

FCC Appendix RF Test Data for BLE

Product Name: Smart Diagnostic System

Test Model: P805

Environmental Conditions

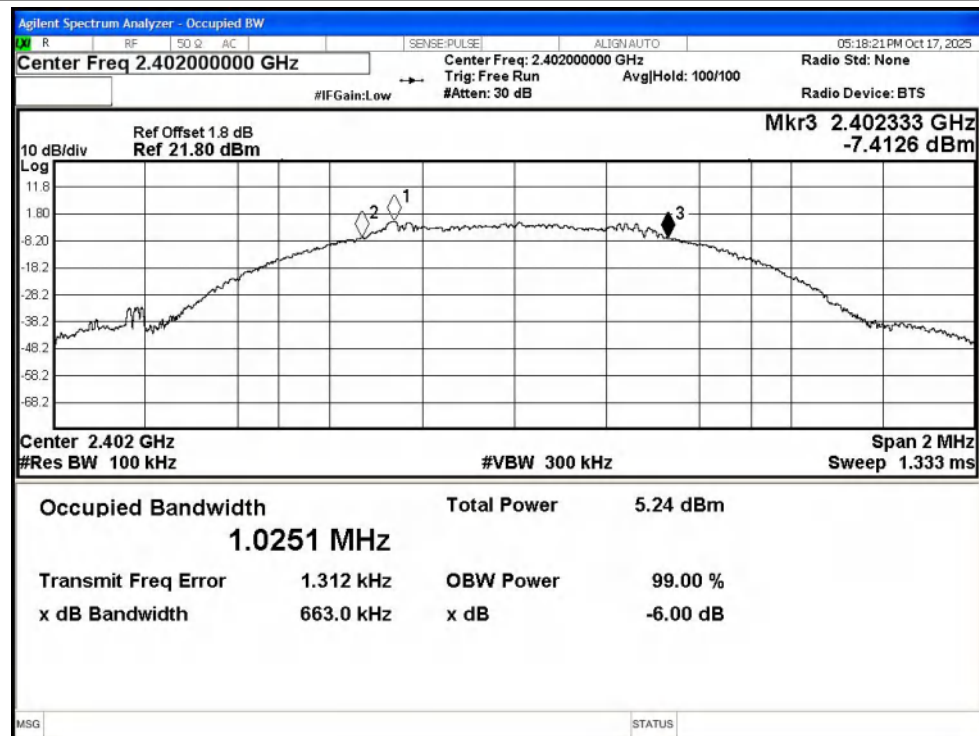
Temperature:	23.8° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Zoey Cao
Supervised by:	Eric Wang

For ESP32 modular:**1. -6dB Bandwidth**

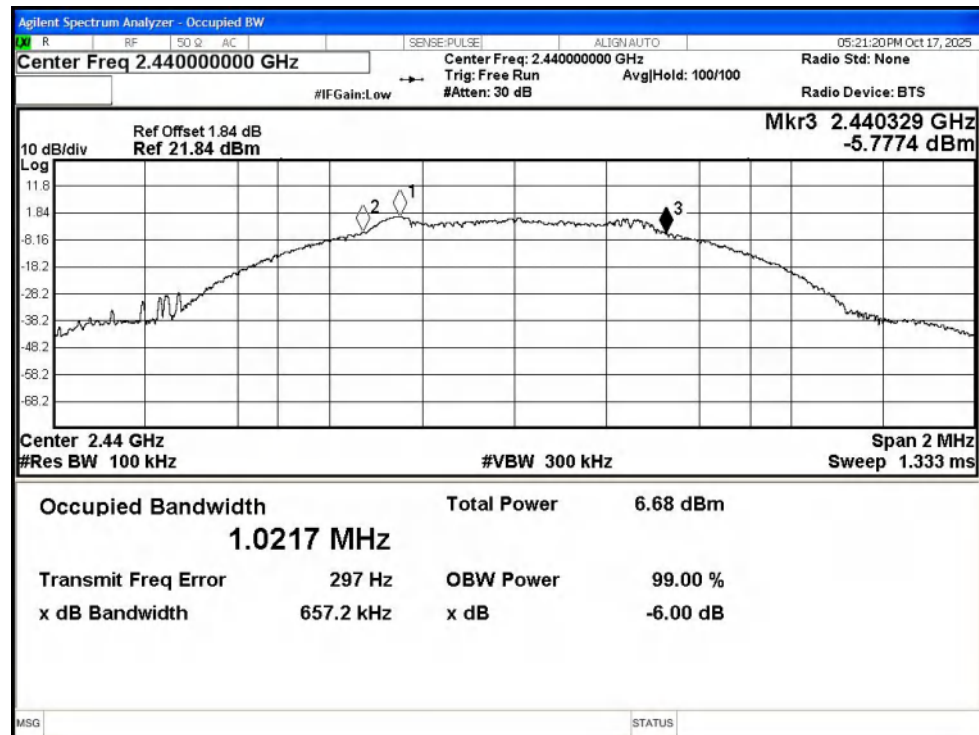
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.663	≥ 0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.657	≥ 0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.662	≥ 0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.16	≥ 0.5	Pass
NVNT	BLE 2M	2440	Ant1	1.127	≥ 0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.145	≥ 0.5	Pass

Test Graphs

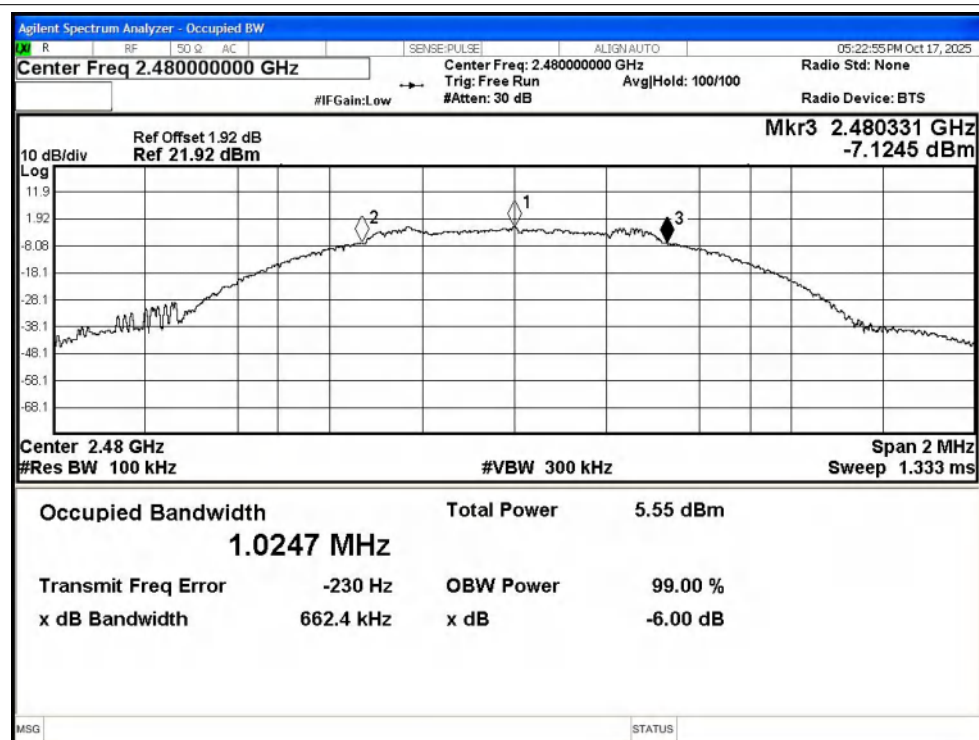
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



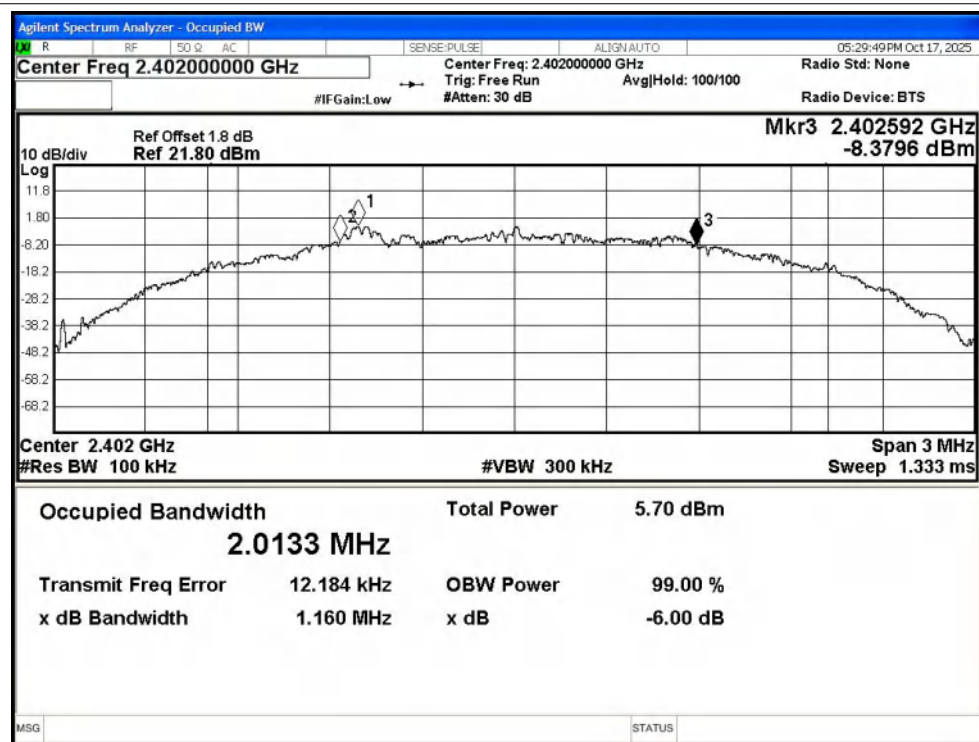
-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



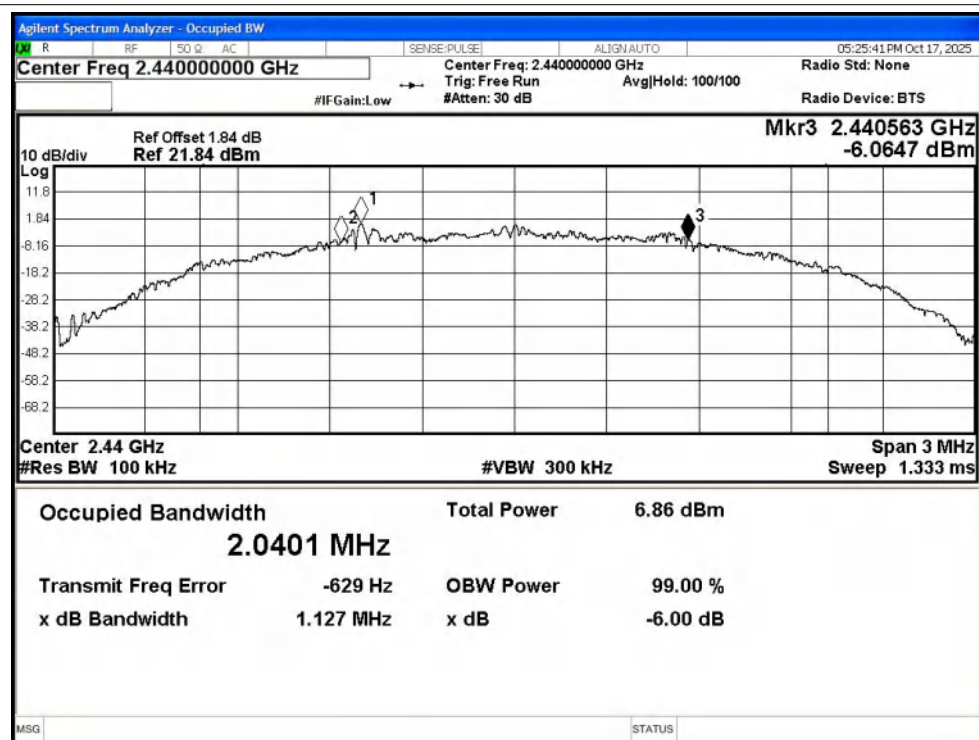
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



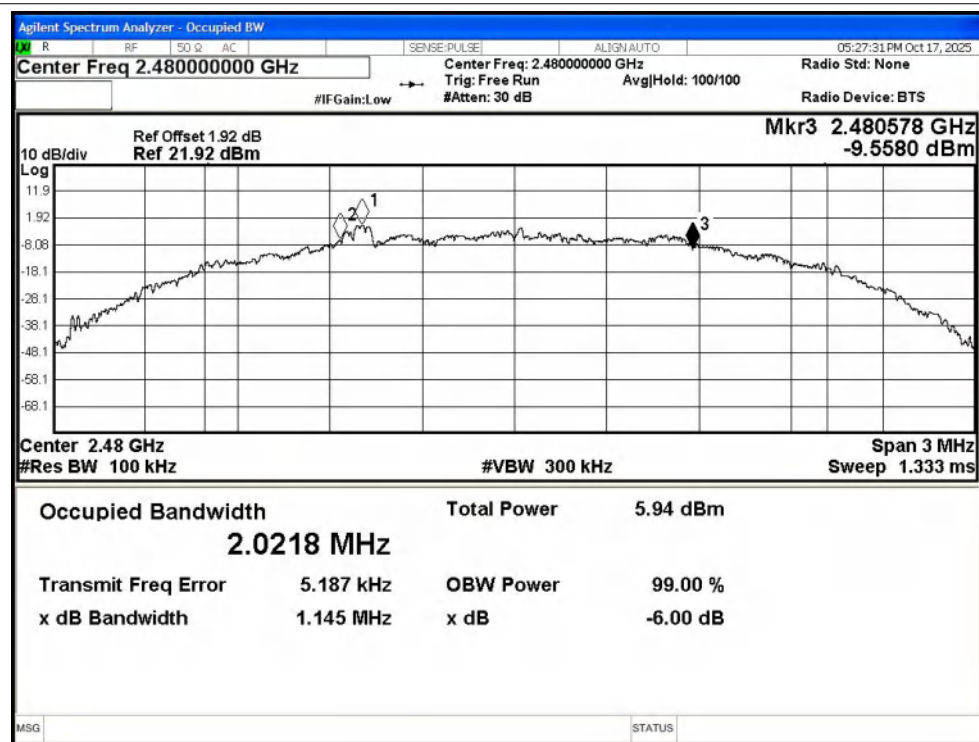
-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



2. Maximum Peak Conducted Output Power

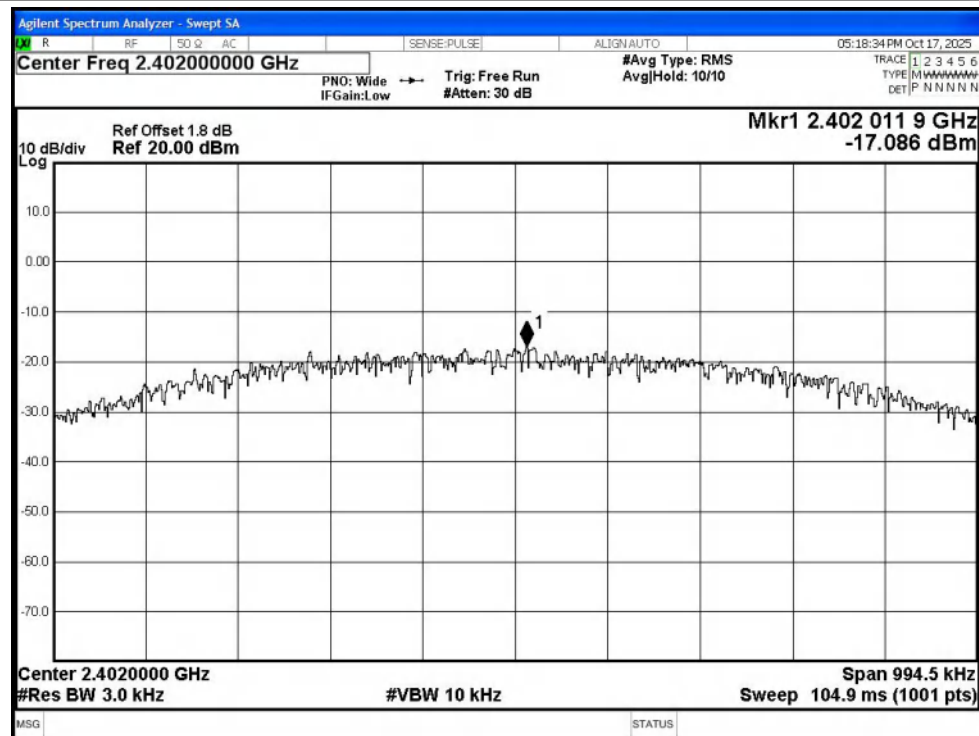
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-0.43	30	Pass
NVNT	BLE 1M	2440	Ant1	0.85	30	Pass
NVNT	BLE 1M	2480	Ant1	-0.20	30	Pass
NVNT	BLE 2M	2402	Ant1	-0.59	30	Pass
NVNT	BLE 2M	2440	Ant1	0.69	30	Pass
NVNT	BLE 2M	2480	Ant1	-0.34	30	Pass

3. Maximum Power Spectral Density Level

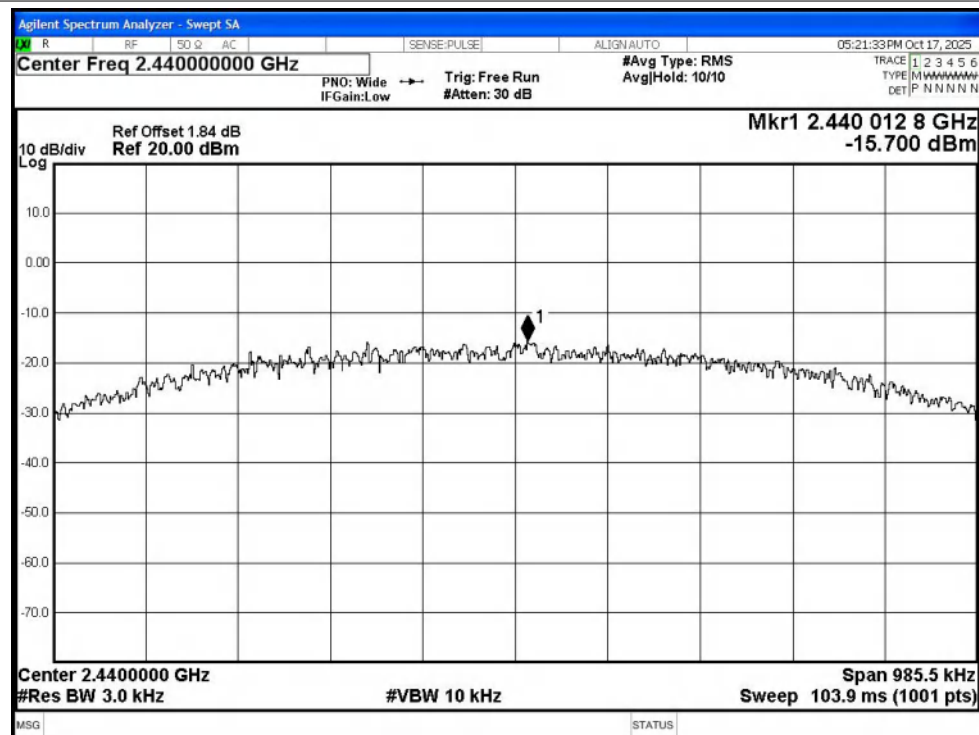
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-17.09	8	Pass
NVNT	BLE 1M	2440	Ant1	-15.7	8	Pass
NVNT	BLE 1M	2480	Ant1	-16.72	8	Pass
NVNT	BLE 2M	2402	Ant1	-20.49	8	Pass
NVNT	BLE 2M	2440	Ant1	-19.12	8	Pass
NVNT	BLE 2M	2480	Ant1	-19.98	8	Pass

Test Graphs

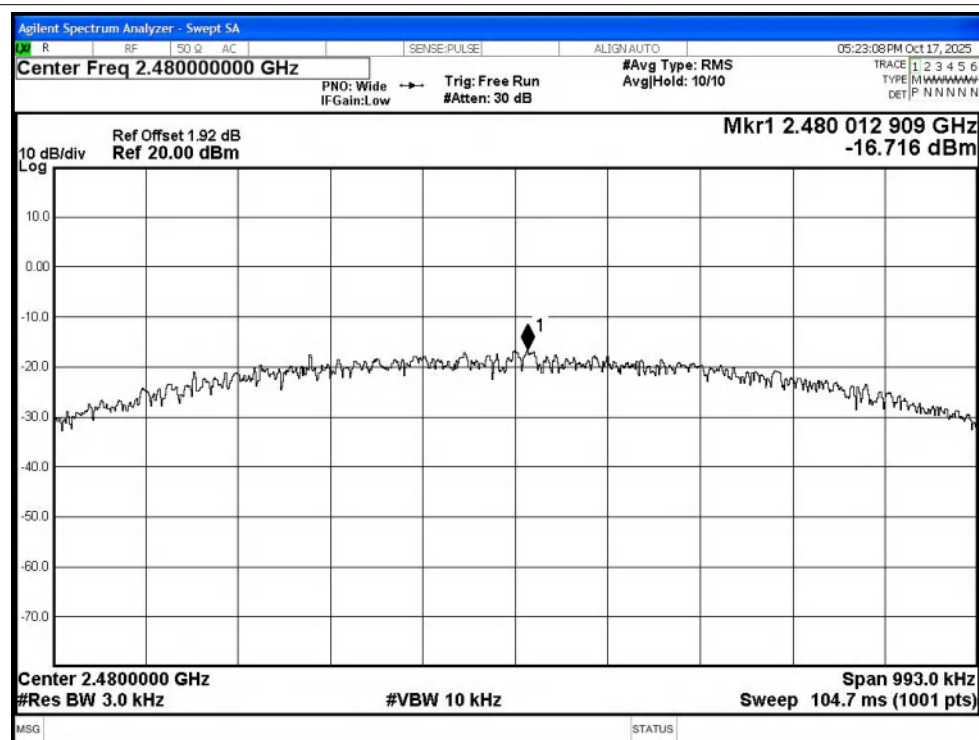
PSD NVNT BLE 1M 2402MHz Ant1



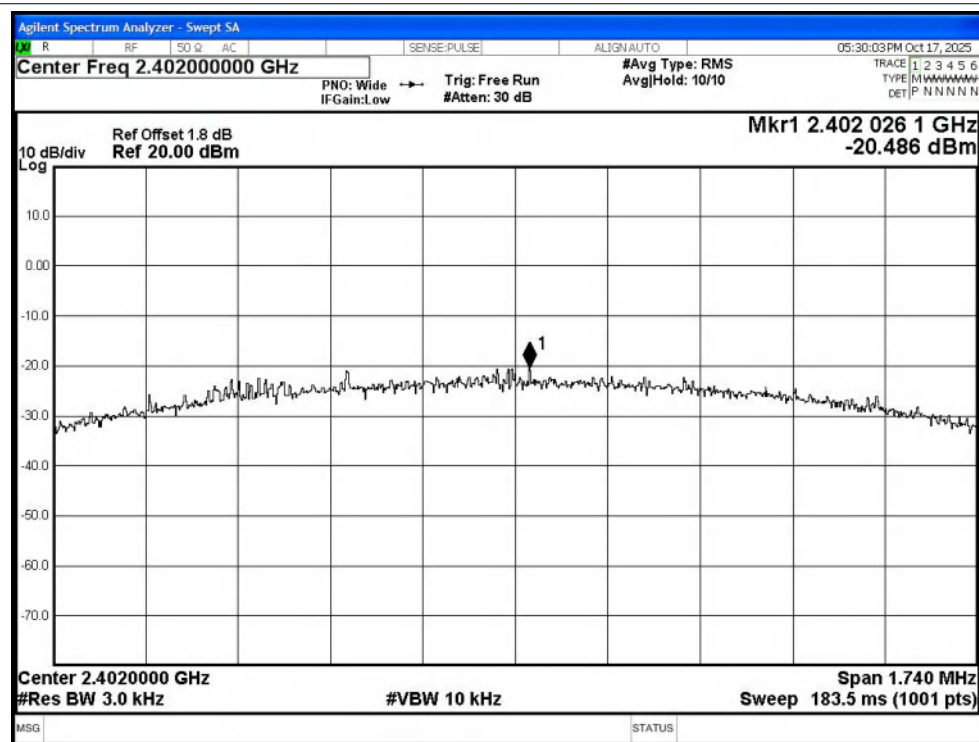
PSD NVNT BLE 1M 2440MHz Ant1



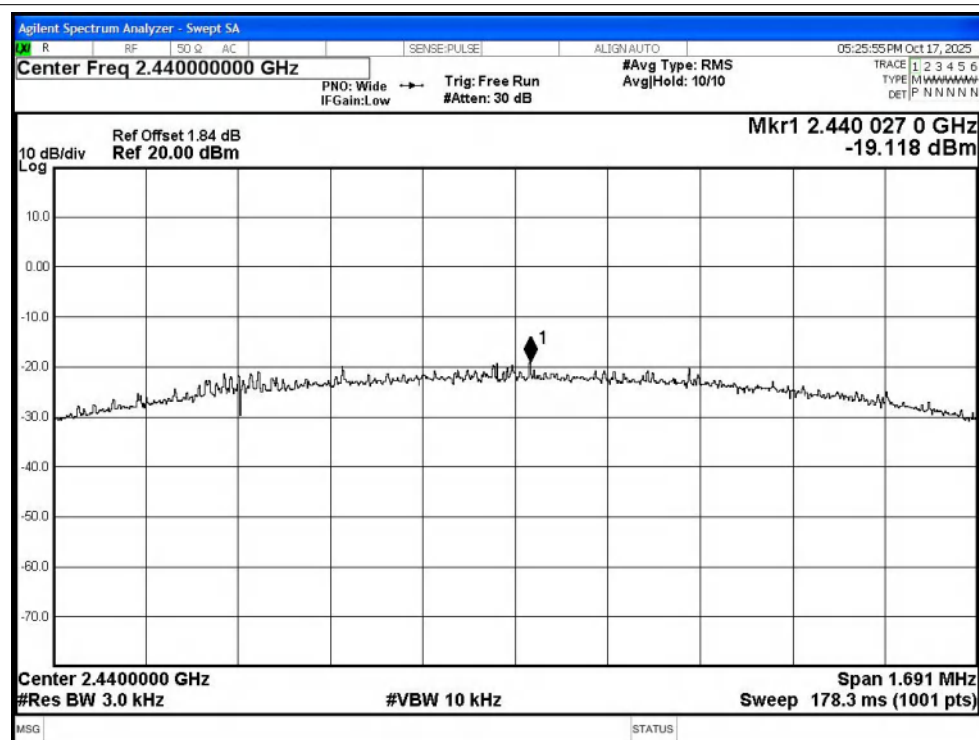
PSD NVNT BLE 1M 2480MHz Ant1



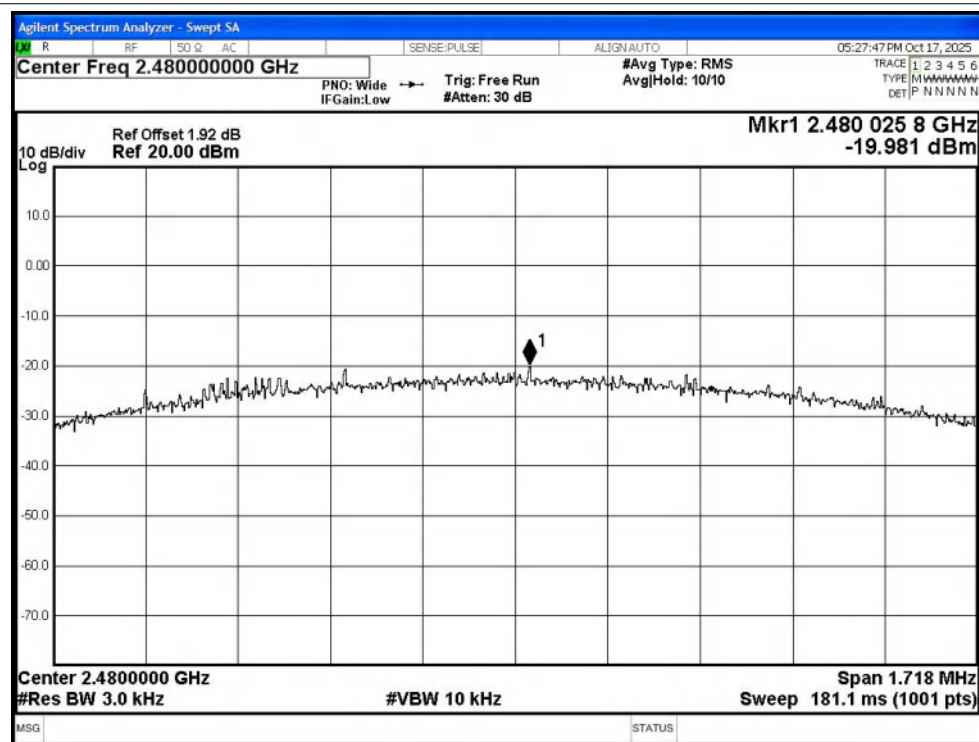
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1

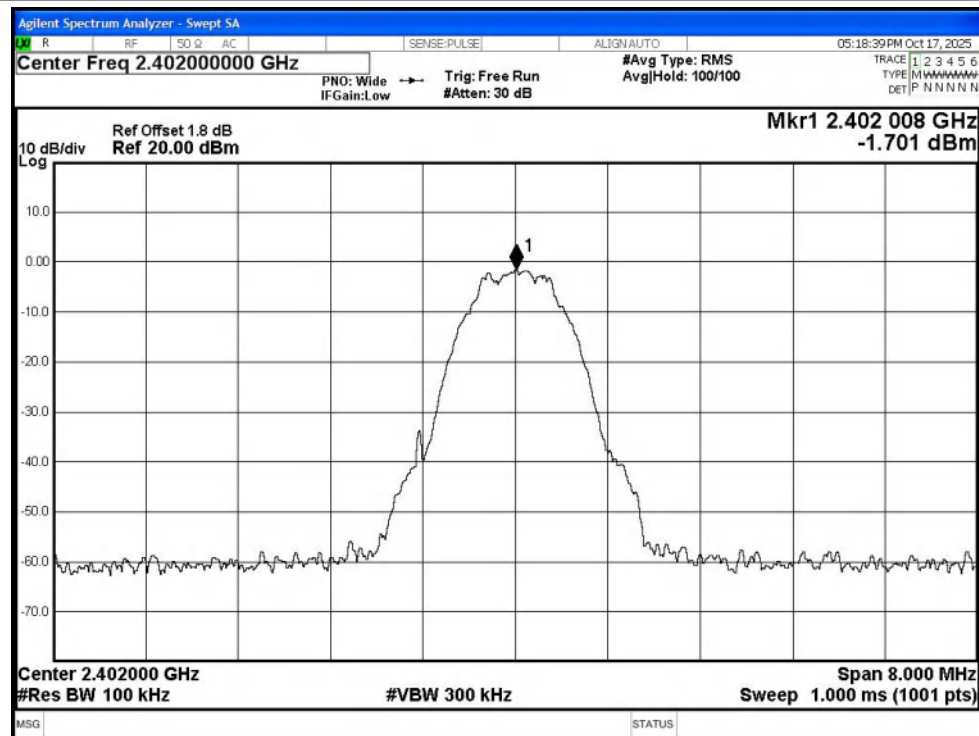


4. Band Edge

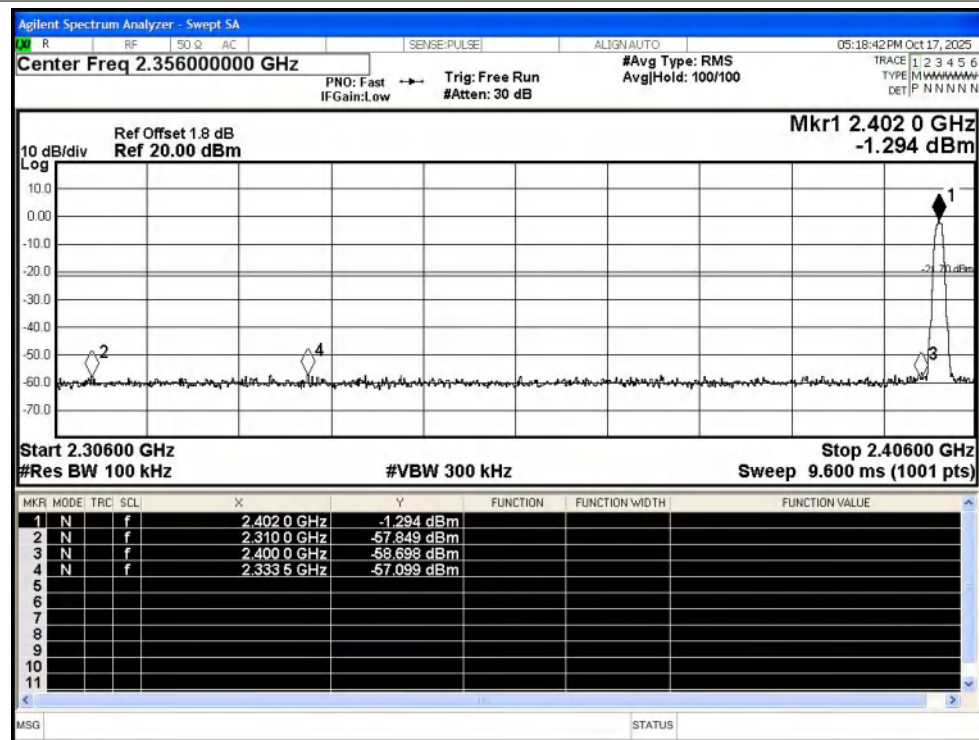
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-55.4	-20	Pass
NVNT	BLE 1M	2480	Ant1	-55.66	-20	Pass
NVNT	BLE 2M	2402	Ant1	-45.42	-20	Pass
NVNT	BLE 2M	2480	Ant1	-55.34	-20	Pass

Test Graphs

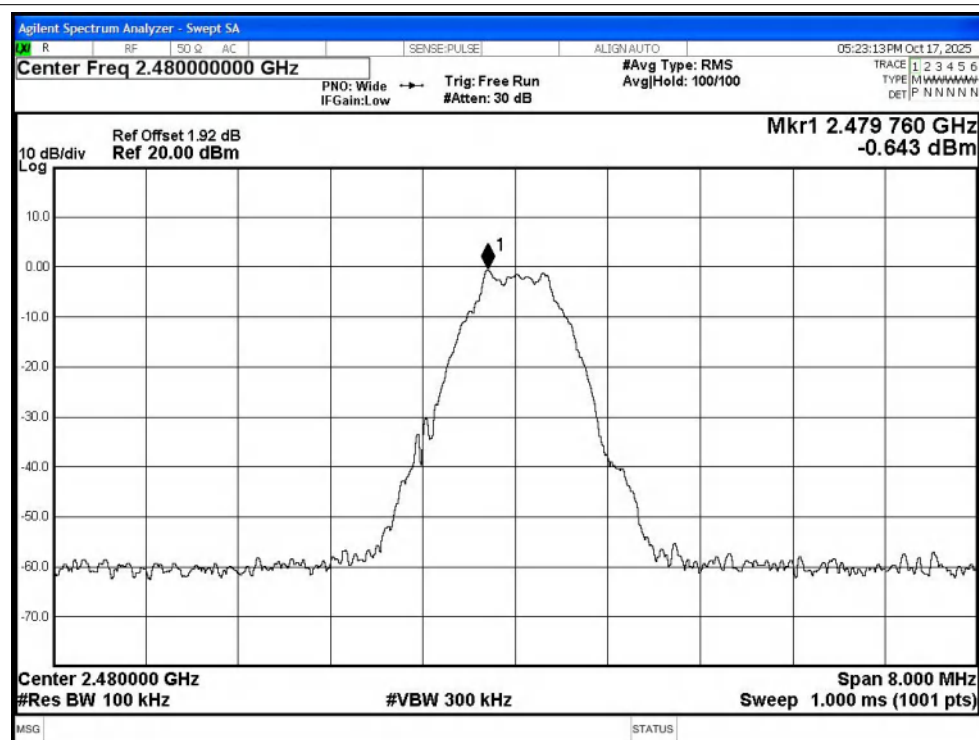
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



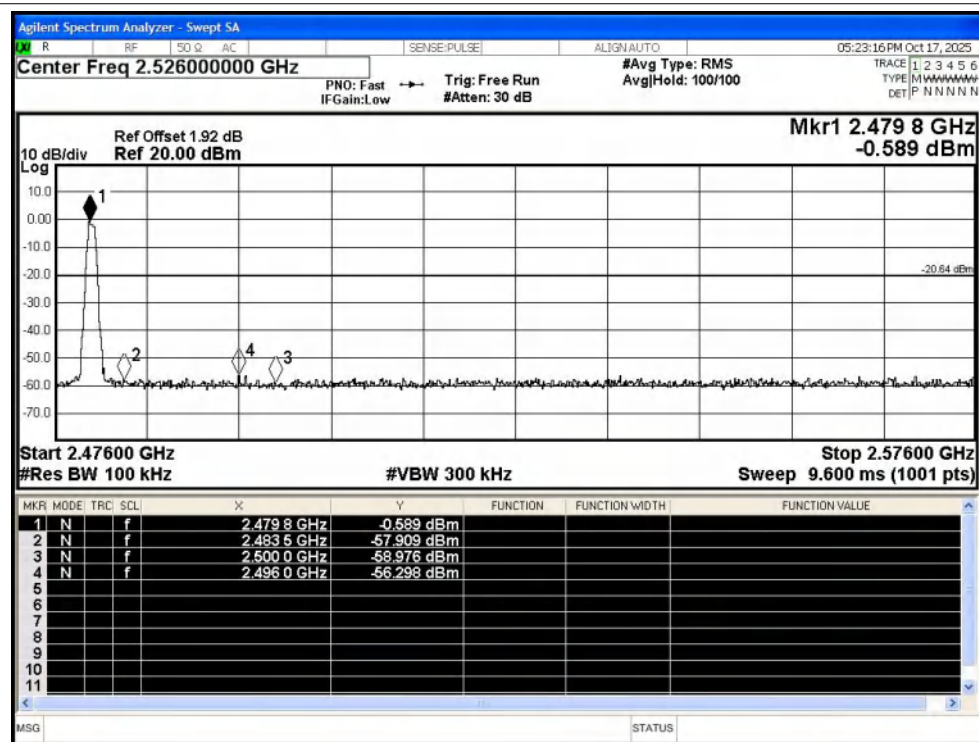
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



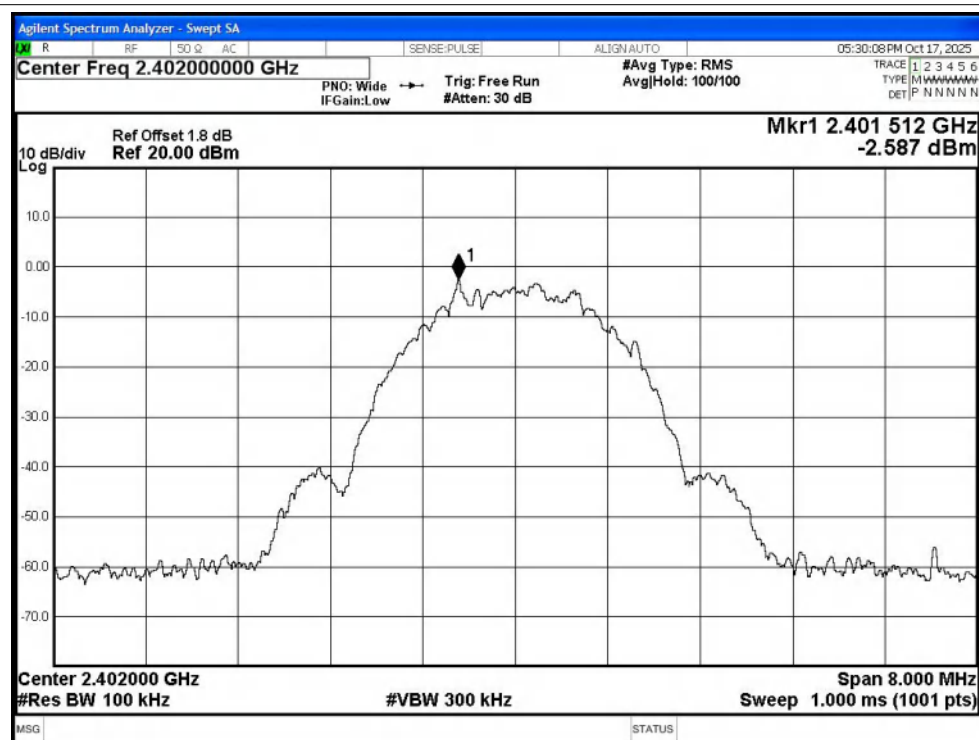
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



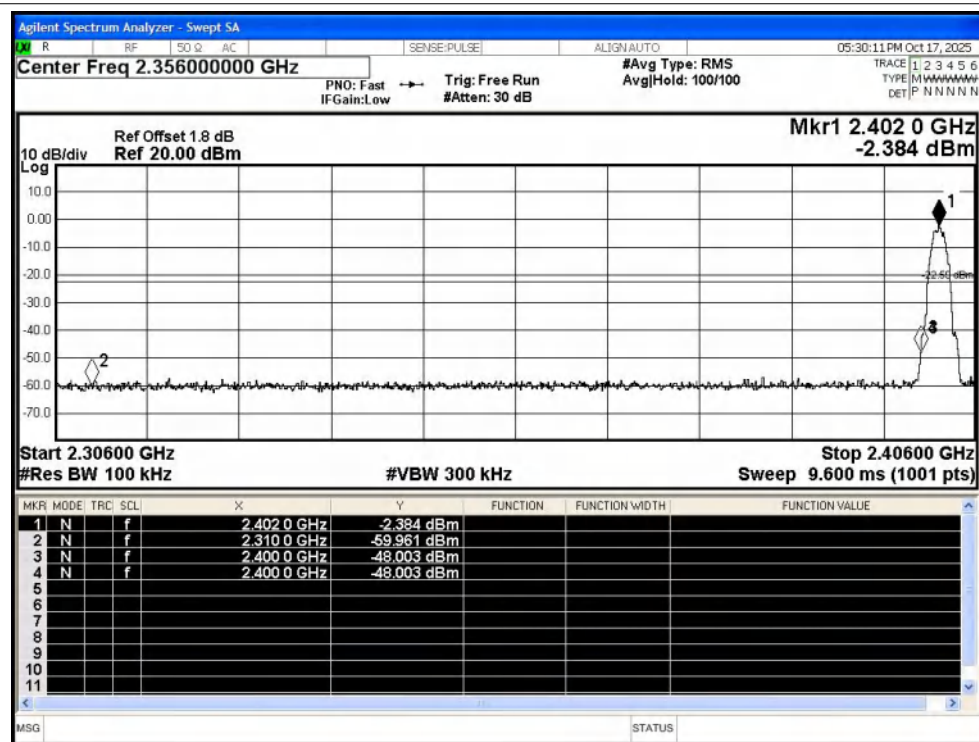
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



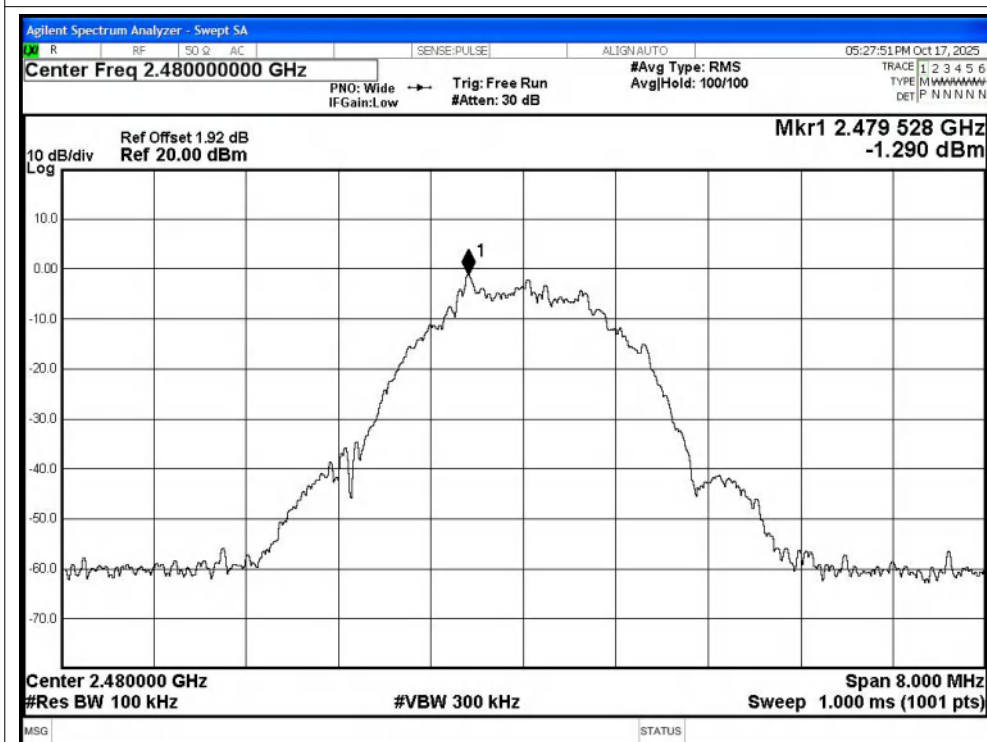
Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



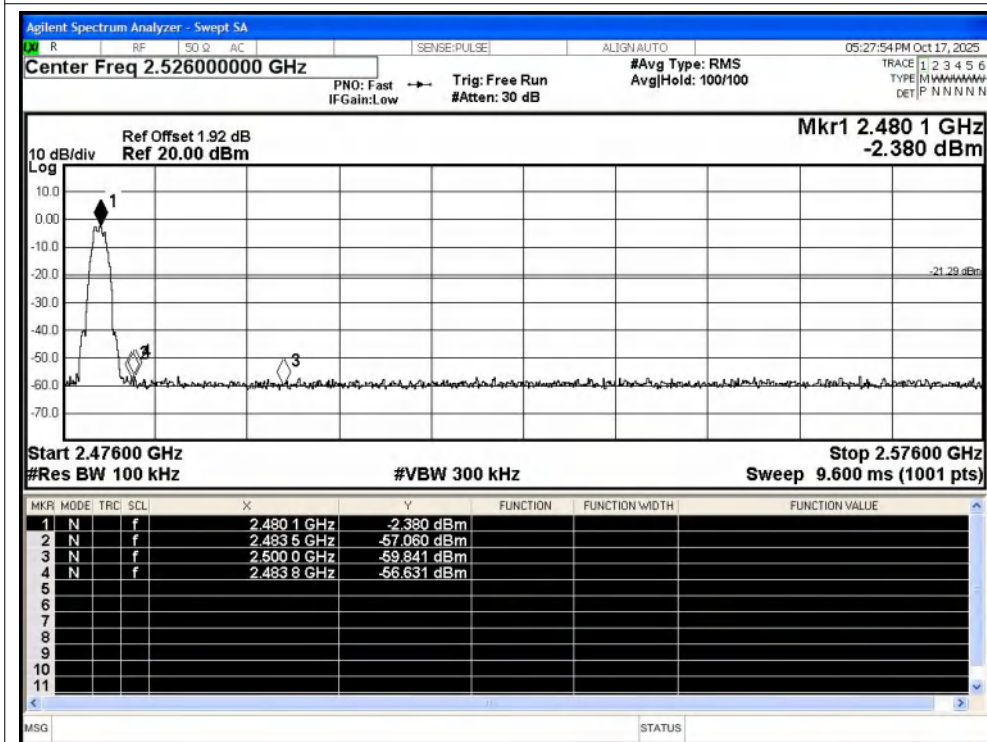
Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Band Edge NVNT BLE 2M 2480MHz Ant1 Emission

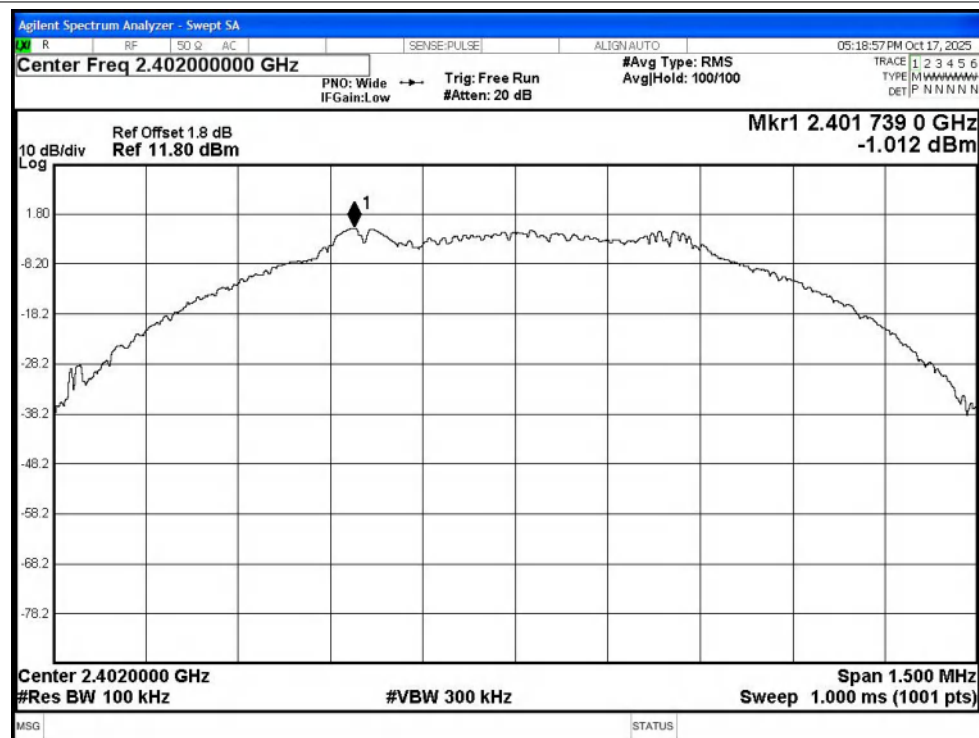


5. Conducted RF Spurious Emission

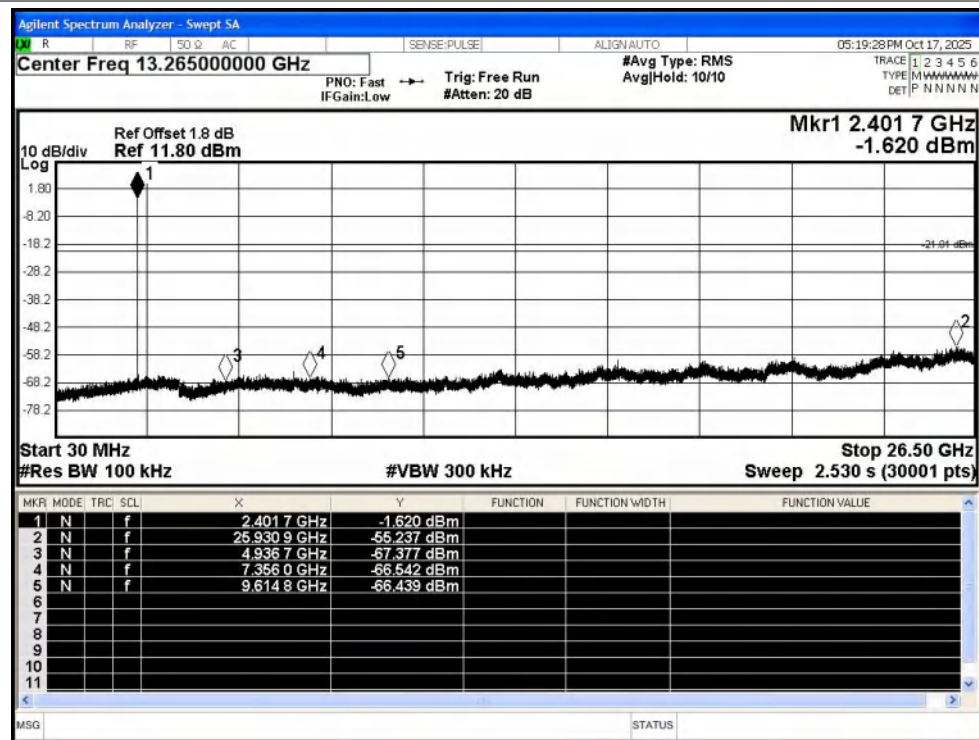
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-54.23	-20	Pass
NVNT	BLE 1M	2440	Ant1	-55.39	-20	Pass
NVNT	BLE 1M	2480	Ant1	-54.39	-20	Pass
NVNT	BLE 2M	2402	Ant1	-51.54	-20	Pass
NVNT	BLE 2M	2440	Ant1	-55.14	-20	Pass
NVNT	BLE 2M	2480	Ant1	-54.31	-20	Pass

Test Graphs

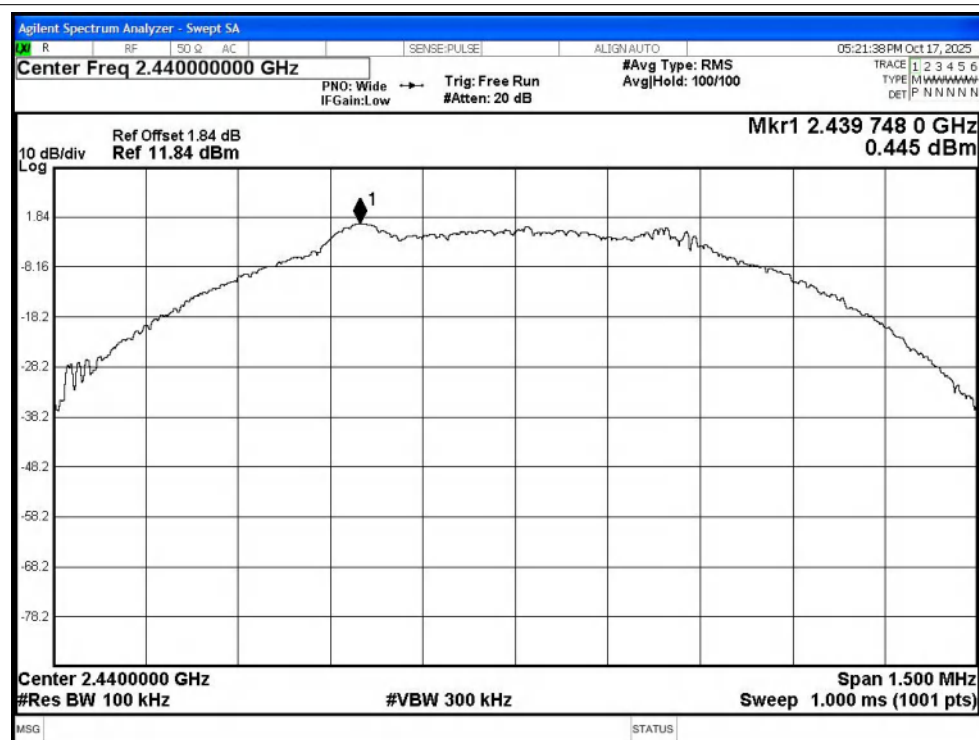
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



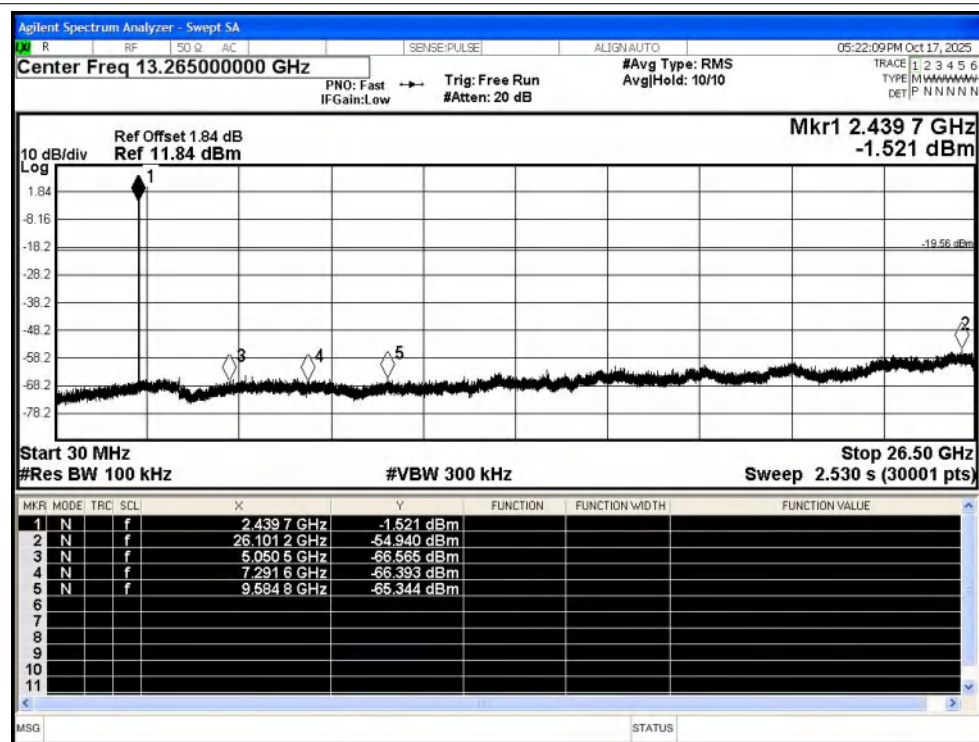
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



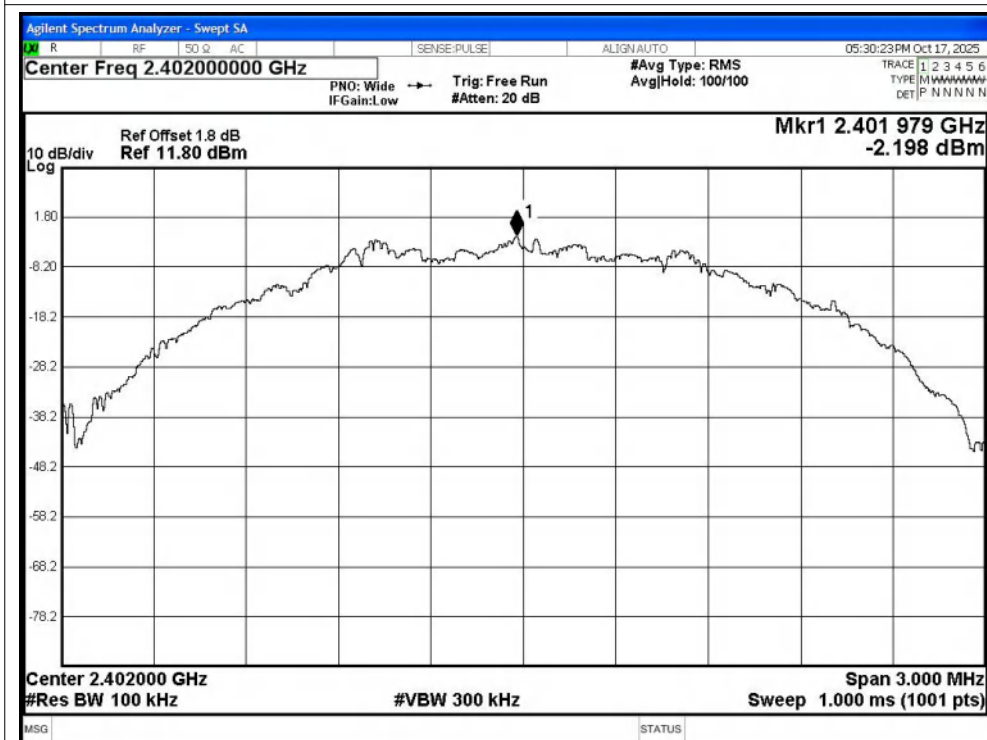
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



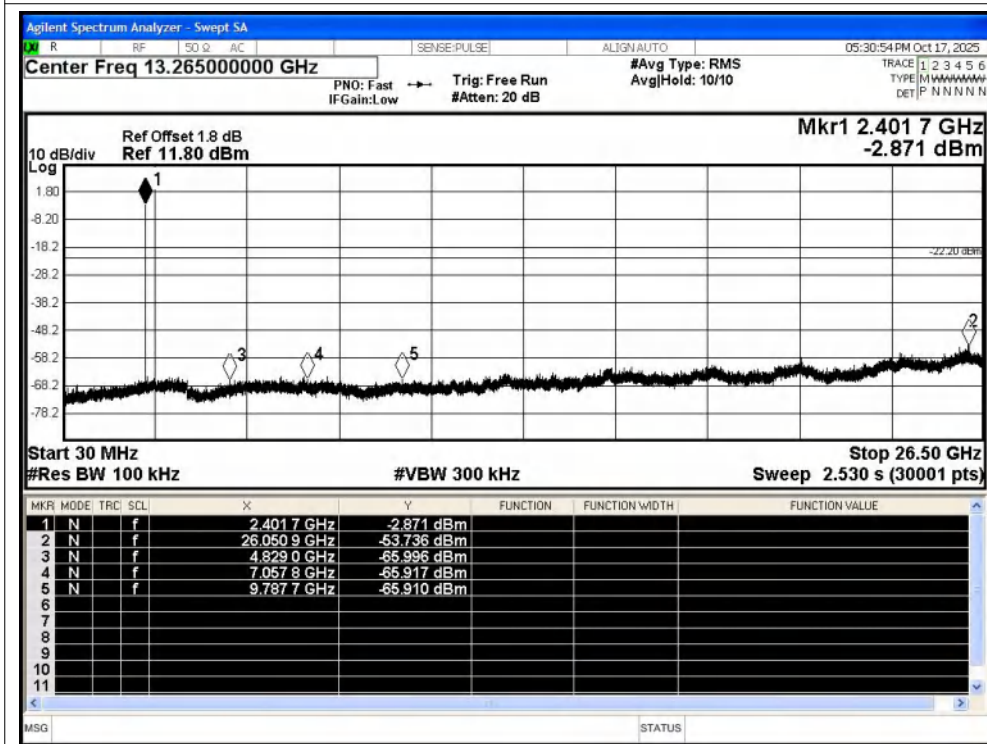
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



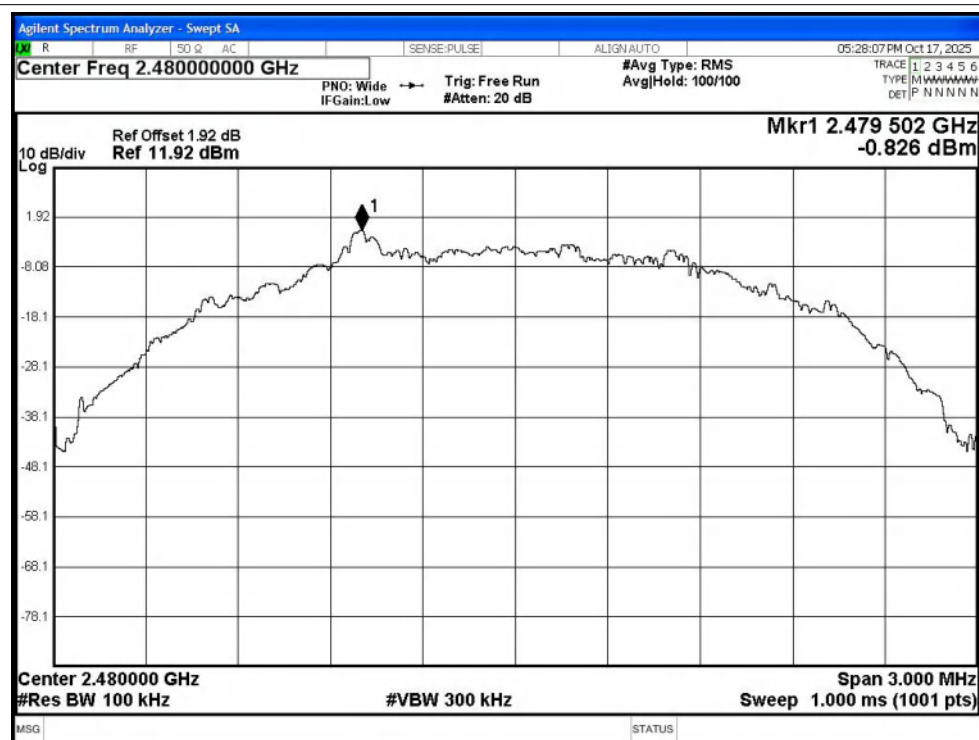
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



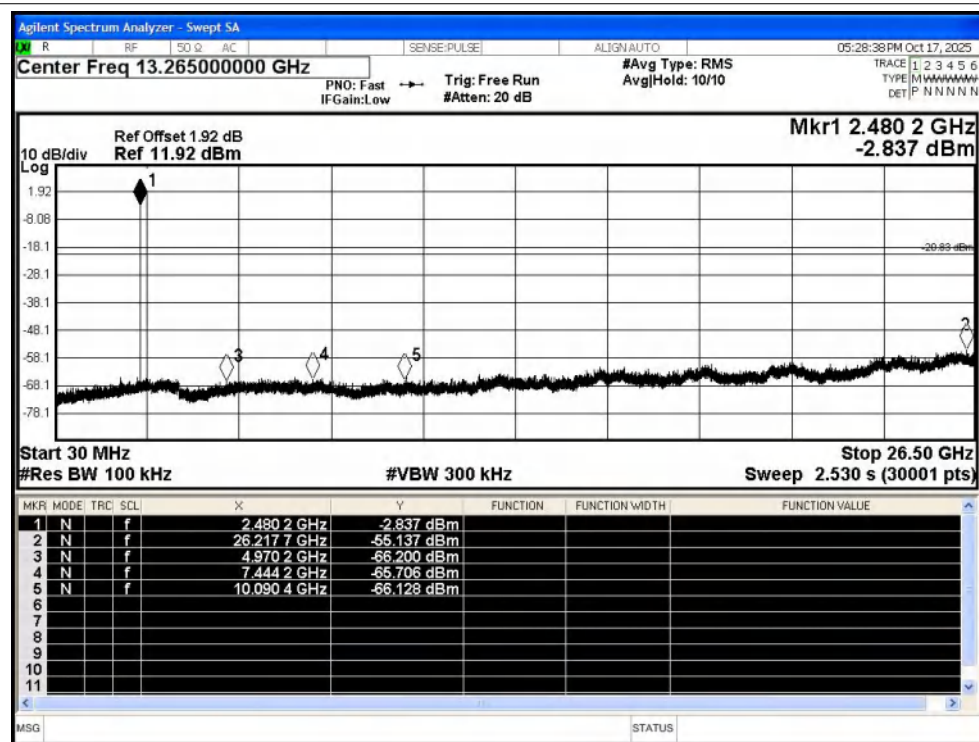
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



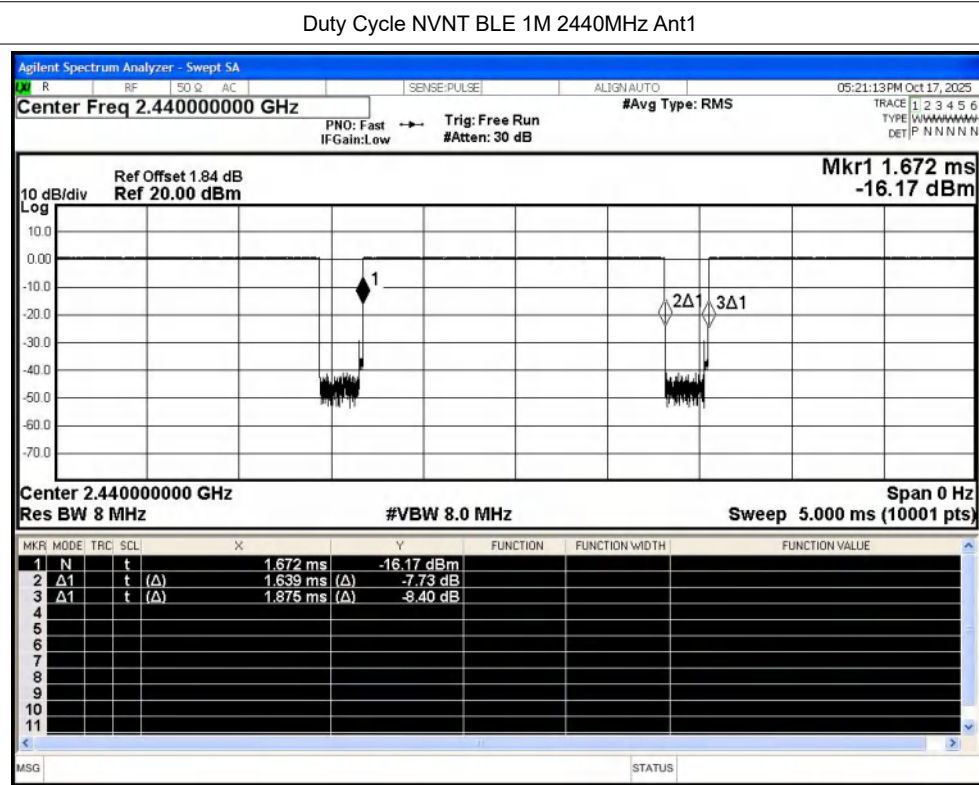
Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission



6. Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	87.41	0.58	0.61
NVNT	BLE 1M	2440	Ant1	87.41	0.58	0.61
NVNT	BLE 1M	2480	Ant1	87.39	0.59	0.61
NVNT	BLE 2M	2402	Ant1	65.96	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

Duty Cycle NVNT BLE 1M 2402MHz Ant1



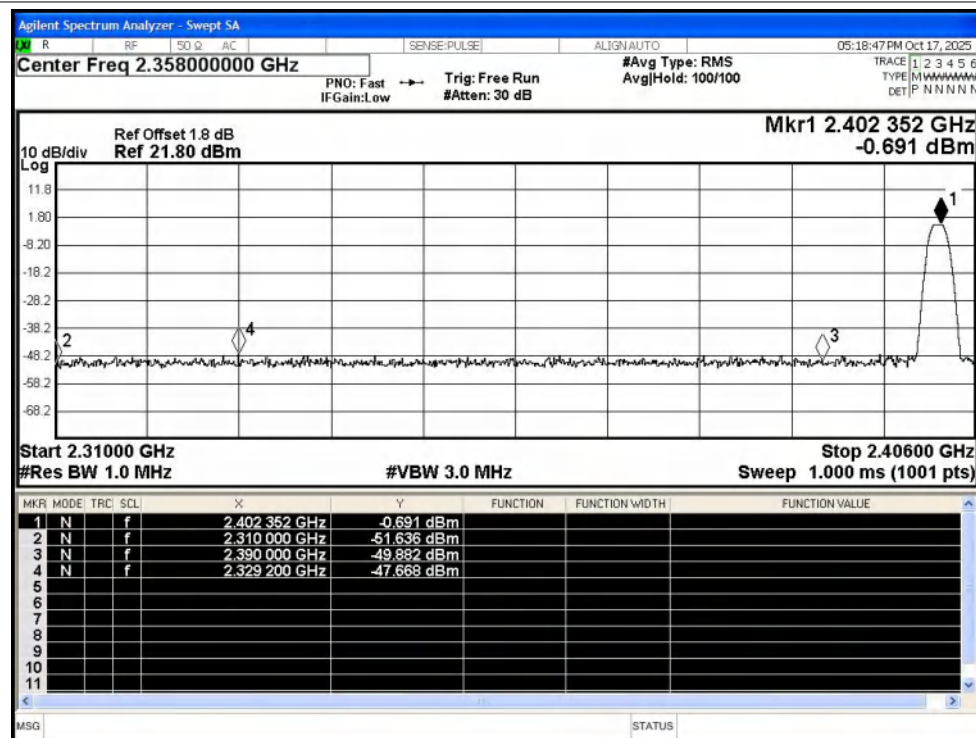
[illegible][illegible]

[illegible][illegible]

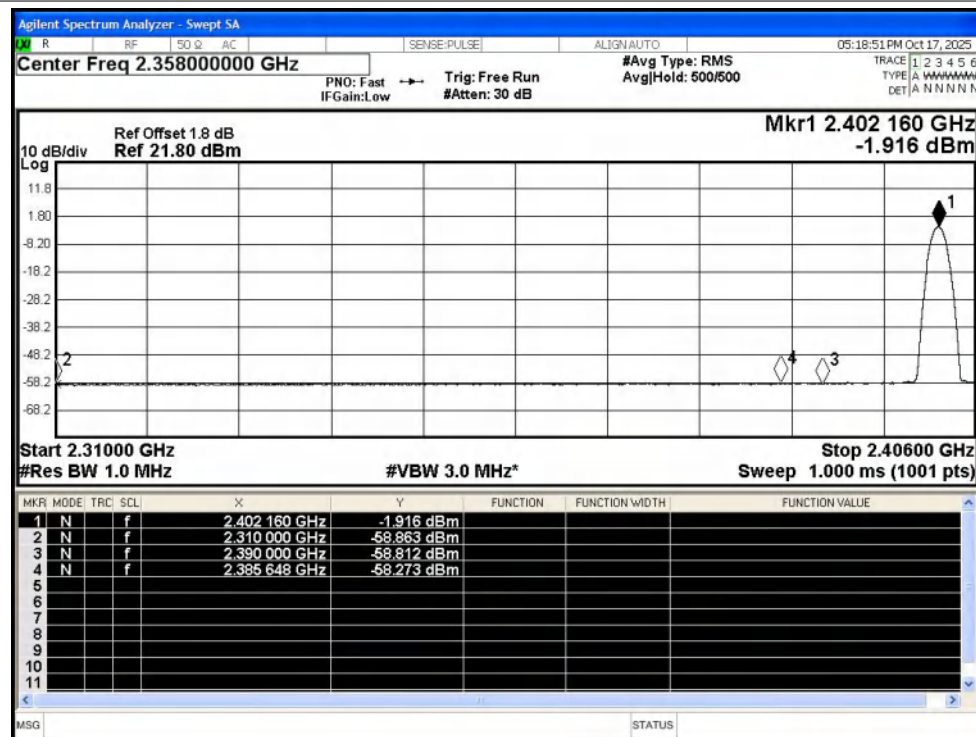
7. Restrict Band

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	-51.64	4.48	-	48.07	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2310	-58.86	4.48	0.58	41.43	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2329.2	-47.67	4.48	-	52.04	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2385.648	-58.27	4.48	0.58	42.02	Average	54	Pass
NVNT	BLE 1M	2402	Ant1	2390	-49.88	4.48	-	49.83	Peak	74	Pass
NVNT	BLE 1M	2402	Ant1	2390	-58.81	4.48	0.58	41.48	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-49.7	4.48	-	50.01	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.5	-57.94	4.48	0.59	42.36	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2483.824	-44.71	4.48	-	55	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2483.704	-57.4	4.48	0.59	42.9	Average	54	Pass
NVNT	BLE 1M	2480	Ant1	2500	-50.15	4.48	-	49.56	Peak	74	Pass
NVNT	BLE 1M	2480	Ant1	2500	-58.02	4.48	0.59	42.28	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2310	-51.29	4.48	-	48.42	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2310	-58.87	4.48	1.81	42.65	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2368.752	-47.64	4.48	-	52.07	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2374.032	-57.81	4.48	1.81	43.71	Average	54	Pass
NVNT	BLE 2M	2402	Ant1	2390	-50.63	4.48	-	49.08	Peak	74	Pass
NVNT	BLE 2M	2402	Ant1	2390	-58.63	4.48	1.81	42.89	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2483.5	-48.97	4.48	-	50.74	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2483.5	-57.77	4.48	1.81	43.75	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2483.776	-42.55	4.48	-	57.16	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2485.048	-57.22	4.48	1.81	44.3	Average	54	Pass
NVNT	BLE 2M	2480	Ant1	2500	-51.21	4.48	-	48.5	Peak	74	Pass
NVNT	BLE 2M	2480	Ant1	2500	-58.09	4.48	1.81	43.43	Average	54	Pass

Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak



Restrict Band NVNT BLE 1M 2402MHz Ant1 Average



Agilent Spectrum Analyzer - Swept SA

Center Freq 2.358000000 GHz

Ref Offset 1.8 dB
Ref 20.00 dBm

Mkr1 2.402 544 GHz
-0.698 dBm

Start 2.31000 GHz
#Res BW 1.0 MHz

Stop 2.40600 GHz
Sweep 1.000 ms (1001 pts)

#VBW 3.0 MHz

10 dB/div
Log

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.402 544 GHz	-0.698 dBm			
2	N		f	2.310 000 GHz	-51.291 dBm			
3	N		f	2.390 000 GHz	-50.629 dBm			
4	N		f	2.368 752 GHz	-47.640 dBm			

The screenshot shows the Agilent Spectrum Analyzer interface. The top status bar displays "Agilent Spectrum Analyzer - Swept SA". Below it, various settings are visible: "R" (Reference), "RF" (Radio Frequency), "SQ" (Spectrum Quality), "AC" (Auto Control), "SENSE-PULSE", "ALIGN-AUTO", and the date/time "05:30:18 PM Oct 17, 2005".

The main display area shows a spectrum plot with the following parameters:

- Center Freq:** 2.358000000 GHz
- PNO:** Fast IF Gain: Low
- Trig:** Free Run
- #Avg Type:** RMS
- Avg Hold:** 100/100
- Ref Offset:** 1.8 dB
- Ref:** 20.00 dBm
- Mkr1:** 2.402 064 GHz, -3.827 dBm

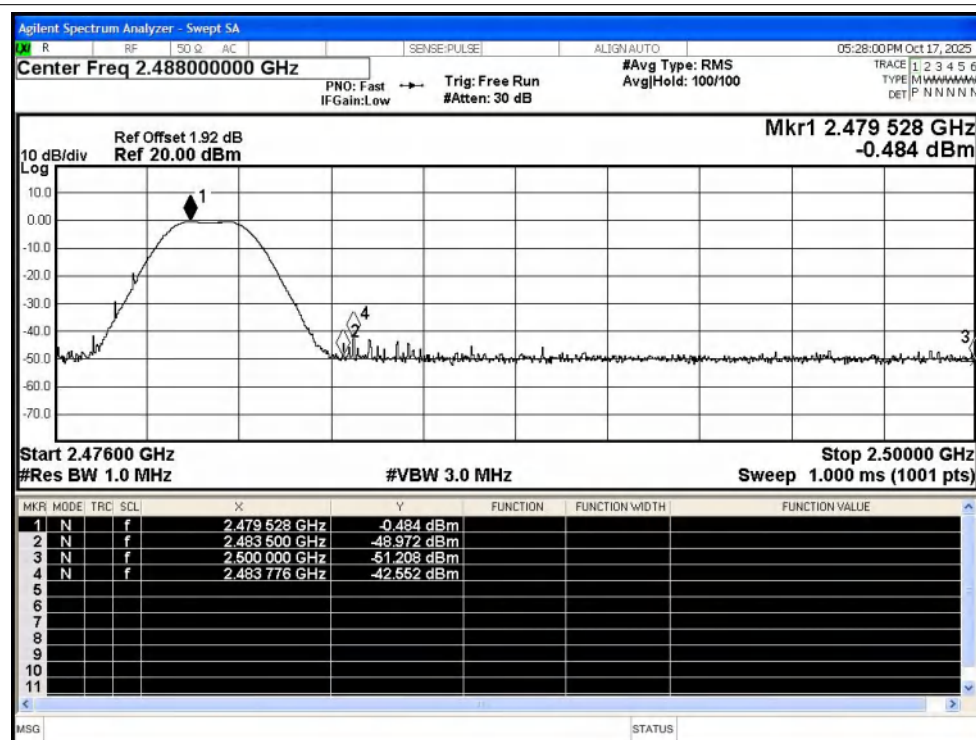
The plot shows a flat baseline with noise floor around -60 dBm. A single prominent peak is visible at 2.402064 GHz, reaching approximately -3.8 dBm. This peak is labeled "Mkr1". There are also smaller peaks labeled "2", "3", and "4" along the baseline.

Marker	Freq (GHz)	Power (dBm)
1	2.402064	-3.827
2	~2.310000	~-58.866
3	~2.390000	~-58.633
4	~2.374032	~-57.807

At the bottom, there is a table summarizing the marker data:

MARKER MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f	2.402 064 GHz	-3.827 dBm			
2	N	f	2.310 000 GHz	-58.866 dBm			
3	N	f	2.390 000 GHz	-58.633 dBm			
4	N	f	2.374 032 GHz	-57.807 dBm			

Restrict Band NVNT BLE 2M 2480MHz Ant1 Peak



Restrict Band NVNT BLE 2M 2480MHz Ant1 Average

