



Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: Permanent Outdoor lights Pro

Test Model: S108F

Note: Ant 0 CBU Module Ant 1 ESP Module

Environmental Conditions

Temperature:	23.8° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Jerry Chu
Supervised by:	Nick Peng



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A.1 -6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant0	0.655	≥ 0.5	Pass
NVNT	BLE 1M	2440	Ant0	0.659	≥ 0.5	Pass
NVNT	BLE 1M	2480	Ant0	0.658	≥ 0.5	Pass
NVNT	BLE 1M	2402	Ant1	0.677	≥ 0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.653	≥ 0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.665	≥ 0.5	Pass



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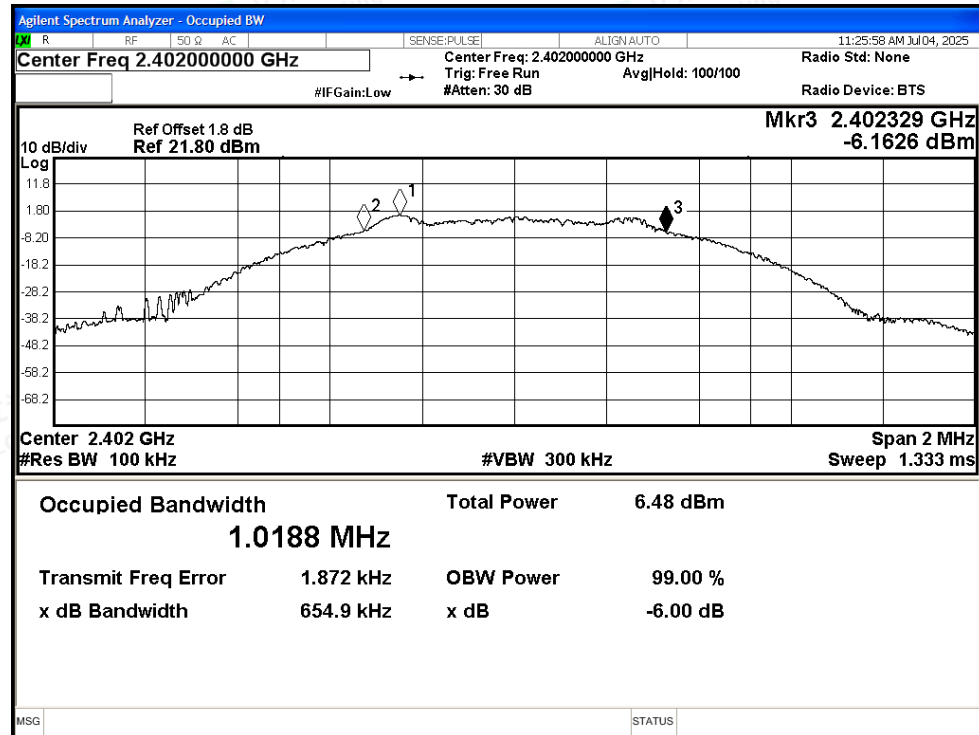
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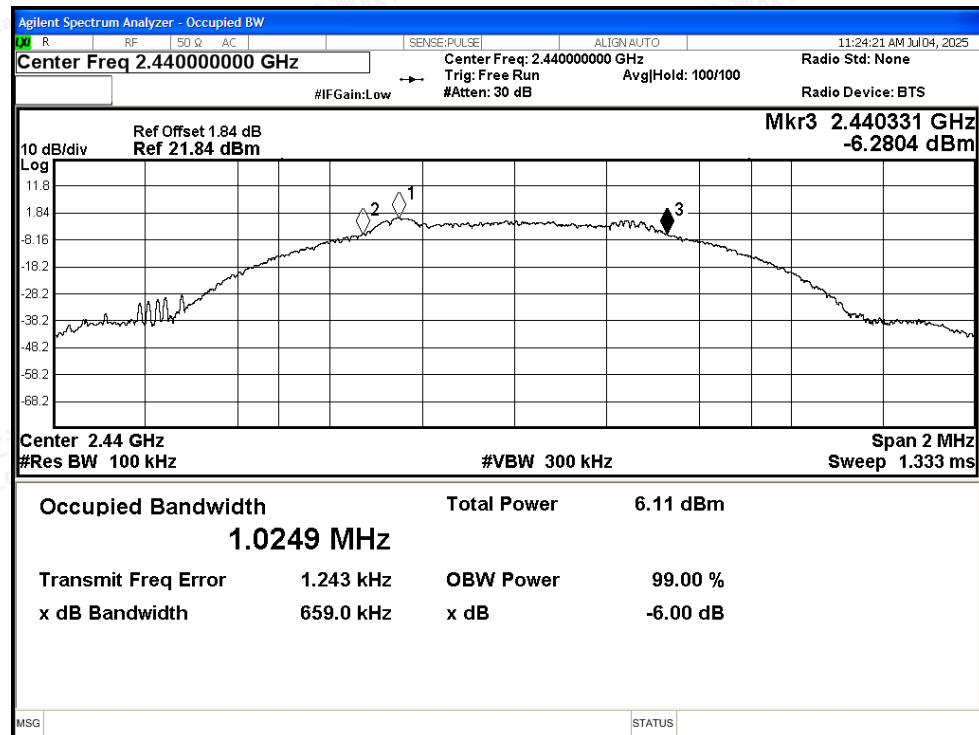


Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant0



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant0

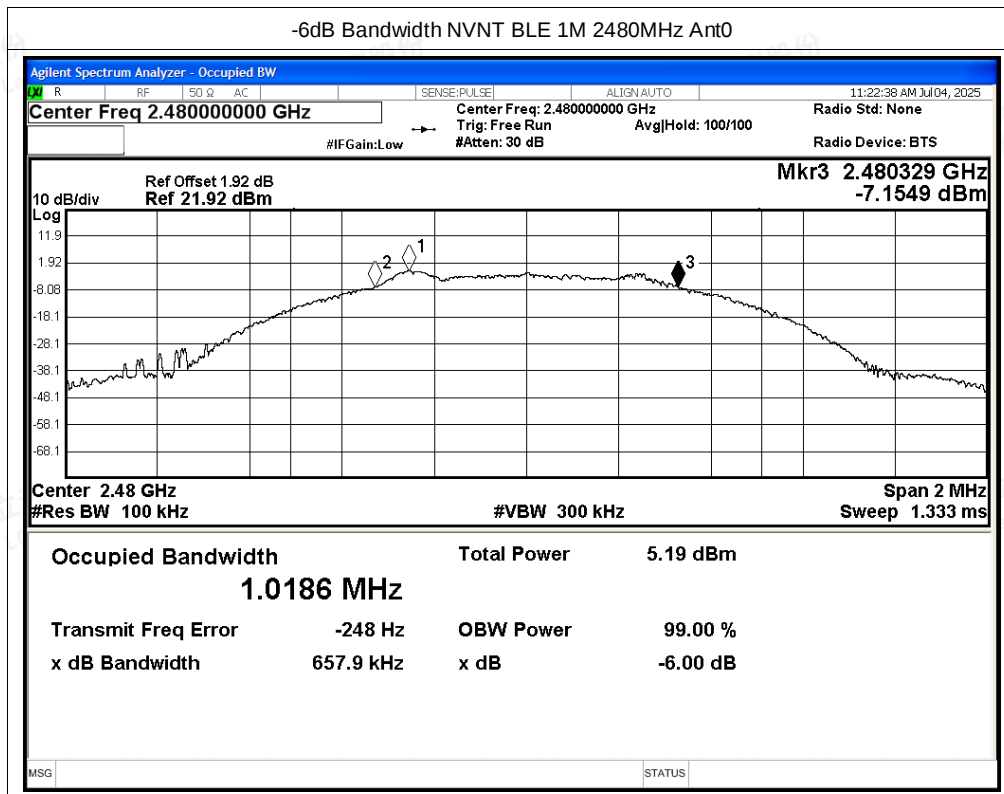


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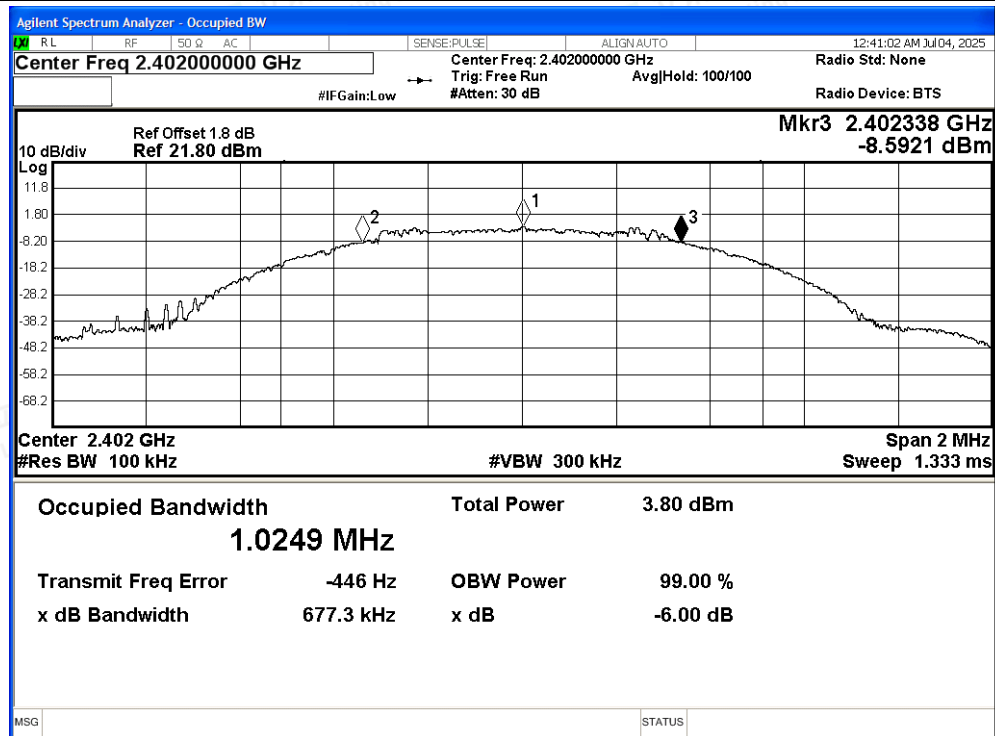
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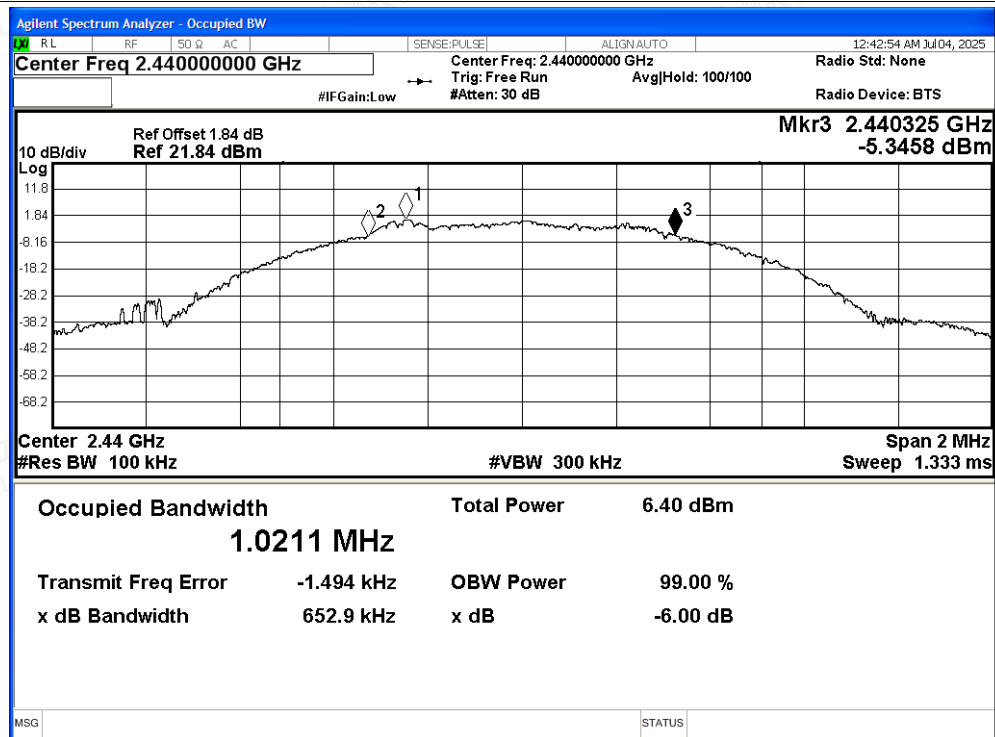


Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

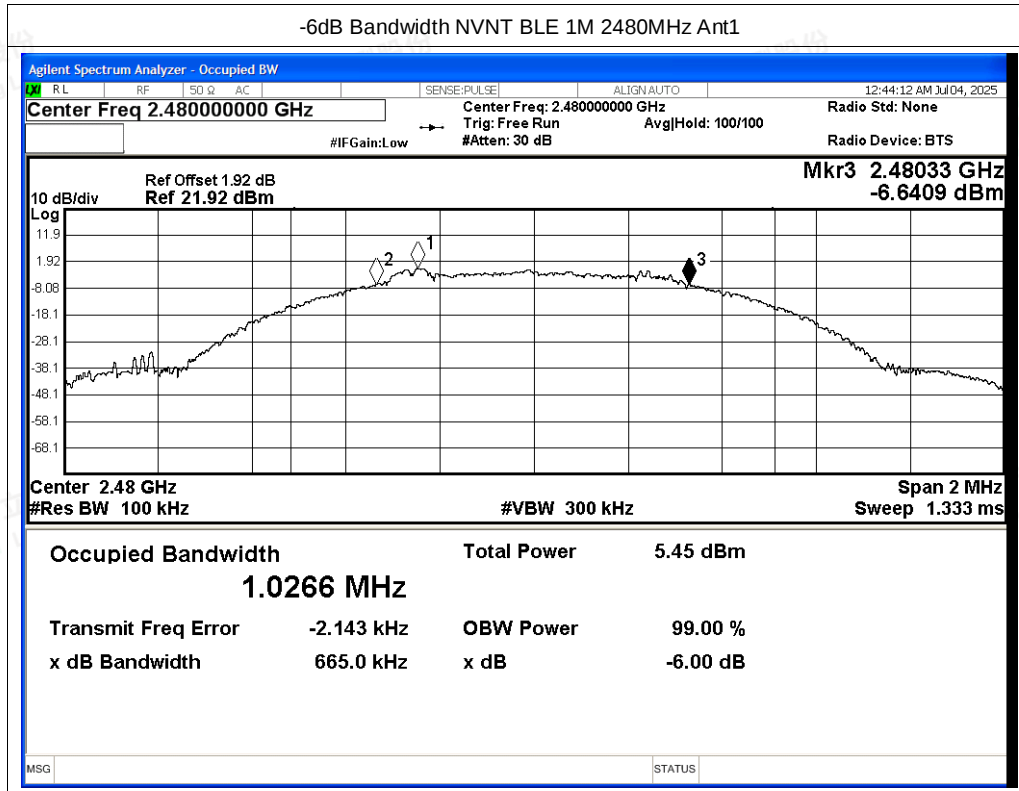


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A.2 Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant0	0.62	30	Pass
NVNT	BLE 1M	2440	Ant0	0.31	30	Pass
NVNT	BLE 1M	2480	Ant0	-0.69	30	Pass
NVNT	BLE 1M	2402	Ant1	-1.79	30	Pass
NVNT	BLE 1M	2440	Ant1	0.77	30	Pass
NVNT	BLE 1M	2480	Ant1	-0.16	30	Pass



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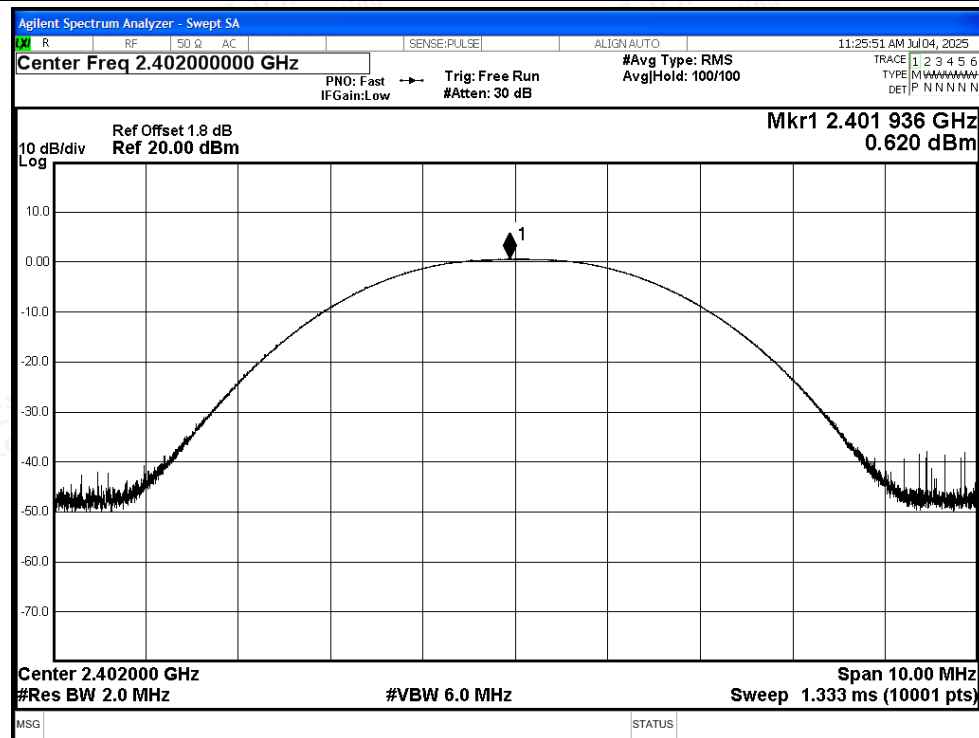
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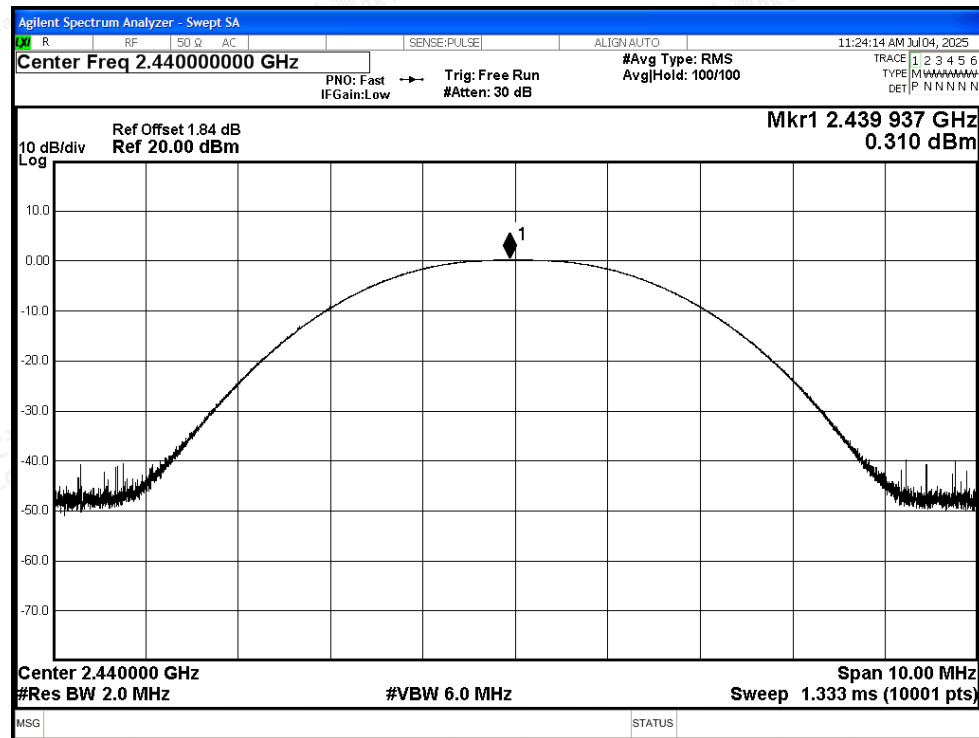


Test Graphs

Power NVNT BLE 1M 2402MHz Ant0



Power NVNT BLE 1M 2440MHz Ant0

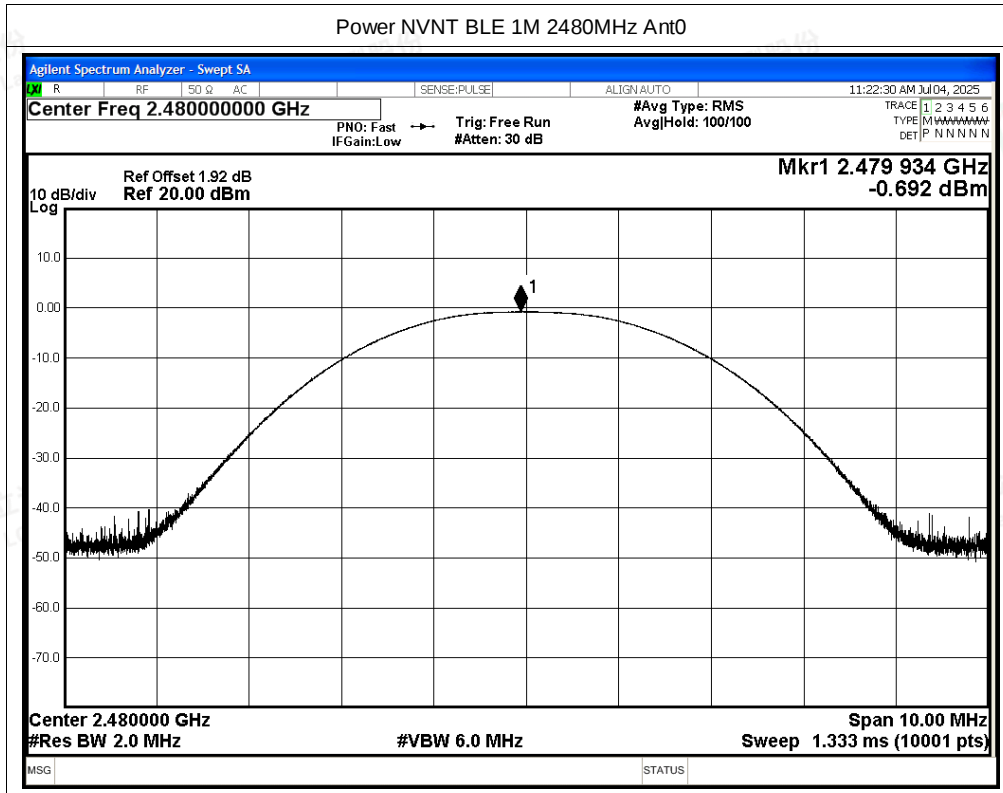


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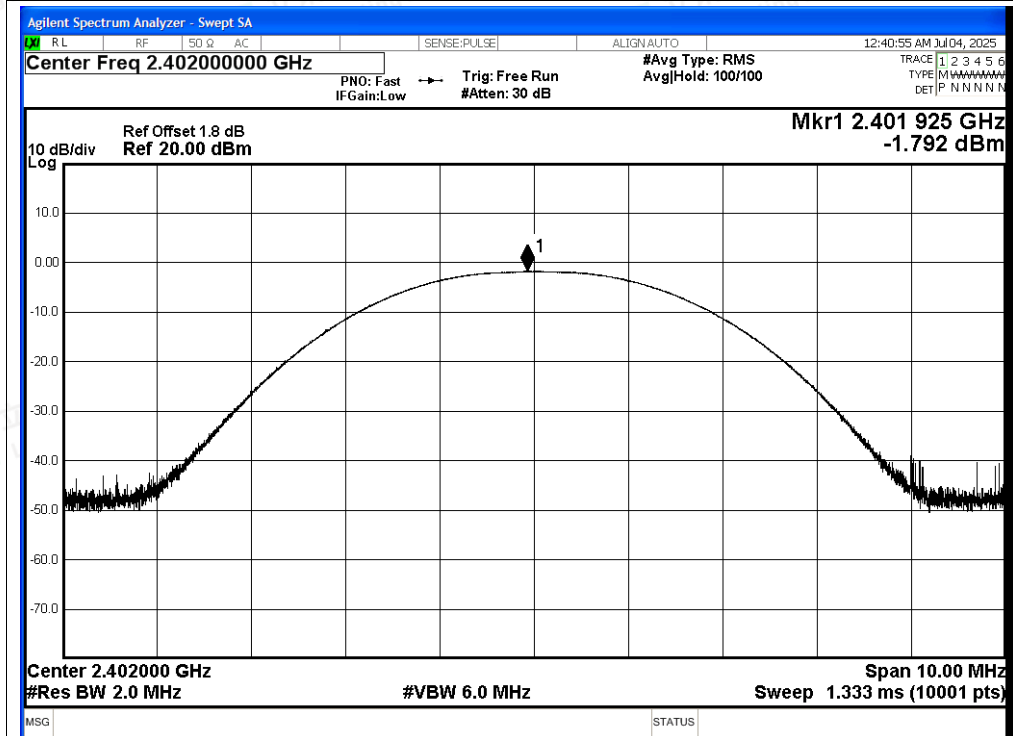
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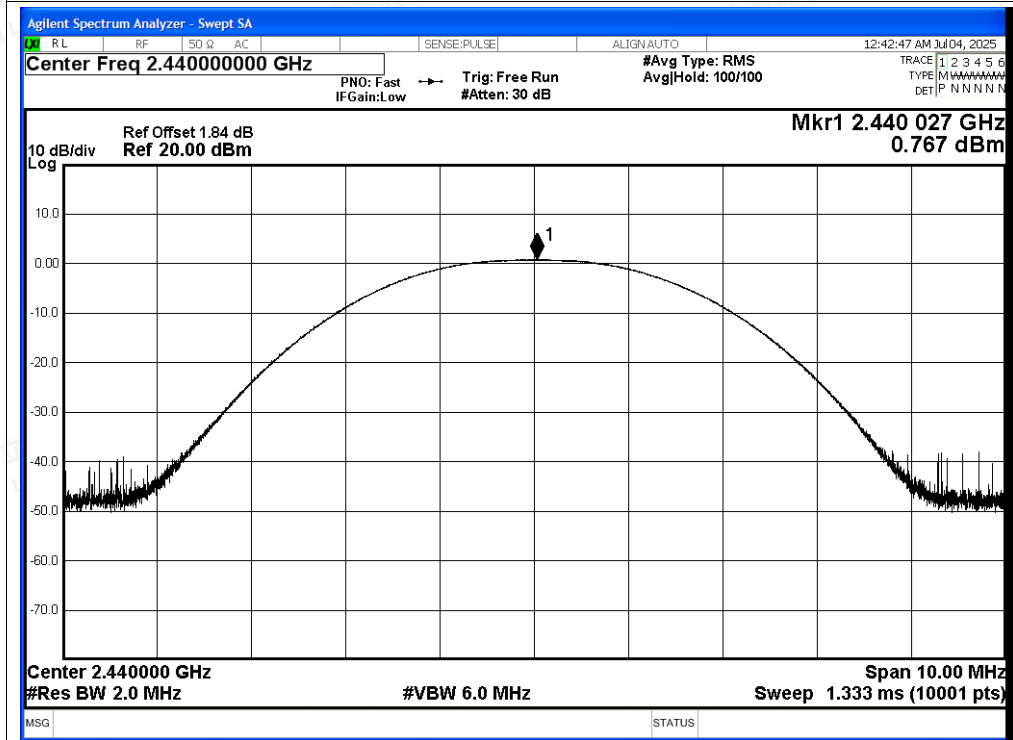


Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1

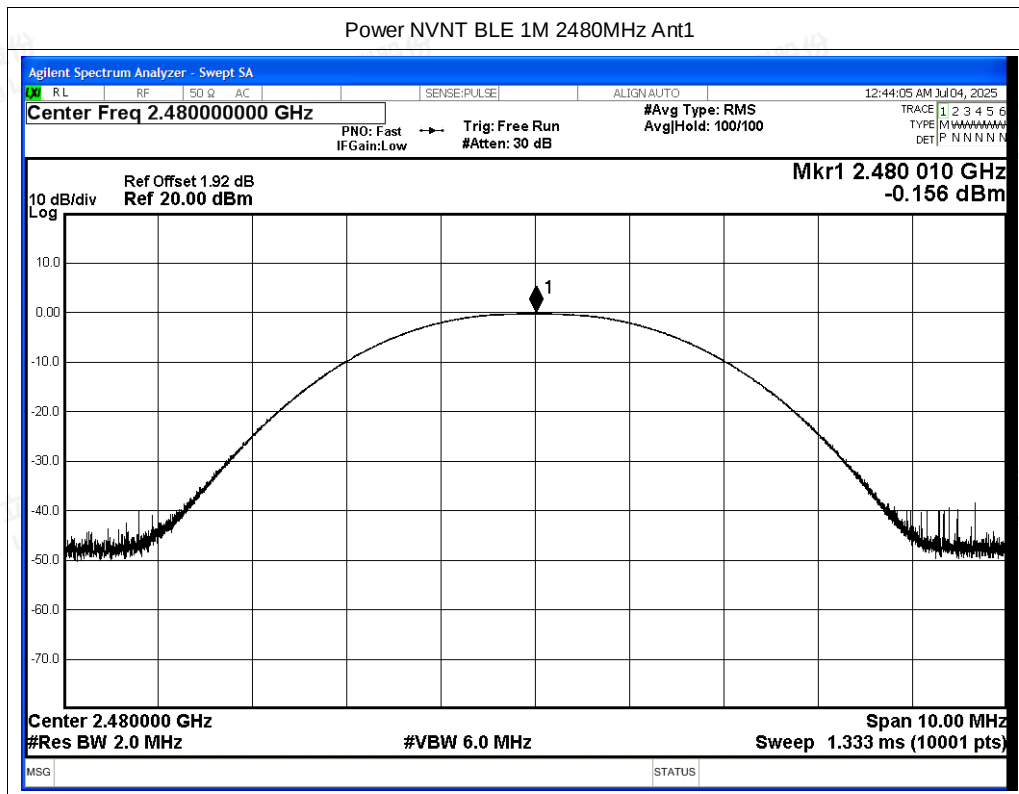


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A.3 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant0	-16.03	8	Pass
NVNT	BLE 1M	2440	Ant0	-16.45	8	Pass
NVNT	BLE 1M	2480	Ant0	-17.3	8	Pass
NVNT	BLE 1M	2402	Ant1	-18.06	8	Pass
NVNT	BLE 1M	2440	Ant1	-15.71	8	Pass
NVNT	BLE 1M	2480	Ant1	-16.47	8	Pass



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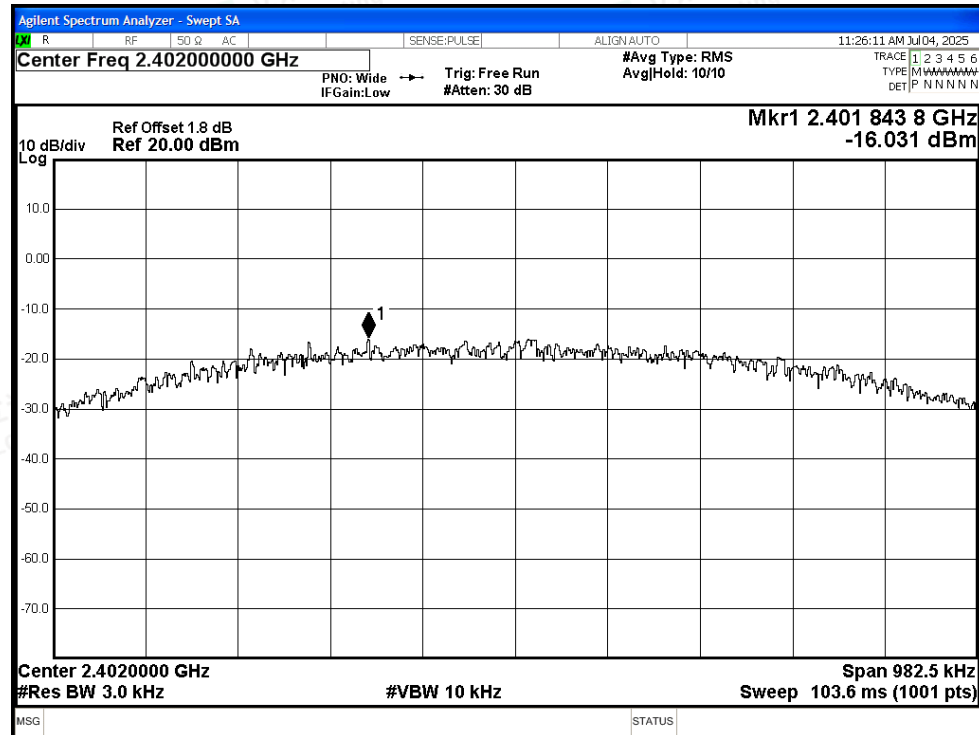
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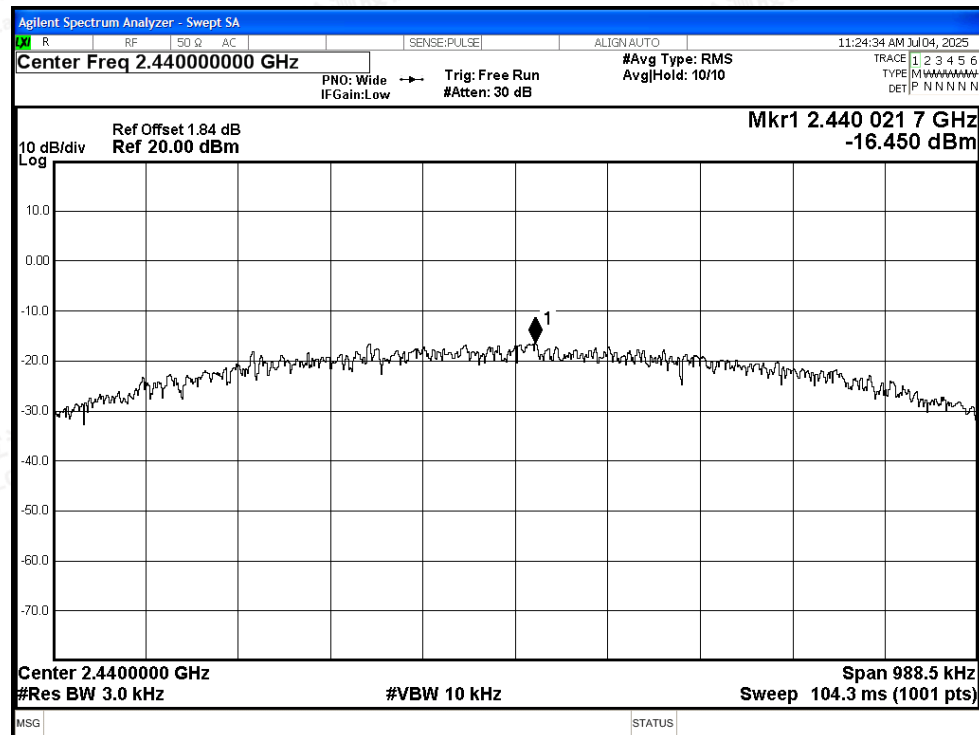


Test Graphs

PSD NVNT BLE 1M 2402MHz Ant0



PSD NVNT BLE 1M 2440MHz Ant0

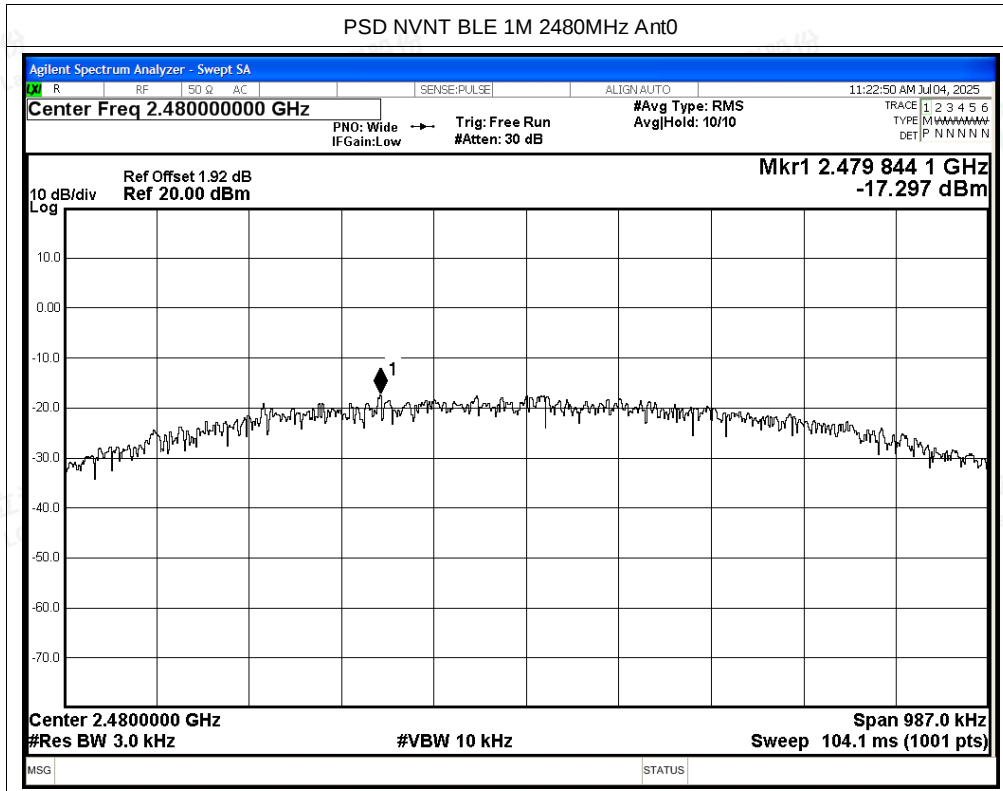


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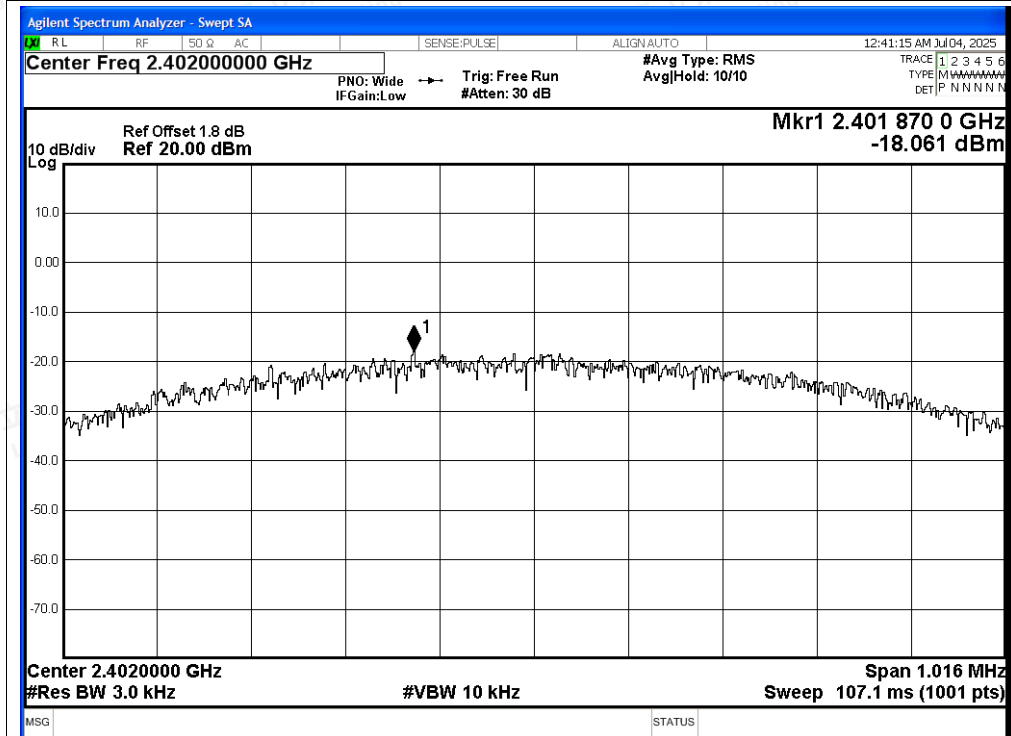
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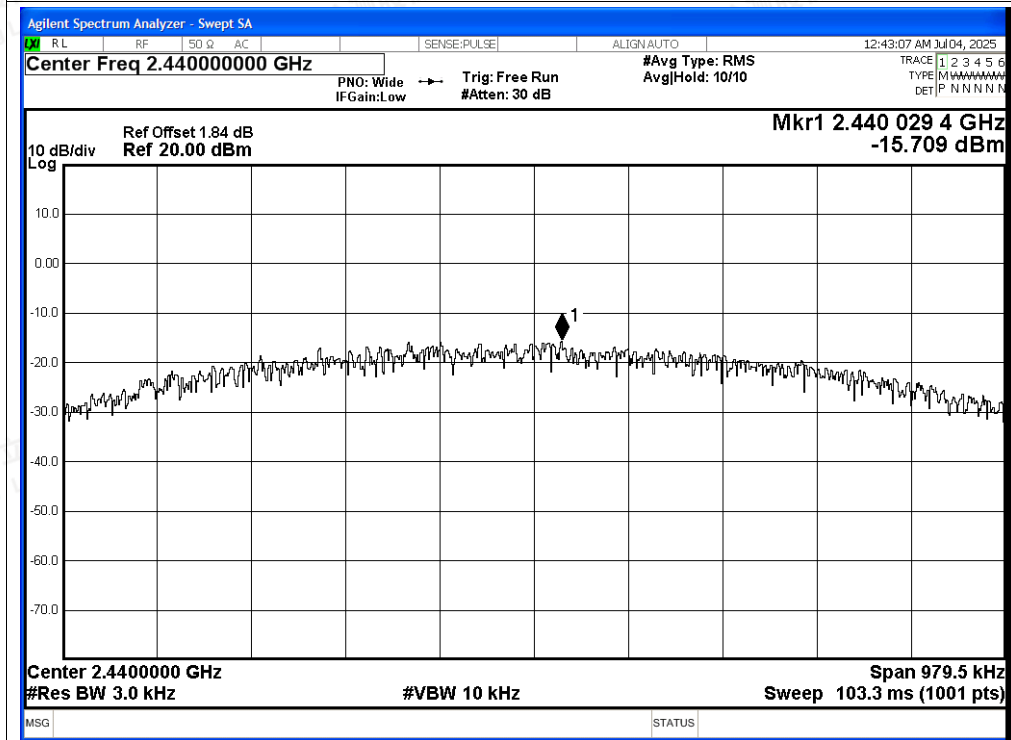


Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1

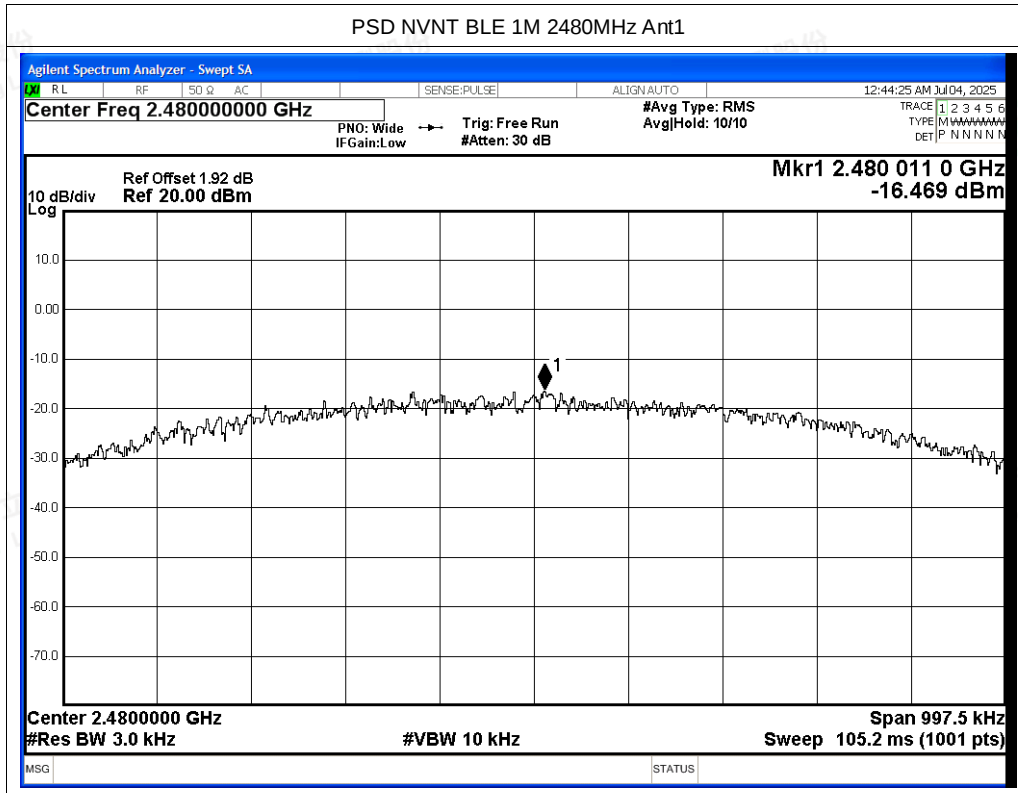


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A. 4 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant0	-56.02	-20	Pass
NVNT	BLE 1M	2480	Ant0	-55.82	-20	Pass
NVNT	BLE 1M	2402	Ant1	-54.71	-20	Pass
NVNT	BLE 1M	2480	Ant1	-56.13	-20	Pass



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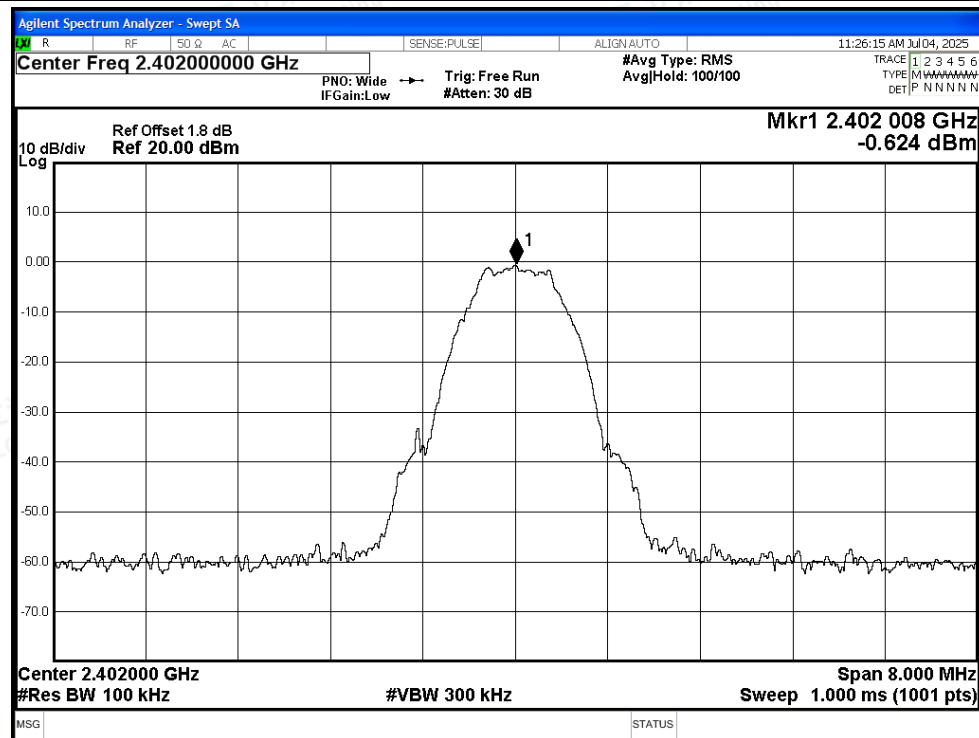
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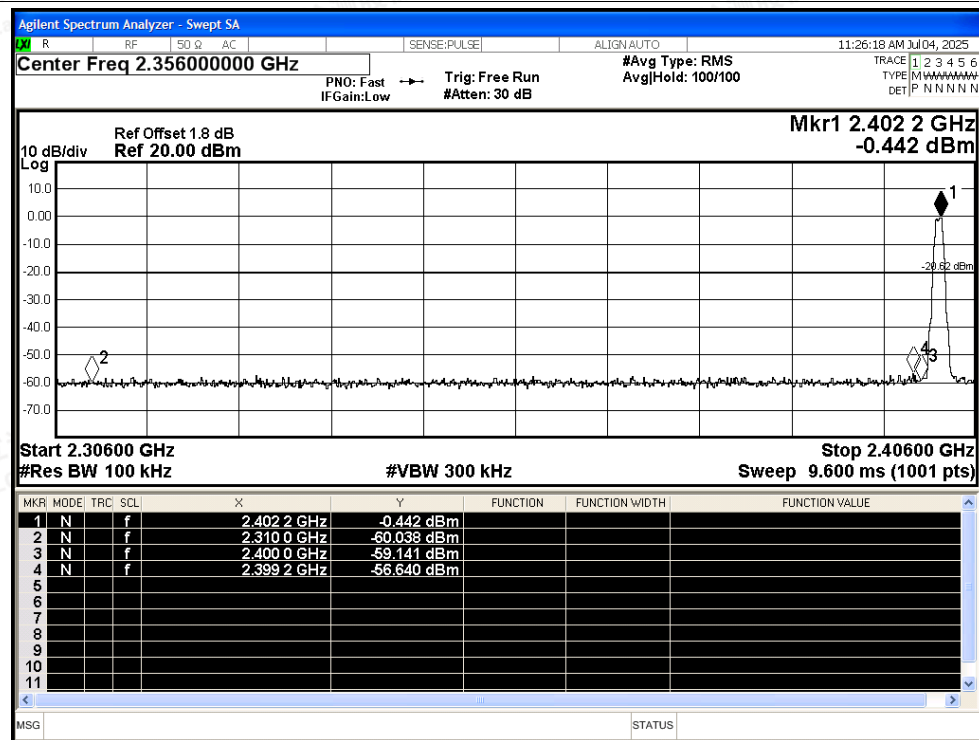


Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant0 Ref



Band Edge NVNT BLE 1M 2402MHz Ant0 Emission



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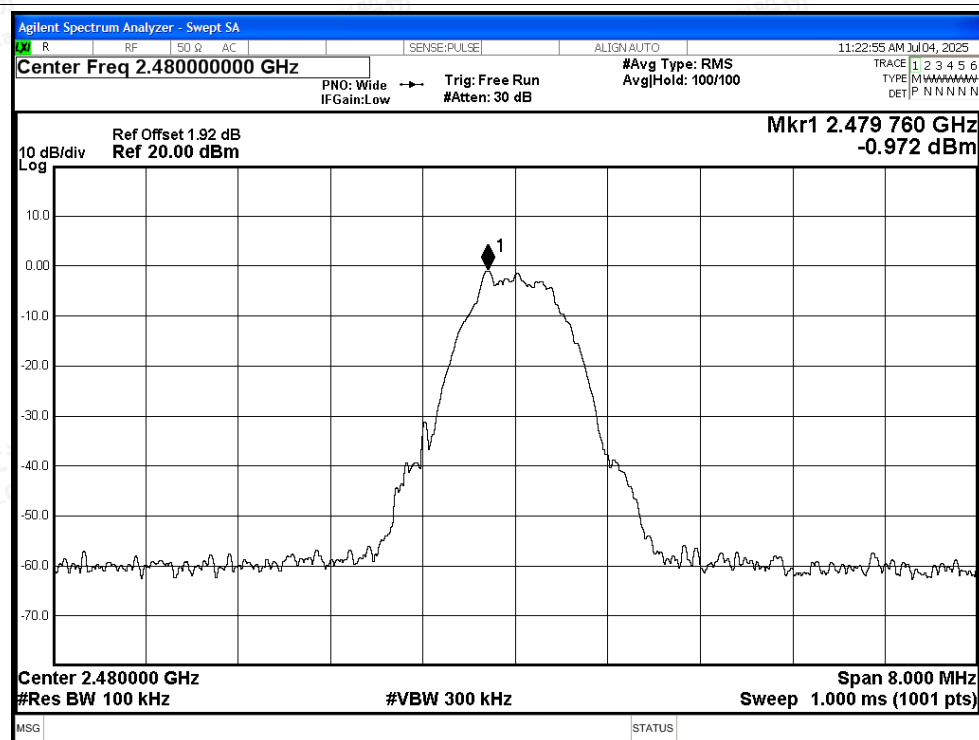
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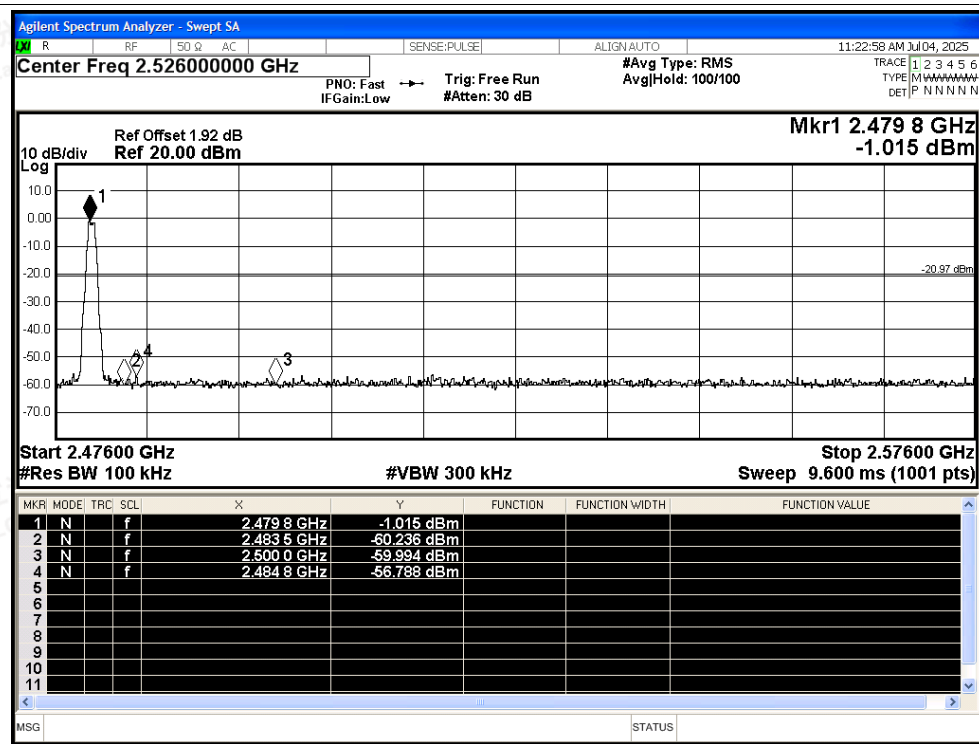
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Band Edge NVNT BLE 1M 2480MHz Ant0 Ref



Band Edge NVNT BLE 1M 2480MHz Ant0 Emission



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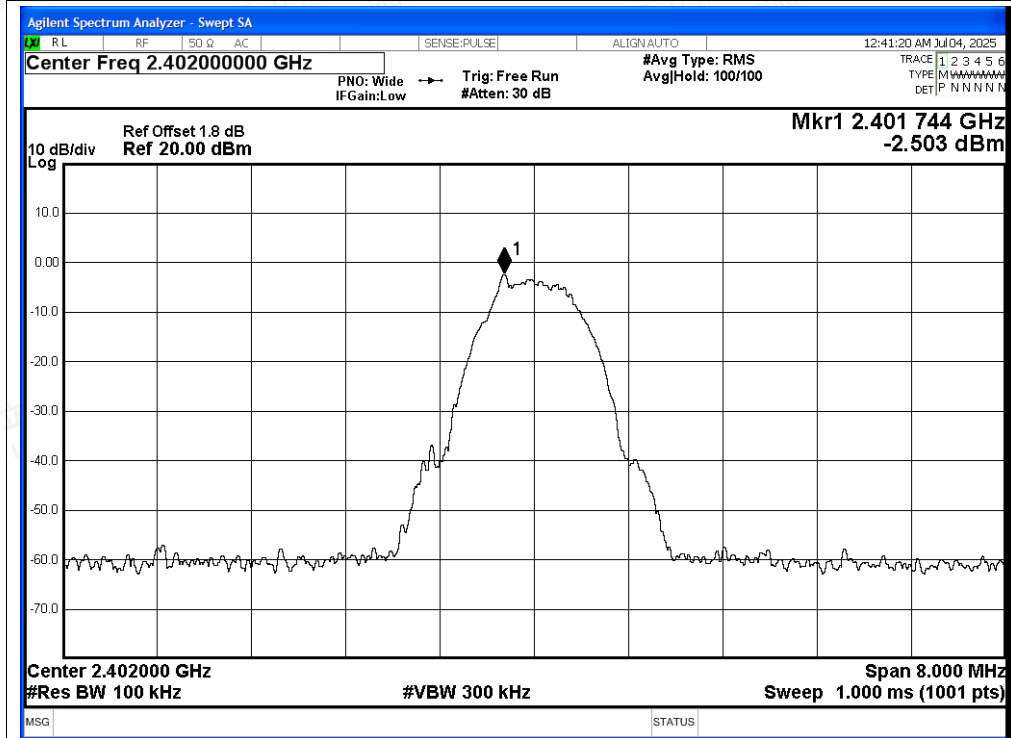
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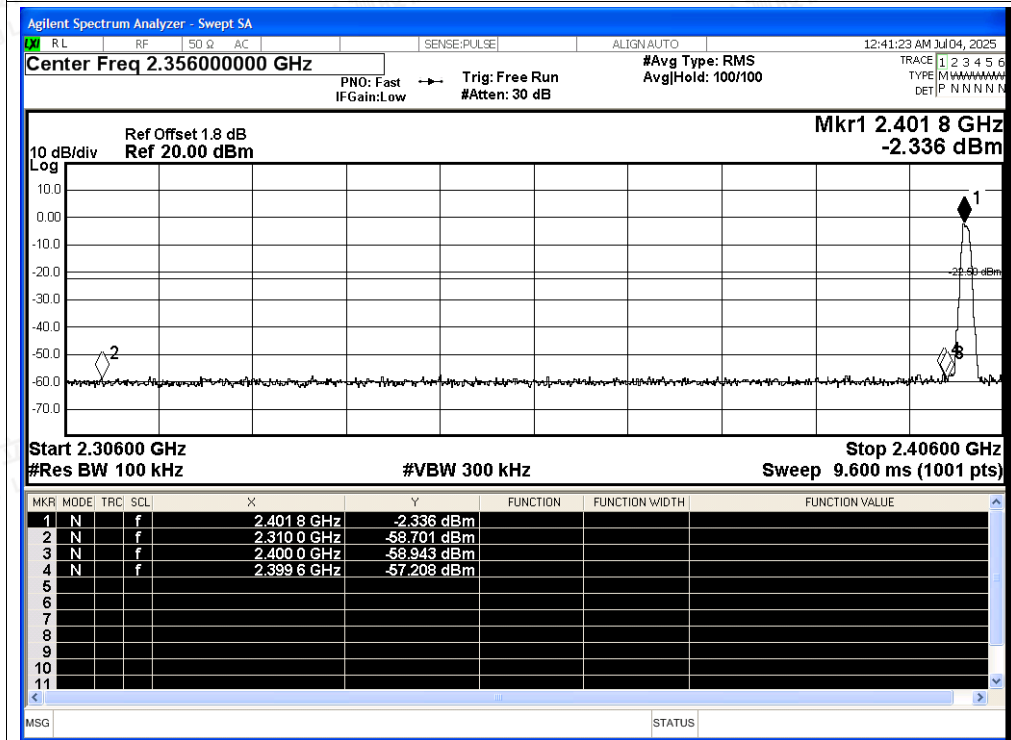


Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



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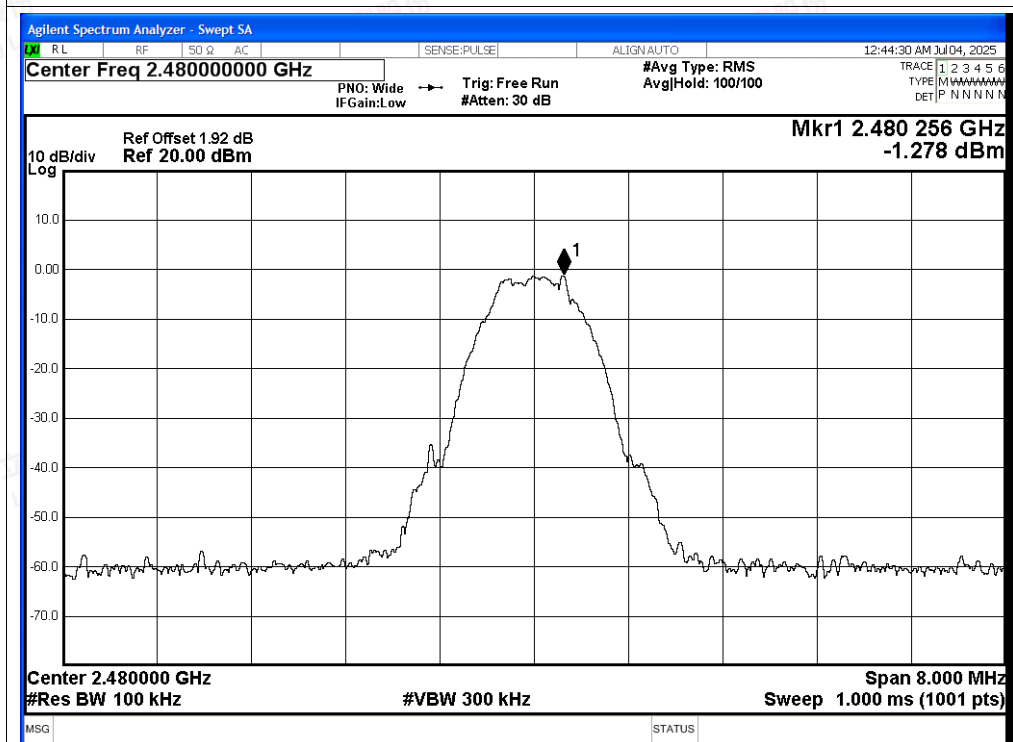
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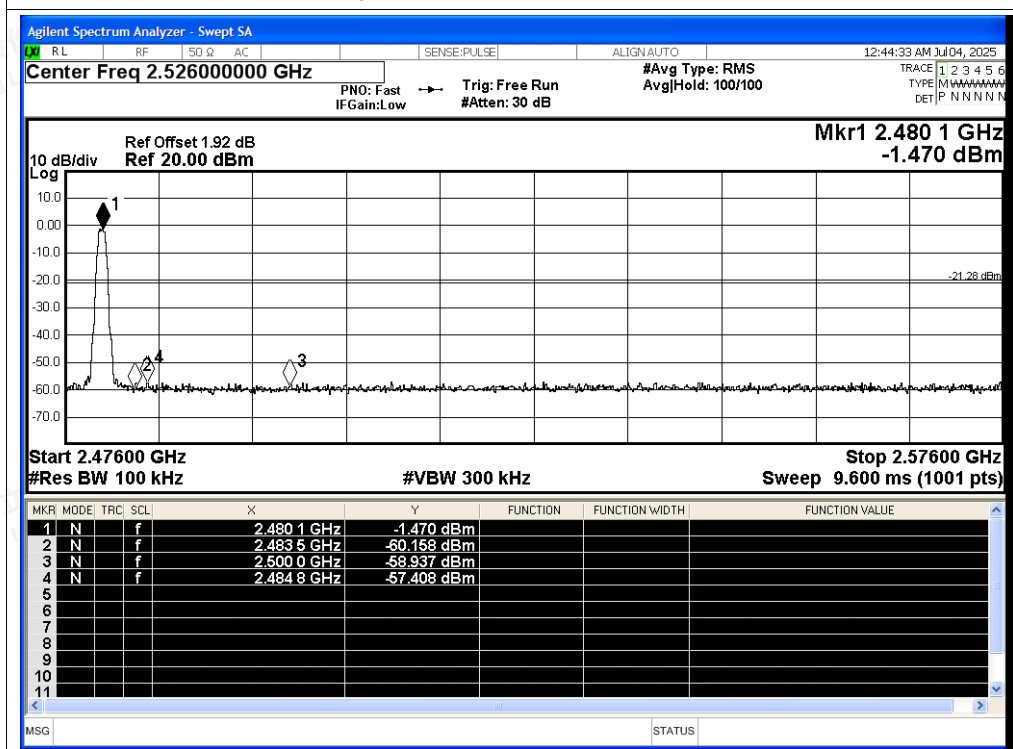
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Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



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A.5 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant0	-55.57	-20	Pass
NVNT	BLE 1M	2440	Ant0	-55.74	-20	Pass
NVNT	BLE 1M	2480	Ant0	-53.6	-20	Pass
NVNT	BLE 1M	2402	Ant1	-53.14	-20	Pass
NVNT	BLE 1M	2440	Ant1	-54.76	-20	Pass
NVNT	BLE 1M	2480	Ant1	-54.19	-20	Pass



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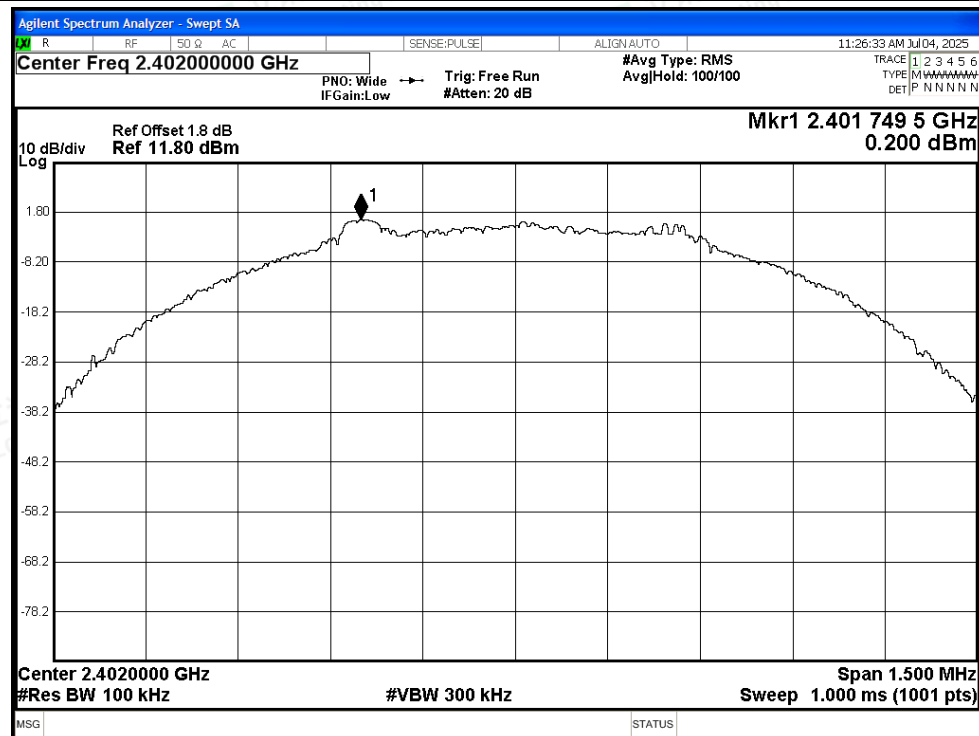
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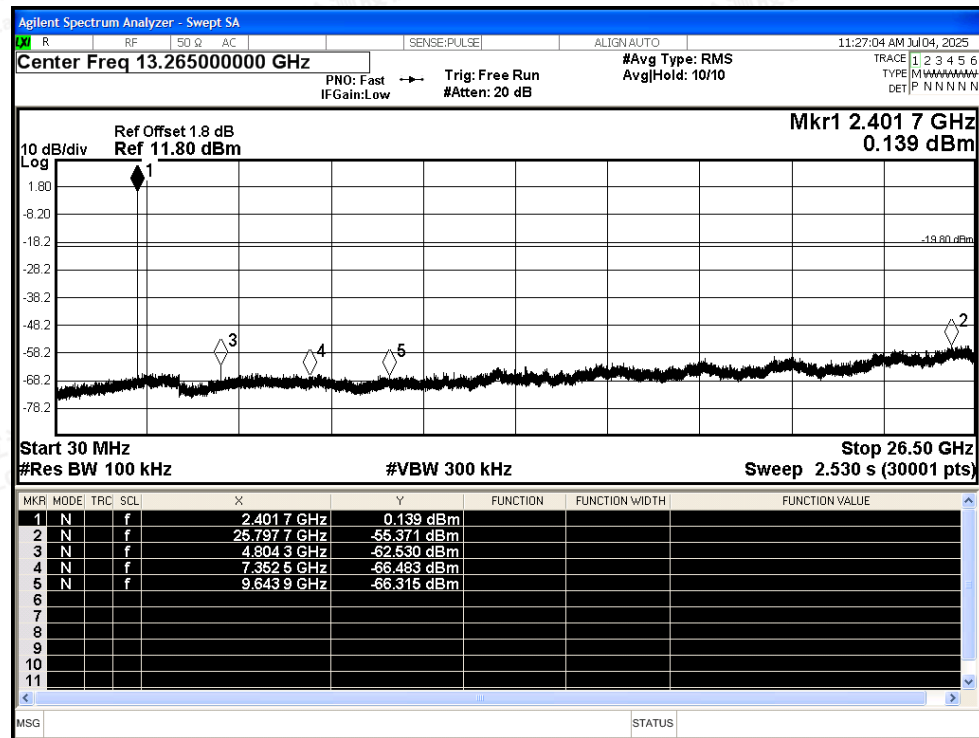


Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant0 Ref



Tx. Spurious NVNT BLE 1M 2402MHz Ant0 Emission



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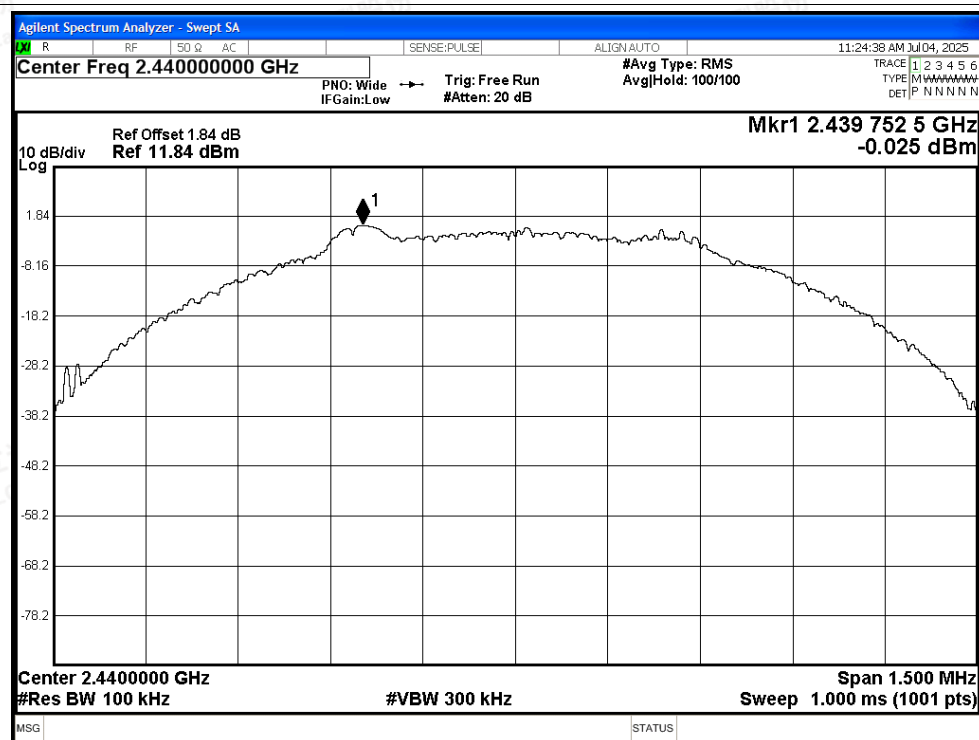
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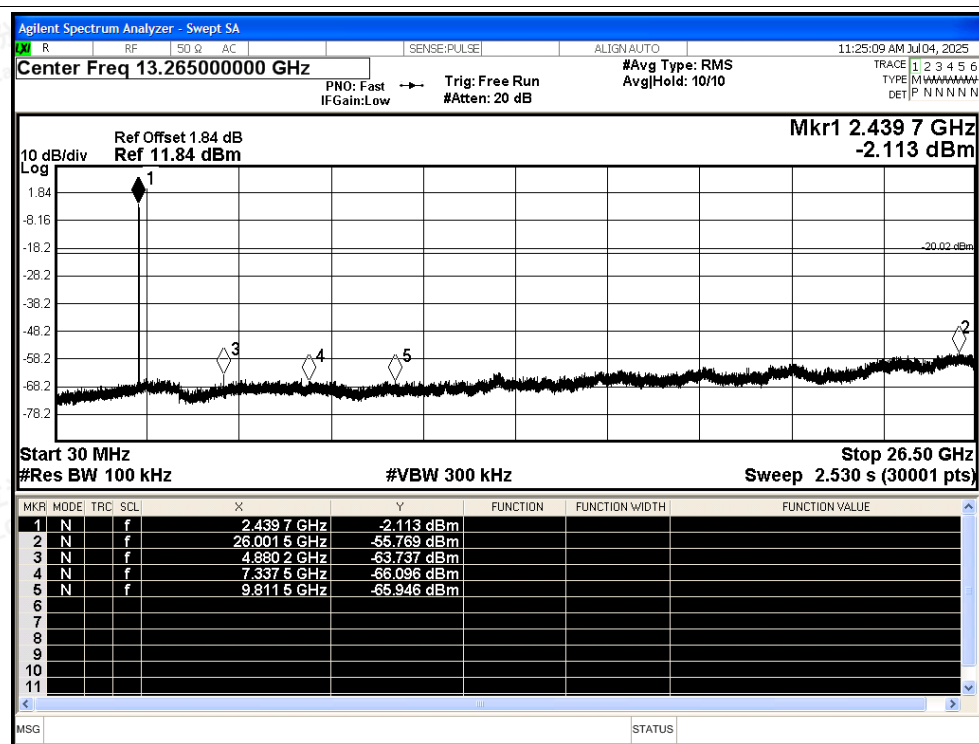
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Tx. Spurious NVNT BLE 1M 2440MHz Ant0 Ref



Tx. Spurious NVNT BLE 1M 2440MHz Ant0 Emission



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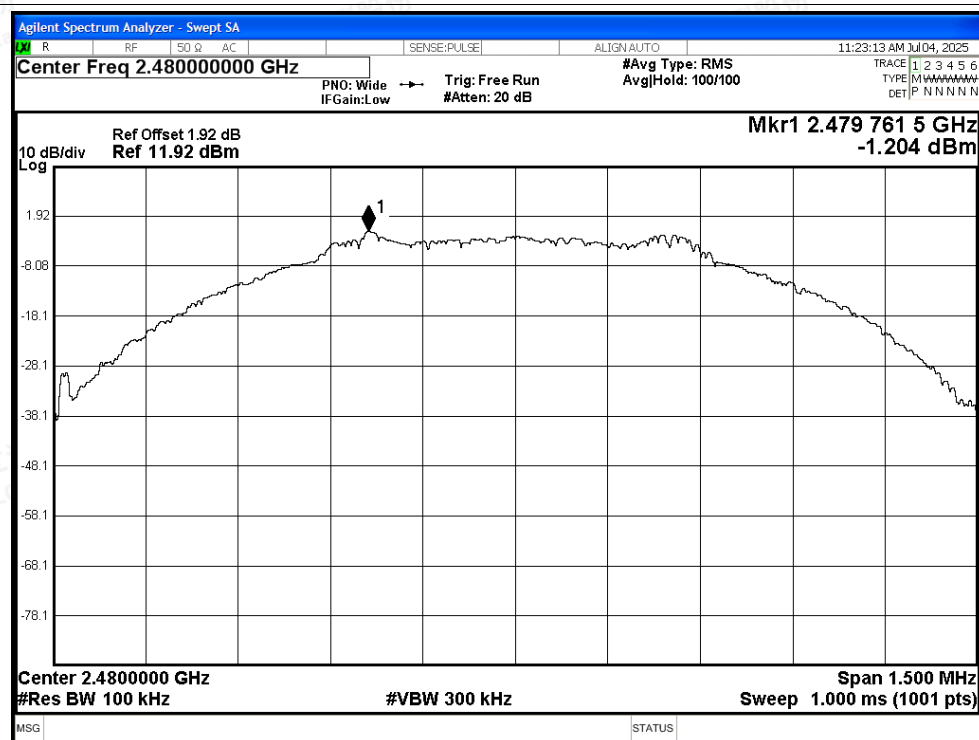
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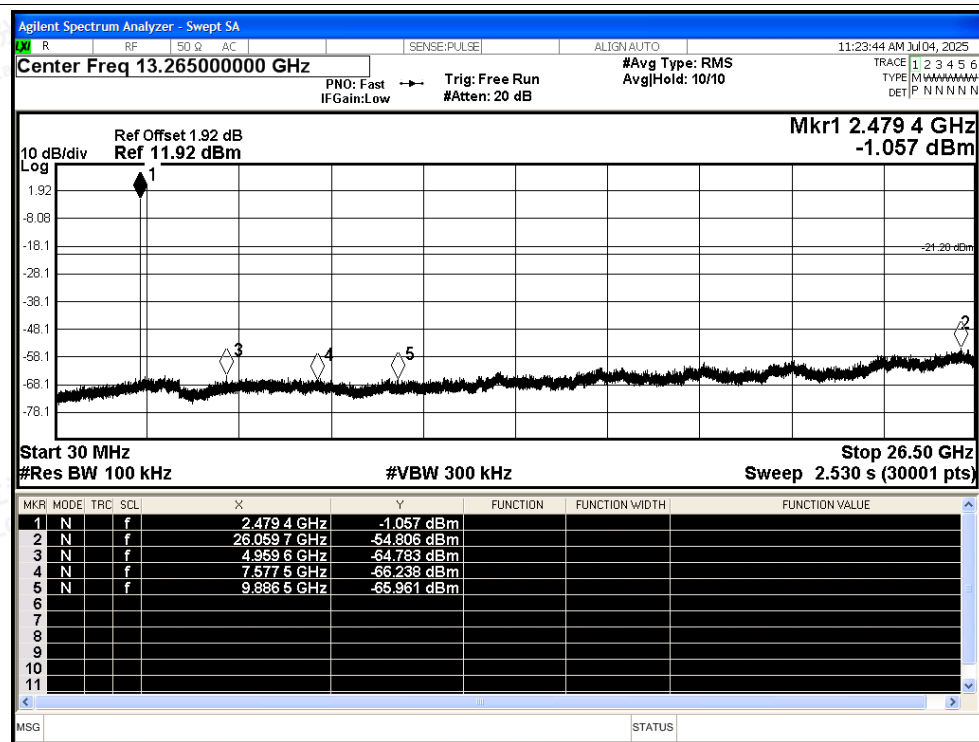
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Tx. Spurious NVNT BLE 1M 2480MHz Ant0 Ref



Tx. Spurious NVNT BLE 1M 2480MHz Ant0 Emission



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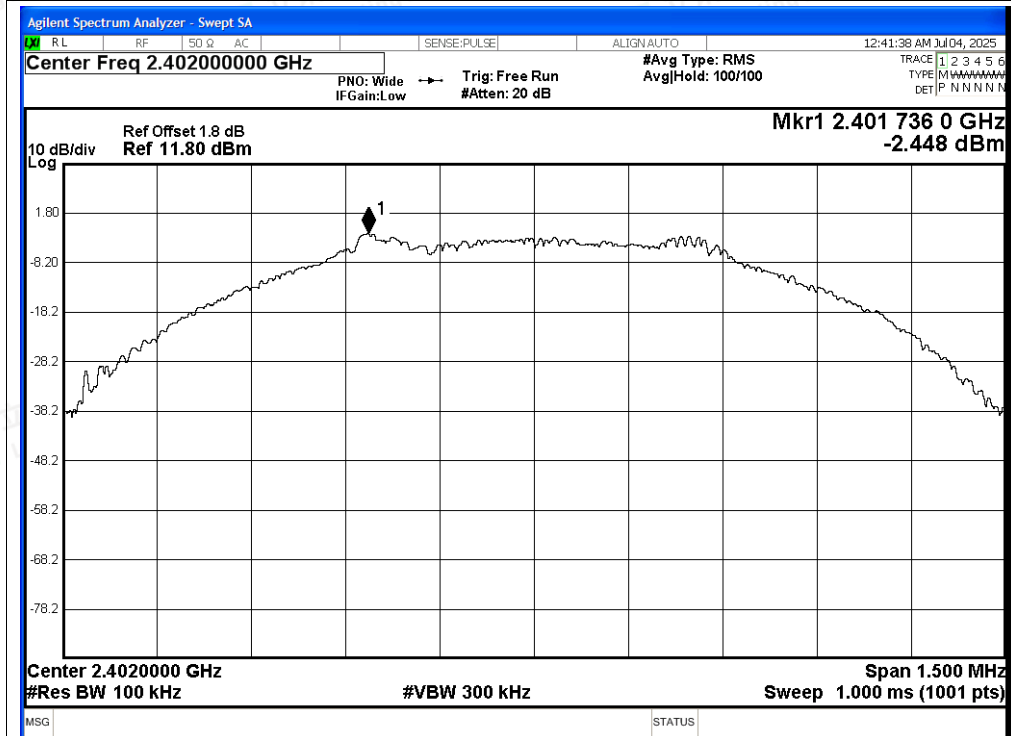
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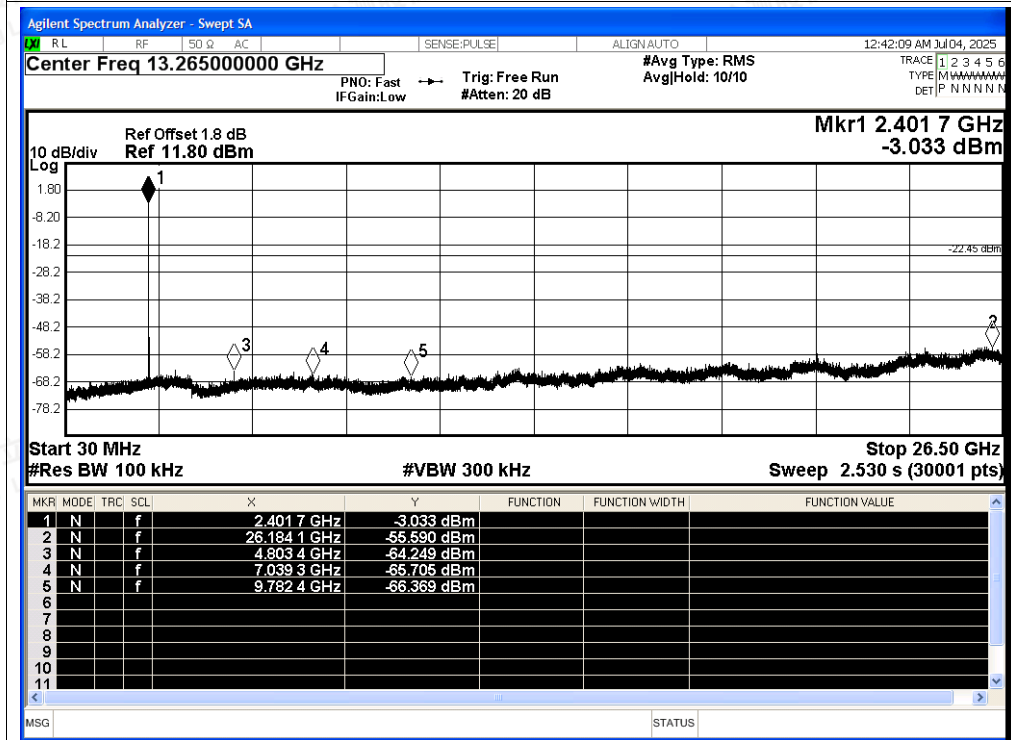


Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



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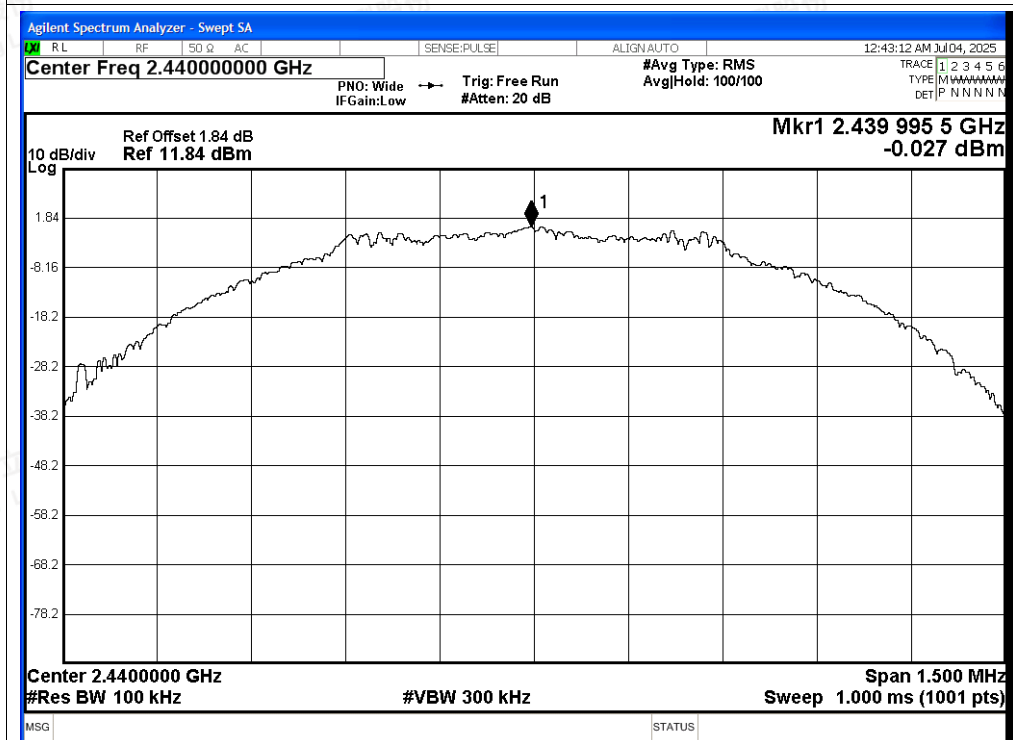
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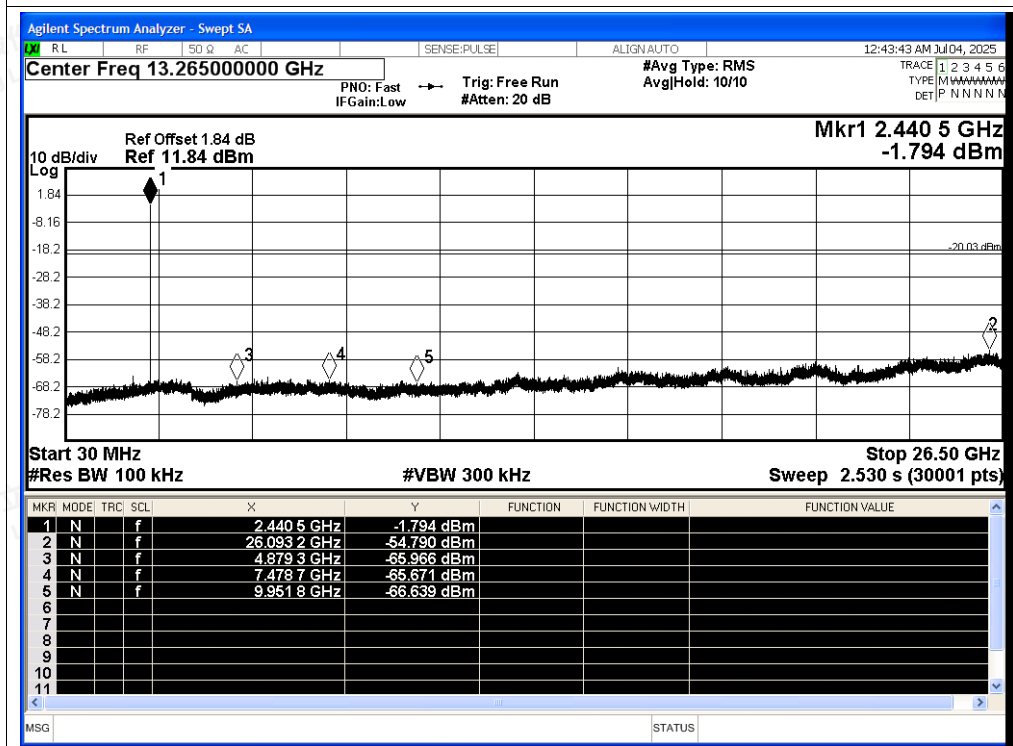
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Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



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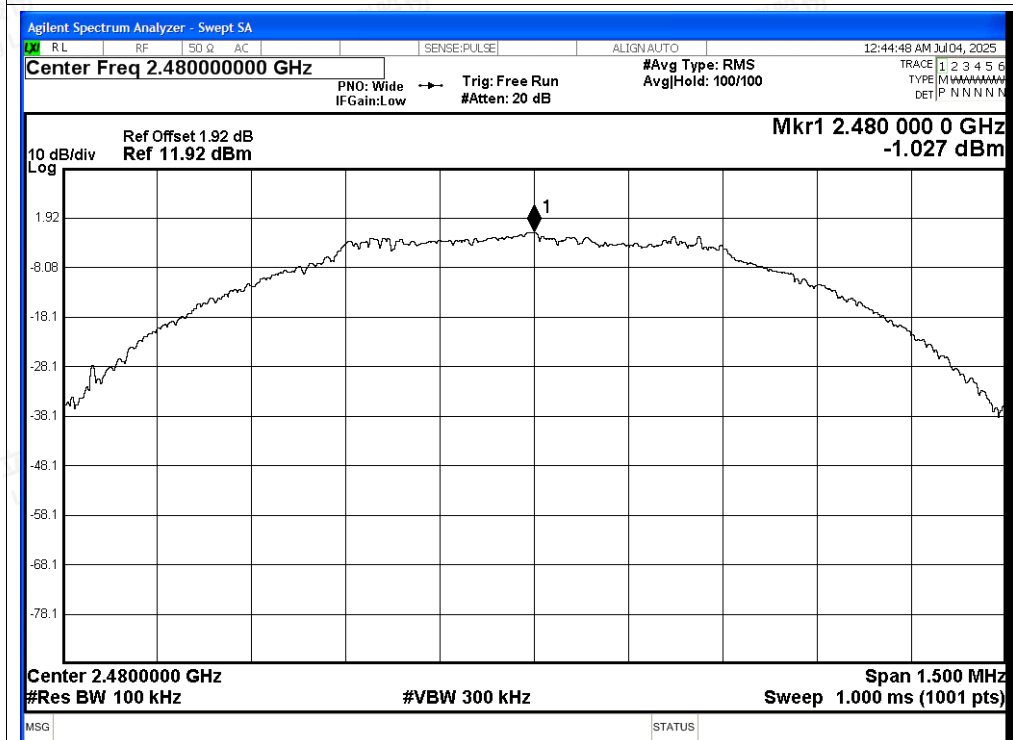
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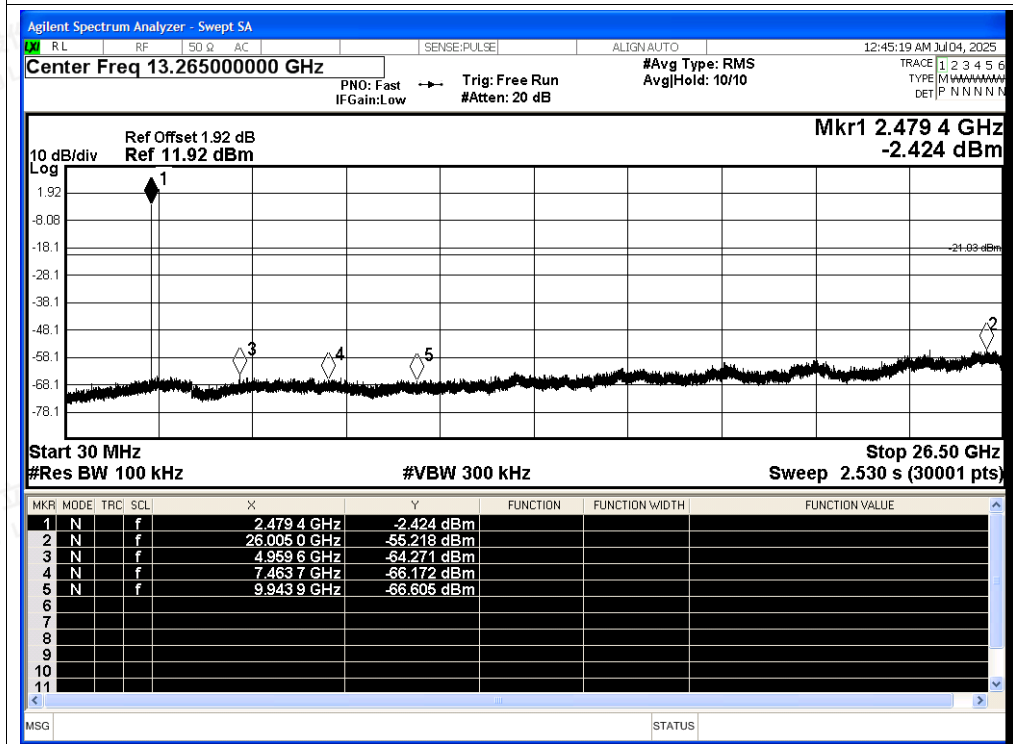
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A.6 Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant0	87.39	0.59	0.61
NVNT	BLE 1M	2440	Ant0	87.39	0.59	0.61
NVNT	BLE 1M	2480	Ant0	87.39	0.59	0.61
NVNT	BLE 1M	2402	Ant1	72.03	1.42	0.74
NVNT	BLE 1M	2440	Ant1	72.03	1.42	0.74
NVNT	BLE 1M	2480	Ant1	72.03	1.42	0.74



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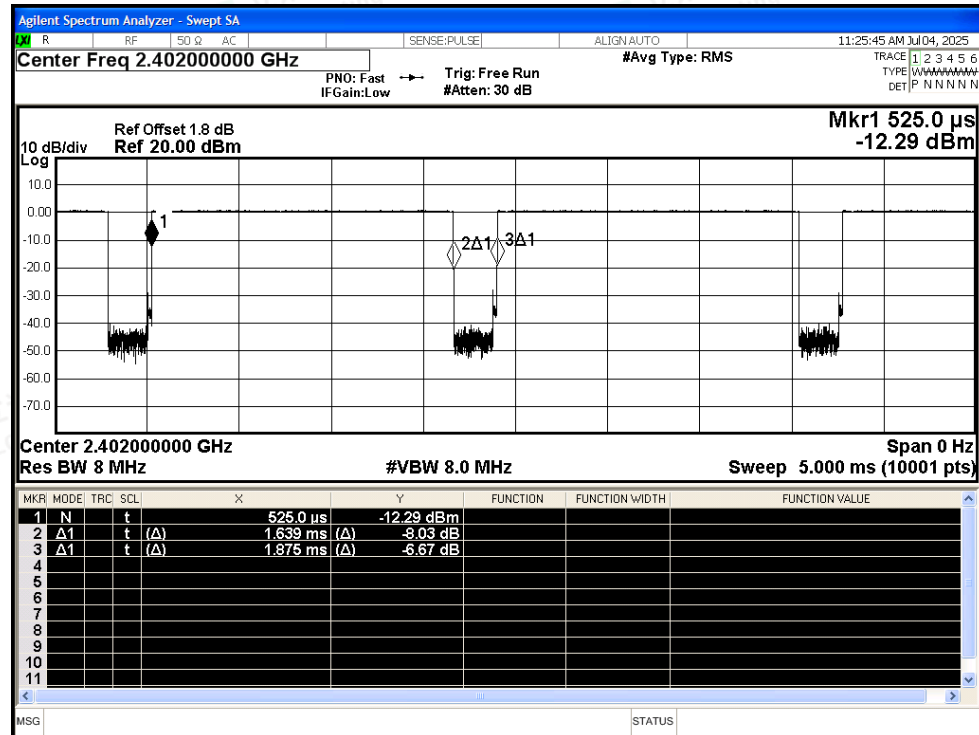
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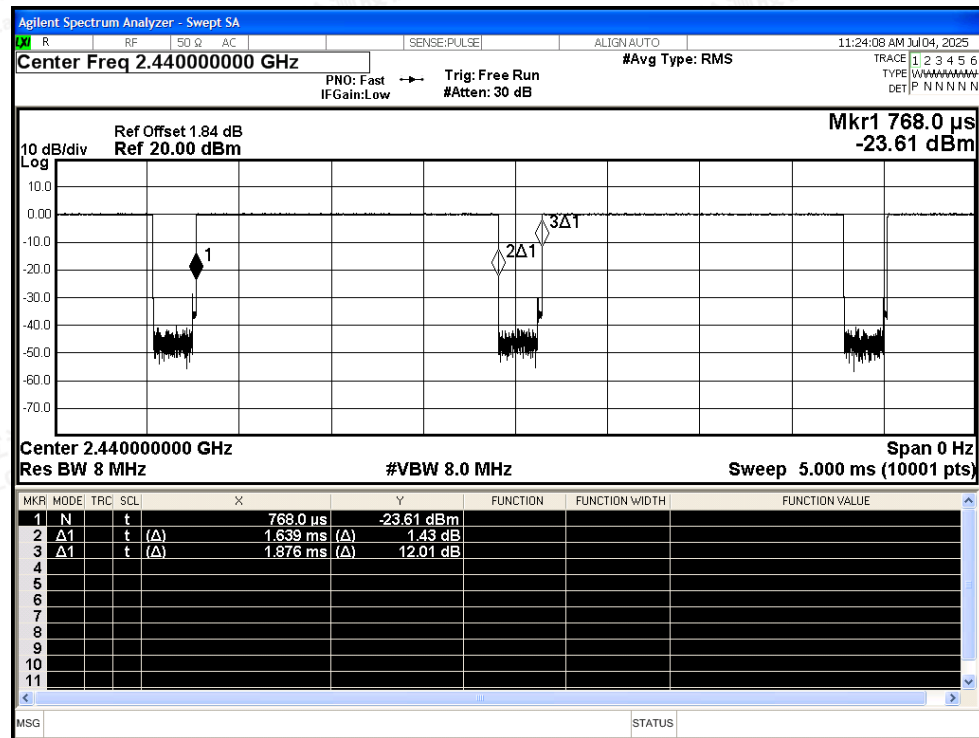


Test Graphs

Duty Cycle NVNT BLE 1M 2402MHz Ant0



Duty Cycle NVNT BLE 1M 2440MHz Ant0

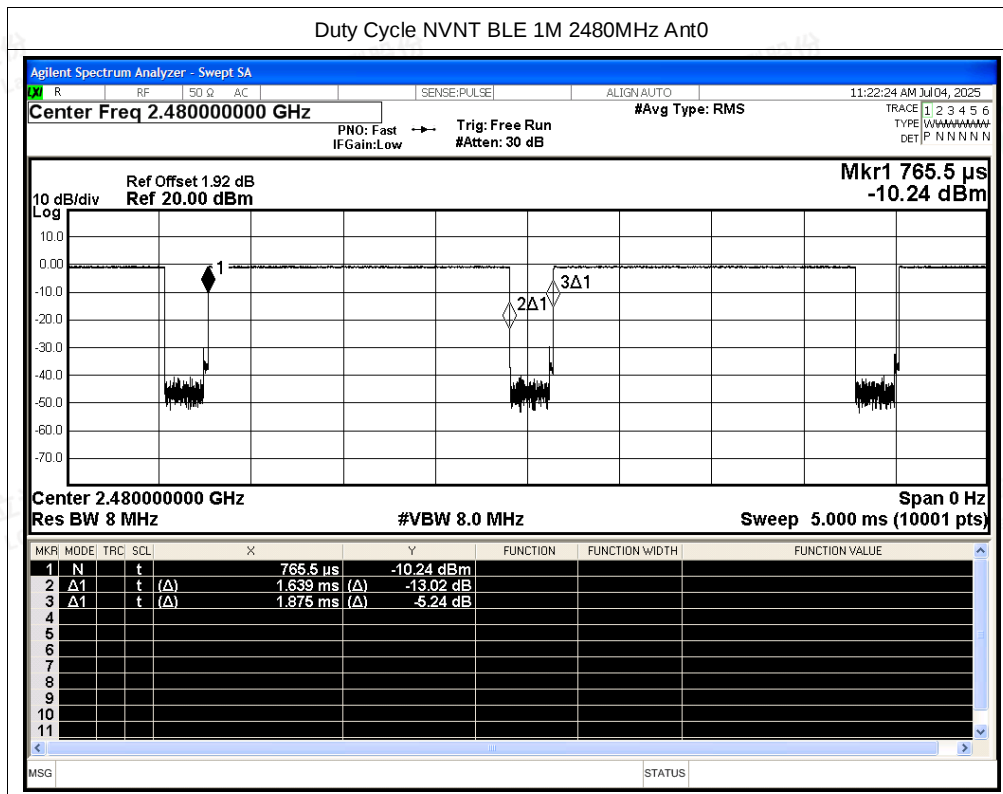


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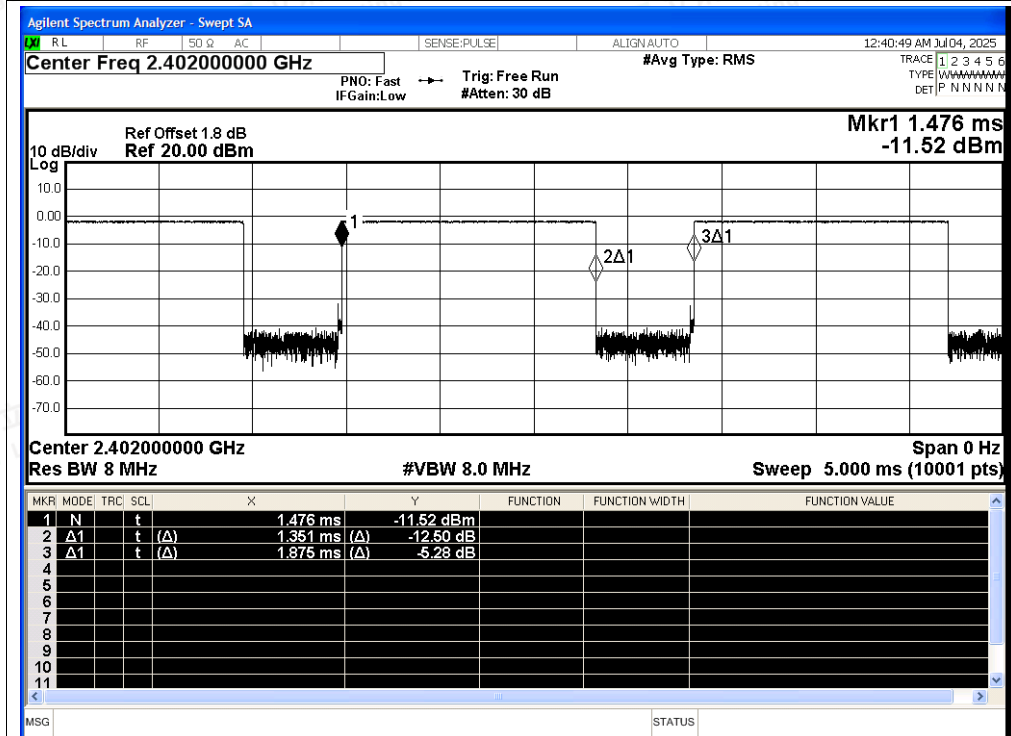
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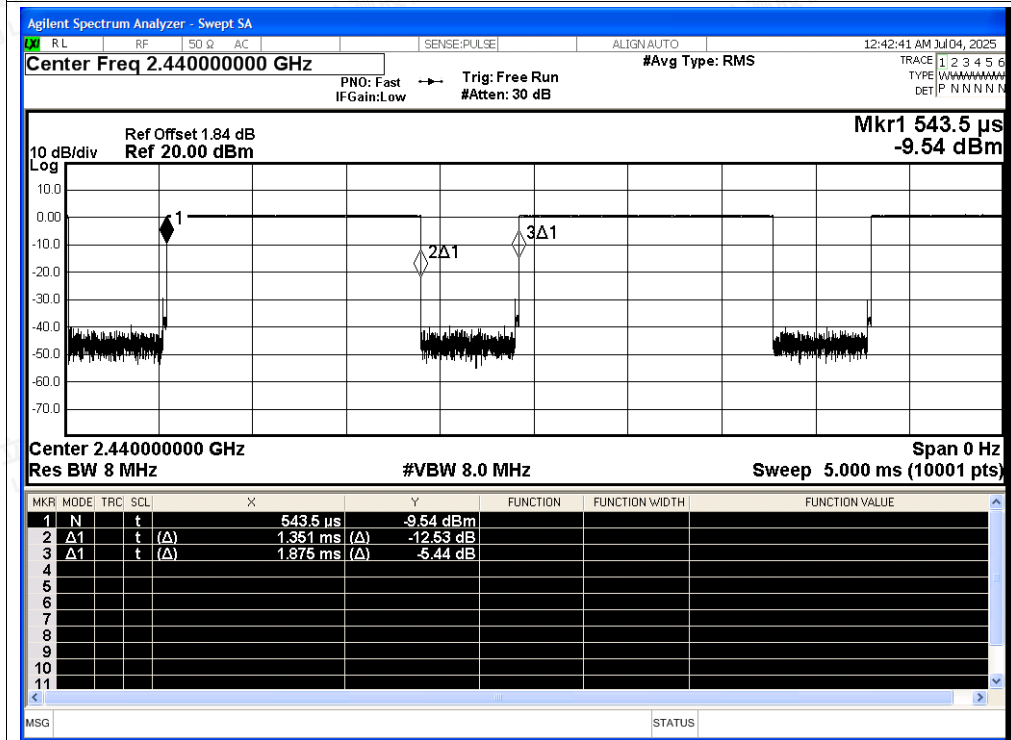


Test Graphs

Duty Cycle NVNT BLE 1M 2402MHz Ant1



Duty Cycle NVNT BLE 1M 2440MHz Ant1

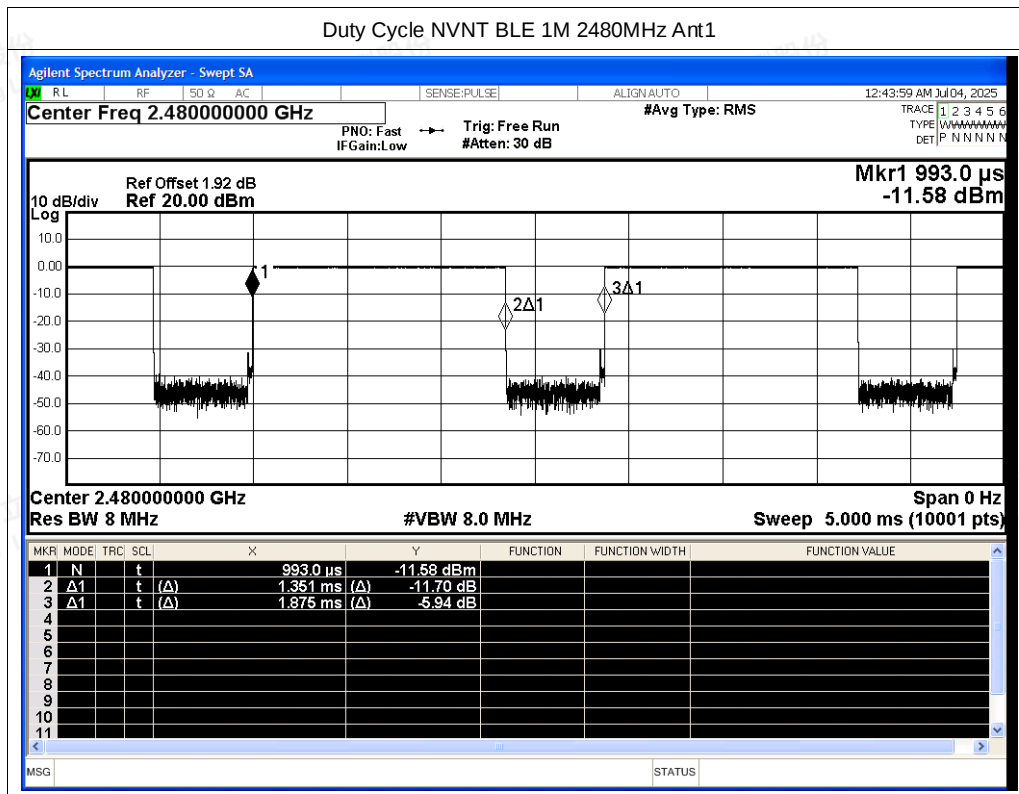


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A.7 Restrict Band

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	Ant0	2310	-51.87	2.2	-	45.59	Peak	74	Pass
NVNT	BLE 1M	2402	Ant0	2310	-59.02	2.2	0.59	39.03	Average	54	Pass
NVNT	BLE 1M	2402	Ant0	2346.768	-47.48	2.2	-	49.98	Peak	74	Pass
NVNT	BLE 1M	2402	Ant0	2389.488	-58.32	2.2	0.59	39.73	Average	54	Pass
NVNT	BLE 1M	2402	Ant0	2390	-50.59	2.2	-	46.87	Peak	74	Pass
NVNT	BLE 1M	2402	Ant0	2390	-58.58	2.2	0.59	39.47	Average	54	Pass
NVNT	BLE 1M	2480	Ant0	2483.5	-50.53	2.2	-	46.93	Peak	74	Pass
NVNT	BLE 1M	2480	Ant0	2483.5	-57.7	2.2	0.59	40.35	Average	54	Pass
NVNT	BLE 1M	2480	Ant0	2484.256	-46.68	2.2	-	50.78	Peak	74	Pass
NVNT	BLE 1M	2480	Ant0	2484.784	-57.69	2.2	0.59	40.36	Average	54	Pass
NVNT	BLE 1M	2480	Ant0	2500	-49.69	2.2	-	47.77	Peak	74	Pass
NVNT	BLE 1M	2480	Ant0	2500	-58.23	2.2	0.59	39.82	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2310	-49.1	2.2	-	48.36	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2310	-59	2.2	1.42	39.88	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2359.056	-47.88	2.2	-	49.58	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2376.528	-58.31	2.2	1.42	40.57	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2390	-50.66	2.2	-	46.80	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2390	-58.49	2.2	1.42	40.39	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-50.05	2.2	-	47.41	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-57.83	2.2	1.42	41.05	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2486.056	-45.17	2.2	-	52.29	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.704	-57.71	2.2	1.42	41.17	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2500	-50.71	2.2	-	46.75	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2500	-58.1	2.2	1.42	48.36	Average	54	Pass



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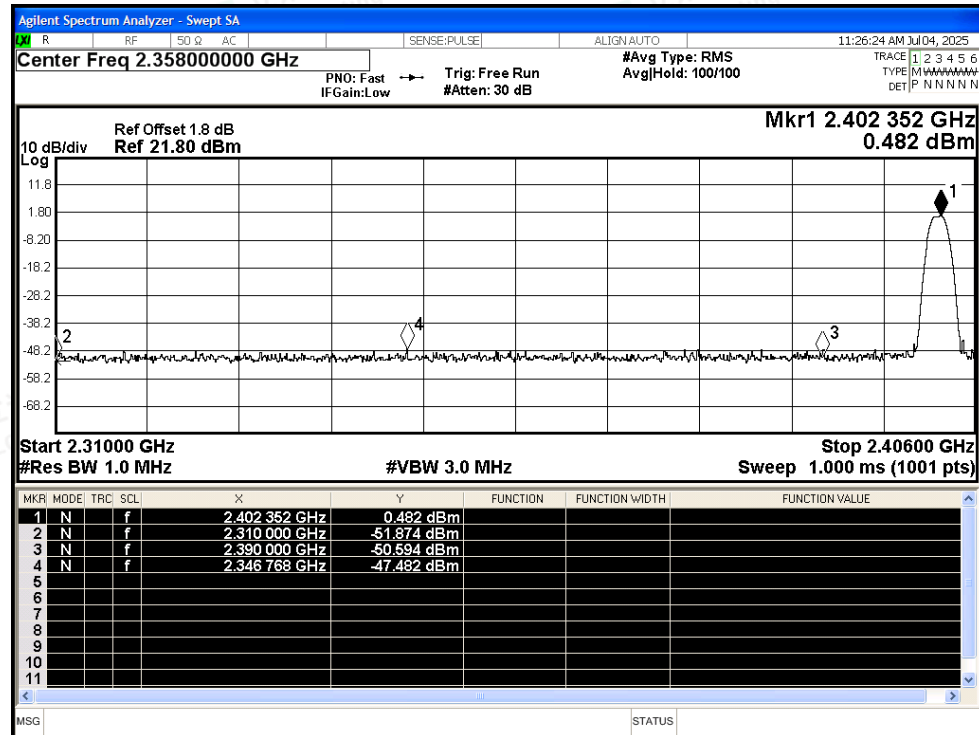
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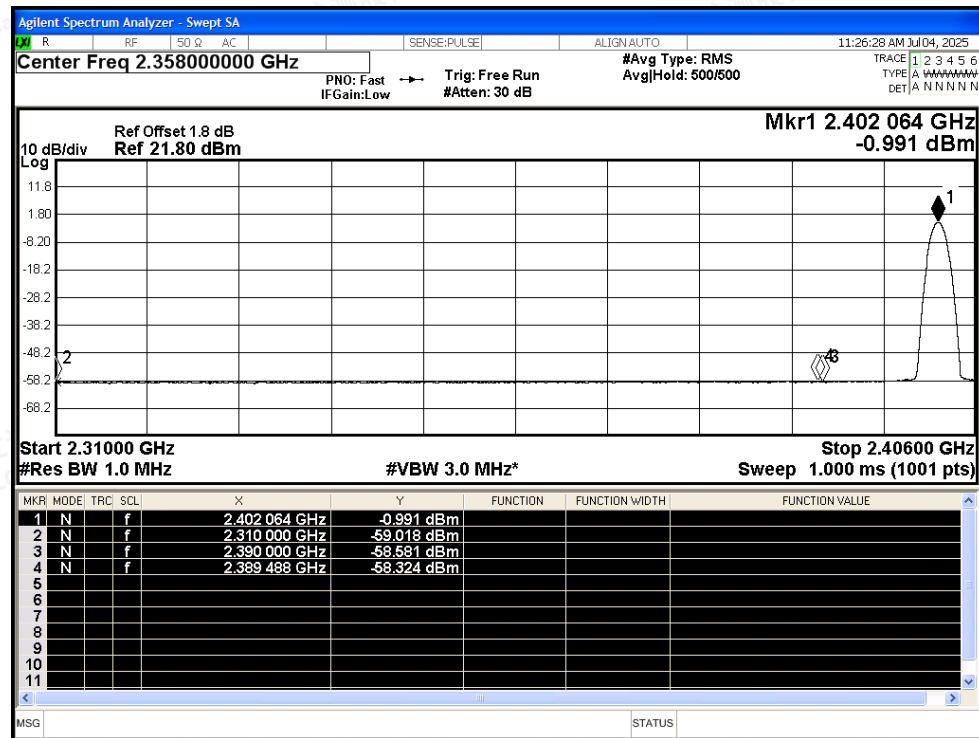


Test Graphs

Restrict Band NVNT BLE 1M 2402MHz Ant0 Peak



Restrict Band NVNT BLE 1M 2402MHz Ant0 Average



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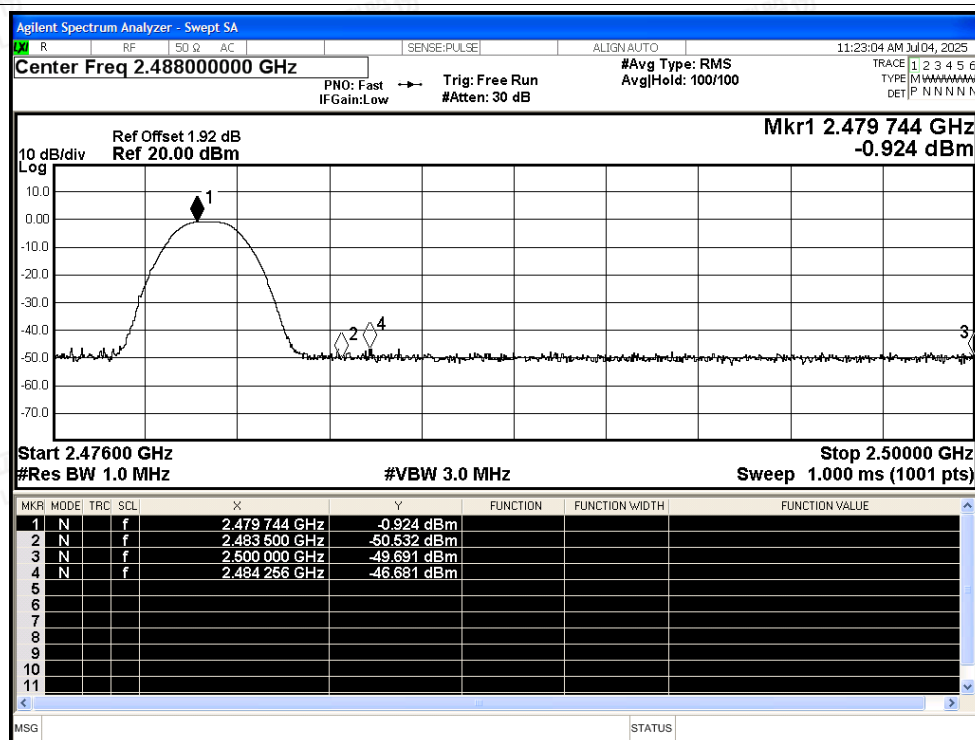
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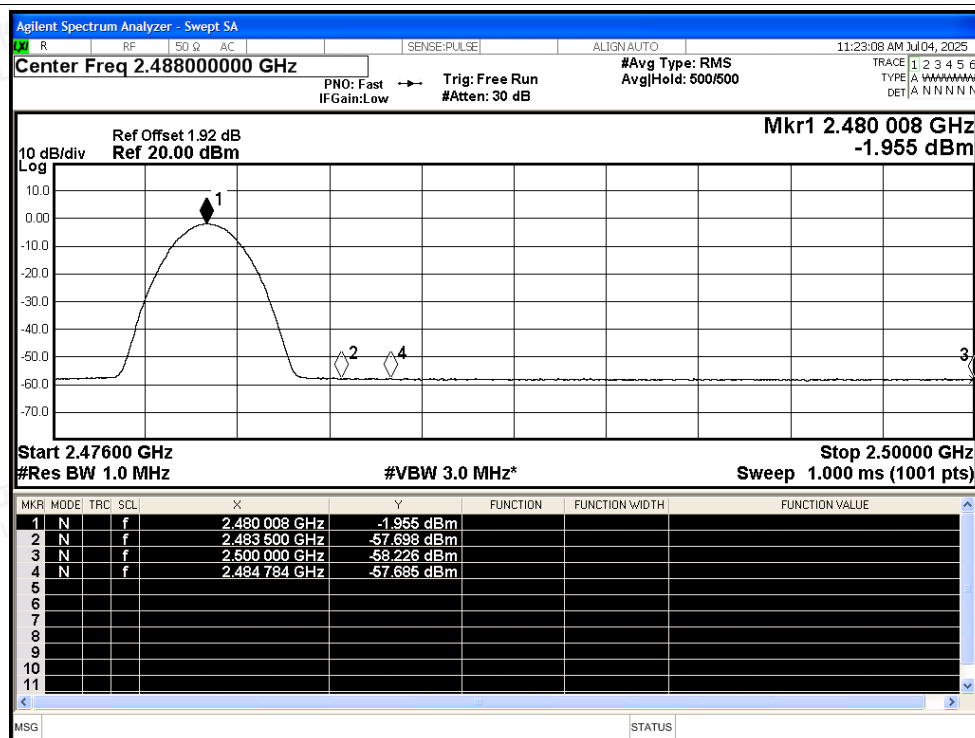
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Restrict Band NVNT BLE 1M 2480MHz Ant0 Peak



Restrict Band NVNT BLE 1M 2480MHz Ant0 Average



Test Graphs

Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak

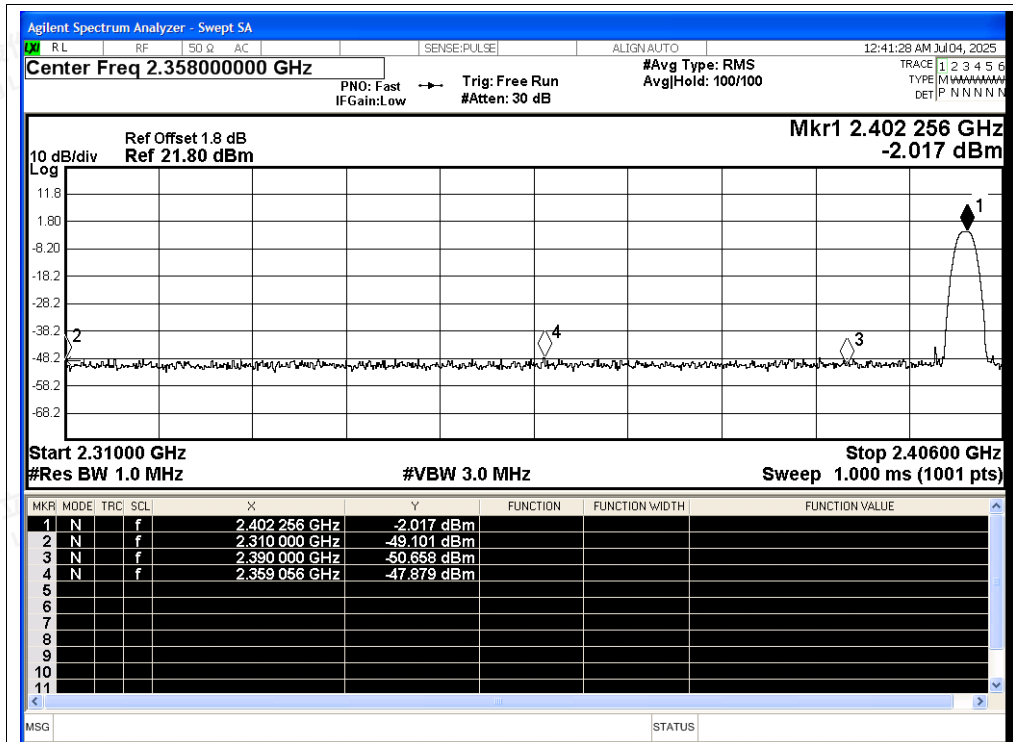


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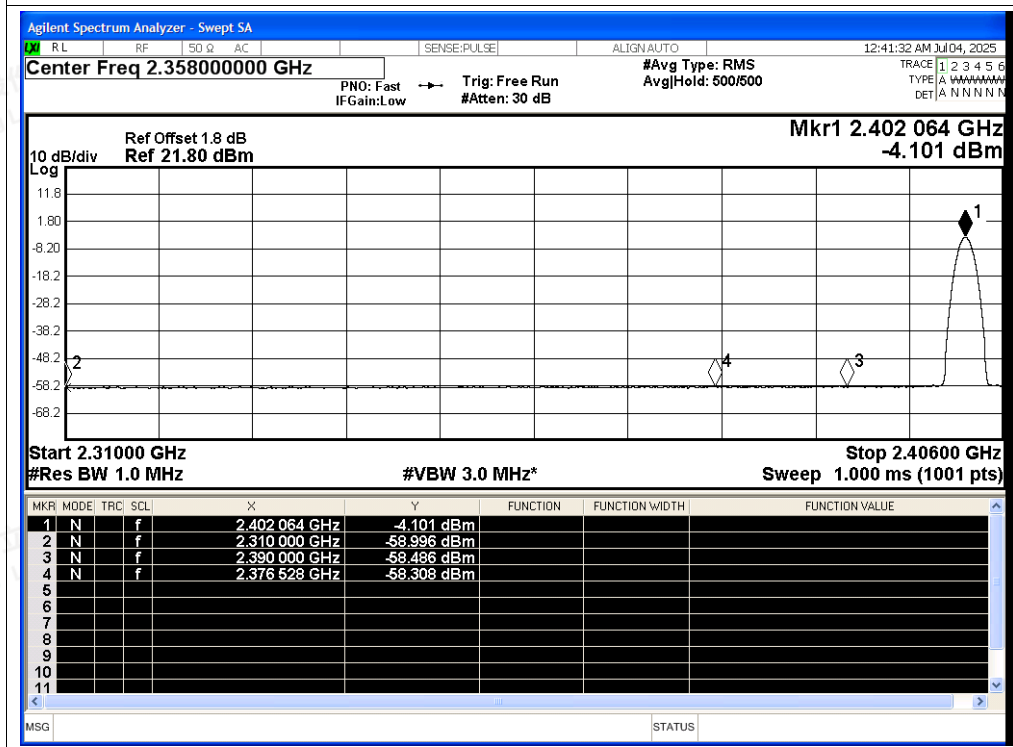
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Restrict Band NVNT BLE 1M 2402MHz Ant1 Average



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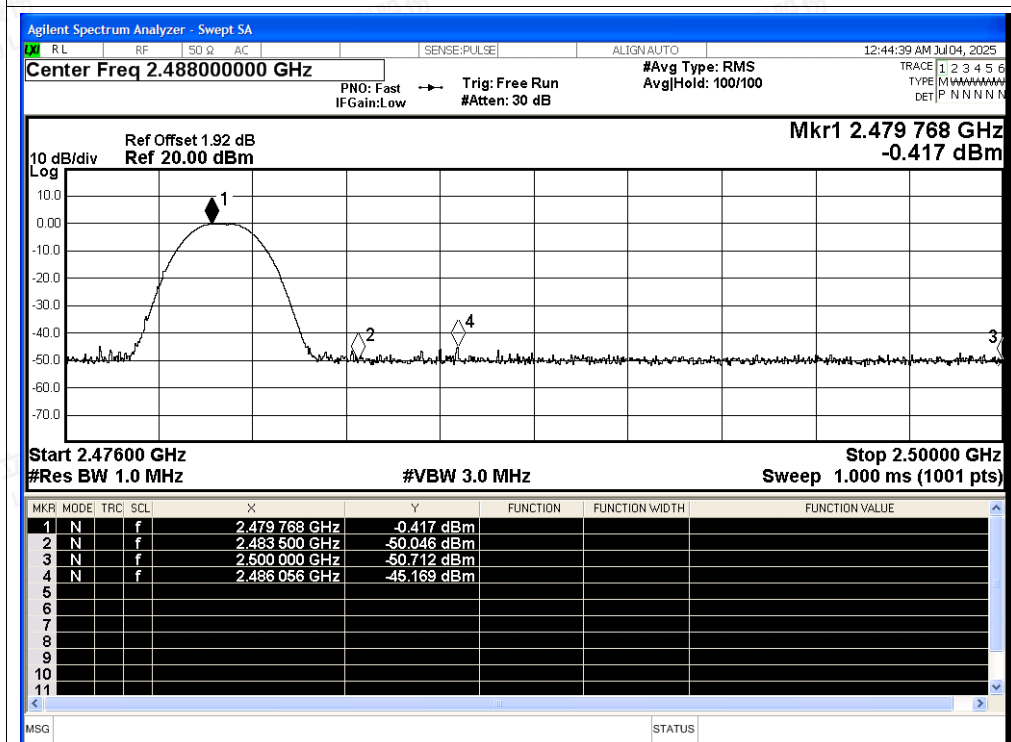
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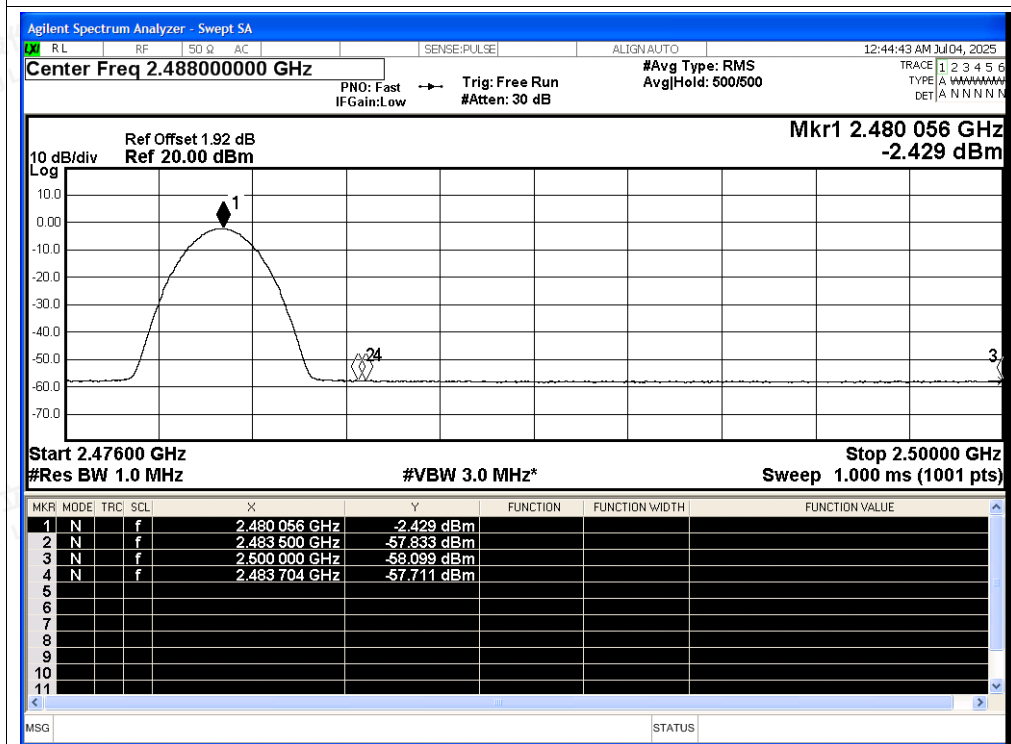
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Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak



Restrict Band NVNT BLE 1M 2480MHz Ant1 Average



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