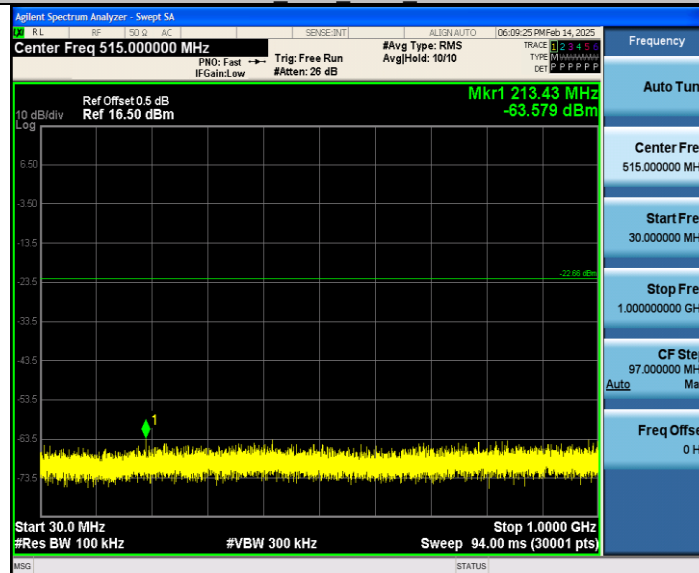
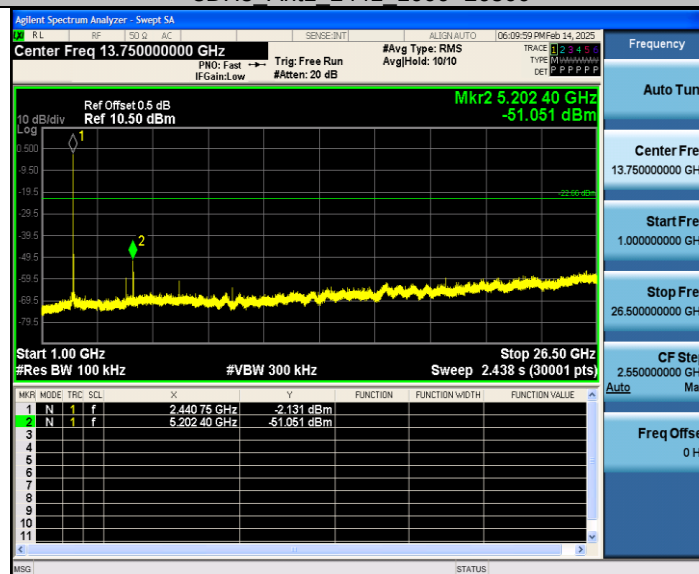




3DH5_Ant1_2441_30~1000



3DH5_Ant1_2441_1000~26500



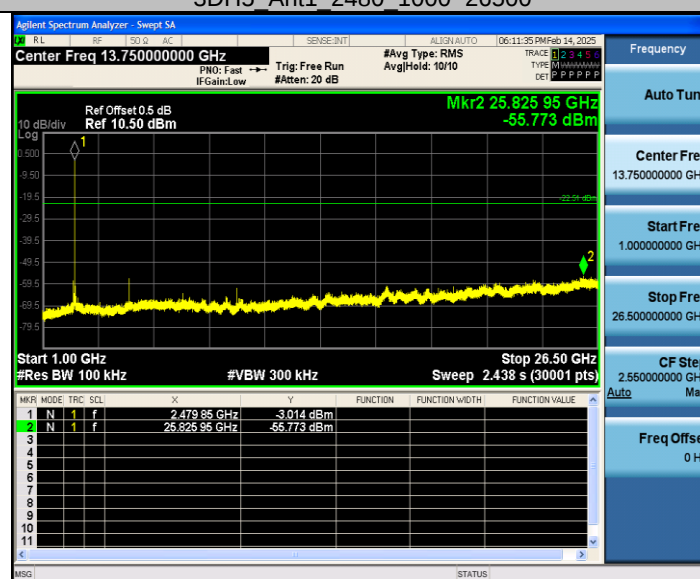
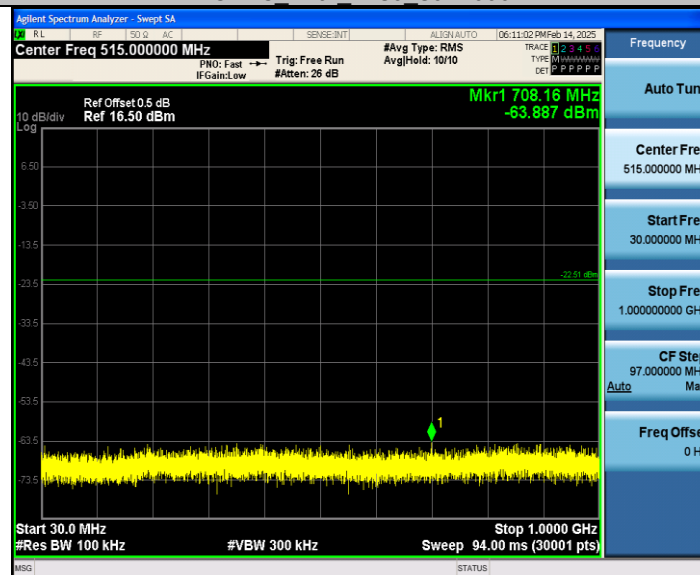
3DH5_Ant1_2480_0~Reference

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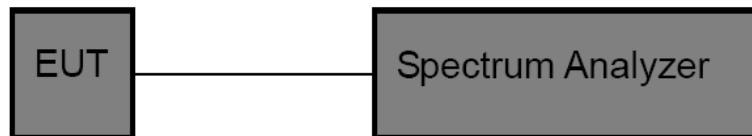


3.5. 20dB Bandwidth

Limit

N/A

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. OCB and 20dB Spectrum Setting:
 - (1) Set RBW = 1% ~ 5% occupied bandwidth.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

Note: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)	20dB Bandwidth *2/3 (MHz)
GFSK	2402	0.87690	0.933	0.642
	2441	0.86977	0.957	0.622
	2480	0.88812	1.041	0.630
$\pi/4$ -DQPSK	2402	1.1641	1.284	0.856
	2441	1.1563	1.281	0.862
	2480	1.1660	1.212	0.854
8-DPSK	2402	1.1568	1.344	0.854
	2441	1.1577	1.281	0.858
	2480	1.1778	1.257	0.862



99% Bandwidth Test Graphs

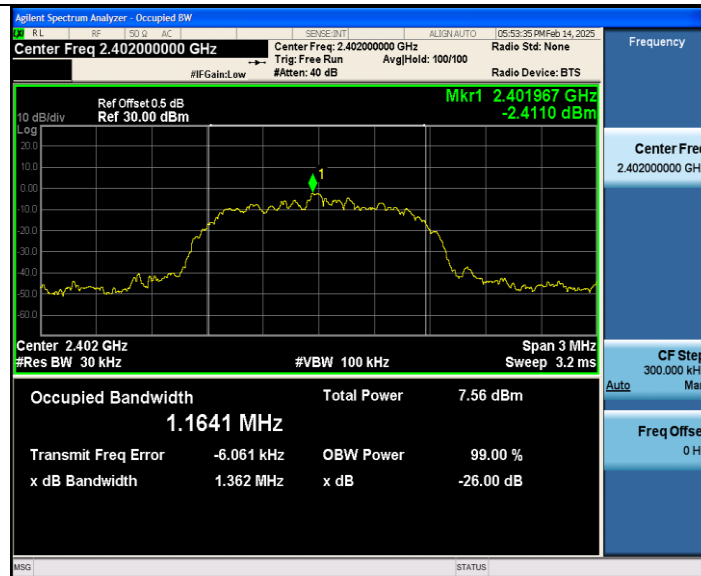


CTC Laboratories, Inc.

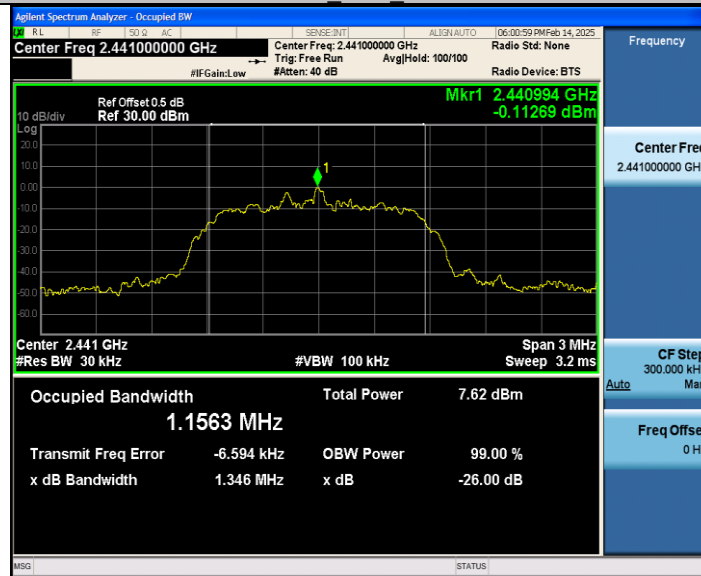
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2DH5 Ant1 2441



2DH5 Ant1 2480



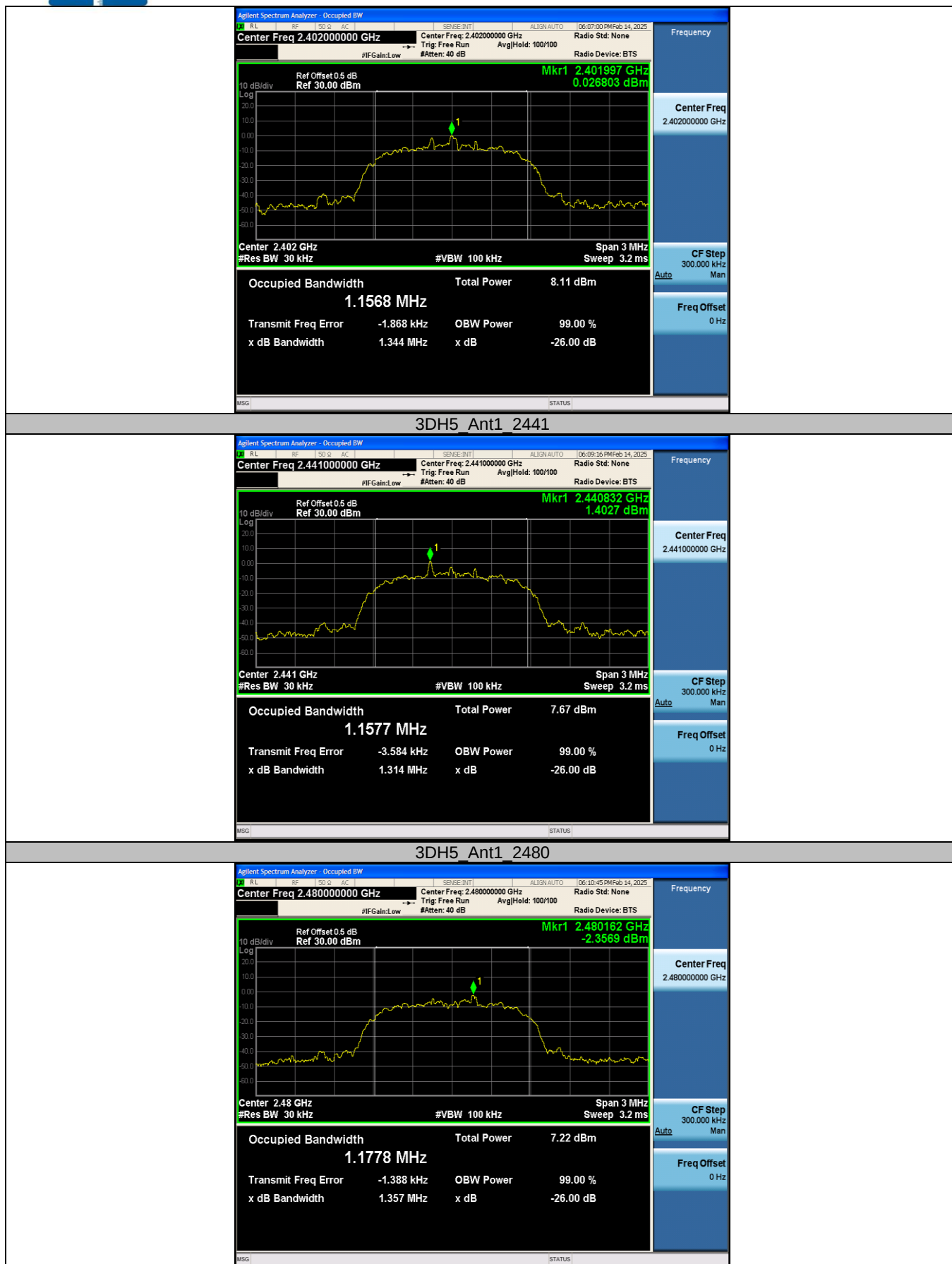
3DH5 Ant1 2402

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20dB Bandwidth Test Graphs:



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2DH5 Ant1 2441



2DH5 Ant1 2480



3DH5 Ant1 2402

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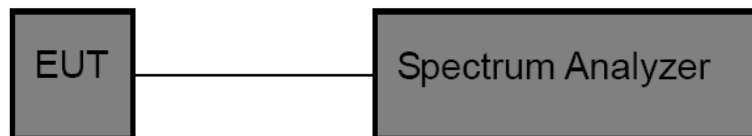
3.6. Channel Separation

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1)

Test Item	Limit	Frequency Range (MHz)
Channel Separation	>25kHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Set RBW = 100 kHz.
 - (2) Set the video bandwidth (VBW) ≥ 3 RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency (MHz)	Carrier Frequencies Separation (MHz)	Limit (MHz)	Verdict
GFSK	Hop_2441	1.004	≥ 0.694	Pass
$\pi/4$ -DQPSK	Hop_2441	1.02	≥ 0.856	Pass
8-DPSK	Hop_2441	0.998	≥ 0.896	Pass



Test plot as follows:



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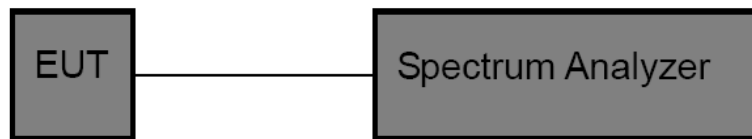
3.7. Number of Hopping Channel

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)

Section	Test Item	Limit
15.247 (a)(iii) RSS-247 5.1 d	Number of Hopping Channel	≥ 15

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Peak Detector: RBW=100 kHz, VBW $\geq$ RBW, Sweep time= Auto.

Test Mode

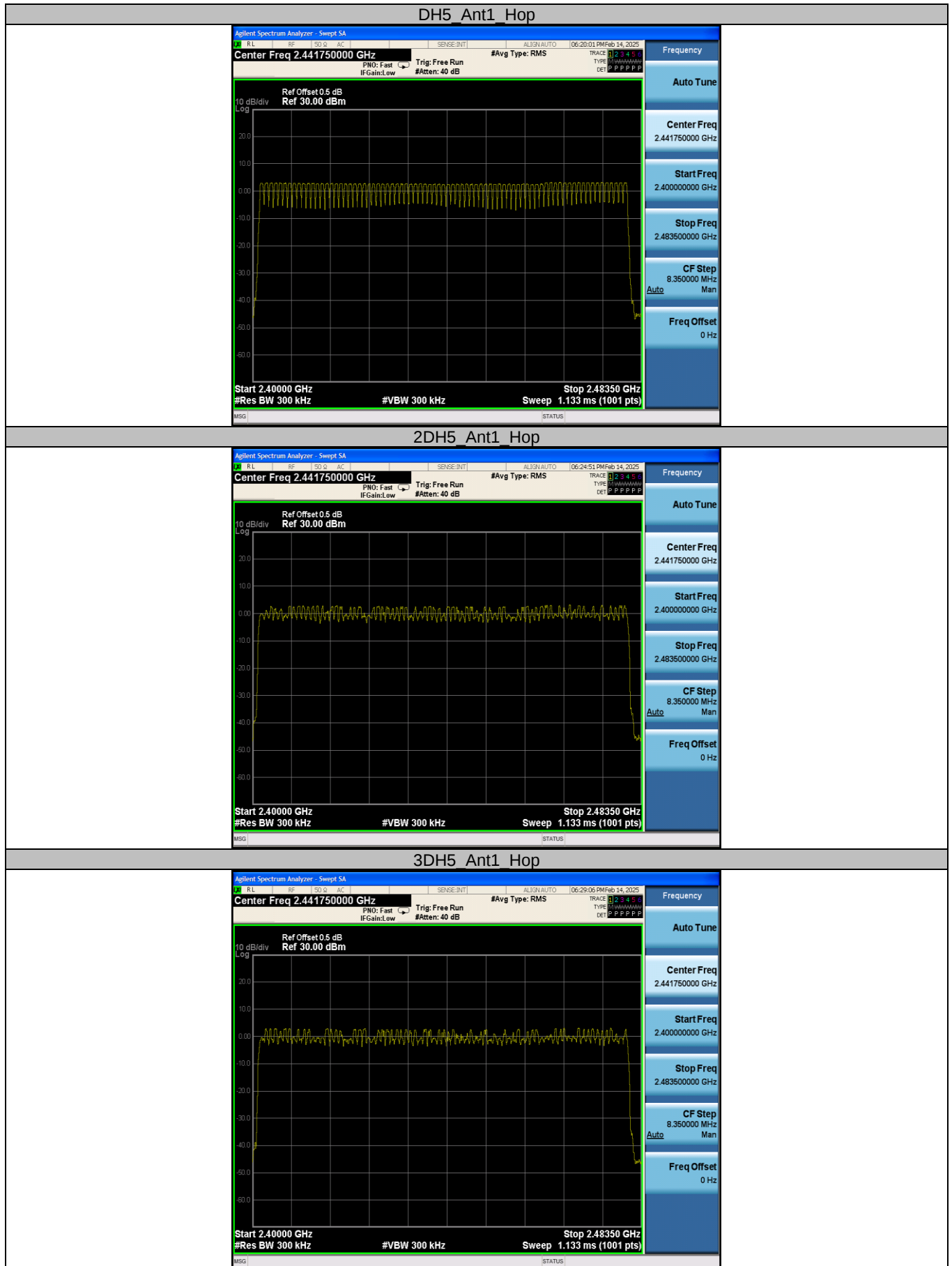
Please refer to the clause 2.4.

Test Result

Test Mode	Channel Number	Limit	Verdict
GFSK	79	≥ 15	Pass
$\pi/4$ -DQPSK	79	≥ 15	Pass
8-DPSK	79	≥ 15	Pass



Test plot as follows:



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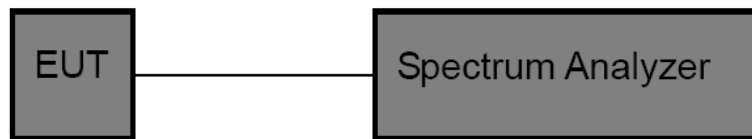
3.8. Dwell Time

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)

Section	Test Item	Limit
15.247 (a)(iii) RSS-247 5.1 d	Average Time of Occupancy	0.4 sec

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Spectrum Setting: RBW=1MHz, VBW $\geq$ RBW.
 - (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
 - (3) Sweep Time is more than once pulse time.
 - (4) Set the center frequency on any frequency would be measure and set the frequency span to zero.
 - (5) Measure the maximum time duration of one single pulse.
 - (6) Set the EUT for packet transmitting.

Test Mode

Please refer to the clause 2.4.

**Test Result**

Test Mode	Channel	Frequency (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (second)	Verdict
GFSK	DH1	2441	0.370	118.40	0.12	≤0.40	Pass
	DH3	2441	1.620	259.20	0.28		
	DH5	2441	2.868	305.92	0.32		
π/4-DQPSK	2DH1	2441	0.379	121.28	0.13	≤0.40	Pass
	2DH3	2441	1.631	260.96	0.28		
	2DH5	2441	2.879	307.09	0.32		
8-DPSK	3DH1	2441	0.377	120.64	0.12	≤0.40	Pass
	3DH3	2441	1.629	260.64	0.28		
	3DH5	2441	2.880	307.20	0.32		

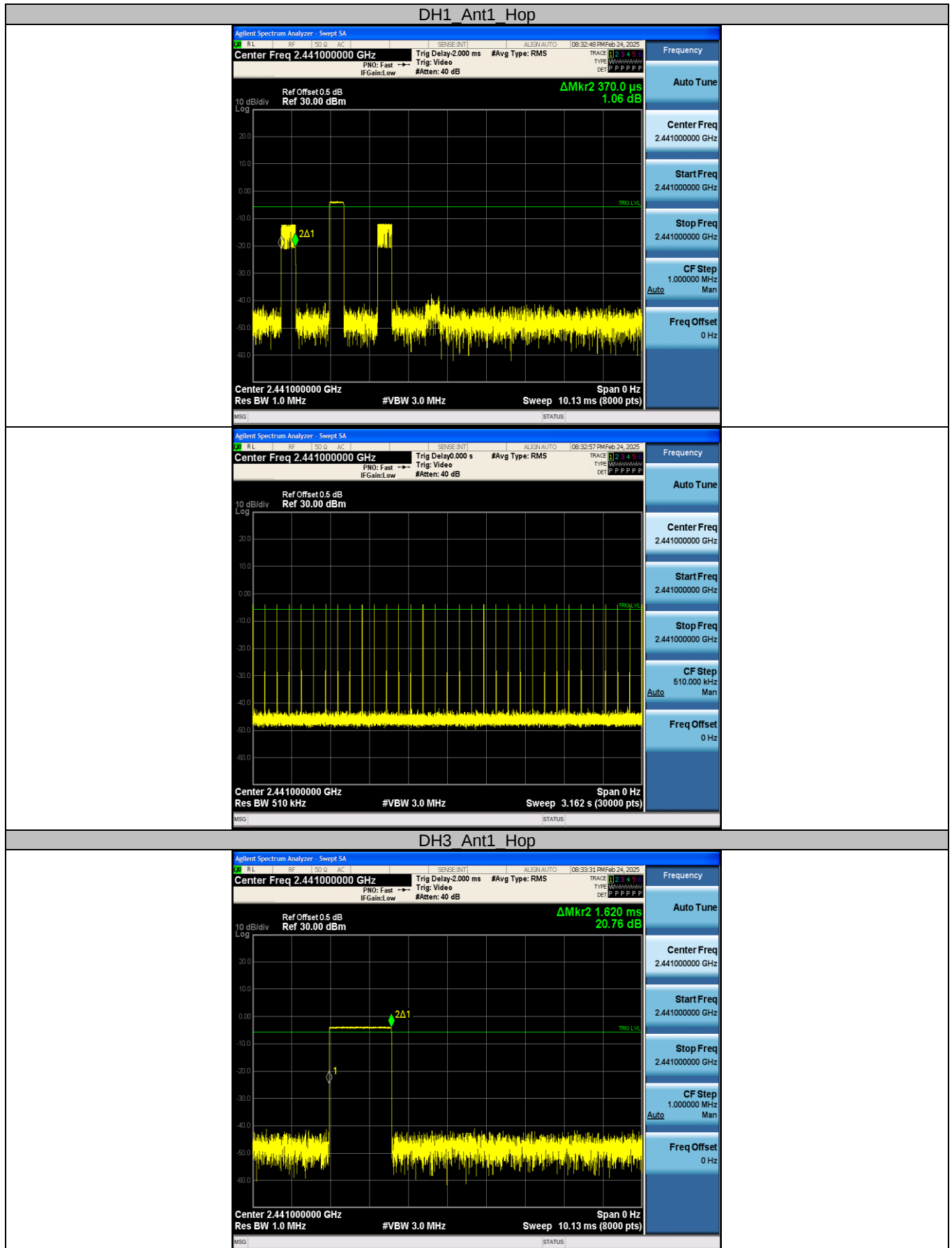
Note: 1DH1/2DH1/3DH1 Total of Dwell = Pulse Time*(1600/2)*31.6/79

1DH3/2DH3/3DH3 Total of Dwell = Pulse Time*(1600/4)*31.6/79

1DH5/2DH5/3DH5 Total of Dwell = Pulse Time*(1600/6)*31.6/79



Test plot as follows:

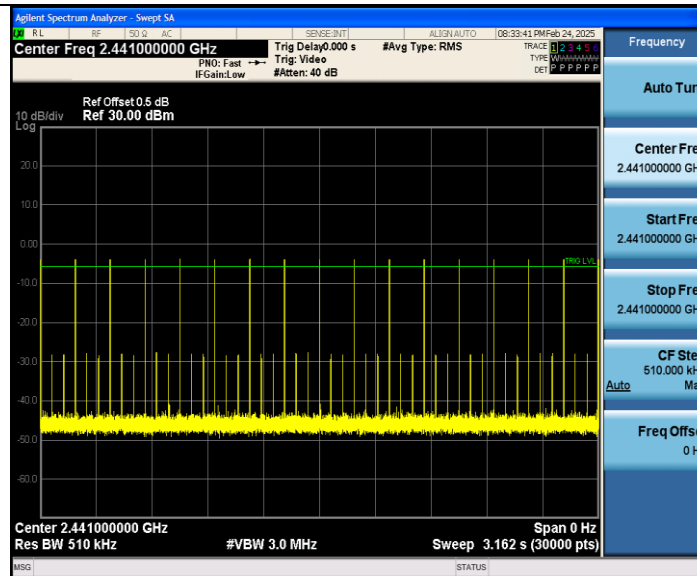


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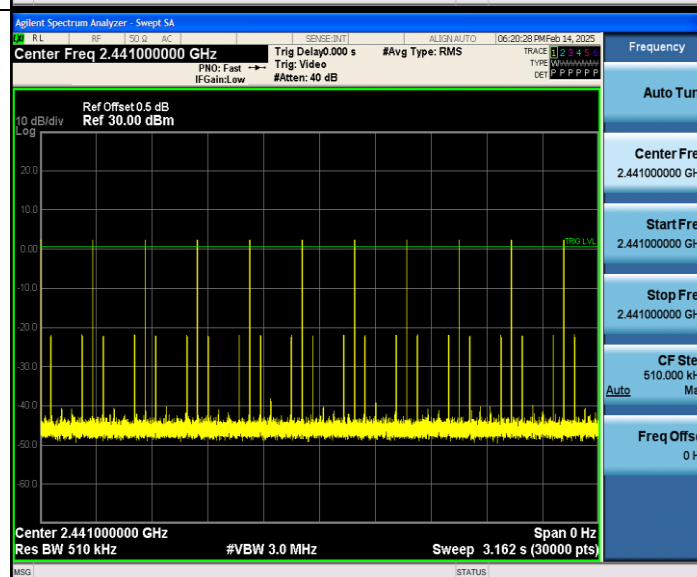
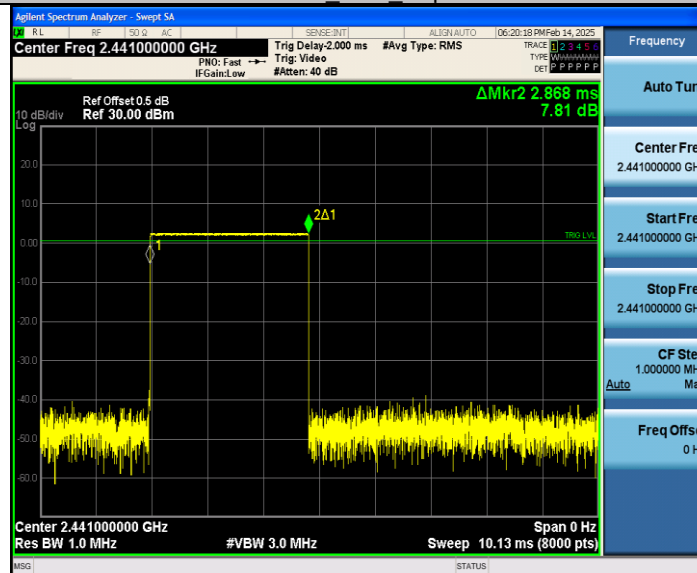
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DH5 Ant1 Hop



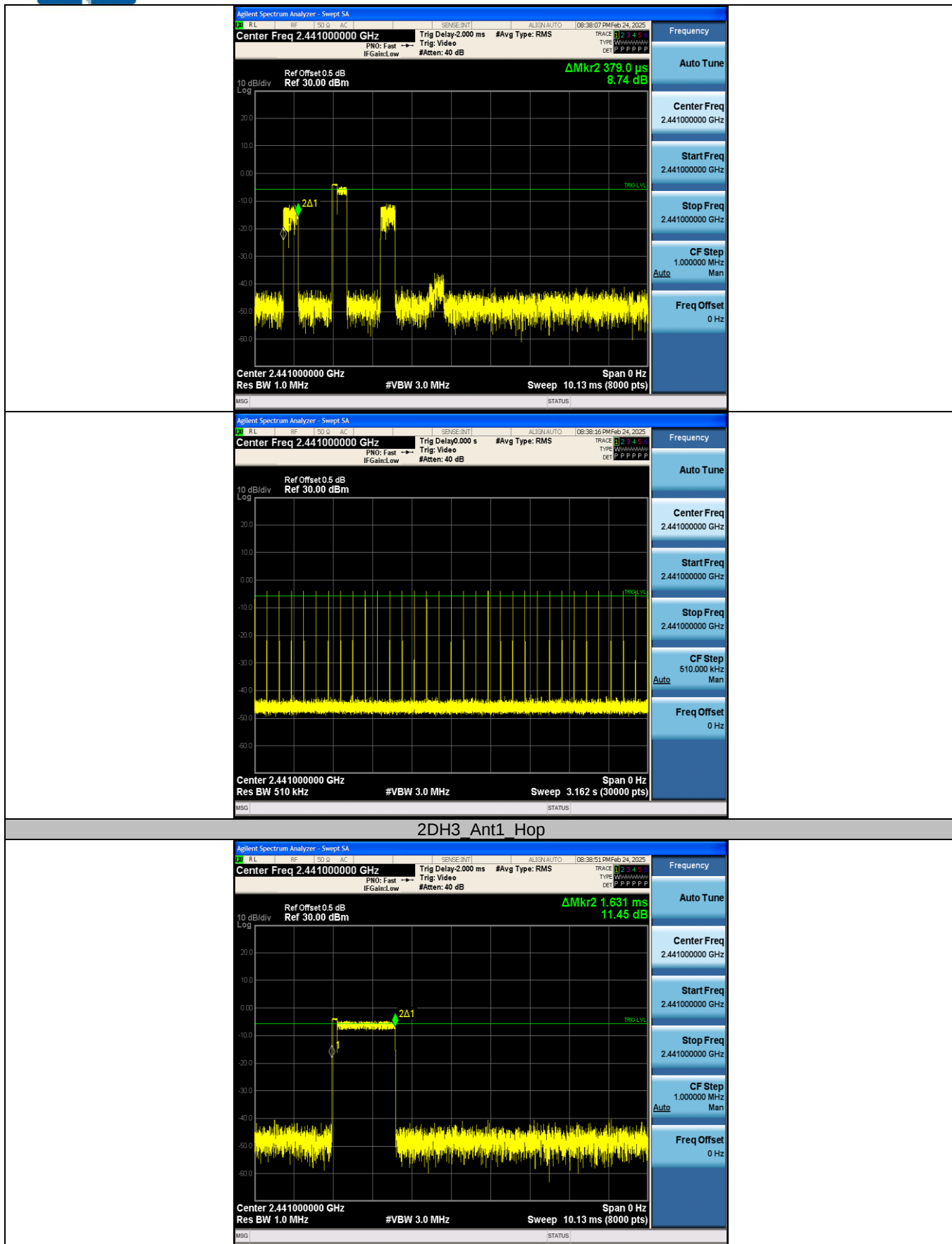
2DH1 Ant1 Hop

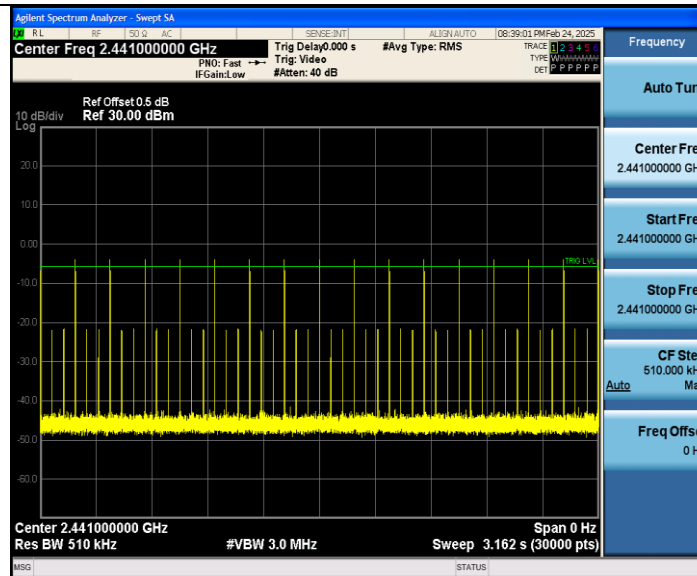
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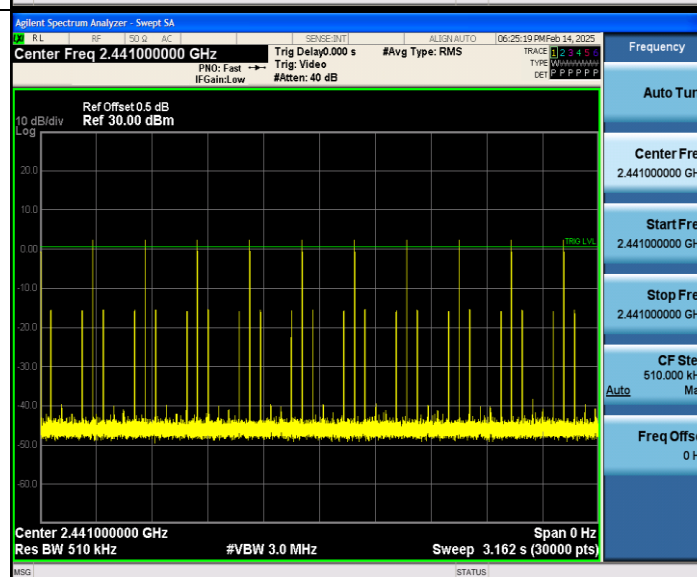
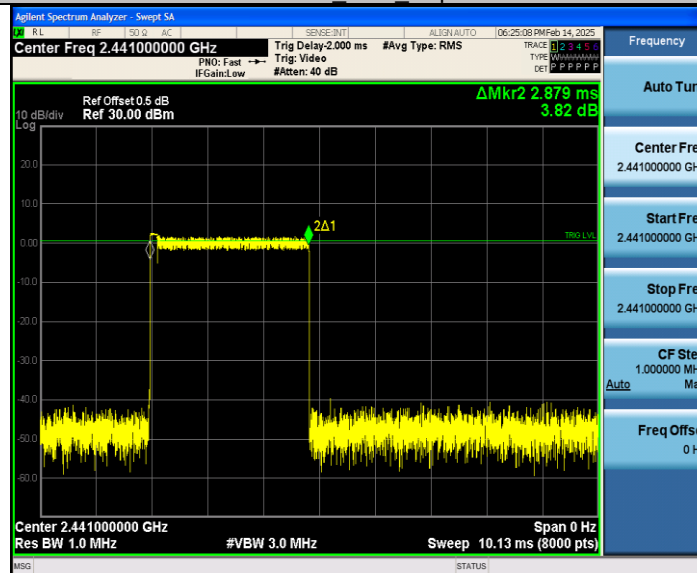
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2DH5_Ant1_Hop



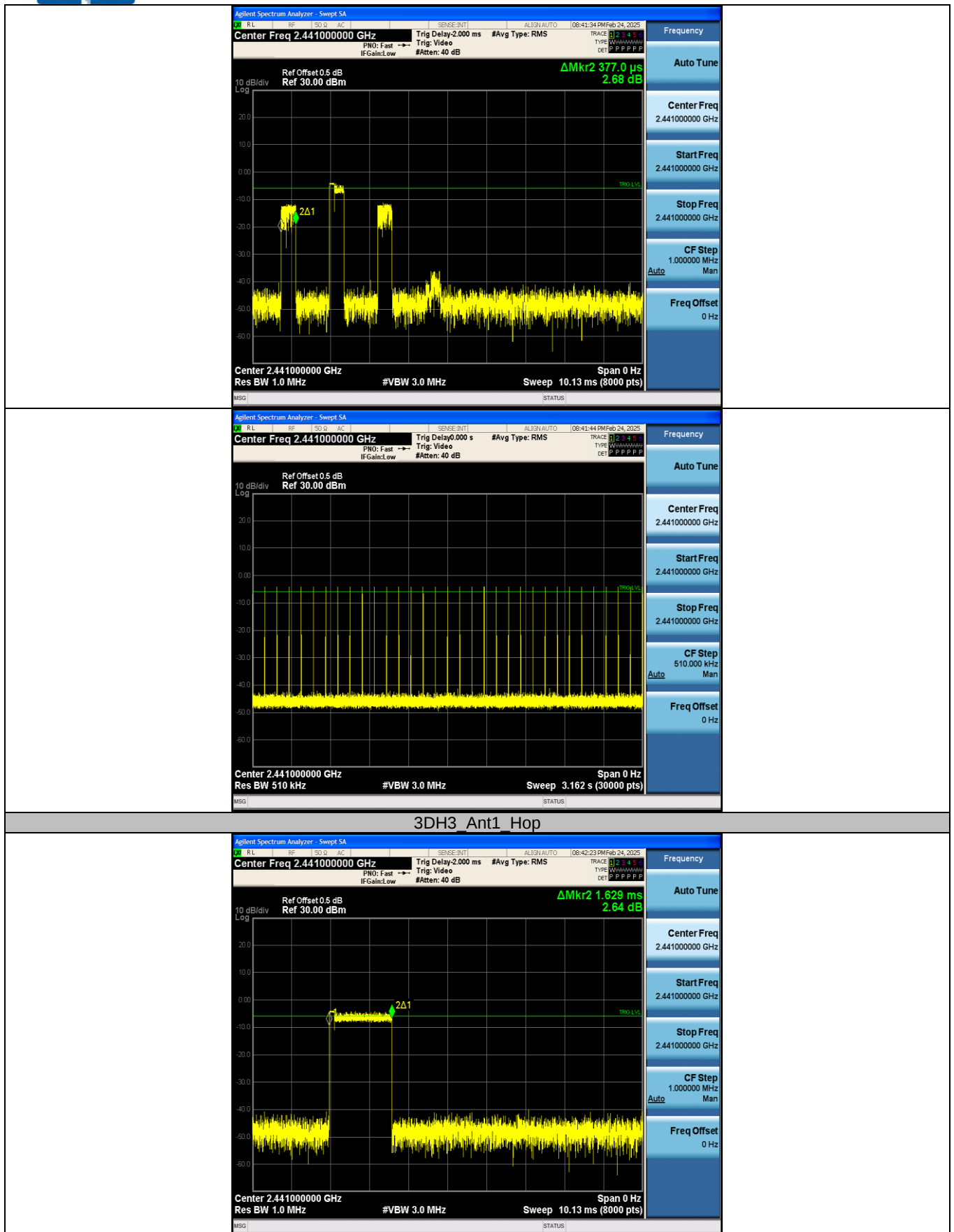
3DH1_Ant1_Hop

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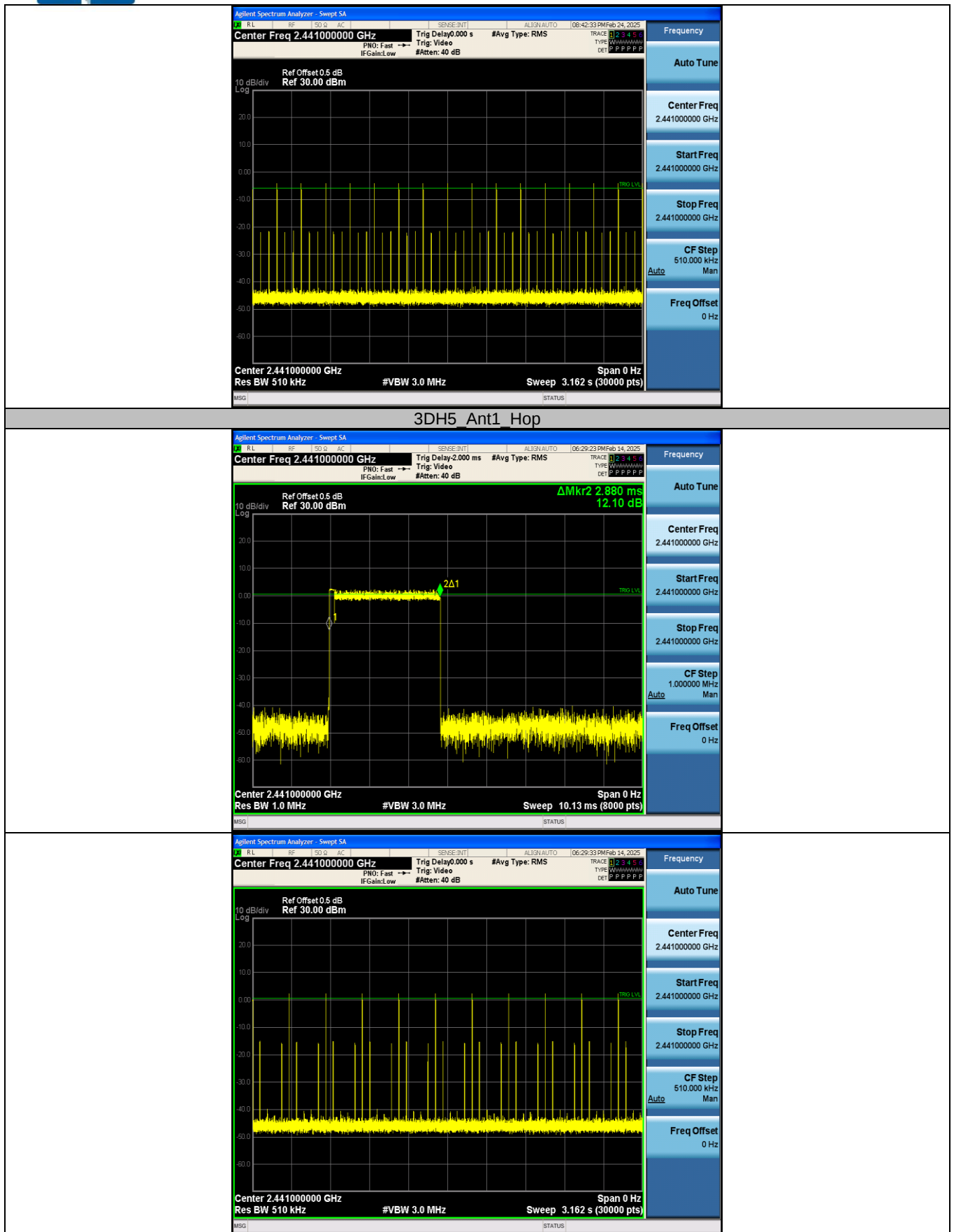


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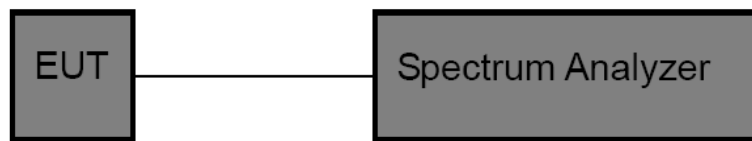
3.9. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1)

Section	Test Item	Limit	Frequency Range (MHz)
FCC CFR 47 Part15.247 (b)(1)	Maximum Conducted Output Power	Hopping Channels $\geq$ 75, Power <1W(30dBm); Others <125mW(21dBm)	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
 - (1) Set RBW > 20dB Bandwidth.
 - (2) Set VBW $\geq$ RBW.
 - (3) Detector = Peak.
 - (4) Trace mode = Max hold.
 - (5) Sweep = Auto couple.
 - (6) Span = Approximately five times the 20dB bandwidth, centered on a hopping channel.

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Antenna	Freq(MHz)	Result[dBm]	Limit[dBm]	Verdict
GFSK	Ant1	2402	3.06	$\leq$ 30	Pass
		2441	2.62	$\leq$ 30	Pass
		2480	3.12	$\leq$ 30	Pass
$\pi/4$ -DQPSK	Ant1	2402	3.02	$\leq$ 21	Pass
		2441	2.61	$\leq$ 21	Pass
		2480	3.13	$\leq$ 21	Pass
8-DPSK	Ant1	2402	3.42	$\leq$ 21	Pass
		2441	3.00	$\leq$ 21	Pass
		2480	3.47	$\leq$ 21	Pass

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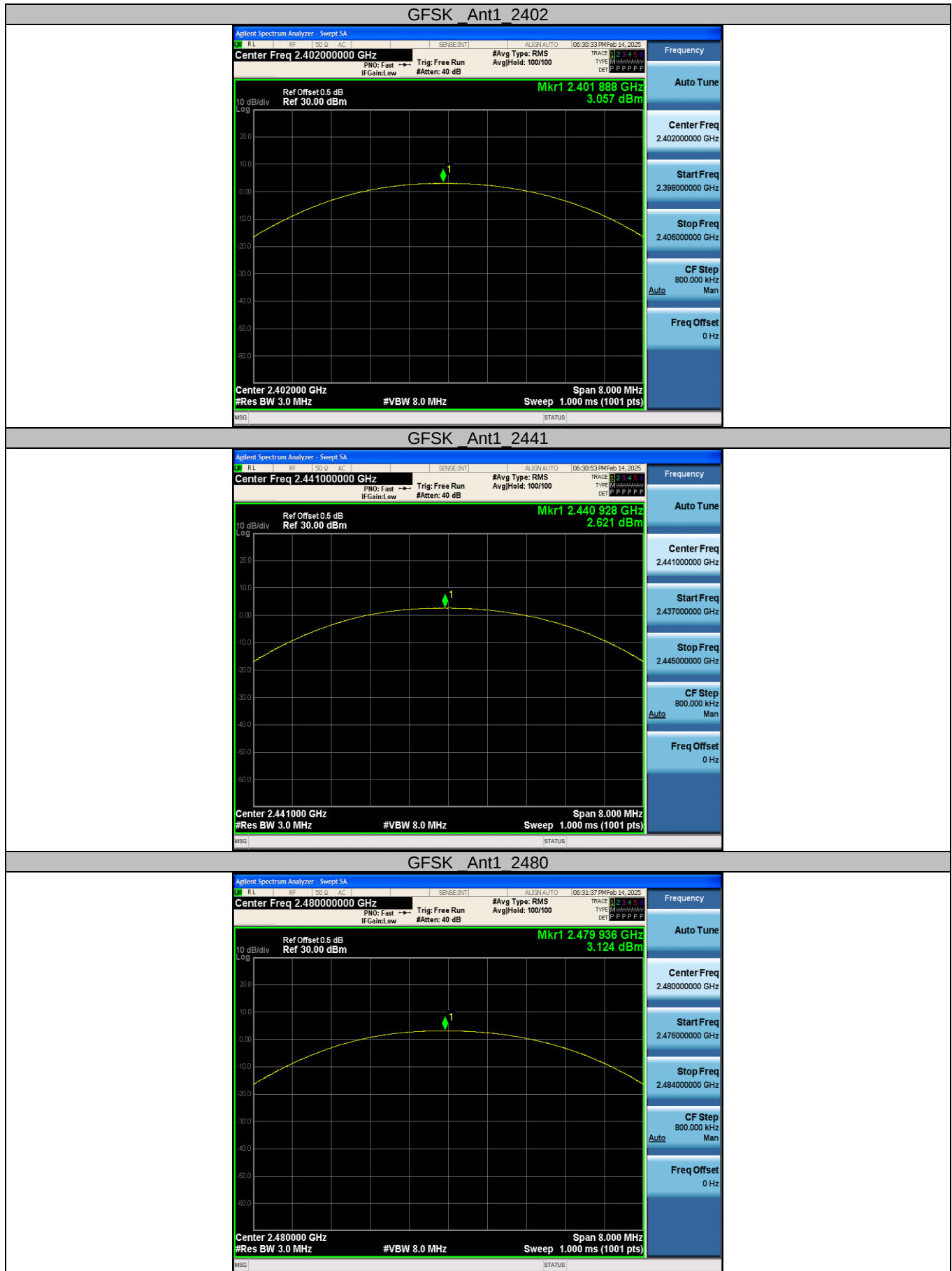
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Test plot as follows:

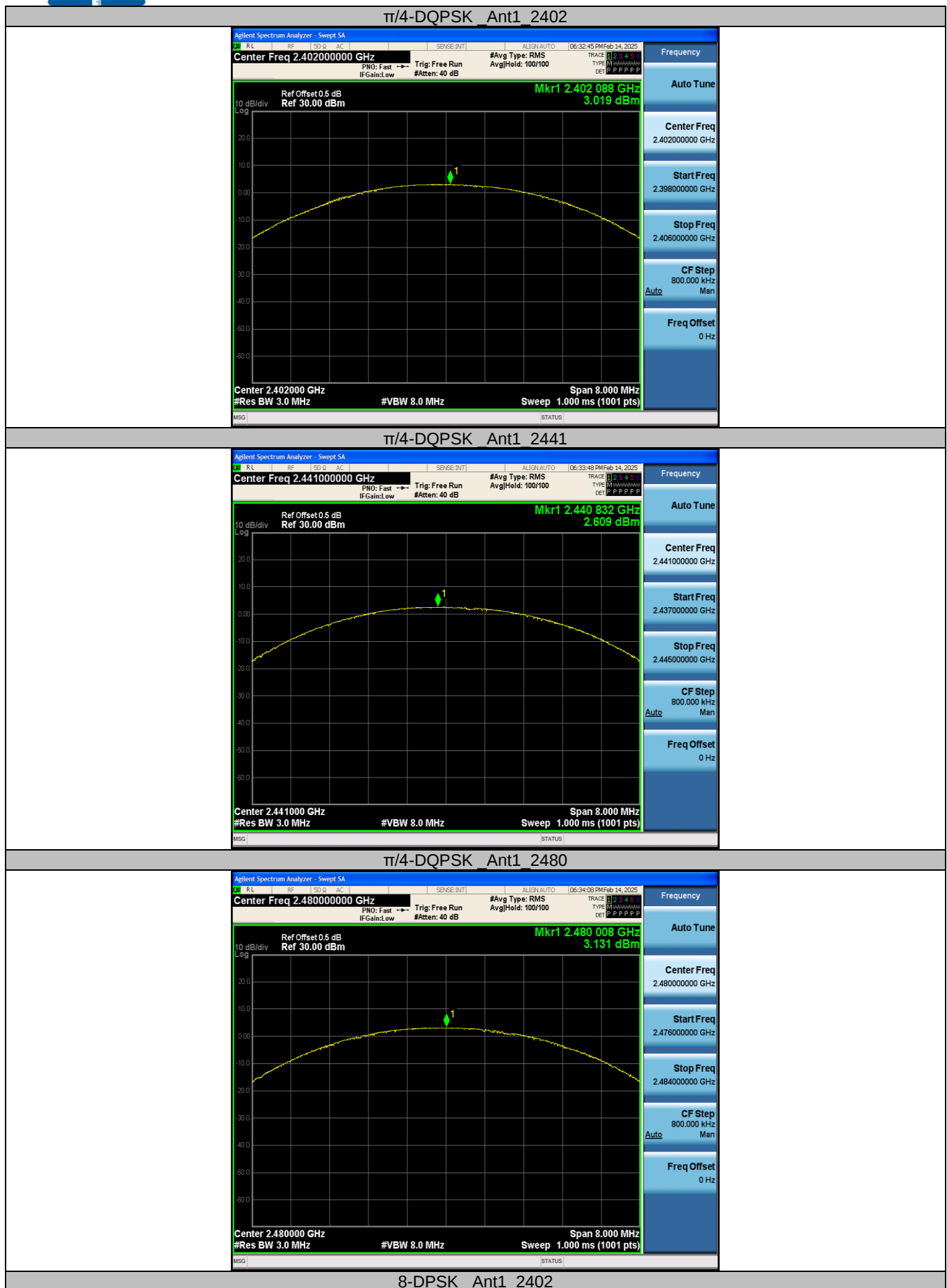


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