

# FCC Test Report

**E.U.T.** : 3 Button Wireless Optical Mouse  
**Model** : WMU95S  
**FCC ID** : IBA-WMU95S  
**Report No.** : RF-J76-0512-079  
**Date of Report** : November 19, 2005

Prepared for

**Creative Technology Ltd.**

31, International Business Park, Creative Resource Singapore 609921

Prepared by



**Central Research Technology Co.**

**EMC Test Laboratory**

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# Certification of Compliance

E.U.T. : 3 Button Wireless Optical Mouse  
Model : WMU95S  
FCC ID : IBA-WMU95S  
Manufacturer : De-Chuang  
Applicant : Creative Technology Ltd.  
Address : 31, International Business Park, Creative Resource Singapore  
609921  
Arrival of Sample(s) : November 16, 2005  
Date of Test : November 17, 2005  
Applicable Standards : 47 CFR part 15, Subpart C  
Deviation : N/A  
Condition of Test Sample : Prototype



We, **Central Research Technology Co.**, hereby certify that one sample of the designated product was tested in our facility during the period mentioned above. The test records, data evaluation and Equipment Under Test (EUT) configurations shown in the present report are true and accurate representation of the measurements of the sample's RF characteristics under the conditions herein specified.

The test results show that the EUT as described in the present report is in compliance with the requirements set forth in the standards mentioned above and apply to the tested sample identified in the present report only. The test report shall not be reproduced, except in its entirety, without the written approval of Central Research Technology Co.

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(Tsun-Yu Shih/Laboratory Head)

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## **1 General Description**

### **1.1 General Description of EUT**

E.U.T. : 3 Button Wireless Optical Mouse  
Model No. : WMU95S  
FCC ID : IBA-WMU95S  
Power in : DC 3V (Battery)  
Test Voltage : DC 3V (Battery)  
Applicant : Creative Technology Ltd.  
Manufacturer : De-Chuang

### **1.2 Characteristic of E.U.T.**

Frequency Range : 26.995MHz~27.195MHz

Channel Numbers : 5

Function Modulation: GFSK

| Channel Number | Frequency(MHz) | Channel Number | Frequency(MHz) |
|----------------|----------------|----------------|----------------|
| 0              | 26.995         | 6              | 27.145         |
| 2              | 27.045         | 8              | 27.195         |
| 4              | 27.095         |                |                |

The EUT is used to transmit control command only. Please refer to the user's manual for the details.

### **1.3 Test Methodology**

For this E.U.T., the radiated emissions measurement performed according to the procedures illustrated in ANSI C63.4 and other required were illustrated in separate sections of this test report for detail.

## 1.4 Requirement for Compliance

### (1) Field strength of Fundametal

According to 15.227(a),The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

### (2) Radiation emission

According to 15.227(b), The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

### (3) Radiated emission limits, general requirements.

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency<br>(MHz) | Field Strength<br>(uV/m) | Measurement Distance<br>(m) |
|--------------------|--------------------------|-----------------------------|
| 0.009 - 0.490      | 2400/F(kHz)              | 300                         |
| 0.490 - 1.705      | 24000/F(kHz)             | 30                          |
| 1.705 - 30.0       | 30                       | 30                          |
| 30 - 88            | 100 **                   | 3                           |
| 88 - 216           | 150 **                   | 3                           |
| 216 - 960          | 200 **                   | 3                           |
| Above 960          | 500                      | 3                           |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

## (4) Restricted Band

| Frequency (MHz)            | Frequency (MHz)       | Frequency (MHz) | Frequency (MHz) |
|----------------------------|-----------------------|-----------------|-----------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15      |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46     |
| <sup>2</sup> 1735 - 2.1905 | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75     |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5     |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2       |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5       |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7     |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4    |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5    |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2    |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4     |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12   |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0     |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8     |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5    |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | (2)             |
| 13.36 - 13.41              |                       |                 |                 |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

## 1.5 Layout of Setup

EUT

(Transmitter)

### The Support Units

| No. | Unit | Model No./<br>Serial No. | FCC ID | Trade<br>Name | Power<br>Cord | Supported<br>by lab. |
|-----|------|--------------------------|--------|---------------|---------------|----------------------|
| NA  | *    | *                        | *      | *             | *             | *                    |

### Connecting Cables :

| No. | Cable | Length | Shielded | Core | Shielded<br>Backshell | Supported by<br>lab. | Note |
|-----|-------|--------|----------|------|-----------------------|----------------------|------|
| NA  | *     | *      | *        | *    | *                     | *                    | *    |

### Justification:

For both conducted and radiated emission below 1GHz, the system was configured for typical fashion as a customer could normal use it.

For radiated emission, measurement of radiated emission from digital circuit is performed with normal transmitting.

**1.6 Test Facility**

| Test Room                               | Type of Test Room                         | Descriptions                                                                                                     |
|-----------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> TR1 | 10m semi-anechoic chamber<br>(23m×14m×9m) | Complying with the NSA requirements in documents CISPR 22 and ANSI C63.4. for the radiated emission measurement. |
| <input type="checkbox"/> TR4            | Shielding Room<br>(5m×3m×3m)              | For the RF conducted emission measurement.                                                                       |

**1.7 Measurement Uncertainty**

All the measurement uncertainty evaluation procedures in this report are base on ETSI TR 100 028-1, 100 028-2,and ETSI TR 102 273-3. The assessed measurement uncertainties are:

| Test Item         | Measurement Uncertainty             |
|-------------------|-------------------------------------|
| Radiated Emission | Horizontal 4.05dB ; Vertical 4.08dB |

## **2 Field Strength of fundamental**

**Result:** Pass

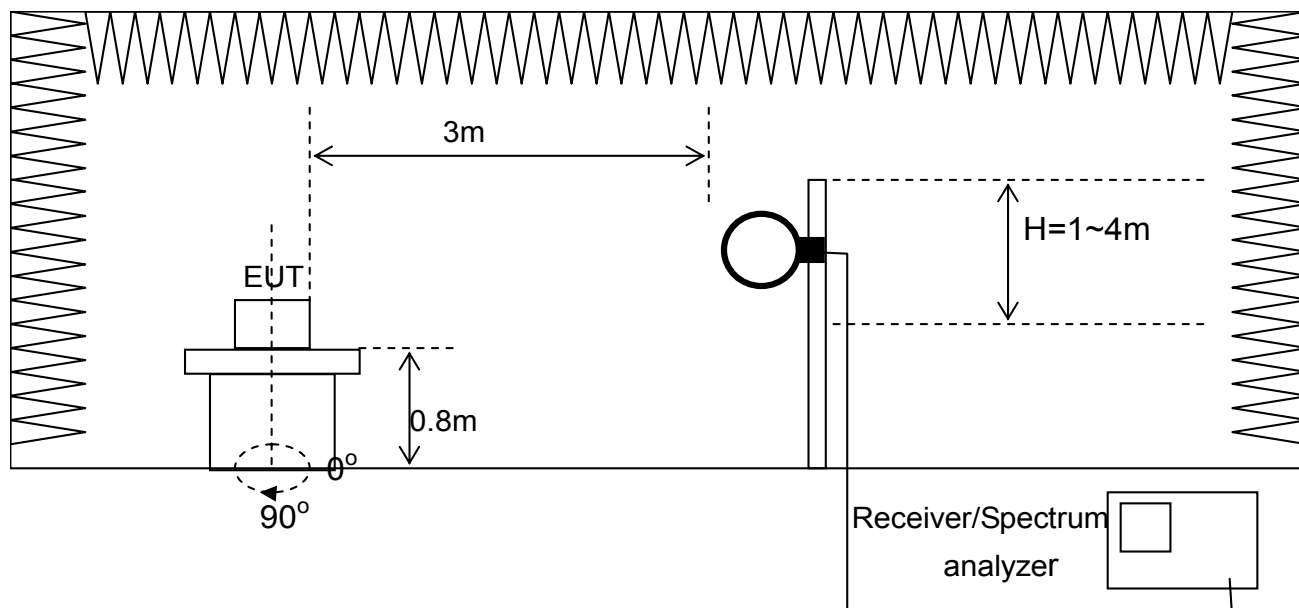
### **2.1 Applied Standard**

According to 15.227(a), The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply

### **2.2 Measurement Procedure**

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 millimeters above the reference ground plane in the semi-anechoic chamber.
- c. The EUT was set 3m away from the interference receiving antenna.
- d. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.
- e. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine the fundamental frequency and compare the maximum level with the required limit.
- f. Finely tune the antenna and turntable around the recorded position of fundamental frequency found from step e.
- g. Record the frequency and polarization of the receiving antenna and compare the maximum level with the required limit.
- h. Change the receiving antenna to another polarization to measure Field Strength of fundamental by following step e. to g. again.

## 2.3 Test Configuration



## 2.4 Test Instruments

| Test Site and Equipment | Manufacturer | Model No./ Serial No.    | Last Cal.      | Calibration Due Data |
|-------------------------|--------------|--------------------------|----------------|----------------------|
| Semi-anechoic Chamber   | ETS.LINDGREN | TR1/<br><b>17627-B</b>   | April 12,2005  | April 12,2006        |
| Spectrum Analyzer       | R&S          | FSP40/<br><b>100031</b>  | June 6,2005    | June 6,2006          |
| Antenna                 | EMCO         | 6502/<br><b>00042960</b> | January 6,2005 | January 6,2006       |

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

## Instrument Setting

| RBW    | VBW    | Detector | Trace   | Comment |
|--------|--------|----------|---------|---------|
| 100KHz | 300KHz | Peak     | Maxhold | Peak    |
| 100KHz | 10Hz   | Peak     | Maxhold | Average |

## Climatic Condition

Ambient Temperature : 24°C;

Relative Humidity : 55%

## 2.5 Test Data

### Field Strength of Fundament

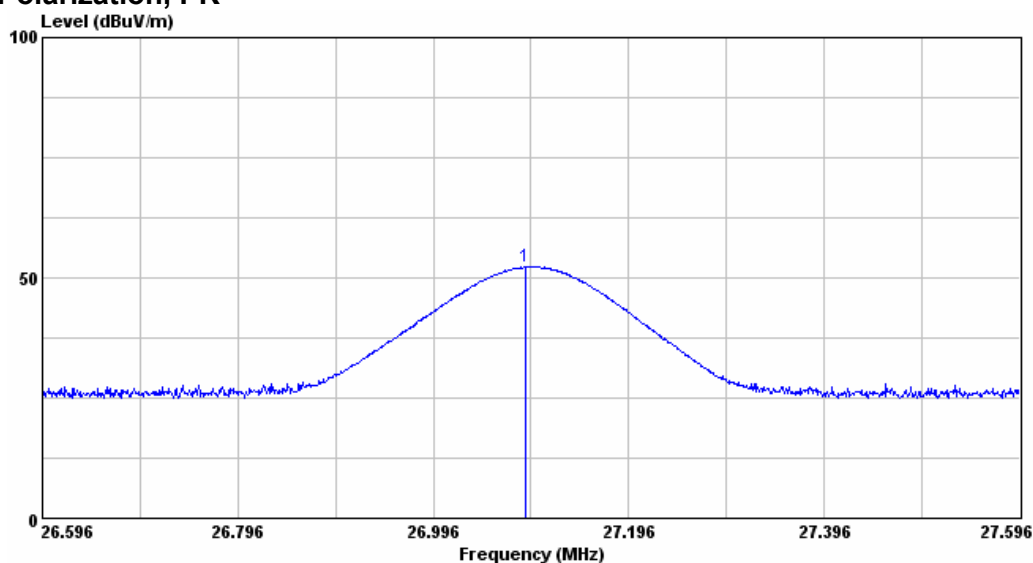
Test Mode : Channel 4, Conutious Transmitting  
 Test Distance : 3m Tester : Jim

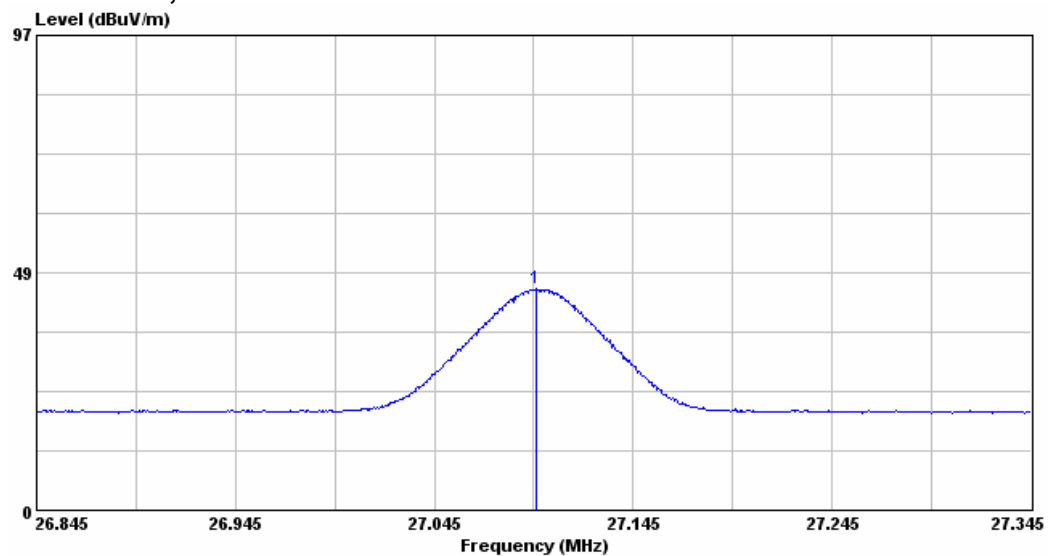
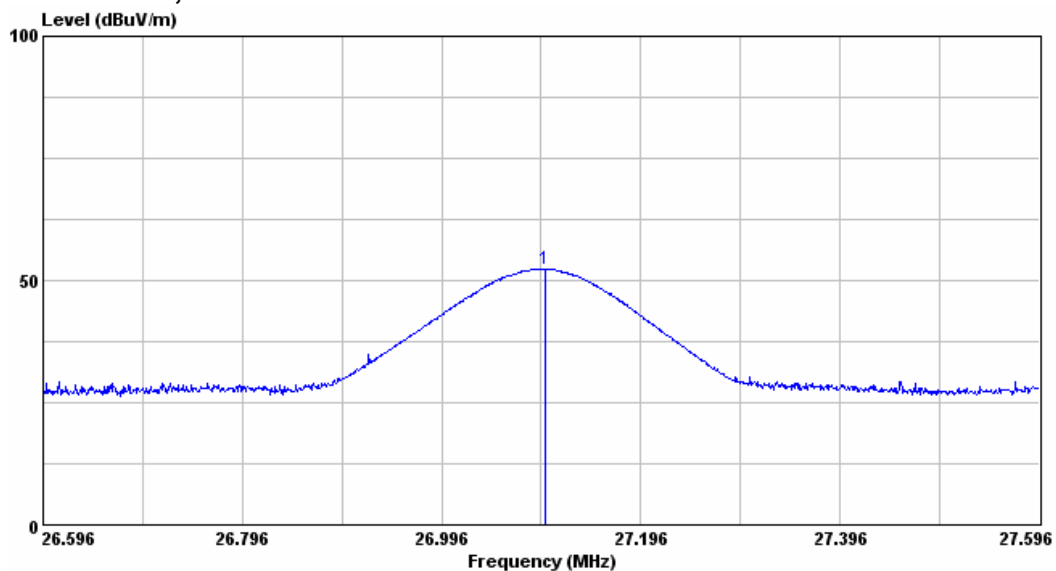
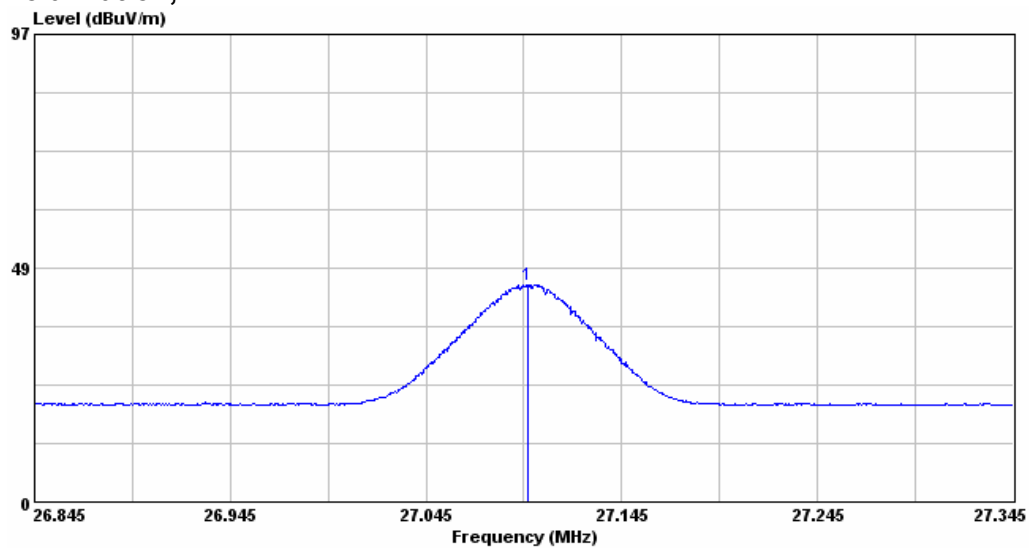
| Frequency (MHz) | Polarization | Reading Data (dBUV) |       | Correction Factor (dB/m) | Output Field Strength (dBμV/m) |       | Limit (dBμV/m) |    | Margin (dB) |       |
|-----------------|--------------|---------------------|-------|--------------------------|--------------------------------|-------|----------------|----|-------------|-------|
|                 |              | PK                  | AV    |                          | PK                             | AV    | PK             | AV | PK          | AV    |
| 27.095          | V            | 43.02               | 35.71 | 9.28                     | 52.30                          | 44.99 | 100            | 80 | 47.70       | 35.01 |
| 27.095          | H            | 43.09               | 35.67 | 9.28                     | 52.37                          | 44.95 | 100            | 80 | 47.63       | 35.05 |

Note :

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor
2. Output Field Strength (dBUV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Output Field Strength

#### V Polarization, PK



**V Polarization, AV****H Polarization, PK****H Polarization, AV**

### 3 Radiated Emission

Result: Pass

#### 3.1 Applied Standard

According to 15.231(b), The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209

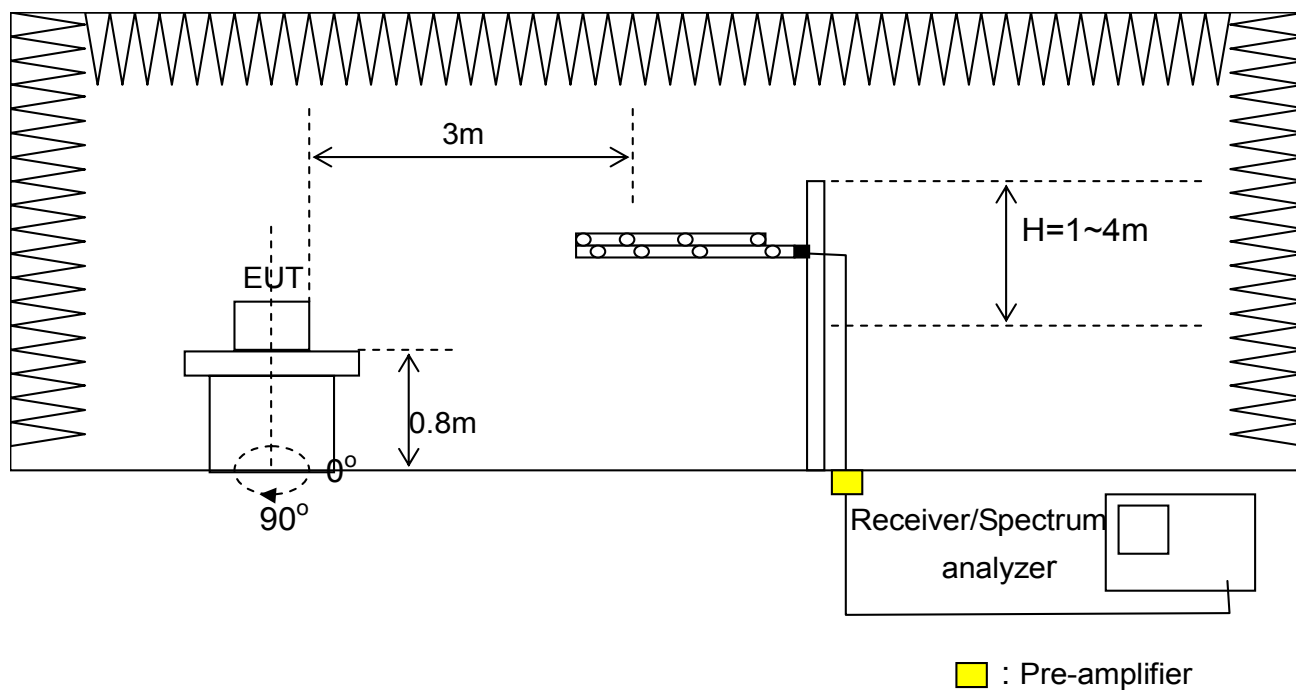
| Frequency<br>(MHz) | Field Strength<br>(uV/m) | Measurement Distance<br>(m) |
|--------------------|--------------------------|-----------------------------|
| 0.009 - 0.490      | 2400/F(kHz)              | 300                         |
| 0.490 - 1.705      | 24000/F(kHz)             | 30                          |
| 1.705 - 30.0       | 30                       | 30                          |
| 30 - 88            | 100 **                   | 3                           |
| 88 - 216           | 150 **                   | 3                           |
| 216 - 960          | 200 **                   | 3                           |
| Above 960          | 500                      | 3                           |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

### **3.2 Measurement Procedure**

- a. The EUT was set up per the test configuration figured in the next section of this chapter to simulate the typical usage per the user's manual.
- b. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 meters above the reference ground plane in the semi-anechoic chamber. If the EUT is floor-standing equipment, it was placed on a non-conducted support with a height of 12 millimeters above the reference ground plane in the semi-anechoic chamber.
- c. The EUT was set 3m away from the interference receiving antenna.
- d. Rapidly sweep the signal in the test frequency range by using the spectrum through the Maximum-peak detector.
- e. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 to 4 meters above the reference ground plane continuously to determine the fundamental frequency and frequencies associated with higher emission levels and record them.
- f. Then measure each frequency found from step e. by using the spectrum with rotating the EUT and positioning the receiving antenna height to determine the maximum level.
- g. Finely tune the antenna and turntable around the recorded position of each frequency found from step f.
- h. For measurement of frequency below 1000MHz, set the receiver detector to be Quasi-Peak per CISPR 16-1 to find out the maximum level occurred.
- i. For measurement of frequency above 1000MHz, set the spectrum detector to be Peak or Average to find out the maximum level occurred, if any.
- j. Record the frequency and polarization of the receiving antenna and compare the maximum level with the required limit.
- k. Change the receiving antenna to another polarization to measure radiated emission by following step d. to j. again.
- l. If the peak emission level measured from step e. is 10dB lower than the limit specified, then the emission values presented will be the peak value only. Otherwise, accurate Q.P. value will be measured and presented.

### 3.3 Test Configuration



**3.4 Test Instruments**

| <b>Test Site and Equipment</b> | <b>Manufacturer</b> | <b>Model No./ Serial No.</b> | <b>Last Cal.</b> | <b>Calibration Due Data</b> |
|--------------------------------|---------------------|------------------------------|------------------|-----------------------------|
| Semi-anechoic Chamber          | ETS.LINDGREN        | TR1/<br><b>17627-B</b>       | April 12,2005    | April 12,2006               |
| Test Receiver                  | R&S                 | ESCS30/<br><b>836858/020</b> | July 30,2005     | July 30,2006                |
| Antenna                        | EMCO                | 6502/<br><b>00042960</b>     | January 6,2005   | January 6,2006              |
| Antenna                        | R&S                 | HL562/<br><b>360543/006</b>  | December 10,2005 | December 10,2005            |
| Pre-amplifier                  | Mini Circuit        | ZKL-2/<br><b>001</b>         | April 11,2005    | April 11,2006               |

Note:

1. The calibrations are traceable to NML/ROC.
2. NCR : No Calibration Required.

**Instrument Setting**

| <b>RBW</b> | <b>VBW</b> | <b>Detector</b> | <b>Trace</b> | <b>Comment</b> |
|------------|------------|-----------------|--------------|----------------|
| 120kHz     | N/A        | Quasi-Peak      | Maxhold      |                |

**Climatic Condition**

Ambient Temperature : 24°C;

Relative Humidity : 55%

### 3.5 Test Data

**Test Mode** : Channel 4,Continuous Transmitting

**Test Distance** : 3m

**Tester** : Jim

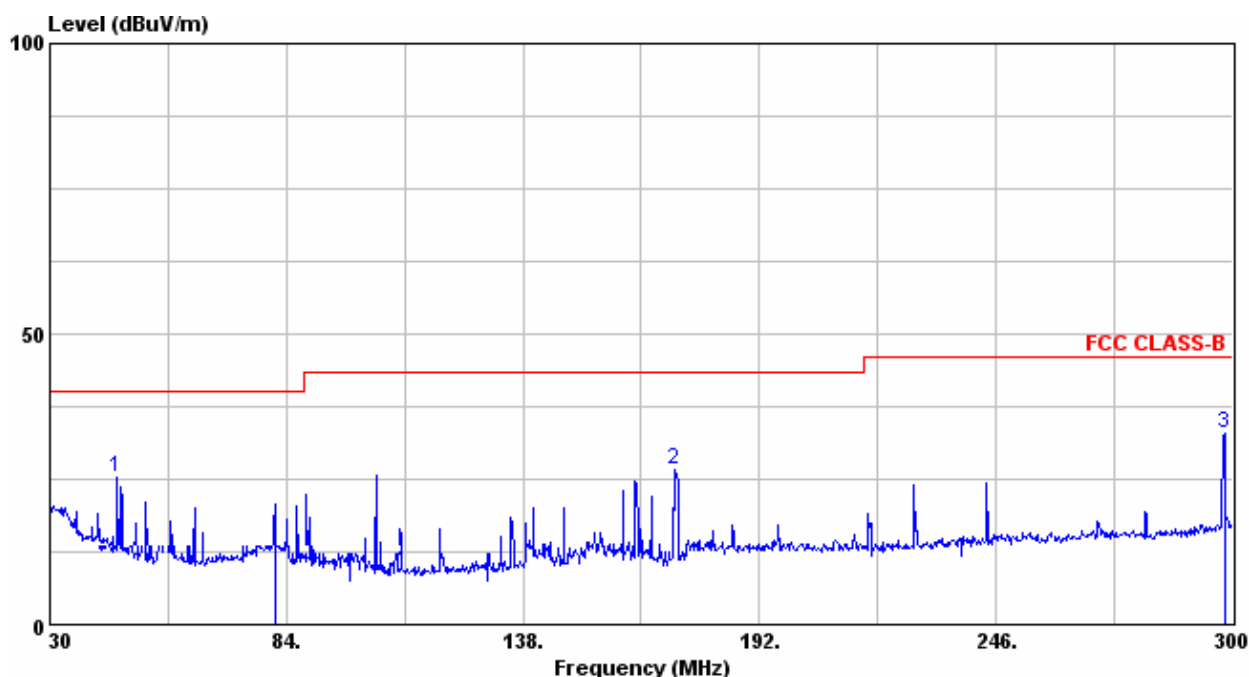
**Polarization** : Vertical

**Frequency Range** : 27MHz~300MHz

|   | Freq.<br>(MHz) | Reading Data<br>(dBuV) | Correction Factor<br>(dB/m) | Emission Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|---|----------------|------------------------|-----------------------------|----------------------------|-------------------|----------------|
| 1 | 45.39          | 44.24                  | -19.45                      | 24.79                      | 40.00             | 15.21          |
| 2 | 172.56         | 45.59                  | -19.13                      | 26.46                      | 43.50             | 17.04          |
| 3 | 298.11         | 47.67                  | -14.46                      | 33.21                      | 46.00             | 12.79          |

Note :

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level



**Test Mode** : Channel 4,Continuous Transmitting

**Test Distance** :3m

**Tester** : Jim

**Polarization** : Horizontal

**Frequency Range** : 27MHz~300MHz

|   | Freq.<br>(MHz) | Reading Data<br>(dBuV) | Correction Factor<br>(dB/m) | Emission Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|---|----------------|------------------------|-----------------------------|----------------------------|-------------------|----------------|
| 1 | 81.30          | 51.29                  | -21.90                      | 29.39                      | 40.00             | 10.61          |
| 2 | 298.11         | 49.57                  | -14.46                      | 35.11                      | 46.00             | 10.89          |

Note :

1. Correction Factor (dB/m) = Cable Loss + Antenna Factor – Gain of Preamplifier
2. Emission Level (dBuV/m) = Reading Data + Correction Factor
3. Margin (dB) = Limit – Emission Level

