



# TEST REPORT

**Reference No.**..... : WTD21D01009766W002  
**FCC ID**..... : 2ADCS6720  
**Applicant**..... : Inforce Computing Inc.  
**Address**..... : 48820 Kato Road, Ste 600B, Fremont, CA94538, United States of America.  
**Manufacturer**..... : Inforce Computing Inc.  
**Address**..... : 48820 Kato Road, Ste 600B, Fremont, CA94538, United States of America.  
**Product**..... : Application Ready Platform 6720  
**Model(s)**..... : 6720  
**Brand name**..... : Smart  
**Standards**..... : FCC CFR47 Part 15.247:2018  
**Date of Receipt sample**... : 2021-02-19  
**Date of Test**..... : 2021-02-20 to 2021-04-06  
**Date of Issue**..... : 2021-05-18  
**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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### 3 Revision History

| Test report No.        | Date of Receipt sample | Date of Test                   | Date of Issue | Purpose  | Comment | Approved |
|------------------------|------------------------|--------------------------------|---------------|----------|---------|----------|
| WTD21D01009766<br>W002 | 2021-02-19             | 2021-02-20<br>to<br>2021-04-06 | 2021-05-18    | Original | -       | Valid    |

# WALTEK



## 4 General Information

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

|                      |                                                                          |
|----------------------|--------------------------------------------------------------------------|
| Product:             | Application Ready Platform 6720                                          |
| Model(s):            | 6720                                                                     |
| Wi-Fi Specification: | 2.4G-802.11b/g/n HT20/n HT40<br>5G-802.11a/n/ac HT20 /n/ac HT40 /ac HT80 |
| Bluetooth Version:   | Bluetooth v5.0 with BLE                                                  |
| GPS:                 | Support                                                                  |
| Hardware Version:    | 6720-P2                                                                  |
| Software Version:    | Android Q 10.0                                                           |

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

|                       |                                                   |
|-----------------------|---------------------------------------------------|
| Operation Frequency:  | Bluetooth: 2402~2480MHz                           |
| Max. RF output power: | Bluetooth: 2.90dBm                                |
| Type of Modulation:   | Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK                |
| Antenna installation: | Bluetooth: External antenna with RP-SMA connector |
| Antenna Gain:         | Bluetooth: 5.3dBi                                 |
| Ratings:              | DC 12V For Battery                                |



### 4.3 Channel List

Normal

| 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      |



## 5 Test Summary

| Test Items                                                        | Test Requirement                 | Result                    |
|-------------------------------------------------------------------|----------------------------------|---------------------------|
| Radiated Spurious Emissions                                       | 15.205(a)<br>15.209<br>15.247(d) | PASS                      |
| Conducted Spurious emissions                                      | 15.247(d)                        | PASS                      |
| Band edge                                                         | 15.247(d)<br>15.205(a)           | PASS                      |
| Conduct Emission                                                  | 15.207                           | N/A                       |
| 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                      |
| Adaptive frequency hopping transmission                           | 15.247(g)                        | Complies <sup>note1</sup> |
| Adaptive frequency hopping                                        | 15.247(h)                        | Complies <sup>note1</sup> |
| Antenna Requirement                                               | 15.203                           | Complies                  |
| Maximum Permissible Exposure<br>(Exposure of Humans to RF Fields) | 1.1307(b)(1)                     | PASS                      |
| note1: by the manufacturer declare                                |                                  |                           |



## 6 Equipment Used during Test

### 6.1 Equipments List

| Conducted Emissions Test Site 1#                              |                            |                      |              |                 |                       |                      |
|---------------------------------------------------------------|----------------------------|----------------------|--------------|-----------------|-----------------------|----------------------|
| Item                                                          | Equipment                  | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1.                                                            | EMI Test Receiver          | R&S                  | ESCI         | 100947          | 2020-07-30            | 2021-07-29           |
| 2.                                                            | LISN                       | R&S                  | ENV216       | 100115          | 2020-07-30            | 2021-07-29           |
| 3.                                                            | Cable                      | Top                  | TYPE16(3.5M) | -               | 2020-07-30            | 2021-07-29           |
| Conducted Emissions Test Site 2#                              |                            |                      |              |                 |                       |                      |
| Item                                                          | Equipment                  | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1.                                                            | EMI Test Receiver          | R&S                  | ESCI         | 101155          | 2020-07-30            | 2021-07-29           |
| 2.                                                            | LISN                       | SCHWARZBECK          | NSLK 8128    | 8128-259        | 2020-07-30            | 2021-07-29           |
| 3.                                                            | Limiter                    | CYBERTEK             | EM5010       | 261115-001-0024 | 2020-07-30            | 2021-07-29           |
| 4.                                                            | Cable                      | Laplace              | RF300        | -               | 2020-07-30            | 2021-07-29           |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 1# |                            |                      |              |                 |                       |                      |
| Item                                                          | Equipment                  | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                             | Spectrum Analyzer          | R&S                  | FSP30        | 100091          | 2020-04-20            | 2021-04-19           |
| 2                                                             | Amplifier                  | Agilent              | 8447D        | 2944A10178      | 2020-04-20            | 2021-04-19           |
| 3                                                             | Trilog Broadband Antenna   | SCHWARZBECK          | VULB9163     | 336             | 2020-08-22            | 2021-08-21           |
| 4                                                             | Coaxial Cable (below 1GHz) | Top                  | TYPE16(13M)  | -               | 2020-04-20            | 2021-04-19           |
| 5                                                             | Broad-band Horn Antenna    | SCHWARZBECK          | BBHA 9120 D  | 667             | 2020-04-25            | 2021-04-24           |
| 6                                                             | Broad-band Horn Antenna    | SCHWARZBECK          | BBHA 9170    | 335             | 2020-04-20            | 2021-04-19           |
| 7                                                             | Broadband Preamplifier     | COMPLIANCE DIRECTION | PAP-1G18     | 2004            | 2020-04-20            | 2021-04-19           |
| 8                                                             | Coaxial Cable (above 1GHz) | ZT26-NJ-NJ-8M/FA     | 1GHz-18GHz   | NA              | 2020-04-20            | 2021-04-19           |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 2# |                            |                      |              |                 |                       |                      |
| Item                                                          | Equipment                  | Manufacturer         | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                             | Test Receiver              | R&S                  | ESCI         | 101296          | 2020-04-20            | 2021-04-19           |
| 2                                                             | Trilog Broadband Antenna   | SCHWARZBECK          | VULB9160     | 9160-3325       | 2020-04-25            | 2021-04-24           |
| 3                                                             | Active Loop Antenna        | Com-Power Corp.      | AL-130R      | 10160007        | 2020-05-06            | 2021-05-05           |
| 4                                                             | Amplifier                  | ANRITSU              | MH648A       | M43381          | 2020-04-20            | 2021-04-19           |



| 5                           | Cable                        | HUBER+SUHNER      | CBL2      | 525178     | 2020-04-20            | 2021-04-19           |
|-----------------------------|------------------------------|-------------------|-----------|------------|-----------------------|----------------------|
| <b>RF Conducted Testing</b> |                              |                   |           |            |                       |                      |
| Item                        | Equipment                    | Manufacturer      | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1.                          | EMC Analyzer<br>(9k~26.5GHz) | Agilent           | E7405A    | MY45114943 | 2020-04-20            | 2021-04-19           |
| 2.                          | Spectrum Analyzer            | R&S               | FSP30     | 100091     | 2020-04-20            | 2021-04-19           |
| 3.                          | EXA Signal Analyzer          | Malaysia Keysight | N9010A    | MY50520207 | 2020-04-20            | 2021-04-19           |

## 6.2 Description of Support Units

| Equipment | Manufacturer | Model No. | Series No. |
|-----------|--------------|-----------|------------|
| Computer  | Dell         | K053      | /          |
| Mouse     | Lenovo       | AP01      | /          |

## 6.3 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 Emissions test          | $\pm 3.64$ dB (AC mains 150KHz~30MHz)       |
| Conducted Spurious Emissions test | $\pm 3.12$ dB (9kHz~30MHz)                  |
|                                   | $\pm 4.21$ dB (30M~1000MHz)                 |
|                                   | $\pm 5.14$ dB (1000M~26500MHz)              |

## 6.4 Test Facility

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

**ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.**

Waltek Testing Group 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 number 7760A, October 15, 2016.

**FCC Designation No.: CN1201. Test Firm Registration No.: 523476. Certificate Number: 4243.01**

Waltek Testing Group 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 number 523476, September 10, 2019.

## 6.5 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.



## 7 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10: 2013

Test Result: PASS

Measurement Distance: 3m

Limit:

| Frequency<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             | $10000 * 2400/F(\text{kHz})$                | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705      | 24000/F(kHz)   | 30              | $100 * 24000/F(\text{kHz})$                 | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30         | 30             | 30              | $100 * 30$                                  | $20\log^{(30)} + 40$                  |
| 30 ~ 88            | 100            | 3               | 100                                         | $20\log^{(100)}$                      |
| 88 ~ 216           | 150            | 3               | 150                                         | $20\log^{(150)}$                      |
| 216 ~ 960          | 200            | 3               | 200                                         | $20\log^{(200)}$                      |
| Above 960          | 500            | 3               | 500                                         | $20\log^{(500)}$                      |

### 7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

EUT Operation :

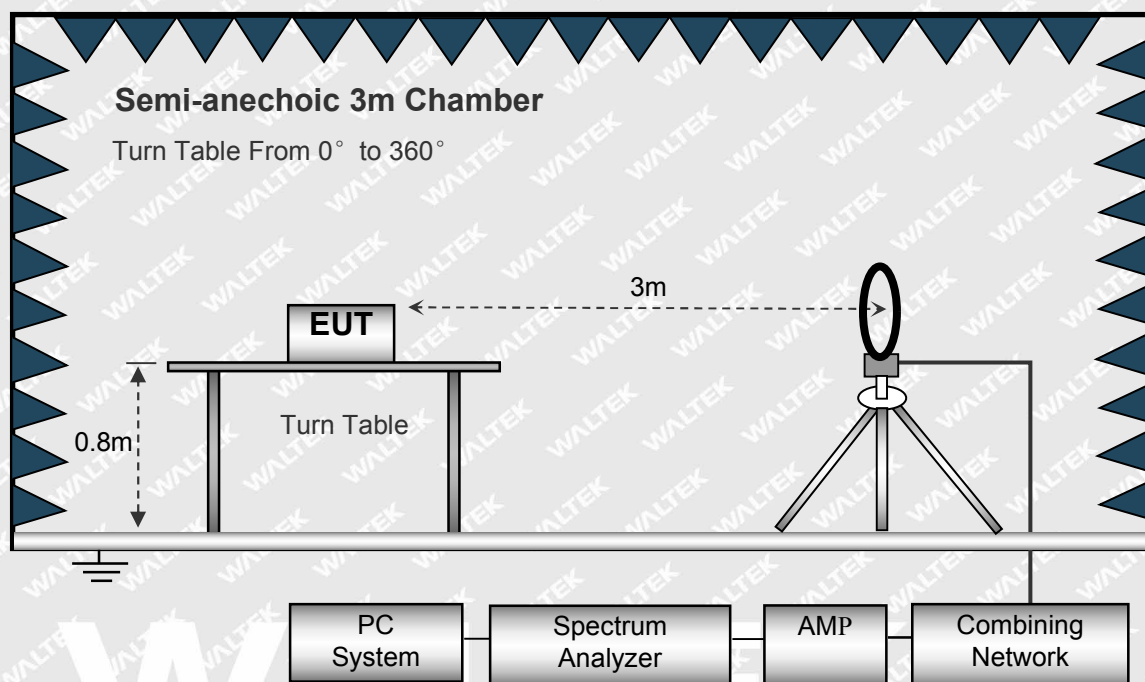
The test was performed in TX Transmitting mode, the test data were shown in the report.



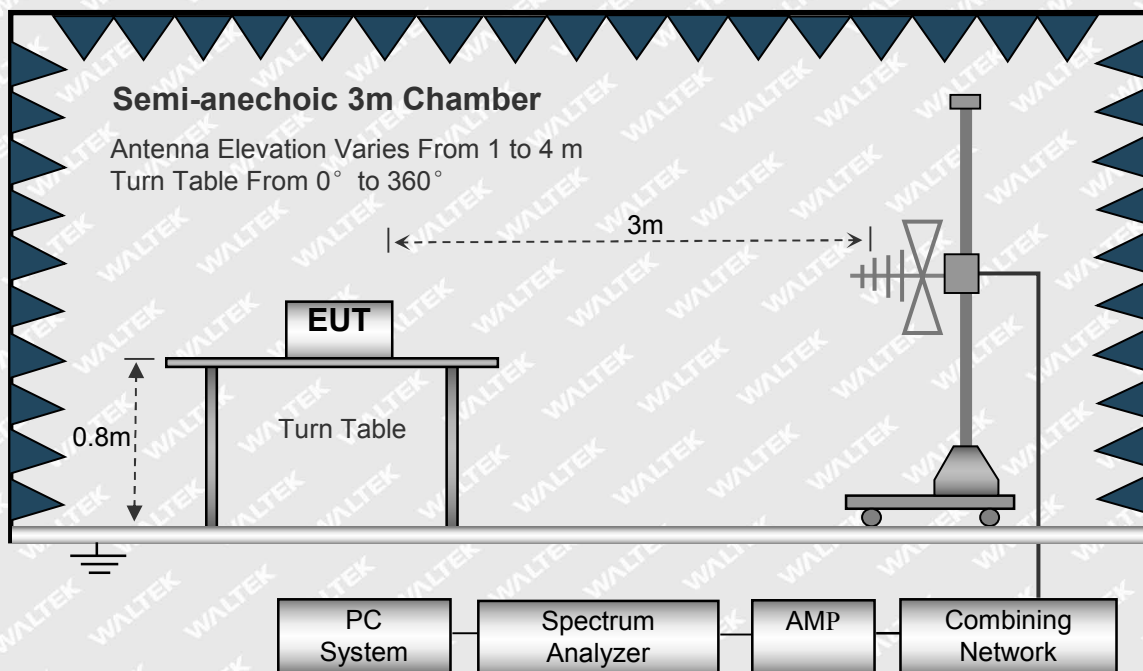
## 7.2 Test Setup

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

The test setup for emission measurement below 30MHz.

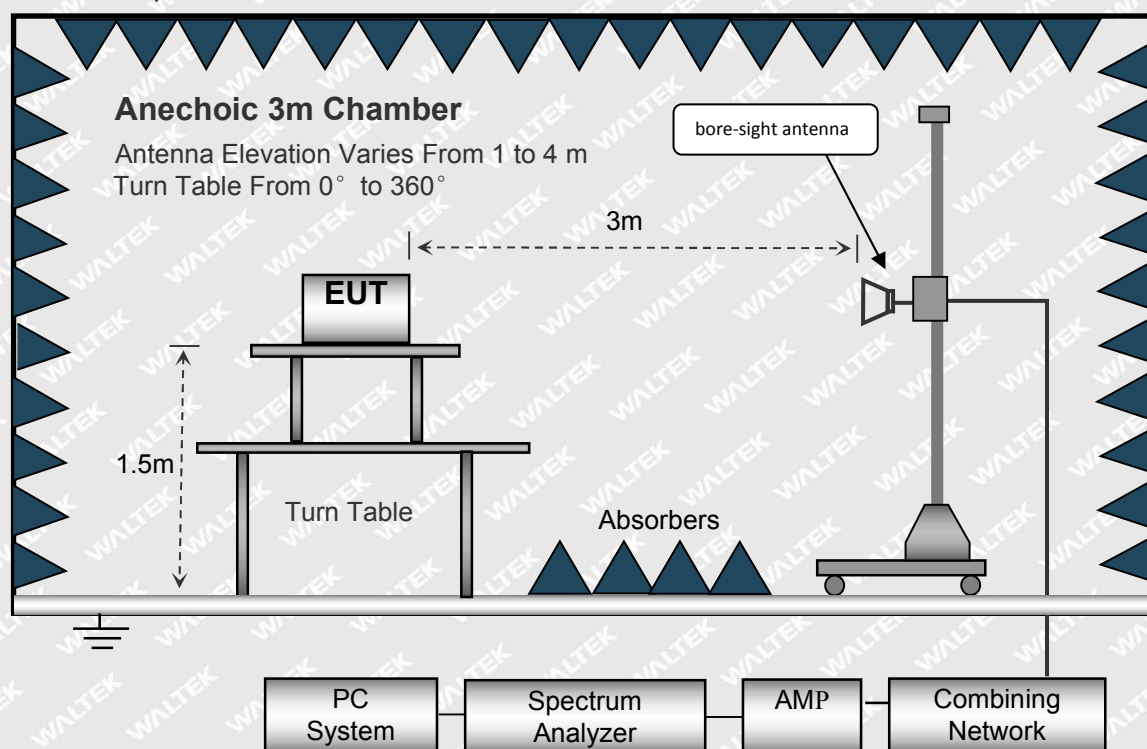


The test setup for emission measurement from 30 MHz to 1 GHz.





The test setup for emission measurement above 1 GHz.



### 7.3 Spectrum Analyzer Setup

Below 30MHz

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

30MHz ~ 1GHz

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

Above 1GHz

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



## 7.4 Test Procedure

1. The EUT is placed on a turntable, which is 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 Z position. So the data shown was the Z position only.

## 7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

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

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



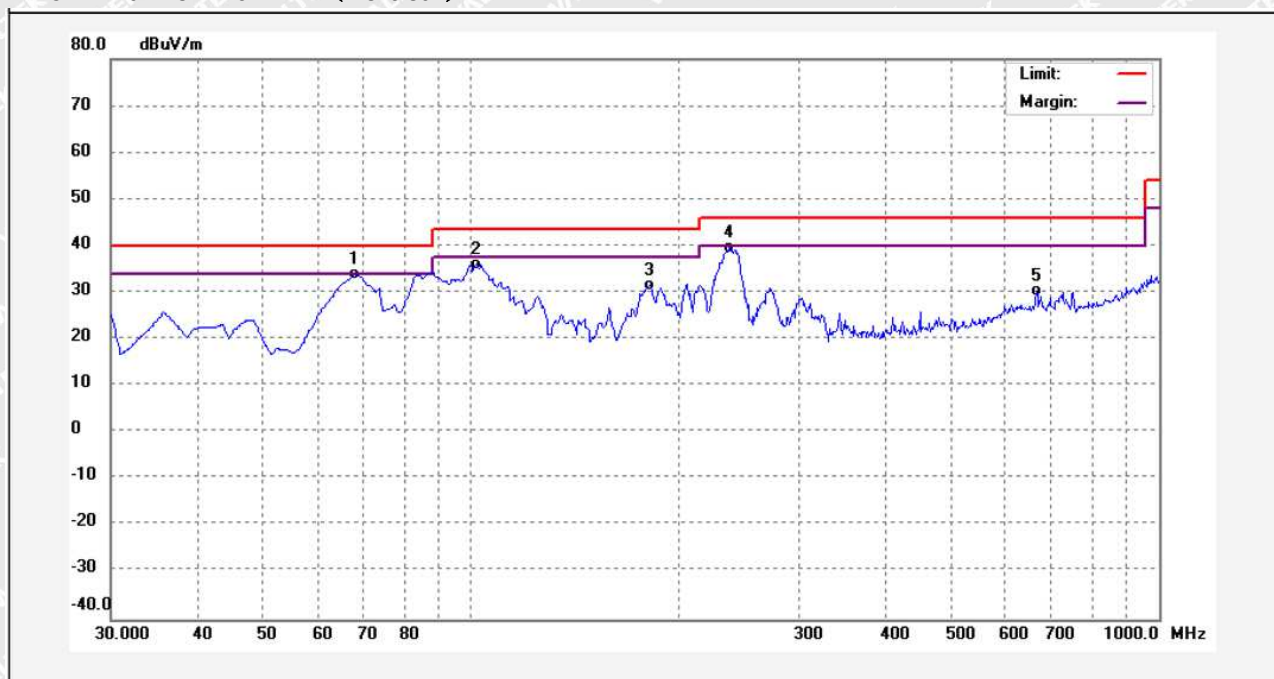
## 7.6 Summary of Test Results

Test Frequency: 9KHz~30MHz

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

Test Frequency: 30MHz ~ 1GHz(Only the worst case GFSK mode Low Channel were record in the report.)

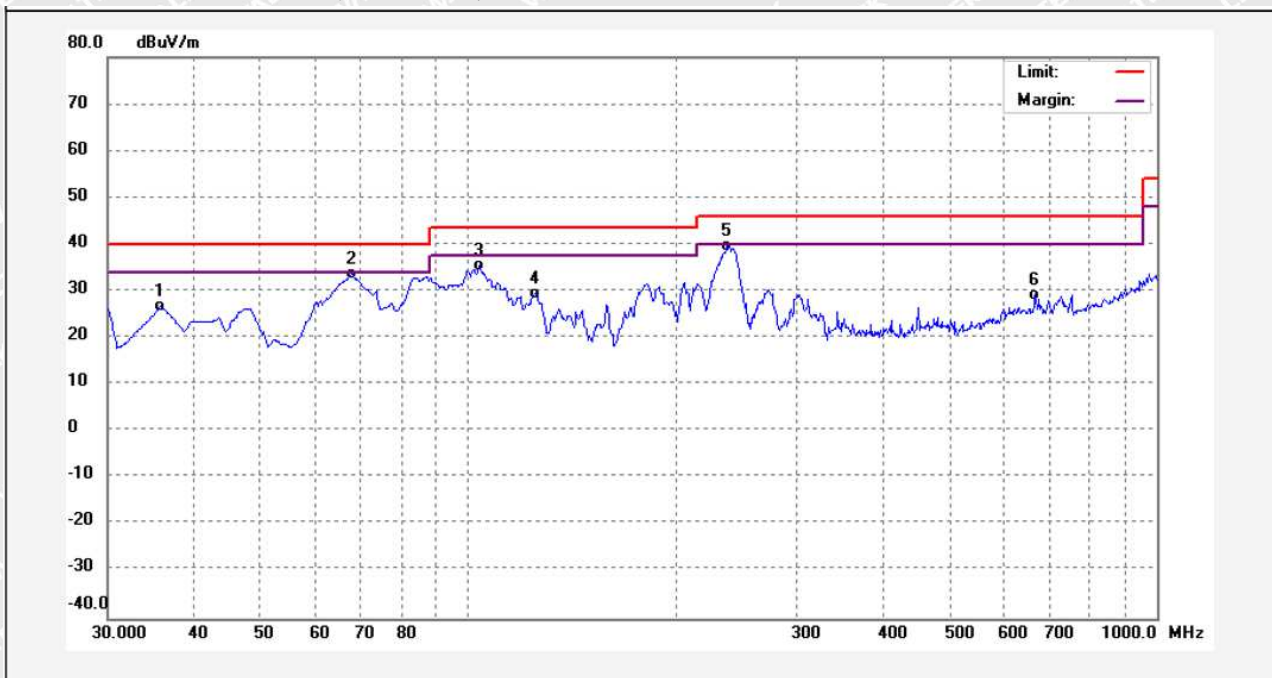
Low Channel 2402MHz (Vertical)



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Remark |
|-----|-------------|------------------|-------------|-----------------|----------------|-------------|----------|--------|
| 1   | 67.8300     | 48.81            | -14.76      | 34.05           | 40.00          | -5.95       | QP       |        |
| 2   | 101.7800    | 49.32            | -13.20      | 36.12           | 43.50          | -7.38       | QP       |        |
| 3   | 182.2899    | 45.70            | -14.19      | 31.51           | 43.50          | -11.99      | QP       |        |
| 4   | 237.5800    | 50.91            | -11.25      | 39.66           | 46.00          | -6.34       | QP       |        |
| 5   | 664.3800    | 30.89            | -0.63       | 30.26           | 46.00          | -15.74      | QP       |        |



## Low Channel 2402MHz (Horizontal)



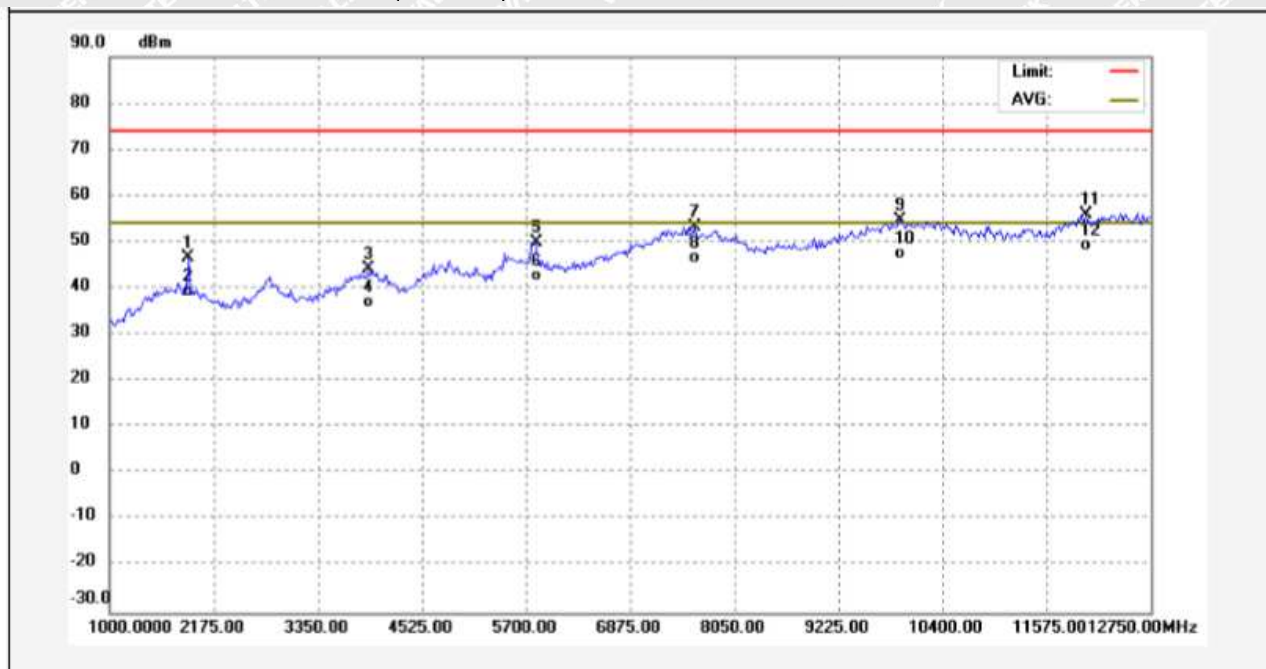
| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Remark |
|-----|-------------|------------------|-------------|-----------------|----------------|-------------|----------|--------|
| 1   | 35.7553     | 42.40            | -15.65      | 26.75           | 40.00          | -13.25      | QP       |        |
| 2   | 67.7303     | 48.31            | -14.75      | 33.56           | 40.00          | -6.44       | QP       |        |
| 3   | 103.5704    | 48.68            | -13.24      | 35.44           | 43.50          | -8.06       | QP       |        |
| 4   | 125.1853    | 45.82            | -16.32      | 29.50           | 43.50          | -14.00      | QP       |        |
| 5   | 237.9683    | 50.91            | -11.25      | 39.66           | 46.00          | -6.34       | QP       |        |
| 6   | 665.5324    | 29.89            | -0.61       | 29.28           | 46.00          | -16.72      | QP       |        |



**Test Frequency: 1GHz ~ 12.75GHz**

**Remark: The current test plots doesn't have the fundamental signal, It's blocked by the filter**

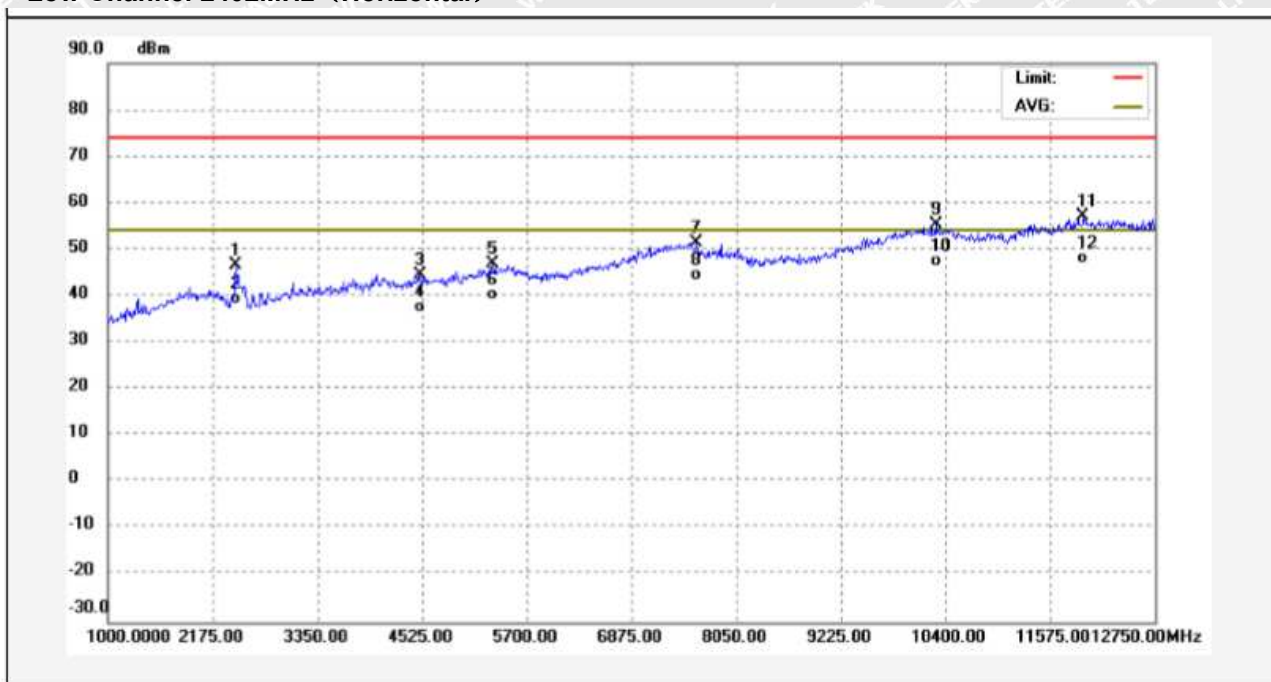
**Test Low Channel 2402MHz (Vertical)**



| No. | Freq. (MHz) | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector | Remark |
|-----|-------------|---------------|-------------|--------------|-------------|-------------|----------|--------|
| 1   | 1884.226    | 55.91         | -9.27       | 46.64        | 74.00       | -27.36      | peak     |        |
| 2   | 1884.226    | 48.69         | -9.27       | 39.42        | 54.00       | -14.58      | AVG      |        |
| 3   | 3924.747    | 50.78         | -6.59       | 44.19        | 74.00       | -29.81      | peak     |        |
| 4   | 3924.747    | 43.75         | -6.59       | 37.16        | 54.00       | -16.84      | AVG      |        |
| 5   | 5812.229    | 52.60         | -2.65       | 49.95        | 74.00       | -24.05      | peak     |        |
| 6   | 5812.229    | 45.29         | -2.65       | 42.64        | 54.00       | -11.36      | AVG      |        |
| 7   | 7597.685    | 50.53         | 2.76        | 53.29        | 74.00       | -20.71      | peak     |        |
| 8   | 7597.685    | 43.96         | 2.76        | 46.72        | 54.00       | -7.28       | AVG      |        |
| 9   | 9927.279    | 49.75         | 4.97        | 54.72        | 74.00       | -19.28      | peak     |        |
| 10  | 9927.279    | 42.67         | 4.97        | 47.64        | 54.00       | -6.36       | AVG      |        |
| 11  | 12018.813   | 49.53         | 6.31        | 55.84        | 74.00       | -18.16      | peak     |        |
| 12  | 12018.813   | 43.11         | 6.31        | 49.42        | 54.00       | -4.58       | AVG      |        |



### Low Channel 2402MHz (Horizontal)



| No. | Freq. (MHz) | Reading (dBm) | Factor (dB) | Result (dBm) | Limit (dBm) | Margin (dB) | Detector | Remark |
|-----|-------------|---------------|-------------|--------------|-------------|-------------|----------|--------|
| 1   | 2434.935    | 54.71         | -8.00       | 46.71        | 74.00       | -27.29      | peak     |        |
| 2   | 2434.935    | 47.42         | -8.00       | 39.42        | 54.00       | -14.58      | AVG      |        |
| 3   | 4505.005    | 50.08         | -5.56       | 44.52        | 74.00       | -29.48      | peak     |        |
| 4   | 4505.005    | 43.08         | -5.56       | 37.52        | 54.00       | -16.48      | AVG      |        |
| 5   | 5316.566    | 50.43         | -3.35       | 47.08        | 74.00       | -26.92      | peak     |        |
| 6   | 5316.566    | 43.58         | -3.35       | 40.23        | 54.00       | -13.77      | AVG      |        |
| 7   | 7610.110    | 48.58         | 2.76        | 51.34        | 74.00       | -22.66      | peak     |        |
| 8   | 7610.110    | 41.81         | 2.76        | 44.57        | 54.00       | -9.43       | AVG      |        |
| 9   | 10291.792   | 50.06         | 5.39        | 55.45        | 74.00       | -18.55      | peak     |        |
| 10  | 10291.792   | 42.06         | 5.39        | 47.45        | 54.00       | -6.55       | AVG      |        |
| 11  | 11950.200   | 50.88         | 6.32        | 57.20        | 74.00       | -16.80      | peak     |        |
| 12  | 11950.200   | 41.91         | 6.32        | 48.23        | 54.00       | -5.77       | AVG      |        |

### Test Frequency: 12.75GHz ~ 25GHz

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



## 8 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: ANSI C63.10: 2013

Test Result: PASS

Limit:

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 Section 15.209(a) is not required. 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)).

### 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:

Blow 1GHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 1GHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold



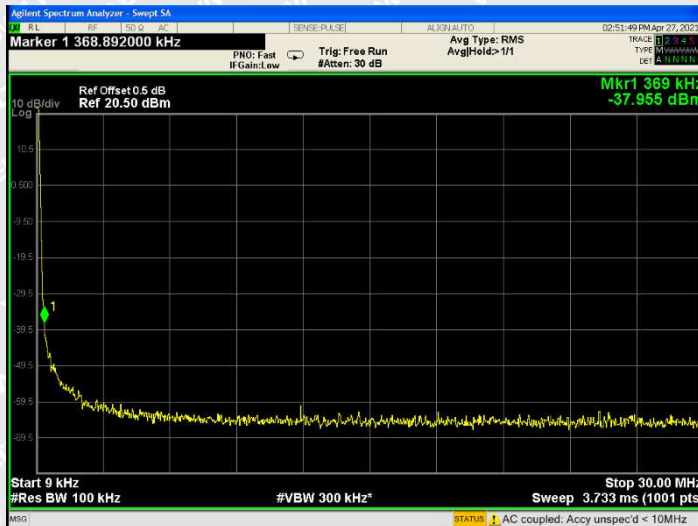
## 8.2 Test Result

9KHz - 30MHz

Modulation: GFSK

Low Channel

Middle Channel



High Channel

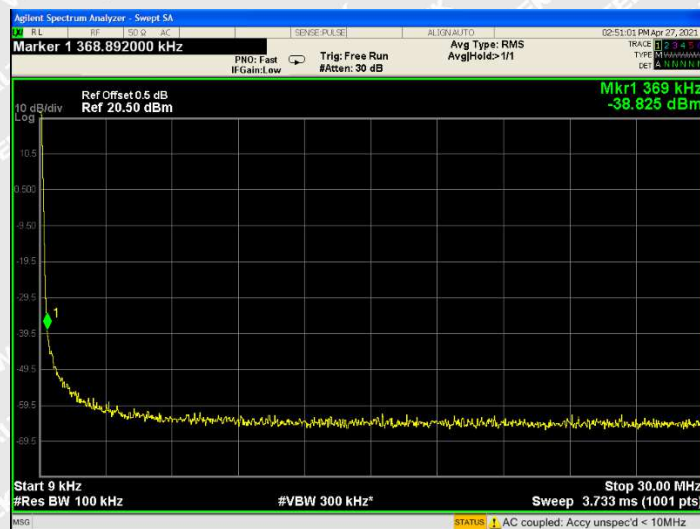
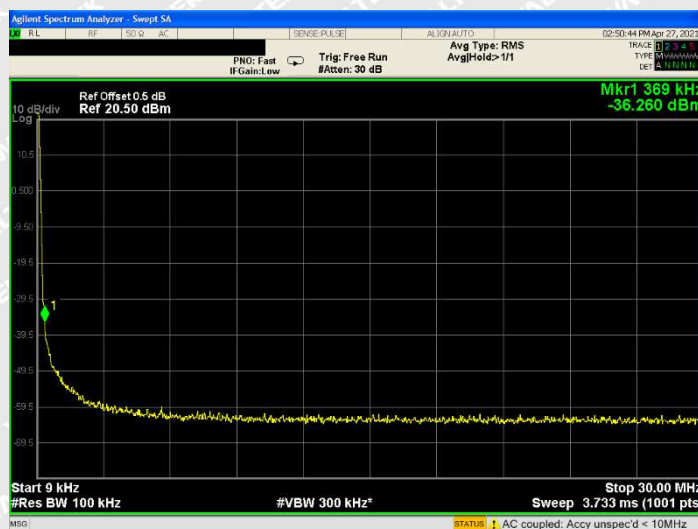




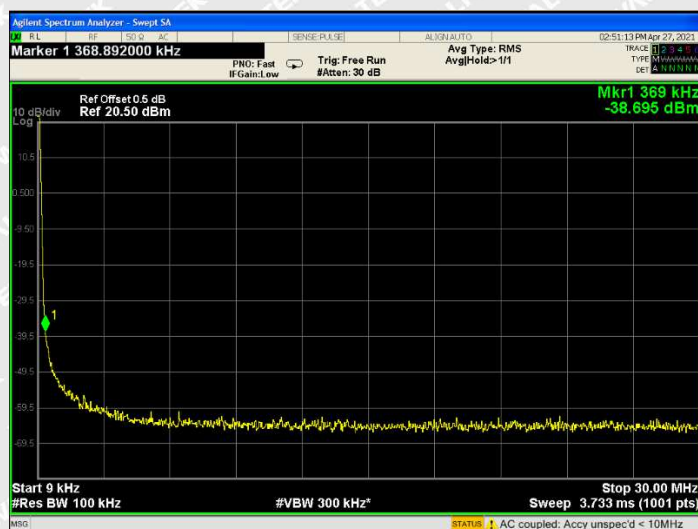
Modulation: Pi/4 DQPSK

Low Channel

Middle Channel



High Channel

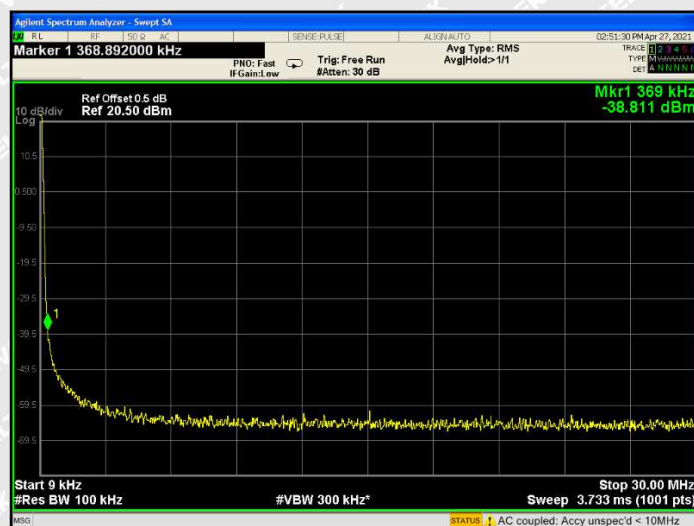
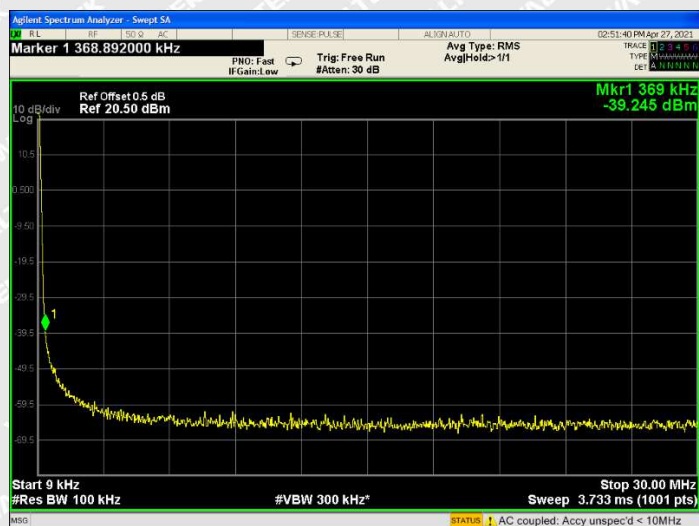




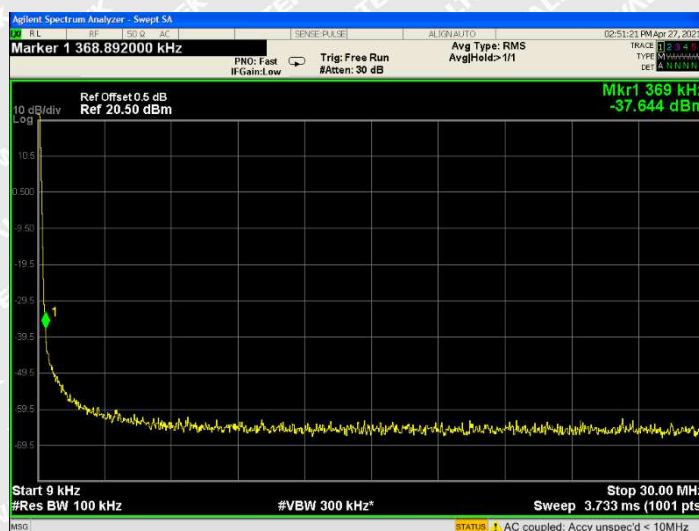
Modulation: 8DPSK

Low Channel

Middle Channel



High Channel





30MHz – 25GHz  
GFSK Low Channel

Fundamental



GFSK Middle Channel

Fundamental





## GFSK High Channel

Fundamental



## Pi/4 DQPSK Low Channel

Fundamental





## Pi/4 DQPSK Middle Channel

Fundamental



## Pi/4 DQPSK High Channel

Fundamental





## 8DPSK Low Channel

Fundamental



## 8DPSK Middle Channel

Fundamental





## 8DPSK High Channel

Fundamental



WALTEK



## 9 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

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:

Transmitting

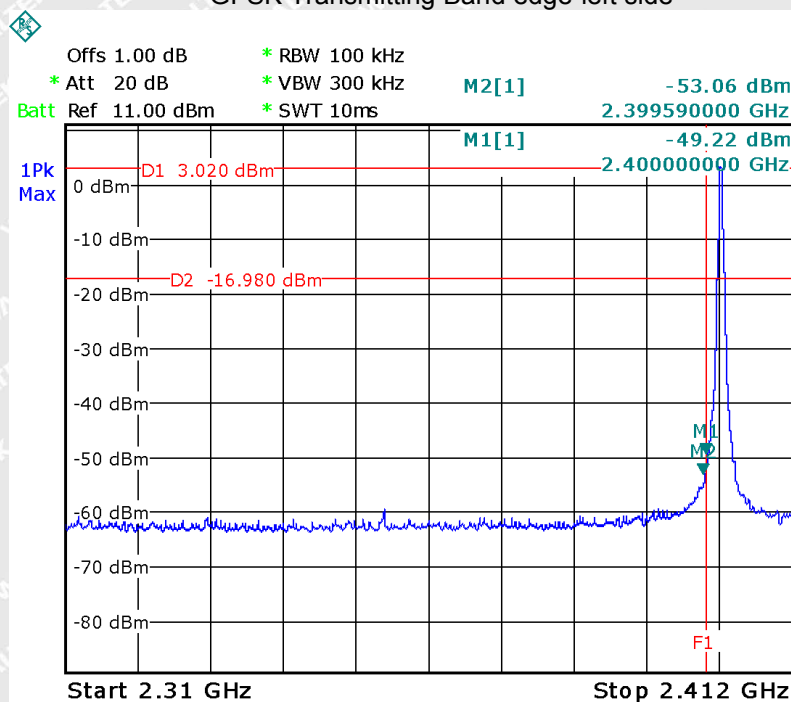
### 9.1 Test Procedure

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, Sweep = auto  
Detector function = peak, Trace = max hold

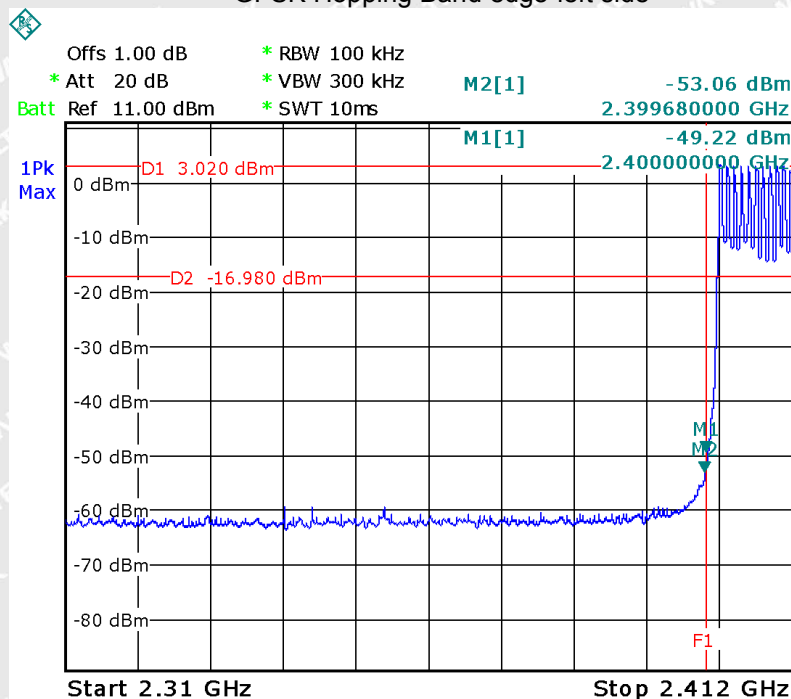


## 9.2 Test Result

GFSK Transmitting Band edge-left side

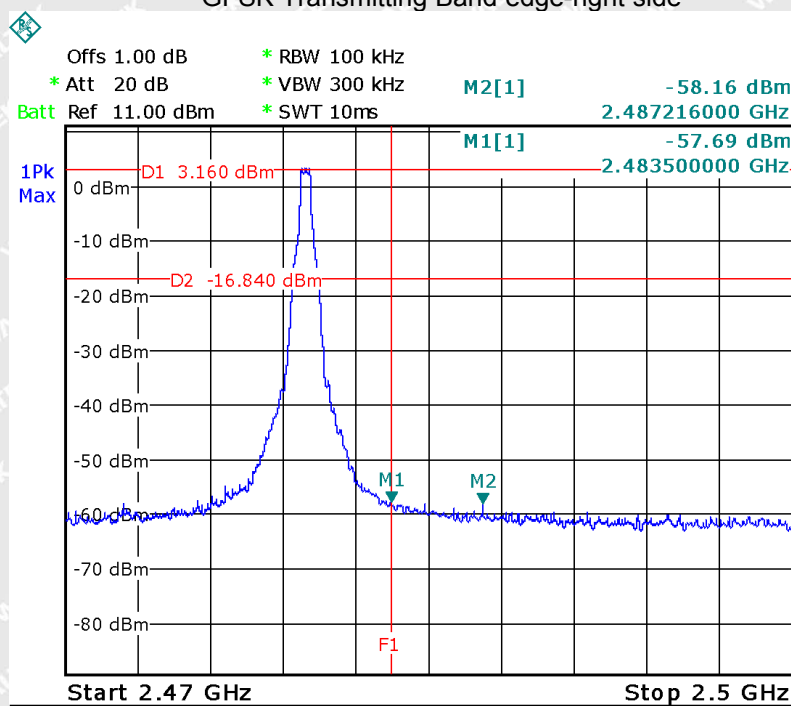


GFSK Hopping Band edge-left side

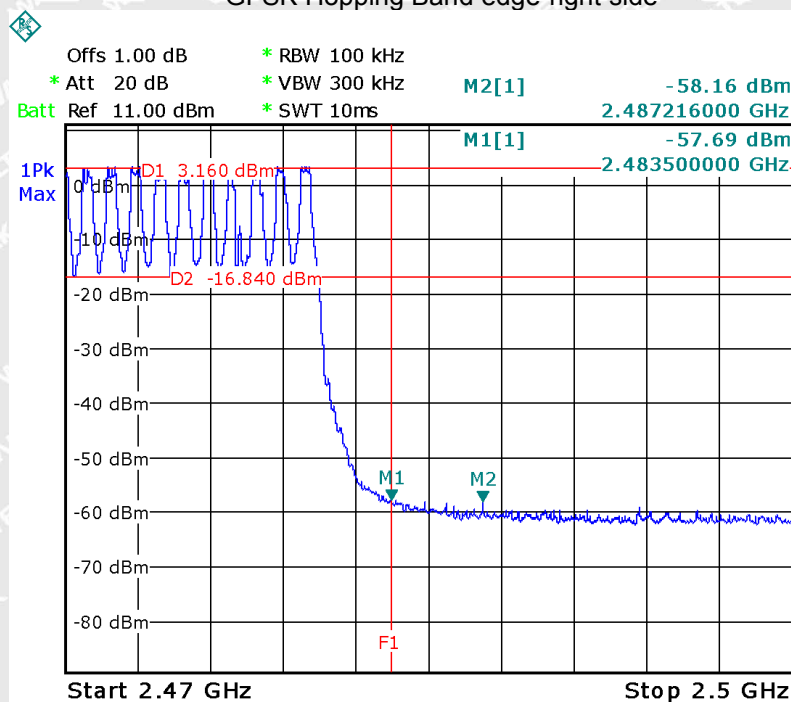




GFSK Transmitting Band edge-right side

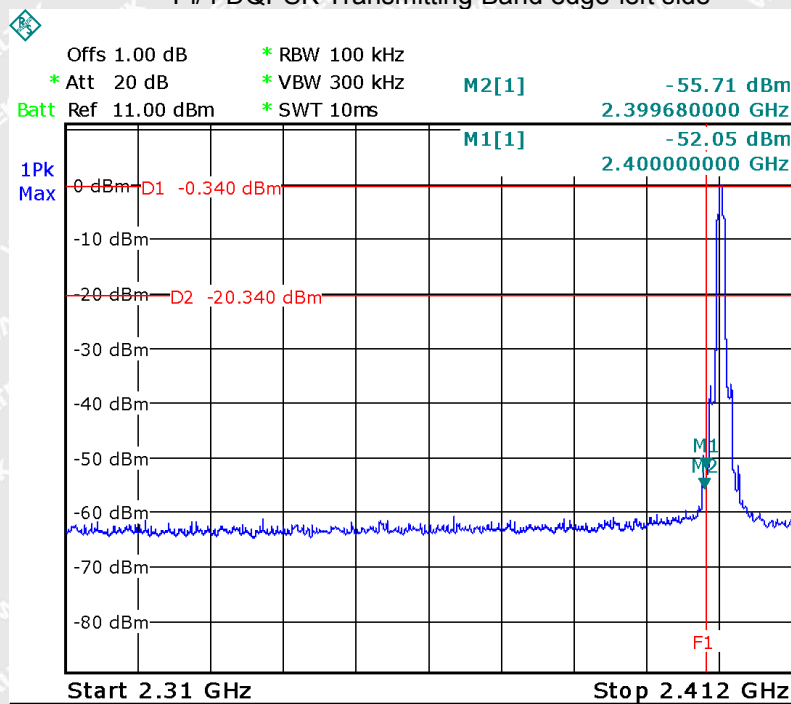


GFSK Hopping Band edge-right side

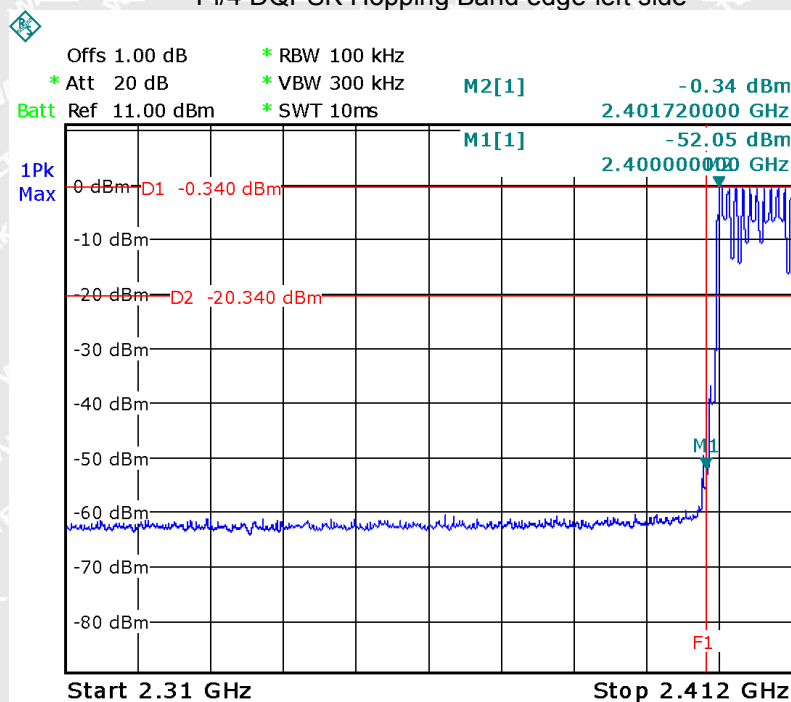




Pi/4 DQPSK Transmitting Band edge-left side

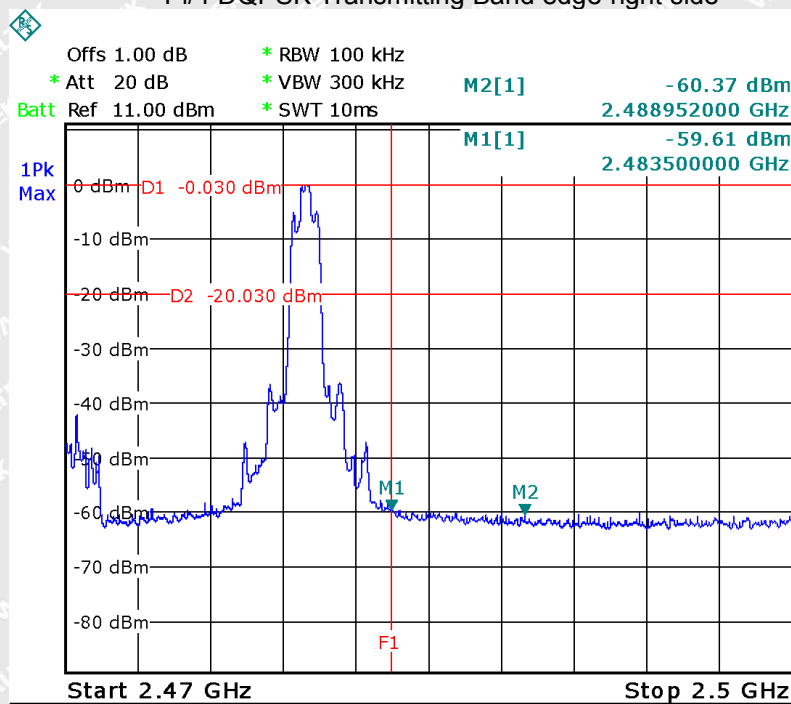


Pi/4 DQPSK Hopping Band edge-left side

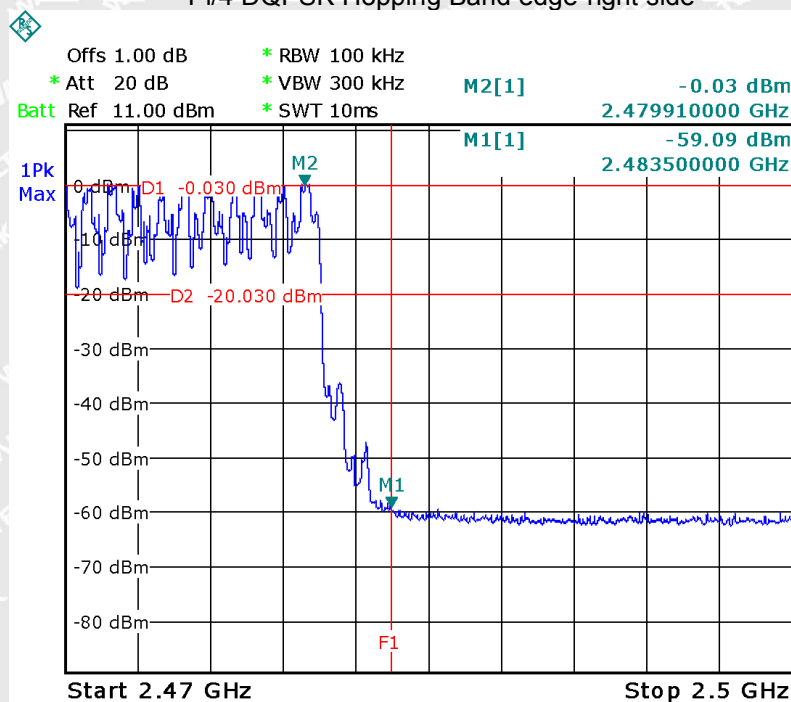




Pi/4 DQPSK Transmitting Band edge-right side

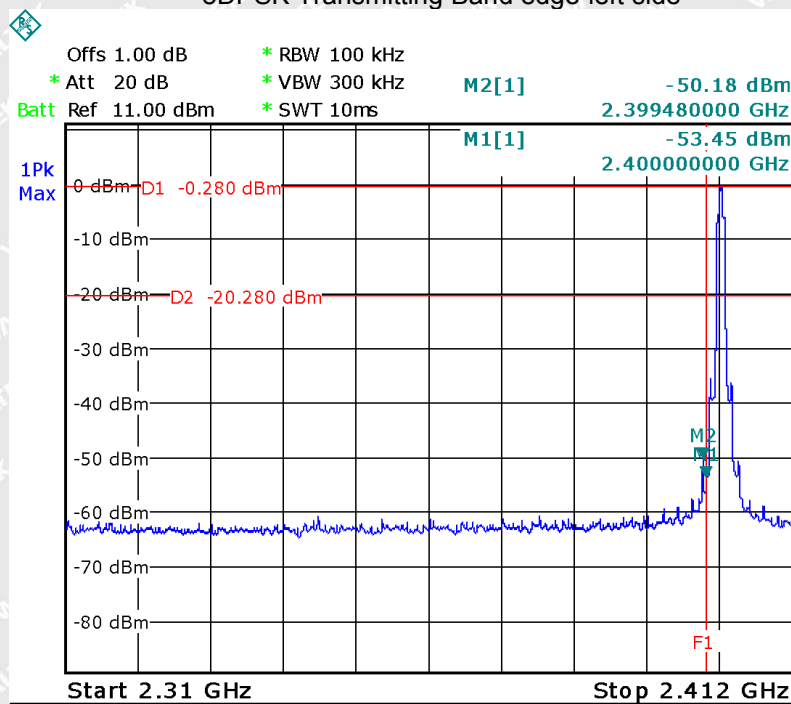


Pi/4 DQPSK Hopping Band edge-right side

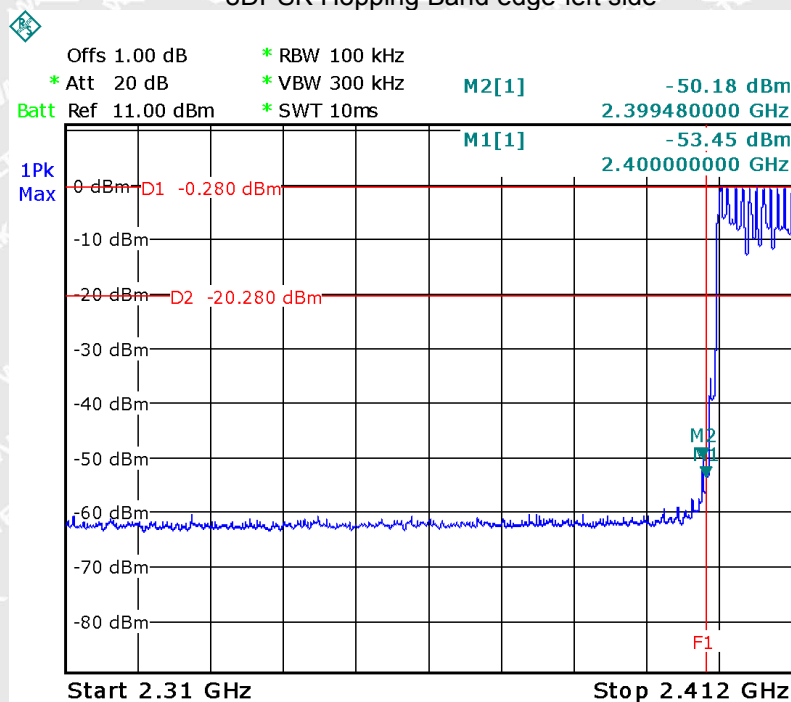




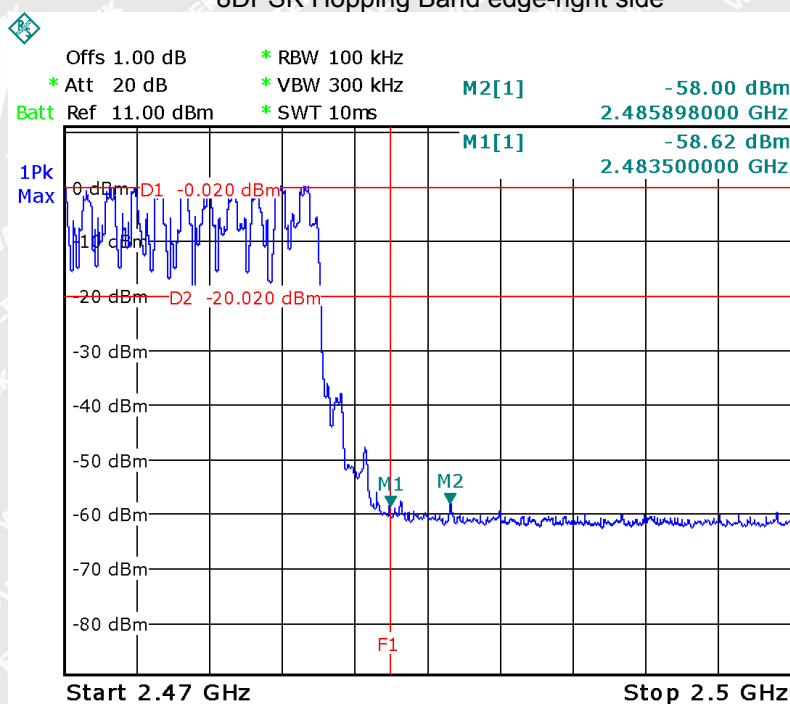
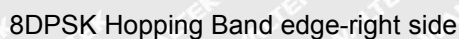
8DPSK Transmitting Band edge-left side



8DPSK Hopping Band edge-left side



8DPSK Transmitting Band edge-right side





## 10 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: ANSI C63.10: 2013

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

### 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 = 30kHz, VBW = 100kHz

### 10.2 Test Result

| Modulation    | Test Channel | 20 dB Bandwidth<br>MHz | 99% Bandwidth<br>MHz |
|---------------|--------------|------------------------|----------------------|
| GFSK          | Low          | 0.713                  | 0.766                |
| GFSK          | Middle       | 0.713                  | 0.784                |
| GFSK          | High         | 0.719                  | 0.784                |
| $\pi/4$ DQPSK | Low          | 1.114                  | 1.089                |
| $\pi/4$ DQPSK | Middle       | 1.114                  | 1.089                |
| $\pi/4$ DQPSK | High         | 1.149                  | 1.089                |
| 8DPSK         | Low          | 1.108                  | 1.089                |
| 8DPSK         | Middle       | 1.144                  | 1.096                |
| 8DPSK         | High         | 1.144                  | 1.089                |



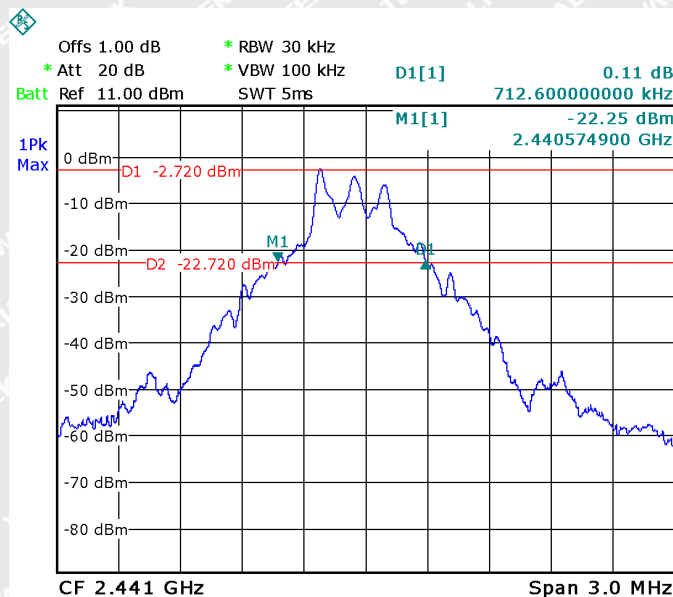
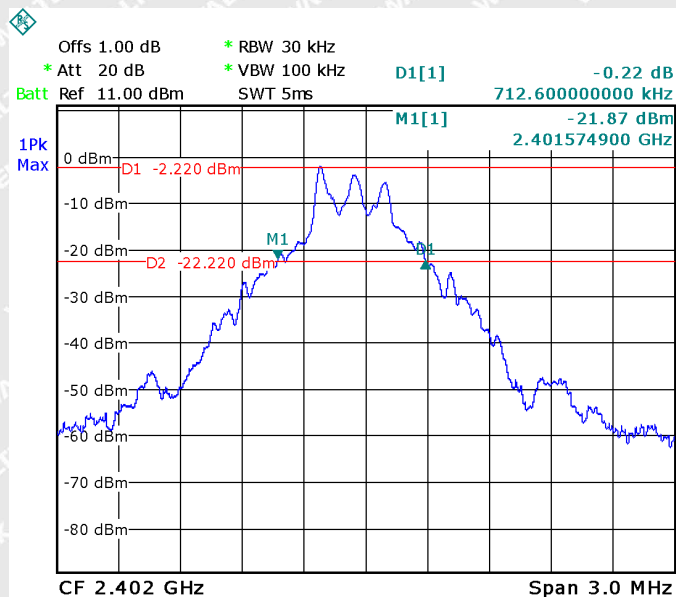
## Test plots

## 20 dB Bandwidth

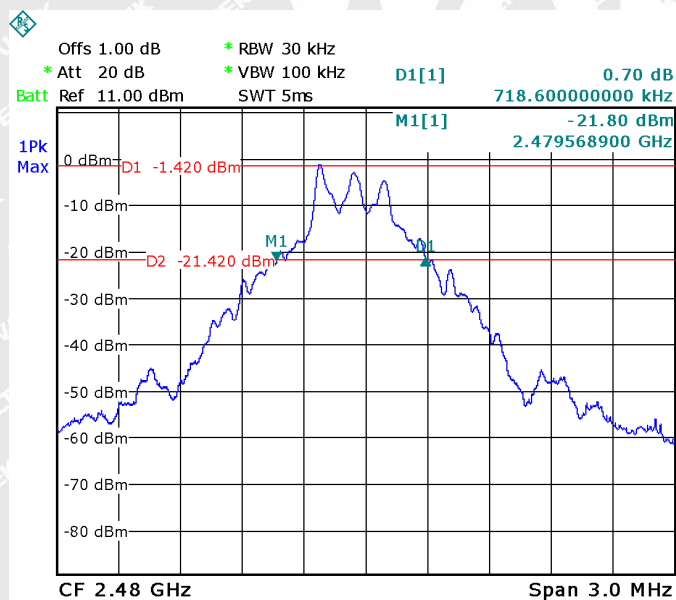
Modulation: GFSK

## Low Channel

## Middle Channel

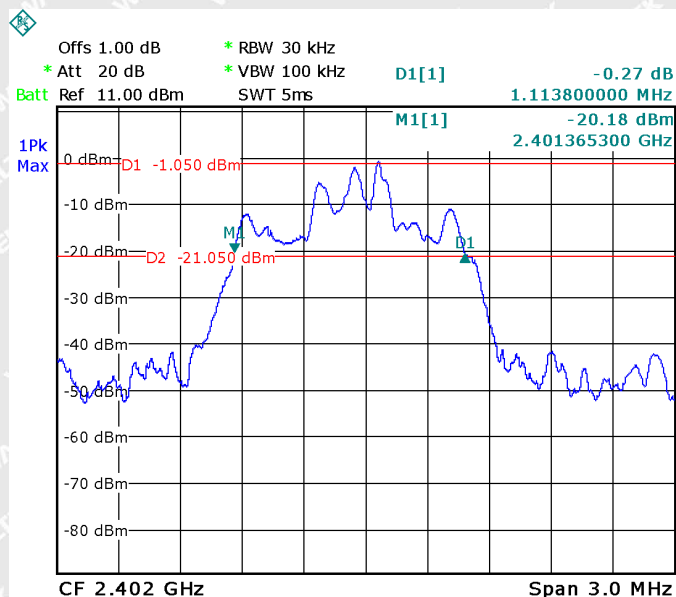


## High Channel

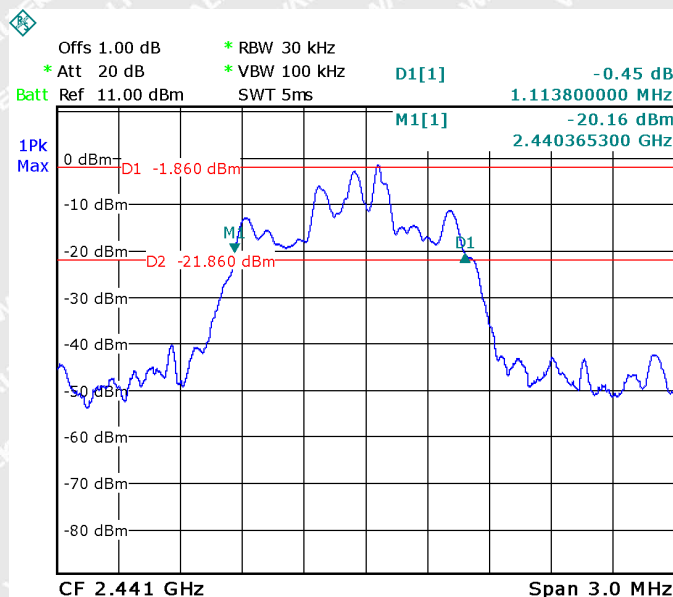


Modulation:  $\pi/4$  DQPSK

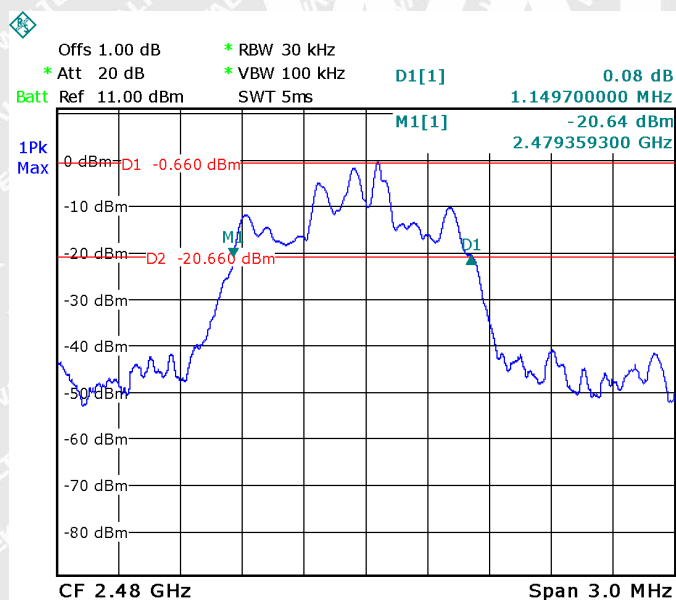
Low Channel



Middle Channel



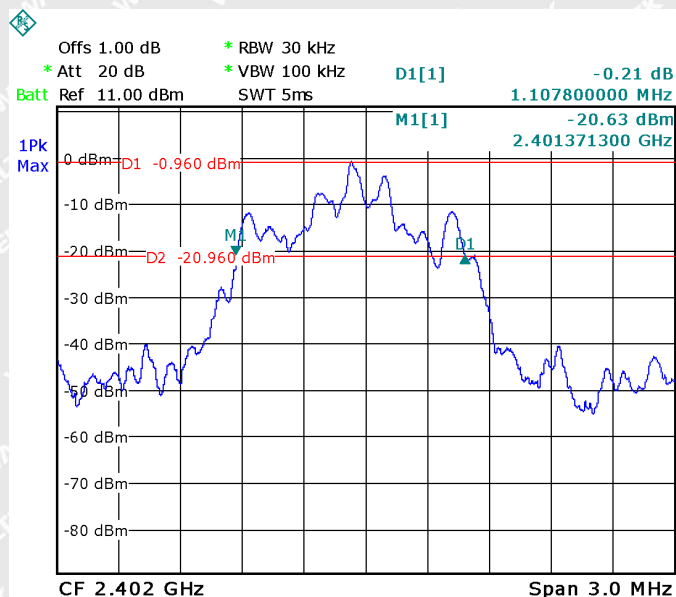
High Channel



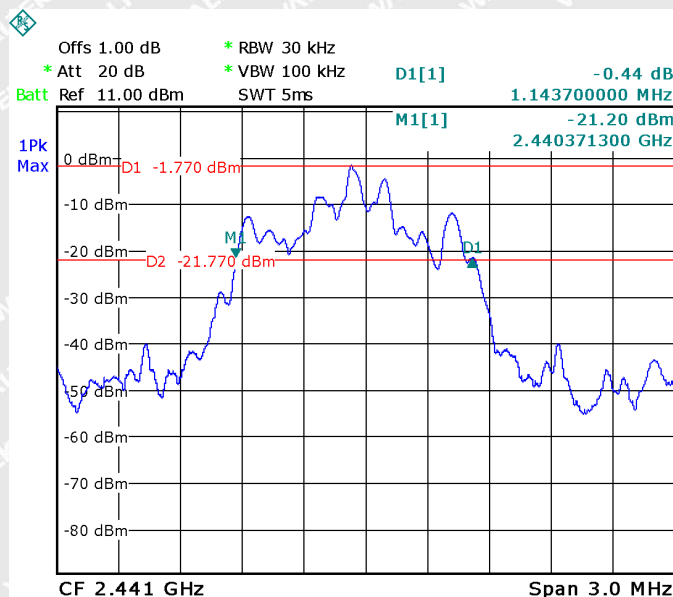


Modulation: 8DPSK

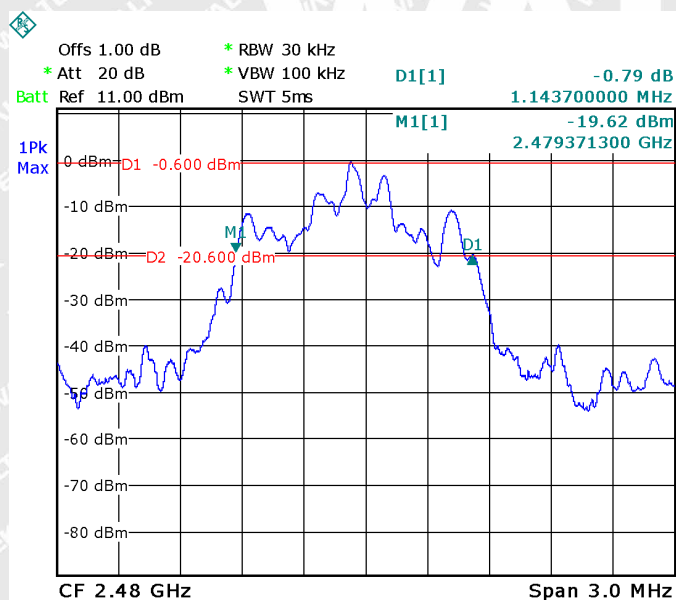
Low Channel



Middle Channel

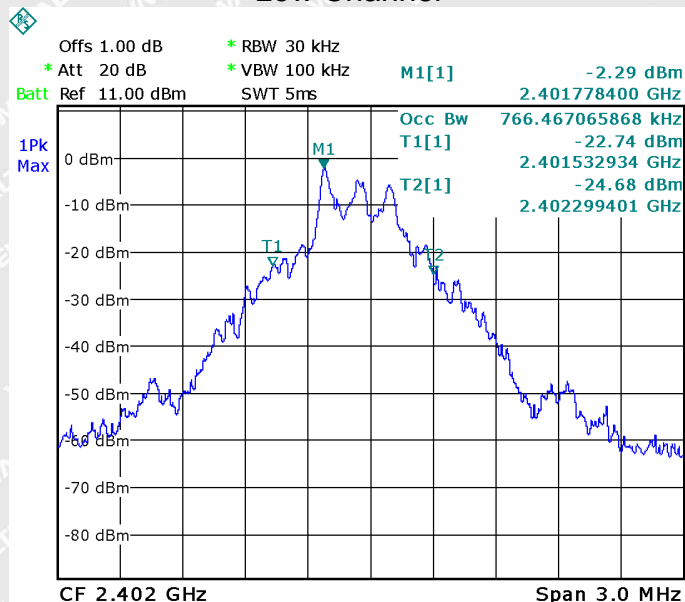
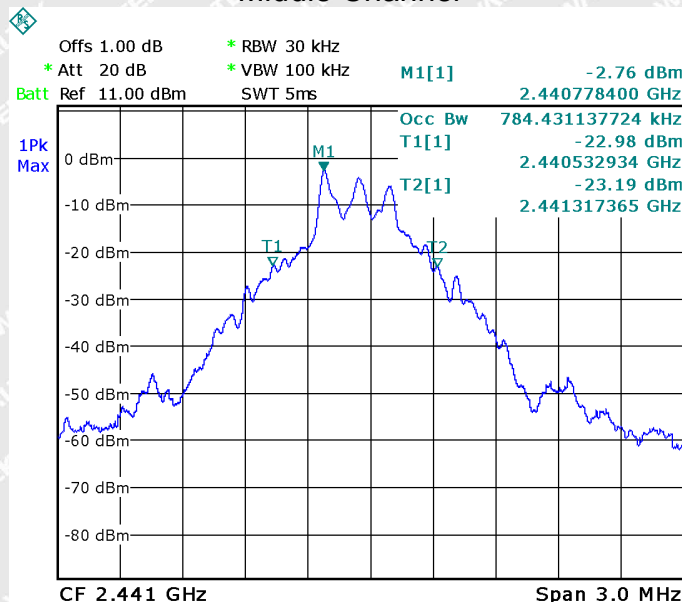
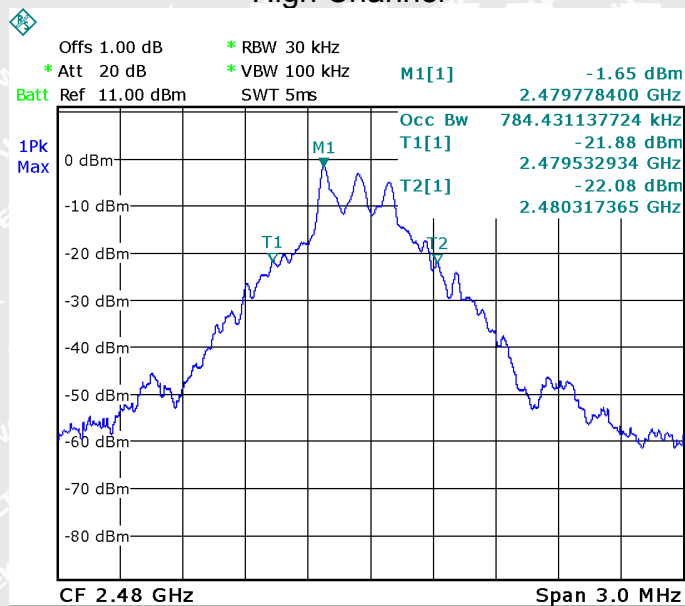


High Channel



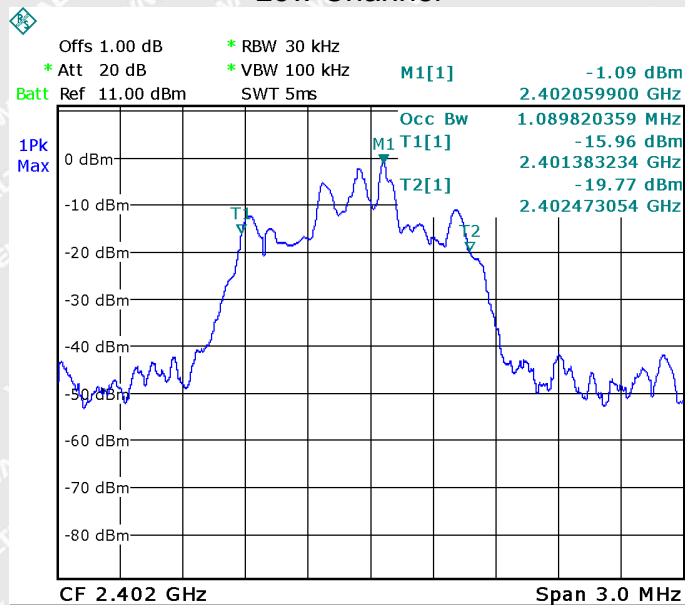
**99% Bandwidth**

Modulation: GFSK

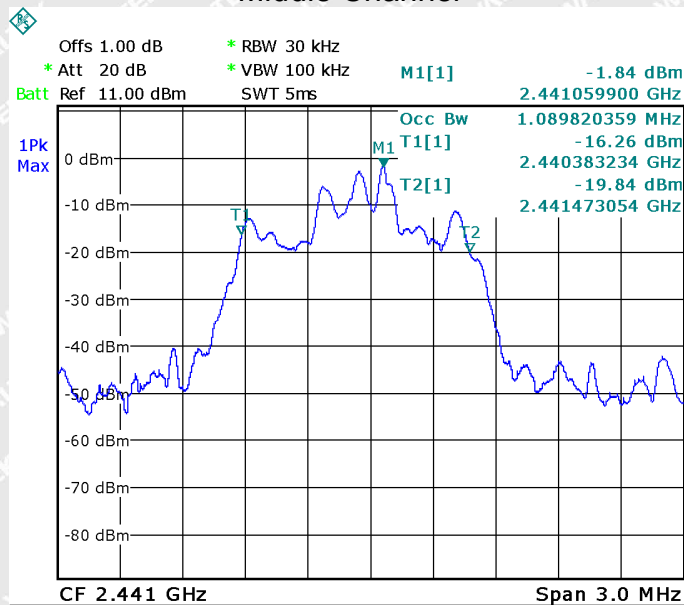
**Low Channel****Middle Channel****High Channel**

Modulation:  $\pi/4$  DQPSK

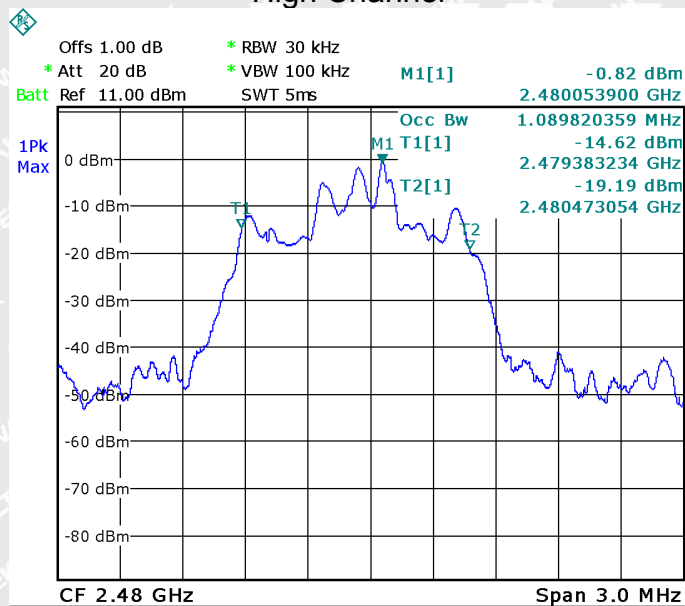
Low Channel



Middle Channel



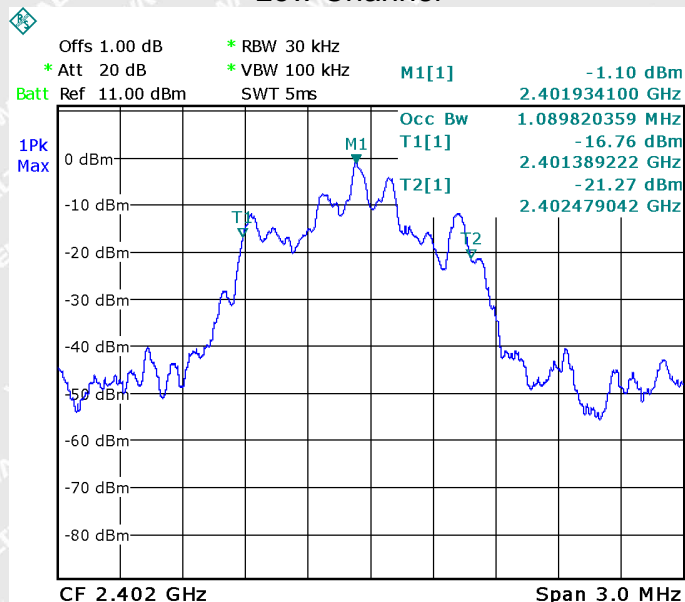
High Channel



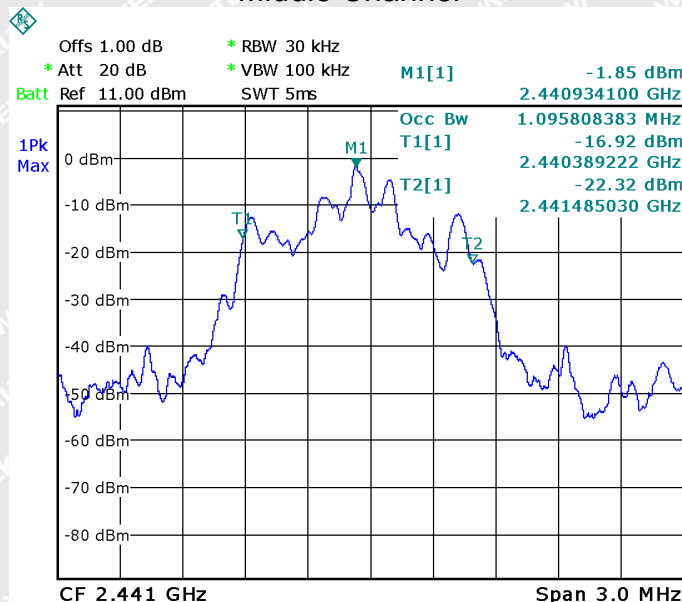


## Modulation: 8DPSK

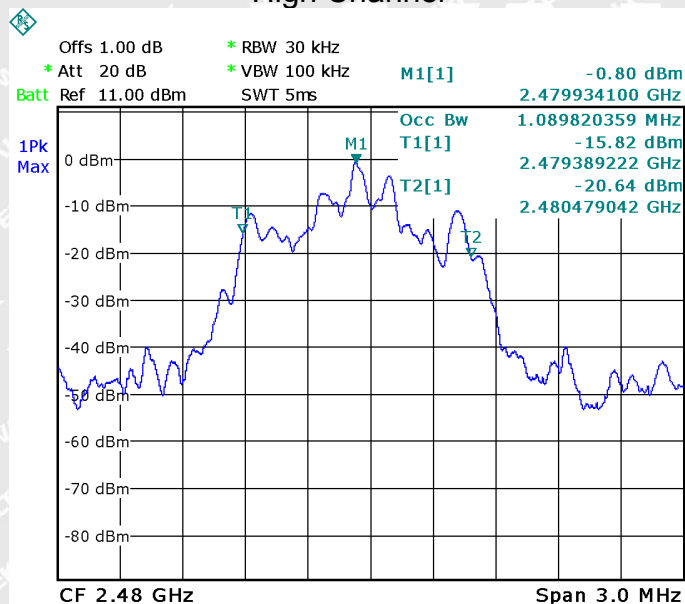
Low Channel



Middle Channel



High Channel





## 11 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

ANSI C63.10: 2013

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.

Test mode:

Test in fixing frequency transmitting 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 = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.///

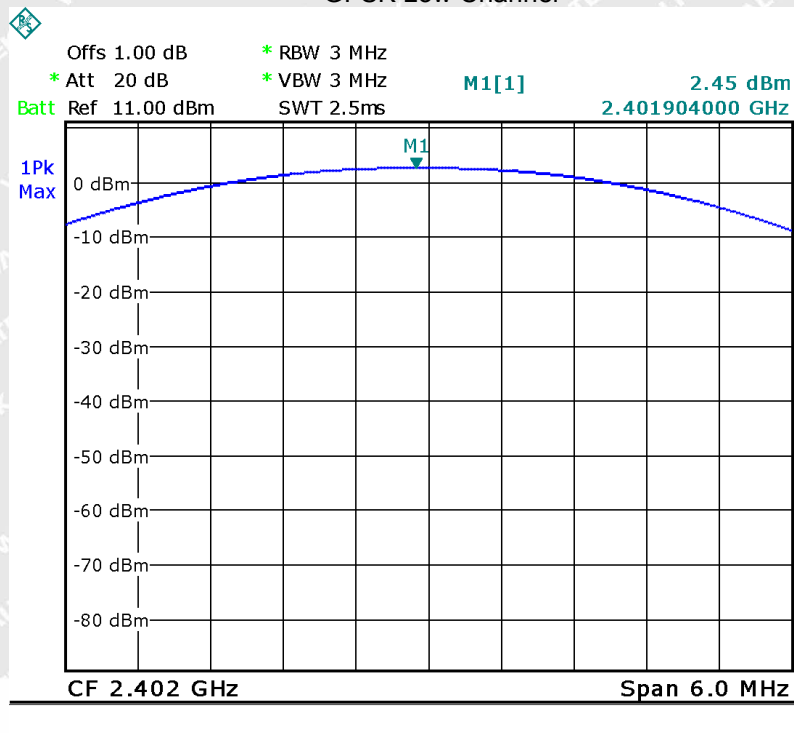
### 11.2 Test Result

| Modulation | Test Channel | Output Power (dBm) | Limit (dBm) |
|------------|--------------|--------------------|-------------|
| GFSK       | Low          | 2.45               | 21          |
| GFSK       | Middle       | 2.24               | 21          |
| GFSK       | High         | 2.90               | 21          |
| Pi/4 DQPSK | Low          | 1.55               | 21          |
| Pi/4 DQPSK | Middle       | 0.85               | 21          |
| Pi/4 DQPSK | High         | 2.01               | 21          |
| 8DPSK      | Low          | 1.38               | 21          |
| 8DPSK      | Middle       | 0.86               | 21          |
| 8DPSK      | High         | 1.90               | 21          |

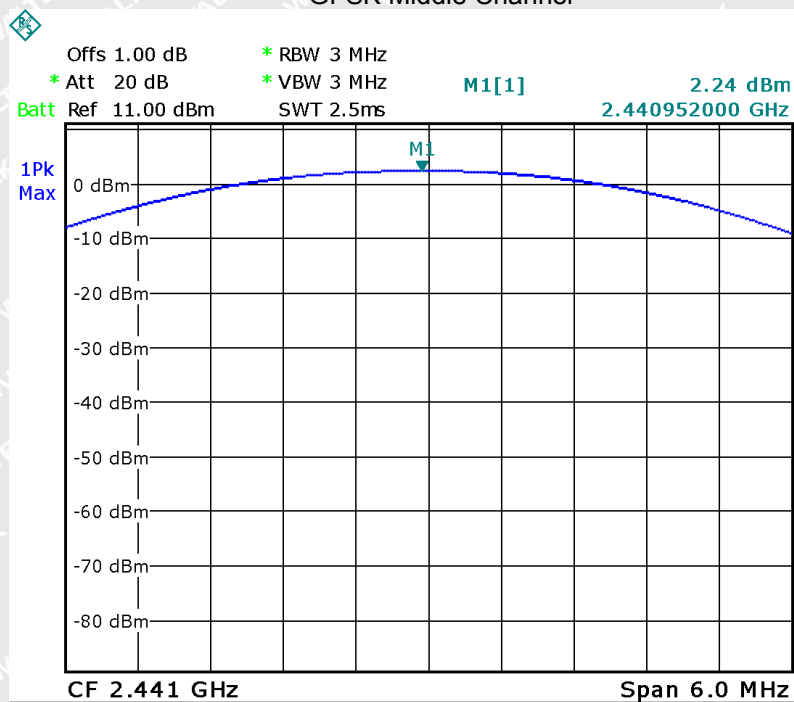


## Test plots

GFSK Low Channel

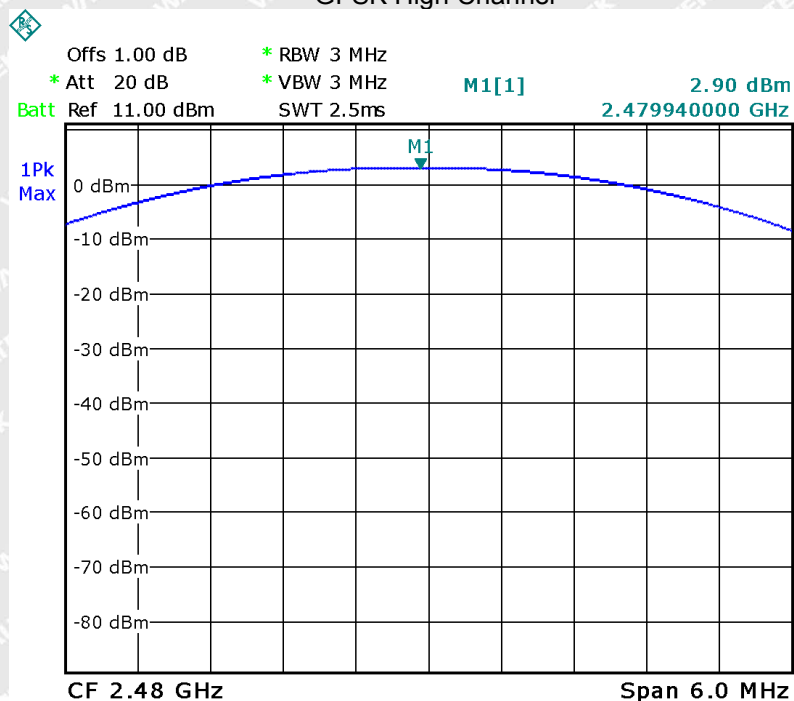


GFSK Middle Channel

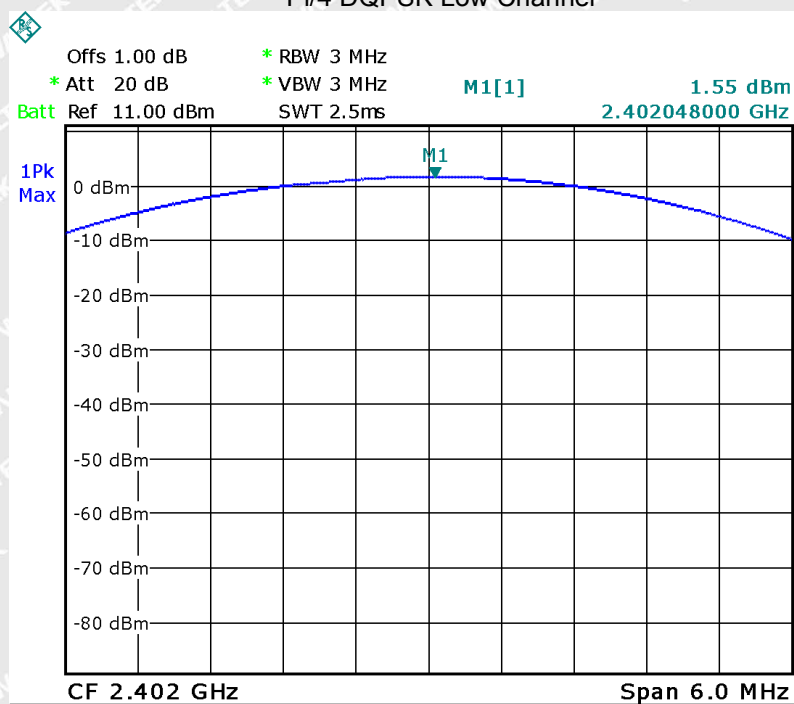




GFSK High Channel

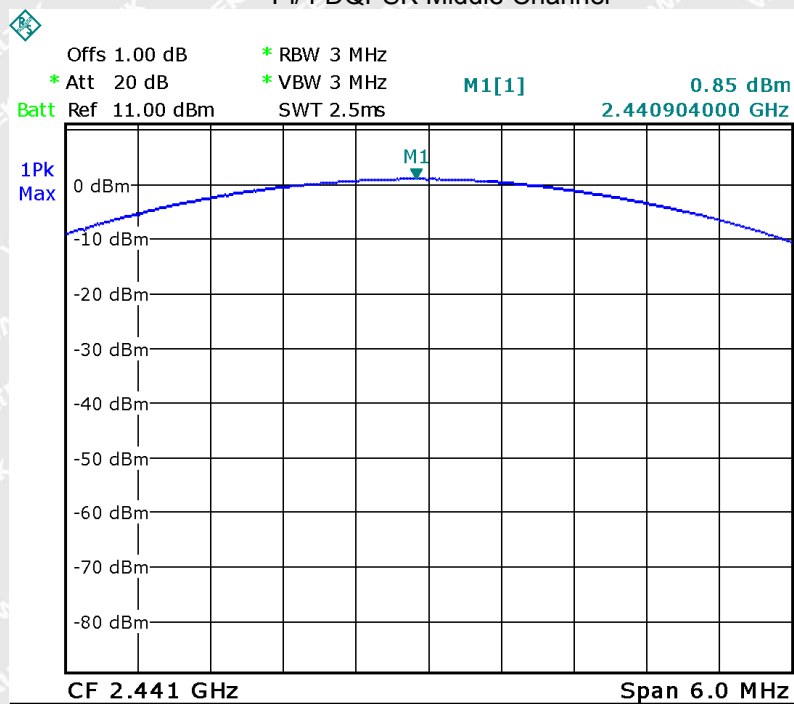


Pi/4 DQPSK Low Channel

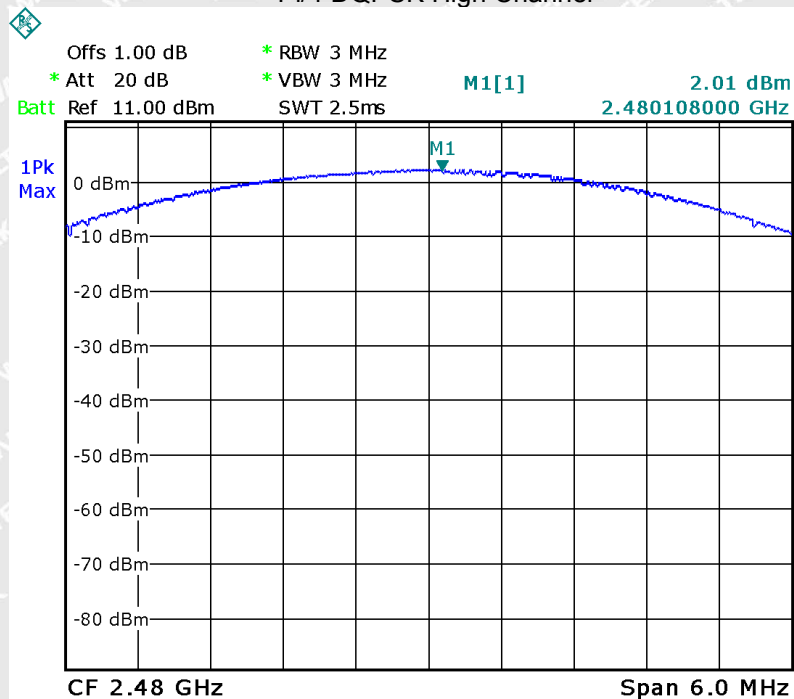




Pi/4 DQPSK Middle Channel

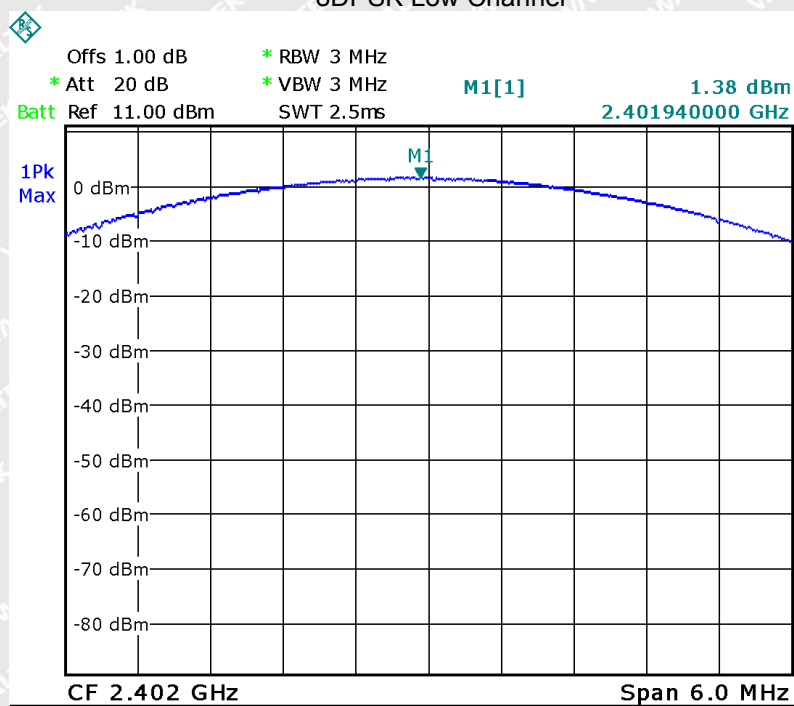


Pi/4 DQPSK High Channel

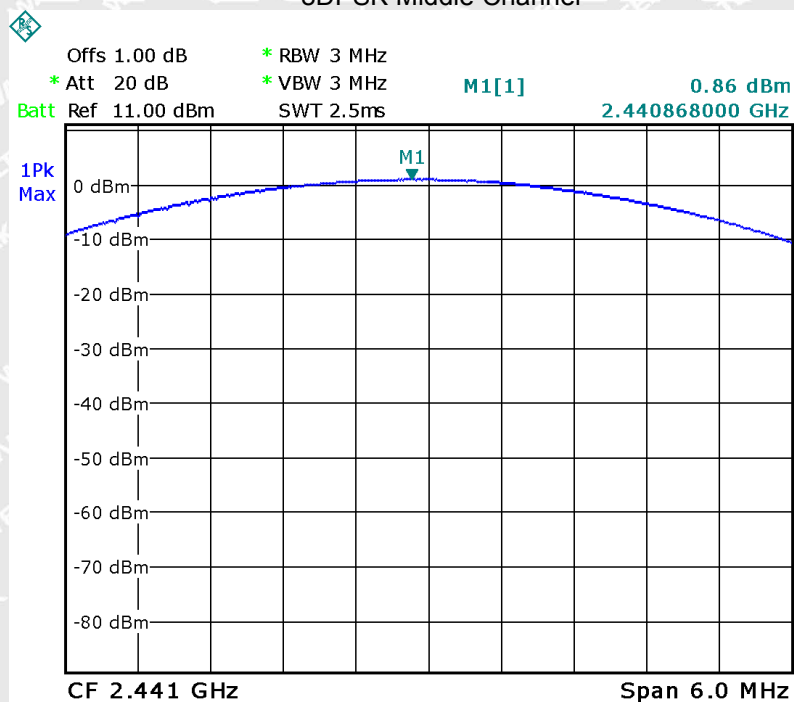




## 8DPSK Low Channel

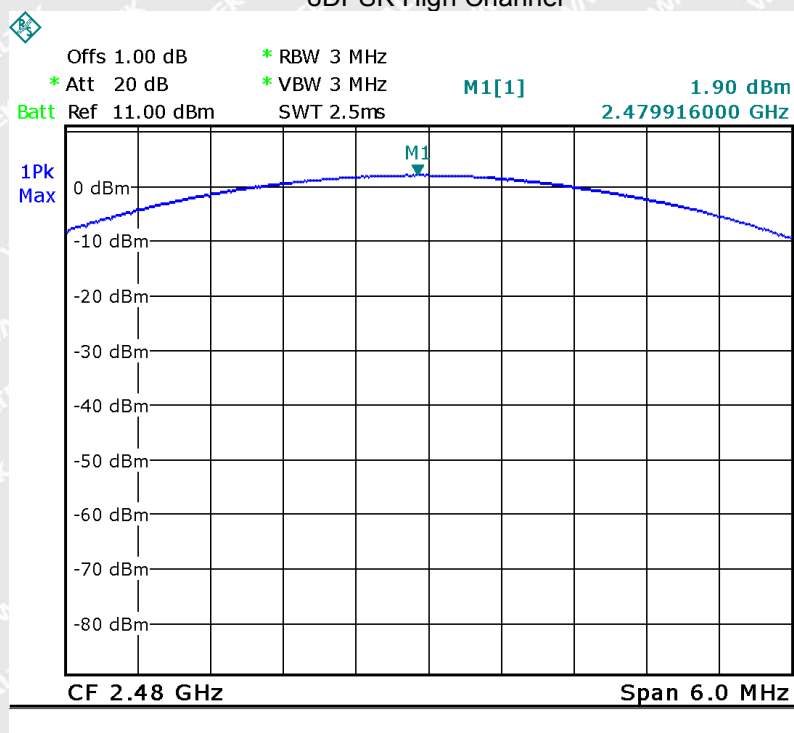


## 8DPSK Middle Channel





## 8DPSK High Channel





## 12 Hopping Channel Separation

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test Method:      | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 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 0.125W. |
| 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 = 30kHz. VBW = 100kHz , Span = 3.0MHz. 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.

### 12.2 Test Result

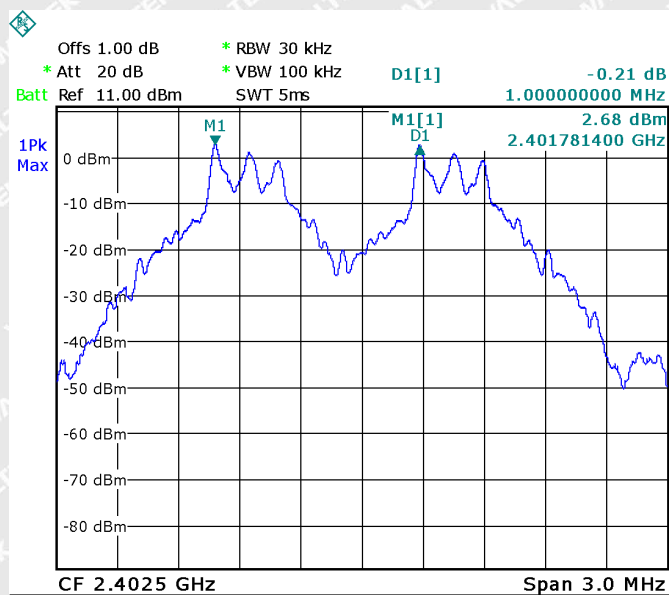
| Modulation | Test Channel | Separation (MHz) | Limit(MHz) | Result |
|------------|--------------|------------------|------------|--------|
| GFSK       | Low          | 1.000            | 0.475      | PASS   |
| GFSK       | Middle       | 1.000            | 0.475      | PASS   |
| GFSK       | High         | 1.000            | 0.479      | PASS   |
| Pi/4 DQPSK | Low          | 1.000            | 0.743      | PASS   |
| Pi/4 DQPSK | Middle       | 1.000            | 0.743      | PASS   |
| Pi/4 DQPSK | High         | 1.000            | 0.766      | PASS   |
| 8DPSK      | Low          | 1.000            | 0.739      | PASS   |
| 8DPSK      | Middle       | 1.000            | 0.763      | PASS   |
| 8DPSK      | High         | 1.000            | 0.763      | PASS   |



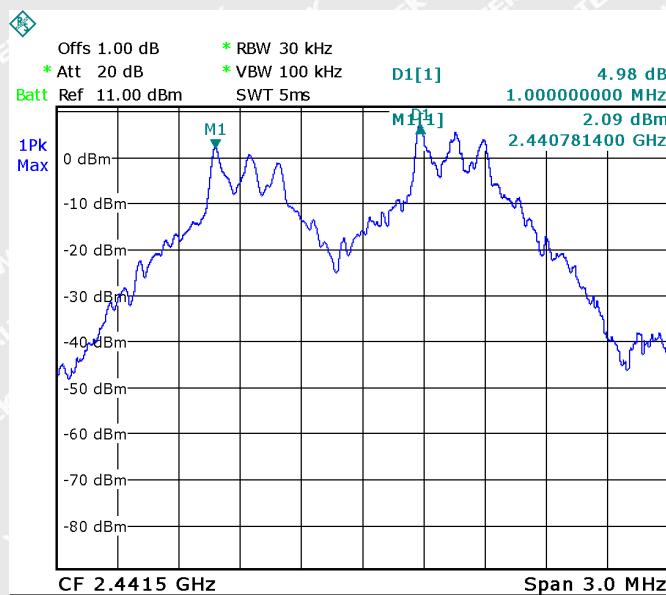
## Test plots

Modulation: GFSK

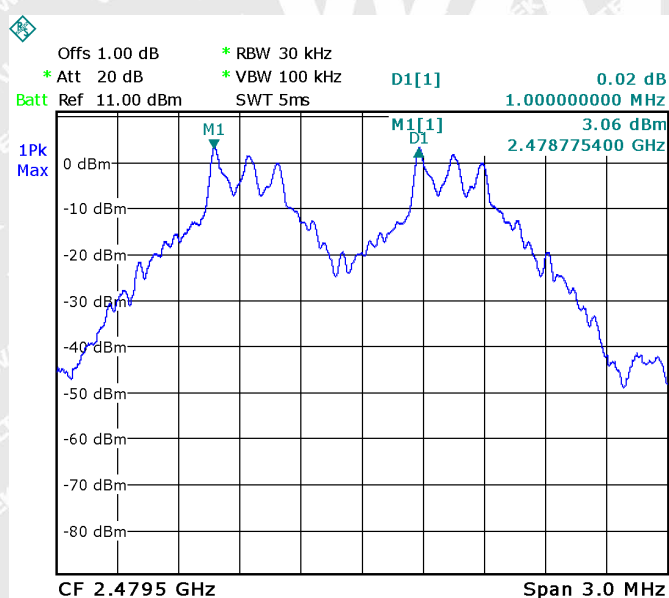
Low Channel



Middle Channel

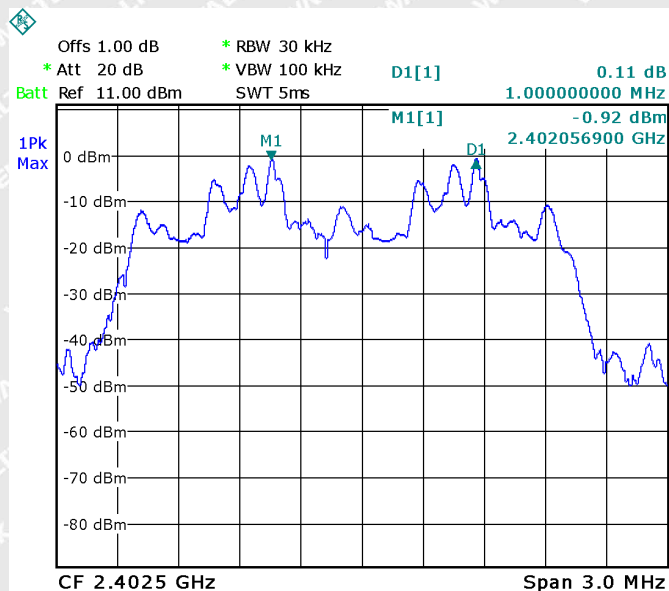


High Channel

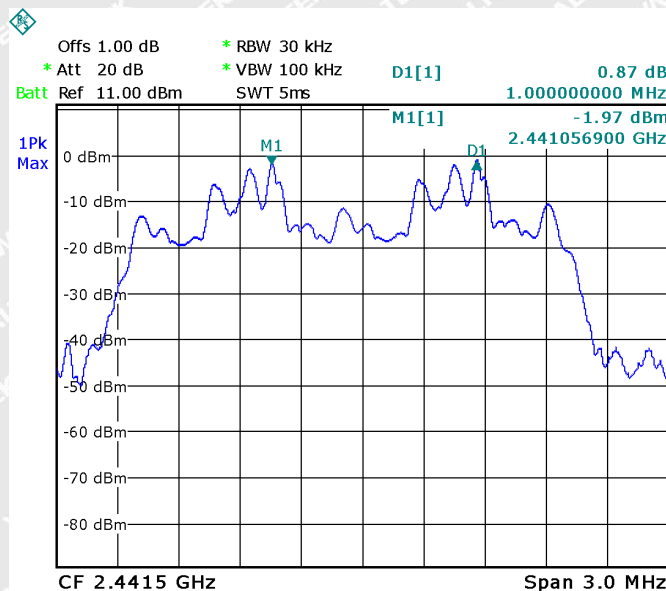


Modulation:  $\pi/4$  DQPSK

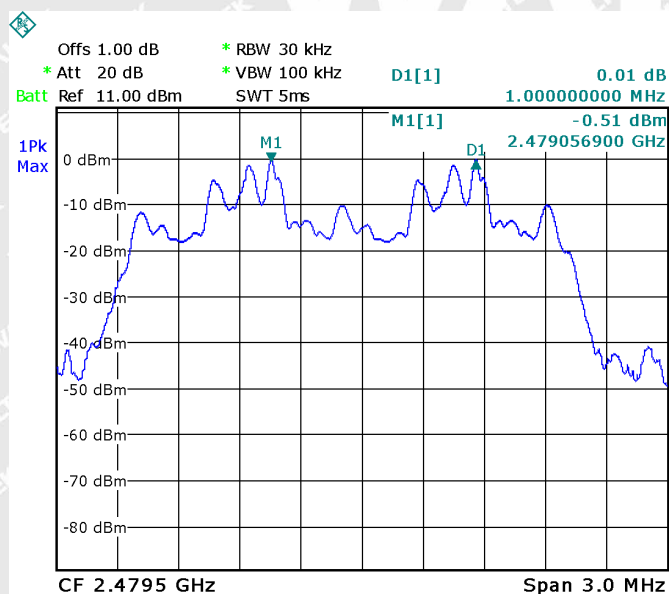
Low Channel



Middle Channel



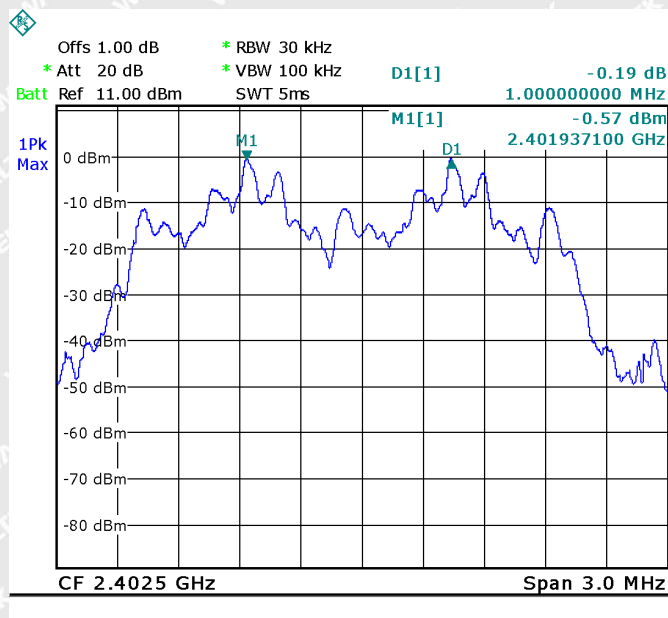
High Channel



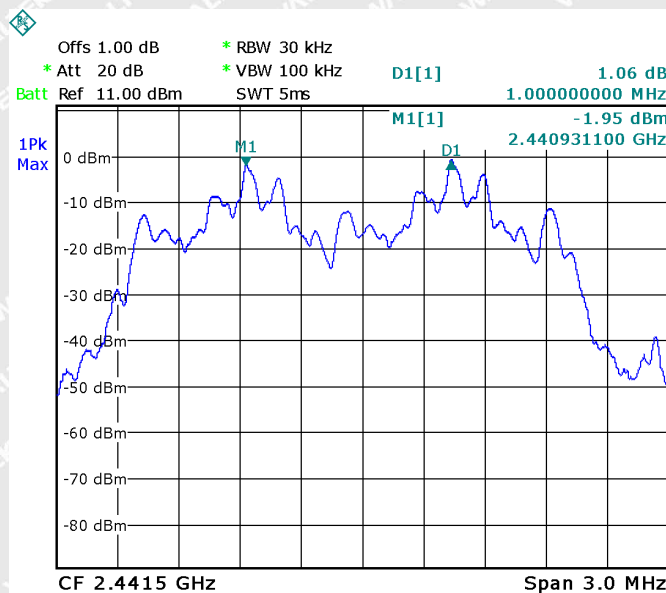


## Modulation: 8DPSK

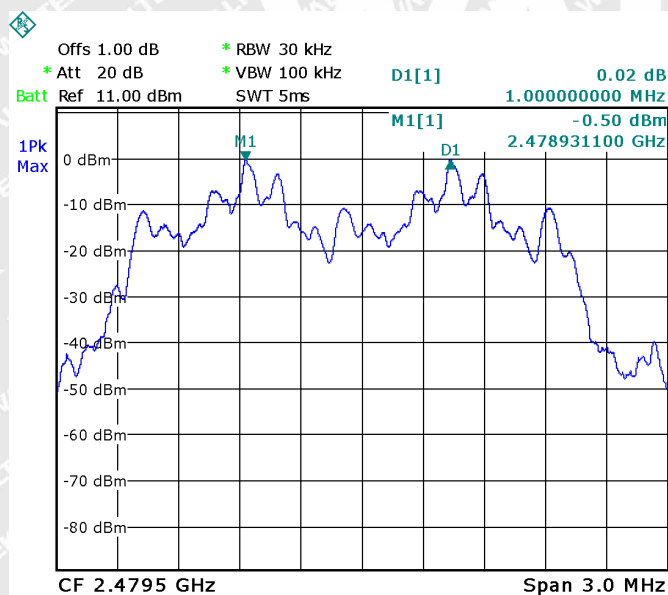
## Low Channel



## Middle Channel



## High Channel





### 13 Number of Hopping Frequency

|                   |                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247                                                                                    |
| Test Method:      | ANSI C63.10: 2013                                                                                                   |
| 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.                                                                        |

#### 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 the spectrum analyzer: RBW = 0.1MHz. VBW = 0.3MHz. 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 = 2.4835GHz. Sweep=auto;

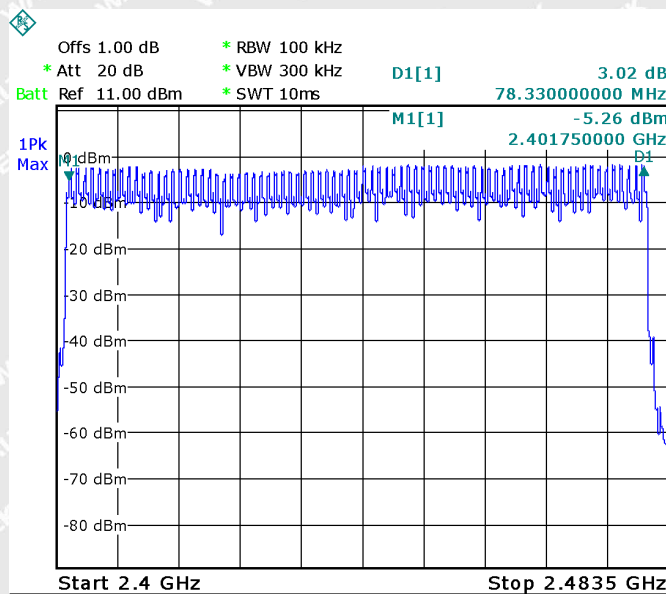
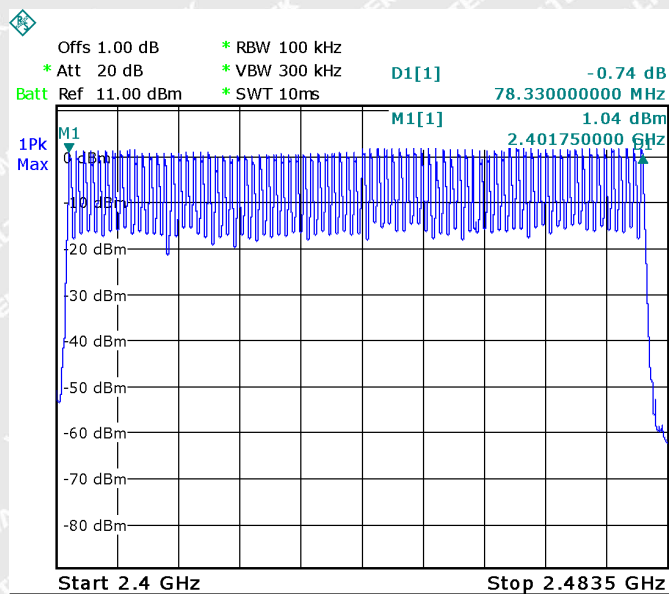
#### 13.2 Test Result

| Mode      | Hopping Sequence |       |        |
|-----------|------------------|-------|--------|
|           | Hopping Number   | Limit | Result |
| GFSK      | 79               | ≥15   | PASS   |
| π/4 DQPSK | 79               |       |        |
| 8DPSK     | 79               |       |        |

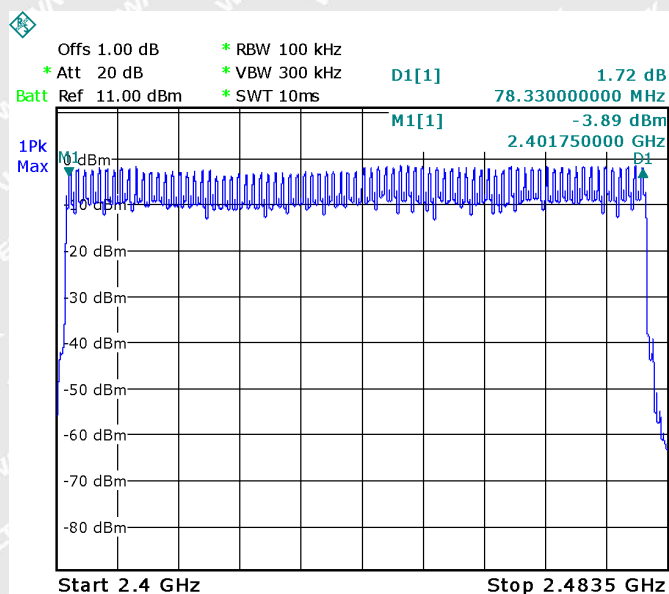


## Test Plots:

Modulation: GFSK

Modulation:  $\pi/4$  DQPSK

Modulation: 8DPSK





## 14 Dwell Time

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

ANSI C63.10: 2013

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.

### 14.1 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).

### 14.2 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. |                                    |



| Modulation | Data Packet | Channel | pulse time(ms) | Dwell Time(s) | Limits(s) |
|------------|-------------|---------|----------------|---------------|-----------|
| GFSK       | DH5         | Low     | 2.900          | 0.309         | 0.4       |
|            |             | middle  | 2.900          | 0.309         | 0.4       |
|            |             | High    | 2.880          | 0.307         | 0.4       |
| Pi/4DQPSK  | DH5         | Low     | 2.200          | 0.235         | 0.4       |
|            |             | middle  | 2.880          | 0.307         | 0.4       |
|            |             | High    | 2.900          | 0.309         | 0.4       |
| 8DPSK      | DH5         | Low     | 2.880          | 0.307         | 0.4       |
|            |             | middle  | 2.860          | 0.305         | 0.4       |
|            |             | High    | 2.880          | 0.307         | 0.4       |

Remark: Only the worst-case mode DH5 is recorded.

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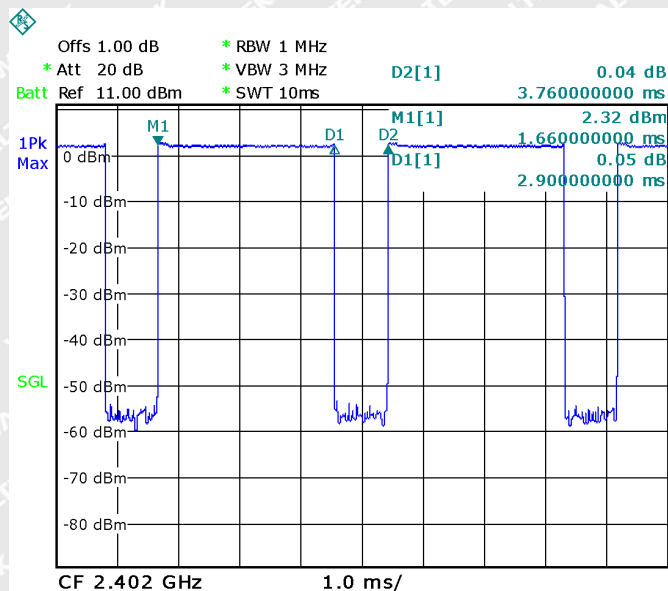


## Test Plots

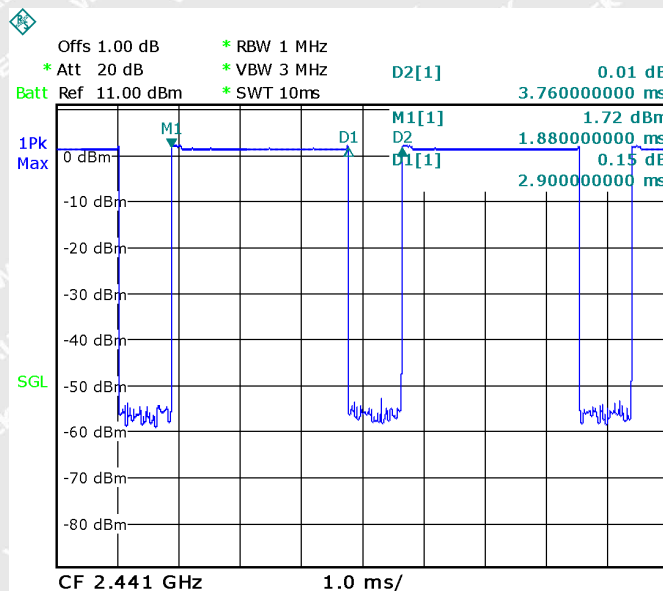
Modulation: GFSK

Data Packet: DH5

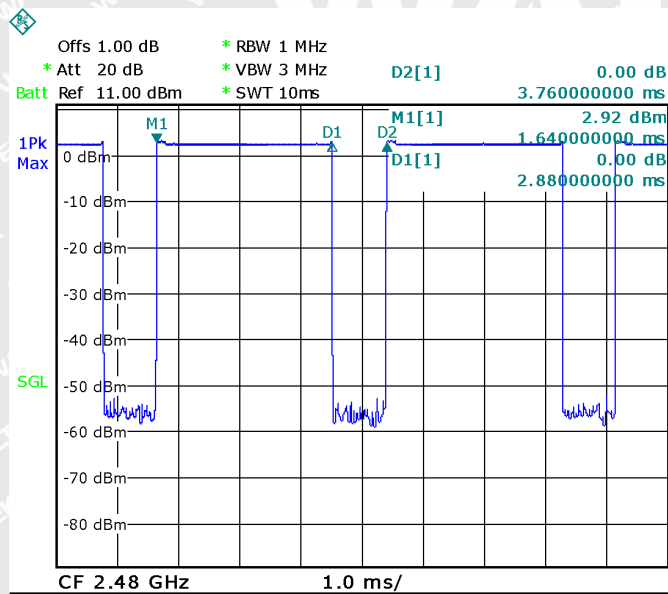
## Low Channel



## Middle Channel



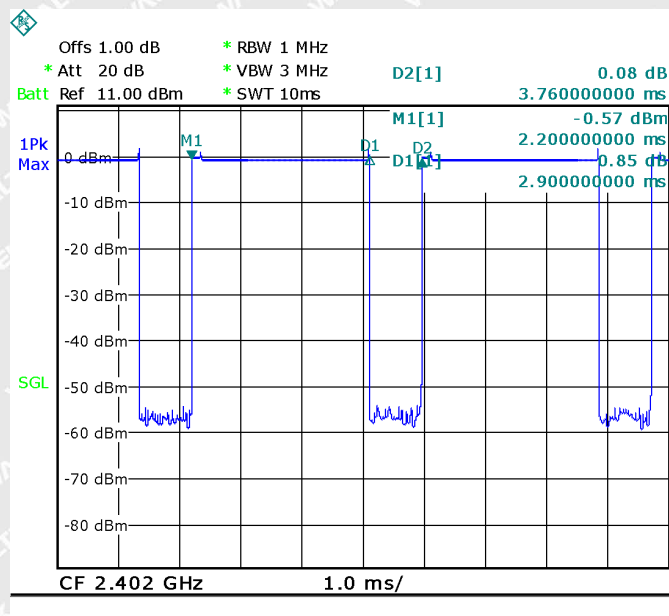
## High Channel



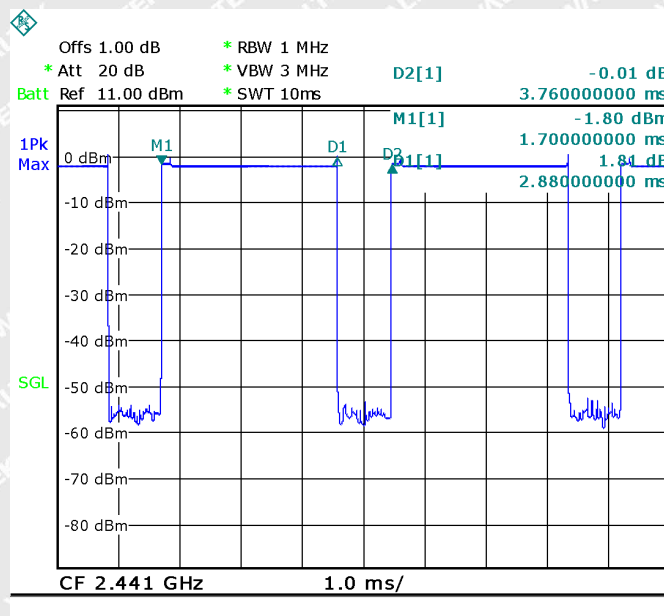
Modulation:  $\pi/4$  DQPSK

Data Packet: 2DH5

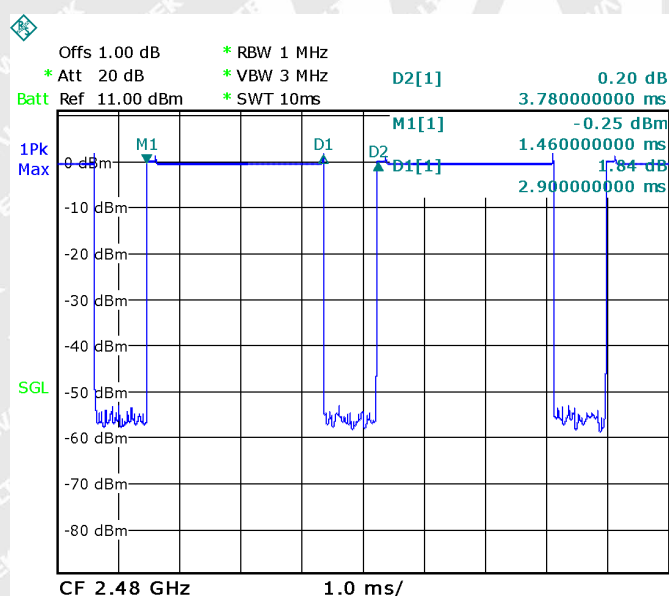
## Low Channel



## Middle Channel



## High Channel

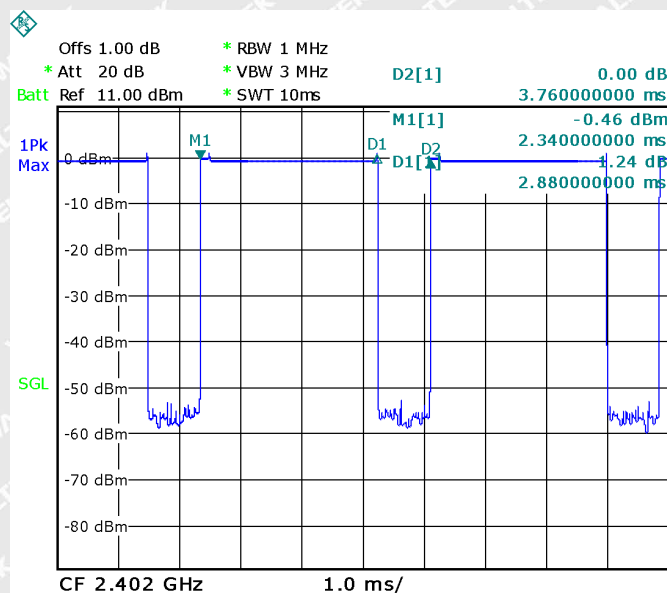




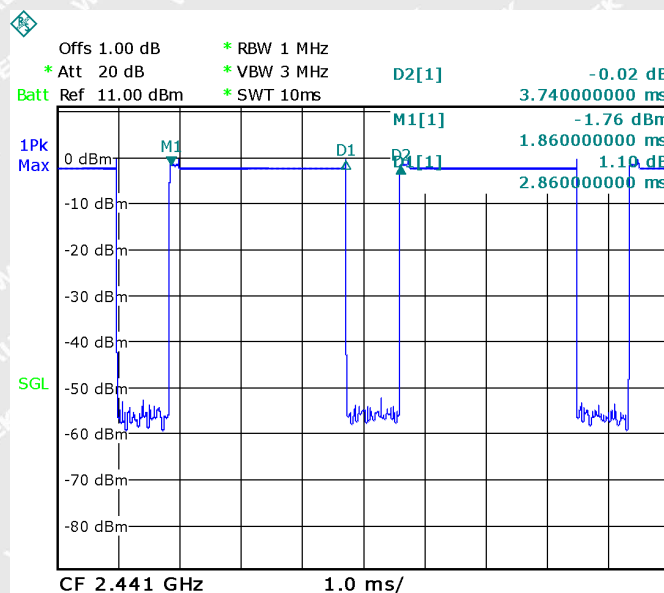
Modulation: 8DPSK

Data Packet: 3DH5

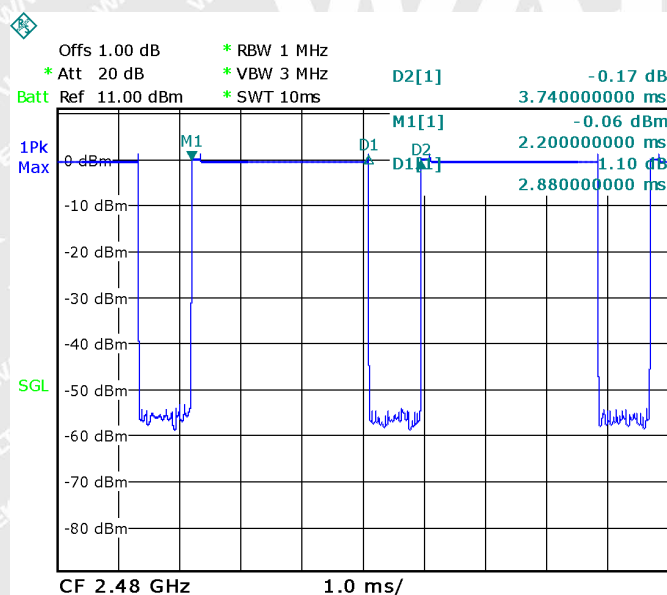
Low Channel



Middle Channel



High Channel





## 15 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 an integrated antenna, fulfil the requirement of this section.

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## 16 RF Exposure

Remark: refer to MPE test report: WTD21D01009766W005.

## 17 Photographs of test setup and EUT.

Note: Please refer to appendix: 6720 -Photo.

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

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