Appendix:Bluetooth LE

Contents

Duty Cycle 3
Maximum Peak Conducted Output Power 7
-6dB Bandwidth 11
Occupied Channel Bandwidth 15
Maximum Power Spectral Density Level 19
Band Edge 23
Conducted RF Spurious Emission 28

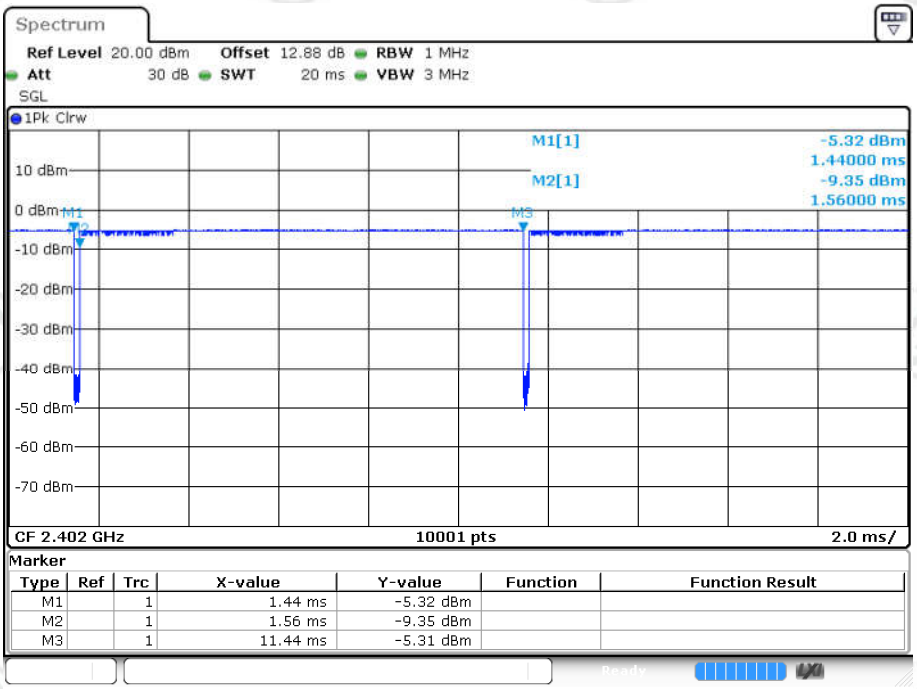
Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	98.8	0	0.1
NVNT	BLE 1M	2440	Ant1	98.8	0	0.1
NVNT	BLE 1M	2480	Ant1	98.8	0	0.1
NVNT	BLE 2M	2402	Ant1	98.82	0	0.1
NVNT	BLE 2M	2440	Ant1	98.82	0	0.1
NVNT	BLE 2M	2480	Ant1	98.82	0	0.1

Note:Duty Cycle Correction Factor =-10*lg(Duty Cycle);

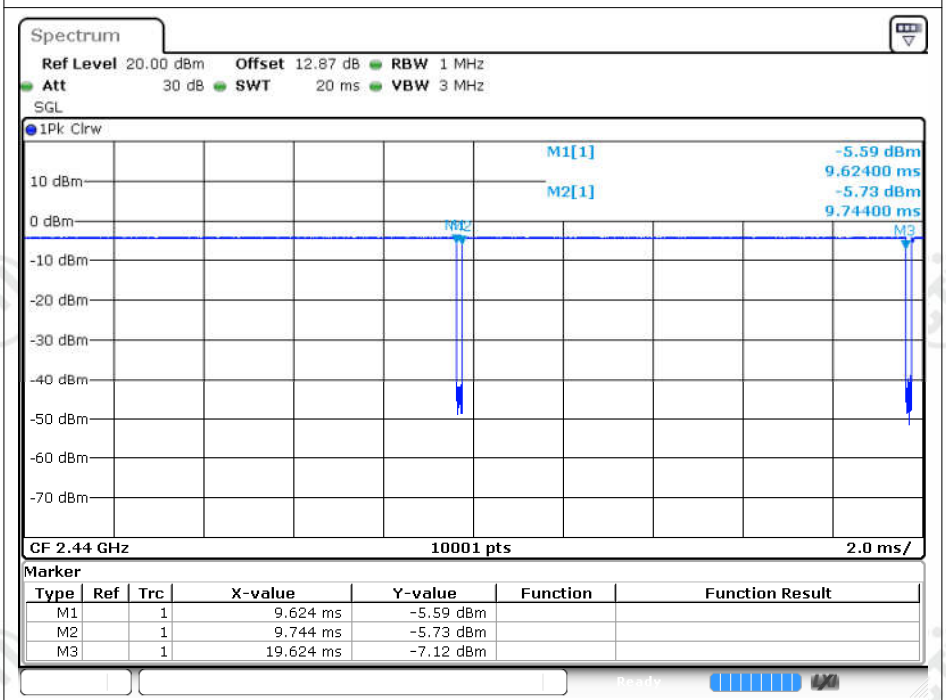
Test Graphs

Duty Cycle NVNT BLE 1M 2402MHz Ant1



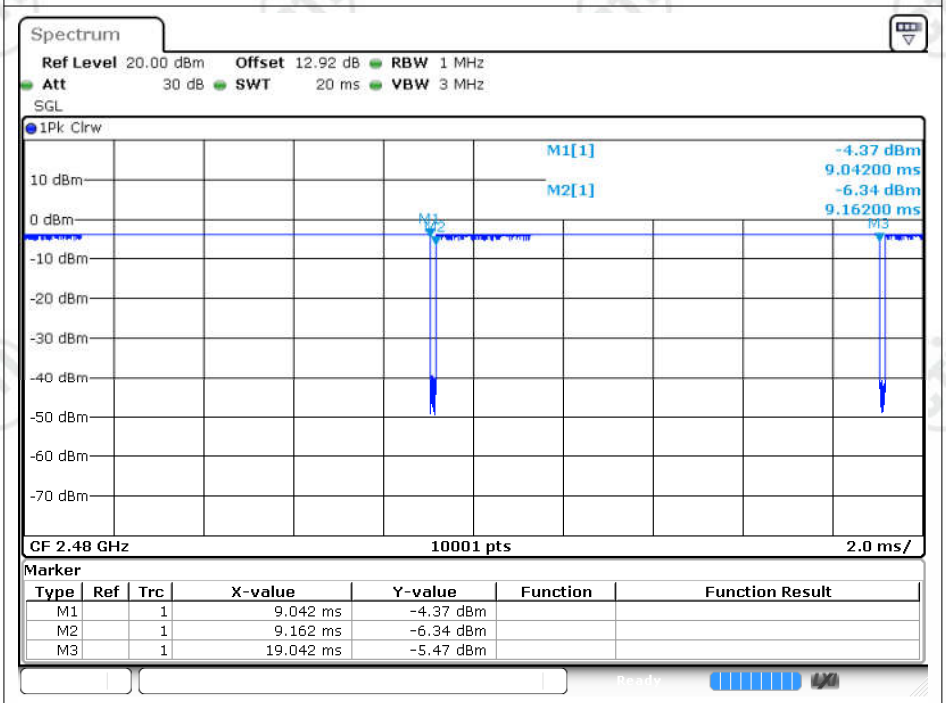
Date: 15.APR.2024 10:30:08

Duty Cycle NVNT BLE 1M 2440MHz Ant1



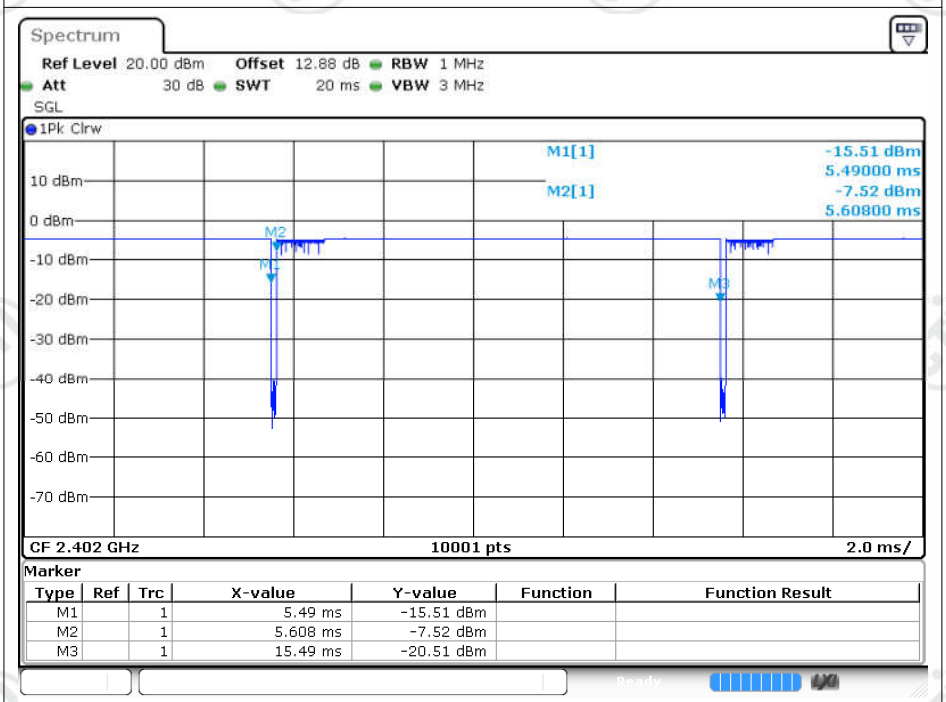
Date: 15.APR.2024 10:39:35

Duty Cycle NVNT BLE 1M 2480MHz Ant1



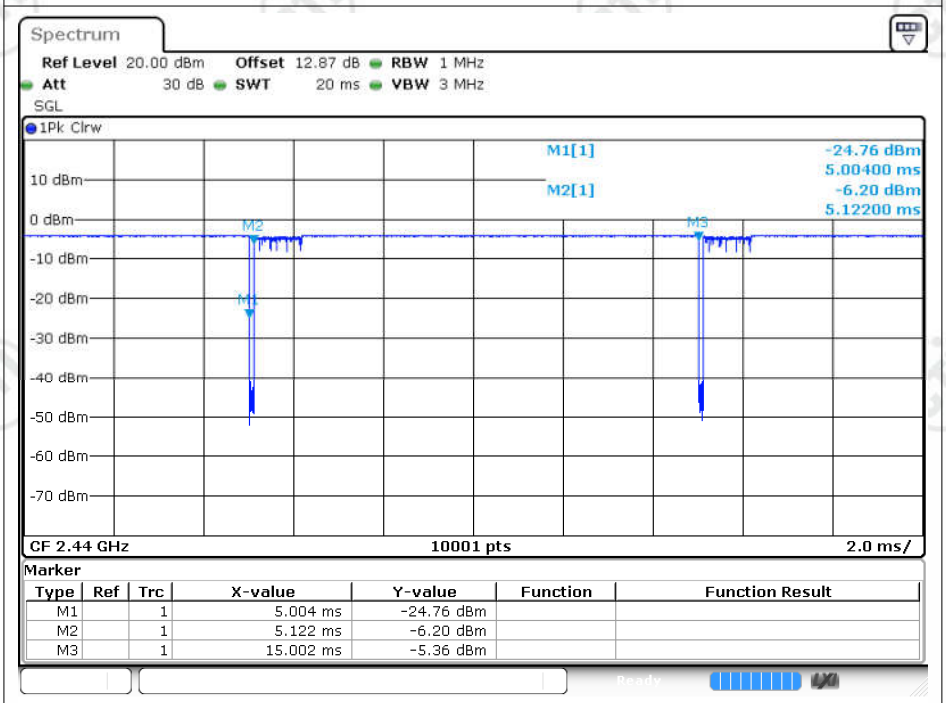
Date: 15.APR.2024 10:57:35

Duty Cycle NVNT BLE 2M 2402MHz Ant1



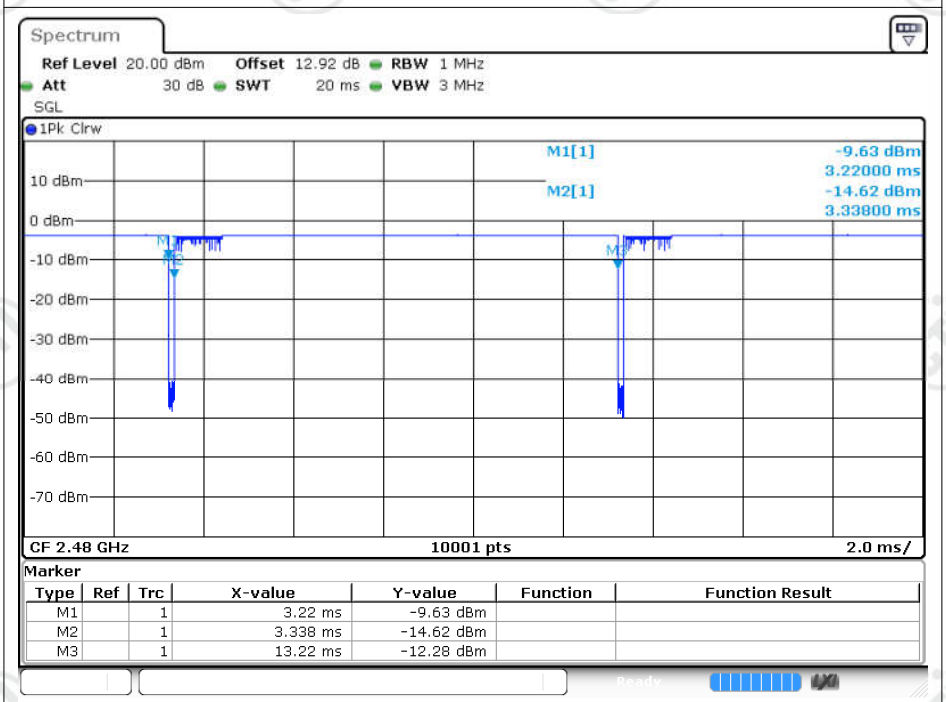
Date: 15.APR.2024 11:02:29

Duty Cycle NVNT BLE 2M 2440MHz Ant1



Date: 15.APR.2024 11:41:06

Duty Cycle NVNT BLE 2M 2480MHz Ant1



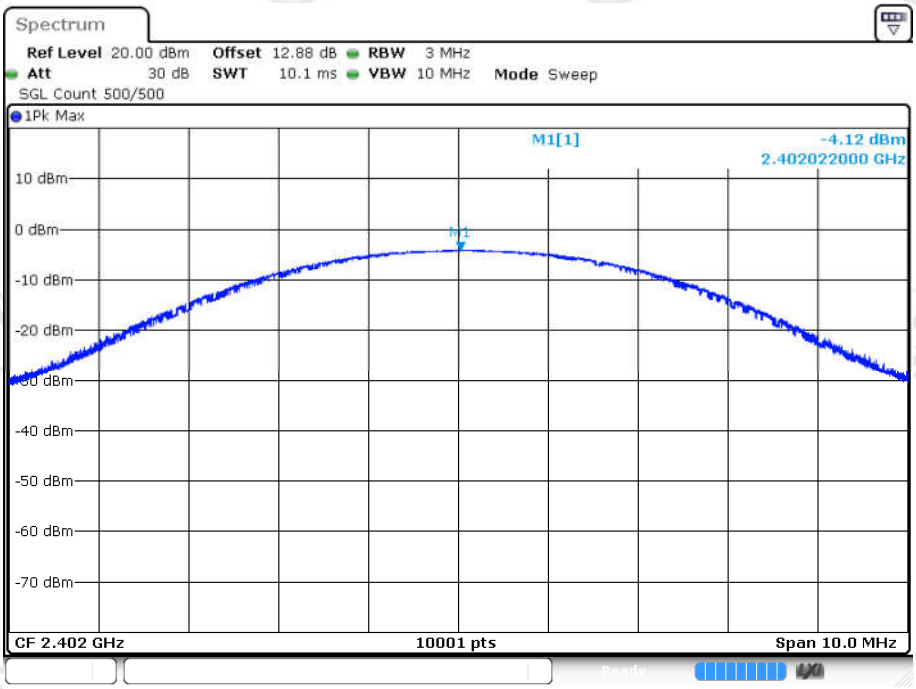
Date: 15.APR.2024 12:52:06

Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-4.12	30	Pass
NVNT	BLE 1M	2440	Ant1	-3.79	30	Pass
NVNT	BLE 1M	2480	Ant1	-3.34	30	Pass
NVNT	BLE 2M	2402	Ant1	-4.13	30	Pass
NVNT	BLE 2M	2440	Ant1	-3.70	30	Pass
NVNT	BLE 2M	2480	Ant1	**-3.30**	30	Pass

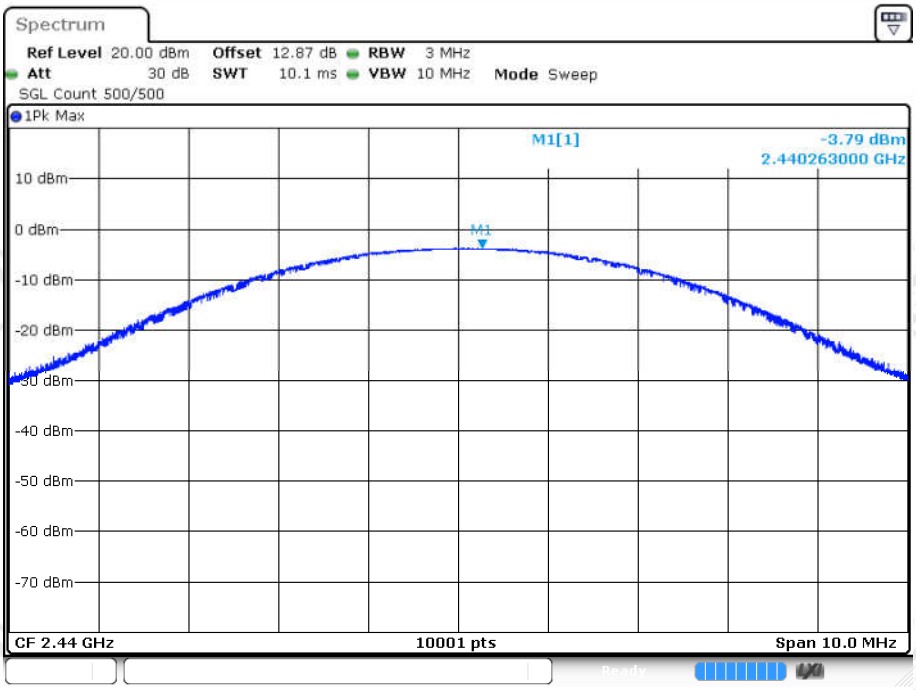
Test Graphs

Peak Power NVNT BLE 1M 2402MHz Ant1



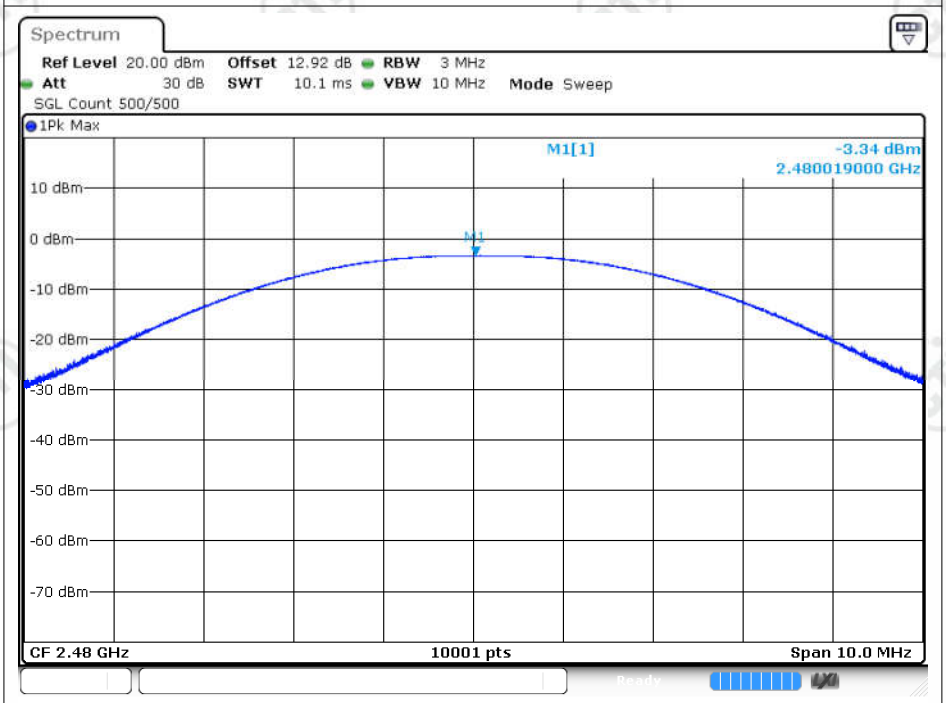
Date: 15.APR.2024 10:38:49

Peak Power NVNT BLE 1M 2440MHz Ant1



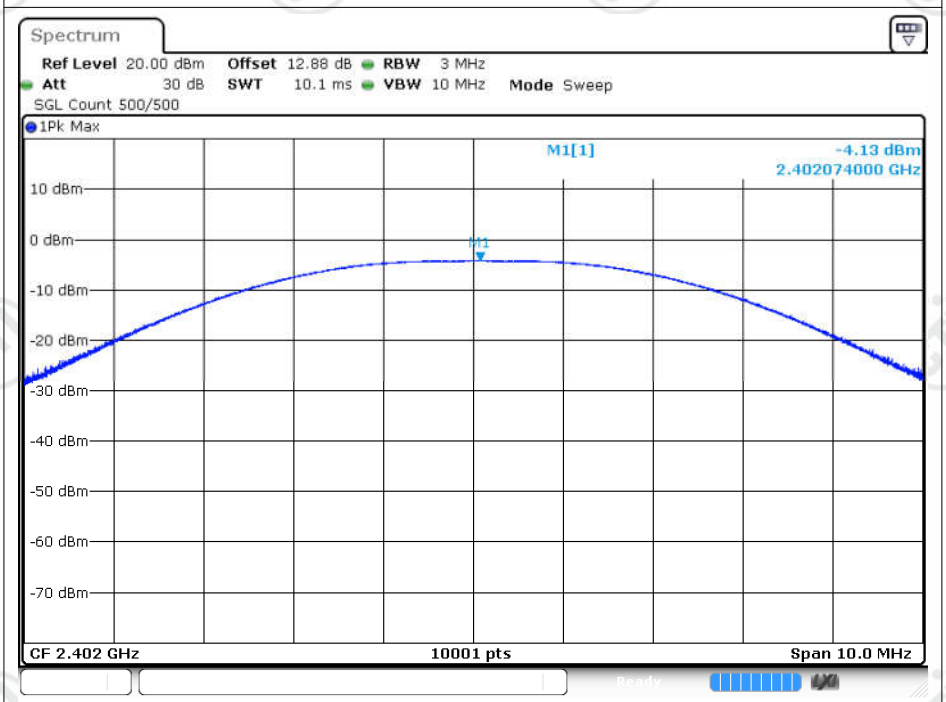
Date: 15.APR.2024 10:40:26

Peak Power NVNT BLE 1M 2480MHz Ant1



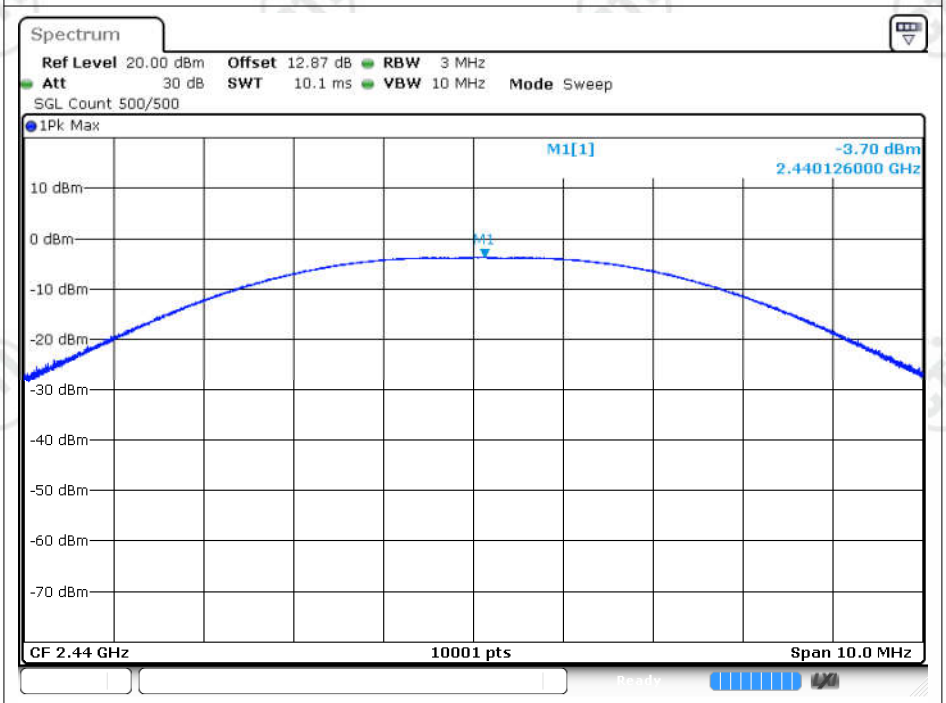
Date: 15.APR.2024 10:57:45

Peak Power NVNT BLE 2M 2402MHz Ant1



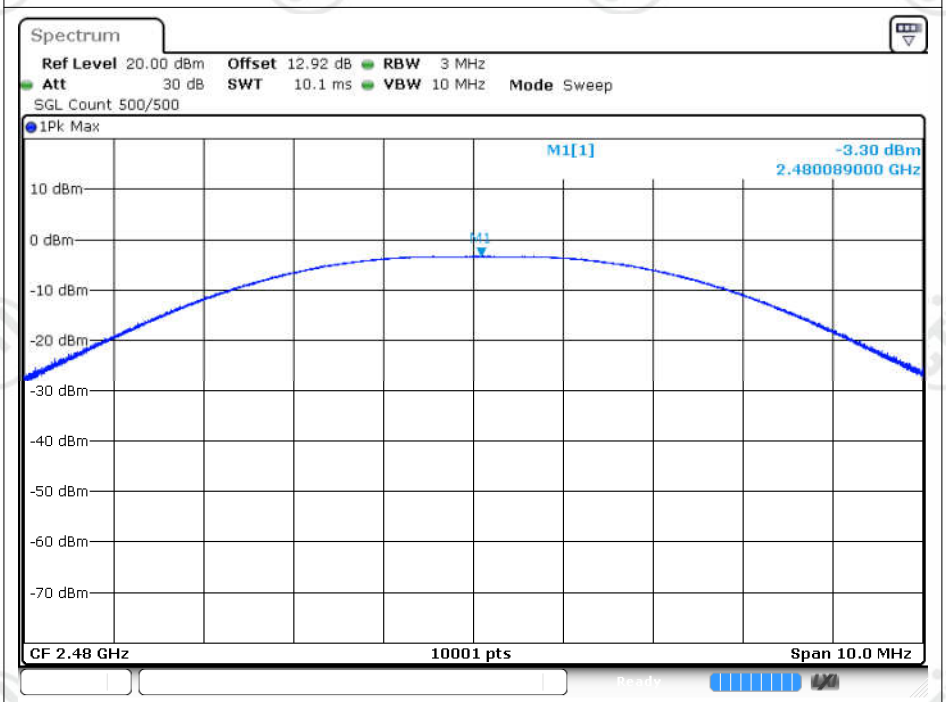
Date: 15.APR.2024 11:00:43

Peak Power NVNT BLE 2M 2440MHz Ant1



Date: 15.APR.2024 11:41:16

Peak Power NVNT BLE 2M 2480MHz Ant1



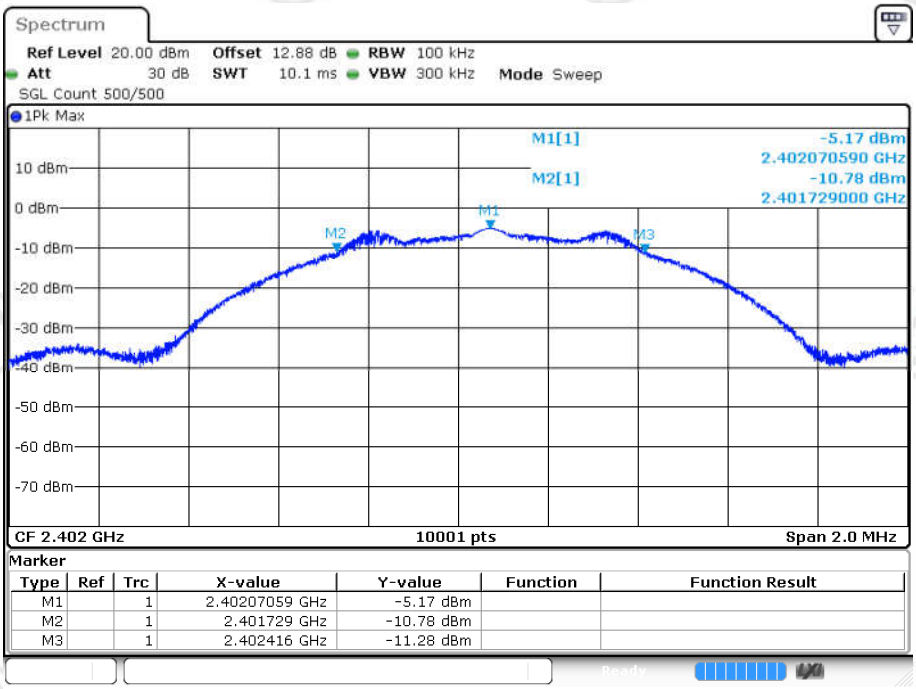
Date: 15.APR.2024 12:52:21

-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.687	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.689	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.697	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.121	0.5	Pass
NVNT	BLE 2M	2440	Ant1	1.164	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.143	0.5	Pass

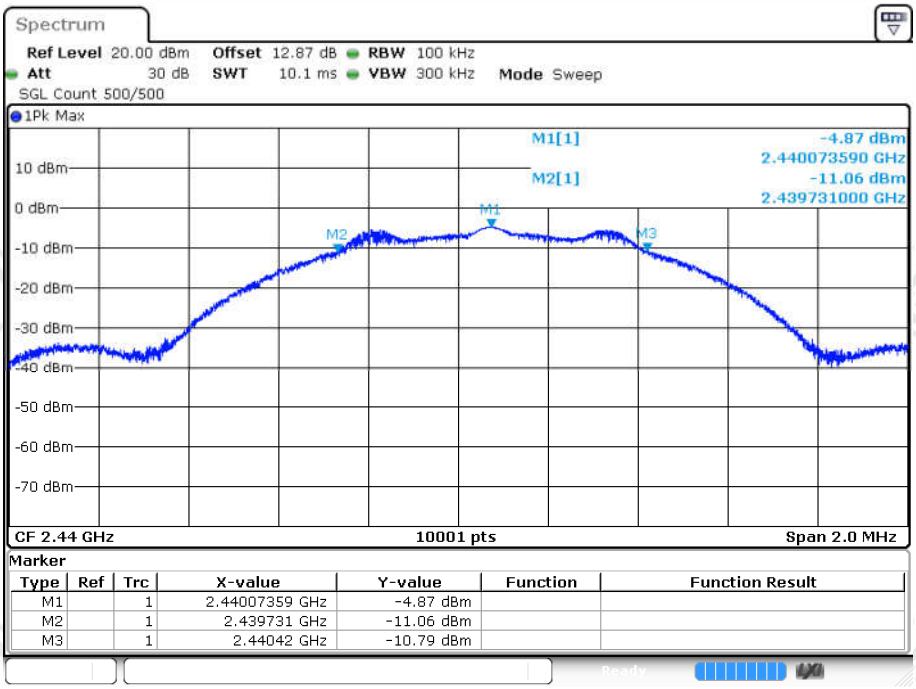
Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



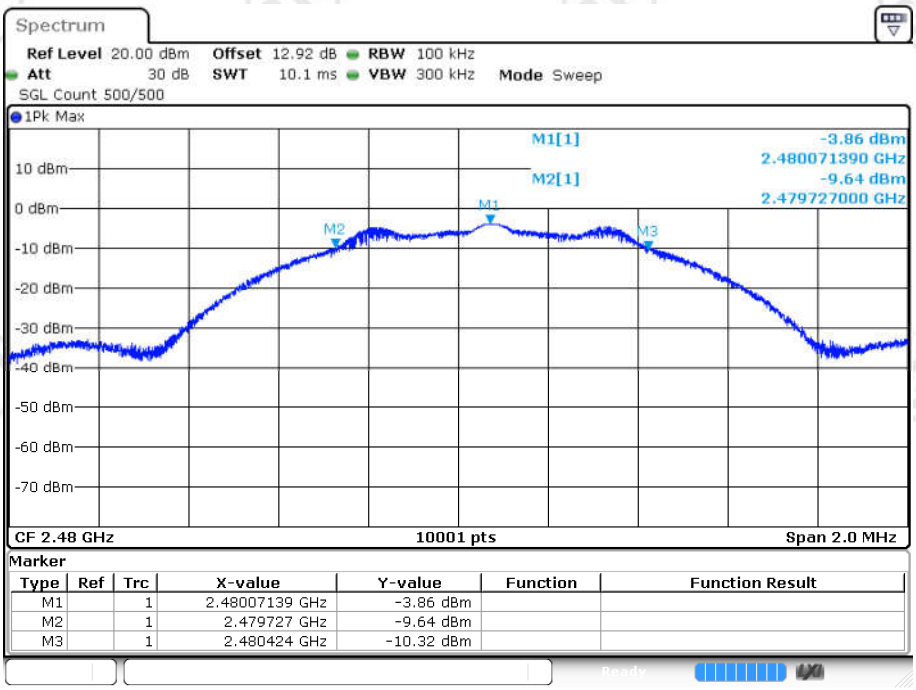
Date: 15.APR.2024 10:31:05

-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



Date: 15.APR.2024 10:34:27

-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

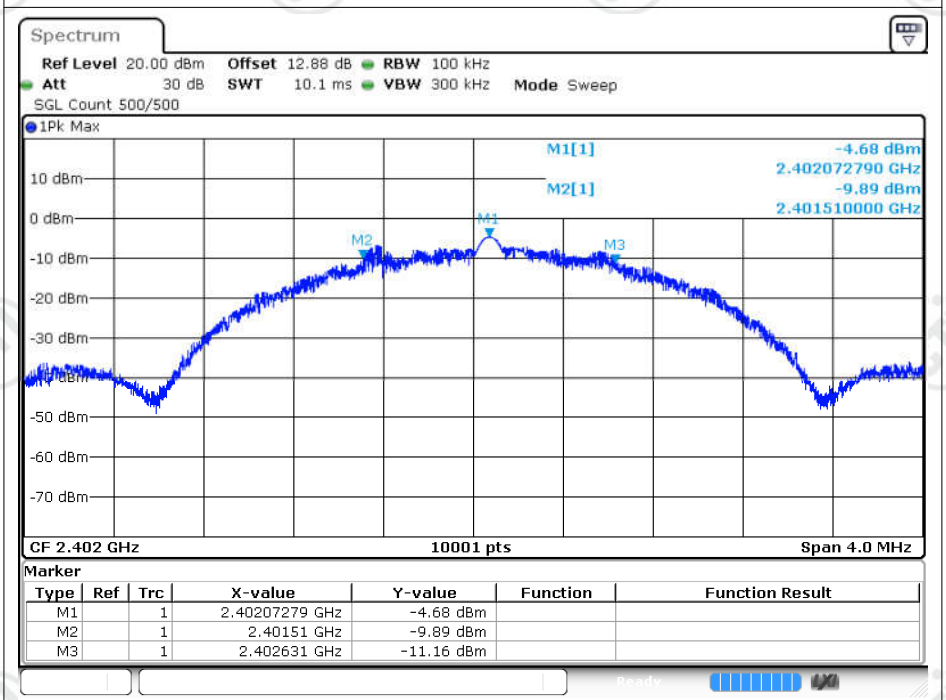


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48007139 GHz	-3.86 dBm		
M2		1	2.479727 GHz	-9.64 dBm		
M3		1	2.480424 GHz	-10.32 dBm		

Date: 15.APR.2024 10:58:08

-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1

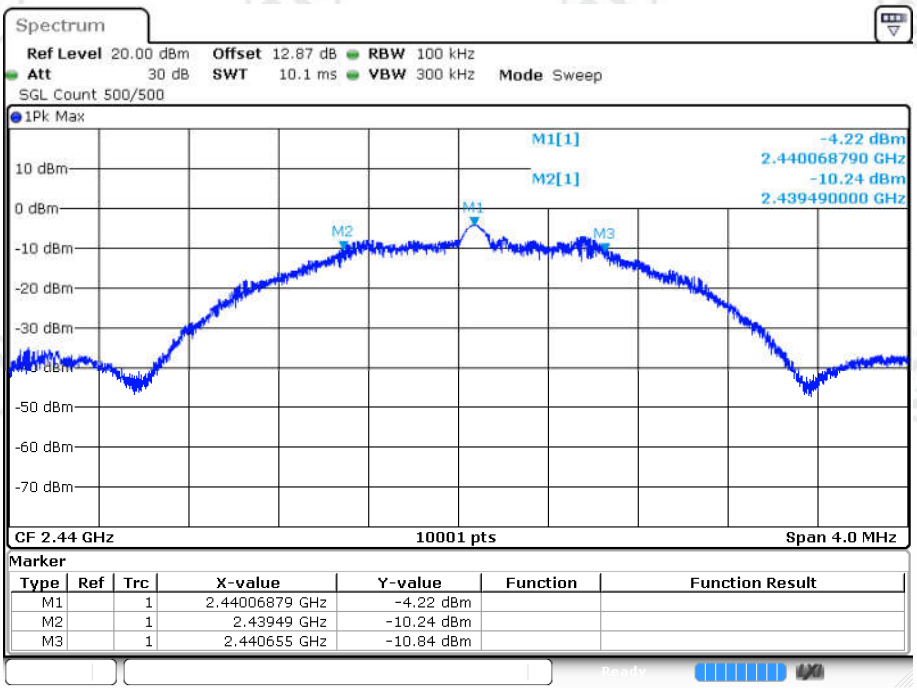


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40207279 GHz	-4.68 dBm		
M2		1	2.40151 GHz	-9.89 dBm		
M3		1	2.402631 GHz	-11.16 dBm		

Date: 15.APR.2024 11:01:05

-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1

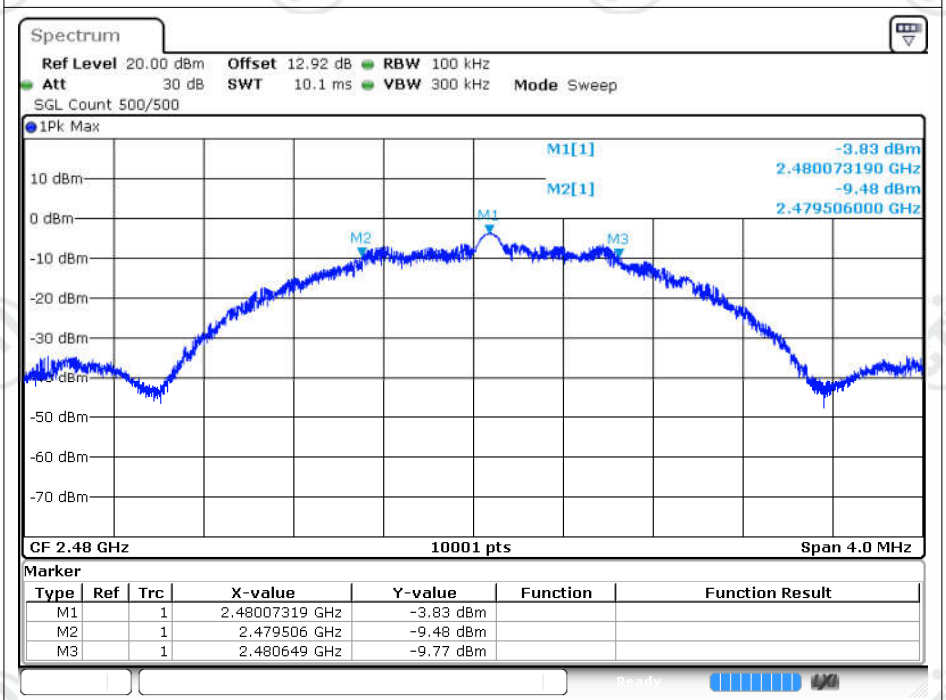


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.44006879 GHz	-4.22 dBm		
M2		1	2.43949 GHz	-10.24 dBm		
M3		1	2.440655 GHz	-10.84 dBm		

Date: 15.APR.2024 11:41:38

-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48007319 GHz	-3.83 dBm		
M2		1	2.479506 GHz	-9.48 dBm		
M3		1	2.480649 GHz	-9.77 dBm		

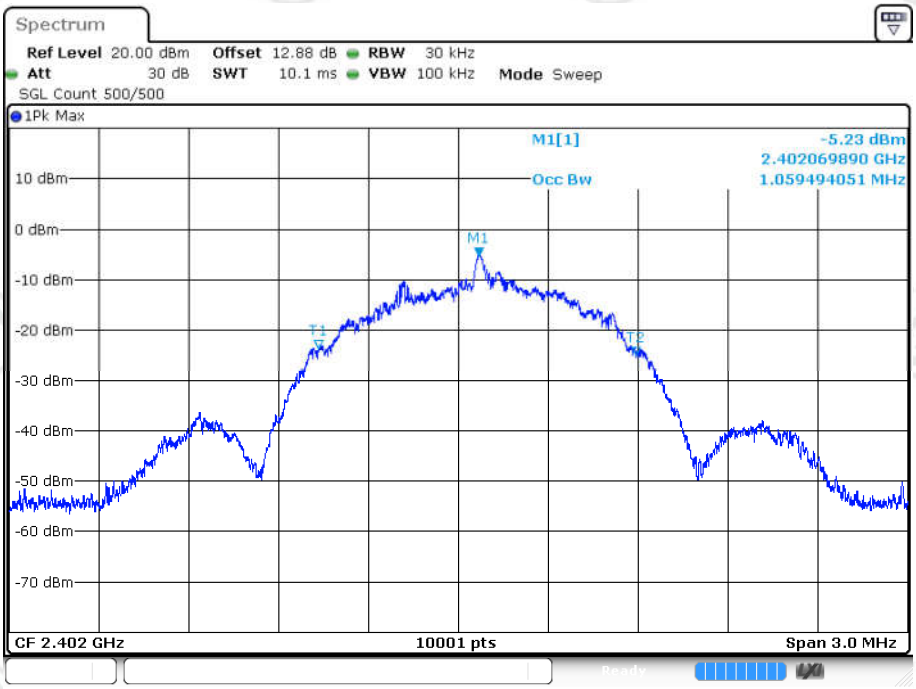
Date: 15.APR.2024 12:52:59

Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.059
NVNT	BLE 1M	2440	Ant1	1.058
NVNT	BLE 1M	2480	Ant1	1.06
NVNT	BLE 2M	2402	Ant1	2.06
NVNT	BLE 2M	2440	Ant1	2.053
NVNT	BLE 2M	2480	Ant1	2.051

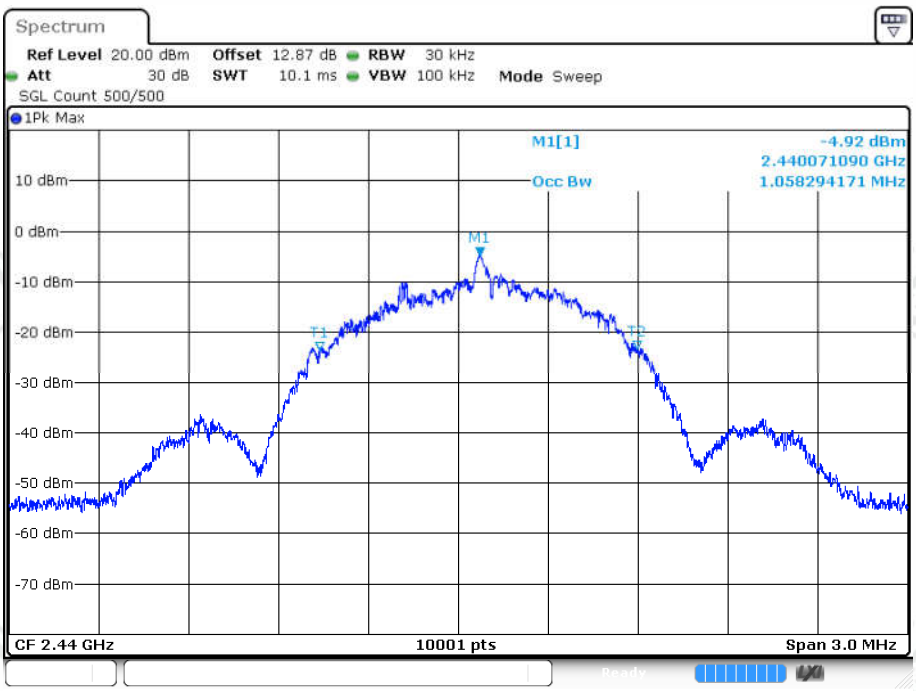
Test Graphs

OBW NVNT BLE 1M 2402MHz Ant1



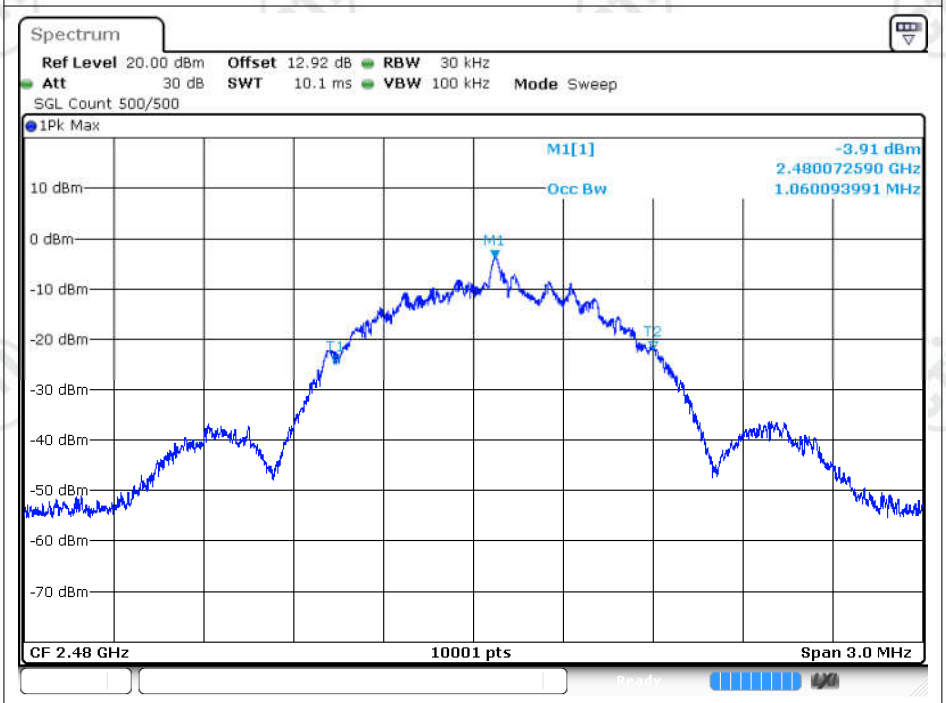
Date: 15.APR.2024 10:30:52

OBW NVNT BLE 1M 2440MHz Ant1



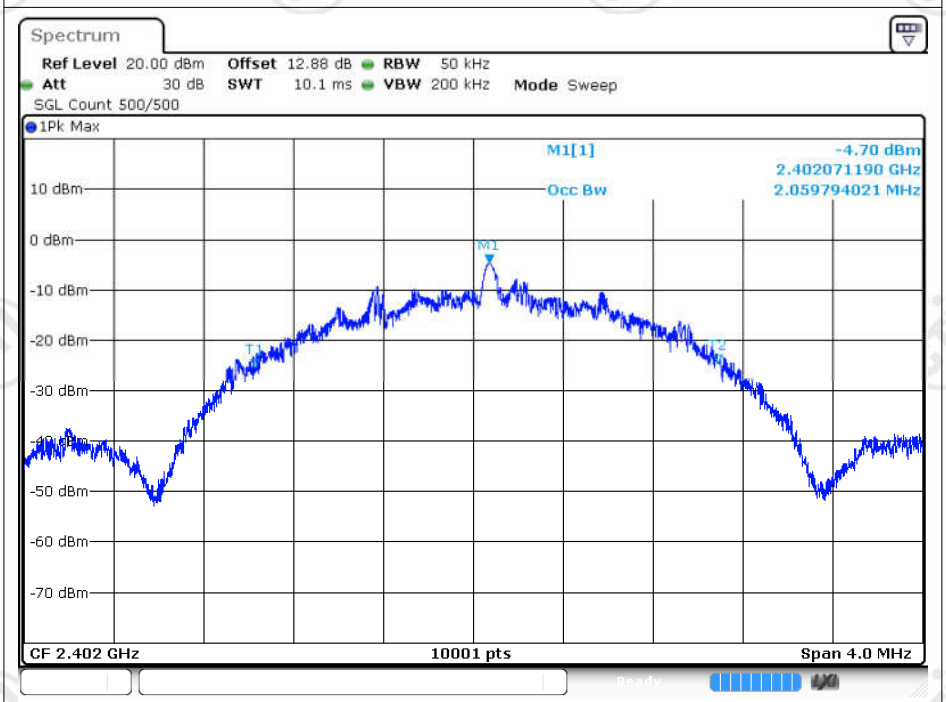
Date: 15.APR.2024 10:34:15

OBW NVNT BLE 1M 2480MHz Ant1



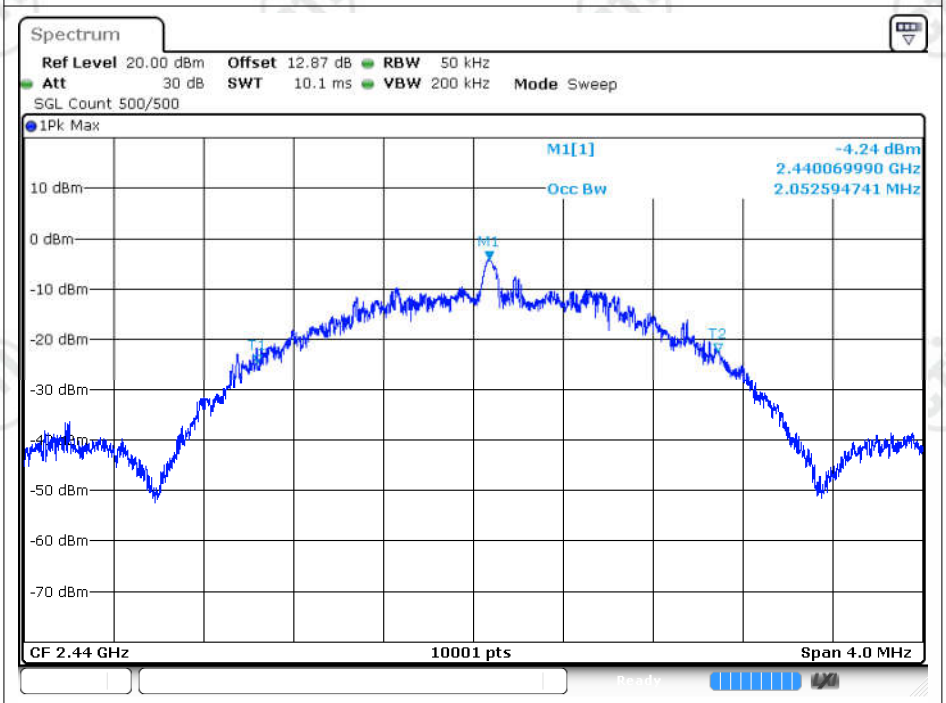
Date: 15.APR.2024 10:57:57

OBW NVNT BLE 2M 2402MHz Ant1



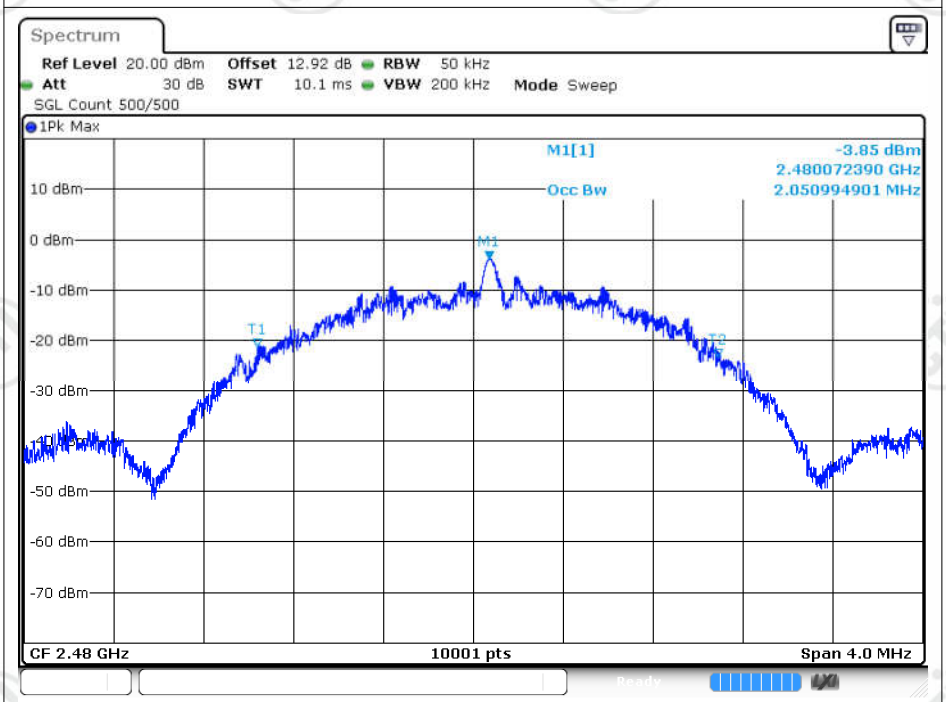
Date: 15.APR.2024 11:00:54

OBW NVNT BLE 2M 2440MHz Ant1



Date: 15.APR.2024 11:41:27

OBW NVNT BLE 2M 2480MHz Ant1



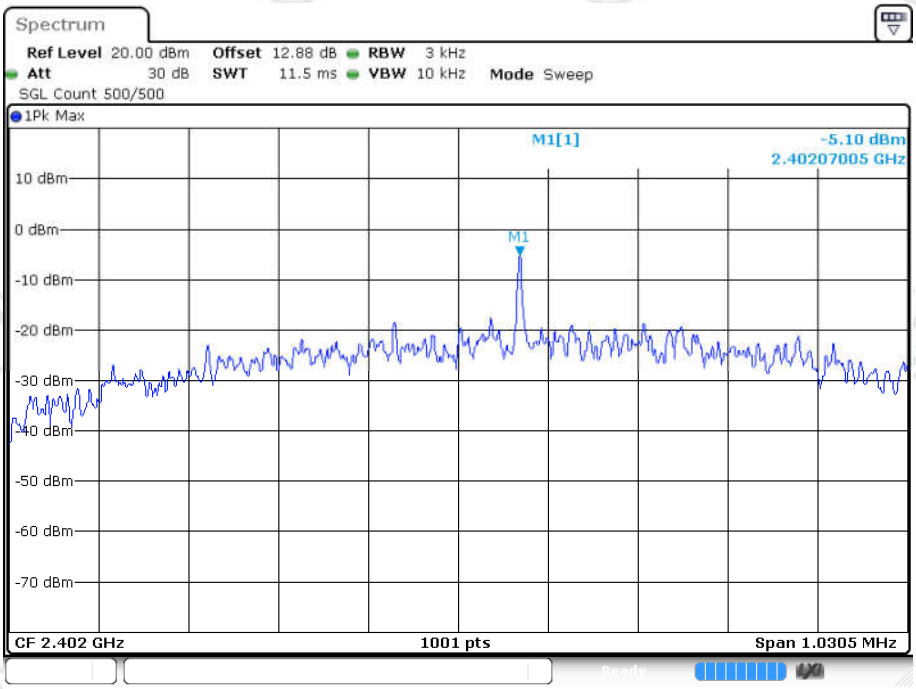
Date: 15.APR.2024 12:52:33

Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-5.1	8	Pass
NVNT	BLE 1M	2440	Ant1	-4.8	8	Pass
NVNT	BLE 1M	2480	Ant1	-3.79	8	Pass
NVNT	BLE 2M	2402	Ant1	-4.58	8	Pass
NVNT	BLE 2M	2440	Ant1	-4.12	8	Pass
NVNT	BLE 2M	2480	Ant1	-3.74	8	Pass

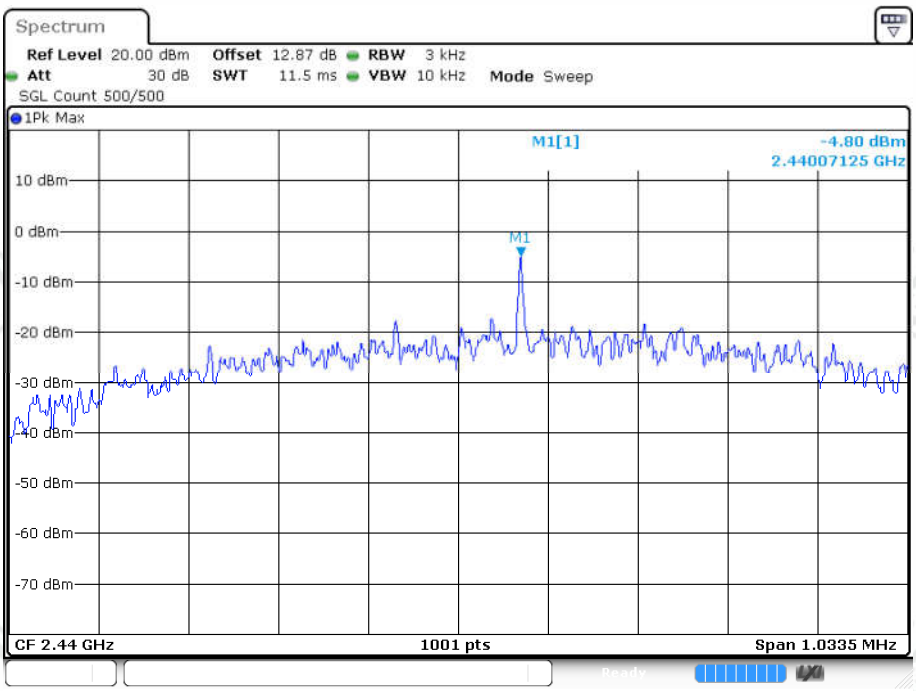
Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



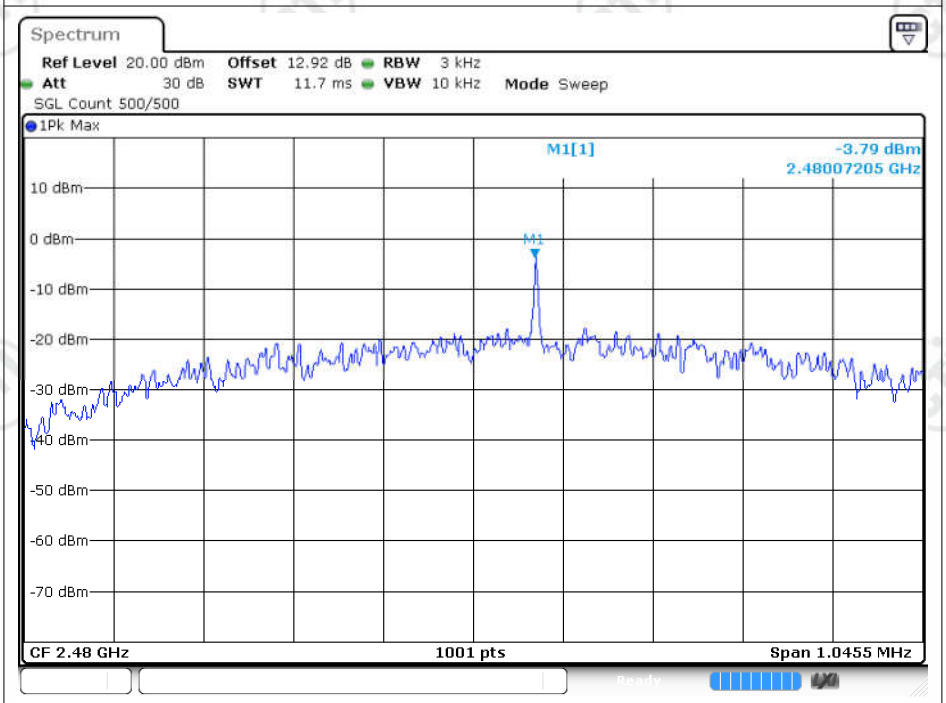
Date: 15.APR.2024 10:31:43

PSD NVNT BLE 1M 2440MHz Ant1



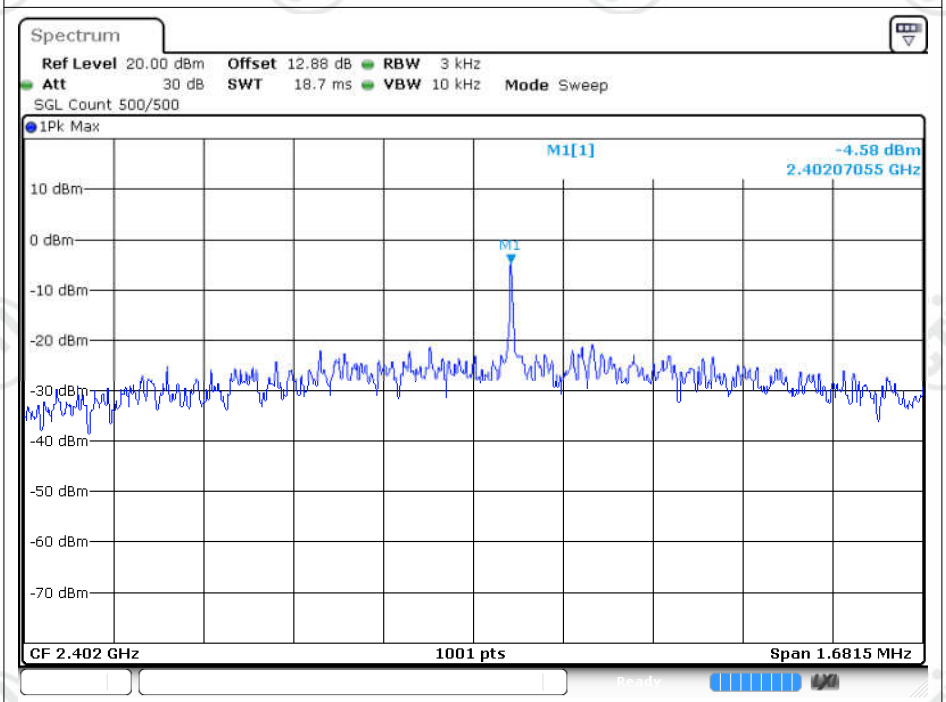
Date: 15.APR.2024 10:34:44

PSD NVNT BLE 1M 2480MHz Ant1



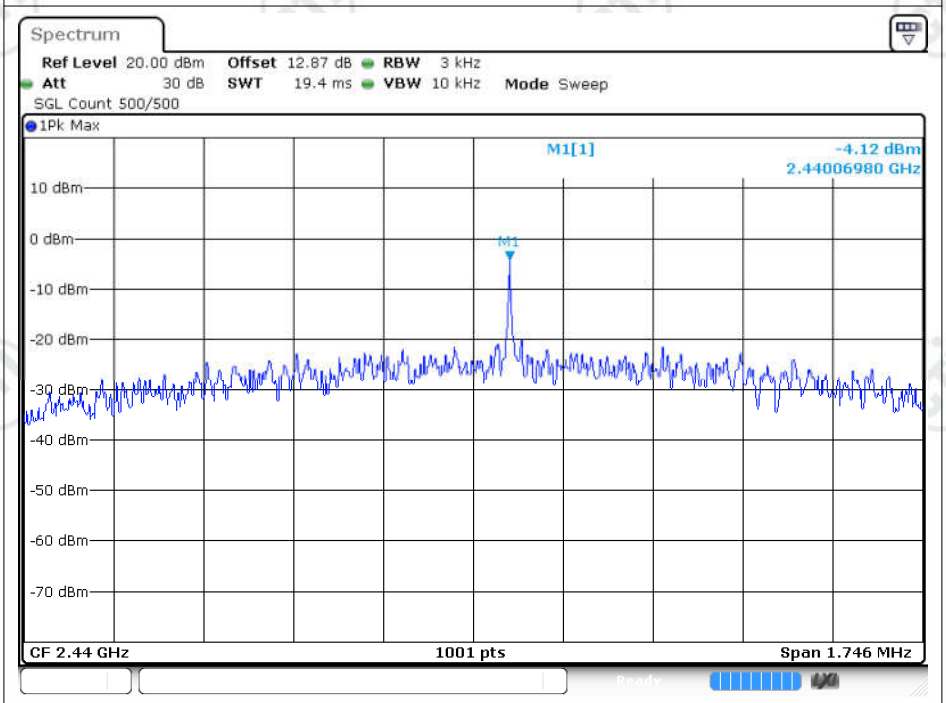
Date: 15.APR.2024 10:58:26

PSD NVNT BLE 2M 2402MHz Ant1



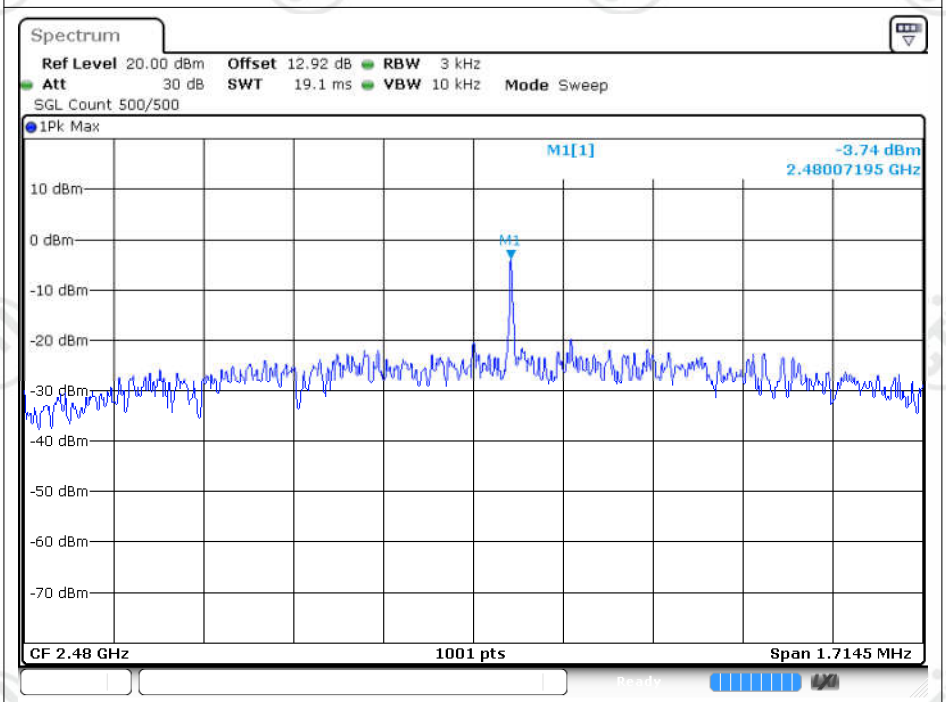
Date: 15.APR.2024 11:01:27

PSD NVNT BLE 2M 2440MHz Ant1



Date: 15.APR.2024 11:42:00

PSD NVNT BLE 2M 2480MHz Ant1



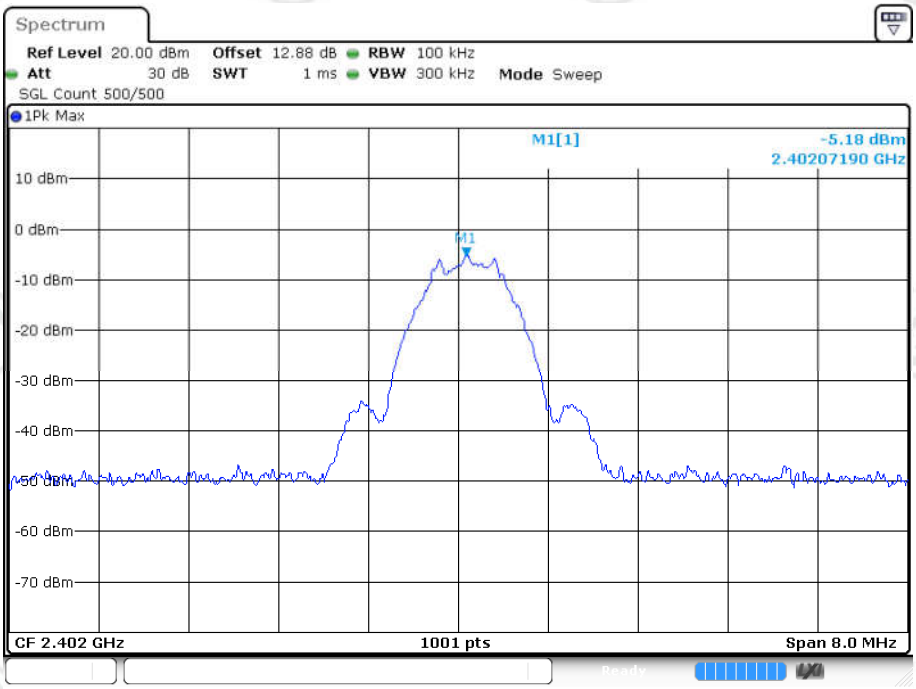
Date: 15.APR.2024 12:53:27

Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-40.70	-20	Pass
NVNT	BLE 1M	2480	Ant1	-42.83	-20	Pass
NVNT	BLE 2M	2402	Ant1	-38.01	-20	Pass
NVNT	BLE 2M	2480	Ant1	-42.38	-20	Pass

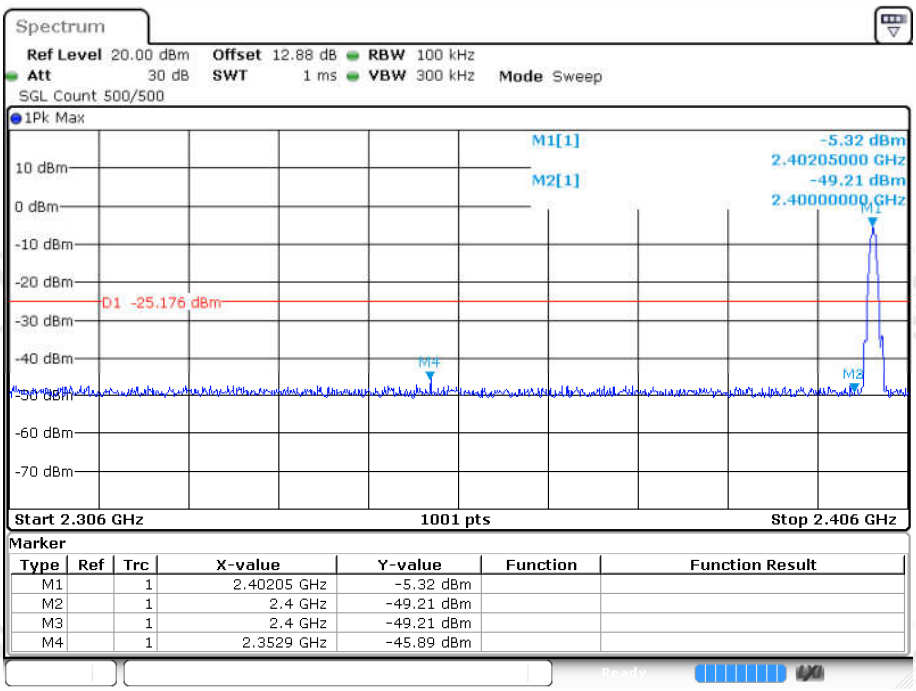
Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Date: 15.APR.2024 10:31:55

Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

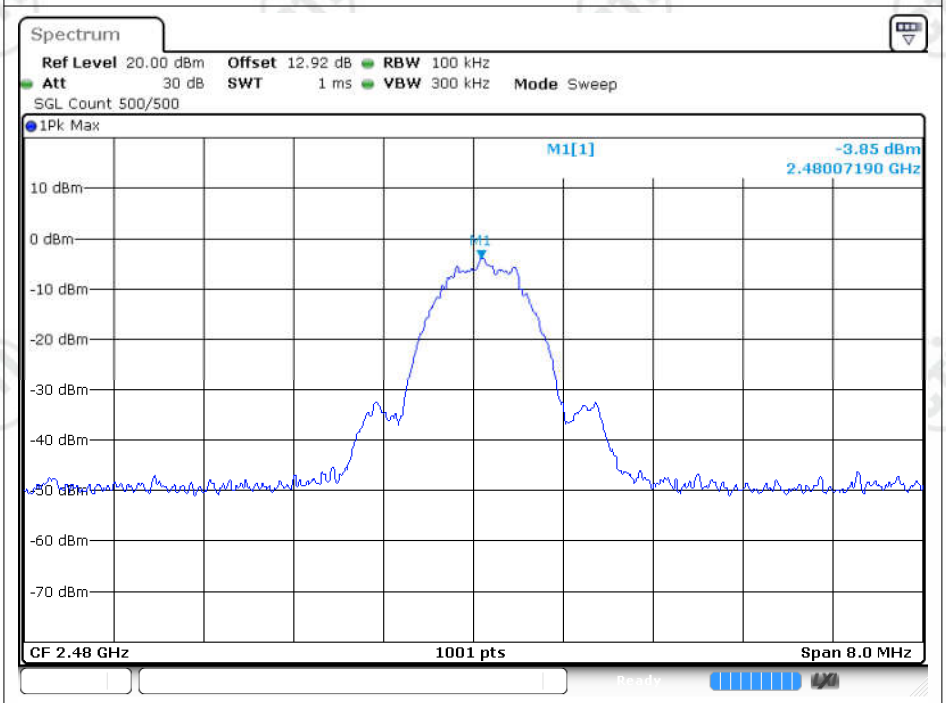


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40205 GHz	-5.32 dBm		
M2		1	2.4 GHz	-49.21 dBm		
M3		1	2.4 GHz	-49.21 dBm		
M4		1	2.3529 GHz	-45.89 dBm		

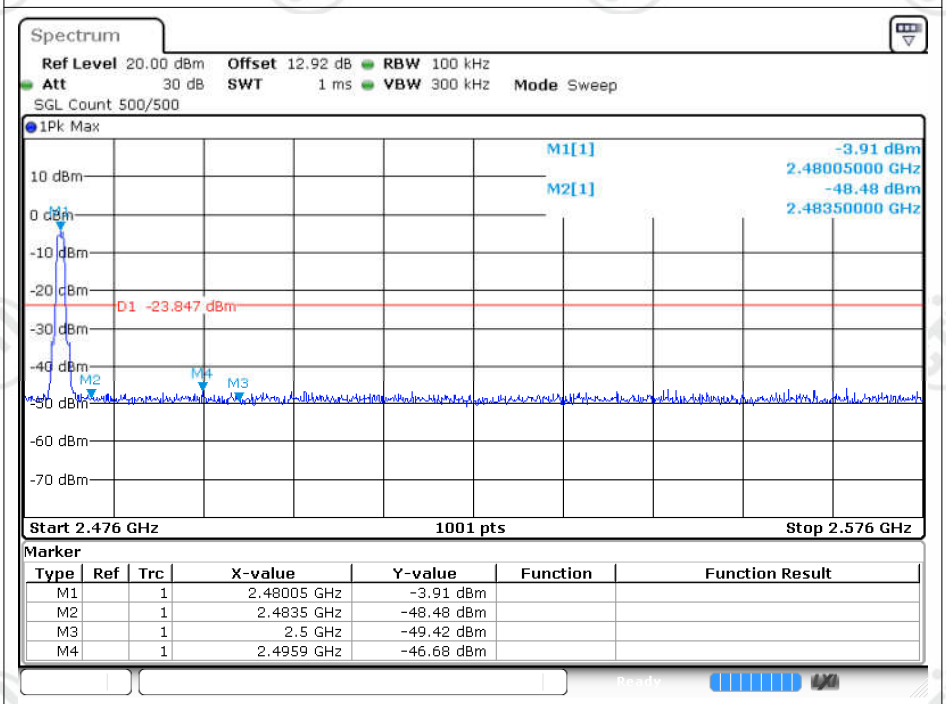
Date: 15.APR.2024 10:31:58

Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



Date: 15.APR.2024 10:58:30

Band Edge NVNT BLE 1M 2480MHz Ant1 Emission

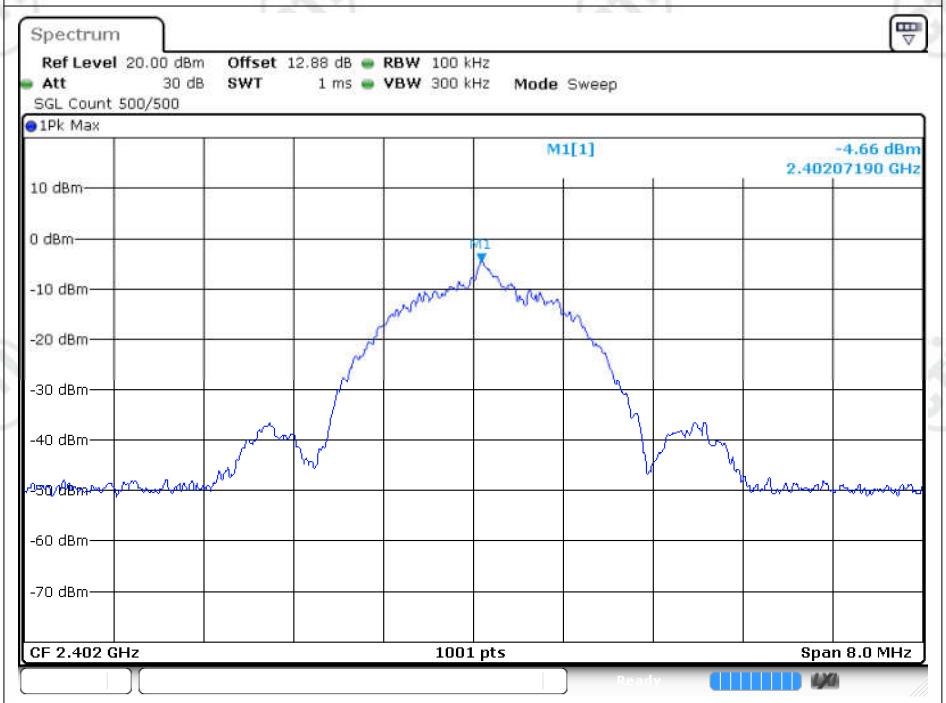


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48005 GHz	-3.91 dBm		
M2		1	2.4835 GHz	-48.48 dBm		
M3		1	2.5 GHz	-49.42 dBm		
M4		1	2.4959 GHz	-46.68 dBm		

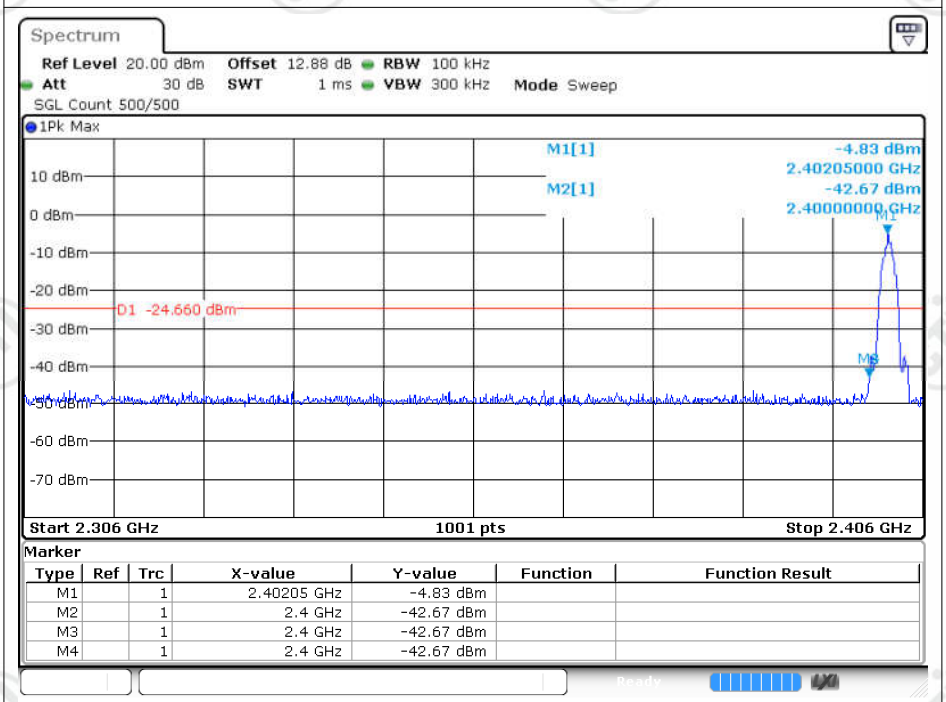
Date: 15.APR.2024 10:58:32

Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



Date: 15.APR.2024 11:01:30

Band Edge NVNT BLE 2M 2402MHz Ant1 Emission

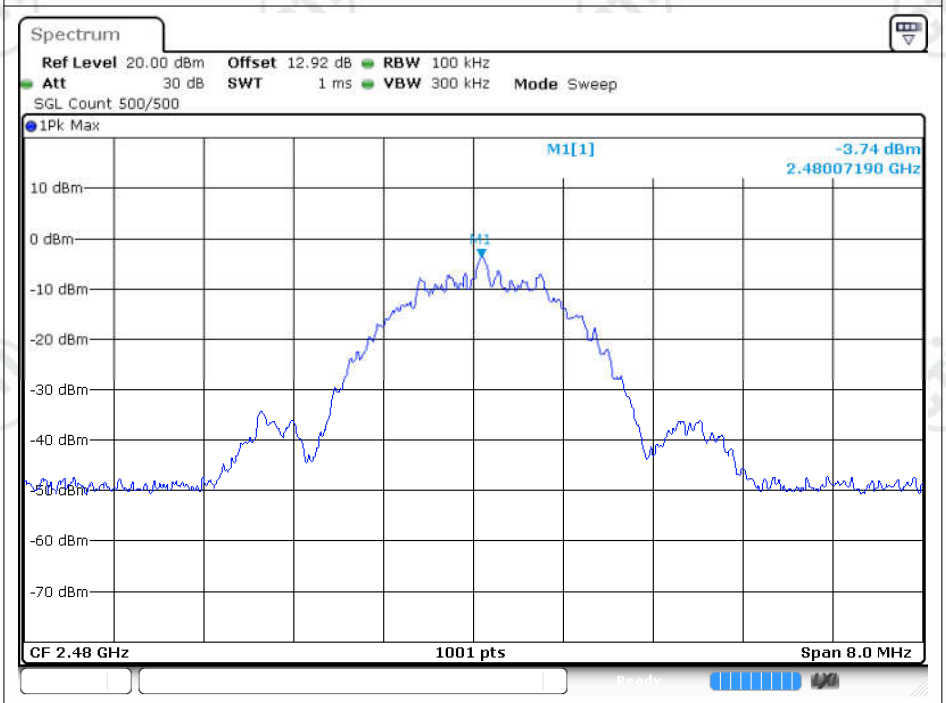


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40205 GHz	-4.83 dBm		
M2		1	2.4 GHz	-42.67 dBm		
M3		1	2.4 GHz	-42.67 dBm		
M4		1	2.4 GHz	-42.67 dBm		

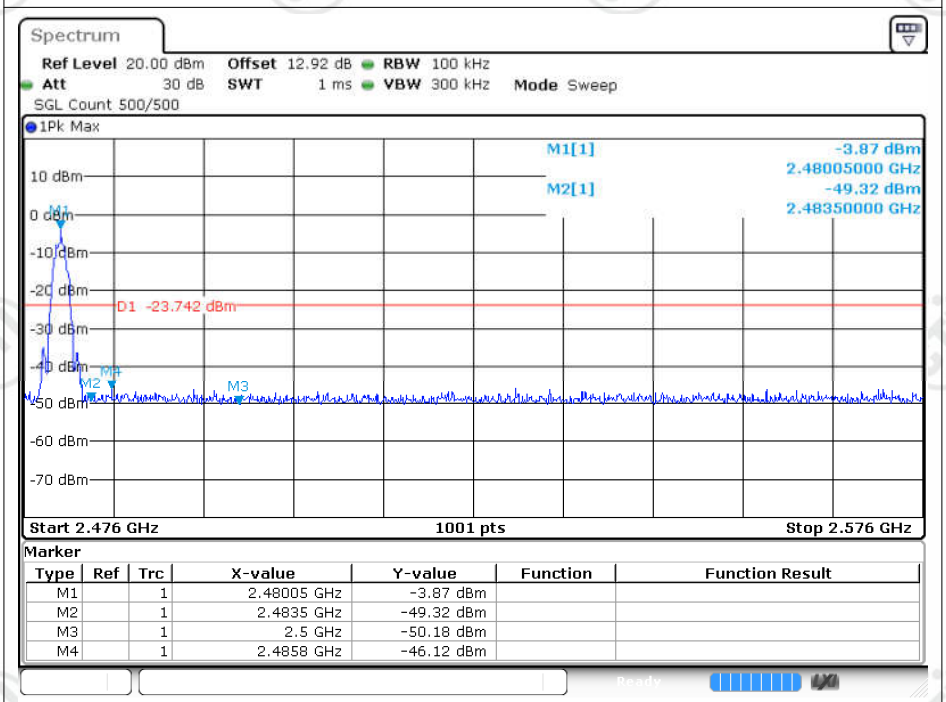
Date: 15.APR.2024 11:01:34

Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Date: 15.APR.2024 12:53:34

Band Edge NVNT BLE 2M 2480MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.48005 GHz	-3.87 dBm		
M2		1	2.4835 GHz	-49.32 dBm		
M3		1	2.5 GHz	-50.18 dBm		
M4		1	2.4858 GHz	-46.12 dBm		

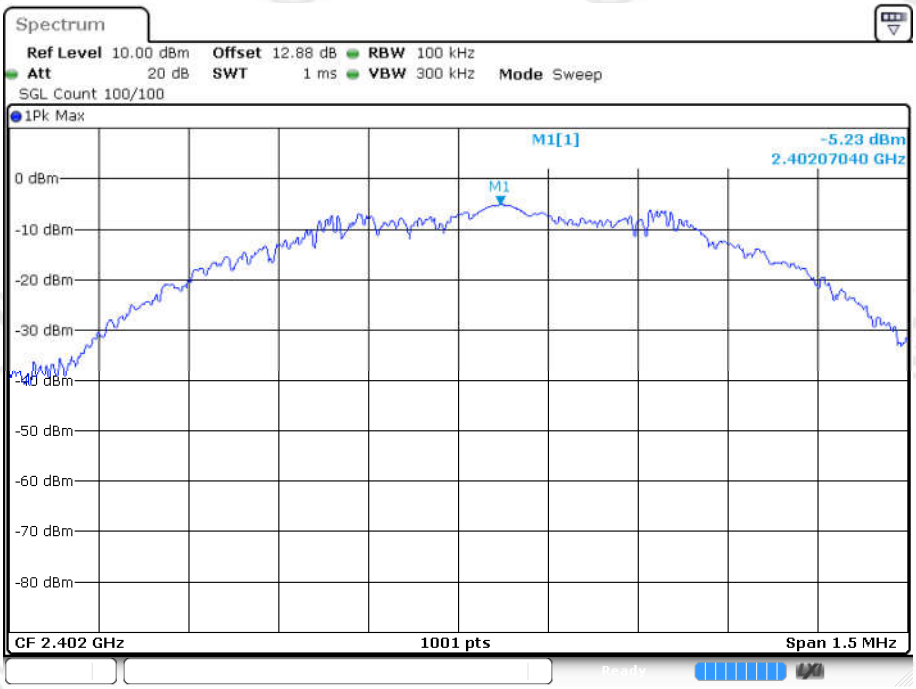
Date: 15.APR.2024 12:53:36

Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-34.22	-20	Pass
NVNT	BLE 1M	2440	Ant1	-36.18	-20	Pass
NVNT	BLE 1M	2480	Ant1	-36.53	-20	Pass
NVNT	BLE 2M	2402	Ant1	-32.9	-20	Pass
NVNT	BLE 2M	2440	Ant1	-34.92	-20	Pass
NVNT	BLE 2M	2480	Ant1	-36.39	-20	Pass

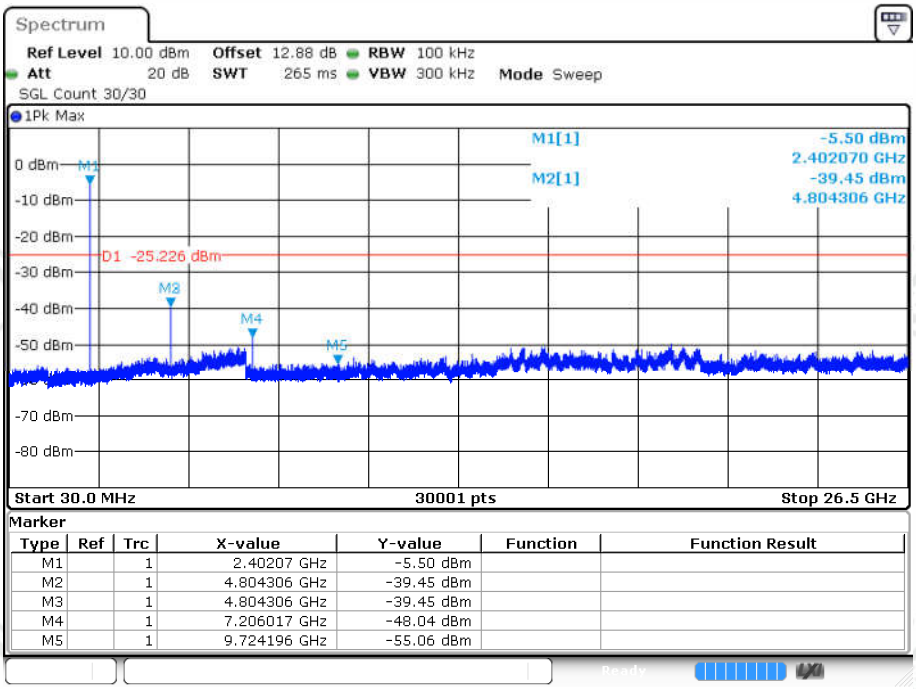
Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



Date: 15.APR.2024 10:32:16

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

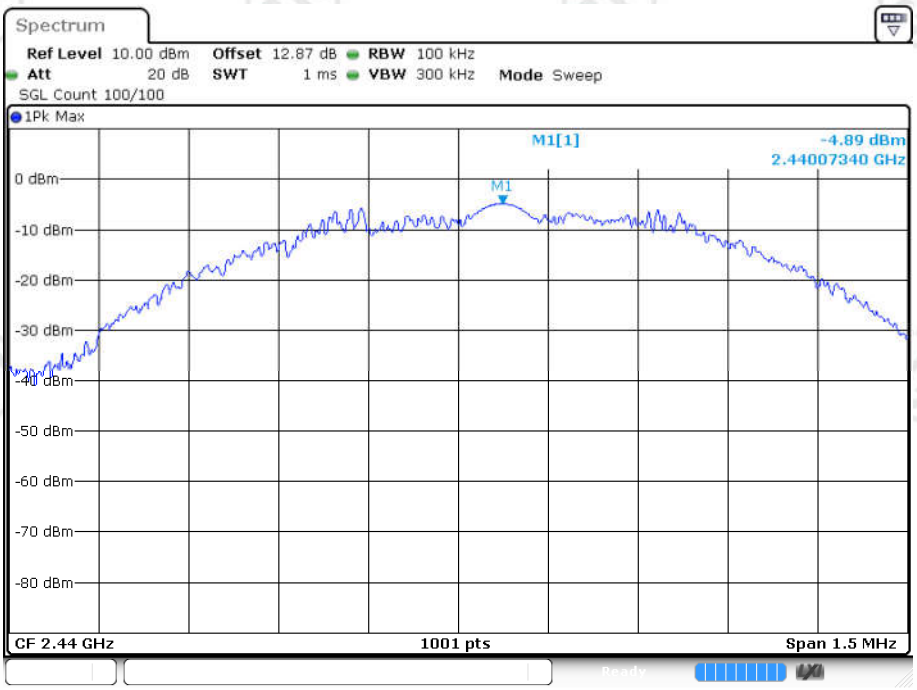


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40207 GHz	-5.50 dBm		
M2		1	4.804306 GHz	-39.45 dBm		
M3		1	4.804306 GHz	-39.45 dBm		
M4		1	7.206017 GHz	-48.04 dBm		
M5		1	9.724196 GHz	-55.06 dBm		

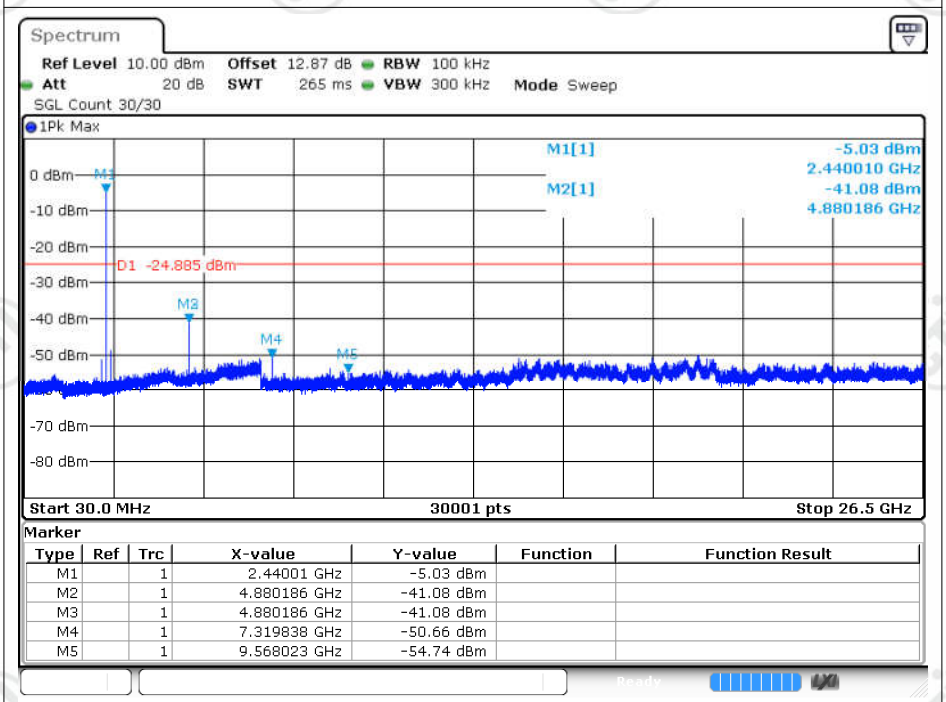
Date: 15.APR.2024 10:32:45

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Date: 15.APR.2024 10:34:47

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

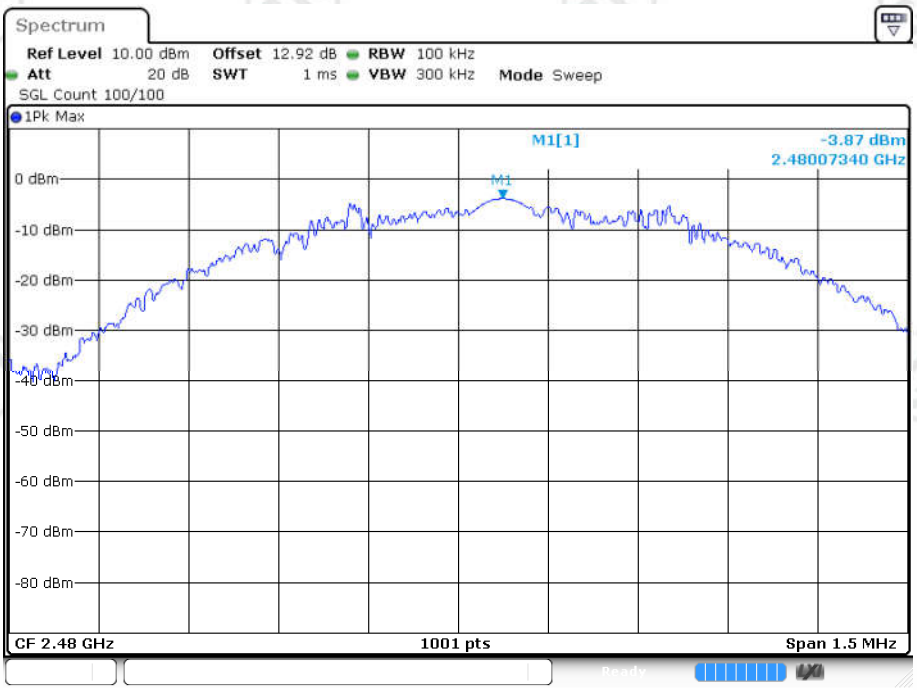


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.44001 GHz	-5.03 dBm		
M2		1	4.880186 GHz	-41.08 dBm		
M3		1	4.880186 GHz	-41.08 dBm		
M4		1	7.319838 GHz	-50.66 dBm		
M5		1	9.568023 GHz	-54.74 dBm		

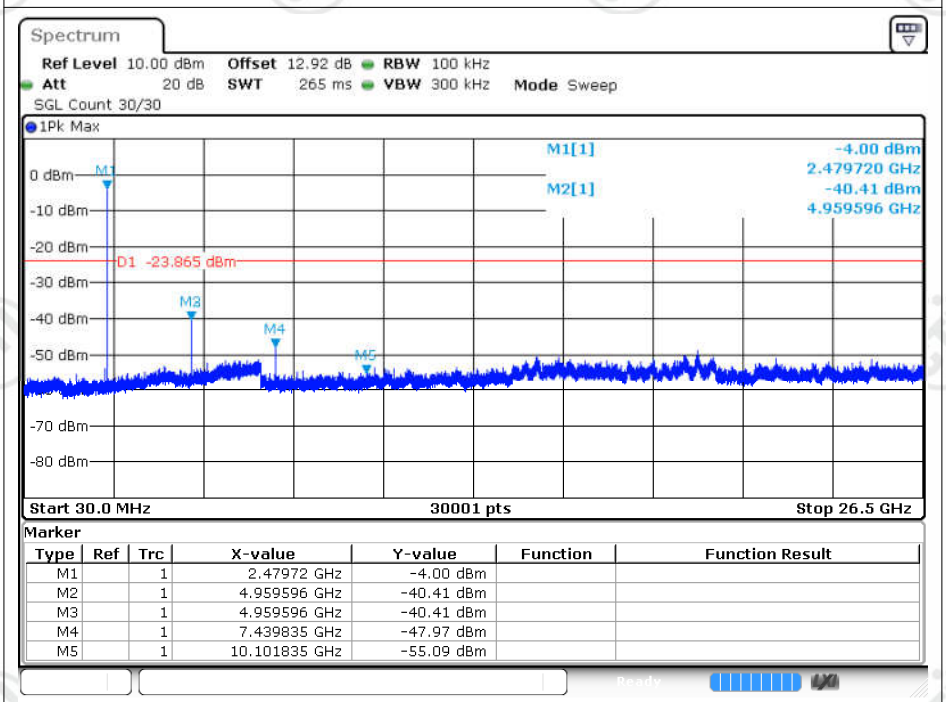
Date: 15.APR.2024 10:35:16

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



Date: 15.APR.2024 10:58:35

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

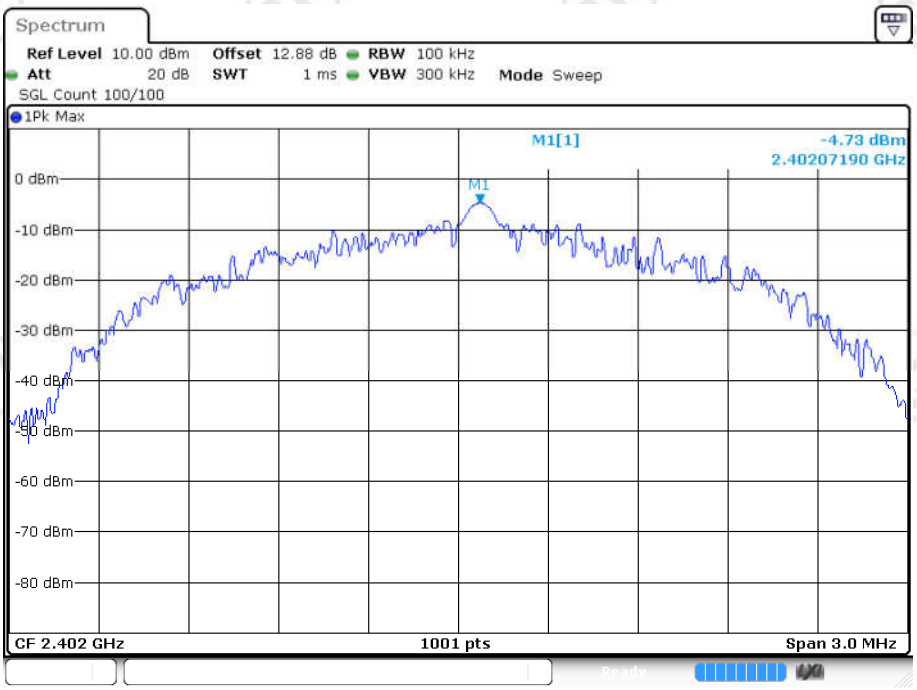


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47972 GHz	-4.00 dBm		
M2		1	4.959596 GHz	-40.41 dBm		
M3		1	4.959596 GHz	-40.41 dBm		
M4		1	7.439835 GHz	-47.97 dBm		
M5		1	10.101835 GHz	-55.09 dBm		

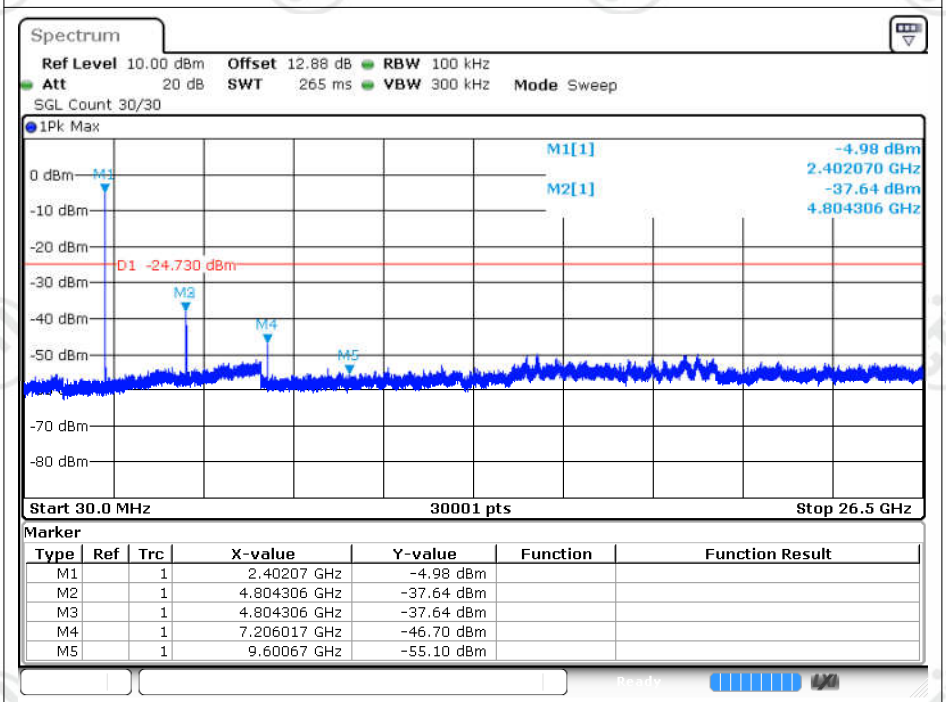
Date: 15.APR.2024 10:59:04

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



Date: 15.APR.2024 11:01:37

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission

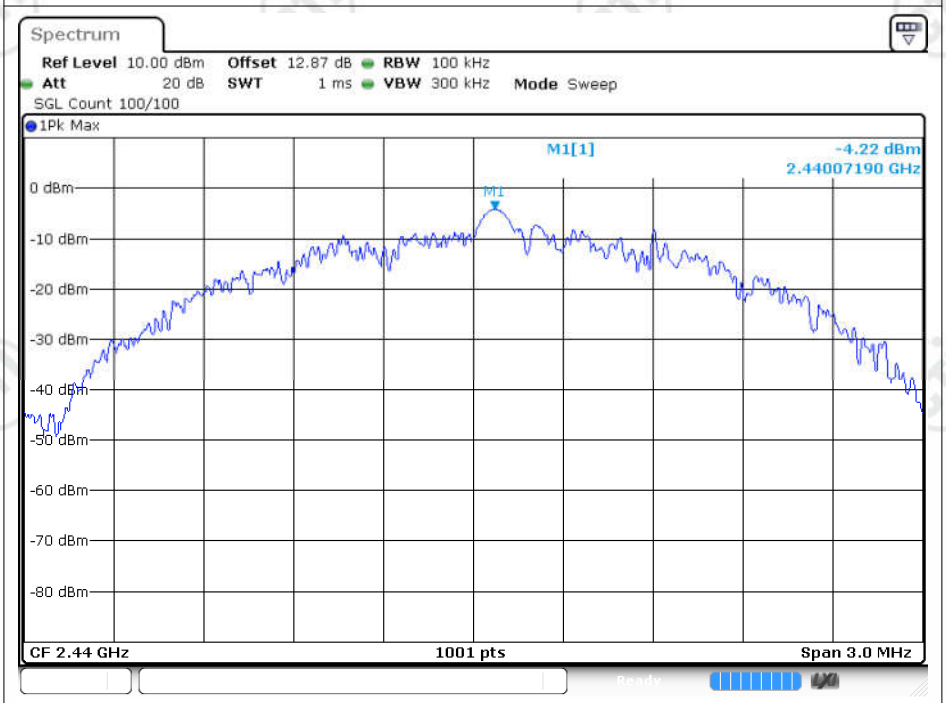


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40207 GHz	-4.98 dBm		
M2		1	4.804306 GHz	-37.64 dBm		
M3		1	4.804306 GHz	-37.64 dBm		
M4		1	7.206017 GHz	-46.70 dBm		
M5		1	9.60067 GHz	-55.10 dBm		

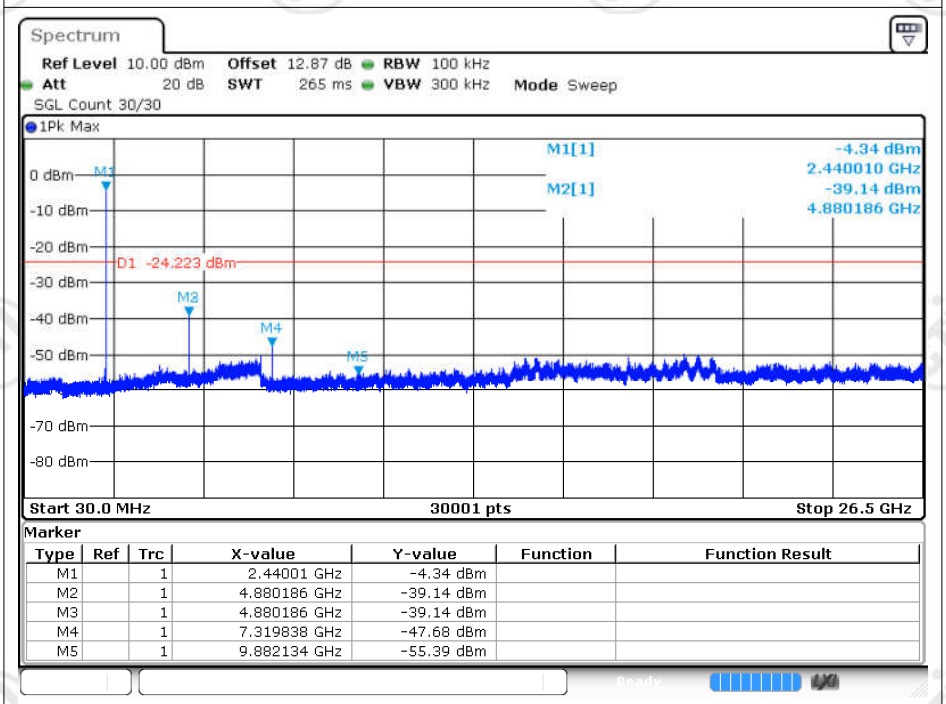
Date: 15.APR.2024 11:02:06

Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



Date: 15.APR.2024 11:42:03

Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission

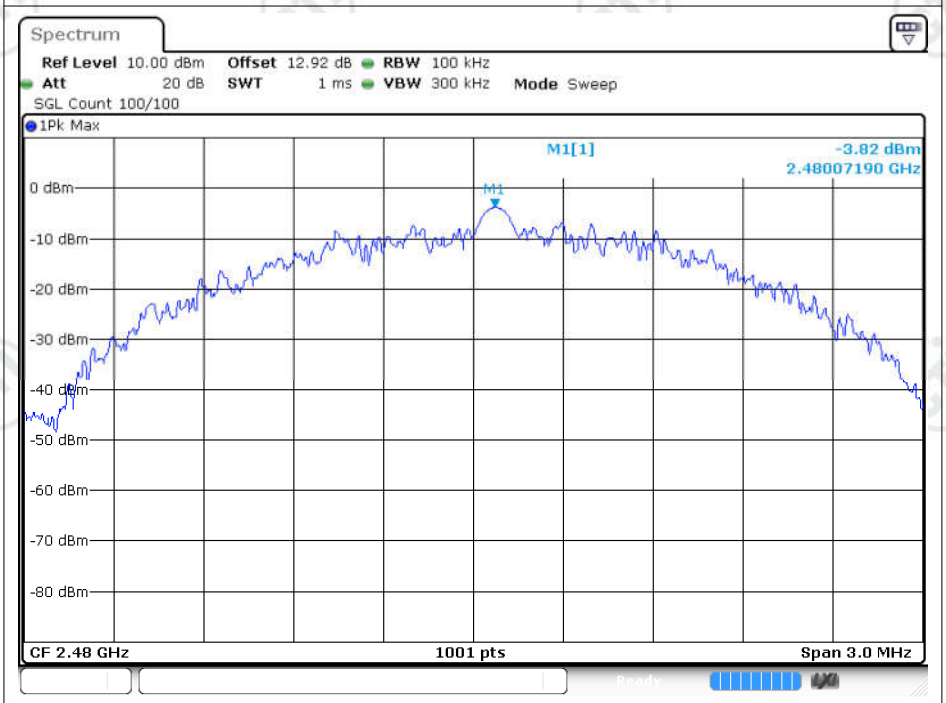


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.44001 GHz	-4.34 dBm		
M2		1	4.880186 GHz	-39.14 dBm		
M3		1	4.880186 GHz	-39.14 dBm		
M4		1	7.319838 GHz	-47.68 dBm		
M5		1	9.882134 GHz	-55.39 dBm		

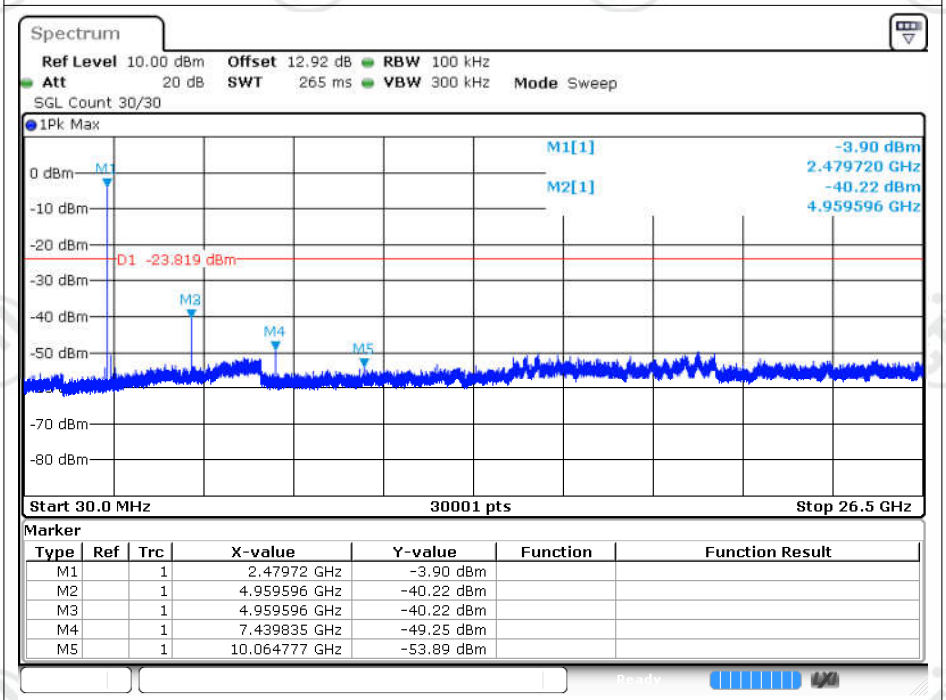
Date: 15.APR.2024 11:42:32

Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



Date: 15.APR.2024 12:53:54

Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.47972 GHz	-3.90 dBm		
M2		1	4.959596 GHz	-40.22 dBm		
M3		1	4.959596 GHz	-40.22 dBm		
M4		1	7.439835 GHz	-49.25 dBm		
M5		1	10.064777 GHz	-53.89 dBm		

Date: 15.APR.2024 12:54:23

END OF REPORT