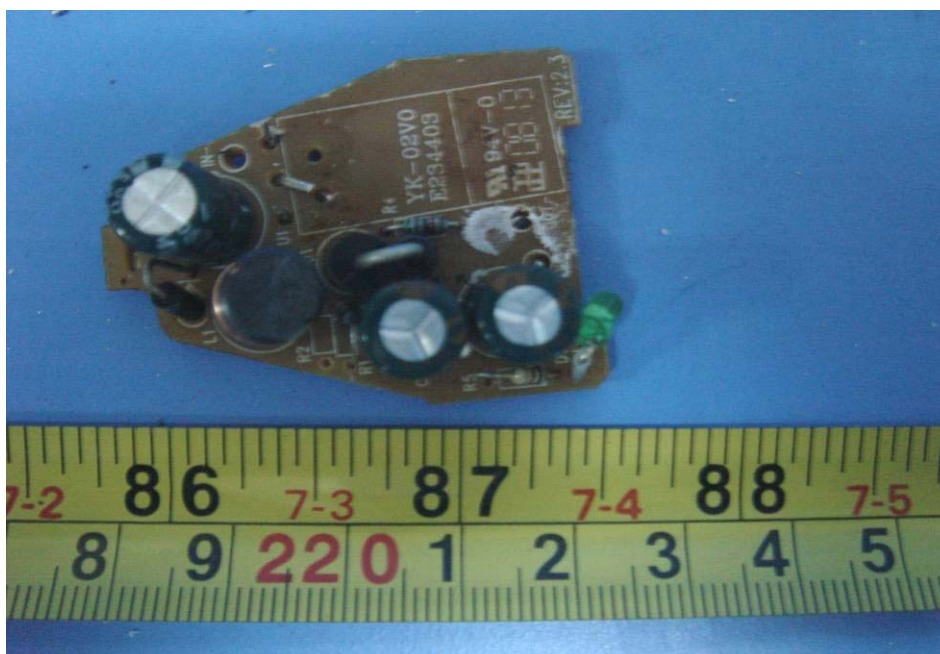
### 17.7 PCB 3- Front View



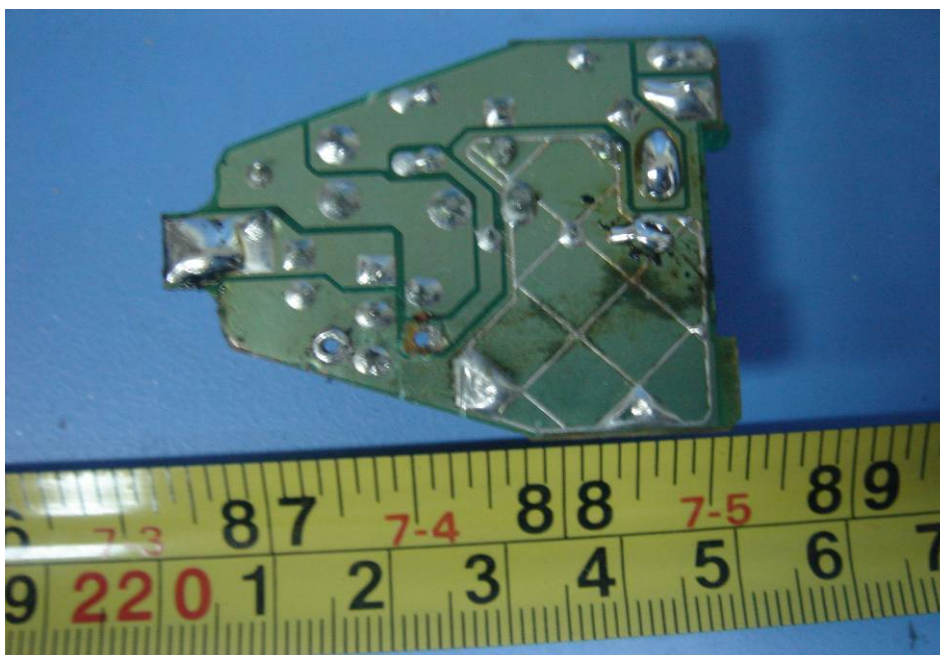
### 17.8 PCB 3- Back View



### 17.9 PCB 4- Front View



### 17.10 PCB 4- Back View



## 18 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT  
EUT Bottom View/proposed FCC Mark Location

