

## Appendix A

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

Product Name: Hi-Res Audio Media Player

Trade Mark: Alpine

Test Model: HDS-990

FCC ID: 2A38M-HDS990

### Environmental Conditions

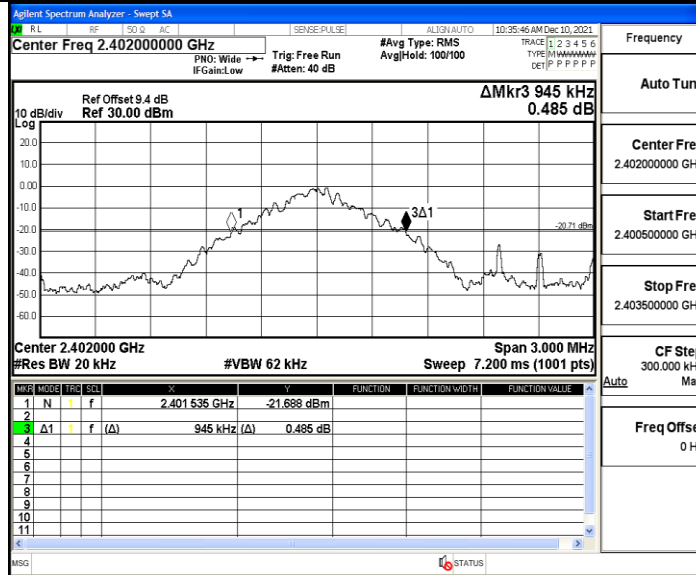
Temperature:	22.8° C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa
Test Engineer:	Nancy Li
Supervised by:	Hugo Chen

#### A.1 20 dB Bandwidth

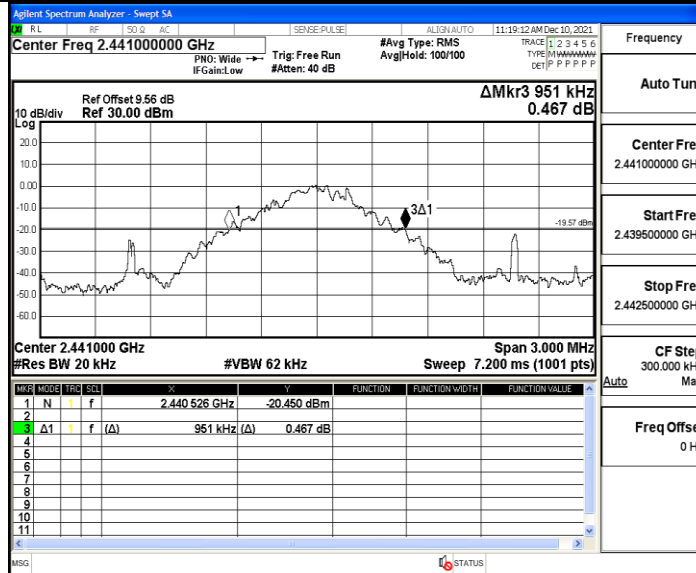
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.945	2401.535	2402.480	---	PASS
		2441	0.951	2440.526	2441.477	---	PASS
		2480	0.945	2479.529	2480.474	---	PASS
2DH5	Ant1	2402	1.251	2401.367	2402.618	---	PASS
		2441	1.290	2440.358	2441.648	---	PASS
		2480	1.233	2479.379	2480.612	---	PASS
3DH5	Ant1	2402	1.260	2401.361	2402.621	---	PASS
		2441	1.257	2440.361	2441.618	---	PASS
		2480	1.263	2479.358	2480.621	---	PASS

Test Graph

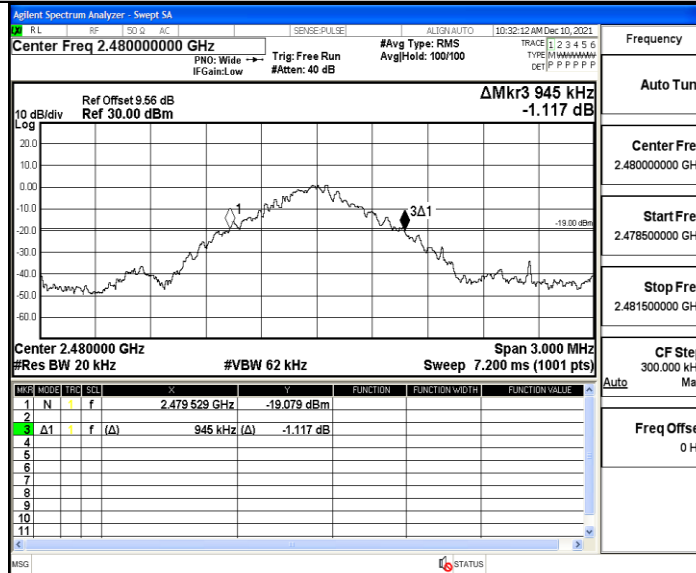
DH5\_Ant1\_2402



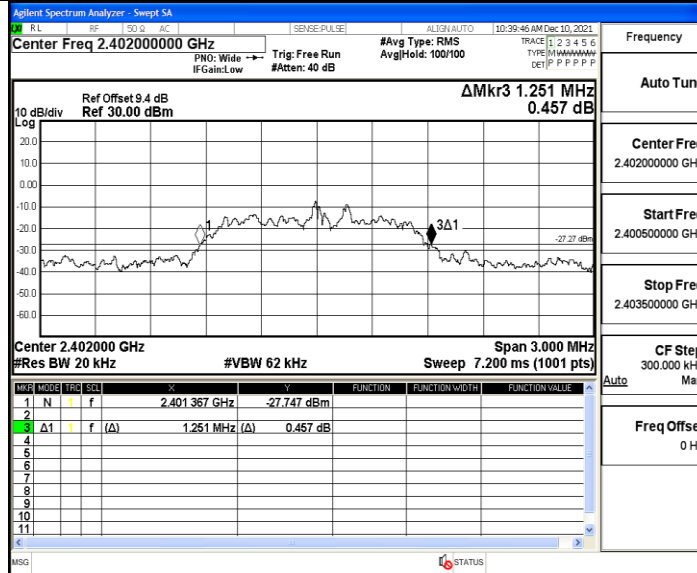
DH5\_Ant1\_2441



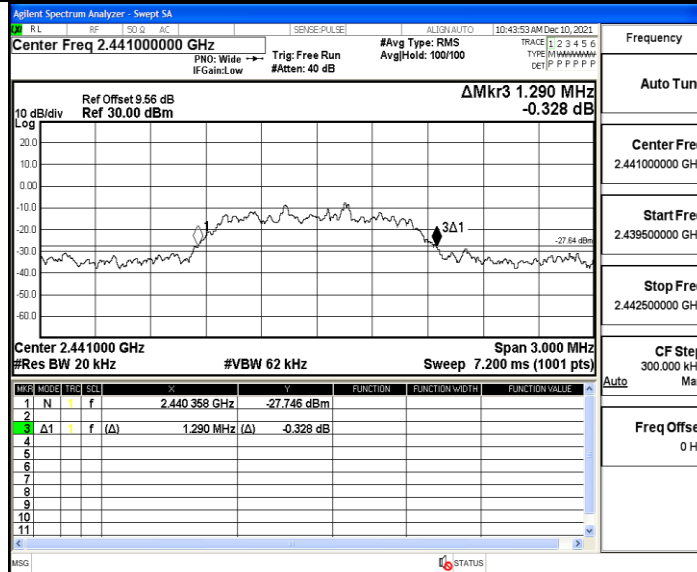
DH5\_Ant1\_2480



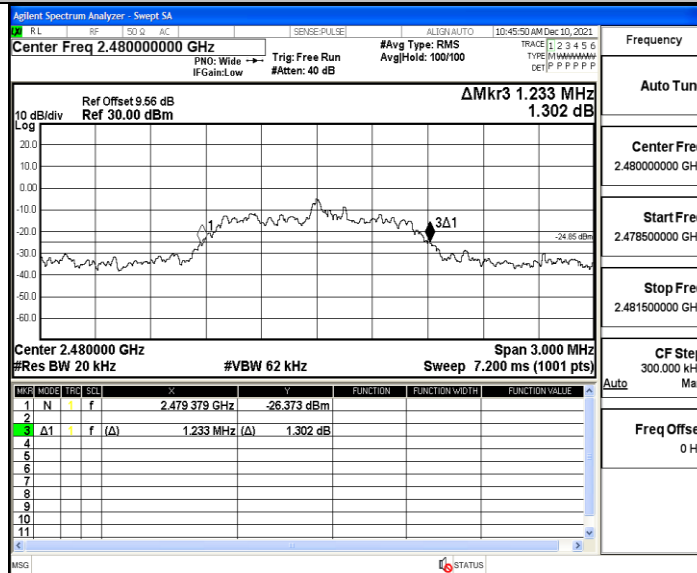
2DH5\_Ant1\_2402



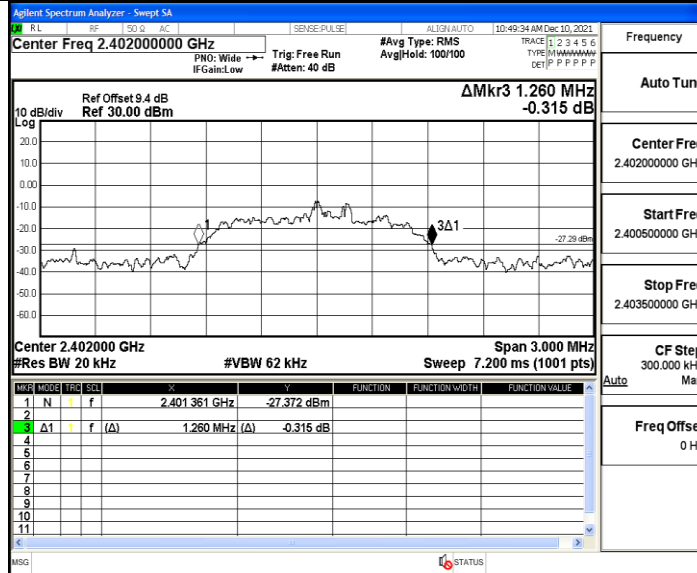
2DH5\_Ant1\_2441



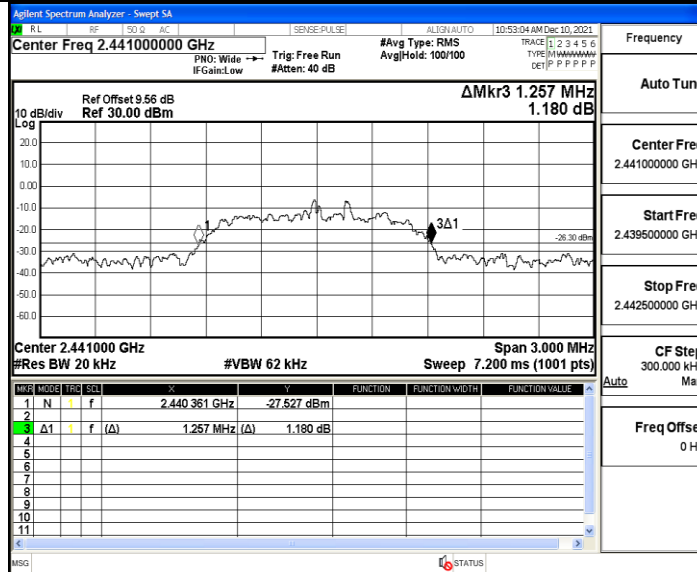
2DH5\_Ant1\_2480



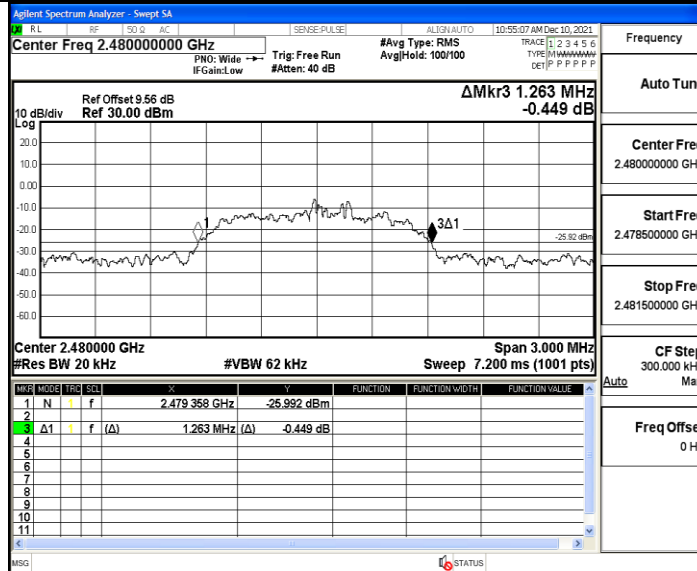
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480

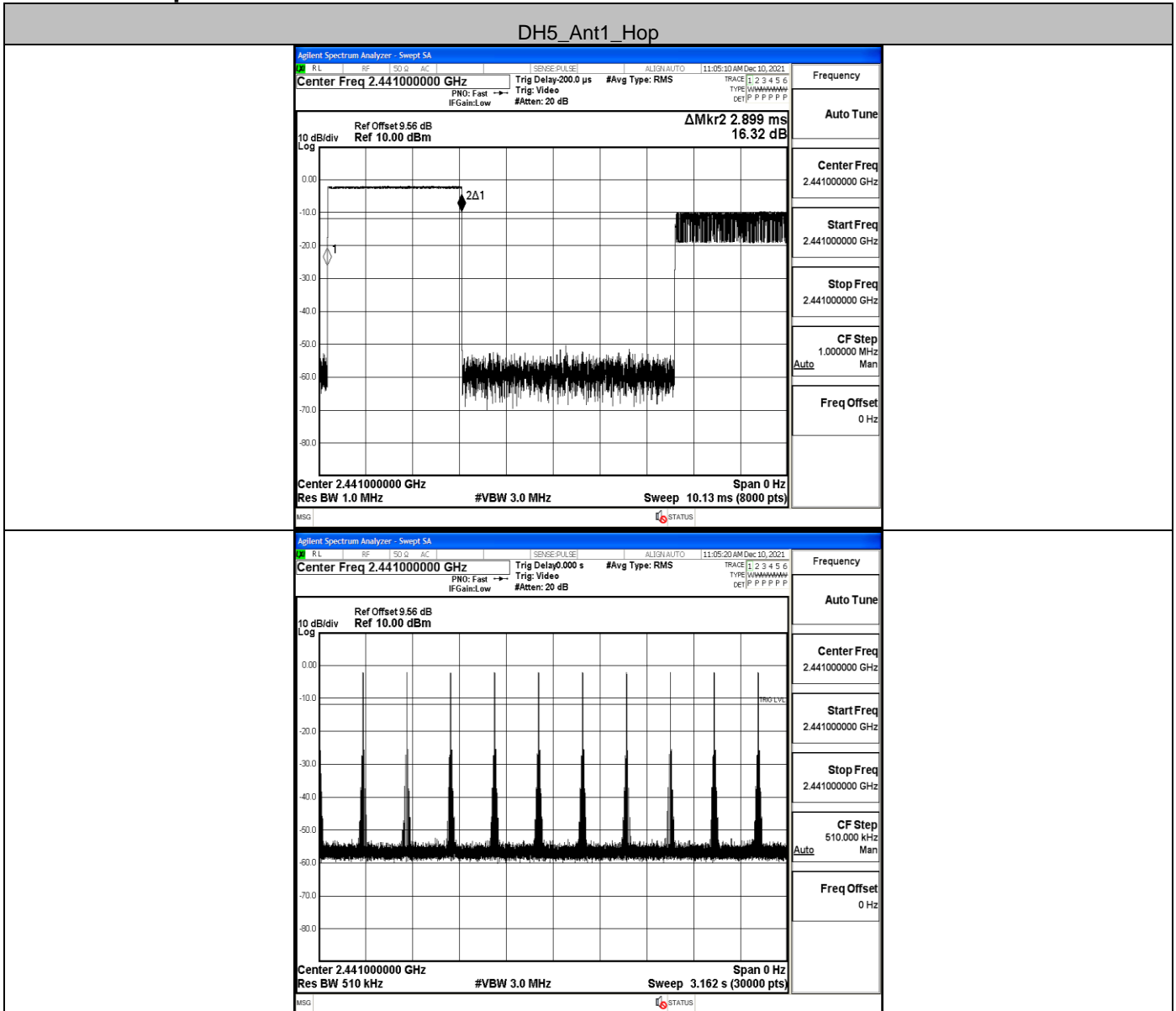


**A.2 Dwell Time**

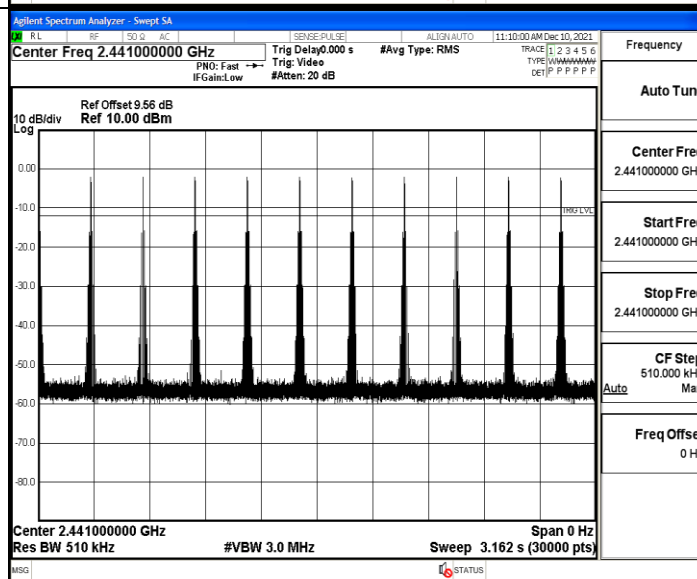
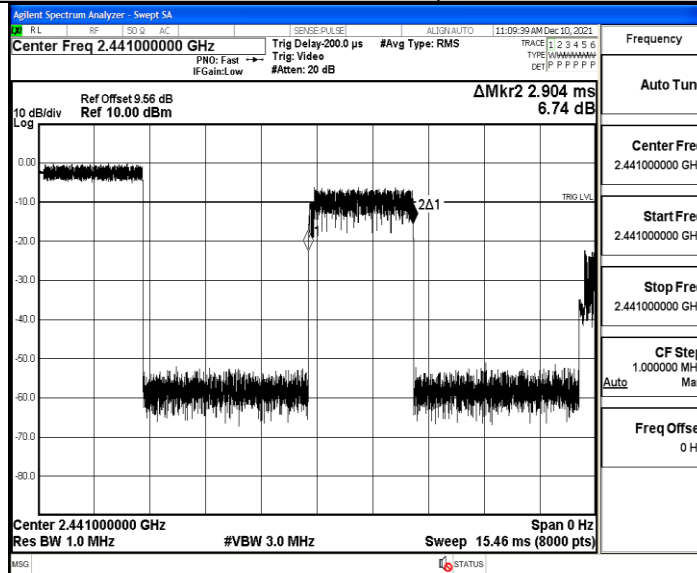
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.90	110	0.319	≤0.4	PASS
2DH5	Ant1	Hop	2.90	110	0.319	≤0.4	PASS
3DH5	Ant1	Hop	2.90	110	0.319	≤0.4	PASS

### Test Graph

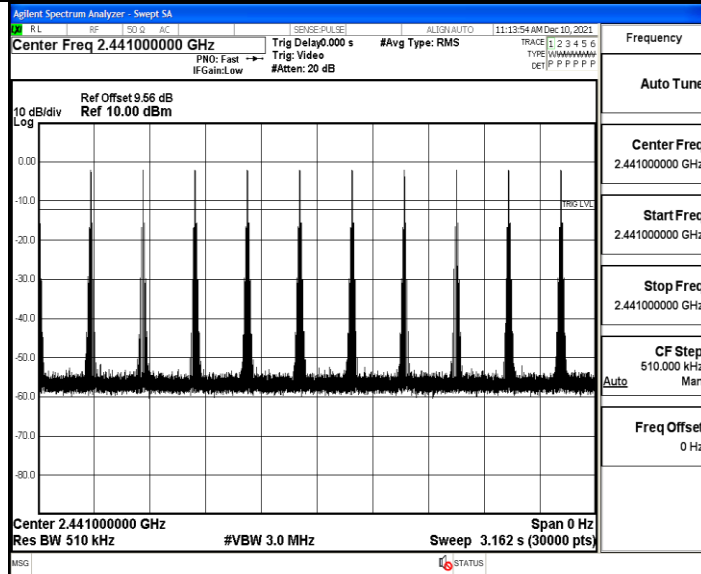
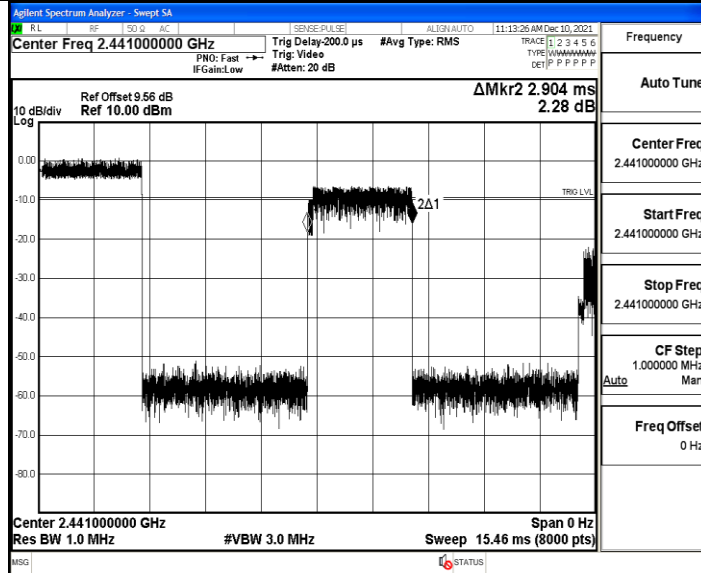
DH5\_Ant1\_Hop



2DH5\_Ant1\_Hop



3DH5\_Ant1\_Hop



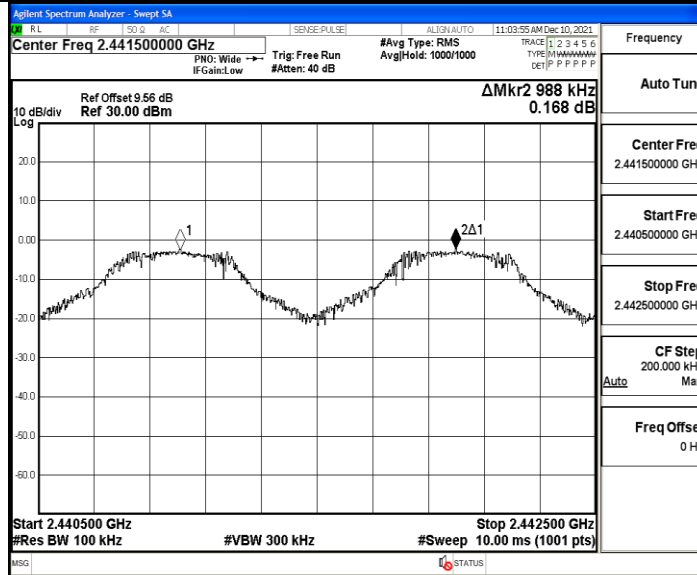


### A.3 Carrier Frequency Separation

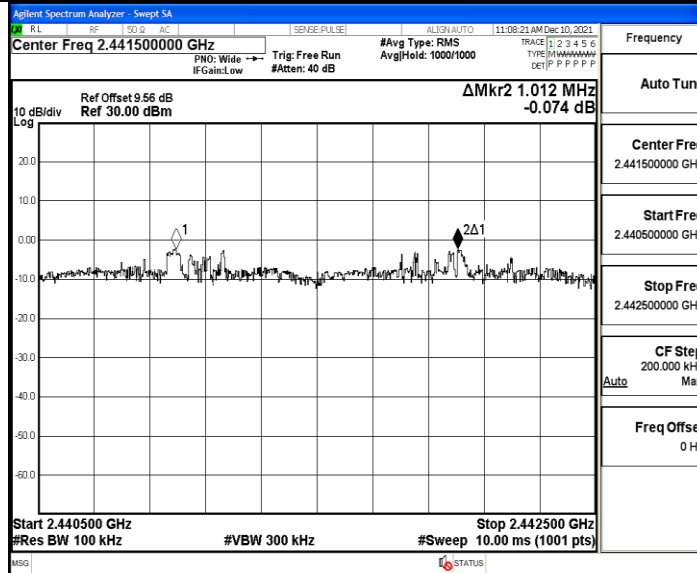
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.988	$\geq 0.945$	PASS
2DH5	Ant1	Hop	1.012	$\geq 0.860$	PASS
3DH5	Ant1	Hop	1.008	$\geq 0.842$	PASS

### Test Graph

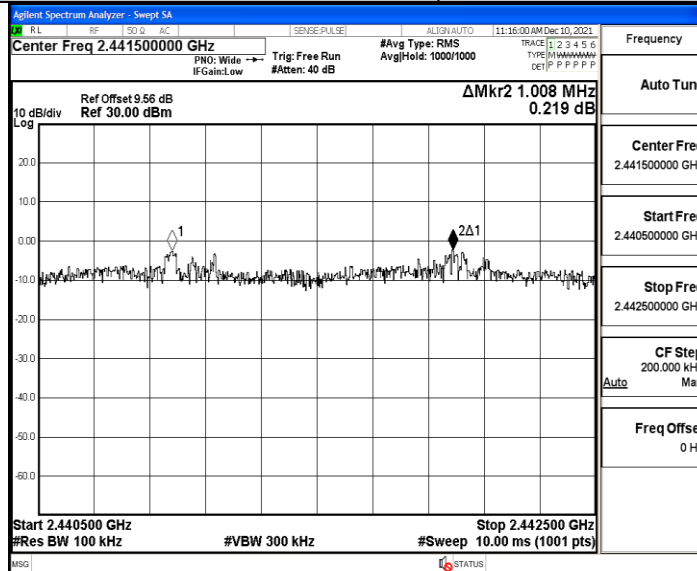
#### DH5\_Ant1\_Hop



#### 2DH5\_Ant1\_Hop



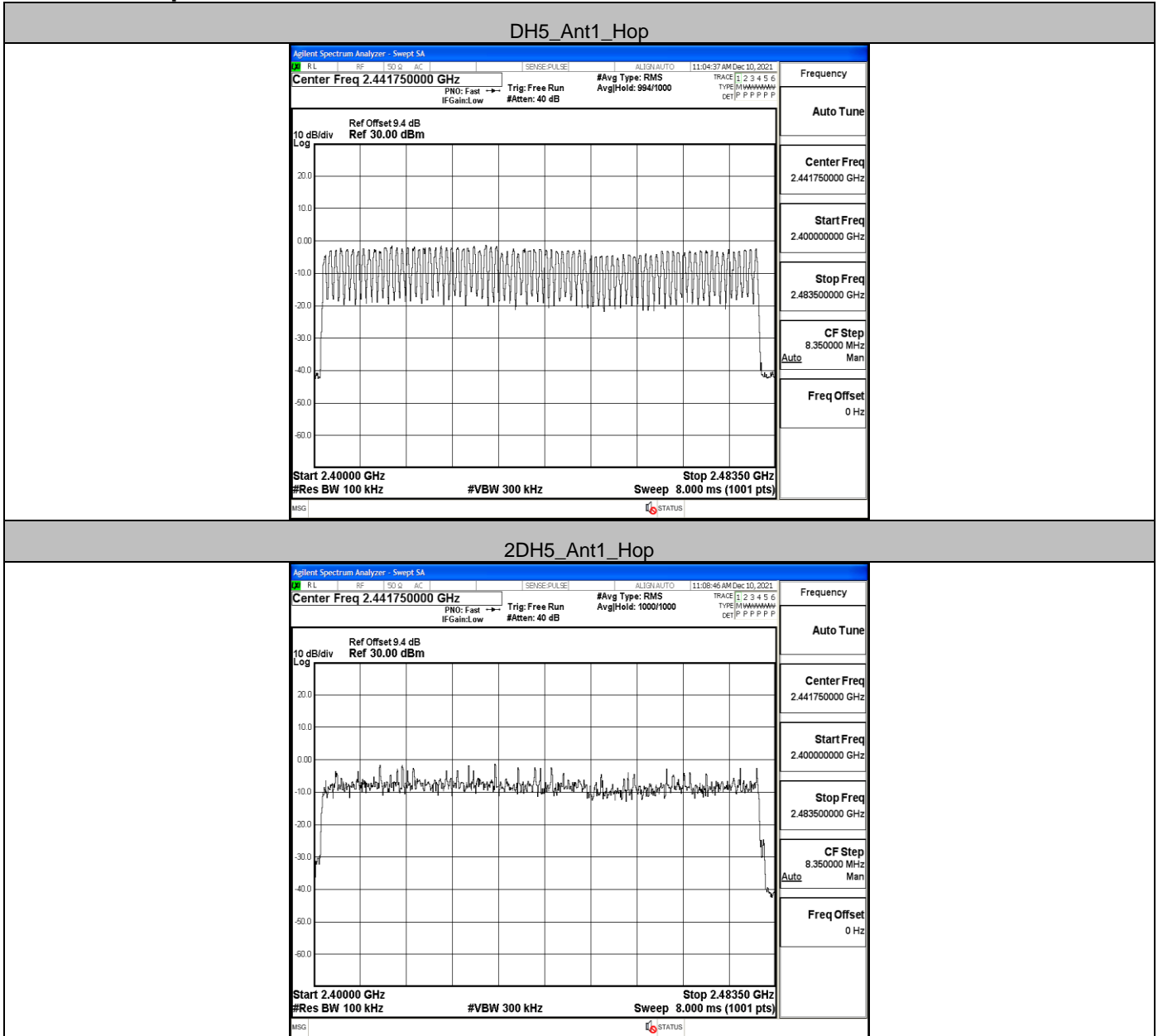
#### 3DH5\_Ant1\_Hop



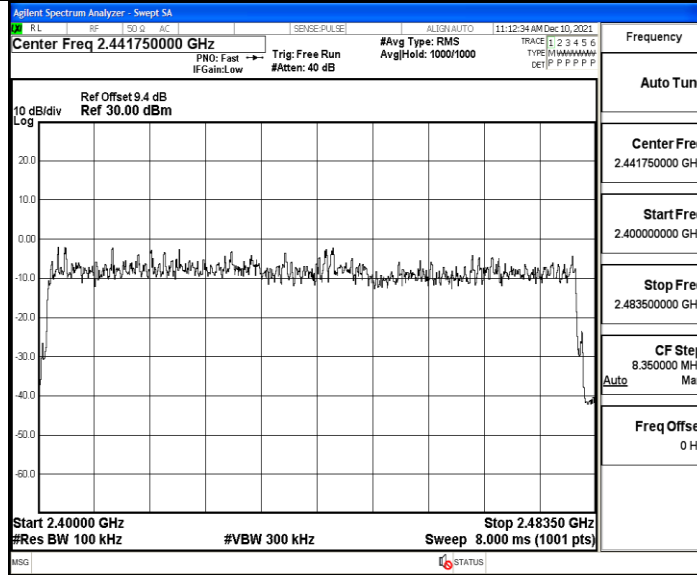
### A.4 Hopping Channel Number

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



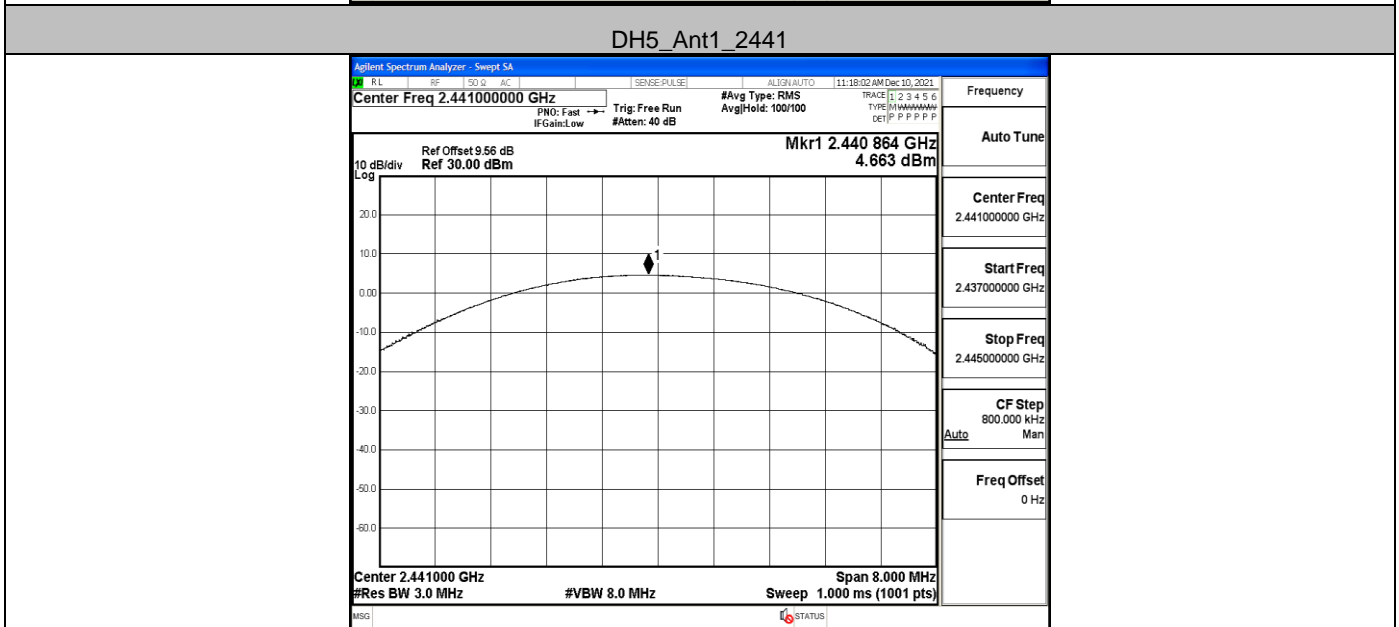
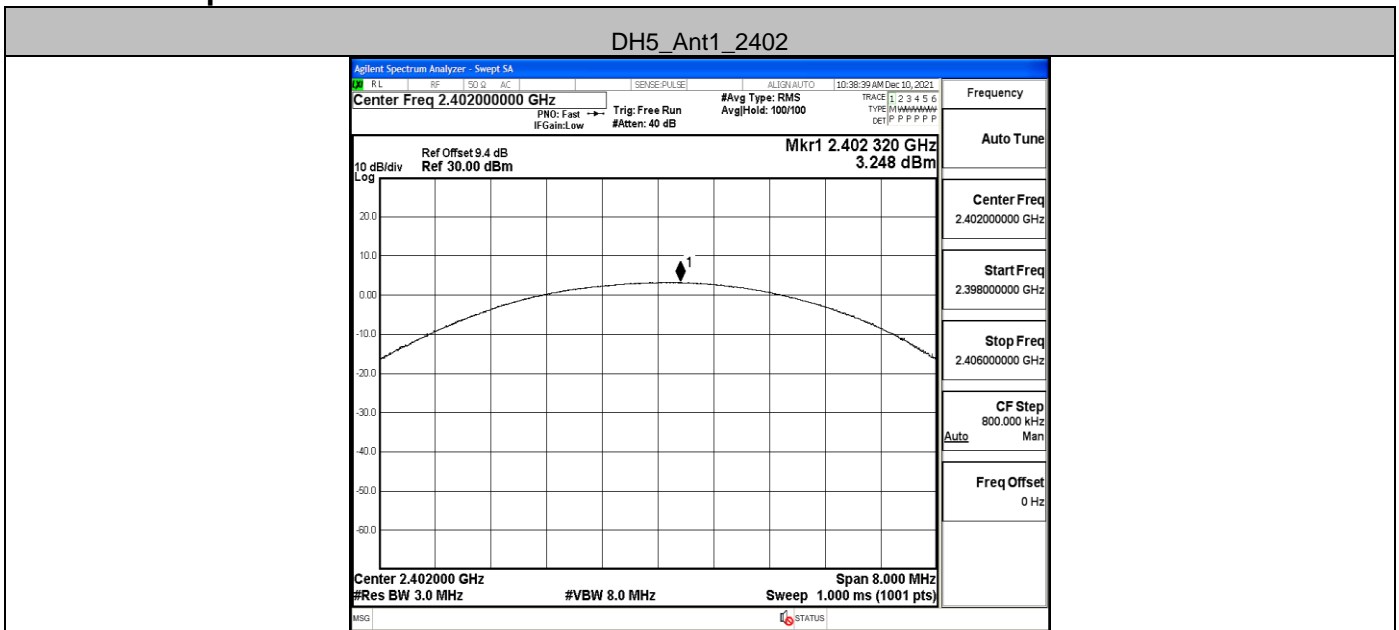
3DH5\_Ant1\_Hop



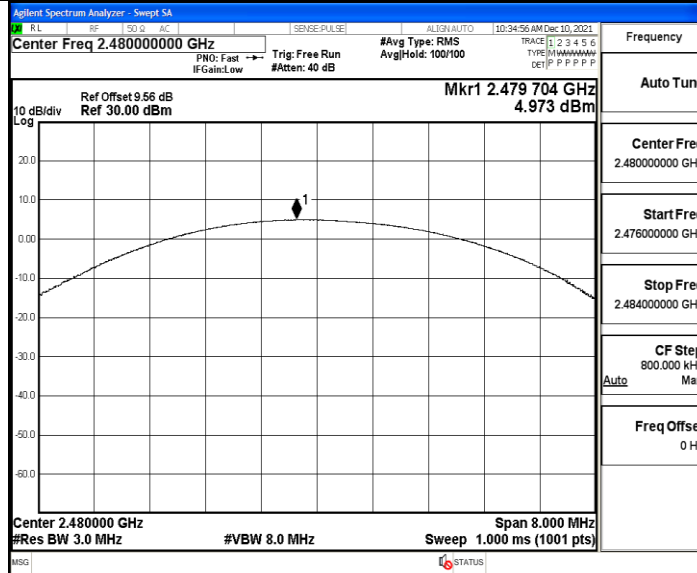
### A.5 Conducted Peak Output Power

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	3.25	≤30	PASS
		2441	4.66	≤30	PASS
		2480	4.97	≤30	PASS
2DH5	Ant1	2402	-0.82	≤20.97	PASS
		2441	0.77	≤20.97	PASS
		2480	1.02	≤20.97	PASS
3DH5	Ant1	2402	-0.11	≤20.97	PASS
		2441	1.48	≤20.97	PASS
		2480	1.76	≤20.97	PASS

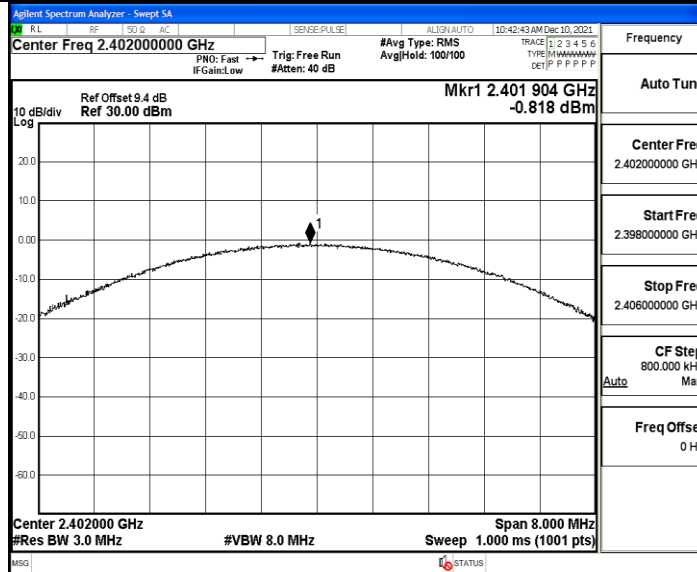
### Test Graph



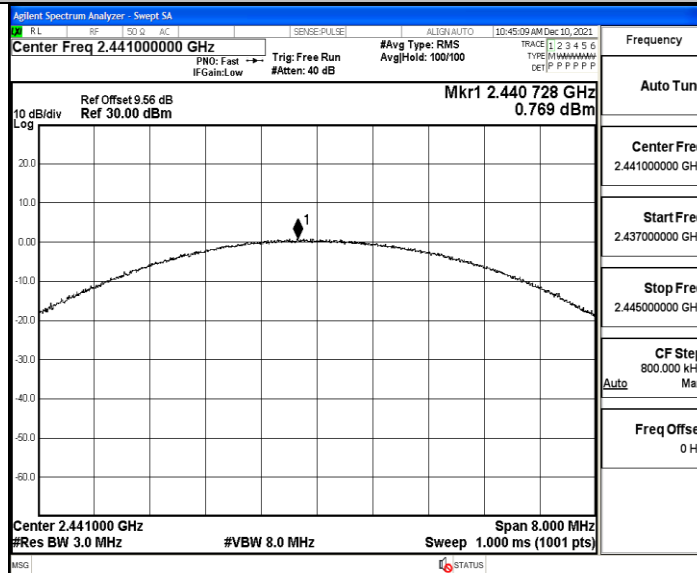
DH5\_Ant1\_2480



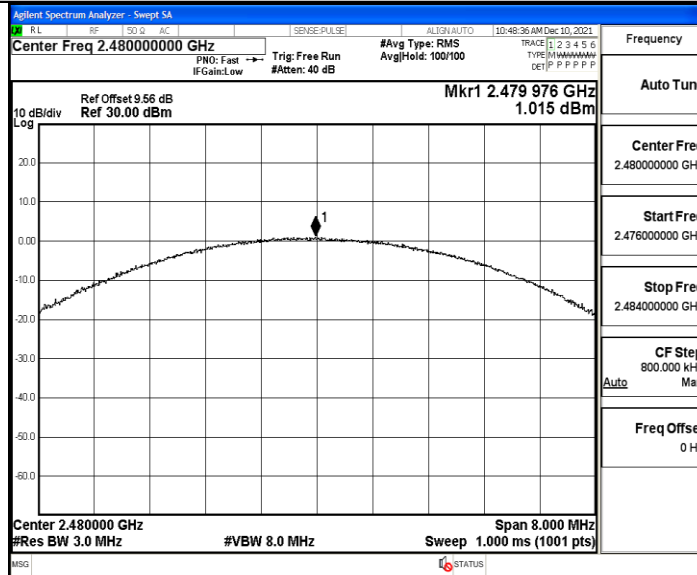
2DH5\_Ant1\_2402



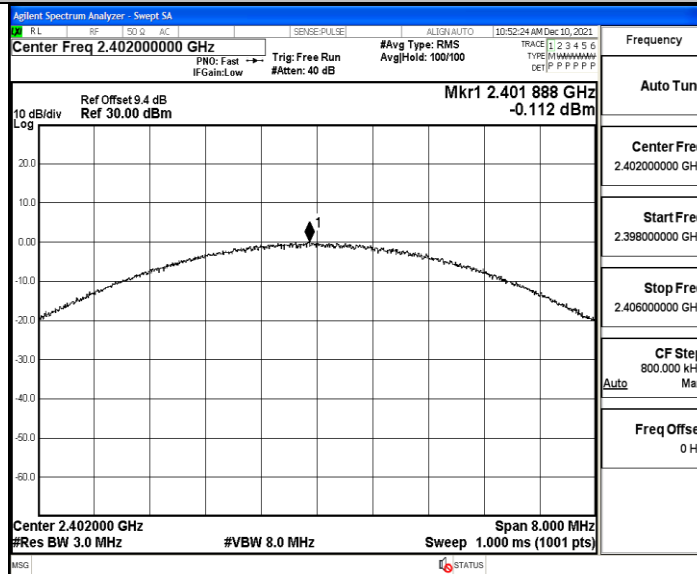
2DH5\_Ant1\_2441



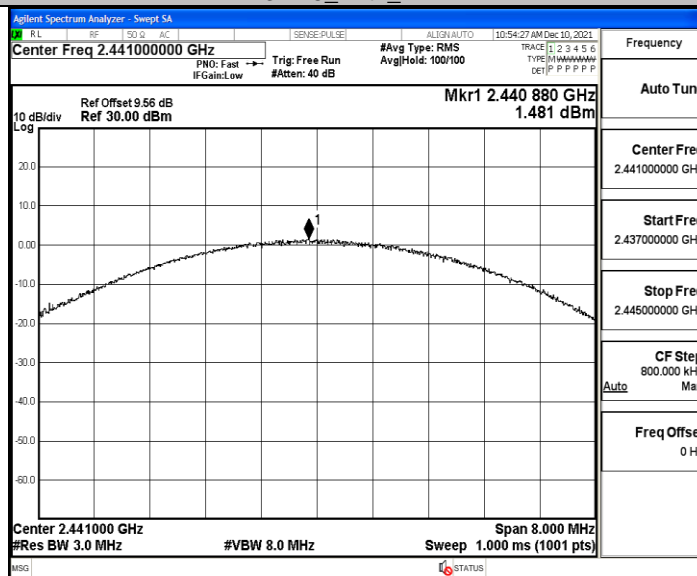
2DH5\_Ant1\_2480



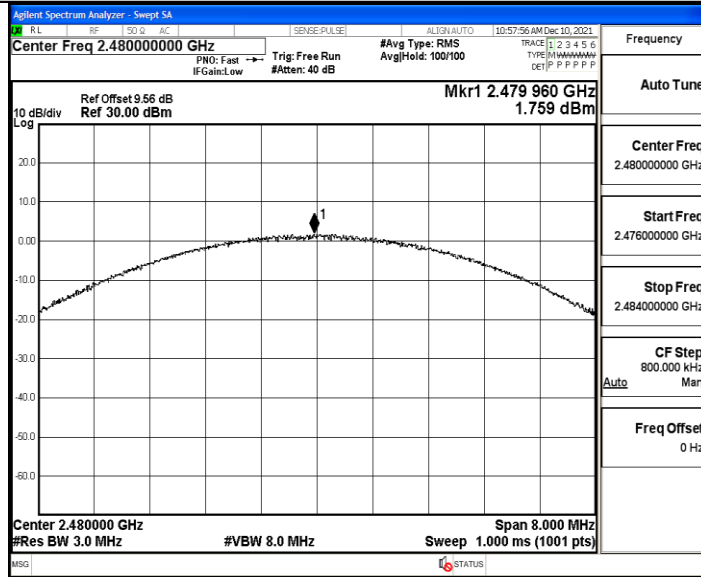
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480



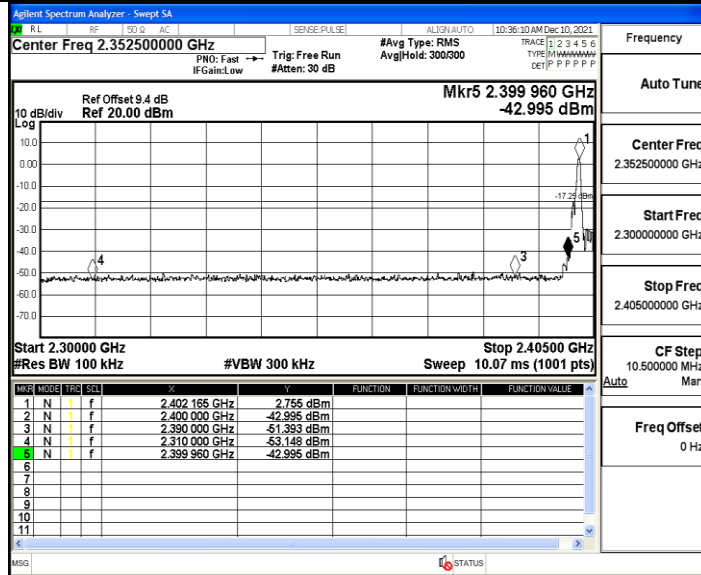


**A.6 Band-edge for RF Conducted Emissions**

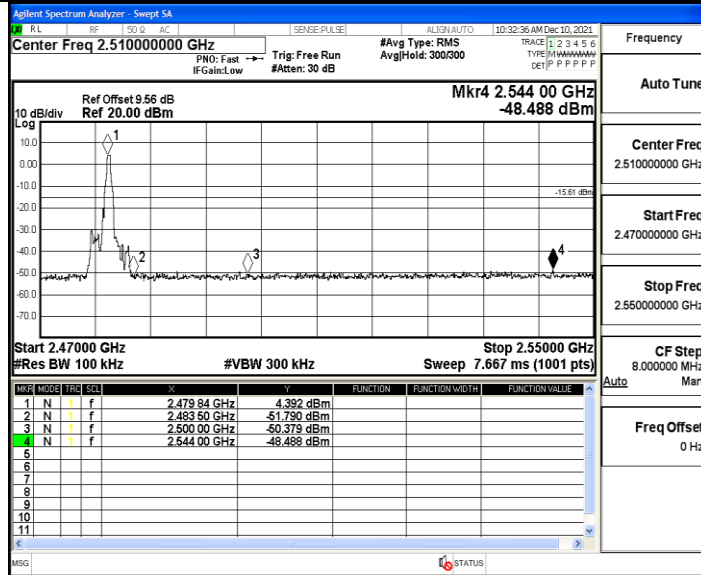
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	2.76	-43	≤-17.25	PASS
		High	2480	4.39	-48.49	≤-15.61	PASS
		Low	Hop_2402	-3.08	-50.01	≤-23.08	PASS
		High	Hop_2480	-2.72	-48.67	≤-22.72	PASS
2DH5	Ant1	Low	2402	-3.95	-40.36	≤-23.95	PASS
		High	2480	-2.01	-48.27	≤-22.01	PASS
		Low	Hop_2402	-6.33	-50.03	≤-26.33	PASS
		High	Hop_2480	-4.86	-49.23	≤-24.86	PASS
3DH5	Ant1	Low	2402	-3.83	-40.79	≤-23.83	PASS
		High	2480	-1.99	-48.37	≤-21.99	PASS
		Low	Hop_2402	-2.42	-49.93	≤-22.42	PASS
		High	Hop_2480	-4.53	-48.56	≤-24.53	PASS

Test Graph

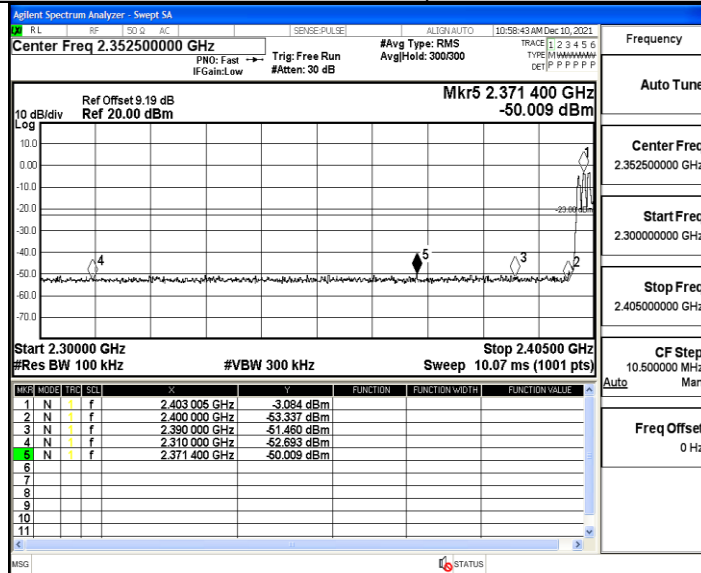
DH5\_Ant1\_Low\_2402



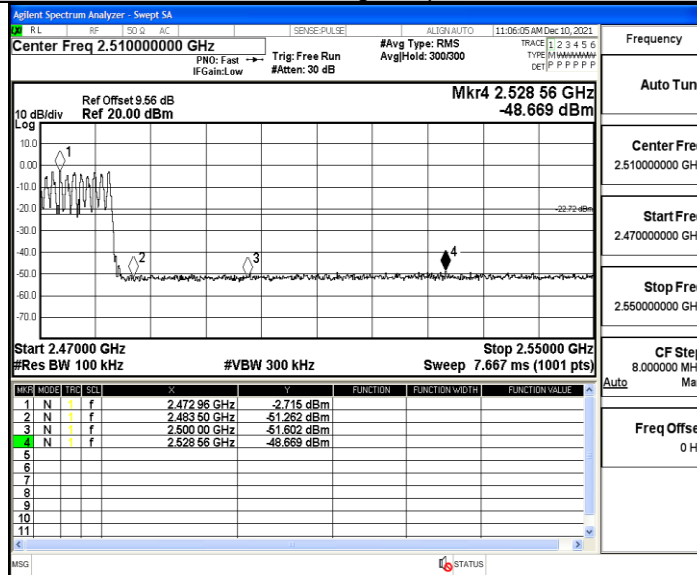
DH5\_Ant1\_High\_2480



DH5\_Ant1\_Low\_Hop\_2402

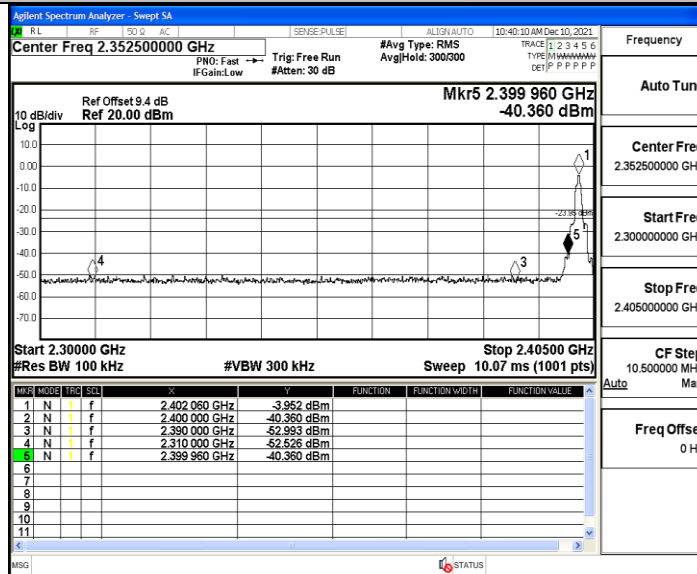


DH5\_Ant1\_High\_Hop\_2480



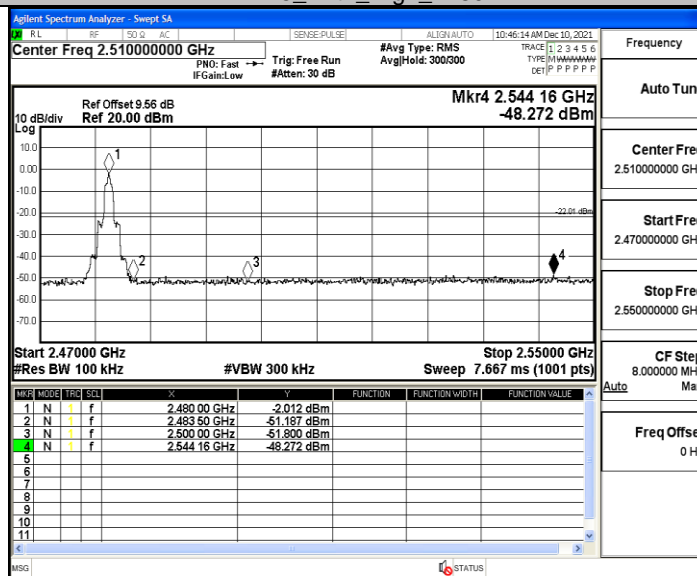
Frequency	Auto Tune
Center Freq	2.510000000 GHz
Start Freq	2.470000000 GHz
Stop Freq	2.550000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

2DH5\_Ant1\_Low\_2402



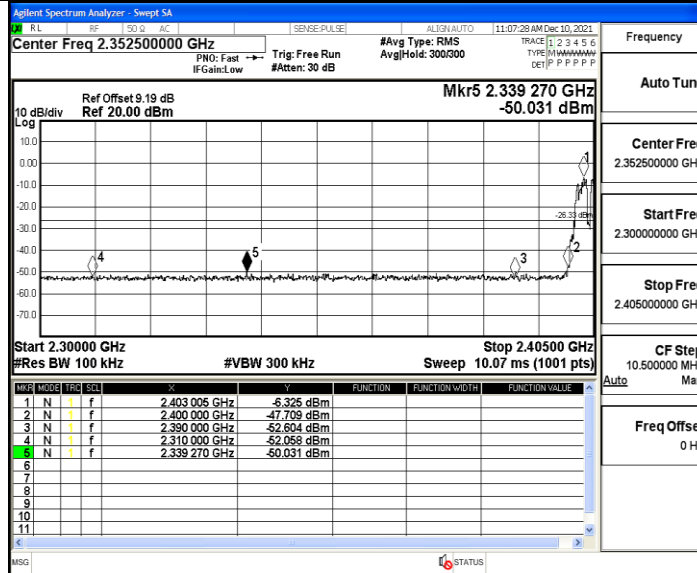
Frequency	Auto Tune
Center Freq	2.352500000 GHz
Start Freq	2.300000000 GHz
Stop Freq	2.405000000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

2DH5\_Ant1\_High\_2480

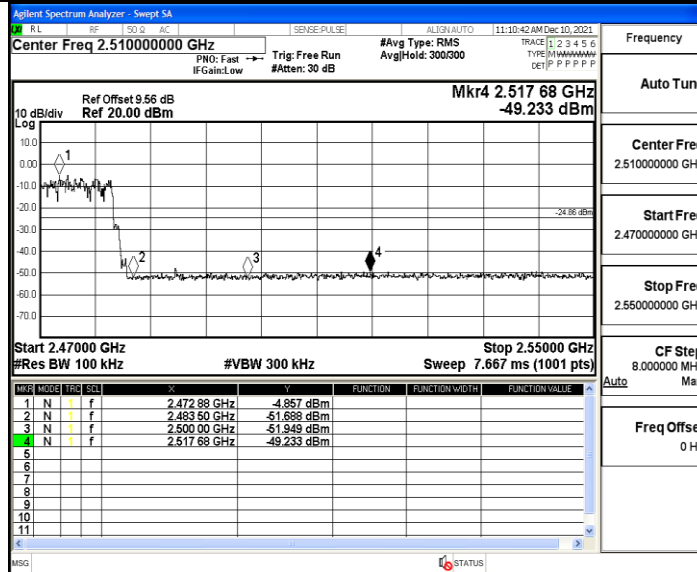


Frequency	Auto Tune
Center Freq	2.510000000 GHz
Start Freq	2.470000000 GHz
Stop Freq	2.550000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

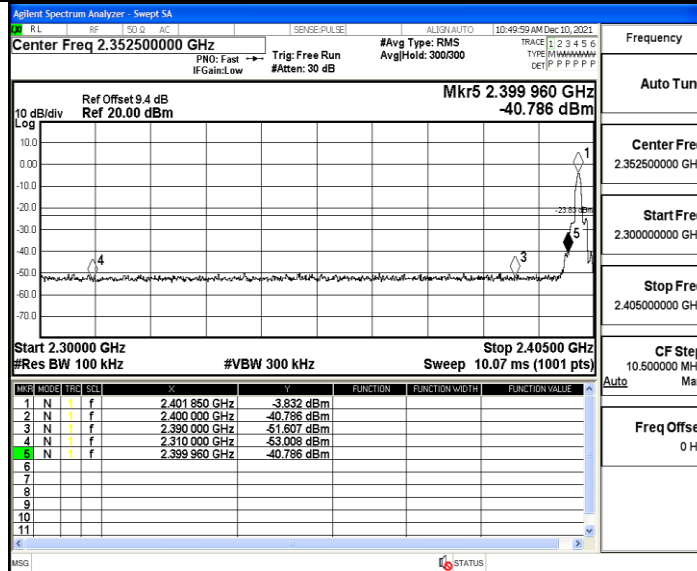
2DH5\_Ant1\_Low\_Hop\_2402



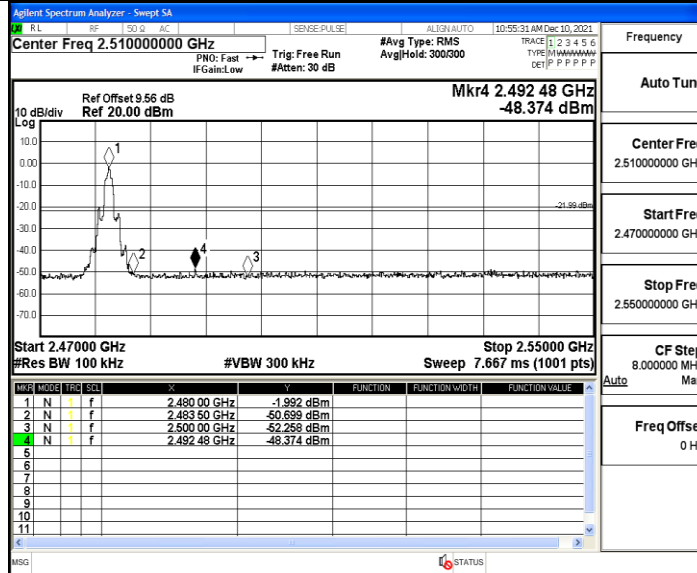
2DH5\_Ant1\_High\_Hop\_2480



3DH5\_Ant1\_Low\_2402

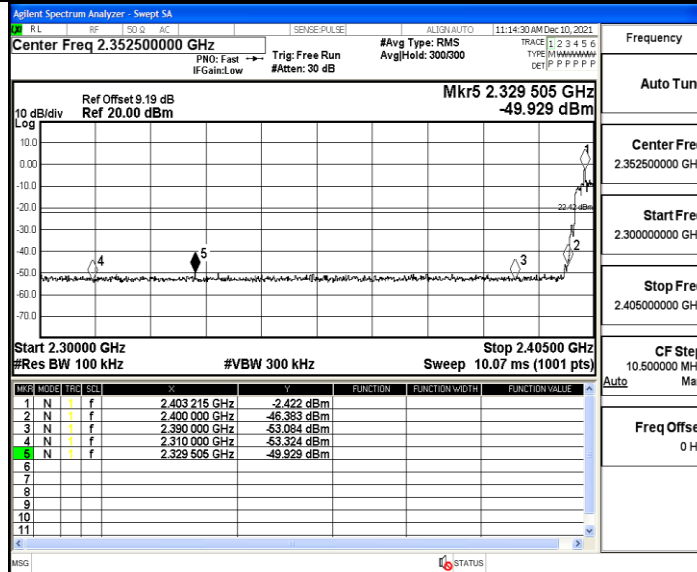


3DH5\_Ant1\_High\_2480



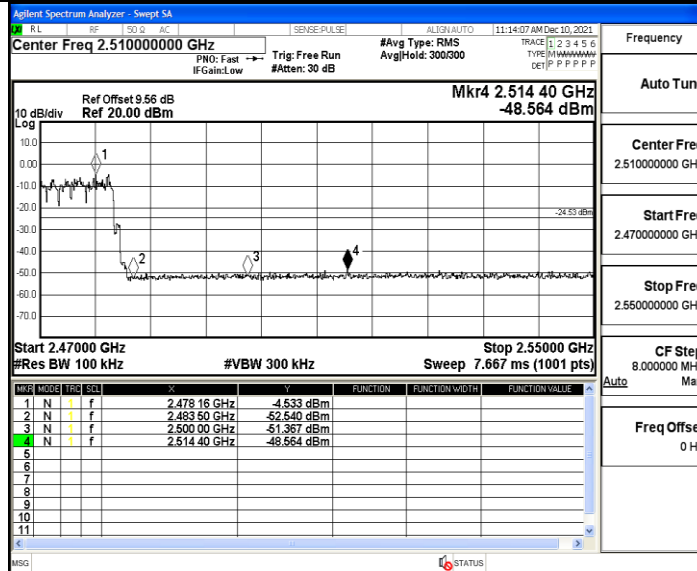
Frequency	Auto Tune
Center Freq	2.510000000 GHz
Start Freq	2.470000000 GHz
Stop Freq	2.550000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

3DH5\_Ant1\_Low\_Hop\_2402



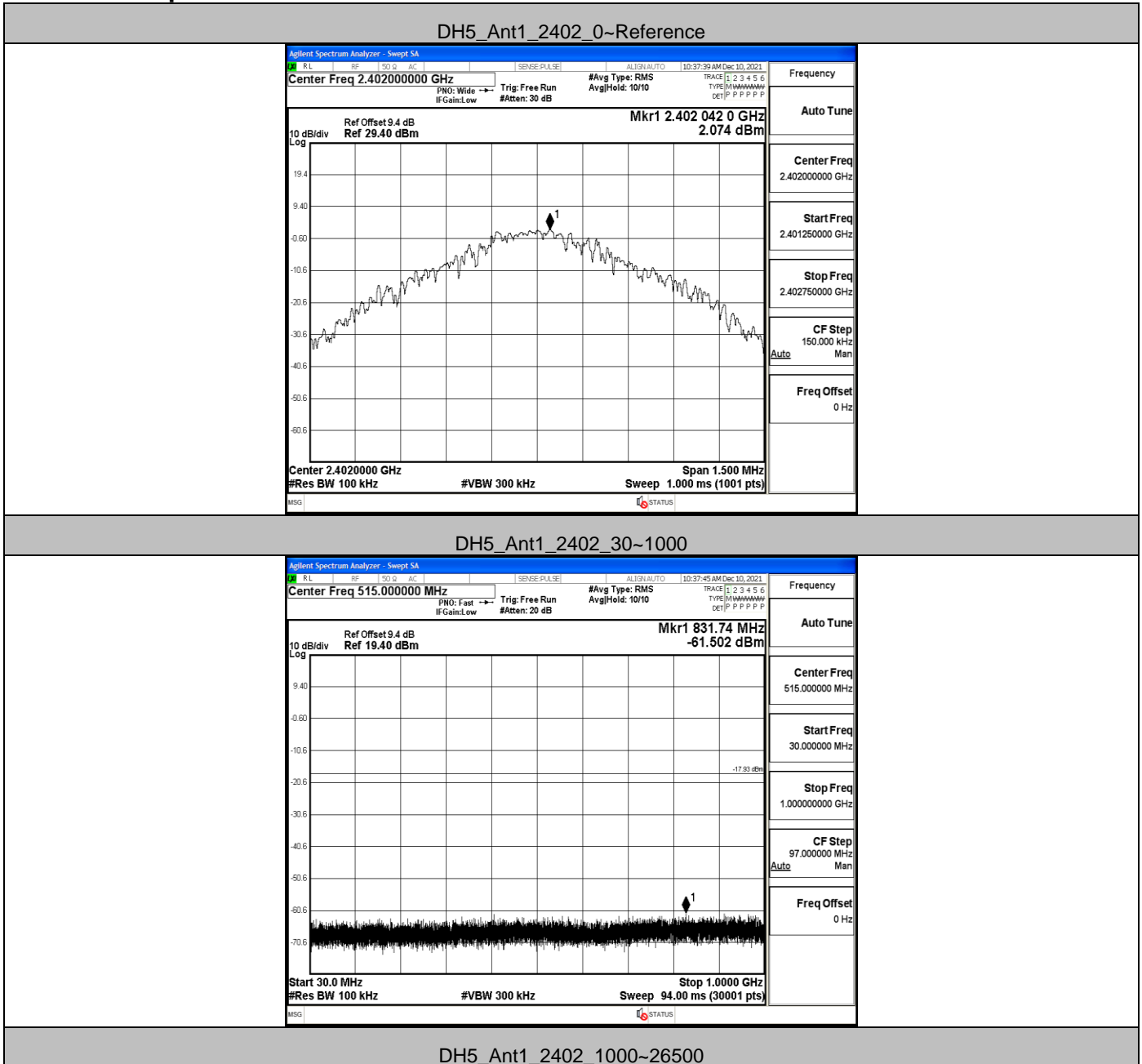
Frequency	Auto Tune
Center Freq	2.352500000 GHz
Start Freq	2.300000000 GHz
Stop Freq	2.405000000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

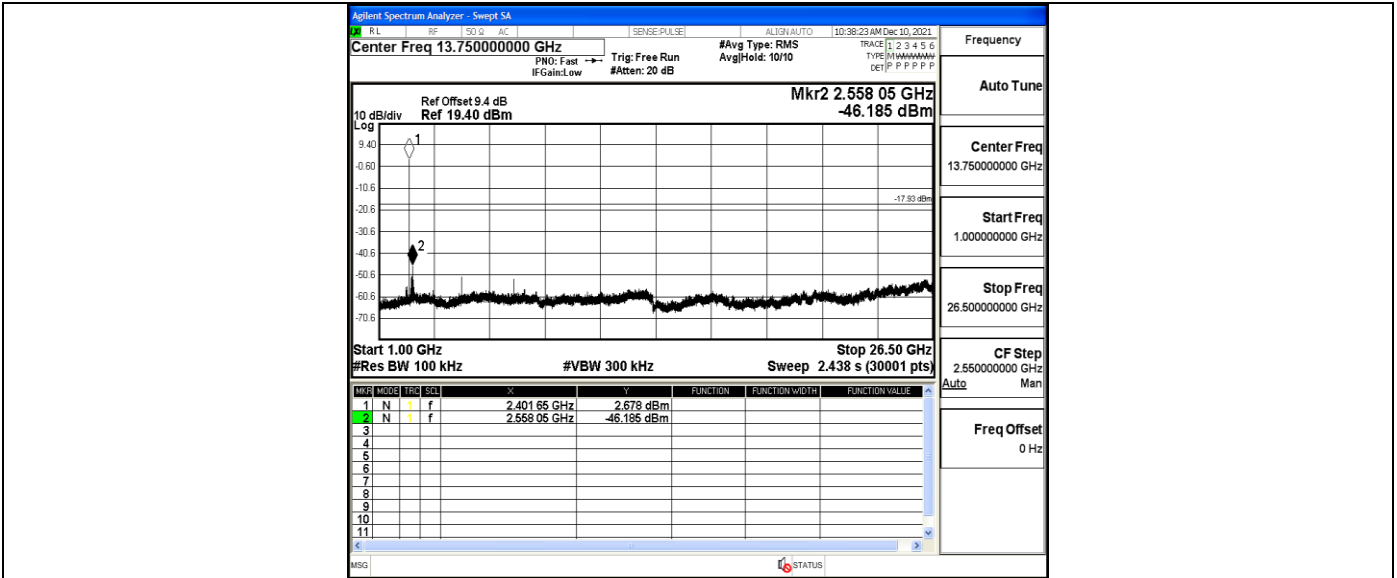
3DH5\_Ant1\_High\_Hop\_2480



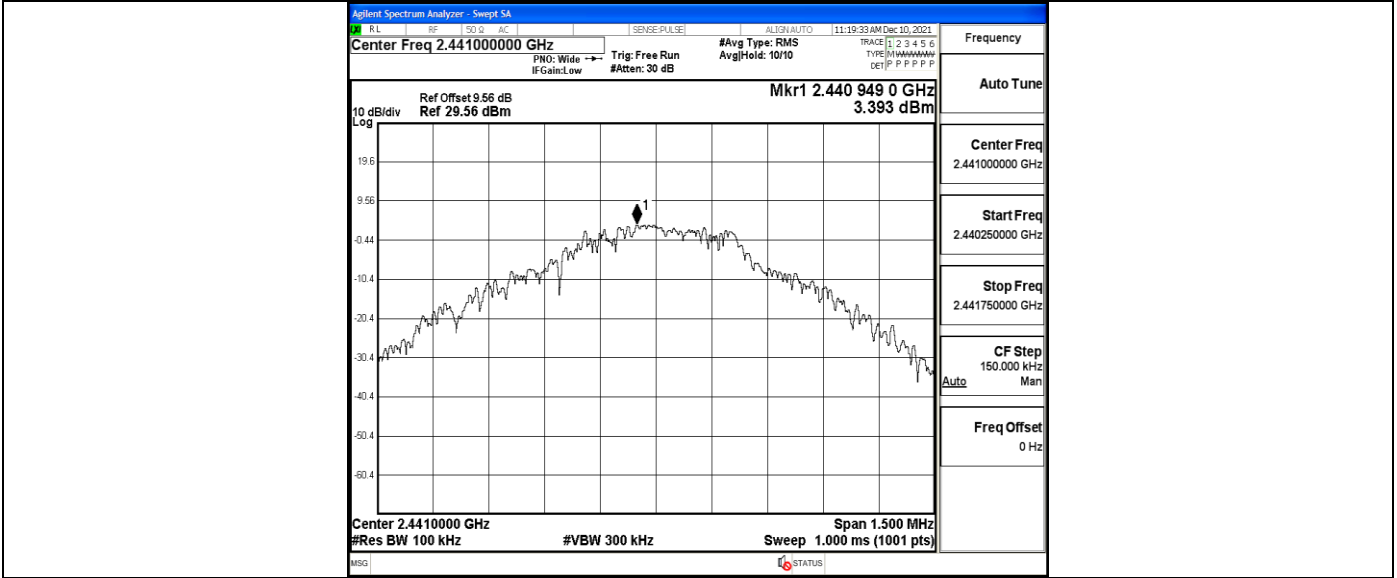
Frequency	Auto Tune
Center Freq	2.510000000 GHz
Start Freq	2.470000000 GHz
Stop Freq	2.550000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

### A.7 RF Conducted Spurious Emissions Test Graph

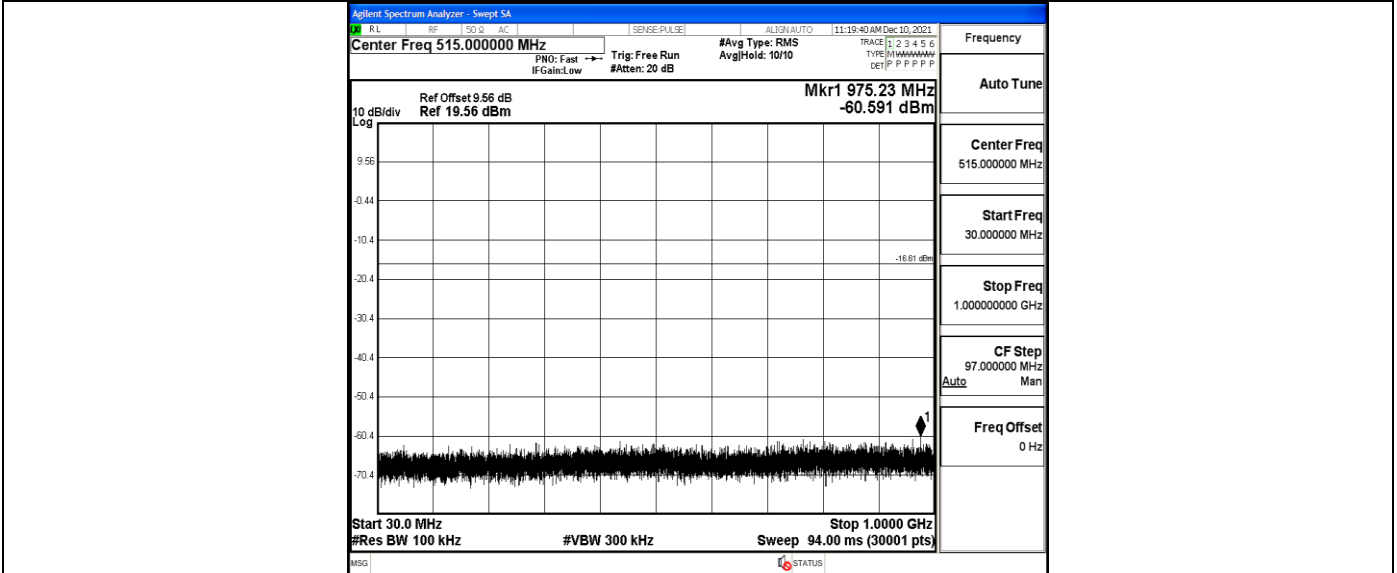




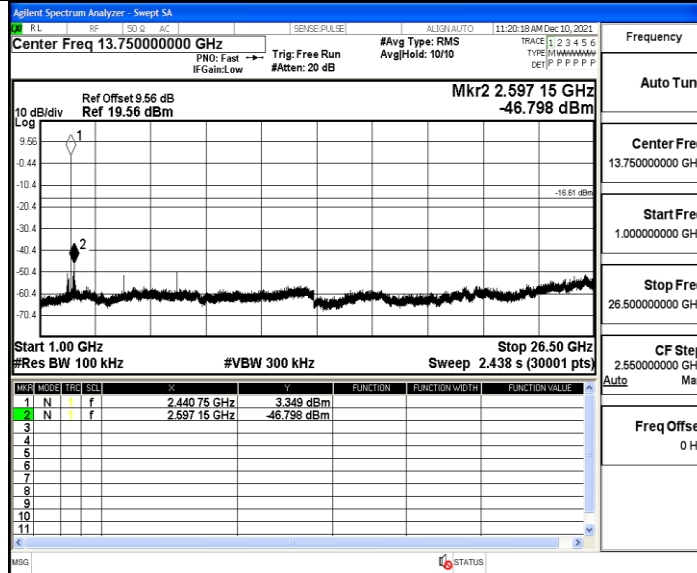
DH5\_Ant1\_2441\_0~Reference



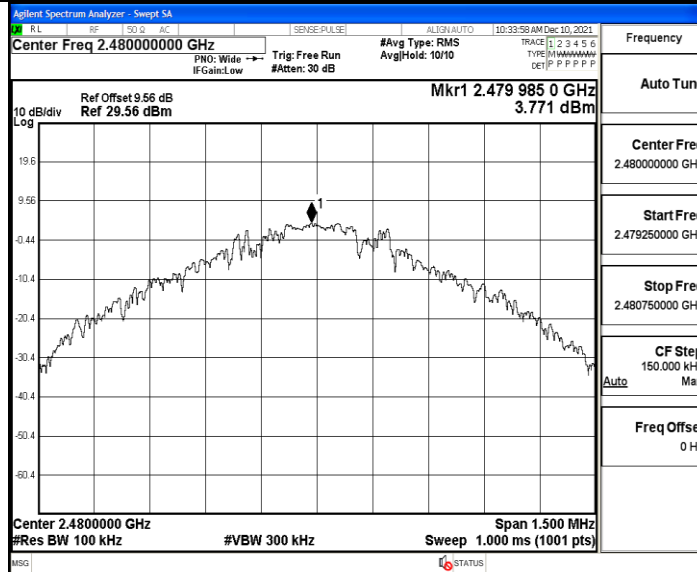
DH5\_Ant1\_2441\_30~1000



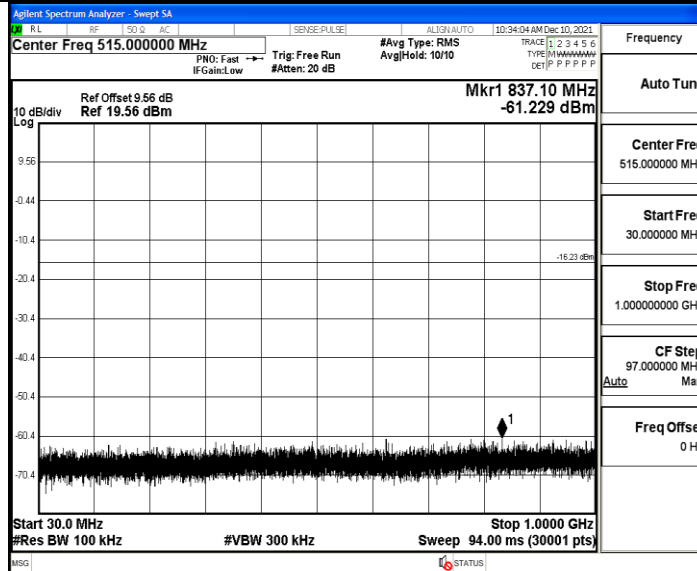
DH5\_Ant1\_2441\_1000~26500



DH5\_Ant1\_2480\_0~Reference

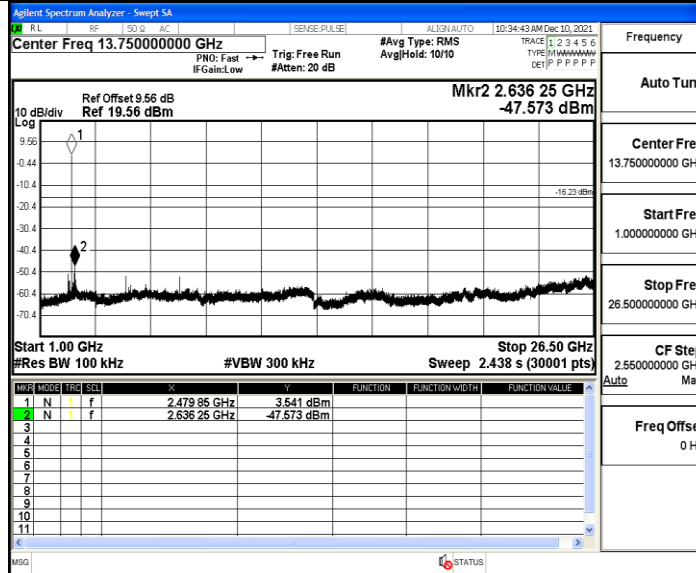


DH5\_Ant1\_2480\_30~1000

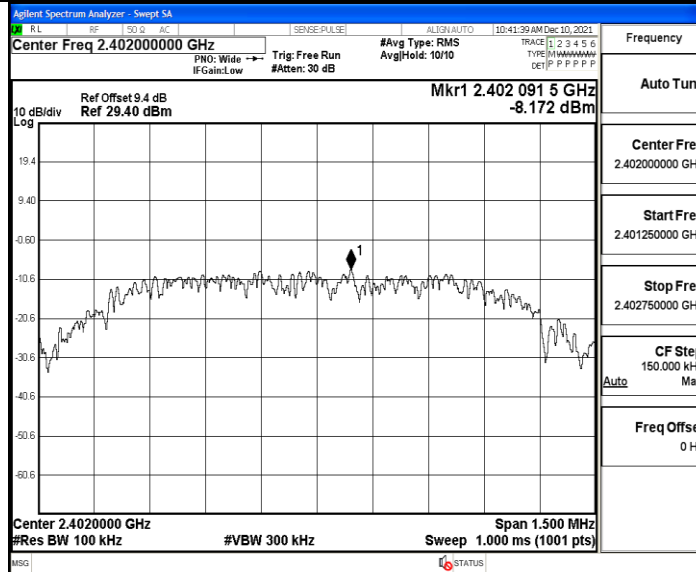




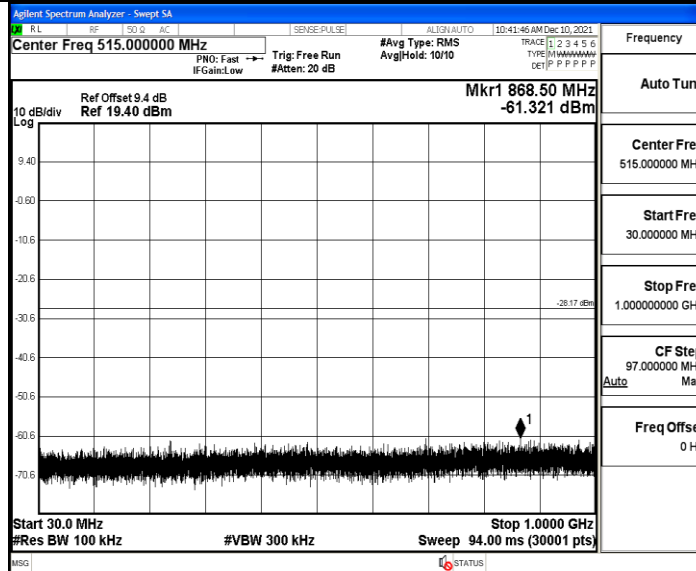
DH5\_Ant1\_2480\_1000~26500



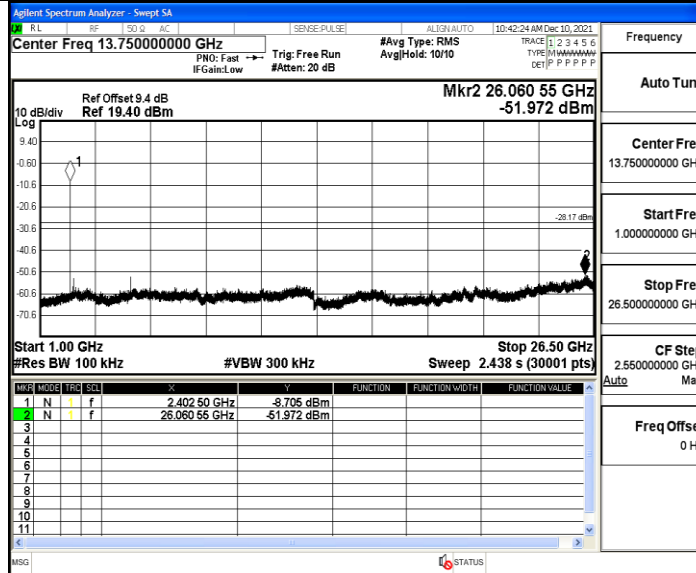
2DH5\_Ant1\_2402\_0~Reference



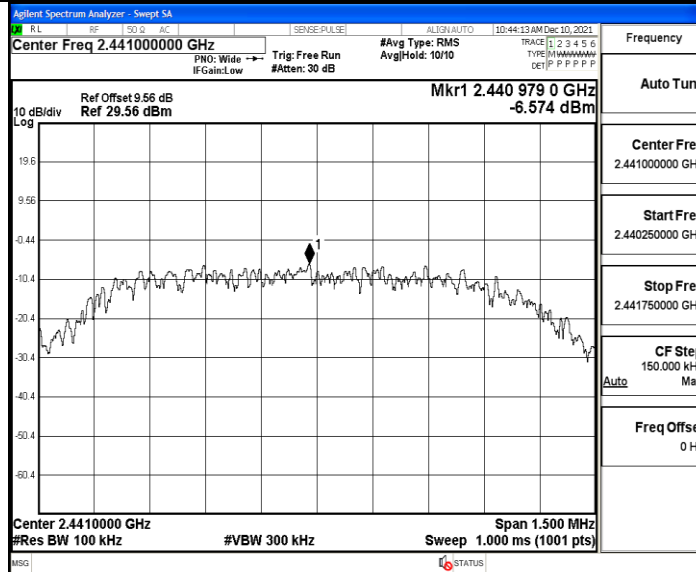
2DH5\_Ant1\_2402\_30~1000



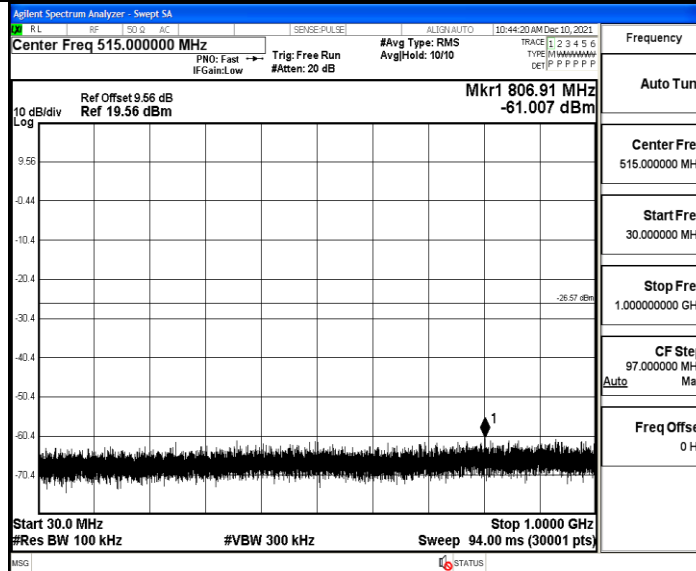
2DH5\_Ant1\_2402\_1000~26500



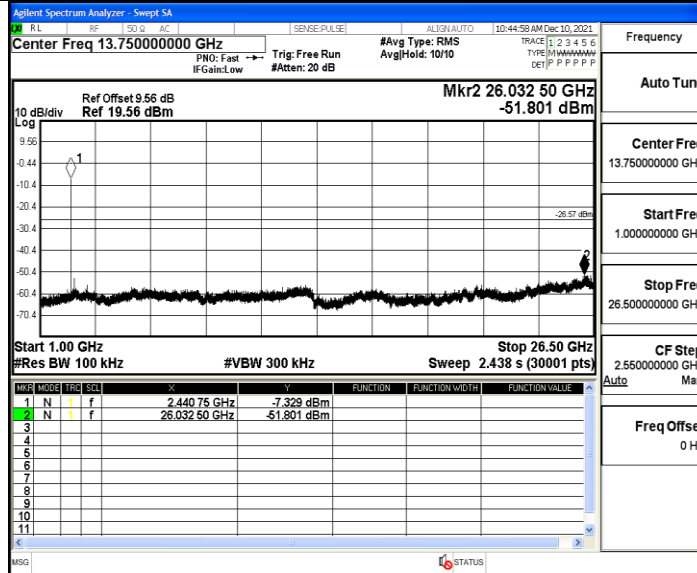
2DH5\_Ant1\_2441\_0~Reference



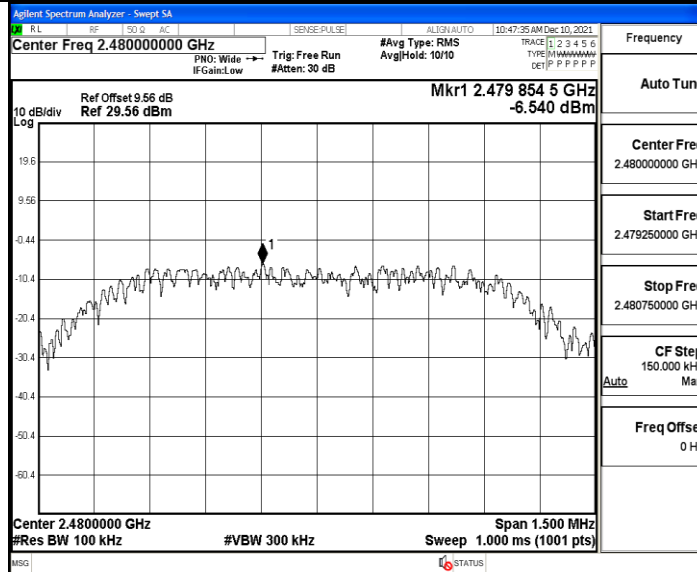
2DH5\_Ant1\_2441\_30~1000



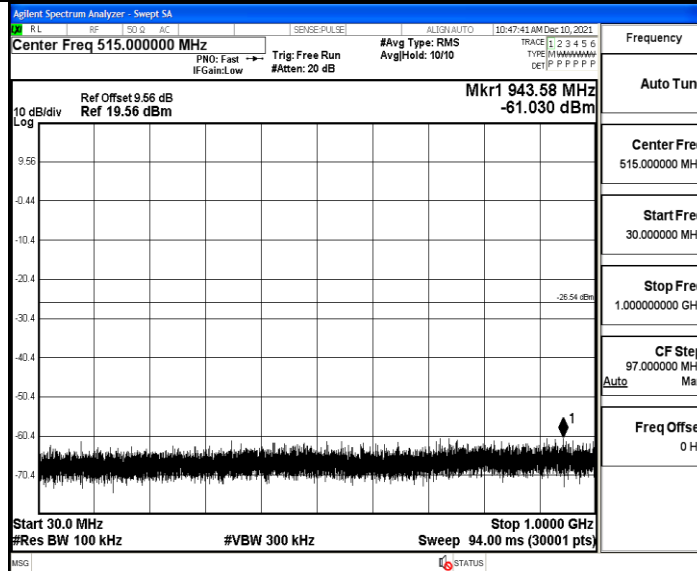
2DH5\_Ant1\_2441\_1000~26500



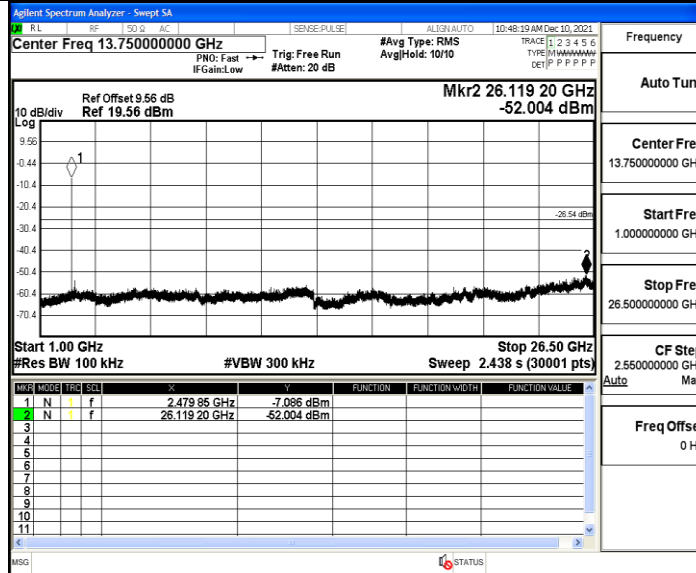
2DH5\_Ant1\_2480\_0~Reference



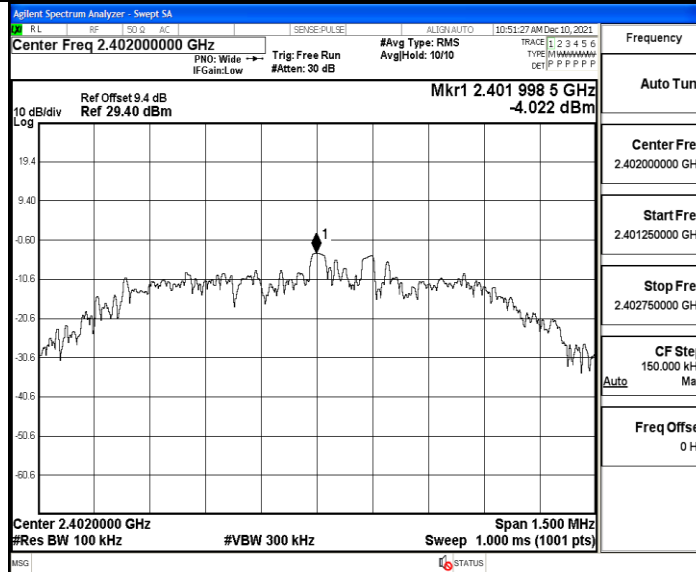
2DH5\_Ant1\_2480\_30~1000



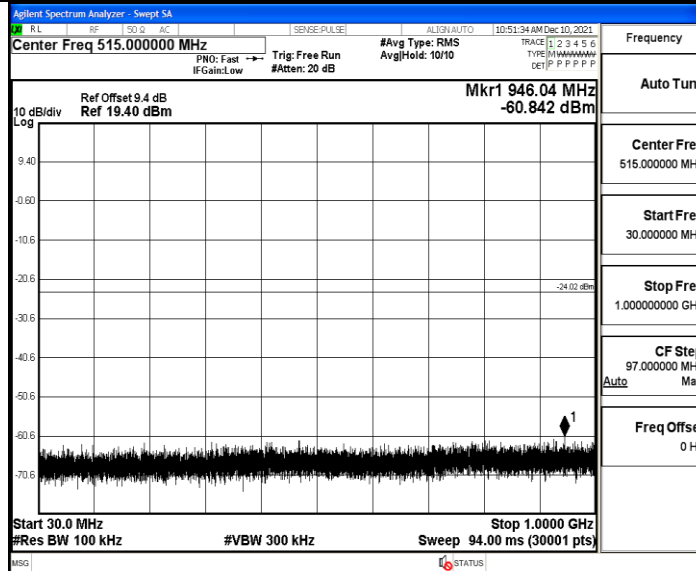
2DH5\_Ant1\_2480\_1000~26500



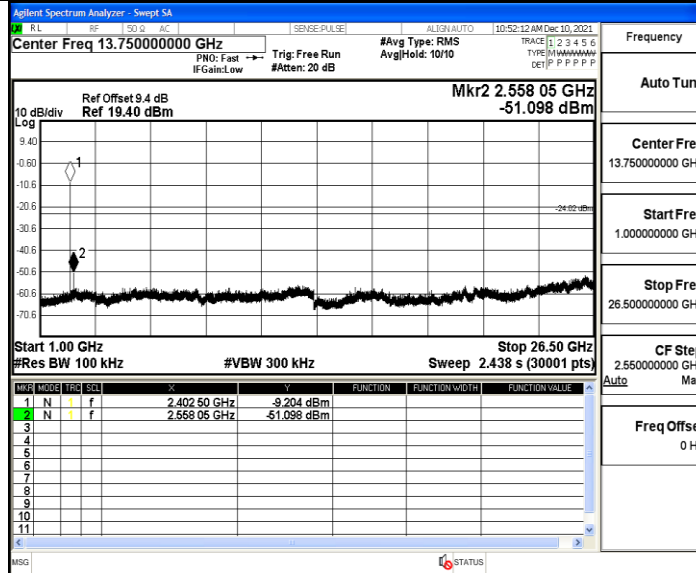
3DH5\_Ant1\_2402\_0~Reference



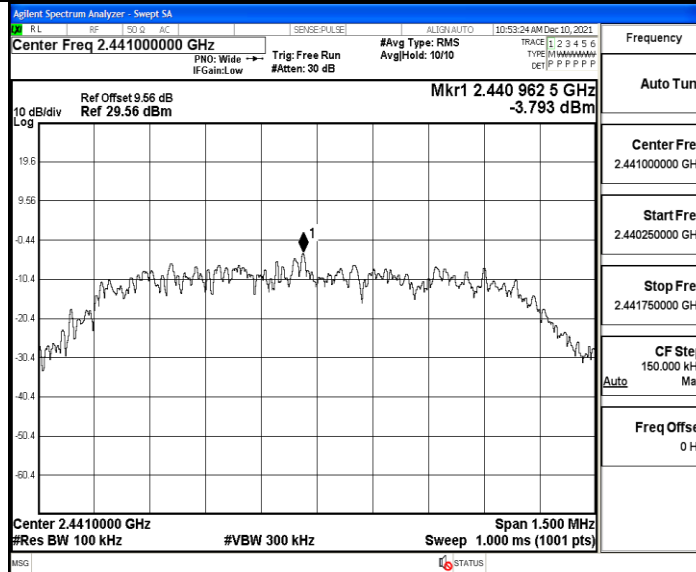
3DH5\_Ant1\_2402\_30~1000



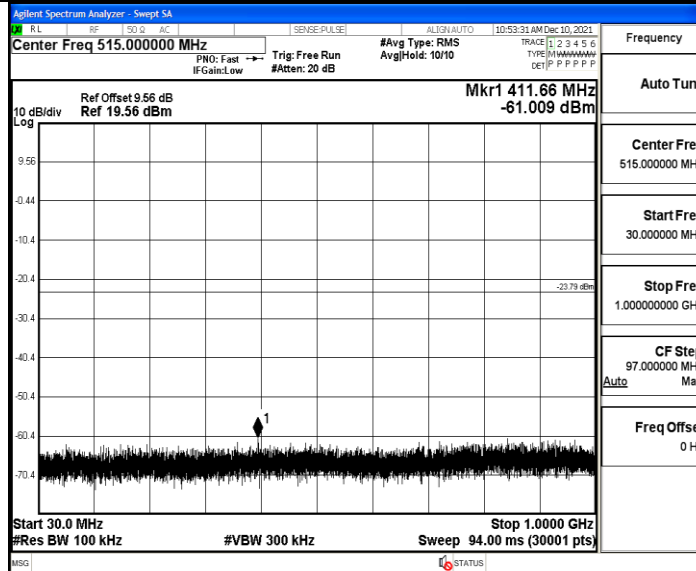
3DH5\_Ant1\_2402\_1000~26500



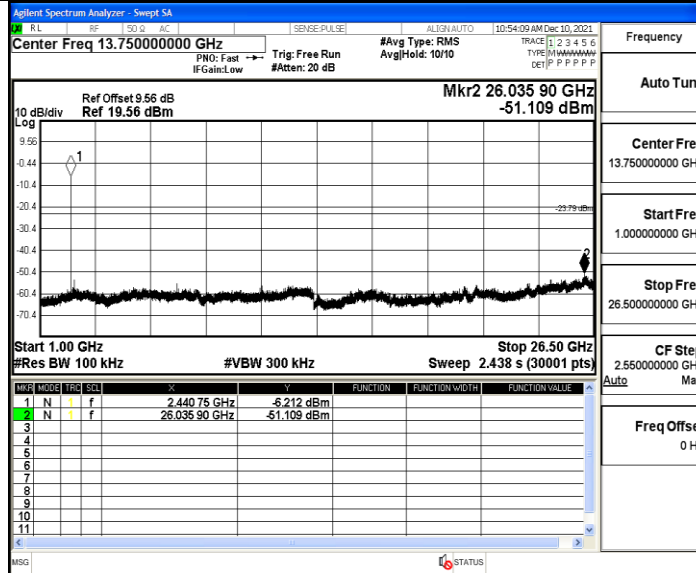
3DH5\_Ant1\_2441\_0~Reference



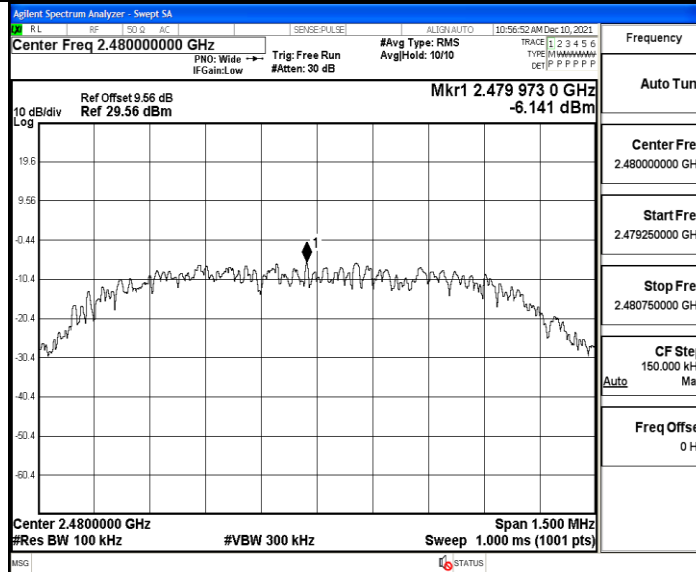
3DH5\_Ant1\_2441\_30~1000



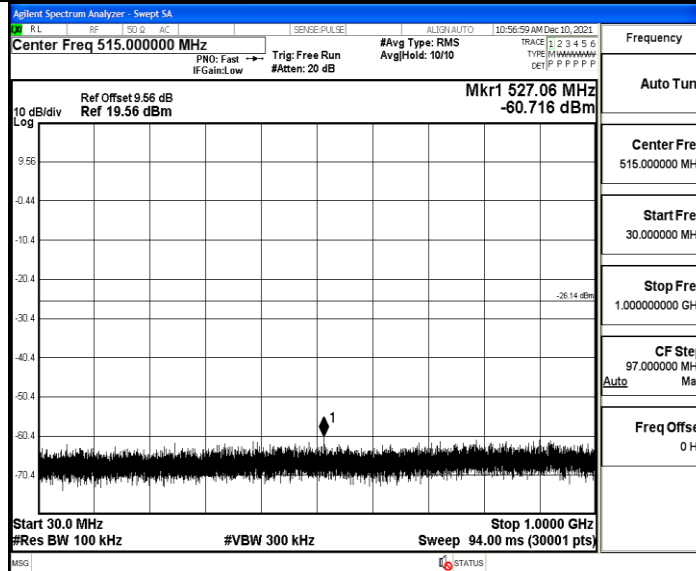
3DH5\_Ant1\_2441\_1000~26500



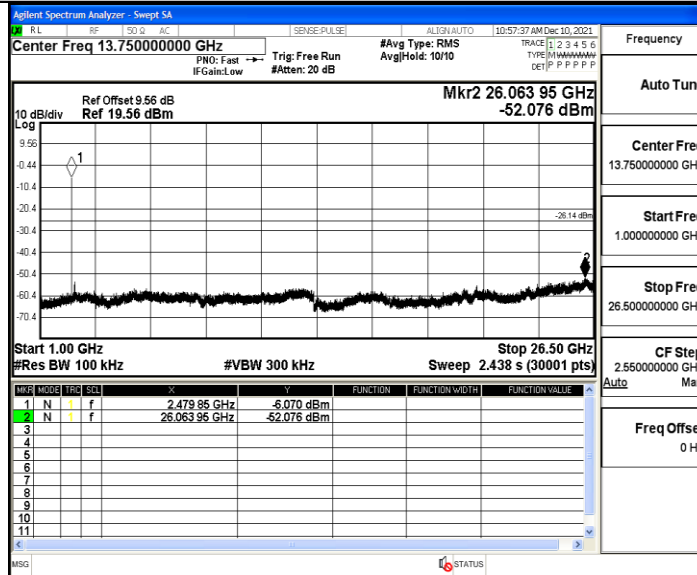
3DH5\_Ant1\_2480\_0~Reference



3DH5\_Ant1\_2480\_30~1000



3DH5\_Ant1\_2480\_1000-26500



### A.8 Restrict-band band-edge measurements

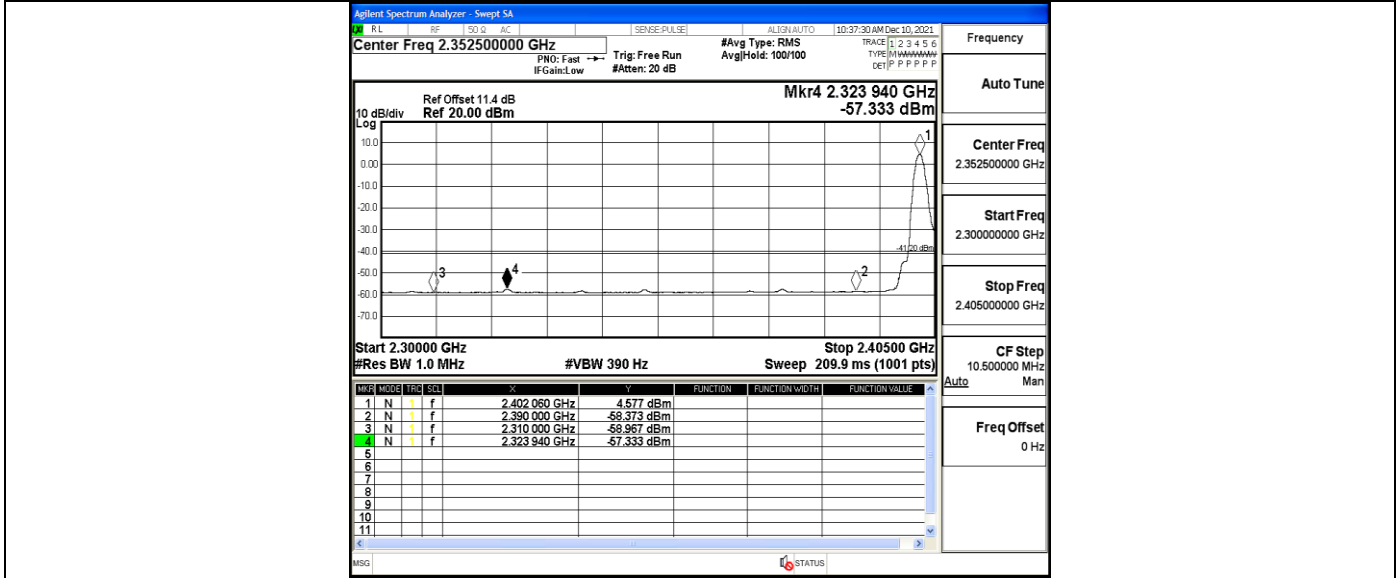
TestMode	Antenna	ChName	Channel	Detector	Freq(MHz)	Result(dBm)	Limit(dBm)	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-58.97	≤-41.20	PASS
				AV	2323.940	-57.33	≤-41.20	PASS
				AV	2390.000	-58.37	≤-41.20	PASS
				Peak	2310.000	-52.13	≤-21.20	PASS
				Peak	2323.940	-47.79	≤-21.20	PASS
				Peak	2390.000	-51.27	≤-21.20	PASS
		High	2480	AV	2483.500	-43.22	≤-41.20	PASS
				AV	2483.520	-43.22	≤-41.20	PASS
				AV	2500.000	-57.92	≤-41.20	PASS
				Peak	2483.500	-38.59	≤-21.20	PASS
				Peak	2483.520	-38.59	≤-21.20	PASS
				Peak	2500.000	-50.86	≤-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-59.05	≤-41.20	PASS
				AV	2337.800	-58.38	≤-41.20	PASS
				AV	2390.000	-58.7	≤-41.20	PASS
				Peak	2310.000	-52.04	≤-21.20	PASS
				Peak	2356.700	-48.65	≤-21.20	PASS
				Peak	2390.000	-51.74	≤-21.20	PASS
		High	2480	AV	2483.500	-49.65	≤-41.20	PASS
				AV	2483.520	-49.65	≤-41.20	PASS
				AV	2500.000	-57.99	≤-41.20	PASS
				Peak	2483.500	-38.15	≤-21.20	PASS
				Peak	2483.520	-38.15	≤-21.20	PASS
				Peak	2500.000	-51.02	≤-21.20	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-59.09	≤-41.20	PASS
				AV	2369.930	-58.5	≤-41.20	PASS
				AV	2390.000	-58.71	≤-41.20	PASS
				Peak	2310.000	-51.35	≤-21.20	PASS
				Peak	2338.745	-48.06	≤-21.20	PASS
				Peak	2390.000	-52.47	≤-21.20	PASS
		High	2480	AV	2483.500	-49.23	≤-41.20	PASS
				AV	2483.520	-49.23	≤-41.20	PASS
				AV	2500.000	-58.03	≤-41.20	PASS
				Peak	2483.500	-39.86	≤-21.20	PASS
				Peak	2483.520	-39.86	≤-21.20	PASS
				Peak	2500.000	-50	≤-21.20	PASS



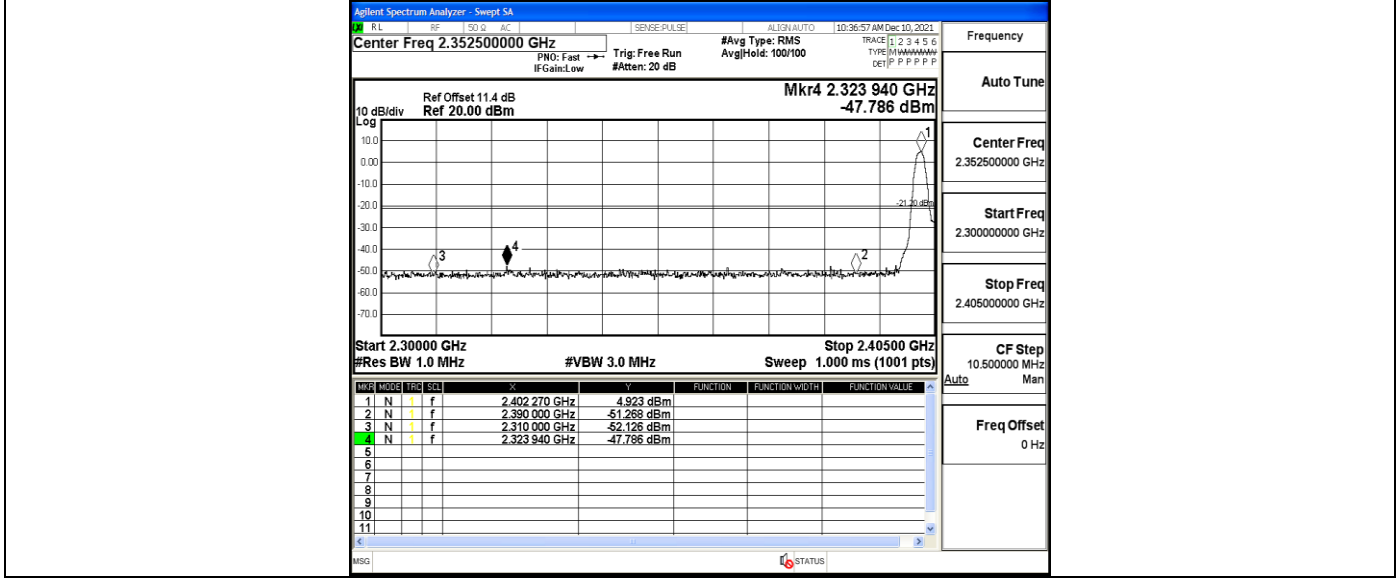
1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

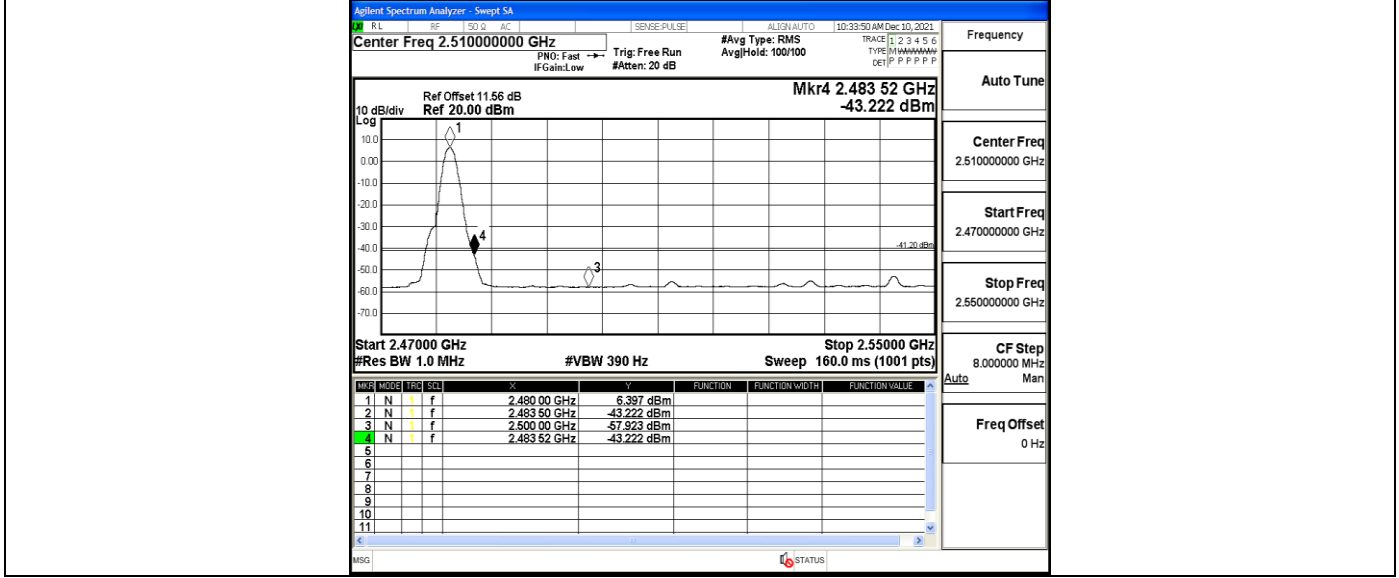
DH5\_Ant1\_Low\_2402\_AV



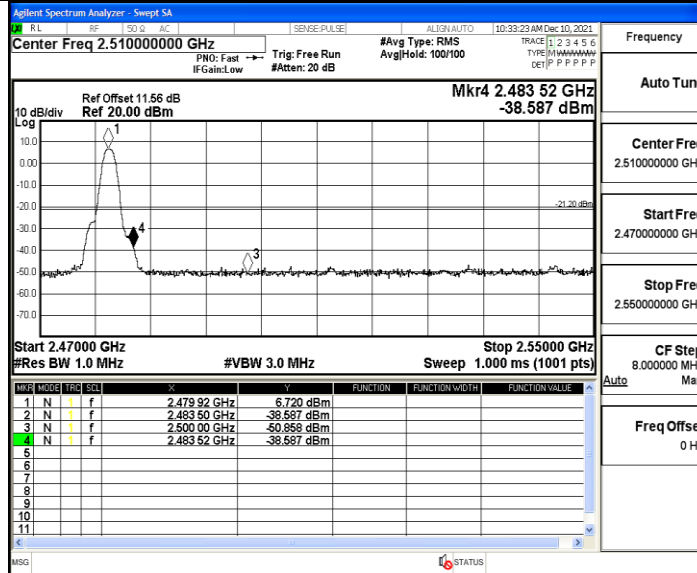
DH5\_Ant1\_Low\_2402\_Peak



DH5\_Ant1\_High\_2480\_AV

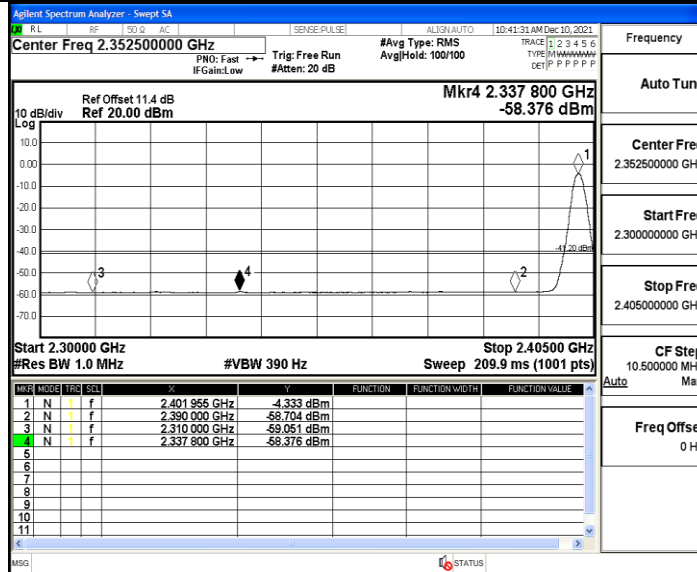


DH5\_Ant1\_High\_2480\_Peak



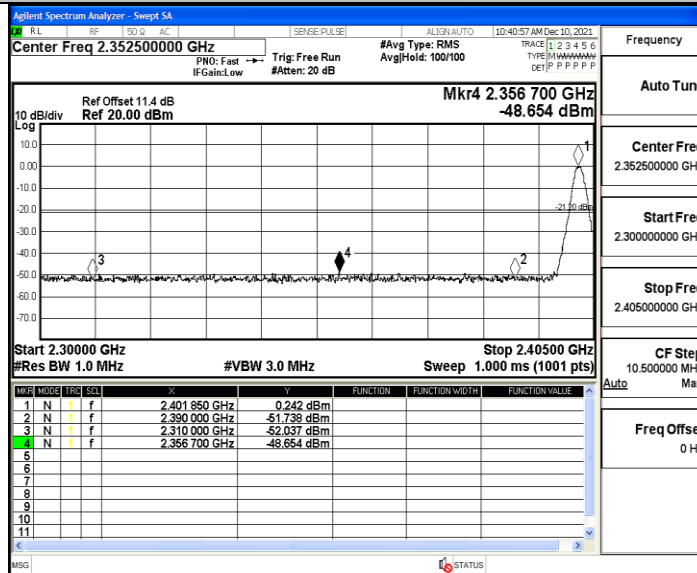
Frequency	Auto Tune
Center Freq	2.51000000 GHz
Start Freq	2.47000000 GHz
Stop Freq	2.55000000 GHz
CF Step	8.000000 MHz
Freq Offset	0 Hz

2DH5\_Ant1\_Low\_2402\_AV



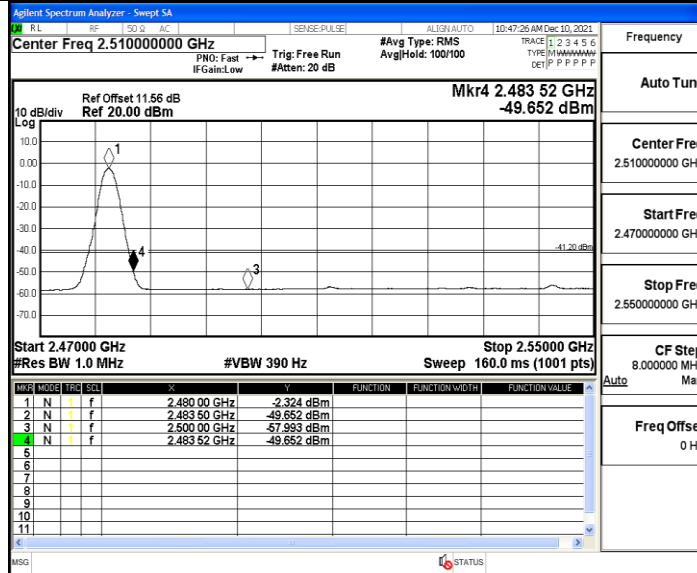
Frequency	Auto Tune
Center Freq	2.35250000 GHz
Start Freq	2.30000000 GHz
Stop Freq	2.40500000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

2DH5\_Ant1\_Low\_2402\_Peak

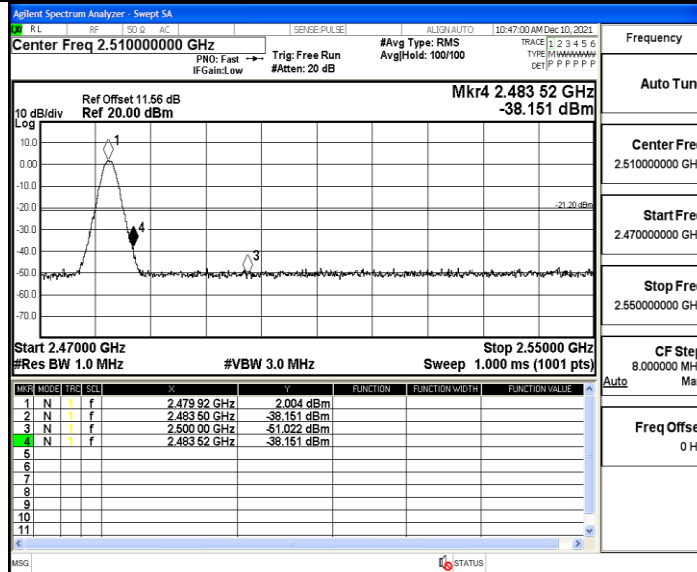


Frequency	Auto Tune
Center Freq	2.35250000 GHz
Start Freq	2.30000000 GHz
Stop Freq	2.40500000 GHz
CF Step	10.500000 MHz
Freq Offset	0 Hz

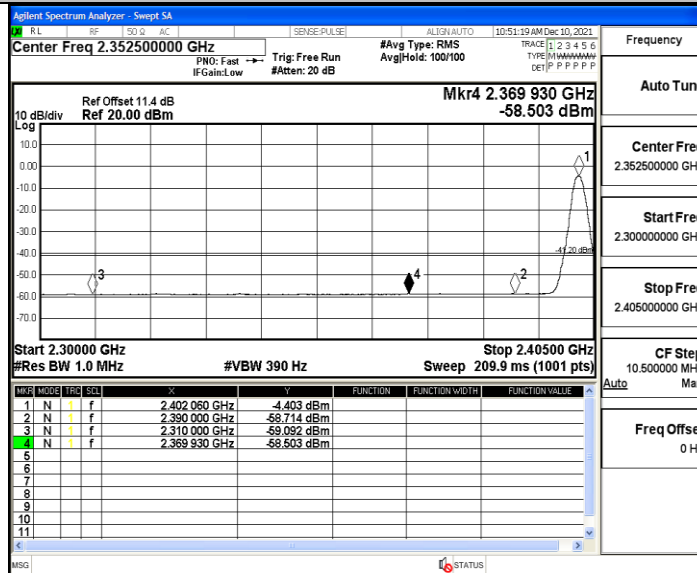
2DH5\_Ant1\_High\_2480\_AV



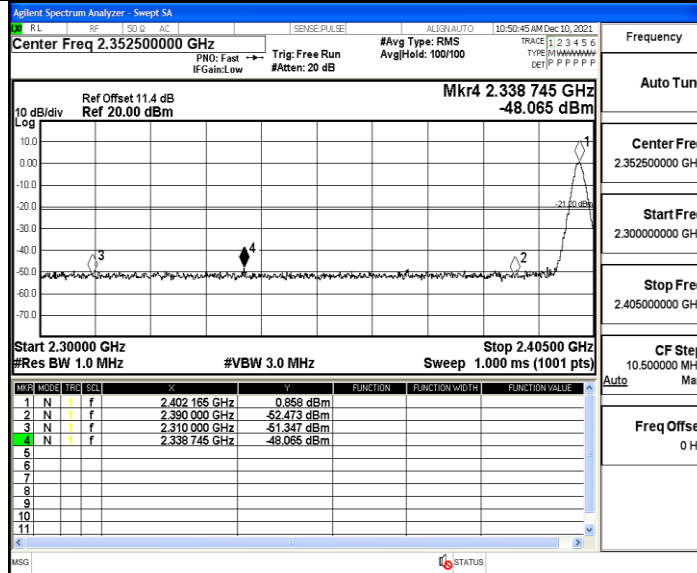
2DH5\_Ant1\_High\_2480\_Peak



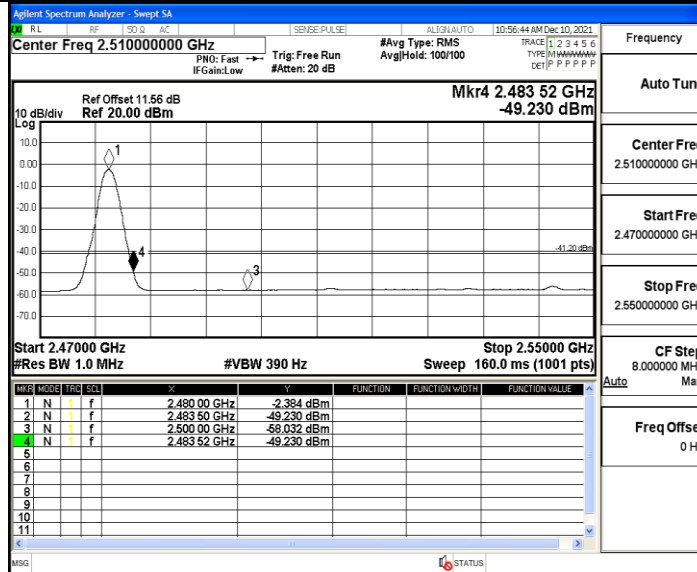
3DH5\_Ant1\_Low\_2402\_AV



3DH5\_Ant1\_Low\_2402\_Peak



3DH5\_Ant1\_High\_2480\_AV



3DH5\_Ant1\_High\_2480\_Peak

