# *FCC TEST REPORT*

**FCC ID** : VCYMX-BT30

**Applicant** : **TOHO SUPPLY CO., LTD.**
ROYAL MEGURO 502 1-4-6 SHIMOMEGURO MEGURO-KU TOKYO JAPAN

**Equipment Under Test (EUT) :**

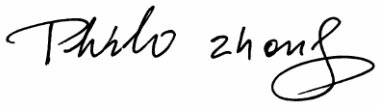
Product description : Bluetooth stereo headset

Model No. : MX-BT30/GW-BTH-033

**Standards** : FCC 15 Paragraph 15.247

**Date of Test** : May 31, 2007

**Test Engineer** : Tiger Su

**Reviewed By** : 

PERPARED BY:
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# 2 Contents

# 3 Test Summary

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

# 4 General Information

## 4.1 Client Information

| | |
|---|---|
| Applicant: | **TOHO SUPPLY CO., LTD.** |
| Address of Applicant: | ROYAL MEGURO 502 1-4-6 SHIMOMEGURO MEGURO-KU TOKYO JAPAN |

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

| | |
|---|---|
| Product description: | Bluetooth stereo headset |
| Model No.: | MX-BT30/GW-BTH-033 |

## 4.3 Details of E.U.T.

| | |
|---|---|
| Power Supply: | DC 3.7V 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 Bluetooth stereo headset. 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.: 101879**

  Compliance Engineering Service (China) 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 101879, September 28, 2004.

## 4.7 Test Location

All Emissions testswere performed at:-

No. 6 Bldg. 35 Jin Ao Industry Technolog Yuan, Jukeng Rd., Da-Dhui-Keng Cun, Guan Lan Zhen, Bao An Qu, ShenZhen City, China 518110

# 5 Equipment Used during Test

| DESCRIPTION | MFR | MODEL# | SERIAL # | LAST CAL. | CAL.DUE | Firmware | Software |
|---|---|---|---|---|---|---|---|
| AMPLIFIER | MITEQ | AW-1604-3000 | 1093584 | 2006/06/10 | 2007/06/09 | N/A | N/A |
| ANTENNA | EMCO | 3142B | 9910-1436 | 2006/06/10 | 2007/06/09 | N/A | N/A |
| BILOG ANTENNA | SCHAFFNER | CBL6143 | 5082 | 2006/06/10 | 2007/06/09 | N/A | N/A |
| Horn Antenna | ASA | NA | NA | 2006/06/10 | 2007/06/09 | N/A | N/A |
| CABLE | TIME MICRO WAVE | LMR-400 | N-TYPE04 | 2006/06/10 | 2007/06/09 | N/A | N/A |
| Spectrum Analyzer | Agilent | E7402A | MY42000139 | 2006/06/10 | 2007/06/09 | N/A | N/A |
| EMI test Receiver | ROHDE&SCHWARZ | ESCI | 1166.595K03 | 2007/02/09 | 2008/02/08 | N/A | N/A |
| Signal Generator | Agilent | 8648C | 3847M01114 | 2007/02/09 | 2008/02/08 | N/A | N/A |

| DESCRIPTION | MFR | MODEL# | SERIAL# | LAST CAL. | CAL. DUE | Firmware | Software |
|---|---|---|---|---|---|---|---|
| Receiver | R&S | ESPI3 | | 2007/02/09 | 2008/02/08 | Ver 3.32 SP2 | Labview 5.0 |
| LISN (EUT) | R&S | ENV216 | | 2007/02/09 | 2008/02/08 | N/A | N/A |
| LISN | EMCO | 3825/2 | 8901-1459 | 2007/02/09 | 2008/02/08 | N/A | N/A |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SPECTRUM ANALYZER | ADVANTENT | R3132 | N02563 | 2006/06/10 | 2007/06/09 | Ver F04 | N/A |

# 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 Average Limit |

## 6.1 Test Equipment

Please refer to Section 5 this report.

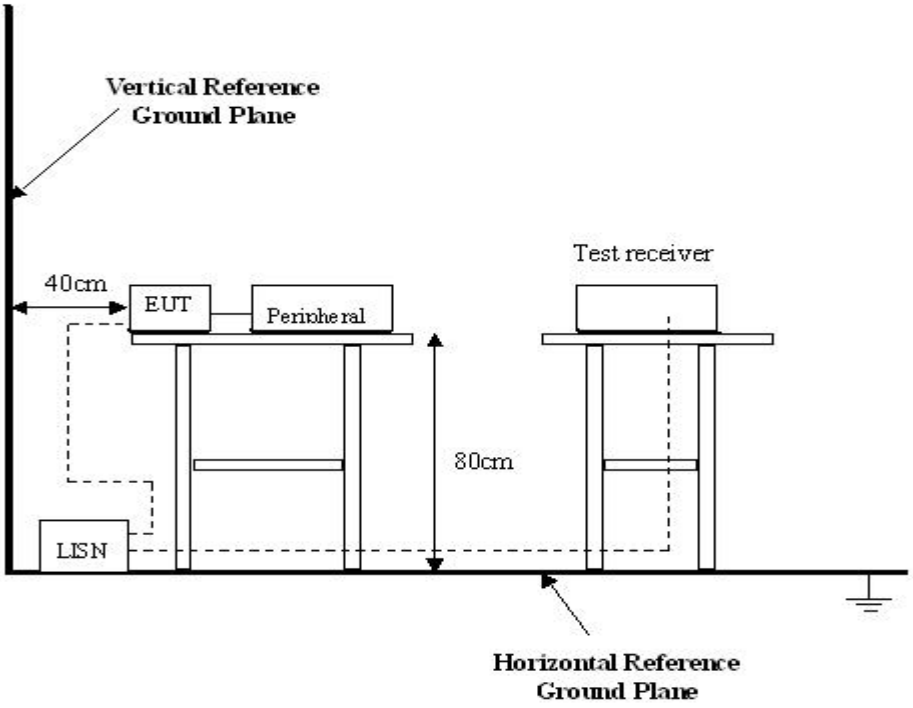
## 6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.

2. 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

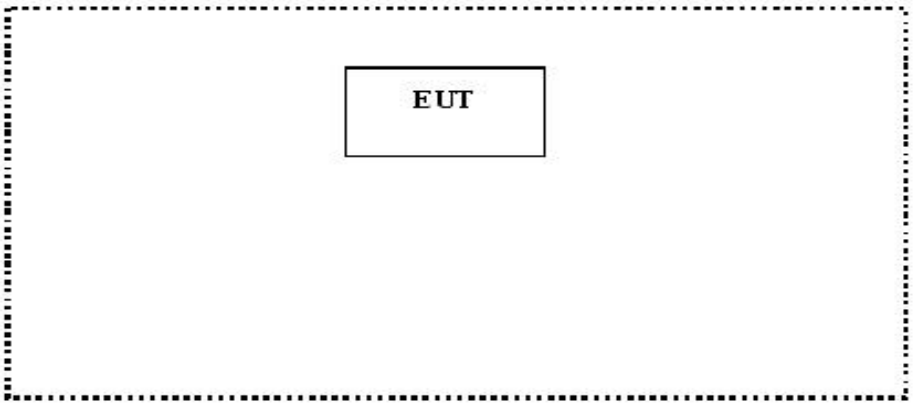
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.




## 6.4 EUT Operating Condition

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

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



## 6.5 Conducted Emission Limits

66-56 dBμV/m between 0.15MHz & 0.5MHz
56 dBμV/m between 0.5MHz & 5MHz
60 dBμV/m between 5MHz & 30MHz

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

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: | May 31, 2007 |
| Frequency Range: | 30MHz to 25GHz |
| Measurement Distance: | 3m |
| Detector: | Peak for pre-scan (120kHz resolution bandwidth) |
| | 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.

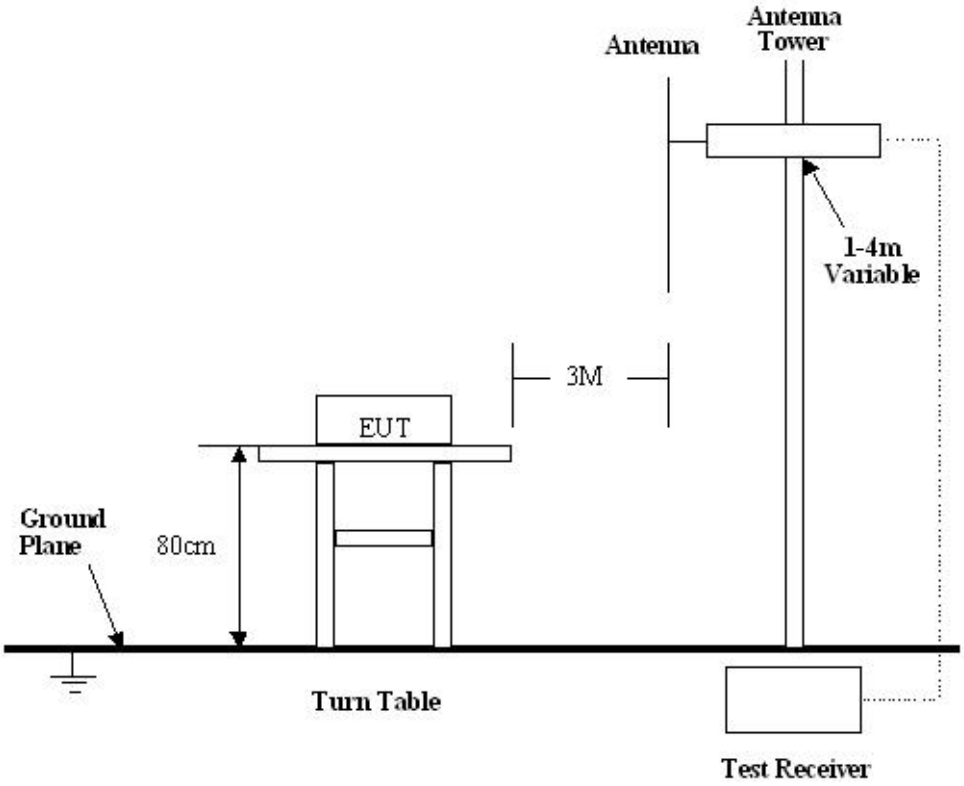
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at CCS EMC Lab is +4.0 dB.

## 7.3 Test Procedure

1. For the radiated emissions test, since the EUT does not have a power source, there was no connection to AC outlets.
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 detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "Qp" in the data table.
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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

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

Margin = Corr. Ampl. – 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(Tx Low/Tx Middle/Tx High) 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) RF Voltage(dBuV)=20 log 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 instrumentaion 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 74dBuvV/m,According to Part15.35(b) and average is 54BuvV/m.

## 7.10 Radiated Emissions Test Result

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

Example:

Freq(MHz) Meter Reading +ACF=FS

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

## 7.11 Radiated Emission Data

Test Item: Radiated Emission Data
Test Voltage: 3.7 VDC
Test Mode: On(Tx Low/Tx Middle/Tx High)
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 | 75.67 | | (Fund.) | 1.5 | 90 |
| 4804.00 | AV | Vertical | 44.68 | 54.00 | 9.32 | 1.5 | 90 |
| 7206.00 | AV | Vertical | 44.91 | 54.00 | 9.09 | 1.8 | 45 |
| 2402.00 | AV | Horizontal | 75.15 | | (Fund.) | 1.5 | 270 |
| 4804.00 | AV | Horizontal | 43.54 | 54.00 | 10.46 | 1.6 | 90 |
| 7206.00 | AV | Horizontal | 43.28 | 54.00 | 10.72 | 1.5 | 90 |
| 2402.00 | PK | Vertical | 76.88 | | (Fund.) | 1.5 | 90 |
| 4804.00 | PK | Vertical | 67.75 | 74.00 | 6.25 | 1.5 | 180 |
| 7206.00 | PK | Vertical | 63.24 | 74.00 | 10.76 | 1.8 | 45 |
| 2402.00 | PK | Horizontal | 76.52 | | (Fund.) | 1.5 | 230 |
| 4804.00 | PK | Horizontal | 63.42 | 74.00 | 10.76 | 1.6 | 60 |
| 7206.00 | PK | Horizontal | 64.27 | 74.00 | 9.73 | 1.5 | 180 |

| Middle frequency | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2441.00 | AV | Vertical | 76.56 | | (Fund.) | 1.5 | 90 |
| 4882.00 | AV | Vertical | 46.62 | 54.00 | 7.38 | 1.5 | 90 |
| 7323.00 | AV | Vertical | 45.73 | 54.00 | 8.27 | 1.6 | 60 |
| 2441.00 | AV | Horizontal | 75.76 | | (Fund.) | 1.5 | 45 |
| 4882.00 | AV | Horizontal | 44.34 | 54.00 | 9.66 | 1.5 | 250 |
| 7323.00 | AV | Horizontal | 43.16 | 54.00 | 10.84 | 1.8 | 60 |
| 2441.00 | PK | Vertical | 74.52 | | (Fund.) | 1.5 | 45 |
| 4882.00 | PK | Vertical | 62.65 | 74.00 | 11.35 | 1.5 | 80 |
| 7323.00 | PK | Vertical | 61.72 | 74.00 | 12.28 | 1.5 | 230 |
| 2441.00 | PK | Horizontal | 74.25 | | (Fund.) | 1.5 | 180 |
| 4882.00 | PK | Horizontal | 61.21 | 74.00 | 12.79 | 1.8 | 60 |
| 7323.00 | PK | Horizontal | 58.31 | 74.00 | 15.69 | 1.5 | 90 |
| High frequency | | | | | | | |
| 2480.00 | AV | Vertical | 76.76 | | (Fund.) | 1.5 | 120 |
| 4960.00 | AV | Vertical | 45.65 | 54.00 | 8.35 | 1.5 | 60 |
| 7440.00 | AV | Vertical | 44.28 | 54.00 | 9.72 | 1.5 | 80 |
| 2480.00 | AV | Horizontal | 74.56 | | (Fund.) | 1.5 | 120 |
| 4960.00 | AV | Horizontal | 45.12 | 54.00 | 8.88 | 1.5 | 45 |
| 7440.00 | AV | Horizontal | 44.94 | 54.00 | 9.06 | 1.5 | 210 |
| 2480.00 | PK | Vertical | 75.61 | | (Fund.) | 1.5 | 80 |
| 4960.00 | PK | Vertical | 66.73 | 74.00 | 7.27 | 1.5 | 270 |
| 7440.00 | PK | Vertical | 57.33 | 74.00 | 16.67 | 1.5 | 90 |
| 2480.00 | PK | Horizontal | 72.12 | | (Fund.) | 1.5 | 45 |
| 4960.00 | PK | Horizontal | 62.28 | 74.00 | 11.72 | 1.5 | 250 |
| 7440.00 | PK | Horizontal | 54.75 | 74.00 | 19.25 | 1.5 | 60 |

# 8 Maximum Peak Output Power

Test Requirement: FCC Part15 Paragraph 15.247
Test Method: Based on ANSI 63.4:2003
Test Date: May 31, 2007
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:

1. The EUT was powered ON and placed on a table in the chamer.The antenna of the transmitter was extended to its maximum length.
2. The fundamental frequency of the transmitter was maximized on the test receiver display by raising and lowering the receive antenna and by rotating the turntable.After the fundamental emission was maximized,afield strength measurement was made.
3. The device under test has an integral antenna and the power was measured on a radiated basis.

**Test Result:**

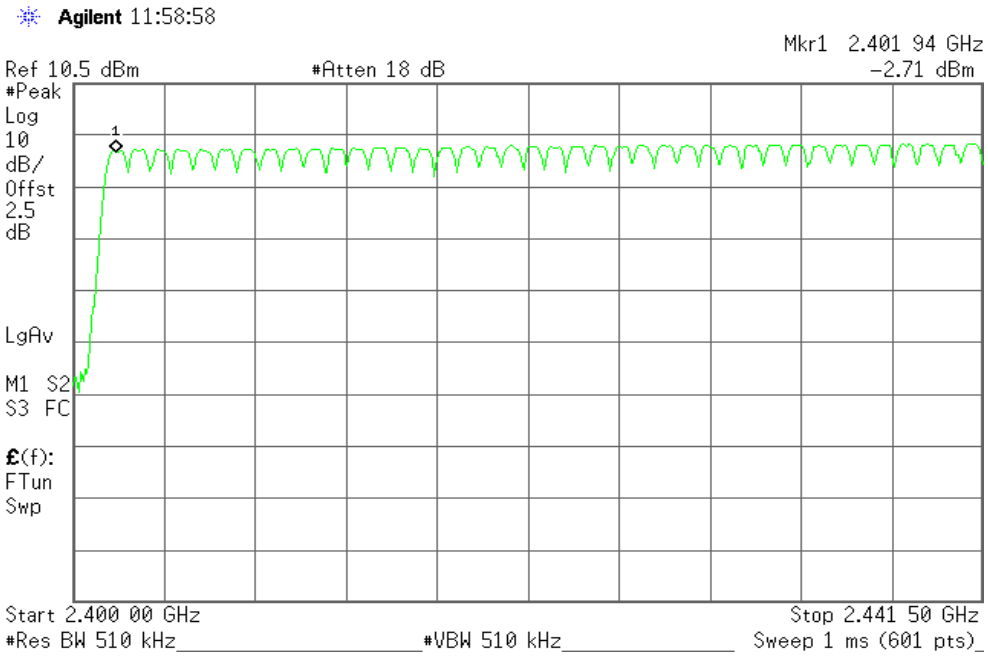
| Test Channel | Fundamental Frequency(GHz) | Output Power (mW) | Limit (W) | Power output level |
|---|---|---|---|---|
| low | 2.402 | 3.05 | 1 | EIRP |
| middle | 2.441 | 2.06 | 1 | EIRP |
| high | 2.480 | 2.15 | 1 | EIRP |

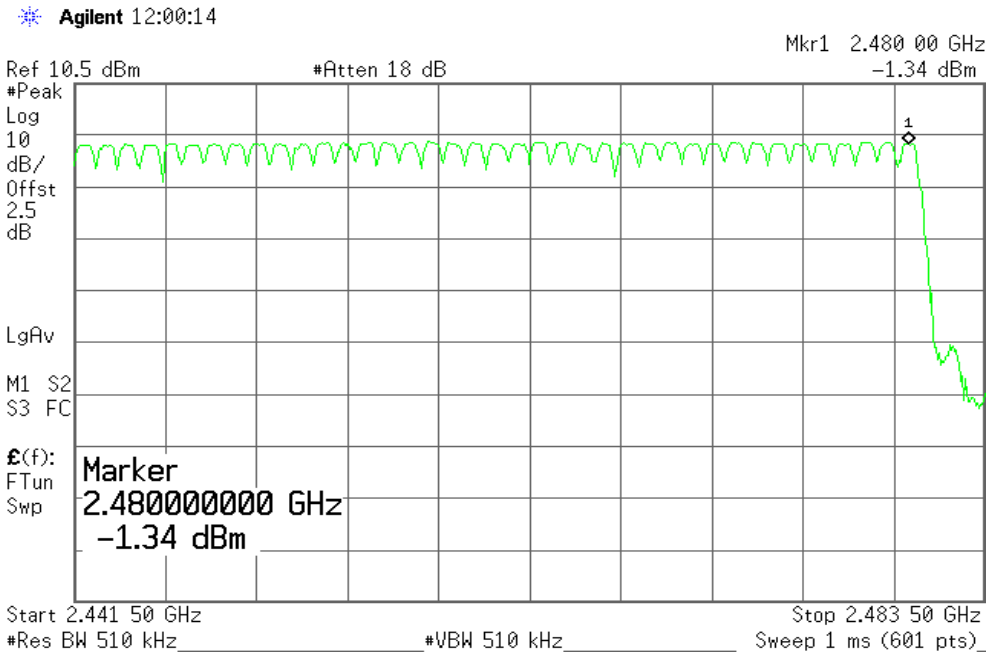
**Test Results**:The unit does meet the FCC requirements.

# 9 Hopping Channel Number

| | |
|---|---|
| Test Requirement: | FCC Part15 C |
| Test Method: | Based on FCC Part15 Paragraph 15.247 |
| Test Date: | May 31, 2007 |
| Test mode: | The EUT work in test mode(Tx) and test it |
| Requirements: | Regulation 15.247(a) For frequency hopping systems operating In the 2400-2483.5MHz band employing at least 75 hopping channels. |
| Test result: | The total number of channels would be 79 channels. The unit does meet the FCC requirements. |

Please refer the graph as below:




Agilent 12:00:14
Mkr1 2.480 00 GHz
Ref 10.5 dBm
#Atten 18 dB
-1.34 dBm
#Peak
Log
10
dB/
Offst
2.5
dB
LgAv
M1 S2
S3 FC
£(f):
FTun
Swp
Marker
2.480000000 GHz
-1.34 dBm
Start 2.441 50 GHz
Stop 2.483 50 GHz
#Res BW 510 kHz
#VBW 510 kHz
Sweep 1 ms (601 pts)

# 10 Carrier Frequencies Separated

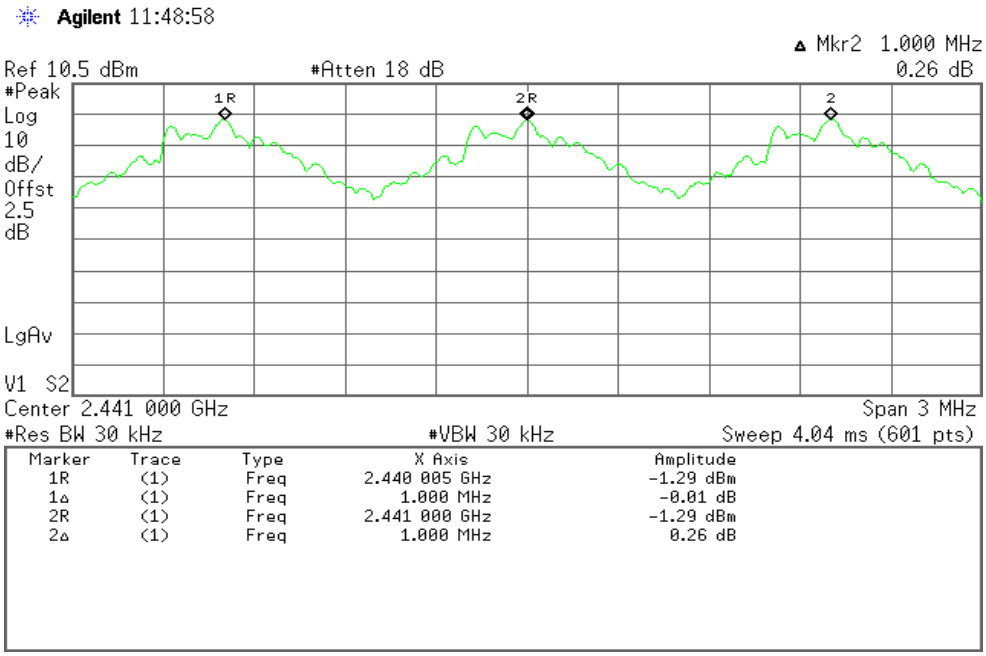
| | |
|---|---|
| Test Requirement: | FCC Part15 C |
| Test Method: | Based on FCC Part15 Paragraph 15.247 |
| Test Date: | May 31, 2007 |
| Test mode: | The EUT work in test mode(Tx) and test it |
| Requirements: | The bandwidth of the fundamental frequency was measur by spectrum analyser with 30kHz RBW and 30kHz 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 (channel 1 and channel 2) | 1MHz | Pass |
| Lower Channels (channel 39 and channel 40) | 1MHz | Pass |
| Lower Channels (channel 78 and channel 79) | 1MHz | Pass |

The unit does meet the FCC requirements.

## 10.1 Middle Channels:Carrier Frequencies Separated



# 11 Dwell Time

| | |
|---|---|
| Test Requirement: | FCC Part15 C |
| Test Method: | Based on FCC Part15 Paragraph 15.247 |
| Test Date: | May 31, 2007 |
| 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.

## 11.1 Test procedure

EUT and its simulators are placed on a turn table, the EUT and let it work normally, 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,set sweep time:5 ms.Span:0Hz.

## 11.2 Test Results : PASS

Sample calculation: In normal operation, there are 5 transmissions per 50ms. Therefore, the dwell time for each channel is:

1.Low Channel: 0.4167ms x (42/50ms x 32s)/80 = 0.14 s < 0.4 s

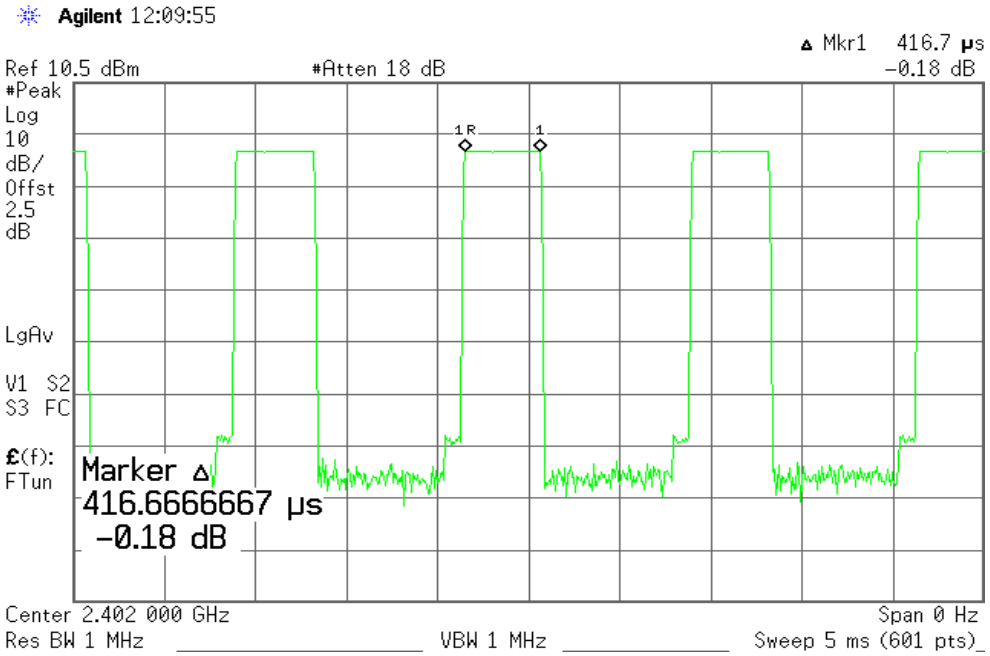
2.Middle Channel: 0.4333ms x (42/50ms x 32s)/80 = 0.1454 s < 0.4 s

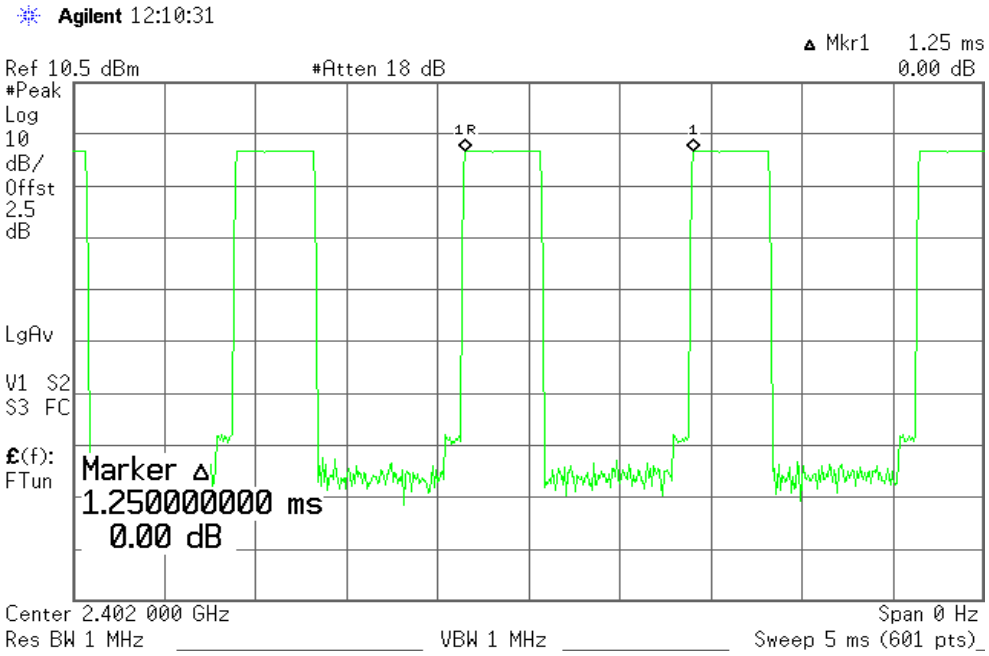
3.High Channel: 0. 4167ms x (42/50ms x 32s)/80 = 0.14 s < 0.4 s

The Results are not be greater than 0.4 seconds.

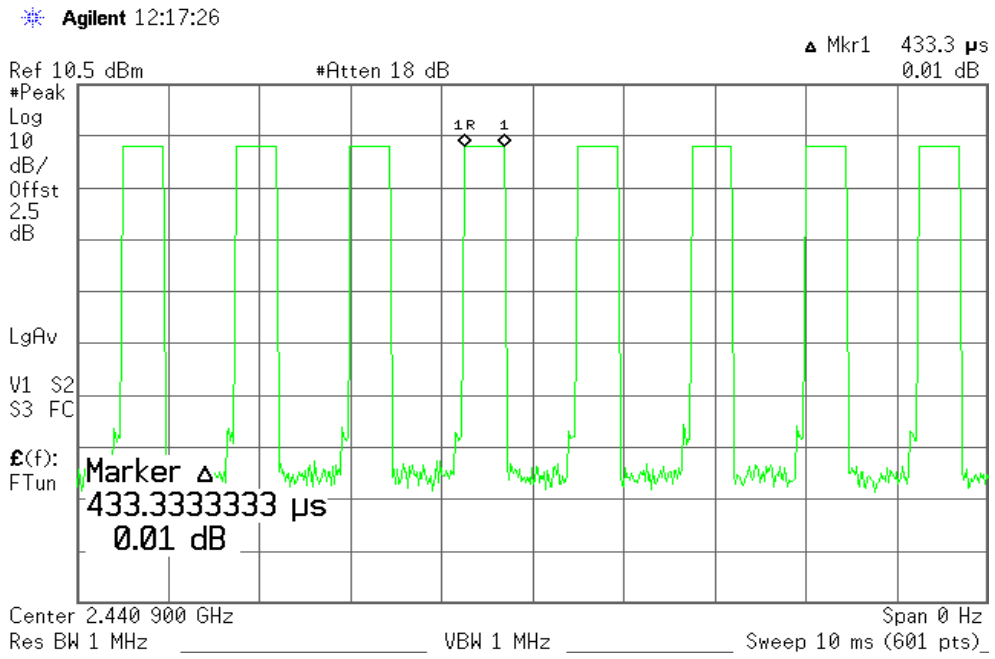
Please refer the graph as below:

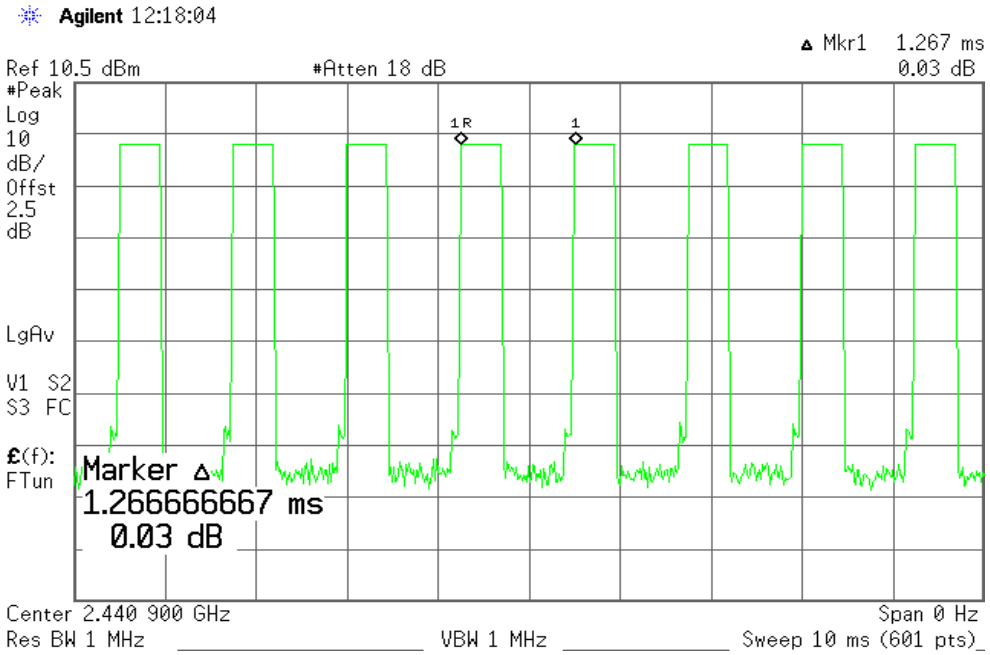
**Channel 0: 2. 402GHz**



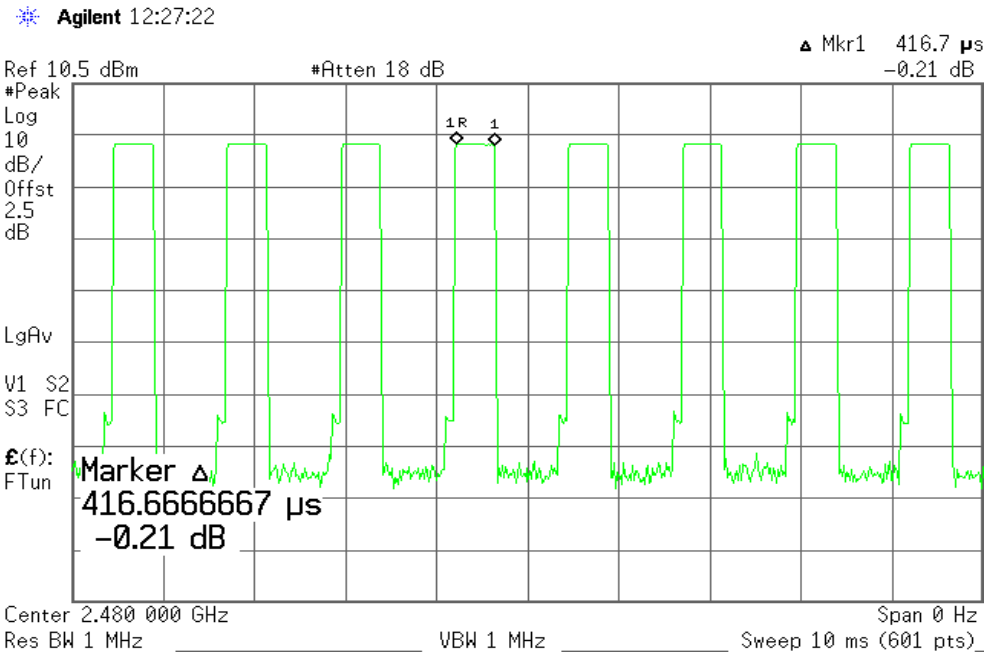



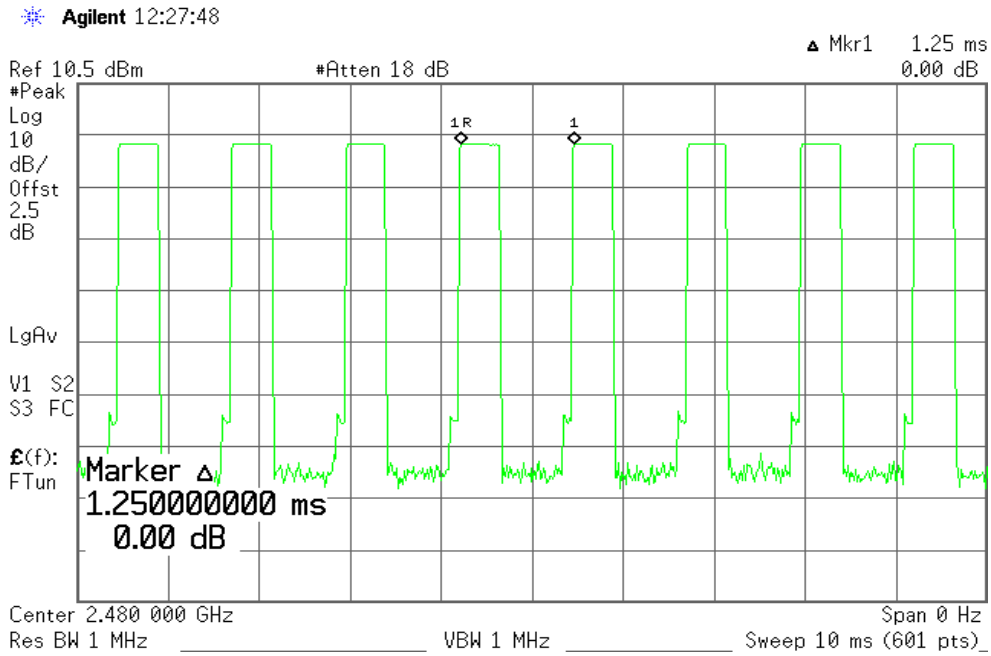
**Channel 39: 2.441GHz**



**Channel 79: 2.480GHz**



# 12 20-dB Bandwith

| | |
|---|---|
| Test Requirement: | FCC Part15 C |
| Test Method: | Based on FCC Part15 Paragraph 15.247 |
| Test Date: | May 31, 2007 |
| Test mode: | The EUT work in test mode(Tx) and test it |

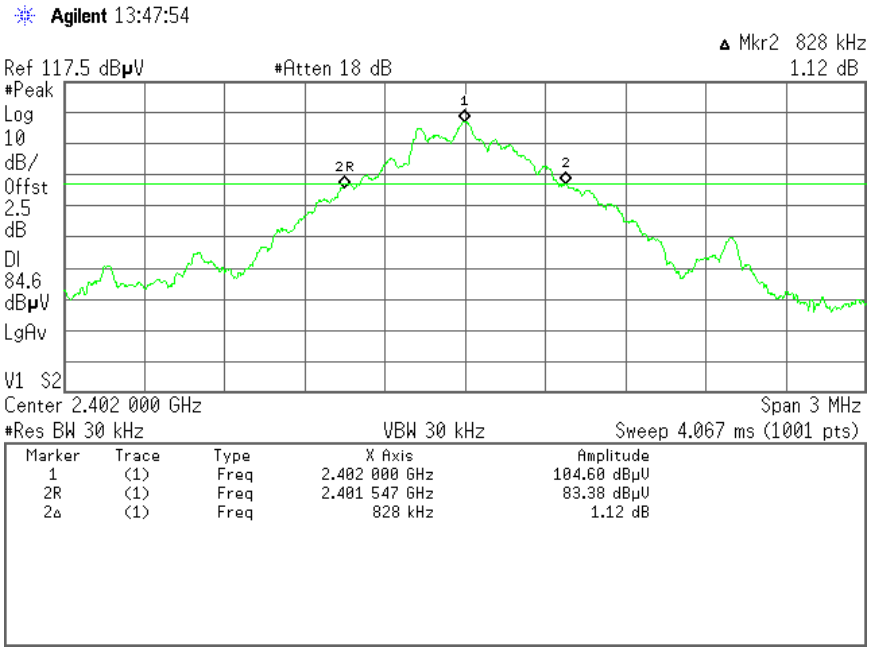
## 12.1 Test Procedure

1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4:2003.
2. With the EUT's antenna attached,The EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyser with the START and STOP frequencies set to the EUT's operation band. Measurements were made at 3 meters.
3. The antenna high were varied from 1m to 4m high to find the maximum emission for each frequency.
4. The bandwidth of the fundamental frequency was measure by spectrum analyser with 30kHz RBW and 30kHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

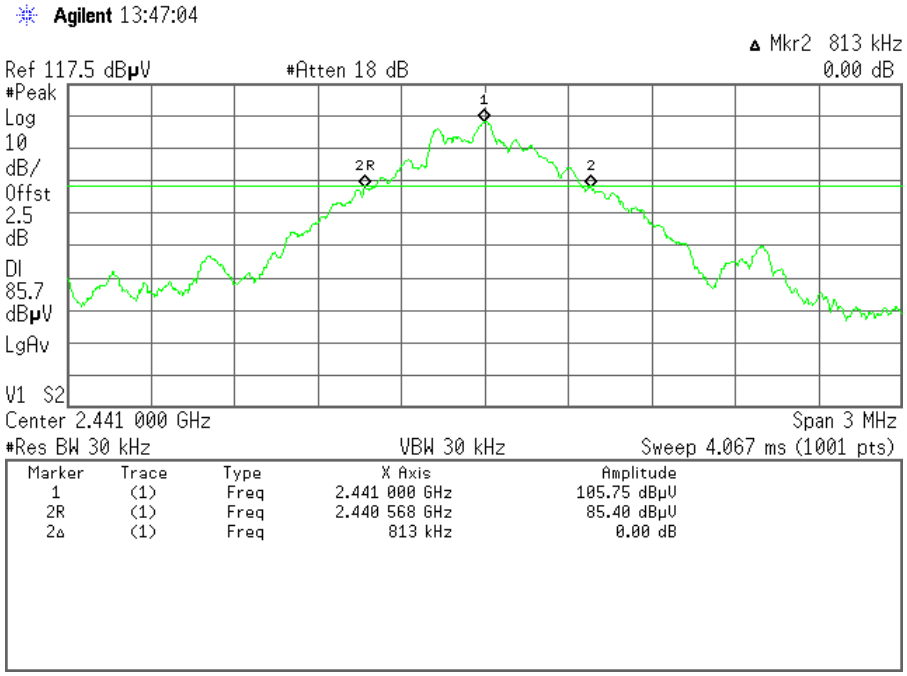
## 12.2 Test Result

Please refer the graph as below:

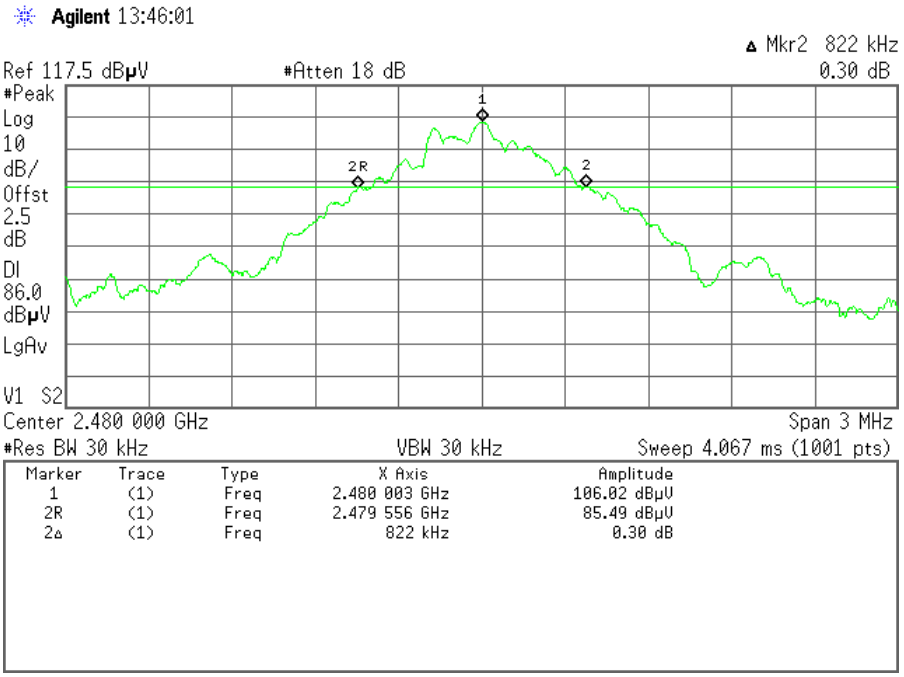
2.402GHz




2.441GHz



2.480GHz


Agilent 13:46:01
Mkr2 822 kHz
Ref 117.5 dBµV
#Atten 18 dB
0.30 dB
#Peak
Log
10
dB/
Offst
2.5
dB
Dl
86.0
dBµV
LgAv
V1 S2
Center 2.480 000 GHz
Span 3 MHz
#Res BW 30 kHz
VBW 30 kHz
Sweep 4.067 ms (1001 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 2.480 003 GHz 106.02 dBµV
2R (1) Freq 2.479 556 GHz 85.49 dBµV
2Δ (1) Freq 822 kHz 0.30 dB

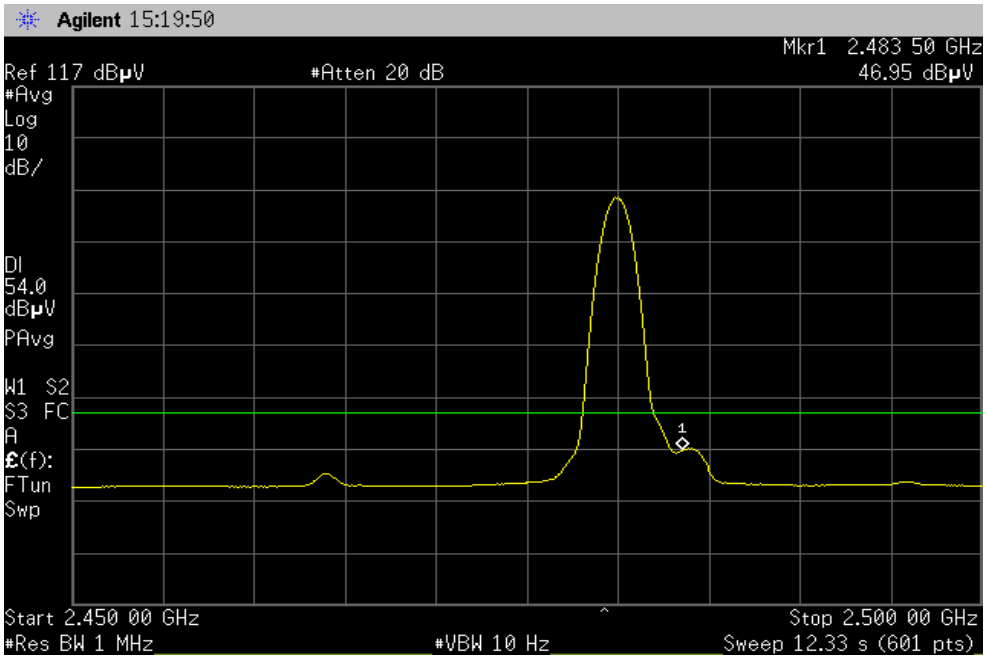
# 13 Radiated spurious emissions into adjacent restricted band

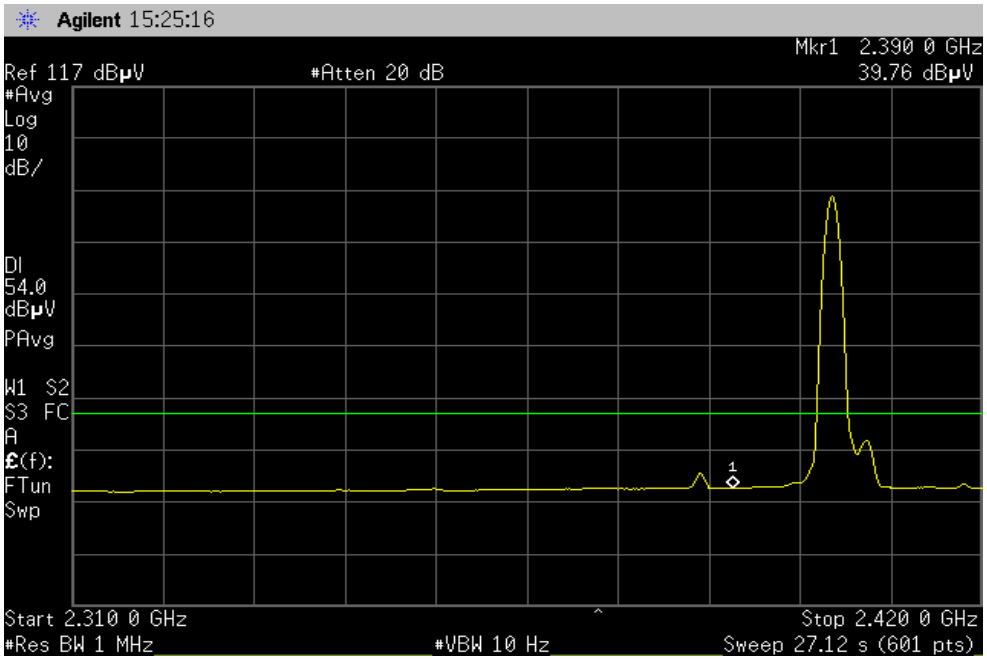
| | |
|---|---|
| Test Requirement: | FCC Part15 Paragraph 15.205 |
| Test Method: | Based on FCC Part 15 Paragraph 15.247 |
| Test Date: | May 31, 2007 |
| Requirements: | The EUT work in test mode(Tx) and test it |

**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.

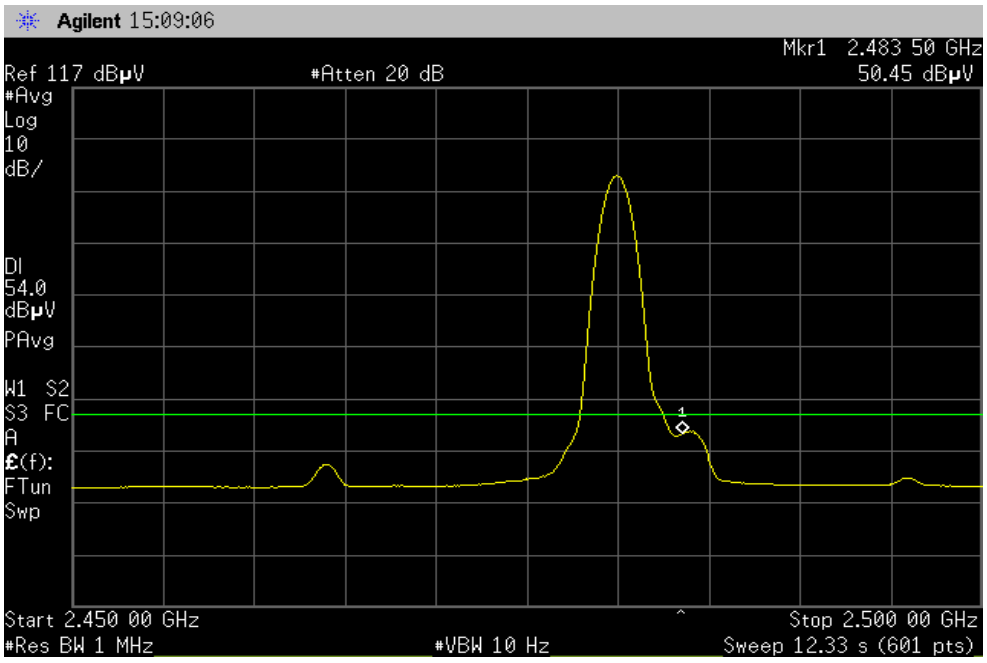
**Test procedure:**An in band field strength measurement of the fundamental emission using the RBW and detector function required by C63.4-2003 and FCC Rules.The procedure was repeated with an average detector and a plot made.The calculated field strength in the adjacent restricted band is presented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

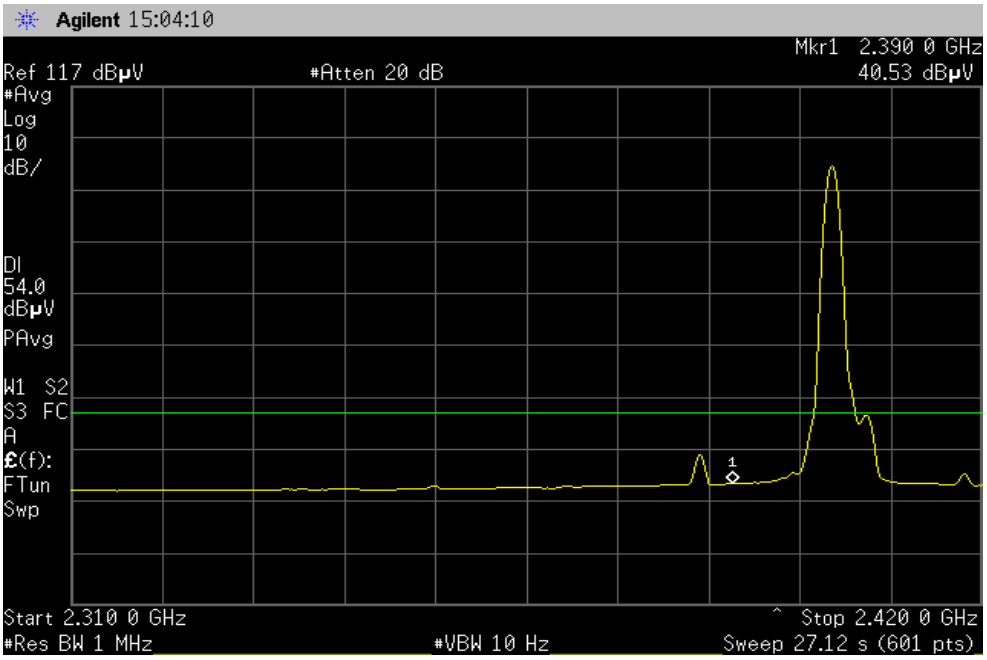
Horizontal bandedge/ restricted band



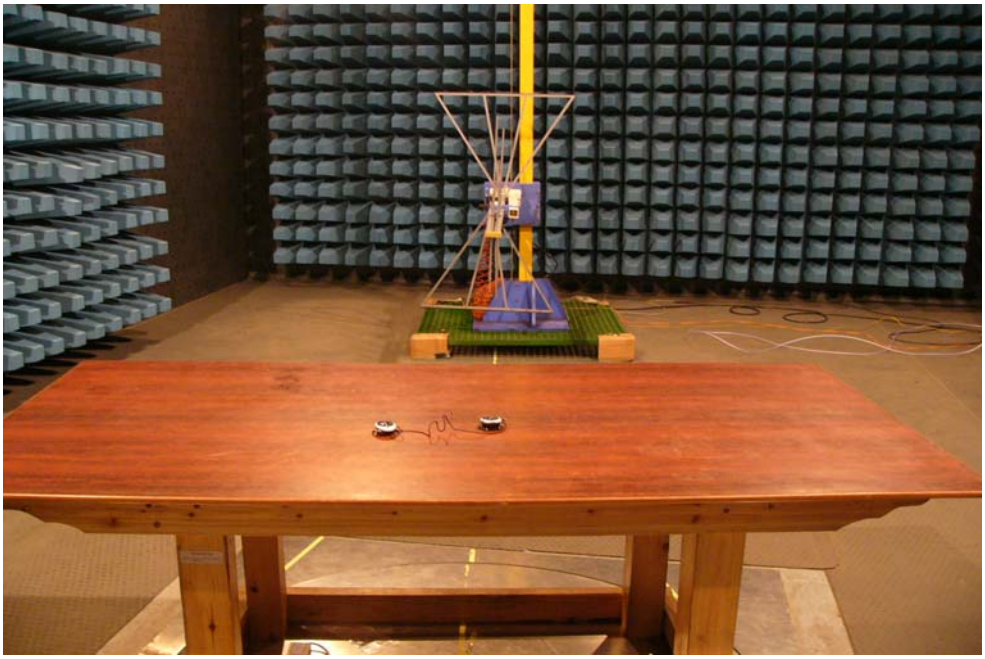
Vertical bandedge and restricted band



# 14 Photographs of Testing

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



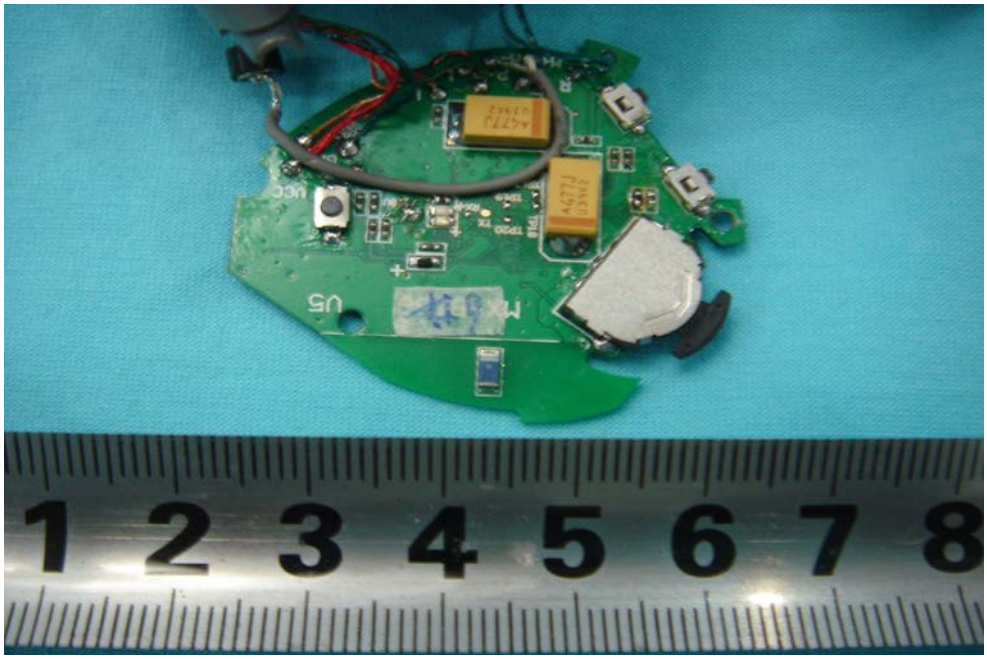
## 14.2 Radiation Emission Test View For 1GHz-25GHz

# 15 Photographs - Constructional Details

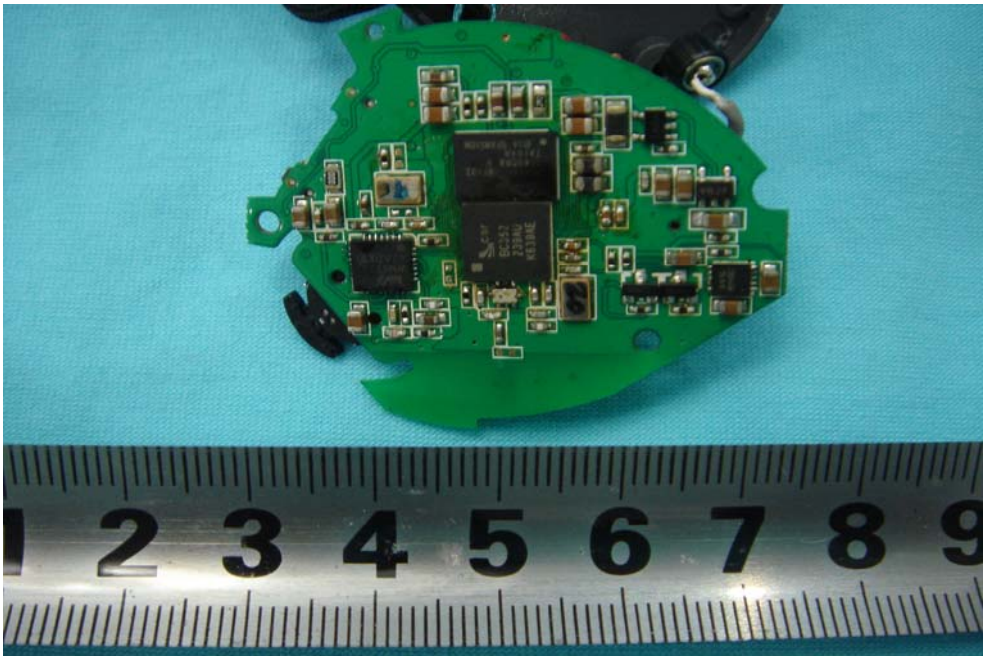
## 15.1 EUT - Front View


## 15.2 EUT - Back View

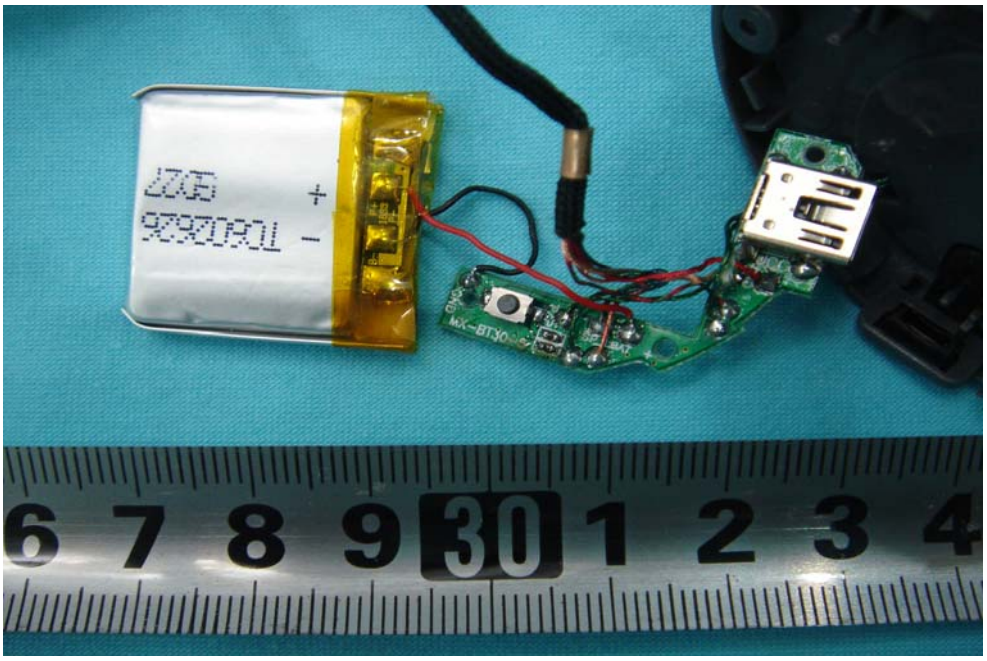
### 15.3 PCB1 – Front View



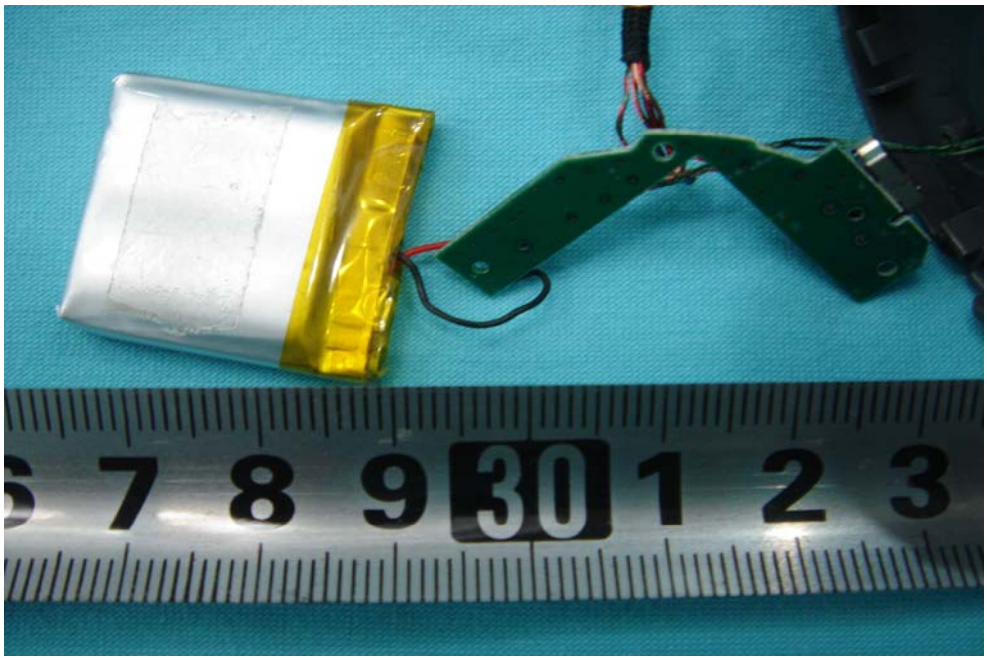
### 15.4 PCB 1- Back View



### 15.5 PCB 2- Front View



### 15.6 PCB 2- Back View



# 16 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