# FCC Test Report

<div style="border:1px solid black;">

Report No.: AGC05X130302F2

</div>

| | | |
|---|---|---|
| **FCC ID** | : | GFOBX-5 |
| **APPLICATION PURPOSE** | : | Class II Permissive Change |
| **PRODUCT DESIGNATION** | : | Bluetooth Speaker |
| **BRAND NAME** | : | COWIN |
| **MODEL NAME** | : | X-9Bluetooth |
| **CLIENT** | : | Cowin Electronics Corp., Limited |
| **DATE OF ISSUE** | : | Mar, 15, 2013 |
| **STANDARD(S)** | : | FCC Part 15 Rules |
| **REPORT VERSION** | : | V 1.0 |

## *A*ttestation of *G*lobal *C*ompliance (Shenzhen) Co., Ltd

**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|:---:|:---:|:---:|:---:|:---:|
| V1.0 | / | Mar.05,2013 | Valid | Original Report |

# Product Change Record

This is a variant report based on model BX-5.The new product model is X-9Bluetooth.Two Models all the same except for PCB Components and product appearance. But Bluetooth Module no any change.
The original report can be referred to AGC05X120501-1F2.
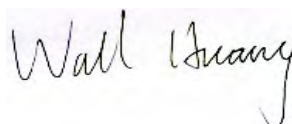Only Radiated Emission and Band Edges were verified for the differences based on the original product.

## VERIFICATION OF COMPLIANCE

| | |
|---|---|
| Applicant | Cowin Electronics Corp., Limited |
| | Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, Shenzhen, Guangdong, China |
| Manufacturer | Cowin Electronics Corp., Limited |
| | Cell B, 3th Floor, Tower B, Hongzhuyongqi Technology Park, Lezhujiao, Xixiang, Baoan, Shenzhen, Guangdong, China |
| Product Designation | Bluetooth Speaker |
| Brand Name | COWIN |
| Test Model | X-9Bluetooth |
| FCC ID | GFOBX-5 |
| Report Number | AGC05X130302F2 |
| Date of Test | Mar.13, 2013 to Mar.14, 2013 |

## WE HEREBY CERTIFY THAT:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

Prepared By

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Checked By

Mar.15, 2013

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# 1. GENERAL INFORMATION

## 1.1 PRODUCT DESCRIPTION

The EUT is a **Bluetooth Speaker** designed as a "Communication Device". It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following:

| | |
|---|---|
| Operation Frequency | 2.402 GHz to 2.480GHz |
| Bluetooth Version | V2.1 with EDR |
| Modulation | GFSK, π /4-DQPSK, 8DPSK |
| Number of channels | 79 |
| Antenna Designation | Integrated Antenna |
| Antenna Gain | 0.8dBi |
| Hardware Version | 1.0 |
| Software Version | N/A |
| Power Supply | DC 3.7V by Built-in Li-ion Battery |

**Note:** *The USB port is only used to charging.*

## 1.2 TABLE OF CARRIER FREQUENCYS

| Frequency Band | Channel Number | Frequency |
|---|---|---|
| 2400~2483.5MHZ | 0 | 2402MHZ |
| | 1 | 2403MHZ |
| | : | : |
| | 38 | 2440 MHZ |
| | 39 | 2441 MHZ |
| | 40 | 2442 MHZ |
| | : | : |
| | 77 | 2479 MHZ |
| | 78 | 2480 MHZ |

## 1.3 RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3 MHz. In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single of multisport (packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

## 1.4 EXAMPLE OF A HOPPING SEQUENCE IN DATA MODE

Example of a 79 hopping sequence in data mode:
40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06
01,51,03,55,05,04

## 1.5 EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:
1 LAP/UAP of the master of the connection
2 Internal master clock
The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is
an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of
the 48BD_ADDRESS
The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and
Is never turned off. For synchronization with other units only offset are used. It has no relation to the time
Of the day. Its resolution is at least half the RX/TX slot length of 312.5us.The clock has a cycle of about
One day(23h30).In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence
the entire.
LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values
different mathematical procedures(permutations, additions, XOR-operations)are performed to generate te
Sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions the Bluetooth system has the following behavior:
The first connection between the two devices is established, a hopping sequence was generated. For
Transmitting the wanted data the complete hopping sequence was not used. The connection ended.
The second connection will be established. A new hopping sequence is generated. Due to the fact the
Bluetooth clock has a different value, because the period between the two transmission is longer(and it
Cannot be shorter)than the minimum resolution of the clock(312.5us).The hopping sequence will always
Differ from the first one.

## 1.6 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: GFOBX-5**, filing to comply with Section 15.247 of the FCC
Part 15, Subpart C Rules.

## 1.7 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003).
Radiated testing was performed at an antenna to EUT distance 3 meters.

## 1.8 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in
Measurement" (GUM) published by ISO.
- Uncertainty of Conducted Emission, Uc = ±2.75dB
- Uncertainty of Radiated Emission, Uc = ±3.2dB

## 1.9 TEST FACILITY

All measurement facilities used to collect the measurement data are located at
Attestation of Global Compliance(Shenzhen) Co., Ltd.
2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.
FCC register No.: 259865

## 1.10 SPECIAL ACCESSORIES
Refer to section 2.2.

## 1.11 EQUIPMENT MODIFICATIONS
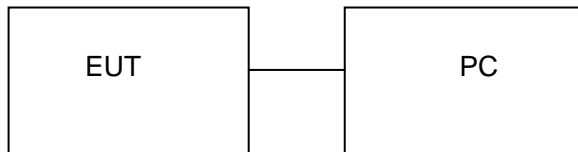Not available for this EUT intended for grant.

## 2. SYSTEM TEST CONFIGURATION

### 2.1 CONFIGURATION OF TESTED SYSTEM

**Configure 1** (Normal Hopping mode)

```
┌──────────────┐
│              │
│     EUT      │
│              │
└──────────────┘
```

**Configure 2** (Control continuous TX through PC)

```
┌──────────────┐      ┌──────────────┐
│              │      │              │
│     EUT      │──────│     PC       │
│              │      │              │
└──────────────┘      └──────────────┘
```

***Note:** All the accessories have been used during the test.*

### 2.2 EQUIPMENT USED IN EUT SYSTEM

| Item | Equipment | Mfr/Brand | Model/Type No. | Remark |
|------|-----------|-----------|----------------|--------|
| 1 | Bluetooth Speaker | N/A | X-9Bluetooth | EUT |
| 2 | PC | DELL | INSPIRON | A.E |

## 3. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|---|---|---|
| §15.209 | Radiated Emission | Compliant |
| §15.247 | Band Edges | Compliant |

***Note:** The EUT can work normally when charging. The adapter was supplied by lab during test.*

## 4. DESCRIPTION OF TEST MODES

The EUT has been operated in three modulations: GFSK, π /4-DQPSK, 8-DPSK independently.
The following operating modes were applied for the related test items. All 3axis have been tested.

| No. | TEST MODES |
|---|---|
| 1 | Low Channel(TX) |
| 2 | Middle Channel(TX) |
| 3 | High Channel(TX) |
| 4 | Normal Hopping |

***Note:** All the test modes were tested, and the battery is full filled, only the result of the worst case was recorded in the report.*

## 5. RADIATED EMISSION

### 5.1 MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.

2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.

4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.

7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.

9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
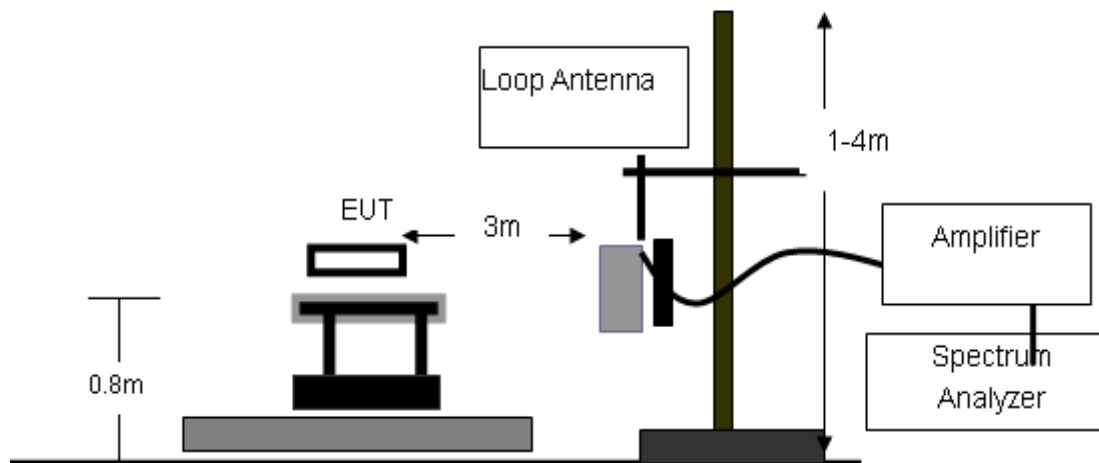
The following table is the setting of spectrum analyzer and receiver.'

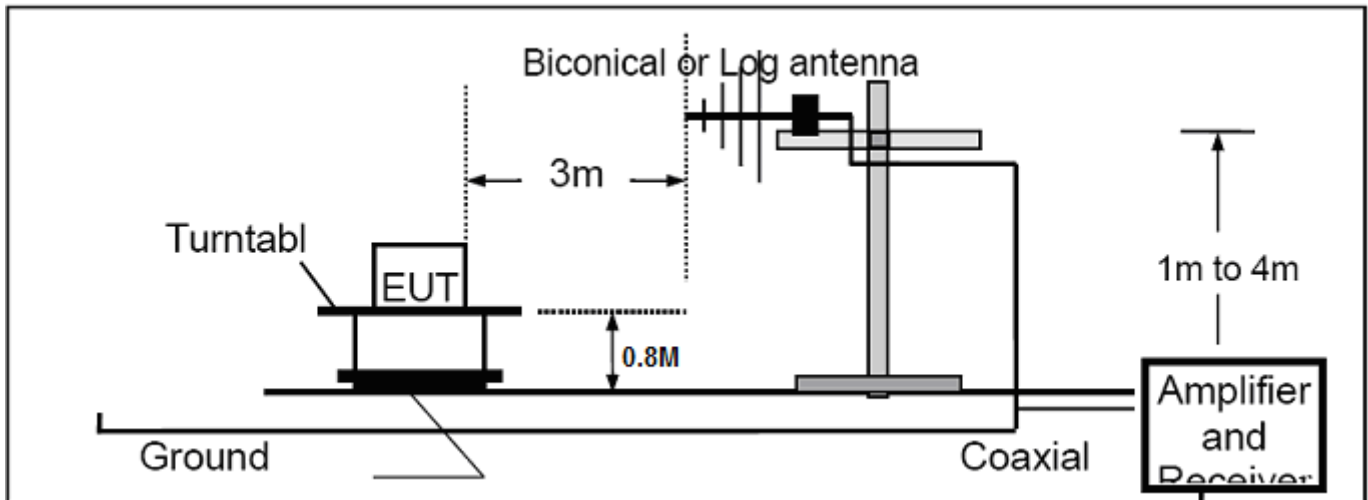| Spectrum Parameter | Setting |
|---|---|
| Start Frequency | 1GHz |
| Stop Frequency | 26.5GHz |
| RB/VB(Emission in restricted band) | 1MHz/1MHz for Peak, 1MHz/10Hz for Average |
| RB/VB(Emission in non-restricted band) | 1MHz/1MHz for Peak |

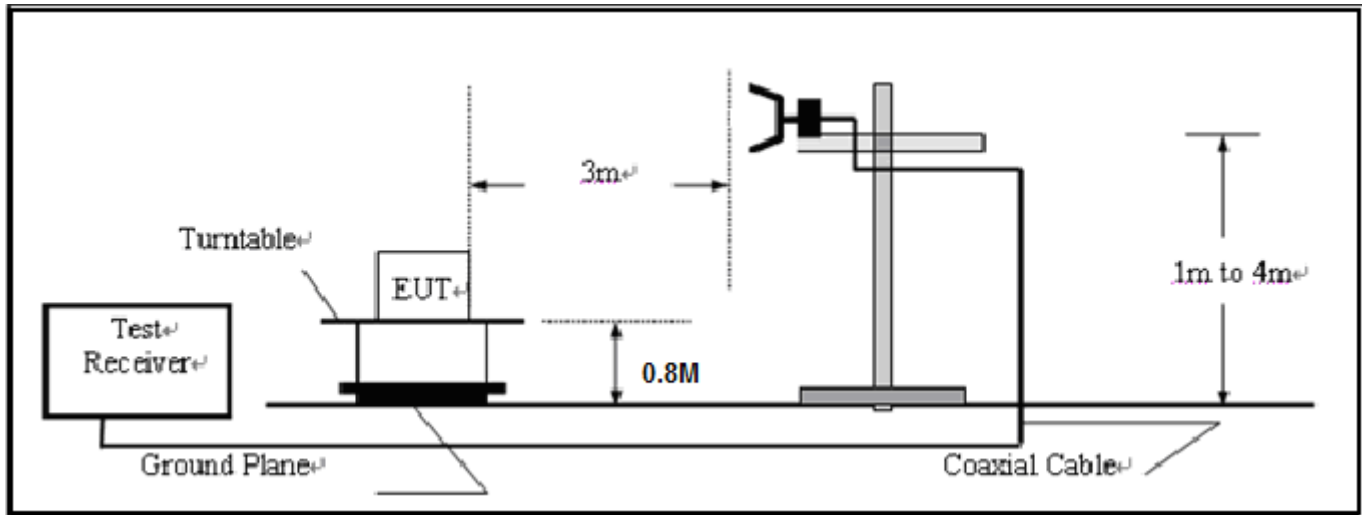| Receiver   Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |

**5.2 TEST SETUP**

RADIATED EMISSION TEST SETUP BELOW 30MHz

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



## 5.3 TEST EQUIMENT LIST

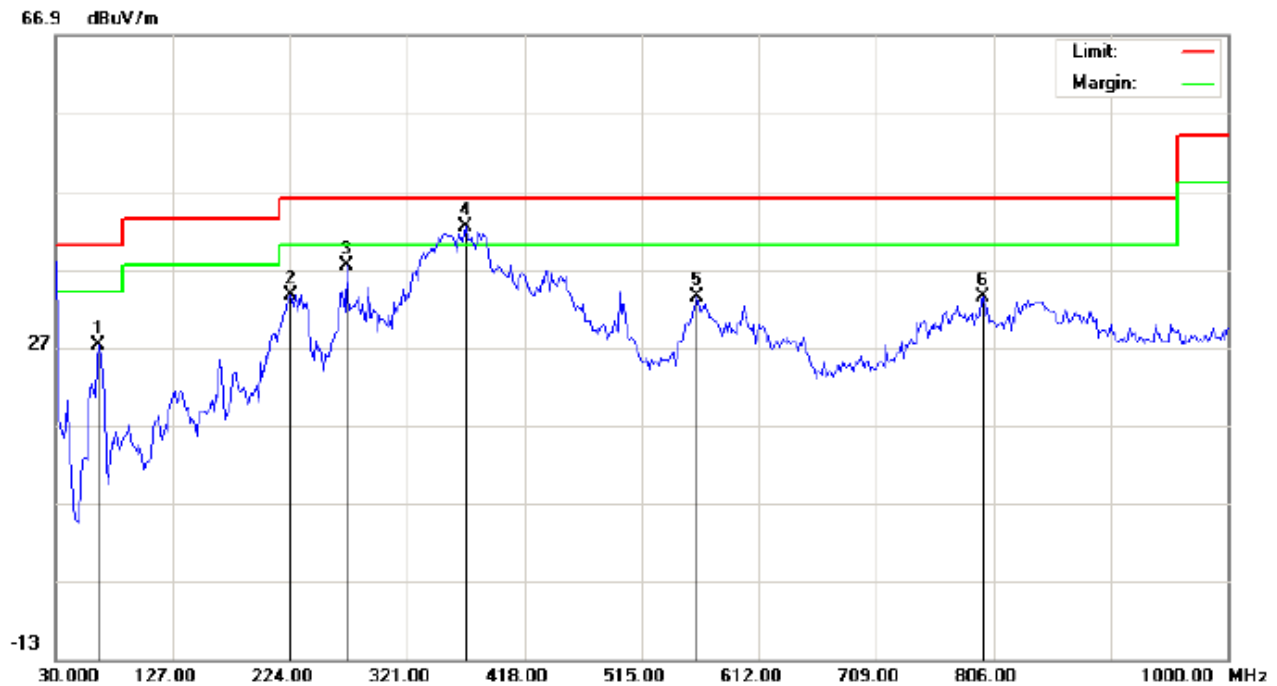| Description | Manufacturer | Model | SERIAL NUMBER | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4440A | N/A | 07/18/2013 | 07/17/2013 |
| Amplifier | EM | EM30180 | 0607030 | 07/18/2013 | 07/17/2013 |
| Horn Antenna | EM | EM-AH-10180 | N/A | 04/21/2012 | 04/20/2013 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | N/A | 07/18/2013 | 07/17/2013 |
| Biological Antenna | A.H. Systems Inc. | SAS-521-4 | N/A | 06/08/2011 | 06/07/2013 |
| Horn Antenna | A.H. Systems Inc. | SAS-574 | N/A | 07/18/2012 | 07/17/2013 |

## 5.4 TEST RESULT

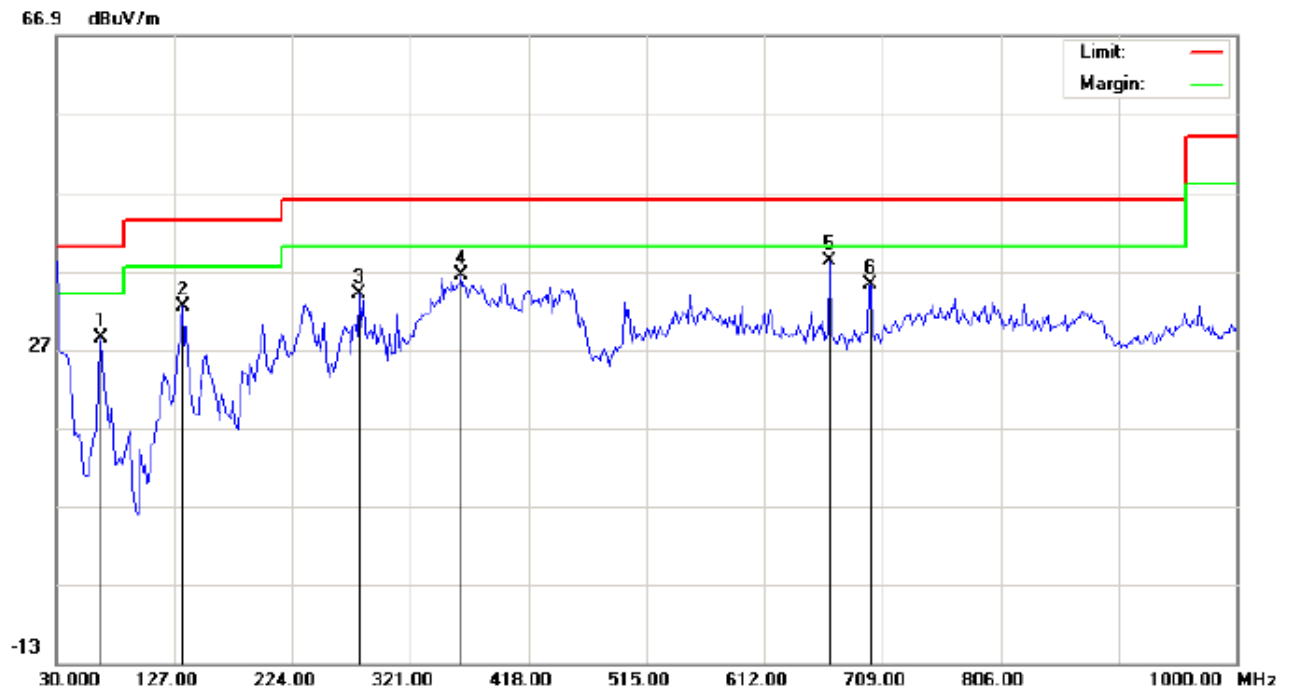## THE WORST CASE IS NORMAL HOPPING MODE.

### RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

### RADIATED EMISSION BELOW 1GHZ



Site:    site #1

Limit:  FCC Class B 3M Radiation

EUT:   Bluetooth speaker

M/N:   X-9Bluetooth

Mode:   Normal Hopping

Note:

Polarization:  *Horizontal*

Power:

Distance: 3M

Temperature:  26

Humidity:  60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|--------------|---------|
|     |     | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 65.5667 | 24.68 | 2.57 | 27.25 | 40.00 | -12.75 | peak | | | |
| 2 | | 224.0000 | 21.17 | 12.48 | 33.65 | 46.00 | -12.35 | peak | | | |
| 3 | | 270.8833 | 20.26 | 17.22 | 37.48 | 46.00 | -8.52 | peak | | | |
| 4 | * | 369.5000 | 23.15 | 19.17 | 42.32 | 46.00 | -3.68 | peak | | | |
| 5 | | 560.2667 | 9.29 | 24.02 | 33.31 | 46.00 | -12.69 | peak | | | |
| 6 | | 797.9167 | 5.27 | 28.05 | 33.32 | 46.00 | -12.68 | peak | | | |

Site: site #1

Limit: FCC Class B 3M Radiation

EUT: Bluetooth speaker

M/N: X-9Bluetooth

Mode: Normal Hopping

Note:

Polarization: **Vertical**

Power:

Distance: 3M

Temperature: 26

Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|--------------|---------|
|     |     | MHz   | dBuV    | dB/m   | dBuV/m      | dBuV/m | dB  |          | cm             | degree       |         |
| 1   |     | 67.1833 | 25.18 | 3.21   | 28.39       | 40.00 | -11.61 | peak   |                |              |         |
| 2   |     | 133.4667 | 22.12 | 10.26 | 32.38      | 43.50 | -11.12 | peak   |                |              |         |
| 3   |     | 278.9667 | 16.98 | 16.99 | 33.97      | 46.00 | -12.03 | peak   |                |              |         |
| 4   |     | 363.0333 | 17.31 | 19.13 | 36.44      | 46.00 | -9.56  | peak   |                |              |         |
| 5   | *   | 665.3500 | 12.36 | 25.82 | 38.18      | 46.00 | -7.82  | peak   |                |              |         |
| 6   |     | 699.3000 | 8.56  | 26.60 | 35.16      | 46.00 | -10.84 | peak   |                |              |         |

## RADIATED EMISSION ABOVE 1GHZ (1-10<sup>th</sup> Harmonics)



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Bluetooth Speaker
M/N: X-9Bluetooth
Mode: Normal Hopping
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|---------------|-------------|---------|
|     |     | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB |  | cm | degree |  |
| 1 |   | 2246.667 | 44.17 | -9.01 | 35.16 | 74.00 | -38.84 | peak |  |  |  |
| 2 | X | 2400.000 | 85.05 | -8.40 | 76.65 | 74.00 | 2.65 | peak |  |  |  |
| 3 | * | 2480.000 | 84.89 | -8.08 | 76.81 | 74.00 | 2.81 | peak |  |  |  |
| 4 |   | 3813.333 | 47.15 | -7.30 | 39.85 | 74.00 | -34.15 | peak |  |  |  |
| 5 |   | 4613.333 | 44.65 | -4.17 | 40.48 | 74.00 | -33.52 | peak |  |  |  |

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

EUT: Bluetooth Speaker

M/N: X-9Bluetooth

Mode: Normal Hopping

Note:

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 26

Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|--------------|---------|
|     |     | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 2340.000 | 44.51 | -8.64 | 35.87 | 74.00 | -38.13 | peak | | | |
| 2 | | 3620.000 | 48.10 | -7.48 | 40.62 | 74.00 | -33.38 | peak | | | |
| 3 | | 4420.000 | 45.65 | -4.88 | 40.77 | 74.00 | -33.23 | peak | | | |
| 4 | * | 2400.000 | 85.31 | -8.40 | 76.91 | 74.00 | 2.91 | peak | | | |
| 5 | X | 2480.000 | 84.65 | -8.08 | 76.57 | 74.00 | 2.57 | peak | | | |

**Note:** 5~25GHz at least have 20dB margin. No recording in the test report.

Factor=Antenna Factor+ Cable loss-Amplifier gain, Over=Measurement-Limit.

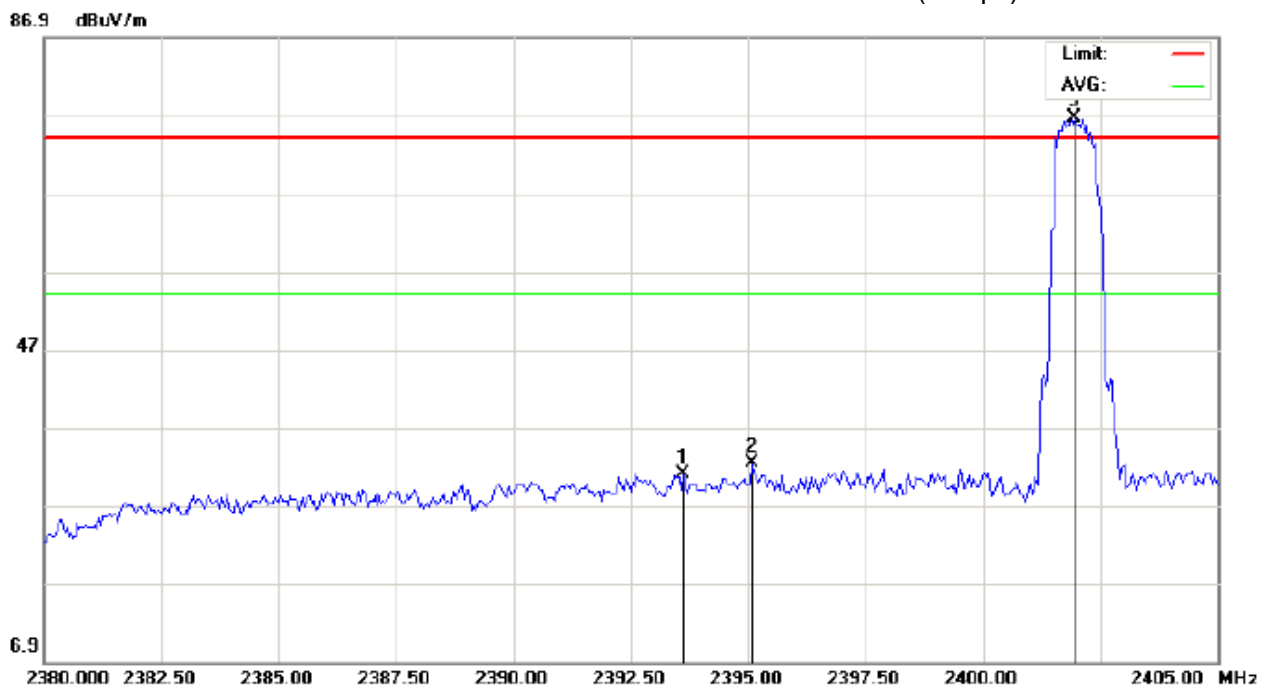# 6. BAND EDGES EMISSION
## 6.1 MEASUREMENT PROCEDURE

1, Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, RBW>=1%span, VBW>=RBW
3. The band edges was measured and recorded.
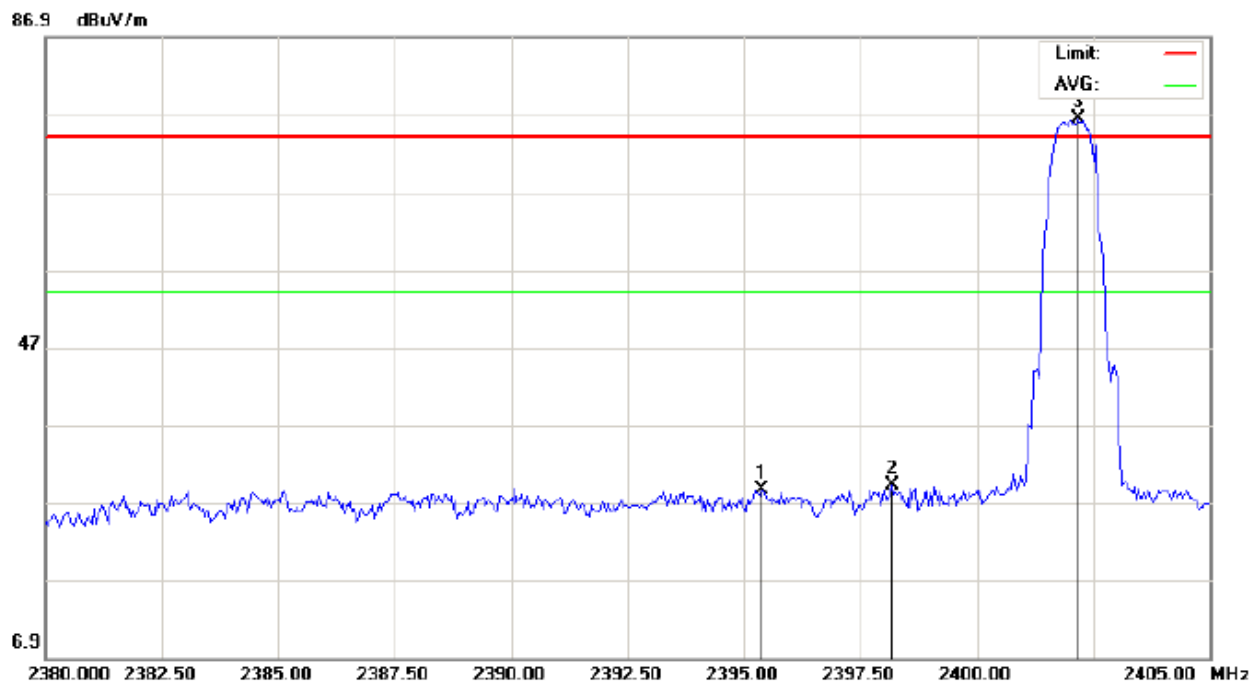
## 6.2 TEST SET-UP

The same as described in section 8.2

## 6.3 TEST RESULT

### TEST PLOT OF BAND EDGE FOR LOW CHANNEL (3Mbps)



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Bluetooth Speaker
M/N: X-9Bluetooth
Mode: Low channel TX (3Mbps)
Note:

Polarization: *Horizontal*
Power:
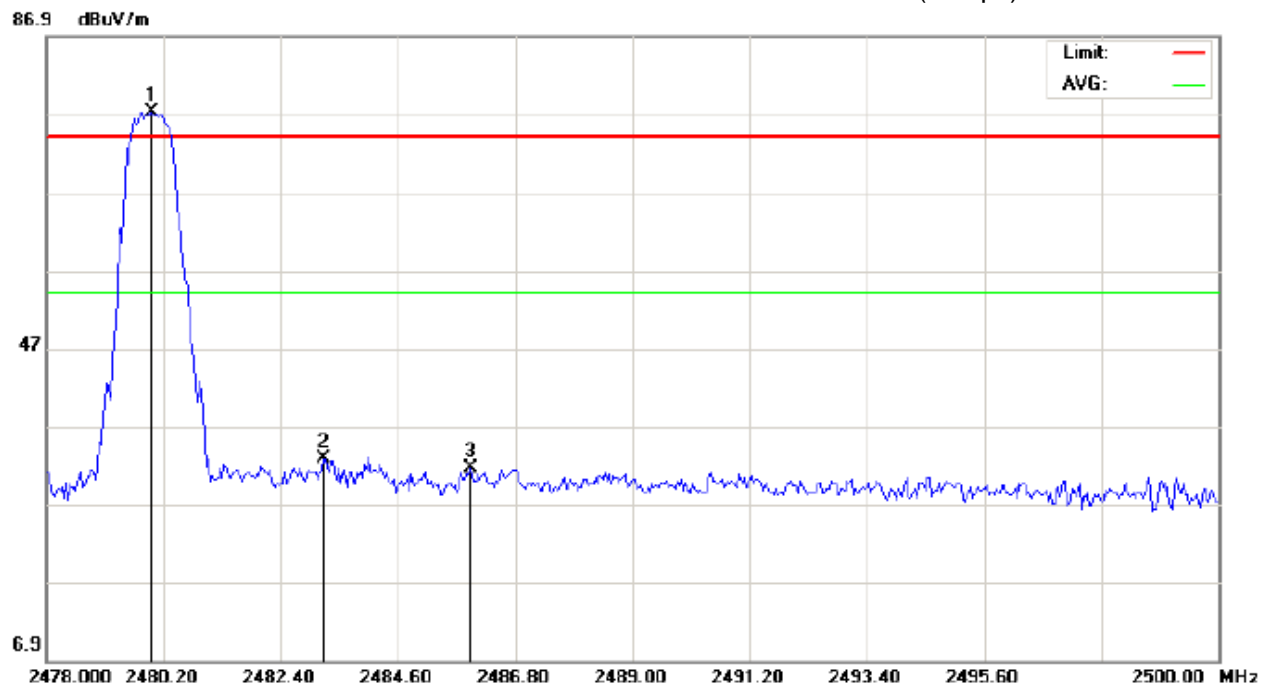Distance: 3m

Temperature: 26
Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 2393.625 | 39.38 | -8.43 | 30.95 | 74.00 | -43.05 | peak | | | |
| 2 | | 2395.083 | 40.75 | -8.42 | 32.33 | 74.00 | -41.67 | peak | | | |
| 3 | * | 2401.958 | 84.95 | -8.39 | 76.56 | 74.00 | 2.56 | peak | | | |

Site: site #1

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

EUT: Bluetooth Speaker
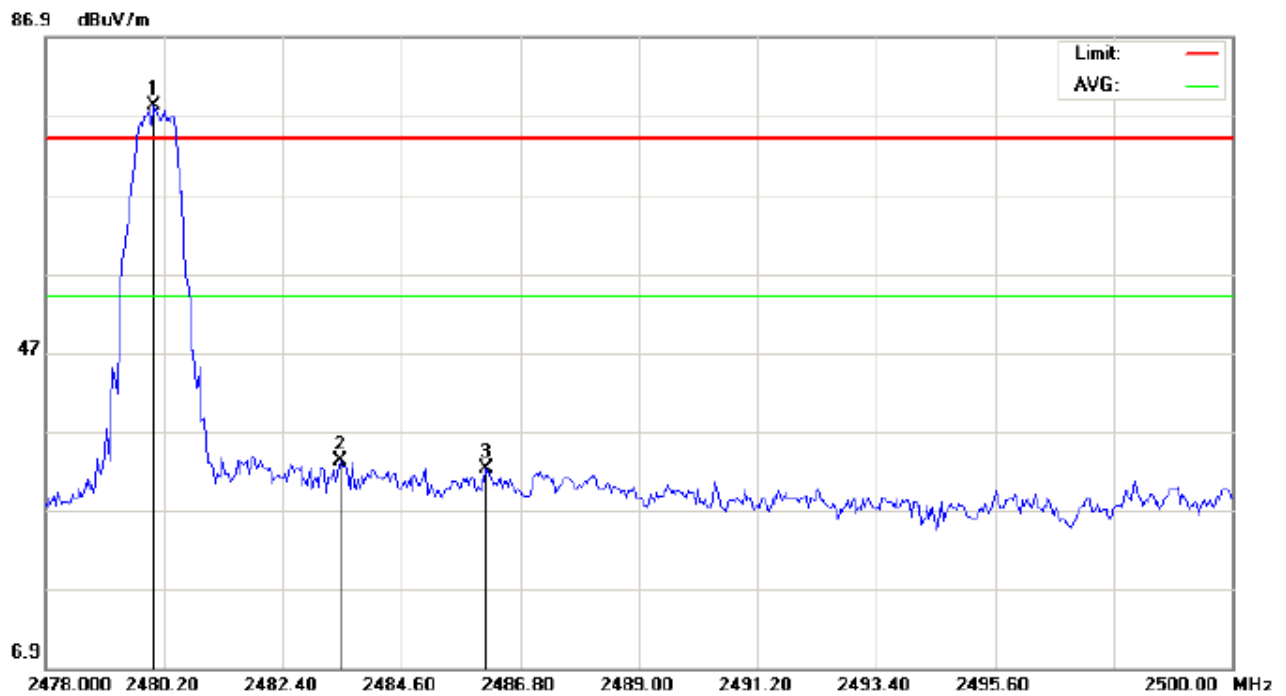
M/N: X-9Bluetooth

Mode: Low channel TX (3Mbps)

Note:

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 26

Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|--------------|---------|
|     |     | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 2395.375 | 37.10 | -8.42 | 28.68 | 74.00 | -45.32 | peak | | | |
| 2 | | 2398.167 | 37.68 | -8.41 | 29.27 | 74.00 | -44.73 | peak | | | |
| 3 | * | 2402.167 | 84.79 | -8.39 | 76.40 | 74.00 | 2.40 | peak | | | |

## TEST PLOT OF BAND EDGE FOR HIGH CHANNEL (3Mbps)



Site:  site #1

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

EUT:  Bluetooth Speaker

M/N:  X-9Bluetooth

Mode:  High channel TX (3Mbps)

Note:

Polarization:  *Horizontal*

Power:

Distance:  3m

Temperature: 26

Humidity:  60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|--------------|---------|
|     |     | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2479.980 | 85.37 | -8.08 | 77.29 | 74.00 | 3.29 | peak | | | |
| 2 |   | 2483.207 | 40.83 | -8.07 | 32.76 | 74.00 | -41.24 | peak | | | |
| 3 |   | 2485.957 | 39.59 | -8.06 | 31.53 | 74.00 | -42.47 | peak | | | |

| Site: | site #1 | Polarization: | **Vertical** | Temperature: 26 |
| Limit: | FCC Class B 3M Radiation above 1GHZ(PK) | Power: | | Humidity: 60 % |
| EUT: | Bluetooth Speaker | Distance: 3m | | |
| M/N: | X-9Bluetooth | | | |
| Mode: | High channel TX (3Mbps) | | | |
| Note: | | | | |

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|-----|-------|---------|--------|-------------|-------|------|----------|----------------|-------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2480.017 | 86.33 | -8.08 | 78.25 | 74.00 | 4.25 | peak | | | |
| 2 | | 2483.463 | 41.19 | -8.07 | 33.12 | 74.00 | -40.88 | peak | | | |
| 3 | | 2486.177 | 40.18 | -8.06 | 32.12 | 74.00 | -41.88 | peak | | | |

# APPENDIX I
# PHOTOGRAPHS OF THE EUT

TOTAL VIEW OF EUT



TOP VIEW OF EUT

BOTTOM VIEW OF EUT
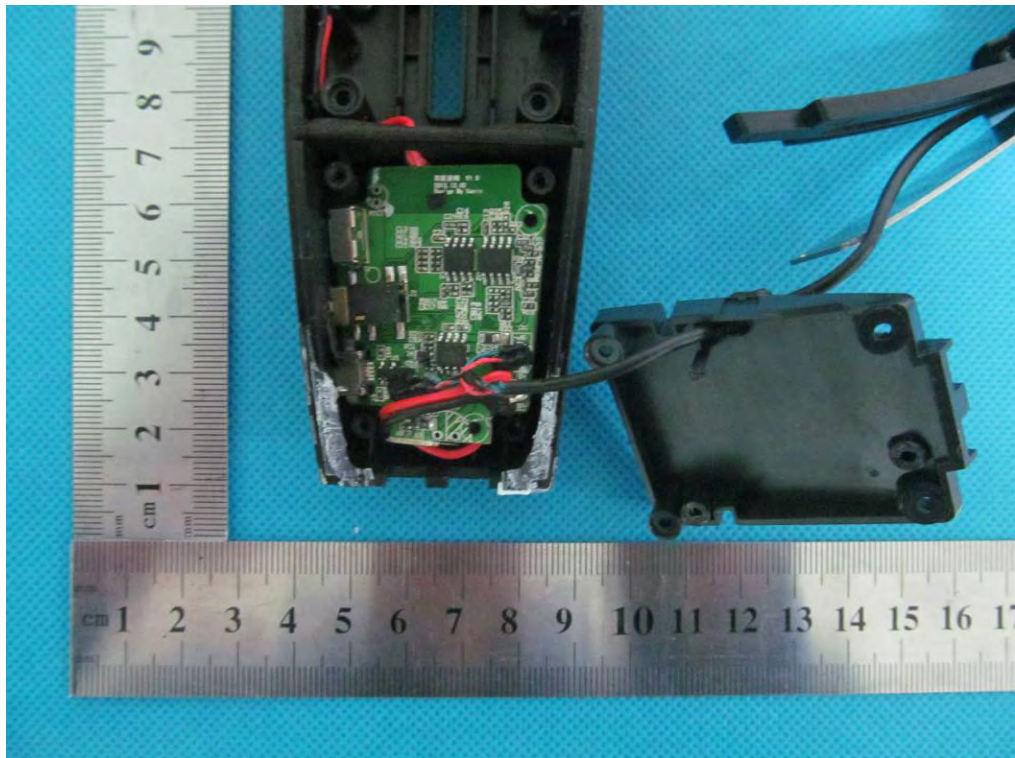


LEFT VIEW OF EUT
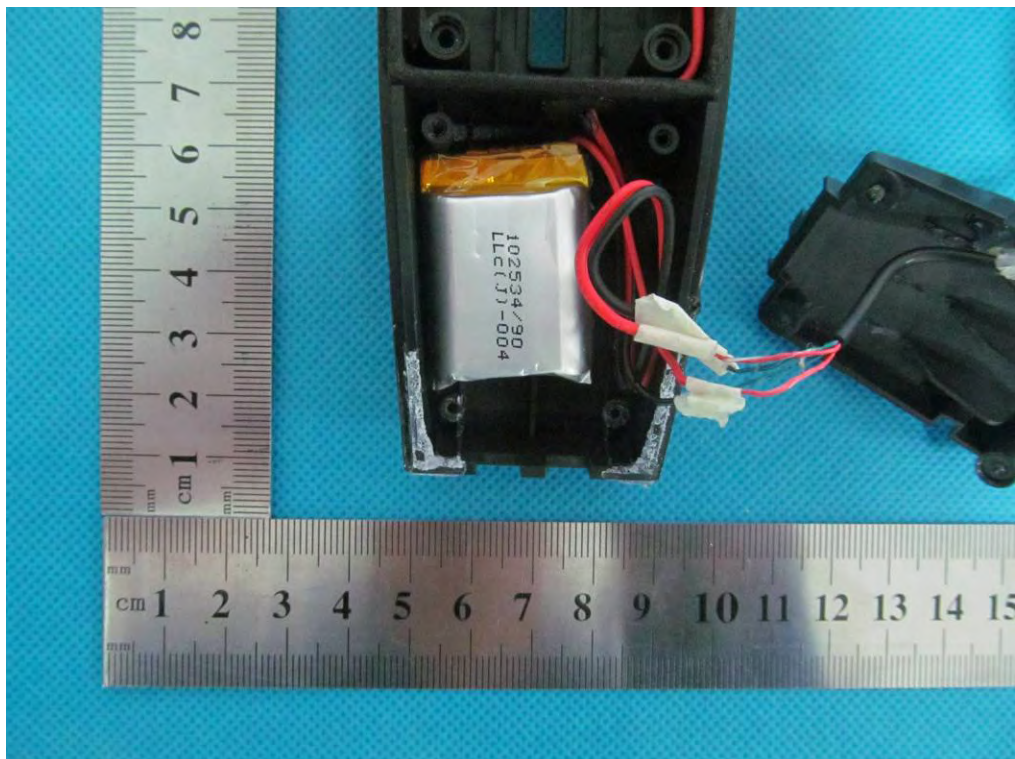
RIGHT VIEW OF EUT



FRONT VIEW OF EUT

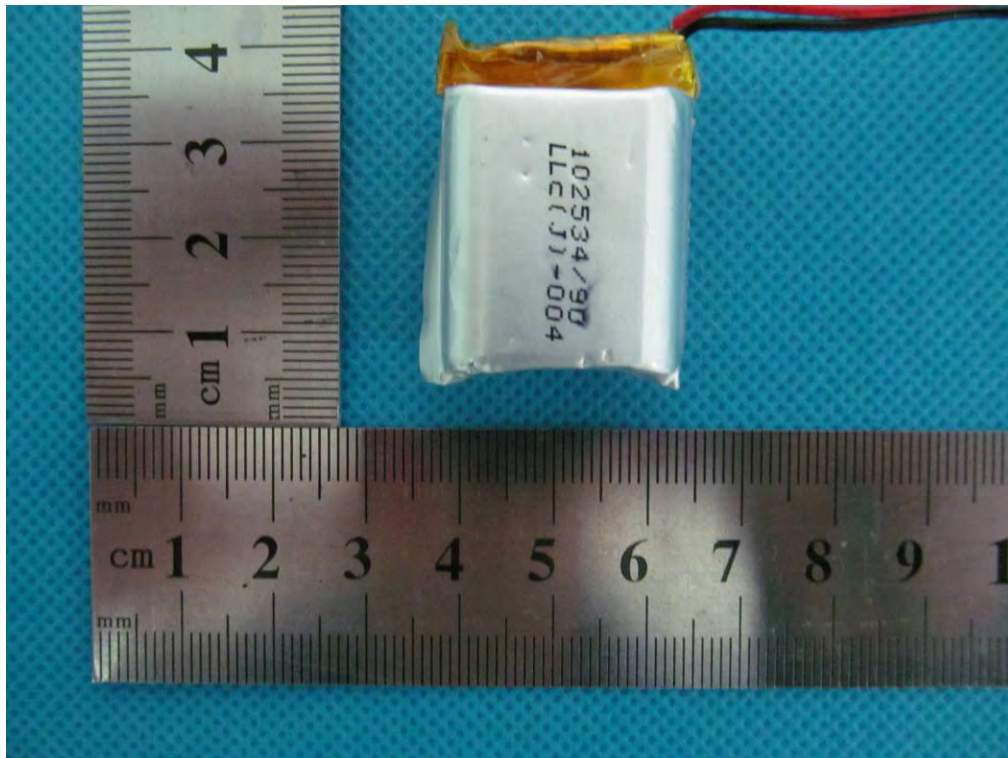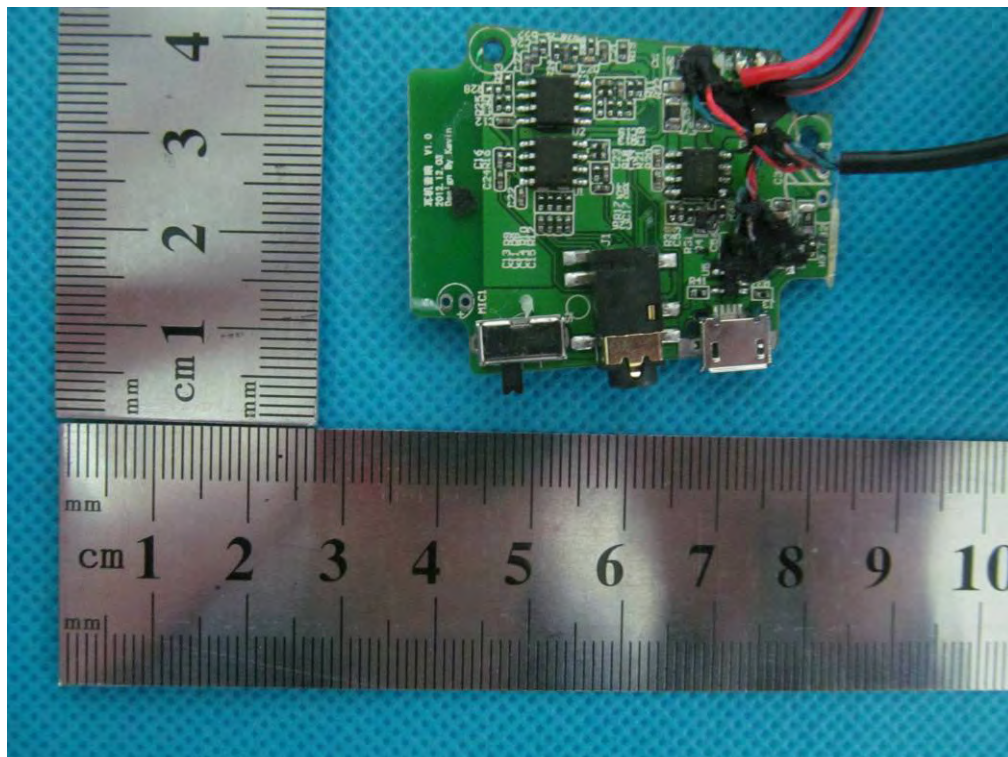BACK VIEW OF EUT



OPEN VIEW OF EUT

INTERNAL VIEW-1 OF EUT



INTERNAL VIEW-2 OF EUT

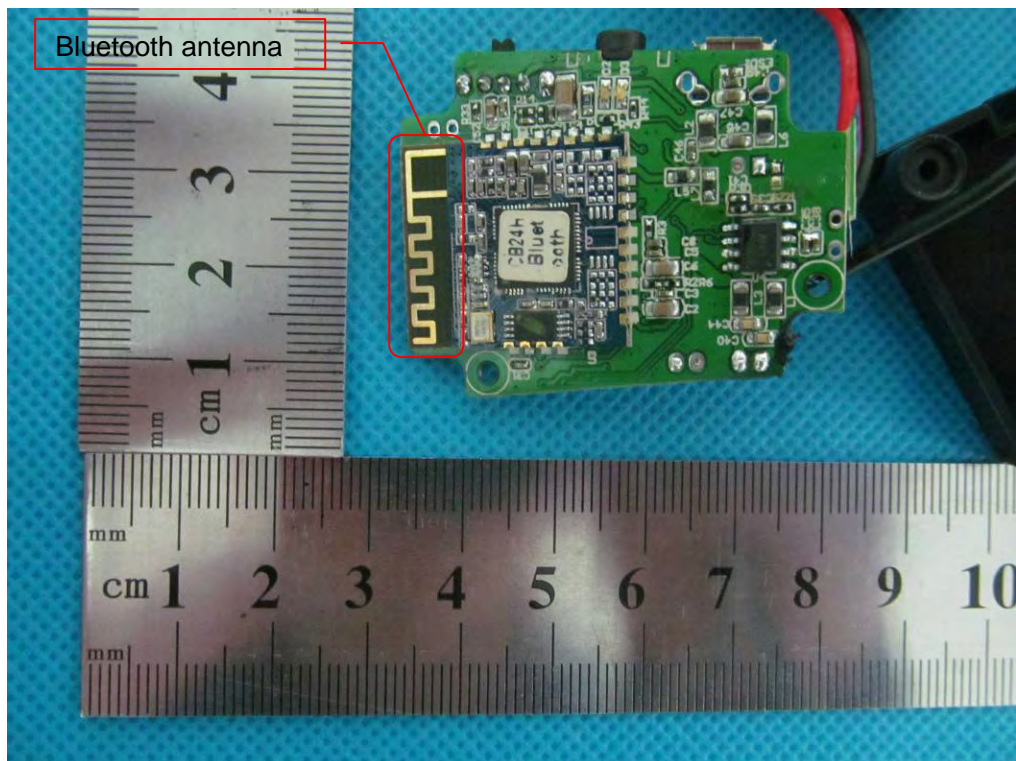INTERNAL VIEW-3OF EUT
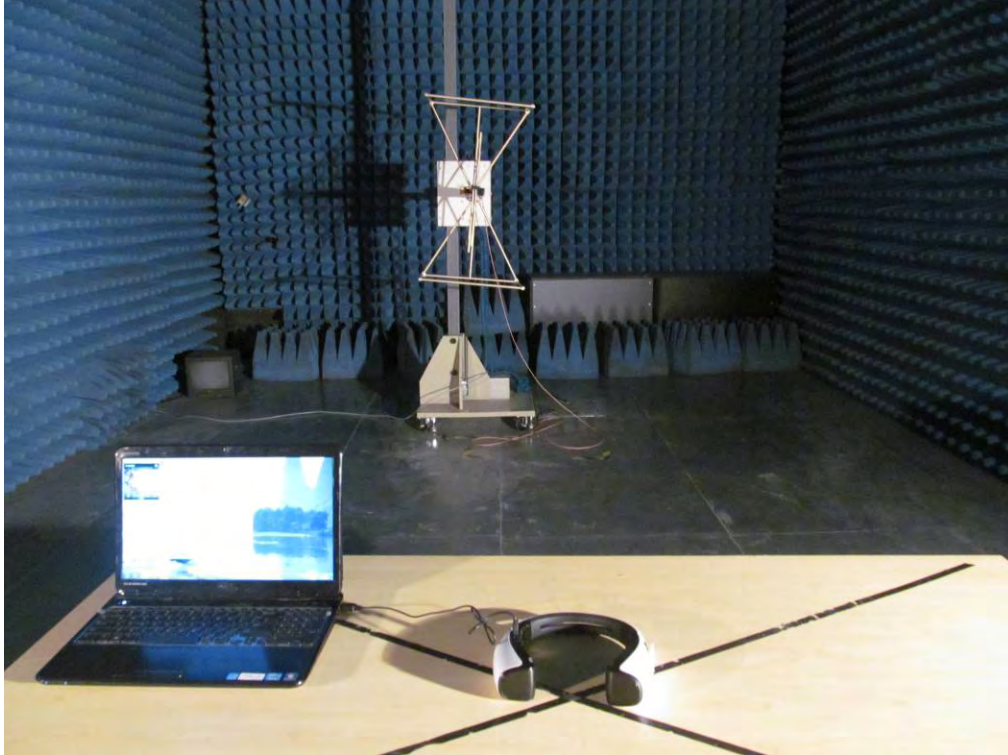


INTERNAL VIEW-4 OF EUT

INTERNAL VIEW-5 OF EUT



Bluetooth antenna

# APPENDIX II
# PHOTOGRAPHS OF THE TEST SETUP

RADIATED EMISSION



**----END OF REPORT----**