Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Radiar AFD1

Test Model: WCAD1N

Environmental Conditions

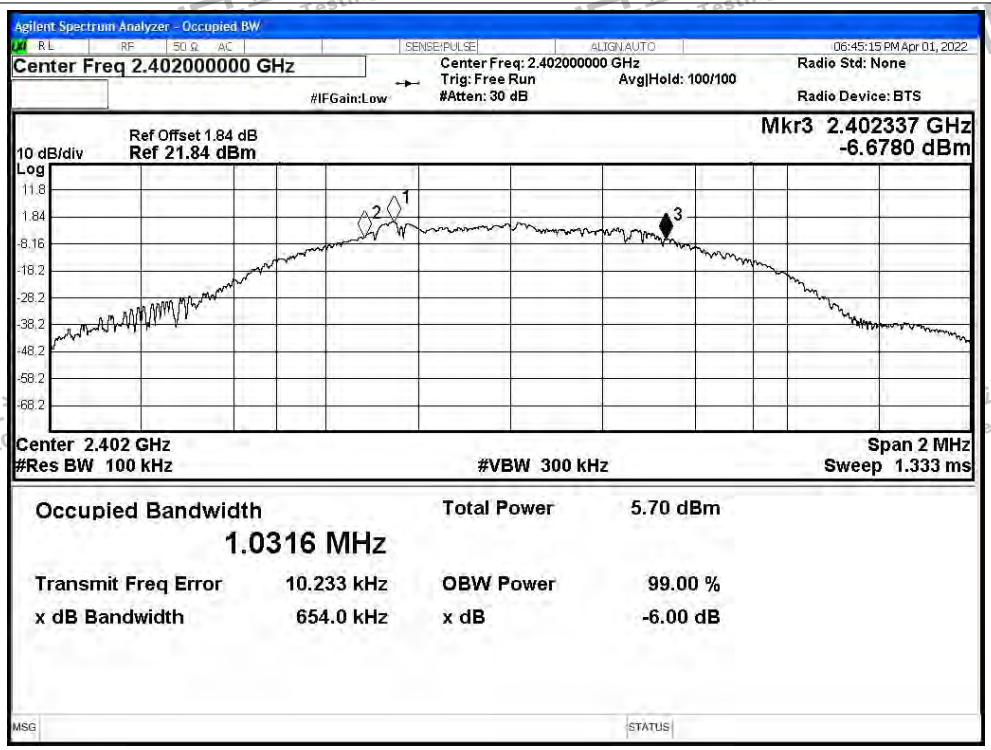
Temperature:	23.5° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Bill Zhu
Supervised by:	Li Huan

A.1 6dB Bandwidth

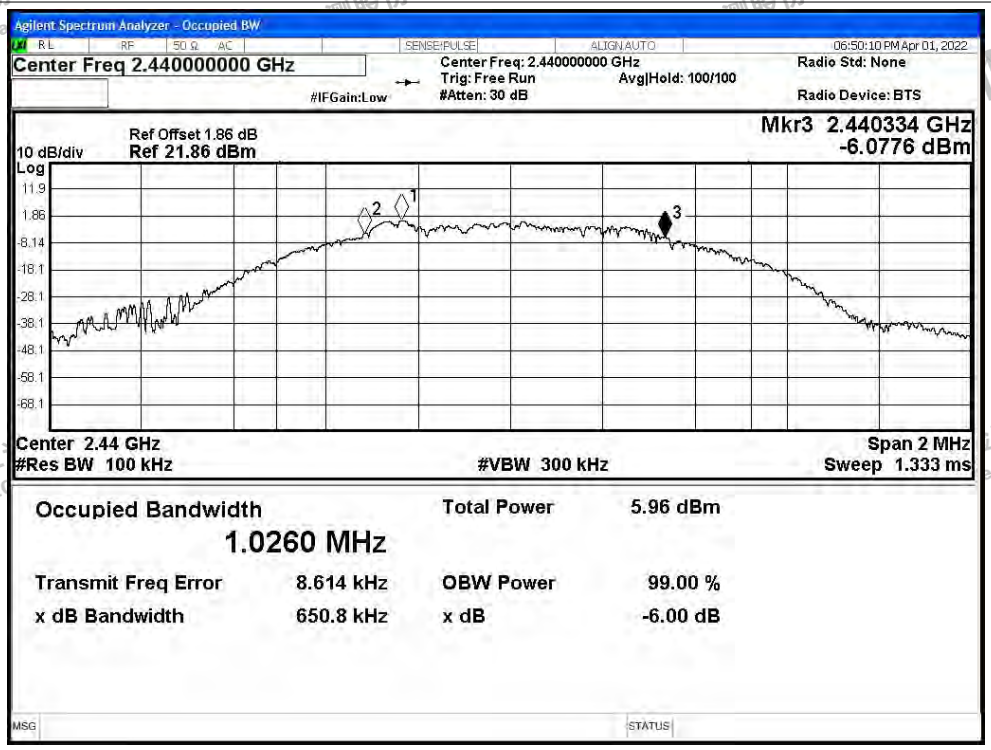
Condition	Mode	Frequency (MHz)	Antenna	6 dB Bandwidth (MHz)	Limit 6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.654	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.651	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.648	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.111	0.5	Pass
NVNT	BLE 2M	2440	Ant1	1.109	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.116	0.5	Pass

Test Graphs

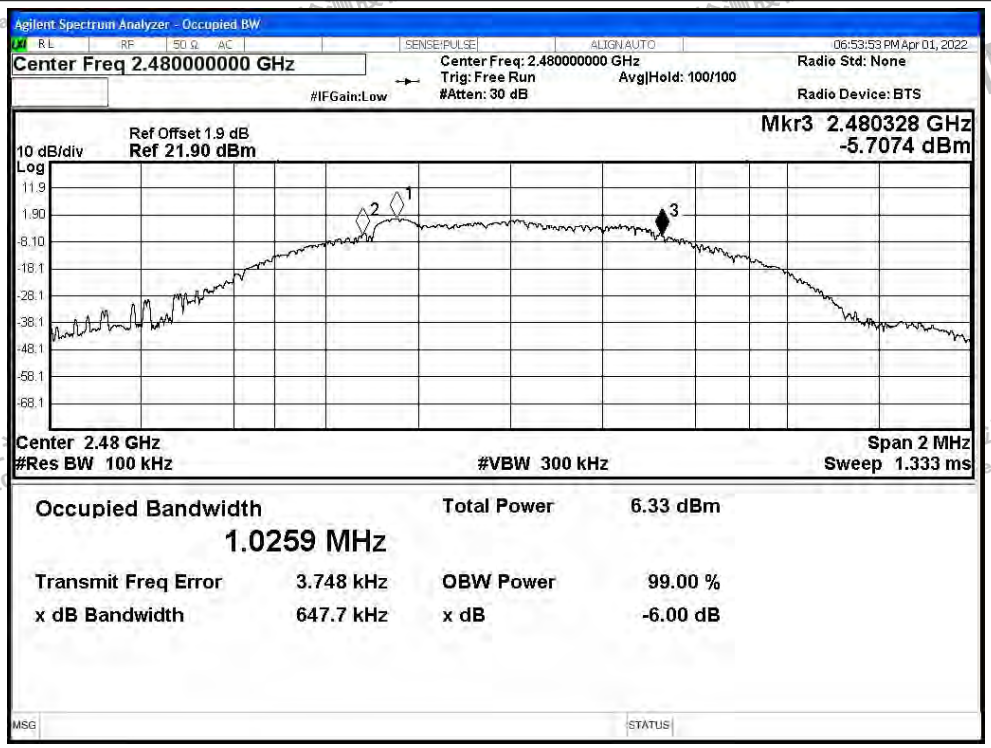
6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



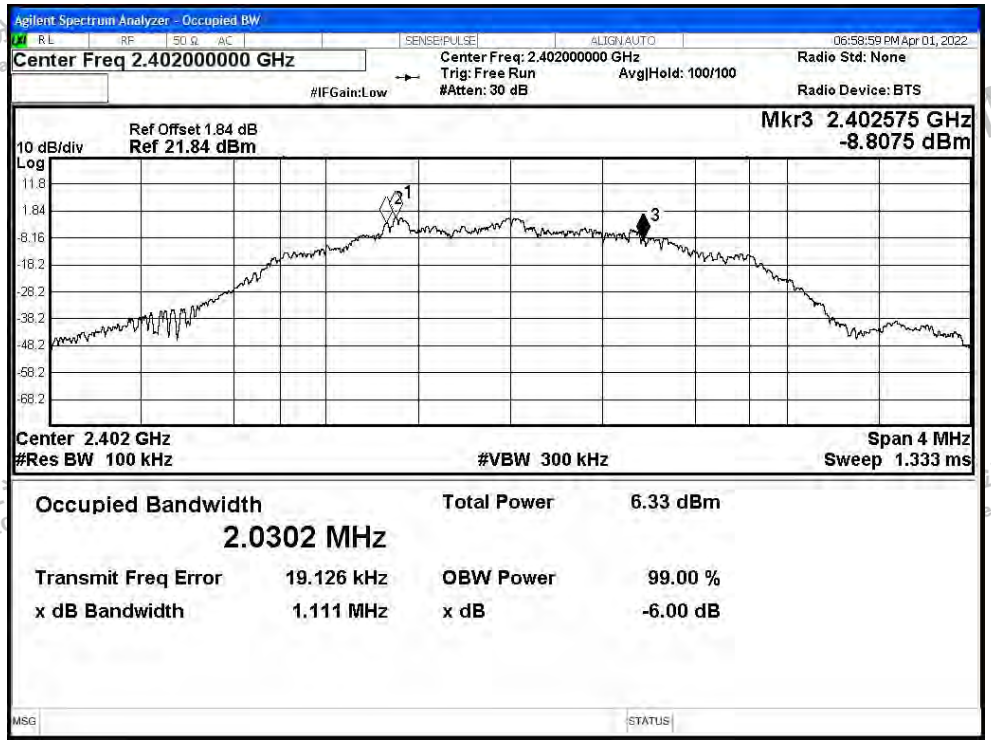
6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

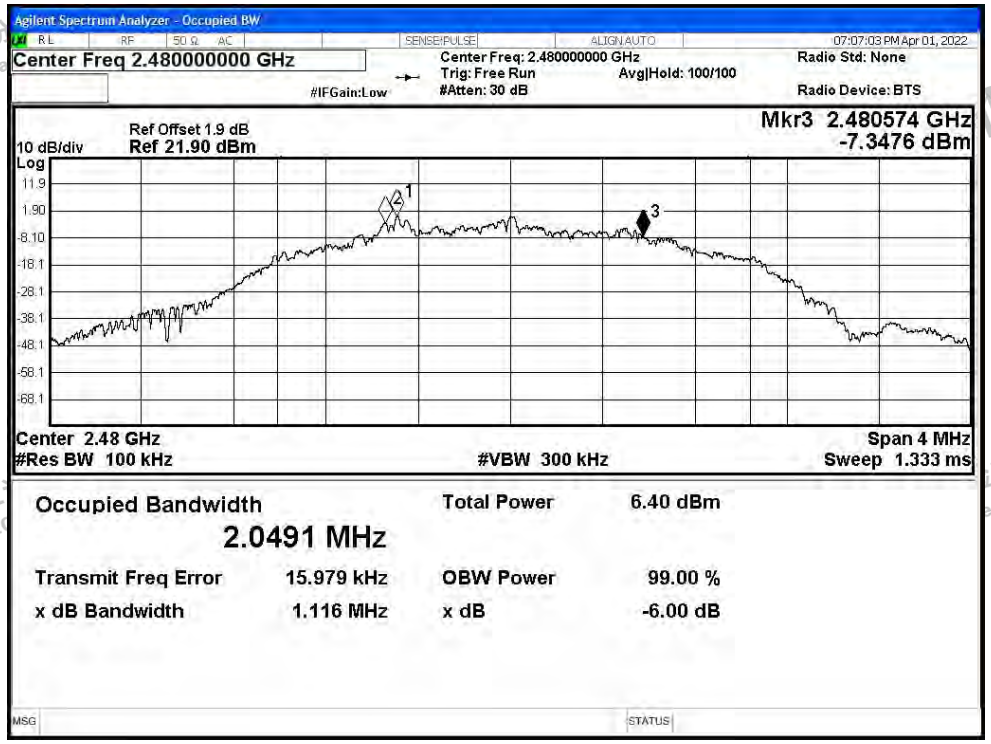


6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



6dB Bandwidth NVNT BLE 2M 2440MHz Ant1

6dB Bandwidth NVNT BLE 2M 2480MHz Ant1

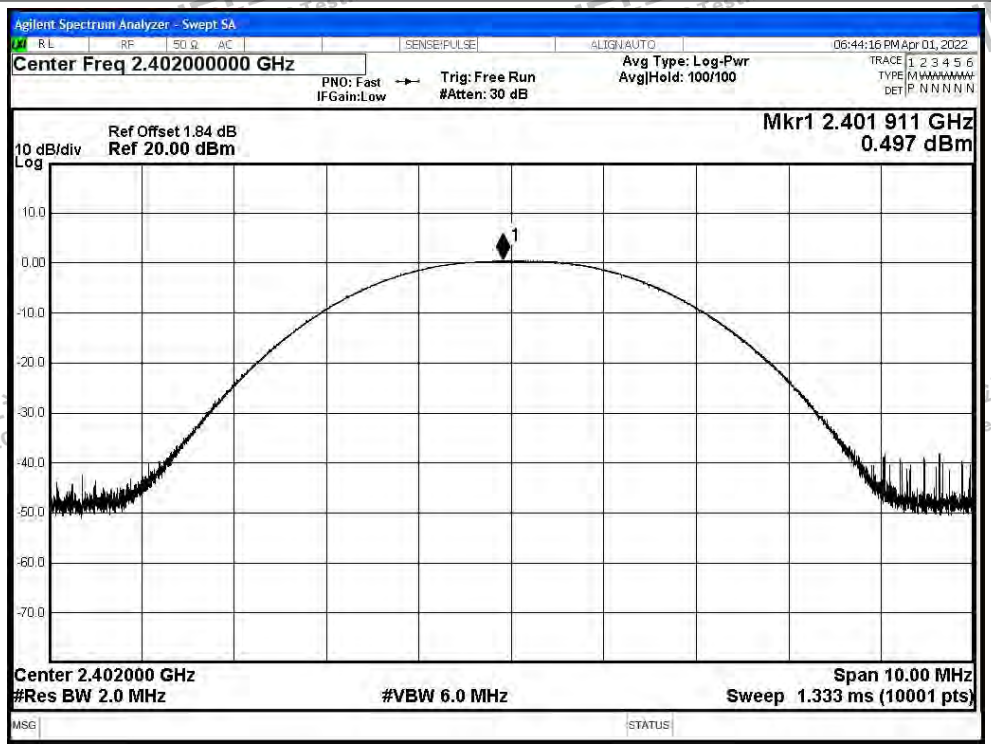


A.2 Maximum Conducted Output Power

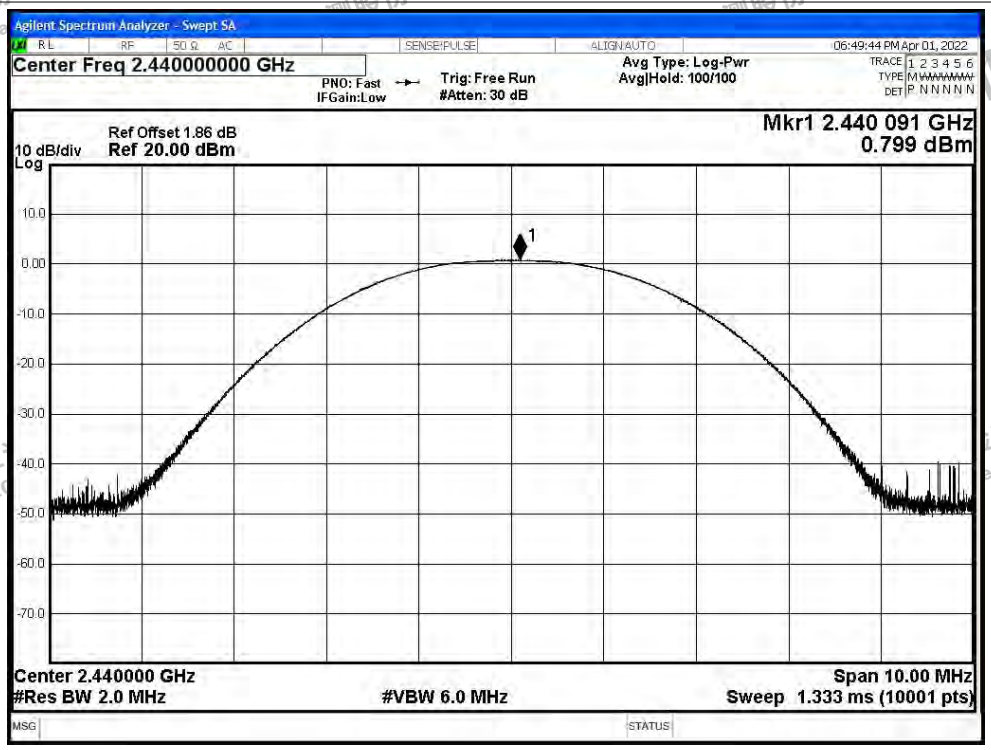
Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	0.5	30	Pass
NVNT	BLE 1M	2440	Ant1	0.8	30	Pass
NVNT	BLE 1M	2480	Ant1	0.92	30	Pass
NVNT	BLE 2M	2402	Ant1	0.42	30	Pass
NVNT	BLE 2M	2440	Ant1	0.67	30	Pass
NVNT	BLE 2M	2480	Ant1	0.71	30	Pass

Test Graphs

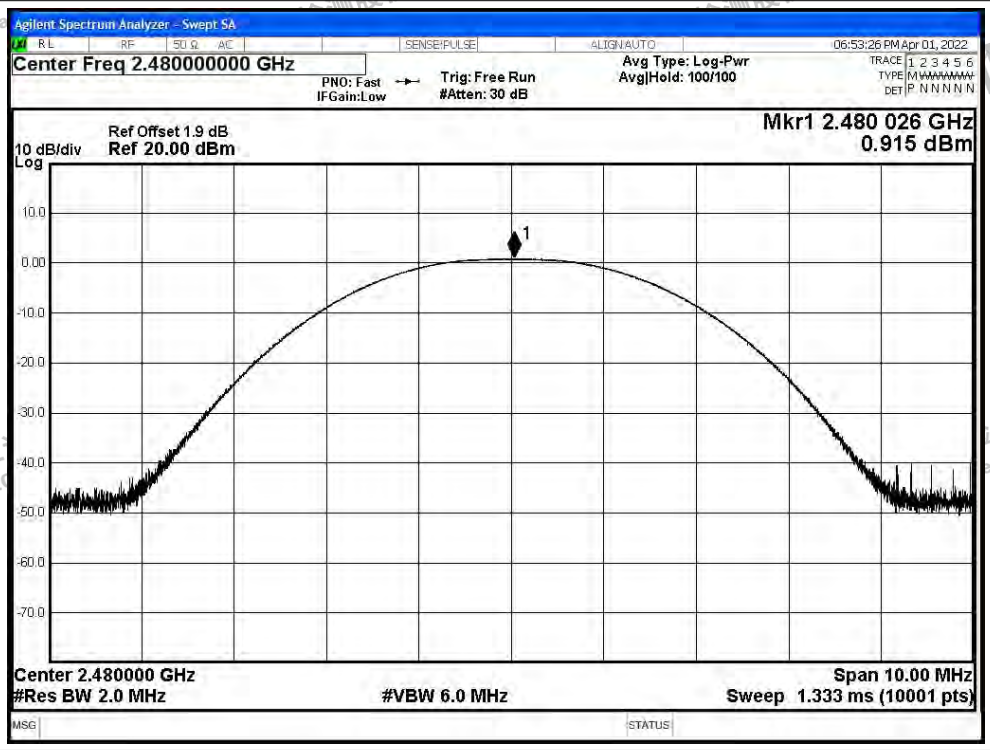
Power NVNT BLE 1M 2402MHz Ant1



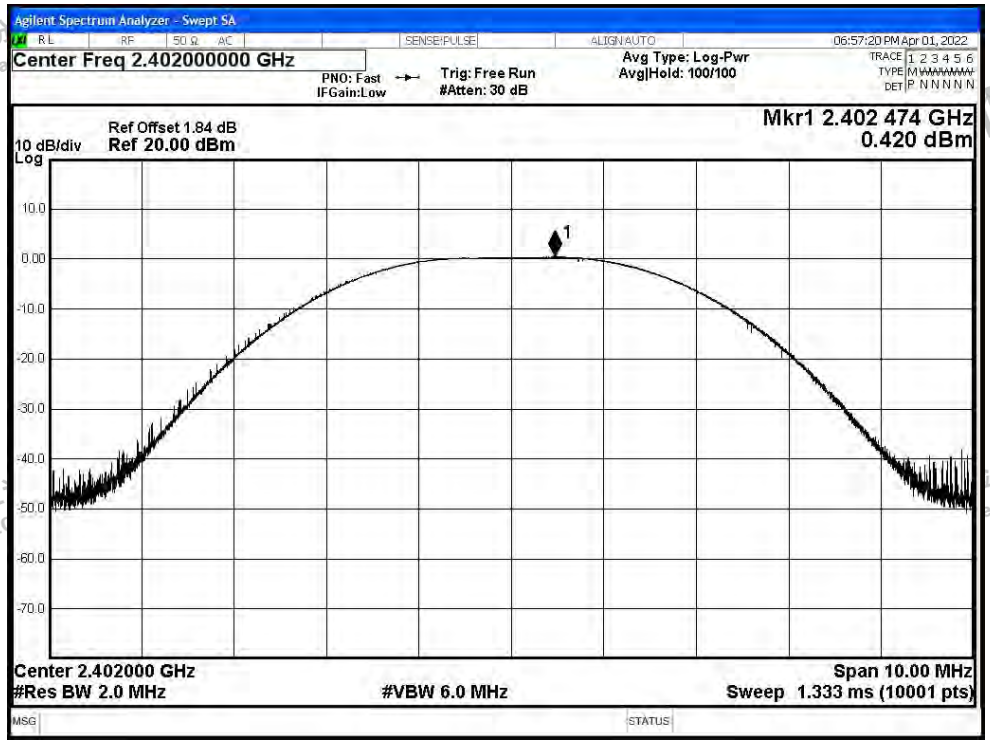
Power NVNT BLE 1M 2440MHz Ant1



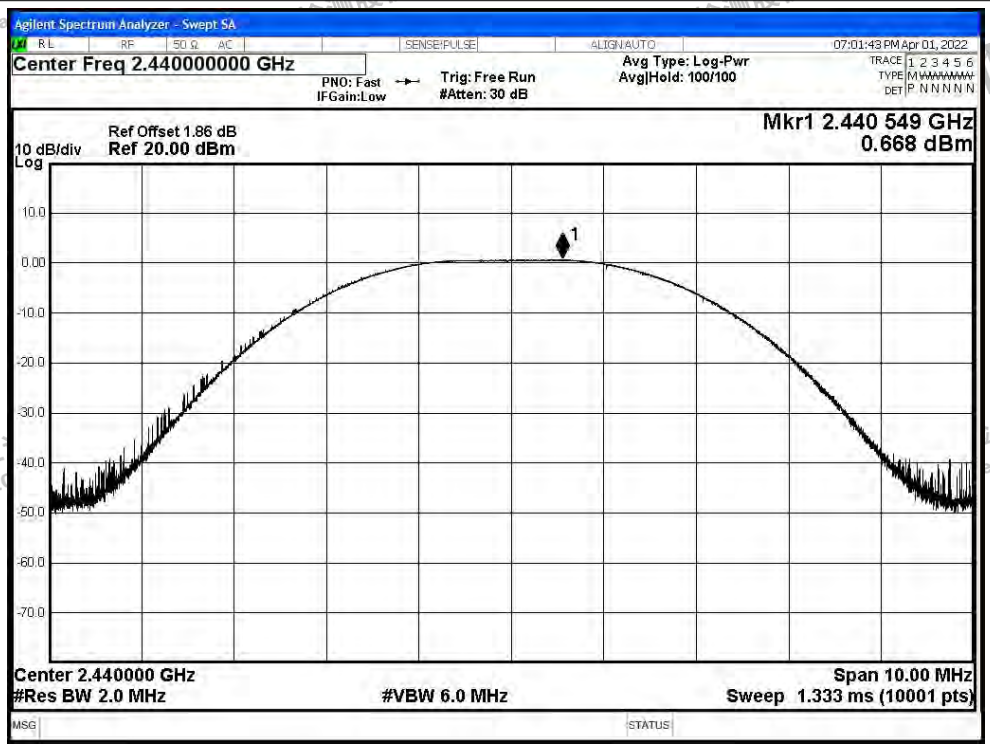
Power NVNT BLE 1M 2480MHz Ant1



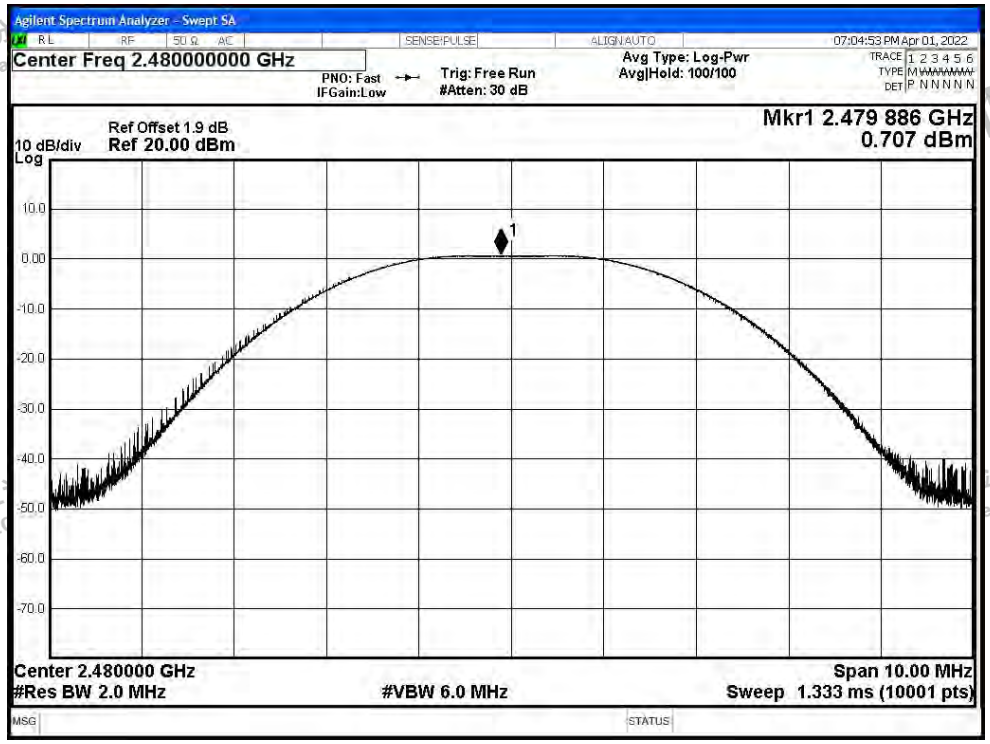
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2440MHz Ant1



Power NVNT BLE 2M 2480MHz Ant1

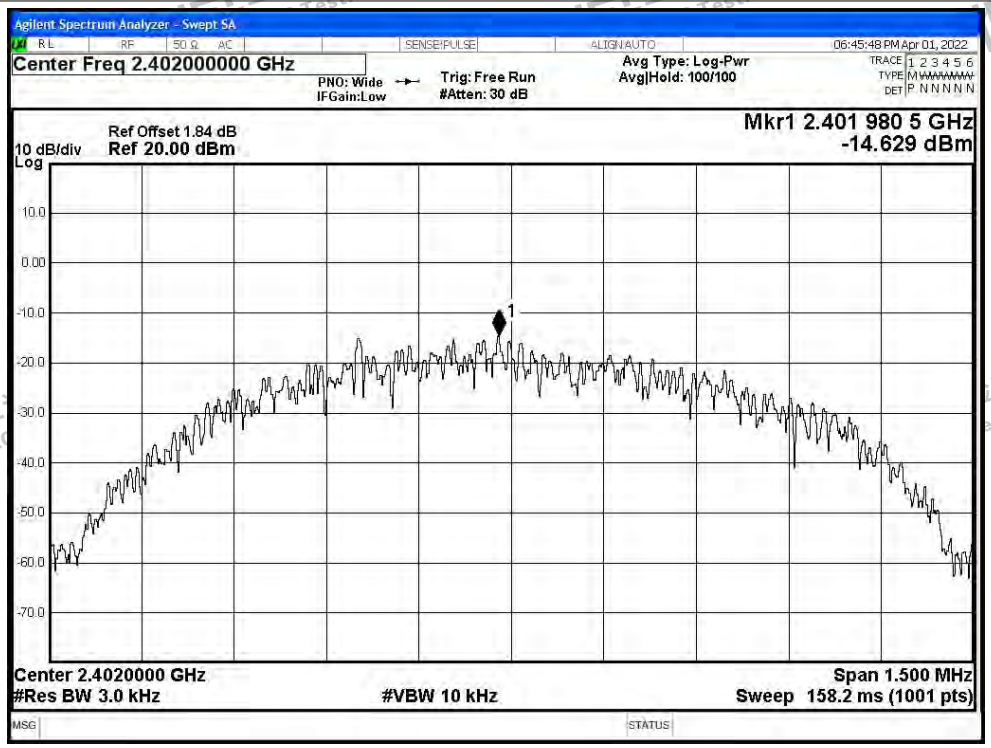


A.3 Maximum Power Spectral Density

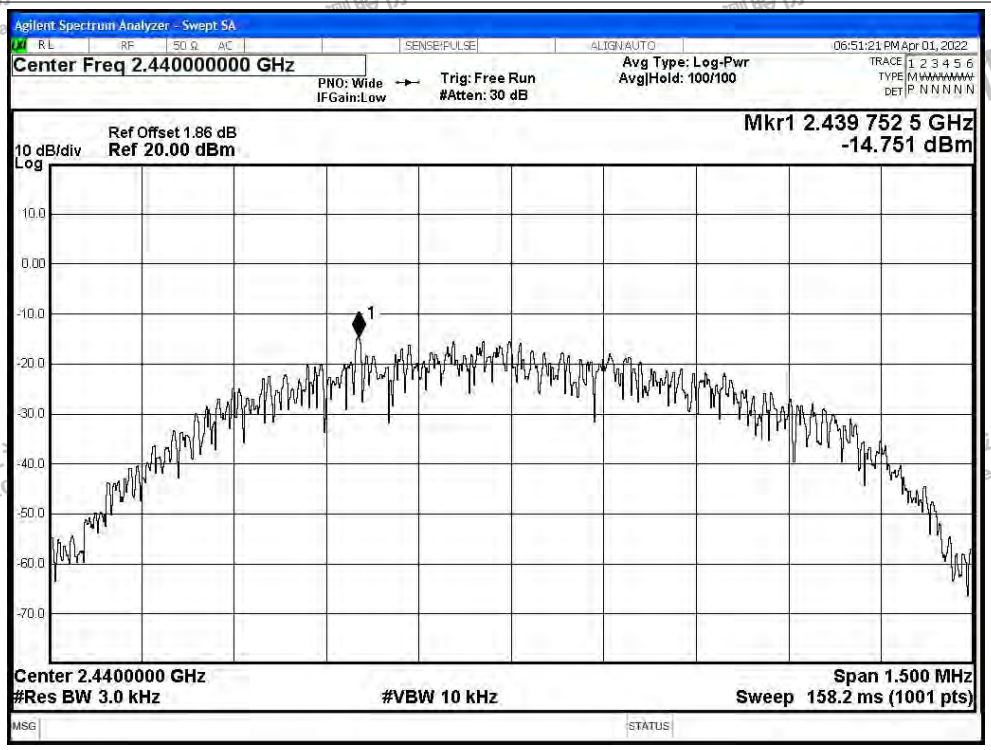
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-14.63	0	-14.63	8	Pass
NVNT	BLE 1M	2440	Ant1	-14.75	0	-14.75	8	Pass
NVNT	BLE 1M	2480	Ant1	-14.32	0	-14.32	8	Pass
NVNT	BLE 2M	2402	Ant1	-17.08	0	-17.08	8	Pass
NVNT	BLE 2M	2440	Ant1	-16.84	0	-16.84	8	Pass
NVNT	BLE 2M	2480	Ant1	-16.97	0	-16.97	8	Pass

Test Graphs

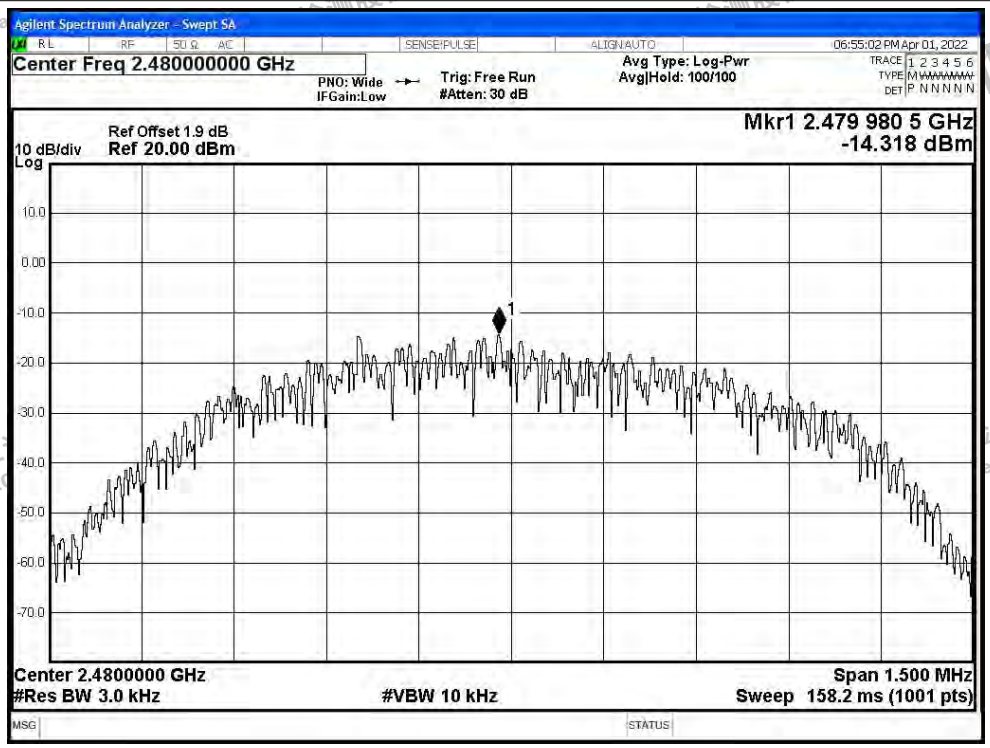
PSD NVNT BLE 1M 2402MHz Ant1



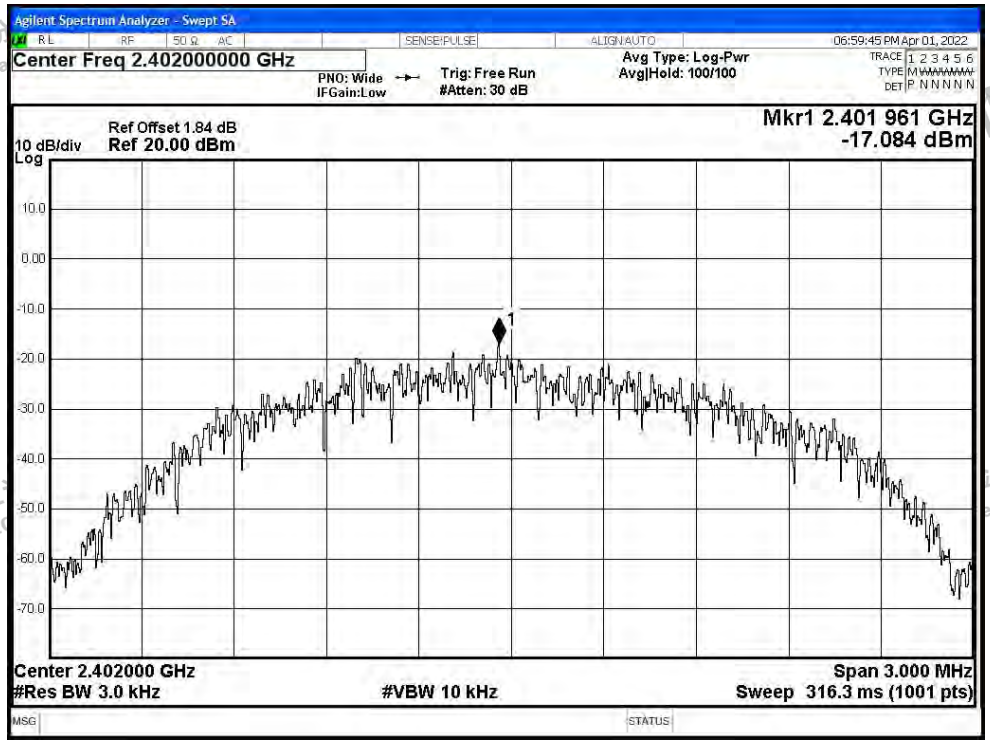
PSD NVNT BLE 1M 2440MHz Ant1



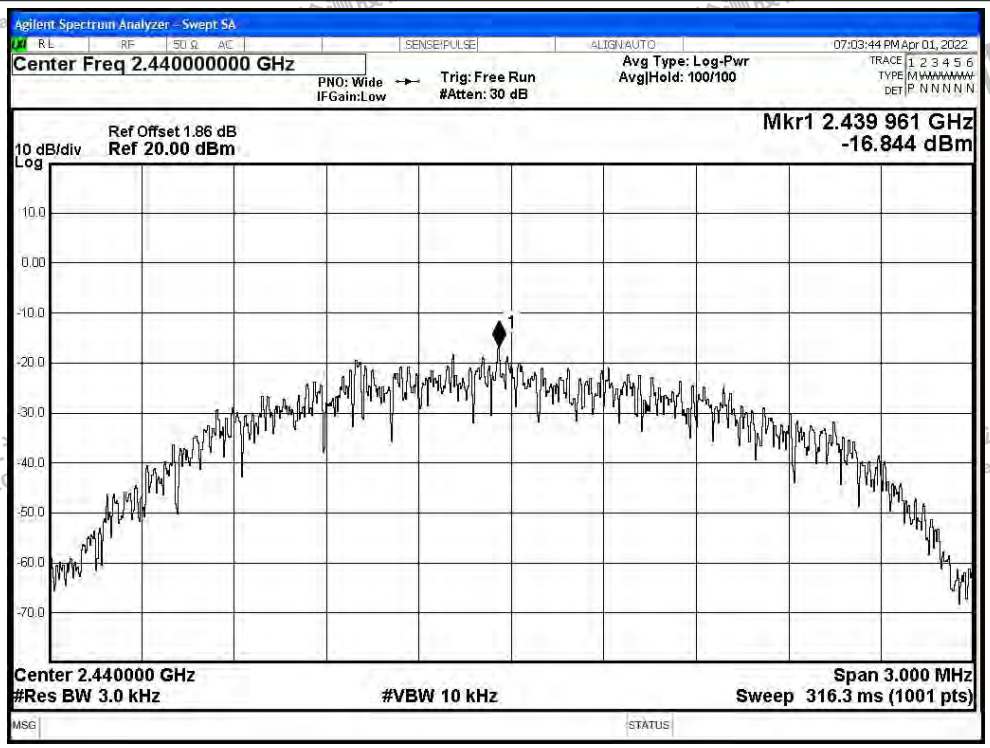
PSD NVNT BLE 1M 2480MHz Ant1



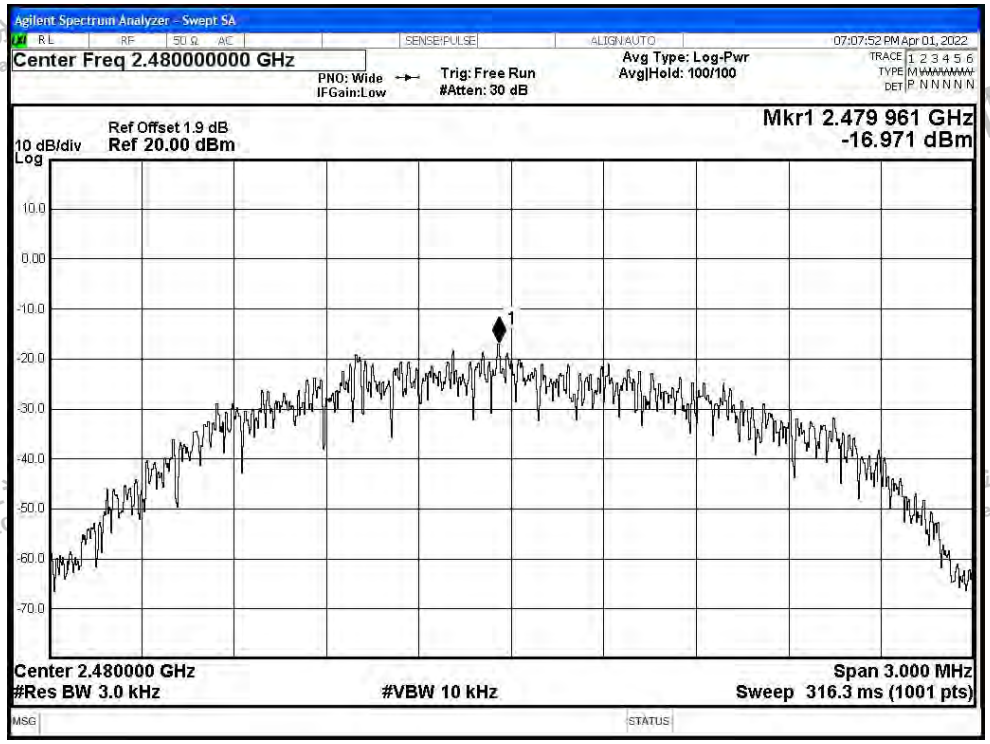
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1

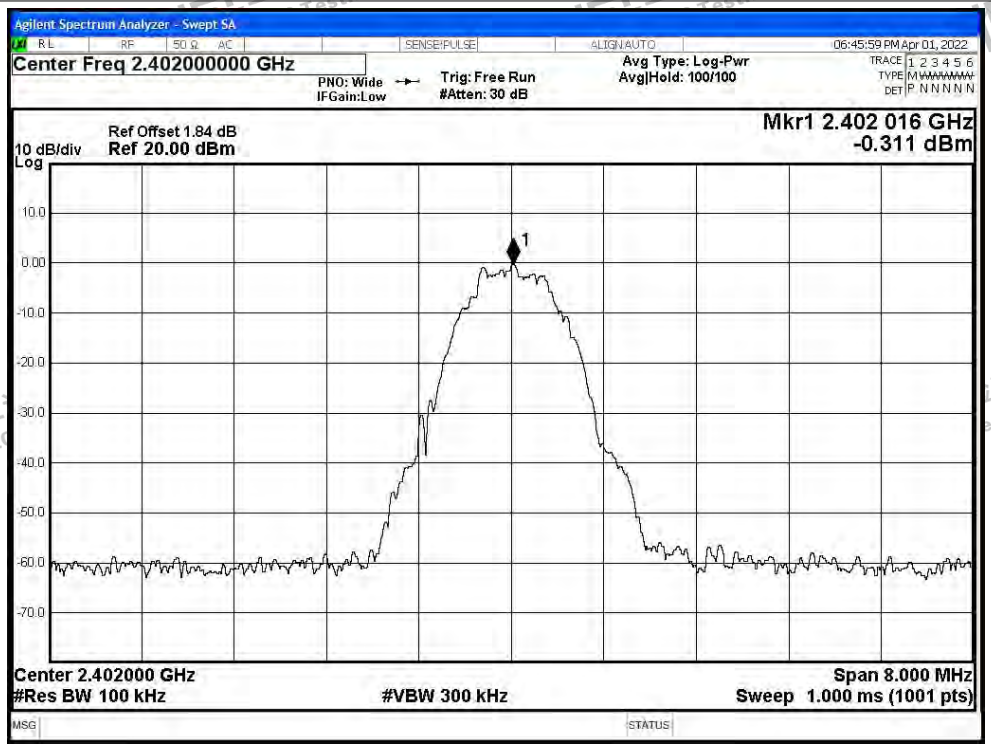


A.4 Band edge measurements

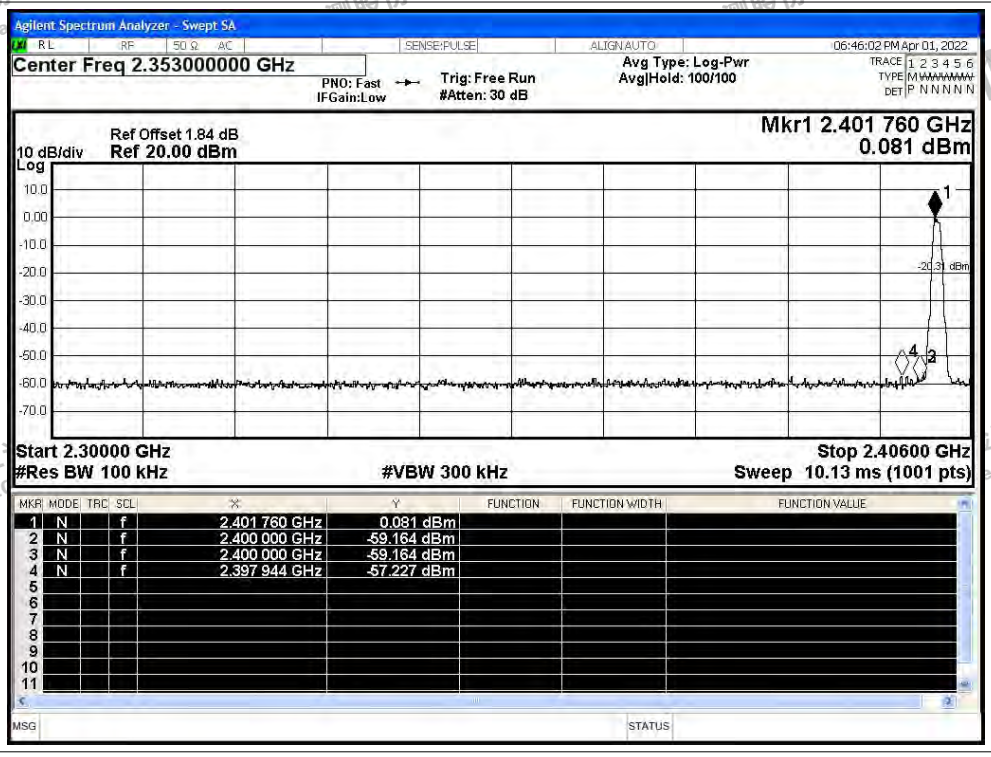
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-56.91	-20	Pass
NVNT	BLE 1M	2480	Ant1	-56.68	-20	Pass
NVNT	BLE 2M	2402	Ant1	-47.93	-20	Pass
NVNT	BLE 2M	2480	Ant1	-58.01	-20	Pass

Test Graphs

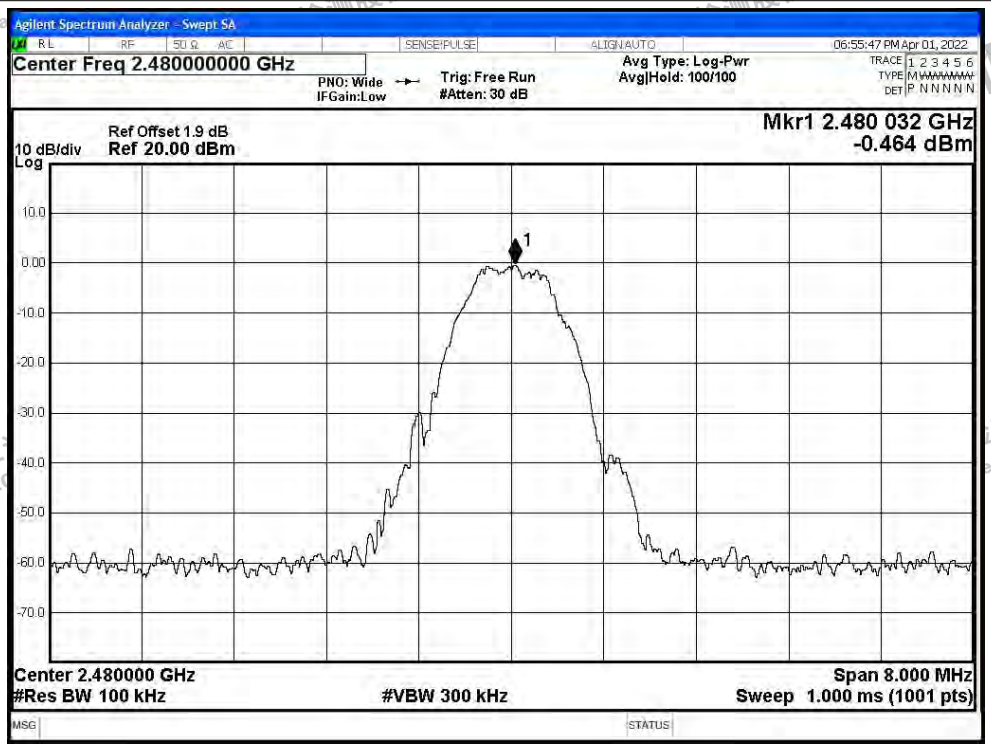
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



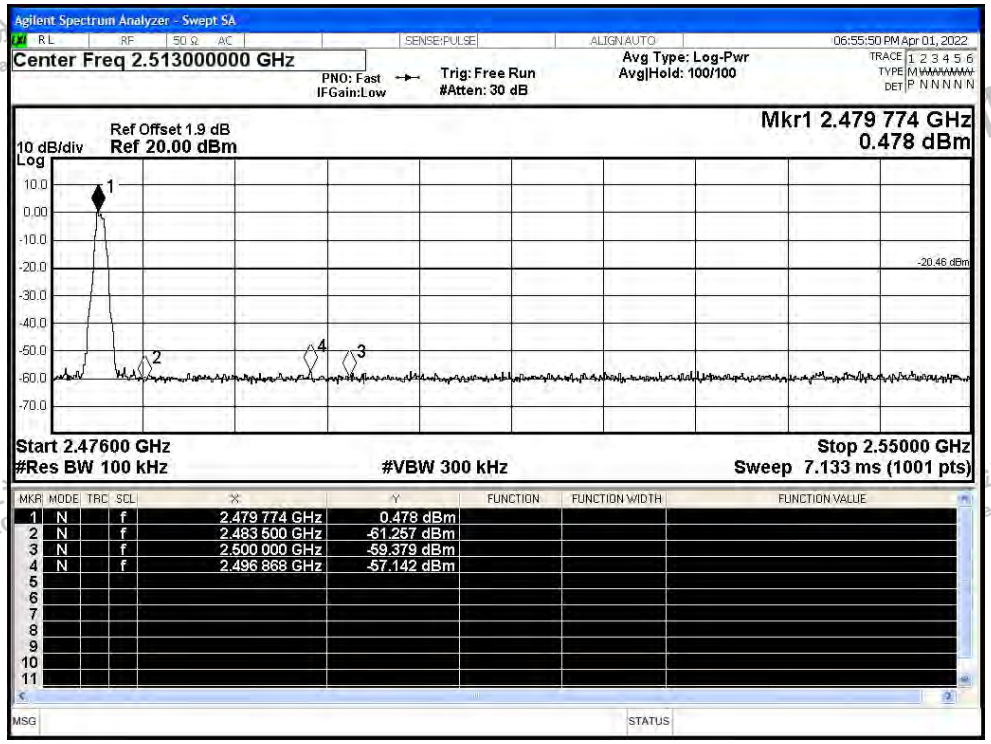
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



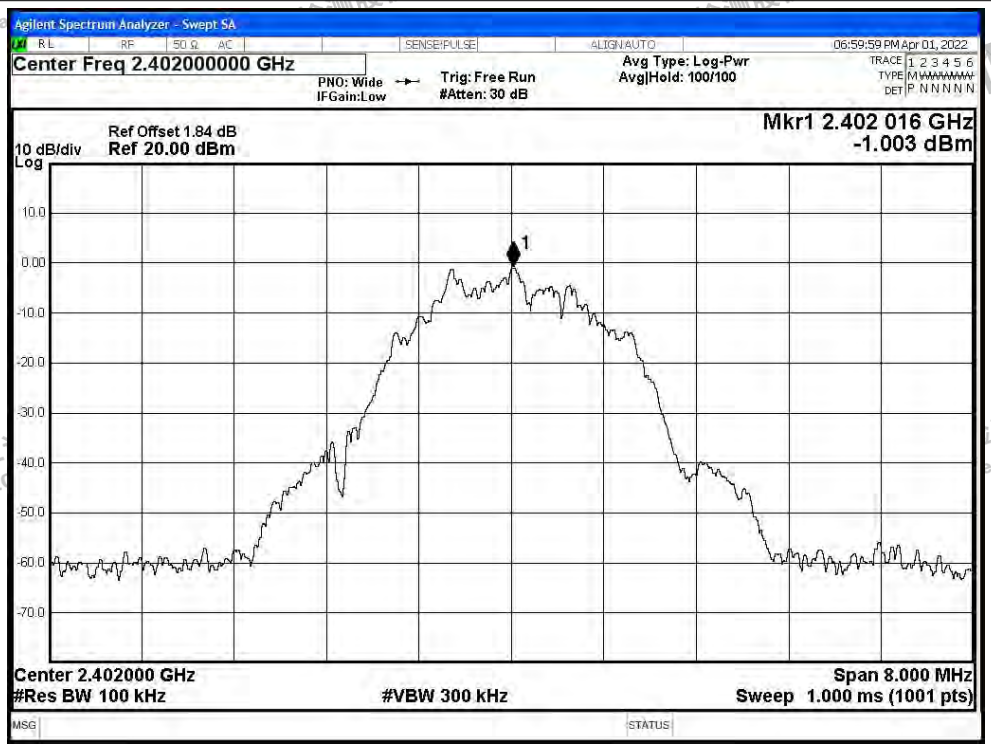
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



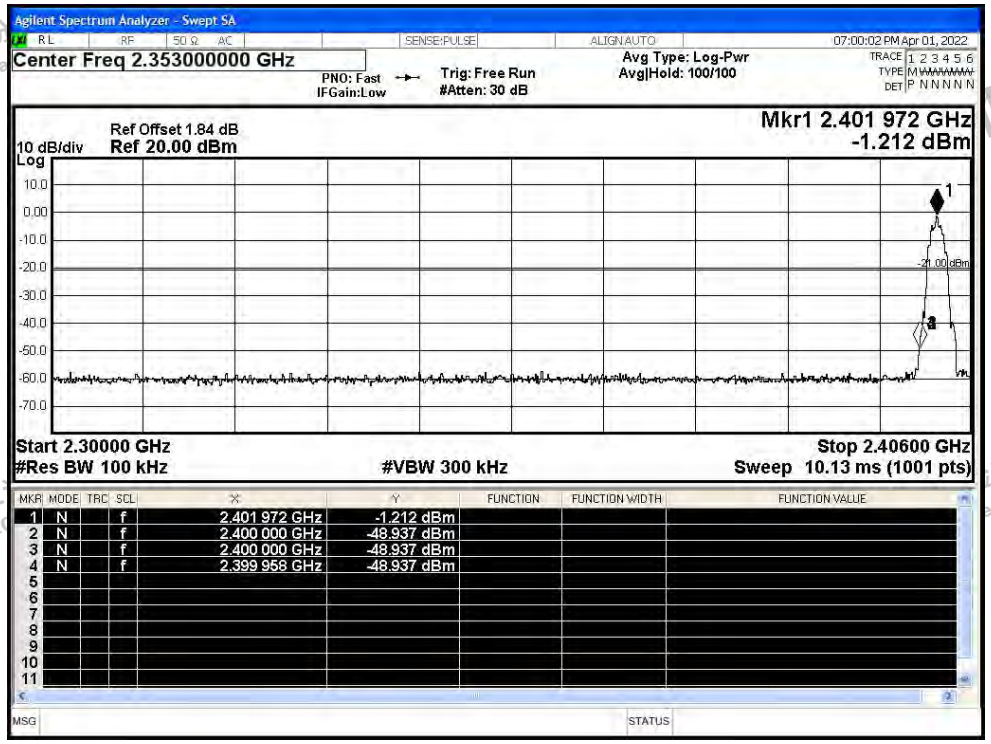
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



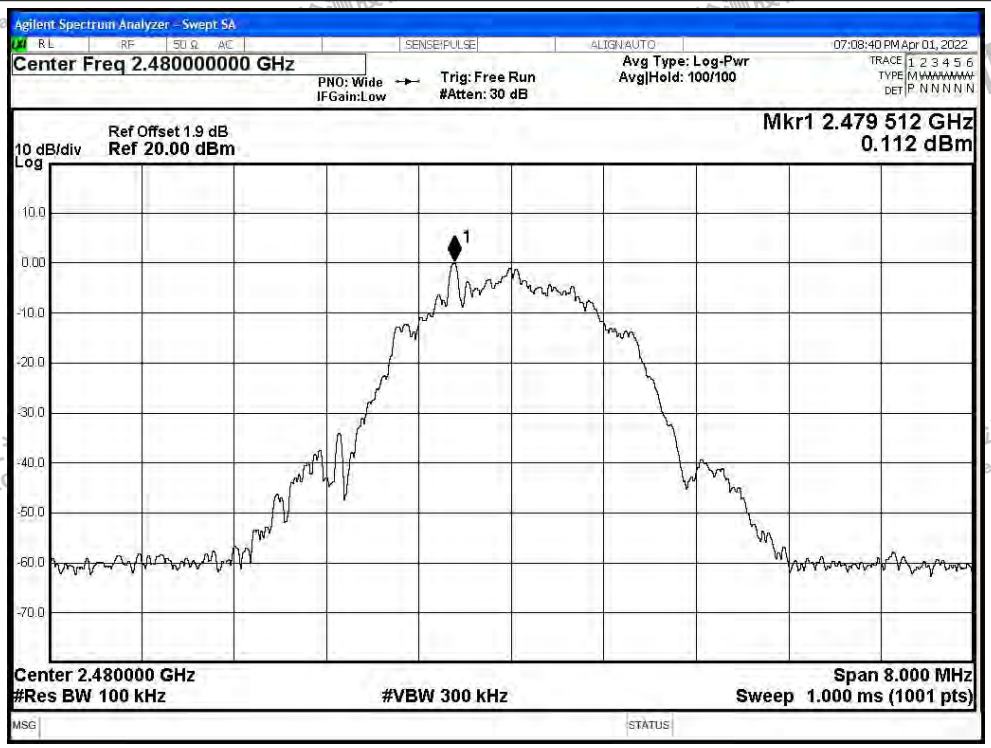
Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



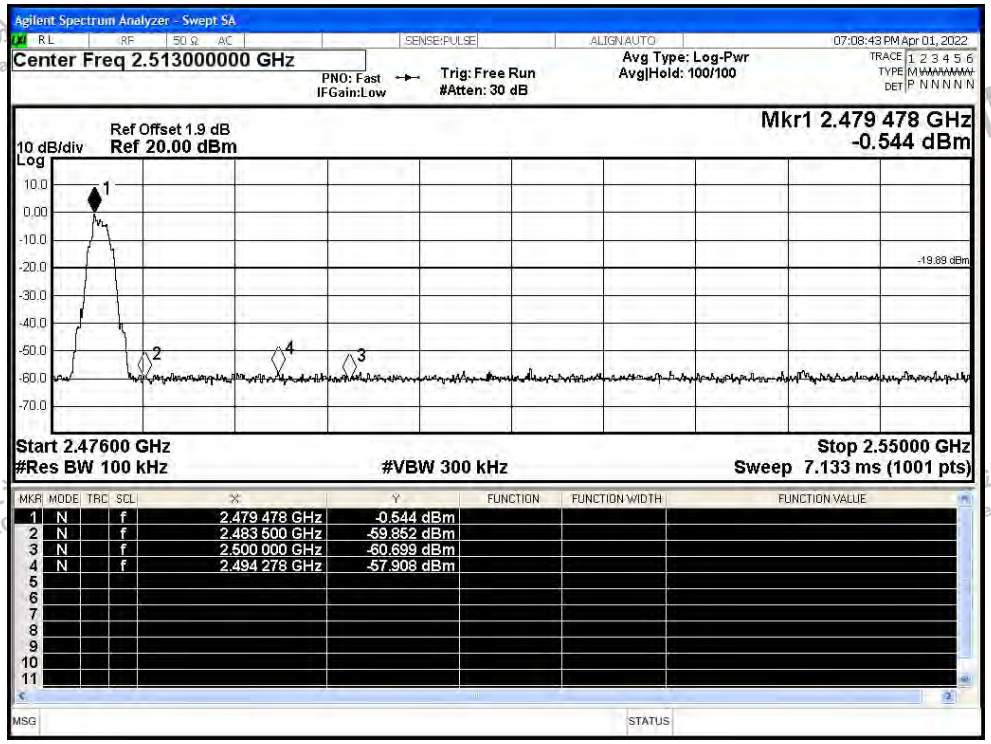
Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Band Edge NVNT BLE 2M 2480MHz Ant1 Emission

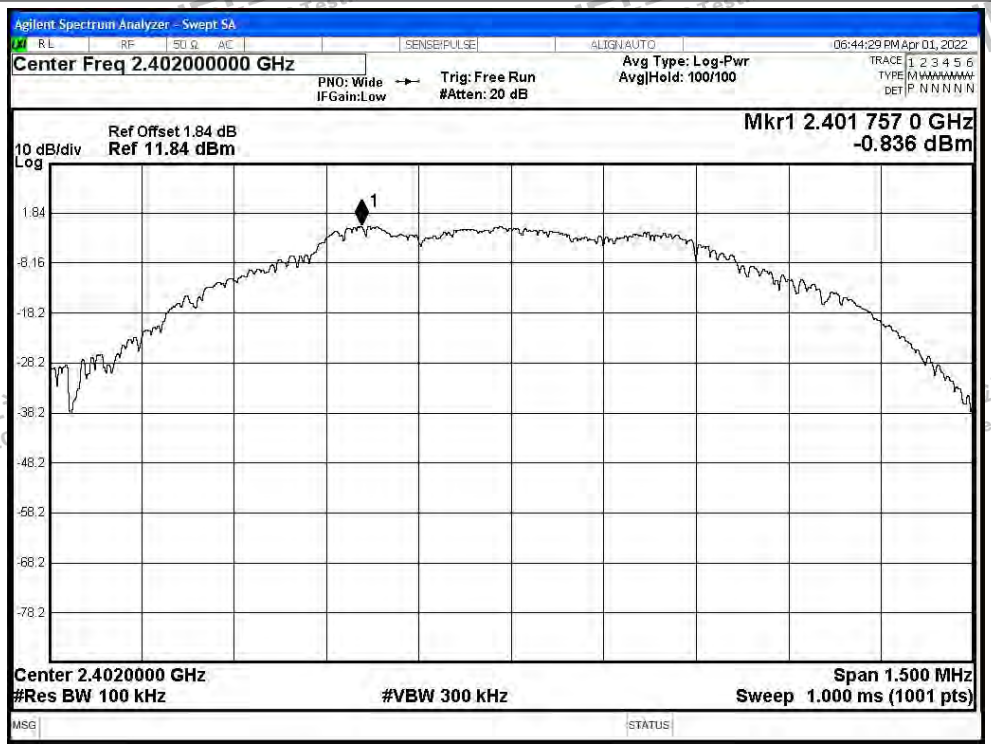


A.5 Conducted Spurious Emission

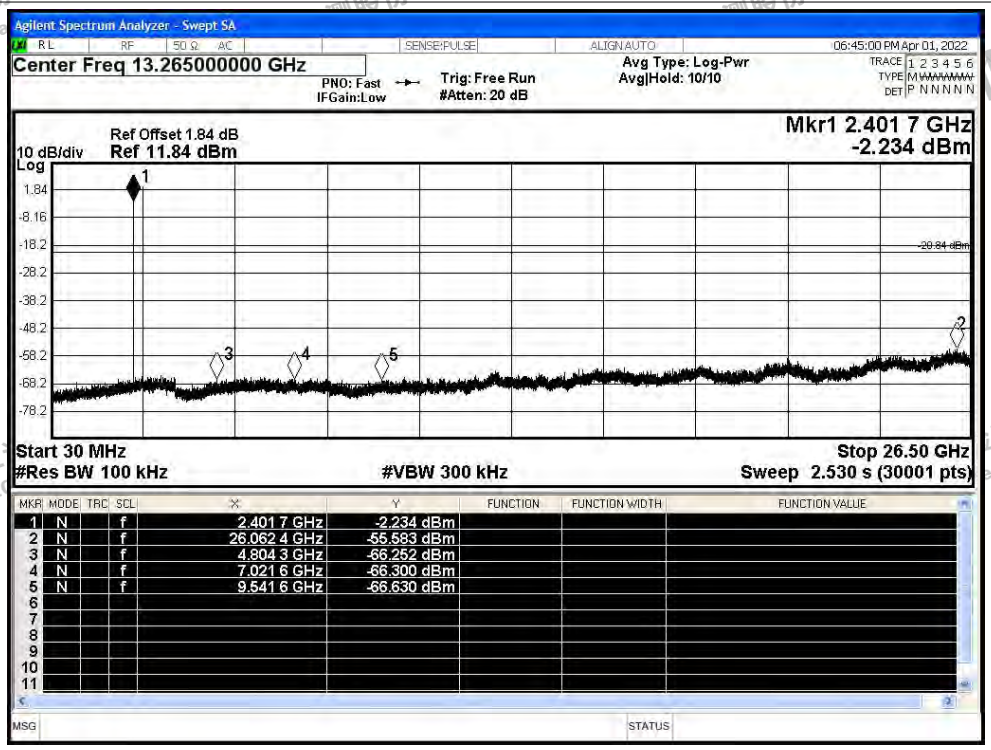
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-54.74	-20	Pass
NVNT	BLE 1M	2440	Ant1	-54.94	-20	Pass
NVNT	BLE 1M	2480	Ant1	-56.21	-20	Pass
NVNT	BLE 2M	2402	Ant1	-55.51	-20	Pass
NVNT	BLE 2M	2440	Ant1	-55.82	-20	Pass
NVNT	BLE 2M	2480	Ant1	-55.8	-20	Pass

Test Graphs

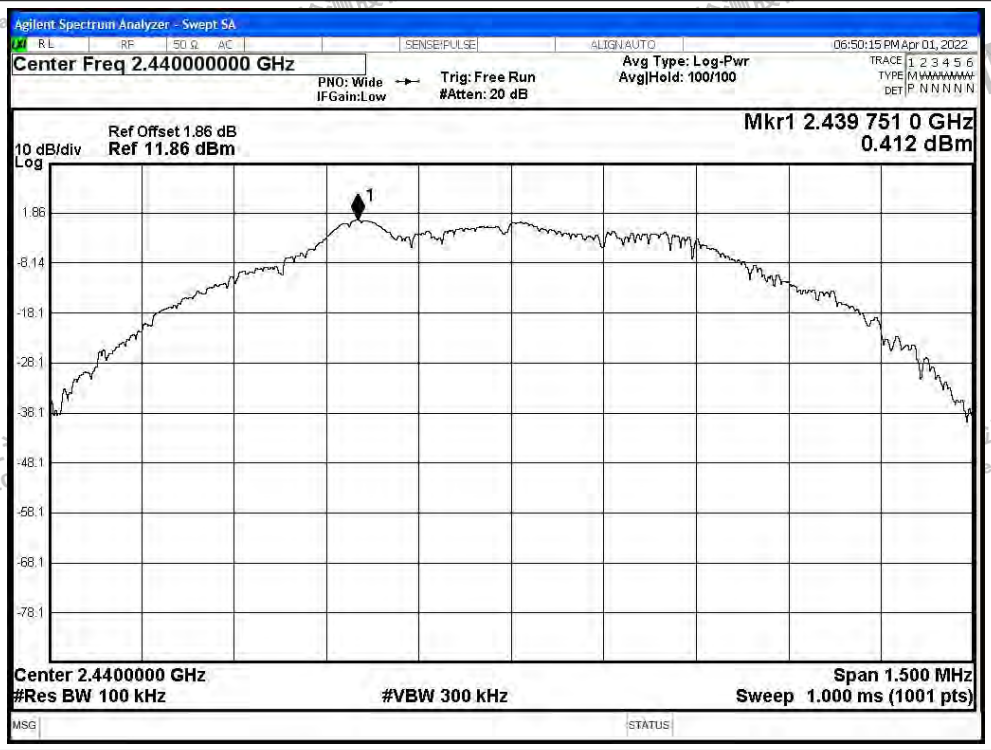
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



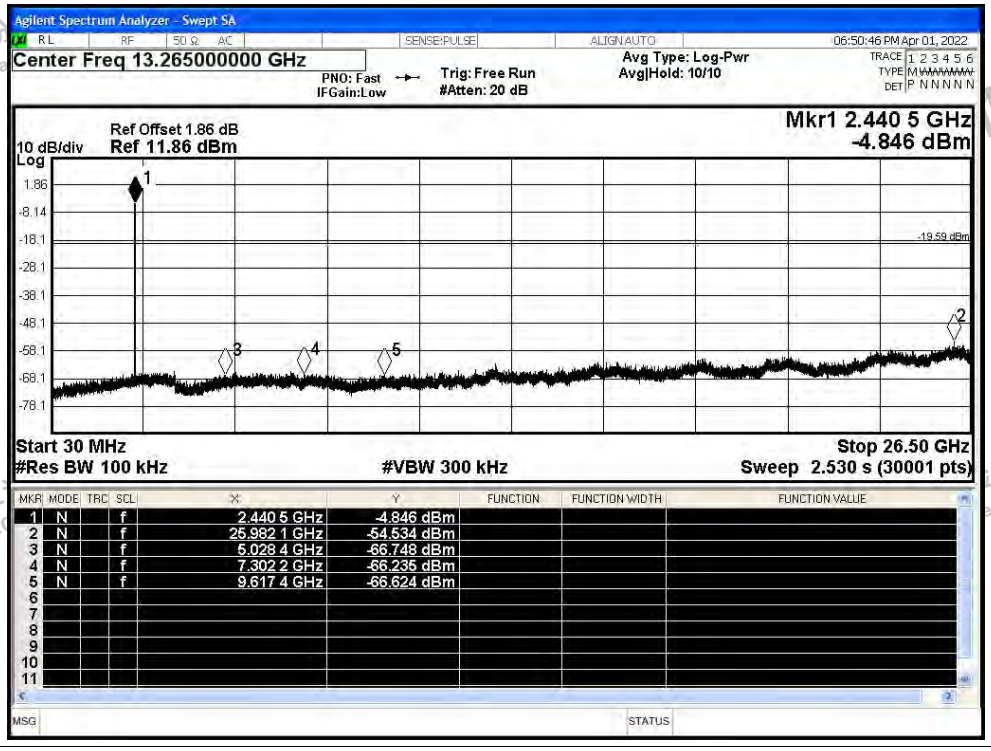
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

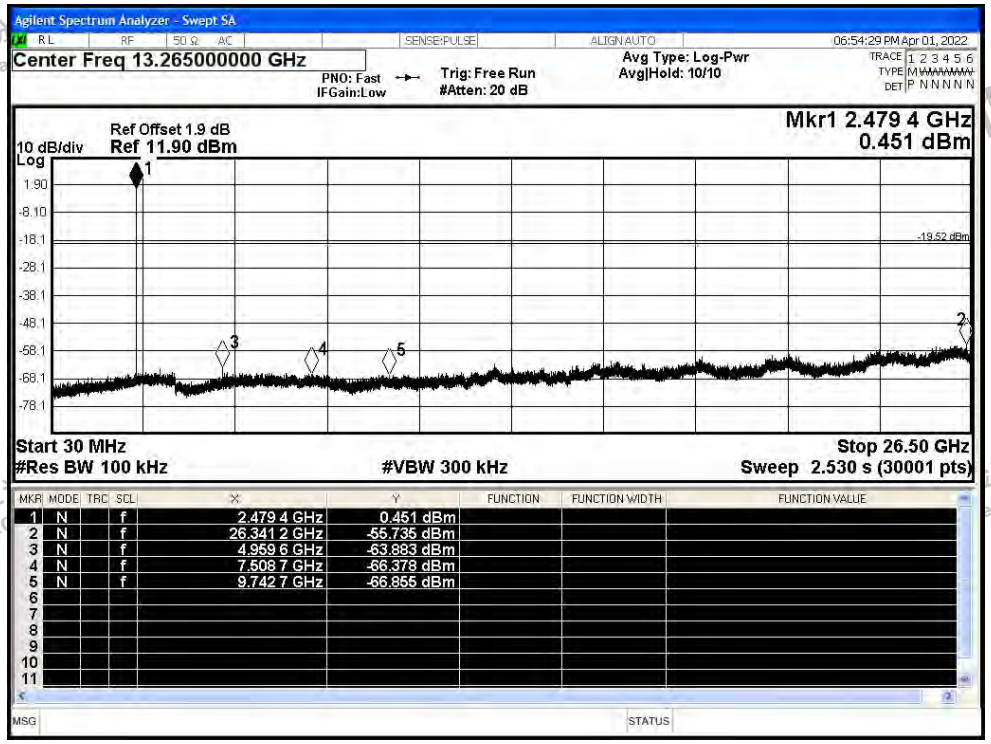


Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



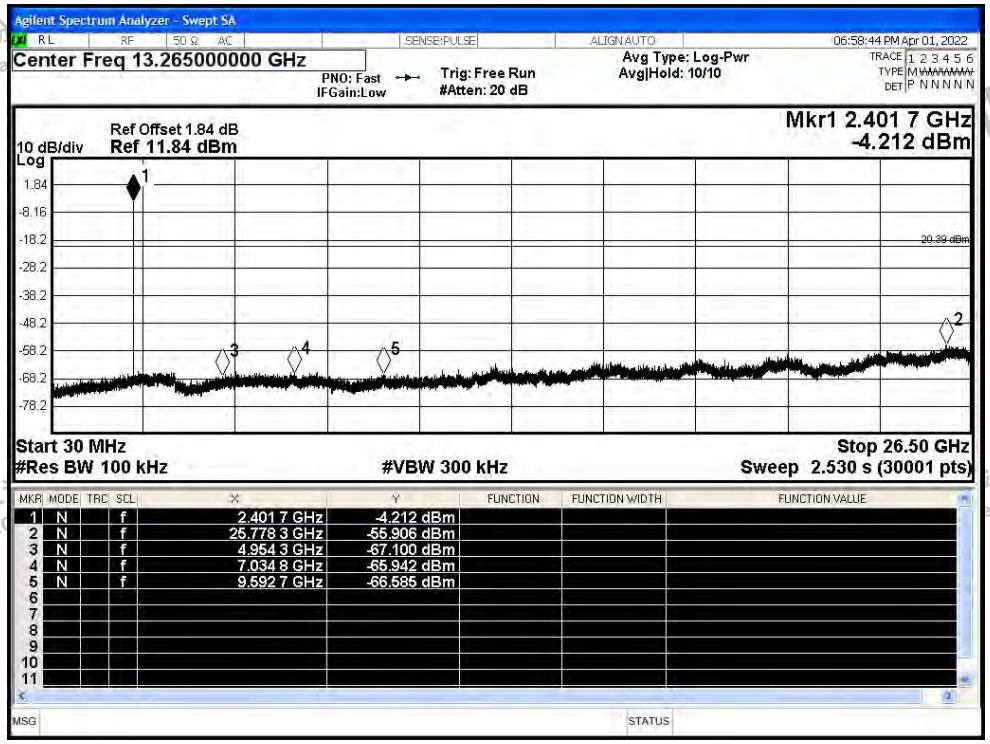
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



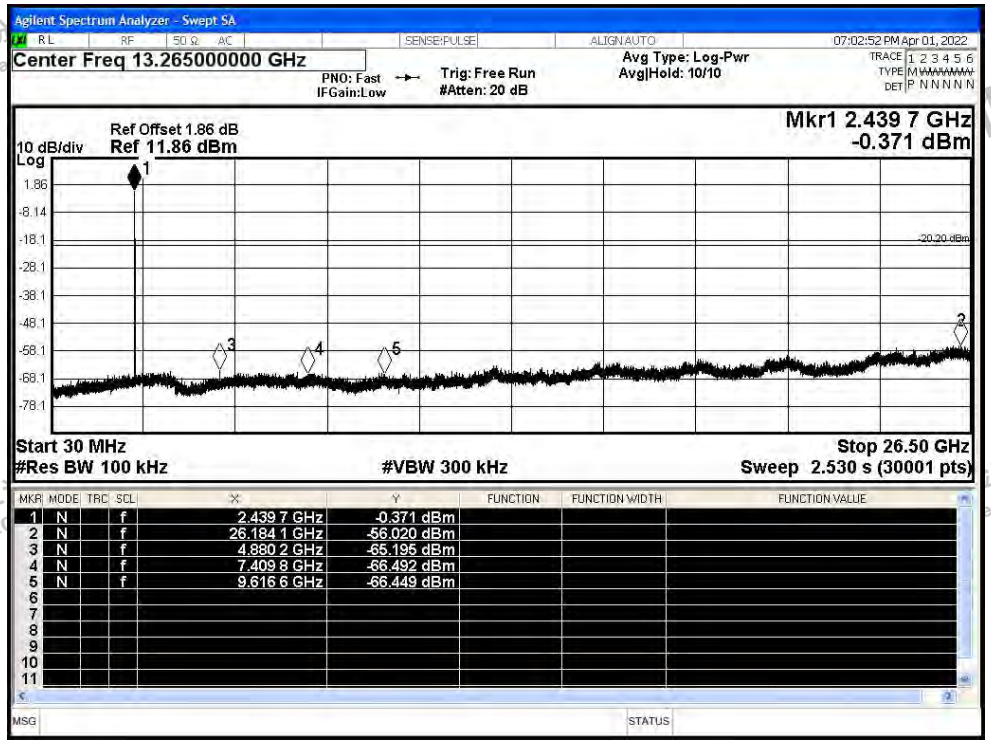
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



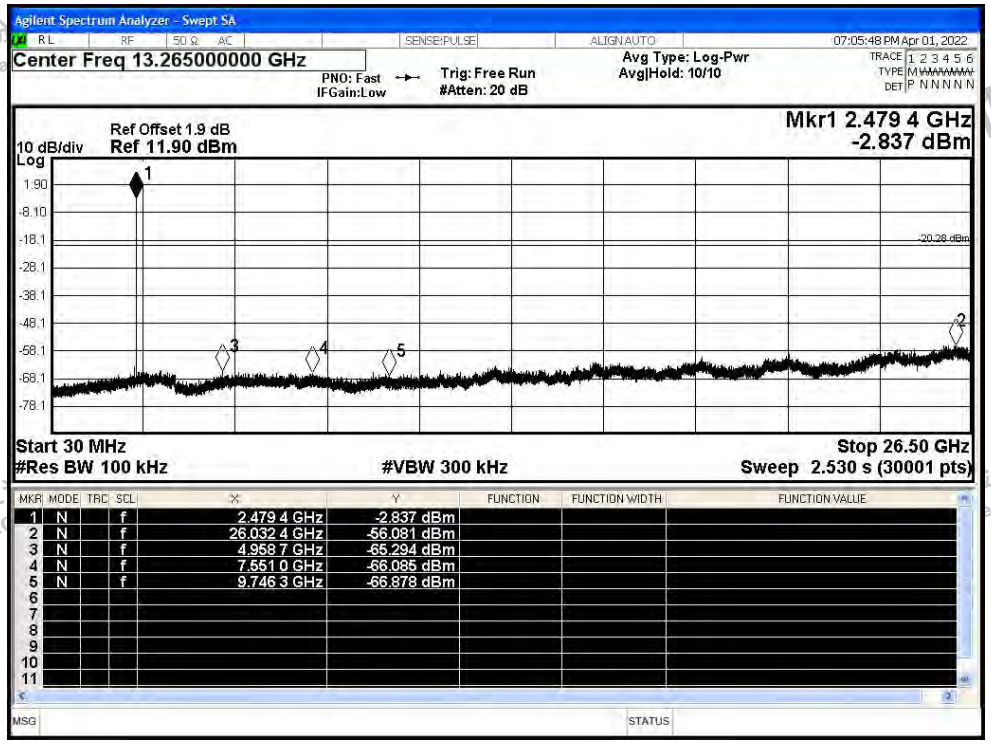
Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref

Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref

Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission

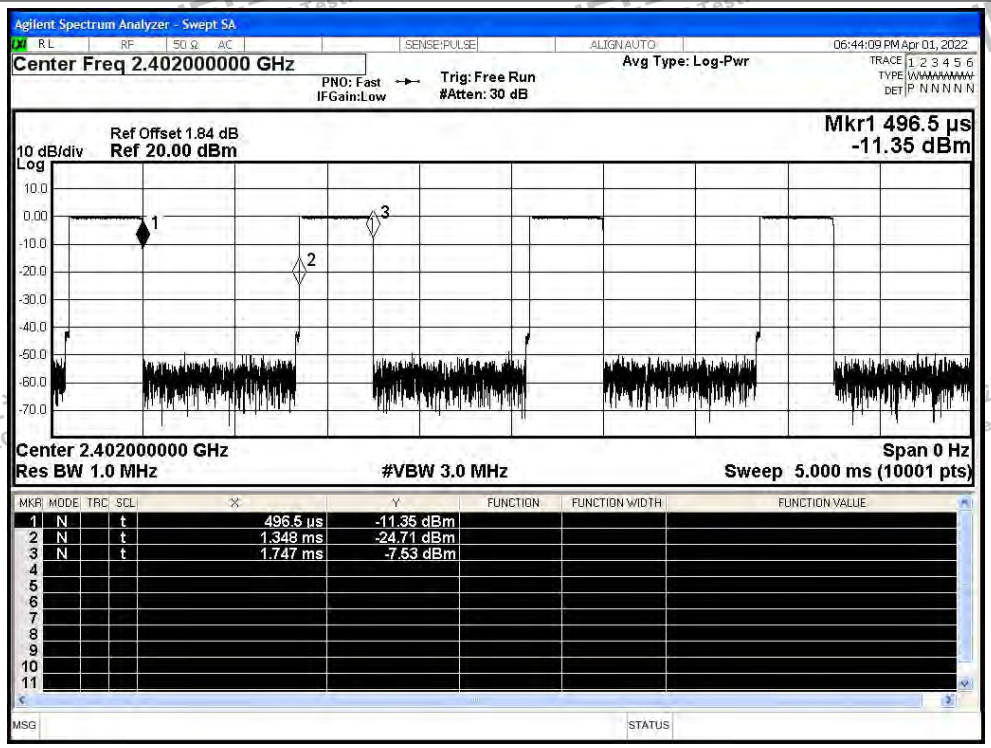


A.6 Duty Cycle

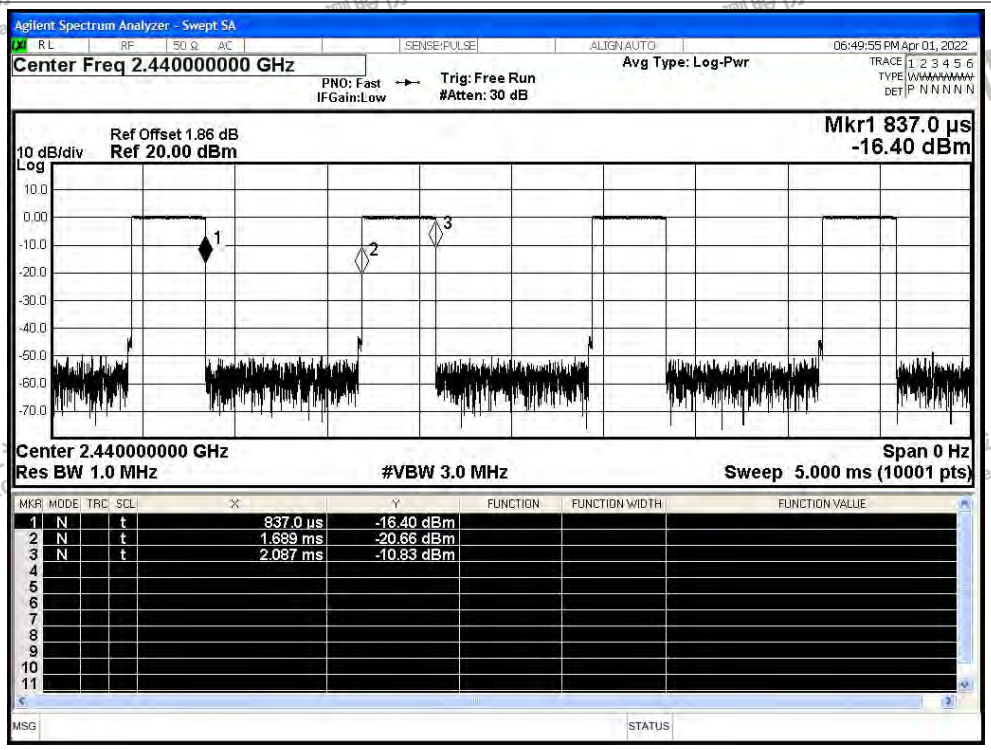
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	31.88	4.96	2.51
NVNT	BLE 1M	2440	Ant1	31.88	4.96	2.51
NVNT	BLE 1M	2480	Ant1	31.88	4.96	2.51
NVNT	BLE 2M	2402	Ant1	32.64	4.86	4.9
NVNT	BLE 2M	2440	Ant1	32.56	4.87	4.91
NVNT	BLE 2M	2480	Ant1	32.64	4.86	4.9

Test Graphs

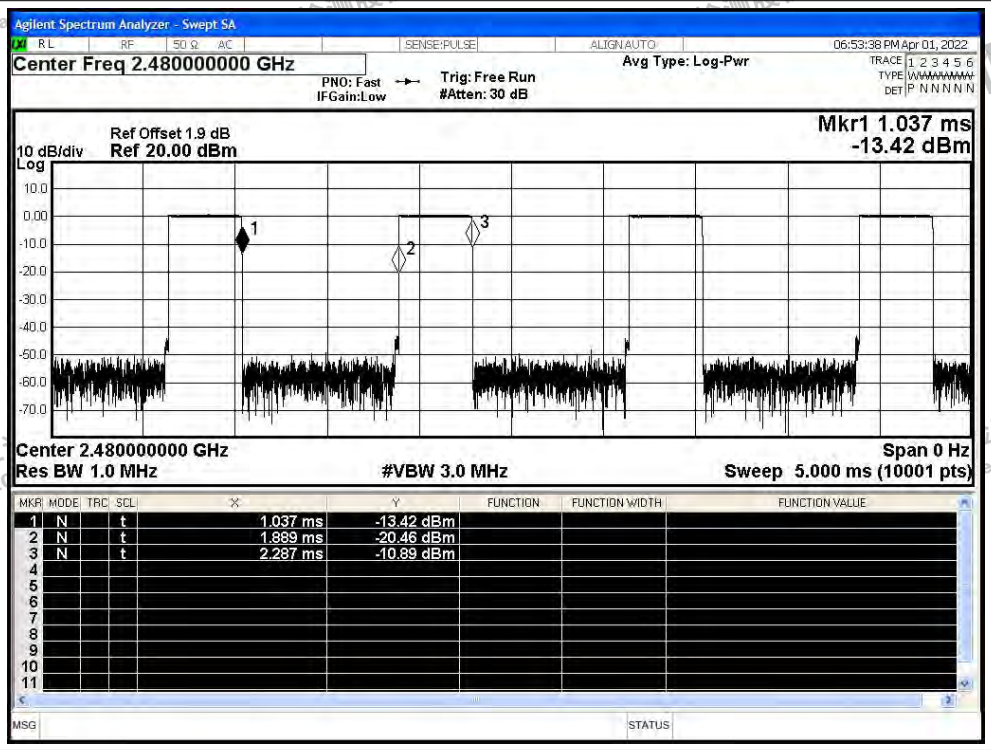
Duty Cycle NVNT BLE 1M 2402MHz Ant1



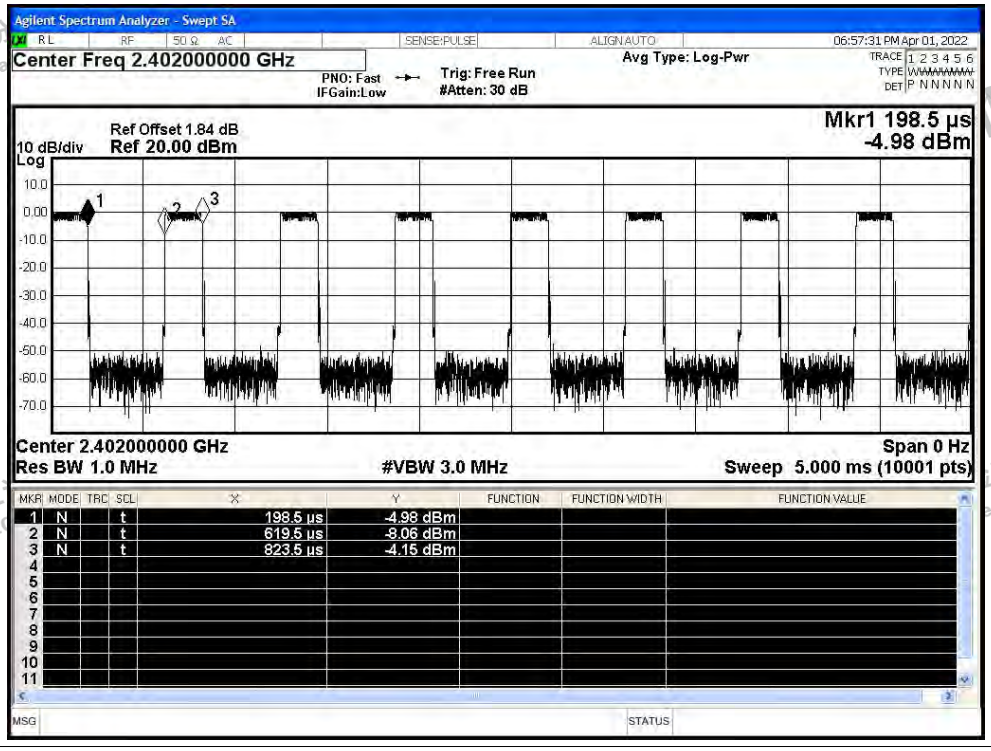
Duty Cycle NVNT BLE 1M 2440MHz Ant1



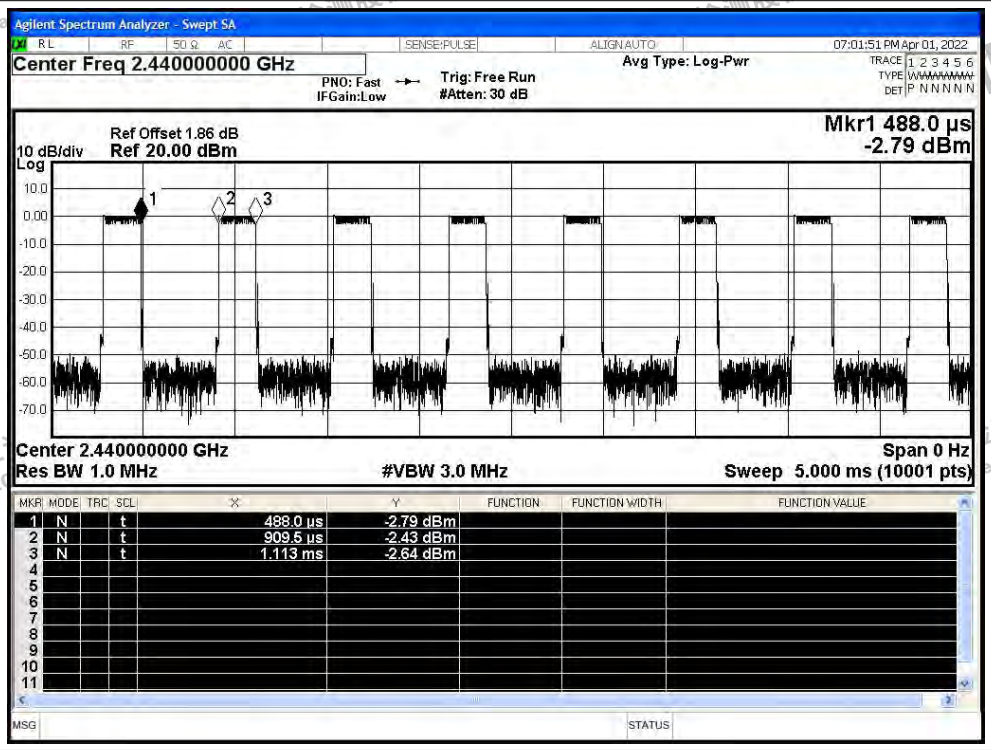
Duty Cycle NVNT BLE 1M 2480MHz Ant1



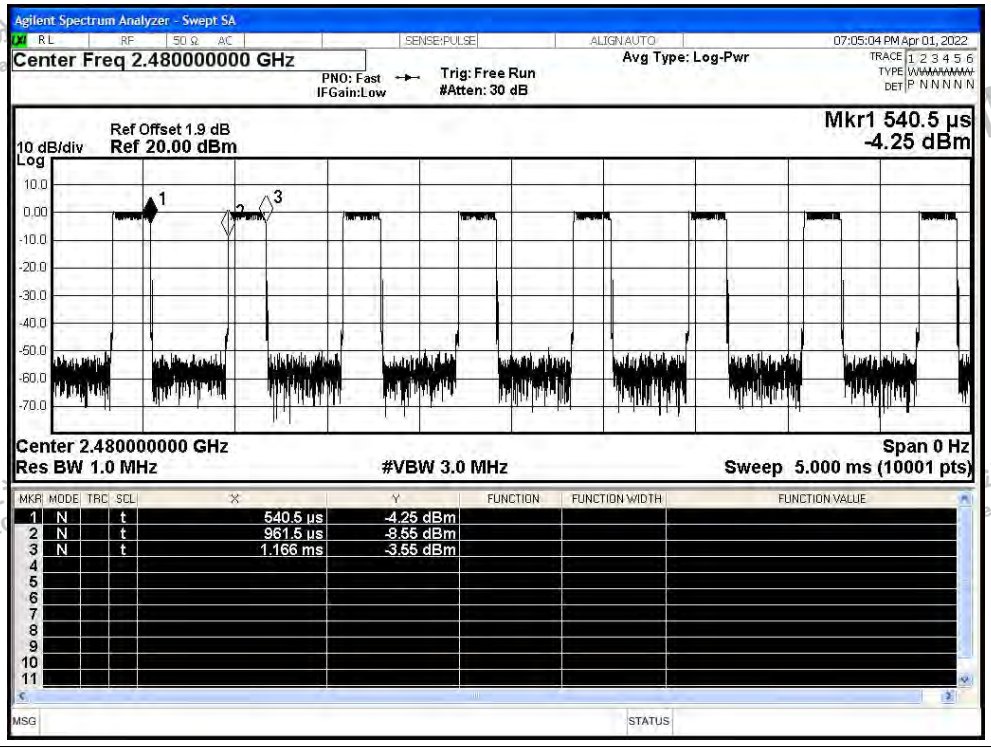
Duty Cycle NVNT BLE 2M 2402MHz Ant1



Duty Cycle NVNT BLE 2M 2440MHz Ant1



Duty Cycle NVNT BLE 2M 2480MHz Ant1

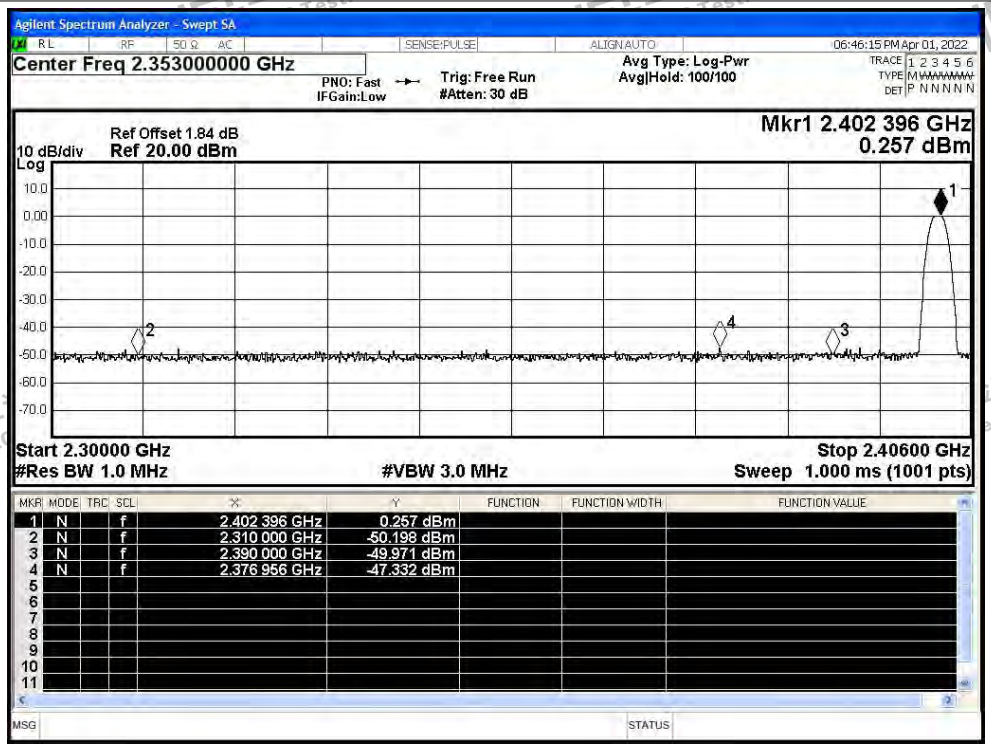


A.7 Emissions in Restricted Bands

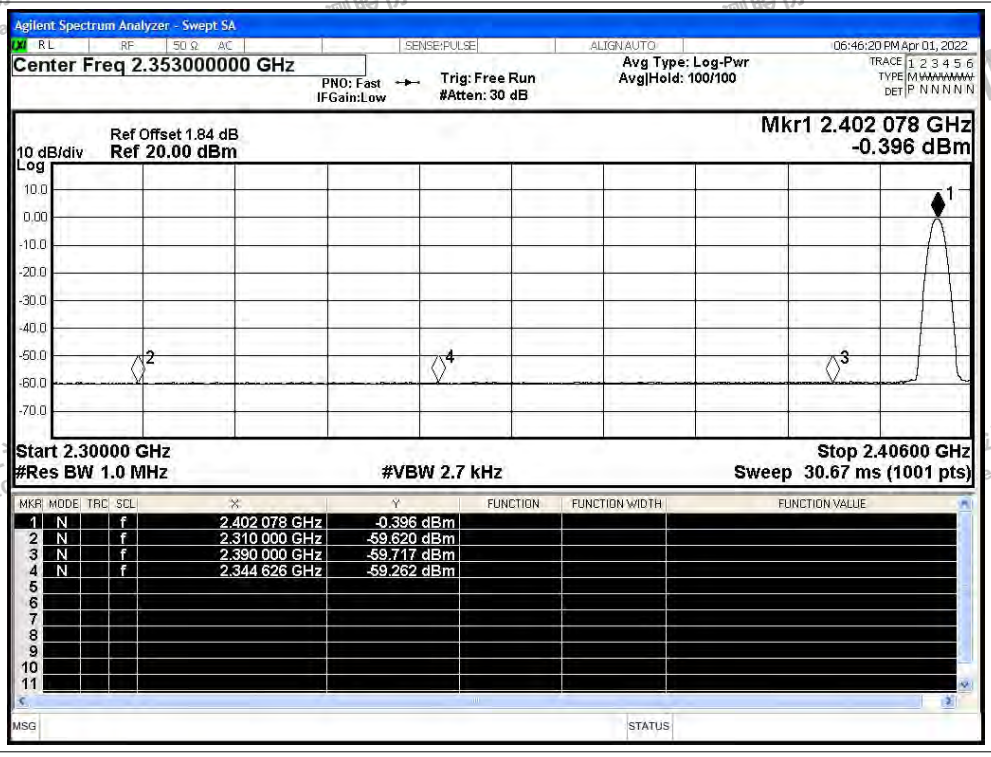
Condition	Mode	Frequency (MHz)	Antenna	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	BLE 1M	2402	Ant1	2310	-50.85	2	46.41	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2310	-59.93	2	37.33	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2376.956	-47.33	2	49.93	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2344.626	-59.26	2	38	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2390	-49.98	2	47.28	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2390	-59.55	2	37.71	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-45.82	2	51.44	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-59.27	2	37.99	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.548	-45.82	2	51.44	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2489.986	-58.78	2	38.48	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2500	-51.07	2	46.19	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2500	-59.25	2	38.01	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2310	-50.31	2	46.95	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2310	-59.59	2	37.67	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2346.11	-47.42	2	49.84	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2383.104	-58.7	2	38.56	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2390	-50.24	2	47.02	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2390	-59.19	2	38.07	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2483.5	-49.42	2	47.84	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2483.5	-58.54	2	38.72	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2485.25	-46.08	2	51.18	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2483.844	-58.04	2	39.22	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2500	-51.38	2	45.88	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2500	-58.34	2	38.92	Average	54	Pass

Test Graphs

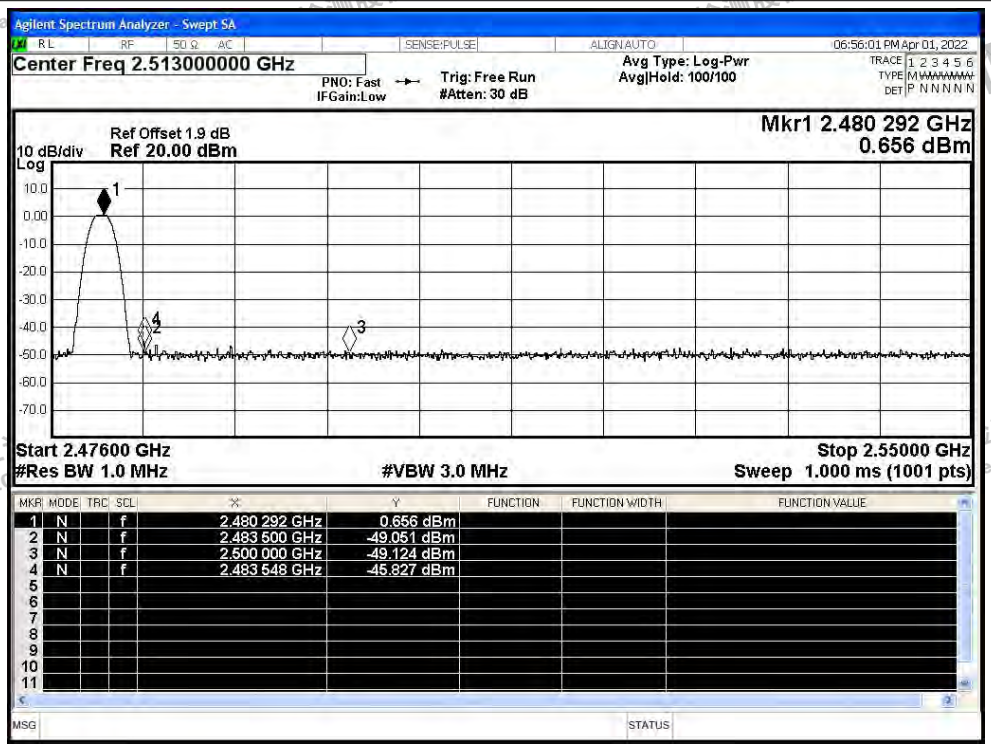
Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak



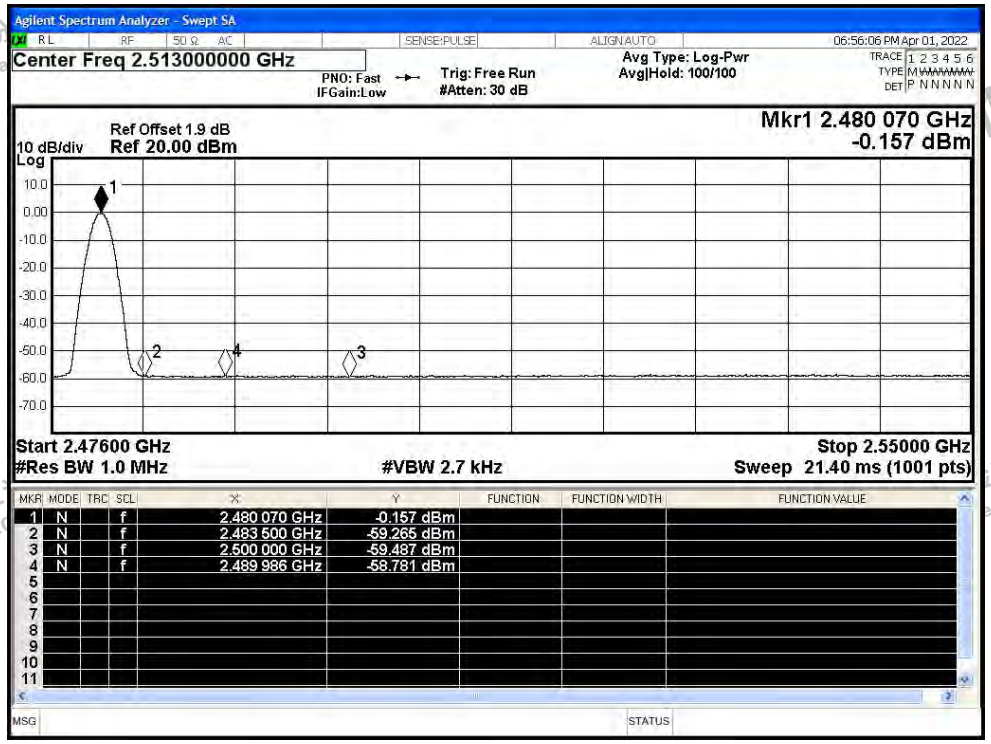
Restrict Band NVNT BLE 1M 2402MHz Ant1 Average



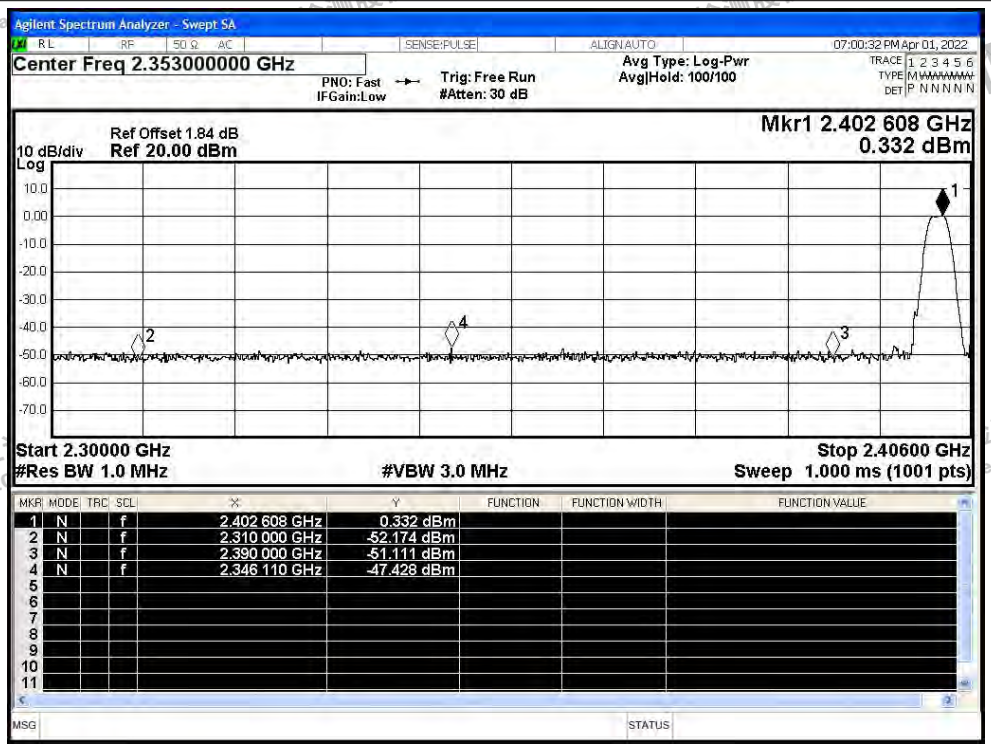
Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak



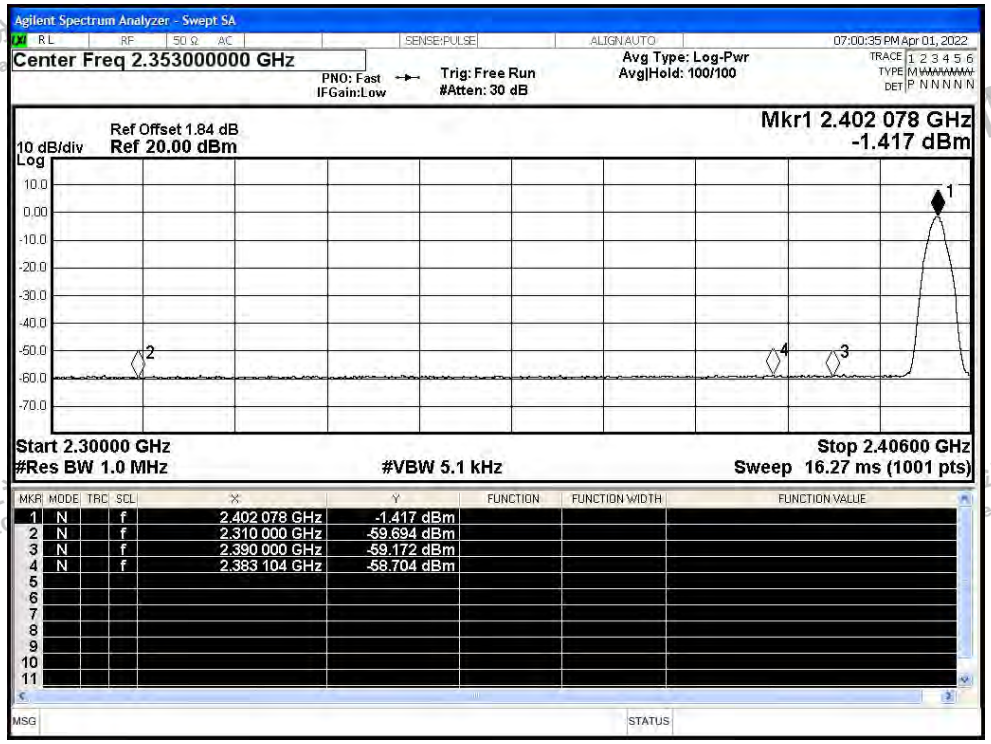
Restrict Band NVNT BLE 1M 2480MHz Ant1 Average



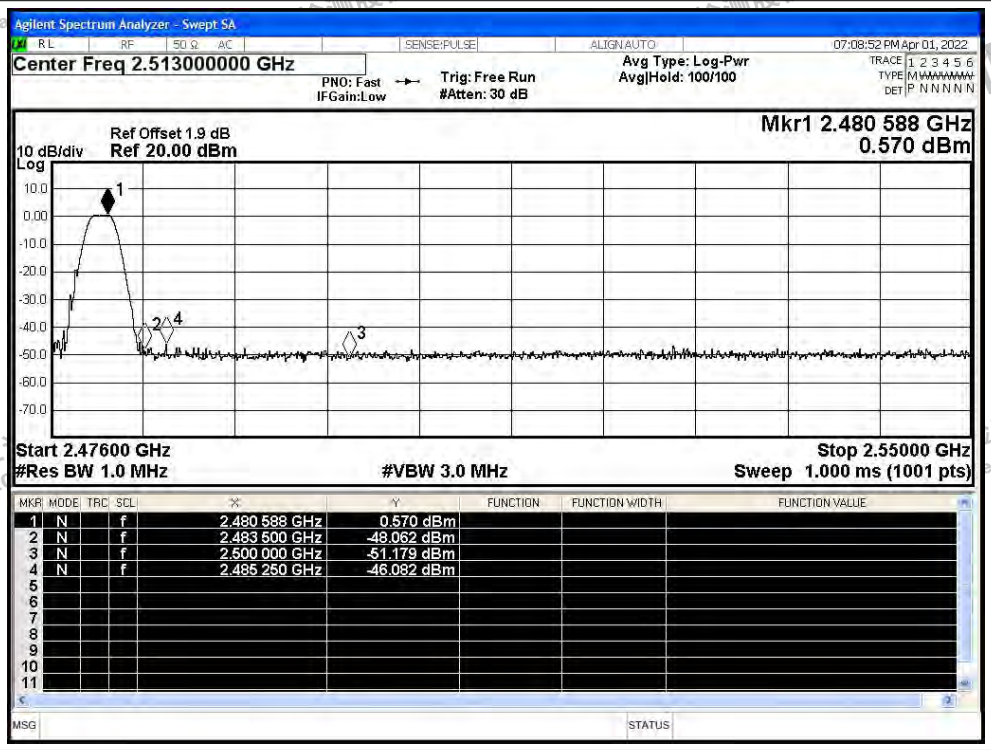
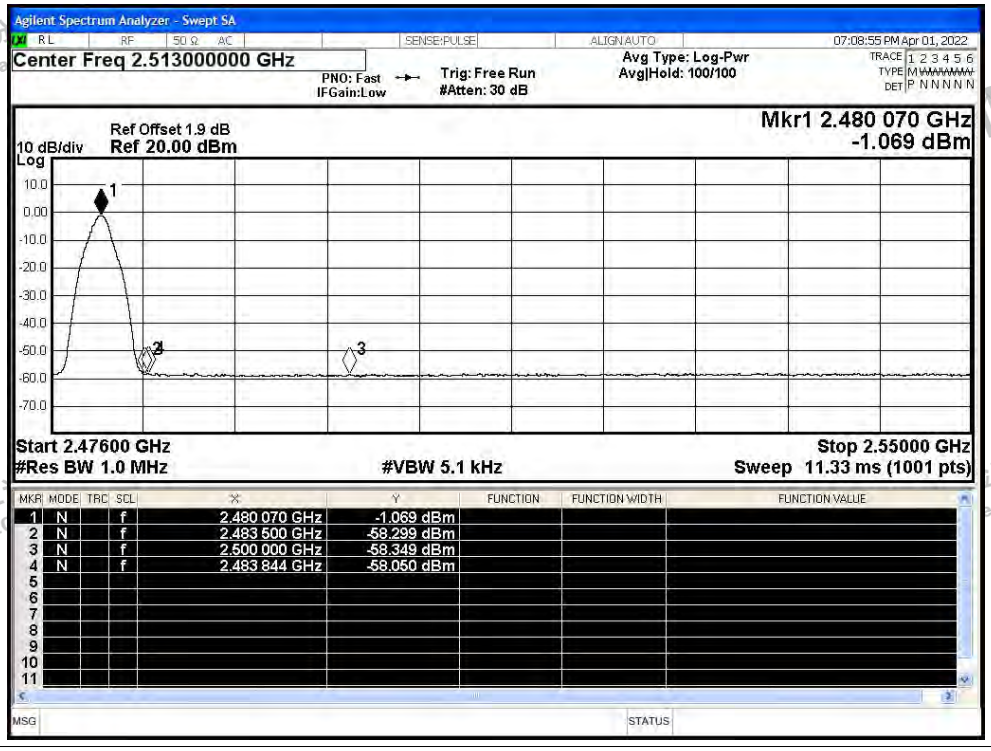
Restrict Band NVNT BLE 2M 2402MHz Ant1 Peak



Restrict Band NVNT BLE 2M 2402MHz Ant1 Average



Restrict Band NVNT BLE 2M 2480MHz Ant1 Peak



Restrict Band NVNT BLE 2M 2480MHz Ant1 Average