

FCC TEST REPORT

FCC ID: 2AKRG-BB

Product : Bluetooth Bone Conduction Headphones

Model Name : B&B

Brand : Zhi Hang

Report No. : PTCDQ04161110801E-FC01

Prepared for

Shenzhen City Zhi Hang Technology Co., Ltd.
4G, Building 2, Longduming Park, Xili street, Nanshan District,
Shenzhen, China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen City Zhi Hang Technology Co., Ltd.

Address : 4G, Building 2, Longduming Park, Xili street, Nanshan District,,
Shenzhen, China

Manufacture's name : Shenzhen City Zhi Hang Technology Co., Ltd.

Address : 4G, Building 2, Longduming Park, Xili street, Nanshan District,,
Shenzhen, China

Product name : Bluetooth Bone Conduction Headphones

Model name : B&B

Standards : FCC CFR47 Part 15 Section 15.247

Test procedure : ANSI C63.10:2013, KDB 558074 D01 DTS MEAS GUIDANCE V03R05

Test Date : Dec.15. 2016 ~ Dec.16. 2016

Date of Issue : Dec.19. 2016

Test Result : Pass

This device described above has been tested by PTC, 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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Testing Engineer

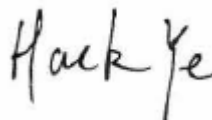

August Qiu

Technical Manager

Hack Ye

Authorized Signatory

Chris Du



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2 Test Summary

| Test Items | Test Requirement | Result |
|--------------------------------|----------------------------------|--------|
| Conduct Emission | 15.207 | PASS |
| Radiated Spurious Emissions | 15.205(a) 15.209 15.247(d) | PASS |
| Conducted Spurious Emission | 15.247(d) | PASS |
| Band edge | 15.247(d) 15.205(a) | PASS |
| 6dB Bandwidth | 15.247(a)(2) | PASS |
| Maximum Peak Output Power | 15.247(b)(1) | PASS |
| Power Spectral Density | 15.247(e) | PASS |
| Antenna Requirement | 15.203 | PASS |
| Remark: N/A: Not Applicable | | |

3 General Information

3.1 General Description of E.U.T.

| | | |
|------------------------|---|---------------------------------------|
| Product Name | : | Bluetooth Bone Conduction Headphones |
| Model Name | : | B&B |
| Model Description | : | N/A |
| Bluetooth Version | : | V4.1(BLE Only) |
| Operating frequency | : | For BLE: 2402-2480MHz, 40 channels |
| Antenna installation: | : | PCB printed antenna |
| Antenna Gain: | : | BLE: 0dBi |
| The lowest oscillator: | : | 32.768KHz |
| Type of Modulation | : | For BLE: GFSK |
| Power supply | : | DC 4.2V 210mAh by battery |
| Hardware Version | : | V0.3 |
| Software Version | : | V0.5 |

3.2 Channel List

| BLE | | | | | | | |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
| 0 | 2402 | 10 | 2422 | 20 | 2442 | 30 | 2462 |
| 1 | 2404 | 11 | 2424 | 21 | 2444 | 31 | 2464 |
| 2 | 2406 | 12 | 2426 | 22 | 2446 | 32 | 2466 |
| 3 | 2408 | 13 | 2428 | 23 | 2448 | 33 | 2468 |
| 4 | 2410 | 14 | 2430 | 24 | 2450 | 34 | 2470 |
| 5 | 2412 | 15 | 2432 | 25 | 2452 | 35 | 2472 |
| 6 | 2414 | 16 | 2434 | 26 | 2454 | 36 | 2474 |
| 7 | 2416 | 17 | 2436 | 27 | 2456 | 37 | 2476 |
| 8 | 2418 | 18 | 2438 | 28 | 2458 | 38 | 2478 |
| 9 | 2420 | 19 | 2440 | 29 | 2460 | 39 | 2480 |

3.3 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported. New battery is used during all test

| Modulation | Test mode | Low channel | Middle channel | High channel |
|---|--------------|------------------|----------------|--------------|
| GFSK(BLE) | Transmitting | 2402MHz | 2440MHz | 2480MHz |
| Tests Carried Out Under FCC part 15.207 | | | | |
| Test Item | | Test Mode | | |
| Conduction Emission 0.15MHz to 30MHz | | BT Communication | | |

3.4 Test Site

Dongguan Precise Testing Service Co., Ltd.

Building D,Baoding Technology Park,Guangming Road2, Dongcheng District, Dongguan,

Guangdong, China, Dongguan, 523129

China

FCC Registration Number: 371540

IC Registration Number: 12191A-1

4 Equipment During Test

4.1 Equipments List

| RF Conducted Test | | | | | | | |
|---------------------|---------------------------|---------------|---------------|--------------------------------|------------------|------------------|--------------------|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
| 1 | EMC Analyzer (9k~26.5GHz) | Agilent | E4407B | MY45109572 | Aug.04, 2016 | Aug.03, 2017 | 1 year |
| 2 | EXA Signal Analyzer | Keysight | N9010A | MY50520207 526B25MPB W7X | Aug.04, 2016 | Aug.03, 2017 | 1 year |
| 3 | EMI Test Receiver | R&S | ESCI | 101155 | July 15, 2016 | July 14, 2017 | 1 year |
| 4 | Humidity Chamber | GF | GTH-225-40-1P | IAA061225 | July 15, 2016 | July 14, 2017 | 1 year |
| 5 | USB RF power sensor | DARE | RPR3006W | 15I00041SN O01 | July 15, 2016 | July 14, 2017 | 1 year |
| Radiated Emissions | | | | | | | |
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
| 1 | EMI Test Receiver | Rohde&Schwarz | ESCI | 101417 | July 15, 2016 | July 14, 2017 | 1 year |
| 2 | Trilog Broadband Antenna | SCHWARZB ECK | VULB9160 | 9160-3355 | July 15, 2016 | July 14, 2017 | 1 year |
| 3 | Amplifier | EM | EM-30180 | 060538 | July 15, 2016 | July 14, 2017 | 1 year |
| 4 | Horn Antenna | SCHWARZB ECK | BBHA9120D | 9120D-1246 | July 15, 2016 | July 14, 2017 | 1 year |
| 5 | Coaxial Cable(below 1GHz) | LARGE | CALB1 | - | July 15, 2016 | July 14, 2017 | 1 year |
| 6 | Coaxial Cable(above 1GHz) | LARGE | CALB2 | - | July 15, 2016 | July 14, 2017 | 1 year |
| Conducted Emissions | | | | | | | |
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
| 1 | EMI Test Receiver | R&S | ESCI | 101155 | July 15, 2016 | July 14, 2017 | 1 year |
| 2 | LISN | SCHWARZB ECK | NSLK 8128 | 8128-289 | July 15, 2016 | July 14, 2017 | 1 year |
| 3 | Cable | LARGE | RF300 | - | July 15, 2016 | July 14, 2017 | 1 year |



4.2 Measurement Uncertainty

| Parameter | Uncertainty |
|-----------------------------------|--------------------------|
| RF output power, conducted | $\pm 1.0\text{dB}$ |
| Power Spectral Density, conducted | $\pm 2.2\text{dB}$ |
| Radio Frequency | $\pm 1 \times 10^{-6}$ |
| Bandwidth | $\pm 1.5 \times 10^{-6}$ |
| Time | $\pm 2\%$ |
| Duty Cycle | $\pm 2\%$ |
| Temperature | $\pm 1^{\circ}\text{C}$ |
| Humidity | $\pm 5\%$ |
| DC and low frequency voltages | $\pm 3\%$ |
| Conducted Emissions(150kHz~30MHz) | $\pm 3.64\text{dB}$ |
| Radiated Emission(30MHz~1GHz) | $\pm 5.03\text{dB}$ |
| Radiated Emission(1GHz~25GHz) | $\pm 4.74\text{dB}$ |

5 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207
 Test Method: : ANSI C63.4:2014
 Test Result: : PASS
 Frequency Range: : 150kHz to 30MHz
 Class/Severity: : Class B
 Limit:
 : 66-56 dB μ V between 0.15MHz & 0.5MHz
 : 56 dB μ V between 0.5MHz & 5MHz
 : 60 dB μ V between 5MHz & 30MHz
 Detector: : Peak for pre-scan(9kHz Resolution Bandwidth)

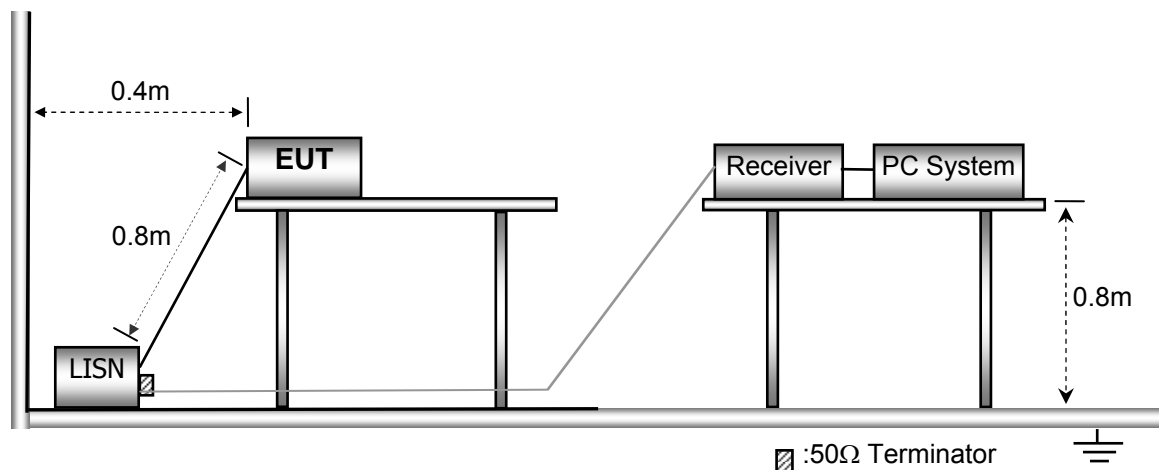
5.1 E.U.T. Operation

Operating Environment:

Temperature: : 25.5 °C
 Humidity: : 51 % RH
 Atmospheric Pressure: : 101.2kPa
 EUT Operation: : Refer to section 3.3

5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.

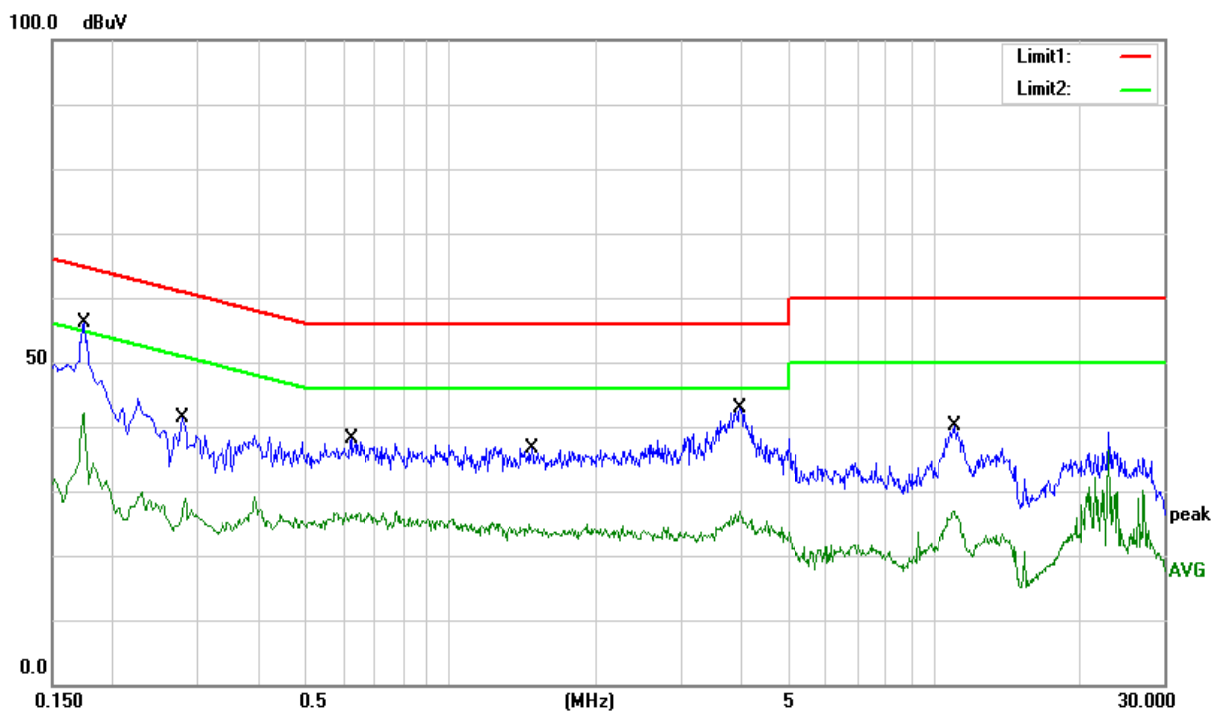


5.3 Measurement Description

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.

5.4 Conducted Emission Test Result

Live line:

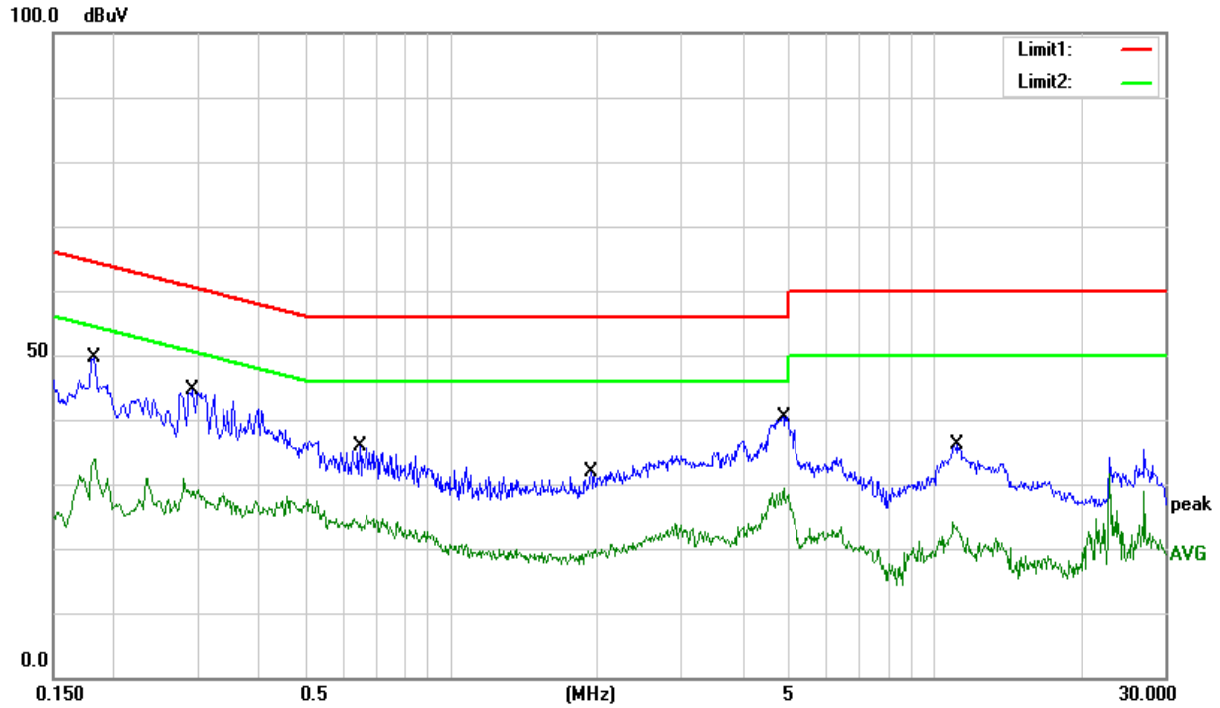


| Frequency (MHz) | Reading (dBuV) | Correct Factor(dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|--------------------|-------------------|-----------------------|------------------|-----------------|----------------|--------|
| 0.1748 | 46.04 | 10.00 | 56.04 | 64.73 | -8.69 | QP |
| 0.1748 | 32.24 | 10.00 | 42.24 | 54.73 | -12.49 | AVG |
| 0.2780 | 31.56 | 9.92 | 41.48 | 60.88 | -19.40 | QP |
| 0.2780 | 17.01 | 9.92 | 26.93 | 50.88 | -23.95 | AVG |
| 0.6220 | 28.10 | 9.96 | 38.06 | 56.00 | -17.94 | QP |
| 0.6220 | 16.29 | 9.96 | 26.25 | 46.00 | -19.75 | AVG |
| 1.4740 | 26.58 | 9.95 | 36.53 | 56.00 | -19.47 | QP |
| 1.4740 | 13.74 | 9.95 | 23.69 | 46.00 | -22.31 | AVG |
| 3.9660 | 32.67 | 10.19 | 42.86 | 56.00 | -13.14 | QP |
| 3.9660 | 16.67 | 10.19 | 26.86 | 46.00 | -19.14 | AVG |
| 11.0540 | 29.72 | 10.38 | 40.10 | 60.00 | -19.90 | QP |
| 11.0540 | 16.37 | 10.38 | 26.75 | 50.00 | -23.25 | AVG |

Remark:Emission Level=Receiver Reading+Cable Loss+AMN Factor



Neutral line:



| Frequency (MHz) | Reading (dBuV) | Correct Factor(dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Remark |
|--------------------|-------------------|-----------------------|------------------|-----------------|----------------|--------|
| 0.1820 | 39.55 | 10.00 | 49.55 | 64.39 | -14.84 | QP |
| 0.1820 | 24.00 | 10.00 | 34.00 | 54.39 | -20.39 | AVG |
| 0.2900 | 34.71 | 9.91 | 44.62 | 60.52 | -15.90 | QP |
| 0.2900 | 18.95 | 9.91 | 28.86 | 50.52 | -21.66 | AVG |
| 0.6460 | 25.84 | 9.97 | 35.81 | 56.00 | -20.19 | QP |
| 0.6460 | 13.39 | 9.97 | 23.36 | 46.00 | -22.64 | AVG |
| 1.9460 | 21.81 | 10.00 | 31.81 | 56.00 | -24.19 | QP |
| 1.9460 | 8.53 | 10.00 | 18.53 | 46.00 | -27.47 | AVG |
| 4.8580 | 30.24 | 10.20 | 40.44 | 56.00 | -15.56 | QP |
| 4.8580 | 17.69 | 10.20 | 27.89 | 46.00 | -18.11 | AVG |
| 11.1940 | 25.77 | 10.30 | 36.07 | 60.00 | -23.93 | QP |
| 11.1940 | 13.81 | 10.30 | 24.11 | 50.00 | -25.89 | AVG |

Remark:Emission Level=Receiver Reading+Cable Loss+AMN Factor

6 Radiated Spurious Emissions

Test Requirement: : FCC CFR47 Part 15 Section 15.209 & 15.247
 Test Method: : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03
 Test Result: : PASS
 Measurement Distance: : 3m
 Limit: : See the follow table

| 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 | $20\log^{(500)}$ |

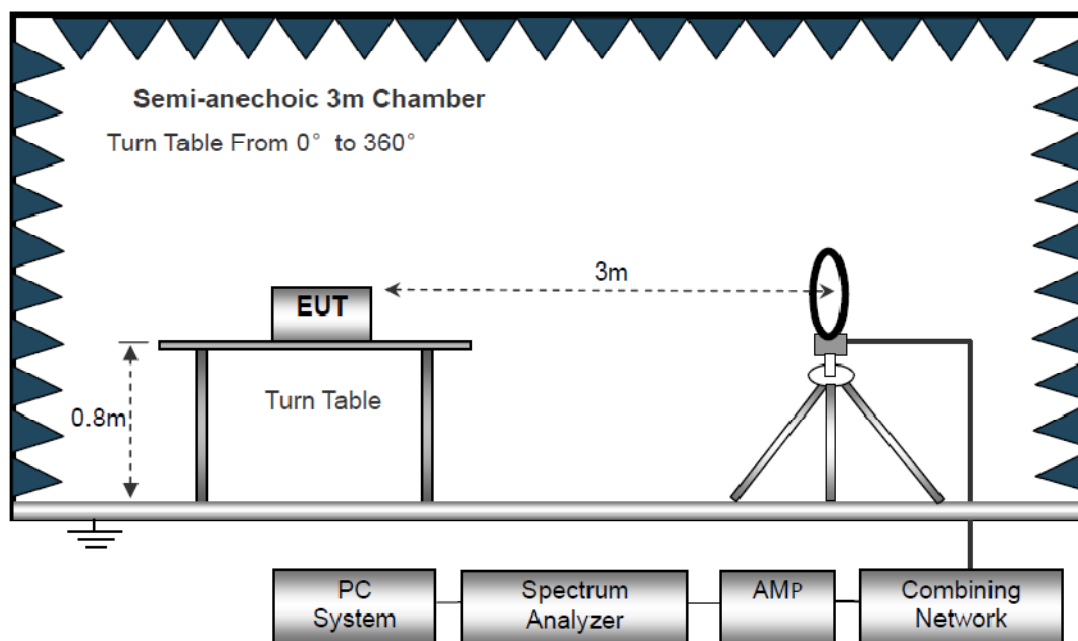
6.1 EUT Operation

Operating Environment :
 Temperature: : 23.5 °C
 Humidity: : 51.1 % RH
 Atmospheric Pressure: : 101.2kPa
 EUT Operation : : Refer to section 3.3

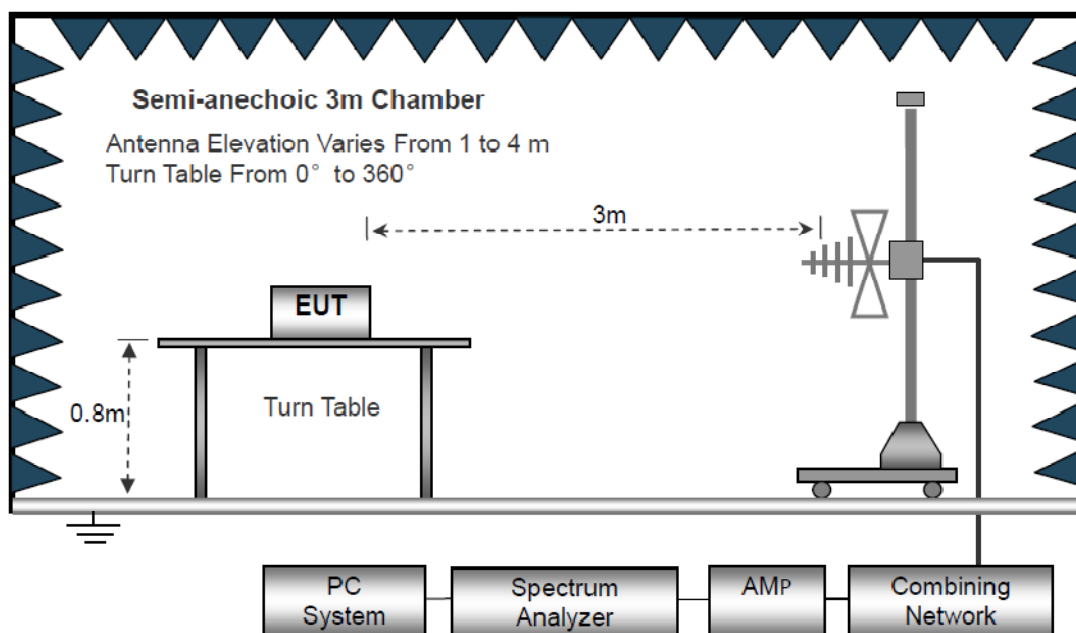
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber testsite

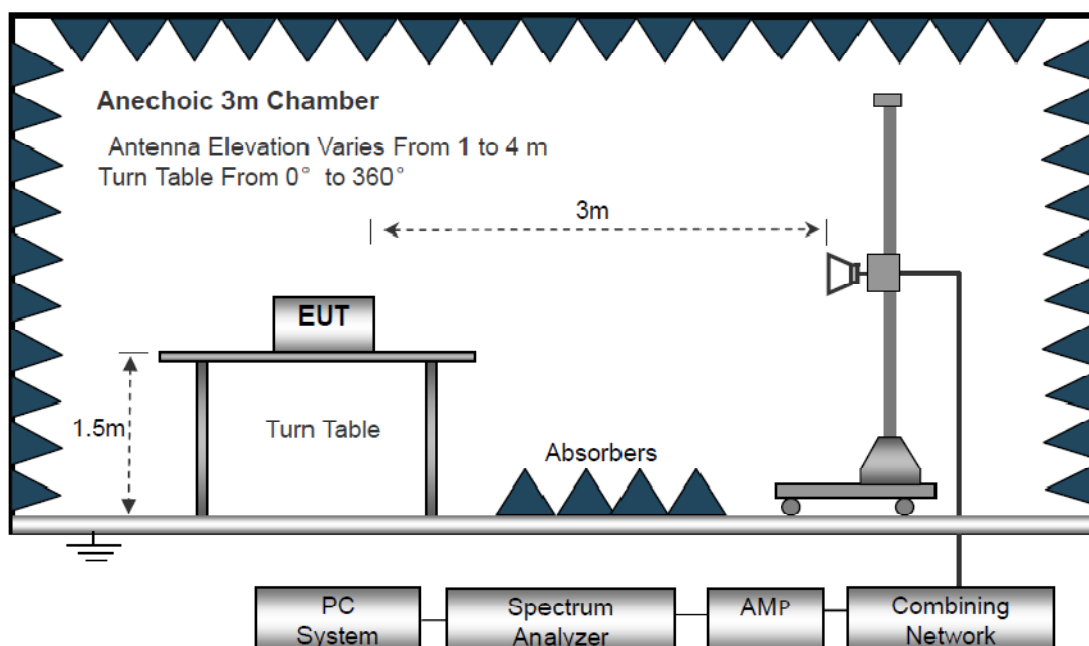
The test setup for emission measurement below 30MHz



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



The test setup for emission measurement above 1 GHz



6.3 Spectrum Analyzer Setup

Below 30MHz

IF Bandwidth : 10kHz

Resolution Bandwidth : 10kHz

Video Bandwidth : 10kHz

30MHz ~ 1GHz

Detector : PK

Resolution Bandwidth : 100kHz

Video Bandwidth : 300kHz

Detector : QP

Resolution Bandwidth : 120kHz

Video Bandwidth : 300kHz

Above 1GHz

Detector : PK

Resolution Bandwidth : 1MHz

Video Bandwidth : 3MHz

Detector : PK detector is for AV value

Resolution Bandwidth : 1MHz

Video Bandwidth : 10Hz

6.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
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. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
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 tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
8. The test above 1GHz must be use the fully anechoic room and the test below 1GHz use the half anechoic room

6.5 Summary of Test Results

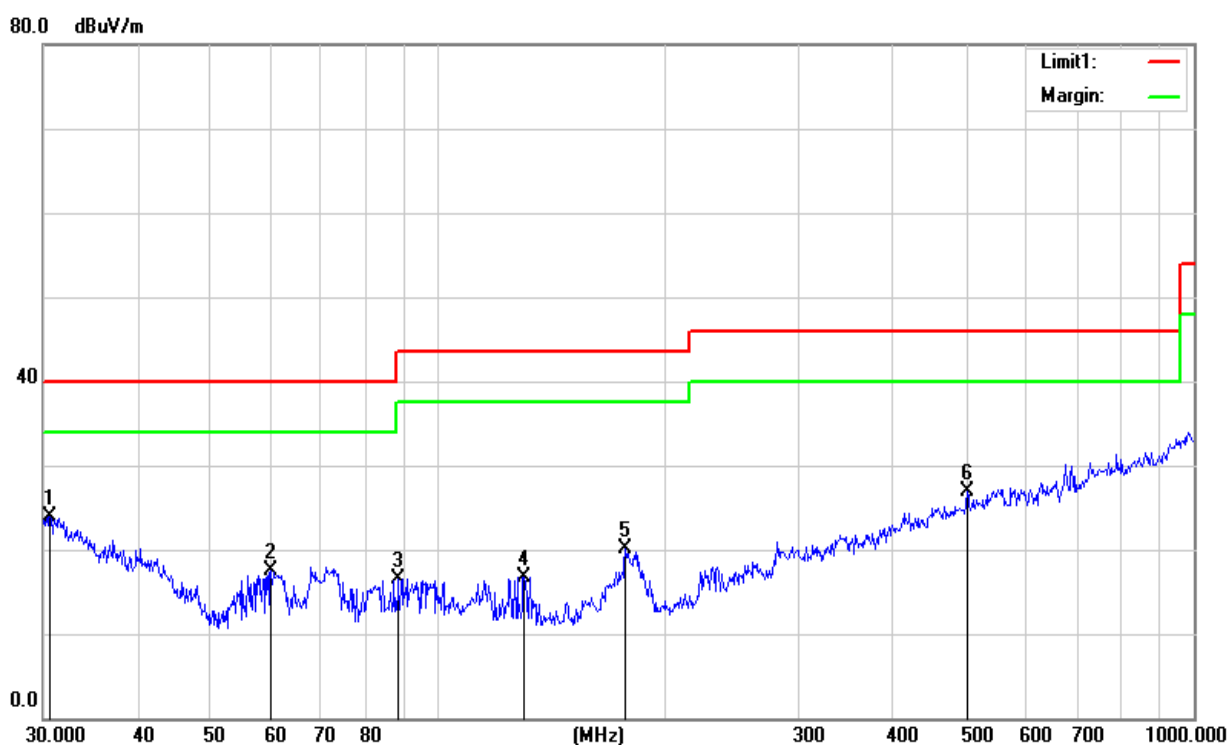
Test Frequency: Below 30MHz

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

Test Frequency: 30MHz ~ 1GHz

All applicable test modes have been tested and only the worst case (802.11b TX in middle channel) is recorded.

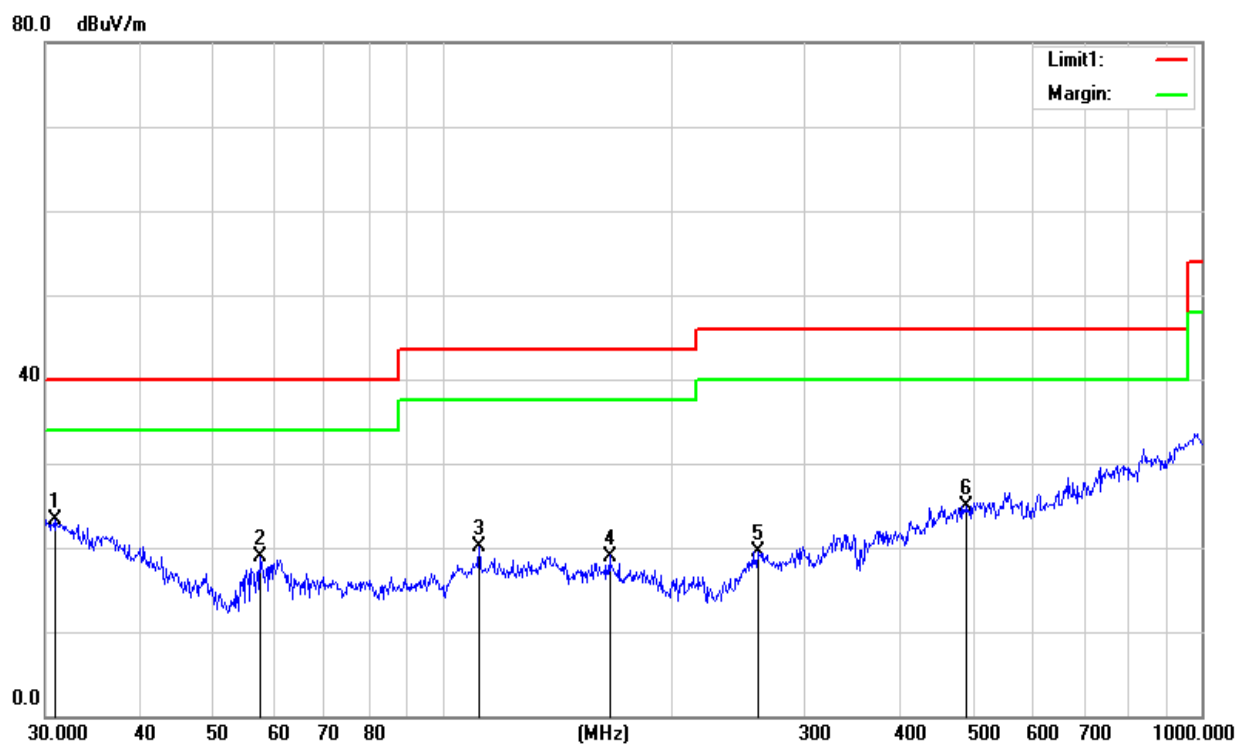
Antenna Polarization: Horizontal



| Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----------|---------|--------------|----------|----------|--------|--------|
| (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 30.6378 | 5.45 | 18.37 | 23.82 | 40.00 | -16.18 | QP |
| 60.0690 | 12.24 | 5.33 | 17.57 | 40.00 | -22.43 | QP |
| 88.6524 | 7.22 | 9.33 | 16.55 | 43.50 | -26.95 | QP |
| 129.9225 | 5.01 | 11.78 | 16.79 | 43.50 | -26.71 | QP |
| 176.8877 | 9.95 | 10.23 | 20.18 | 43.50 | -23.32 | QP |
| 501.1790 | 6.57 | 20.38 | 26.95 | 46.00 | -19.05 | QP |

Remark: Emission Level = Receiver Reading + Cable Loss + ANT Factor - AMP Factor

Antenna Polarization: Vertical



| Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----------|---------|--------------|----------|----------|--------|--------|
| (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 30.8535 | 5.13 | 18.26 | 23.39 | 40.00 | -16.61 | QP |
| 57.5938 | 13.09 | 5.72 | 18.81 | 40.00 | -21.19 | QP |
| 111.7380 | 8.18 | 11.92 | 20.10 | 43.50 | -23.40 | QP |
| 166.0680 | 8.07 | 10.93 | 19.00 | 43.50 | -24.50 | QP |
| 260.1444 | 4.57 | 14.95 | 19.52 | 46.00 | -26.48 | QP |
| 489.0270 | 4.69 | 20.23 | 24.92 | 46.00 | -21.08 | QP |

Remark: Emission Level = Receiver Reading + Cable Loss + ANT Factor - AMP Factor

Test Frequency: 1GHz ~ 18GHz

| Frequency (MHz) | Reading (dBuV) | Factor (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Comment |
|---|----------------|-------------|-------------------------|----------------|-------------|----------|------------|
| Low Channel (GFSK/2402 MHz) | | | | | | | |
| 4804.20 | 65.91 | -3.62 | 62.29 | 74 | -11.71 | PK | Vertical |
| 4804.22 | 46.63 | -3.62 | 43.01 | 54 | -10.99 | AV | Vertical |
| 7206.13 | 62.01 | -0.9 | 61.11 | 74 | -12.89 | PK | Vertical |
| 7206.12 | 40.99 | -0.9 | 40.09 | 54 | -13.91 | AV | Vertical |
| 4803.99 | 62.09 | -3.65 | 58.44 | 74 | -15.56 | PK | Horizontal |
| 4803.98 | 43.94 | -3.65 | 40.29 | 54 | -13.71 | AV | Horizontal |
| Mid Channel (GFSK/2440 MHz) | | | | | | | |
| 4882.08 | 64.83 | -3.65 | 61.18 | 74 | -12.82 | PK | Vertical |
| 4882.07 | 48.67 | -3.65 | 45.02 | 54 | -8.98 | AV | Vertical |
| 7320.21 | 60.71 | -0.83 | 59.88 | 74 | -14.12 | PK | Vertical |
| 7320.21 | 44.20 | -0.83 | 43.37 | 54 | -10.63 | AV | Vertical |
| 4882.18 | 61.29 | -3.68 | 57.61 | 74 | -16.39 | PK | Horizontal |
| 4882.15 | 44.90 | -3.68 | 41.22 | 54 | -12.78 | AV | Horizontal |
| High Channel (GFSK/2480 MHz) | | | | | | | |
| 4960.26 | 61.03 | -3.59 | 57.44 | 74 | -16.56 | PK | Vertical |
| 4960.31 | 45.03 | -3.59 | 41.44 | 54 | -12.56 | AV | Vertical |
| 7440.26 | 60.73 | -0.73 | 60 | 74 | -14 | PK | Vertical |
| 7440.31 | 45.01 | -0.73 | 44.28 | 54 | -9.72 | AV | Vertical |
| 4960.33 | 60.91 | -3.59 | 57.32 | 74 | -16.68 | PK | Horizontal |
| 4960.31 | 45.37 | -3.59 | 41.78 | 54 | -12.22 | AV | Horizontal |
| Remark: 1. Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | | |



Radiated band edge:

| Frequency (MHz) | Reading (dBuV) | Factor (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Comment |
|---|----------------|-------------|-------------------------|----------------|-------------|----------|------------|
| GFSK | | | | | | | |
| 2390.0 | 68.09 | -12.99 | 55.10 | 74 | -18.90 | PK | Vertical |
| 2390.0 | 54.06 | -12.99 | 41.07 | 54 | -12.93 | AV | Vertical |
| 2390.0 | 69.26 | -12.99 | 56.27 | 74 | -17.73 | PK | Horizontal |
| 2390.0 | 52.85 | -12.99 | 39.86 | 54 | -14.14 | AV | Horizontal |
| 2483.6 | 69.95 | -12.78 | 52.97 | 74 | -16.83 | PK | Vertical |
| 2483.6 | 52.90 | -12.78 | 38.73 | 54 | -13.88 | AV | Vertical |
| 2483.6 | 70.07 | -12.78 | 53.98 | 74 | -16.71 | PK | Horizontal |
| 2483.6 | 52.77 | -12.78 | 40.17 | 54 | -14.01 | AV | Horizontal |
| Remark: 1. Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | | |
| Low measurement frequencies is range from 2310 to 2400 MHz, high measurement frequencies is range from 2483.5 to 2500 MHz. Only show the worst point data of the emissions in the frequency 2310-2400 MHz and 2483.5-2500 MHz. | | | | | | | |

7 Conducted Spurious Emission

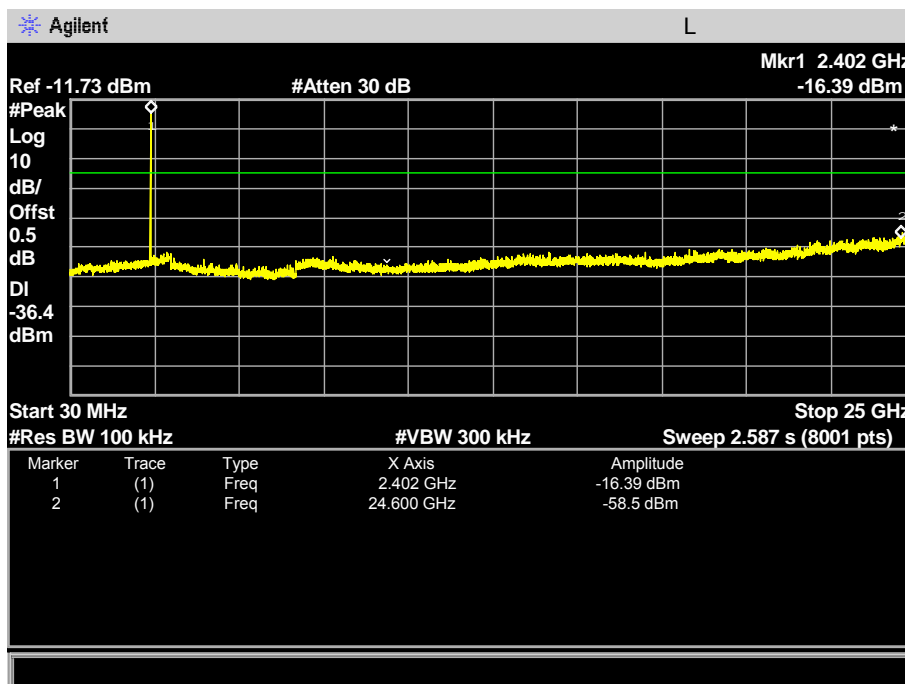
| | |
|------------------|--|
| Test Requirement | : FCC CFR47 Part 15 Section 15.247 |
| Test Method | : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R05 |
| Test Limit | : Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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)). |
| Test Mode | : Refer to section 3.3 |

7.1 Test Procedure

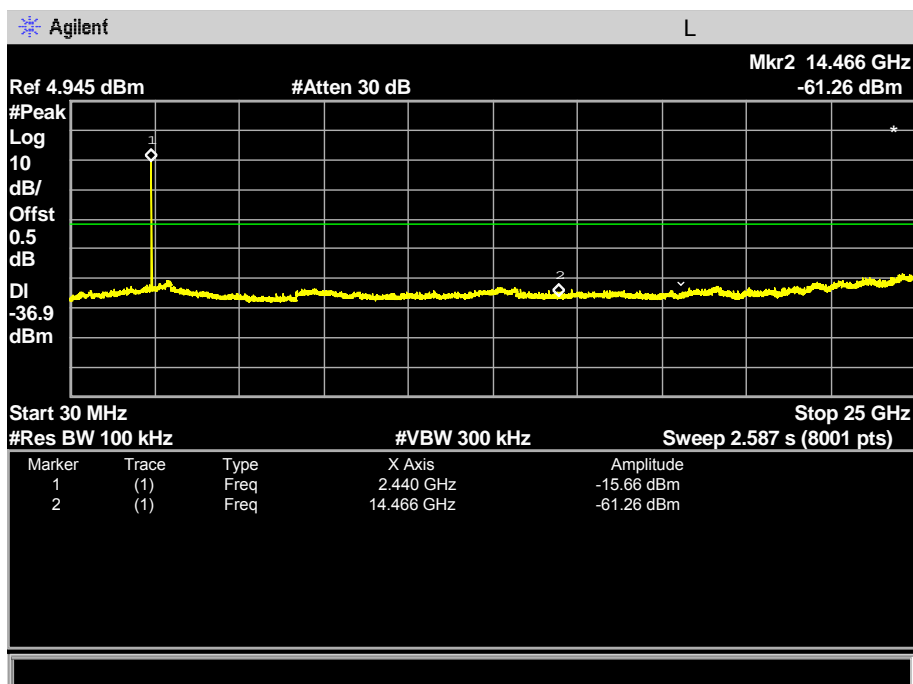
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

7.2 Test Result

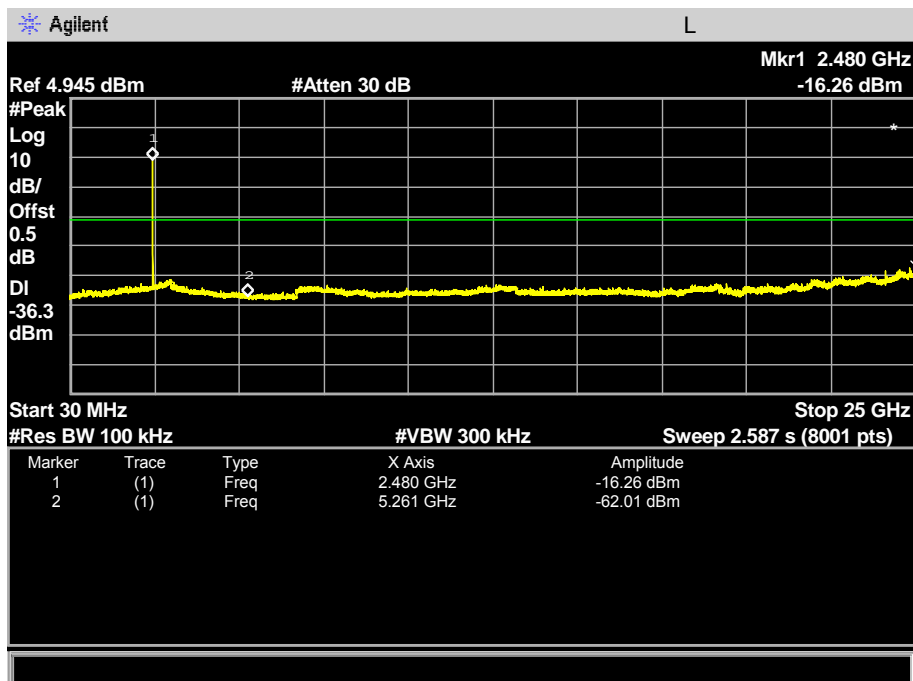
BLE Low Channel



BLE Middle Channel



BLE High Channel



8 Band Edge Measurement

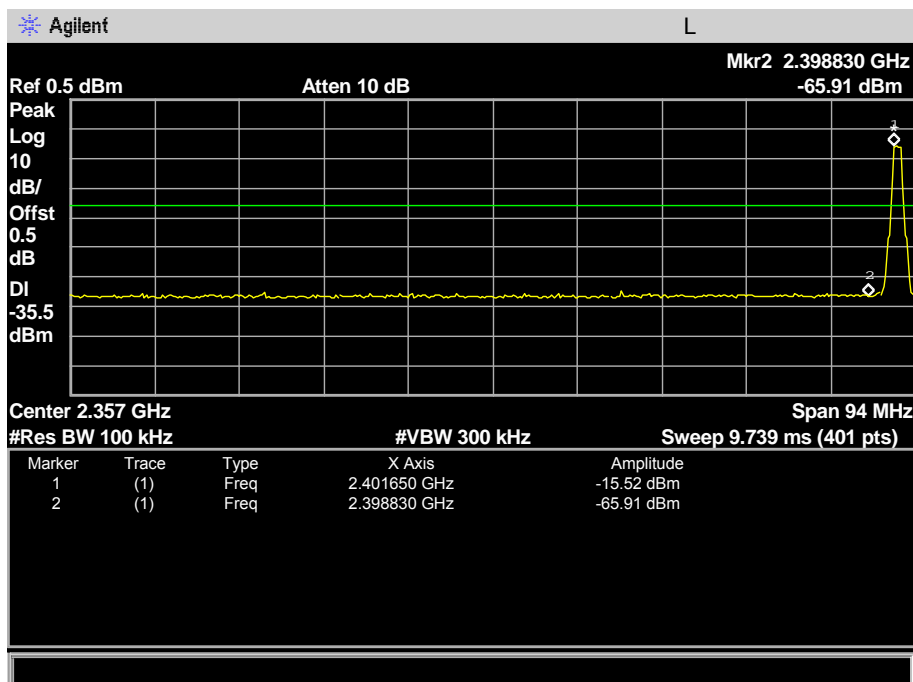
| | |
|------------------|--|
| Test Requirement | : Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). |
| Test Method | : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03 |
| Test Limit | : 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)). |
| Test Mode | : Refer to section 3.3 |

8.1 Test Procedure

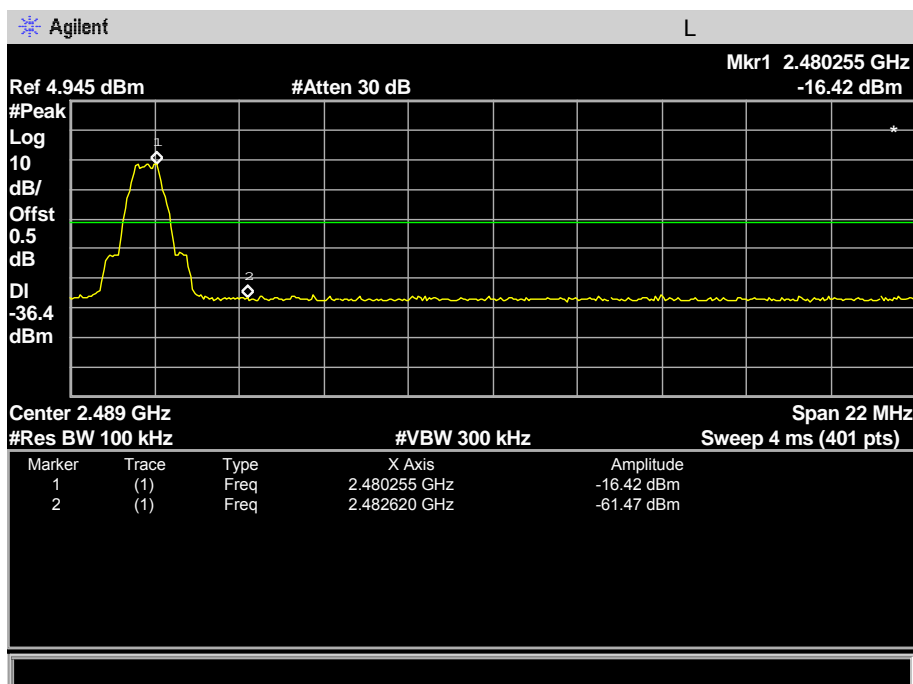
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

8.2 Test Result

GFSK(BLE) Band edge-left side



GFSK(BLE) Band edge-right side



9 6dB Bandwidth Measurement

| | |
|------------------|---|
| Test Requirement | : FCC CFR47 Part 15 Section 15.247 |
| Test Method | : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03 |
| Test Limit | Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |
| Test Mode | : Refer to section 3.3 |

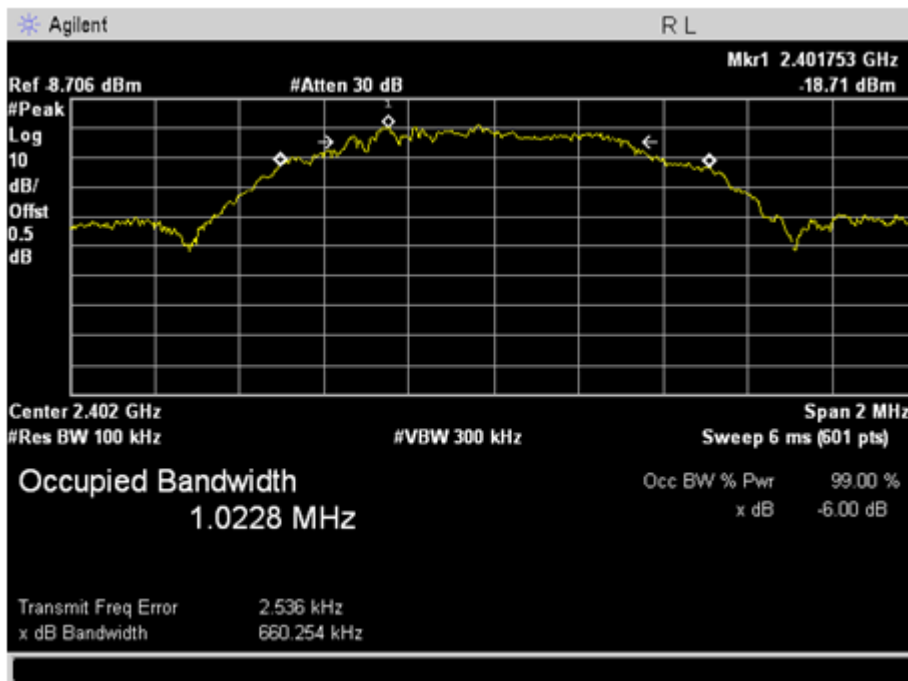
9.1 Test Procedure

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: For BLE, RBW = 100 kHz, VBW = 300kHz, For WIFI, RBW = 100kHz, VBW = 300kHz

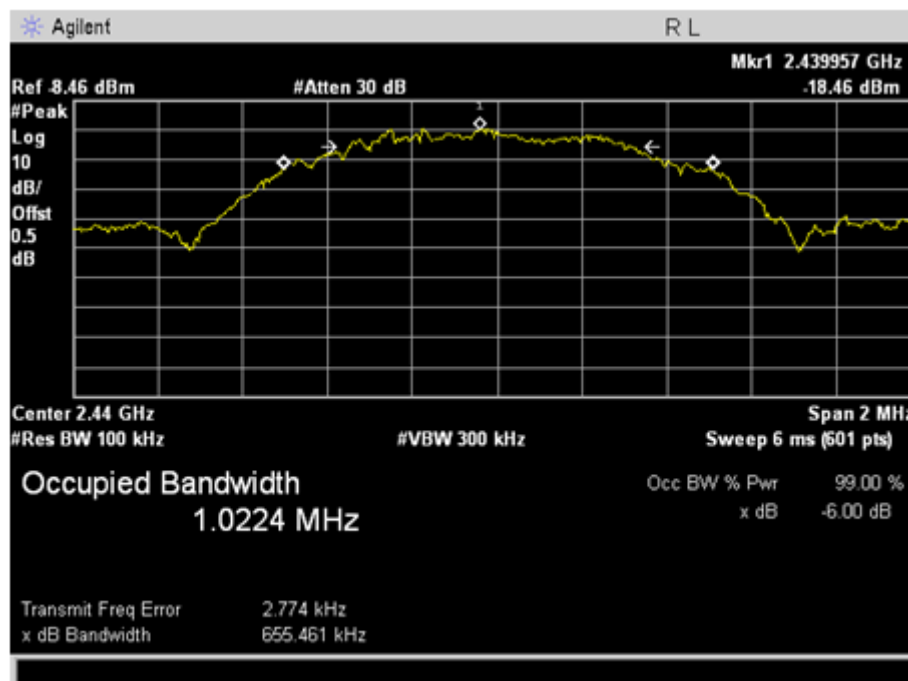
9.2 Test Result

| Modulation | Bandwidth(MHz) | | | Limit |
|------------|----------------|----------------|--------------|---------|
| | Low Channel | Middle Channel | High Channel | |
| GFSK(BLE) | 0.660 | 0.655 | 0.715 | ≥500kHz |

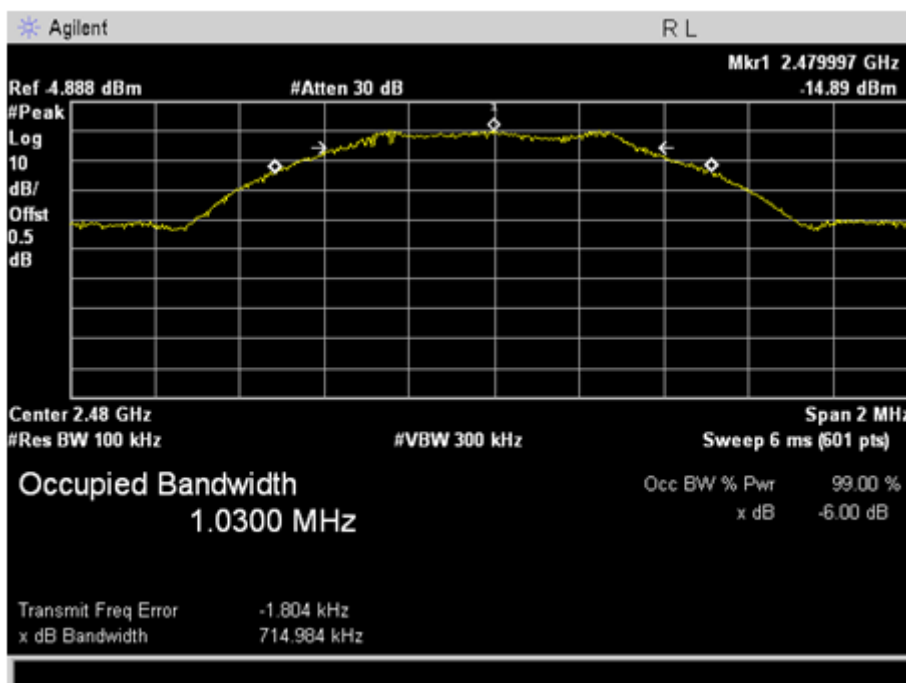
GFSK(BLE) Low Channel



GFSK(BLE) Middle Channel



GFSK(BLE)High Channel



10 Maximum Peak Output Power

| | |
|------------------|---|
| Test Requirement | : FCC CFR47 Part 15 Section 15.247 |
| Test Method | : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03 |
| Test Limit | : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. |
| Test Mode | : Refer to section 3.3 |

10.1 Test Procedure

KDB 558074 D01 DTS Meas Guidance v03r03

The maximum peak conducted output power measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.





10.2 Test Result

| Modulation | Maximum Peak Output Power (dBm) | | | Limit |
|------------|---------------------------------|----------------|--------------|-----------|
| | Low Channel | Middle Channel | High Channel | |
| GFSK(BLE) | -13.70 | -13.56 | -14.16 | 1W(30dBm) |

11 Power Spectral density

| | |
|------------------|---|
| Test Requirement | : FCC CFR47 Part 15 Section 15.247 |
| Test Method | : ANSI C63.10:2013,KDB 558074 D01 DTS MEAS GUIDANCE V03R03 |
| Test Limit | : Regulation 15.247(f)The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. |
| Test Mode | : Refer to section 3.3 |

11.1 Test Procedure

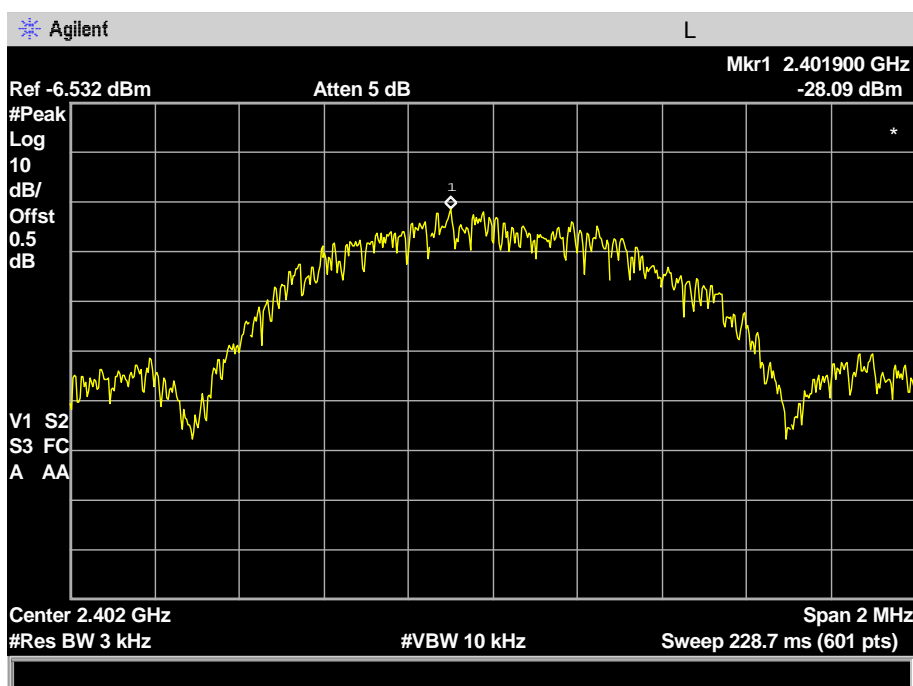
KDB 558074 D01 DTS Meas Guidance V03R05

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 = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. 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.

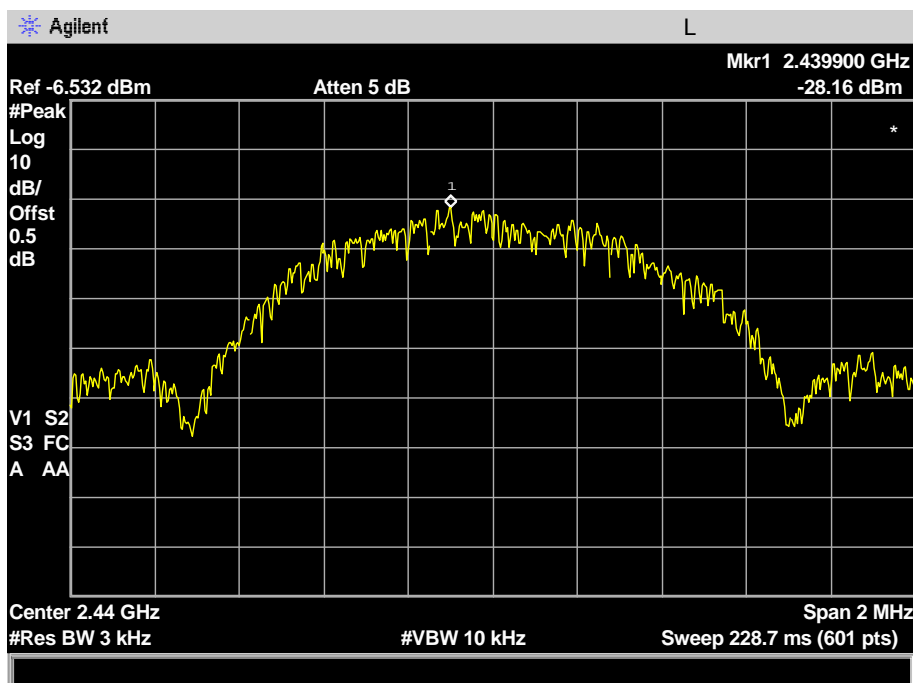
11.2 Test Result

| Modulation | Power Spectral density (dBm/3kHz) | | | Limit |
|------------|-------------------------------------|----------------|--------------|-----------|
| | Low Channel | Middle Channel | High Channel | |
| GFSK(BLE) | -28.09 | -28.16 | -28.73 | 8dBm/3kHz |

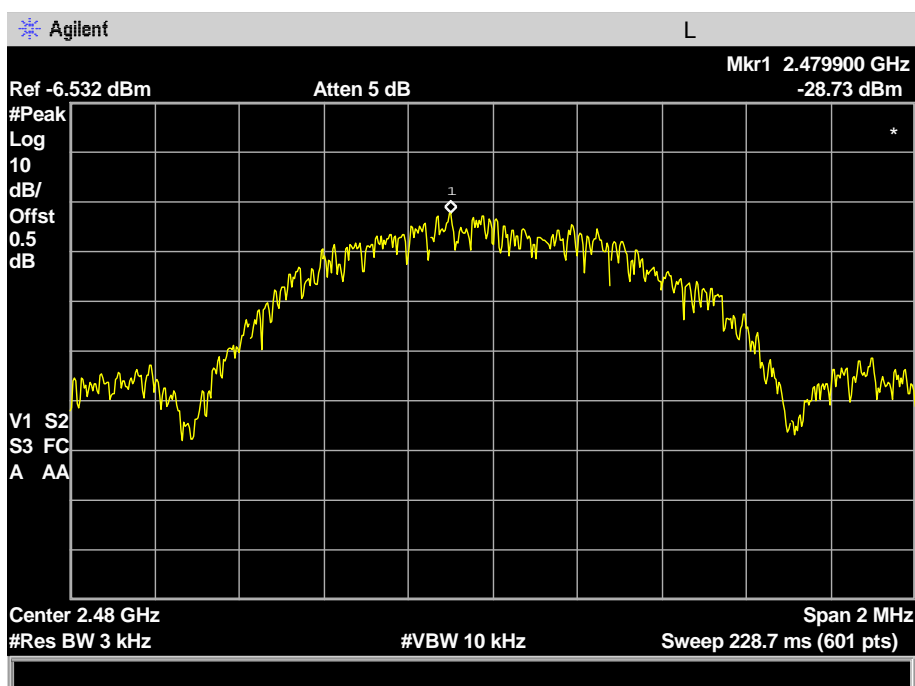
GFSK(BLE) Low Channel



GFSK(BLE) Middle Channel



GFSK(BLE)High Channel



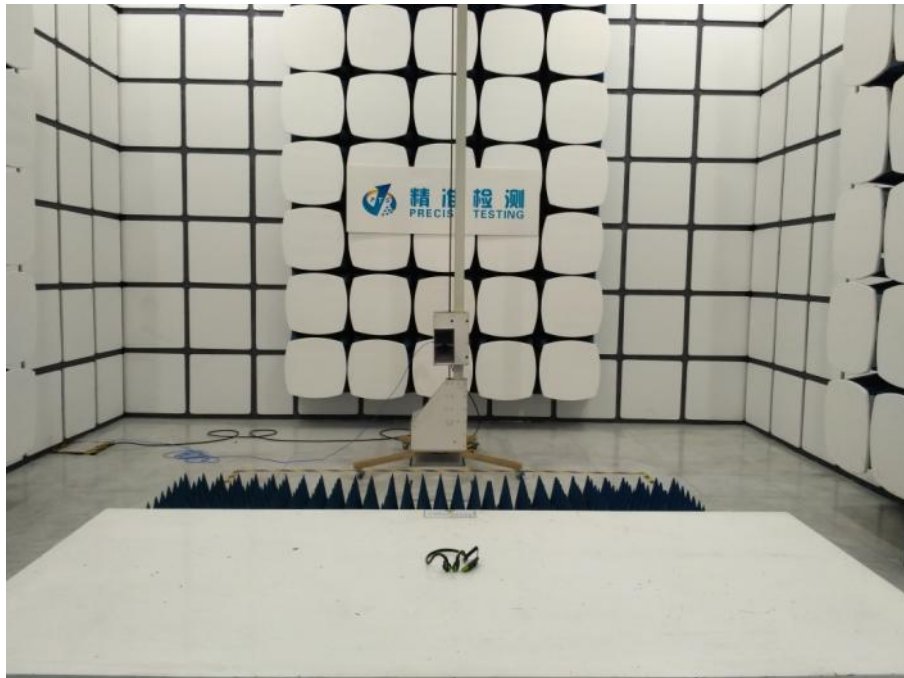


12 Antenna Requirement

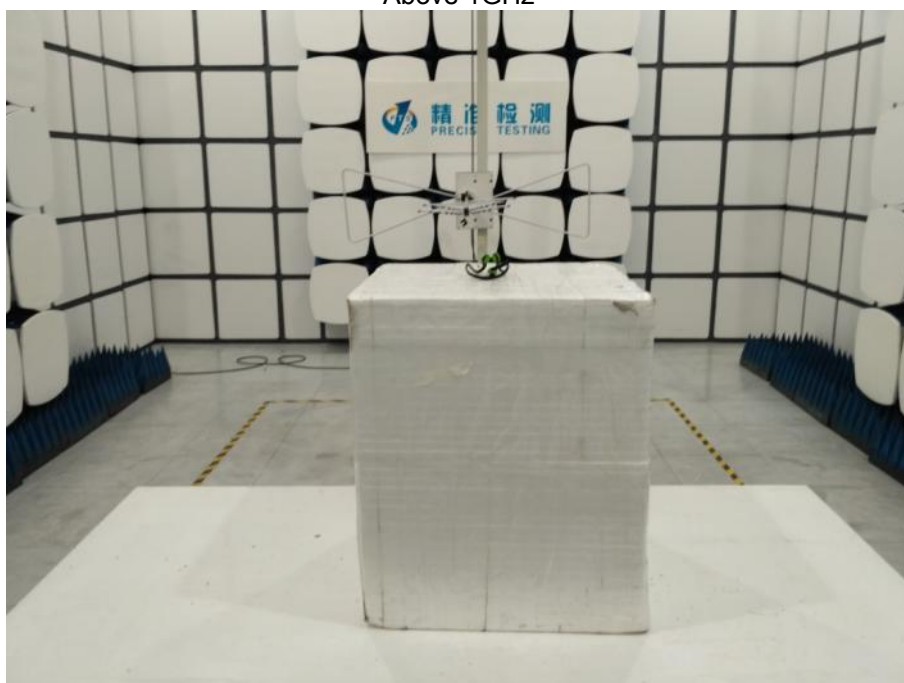
According to the FCC part15.203, a transmitter can only be sold or operated with antennas with which it was approved. This product has anPCB printed antenna, it meet the requirement of this section.

13 Test Setup

Radiated Spurious Emissions
From 30MHz-1000MHz



Above 1GHz



14 EUT Photos

External Photos



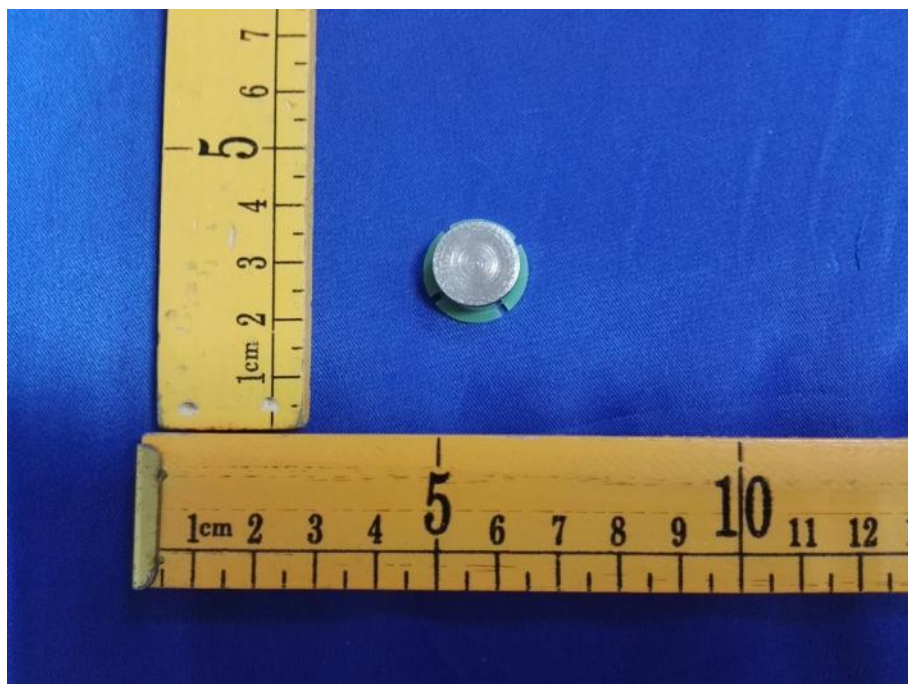




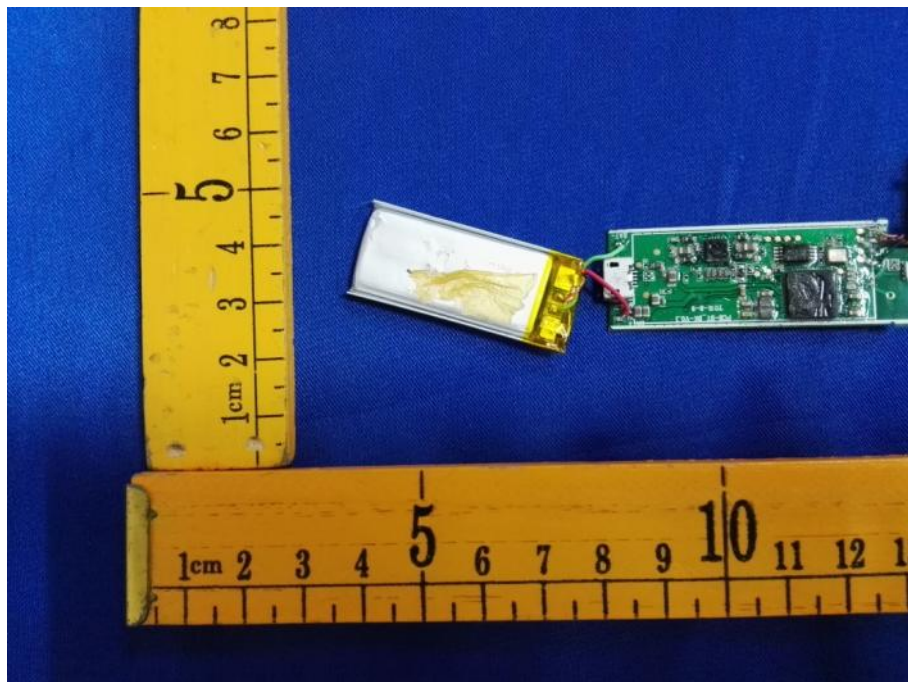
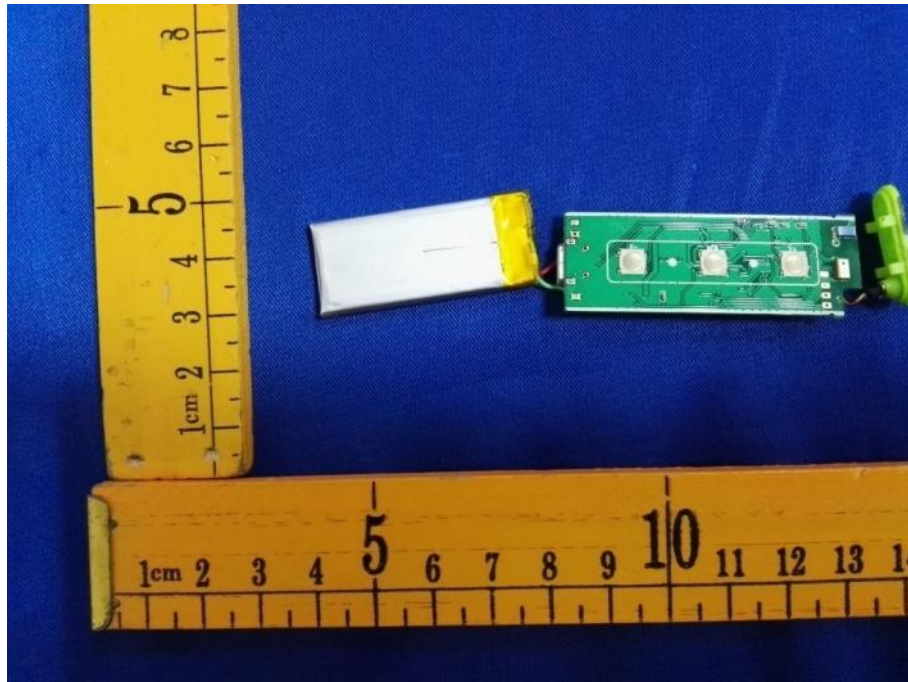
Internal Photos

Antenna









*****THE END REPORT*****