



Appendix A

RF Test Data for BT LE (Conducted Measurement)

Product Name: LED Controller

Test Model: SP668E

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

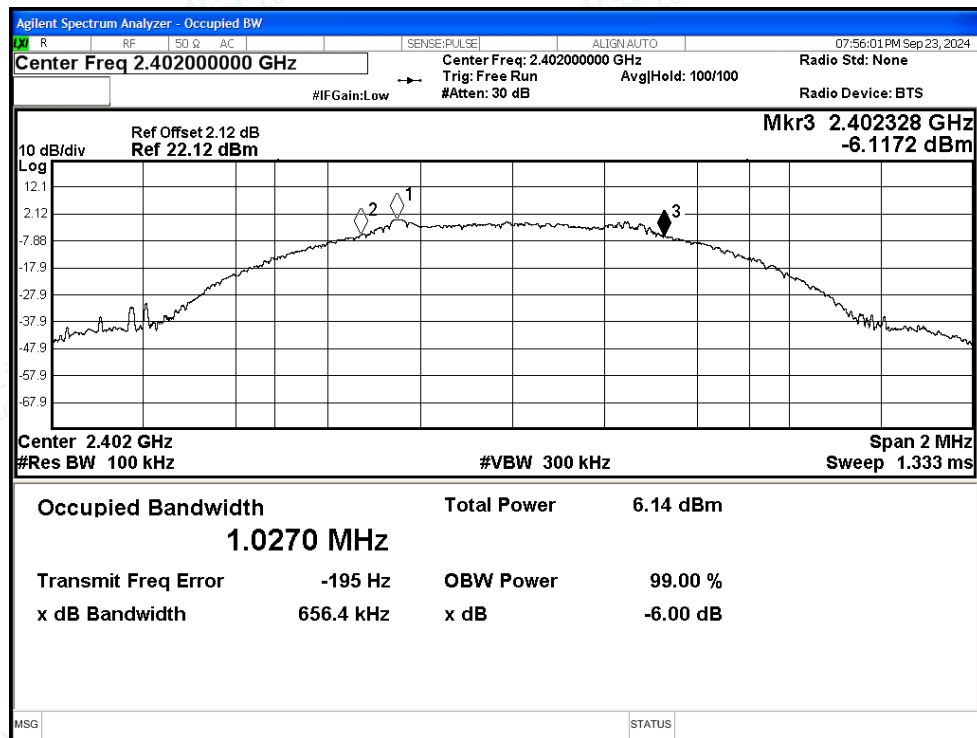
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.656	≥ 0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.656	≥ 0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.651	≥ 0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.164	≥ 0.5	Pass
NVNT	BLE 2M	2440	Ant1	1.126	≥ 0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.167	≥ 0.5	Pass



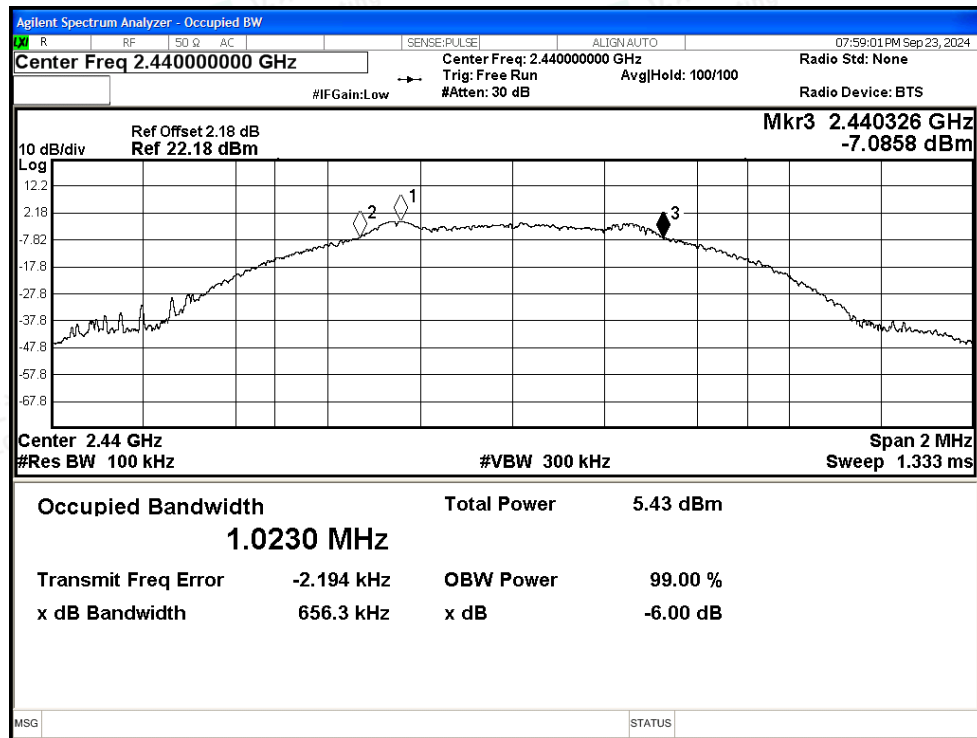


Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



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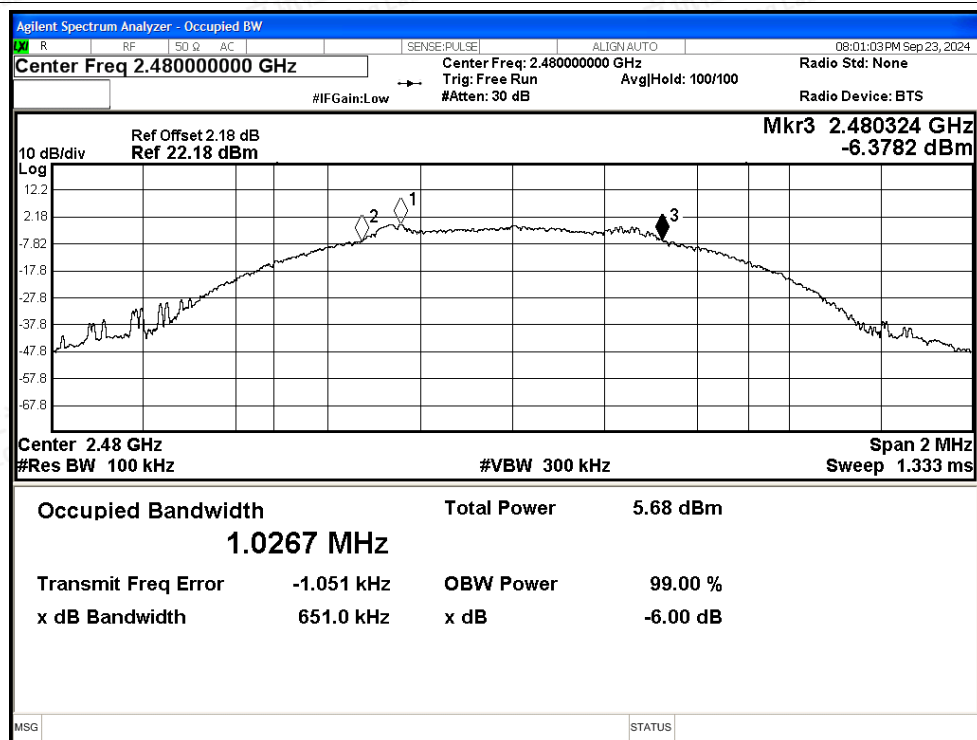
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

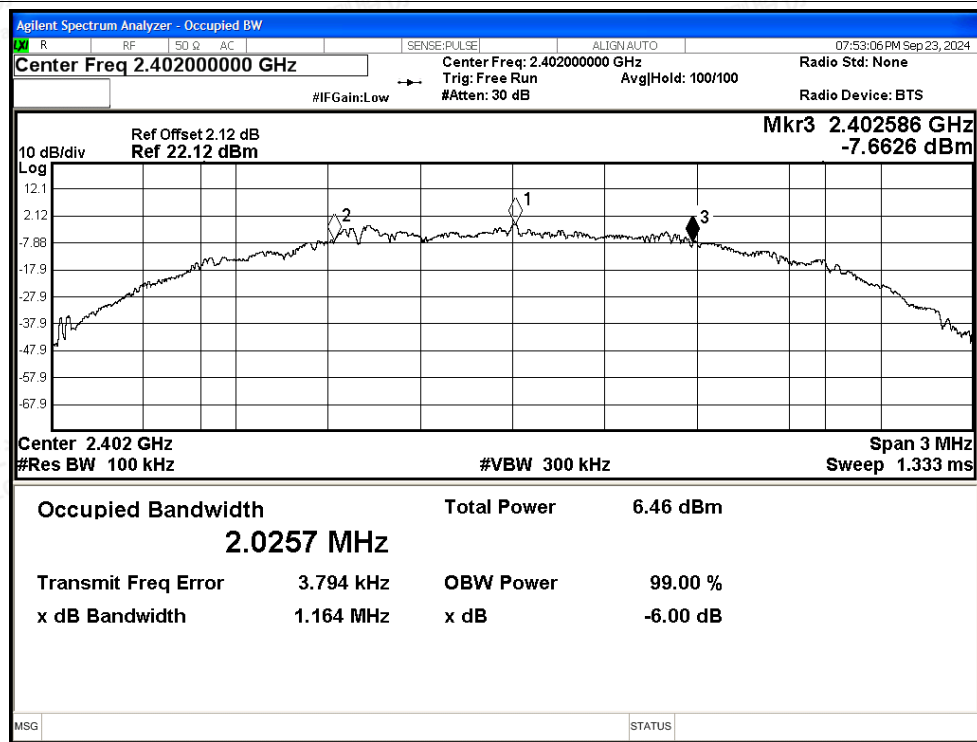
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-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



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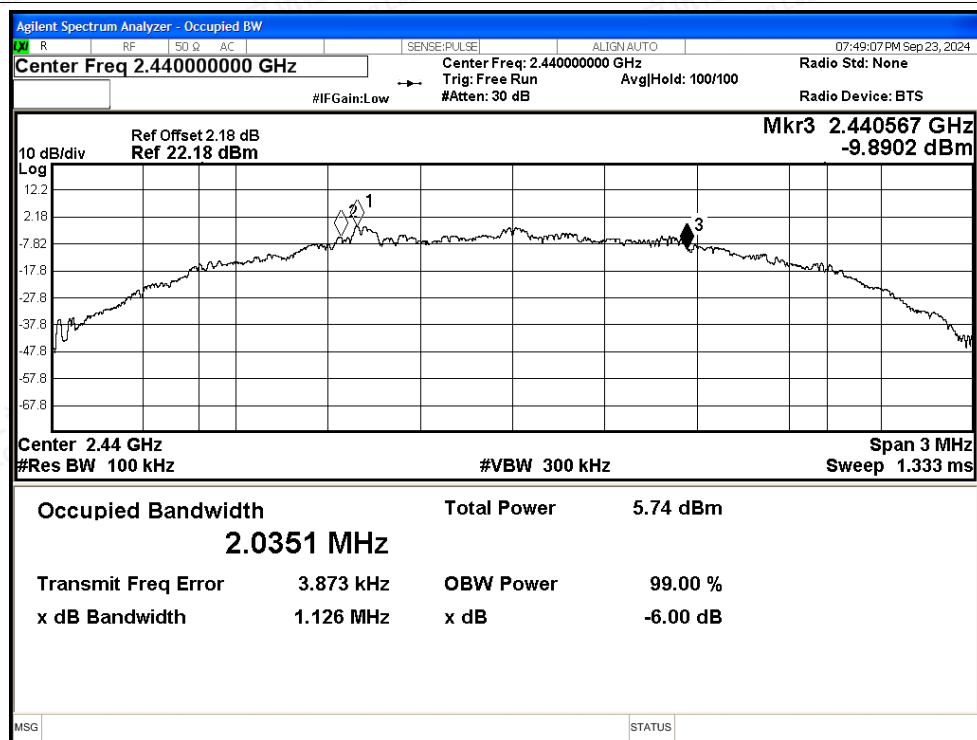
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

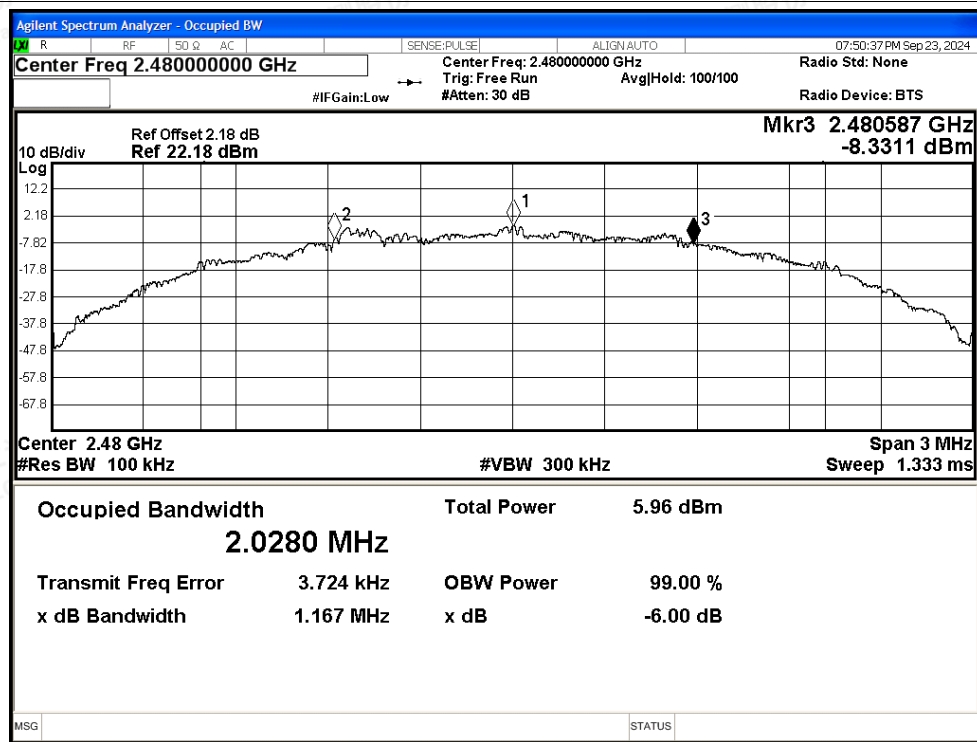
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-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2480MHz 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	Ant1	0.5	30	Pass
NVNT	BLE 1M	2440	Ant1	-0.33	30	Pass
NVNT	BLE 1M	2480	Ant1	-0.02	30	Pass
NVNT	BLE 2M	2402	Ant1	0.28	30	Pass
NVNT	BLE 2M	2440	Ant1	-0.54	30	Pass
NVNT	BLE 2M	2480	Ant1	-0.26	30	Pass



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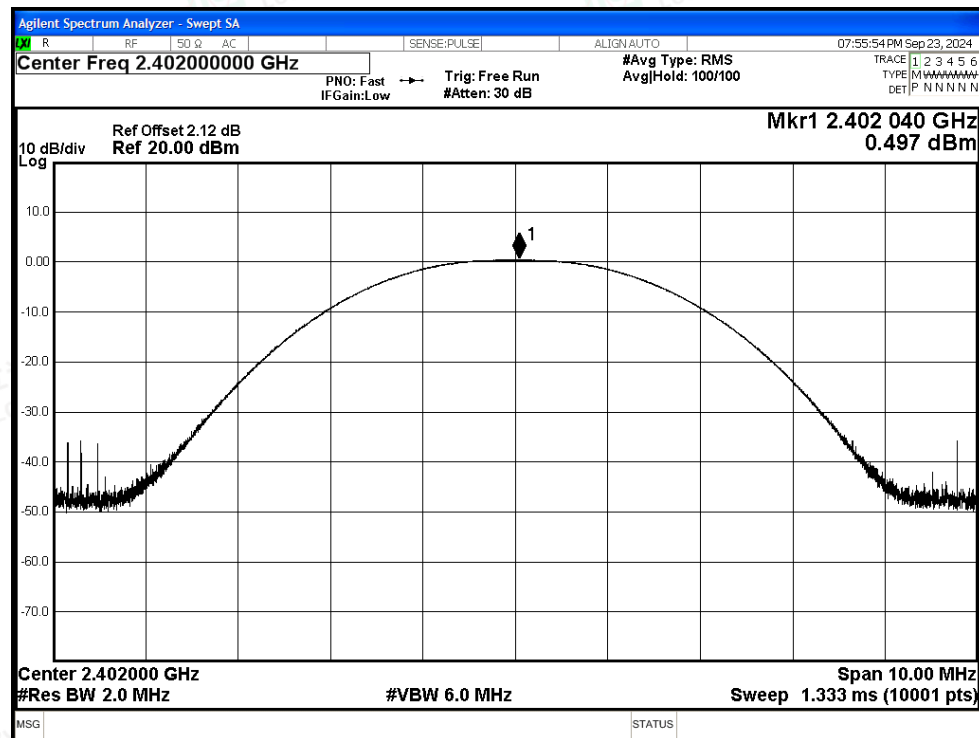
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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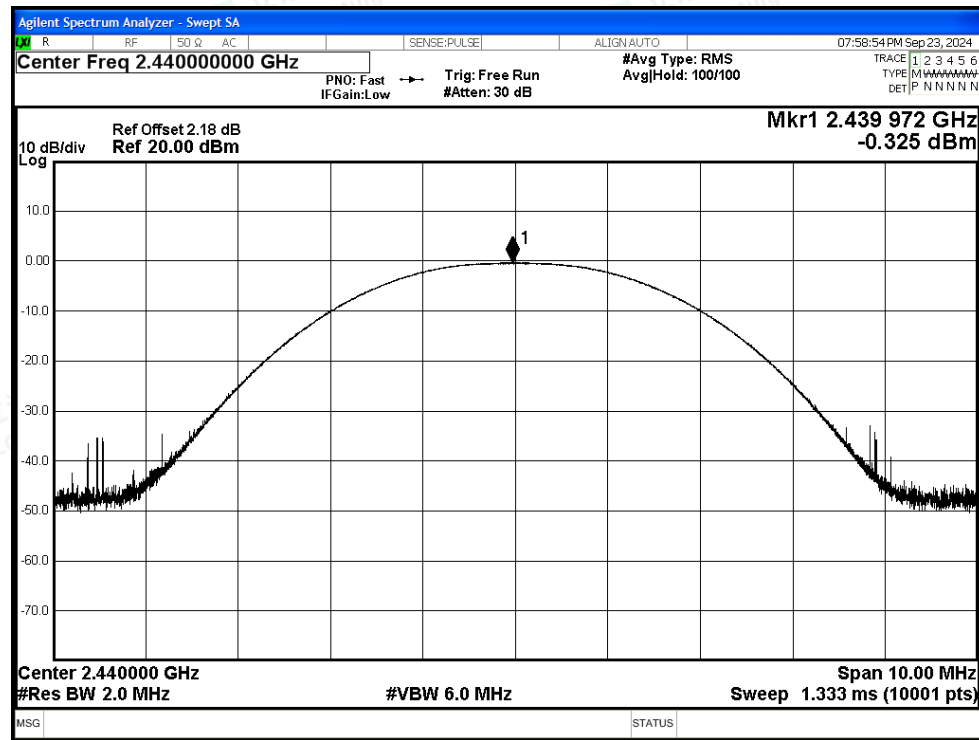


Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1



Shenzhen LCS Compliance Testing Laboratory Ltd.

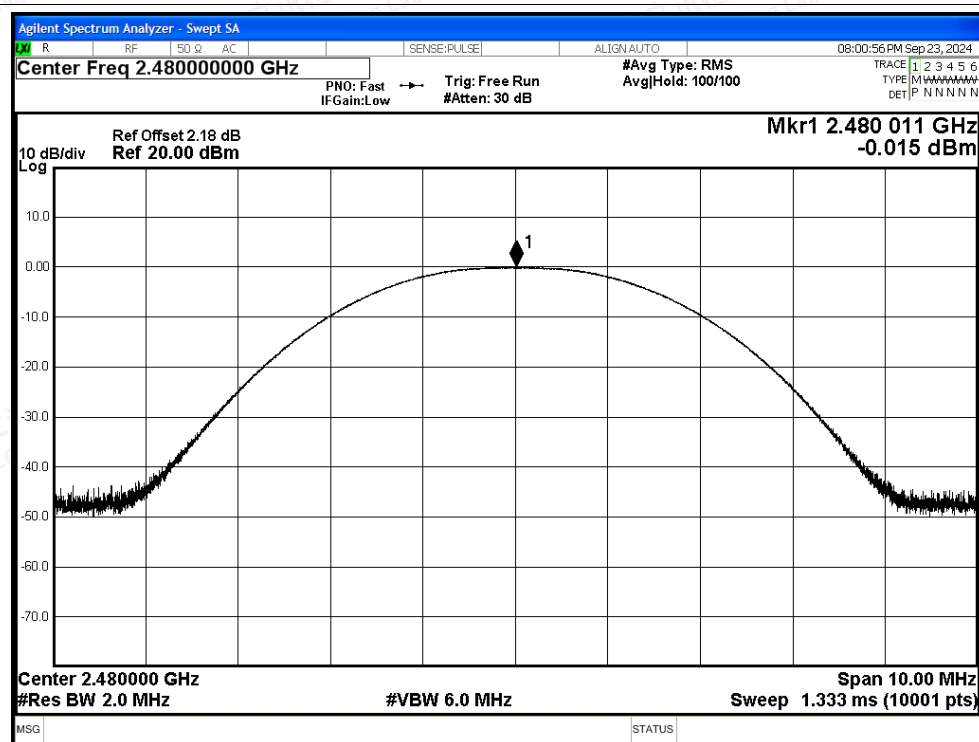
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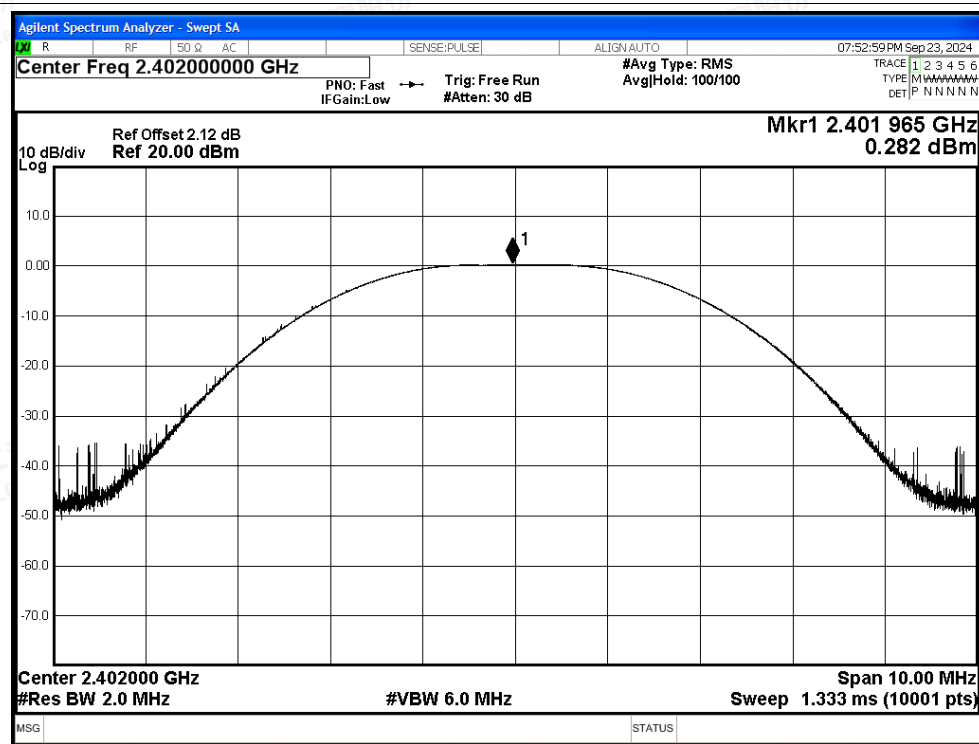
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Power NVNT BLE 1M 2480MHz Ant1



Power NVNT BLE 2M 2402MHz Ant1

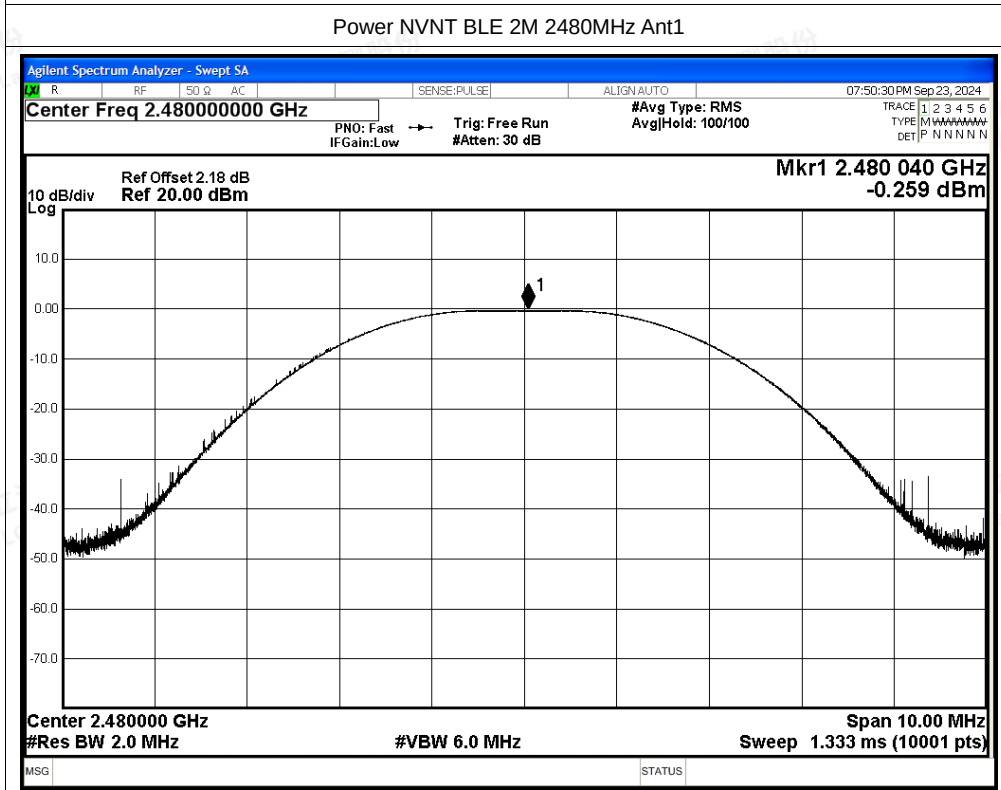
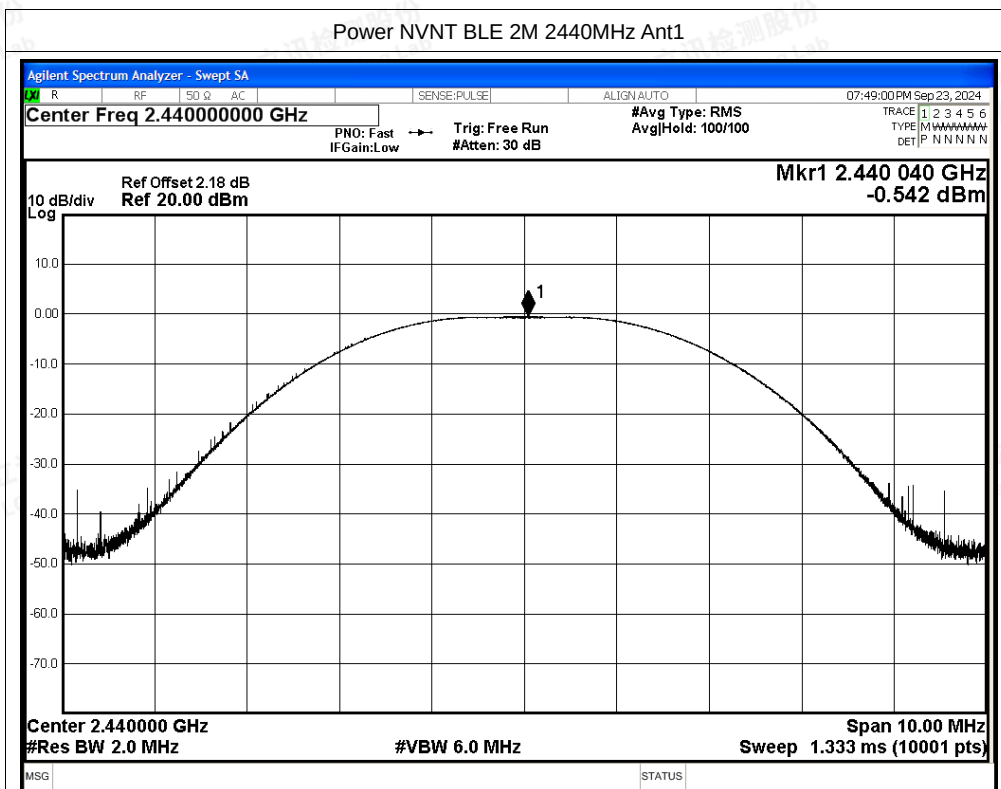


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A.3 Maximum Power Spectral Density Level

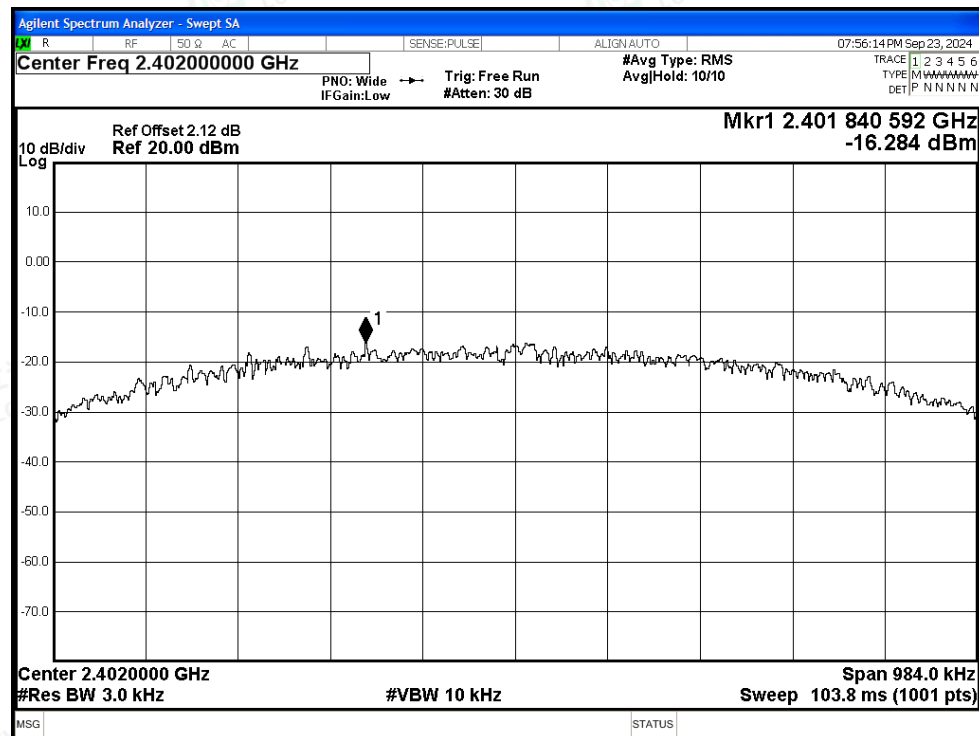
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-16.28	8	Pass
NVNT	BLE 1M	2440	Ant1	-16.74	8	Pass
NVNT	BLE 1M	2480	Ant1	-16.67	8	Pass
NVNT	BLE 2M	2402	Ant1	-19.55	8	Pass
NVNT	BLE 2M	2440	Ant1	-20.35	8	Pass
NVNT	BLE 2M	2480	Ant1	-20.1	8	Pass



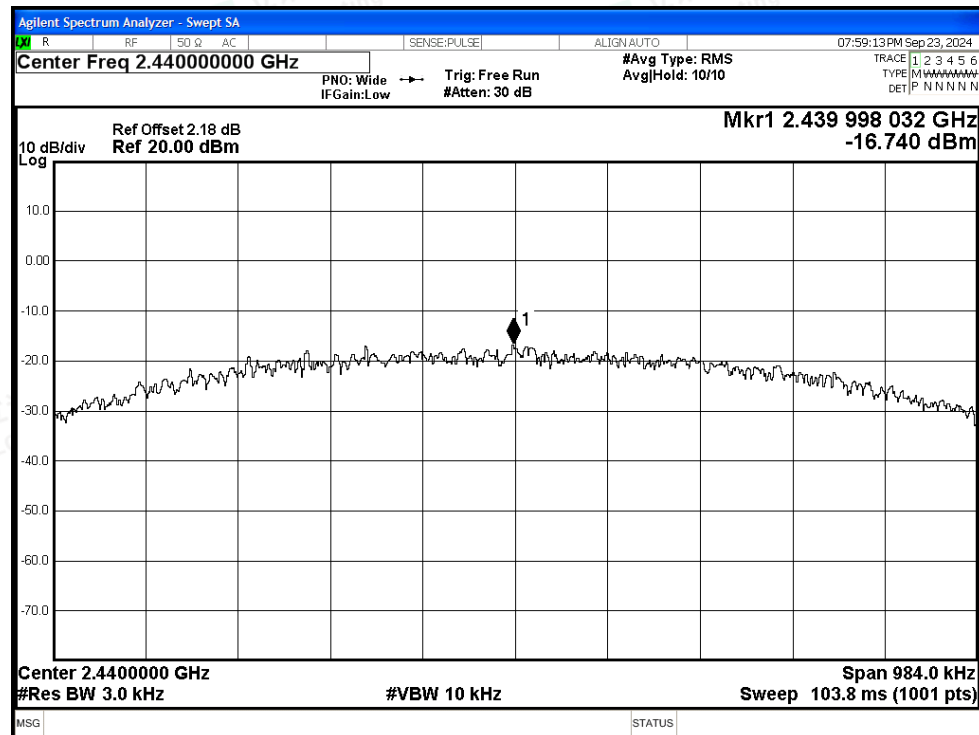


Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1



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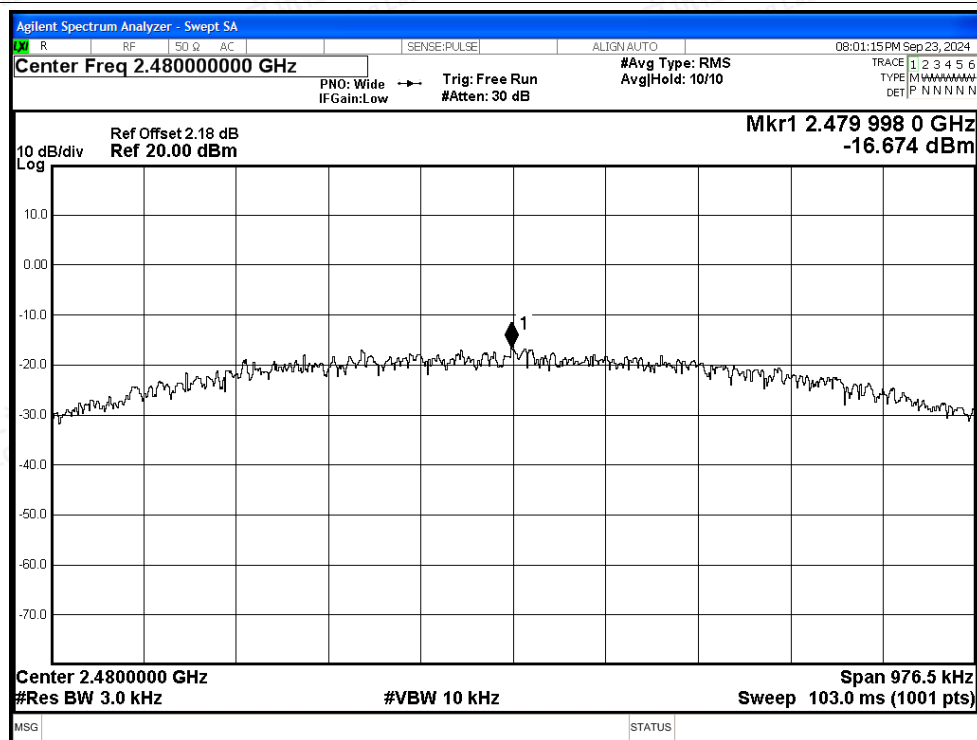
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Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

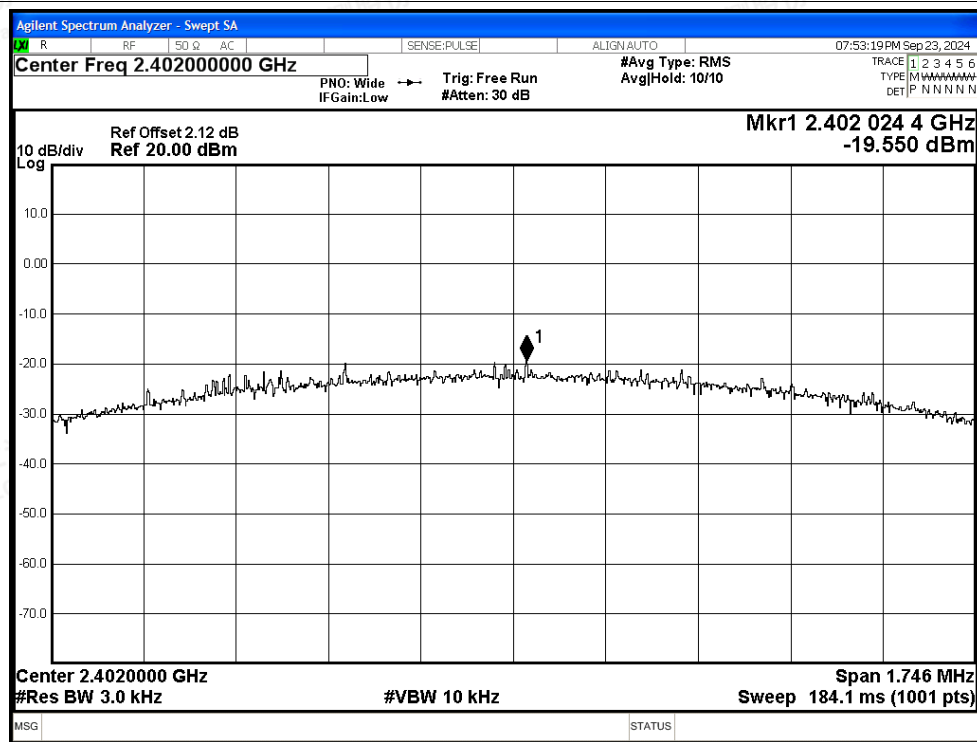
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PSD NVNT BLE 1M 2480MHz Ant1



PSD NVNT BLE 2M 2402MHz Ant1



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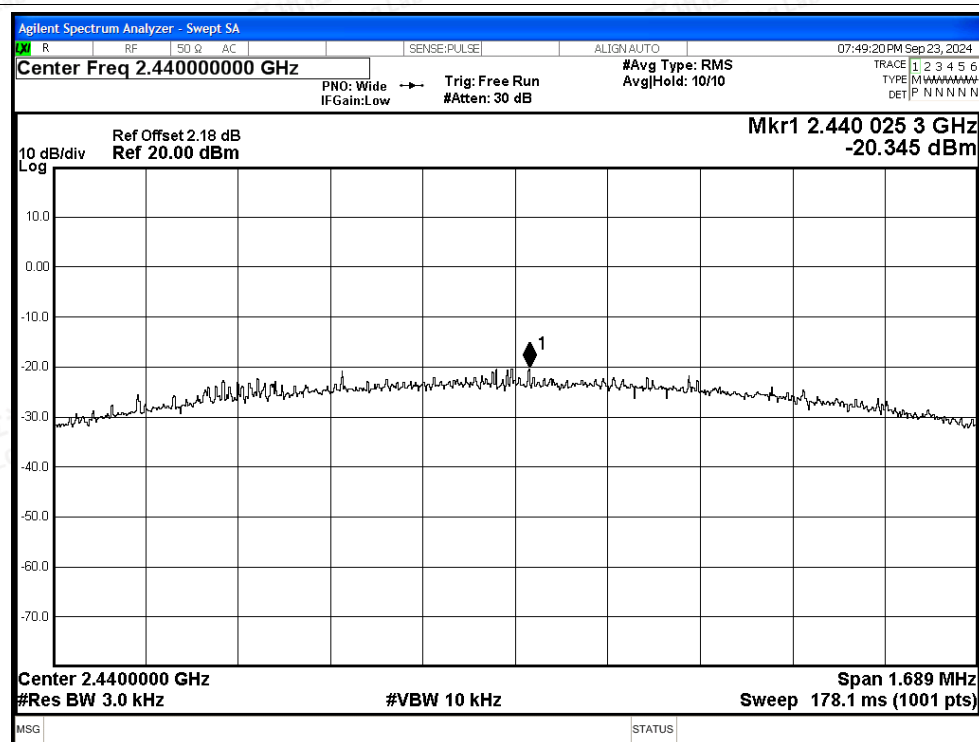
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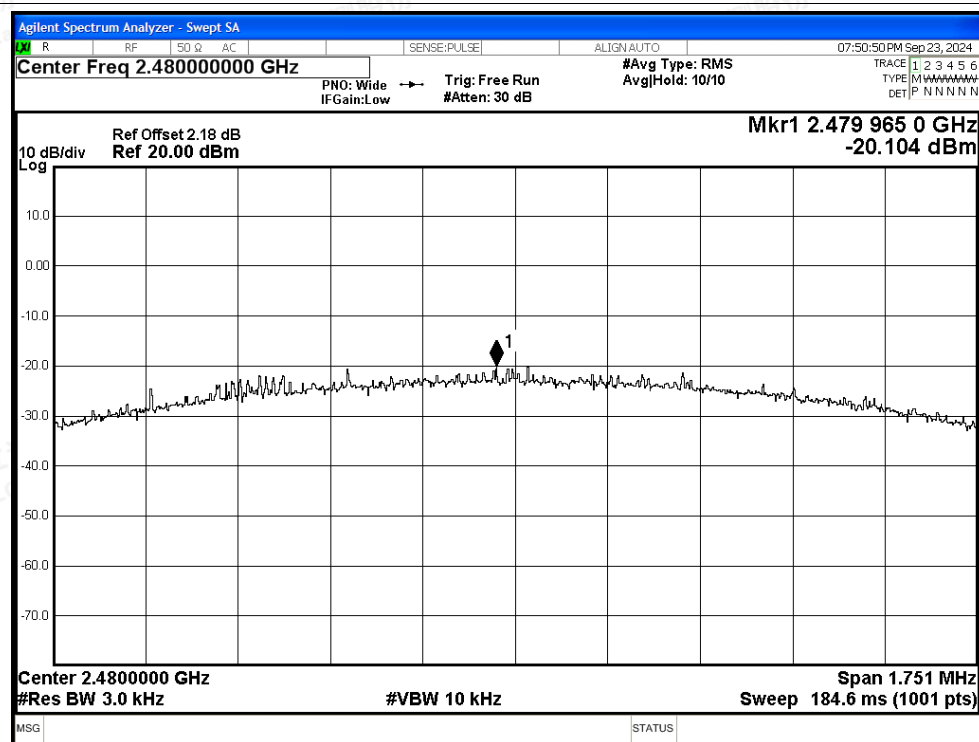
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PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1



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A.4 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-56.92	-20	Pass
NVNT	BLE 1M	2480	Ant1	-56.48	-20	Pass
NVNT	BLE 2M	2402	Ant1	-47.85	-20	Pass
NVNT	BLE 2M	2480	Ant1	-55.1	-20	Pass

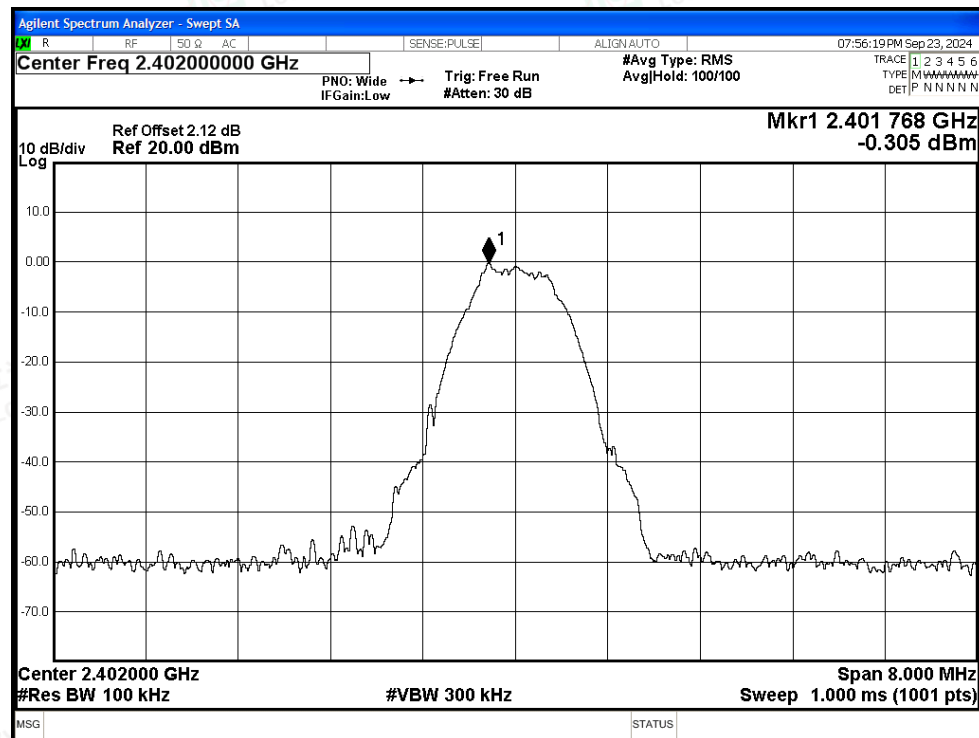


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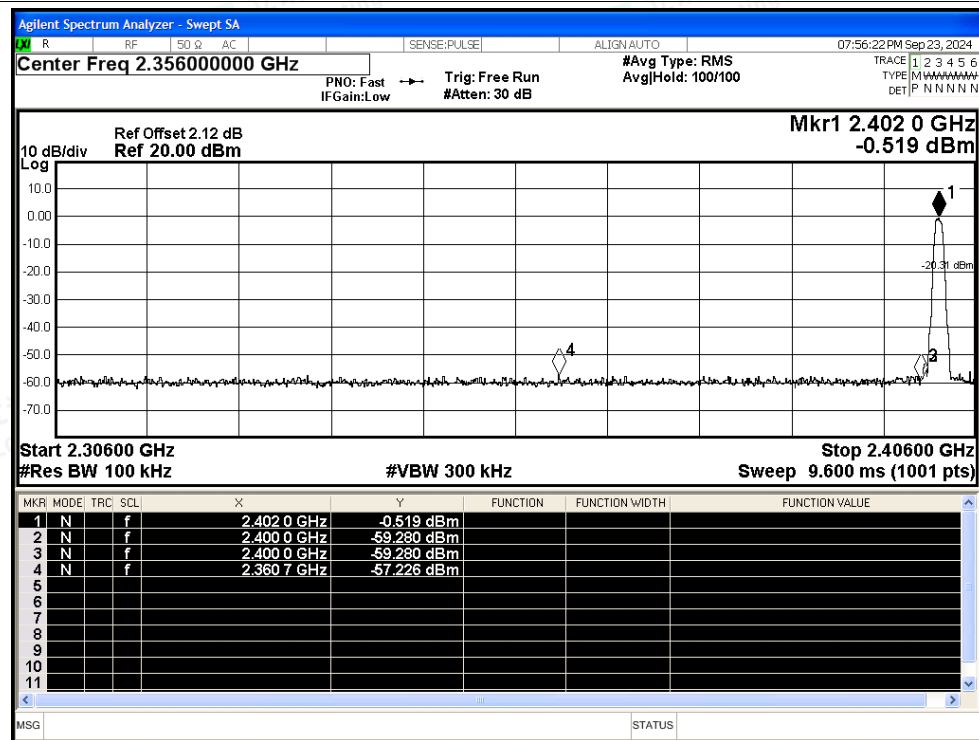


Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



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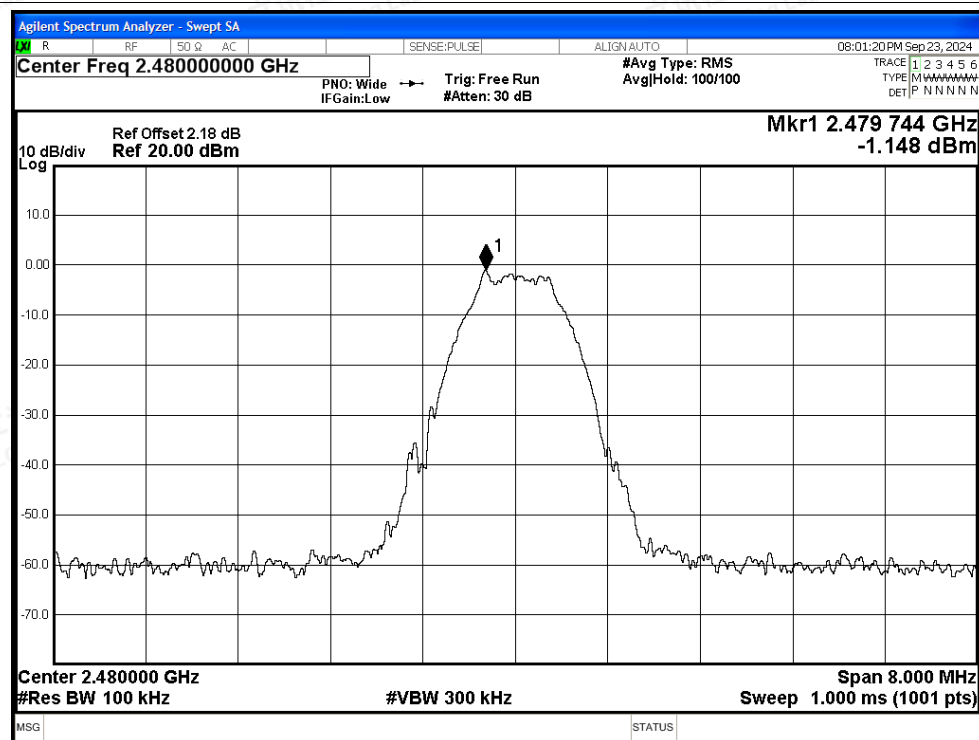
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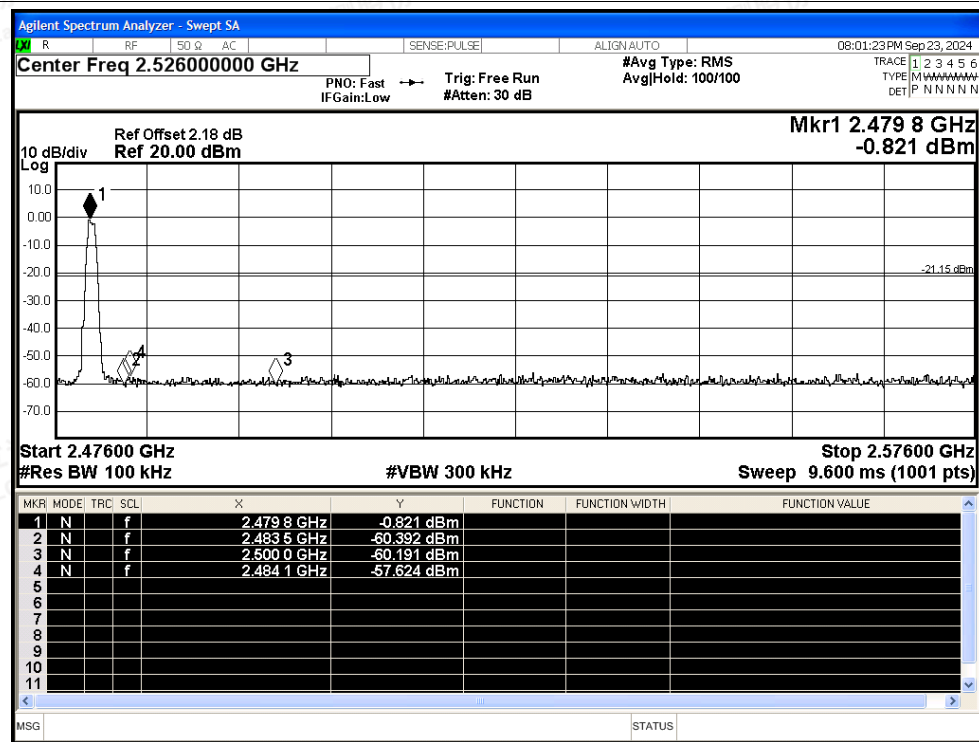
Scan code to check authenticity



Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



Shenzhen LCS Compliance Testing Laboratory Ltd.

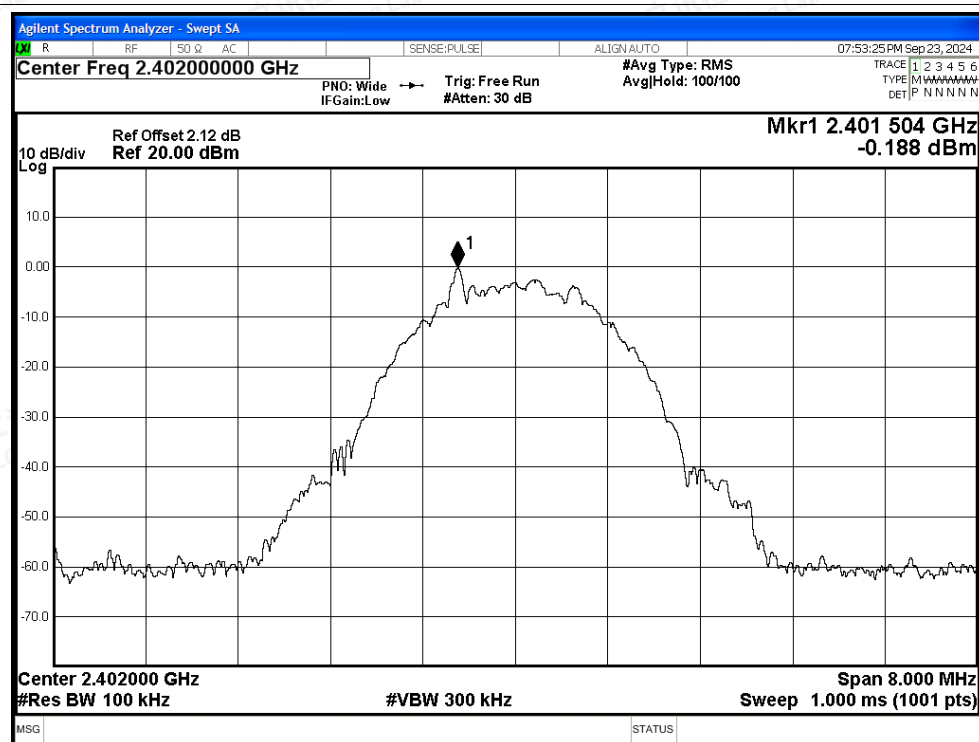
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

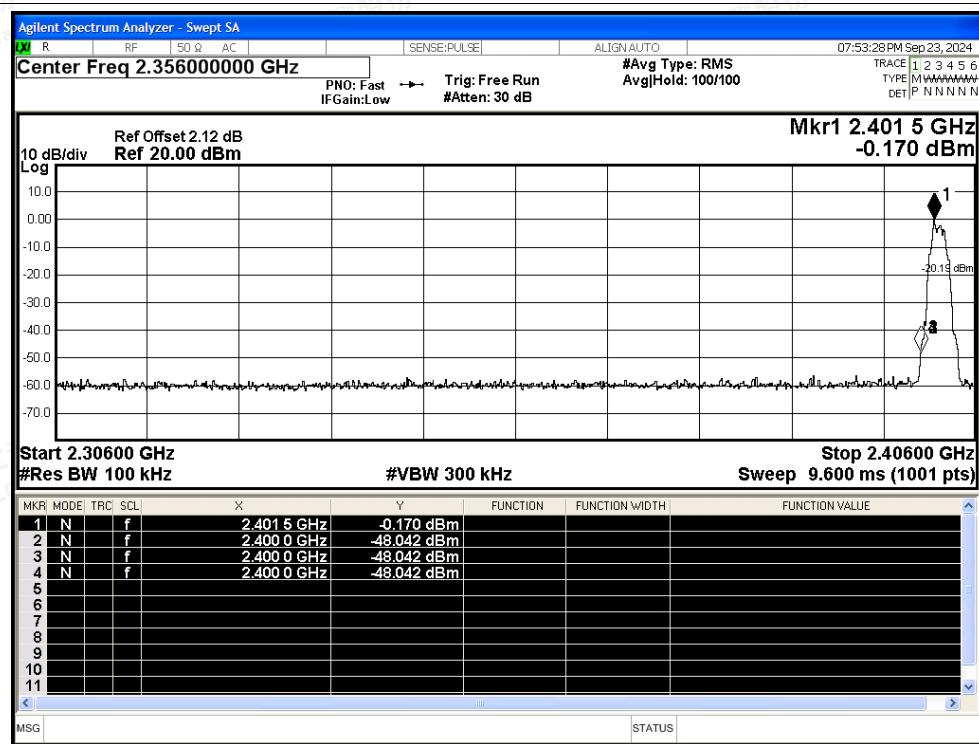
Scan code to check authenticity



Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



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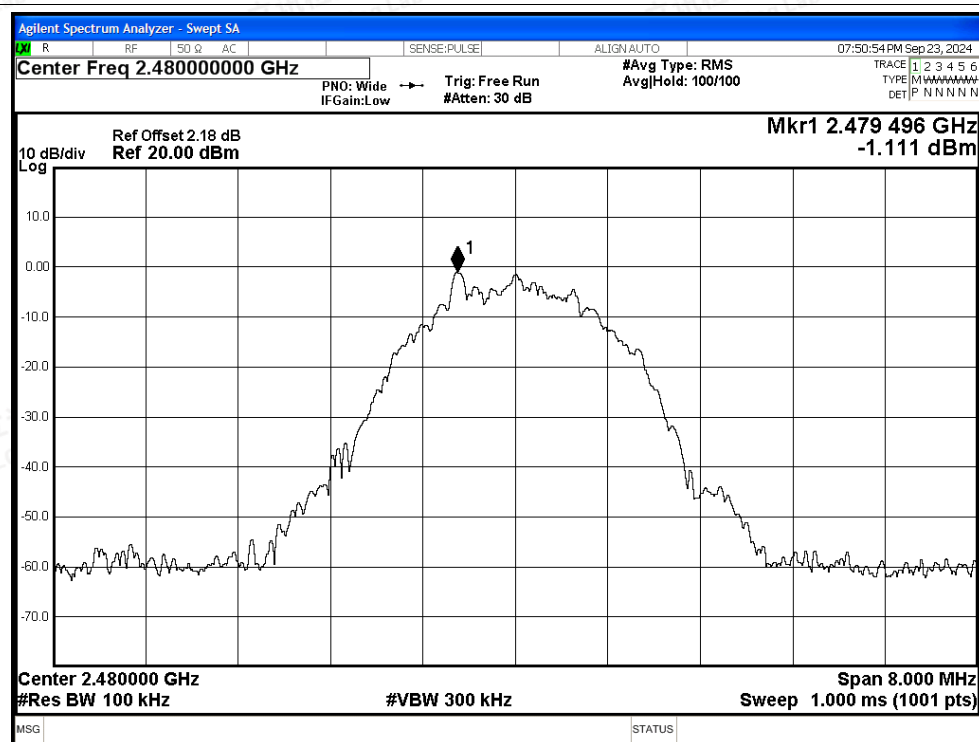
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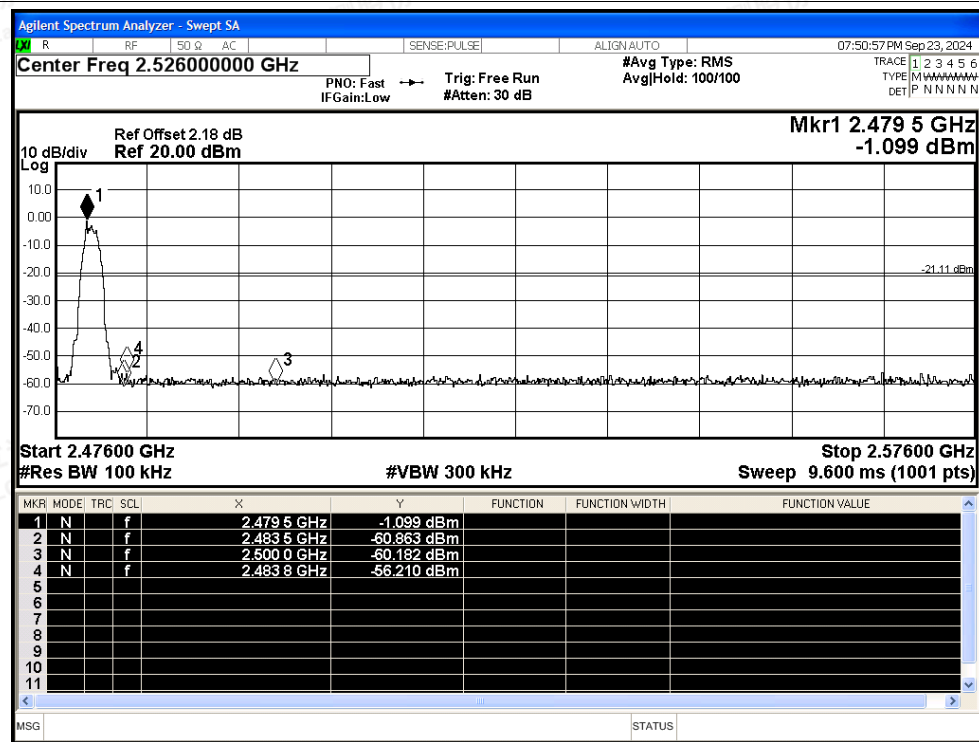
Scan code to check authenticity



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Band Edge NVNT BLE 2M 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	Ant1	-54.76	-20	Pass
NVNT	BLE 1M	2440	Ant1	-53.66	-20	Pass
NVNT	BLE 1M	2480	Ant1	-54.28	-20	Pass
NVNT	BLE 2M	2402	Ant1	-55.02	-20	Pass
NVNT	BLE 2M	2440	Ant1	-53.36	-20	Pass
NVNT	BLE 2M	2480	Ant1	-46.39	-20	Pass

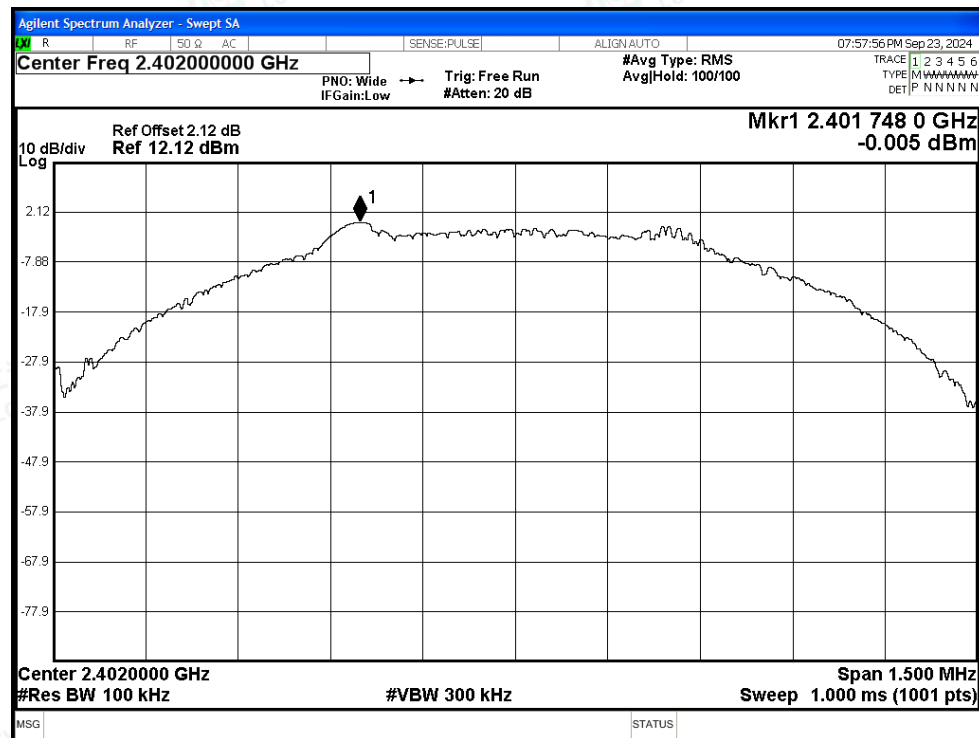


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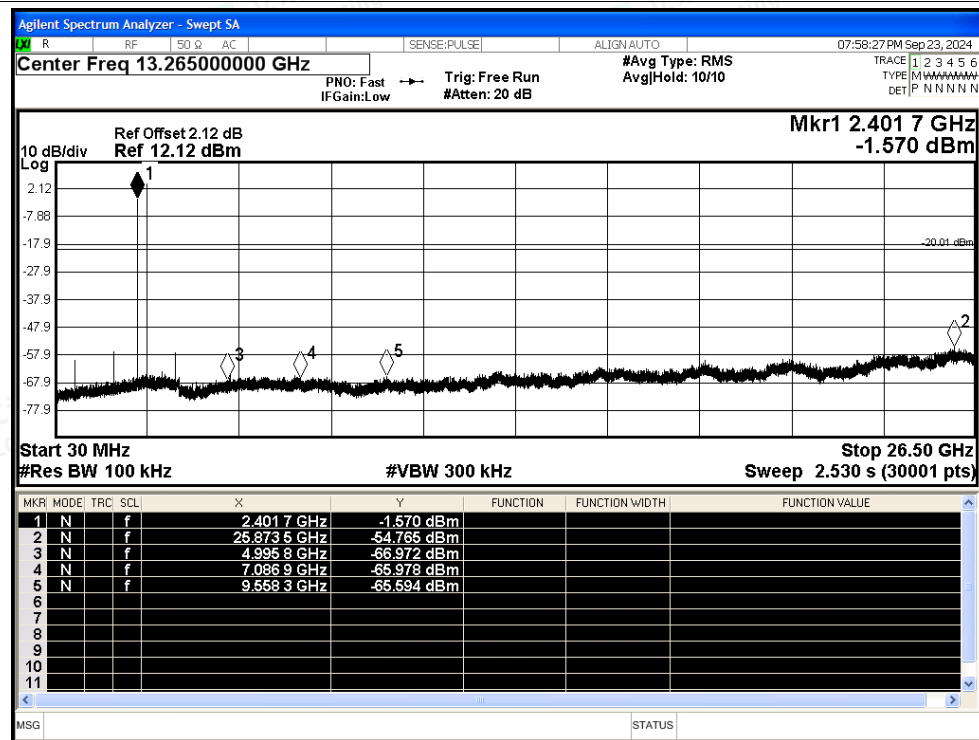


Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



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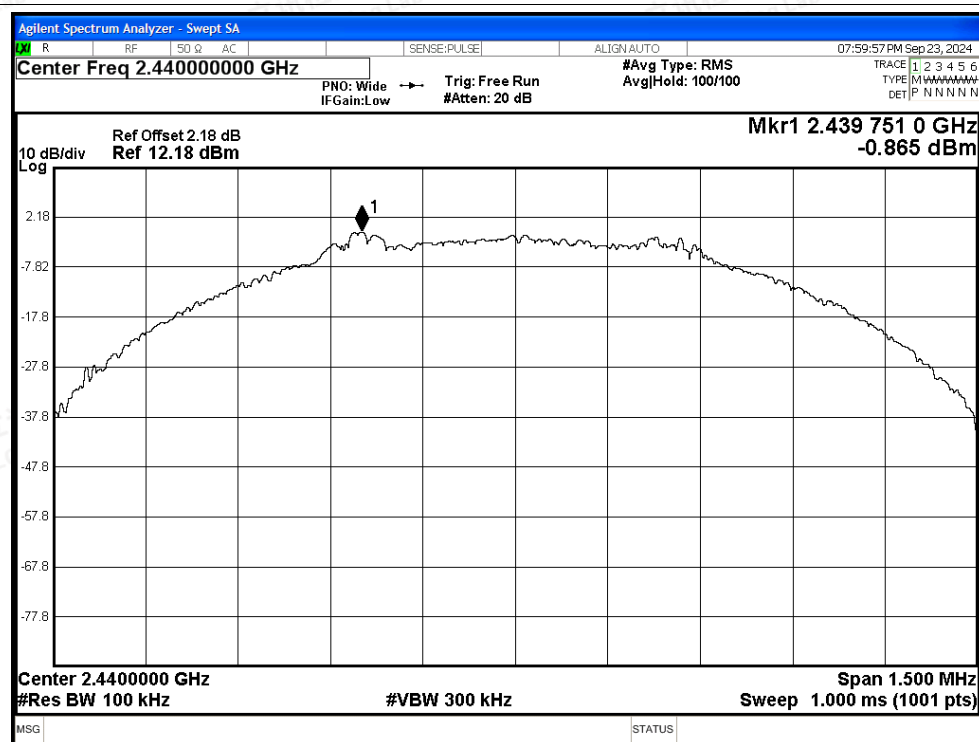
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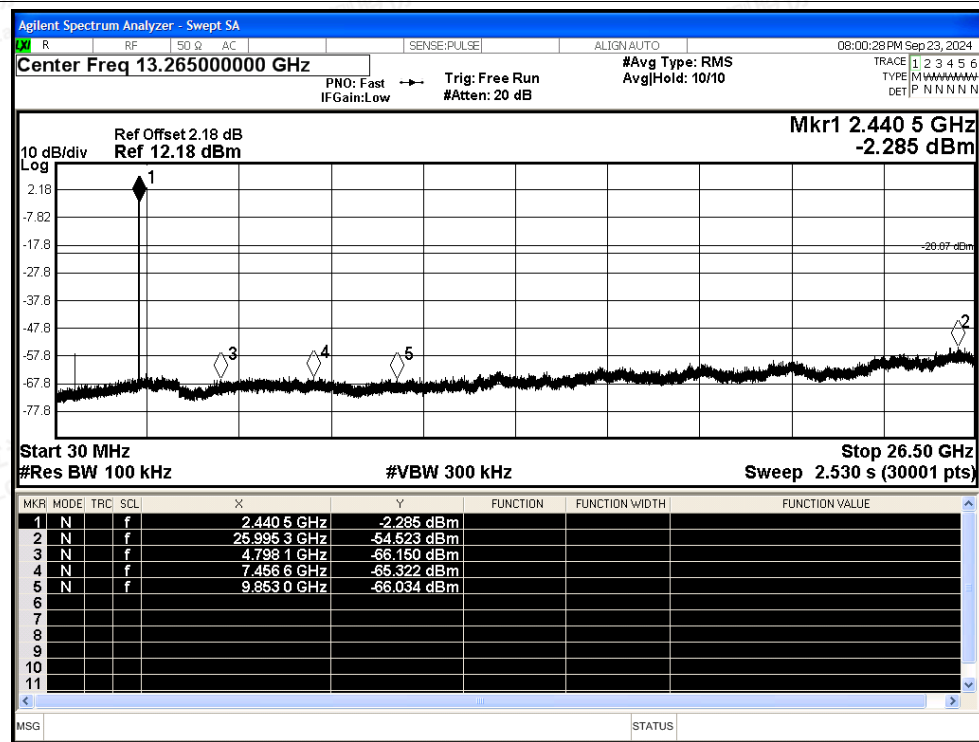
Scan code to check authenticity



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



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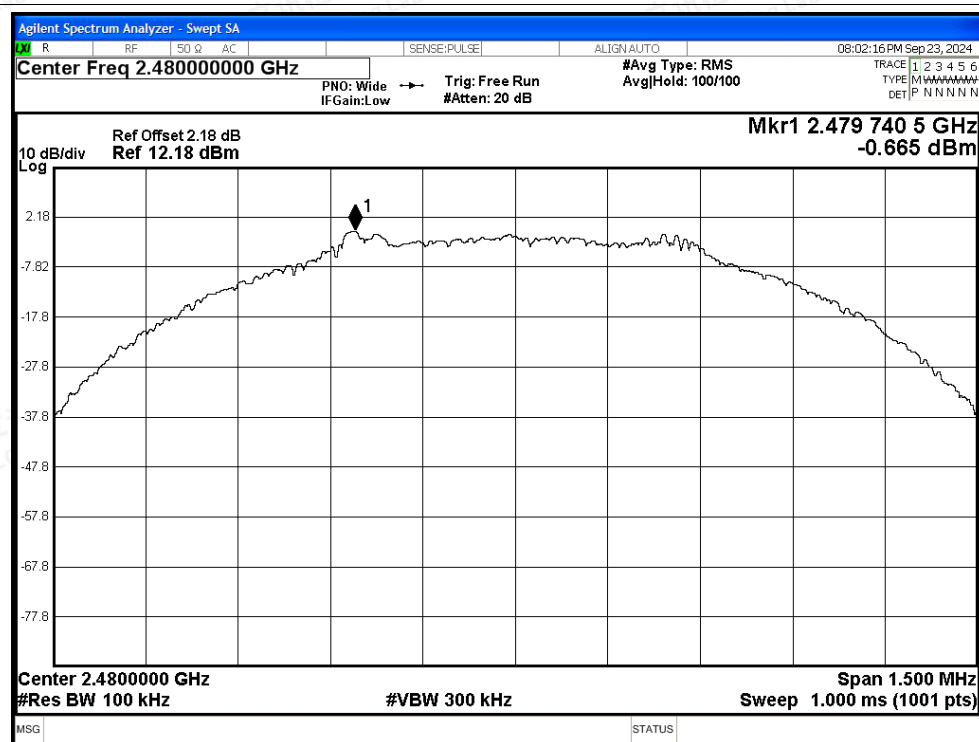
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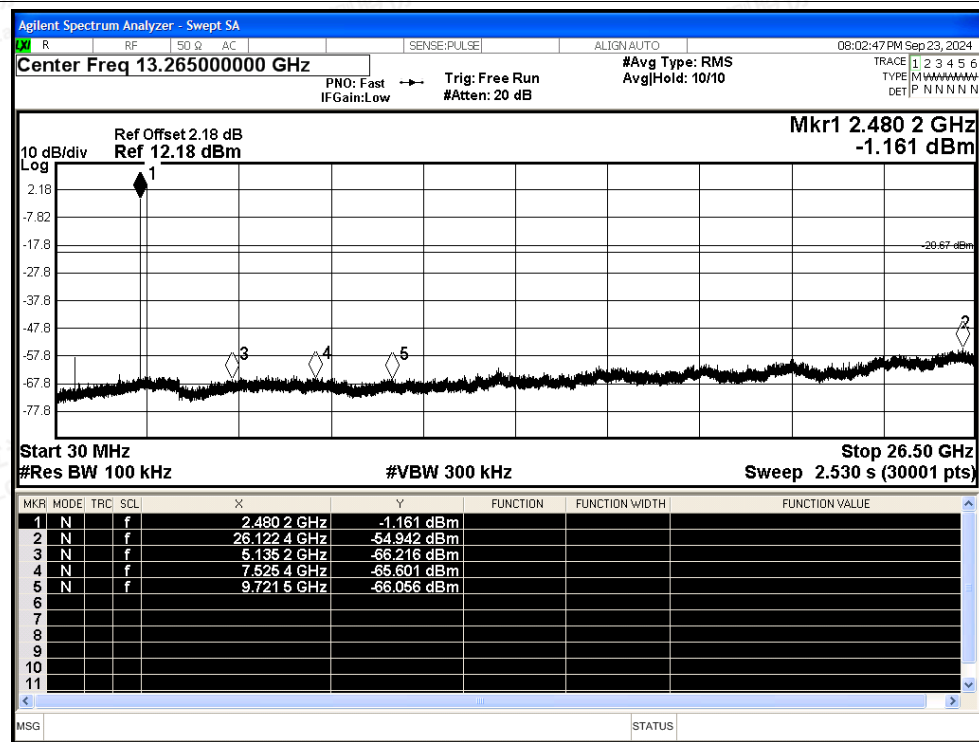
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Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



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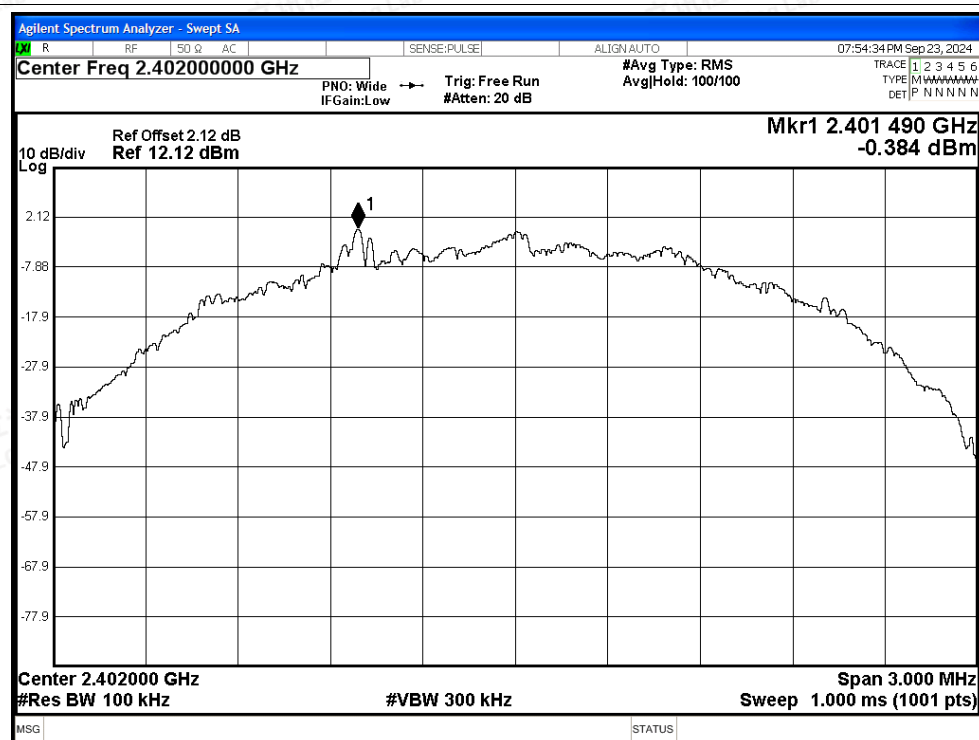
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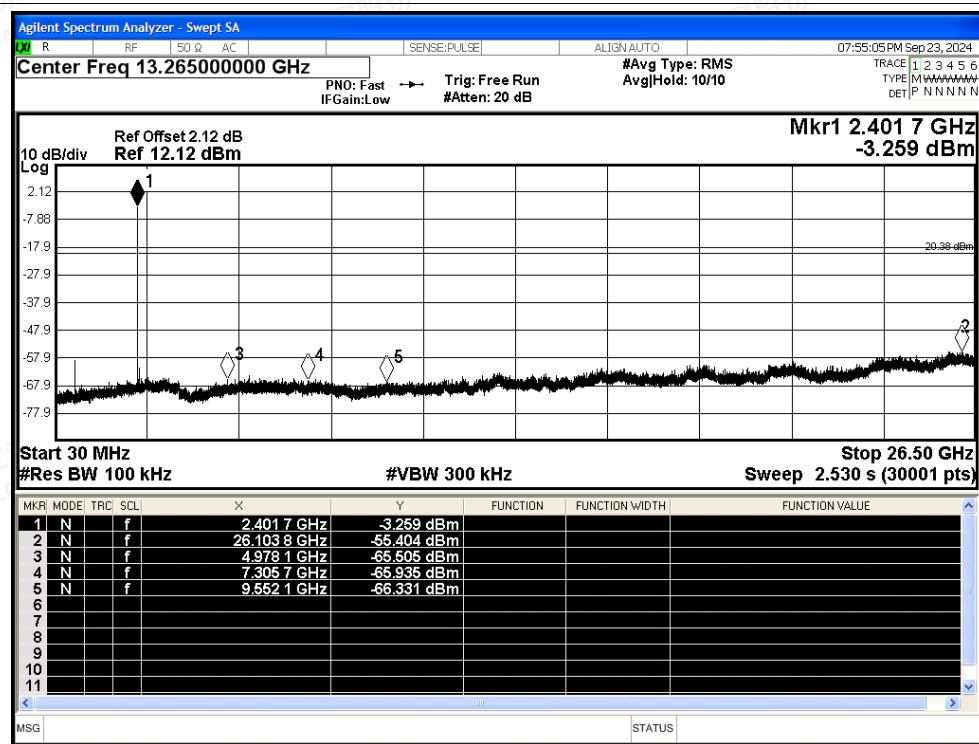
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Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



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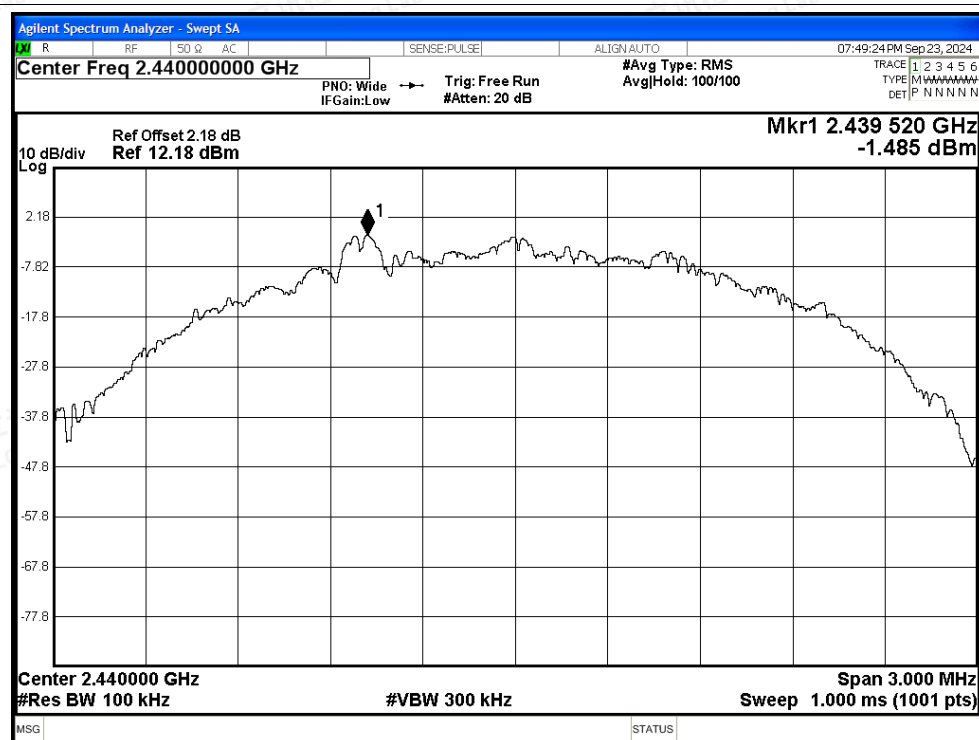
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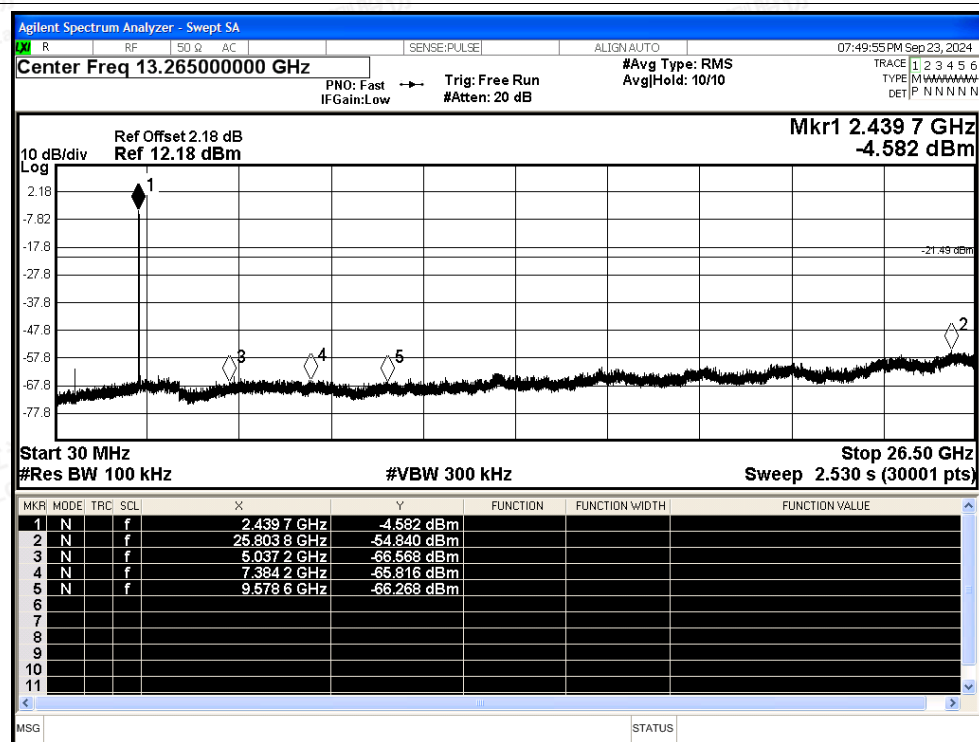
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Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



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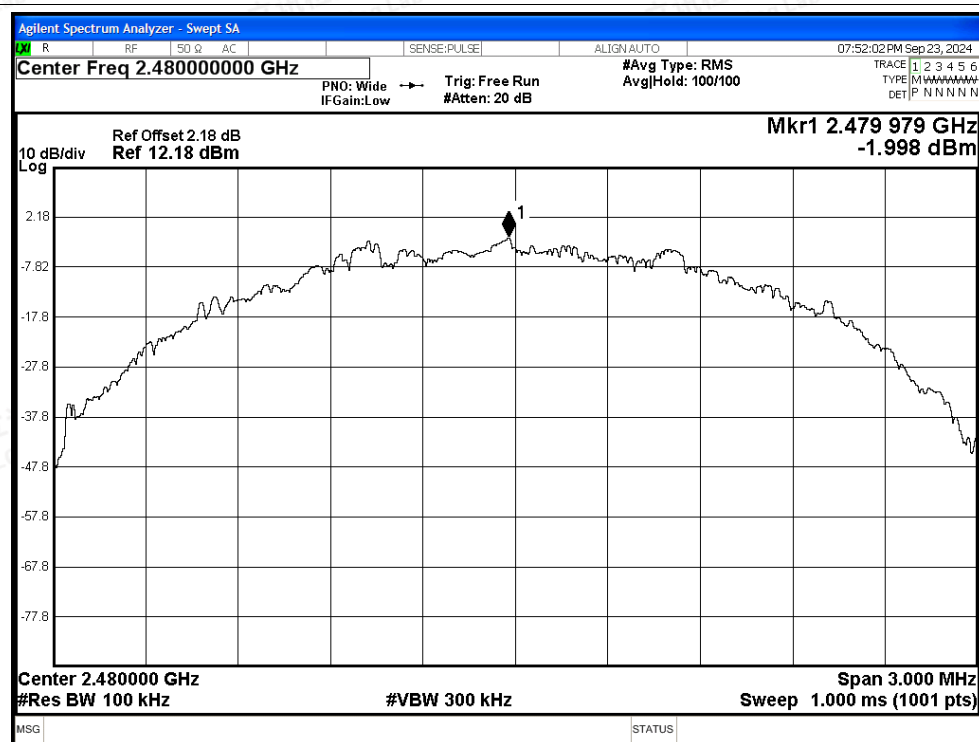
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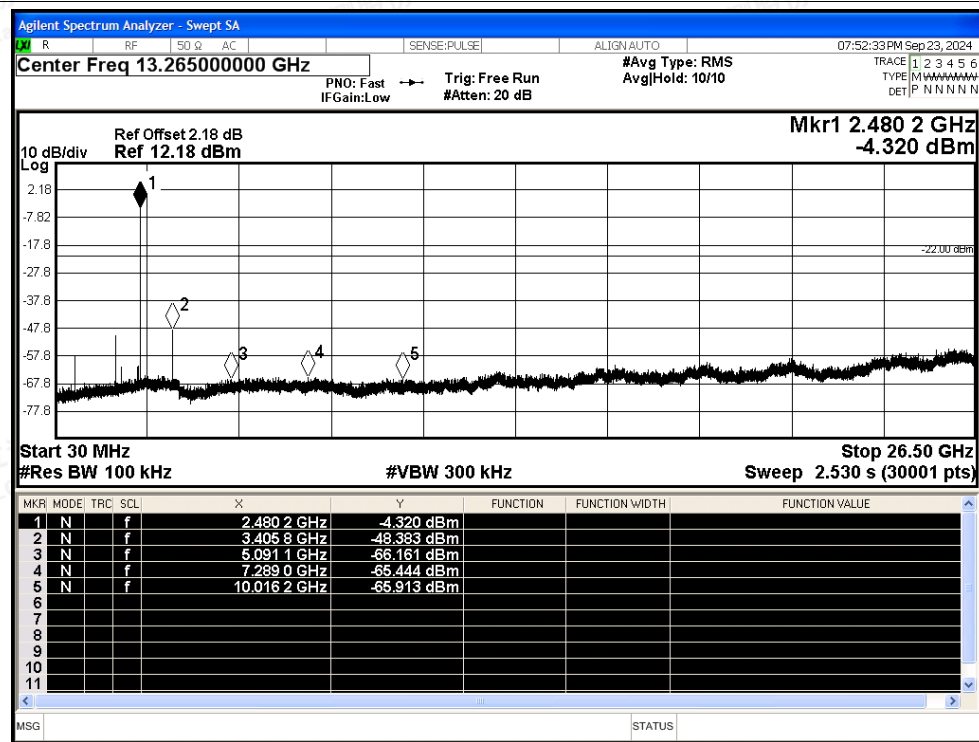
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Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission



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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	Ant1	87.39	0.59	0.61
NVNT	BLE 1M	2440	Ant1	87.39	0.59	0.61
NVNT	BLE 1M	2480	Ant1	87.39	0.59	0.61
NVNT	BLE 2M	2402	Ant1	65.93	1.81	1.21
NVNT	BLE 2M	2440	Ant1	65.92	1.81	1.21
NVNT	BLE 2M	2480	Ant1	65.92	1.81	1.21

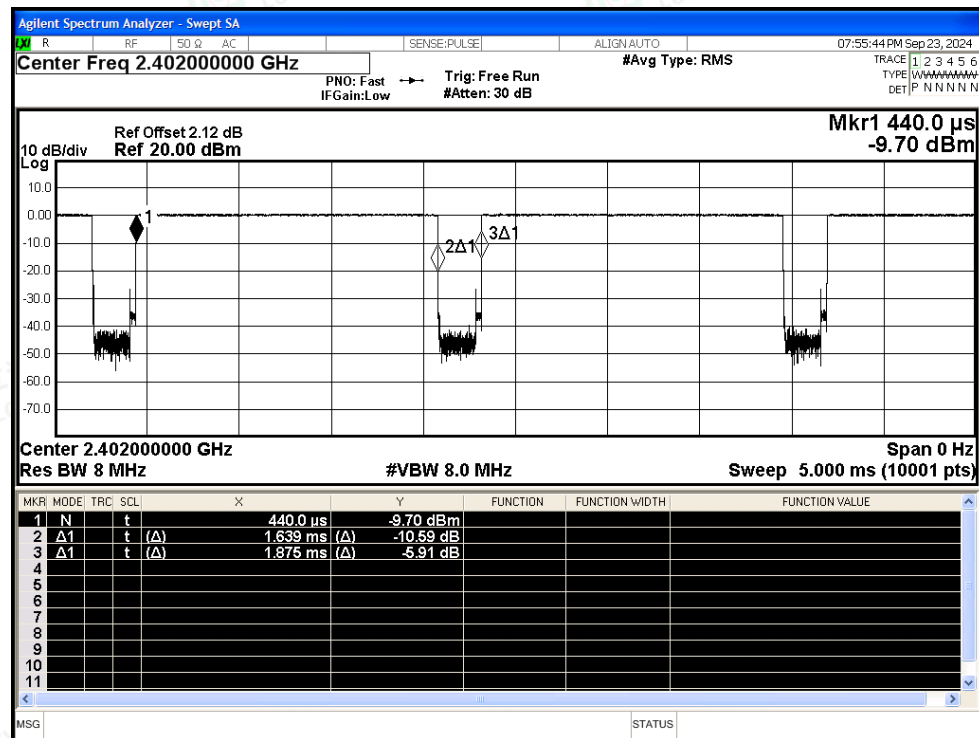


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Scan code to check authenticity

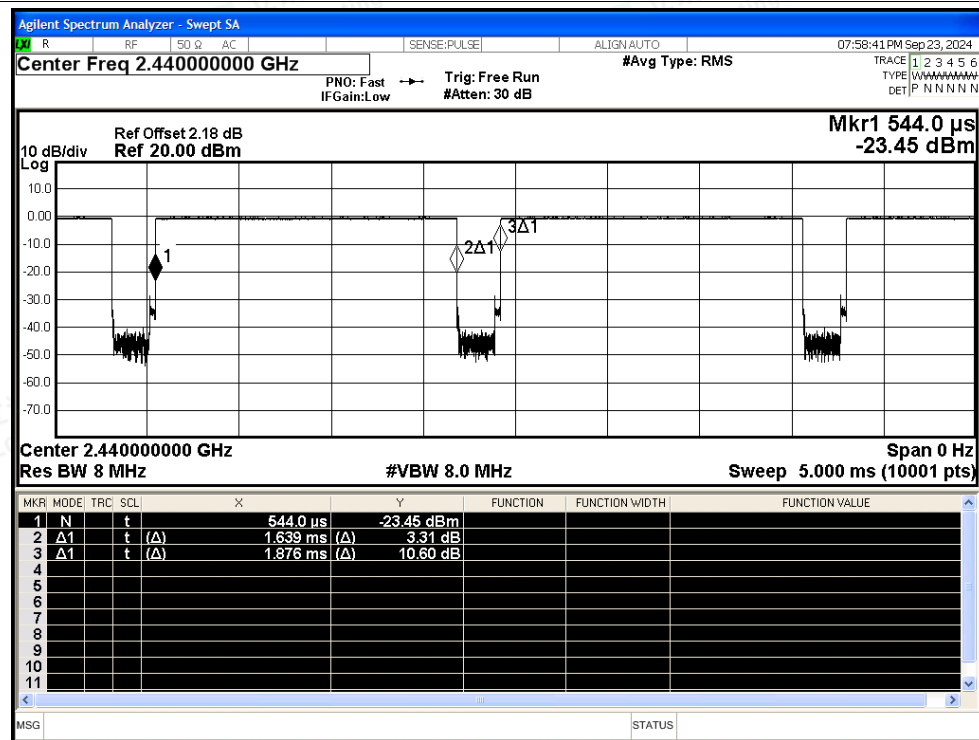


Test Graphs

Duty Cycle NVNT BLE 1M 2402MHz Ant1



Duty Cycle NVNT BLE 1M 2440MHz Ant1



Shenzhen LCS Compliance Testing Laboratory Ltd.

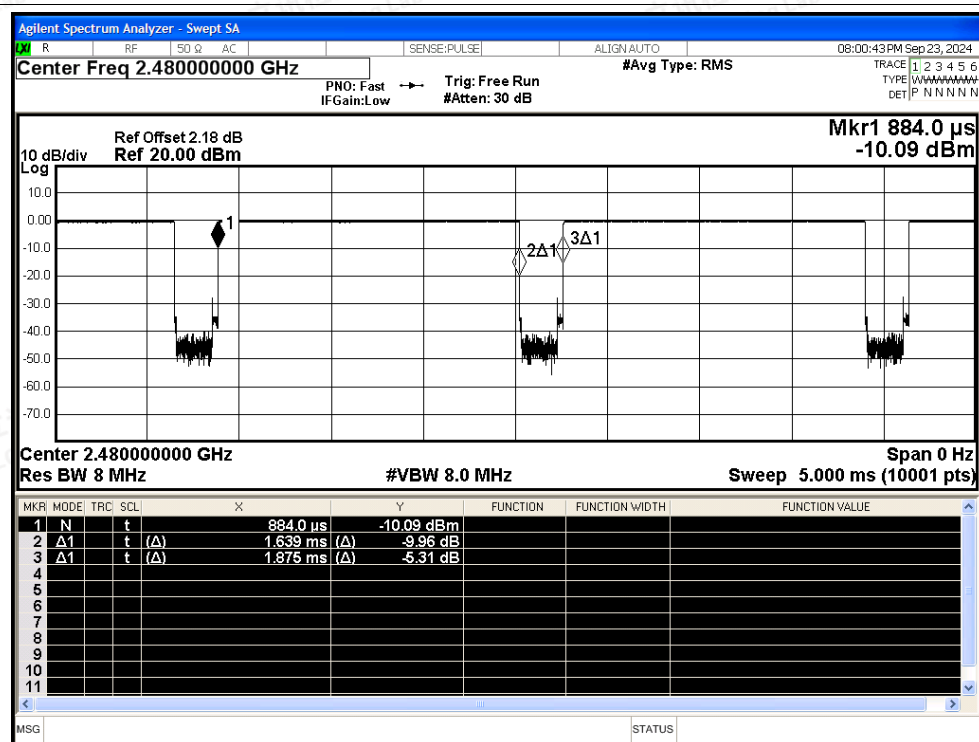
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

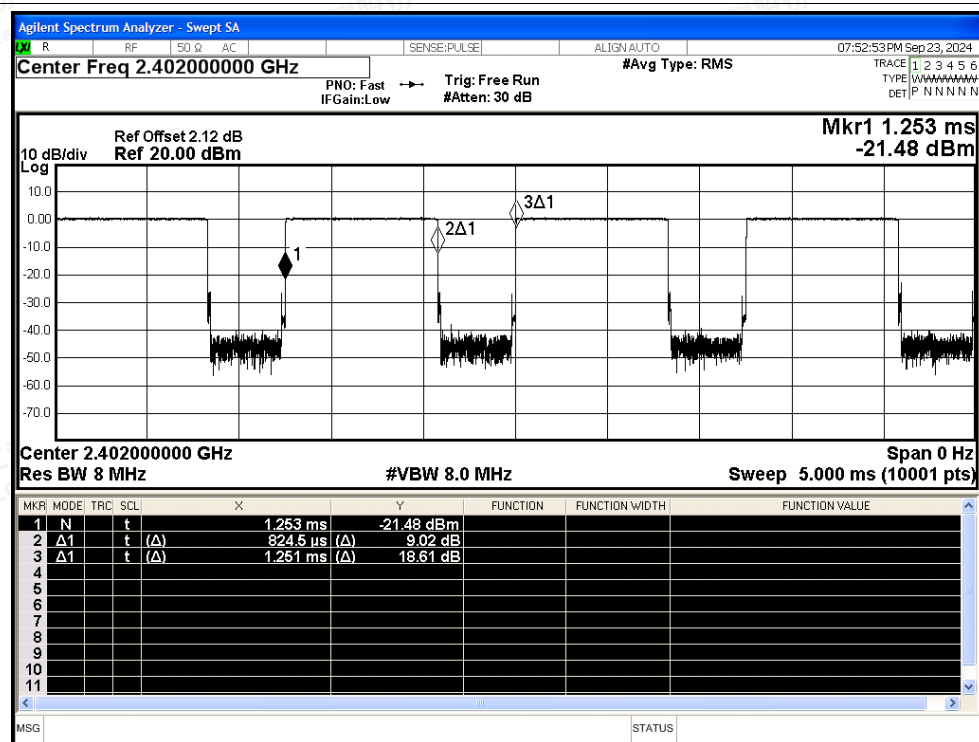
Scan code to check authenticity



Duty Cycle NVNT BLE 1M 2480MHz Ant1



Duty Cycle NVNT BLE 2M 2402MHz Ant1



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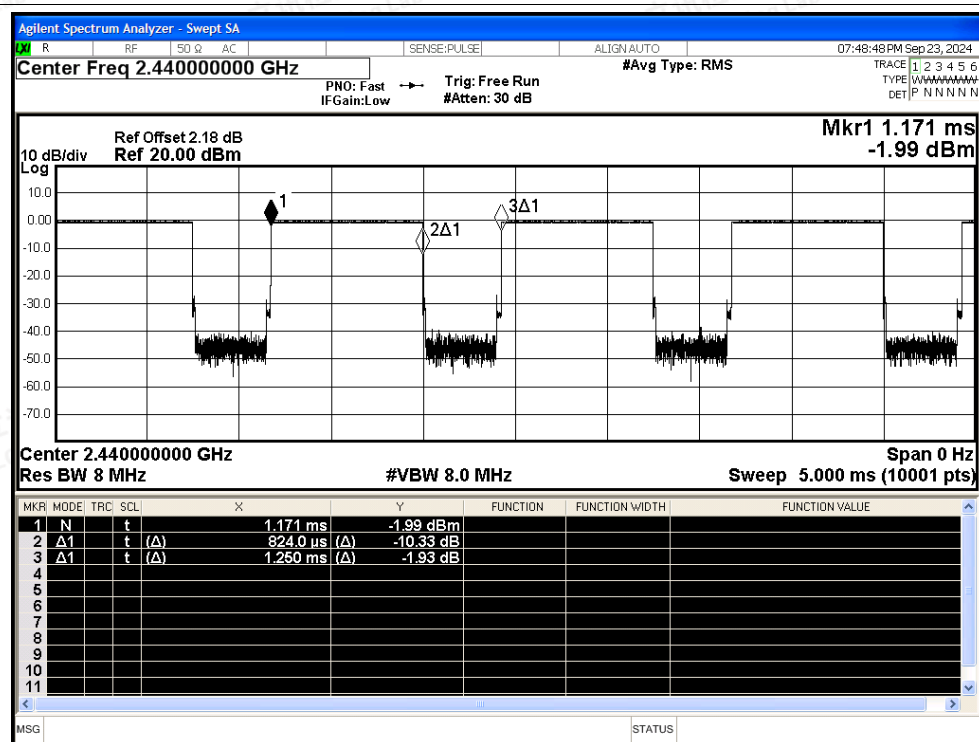
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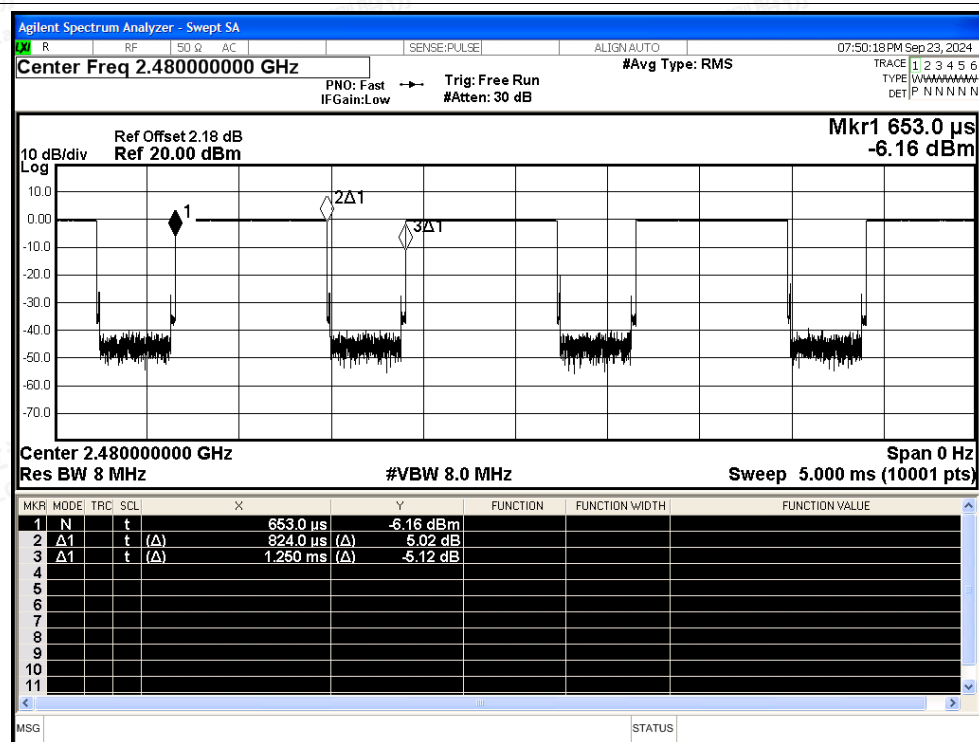
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Duty Cycle NVNT BLE 2M 2440MHz Ant1



Duty Cycle NVNT BLE 2M 2480MHz 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	Ant1	2310	-50.01	2	-	47.25	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2310	-59.06	2	0.59	38.79	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2348.688	-47.41	2	-	49.85	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2385.744	-57.42	2	0.59	40.43	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2390	-48.13	2	-	49.13	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2390	-58.06	2	0.59	39.79	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-48.47	2	-	48.79	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-58.22	2	0.59	39.63	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2492.848	-47.09	2	-	50.17	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.92	-57	2	0.59	40.85	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2500	-49.63	2	-	47.63	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2500	-57.38	2	0.59	40.47	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2310	-50.19	2	-	47.07	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2310	-58.74	2	1.81	40.33	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2371.632	-47.38	2	-	49.88	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2375.184	-57.43	2	1.81	41.64	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2390	-50.59	2	-	46.67	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2390	-58.32	2	1.81	40.75	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2483.5	-47.26	2	-	50	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2483.5	-57.45	2	1.81	41.62	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2484.688	-40.22	2	-	57.04	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2485.24	-56.64	2	1.81	42.43	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2500	-49.07	2	-	48.19	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2500	-58.23	2	1.81	40.84	Average	54	Pass



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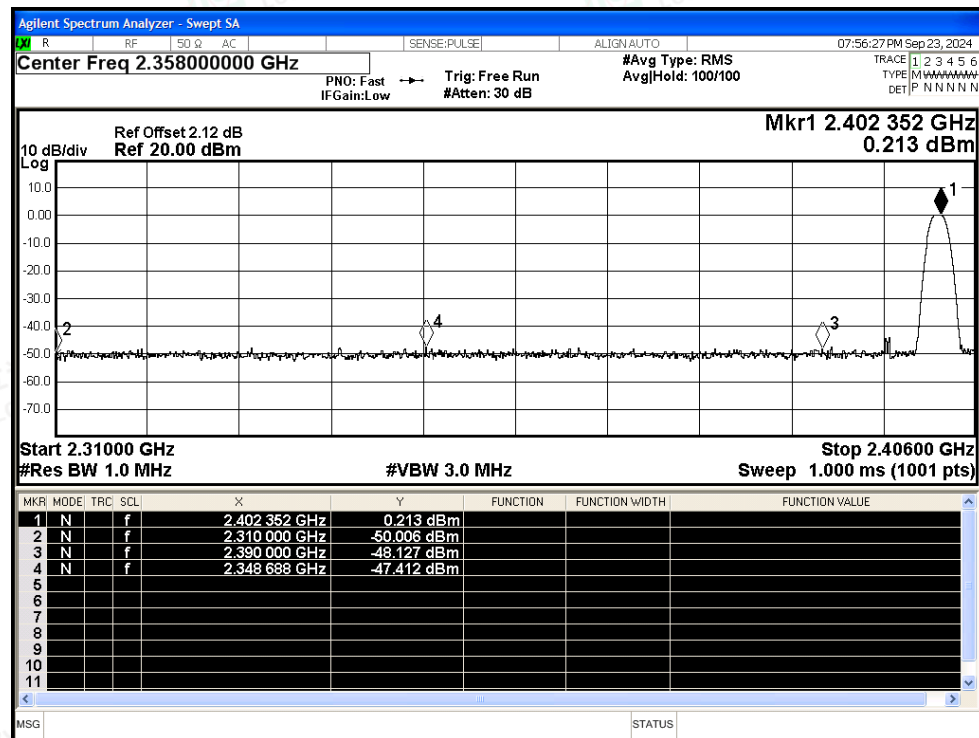
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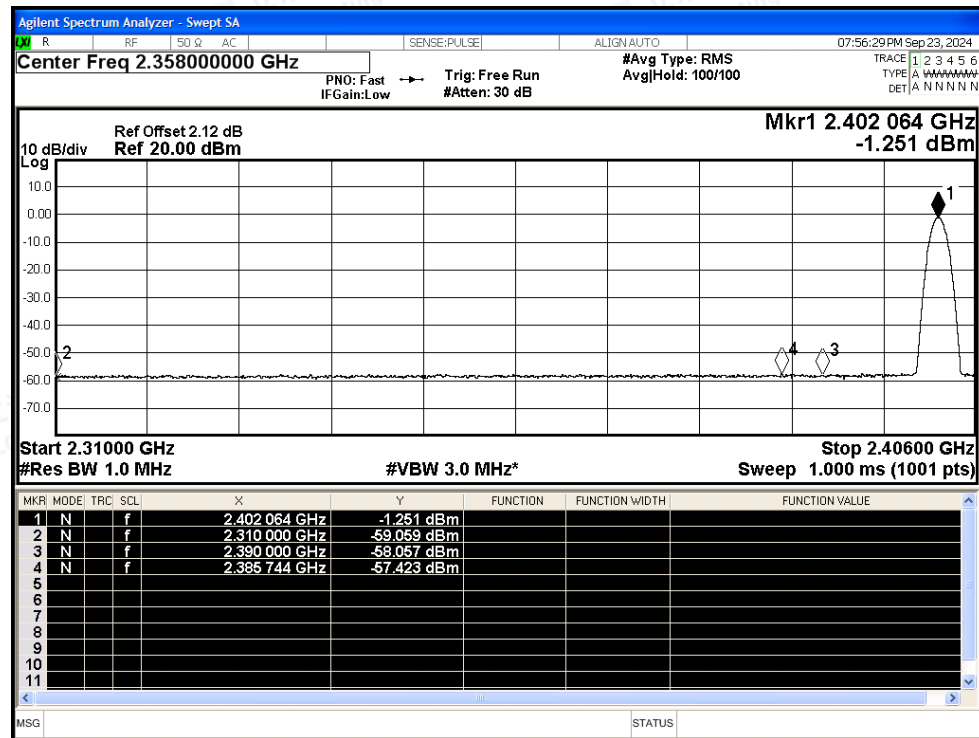


Test Graphs

Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak



Restrict Band NVNT BLE 1M 2402MHz Ant1 Average



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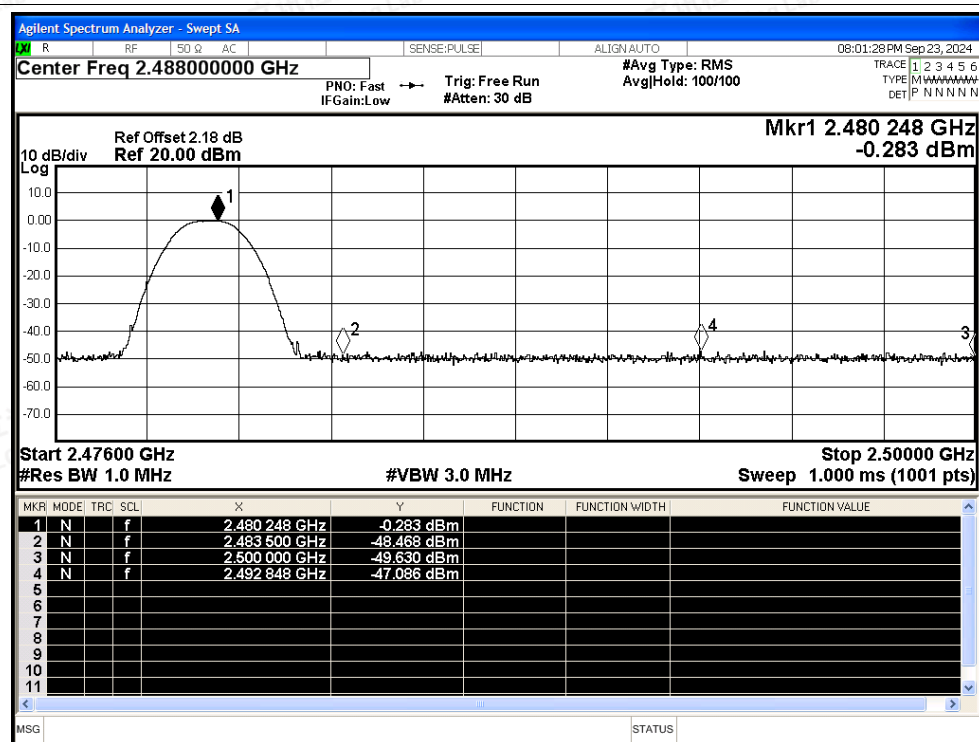
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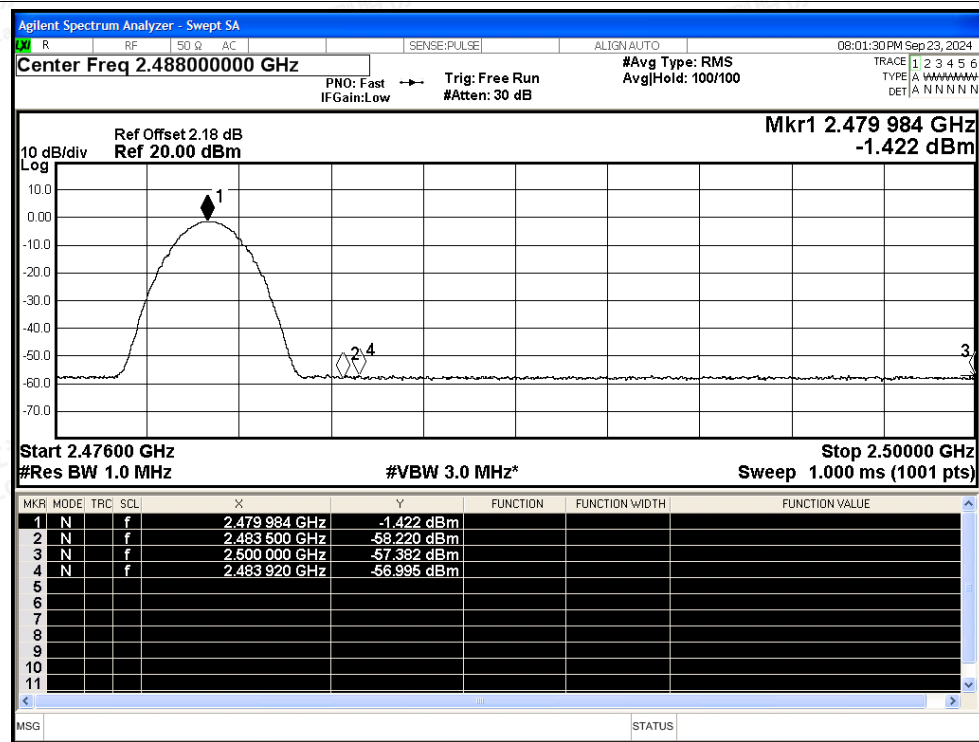
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Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak



Restrict Band NVNT BLE 1M 2480MHz Ant1 Average



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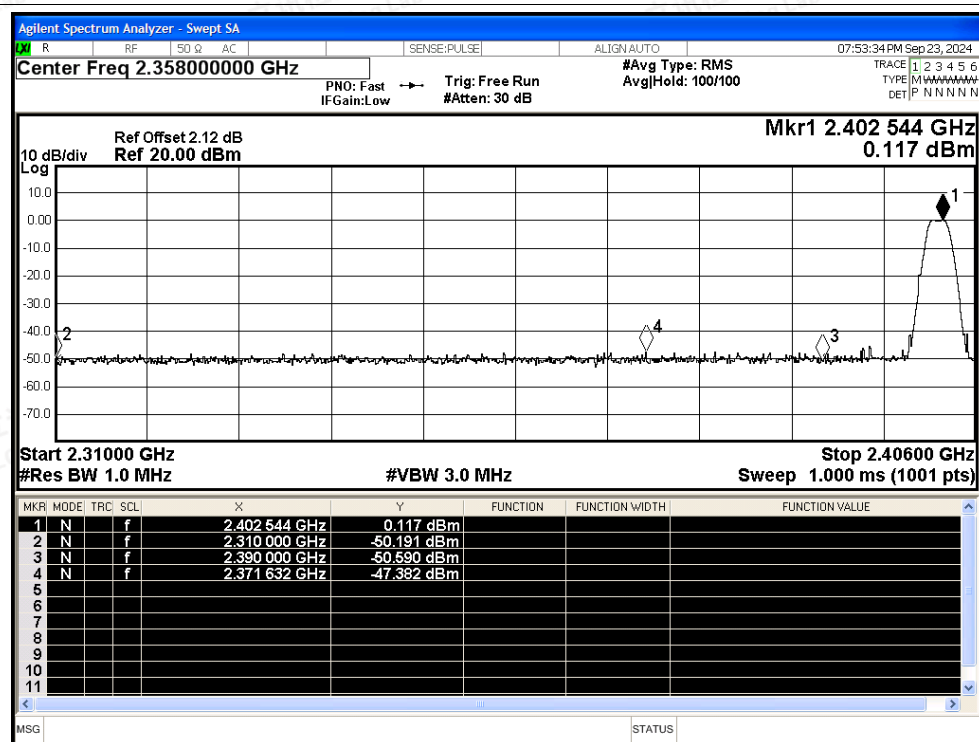
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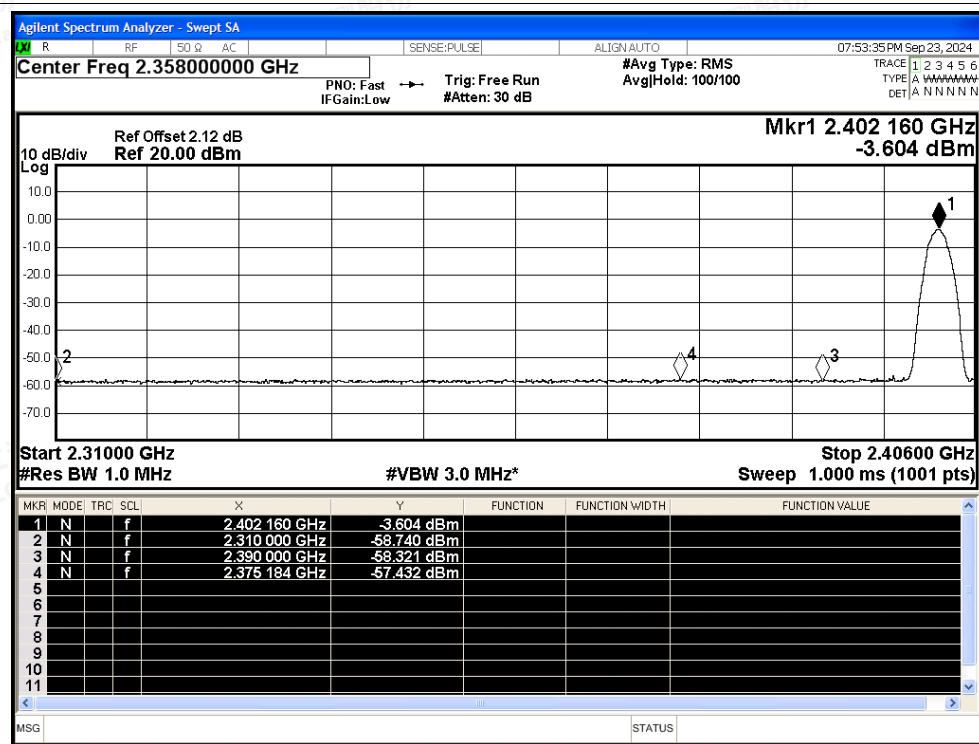
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Restrict Band NVNT BLE 2M 2402MHz Ant1 Peak



Restrict Band NVNT BLE 2M 2402MHz Ant1 Average



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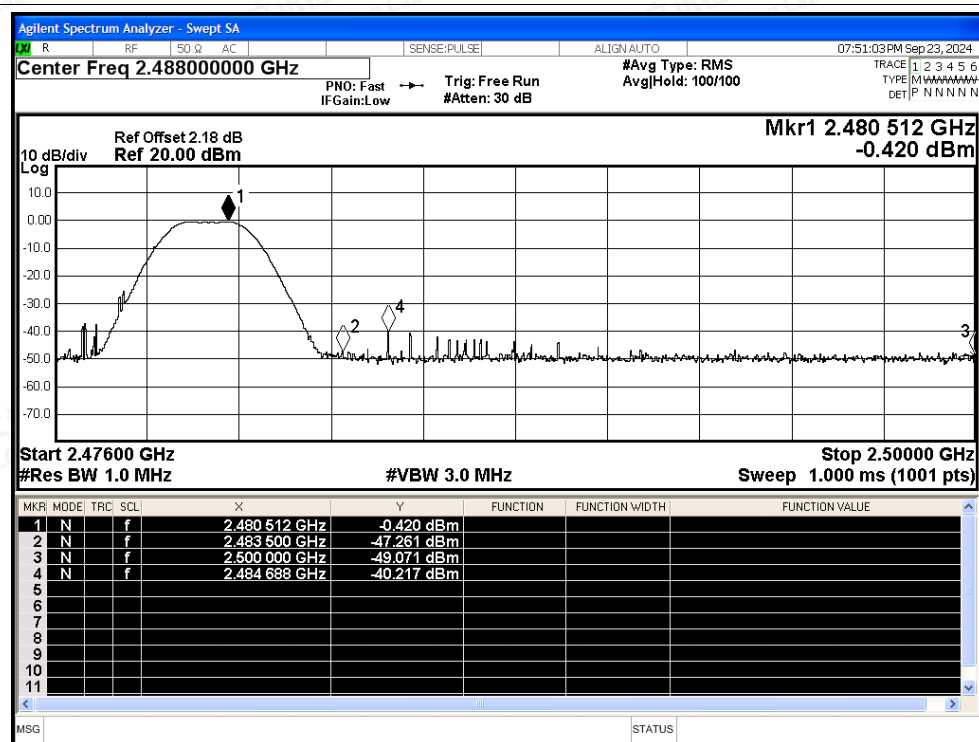
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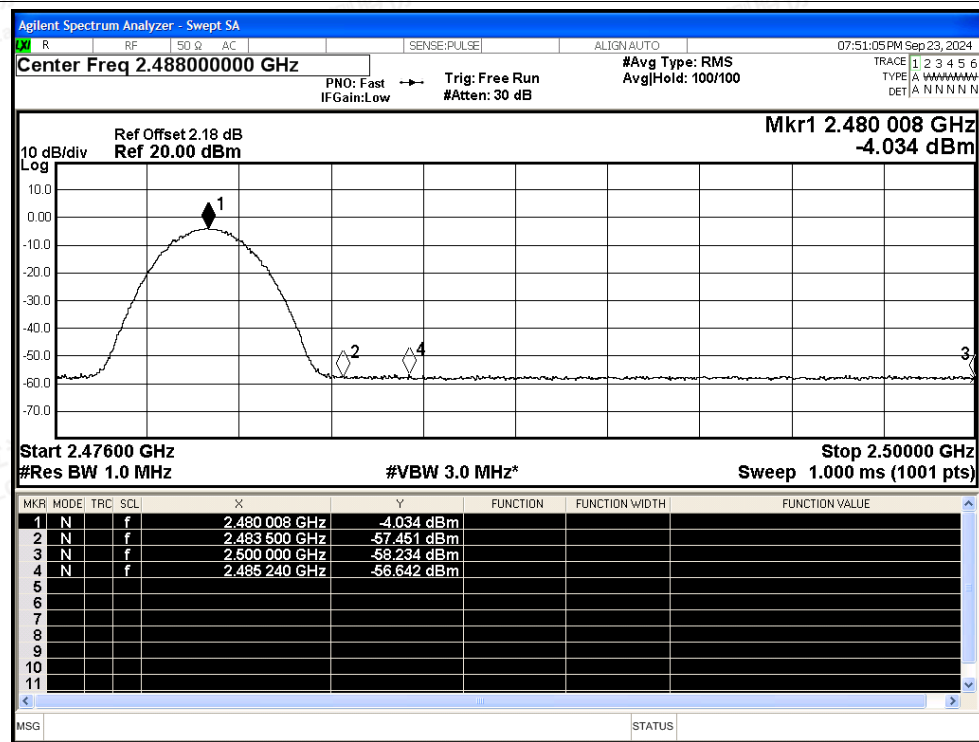
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Restrict Band NVNT BLE 2M 2480MHz Ant1 Peak



Restrict Band NVNT BLE 2M 2480MHz Ant1 Average



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