

# TEST REPORT

**Reference No.**..... : WTS15S0122421E  
**FCC ID** ..... : ZRHYU-BT901  
**Applicant**..... : SHENZHEN YUXINXIN ELECTRONICS CO.,LTD  
**Address**..... : Building 7,XinXing Industrial Park, FuYong Town, Bao,  
ShenZhen, China  
**Manufacturer** ..... : The same as above  
**Address**..... : The same as above  
**Product Name**..... : Bluetooth Headphone  
**Model No** ..... : YU-BT901  
**Standards**..... : FCC CFR47 Part 15 Section 15.247:2013  
**Date of Receipt sample** .... : Jan. 21, 2015  
**Date of Test** ..... : Jan. 21, 2015 ~ Jan. 26, 2015  
**Date of Issue**..... : Jan. 28, 2015  
**Test Result**..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

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## 2 Test Summary

| Test Items  | Test Requirement                 | Result |
|---|----------------------------------|--------|
| Radiated Spurious Emissions                                       | 15.205(a)<br>15.209<br>15.247(d) | PASS   |
| Band edge   | 15.247(d)<br>15.205(a)           | PASS   |
| Conduct Emission  | 15.207                           | PASS   |
| 20dB Bandwidth  | 15.247(a)(1)                     | PASS   |
| Maximum Peak Output Power   | 15.247(b)(1)                     | PASS   |
| Frequency Separation  | 15.247(a)(1)                     | PASS   |
| Number of Hopping Frequency                                       | 15.247(a)(1)(iii)                | PASS   |
| Dwell time  | 15.247(a)(1)(iii)                | PASS   |
| Maximum Permissible Exposure<br>(Exposure of Humans to RF Fields) | 1.1307(b)(1)                     | PASS   |

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## 4 General Information

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

Product Name: : Bluetooth Headphone  
 Model No.: : YU-BT901  
 Operation Frequency: : 2402-2480MHz, 79(EDR) Channels in total  
 Type of Modulation: : GFSK, Pi/4DQPSK, 8DPSK  
 The lowest oscillator: :16 MHz  
 Antenna installation: : PCB Printed Antenna  
 Antenna Gain: :0dBi

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

Technical Data: : DC 3.7V, 320mA  
 DC 5V for charging

### 4.3 Channel List

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 0           | 2402            | 1           | 2403            | 2           | 2404            | 3           | 2405            |
| 4           | 2406            | 5           | 2407            | 6           | 2408            | 7           | 2409            |
| 8           | 2410            | 9           | 2411            | 10          | 2412            | 11          | 2413            |
| 12          | 2414            | 13          | 2415            | 14          | 2416            | 15          | 2417            |
| 16          | 2418            | 17          | 2419            | 18          | 2420            | 19          | 2421            |
| 20          | 2422            | 21          | 2423            | 22          | 2424            | 23          | 2425            |
| 24          | 2426            | 25          | 2427            | 26          | 2428            | 27          | 2429            |
| 28          | 2430            | 29          | 2431            | 30          | 2432            | 31          | 2433            |
| 32          | 2434            | 33          | 2435            | 34          | 2436            | 35          | 2437            |
| 36          | 2438            | 37          | 2439            | 38          | 2440            | 39          | 2441            |
| 40          | 2442            | 41          | 2443            | 42          | 2444            | 43          | 2445            |
| 44          | 2446            | 45          | 2447            | 46          | 2448            | 47          | 2449            |
| 48          | 2450            | 49          | 2451            | 50          | 2452            | 51          | 2453            |
| 52          | 2454            | 53          | 2455            | 54          | 2456            | 55          | 2457            |
| 56          | 2458            | 57          | 2459            | 58          | 2460            | 59          | 2461            |
| 60          | 2462            | 61          | 2463            | 62          | 2464            | 63          | 2465            |
| 64          | 2466            | 65          | 2467            | 66          | 2468            | 67          | 2469            |
| 68          | 2470            | 69          | 2471            | 70          | 2472            | 71          | 2473            |
| 72          | 2474            | 73          | 2475            | 74          | 2476            | 75          | 2477            |
| 76          | 2478            | 77          | 2479            | 78          | 2480            | -           | -               |

#### 4.4 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.

| Test mode    | Low channel | Middle channel | High channel |
|--------------|-------------|----------------|--------------|
| Transmitting | 2402MHz     | 2441MHz        | 2480MHz      |

#### 4.5 Test Facility

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

- **IC – Registration No.: 7760A-1**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, July 12, 2012.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

## 5 Equipment Used during Test

### 5.1 Equipments List

| <b>Conducted Emissions Test Site 1#</b>                              |                            |                                  |                  |                   |                              |                             |
|--|----------------------------|----------------------------------|------------------|-------------------|------------------------------|-----------------------------|
| <b>Item</b>  | <b>Equipment</b>           | <b>Manufacturer</b>              | <b>Model No.</b> | <b>Serial No.</b> | <b>Last Calibration Date</b> | <b>Calibration Due Date</b> |
| 1.   | EMI Test Receiver          | R&S                              | ESCI             | 100947            | Sep.15,2014                  | Sep.14,2015                 |
| 2.   | LISN                       | R&S                              | ENV216           | 101215            | Sep.15,2014                  | Sep.14,2015                 |
| 3.   | Cable                      | Top                              | TYPE16(3.5M)     | -                 | Sep.15,2014                  | Sep.14,2015                 |
| <b>Conducted Emissions Test Site 2#</b>                              |                            |                                  |                  |                   |                              |                             |
| <b>Item</b>  | <b>Equipment</b>           | <b>Manufacturer</b>              | <b>Model No.</b> | <b>Serial No.</b> | <b>Last Calibration Date</b> | <b>Calibration Due Date</b> |
| 1.   | EMI Test Receiver          | R&S                              | ESCI             | 101155            | Sep.15,2014                  | Sep.14,2015                 |
| 2.   | LISN                       | SCHWARZBECK                      | NSLK 8128        | 8128-289          | Sep.15,2014                  | Sep.14,2015                 |
| 3.   | Limiter                    | York                             | MTS-IMP-136      | 261115-001-0024   | Sep.15,2014                  | Sep.14,2015                 |
| 4.   | Cable                      | LARGE                            | RF300            | -                 | Sep.15,2014                  | Sep.14,2015                 |
| <b>3m Semi-anechoic Chamber for Radiation Emissions Test site 1#</b> |                            |                                  |                  |                   |                              |                             |
| <b>Item</b>  | <b>Equipment</b>           | <b>Manufacturer</b>              | <b>Model No.</b> | <b>Serial No.</b> | <b>Last Calibration Date</b> | <b>Calibration Due Date</b> |
| 1  | EMC Analyzer               | Agilent                          | E7405A           | MY45114943        | Sep.15,2014                  | Sep.14,2015                 |
| 2  | Active Loop Antenna        | Beijing Dazhi                    | ZN30900A         | -                 | Sep.15,2014                  | Sep.14,2015                 |
| 3  | Trilog Broadband Antenna   | SCHWARZBECK                      | VULB9163         | 336               | Apr.19,2014                  | Apr.18,2015                 |
| 4  | Coaxial Cable (below 1GHz) | Top                              | TYPE16(13M)      | -                 | Sep.15,2014                  | Sep.14,2015                 |
| 5  | Broad-band Horn Antenna    | SCHWARZBECK                      | BBHA 9120 D      | 667               | Apr.19,2014                  | Apr.18,2015                 |
| 6  | Broad-band Horn Antenna    | SCHWARZBECK                      | BBHA 9170        | 335               | Apr.19,2014                  | Apr.18,2015                 |
| 7  | Broadband Preamplifier     | COMPLIANCE DIRECTION             | PAP-1G18         | 2004              | Mar.17,2014                  | Mar.16,2015                 |
| 8  | Coaxial Cable (above 1GHz) | Top                              | 1GHz-25GHz       | EW02014-7         | Apr.10,2014                  | Apr.09,2015                 |
| <b>3m Semi-anechoic Chamber for Radiation Emissions Test site 2#</b> |                            |                                  |                  |                   |                              |                             |
| <b>Item</b>  | <b>Equipment</b>           | <b>Manufacturer</b>              | <b>Model No.</b> | <b>Serial No</b>  | <b>Last Calibration Date</b> | <b>Calibration Due Date</b> |
| 1  | Test Receiver              | R&S                              | ESCI             | 101296            | Sep.15,2014                  | Sep.14,2015                 |
| 2  | Trilog Broadband Antenna   | SCHWARZBECK                      | VULB9160         | 9160-3325         | Sep.15,2014                  | Sep.14,2015                 |
| 3  | Amplifier                  | Compliance pirection systems inc | PAP-0203         | 22024             | Sep.15,2014                  | Sep.14,2015                 |
| 4  | Cable                      | HUBER+SUHNER                     | CBL2             | 525178            | Sep.15,2014                  | Sep.14,2015                 |

| RF Conducted Testing |                                 |              |           |            |                       |                      |
|----------------------|---------------------------------|--------------|-----------|------------|-----------------------|----------------------|
| Item                 | Equipment                       | Manufacturer | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1.                   | EMC Analyzer<br>(9k~26.5GHz)    | Agilent      | E7405A    | MY45114943 | Sep.15,2014           | Sep.14,2015          |
| 2.                   | Spectrum Analyzer<br>(9k-6GHz)  | R&S          | FSL6      | 100959     | Sep.15,2014           | Sep.14,2015          |
| 3.                   | Signal Analyzer<br>(9k~26.5GHz) | Agilent      | N9010A    | MY50520207 | Sep.15,2014           | Sep.14,2015          |

## 5.2 Measurement Uncertainty

| Parameter                         | Uncertainty                                 |
|-----------------------------------|---|
| Radio Frequency                   | $\pm 1 \times 10^{-6}$                      |
| RF Power                          | $\pm 1.0$ dB                                |
| RF Power Density                  | $\pm 2.2$ dB                                |
| Radiated Spurious Emissions test  | $\pm 5.03$ dB (Bilog antenna 30M~1000MHz)   |
|                                   | $\pm 5.47$ dB (Horn antenna 1000M~25000MHz) |
| Conducted Spurious Emissions test | $\pm 3.64$ dB (AC mains 150KHz~30MHz)       |

## 5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.



## 6 Conducted Emission

|                   |  |
|-------------------|--|
| Test Requirement: | FCC CFR 47 Part 15 Section 15.207  |
| Test Method:      | ANSI C63.4:2003  |
| Test Result:      | PASS   |
| Frequency Range:  | 150kHz to 30MHz  |
| Class/Severity:   | Class B  |
| Limit:            | 66-56 dB $\mu$ V between 0.15MHz & 0.5MHz<br>56 dB $\mu$ V between 0.5MHz & 5MHz<br>60 dB $\mu$ V between 5MHz & 30MHz |
| Detector:         | Peak for pre-scan (9kHz Resolution Bandwidth)  |

### 6.1 E.U.T. Operation

Operating Environment :

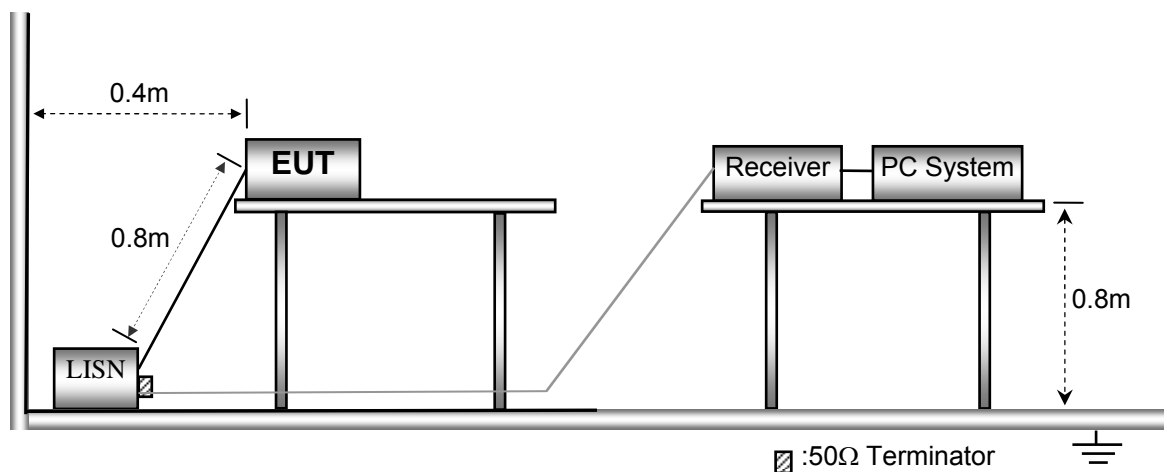
|                       |          |
|-----------------------|----------|
| Temperature:          | 25.5 °C  |
| Humidity:             | 51 % RH  |
| Atmospheric Pressure: | 101.2kPa |

EUT Operation :

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

### 6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003.

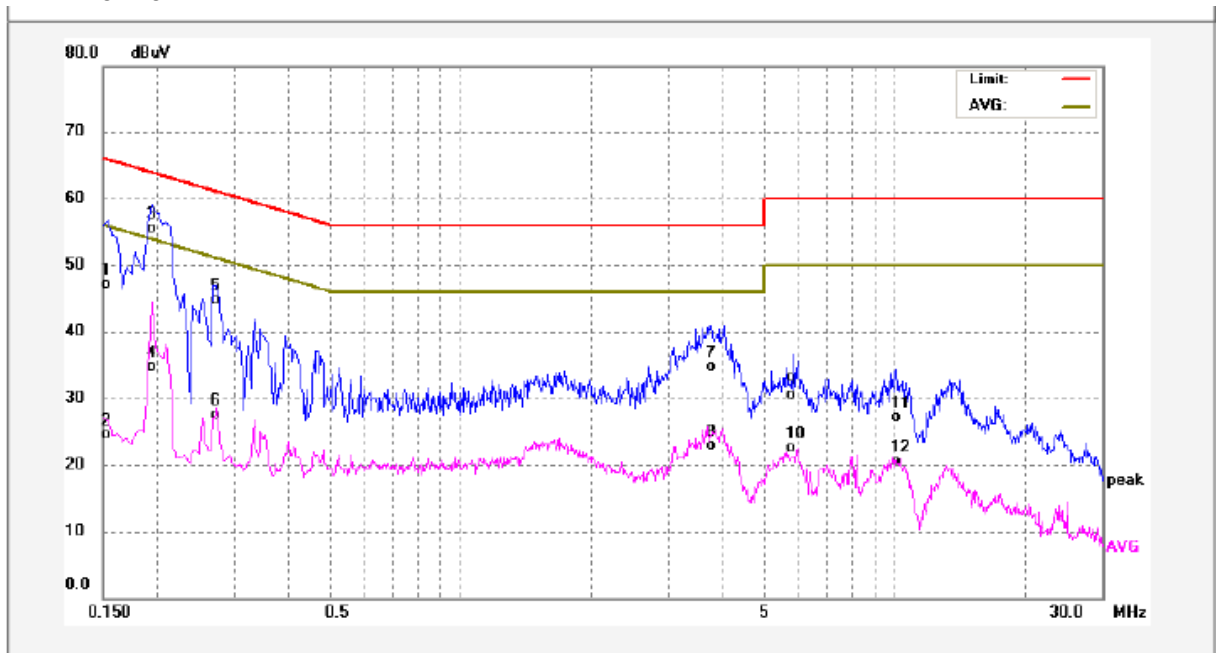


### 6.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

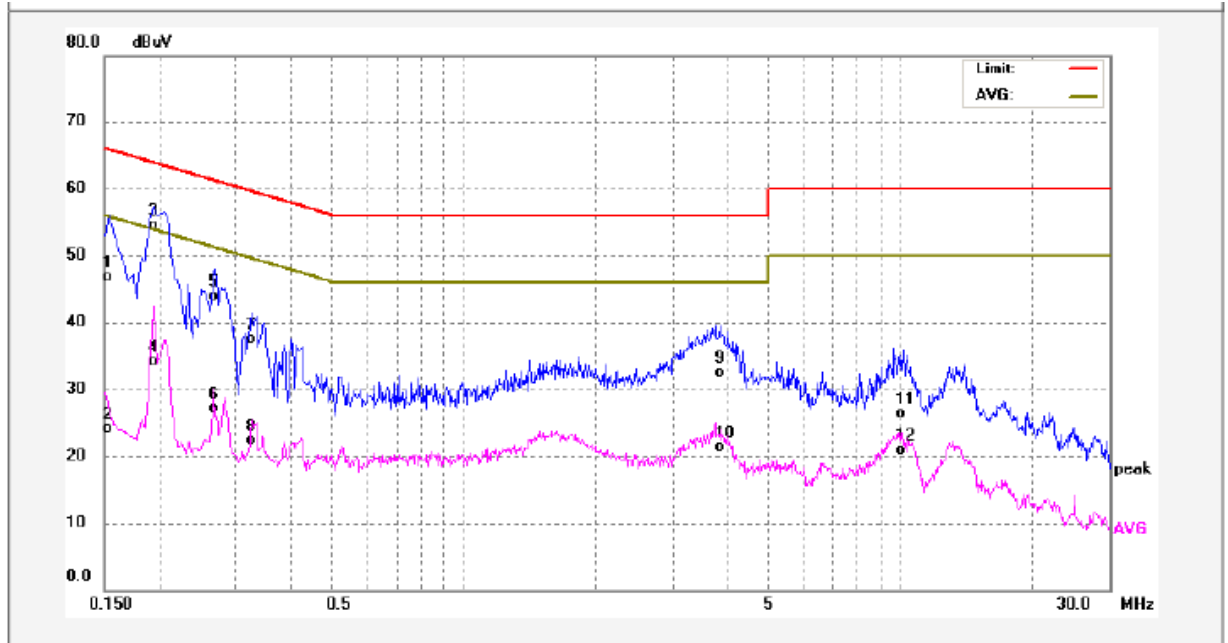
### 6.4 Conducted Emission Test Result

Live line:



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|------------|-------------|----------|--------|
| 1   | 0.1539      | 35.93          | 11.18       | 47.11         | 65.78      | -18.67      | QP       |        |
| 2   | 0.1539      | 13.26          | 11.18       | 24.44         | 55.78      | -31.34      | AVG      |        |
| 3   | 0.1940      | 44.19          | 11.28       | 55.47         | 63.86      | -8.39       | QP       |        |
| 4   | 0.1940      | 23.37          | 11.28       | 34.65         | 53.86      | -19.21      | AVG      |        |
| 5   | 0.2700      | 33.31          | 11.30       | 44.61         | 61.12      | -16.51      | QP       |        |
| 6   | 0.2700      | 16.16          | 11.30       | 27.46         | 51.12      | -23.66      | AVG      |        |
| 7   | 3.7820      | 23.46          | 11.22       | 34.68         | 56.00      | -21.32      | QP       |        |
| 8   | 3.7820      | 11.64          | 11.22       | 22.86         | 46.00      | -23.14      | AVG      |        |
| 9   | 5.8540      | 19.20          | 11.25       | 30.45         | 60.00      | -29.55      | QP       |        |
| 10  | 5.8540      | 11.24          | 11.25       | 22.49         | 50.00      | -27.51      | AVG      |        |
| 11  | 10.0900     | 15.89          | 11.31       | 27.20         | 60.00      | -32.80      | QP       |        |
| 12  | 10.0900     | 9.29           | 11.31       | 20.60         | 50.00      | -29.40      | AVG      |        |

Neutral line:



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|------------|-------------|----------|--------|
| 1   | 0.1539      | 35.44          | 11.18       | 46.62         | 65.78      | -19.16      | QP       |        |
| 2   | 0.1539      | 12.99          | 11.18       | 24.17         | 55.78      | -31.61      | AVG      |        |
| 3   | 0.1940      | 43.25          | 11.28       | 54.53         | 63.86      | -9.33       | QP       |        |
| 4   | 0.1940      | 22.76          | 11.28       | 34.04         | 53.86      | -19.82      | AVG      |        |
| 5   | 0.2700      | 32.64          | 11.30       | 43.94         | 61.12      | -17.18      | QP       |        |
| 6   | 0.2700      | 15.82          | 11.30       | 27.12         | 51.12      | -24.00      | AVG      |        |
| 7   | 0.3260      | 26.12          | 11.30       | 37.42         | 59.55      | -22.13      | QP       |        |
| 8   | 0.3260      | 11.09          | 11.30       | 22.39         | 49.55      | -27.16      | AVG      |        |
| 9   | 3.8700      | 21.27          | 11.22       | 32.49         | 56.00      | -23.51      | QP       |        |
| 10  | 3.8700      | 10.03          | 11.22       | 21.25         | 46.00      | -24.75      | AVG      |        |
| 11  | 10.1500     | 15.01          | 11.31       | 26.32         | 60.00      | -33.68      | QP       |        |
| 12  | 10.1500     | 9.62           | 11.31       | 20.93         | 50.00      | -29.07      | AVG      |        |

## 7 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: DA 00-705

Test Result: PASS

Measurement Distance: 3m

Limit:

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

### 7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

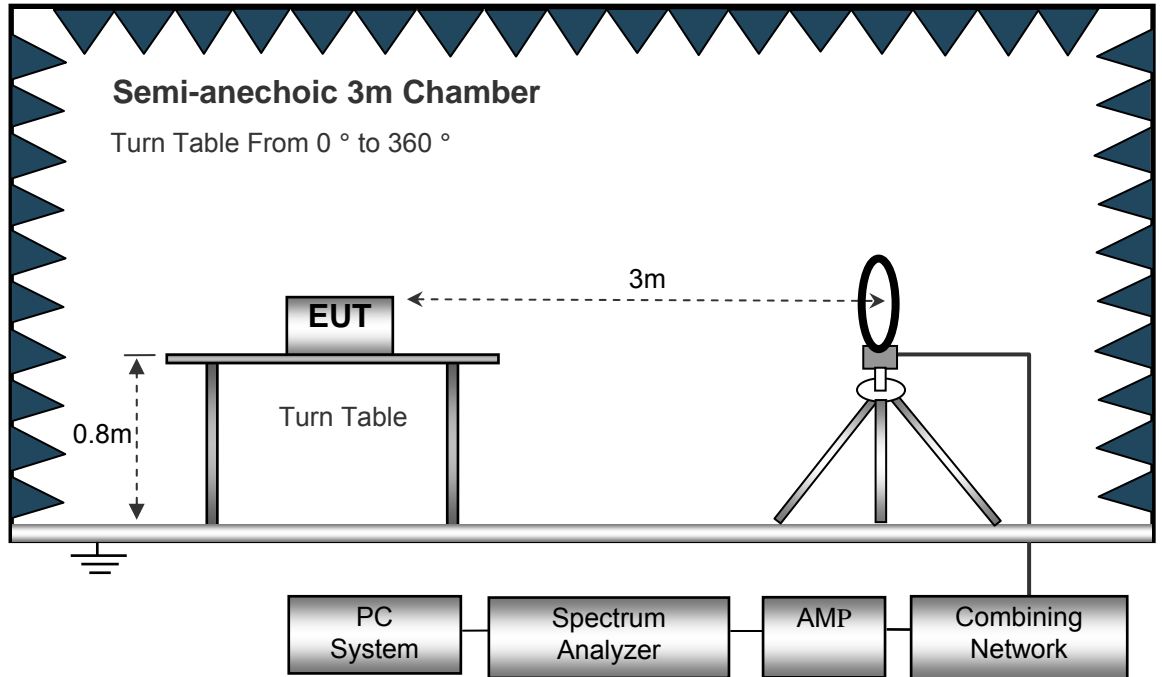
EUT Operation :

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

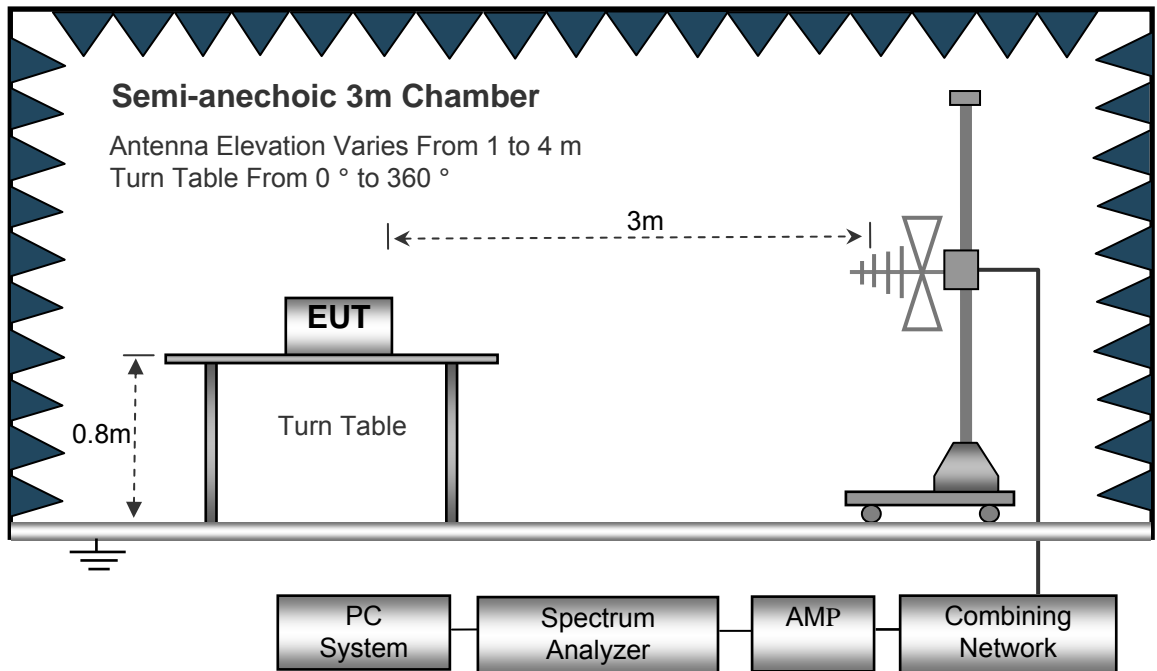
## 7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

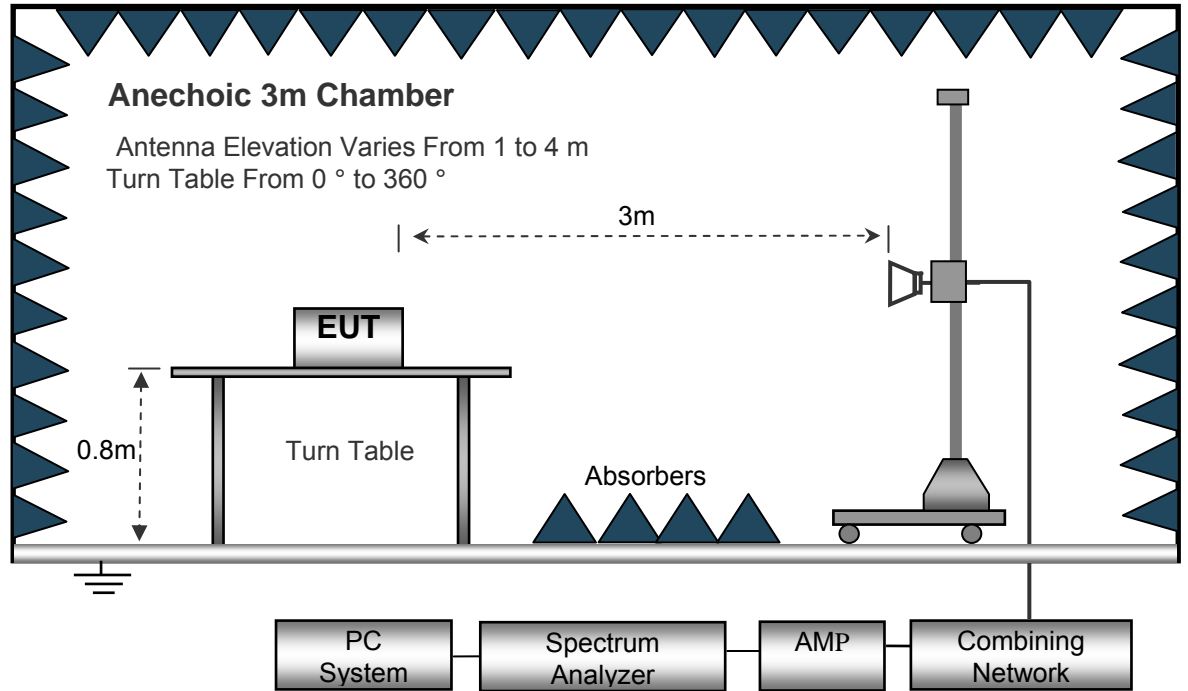
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



### 7.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep Speed ..... Auto
- IF Bandwidth..... 10kHz
- Video Bandwidth..... 10kHz
- Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

- Sweep Speed ..... Auto
- Detector ..... PK
- Resolution Bandwidth..... 100kHz
- Video Bandwidth..... 300kHz

Above 1GHz

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

#### 7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. 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.

## 7.5 Summary of Test Results

### Test Frequency: 16MHz~30MHz

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

### Test Frequency: 30MHz ~ 18GHz

Remark: only the worst data(GFSK modulation mode) were reported.

| Frequency        | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | Limit          | Margin |
|------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|----------------|--------|
|                  |                  |             |                  | Height     | Polar |                  |                     |                |        |
| (MHz)            | (dB $\mu$ V)     | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dB $\mu$ V/m)      | (dB $\mu$ V/m) | (dB)   |
| GFSK Low Channel |                  |             |                  |            |       |                  |                     |                |        |
| 76.86            | 21.00            | QP          | 287              | 1.6        | H     | 9.85             | 30.85               | 41.00          | -10.15 |
| 76.86            | 20.89            | QP          | 150              | 1.5        | V     | 9.85             | 30.74               | 41.00          | -10.26 |
| 4804.00          | 54.92            | PK          | 287              | 1.7        | V     | -1.05            | 53.87               | 74.00          | -20.13 |
| 4804.00          | 43.78            | Ave         | 287              | 1.7        | V     | -1.05            | 42.73               | 54.00          | -11.27 |
| 7206.00          | 51.54            | PK          | 139              | 1.3        | H     | 1.37             | 52.91               | 74.00          | -21.09 |
| 7206.00          | 42.17            | Ave         | 139              | 1.3        | H     | 1.37             | 43.54               | 54.00          | -10.46 |
| 2312.45          | 46.46            | PK          | 254              | 1.3        | V     | -13.20           | 33.26               | 74.00          | -40.74 |
| 2312.45          | 38.23            | Ave         | 254              | 1.3        | V     | -13.20           | 25.03               | 54.00          | -28.97 |
| 2359.58          | 44.43            | PK          | 96               | 1.4        | H     | -13.16           | 31.27               | 74.00          | -42.73 |
| 2359.58          | 36.12            | Ave         | 96               | 1.4        | H     | -13.16           | 22.96               | 54.00          | -31.04 |
| 2491.12          | 44.54            | PK          | 320              | 1.1        | V     | -13.09           | 31.45               | 74.00          | -42.55 |
| 2491.12          | 38.21            | Ave         | 320              | 1.1        | V     | -13.09           | 25.12               | 54.00          | -28.88 |



| Frequency           | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | Limit          | Margin |
|---------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|----------------|--------|
|                     |                  |             |                  | Height     | Polar |                  |                     |                |        |
| (MHz)               | (dB $\mu$ V)     | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dB $\mu$ V/m)      | (dB $\mu$ V/m) | (dB)   |
| GFSK Middle Channel |                  |             |                  |            |       |                  |                     |                |        |
| 76.86               | 20.55            | QP          | 207              | 1.7        | H     | 9.85             | 30.40               | 41.00          | -10.60 |
| 76.86               | 20.97            | QP          | 102              | 1.7        | V     | 9.85             | 30.82               | 41.00          | -10.18 |
| 4882.00             | 51.02            | PK          | 306              | 1.5        | V     | -0.63            | 50.39               | 74.00          | -23.61 |
| 4882.00             | 44.71            | Ave         | 306              | 1.5        | V     | -0.63            | 44.08               | 54.00          | -9.92  |
| 7323.00             | 51.84            | PK          | 321              | 1.8        | H     | 2.32             | 54.16               | 74.00          | -19.84 |
| 7323.00             | 42.40            | Ave         | 321              | 1.8        | H     | 2.32             | 44.72               | 54.00          | -9.28  |
| 2313.84             | 46.56            | PK          | 176              | 1.4        | V     | -13.17           | 33.39               | 74.00          | -40.61 |
| 2313.84             | 38.54            | Ave         | 176              | 1.4        | V     | -13.17           | 25.37               | 54.00          | -28.63 |
| 2386.53             | 43.66            | PK          | 31               | 1.4        | H     | -13.16           | 30.50               | 74.00          | -43.50 |
| 2386.53             | 38.45            | Ave         | 31               | 1.4        | H     | -13.16           | 25.29               | 54.00          | -28.71 |
| 2497.04             | 44.94            | PK          | 109              | 1.2        | V     | -13.06           | 31.88               | 74.00          | -42.12 |
| 2497.04             | 38.51            | Ave         | 109              | 1.2        | V     | -13.06           | 25.45               | 54.00          | -28.55 |

| Frequency         | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | Limit          | Margin |
|-------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|----------------|--------|
|                   |                  |             |                  | Height     | Polar |                  |                     |                |        |
| (MHz)             | (dB $\mu$ V)     | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dB $\mu$ V/m)      | (dB $\mu$ V/m) | (dB)   |
| GFSK High Channel |                  |             |                  |            |       |                  |                     |                |        |
| 76.86             | 21.22            | QP          | 217              | 1.1        | H     | 9.91             | 31.13               | 41.00          | -9.87  |
| 76.86             | 18.92            | QP          | 286              | 1.7        | V     | 9.91             | 28.83               | 41.00          | -12.17 |
| 4960.00           | 51.67            | PK          | 182              | 1.5        | V     | -0.23            | 51.44               | 74.00          | -22.56 |
| 4960.00           | 44.47            | Ave         | 182              | 1.5        | V     | -0.23            | 44.24               | 54.00          | -9.76  |
| 7440.00           | 53.17            | PK          | 357              | 1.1        | H     | 2.76             | 55.93               | 74.00          | -18.07 |
| 7440.00           | 42.78            | Ave         | 357              | 1.1        | H     | 2.76             | 45.54               | 54.00          | -8.46  |
| 2337.08           | 45.01            | PK          | 353              | 1.0        | V     | -13.18           | 31.83               | 74.00          | -42.17 |
| 2337.08           | 38.67            | Ave         | 353              | 1.0        | V     | -13.18           | 25.49               | 54.00          | -28.51 |
| 2352.43           | 43.52            | PK          | 220              | 1.5        | H     | -13.15           | 30.37               | 74.00          | -43.63 |
| 2352.43           | 36.15            | Ave         | 220              | 1.5        | H     | -13.15           | 23.00               | 54.00          | -31.00 |
| 2495.75           | 43.12            | PK          | 107              | 2.0        | V     | -13.09           | 30.03               | 74.00          | -43.97 |
| 2495.75           | 37.69            | Ave         | 107              | 2.0        | V     | -13.09           | 24.60               | 54.00          | -29.40 |

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

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

## 8 Band Edge Measurement

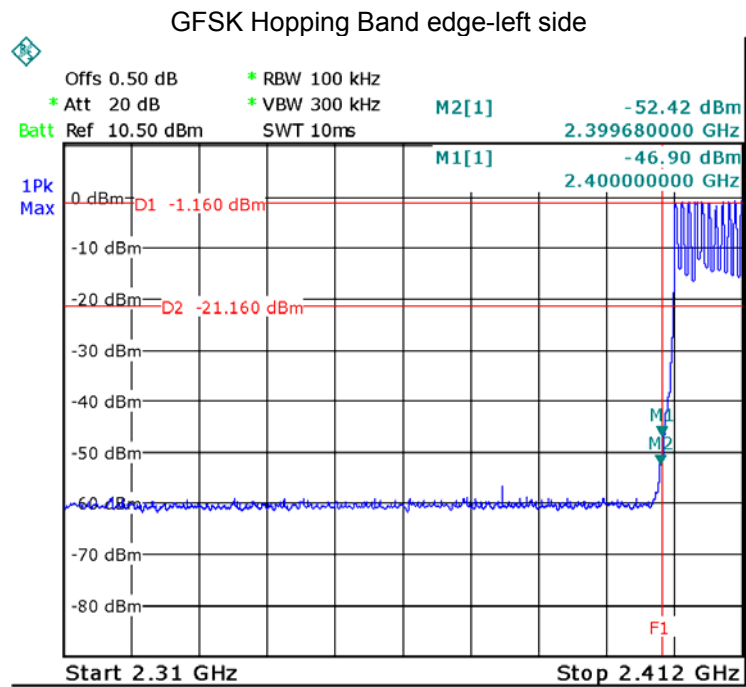
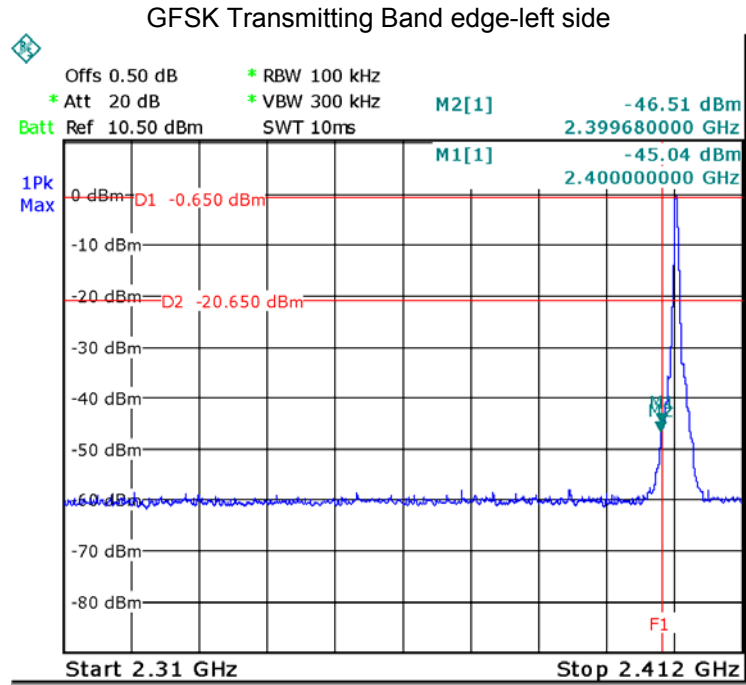
|                   |   |
|-------------------|---|
| Test Requirement: | Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). |
| Test Method:      | DA 00-705   |
| Test Mode:        | Transmitting and Hopping  |

### 8.1 Test Procedure

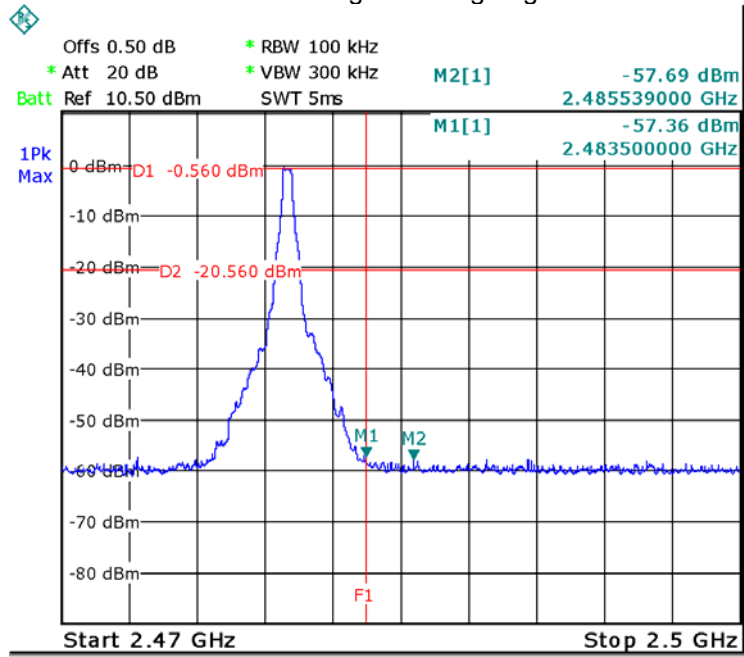
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto  
Detector function = peak, Trace = max hold

### 8.2 Test Result

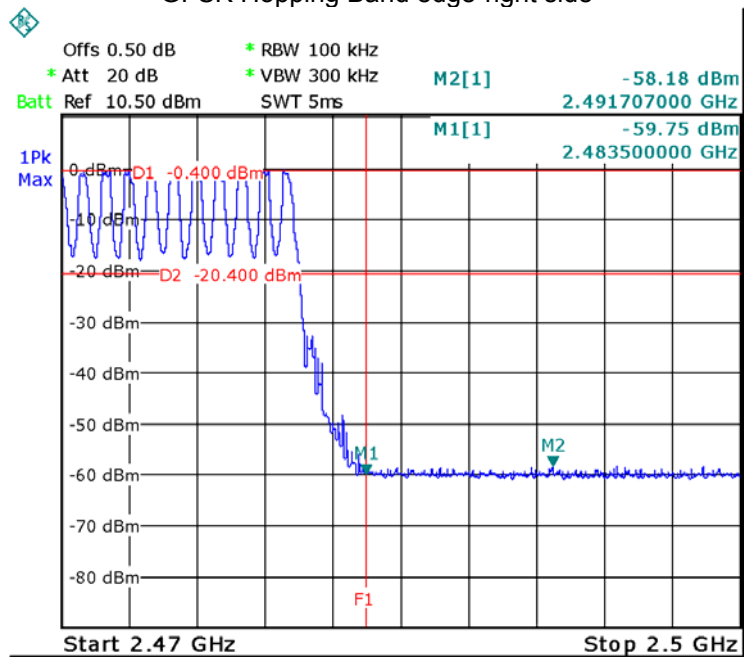
#### Test plots

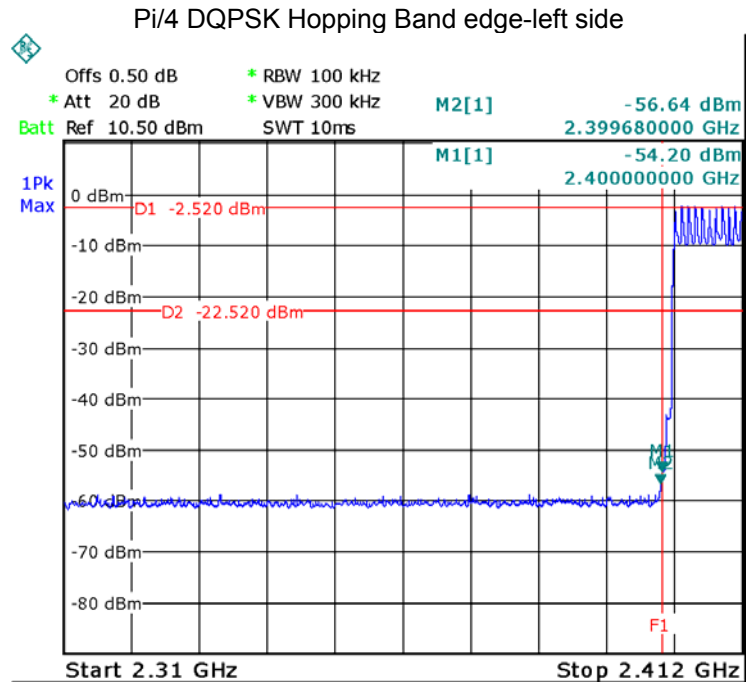
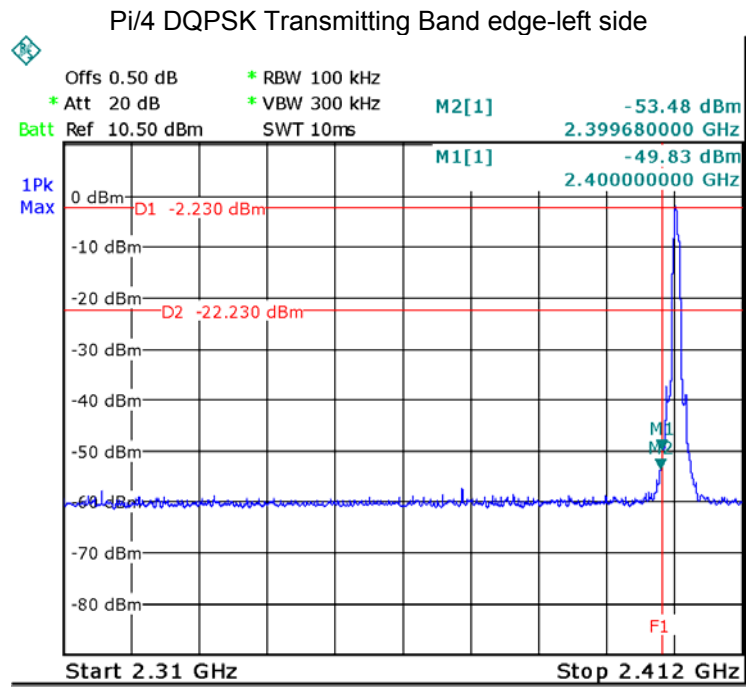


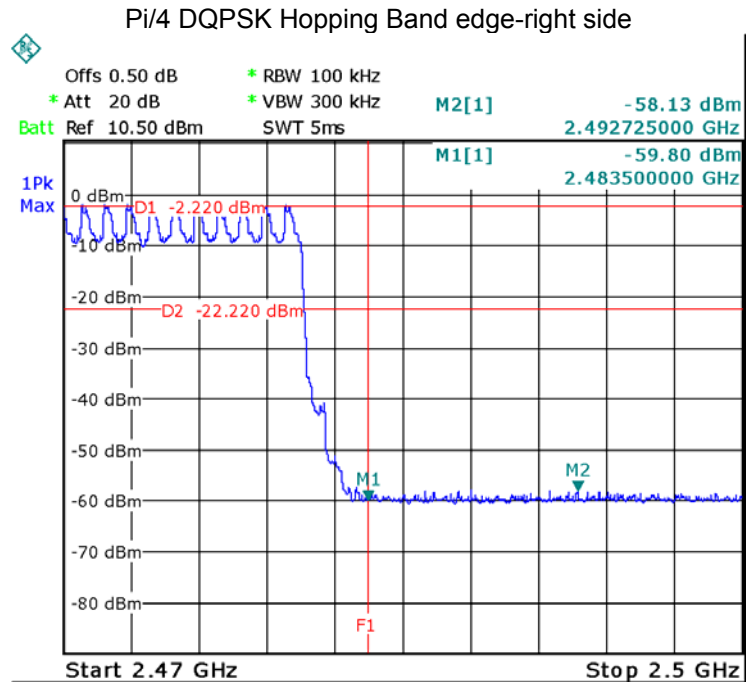
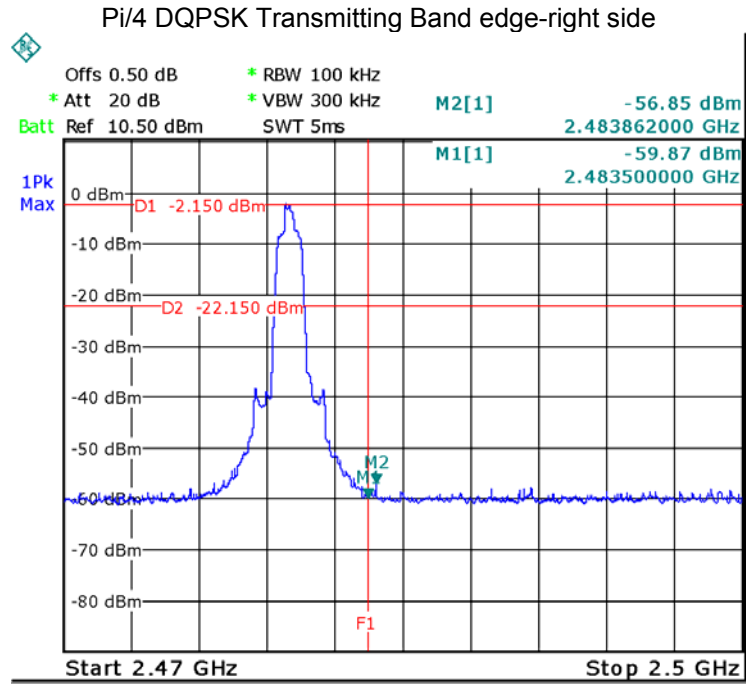
### GFSK Transmitting Band edge-right side

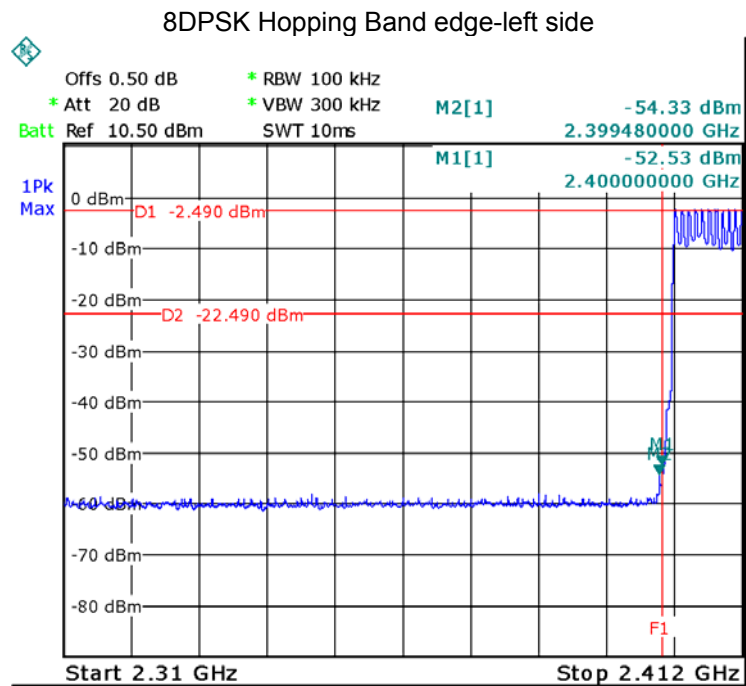
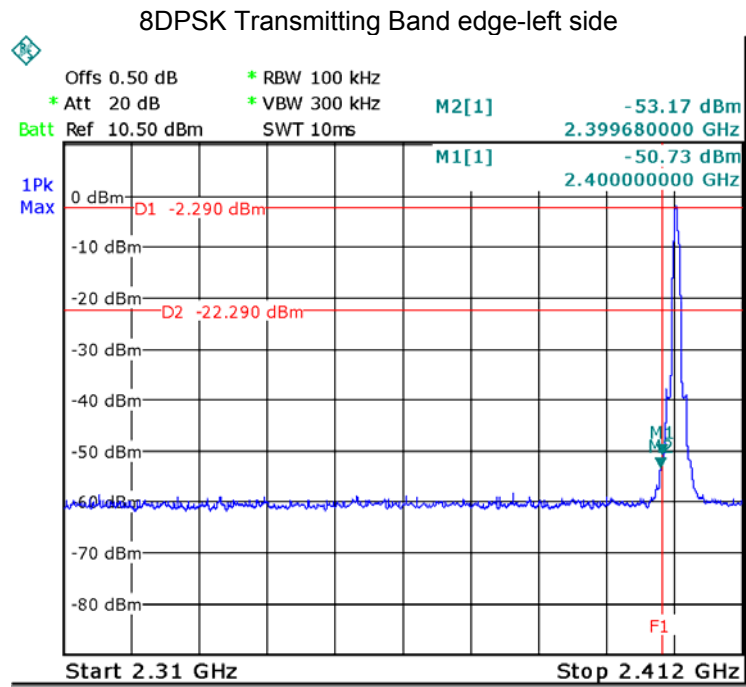


### GFSK Hopping Band edge-right side

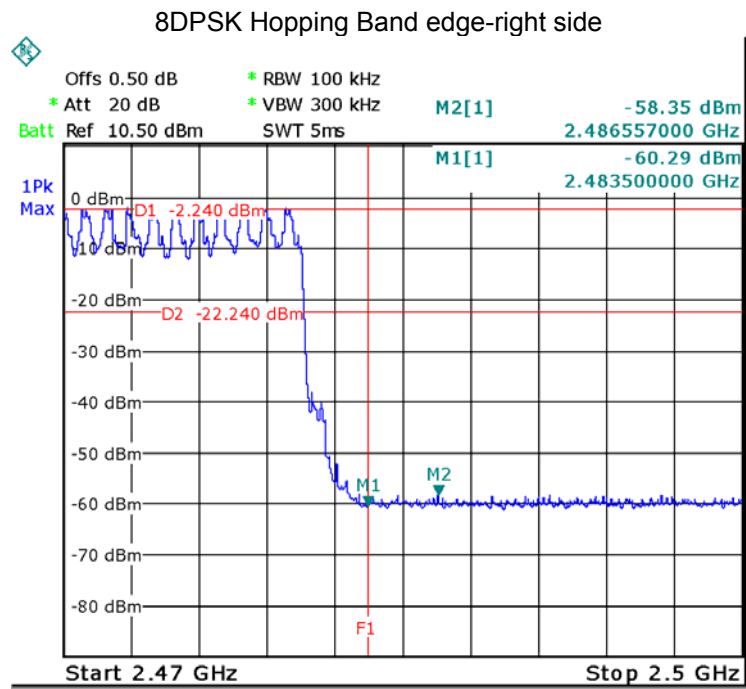
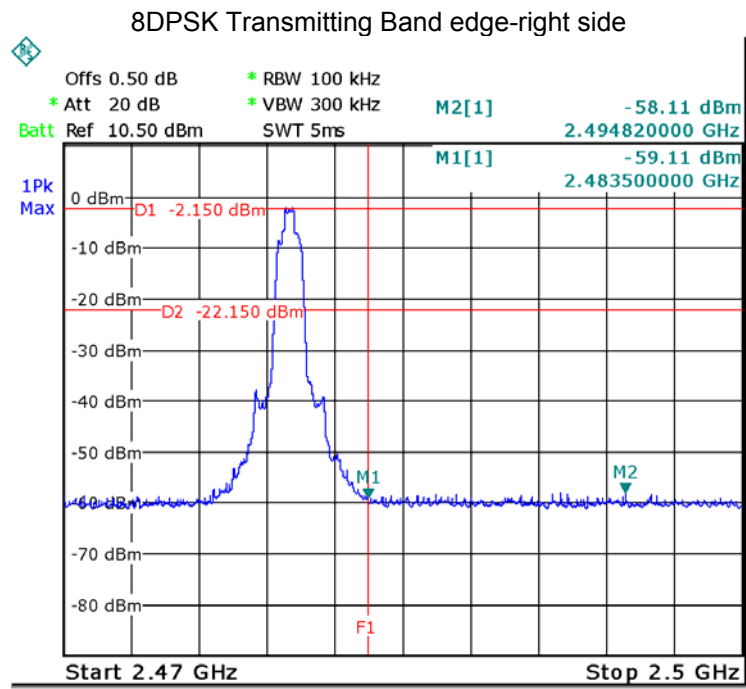












## 9 20 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: DA 00-705

Test Mode: Test in fixing operating frequency at low, Middle, high channel.

### 9.1 Test Procedure

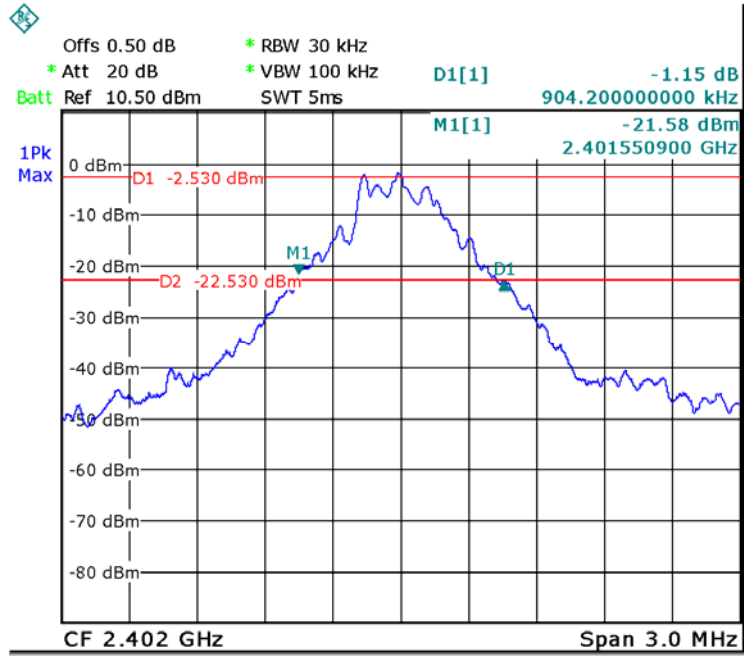
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

### 9.2 Test Result

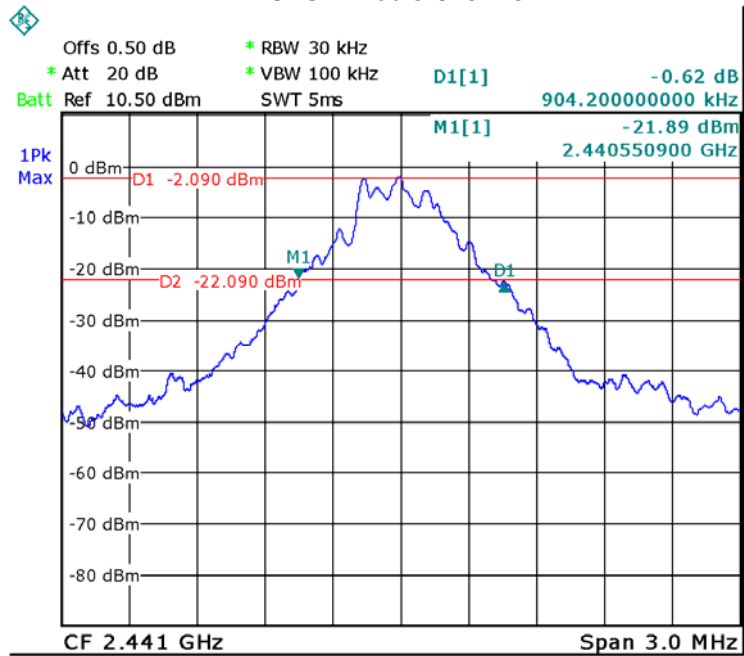
| Modulation | Test Channel | Bandwidth |
|------------|--------------|-----------|
| GFSK       | Low          | 0.904MHz  |
| GFSK       | Middle       | 0.904MHz  |
| GFSK       | High         | 0.904MHz  |
| Pi/4 DQPSK | Low          | 1.234MHz  |
| Pi/4 DQPSK | Middle       | 1.234MHz  |
| Pi/4 DQPSK | High         | 1.234MHz  |
| 8DPSK      | Low          | 1.210MHz  |
| 8DPSK      | Middle       | 1.210MHz  |
| 8DPSK      | High         | 1.210MHz  |

Test plots

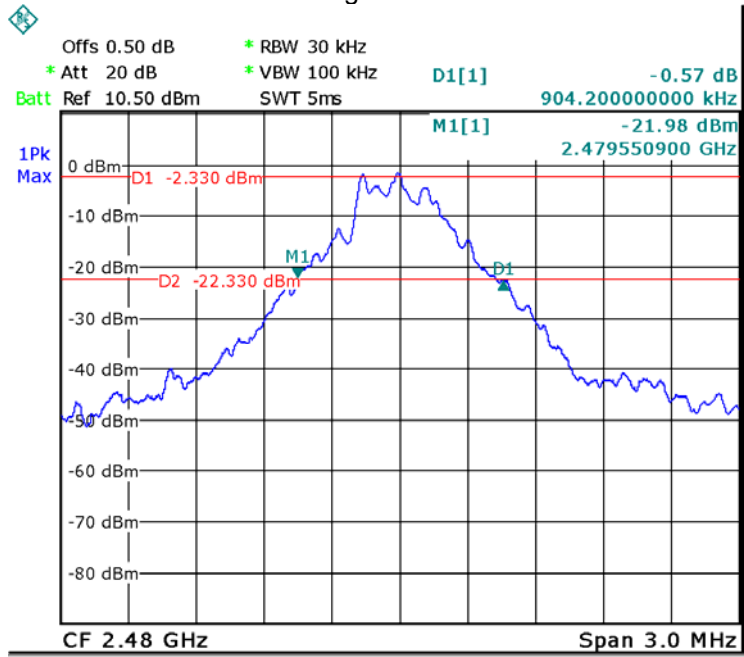
GFSK Low Channel



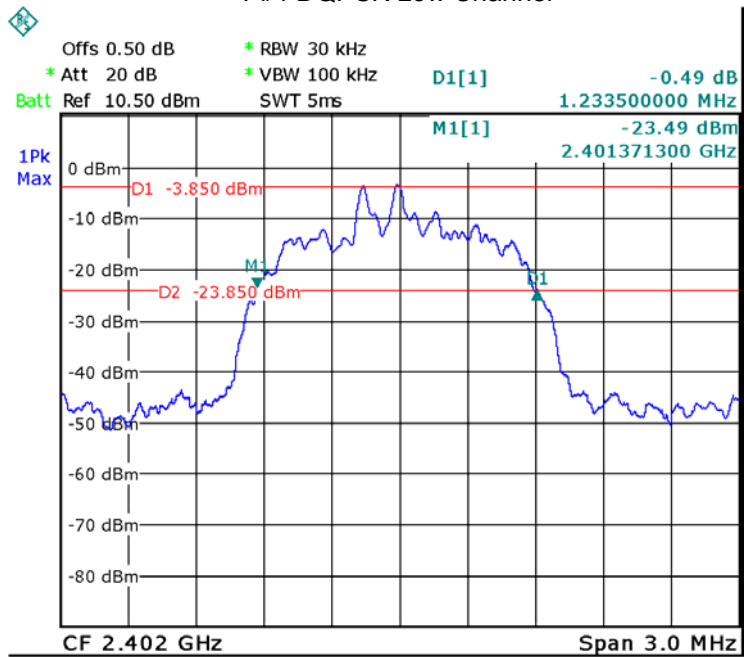
GFSK Middle Channel



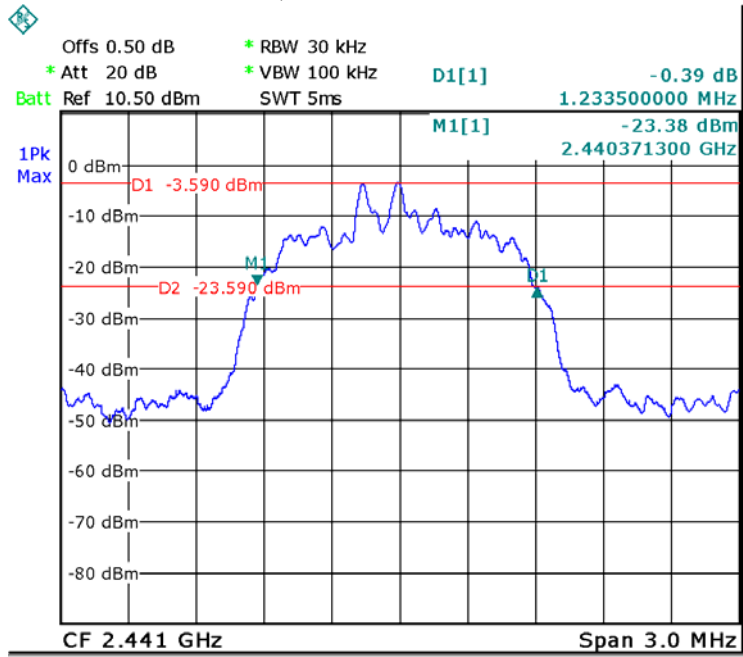
### GFSK High Channel



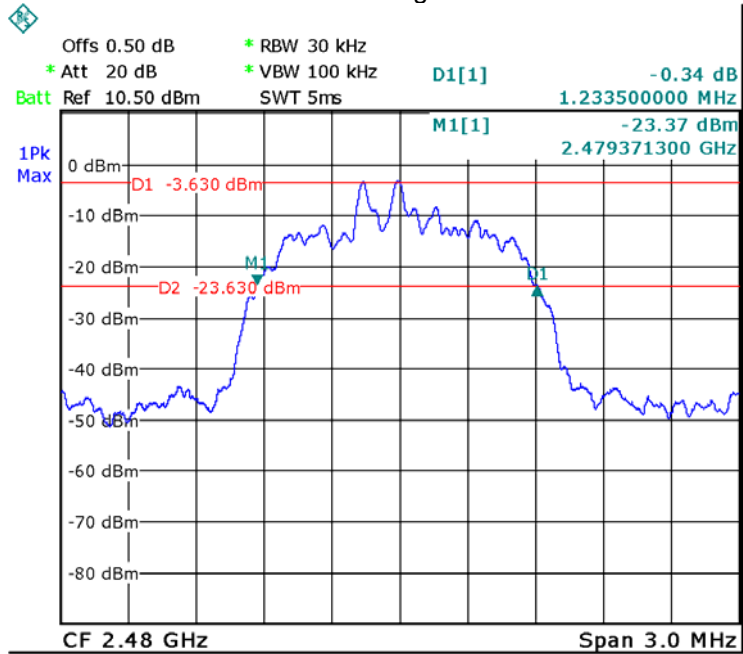
### Pi/4 DQPSK Low Channel



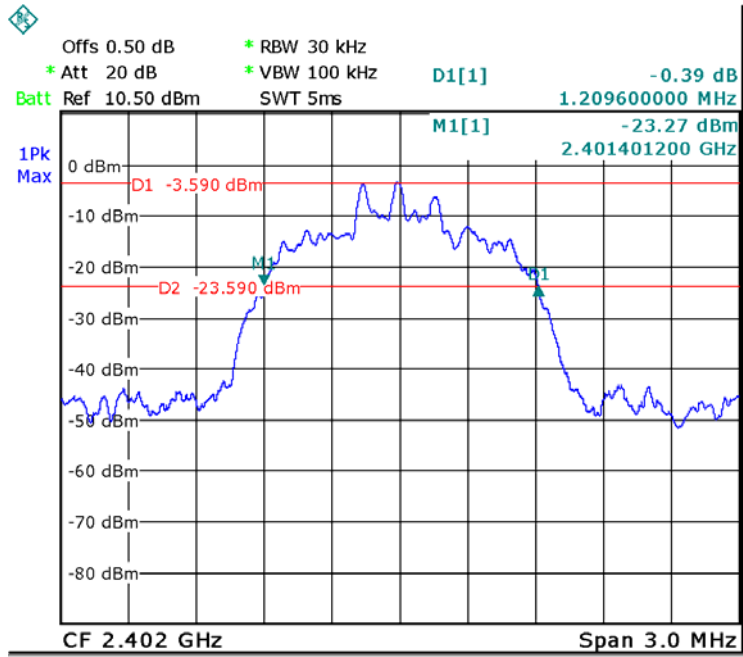
### Pi/4 DQPSK Middle Channel



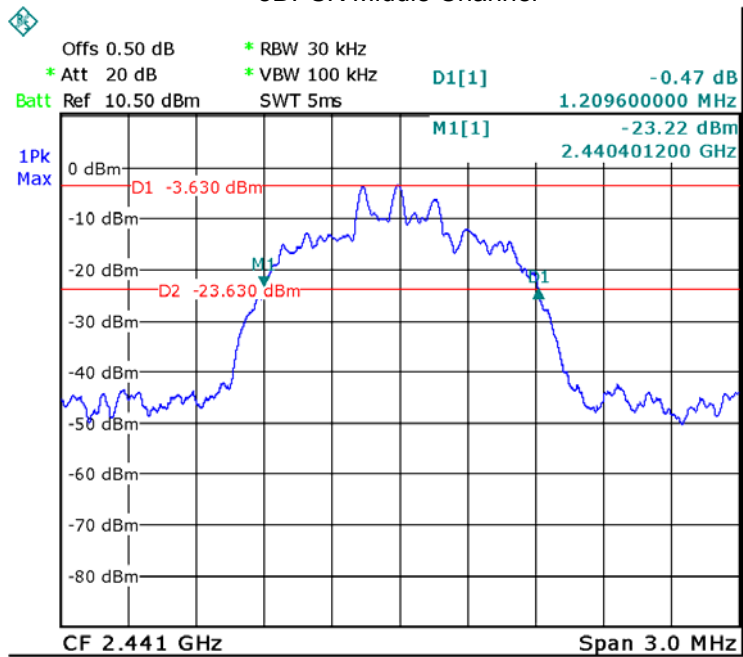
### Pi/4 DQPSK High Channel

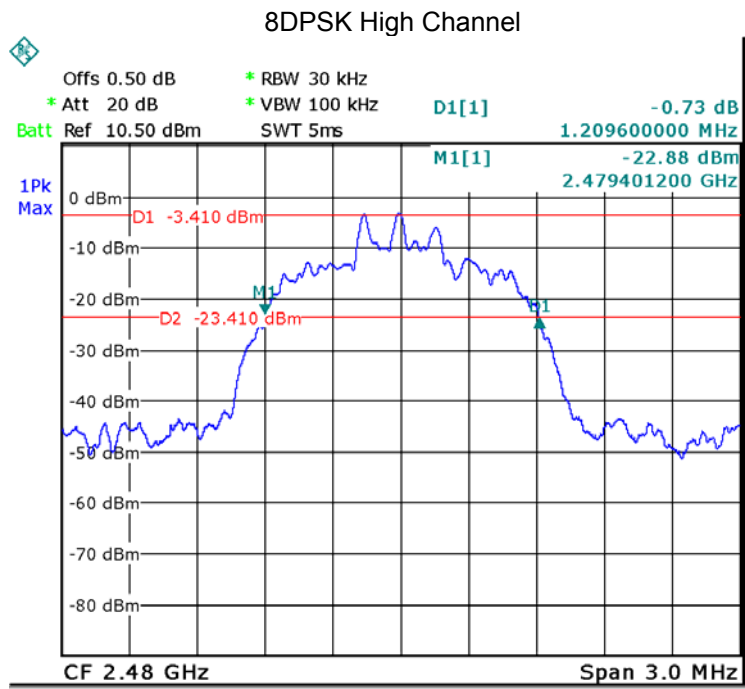


### 8DPSK Low Channel



### 8DPSK Middle Channel





## 10 Maximum Peak Output Power

|                   |   |
|-------------------|---|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247  |
| Test Method:      | DA 00-705   |
| Test Limit:       | Regulation 15.247 (b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.<br>Refer to the result "Number of Hopping Frequency" of this document. The 0.125watts (20.97 dBm) limit applies. |
| Test mode:        | Test in fixing frequency transmitting mode.   |

### 10.1 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 = 10MHz. VBW = 10MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

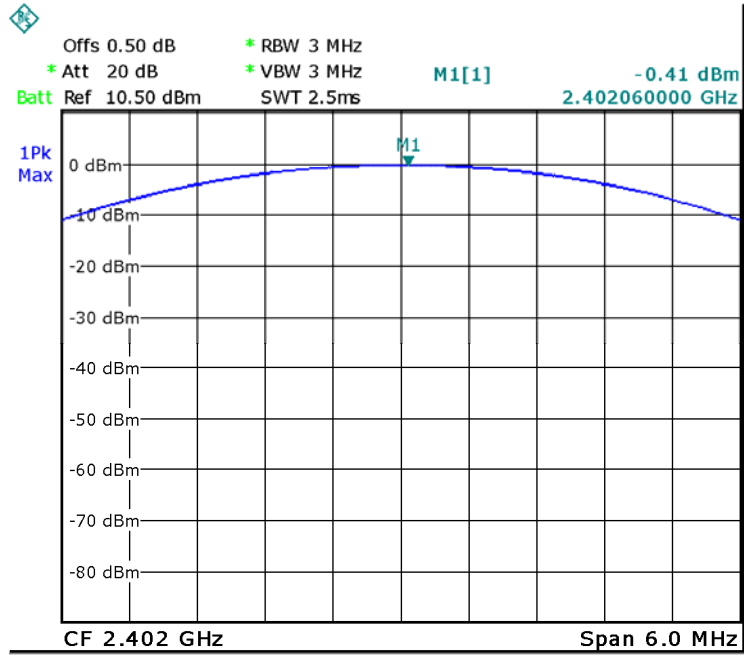
### 10.2 Test Result

| Modulation | Test Channel | Output Power (dBm) | Limit (dBm) |
|------------|--------------|--------------------|-------------|
| GFSK       | Low          | -0.41              | 30          |
| GFSK       | Middle       | -0.51              | 30          |
| GFSK       | High         | -0.10              | 30          |
| Pi/4 DQPSK | Low          | -1.74              | 21          |
| Pi/4 DQPSK | Middle       | -1.82              | 21          |
| Pi/4 DQPSK | High         | -1.64              | 21          |
| 8DPSK      | Low          | -1.55              | 21          |
| 8DPSK      | Middle       | -1.67              | 21          |
| 8DPSK      | High         | -1.41              | 21          |

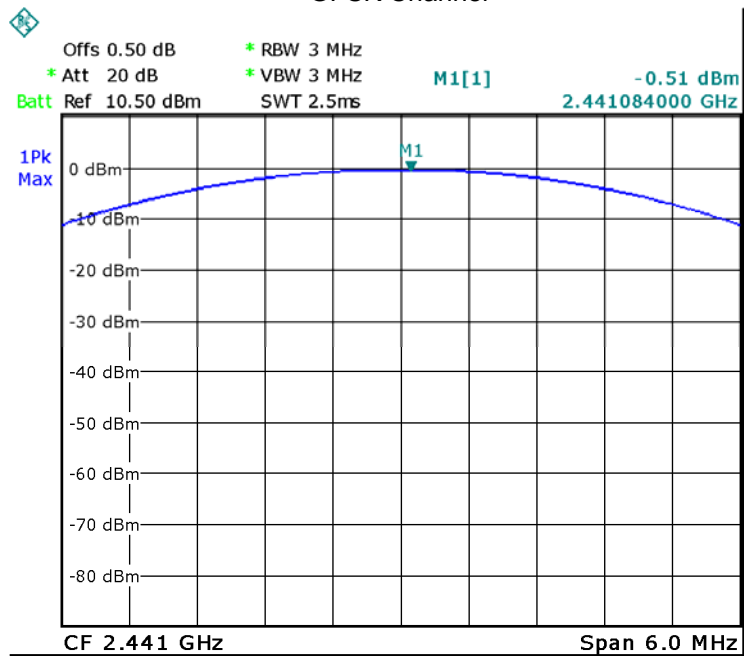


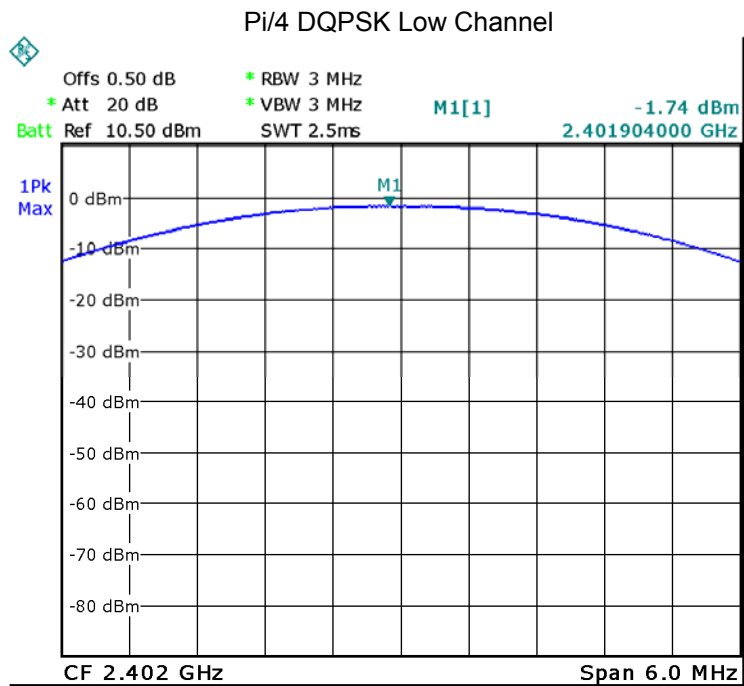
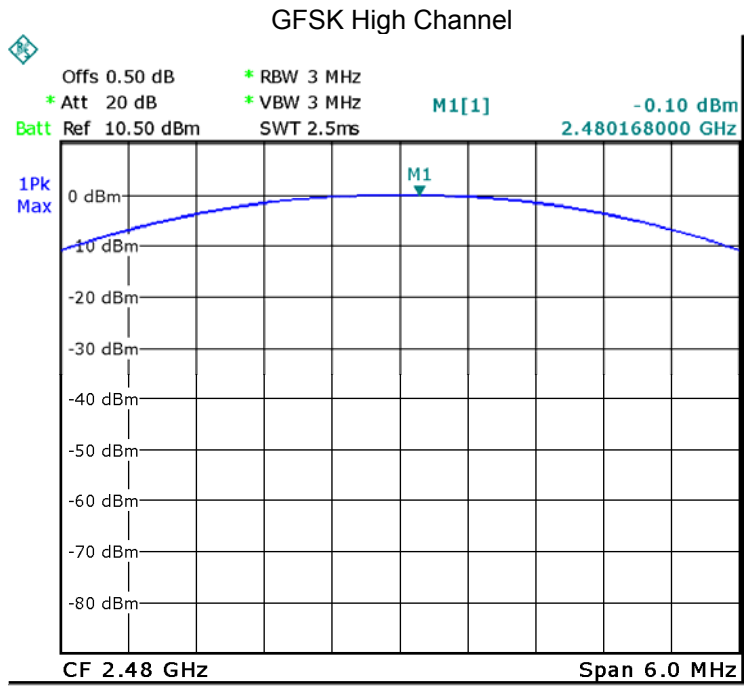
Test plots

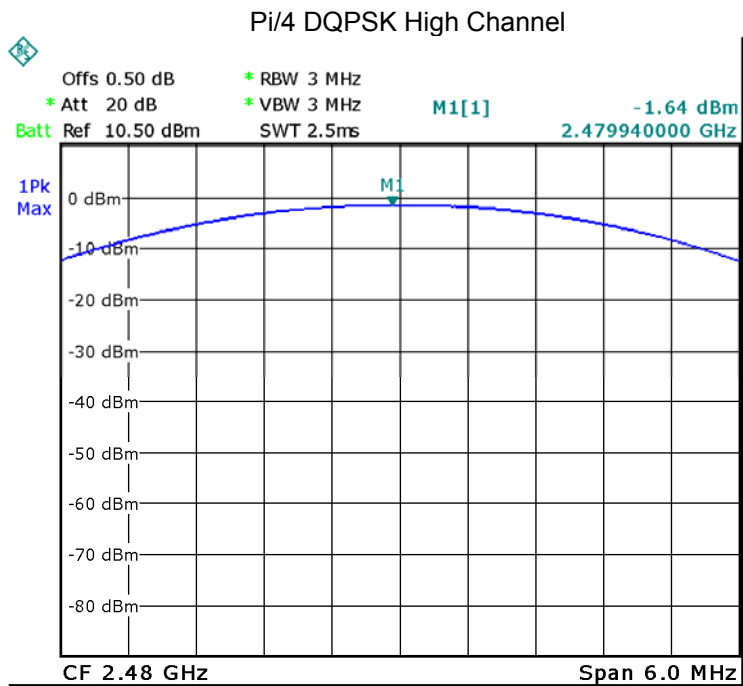
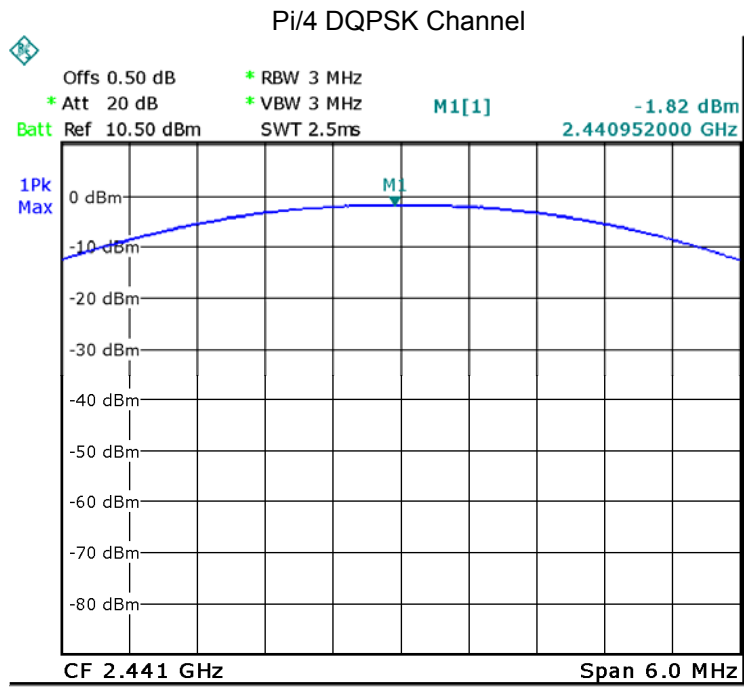
GFSK Low Channel

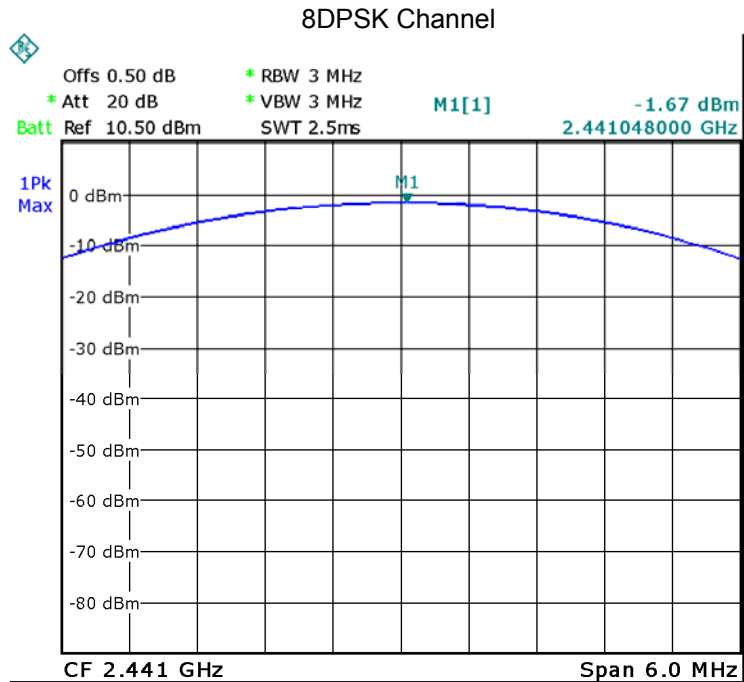
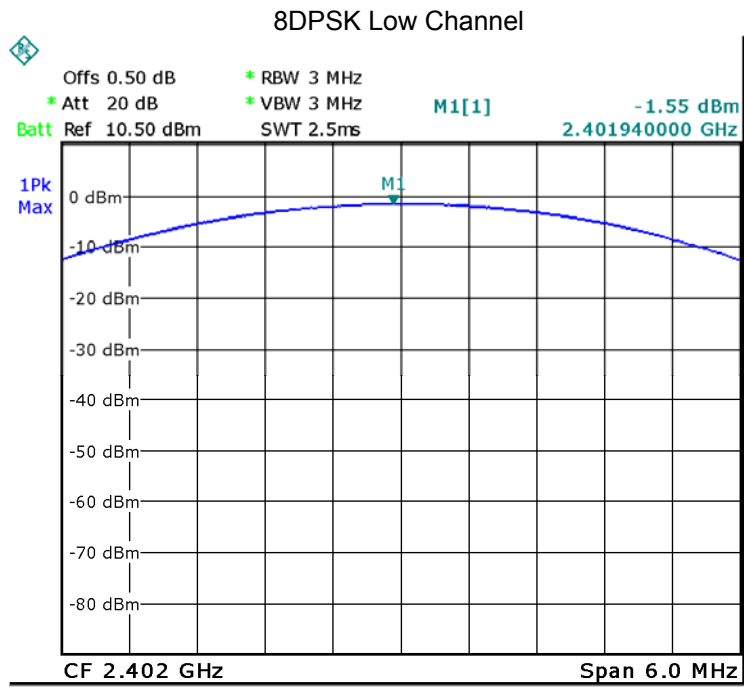


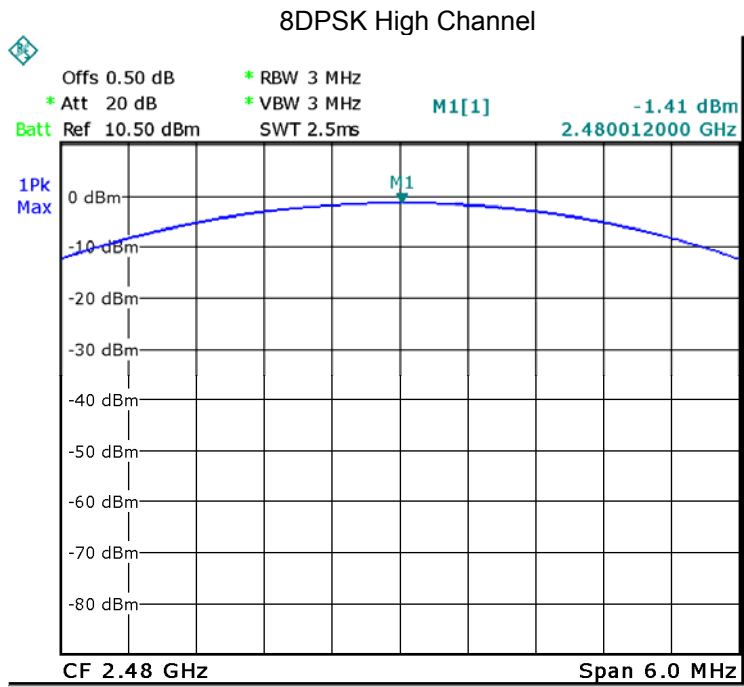
GFSK Channel











## 11 Hopping Channel Separation

|                   |  |
|-------------------|--|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247   |
| Test Method:      | DA 00-705  |
| Test Limit:       | Regulation 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 1W. |
| Test Mode:        | Test in hopping transmitting operating mode.   |

### 11.1 Test Procedure

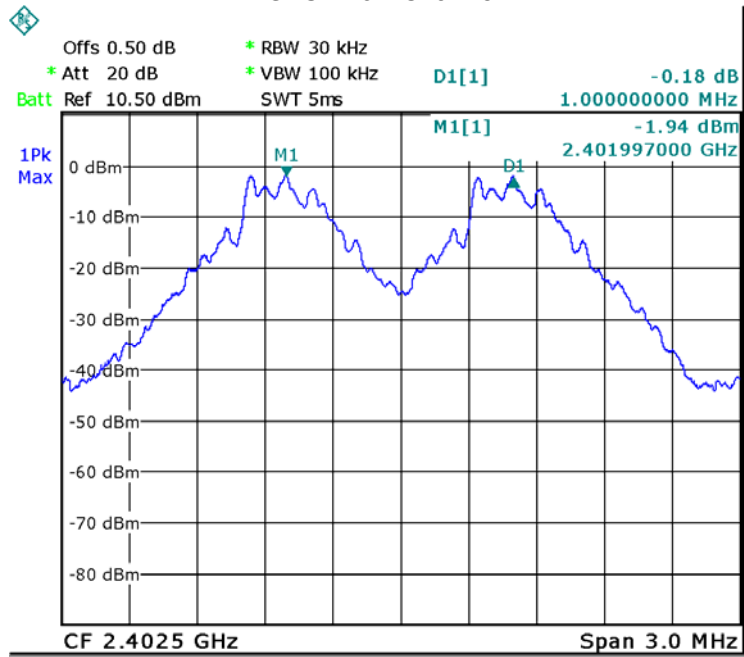
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz , Span = 6.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function 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

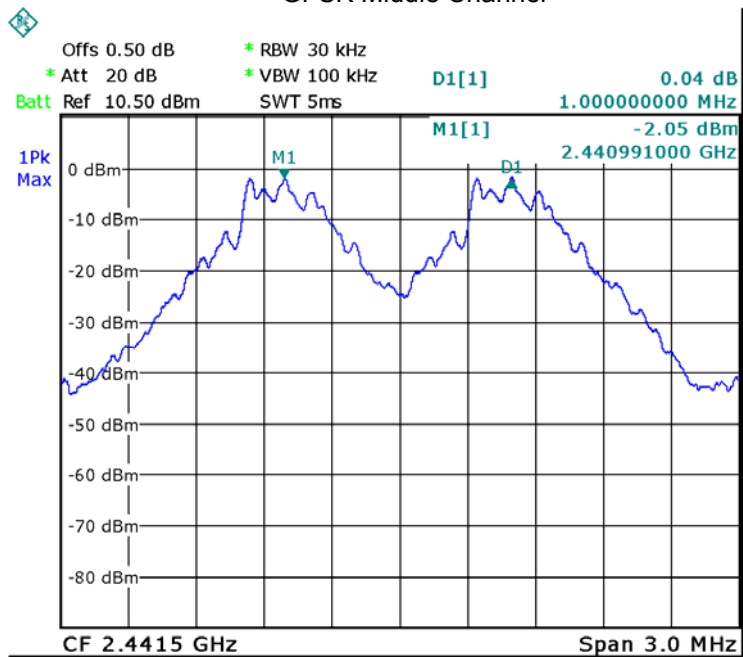
| Modulation | Test Channel | Separation (MHz) | Result |
|------------|--------------|------------------|--------|
| GFSK       | Low          | 1.000            | PASS   |
| GFSK       | Middle       | 1.000            | PASS   |
| GFSK       | High         | 1.000            | PASS   |
| Pi/4 DQPSK | Low          | 1.000            | PASS   |
| Pi/4 DQPSK | Middle       | 1.000            | PASS   |
| Pi/4 DQPSK | High         | 1.000            | PASS   |
| 8DPSK      | Low          | 1.000            | PASS   |
| 8DPSK      | Middle       | 1.000            | PASS   |
| 8DPSK      | High         | 1.000            | PASS   |

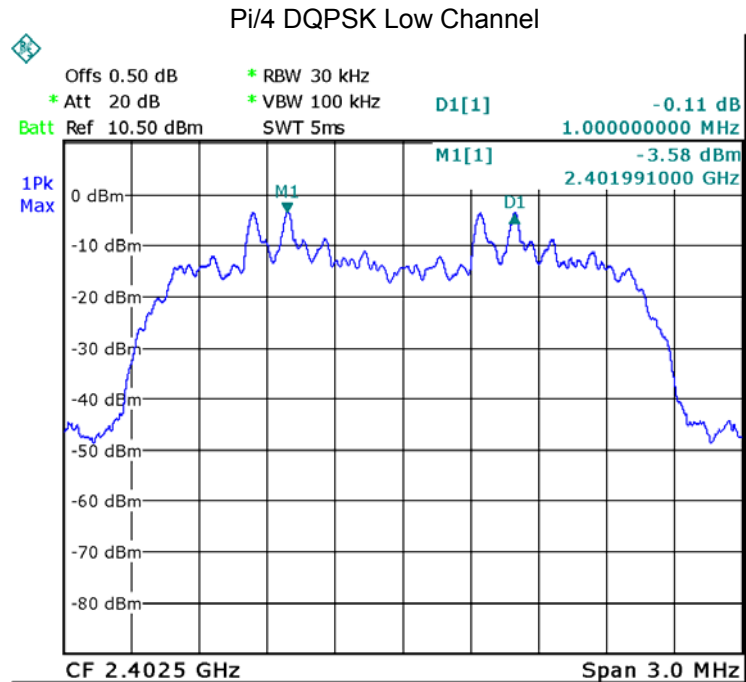
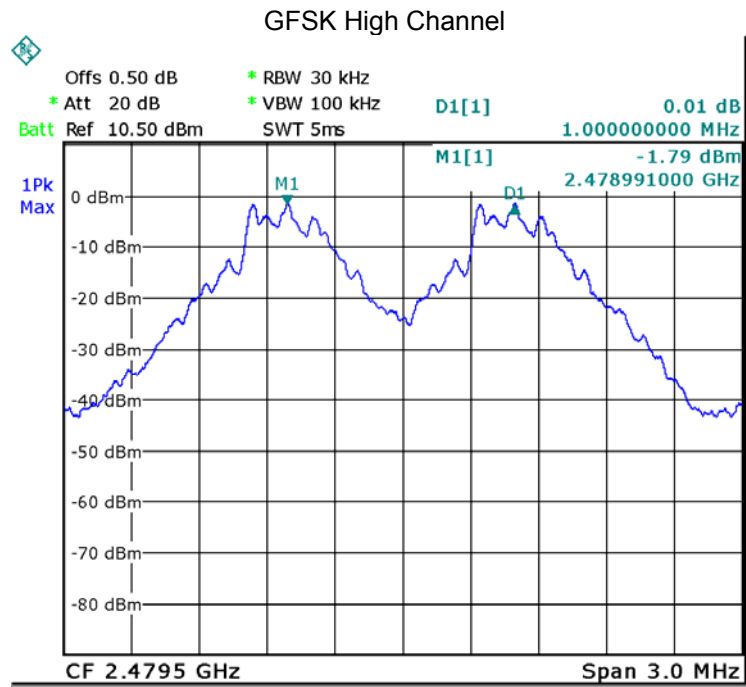
Test plots

GFSK Low Channel

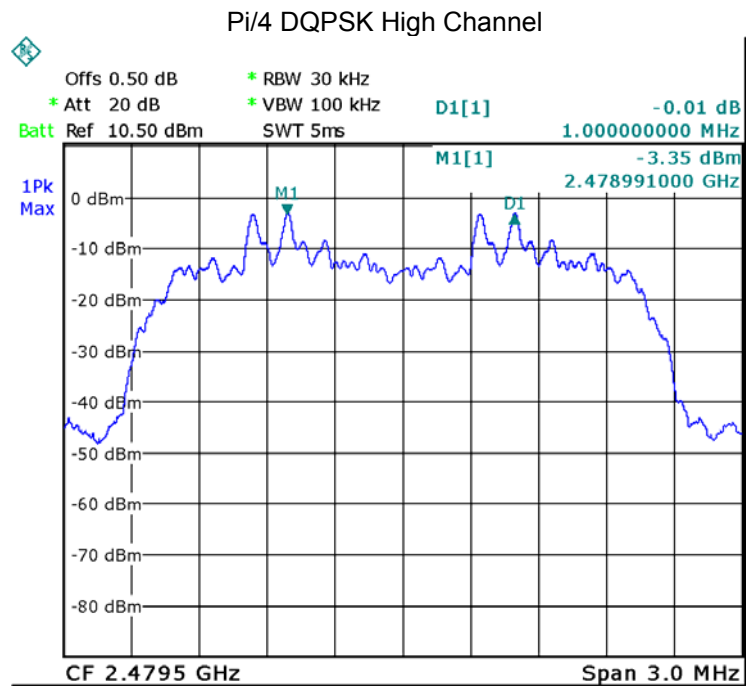
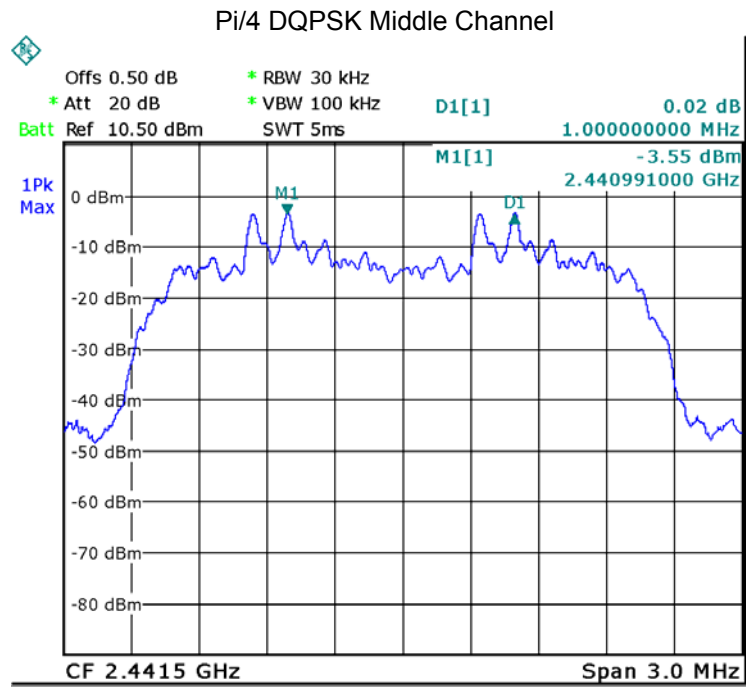


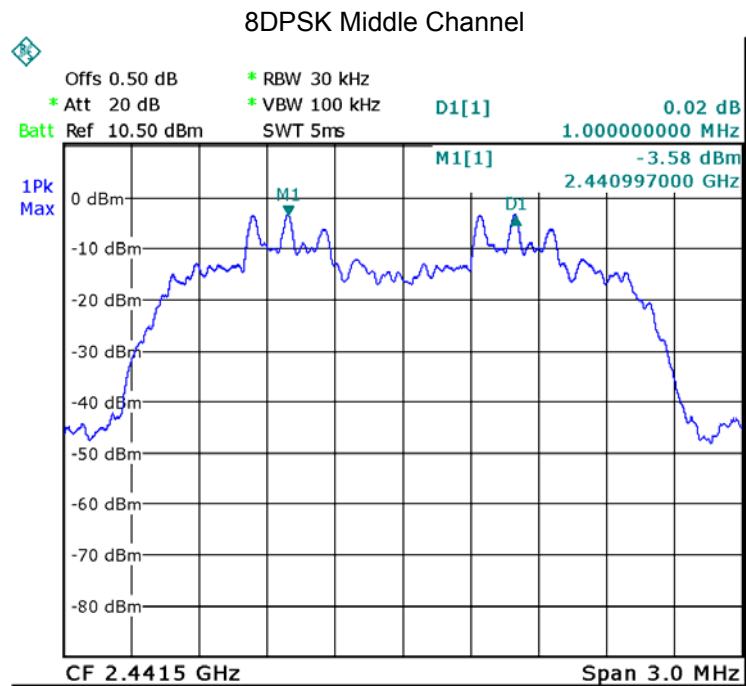
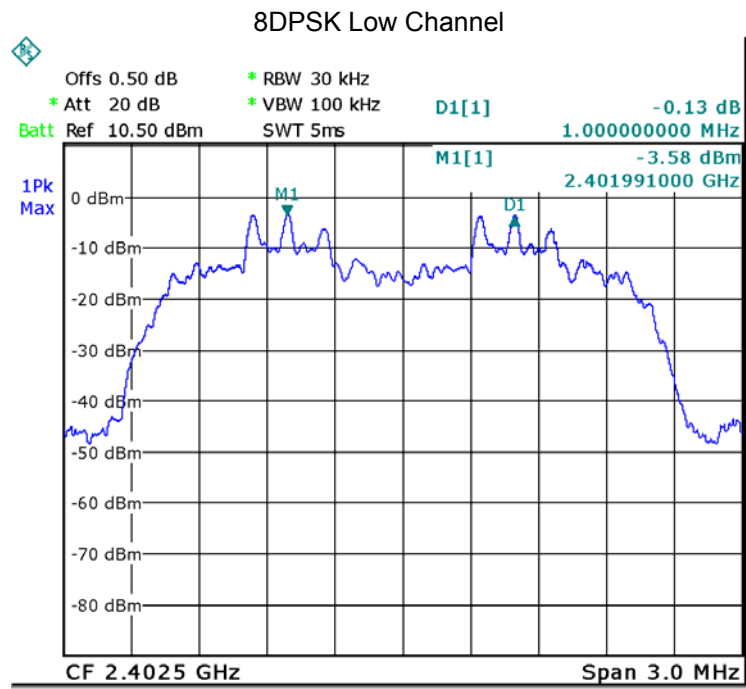
GFSK Middle Channel

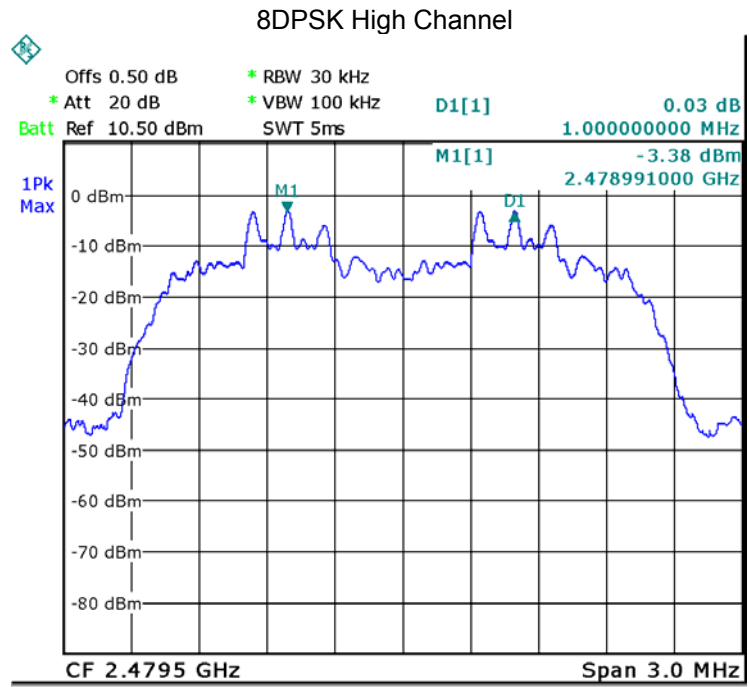












## 12 Number of Hopping Frequency

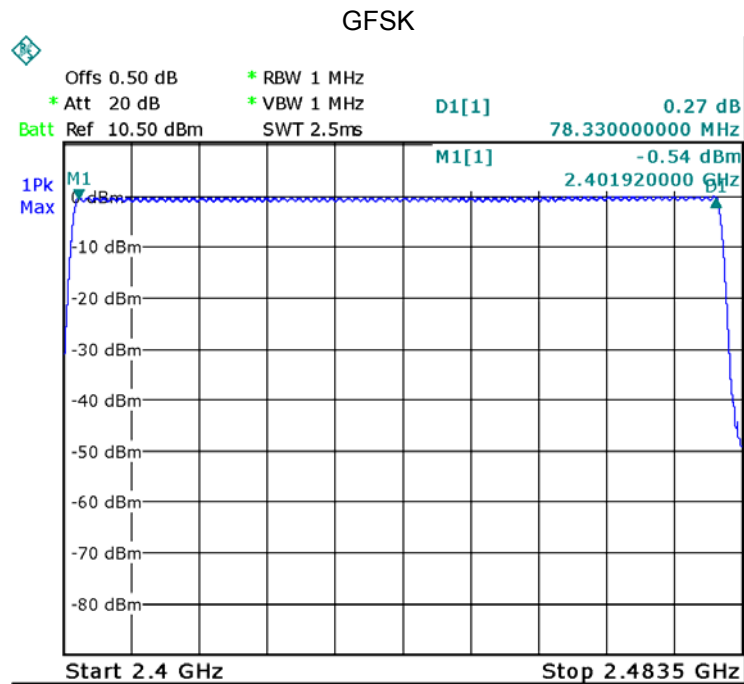
|                   |   |
|-------------------|---|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247  |
| Test Method:      | DA 00-705   |
| Test Limit:       | Regulation 15.247 (a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. |
| Test Mode:        | Test in hopping transmitting operating mode.  |

### 12.1 Test Procedure

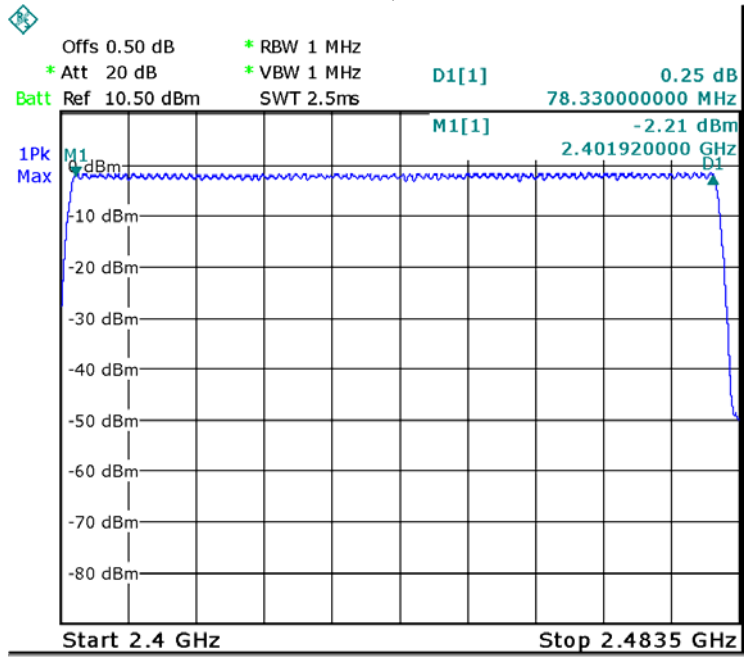
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 1MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.483GHz. Sweep=auto;

### 12.2 Test Result

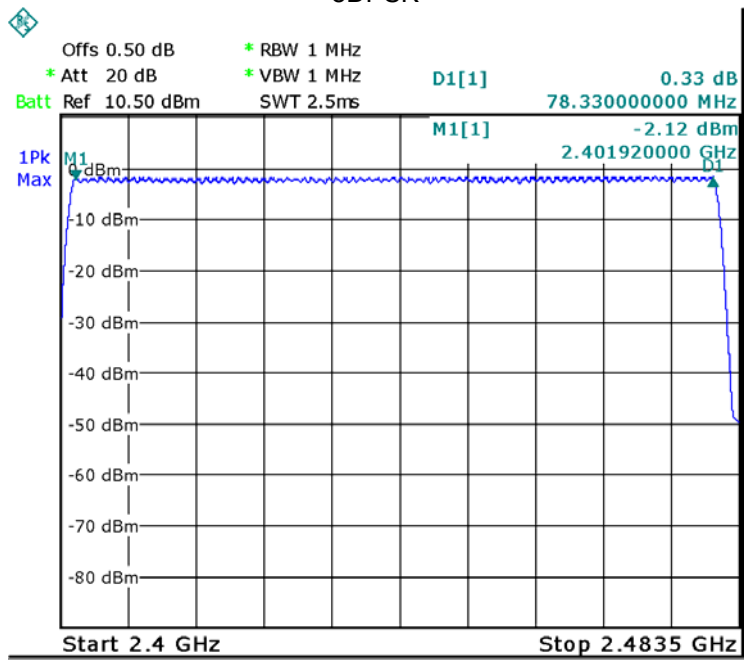
Test Plot: 79 Channels in total



### Pi/4 DQPSK



### 8DPSK



## 13 Dwell Time

|                   |  |
|-------------------|--|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247   |
| Test Method:      | DA 00-705  |
| Test Limit:       | Regulation 15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. |
| Test Mode:        | Test in hopping transmitting operating mode.   |

### 13.1 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 spectrum analyzer span = 0. Centred on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz. Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

### 13.2 Test Result

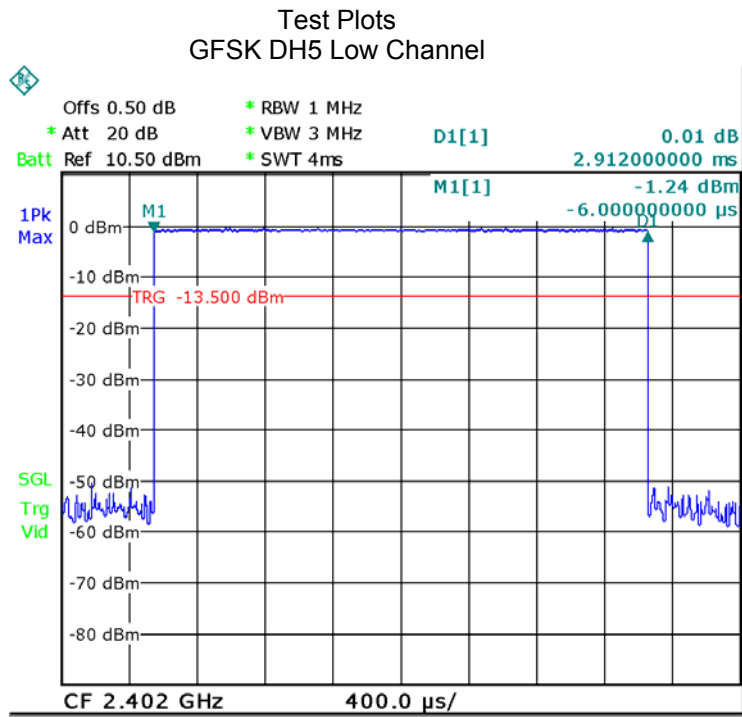
DH5 Packet permit maximum  $1600 / 79 / 6$  hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum  $1600 / 79 / 4$  hops per second in each channel (3 time slots RX, 1 time slot TX).

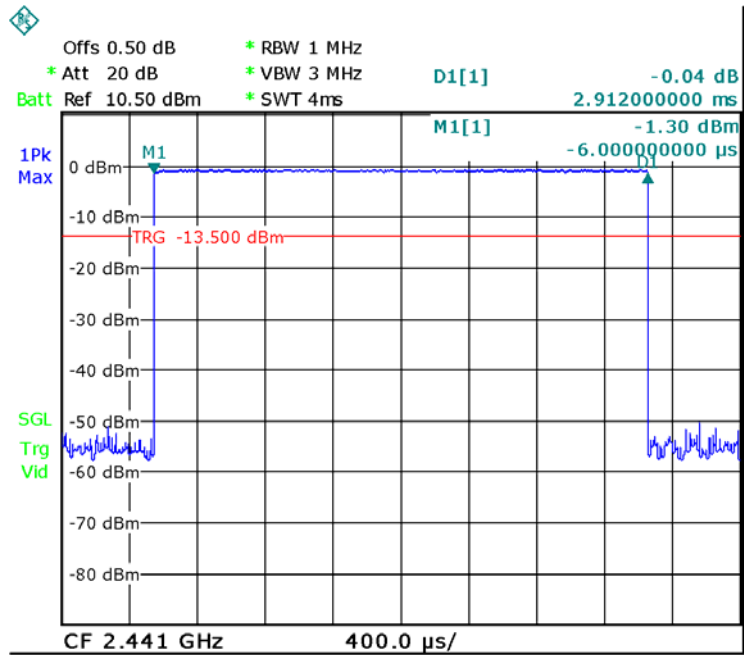
DH1 Packet permit maximum  $1600 / 79 / 2$  hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

| Data Packet   | Dwell Time(s)                      |
|---|------------------------------------|
| DH5   | $1600/79/6*0.4*79*(MkrDelta)/1000$ |
| DH3   | $1600/79/4*0.4*79*(MkrDelta)/1000$ |
| DH1   | $1600/79/2*0.4*79*(MkrDelta)/1000$ |
| Remark: Mkr Delta is once pulse time. Only the worst data(DH5) were show as follow. |                                    |

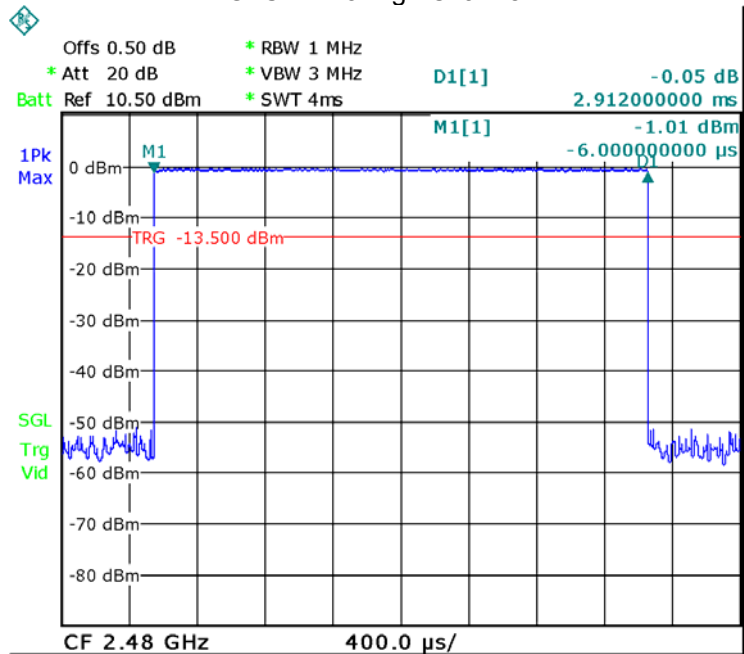
| Modulation | Data Packet | Channel | pulse time(ms) | Dwell Time(s) | Limits(s) |
|------------|-------------|---------|----------------|---------------|-----------|
| GFSK       | DH5         | Low     | 2.912          | 0.311         | 0.4       |
|            |             | middle  | 2.912          | 0.311         | 0.4       |
|            |             | High    | 2.912          | 0.311         | 0.4       |
| Pi/4DQPSK  | DH5         | Low     | 2.920          | 0.311         | 0.4       |
|            |             | middle  | 2.920          | 0.311         | 0.4       |
|            |             | High    | 2.920          | 0.311         | 0.4       |
| 8DPSK      | DH5         | Low     | 2.912          | 0.311         | 0.4       |
|            |             | middle  | 2.912          | 0.311         | 0.4       |
|            |             | High    | 2.920          | 0.311         | 0.4       |



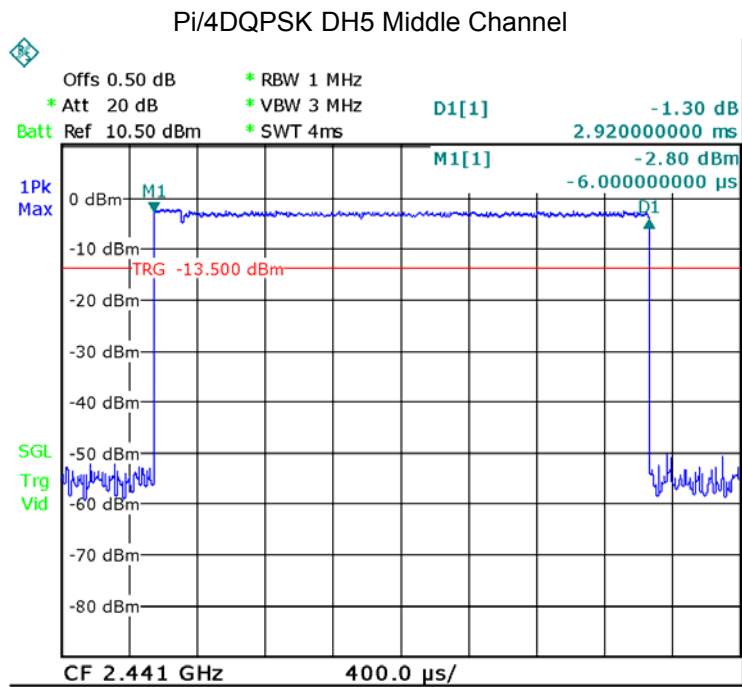
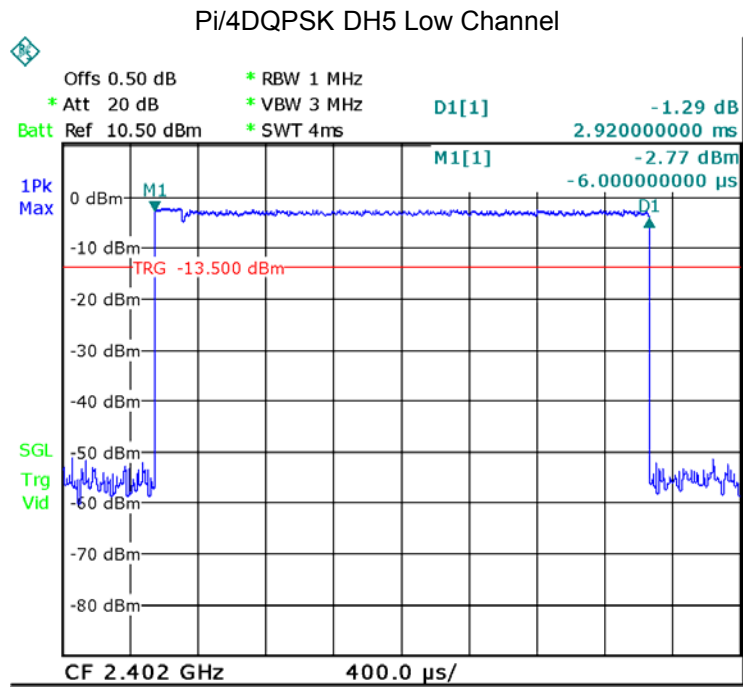
### GFSK DH5 Middle Channel

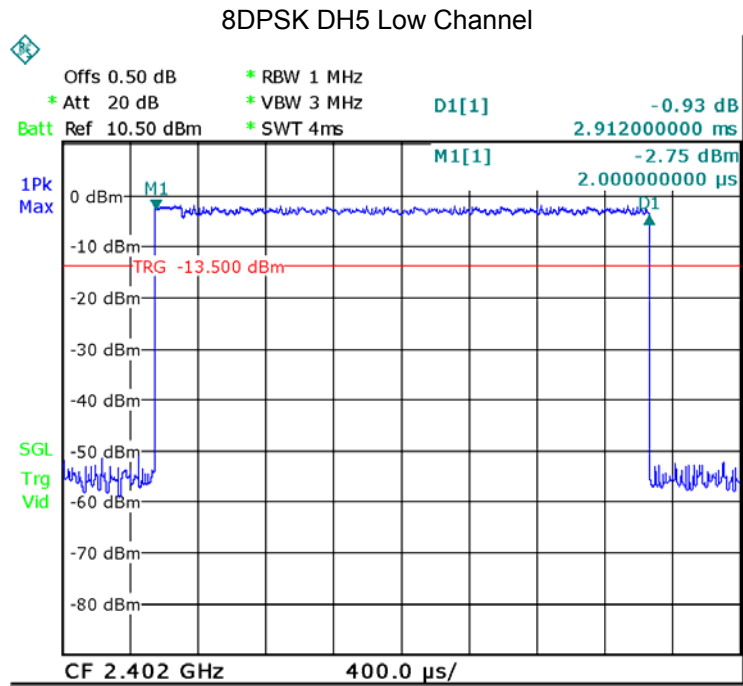
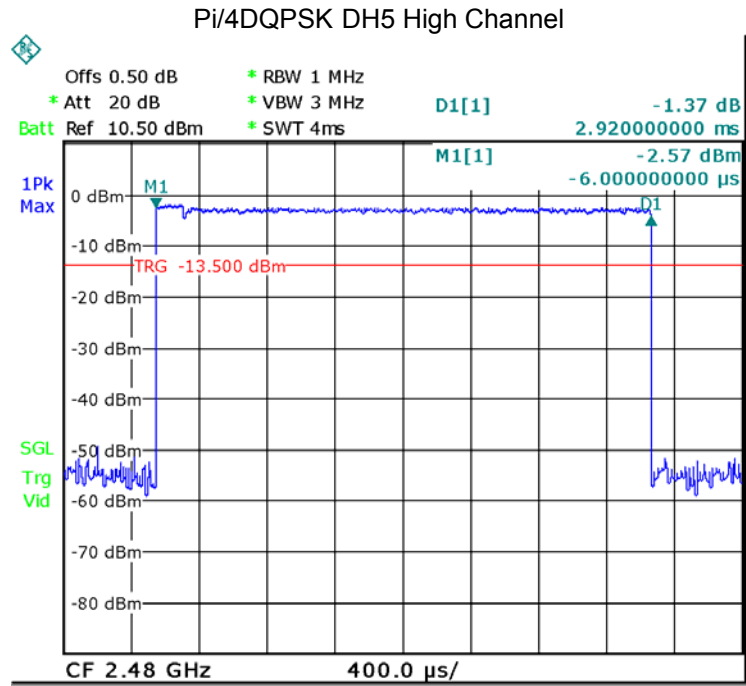


### GFSK DH5 High Channel

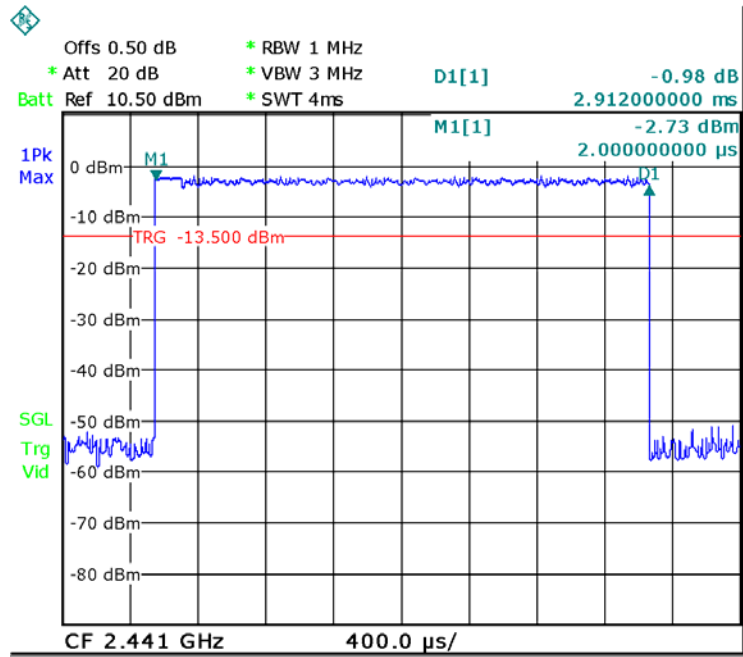




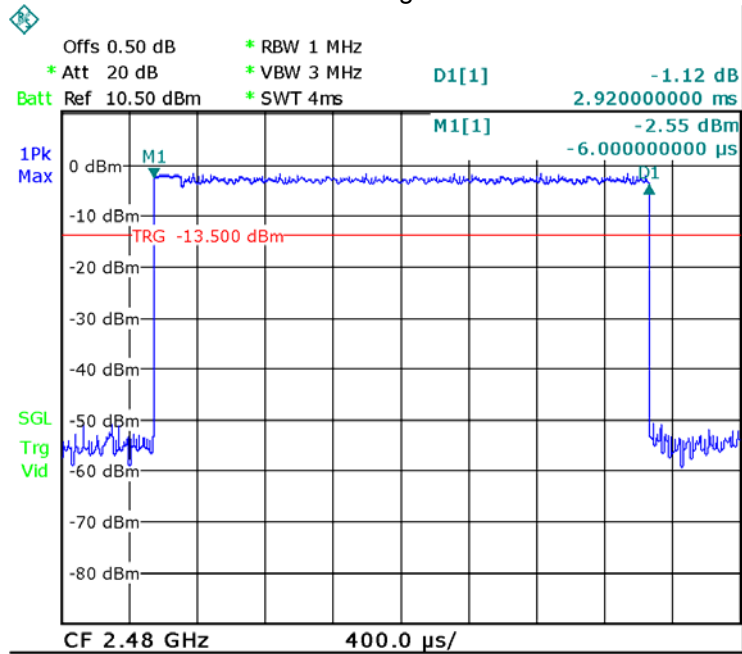




### 8DPSK DH5 Middle Channel



### 8DPSK DH5 High Channel



## **14 Antenna Requirement**

According to the FCC Part 15 Paragraph 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. This product has a PCB printed antenna, fulfil the requirement of this section.

## 15 RF Exposure

|                   |  |
|-------------------|--|
| Test Requirement: | FCC Part 1.1307                                |
| Evaluation Method | 447498 D01 General RF Exposure Guidance v05r02 |

### 15.1 Requirements

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances 50 mm are determined by:

$$\left[ \frac{\text{max. power of channel, including tune-up tolerance, (mW)}}{\text{min. test separation distance, (mm)}} \right] \cdot [f(\text{GHz})]^{3.0}$$
 for 1-g SAR and  $7.5$  for 10-g extremity SAR where

1.  $f(\text{GHz})$  is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

### 15.2 The procedures / limit

| Conducted Peak power(dBm) | Conducted Peak power(mW) | Source-based time-averaged maximum conducted output power(mW) | Minimum test separation distance required for the exposure conditions (mm) | SAR Test Exclusion Thresholds(mW) |
|---------------------------|--------------------------|---|--|-----------------------------------|
| -0.10                     | 0.98                     | 0.98  | 5  | 10                                |

Remark: Max. duty factor is 100%

Calculation formula: Source-based time-averaged maximum conducted output power(mW) = Conducted peak power(mW)\*Duty factor

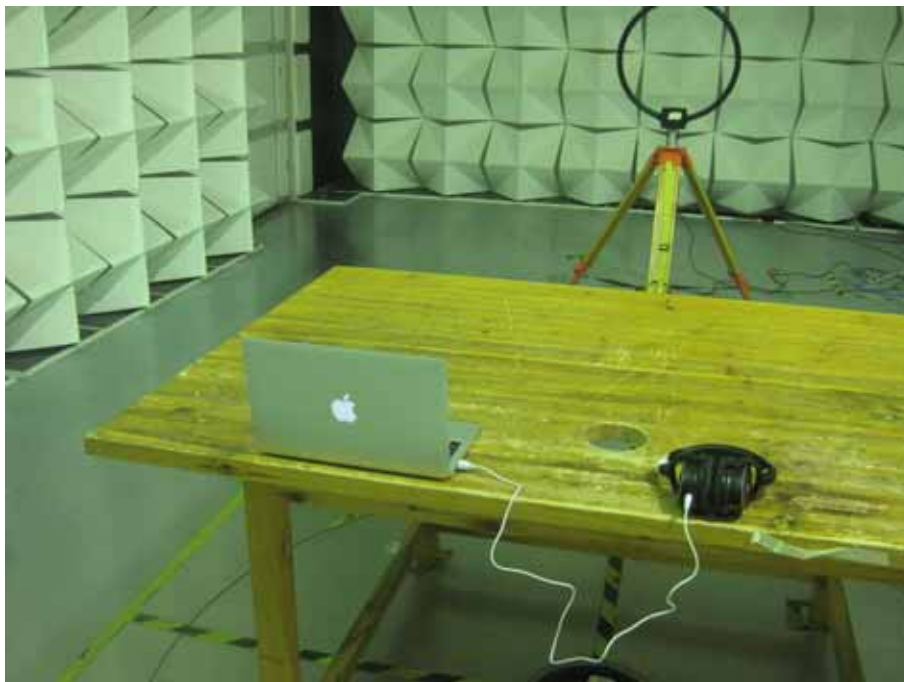
## 16 Photographs – Model YU-BT901 Test Setup

### 16.1 Photograph – Conducted Emission Test Setup



### 16.2 Photograph – Radiation Spurious Emission Test Setup

Below 30MHz at Test Site 2#



30MHz-1GHz at Test Site 2#



Above 1GHz at Test Site 1#



## 17 Photographs - Constructional Details

### 17.1 Model YU-BT901 External View

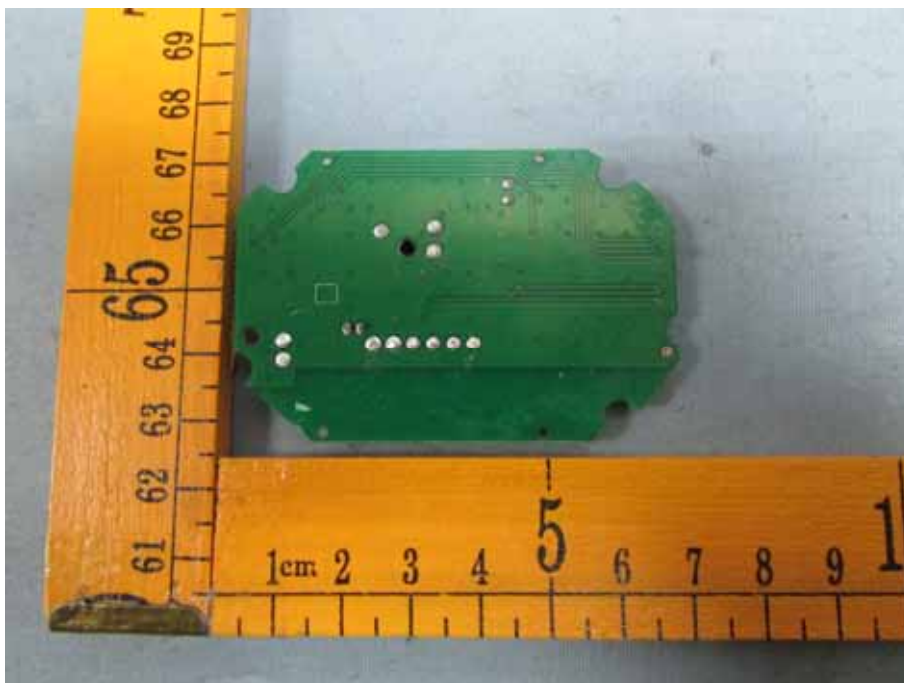


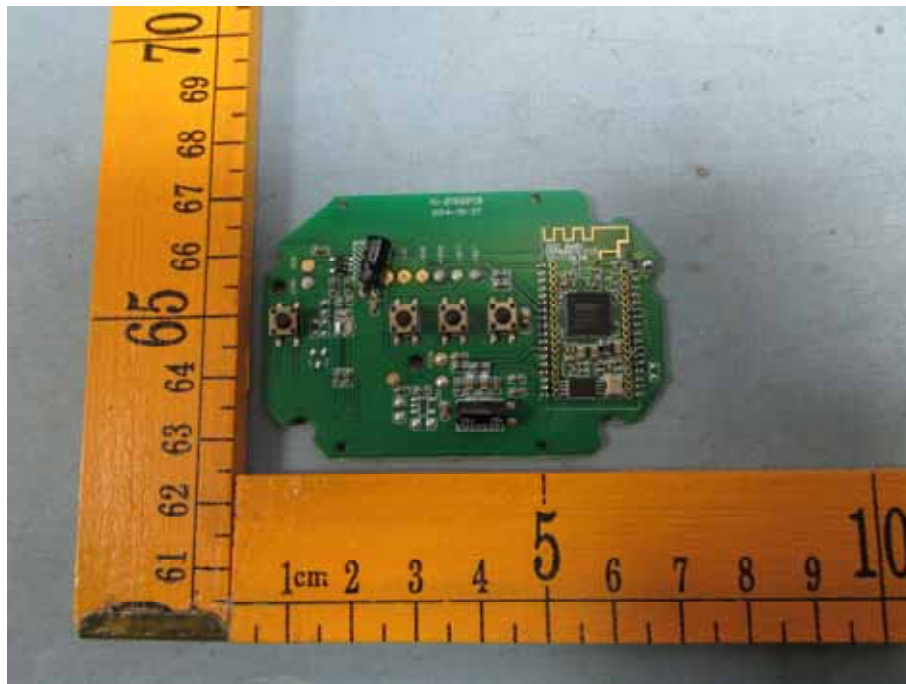




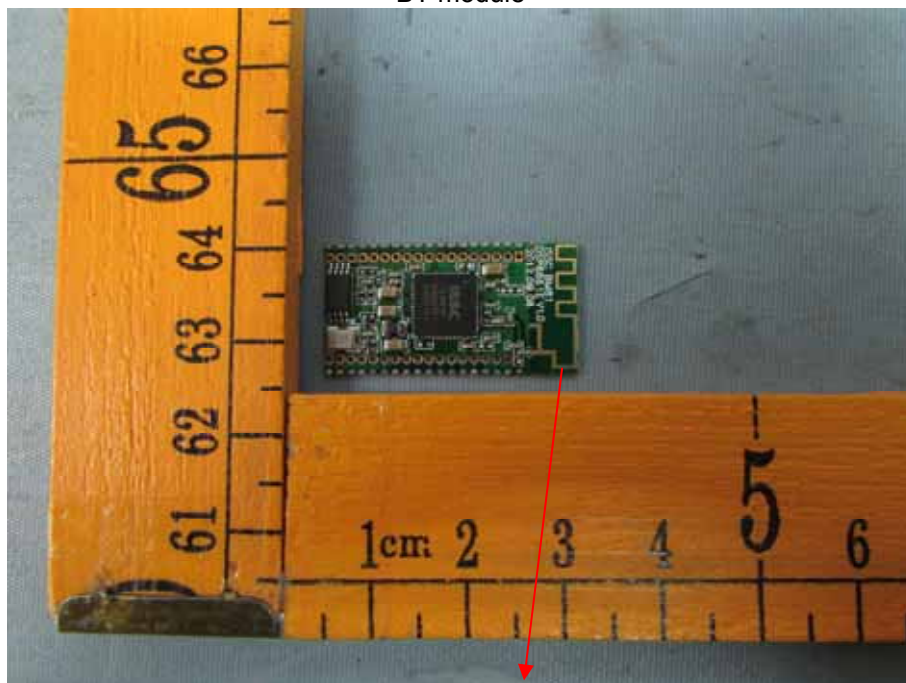


### 17.2 Model YU-BT901 Internal View

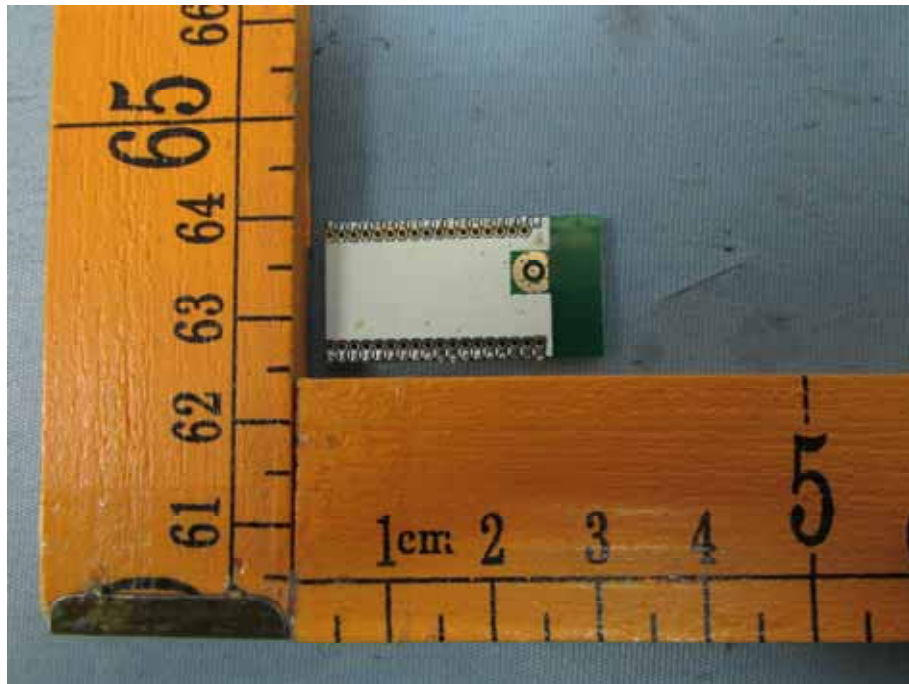




BT module



PCB printed ANT.





====End of Report====