



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: Laser & LED Projector Light

Test Model: SL-MS3W03L-G

Environmental Conditions

Temperature:	21.1 ° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Mark Chen
Supervised by:	Libin



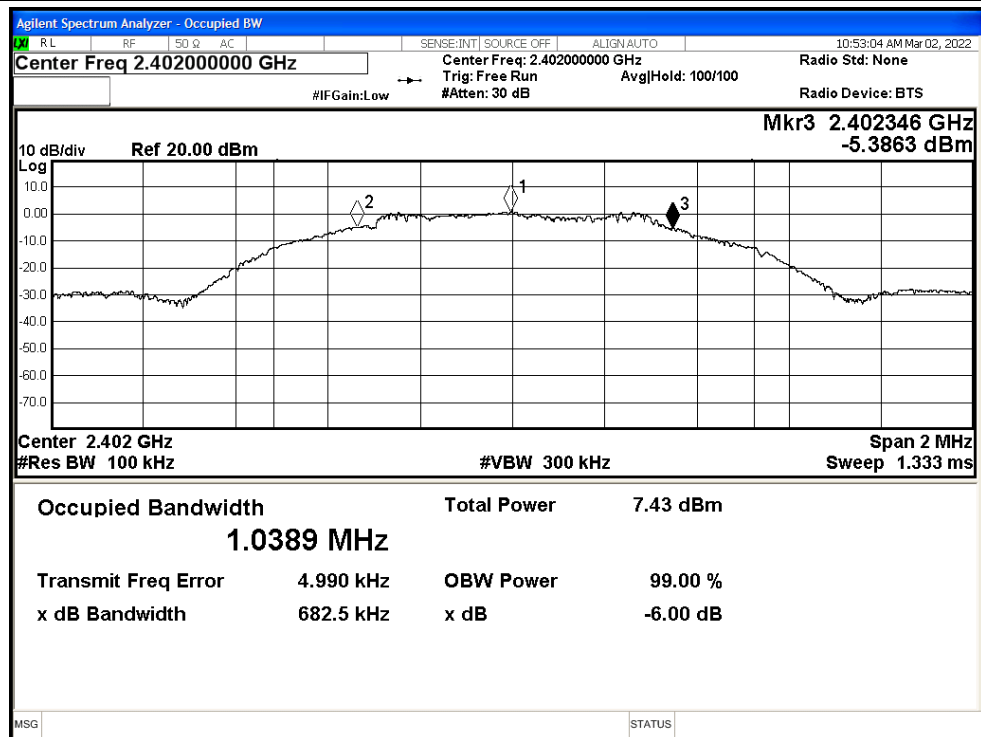
A.1 6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	6 dB Bandwidth (MHz)	Limit 6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.683	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.707	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.693	0.5	Pass

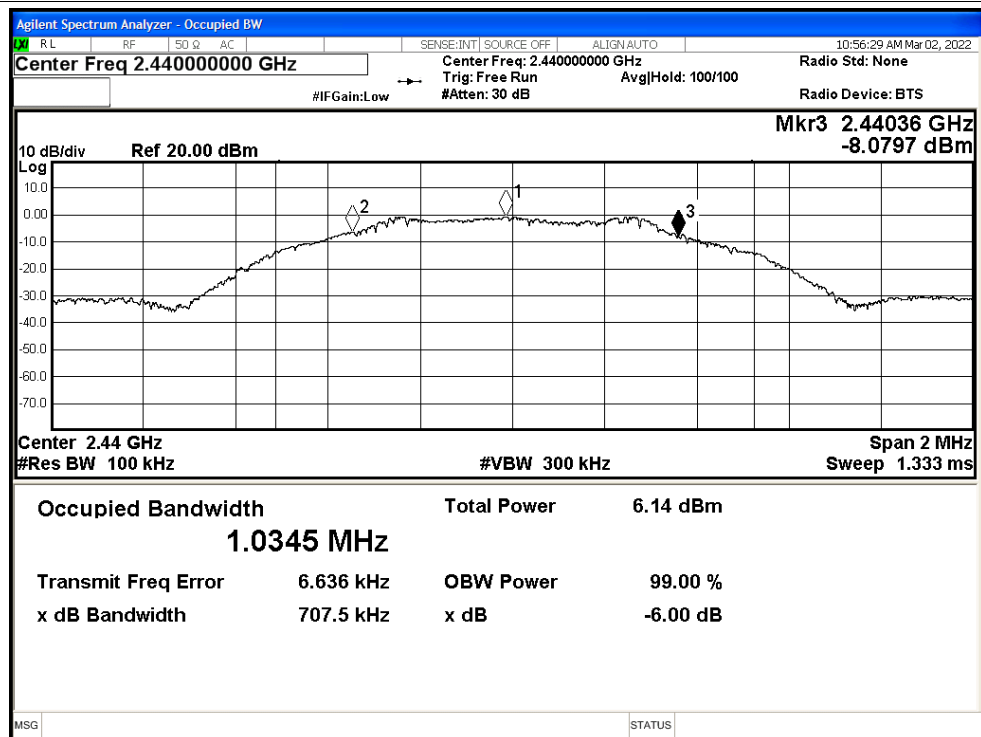


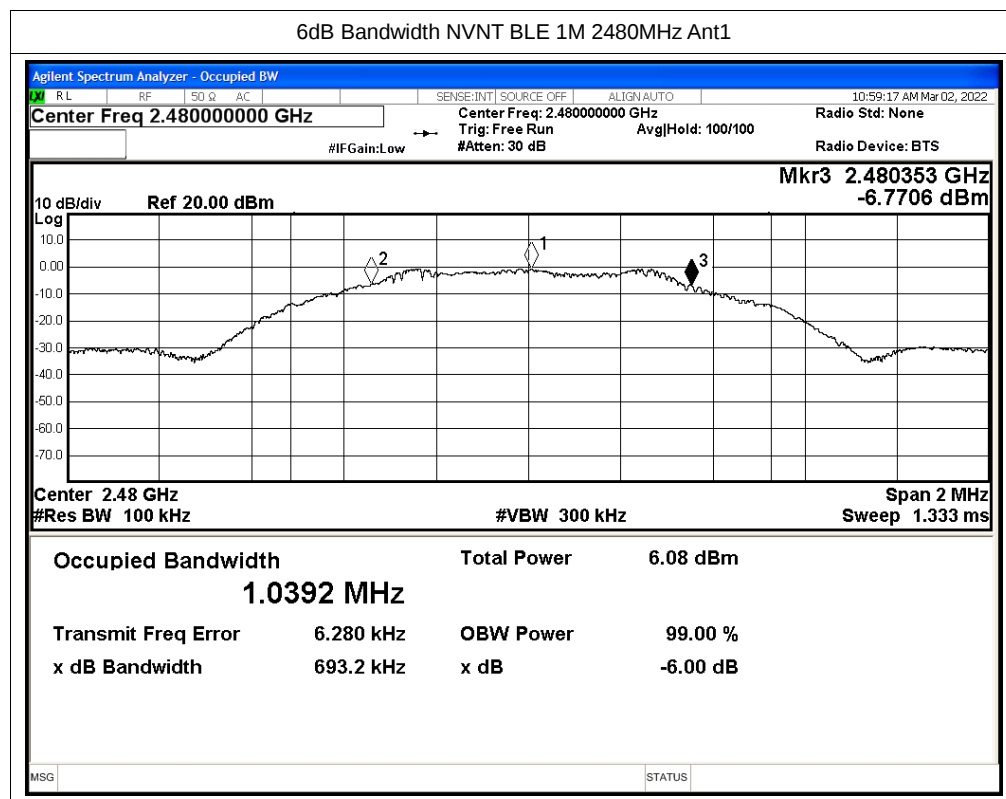
Test Graphs

6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



6dB Bandwidth NVNT BLE 1M 2440MHz Ant1







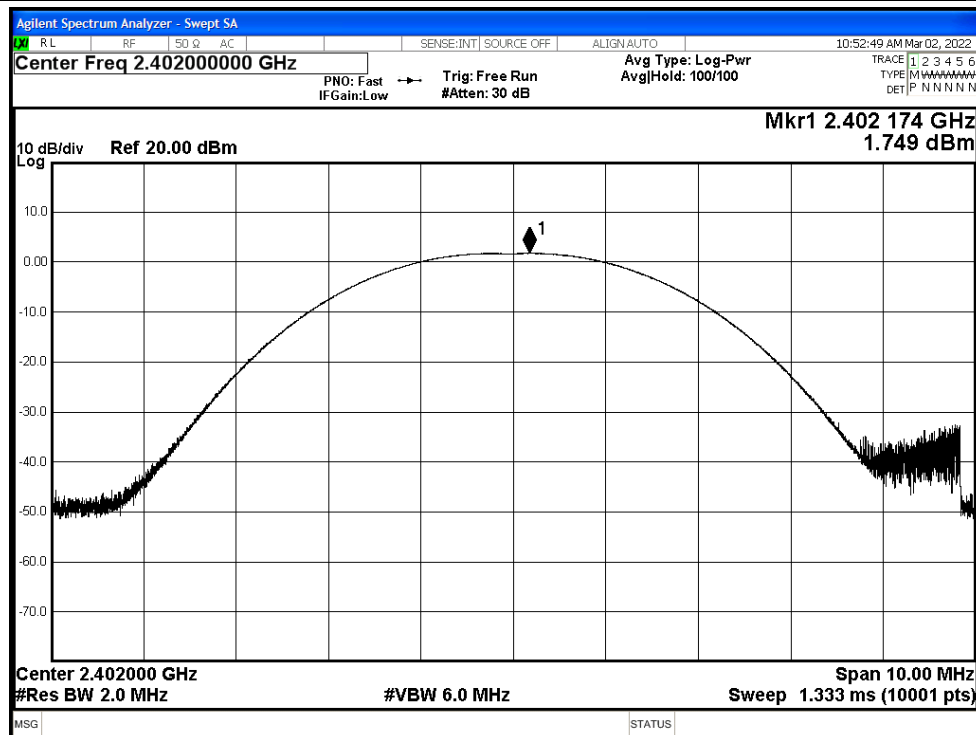
A.2 Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	1.75	30	Pass
NVNT	BLE 1M	2440	Ant1	0.27	30	Pass
NVNT	BLE 1M	2480	Ant1	0.4	30	Pass

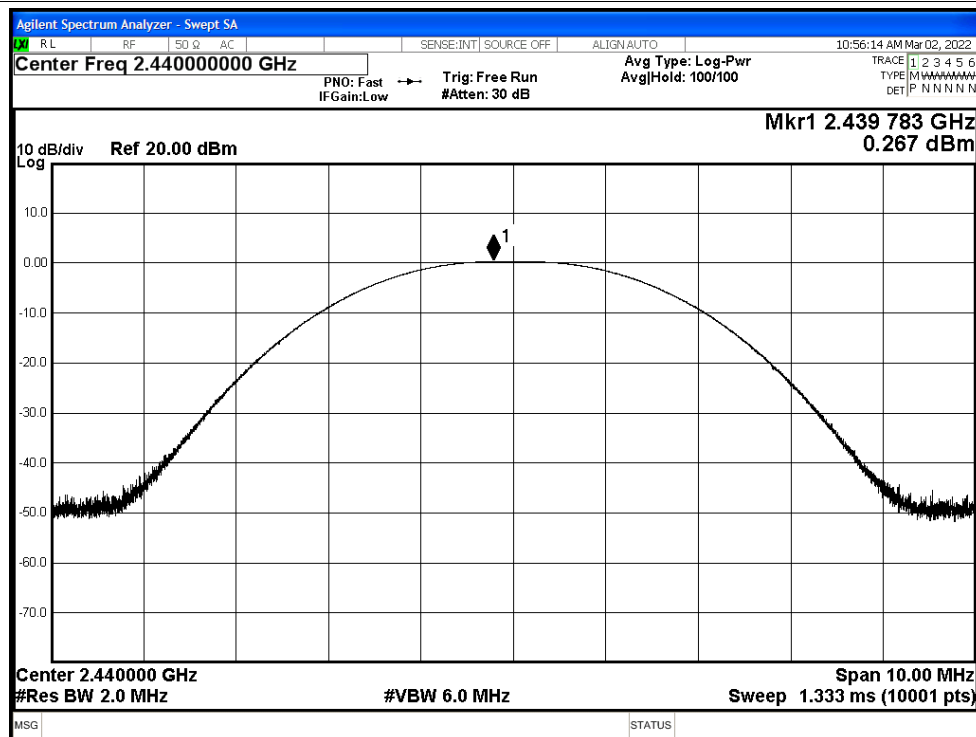


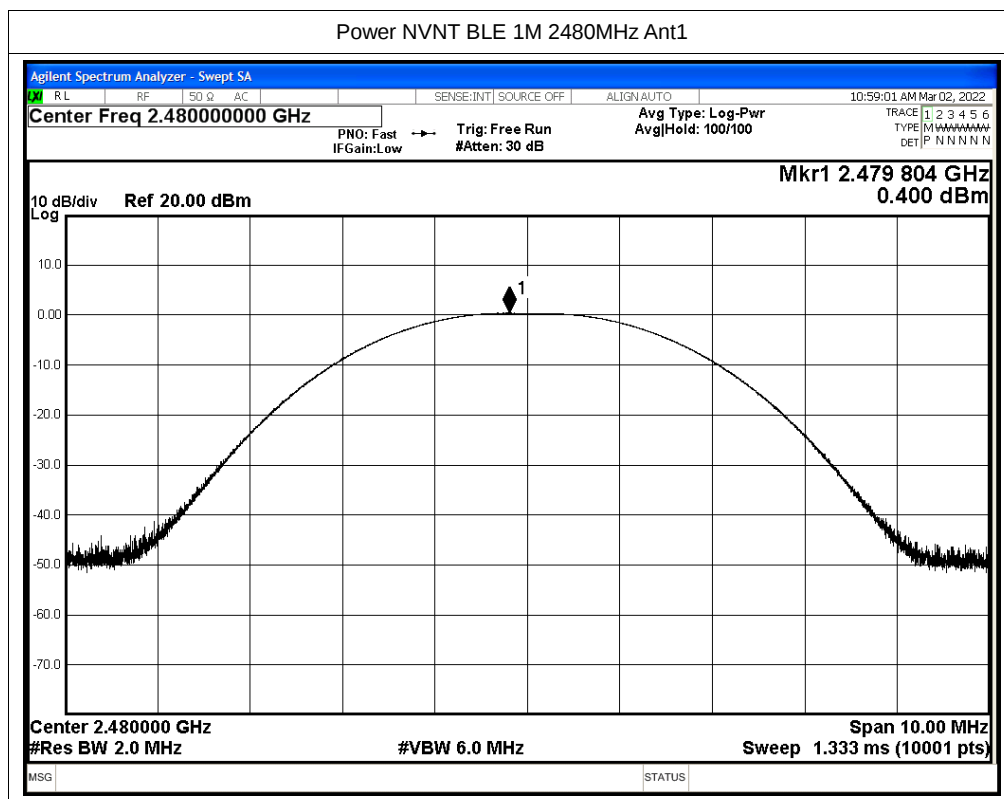
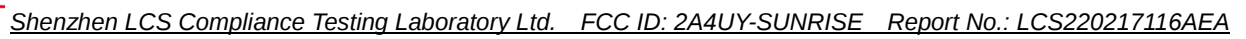
Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1







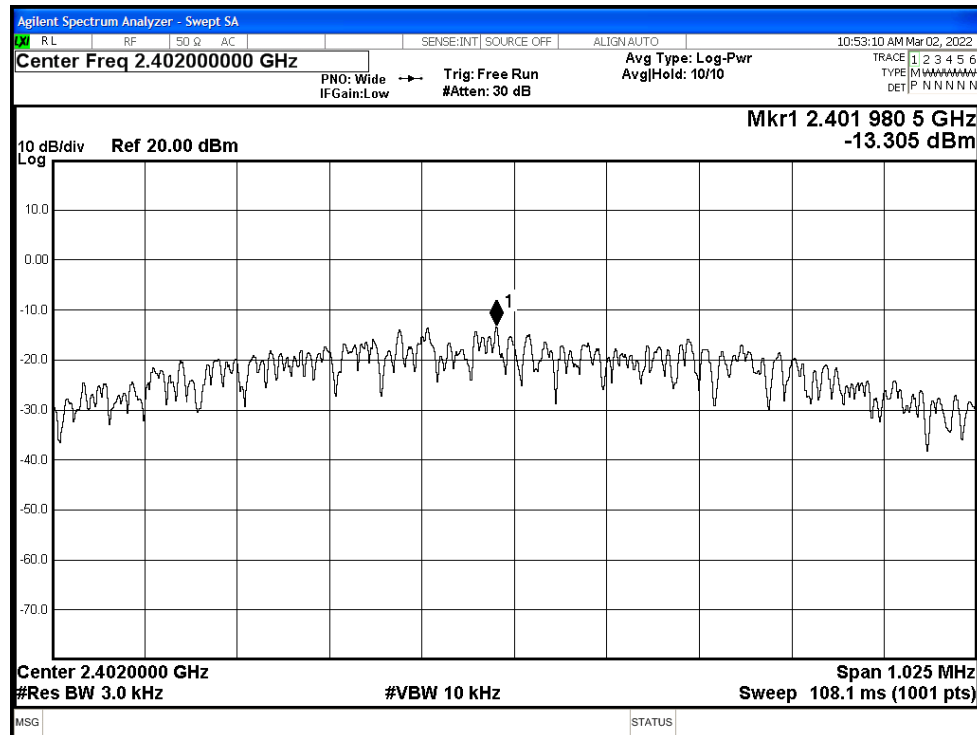
A.3 Maximum power spectral density

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	-13.31	0	-13.31	8	Pass
NVNT	BLE 1M	2440	Ant1	-14.65	0	-14.65	8	Pass
NVNT	BLE 1M	2480	Ant1	-14.75	0	-14.75	8	Pass

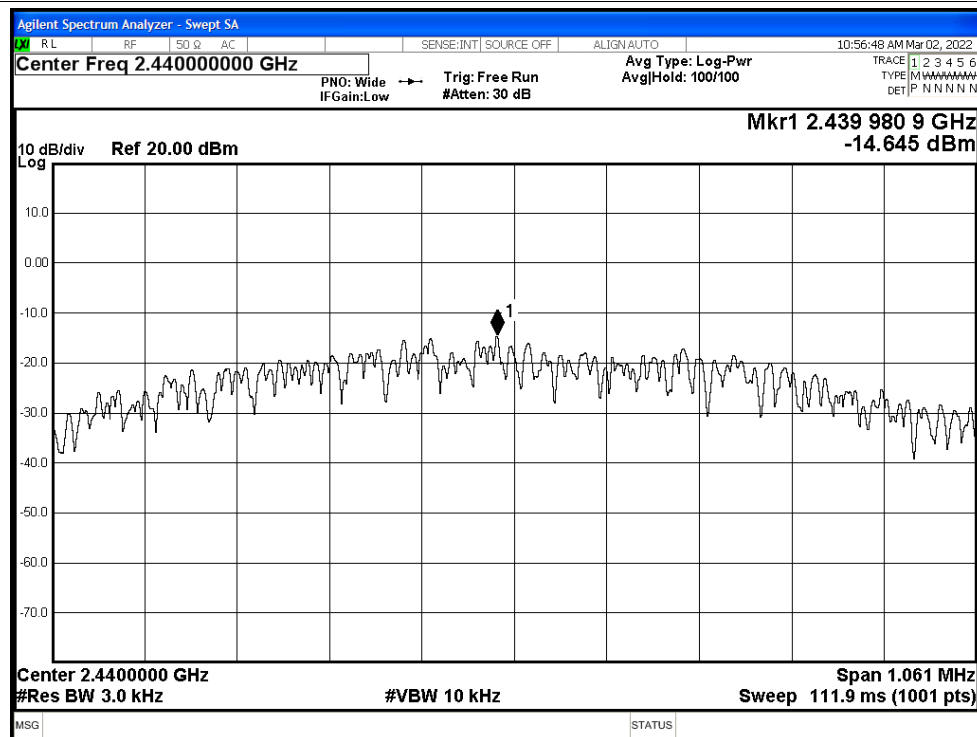


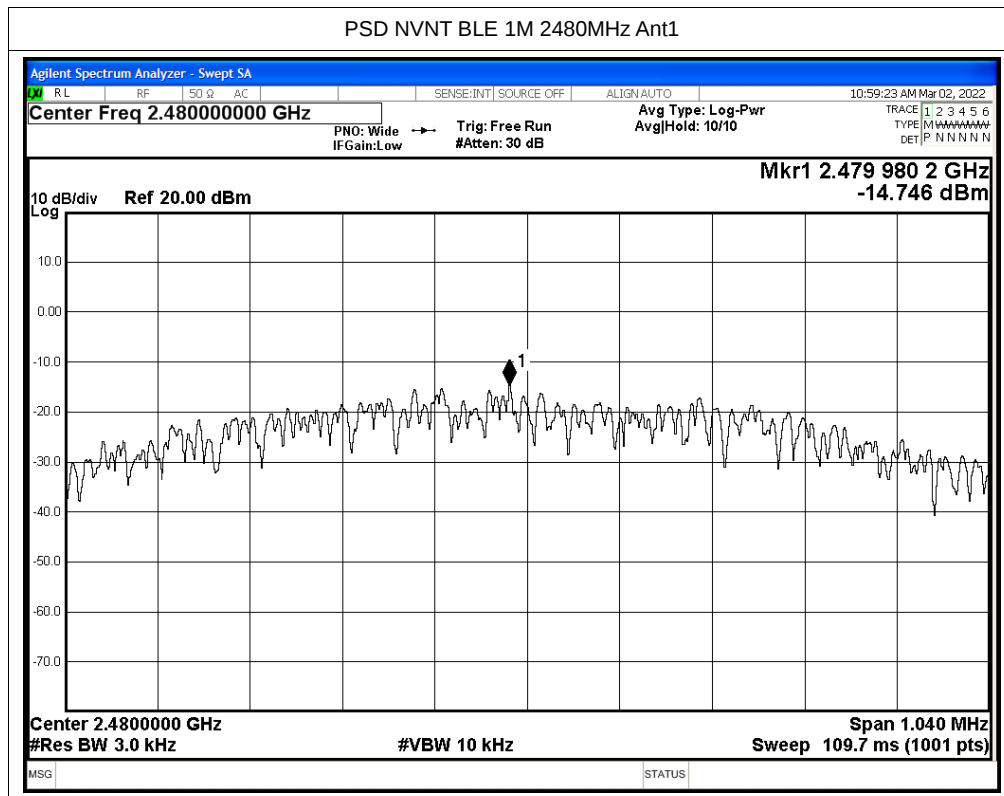
Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1







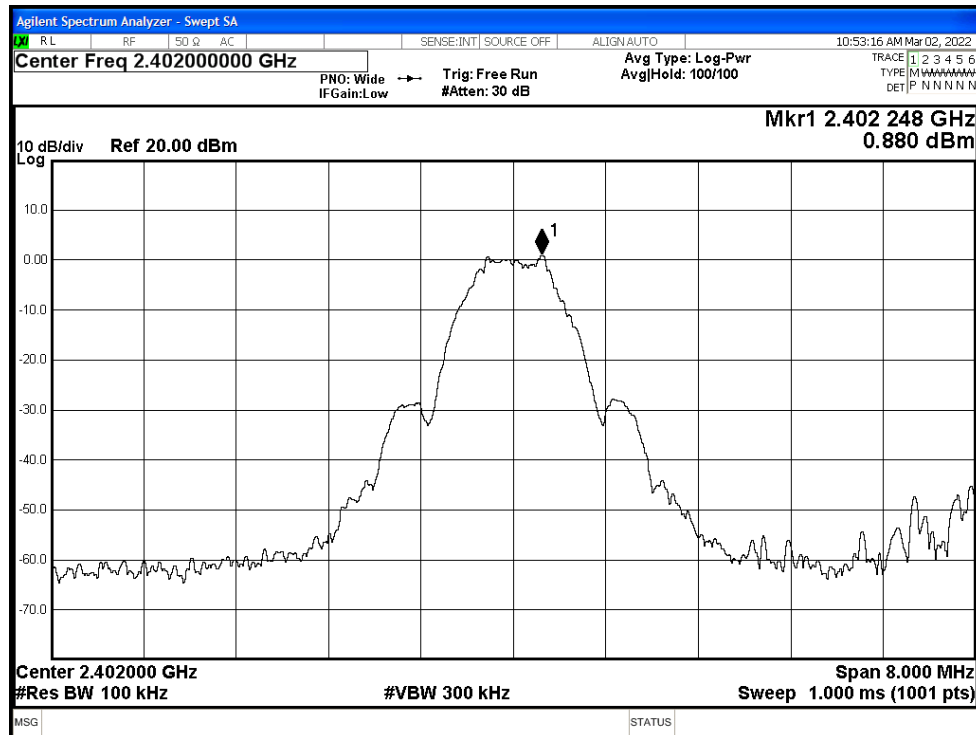
A.4 Band edge measurements

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-59.65	-20	Pass
NVNT	BLE 1M	2480	Ant1	-58.23	-20	Pass

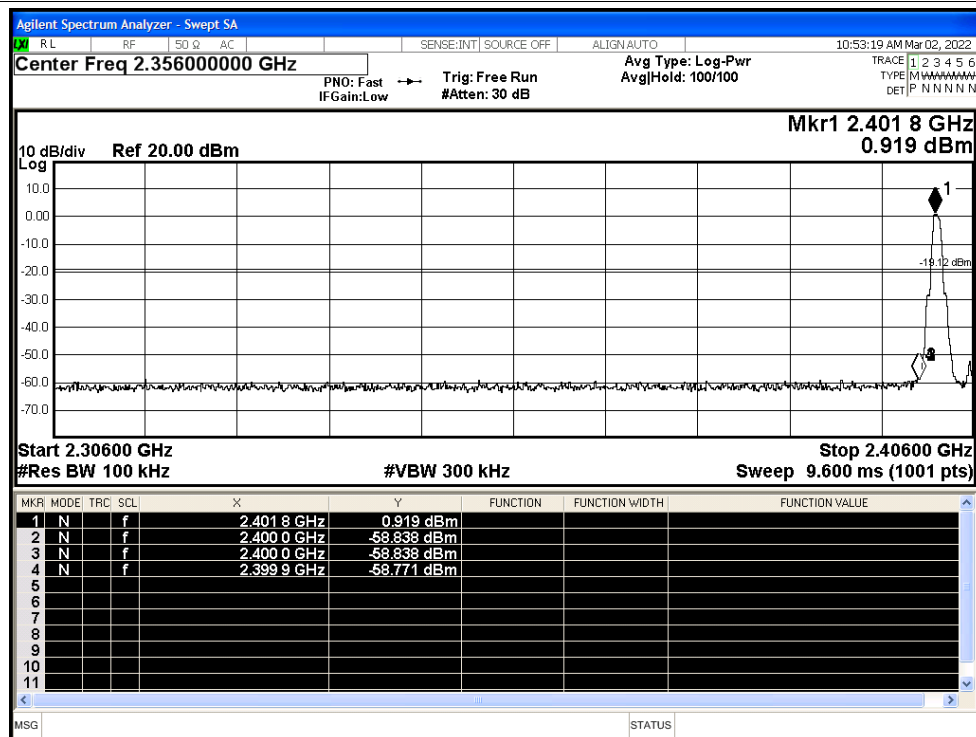


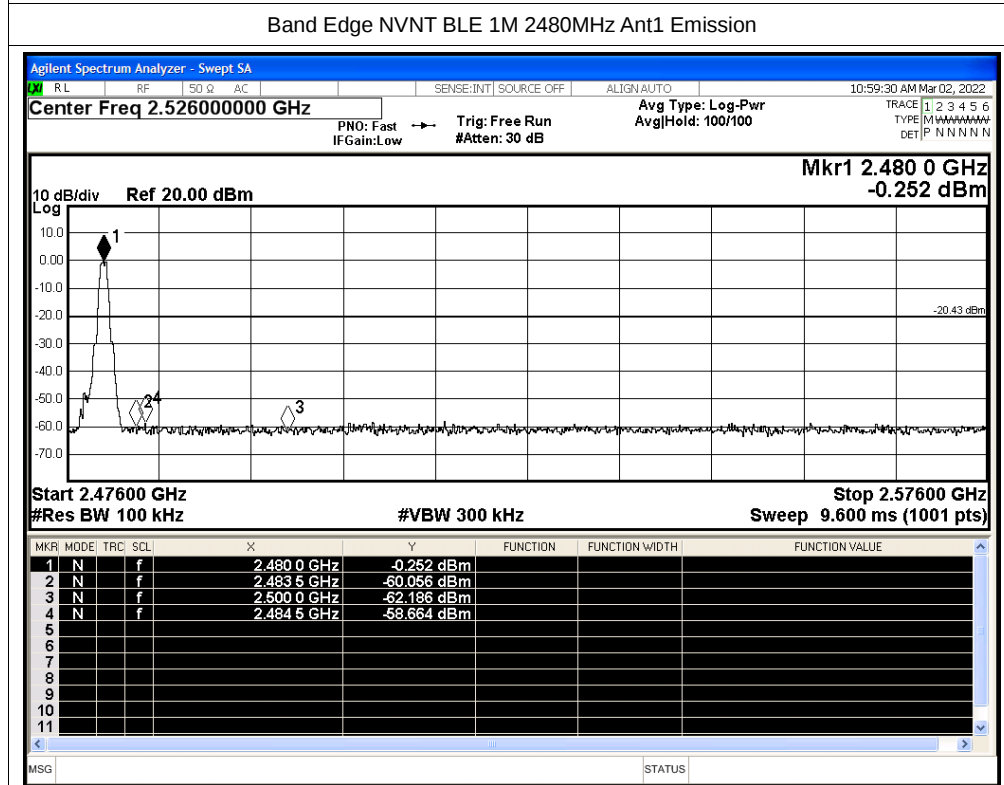
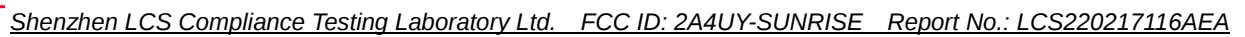
Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Band Edge NVNT BLE 1M 2402MHz Ant1 Emission





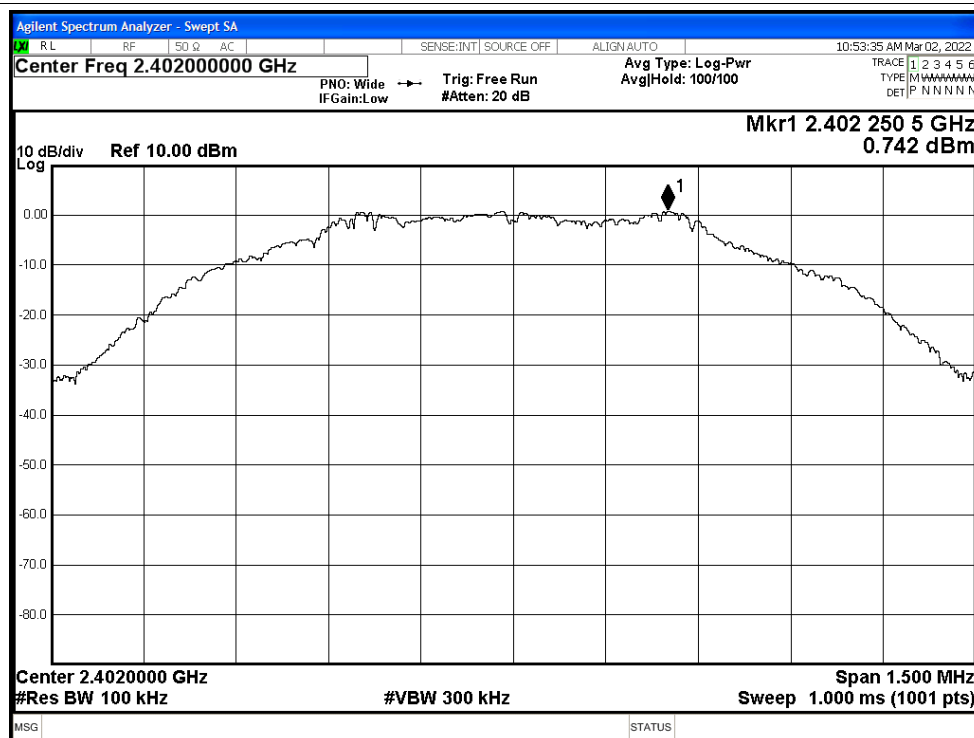


A.5 Conducted Spurious Emission

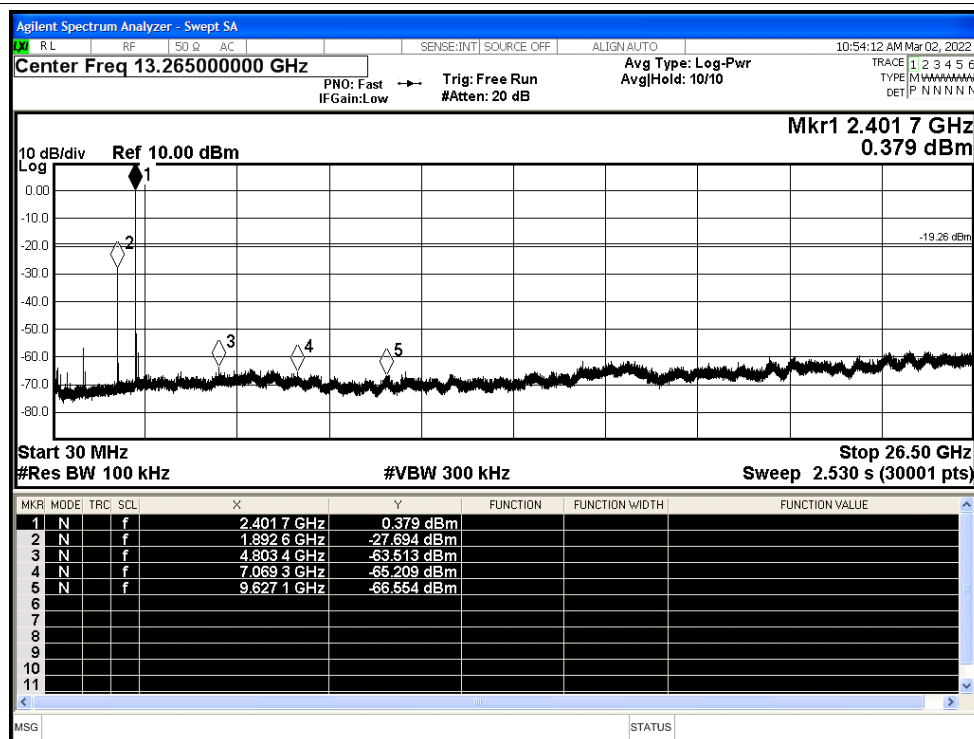
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-28.43	-20	Pass
NVNT	BLE 1M	2440	Ant1	-56.93	-20	Pass
NVNT	BLE 1M	2480	Ant1	-28.22	-20	Pass



Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

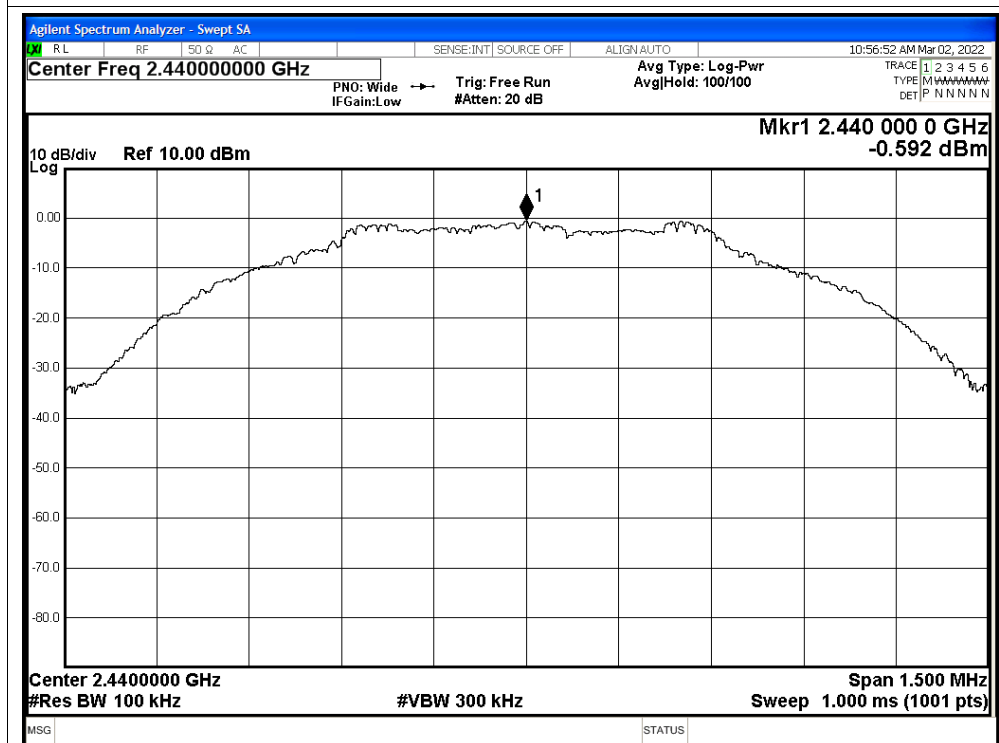


Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

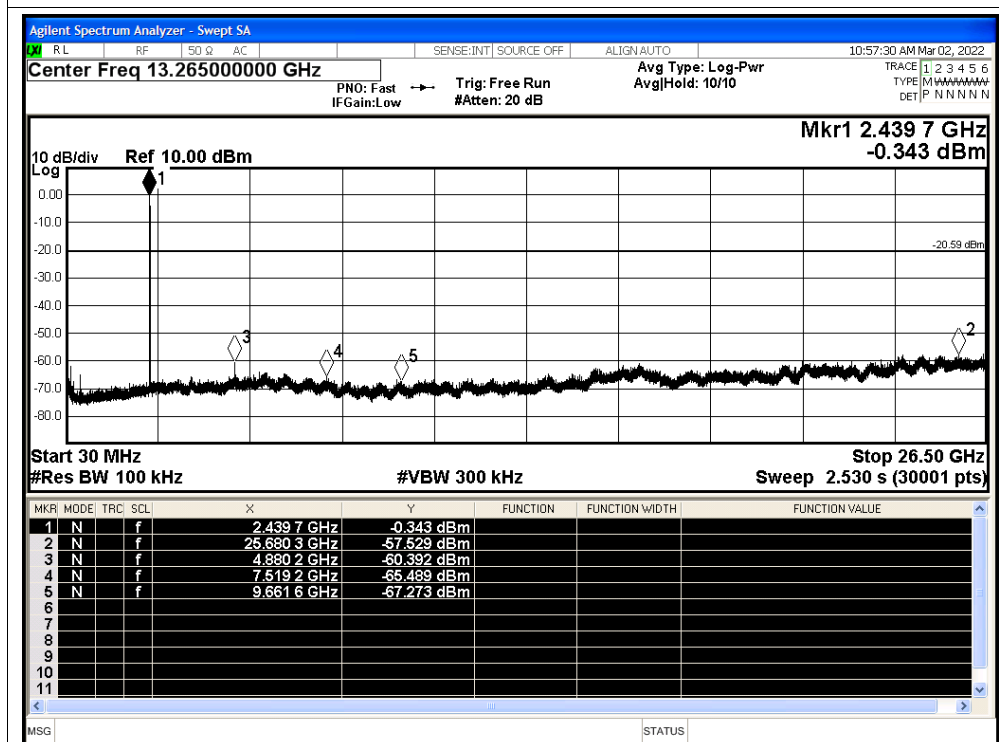


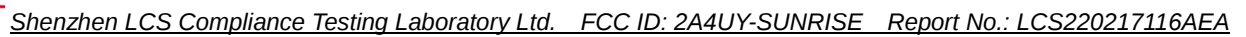


Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission





Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Q AC SENSE:INT SOURCE OFF ALIGN:AUTO 10:59:44 AM Mar 02, 2022

Center Freq 2.48000000 GHz

PNO: Wide IFGain:Low Trig: Free Run #Atten: 20 dB

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

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

10 dB/div Ref 10.00 dBm

Mkr1 2.479 985 0 GHz
-0.594 dBm

Center 2.4800000 GHz
#Res BW 100 kHz

#VBW 300 kHz

Span 1.500 MHz
Sweep 1.000 ms (1001 pts)

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

Center Freq 13.26500000 GHz

PNO: Fast IFGain:Low

Trig: Free Run #Atten: 20 dB

Avg Type: Log-Pwr AvgHld: 10/10

11:00:22 AM Mar 02, 2022

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

Mkr1 2.480 2 GHz
-0.444 dBm

10 dB/div Ref 10.00 dBm

Log

Start 30 MHz

Stop 26.50 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 2.530 s (30001 pts)

MKR	MODE	TBC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.480 2 GHz	-0.444 dBm			
2	N	f		1.901 4 GHz	-28.818 dBm			
3	N	f		4.960 5 GHz	-64.137 dBm			
4	N	f		7.551 9 GHz	-66.451 dBm			
5	N	f		10.095 7 GHz	-67.267 dBm			
6								
7								
8								
9								
10								
11								

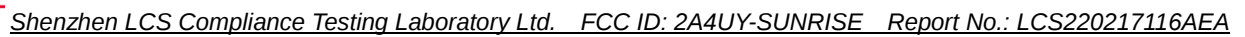
MSG

STATUS

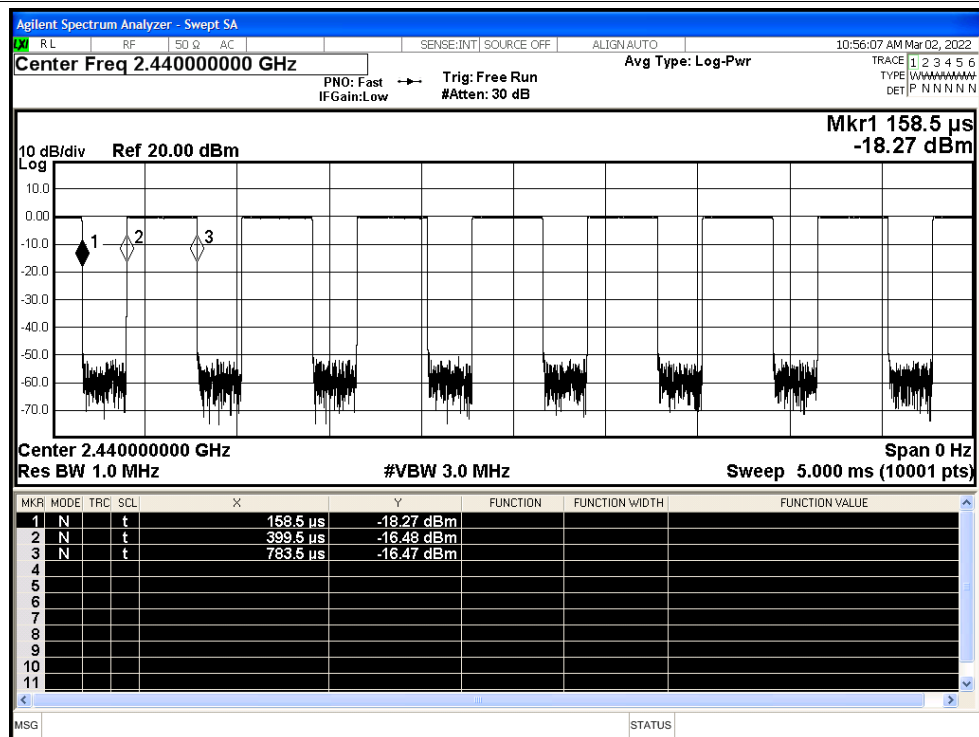


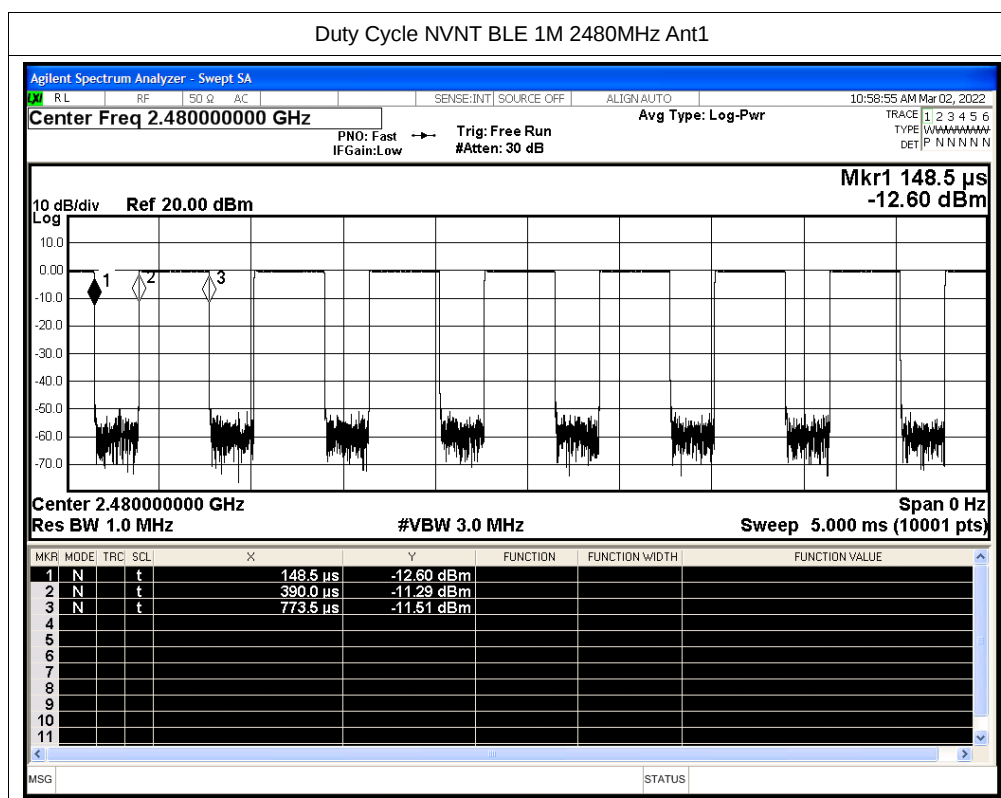
A.6 Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	61.44	2.12	2.6
NVNT	BLE 1M	2440	Ant1	61.44	2.12	2.6
NVNT	BLE 1M	2480	Ant1	61.36	2.12	2.61



Duty Cycle NVNT BLE 1M 2402MHz Ant1







A.7 Emissions in Restricted Bands

Condition	Mode	Frequency (MHz)	Spur Freq (MHz)	Power (dBm)	Gain (dBi)	E (dBuV/m)	Detector	Limit (dBuV/m)	Verdict
NVNT	BLE 1M	2402	2310	-53.64	2	43.62	Peak	74	Pass
NVNT	BLE 1M	2402	2310	-61.37	2	35.89	Average	54	Pass
NVNT	BLE 1M	2402	2344.08	-49.42	2	47.84	Peak	74	Pass
NVNT	BLE 1M	2402	2381.52	-60.51	2	36.75	Average	54	Pass
NVNT	BLE 1M	2402	2390	-52.86	2	44.4	Peak	74	Pass
NVNT	BLE 1M	2402	2390	-60.78	2	36.48	Average	54	Pass
NVNT	BLE 1M	2480	2483.5	-51.44	2	45.82	Peak	74	Pass
NVNT	BLE 1M	2480	2483.5	-60.37	2	36.89	Average	54	Pass
NVNT	BLE 1M	2480	2485.528	-49.08	2	48.18	Peak	74	Pass
NVNT	BLE 1M	2480	2483.848	-60.18	2	37.08	Average	54	Pass
NVNT	BLE 1M	2480	2500	-52.46	2	44.8	Peak	74	Pass
NVNT	BLE 1M	2480	2500	-61.07	2	36.19	Average	54	Pass



Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak

