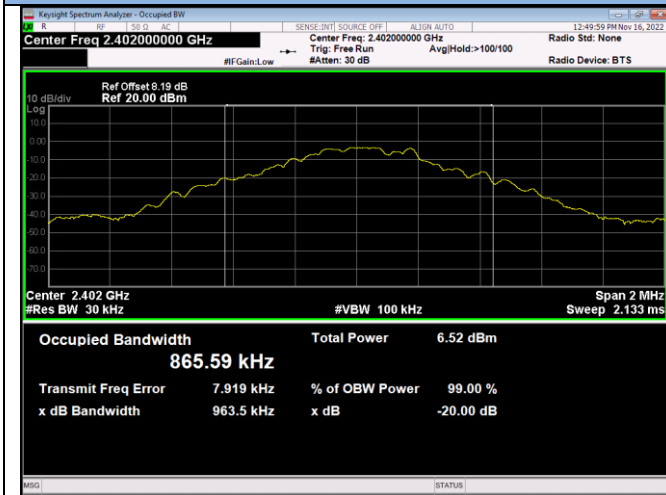
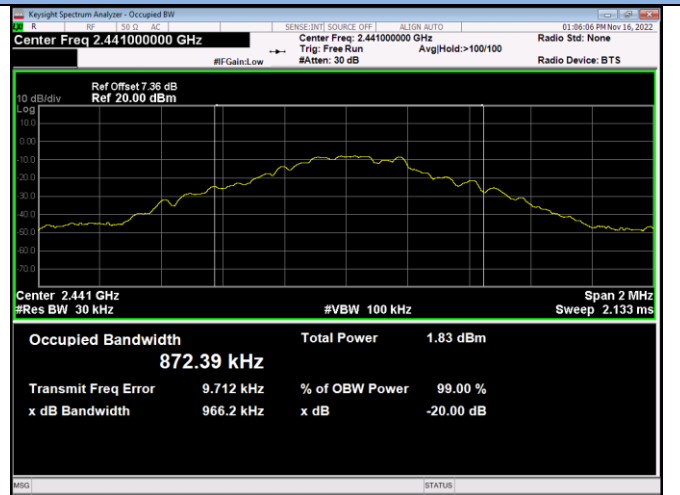


| Modulation     | Channel | Frequency<br>(MHz) | 20dB Measurement<br>(MHz) | Limit<br>(MHz) | Remark            |
|----------------|---------|--------------------|---------------------------|----------------|-------------------|
| GFSK           | Low     | 2402               | 0.963                     | N/A            | Reporting<br>only |
|                | Mid     | 2441               | 0.966                     | N/A            |                   |
|                | High    | 2480               | 0.966                     | N/A            |                   |
| $\pi/4$ -DQPSK | Low     | 2402               | 1.281                     | N/A            |                   |
|                | Mid     | 2441               | 1.263                     | N/A            |                   |
|                | High    | 2480               | 1.260                     | N/A            |                   |
| 8DPSK          | Low     | 2402               | 1.296                     | N/A            |                   |
|                | Mid     | 2441               | 1.265                     | N/A            |                   |
|                | High    | 2480               | 1.265                     | N/A            |                   |

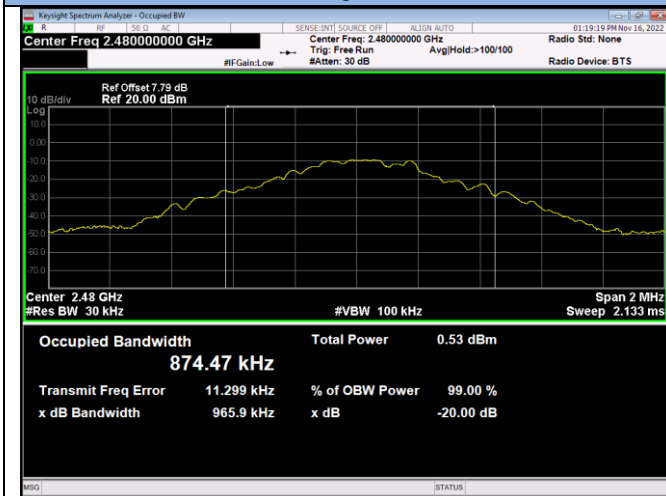
### GFSK / Low Channel



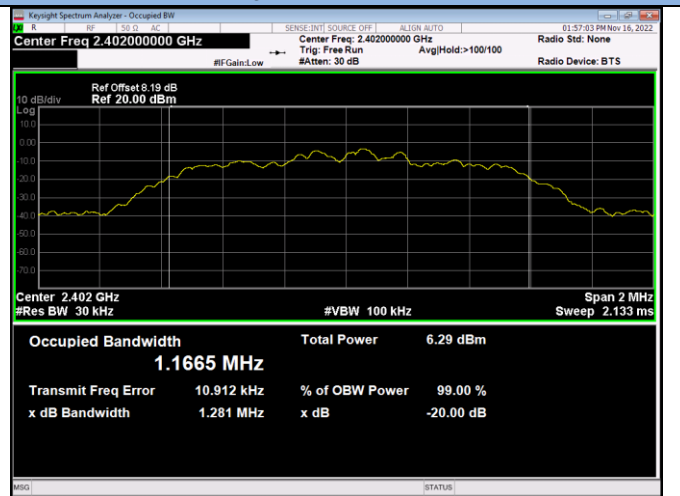
### GFSK / Mid Channel



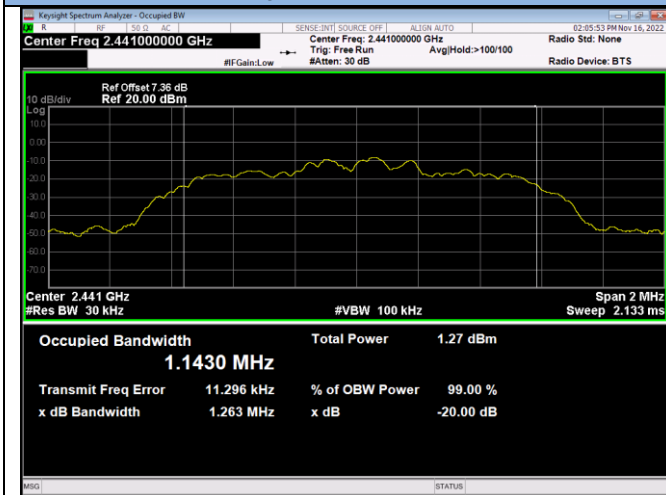
### GFSK / High Channel



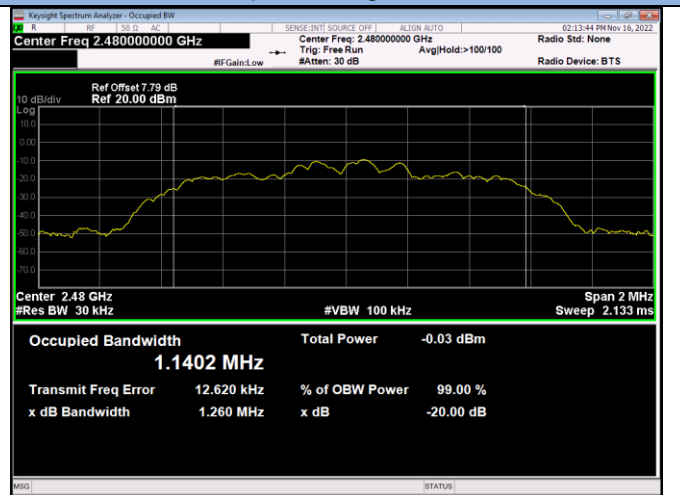
### $\pi/4$ -DQPSK / Low Channel



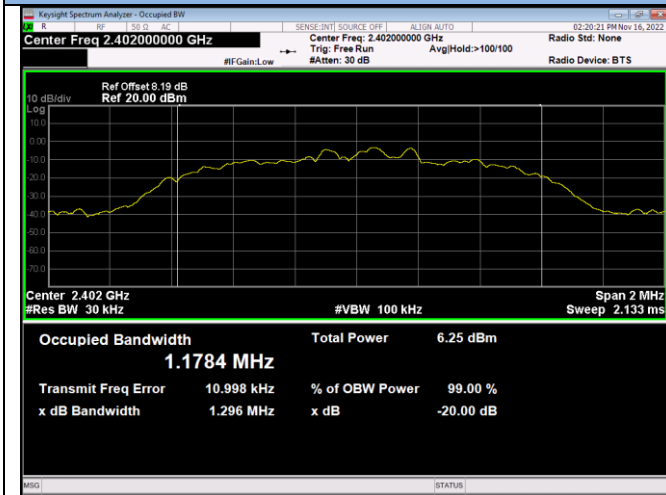
### $\pi/4$ -DQPSK / Mid Channel



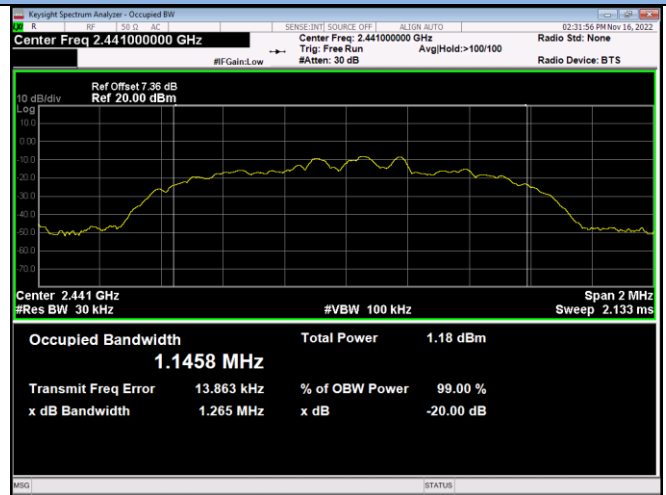
### $\pi/4$ -DQPSK / High Channel



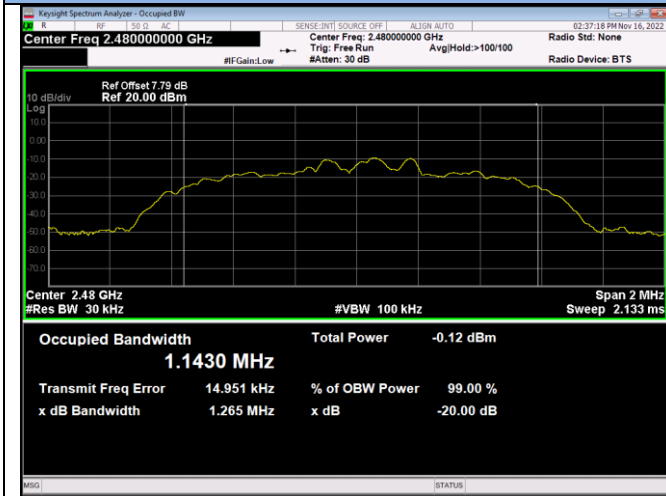
### 8DPSK / Low Channel



### 8DPSK / Mid Channel



### 8DPSK / High Channel



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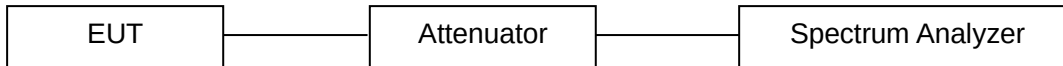
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### 13.5 Hopping Channel Number

#### LIMIT

Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

#### BLOCK DIAGRAM OF TEST SETUP



#### TEST PROCEDURES

- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously.
- Enable the EUT hopping function.
- Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.3.

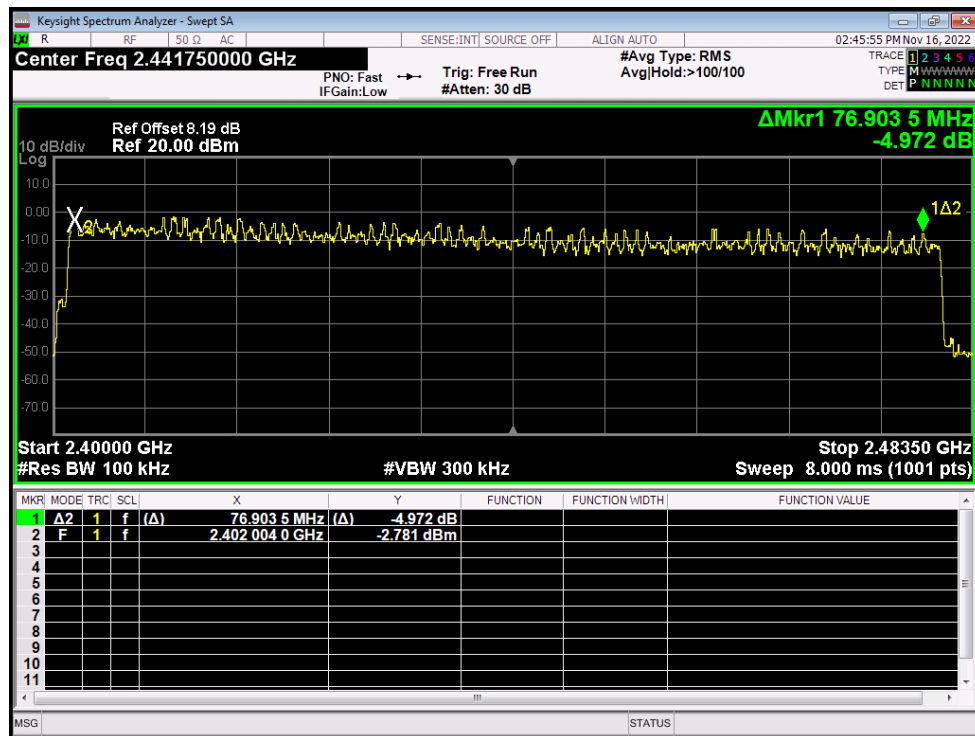
#### TEST RESULTS

PASS

Please refer to the following table.

| Modulation     | Number of Hopping Channels Measurement | Limit     | Test Result |
|----------------|----------------------------------------|-----------|-------------|
| GFSK           | 79                                     | $\geq 15$ | PASS        |
| $\pi/4$ -DQPSK | 79                                     | $\geq 15$ | PASS        |
| 8DPSK          | 79                                     | $\geq 15$ | PASS        |

The worst case: 8DPSK

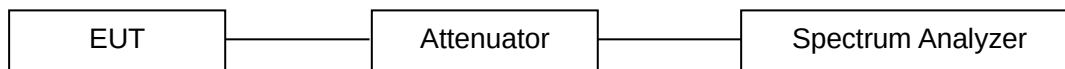


### 13.6 Time of Occupancy (Dwell Time)

#### LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

#### BLOCK DIAGRAM OF TEST SETUP



#### TEST PROCEDURES

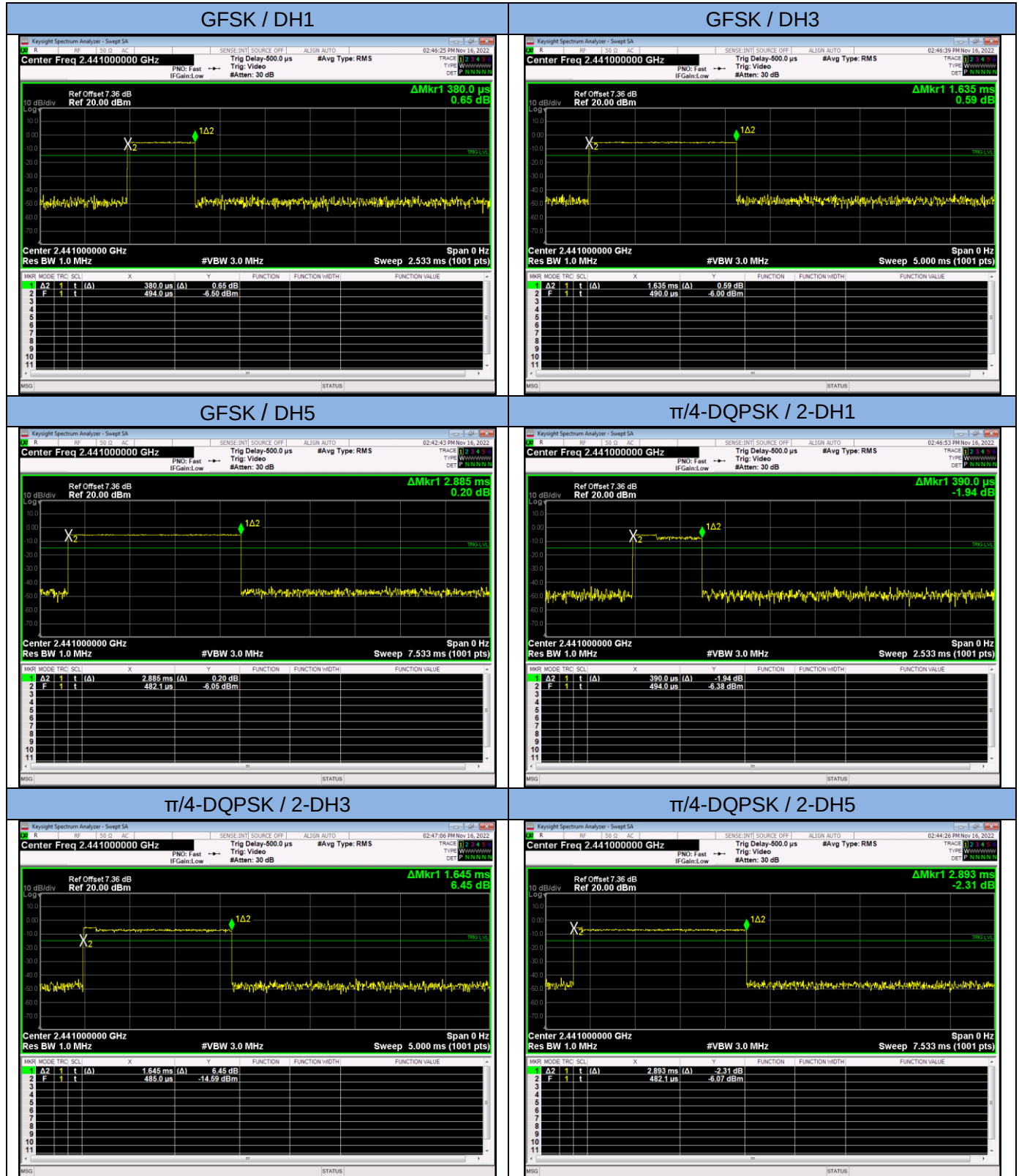
- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously.
- Enable the EUT hopping function.
- Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.4.

#### TEST RESULTS

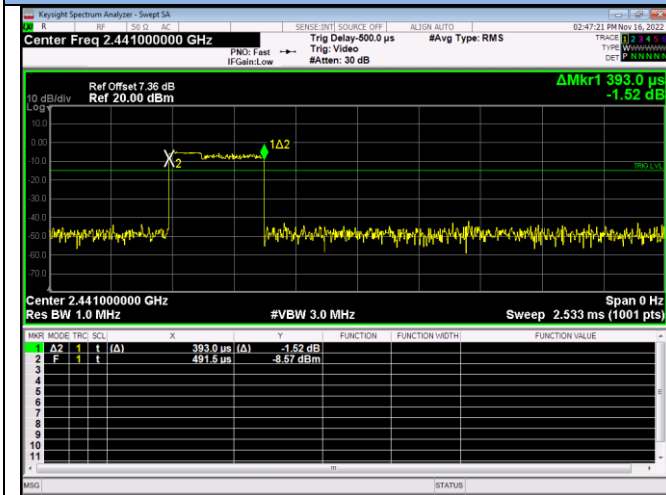
PASS

Please refer to the following table.

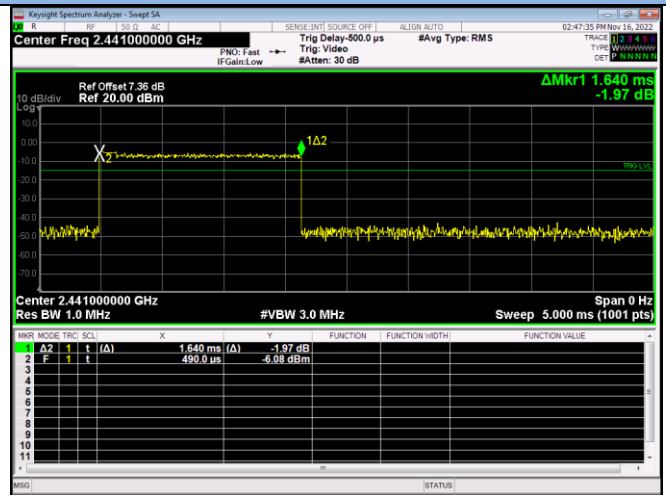
| Modulation     | Packet | Frequency<br>(MHz) | Dwell Time Measurement<br>(msec) |                                                           |        | Limit<br>(msec) | Test<br>Result |
|----------------|--------|--------------------|----------------------------------|-----------------------------------------------------------|--------|-----------------|----------------|
| GFSK           | DH1    | 2441               | 0.380                            | $(\text{ms}) \times (1600 / (2 \times 79)) \times 31.6 =$ | 121.60 | 400             | Pass           |
|                | DH3    | 2441               | 1.635                            | $(\text{ms}) \times (1600 / (4 \times 79)) \times 31.6 =$ | 261.60 | 400             | Pass           |
|                | DH5    | 2441               | 2.885                            | $(\text{ms}) \times (1600 / (6 \times 79)) \times 31.6 =$ | 307.73 | 400             | Pass           |
| $\pi/4$ -DQPSK | 2-DH1  | 2441               | 0.390                            | $(\text{ms}) \times (1600 / (2 \times 79)) \times 31.6 =$ | 124.80 | 400             | Pass           |
|                | 2-DH3  | 2441               | 1.645                            | $(\text{ms}) \times (1600 / (4 \times 79)) \times 31.6 =$ | 263.20 | 400             | Pass           |
|                | 2-DH5  | 2441               | 2.893                            | $(\text{ms}) \times (1600 / (6 \times 79)) \times 31.6 =$ | 308.59 | 400             | Pass           |
| 8DPSK          | 3-DH1  | 2441               | 0.393                            | $(\text{ms}) \times (1600 / (2 \times 79)) \times 31.6 =$ | 125.76 | 400             | Pass           |
|                | 3-DH3  | 2441               | 1.640                            | $(\text{ms}) \times (1600 / (4 \times 79)) \times 31.6 =$ | 262.40 | 400             | Pass           |
|                | 3-DH5  | 2441               | 2.893                            | $(\text{ms}) \times (1600 / (6 \times 79)) \times 31.6 =$ | 308.59 | 400             | Pass           |



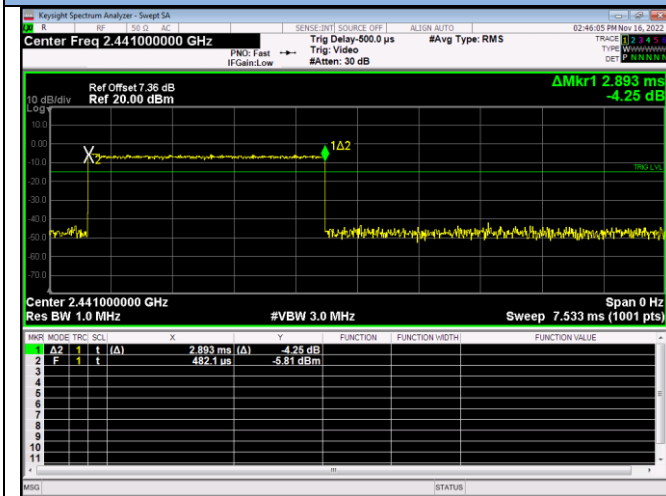
### 8DPSK / 3-DH1



### 8DPSK / 3-DH3



### 8DPSK / 3-DH5



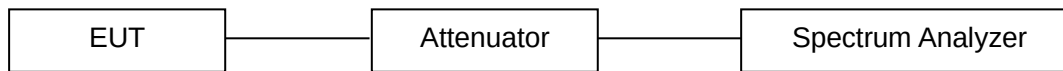
Blank

### 13.7 Maximum Peak Output Power

#### LIMIT

The maximum peak conducted output power of the intentional radiator shall not exceed the following: 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.

#### BLOCK DIAGRAM OF TEST SETUP



#### TEST PROCEDURES

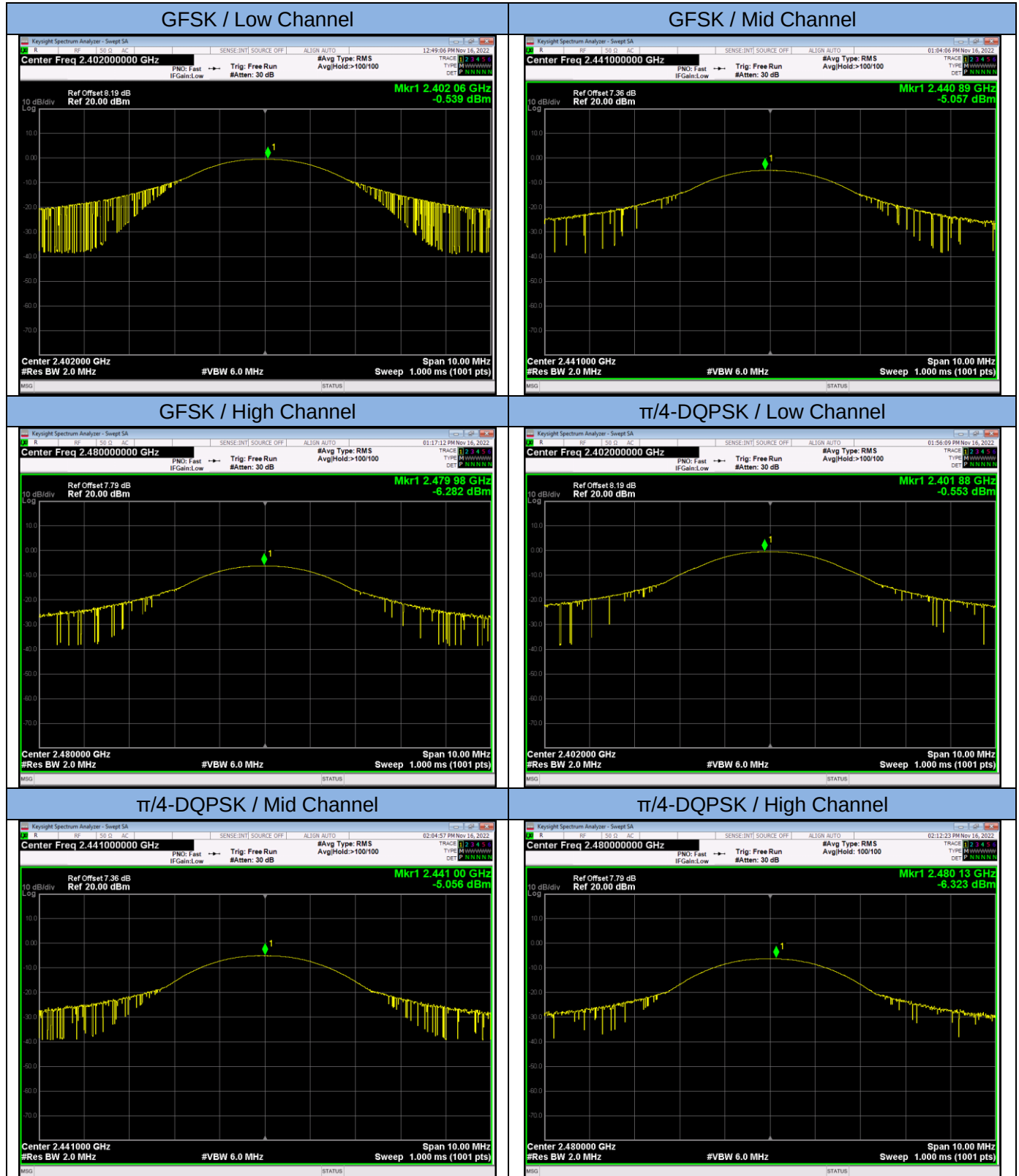
- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously.
- Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.5.

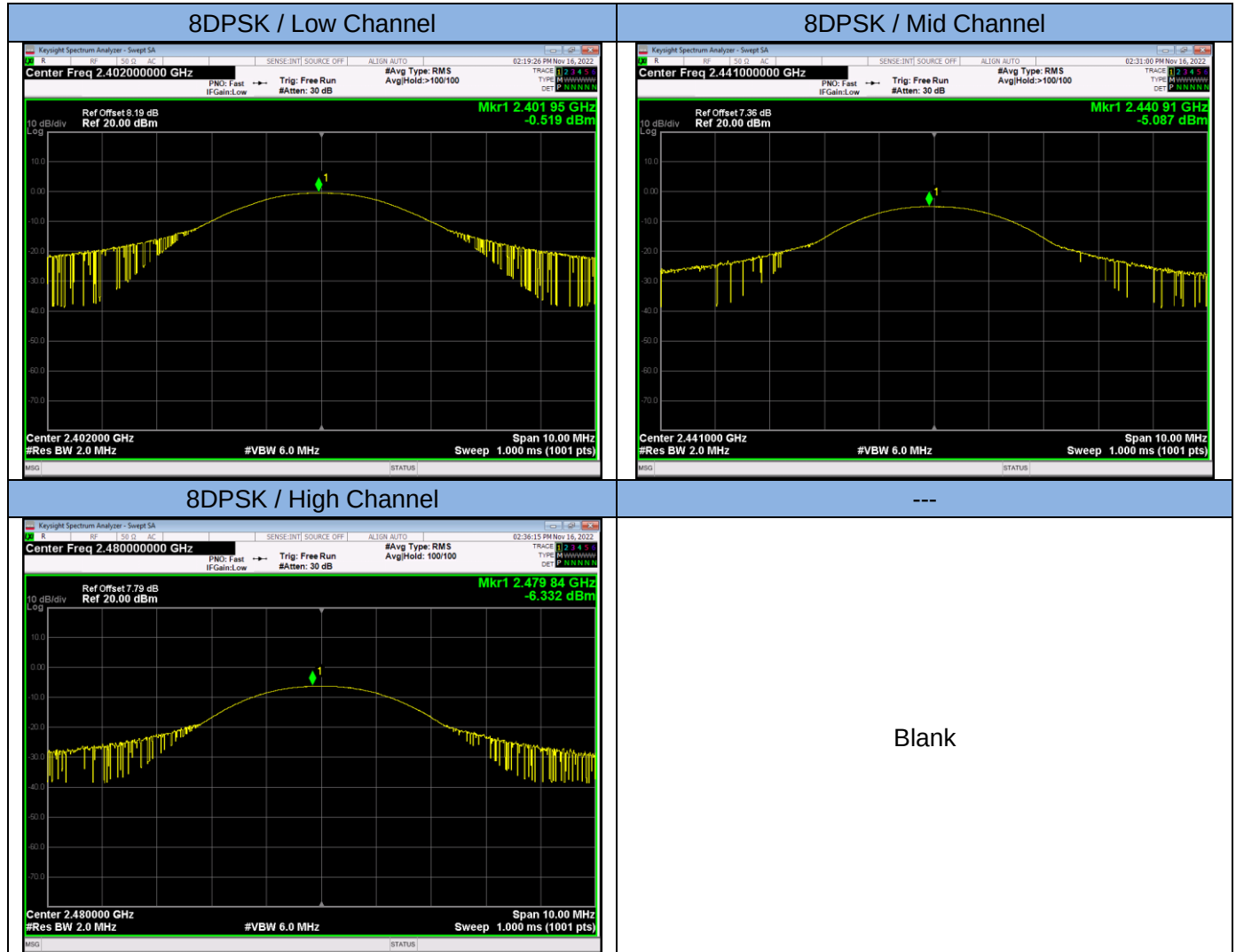
#### TEST RESULTS

PASS

Please refer to the following tables.

| Modulation     | Frequency (MHz) | Peak Power output Measurement (dBm) | Peak Power output Measurement (mW) | Peak Power Limit (dBm) | Test Result |
|----------------|-----------------|-------------------------------------|------------------------------------|------------------------|-------------|
| GFSK           | 2402.00         | -0.539                              | 0.88                               | 30                     | Pass        |
|                | 2441.00         | -5.057                              | 0.31                               | 30                     | Pass        |
|                | 2480.00         | -6.282                              | 0.24                               | 30                     | Pass        |
| $\pi/4$ -DQPSK | 2402.00         | -0.553                              | 0.88                               | 21                     | Pass        |
|                | 2441.00         | -5.056                              | 0.31                               | 21                     | Pass        |
|                | 2480.00         | -6.323                              | 0.23                               | 21                     | Pass        |
| 8DPSK          | 2402.00         | -0.519                              | 0.89                               | 21                     | Pass        |
|                | 2441.00         | -5.087                              | 0.31                               | 21                     | Pass        |
|                | 2480.00         | -6.332                              | 0.23                               | 21                     | Pass        |



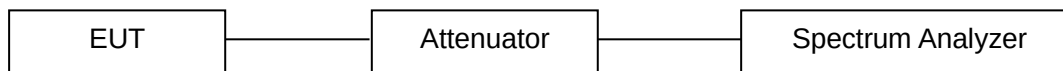


### 13.8 Band Edge Conducted Spurious Emission Measurement

#### LIMIT

In any 100KHz 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 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

#### BLOCK DIAGRAM OF TEST SETUP



#### TEST PROCEDURES

- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously.
- Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.6 and 6.10.
- Enable hopping function of the EUT and then repeat steps above.

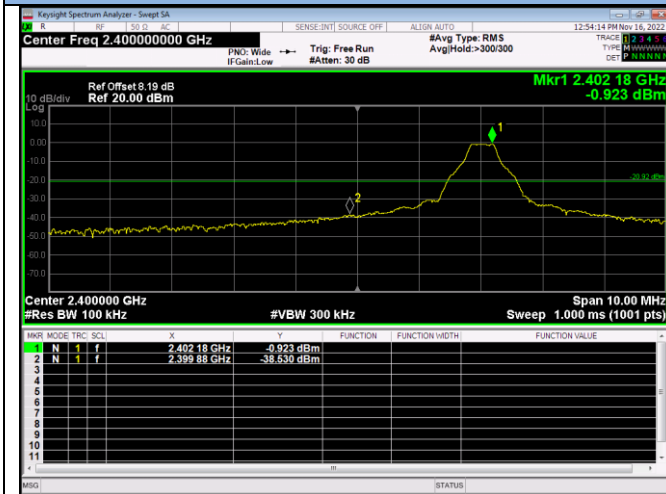
#### TEST RESULTS

PASS

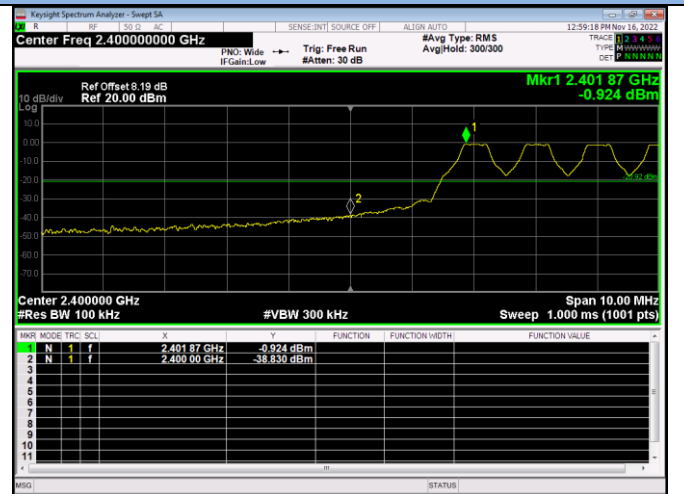
Please refer to the following test plots.

## Band Edge

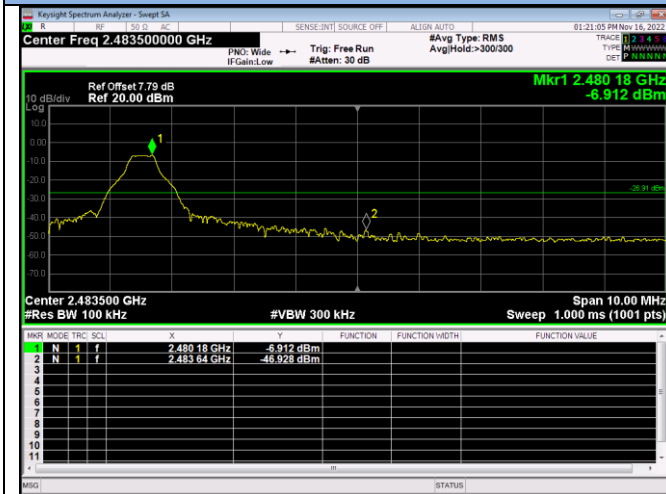
### GFSK / Low / 2402



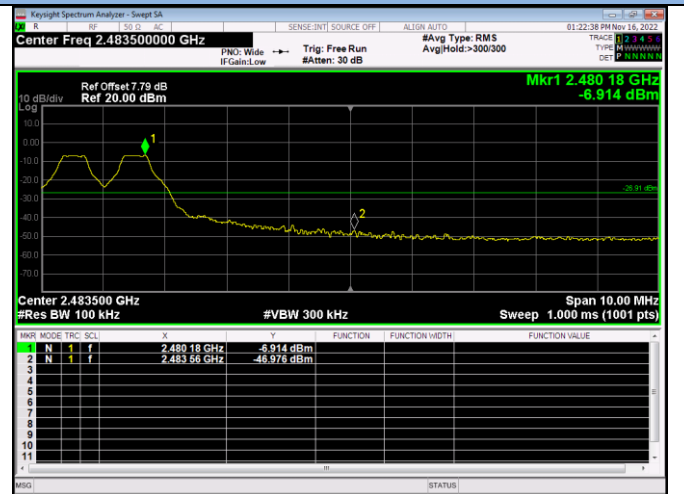
### GFSK / Hopping



### GFSK / High Channel / 2480

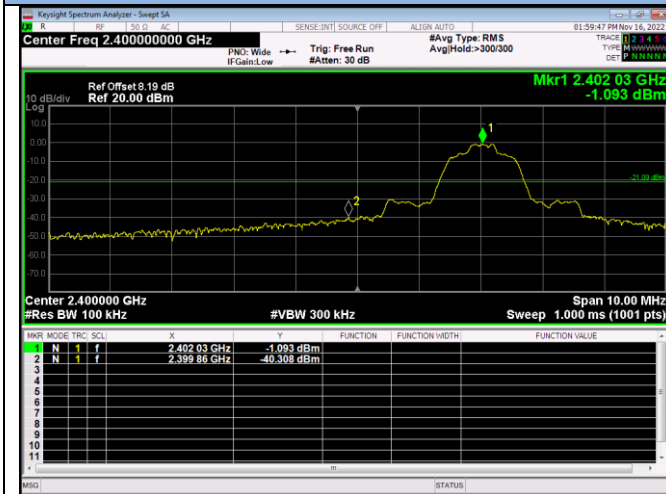


### GFSK / Hopping

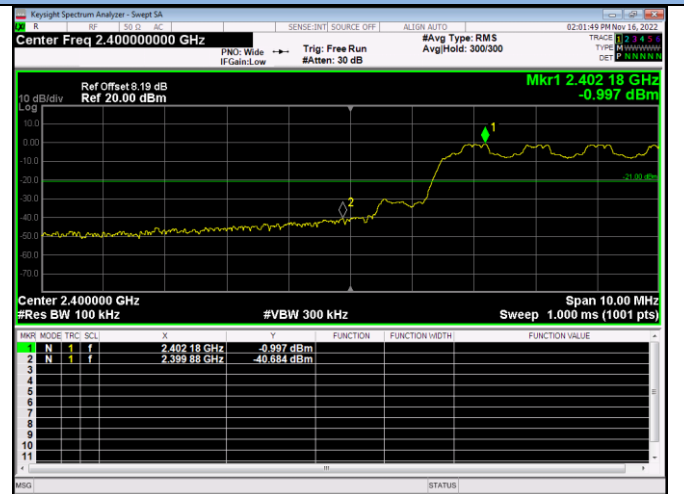


## Band Edge

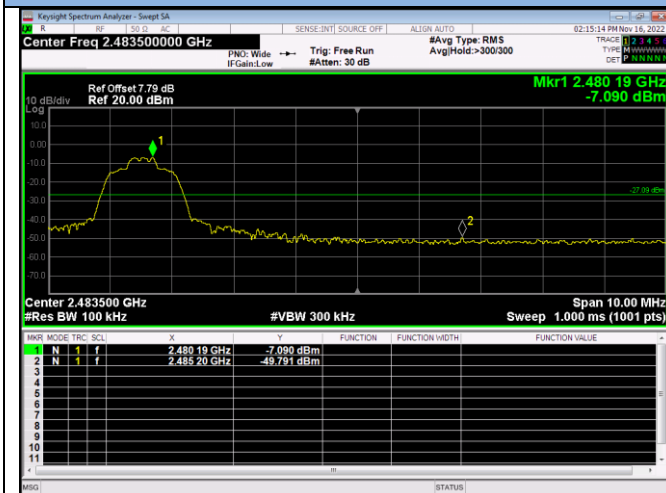
### $\pi/4$ -DQPSK / Low / 2402



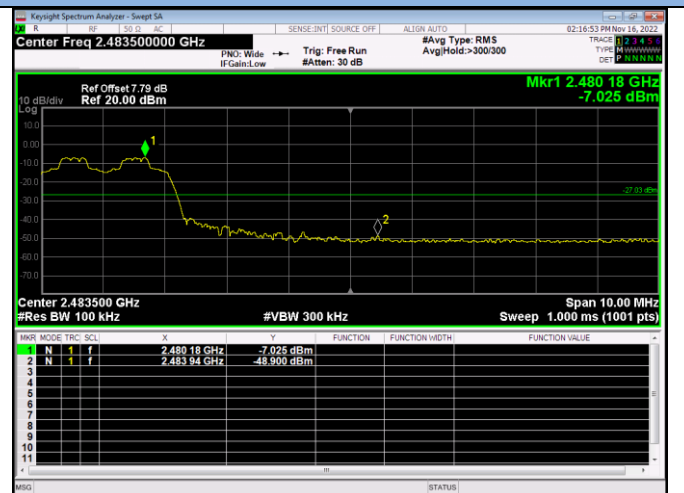
### $\pi/4$ -DQPSK / Hopping



### $\pi/4$ -DQPSK / High / 2480

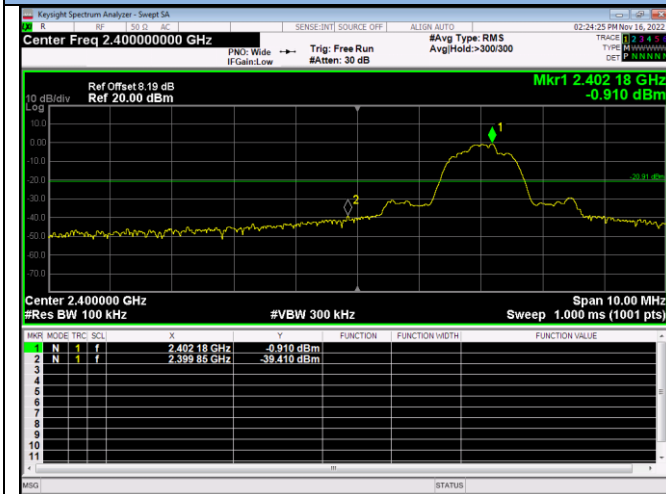


### $\pi/4$ -DQPSK / Hopping

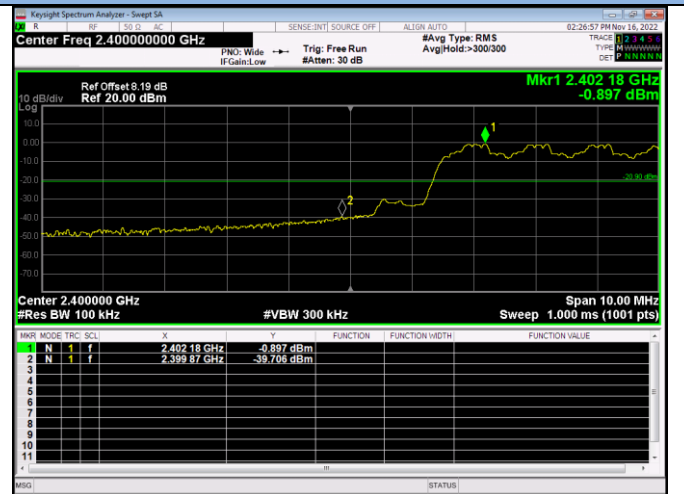


## Band Edge

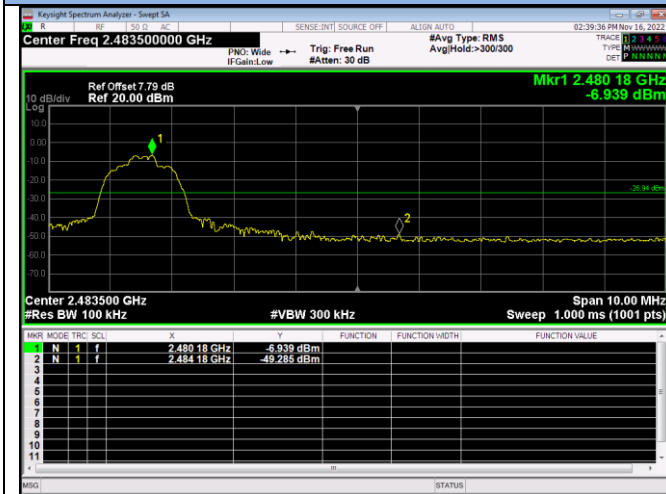
### 8DPSK / Low / 2402



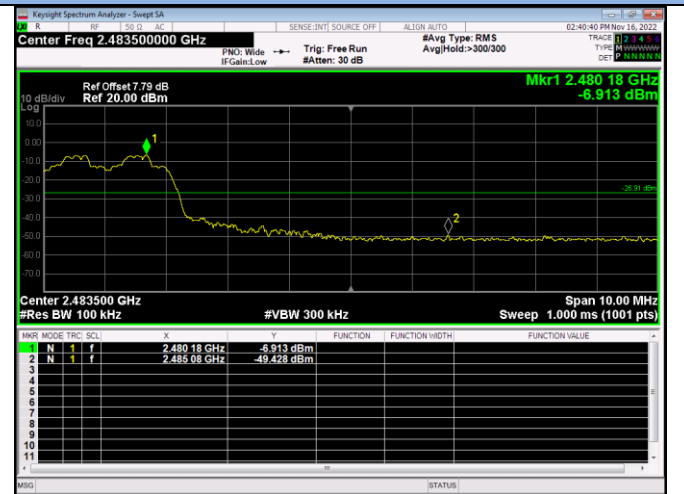
### 8DPSK / Hopping



### 8DPSK / High / 2480

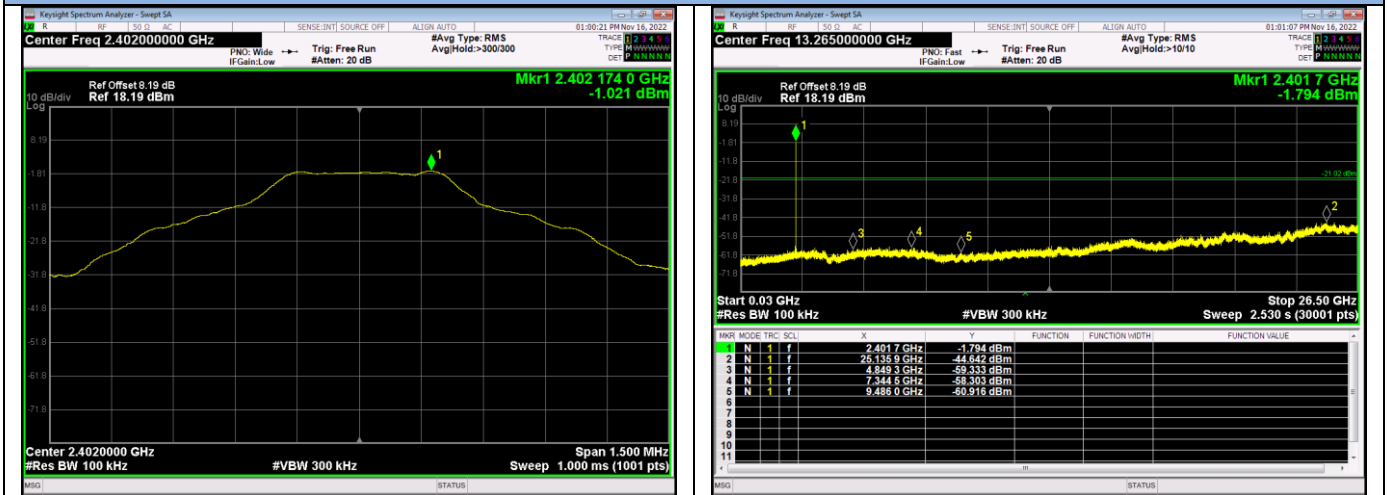


### 8DPSK / Hopping

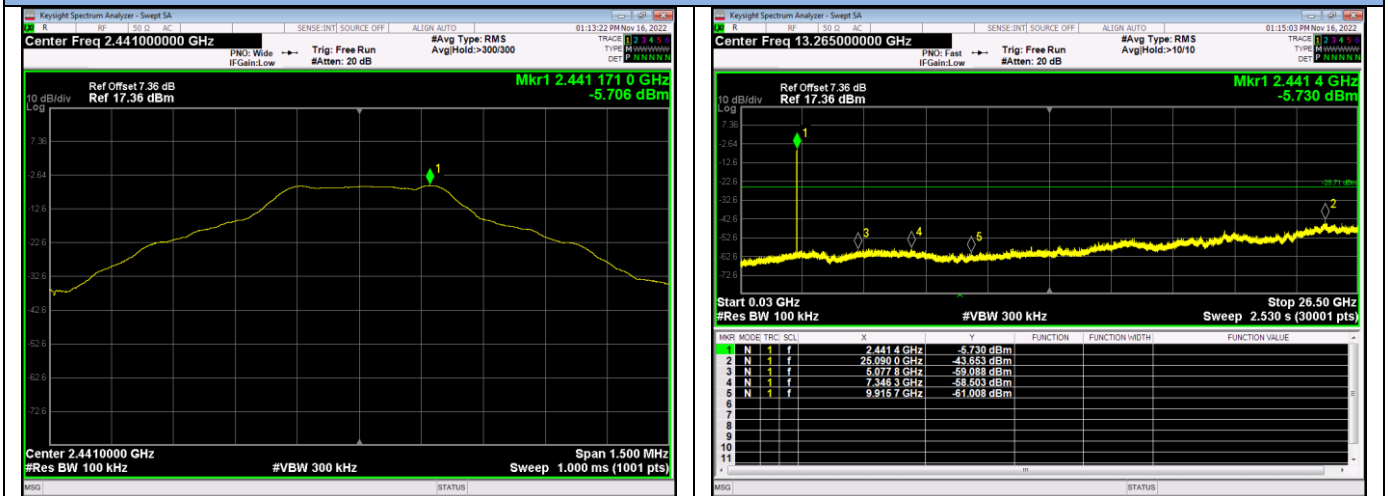


## Conducted Spurious Emission (the worst case)

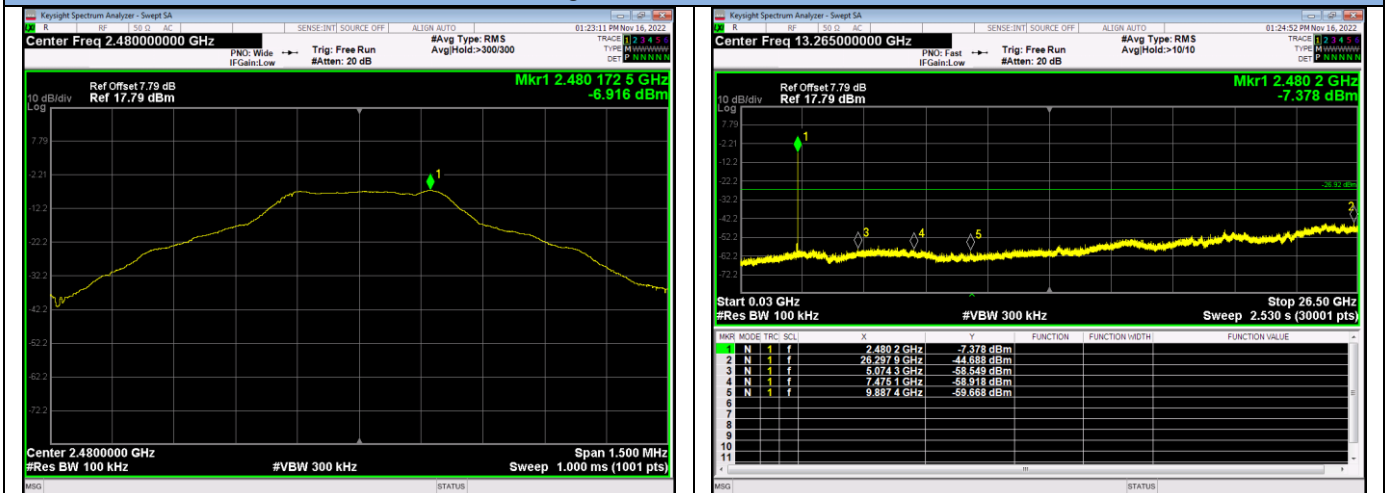
### GFSK / Low Channel / 30MHz~26.5GHz



### GFSK / Mid Channel / 30MHz~26.5GHz



### GFSK / High Channel / 30MHz~26.5GHz



## **13.9 Antenna Requirement**

### **STANDARD APPLICABLE**

According to of FCC part 15C section 15.203 and 15.247:

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.

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

### **ANTENNA CONNECTED CONSTRUCTION**

The antenna is PCB antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 0 dBi, Therefore, the antenna is considered to meet the requirement.

## 14. Test Equipment List

| Item | Equipment                      | Manufacturer                      | Model No. | Serial No.        | Last Cal.     | Cal. Interval |
|------|--------------------------------|-----------------------------------|-----------|-------------------|---------------|---------------|
| 1.   | Test Receiver                  | Rohde & Schwarz                   | ESCI7     | 100837            | Mar. 13, 2022 | 1 Year        |
| 2.   | Antenna                        | Schwarzbeck                       | VULB9162  | 9162-010          | Mar. 23, 2022 | 2 Year        |
| 3.   | Spectrum Analyzer              | Rohde & Schwarz                   | FSU26     | 200409/026        | Mar. 13, 2022 | 1 Year        |
| 4.   | Spectrum Analyzer              | Keysight                          | N9020A    | MY54200831        | Mar. 13, 2022 | 1 Year        |
| 5.   | Spectrum Analyzer              | Rohde & Schwarz                   | FSV40     | 101094            | Mar. 13, 2022 | 1 Year        |
| 6.   | Horn Antenna                   | Schwarzbeck                       | BBHA9170  | 9170-172          | Mar. 23, 2022 | 2 Year        |
| 7.   | Power Sensor                   | DARE                              | RPR3006W  | 15I00041SNO<br>64 | Mar. 13, 2022 | 1 Year        |
| 8.   | Communication Tester           | Rohde & Schwarz                   | CMW500    | 149004            | Mar. 13, 2022 | 1 Year        |
| 9.   | Horn Antenna                   | COM-Power                         | AH-118    | 071078            | Mar. 23, 2022 | 2 Year        |
| 10.  | Pre-Amplifier                  | HP                                | HP 8449B  | 3008A00964        | Mar. 13, 2022 | 1 Year        |
| 11.  | Pre-Amplifier                  | HP                                | HP 8447D  | 1145A00203        | Mar. 13, 2022 | 1 Year        |
| 12.  | Loop Antenna                   | Schwarzbeck                       | FMZB 1513 | 1513-272          | Mar. 23, 2022 | 2 Year        |
| 13.  | Test Receiver                  | Rohde & Schwarz                   | ESCI      | 101152            | Mar. 13, 2022 | 1 Year        |
| 14.  | L.I.S.N                        | Rohde & Schwarz                   | ENV 216   | 101317            | Mar. 13, 2022 | 1 Year        |
| 15.  | L.I.S.N                        | Rohde & Schwarz                   | ESH2-Z5   | 893606/014        | Mar. 13, 2022 | 1 Year        |
| 16.  | RF Switching Unit              | Compliance Direction Systems Inc. | RSU-M2    | 38311             | Mar. 13, 2022 | 1 Year        |
| 17.  | Temperature & Humidity Chamber | REMAFEE                           | SYHR225L  | N/A               | Mar. 13, 2022 | 1 Year        |
| 18.  | DC Source                      | Maynuo                            | MY8811    | N/A               | Mar. 13, 2022 | 1 Year        |
| 19.  | Temporary antenna connector    | TESCOM                            | SS402     | N/A               | N/A           | N/A           |
| 20.  | Chamber                        | SAEMC                             | 9*7*7m    | N/A               | Apr. 21, 2021 | 2 Year        |
| 21.  | Test Software                  | EZ                                | EZ EMC    | N/A               | N/A           | N/A           |

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

---End---