

Case No. : CTA24103100101	
Ambient Condition: 23 °C, 54 %RH	
According Standard: ■Part15C	
Test Date: 2024.9.6	Test Engineer: Lushan Kong

Appendix A.1: 20dB Emission Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	0.924	2401.532	2402.456	---	---
		2441	0.924	2440.529	2441.453	---	---
		2480	0.927	2479.532	2480.459	---	---
2DH1	Ant1	2402	1.269	2401.355	2402.624	---	---
		2441	1.305	2440.328	2441.633	---	---
		2480	1.305	2479.337	2480.642	---	---
3DH1	Ant1	2402	1.311	2401.334	2402.645	---	---
		2441	1.284	2440.331	2441.615	---	---
		2480	1.308	2479.319	2480.627	---	---

Test Graphs

DH1_Ant1_2402



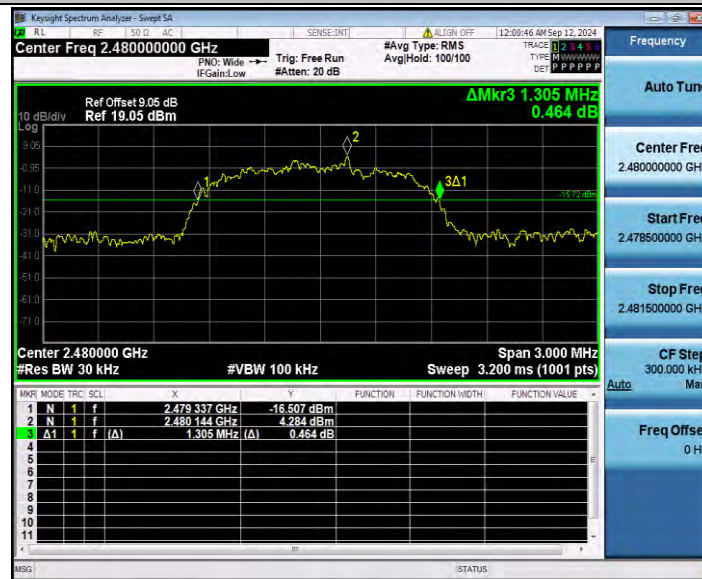
DH1_Ant1_2441



DH1_Ant1_2480



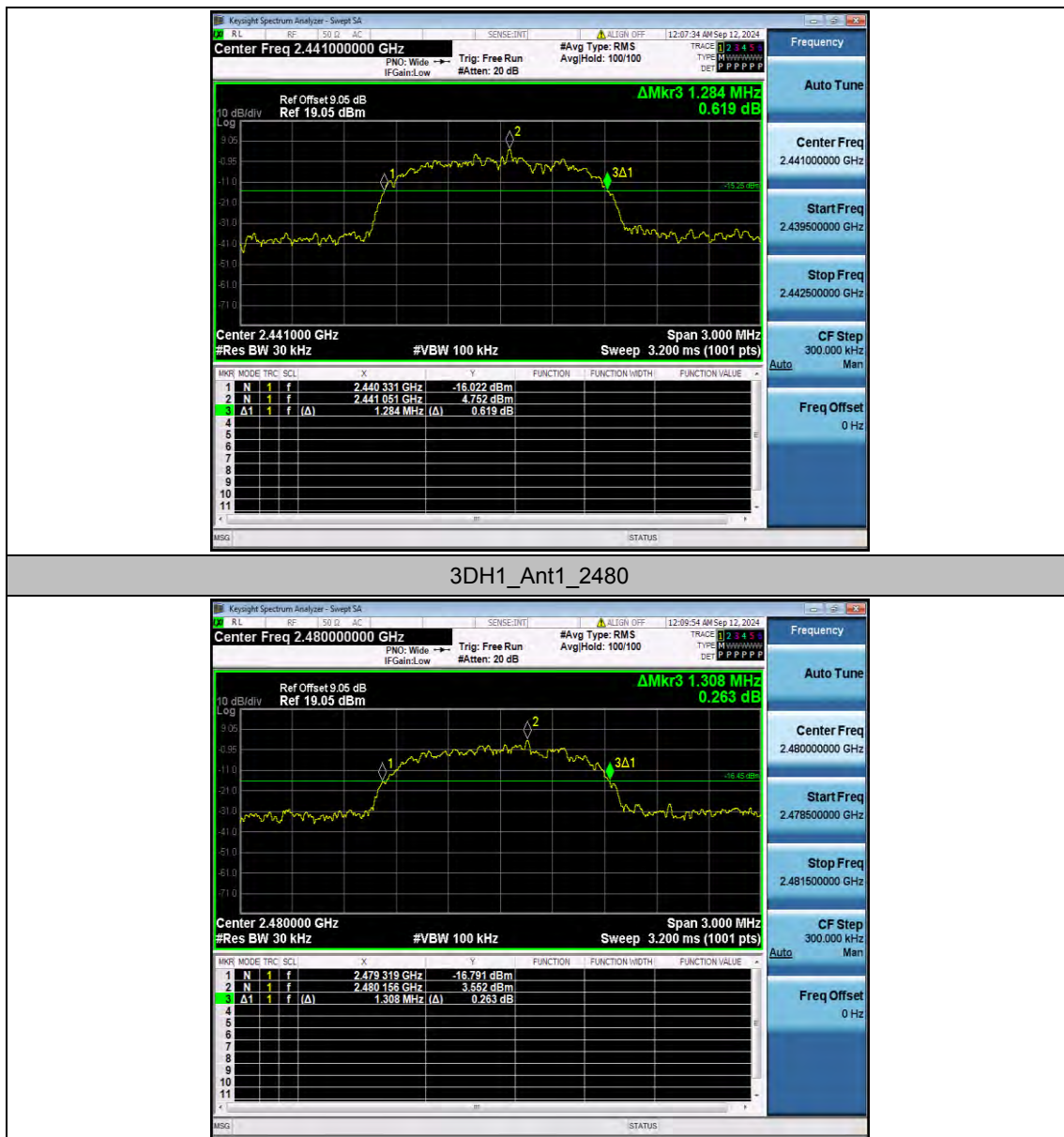
2DH1_Ant1_2480



3DH1_Ant1_2402



3DH1_Ant1_2441

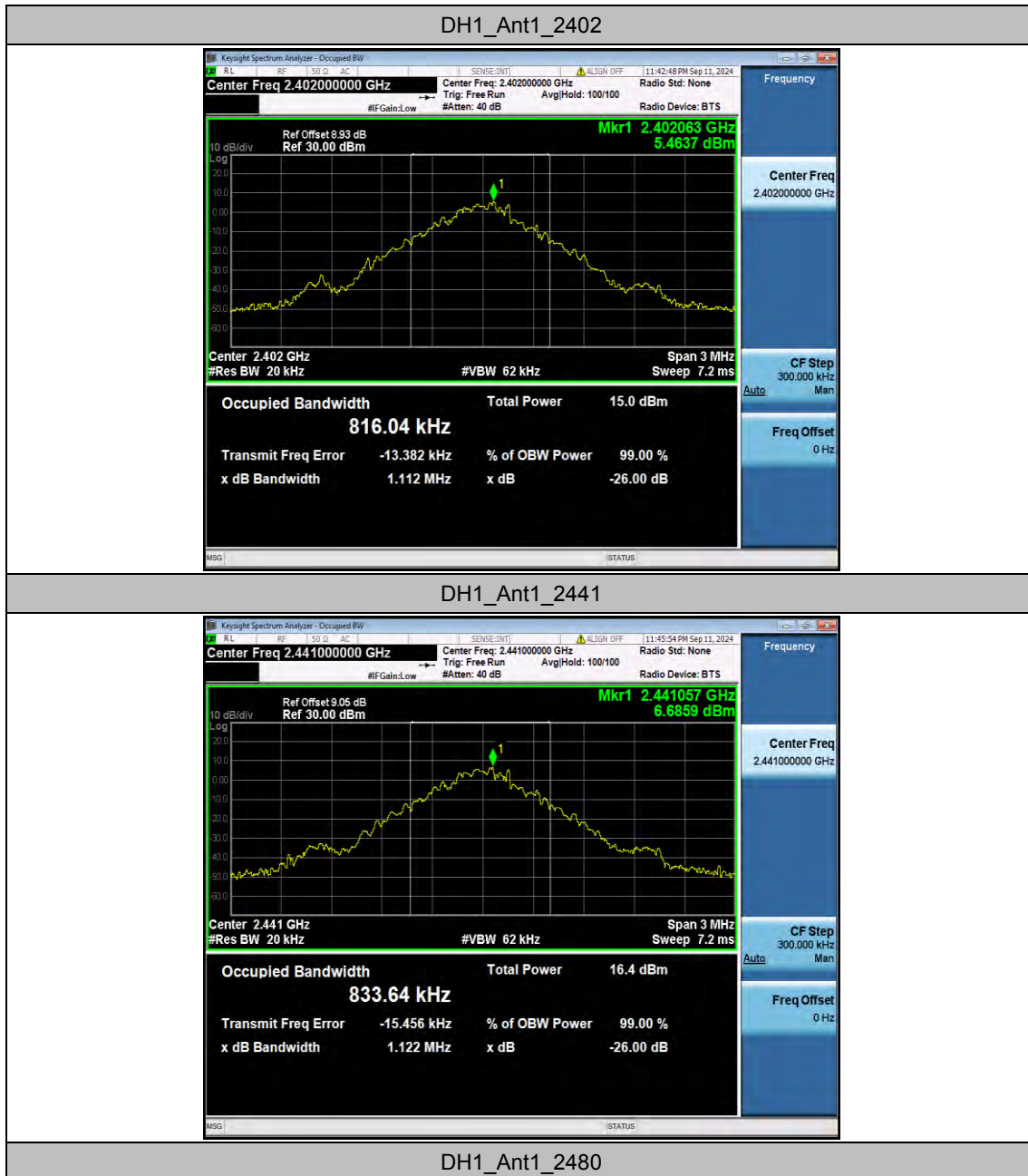


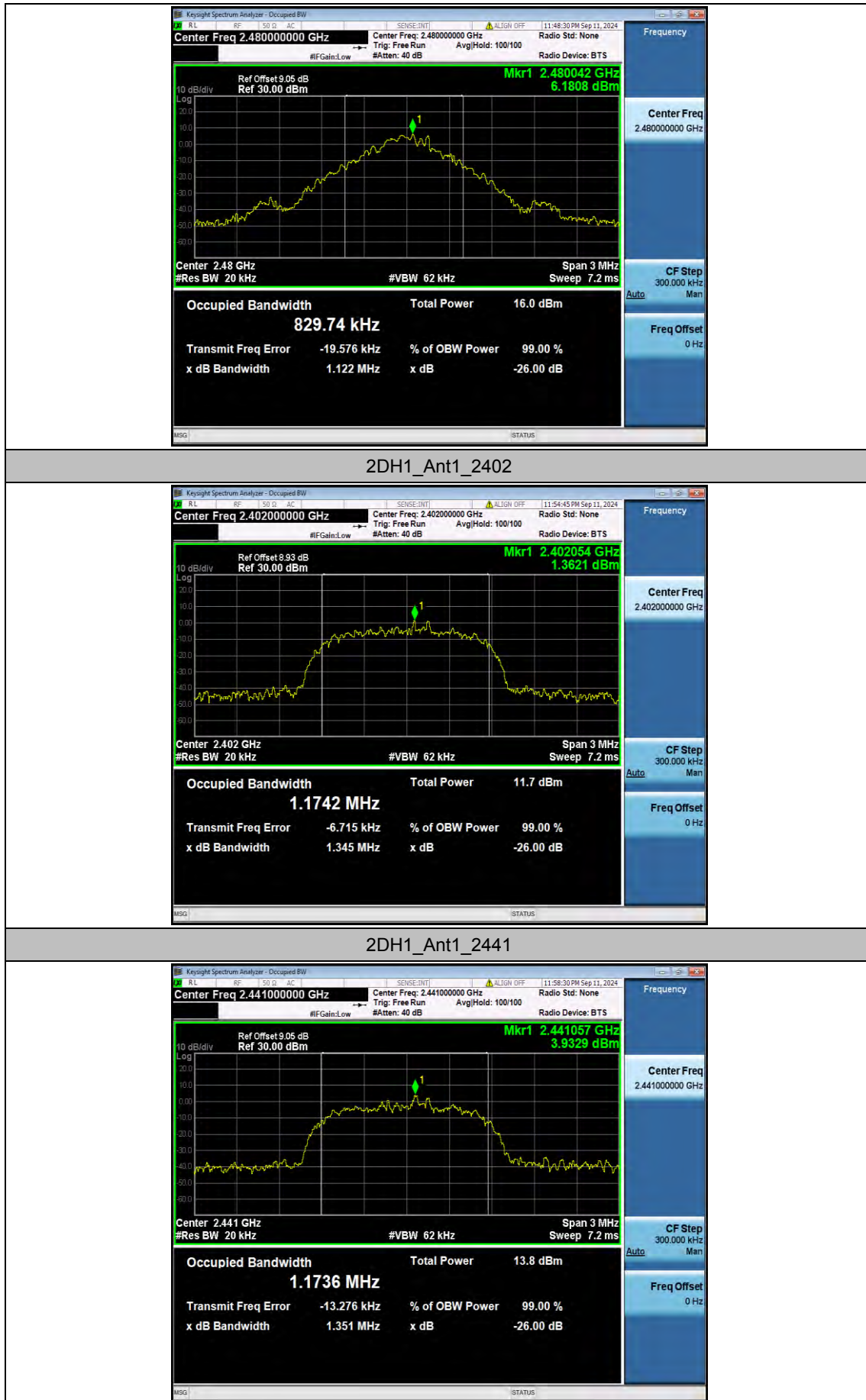
Appendix A.2: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	0.81604	2401.5786	2402.3946	---	---
		2441	0.83364	2440.5677	2441.4014	---	---
		2480	0.82974	2479.5656	2480.3953	---	---
2DH1	Ant1	2402	1.1742	2401.4062	2402.5804	---	---
		2441	1.1736	2440.3999	2441.5735	---	---
		2480	1.2001	2479.3797	2480.5798	---	---
3DH1	Ant1	2402	1.1979	2401.3798	2402.5777	---	---
		2441	1.1974	2440.3814	2441.5788	---	---
		2480	1.1982	2479.3824	2480.5806	---	---

Test Graphs

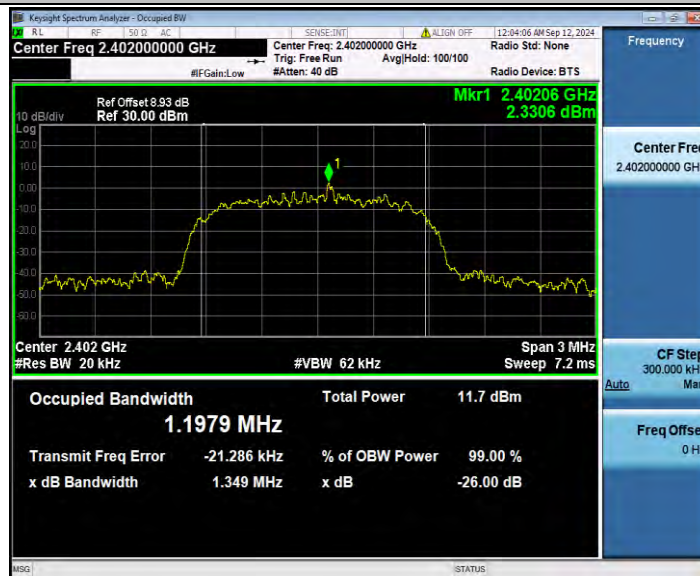




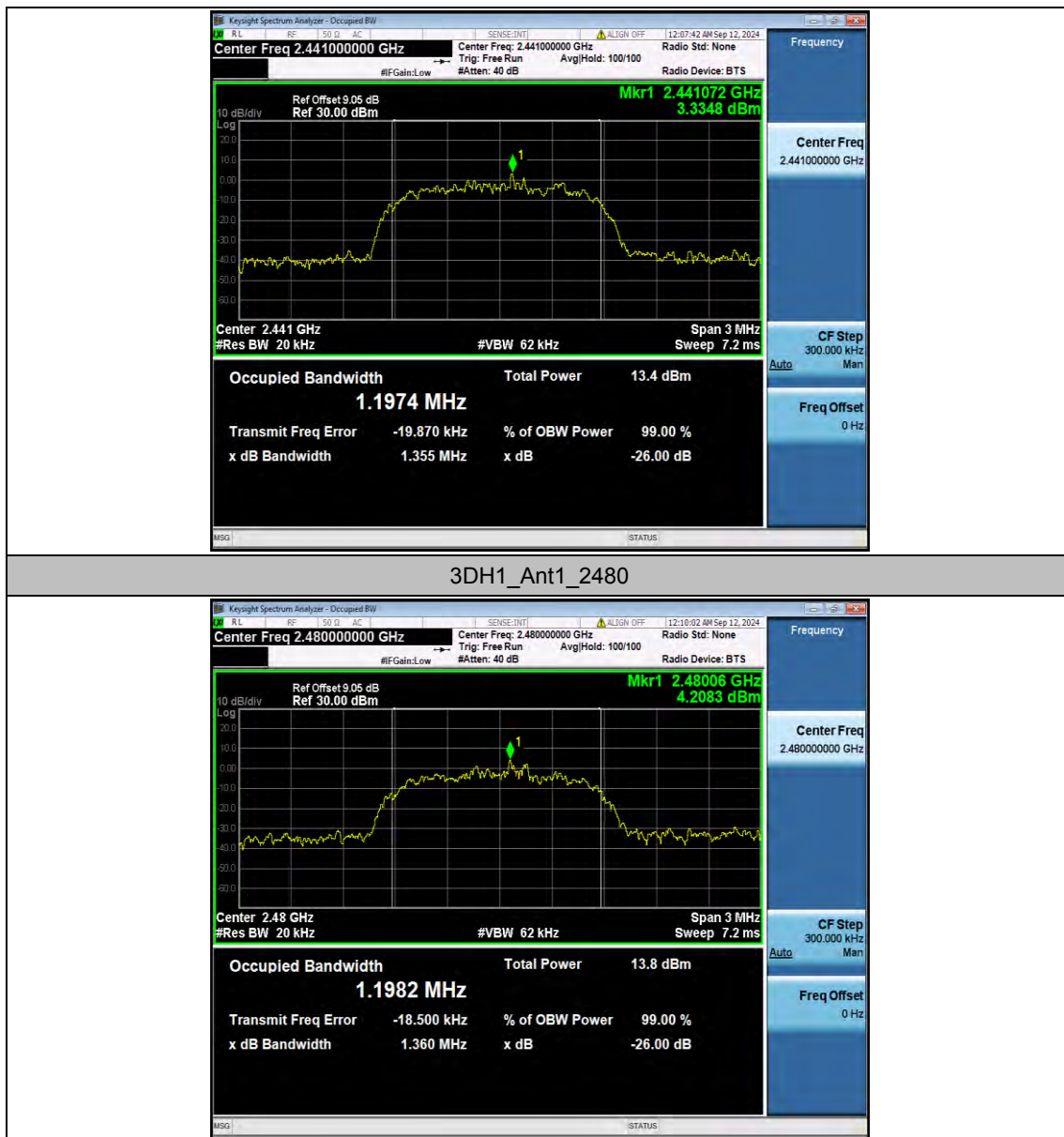
2DH1_Ant1_2480



3DH1_Ant1_2402



3DH1_Ant1_2441



Appendix A.3: Maximum conducted output power

Test Result Peak

Test Mode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH1	Ant1	2402	8.47	≤30.00	PASS
		2441	9.94	≤30.00	PASS
		2480	9.70	≤30.00	PASS
2DH1	Ant1	2402	8.16	≤20.97	PASS
		2441	9.64	≤20.97	PASS
		2480	9.50	≤20.97	PASS
3DH1	Ant1	2402	8.19	≤20.97	PASS
		2441	9.63	≤20.97	PASS
		2480	9.47	≤20.97	PASS

Appendix A.4: Carrier frequency separation

Test Result

TestMode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH1	Ant1	Hop_2402	1.006	≥ 0.927	PASS
		Hop_2441	1.002	≥ 0.927	PASS
		Hop_2480	0.988	≥ 0.927	PASS
2DH1	Ant1	Hop_2402	1.008	≥ 0.870	PASS
		Hop_2441	1.042	≥ 0.870	PASS
		Hop_2480	1.278	≥ 0.870	PASS
3DH1	Ant1	Hop_2402	0.918	≥ 0.874	PASS
		Hop_2441	1.114	≥ 0.874	PASS
		Hop_2480	1.272	≥ 0.874	PASS

Test Graphs

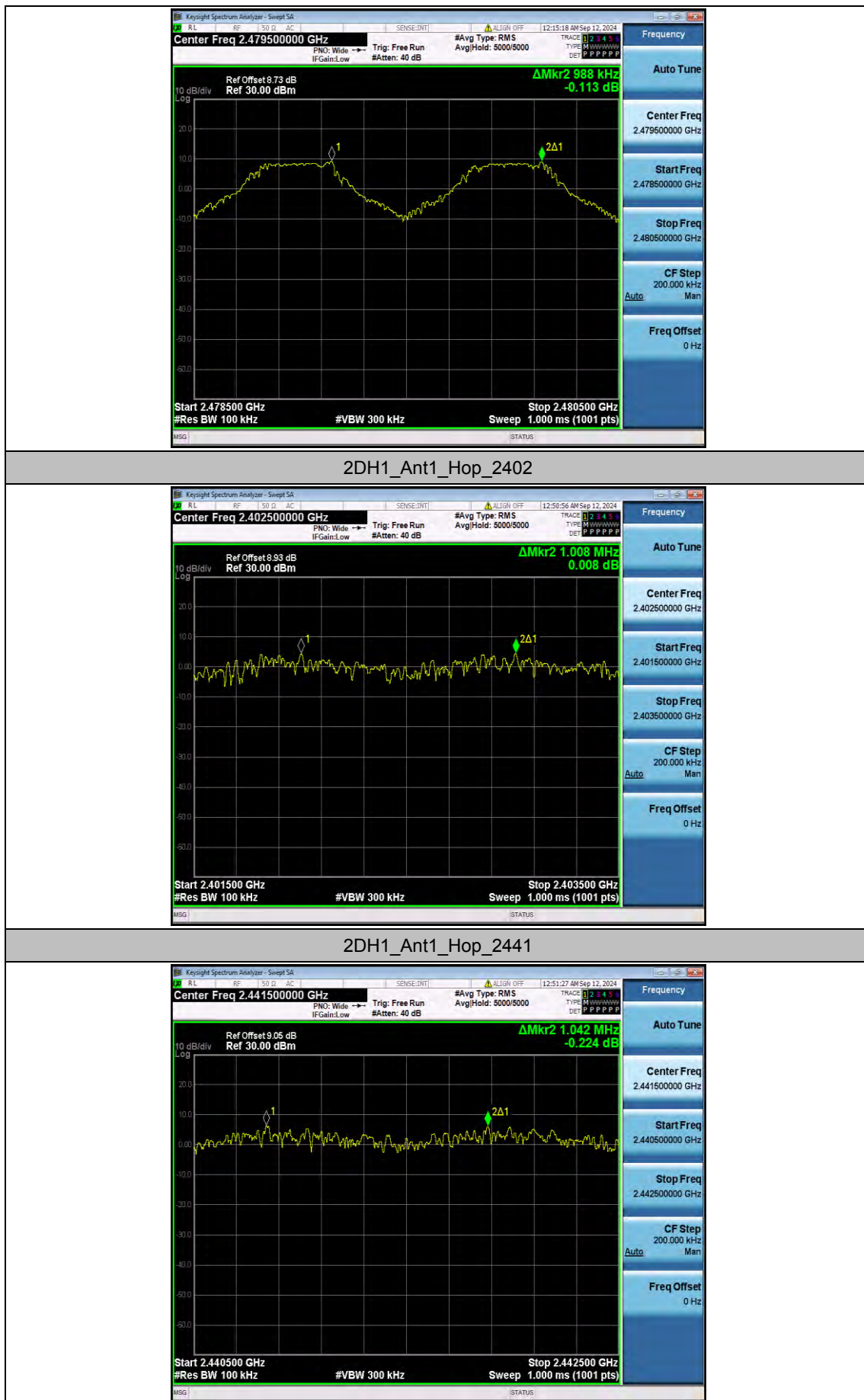
DH1_Ant1_Hop_2402



DH1_Ant1_Hop_2441



DH1_Ant1_Hop_2480



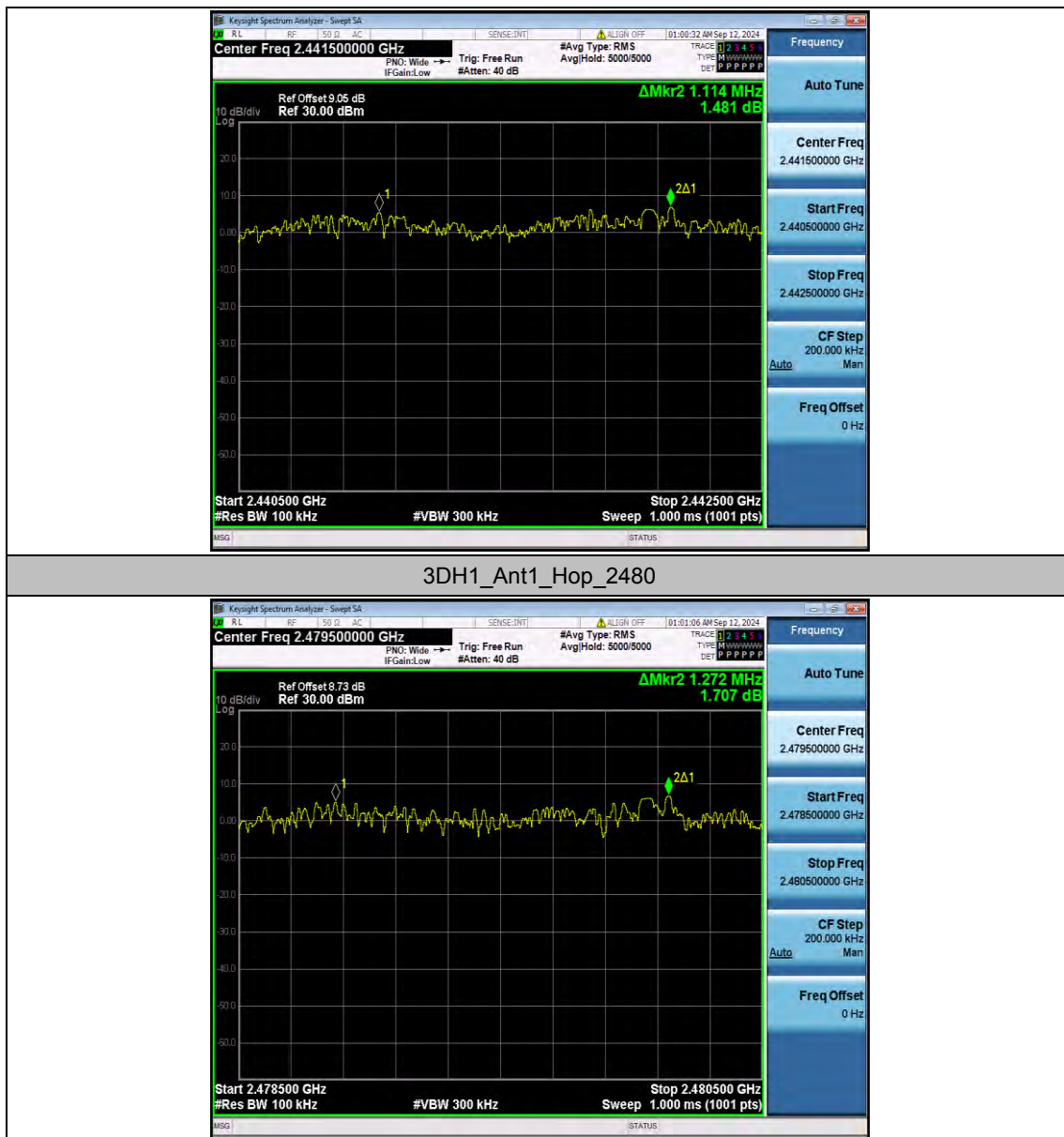
2DH1_Ant1_Hop_2480



3DH1_Ant1_Hop_2402



3DH1_Ant1_Hop_2441

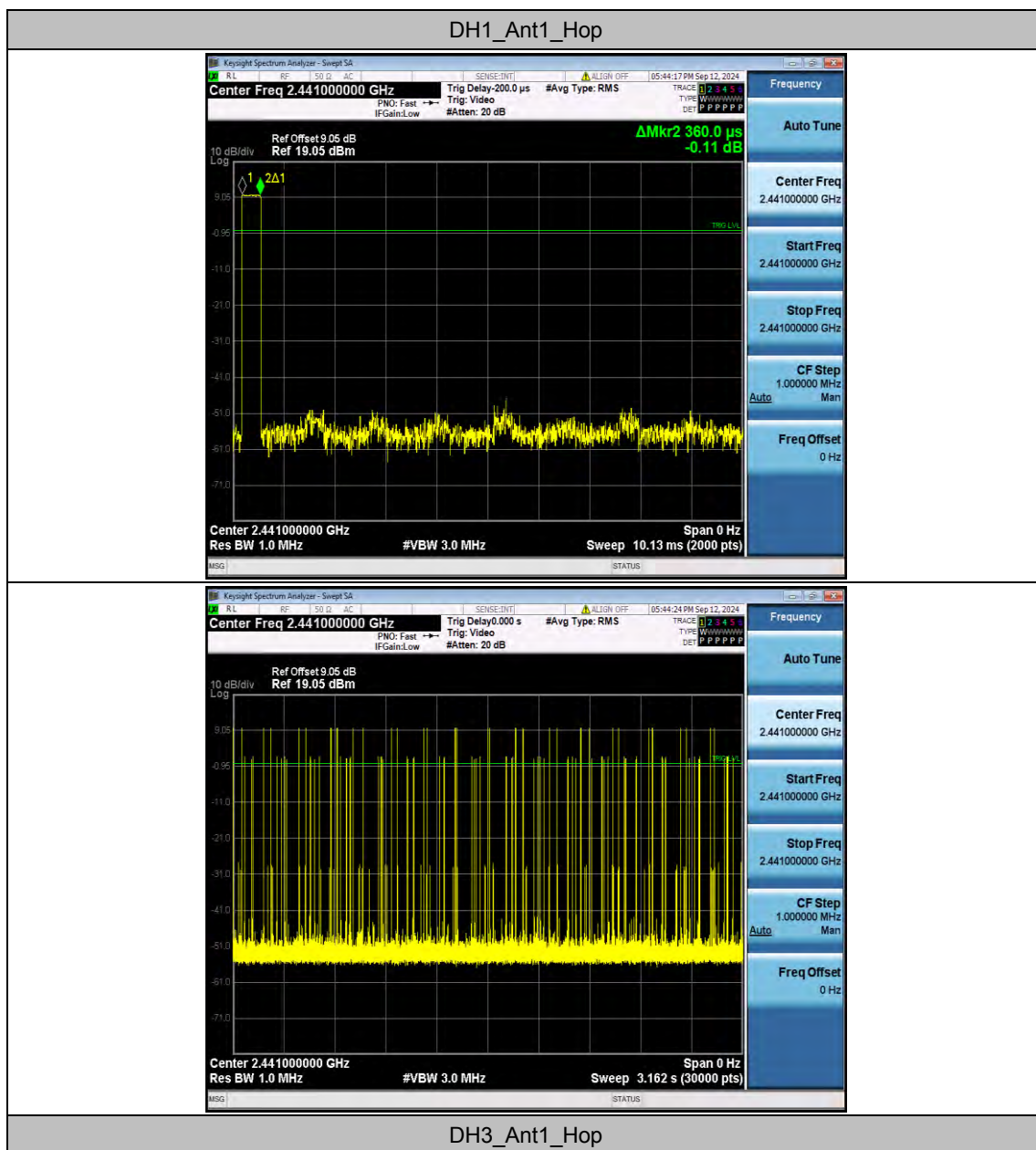


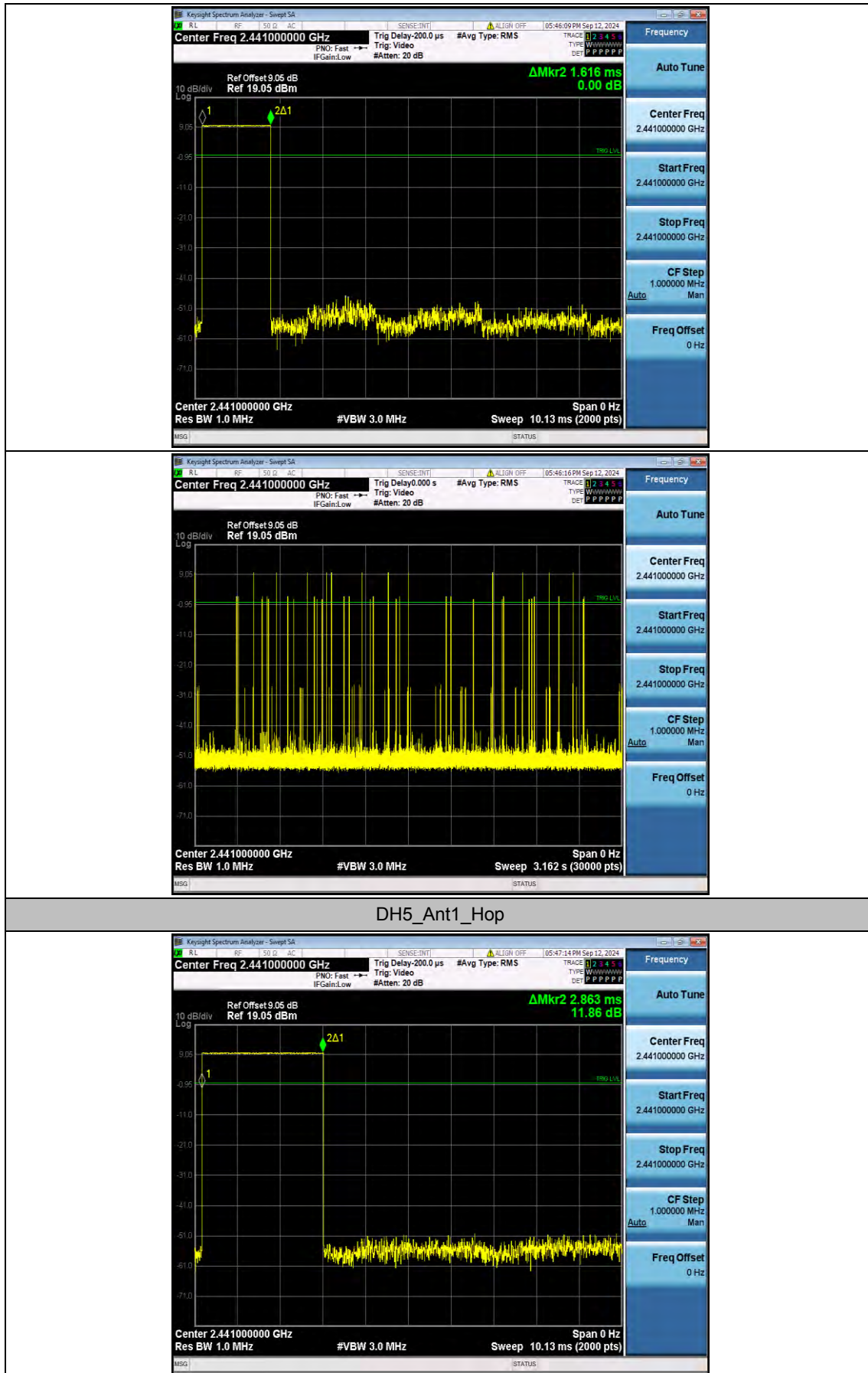
Appendix A.5: Time of occupancy

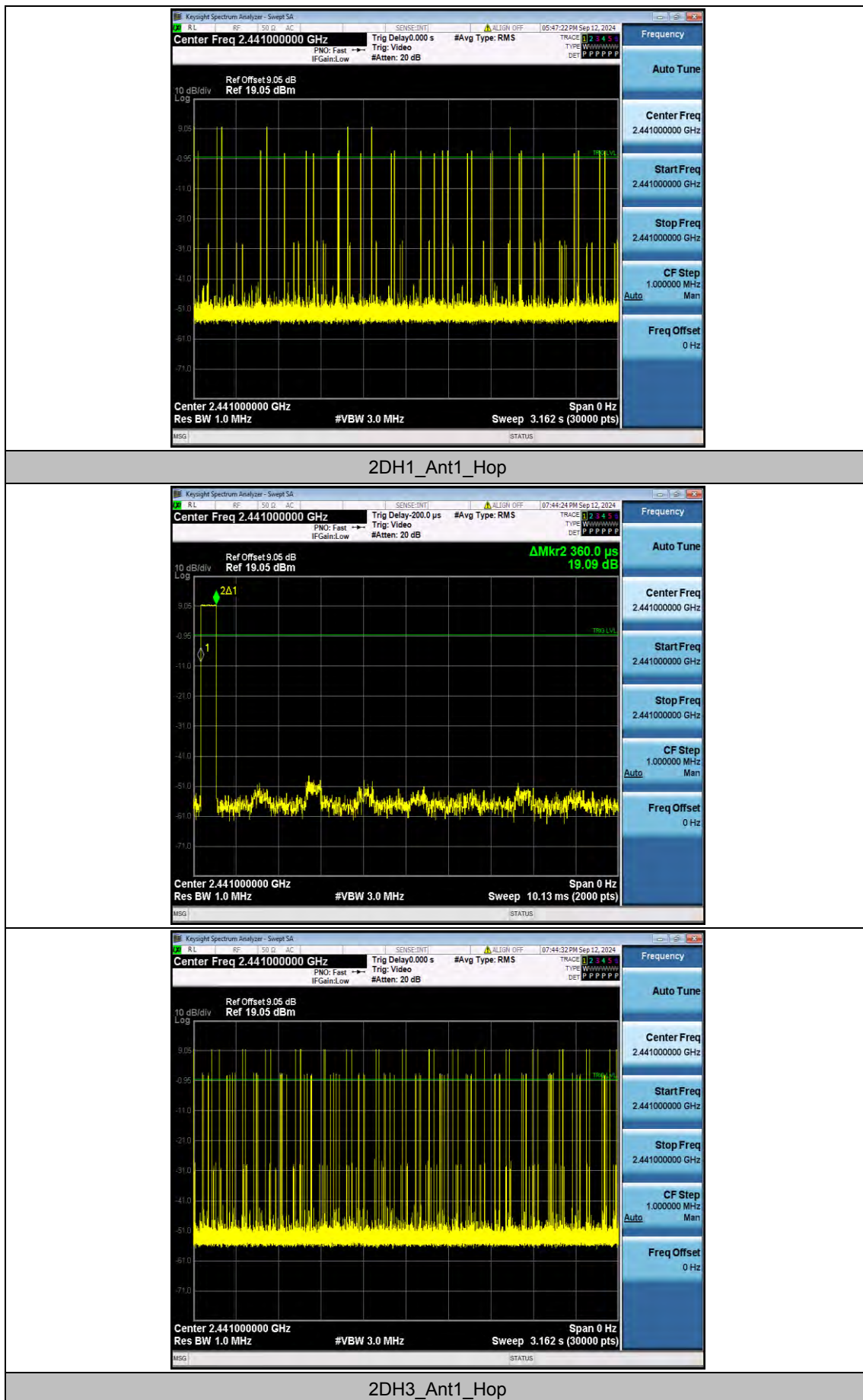
Test Result

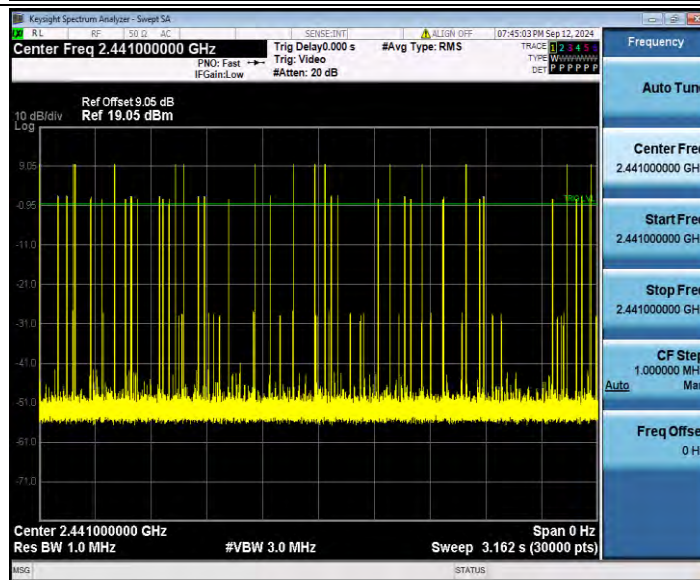
TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.360	320	0.115	≤0.4	PASS
DH3	Ant1	Hop	1.616	130	0.21	≤0.4	PASS
DH5	Ant1	Hop	2.863	70	0.2	≤0.4	PASS
2DH1	Ant1	Hop	0.360	330	0.119	≤0.4	PASS
2DH3	Ant1	Hop	1.616	150	0.242	≤0.4	PASS
2DH5	Ant1	Hop	2.863	100	0.286	≤0.4	PASS
3DH1	Ant1	Hop	0.360	330	0.119	≤0.4	PASS
3DH3	Ant1	Hop	1.616	160	0.259	≤0.4	PASS
3DH5	Ant1	Hop	2.863	100	0.286	≤0.4	PASS

Test Graphs

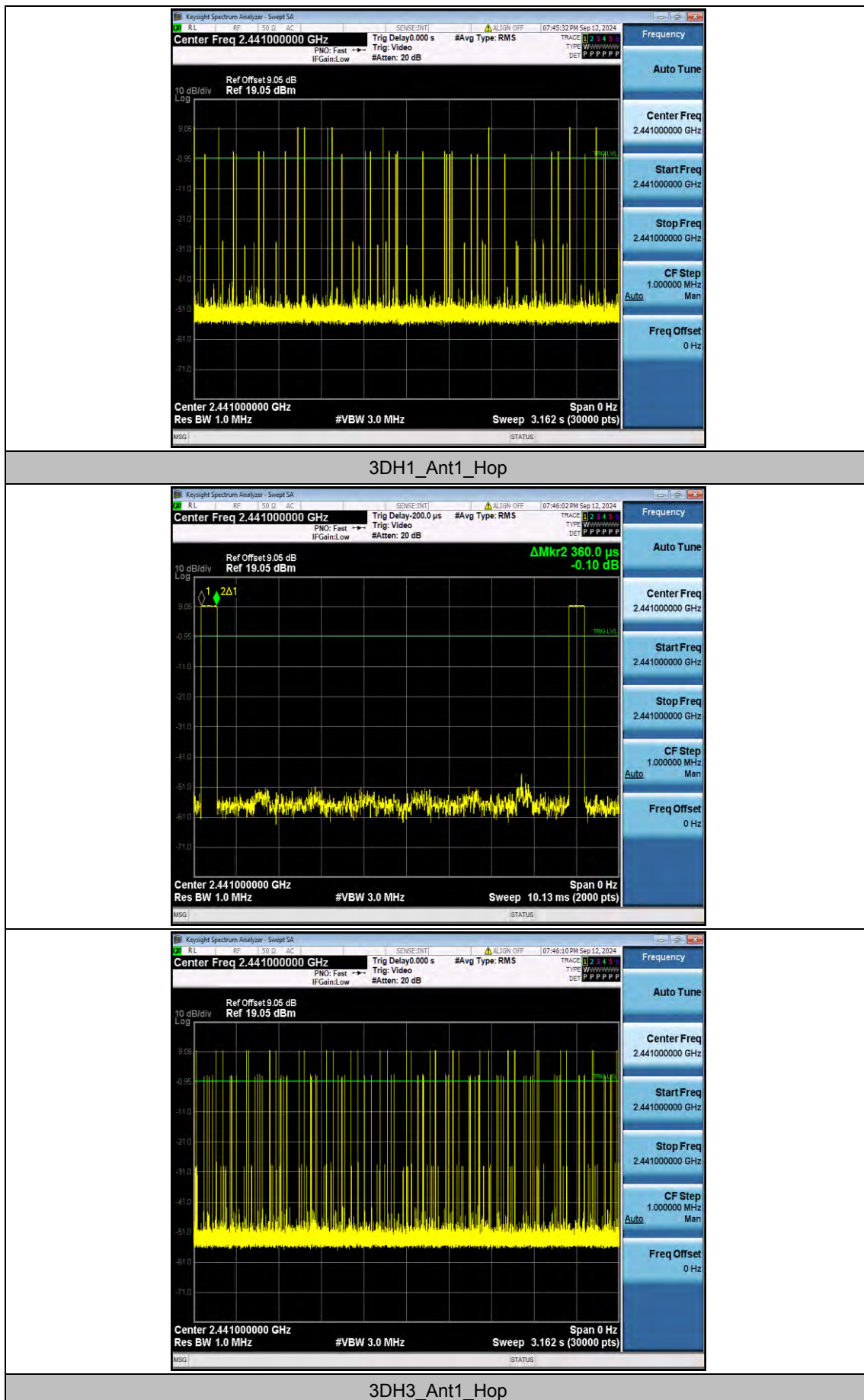


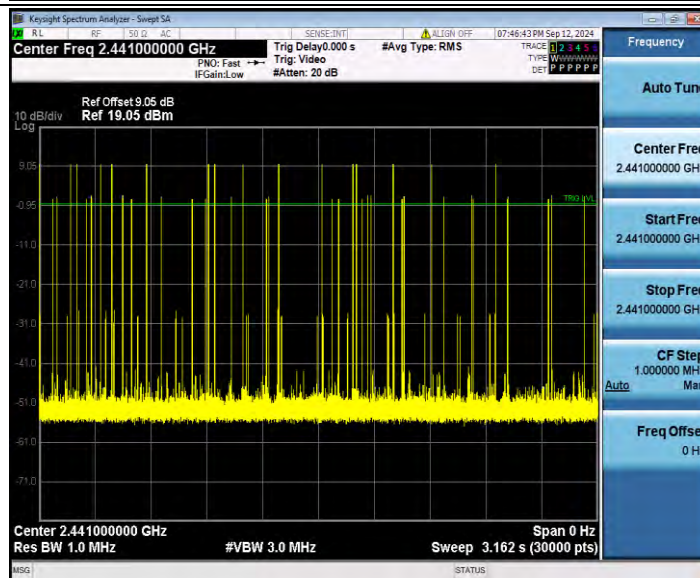






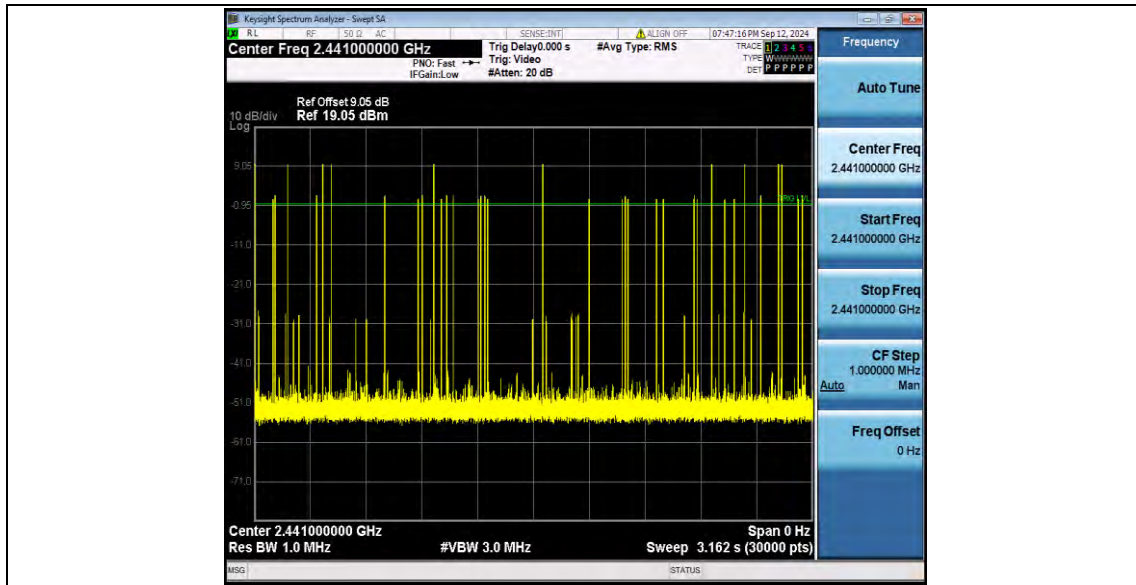
The screenshot shows a Keysight Spectrum Analyzer interface. The main display is a log-log plot of power spectral density (dBm/Hz) versus frequency (GHz). The center frequency is set to 2.441000000 GHz. The span is 0 Hz, and the resolution bandwidth (Res BW) is 1.0 MHz. The video bandwidth (VBW) is 3.0 MHz. The sweep time is 10.13 ms. The plot shows a signal with a sharp peak at the center frequency, labeled with a green '2Δ1' and a green arrow. The peak is at 2.863 ms. The signal level is 0.09 dB. The plot also shows a green line labeled 'TRIG LVL' at -9.5 dBm. The right side of the screen shows various settings: Frequency (2.441000000 GHz), Auto Tune, Center Freq (2.441000000 GHz), Start Freq (2.441000000 GHz), Stop Freq (2.441000000 GHz), CF Step (1.000000 MHz), Freq Offset (0 Hz), and Span (0 Hz).





The screenshot displays a Keysight Spectrum Analyzer interface. The main plot shows a signal at a center frequency of 2.441000000 GHz. The signal is characterized by a sharp peak at the center, with a measured width of 2Δ1 (2 times the standard deviation) of 2.863 ms and a power level of 8.12 dB. The plot also shows a noise floor at approximately -50 dBm. The x-axis represents frequency, and the y-axis represents power in dBm. The interface includes various control panels on the right for frequency, auto-tune, and other settings.

Parameter	Value
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Freq Offset	0 Hz

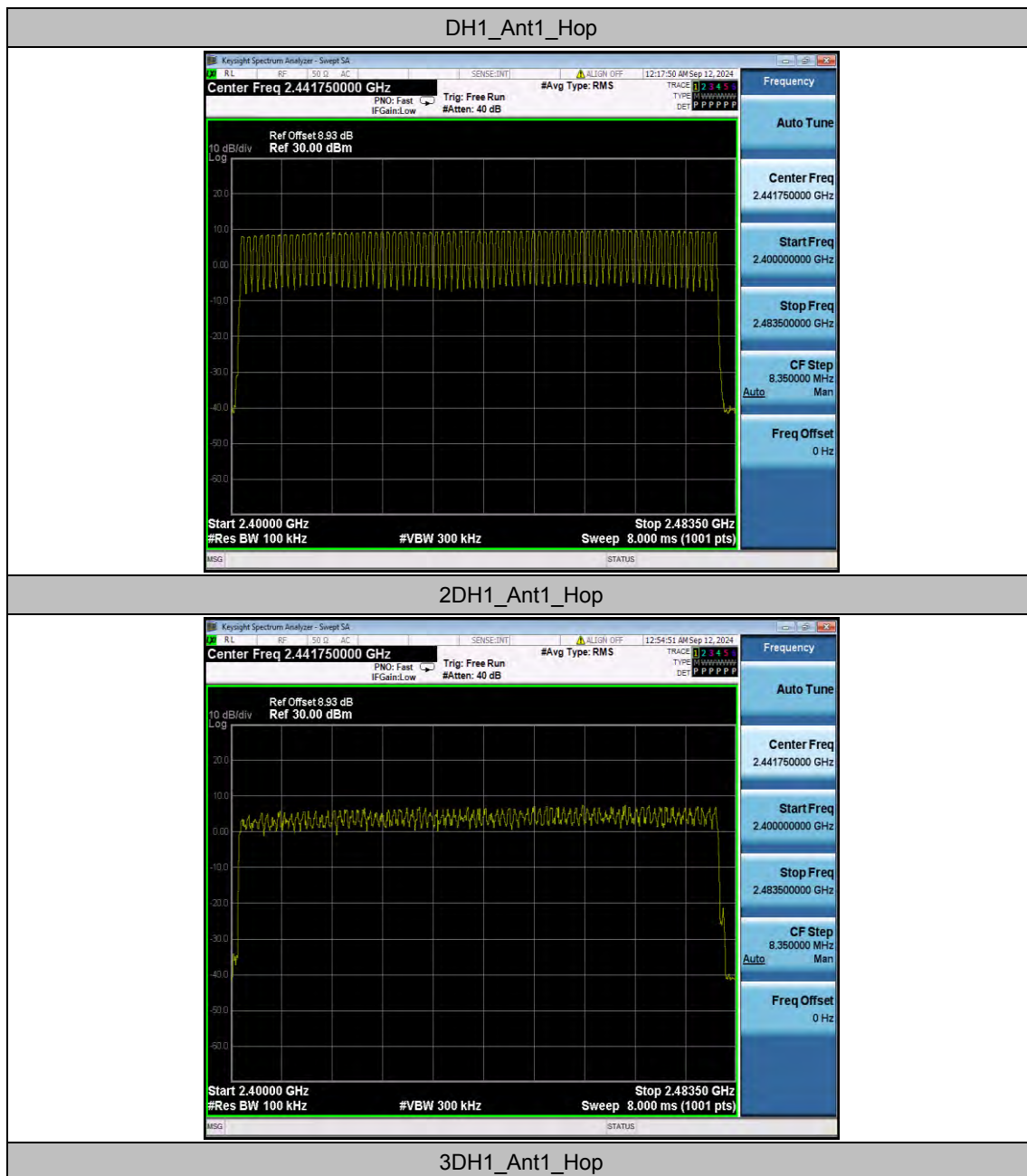


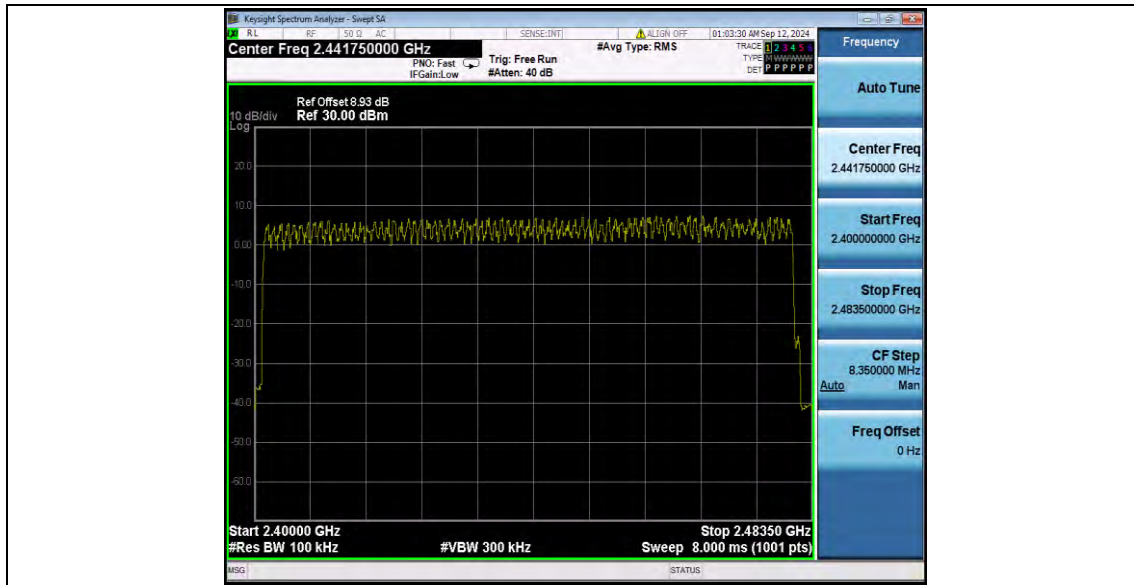
Appendix A.6: Number of hopping channels

Test Result

TestMode	Antenna	Freq(MHz)	Result[Num]	Limit[Num]	Verdict
DH1	Ant1	Hop	79	≥15	PASS
2DH1	Ant1	Hop	79	≥15	PASS
3DH1	Ant1	Hop	79	≥15	PASS

Test Graphs





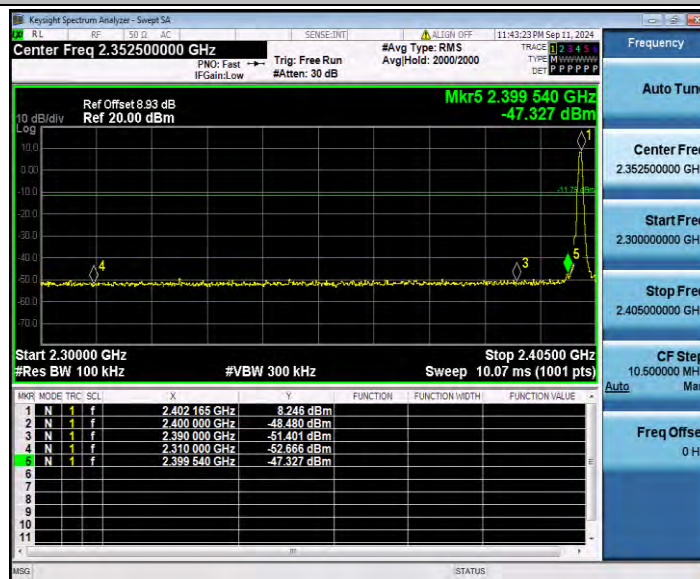
Appendix A.7: Band edge measurements

Test Result

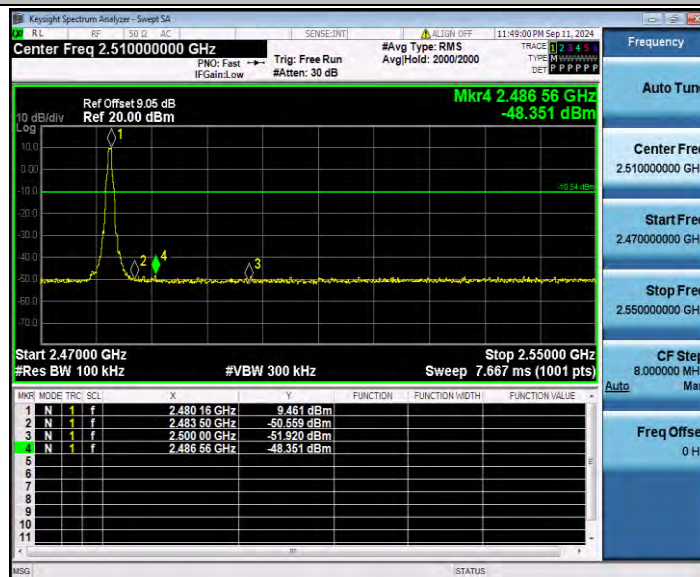
TestMode	Antenna	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	2402	8.25	-47.33	≤ -11.75	PASS
		High	2480	9.46	-48.35	≤ -10.54	PASS
		Low	Hop_2402	8.09	-49.05	≤ -11.91	PASS
		High	Hop_2480	9.77	-48.06	≤ -10.23	PASS
2DH1	Ant1	Low	2402	5.22	-43.4	≤ -14.78	PASS
		High	2480	7.16	-48.31	≤ -12.84	PASS
		Low	Hop_2402	3.33	-48.94	≤ -16.67	PASS
		High	Hop_2480	6.77	-48.55	≤ -13.23	PASS
3DH1	Ant1	Low	2402	4.80	-43.5	≤ -15.21	PASS
		High	2480	7.12	-48.47	≤ -12.88	PASS
		Low	Hop_2402	3.31	-46.52	≤ -16.69	PASS
		High	Hop_2480	7.38	-48.33	≤ -12.62	PASS

Test Graphs

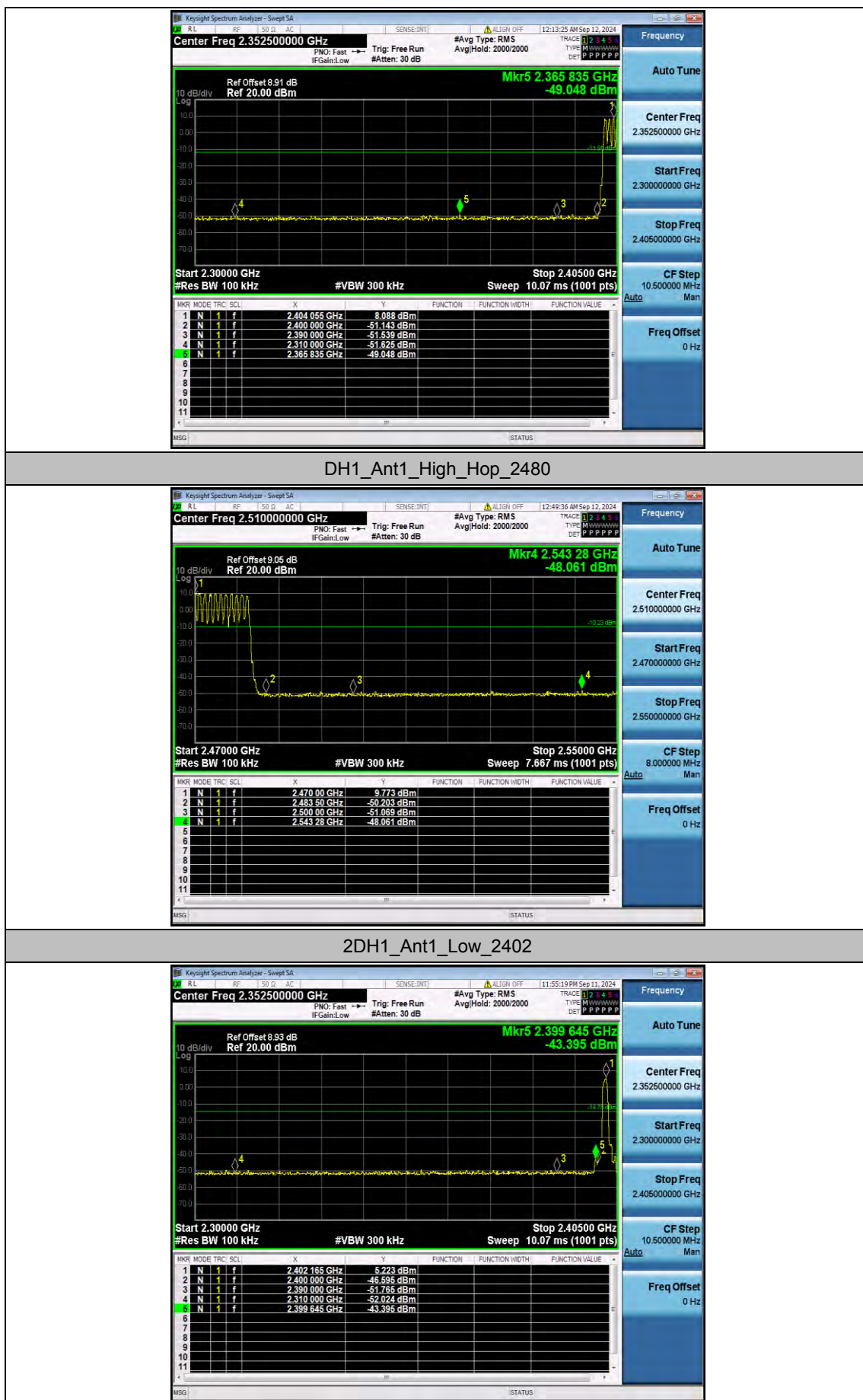
DH1_Ant1_Low_2402



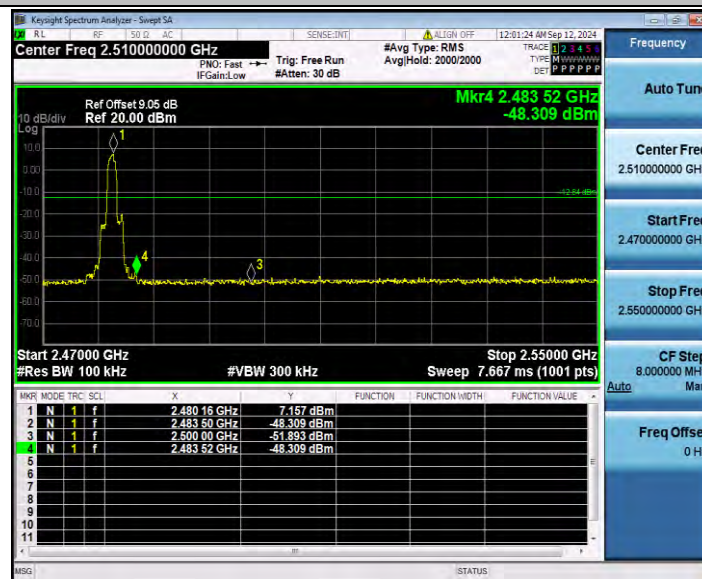
DH1_Ant1_High_2480



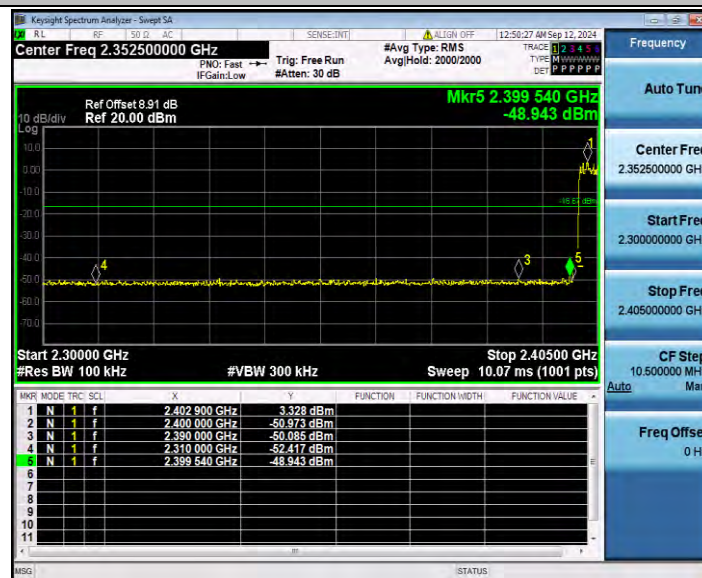
DH1_Ant1_Low_Hop_2402



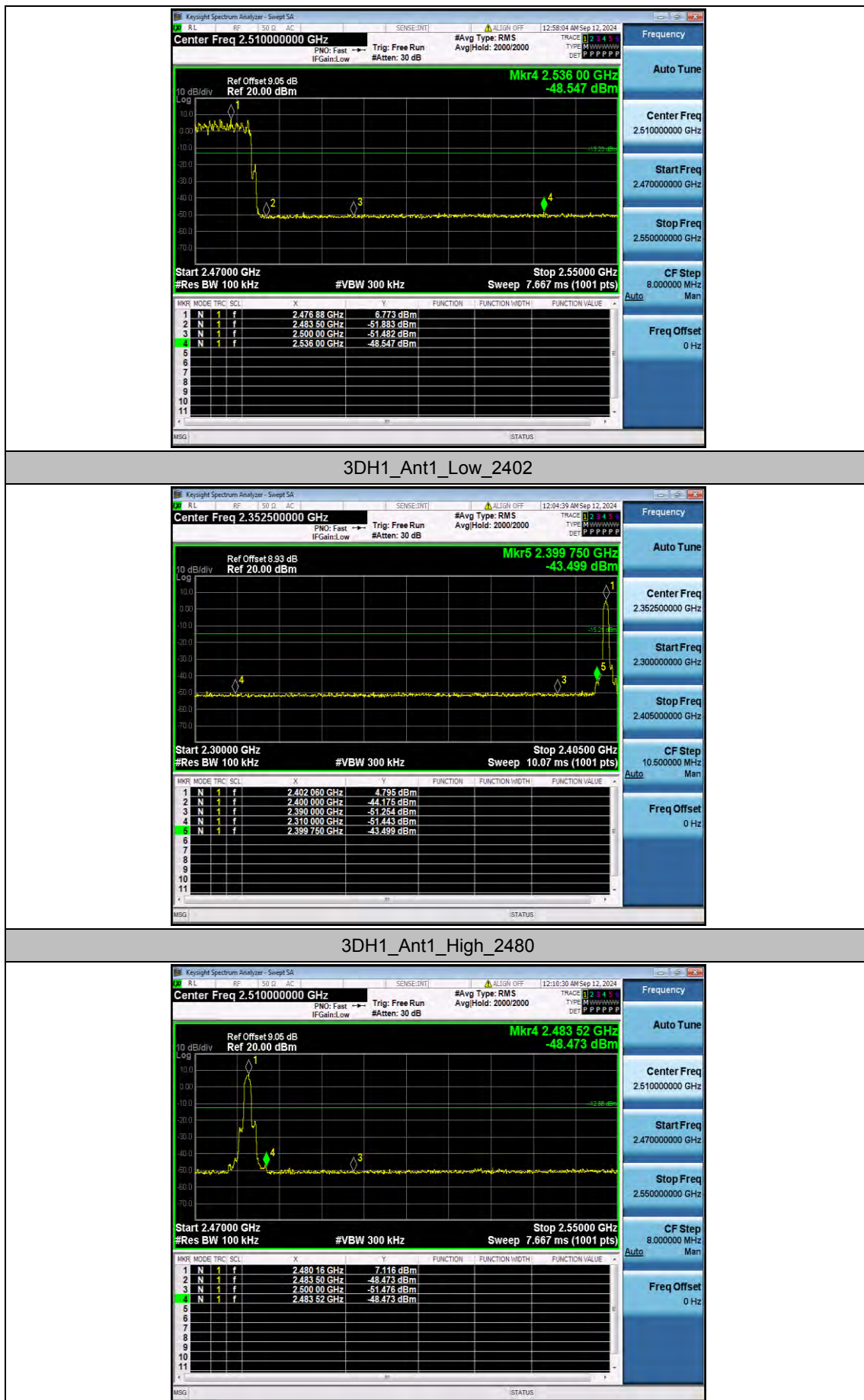
2DH1_Ant1_High_2480



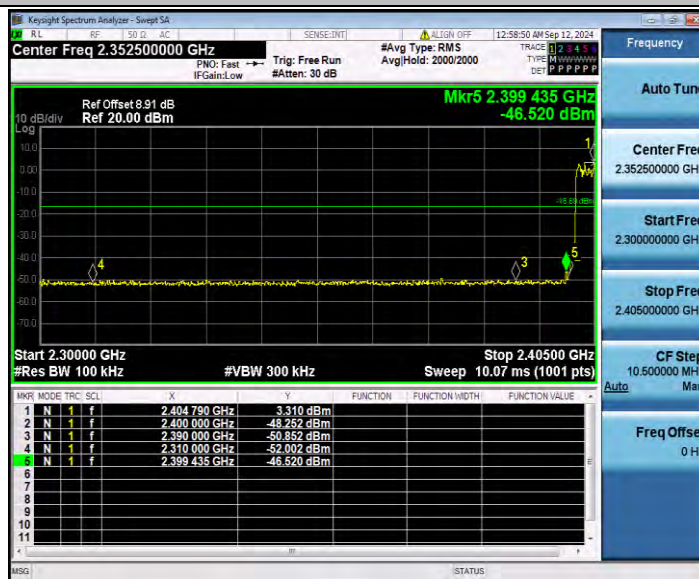
2DH1_Ant1_Low_Hop_2402



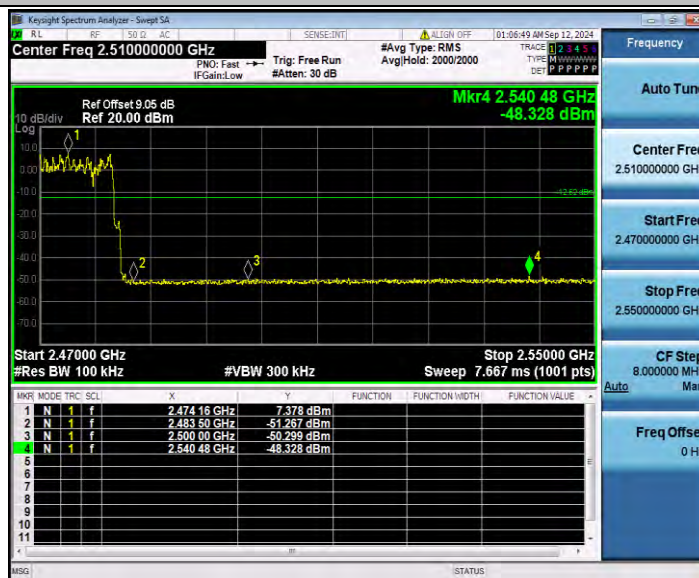
2DH1_Ant1_High_Hop_2480



3DH1_Ant1_Low_Hop_2402



3DH1_Ant1_High_Hop_2480

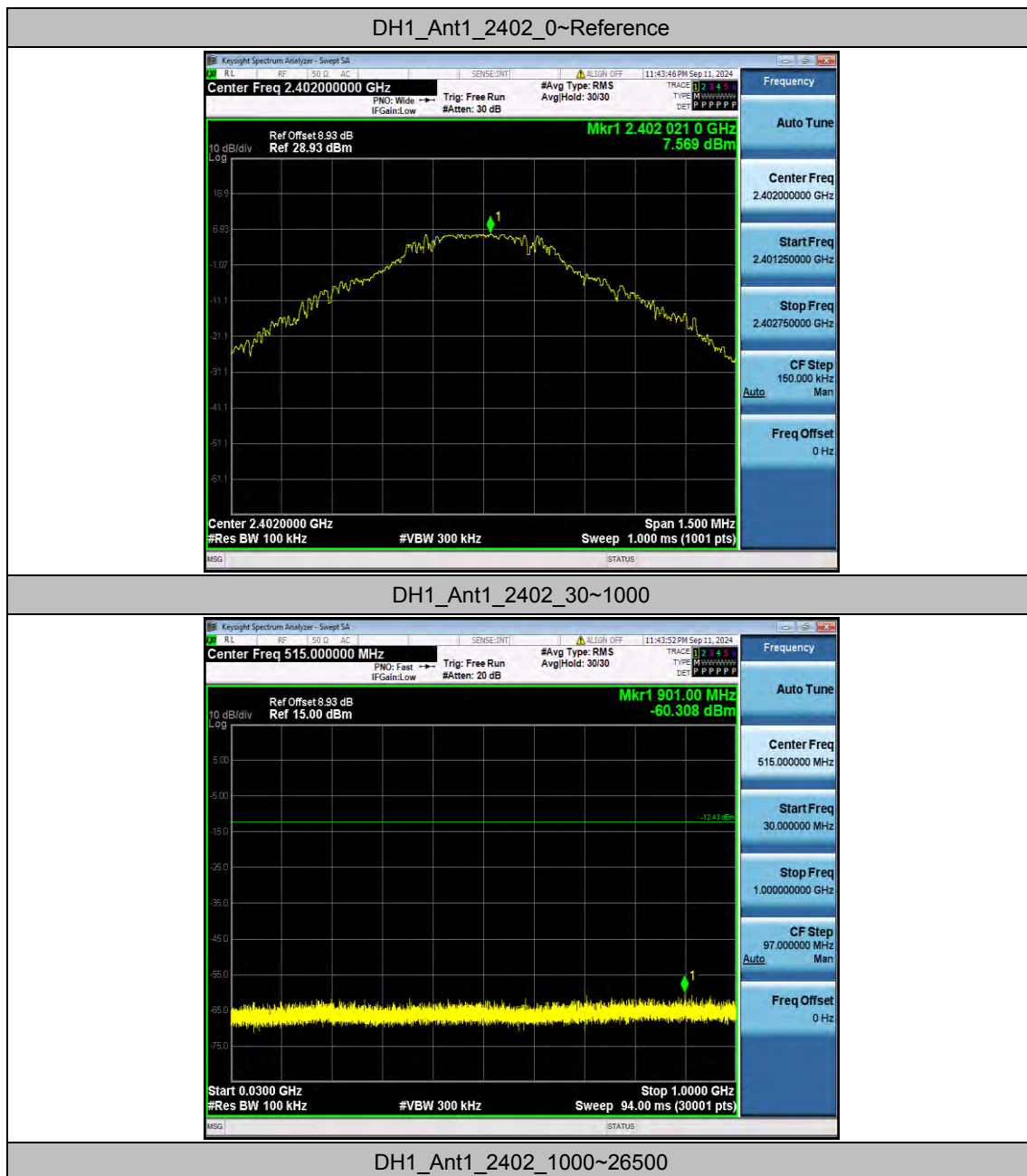


Appendix A.8: Conducted Spurious Emission

Test Result

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	2402	Reference	7.57	7.57	---	PASS
			30~1000	7.57	-60.31	≤ -12.43	PASS
			1000~26500	7.57	-47.3	≤ -12.43	PASS
		2441	Reference	9.09	9.09	---	PASS
			30~1000	9.09	-60.23	≤ -10.91	PASS
			1000~26500	9.09	-47.6	≤ -10.91	PASS
		2480	Reference	8.93	8.93	---	PASS
			30~1000	8.93	-60.02	≤ -11.07	PASS
			1000~26500	8.93	-47.36	≤ -11.07	PASS
2DH1	Ant1	2402	Reference	5.23	5.23	---	PASS
			30~1000	5.23	-60.38	≤ -14.77	PASS
			1000~26500	5.23	-47.96	≤ -14.77	PASS
		2441	Reference	5.12	5.12	---	PASS
			30~1000	5.12	-60.16	≤ -14.88	PASS
			1000~26500	5.12	-47.57	≤ -14.88	PASS
		2480	Reference	6.06	6.06	---	PASS
			30~1000	6.06	-60.24	≤ -13.94	PASS
			1000~26500	6.06	-46.41	≤ -13.94	PASS
3DH1	Ant1	2402	Reference	4.48	4.48	---	PASS
			30~1000	4.48	-60.47	≤ -15.52	PASS
			1000~26500	4.48	-47.6	≤ -15.52	PASS
		2441	Reference	5.74	5.74	---	PASS
			30~1000	5.74	-60.25	≤ -14.26	PASS
			1000~26500	5.74	-46.73	≤ -14.26	PASS
		2480	Reference	6.53	6.53	---	PASS
			30~1000	6.53	-60.44	≤ -13.47	PASS
			1000~26500	6.53	-46.78	≤ -13.47	PASS

Test Graphs





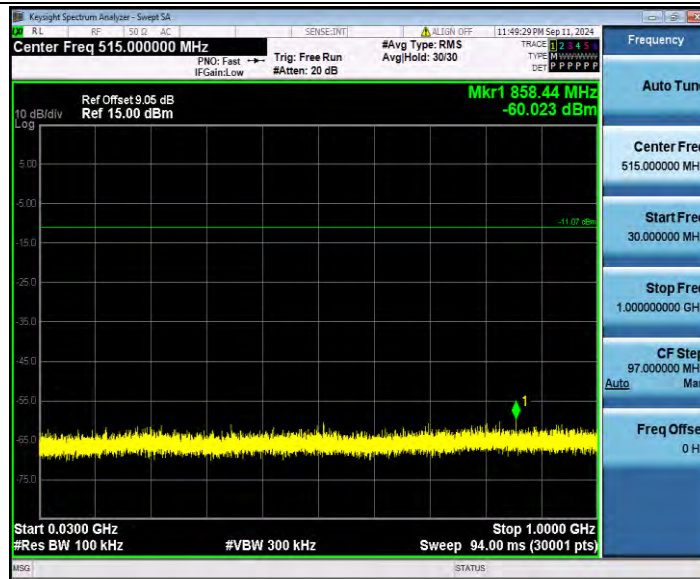
DH1_Ant1_2441_1000~26500



DH1_Ant1_2480_0~Reference



DH1_Ant1_2480_30~1000

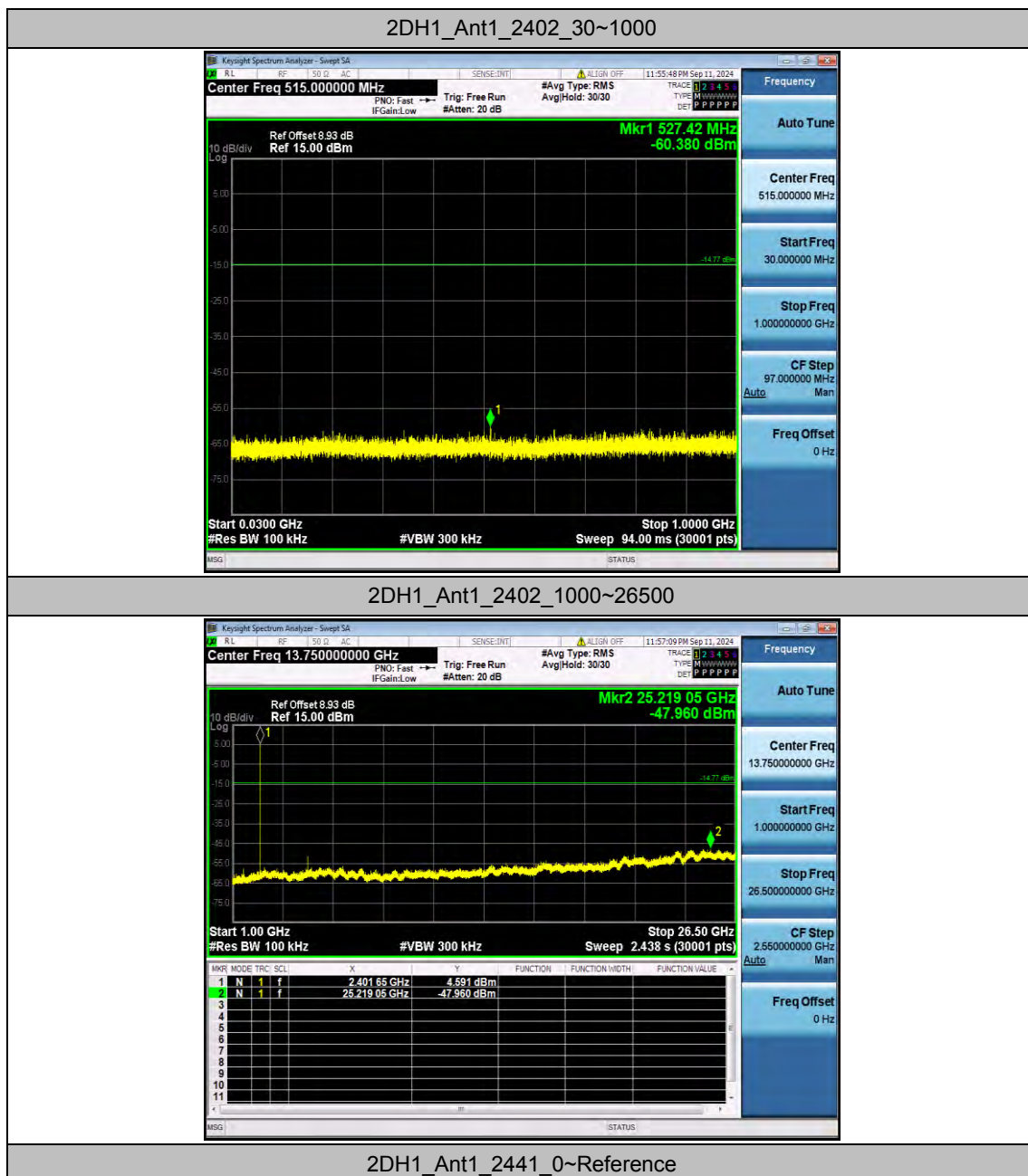


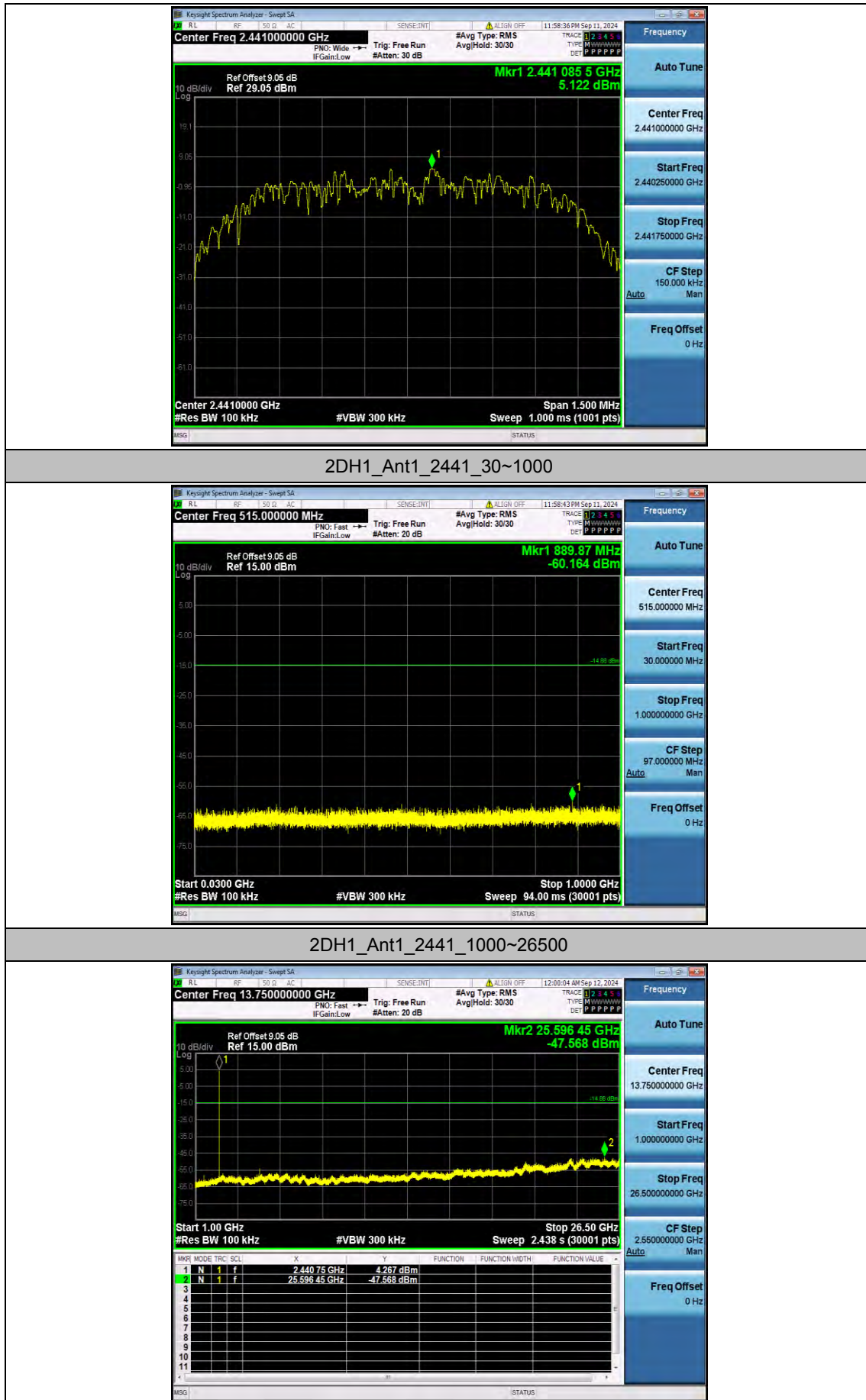
DH1_Ant1_2480_1000~26500



2DH1_Ant1_2402_0~Reference



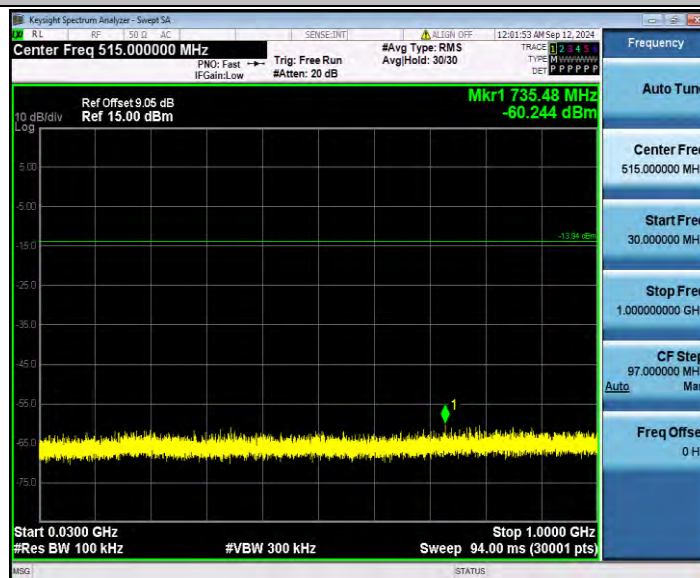




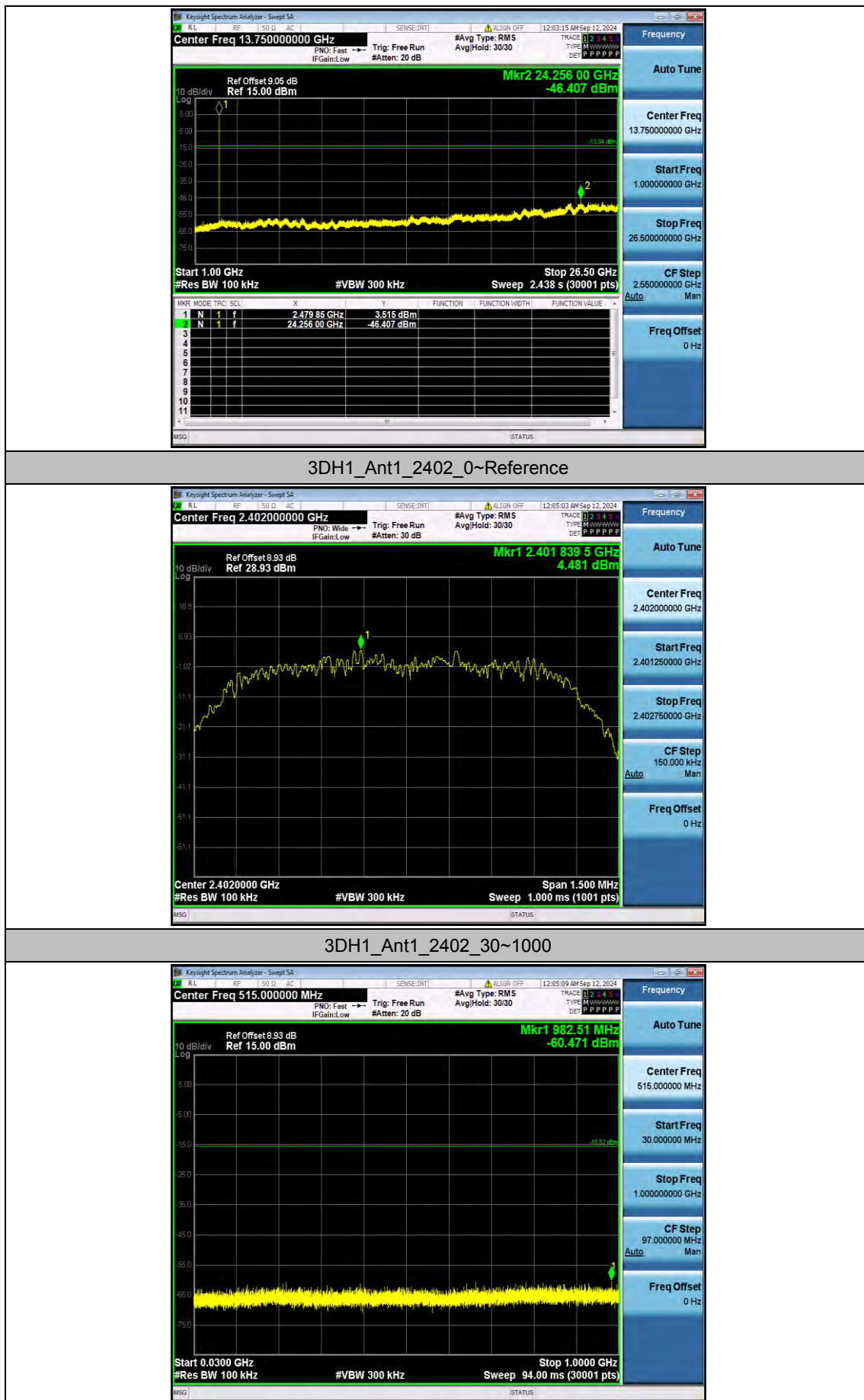
2DH1_Ant1_2480_0~Reference



2DH1_Ant1_2480_30~1000



2DH1_Ant1_2480_1000~26500



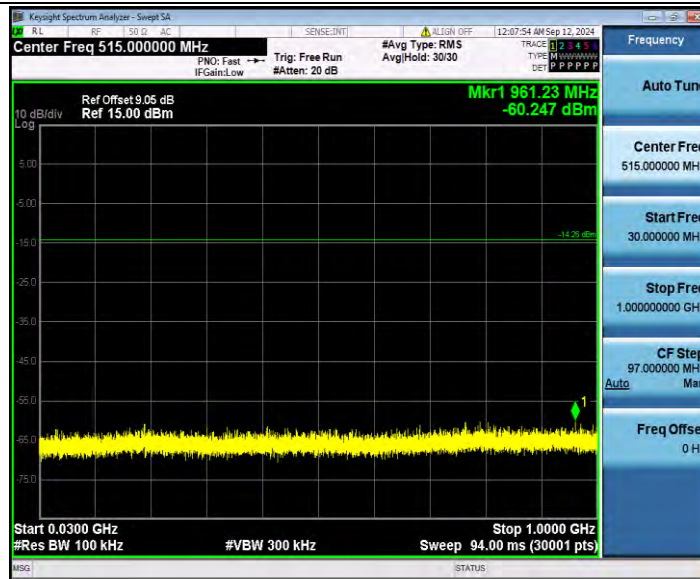
3DH1_Ant1_2402_1000~26500



3DH1_Ant1_2441_0~Reference



3DH1_Ant1_2441_30~1000

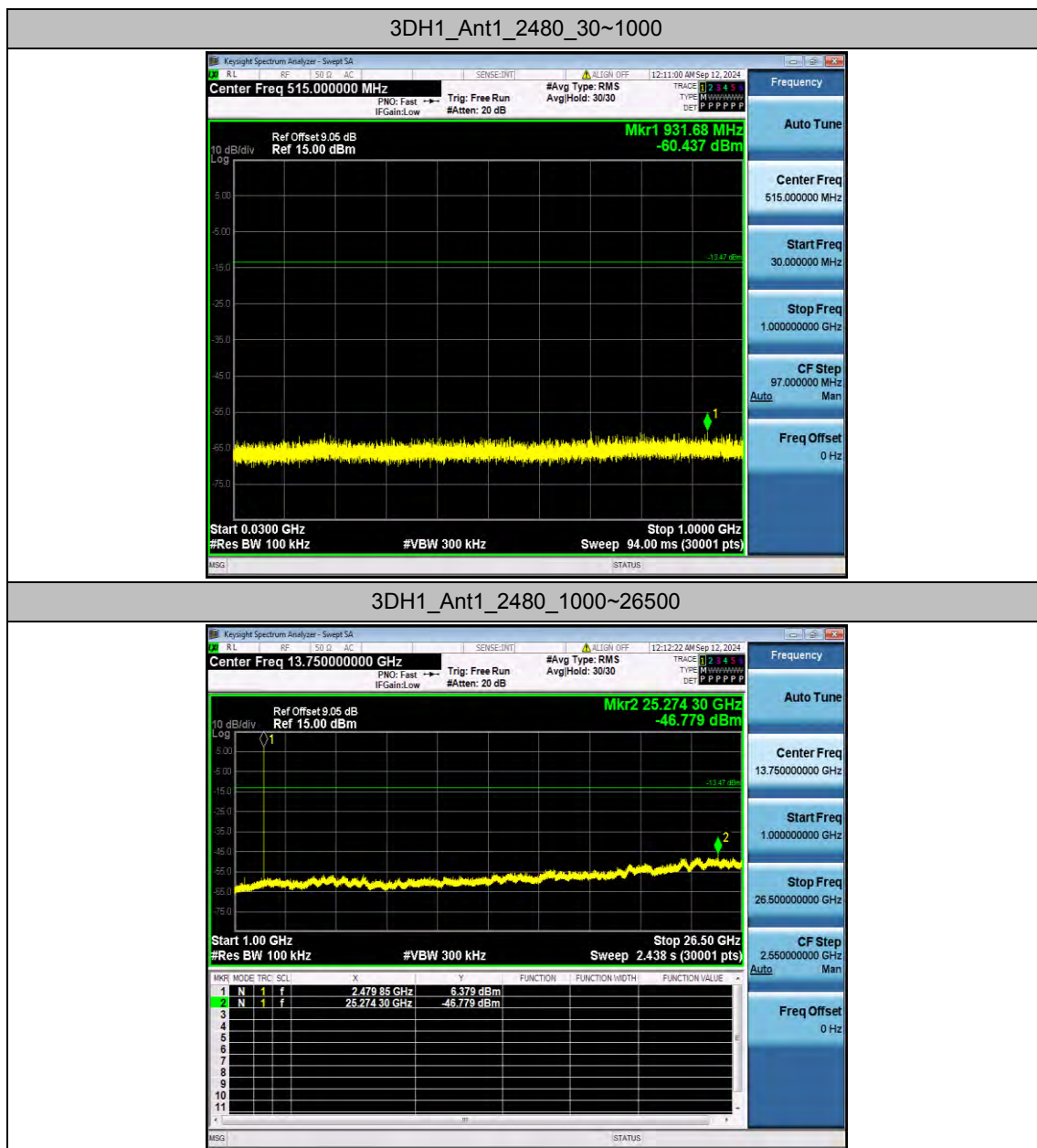


3DH1_Ant1_2441_1000~26500



3DH1_Ant1_2480_0~Reference





Appendix A.9: Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Freq(MHz)	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
DH1	Ant1	Low	2402	AV	2310.000	-49.23	≤-41.20	45.97	≤54	PASS
				AV	2389.145	-48.69	≤-41.20	46.51	≤54	PASS
				AV	2390.000	-48.69	≤-41.20	46.51	≤54	PASS
				Peak	2310.000	-43.91	≤-21.20	51.29	≤74	PASS
				Peak	2365.835	-38.35	≤-21.20	56.85	≤74	PASS
				Peak	2390.000	-42.96	≤-21.20	52.24	≤74	PASS
		High	2480	AV	2483.500	-45.77	≤-41.20	49.43	≤54	PASS
				AV	2483.520	-45.77	≤-41.20	49.43	≤54	PASS
				AV	2500.000	-48.36	≤-41.20	46.84	≤54	PASS
				Peak	2483.500	-40.89	≤-21.20	54.31	≤74	PASS
				Peak	2485.360	-38.17	≤-21.20	57.03	≤74	PASS
				Peak	2500.000	-41.27	≤-21.20	53.93	≤74	PASS
2DH1	Ant1	Low	2402	AV	2310.000	-49.29	≤-41.20	45.91	≤54	PASS
				AV	2385.155	-48.79	≤-41.20	46.41	≤54	PASS
				AV	2390.000	-48.91	≤-41.20	46.29	≤54	PASS
				Peak	2310.000	-41.21	≤-21.20	53.99	≤74	PASS
				Peak	2346.095	-38.63	≤-21.20	56.57	≤74	PASS
				Peak	2390.000	-40.11	≤-21.20	55.09	≤74	PASS
		High	2480	AV	2483.500	-46.53	≤-41.20	48.67	≤54	PASS
				AV	2483.520	-46.53	≤-41.20	48.67	≤54	PASS
				AV	2500.000	-48.6	≤-41.20	46.60	≤54	PASS
				Peak	2483.500	-39.71	≤-21.20	55.49	≤74	PASS
				Peak	2483.680	-38.57	≤-21.20	56.63	≤74	PASS
				Peak	2500.000	-40.2	≤-21.20	55.00	≤74	PASS
3DH1	Ant1	Low	2402	AV	2310.000	-49.14	≤-41.20	46.06	≤54	PASS
				AV	2389.250	-48.81	≤-41.20	46.39	≤54	PASS
				AV	2390.000	-48.84	≤-41.20	46.36	≤54	PASS
				Peak	2310.000	-40.89	≤-21.20	54.31	≤74	PASS
				Peak	2323.835	-38.05	≤-21.20	57.15	≤74	PASS
				Peak	2390.000	-41.12	≤-21.20	54.08	≤74	PASS
		High	2480	AV	2483.500	-46.84	≤-41.20	48.36	≤54	PASS
				AV	2483.520	-46.84	≤-41.20	48.36	≤54	PASS
				AV	2500.000	-48.67	≤-41.20	46.53	≤54	PASS
				Peak	2483.500	-41.43	≤-21.20	53.77	≤74	PASS
				Peak	2486.720	-38.57	≤-21.20	56.63	≤74	PASS

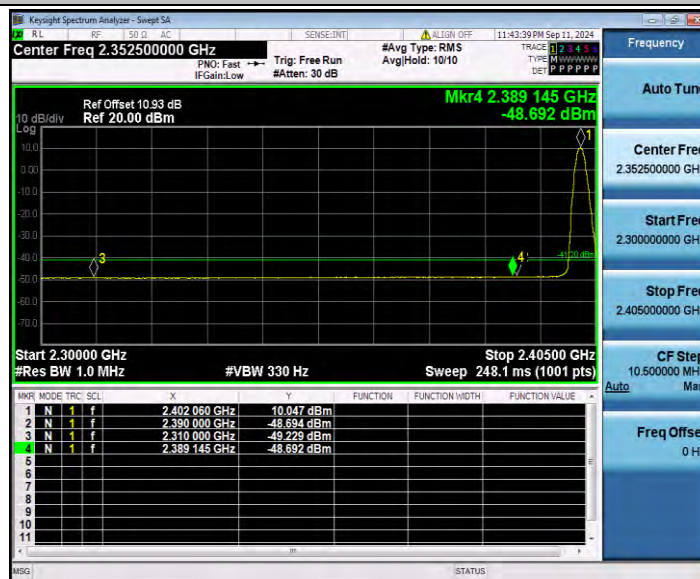
				Peak	2500.000	-40.34	≤-21.20	54.86	≤74	PASS
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Note:

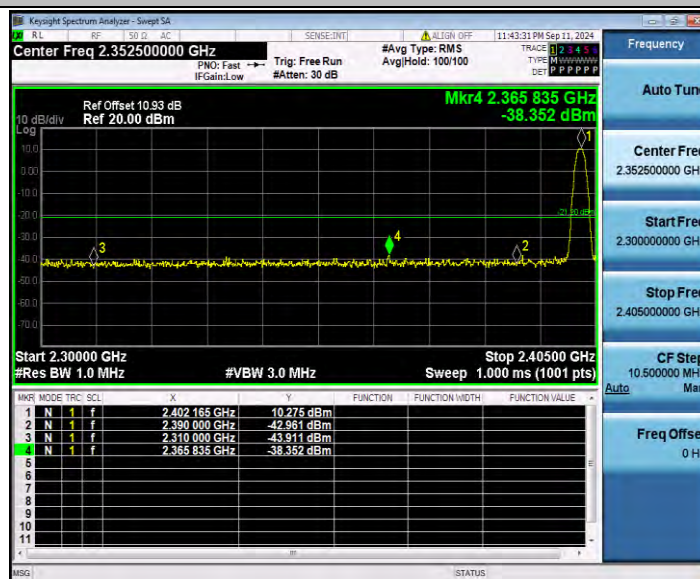
1. The Antenna Gain is compensated in the graph.
2. The Duty Cycle Factor and RBW Factor is compensated in the graph.
3. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

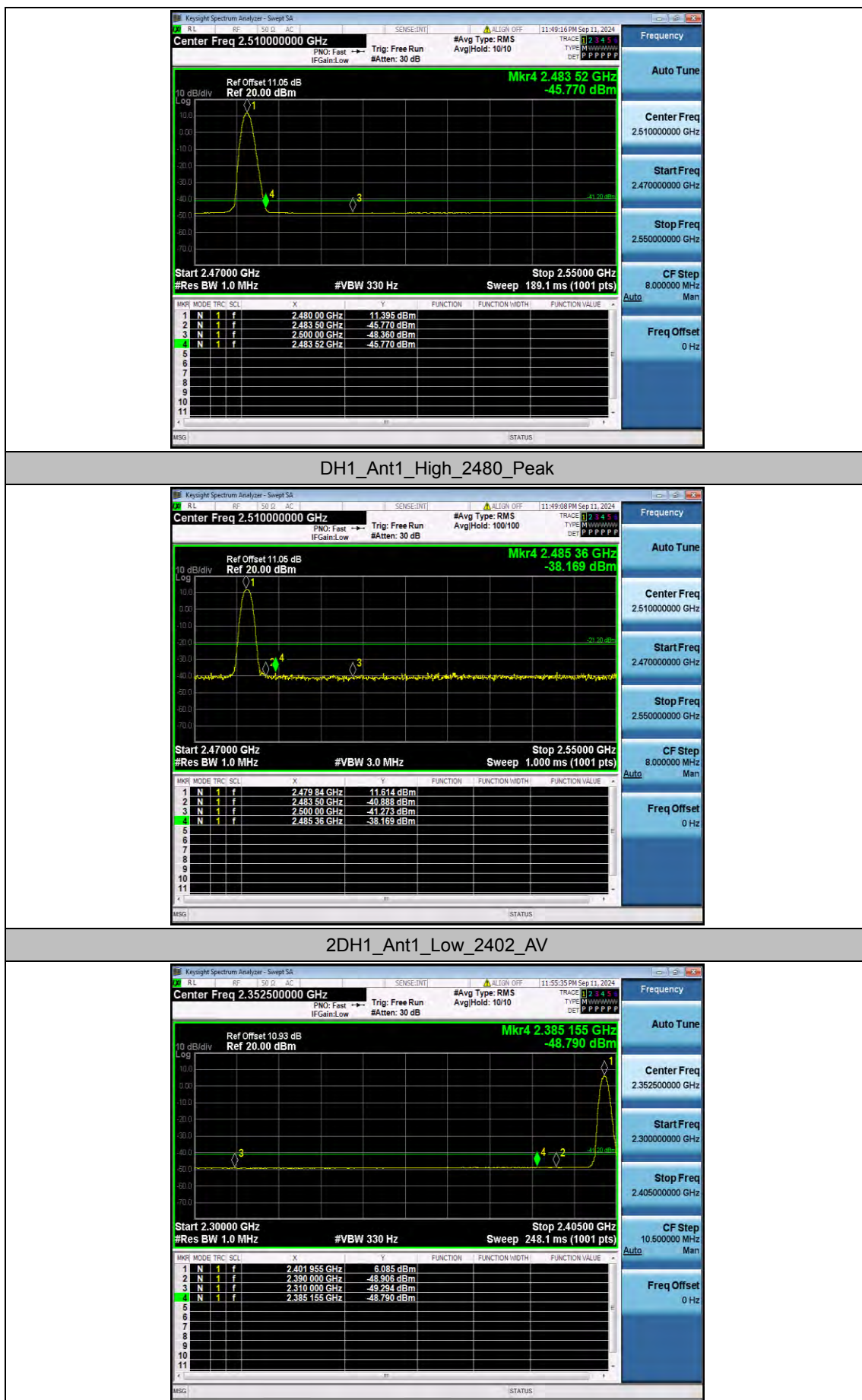
DH1_Ant1_Low_2402_AV



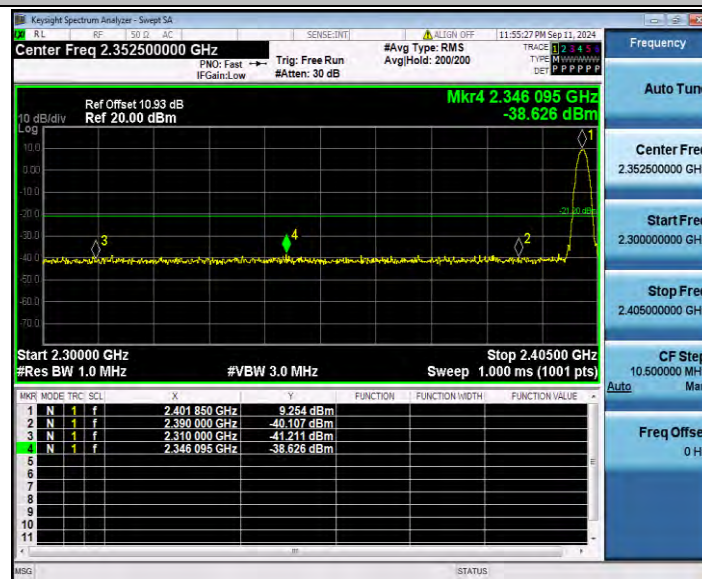
DH1_Ant1_Low_2402_Peak



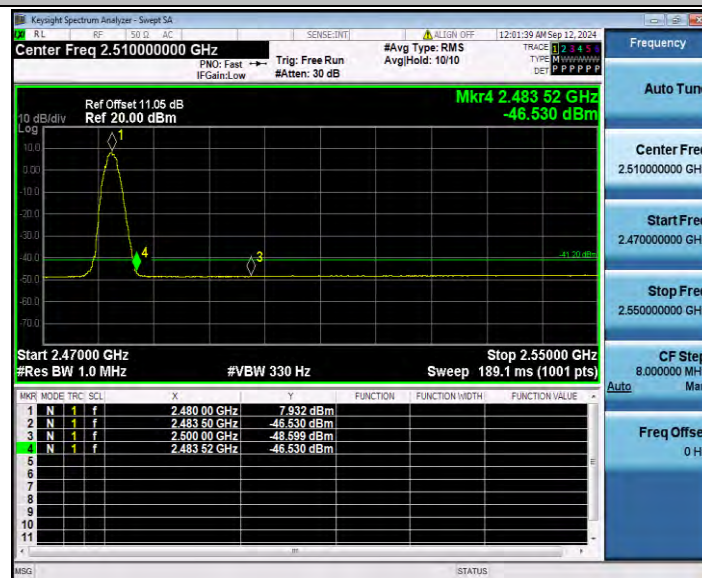
DH1_Ant1_High_2480_AV



2DH1_Ant1_Low_2402_Peak



2DH1_Ant1_High_2480_AV



2DH1_Ant1_High_2480_Peak

