

# TEST REPORT

Reference No. .... : WTF17S1093240-1E  
FCC ID..... : 2AN8J-150KB-S  
Applicant..... : JIANGSU LIANGDI TECH CORPORATION  
Address ..... : NO.1 WEISHANHU ROAD, XIXIASHU, XINBEI DISTRICT,  
CHANGZHOU, JIANGSU, CHINA  
Manufacturer..... : The same as above  
Address ..... : The same as above  
Product..... : Infrared Patio Heater  
Model(s)..... : LDHR062-150KB-S  
Brand Name ..... : **SUNKARE**  
Standards..... : FCC CFR47 Part 15 C Section 15.247:2016  
Date of Receipt sample..... : 2017-10-23  
Date of Test..... : 2017-10-24 to 2017-11-14  
Date of Issue ..... : 2017-11-15  
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:**

**Waltek Services (Shenzhen) Co., Ltd.**

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Tested by:

*Jack Wen*

Jack Wen / Test Engineer

Approved by:



*Philo Zhong*

Philo Zhong / Manager

## 2 Laboratories Introduction

**Waltek Services (Shenzhen) Co., Ltd** is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

## 2.1 Test Facility

### A. Accreditations for Conformity Assessment (International)

| Accreditations for Conformity Assessment (International)            |                                                  |                               |      |
|---------------------------------------------------------------------|--------------------------------------------------|-------------------------------|------|
| Country/Region                                                      | Accreditation Body                               | Scope                         | Note |
| USA                                                                 | <b>A2LA</b><br><b>(Certificate No.: 4243.01)</b> | FCC ID \ DOC \ VOC            | 1    |
| Canada                                                              |                                                  | IC ID \ VOC                   | 2    |
| Japan                                                               |                                                  | MIC-T \ MIC-R                 | -    |
| Europe                                                              |                                                  | EMCD \ RED                    | -    |
| Taiwan                                                              |                                                  | NCC                           | -    |
| Hong Kong                                                           |                                                  | OFCA                          | -    |
| Australia                                                           |                                                  | RCM                           | -    |
| India                                                               |                                                  | <b>International Services</b> | WPC  |
| Thailand                                                            | NTC                                              |                               | -    |
| Singapore                                                           | IDA                                              |                               | -    |
| Note:                                                               |                                                  |                               |      |
| 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. |                                                  |                               |      |
| 2. IC Canada Registration No.: 7760A                                |                                                  |                               |      |

### B.TCBs and Notify Bodies Recognized Testing Laboratory.

| Recognized Testing Laboratory of ...     | Notify body number |
|------------------------------------------|--------------------|
| TUV Rheinland                            | Optional.          |
| Intertek                                 |                    |
| TUV SUD                                  |                    |
| SGS                                      |                    |
| Phoenix Testlab GmbH                     | 0700               |
| Element Materials Technology Warwick Ltd | 0891               |
| Timco Engineering, Inc.                  | 1177               |
| Eurofins Product Service GmbH            | 0681               |

### 3 Contents

|                                                               | Page      |
|---------------------------------------------------------------|-----------|
| <b>1 COVER PAGE.....</b>                                      | <b>1</b>  |
| <b>2 LABORATORIES INTRODUCTION.....</b>                       | <b>2</b>  |
| 2.1 TEST FACILITY.....                                        | 3         |
| <b>3 CONTENTS.....</b>                                        | <b>4</b>  |
| <b>4 REVISION HISTORY.....</b>                                | <b>6</b>  |
| <b>5 GENERAL INFORMATION(ONLY APPLIED TO CLASSIC BT).....</b> | <b>7</b>  |
| 5.1 GENERAL DESCRIPTION OF E.U.T.....                         | 7         |
| 5.2 DETAILS OF E.U.T.....                                     | 7         |
| 5.3 CHANNEL LIST.....                                         | 8         |
| 5.4 TEST MODE.....                                            | 9         |
| <b>6 EQUIPMENT USED DURING TEST.....</b>                      | <b>10</b> |
| 6.1 EQUIPMENTS LIST.....                                      | 10        |
| 6.2 MEASUREMENT UNCERTAINTY.....                              | 11        |
| 6.3 TEST EQUIPMENT CALIBRATION.....                           | 11        |
| <b>7 TEST SUMMARY.....</b>                                    | <b>12</b> |
| <b>8 CONDUCTED EMISSION.....</b>                              | <b>13</b> |
| 8.1 E.U.T. OPERATION.....                                     | 13        |
| 8.2 EUT SETUP.....                                            | 13        |
| 8.3 MEASUREMENT DESCRIPTION.....                              | 13        |
| 8.4 CONDUCTED EMISSION TEST RESULT.....                       | 14        |
| <b>9 RADIATED EMISSIONS.....</b>                              | <b>16</b> |
| 9.1 EUT OPERATION.....                                        | 16        |
| 9.2 TEST SETUP.....                                           | 17        |
| 9.3 SPECTRUM ANALYZER SETUP.....                              | 18        |
| 9.4 TEST PROCEDURE.....                                       | 19        |
| 9.5 CORRECTED AMPLITUDE & MARGIN CALCULATION.....             | 19        |
| 9.6 SUMMARY OF TEST RESULTS.....                              | 20        |
| <b>10 CONDUCTED SPURIOUS EMISSIONS.....</b>                   | <b>23</b> |
| 10.1 TEST PROCEDURE.....                                      | 23        |
| 10.2 TEST RESULT.....                                         | 24        |
| <b>11 BAND EDGE MEASUREMENT.....</b>                          | <b>33</b> |
| 11.1 TEST PRODUCE.....                                        | 33        |
| 11.2 TEST RESULT.....                                         | 34        |
| <b>12 BANDWIDTH MEASUREMENT.....</b>                          | <b>40</b> |
| 12.1 TEST PROCEDURE:.....                                     | 40        |
| 12.2 TEST RESULT:.....                                        | 40        |
| <b>13 MAXIMUM PEAK OUTPUT POWER.....</b>                      | <b>46</b> |
| 13.1 TEST PROCEDURE:.....                                     | 46        |
| 13.2 TEST RESULT:.....                                        | 46        |
| <b>14 HOPPING CHANNEL SEPARATION.....</b>                     | <b>52</b> |
| 14.1 TEST PROCEDURE:.....                                     | 52        |
| 14.2 TEST RESULT:.....                                        | 52        |
| <b>15 NUMBER OF HOPPING FREQUENCY.....</b>                    | <b>58</b> |
| 15.1 TEST PROCEDURE:.....                                     | 58        |
| 15.2 TEST RESULT:.....                                        | 58        |

|           |                                                   |           |
|-----------|---------------------------------------------------|-----------|
| <b>16</b> | <b>DWELL TIME .....</b>                           | <b>60</b> |
| 16.1      | TEST PROCEDURE:.....                              | 60        |
| 16.2      | TEST RESULT: .....                                | 60        |
| <b>17</b> | <b>ANTENNA REQUIREMENT .....</b>                  | <b>66</b> |
| <b>18</b> | <b>SAR EVALUATION .....</b>                       | <b>67</b> |
| <b>19</b> | <b>PHOTOGRAPHS –TEST SETUP PHOTOS .....</b>       | <b>68</b> |
| 19.1      | RADIATED EMISSION .....                           | 68        |
| 19.2      | CONDUCTED EMISSION .....                          | 70        |
| <b>20</b> | <b>PHOTOGRAPHS – CONSTRUCTIONAL DETAILS .....</b> | <b>71</b> |
| 20.1      | EUT– EXTERNAL PHOTOS.....                         | 71        |
| 20.2      | EUT– INTERNAL PHOTOS .....                        | 75        |

#### 4 Revision History

| Test report No.  | Date of Receipt sample | Date of Test             | Date of Issue | Purpose  | Comment | Approved |
|------------------|------------------------|--------------------------|---------------|----------|---------|----------|
| WTF17S1093240-1E | 2017-10-23             | 2017-10-24 to 2017-11-14 | 2017-11-15    | Original | -       | Valid    |

## 5 General Information(Only applied to Classic BT)

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

|                        |                       |
|------------------------|-----------------------|
| Product:               | Infrared Patio Heater |
| Model(s):              | LDHR062-150KB-S       |
| Model Difference:      | N/A                   |
| The lowest oscillator: | 16MHz                 |

### 5.2 Details of E.U.T

|                       |                                                    |
|-----------------------|----------------------------------------------------|
| Operation Frequency:  | 2402-2480MHz, 79 Channels in total                 |
| RF output power       | -0.29dBm                                           |
| Antenna Gain:         | 0dBi                                               |
| Antenna installation: | Classic BT: External antenna with RP-SMA connector |
| Type of modulation:   | GFSK, Pi/4DQPSK, 8DPSK                             |
| Ratings:              | Input: AC 120V, 60Hz, 1500W                        |

### 5.3 Channel List

BT

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 1           | 2402            | 2           | 2403            | 3           | 2404            | 4           | 2405            |
| 5           | 2406            | 6           | 2407            | 7           | 2408            | 8           | 2409            |
| 9           | 2410            | 10          | 2411            | 11          | 2412            | 12          | 2413            |
| 13          | 2414            | 14          | 2415            | 15          | 2416            | 16          | 2417            |
| 17          | 2418            | 18          | 2419            | 19          | 2420            | 20          | 2421            |
| 21          | 2422            | 22          | 2423            | 23          | 2424            | 24          | 2425            |
| 25          | 2426            | 26          | 2427            | 27          | 2428            | 28          | 2429            |
| 29          | 2430            | 30          | 2431            | 31          | 2432            | 32          | 2433            |
| 33          | 2434            | 34          | 2435            | 35          | 2436            | 36          | 2437            |
| 37          | 2438            | 38          | 2439            | 39          | 2440            | 40          | 2441            |
| 41          | 2442            | 42          | 2443            | 43          | 2444            | 44          | 2445            |
| 45          | 2446            | 46          | 2447            | 47          | 2448            | 48          | 2449            |
| 49          | 2450            | 50          | 2451            | 51          | 2452            | 52          | 2453            |
| 53          | 2454            | 54          | 2455            | 55          | 2456            | 56          | 2457            |
| 57          | 2458            | 58          | 2459            | 59          | 2460            | 60          | 2461            |
| 61          | 2462            | 62          | 2463            | 63          | 2464            | 64          | 2465            |
| 65          | 2466            | 66          | 2467            | 67          | 2468            | 68          | 2469            |
| 69          | 2470            | 70          | 2471            | 71          | 2472            | 72          | 2473            |
| 73          | 2474            | 74          | 2475            | 75          | 2476            | 76          | 2477            |
| 77          | 2478            | 78          | 2479            | 79          | 2480            | -           | -               |

## 5.4 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.

Table 1 Tests Carried Out Under FCC part 15.247

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

Table 2 Tests Carried Out Under FCC part 15.207 and 15.209

| Test Item           | Test Mode    |
|---------------------|--------------|
| Radiated Emissions  | Transmitting |
| Conducted Emissions | Transmitting |

## 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          | 2017-09-12            | 2018-09-11           |
| 2.                                                            | LISN                       | R&S                              | ENV216       | 101215          | 2017-09-12            | 2018-09-11           |
| 3.                                                            | Cable                      | Top                              | TYPE16(3.5M) | -               | 2017-09-12            | 2018-09-11           |
| 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          | 2017-09-12            | 2018-09-11           |
| 2.                                                            | LISN                       | SCHWARZBECK                      | NSLK 8128    | 8128-289        | 2017-09-12            | 2018-09-11           |
| 3.                                                            | Limiter                    | York                             | MTS-IMP-136  | 261115-001-0024 | 2017-09-12            | 2018-09-11           |
| 4.                                                            | Cable                      | LARGE                            | RF300        | -               | 2017-09-12            | 2018-09-11           |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 1# |                            |                                  |              |                 |                       |                      |
| Item                                                          | Equipment                  | Manufacturer                     | Model No.    | Serial No.      | Last Calibration Date | Calibration Due Date |
| 1                                                             | EMC Analyzer               | Agilent                          | E7405A       | MY45114943      | 2017-09-14            | 2018-09-13           |
| 2                                                             | Active Loop Antenna        | Beijing Dazhi                    | ZN30900A     | -               | 2017-10-17            | 2018-10-16           |
| 3                                                             | Trilog Broadband Antenna   | SCHWARZBECK                      | VULB9163     | 336             | 2017-04-09            | 2018-04-08           |
| 4                                                             | Coaxial Cable (below 1GHz) | Top                              | TYPE16(13M)  | -               | 2017-09-12            | 2018-09-11           |
| 5                                                             | Broad-bandHorn Antenna     | SCHWARZBECK                      | BBHA 9120 D  | 667             | 2017-04-09            | 2018-04-08           |
| 6                                                             | Broad-band Horn Antenna    | SCHWARZBECK                      | BBHA 9170    | 335             | 2017-09-14            | 2018-09-13           |
| 7                                                             | Broadband Preamplifier     | COMPLIANCE DIRECTION             | PAP-1G18     | 2004            | 2017-04-13            | 2018-04-12           |
| 8                                                             | Coaxial Cable (above 1GHz) | Top                              | 1GHz-25GHz   | EW02014-7       | 2017-04-13            | 2018-04-12           |
| 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          | 2017-04-13            | 2018-04-12           |
| 2                                                             | Trilog Broadband Antenna   | SCHWARZBECK                      | VULB9160     | 9160-3325       | 2017-04-09            | 2018-04-08           |
| 3                                                             | Amplifier                  | Compliance pirection systems inc | PAP-0203     | 22024           | 2017-04-13            | 2018-04-12           |

| 4                           | Cable                           | HUBER+SUHNER | CBL2      | 525178     | 2017-04-13            | 2018-04-12           |
|-----------------------------|---------------------------------|--------------|-----------|------------|-----------------------|----------------------|
| <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 | 2017-09-14            | 2018-09-13           |
| 2.                          | Spectrum Analyzer<br>(9k-6GHz)  | R&S          | FSL6      | 100959     | 2017-09-12            | 2018-09-11           |
| 3.                          | Signal Analyzer<br>(9k~26.5GHz) | Agilent      | N9010A    | MY50520207 | 2017-09-12            | 2018-09-11           |

## 6.2 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 SpuriousEmissions test  | $\pm 5.03$ dB (30M~1000MHz)          |
|                                  | $\pm 5.47$ dB(1000M~25000MHz)        |
| Conducted SpuriousEmissions test | $\pm 3.64$ dB(AC mains 150KHz~30MHz) |

## 6.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave,Tianhe District, Guangzhou, Guangdong, China.

## 7 Test Summary

| Test Items                                                                | Test Requirement                 | Result |
|---------------------------------------------------------------------------|----------------------------------|--------|
| Spurious Radiated Emissions                                               | 15.247<br>15.205(a)<br>15.209(a) | C      |
| Conducted Emissions                                                       | 15.207(a)                        | C      |
| Conducted Spurious Emissions                                              | 15.247                           | C      |
| Bandwidth                                                                 | 15.247(a)(2)                     | C      |
| Maximum Peak Output Power                                                 | 15.247(b)(3),(4)                 | C      |
| Frequency Separation                                                      | 15.247(a)(1)                     | C      |
| Number of Hopping Frequency                                               | 15.247(a)(1)(iii)                | C      |
| Dwell time                                                                | 15.247(a)(1)(iii)                | C      |
| Power Spectral Density                                                    | 15.247(e)                        | C      |
| Band Edge                                                                 | 15.247(d)                        | C      |
| Antenna Requirement                                                       | 15.203                           | C      |
| Maximum Permissible Exposure<br>(Exposure of Humans to RF Fields)         | 1.1307(b)(1)                     | C      |
| Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable. |                                  |        |

## 8 Conducted Emission

|                   |                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR 47 Part 15 Section 15.207                                                                                      |
| Test Method:      | ANSI C63.10:2013                                                                                                       |
| 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)                                                                           |

### 8.1 E.U.T. Operation

Operating Environment:

Temperature: 21.5 °C

Humidity: 51.9% RH

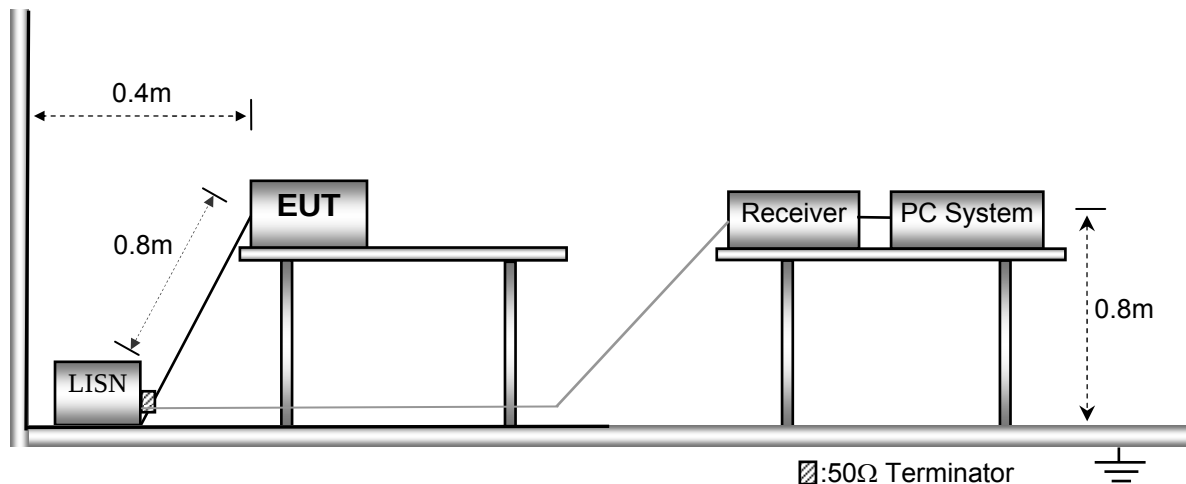
Atmospheric Pressure: 101.2kPa

EUT Operation:

The test was performed in Transmitting mode, only the worst case(BT module) were record in the report.

### 8.2 EUT Setup

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



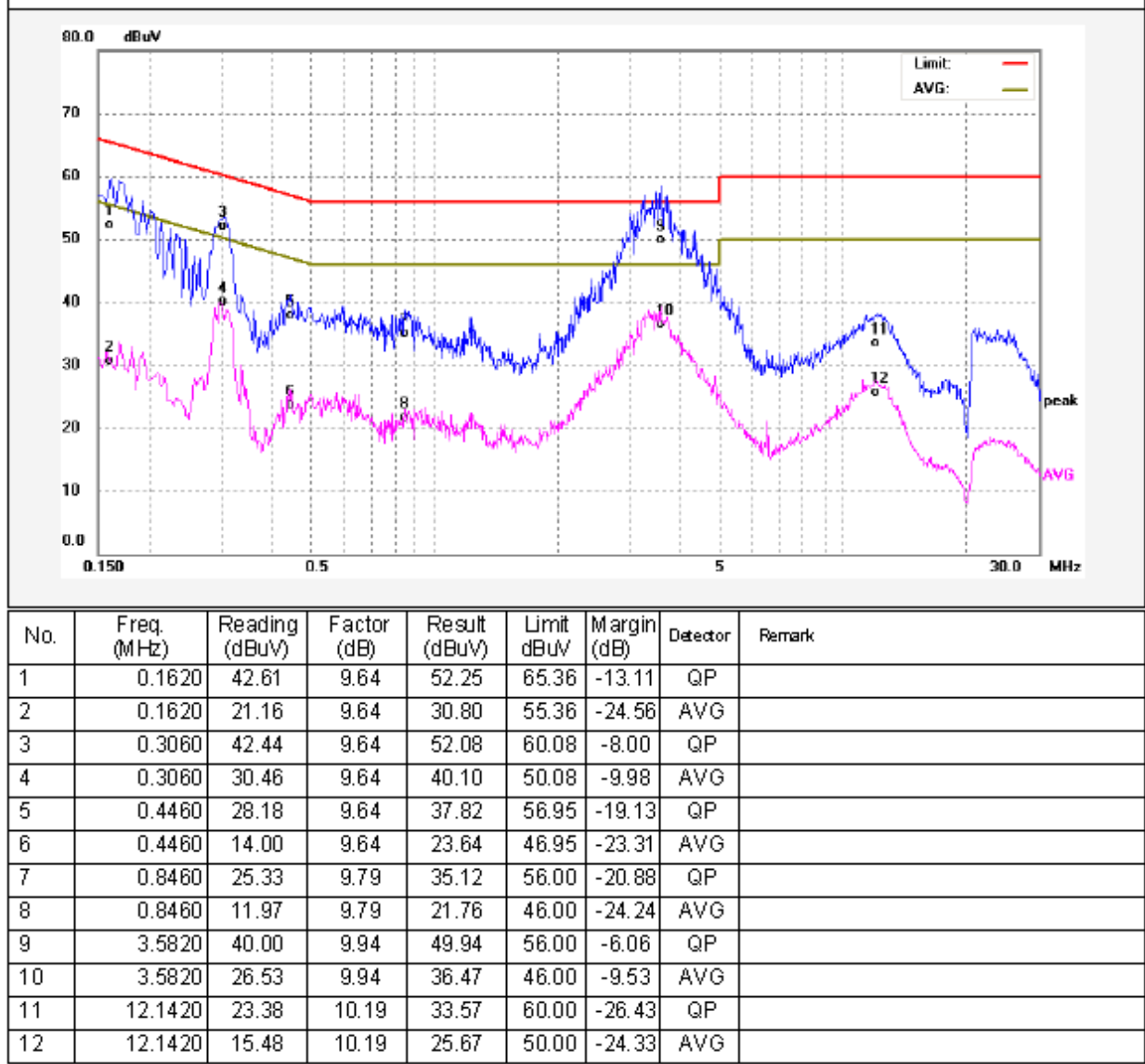
### 8.3 Measurement Description

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.

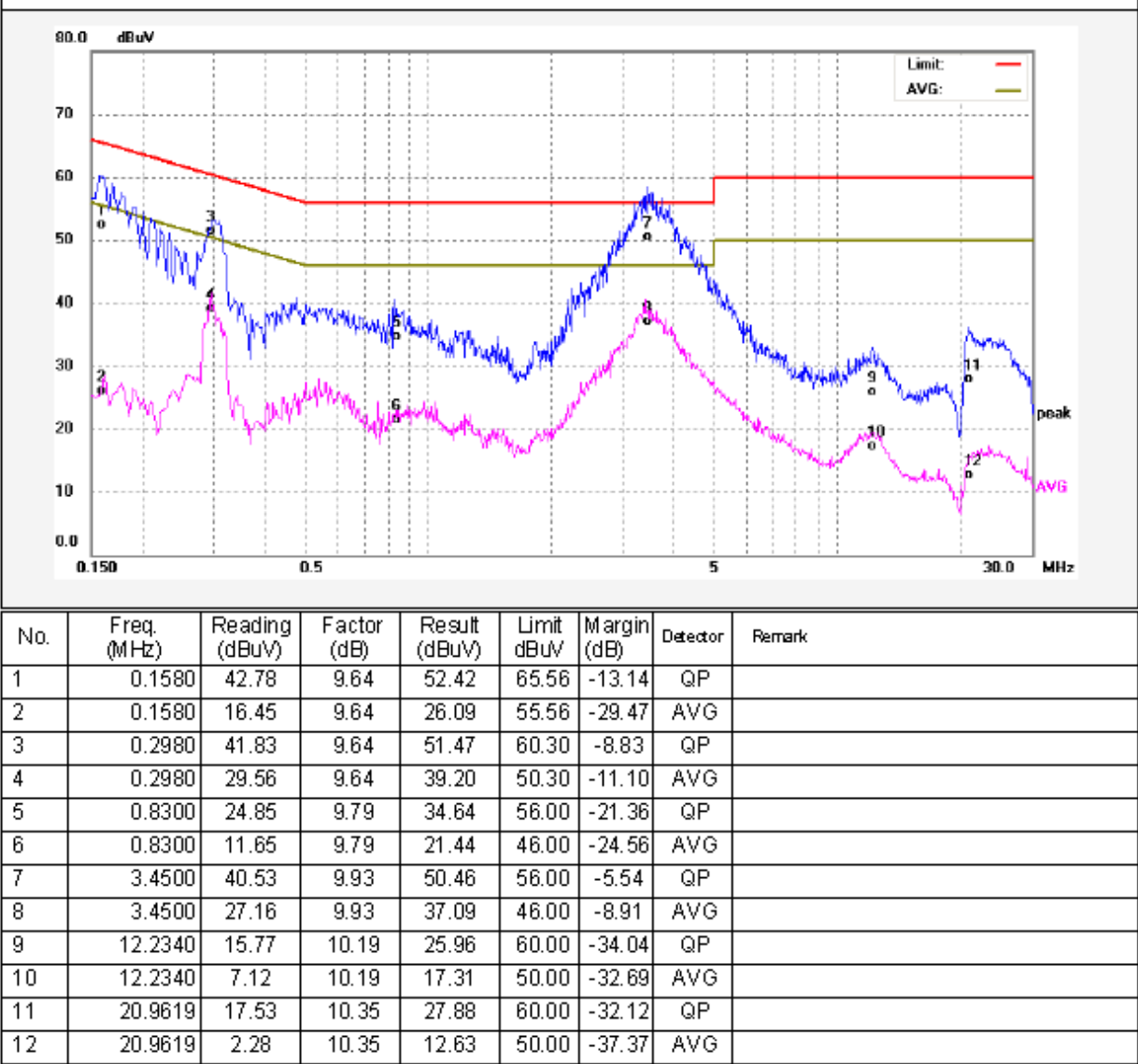
8.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

Live line:



Neutral line:



## 9 Radiated 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      | $2400/F(\text{kHz})$  | 300             | $10000 * 2400/F(\text{kHz})$                | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705      | $24000/F(\text{kHz})$ | 30              | $100 * 24000/F(\text{kHz})$                 | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30         | 30                    | 30              | $100 * 30$                                  | $20\log^{(30)} + 40$                  |
| 30 ~ 88            | 100                   | 3               | 100                                         | $20\log^{(100)}$                      |
| 88 ~ 216           | 150                   | 3               | 150                                         | $20\log^{(150)}$                      |
| 216 ~ 960          | 200                   | 3               | 200                                         | $20\log^{(200)}$                      |
| Above 960          | 500                   | 3               | 500                                         | $20\log^{(500)}$                      |

### 9.1 EUT Operation

Operating Environment:

Temperature: 23.5 °C

Humidity: 52.1% RH

Atmospheric Pressure: 101.2kPa

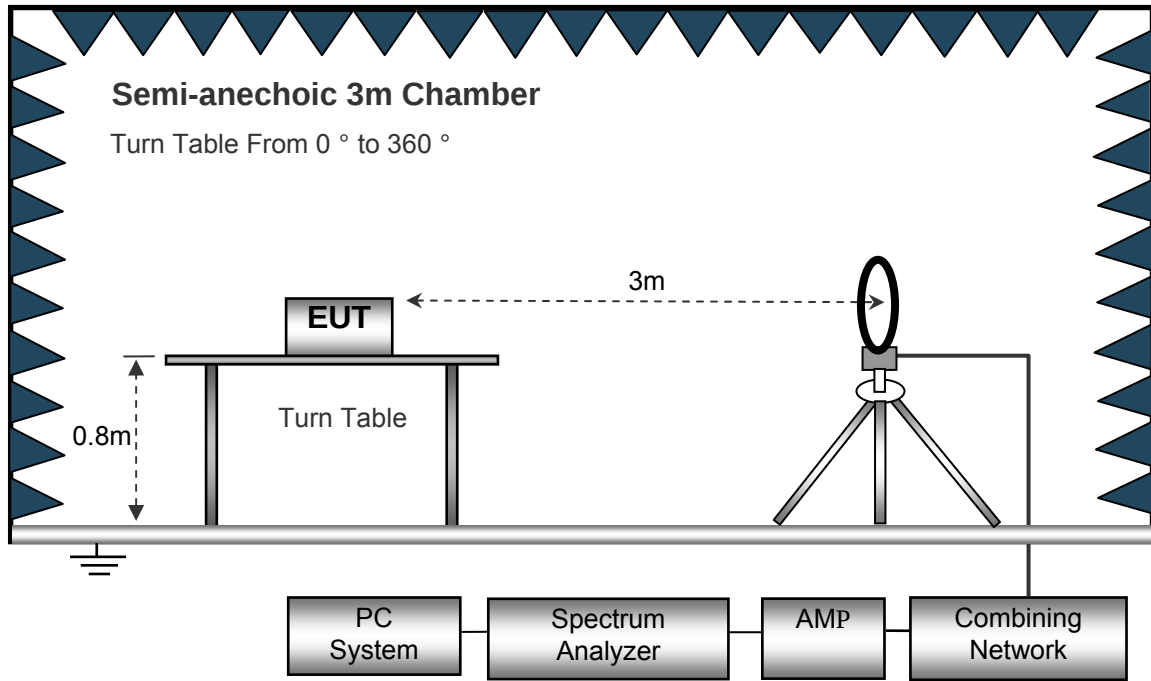
EUT Operation:

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

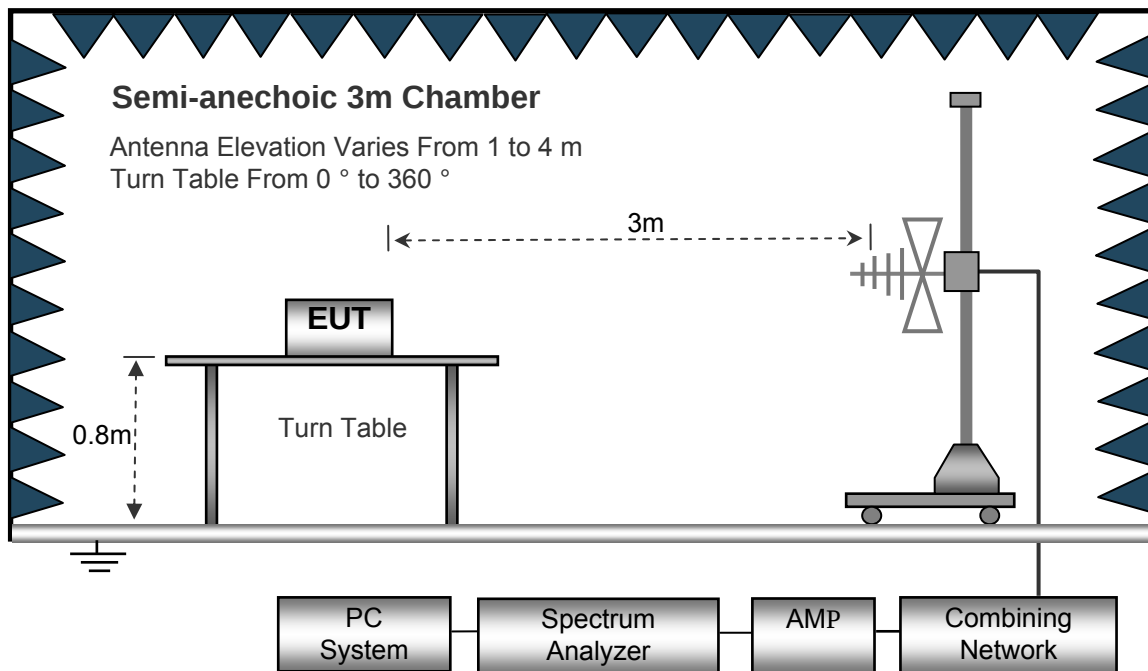
## 9.2 Test Setup

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

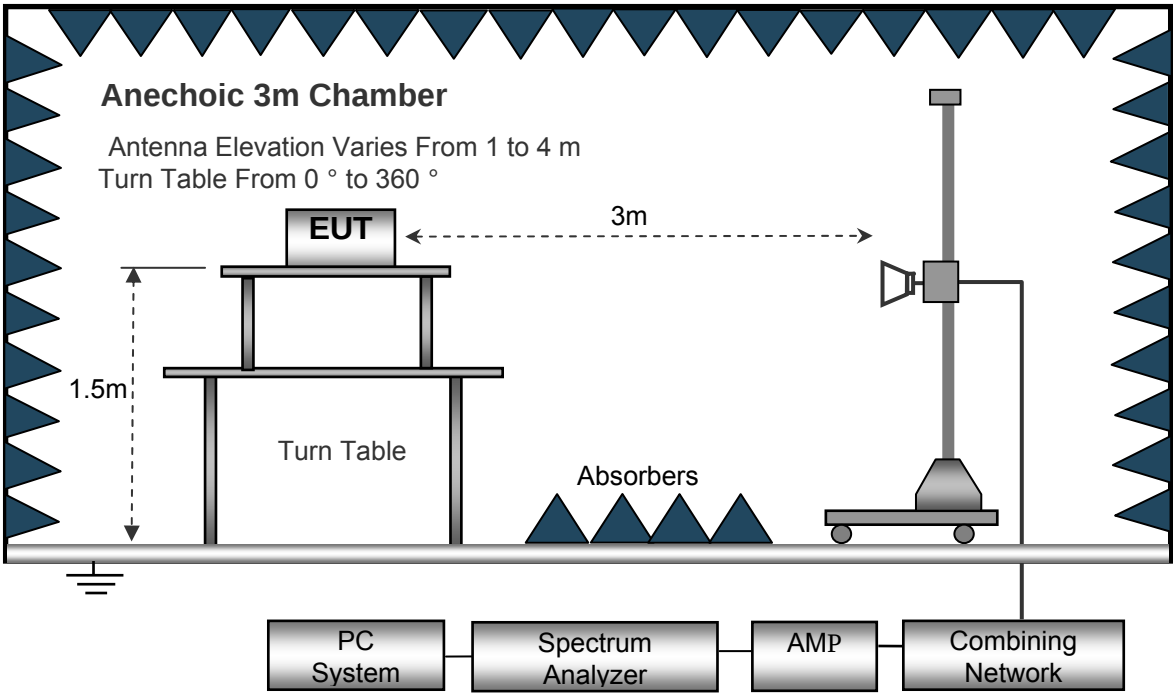
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



9.3 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

## 9.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane;  
For above 1GHz, the EUT is 1.5m 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.
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 performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

## 9.5 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:

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

## 9.6 Summary of Test Results

Only the worst case GFSK mode were record in the report.

Test Frequency: 32.768kHz ~ 30MHz

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

Test Frequency : 30MHz ~ 18GHz

| Frequency                | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|--------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                          |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                    | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| GFSK Low Channel 2402MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 255.38                   | 14.92            | QP          | 50               | 1.8        | H     | 10.59            | 25.51               | 46.00                   | -20.49 |
| 255.38                   | 15.09            | QP          | 290              | 1.7        | V     | 10.59            | 25.68               | 46.00                   | -20.32 |
| 4804.00                  | 50.11            | PK          | 329              | 1.5        | V     | -1.08            | 49.03               | 74.00                   | -24.97 |
| 4804.00                  | 40.38            | Ave         | 329              | 1.5        | V     | -1.08            | 39.30               | 54.00                   | -14.70 |
| 7206.00                  | 51.06            | PK          | 238              | 1.9        | H     | 1.34             | 52.40               | 74.00                   | -21.60 |
| 7206.00                  | 41.38            | Ave         | 238              | 1.9        | H     | 1.34             | 42.72               | 54.00                   | -11.28 |
| 2328.74                  | 47.36            | PK          | 75               | 1.1        | V     | -13.20           | 34.16               | 74.00                   | -39.84 |
| 2328.74                  | 38.14            | Ave         | 75               | 1.1        | V     | -13.20           | 24.94               | 54.00                   | -29.06 |
| 2373.99                  | 50.29            | PK          | 120              | 1.1        | H     | -13.12           | 37.17               | 74.00                   | -36.83 |
| 2373.99                  | 36.26            | Ave         | 120              | 1.1        | H     | -13.12           | 23.14               | 54.00                   | -30.86 |
| 2487.17                  | 48.84            | PK          | 315              | 1.8        | V     | -13.02           | 35.82               | 74.00                   | -38.18 |
| 2487.17                  | 38.56            | Ave         | 315              | 1.8        | V     | -13.02           | 25.54               | 54.00                   | -28.46 |

| Frequency                   | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|-----------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                             |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                       | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| GFSK Middle Channel 2441MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 255.38                      | 13.45            | QP          | 260              | 1.9        | H     | 10.59            | 24.04               | 46.00                   | -21.96 |
| 255.38                      | 15.69            | QP          | 77               | 1.7        | V     | 10.59            | 26.28               | 46.00                   | -19.72 |
| 4882.00                     | 40.14            | PK          | 264              | 2.0        | V     | -0.62            | 39.52               | 74.00                   | -34.48 |
| 4882.00                     | 43.51            | Ave         | 264              | 2.0        | V     | -0.62            | 42.89               | 54.00                   | -11.11 |
| 7323.00                     | 51.67            | PK          | 56               | 1.8        | H     | 2.21             | 53.88               | 74.00                   | -20.12 |
| 7323.00                     | 43.11            | Ave         | 56               | 1.8        | H     | 2.21             | 45.32               | 54.00                   | -8.68  |
| 2341.03                     | 46.94            | PK          | 241              | 1.7        | V     | -13.19           | 33.75               | 74.00                   | -40.25 |
| 2341.03                     | 37.97            | Ave         | 241              | 1.7        | V     | -13.19           | 24.78               | 54.00                   | -29.22 |
| 2367.21                     | 46.09            | PK          | 160              | 1.9        | H     | -13.14           | 32.95               | 74.00                   | -41.05 |
| 2367.21                     | 38.11            | Ave         | 160              | 1.9        | H     | -13.14           | 24.97               | 54.00                   | -29.03 |
| 2487.89                     | 49.69            | PK          | 276              | 1.5        | V     | -13.08           | 36.61               | 74.00                   | -37.39 |
| 2487.89                     | 38.76            | Ave         | 276              | 1.5        | V     | -13.08           | 25.68               | 54.00                   | -28.32 |

| Frequency                 | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.247/209/205 |        |
|---------------------------|------------------|-------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
|                           |                  |             |                  | Height     | Polar |                  |                     | Limit                   | Margin |
| (MHz)                     | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                | (dB)   |
| GFSK High Channel 2480MHz |                  |             |                  |            |       |                  |                     |                         |        |
| 255.38                    | 22.14            | QP          | 240              | 1.9        | H     | 10.59            | 32.73               | 46.00                   | -13.27 |
| 255.38                    | 20.99            | QP          | 130              | 1.5        | V     | 10.59            | 31.58               | 46.00                   | -14.42 |
| 4960.00                   | 54.72            | PK          | 232              | 1.2        | V     | -0.24            | 54.48               | 74.00                   | -19.52 |
| 4960.00                   | 44.88            | Ave         | 232              | 1.2        | V     | -0.24            | 44.64               | 54.00                   | -9.36  |
| 7440.00                   | 50.43            | PK          | 298              | 1.4        | H     | 2.84             | 53.27               | 74.00                   | -20.73 |
| 7440.00                   | 42.26            | Ave         | 298              | 1.4        | H     | 2.84             | 45.10               | 54.00                   | -8.90  |
| 2338.32                   | 45.53            | PK          | 188              | 1.4        | V     | -13.19           | 32.34               | 74.00                   | -41.66 |
| 2338.32                   | 39.70            | Ave         | 188              | 1.4        | V     | -13.19           | 26.51               | 54.00                   | -27.49 |
| 2387.34                   | 42.88            | PK          | 211              | 1.8        | H     | -13.14           | 29.74               | 74.00                   | -44.26 |
| 2387.34                   | 38.10            | Ave         | 211              | 1.8        | H     | -13.14           | 24.96               | 54.00                   | -29.04 |
| 2485.04                   | 44.36            | PK          | 37               | 1.4        | V     | -13.08           | 31.28               | 74.00                   | -42.72 |
| 2485.04                   | 38.48            | Ave         | 37               | 1.4        | V     | -13.08           | 25.40               | 54.00                   | -28.60 |

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

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

## 10 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247  
Test Method: KDB 558074 D01 DTS Meas Guidance v03r05April 8, 2016  
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)).

### 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:

Below 30MHz:

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

Detector function = peak, Trace = max hold

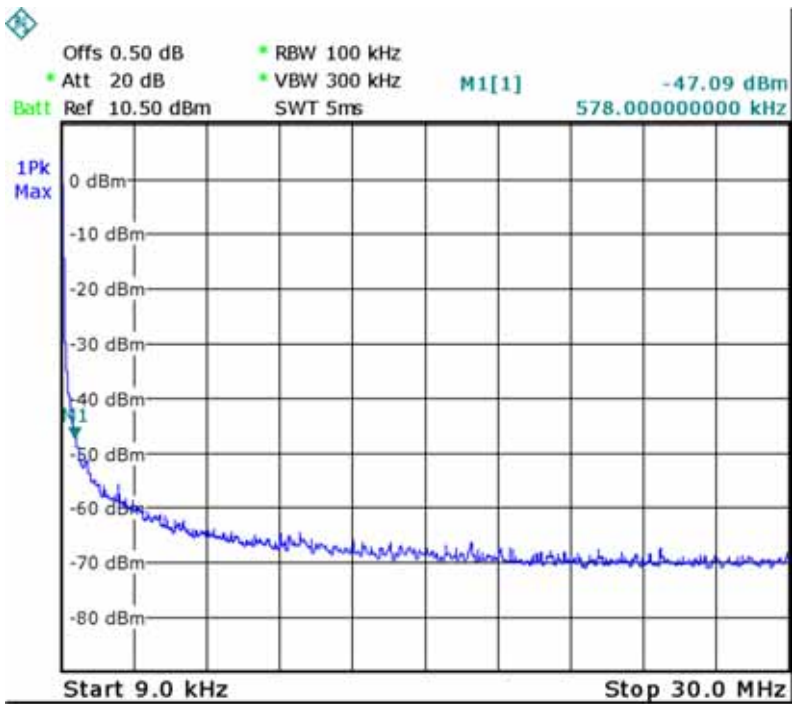
Above 30MHz:

RBW = 1MHz, VBW = 3MHz, Sweep = auto

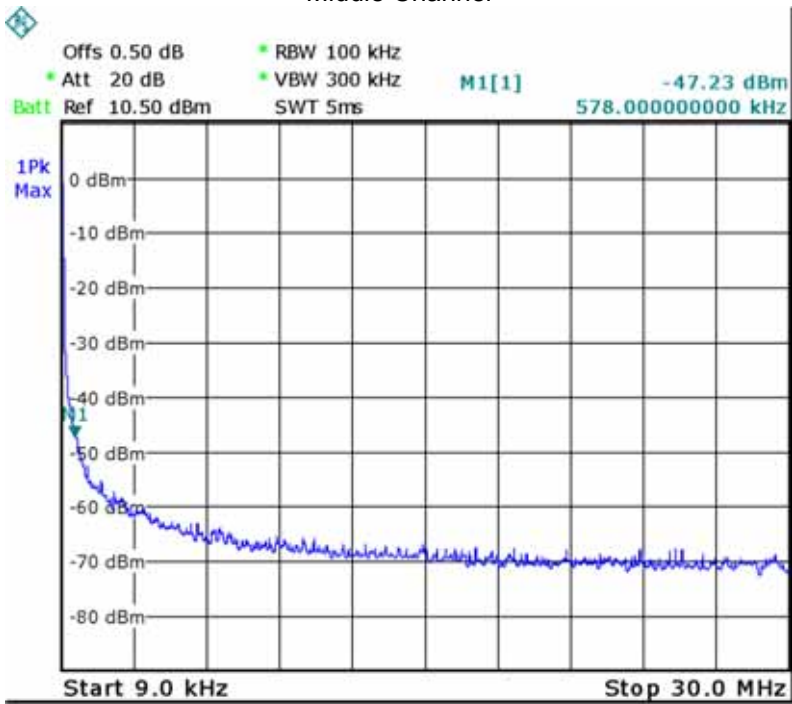
Detector function = peak, Trace = max hold

10.2Test Result

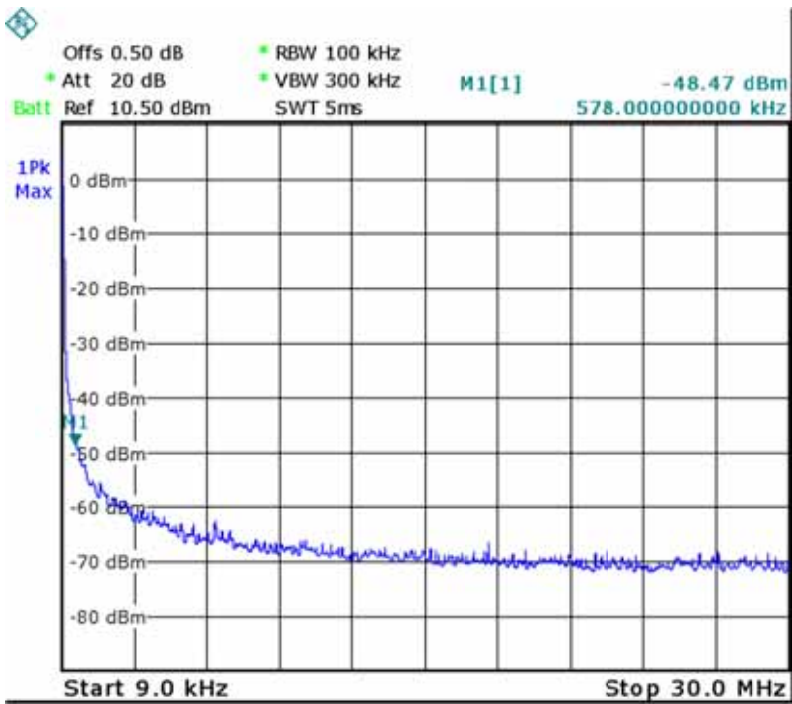
GFSK  
Low Channel



Middle Channel



High Channel



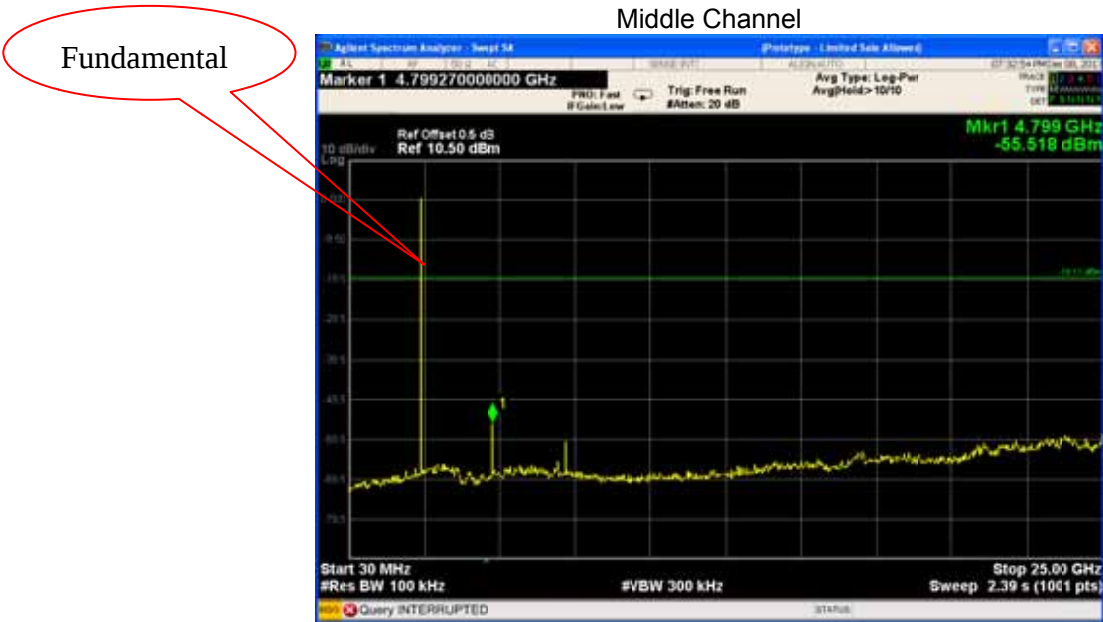
GFSK

Low Channel

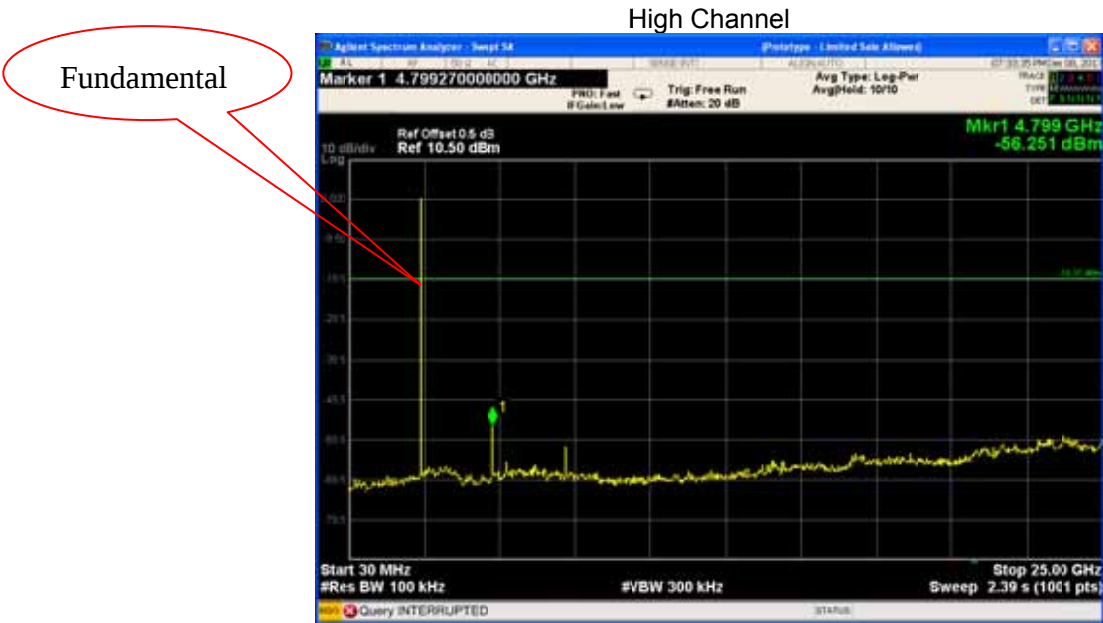
Fundamental



Middle Channel

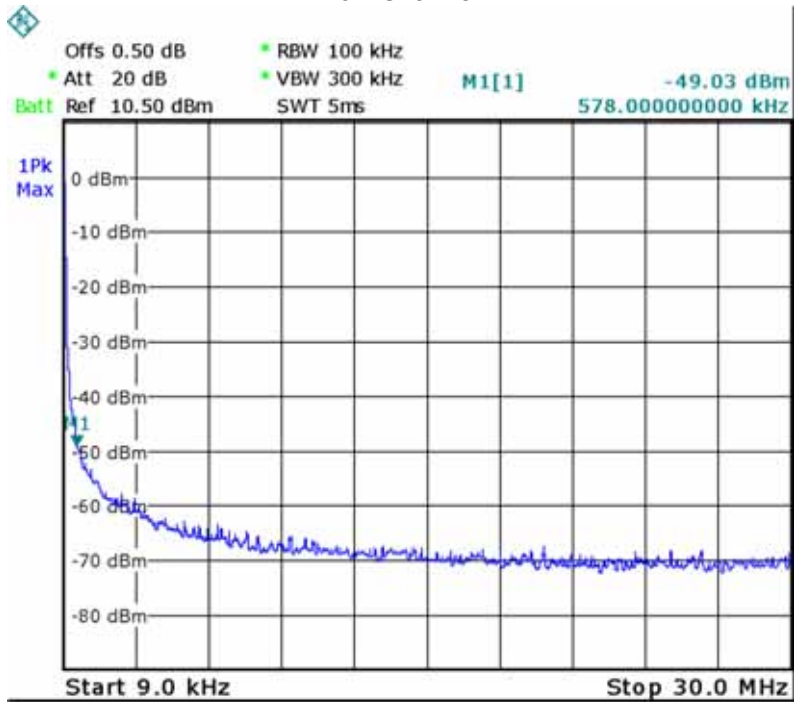


High Channel

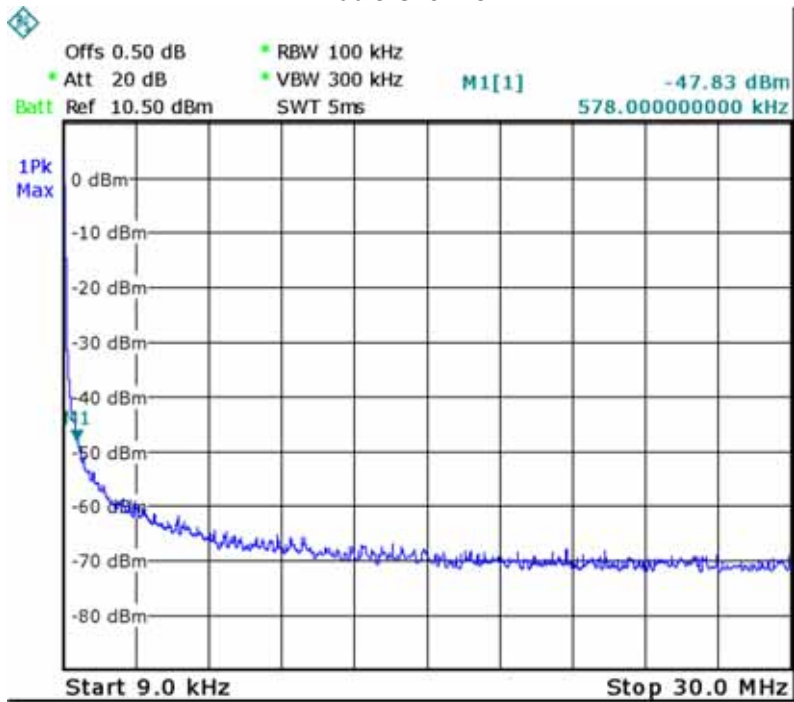


Pi/4DQPSK

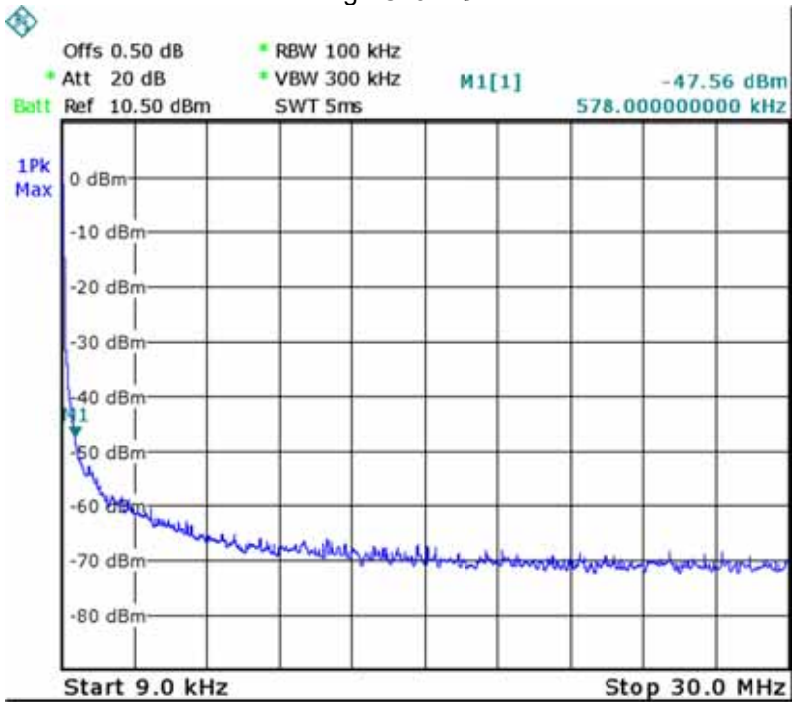
Low Channel



Middle Channel



High Channel



Pi/4DQPSK

Low Channel

Fundamental



Middle Channel

Fundamental

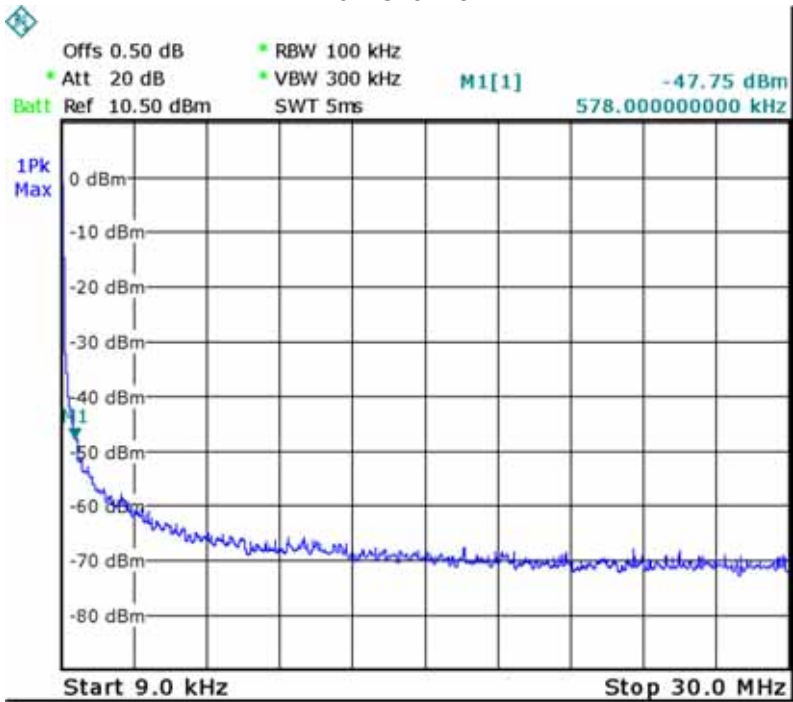


High Channel

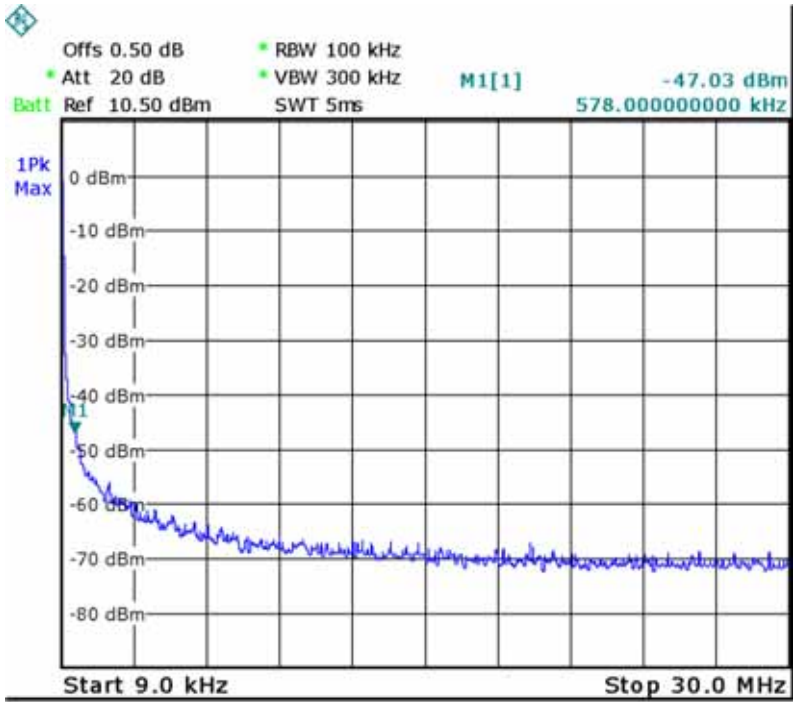
Fundamental



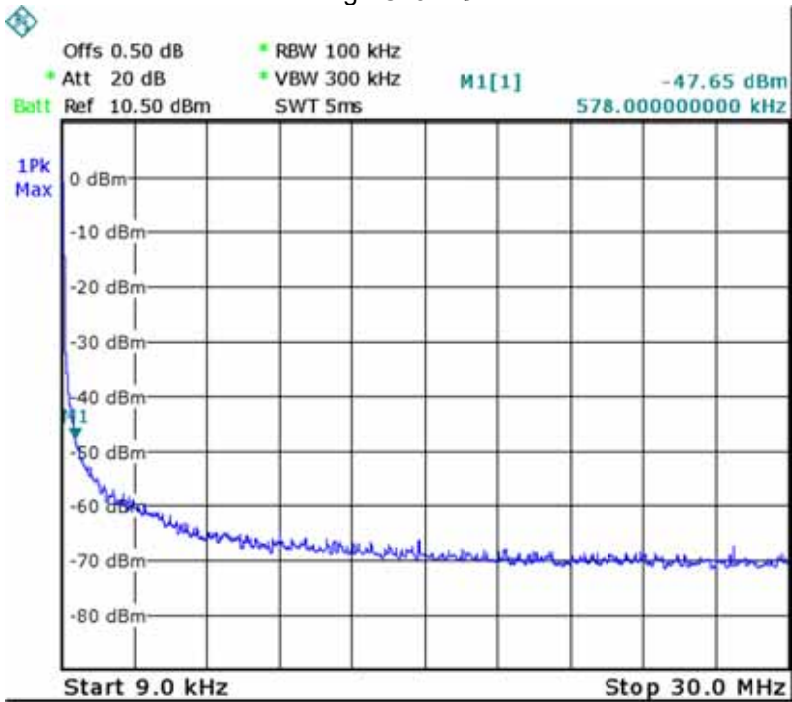
8DPSK  
Low Channel



Middle Channel



High Channel



8DPSK

Low Channel

Fundamental



Middle Channel

Fundamental



High Channel

Fundamental



## 11 Band Edge Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance V04

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

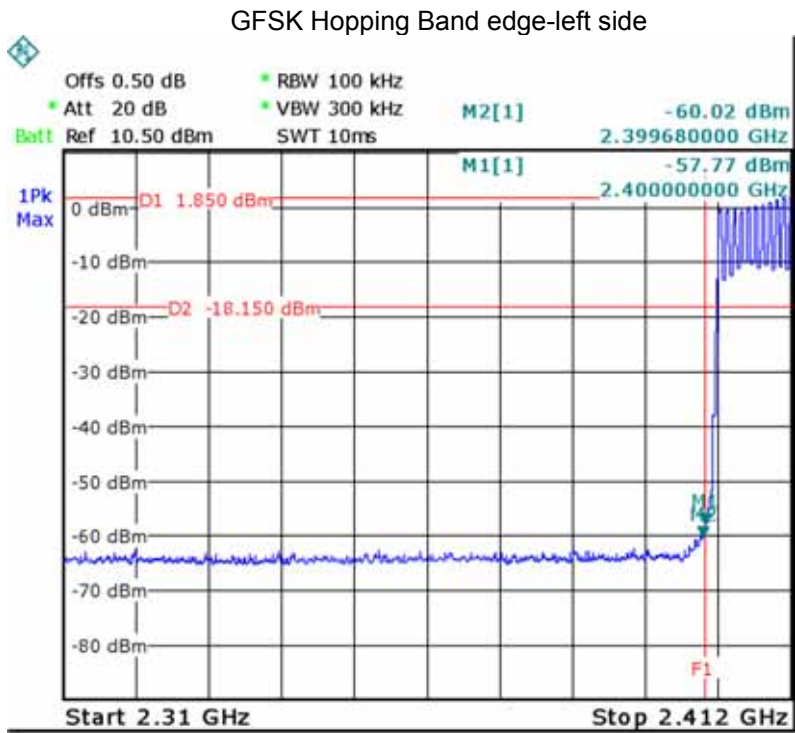
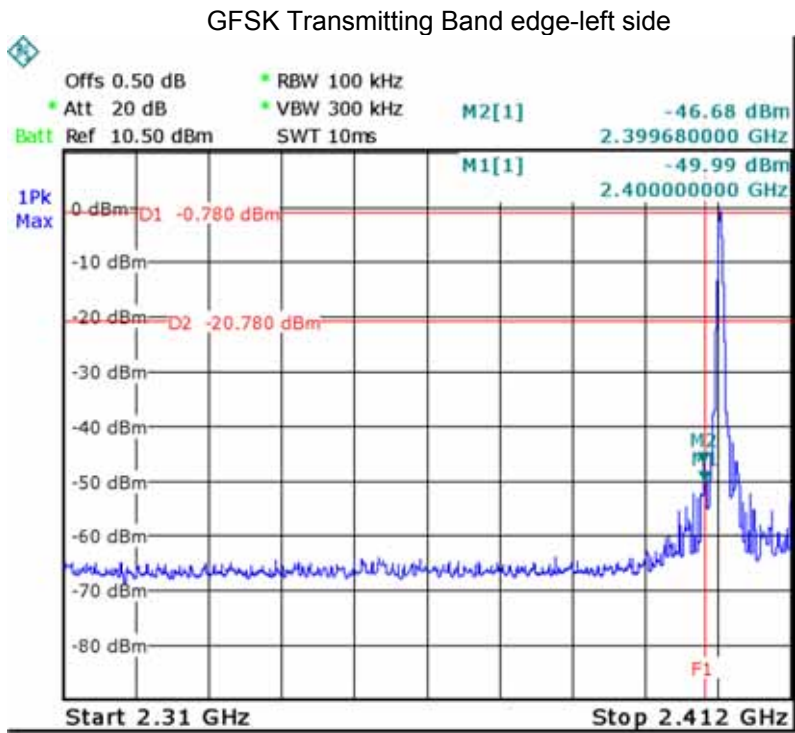
### 11.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

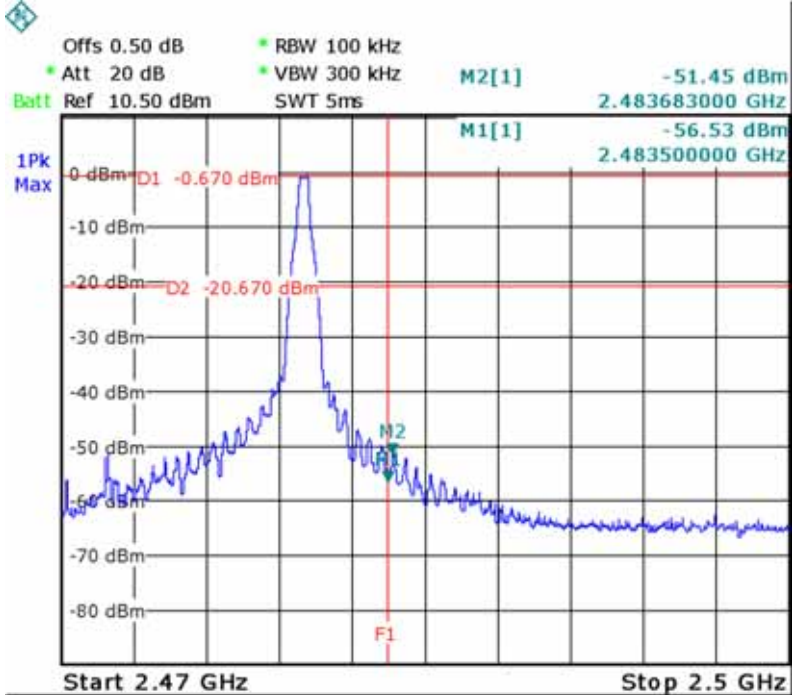
11.2 Test Result

Test result plots shown as follows:

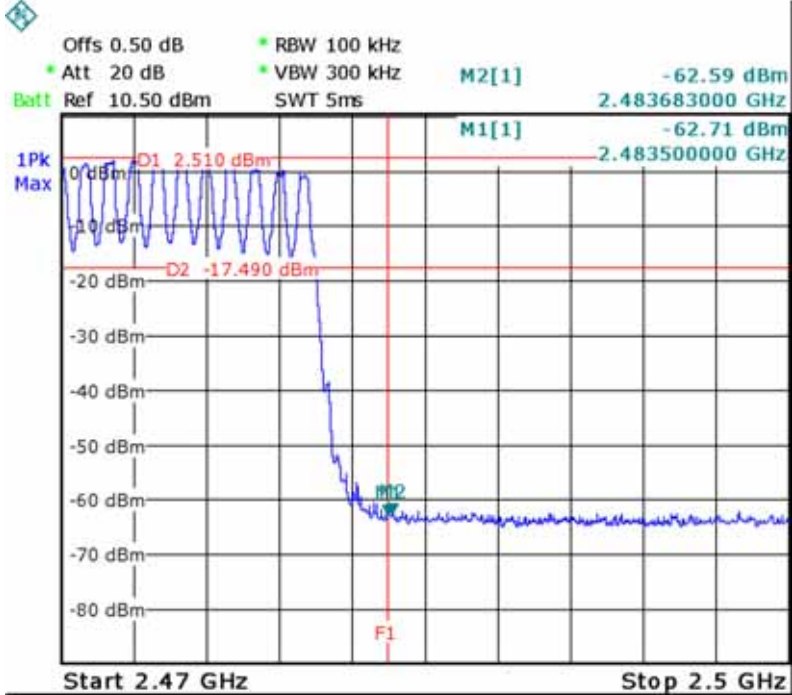
Test plots



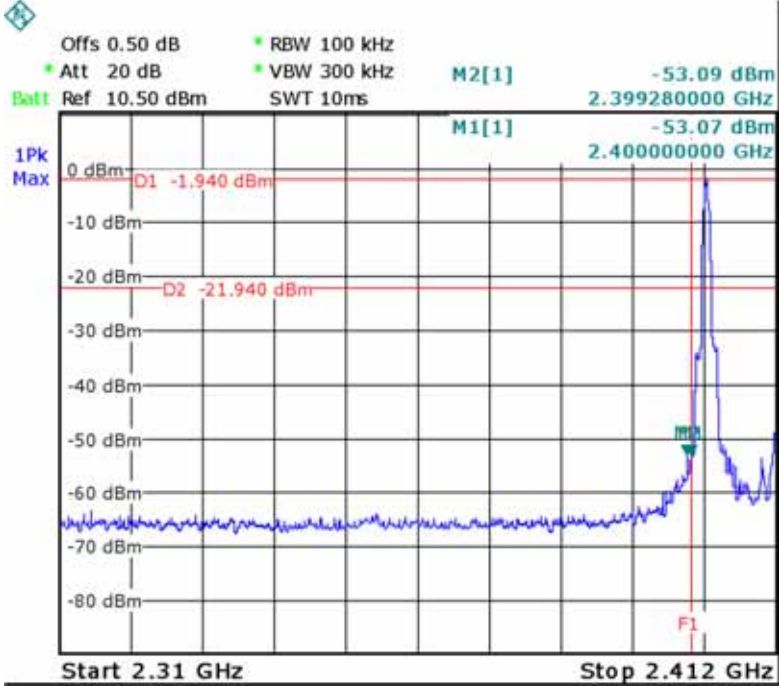
GFSK Transmitting Band edge-right side



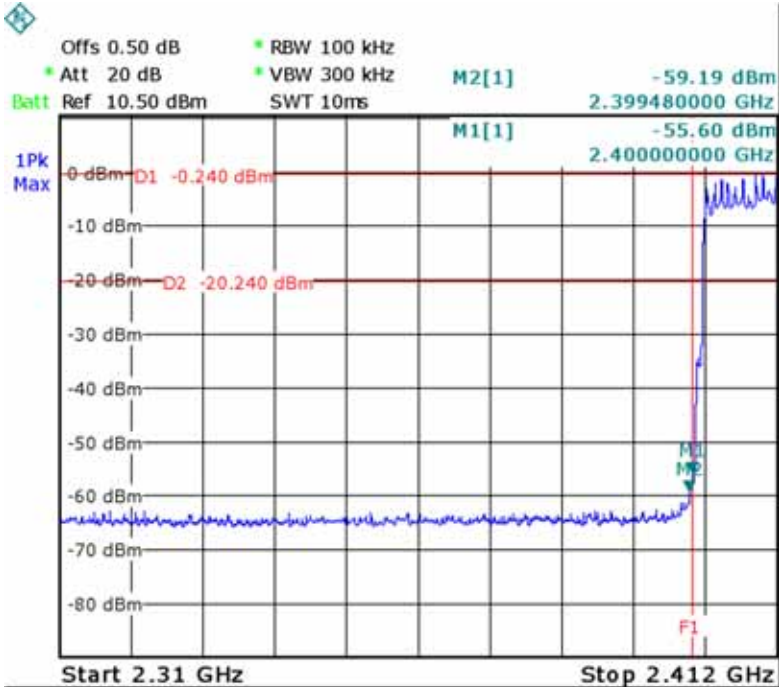
GFSK Hopping Band edge-right side



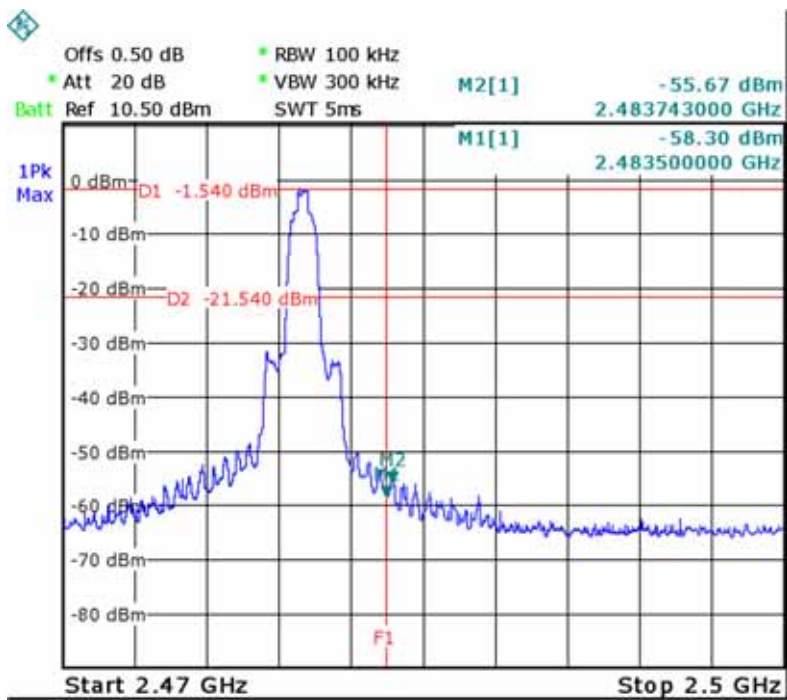
Pi/4 DQPSK Transmitting Band edge-left side



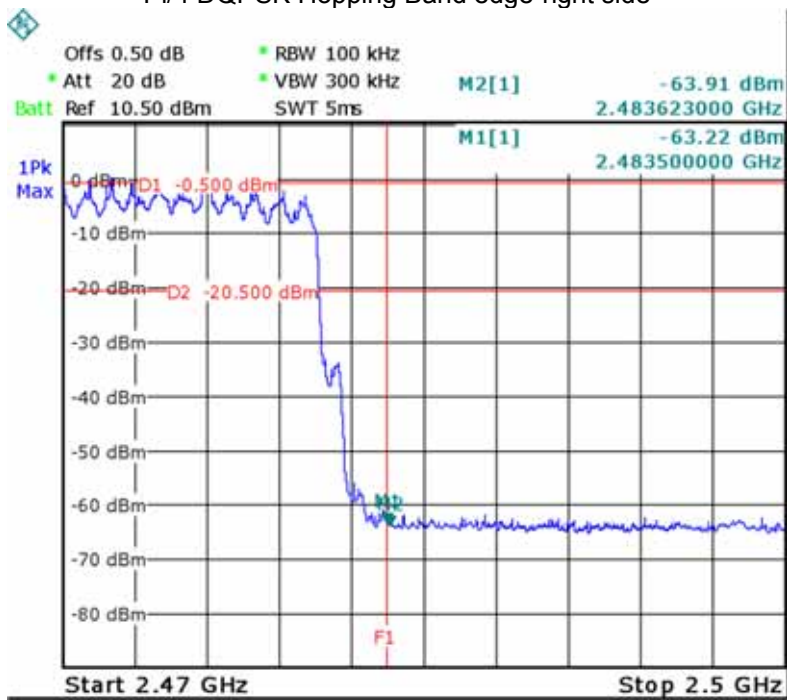
Pi/4 DQPSK Hopping Band edge-left side



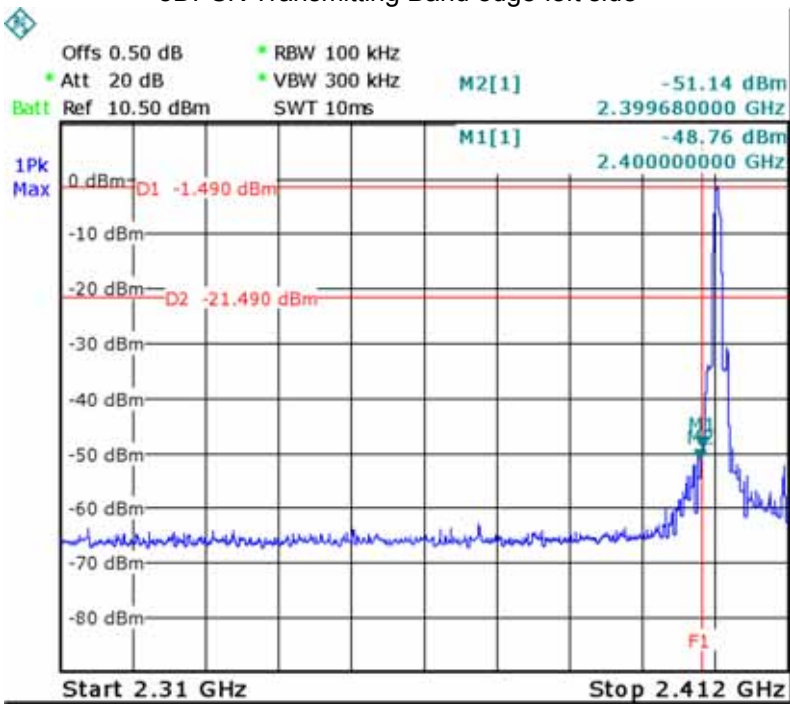
Pi/4 DQPSK Transmitting Band edge-right side



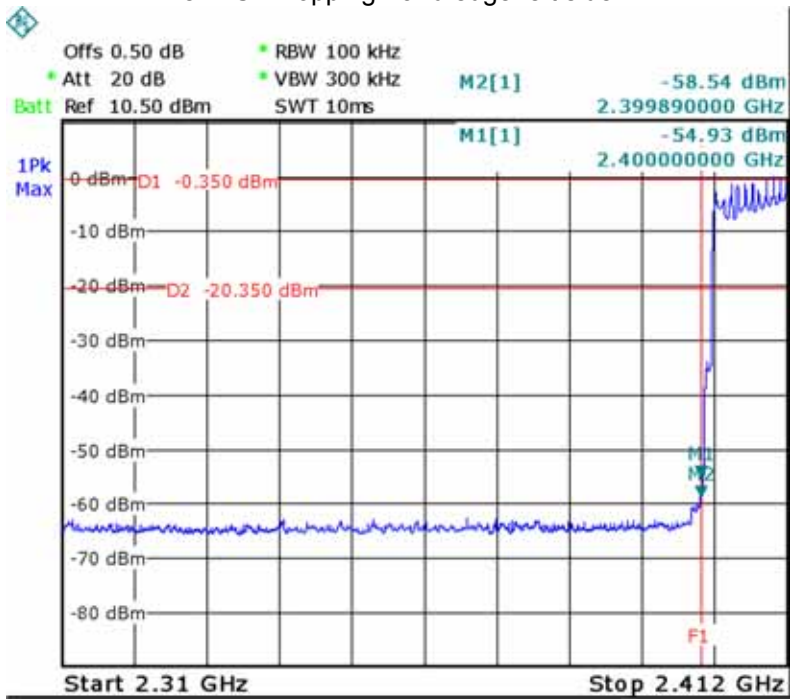
Pi/4 DQPSK Hopping Band edge-right side



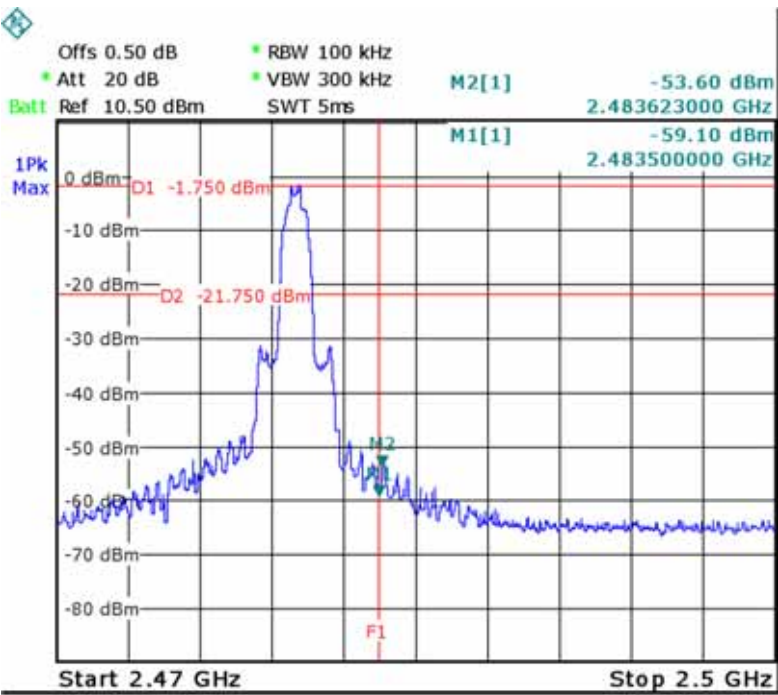
8DPSK Transmitting Band edge-left side



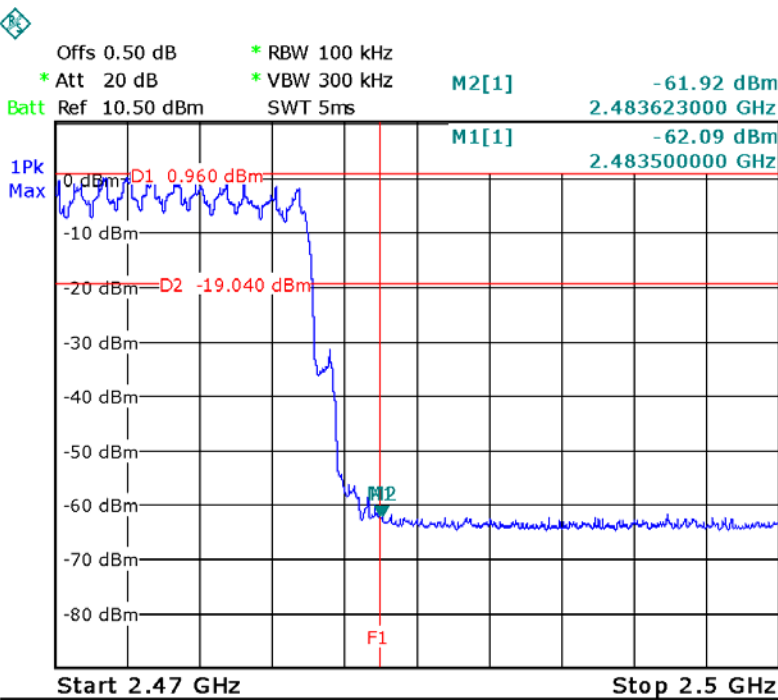
8DPSK Hopping Band edge-left side



8DPSK Transmitting Band edge-right side



8DPSK Hopping Band edge-right side



## 12 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance V04

### 12.1 Test Procedure:

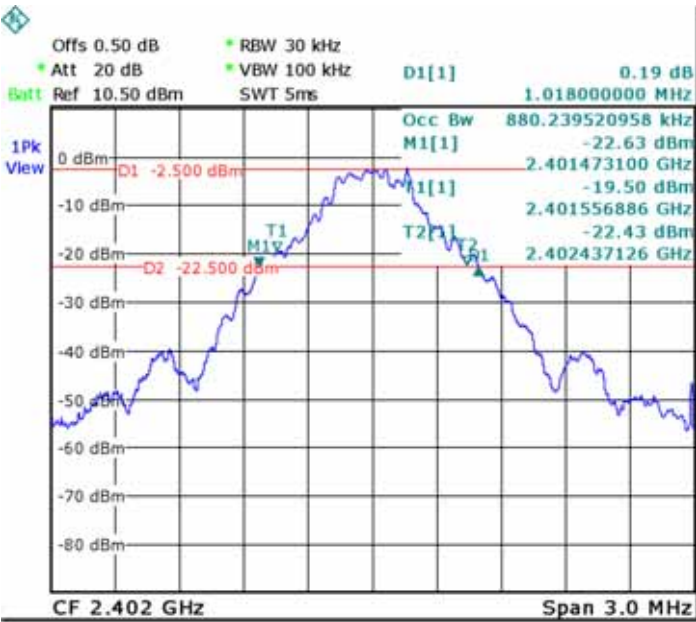
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

### 12.2 Test Result:

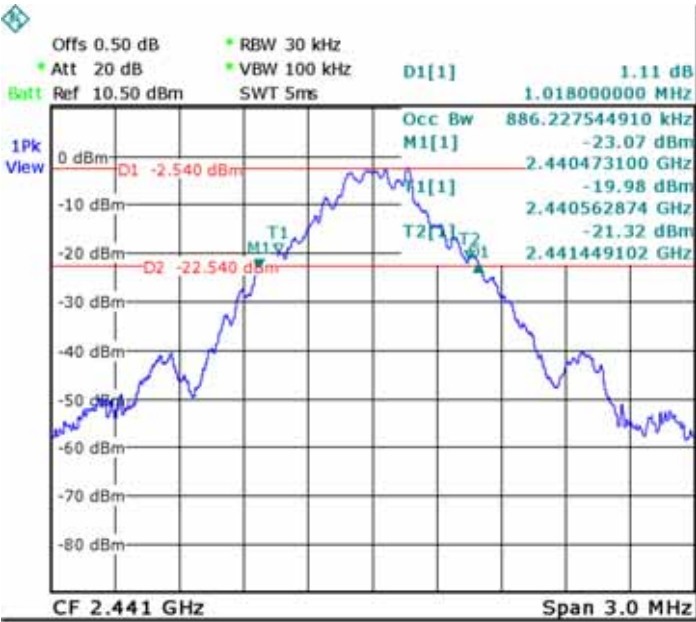
| Modulation | Test Channel | 20 dB Bandwidth | 99% Bandwidth |
|------------|--------------|-----------------|---------------|
| GFSK       | Low          | 1.018MHz        | 0.880MHz      |
| GFSK       | Middle       | 1.018MHz        | 0.886MHz      |
| GFSK       | High         | 1.018MHz        | 0.904MHz      |
| Pi/4 DQPSK | Low          | 1.293MHz        | 1.198MHz      |
| Pi/4 DQPSK | Middle       | 1.293MHz        | 1.180MHz      |
| Pi/4 DQPSK | High         | 1.293MHz        | 1.192MHz      |
| 8DPSK      | Low          | 1.287MHz        | 1.204MHz      |
| 8DPSK      | Middle       | 1.287MHz        | 1.198MHz      |
| 8DPSK      | High         | 1.287MHz        | 1.198MHz      |

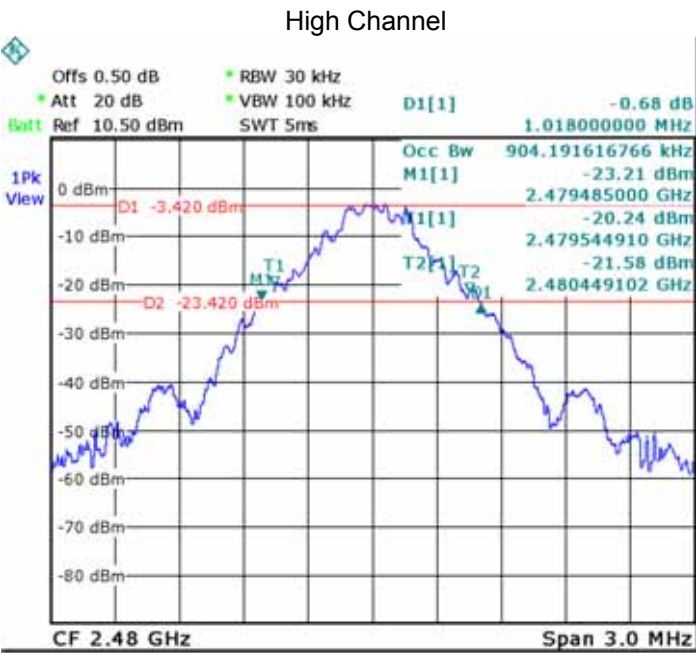
Test result plot as follows:

Modulation: GFSKLow Channel

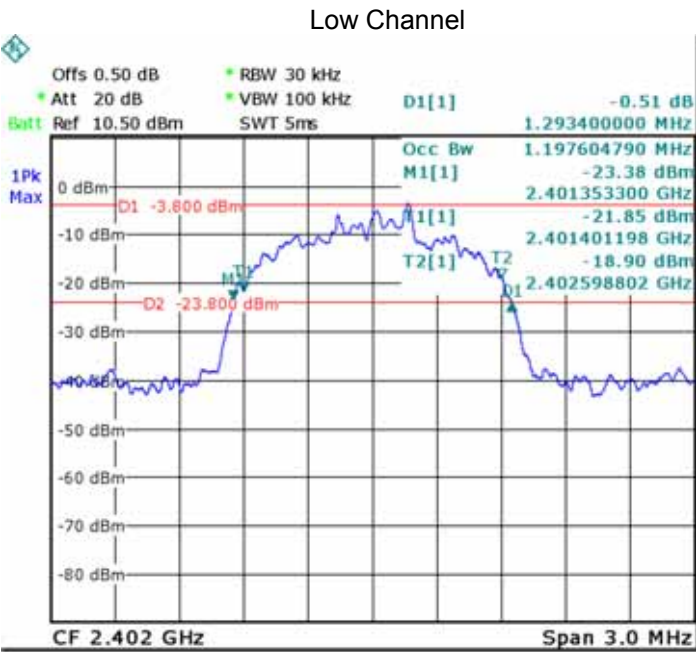


Middle Channel

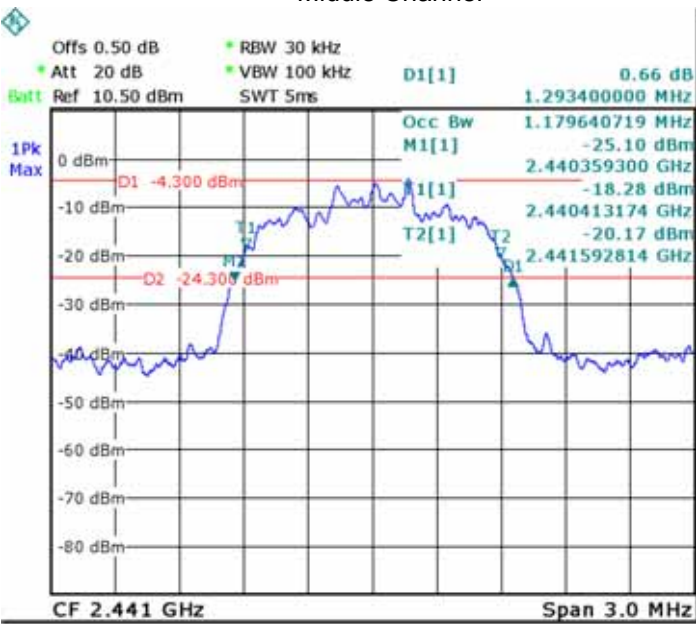




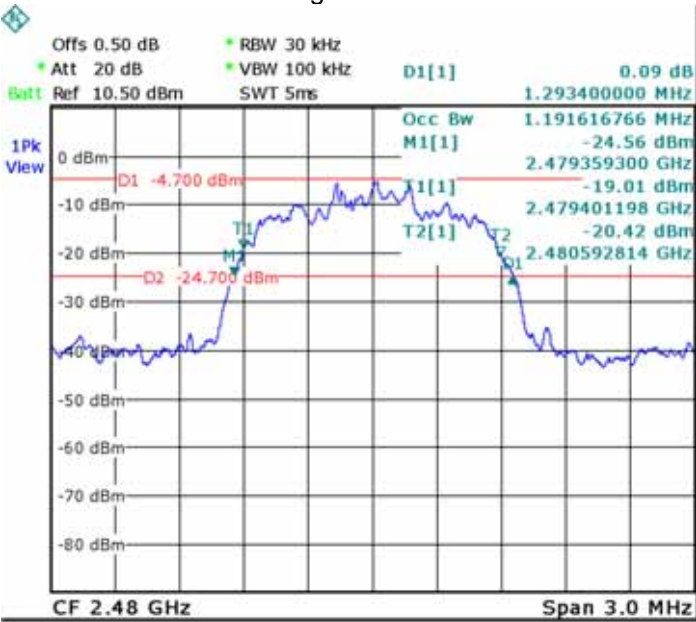
Modulation: Pi/4 DQPSK



Middle Channel

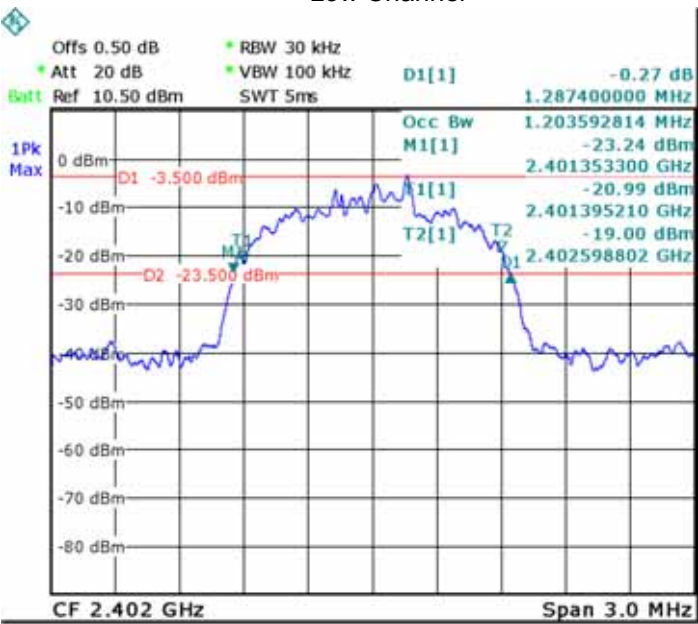


High Channel

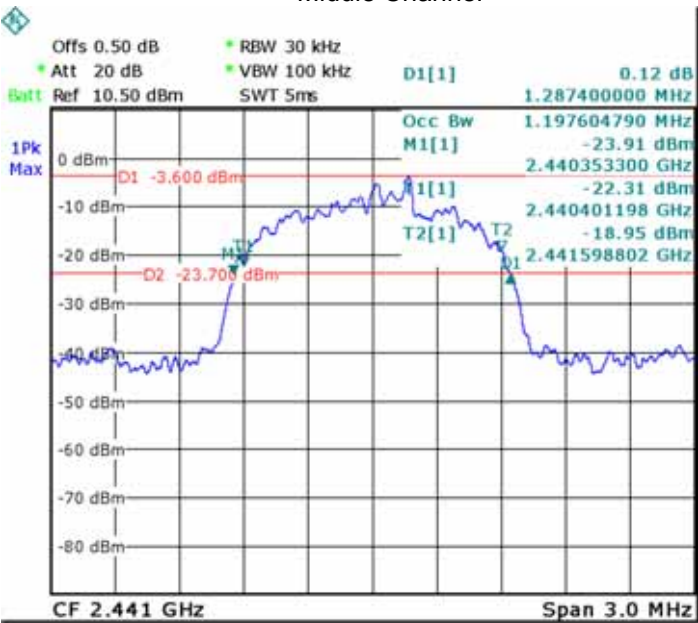


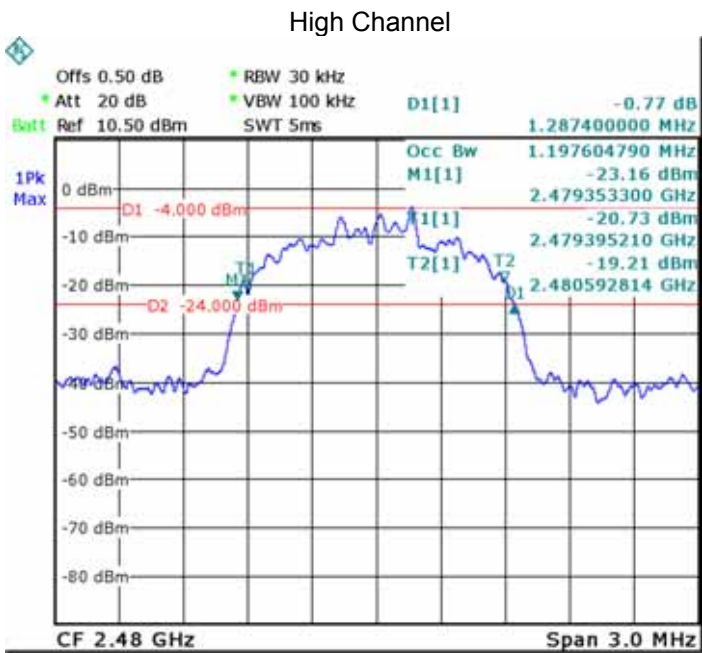
Modulation: 8DPSK

Low Channel



Middle Channel





### 13 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance V04

#### 13.1 Test Procedure:

558074 D01 DTS Meas Guidance V04

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 = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

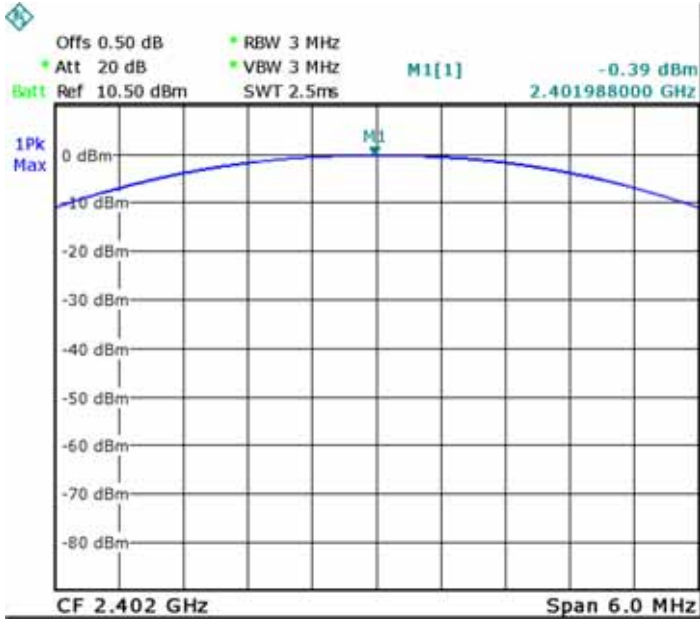
#### 13.2 Test Result:

BT:

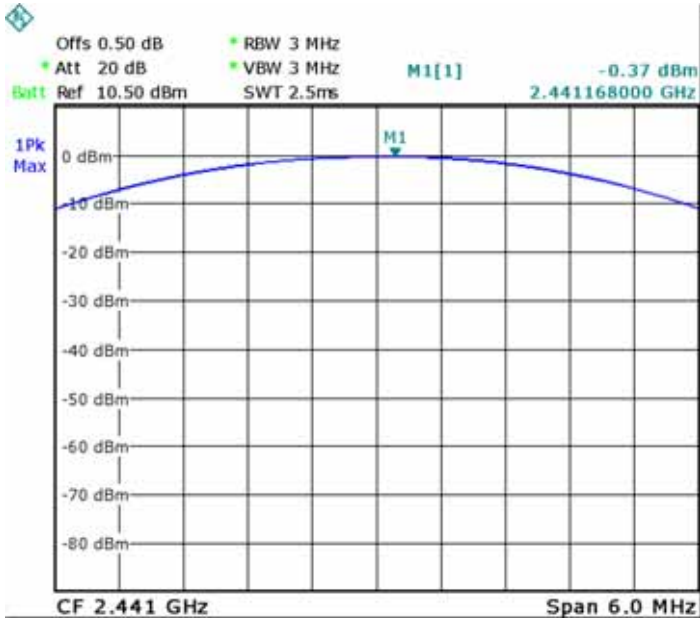
| Test Mode     | Data Rate | Peak Power(dBm) |                |              | Limit (dBm) |
|---------------|-----------|-----------------|----------------|--------------|-------------|
|               |           | Low Channel     | Middle Channel | High Channel |             |
| GFSK          | 1Mbps     | -0.39           | -0.37          | <b>-0.29</b> | 20.97       |
| $\pi/4$ DQPSK | 2Mbps     | -0.95           | -0.78          | -0.76        | 20.97       |
| 8DPSK         | 3Mbps     | -0.81           | -0.66          | -0.76        | 20.97       |

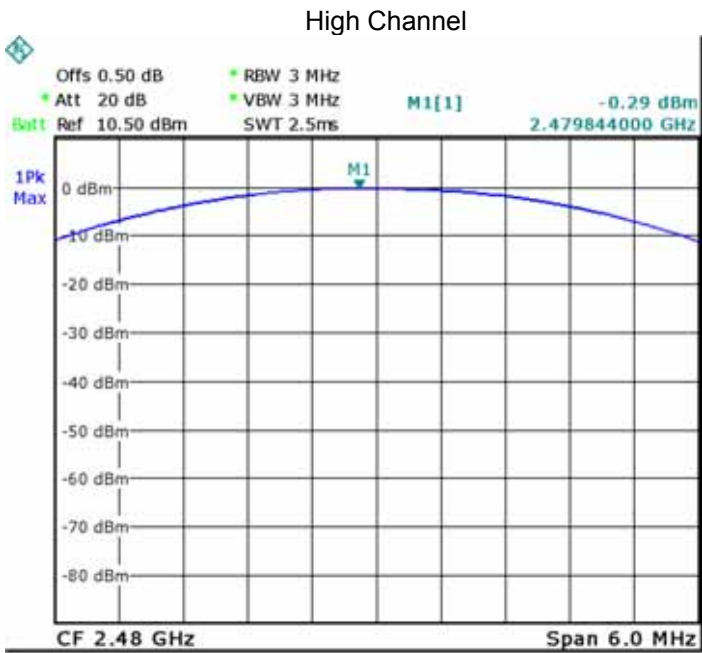
Test result plot as follows:

Modulation: GFSK  
Low Channel

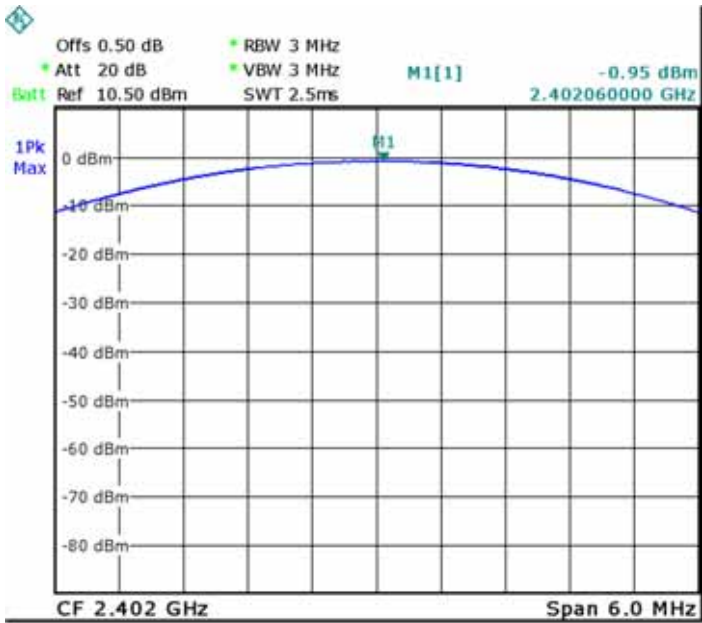


Middle Channel

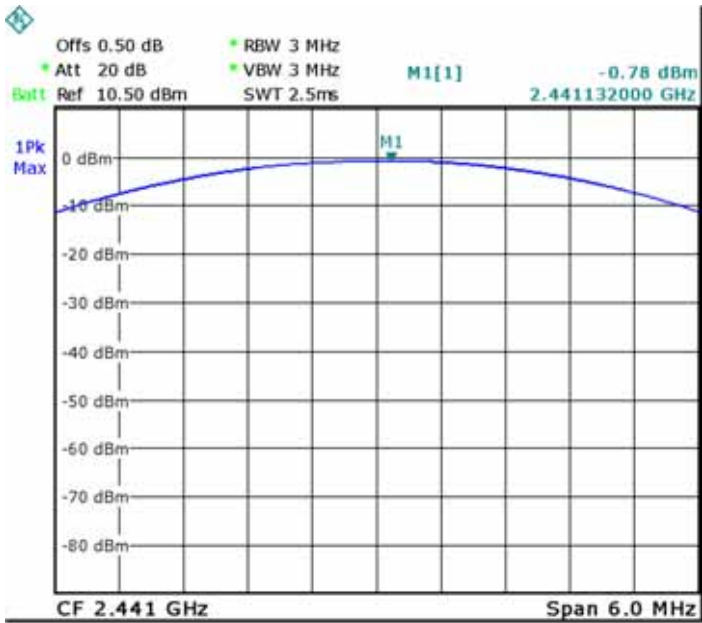




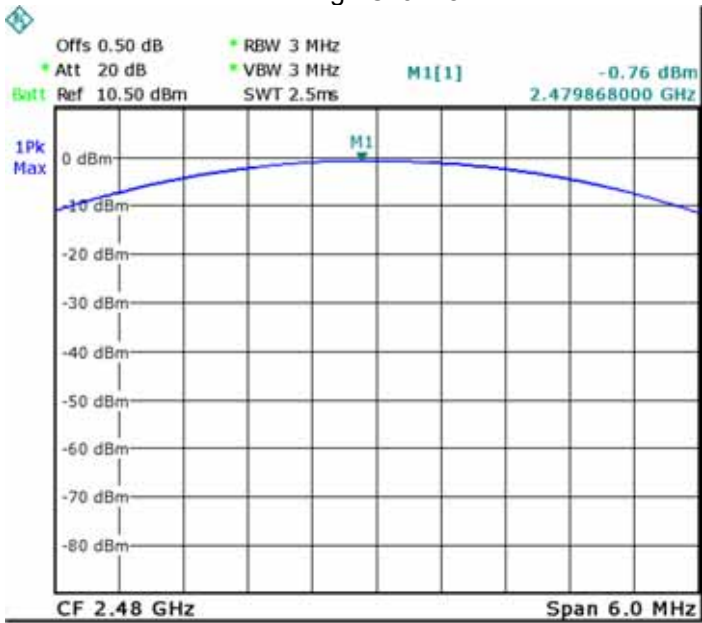
Modulation: Pi/4 DQPSK Low Channel  
Low Channel



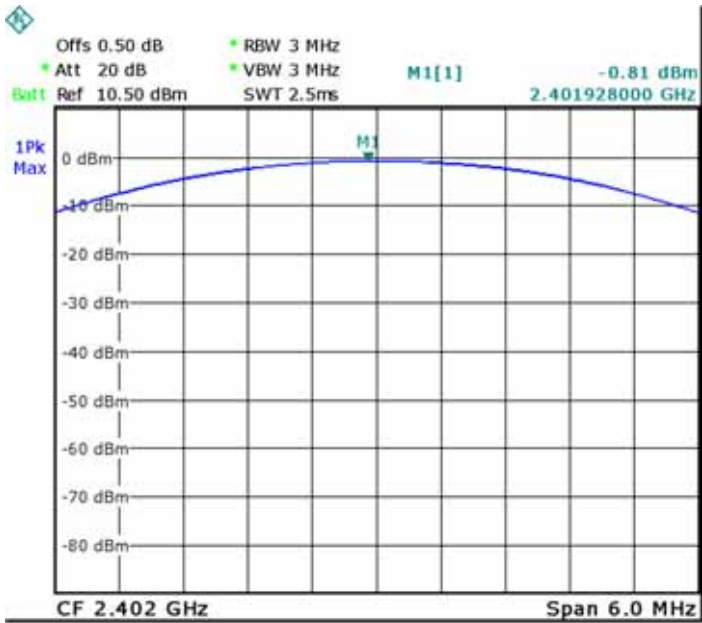
Middle Channel



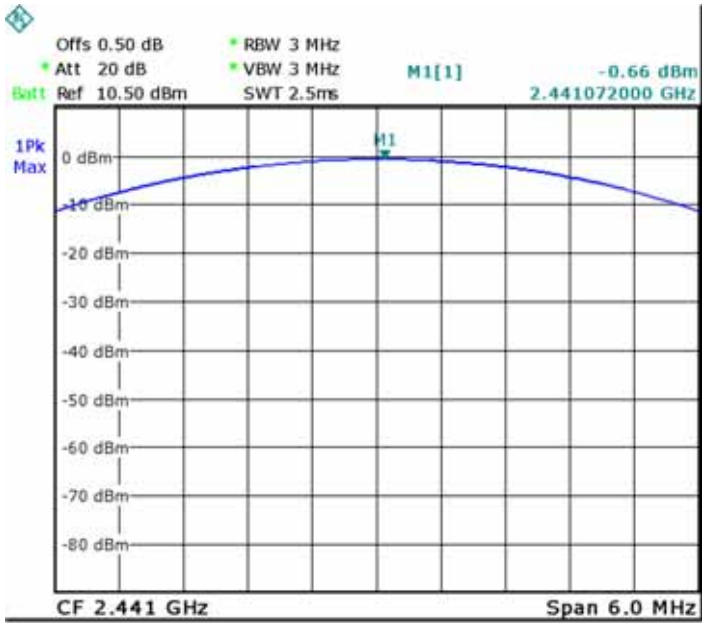
High Channel

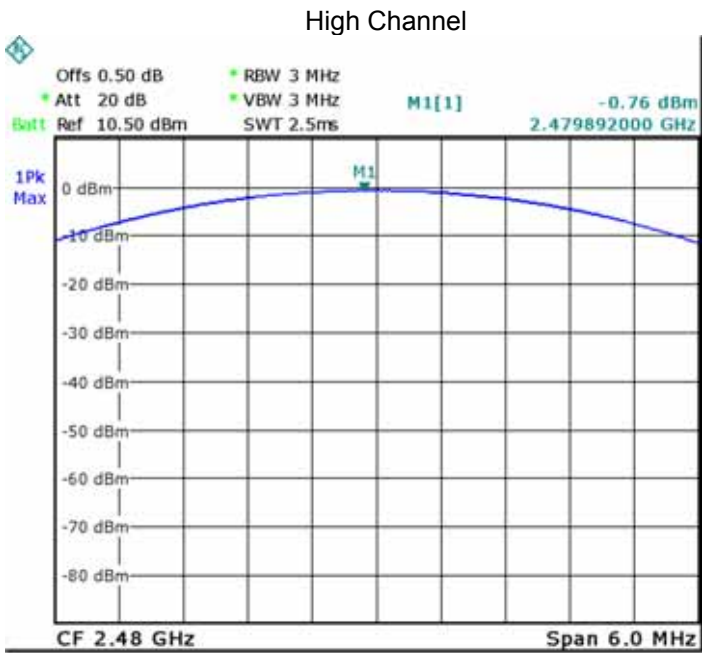


Modulation: 8DPSK Low Channel  
Low Channel



Middle Channel





## 14 Hopping Channel Separation

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test Method:      | 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 1W. |
| 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 the spectrum analyzer: RBW = 30KHz. VBW = 100KHz , Span = 3MHz. 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.

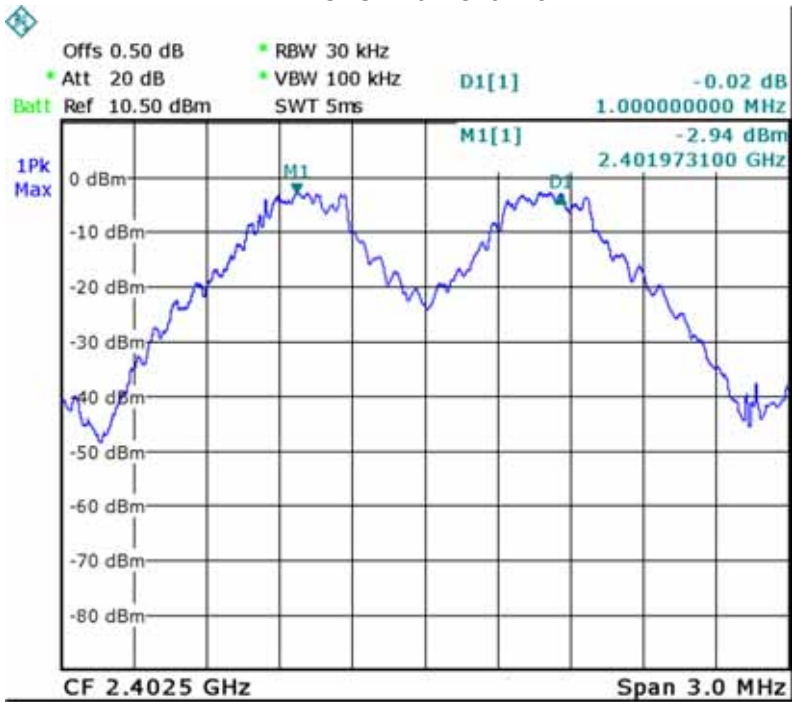
### 14.2 Test Result:

Test result plot as follows:

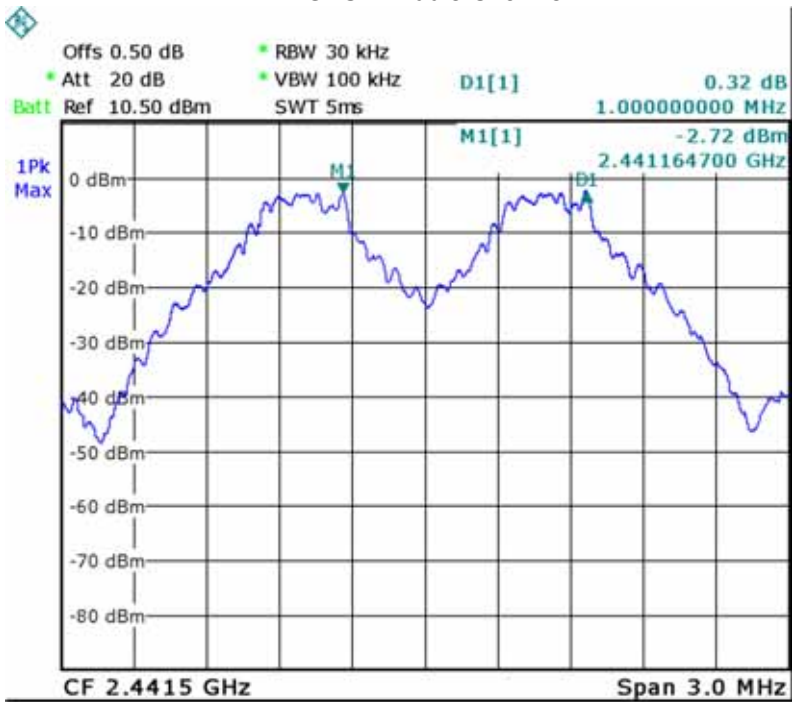
| Modulation | Test Channel | Separation (MHz) | Result |
|------------|--------------|------------------|--------|
| GFSK       | Low          | 1 MHz            | PASS   |
| GFSK       | Middle       | 1 MHz            | PASS   |
| GFSK       | High         | 1 MHz            | PASS   |
| Pi/4 DQPSK | Low          | 1 MHz            | PASS   |
| Pi/4 DQPSK | Middle       | 1 MHz            | PASS   |
| Pi/4 DQPSK | High         | 1 MHz            | PASS   |
| 8DPSK      | Low          | 1 MHz            | PASS   |
| 8DPSK      | Middle       | 1 MHz            | PASS   |
| 8DPSK      | High         | 1 MHz            | PASS   |

Test plots

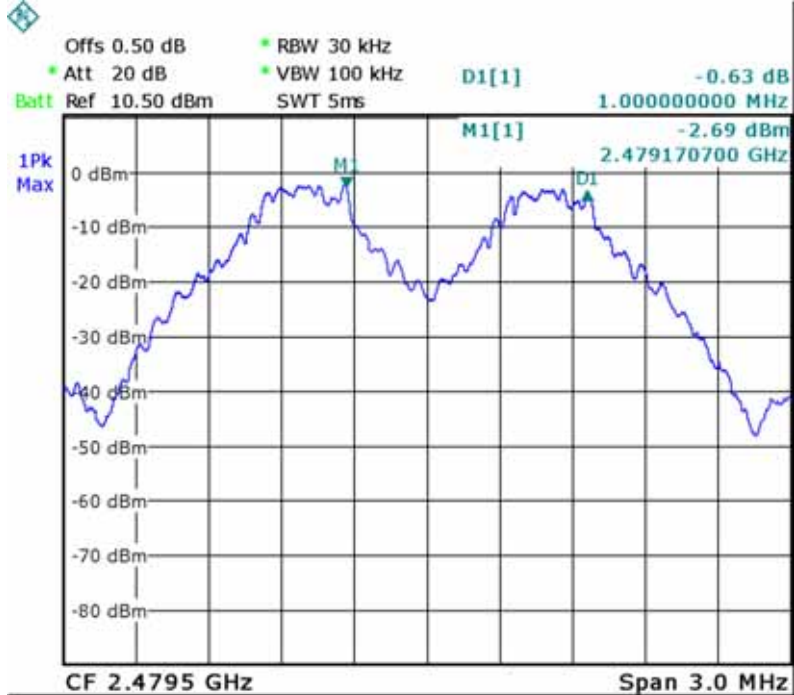
GFSK Low Channel



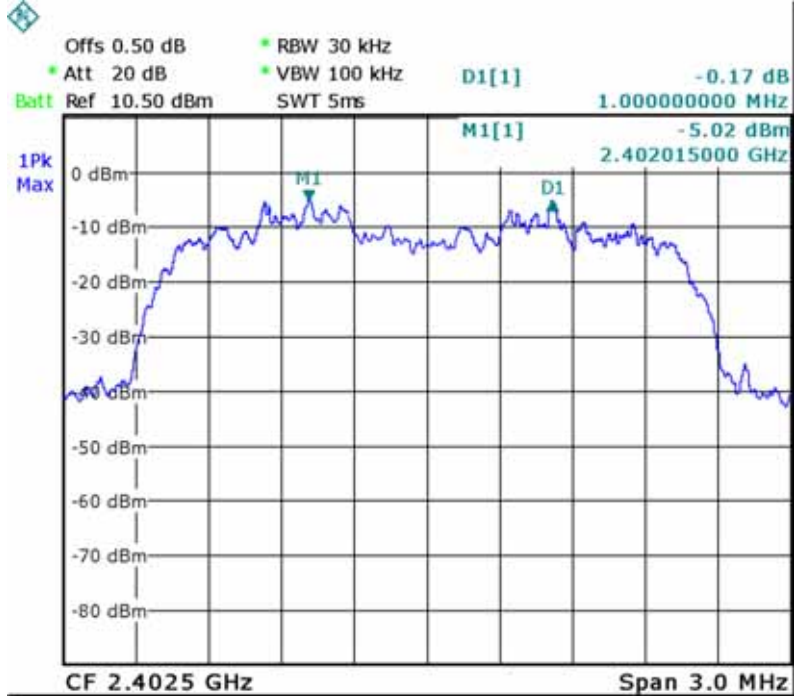
GFSK Middle Channel



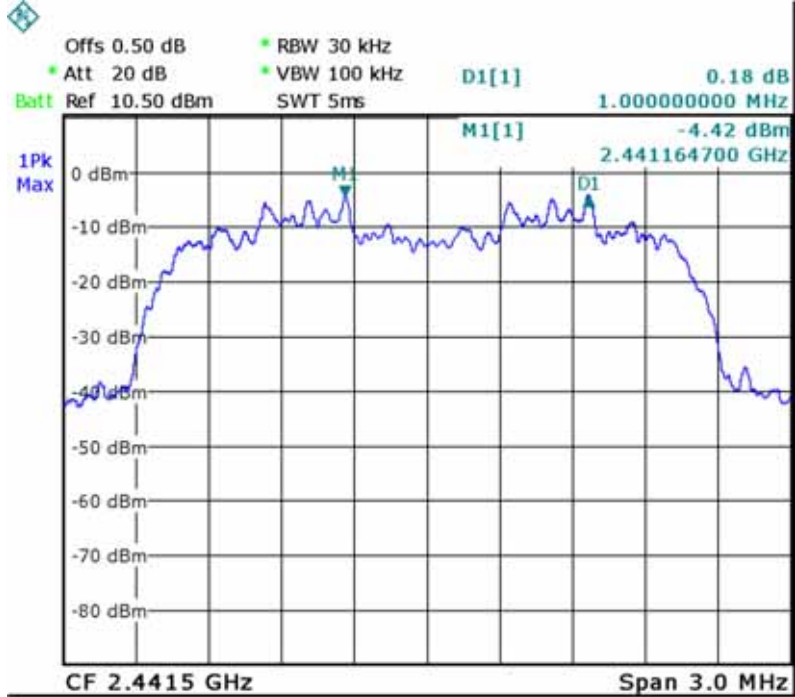
GFSK High Channel



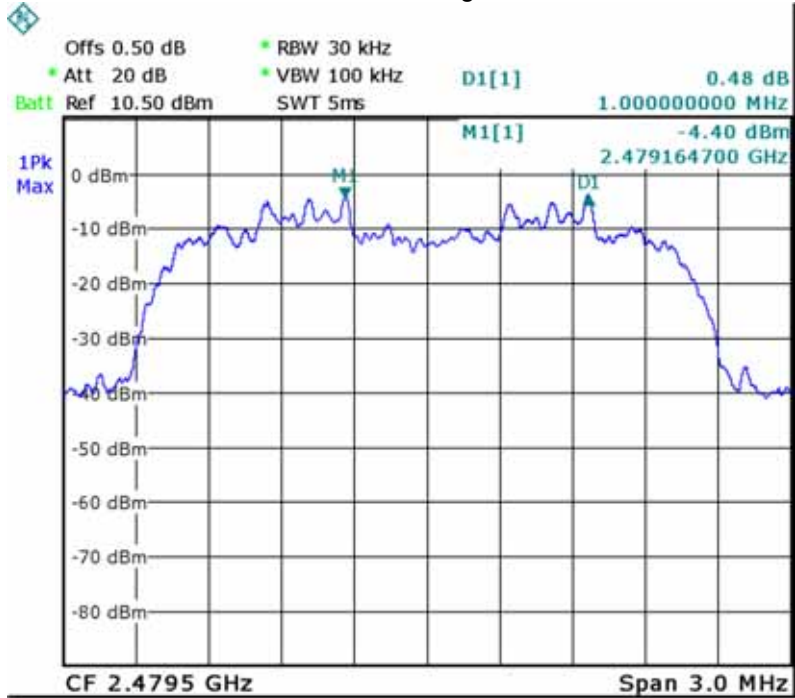
Pi/4 DQPSKLow Channel



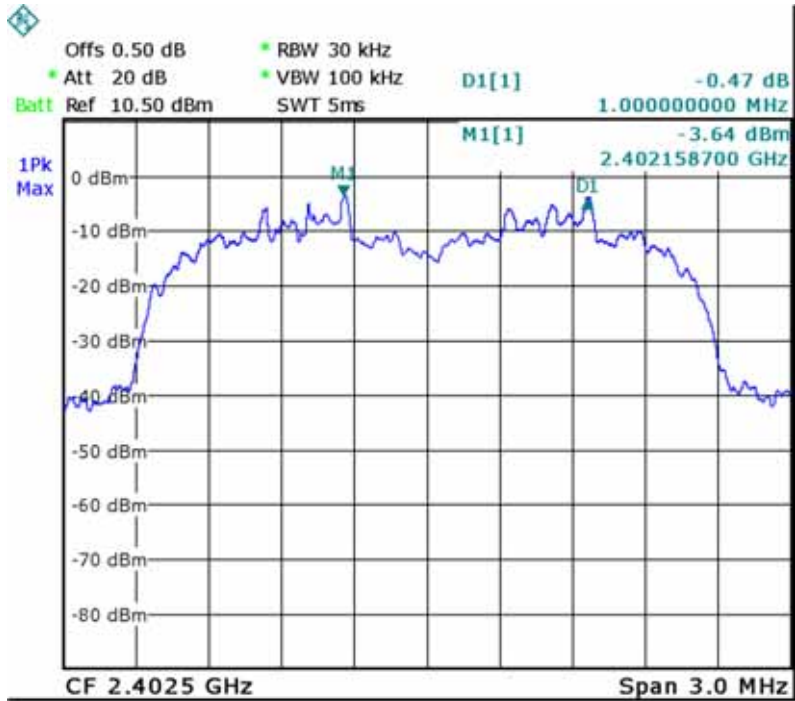
Pi/4 DQPSK Middle Channel



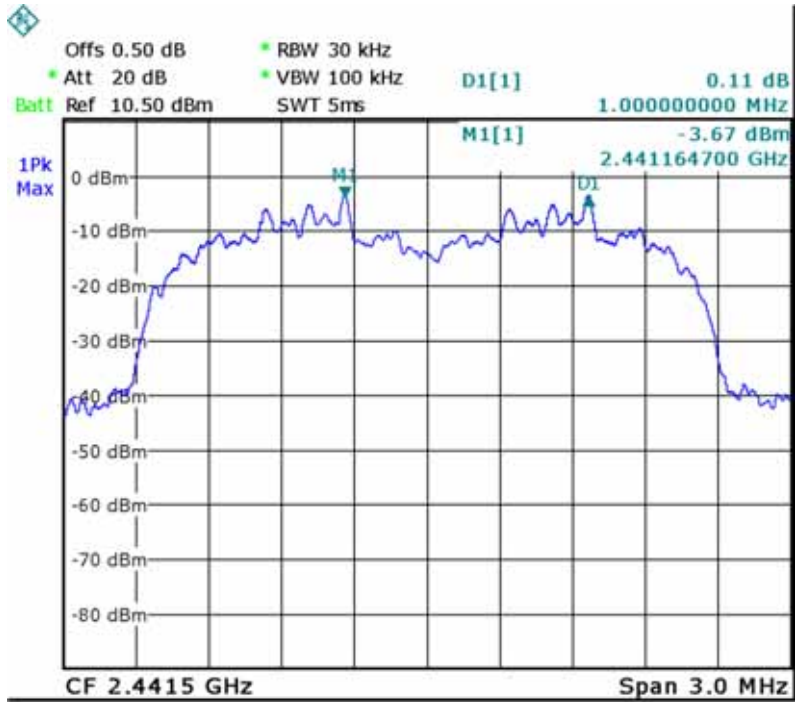
Pi/4 DQPSK High Channel

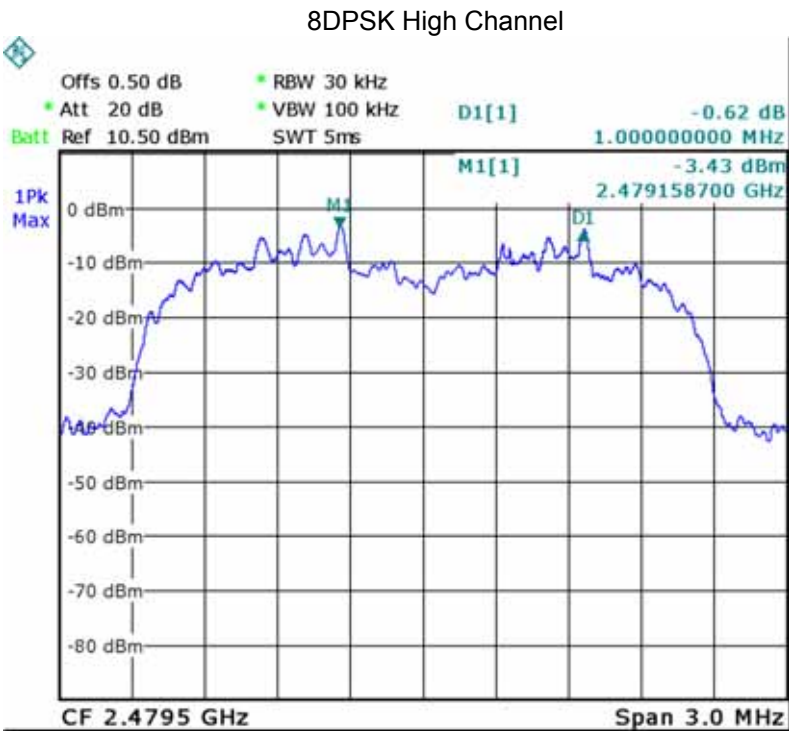


8DPSKLow Channel



8DPSK Middle Channel





## 15 Number of Hopping Frequency

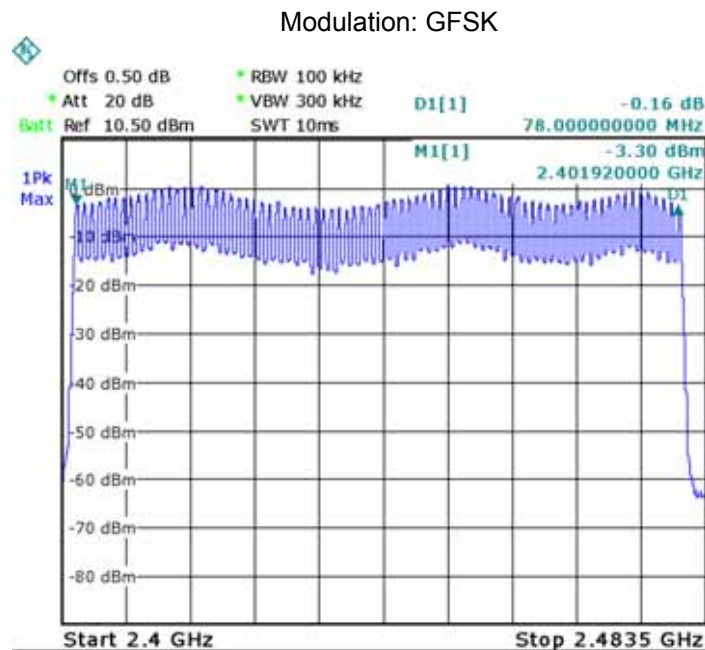
|                   |                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247                                                                                    |
| Test Method:      | 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.                                                                        |

### 15.1 Test Procedure:

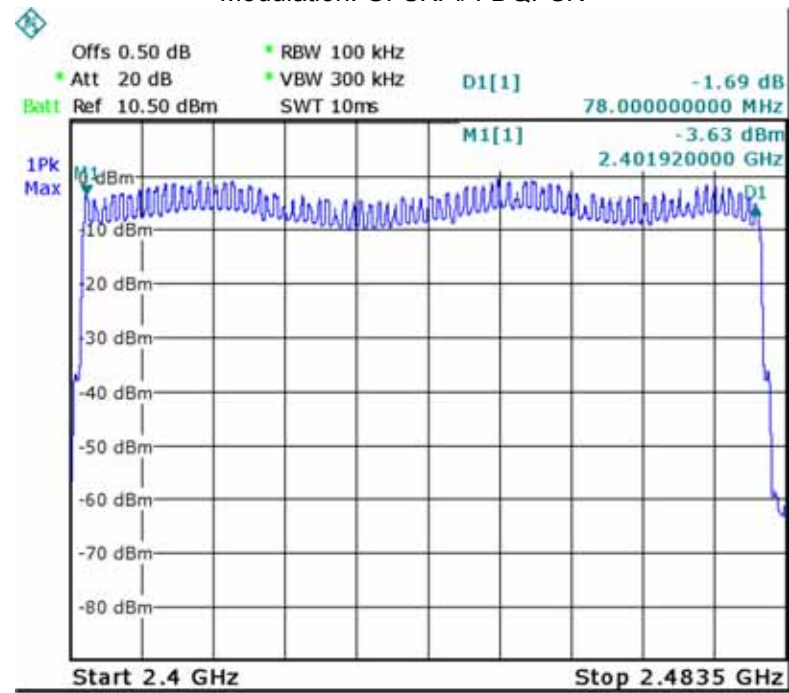
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 1MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. 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 = 2.4835GHz. Sweep=auto;

### 15.2 Test Result:

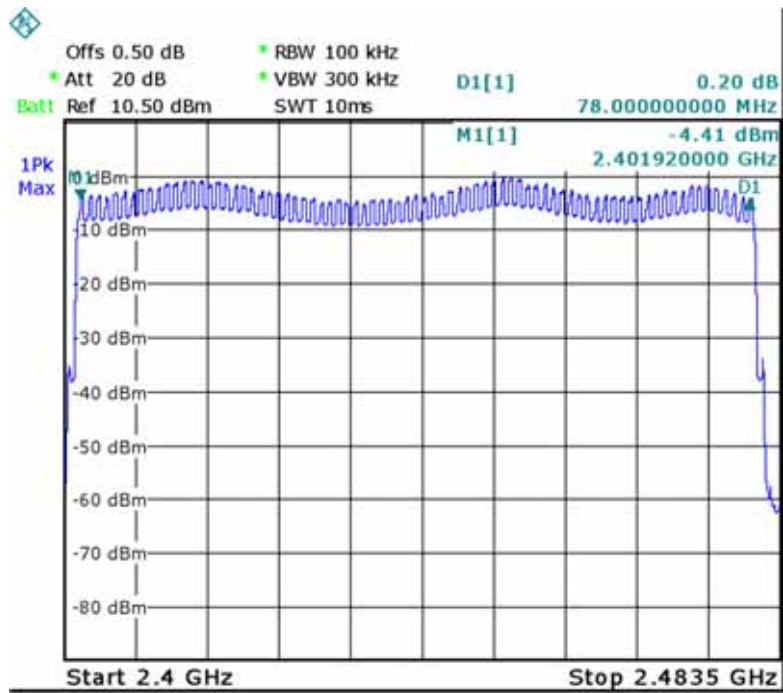
Total Channels are 79 Channels.



Modulation: GFSKPi/4 DQPSK



Modulation: 8DPSK



## 16 Dwell Time

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.247                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test Method:      | 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.                                                                                                                                                                                                                                                                                                                                                                                                 |

### 16.1 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.
- 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).

### 16.2 Test Result:

Dwell time = Pulse wide x (Hopping rate / Number of channels) x Period

The test period:  $T = 0.4(s) * 79 = 31.6 (s)$

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:

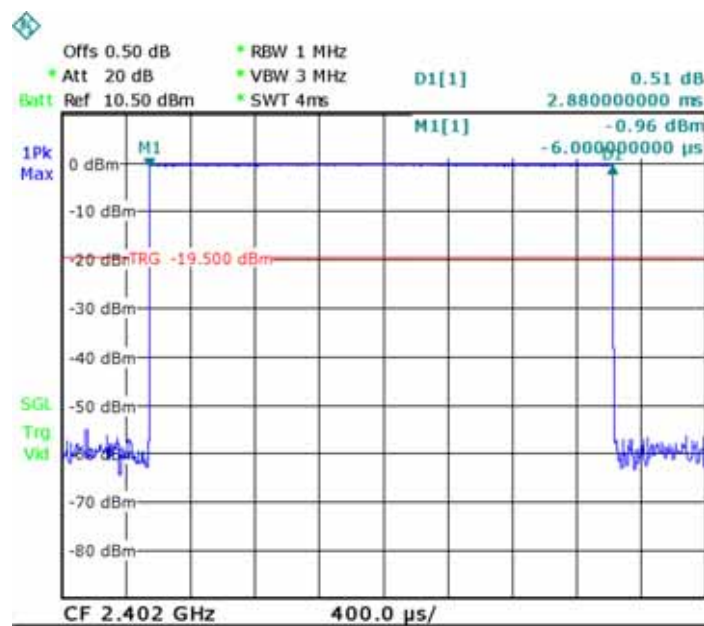
| Data Packet | Dwell Time(s)                    |
|-------------|----------------------------------|
| DH5         | $1600/79/6*31.6*(MkrDelta)/1000$ |
| DH3         | $1600/79/4*31.6*(MkrDelta)/1000$ |
| DH1         | $1600/79/2*31.6*(MkrDelta)/1000$ |
| Remark      | Mkr Delta is single pulse time.  |

| Modulation | Data Packet | Channel | pulse time(ms) | Dwell Time(s) | Limits(s) |
|------------|-------------|---------|----------------|---------------|-----------|
| GFSK       | DH5         | Low     | 2.880          | 0.307         | 0.4       |
|            |             | middle  | 2.880          | 0.307         | 0.4       |
|            |             | High    | 2.880          | 0.307         | 0.4       |
| Pi/4DQPSK  | 2DH5        | Low     | 2.880          | 0.307         | 0.4       |
|            |             | middle  | 2.880          | 0.307         | 0.4       |
|            |             | High    | 2.880          | 0.307         | 0.4       |
| 8DPSK      | 3DH5        | Low     | 2.880          | 0.307         | 0.4       |
|            |             | middle  | 2.880          | 0.307         | 0.4       |
|            |             | High    | 2.880          | 0.307         | 0.4       |

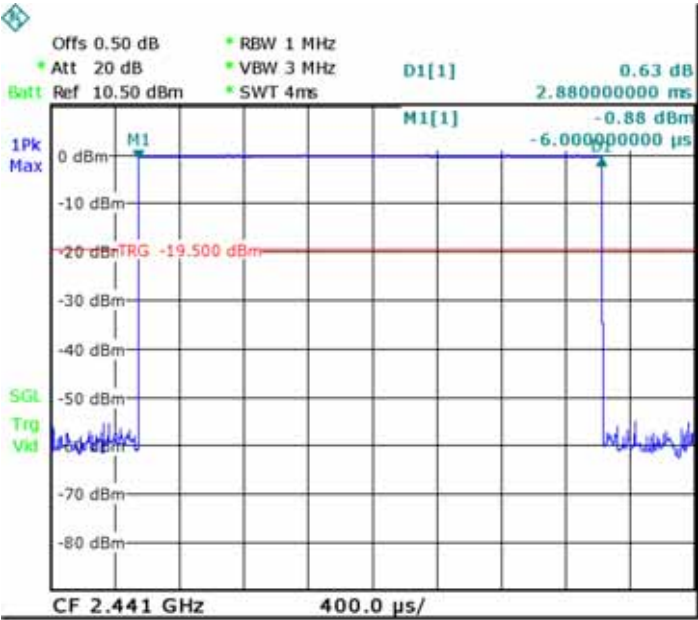
Modulation: GFSK

Data Packet:

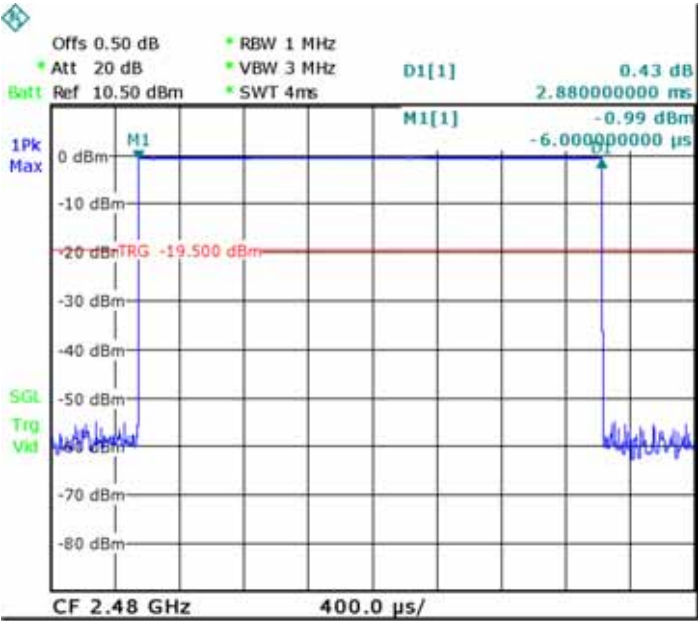
DH5.Low channel



Data Packet:  
DH5.Middle channel



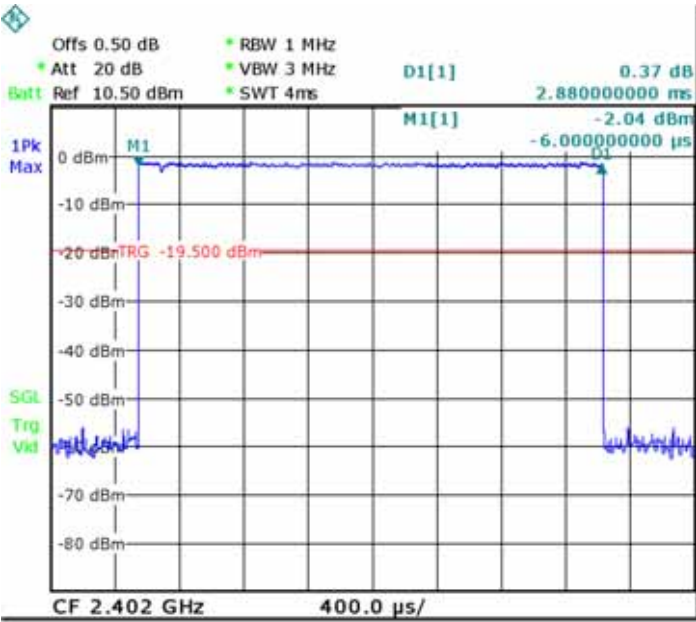
Data Packet:  
DH5,High channel



Modulation: Pi/4DQPSK

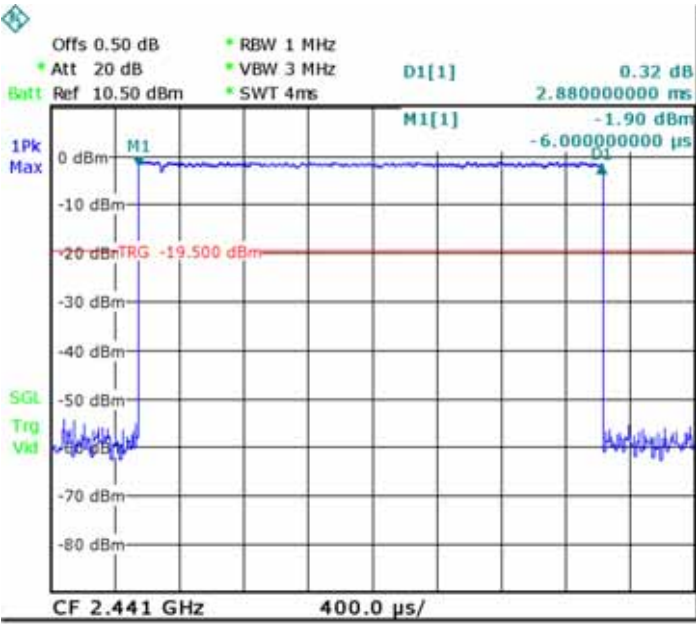
Data Packet:

2DH5 Low channel

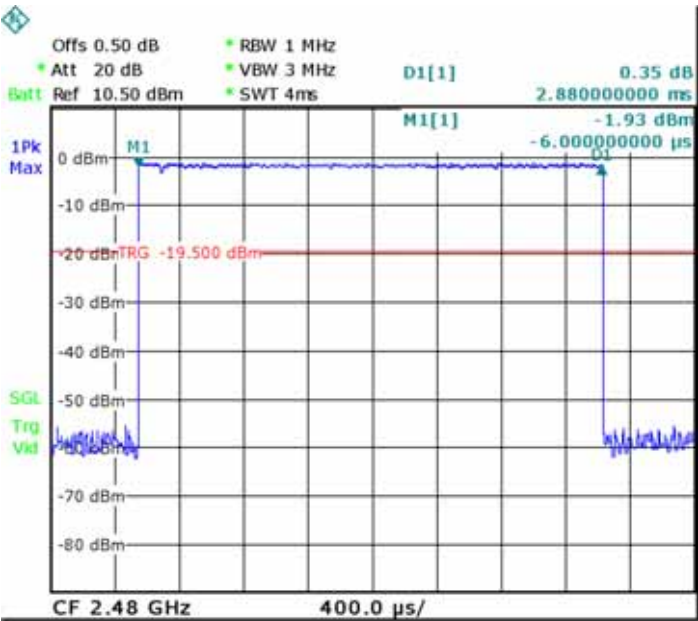


Data Packet:

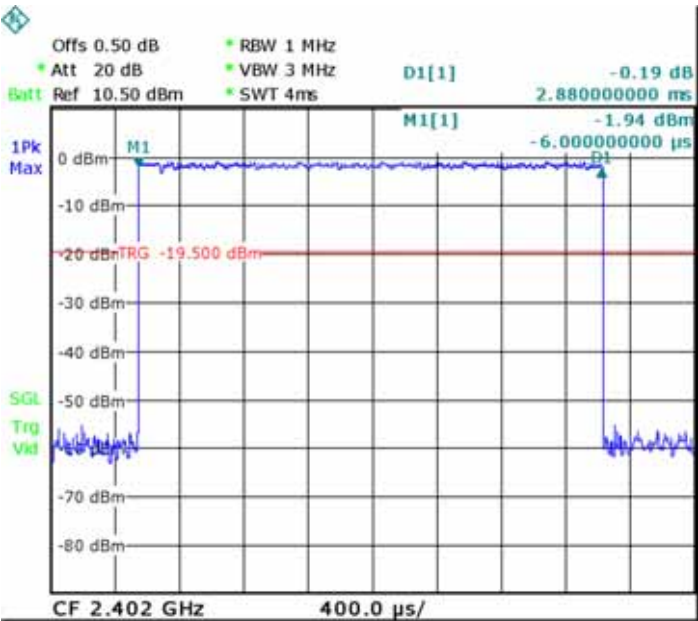
2DH5.Middle channel



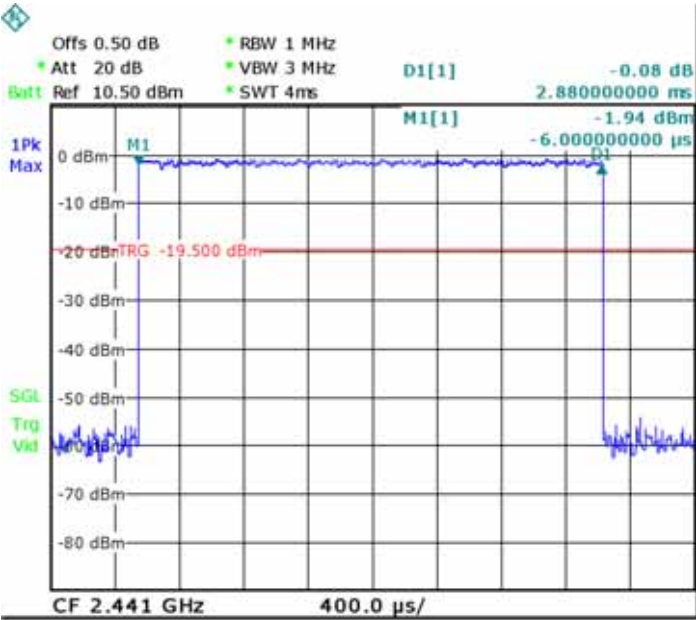
Data Packet:  
2DH5,High channel



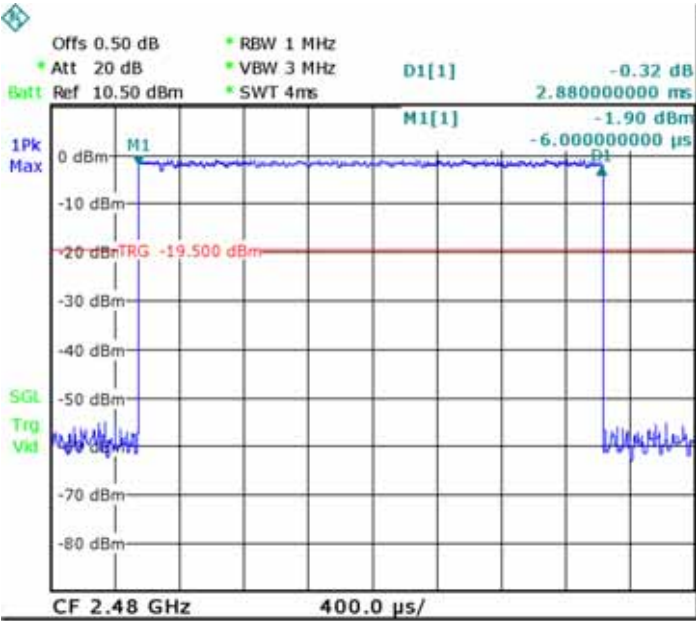
Modulation:8DPSK  
Data Packet:  
3DH5.Low channel



Data Packet:  
3DH5.Middle channel



Data Packet:  
3DH5,High channel



## 17 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

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

Result:

The EUT have two External antenna with RP-SMA connector, meets the requirements of FCC 15.203.



## **18 SAR Evaluation**

Please refer to SAR report.

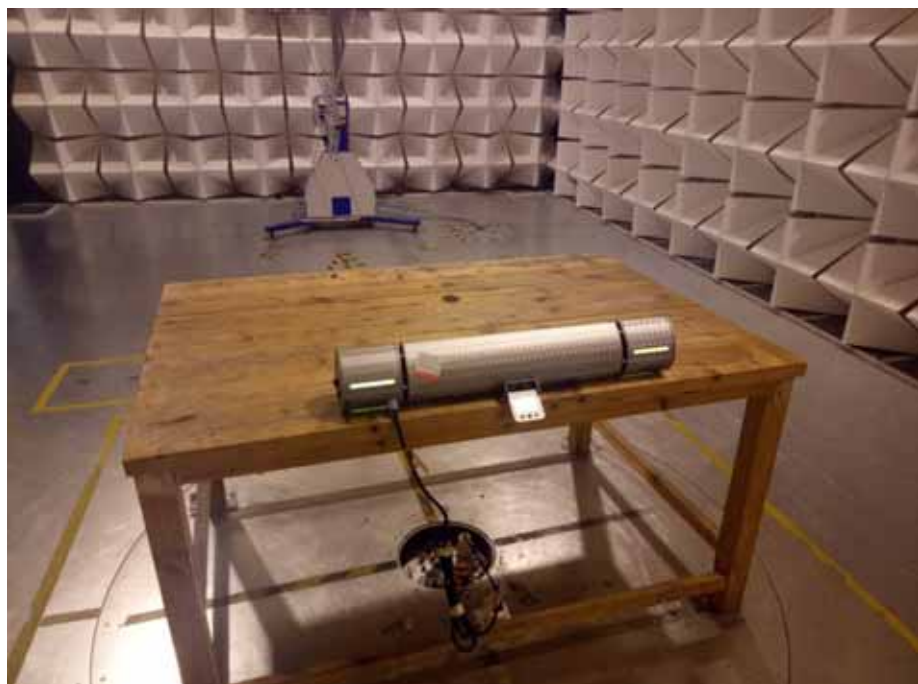
## 19 Photographs –Test Setup Photos

### 19.1 Radiated Emission

Test frequency Below30MHz

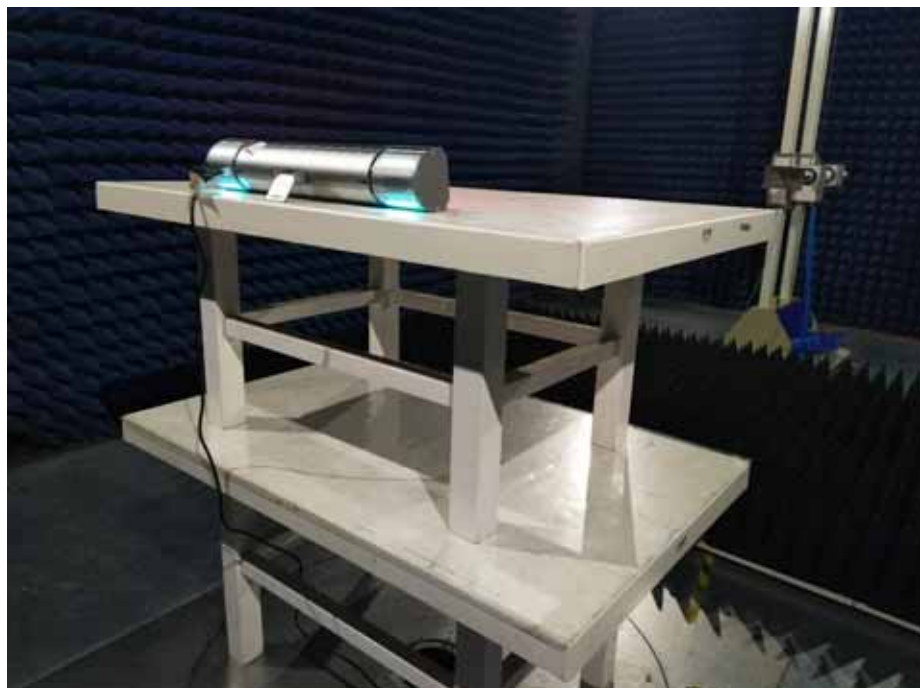


Test frequency from 30MHz to 1GHz





Test frequency above 1GHz

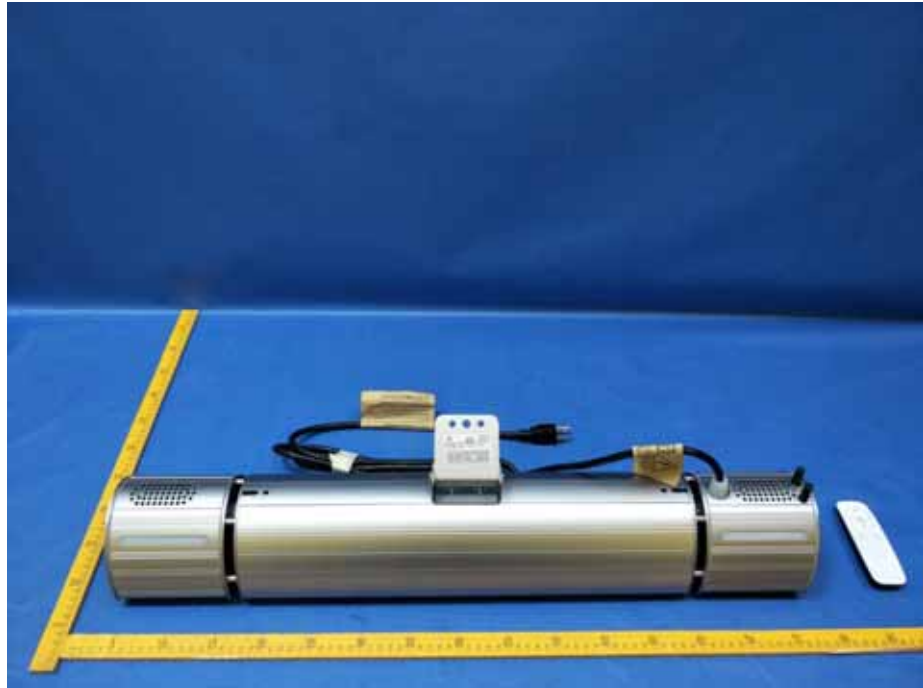


## 19.2 Conducted Emission



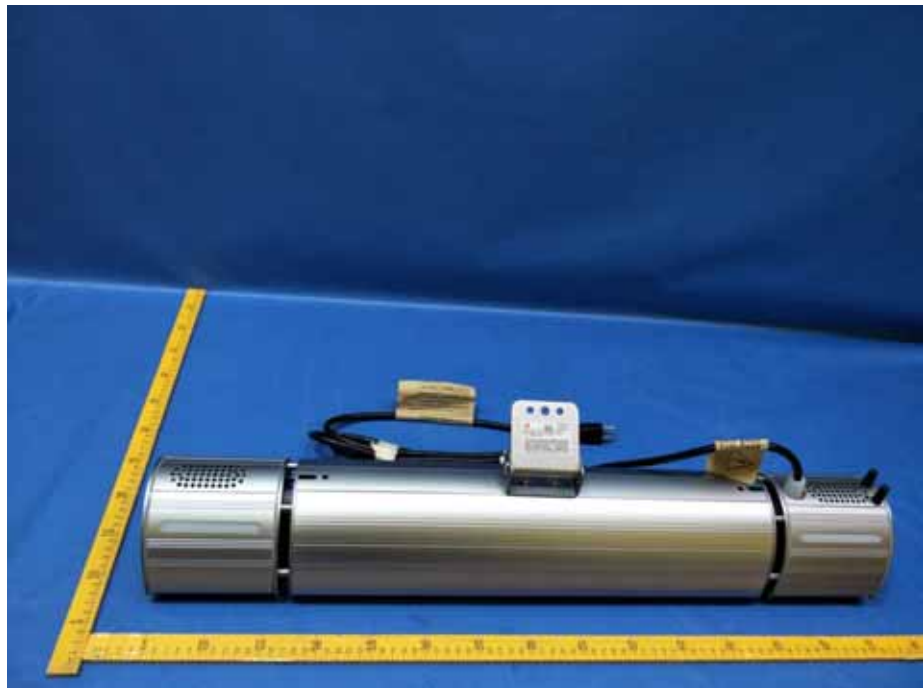
## 20 Photographs – Constructional Details

### 20.1 EUT– External Photos

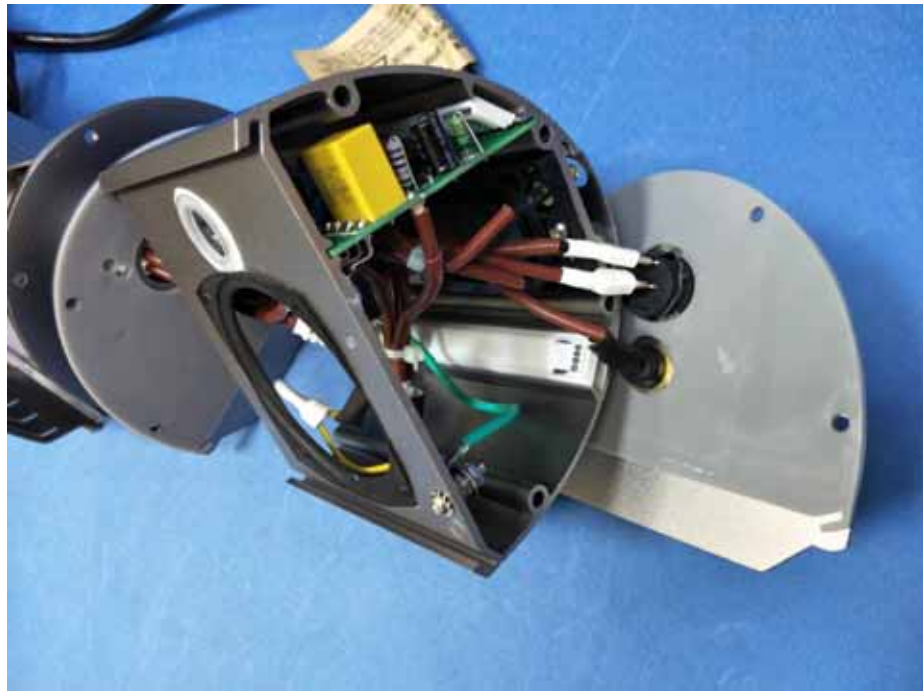








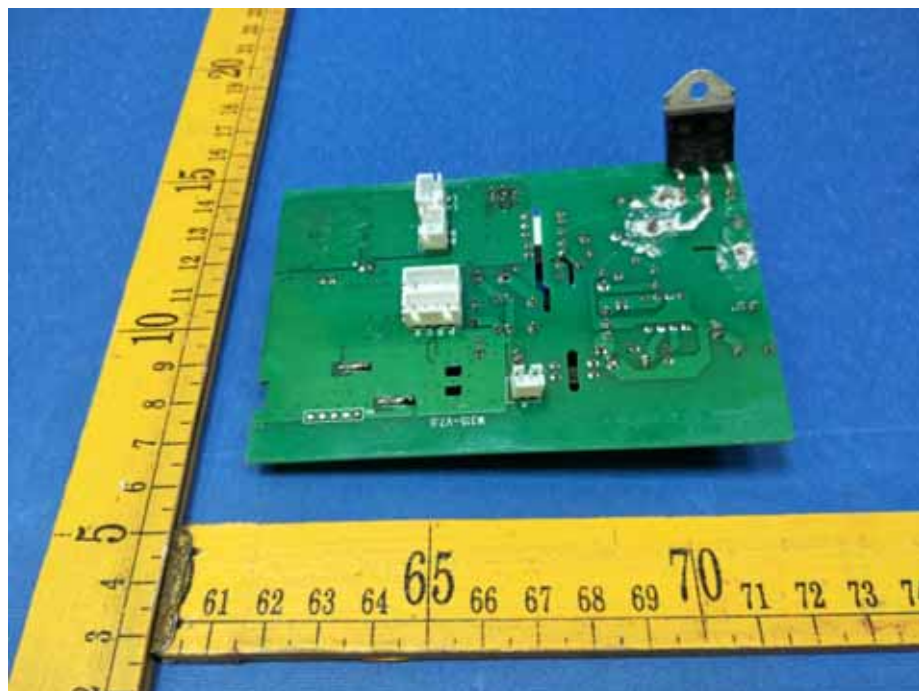
## 20.2 EUT– Internal Photos





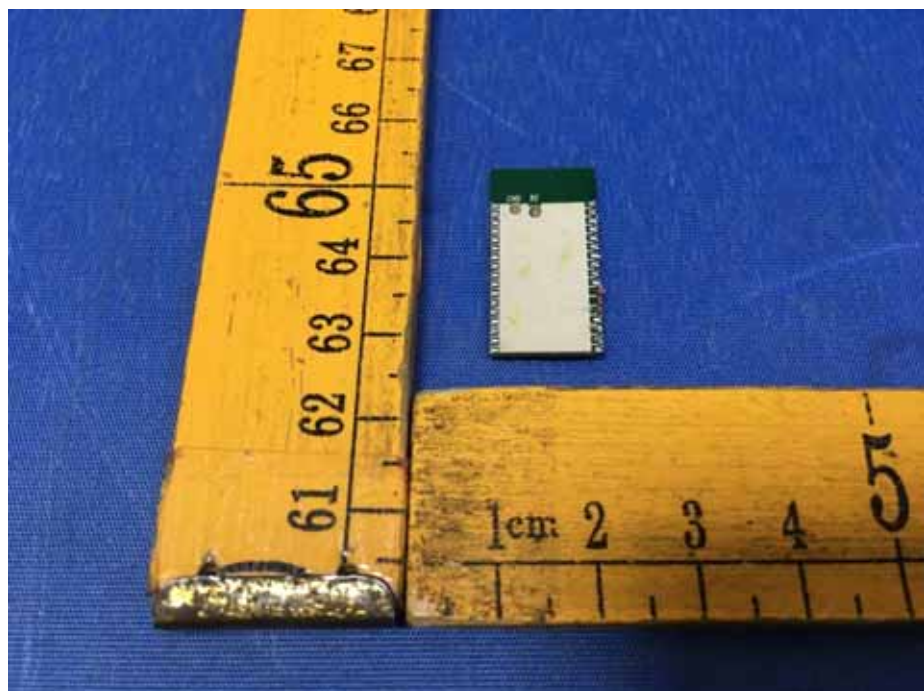
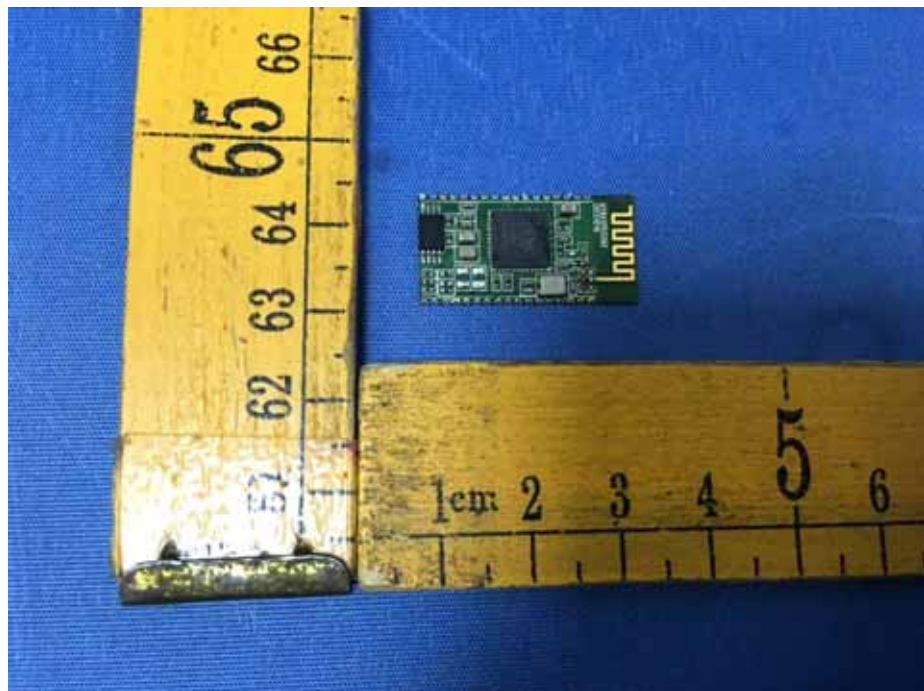
Classic BT ANT

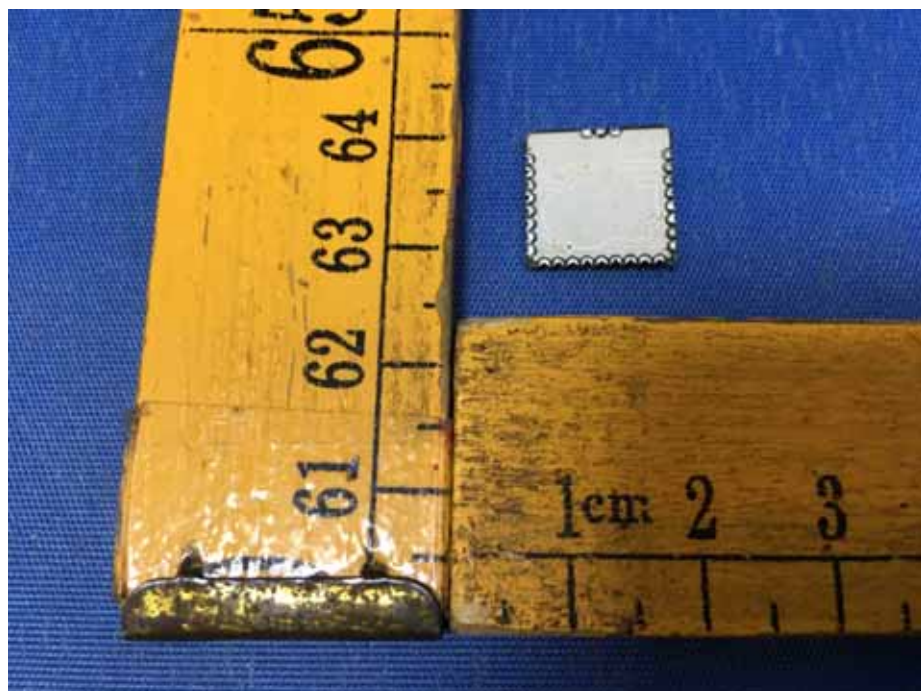
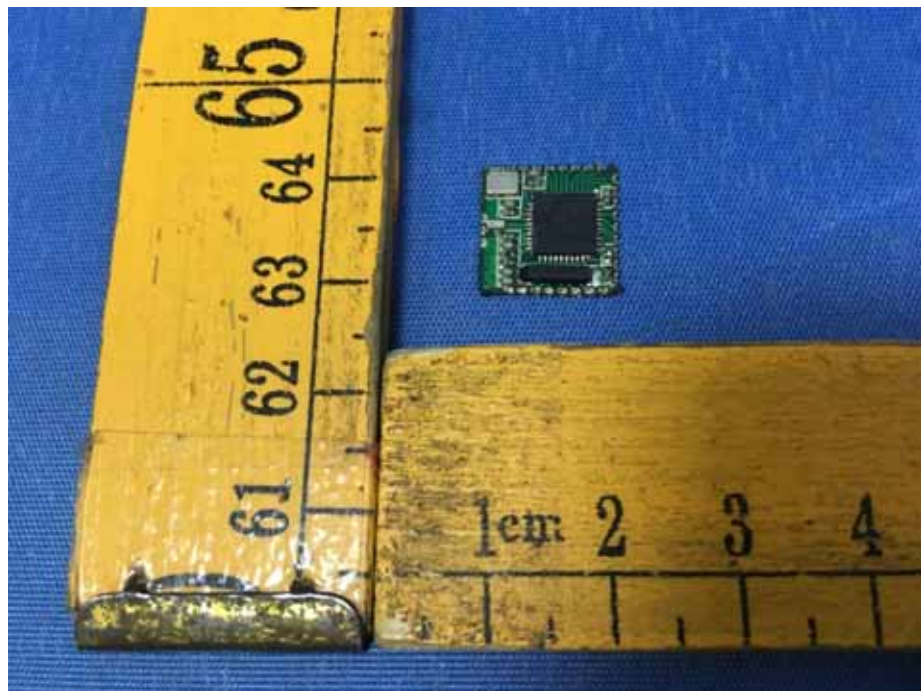












=====End of Report=====