



Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: Wireless headset

Trade Mark: WINTORY

Test Model: WINTORY W1

Environmental Conditions

Temperature:	22.5 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan



Appendix A.1: Maximum conducted output power

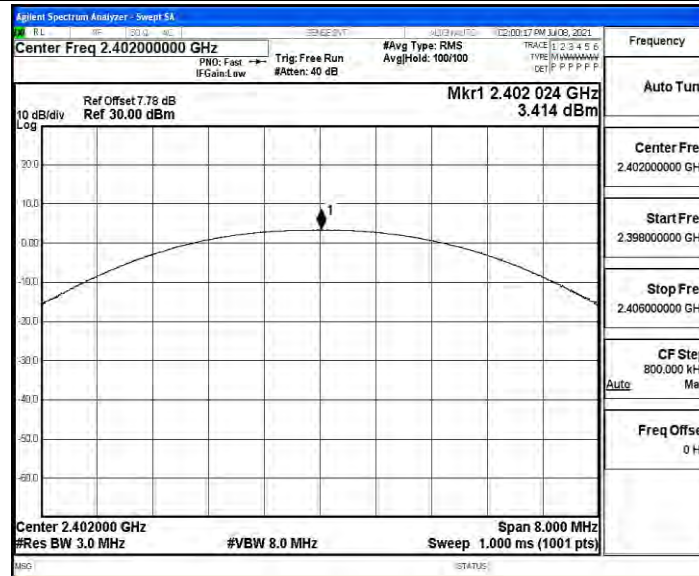
Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	3.41	≤ 20.97	PASS
		2441	4.56	≤ 20.97	PASS
		2480	3.12	≤ 20.97	PASS
2DH5	Ant1	2402	2.53	≤ 20.97	PASS
		2441	3.68	≤ 20.97	PASS
		2480	2.36	≤ 20.97	PASS
3DH5	Ant1	2402	2.66	≤ 20.97	PASS
		2441	3.86	≤ 20.97	PASS
		2480	2.48	≤ 20.97	PASS

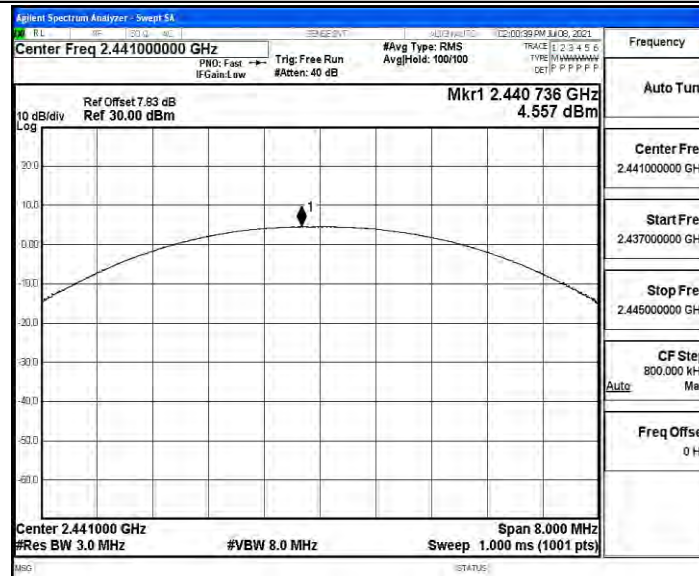


Test Graphs

DH5_Ant1_2402

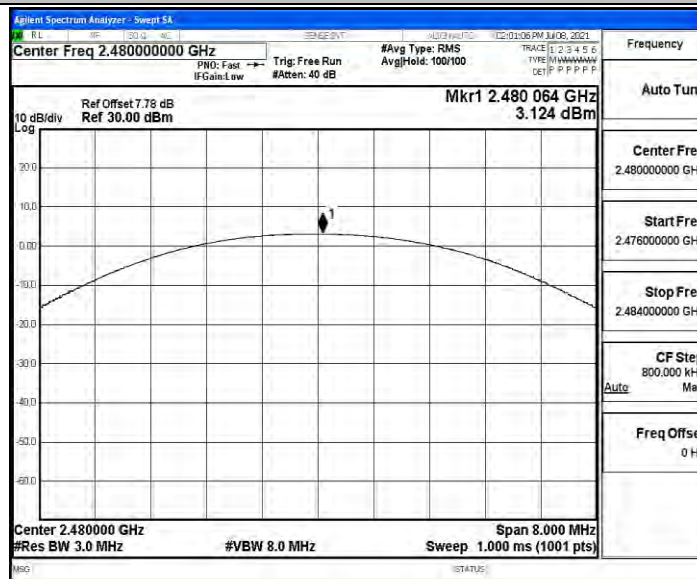


DH5_Ant1_2441

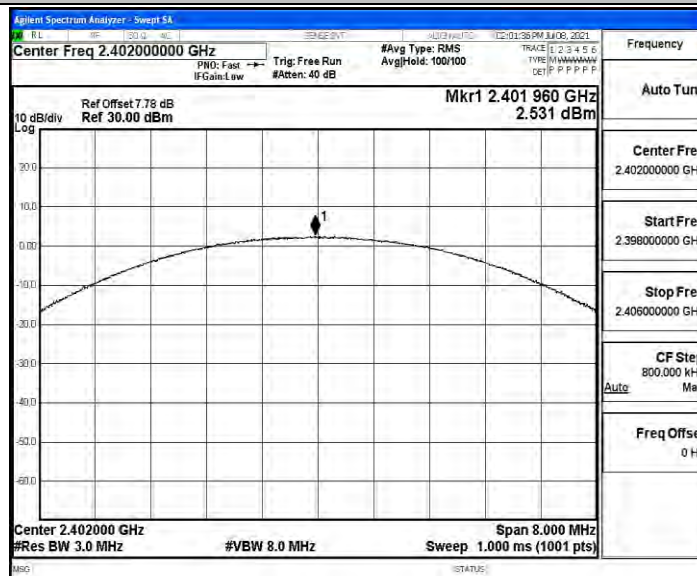




DH5_Ant1_2480

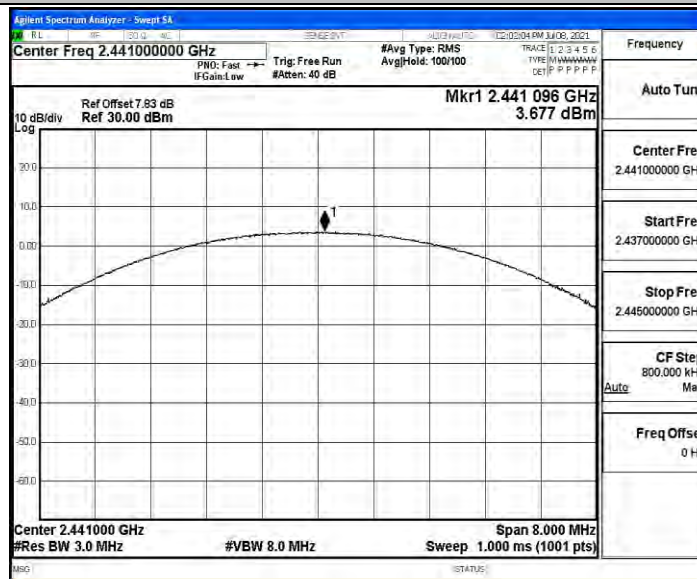


2DH5_Ant1_2402

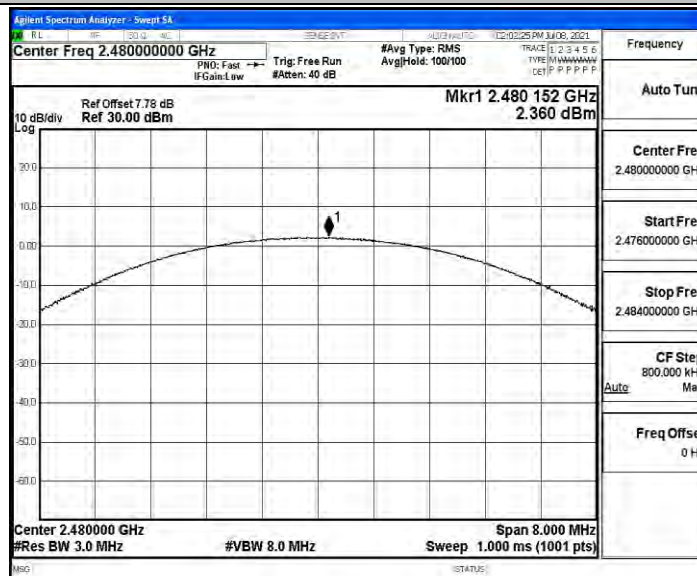




2DH5_Ant1_2441

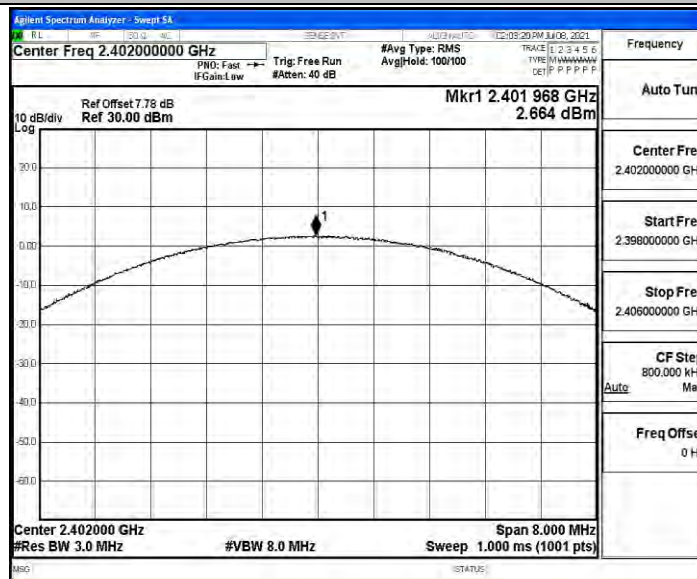


2DH5_Ant1_2480

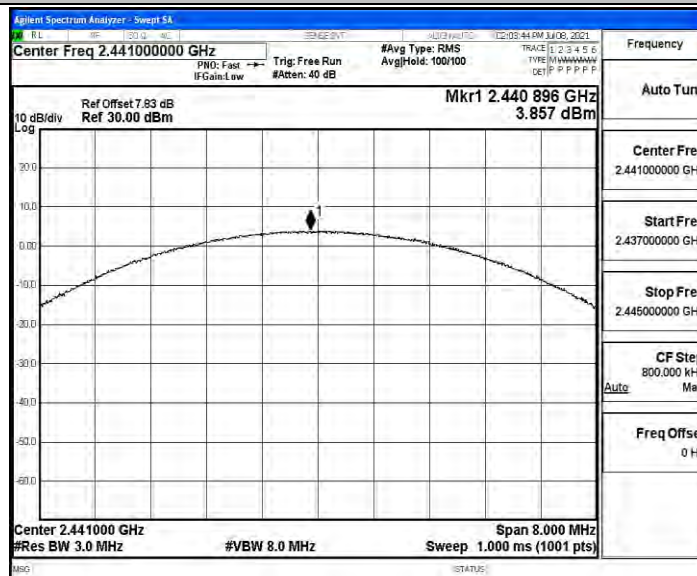




3DH5_Ant1_2402

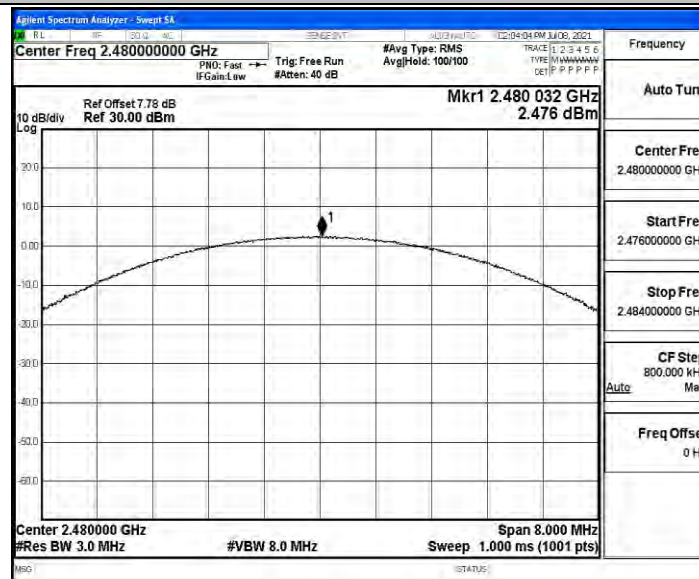


3DH5_Ant1_2441





3DH5_Ant1_2480





Appendix A.2.1: 20dB Emission Bandwidth

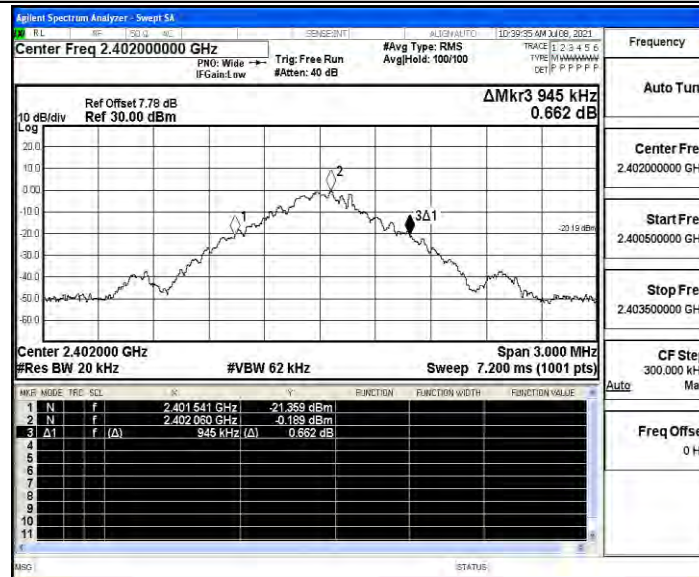
Test Result

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.945	2401.541	2402.486	---	PASS
		2441	0.942	2440.541	2441.483	---	PASS
		2480	0.942	2479.541	2480.483	---	PASS
2DH5	Ant1	2402	1.317	2401.346	2402.663	---	PASS
		2441	1.263	2440.373	2441.636	---	PASS
		2480	1.317	2479.343	2480.660	---	PASS
3DH5	Ant1	2402	1.278	2401.355	2402.633	---	PASS
		2441	1.272	2440.355	2441.627	---	PASS
		2480	1.281	2479.352	2480.633	---	PASS

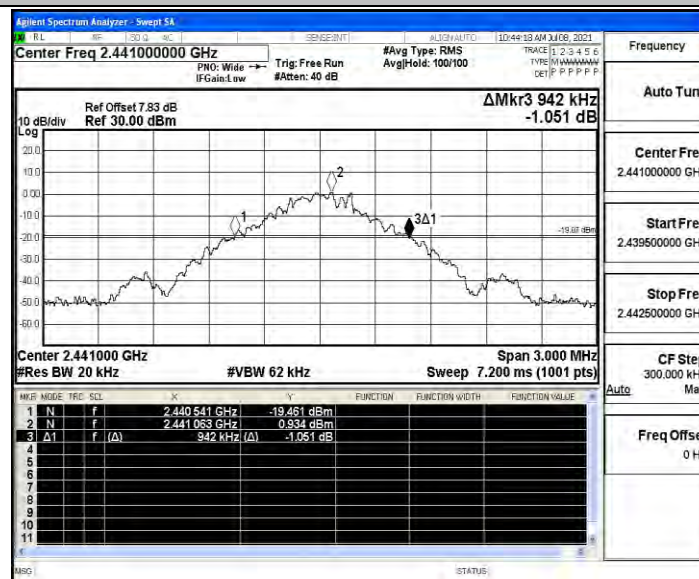


Test Graphs

DH5_Ant1_2402

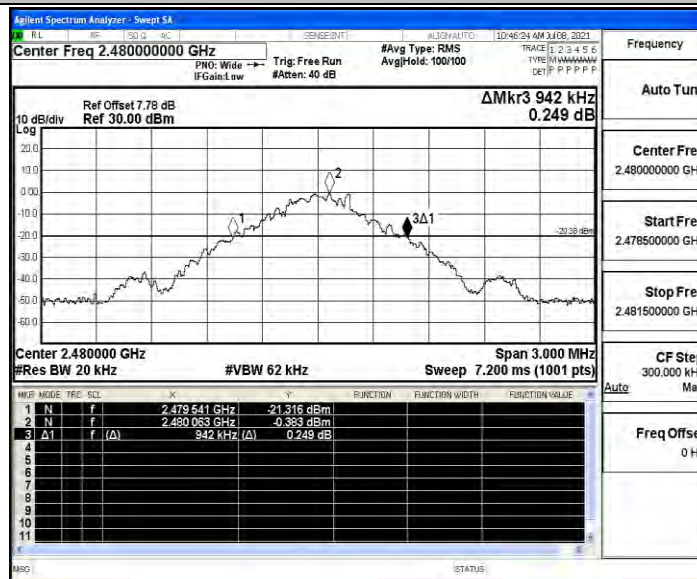


DH5_Ant1_2441

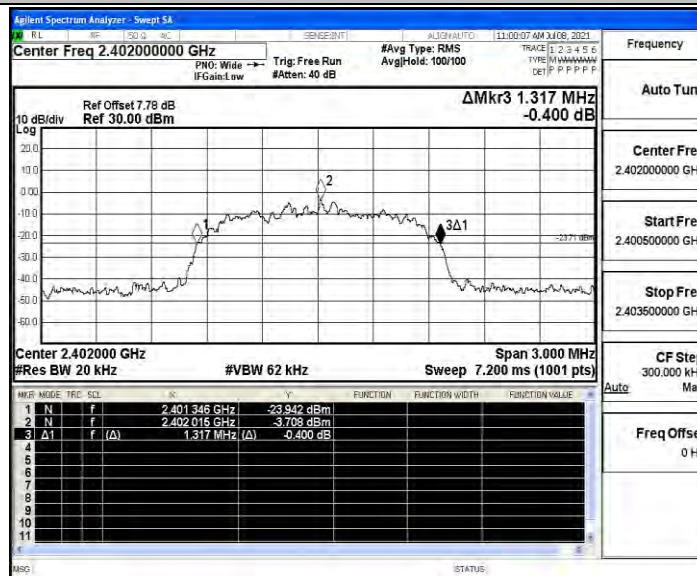




DH5_Ant1_2480

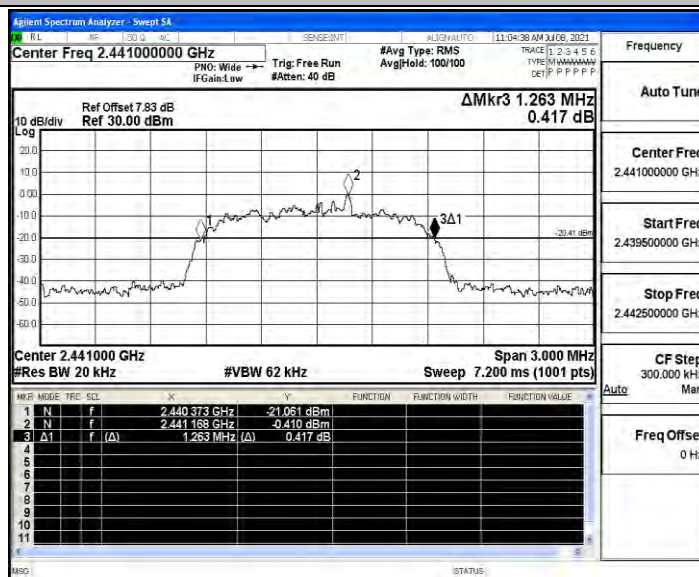


2DH5_Ant1_2402

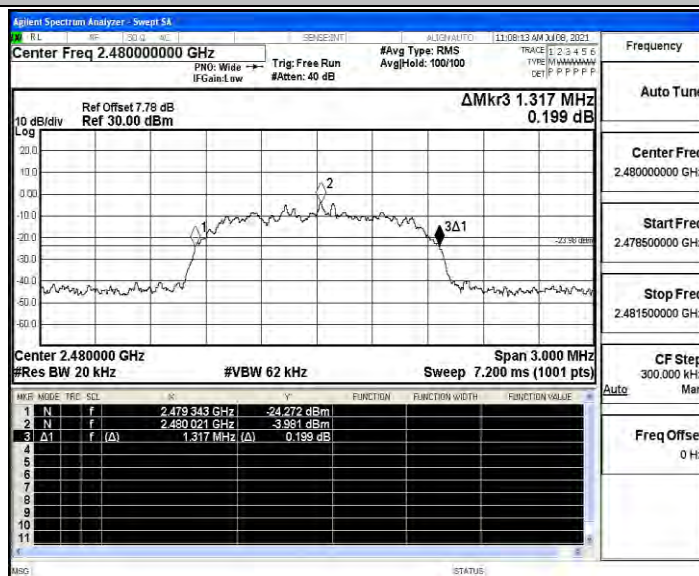




2DH5_Ant1_2441

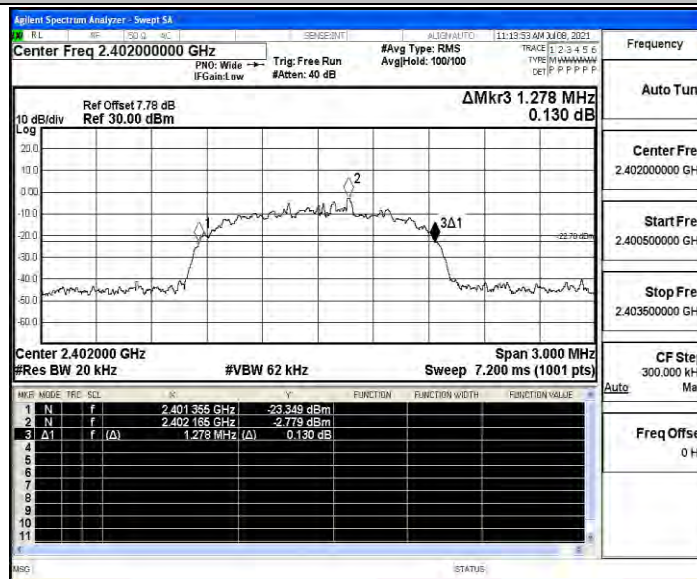


2DH5_Ant1_2480

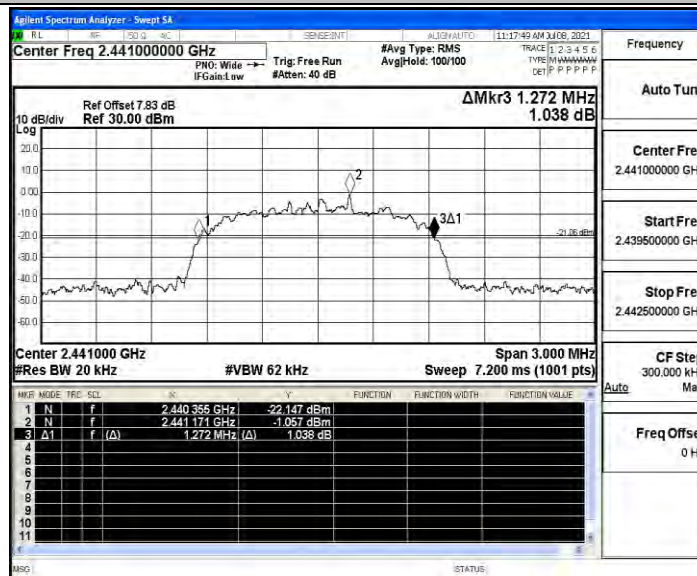


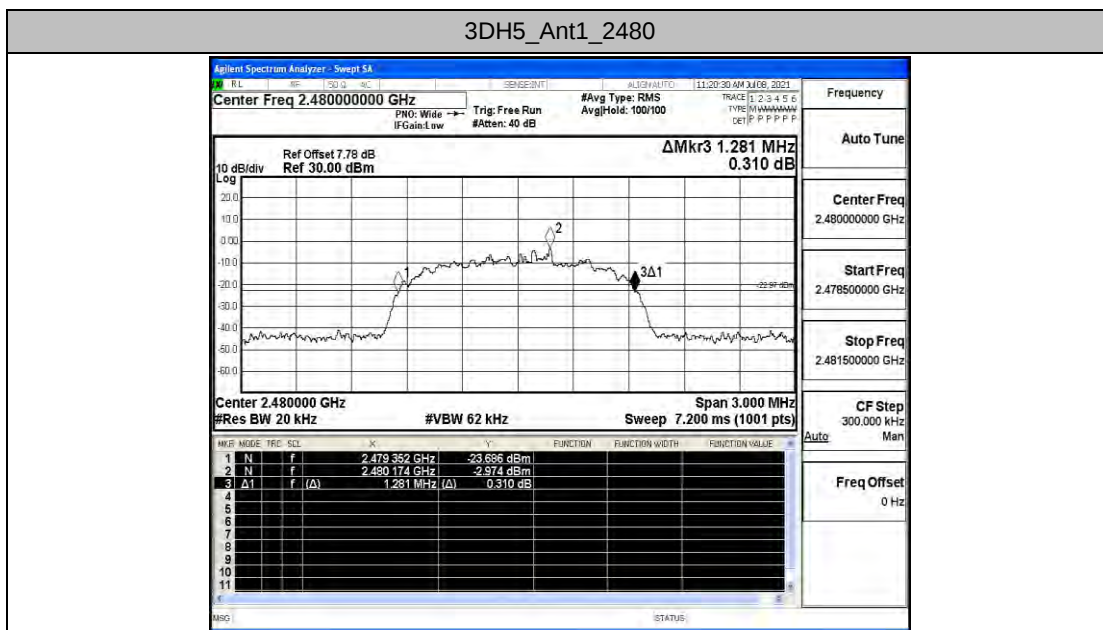


3DH5_Ant1_2402



3DH5_Ant1_2441







Appendix A.2.2: Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.89057	2401.564	2402.454	---	PASS
		2441	0.90007	2440.554	2441.454	---	PASS
		2480	0.90446	2479.550	2480.455	---	PASS
2DH5	Ant1	2402	1.1844	2401.413	2402.597	---	PASS
		2441	1.1866	2440.410	2441.596	---	PASS
		2480	1.1832	2479.411	2480.594	---	PASS
3DH5	Ant1	2402	1.1989	2401.397	2402.596	---	PASS
		2441	1.1952	2440.399	2441.595	---	PASS
		2480	1.1938	2479.400	2480.594	---	PASS

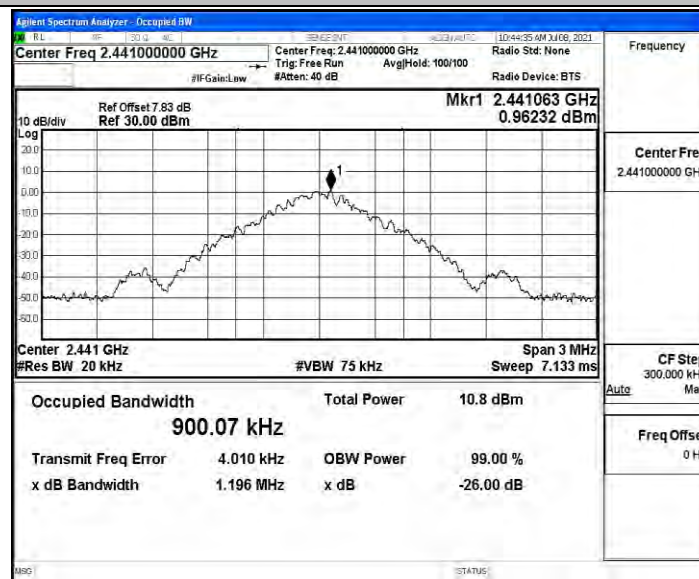


Test Graphs

DH5_Ant1_2402

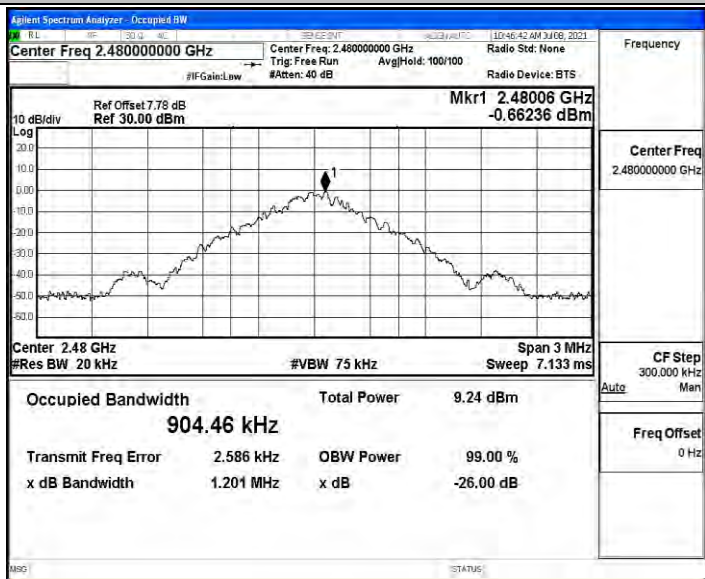


DH5_Ant1_2441





DH5_Ant1_2480



2DH5_Ant1_2402





2DH5_Ant1_2441

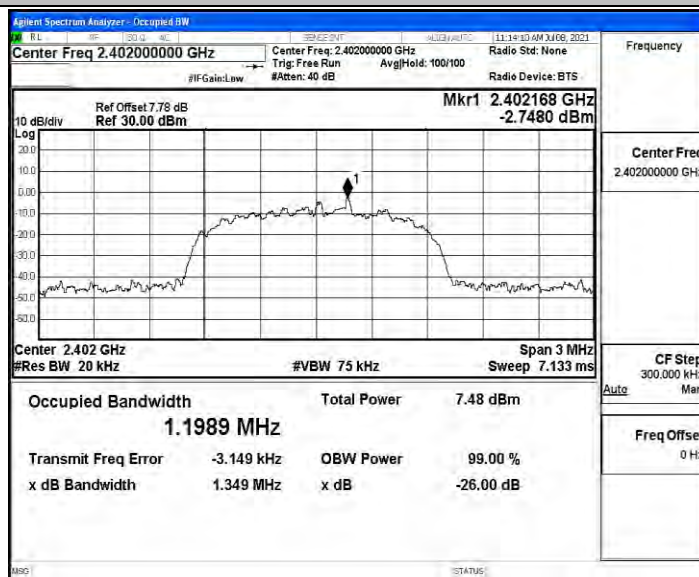


2DH5_Ant1_2480

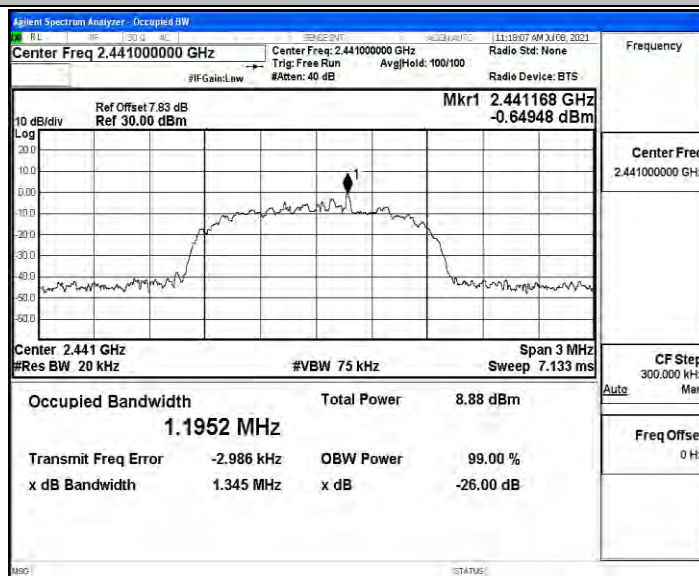




3DH5_Ant1_2402

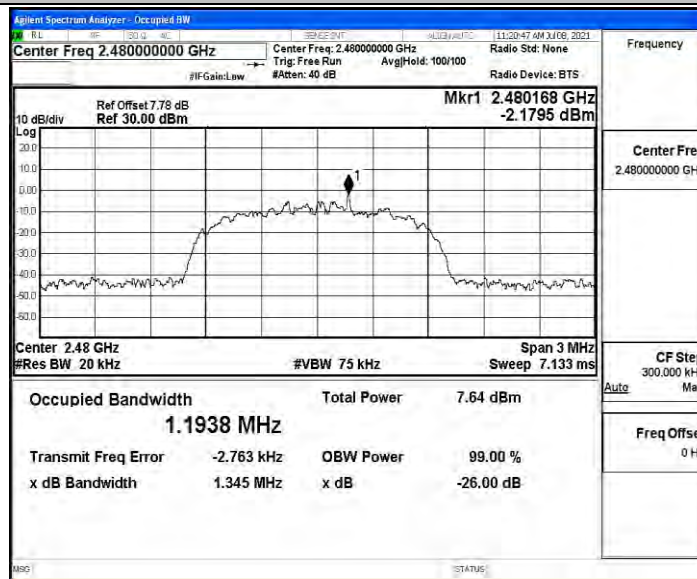


3DH5_Ant1_2441





3DH5_Ant1_2480





Appendix A.3: Carrier frequency separation

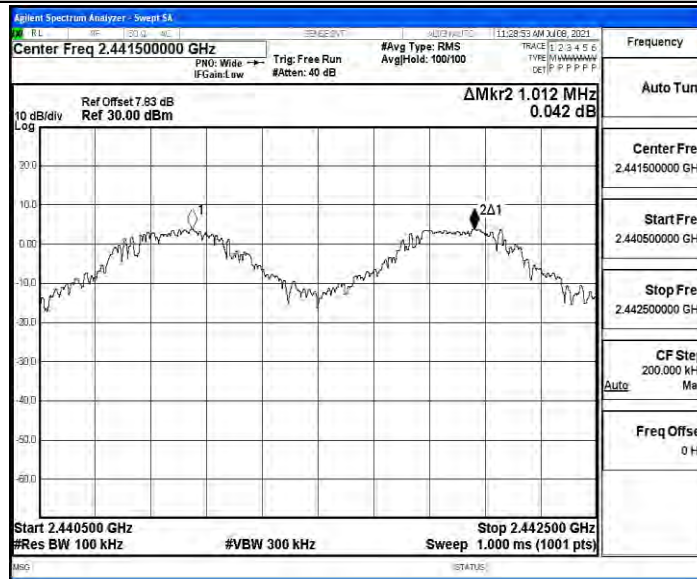
Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	Hop	1.012	≥ 0.945	PASS
2DH5	Ant1	Hop	1.052	≥ 0.878	PASS
3DH5	Ant1	Hop	1.018	≥ 0.854	PASS

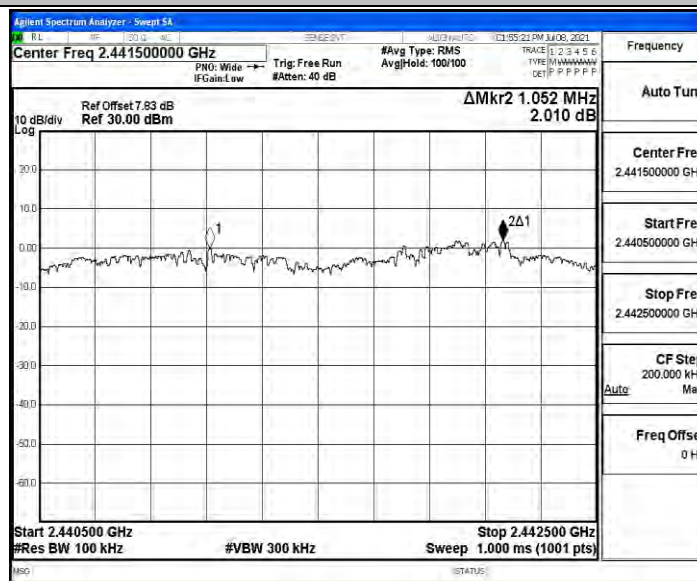


Test Graphs

DH5_Ant1_Hop

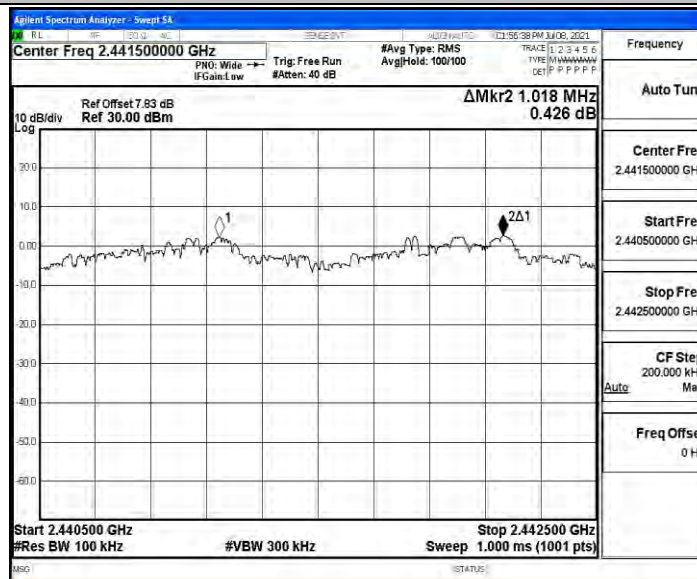


2DH5_Ant1_Hop





3DH5_Ant1_Hop





Appendix A.4: Number of hopping channels

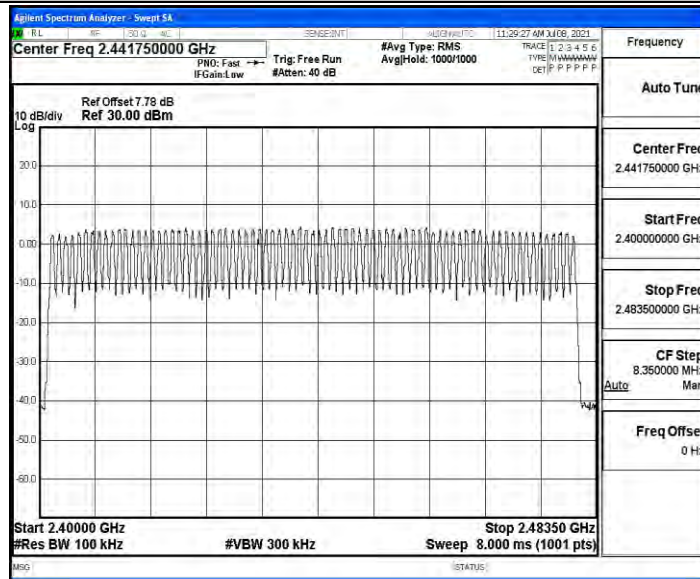
Test Result

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

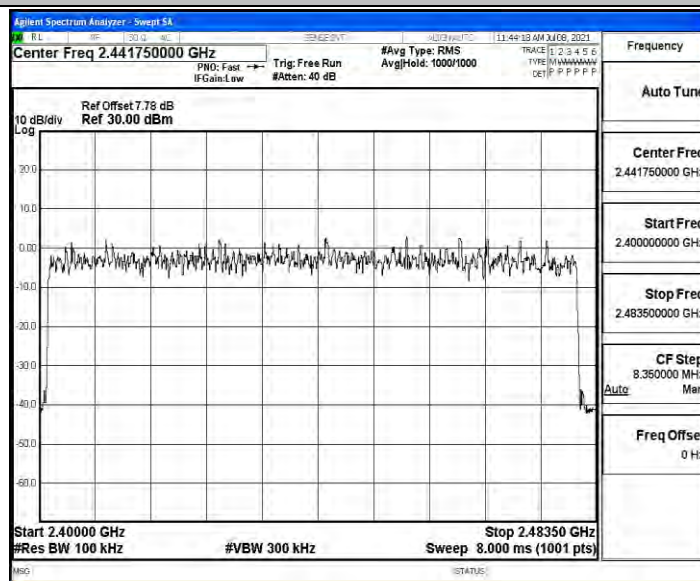


Test Graphs

DH5_Ant1_Hop

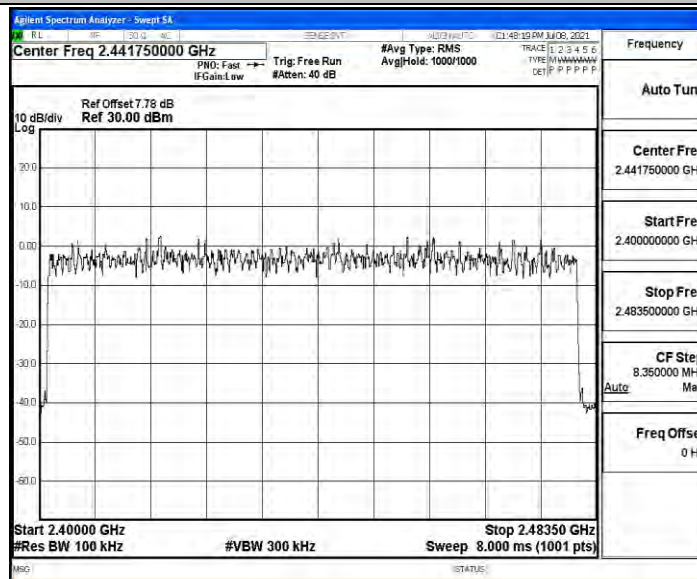


2DH5_Ant1_Hop





3DH5_Ant1_Hop





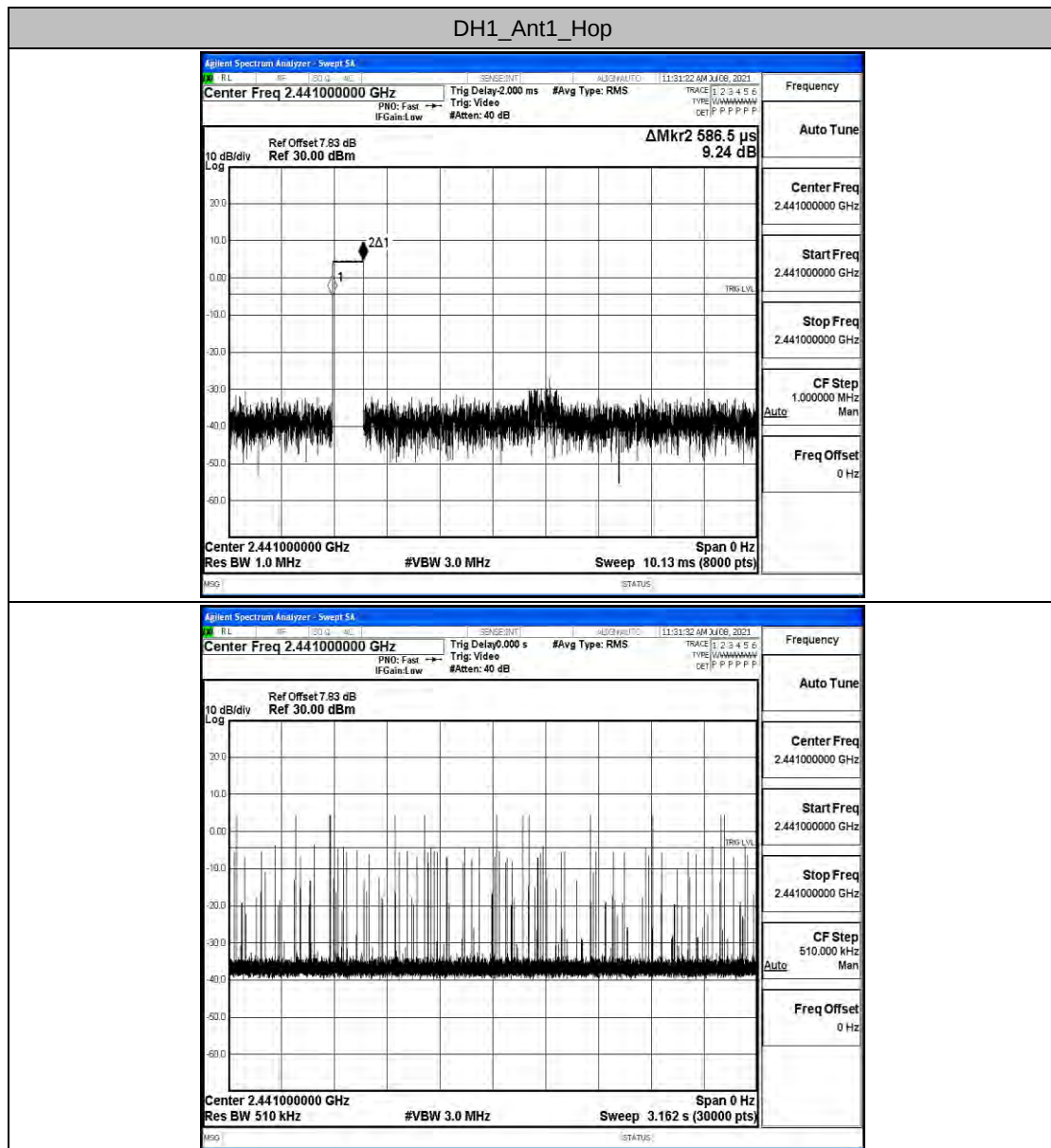
Appendix A.5.1: Time of occupancy

Test Result

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.59	130	0.076	≤0.4	PASS
DH3	Ant1	Hop	1.84	70	0.128	≤0.4	PASS
DH5	Ant1	Hop	2.88	110	0.317	≤0.4	PASS
2DH1	Ant1	Hop	0.59	50	0.029	≤0.4	PASS
2DH3	Ant1	Hop	1.84	70	0.128	≤0.4	PASS
2DH5	Ant1	Hop	2.88	100	0.288	≤0.4	PASS
3DH1	Ant1	Hop	0.59	90	0.053	≤0.4	PASS
3DH3	Ant1	Hop	1.84	70	0.128	≤0.4	PASS
3DH5	Ant1	Hop	2.88	70	0.202	≤0.4	PASS

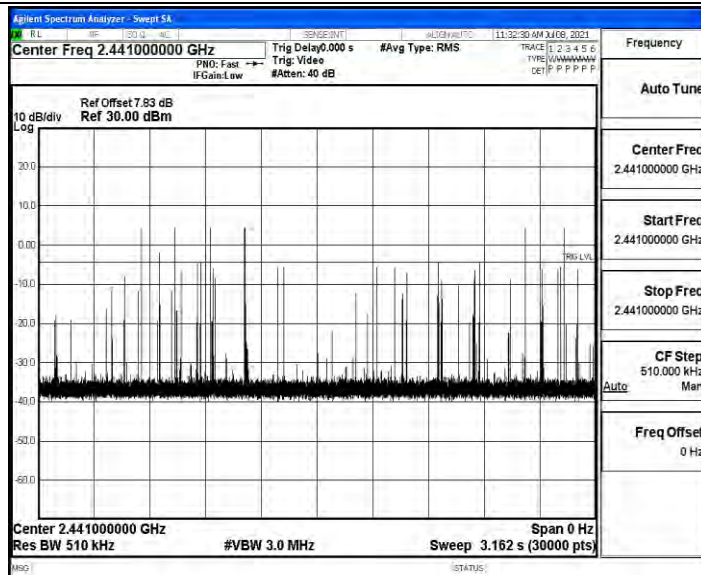
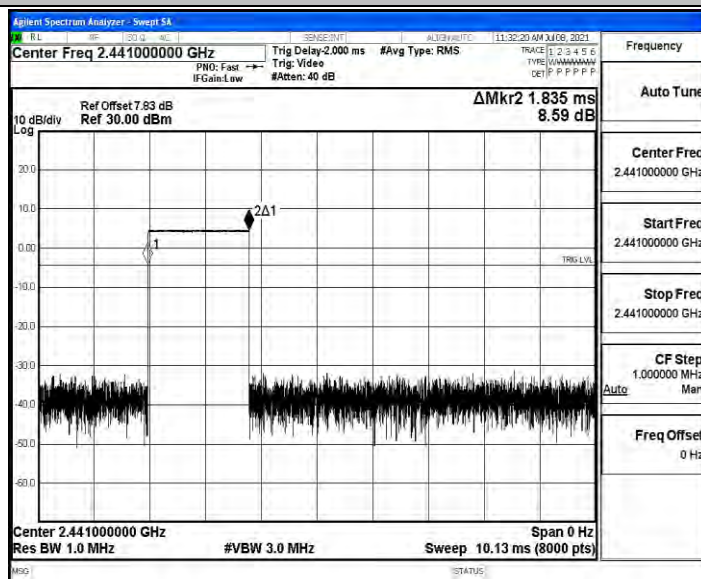


Test Graphs

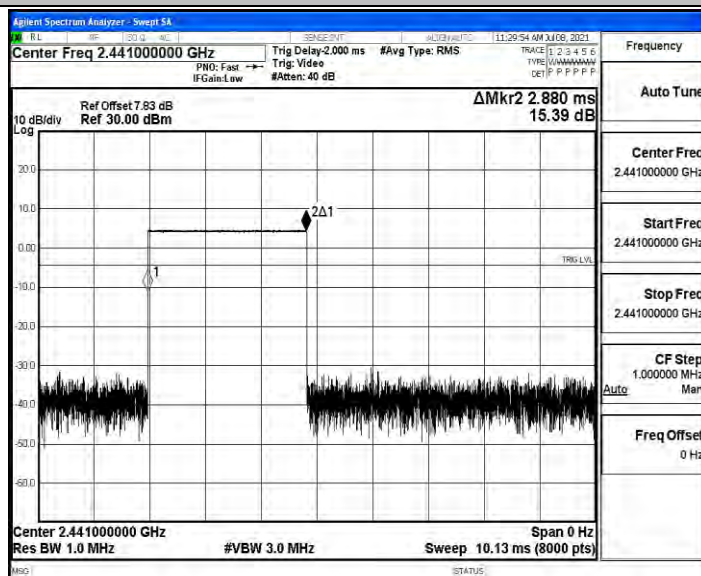


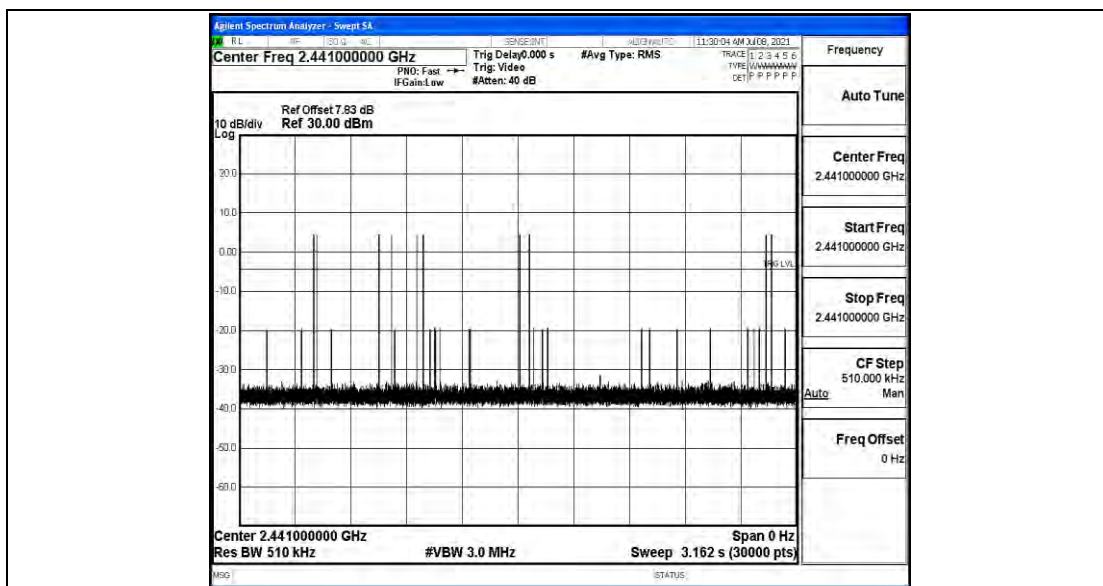


DH3_Ant1_Hop

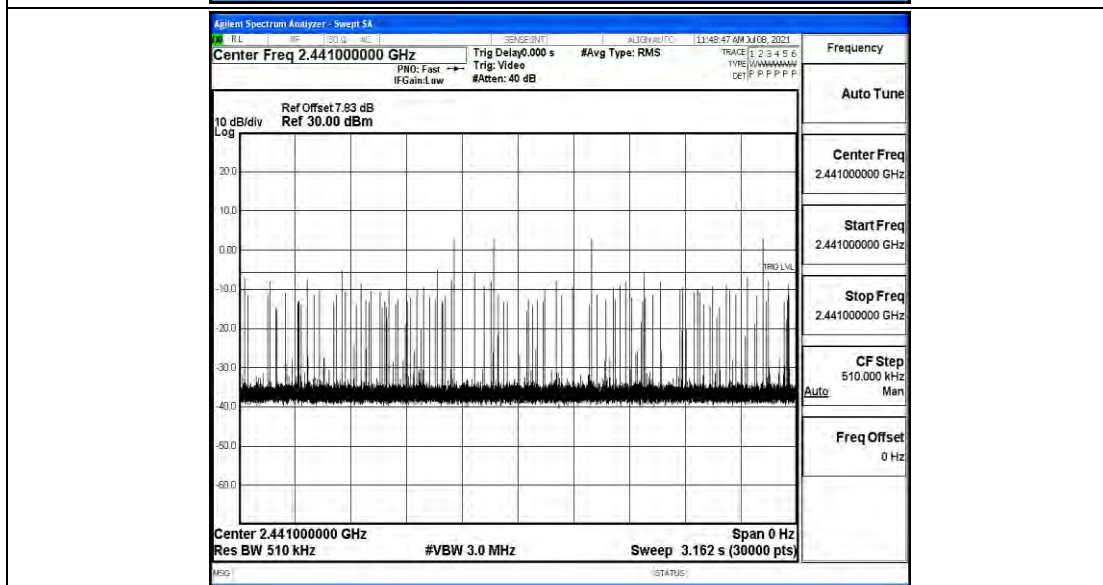
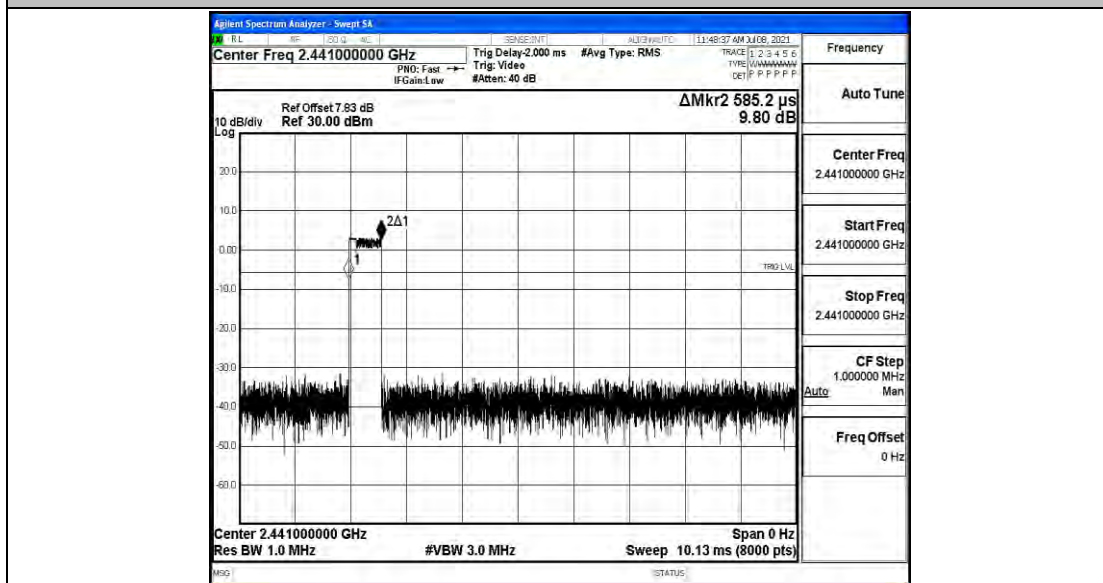


DH5_Ant1_Hop



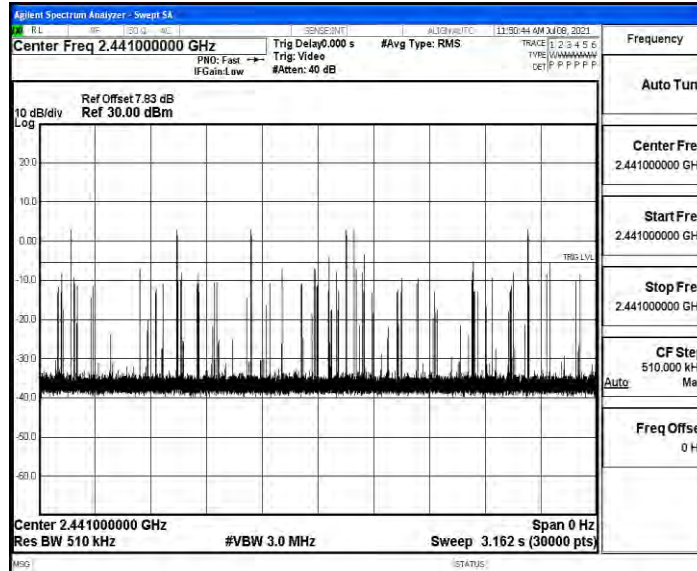
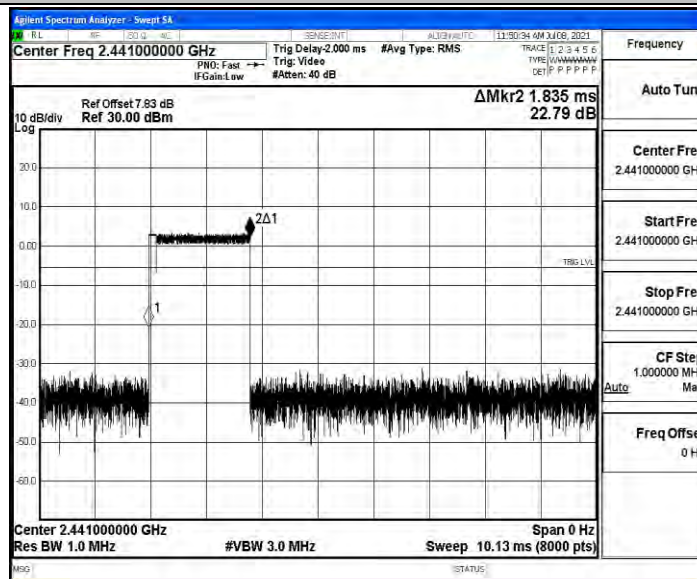


2DH1_Ant1_Hop

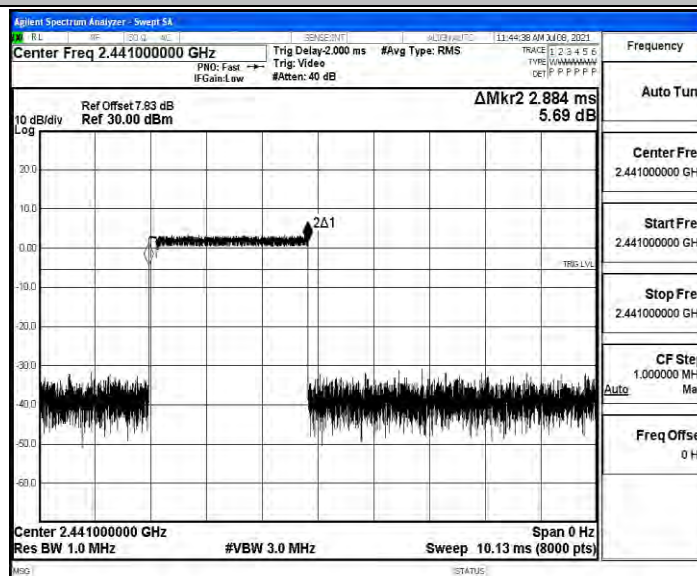


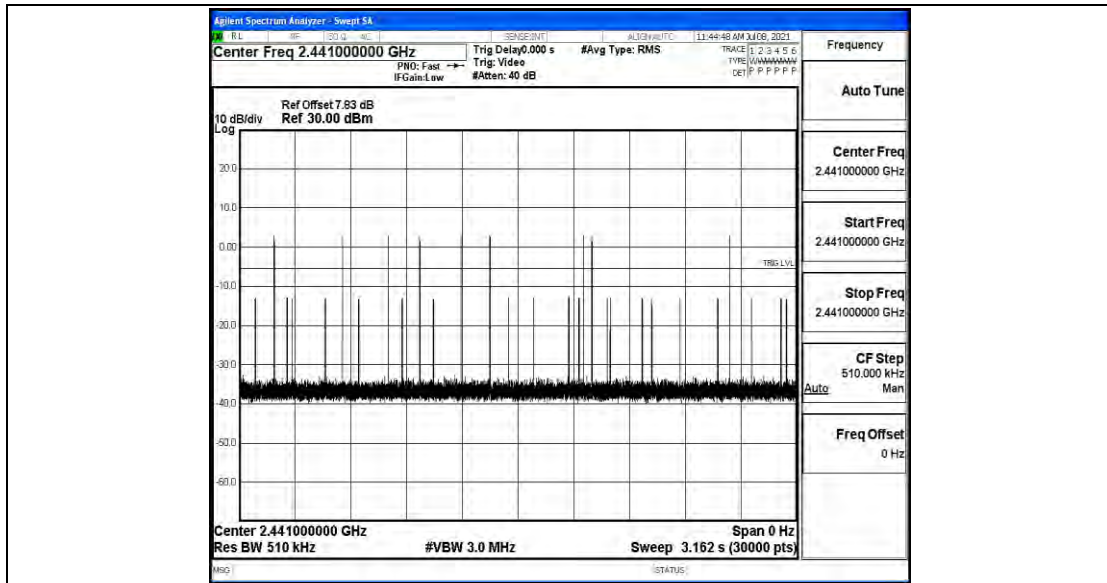


2DH3_Ant1_Hop

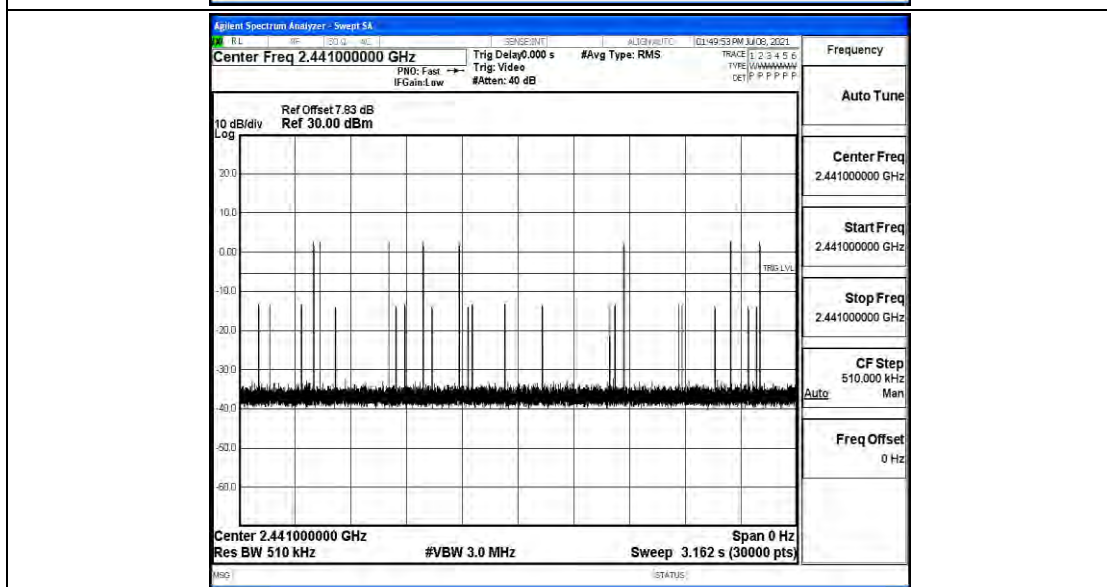
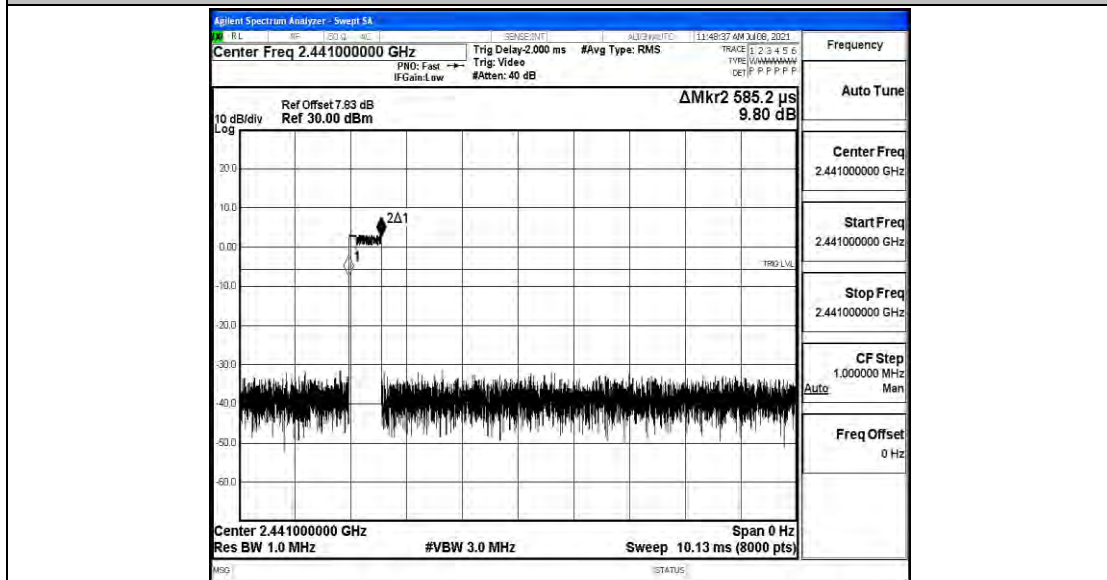


2DH5_Ant1_Hop



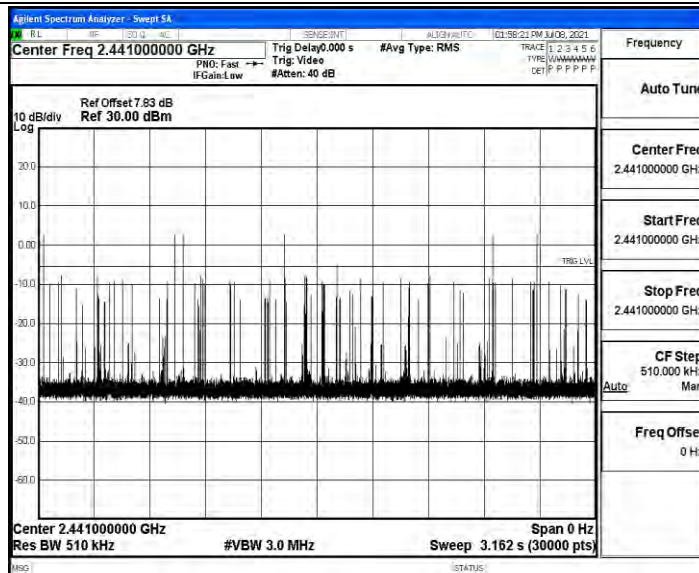
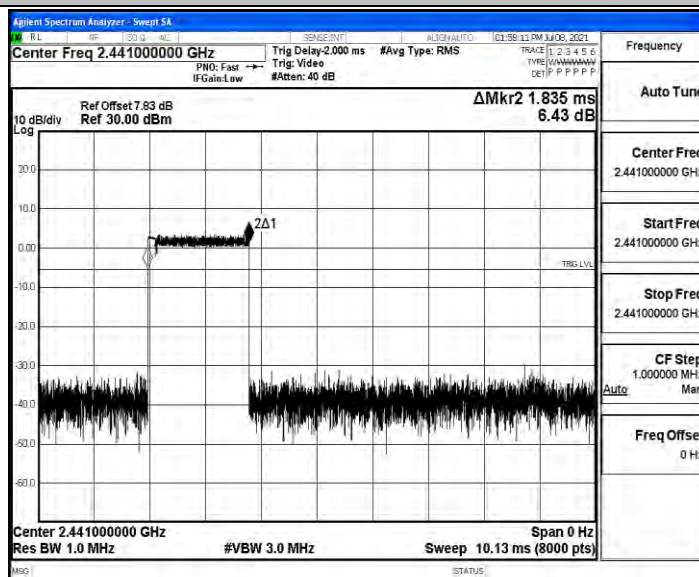


3DH1_Ant1_Hop

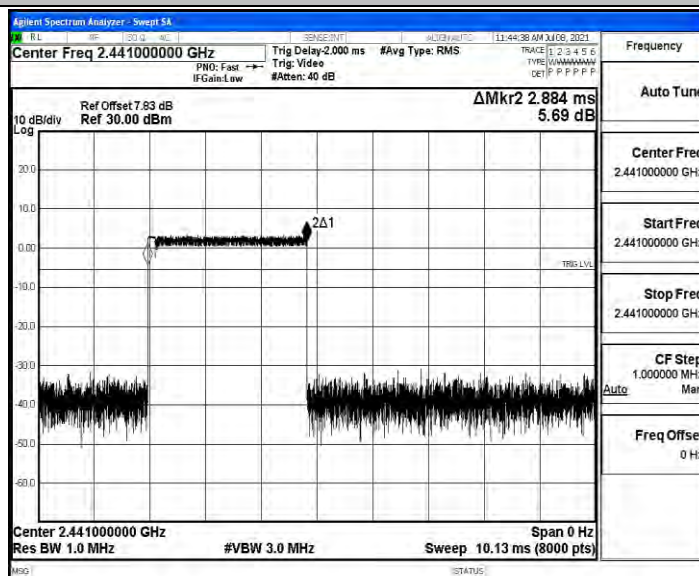


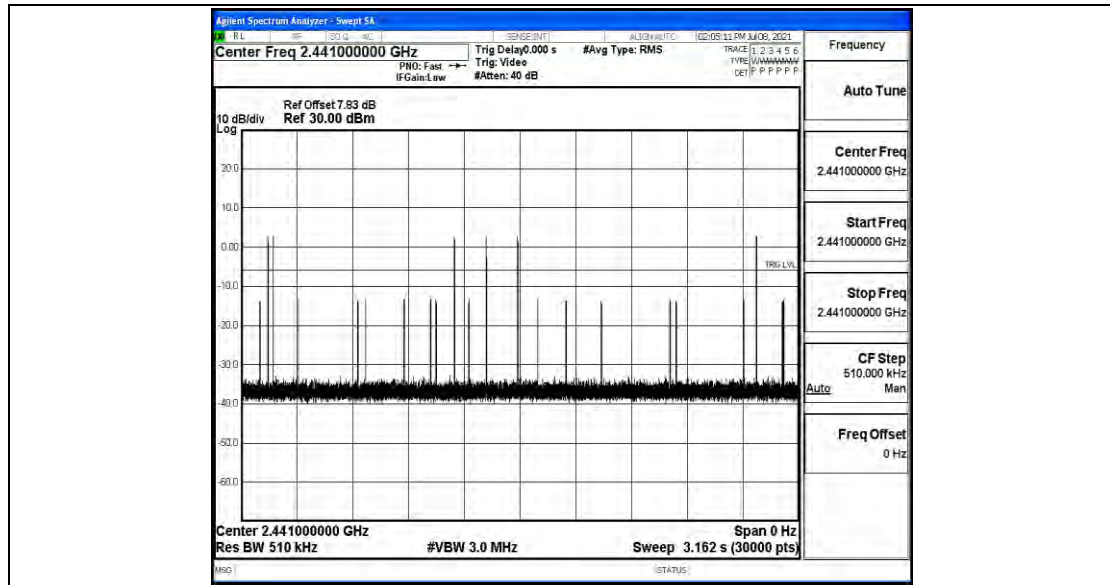


3DH3_Ant1_Hop



3DH5_Ant1_Hop







Appendix A.5.2: Duty Cycle

Test Result

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Limit	Verdict
DH5	Ant1	2402	2.88	3.75	0.7680	76.80	1.13	---	PASS
		2441	2.89	3.75	0.7707	77.07	1.13	---	PASS
		2480	2.88	3.74	0.7701	77.01	1.13	---	PASS
2DH5	Ant1	2402	2.88	3.75	0.7680	76.80	1.15	---	PASS
		2441	2.89	3.75	0.7707	77.07	1.13	---	PASS
		2480	2.88	3.74	0.7701	77.01	1.13	---	PASS
3DH5	Ant1	2402	2.89	3.75	0.7707	77.07	1.13	---	PASS
		2441	2.89	3.75	0.7707	77.07	1.13	---	PASS
		2480	2.88	3.74	0.7701	77.01	1.13	---	PASS



The figure displays two screenshots of an Agilent Spectrum Analyzer interface, showing signal analysis results for two different antennas.

DH5_Ant1_2402

Center Freq: 2.40200000 GHz
Ref Offset: 7.78 dB
Ref: 30.00 dBm
ΔMkr3: 3.750 ms
-0.12 dB

MKR	MODE	FREQ	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	t		1.720 ms	2.10 dBm			
2	Δ1	t	(Δ)	2.880 ms (Δ)	-1.62 dB			
3	Δ1	t	(Δ)	3.750 ms (Δ)	-0.12 dB			

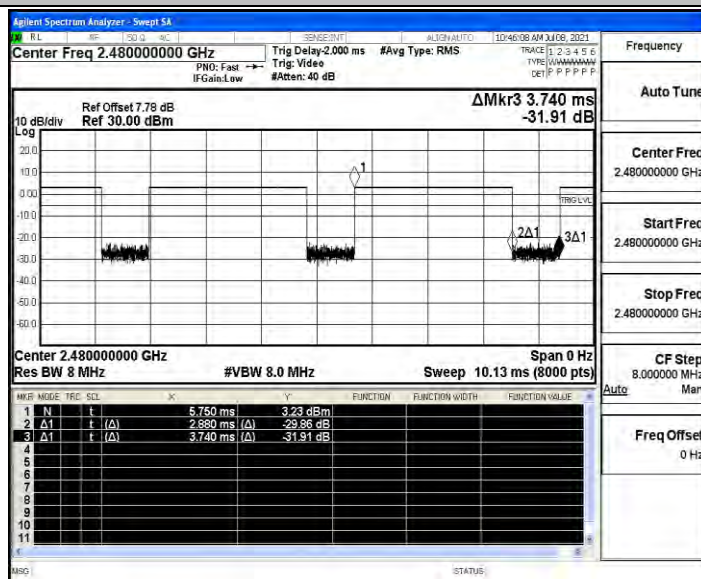
DH5_Ant1_2441

Center Freq: 2.441000000 GHz
Ref Offset: 7.83 dB
Ref: 30.00 dBm
ΔMkr3: 3.750 ms
0.71 dB

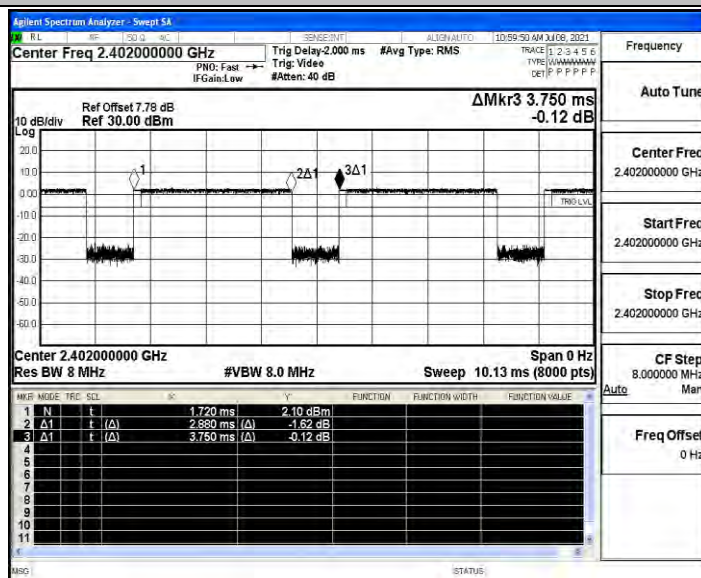
MKR	MODE	FREQ	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	t		1.990 ms	-26.27 dBm			
2	Δ1	t	(Δ)	2.890 ms (Δ)	-0.39 dB			
3	Δ1	t	(Δ)	3.750 ms (Δ)	0.71 dB			



DH5_Ant1_2480



2DH5_Ant1_2402



[illegible]

2DH5_Ant1_2480

Agilent Spectrum Analyzer - Sweet 5A

Center Freq 2.480000000 GHz Trg Delay: 2.000 ms #Avg Type: RMS Frequency

Ref Offset: 7.78 dB ΔMkr3 3.740 ms Auto Tune

Ref 30.00 dBm -31.91 dB

10 dB/div Log

Center 2.480000000 GHz Span 0 Hz

Res BW 8 MHz #VBW 8.0 MHz Sweep 10.13 ms (8000 pts)

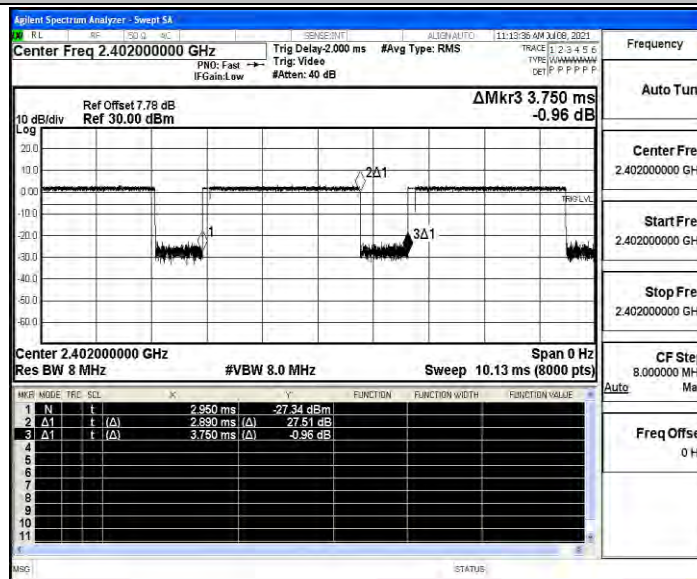
MKR	MODE	TRG	SCN	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	t		5.750 ms	3.23 dBm			
2	Δ1	t	(Δ)	2.980 ms (Δ)	-29.86 dB			
3	Δ1	t	(Δ)	3.740 ms (Δ)	-31.91 dB			
4								
5								
6								
7								
8								
9								
10								
11								

CF Step 8.0000000 MHz Auto Man

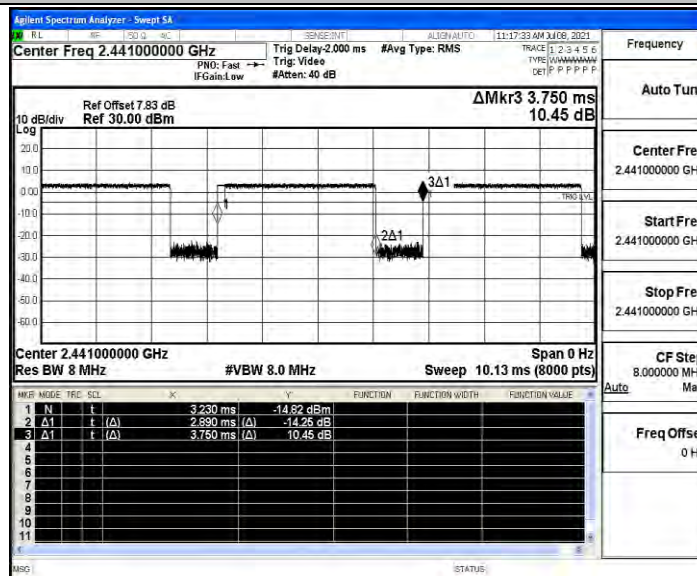
Freq Offset 0 Hz

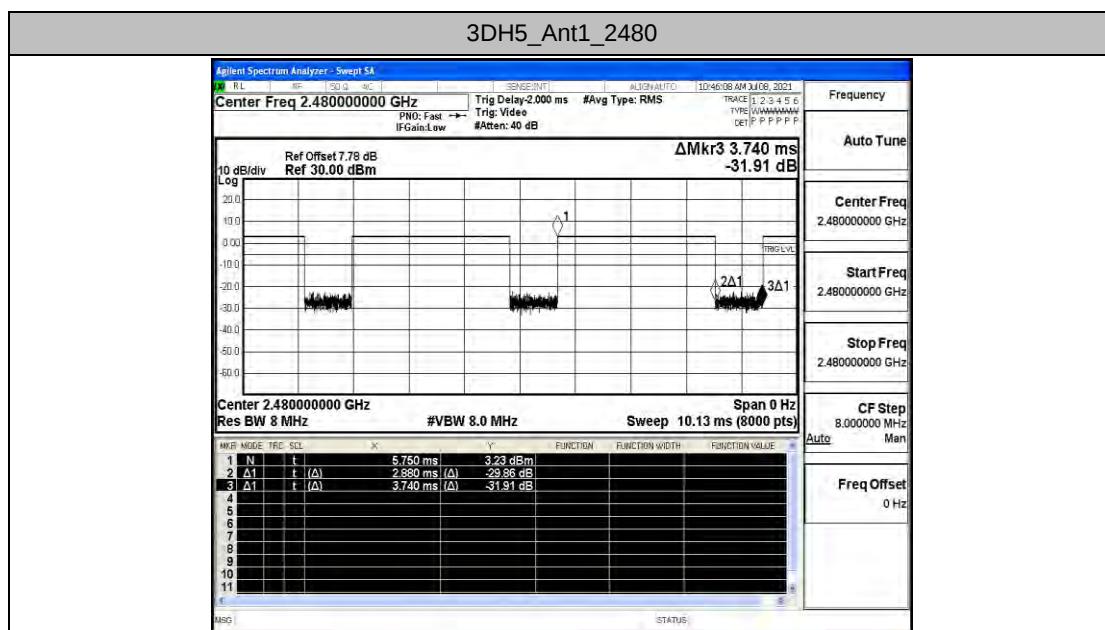


3DH5_Ant1_2402



3DH5_Ant1_2441







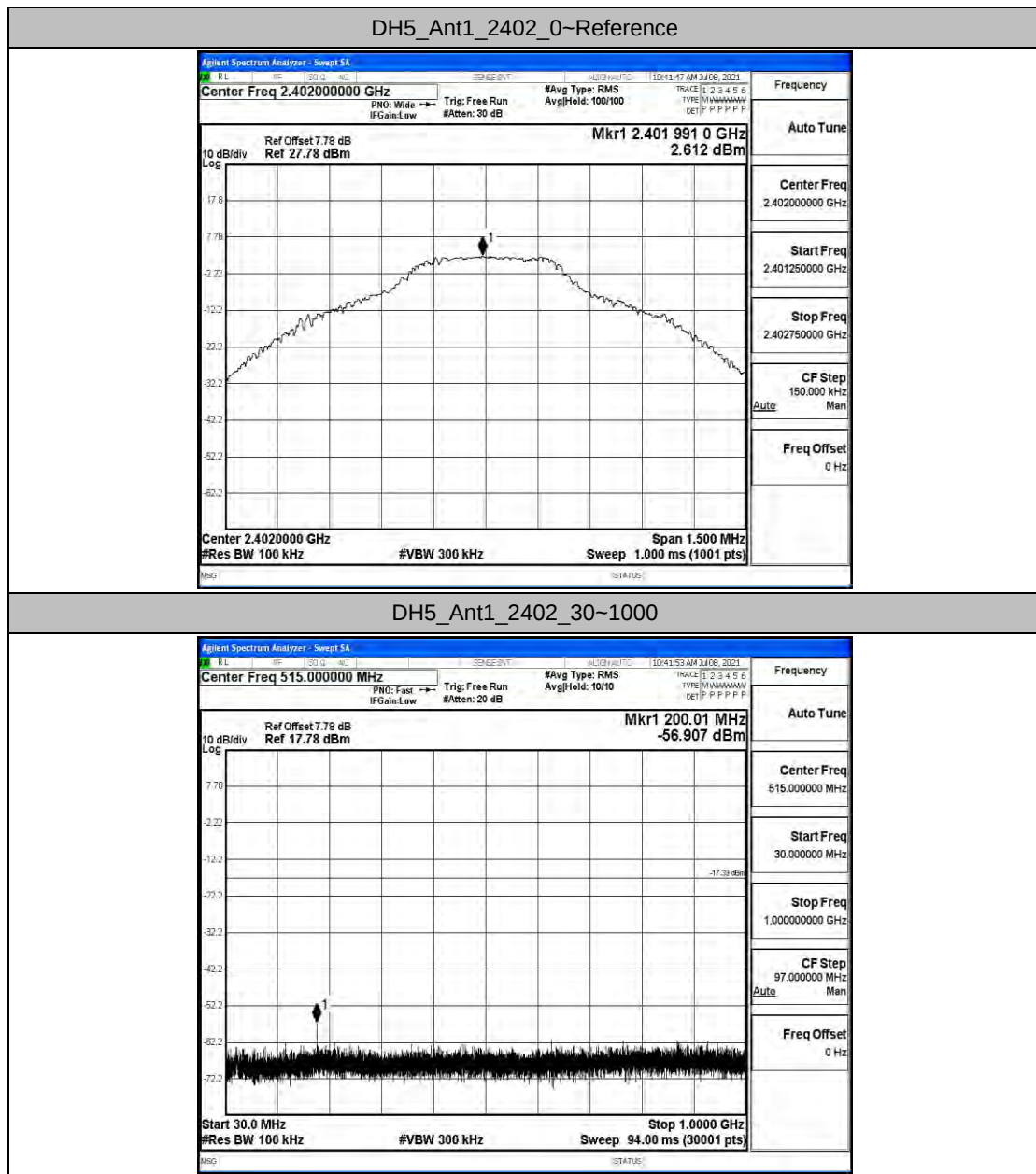
Appendix A.6: Conducted Spurious Emission

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	2.61	2.61	---	PASS
			30~1000	2.61	-56.91	≤-17.39	PASS
			1000~26500	2.61	-47.74	≤-17.39	PASS
		2441	Reference	4.16	4.16	---	PASS
			30~1000	4.16	-56.33	≤-15.84	PASS
			1000~26500	4.16	-47.41	≤-15.84	PASS
		2480	Reference	2.36	2.36	---	PASS
			30~1000	2.36	-58.21	≤-17.64	PASS
			1000~26500	2.36	-47.47	≤-17.64	PASS
2DH5	Ant1	2402	Reference	0.53	0.53	---	PASS
			30~1000	0.53	-57.39	≤-19.47	PASS
			1000~26500	0.53	-47.67	≤-19.47	PASS
		2441	Reference	2.69	2.69	---	PASS
			30~1000	2.69	-57.16	≤-17.31	PASS
			1000~26500	2.69	-47.79	≤-17.31	PASS
		2480	Reference	-1.89	-1.89	---	PASS
			30~1000	-1.89	-57.19	≤-21.89	PASS
			1000~26500	-1.89	-47.55	≤-21.89	PASS
3DH5	Ant1	2402	Reference	0.82	0.82	---	PASS
			30~1000	0.82	-57.22	≤-19.18	PASS
			1000~26500	0.82	-47.89	≤-19.18	PASS
		2441	Reference	2.28	2.28	---	PASS
			30~1000	2.28	-56.39	≤-17.72	PASS
			1000~26500	2.28	-47.52	≤-17.72	PASS
		2480	Reference	0.69	0.69	---	PASS
			30~1000	0.69	-58.44	≤-19.31	PASS
			1000~26500	0.69	-47.53	≤-19.31	PASS

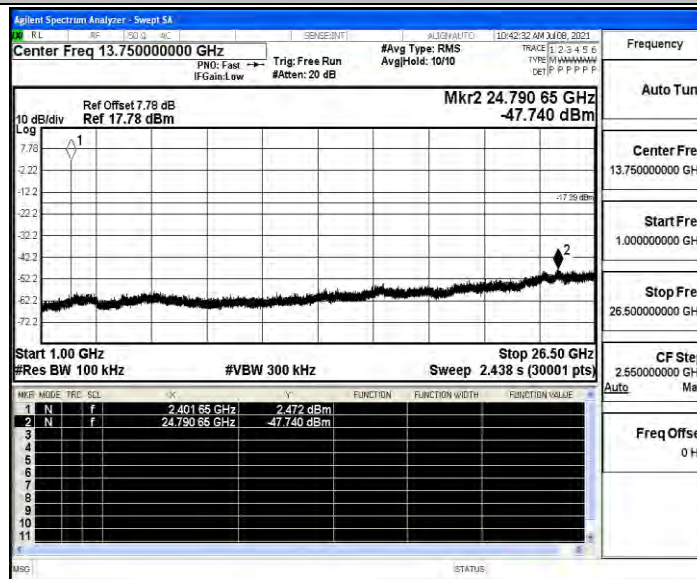


Test Graphs

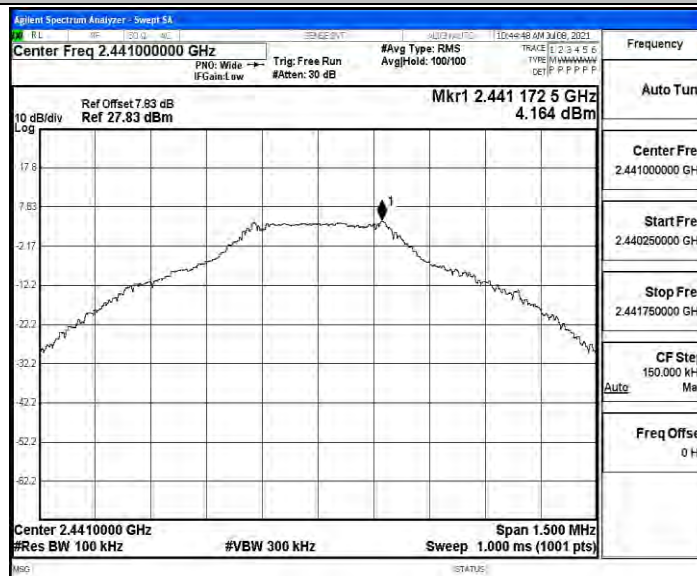




DH5_Ant1_2402_1000~26500

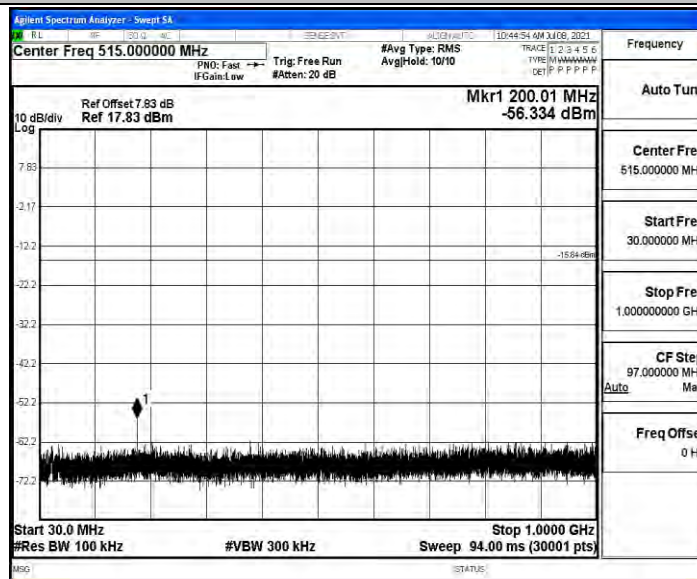


DH5_Ant1_2441_0~Reference

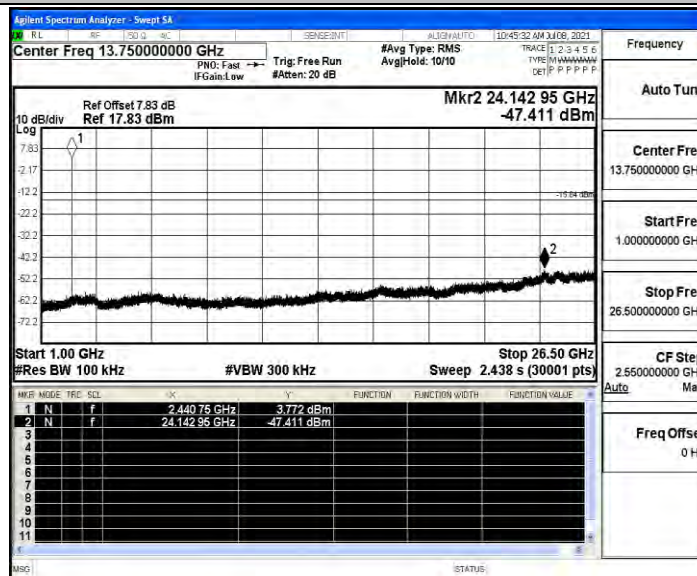




DH5_Ant1_2441_30~1000

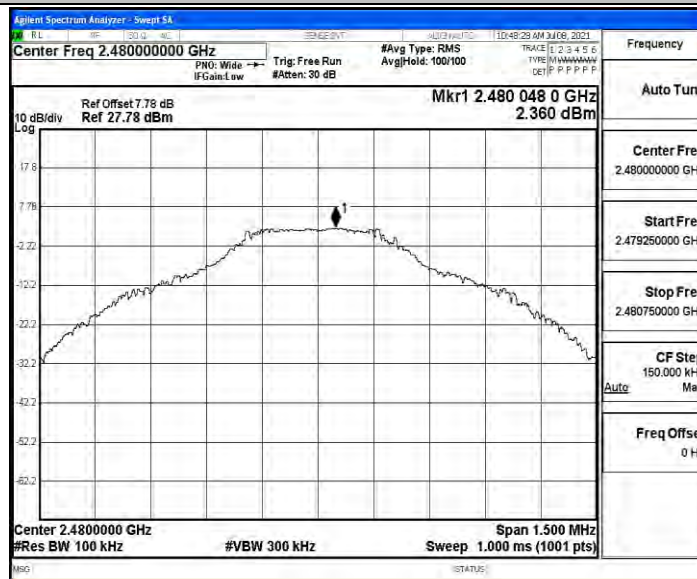


DH5_Ant1_2441_1000~26500

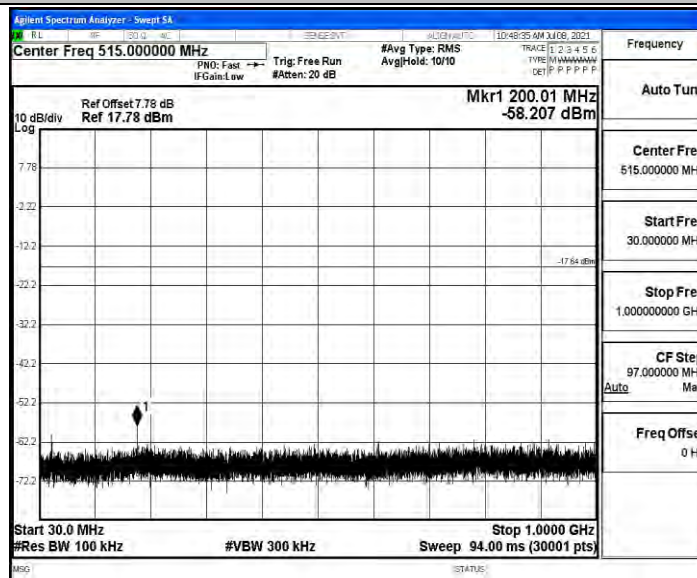




DH5_Ant1_2480_0-Reference

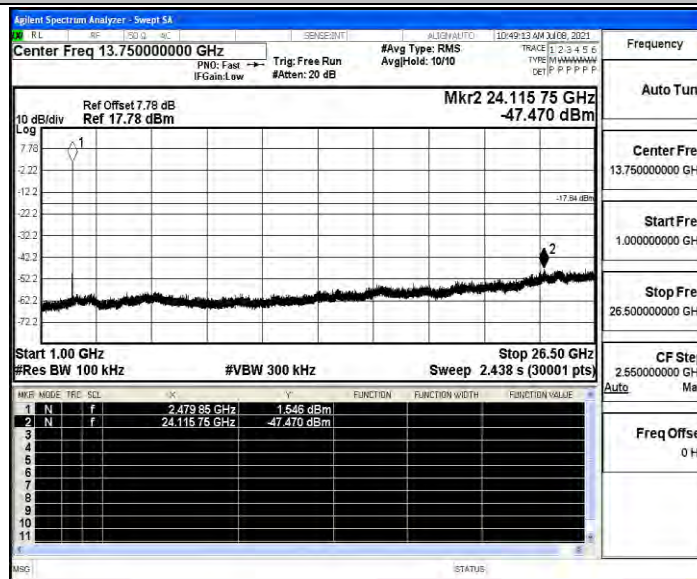


DH5_Ant1_2480_30-1000

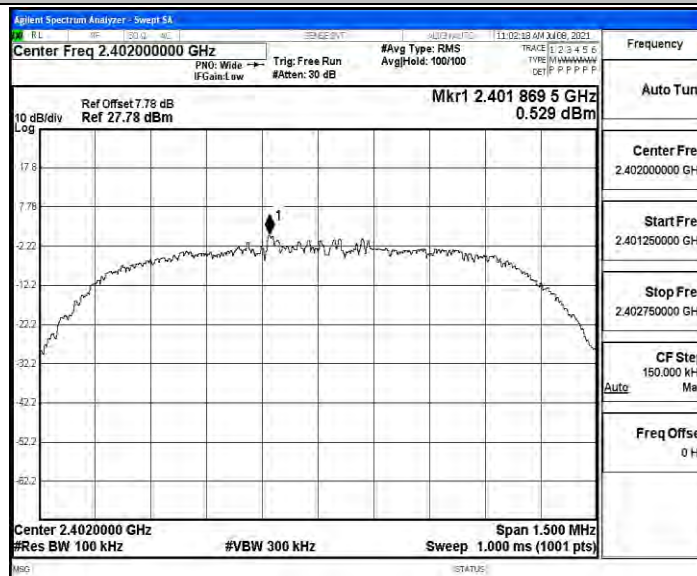




DH5_Ant1_2480_1000~26500

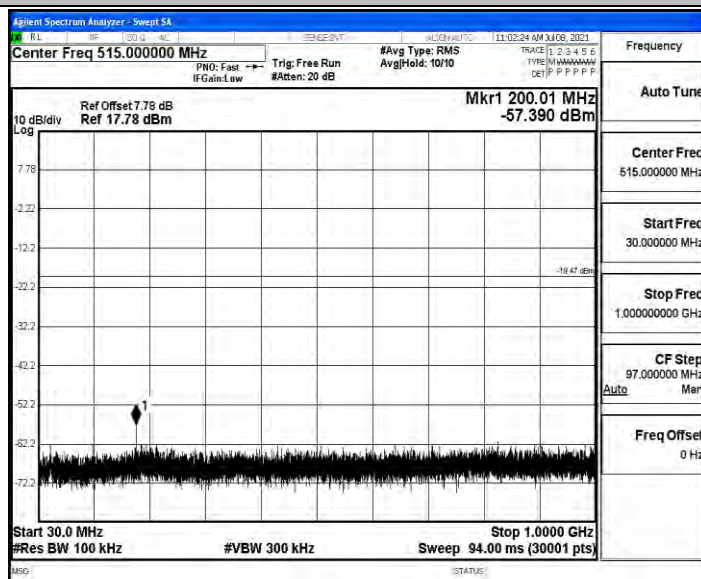


2DH5_Ant1_2402_0~Reference

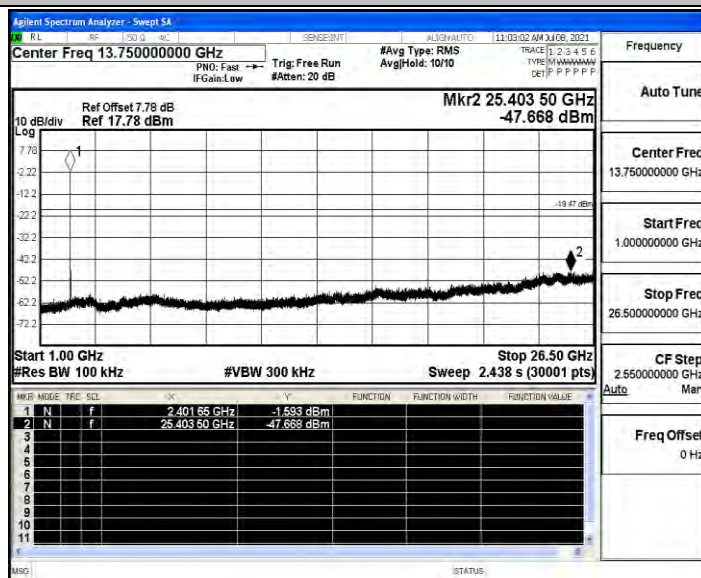




2DH5_Ant1_2402_30~1000

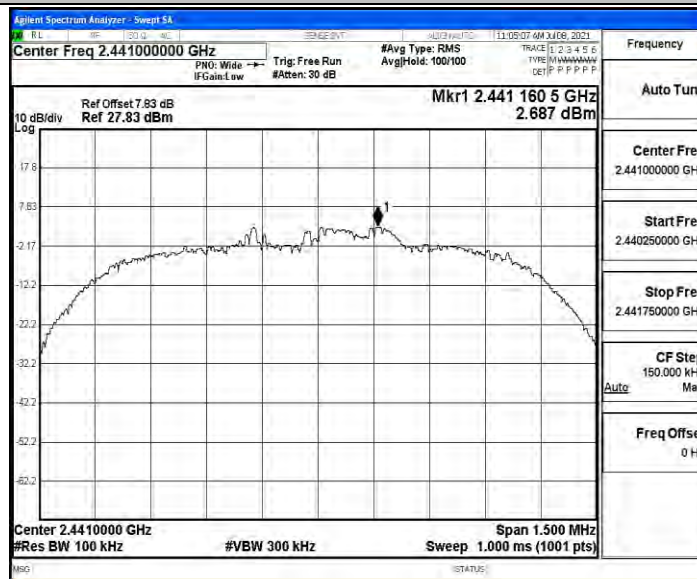


2DH5_Ant1_2402_1000~26500

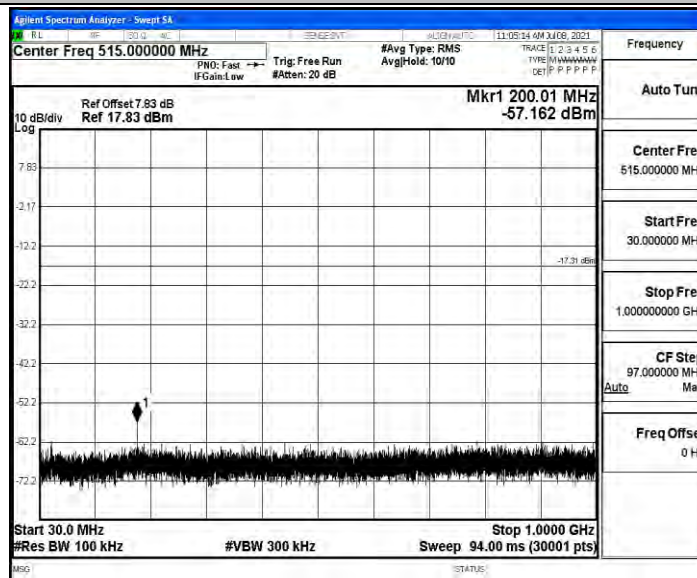




2DH5_Ant1_2441_0~Reference

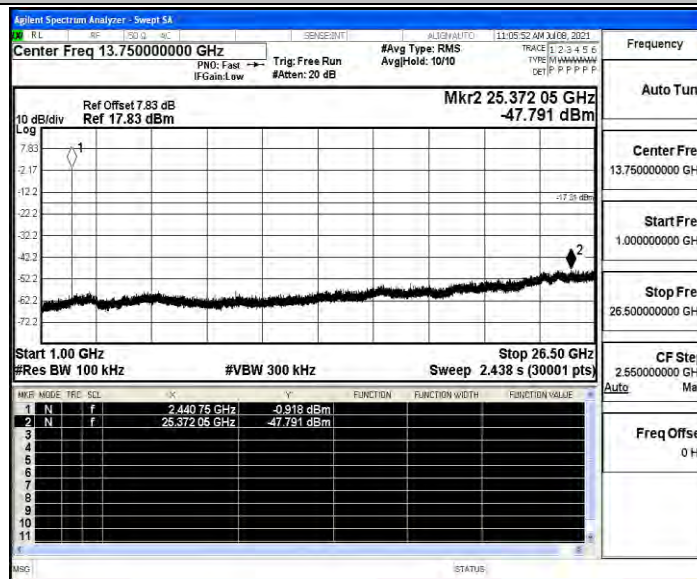


2DH5_Ant1_2441_30~1000

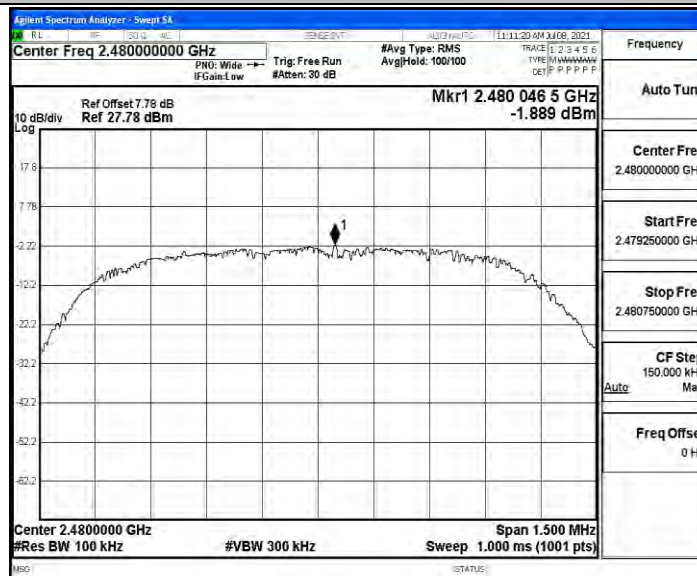




2DH5_Ant1_2441_1000~26500



2DH5_Ant1_2480_0~Reference





2DH5_Ant1_2480_30~1000

Agilent Spectrum Analyzer - Sweet 5k

11/11/20 AM 14/08, 2021

Center Freq 515.000000 MHz

Trig: Free Run

Avg Type: RMS

Ref Offset: 7.76 dB

Ref: 17.78 dBm

Mkr1 200.01 Bm

-57.193 dBm

10 dB/div

Log

Start 30.0 MHz

Stop 1.0000 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 94.00 ms (30001 pts)

Frequency

Auto Tune

Center Freq 515.000000 MHz

Start Freq 30.000000 MHz

Stop Freq 1.000000000 GHz

CF Step 97.000000 MHz

Freq Offset 0 Hz

Agilent Spectrum Analyzer - Sweet 5A

Center Freq 13.75000000 GHz

Ref Offset 7.78 dB
Ref 17.78 dBm

Mkr2 24.754 10 GHz
-47.547 dBm

10 dB/div
Log

Start 1.00 GHz
#Res BW 100 kHz

Stop 26.50 GHz
#VBW 300 kHz
Sweep 2.438 s (30001 pts)

Frequency

Auto Tune

Center Freq
13.75000000 GHz

Start Freq
1.000000000 GHz

Stop Freq
26.500000000 GHz

CF Step
2.550000000 GHz

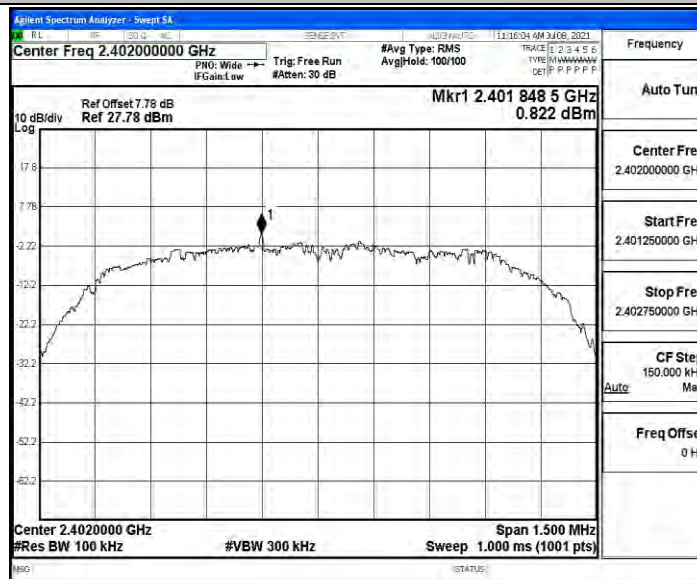
Auto

Freq Offset
0 Hz

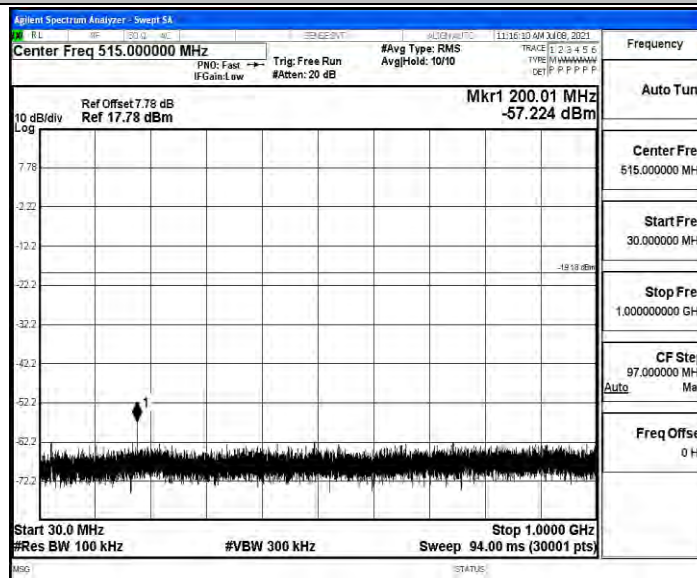
MKR	MODE	TRC	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.479 85 GHz	-2.349 dBm			
2	N	f		24.754 10 GHz	-47.547 dBm			



3DH5_Ant1_2402_0~Reference

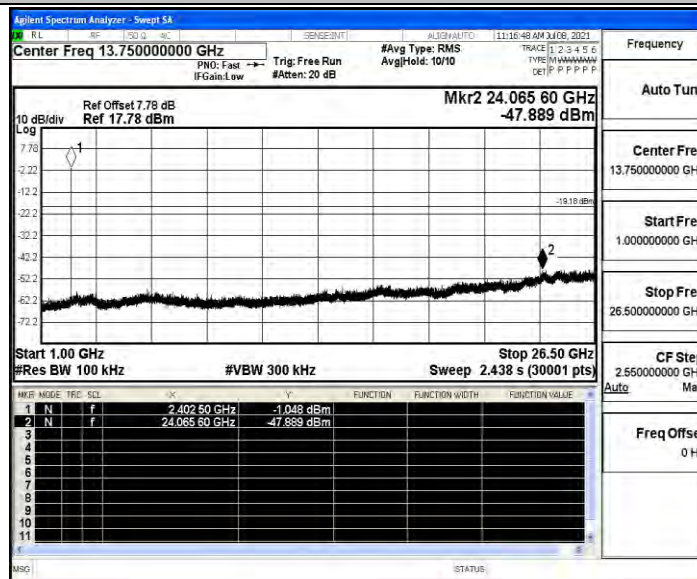


3DH5_Ant1_2402_30~1000

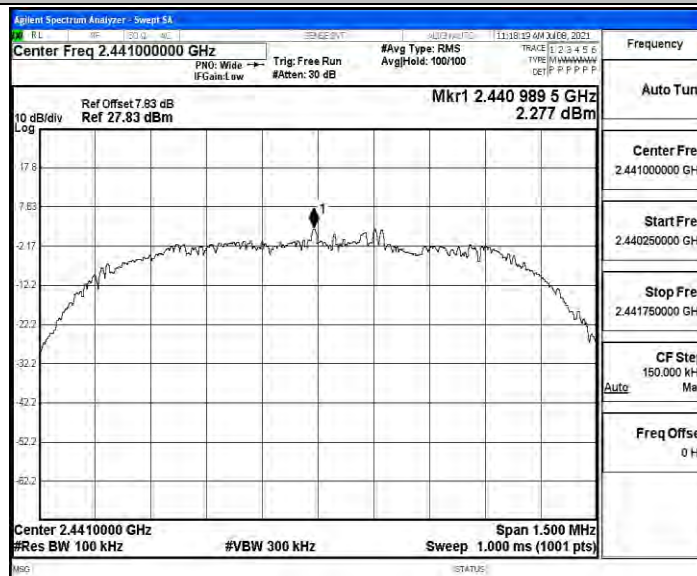




3DH5_Ant1_2402_1000~26500



3DH5_Ant1_2441_0~Reference





Agilent Spectrum Analyzer - Sweet 5k

Center Freq 515.000000 MHz

Ref Offset 7.83 dB
Ref 17.83 dBm

Mkr1 200.01 MHz
-56.387 dBm

Start 30.0 MHz
#Res BW 100 kHz

#VBW 300 kHz

Sweep 94.00 ms (30001 pts)

Stop 1.0000 GHz

Frequency

Auto Tune

Center Freq 515.000000 MHz

Start Freq 30.000000 MHz

Stop Freq 1.000000000 GHz

CF Step 97.000000 MHz
Auto Man

Freq Offset 0 Hz

Agilent Spectrum Analyzer - Sweet 5A

Center Freq 13.75000000 GHz

Ref OffSet 7.83 dB

Ref 17.83 dBm

Mkr2 26.467 70 GHz

-47.515 dBm

10 dB/div

Log

Start 1.00 GHz

Stop 26.50 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 2.438 s (30001 pts)

Marker 1: 13.75000000 GHz, -17.72 dBm

Marker 2: 26.467 70 GHz, -47.515 dBm

MRK	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.440 76 GHz	-0.214 dBm			
2	N	f		26.467 70 GHz	-47.515 dBm			

Frequency

Auto Tune

Center Freq 13.75000000 GHz

Start Freq 1.000000000 GHz

Stop Freq 26.500000000 GHz

CF Step 2.550000000 GHz

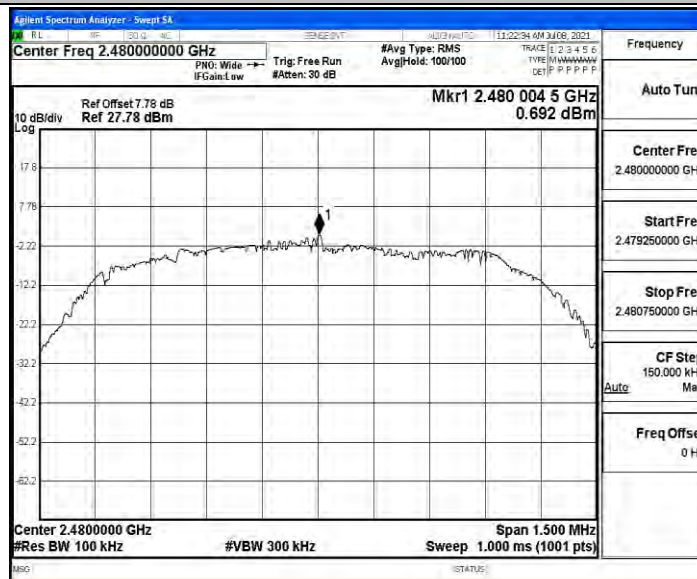
Auto Man

Freq Offset 0 Hz

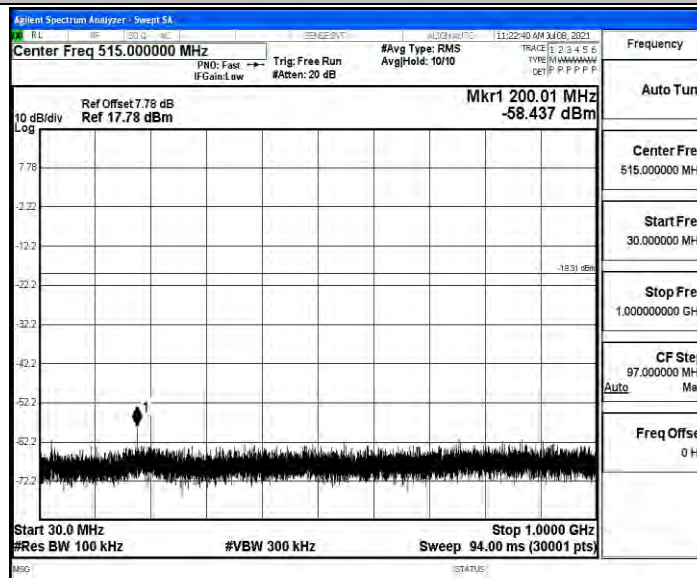
STATUS



3DH5_Ant1_2480_0~Reference

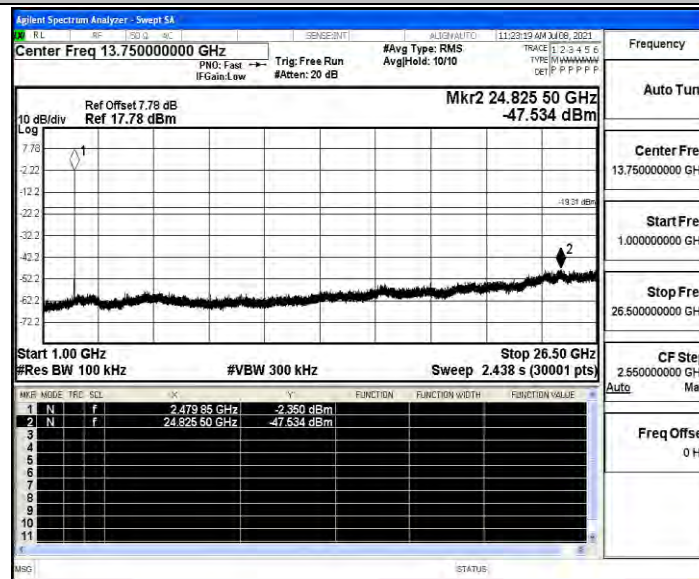


3DH5_Ant1_2480_30~1000





3DH5_Ant1_2480_1000-26500





Appendix A.7: Band edge measurements

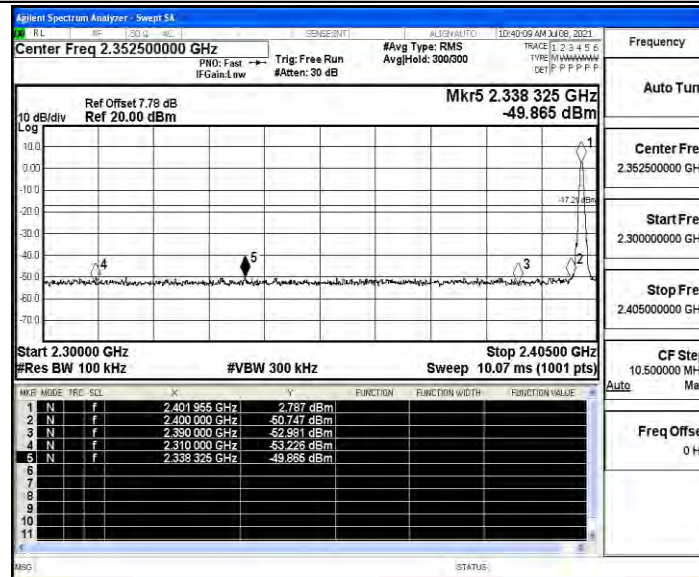
Test Result

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	2.79	-49.87	≤ -17.21	PASS
		High	2480	2.77	-48.33	≤ -17.23	PASS
		Low	Hop	2.86	-50.68	≤ -17.14	PASS
		High	Hop	3.29	-49.22	≤ -16.71	PASS
2DH5	Ant1	Low	2402	1.36	-49.05	≤ -18.64	PASS
		High	2480	1.58	-48.68	≤ -18.43	PASS
		Low	Hop	-2.50	-49.61	≤ -22.5	PASS
		High	Hop	-1.73	-48.33	≤ -21.73	PASS
3DH5	Ant1	Low	2402	1.75	-49.23	≤ -18.25	PASS
		High	2480	1.49	-48.56	≤ -18.51	PASS
		Low	Hop	0.04	-49.75	≤ -19.96	PASS
		High	Hop	-1.62	-48.95	≤ -21.62	PASS

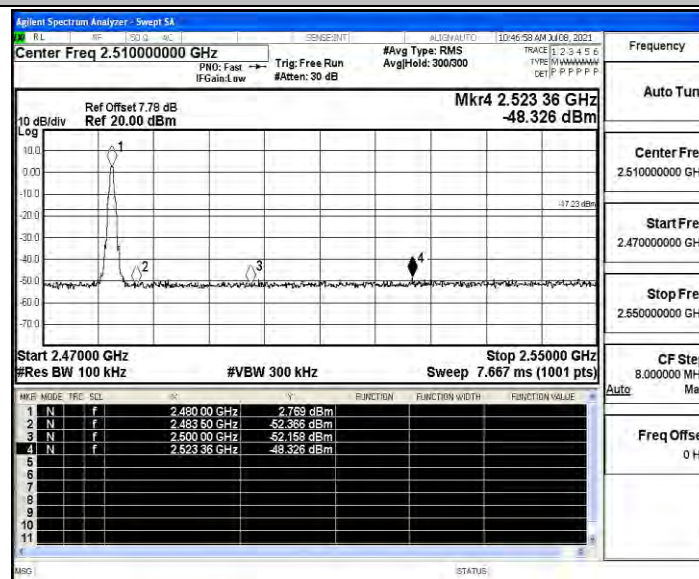


Test Graphs

DH5_Ant1_Low_2402

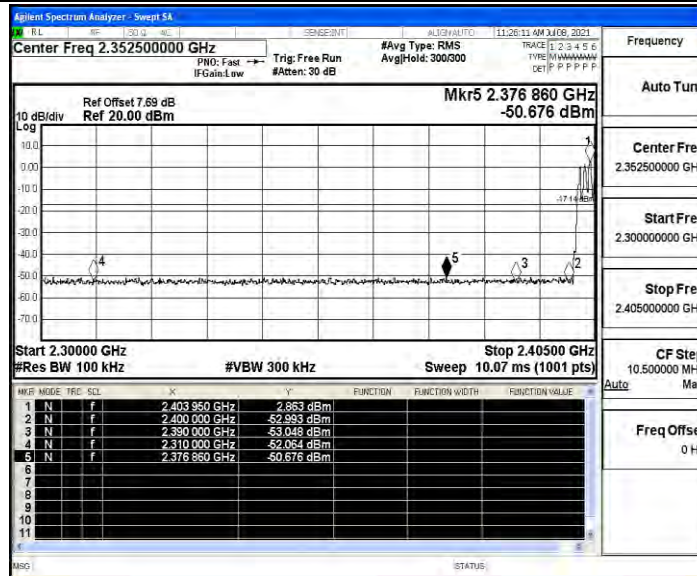


DH5_Ant1_High_2480

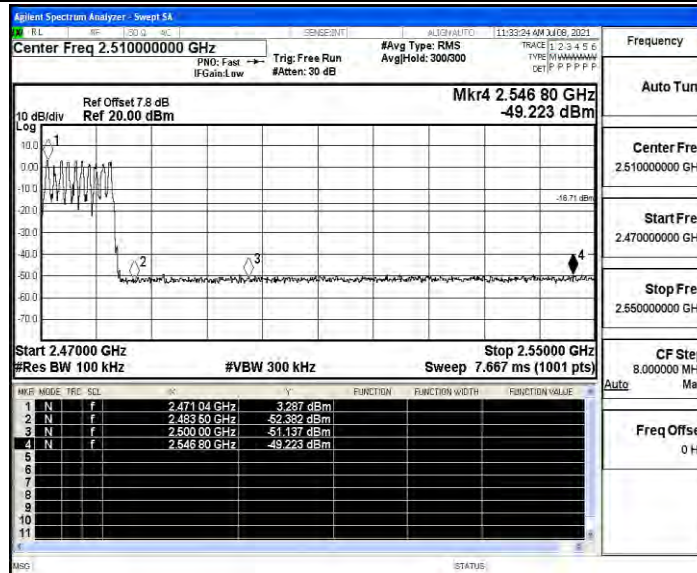




DH5_Ant1_Low_Hop

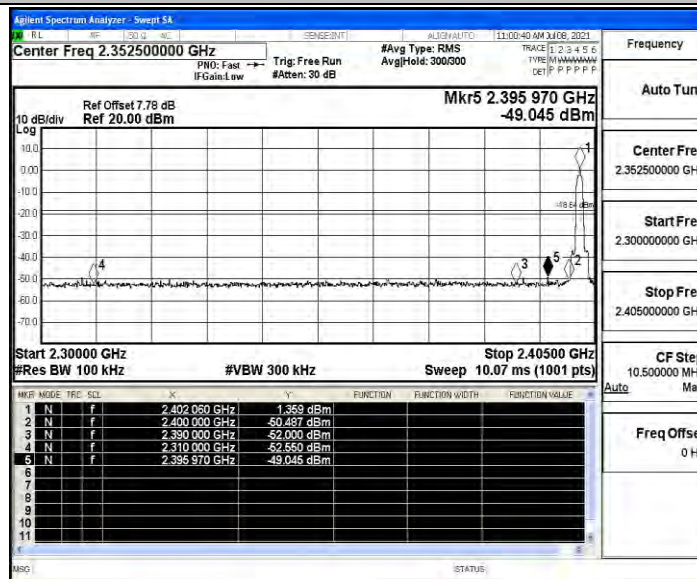


DH5_Ant1_High_Hop

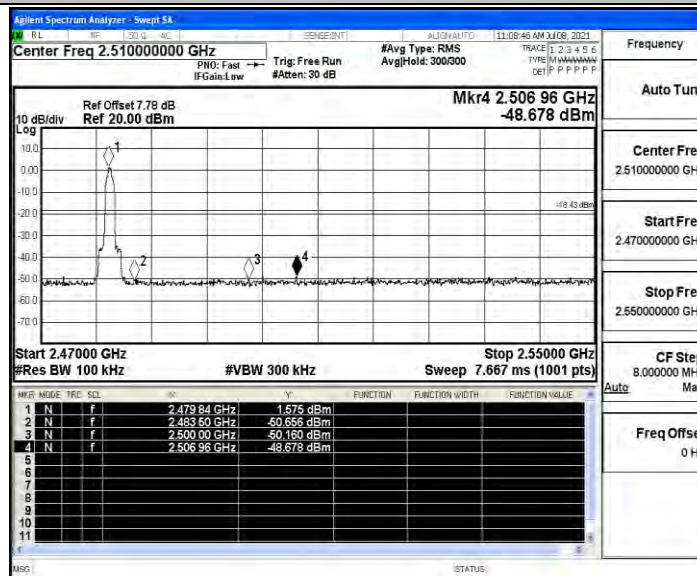




2DH5_Ant1_Low_2402

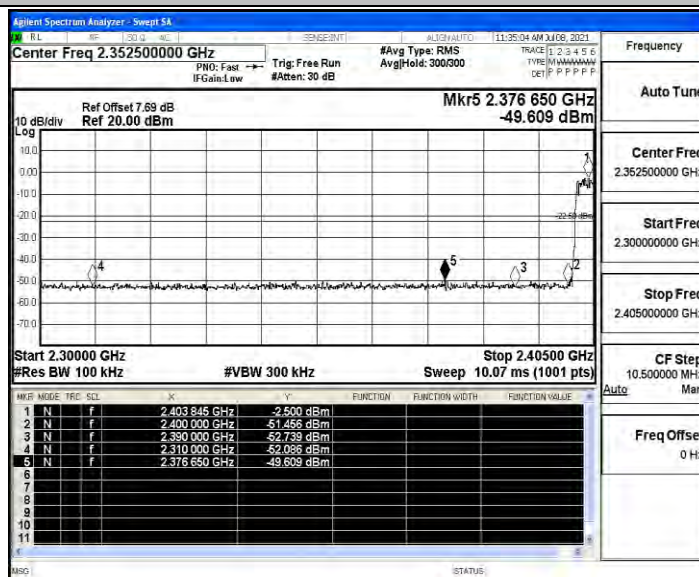


2DH5_Ant1_High_2480

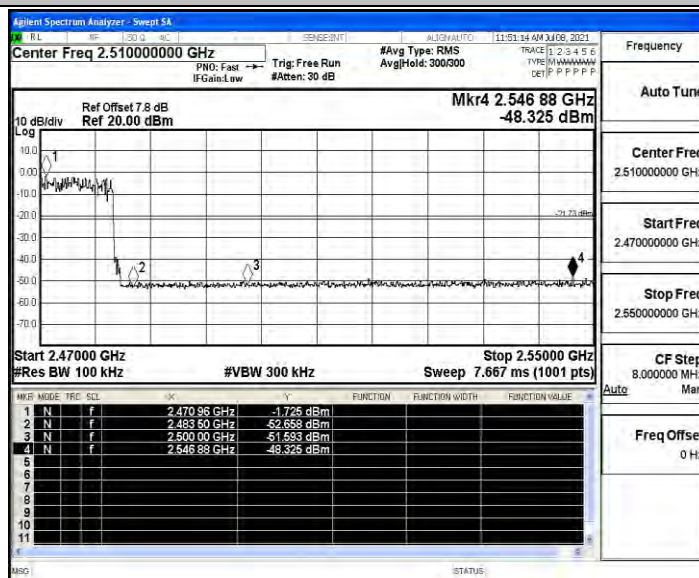




2DH5_Ant1_Low_Hop

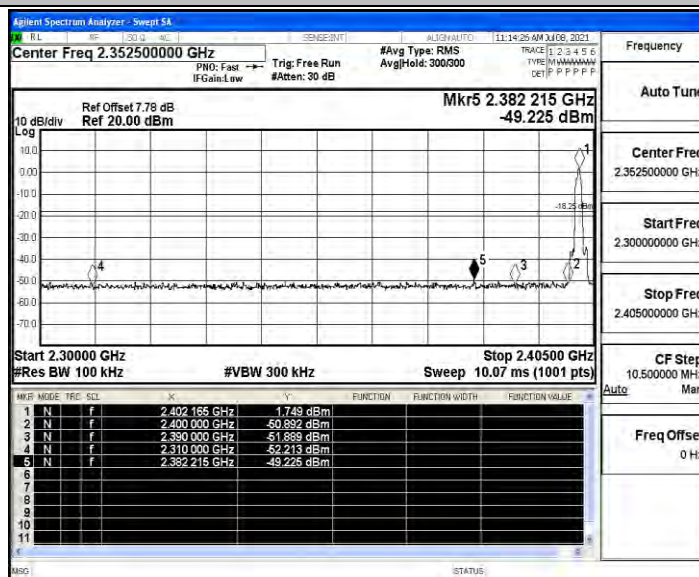


2DH5_Ant1_High_Hop

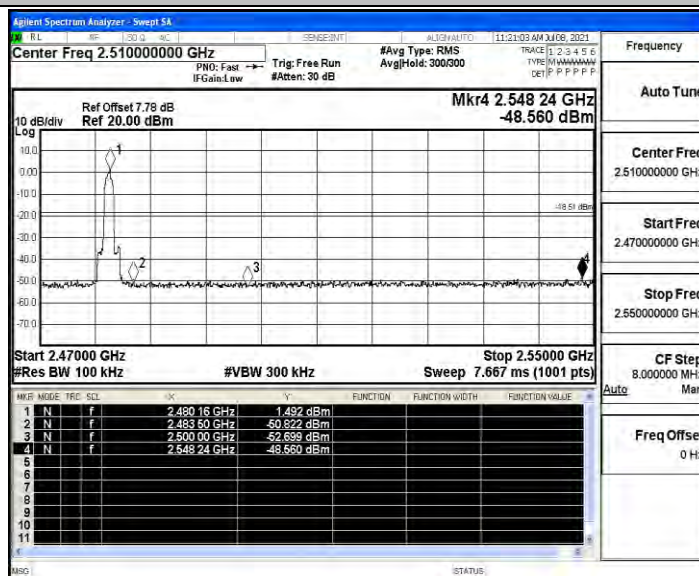




3DH5_Ant1_Low_2402

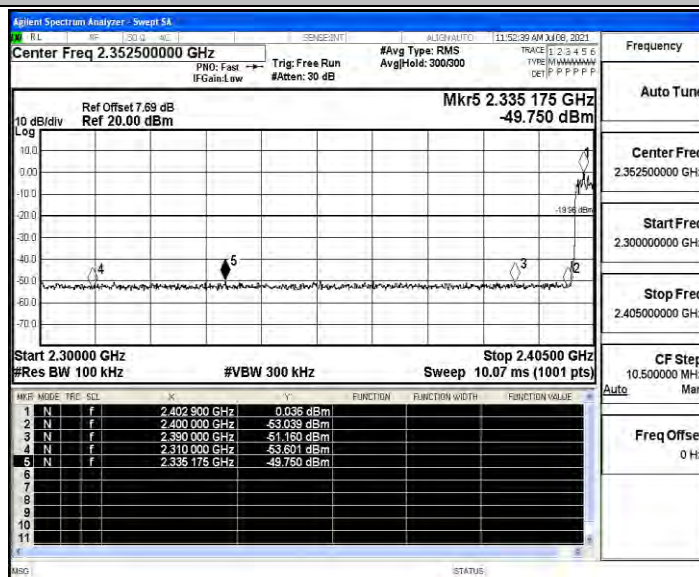


3DH5_Ant1_High_2480

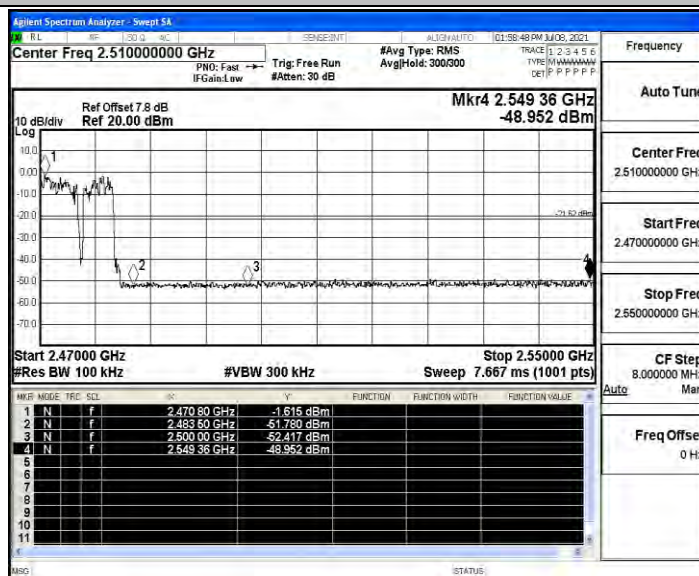




3DH5_Ant1_Low_Hop



3DH5_Ant1_High_Hop





Appendix A.8: Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq	Result	Limit	Verdict
DH5	Ant1	Low	2402	AV	2310.000	-49.1	≤-41.20	PASS
				AV	2387.150	-48.55	≤-41.20	PASS
				AV	2390.000	-48.65	≤-41.20	PASS
				Peak	2310.000	-41.99	≤-21.20	PASS
				Peak	2336.645	-38.4	≤-21.20	PASS
				Peak	2390.000	-41.17	≤-21.20	PASS
		High	2480	AV	2483.500	-47.77	≤-41.20	PASS
				AV	2483.520	-47.77	≤-41.20	PASS
				AV	2500.000	-48	≤-41.20	PASS
				Peak	2483.500	-40.98	≤-21.20	PASS
				Peak	2487.680	-38.5	≤-21.20	PASS
				Peak	2500.000	-40.74	≤-21.20	PASS
		Low	Hop	Peak	2310.000	-41.56	≤-21.20	PASS
				Peak	2370.665	-38.98	≤-21.20	PASS
				Peak	2390.000	-41.92	≤-21.20	PASS
		High	Hop	Peak	2483.500	-41.85	≤-21.20	PASS
				Peak	2491.520	-38.38	≤-21.20	PASS
				Peak	2500.000	-42.12	≤-21.20	PASS
2DH5	Ant1	Low	2402	AV	2310.000	-49.01	≤-41.20	PASS
				AV	2383.055	-48.44	≤-41.20	PASS
				AV	2390.000	-48.72	≤-41.20	PASS
				Peak	2310.000	-43.5	≤-21.20	PASS
				Peak	2387.255	-38.94	≤-21.20	PASS
				Peak	2390.000	-41.17	≤-21.20	PASS
		High	2480	AV	2483.500	-47.68	≤-41.20	PASS
				AV	2483.520	-47.68	≤-41.20	PASS
				AV	2500.000	-47.97	≤-41.20	PASS
				Peak	2483.500	-41.82	≤-21.20	PASS
				Peak	2497.760	-39.44	≤-21.20	PASS
				Peak	2500.000	-43.28	≤-21.20	PASS
3DH5	Ant1	Low	2402	AV	2310.000	-49.06	≤-41.20	PASS
				AV	2389.670	-48.53	≤-41.20	PASS
				AV	2390.000	-48.71	≤-41.20	PASS
				Peak	2310.000	-42.05	≤-21.20	PASS
				Peak	2361.005	-39.32	≤-21.20	PASS
				Peak	2390.000	-42.03	≤-21.20	PASS
		High	2480	AV	2483.500	-47.68	≤-41.20	PASS



				AV	2483.520	-47.68	≤ -41.20	PASS
				AV	2500.000	-47.97	≤ -41.20	PASS
				Peak	2483.500	-40.46	≤ -21.20	PASS
				Peak	2499.600	-38.51	≤ -21.20	PASS
				Peak	2500.000	-40.83	≤ -21.20	PASS
		Low	Hop	Peak	2310.000	-41.54	≤ -21.20	PASS
				Peak	2327.510	-39.1	≤ -21.20	PASS
				Peak	2390.000	-42.65	≤ -21.20	PASS
		High	Hop	Peak	2483.500	-40.36	≤ -21.20	PASS
				Peak	2483.600	-38.8	≤ -21.20	PASS
				Peak	2500.000	-40.15	≤ -21.20	PASS

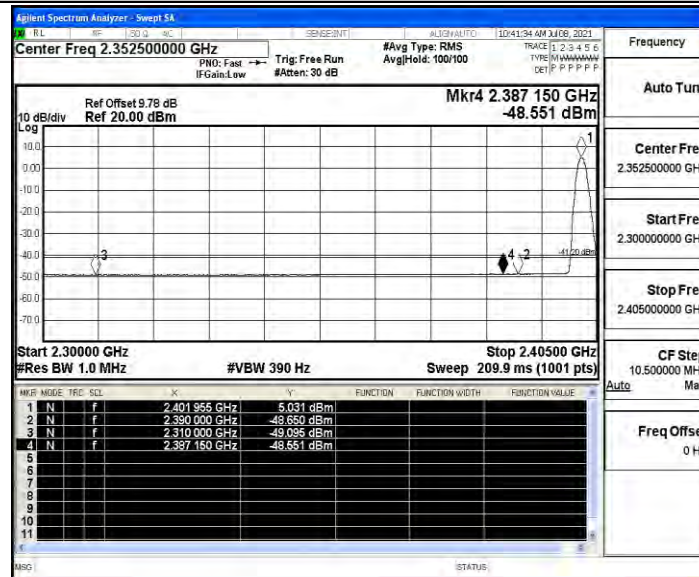
Note:

1. The Antenna Gain is compensated in the graph.
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.

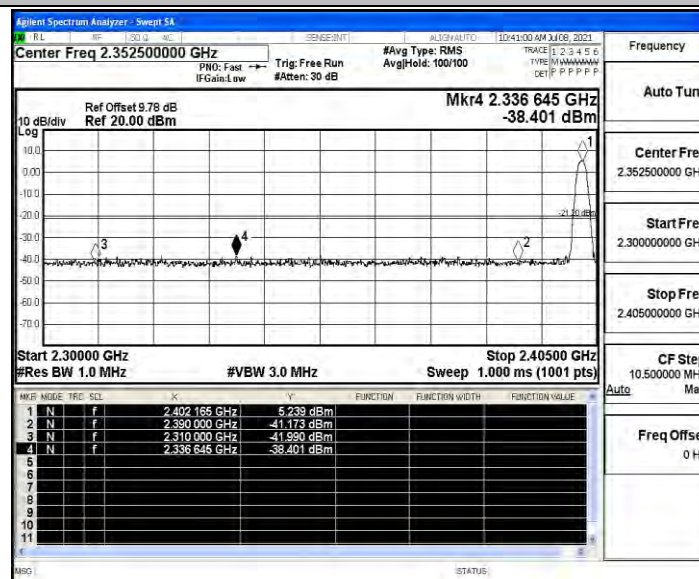


Test Graphs

DH5_Ant1_Low_2402_AV

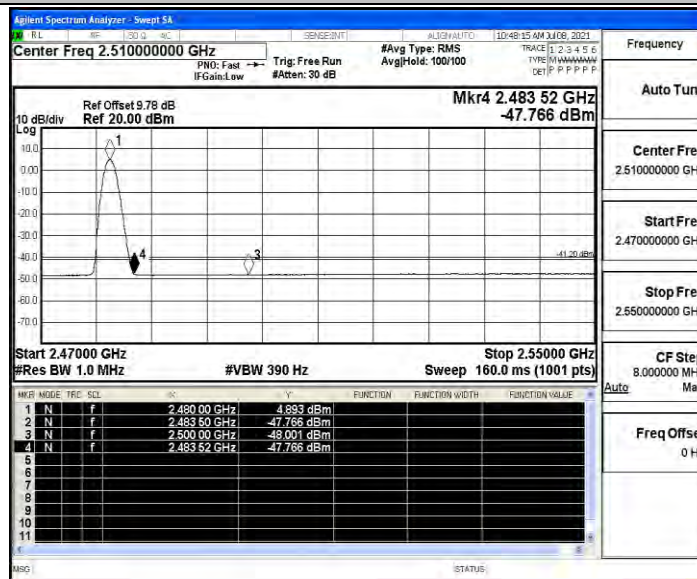


DH5_Ant1_Low_2402_Peak

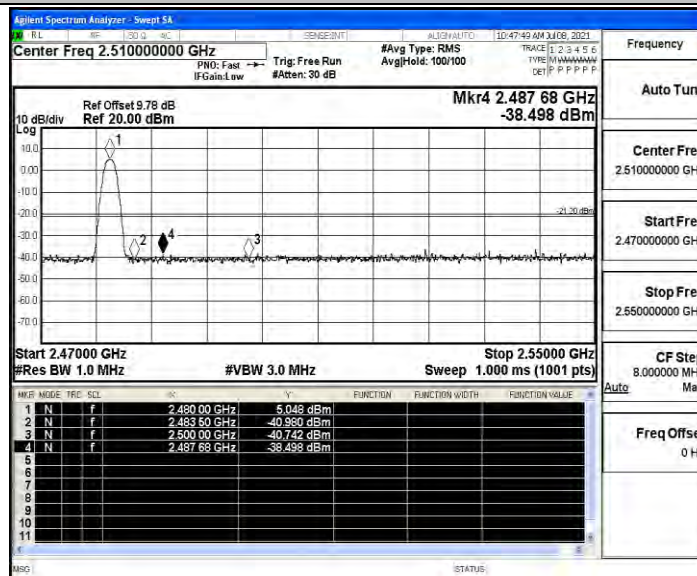




DH5_Ant1_High_2480_AV

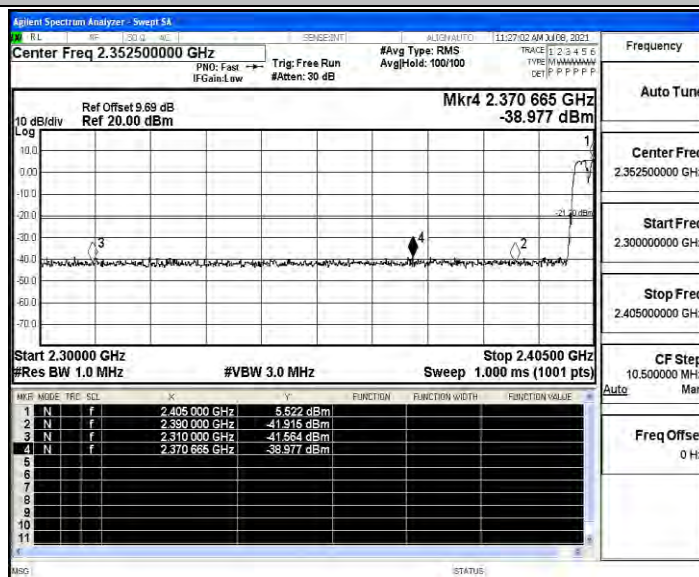


DH5_Ant1_High_2480_Peak

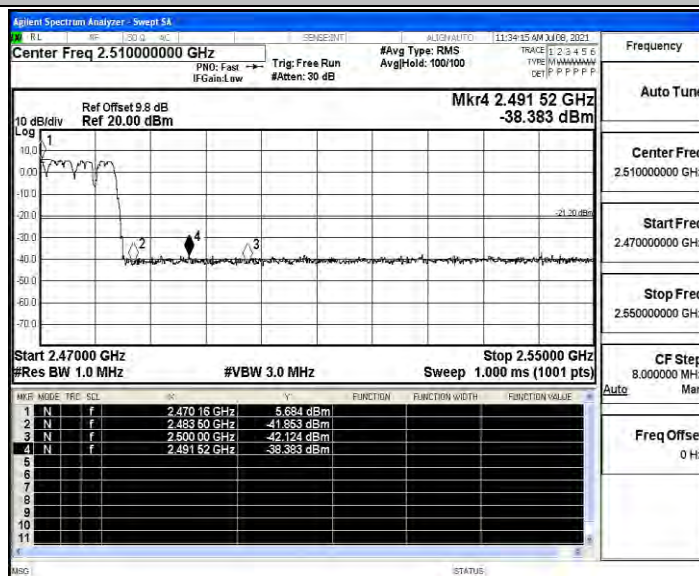




DH5_Ant1_Low_Hop_Peak

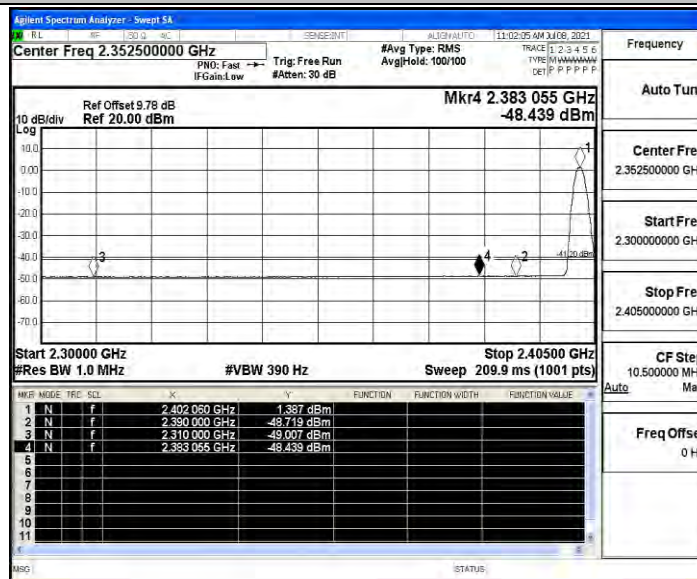


DH5_Ant1_High_Hop_Peak

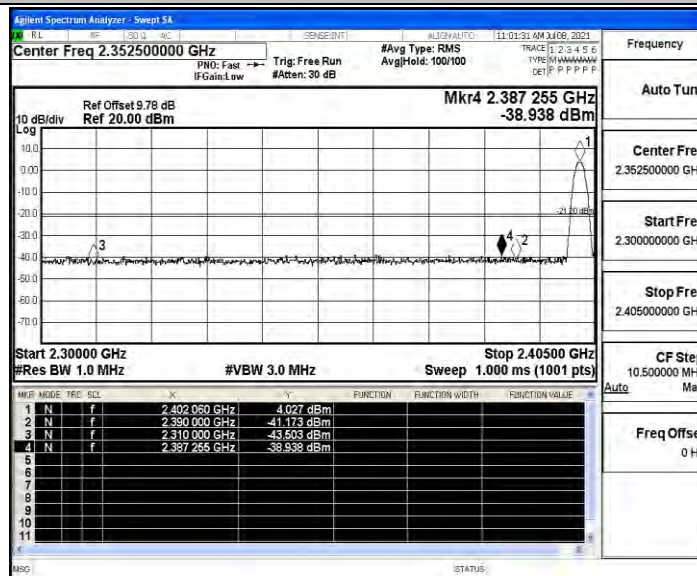




2DH5_Ant1_Low_2402_AV

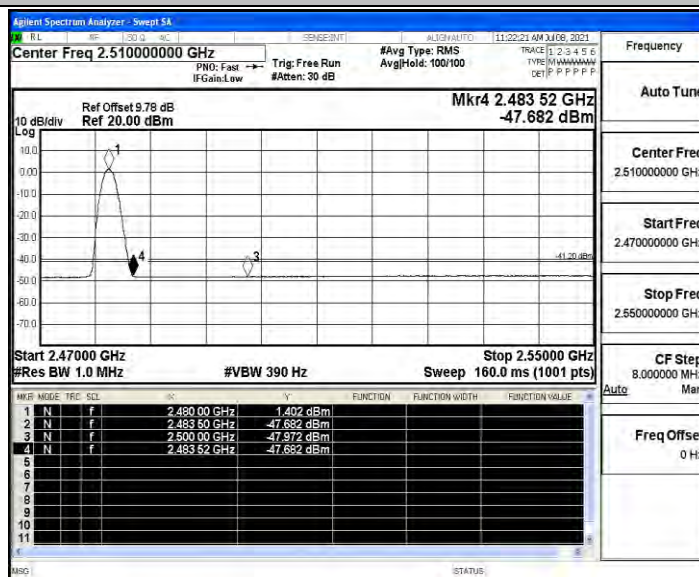


2DH5_Ant1_Low_2402_Peak

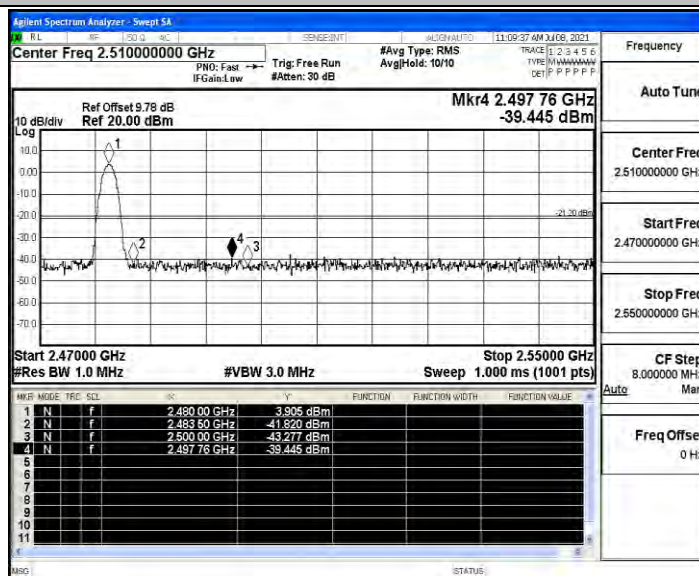




2DH5_Ant1_High_2480_AV

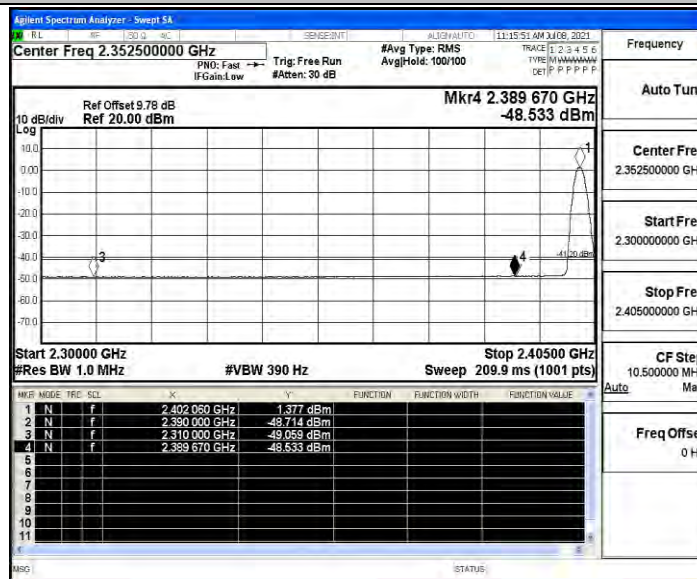


2DH5_Ant1_High_2480_Peak

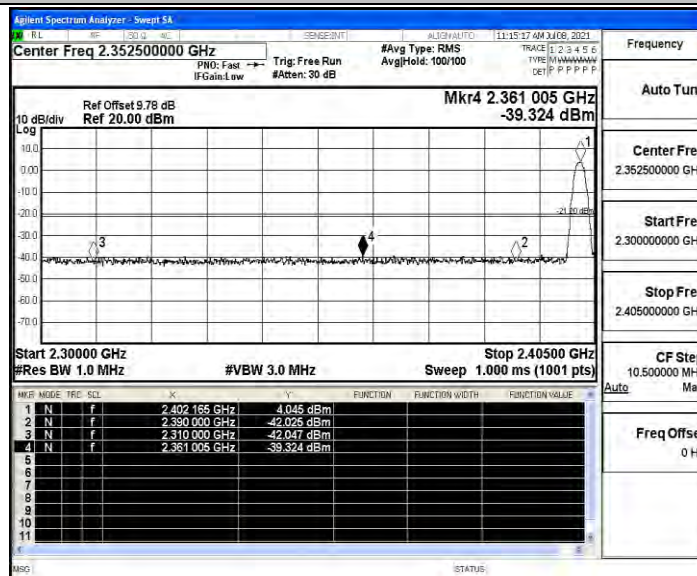




3DH5_Ant1_Low_2402_AV

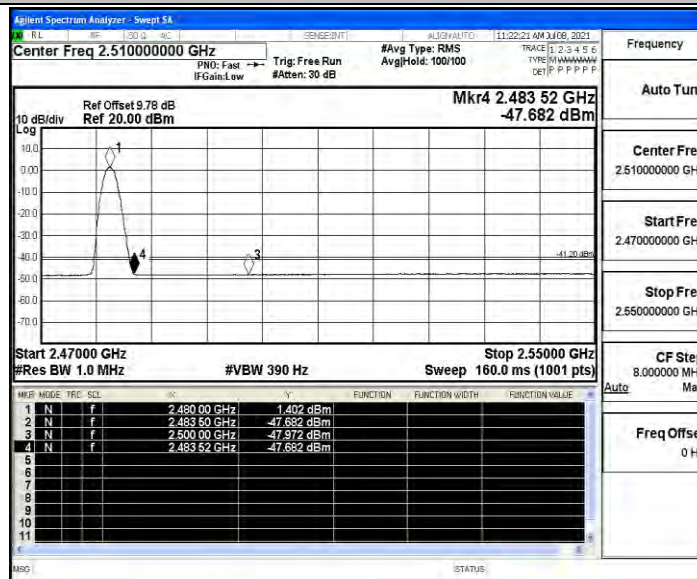


3DH5_Ant1_Low_2402_Peak

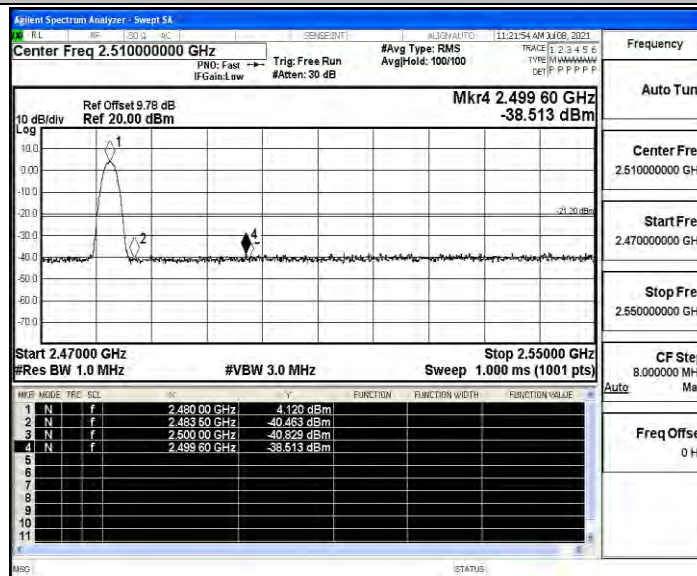




3DH5_Ant1_High_2480_AV

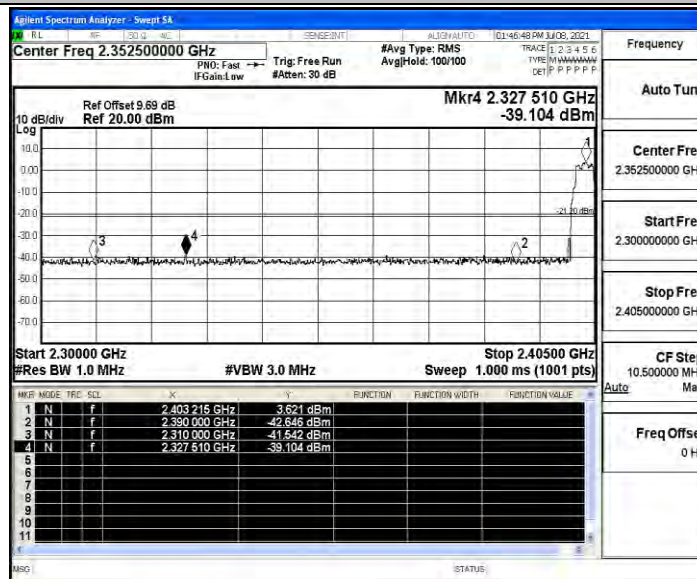


3DH5_Ant1_High_2480_Peak





3DH5_Ant1_Low_Hop_Peak



3DH5_Ant1_High_Hop_Peak

