Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: BDE Wi-Fi 6 & BLE Combo Module

Test Model: BDE-BW3301NP2

Environmental Conditions

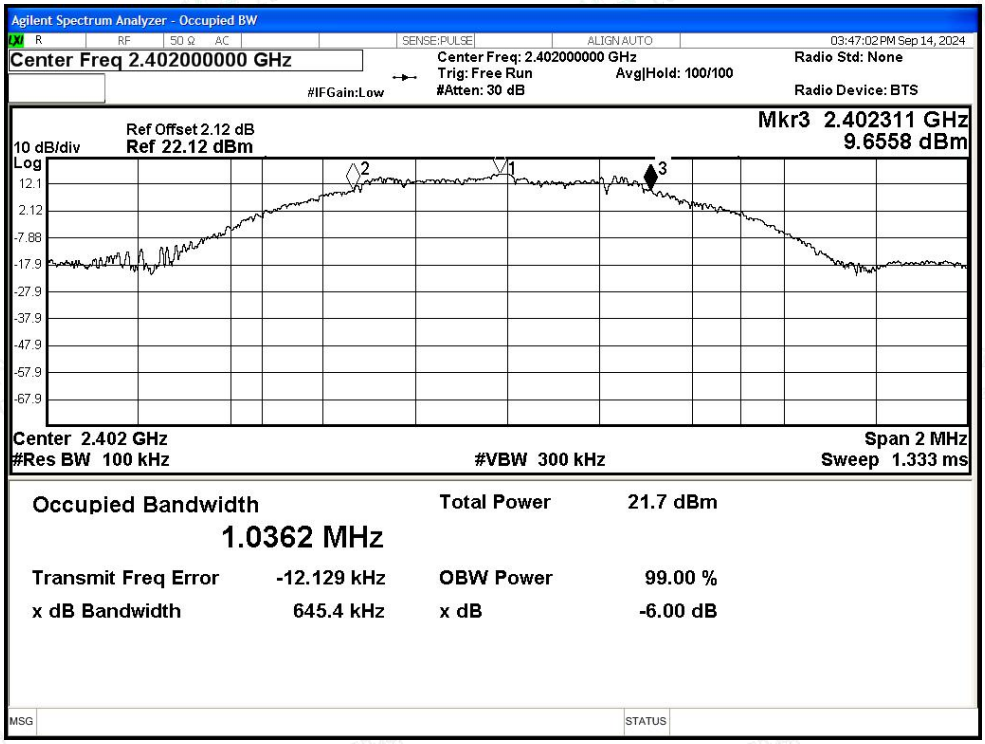
Temperature:	23.1° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Can Kun
Supervised by:	Nick Peng

A.1 -6dB Bandwidth

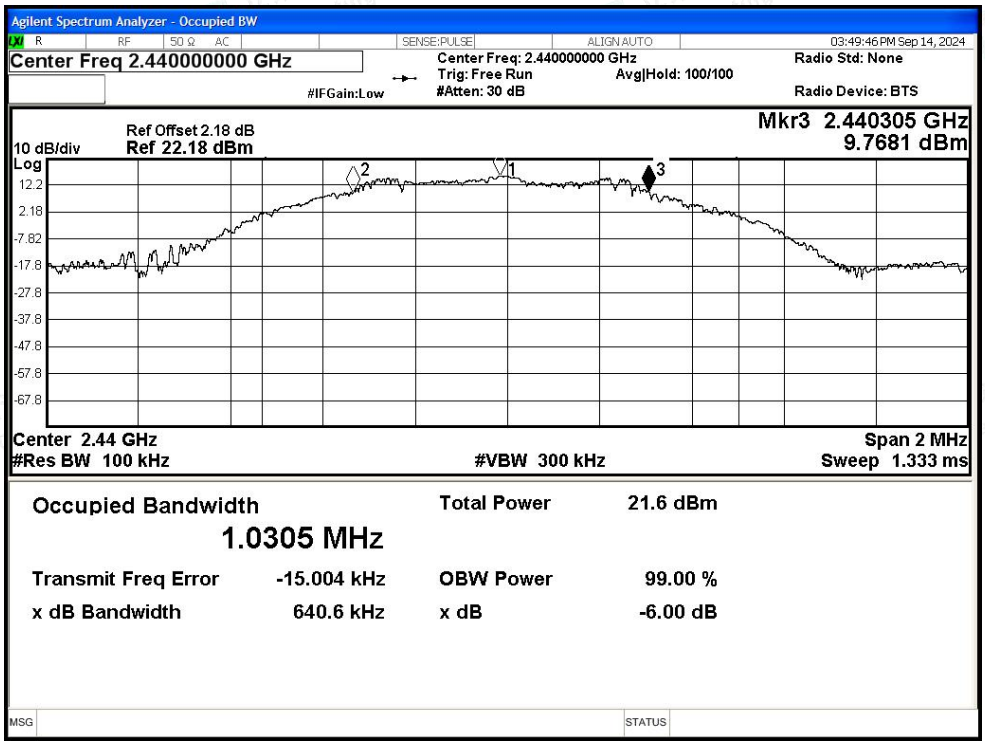
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.645	>=0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.641	>=0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.636	>=0.5	Pass
NVNT	BLE 2M	2404	Ant1	1.109	>=0.5	Pass
NVNT	BLE 2M	2440	Ant1	1.083	>=0.5	Pass
NVNT	BLE 2M	2478	Ant1	1.111	>=0.5	Pass

Test Graphs

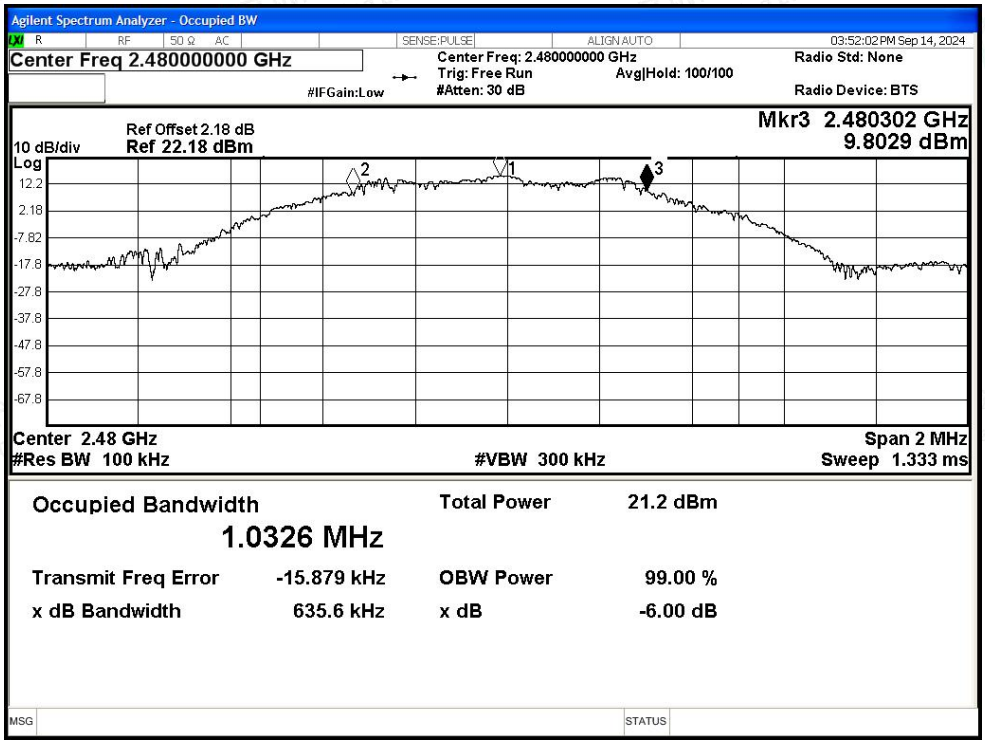
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



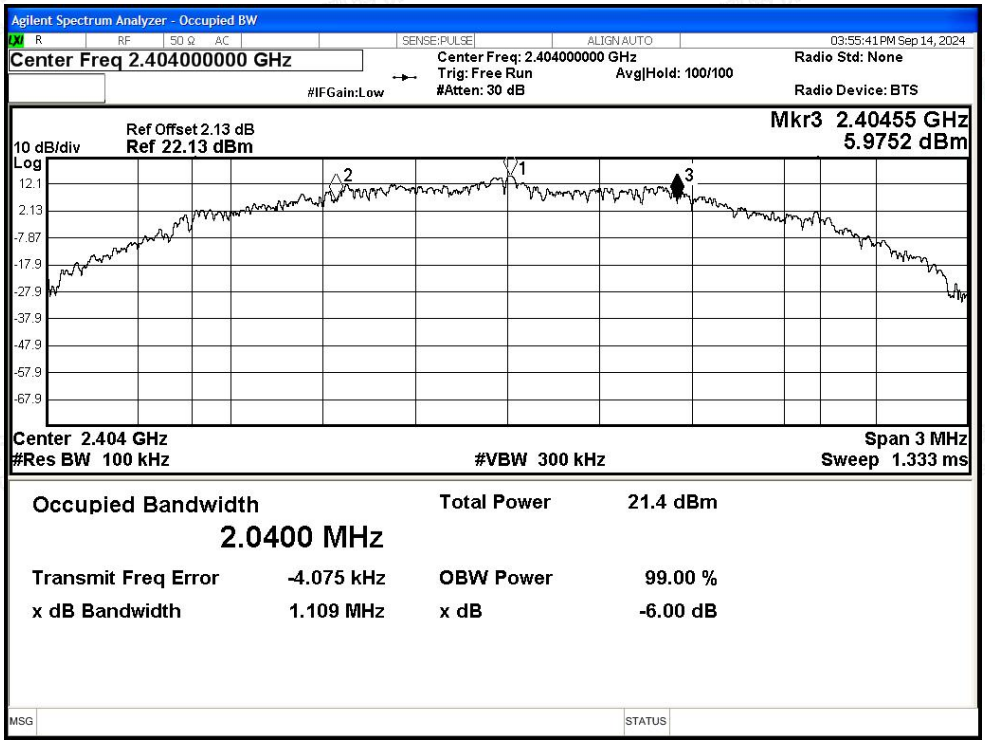
-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



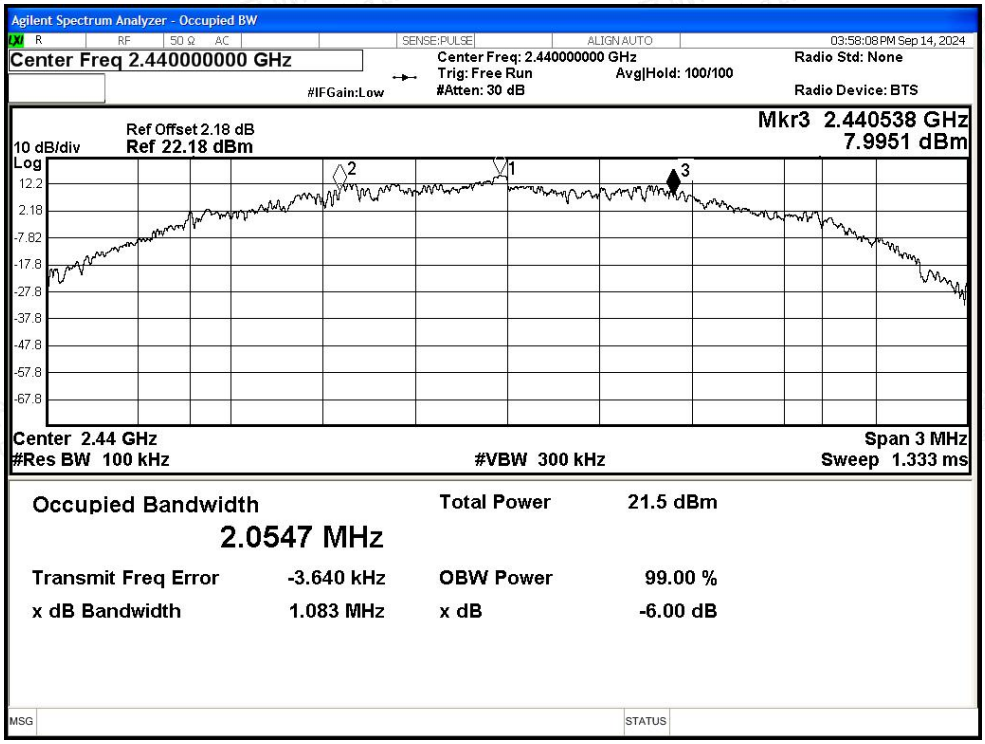
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



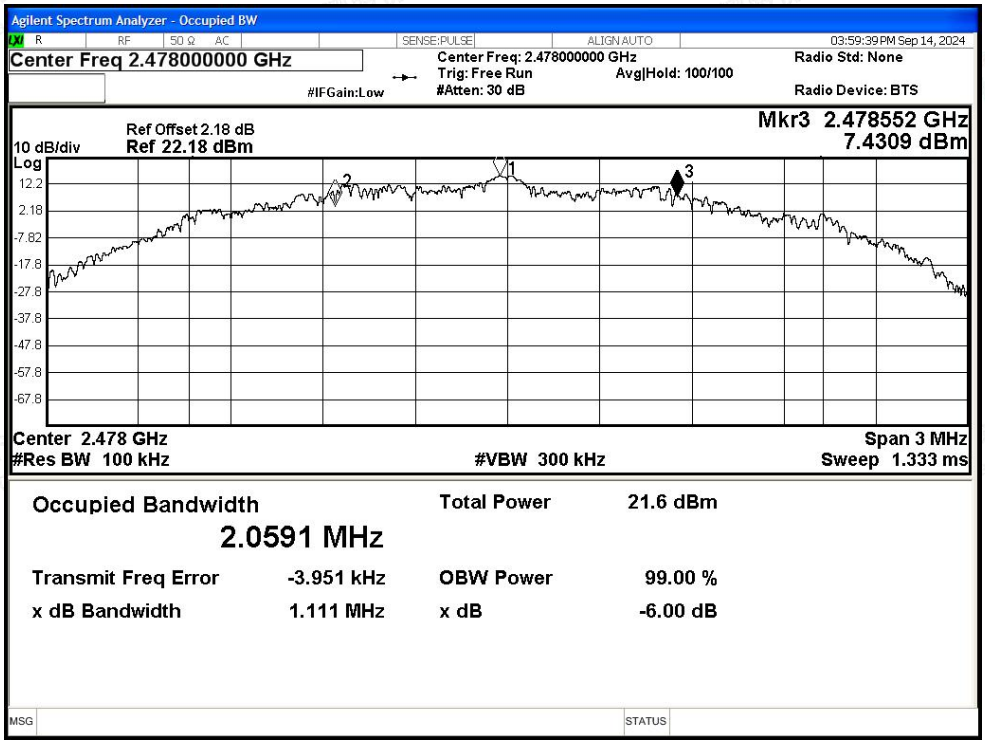
-6dB Bandwidth NVNT BLE 2M 2404MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2478MHz Ant1

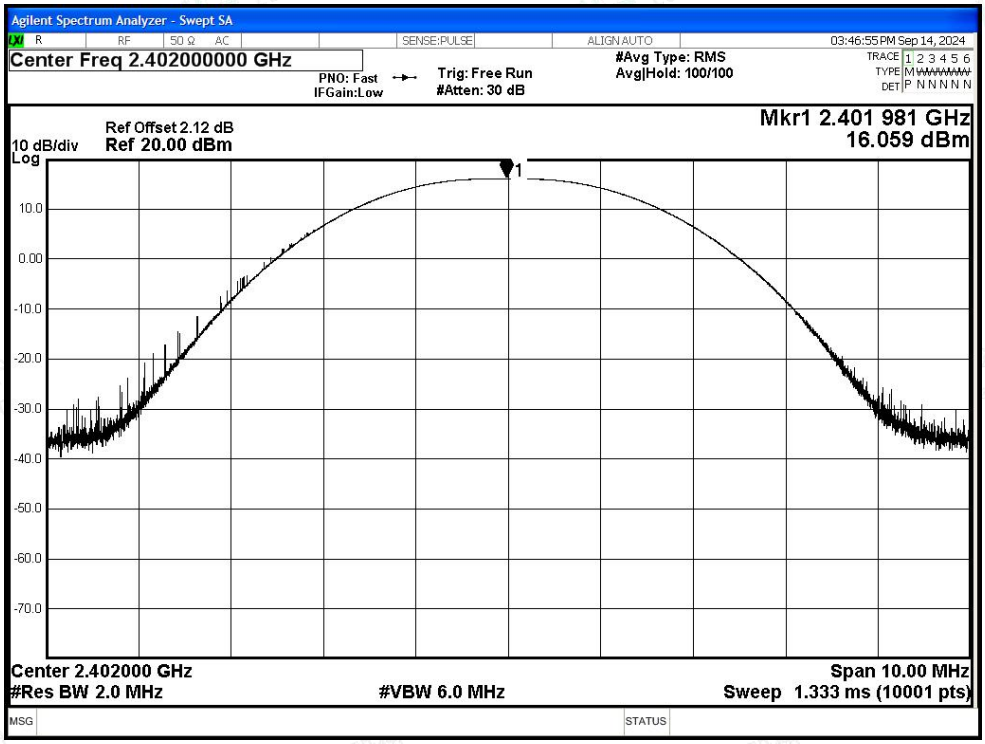


A.2 Maximum Peak Conducted Output Power

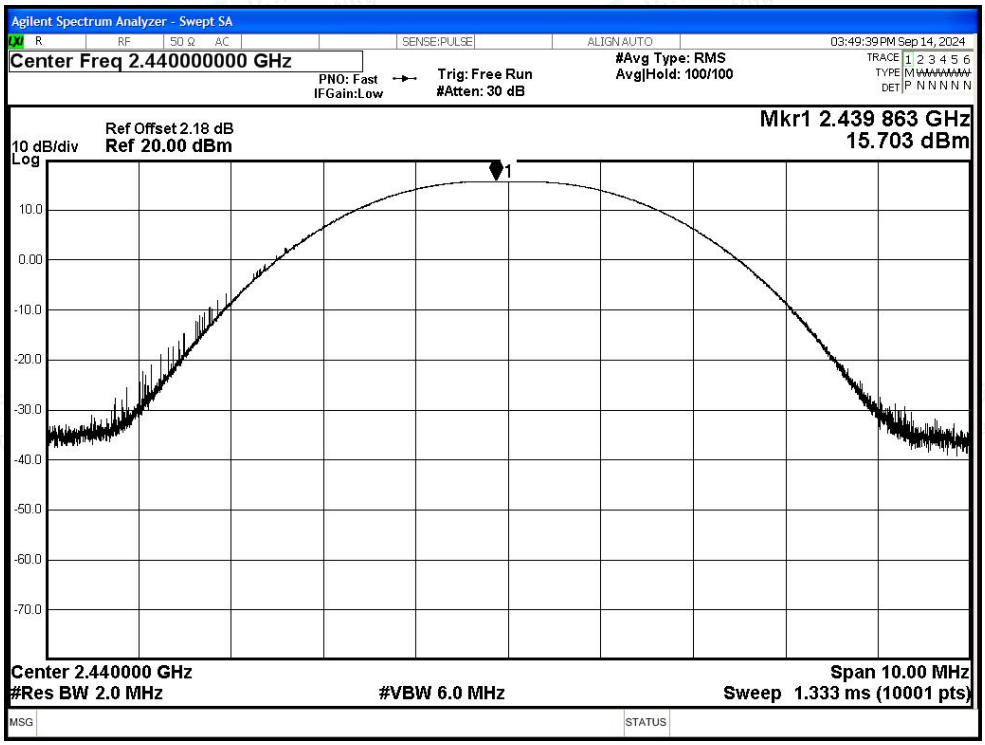
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	16.06	30	Pass
NVNT	BLE 1M	2440	Ant1	15.7	30	Pass
NVNT	BLE 1M	2480	Ant1	15.48	30	Pass
NVNT	BLE 2M	2404	Ant1	15.68	30	Pass
NVNT	BLE 2M	2440	Ant1	15.96	30	Pass
NVNT	BLE 2M	2478	Ant1	15.82	30	Pass

Test Graphs

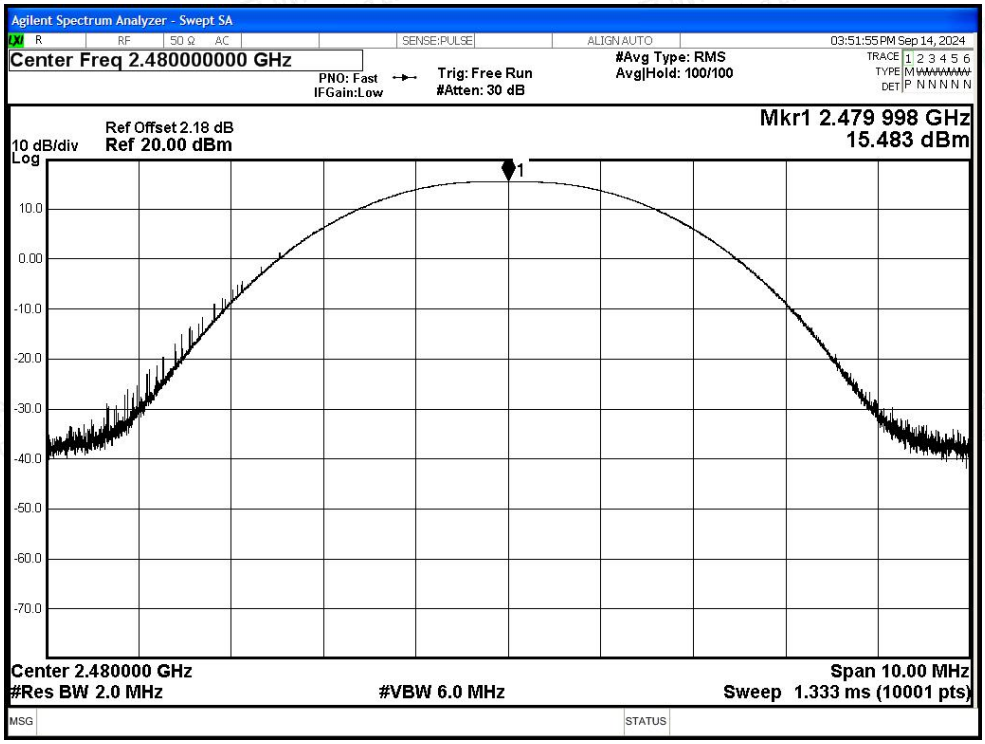
Power NVNT BLE 1M 2402MHz Ant1



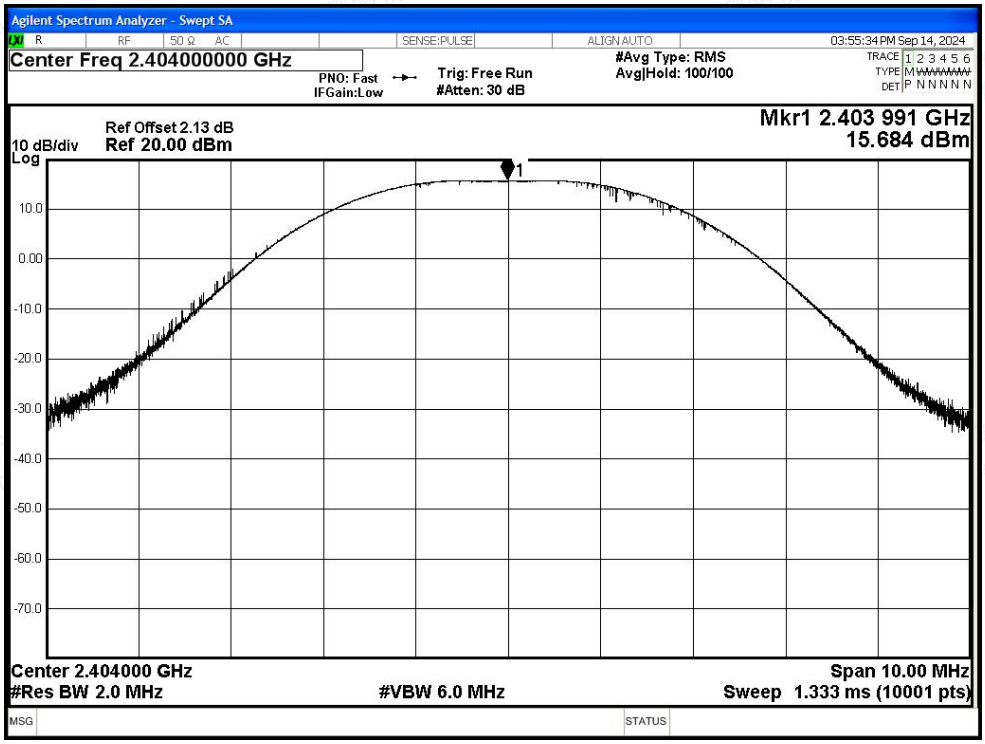
Power NVNT BLE 1M 2440MHz Ant1



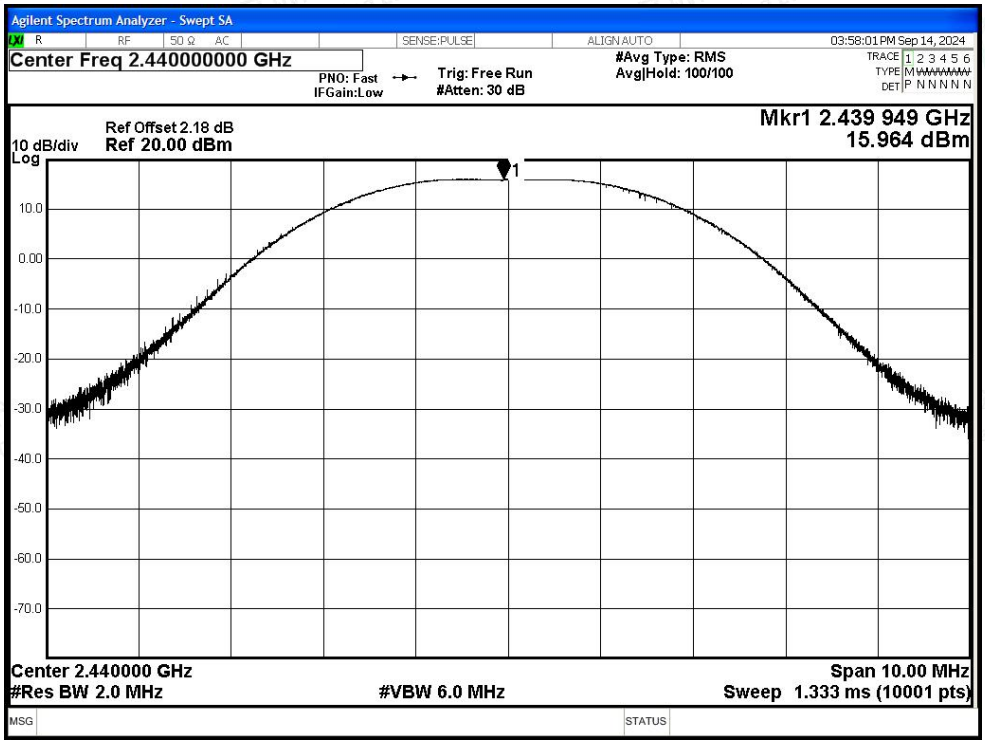
Power NVNT BLE 1M 2480MHz Ant1



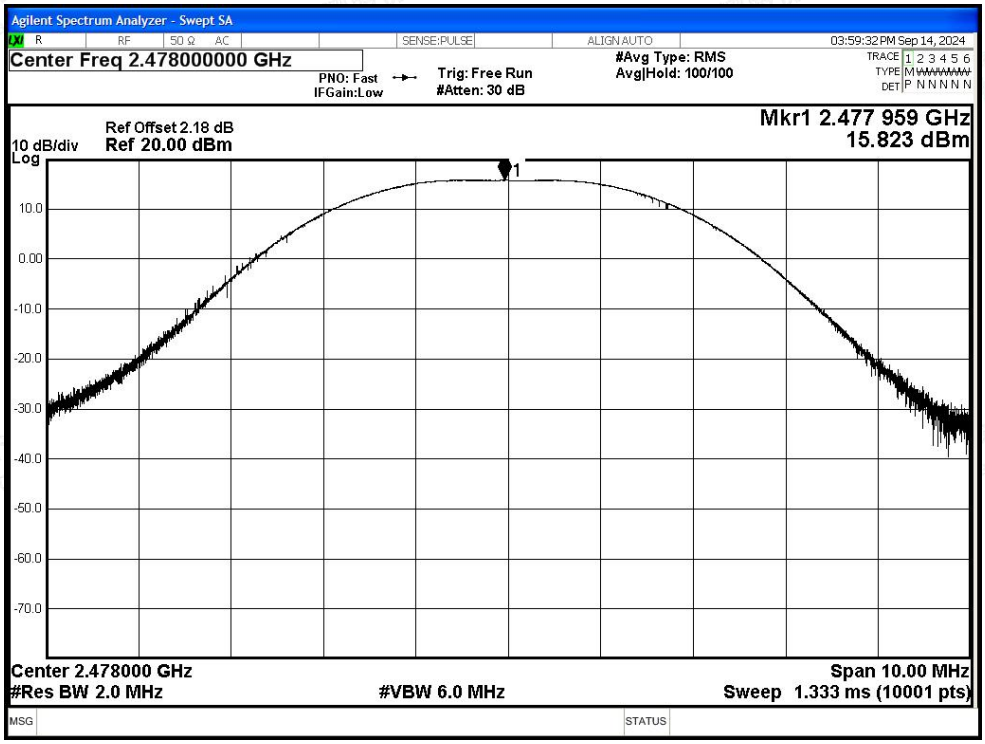
Power NVNT BLE 2M 2404MHz Ant1



Power NVNT BLE 2M 2440MHz Ant1



Power NVNT BLE 2M 2478MHz Ant1

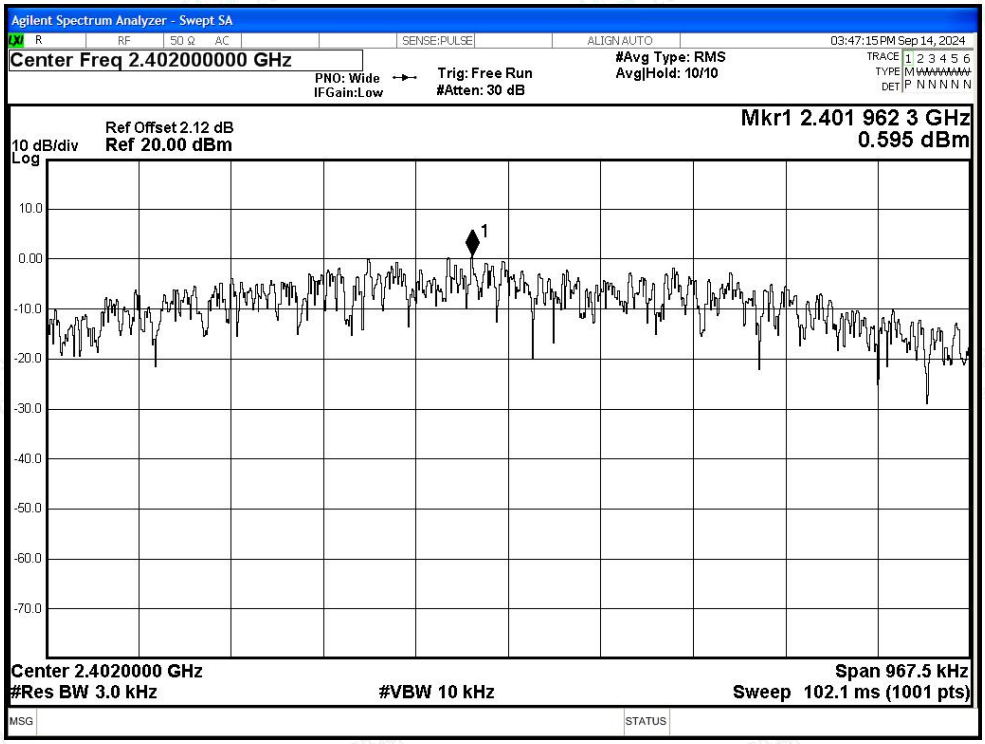


A.3 Maximum Power Spectral Density Level

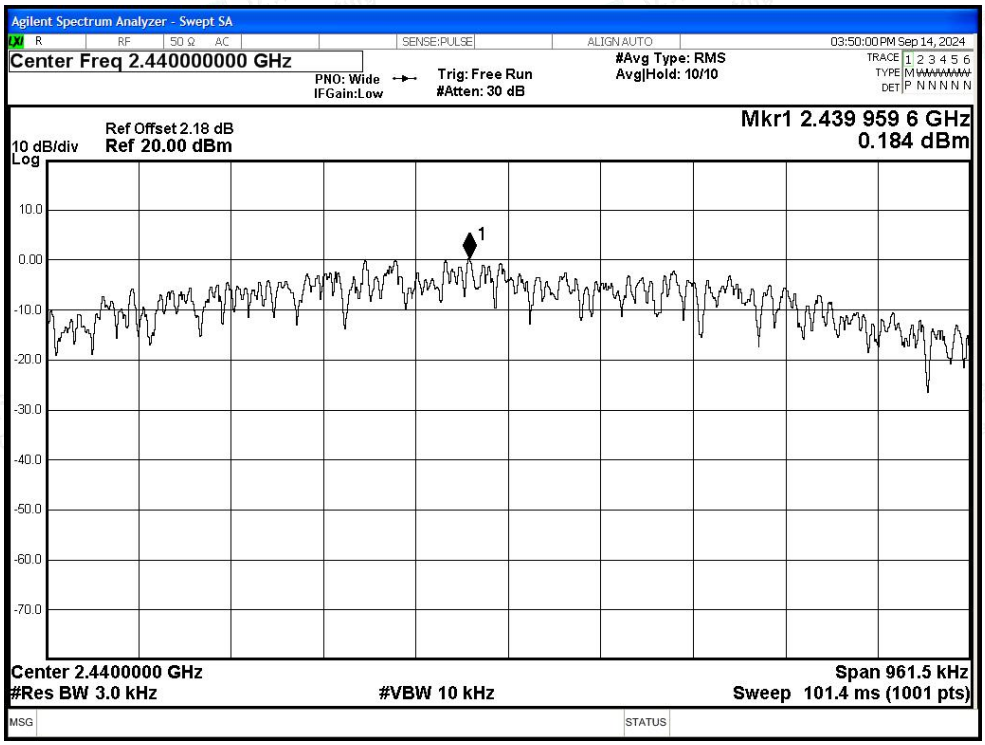
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.6	8	Pass
NVNT	BLE 1M	2440	Ant1	0.18	8	Pass
NVNT	BLE 1M	2480	Ant1	-0.06	8	Pass
NVNT	BLE 2M	2404	Ant1	-3	8	Pass
NVNT	BLE 2M	2440	Ant1	-2.67	8	Pass
NVNT	BLE 2M	2478	Ant1	-2.9	8	Pass

Test Graphs

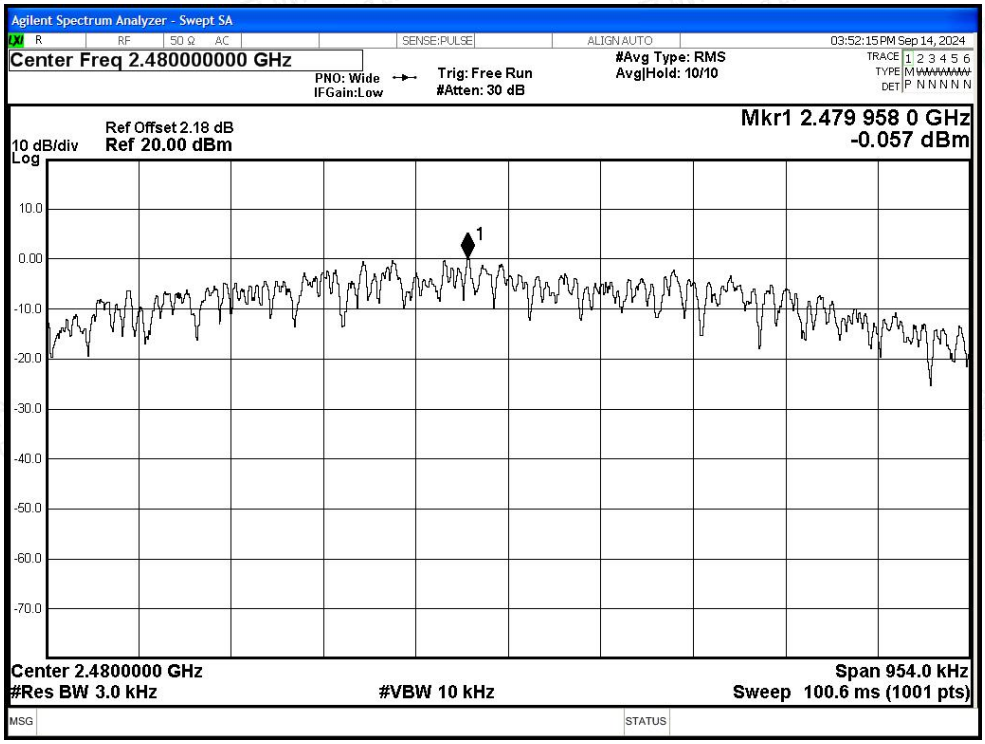
PSD NVNT BLE 1M 2402MHz Ant1



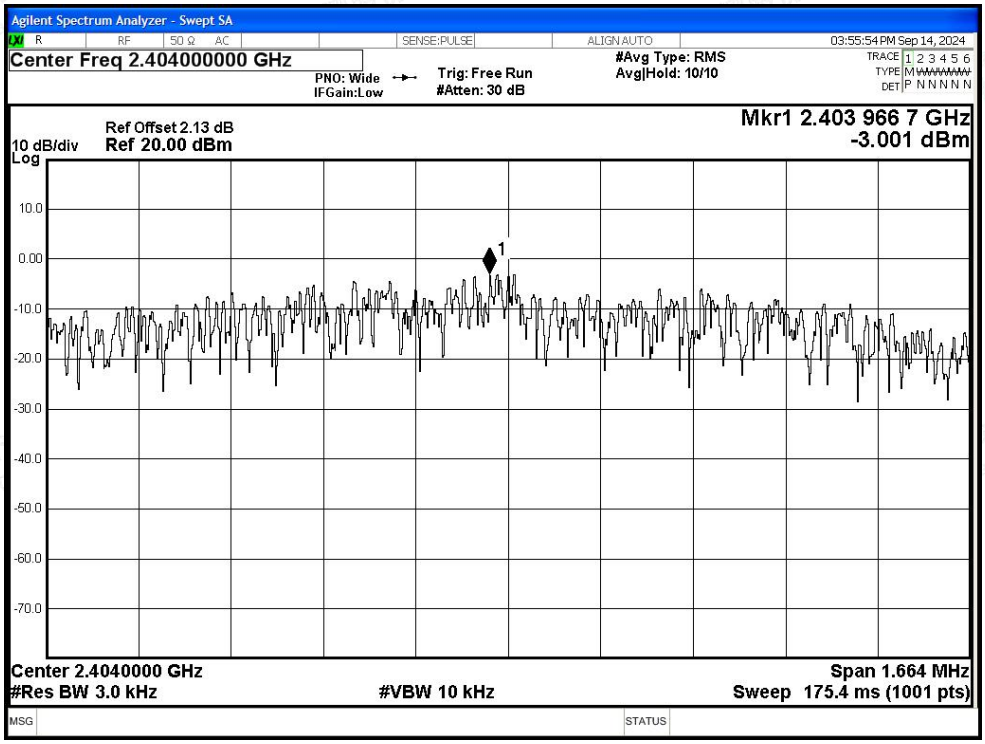
PSD NVNT BLE 1M 2440MHz Ant1



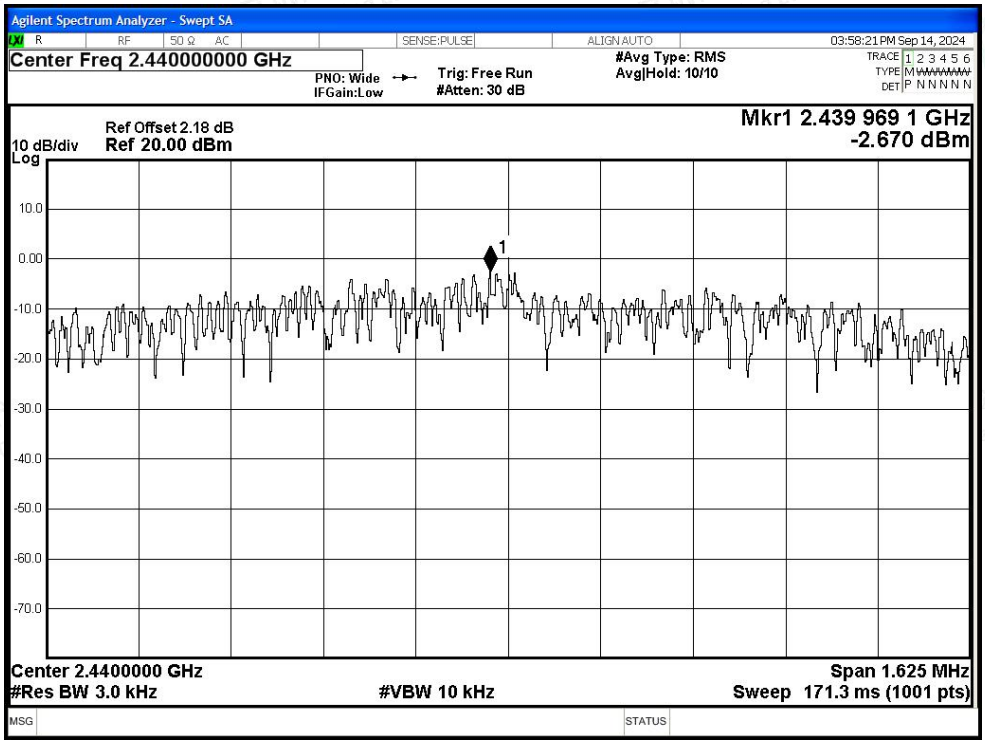
PSD NVNT BLE 1M 2480MHz Ant1



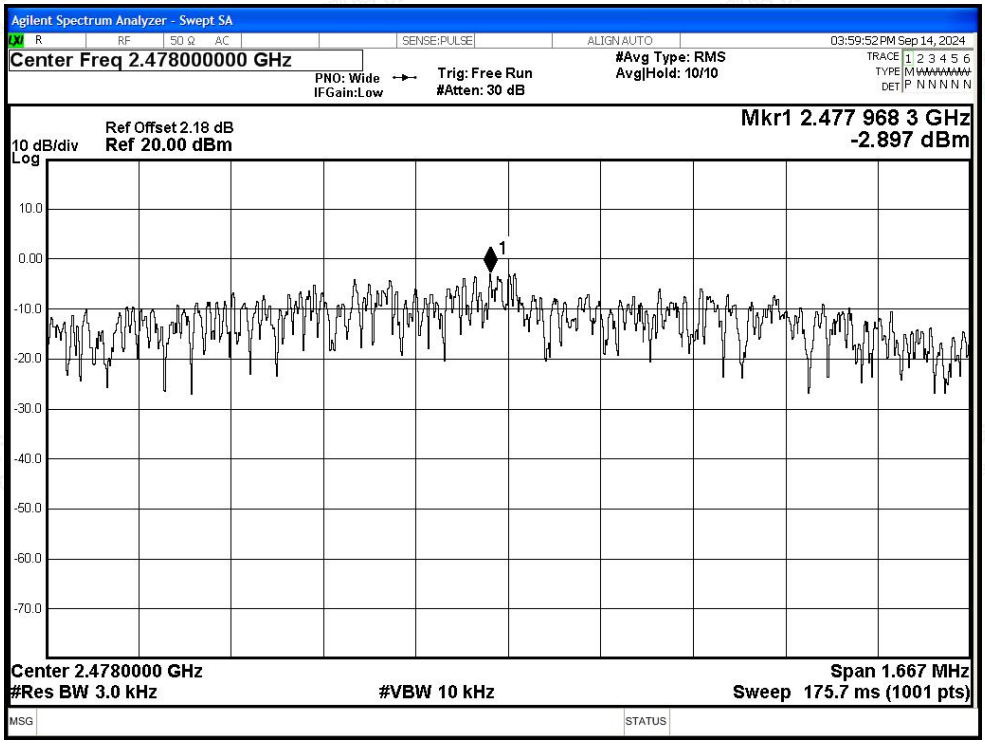
PSD NVNT BLE 2M 2404MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2478MHz Ant1

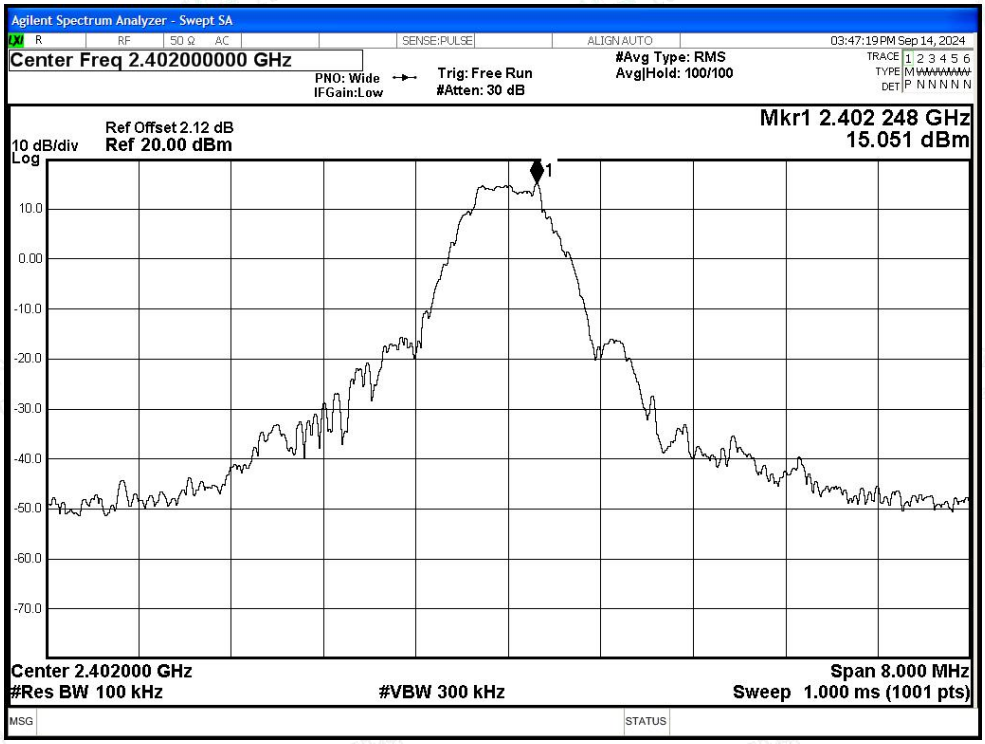


A.4 Band Edge

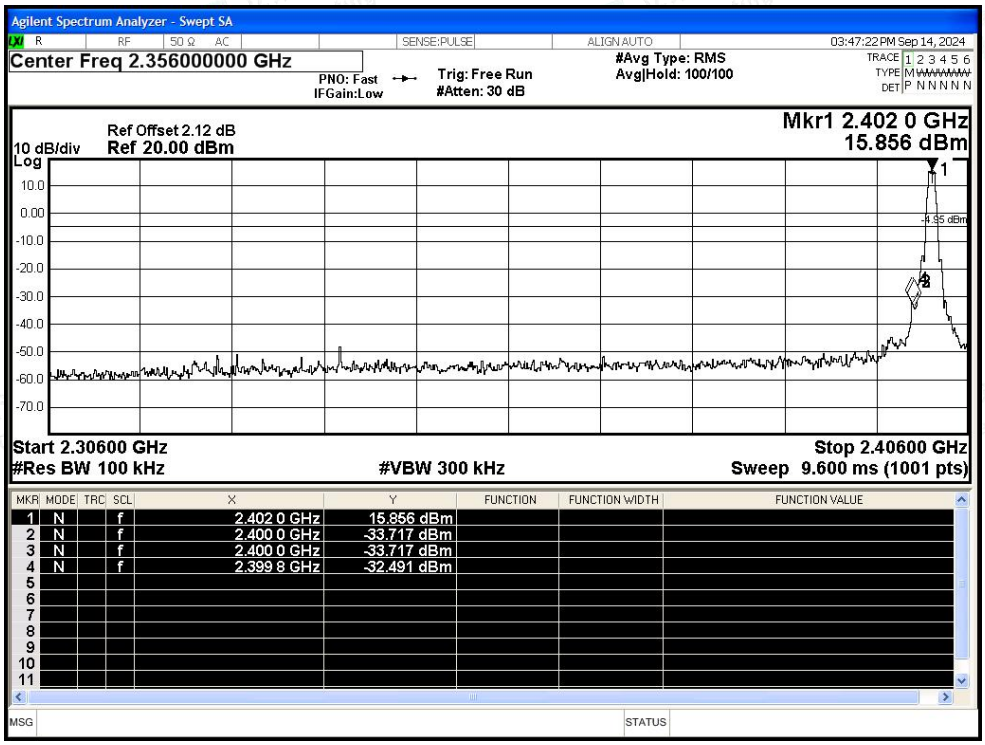
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-47.54	-20	Pass
NVNT	BLE 1M	2480	Ant1	-61.11	-20	Pass
NVNT	BLE 2M	2404	Ant1	-55.48	-20	Pass
NVNT	BLE 2M	2478	Ant1	-62	-20	Pass

Test Graphs

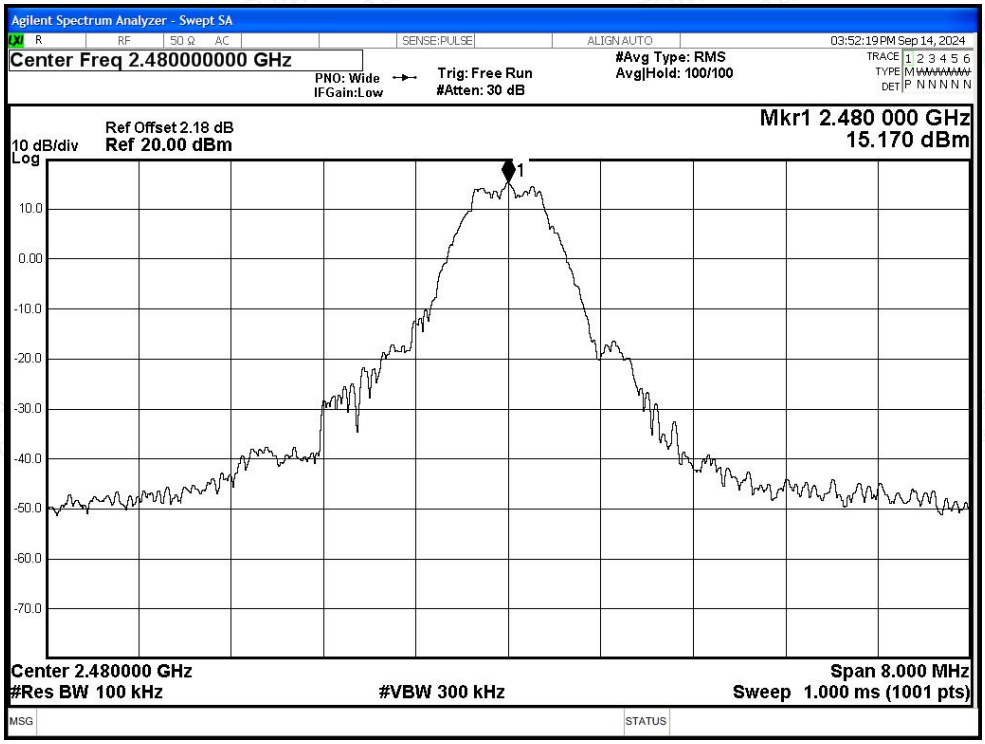
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



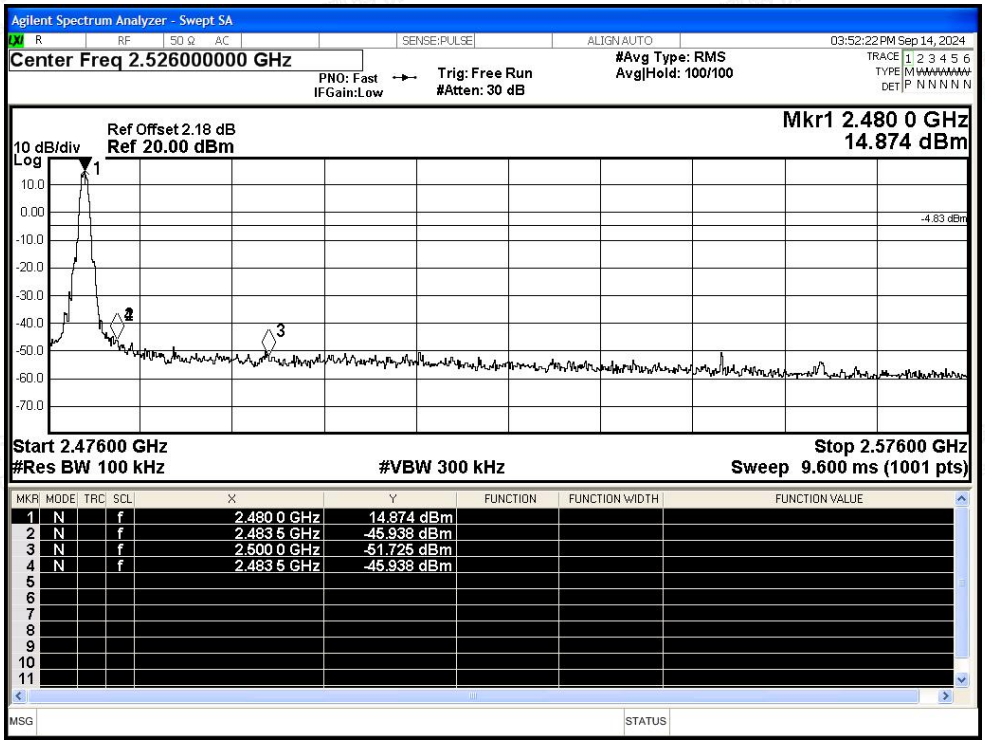
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



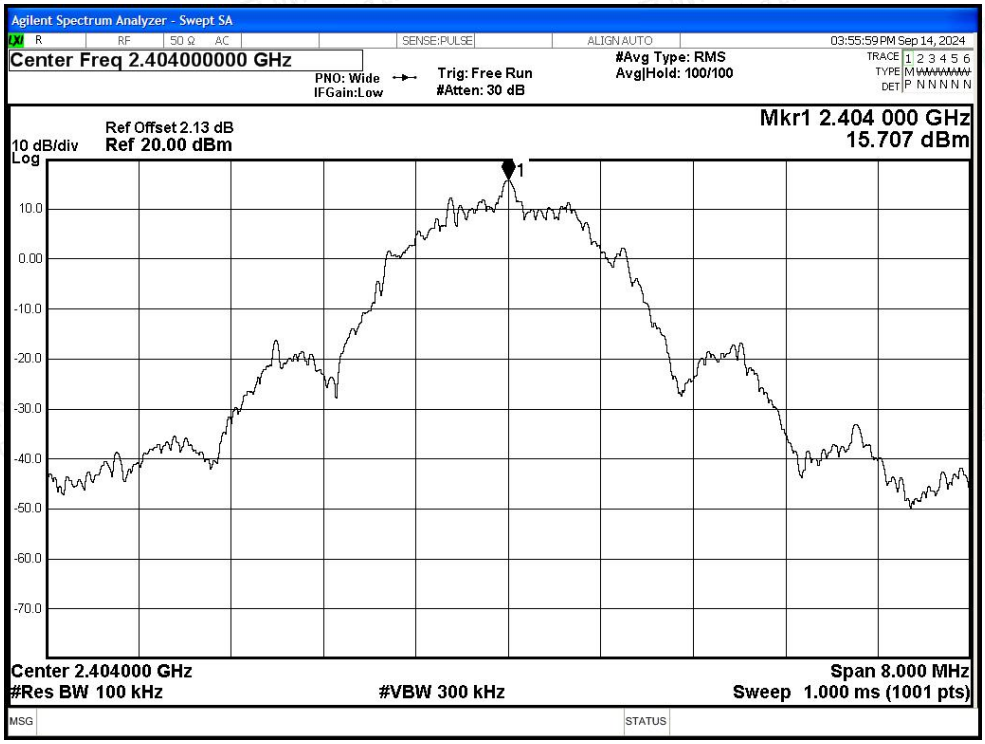
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



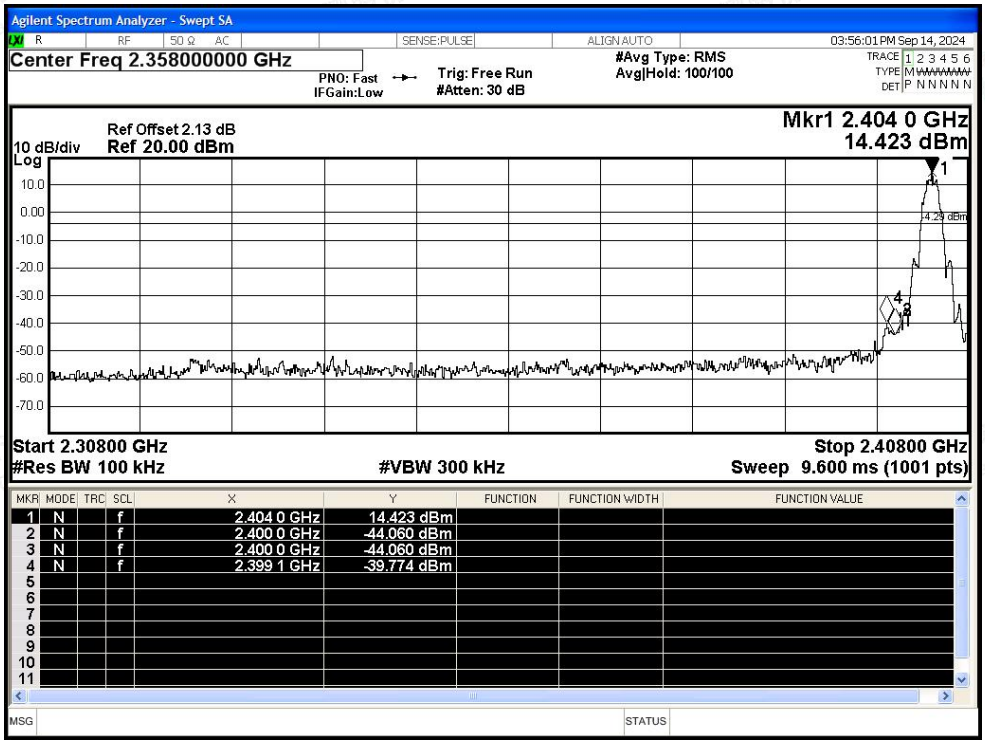
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



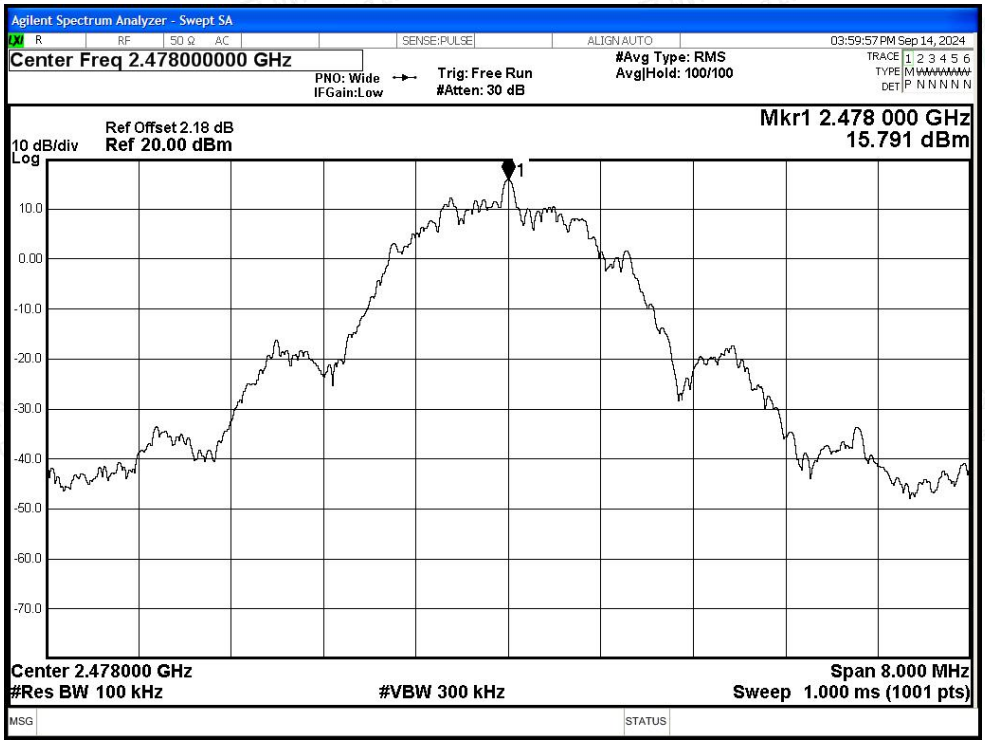
Band Edge NVNT BLE 2M 2404MHz Ant1 Ref



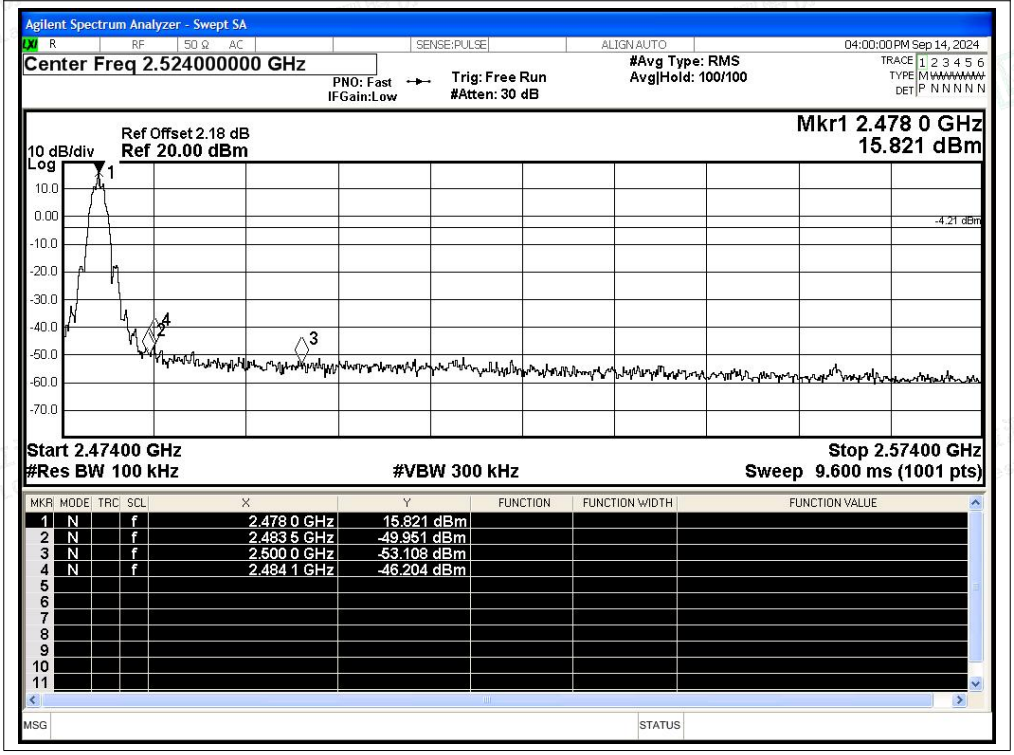
Band Edge NVNT BLE 2M 2404MHz Ant1 Emission



Band Edge NVNT BLE 2M 2478MHz Ant1 Ref



Band Edge NVNT BLE 2M 2478MHz Ant1 Emission

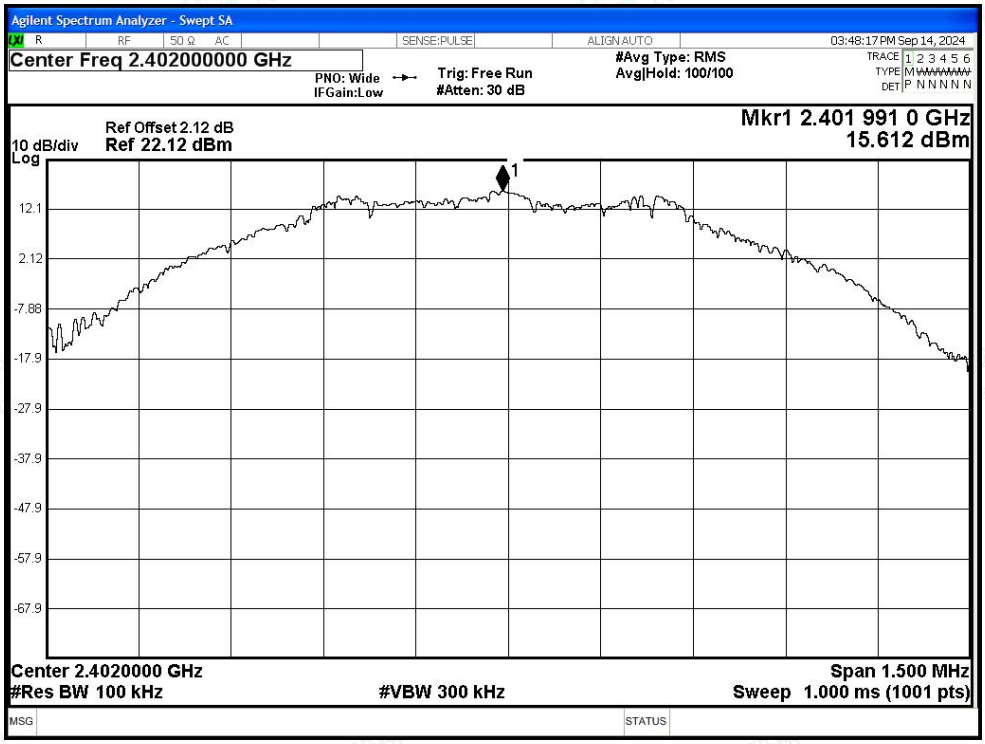


A.5 Conducted RF Spurious Emission

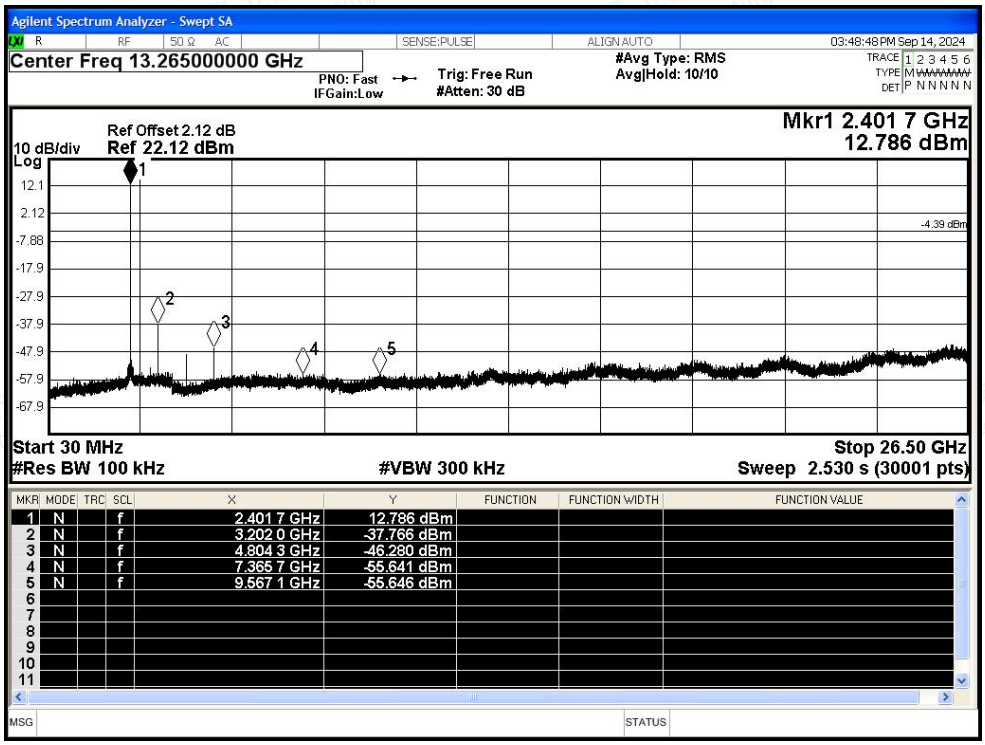
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-53.38	-20	Pass
NVNT	BLE 1M	2440	Ant1	-56.96	-20	Pass
NVNT	BLE 1M	2480	Ant1	-58.53	-20	Pass
NVNT	BLE 2M	2404	Ant1	-52.93	-20	Pass
NVNT	BLE 2M	2440	Ant1	-56.51	-20	Pass
NVNT	BLE 2M	2478	Ant1	-58.22	-20	Pass

Test Graphs

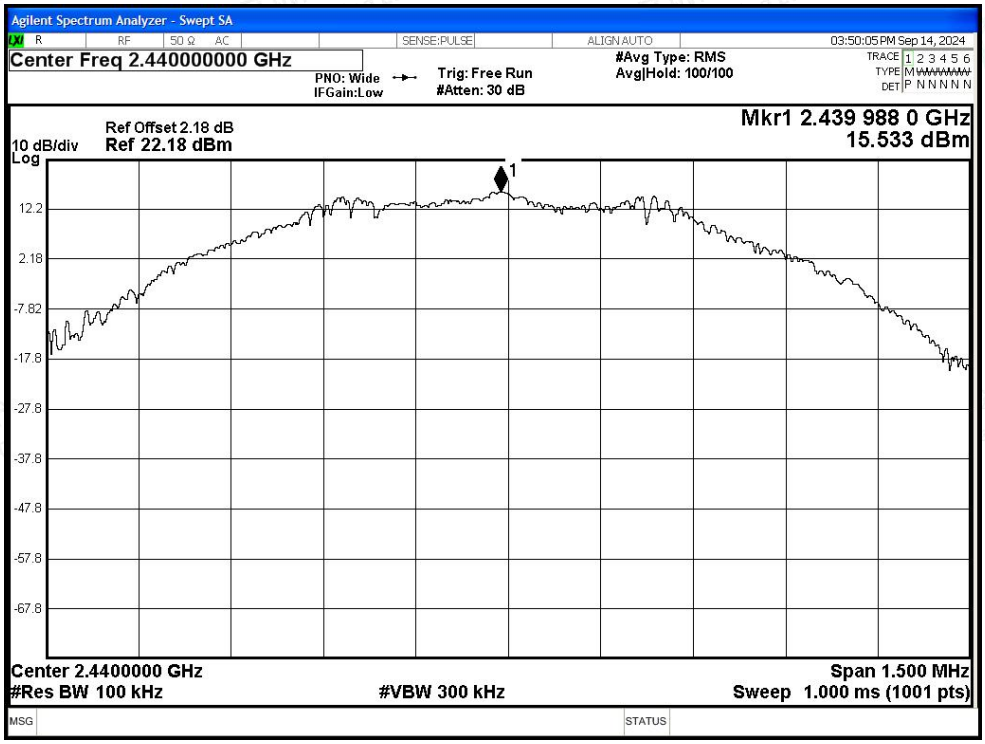
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



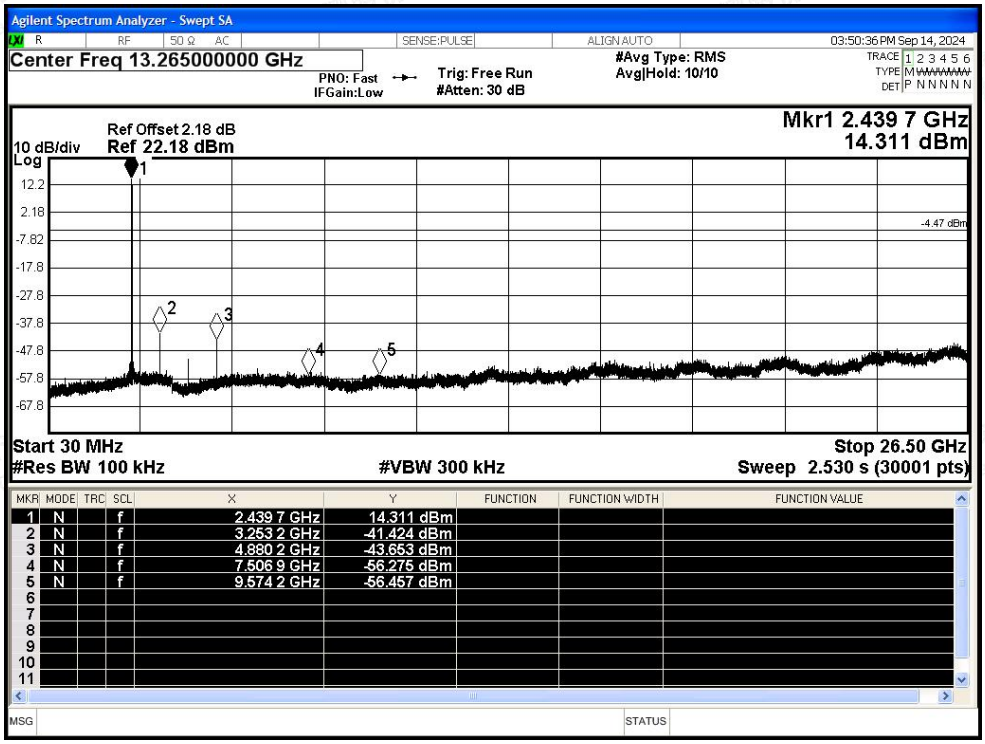
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



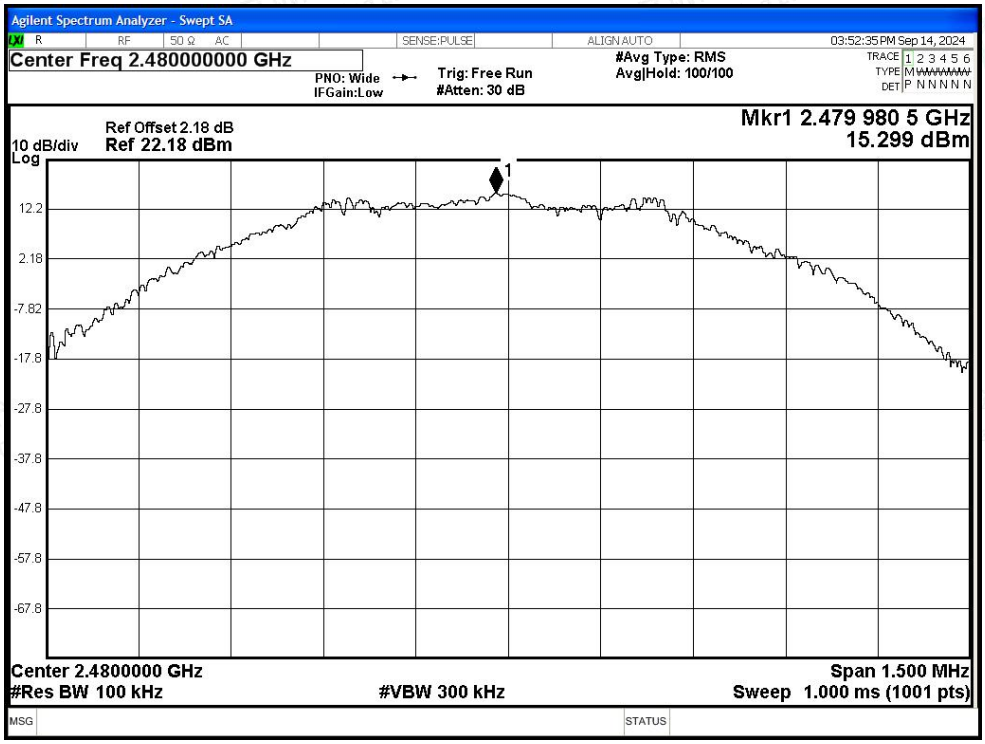
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



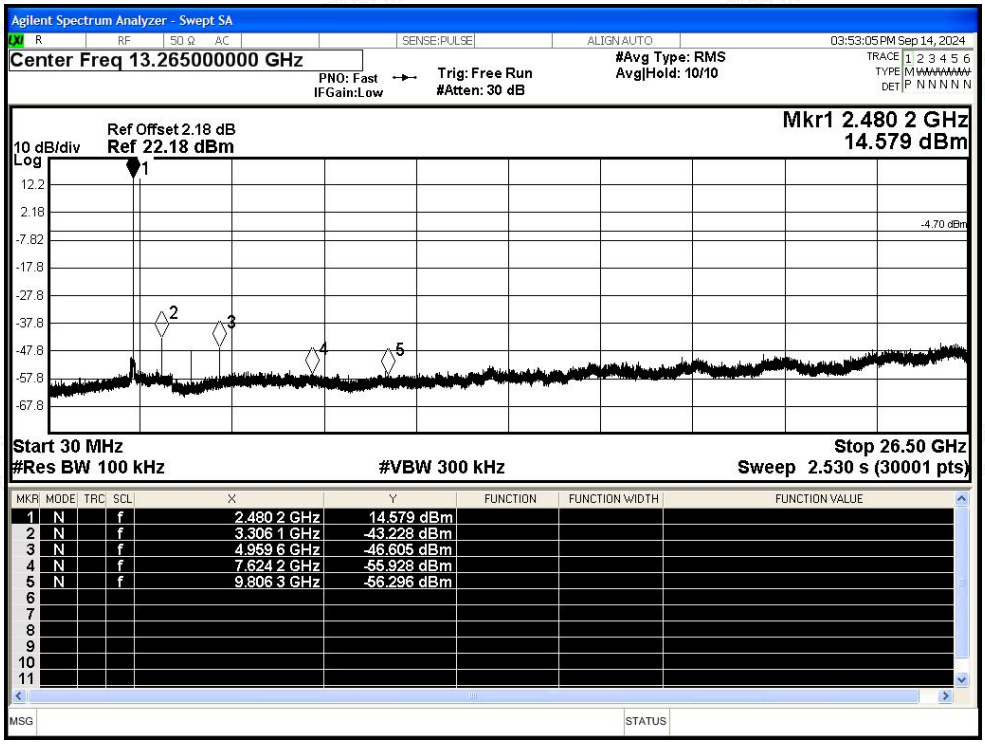
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



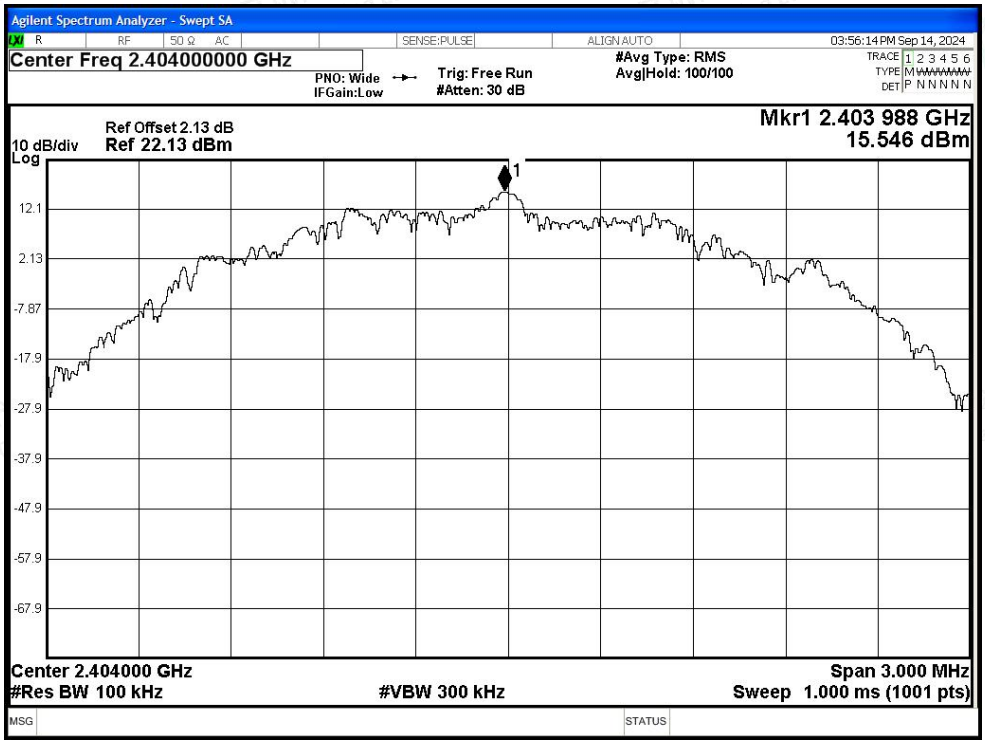
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



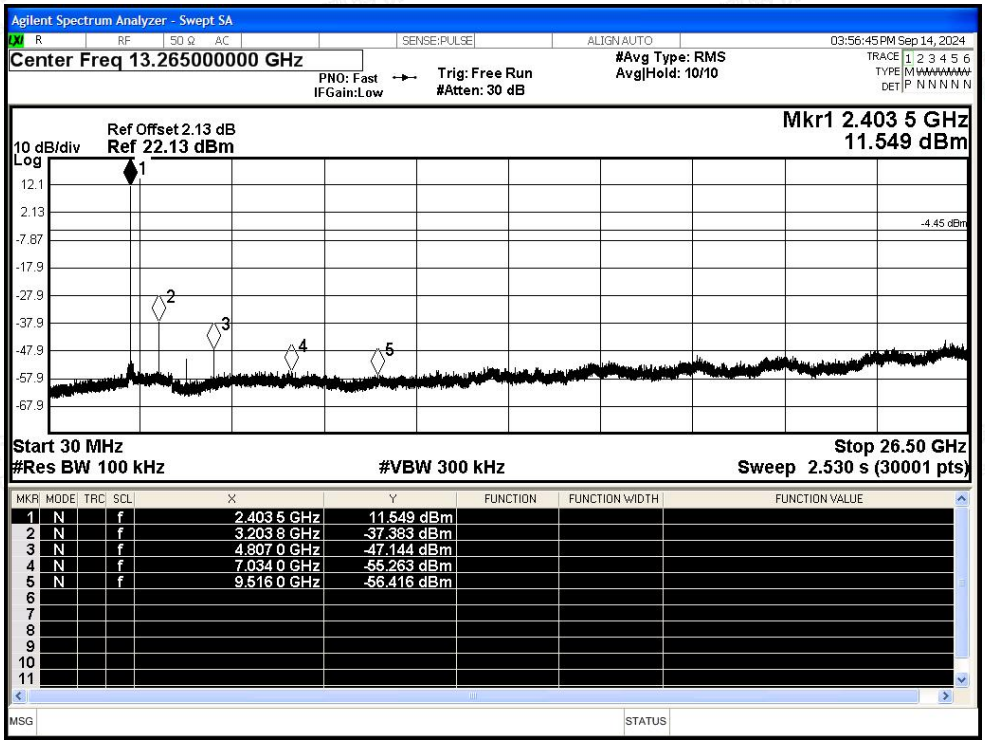
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



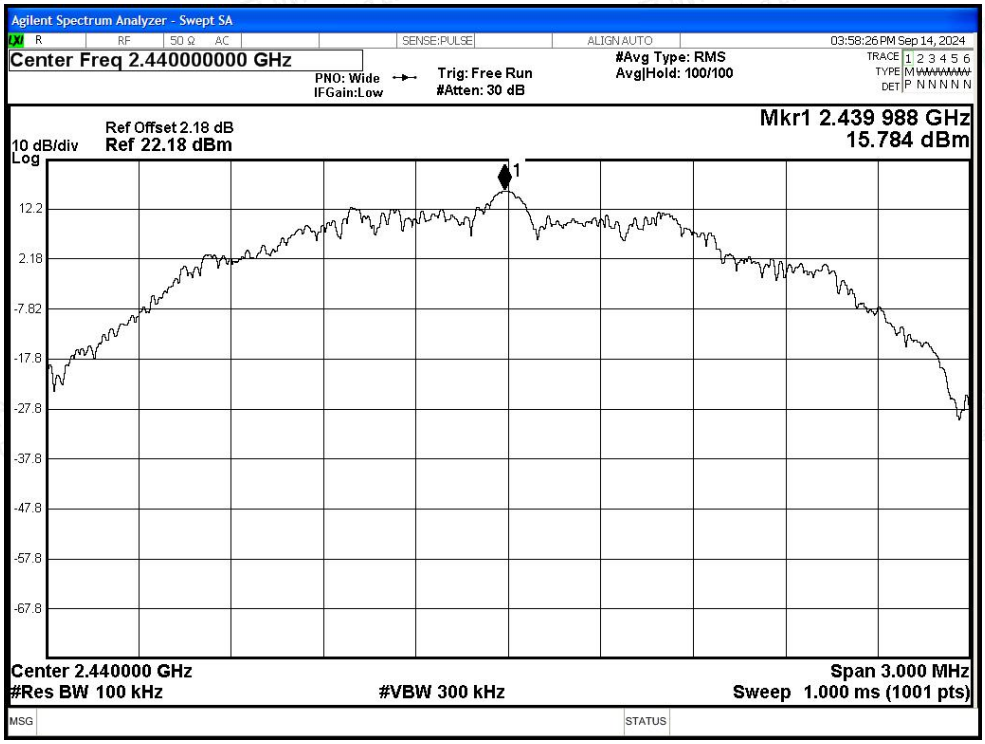
Tx. Spurious NVNT BLE 2M 2404MHz Ant1 Ref



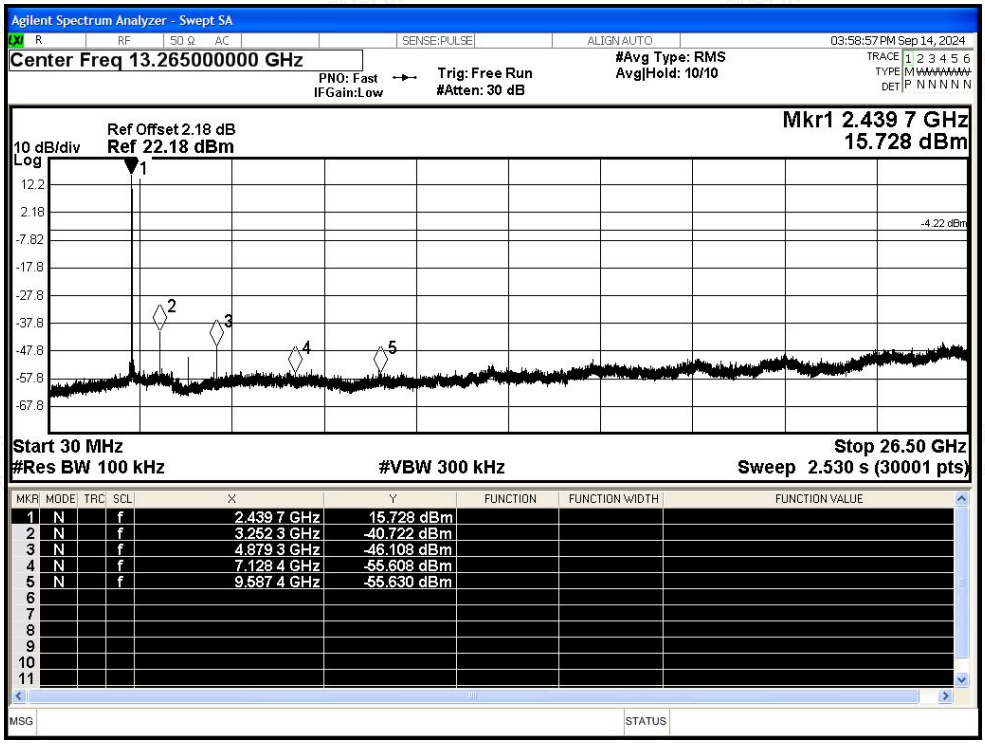
Tx. Spurious NVNT BLE 2M 2404MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref

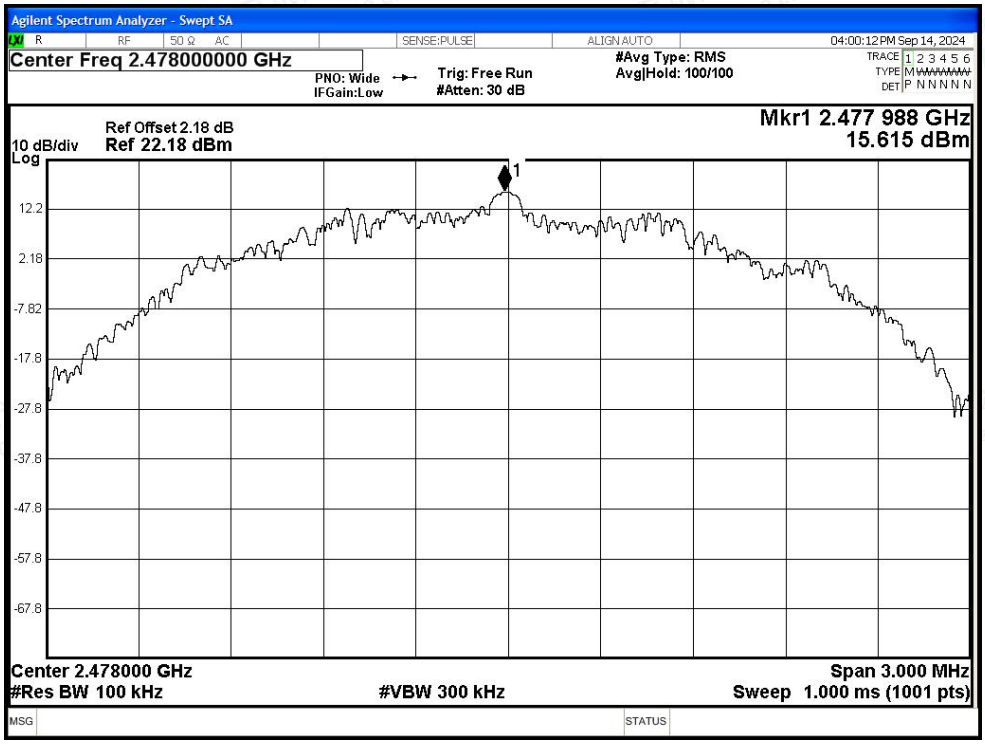


Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission

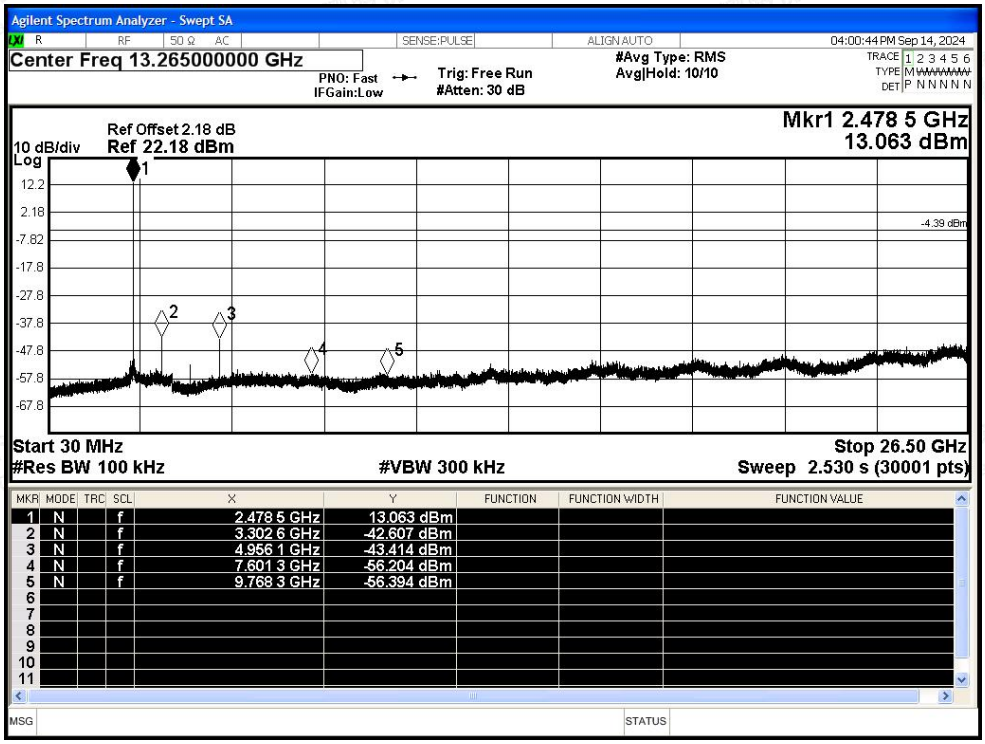


MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.439 7 GHz	15.728 dBm			
2	N		f	3.252 3 GHz	-40.722 dBm			
3	N		f	4.879 3 GHz	-46.108 dBm			
4	N		f	7.128 4 GHz	-55.608 dBm			
5	N		f	9.587 4 GHz	-55.630 dBm			
6								
7								
8								
9								
10								
11								

Tx. Spurious NVNT BLE 2M 2478MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2478MHz Ant1 Emission

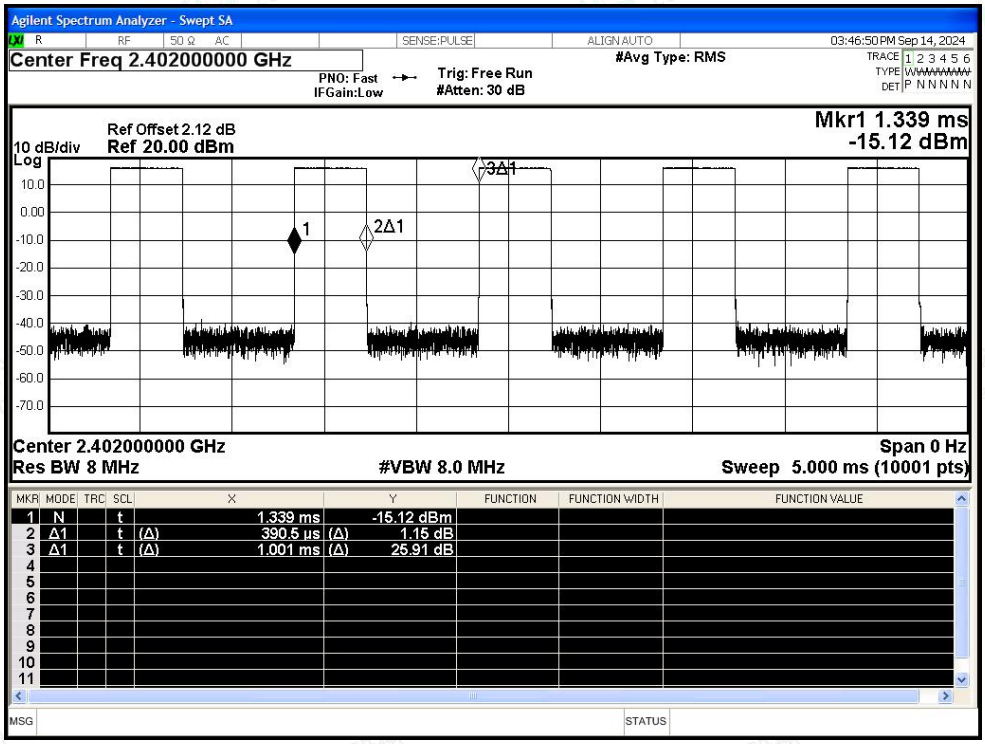


A.6 Duty Cycle

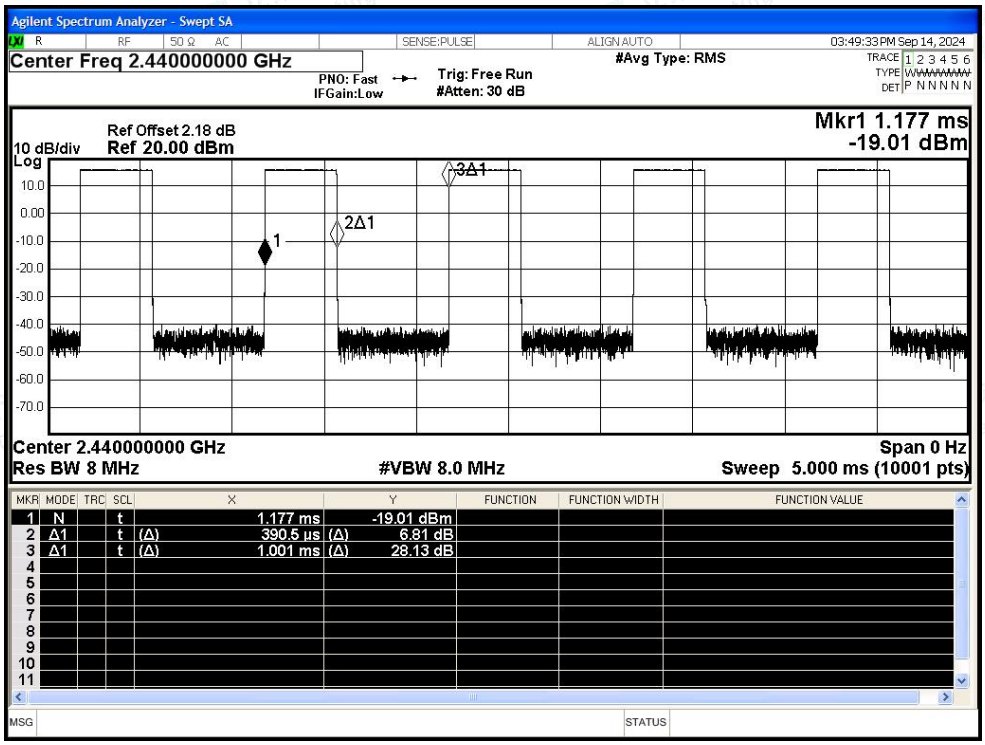
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	39.03	4.09	2.56
NVNT	BLE 1M	2440	Ant1	39.03	4.09	2.56
NVNT	BLE 1M	2480	Ant1	39.05	4.08	2.56
NVNT	BLE 2M	2404	Ant1	20.4	6.9	4.9
NVNT	BLE 2M	2440	Ant1	20.4	6.9	4.9
NVNT	BLE 2M	2478	Ant1	20.4	6.9	4.9

Test Graphs

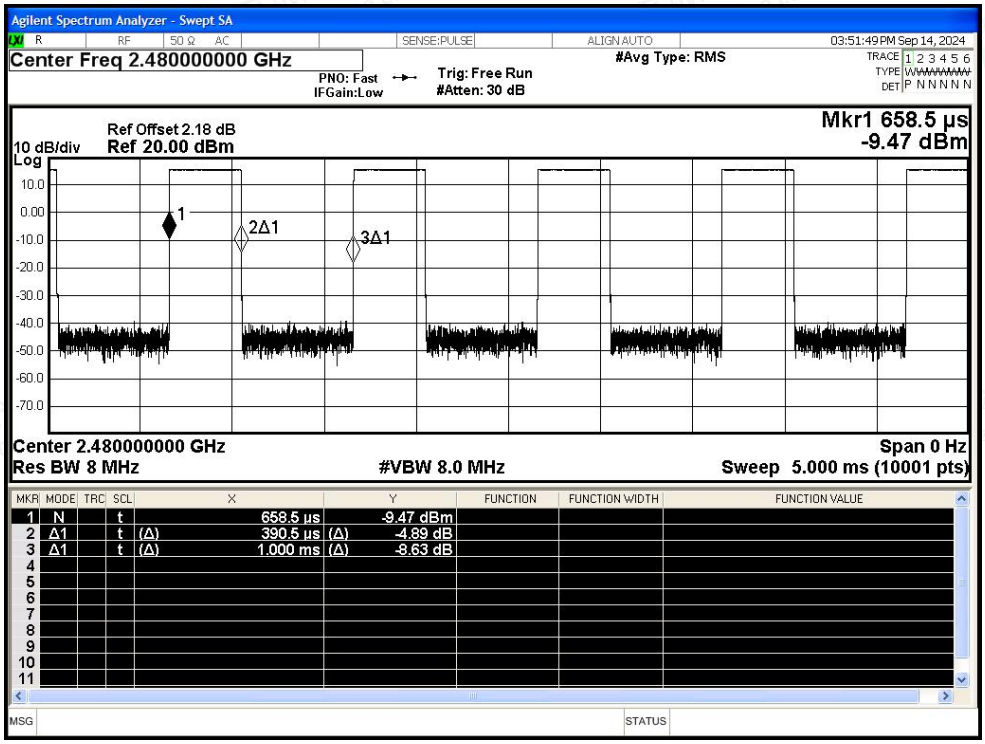
Duty Cycle NVNT BLE 1M 2402MHz Ant1



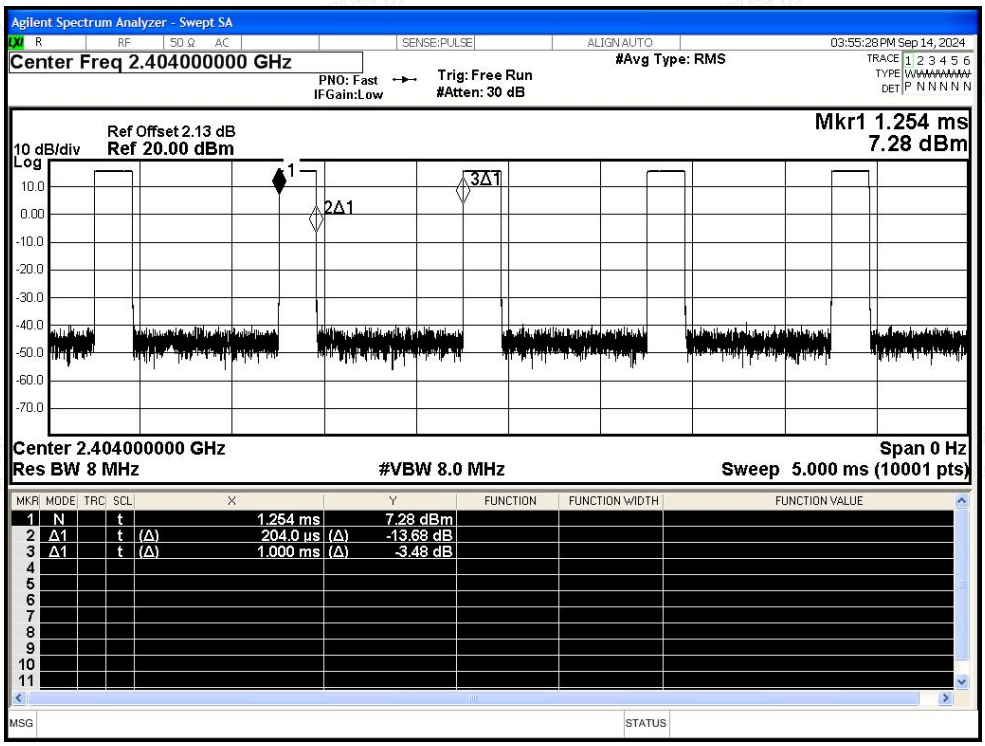
Duty Cycle NVNT BLE 1M 2440MHz Ant1



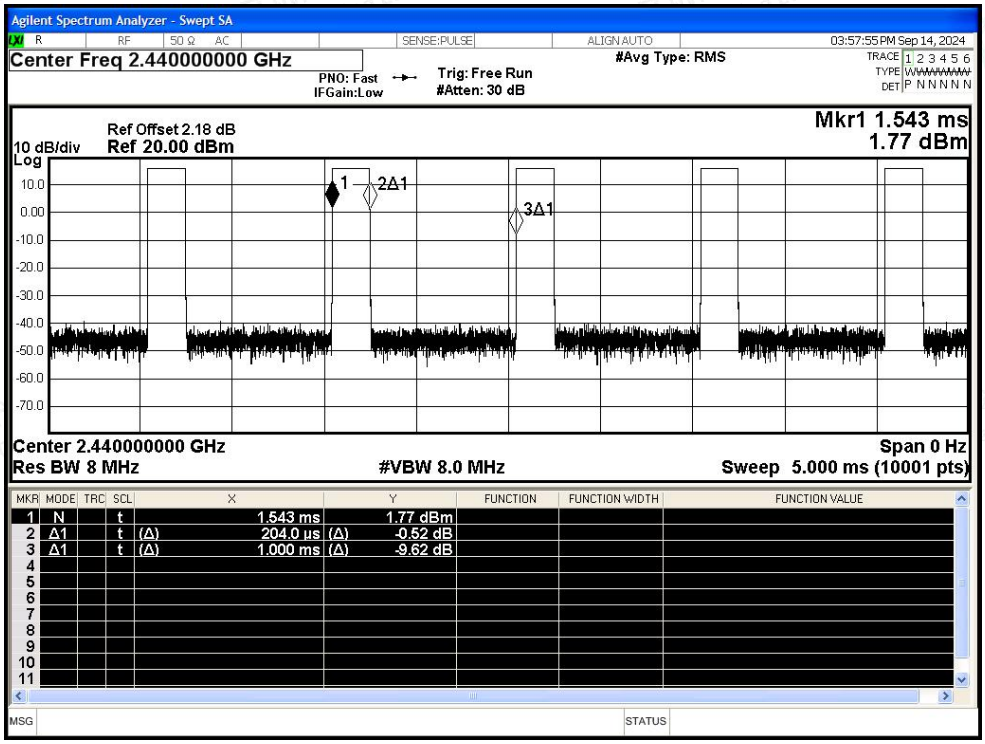
Duty Cycle NVNT BLE 1M 2480MHz Ant1



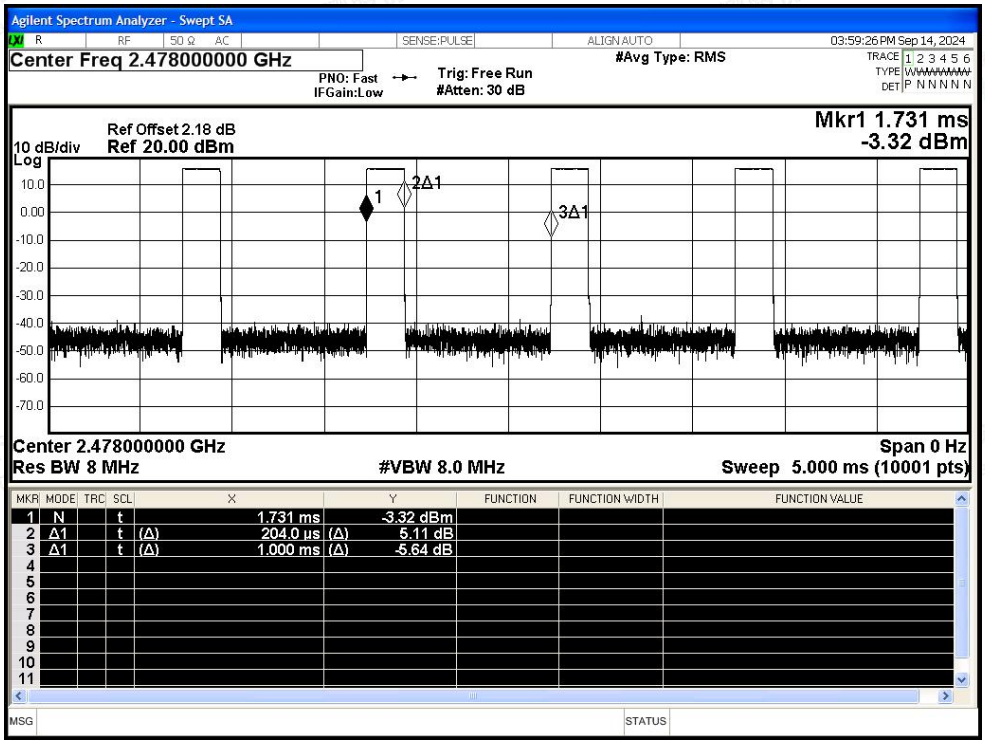
Duty Cycle NVNT BLE 2M 2404MHz Ant1



Duty Cycle NVNT BLE 2M 2440MHz Ant1



Duty Cycle NVNT BLE 2M 2478MHz Ant1



A.7 Restrict Band

Condition	Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	Duty Factor (dB)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	BLE 1M	2402	Ant1	2310	-50.06	2.7	-	47.9	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2310	-58.75	2.7	4.09	43.3	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2386.32	-47.75	2.7	-	50.21	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2386.416	-57.47	2.7	4.09	44.58	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2390	-48.95	2.7	-	49.01	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2390	-58.45	2.7	4.09	43.6	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-47.66	2.7	-	50.3	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-55.91	2.7	4.08	46.13	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2490.376	-41.74	2.7	-	56.22	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.512	-55.66	2.7	4.08	46.38	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2500	-50.03	2.7	-	47.93	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2500	-58.61	2.7	4.08	43.43	Average	54	Pass
NVNT	BLE 2M	2404	Ant1	2310	-49.2	2.7	-	48.76	Peak	74	Pass
NVNT	BLE 2M	2404	Ant1	2310	-58.53	2.7	6.9	46.33	Average	54	Pass
NVNT	BLE 2M	2404	Ant1	2389.184	-46.77	2.7	-	51.19	Peak	74	Pass
NVNT	BLE 2M	2404	Ant1	2384.872	-57.46	2.7	6.9	47.4	Average	54	Pass
NVNT	BLE 2M	2404	Ant1	2390	-50.67	2.7	-	47.29	Peak	74	Pass
NVNT	BLE 2M	2404	Ant1	2390	-58.2	2.7	6.9	46.66	Average	54	Pass
NVNT	BLE 2M	2478	Ant1	2483.5	-43.5	2.7	-	54.46	Peak	74	Pass
NVNT	BLE 2M	2478	Ant1	2483.5	-57.22	2.7	6.9	47.64	Average	54	Pass
NVNT	BLE 2M	2478	Ant1	2492.954	-42.2	2.7	-	55.76	Peak	74	Pass
NVNT	BLE 2M	2478	Ant1	2483.646	-56.67	2.7	6.9	48.19	Average	54	Pass
NVNT	BLE 2M	2478	Ant1	2500	-49.55	2.7	-	48.41	Peak	74	Pass
NVNT	BLE 2M	2478	Ant1	2500	-58.09	2.7	6.9	46.77	Average	54	Pass