

# TEST REPORT

**Reference No.** ..... : WTF19F06038197X1E  
**FCC ID** ..... : 2AREA-LC2  
**Applicant** ..... : Lume Cube Inc  
**Address** ..... : 2870 Whiptail Loop East, Suite 103, Carlsbad, Ca 92010, USA  
**Manufacturer** ..... : Victory Telecom (Huizhou) Ltd.  
**Address** ..... : Building A, No.18, Shuiyuan Industrial District, Ruhu Town, Huizhou City 516021, Guangdong Province, P.R. China  
**Product Name** ..... : Bluetooth control camera light  
**Model No.** ..... : LC2  
**Standards** ..... : FCC CFR47 Part 15 Subpart C (Section 15.247): 2017  
**Date of Receipt sample** ..... : 2019-06-12  
**Date of Test** ..... : 2019-08-26  
**Date of Issue** ..... : 2019-08-26  
**Test Result** ..... : Pass

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.

The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

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Roy Hong / Project Engineer

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Yanny Zhou / Manager

## 1 Test Summary

| Test Items                                                        | Test Requirement                 | Result |
|-------------------------------------------------------------------|----------------------------------|--------|
| Radiated Emissions                                                | 15.247<br>15.205(a)<br>15.209(a) | Pass   |
| Conducted Emissions                                               | 15.207(a)                        | Pass   |
| 6dB Bandwidth                                                     | 15.247(a)(2)                     | Pass   |
| Maximum Peak Output Power                                         | 15.247(b)(3),(4)                 | Pass   |
| Power Spectral Density                                            | 15.247€                          | Pass   |
| Band Edge                                                         | 15.247(d)                        | Pass   |
| Antenna Requirement                                               | 15.203                           | Pass   |
| Maximum Permissible Exposure<br>(Exposure of Humans to RF Fields) | 1.1307(b)(1)                     | Pass   |

### Remark:

|      |                                             |
|------|---------------------------------------------|
| Pass | Test item meets the requirement             |
| Fail | Test item does not meet the requirement     |
| N/A  | Test case does not apply to the test object |

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### 3 Revision History

| Test report No. | Date of Receipt sample | Date of Test | Date of Issue | Purpose  | Comment | Approved |
|-----------------|------------------------|--------------|---------------|----------|---------|----------|
| WTF19F06038197E | 2019-06-12             | 2019-08-26   | 2019-08-26    | Original | -       | Valid    |

## 4 General Information

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

**Product Name** .....: Bluetooth control camera light  
**Model No.** .....: LC2  
**Model Description** .....: ---  
**Operation Frequency** .....: 2402-2480MHz, 40 channels in total  
**Bluetooth Version** .....: Bluetooth 4.2 Single mode (BLE)  
**Modulation Type**.....: GFSK  
**Antenna Type** .....: PCB Printed Antenna  
**The Lowest Oscillator** .....: 16MHz  
**Antenna Gain** .....: 0dBi

### 4.2 Details of E.U.T.

**Technical Data** .....: Battery 3.7V

### 4.3 Channel List

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 1           | 2402            | 2           | 2404            | 3           | 2406            | 4           | 2408            |
| 5           | 2410            | 6           | 2412            | 7           | 2414            | 8           | 2416            |
| 9           | 2418            | 10          | 2420            | 11          | 2422            | 12          | 2424            |
| 13          | 2426            | 14          | 2428            | 15          | 2430            | 16          | 2432            |
| 17          | 2434            | 18          | 2436            | 19          | 2438            | 20          | 2440            |
| 21          | 2442            | 22          | 2444            | 23          | 2446            | 24          | 2448            |
| 25          | 2450            | 26          | 2452            | 27          | 2454            | 28          | 2456            |
| 29          | 2458            | 30          | 2460            | 31          | 2462            | 32          | 2464            |
| 33          | 2466            | 34          | 2468            | 35          | 2470            | 36          | 2472            |
| 37          | 2474            | 38          | 2476            | 39          | 2478            | 40          | 2480            |

#### 4.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

| Test Items                     | Mode | Data Rate | Channel | TX/RX |
|--------------------------------|------|-----------|---------|-------|
| Maximum Peak Output Power      | BLE  | 11 Mbps   | 1/21/10 | TX    |
| Power Spectral Density         | BLE  | 11 Mbps   | 1/21/10 | TX    |
| Band Edge                      | BLE  | 11 Mbps   | 1/21/10 | TX    |
| 6dB Bandwidth                  | BLE  | 11 Mbps   | 1/21/10 | TX    |
| Transmitter Spurious Emissions | BLE  | 11 Mbps   | 1/21/10 | TX    |

**Note** :Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product .

#### 4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 21895-1**

Waltek Services (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration IC number:21895-1, Nov. 14, 2016.

- **FCC – Registration No.: 820106**

Waltek Services (Foshan) 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 820106, August 16, 2018

- **FCC – Designation No.: CN5034**

Waltek Services (Foshan) 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. Designation No. CN5034.

- **NVLAP – Lab Code: 600191-0**

Waltek Services (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

#### 4.6 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes      ☒ No

If Yes, list the related test items and lab information:

Test items:---

Lab information:---

#### 4.7 Abnormalities from Standard Conditions

None.

#### 4.8 Other

This report is based on report No. WTF19F06038197E for amending the Bluetooth Version from 4.0 to 4.2 which is described in section 4.1. It does not affect the test items. Original report No. WTF19F06038197E is no longer valid.

## 5 Equipment Used during Test

### 5.1 Equipments List

| Conducted Emissions                              |                            |                 |                |             |                       |                      |
|--------------------------------------------------|----------------------------|-----------------|----------------|-------------|-----------------------|----------------------|
| Item                                             | Equipment                  | Manufacturer    | Model No.      | Serial No.  | Last Cal Date         | Cal Due Date         |
| 1.                                               | EMI Test Receiver          | RS              | ESCI           | 101178      | 2019-01-18            | 2020-01-17           |
| 2.                                               | LISN                       | RS              | ENV216         | 101215      | 2019-01-10            | 2020-01-09           |
| 3.                                               | Cable                      | HUBER+SUHNER    | CBL2-NN-3M     | 223NN322    | 2019-01-10            | 2020-01-09           |
| 4.                                               | Test Software              | FARATRONIC      | EZ-EMC         | EMEC-3AA    | -                     | -                    |
| 3m Semi-anechoic Chamber for Radiation Emissions |                            |                 |                |             |                       |                      |
| Item                                             | Equipment                  | Manufacturer    | Model No.      | Serial No.  | Last Calibration Date | Calibration Due Date |
| 1.                                               | EMC Analyzer               | Agilent         | N9020A         | MY48011796  | 2019-01-26            | 2020-01-25           |
| 2.                                               | Active Loop Antenna        | SCHWARZBECK     | FMZB1519B      | 00004       | 2019-01-26            | 2020-01-25           |
| 3.                                               | Trilog Broadband Antenna   | SCHWARZBECK     | VULB 9162      | 9162-117    | 2019-01-26            | 2020-01-25           |
| 4.                                               | Broad-band Horn Antenna    | SCHWARZBECK     | BBHA 9120 D    | 01561       | 2019-01-26            | 2020-01-25           |
| 5.                                               | Broad-band Horn Antenna    | SCHWARZBECK     | BBHA 9170      | 335         | 2019-01-26            | 2020-01-25           |
| 6.                                               | Amplifier                  | Lunar E M       | LNA1G18-40     | 20160501002 | 2019-01-26            | 2020-01-25           |
| 7.                                               | Coaxial Cable (below 1GHz) | H+S             | CBL3-NN-12+3 m | 214NN320    | 2019-01-10            | 2020-01-09           |
| 8.                                               | Coaxial Cable (above 1GHz) | Times-Microwave | CBL5-NN        | -           | 2019-01-10            | 2020-01-09           |
| 9.                                               | Test Software              | FARATRONIC      | EZ-EMC         | EMEC-3AA    | -                     | -                    |
| RF Conducted Testing                             |                            |                 |                |             |                       |                      |
| Item                                             | Equipment                  | Manufacturer    | Model No.      | Serial No.  | Last Calibration Date | Calibration Due Date |
| 1.                                               | Spectrum Analyzer          | Agilent         | N9020A         | MY48011796  | 2019-01-26            | 2020-01-25           |
| 2.                                               | Spectrum Analyzer          | R&S             | FSP40          | 100501      | 2019-01-26            | 2020-01-25           |
| 3.                                               | Vector Signal Generator    | Agilent         | N5182A         | MY50141533  | 2019-01-26            | 2020-01-25           |
| 4.                                               | Analog Signal Generator    | Agilent         | N5181A         | MY48180720  | 2019-01-26            | 2020-01-26           |
| 5.                                               | Environmental Chamber      | KSON            | THS-D4C-100    | 5244K       | 2019-01-26            | 2020-01-26           |
| 6.                                               | Test Software              | FARATRONIC      | EZ-EMC         | EMEC-3AA    | -                     | -                    |

## 5.2 Measurement Uncertainty

### Conducted Emission (150kHz-30MHz)

| Input quantity                                                                                                                                                               | $X_i$           | Uncertainty of $x_i$ |                                   | $u(X_i)$ | $C_i$ | $C_i u(X_i)$<br>(dB) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|-----------------------------------|----------|-------|----------------------|
|                                                                                                                                                                              |                 | dB                   | Probability distribution function |          |       |                      |
| Receiver reading                                                                                                                                                             | $V_r$           | $\pm 0.36$           | K=2                               | 0.18     | 1     | 0.18                 |
| Attenuation: AMN-receiver                                                                                                                                                    | $a_c$           | $\pm 0.20$           | K=2                               | 0.10     | 1     | 0.10                 |
| AMN voltage division factor                                                                                                                                                  | $F_{AMN}$       | $\pm 0.20$           | K=2                               | 0.10     | 1     | 0.10                 |
| Receiver corrections:                                                                                                                                                        |                 |                      |                                   |          |       |                      |
| Sine wave voltage                                                                                                                                                            | $\delta V_{sw}$ | $\pm 1.0$            | K=2                               | 0.50     | 1     | 0.50                 |
| Pulse amplitude response                                                                                                                                                     | $\delta V_{pa}$ | $\pm 0.0$            |                                   | 0.00     | 1     | 0.00                 |
| Pulse repetition rate response                                                                                                                                               | $\delta V_{pr}$ | $\pm 0.0$            |                                   | 0.00     | 1     | 0.00                 |
| Noise floor proximity                                                                                                                                                        | $\delta V_{nf}$ | $\pm 0.05$           |                                   | 0.00     | 1     | 0.00                 |
| Mismatch: AMN-receiver                                                                                                                                                       | $\delta M$      | +0.7/-0.8            | U-shaped                          | 0.53     | 1     | 0.53                 |
| AMN impedance                                                                                                                                                                | $\delta Z$      | +2.6/-2.7            | Triangular                        | 1.08     | 1     | 1.08                 |
| Note: $V = V_r + a_c + F_{AMN} + \delta F_{AMN} + \delta V_{sw} + \delta V_{pa} + \delta V_{pr} + \delta V_{nf} + \delta M + \delta Z$<br>$U(V) = 2u_c(V) = \mathbf{2.66dB}$ |                 |                      |                                   |          |       |                      |

**Radiated Emission (30MHz-1GHz)**

| Input quantity                                                                                                                                                                                                                                                                      | $X_i$             | Uncertainty of $x_i$ |                                         | $u(X_i)$ | $C_i$ | $C_i u(X_i)$<br>(dB) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------|-----------------------------------------|----------|-------|----------------------|
|                                                                                                                                                                                                                                                                                     |                   | dB                   | Probability<br>distribution<br>function |          |       |                      |
| Receiver reading                                                                                                                                                                                                                                                                    | $V_r$             | $\pm 0.36$           | K=2                                     | 0.18     | 1     | 0.18                 |
| Attenuation: antenna-receiver                                                                                                                                                                                                                                                       | $a_c$             | $\pm 0.10$           | K=2                                     | 0.05     | 1     | 0.05                 |
| Antenna facotr                                                                                                                                                                                                                                                                      | $F_a$             | $\pm 1.6$            | K=2                                     | 0.8      | 1     | 0.8                  |
| Receiver corrections:                                                                                                                                                                                                                                                               |                   |                      |                                         |          |       |                      |
| Sine wave voltage                                                                                                                                                                                                                                                                   | $\delta V_{sw}$   | $\pm 1.0$            | K=2                                     | 0.5      | 1     | 0.5                  |
| Pulse amplitude response                                                                                                                                                                                                                                                            | $\delta V_{pa}$   | $\pm 0.6$            | Rectangular                             | 0.35     | 1     | 0.35                 |
| Pulse repetition rate response                                                                                                                                                                                                                                                      | $\delta V_{pr}$   | $\pm 1.5$            | Rectangular                             | 0.87     | 1     | 0.87                 |
| Noise floor proximity                                                                                                                                                                                                                                                               | $\delta V_{nf}$   | $\pm 0.5$            | K=2                                     | 0.25     | 1     | 0.25                 |
| Mismatch: antenna-receiver                                                                                                                                                                                                                                                          | $\delta M$        | $+0.9/-1.0$          | U-shaped                                | 0.67     | 1     | 0.67                 |
| Antenna corrections:                                                                                                                                                                                                                                                                |                   |                      |                                         |          |       |                      |
| AF frequency interpolation                                                                                                                                                                                                                                                          | $\delta F_{af}$   | $\pm 0.3$            | Rectangular                             | 0.17     | 1     | 0.17                 |
| AF variation due to FAR influence                                                                                                                                                                                                                                                   | $\delta F_{ah}$   | $\pm 0.5$            | Rectangular                             | 0.29     | 1     | 0.29                 |
| Directivity difference                                                                                                                                                                                                                                                              | $\delta F_{adir}$ | $\pm 0.0$            |                                         | 0.00     | 1     | 0.00                 |
| Phase centre location                                                                                                                                                                                                                                                               | $\delta F_{aph}$  | $\pm 0.0$            |                                         | 0.00     | 1     | 0.00                 |
| Cross-polarization                                                                                                                                                                                                                                                                  | $\delta F_{acp}$  | $\pm 0.0$            |                                         | 0.00     | 1     | 0.00                 |
| Balance                                                                                                                                                                                                                                                                             | $\delta F_{abal}$ | $\pm 0.3$            | Rectangular                             | 0.17     | 1     | 0.17                 |
| Site corrections:                                                                                                                                                                                                                                                                   |                   |                      |                                         |          |       |                      |
| Site imperfections                                                                                                                                                                                                                                                                  | $\delta A_N$      | $\pm 4.0$            | Triangular                              | 1.63     | 1     | 1.63                 |
| Separation distance                                                                                                                                                                                                                                                                 | $\delta d$        | $\pm 0.3$            | Rectangular                             | 0.17     | 1     | 0.17                 |
| Table height                                                                                                                                                                                                                                                                        | $\delta h$        | $\pm 0.1$            | K=2                                     | 0.05     | 1     | 0.05                 |
| Note: $E = V_r + a_c + F_a + \delta V_{sw} + \delta V_{pa} + \delta V_{pr} + \delta V_{nf} + \delta M + \delta F_{af} + \delta F_{ah} + \delta F_{adir} + \delta F_{aph} + \delta F_{acp} + \delta F_{abal} + \delta A_N + \delta d + \delta h$<br>$U(E) = 2u_c(E) = 4.56\text{dB}$ |                   |                      |                                         |          |       |                      |

**Radiated Spurious Emissions (25MHz-1GHz)**

| Input quantity                                                                                                                                                                                      | $X_i$           | Uncertainty of $x_i$ |                                         | $u(x_i)$<br>dB | $c_i$ | $c_i u(x_i)$<br>dB |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|-----------------------------------------|----------------|-------|--------------------|
|                                                                                                                                                                                                     |                 | dB                   | Probability<br>distribution<br>function |                |       |                    |
| Receiver reading                                                                                                                                                                                    | $V_r$           | $\pm 0.4$            | $k=2$                                   | 0.20           | 1     | 0.20               |
| Attenuation: antenna-receiver                                                                                                                                                                       | $a_c$           | $\pm 0.5$            | $k=2$                                   | 0.25           | 1     | 0.25               |
| Cable loss and correction                                                                                                                                                                           | $L_{ac}$        | $\pm 1.6$            | $k=2$                                   | 0.80           | 1     | 0.80               |
| Receiver corrections:                                                                                                                                                                               |                 |                      |                                         |                |       |                    |
| Sine wave voltage                                                                                                                                                                                   | $\delta V_{sw}$ | $\pm 0.9$            | $k=2$                                   | 0.45           | 1     | 0.45               |
| Pulse amplitude response                                                                                                                                                                            | $\delta V_{pa}$ | $\pm 0.6$            | Rectangular                             | 0.35           | 1     | 0.35               |
| Pulse repetition rate response                                                                                                                                                                      | $\delta V_{pr}$ | $\pm 0.6$            | Rectangular                             | 0.35           | 1     | 0.35               |
| Noise floor proximity                                                                                                                                                                               | $\delta V_{nf}$ | $+1.0/0.0$           | U-shaped                                | 0.58           | 1     | 0.58               |
| Mismatch: antenna-receiver                                                                                                                                                                          | $\delta M$      | $+0.9/-1.0$          | U-shaped                                | 0.67           | 1     | 0.67               |
| Site imperfections                                                                                                                                                                                  | $\delta MD$     | $\pm 3.0$            | Triangular                              | 1.14           | 1     | 1.23               |
| Reproducibility of measurement operation                                                                                                                                                            | $\delta p$      | $\pm 0.60$           | $k=2$                                   | 0.30           | 1     | 0.30               |
| Separation distance                                                                                                                                                                                 | $\delta d$      | $\pm 0.3$            | Rectangular                             | 0.17           | 1     | 0.17               |
| Table height                                                                                                                                                                                        | $\delta h$      | $\pm 0.1$            | $k=2$                                   | 0.05           | 1     | 0.05               |
| <b>Note:</b> $E = V_r + a_c + L_{ac} + \delta V_{sw} + \delta V_{pa} + \delta V_{pr} + \delta V_{nf} + \delta M + \delta MD + \delta p + \delta d + \delta h$<br>$U(E) = 2u_c(E) = 3.80 \text{ dB}$ |                 |                      |                                         |                |       |                    |

**Radiated Spurious Emissions (1GHz-18GHz)**

| Input quantity                                                                                                                                                                                                        | $X_i$             | Uncertainty of $x_i$ |                                         | $u(x_i)$<br>dB | $c_i$ | $c_i u(x_i)$<br>dB |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------|-----------------------------------------|----------------|-------|--------------------|
|                                                                                                                                                                                                                       |                   | dB                   | Probability<br>distribution<br>function |                |       |                    |
| Receiver reading                                                                                                                                                                                                      | $V_r$             | $\pm 0.40$           | $k=2$                                   | 0.20           | 1     | 0.20               |
| Attenuation: antenna-receiver                                                                                                                                                                                         | $a_c$             | $\pm 0.80$           | $k=2$                                   | 0.40           | 1     | 0.40               |
| Cable loss and correction                                                                                                                                                                                             | $L_{ac}$          | $\pm 2.40$           | $k=2$                                   | 1.20           | 1     | 1.20               |
| Mismatch: Preamplifiers - Signal Analyzers                                                                                                                                                                            | $\delta M_{ps}$   | $+1.2/-1.4$          | U-shaped                                | 0.92           | 1     | 0.92               |
| Mismatch: antenna-receiver                                                                                                                                                                                            | $\delta M_{ac}$   | $+1.3/-1.5$          | U-shaped                                | 1.00           | 1     | 1.00               |
| Receiver corrections:                                                                                                                                                                                                 |                   |                      |                                         |                |       |                    |
| Sine wave voltage                                                                                                                                                                                                     | $\delta V_{sw}$   | $\pm 0.9$            | $k=2$                                   | 0.45           | 1     | 0.45               |
| Pulse amplitude response                                                                                                                                                                                              | $\delta V_{pa}$   | $\pm 0.6$            | Rectangular                             | 0.35           | 1     | 0.35               |
| Pulse repetition rate response                                                                                                                                                                                        | $\delta V_{pr}$   | $\pm 0.6$            | Rectangular                             | 0.35           | 1     | 0.35               |
| Noise floor proximity                                                                                                                                                                                                 | $\delta V_{nf}$   | $+1.0/0.0$           | U-shaped                                | 0.58           | 1     | 0.58               |
| Site imperfections                                                                                                                                                                                                    | $\delta S_{vswr}$ | $\pm 3.0$            | Triangular                              | 1.22           | 1     | 1.22               |
| Effect of setup table material                                                                                                                                                                                        | $\delta ANT$      | $\pm 1.0$            | Rectangular                             | 0.58           | 1     | 0.58               |
| Reproducibility of measurement operation                                                                                                                                                                              | $\delta p$        | $\pm 0.60$           | $k=2$                                   | 0.30           | 1     | 0.30               |
| <b>Note:</b> $E = V_r + a_c + L_{ac} + \delta M_{ps} + \delta M_{ac} + \delta V_{sw} + \delta V_{pa} + \delta V_{pr} + \delta V_{nf} + \delta S_{vswr} + \delta ANT + \delta p$<br>$U(E) = 2u_c(E) = 4.97 \text{ dB}$ |                   |                      |                                         |                |       |                    |



### 6.3 Measurement Description

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.

### 6.4 Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF(Voltage Division Facotr), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Measurement} = \text{Reading Level} + \text{Correct Factor}$$

$$\text{Correct Facotor} = \text{LISN VDF} + \text{Cable Loss}$$

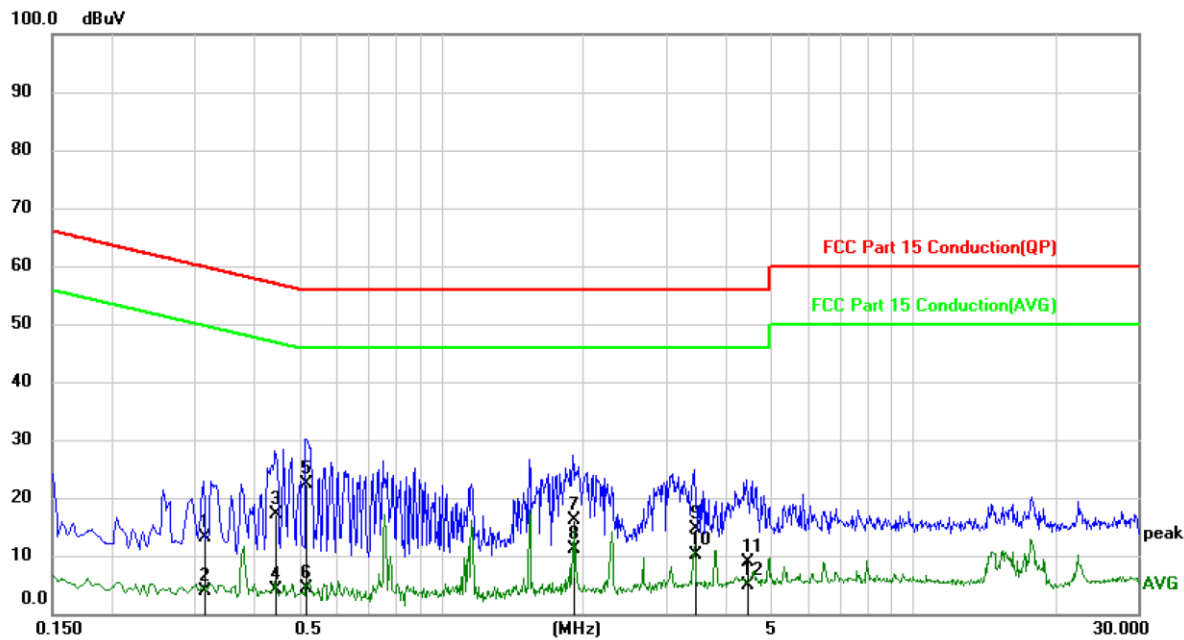
The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Measurement}$$

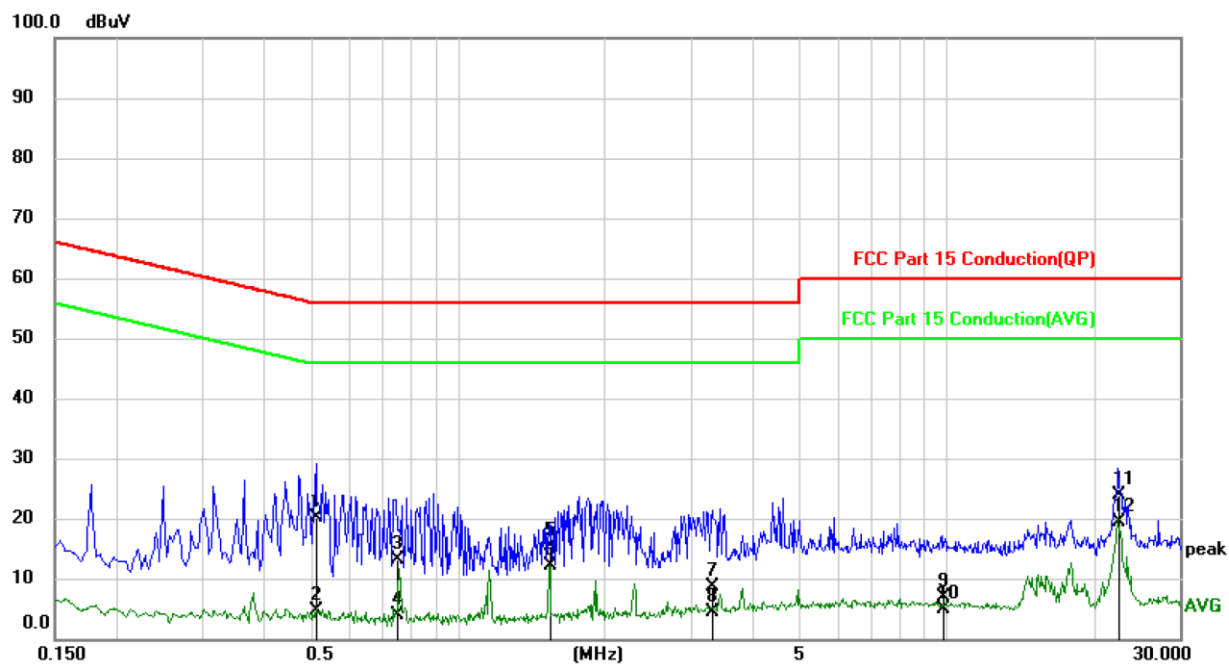
6.5 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

Live Line :



| No. | Mk. | Freq.  | Reading | Correct | Measure- | Limit | Over   | Detector | Comment |
|-----|-----|--------|---------|---------|----------|-------|--------|----------|---------|
|     |     | MHz    | dBuV    | Factor  | ment     | dBuV  | dB     |          |         |
| 1   |     | 0.3140 | 3.59    | 9.59    | 13.18    | 59.86 | -46.68 | QP       |         |
| 2   |     | 0.3140 | -5.82   | 9.59    | 3.77     | 49.86 | -46.09 | AVG      |         |
| 3   |     | 0.4460 | 7.53    | 9.59    | 17.12    | 56.95 | -39.83 | QP       |         |
| 4   |     | 0.4460 | -5.54   | 9.59    | 4.05     | 46.95 | -42.90 | AVG      |         |
| 5   | *   | 0.5180 | 12.70   | 9.59    | 22.29    | 56.00 | -33.71 | QP       |         |
| 6   |     | 0.5180 | -5.18   | 9.59    | 4.41     | 46.00 | -41.59 | AVG      |         |
| 7   |     | 1.9060 | 6.45    | 9.62    | 16.07    | 56.00 | -39.93 | QP       |         |
| 8   |     | 1.9060 | 1.40    | 9.62    | 11.02    | 46.00 | -34.98 | AVG      |         |
| 9   |     | 3.4500 | 4.85    | 9.66    | 14.51    | 56.00 | -41.49 | QP       |         |
| 10  |     | 3.4500 | 0.42    | 9.66    | 10.08    | 46.00 | -35.92 | AVG      |         |
| 11  |     | 4.4340 | -0.77   | 9.68    | 8.91     | 56.00 | -47.09 | QP       |         |
| 12  |     | 4.4340 | -4.68   | 9.68    | 5.00     | 46.00 | -41.00 | AVG      |         |

**Neutral Line :**

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   |     | 0.5140       | 10.55                    | 9.59                    | 20.14                    | 56.00         | -35.86     | QP       |         |
| 2   |     | 0.5140       | -5.05                    | 9.59                    | 4.54                     | 46.00         | -41.46     | AVG      |         |
| 3   |     | 0.7500       | 3.65                     | 9.60                    | 13.25                    | 56.00         | -42.75     | QP       |         |
| 4   |     | 0.7500       | -5.78                    | 9.60                    | 3.82                     | 46.00         | -42.18     | AVG      |         |
| 5   |     | 1.5420       | 5.66                     | 9.62                    | 15.28                    | 56.00         | -40.72     | QP       |         |
| 6   |     | 1.5420       | 2.62                     | 9.62                    | 12.24                    | 46.00         | -33.76     | AVG      |         |
| 7   |     | 3.3180       | -1.03                    | 9.65                    | 8.62                     | 56.00         | -47.38     | QP       |         |
| 8   |     | 3.3180       | -5.32                    | 9.65                    | 4.33                     | 46.00         | -41.67     | AVG      |         |
| 9   |     | 9.8220       | -2.96                    | 9.81                    | 6.85                     | 60.00         | -53.15     | QP       |         |
| 10  |     | 9.8220       | -4.95                    | 9.81                    | 4.86                     | 50.00         | -45.14     | AVG      |         |
| 11  |     | 22.4780      | 13.86                    | 10.08                   | 23.94                    | 60.00         | -36.06     | QP       |         |
| 12  | *   | 22.4780      | 9.23                     | 10.08                   | 19.31                    | 50.00         | -30.69     | AVG      |         |

## 7 Radiated Emissions

**Test Requirement** .....: FCC CFR47 Part 15 Section 15.209 & 15.247

**Test Method** .....: ANSI C63.10:2013

**Test Result** .....: PASS

**Measurement Distance** .....: 3m

**Limit:**

| Frequency (MHz) | Field Strength        |              | Field Strength Limit at 3m Measurement Dist |                                       |
|-----------------|-----------------------|--------------|---------------------------------------------|---------------------------------------|
|                 | uV/m                  | Distance (m) | uV/m                                        | dBuV/m                                |
| 0.009 ~ 0.490   | $2400/F(\text{kHz})$  | 300          | $10000 * 2400/F(\text{kHz})$                | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705   | $24000/F(\text{kHz})$ | 30           | $100 * 24000/F(\text{kHz})$                 | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30      | 30                    | 30           | $100 * 30$                                  | $20\log^{(30)} + 40$                  |
| 30 ~ 88         | 100                   | 3            | 100                                         | $20\log^{(100)}$                      |
| 88 ~ 216        | 150                   | 3            | 150                                         | $20\log^{(150)}$                      |
| 216 ~ 960       | 200                   | 3            | 200                                         | $20\log^{(200)}$                      |
| Above 960       | 500                   | 3            | 500                                         | $20\log^{(500)}$                      |

### 7.1 EUT Operation

**Operating Environment:**

**Temperature** .....: 23.5 °C

**Humidity** .....: 52.1 % RH

**Atmospheric Pressure** .....: 101.2kPa

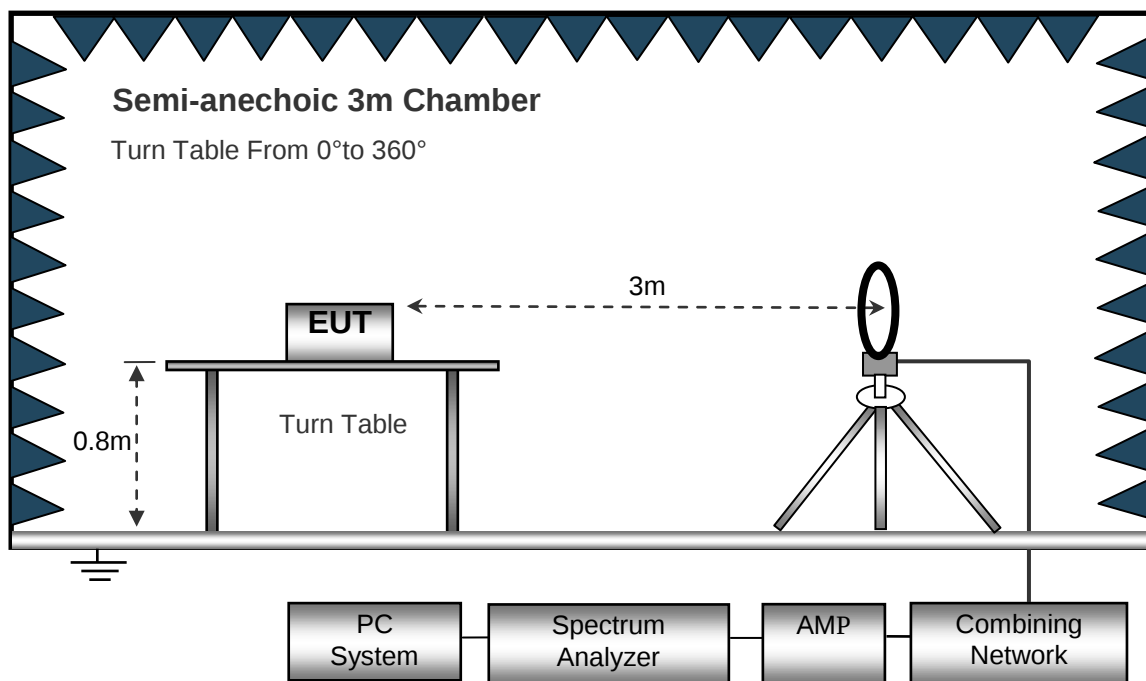
**EUT Operation:**

The test was performed in transmitting mode, the test data were shown in the report.

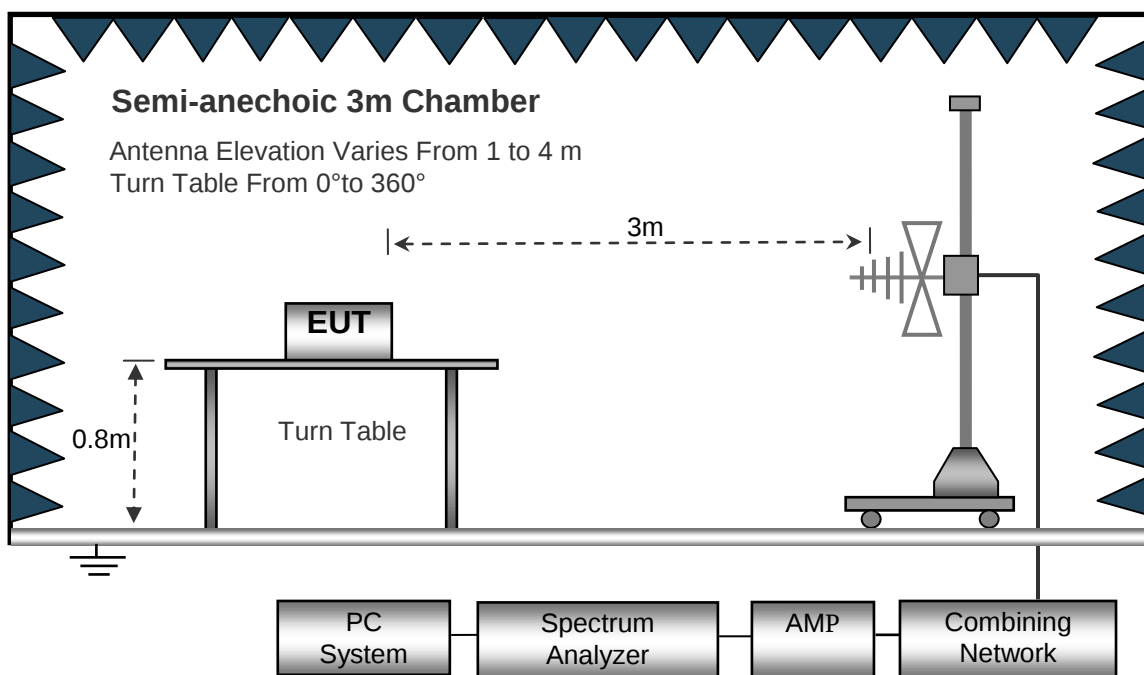
## 7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10:2013.

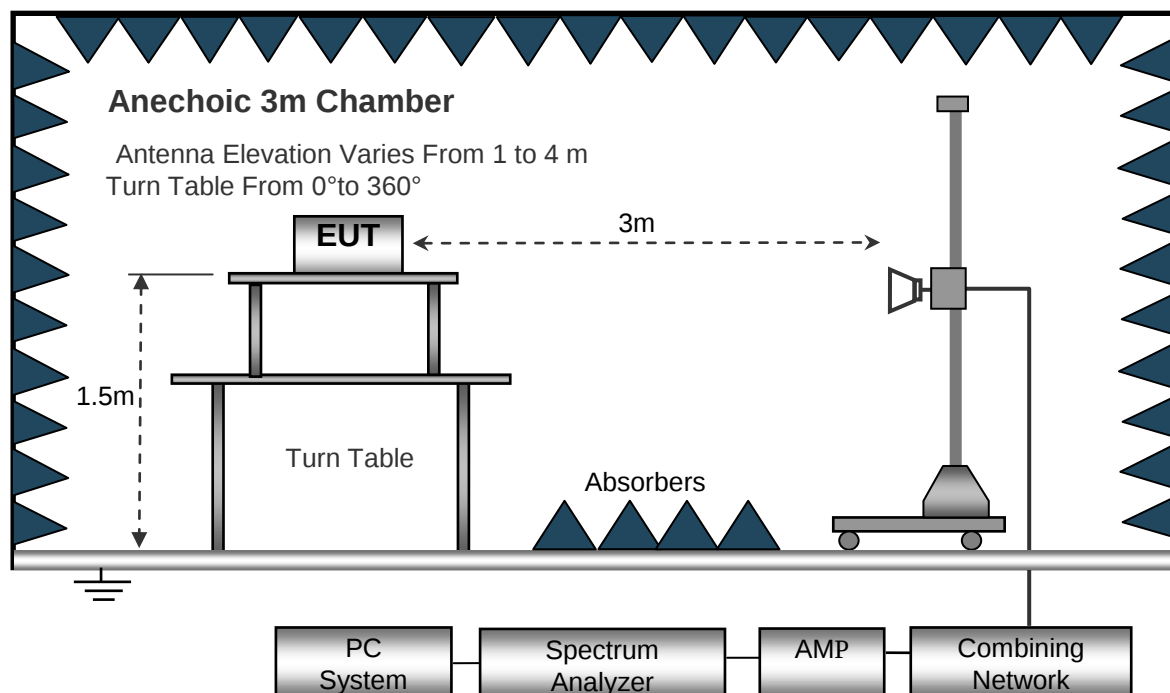
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



### 7.3 Spectrum Analyzer Setup

#### Below 30MHz

Sweep Speed : Auto  
 IF Bandwidth : 10kHz  
 Video Bandwidth : 10kHz  
 Resolution Bandwidth : 10kHz

#### 30MHz ~ 1GHz

Sweep Speed : Auto  
 Detector : PK  
 Resolution Bandwidth : 100kHz  
 Video Bandwidth : 300kHz

#### Above 1GHz

Sweep Speed : Auto  
 Detector : PK  
 Resolution Bandwidth : 1MHz  
 Video Bandwidth : 3MHz  
 Detector : Ave.  
 Resolution Bandwidth : 1MHz  
 Video Bandwidth : 10Hz

## 7.4 Test Procedure

- 1) The EUT is placed on a turntable, which is above ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
- 4) Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6) Repeat above procedures until the measurements for all frequencies are complete.
- 7) The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
- 8) A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

## 7.5 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 means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

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

## 7.6 Summary of Test Results

### Test Frequency : 26KHz to 30MHz

The measurements were more than 20 dB below the limit and not reported.

**Test Frequency : 30MHz ~ 18GHz**

| Frequency<br>(MHz)      | Receiver<br>Reading<br>(dBμV/m) | Detector<br>(PK/QP/AVG) | Turn table<br>Angle (°) | RX Antenna    |                | Corrected<br>Factor (dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part 15.247   |                |
|-------------------------|---------------------------------|-------------------------|-------------------------|---------------|----------------|--------------------------|------------------------------------|-------------------|----------------|
|                         |                                 |                         |                         | Height<br>(m) | Polar<br>(H/V) |                          |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| BLE_Low Channel_2402MHz |                                 |                         |                         |               |                |                          |                                    |                   |                |
| 77.87                   | 13.27                           | QP                      | 216                     | 1.1           | H              | 9.57                     | 22.84                              | 40                | -17.16         |
| 77.87                   | 11.43                           | QP                      | 267                     | 1.8           | V              | 9.67                     | 21.10                              | 40                | -18.90         |
| 1685.00                 | 49.75                           | PK                      | 169                     | 1.4           | H              | -13.73                   | 36.02                              | 74                | -37.98         |
| 1685.00                 | 38.18                           | AVG                     | 248                     | 1.2           | H              | -13.73                   | 24.45                              | 54                | -29.55         |
| 2190.00                 | 50.53                           | PK                      | 116                     | 1.1           | V              | -13.32                   | 37.21                              | 74                | -36.79         |
| 2190.00                 | 39.03                           | AVG                     | 263                     | 1.5           | V              | -13.32                   | 25.71                              | 54                | -28.29         |
| 5925.00                 | 53.64                           | PK                      | 276                     | 1.6           | H              | -4.46                    | 49.18                              | 74                | -24.82         |
| 5925.00                 | 41.55                           | AVG                     | 162                     | 1.7           | H              | -4.46                    | 37.09                              | 54                | -16.91         |
| 3885.00                 | 52.33                           | PK                      | 187                     | 1.2           | V              | -9.26                    | 43.07                              | 74                | -30.93         |
| 3885.00                 | 41.55                           | AVG                     | 208                     | 1.7           | V              | -9.26                    | 32.29                              | 54                | -21.71         |

| Frequency<br>(MHz)         | Receiver<br>Reading<br>(dBμV/m) | Detector<br>(PK/QP/AVG) | Turn table<br>Angle (°) | RX Antenna    |                | Corrected<br>Factor<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part 15.247   |                |
|----------------------------|---------------------------------|-------------------------|-------------------------|---------------|----------------|-----------------------------|------------------------------------|-------------------|----------------|
|                            |                                 |                         |                         | Height<br>(m) | Polar<br>(H/V) |                             |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| BLE_Middle Channel_2442MHz |                                 |                         |                         |               |                |                             |                                    |                   |                |
| 107.13                     | 13.98                           | QP                      | 217                     | 1.5           | H              | 11.56                       | 25.54                              | 40                | -14.46         |
| 107.13                     | 14.32                           | QP                      | 183                     | 1.8           | V              | 10.96                       | 25.28                              | 40                | -14.72         |
| 1681.16                    | 51.31                           | PK                      | 154                     | 1.6           | H              | -13.74                      | 37.57                              | 74                | -36.43         |
| 1681.16                    | 44.48                           | AVG                     | 197                     | 1.2           | H              | -13.74                      | 30.74                              | 54                | -23.26         |
| 2915.76                    | 50.12                           | PK                      | 235                     | 1.3           | V              | -11.27                      | 38.85                              | 74                | -35.15         |
| 2915.76                    | 41.41                           | AVG                     | 276                     | 1.5           | V              | -11.27                      | 30.14                              | 54                | -23.86         |
| 12366.85                   | 42.12                           | PK                      | 135                     | 1.4           | H              | 8.85                        | 50.97                              | 74                | -23.03         |
| 12366.85                   | 35.34                           | AVG                     | 287                     | 1.2           | H              | 8.85                        | 44.19                              | 54                | -9.81          |
| 8663.04                    | 44.06                           | PK                      | 204                     | 1.8           | V              | 1.89                        | 45.95                              | 74                | -28.05         |
| 8663.04                    | 35.09                           | AVG                     | 147                     | 1.7           | V              | 1.89                        | 36.98                              | 54                | -17.02         |

| Frequency<br>(MHz)       | Receiver<br>Reading<br>(dBμV/m) | Detector<br>(PK/QP/AVG) | Turn table<br>Angle (°) | RX Antenna    |                | Corrected<br>Factor<br>(dB) | Corrected<br>Amplitude<br>(dBμV/m) | FCC Part 15.247   |                |
|--------------------------|---------------------------------|-------------------------|-------------------------|---------------|----------------|-----------------------------|------------------------------------|-------------------|----------------|
|                          |                                 |                         |                         | Height<br>(m) | Polar<br>(H/V) |                             |                                    | Limit<br>(dBμV/m) | Margin<br>(dB) |
| BLE_High Channel_2480MHz |                                 |                         |                         |               |                |                             |                                    |                   |                |
| 201.39                   | 22.16                           | QP                      | 151                     | 1.1           | H              | 13.03                       | 35.19                              | 40                | -4.81          |
| 201.39                   | 13.60                           | QP                      | 203                     | 1.8           | V              | 13.16                       | 26.76                              | 40                | -13.24         |
| 1495.00                  | 46.45                           | PK                      | 286                     | 1.7           | H              | -13.77                      | 32.68                              | 74                | -41.32         |
| 1495.00                  | 30.29                           | AVG                     | 165                     | 1.8           | H              | -13.77                      | 16.52                              | 54                | -37.48         |
| 3320.00                  | 48.00                           | PK                      | 215                     | 1.2           | V              | -8.26                       | 39.74                              | 74                | -34.26         |
| 3320.00                  | 30.63                           | AVG                     | 114                     | 1.5           | V              | -8.26                       | 22.37                              | 54                | -31.63         |
| 5805.00                  | 50.93                           | PK                      | 230                     | 1.6           | H              | -0.82                       | 50.11                              | 74                | -23.89         |
| 5805.00                  | 34.23                           | AVG                     | 117                     | 1.8           | H              | -0.82                       | 33.41                              | 54                | -20.59         |
| 2110.00                  | 46.53                           | PK                      | 280                     | 1.5           | V              | -12.22                      | 34.31                              | 74                | -39.69         |
| 2110.00                  | 29.66                           | AVG                     | 286                     | 1.3           | V              | -12.22                      | 17.44                              | 54                | -36.56         |

**Test Frequency: 18GHz~25GHz**

The measurements were more than 20 dB below the limit and not reported.

## 8 Band Edge Measurement

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement</b> ..... | FCC CFR47 Part 15 Section 15.247                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Test Method</b> .....      | 558074 D01 DTS Meas Guidance v03r05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Result</b> .....      | Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |
| <b>Test Mode</b> .....        | Transmitting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

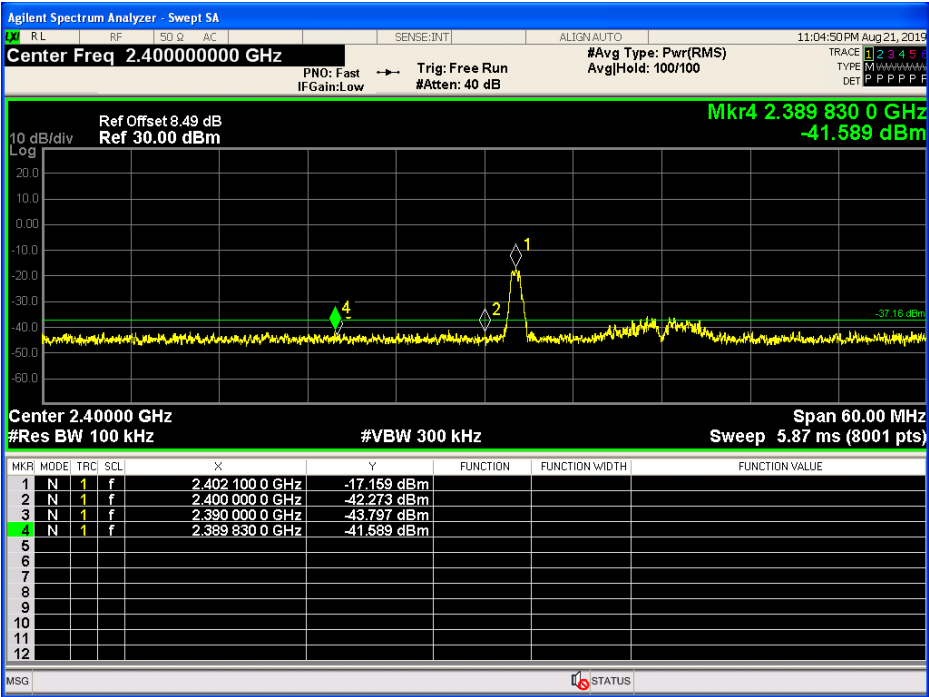
### 8.1 Test Produce

- 1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- 4) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5) Repeat above procedures until all measured frequencies were complete.

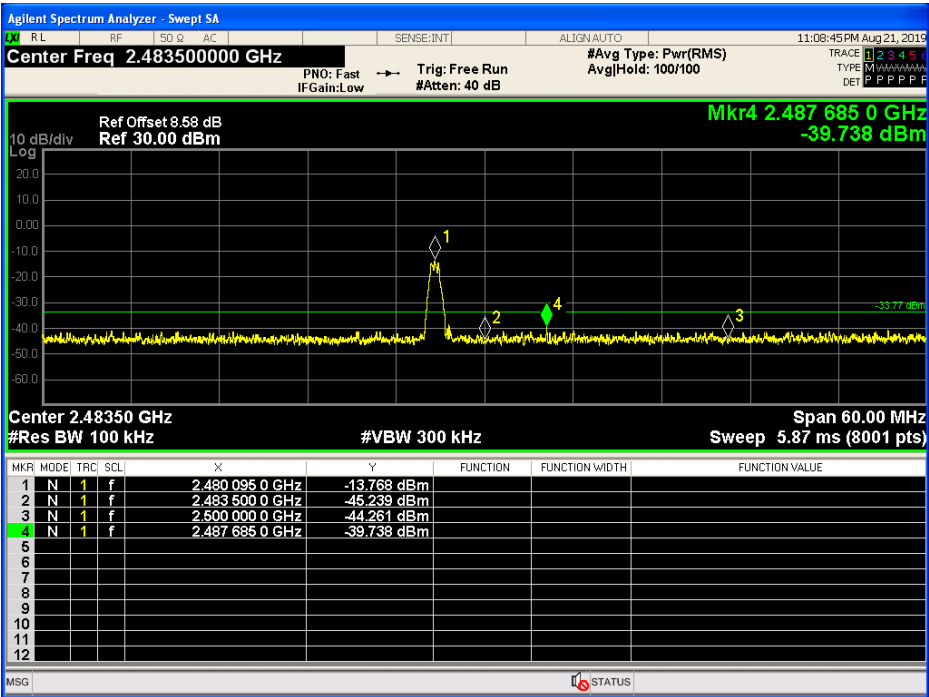
8.2 Test Result

Test result plots as follows:

TX BLE: Band edge-left side



TX BLE Band edge-right side



## 9 6 dB Bandwidth Measurement

**Test Requirement** .....: FCC CFR47 Part 15 Section 15.247

**Test Method** .....: 558074 D01 DTS Meas Guidance v03r05

### 9.1 Test Procedure

- 1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
- 2) Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

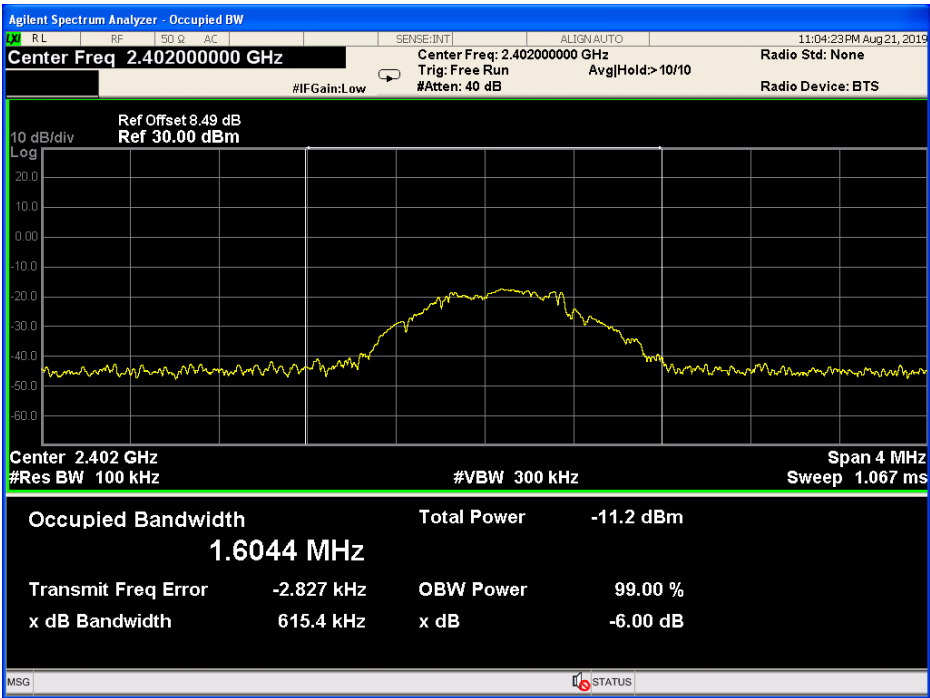
### 9.2 Test Result

| Test Mode | Test Channel | Occupied Bandwidth (MHz) | 6dB Bandwidth (MHz) | Result |
|-----------|--------------|--------------------------|---------------------|--------|
| BLE       | 2402         | 1.6044                   | 0.6154              | PASS   |
| BLE       | 2442         | 1.2185                   | 0.6630              | PASS   |
| BLE       | 2480         | 1.1613                   | 0.6532              | PASS   |

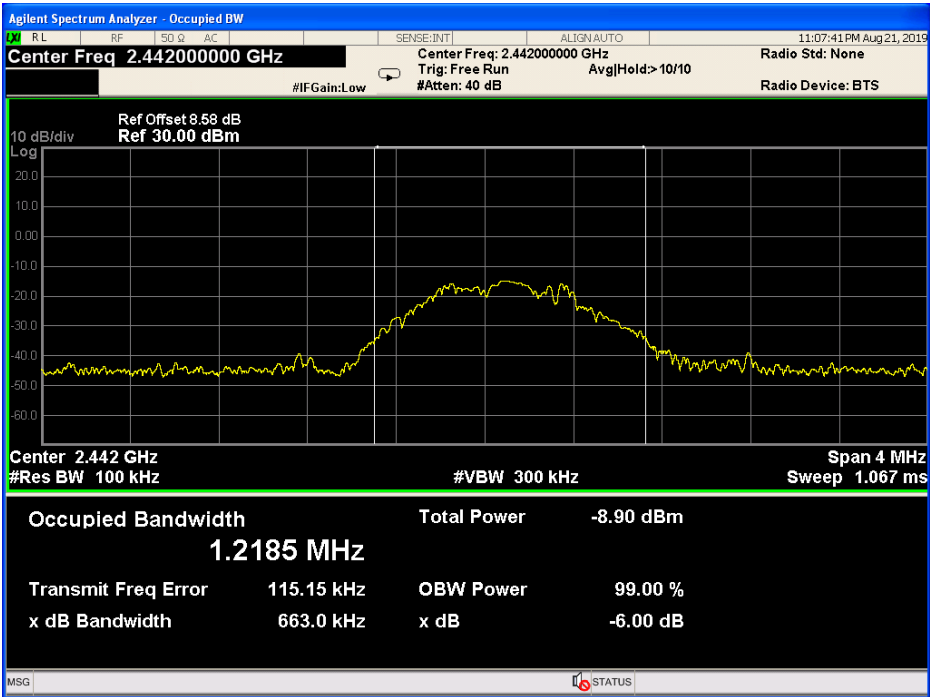


Test result plot as follows:

Mode: BLE channel 2402MHz

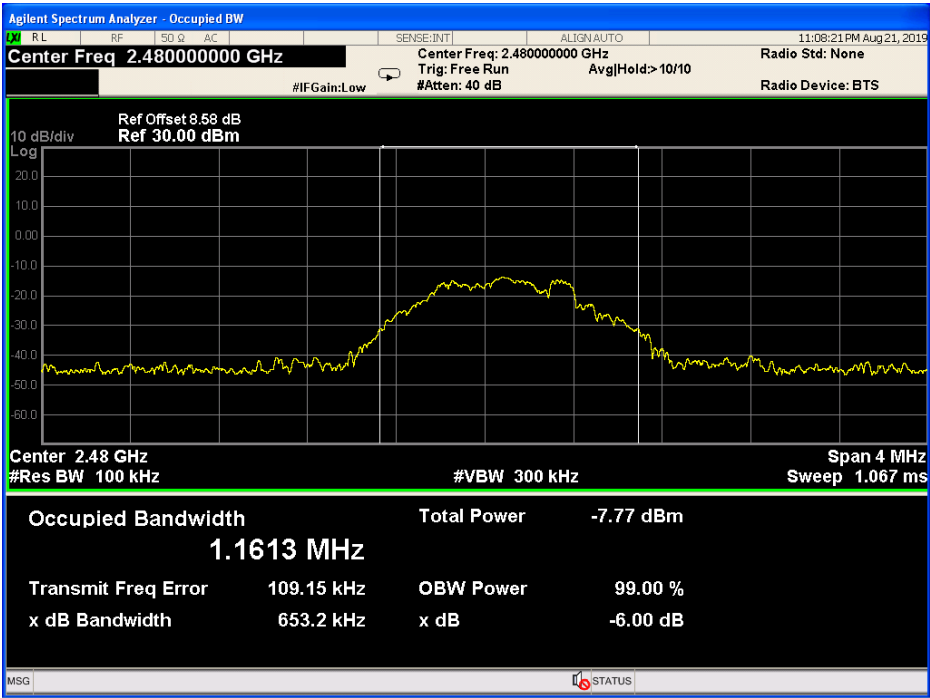


Mode: BLE channel 2442MHz





Mode: BLE channel 2480MHz



## 10 Maximum Peak Output Power

**Test Requirement** .....: FCC CFR47 Part 15 Section 15.247

**Test Method** .....: 558074 D01 DTS Meas Guidance v03r05

### 10.1 Test Procedure

558074 D01 DTS Meas Guidance v03r05 section 9.1.2

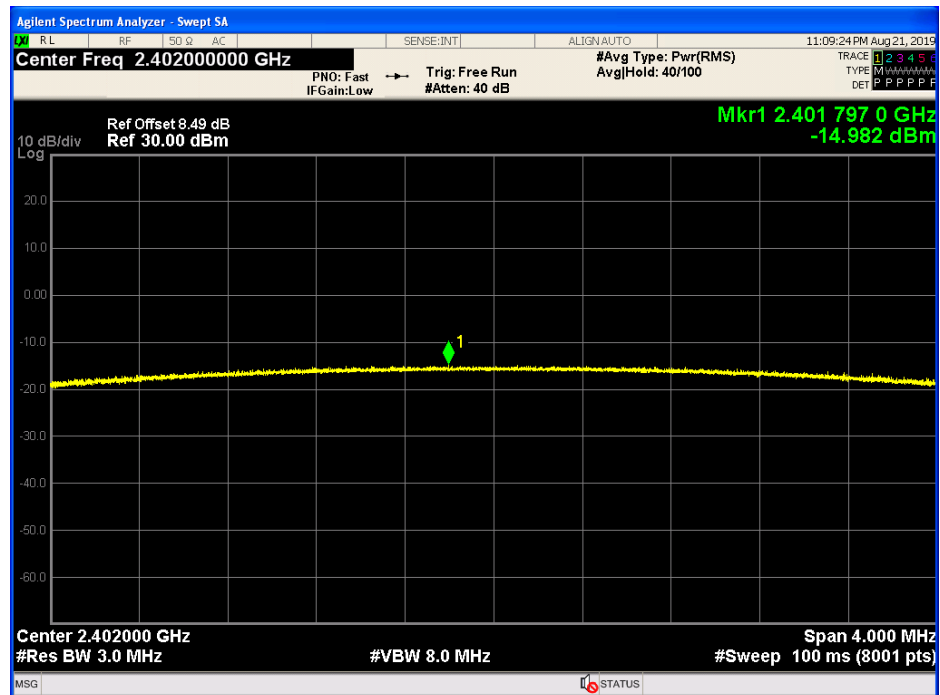
- 1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
- 3) Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

### 10.2 Test Result

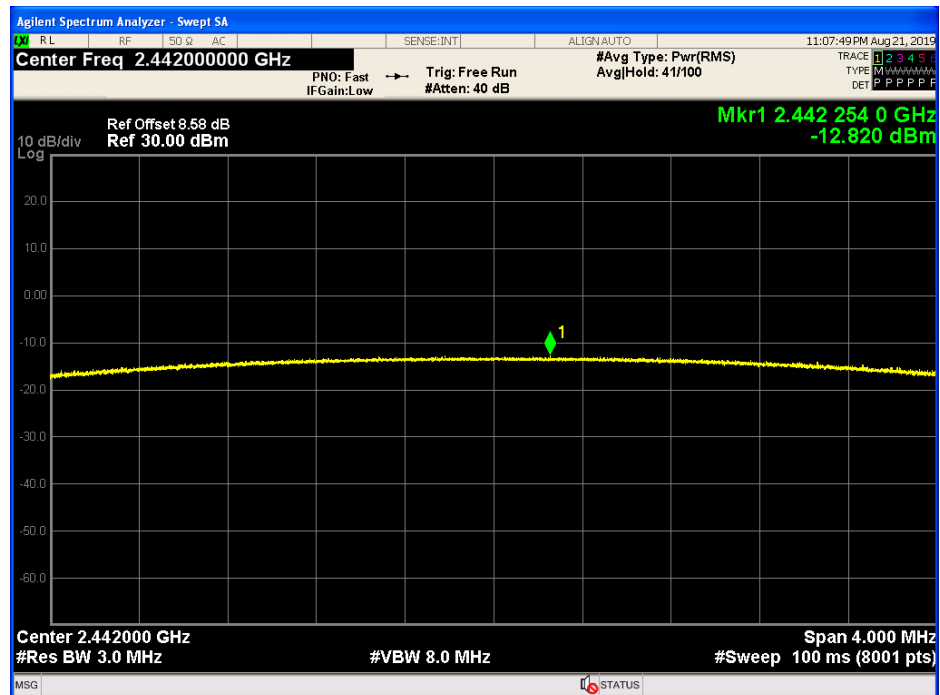
| Test Mode | Test Channel | Conducted Peak Output Power (dBm) | Limit (dBm) | Result |
|-----------|--------------|-----------------------------------|-------------|--------|
| BLE       | 2402         | -14.982                           | 30          | PASS   |
| BLE       | 2442         | -12.820                           | 30          | PASS   |
| BLE       | 2480         | -12.083                           | 30          | PASS   |

Test result plot as follows:

Mode: BLE channel 2402MHz



Mode: BLE channel 2442MHz





Mode: BLE channel 2480MHz



## 11 Power Spectral density

**Test Requirement** .....: FCC CFR47 Part 15 Section 15.247

**Test Method** .....: 558074 D01 DTS Meas Guidance v03r05

### 11.1 Test Procedure

558074 D01 DTS Meas Guidance v03r05 section 10.2

- 1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port
- 2) to the spectrum.
- 3) Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
- 4) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

### 11.2 Test Result

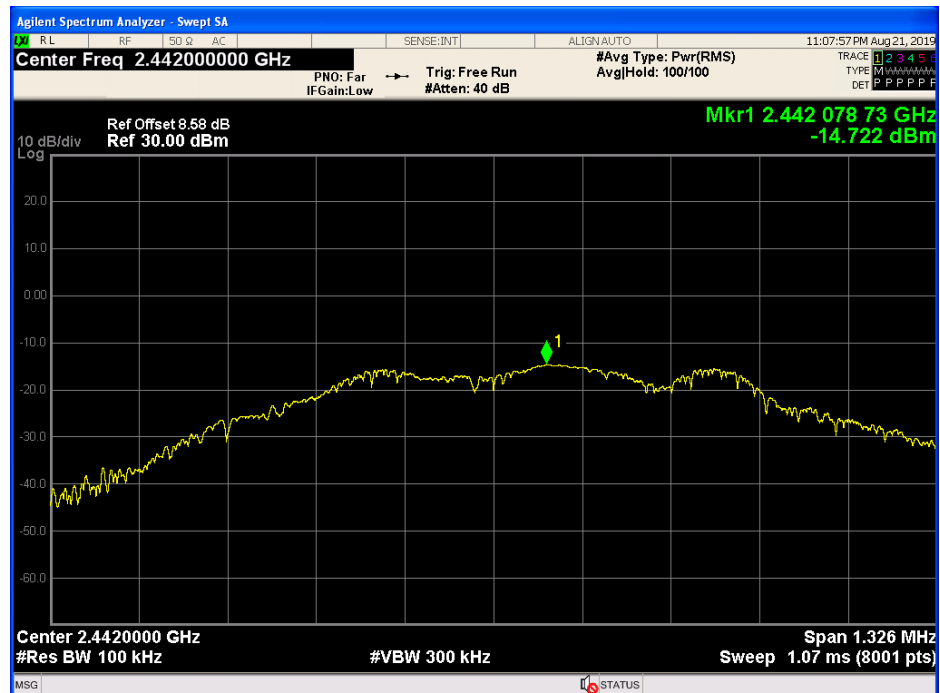
| Test Mode | Test Channel | PSD(dBm/MHz) | Limit (dBm/MHz) | Verdict |
|-----------|--------------|--------------|-----------------|---------|
| BLE       | 2402         | -17.299      | 8.00            | PASS    |
| BLE       | 2442         | -14.722      | 8.00            | PASS    |
| BLE       | 2480         | -13.862      | 8.00            | PASS    |

Test result plot as follows:

Mode: BLE channel 2402MHz



Mode: BLE channel 2442MHz





Mode: BLE channel 2480MHz



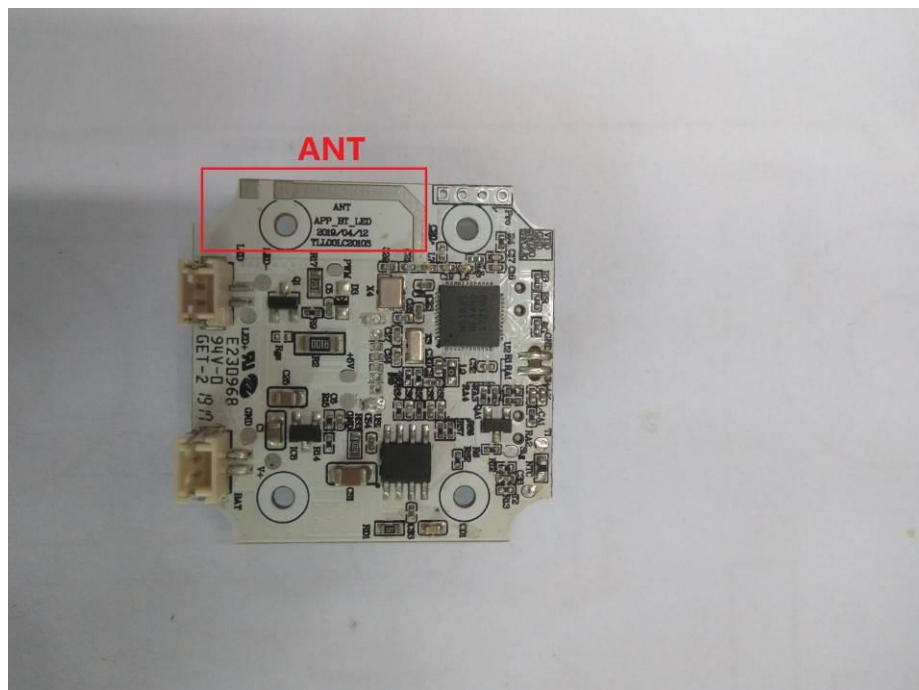
## 12 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacture may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Subpart C Section 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.

Result:

The EUT has one PCB Printed Antenna, the gain is 0dBi meets the requirements of FCC Subpart C 15.203.



### 13 RF Exposure

**Test Requirement** ..... FCC Part 1.1307

**Test Method** ..... FCC Part 2.1091

#### 13.1 Requirements

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.

#### 13.2 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

### 13.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = output power to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

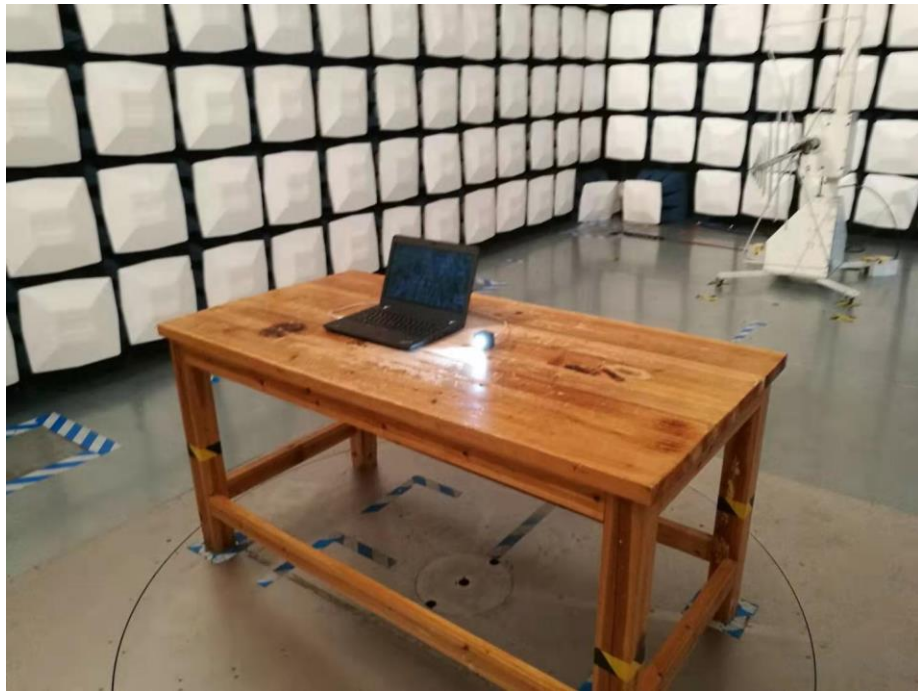
From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

| Antenna Gain (dBi) | Antenna Gain (numeric) | Max. Peak Output Power (dBm) | Peak Output Power (mW) | Power Density (mW/cm <sup>2</sup> ) | Limit of Power Density (mW/cm <sup>2</sup> ) |
|--------------------|------------------------|------------------------------|------------------------|-------------------------------------|----------------------------------------------|
| 0                  | 1                      | -12.083                      | 0.062                  | 0.000012341                         | 1                                            |

## 14 Photographs - Test Setup

### 14.1 Photographs - Radiated Emission

Test frequency from 30MHz to 1GHz



Test frequency above 1GHz

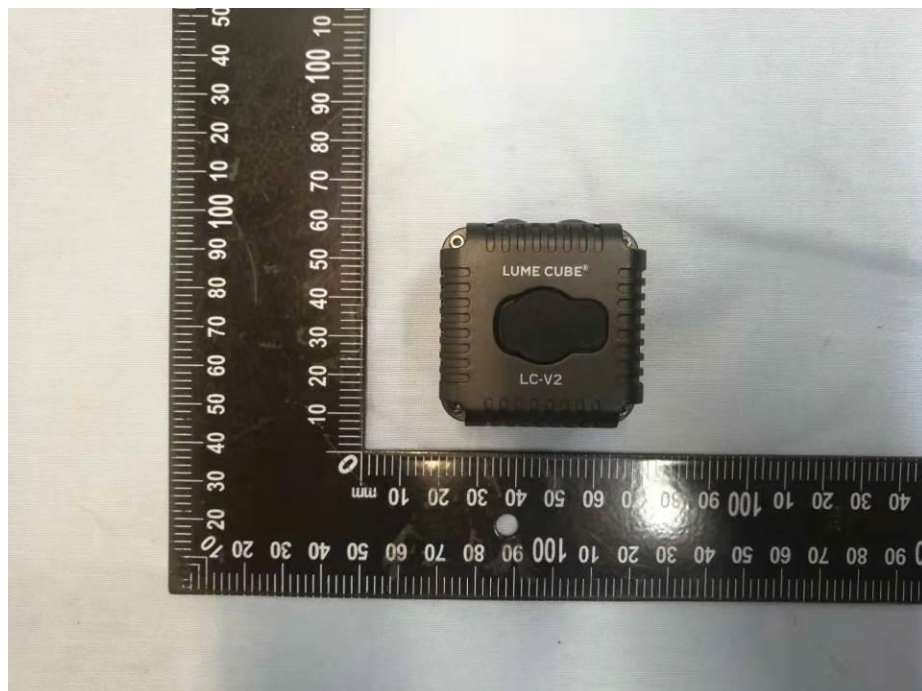
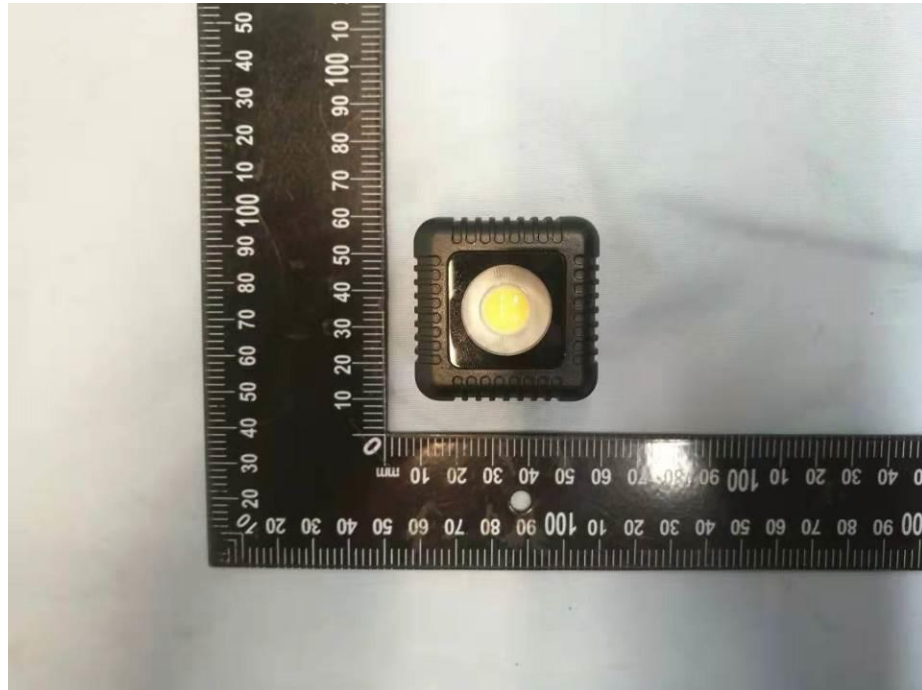


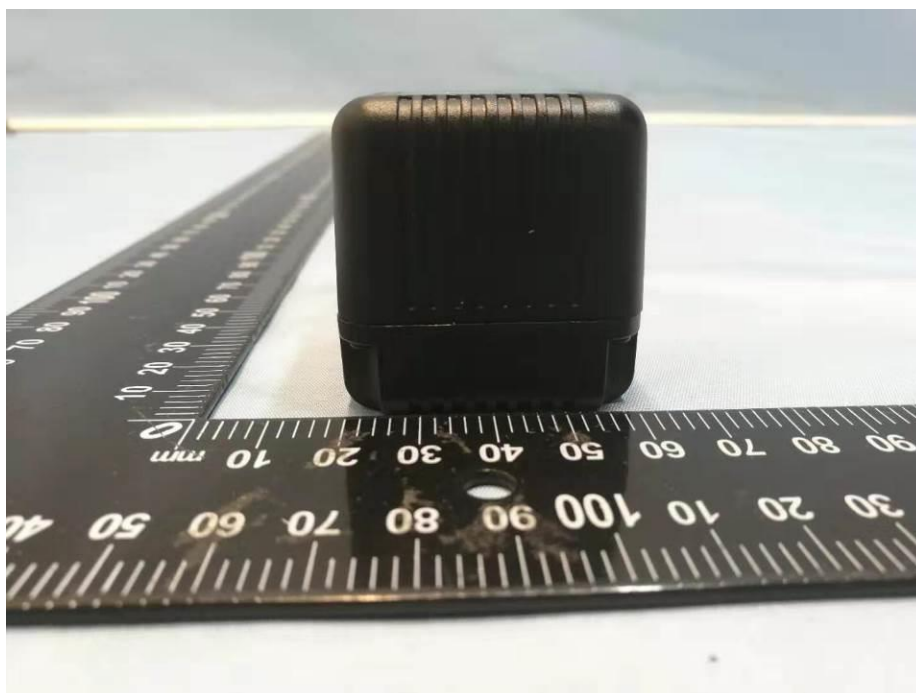
## 14.2 Photographs - Conducted Emission

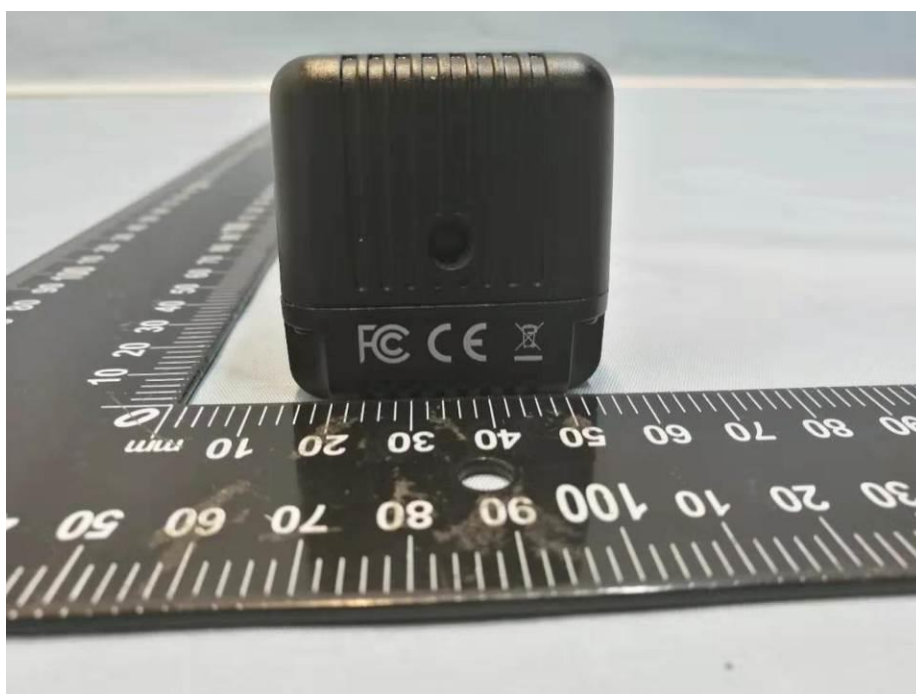
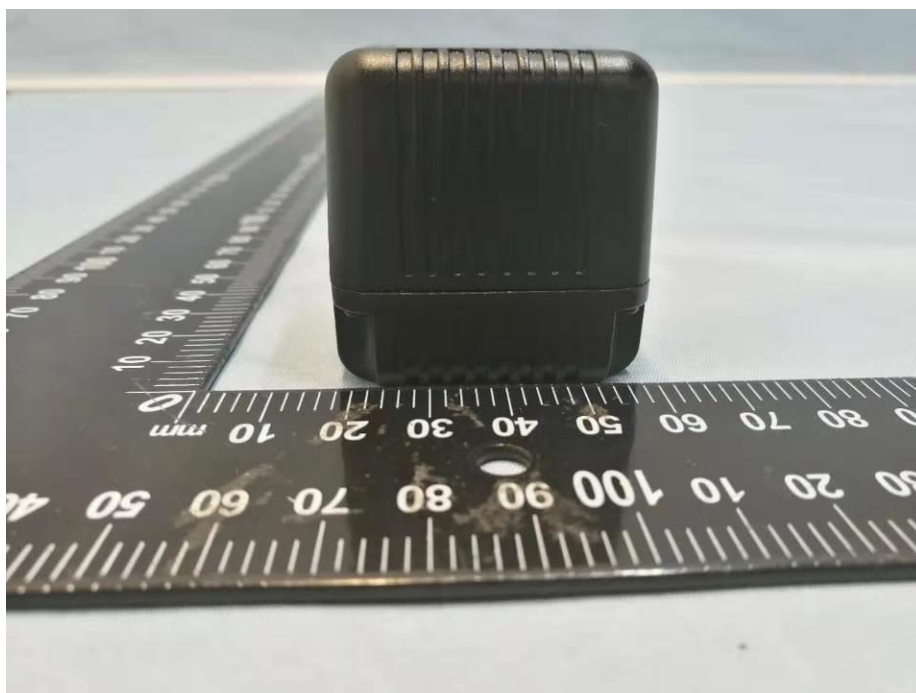


## 15 Photographs - Constructional Details

### 15.1 EUT – External Photos



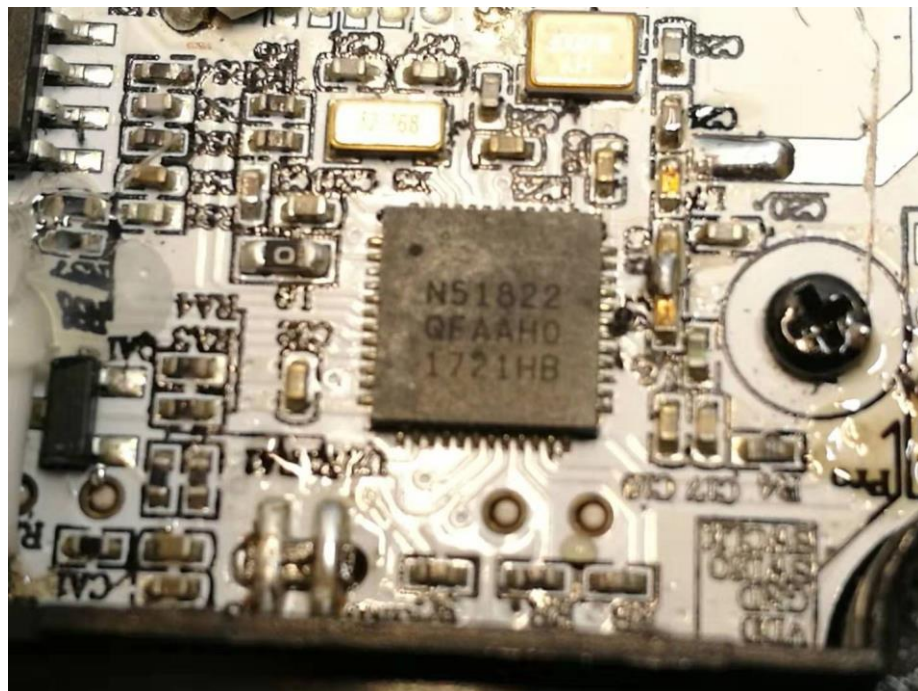
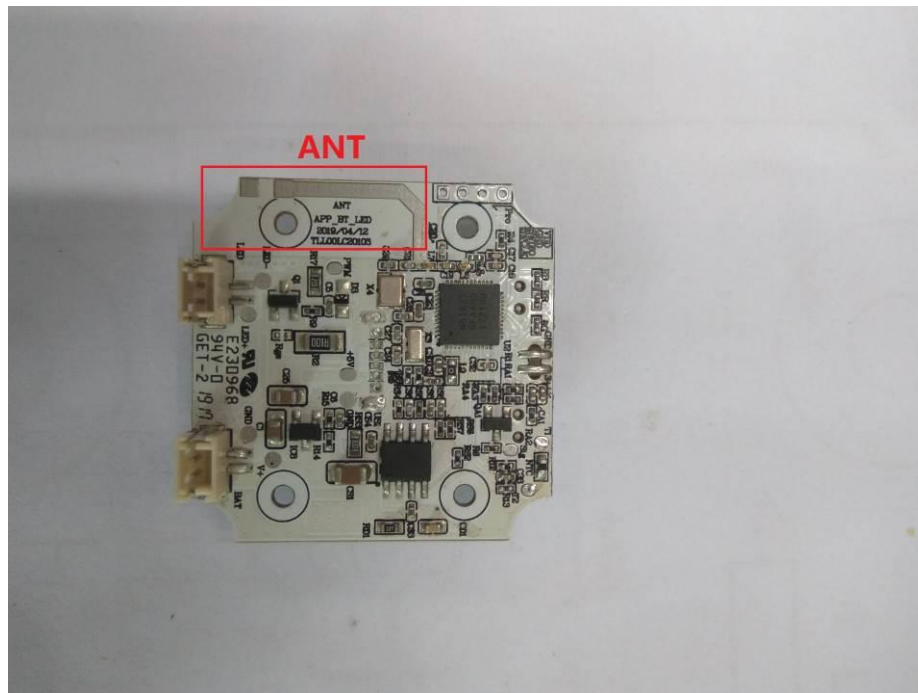


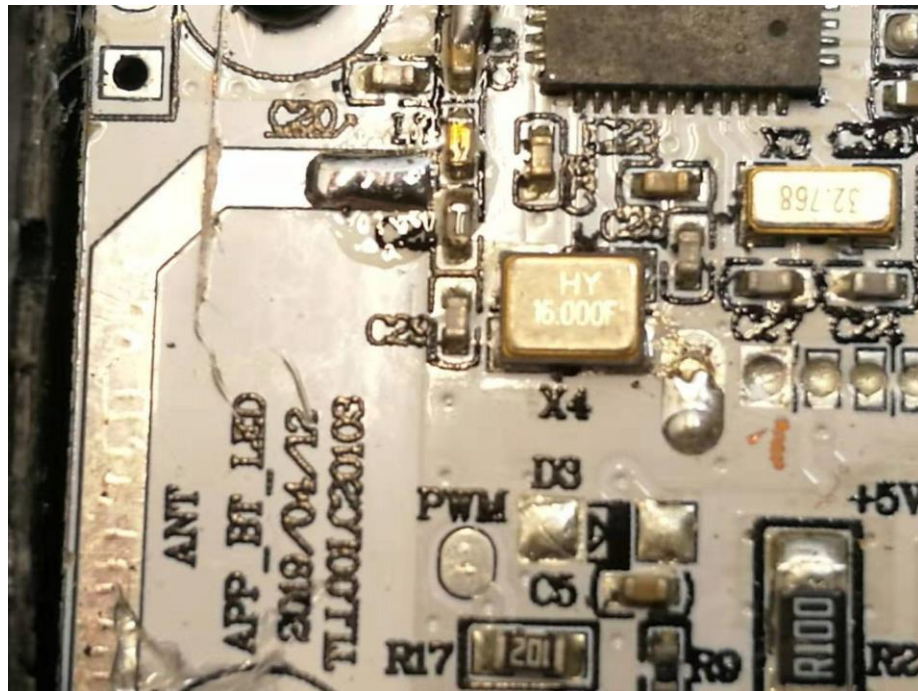




## 15.2 EUT – Internal Photos







=====End of Report=====