

# FCC TEST REPORT

## FCC ID: 2BAIJ-TX60RF

Report Number..... : ZKT-220415L2480-02

Date of Test..... : Apr. 15, 2022 -- Apr. 30, 2022

Date of issue ..... : Apr. 30, 2022

Total number of pages ..... : 31

Test Result ..... : PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address ..... : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name ..... : GOON Technology Co.,Ltd.

Address ..... : 9/F, Taohuayuan Science and Technology Innovation Park, Tangtou Avenue, Bao'an District, Shenzhen

Manufacturer's name ..... : GOON Technology Co.,Ltd.

Address ..... : 9/F, Taohuayuan Science and Technology Innovation Park, Tangtou Avenue, Bao'an District, Shenzhen

Test specification:

Standard..... : FCC Rules and Regulations Part 15 Subpart C Section 15.236  
ANSI C63.4: 2014

Test procedure..... : /

Non-standard test method ..... : N/A

**Test Report Form No.** ..... : TRF-EL-111\_V0

**Test Report Form(s) Originator** .... : ZKT Testing

**Master TRF** ..... : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : Wireless transmitter

Trademark ..... : **GO•ON®**

Model/Type reference ..... : TX-60RF

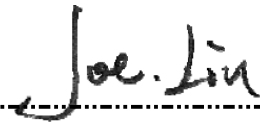
Ratings..... : DC 7.4V from battery  
DC 12V from adapter

**Testing procedure and testing location:****Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community  
Industrial Avenue, Fuhai Street, Bao'an District,  
Shenzhen, China

Tested by (name + signature) .....: Alen He



Reviewer (name + signature).....: Joe Liu



Approved (name + signature) .....: Lake Xie



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**1.VERSION**

| Report No.         | Version | Description             | Approved      |
|--------------------|---------|-------------------------|---------------|
| ZKT-220415L2480-02 | Rev.01  | Initial issue of report | Apr. 30, 2022 |
|                    |         |                         |               |
|                    |         |                         |               |

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.236) , Subpart C |                                        |          |        |
|---------------------------------|----------------------------------------|----------|--------|
| Standard Section                | Test Item                              | Judgment | Rem rk |
| FCC part 15.203                 | Antenna requirement                    | PASS     |        |
| FCC part 15.207                 | AC Power Line Conducted Emission       | PASS     |        |
| FCC part 15.236(d)(1)           | Conducted Peak Output Power            | PASS     |        |
| FCC part 15.236(d)(2)           | Radiated Spurious Emission Measurement | PASS     |        |
| FCC part 15.236(d)(2)           | Spurious Emission at Antenna Port      | PASS     |        |
| FCC part 15.236(f)(2)           | Occupied Bandwidth Emission            | PASS     |        |
| FCC part 15.236(f)(3)           | Frequency Stability                    | PASS     |        |

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

### 2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

### 2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$  , providing a level of confidence of approximately 95 %.

| No. | Item                         | Uncertainty               |
|-----|------------------------------|---------------------------|
| 1   | Conducted Emission Test      | $\pm 1.38\text{dB}$       |
| 2   | RF power conducted           | $\pm 0.16\text{dB}$       |
| 3   | Spurious emissions conducted | $\pm 0.21\text{dB}$       |
| 4   | All emissions radiated(<1G)  | $\pm 4.68\text{dB}$       |
| 5   | All emissions radiated(>1G)  | $\pm 4.89\text{dB}$       |
| 6   | Temperature                  | $\pm 0.5^{\circ}\text{C}$ |
| 7   | Humidity                     | $\pm 2\%$                 |

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                        |                                                                         |
|------------------------|-------------------------------------------------------------------------|
| Product Name:          | Wireless transmitter                                                    |
| Model No.:             | TX-60RF                                                                 |
| Hardware Version:      | TX-60RFN                                                                |
| Software Version:      | V1.2.10                                                                 |
| Frequency range:       | 657.2MHz~662.8MHz                                                       |
| Channel numbers:       | 2                                                                       |
| Modulation technology: | FSK                                                                     |
| Antenna Type:          | glue stick antenna                                                      |
| Antenna gain:          | 3 dBi                                                                   |
| Power supply:          | DC 7.4V from battery<br>DC12V from adapter                              |
| adapter                | Model:TDX-1201300<br>Input:100-240V ~50/60Hz<br>Output:12.0V 1.3A 15.6W |

Note: The product can adjust different frequencies through buttons, there are two frequency bands, 902.5MHz~927.5MHz is A mode, 657.2MHz~662.8MHz is B mode, this report only shows the test data of B mode.

| B mode-Channel | Frequency (MHz) |
|----------------|-----------------|
| 1              | 657.2MHz        |
| 2              | 662.8MHz        |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Test channel | Frequency |
|--------------|-----------|
| 1            | 657.2MHz  |
| 2            | 662.8MHz  |

#### 3.2 DESCRIPTION OF TEST MODES

|                                                                                                                                                                                                                                       |                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                     | Keep the EUT in continuously transmitting mode |
| Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. |                                                |

|                   |                            |
|-------------------|----------------------------|
| Test Software     | Fixed frequency test board |
| Power level setup | <10dBm                     |

## 3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Conducted Spurious



## 3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No.                                                          | Series No. | Note              |
|------|-----------|-----------|-------------------------------------------------------------------------|------------|-------------------|
|      | Adapter   | /         | Model:TDX-1201300<br>Input:100-240V ~50/60Hz<br>Output:12.0V 1.3A 15.6W | /          | Provide by client |
|      |           |           |                                                                         |            |                   |
|      |           |           |                                                                         |            |                   |
|      |           |           |                                                                         |            |                   |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
|      |               |              |        |      |
|      |               |              |        |      |
|      |               |              |        |      |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

## Radiation Test equipment

| Item | Equipment                        | Manufacturer   | Type No.        | Serial No. | Last calibration | Calibrated until |
|------|----------------------------------|----------------|-----------------|------------|------------------|------------------|
| 1    | Spectrum Analyzer (9kHz-26.5GHz) | KEYSIGHT       | 9020A           | MY45109572 | Sep. 21, 2021    | Sep. 20, 2022    |
| 2    | Spectrum Analyzer (1GHz-40GHz)   | Agilent        | E4446A          | 100363     | Sep. 21, 2021    | Sep. 20, 2022    |
| 3    | Test Receiver (9kHz-7GHz)        | R&S            | ESCI7           | 101169     | Sep. 21, 2021    | Sep. 20, 2022    |
| 4    | Bilog Antenna (30MHz-1400MHz)    | Schwarzbeck    | VULB9168        | 00877      | Sep. 21, 2021    | Sep. 20, 2022    |
| 5    | Horn Antenna (1GHz-18GHz)        | SCHWARZBECK    | BBHA9120D       | 1541       | Sep. 21, 2021    | Sep. 20, 2022    |
| 6    | Horn Antenna (18GHz-40GHz)       | A.H. System    | SAS-574         | 588        | Sep. 21, 2021    | Sep. 20, 2022    |
| 7    | Amplifier (30-1000MHz)           | EM Electronics | EM330 Amplifier | N/A        | Sep. 21, 2021    | Sep. 20, 2022    |
| 8    | Amplifier (1GHz-40GHz)           | QUANJUDA       | DLE-161         | 097        | Sep. 21, 2021    | Sep. 20, 2022    |
| 9    | Loop Antenna (9KHz-30MHz)        | SCHWARZBECK    | FMZB1519B       | 014        | Sep. 21, 2021    | Sep. 20, 2022    |
| 10   | RF cables1 (9kHz-30MHz)          | N/A            | 9kHz-30MHz      | N/A        | Sep. 21, 2021    | Sep. 20, 2022    |
| 11   | RF cables2 (30MHz-1GHz)          | N/A            | 30MHz-1GHz      | N/A        | Sep. 21, 2021    | Sep. 20, 2022    |
| 12   | RF cables3 (1GHz-40GHz)          | N/A            | 1GHz-40GHz      | N/A        | Sep. 21, 2021    | Sep. 20, 2022    |
| 13   | CMW500 Test                      | R&S            | CMW500          | 106504     | Sep. 21, 2021    | Sep. 20, 2022    |
| 14   | ESG Signal Generator             | Agilent        | E4421B          | GB40051203 | Sep. 21, 2021    | Sep. 20, 2022    |
| 15   | Signal Generator                 | Agilent        | N5182A          | MY47420215 | Sep. 21, 2021    | Sep. 20, 2022    |
| 16   | D.C. Power Supply                | LongWei        | TPR-6405D       | \          | \                | \                |
| 17   | Software                         | Frad           | EZ-EMC          | FA-03A2 RE | \                | \                |

## Conduction Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No.  | Last calibration | Calibrated until |
|------|-------------------|--------------|----------|-------------|------------------|------------------|
| 1    | LISN              | R&S          | ENV216   | 101471      | Sep. 21, 2021    | Sep. 20, 2022    |
| 2    | LISN              | CYBERTEK     | EM5040A  | E1850400149 | Sep. 21, 2021    | Sep. 20, 2022    |
| 3    | Test Cable        | N/A          | C01      | N/A         | Sep. 21, 2021    | Sep. 20, 2022    |
| 4    | Test Cable        | N/A          | C02      | N/A         | Sep. 21, 2021    | Sep. 20, 2022    |
| 5    | EMI Test Receiver | R&S          | ESRP3    | 101946      | Sep. 21, 2021    | Sep. 20, 2022    |
| 6    | Absorbing Clamp   | DZ           | ZN23201  | N/A         | Sep. 21, 2021    | Sep. 20, 2022    |

#### 4. EMC EMISSION TEST

##### 4.1 CONDUCTED EMISSION MEASUREMENT

|                       |                                      |
|-----------------------|--------------------------------------|
| Test Requirement:     | FCC Part15 C Section 15.207          |
| Test Method:          | ANSI C63.4: 2014                     |
| Test Frequency Range: | 150KHz to 30MHz                      |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, Sweep time=auto |

##### 4.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Limit (dBuV) |           | Standard |
|-----------------|--------------|-----------|----------|
|                 | Quas -peak   | Average   |          |
| 0.15 -0.5       | 66 - 56 *    | 56 - 46 * | FCC      |
| 0.50 -5.0       | 56.00        | 46.00     | FCC      |
| 5.0 -30.0       | 60.00        | 50.00     | FCC      |

Note:

(1) \*Decreases with the logarithm of the frequency.

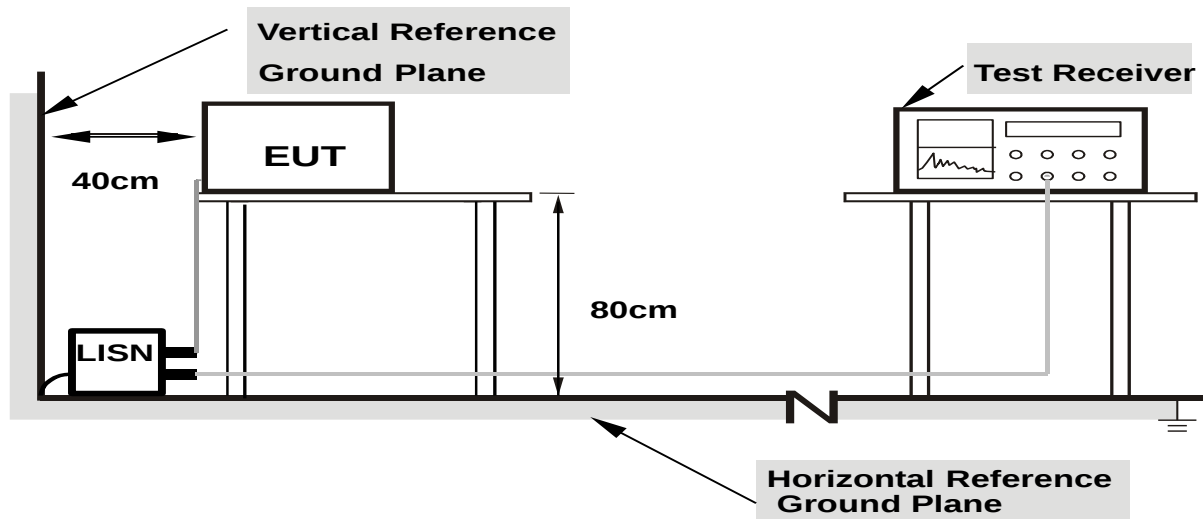
##### 4.1.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.4 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

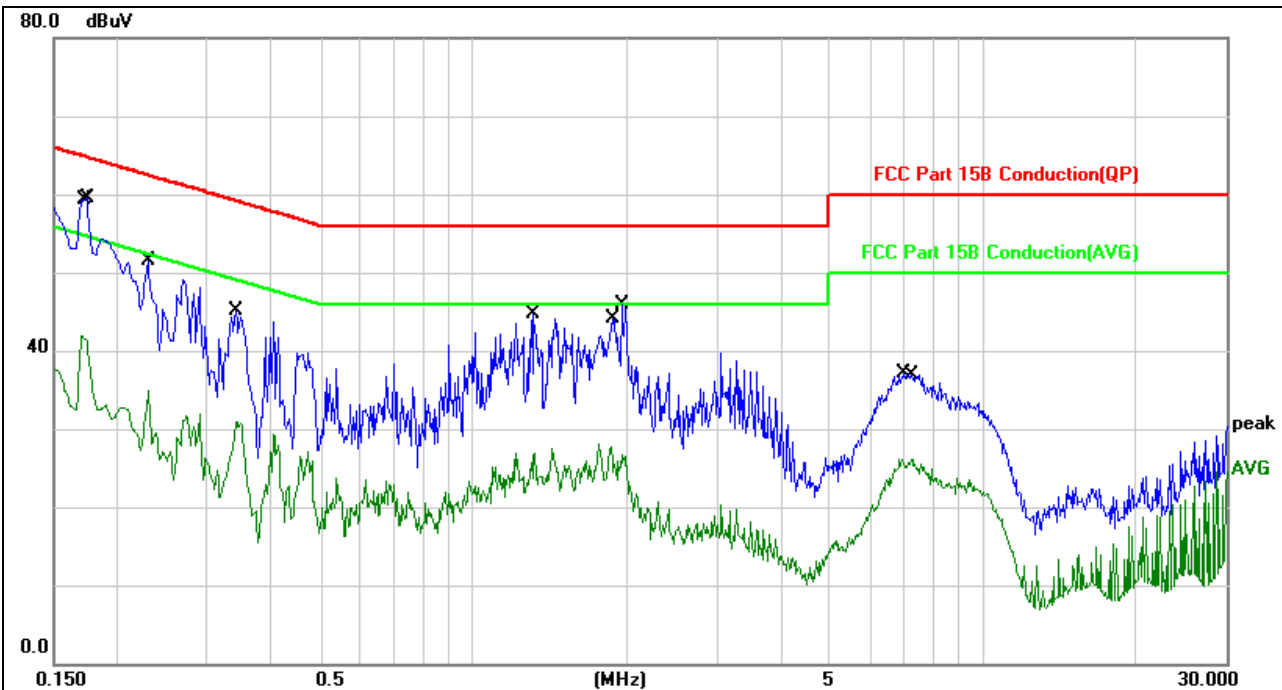
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### 4.1.6 TEST RESULTS

|                |              |                     |     |
|----------------|--------------|---------------------|-----|
| Temperature :  | 26°C         | Relative Humidity : | 54% |
| Pressure :     | 101kPa       | Phase :             | L   |
| Test Voltage : | AC 120V/60Hz | Test mode           |     |

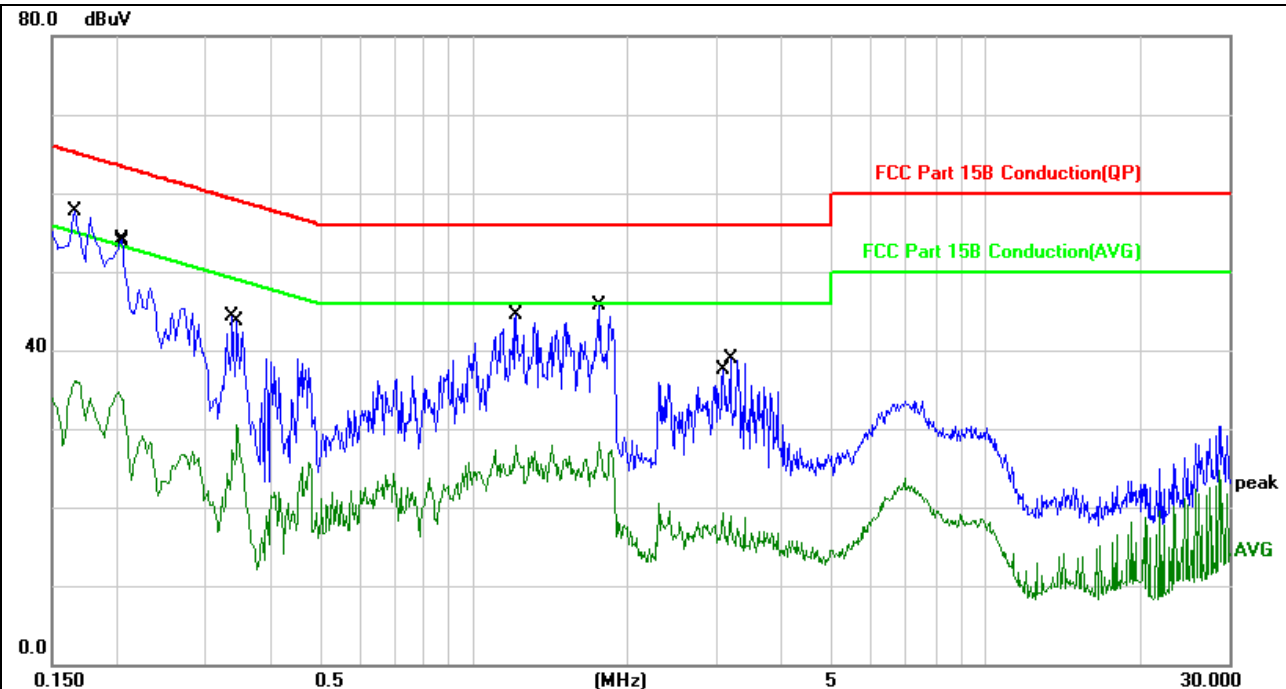


| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   |     | 0.1700       | 31.81                    | 10.07                   | 41.88                    | 54.96         | -13.08     | AVG      |         |
| 2   | *   | 0.1740       | 49.48                    | 10.07                   | 59.55                    | 64.76         | -5.21      | QP       |         |
| 3   |     | 0.2300       | 41.38                    | 10.08                   | 51.46                    | 62.45         | -10.99     | QP       |         |
| 4   |     | 0.2300       | 24.89                    | 10.08                   | 34.97                    | 52.45         | -17.48     | AVG      |         |
| 5   |     | 0.3420       | 34.96                    | 10.20                   | 45.16                    | 59.15         | -13.99     | QP       |         |
| 6   |     | 0.3420       | 20.76                    | 10.20                   | 30.96                    | 49.15         | -18.19     | AVG      |         |
| 7   |     | 1.3099       | 34.61                    | 10.13                   | 44.74                    | 56.00         | -11.26     | QP       |         |
| 8   |     | 1.3180       | 16.80                    | 10.13                   | 26.93                    | 46.00         | -19.07     | AVG      |         |
| 9   |     | 1.8660       | 17.66                    | 10.06                   | 27.72                    | 46.00         | -18.28     | AVG      |         |
| 10  |     | 1.9500       | 35.84                    | 10.05                   | 45.89                    | 56.00         | -10.11     | QP       |         |
| 11  |     | 7.0220       | 27.19                    | 9.87                    | 37.06                    | 60.00         | -22.94     | QP       |         |
| 12  |     | 7.2820       | 16.16                    | 9.87                    | 26.03                    | 50.00         | -23.97     | AVG      |         |

## Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

|                |              |                     |     |
|----------------|--------------|---------------------|-----|
| Temperature :  | 26°C         | Relative Humidity : | 54% |
| Pressure :     | 101kPa       | Phase :             | N   |
| Test Voltage : | AC 120V/60Hz | Test mode           |     |



| 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   | *   | 0.1660       | 47.66                    | 10.07                   | 57.73                    | 65.15         | -7.42      | QP       |         |
| 2   |     | 0.1660       | 26.04                    | 10.07                   | 36.11                    | 55.15         | -19.04     | AVG      |         |
| 3   |     | 0.2020       | 24.69                    | 10.07                   | 34.76                    | 53.52         | -18.76     | AVG      |         |
| 4   |     | 0.2060       | 43.95                    | 10.07                   | 54.02                    | 63.36         | -9.34      | QP       |         |
| 5   |     | 0.3379       | 34.10                    | 10.20                   | 44.30                    | 59.25         | -14.95     | QP       |         |
| 6   |     | 0.3460       | 20.39                    | 10.20                   | 30.59                    | 49.06         | -18.47     | AVG      |         |
| 7   |     | 1.2100       | 34.31                    | 10.15                   | 44.46                    | 56.00         | -11.54     | QP       |         |
| 8   |     | 1.2100       | 17.84                    | 10.15                   | 27.99                    | 46.00         | -18.01     | AVG      |         |
| 9   |     | 1.7580       | 18.32                    | 10.07                   | 28.39                    | 46.00         | -17.61     | AVG      |         |
| 10  |     | 1.7660       | 35.59                    | 10.07                   | 45.66                    | 56.00         | -10.34     | QP       |         |
| 11  |     | 3.0780       | 9.37                     | 9.86                    | 19.23                    | 46.00         | -26.77     | AVG      |         |
| 12  |     | 3.1820       | 29.13                    | 9.85                    | 38.98                    | 56.00         | -17.02     | QP       |         |

## Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor
4. when charging, BT can not transmit

## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMIT

Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in § 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08).

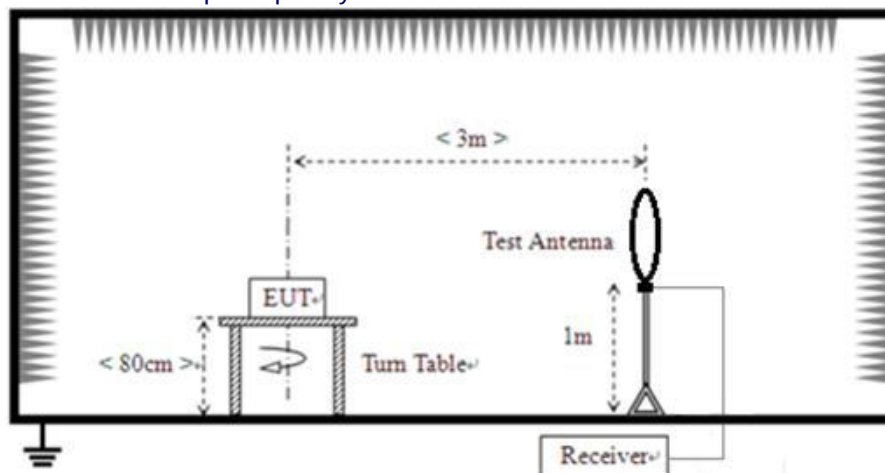
| State     | Frequency                                                                           |                                      |                                |
|-----------|-------------------------------------------------------------------------------------|--------------------------------------|--------------------------------|
|           | 47 MHz to 74 MHz<br>87,5 MHz to 137 MHz<br>174 MHz to 230 MHz<br>470 MHz to 862 MHz | Other Frequencies<br>below 1 000 MHz | Frequencies above<br>1 000 MHz |
| Operation | 4 nW                                                                                | 250 nW                               | 1 $\mu$ W                      |
| Standby   | 2 nW                                                                                | 2 nW                                 | 20 nW                          |

### 4.2.3 DEVIATION FROM TEST STANDARD

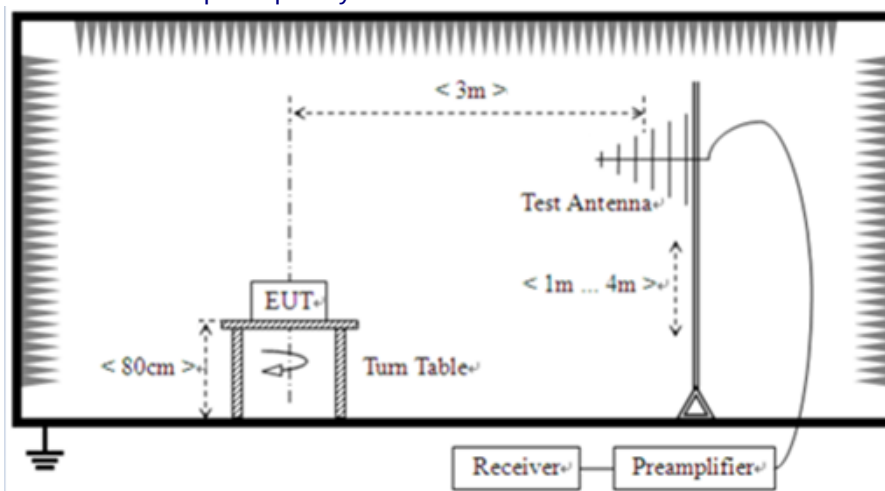
No deviation

### 4.2.4 TEST SETUP

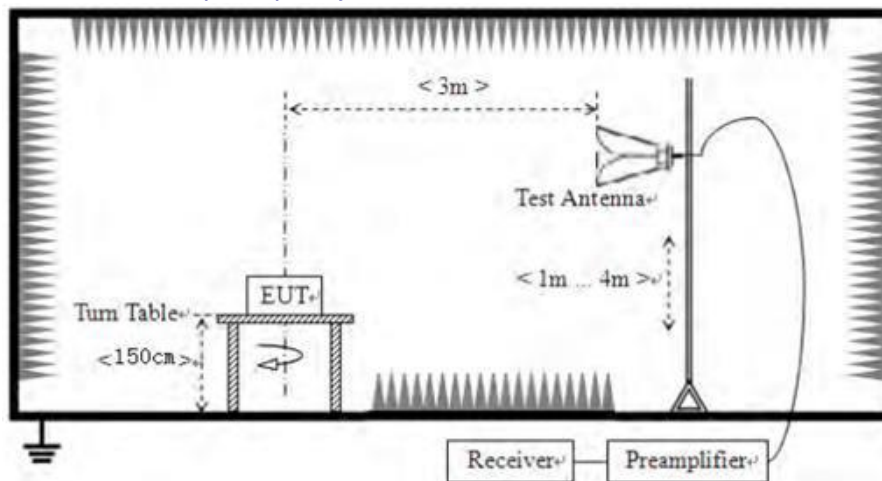
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



## (C) Radiated Emission Test-Up Frequency Above 1GHz



## 4.2.5 TEST PROCEDURE

1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

## 4.2.6 TEST RESULTS

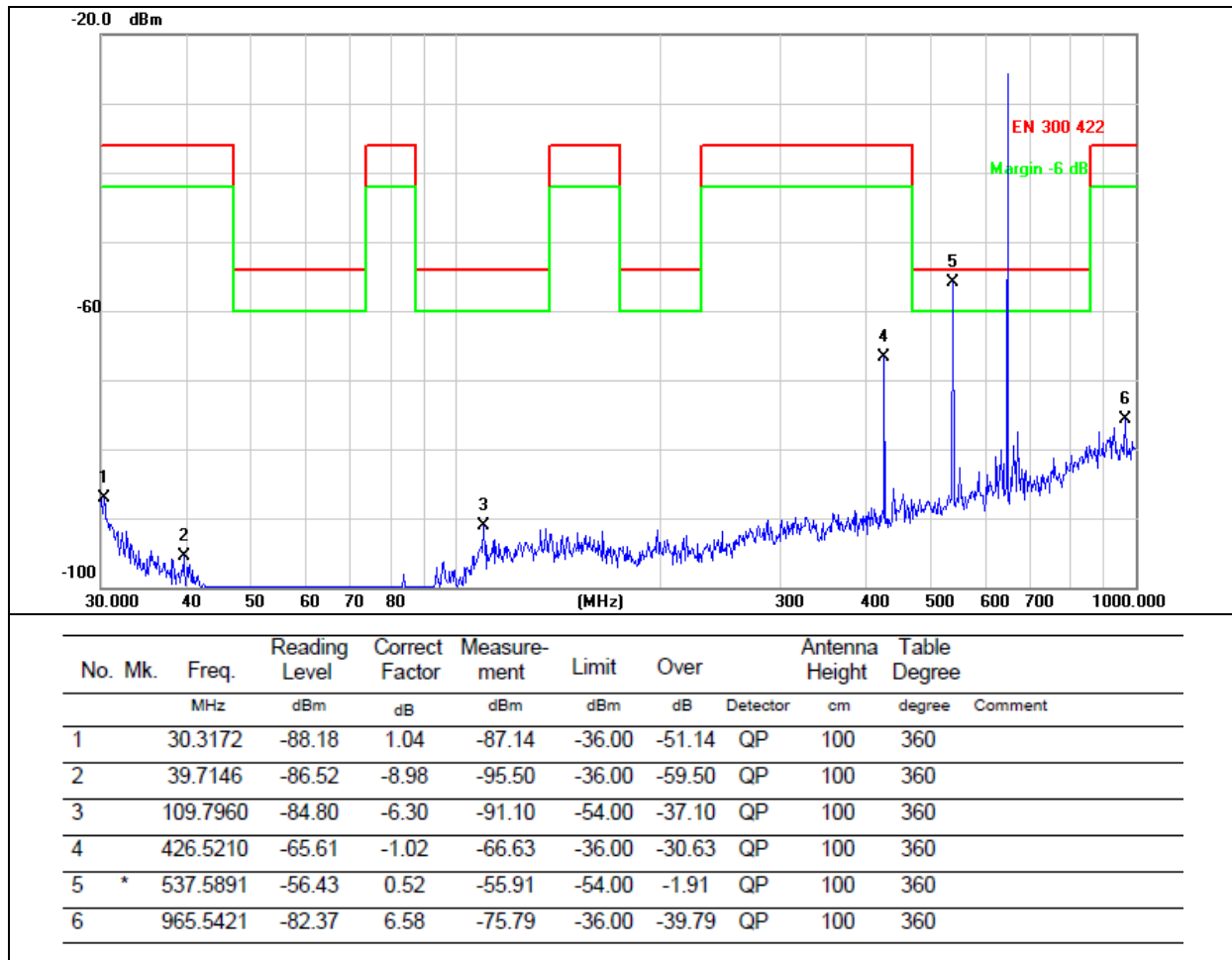
Below 30MHz Test Results:

| FREQUENCY<br>(MHZ) | Reading<br>(dBm) | Factor<br>(dB) | Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dBm) | Polarity |
|--------------------|------------------|----------------|----------------|----------------|-----------------|----------|
| --                 | --               | --             | --             | --             | --              | --       |
| --                 | --               | --             | --             | --             | --              | --       |

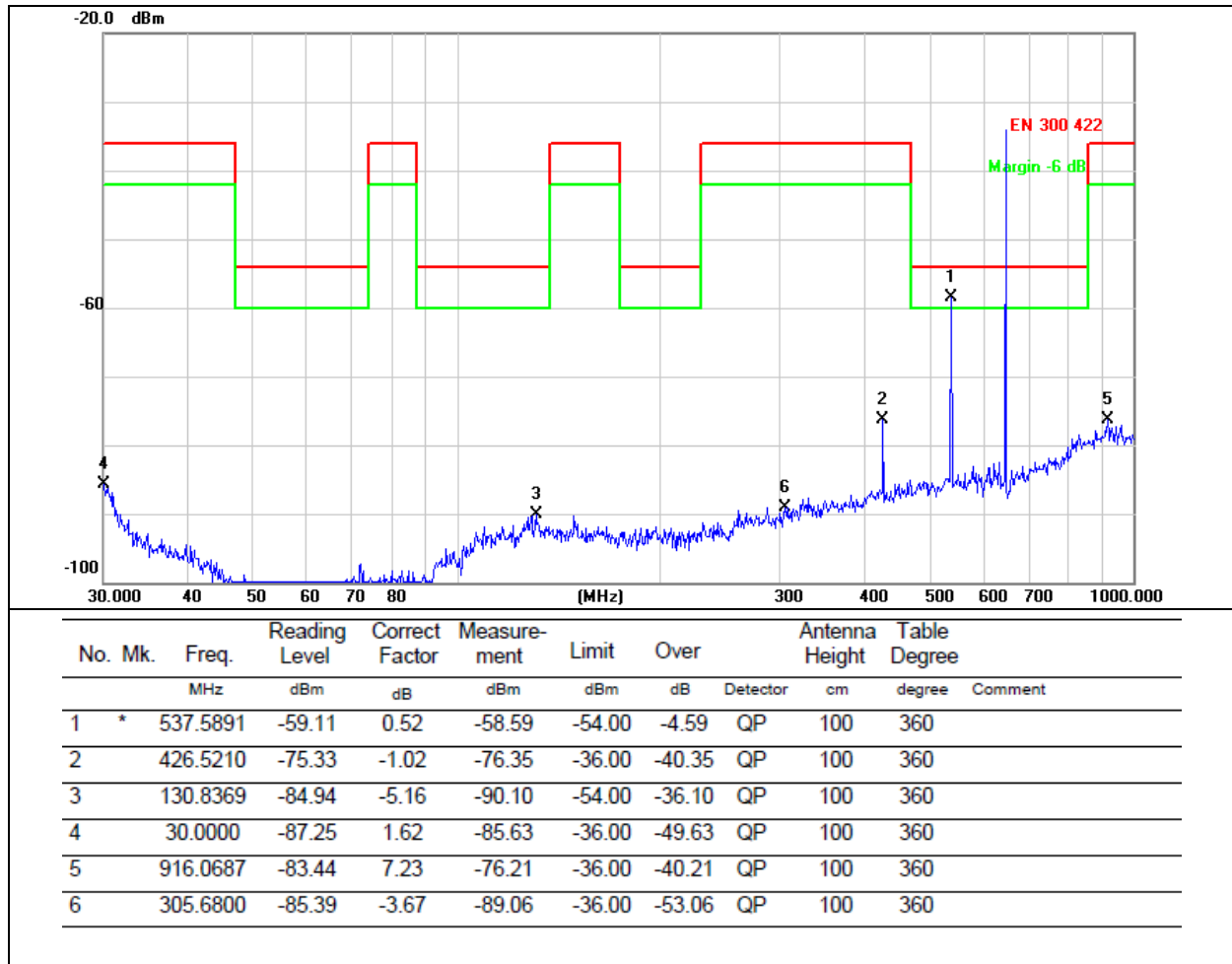
NOTE: Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor (more than 20dB below the limit) in 9KHz to 30MHz and not recorded in this report.

Between 30MHz – 1GHz

|               |         |                    |            |
|---------------|---------|--------------------|------------|
| Temperature:  | 26°C    | Relative Humidity: | 54%        |
| Pressure:     | 101 kPa | Polarization:      | Horizontal |
| Test Voltage: | AC120V  |                    |            |



|               |        |                    |          |
|---------------|--------|--------------------|----------|
| Temperature:  | 26°C   | Relative Humidity: | 54%      |
| Pressure:     | 101kPa | Polarization:      | Vertical |
| Test Voltage: | AC120V |                    |          |



## Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

## Above 1GHz Test Results:

| FREQUENCY<br>(MHZ) | Reading<br>(dBm) | Factor<br>(dB) | Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dBm) | Polarity |
|--------------------|------------------|----------------|----------------|----------------|-----------------|----------|
| 1327.6             | -43.17           | 7.88           | -35.29         | -30            | 5.29            | H        |
| 1991.4             | -42.69           | 3.43           | -39.26         | -30            | 9.26            | H        |
| 2655.2             | -41.23           | -1.83          | -43.06         | -30            | 13.06           | H        |
| 1327.6             | -42.93           | 6.31           | -36.62         | -30            | 6.62            | V        |
| 1991.4             | -42.83           | 3.03           | -39.80         | -30            | 9.80            | V        |
| 2655.2             | -41.35           | -3.46          | -44.81         | -30            | 14.81           | V        |

(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.

(2) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

## Standby mode:

| FREQUENCY<br>(MHZ) | Reading<br>(dBm) | Factor<br>(dB) | Level<br>(dBm) | Limit<br>(dBm) | Margin<br>(dBm) | Polarity |
|--------------------|------------------|----------------|----------------|----------------|-----------------|----------|
| --                 | --               | --             | --             | --             | --              | --       |
| --                 | --               | --             | --             | --             | --              | --       |
| --                 | --               | --             | --             | --             | --              | --       |

## NOTE:

Radiated emission test from 30MHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor (more than 20dB below the limit) in 30MHz to 8GHz and not recorded in this report.

## 5.CONDUCTED OUTPUT POWER

### 5.1 LIMIT

According to FCC 15.236(d)(1), The maximum radiated power shall not exceed the following values: (1) In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP  
(2) In the 600 MHz guard band and the 600 MHz duplex gap: 20 mW EIRP.

### 5.2 TEST SETUP



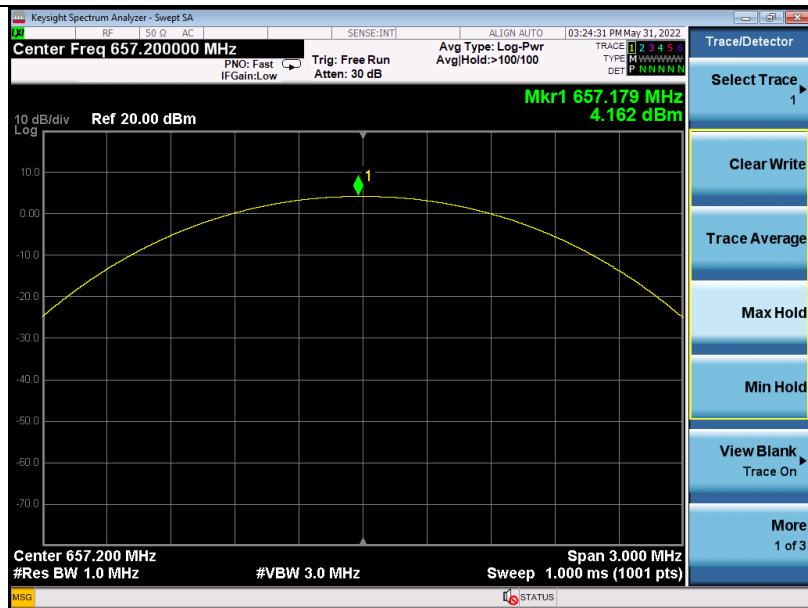
### 5.3 TEST PROCEDURE:

1. The maximum peak output power was measured with a Spectrum Analyzer connected to the antenna terminal while EUT was operating in unmodulated situation.
2. Power was supplied to the battery input connector a power supply. The power supply was set for +3.0VDC. The Spectrum Analyzer was connected at antenna terminal to measure RF power of the carrier.
3. A Multimeter was connected in series with final RF Stage to measure the current; A Multimeter was used to measure final RF Stage supply voltage. Then the voltage v.s. current of the final RF Stage can be showed.

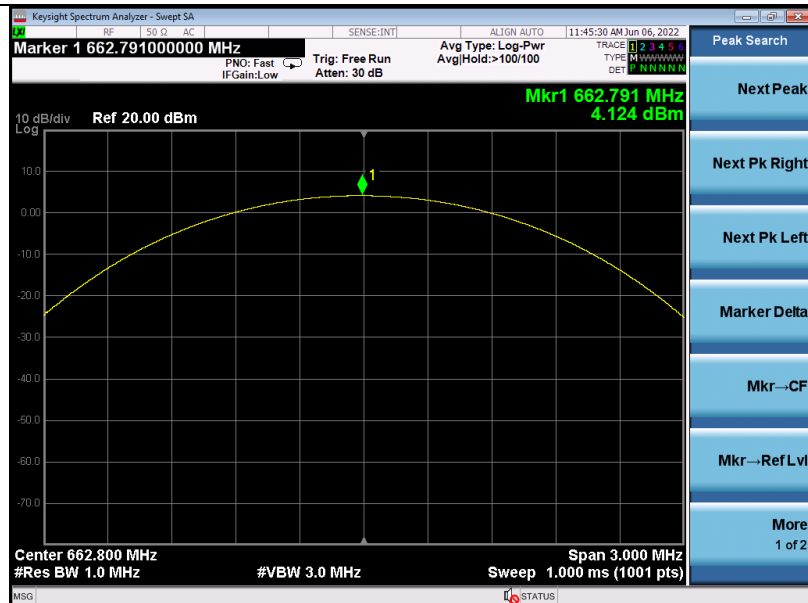
### 5.4 TEST RESULTS:

| frequency (MHz) | Conducted Output Power (dBm) | ANT Gain (dBi) | EIRP (dBm) | Limit (dBm) | Result |
|-----------------|------------------------------|----------------|------------|-------------|--------|
| 657.2           | 4.162                        | 3.0            | 7.162      | 13.01       | PASS   |
| 662.8           | 4.124                        | 3.0            | 7.124      | 13.01       | PASS   |

### 657.2MHz



### 662.8MHz



## 6. CHANNEL BANDWIDTH

|                   |                                    |
|-------------------|------------------------------------|
| Test Requirement: | FCC Part15 C Section 15. 236(f)(2) |
| Test Method:      | ANSI C63.4: 2014                   |

### 6.1 APPLIED PROCEDURES / LIMIT

According to FCC 15.236(f)(2), The operating frequency within a permissible band of operation as defined in paragraph (c) must comply with the following requirements.

(1) The frequency selection shall be offset from the upper or lower band limits by 25 kHz or an integral multiple thereof.

(2) One or more adjacent 25 kHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz. The operating bandwidth shall not exceed 200kHz.

Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in Section 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08) (incorporated by reference, see §15.38). Emissions outside this band shall comply with the limit specified at the edges of the ETSI mask

### 6.2 TEST PROCEDURE

According to TIA-603 for additional Test Set-Up procedures, the occupied bandwidth of emission was measured with a Spectrum Analyzer connected to the antenna terminal while EUT was operating in 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. Then mark the -26dB Bandwidth and record it.

### 6.3 DEVIATION FROM STANDARD

No deviation.

### 6.4 TEST SETUP



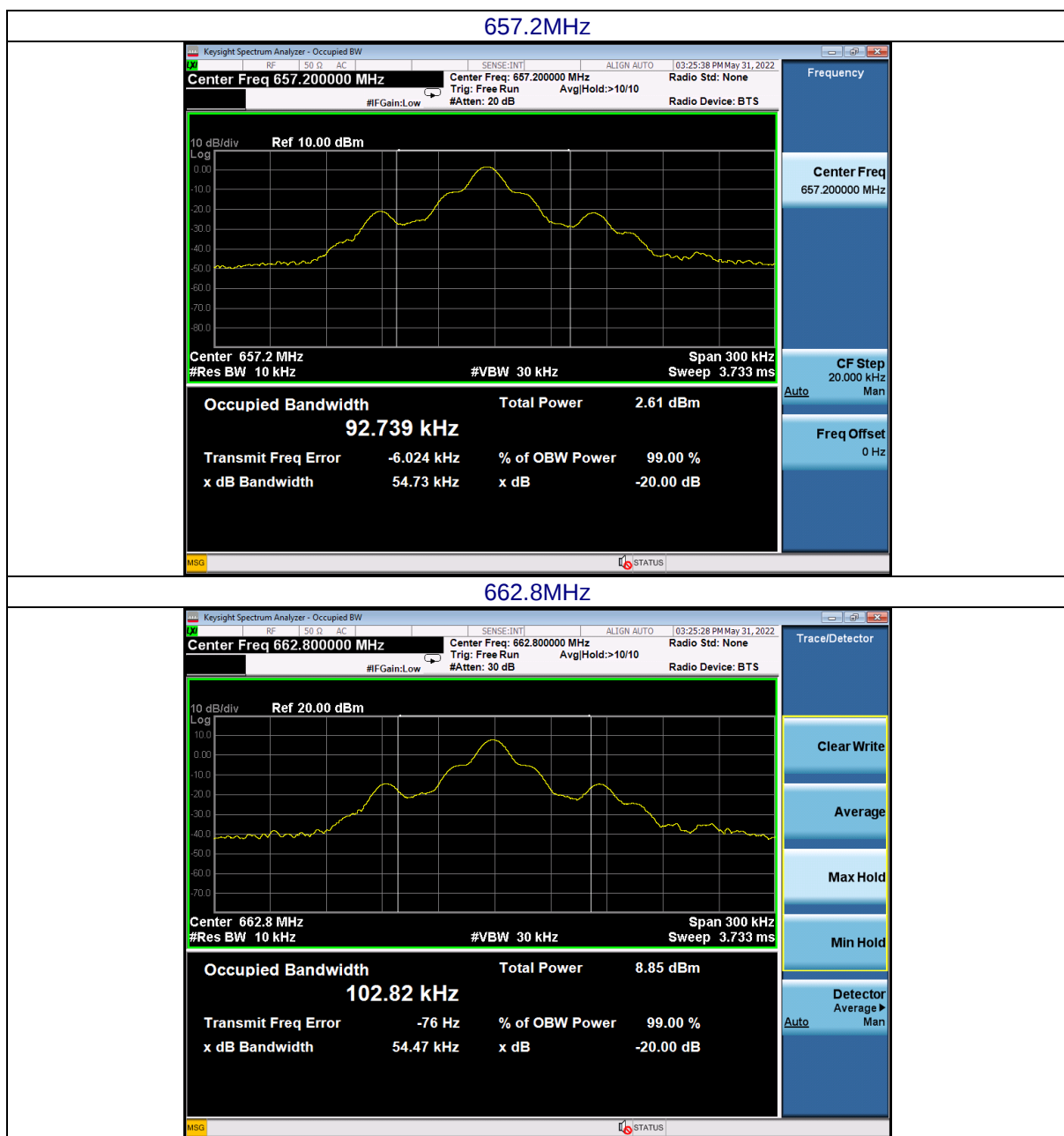
### 6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

## 6.6 TEST RESULTS

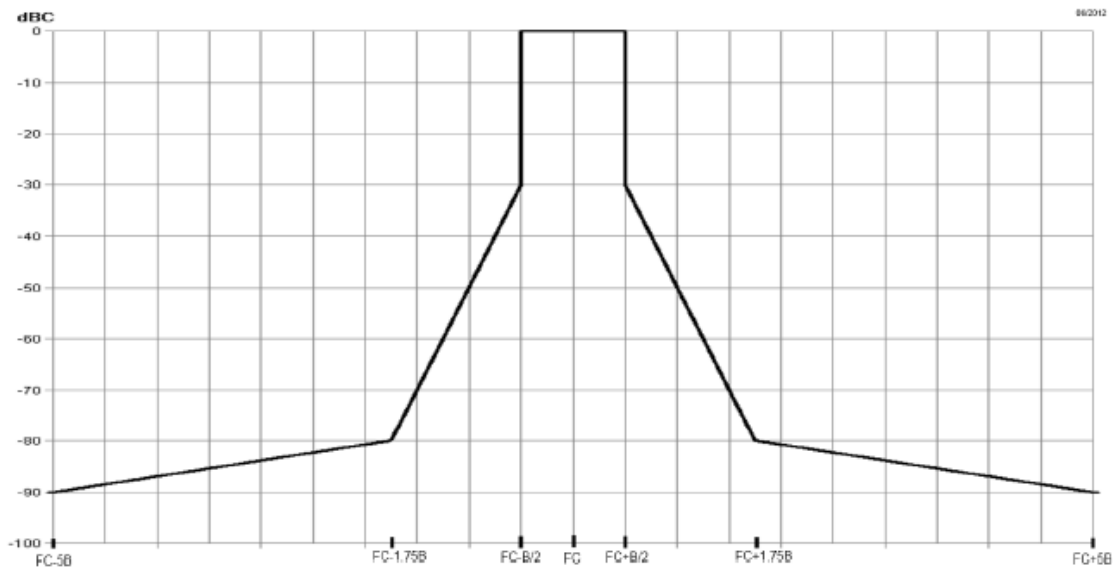
|               |      |                     |         |
|---------------|------|---------------------|---------|
| Temperature : | 26°C | Relative Humidity : | 54%     |
| Test Mode :   | FM   | Test Voltage :      | DC 3.7V |

| Test channel | 20dB bandwidth (kHz) | 99%Bandwidth (kHz) | Limit (kHz) | Result |
|--------------|----------------------|--------------------|-------------|--------|
| 657.2MHz     | 54.73                | 92.739             | 200.0       | Pass   |
| 662.8MHz     | 54.47                | 102.82             | 200.0       |        |



## 7.Necessary bandwidth

### 7.1LIMIT

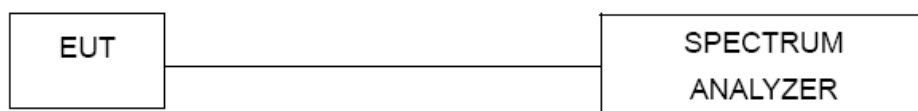


### Standard Applicable

According to §15.236 (g) Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in §8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V1.4.2 (2011-08).

According to ETSI EN 300 422-2 V2.1.1 section 8.3, the transmitter output spectrum shall be within the mask defined in the following figure.

### 7.2 TEST SETUP



### 7.3 TEST PROCEDURE:

Principal Spectrum Mask measuring method for digital transmitters:

- Spectrum mask below 1 GHz, see figure 4; for the spectrum mask above 1 GHz, see figure 5.

NOTE: This parameter also includes the limits for spectral components within the out-of-band region.

The transmitter shall be modulated with the test signals defined in clause 7.1.2. In any case the mask shall not be exceeded.

- Step 1: Measure the "Carrier Power" with the spectrum analyser setup:

- Centre Frequency =  $f_c$
- Span = Zero span
- Detector = RMS
- Trace Mode = Average
- RBW & VBW =  $5 \times B$
- Sweep time  $\geq 2$  s

Step 2: Measure the "Maximum Relative Level (dBc) at Specified Carrier Offsets" with the following spectrum analyser setup:

- Centre Frequency =  $f_c$
- Span  $\geq 5 \times B$
- Detector = RMS
- Trace Mode = Peak Hold
- RBW&VBW = 1 kHz
- Sweep time  $\geq 2$  s

Limits:

-Step 3: Measure the "transmitter wide band noise floor":

The measurement of transmitter broad band noise floor shall be carried out according to clause 8.3.2.1.

-Step 3a: Measure the "lower frequency transmitter wide band noise floor":

-Start Frequency =  $f_c - 5 \times B$

Stop Frequency =  $f_c - 1,75 \times B$

-Detector = RMS

-Trace Mode = Average

-RBW&VBW = 1 kHz

-Sweep time = 2 s per 200 kHz

-Step 3b: Measure the "upper frequency transmitter wide band noise floor":

-Start Frequency =  $f_c + 1,75 \times B$

Stop Frequency =  $f_c + 5 \times B$

-Detector = RMS

-Trace Mode = Average

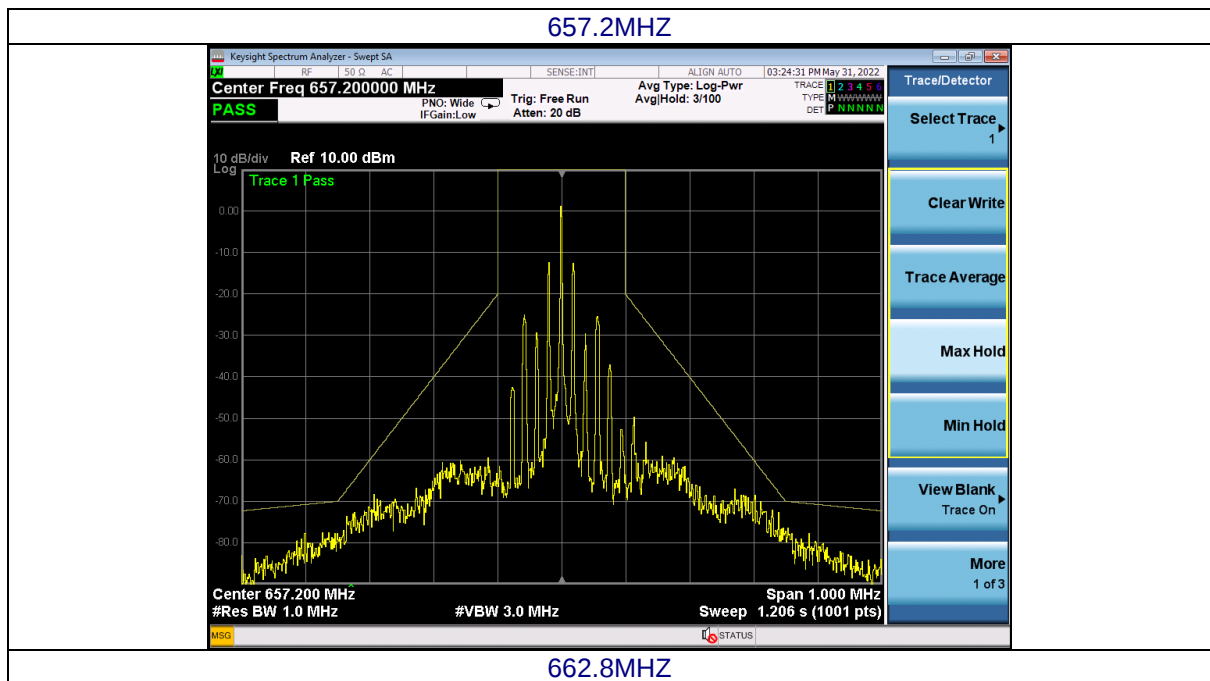
-RBW&VBW = 1 kHz

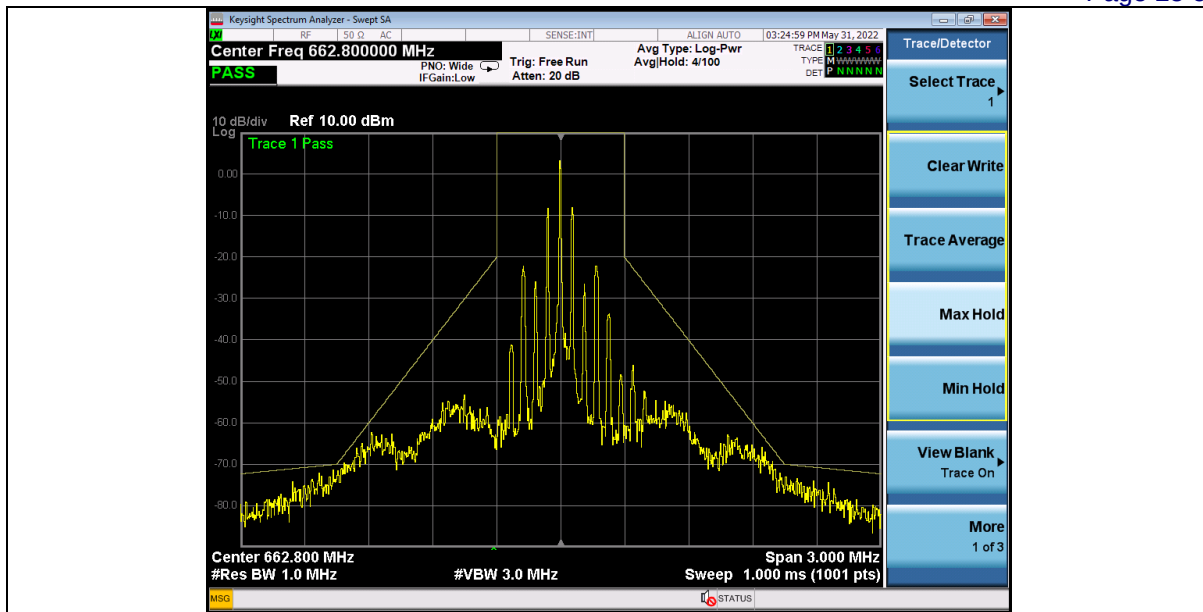
-Sweep time = 2 s per 200 kHz

Both spectrum ranges shall be measured.

Limits: The spectrum mask for digital systems shall not be exceeded. See figure 4 for systems operating below 2 GHz and figure 5 for systems operating above 2 GHz.

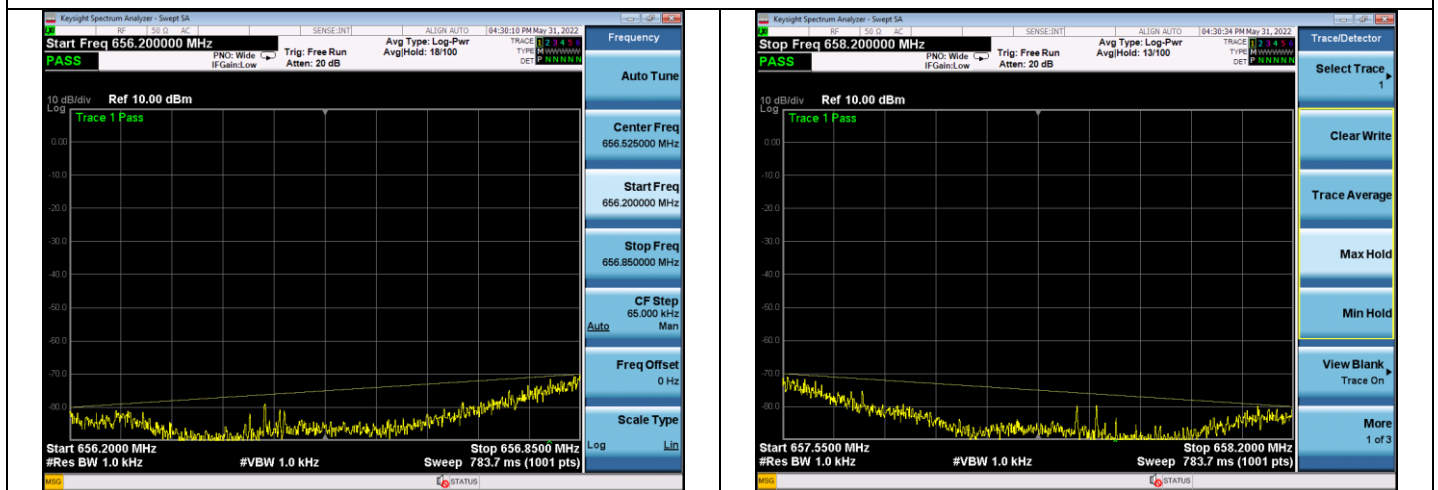
#### 7.4 TEST RESULT:



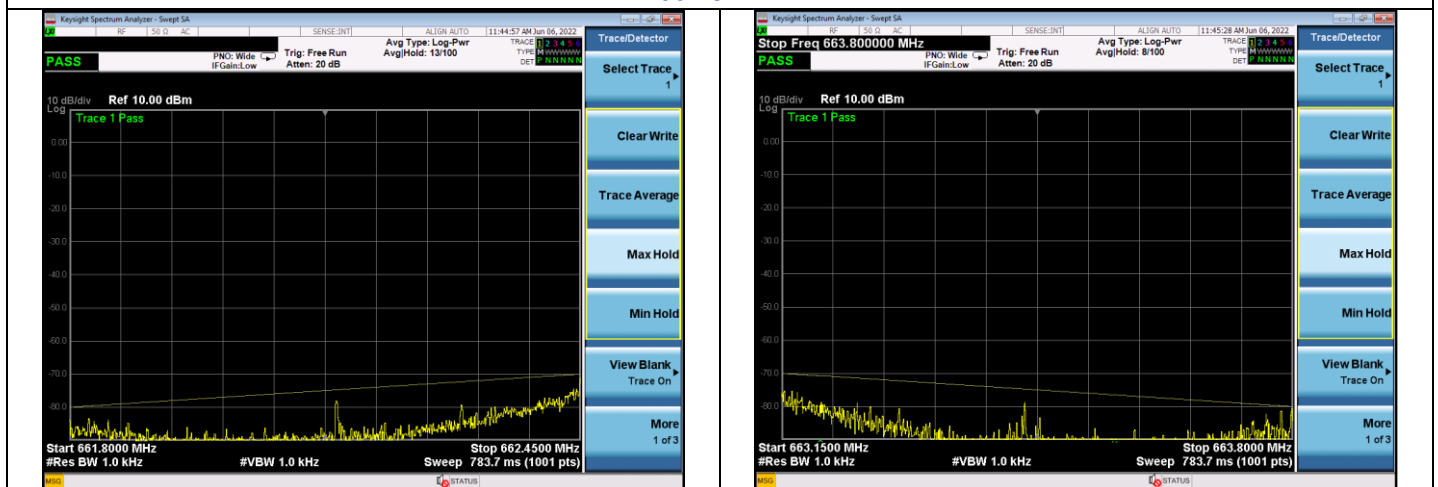


-90 dBc point test result:

657.2MHz



662.8MHz



## 8.FREQUENCY STABILITY

### 8.1 Limit

$\pm 50\text{ppm}$

### 8.2 Standard Applicable

According to FCC 15.236(f)(3), The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.005\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. Battery operated equipment shall be tested using a new battery

### 8.3 TEST SETUP



### 8.4 Test Procedure

1. Setup the configuration of the ambient temperature from  $-20^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  with sufficient time. And measure the different power of the EUT with an artificial power from highest to end point voltage.
2. Set frequency counter center frequency to the right frequency needs to be measured band.

## 8.5 Test Result

| Test frequency | Test Conditions |                  | Measure Frequency | Frequency Error |         | Limit  | Result |
|----------------|-----------------|------------------|-------------------|-----------------|---------|--------|--------|
| (MHz)          | Voltage (V)     | Temperature (°C) | (MHz)             | (MHz)           | ppm     | ppm    |        |
| 657.2MHz       | N               | N                | 657.1865          | -0.0135         | -20.568 | ±50ppm | PASS   |
|                |                 | L                | 657.1898          | -0.0102         | -15.533 |        |        |
|                |                 | H                | 657.1902          | -0.0098         | -14.861 |        |        |
|                | L               | N                | 657.1816          | -0.0184         | -27.955 |        |        |
|                |                 | L                | 657.1968          | -0.0032         | -4.901  |        |        |
|                |                 | H                | 657.1861          | -0.0139         | -21.087 |        |        |
|                | H               | N                | 657.1985          | -0.0015         | -2.212  |        |        |
|                |                 | L                | 657.1839          | -0.0161         | -24.445 |        |        |
|                |                 | H                | 657.1907          | -0.0093         | -14.170 |        |        |

| Test frequency | Test Conditions |                  | Measure Frequency | Frequency Error |          | Limit  | Result |
|----------------|-----------------|------------------|-------------------|-----------------|----------|--------|--------|
| (MHz)          | Voltage (V)     | Temperature (°C) | (MHz)             | (MHz)           | ppm      | ppm    |        |
| 662.8MHz       | N               | N                | 662.7988          | -0.0012         | -1.7738  | ±50ppm | PASS   |
|                |                 | L                | 662.7884          | -0.0116         | -17.4857 |        |        |
|                |                 | H                | 662.7863          | -0.0137         | -20.6841 |        |        |
|                | L               | N                | 662.7861          | -0.0139         | -20.9337 |        |        |
|                |                 | L                | 662.7842          | -0.0158         | -23.8295 |        |        |
|                |                 | H                | 662.7973          | -0.0027         | -4.0768  |        |        |
|                | H               | N                | 662.7802          | -0.0198         | -29.9454 |        |        |
|                |                 | L                | 662.7925          | -0.0075         | -11.2818 |        |        |
|                |                 | H                | 662.7887          | -0.0113         | -17.0497 |        |        |

## 9. ANTENNA REQUIREMENT

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Standard requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FCC Part15 C Section 15.203 |
| 15.203 requirement:<br>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, the manufacturer 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. |                             |
| EUT Antenna:                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |
| The antennas is glue stick antenna, the best case gain of the antennas are 3 dBi Max, reference to the internal photos                                                                                                                                                                                                                                                                                                                                                    |                             |
| <p>glue stick antenna</p>                                                                                                                                                                                                                                                                                                                                                              |                             |

**10. TEST SETUP PHOTO**





## 11. EUT CONSTRUCTIONAL DETAILS

Please refer to the external photos file and internal photos file

\*\*\*\*\* END OF REPORT \*\*\*\*\*