3DH5_Ant1_2480

OCB

DH5_Ant1_2402

DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

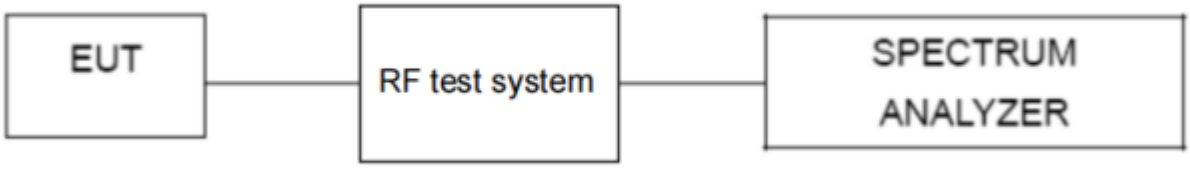
3DH5_Ant1_2480


Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
02:33:47 PM Oct 30, 2025
Frequency
Ref Offset 10.81 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.480129 GHz
2.1828 dBm
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
1.2105 MHz
Total Power 10.9 dBm
Transmit Freq Error -32.017 kHz
% of OBW Power 99.00 %
x dB Bandwidth 1.380 MHz
x dB -26.00 dB
MSG
STATUS

8. MAXIMUM PEAK OUTPUT POWER

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2020
Limit:	GFSK: 30dBm π/4-DQPSK & 8-DPSK: 20.97dBm

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.

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.

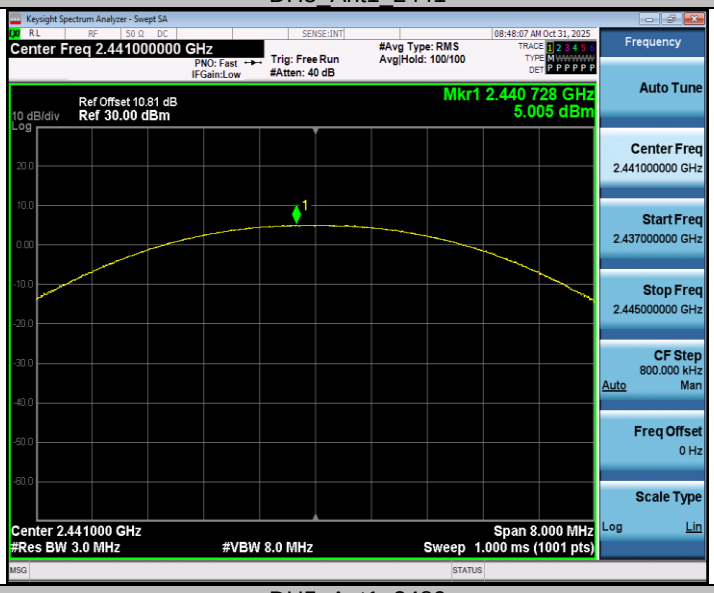
8.4 DEVIATION FROM STANDARD

No deviation.

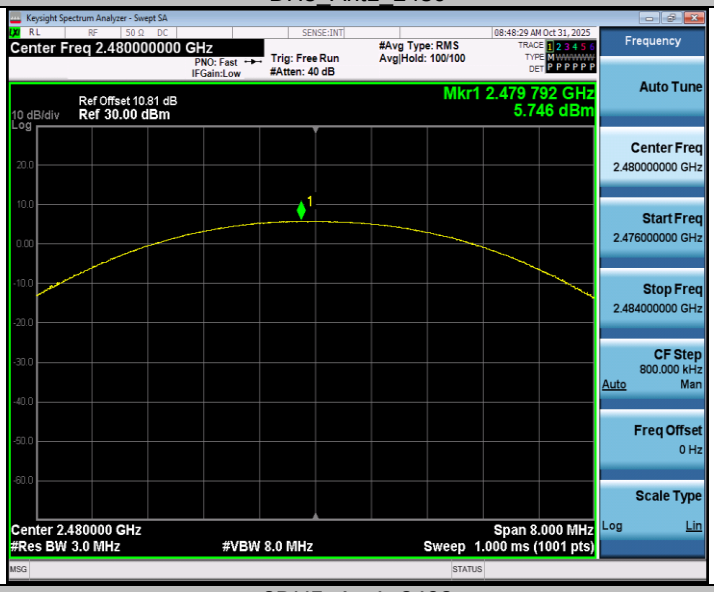
8.5 TEST RESULT

Modulation	Packet	Test channel	Peak output power (dBm)	Limit (dBm)	Result
GFSK	1-DH5	Lowest	5.76	30.00	Pass
		Middle	5.01		
		Highest	5.75		
π/4-DQPSK	2-DH5	Lowest	6.48	20.97	Pass
		Middle	6.26		
		Highest	7.11		
8-DPSK	3-DH5	Lowest	6.92	20.97	Pass
		Middle	6.65		
		Highest	7.50		

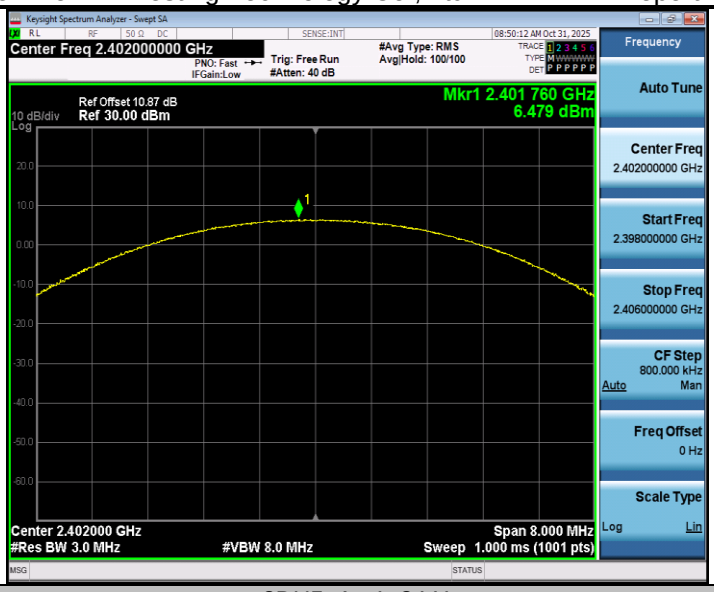
DH5_Ant1_2441



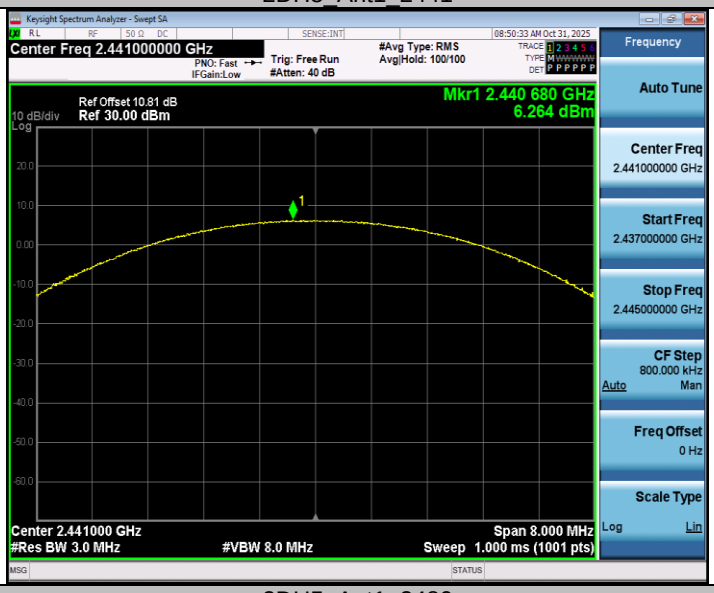
DH5_Ant1_2480



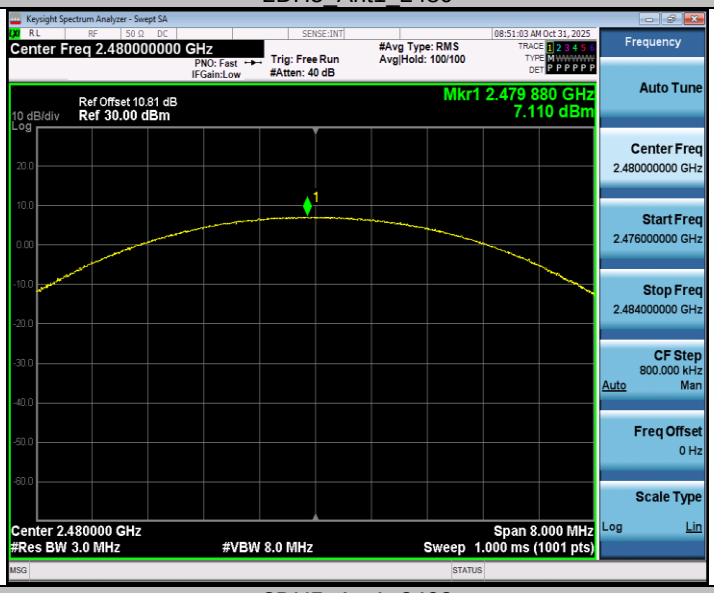
2DH5_Ant1_2402



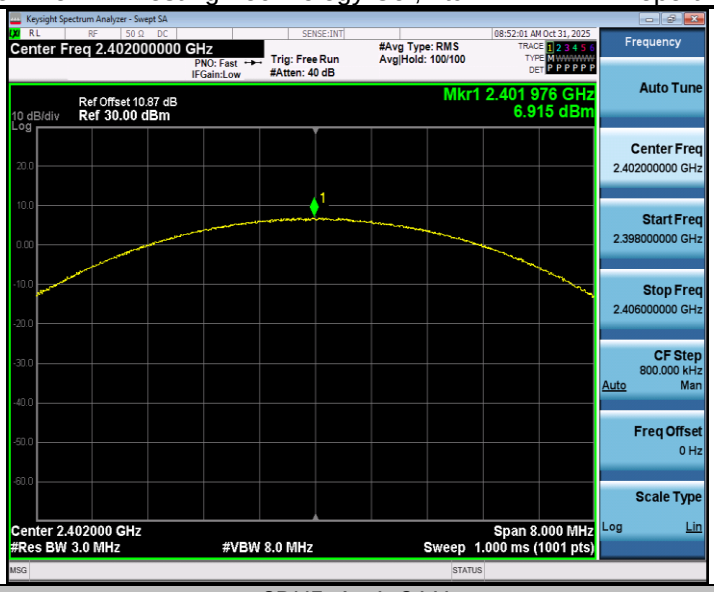
2DH5_Ant1_2441



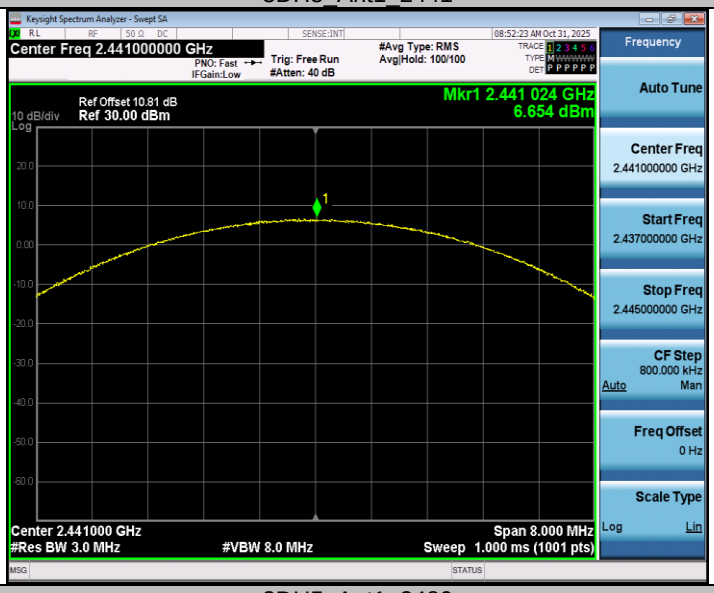
2DH5_Ant1_2480



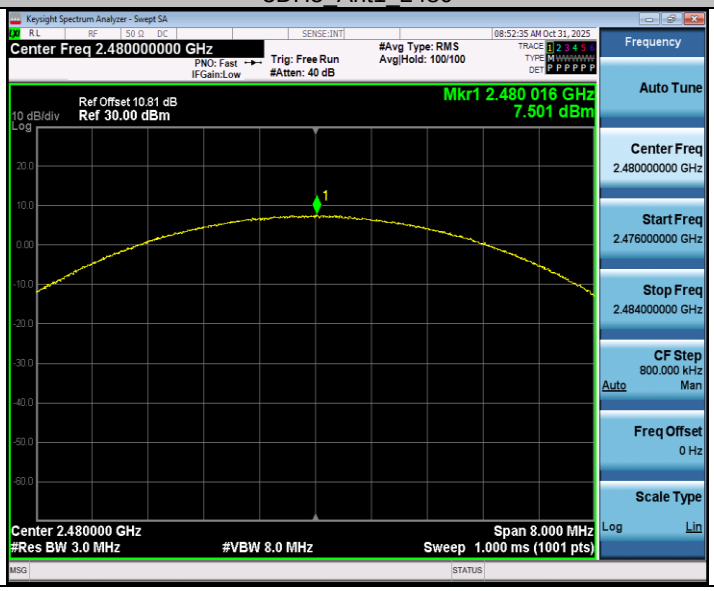
3DH5_Ant1_2402



3DH5_Ant1_2441



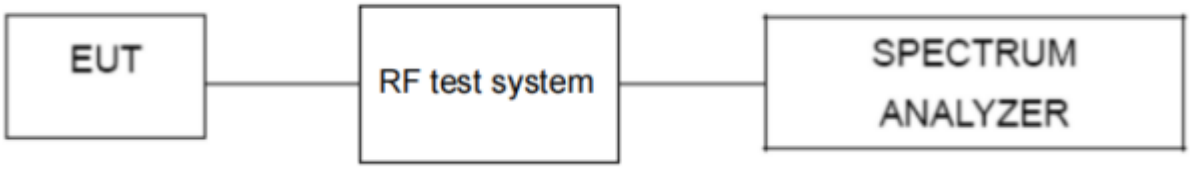
3DH5_Ant1_2480



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: 20dB Bandwidth 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 = 30kHz. VBW = 100kHz , 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.

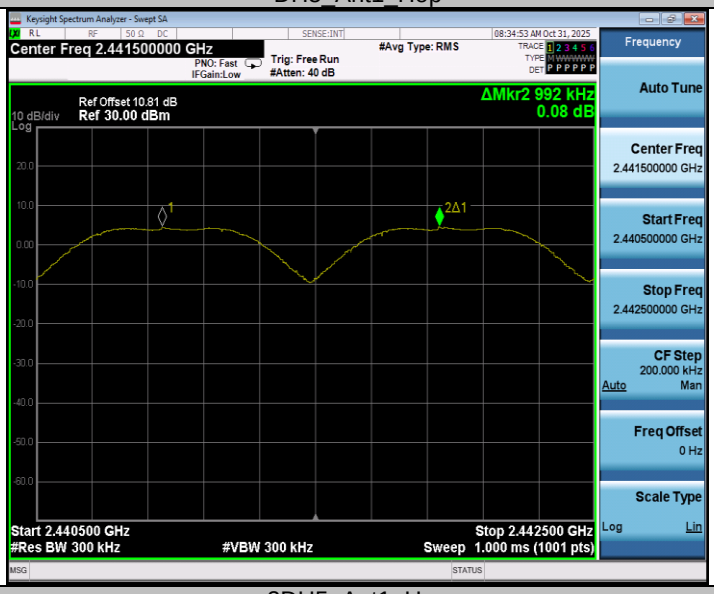
9.3 DEVIATION FROM STANDARD

No deviation.

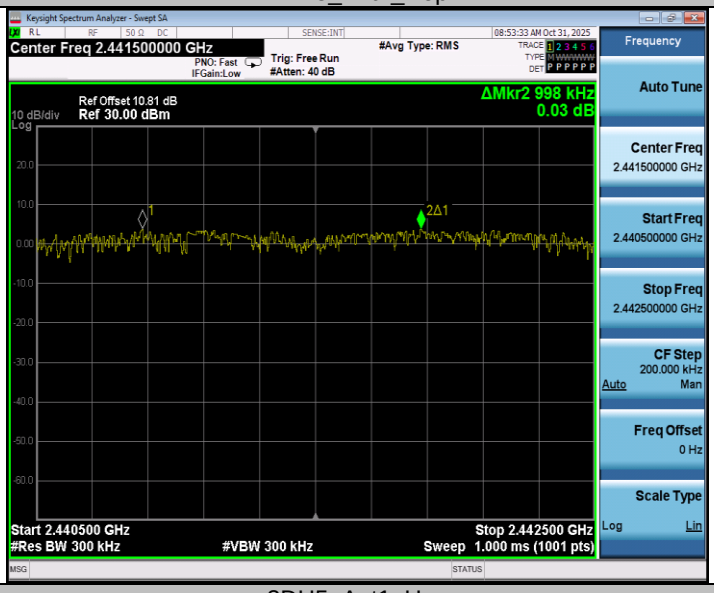
9.4 TEST RESULT

TestMode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.992	≥0.690	PASS
2DH5	Ant1	Hop	0.998	≥0.918	PASS
3DH5	Ant1	Hop	1.066	≥0.880	PASS

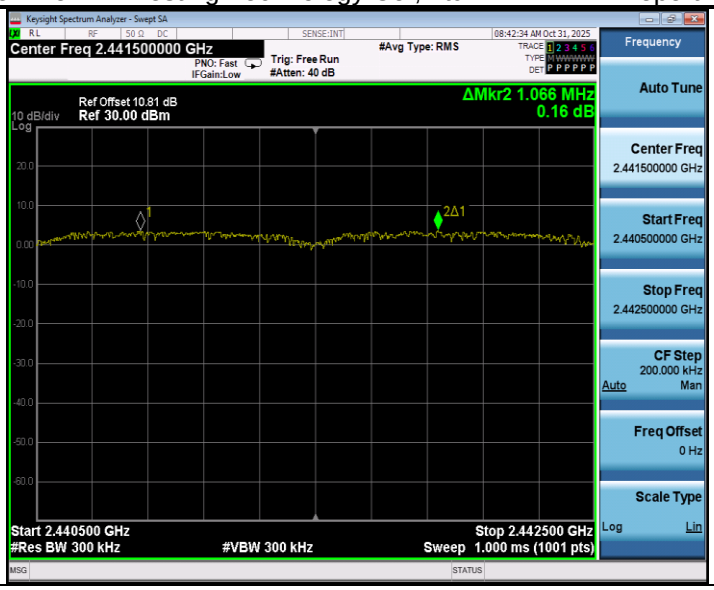
DH5_Ant1_Hop



2DH5_Ant1_Hop



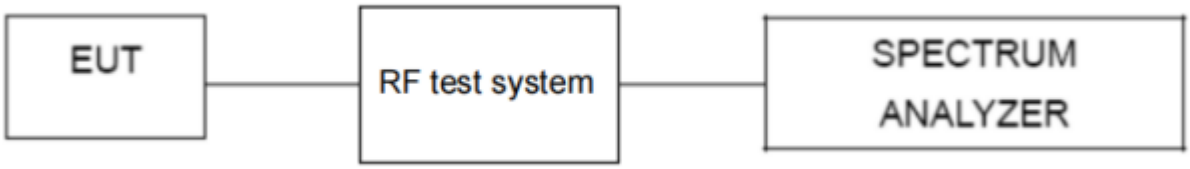
3DH5_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
08:42:34 AM Oct 31, 2025
Ref Offset 10.81 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 1.066 MHz
0.16 dB
Start 2.440500 GHz
#Res BW 300 kHz
#VBW 300 kHz
Stop 2.442500 GHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

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 = 100 kHz, VBW = 300 kHz Frequency range = 2400MHz - 2483.5MHz Detector = peak
Limit:	P_{max-pk} ≤ 1W, N_{ch} ≥ 75 Channels P_{max-pk} ≤ 0.125W, N_{ch} ≥ 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

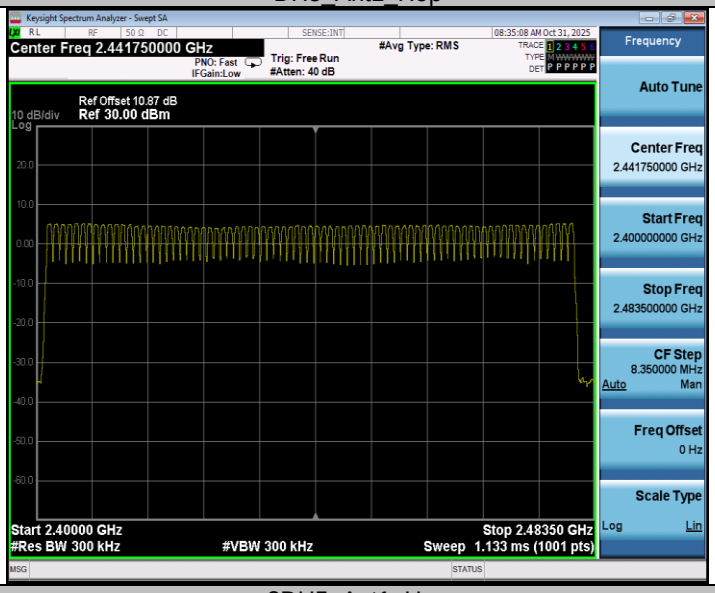
No deviation.

10.4 TEST RESULT

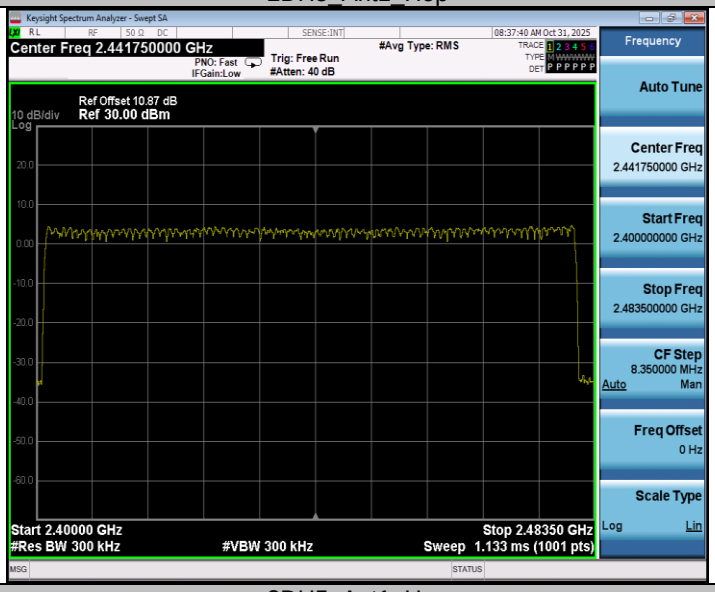
Modulation	Packet	Hopping Number	Limit	Result
GFSK	1-DH5	79	≥75	Pass
π/4-DQPSK	2-DH5	79	≥15	Pass
8-DPSK	3-DH5	79	≥15	Pass

Test Plots:
79 Channels in total

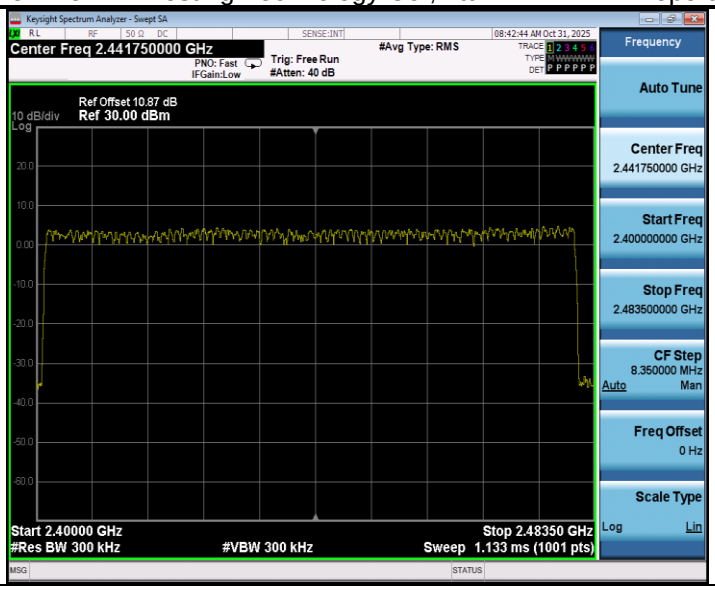
DH5_Ant1_Hop



2DH5_Ant1_Hop



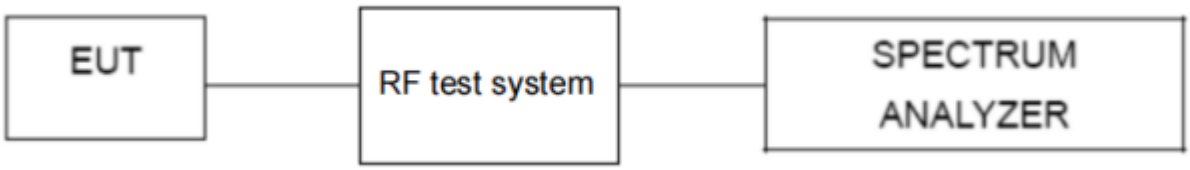
3DH5_Ant1_Hop


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
08:42:44 AM Oct 31, 2025
Ref Offset 10.87 dB
10 dB/div
Log
Ref 30.00 dBm
Start 2.40000 GHz
#Res BW 300 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 1.133 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

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 = 0 Hz;

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	121.92	400	Pass
2441MHz	DH3	261.92	400	Pass
2441MHz	DH5	307.73	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2441MHz time slot=0.381(ms)*(1600/ (2*79))*31.6=121.92ms

CH:2441MHz time slot=1.637(ms)*(1600/ (4*79))*31.6=261.92ms

CH:2441MHz time slot=2.885(ms)*(1600/ (6*79))*31.6=307.73ms

π/4-DQPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	2DH1	123.52	400	Pass
2441MHz	2DH3	262.24	400	Pass
2441MHz	2DH5	307.95	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2441MHz time slot=0.386(ms)*(1600/ (2*79))*31.6=123.52ms

CH:2441MHz time slot=1.639(ms)*(1600/ (4*79))*31.6=262.24ms

CH:2441MHz time slot=2.887(ms)*(1600/ (6*79))*31.6=307.95ms

8-DPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	3DH1	123.52	400	Pass
2441MHz	3DH3	262.24	400	Pass
2441MHz	3DH5	308.05	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

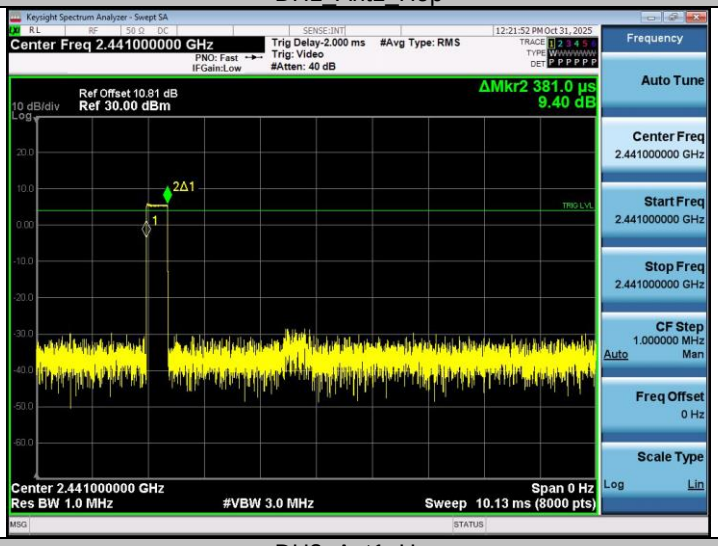
CH:2441MHz time slot=0.386(ms)*(1600/ (2*79))*31.6=123.52ms

CH:2441MHz time slot=1.638(ms)*(1600/ (4*79))*31.6=262.08ms

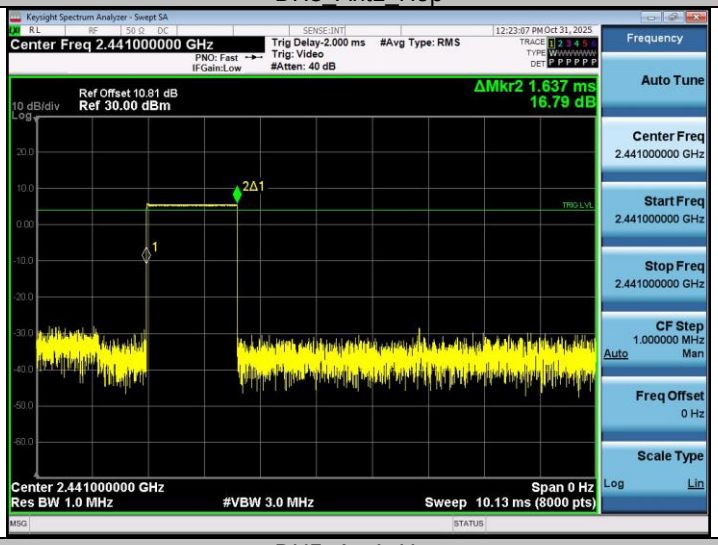
CH:2441MHz time slot=2.888(ms)*(1600/ (6*79))*31.6=308.05ms

Test Plots

DH1_Ant1_Hop

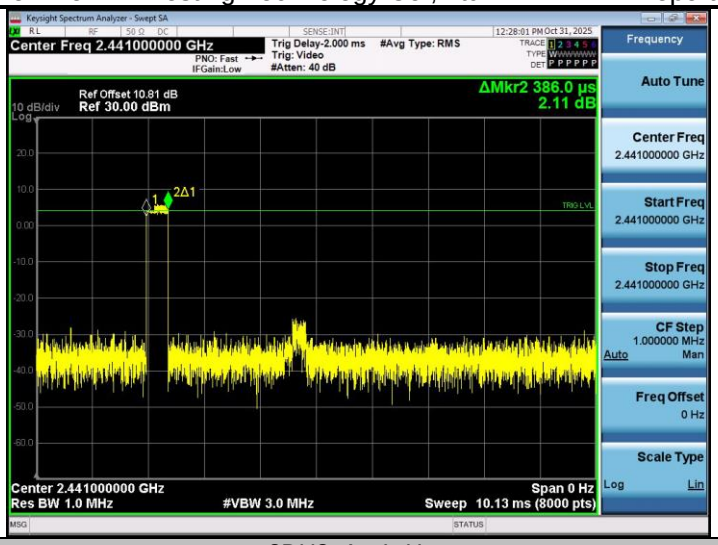


DH3_Ant1_Hop

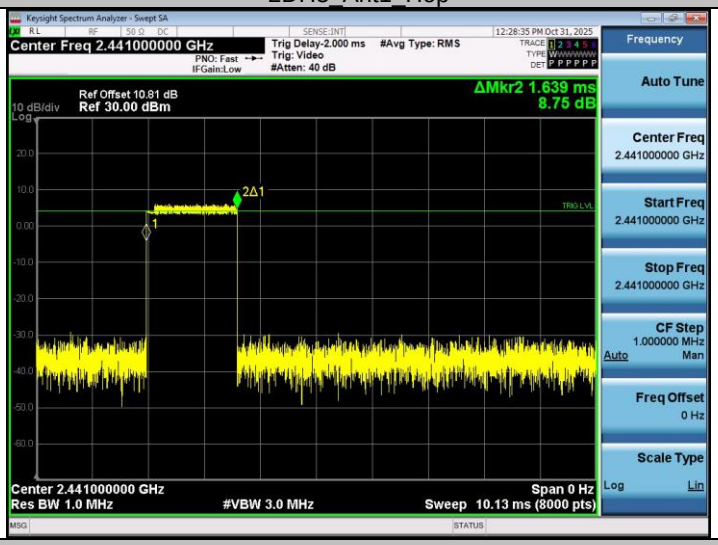


DH5_Ant1_Hop

2DH1_Ant1_Hop

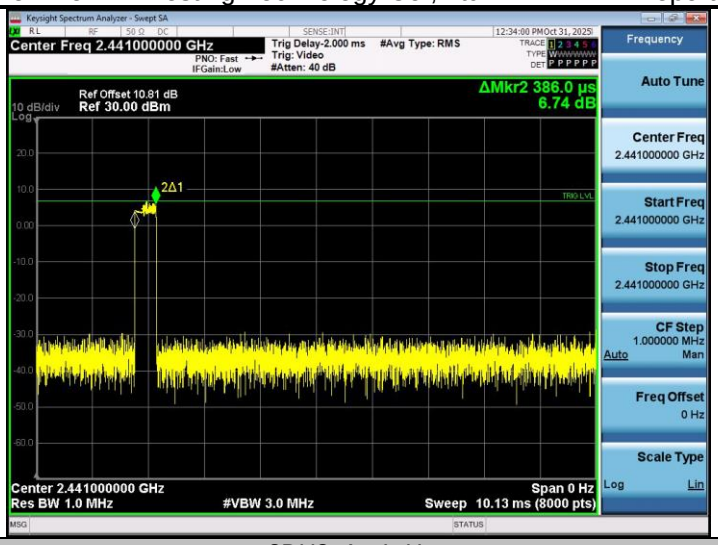


2DH3_Ant1_Hop

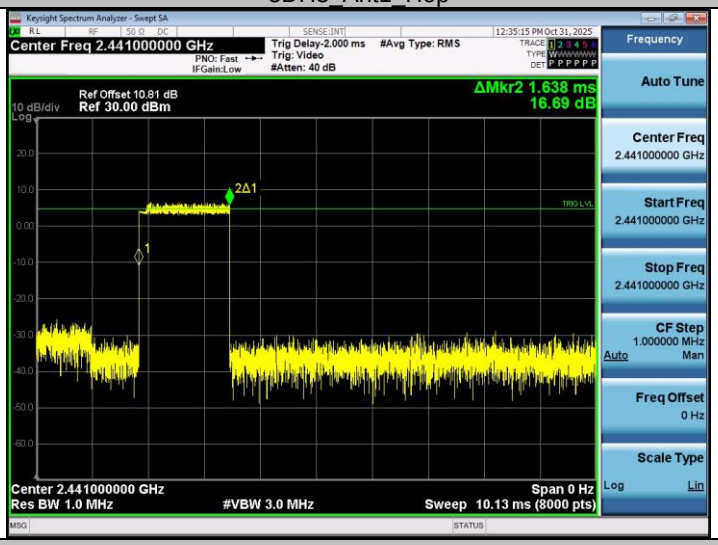


2DH5_Ant1_Hop

3DH1_Ant1_Hop



3DH3_Ant1_Hop



3DH5_Ant1_Hop

12. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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(c) (1)(i) requirement: (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 FPC Antenna, the best case gain of the antennas is 3.5dBi, 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 ※※※※※