

Appendix D

Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	On Time (ms)	Period (ms)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)	Final settingFor VBW (kHz)
NVNT	BLE 1M	2402	Ant1	0.4	0.63	63.49	1.97	2.53	1
NVNT	BLE 1M	2440	Ant1	0.4	0.63	63.49	1.97	2.53	1
NVNT	BLE 1M	2480	Ant1	0.39	0.63	61.9	2.08	2.53	1
NVNT	BLE 2M	2402	Ant1	0.21	0.63	33.33	4.77	4.77	1
NVNT	BLE 2M	2440	Ant1	0.21	0.63	33.33	4.77	4.77	1
NVNT	BLE 2M	2480	Ant1	0.21	0.63	33.33	4.77	4.77	1

Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	E.I.R.P (dBm)	E.I.R.P Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	6.44	0	6.44	30	9.42	<=36.02	Pass
NVNT	BLE 1M	2440	Ant1	5.79	0	5.79	30	8.77	<=36.02	Pass
NVNT	BLE 1M	2480	Ant1	6.43	0	6.43	30	9.41	<=36.02	Pass
NVNT	BLE 2M	2402	Ant1	6.51	0	6.51	30	9.49	<=36.02	Pass
NVNT	BLE 2M	2440	Ant1	5.94	0	5.94	30	8.92	<=36.02	Pass
NVNT	BLE 2M	2480	Ant1	6.54	0	6.54	30	9.52	<=36.02	Pass
Note1: Antenna Gain: 2.98dBi; Note2: E.I.R.P = Measured Power + Antenna Gain										

Test Graphs

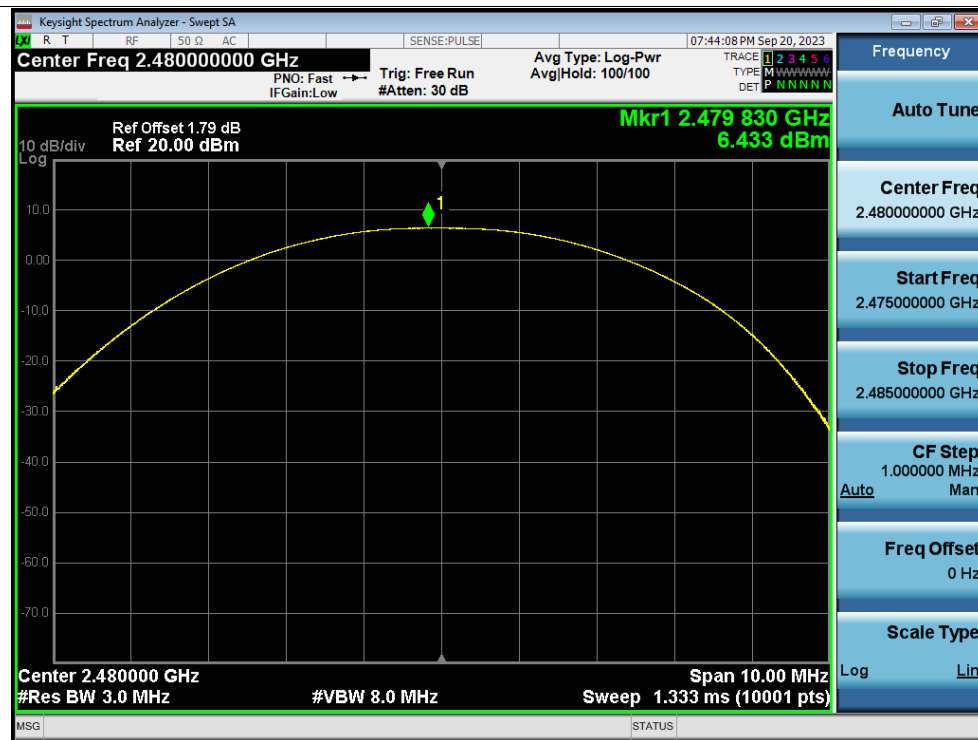
Power NVNT BLE 1M 2402MHz Ant1



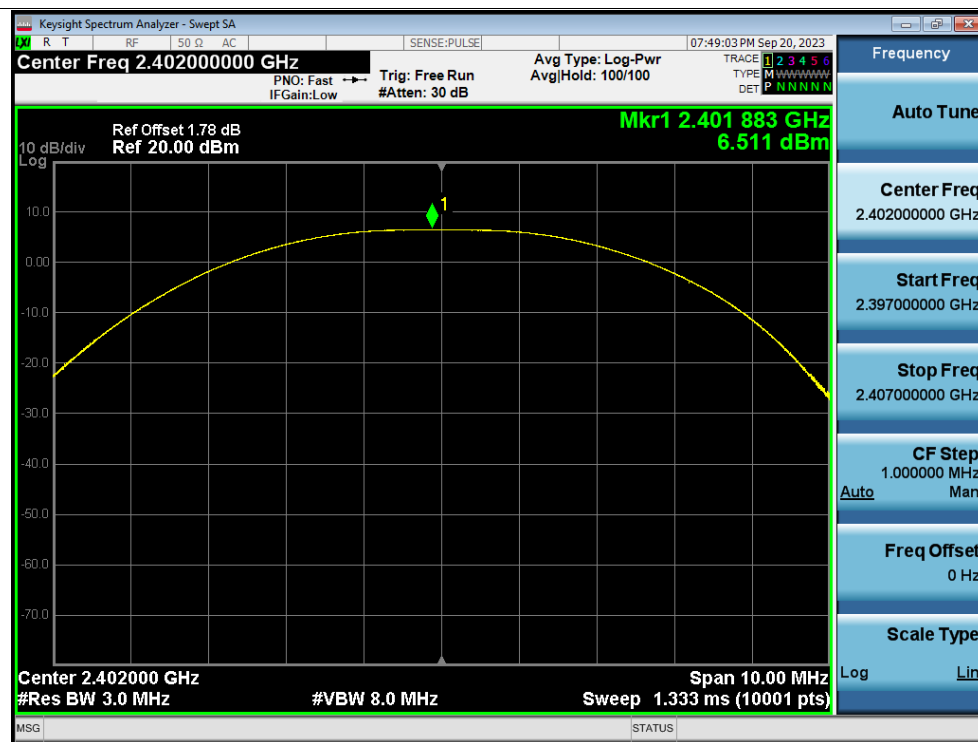
Power NVNT BLE 1M 2440MHz Ant1



Power NVNT BLE 1M 2480MHz Ant1



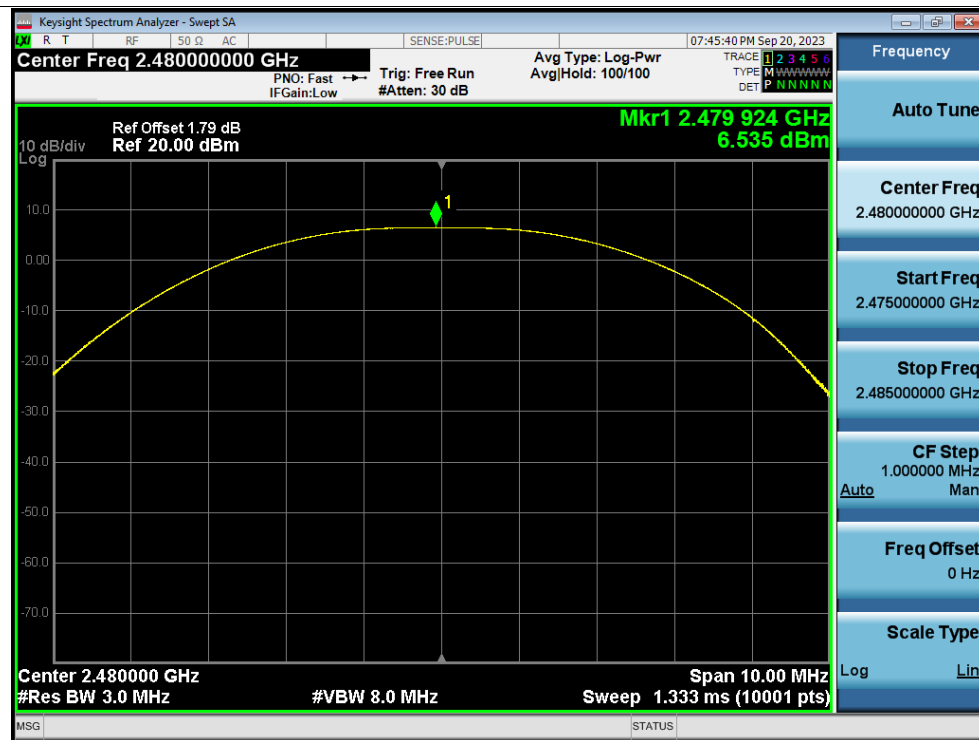
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2440MHz Ant1



Power NVNT BLE 2M 2480MHz Ant1



-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.653	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.653	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.643	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.068	0.5	Pass
NVNT	BLE 2M	2440	Ant1	0.941	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.097	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



Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.027
NVNT	BLE 1M	2440	Ant1	1.035
NVNT	BLE 1M	2480	Ant1	1.034
NVNT	BLE 2M	2402	Ant1	2.037
NVNT	BLE 2M	2440	Ant1	2.05
NVNT	BLE 2M	2480	Ant1	2.017

Test Graphs

OBW NVNT BLE 1M 2402MHz Ant1



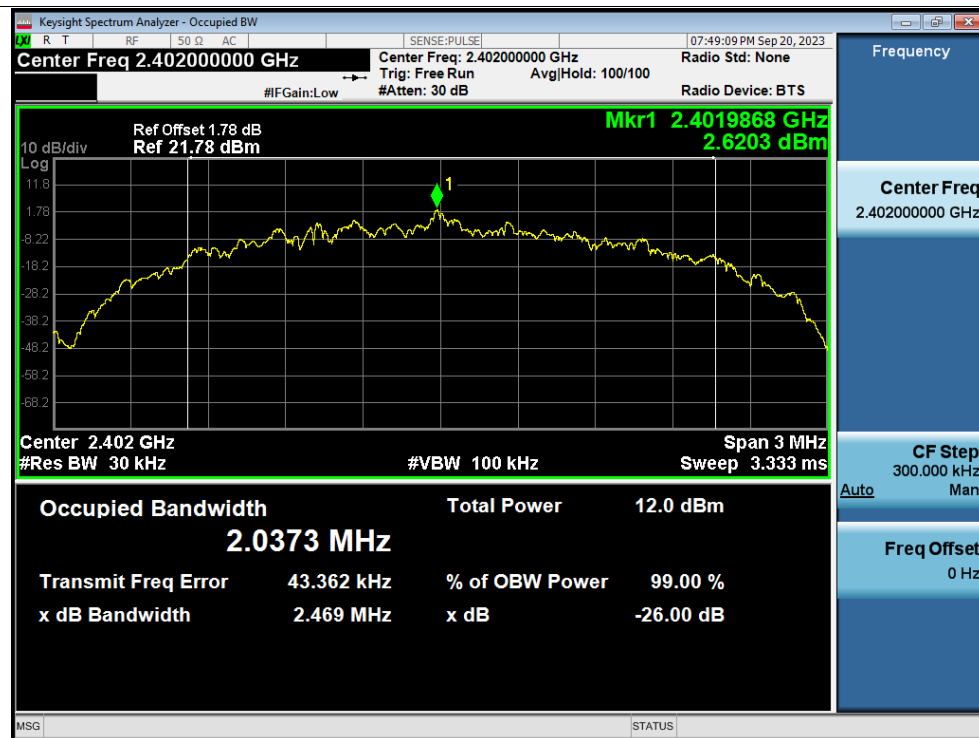
OBW NVNT BLE 1M 2440MHz Ant1



OBW NVNT BLE 1M 2480MHz Ant1



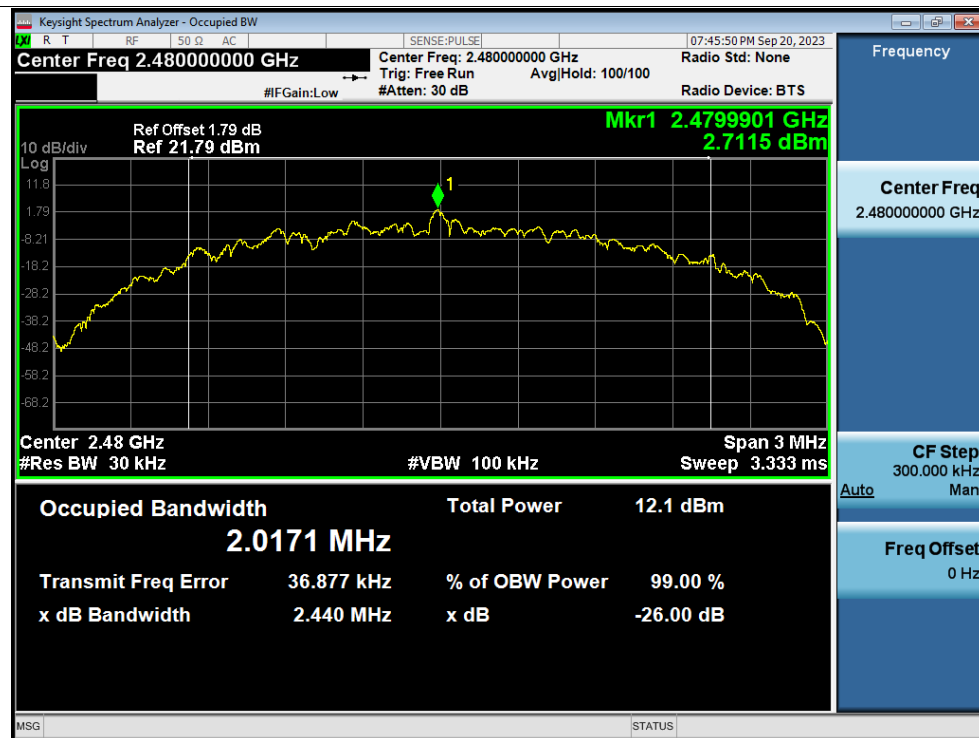
OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2440MHz Ant1



OBW NVNT BLE 2M 2480MHz Ant1

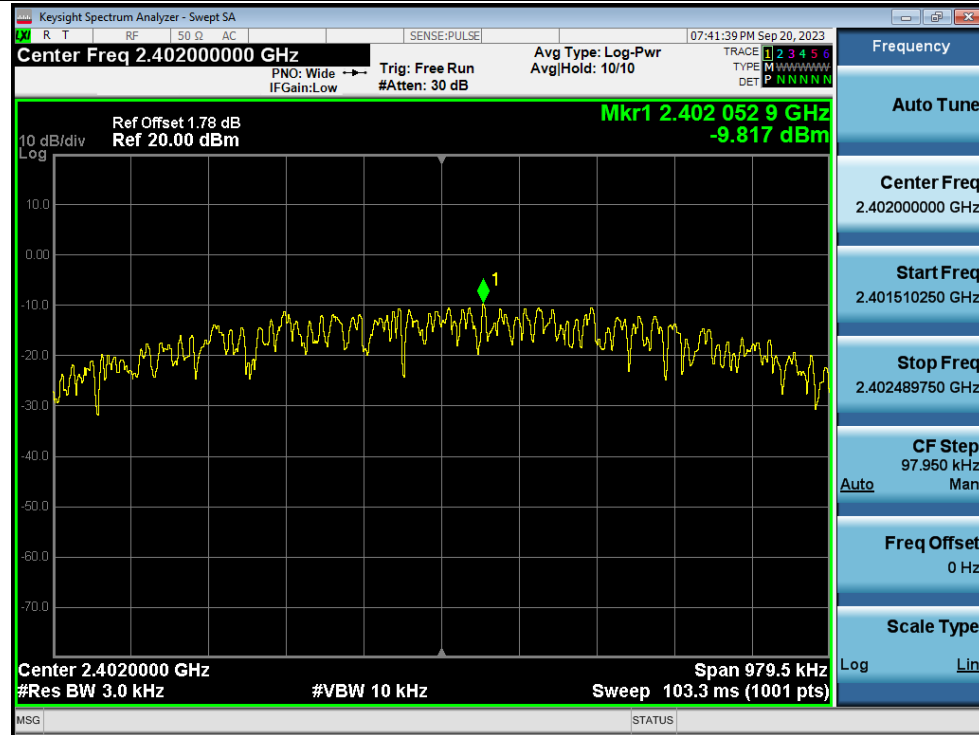


Maximum Power Spectral Density Level

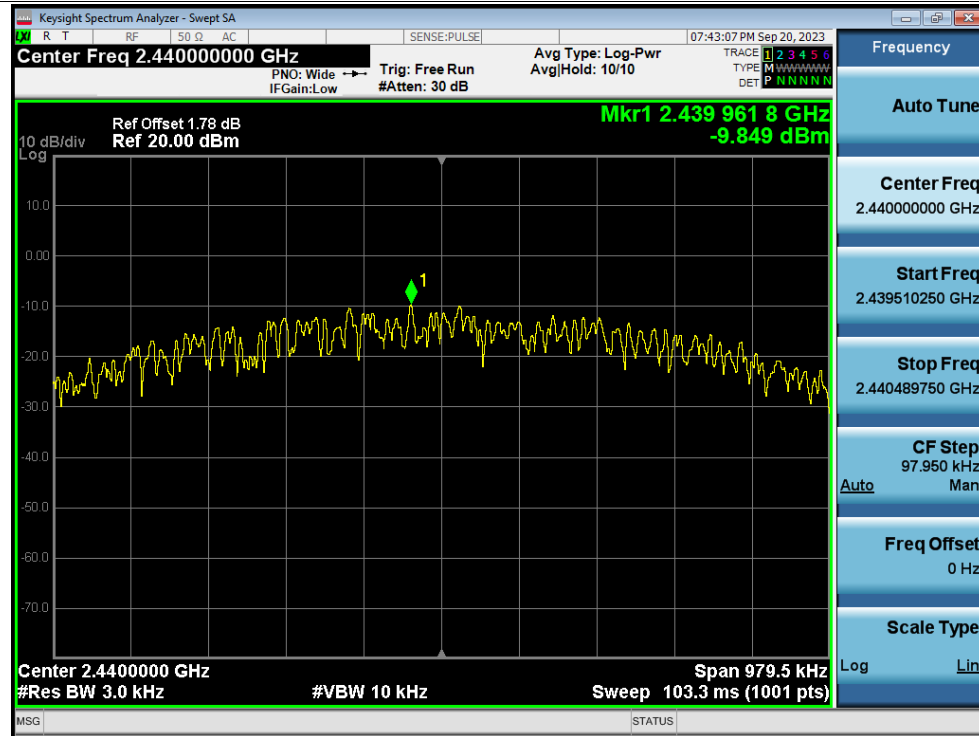
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-9.82	0	-9.82	8	Pass
NVNT	BLE 1M	2440	Ant1	-9.85	0	-9.85	8	Pass
NVNT	BLE 1M	2480	Ant1	-9.06	0	-9.06	8	Pass
NVNT	BLE 2M	2402	Ant1	-9.49	0	-9.49	8	Pass
NVNT	BLE 2M	2440	Ant1	-11.47	0	-11.47	8	Pass
NVNT	BLE 2M	2480	Ant1	-11.89	0	-11.89	8	Pass

Test Graphs

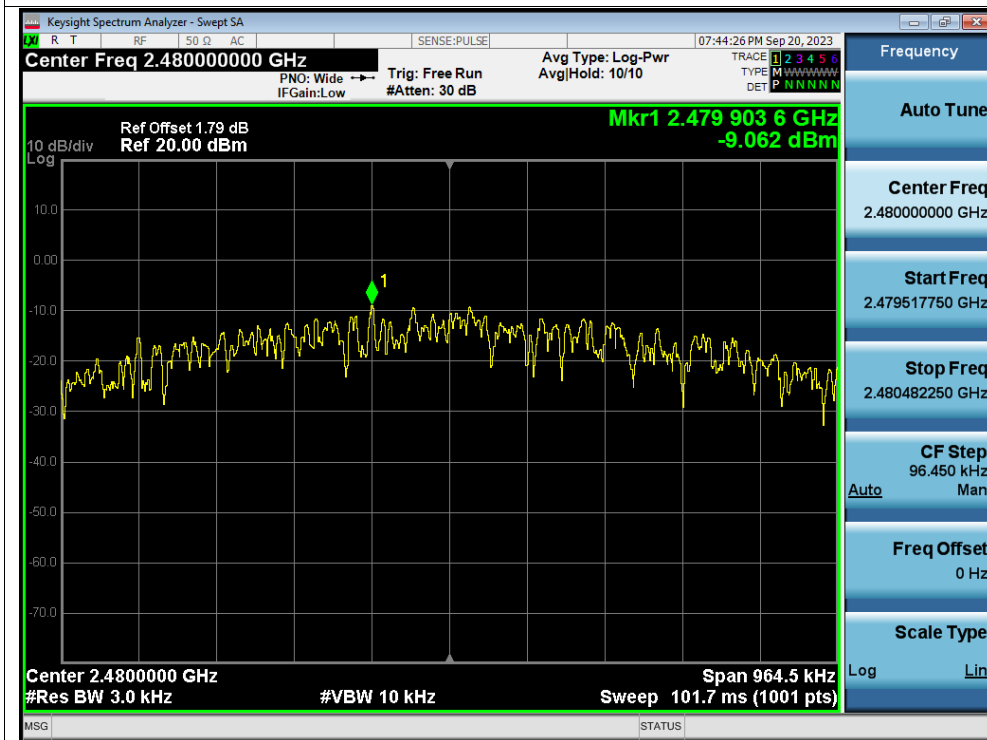
PSD NVNT BLE 1M 2402MHz Ant1



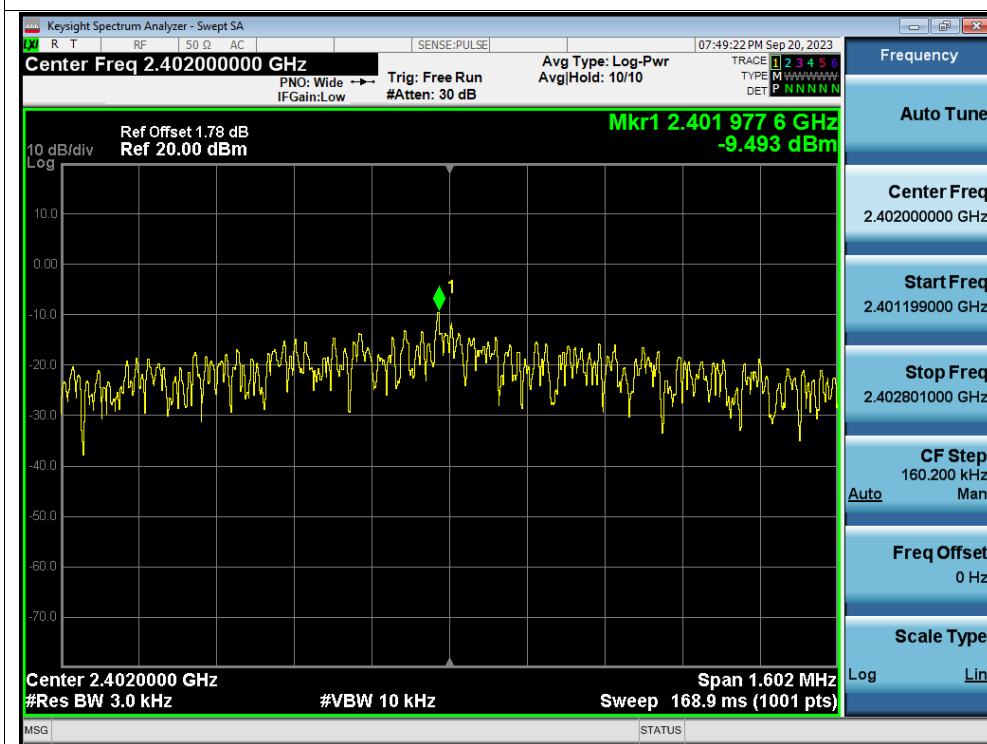
PSD NVNT BLE 1M 2440MHz Ant1



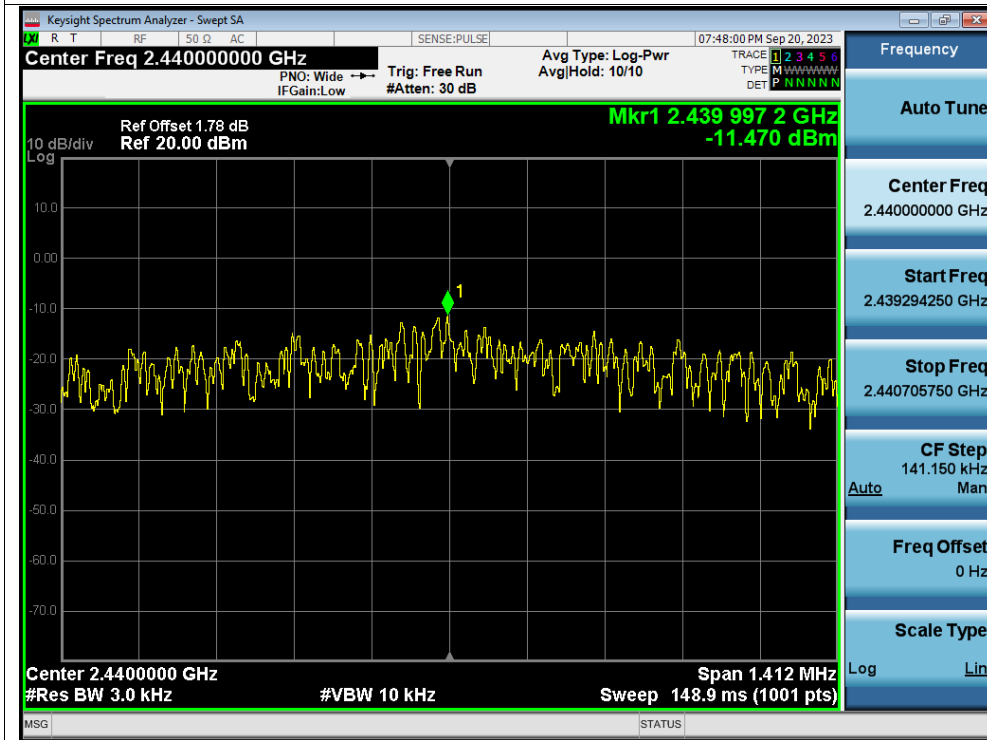
PSD NVNT BLE 1M 2480MHz Ant1



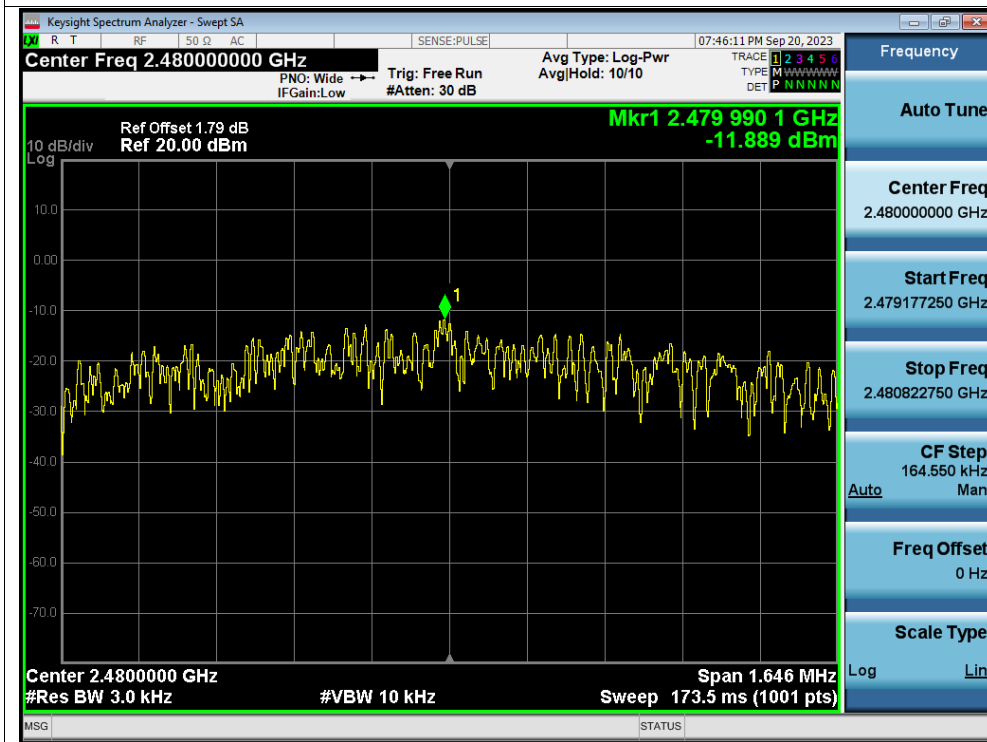
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1

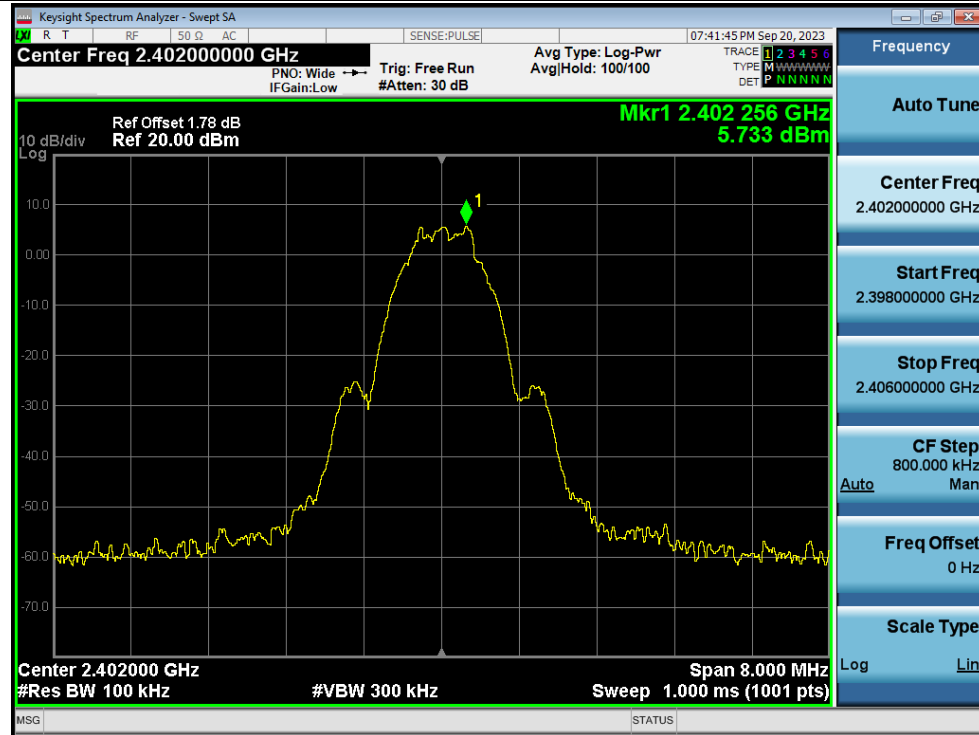


Band Edge

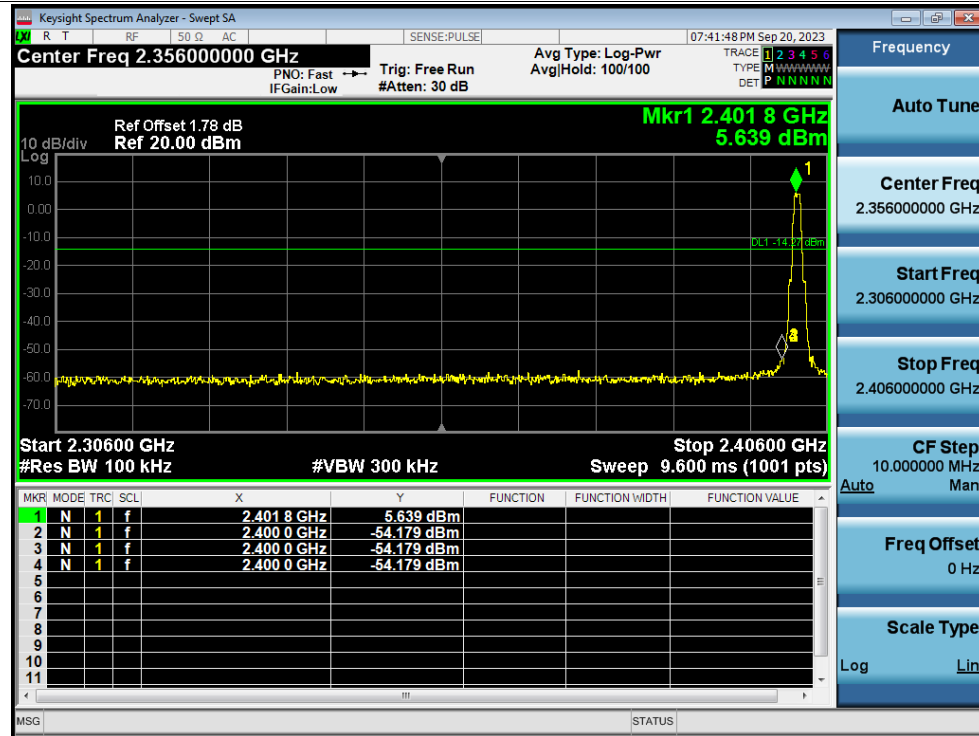
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-59.9	-20	Pass
NVNT	BLE 1M	2480	Ant1	-63.79	-20	Pass
NVNT	BLE 2M	2402	Ant1	-32.85	-20	Pass
NVNT	BLE 2M	2480	Ant1	-59.78	-20	Pass

Test Graphs

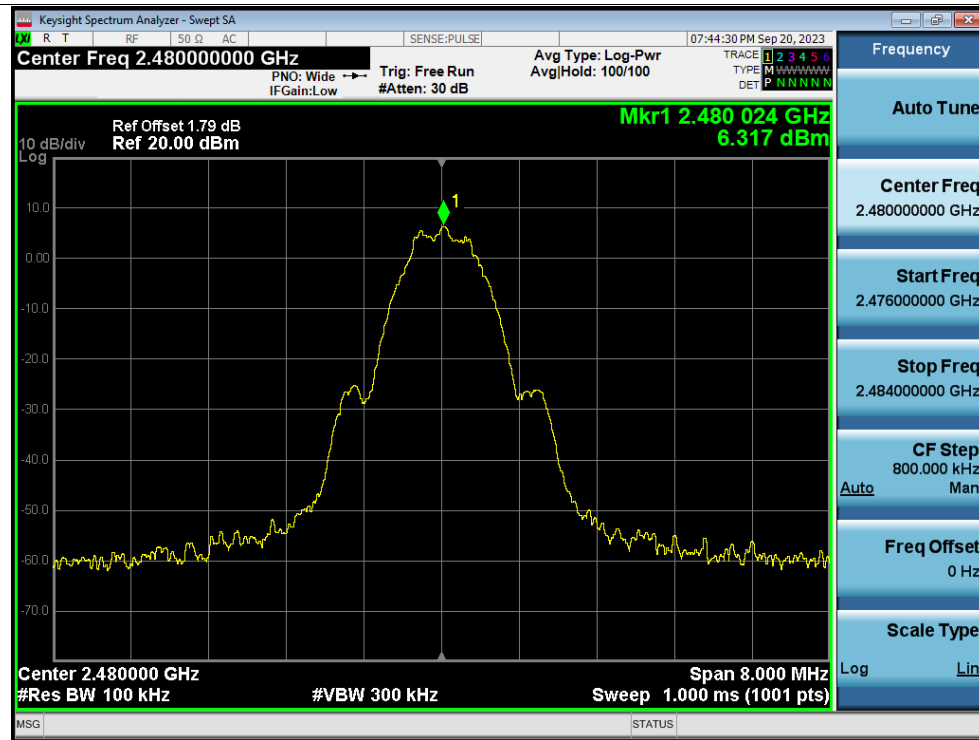
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



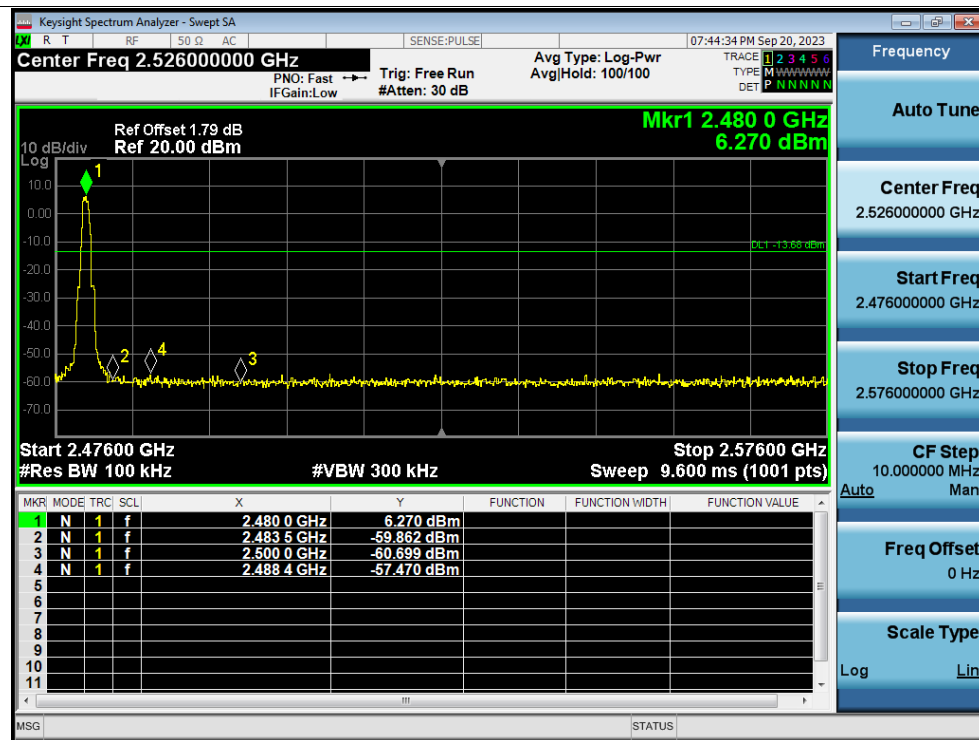
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



Band Edge NVNT BLE 2M 2402MHz Ant1 Ref

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.402000000 GHz

Ref Offset 1.78 dB
Ref 20.00 dBm

Trig: Free Run
#Atten: 30 dB

Avg Type: Log-Pwr
Avg/Hold: 100/100

Frequency

Auto Tune

Center Freq
2.402000000 GHz

Start Freq
2.398000000 GHz

Stop Freq
2.406000000 GHz

CF Step
800.000 kHz
Man

Freq Offset
0 Hz

Scale Type
Log

10 dB/div
Log

Mkr1 2.402 016 GHz
5.401 dBm

Center 2.402000 GHz
#Res BW 100 kHz

#VBW 300 kHz

Span 8.000 MHz
Sweep 1.000 ms (1001 pts)

The image shows a Keysight Spectrum Analyzer interface. The main display area shows a spectrum plot with a yellow trace. A peak is marked with a green diamond and labeled '1'. The peak is at 2.402016 GHz with a power of 5.401 dBm. The plot has a grid and a logarithmic scale. The y-axis is labeled '10 dB/div Log' and ranges from -70.0 to 10.0. The x-axis is labeled 'Center 2.402000 GHz' and 'Span 8.000 MHz'. The plot shows a signal with a peak at 2.402016 GHz and a power of 5.401 dBm. The signal is centered at 2.402000 GHz. The resolution bandwidth is 100 kHz. The video bandwidth is 300 kHz. The sweep time is 1.000 ms (1001 pts). The center frequency is 2.402000000 GHz. The start frequency is 2.398000000 GHz. The stop frequency is 2.406000000 GHz. The CF step is 800.000 kHz. The frequency offset is 0 Hz. The scale type is Log. The auto tune button is visible. The center frequency is 2.402000000 GHz. The start frequency is 2.398000000 GHz. The stop frequency is 2.406000000 GHz. The CF step is 800.000 kHz. The frequency offset is 0 Hz. The scale type is Log. The auto tune button is visible. The center frequency is 2.402000000 GHz. The start frequency is 2.398000000 GHz. The stop frequency is 2.406000000 GHz. The CF step is 800.000 kHz. The frequency offset is 0 Hz. The scale type is Log. The auto tune button is visible.

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.35600000 GHz

Ref Offset 1.78 dB
Ref 20.00 dBm

PN0: Fast
IF Gain: Low

Trig: Free Run
#Atten: 30 dB

Avg Type: Log-Pwr
Avg/Hold: 100/100

07:49:28 PM Sep 20, 2023

TRACE 1 2 3 4 5 6
TYPE M
DET P NNNNN

Mkr2 2.356 0 GHz
-60.467 dBm

10 dB/div
Log

Start 2.30600 GHz
#Res BW 100 kHz

Stop 2.40600 GHz
#VBW 300 kHz
Sweep 9.600 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	t	60.50 μ s	-7.73 dBm			
2	N	1	t	476.0 μ s	-10.28 dBm			
3	N	1	t	685.5 μ s	-5.48 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

Auto Tune

Center Freq
2.35600000 GHz

Start Freq
2.30600000 GHz

Stop Freq
2.40600000 GHz

CF Step
10.000000 MHz

Auto Man

Freq Offset
0 Hz

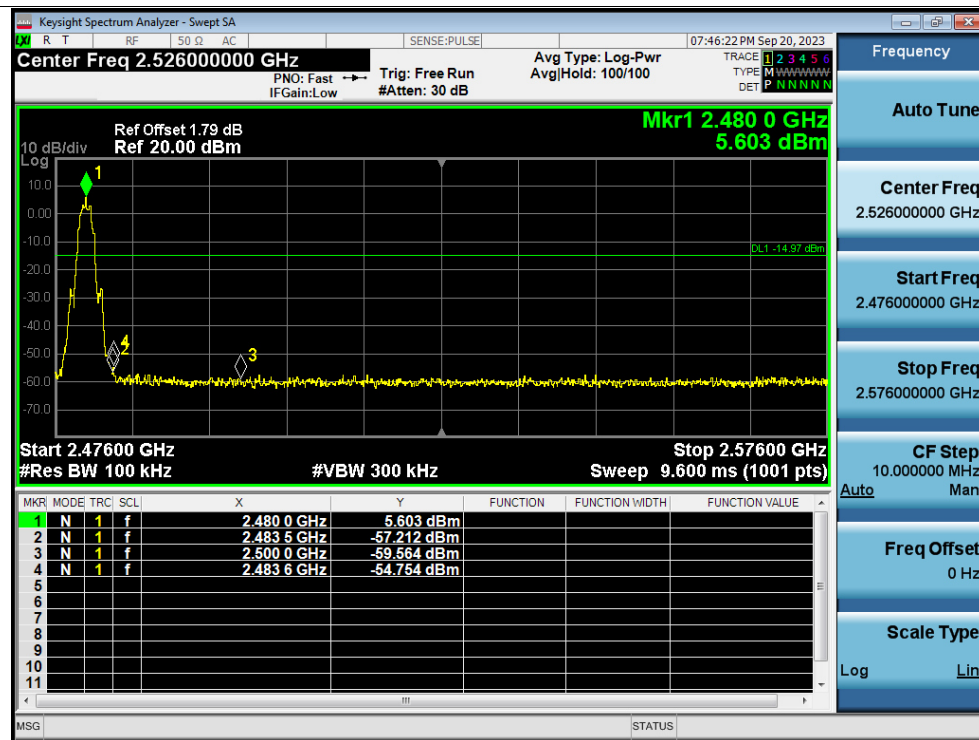
Scale Type
Log Lin

MSG STATUS

Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Band Edge NVNT BLE 2M 2480MHz Ant1 Emission



Conducted RF Spurious Emission

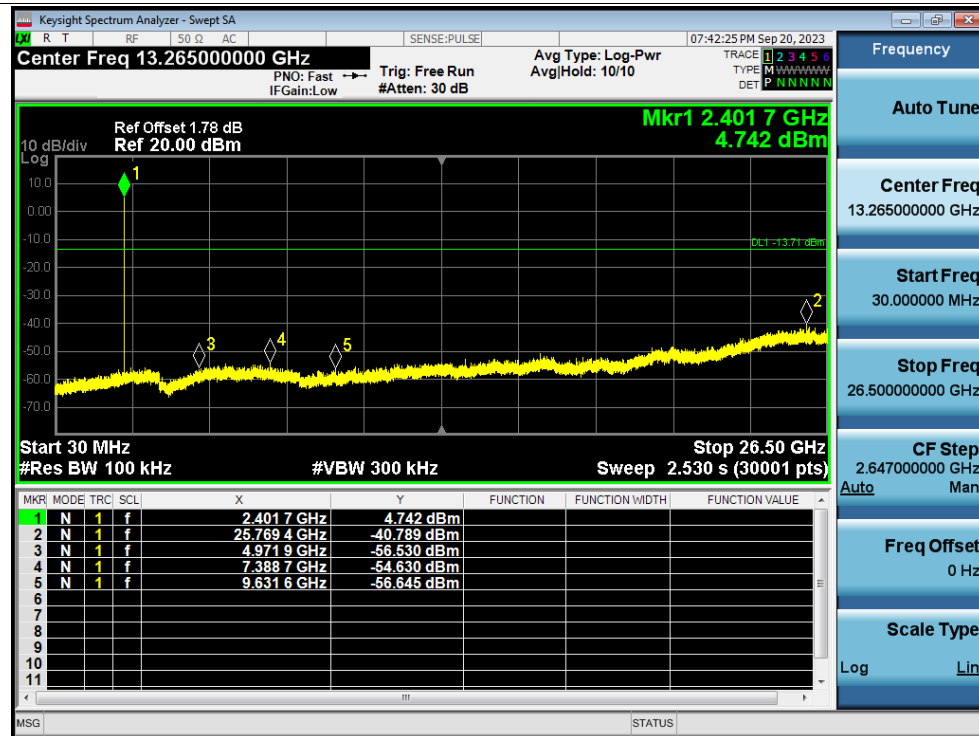
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-47.07	-20	Pass
NVNT	BLE 1M	2440	Ant1	-47.36	-20	Pass
NVNT	BLE 1M	2480	Ant1	-47.82	-20	Pass
NVNT	BLE 2M	2402	Ant1	-47.99	-20	Pass
NVNT	BLE 2M	2440	Ant1	-47	-20	Pass
NVNT	BLE 2M	2480	Ant1	-46.79	-20	Pass

Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



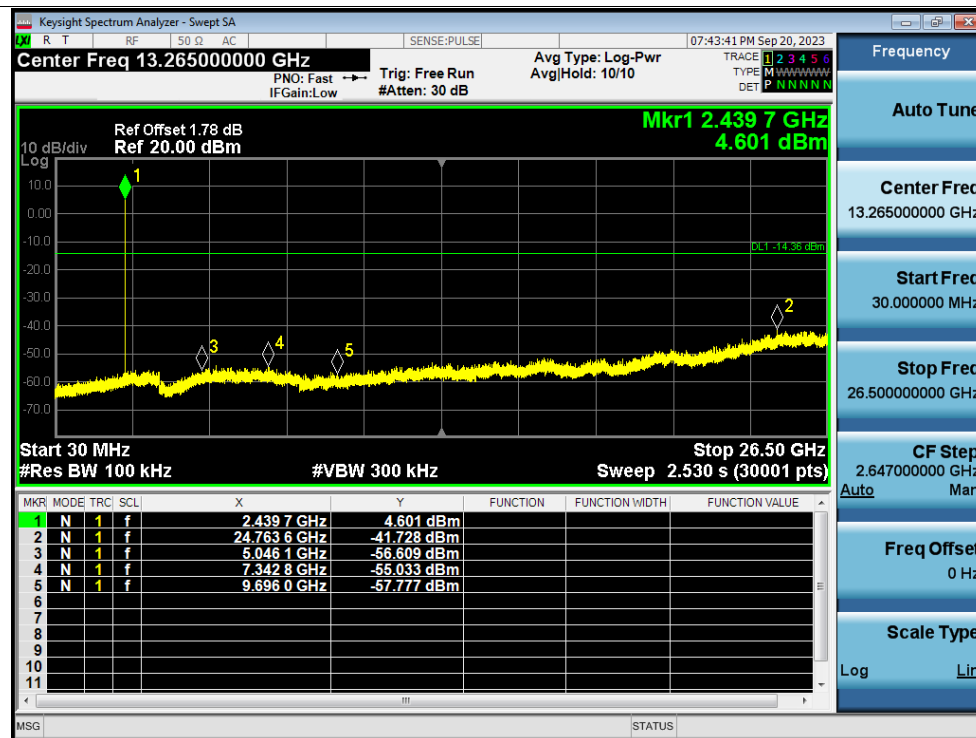
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



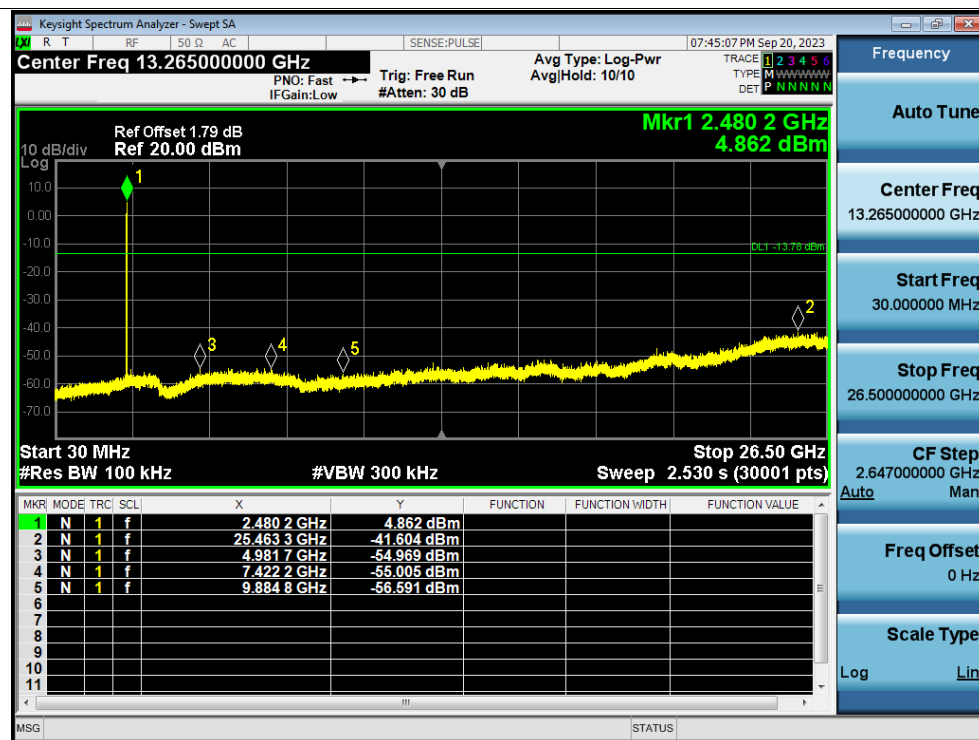
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



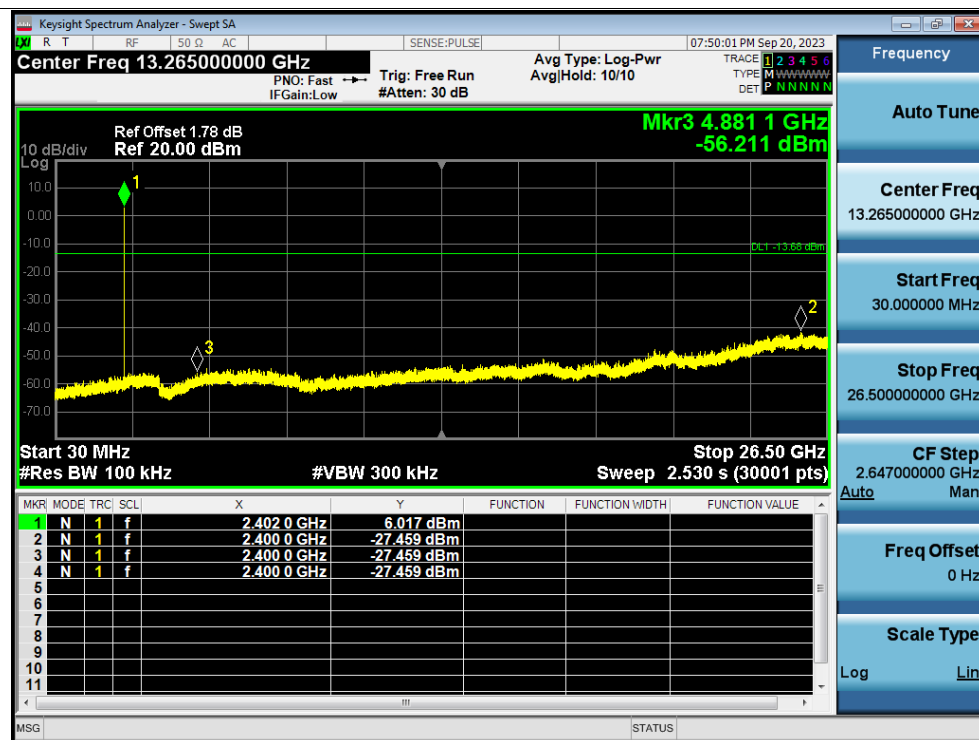
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



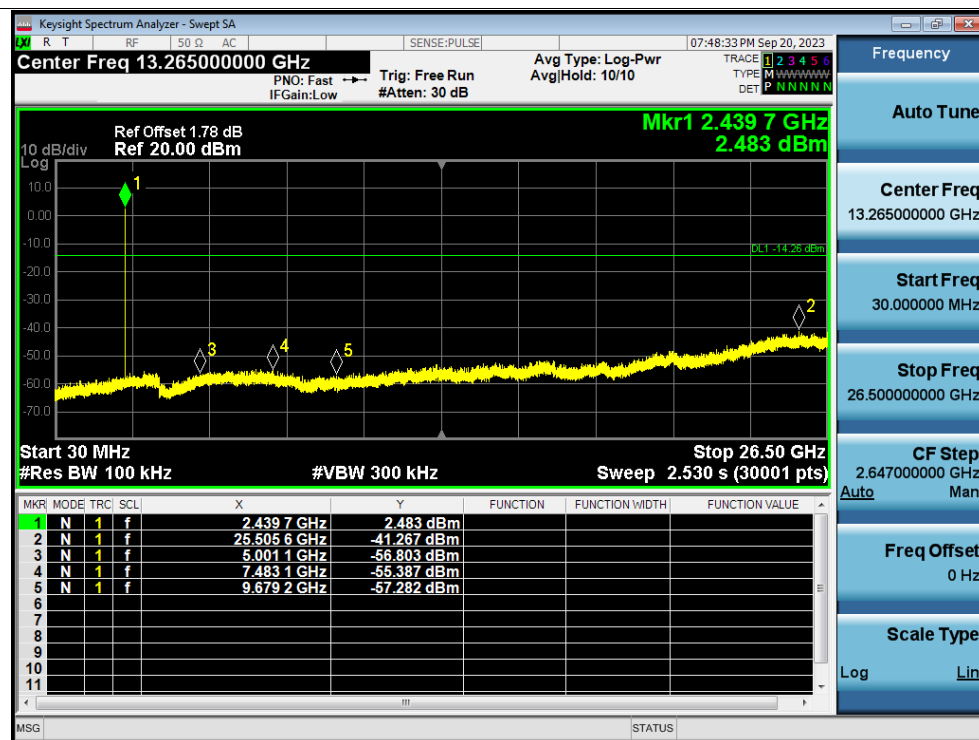
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



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

