



Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.250

Report Reference No.....: **GTS20190703006-1-2**

FCC ID.....: **2AS75-EM-UWBTG100**

Compiled by

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Date of issue.....: July 11, 2019

Representative Laboratory Name.: **Shenzhen Global Test Service Co., Ltd.**

Address.....: No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Applicant's name.....: **Techbloom (Beijing) Information Technology Co., Ltd.**

Address: Room 301, Buliding 6, No. 2, Ronghua South Road, Beijing ETDZ, Beijing, China

Test specification

Standard: **FCC Part 15.250**

TRF Originator.....: Shenzhen Global Test Service Co.,Ltd.

Master TRF.....: Dated 2014-12

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Test item description: UWB Location Label Module

Trade Mark: N/A

Manufacturer: Techbloom (Beijing) Information Technology Co., Ltd.

Model/Type reference.....: EM-UWBTG100

Listed Models: N/A

Modulation Type: Pulse Modulation, Frequency Hopping

Operation Frequency.....: From 6240MHz to 6739.2MHz

Rating: DC 3.3V from host device

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

TEST REPORT

| | | |
|-------------------|--------------------|---------------|
| Test Report No. : | GTS20190703006-1-2 | July 11, 2019 |
| | | Date of issue |

Equipment under Test : UWB Location Label Module

Model /Type : EM-UWBTG100

Listed Models : N/A

Applicant : **Techbloom (Beijing) Information Technology Co., Ltd.**

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Manufacturer : **Techbloom (Beijing) Information Technology Co., Ltd.**

Address : Room 301, Buliding 6, No. 2, Ronghua South Road, Beijing ETDZ, Beijing, China

| | |
|---------------------|-------------|
| Test Result: | PASS |
|---------------------|-------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.250](#): Operation of wideband systems within the band 5925-7250 MHz.
[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

2 SUMMARY

2.1 General Remarks

| | | |
|--------------------------------|---|---------------|
| Date of receipt of test sample | : | June 24, 2019 |
| | | |
| | | |
| Testing commenced on | : | June 25, 2019 |
| | | |
| | | |
| Testing concluded on | : | July 10, 2019 |

2.2 Product Description

| | | |
|---------------------------|-------------------------------------|--|
| Product Name: | UWB Location Label Module | |
| Model/Type reference: | EM-UWBTG100 | |
| Power supply: | DC 3.3V from host device | |
| Operation frequency band: | 6240MHz to 6739.2MHz | |
| Center frequency: | 6489.6MHz | |
| Modulation: | Pulse Modulation, Frequency Hopping | |
| Channel number: | 1 | |
| Antenna type: | PCB antenna | |
| Antenna gain: | 2dBi | |

2.3 Equipment Under Test

Power supply system utilised

| | | | | | |
|----------------------|---|----------------------------------|----------------------------------|-----------------------|-------------|
| Power supply voltage | : | <input type="radio"/> | 230V / 50 Hz | <input type="radio"/> | 120V / 60Hz |
| | | <input type="radio"/> | 12 V DC | <input type="radio"/> | 24 V DC |
| | | <input checked="" type="radio"/> | Other (specified in blank below) | | |

DC 3.30V from host device

2.4 Short description of the Equipment under Test (EUT)

This is a UWB Location Label Module.

For more details, refer to the user's manual of the EUT.

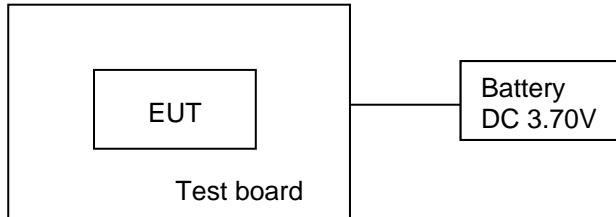
2.5 EUT operation mode

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There is on channel provided to the EUT and was selected to test.

Operation Frequency:

| Channel | Frequency (MHz) |
|---------|-----------------|
| 05 | 6489.6 |

2.6 Block Diagram of Test Setup



2.7 Special Accessories

| Manufacturer | Description | Model | Serial Number | Certificate |
|--------------|-------------|-------|---------------|-------------|
| / | / | / | / | / |

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID:2AS75-EM-UWBTG100** filing to comply with Section 15.250 of the FCC Part 15, Subpart C Rules.

2.9 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 165725

Shenzhen Global Test Service 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.

A2LA-Lab Cert. No.: 4758.01

Shenzhen Global Test Service Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2024.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|-----------------------|--------------|
| Temperature: | 15-35 ° C |
| Humidity: | 30-60 % |
| Atmospheric pressure: | 950-1050mbar |

3.4 Summary of measurement results

| FCC Requirements | | |
|--------------------------------|-----------------------------|------|
| FCC Part 15.207 | AC Power Conducted Emission | N/A |
| FCC Part 15.250(a) | Frequency Stability | PASS |
| FCC Part 15.250(b) | -10 dB Bandwidth | PASS |
| FCC Part 15.250(d)(1)(2)(4)(5) | Radiated emissions | PASS |
| FCC Part 15.250(d)(3) | Peak Power | PASS |
| FCC Part 15.203 & 15.250(C) | Antenna Requirement | PASS |

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

| Test | Range | Measurement Uncertainty | Notes |
|-----------------------|------------|-------------------------|-------|
| Radiated Emission | 30~1000MHz | 4.10 dB | (1) |
| Radiated Emission | 1~18GHz | 4.32 dB | (1) |
| Radiated Emission | 18~40GHz | 5.54 dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.12 dB | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

| Test Equipment | Manufacturer | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|----------------------------|----------------|--------------------|--------------|------------------|----------------------|
| LISN | R&S | ENV216 | 3560.6550.08 | 2018/09/20 | 2019/09/19 |
| LISN | R&S | ESH2-Z5 | 893606/008 | 2018/09/20 | 2019/09/19 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 976 | 2018/09/20 | 2019/09/19 |
| EMI Test Receiver | R&S | ESCI7 | 101102 | 2018/09/20 | 2019/09/19 |
| Spectrum Analyzer | Agilent | N9020A | MY48010425 | 2018/09/20 | 2019/09/19 |
| Spectrum Analyzer | R&S | FSP40 | 100019 | 2018/06/05 | 2019/06/04 |
| Controller | EM Electronics | Controller EM 1000 | N/A | N/A | N/A |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 01622 | 2018/09/20 | 2019/09/19 |
| Active Loop Antenna | SCHWARZBEC K | FMZB1519 | 1519-037 | 2018/09/20 | 2019/09/19 |
| Broadband Horn Antenna | SCHWARZBEC K | BBHA 9170 | 971 | 2018/09/20 | 2019/09/19 |
| Amplifier | Schwarzbeck | BBV 9743 | #202 | 2018/09/20 | 2019/09/19 |
| Amplifier | EMCI | EMC051845B | 980355 | 2018/09/20 | 2019/09/19 |
| Temperature/Humidity Meter | Gangxing | CTH-608 | 02 | 2018/09/20 | 2019/09/19 |

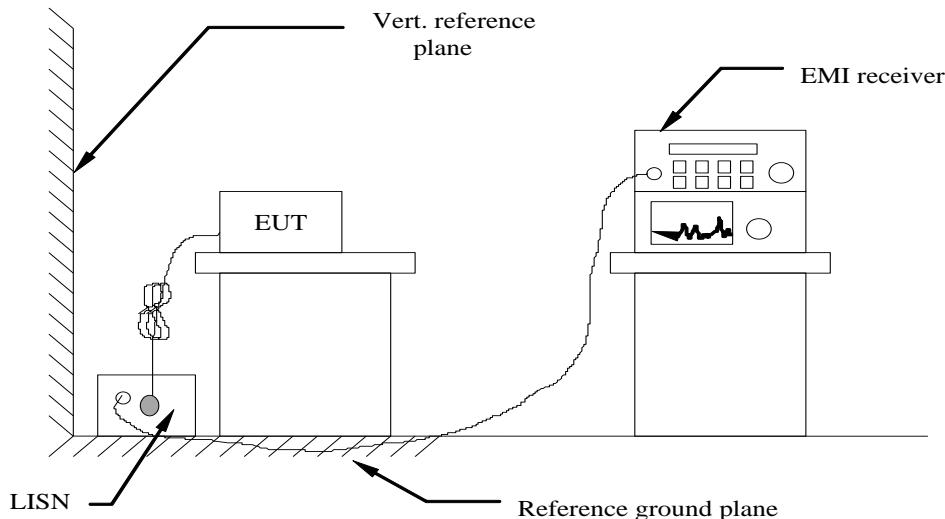
| | | | | | |
|-----------------------|---------------|-----------------------|------------|------------|------------|
| High-Pass Filter | K&L | 9SH10-2700/X12750-O/O | KL142031 | 2018/09/20 | 2019/09/19 |
| High-Pass Filter | K&L | 41H10-1375/U12750-O/O | KL142032 | 2018/09/20 | 2019/09/19 |
| RF Cable(below 1GHz) | HUBER+SUHNE R | RG214 | RE01 | 2018/09/20 | 2019/09/19 |
| RF Cable(above 1GHz) | HUBER+SUHNE R | RG214 | RE02 | 2018/09/20 | 2019/09/19 |
| Data acquisition card | Agilent | U2531A | TW53323507 | 2018/09/20 | 2019/09/19 |
| Power Sensor | Agilent | U2021XA | MY5365004 | 2018/09/20 | 2019/09/19 |
| EMI Test Software | R&S | ES-K1 | V1.7.1 | 2018/09/20 | 2019/09/19 |
| EMI Test Software | JS Tonscend | JS32-RE | 2.0.1.5 | 2018/09/20 | 2019/09/19 |
| EMI Test Software | Audix | E3 | 2..1.1 | 2018/09/20 | 2019/09/19 |

Note: The Cal.Interval was one year.

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
- 4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| Frequency range (MHz) | Limit (dBuV) | |
|-----------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

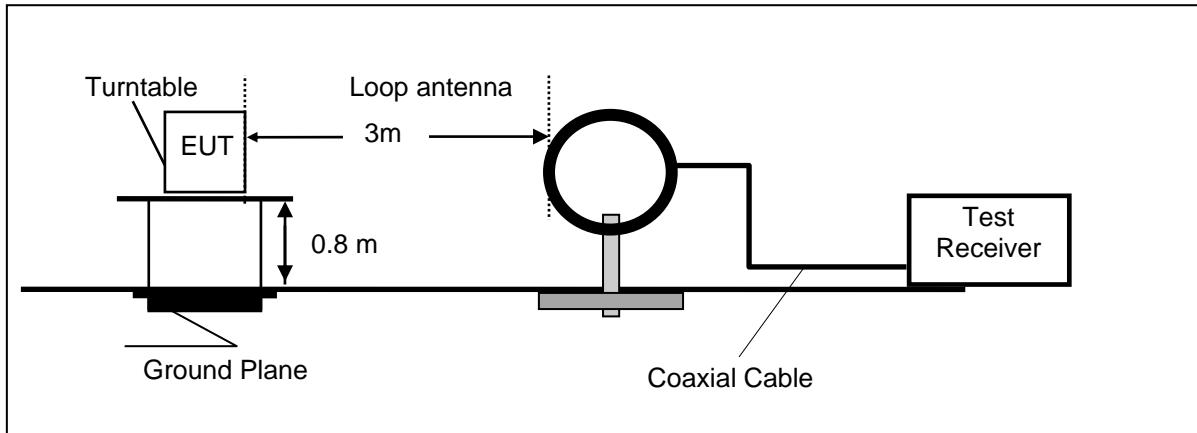
TEST RESULTS

Not applicable to this device, which is a battery powered device.

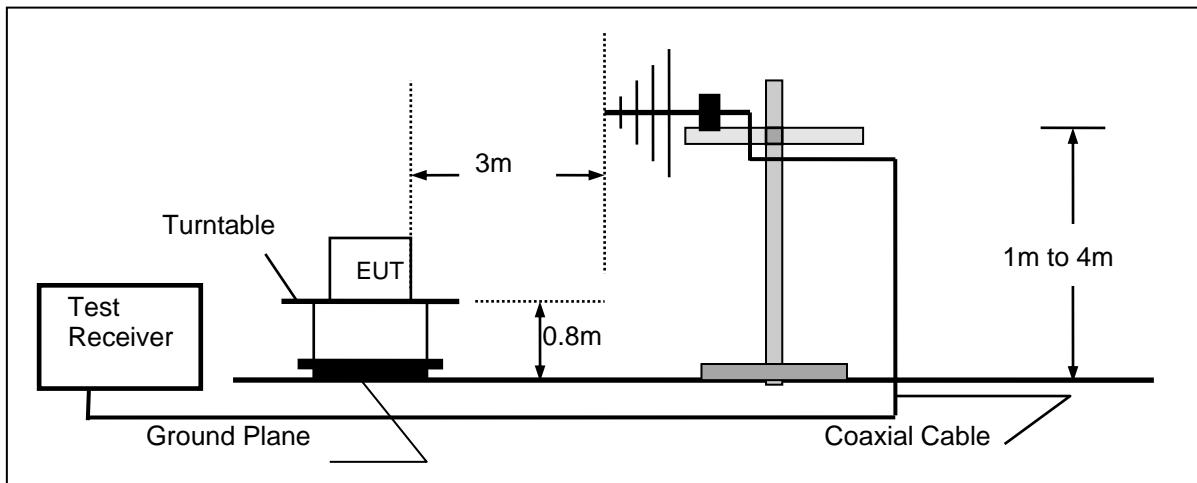
4.2 Radiated Emission

TEST CONFIGURATION

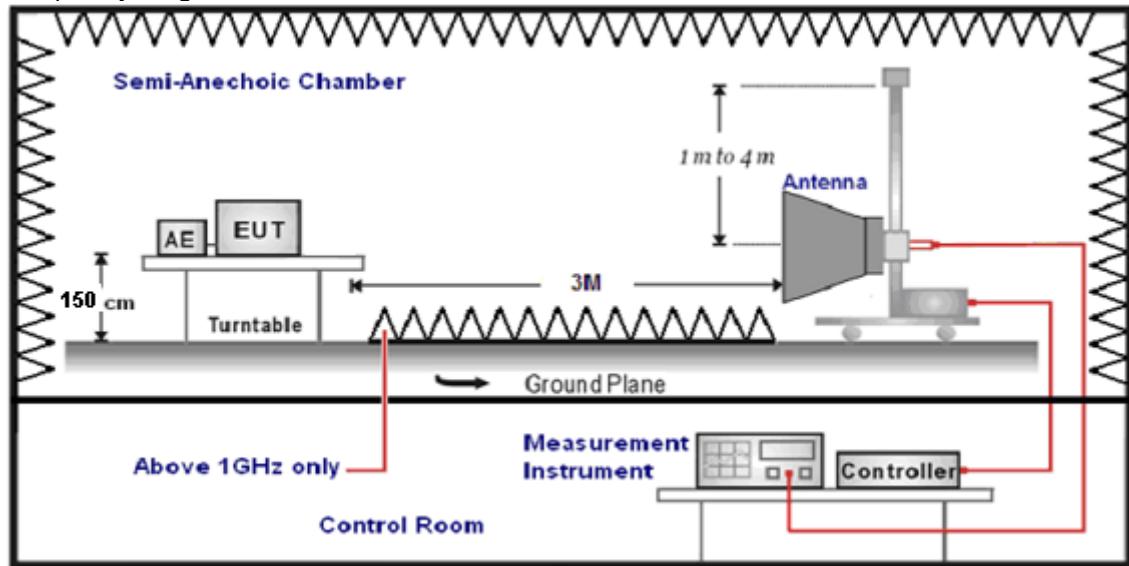
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz; the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range above 1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

| Test Frequency range | Test Antenna Type | Test Distance |
|----------------------|----------------------------|---------------|
| 9KHz-30MHz | Active Loop Antenna | 3 |
| 30MHz-1GHz | Ultra-Broadband Antenna | 3 |
| 1GHz-18GHz | Double Ridged Horn Antenna | 3 |
| Above 18GHz | Horn Anternna | 1 |

7. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|----------------------|--|----------|
| 9KHz-150KHz | RBW=200Hz/VBW=3KHz,Sweep time=Auto | QP |
| 150KHz-30MHz | RBW=9KHz/VBW=100KHz,Sweep time=Auto | QP |
| 30MHz-960MHz | RBW=120KHz/VBW=1000KHz,Sweep time=Auto | QP |
| 960MHz-1610MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| 1610 MHz -1990 MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| 1990 MHz -3100 MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| 3100 MHz -5925 MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| 5925 MHz -7250 MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| 7250 MHz -10600 MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| Above 10600 MHz | RBW=1MHz/VBW=3MHz,Sweep time=Auto | RMS |
| 1164-1240 | RBW=1KHz/VBW=3KHz,Sweep time=Auto | RMS |
| 1559-1610 | RBW=1KHz/VBW=3KHz,Sweep time=Auto | RMS |

RADIATION LIMIT

- (1) The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following RMS average limits based on measurements using a 1 MHz resolution bandwidth.

| Frequency in MHz | EIRP in dBm | Radiated (dB μ V/m) | Measurement distance(m) |
|------------------|-------------|-------------------------|-------------------------|
| 960-1610 | -75.3 | 20 | 3 |
| 1610-1990 | -63.3 | 32 | 3 |
| 1990-3100 | -61.3 | 34 | 3 |
| 3100-5925 | -51.3 | 44 | 3 |
| 5925-7250 | -41.3 | 54 | 3 |
| 7250-10600 | -51.3 | 44 | 3 |
| Above 10600 | -61.3 | 34 | 3 |

Note: EIRP convert to dB μ V/m follow the formula $EIRP = E_{meas} + 20\log(d_{meas}) - 104.7$ according to ANSI C63.10-2013.

- (2) In addition to the radiated emission limits specified in the table in paragraph (d)(1) of this section, transmitters operating under the provisions of this section shall not exceed the following RMS average limits when measured using a resolution bandwidth of no less than 1 kHz.

| Frequency in MHz | EIRP in dBm | Radiated (dB μ V/m) | Measurement distance(m) |
|------------------|-------------|-------------------------|-------------------------|
| 1164-1240 | -85.3 | 10 | 3 |
| 1559-1610 | -85.3 | 10 | 3 |

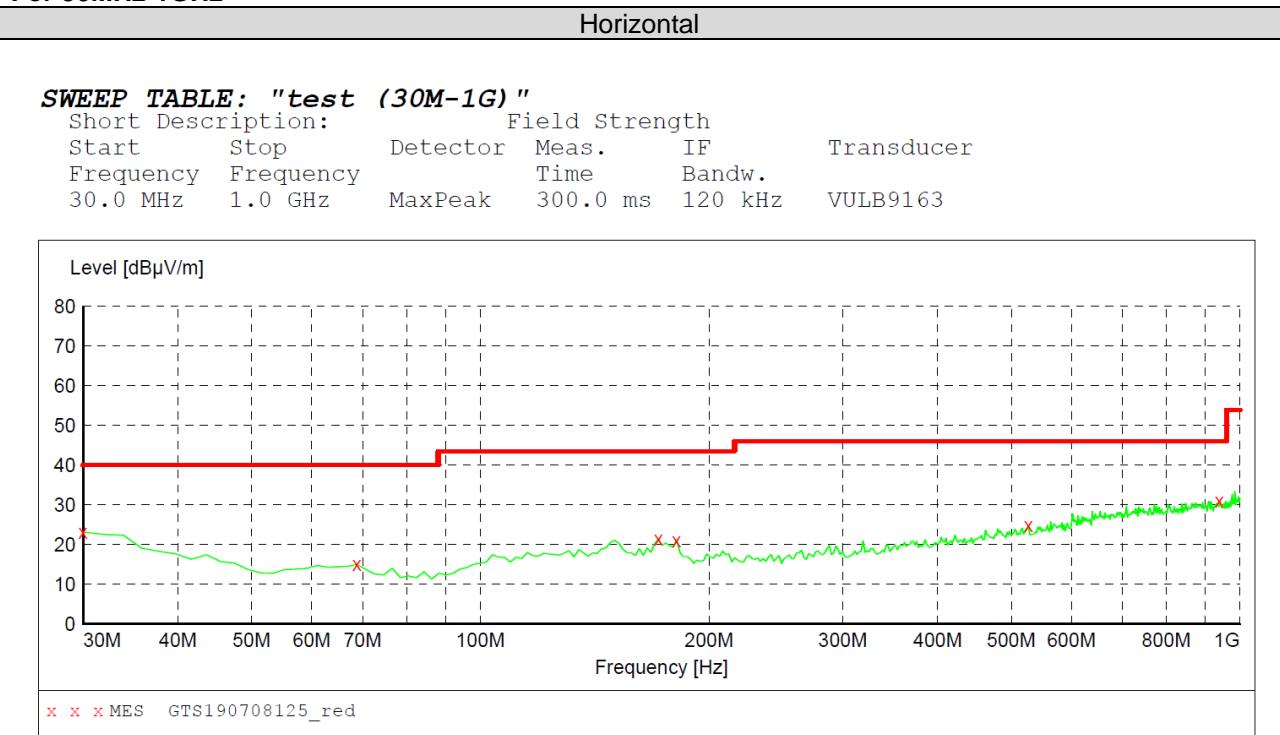
Note: EIRP convert to dB μ V/m follow the formula $EIRP = E_{meas} + 20\log(d_{meas}) - 104.7$ according to ANSI C63.10-2013.

- (3) Radiated emissions at or below 960 MHz shall not exceed the emission levels in §15.209.

| Frequency (MHz) | Distance (Meters) | Radiated (dB μ V/m) | Radiated (μ V/m) |
|-----------------|-------------------|---------------------------------------|-----------------------|
| 0.009-0.49 | 3 | $20\log(2400/F(KHz)) + 40\log(300/3)$ | $2400/F(KHz)$ |
| 0.49-1.705 | 3 | $20\log(24000/F(KHz)) + 40\log(30/3)$ | $24000/F(KHz)$ |
| 1.705-30 | 3 | $20\log(30) + 40\log(30/3)$ | 30 |
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |

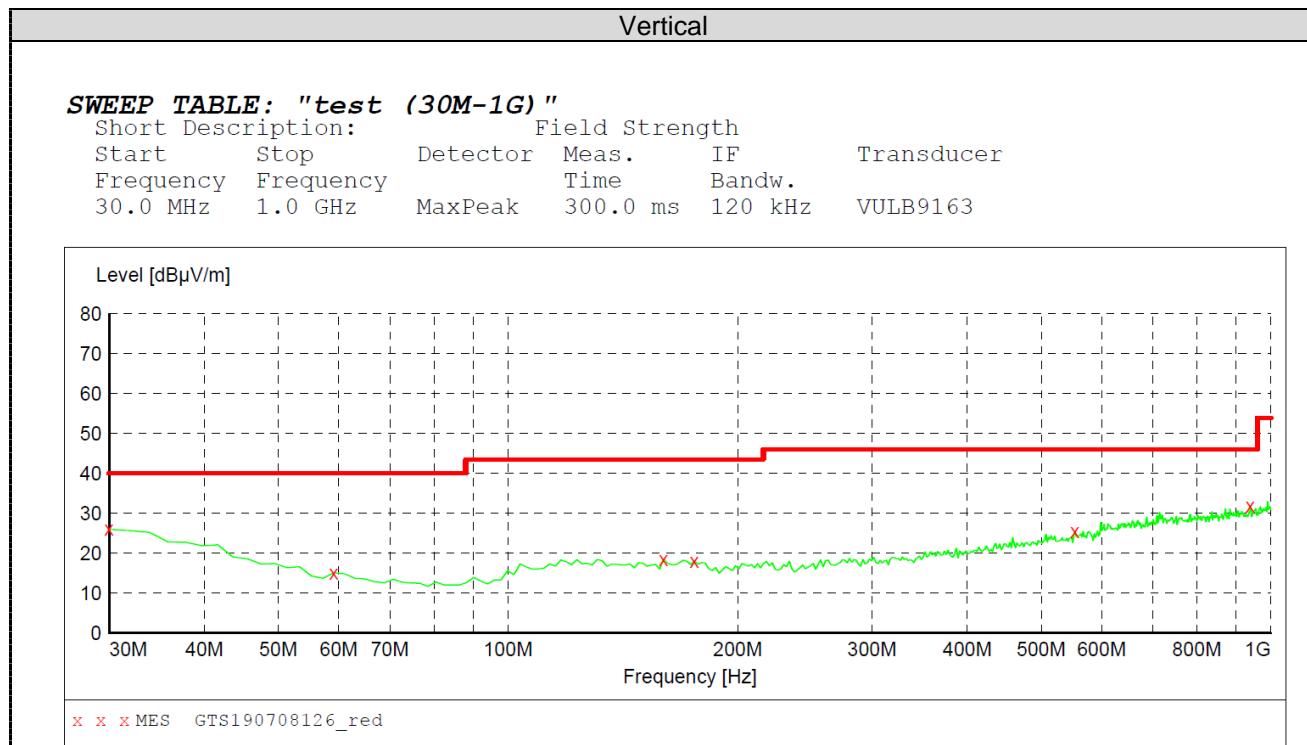
TEST RESULTS

For 30MHz-1GHz

**MEASUREMENT RESULT: "GTS190708125_red"**

7/8/2019 9:14AM

| Frequency MHz | Level dB μ V/m | Transd dB | Limit dB μ V/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|------|--------------|----------------|--------------|
| 30.000000 | 23.10 | 20.8 | 40.0 | 16.9 | --- | 0.0 | 0.00 | HORIZONTAL |
| 68.800000 | 15.00 | 8.2 | 40.0 | 25.0 | --- | 0.0 | 0.00 | HORIZONTAL |
| 171.620000 | 21.30 | 13.1 | 43.5 | 22.2 | --- | 0.0 | 0.00 | HORIZONTAL |
| 181.320000 | 21.10 | 13.0 | 43.5 | 22.4 | --- | 0.0 | 0.00 | HORIZONTAL |
| 526.640000 | 24.80 | 20.4 | 46.0 | 21.2 | --- | 0.0 | 0.00 | HORIZONTAL |
| 939.860000 | 30.90 | 26.4 | 46.0 | 15.1 | --- | 0.0 | 0.00 | HORIZONTAL |



MEASUREMENT RESULT: "GTS190708126_red"

7/8/2019 9:15AM

| Frequency MHz | Level dB μ V/m | Transd dB | Limit dB μ V/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|------------------|-----------------------|--------------|-----------------------|--------------|------|--------------|----------------|--------------|
| 30.000000 | 26.00 | 20.8 | 40.0 | 14.0 | --- | 0.0 | 0.00 | VERTICAL |
| 59.100000 | 15.10 | 8.0 | 40.0 | 24.9 | --- | 0.0 | 0.00 | VERTICAL |
| 159.980000 | 18.50 | 13.6 | 43.5 | 25.0 | --- | 0.0 | 0.00 | VERTICAL |
| 175.500000 | 18.00 | 12.9 | 43.5 | 25.5 | --- | 0.0 | 0.00 | VERTICAL |
| 553.800000 | 25.40 | 21.0 | 46.0 | 20.6 | --- | 0.0 | 0.00 | VERTICAL |
| 939.860000 | 31.80 | 26.4 | 46.0 | 14.2 | --- | 0.0 | 0.00 | VERTICAL |

Above 960MHz

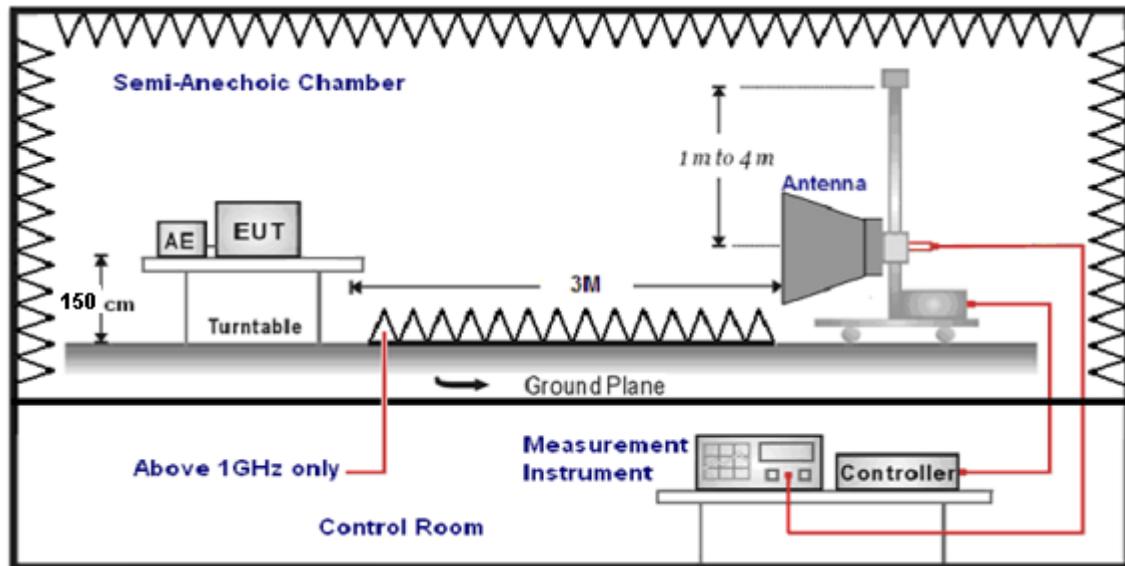
| Frequency(MHz): | | 6489.6 | | Polarity: | | | HORIZONTAL | |
|--|-------------------------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 1164MHz≤f≤1240MHz & 1559MHz≤f≤1610MHz | | | | | | | | |
| 1178.75 | 1.45 | 10 | 8.55 | 8.76 | 25.33 | 3.39 | 36.03 | -7.31 |
| 1185.57 | 2.69 | 10 | 7.31 | 9.99 | 25.33 | 3.39 | 36.03 | -7.30 |
| 1225.65 | 3.25 | 10 | 6.75 | 10.25 | 25.49 | 3.49 | 35.99 | -7.00 |
| 1568.85 | 2.58 | 10 | 7.42 | 9.26 | 25.49 | 3.49 | 35.67 | -6.68 |
| 1586.65 | 3.15 | 10 | 6.85 | 9.29 | 25.71 | 3.81 | 35.65 | -6.14 |
| 1605.52 | 1.26 | 10 | 8.74 | 7.38 | 25.71 | 3.81 | 35.64 | -6.12 |
| F>960MHz(except for above frequency range) | | | | | | | | |
| 1278.56 | 11.25 | 20 | 8.75 | 18.02 | 25.63 | 3.54 | 35.94 | -6.77 |
| 1744.25 | 13.25 | 32 | 18.75 | 19.59 | 25.63 | 3.54 | 35.51 | -6.34 |
| 2450.75 | 10.36 | 34 | 23.64 | 12.19 | 28.87 | 4.67 | 35.37 | -1.83 |
| 4825.55 | 9.56 | 44 | 34.44 | 11.91 | 28.87 | 4.67 | 35.89 | -2.35 |
| 9875.67 | 14.36 | 44 | 29.64 | -4.11 | 38.83 | 11.09 | 31.45 | 18.47 |
| 11575.68 | 10.47 | 34 | 23.53 | -8.97 | 38.83 | 11.09 | 30.48 | 19.44 |
| Frequency(MHz): | | 6489.6 | | Polarity: | | | Vertical | |
| Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 1164MHz≤f≤1240MHz & 1559MHz≤f≤1610MHz | | | | | | | | |
| 1178.75 | 2.36 | 10 | 7.64 | 9.67 | 25.33 | 3.39 | 36.03 | -7.31 |
| 1185.57 | 2.98 | 10 | 7.02 | 10.28 | 25.33 | 3.39 | 36.03 | -7.30 |
| 1225.65 | 4.10 | 10 | 5.90 | 11.10 | 25.49 | 3.49 | 35.99 | -7.00 |
| 1568.85 | 3.22 | 10 | 6.78 | 9.90 | 25.49 | 3.49 | 35.67 | -6.68 |
| 1586.65 | 4.12 | 10 | 5.88 | 10.26 | 25.71 | 3.81 | 35.65 | -6.14 |
| 1605.52 | 2.30 | 10 | 7.70 | 8.42 | 25.71 | 3.81 | 35.64 | -6.12 |
| F>960MHz(except for above frequency range) | | | | | | | | |
| 1278.56 | 12.54 | 20 | 7.46 | 19.31 | 25.63 | 3.54 | 35.94 | -6.77 |
| 1744.25 | 13.26 | 32 | 18.74 | 19.60 | 25.63 | 3.54 | 35.51 | -6.34 |
| 2450.75 | 11.55 | 34 | 22.45 | 13.38 | 28.87 | 4.67 | 35.37 | -1.83 |
| 4825.55 | 10.69 | 44 | 33.31 | 13.04 | 28.87 | 4.67 | 35.89 | -2.35 |
| 9875.67 | 13.54 | 44 | 30.46 | -4.93 | 38.83 | 11.09 | 31.45 | 18.47 |
| 11575.68 | 11.48 | 34 | 22.52 | -7.96 | 38.83 | 11.09 | 30.48 | 19.44 |

4.3 Peak Power

LIMITS

The peak EIRP limit is $20 \log (\text{RBW}/50)$ dBm.

TEST CONFIGURATION



TEST PROCEDURE

1. Set the EUT in Continuous transmitting mode
2. The EUT was placed on a turn table which is 1.5m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|----------------------|--------------------------------------|----------|
| 5889.6-7089.6 | RBW=1MHz/VBW=3MHz Sweep time=Auto | Peak |

TEST RESULTS

| Frequency(MHz): | | 6489.6 | | Polarity: | | | HORIZONTAL | |
|-----------------|-------------------------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 6488.75 | 43.25 | 61.23 | 17.98 | 45.97 | 28.87 | 4.67 | 36.26 | -2.72 |

| Frequency(MHz): | | 6489.6 | | Polarity: | | | Vertical | |
|-----------------|-------------------------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| Frequency (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier (dB) | Correction Factor (dB/m) |
| 6489.25 | 44.86 | 61.23 | 16.37 | 47.58 | 28.87 | 4.67 | 36.26 | -2.72 |

Note:

1. EIRP limit = $20\log(1\text{MHz}/50\text{MHz})=-33.97\text{dBm}$.
2. EIRP limit is convert to dB μ V/m follow the formula $\text{EIRP}=\text{E}_{\text{meas}}+20\log(\text{d}_{\text{meas}})-104.7$ according to ANSI C63.10-2013.

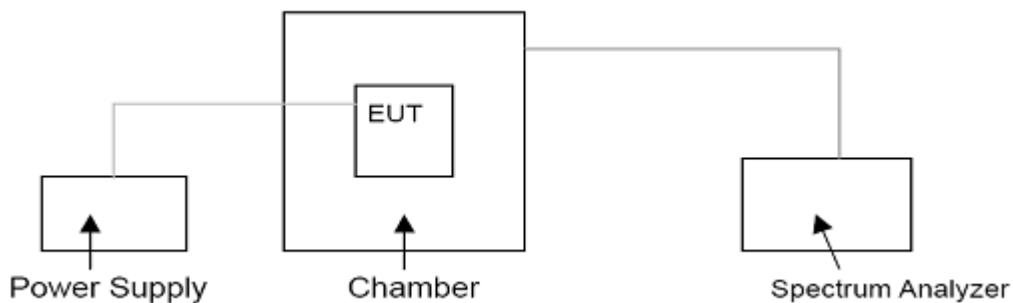
4.4 Frequency Stability

LIMITS

According to FCC 15.250(a)

The -10 dB bandwidth of a device operating under the provisions of this section must be contained within the 5925-7250 MHz band under all conditions of operation including the effects from stepped frequency, frequency hopping or other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

TEST RESULTS

| Voltage (V) | Temperature (°C) | -10dB Band Edges | | Limit | Result |
|---------------|--------------------|------------------|--------|----------------------------|--------|
| | | Lower | Upper | | |
| 3.70 | -30 | 6139.2 | 6837.6 | Within 5925-7250 MHz | Pass |
| | -20 | 6139.3 | 6837.5 | | |
| | -10 | 6139.5 | 6837.3 | | |
| | 0 | 6139.4 | 6837.2 | | |
| | 10 | 6139.1 | 6837.4 | | |
| | 20 | 6139.2 | 6837.3 | | |
| | 30 | 6139.3 | 6837.6 | | |
| | 40 | 6139.5 | 6837.7 | | |
| | 50 | 6139.6 | 6837.5 | | |
| 3.15 | 25 | 6139.4 | 6837.4 | | |
| 4.26 | 25 | 6139.5 | 6837.3 | | |

4.5 -10dB Bandwidth

Limit

According to FCC 15.250(b)

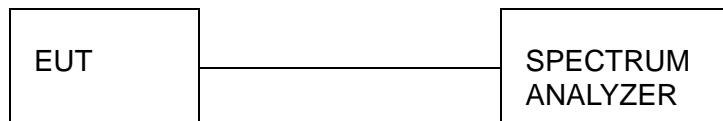
The -10 dB bandwidth of the fundamental emission shall be at least 50 MHz.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

The -10dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 10dB.

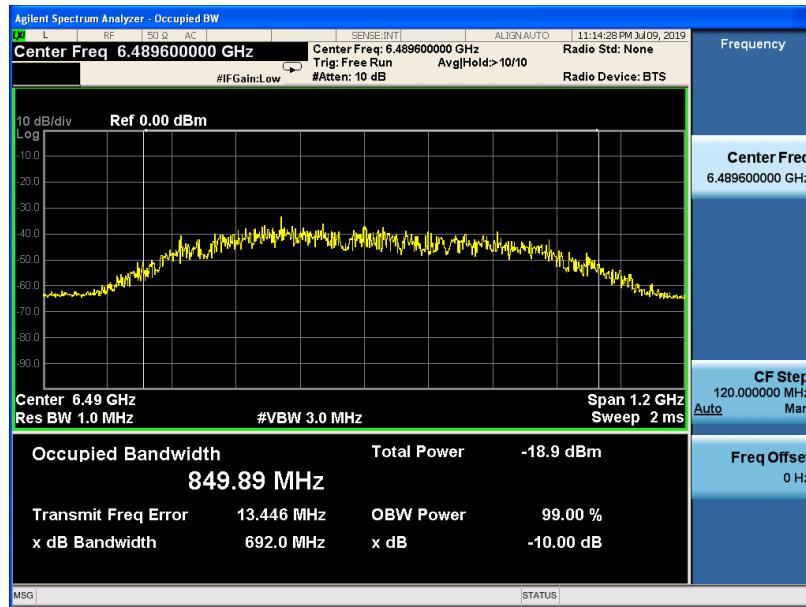
Test Configuration



Test Results

| Test frequency (MHz) | 10dB bandwidth (MHz) | Limit | Result |
|----------------------|----------------------|--------|--------|
| 6489.6 | 692.0 | ≥50MHz | Pass |

Test plot as follows:



4.6 Antenna Requirement

Standard Applicable

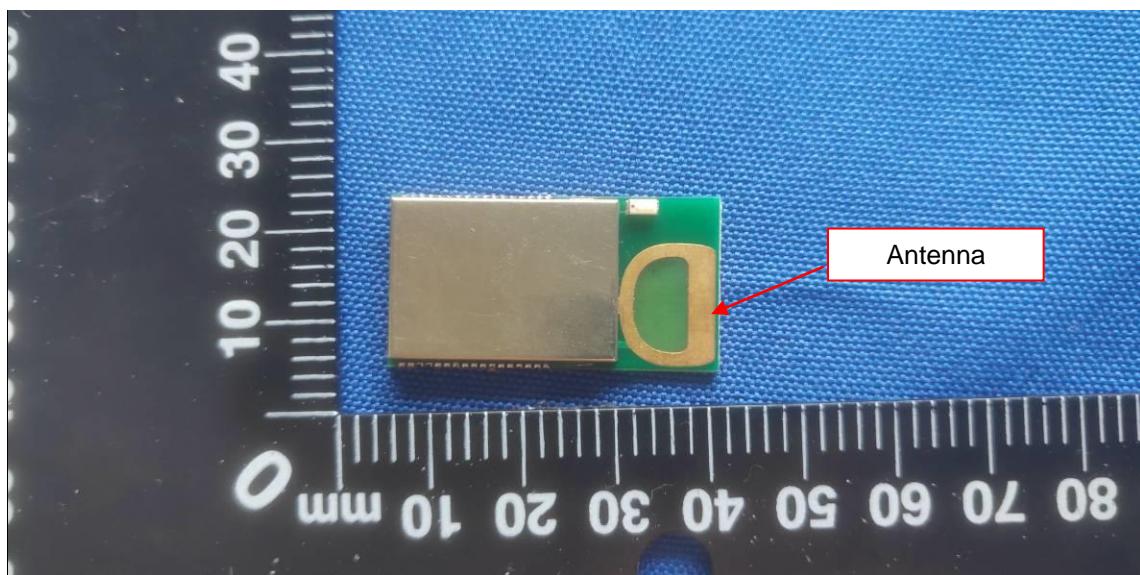
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance

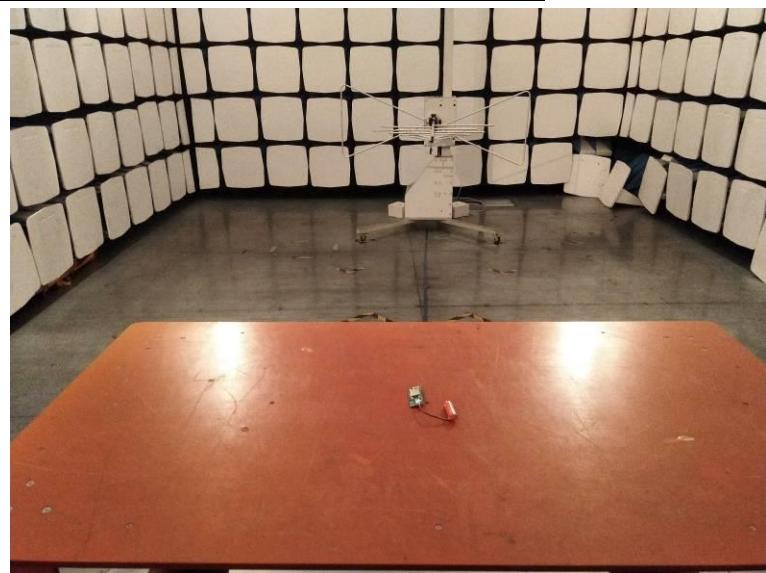
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2dBi.



5 Test Setup Photos of the EUT



6 Photos of the EUT

