

**RF Test Data for BT(BDR/EDR) (Conducted Measurement)****Product Name: TRUE WIRELESS EARBUDS****Trade Mark: TZUMI, SoudPlay****Test Model: RT60****FCC ID: 2ATOY-RT60****Environmental Conditions**

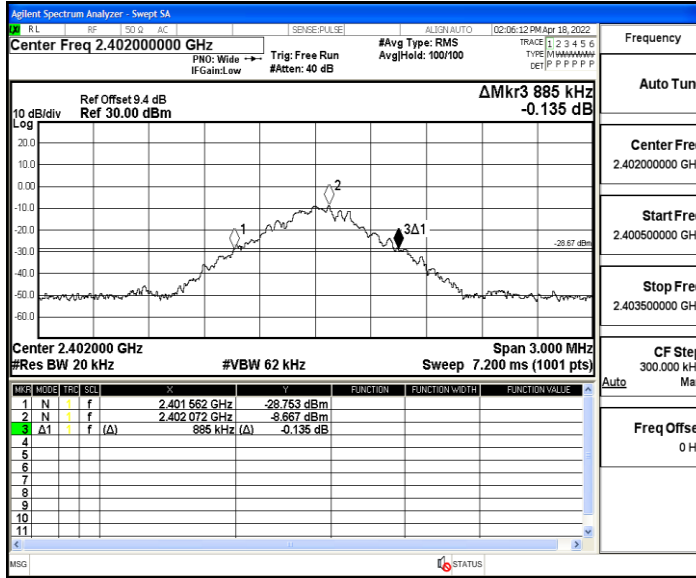
Temperature:	25.5°C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Anna Hu
Supervised by:	Hugo Chen
NOTE	N/A

**Appendix A: 20dB Emission Bandwidth****Test Result**

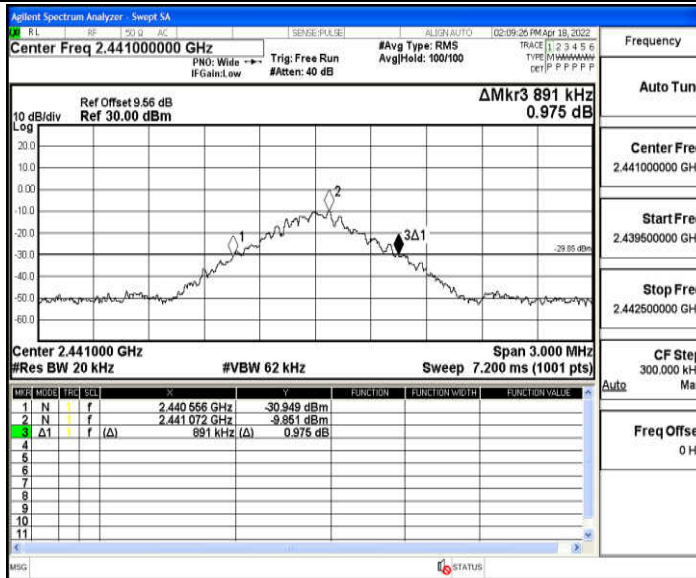
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.885	2401.562	2402.447	---	---
		2441	0.891	2440.556	2441.447	---	---
		2480	0.930	2479.556	2480.486	---	---
2DH5	Ant1	2402	1.305	2401.364	2402.669	---	---
		2441	1.290	2440.361	2441.651	---	---
		2480	1.305	2479.358	2480.663	---	---
3DH5	Ant1	2402	1.284	2401.370	2402.654	---	---
		2441	1.278	2440.367	2441.645	---	---
		2480	1.275	2479.373	2480.648	---	---

Test Graphs

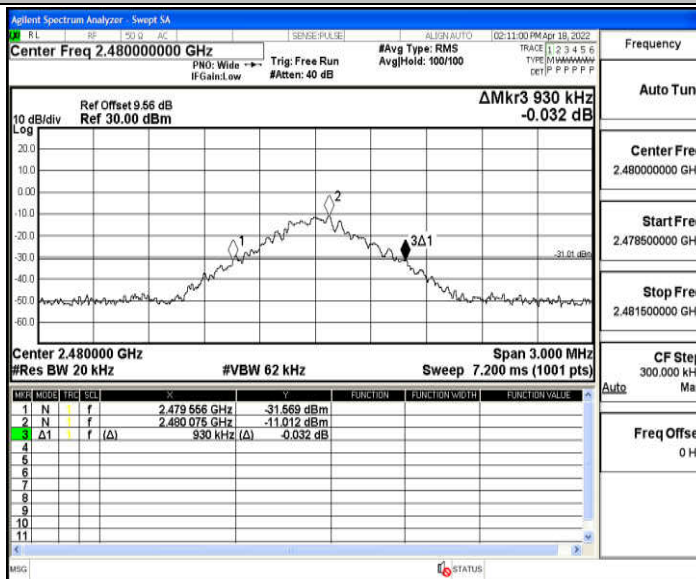
DH5\_Ant1\_2402



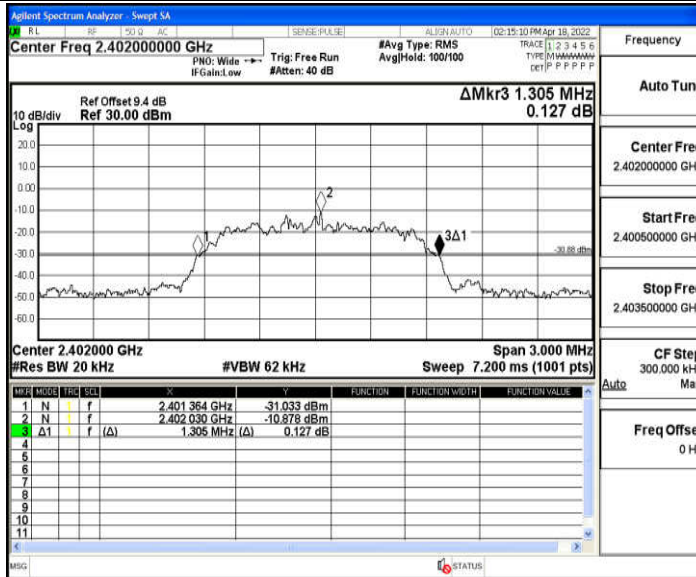
DH5\_Ant1\_2441



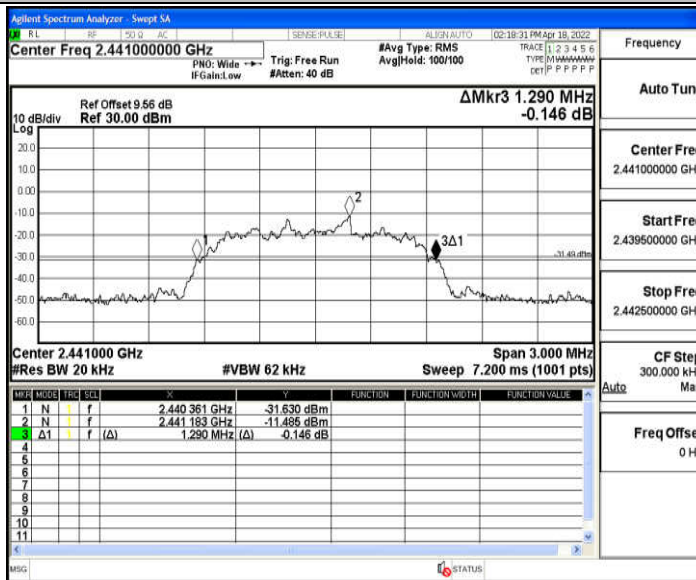
DH5\_Ant1\_2480



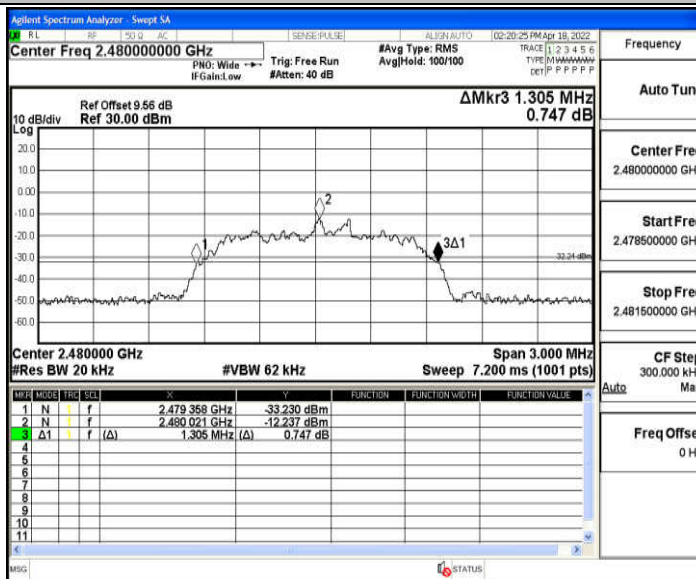
2DH5\_Ant1\_2402



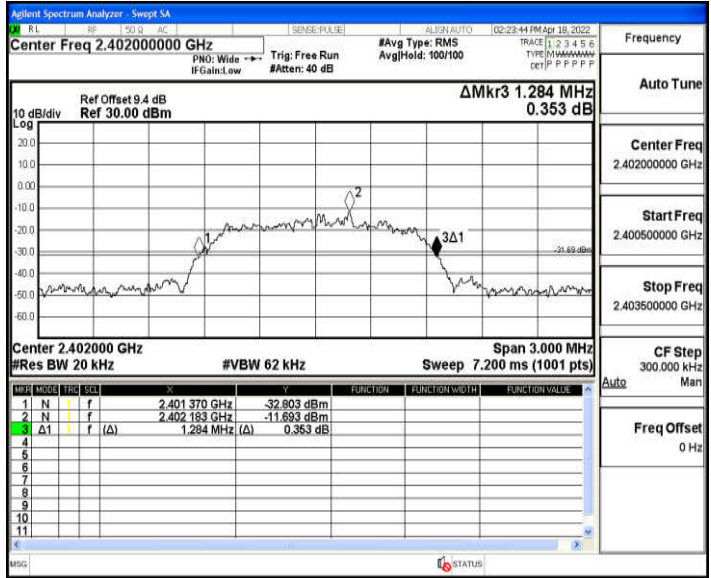
2DH5\_Ant1\_2441



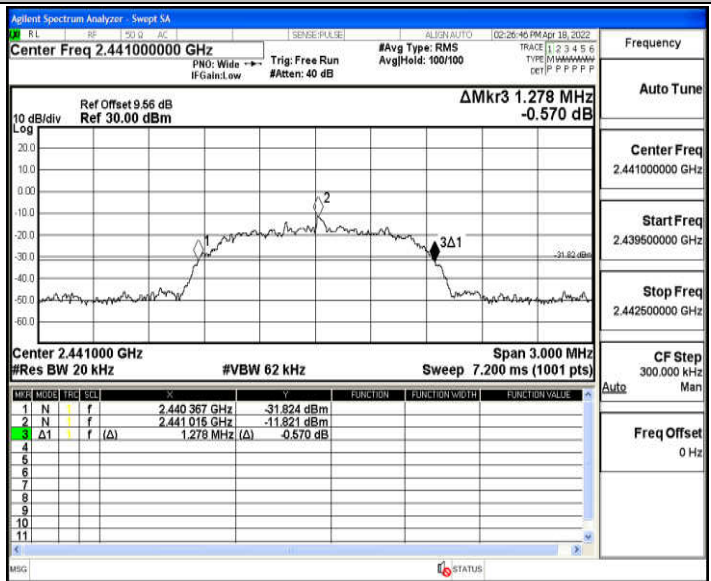
2DH5\_Ant1\_2480



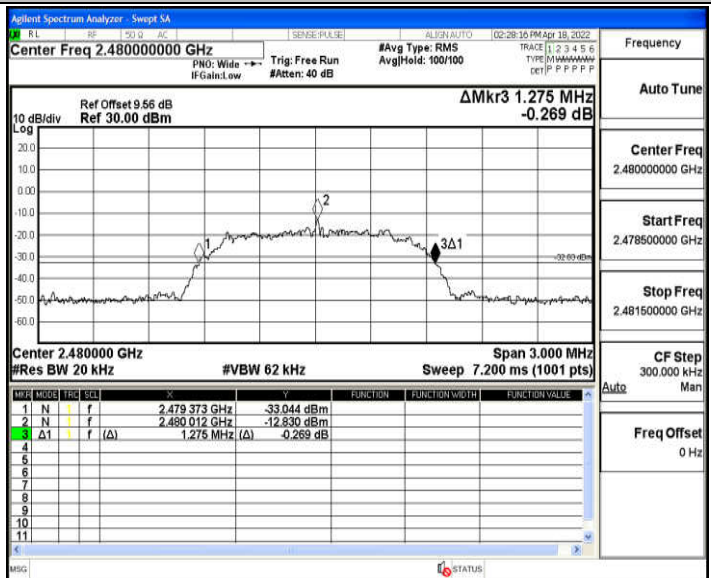
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480



## Appendix B: Occupied Channel Bandwidth

### Test Result

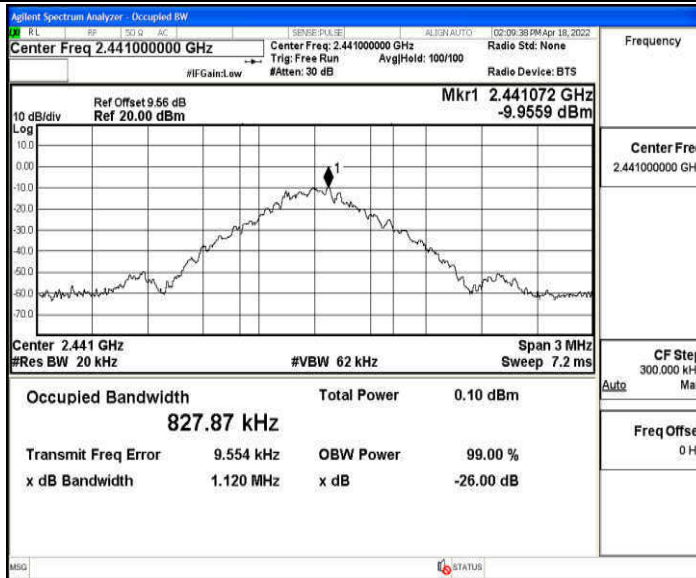
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.81895	2401.603	2402.422	---	---
		2441	0.82787	2440.596	2441.423	---	---
		2480	0.82701	2479.598	2480.425	---	---
2DH5	Ant1	2402	1.1746	2401.427	2402.601	---	---
		2441	1.1730	2440.427	2441.600	---	---
		2480	1.1682	2479.429	2480.597	---	---
3DH5	Ant1	2402	1.1641	2401.431	2402.595	---	---
		2441	1.1702	2440.427	2441.597	---	---
		2480	1.1633	2479.434	2480.597	---	---

Test Graphs

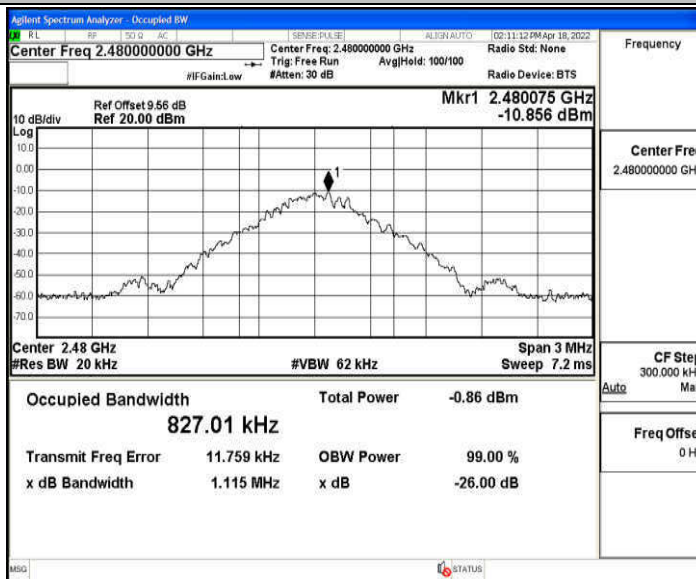
DH5\_Ant1\_2402



DH5\_Ant1\_2441

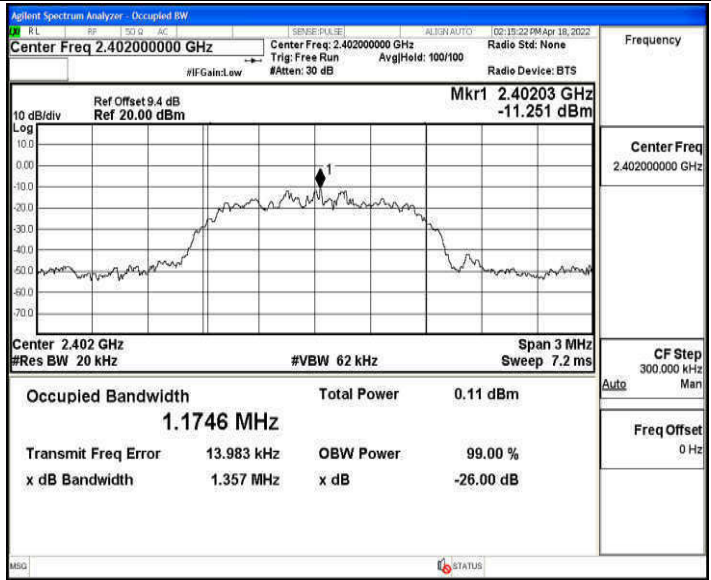


DH5\_Ant1\_2480





2DH5\_Ant1\_2402



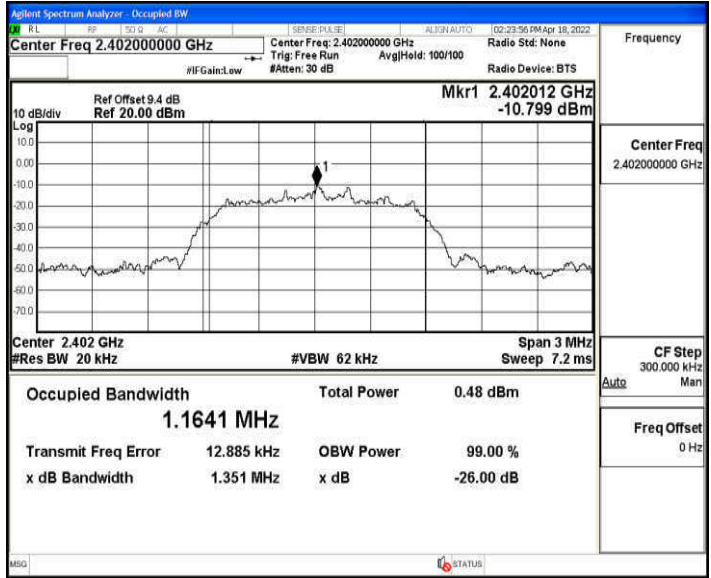
2DH5\_Ant1\_2441



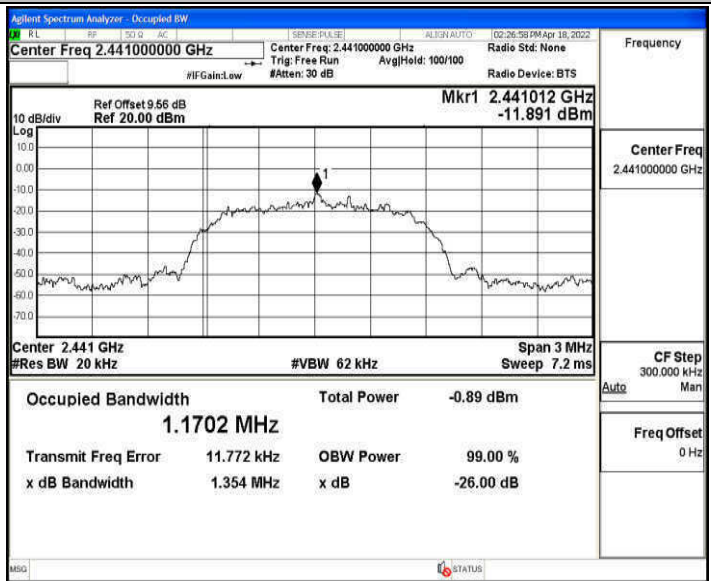
2DH5\_Ant1\_2480



3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480





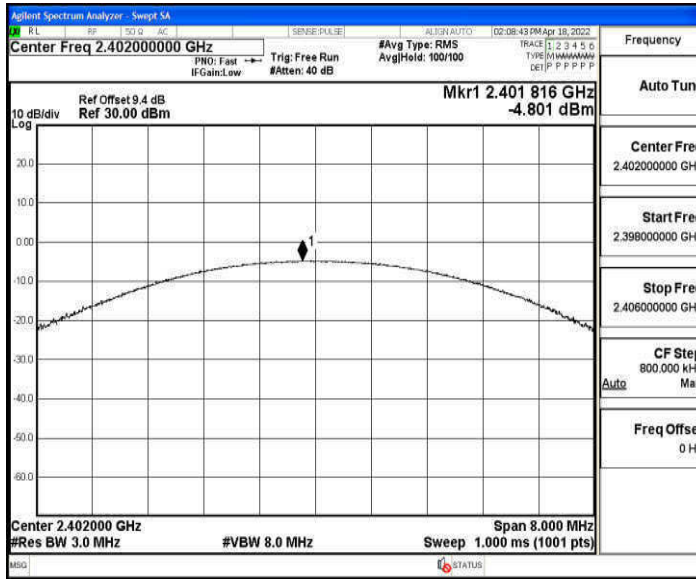
## Appendix C: Maximum conducted output power

### Test Result

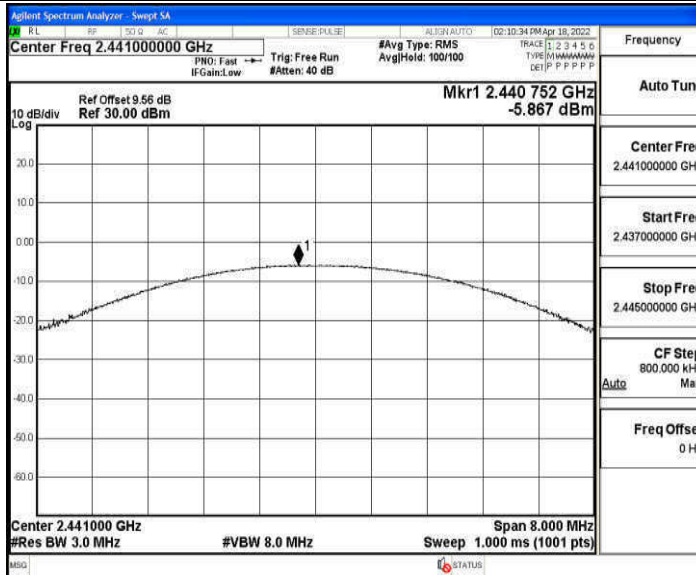
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	-4.8	≤30	PASS
		2441	-5.87	≤30	PASS
		2480	-6.74	≤30	PASS
2DH5	Ant1	2402	-4.05	≤20.97	PASS
		2441	-5.25	≤20.97	PASS
		2480	-6.19	≤20.97	PASS
3DH5	Ant1	2402	-3.5	≤20.97	PASS
		2441	-5.23	≤20.97	PASS
		2480	-5.58	≤20.97	PASS

### Test Graphs

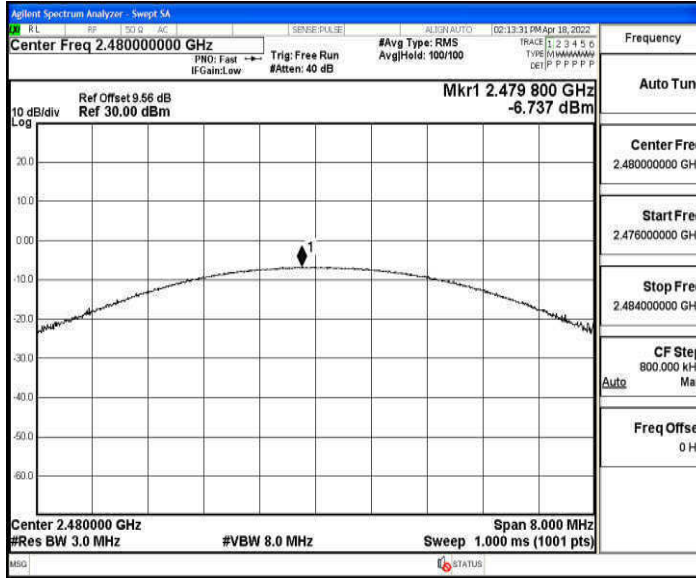
DH5\_Ant1\_2402



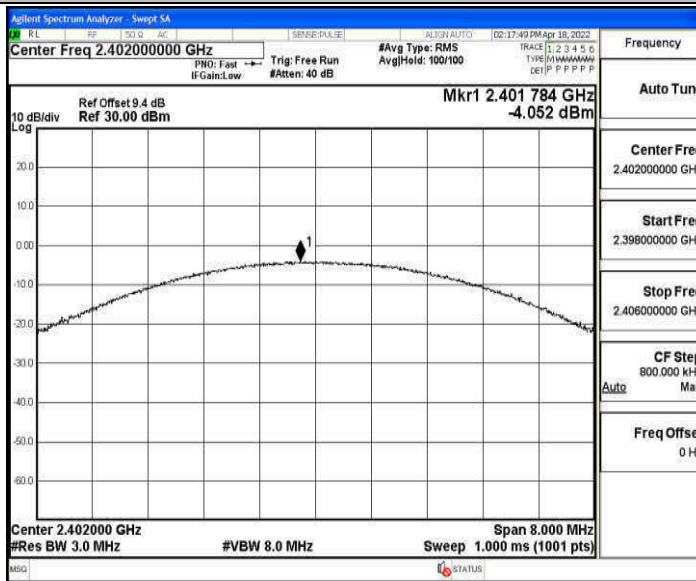
DH5\_Ant1\_2441



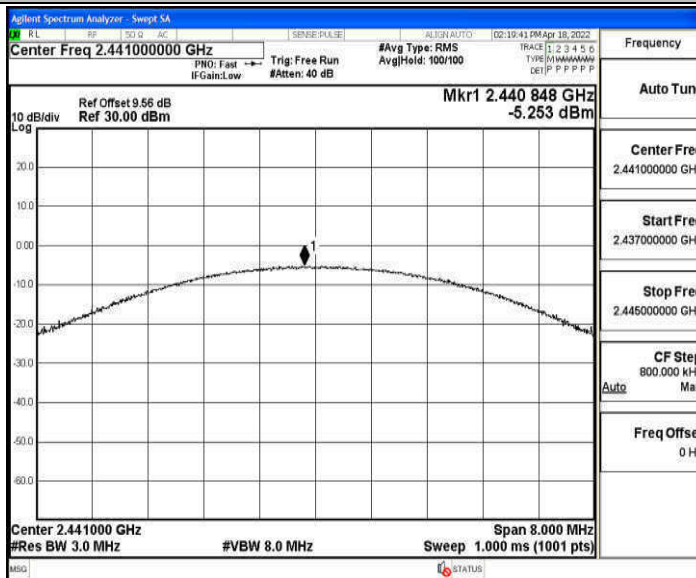
DH5\_Ant1\_2480



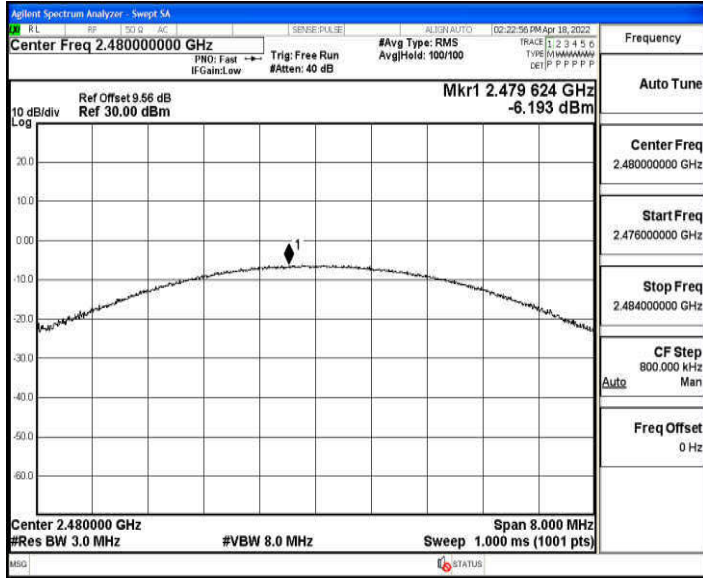
2DH5\_Ant1\_2402



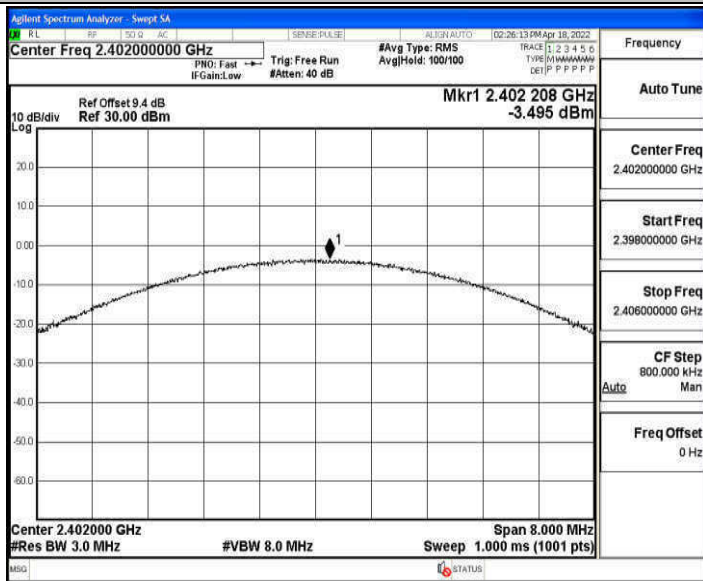
2DH5\_Ant1\_2441



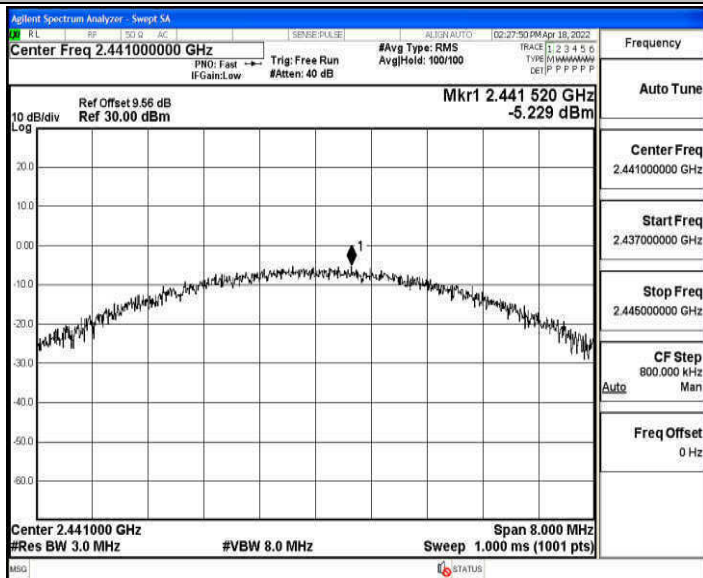
2DH5\_Ant1\_2480



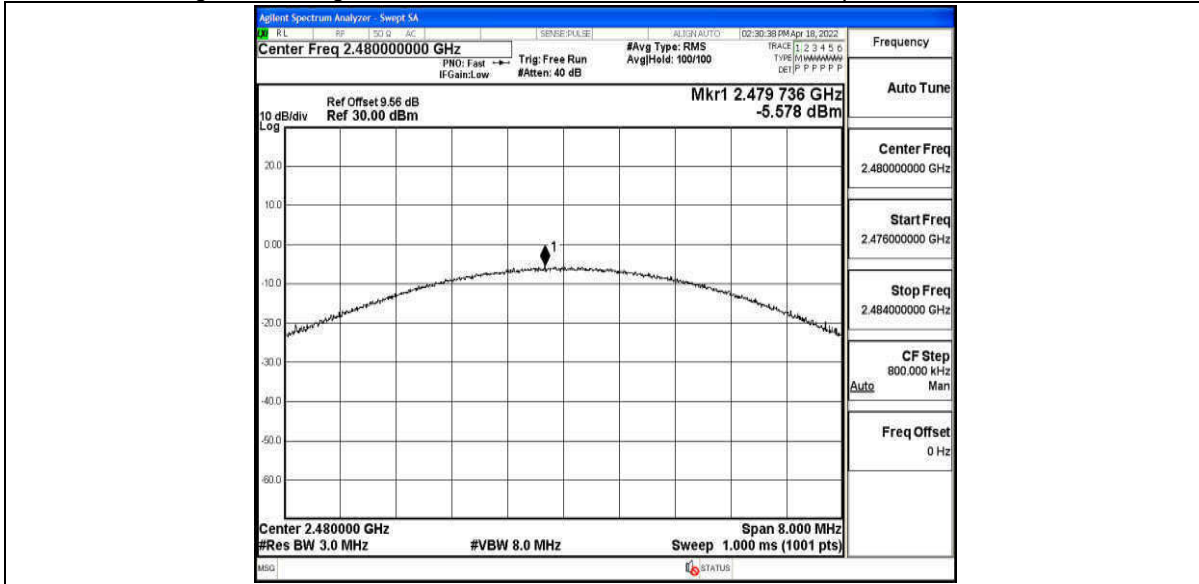
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480



## Appendix D: Carrier frequency separation

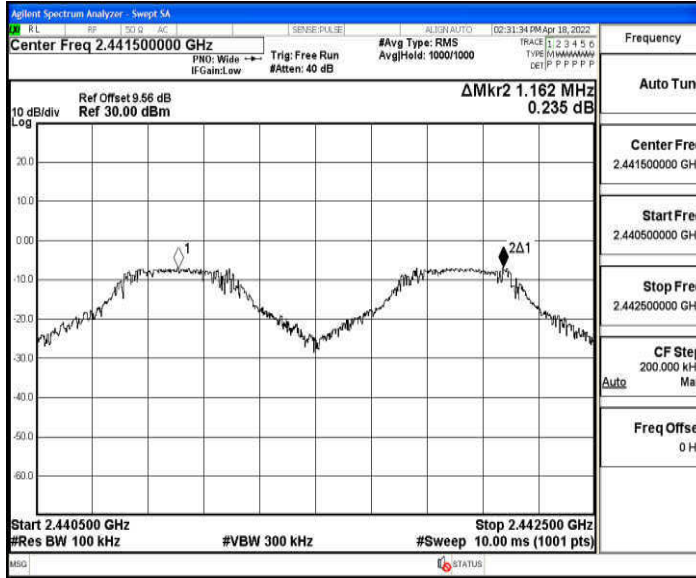
### Test Result

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.162	≥0.930	PASS
2DH5	Ant1	Hop	0.988	≥0.870	PASS
3DH5	Ant1	Hop	1.014	≥0.856	PASS

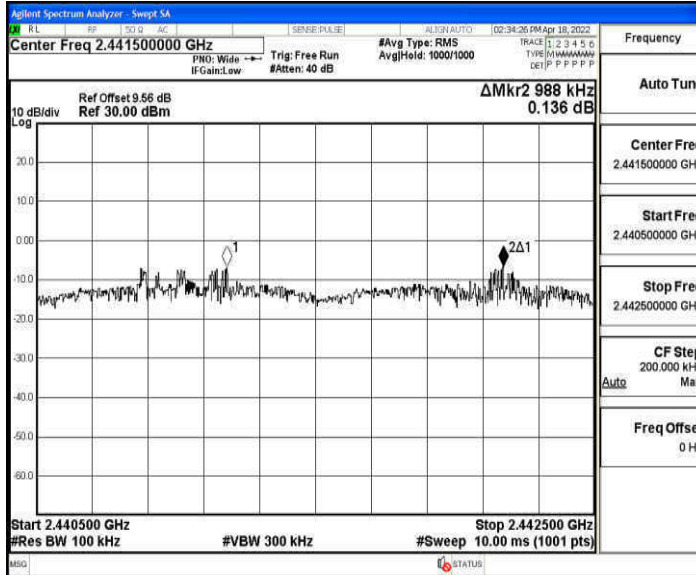


### Test Graphs

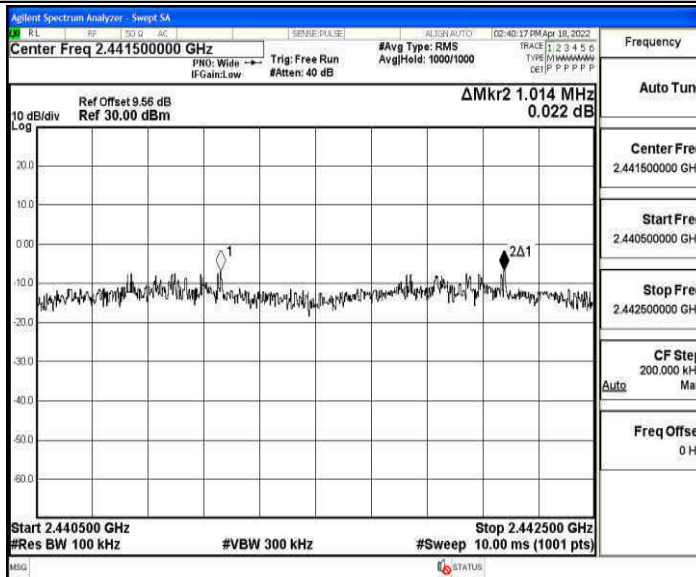
DH5\_Ant1\_Hop



2DH5\_Ant1\_Hop



3DH5\_Ant1\_Hop



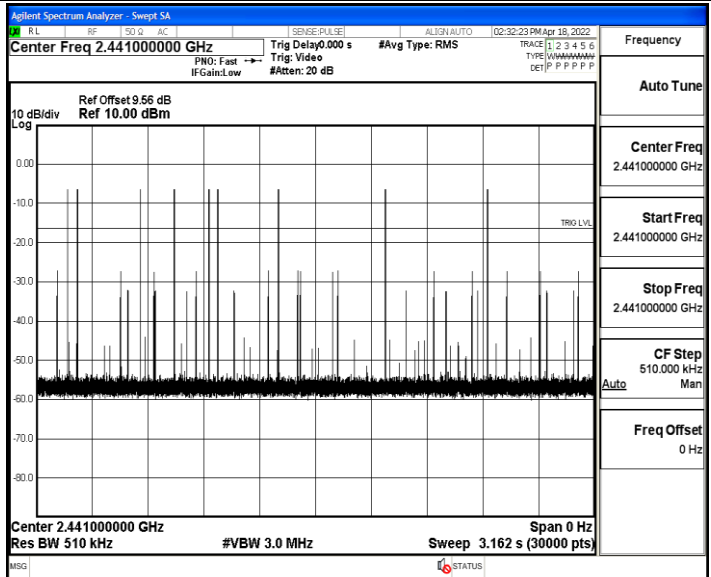
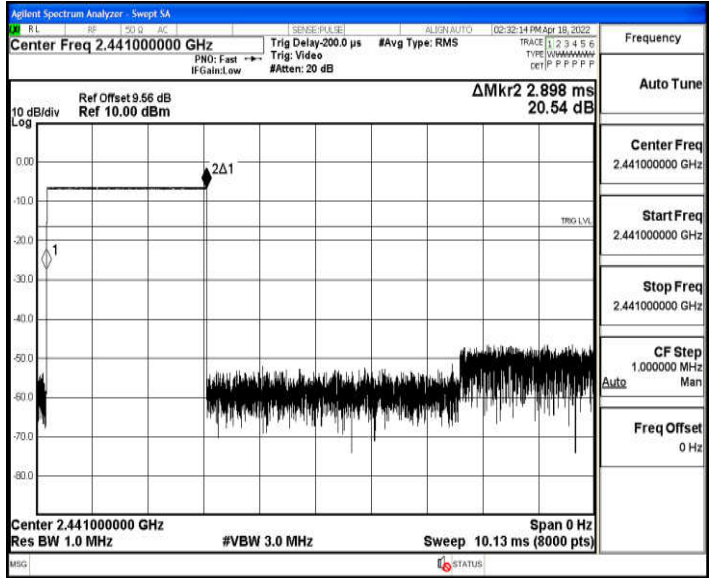
## Appendix E: Time of occupancy

### Test Result

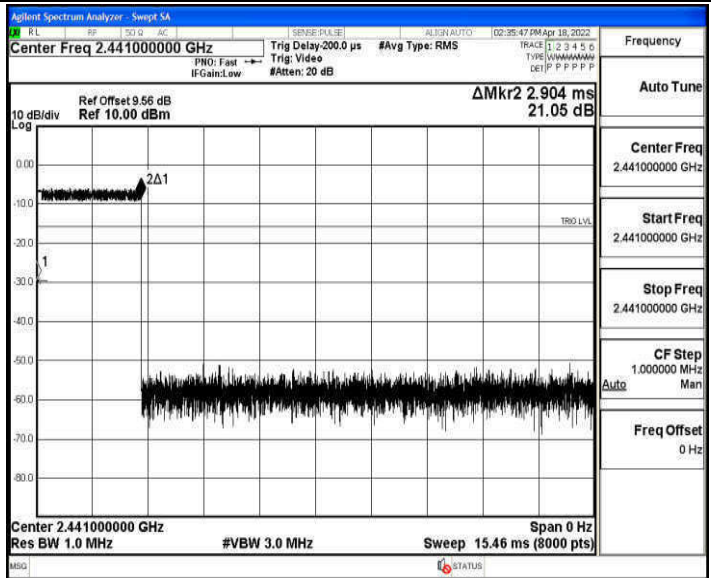
TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.90	100	0.29	≤0.4	PASS
2DH5	Ant1	Hop	2.90	120	0.348	≤0.4	PASS
3DH5	Ant1	Hop	2.91	90	0.262	≤0.4	PASS

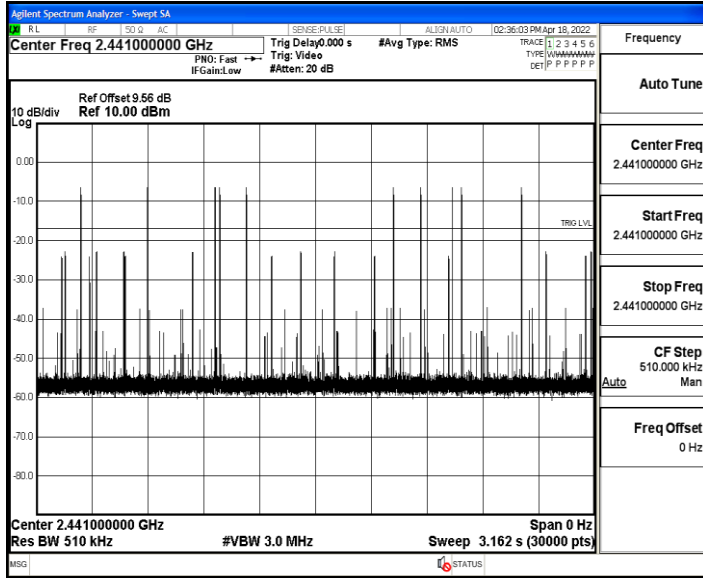
### Test Graphs

#### DH5\_Ant1\_Hop

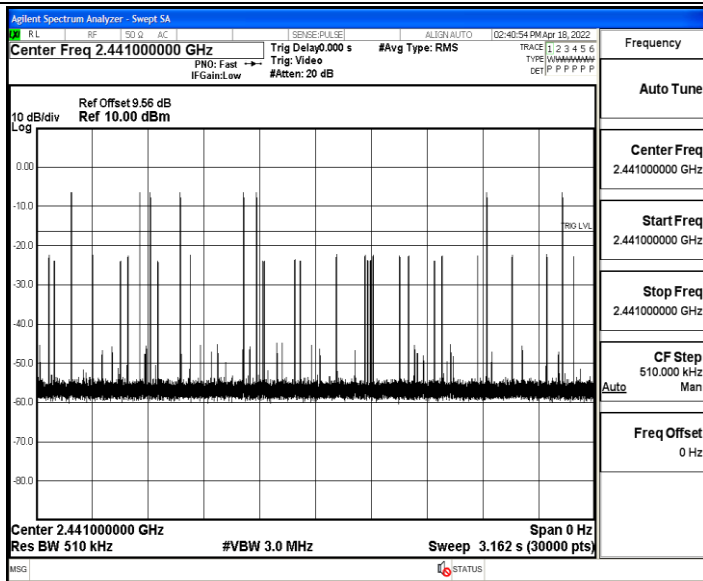
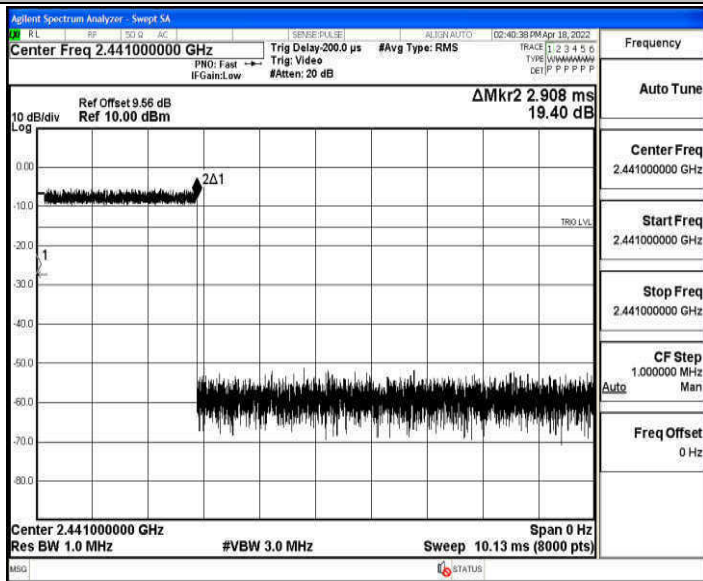


#### 2DH5\_Ant1\_Hop





3DH5\_Ant1\_Hop



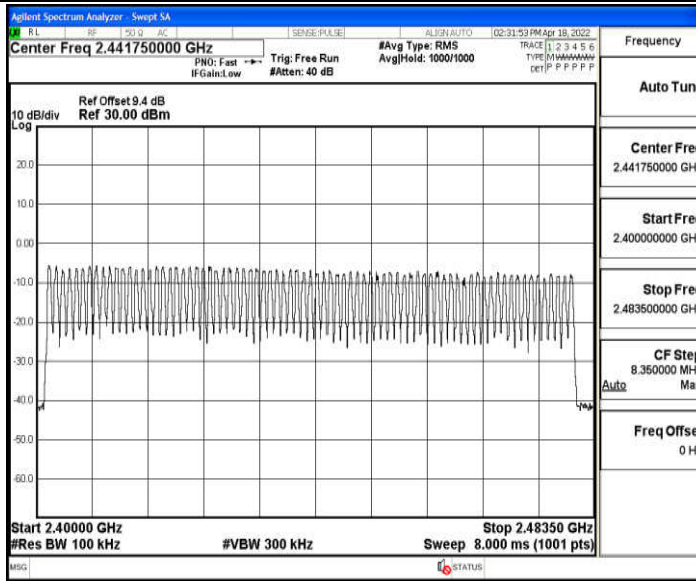
## Appendix F: Number of hopping channels

### Test Result

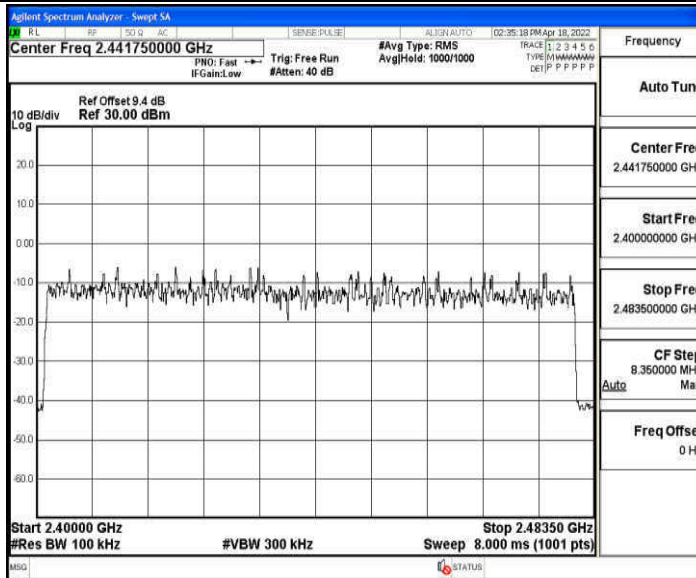
TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

### Test Graphs

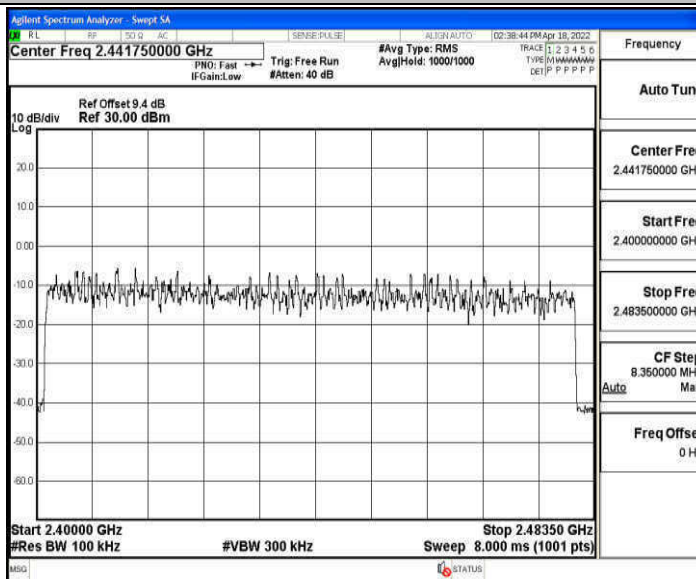
DH5\_Ant1\_Hop



2DH5\_Ant1\_Hop



3DH5\_Ant1\_Hop





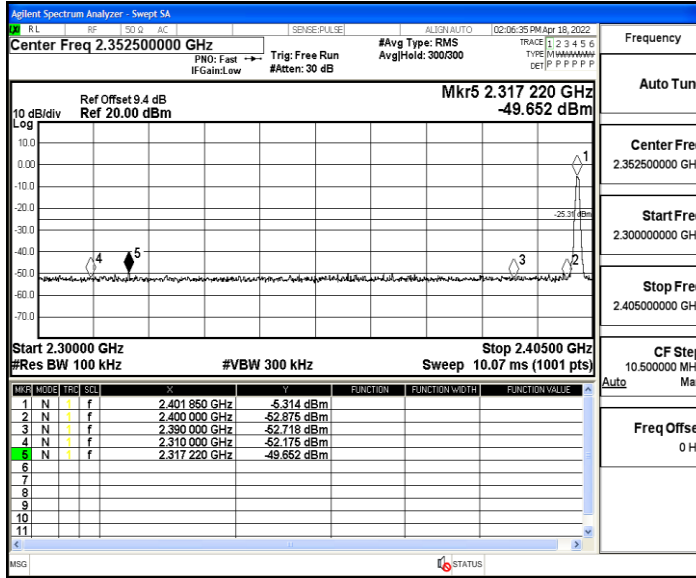
## Appendix G: Band edge measurements

### Test Result

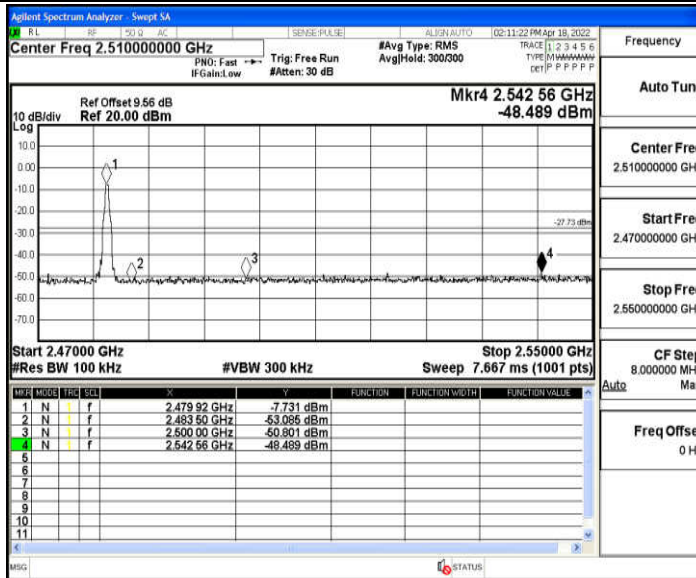
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-5.31	-49.65	$\leq -25.31$	PASS
		High	2480	-7.73	-48.49	$\leq -27.73$	PASS
		Low	Hop_2402	-5.70	-50.57	$\leq -25.7$	PASS
		High	Hop_2480	-7.44	-48.66	$\leq -27.44$	PASS
2DH5	Ant1	Low	2402	-6.15	-49.4	$\leq -26.15$	PASS
		High	2480	-7.57	-48.89	$\leq -27.57$	PASS
		Low	Hop_2402	-10.18	-49.86	$\leq -30.18$	PASS
		High	Hop_2480	-8.15	-48.77	$\leq -28.15$	PASS
3DH5	Ant1	Low	2402	-5.50	-49.56	$\leq -25.5$	PASS
		High	2480	-7.46	-49.46	$\leq -27.46$	PASS
		Low	Hop_2402	-7.45	-50.02	$\leq -27.45$	PASS
		High	Hop_2480	-7.94	-49.09	$\leq -27.94$	PASS

Test Graphs

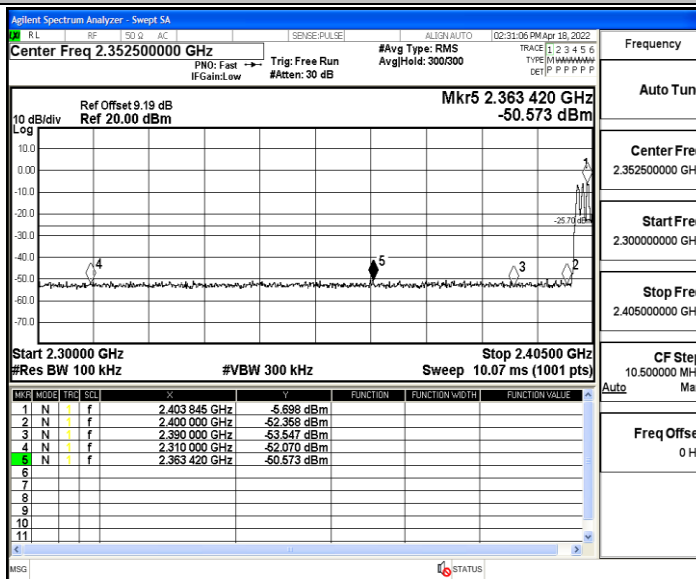
DH5\_Ant1\_Low\_2402



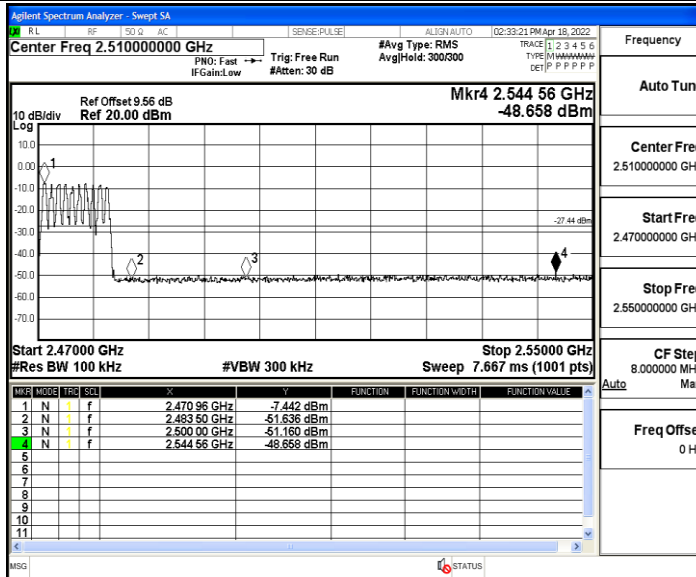
DH5\_Ant1\_High\_2480



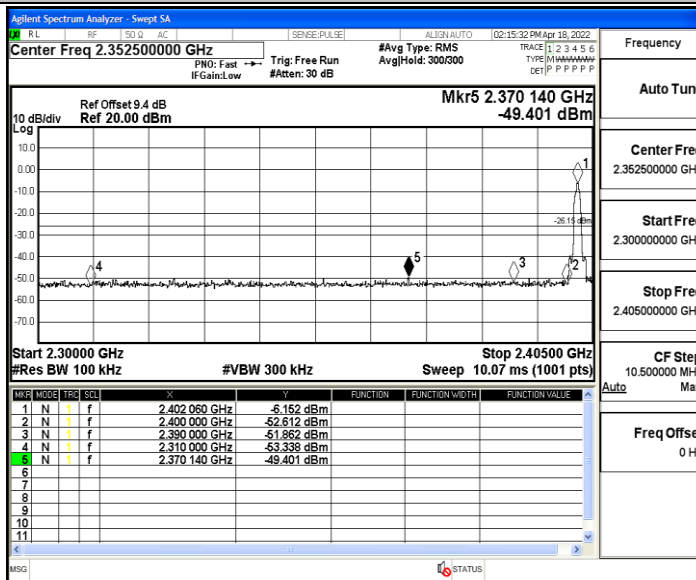
DH5\_Ant1\_Low\_Hop\_2402



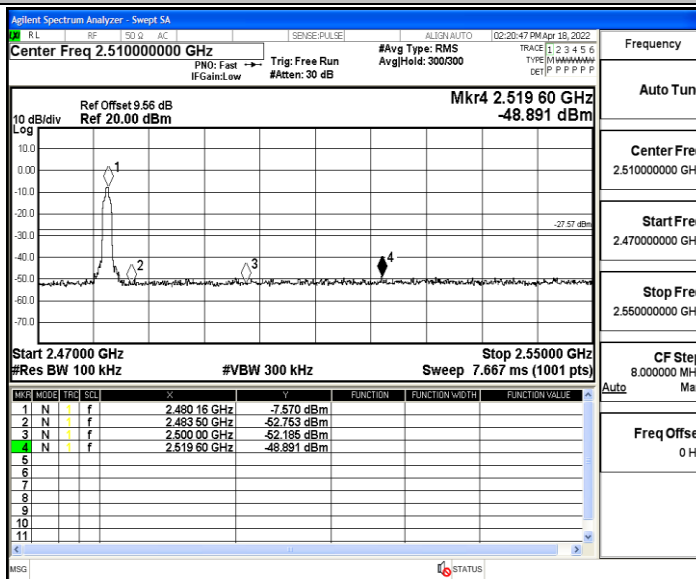
DH5\_Ant1\_High\_Hop\_2480



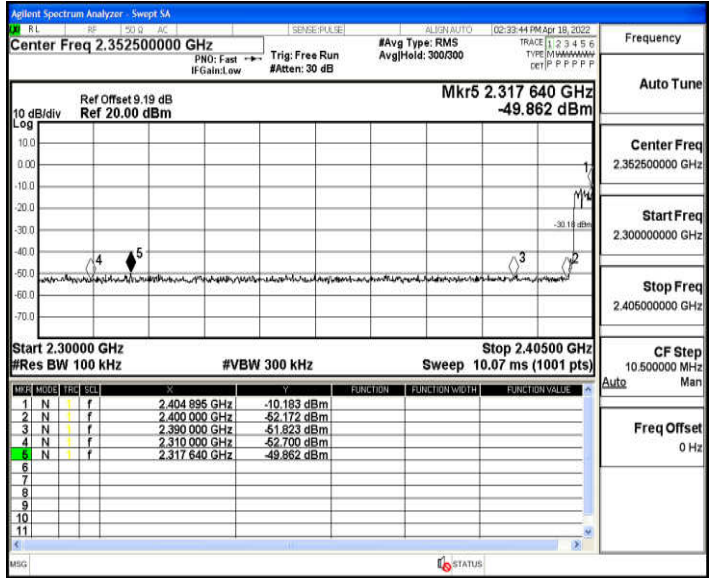
2DH5\_Ant1\_Low\_2402



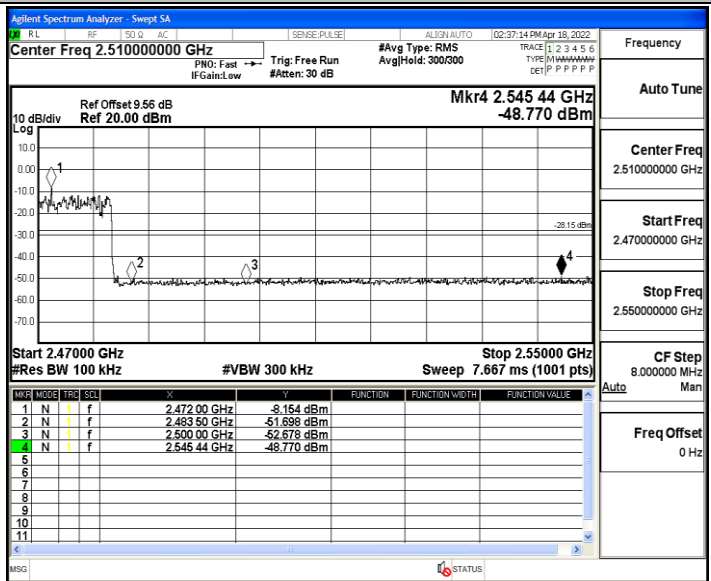
2DH5\_Ant1\_High\_2480



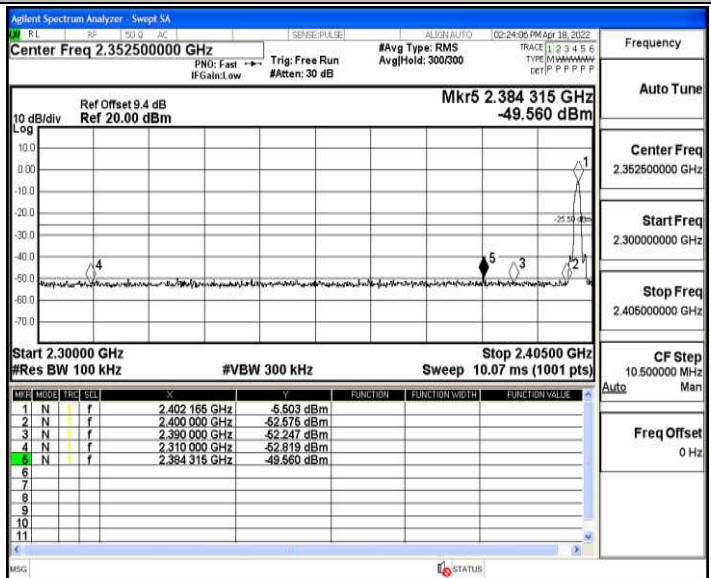
2DH5\_Ant1\_Low\_Hop\_2402



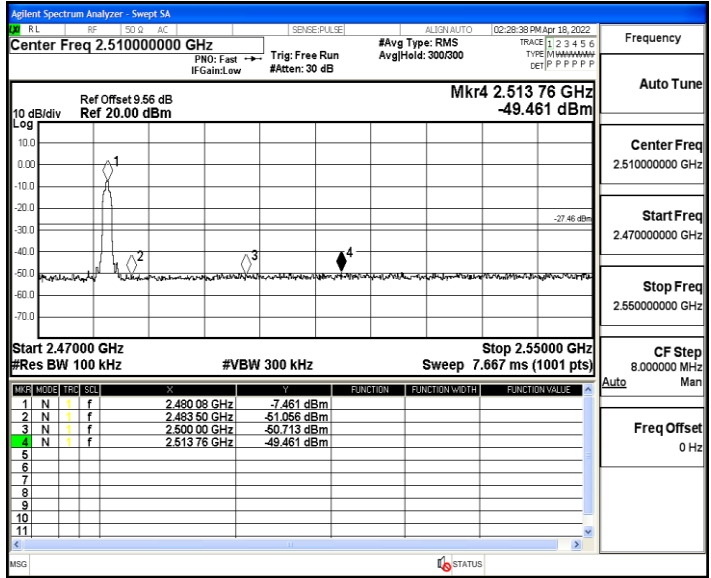
2DH5\_Ant1\_High\_Hop\_2480



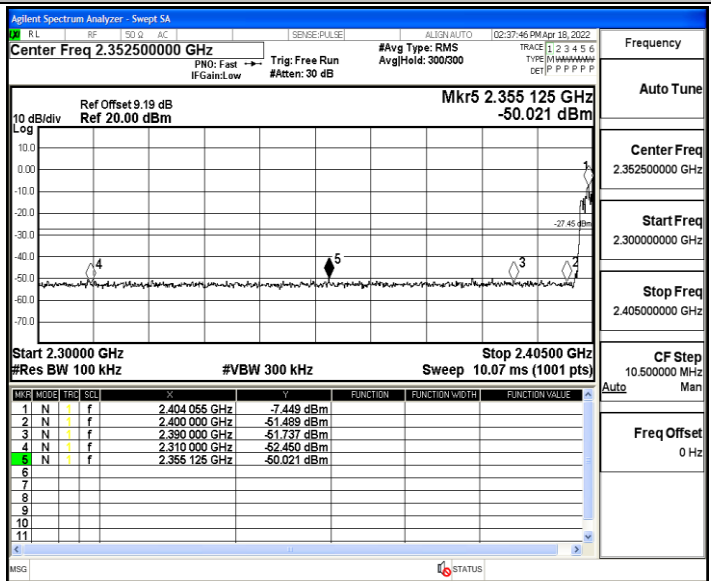
3DH5\_Ant1\_Low\_2402



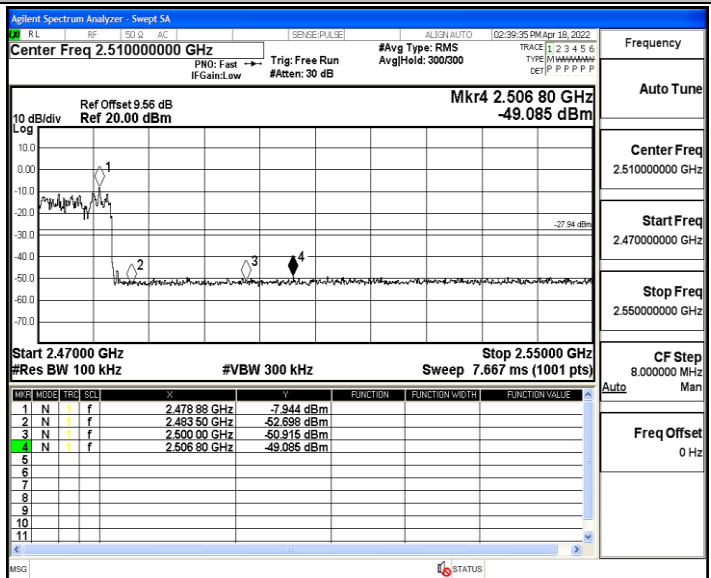
3DH5\_Ant1\_High\_2480



3DH5\_Ant1\_Low\_Hop\_2402



3DH5\_Ant1\_High\_Hop\_2480



## Appendix H: Conducted Spurious Emission

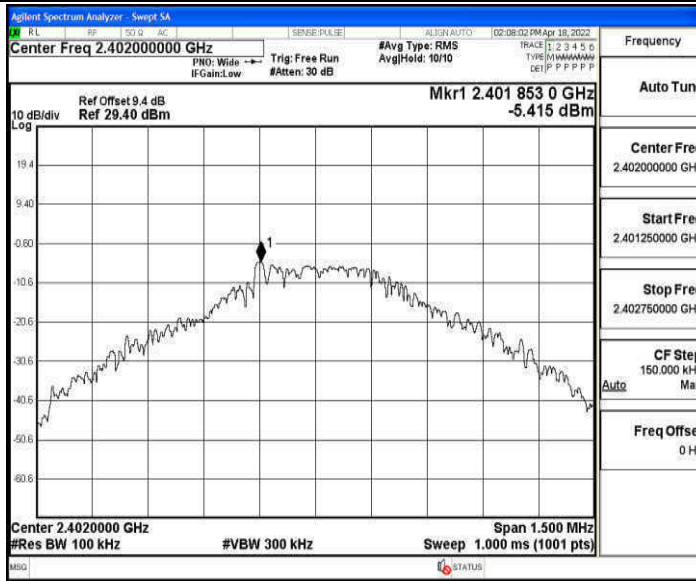
### Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	-5.42	-5.42	---	PASS
			30~1000	-5.42	-61.42	≤-25.42	PASS
			1000~26500	-5.42	-51.23	≤-25.42	PASS
		2441	Reference	-7.05	-7.05	---	PASS
			30~1000	-7.05	-60.13	≤-27.05	PASS
			1000~26500	-7.05	-51.2	≤-27.05	PASS
		2480	Reference	-8.07	-8.07	---	PASS
			30~1000	-8.07	-60.87	≤-28.07	PASS
			1000~26500	-8.07	-51.67	≤-28.07	PASS
2DH5	Ant1	2402	Reference	-9.36	-9.36	---	PASS
			30~1000	-9.36	-61.54	≤-29.36	PASS
			1000~26500	-9.36	-50.22	≤-29.36	PASS
		2441	Reference	-6.94	-6.94	---	PASS
			30~1000	-6.94	-61.11	≤-26.94	PASS
			1000~26500	-6.94	-50.77	≤-26.94	PASS
		2480	Reference	-7.71	-7.71	---	PASS
			30~1000	-7.71	-60.48	≤-27.71	PASS
			1000~26500	-7.71	-50.83	≤-27.71	PASS
3DH5	Ant1	2402	Reference	-7.09	-7.09	---	PASS
			30~1000	-7.09	-61.32	≤-27.09	PASS
			1000~26500	-7.09	-50.64	≤-27.09	PASS
		2441	Reference	-10.76	-10.76	---	PASS
			30~1000	-10.76	-53.58	≤-30.76	PASS
			1000~26500	-10.76	-49.69	≤-30.76	PASS
		2480	Reference	-9.43	-9.43	---	PASS
			30~1000	-9.43	-61.29	≤-29.43	PASS
			1000~26500	-9.43	-50.63	≤-29.43	PASS

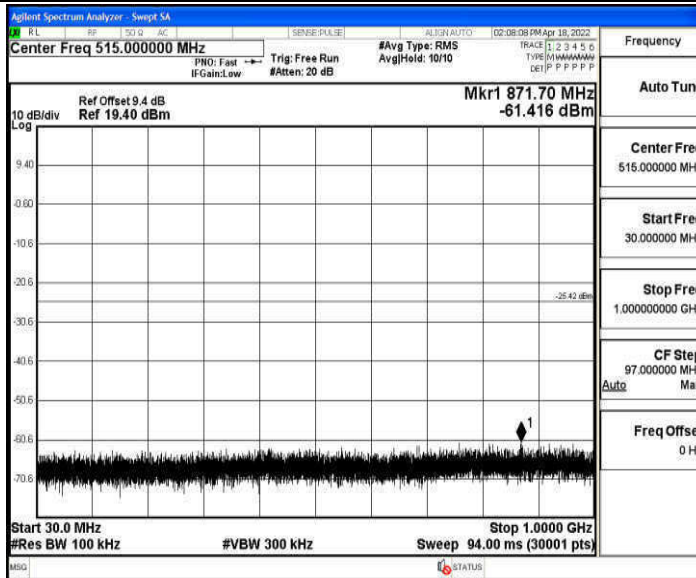


Test Graphs

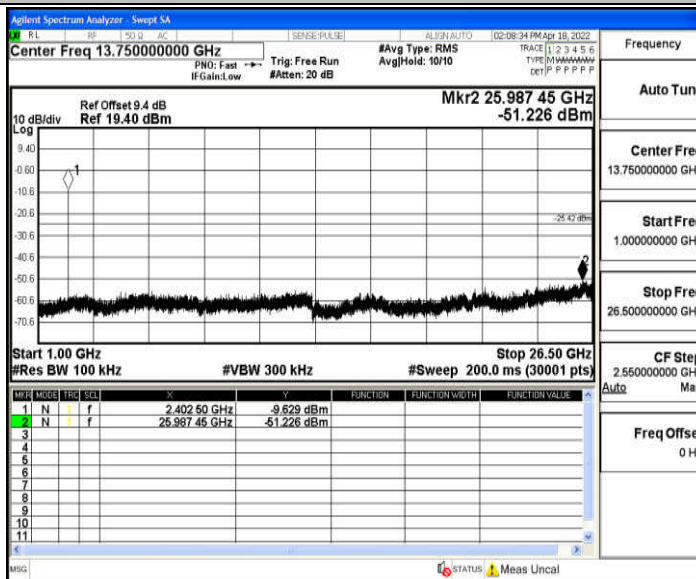
DH5\_Ant1\_2402\_0~Reference



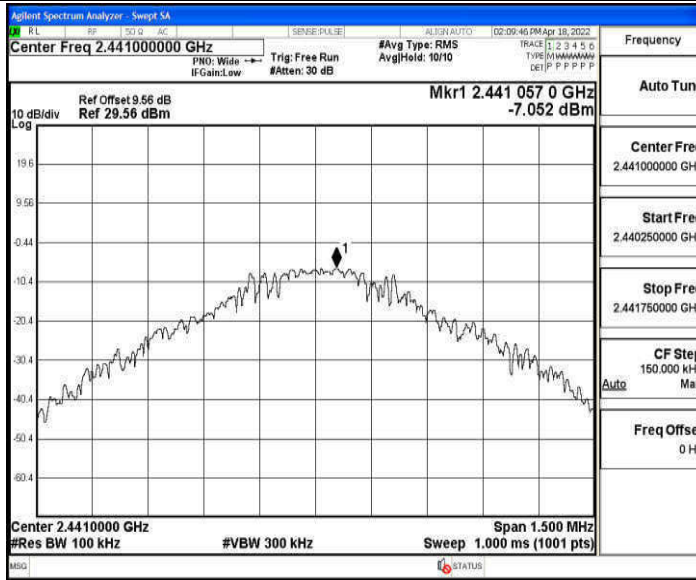
DH5\_Ant1\_2402\_30~1000



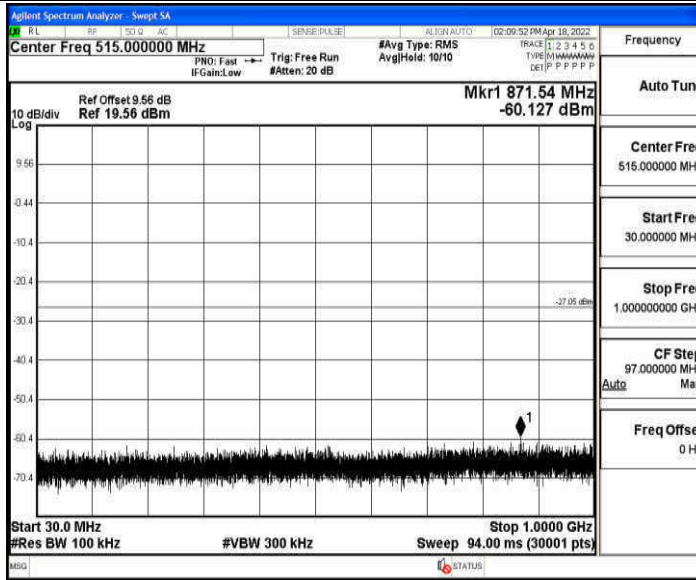
DH5\_Ant1\_2402\_1000~26500



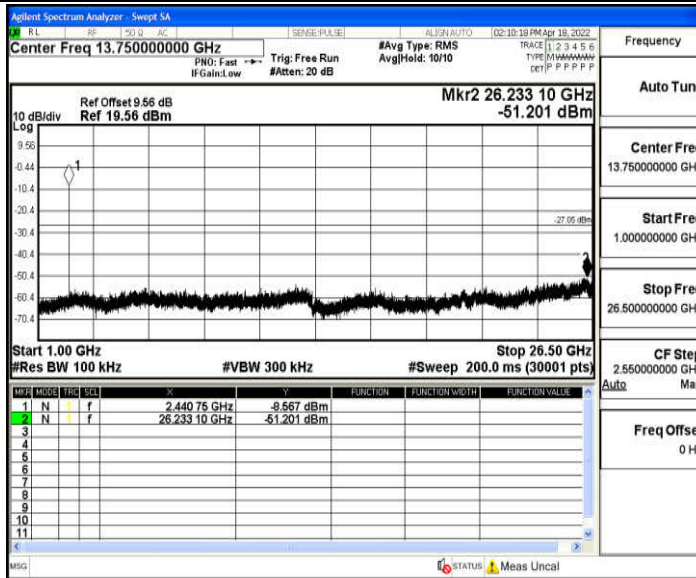
DH5\_Ant1\_2441\_0~Reference



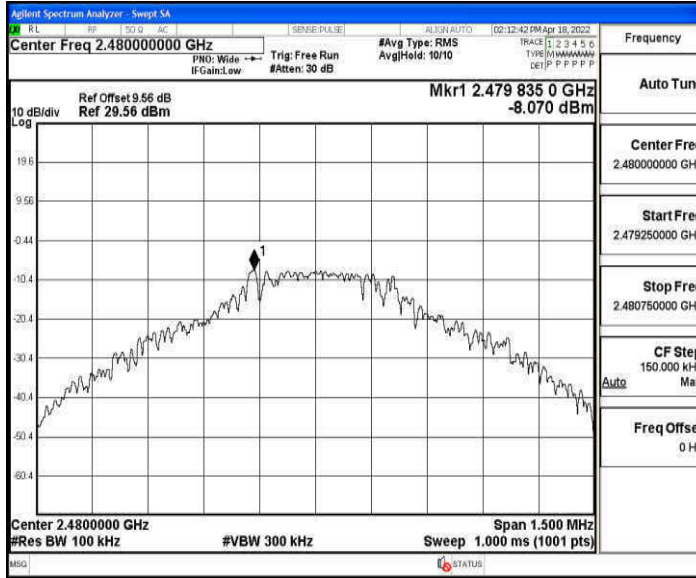
DH5\_Ant1\_2441\_30~1000



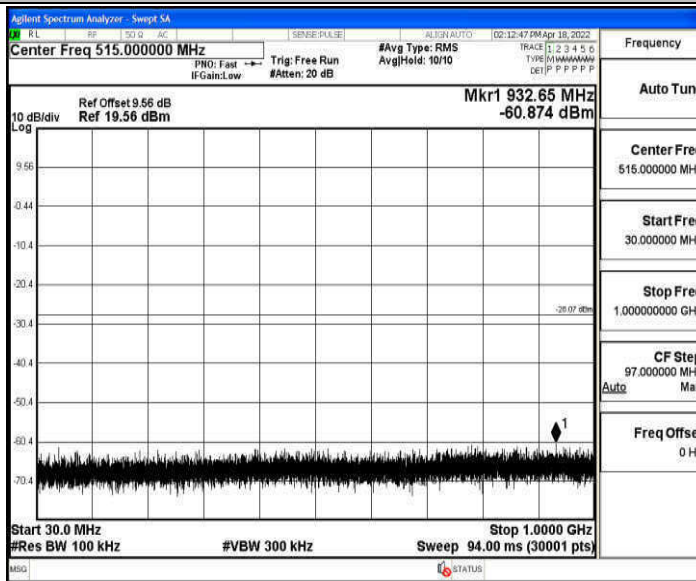
DH5\_Ant1\_2441\_1000~26500



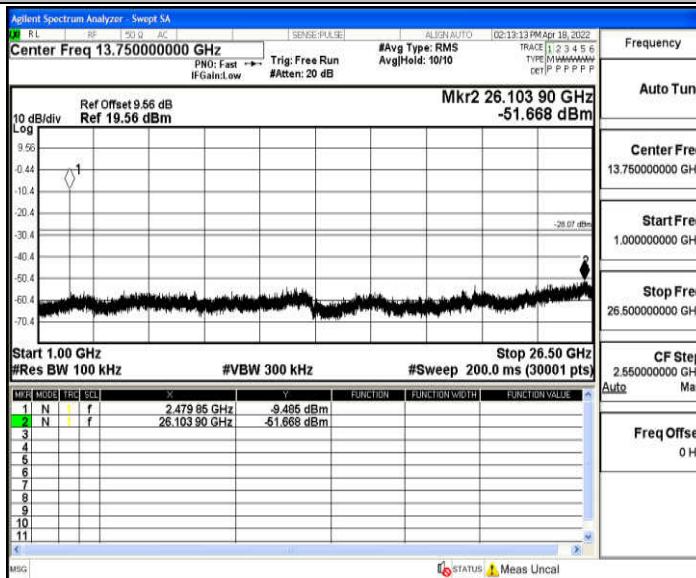
DH5\_Ant1\_2480\_0~Reference



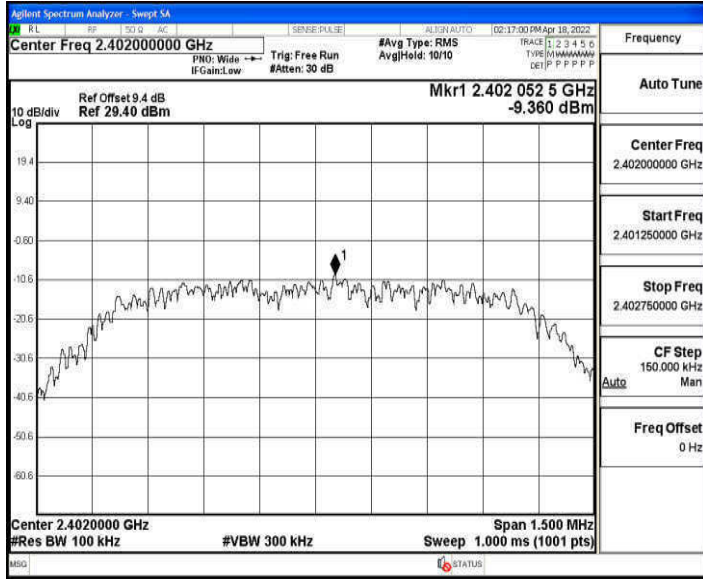
DH5\_Ant1\_2480\_30~1000



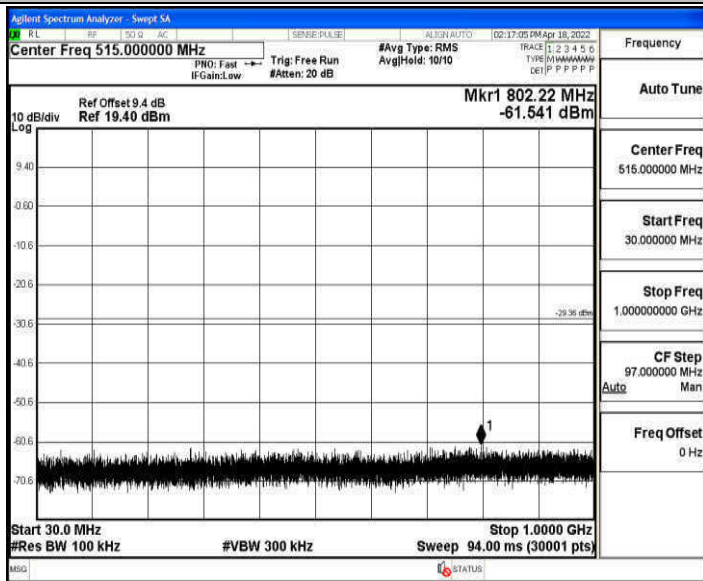
DH5\_Ant1\_2480\_1000~26500



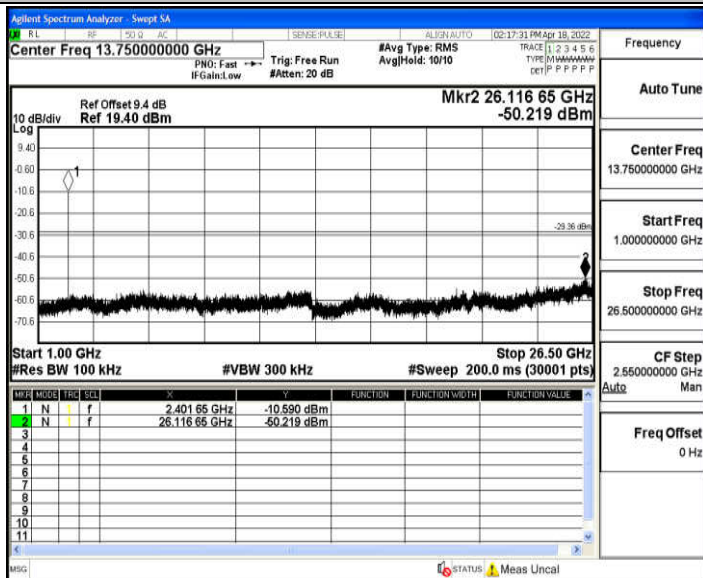
2DH5\_Ant1\_2402\_0~Reference



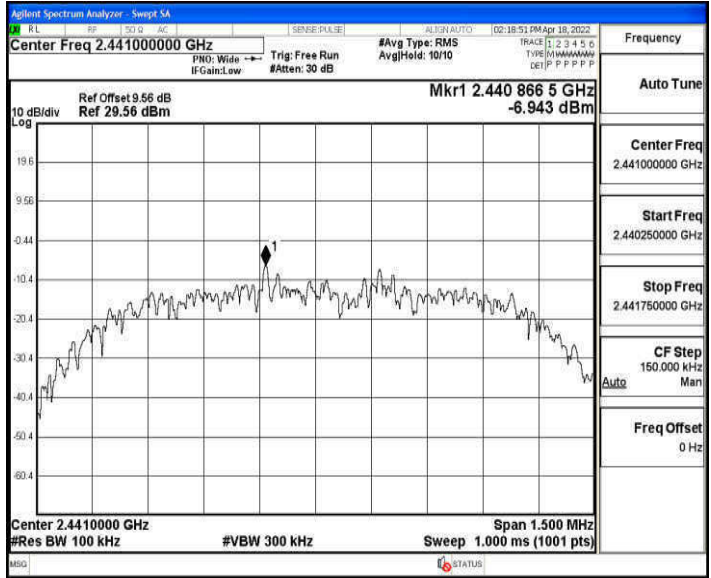
2DH5\_Ant1\_2402\_30~1000



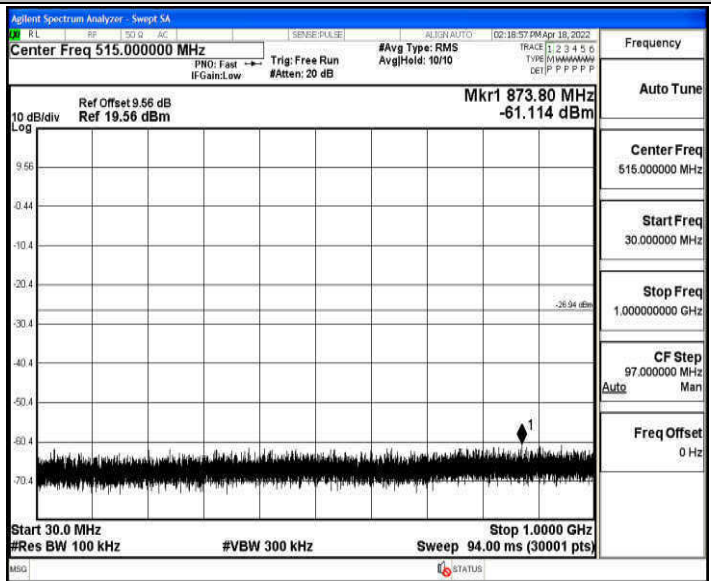
2DH5\_Ant1\_2402\_1000~26500



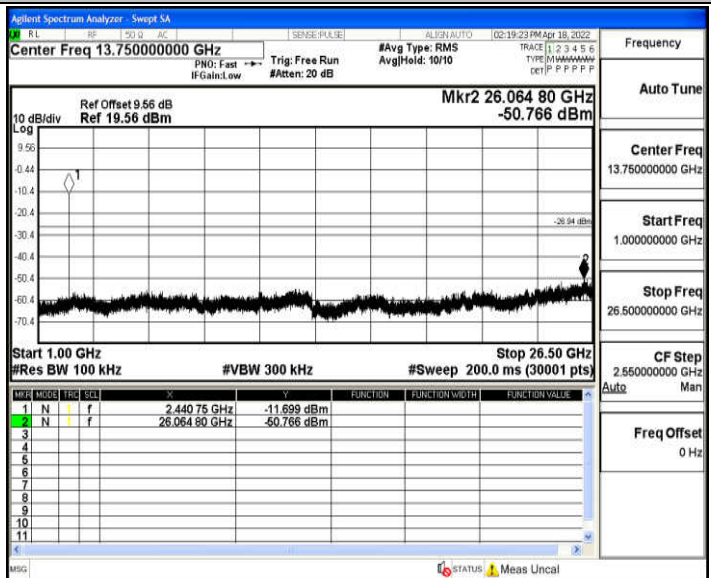
2DH5\_Ant1\_2441\_0~Reference



2DH5\_Ant1\_2441\_30~1000

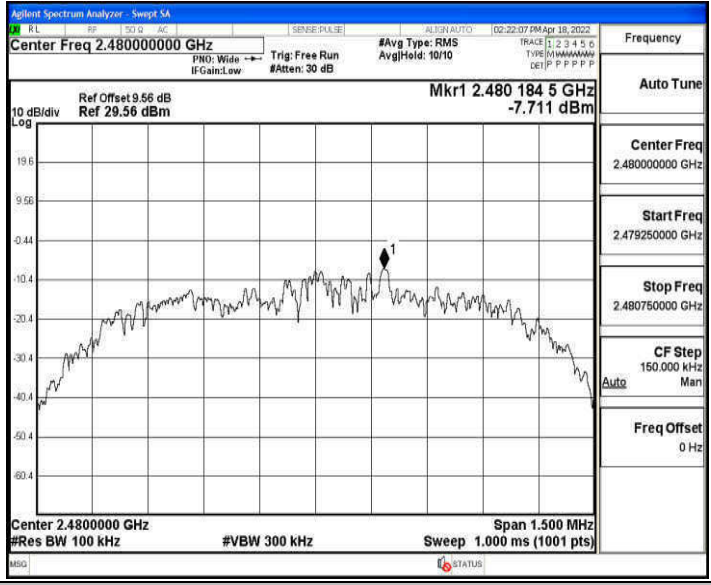


2DH5\_Ant1\_2441\_1000~26500

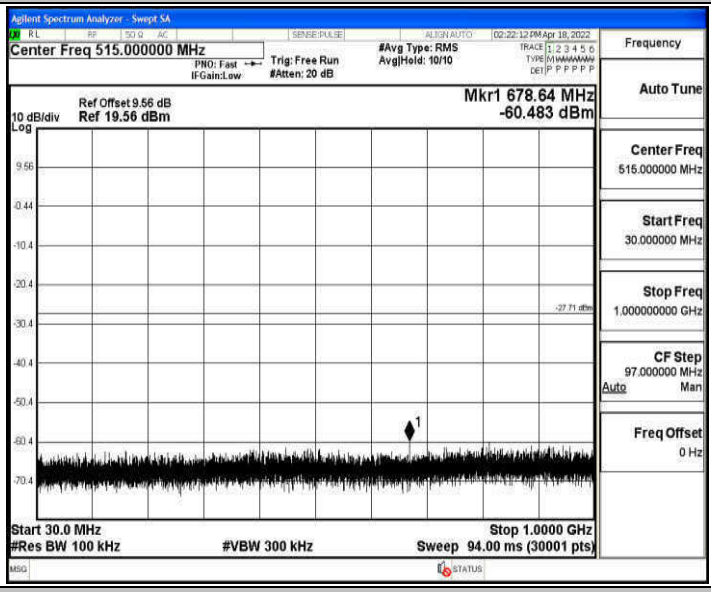


2DH5\_Ant1\_2480\_0~Reference

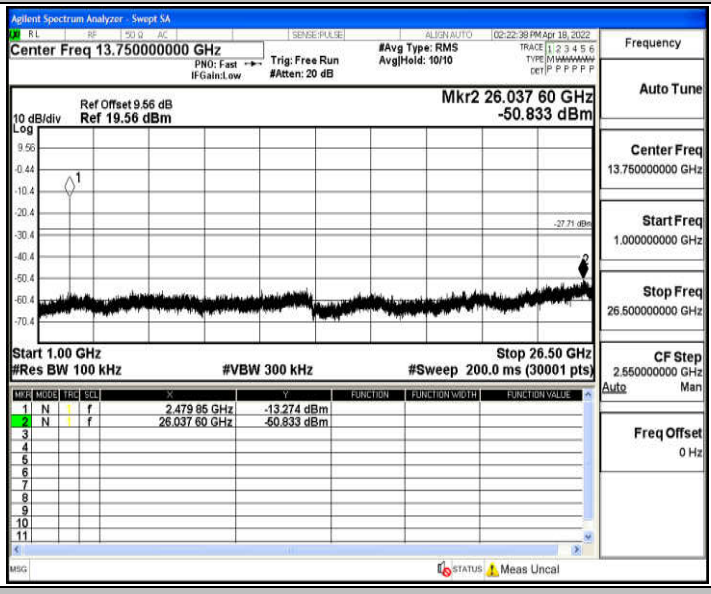




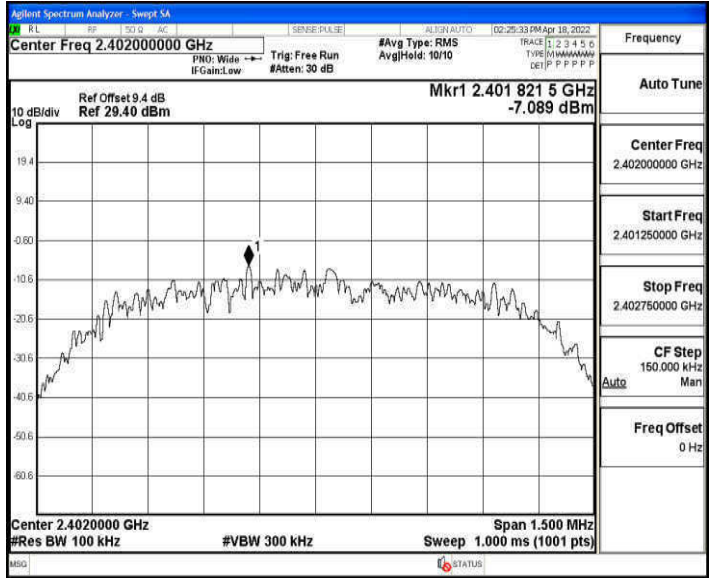
2DH5\_Ant1\_2480\_30~1000



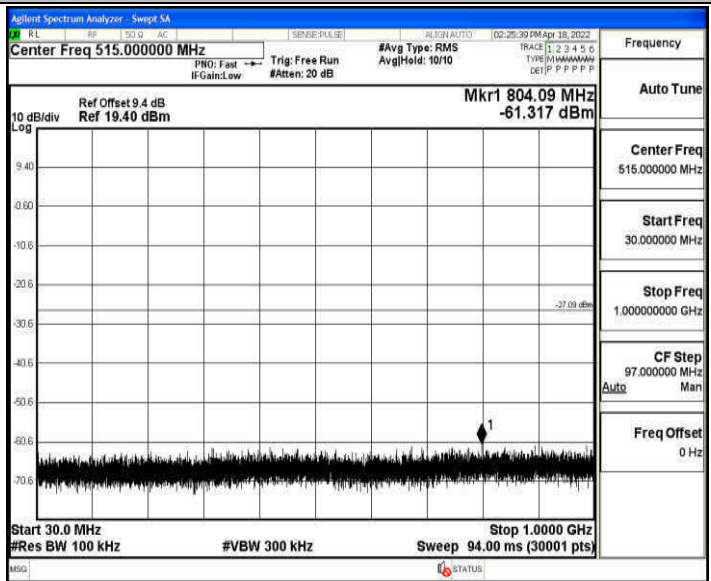
2DH5\_Ant1\_2480\_1000~26500



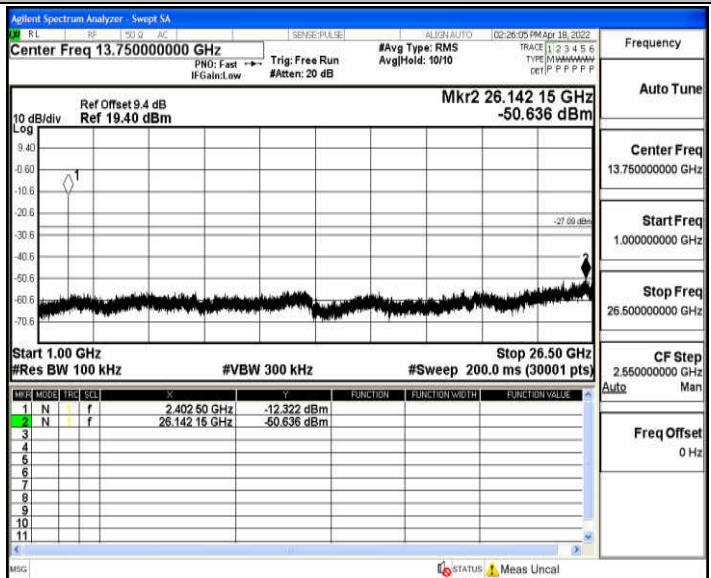
3DH5\_Ant1\_2402\_0~Reference



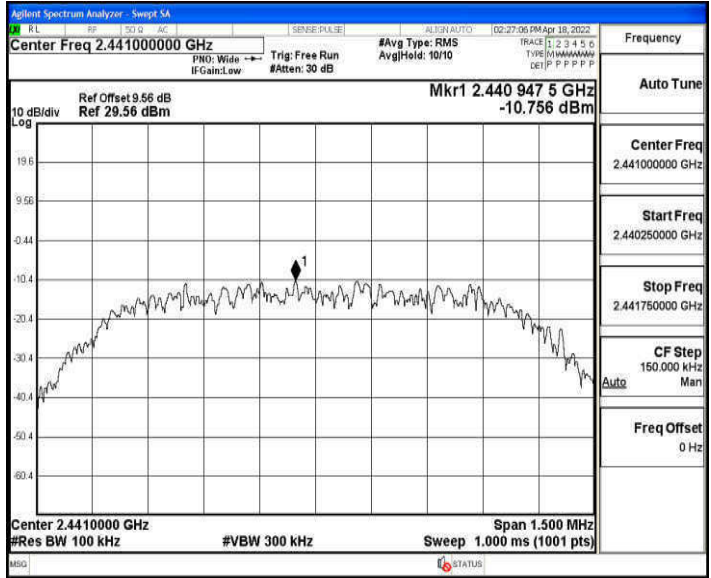
3DH5\_Ant1\_2402\_30~1000



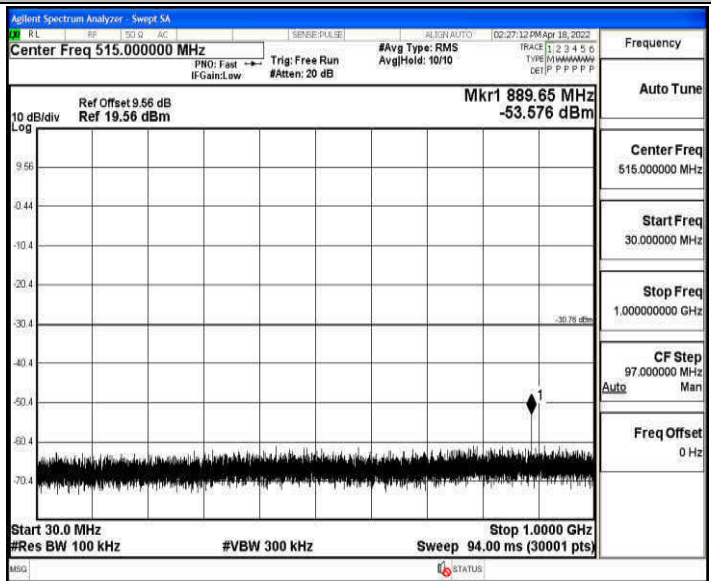
3DH5\_Ant1\_2402\_1000~26500



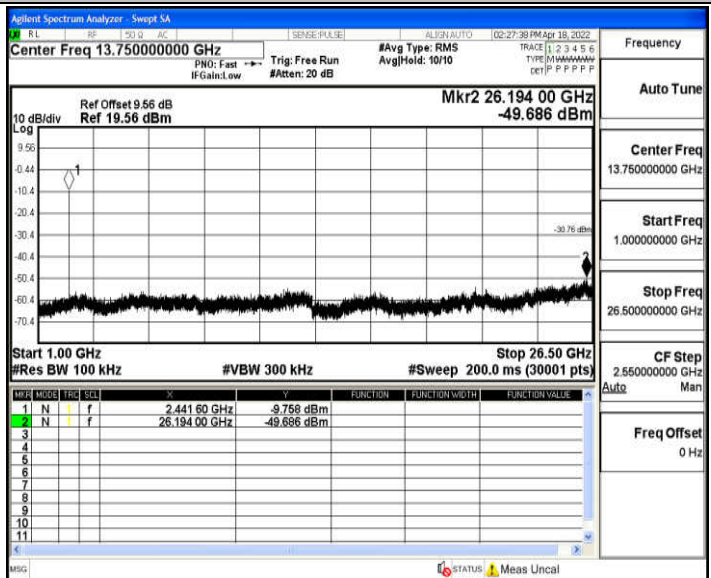
3DH5\_Ant1\_2441\_0~Reference



3DH5\_Ant1\_2441\_30~1000

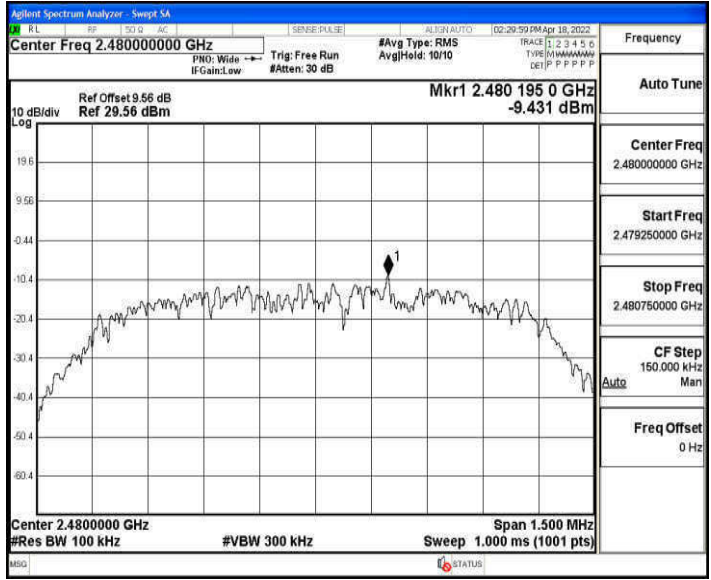


3DH5\_Ant1\_2441\_1000~26500

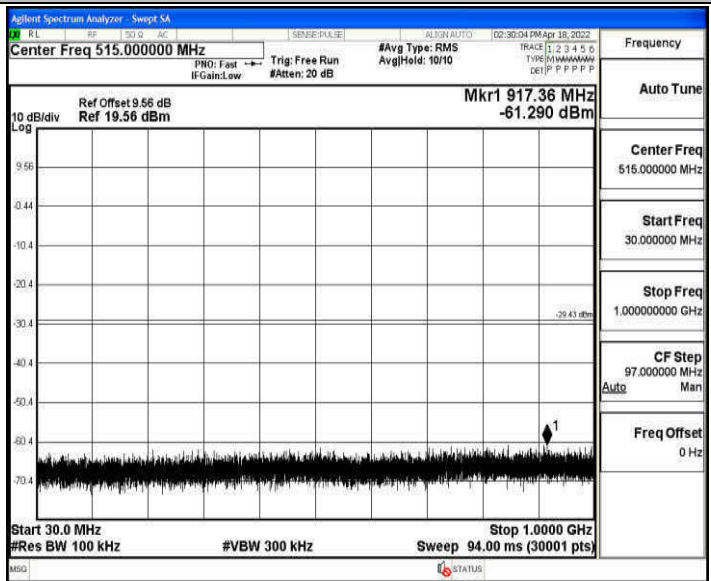


3DH5\_Ant1\_2480\_0~Reference

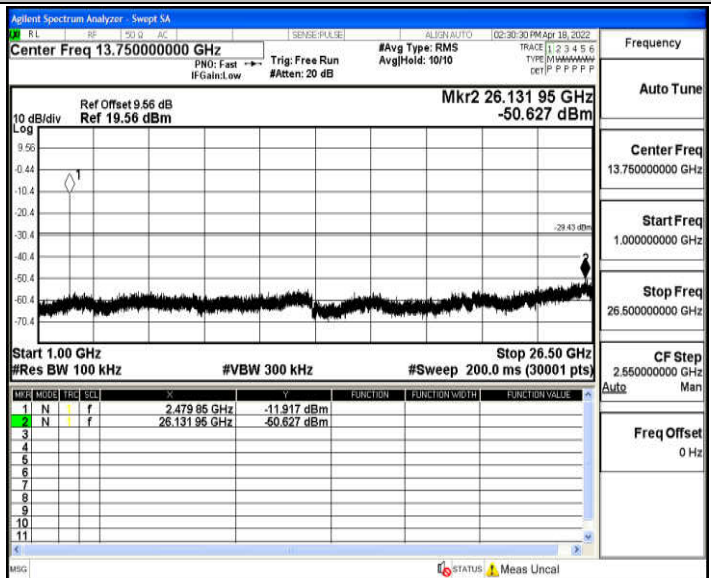




3DH5\_Ant1\_2480\_30~1000



3DH5\_Ant1\_2480\_1000~26500



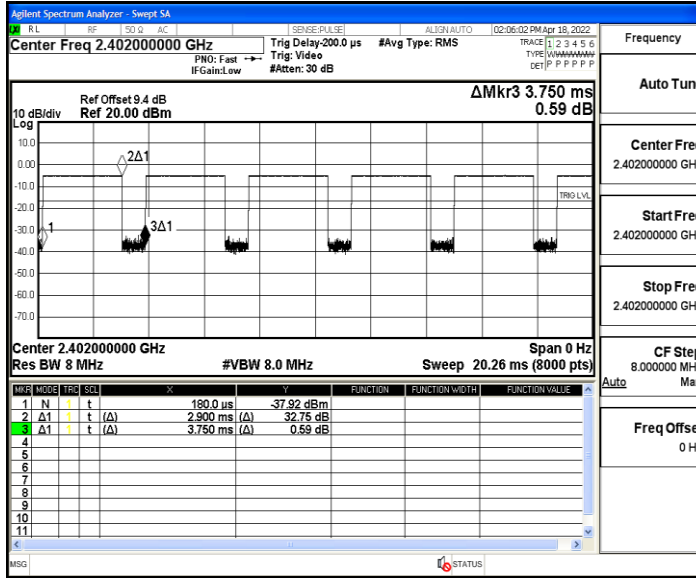
## Appendix I: Duty Cycle

### Test Result

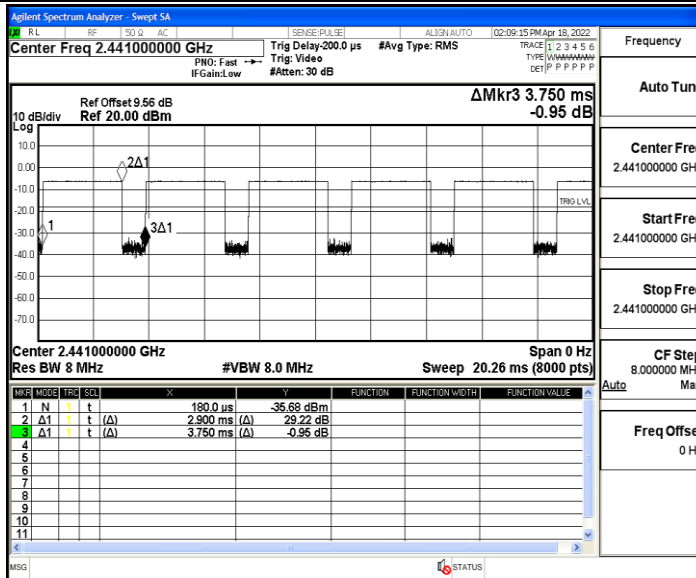
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T
DH5	Ant1	2402	2.90	3.75	77.33	0.34
		2441	2.90	3.75	77.33	0.34
		2480	2.90	3.75	77.33	0.34
2DH5	Ant1	2402	2.91	3.75	77.60	0.34
		2441	2.91	3.75	77.60	0.34
		2480	2.91	3.76	77.39	0.34
3DH5	Ant1	2402	2.91	3.75	77.60	0.34
		2441	2.90	3.75	77.33	0.34
		2480	2.91	3.75	77.60	0.34

Test Graphs

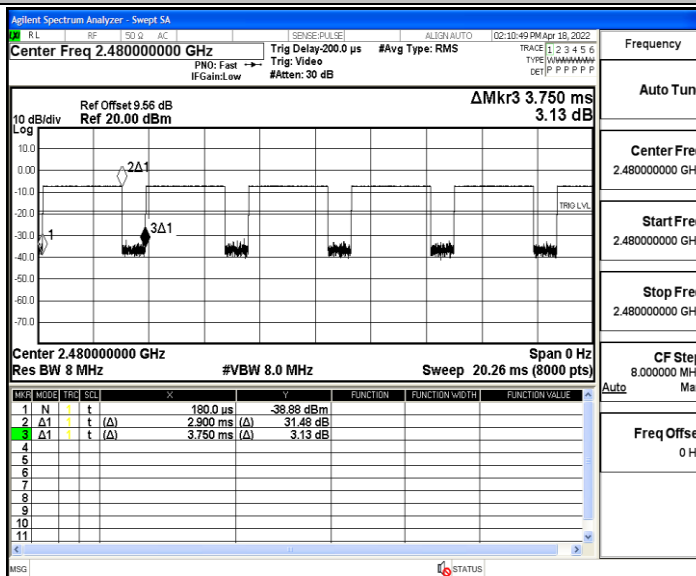
DH5\_Ant1\_2402



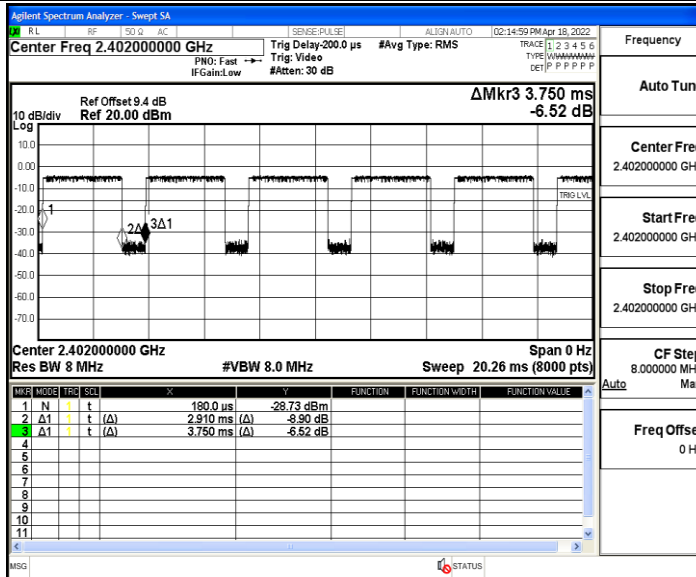
DH5\_Ant1\_2441



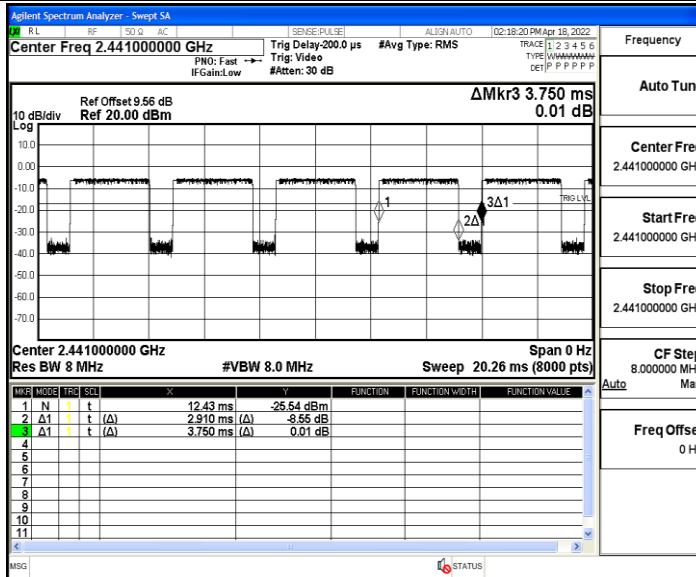
DH5\_Ant1\_2480



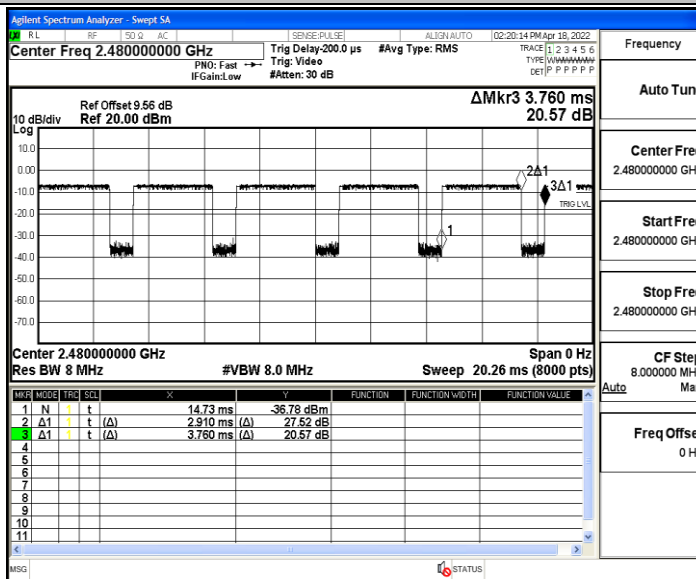
2DH5\_Ant1\_2402



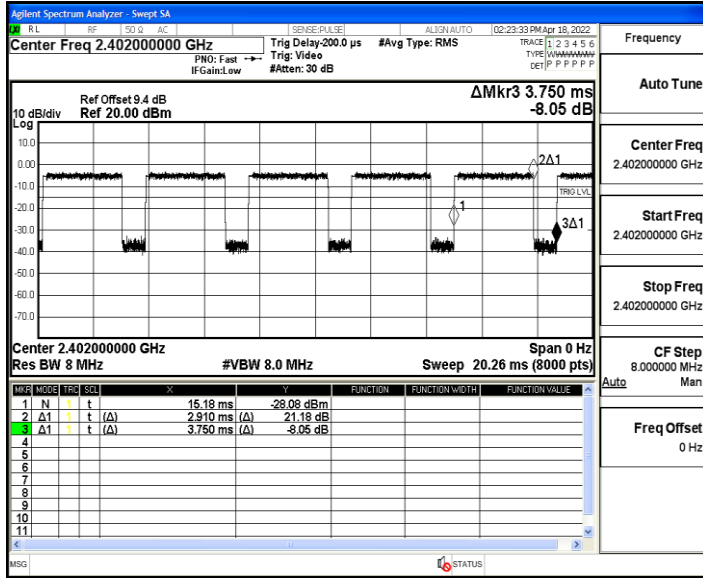
2DH5\_Ant1\_2441



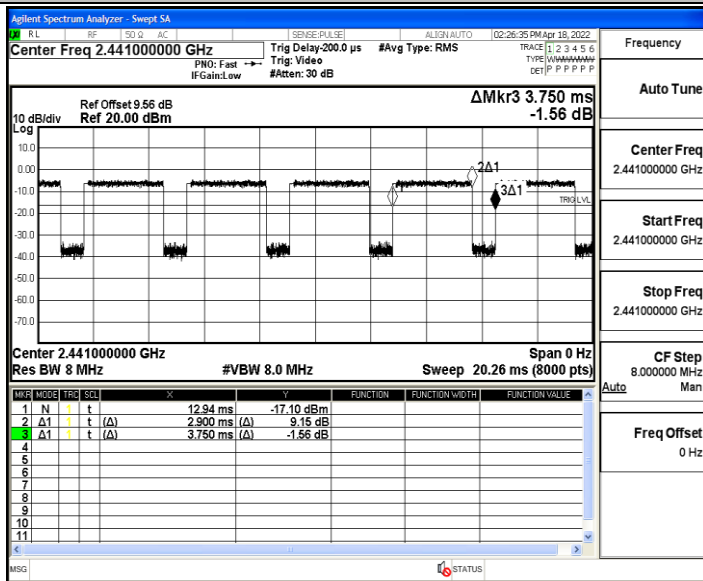
2DH5\_Ant1\_2480



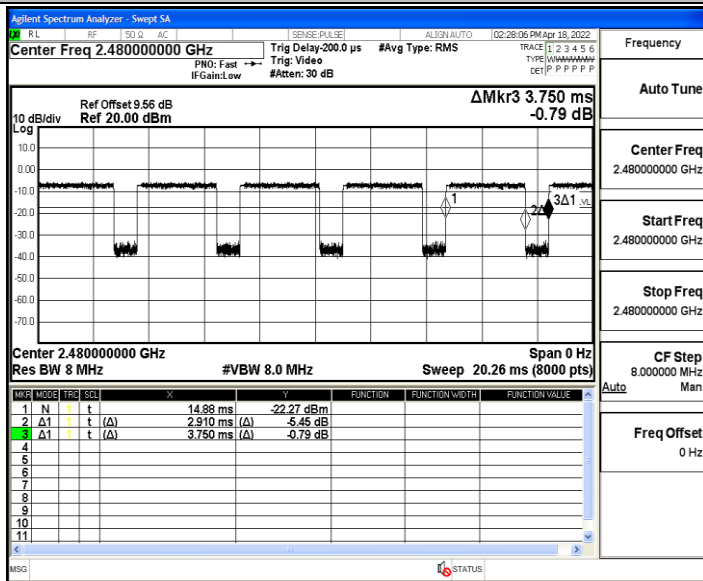
3DH5\_Ant1\_2402



3DH5\_Ant1\_2441



3DH5\_Ant1\_2480



## Appendix J: Emissions in Restricted Bands

### Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq(MHz)	Result(dBm)	Limit(dBm)	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-48.38	≤-41.20	PASS
				AV	2389.565	-47.98	≤-41.20	PASS
				AV	2390.000	-48.09	≤-41.20	PASS
				Peak	2310.000	-41.37	≤-21.20	PASS
				Peak	2377.595	-37.9	≤-21.20	PASS
				Peak	2390.000	-41.08	≤-21.20	PASS
		High	2480	AV	2483.500	-47.7	≤-41.20	PASS
				AV	2496.480	-47.33	≤-41.20	PASS
				AV	2500.000	-47.51	≤-41.20	PASS
				Peak	2483.500	-40.74	≤-21.20	PASS
				Peak	2489.360	-38.57	≤-21.20	PASS
				Peak	2500.000	-41.12	≤-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-48.38	≤-41.20	PASS
				AV	2371.820	-48.05	≤-41.20	PASS
				AV	2390.000	-48.17	≤-41.20	PASS
				Peak	2310.000	-40.99	≤-21.20	PASS
				Peak	2380.955	-37.56	≤-21.20	PASS
				Peak	2390.000	-41.18	≤-21.20	PASS
		High	2480	AV	2483.500	-47.69	≤-41.20	PASS
				AV	2496.960	-47.35	≤-41.20	PASS
				AV	2500.000	-47.42	≤-41.20	PASS
				Peak	2483.500	-40.07	≤-21.20	PASS
				Peak	2489.280	-37.56	≤-21.20	PASS
				Peak	2500.000	-40.81	≤-21.20	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-48.46	≤-41.20	PASS
				AV	2377.280	-47.98	≤-41.20	PASS
				AV	2390.000	-48.06	≤-41.20	PASS
				Peak	2310.000	-40.55	≤-21.20	PASS
				Peak	2388.305	-37.79	≤-21.20	PASS
				Peak	2390.000	-39.37	≤-21.20	PASS
		High	2480	AV	2483.500	-47.61	≤-41.20	PASS
				AV	2499.280	-47.33	≤-41.20	PASS
				AV	2500.000	-47.45	≤-41.20	PASS
				Peak	2483.500	-41.46	≤-21.20	PASS
				Peak	2487.040	-37.19	≤-21.20	PASS
				Peak	2500.000	-39.4	≤-21.20	PASS

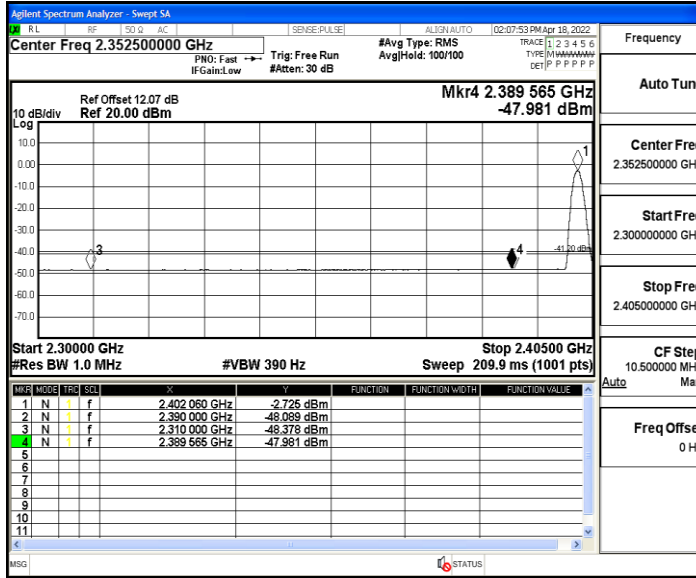
Note:

1. The Antenna Gain is compensated in the graph with 2dBi and Antenna Gain which is Higher.

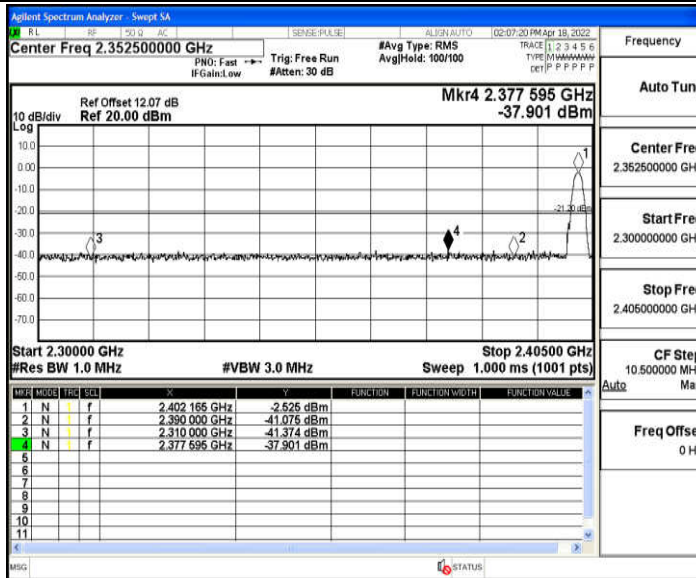
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

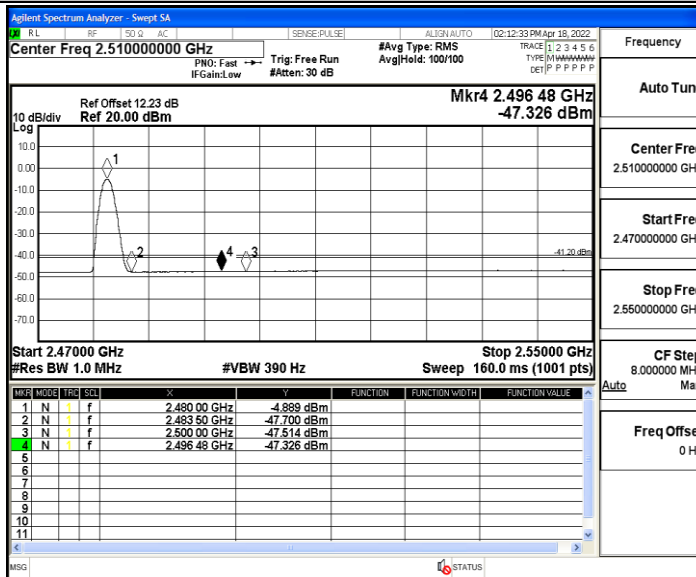
DH5\_Ant1\_Low\_2402\_AV



DH5\_Ant1\_Low\_2402\_Peak

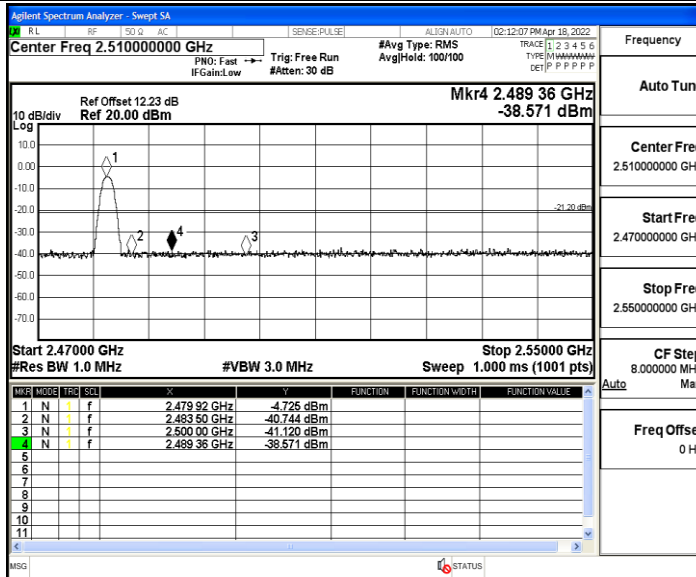


DH5\_Ant1\_High\_2480\_AV

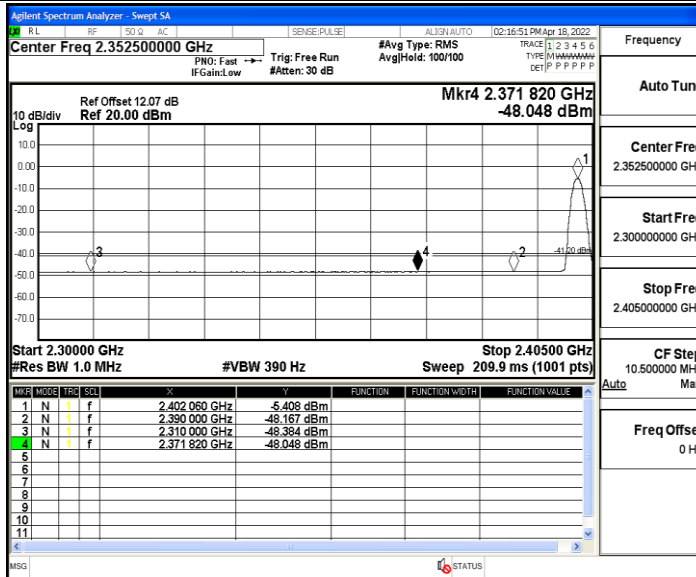




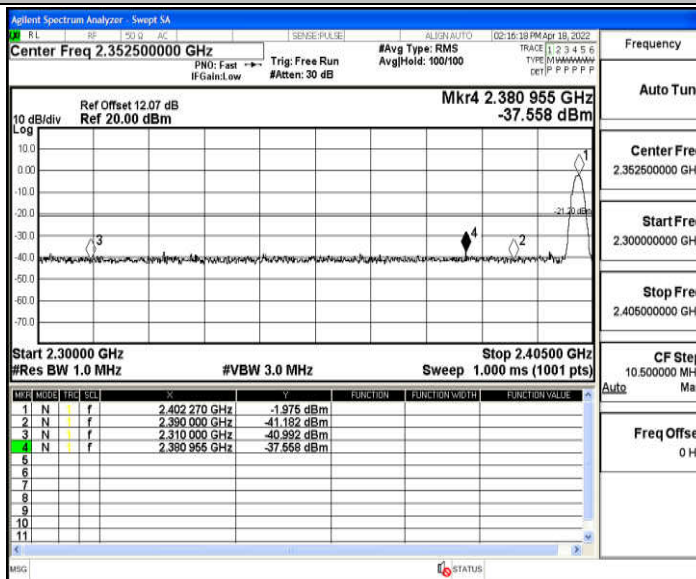
DH5\_Ant1\_High\_2480\_Peak



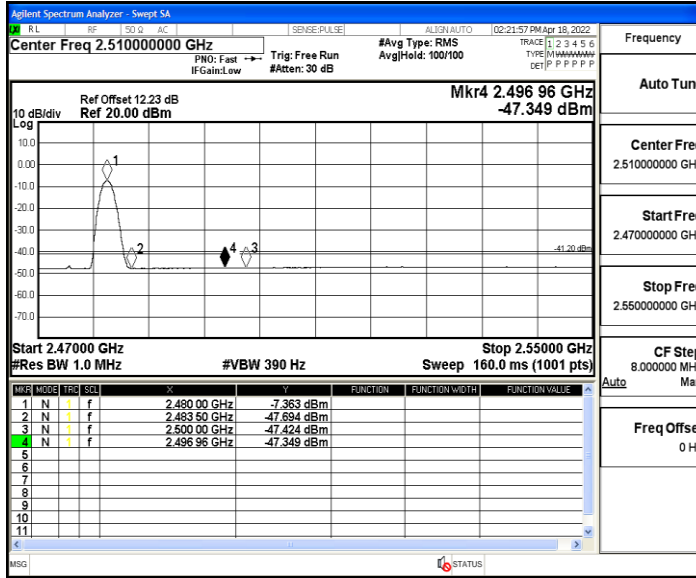
2DH5\_Ant1\_Low\_2402\_AV



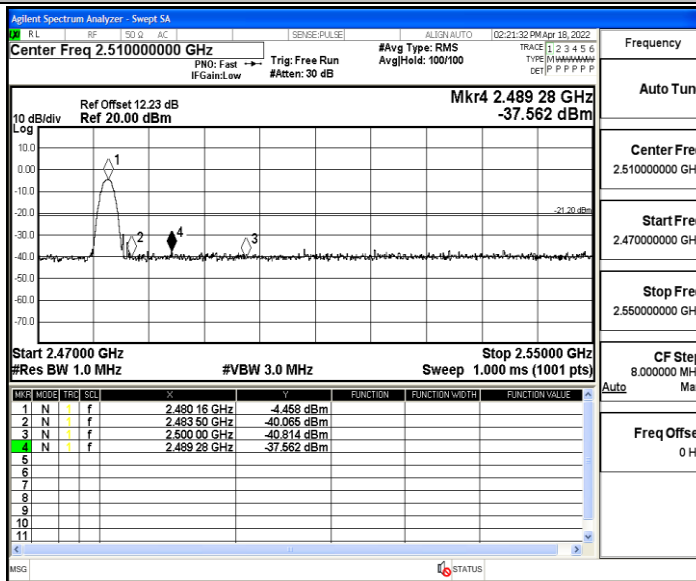
2DH5\_Ant1\_Low\_2402\_Peak



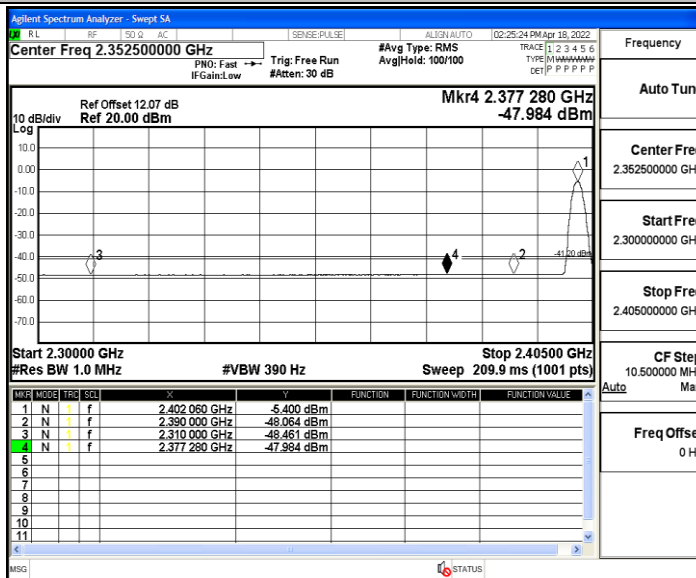
2DH5\_Ant1\_High\_2480\_AV



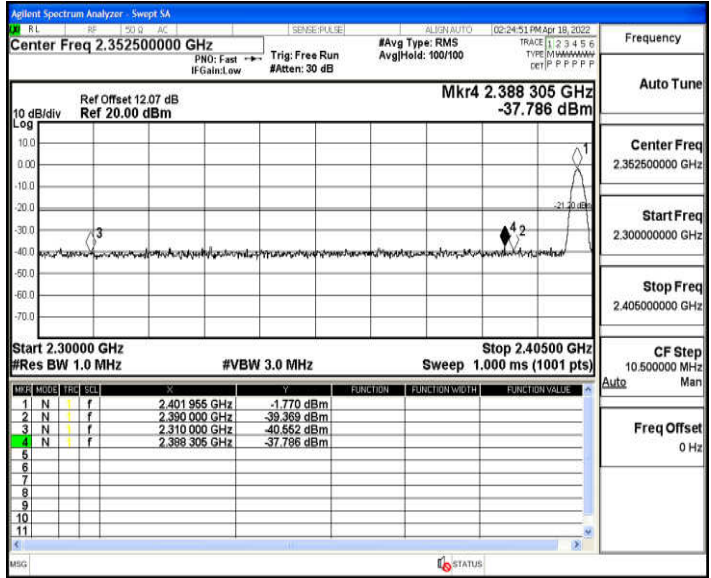
2DH5\_Ant1\_High\_2480\_Peak



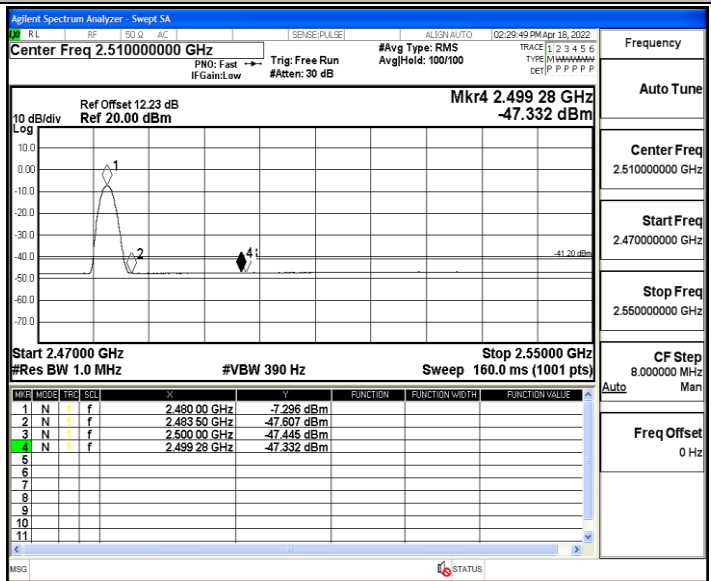
3DH5\_Ant1\_Low\_2402\_AV



3DH5\_Ant1\_Low\_2402\_Peak



3DH5\_Ant1\_High\_2480\_AV



3DH5\_Ant1\_High\_2480\_Peak

