FGTEST

DH5_Ant1_2480
2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

7.3. Output Power Measurement

7.3.1.Test Limit

The maximum out power permissible output power is 1 Watt 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. For all other frequency hopping

systems in the 2400–2483.5 MHz band: 0.125 watts.And for antenna gain greater than 6dBi the

limit shall reduce by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.3.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.5

7.3.3.Test Setting

1. Set RBW ≥ the 20 dB bandwidth of the emission being measured.

2. VBW ≥ RBW

3. Span = approximately five times the 20dB bandwidth, centered on a hopping channel

4. Detector = Peak

5. Trace mode = max hold

6. Sweep = auto couple

7. Allow the trace to stabilize, Use the marker-to-peak function to set the marker to the peak of the

   emission. The indicated level is the peak output power (don't forget added the external

   attenuation and cable loss)

7.3.4.Test Setup
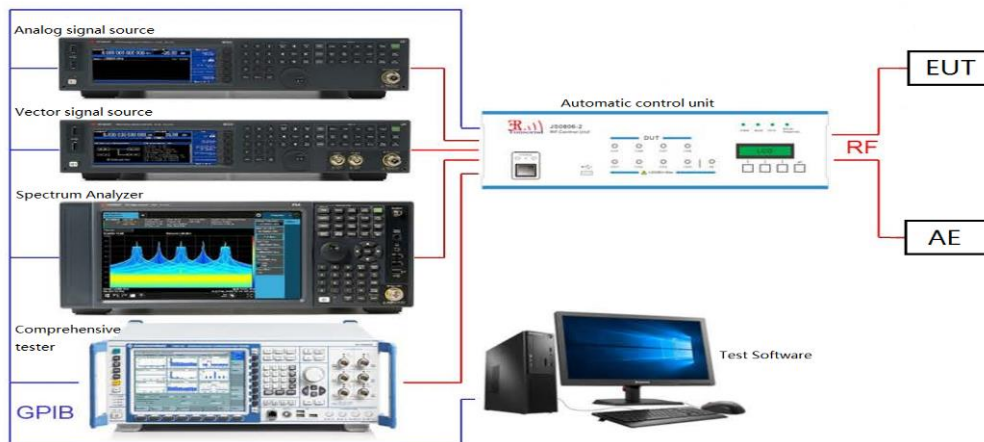
7.3.5.Test Result

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	4.53	≤20.97	PASS
		2441	4.57	≤20.97	PASS
		2480	4.38	≤20.97	PASS
2DH5	Ant1	2402	3.74	≤20.97	PASS
		2441	3.83	≤20.97	PASS
		2480	3.63	≤20.97	PASS
3DH5	Ant1	2402	3.94	≤20.97	PASS
		2441	3.99	≤20.97	PASS
		2480	3.80	≤20.97	PASS

Test Graphs

DH5_Ant1_2402

DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480
3DH5_Ant1_2402
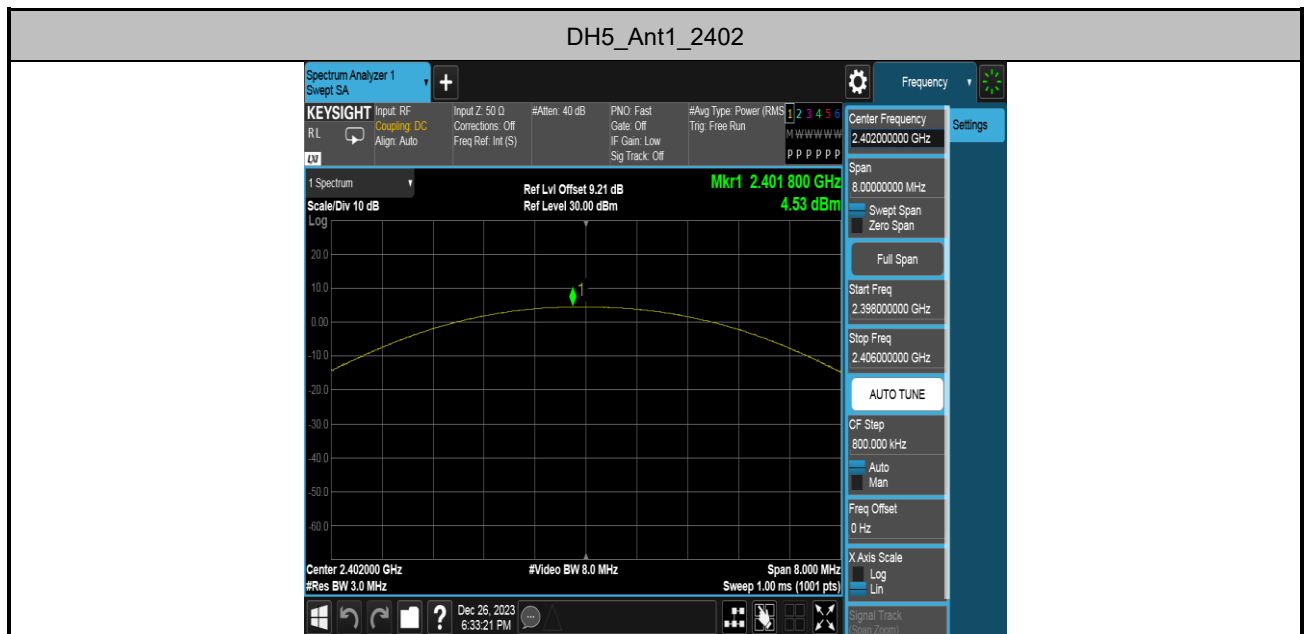
3DH5_Ant1_2441

3DH5_Ant1_2480
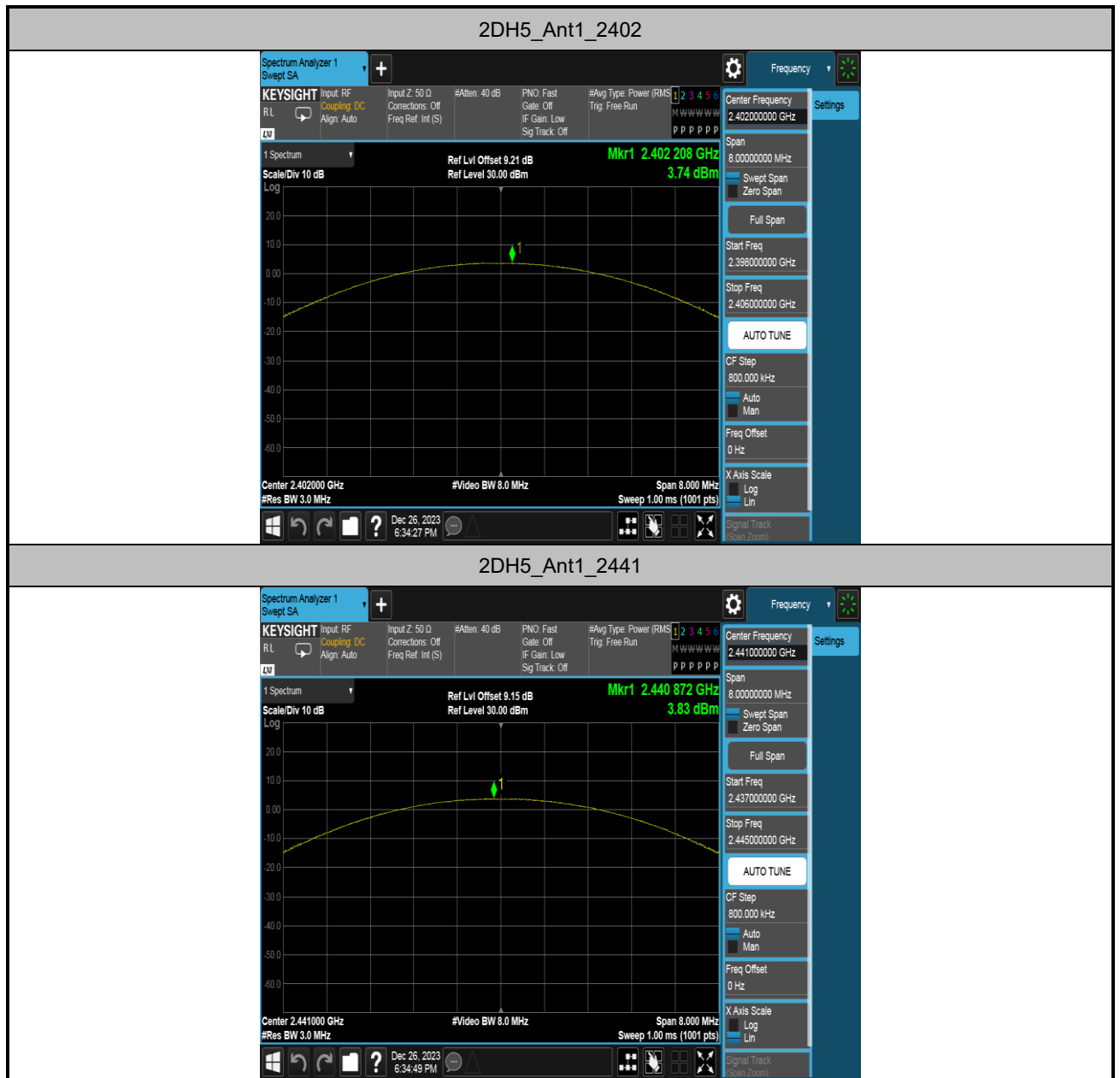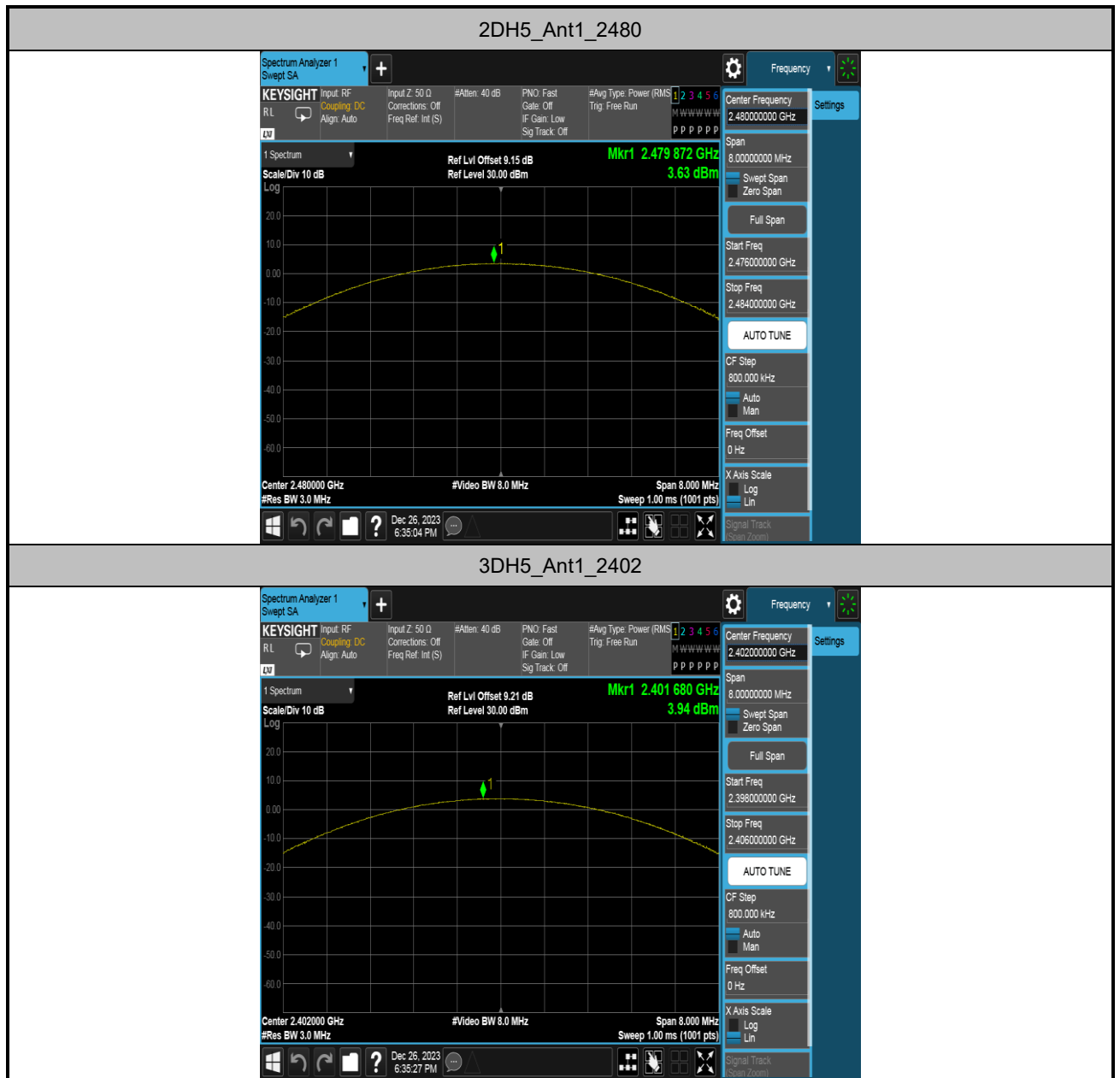
7.4. Carrier Frequency Separation Measurement

7.4.1.Test Limit

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.

7.4.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.2

7.4.3.Test Setting

1. Span = wide enough to capture the peaks of two adjacent channels.

2. Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

3. VBW ≥ RBW

4. Sweep time = Auto couple

5. Detector = Peak

6. Trace mode = Max hold

7. Allowed the trace to stabilize

8. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.
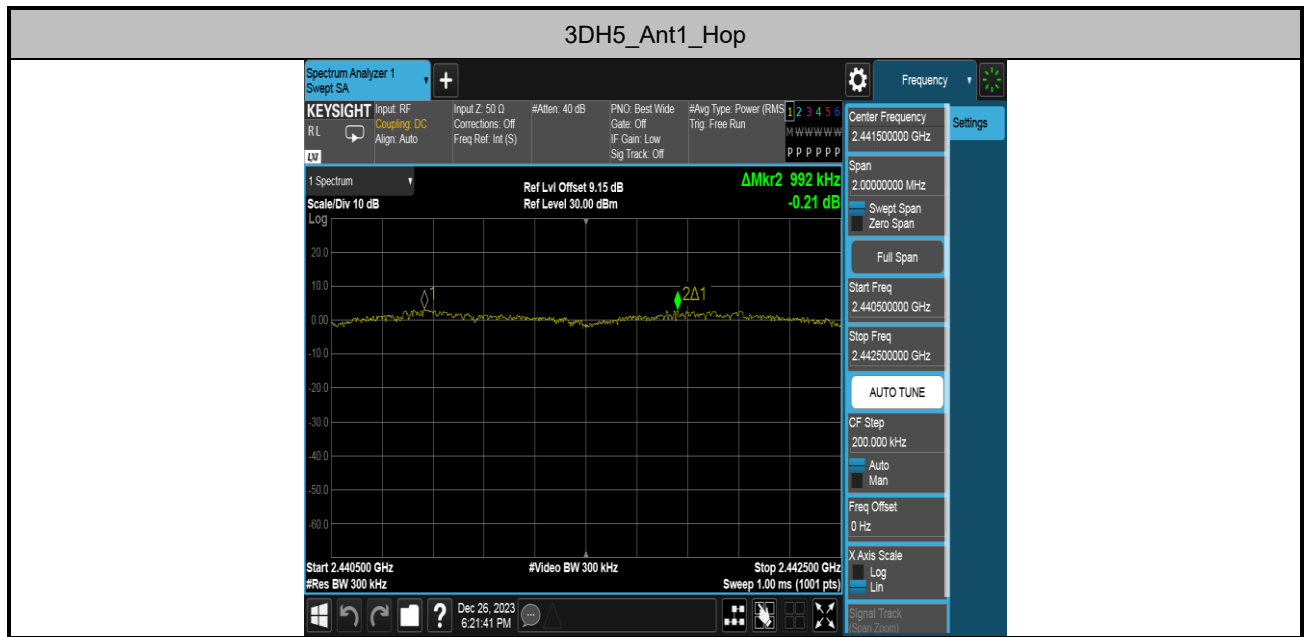
7.4.4.Test Setup
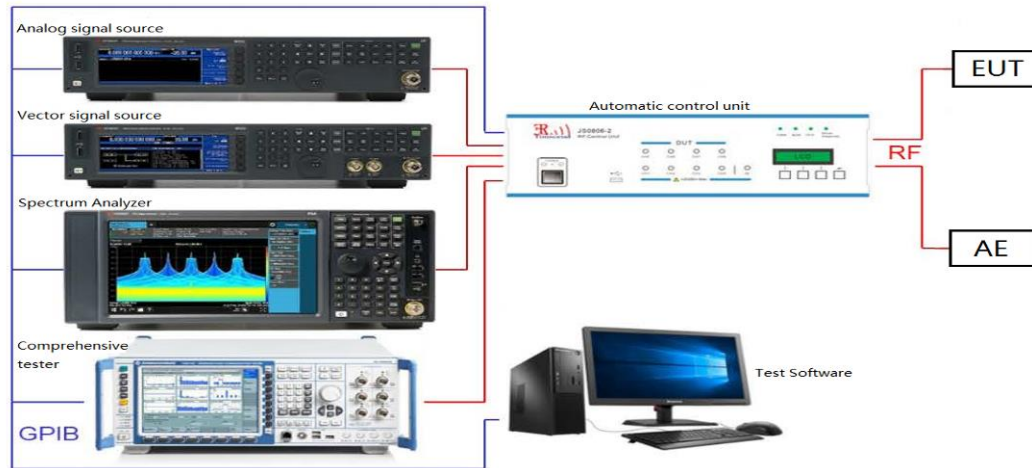
7.4.5.Test Result

Test Mode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.014	≥0.692	PASS
2DH5	Ant1	Hop	0.99	≥0.874	PASS
3DH5	Ant1	Hop	0.992	≥0.866	PASS

Test Graphs

DH5_Ant1_Hop

2DH5_Ant1_Hop

FGTEST

3DH5_Ant1_Hop

7.5. Number of Hopping Channels Measurement

7.5.1.Test Limit

This frequency hopping system must employ a minimum of 15 hopping channels.

7.5.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.3

7.5.3.Test Settitng

1. Span = the frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.

2. To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

3. VBW ≥ RBW

4. Sweep time = Auto couple

5. Detector = Peak

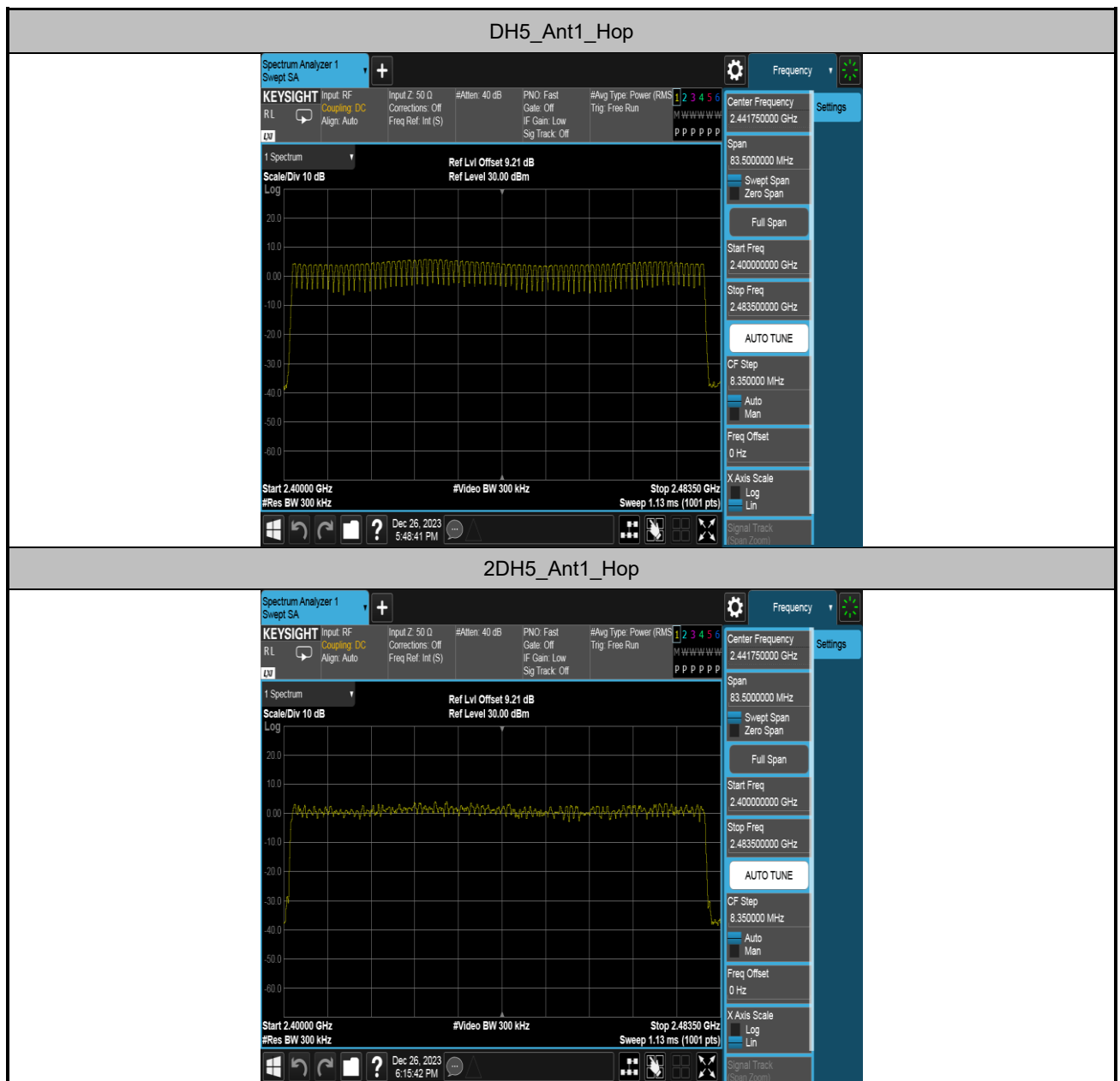6. Trace mode = Max hold

7. Allow the trace to stabilize
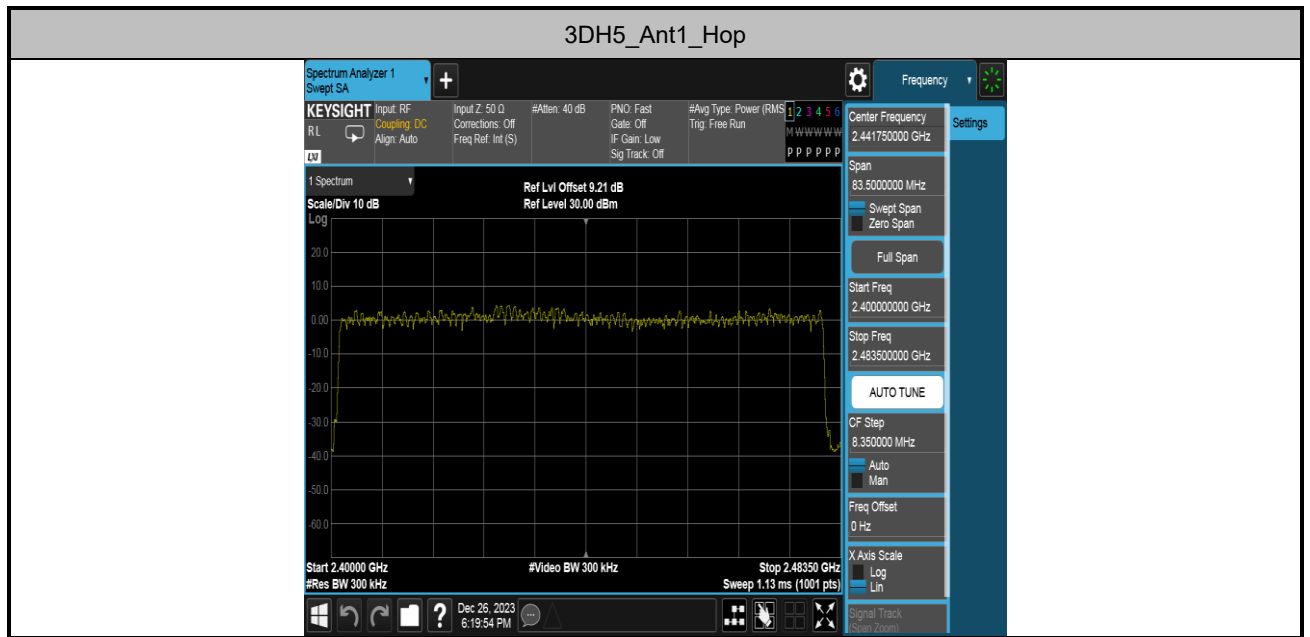
7.5.4.Test Setup
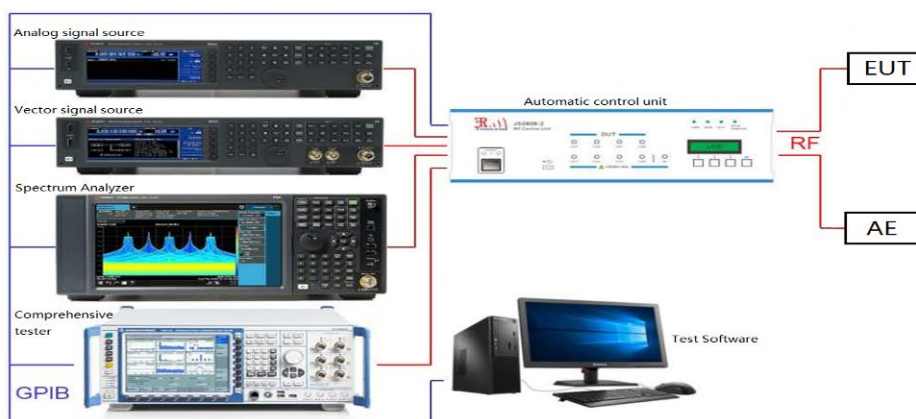
7.5.5.Test Result

Test Mode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

Test Graphs

DH5_Ant1_Hop
2DH5_Ant1_Hop

3DH5_Ant1_Hop

7.6. Time of Occupancy Measurement

7.6.1.Test Limit

The maximum permissible time of occupancy is 400ms within a period of 400ms multiplied by the number of hopping channels employed.

7.6.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.4

7.6.3.Test Settitng

1. Span = zero span, centered on a hopping channel.

2. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.

3. VBW ≥ RBW

4. Sweep time = as necessary to capture the entire dwell time per hopping channel

5. Detector = Peak

6. Trace mode = max hold

7. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. An oscilloscope may be used instead of a spectrum analyzer. The EUT shall show compliance with the appropriate regulatory limit for the number of hopping channels. A plot of the data shall be included in the test report.
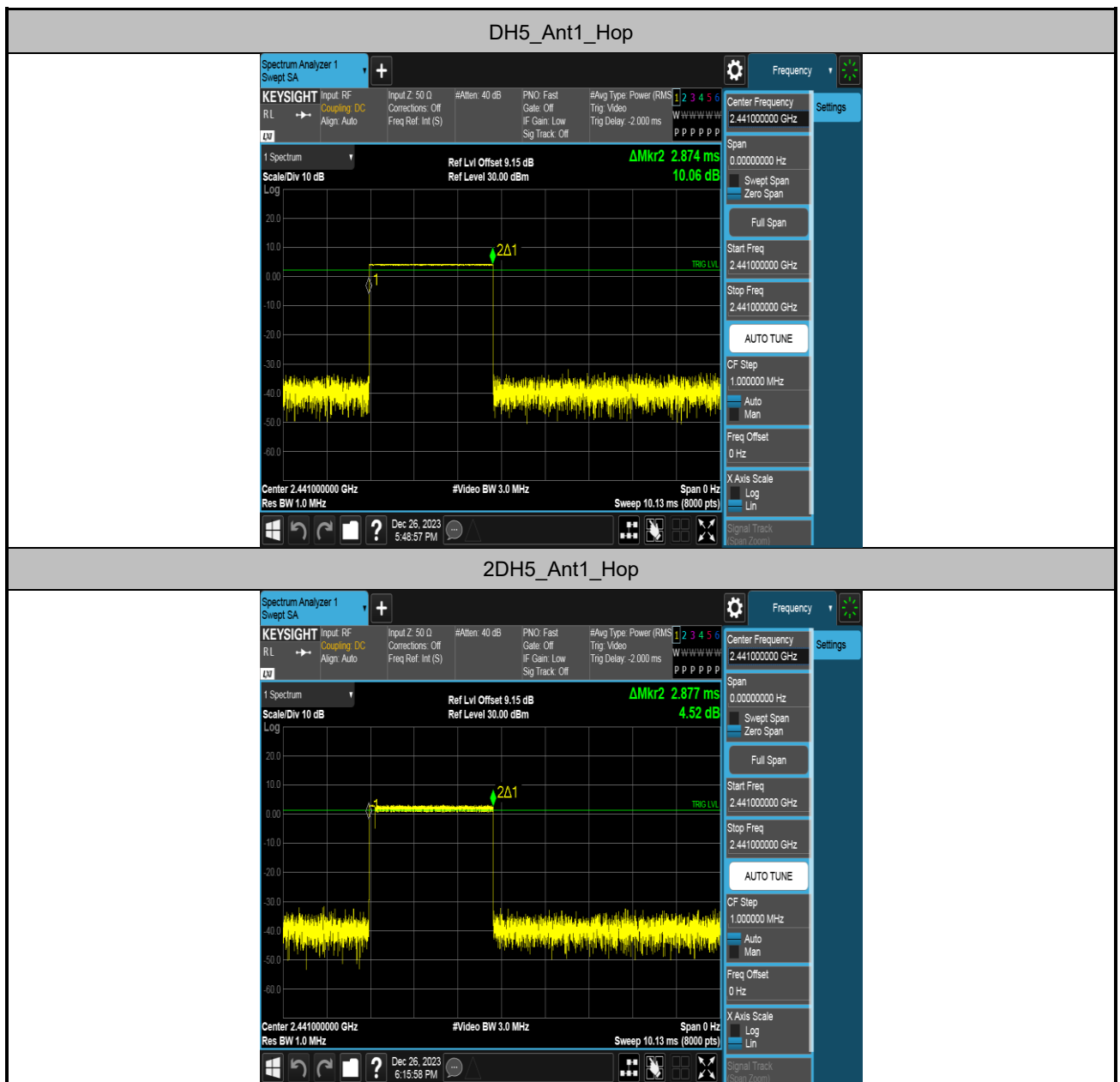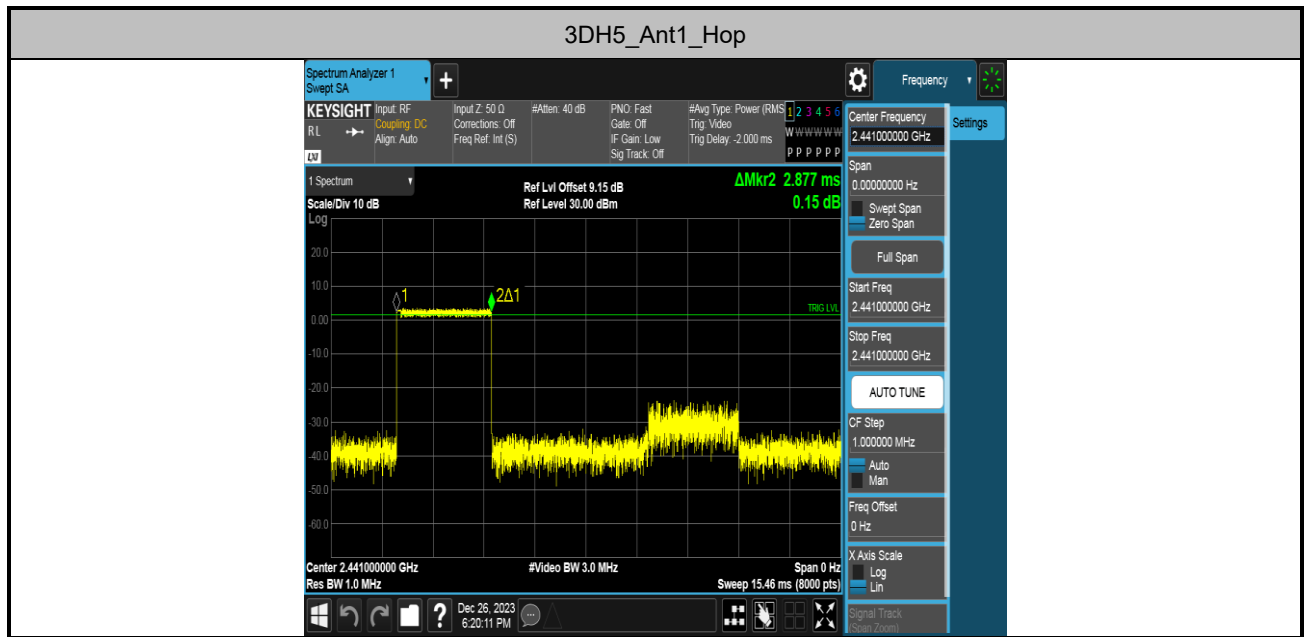
7.6.4.Test Setup
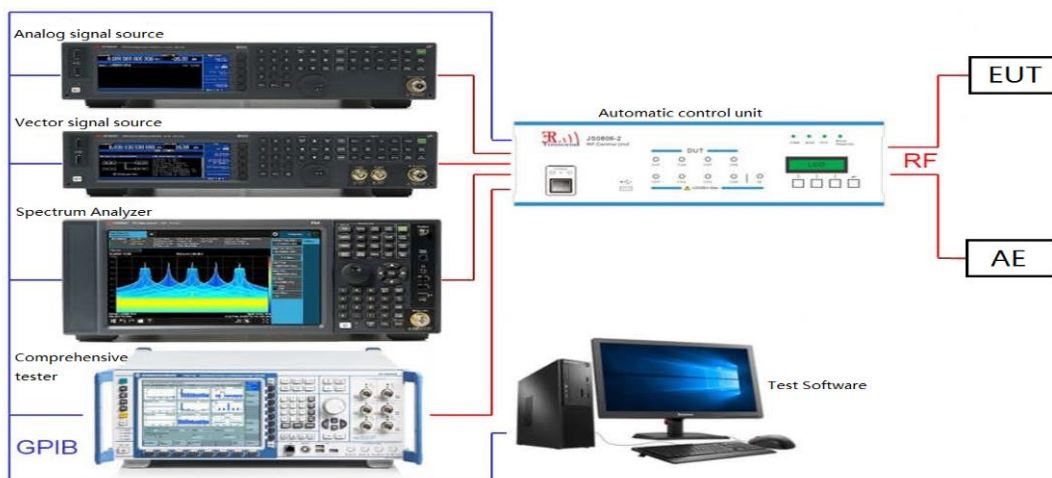
7.6.5.Test Result

Test Mode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.874	106.67	0.307	≤0.4	PASS
2DH5	Ant1	Hop	2.877	106.67	0.307	≤0.4	PASS
3DH5	Ant1	Hop	2.877	106.67	0.307	≤0.4	PASS

Note：TotalHops is the number of bursts measured in a scan time of 31.6 seconds.

Test Graphs

DH5_Ant1_Hop

2DH5_Ant1_Hop

3DH5_Ant1_Hop

7.7. Band-edge Compliance Measurement

7.7.1.Test Limit

The maximum permissible emission level is 20dBc. Any emissions were lying outside of the

emission bandwidth and in authorized band edges to a field strength limit specified in Section

15.209 of the Title 47 CFR.

7.7.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.10.4

7.7.3.Test Setting

1. Span = wide enough to capture the peak level of the emission operating on the channel closest

   to the band edge, as well as any modulation products which fall outside of the authorized band

   of operation.

2. RBW = 100kHz

3. VBW = 300kHz

4. Detector = peak

5. Sweep time = auto couple

6. Trace mode = max hold

7. Trace was allowed to stabilize

8. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest

   modulation product outside of the band, if this level is greater than that at the band edge.

   Enable the marker-delta function, than use the marker-to-peak function to move the marker to

   the peak of the in-band emission.
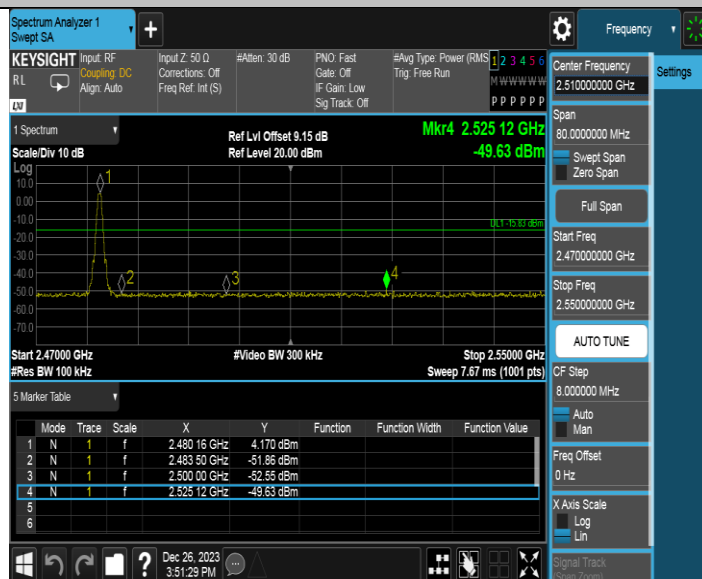
7.7.4.Test Setup
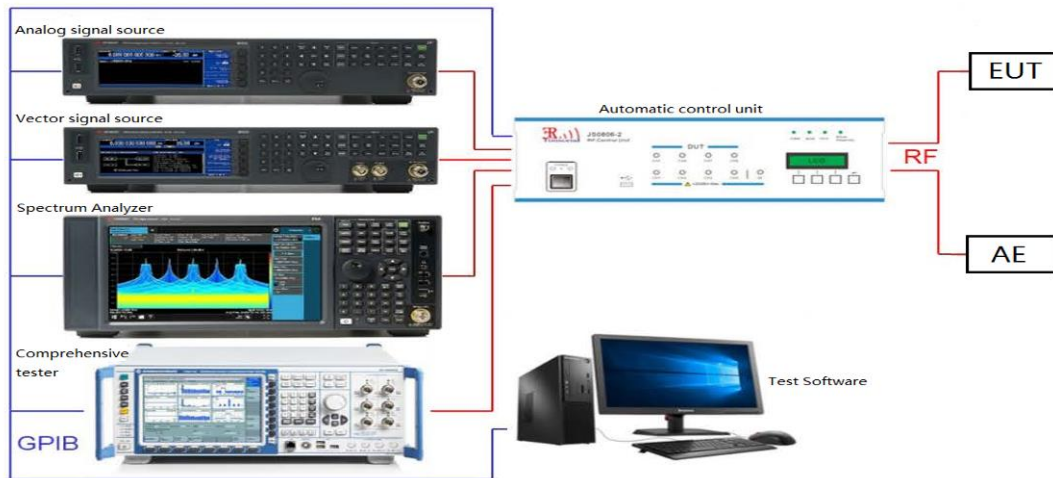
7.7.5.Test Result

Test Mode	Antenna	Ch Name	Channel	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	4.46	-49.81	≤-15.54	PASS
		High	2480	4.17	-49.63	≤-15.83	PASS
		Low	Hop_2402	3.01	-50.4	≤-16.99	PASS
		High	Hop_2480	4.71	-49.97	≤-15.29	PASS
2DH5	Ant1	Low	2402	2.63	-49.66	≤-17.37	PASS
		High	2480	2.50	-49.37	≤-17.5	PASS
		Low	Hop_2402	1.21	-50.24	≤-18.79	PASS
		High	Hop_2480	2.63	-49.55	≤-17.38	PASS
3DH5	Ant1	Low	2402	2.78	-49.5	≤-17.22	PASS
		High	2480	2.62	-48.3	≤-17.38	PASS
		Low	Hop_2402	-0.89	-50.63	≤-20.89	PASS
		High	Hop_2480	2.42	-49.5	≤-17.58	PASS

Test Graphs
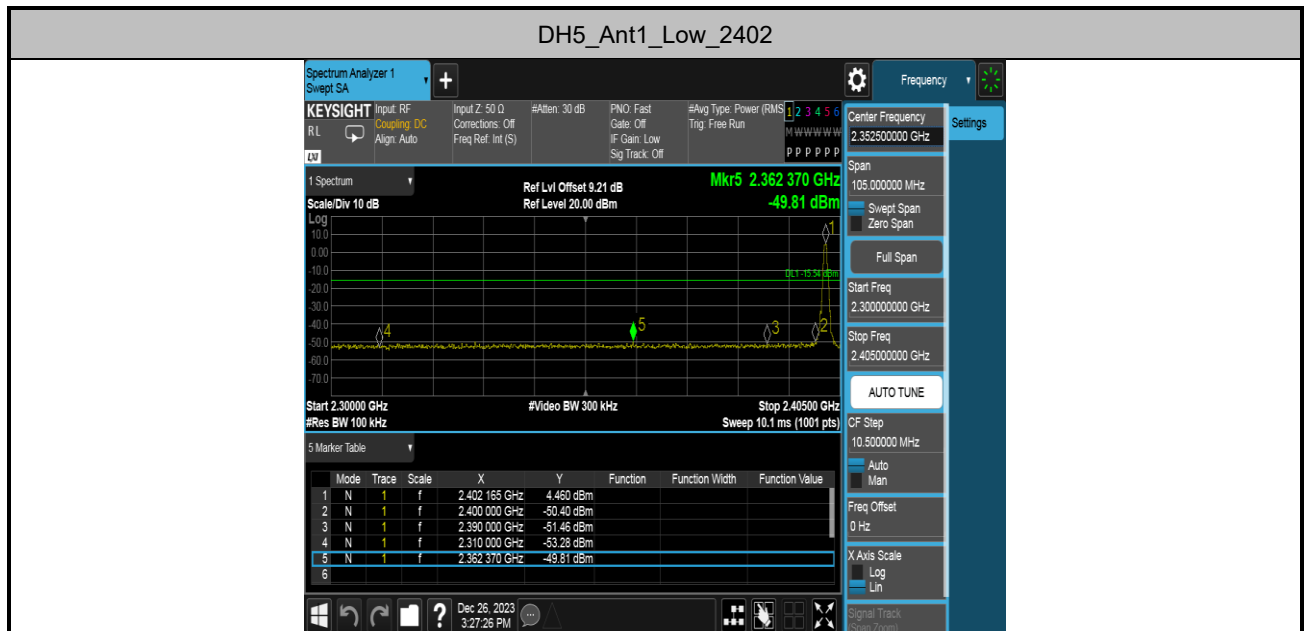
DH5_Ant1_Low_2402

DH5_Ant1_High_2480
DH5_Ant1_Low_Hop_2402