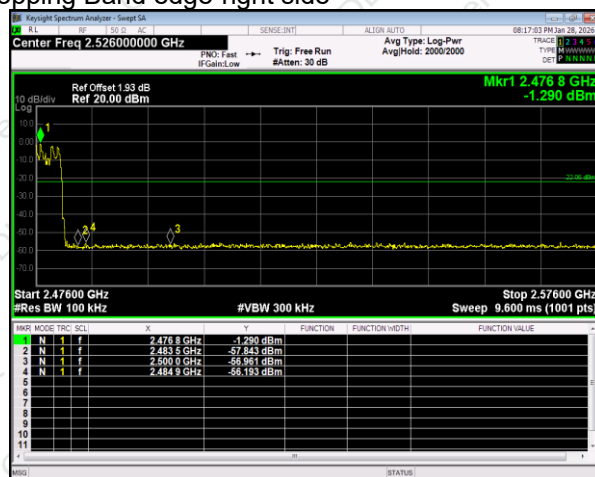
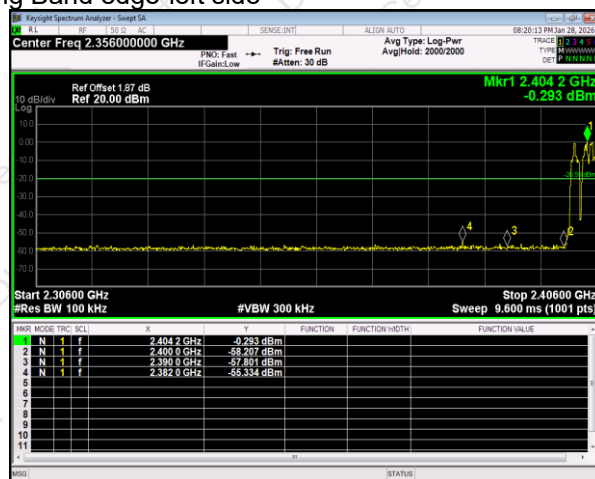
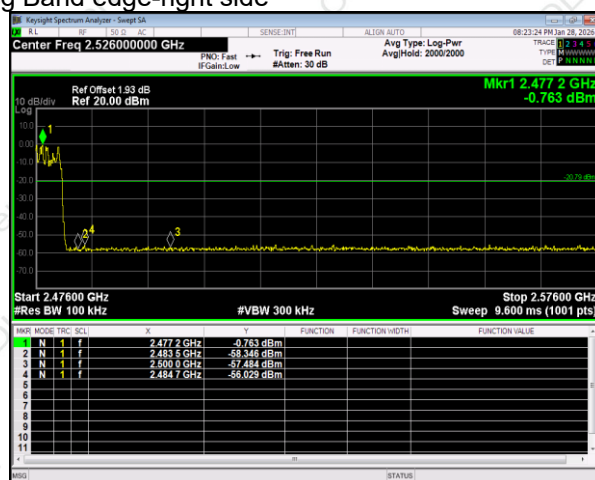
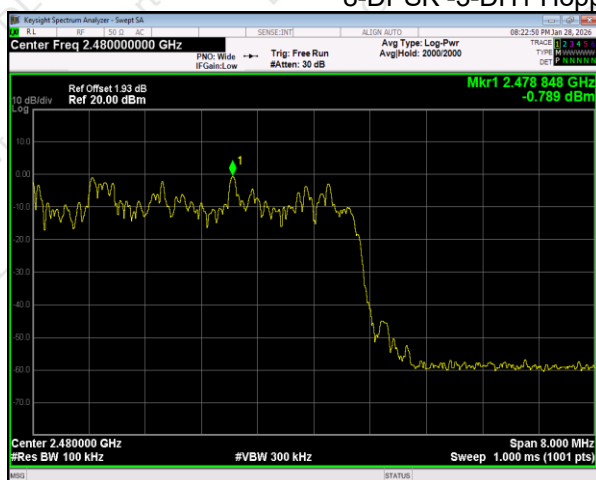


 $\pi/4$ -DQPSK -2-DH1 Hopping Band edge-right side

8-DPSK -3-DH1 Hopping Band edge-left side



8-DPSK -3-DH1 Hopping Band edge-right side



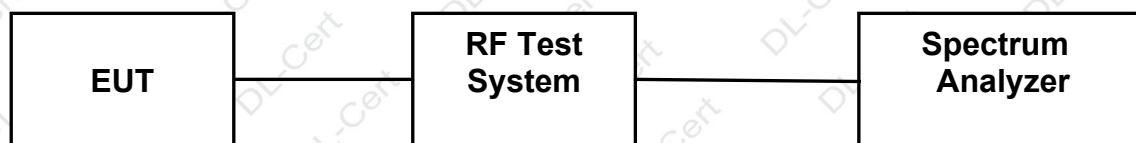
Remark: The test data shows only the worst case 1-DH1/2DH1/3DH1 with GFSK/ $\pi/4$ -DQPSK/8-DPSK.



7. 20DB OCCUPIED BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2020

7.1 Test Setup



7.2 Limit

N/A

7.3 Test procedure

1. Set RBW = 30 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

7.4 DEVIATION FROM STANDARD

No deviation.



7.5 Test Result

Modulation	Packet	Test Channel	20dB Occupied Bandwidth (MHz)	Result
GFSK	1-DH1	Lowest	0.8669	Pass
		Middle	0.8648	
		Highest	0.8634	
$\pi/4$ -DQPSK	2-DH1	Lowest	1.207	Pass
		Middle	1.206	
		Highest	1.204	
8-DPSK	3-DH1	Lowest	1.206	Pass
		Middle	1.21	
		Highest	1.213	

Remark: The test data shows only the worst case 1-DH1/2DH1/3DH1 with GFSK / $\pi/4$ -DQPSK/8-DPSK.



GFSK - 1-DH1 Test plots

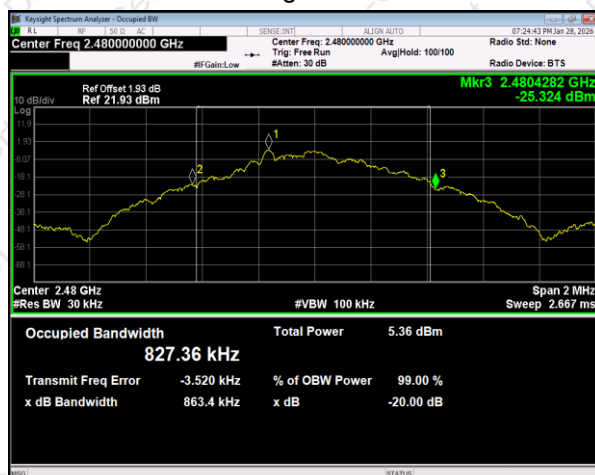
Low Channel



Middle Channel

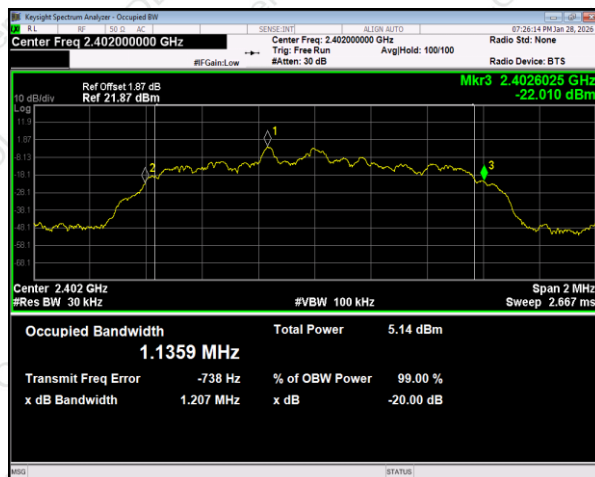


High Channel

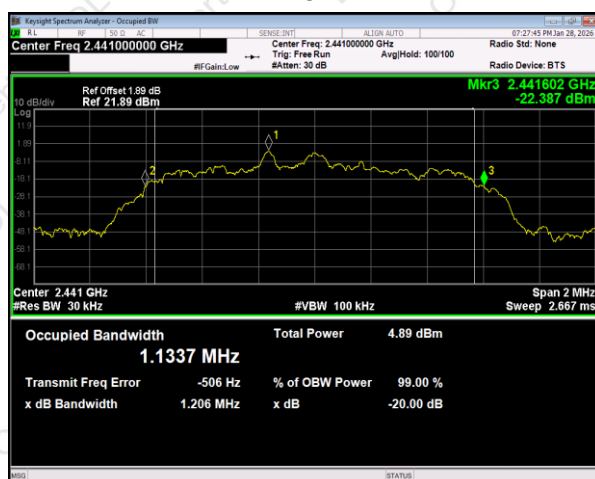


 $\pi/4$ -DQPSK - 2-DH1 Test plots

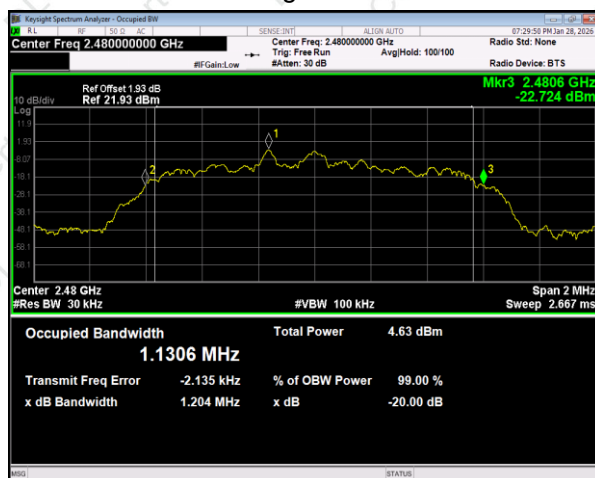
Low Channel



Middle Channel

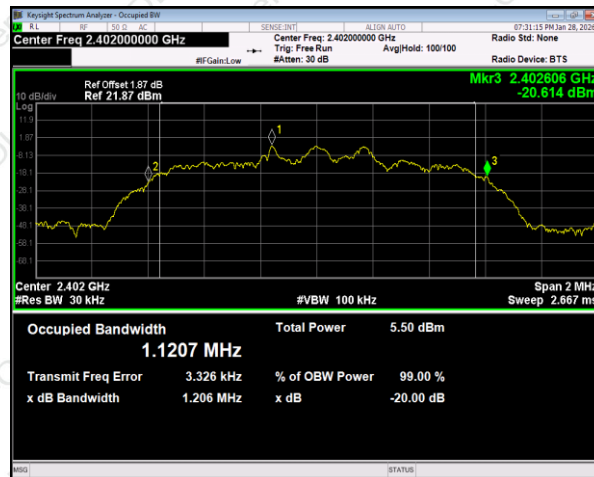


High Channel

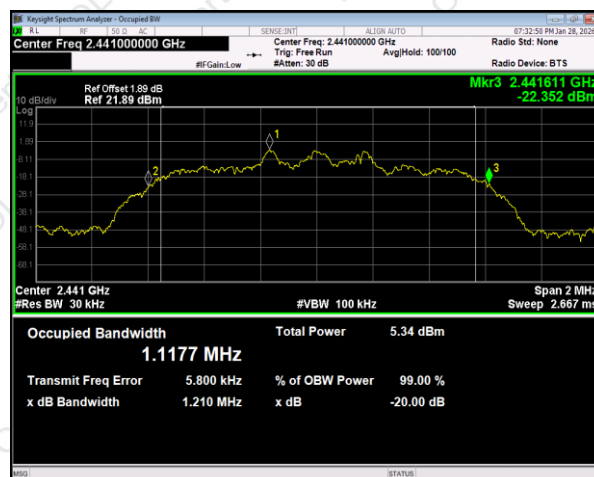




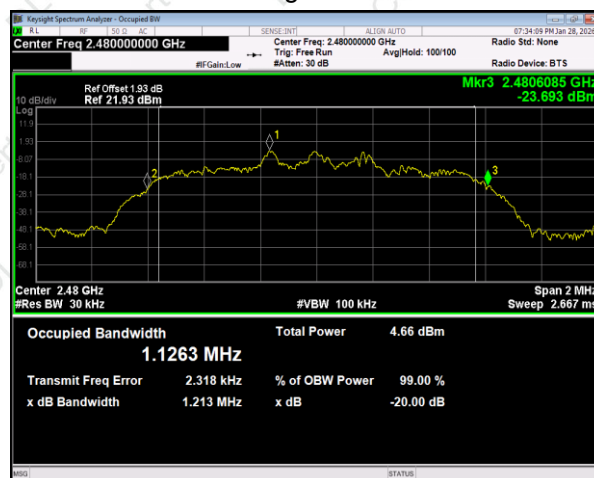
8-DPSK - 3-DH1 Test plots Low Channel



Middle Channel



High Channel

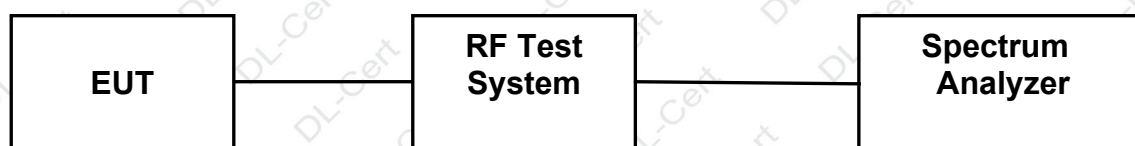




8. Maximum Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2020
Limit:	GFSK & $\pi/4$ -DQPSK & 8-DPSK: 21 dBm

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 = 2MHz. VBW = 6MHz. 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

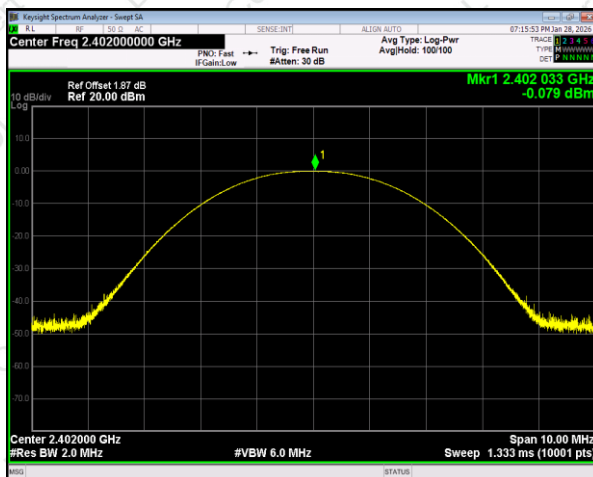
Modulation	Packet	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
GFSK	1-DH1	Lowest	-0.08	21.00	Pass
		Middle	-0.29		
		Highest	-0.62		
$\pi/4$ -DQPSK	2-DH1	Lowest	-0.07	21.00	Pass
		Middle	-0.29		
		Highest	-0.61		
8-DPSK	3-DH1	Lowest	-0.06	21.00	Pass
		Middle	-0.26		
		Highest	-0.58		

Remark: The test data shows only the worst case 1-DH1/2DH1/3DH1 with GFSK / $\pi/4$ -DQPSK/8-DPSK.

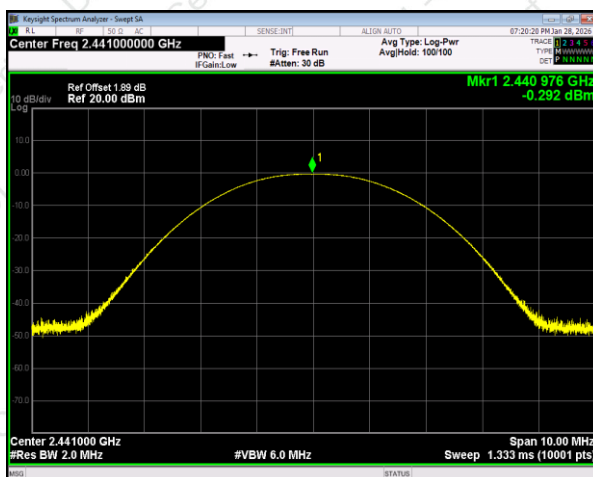


GFSK - 1-DH1 Test plots

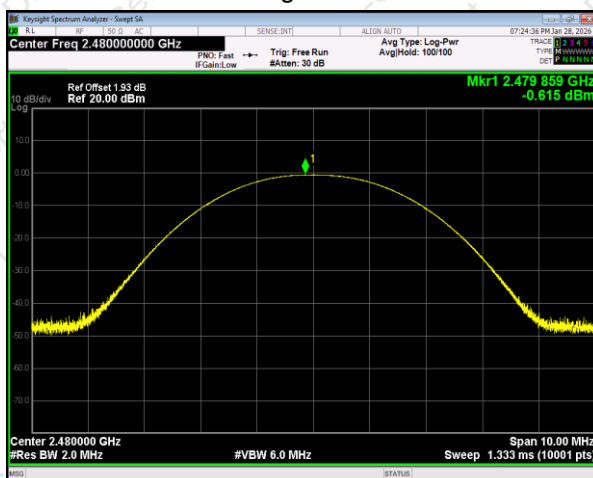
Low Channel



Middle Channel



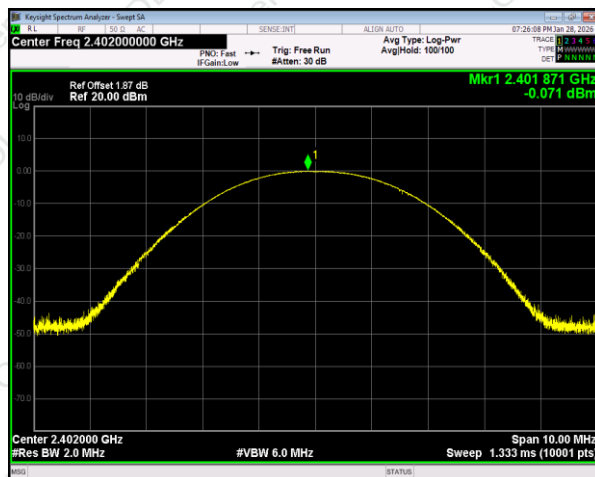
High Channel



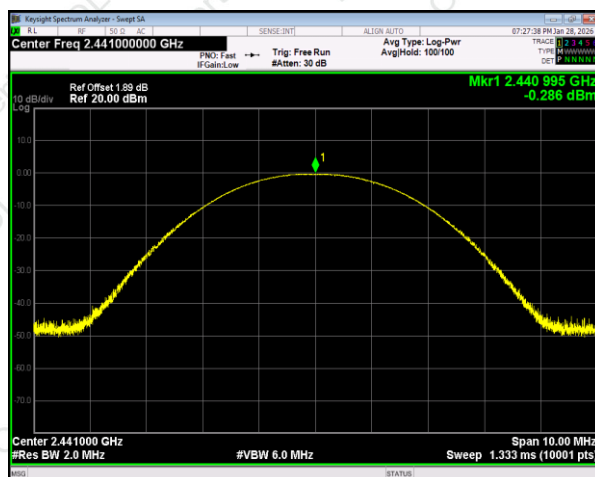


$\pi/4$ -DQPSK - 2-DH1 Test plots

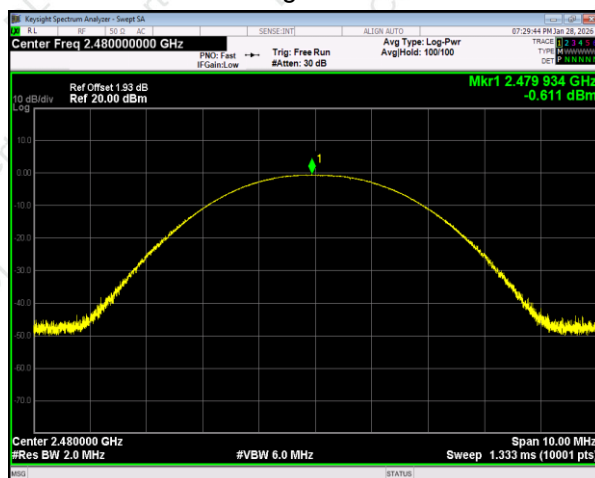
Low Channel



Middle Channel



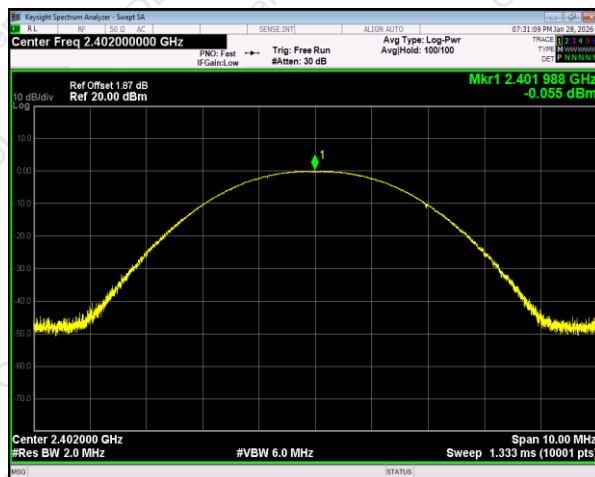
High Channel



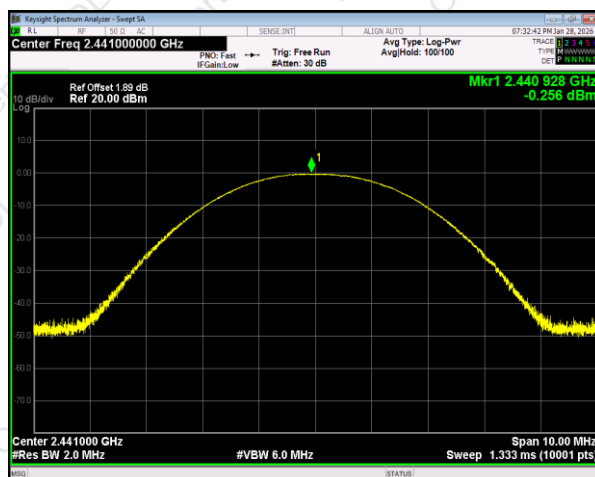


8-DPSK - 3-DH1 Test plots

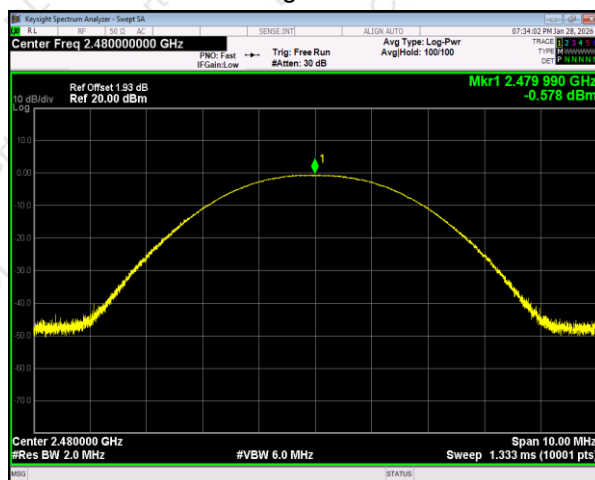
Low Channel



Middle Channel



High Channel

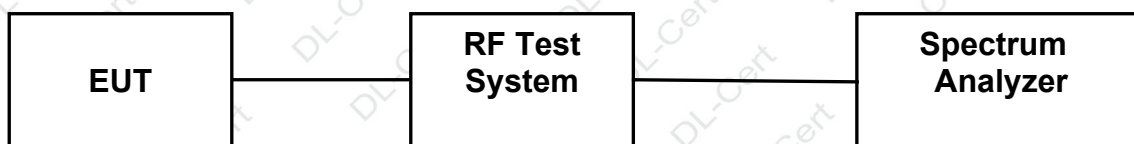




9. HOPPING CHANNEL SEPARATION

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2020
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	GFSK & $\pi/4$ -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 = 30kHz. VBW = 100kHz , Span = 2.0MHz. 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

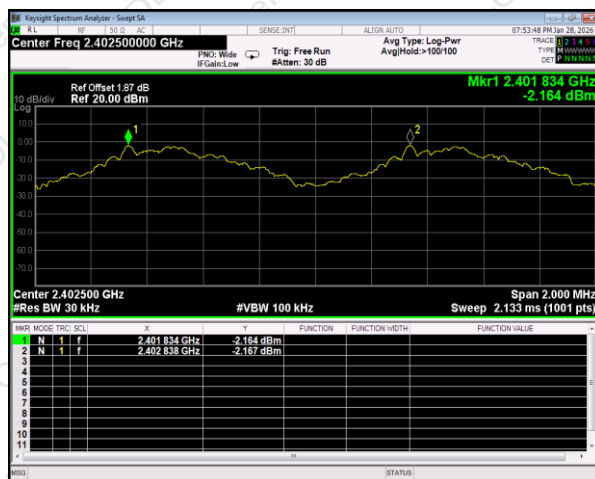
Modulation	Packet	Test Channel	Separation (MHz)	Limit (MHz)	Result
GFSK	1-DH1	Low	1.004	0.578	PASS
		Middle	1.004	0.577	PASS
		High	0.996	0.576	PASS
$\pi/4$ -DQPSK	2-DH1	Low	1.004	0.805	PASS
		Middle	1.002	0.804	PASS
		High	0.998	0.803	PASS
8-DPSK	3-DH1	Low	0.996	0.804	PASS
		Middle	1.002	0.807	PASS
		High	0.998	0.809	PASS

Remark: The test data shows only the worst case 1-DH1/2DH1/3DH1 with GFSK / $\pi/4$ -DQPSK/8-DPSK.



GFSK - 1-DH1 Test plots

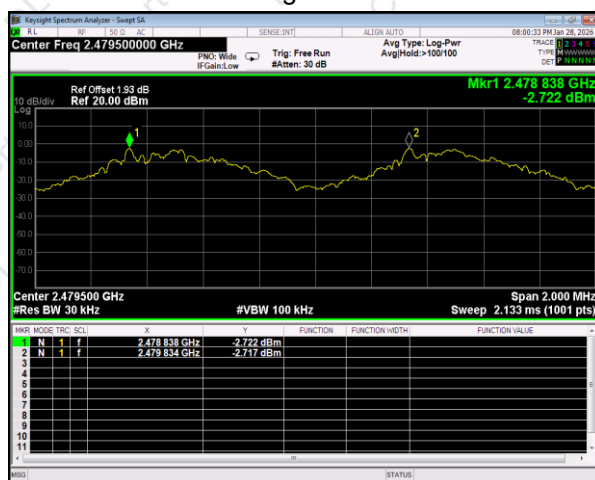
Low Channel



Middle Channel

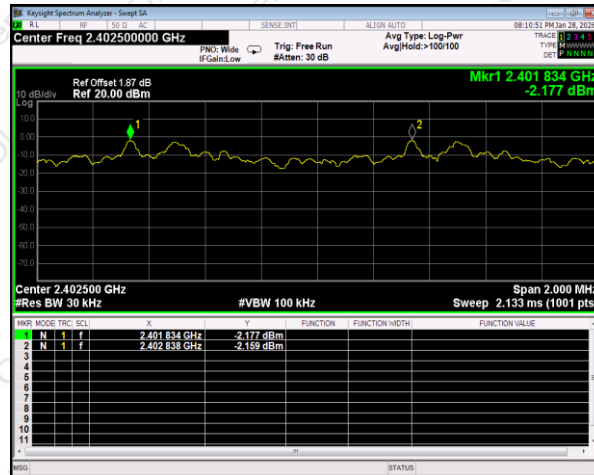


High Channel

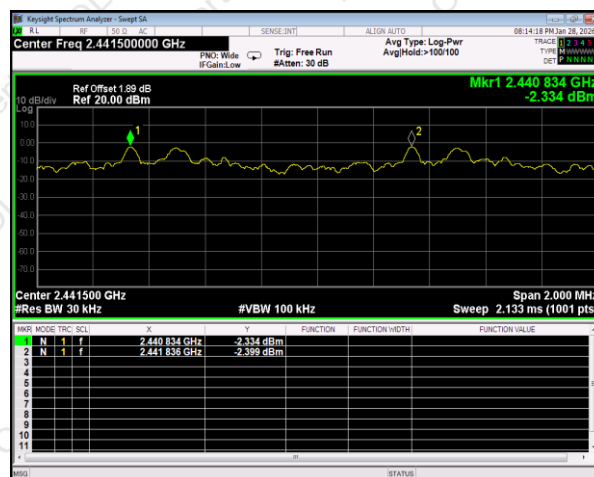


 $\pi/4$ -DQPSK - 2-DH1 Test plots

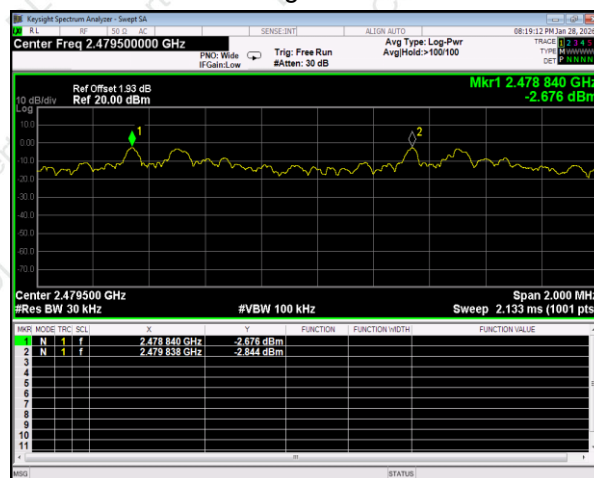
Low Channel



Middle Channel



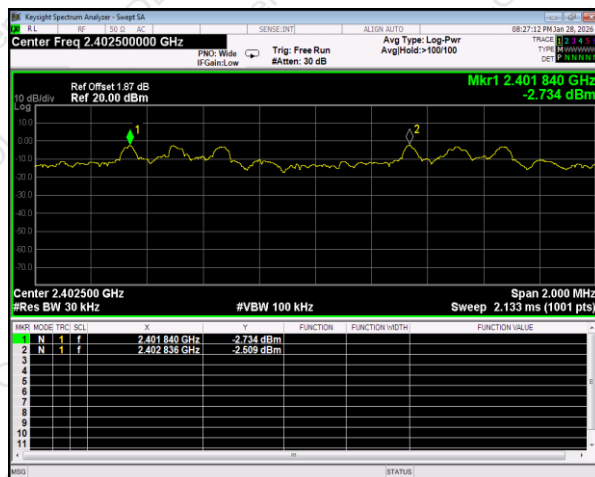
High Channel



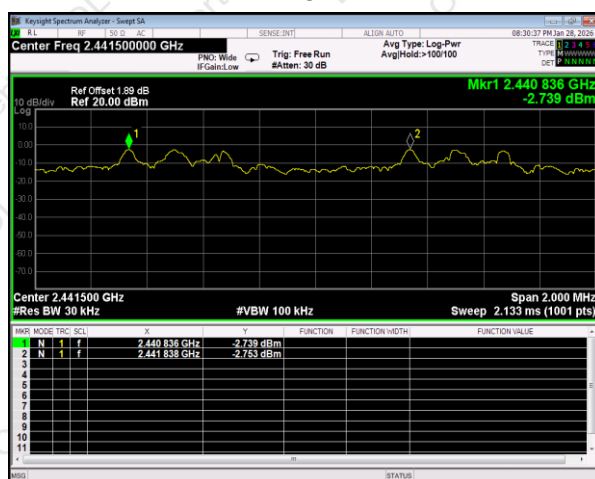


8-DPSK - 3-DH1 Test plots

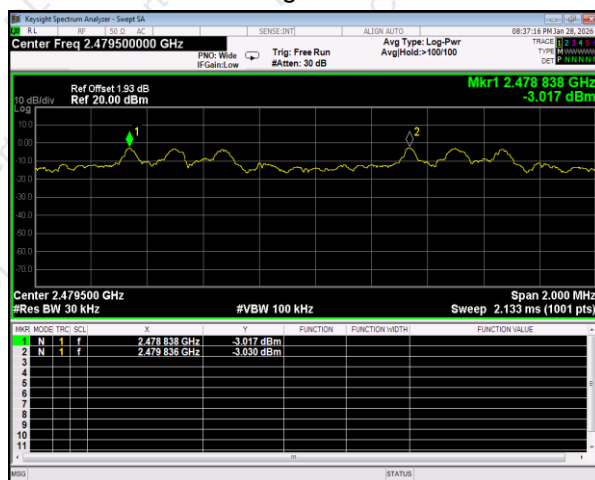
Low Channel



Middle Channel

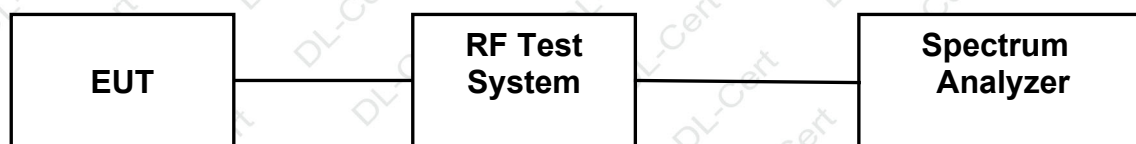


High Channel



**10. NUMBER OF HOPPING FREQUENCY**

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10:2020
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.

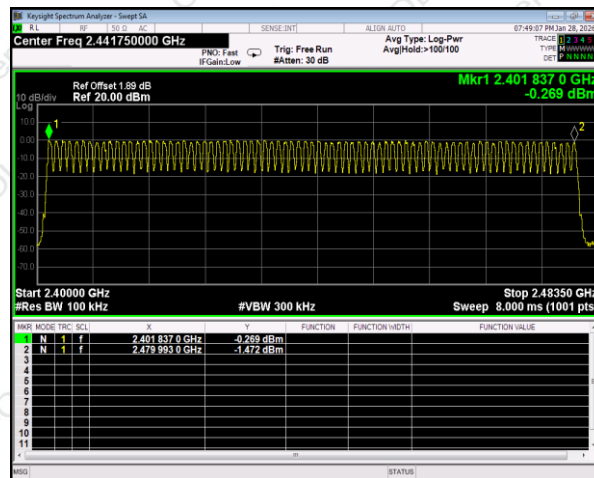
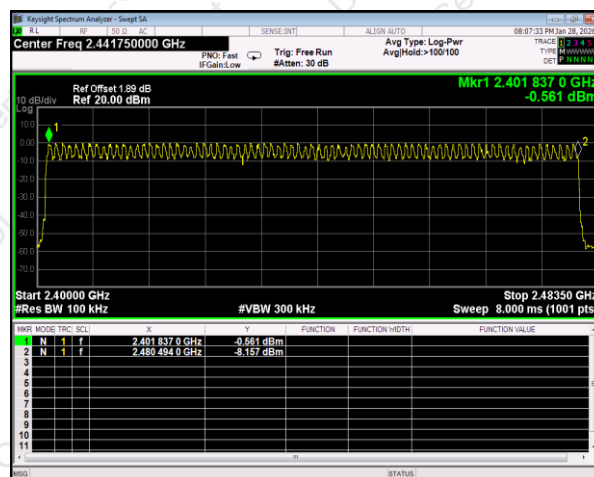


10.4 Test Result

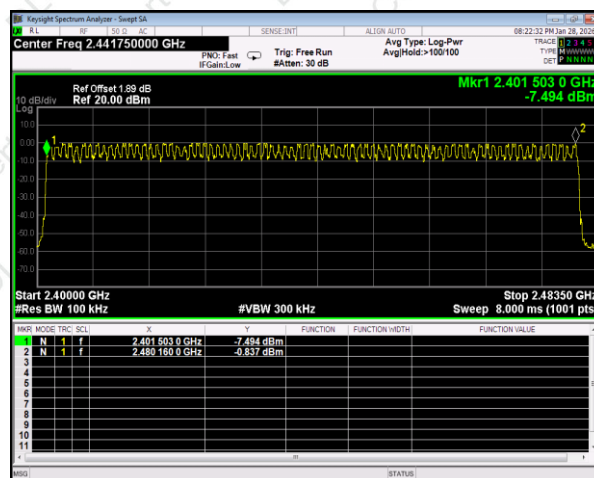
Modulation	Packet	Hopping Number	Limit	Result
GFSK	1-DH1	79	15	Pass
$\pi/4$ -DQPSK	2-DH1	79	15	Pass
8-DPSK	3-DH1	79	15	Pass
Remark: The test data shows only the worst case 1-DH1/2DH1/3DH1 with GFSK / $\pi/4$ -DQPSK/8-DPSK.				



GFSK - 1-DH1 Test Plots

 $\pi/4$ -DQPSK - 2-DH1 Test Plots

8-DPSK - 3-DH1 Test Plots

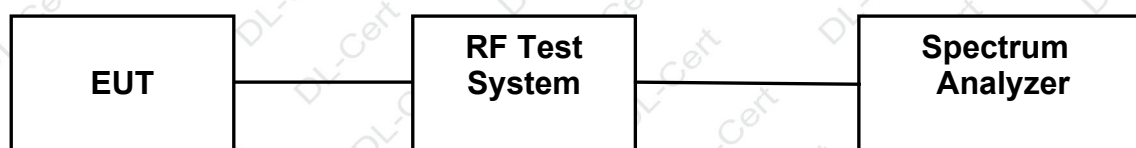




11. DWELL TIME

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10:2020
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.



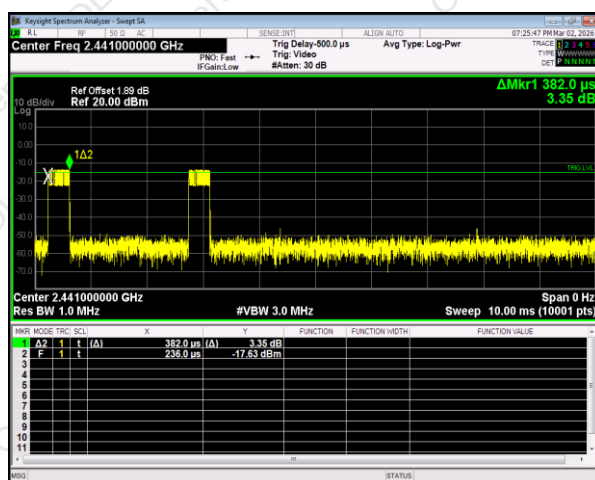
11.4 Test Result

Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.382	121.858	319	31600	400	Pass
1-DH3	2441	1.639	260.601	159	31600	400	Pass
1-DH5	2441	2.88	305.28	106	31600	400	Pass
2-DH1	2441	0.392	124.656	318	31600	400	Pass
2-DH3	2441	1.635	263.235	161	31600	400	Pass
2-DH5	2441	2.884	351.848	122	31600	400	Pass
3-DH1	2441	0.391	124.729	319	31600	400	Pass
3-DH3	2441	1.642	252.868	154	31600	400	Pass
3-DH5	2441	2.893	338.481	117	31600	400	Pass

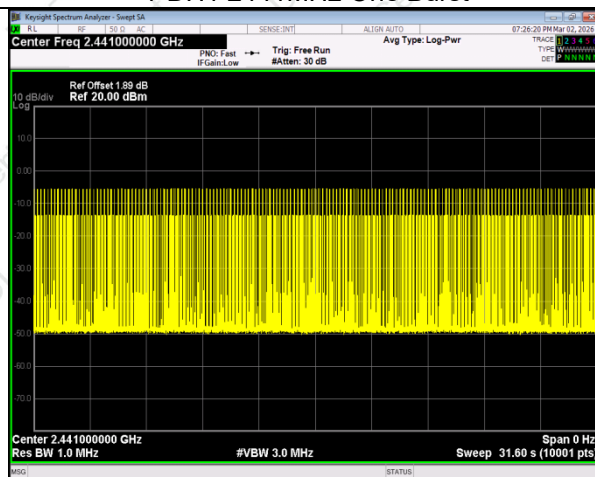
Note: Total Dwell Time (ms) = Pulse Time (ms)*Burst Count



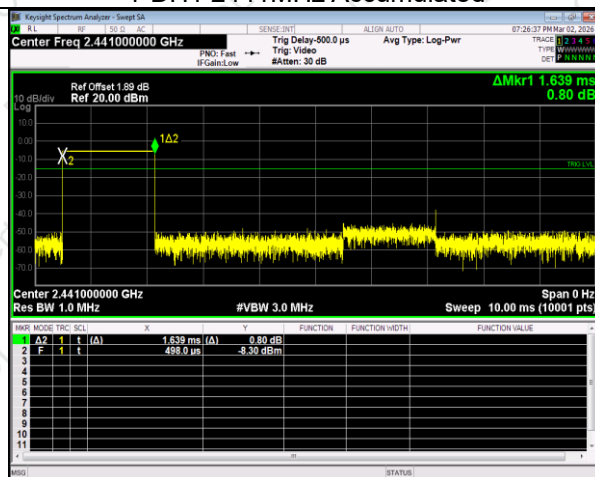
Test Plots



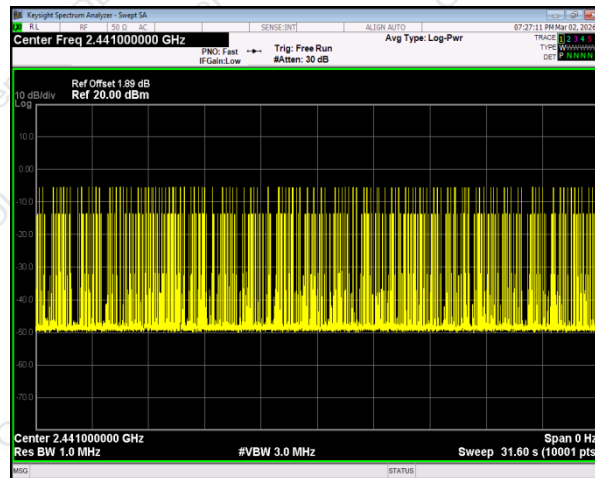
1-DH1 2441MHz One Burst



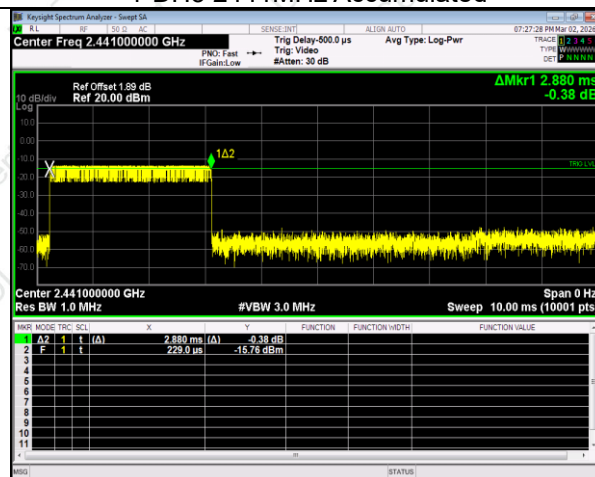
1-DH1 2441MHz Accumulated



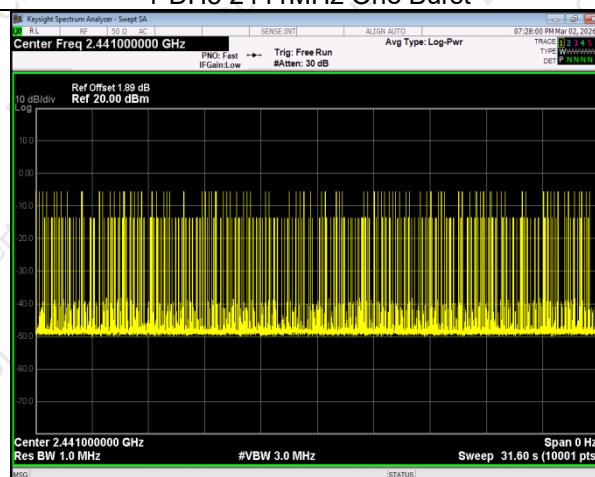
1-DH3 2441MHz One Burst



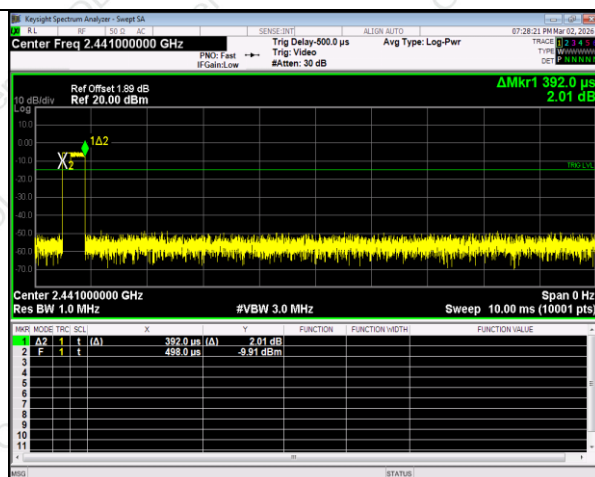
1-DH3 2441MHz Accumulated



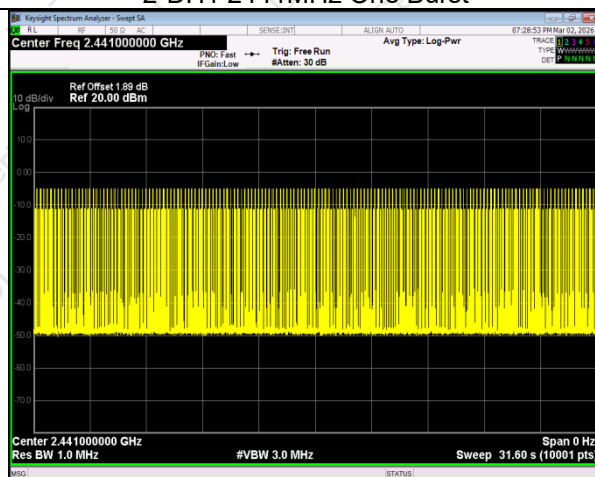
1-DH5 2441MHz One Burst



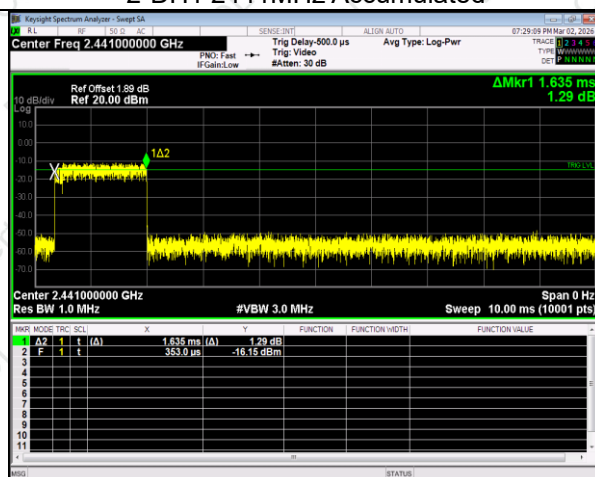
1-DH5 2441MHz Accumulated



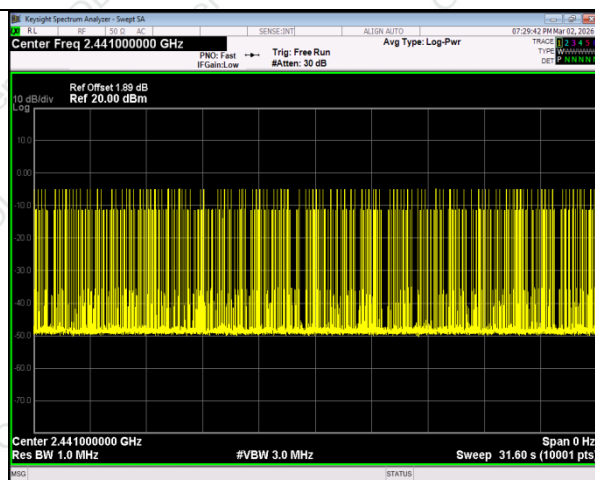
2-DH1 2441MHz One Burst



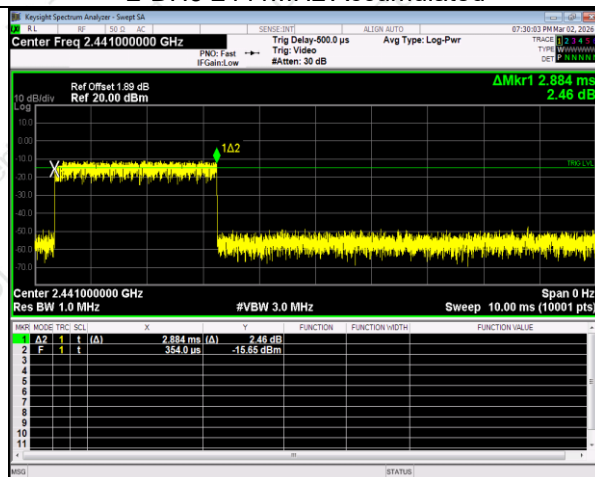
2-DH1 2441MHz Accumulated



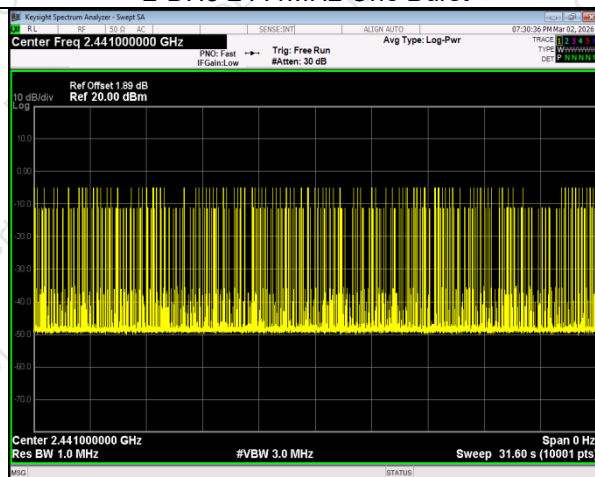
2-DH3 2441MHz One Burst



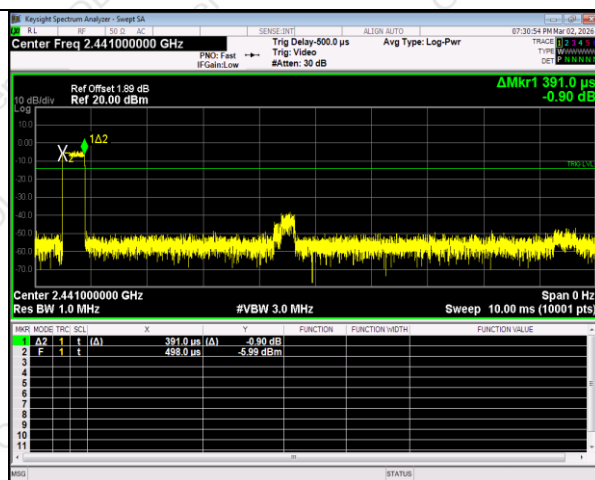
2-DH3 2441MHz Accumulated



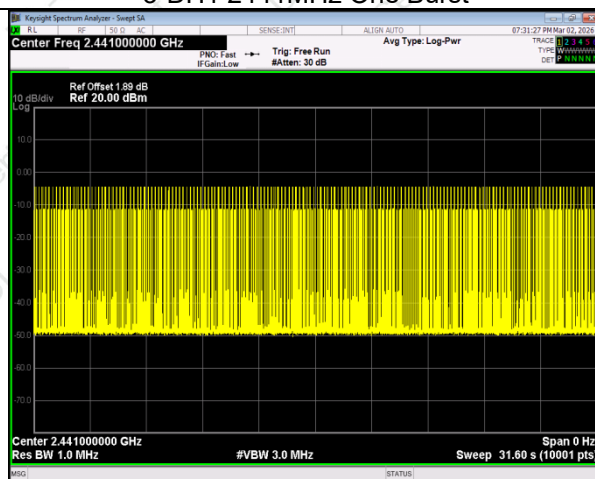
2-DH5 2441MHz One Burst



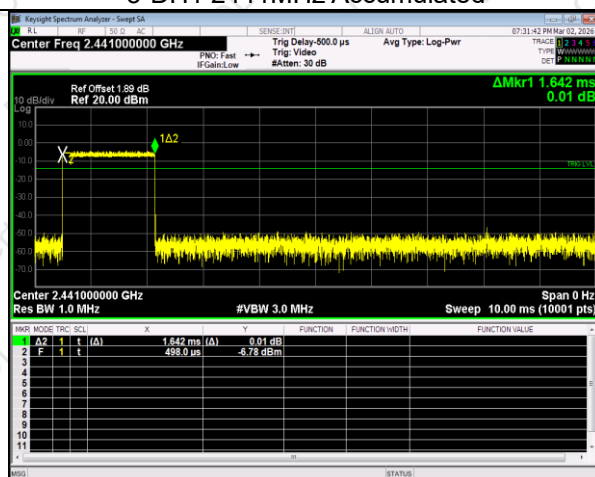
2-DH5 2441MHz Accumulated



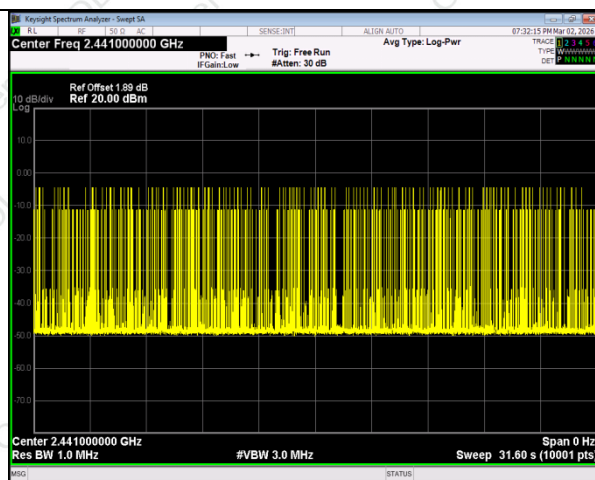
3-DH1 2441MHz One Burst



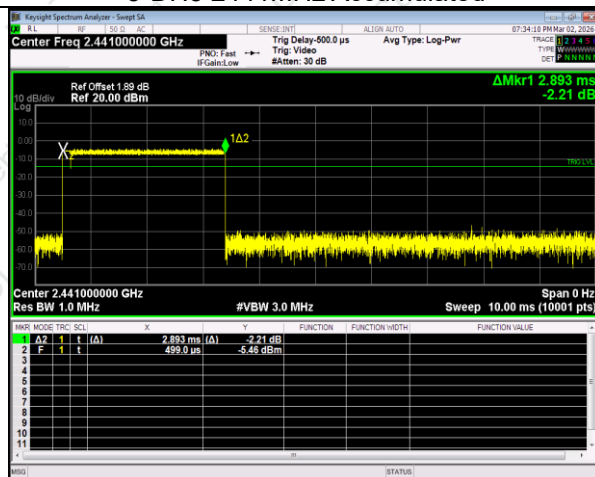
3-DH1 2441MHz Accumulated



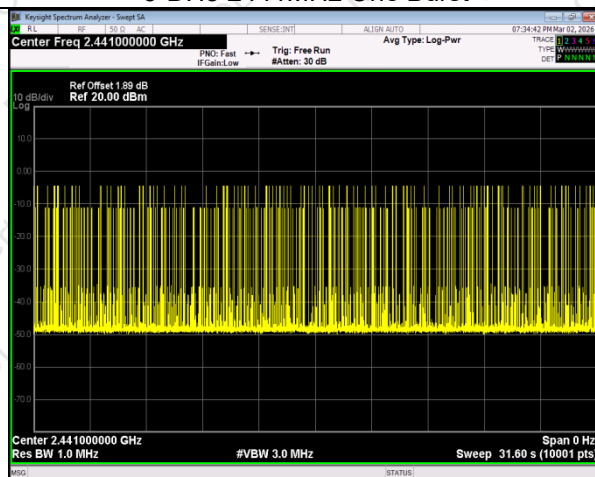
3-DH3 2441MHz One Burst



3-DH3 2441MHz Accumulated



3-DH5 2441MHz One Burst



3-DH5 2441MHz Accumulated

**12. Antenna Requirement**

Standard requirement:	FCC Part15 C Section 15.203 /247(b)(4)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.	
15.247(b)(4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	
The antenna is Internal antenna, the best case gain of the antennas is 2.07dBi, 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 *****