

Appendix A

RF Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: TRUE WIRELESS EARBUDS

Trade Mark: TZUMI, SOUNDMATES

Test Model: RT50A

FCC ID: 2ATOY-RT50A

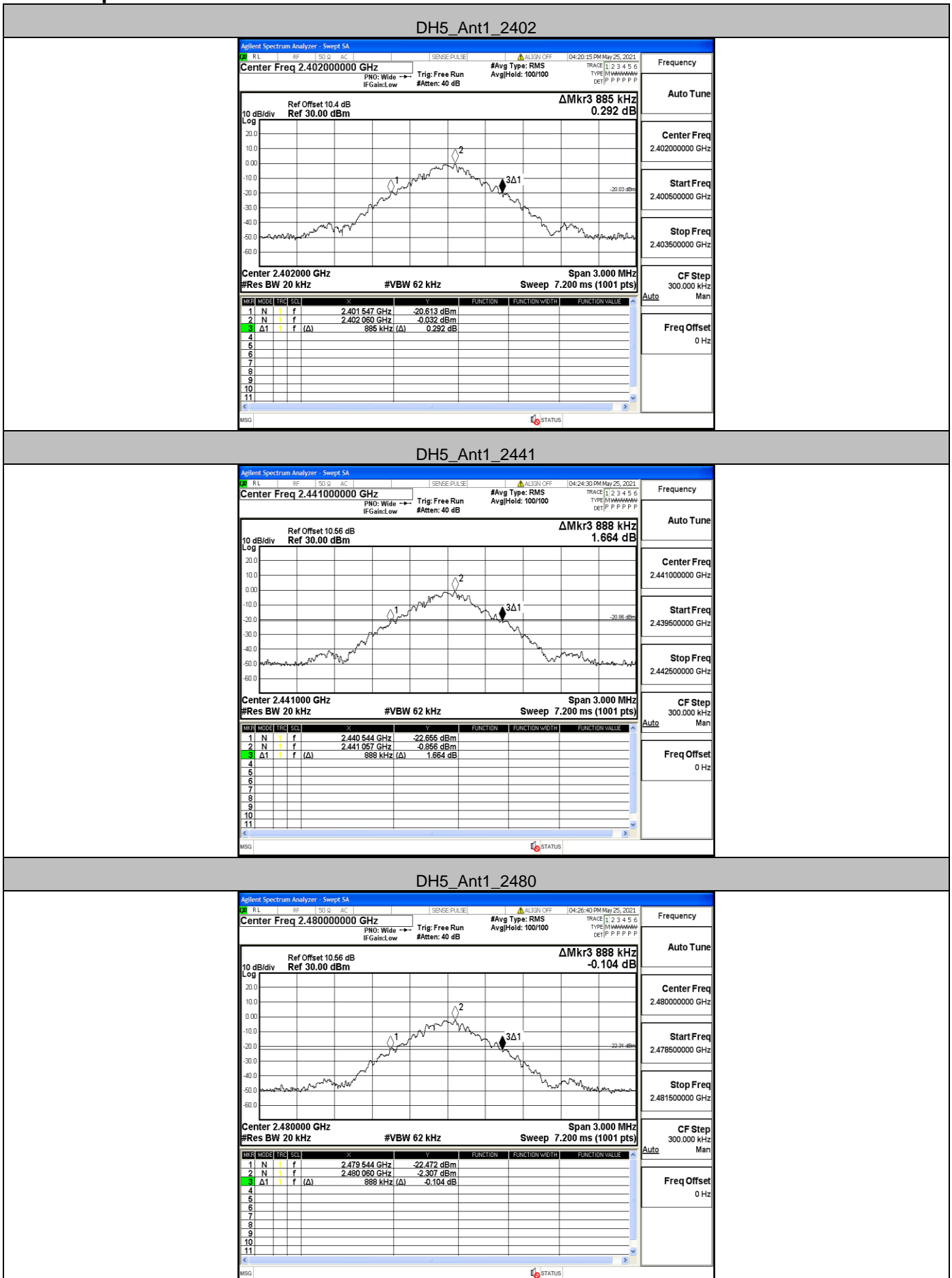
Environmental Conditions

Temperature:	22.8° C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa
Test Engineer:	Nancy Li
Supervised by:	Hugo Chen

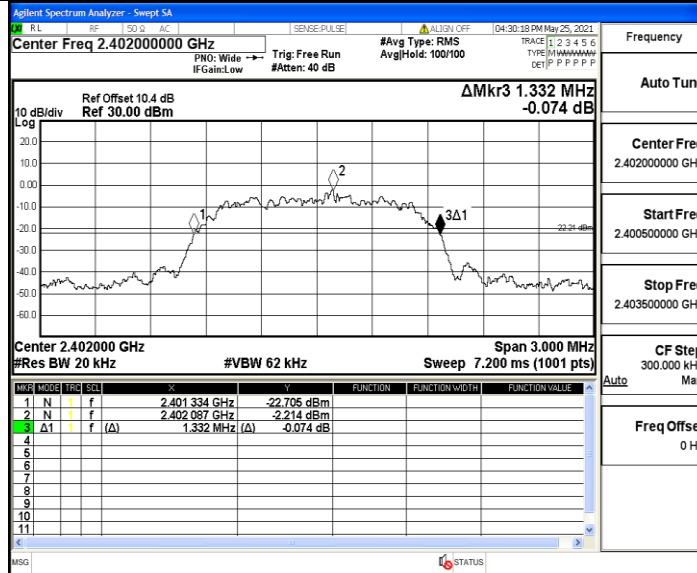
A.1 20 dB Bandwidth

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.885	2401.547	2402.432	---	PASS
		2441	0.888	2440.544	2441.432	---	PASS
		2480	0.888	2479.544	2480.432	---	PASS
2DH5	Ant1	2402	1.332	2401.334	2402.666	---	PASS
		2441	1.332	2440.334	2441.666	---	PASS
		2480	1.320	2479.337	2480.657	---	PASS
3DH5	Ant1	2402	1.188	2401.412	2402.600	---	PASS
		2441	1.188	2440.412	2441.600	---	PASS
		2480	1.239	2479.364	2480.603	---	PASS

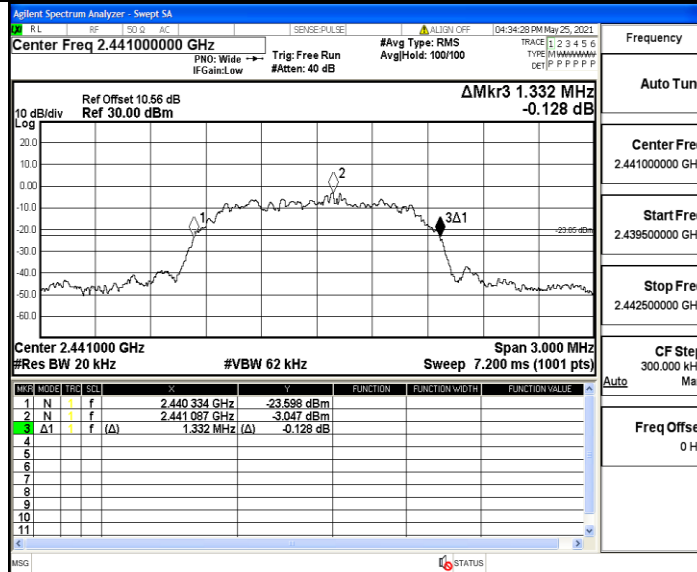
Test Graph



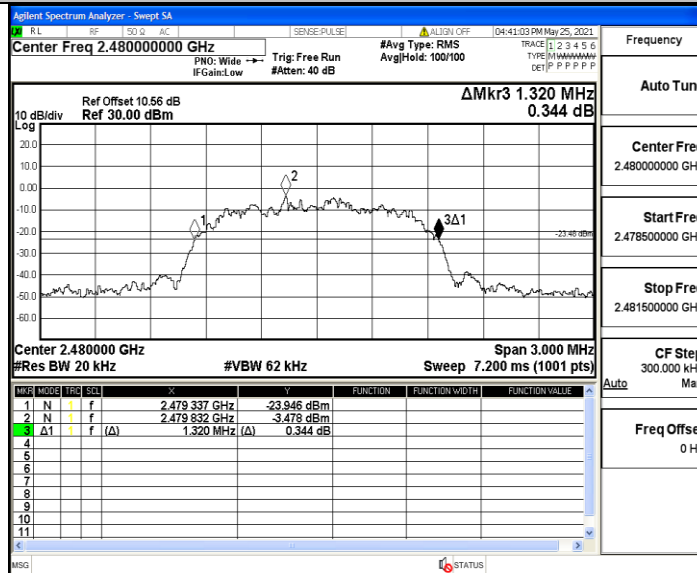
2DH5_Ant1_2402



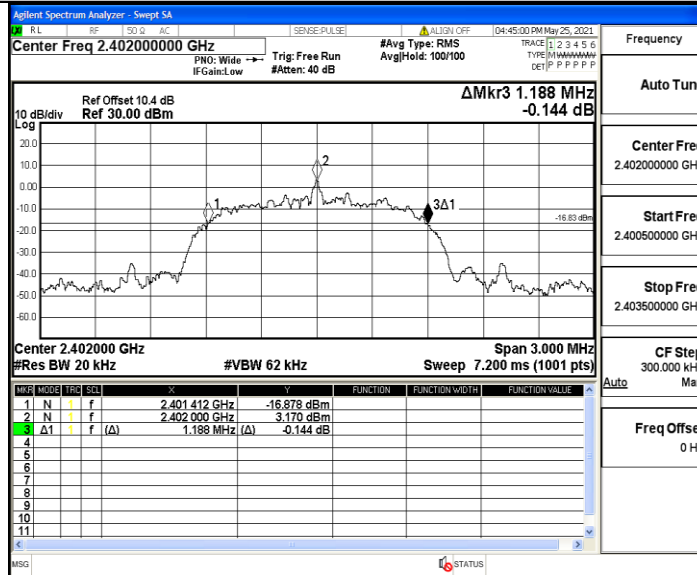
2DH5_Ant1_2441



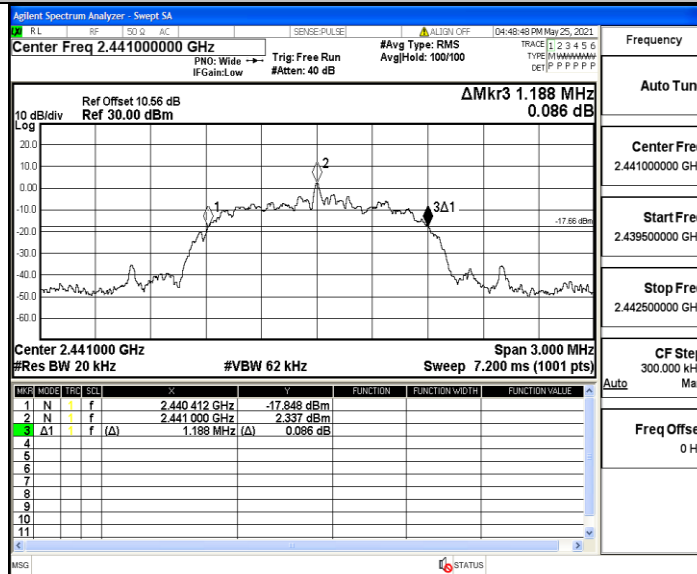
2DH5_Ant1_2480



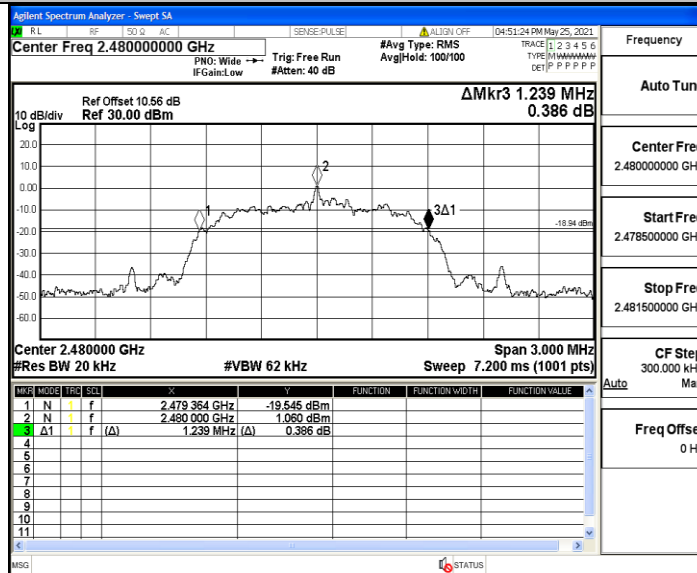
3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480

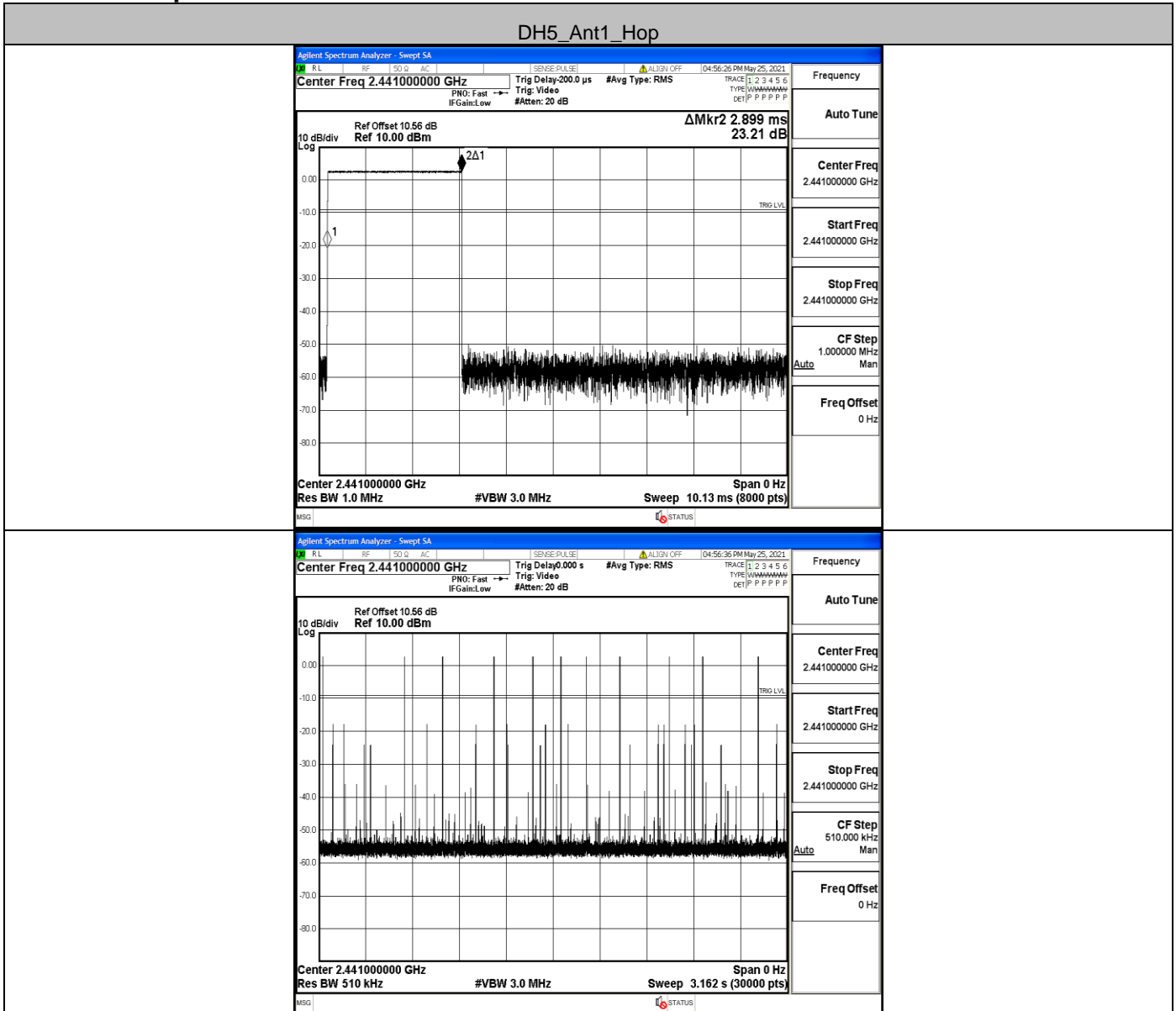


A.2 Dwell Time

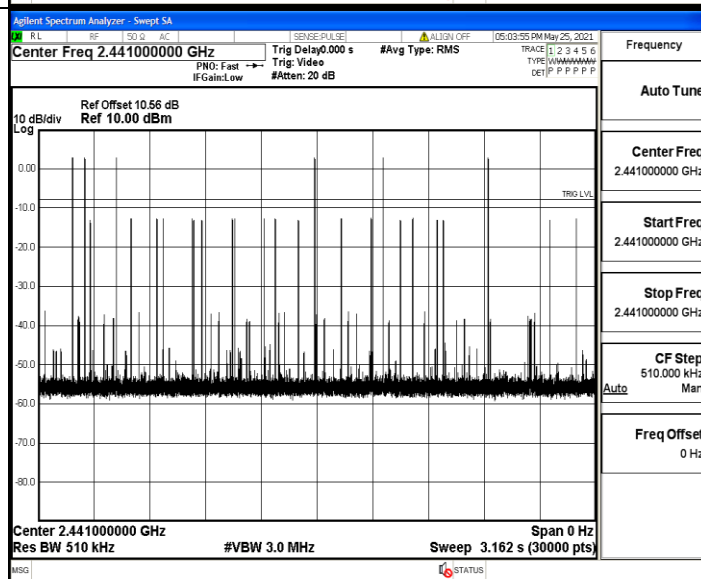
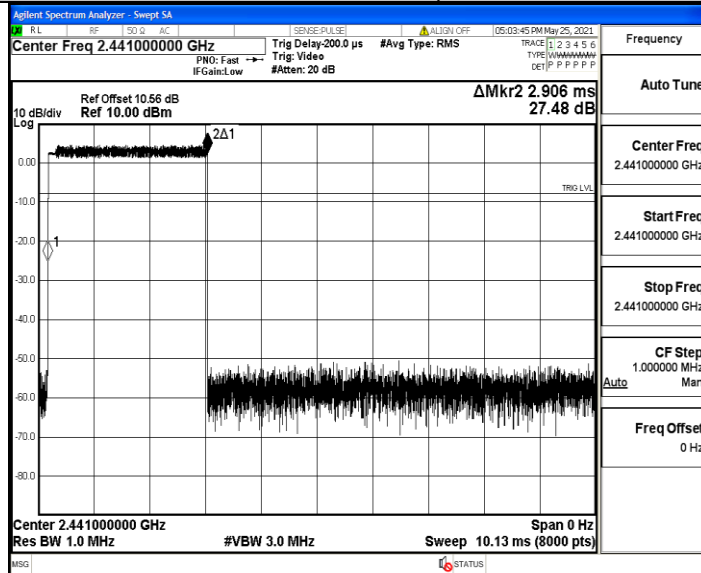
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.90	120	0.348	<=0.4	PASS
2DH5	Ant1	Hop	2.91	70	0.203	<=0.4	PASS
3DH5	Ant1	Hop	2.91	110	0.32	<=0.4	PASS

Test Graph

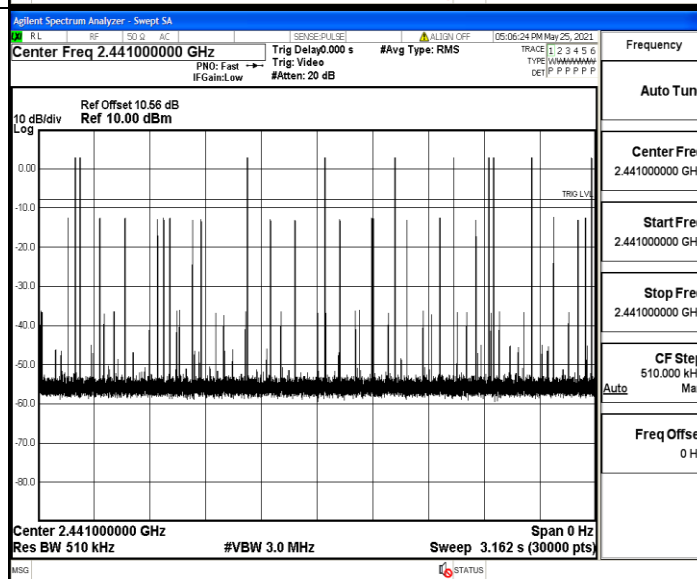
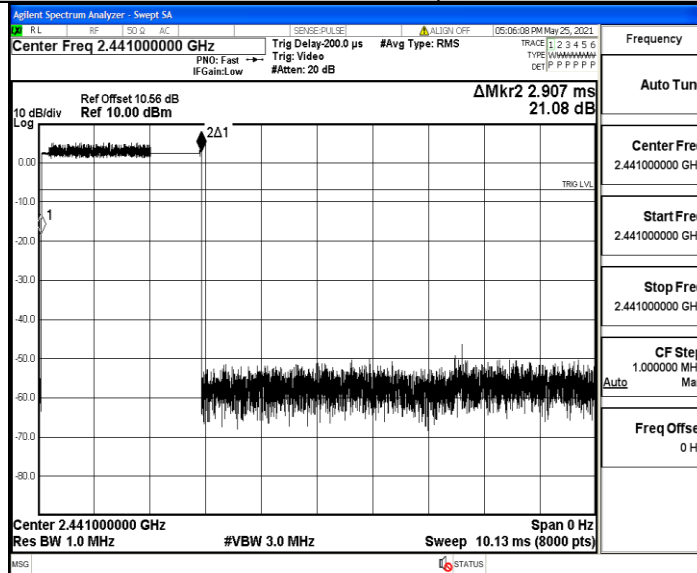
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop

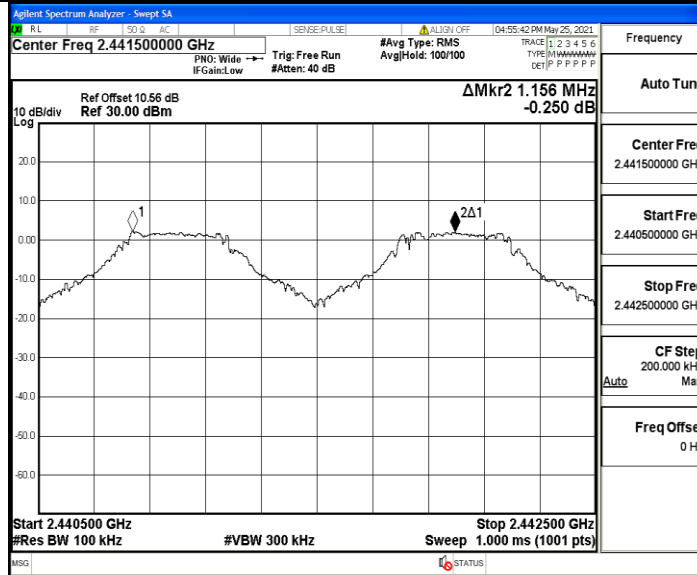


A.3 Carrier Frequency Separation

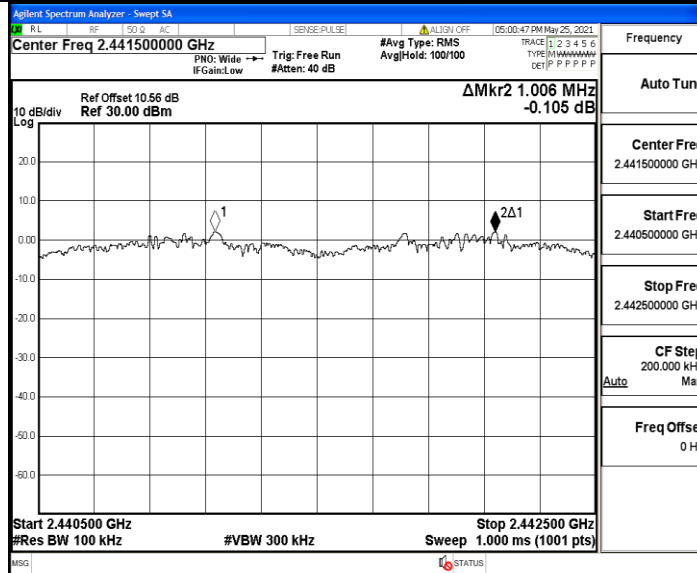
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.156	≥ 0.888	PASS
2DH5	Ant1	Hop	1.006	≥ 0.888	PASS
3DH5	Ant1	Hop	0.998	≥ 0.826	PASS

Test Graph

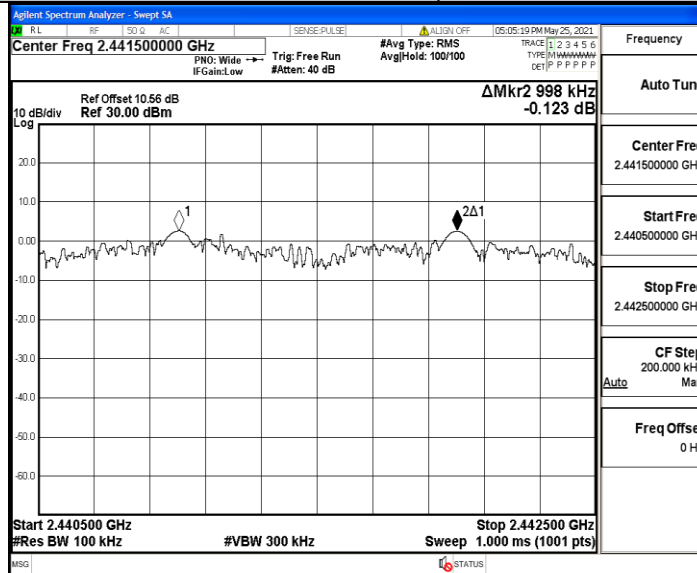
DH5_Ant1_Hop



2DH5_Ant1_Hop



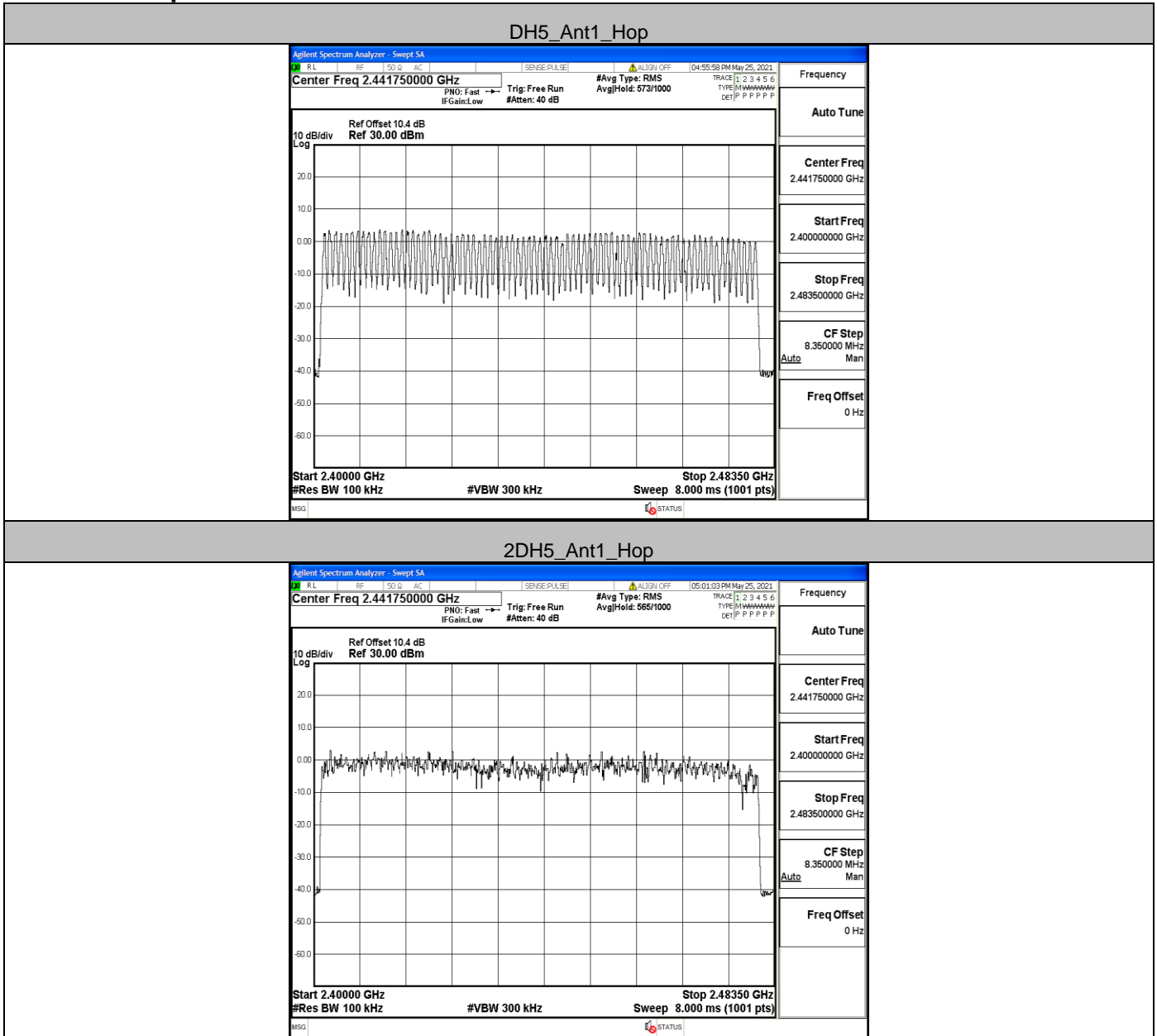
3DH5_Ant1_Hop



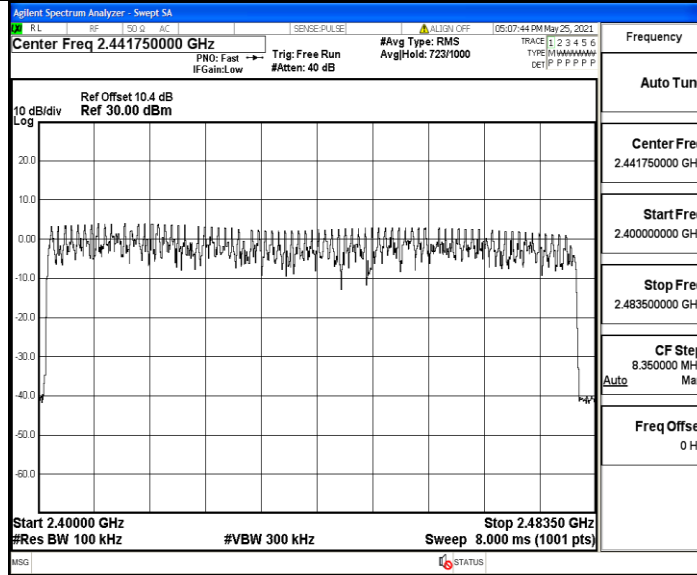
A.4 Hopping Channel Number

TestMode	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 Graph



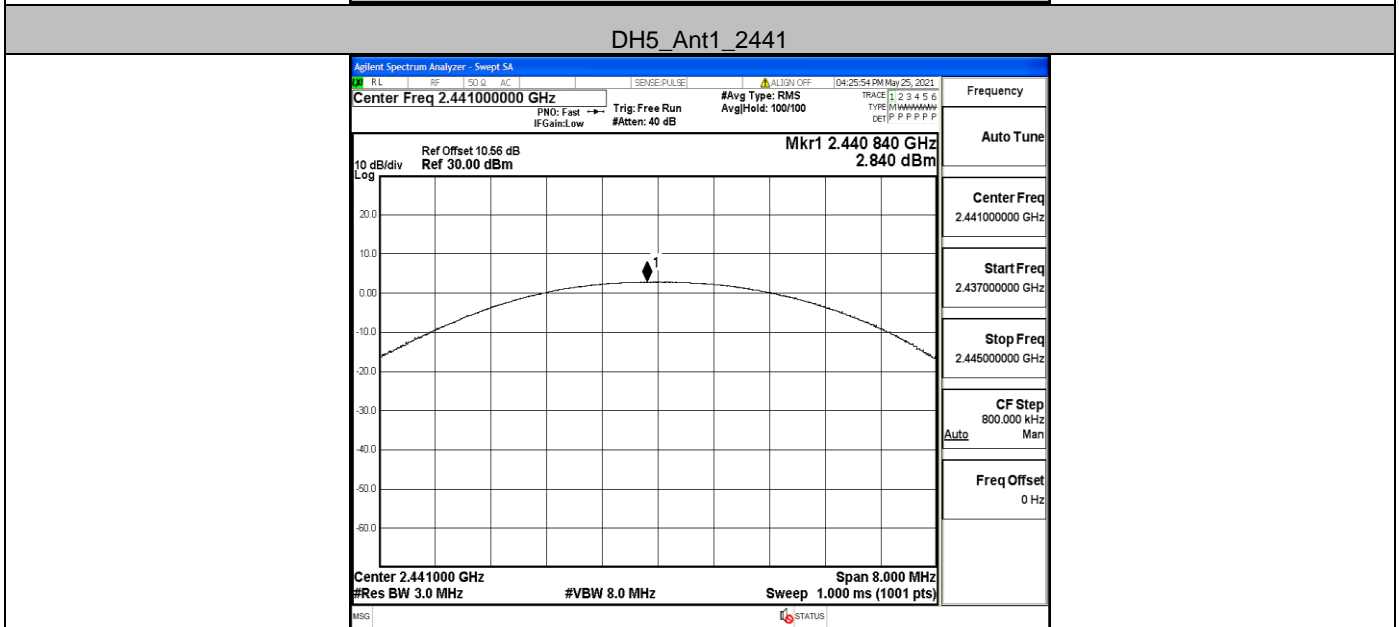
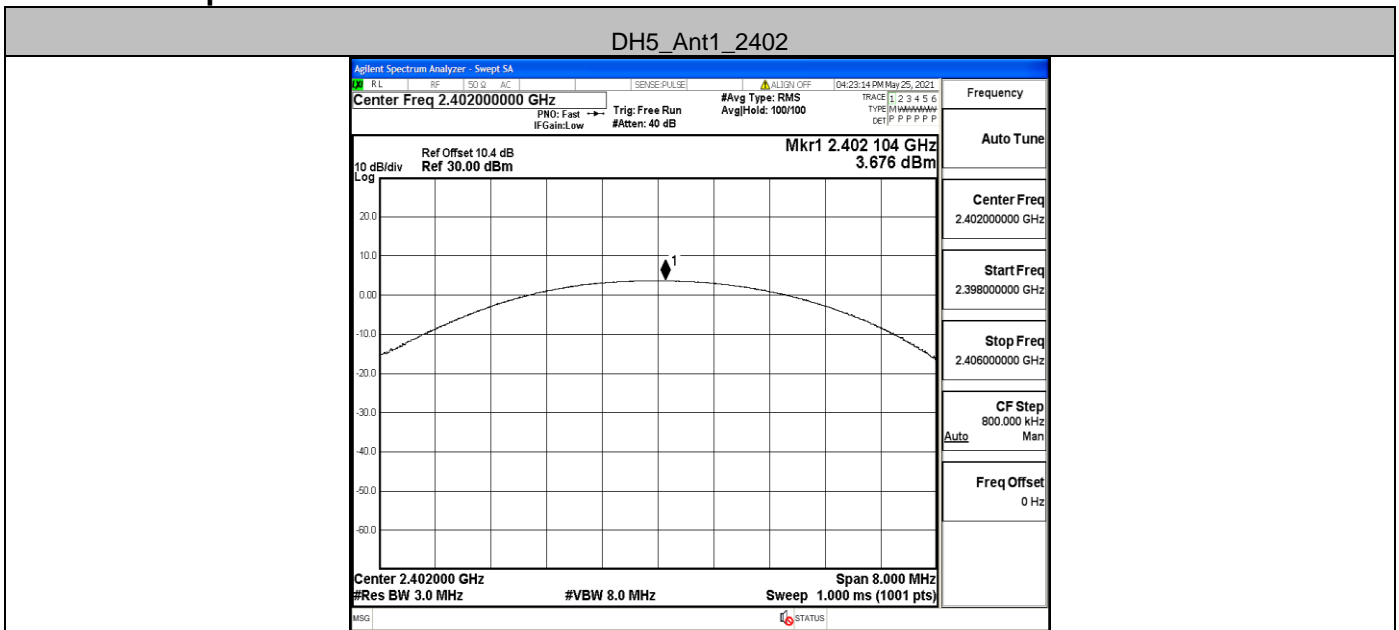
3DH5_Ant1_Hop



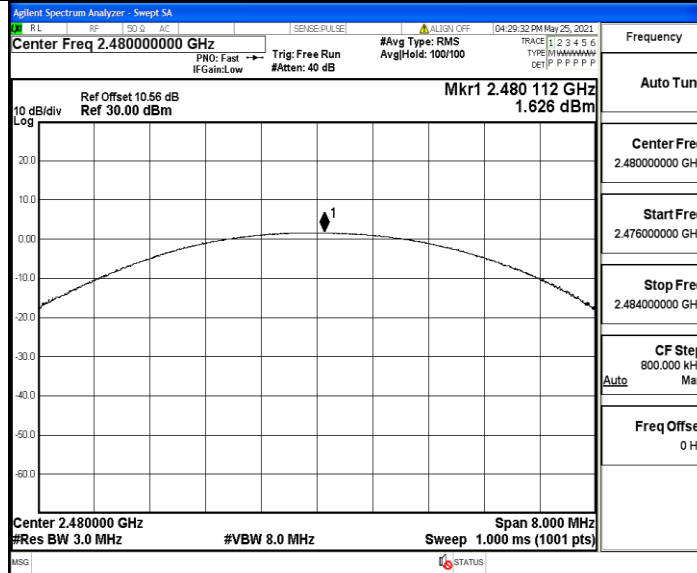
A.5 Conducted Peak Output Power

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	3.68	<=20.97	PASS
		2441	2.84	<=20.97	PASS
		2480	1.63	<=20.97	PASS
2DH5	Ant1	2402	5.98	<=20.97	PASS
		2441	5.09	<=20.97	PASS
		2480	3.8	<=20.97	PASS
3DH5	Ant1	2402	6.49	<=20.97	PASS
		2441	5.64	<=20.97	PASS
		2480	4.29	<=20.97	PASS

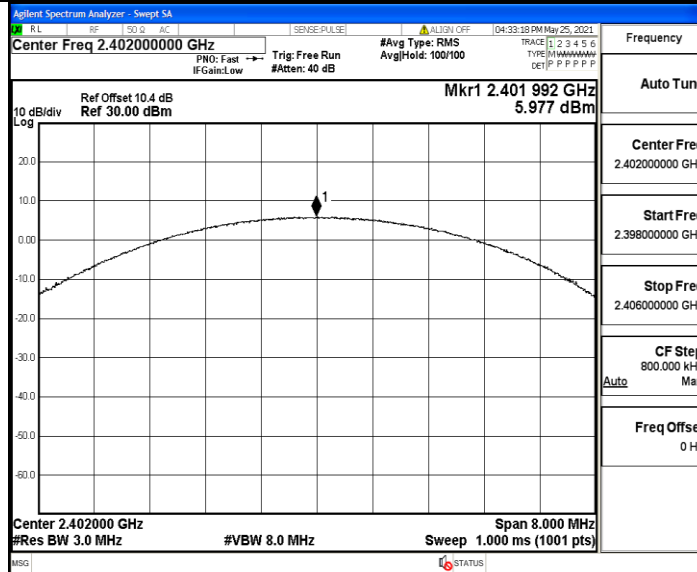
Test Graph



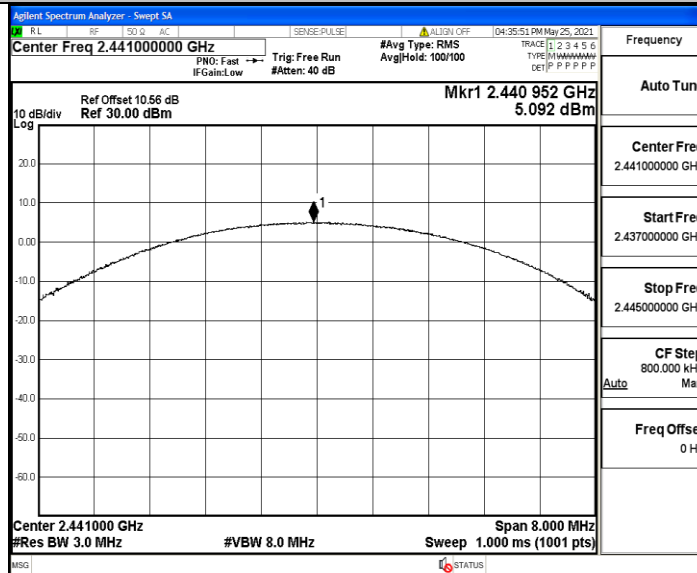
DH5_Ant1_2480



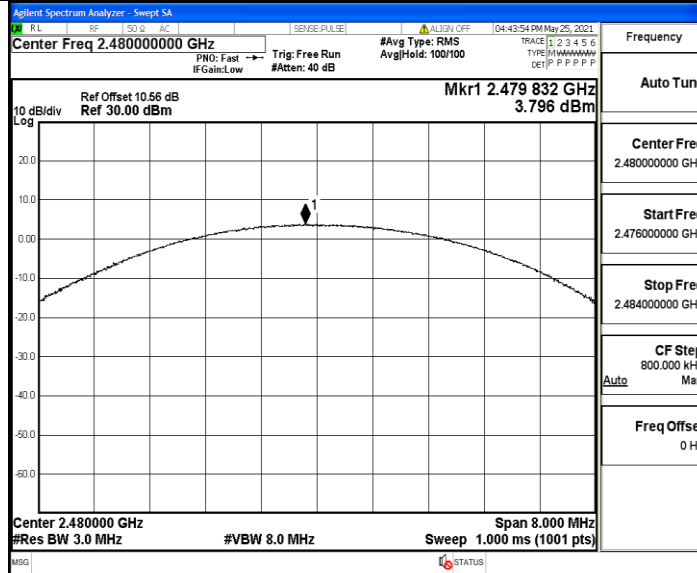
2DH5_Ant1_2402



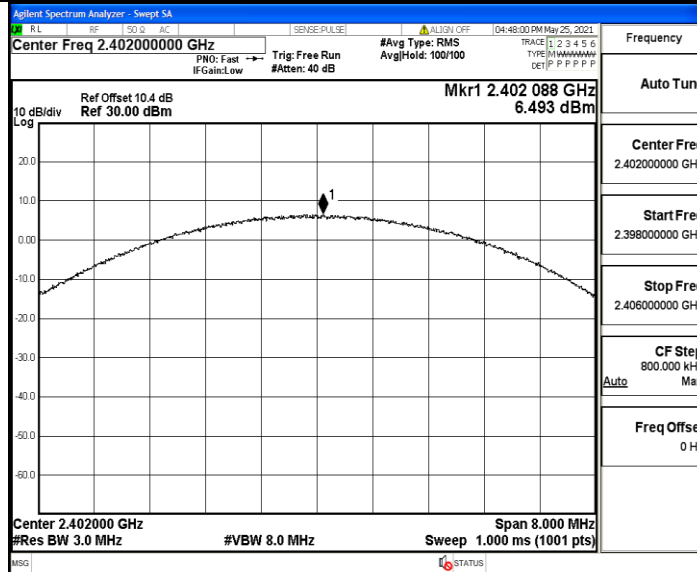
2DH5_Ant1_2441



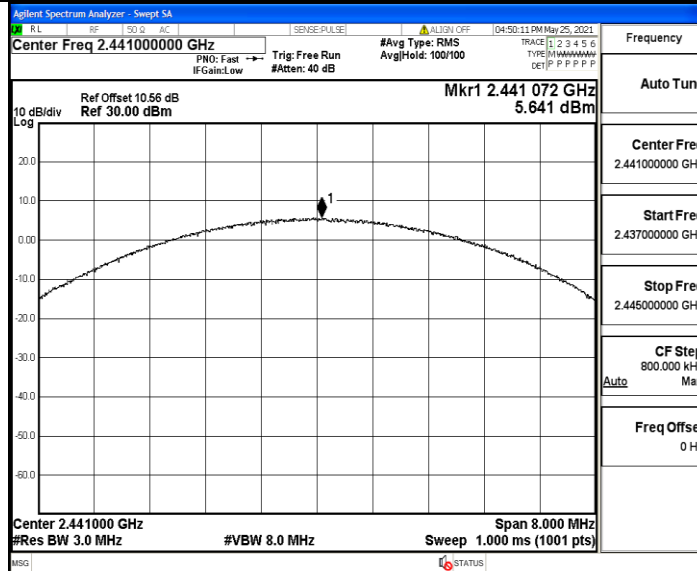
2DH5_Ant1_2480



3DH5_Ant1_2402



3DH5_Ant1_2441

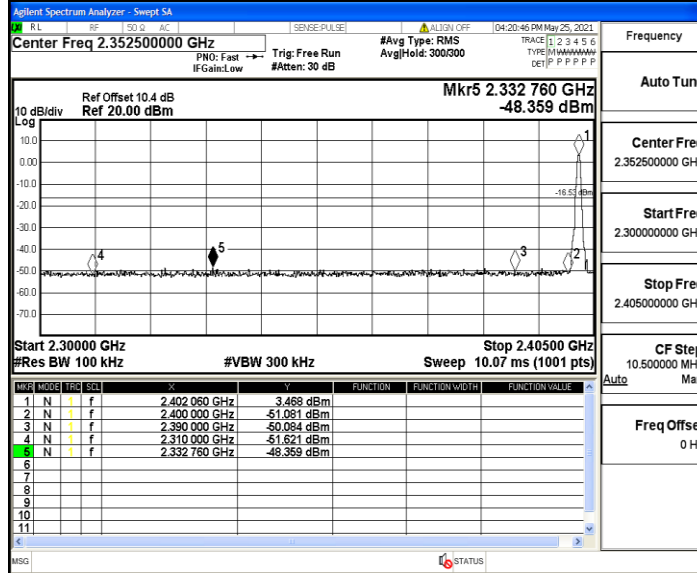


A.6 Band-edge for RF Conducted Emissions

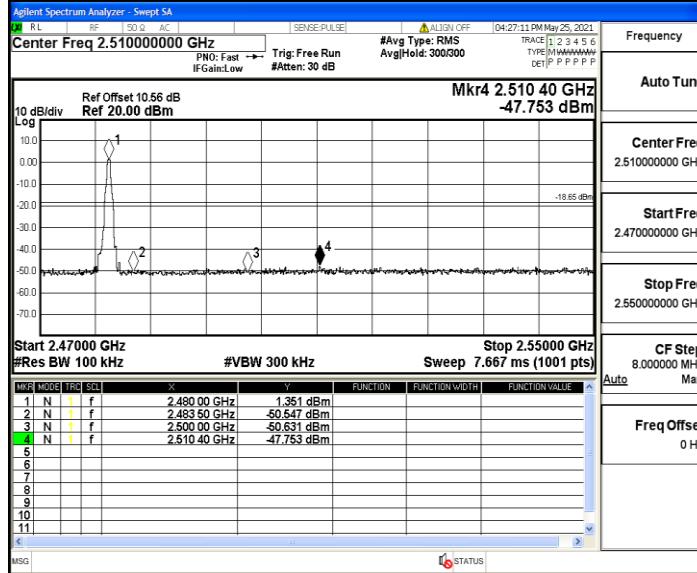
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	3.47	-48.36	<=-16.53	PASS
		High	2480	1.35	-47.75	<=-18.65	PASS
		Low	Hop_2402	3.30	-49.02	<=-16.7	PASS
		High	Hop_2480	1.33	-47.63	<=-18.67	PASS
2DH5	Ant1	Low	2402	3.37	-47.95	<=-16.63	PASS
		High	2480	1.50	-47.41	<=-18.5	PASS
		Low	Hop_2402	1.81	-49.2	<=-18.19	PASS
		High	Hop_2480	1.31	-47.71	<=-18.69	PASS
3DH5	Ant1	Low	2402	3.50	-48.43	<=-16.5	PASS
		High	2480	1.47	-47.82	<=-18.53	PASS
		Low	Hop_2402	3.44	-48.61	<=-16.56	PASS
		High	Hop_2480	2.40	-47.04	<=-17.6	PASS

Test Graph

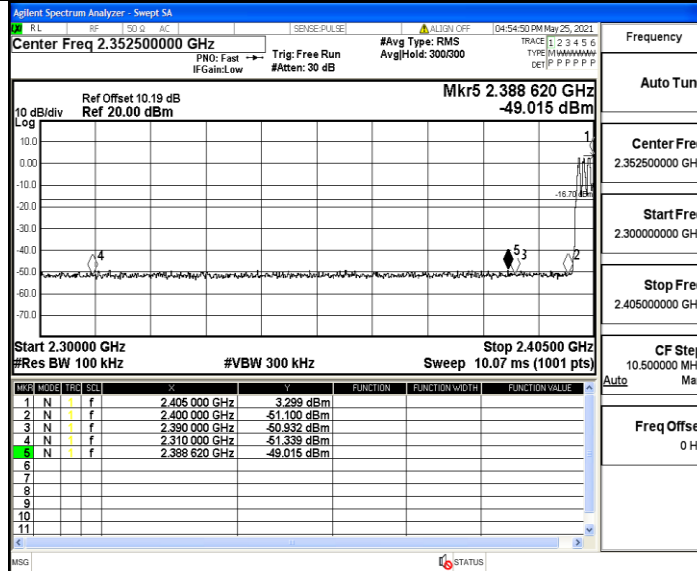
DH5_Ant1_Low_2402



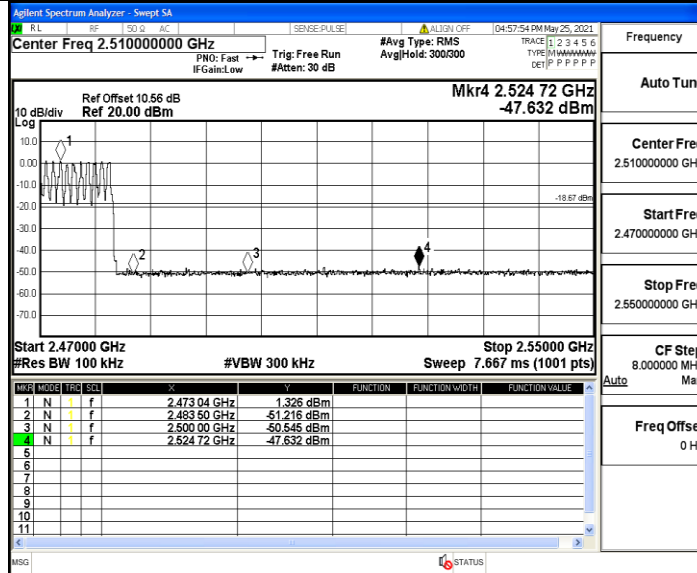
DH5_Ant1_High_2480



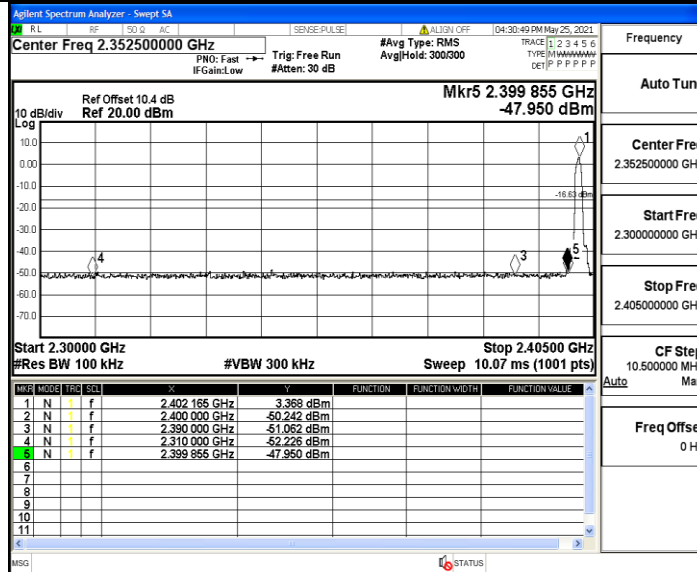
DH5_Ant1_Low_Hop_2402



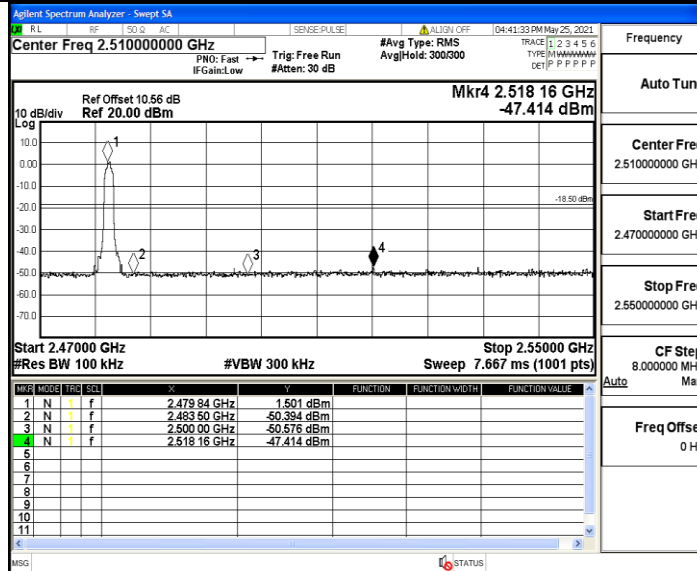
DH5_Ant1_High_Hop_2480



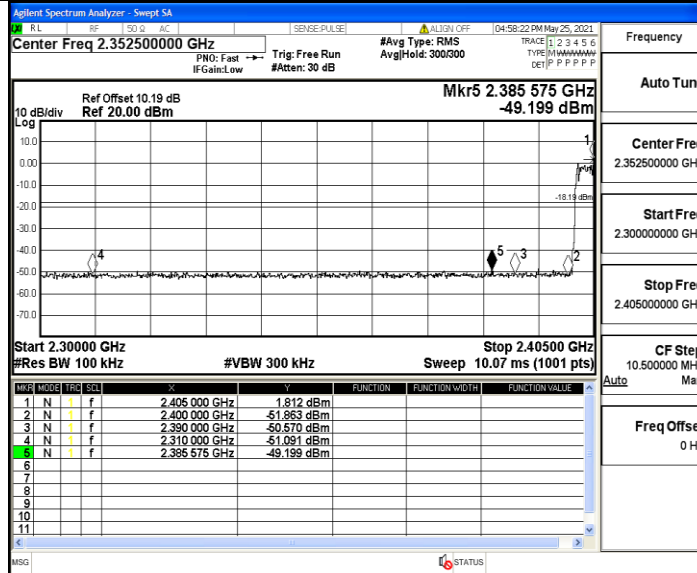
2DH5_Ant1_Low_2402



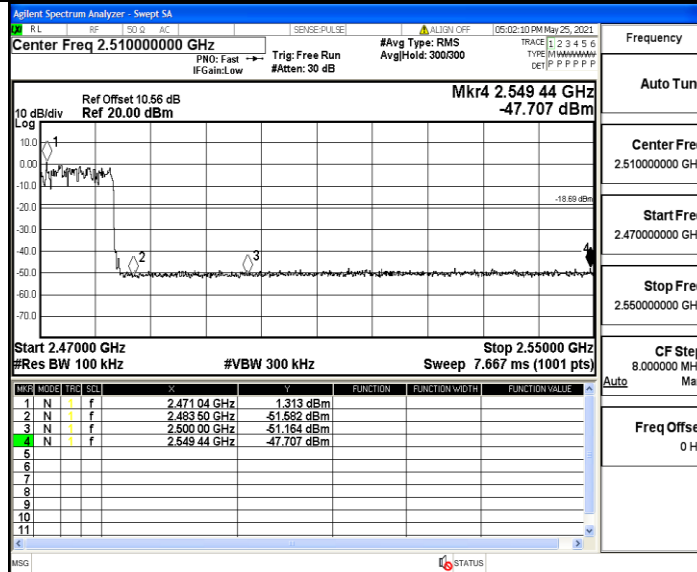
2DH5_Ant1_High_2480



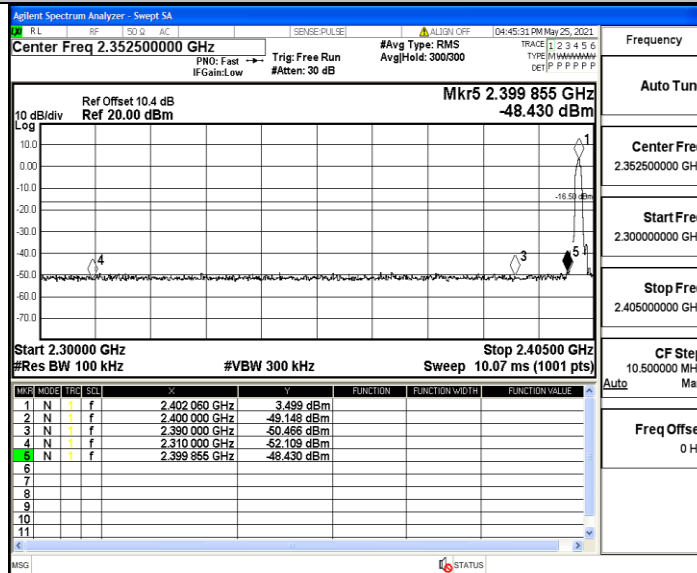
2DH5_Ant1_Low_Hop_2402



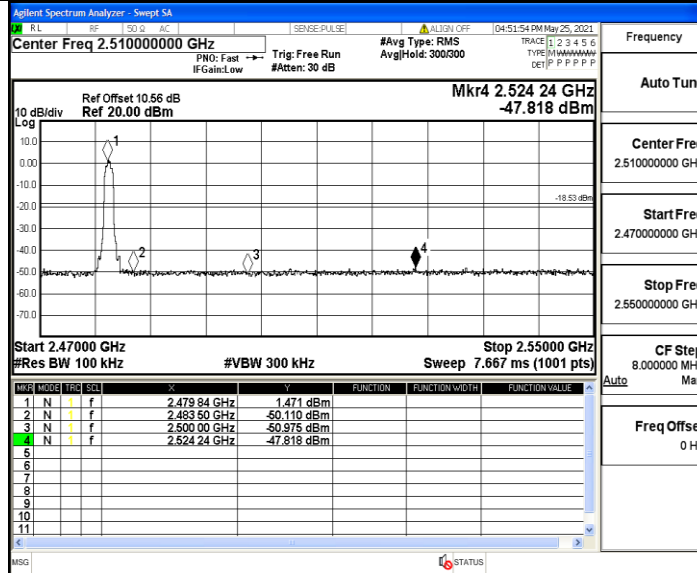
2DH5_Ant1_High_Hop_2480



3DH5_Ant1_Low_2402

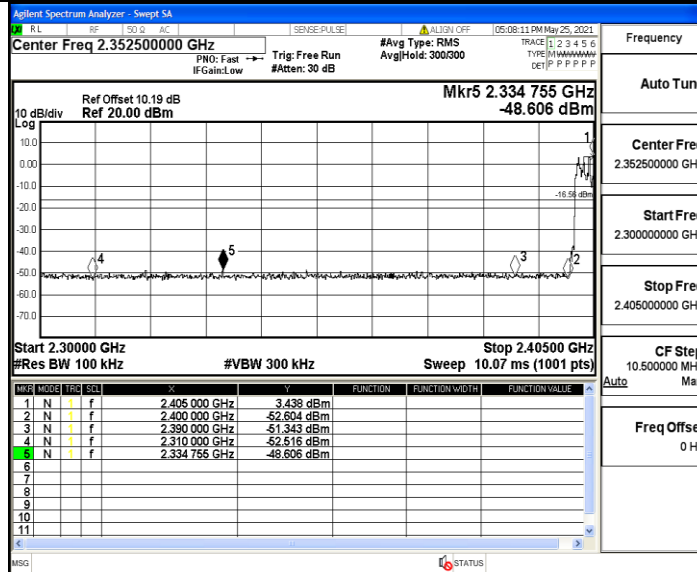


3DH5_Ant1_High_2480



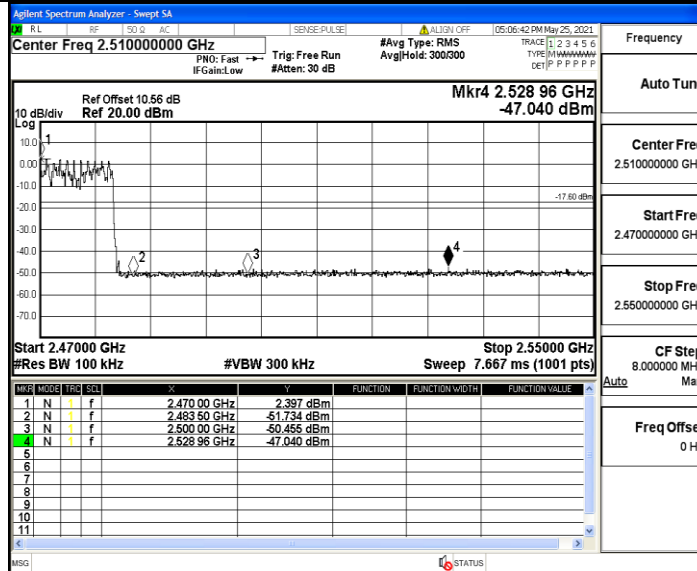
Frequency	Auto Tune
Center Freq	2.51000000 GHz
Start Freq	2.47000000 GHz
Stop Freq	2.55000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

3DH5_Ant1_Low_Hop_2402



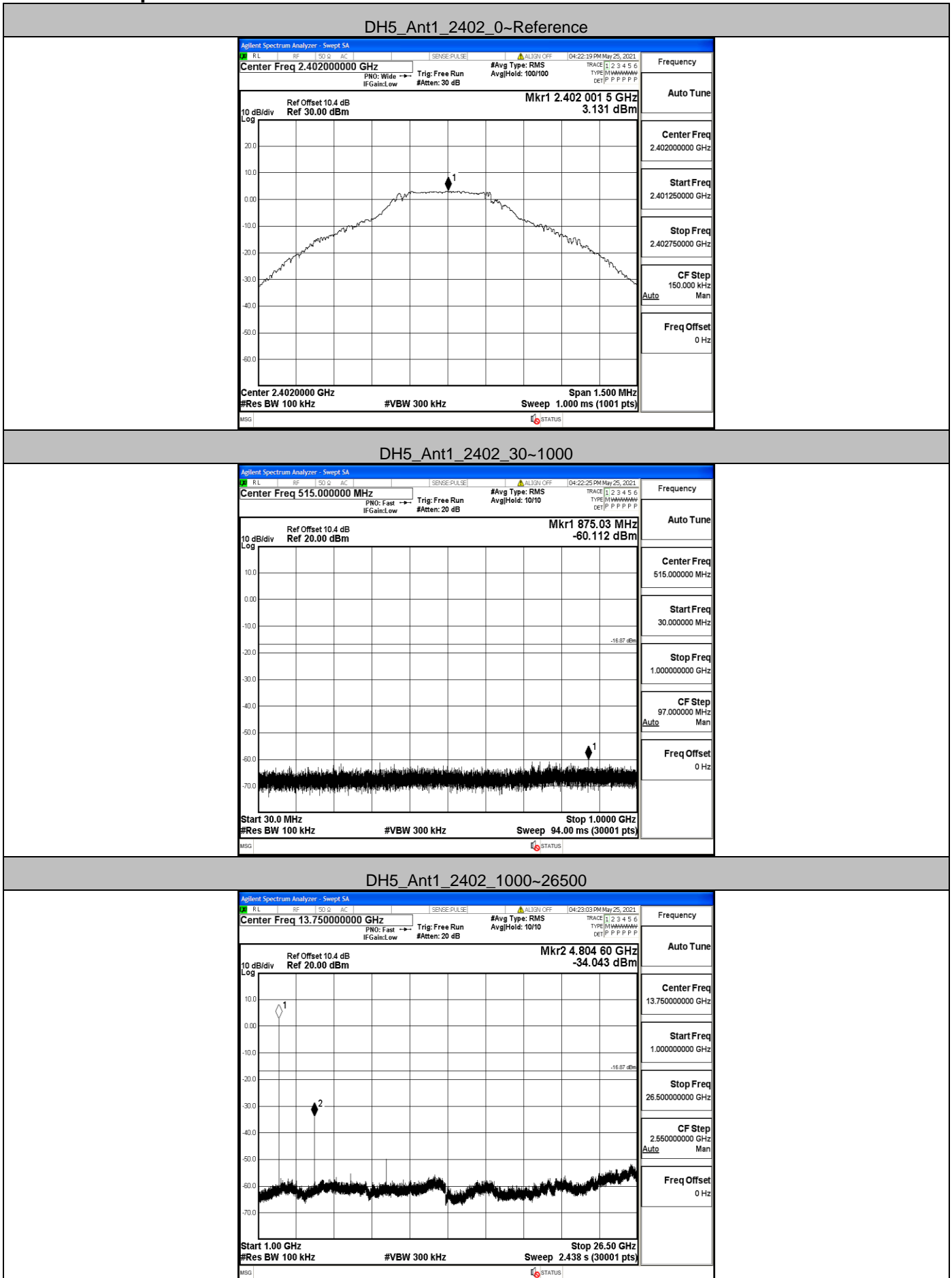
Frequency	Auto Tune
Center Freq	2.35250000 GHz
Start Freq	2.30000000 GHz
Stop Freq	2.40500000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

3DH5_Ant1_High_Hop_2480

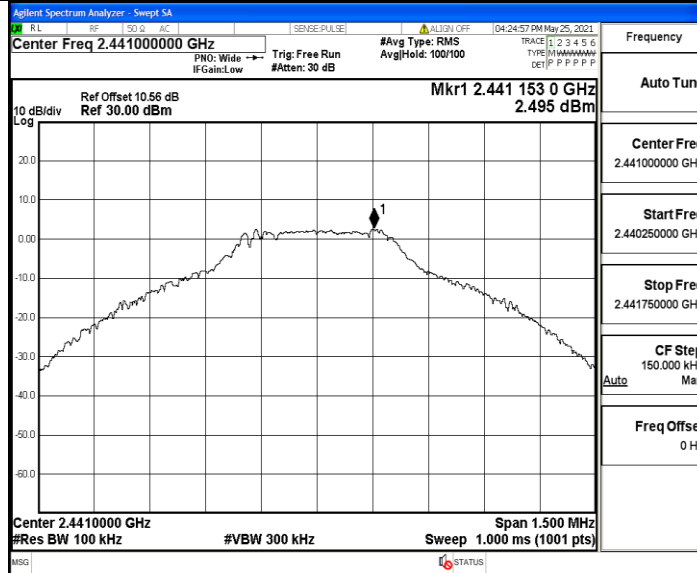


Frequency	Auto Tune
Center Freq	2.51000000 GHz
Start Freq	2.47000000 GHz
Stop Freq	2.55000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

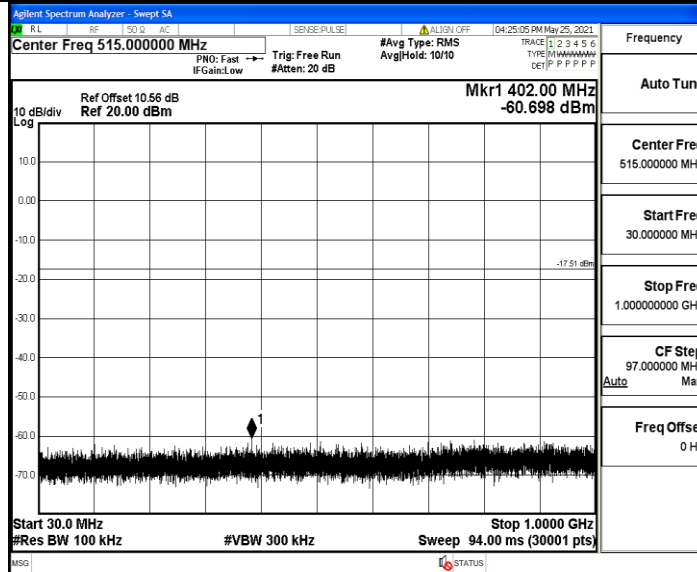
A.7 RF Conducted Spurious Emissions Test Graph



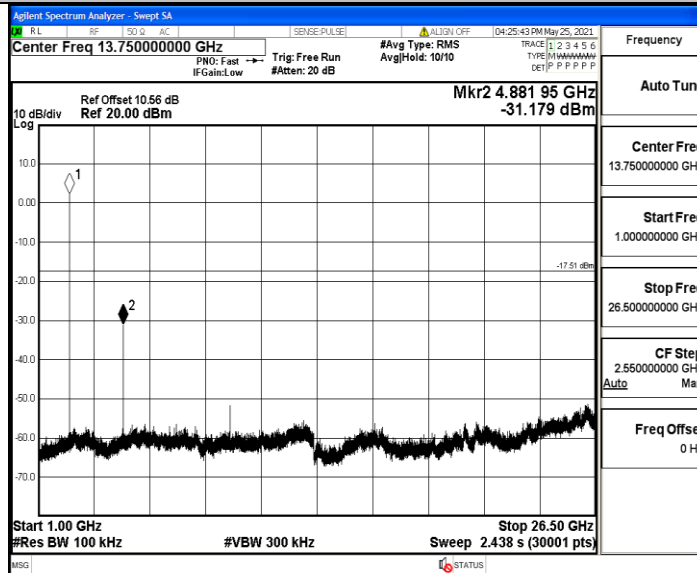
DH5_Ant1_2441_0~Reference



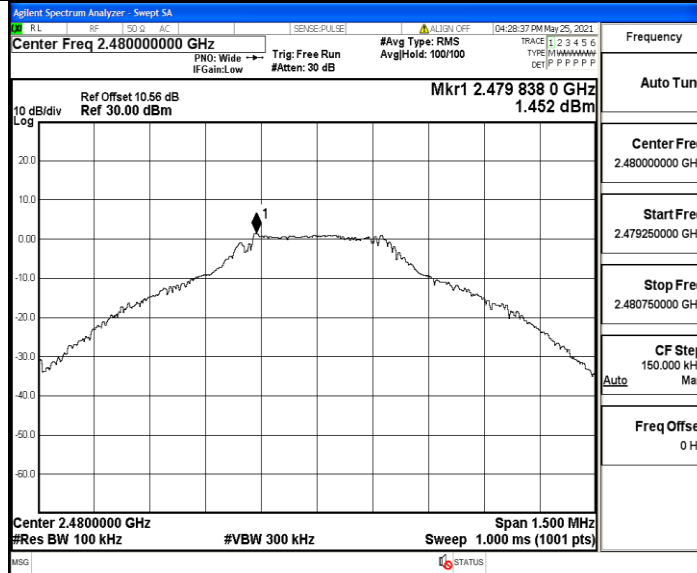
DH5_Ant1_2441_30~1000



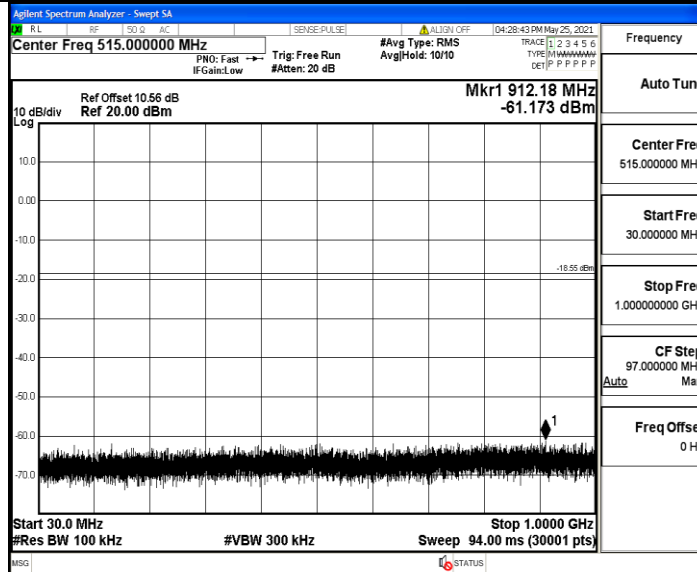
DH5_Ant1_2441_1000~26500



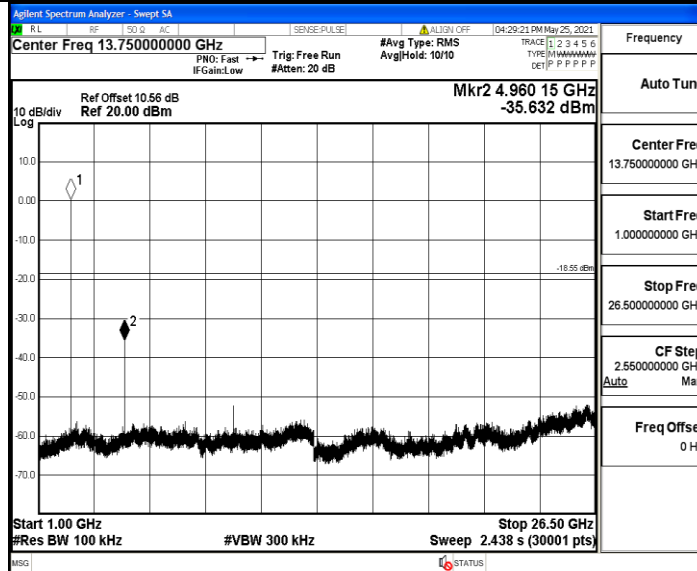
DH5_Ant1_2480_0~Reference



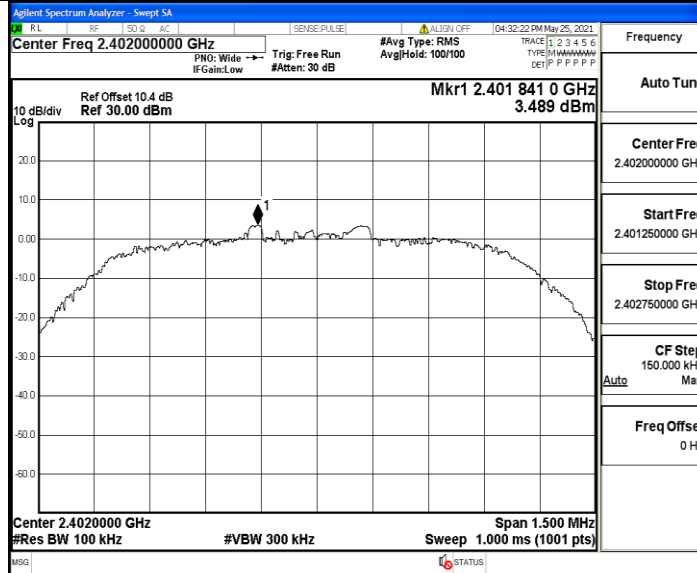
DH5_Ant1_2480_30~1000



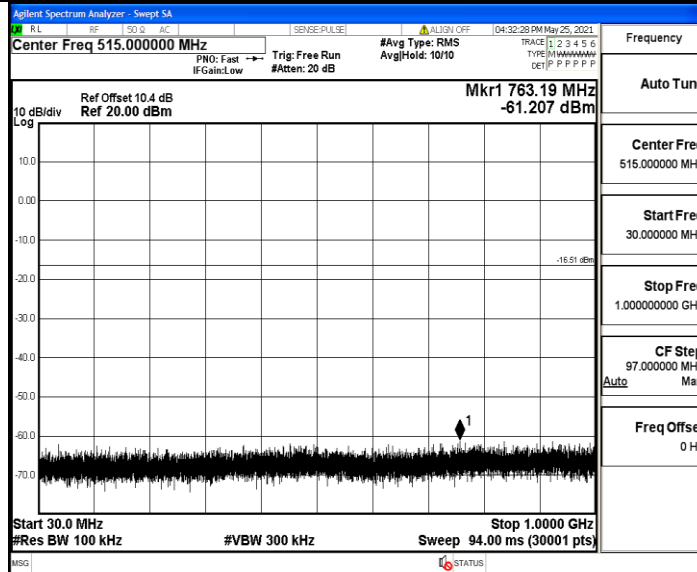
DH5_Ant1_2480_1000~26500



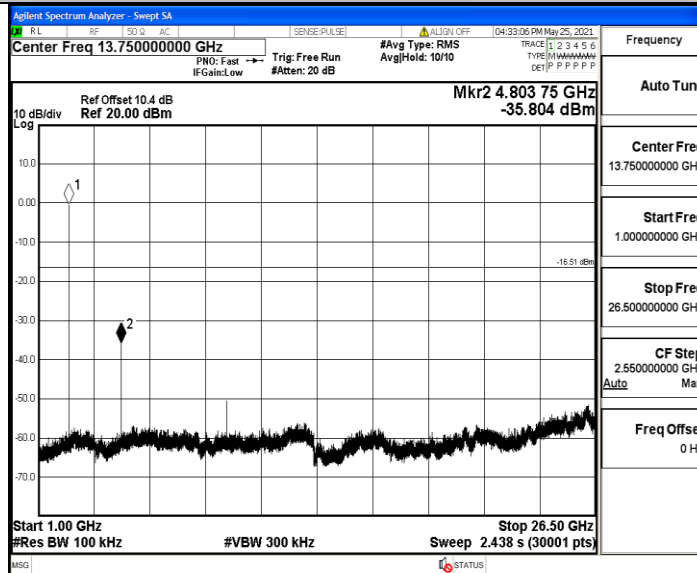
2DH5_Ant1_2402_0~Reference



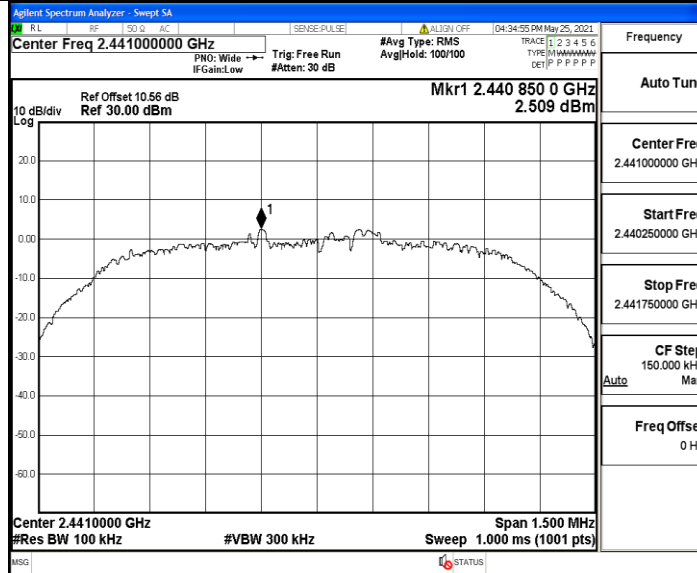
2DH5_Ant1_2402_30~1000



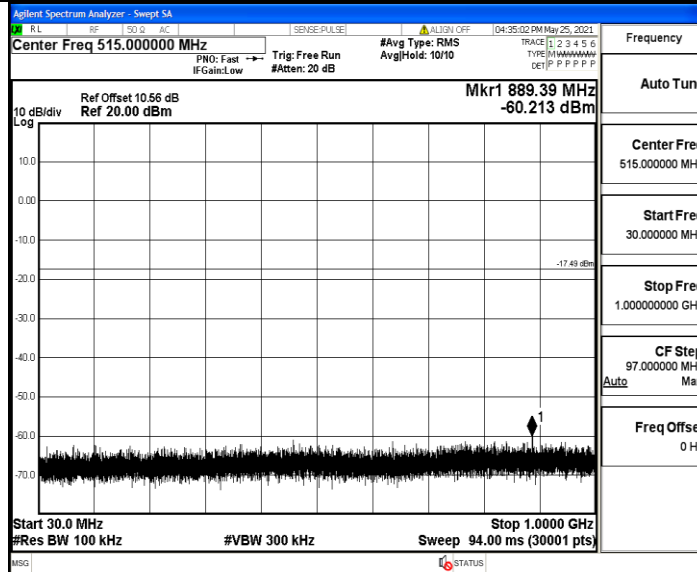
2DH5_Ant1_2402_1000~26500



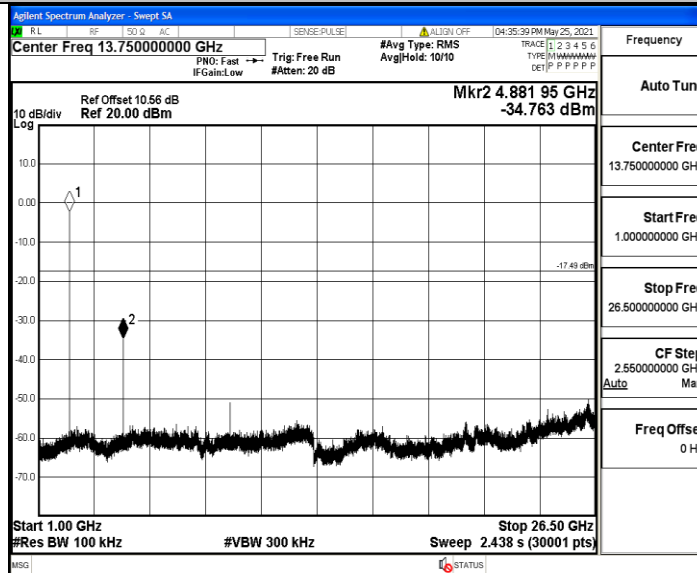
2DH5_Ant1_2441_0~Reference



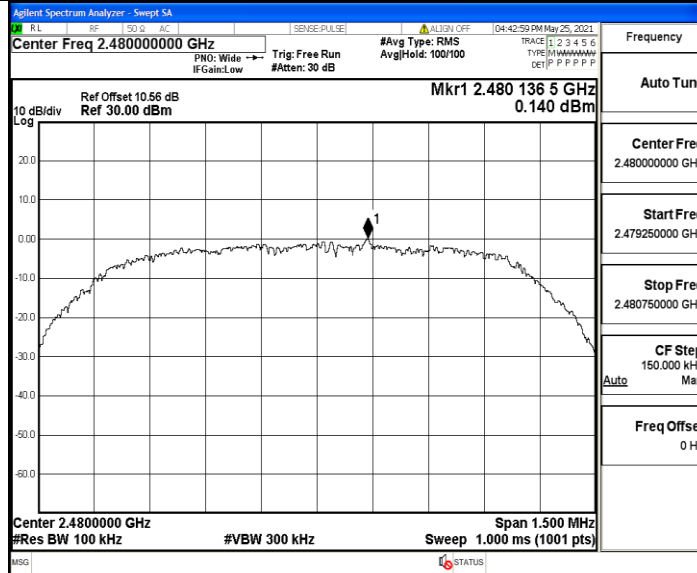
2DH5_Ant1_2441_30~1000



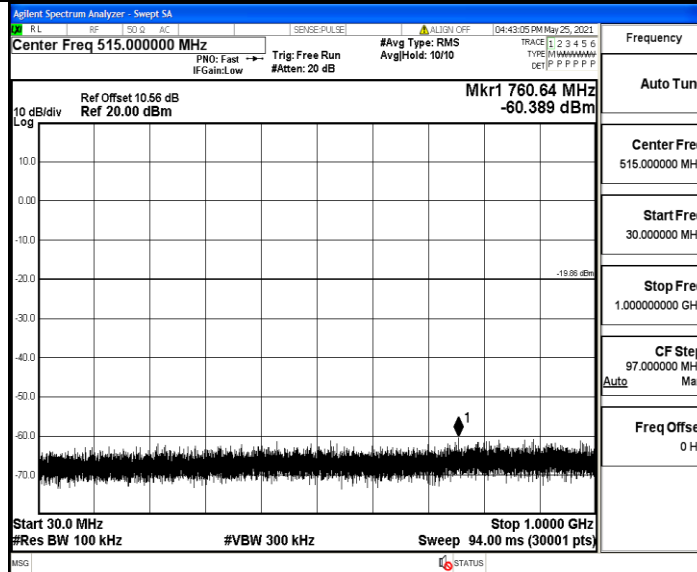
2DH5_Ant1_2441_1000~26500



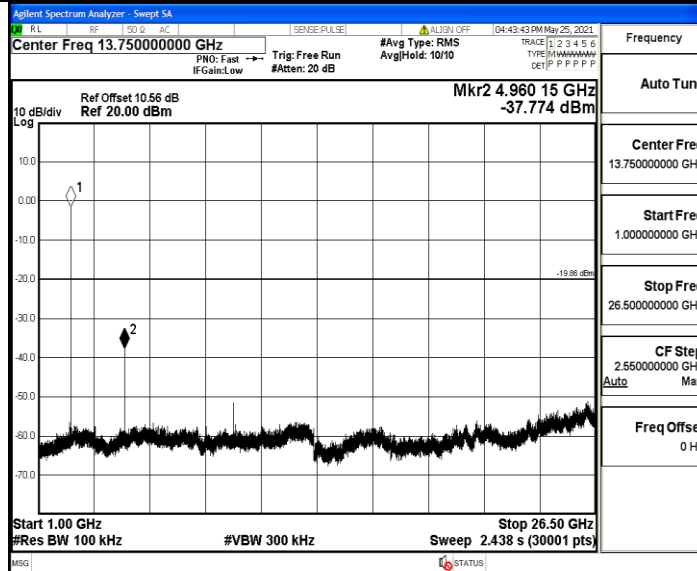
2DH5_Ant1_2480_0~Reference



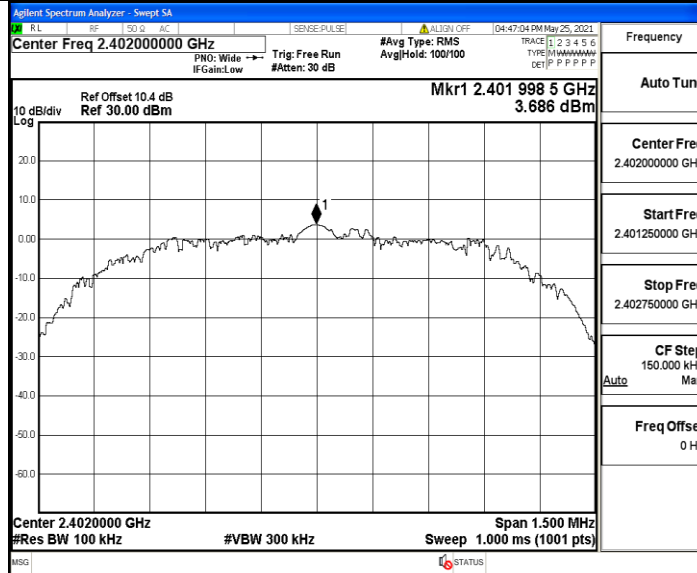
2DH5_Ant1_2480_30~1000



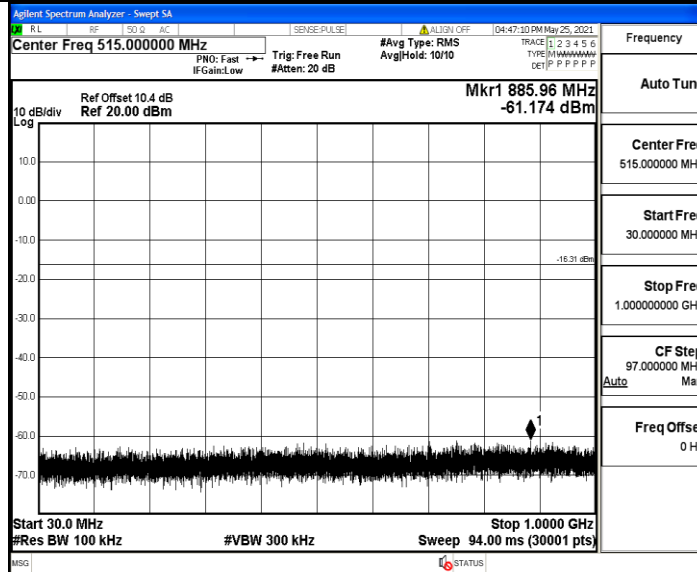
2DH5_Ant1_2480_1000~26500



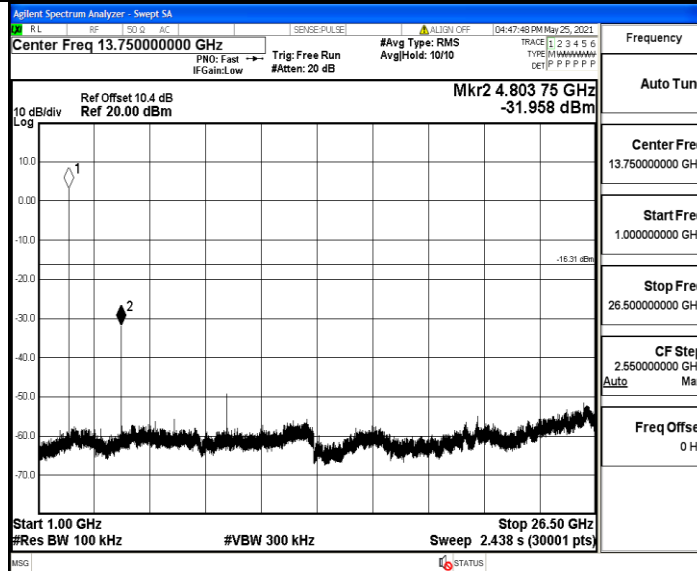
3DH5_Ant1_2402_0~Reference



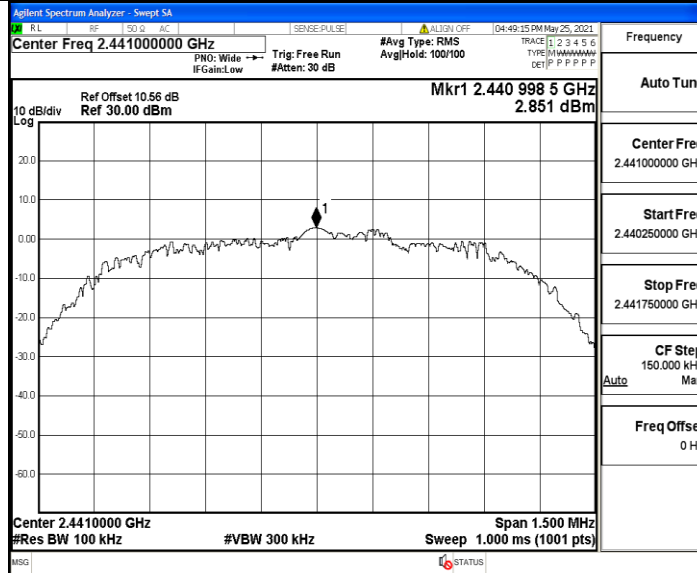
3DH5_Ant1_2402_30~1000



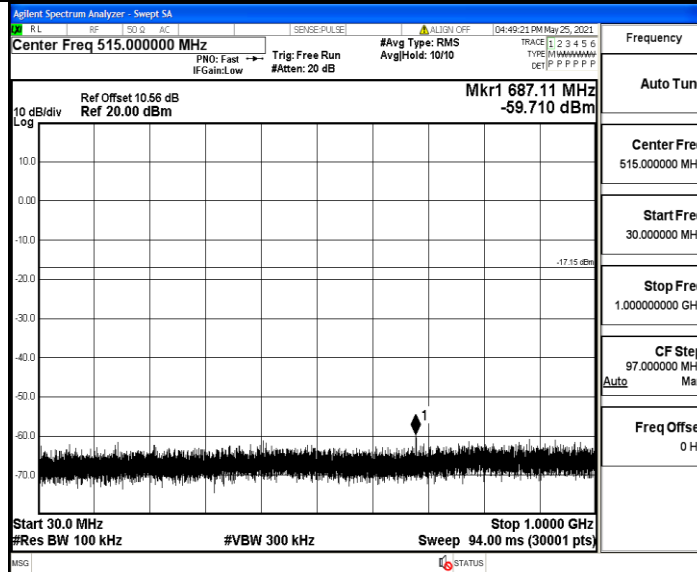
3DH5_Ant1_2402_1000~26500



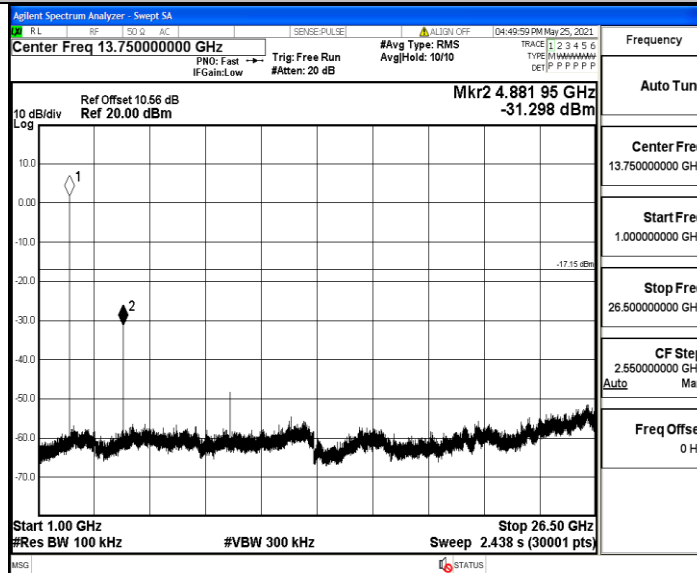
3DH5_Ant1_2441_0~Reference



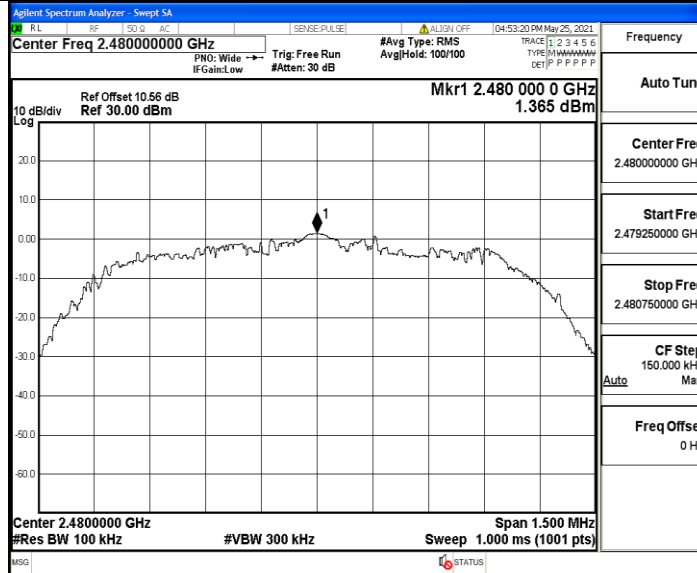
3DH5_Ant1_2441_30~1000



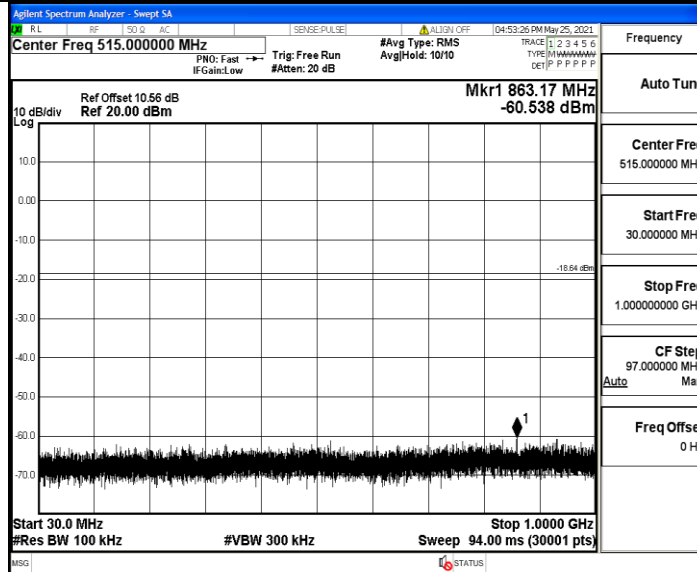
3DH5_Ant1_2441_1000~26500



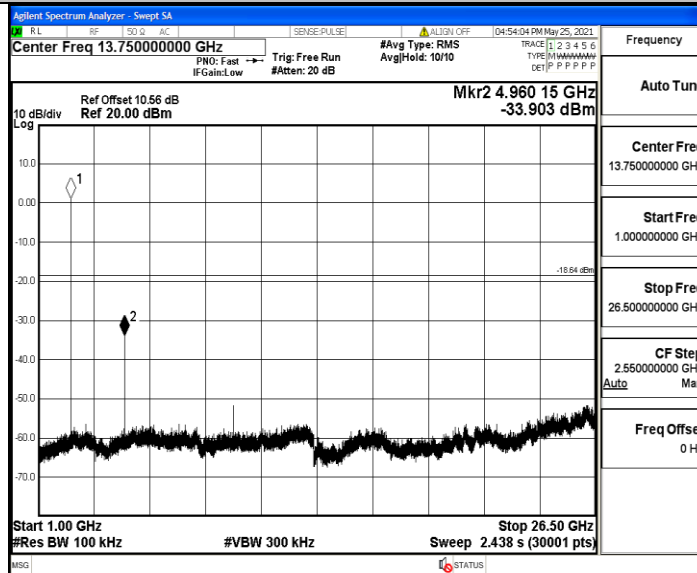
3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500



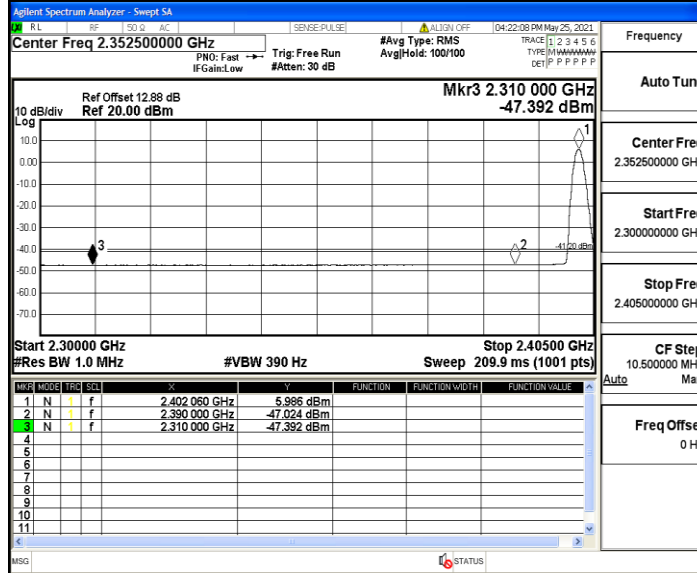
A.8 Restrict-band band-edge measurements

TestMode	Antenna	ChName	Channel	Detector	Freq(MHz)	Result (dBm)	Limit (dBm)	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-47.39	<=-41.20	PASS
				AV	2390.000	-47.02	<=-41.20	PASS
				Peak	2310.000	-40.36	<=-21.20	PASS
				Peak	2349.560	-36.71	<=-21.20	PASS
				Peak	2390.000	-40.02	<=-21.20	PASS
				Peak	2390.000	-40.02	<=-21.20	PASS
		High	2480	AV	2483.500	-46.3	<=-41.20	PASS
				AV	2497.280	-46.17	<=-41.20	PASS
				AV	2500.000	-46.44	<=-41.20	PASS
				Peak	2483.500	-39.87	<=-21.20	PASS
				Peak	2497.280	-37.33	<=-21.20	PASS
				Peak	2500.000	-40.6	<=-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-47.34	<=-41.20	PASS
				AV	2387.885	-46.99	<=-41.20	PASS
				AV	2390.000	-47.05	<=-41.20	PASS
				Peak	2310.000	-39.4	<=-21.20	PASS
				Peak	2329.820	-37.57	<=-21.20	PASS
				Peak	2390.000	-40.6	<=-21.20	PASS
		High	2480	AV	2483.500	-45.9	<=-41.20	PASS
				AV	2500.000	-46.42	<=-41.20	PASS
				Peak	2483.500	-39.7	<=-21.20	PASS
				Peak	2494.080	-35.53	<=-21.20	PASS
				Peak	2500.000	-38.68	<=-21.20	PASS
				Peak	2500.000	-38.68	<=-21.20	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-47.42	<=-41.20	PASS
				AV	2387.675	-46.95	<=-41.20	PASS
				AV	2390.000	-47.02	<=-41.20	PASS
				Peak	2310.000	-40.16	<=-21.20	PASS
				Peak	2361.740	-36.9	<=-21.20	PASS
				Peak	2390.000	-38.53	<=-21.20	PASS
		High	2480	AV	2483.500	-46.12	<=-41.20	PASS
				AV	2500.000	-46.39	<=-41.20	PASS
				Peak	2483.500	-39.66	<=-21.20	PASS
				Peak	2498.800	-36.98	<=-21.20	PASS
				Peak	2500.000	-39.89	<=-21.20	PASS
				Peak	2500.000	-39.89	<=-21.20	PASS

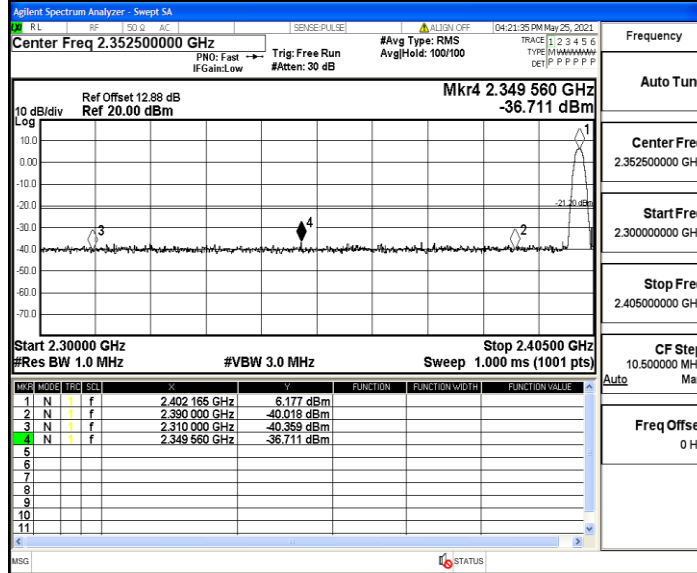
1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

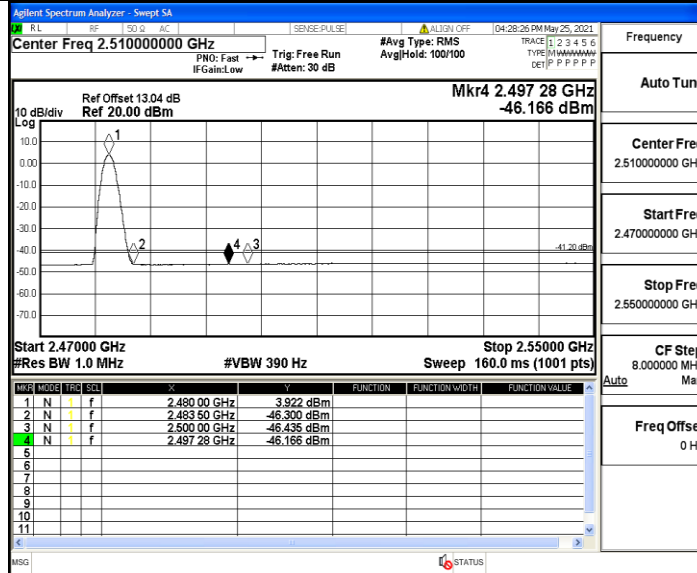
DH5_Ant1_Low_2402_AV



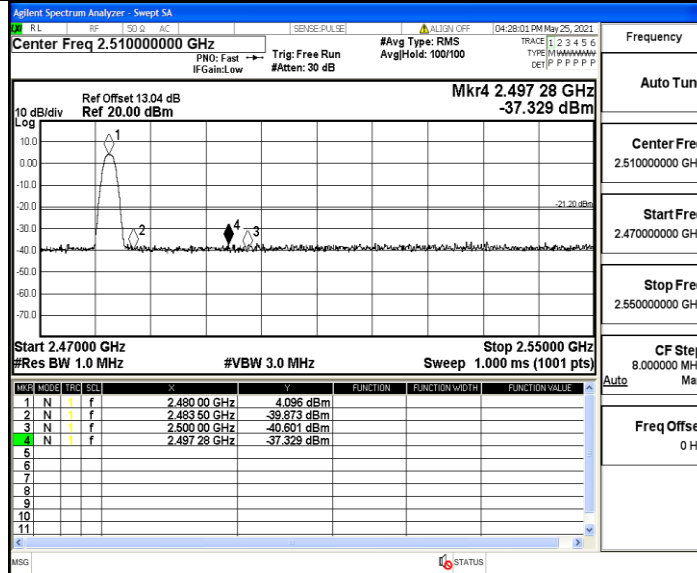
DH5_Ant1_Low_2402_Peak



DH5_Ant1_High_2480_AV

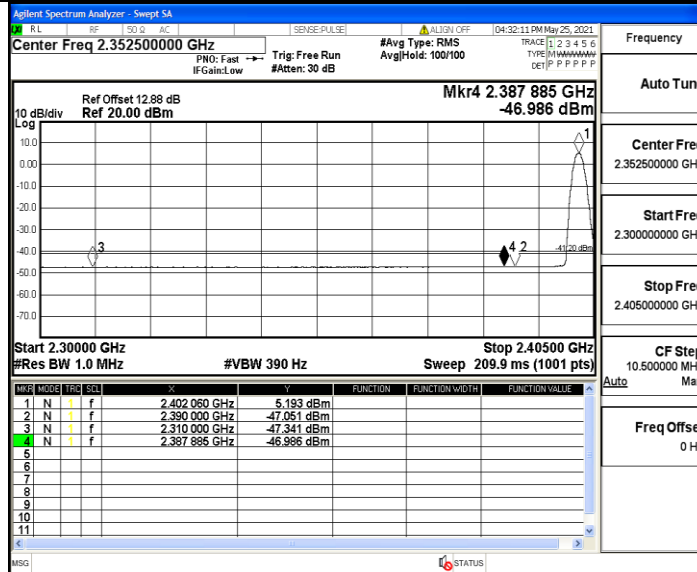


DH5_Ant1_High_2480_Peak



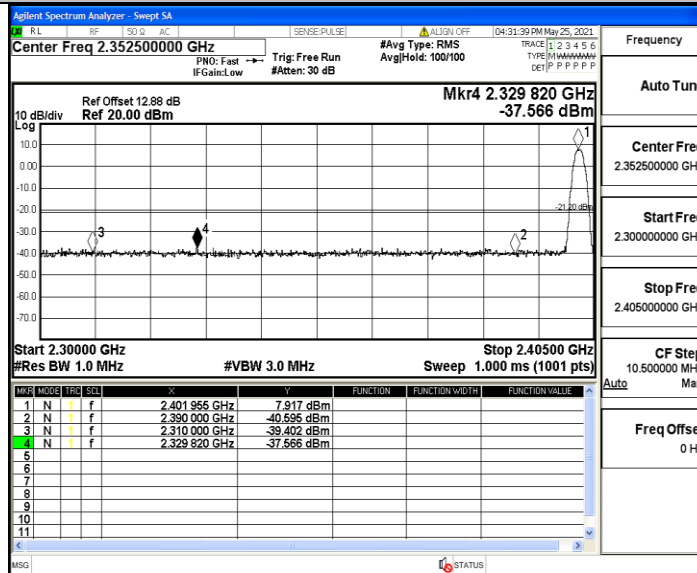
Frequency	Auto Tune
Center Freq	2.51000000 GHz
Start Freq	2.47000000 GHz
Stop Freq	2.55000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

2DH5_Ant1_Low_2402_AV



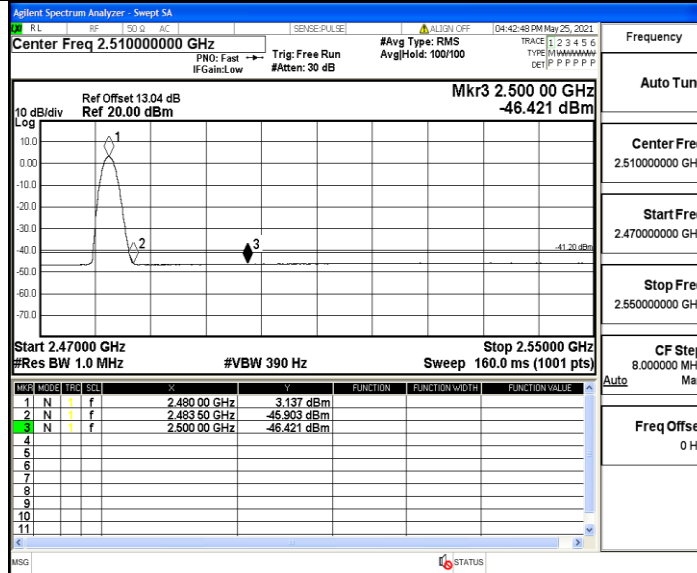
Frequency	Auto Tune
Center Freq	2.35250000 GHz
Start Freq	2.30000000 GHz
Stop Freq	2.40500000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

2DH5_Ant1_Low_2402_Peak

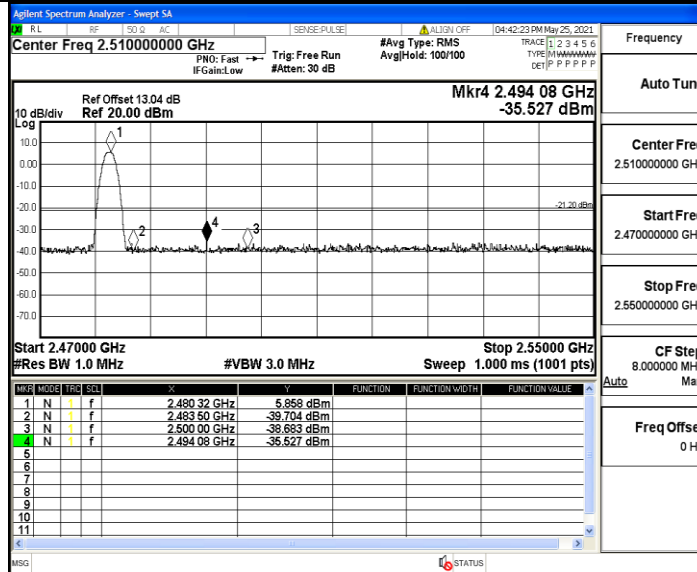


Frequency	Auto Tune
Center Freq	2.35250000 GHz
Start Freq	2.30000000 GHz
Stop Freq	2.40500000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

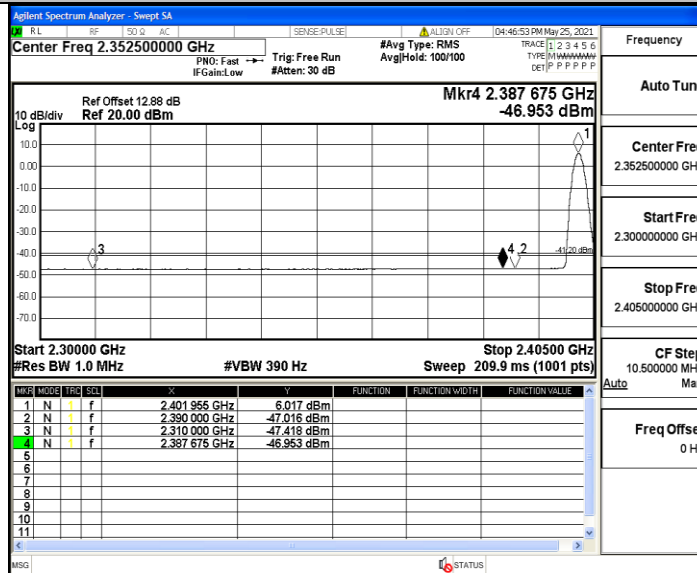
2DH5_Ant1_High_2480_AV



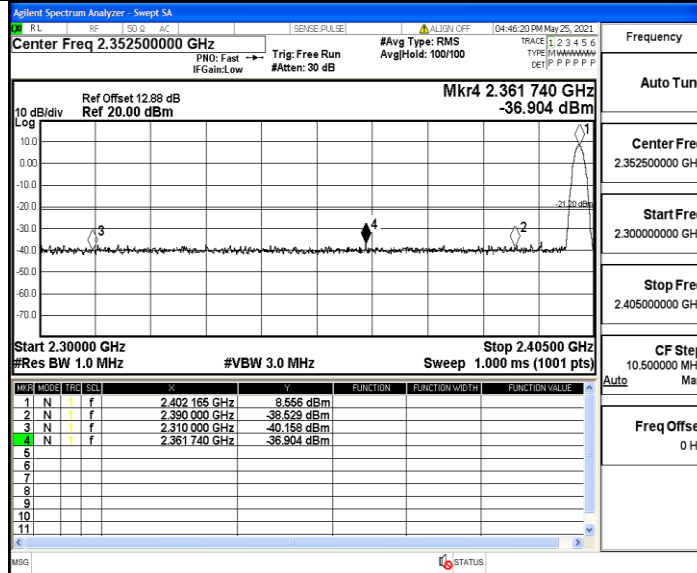
2DH5_Ant1_High_2480_Peak



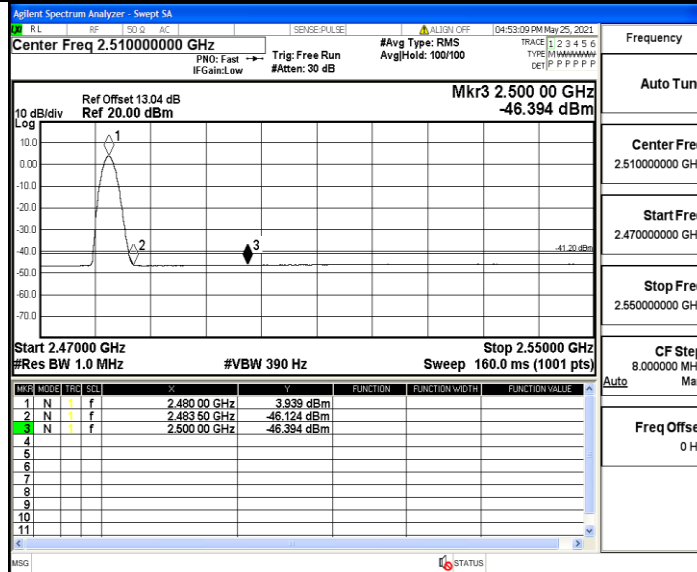
3DH5_Ant1_Low_2402_AV



3DH5_Ant1_Low_2402_Peak



3DH5_Ant1_High_2480_AV



3DH5_Ant1_High_2480_Peak

