## 8. Maximum Peak Output Power

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(1) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | Please see the 8.2 |

### 8.1 Block Diagram Of Test Setup

### 8.2 Limit

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.

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W.

### 8.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW =3MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

### 8.4 DEVIATION FROM STANDARD

No deviation.

### 8.5 Test Result

| Mode | Test channel | Peak Output Power (dBm) | FCC Limit (dBm) | Result |
|---|---|---|---|---|
| GFSK | Lowest | 1.253 | 30 | Pass |
| | Middle | 1.406 | | |
| | Highest | 1.767 | | |
| π/4-DQPSK | Lowest | 2.142 | 20.97 | Pass |
| | Middle | 2.252 | | |
| | Highest | 2.587 | | |
| 8-DPSK | Lowest | 2.651 | 20.97 | Pass |
| | Middle | 2.803 | | |
| | Highest | 3.108 | | |

## Test plots

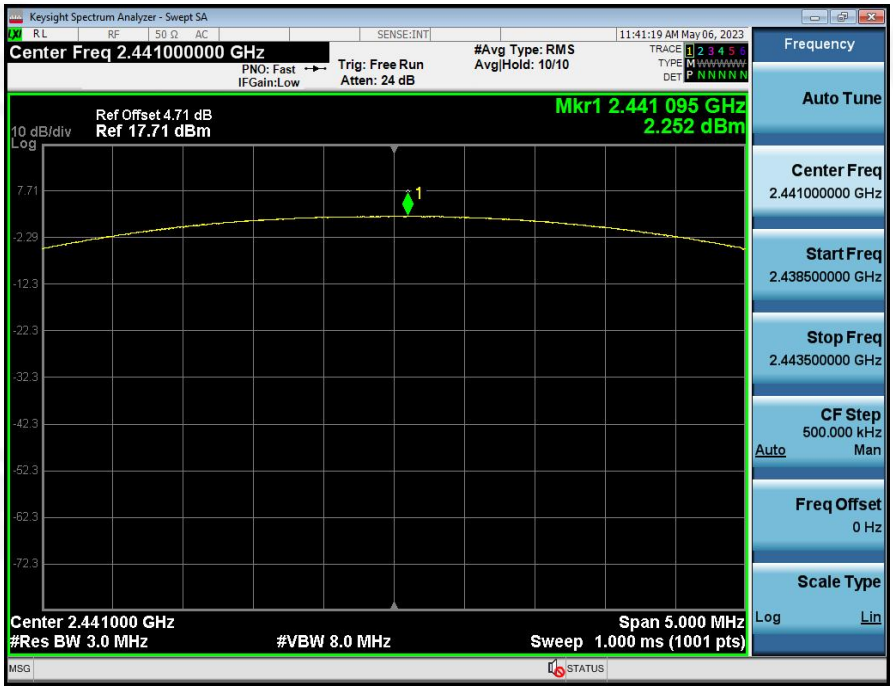
### GFSK Low Channel

### GFSK Middle Channel

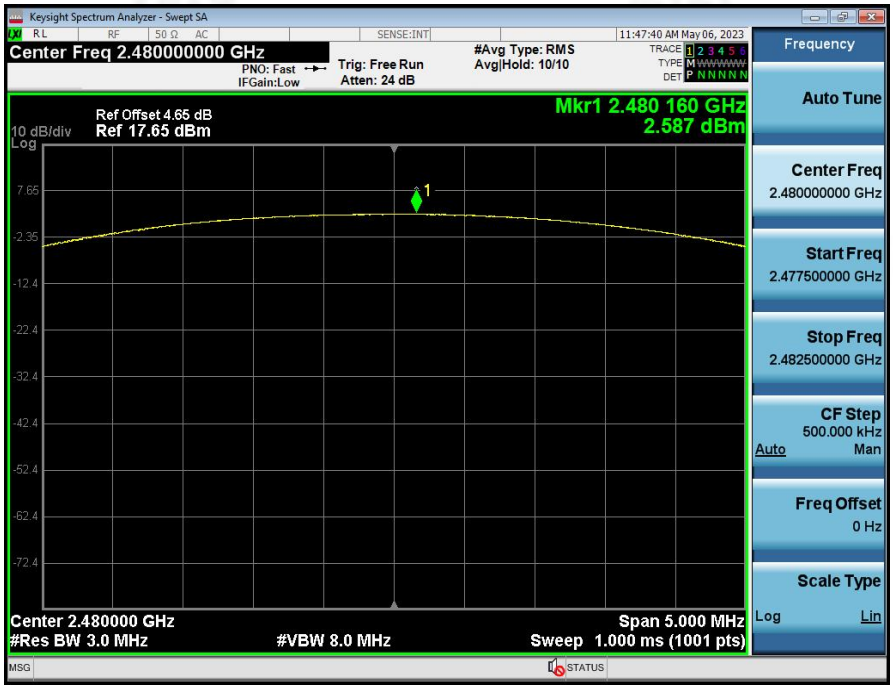
GFSK High Channel

π/4-DQPSK Low Channel

π/4-DQPSK Middle Channel

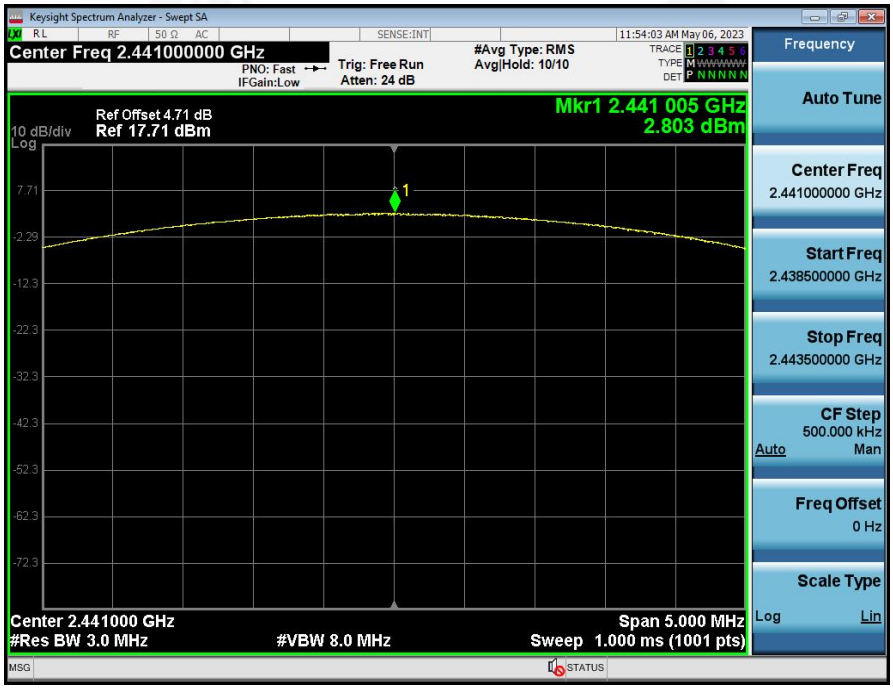



π/4-DQPSK High Channel

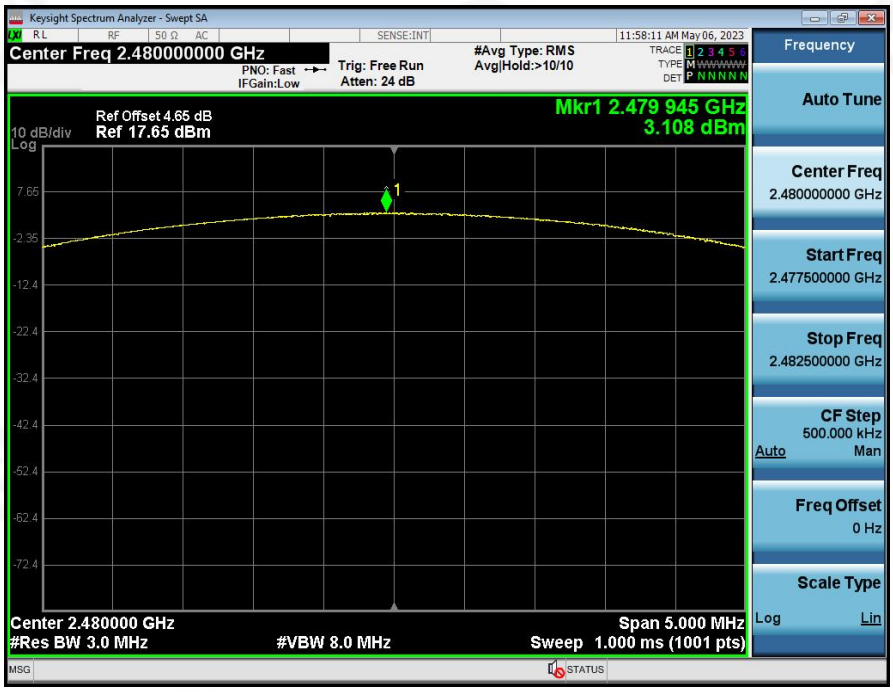


8-DPSK Low Channel

8-DPSK Middle Channel



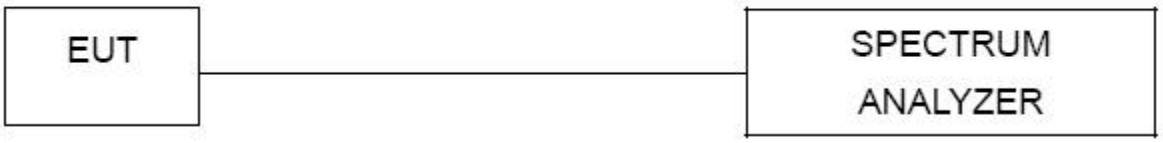
8-DPSK High Channel



## 9. HOPPING CHANNEL SEPARATION

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=100KHz, VBW=300KHz, detector=Peak |
| Limit: | GFSK & π/4-DQPSK & 8DSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater) |

9.1 Test Setup




9.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz , Span = 3.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

9.3 DEVIATION FROM STANDARD

No deviation.

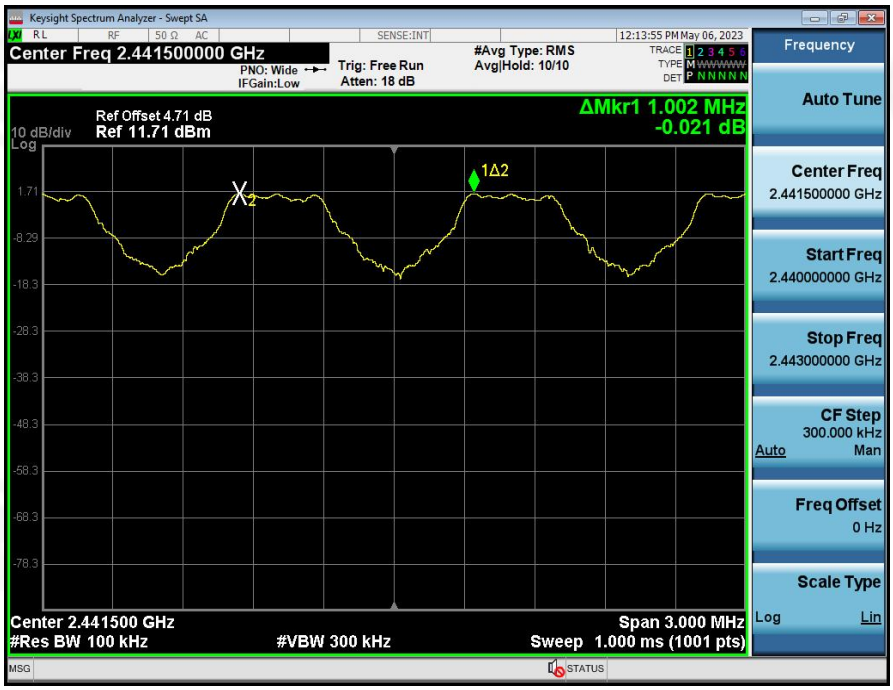
## 9.4 Test Result

| Modulation | Test Channel | Separation (MHz) | Limit(MHz) | Result |
|---|---|---|---|---|
| GFSK | Low | 0.999 | 0.869 | PASS |
| GFSK | Middle | 1.002 | 0.924 | PASS |
| GFSK | High | 1.005 | 0.907 | PASS |
| π/4-DQPSK | Low | 1.002 | 0.839 | PASS |
| π/4-DQPSK | Middle | 0.999 | 0.836 | PASS |
| π/4-DQPSK | High | 0.996 | 0.837 | PASS |
| 8-DPSK | Low | 0.999 | 0.866 | PASS |
| 8-DPSK | Middle | 1.011 | 0.869 | PASS |
| 8-DPSK | High | 1.005 | 0.869 | PASS |

Test plots

GFSK Low Channel

GFSK Middle Channel




GFSK High Channel

π/4-DQPSK Low Channel

π/4-DQPSK Middle Channel

π/4-DQPSK High Channel

8-DPSK Low Channel

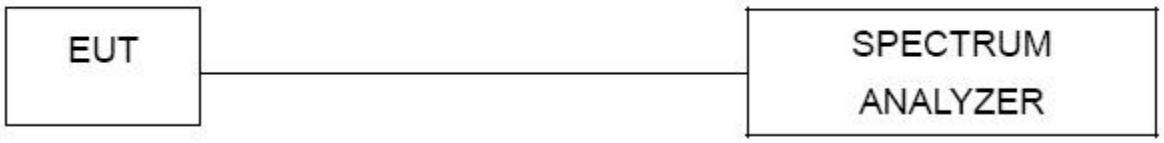
8-DPSK Middle Channel

8-DPSK High Channel

## 10.NUMBER OF HOPPING FREQUENCY

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1)(iii) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak |
| Limit: | 15 channels |

### 10.1 Test Setup




### 10.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

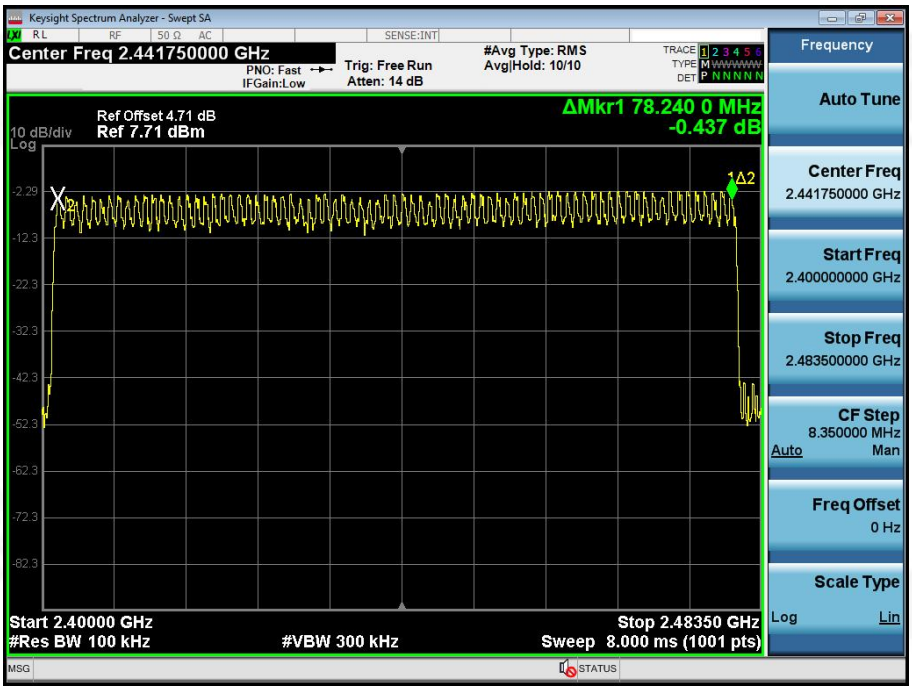
### 10.3 DEVIATION FROM STANDARD

No deviation.

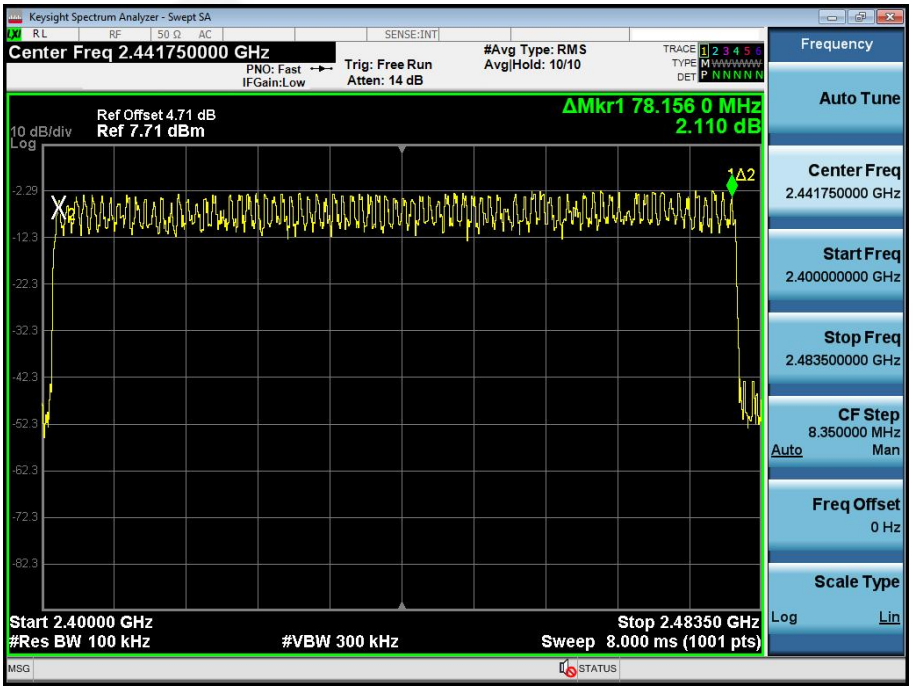
### 10.4 Test Result

Test Plots:
79 Channels in total
GFSK

π/4-DQPSK




8-DPSK



## 11. DWELL TIME

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1)(iii) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak |
| Limit: | 0.4 Second |

### 11.1 Test Setup

### 11.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0Hz;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

### 11.3 DEVIATION FROM STANDARD

No deviation.

## 11.4 Test Result

GFSK mode:

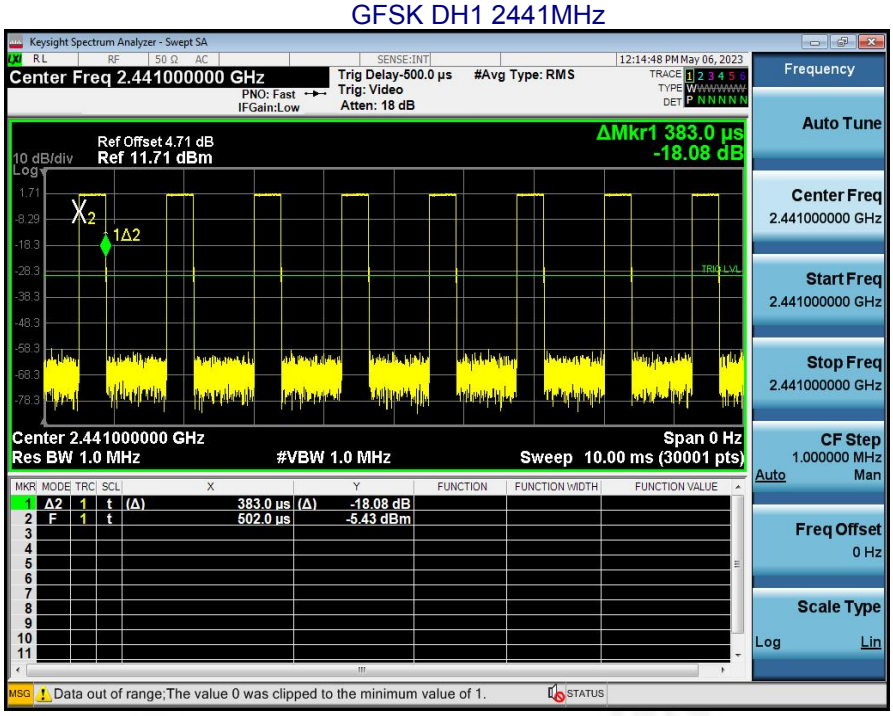
| Frequency | Packet | Dwell time(ms) | Limit(ms) | Result |
|---|---|---|---|---|
| 2441MHz | DH1 | 122.56 | 400 | Pass |
| 2441MHz | DH3 | 262.24 | 400 | Pass |
| 2441MHz | DH5 | 308.05 | 400 | Pass |

Remarks:

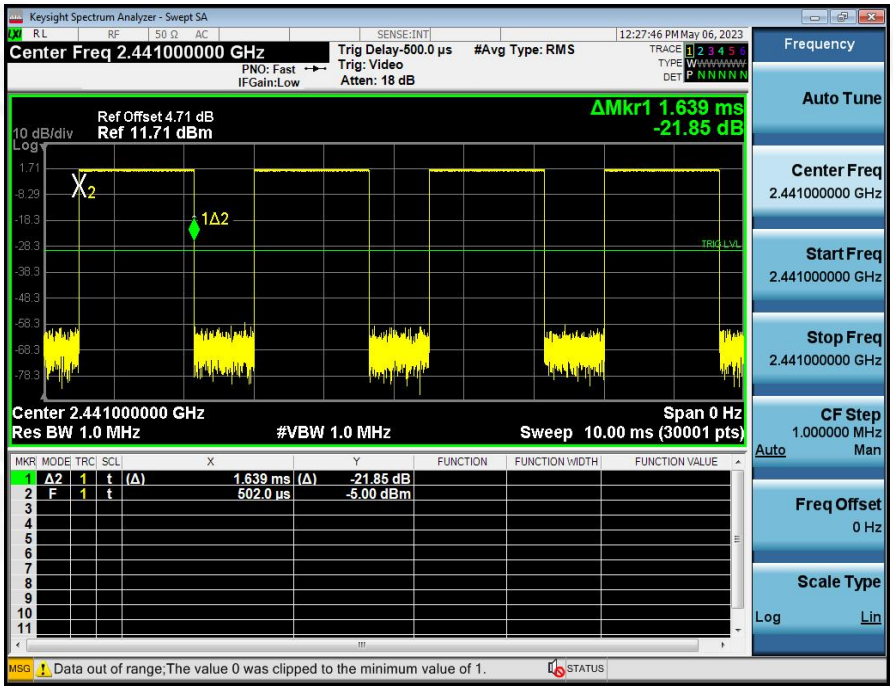
1. The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s
   Test channel: as blow
   CH:2441MHz time slot=0.383(ms)*(1600/ (2*79))*31.6
   CH:2441MHz time slot=1.639(ms)*(1600/ (4*79))*31.6
   CH:2441MHz time slot=2.888(ms)*(1600/ (6*79))*31.6
2. We tested all modes and recorded the worst in the report.

Test Plots

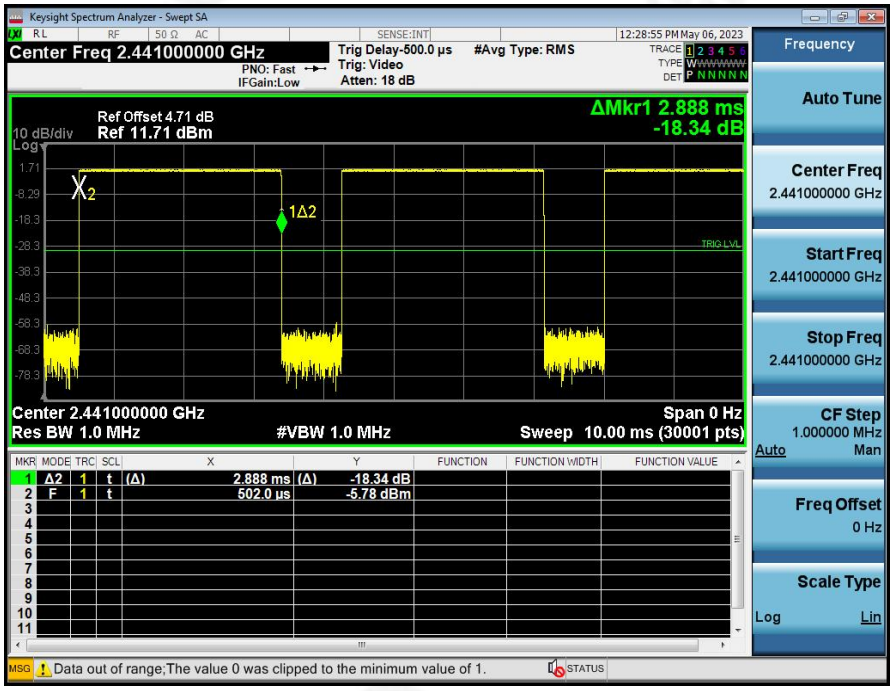
GFSK DH1 2441MHz



GFSK DH3 2441MHz




GFSK DH5 2441MHz



## 12. Antenna Requirement

| Standard requirement: | FCC Part15 C Section 15.203 /247(c) |
|---|---|
| 15.203 requirement:<br>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.<br>15.247(c) (1)(i) requirement:<br>(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 6dBi 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 6dBi. | |
| EUT Antenna: | |
| The antenna is Internal antenna, the best case gain of the antennas is 0.19 dBi, reference to the appendix II for details | |

## 13. Test Setup Photo

Reference to the appendix I for details.

## 14. EUT Constructional Details

Reference to the appendix II for details.

**※※※※※ END OF REPORT ※※※※※**