

Appendix A

RF Test Data for BT (Conducted Measurement)

Product Name: Bluetooth Speaker
Test Model: Onforu SK03

Environmental Conditions

Temperature:	24.2°C
Relative Humidity:	52.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Jone Lee
Supervised by:	Fengliu Tang

A.1 20dB Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.945	2401.538	2402.483	---	---
		2441	0.945	2440.535	2441.480	---	---
		2480	0.948	2479.535	2480.483	---	---
2DH5	Ant1	2402	1.266	2401.379	2402.645	---	---
		2441	1.311	2440.337	2441.648	---	---
		2480	1.311	2479.340	2480.651	---	---
3DH5	Ant1	2402	1.308	2401.343	2402.651	---	---
		2441	1.305	2440.343	2441.648	---	---
		2480	1.308	2479.343	2480.651	---	---

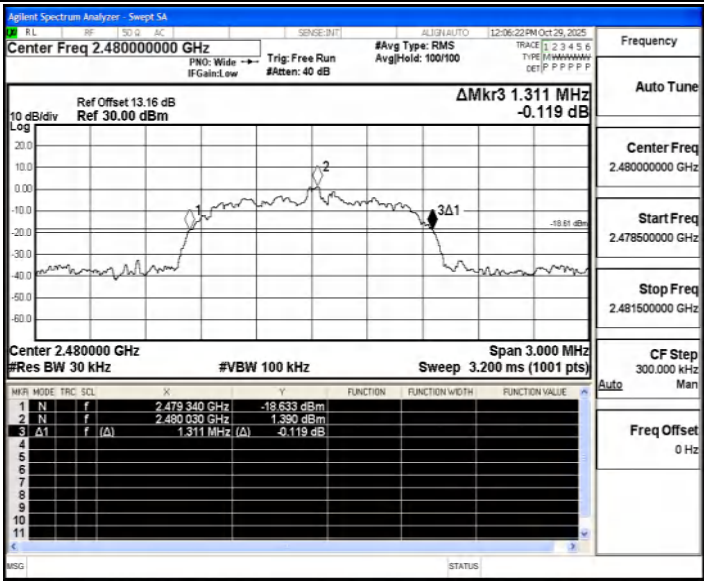


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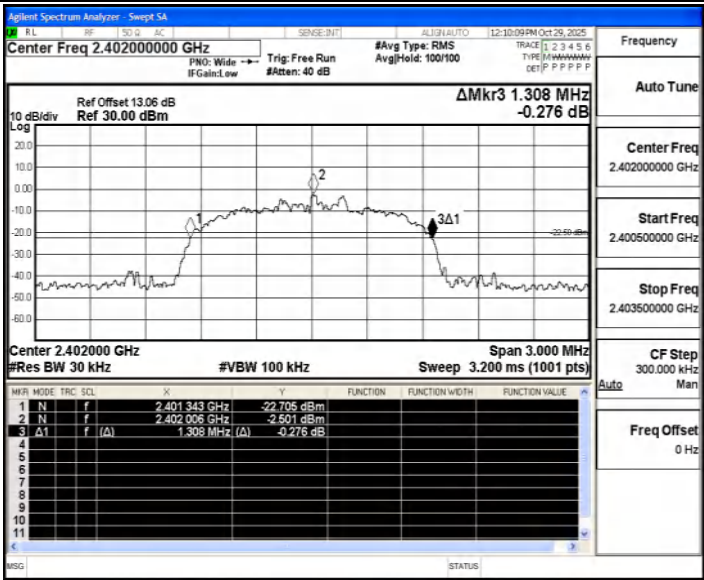
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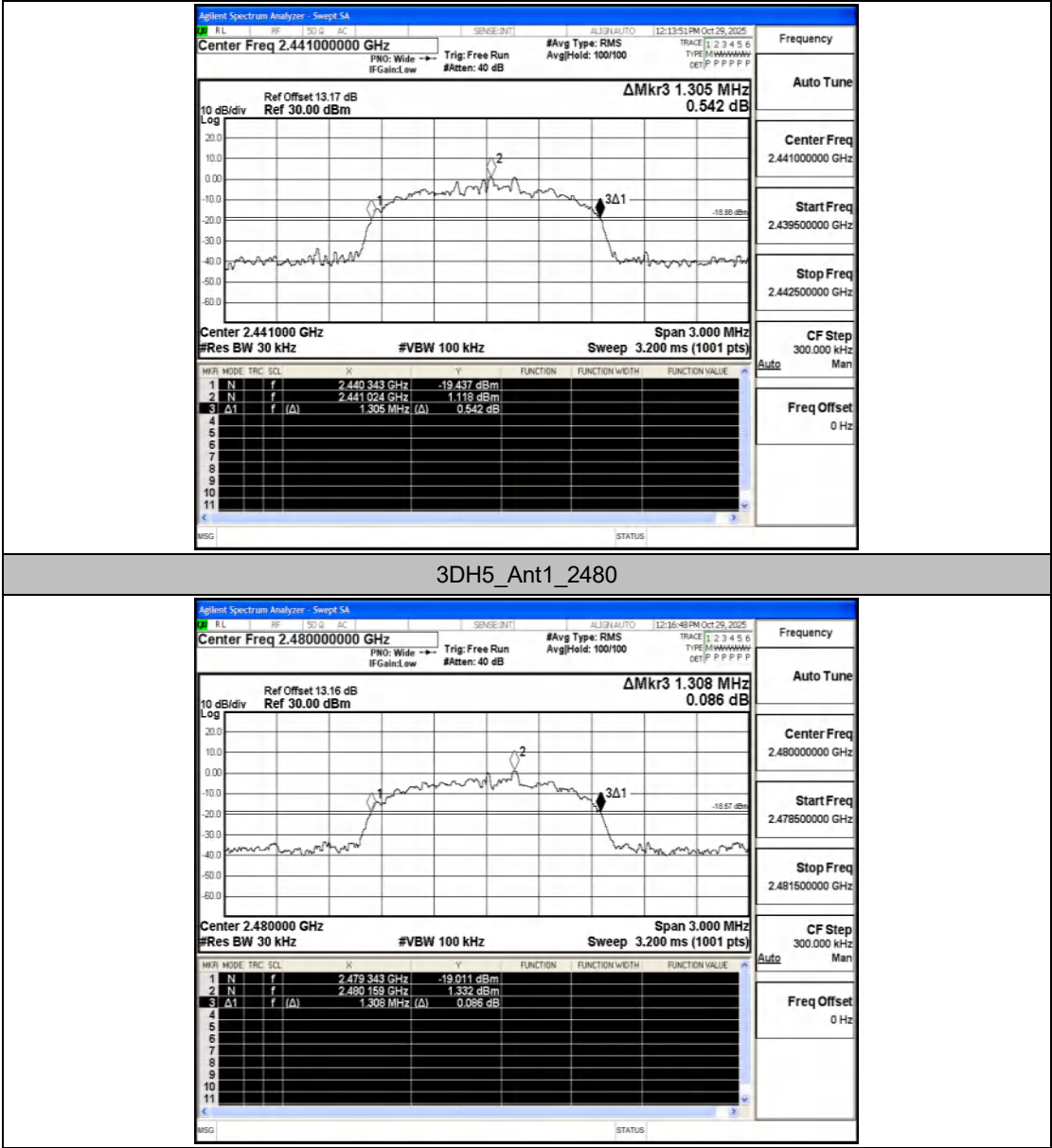
2DH5_Ant1_2480



3DH5_Ant1_2402



3DH5_Ant1_2441

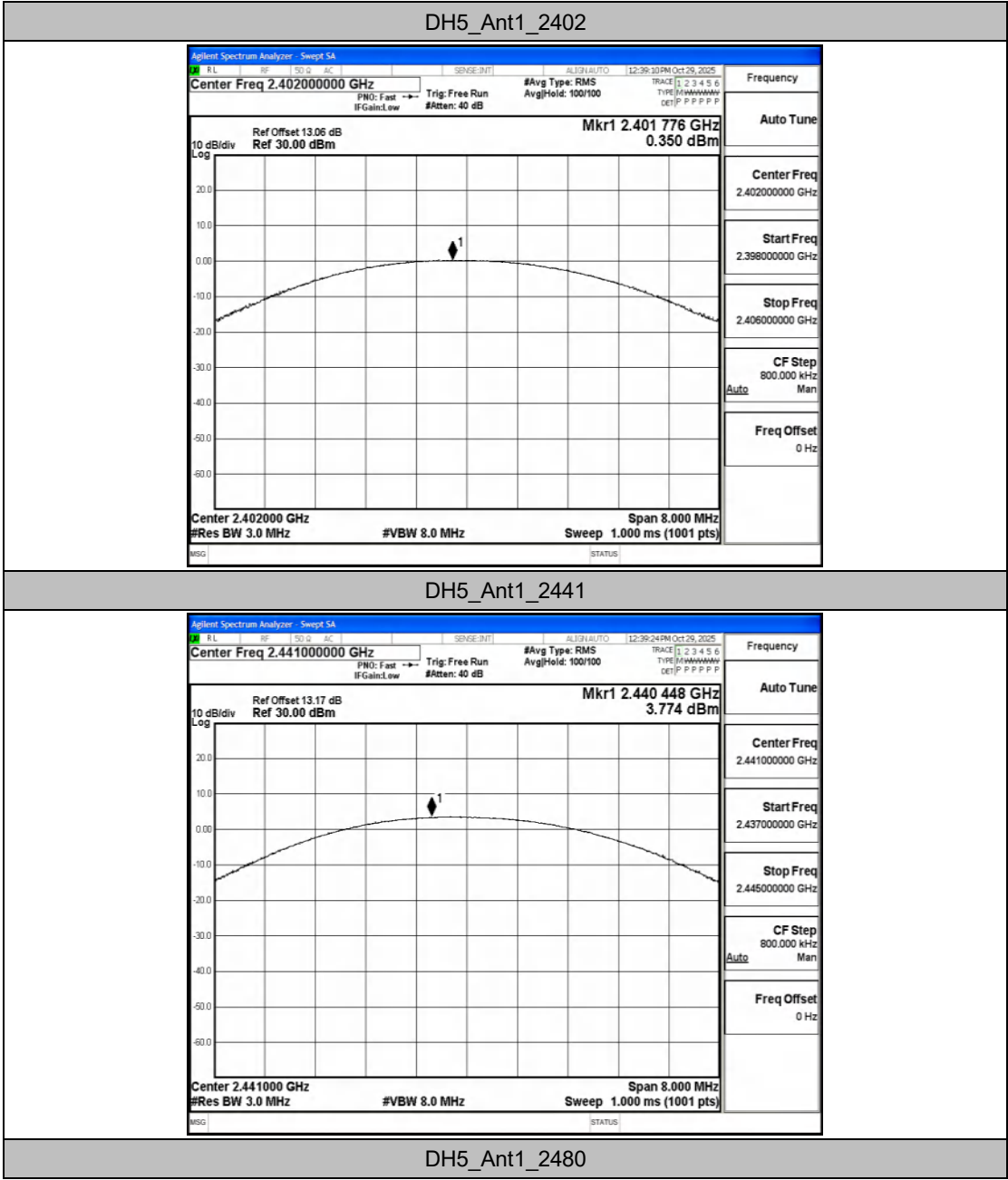


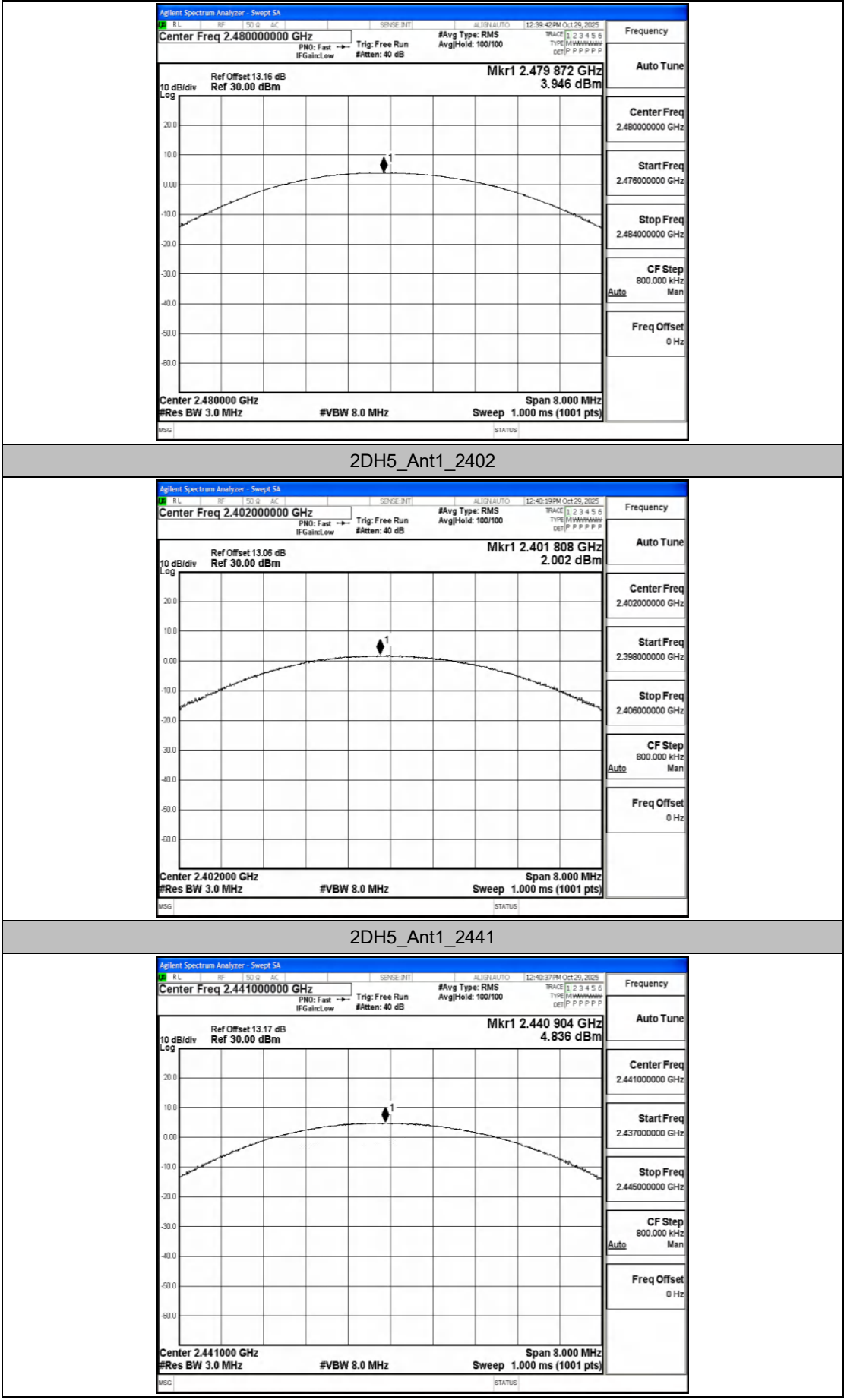
A.2 Maximum Peak Conducted Output Power

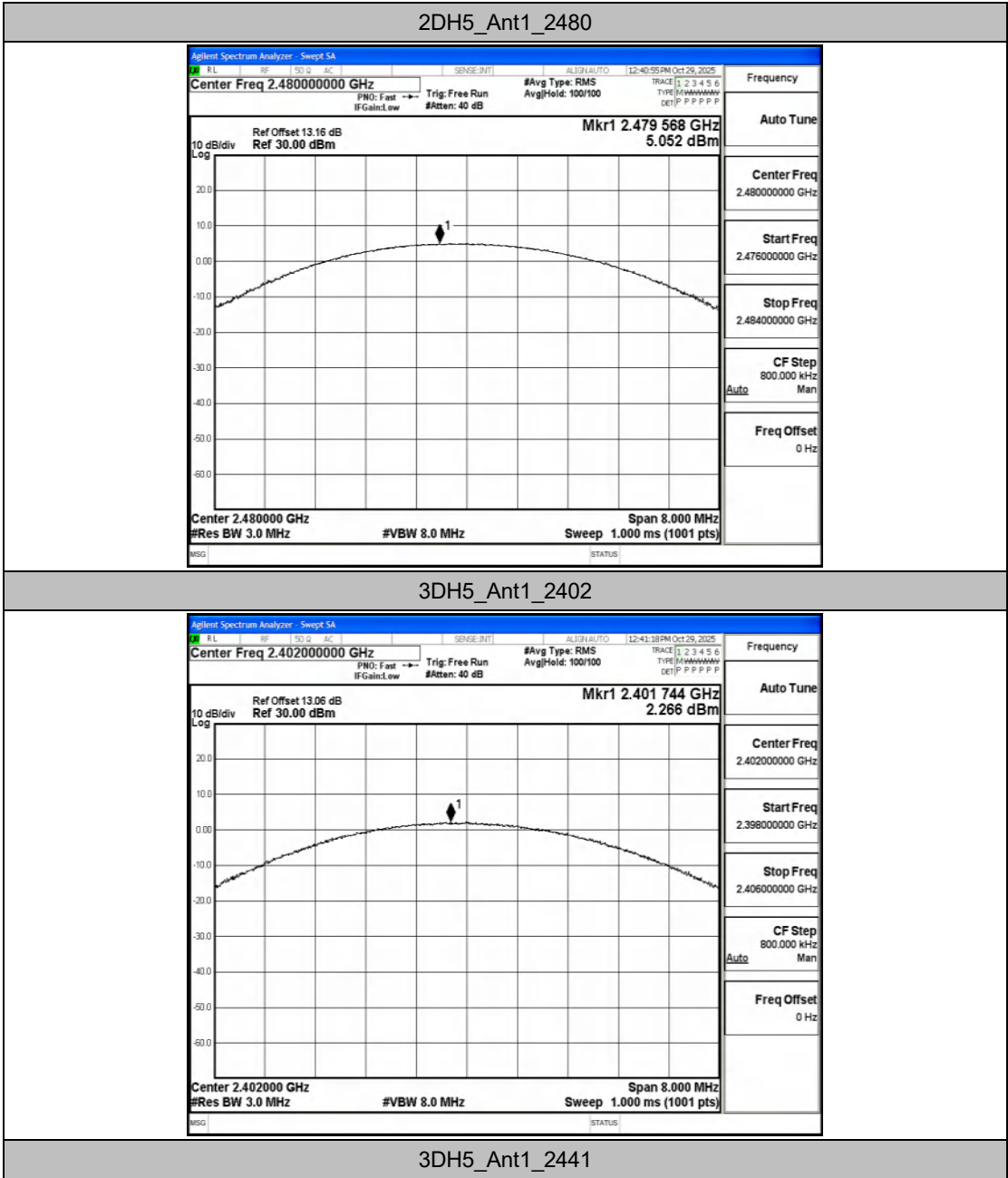
Test Result Peak

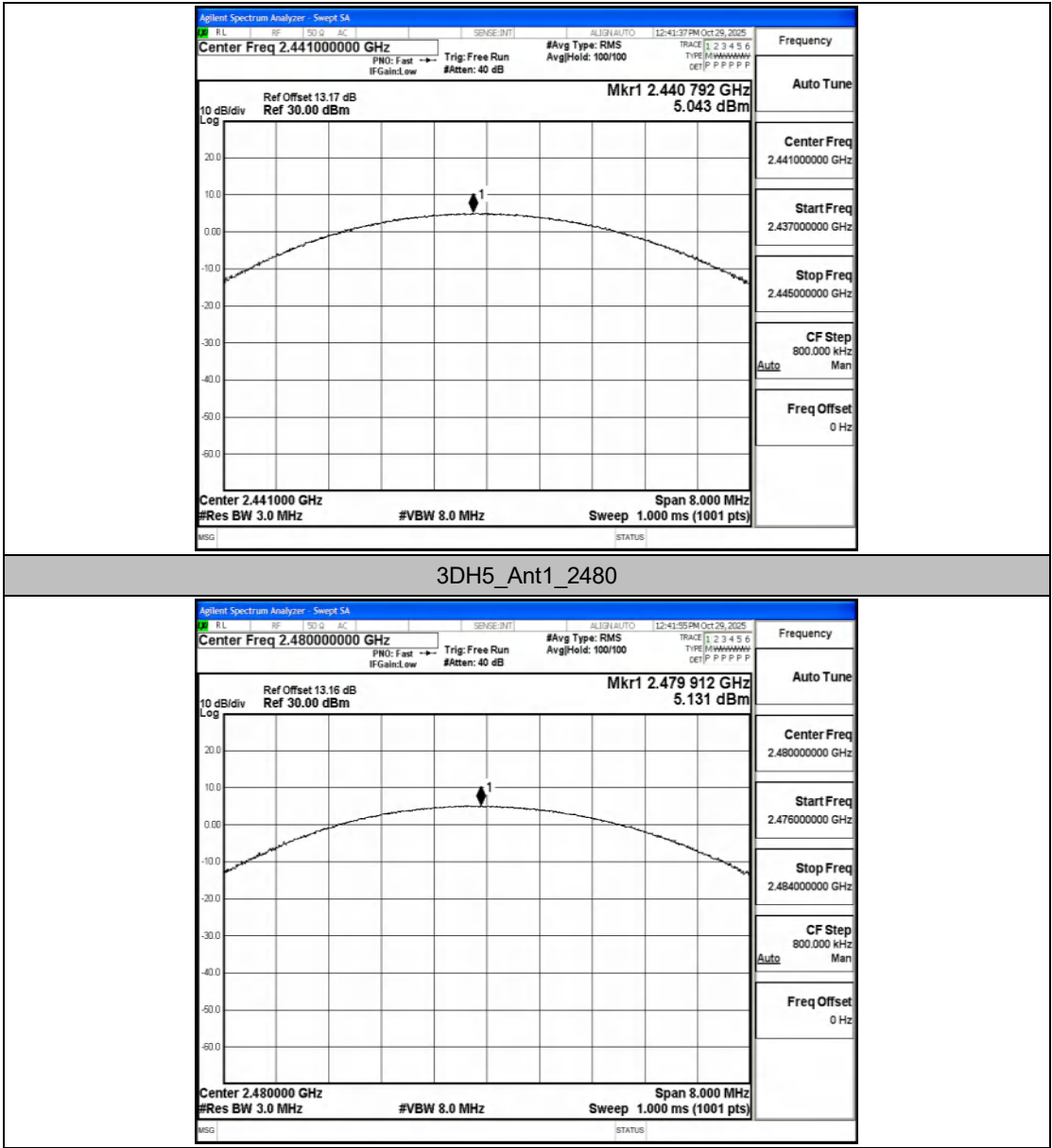
Test Mode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant1	2402	0.35	≤30	PASS
		2441	3.77	≤30	PASS
		2480	3.95	≤30	PASS
2DH5	Ant1	2402	2.00	≤30	PASS
		2441	4.84	≤30	PASS
		2480	5.05	≤30	PASS
3DH5	Ant1	2402	2.27	≤30	PASS
		2441	5.04	≤30	PASS
		2480	5.13	≤30	PASS

Test Graphs







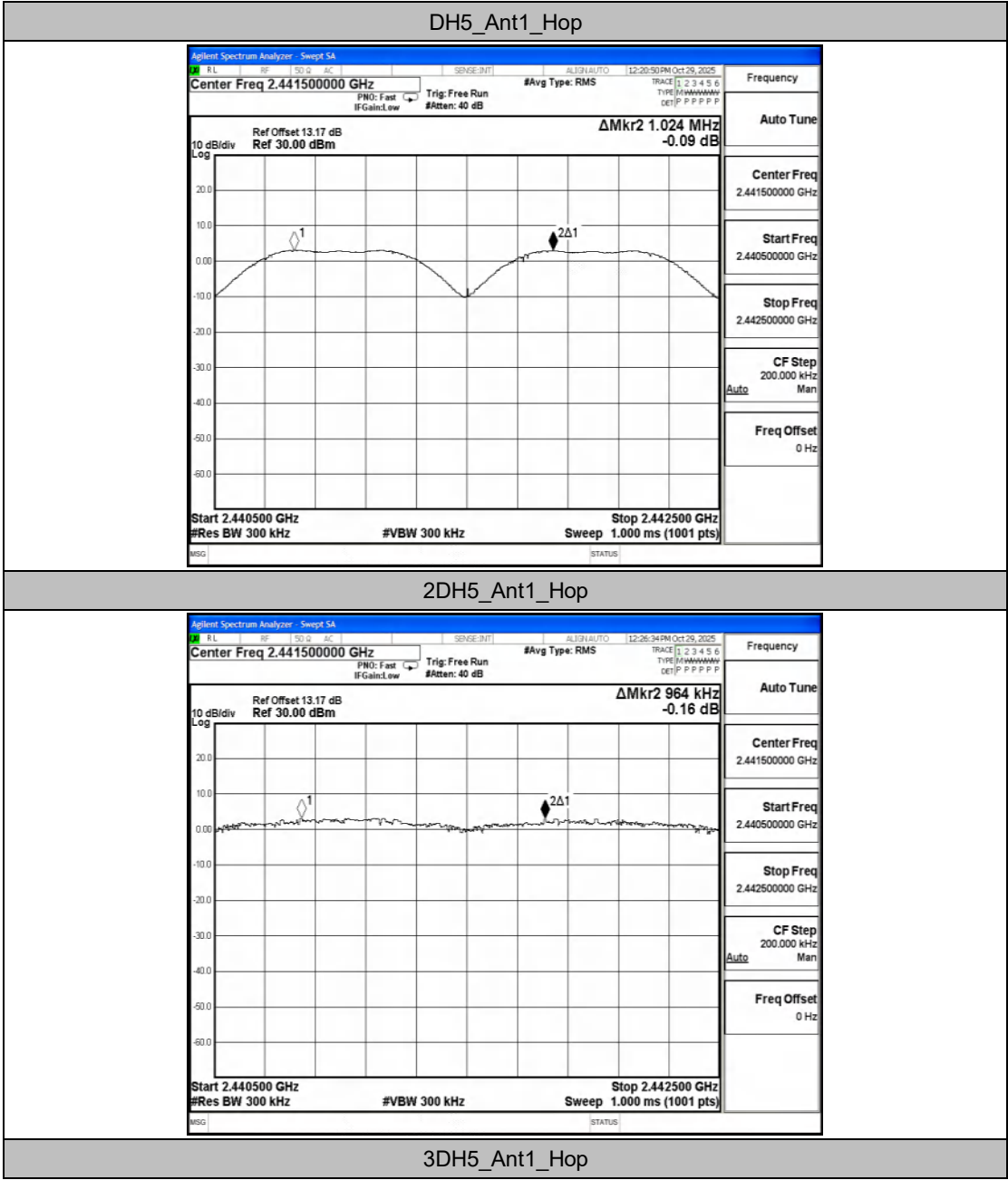


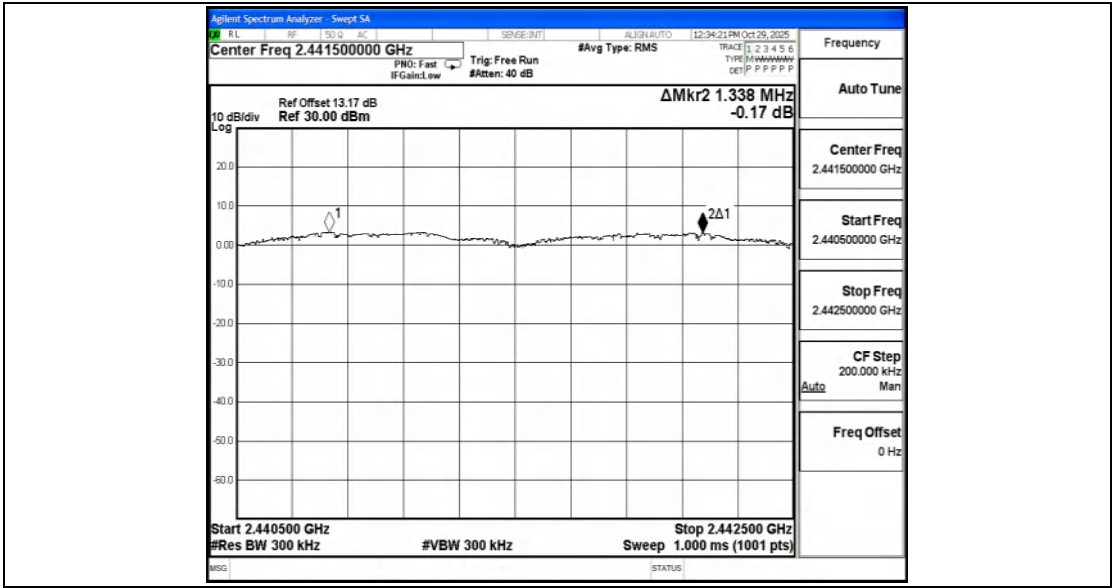
A.3 Carrier frequency separation

Test Result

TestMode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.024	≥0.948	PASS
2DH5	Ant1	Hop	0.964	≥0.874	PASS
3DH5	Ant1	Hop	1.338	≥1.308	PASS

Test Graphs



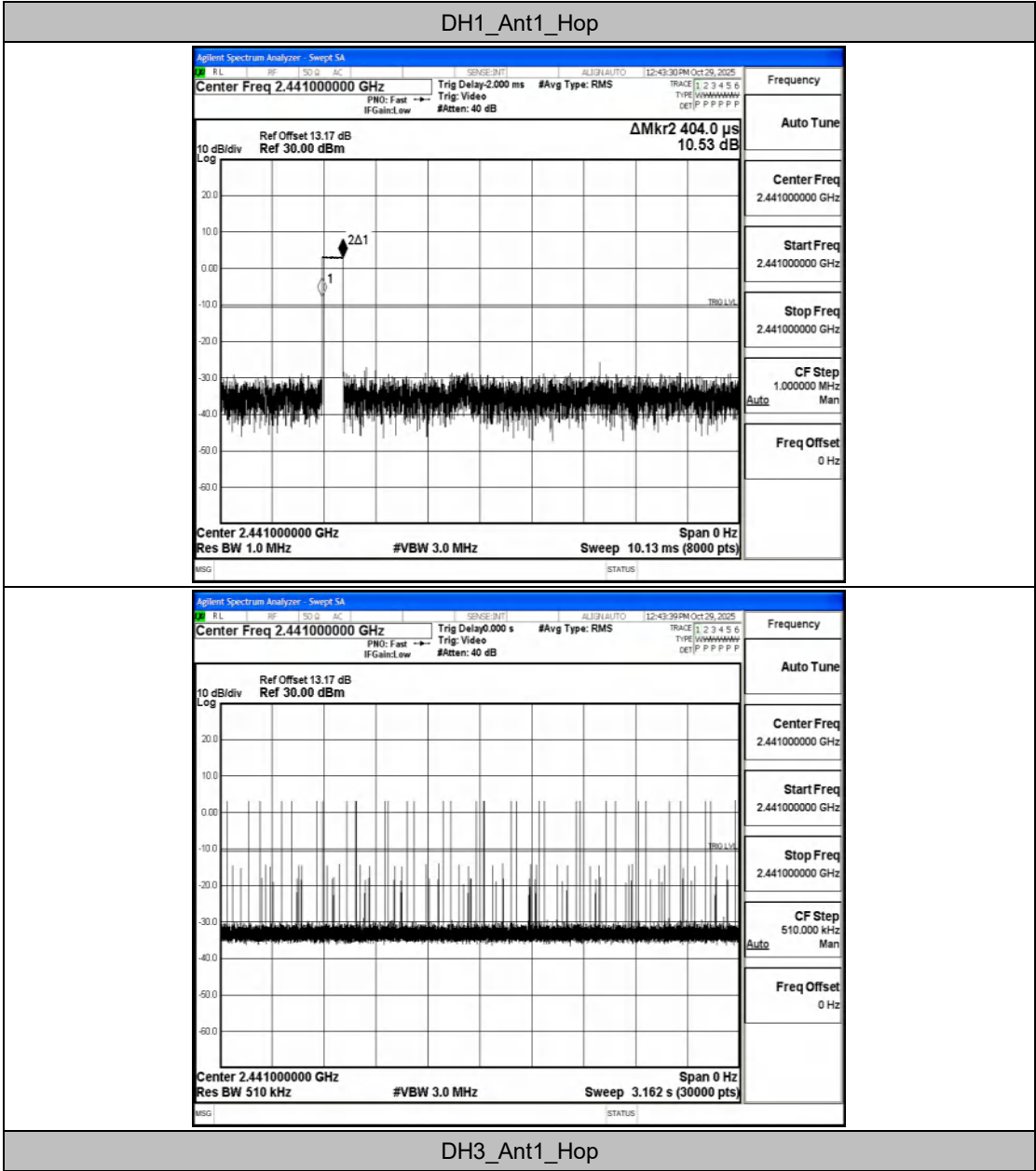


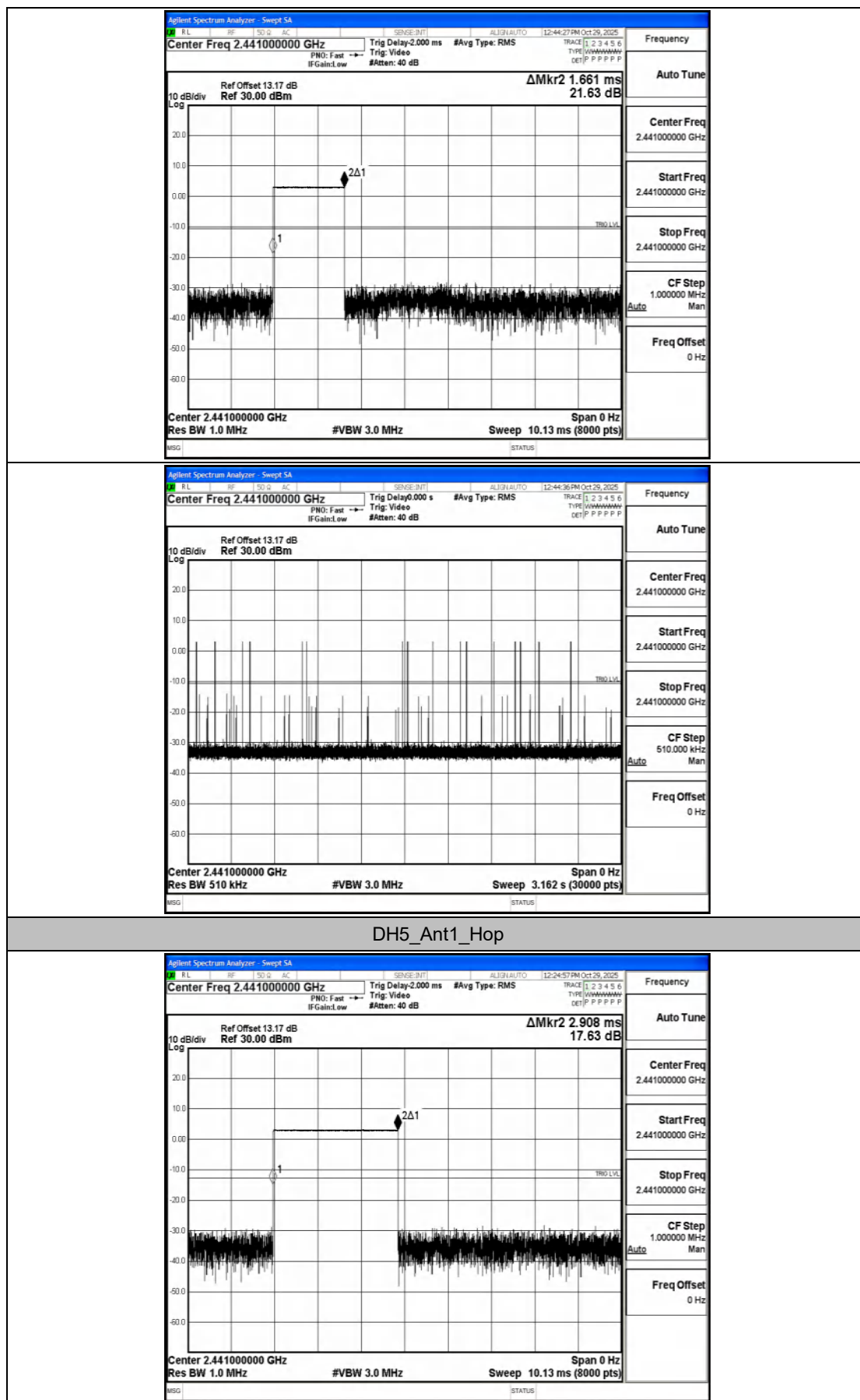
A.4 Dwell Time

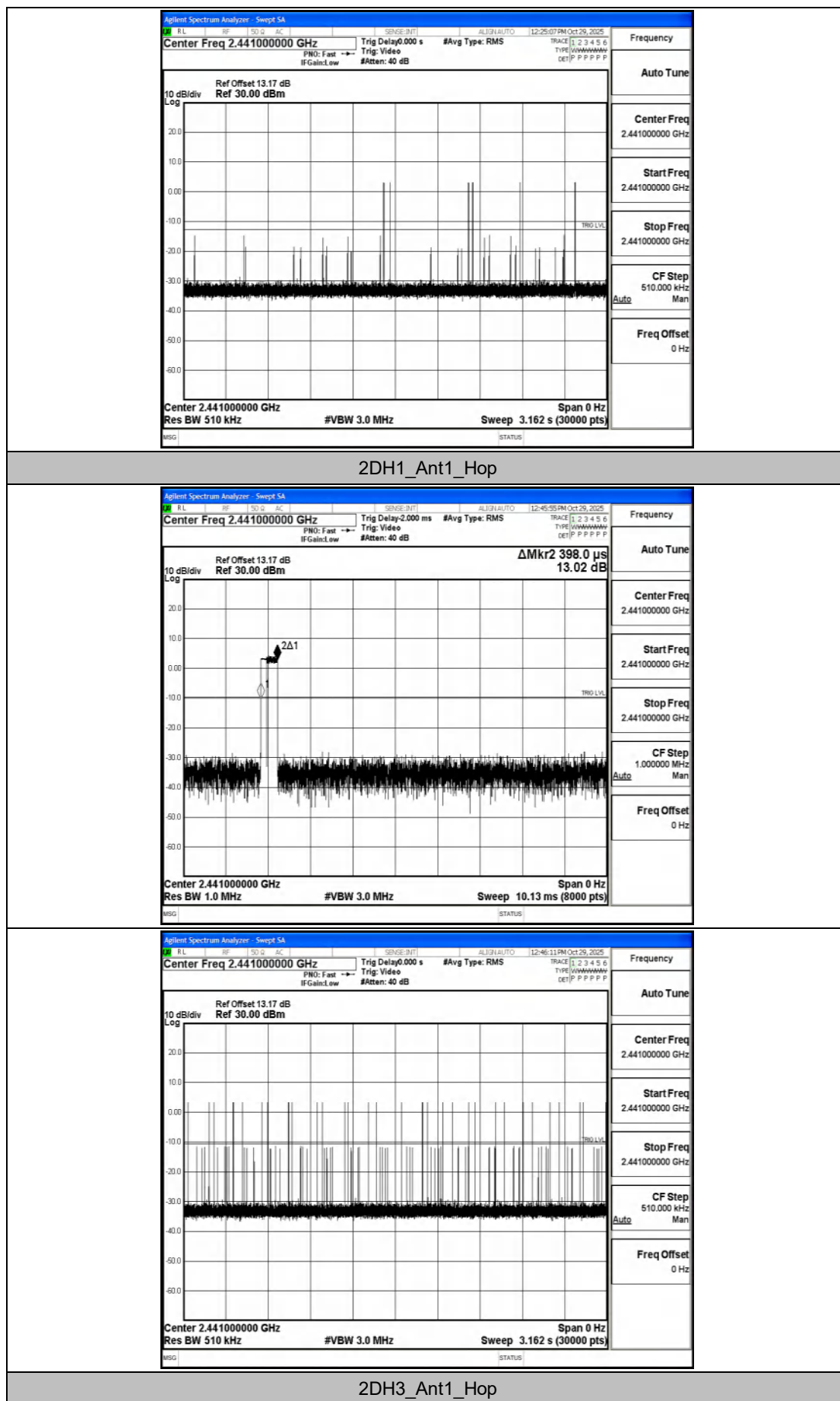
Test Result

TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.404	330	0.133	≤0.4	PASS
DH3	Ant1	Hop	1.661	170	0.282	≤0.4	PASS
DH5	Ant1	Hop	2.908	80	0.233	≤0.4	PASS
2DH1	Ant1	Hop	0.398	330	0.131	≤0.4	PASS
2DH3	Ant1	Hop	1.648	170	0.28	≤0.4	PASS
2DH5	Ant1	Hop	2.897	80	0.232	≤0.4	PASS
3DH1	Ant1	Hop	0.394	320	0.126	≤0.4	PASS
3DH3	Ant1	Hop	1.644	160	0.263	≤0.4	PASS
3DH5	Ant1	Hop	2.896	80	0.232	≤0.4	PASS

Test Graphs



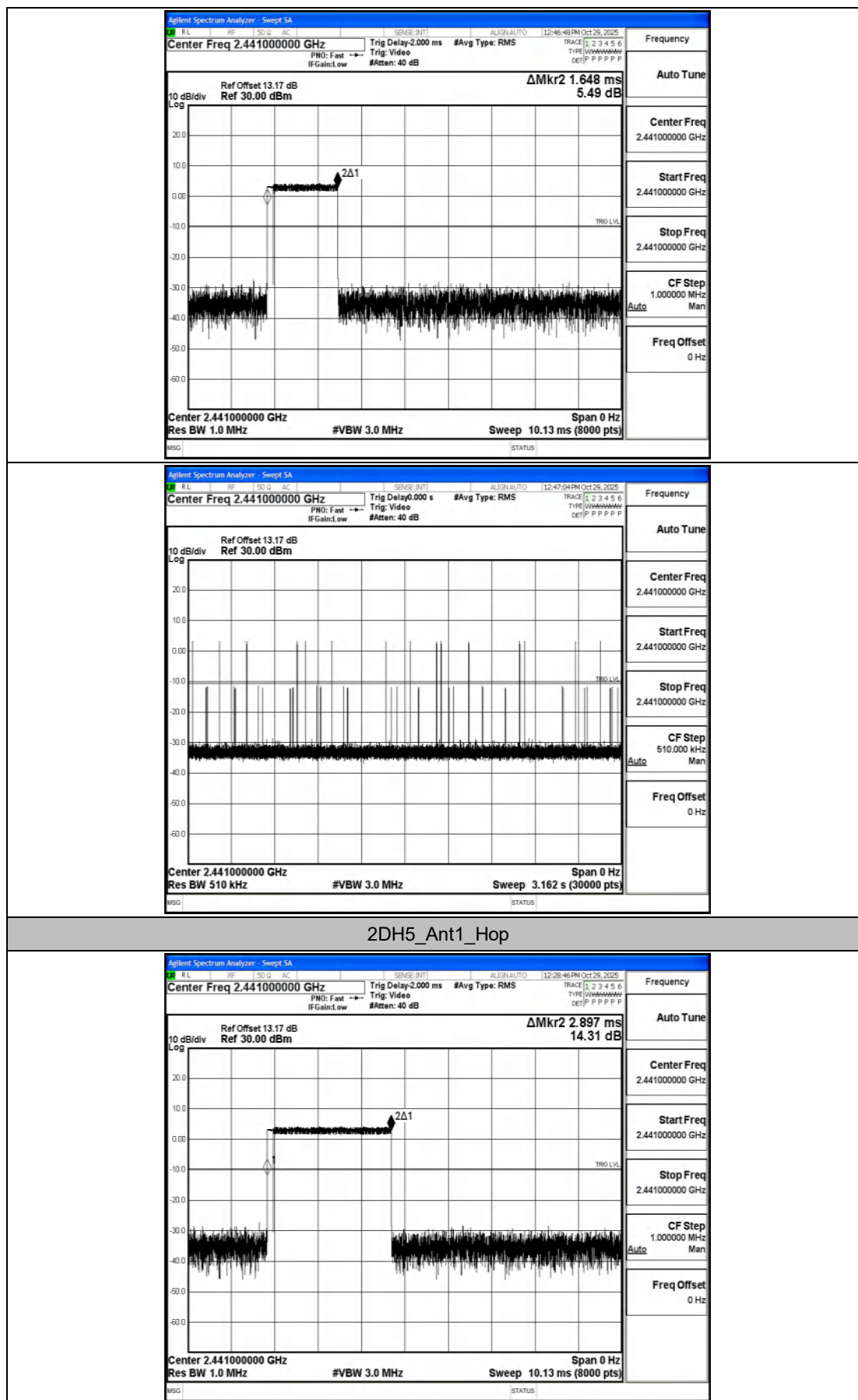


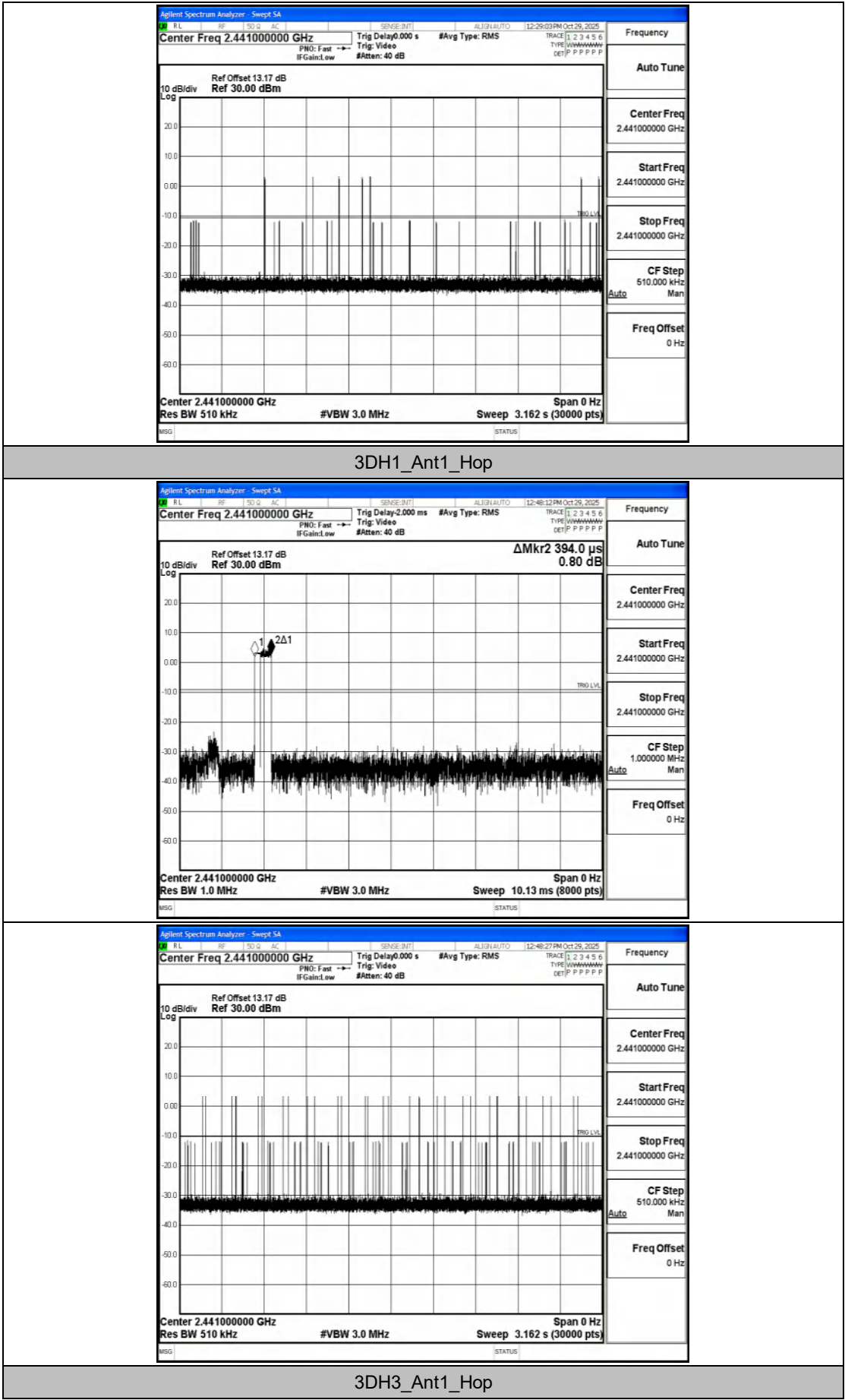


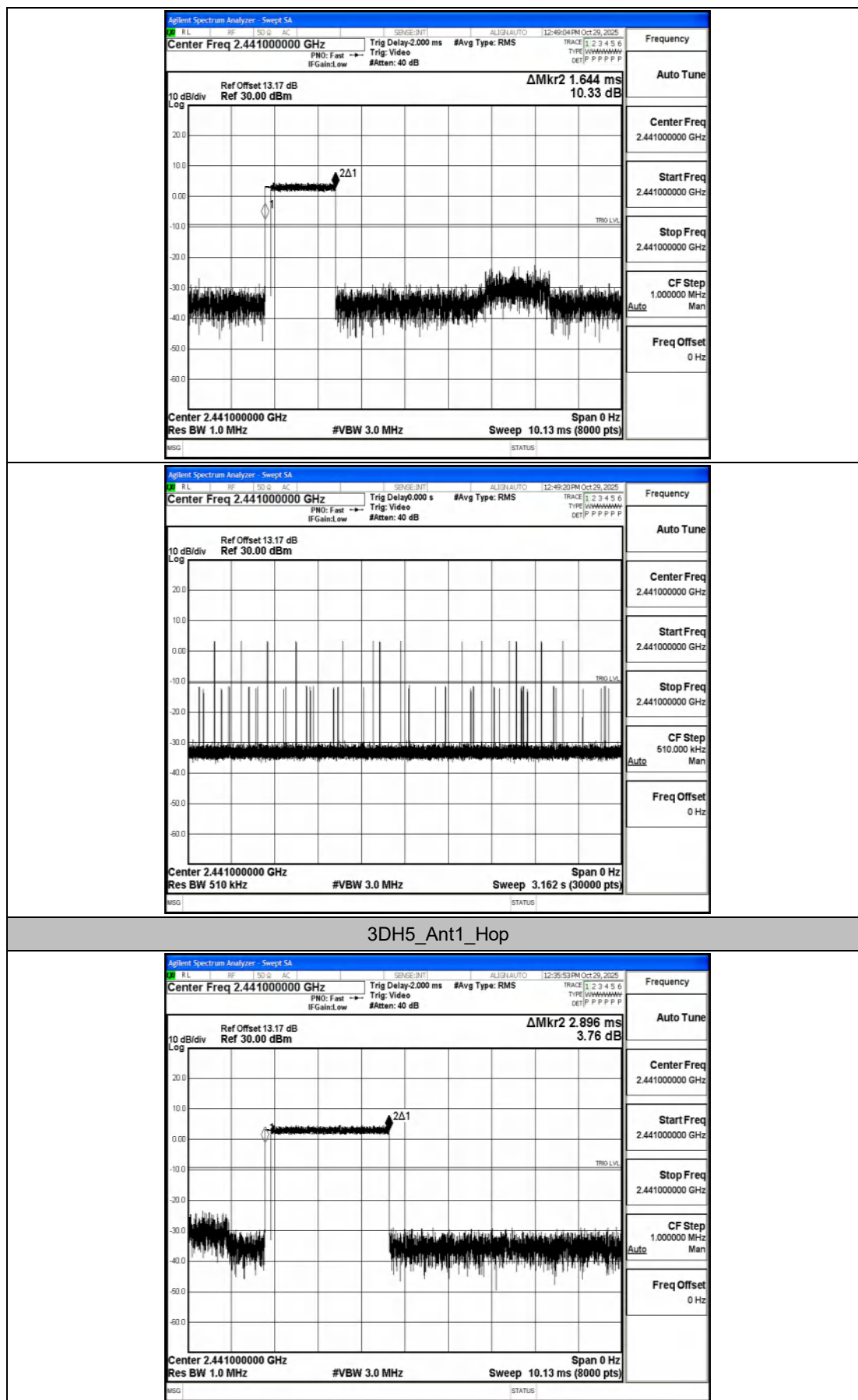
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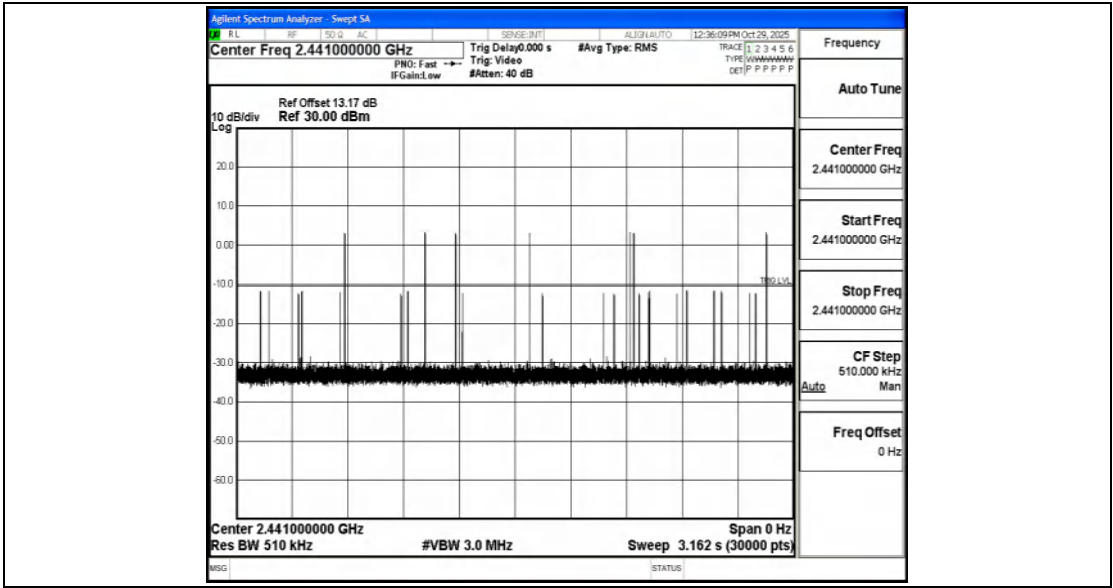
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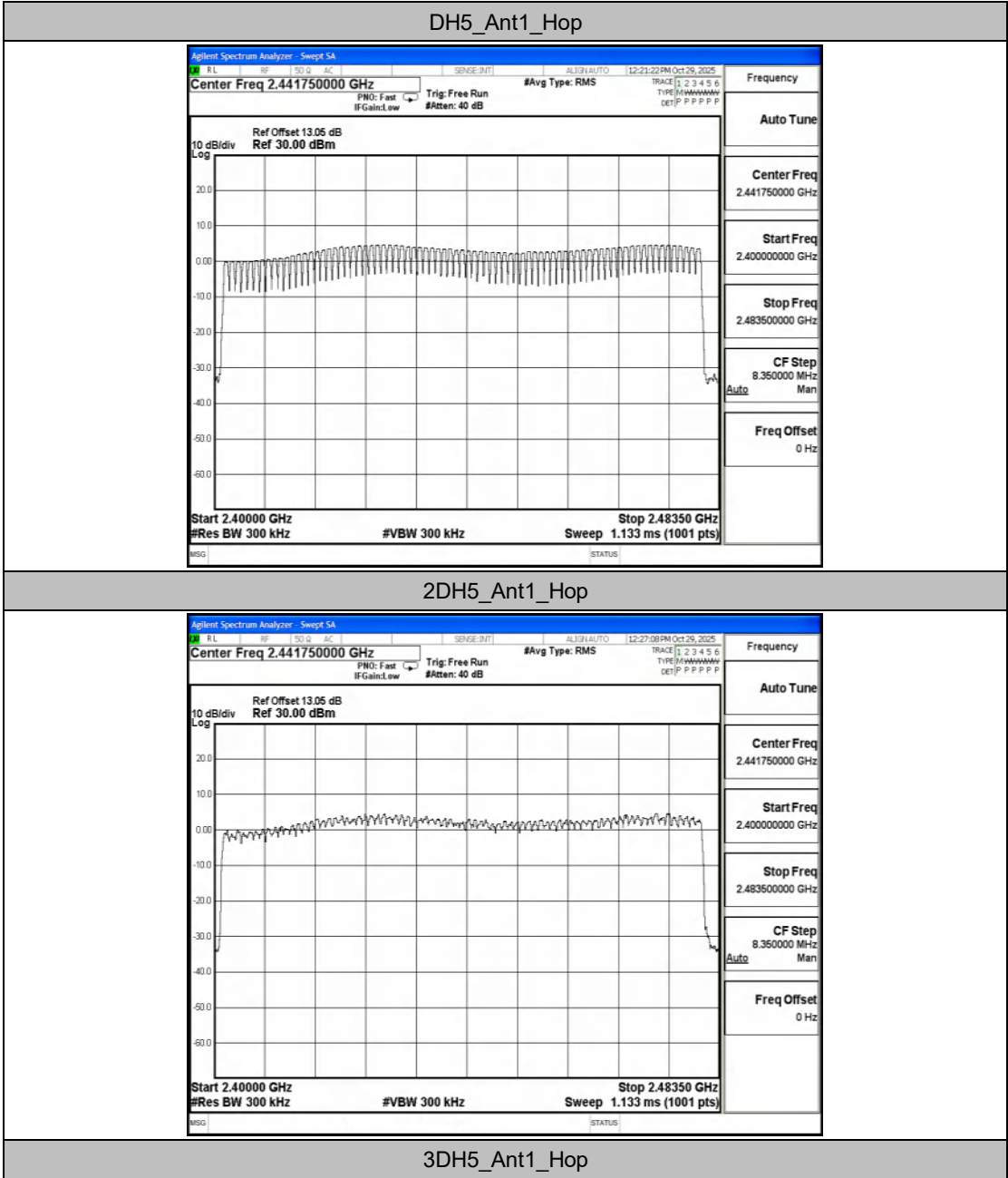


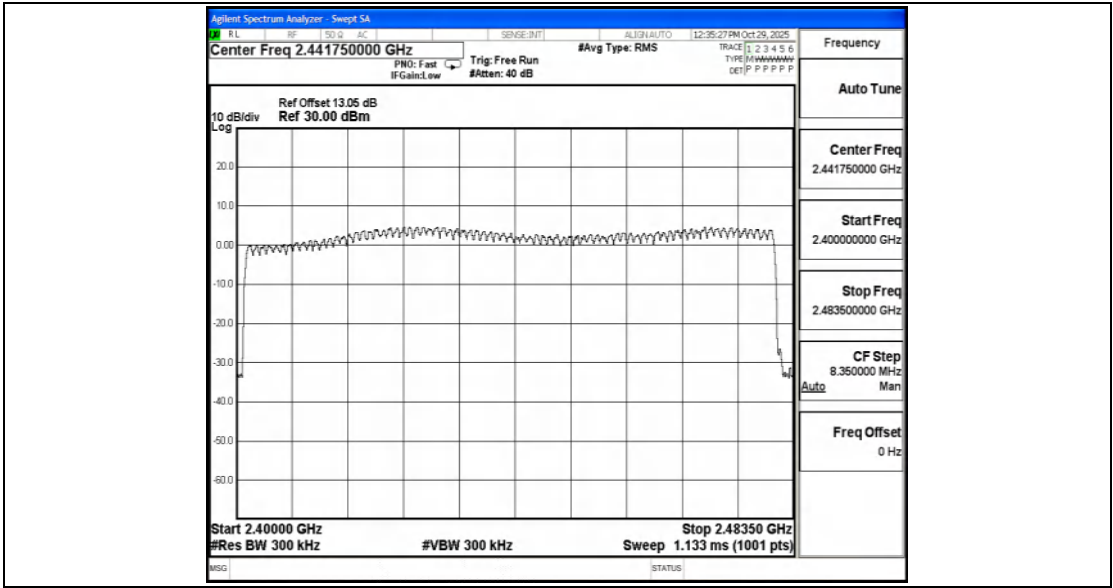
A.5 Number of hopping channels

Test Result

TestMode	Antenna	Freq(MHz)	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



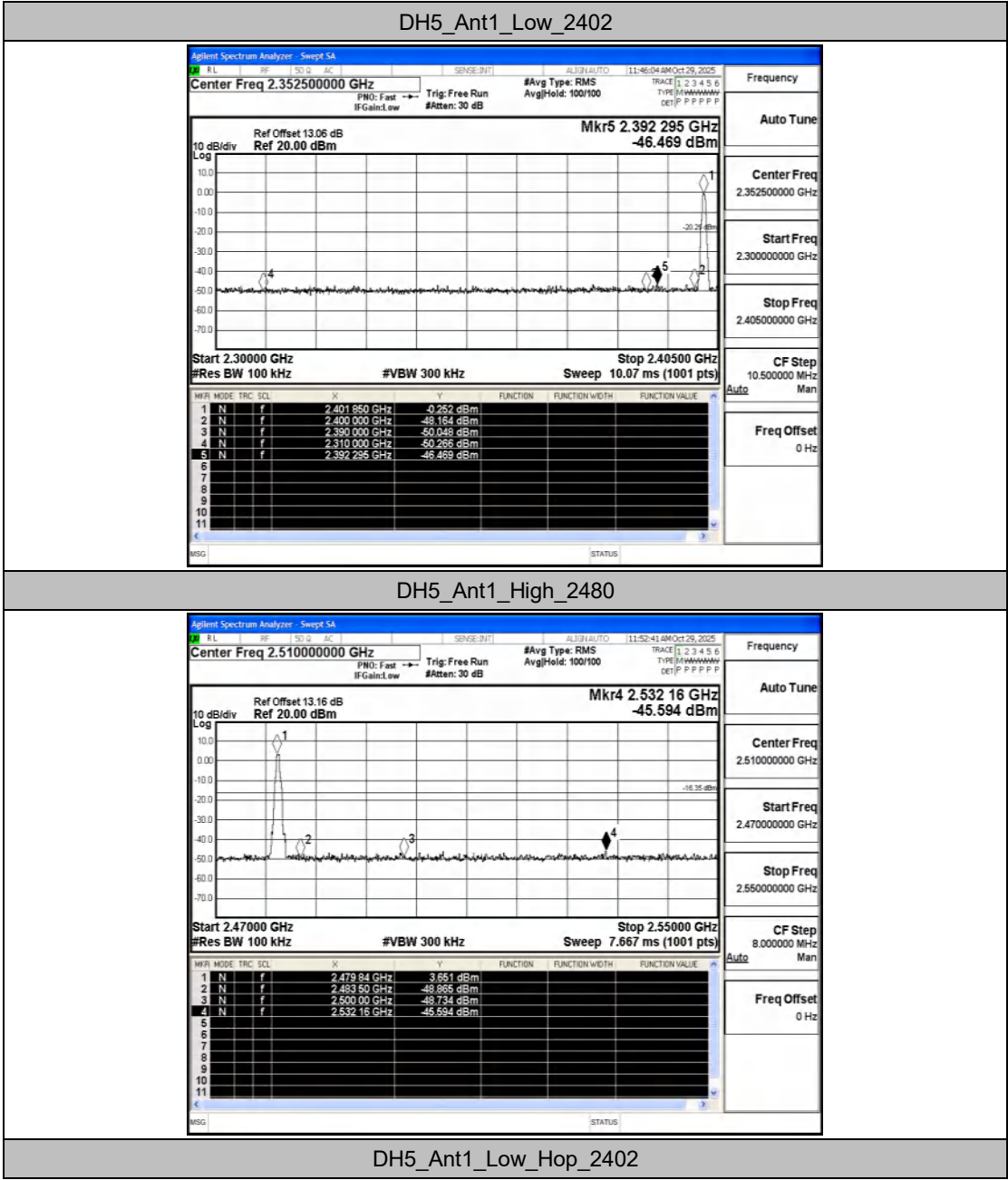


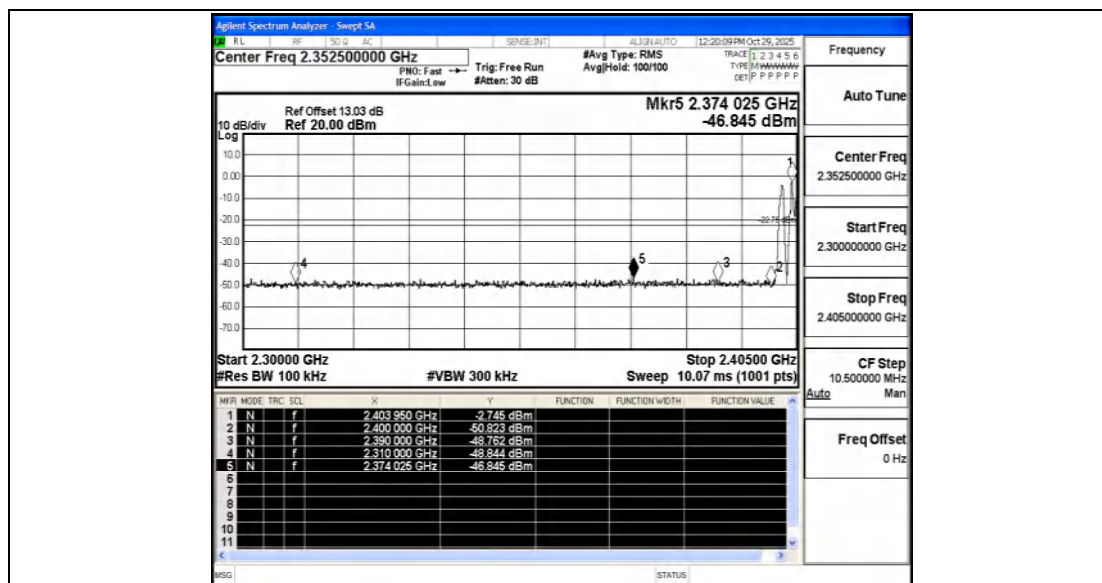
A.6 Band edge measurements

Test Result

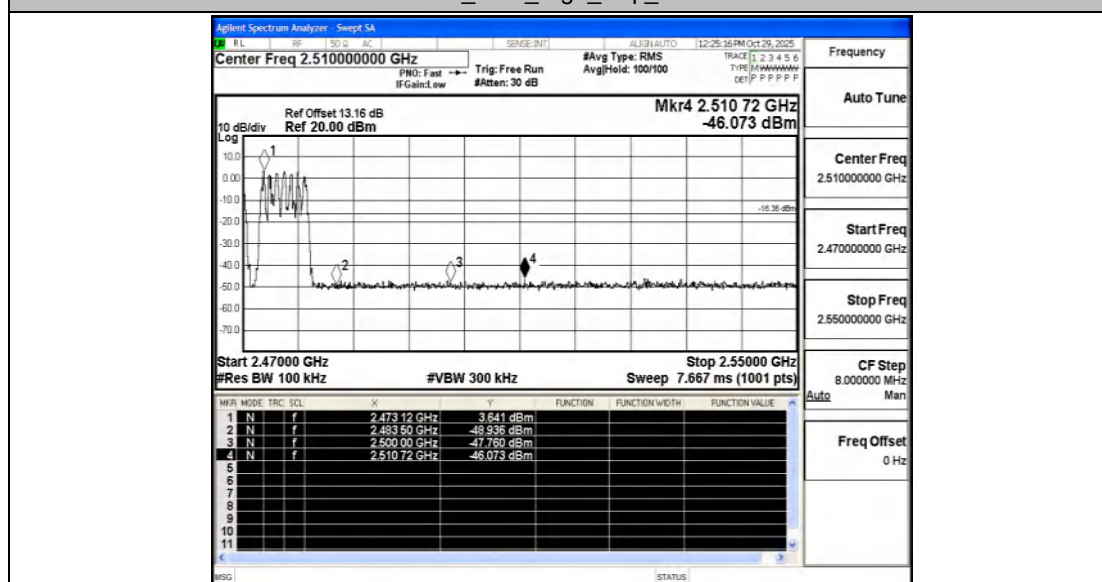
TestMode	Antenna	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-0.25	-46.47	≤ -20.25	PASS
		High	2480	3.65	-45.59	≤ -16.35	PASS
		Low	Hop_2402	-2.75	-46.85	≤ -22.75	PASS
		High	Hop_2480	3.64	-46.07	≤ -16.36	PASS
2DH5	Ant1	Low	2402	-0.84	-46.29	≤ -20.84	PASS
		High	2480	3.60	-46.79	≤ -16.4	PASS
		Low	Hop_2402	-1.39	-46.78	≤ -21.39	PASS
		High	Hop_2480	0.78	-45.65	≤ -19.22	PASS
3DH5	Ant1	Low	2402	-2.83	-46.34	≤ -22.83	PASS
		High	2480	1.62	-46.02	≤ -18.38	PASS
		Low	Hop_2402	-5.98	-46.63	≤ -25.98	PASS
		High	Hop_2480	0.98	-46.44	≤ -19.02	PASS

Test Graphs

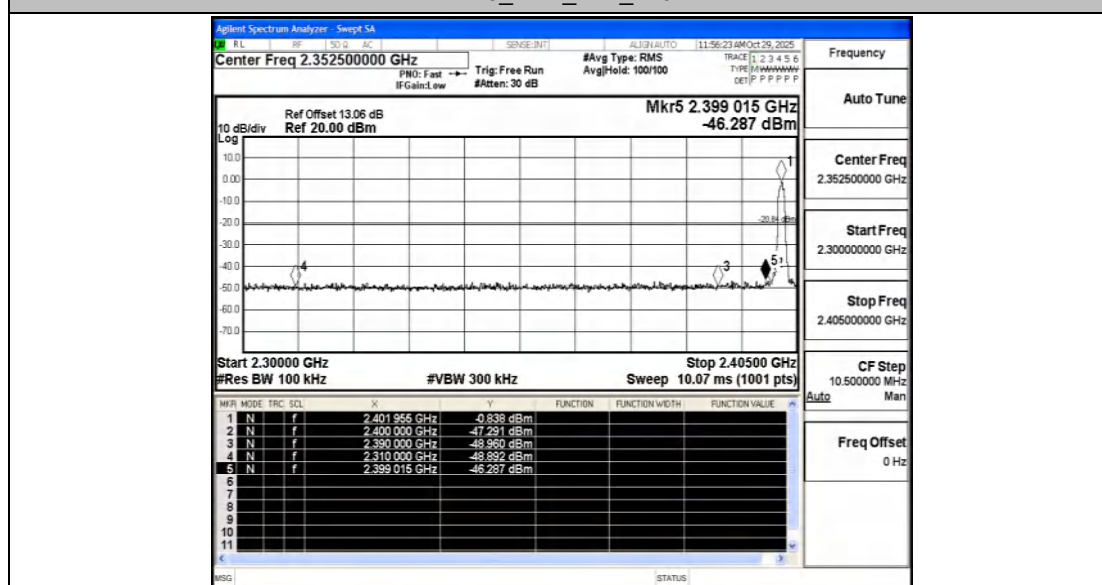


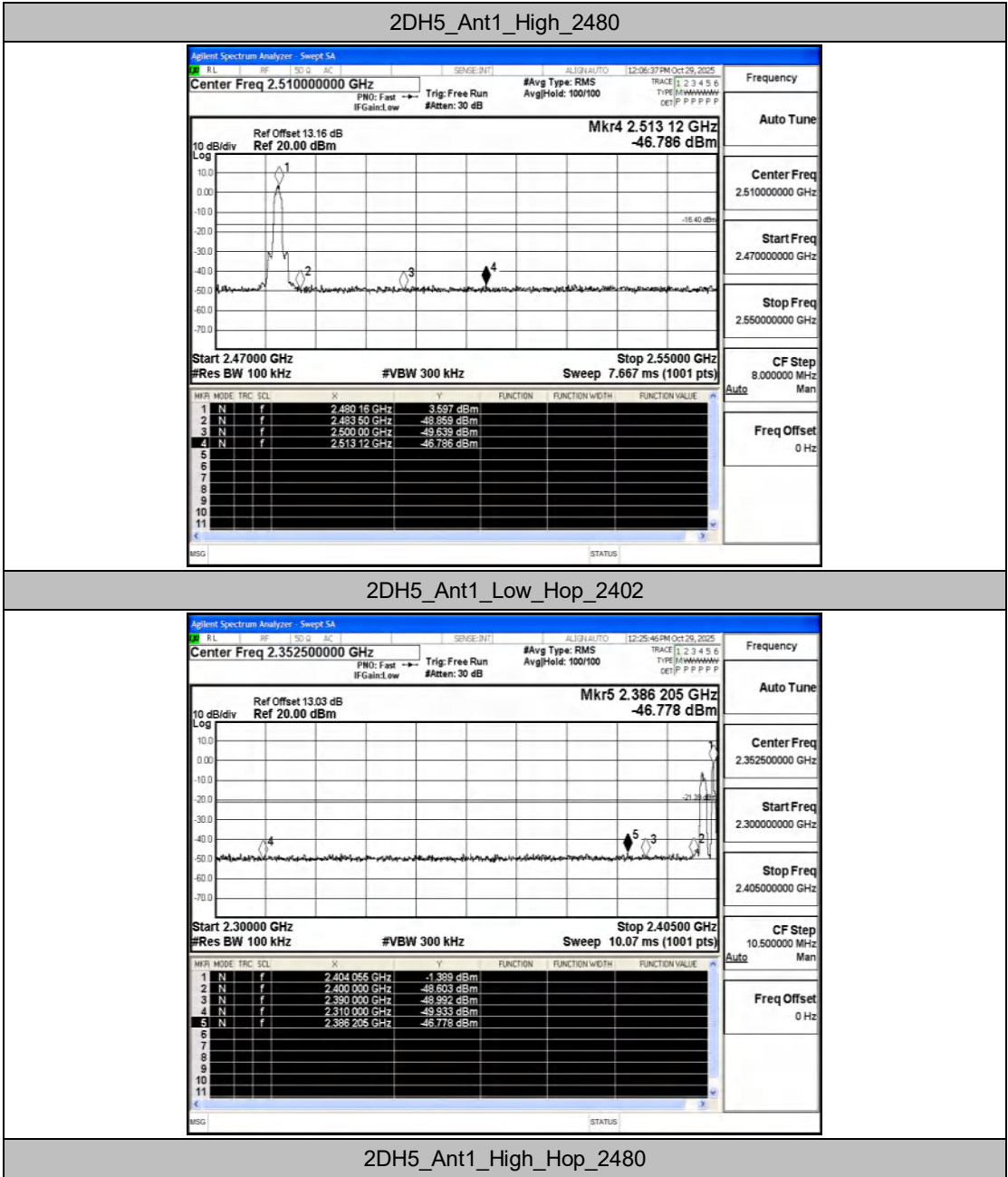


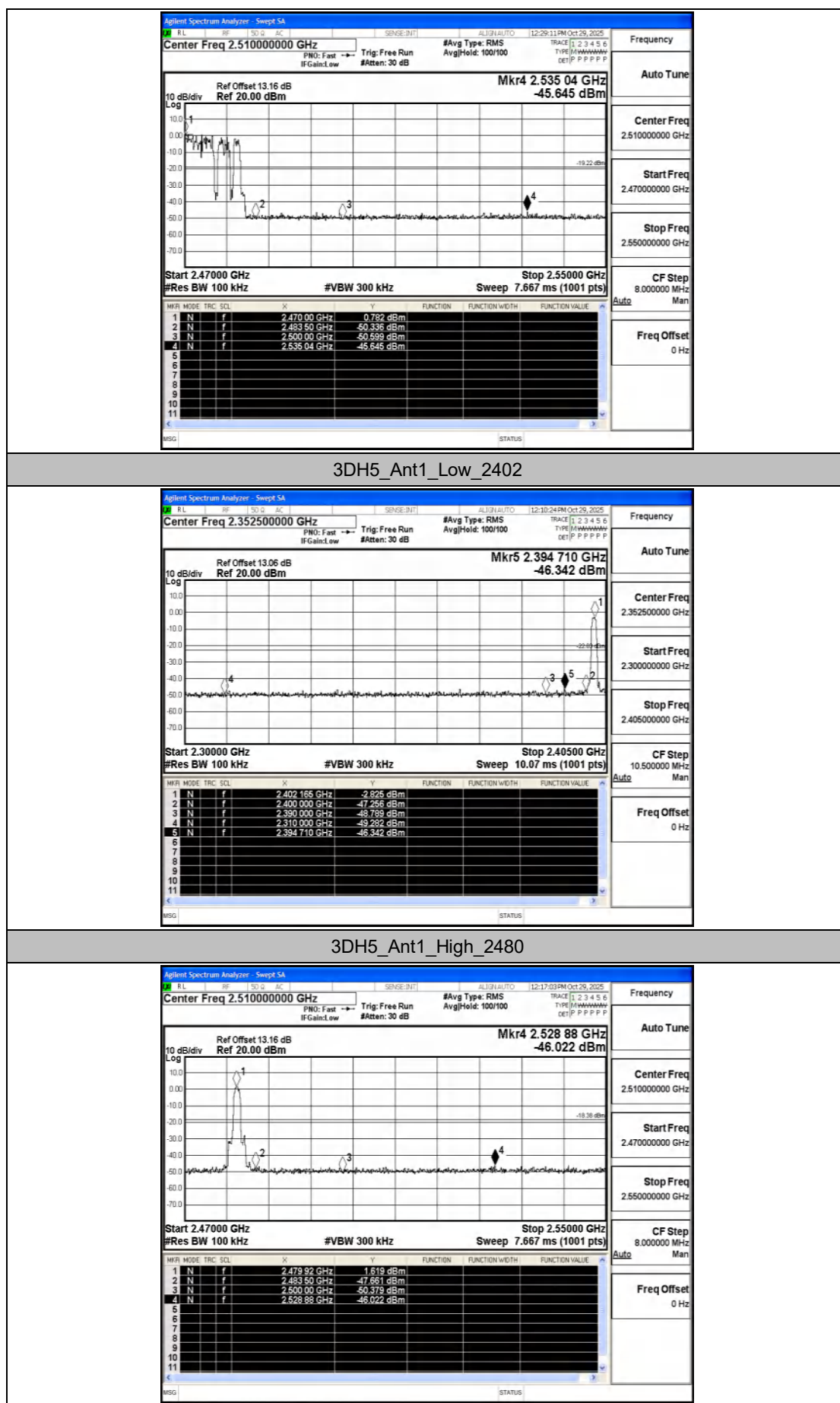
DH5 Ant1 High Hop 2480



2DH5 Ant1 Low 2402





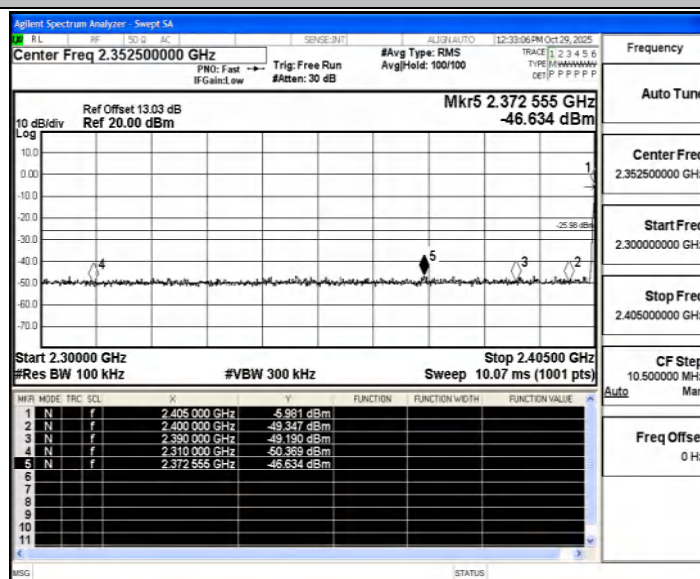


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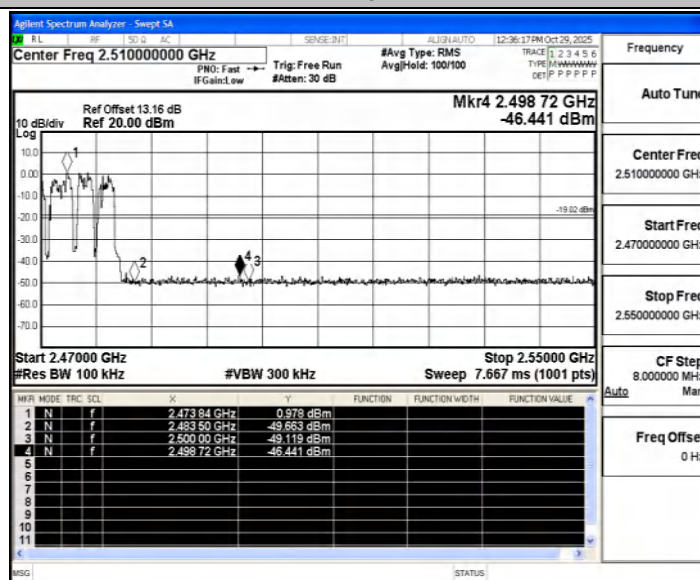
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3DH5_Ant1_Low_Hop_2402



3DH5_Ant1_High_Hop_2480

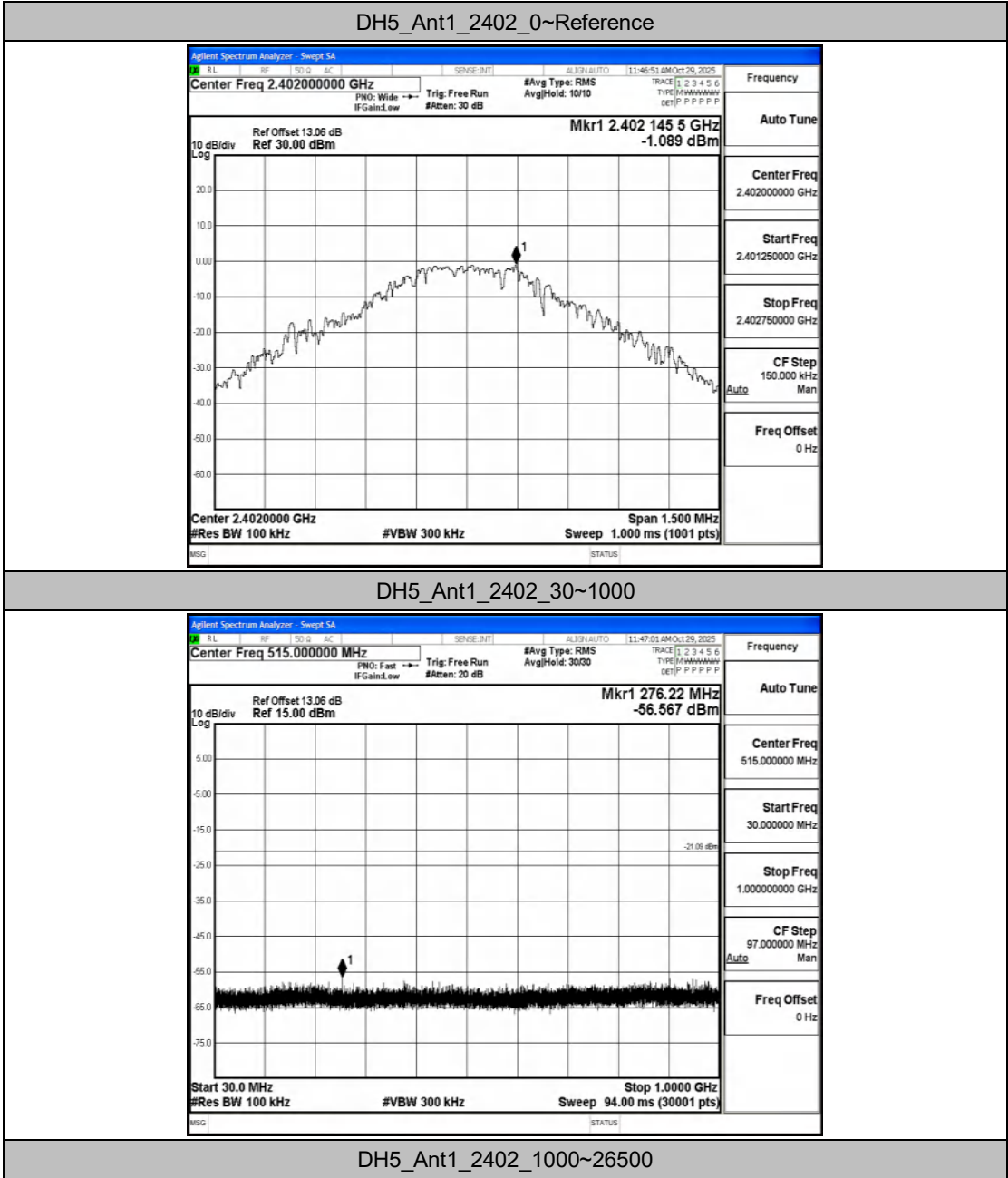


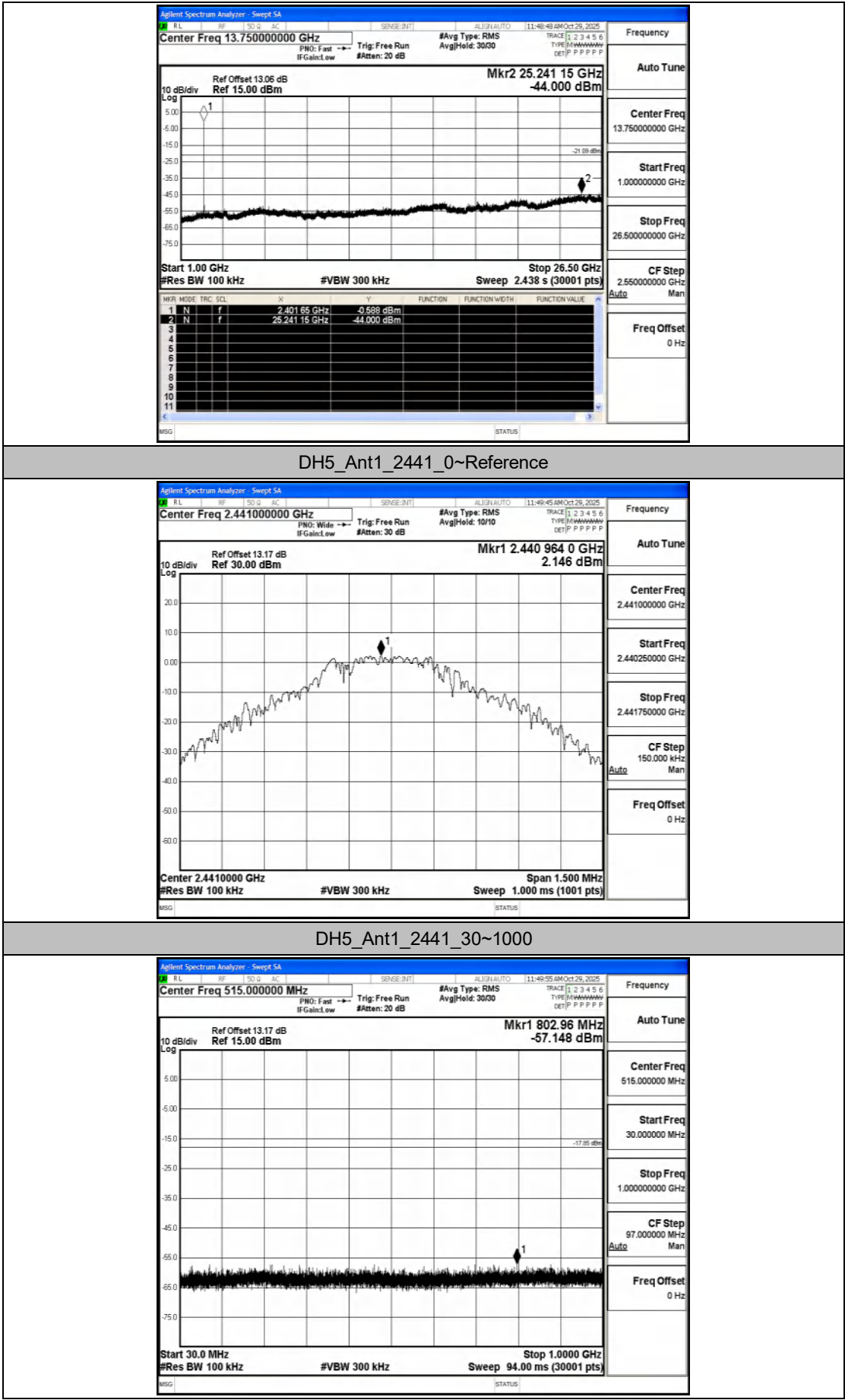
A.7 Conducted Spurious Emission

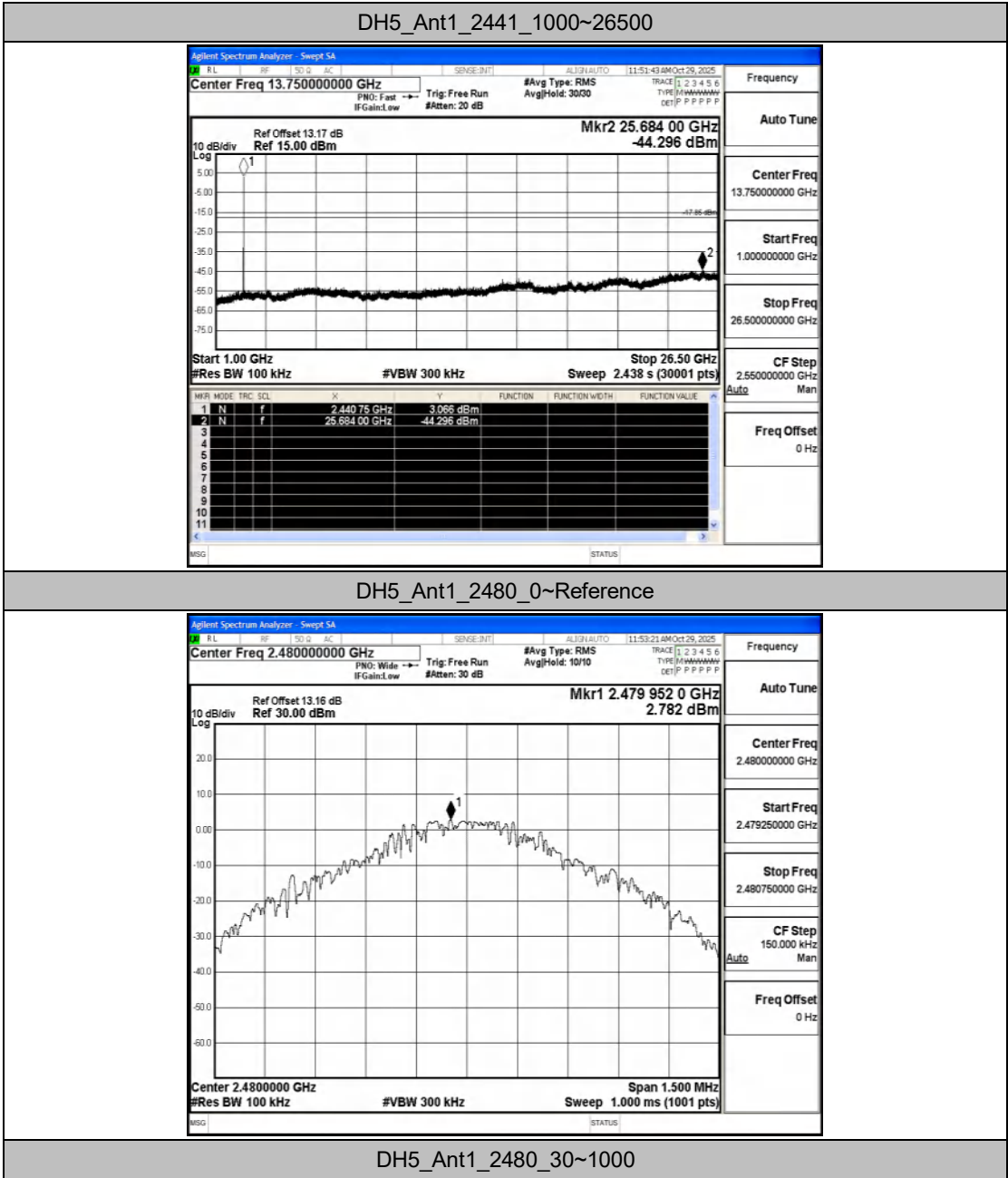
Test Result

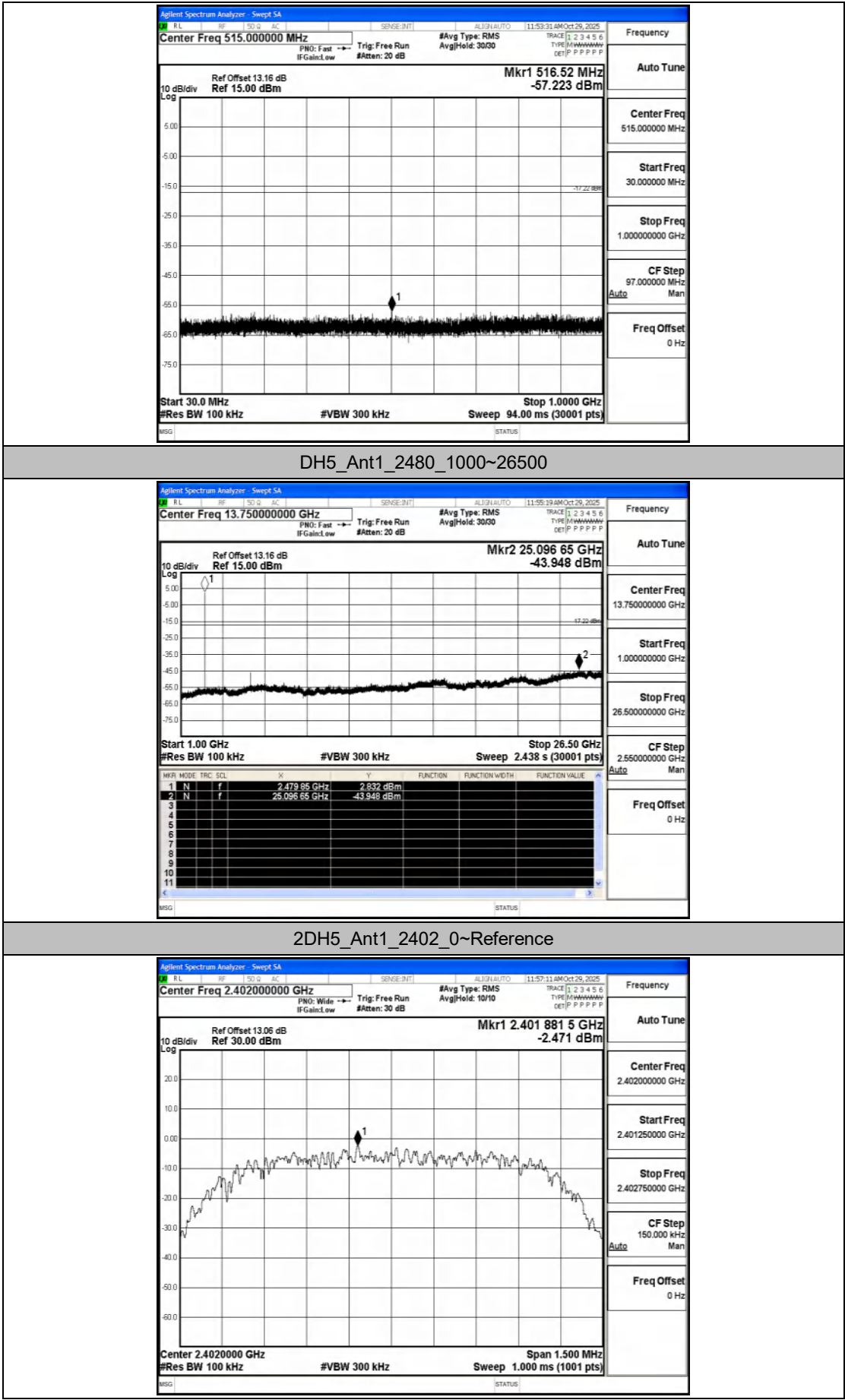
TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	-1.09	-1.09	---	PASS
			30~1000	-1.09	-56.57	≤-21.09	PASS
			1000~26500	-1.09	-44	≤-21.09	PASS
		2441	Reference	2.15	2.15	---	PASS
			30~1000	2.15	-57.15	≤-17.85	PASS
			1000~26500	2.15	-44.3	≤-17.85	PASS
		2480	Reference	2.78	2.78	---	PASS
			30~1000	2.78	-57.22	≤-17.22	PASS
			1000~26500	2.78	-43.95	≤-17.22	PASS
2DH5	Ant1	2402	Reference	-2.47	-2.47	---	PASS
			30~1000	-2.47	-43.67	≤-22.47	PASS
			1000~26500	-2.47	-44.49	≤-22.47	PASS
		2441	Reference	0.01	0.01	---	PASS
			30~1000	0.01	-47.53	≤-19.99	PASS
			1000~26500	0.01	-44.42	≤-19.99	PASS
		2480	Reference	3.04	3.04	---	PASS
			30~1000	3.04	-43.39	≤-16.96	PASS
			1000~26500	3.04	-43.49	≤-16.96	PASS
3DH5	Ant1	2402	Reference	-3.18	-3.18	---	PASS
			30~1000	-3.18	-57.43	≤-23.18	PASS
			1000~26500	-3.18	-34.84	≤-23.18	PASS
		2441	Reference	0.50	0.50	---	PASS
			30~1000	0.50	-56.61	≤-19.5	PASS
			1000~26500	0.50	-44.1	≤-19.5	PASS
		2480	Reference	3.27	3.27	---	PASS
			30~1000	3.27	-56.76	≤-16.73	PASS
			1000~26500	3.27	-38.52	≤-16.73	PASS

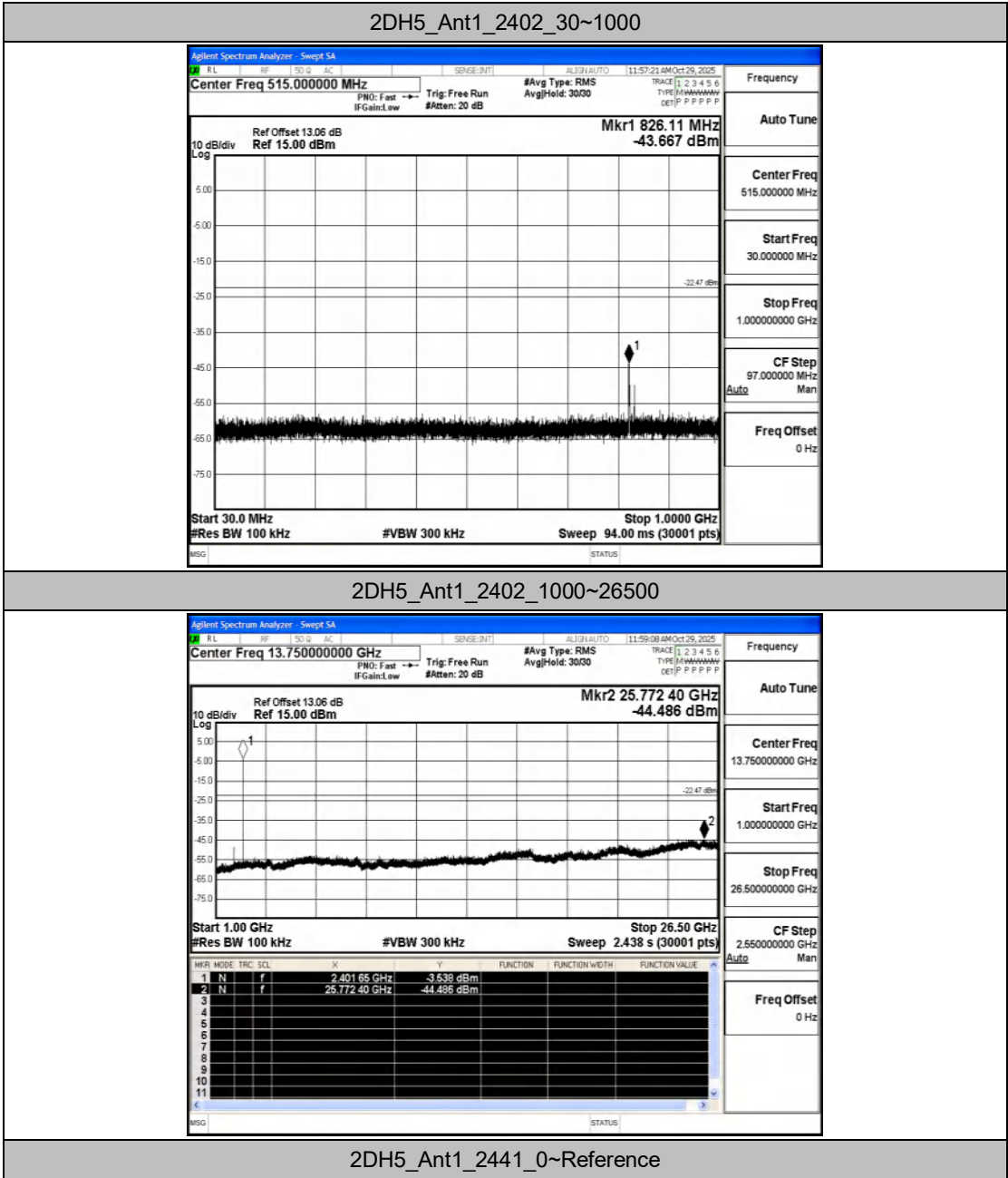
Test Graphs

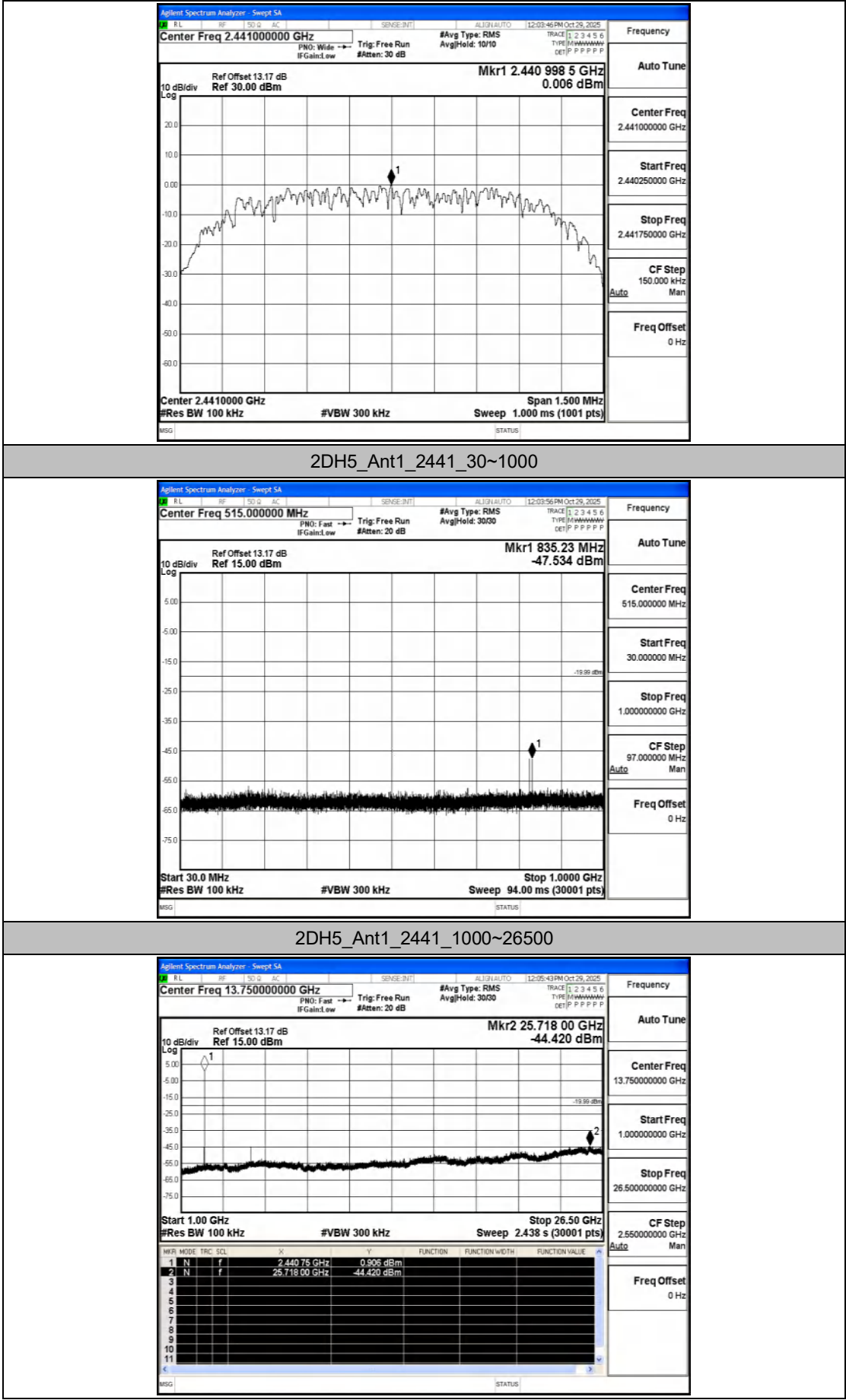


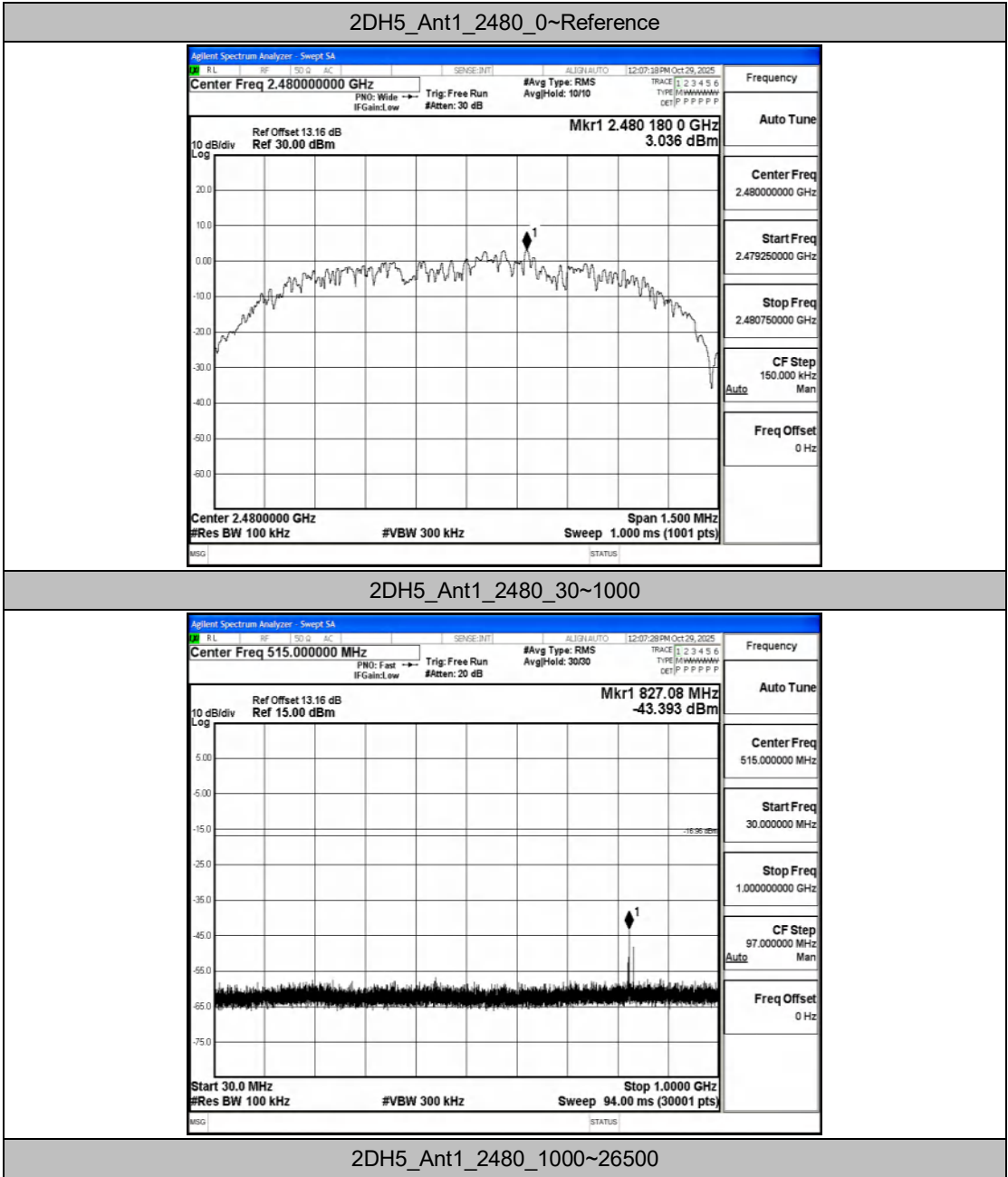


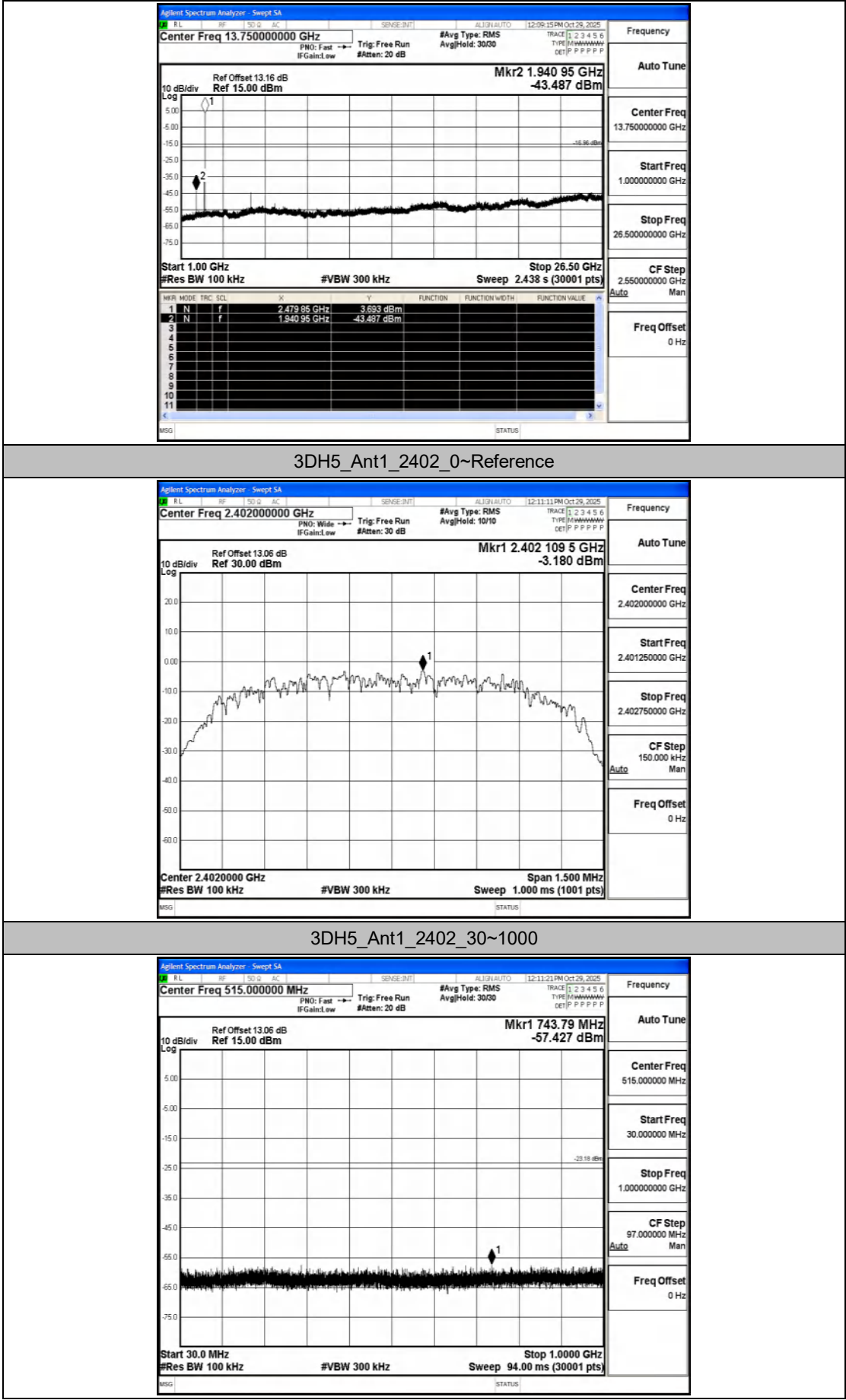


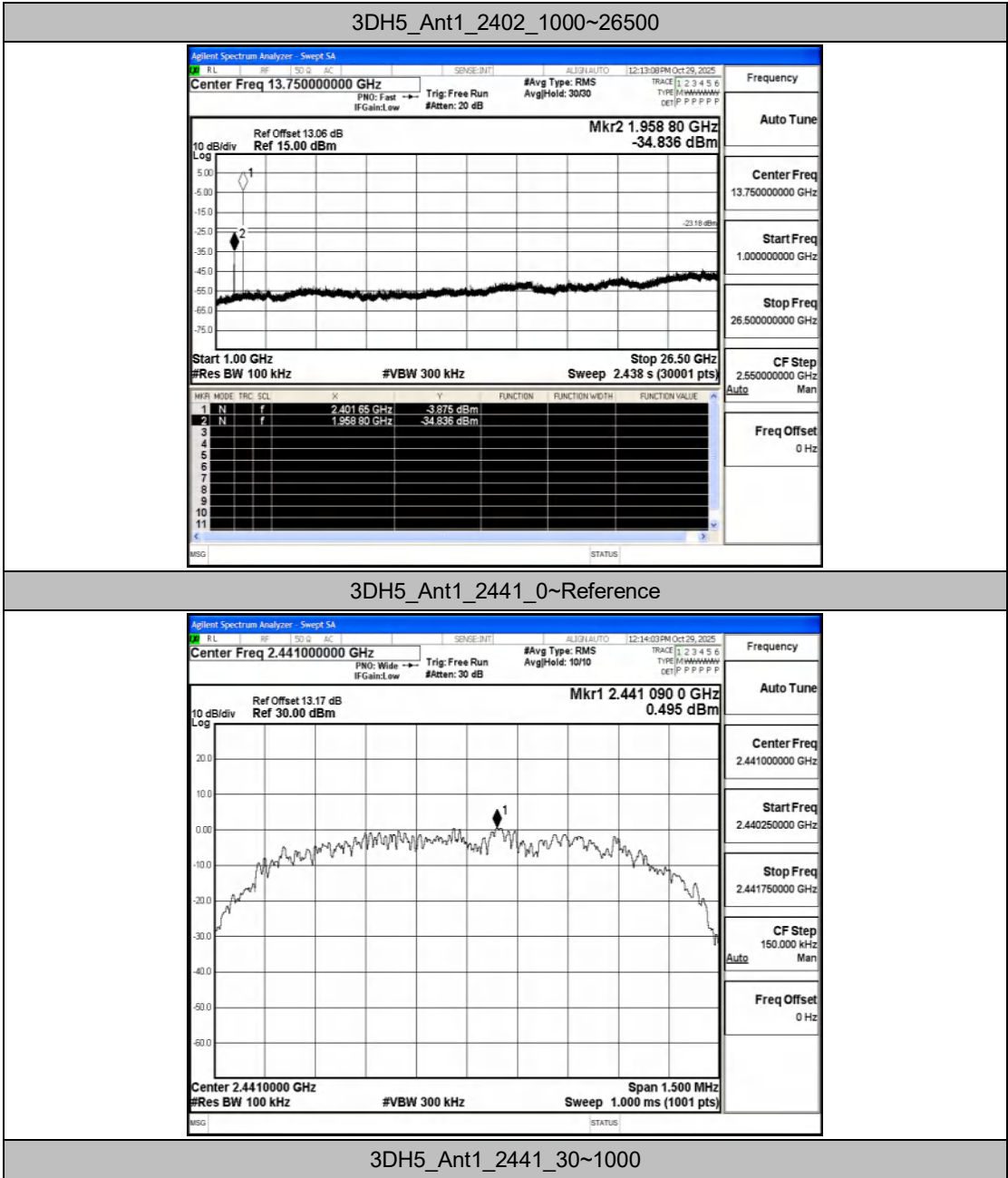


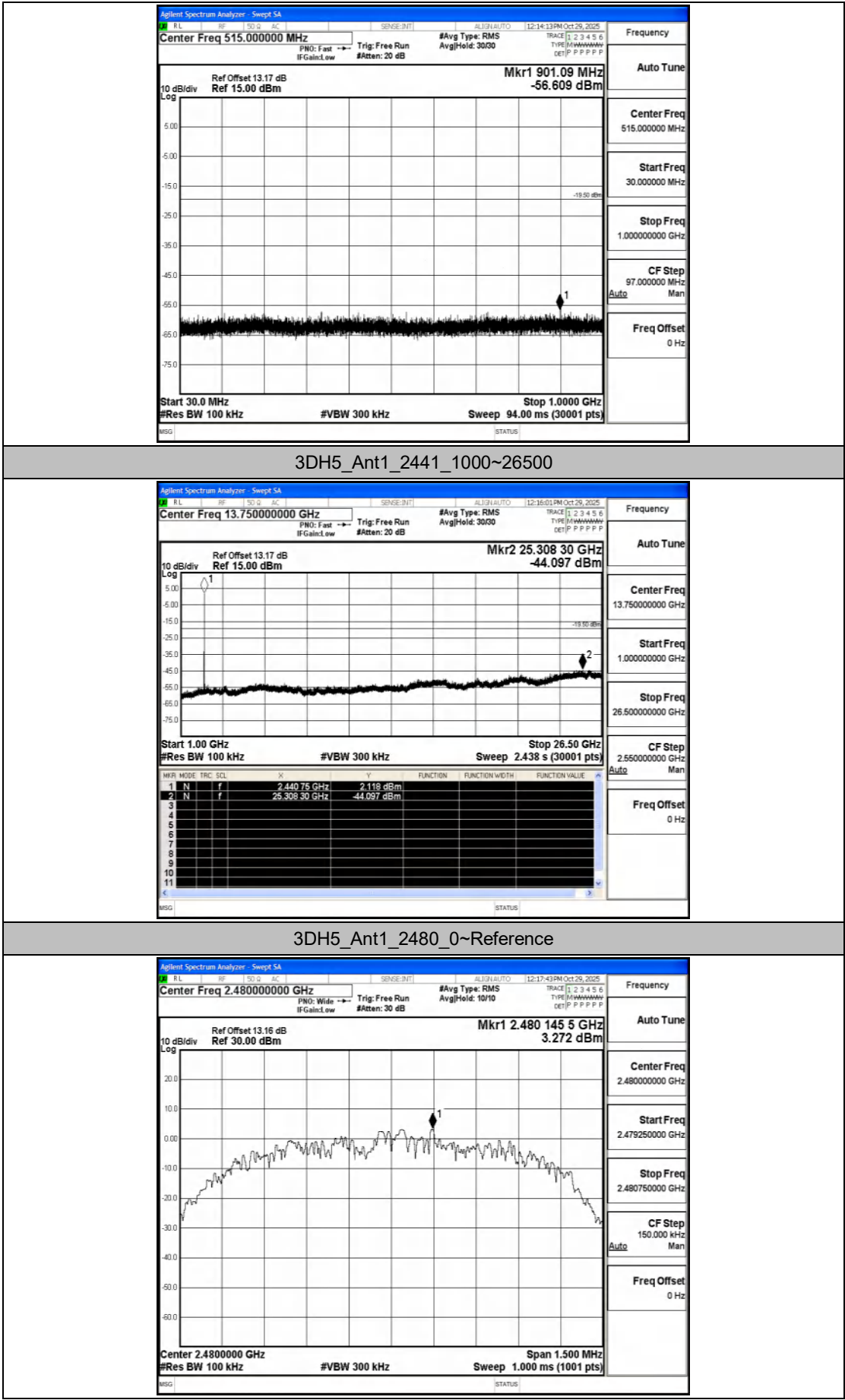


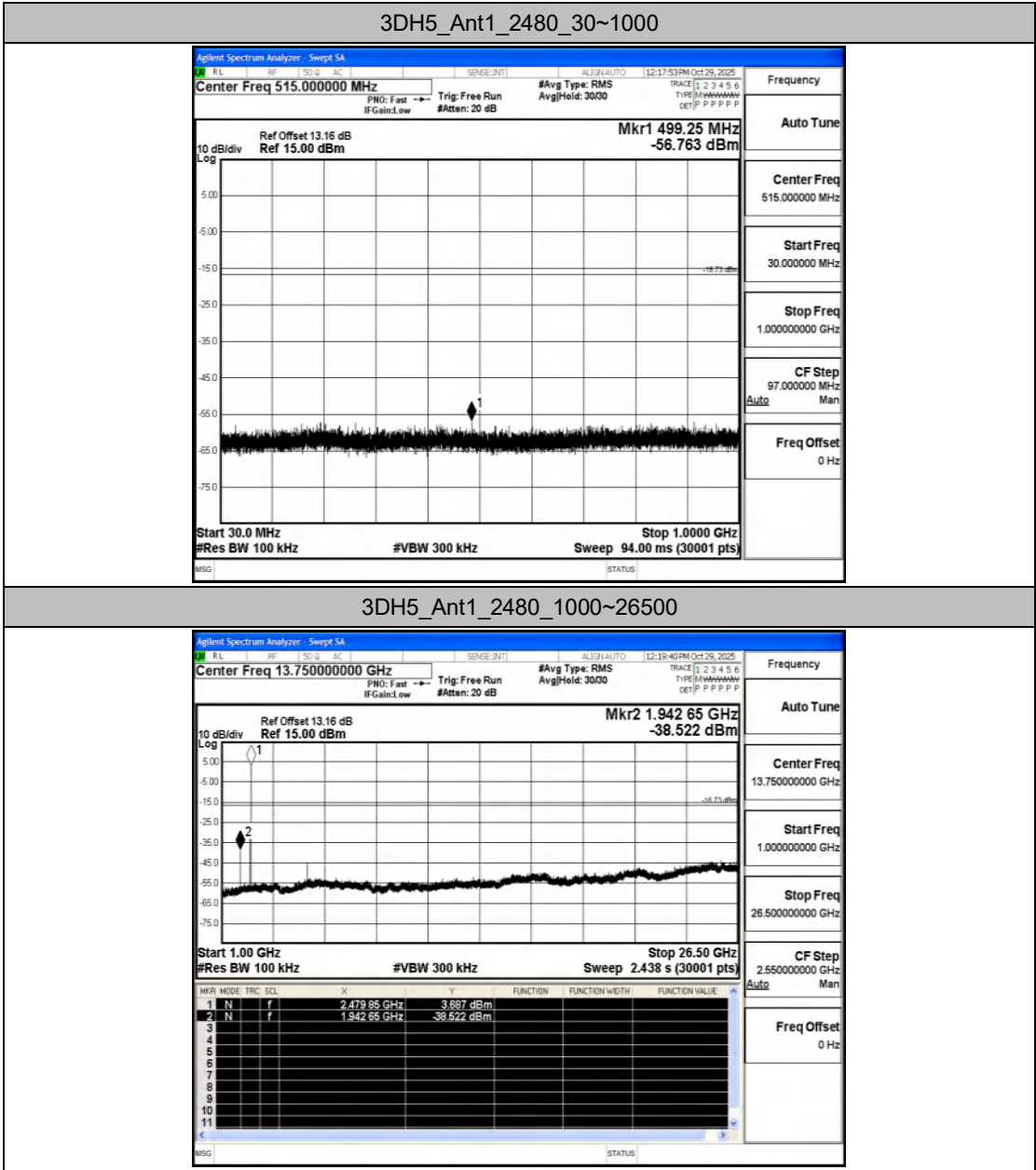












A.8 Duty Cycle

Test Result

TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	DC [%]	xFactor	Limit	Verdict
DH5	Ant1	2402	2.91	3.75	77.60	1.10	---	---
		2441	2.92	3.76	77.66	1.10	---	---
		2480	2.91	3.75	77.60	1.10	---	---
2DH5	Ant1	2402	2.89	3.75	77.07	1.13	---	---
		2441	2.89	3.75	77.07	1.13	---	---
		2480	2.90	3.75	77.33	1.12	---	---
3DH5	Ant1	2402	2.89	3.74	77.27	1.12	---	---
		2441	2.90	3.75	77.33	1.12	---	---
		2480	2.90	3.76	77.13	1.13	---	---

DH5_Ant1_2402

Agilent Spectrum Analyzer - Sweep SA

Center Freq 2.402000000 GHz

Ref Offset 13.06 dB

Ref 15.00 dBm

Trig Delay: 2.000 ms

Trig: Video

#Avg Type: RMS

#Atten: 20 dB

Span 0 Hz

Center 2.402000000 GHz

Res BW 8 MHz

#VBW 8.0 MHz

Sweep 7.000 ms (1001 pts)

ΔMkr3 3.750 ms

0.08 dB

MFR MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	t		1.950 ms	-0.33 dBm		
2	Δ1	t	(Δ)	2.910 ms (Δ)	-20.05 dB		
3	Δ1	t	(Δ)	3.750 ms (Δ)	0.08 dB		

DH5_Ant1_2441

Agilent Spectrum Analyzer - Sweep SA

Center Freq 2.441000000 GHz

Ref Offset 13.17 dB

Ref 15.00 dBm

Trig Delay: 2.000 ms

Trig: Video

#Avg Type: RMS

#Atten: 20 dB

Span 0 Hz

Center 2.441000000 GHz

Res BW 8 MHz

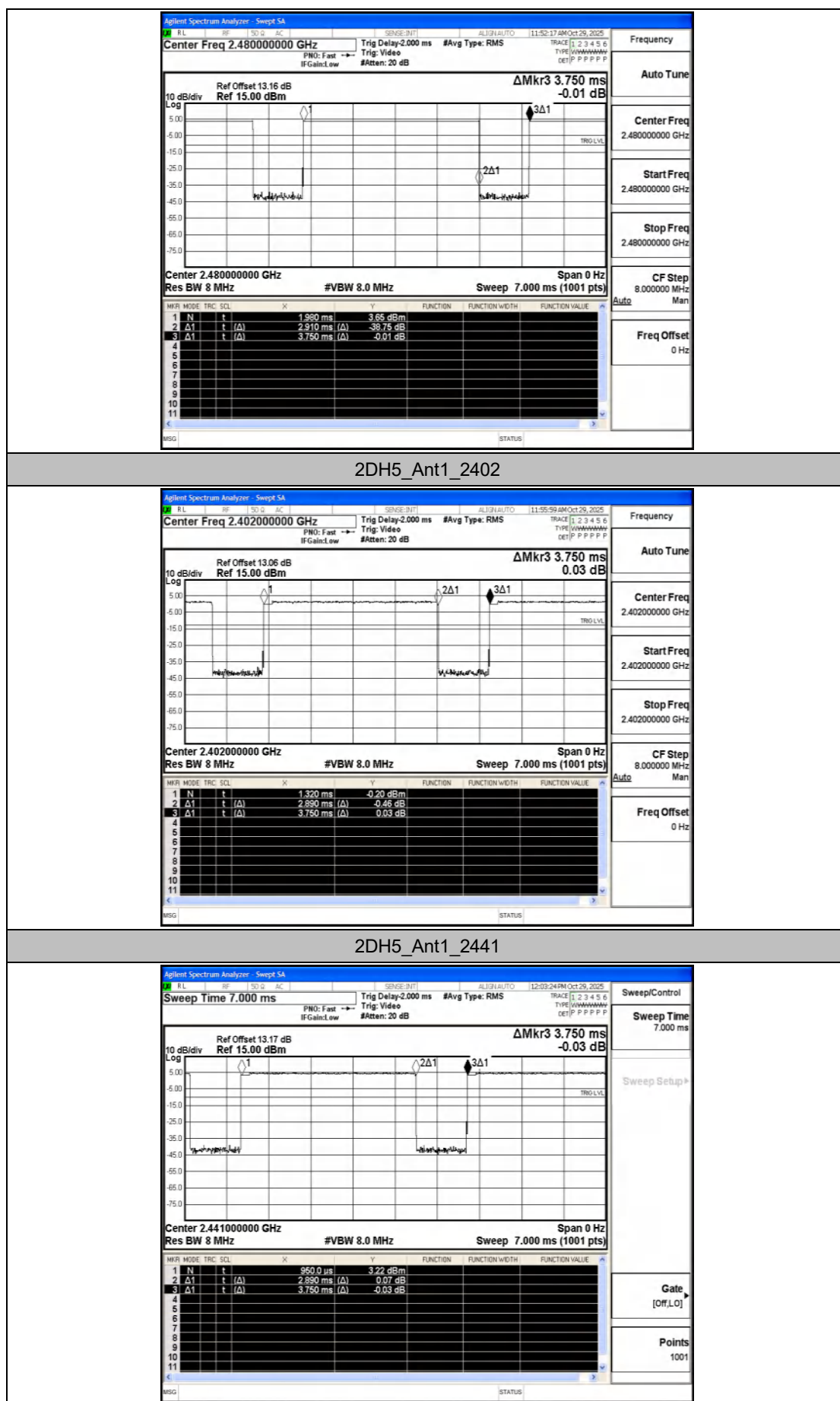
#VBW 8.0 MHz

Sweep 7.000 ms (1001 pts)

ΔMkr3 3.760 ms

27.54 dB

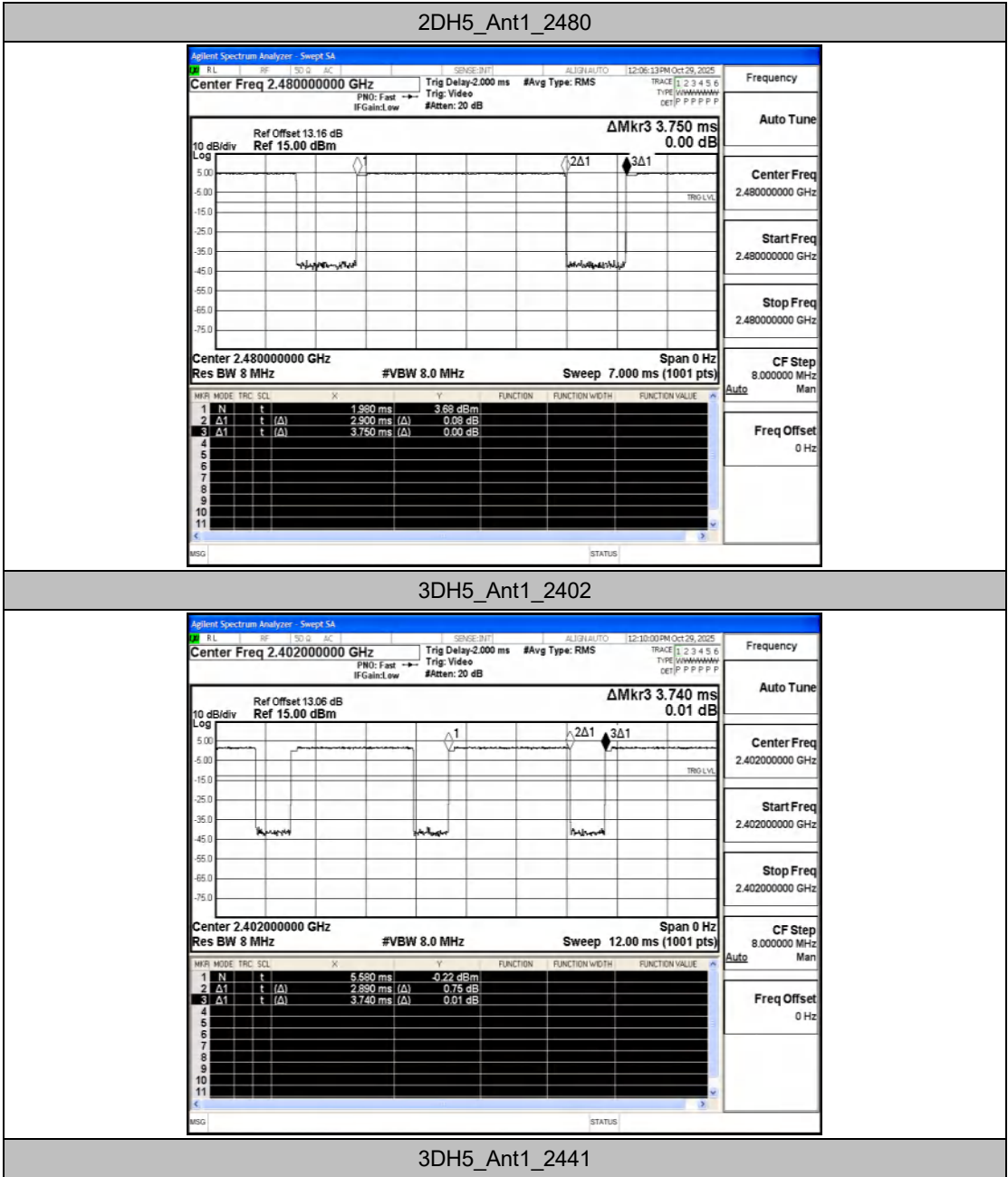
MFR MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	t		1.970 ms	-24.47 dBm		
2	Δ1	t	(Δ)	2.920 ms (Δ)	-8.11 dB		
3	Δ1	t	(Δ)	3.760 ms (Δ)	27.54 dB		

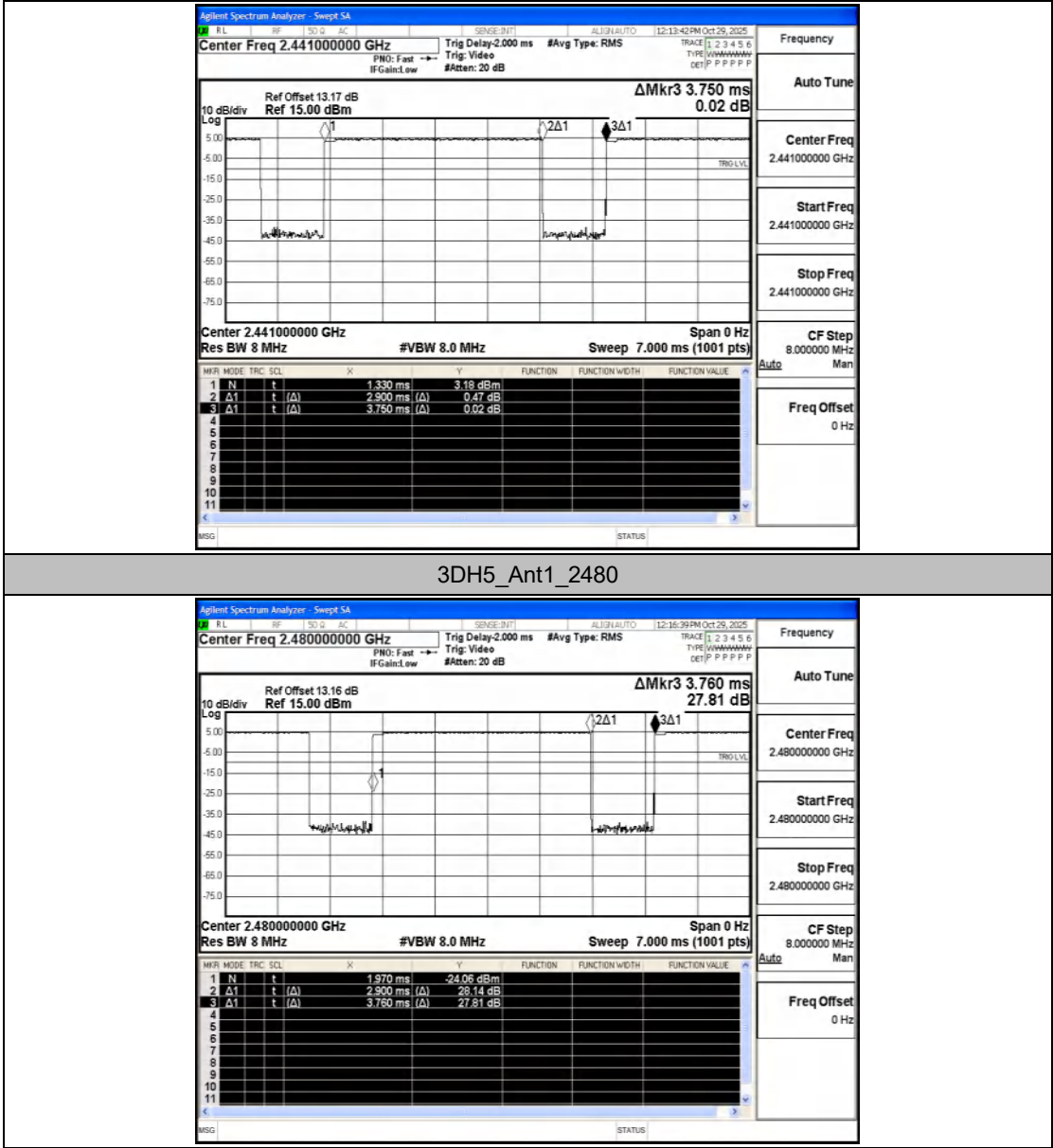


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A.9 Emissions in Restricted Bands

Test Result

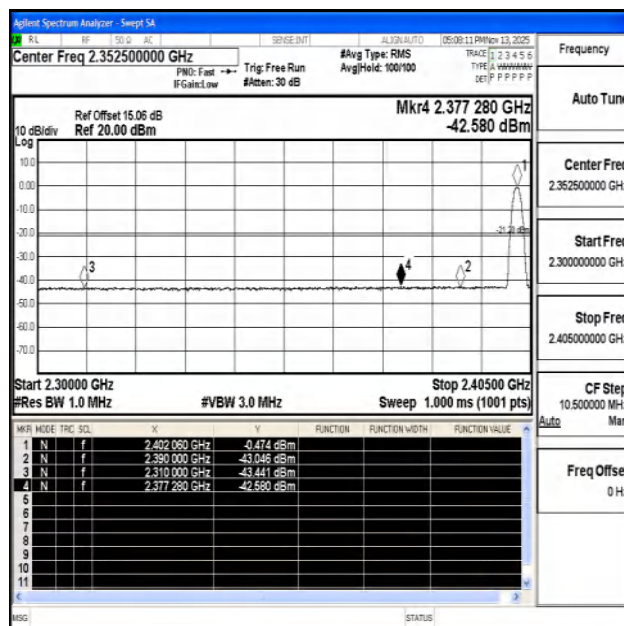
TestMode	Antenna	ChName	Frequency[MHz]	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
DH5	Ant1	Low	2402	Peak	2390.000	-43.05	≤-21.20	52.15	≤74	PASS
DH5	Ant1	Low	2402	Peak	2310.000	-43.44	≤-21.20	51.76	≤74	PASS
DH5	Ant1	Low	2402	Peak	2377.280	-42.58	≤-21.20	52.62	≤74	PASS
DH5	Ant1	Low	2402	AV	2390.000	-45.93	≤-41.20	49.27	≤54	PASS
DH5	Ant1	Low	2402	AV	2310.000	-46.39	≤-41.20	48.81	≤54	PASS
DH5	Ant1	Low	2402	AV	2376.440	-45.28	≤-41.20	49.92	≤54	PASS
DH5	Ant1	High	2480	Peak	2483.500	-43.35	≤-21.20	51.85	≤74	PASS
DH5	Ant1	High	2480	Peak	2500.000	-43.01	≤-21.20	52.19	≤74	PASS
DH5	Ant1	High	2480	Peak	2490.640	-42.35	≤-21.20	52.85	≤74	PASS
DH5	Ant1	High	2480	AV	2483.500	-46.03	≤-41.20	49.17	≤54	PASS
DH5	Ant1	High	2480	AV	2500.000	-46.58	≤-41.20	48.62	≤54	PASS
DH5	Ant1	High	2480	AV	2484.000	-45.12	≤-41.20	50.08	≤54	PASS
DH5	Ant1	Low	Hop_2402	Peak	2390.000	-43.18	≤-21.20	52.02	≤74	PASS
DH5	Ant1	Low	Hop_2402	Peak	2310.000	-43.63	≤-21.20	51.57	≤74	PASS
DH5	Ant1	Low	Hop_2402	Peak	2388.620	-42.62	≤-21.20	52.58	≤74	PASS
DH5	Ant1	High	Hop_2480	Peak	2483.500	-43.12	≤-21.20	52.08	≤74	PASS
DH5	Ant1	High	Hop_2480	Peak	2500.000	-43.12	≤-21.20	52.08	≤74	PASS
DH5	Ant1	High	Hop_2480	Peak	2494.000	-42.39	≤-21.20	52.81	≤74	PASS
2DH5	Ant1	Low	2402	Peak	2390.000	-43.29	≤-21.20	51.91	≤74	PASS
2DH5	Ant1	Low	2402	Peak	2310.000	-43.9	≤-21.20	51.30	≤74	PASS
2DH5	Ant1	Low	2402	Peak	2388.305	-42.64	≤-21.20	52.56	≤74	PASS
2DH5	Ant1	Low	2402	AV	2390.000	-45.88	≤-41.20	49.32	≤54	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-45.93	≤-41.20	49.27	≤54	PASS
2DH5	Ant1	Low	2402	AV	2382.845	-45.22	≤-41.20	49.98	≤54	PASS
2DH5	Ant1	High	2480	Peak	2483.500	-43.23	≤-21.20	51.97	≤74	PASS
2DH5	Ant1	High	2480	Peak	2500.000	-43.16	≤-21.20	52.04	≤74	PASS
2DH5	Ant1	High	2480	Peak	2491.280	-42.47	≤-21.20	52.73	≤74	PASS
2DH5	Ant1	High	2480	AV	2483.500	-46.01	≤-41.20	49.19	≤54	PASS
2DH5	Ant1	High	2480	AV	2500.000	-46.15	≤-41.20	49.05	≤54	PASS
2DH5	Ant1	High	2480	AV	2485.520	-45.16	≤-41.20	50.04	≤54	PASS
2DH5	Ant1	Low	Hop_2402	Peak	2390.000	-42.94	≤-21.20	52.26	≤74	PASS
2DH5	Ant1	Low	Hop_2402	Peak	2310.000	-43.91	≤-21.20	51.29	≤74	PASS
2DH5	Ant1	Low	Hop_2402	Peak	2386.730	-42.41	≤-21.20	52.79	≤74	PASS
2DH5	Ant1	High	Hop_2480	Peak	2483.500	-43.27	≤-21.20	51.93	≤74	PASS
2DH5	Ant1	High	Hop_2480	Peak	2500.000	-43.28	≤-21.20	51.92	≤74	PASS
2DH5	Ant1	High	Hop_2480	Peak	2498.960	-42.31	≤-21.20	52.89	≤74	PASS
3DH5	Ant1	Low	2402	Peak	2390.000	-43.3	≤-21.20	51.90	≤74	PASS

3DH5	Ant1	Low	2402	Peak	2310.000	-43.65	≤-21.20	51.55	≤74	PASS
3DH5	Ant1	Low	2402	Peak	2388.515	-42.41	≤-21.20	52.79	≤74	PASS
3DH5	Ant1	Low	2402	AV	2390.000	-46.59	≤-41.20	48.61	≤54	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-46.95	≤-41.20	48.25	≤54	PASS
3DH5	Ant1	Low	2402	AV	2363.315	-45.36	≤-41.20	49.84	≤54	PASS
3DH5	Ant1	High	2480	Peak	2483.500	-43.08	≤-21.20	52.12	≤74	PASS
3DH5	Ant1	High	2480	Peak	2500.000	-43.51	≤-21.20	51.69	≤74	PASS
3DH5	Ant1	High	2480	Peak	2497.680	-42.53	≤-21.20	52.67	≤74	PASS
3DH5	Ant1	High	2480	AV	2483.500	-45.72	≤-41.20	49.48	≤54	PASS
3DH5	Ant1	High	2480	AV	2500.000	-46.05	≤-41.20	49.15	≤54	PASS
3DH5	Ant1	High	2480	AV	2499.520	-44.71	≤-41.20	50.49	≤54	PASS
3DH5	Ant1	Low	Hop_2402	Peak	2390.000	-43.09	≤-21.20	52.11	≤74	PASS
3DH5	Ant1	Low	Hop_2402	Peak	2310.000	-43.75	≤-21.20	51.45	≤74	PASS
3DH5	Ant1	Low	Hop_2402	Peak	2382.530	-42.56	≤-21.20	52.64	≤74	PASS
3DH5	Ant1	High	Hop_2480	Peak	2483.500	-43.25	≤-21.20	51.95	≤74	PASS
3DH5	Ant1	High	Hop_2480	Peak	2500.000	-43.04	≤-21.20	52.16	≤74	PASS
3DH5	Ant1	High	Hop_2480	Peak	2497.840	-42.57	≤-21.20	52.63	≤74	PASS

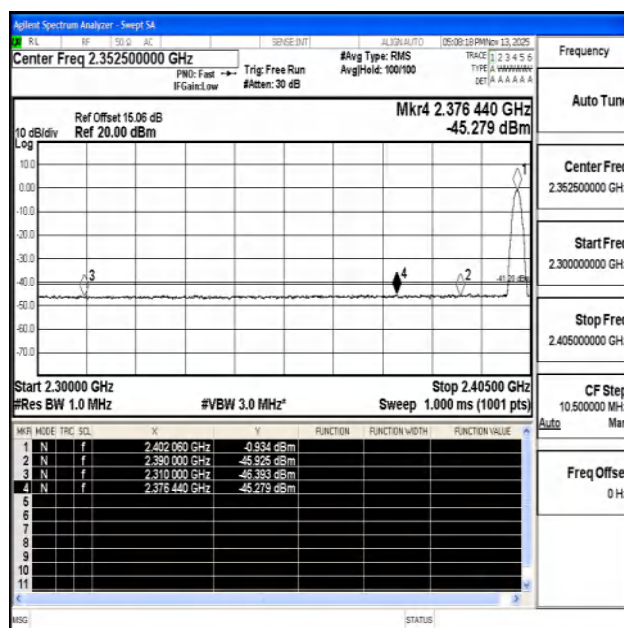
Note:

1. The Antenna Gain and duty factor are compensated in the graph. The gain value is 2dBi.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

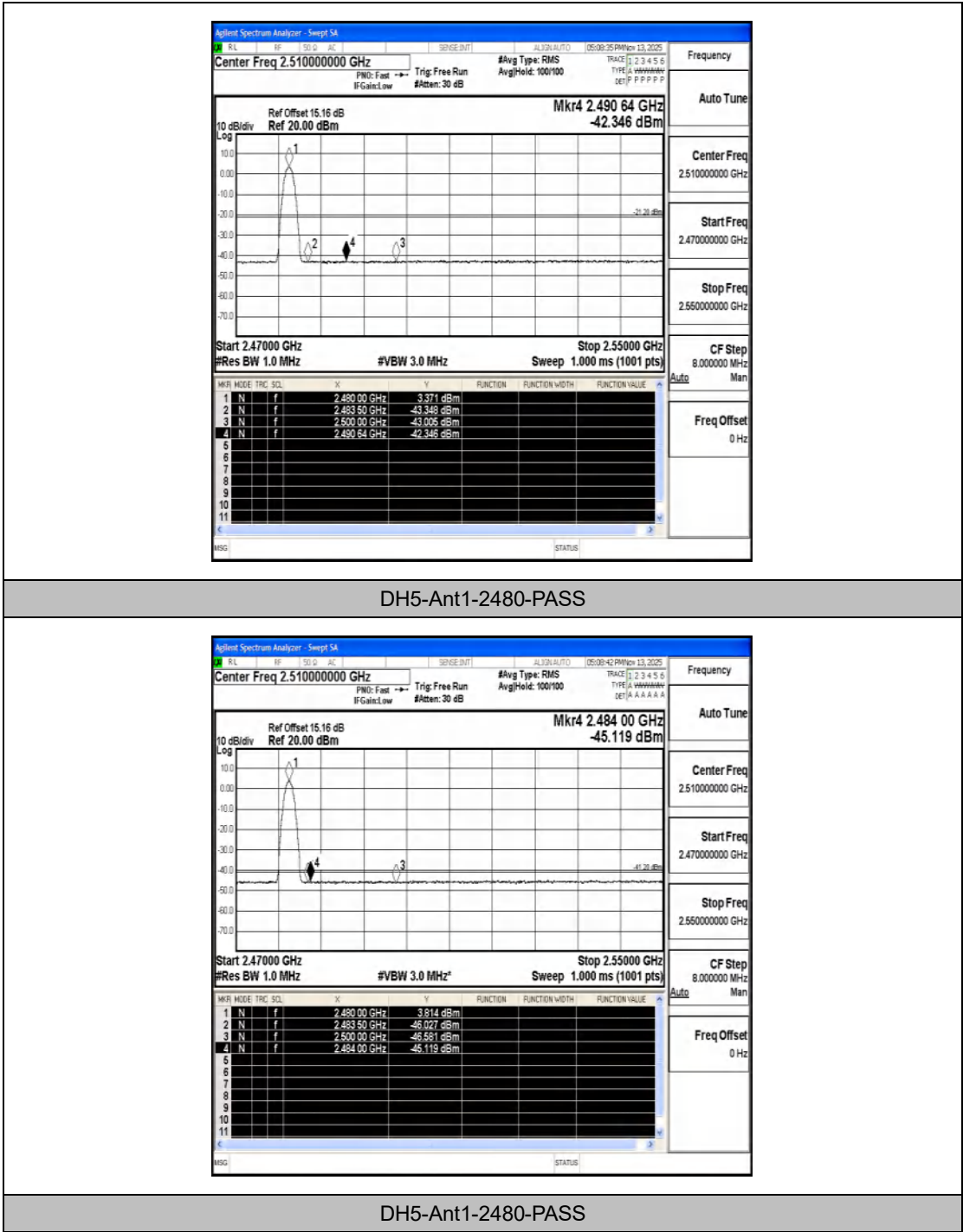
Test Graphs

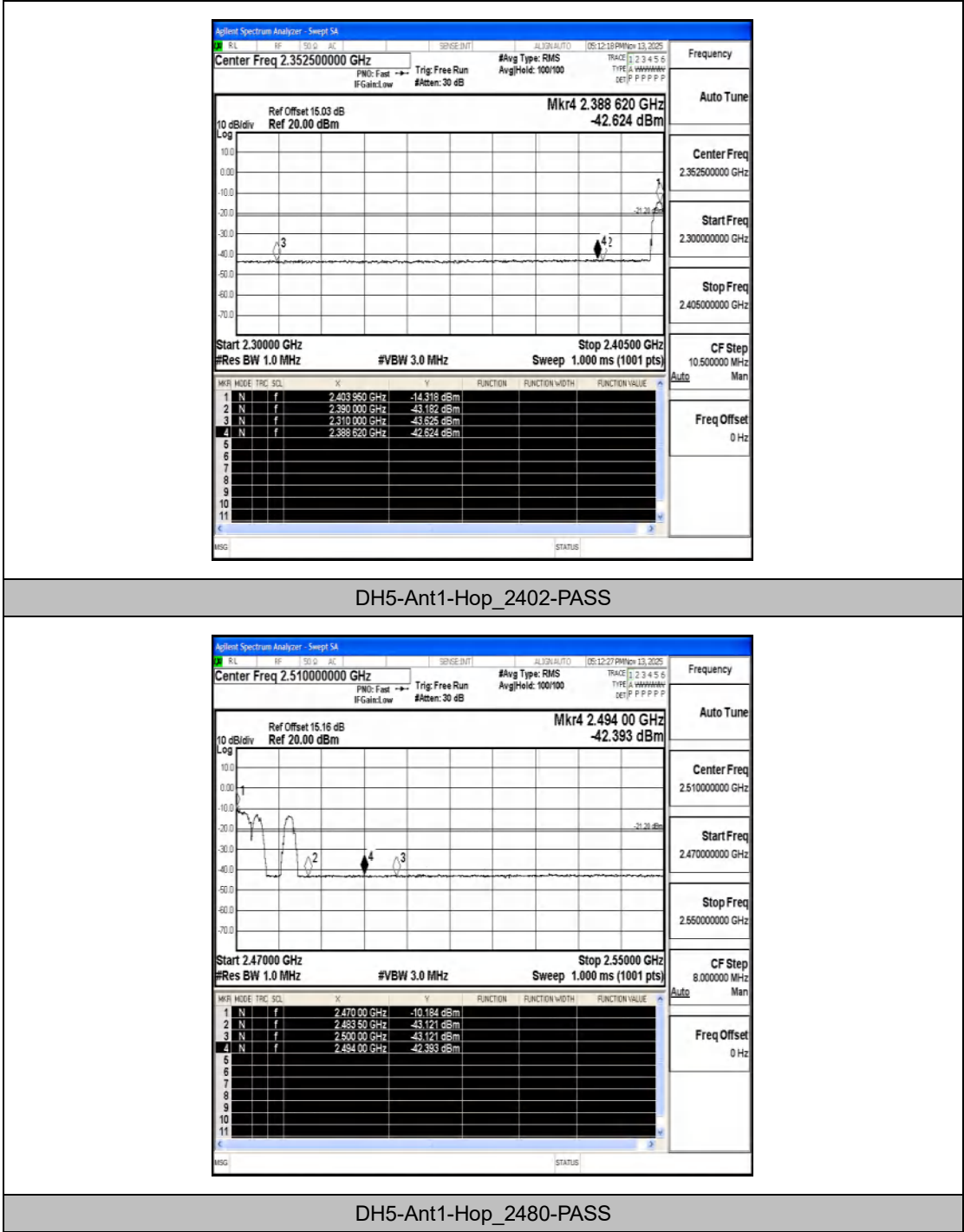


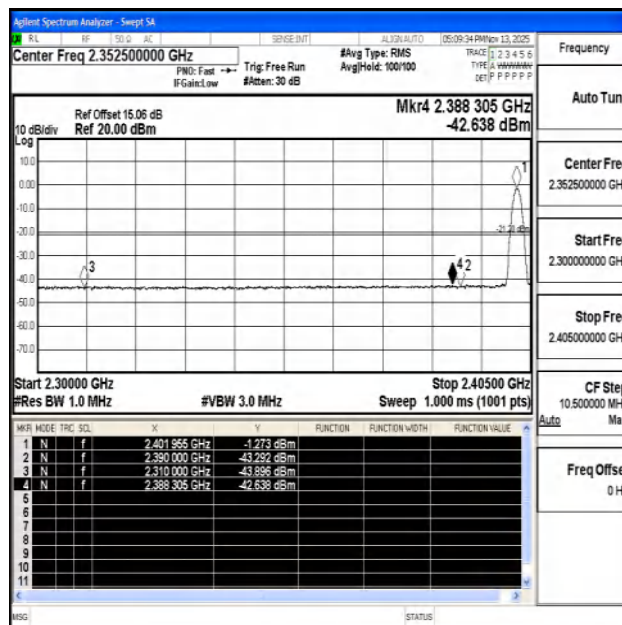
DH5-Ant1-2402-PASS



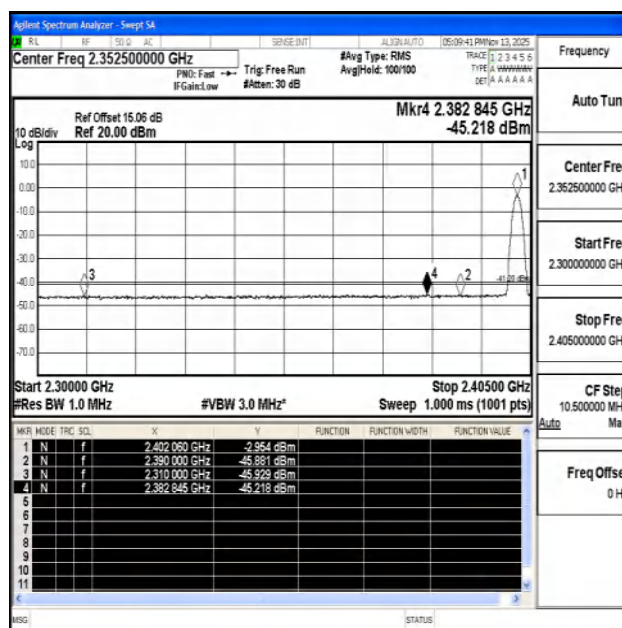
DH5-Ant1-2402-PASS







2DH5-Ant1-2402-PASS



2DH5-Ant1-2402-PASS

