# Appendix A

## RF Test Data for BLE (Conducted Measurement)

**Product Name: Residential Energy Monitor**

**Test Model: TED Pro Home 2.0 Lite**

**Environmental Conditions**

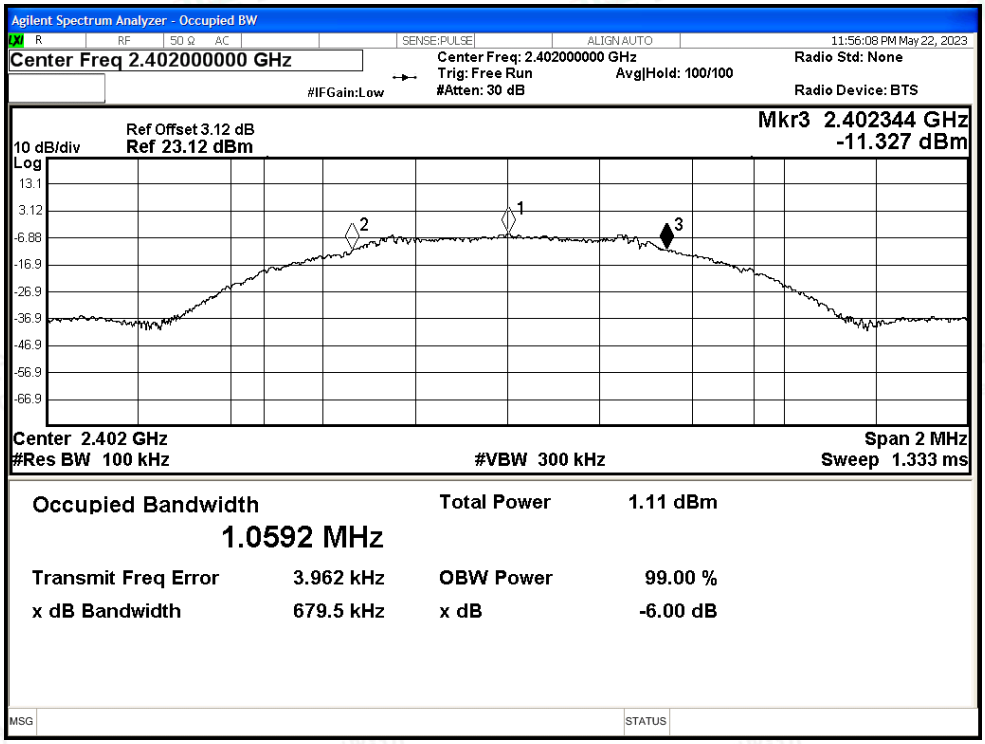
| | |
|---|---|
| Temperature: | 23.5° C |
| Relative Humidity: | 52.2% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Nick Peng |
| Supervised by: | Ling Zhu |

# A.1 -6dB Bandwidth

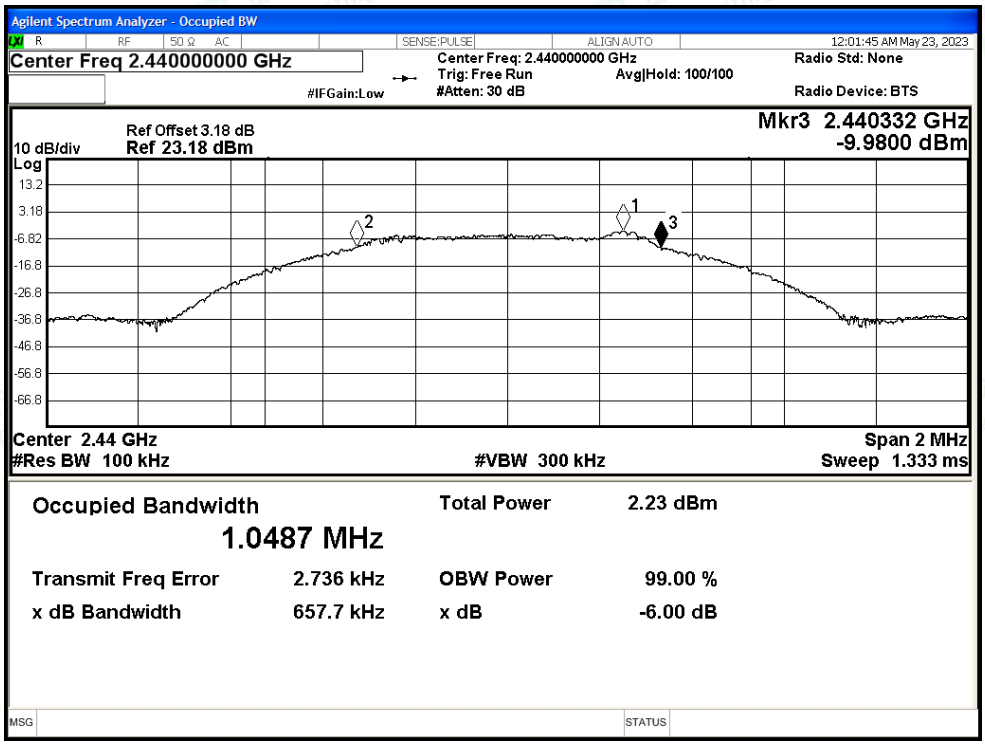
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 0.68 | >=0.5 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | 0.658 | >=0.5 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 0.656 | >=0.5 | Pass |

Test Graphs

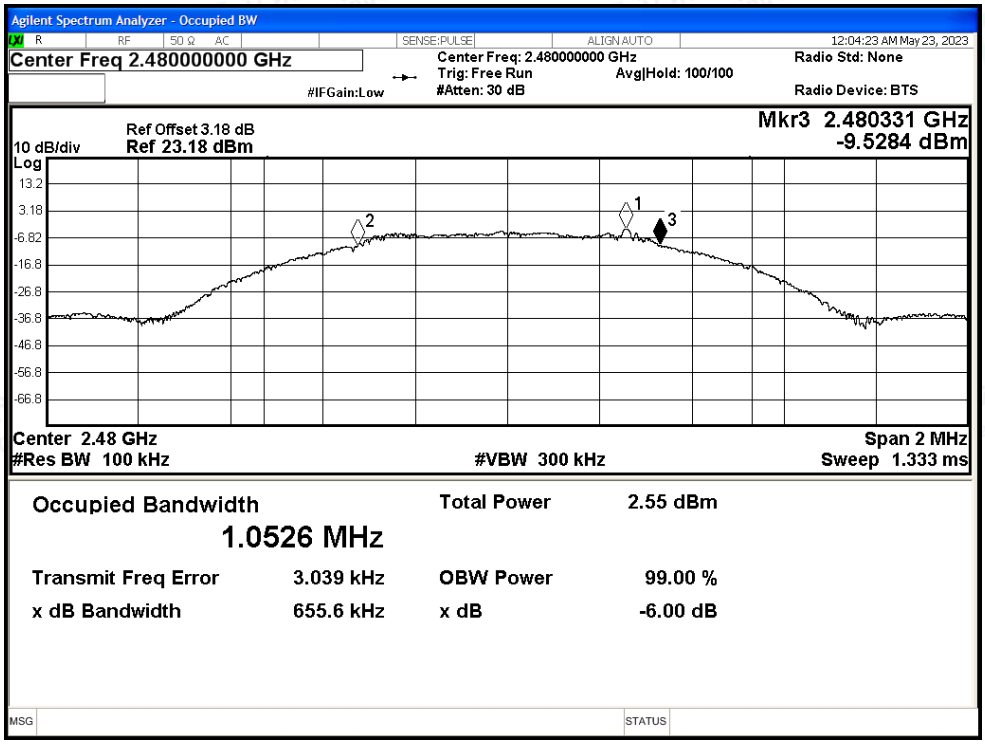
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1




-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

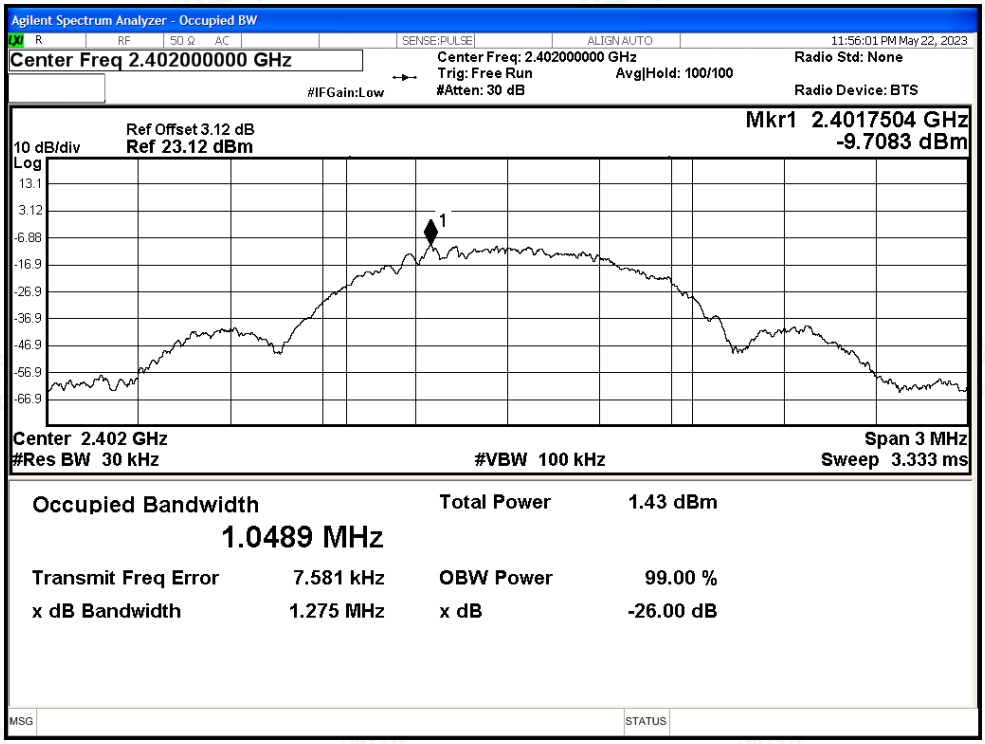


# A.2 Occupied Channel Bandwidth

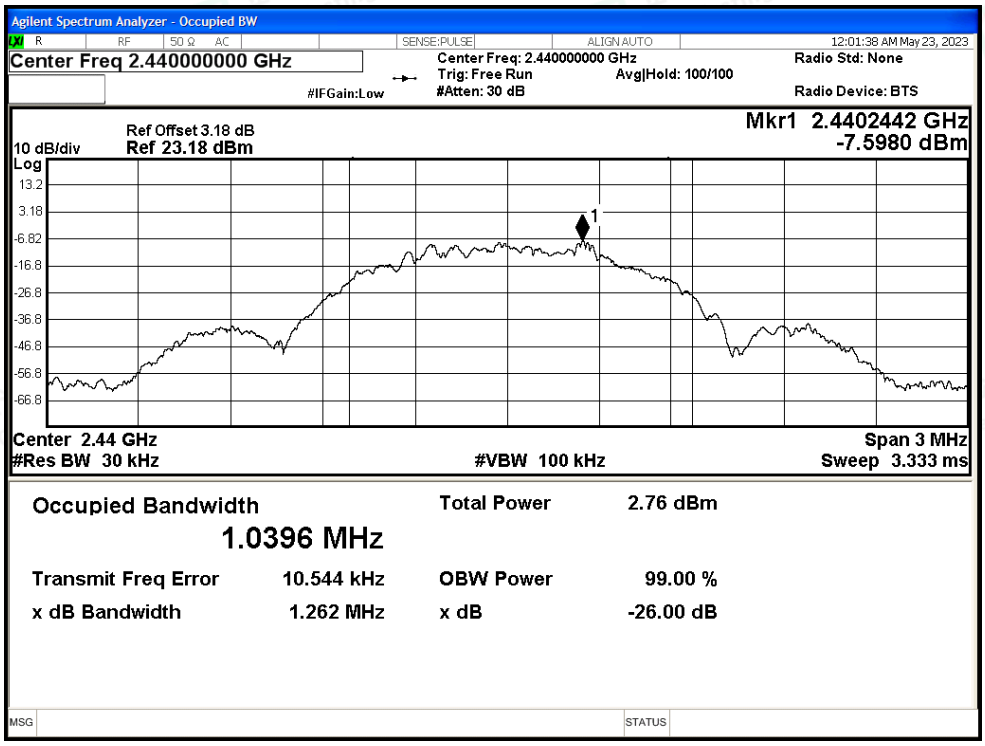
| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 1.049 |
| NVNT | BLE 1M | 2440 | Ant1 | 1.04 |
| NVNT | BLE 1M | 2480 | Ant1 | 1.042 |

Test Graphs

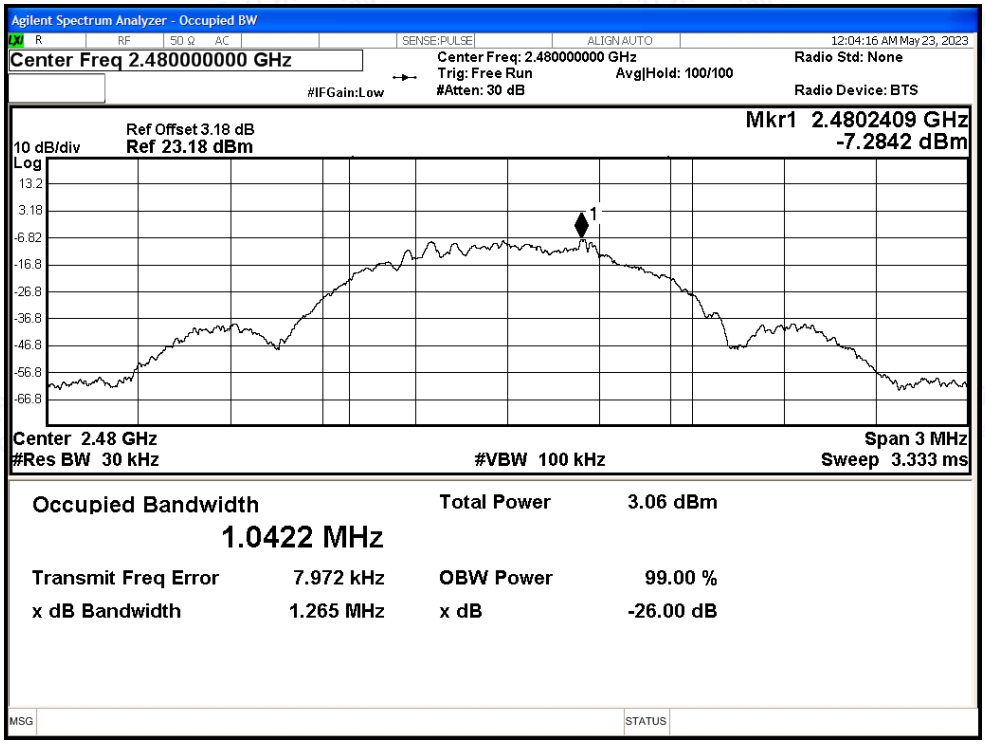
OBW NVNT BLE 1M 2402MHz Ant1




OBW NVNT BLE 1M 2440MHz Ant1



OBW NVNT BLE 1M 2480MHz Ant1

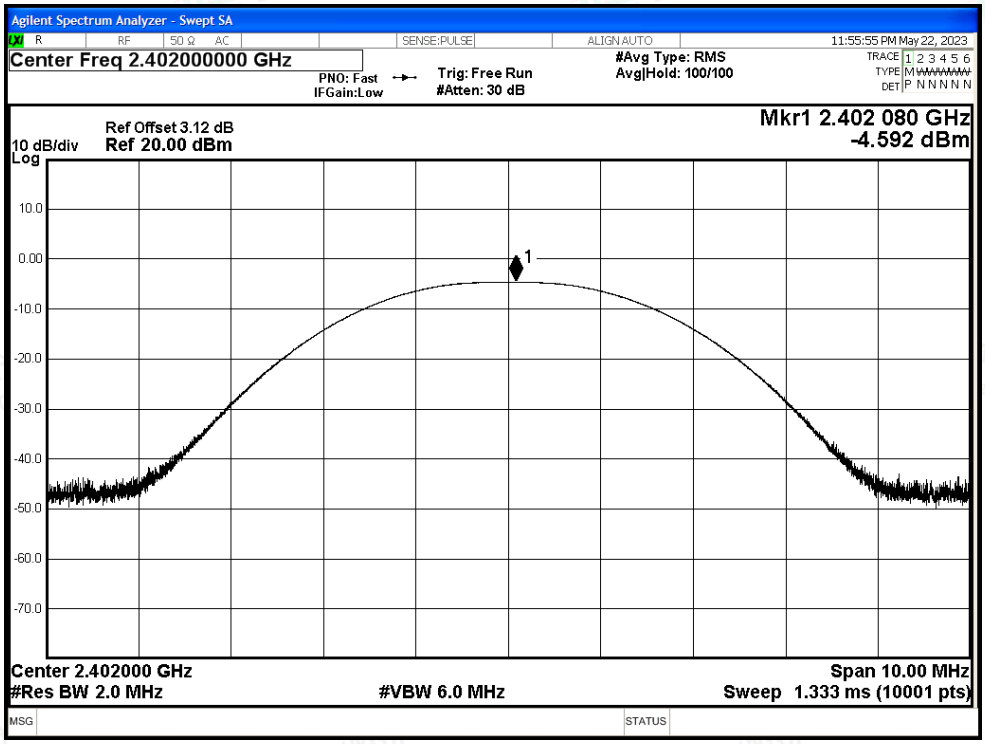


# A.3 Maximum Conducted Output Power and e.i.r.p.

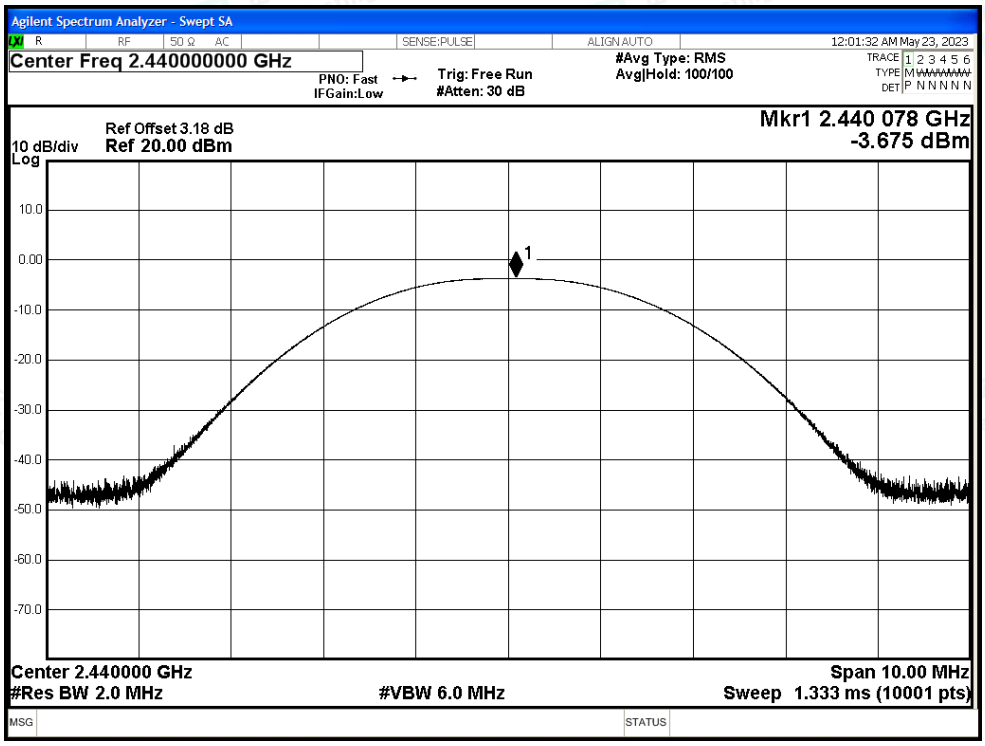
| Condition | Mode | Frequency (MHz) | Antenna | Total Power (dBm) | Limit (dBm) | Antenna Gain | Report EIRP Power(dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -4.59 | 30 | 2 | -2.59 | 36 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | -3.68 | 30 | 2 | -1.68 | 36 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -3.28 | 30 | 2 | -1.28 | 36 | Pass |

Test Graphs

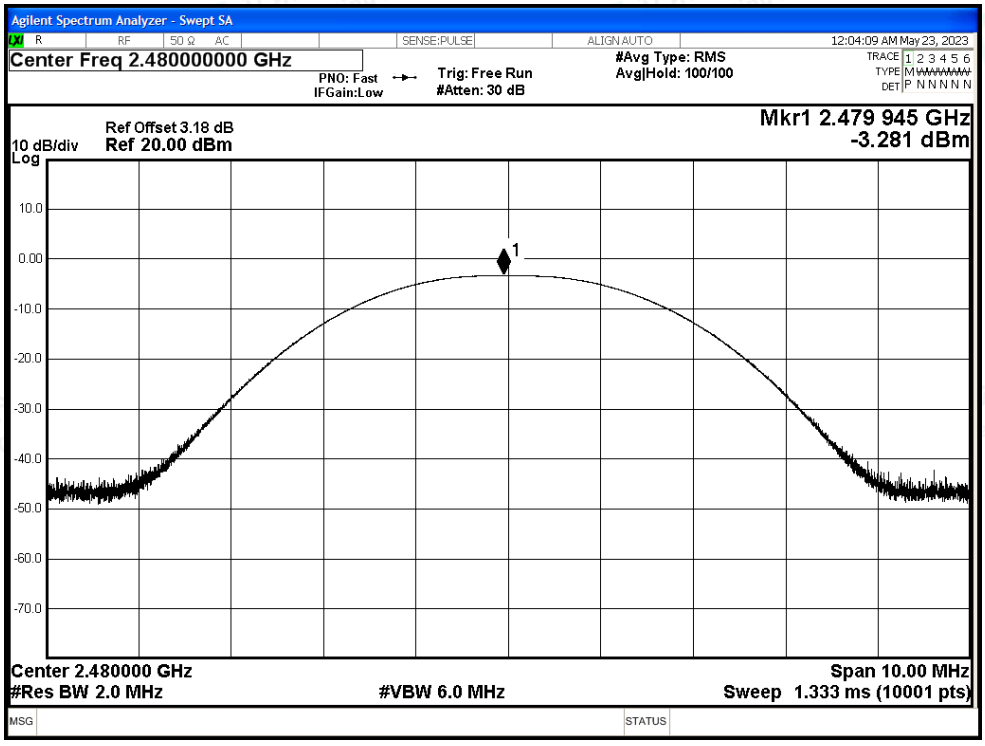
Power NVNT BLE 1M 2402MHz Ant1




Power NVNT BLE 1M 2440MHz Ant1



Power NVNT BLE 1M 2480MHz Ant1

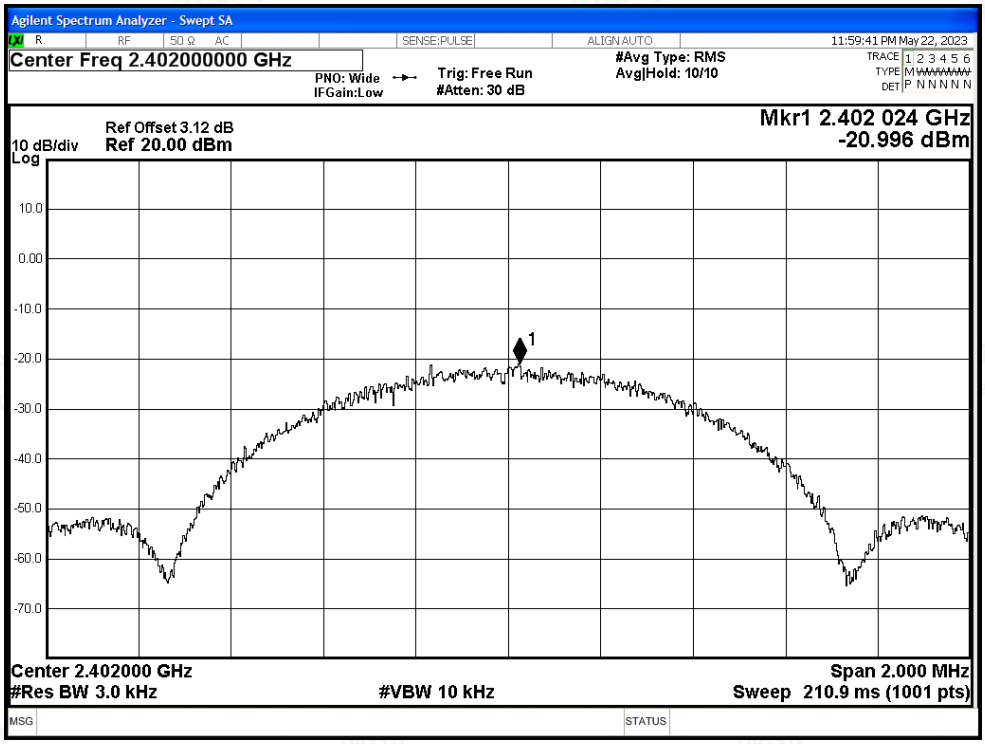


# A.4 Maximum Power Spectral Density Level

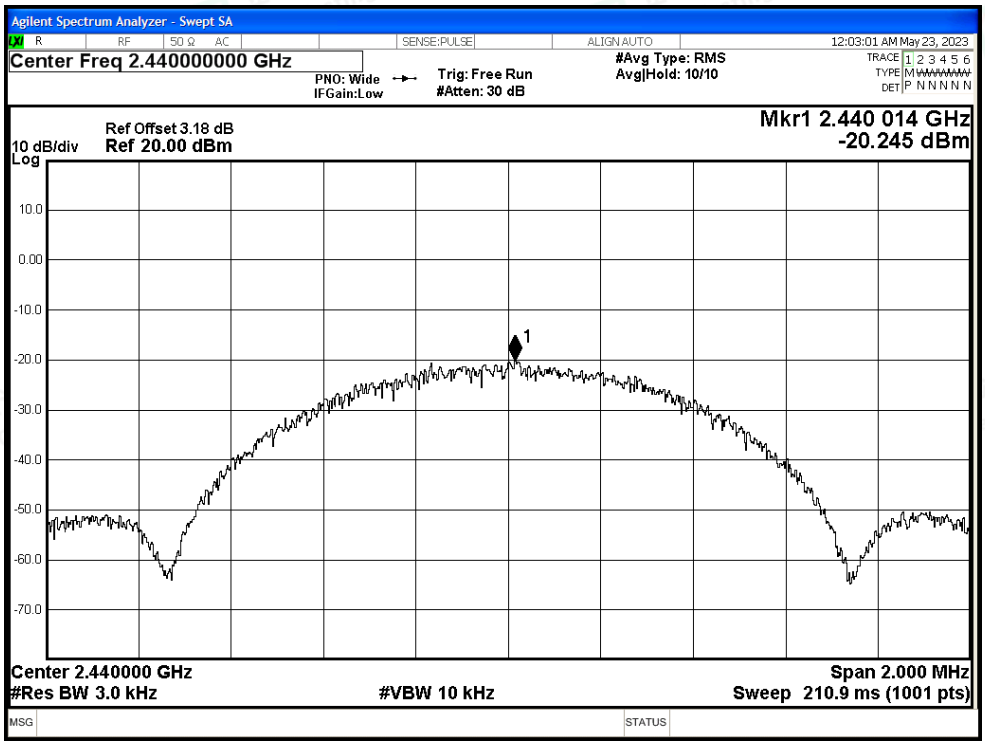
| Condition | Mode | Frequency (MHz) | Antenna | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -21 | 8 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | -20.25 | 8 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -19.91 | 8 | Pass |

Test Graphs

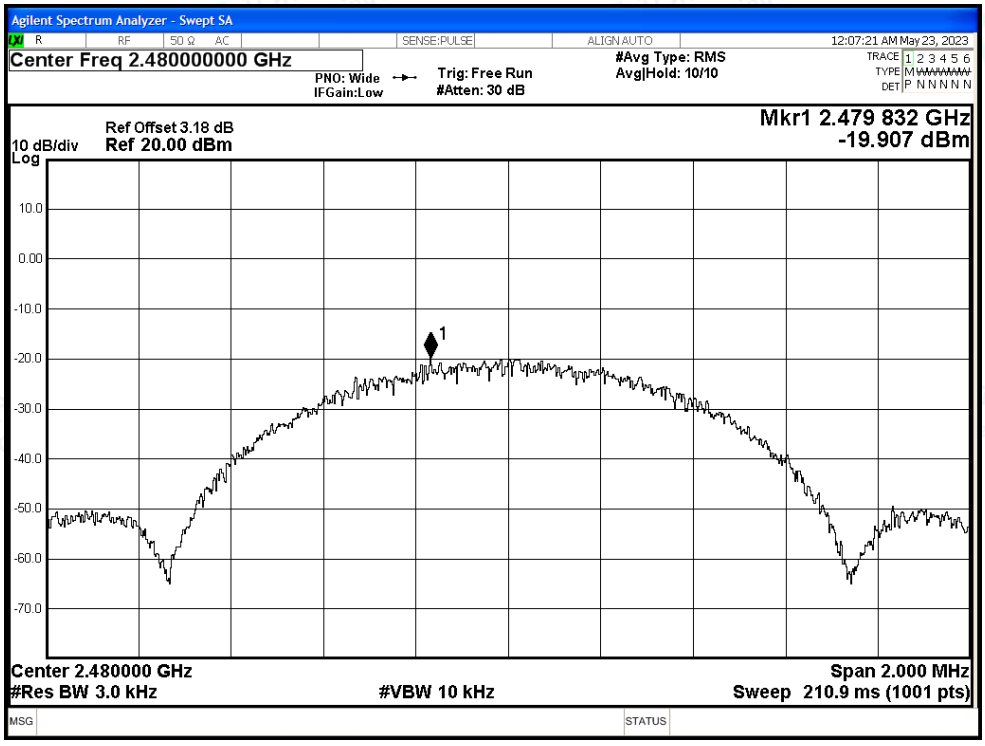
PSD NVNT BLE 1M 2402MHz Ant1




PSD NVNT BLE 1M 2440MHz Ant1



PSD NVNT BLE 1M 2480MHz Ant1

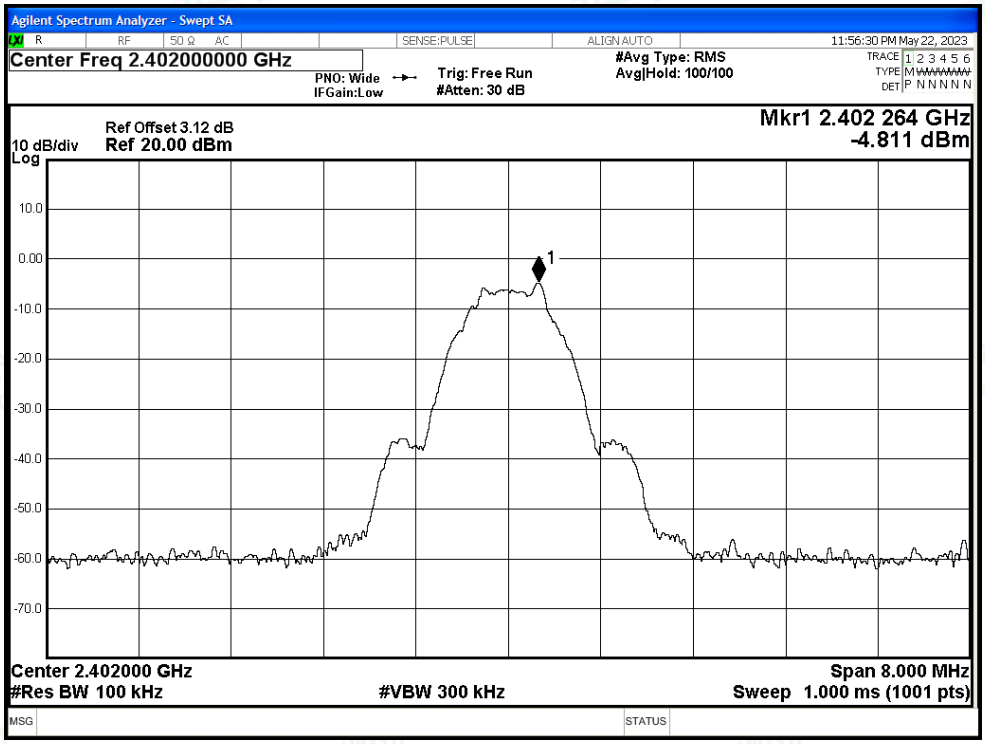


# A.5 Band Edge

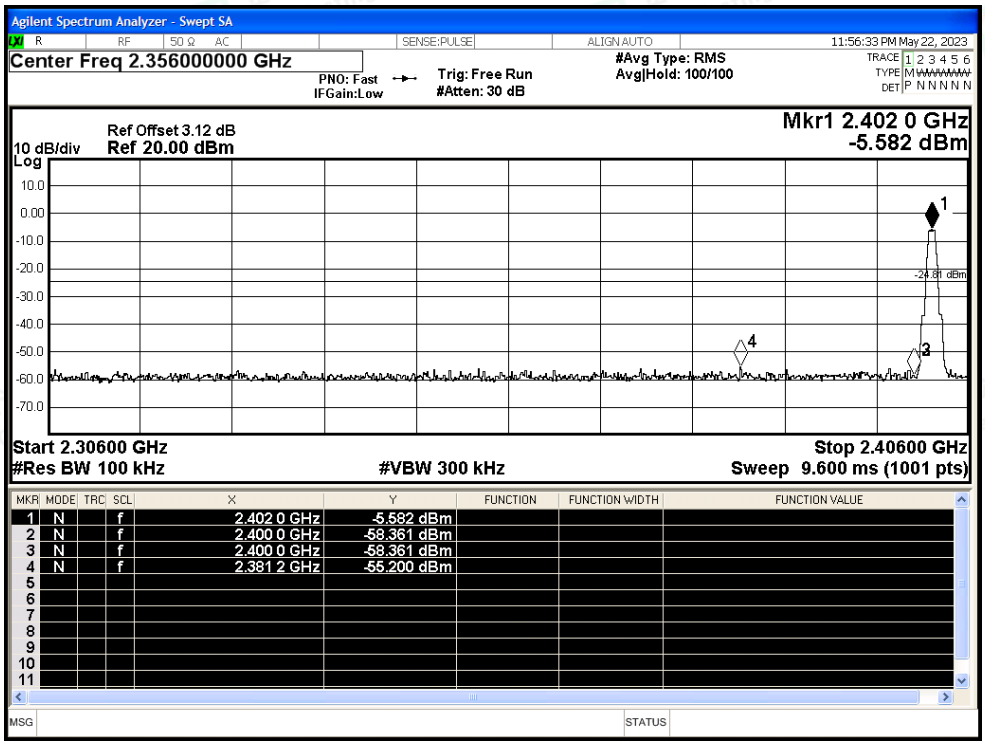
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -50.39 | -20 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -51.32 | -20 | Pass |

Test Graphs

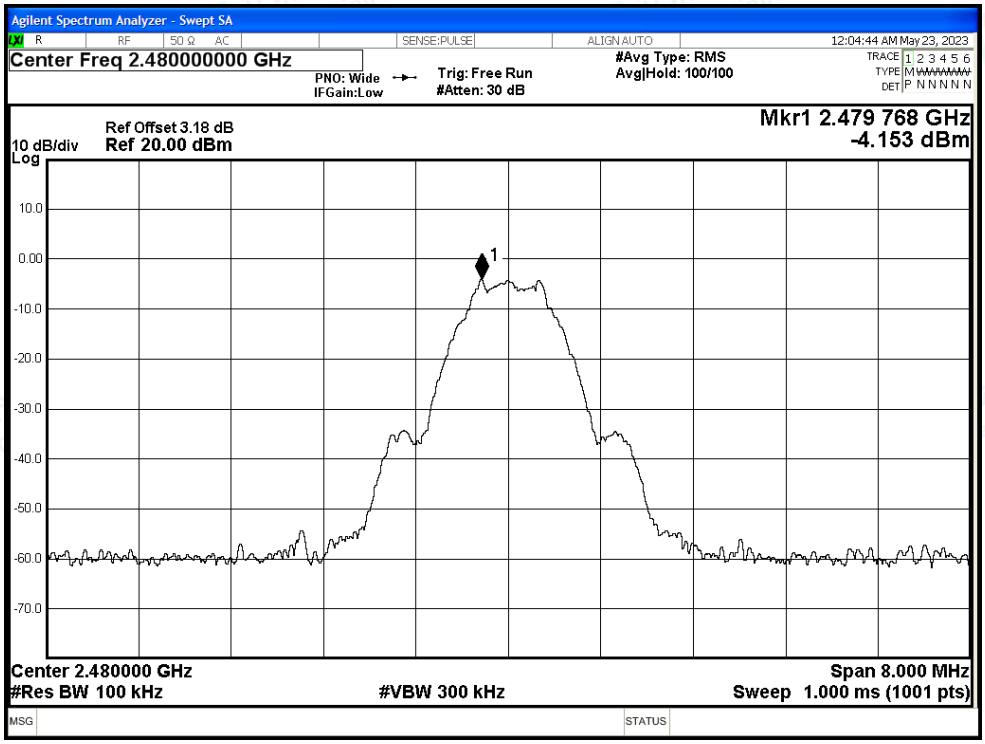
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



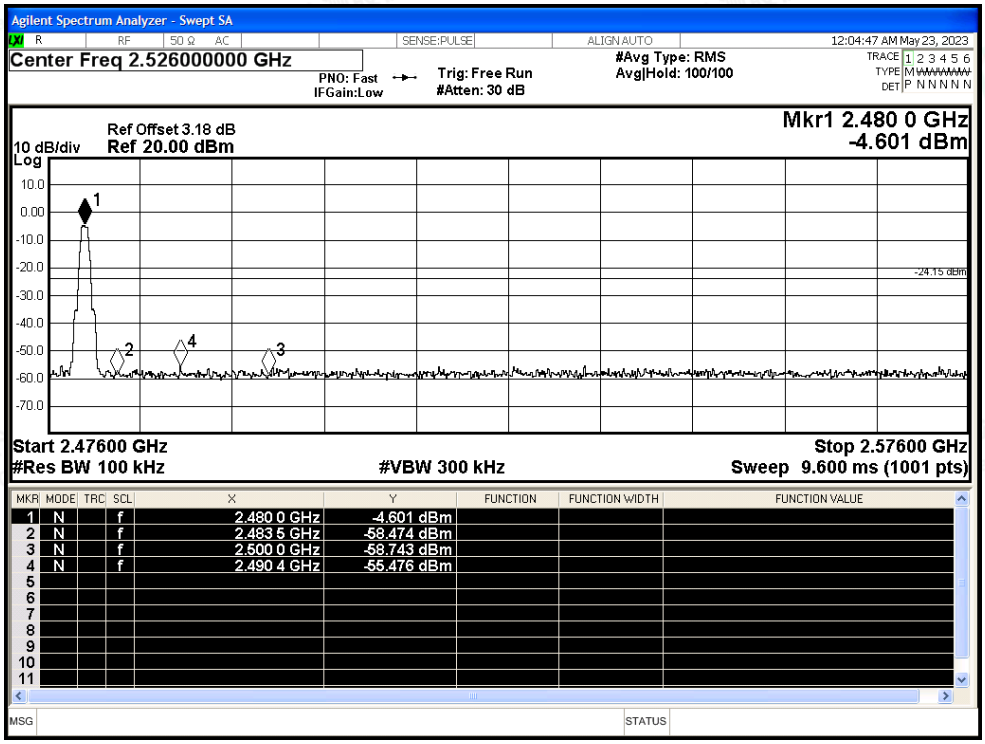

Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



Band Edge NVNT BLE 1M 2480MHz Ant1 Ref




Band Edge NVNT BLE 1M 2480MHz Ant1 Emission

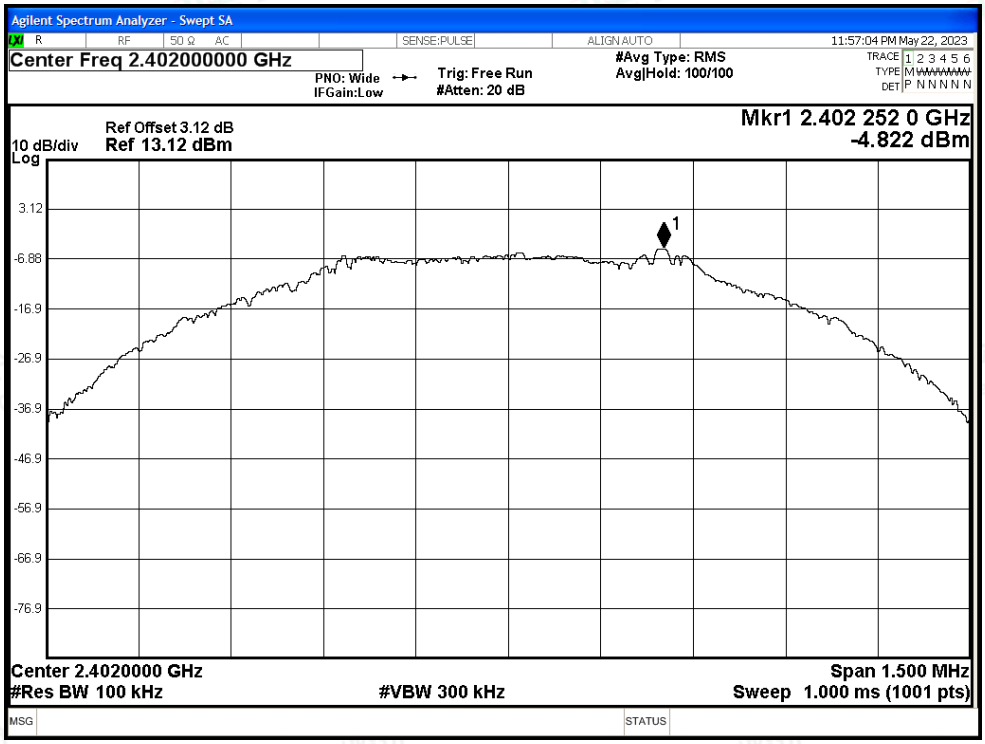


# A.6 Conducted RF Spurious Emission

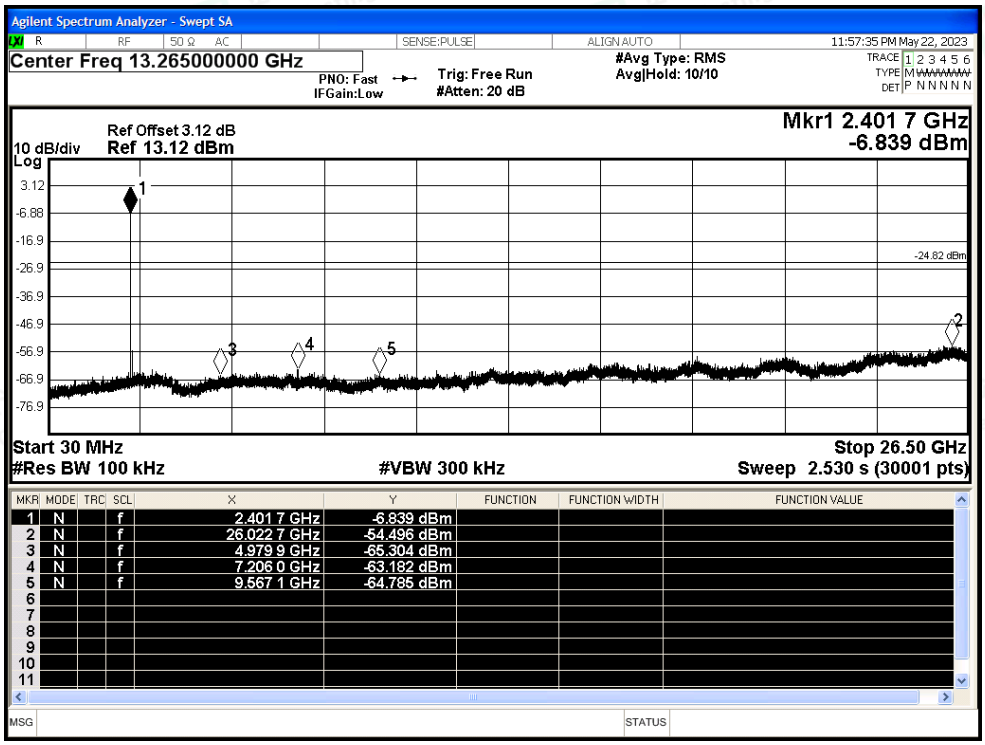
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -49.67 | -20 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | -50.73 | -20 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -50.21 | -20 | Pass |

Test Graphs

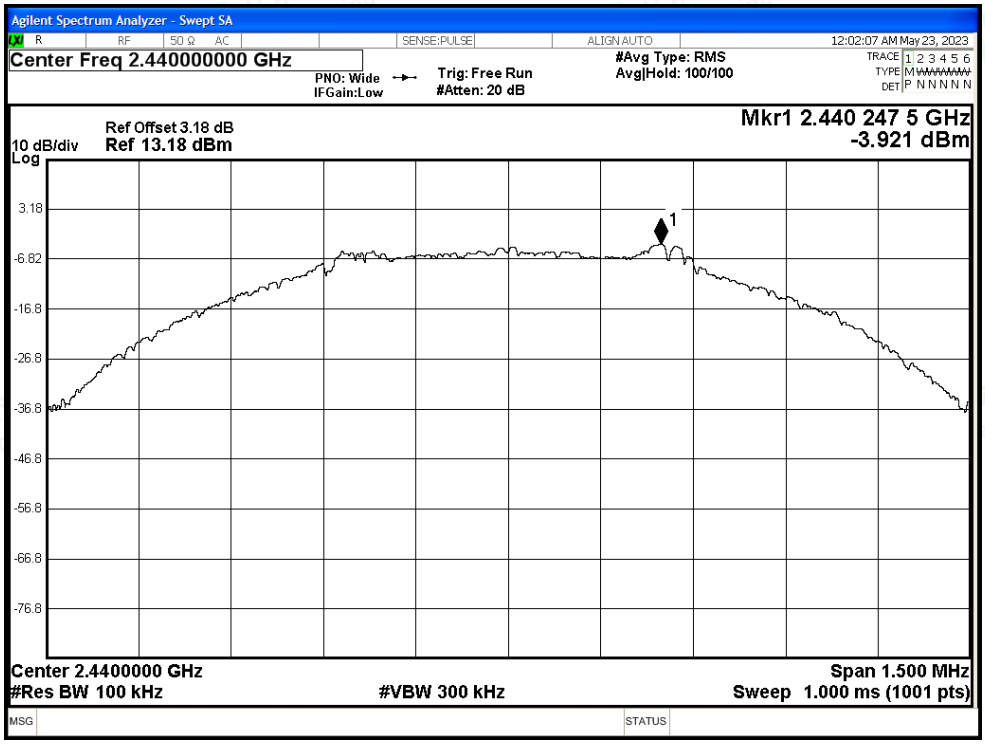
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



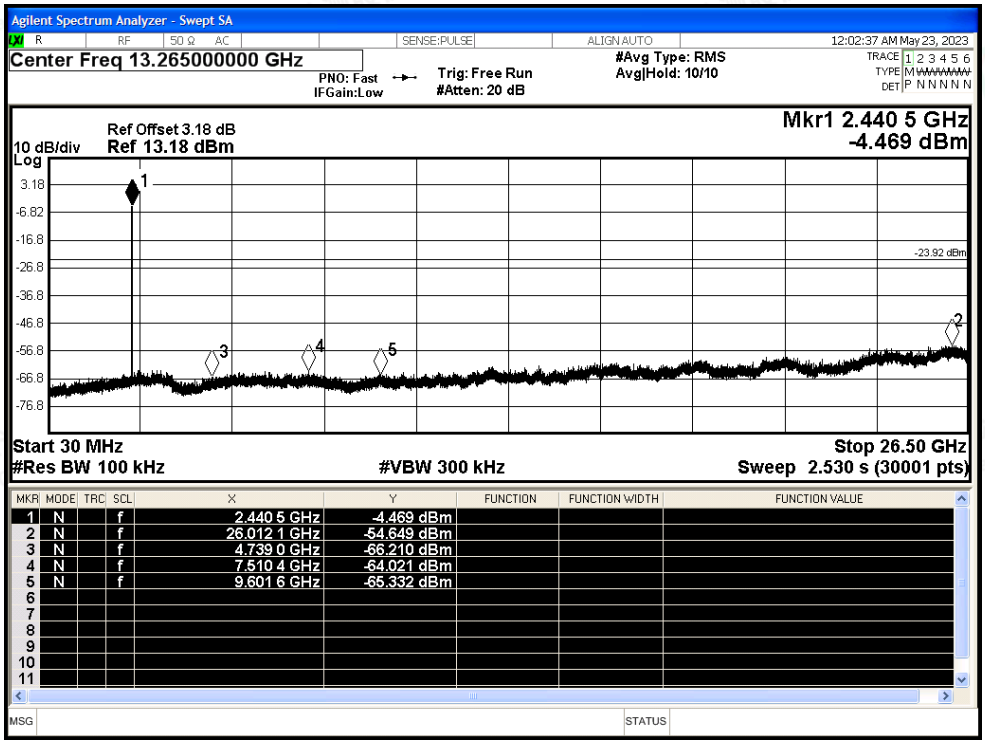

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



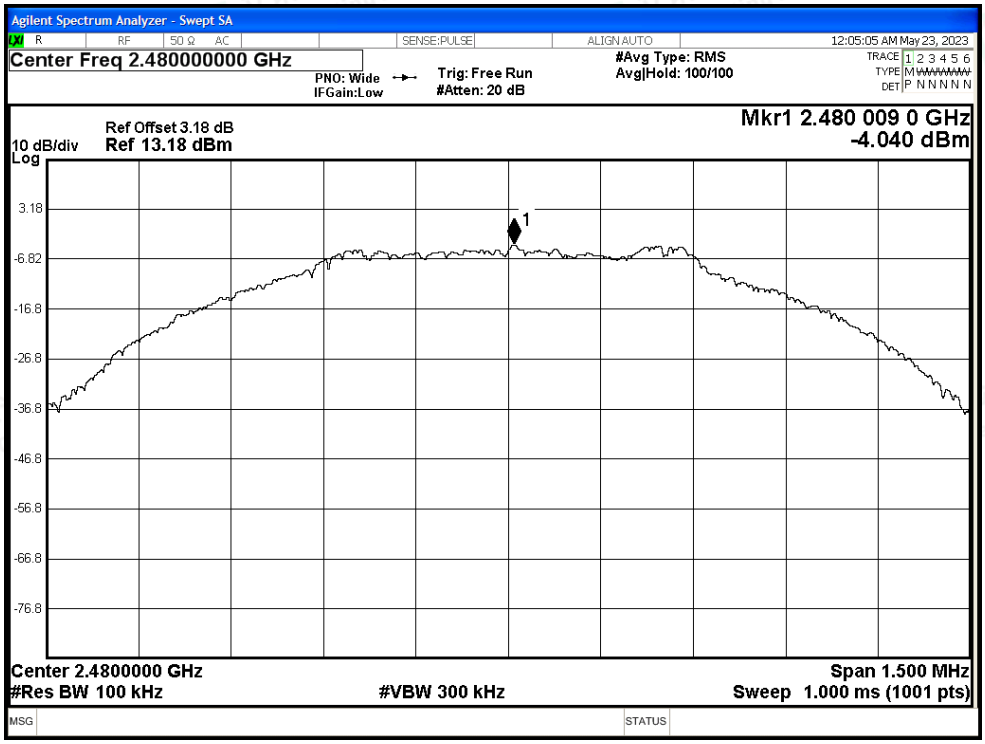
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



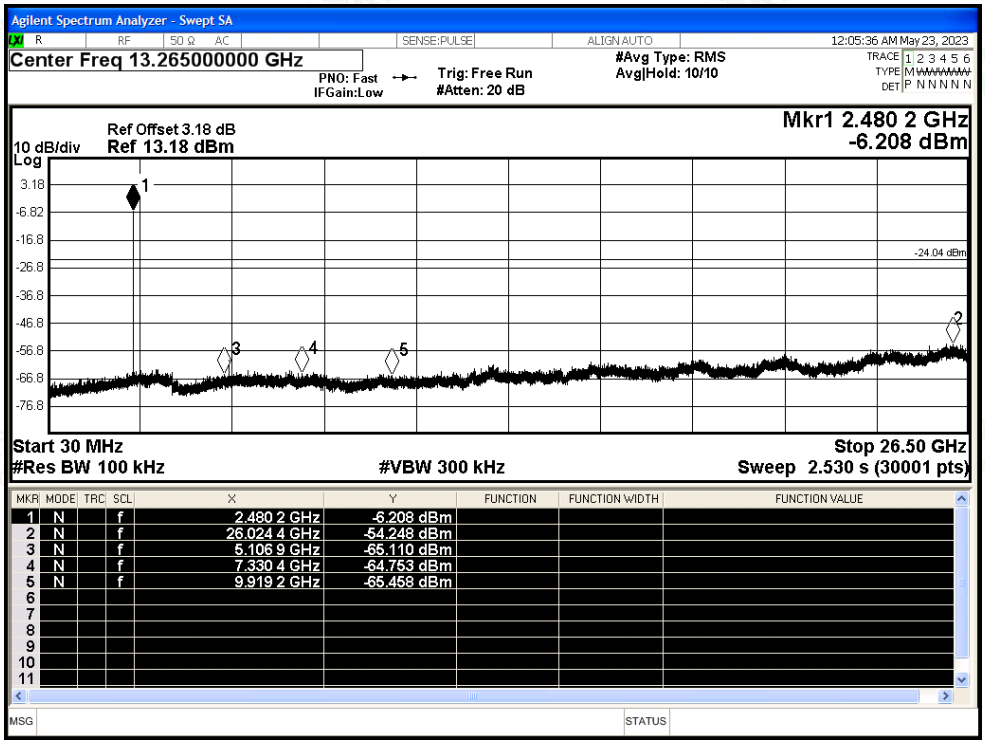

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref




Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

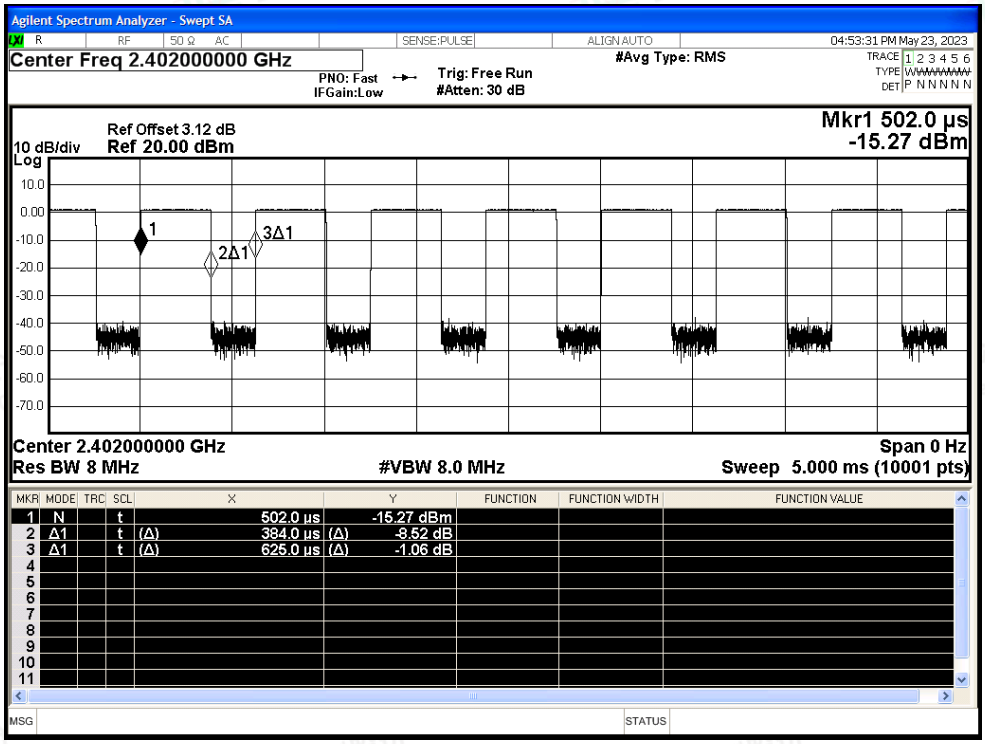


# A.7 Duty Cycle

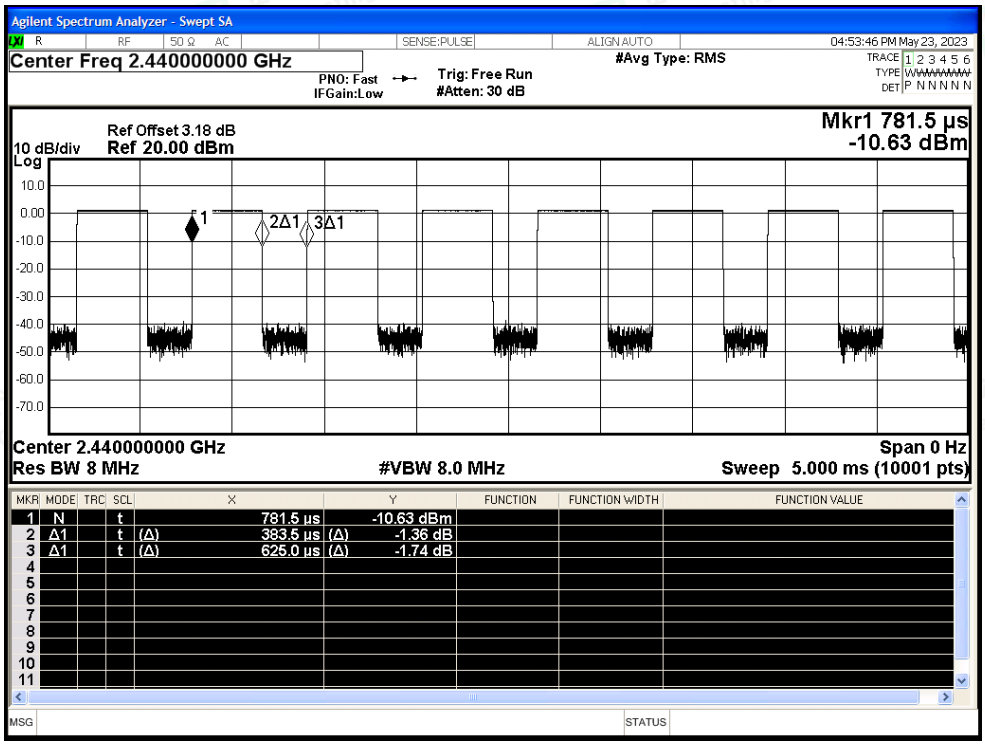
| Condition | Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 61.44 | 2.12 | 2.6 |
| NVNT | BLE 1M | 2440 | Ant1 | 61.36 | 2.12 | 2.61 |
| NVNT | BLE 1M | 2480 | Ant1 | 61.36 | 2.12 | 2.61 |

Test Graphs

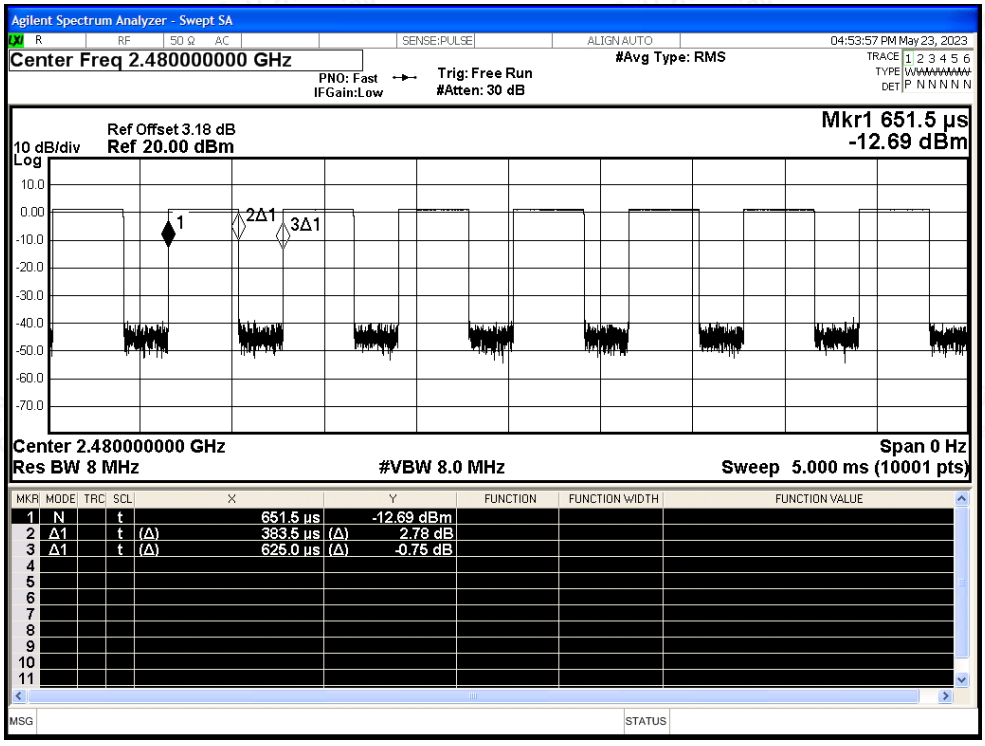
Duty Cycle NVNT BLE 1M 2402MHz Ant1




Duty Cycle NVNT BLE 1M 2440MHz Ant1



Duty Cycle NVNT BLE 1M 2480MHz Ant1

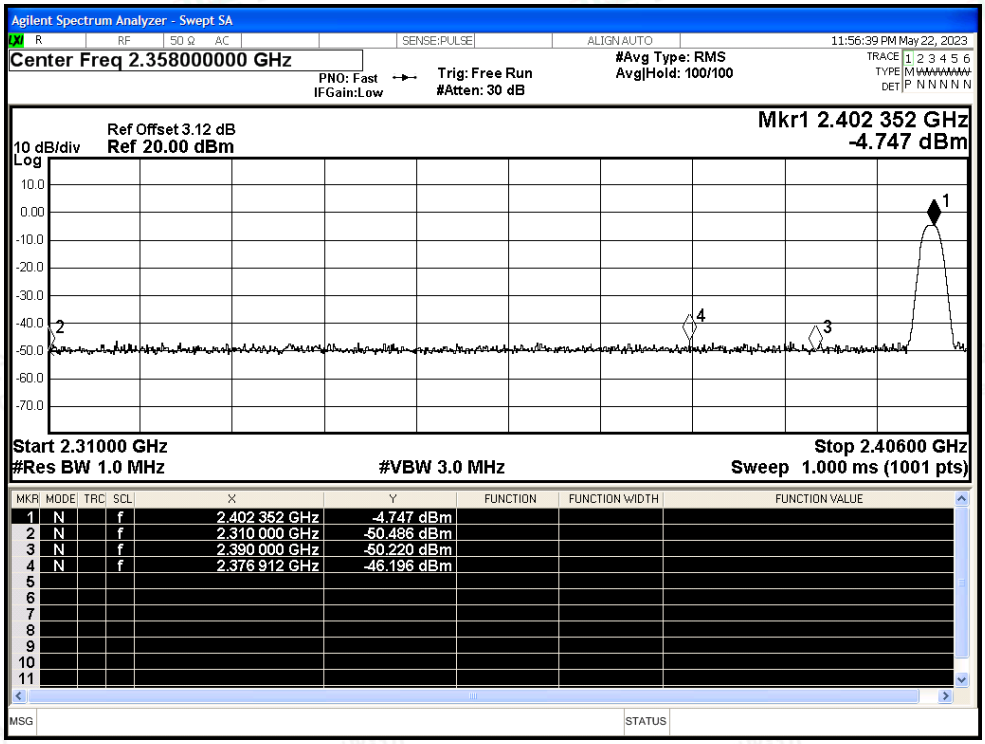


# A.8 Restrict Band

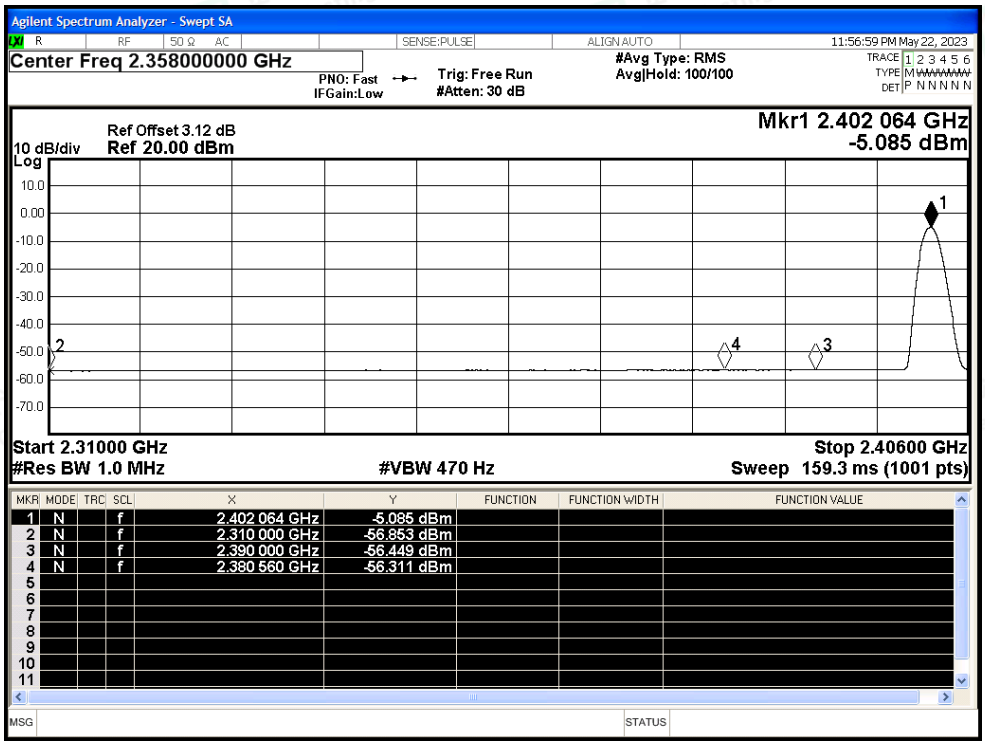
| Condition | Mode | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 2310 | -50.49 | 2 | 46.77 | Peak | 74 | Pass |
| NVNT | BLE 1M | 2402 | Ant1 | 2310 | -56.85 | 2 | 40.41 | Average | 54 | Pass |
| NVNT | BLE 1M | 2402 | Ant1 | 2376.912 | -46.2 | 2 | 51.06 | Peak | 74 | Pass |
| NVNT | BLE 1M | 2402 | Ant1 | 2380.56 | -56.31 | 2 | 40.95 | Average | 54 | Pass |
| NVNT | BLE 1M | 2402 | Ant1 | 2390 | -50.22 | 2 | 47.04 | Peak | 74 | Pass |
| NVNT | BLE 1M | 2402 | Ant1 | 2390 | -56.45 | 2 | 40.81 | Average | 54 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 2483.5 | -48.72 | 2 | 48.54 | Peak | 74 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 2483.5 | -55.41 | 2 | 41.85 | Average | 54 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 2497.12 | -45.84 | 2 | 51.42 | Peak | 74 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 2483.512 | -55.41 | 2 | 41.85 | Average | 54 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 2500 | -48.49 | 2 | 48.77 | Peak | 74 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 2500 | -56.12 | 2 | 41.14 | Average | 54 | Pass |

Test Graphs

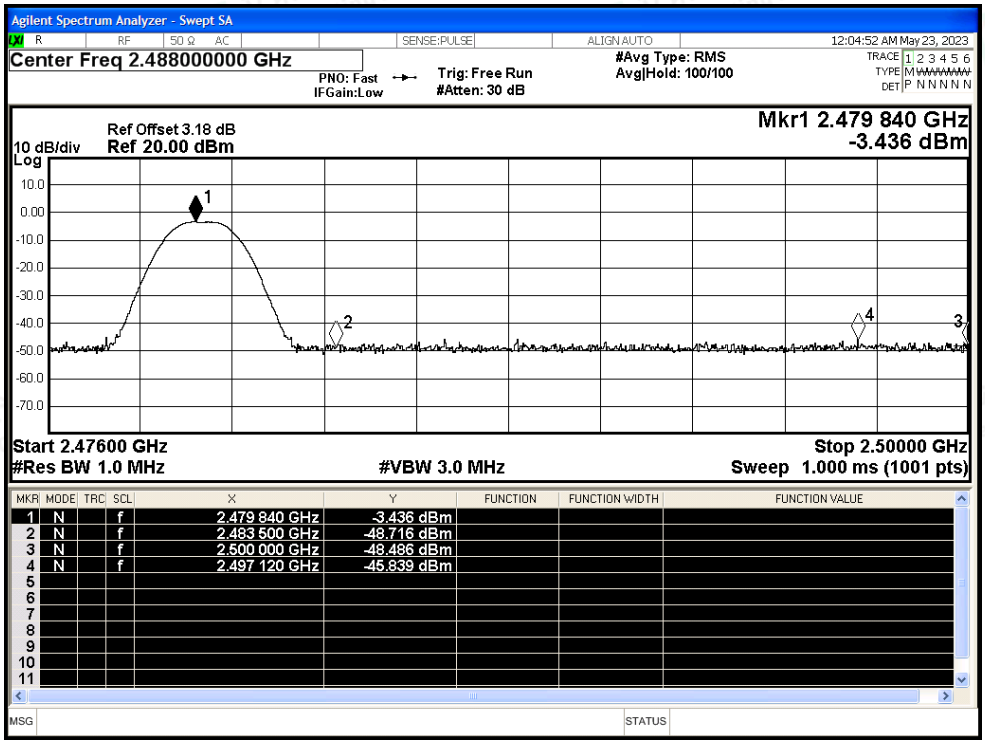
Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak

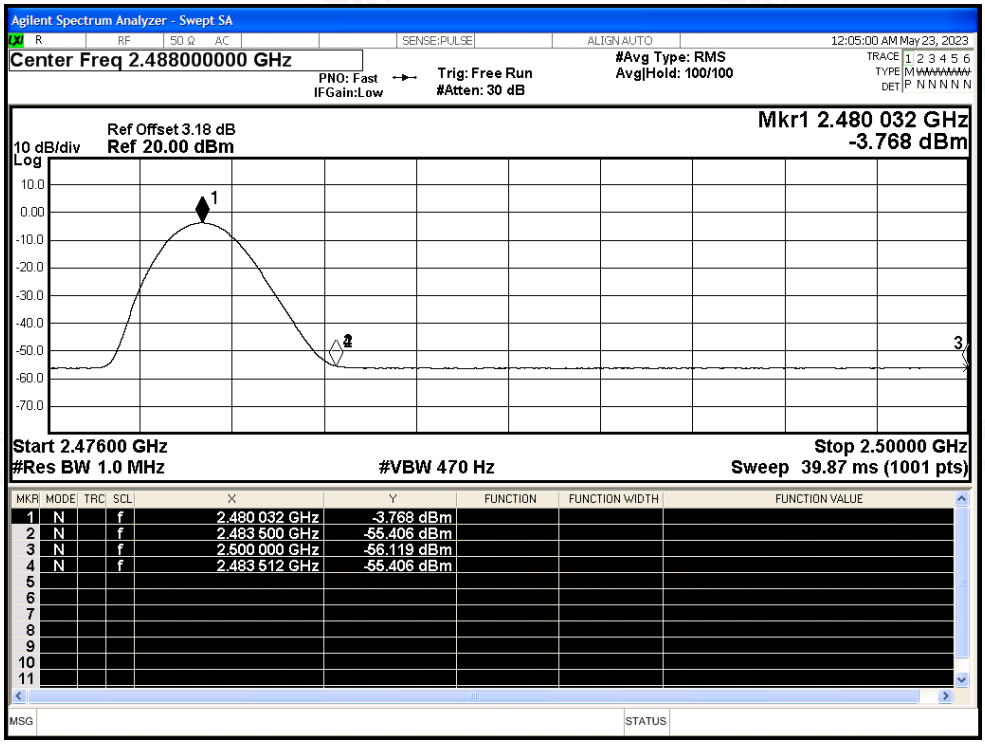



Restrict Band NVNT BLE 1M 2402MHz Ant1 Average



Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak




Restrict Band NVNT BLE 1M 2480MHz Ant1 Average