



# TEST REPORT

Report Reference No..... : TRE1708019404 R/C.....: 33601

FCC ID..... : 2AM6Q-W1452

Applicant's name..... : GRUPO SOLONE SA DE CV

Address..... : AV. LOMAS DE SOTELO NO. 1112 PB,COL. LOMA HERMOSA,DEL. MIGUEL HIDALGO,CIUDAD DE MEXICO.

Manufacturer..... : GUANGDONG ENOK COMMUNICATION CO.,LTD

Address..... : 139&137Lixiang road ,Songmushan Dalang town, Dongguan,Guangdong China

Test item description ..... : Smart Phone

Trade Mark ..... : SOLONE

Model/Type reference..... : W1452

Listed Model(s) ..... : -

Standard ..... : FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of receipt of test sample..... : Aug.29, 2017

Date of testing..... : Aug.30, 2017 - Sep.12, 2017

Date of issue..... : Sep.14, 2017

Result..... : PASS

Compiled by  
( Position+Printed name+Signature): File administrators Candy Liu

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*Lion Cai*

Approved by  
(Position+Printed name+Signature): RF Manager Hans Hu

*Hans Hu*

Testing Laboratory Name ..... : Shenzhen Huatongwei International Inspection Co., Ltd.

Address..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

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*The test report merely correspond to the test sample.*

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## 1. TEST STANDARDS AND REPORT VERSION

### 1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

### 1.2. Report version

| Version No. | Date of issue | Description |
|-------------|---------------|-------------|
| 00          | Sep.14, 2017  | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

## 2. TEST DESCRIPTION

| Test Item                               | Section in CFR 47                                | Result | Test Engineer |
|-----------------------------------------|--------------------------------------------------|--------|---------------|
| Antenna Requirement                     | 15.203/15.247 (c)                                | Pass   | William Wang  |
| AC Power Line Conducted Emissions       | 15.207                                           | Pass   | William Wang  |
| Conducted Peak Output Power             | 15.247 (b)(1)                                    | Pass   | William Wang  |
| 20 dB Bandwidth                         | 15.247 (a)(1)                                    | Pass   | William Wang  |
| Carrier Frequencies Separation          | 15.247 (a)(1)                                    | Pass   | William Wang  |
| Hopping Channel Number                  | 15.247 (a)(1)                                    | Pass   | William Wang  |
| Dwell Time                              | 15.247 (a)(1)                                    | Pass   | William Wang  |
| Pseudorandom Frequency Hopping Sequence | 15.247(b)(4)&TCB Exclusion List<br>(7 July 2002) | Pass   | William Wang  |
| Restricted band                         | 15.247(d)/15.205                                 | Pass   | William Wang  |
| Radiated Emissions                      | 15.247(d)/15.209                                 | Pass   | William Wang  |

Note: The measurement uncertainty is not included in the test result.

### 3. SUMMARY

#### 3.1. Client Information

|               |                                                                                             |
|---------------|---------------------------------------------------------------------------------------------|
| Applicant:    | GRUPO SOLONE SA DE CV                                                                       |
| Address:      | AV. LOMAS DE SOTELO NO. 1112 PB,COL. LOMA HERMOSA,<br>DEL. MIGUEL HIDALGO,CIUDAD DE MEXICO. |
| Manufacturer: | GUANGDONG ENOK COMMUNICATION CO.,LTD                                                        |
| Address:      | 139&137Lixiang road ,Songmushan Dalang town,Dongguan,<br>Guangdong China                    |

#### 3.2. Product Description

|                      |                                                           |
|----------------------|-----------------------------------------------------------|
| Name of EUT:         | Smart Phone                                               |
| Trade Mark:          | SOLONE                                                    |
| Model No.:           | W1452                                                     |
| Listed Model(s):     | -                                                         |
| IMEI:                | 353806090000004                                           |
| Power supply:        | DC 3.8V From internal battery                             |
| Adapter information: | Input: 100-240Va.c.,50/60Hz,0.3A<br>Output: 5Vd.c.,1000mA |
| Hardware version:    | K522A_MB-P0_V1                                            |
| Software version:    | K522 test-key                                             |
| <b>Bluetooth</b>     |                                                           |
| Version:             | Supported BT4.0+EDR                                       |
| Modulation:          | GFSK, $\pi/4$ DQPSK, 8DPSK                                |
| Operation frequency: | 2402MHz~2480MHz                                           |
| Channel number:      | 79                                                        |
| Channel separation:  | 1MHz                                                      |
| Antenna type:        | PIFA Antenna                                              |
| Antenna gain:        | 2.74 dBi                                                  |

### 3.3. Operation state

#### ➤ Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

| Channel | Frequency (MHz) |
|---------|-----------------|
| 00      | 2402            |
| 01      | 2403            |
| :       | :               |
| 39      | 2441            |
| :       | :               |
| 77      | 2479            |
| 78      | 2480            |

#### ➤ TEST MODE

|                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------|
| For RF test items:                                                                                                                |
| The engineering test program was provided and enabled to make EUT continuous transmit                                             |
| For AC power line conducted emissions:                                                                                            |
| The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.                                  |
| For Radiated suprious emissions test item:                                                                                        |
| The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data recorded in the report. |

### 3.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

|   |               |   |
|---|---------------|---|
| / | Manufacturer: | / |
|   | Model No.:    | / |
| / | Manufacturer: | / |
|   | Model No.:    | / |

### 3.5. Modifications

No modifications were implemented to meet testing criteria.

## **4. TEST ENVIRONMENT**

### **4.1. Address of the test laboratory**

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

### **4.2. Test Facility**

#### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 3902.01**

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

#### **FCC-Registration No.: 762235**

Shenzhen Huatongwei International Inspection 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.

#### **IC-Registration No.:5377B-1**

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No.: 5377B-1.

#### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

### 4.3. Environmental conditions

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

|                    |             |
|--------------------|-------------|
| Temperature:       | 15~35°C     |
| Relative Humidity: | 30~60 %     |
| Air Pressure:      | 950~1050mba |

### 4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

| Test Items                              | Measurement Uncertainty | Notes |
|-----------------------------------------|-------------------------|-------|
| Transmitter power conducted             | 0.57 dB                 | (1)   |
| Transmitter power Radiated              | 2.20 dB                 | (1)   |
| Conducted spurious emissions 9kHz~40GHz | 1.60 dB                 | (1)   |
| Radiated spurious emissions 9kHz~40GHz  | 2.20 dB                 | (1)   |
| Conducted Emissions 9kHz~30MHz          | 3.39 dB                 | (1)   |
| Radiated Emissions 30~1000MHz           | 4.24 dB                 | (1)   |
| Radiated Emissions 1~18GHz              | 5.16 dB                 | (1)   |
| Radiated Emissions 18~40GHz             | 5.54 dB                 | (1)   |
| Occupied Bandwidth                      | -----                   | (1)   |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

#### 4.5. Equipments Used during the Test

| Conducted Emissions |                   |               |             |            |            |
|---------------------|-------------------|---------------|-------------|------------|------------|
| Item                | Test Equipment    | Manufacturer  | Model No.   | Serial No. | Last Cal.  |
| 1                   | Artificial Mains  | Rohde&Schwarz | ESH2-Z5     | 100028     | 2016/11/13 |
| 2                   | EMI Test Receiver | Rohde&Schwarz | ESCI3       | 100038     | 2016/11/13 |
| 3                   | Pulse Limiter     | Rohde&Schwarz | ESHSZ2      | 100044     | 2016/11/13 |
| 4                   | EMI Test Software | Rohde&Schwarz | ES-K1 V1.71 | -          | -          |

| Radiated Emissions |                         |                              |                    |            |            |
|--------------------|-------------------------|------------------------------|--------------------|------------|------------|
| Item               | Test Equipment          | Manufacturer                 | Model No.          | Serial No. | Last Cal.  |
| 1                  | EMI test receiver       | Rohde&Schwarz                | ESI 26             | 100009     | 2016/11/13 |
| 2                  | Loop Antenna            | Rohde&Schwarz                | HFH2-Z2            | 100020     | 2016/11/13 |
| 3                  | Ultra-Broadband Antenna | ShwarzBeck                   | VULB9163           | 538        | 2016/11/13 |
| 4                  | Horn antenna            | ShwarzBeck                   | 9120D              | 1011       | 2016/11/13 |
| 5                  | Horn Antenna            | SCHWARZBECK                  | BBHA9170           | 25841      | 2016/11/13 |
| 6                  | Amplifier               | Sonoma                       | 310N               | E009-13    | 2016/11/13 |
| 7                  | JS Amplifier            | Rohde&Schwarz                | JS4-00101800-28-5A | F201504    | 2016/11/13 |
| 8                  | Amplifier               | Compliance Direction systems | PAP1-4060          | 120        | 2016/11/13 |
| 9                  | High pass filter        | Compliance Direction systems | BSU-6              | 34202      | 2016/11/13 |
| 10                 | EMI test Software       | Rohde&Schwarz                | ESK1               | -          | -          |
| 11                 | EMI test Software       | Audix                        | E3                 | -          | -          |
| 12                 | TURNTABLE               | MATURO                       | TT2.0              | -          | -          |
| 13                 | ANTENNA MAST            | MATURO                       | TAM-4.0-P          | -          | -          |

| RF Conducted methods |                     |                      |           |              |            |
|----------------------|---------------------|----------------------|-----------|--------------|------------|
| Item                 | Test Equipment      | Manufacturer         | Model No. | Serial No.   | Last Cal.  |
| 1                    | Spectrum Analyzer   | Rohde&Schwarz        | FSP       | 1164.4391.40 | 2016/11/13 |
| 2                    | MXA Signal Analyzer | Agilent Technologies | N9020A    | MY5050187    | 2016/11/13 |

The Cal.Interval was one year.

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Antenna requirement

#### Requirement

##### **FCC CFR Title 47 Part 15 Subpart C 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

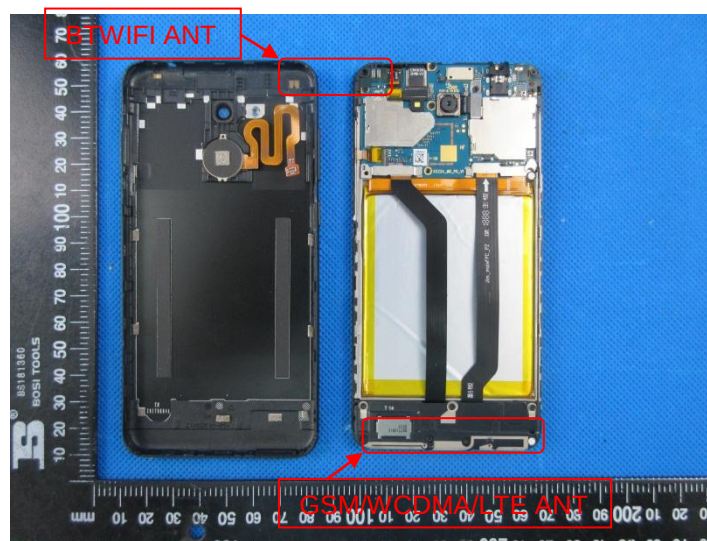
##### **FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):**

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### Test Result:

☒ **Passed**      ☐ **Not Applicable**

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



## 5.2. Conducted Emissions (AC Main)

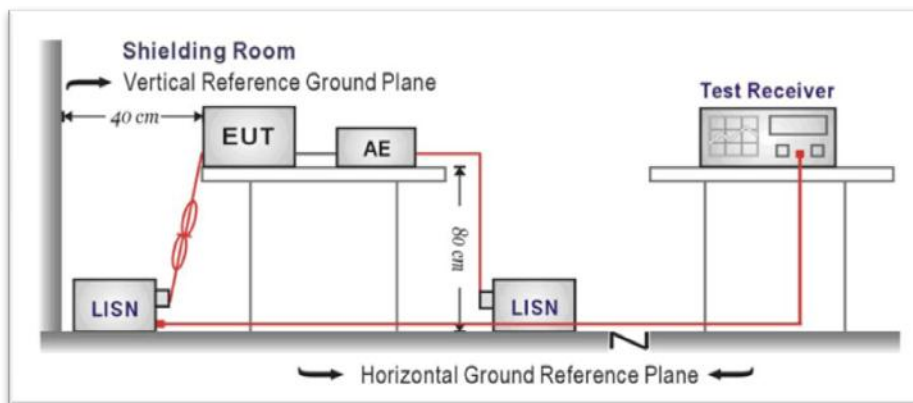
### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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

\* Decreases with the logarithm of the frequency.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

### TEST RESULTS

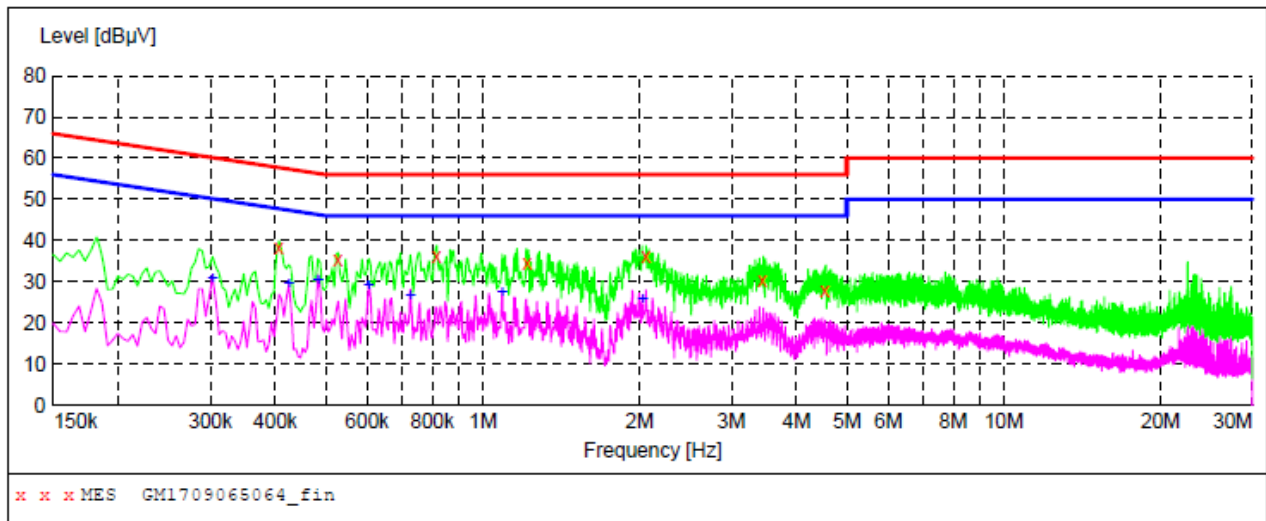
☒ Passed      ☐ Not Applicable

Note:

- 1) Transd= Cable lose + Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit - Level

Test Line:

L

**MEASUREMENT RESULT: "GM1709065064\_fin"**

9/6/2017 4:09PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.406500         | 38.20         | 10.2         | 58            | 19.5         | QP       | L1   | GND |
| 0.528000         | 35.20         | 10.2         | 56            | 20.8         | QP       | L1   | GND |
| 0.816000         | 36.30         | 10.2         | 56            | 19.7         | QP       | L1   | GND |
| 1.216500         | 34.40         | 10.2         | 56            | 21.6         | QP       | L1   | GND |
| 2.058000         | 36.20         | 10.2         | 56            | 19.8         | QP       | L1   | GND |
| 3.444000         | 30.20         | 10.3         | 56            | 25.8         | QP       | L1   | GND |
| 4.528500         | 27.80         | 10.3         | 56            | 28.2         | QP       | L1   | GND |

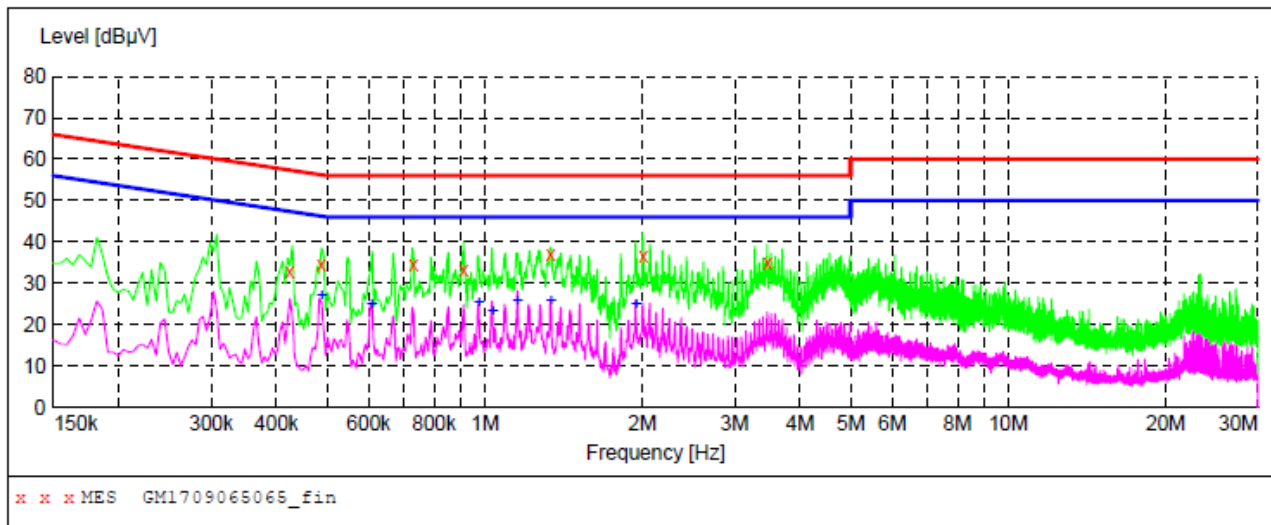
**MEASUREMENT RESULT: "GM1709065064\_fin2"**

9/6/2017 4:09PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.303000         | 30.70         | 10.2         | 50            | 19.5         | AV       | L1   | GND |
| 0.424500         | 29.40         | 10.2         | 47            | 18.0         | AV       | L1   | GND |
| 0.483000         | 30.30         | 10.2         | 46            | 16.0         | AV       | L1   | GND |
| 0.604500         | 29.10         | 10.2         | 46            | 16.9         | AV       | L1   | GND |
| 0.726000         | 26.40         | 10.2         | 46            | 19.6         | AV       | L1   | GND |
| 1.090500         | 27.60         | 10.2         | 46            | 18.4         | AV       | L1   | GND |
| 2.026500         | 25.70         | 10.2         | 46            | 20.3         | AV       | L1   | GND |

Test Line:

N

**MEASUREMENT RESULT: "GM1709065065\_fin"**

9/6/2017 4:12PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.424500         | 32.70         | 10.2         | 57            | 24.7         | QP       | N    | GND |
| 0.487500         | 34.50         | 10.2         | 56            | 21.7         | QP       | N    | GND |
| 0.730500         | 34.40         | 10.2         | 56            | 21.6         | QP       | N    | GND |
| 0.910500         | 33.20         | 10.2         | 56            | 22.8         | QP       | N    | GND |
| 1.338000         | 37.00         | 10.2         | 56            | 19.0         | QP       | N    | GND |
| 2.008500         | 36.70         | 10.2         | 56            | 19.3         | QP       | N    | GND |
| 3.471000         | 35.10         | 10.3         | 56            | 20.9         | QP       | N    | GND |

**MEASUREMENT RESULT: "GM1709065065\_fin2"**

9/6/2017 4:12PM

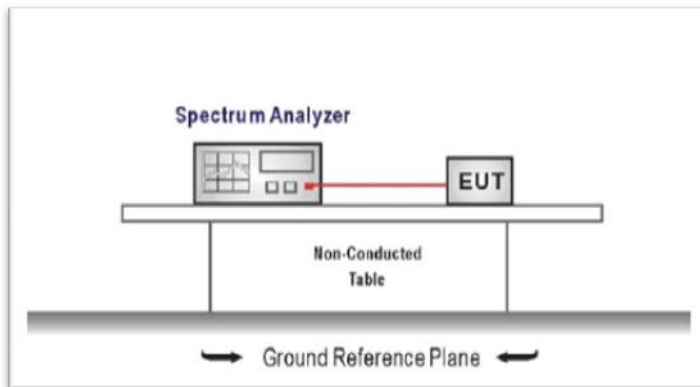
| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.487500         | 26.90         | 10.2         | 46            | 19.3         | AV       | N    | GND |
| 0.609000         | 24.90         | 10.2         | 46            | 21.1         | AV       | N    | GND |
| 0.973500         | 25.30         | 10.2         | 46            | 20.7         | AV       | N    | GND |
| 1.036500         | 23.20         | 10.2         | 46            | 22.8         | AV       | N    | GND |
| 1.153500         | 25.90         | 10.2         | 46            | 20.1         | AV       | N    | GND |
| 1.338000         | 25.90         | 10.2         | 46            | 20.1         | AV       | N    | GND |
| 1.945500         | 24.90         | 10.2         | 46            | 21.1         | AV       | N    | GND |

### 5.3. Conducted Peak Output Power

#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 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 CONFIGURATION



#### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel  
RBW  $\geq$  the 20 dB bandwidth of the emission being measured, VBW  $\geq$  RBW  
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

#### TEST MODE:

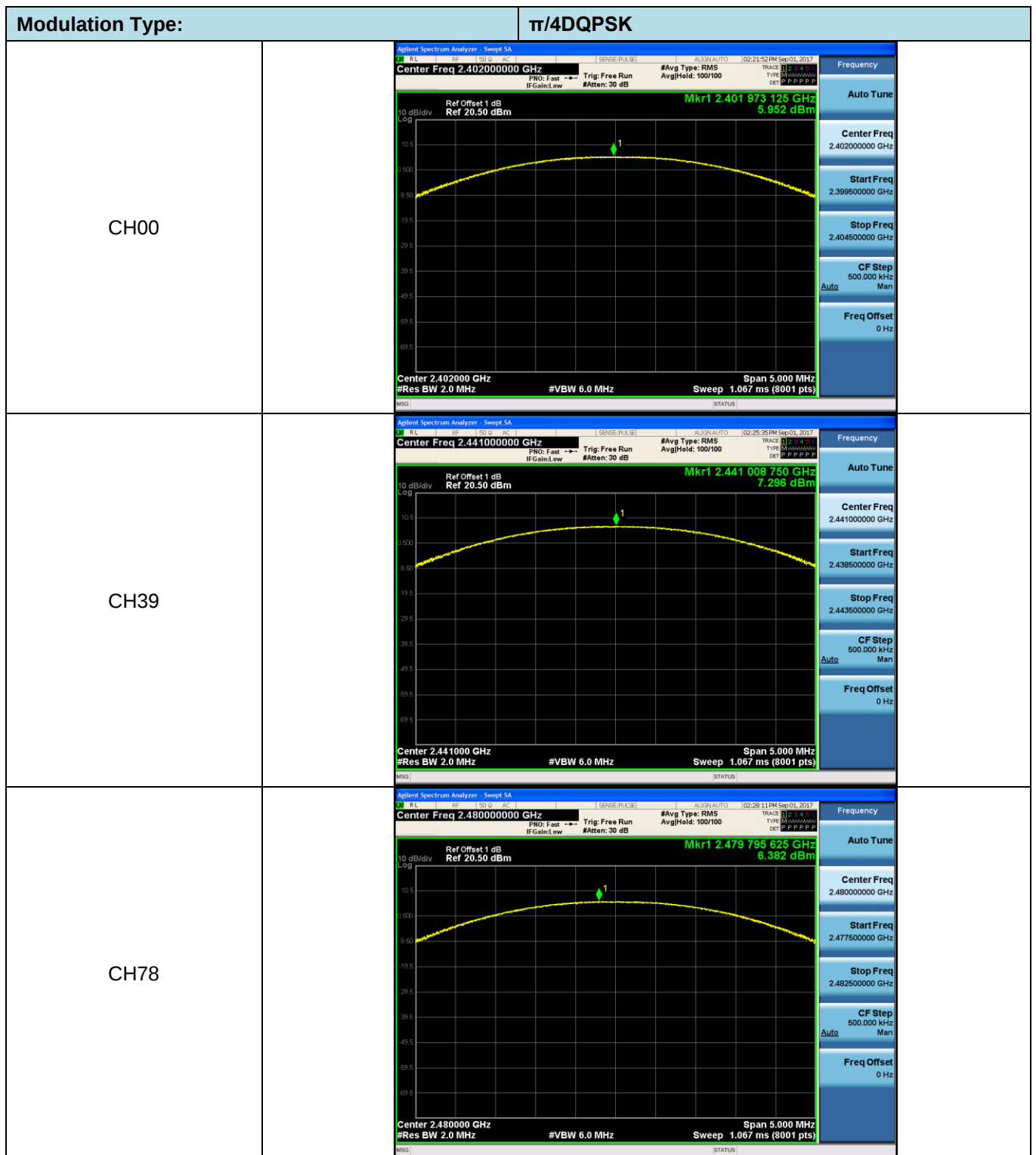
Please refer to the clause 3.3

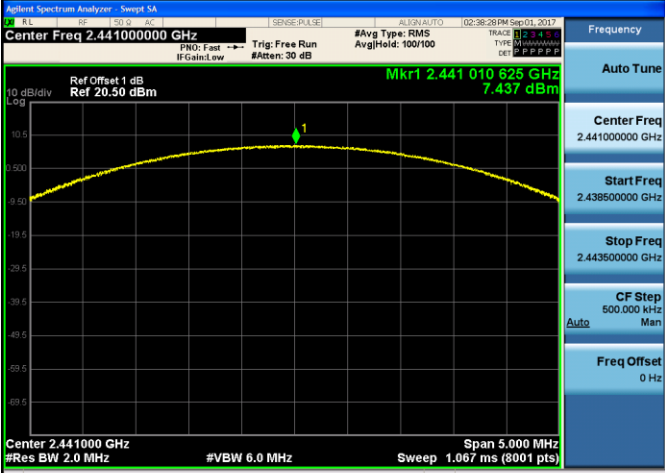
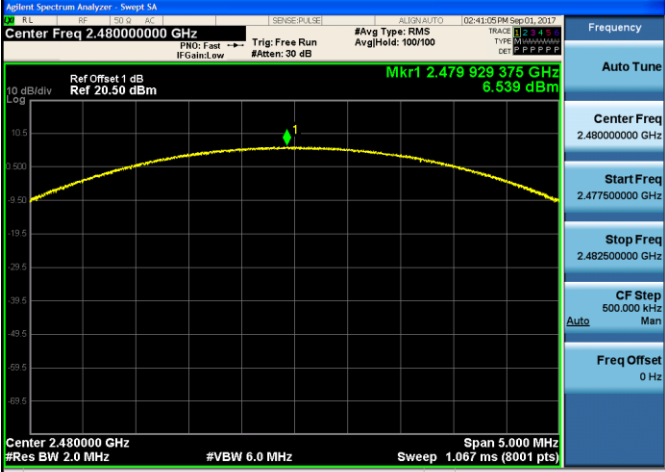
#### TEST RESULTS

☒ Passed ☐ Not Applicable

| Modulation type | Channel | Output power (dBm) | Limit (dBm)  | Result |
|-----------------|---------|--------------------|--------------|--------|
| GFSK            | 00      | 6.713              | $\leq 30.00$ | Pass   |
|                 | 39      | 7.985              |              |        |
|                 | 78      | 7.113              |              |        |
| $\pi/4$ DQPSK   | 00      | 5.952              | $\leq 21.00$ | Pass   |
|                 | 39      | 7.296              |              |        |
|                 | 78      | 6.382              |              |        |
| 8DPSK           | 00      | 6.149              | $\leq 21.00$ | Pass   |
|                 | 39      | 7.437              |              |        |
|                 | 78      | 6.539              |              |        |

| Modulation Type: |  | GFSK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| CH00             |  | <div><div>Agilent Spectrum Analyzer - Sweep SA</div><div><div>RL</div><div>SENSE: PULSE</div><div>ALPHA: AUTO</div><div>02:13:11 PM Sep 01, 2017</div></div><div>Center Freq 2.402000000 GHz</div><div><div>PNP: Fast</div><div>IF Gain: Low</div><div>Trig: Free Run</div><div>#Atten: 30 dB</div></div><div><div>#Avg Type: RMS</div><div>Avg/Hold: 100/100</div><div>TYPE: M</div><div>DET: P P P P P P</div></div><div>10 dB/div</div><div>Ref Offset 1 dB</div><div>Ref 20.50 dBm</div><div>Mkr1 2.402148750 GHz</div><div>6.713 dBm</div><div>1</div><div>Center 2.402000 GHz</div><div>#Res BW 1.0 MHz</div><div>#VBW 3.0 MHz</div><div>Span 5.000 MHz</div><div>Sweep 1.067 ms (8001 pts)</div><div>MSG</div><div>STATUS</div></div> <div><div>Frequency</div><div>Auto Tune</div><div>Center Freq</div><div>2.402000000 GHz</div><div>Start Freq</div><div>2.399500000 GHz</div><div>Stop Freq</div><div>2.404500000 GHz</div><div>CF Step</div><div>500.000 kHz</div><div>Auto</div><div>Man</div><div>Freq Offset</div><div>0 Hz</div></div> |  |
| CH39             |  | <div><div>Agilent Spectrum Analyzer - Sweep SA</div><div><div>RL</div><div>SENSE: PULSE</div><div>ALPHA: AUTO</div><div>02:18:08 PM Sep 01, 2017</div></div><div>Center Freq 2.441000000 GHz</div><div><div>PNP: Fast</div><div>IF Gain: Low</div><div>Trig: Free Run</div><div>#Atten: 30 dB</div></div><div><div>#Avg Type: RMS</div><div>Avg/Hold: 100/100</div><div>TYPE: M</div><div>DET: P P P P P P</div></div><div>10 dB/div</div><div>Ref Offset 1 dB</div><div>Ref 20.50 dBm</div><div>Mkr1 2.441106875 GHz</div><div>7.985 dBm</div><div>1</div><div>Center 2.441000 GHz</div><div>#Res BW 1.0 MHz</div><div>#VBW 3.0 MHz</div><div>Span 5.000 MHz</div><div>Sweep 1.067 ms (8001 pts)</div><div>MSG</div><div>STATUS</div></div> <div><div>Frequency</div><div>Auto Tune</div><div>Center Freq</div><div>2.441000000 GHz</div><div>Start Freq</div><div>2.438500000 GHz</div><div>Stop Freq</div><div>2.443500000 GHz</div><div>CF Step</div><div>500.000 kHz</div><div>Auto</div><div>Man</div><div>Freq Offset</div><div>0 Hz</div></div> |  |
| CH78             |  | <div><div>Agilent Spectrum Analyzer - Sweep SA</div><div><div>RL</div><div>SENSE: PULSE</div><div>ALPHA: AUTO</div><div>02:18:33 PM Sep 01, 2017</div></div><div>Center Freq 2.480000000 GHz</div><div><div>PNP: Fast</div><div>IF Gain: Low</div><div>Trig: Free Run</div><div>#Atten: 30 dB</div></div><div><div>#Avg Type: RMS</div><div>Avg/Hold: 100/100</div><div>TYPE: M</div><div>DET: P P P P P P</div></div><div>10 dB/div</div><div>Ref Offset 1 dB</div><div>Ref 20.50 dBm</div><div>Mkr1 2.479822500 GHz</div><div>7.113 dBm</div><div>1</div><div>Center 2.480000 GHz</div><div>#Res BW 1.0 MHz</div><div>#VBW 3.0 MHz</div><div>Span 5.000 MHz</div><div>Sweep 1.067 ms (8001 pts)</div><div>MSG</div><div>STATUS</div></div> <div><div>Frequency</div><div>Auto Tune</div><div>Center Freq</div><div>2.480000000 GHz</div><div>Start Freq</div><div>2.477500000 GHz</div><div>Stop Freq</div><div>2.482500000 GHz</div><div>CF Step</div><div>500.000 kHz</div><div>Auto</div><div>Man</div><div>Freq Offset</div><div>0 Hz</div></div> |  |



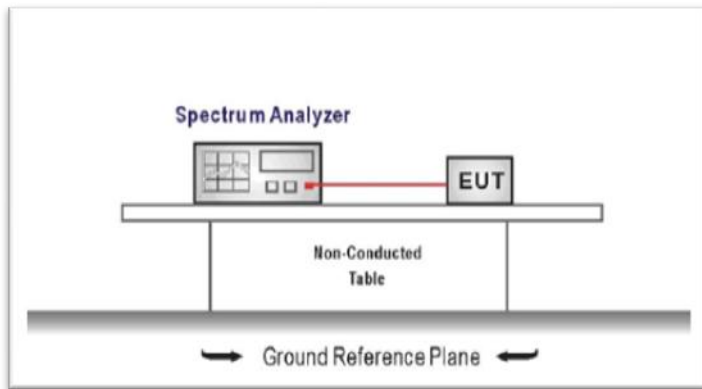
| Modulation Type: |                                                                                      | 8DPSK |
|------------------|--------------------------------------------------------------------------------------|-------|
| CH00             |    |       |
| CH39             |   |       |
| CH78             |  |       |

## 5.4. 20 dB Bandwidth

### LIMIT

N/A

### TEST CONFIGURATION



### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel  
 RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  RBW  
 Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

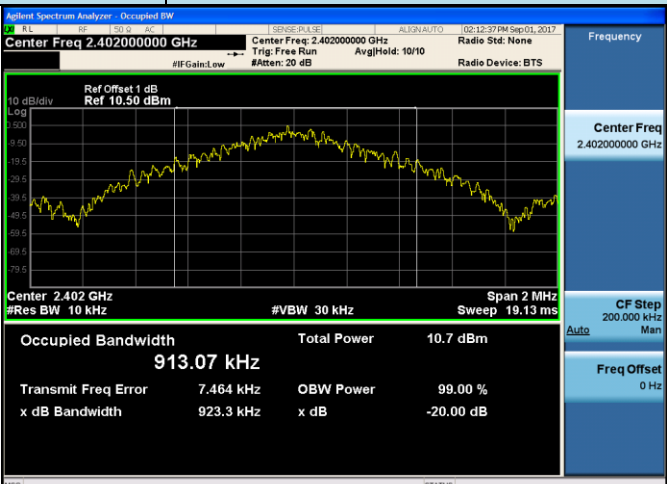
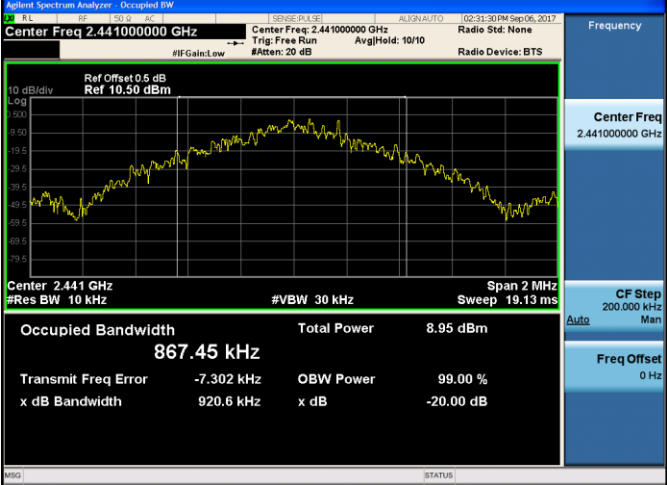
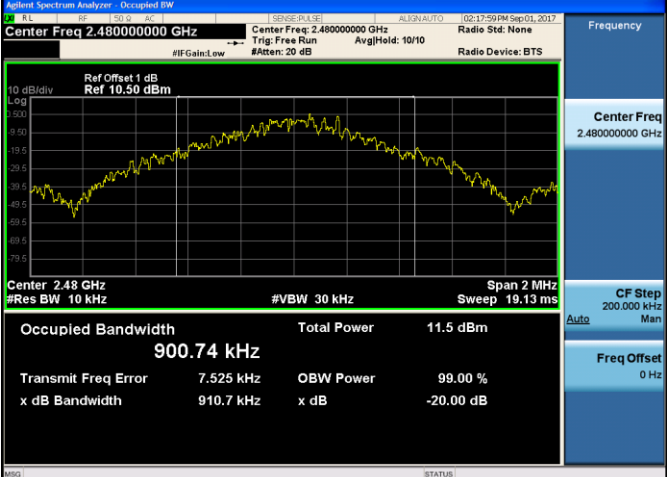
### TEST MODE:

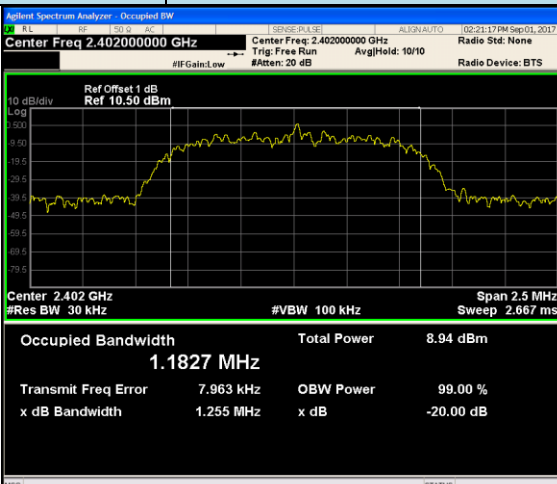
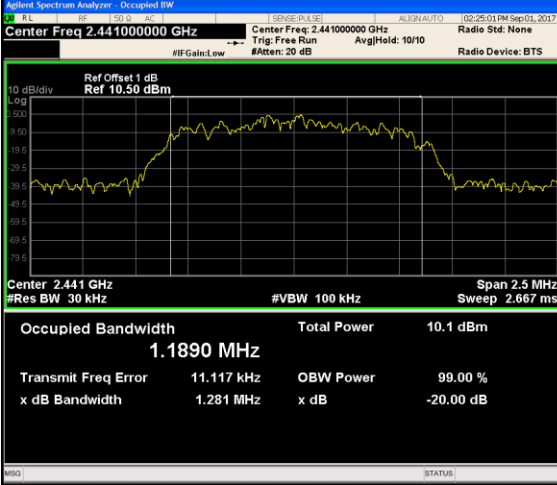
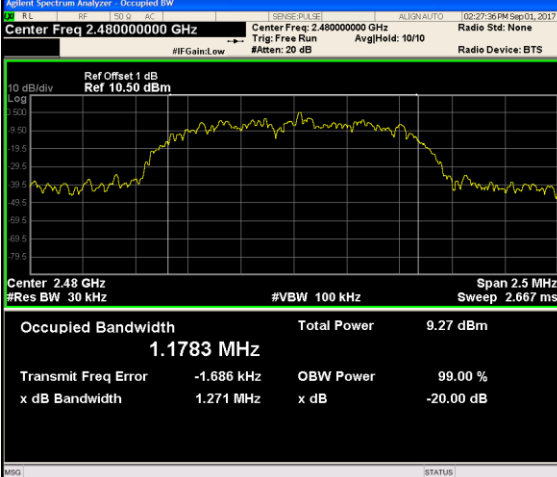
Please refer to the clause 3.3

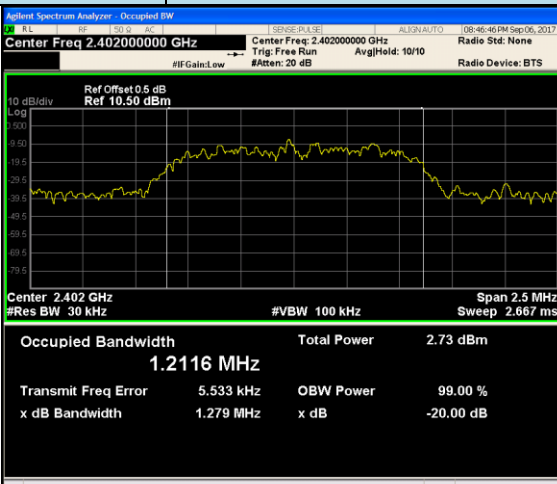
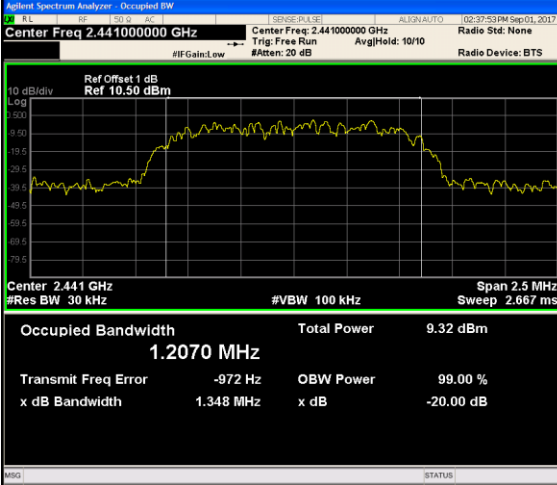
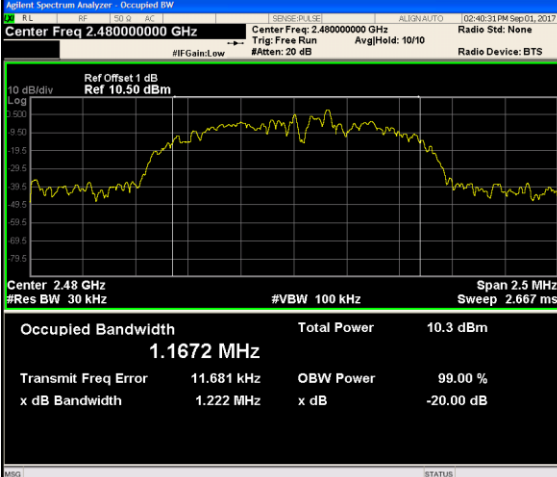
### TEST RESULTS

☒ Passed      ☐ Not Applicable

| Modulation type | Channel | 20 dB Bandwidth (MHz) | Limit (MHz) | Result |
|-----------------|---------|-----------------------|-------------|--------|
| GFSK            | 00      | 0.923                 | -           | Pass   |
|                 | 39      | 0.921                 |             |        |
|                 | 78      | 0.911                 |             |        |
| $\pi/4$ DQPSK   | 00      | 1.255                 | -           | Pass   |
|                 | 39      | 1.281                 |             |        |
|                 | 78      | 1.271                 |             |        |
| 8DPSK           | 00      | 1.279                 | -           | Pass   |
|                 | 39      | 1.348                 |             |        |
|                 | 78      | 1.222                 |             |        |

| Modulation Type: |                                                                                      | GFSK |  |
|------------------|--------------------------------------------------------------------------------------|------|--|
| CH00             |    |      |  |
| CH39             |   |      |  |
| CH78             |  |      |  |

| Modulation Type: |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | $\pi/4$ DQPSK |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| CH00             |  <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 1 dB<br/>Ref 10.50 dBm</p> <p>Center 2.402 GHz<br/>#Res BW 30 kHz</p> <p>Occupied Bandwidth 1.1827 MHz</p> <p>Total Power 8.94 dBm</p> <p>Transmit Freq Error 7.963 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.255 MHz</p> <p>x dB -20.00 dB</p>   |               |
| CH39             |  <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 1 dB<br/>Ref 10.50 dBm</p> <p>Center 2.441 GHz<br/>#Res BW 30 kHz</p> <p>Occupied Bandwidth 1.1890 MHz</p> <p>Total Power 10.1 dBm</p> <p>Transmit Freq Error 11.117 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.281 MHz</p> <p>x dB -20.00 dB</p> |               |
| CH78             |  <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 1 dB<br/>Ref 10.50 dBm</p> <p>Center 2.48 GHz<br/>#Res BW 30 kHz</p> <p>Occupied Bandwidth 1.1783 MHz</p> <p>Total Power 9.27 dBm</p> <p>Transmit Freq Error -1.686 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.271 MHz</p> <p>x dB -20.00 dB</p> |               |

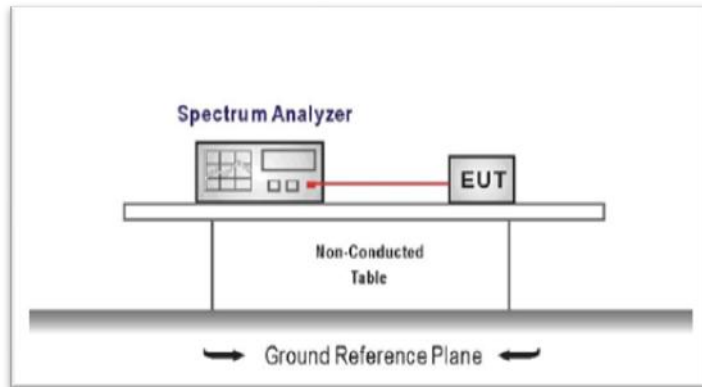
| Modulation Type: |                                                                                      | 8DPSK                                                                                                                                           |
|------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| CH00             |    | <div>Frequency</div> <div>Center Freq<br/>2.402000000 GHz</div> <div>CF Step<br/>250.000 kHz<br/>Auto Man</div> <div>Freq Offset<br/>0 Hz</div> |
| CH39             |   | <div>Frequency</div> <div>Center Freq<br/>2.441000000 GHz</div> <div>CF Step<br/>250.000 kHz<br/>Auto Man</div> <div>Freq Offset<br/>0 Hz</div> |
| CH78             |  | <div>Frequency</div> <div>Center Freq<br/>2.480000000 GHz</div> <div>CF Step<br/>250.000 kHz<br/>Auto Man</div> <div>Freq Offset<br/>0 Hz</div> |

## 5.5. Carrier Frequencies Separation

### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or the  $2/3 \times 20$  dB bandwidth of the hopping channel, whichever is greater.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels  
RBW  $\geq 1\%$  of the span, VBW  $\geq$  RBW  
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

☒ Passed ☐ Not Applicable

| Modulation type | Channel | Carrier Frequencies Separation (MHz) | Limit (MHz) * | Result |
|-----------------|---------|--------------------------------------|---------------|--------|
| GFSK            | 39      | 1.048                                | $\geq 0.923$  | Pass   |
| $\pi/4$ DQPSK   | 39      | 1.081                                | $\geq 0.854$  | Pass   |
| 8DPSK           | 39      | 1.085                                | $\geq 0.899$  | Pass   |

Note:

\*: GFSK limit = The maximum 20 dB Bandwidth for GFSK modulation on the section 5.4.

$\pi/4$ DQPSK limit =  $2/3 \times$  The maximum 20 dB Bandwidth for  $\pi/4$ DQPSK modulation on the section 5.4.

8DPSK limit =  $2/3 \times$  The maximum 20 dB Bandwidth for 8DPSK modulation on the section 5.4

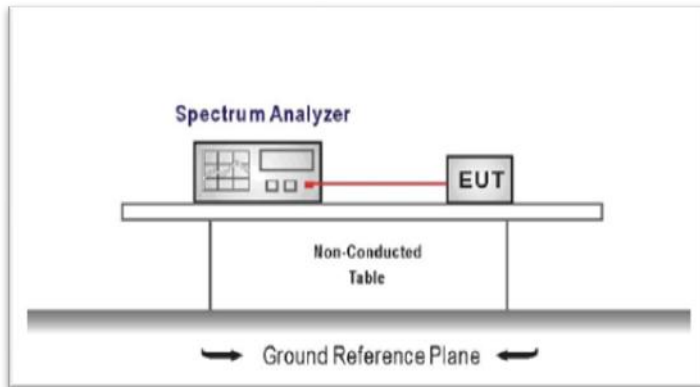
| GFSK          | <div><div><div>Agilent Spectrum Analyzer - Sweep SA</div><div><div>Marker 1 1.048250000 MHz</div><div>PRN: Wide<br/>IF Gain: Low</div><div>Trig: Free Run<br/>#Atten: 26 dB</div><div>#Avg Type: RMS<br/>Avg/Hold: 100/100</div><div>02:56:12 PM Sep 01, 2017</div><div>TRACE 1 3 4 5<br/>TYPE 0 0 0 0 0 0 0 0<br/>DET P P P P P P P P</div></div><div><div>Ref Offset 1 dB<br/>Ref 16.50 dBm</div><div>ΔMkr1 1.048 25 MHz<br/>-0.129 dB</div><div>1Δ2</div><div>Start 2.440500 GHz<br/>#Res BW 30 kHz</div><div>#VBW 100 kHz</div><div>Stop 2.442500 GHz<br/>Sweep 2.133 ms (8001 pts)</div><div><table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>1</td><td>f</td><td>(Δ)</td><td>1.048 25 MHz (Δ)</td><td>-0.129 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>f</td><td></td><td>2.440 996 50 GHz</td><td>4.189 dBm</td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div><div>MSG (STATUS)</div></div><div><div>Peak Search</div><div>Next Peak</div><div>Next Pk Right</div><div>Next Pk Left</div><div>Marker Delta</div><div>Mkr--CF</div><div>Mkr--Ref Lvl</div><div>More 1 of 2</div></div></div></div>          | MKR | MODE | TRC | SCL              | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ2 | 1 | f | (Δ) | 1.048 25 MHz (Δ) | -0.129 dB |  |  | 2 | F | 1 | f |  | 2.440 996 50 GHz | 4.189 dBm |  |  | 3 |  |  |  |  |  |  |  |  | 4 |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |  |  | 6 |  |  |  |  |  |  |  |  | 7 |  |  |  |  |  |  |  |  | 8 |  |  |  |  |  |  |  |  | 9 |  |  |  |  |  |  |  |  | 10 |  |  |  |  |  |  |  |  | 11 |  |  |  |  |  |  |  |  |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|------------------|-----------|----------------|----------------|----------------|----------------|---|----|---|---|-----|------------------|-----------|--|--|---|---|---|---|--|------------------|-----------|--|--|---|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|----|--|--|--|--|--|--|--|--|
| MKR           | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TRC | SCL  | X   | Y                | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 1             | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1   | f    | (Δ) | 1.048 25 MHz (Δ) | -0.129 dB |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 2             | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1   | f    |     | 2.440 996 50 GHz | 4.189 dBm |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 3             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 4             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 5             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 6             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 7             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 8             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 9             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 10            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 11            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| $\pi/4$ DQPSK | <div><div><div>Agilent Spectrum Analyzer - Sweep SA</div><div><div>Marker 1 1.080500000 MHz</div><div>PRN: Wide<br/>IF Gain: Low</div><div>Trig: Free Run<br/>#Atten: 26 dB</div><div>#Avg Type: RMS<br/>Avg/Hold: 100/100</div><div>03:01:55 PM Sep 01, 2017</div><div>TRACE 1 3 4 5<br/>TYPE 0 0 0 0 0 0 0 0<br/>DET P P P P P P P P</div></div><div><div>Ref Offset 1 dB<br/>Ref 16.50 dBm</div><div>ΔMkr1 1.080 50 MHz<br/>-0.333 dB</div><div>1Δ2</div><div>Start 2.440500 GHz<br/>#Res BW 30 kHz</div><div>#VBW 100 kHz</div><div>Stop 2.442500 GHz<br/>Sweep 2.133 ms (8001 pts)</div><div><table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>1</td><td>f</td><td>(Δ)</td><td>1.080 50 MHz (Δ)</td><td>-0.333 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>f</td><td></td><td>2.441 084 00 GHz</td><td>1.283 dBm</td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div><div>MSG (STATUS)</div></div><div><div>Peak Search</div><div>Next Peak</div><div>Next Pk Right</div><div>Next Pk Left</div><div>Marker Delta</div><div>Mkr--CF</div><div>Mkr--Ref Lvl</div><div>More 1 of 2</div></div></div></div>          | MKR | MODE | TRC | SCL              | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ2 | 1 | f | (Δ) | 1.080 50 MHz (Δ) | -0.333 dB |  |  | 2 | F | 1 | f |  | 2.441 084 00 GHz | 1.283 dBm |  |  | 3 |  |  |  |  |  |  |  |  | 4 |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |  |  | 6 |  |  |  |  |  |  |  |  | 7 |  |  |  |  |  |  |  |  | 8 |  |  |  |  |  |  |  |  | 9 |  |  |  |  |  |  |  |  | 10 |  |  |  |  |  |  |  |  | 11 |  |  |  |  |  |  |  |  |
| MKR           | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TRC | SCL  | X   | Y                | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 1             | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1   | f    | (Δ) | 1.080 50 MHz (Δ) | -0.333 dB |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 2             | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1   | f    |     | 2.441 084 00 GHz | 1.283 dBm |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 3             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 4             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 5             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 6             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 7             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 8             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 9             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 10            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 11            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 8DPSK         | <div><div><div>Agilent Spectrum Analyzer - Sweep SA</div><div><div>Marker 1 1.084750000 MHz</div><div>PRN: Wide<br/>IF Gain: Auto</div><div>Trig: Free Run<br/>#Atten: 26 dB</div><div>#Avg Type: RMS<br/>Avg/Hold: 100/100</div><div>03:08:47 PM Sep 01, 2017</div><div>TRACE 1 3 4 5<br/>TYPE 0 0 0 0 0 0 0 0<br/>DET P P P P P P P P</div></div><div><div>Ref Offset 1 dB<br/>Ref 16.50 dBm</div><div>ΔMkr1 1.084 75 MHz<br/>-3.111 dB</div><div>1Δ2</div><div>Start 2.440500 GHz<br/>#Res BW 30 kHz</div><div>#VBW 100 kHz</div><div>Stop 2.442500 GHz<br/>Sweep (#FFT) ~51.73 ms (8001 pts)</div><div><table><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>1</td><td>f</td><td>(Δ)</td><td>1.084 75 MHz (Δ)</td><td>-3.111 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>f</td><td></td><td>2.441 016 25 GHz</td><td>1.735 dBm</td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div><div>MSG (STATUS)</div></div><div><div>Peak Search</div><div>Next Peak</div><div>Next Pk Right</div><div>Next Pk Left</div><div>Marker Delta</div><div>Mkr--CF</div><div>Mkr--Ref Lvl</div><div>More 1 of 2</div></div></div></div> | MKR | MODE | TRC | SCL              | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ2 | 1 | f | (Δ) | 1.084 75 MHz (Δ) | -3.111 dB |  |  | 2 | F | 1 | f |  | 2.441 016 25 GHz | 1.735 dBm |  |  | 3 |  |  |  |  |  |  |  |  | 4 |  |  |  |  |  |  |  |  | 5 |  |  |  |  |  |  |  |  | 6 |  |  |  |  |  |  |  |  | 7 |  |  |  |  |  |  |  |  | 8 |  |  |  |  |  |  |  |  | 9 |  |  |  |  |  |  |  |  | 10 |  |  |  |  |  |  |  |  | 11 |  |  |  |  |  |  |  |  |
| MKR           | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TRC | SCL  | X   | Y                | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 1             | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1   | f    | (Δ) | 1.084 75 MHz (Δ) | -3.111 dB |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 2             | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1   | f    |     | 2.441 016 25 GHz | 1.735 dBm |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 3             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 4             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 5             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 6             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 7             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 8             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 9             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 10            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |
| 11            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |     |      |     |                  |           |                |                |                |                |   |    |   |   |     |                  |           |  |  |   |   |   |   |  |                  |           |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |    |  |  |  |  |  |  |  |  |

## 5.6. Hopping Channel Number

### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1): Frequency hopping systems in the 2400–2483.5 MHz band shall use at least **15** channels.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
Span = the frequency band of operation  
RBW  $\geq$  1% of the span, VBW  $\geq$  RBW  
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

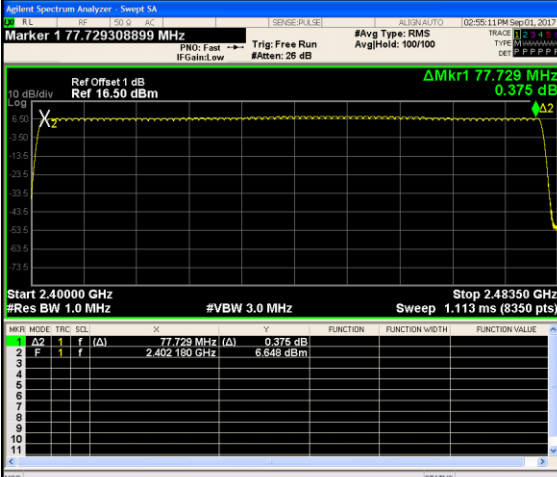
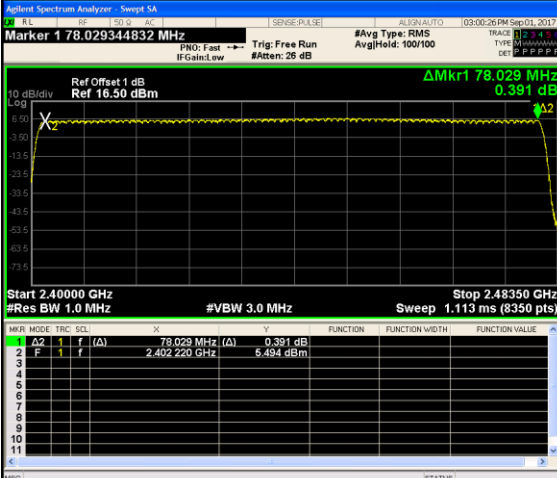
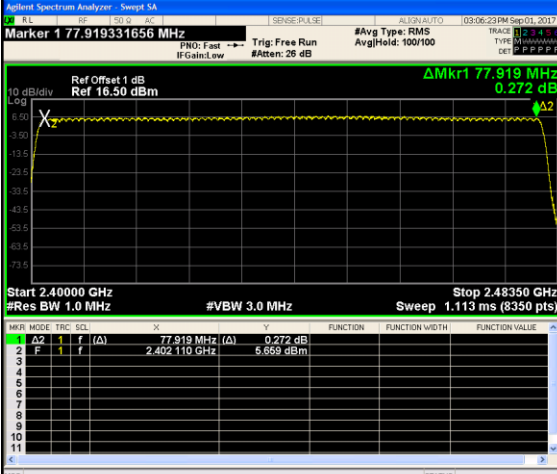
### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

☒ Passed ☐ Not Applicable

| Modulation type | Channel number | Limit        | Result |
|-----------------|----------------|--------------|--------|
| GFSK            | 79             | $\geq 15.00$ | Pass   |
| $\pi/4$ DQPSK   | 79             |              |        |
| 8DPSK           | 79             |              |        |

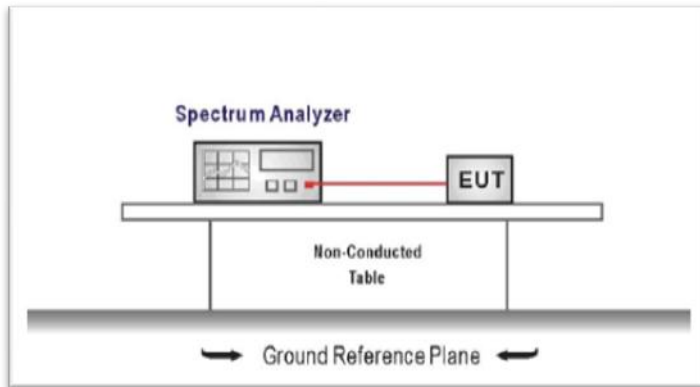
| GFSK          |  <table data-bbox="676 501 1235 658"><tr><th>PKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>f</td><td>(Δ)</td><td>77.729 MHz (Δ)</td><td></td><td></td><td>0.375 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>f</td><td></td><td>2.402180 GHz</td><td></td><td></td><td>6.648 dBm</td></tr></table>     | PKR | MODE | TRC | SCL            | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | f | (Δ) | 77.729 MHz (Δ) |  |  | 0.375 dB | 2 | F | 1 | f |  | 2.402180 GHz |  |  | 6.648 dBm | <div>Peak Search</div> <div>Next Peak</div> <div>Next Pk Right</div> <div>Next Pk Left</div> <div>Marker Delta</div> <div>Mkr--CF</div> <div>Mkr--Ref Lvl</div> <div>More</div> <div>1 of 2</div> |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|----------------|----------|----------------|----------------|----------------|----------------|---|----|---|---|-----|----------------|--|--|----------|---|---|---|---|--|--------------|--|--|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PKR           | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TRC | SCL  | X   | Y              | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 1             | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | f    | (Δ) | 77.729 MHz (Δ) |          |                | 0.375 dB       |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 2             | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | f    |     | 2.402180 GHz   |          |                | 6.648 dBm      |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| $\pi/4$ DQPSK |  <table data-bbox="676 994 1235 1151"><tr><th>PKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>f</td><td>(Δ)</td><td>78.029 MHz (Δ)</td><td></td><td></td><td>0.391 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>f</td><td></td><td>2.402220 GHz</td><td></td><td></td><td>5.494 dBm</td></tr></table>   | PKR | MODE | TRC | SCL            | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | f | (Δ) | 78.029 MHz (Δ) |  |  | 0.391 dB | 2 | F | 1 | f |  | 2.402220 GHz |  |  | 5.494 dBm | <div>Peak Search</div> <div>Next Peak</div> <div>Next Pk Right</div> <div>Next Pk Left</div> <div>Marker Delta</div> <div>Mkr--CF</div> <div>Mkr--Ref Lvl</div> <div>More</div> <div>1 of 2</div> |
| PKR           | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TRC | SCL  | X   | Y              | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 1             | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | f    | (Δ) | 78.029 MHz (Δ) |          |                | 0.391 dB       |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 2             | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | f    |     | 2.402220 GHz   |          |                | 5.494 dBm      |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 8DPSK         |  <table data-bbox="676 1487 1235 1641"><tr><th>PKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>f</td><td>(Δ)</td><td>77.919 MHz (Δ)</td><td></td><td></td><td>0.272 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>f</td><td></td><td>2.402110 GHz</td><td></td><td></td><td>5.558 dBm</td></tr></table> | PKR | MODE | TRC | SCL            | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | f | (Δ) | 77.919 MHz (Δ) |  |  | 0.272 dB | 2 | F | 1 | f |  | 2.402110 GHz |  |  | 5.558 dBm | <div>Peak Search</div> <div>Next Peak</div> <div>Next Pk Right</div> <div>Next Pk Left</div> <div>Marker Delta</div> <div>Mkr--CF</div> <div>Mkr--Ref Lvl</div> <div>More</div> <div>1 of 2</div> |
| PKR           | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TRC | SCL  | X   | Y              | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 1             | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   | f    | (Δ) | 77.919 MHz (Δ) |          |                | 0.272 dB       |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |
| 2             | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1   | f    |     | 2.402110 GHz   |          |                | 5.558 dBm      |                |                |   |    |   |   |     |                |  |  |          |   |   |   |   |  |              |  |  |           |                                                                                                                                                                                                   |

## 5.7. Dwell Time

### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
Span = zero span, centered on a hopping channel, RBW= 1 MHz, VBW ≥ RBW  
Sweep = as necessary to capture the entire dwell time per hopping channel,  
Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

### TEST MODE:

Please refer to the clause 3.3

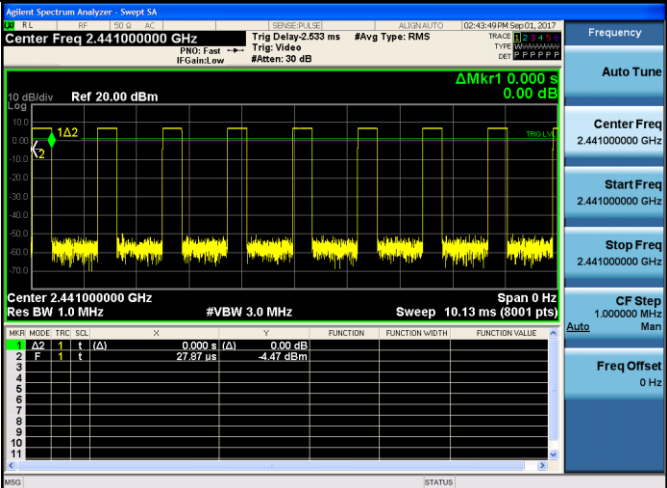
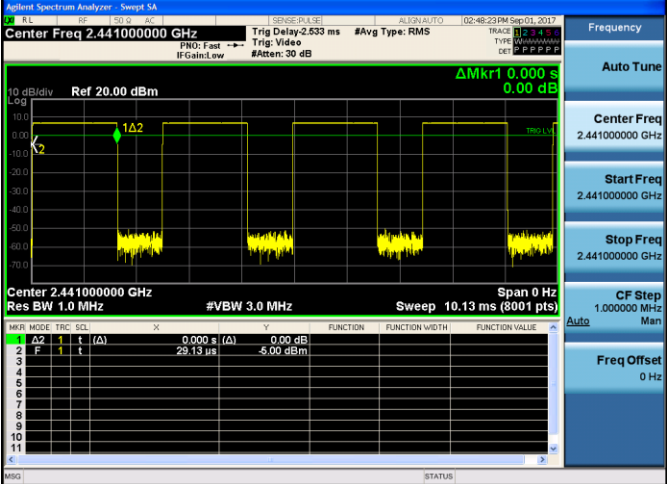
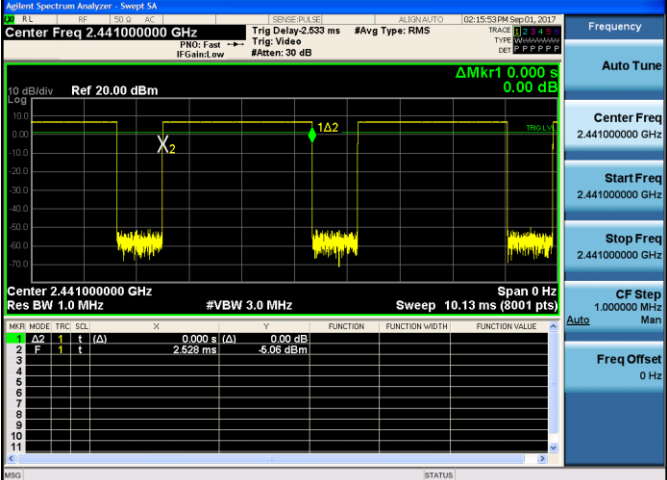
### TEST RESULTS

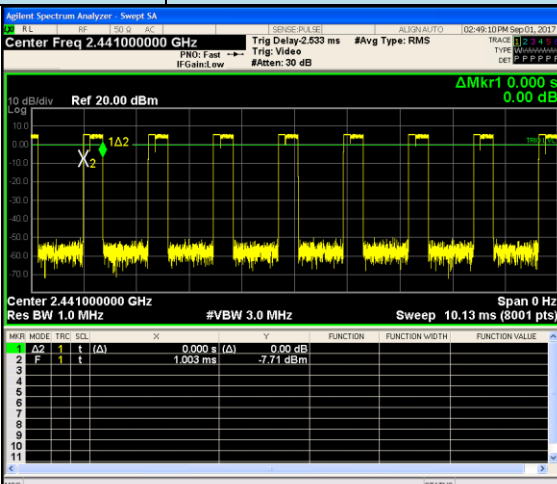
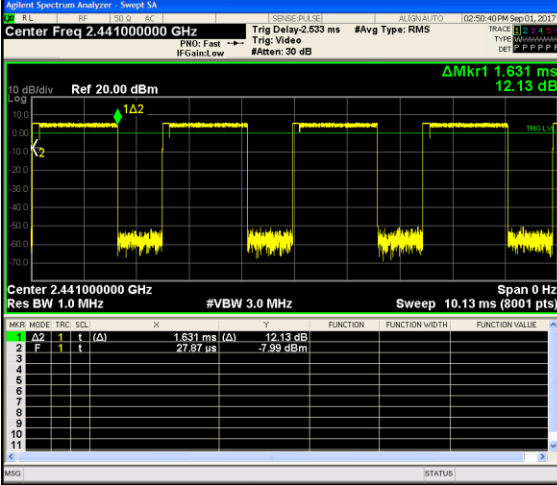
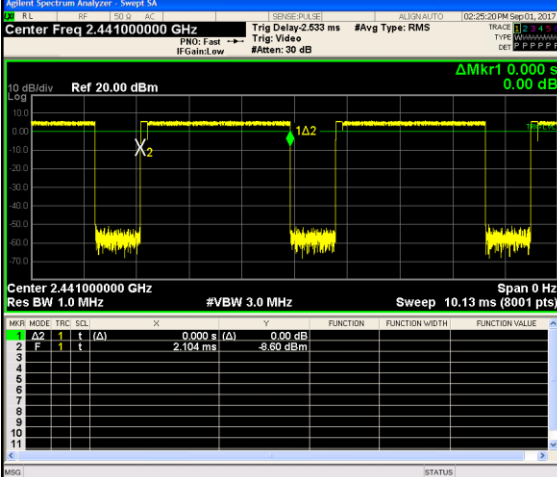
☒ Passed ☐ Not Applicable

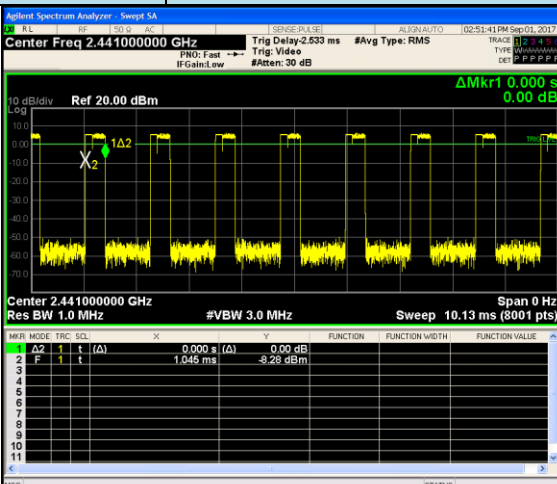
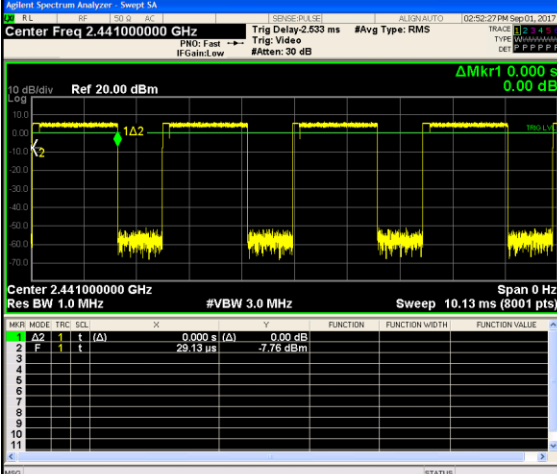
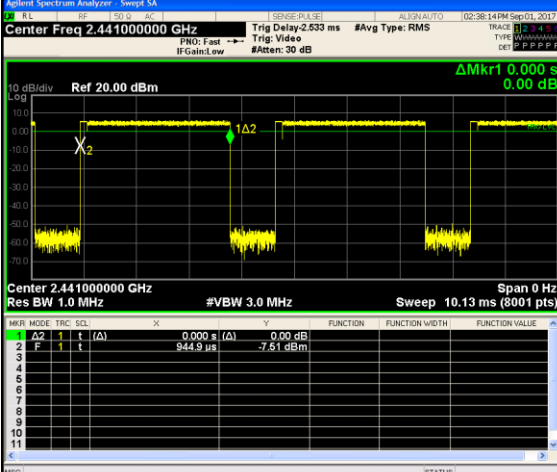
| Modulation type | Channel | Dwell time (Second) | Limit (Second) | Result |
|-----------------|---------|---------------------|----------------|--------|
| GFSK            | DH1     | 0.118               | ≤ 0.40         | Pass   |
|                 | DH3     | 0.261               |                |        |
|                 | DH5     | 0.307               |                |        |
| π/4DQPSK        | 2DH1    | 0.122               | ≤ 0.40         | Pass   |
|                 | 2DH3    | 0.261               |                |        |
|                 | 2DH5    | 0.307               |                |        |
| 8DPSK           | 3DH1    | 0.122               | ≤ 0.40         | Pass   |
|                 | 3DH3    | 0.261               |                |        |
|                 | 3DH5    | 0.307               |                |        |

Note:

1. We have tested all mode at high,middle and low channel,and recoreded worst case at middle channel.
2. Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second for DH1, 2DH1, 3DH1  
Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second for DH3, 2DH3, 3DH3  
Dwell time=Pulse time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second for DH5, 2DH5, 3DH5

| Modulation Type: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | GFSK |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-------------|-----------|----------------|----------------|----------------|----------------|---|----|---|---|-----|-------------|---------|--|--|---|---|---|---|--|----------|-----------|--|--|
| DH1              |  <table><tr><th>MNR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s (Δ)</td><td>0.00 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td></td><td>27.87 μs</td><td>-4.47 dBm</td><td></td><td></td></tr></table>   | MNR  | MODE | TRIG | SCL         | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | t | (Δ) | 0.000 s (Δ) | 0.00 dB |  |  | 2 | F | 1 | t |  | 27.87 μs | -4.47 dBm |  |  |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIG | SCL  | X    | Y           | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| 1                | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1    | t    | (Δ)  | 0.000 s (Δ) | 0.00 dB   |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | t    |      | 27.87 μs    | -4.47 dBm |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| DH3              |  <table><tr><th>MNR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s (Δ)</td><td>0.00 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td></td><td>29.13 μs</td><td>-5.00 dBm</td><td></td><td></td></tr></table>  | MNR  | MODE | TRIG | SCL         | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | t | (Δ) | 0.000 s (Δ) | 0.00 dB |  |  | 2 | F | 1 | t |  | 29.13 μs | -5.00 dBm |  |  |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIG | SCL  | X    | Y           | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| 1                | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1    | t    | (Δ)  | 0.000 s (Δ) | 0.00 dB   |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | t    |      | 29.13 μs    | -5.00 dBm |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| DH5              |  <table><tr><th>MNR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s (Δ)</td><td>0.00 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td></td><td>2.528 ms</td><td>-5.06 dBm</td><td></td><td></td></tr></table> | MNR  | MODE | TRIG | SCL         | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | t | (Δ) | 0.000 s (Δ) | 0.00 dB |  |  | 2 | F | 1 | t |  | 2.528 ms | -5.06 dBm |  |  |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIG | SCL  | X    | Y           | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| 1                | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1    | t    | (Δ)  | 0.000 s (Δ) | 0.00 dB   |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | t    |      | 2.528 ms    | -5.06 dBm |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |  |          |           |  |  |

| Modulation Type: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $\pi/4$ DQPSK |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|-----|----------|----------|----------------|----------------|----------------|----------------|---|----|---|---|-----|----------|-----|--|-----------|---|---|---|---|-----|----------|--|--|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-------------|-----------------|------------|-----------------|-----------|-----------------|---------|--------------|------|-----|-------------|------|
| 2DH1             |  <table><tr><th>MNR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s</td><td>(Δ)</td><td></td><td>0.00 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(Δ)</td><td>1.003 ms</td><td></td><td></td><td>-7.71 dBm</td></tr></table>     | MNR           | MODE | TRC | SCL      | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ2 | 1 | t | (Δ) | 0.000 s  | (Δ) |  | 0.00 dB   | 2 | F | 1 | t | (Δ) | 1.003 ms |  |  | -7.71 dBm | <table><tr><td>Frequency</td><td>Auto Tune</td></tr><tr><td>Center Freq</td><td>2.441000000 GHz</td></tr><tr><td>Start Freq</td><td>2.441000000 GHz</td></tr><tr><td>Stop Freq</td><td>2.441000000 GHz</td></tr><tr><td>CF Step</td><td>1.000000 MHz</td></tr><tr><td>Auto</td><td>Man</td></tr><tr><td>Freq Offset</td><td>0 Hz</td></tr></table> | Frequency | Auto Tune | Center Freq | 2.441000000 GHz | Start Freq | 2.441000000 GHz | Stop Freq | 2.441000000 GHz | CF Step | 1.000000 MHz | Auto | Man | Freq Offset | 0 Hz |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TRC           | SCL  | X   | Y        | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 1                | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1             | t    | (Δ) | 0.000 s  | (Δ)      |                | 0.00 dB        |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1             | t    | (Δ) | 1.003 ms |          |                | -7.71 dBm      |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Frequency        | Auto Tune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Center Freq      | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Start Freq       | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Stop Freq        | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| CF Step          | 1.000000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Auto             | Man                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Freq Offset      | 0 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2DH3             |  <table><tr><th>MNR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>1</td><td>t</td><td>(Δ)</td><td>1.631 ms</td><td>(Δ)</td><td></td><td>-12.13 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(Δ)</td><td>27.87 μs</td><td></td><td></td><td>-7.92 dBm</td></tr></table> | MNR           | MODE | TRC | SCL      | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ2 | 1 | t | (Δ) | 1.631 ms | (Δ) |  | -12.13 dB | 2 | F | 1 | t | (Δ) | 27.87 μs |  |  | -7.92 dBm | <table><tr><td>Frequency</td><td>Auto Tune</td></tr><tr><td>Center Freq</td><td>2.441000000 GHz</td></tr><tr><td>Start Freq</td><td>2.441000000 GHz</td></tr><tr><td>Stop Freq</td><td>2.441000000 GHz</td></tr><tr><td>CF Step</td><td>1.000000 MHz</td></tr><tr><td>Auto</td><td>Man</td></tr><tr><td>Freq Offset</td><td>0 Hz</td></tr></table> | Frequency | Auto Tune | Center Freq | 2.441000000 GHz | Start Freq | 2.441000000 GHz | Stop Freq | 2.441000000 GHz | CF Step | 1.000000 MHz | Auto | Man | Freq Offset | 0 Hz |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TRC           | SCL  | X   | Y        | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 1                | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1             | t    | (Δ) | 1.631 ms | (Δ)      |                | -12.13 dB      |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1             | t    | (Δ) | 27.87 μs |          |                | -7.92 dBm      |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Frequency        | Auto Tune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Center Freq      | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Start Freq       | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Stop Freq        | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| CF Step          | 1.000000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Auto             | Man                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Freq Offset      | 0 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2DH5             |  <table><tr><th>MNR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>Δ2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s</td><td>(Δ)</td><td></td><td>0.00 dB</td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(Δ)</td><td>2.104 ms</td><td></td><td></td><td>-9.60 dBm</td></tr></table>   | MNR           | MODE | TRC | SCL      | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ2 | 1 | t | (Δ) | 0.000 s  | (Δ) |  | 0.00 dB   | 2 | F | 1 | t | (Δ) | 2.104 ms |  |  | -9.60 dBm | <table><tr><td>Frequency</td><td>Auto Tune</td></tr><tr><td>Center Freq</td><td>2.441000000 GHz</td></tr><tr><td>Start Freq</td><td>2.441000000 GHz</td></tr><tr><td>Stop Freq</td><td>2.441000000 GHz</td></tr><tr><td>CF Step</td><td>1.000000 MHz</td></tr><tr><td>Auto</td><td>Man</td></tr><tr><td>Freq Offset</td><td>0 Hz</td></tr></table> | Frequency | Auto Tune | Center Freq | 2.441000000 GHz | Start Freq | 2.441000000 GHz | Stop Freq | 2.441000000 GHz | CF Step | 1.000000 MHz | Auto | Man | Freq Offset | 0 Hz |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TRC           | SCL  | X   | Y        | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 1                | Δ2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1             | t    | (Δ) | 0.000 s  | (Δ)      |                | 0.00 dB        |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1             | t    | (Δ) | 2.104 ms |          |                | -9.60 dBm      |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Frequency        | Auto Tune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Center Freq      | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Start Freq       | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Stop Freq        | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| CF Step          | 1.000000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Auto             | Man                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Freq Offset      | 0 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |      |     |          |          |                |                |                |                |   |    |   |   |     |          |     |  |           |   |   |   |   |     |          |  |  |           |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |

| Modulation Type: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 8DPSK |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|------|-------------|-----------|----------------|----------------|----------------|----------------|---|----|---|---|-----|-------------|---------|--|--|---|---|---|---|-----|----------|-----------|--|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-------------|-----------------|------------|-----------------|-----------|-----------------|---------|--------------|------|-----|-------------|------|
| 3DH1             |  <table><tr><th>MNR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s (Δ)</td><td>0.00 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(Δ)</td><td>1.045 ms</td><td>-9.28 dBm</td><td></td><td></td></tr></table>   | MNR   | MODE | TRIG | SCL         | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | t | (Δ) | 0.000 s (Δ) | 0.00 dB |  |  | 2 | F | 1 | t | (Δ) | 1.045 ms | -9.28 dBm |  |  | <table><tr><td>Frequency</td><td>Auto Tune</td></tr><tr><td>Center Freq</td><td>2.441000000 GHz</td></tr><tr><td>Start Freq</td><td>2.441000000 GHz</td></tr><tr><td>Stop Freq</td><td>2.441000000 GHz</td></tr><tr><td>CF Step</td><td>1.000000 MHz</td></tr><tr><td>Auto</td><td>Man</td></tr><tr><td>Freq Offset</td><td>0 Hz</td></tr></table> | Frequency | Auto Tune | Center Freq | 2.441000000 GHz | Start Freq | 2.441000000 GHz | Stop Freq | 2.441000000 GHz | CF Step | 1.000000 MHz | Auto | Man | Freq Offset | 0 Hz |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TRIG  | SCL  | X    | Y           | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 1                | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1     | t    | (Δ)  | 0.000 s (Δ) | 0.00 dB   |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1     | t    | (Δ)  | 1.045 ms    | -9.28 dBm |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Frequency        | Auto Tune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Center Freq      | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Start Freq       | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Stop Freq        | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| CF Step          | 1.000000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Auto             | Man                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Freq Offset      | 0 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 3DH3             |  <table><tr><th>MNR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s (Δ)</td><td>0.00 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(Δ)</td><td>29.12 μs</td><td>-7.76 dBm</td><td></td><td></td></tr></table>  | MNR   | MODE | TRIG | SCL         | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | t | (Δ) | 0.000 s (Δ) | 0.00 dB |  |  | 2 | F | 1 | t | (Δ) | 29.12 μs | -7.76 dBm |  |  | <table><tr><td>Frequency</td><td>Auto Tune</td></tr><tr><td>Center Freq</td><td>2.441000000 GHz</td></tr><tr><td>Start Freq</td><td>2.441000000 GHz</td></tr><tr><td>Stop Freq</td><td>2.441000000 GHz</td></tr><tr><td>CF Step</td><td>1.000000 MHz</td></tr><tr><td>Auto</td><td>Man</td></tr><tr><td>Freq Offset</td><td>0 Hz</td></tr></table> | Frequency | Auto Tune | Center Freq | 2.441000000 GHz | Start Freq | 2.441000000 GHz | Stop Freq | 2.441000000 GHz | CF Step | 1.000000 MHz | Auto | Man | Freq Offset | 0 Hz |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TRIG  | SCL  | X    | Y           | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 1                | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1     | t    | (Δ)  | 0.000 s (Δ) | 0.00 dB   |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1     | t    | (Δ)  | 29.12 μs    | -7.76 dBm |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Frequency        | Auto Tune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Center Freq      | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Start Freq       | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Stop Freq        | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| CF Step          | 1.000000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Auto             | Man                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Freq Offset      | 0 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 3DH5             |  <table><tr><th>MNR</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(Δ)</td><td>0.000 s (Δ)</td><td>0.00 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(Δ)</td><td>944.9 μs</td><td>-7.51 dBm</td><td></td><td></td></tr></table> | MNR   | MODE | TRIG | SCL         | X         | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | A2 | 1 | t | (Δ) | 0.000 s (Δ) | 0.00 dB |  |  | 2 | F | 1 | t | (Δ) | 944.9 μs | -7.51 dBm |  |  | <table><tr><td>Frequency</td><td>Auto Tune</td></tr><tr><td>Center Freq</td><td>2.441000000 GHz</td></tr><tr><td>Start Freq</td><td>2.441000000 GHz</td></tr><tr><td>Stop Freq</td><td>2.441000000 GHz</td></tr><tr><td>CF Step</td><td>1.000000 MHz</td></tr><tr><td>Auto</td><td>Man</td></tr><tr><td>Freq Offset</td><td>0 Hz</td></tr></table> | Frequency | Auto Tune | Center Freq | 2.441000000 GHz | Start Freq | 2.441000000 GHz | Stop Freq | 2.441000000 GHz | CF Step | 1.000000 MHz | Auto | Man | Freq Offset | 0 Hz |
| MNR              | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | TRIG  | SCL  | X    | Y           | FUNCTION  | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 1                | A2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1     | t    | (Δ)  | 0.000 s (Δ) | 0.00 dB   |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| 2                | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1     | t    | (Δ)  | 944.9 μs    | -7.51 dBm |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Frequency        | Auto Tune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Center Freq      | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Start Freq       | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Stop Freq        | 2.441000000 GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| CF Step          | 1.000000 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Auto             | Man                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |
| Freq Offset      | 0 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |      |      |             |           |                |                |                |                |   |    |   |   |     |             |         |  |  |   |   |   |   |     |          |           |  |  |                                                                                                                                                                                                                                                                                                                                                    |           |           |             |                 |            |                 |           |                 |         |              |      |     |             |      |

## 5.8. Pseudorandom Frequency Hopping Sequence

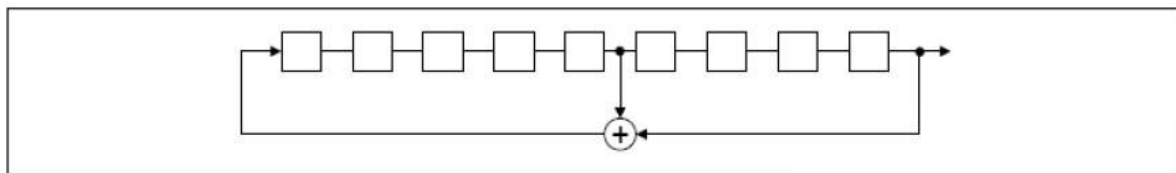
### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 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 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### TEST RESULTS

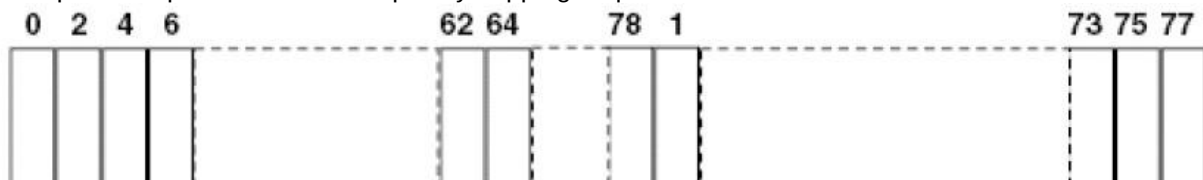
The pseudorandom frequency hopping sequence may be generated in a nine-stage shift register whose 5<sup>th</sup> and 9<sup>th</sup> stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:  $2^9 - 1 = 511$  bits
- Longest sequence of zeros: 8 (non-inverted signal)



*Linear Feedback Shift Register for Generation of the PRBS sequence*

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

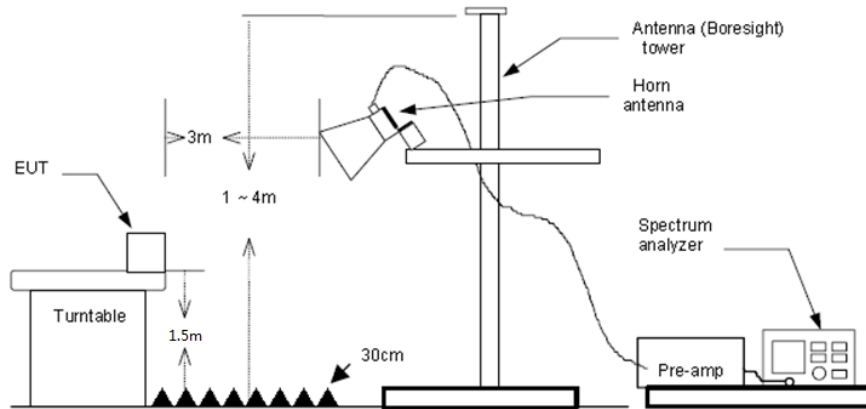
## 5.9. Restricted band (radiated)

### LIMIT

#### **FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:  
RBW=1 MHz, VBW=3 MHz Peak detector for Peak value  
RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

### TEST MODE:

Please refer to the clause 3.3

### TEST RESULTS

☒ Passed      ☐ Not Applicable

Note:

- 1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor
- 2) Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report.
- 3) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

| CH00            |                   |                       |                 |                    |                |                     |                 |              |            |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|------------|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization | Test value |
| 2310.00         | 33.54             | 28.05                 | 6.62            | 37.65              | 30.56          | 74.00               | -43.44          | Vertical     | Peak       |
| 2390.00         | 33.96             | 27.65                 | 6.75            | 37.87              | 30.49          | 74.00               | -43.51          | Vertical     | Peak       |
| 2310.00         | 32.78             | 28.05                 | 6.62            | 37.65              | 29.80          | 74.00               | -44.20          | Horizontal   | Peak       |
| 2390.00         | 32.63             | 27.65                 | 6.75            | 37.87              | 29.16          | 74.00               | -44.84          | Horizontal   | Peak       |
| 2310.00         | 21.87             | 28.05                 | 6.62            | 37.65              | 18.89          | 54.00               | -35.11          | Vertical     | Average    |
| 2390.00         | 21.65             | 27.65                 | 6.75            | 37.87              | 18.18          | 54.00               | -35.82          | Vertical     | Average    |
| 2310.00         | 21.95             | 28.05                 | 6.62            | 37.65              | 18.97          | 54.00               | -35.03          | Horizontal   | Average    |
| 2390.00         | 22.15             | 27.65                 | 6.75            | 37.87              | 18.68          | 54.00               | -35.32          | Horizontal   | Average    |

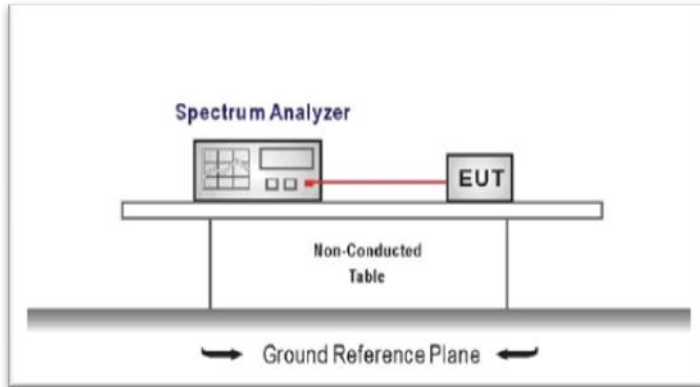
| CH78            |                   |                       |                 |                    |                |                     |                 |              |            |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|------------|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization | Test value |
| 2483.50         | 55.25             | 27.26                 | 6.83            | 37.87              | 51.47          | 74.00               | -22.53          | Vertical     | Peak       |
| 2500.00         | 33.06             | 27.20                 | 6.84            | 37.87              | 29.23          | 74.00               | -44.77          | Vertical     | Peak       |
| 2483.50         | 56.41             | 27.26                 | 6.83            | 37.87              | 52.63          | 74.00               | -21.37          | Horizontal   | Peak       |
| 2500.00         | 32.66             | 27.20                 | 6.84            | 37.87              | 28.83          | 74.00               | -45.17          | Horizontal   | Peak       |
| 2483.50         | 28.42             | 27.26                 | 6.83            | 37.87              | 24.64          | 54.00               | -29.36          | Vertical     | Average    |
| 2500.00         | 20.72             | 27.20                 | 6.84            | 37.87              | 16.89          | 54.00               | -37.11          | Vertical     | Average    |
| 2483.50         | 29.81             | 27.26                 | 6.83            | 37.87              | 26.03          | 54.00               | -27.97          | Horizontal   | Average    |
| 2500.00         | 20.69             | 27.20                 | 6.84            | 37.87              | 16.86          | 54.00               | -37.14          | Horizontal   | Average    |

## 5.10. Band edge and Spurious Emissions (conducted)

### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

### TEST CONFIGURATION



### TEST PROCEDURE

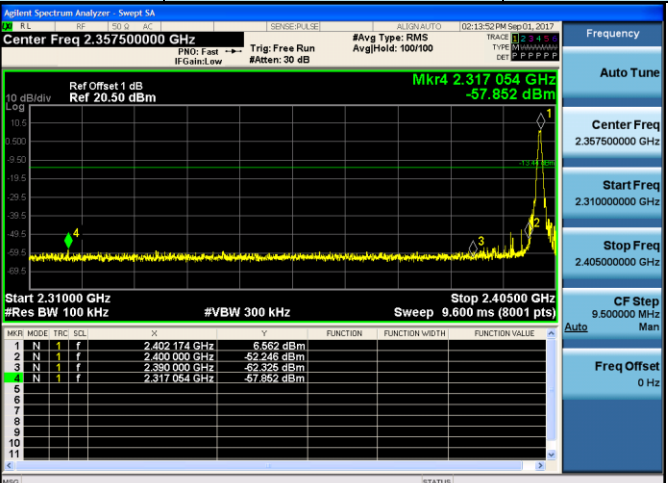
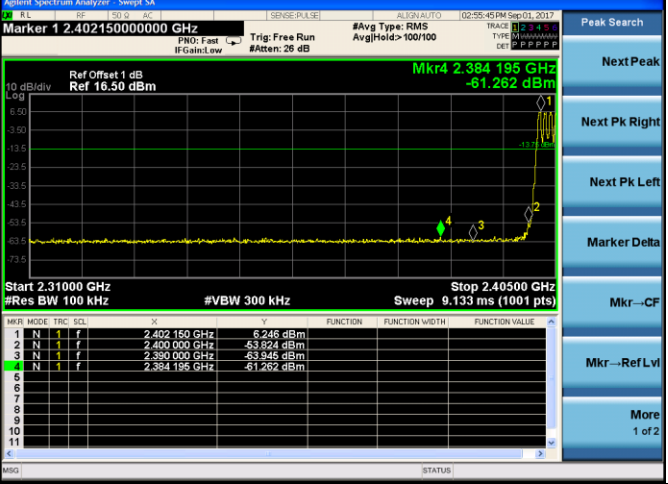
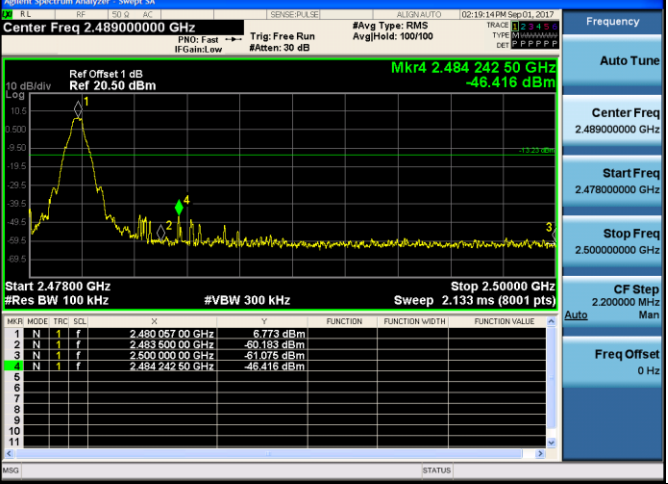
1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:  
RBW = 100 kHz, VBW  $\geq$  RBW  
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

### TEST MODE:

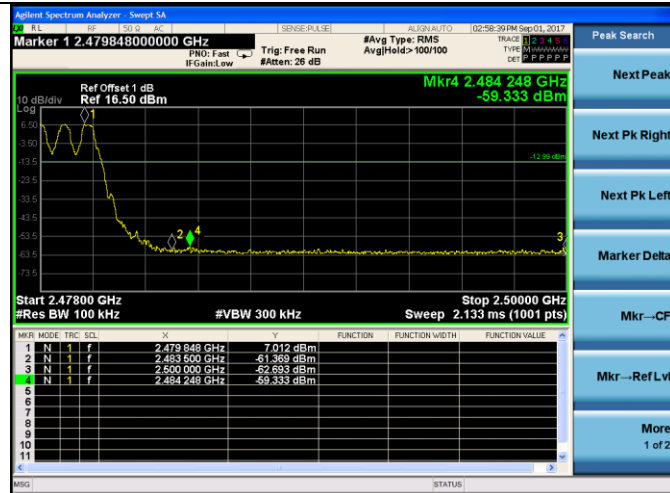
Please refer to the clause 3.3

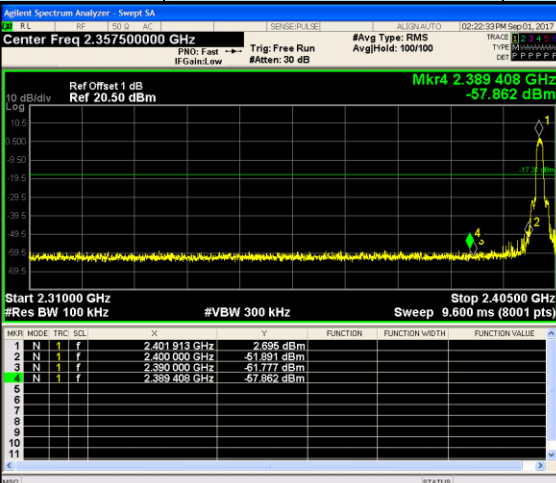
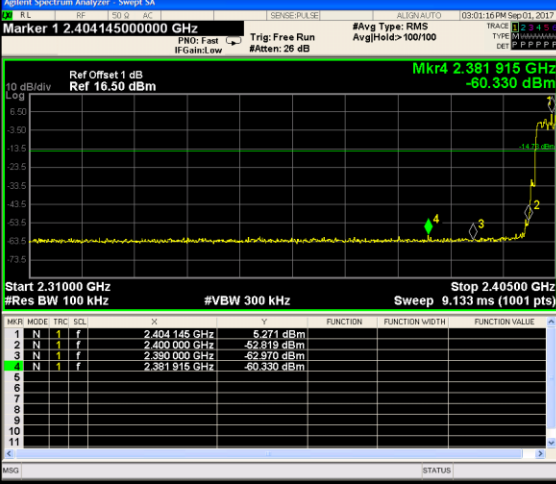
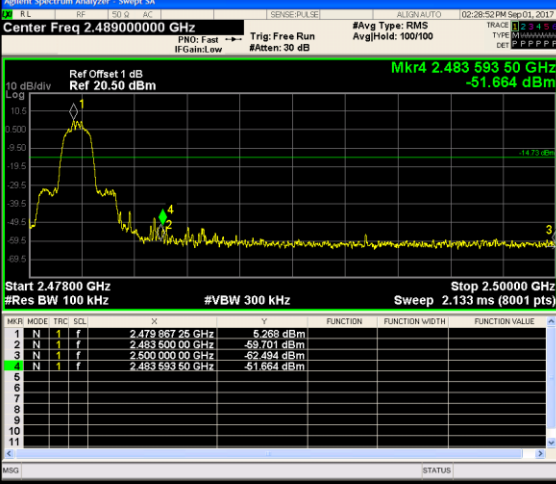
### TEST RESULTS

☒ Passed      ☐ Not Applicable

| Test Item:              | Band edge                                                                            | Modulation type: | GFSK |
|-------------------------|--------------------------------------------------------------------------------------|------------------|------|
| CH00<br>No hopping mode |    |                  |      |
| CH00<br>Hopping mode    |   |                  |      |
| CH78<br>No hopping mode |  |                  |      |

CH78  
Hopping mode



| Test Item:              | Band edge                                                                            | Modulation type: | $\pi/4$ DQPSK |
|-------------------------|--------------------------------------------------------------------------------------|------------------|---------------|
| CH00<br>No hopping mode |    |                  |               |
| CH00<br>Hopping mode    |   |                  |               |
| CH78<br>No hopping mode |  |                  |               |