

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	8.22	<=36.02	Pass
NVNT	BLE 1M	2440	Ant1	5.79	0	5.79	30	7.57	<=36.02	Pass
NVNT	BLE 1M	2480	Ant1	6.43	0	6.43	30	8.21	<=36.02	Pass
NVNT	BLE 2M	2402	Ant1	6.51	0	6.51	30	8.29	<=36.02	Pass
NVNT	BLE 2M	2440	Ant1	5.94	0	5.94	30	7.72	<=36.02	Pass
NVNT	BLE 2M	2480	Ant1	6.54	0	6.54	30	8.32	<=36.02	Pass
Note1: Antenna Gain: 1.78dBi;										
Note2: E.I.R.P = Measured Power + Antenna Gain										

Test Graphs

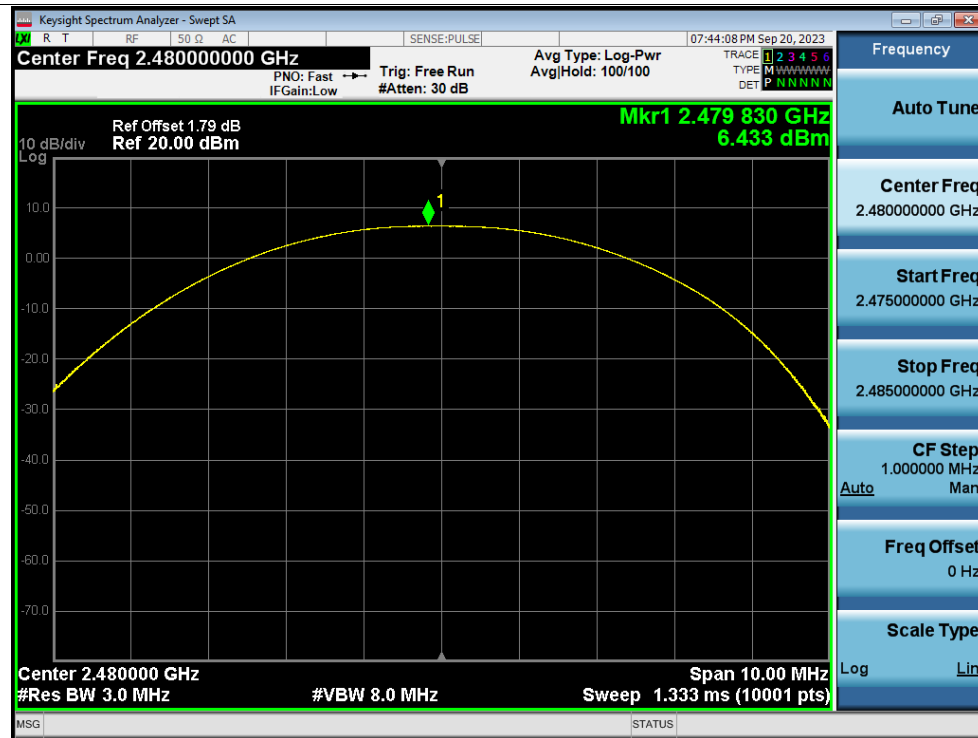
Power NVNT BLE 1M 2402MHz Ant1



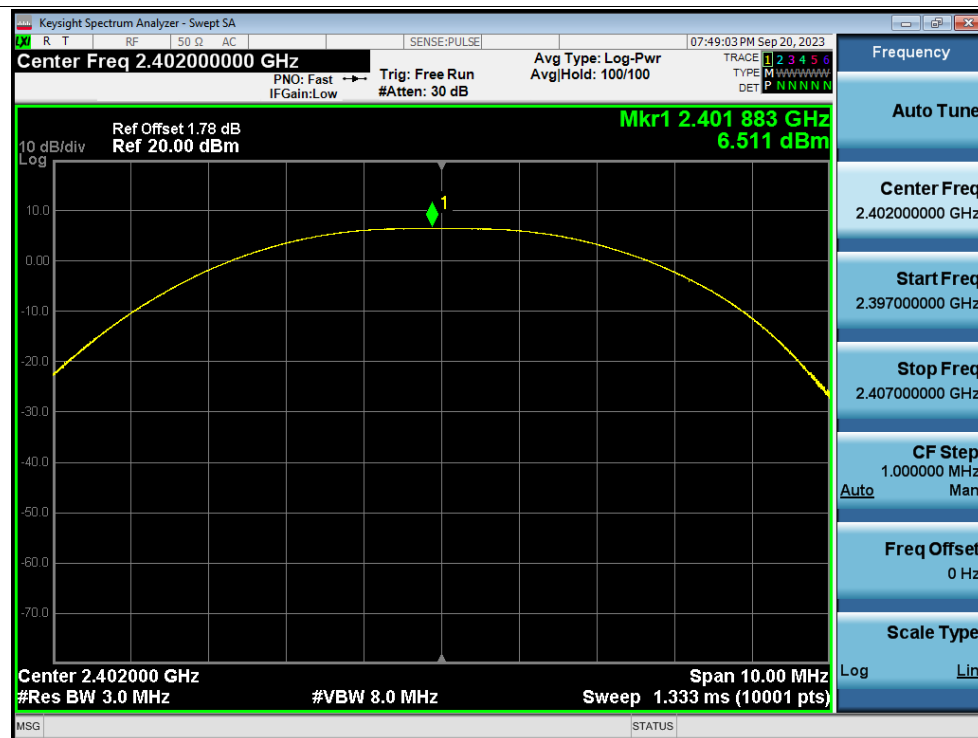
Power NVNT BLE 1M 2440MHz Ant1



Power NVNT BLE 1M 2480MHz Ant1



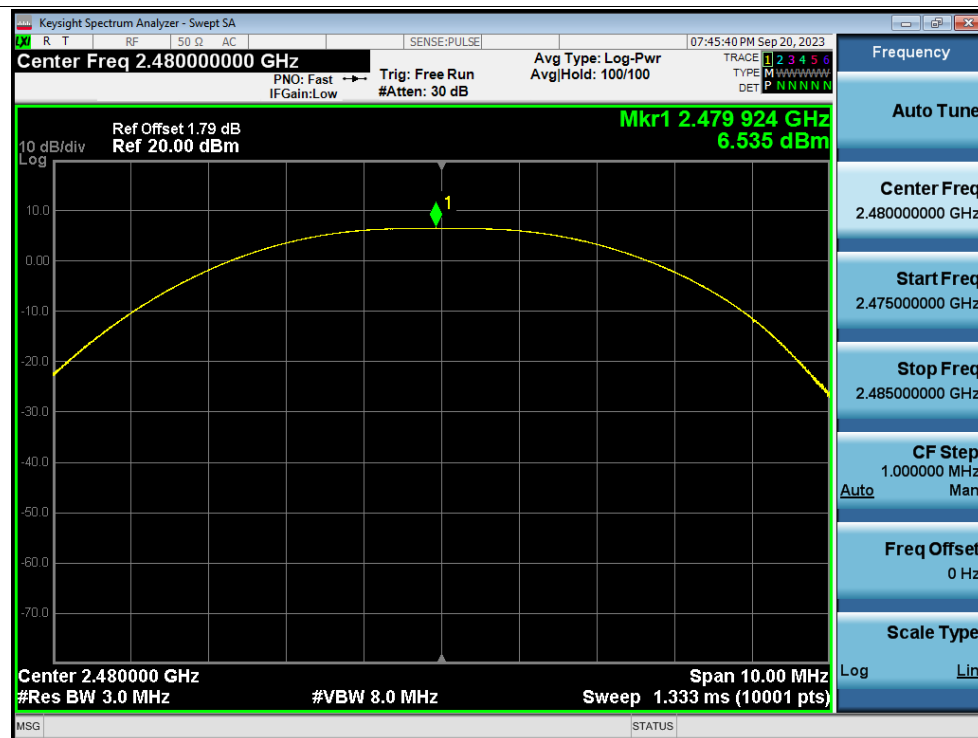
Power NVNT BLE 2M 2402MHz Ant1



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



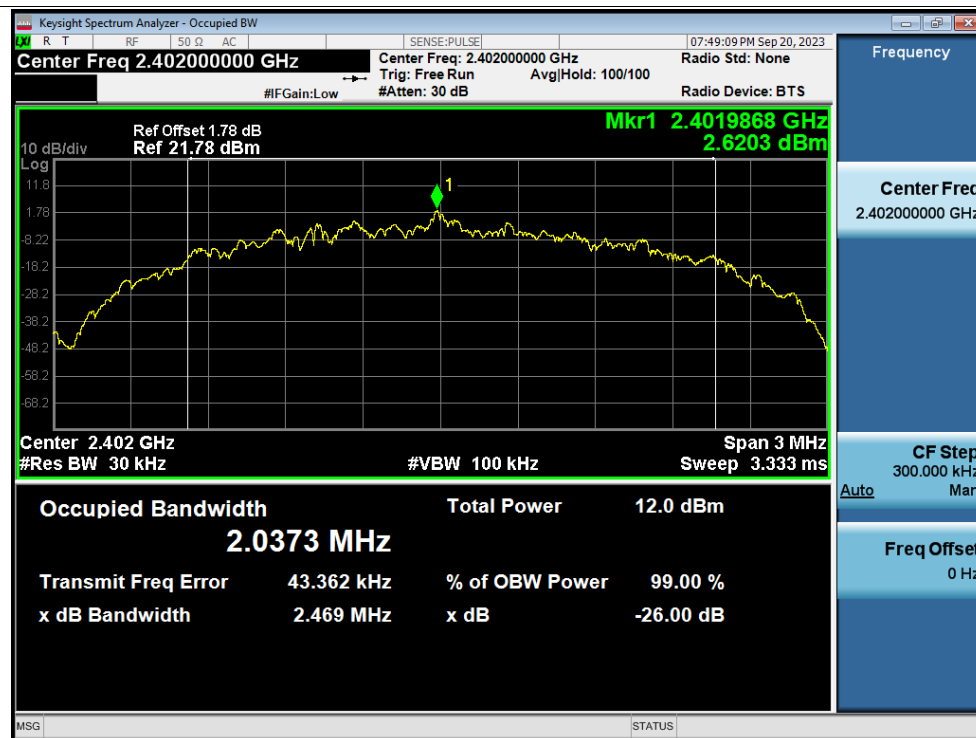
OBW NVNT BLE 1M 2440MHz Ant1



OBW NVNT BLE 1M 2480MHz Ant1



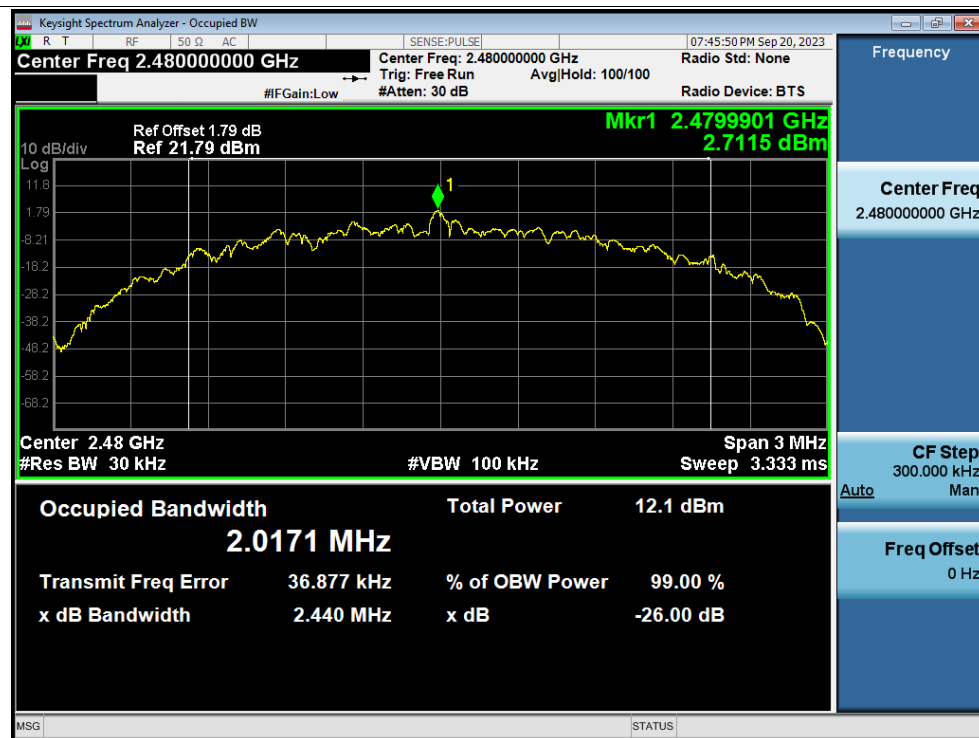
OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2440MHz Ant1



OBW NVNT BLE 2M 2480MHz Ant1

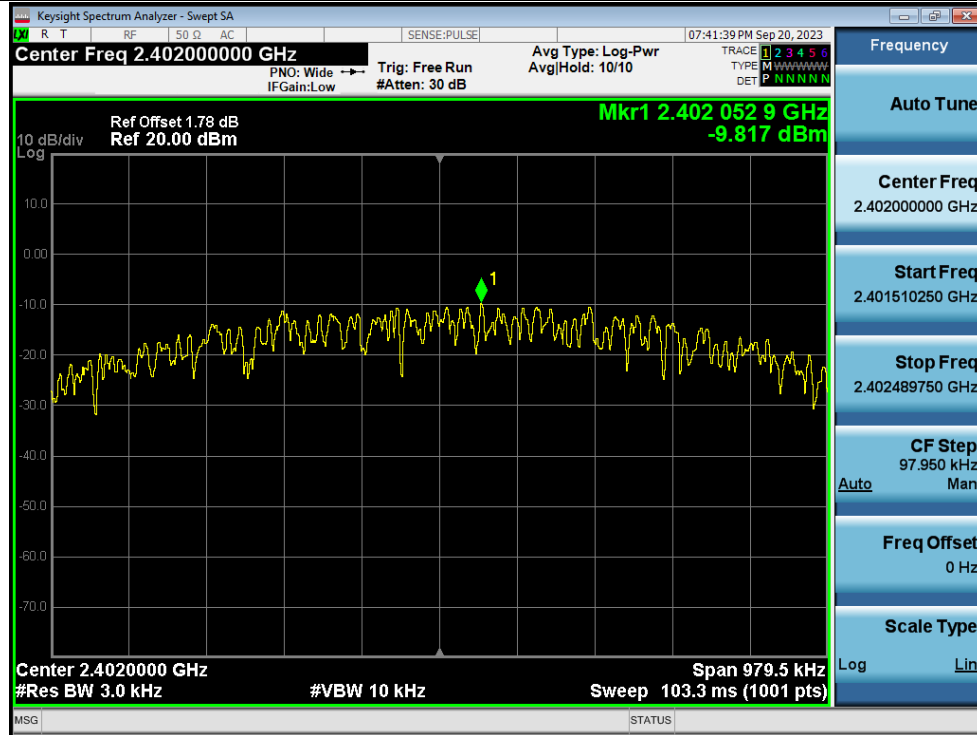


Maximum Power Spectral Density Level

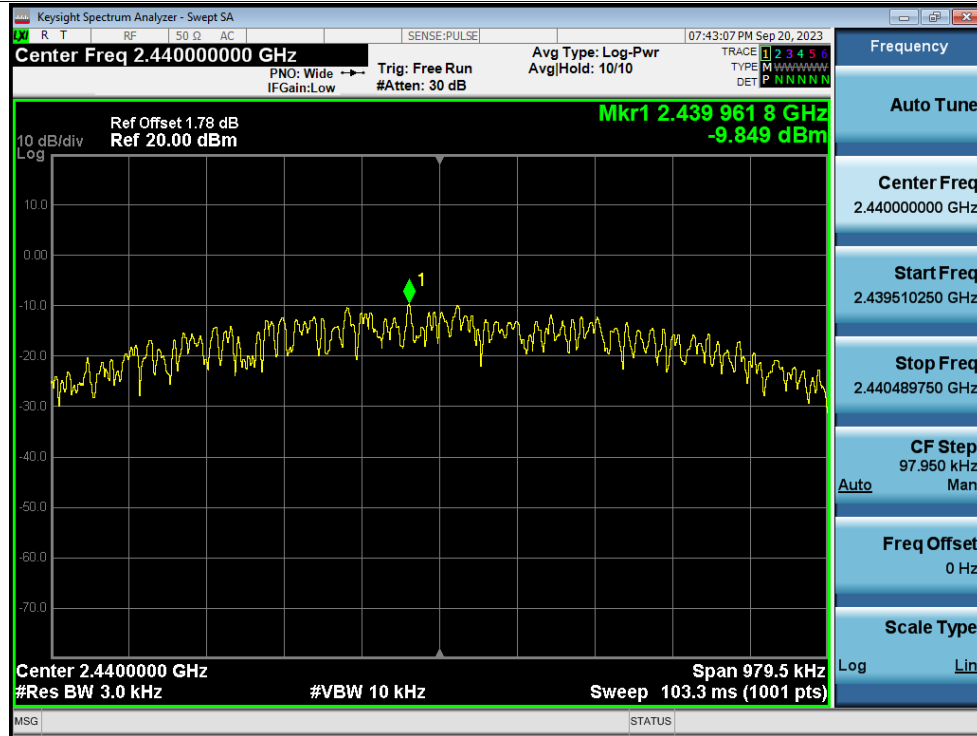
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-9.82	0	-9.82	8	Pass
NVNT	BLE 1M	2440	Ant1	-9.85	0	-9.85	8	Pass
NVNT	BLE 1M	2480	Ant1	-9.06	0	-9.06	8	Pass
NVNT	BLE 2M	2402	Ant1	-9.49	0	-9.49	8	Pass
NVNT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

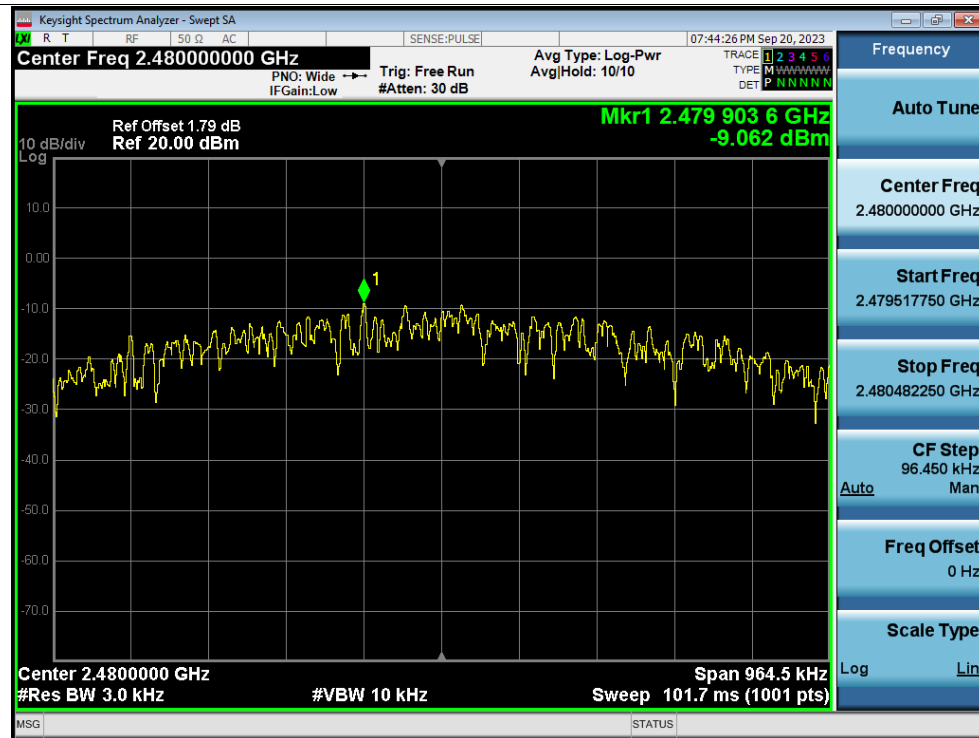
PSD NVNT BLE 1M 2402MHz Ant1



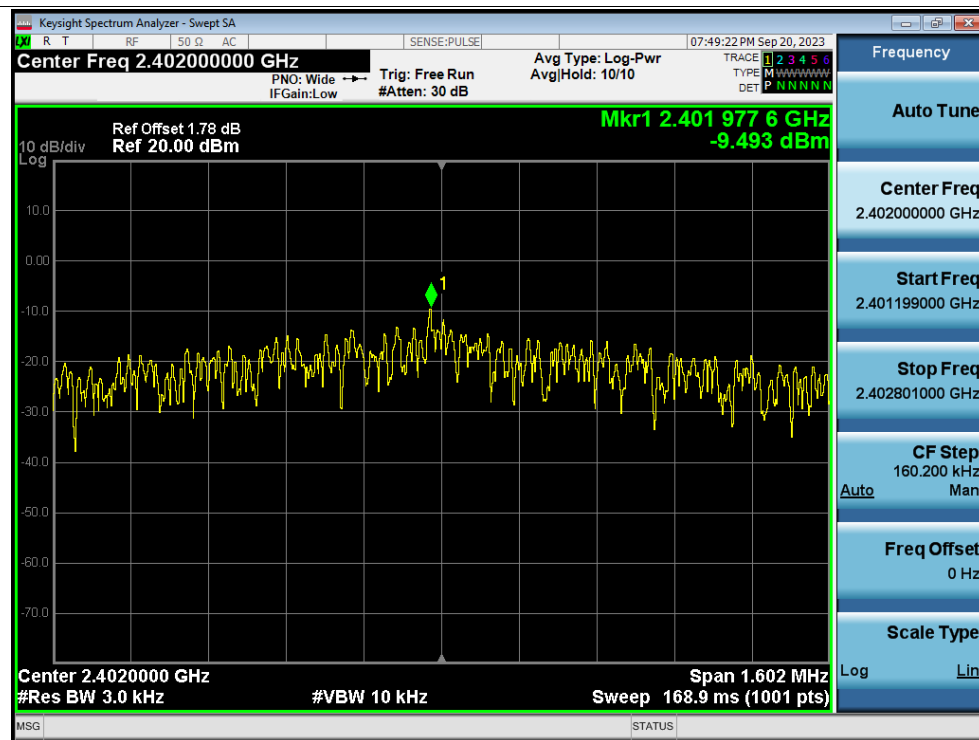
PSD NVNT BLE 1M 2440MHz Ant1



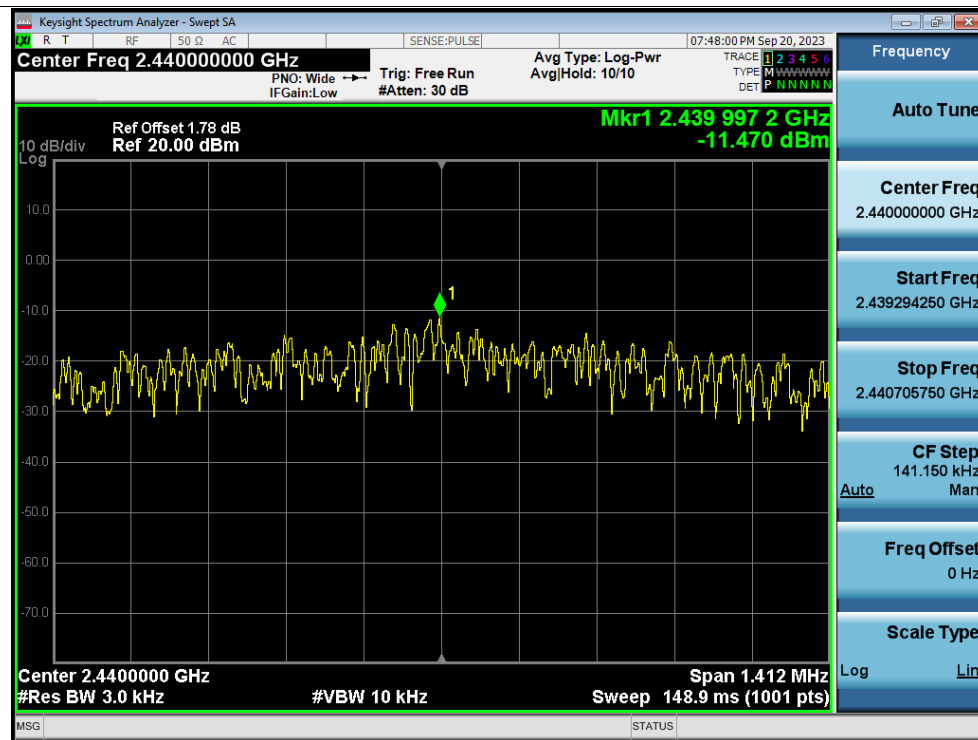
PSD NVNT BLE 1M 2480MHz Ant1



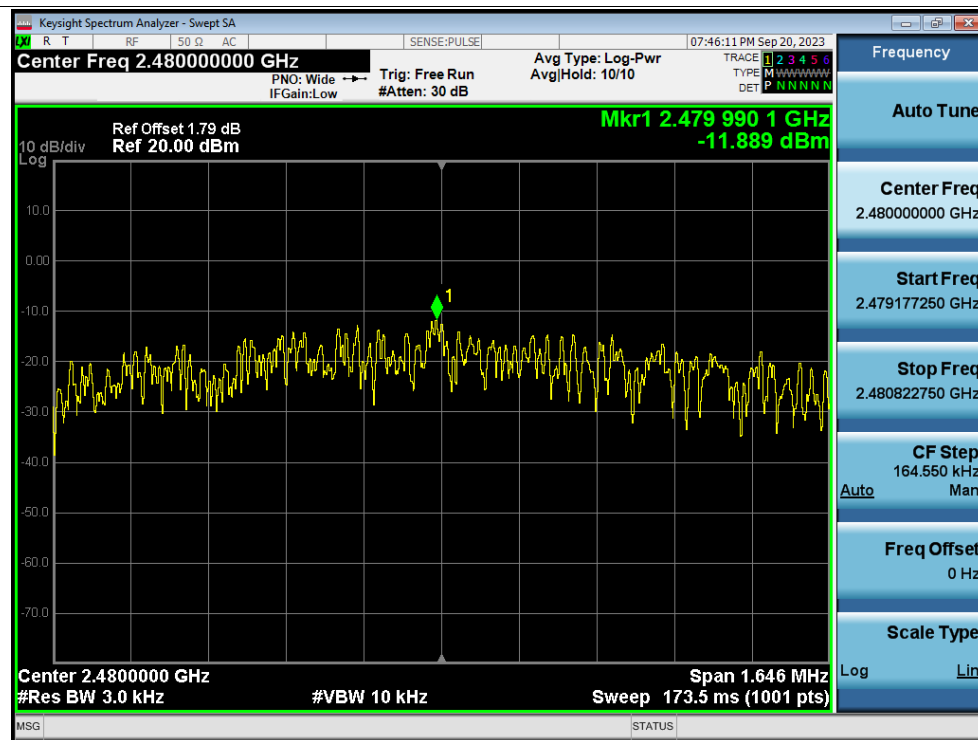
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1

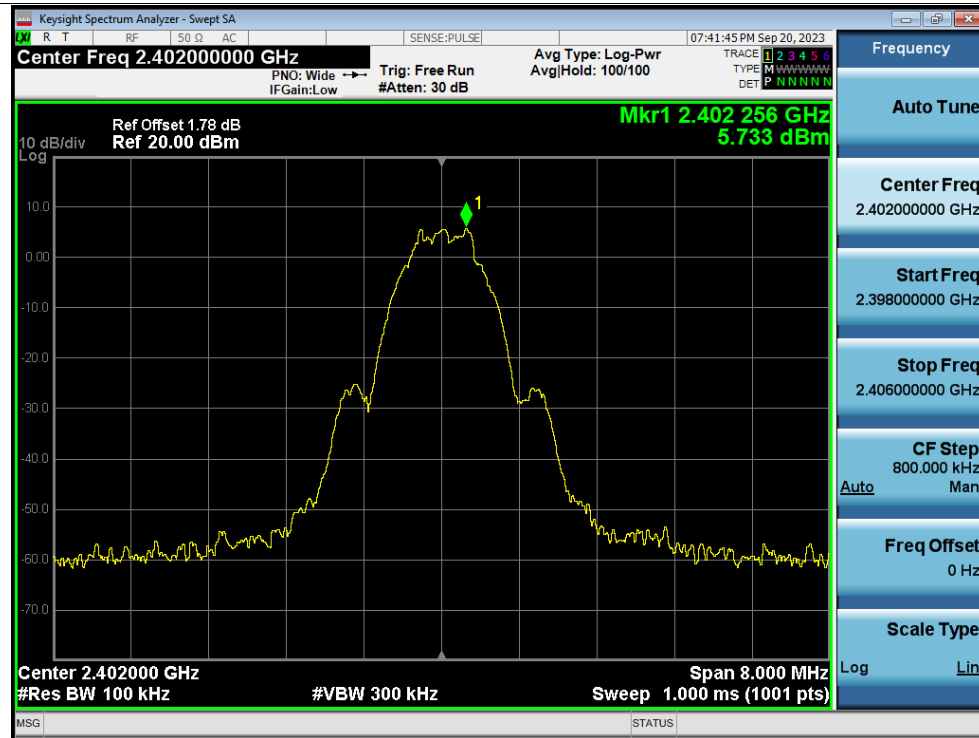


Band Edge

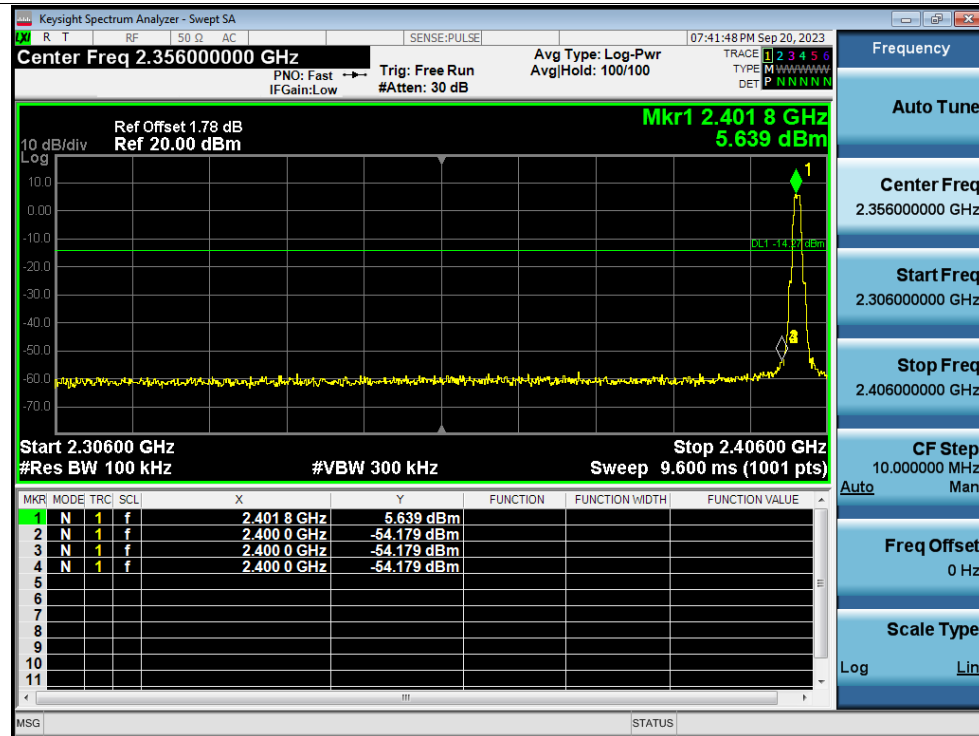
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-59.9	-20	Pass
NVNT	BLE 1M	2480	Ant1	-63.79	-20	Pass
NVNT	BLE 2M	2402	Ant1	-32.85	-20	Pass
NVNT	BLE 2M	2480	Ant1	-59.78	-20	Pass

Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



Keysight Spectrum Analyzer - Swept SA

Center Freq 2.48000000 GHz

Ref Offset 1.79 dB
Ref 20.00 dBm

10 dB/div
Log

Mkr1 2.480 024 GHz
6.317 dBm

Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz

Span 8.000 MHz
Sweep 1.000 ms (1001 pts)

Frequency

Auto Tune

Center Freq
2.48000000 GHz

Start Freq
2.476000000 GHz

Stop Freq
2.484000000 GHz

CF Step
800.000 kHz
Man

Freq Offset
0 Hz

Scale Type
Log

Keysight Spectrum Analyzer - Swept SA

R T RF 50 Ω AC SENSE:PULSE 07:44:34 PM Sep 20, 2023

Center Freq 2.526000000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 100/100

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

Ref Offset 1.79 dB Ref 20.00 dBm

Mkr1 2.480 0 GHz 6.270 dBm

Start 2.47600 GHz Stop 2.57600 GHz
#Res BW 100 kHz #VBW 300 kHz Sweep 9.600 ms (1001 pts)

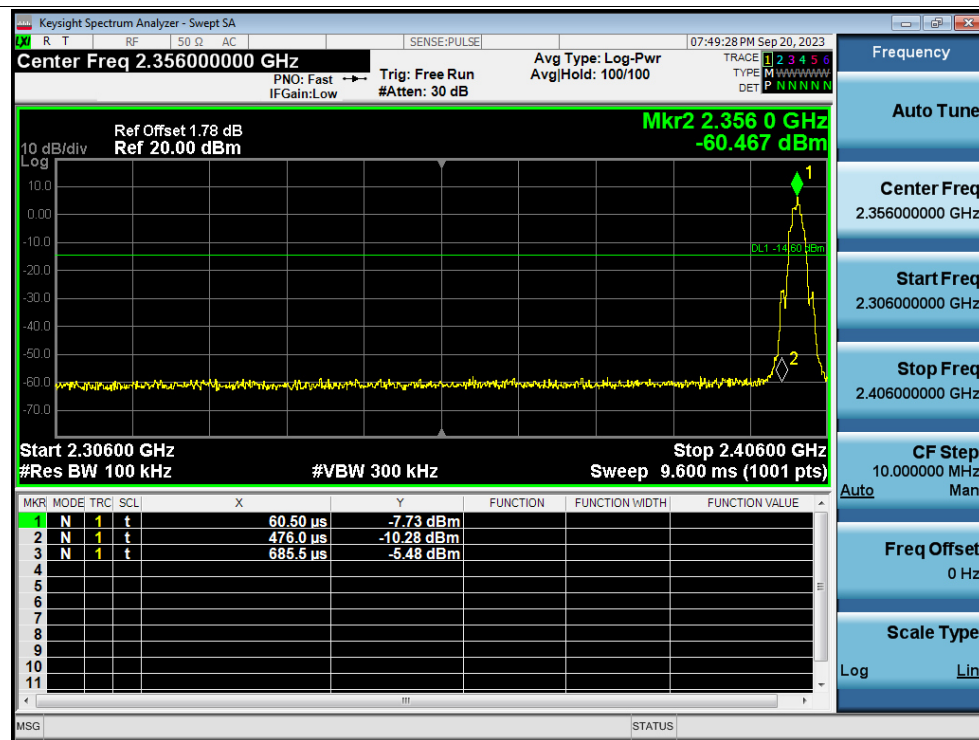
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 0 GHz	6.270 dBm			
2	N	1	f	2.483 5 GHz	-59.862 dBm			
3	N	1	f	2.500 0 GHz	-60.699 dBm			
4	N	1	f	2.488 4 GHz	-57.470 dBm			

MSG STATUS

Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref

Keysight Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:PULSE 07:46:19 PM Sep 20, 2023

Center Freq 2.480000000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg|Hold: 100/100

TRACE 1 2 3 4 5 6 TYPE P N N N N N N P N N N N N N

Ref Offset 1.79 dB Ref 20.00 dBm

Mkr1 2.480 040 GHz 5.034 dBm

10 dB/div Log

Center Freq 2.480000 GHz #Res BW 100 kHz #VBW 300 kHz Span 8.000 MHz Sweep 1.000 ms (1001 pts)

Frequency

Auto Tune

Center Freq 2.480000000 GHz

Start Freq 2.476000000 GHz

Stop Freq 2.484000000 GHz

CF Step 800.000 kHz Man

Auto

Freq Offset 0 Hz

Scale Type Log Lin

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.526000000 GHz

Ref Offset 1.79 dB
Ref 20.00 dBm

Mkr1 2.480 0 GHz
5.603 dBm

Start 2.47600 GHz
#Res BW 100 kHz

Stop 2.57600 GHz
#VBW 300 kHz
Sweep 9.600 ms (1001 pts)

Frequency

Auto Tune

Center Freq
2.526000000 GHz

Start Freq
2.476000000 GHz

Stop Freq
2.576000000 GHz

CF Step
10.000000 MHz
Man

Freq Offset
0 Hz

Scale Type
Log

Auto

Log

Lin

10 dB/div
Log

Ref Offset 1.79 dB
Ref 20.00 dBm

Mkr1 2.480 0 GHz
5.603 dBm

Start 2.47600 GHz
#Res BW 100 kHz

Stop 2.57600 GHz
#VBW 300 kHz
Sweep 9.600 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 0 GHz	5.603 dBm			
2	N	1	f	2.483 5 GHz	-57.212 dBm			
3	N	1	f	2.500 0 GHz	-59.564 dBm			
4	N	1	f	2.483 6 GHz	-54.754 dBm			
5								
6								
7								
8								
9								
10								
11								

MSG

STATUS

07:46:22 PM Sep 20, 2023

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

SENSE:PULSE

PNO: Fast
IFGain:Low

Trig: Free Run
#Atten: 30 dB

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

DL1 -14.97 dBm

Conducted RF Spurious Emission

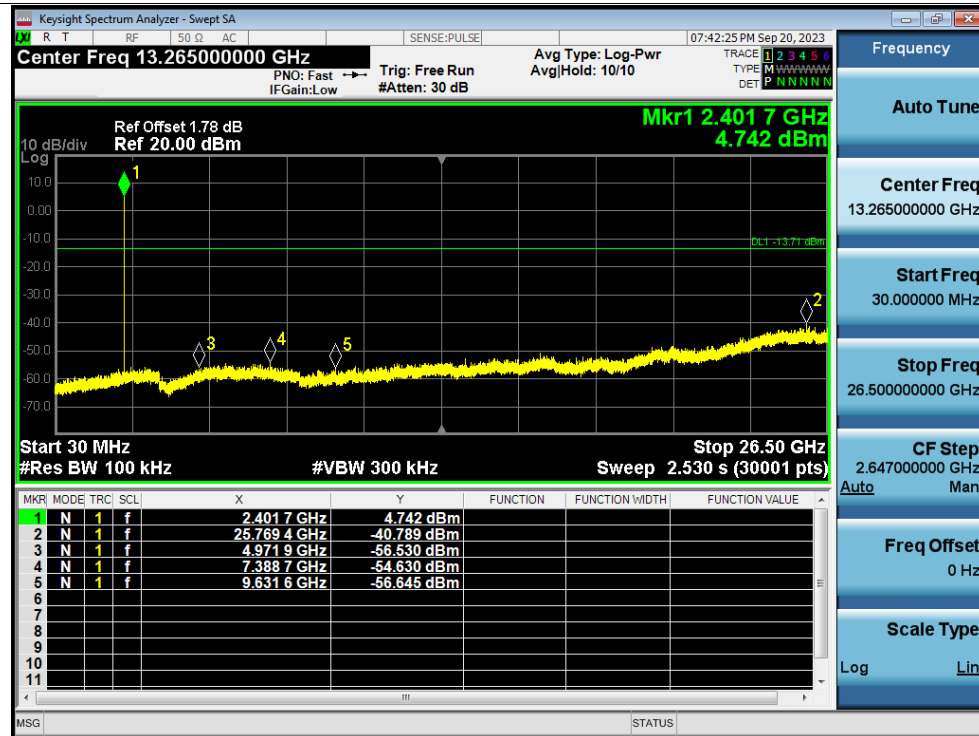
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-47.07	-20	Pass
NVNT	BLE 1M	2440	Ant1	-47.36	-20	Pass
NVNT	BLE 1M	2480	Ant1	-47.82	-20	Pass
NVNT	BLE 2M	2402	Ant1	-47.99	-20	Pass
NVNT	BLE 2M	2440	Ant1	-47	-20	Pass
NVNT	BLE 2M	2480	Ant1	-46.79	-20	Pass

Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



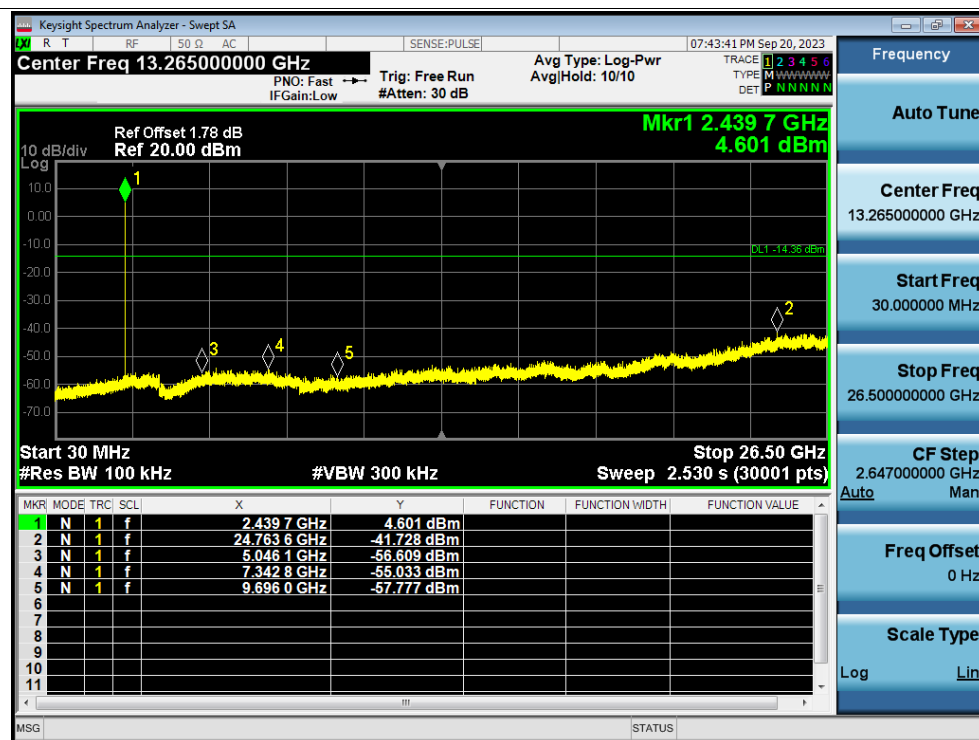
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



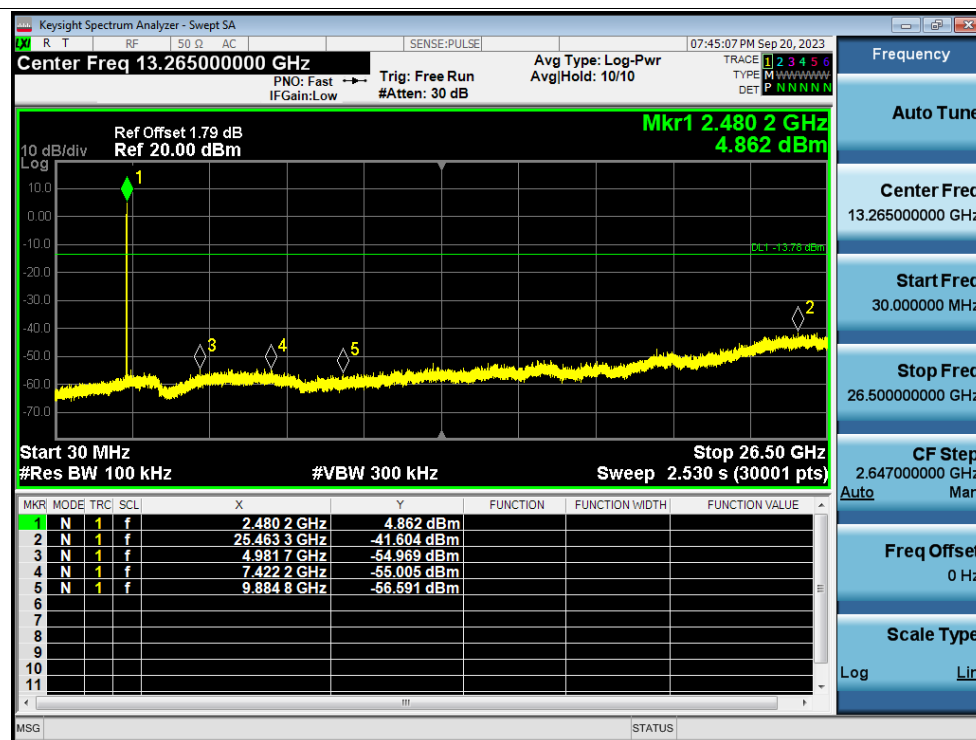
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



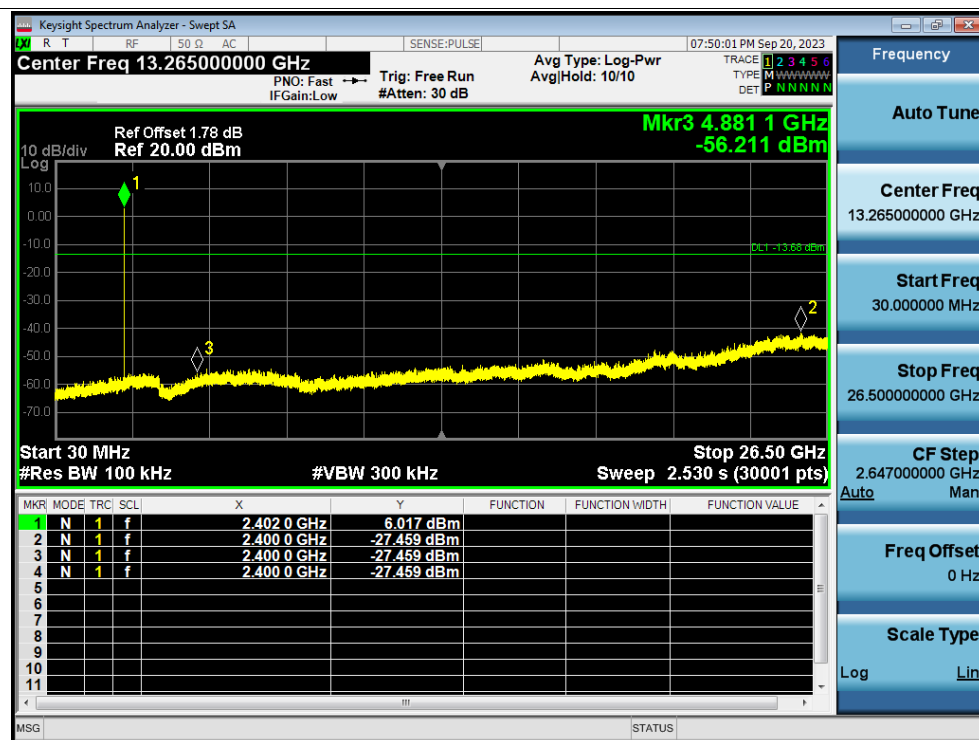
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



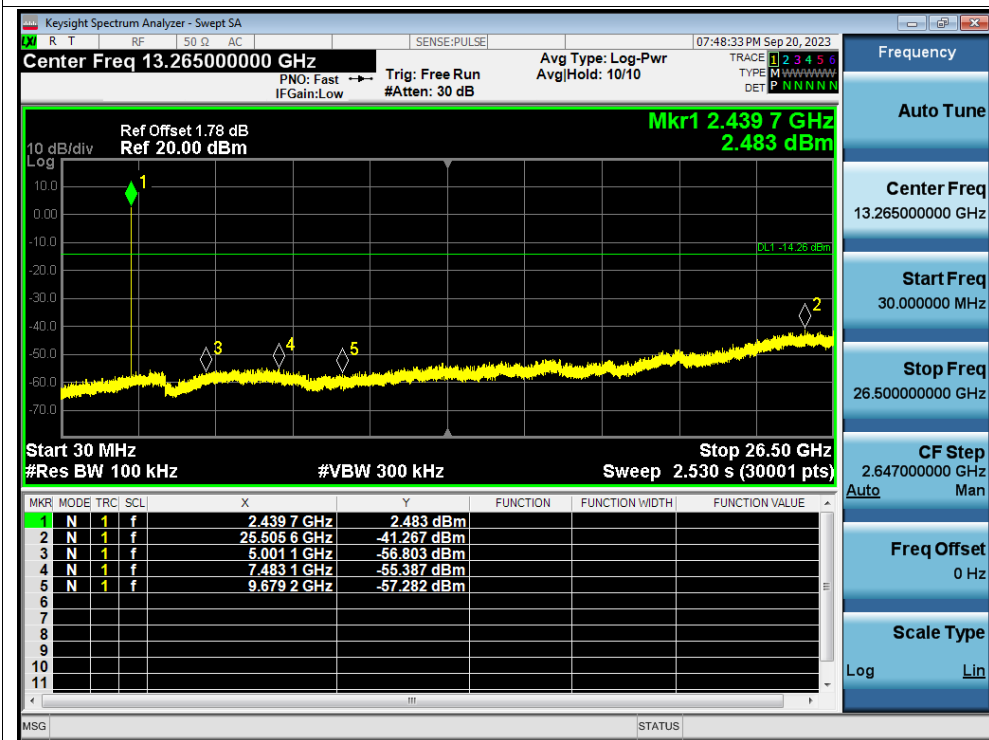
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



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

