# Appendix：Bluetooth LE

# Contents

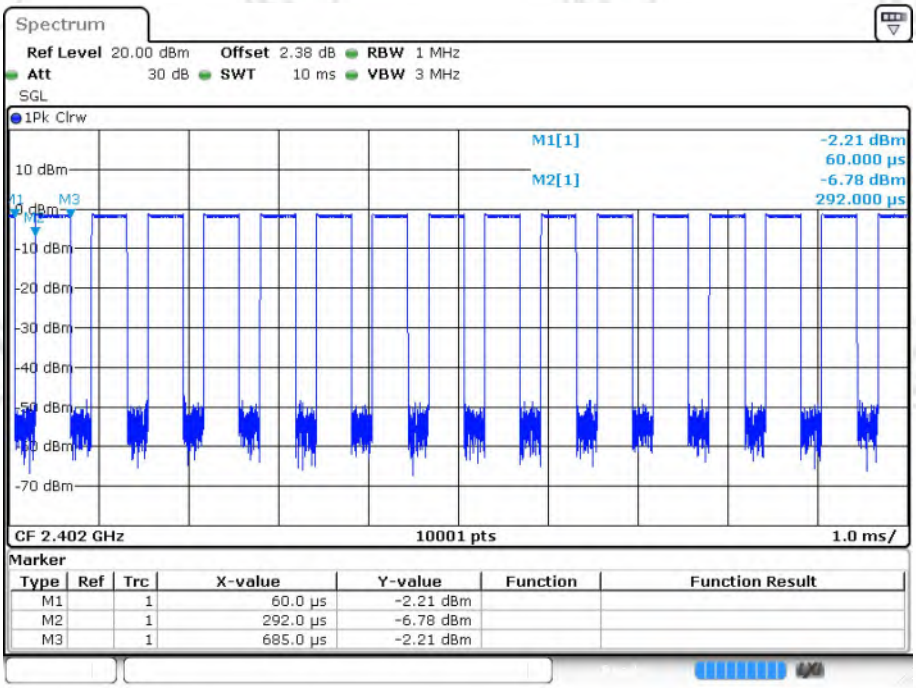
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# Duty Cycle

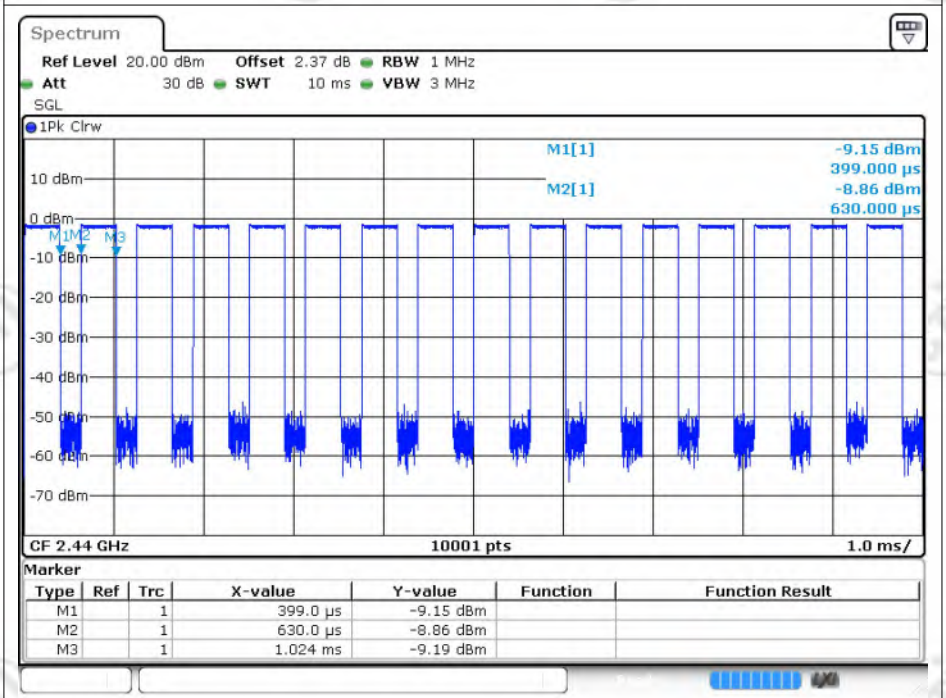
| Condition | Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Duty Cycle Correction Factor (dB) | 1/T (kHz) |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 62.88 | 2.01 | 2.54 |
| NVNT | BLE 1M | 2440 | Ant1 | 63.04 | 2 | 2.54 |
| NVNT | BLE 1M | 2480 | Ant1 | 62.88 | 2.01 | 2.54 |
| NVNT | BLE 2M | 2402 | Ant1 | 33.44 | 4.76 | 4.78 |
| NVNT | BLE 2M | 2440 | Ant1 | 33.44 | 4.76 | 4.78 |
| NVNT | BLE 2M | 2480 | Ant1 | 33.44 | 4.76 | 4.78 |

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

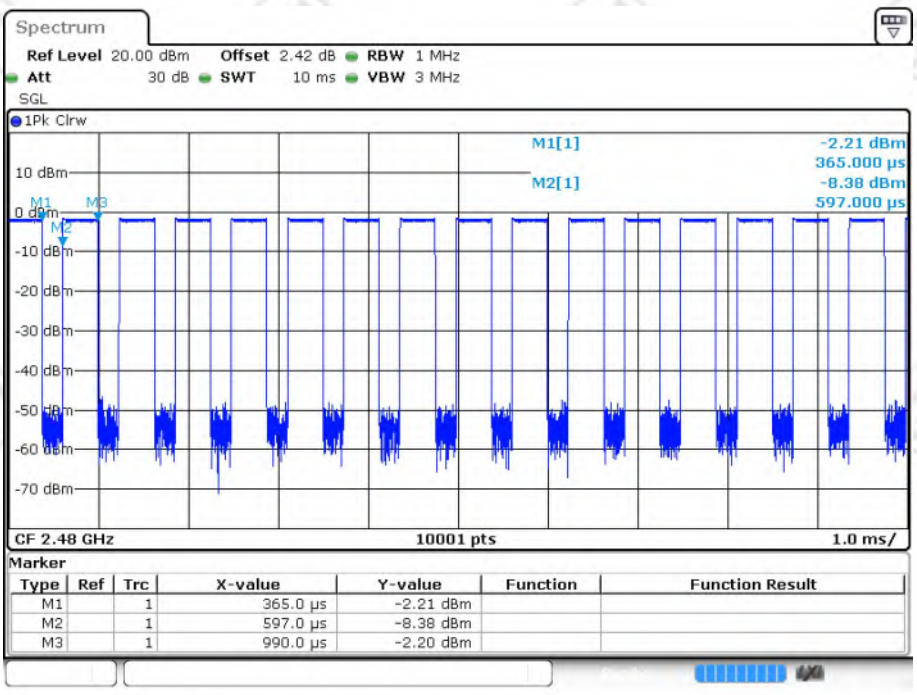
| Test Graphs |
| --- |
| Duty Cycle NVNT BLE 1M 2402MHz Ant1 |




| Duty Cycle NVNT BLE 1M 2440MHz Ant1 |
| --- |

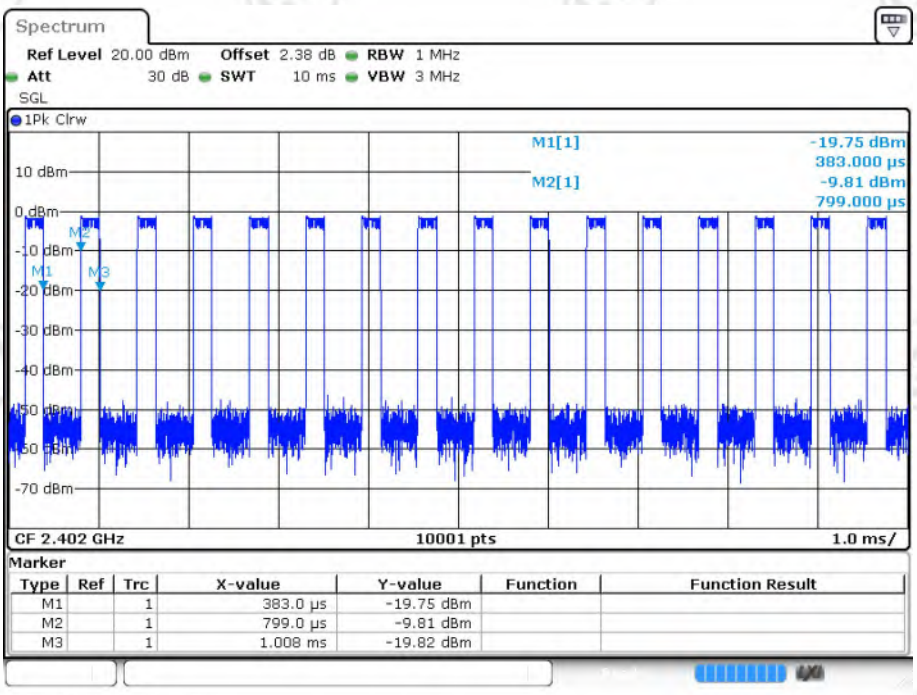


Duty Cycle NVNT BLE 1M 2480MHz Ant1



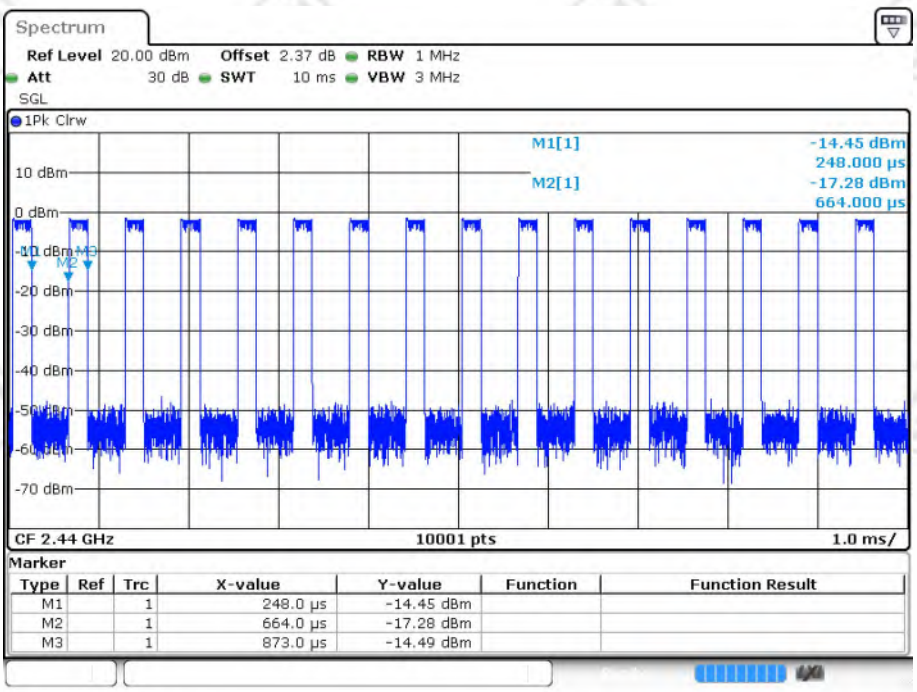

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Duty Cycle NVNT BLE 2M 2402MHz Ant1

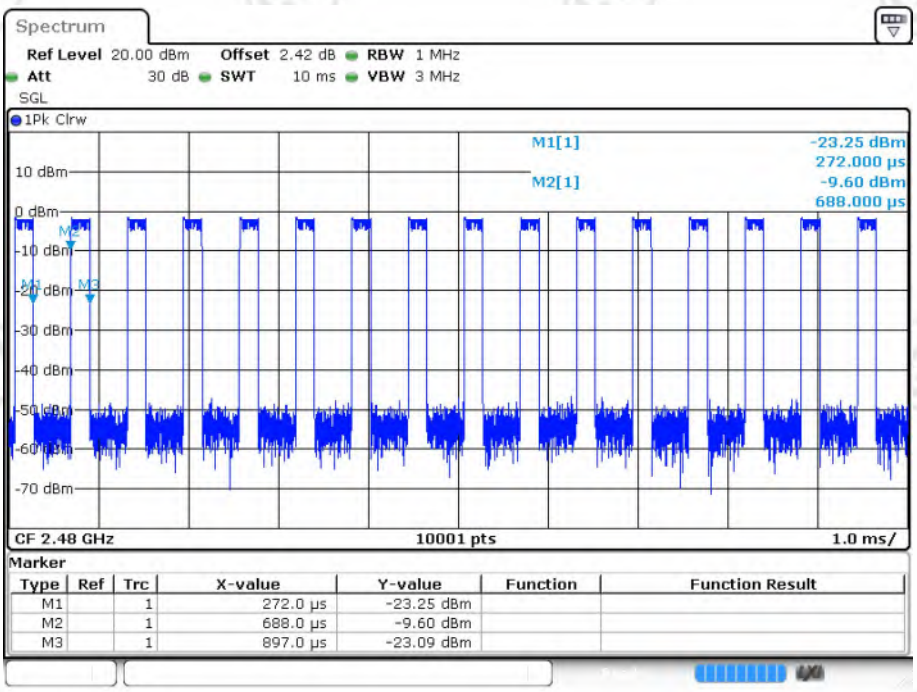



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Duty Cycle NVNT BLE 2M 2440MHz Ant1



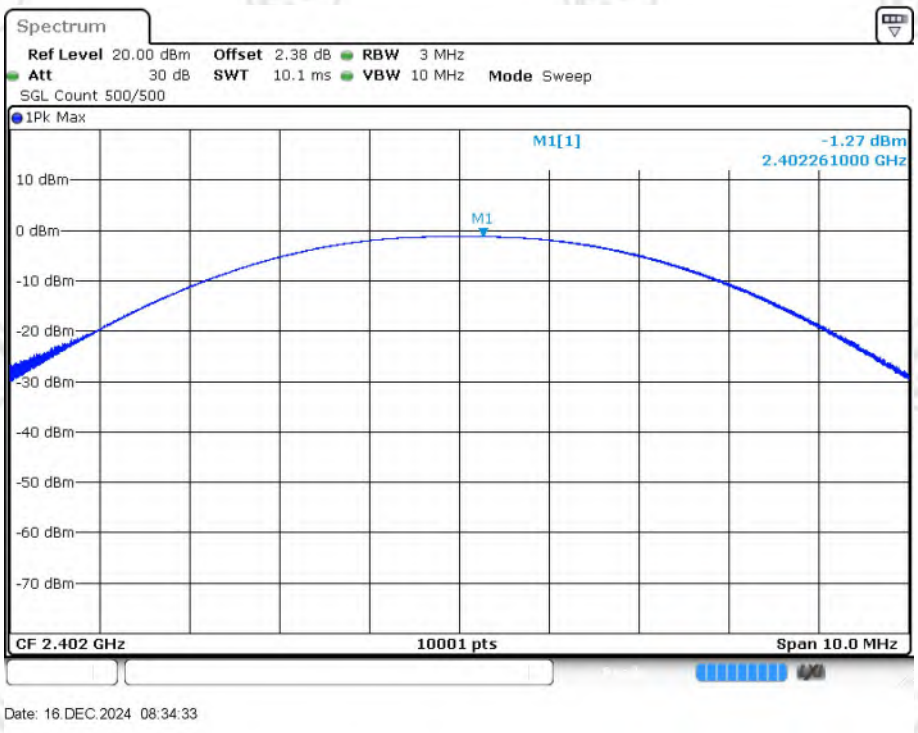

Duty Cycle NVNT BLE 2M 2480MHz Ant1



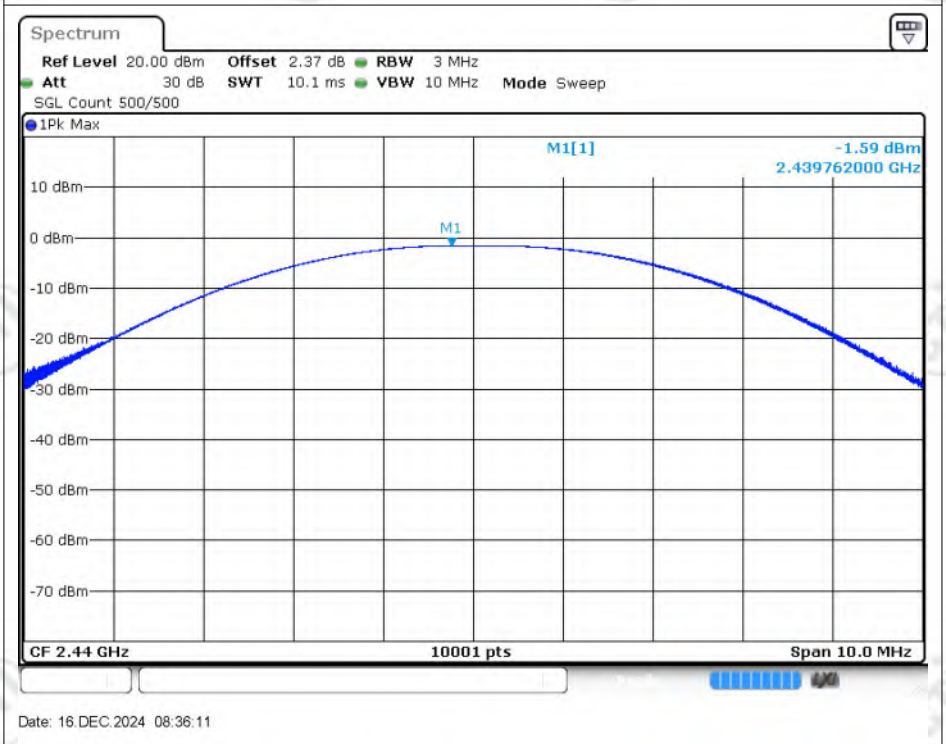
# Maximum Peak Conducted Output Power

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | **-1.27** | 30 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | -1.59 | 30 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -1.60 | 30 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | -1.30 | 30 | Pass |
| NVNT | BLE 2M | 2440 | Ant1 | -1.65 | 30 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | -1.63 | 30 | Pass |

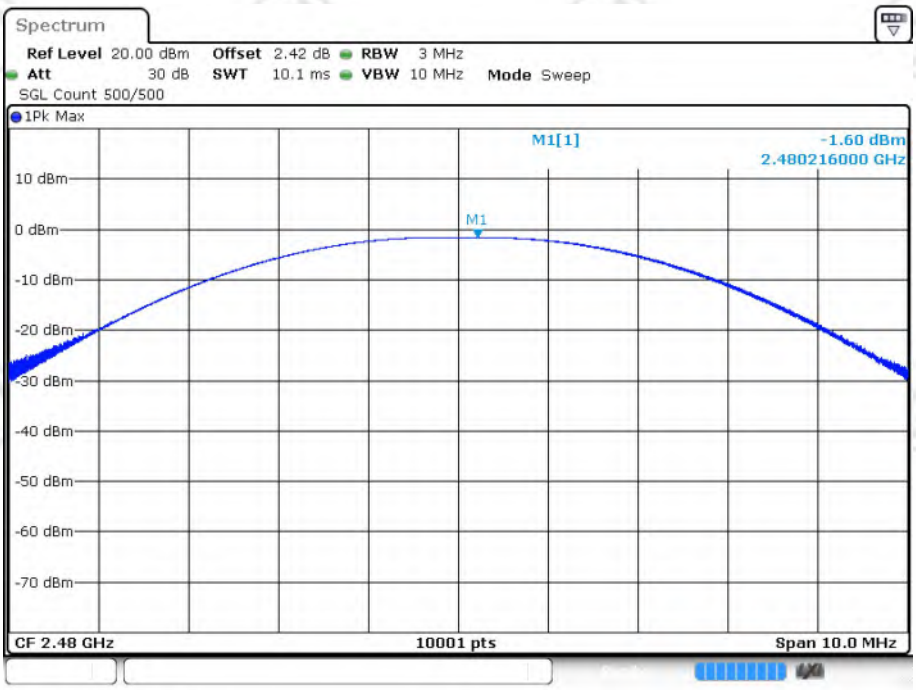
| Test Graphs |
| --- |
| Peak Power NVNT BLE 1M 2402MHz Ant1 |



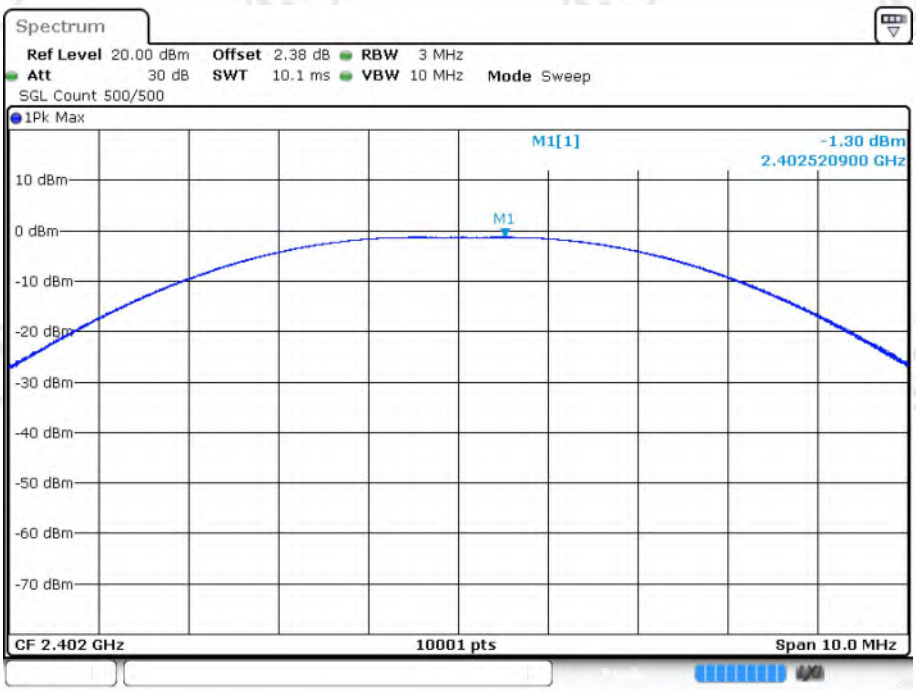

| Peak Power NVNT BLE 1M 2440MHz Ant1 |
| --- |



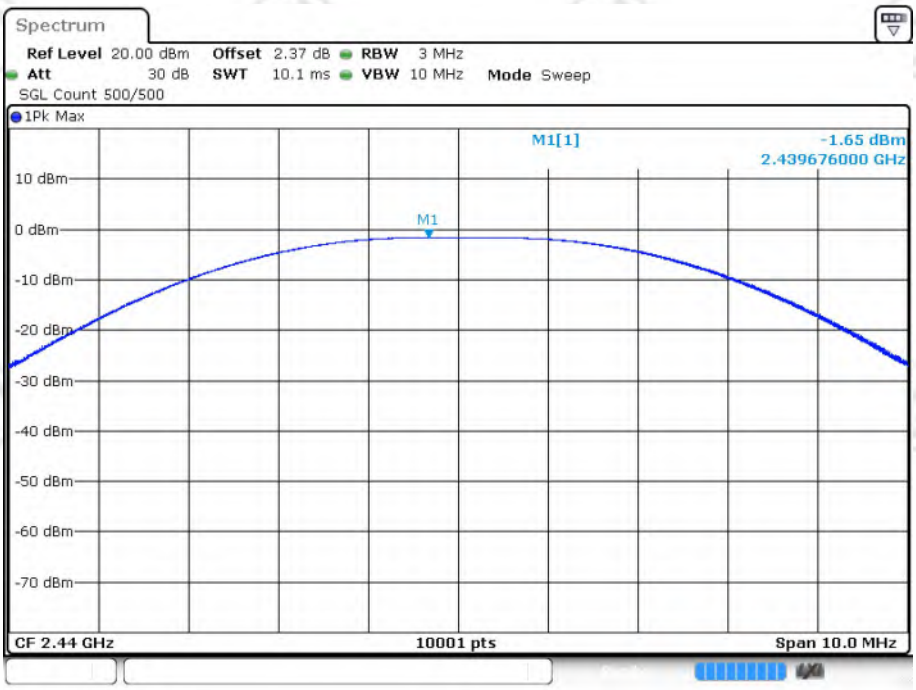
Peak Power NVNT BLE 1M 2480MHz Ant1



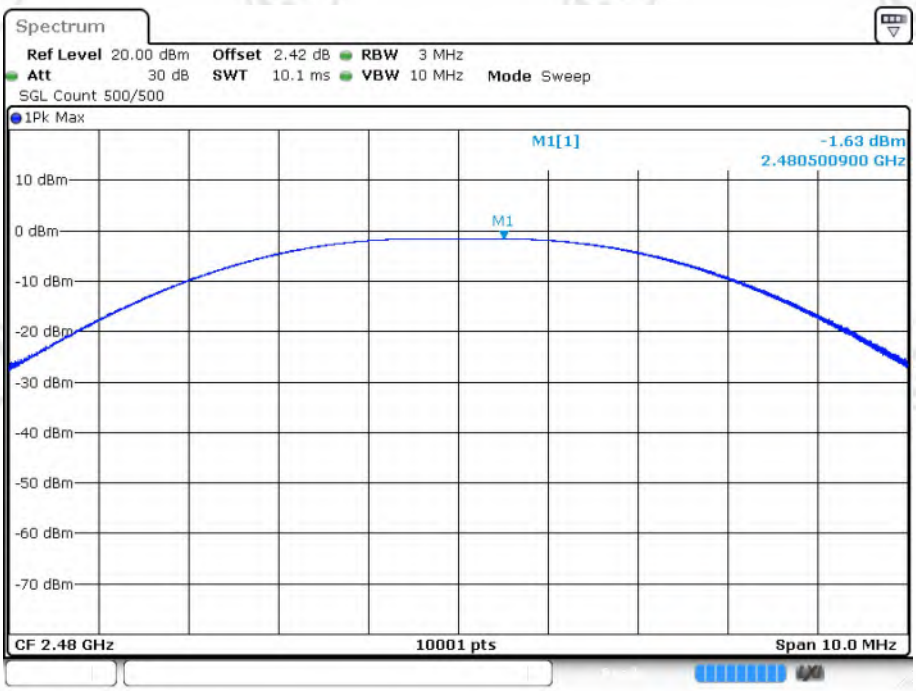

Peak Power NVNT BLE 2M 2402MHz Ant1



Peak Power NVNT BLE 2M 2440MHz Ant1




Peak Power NVNT BLE 2M 2480MHz Ant1

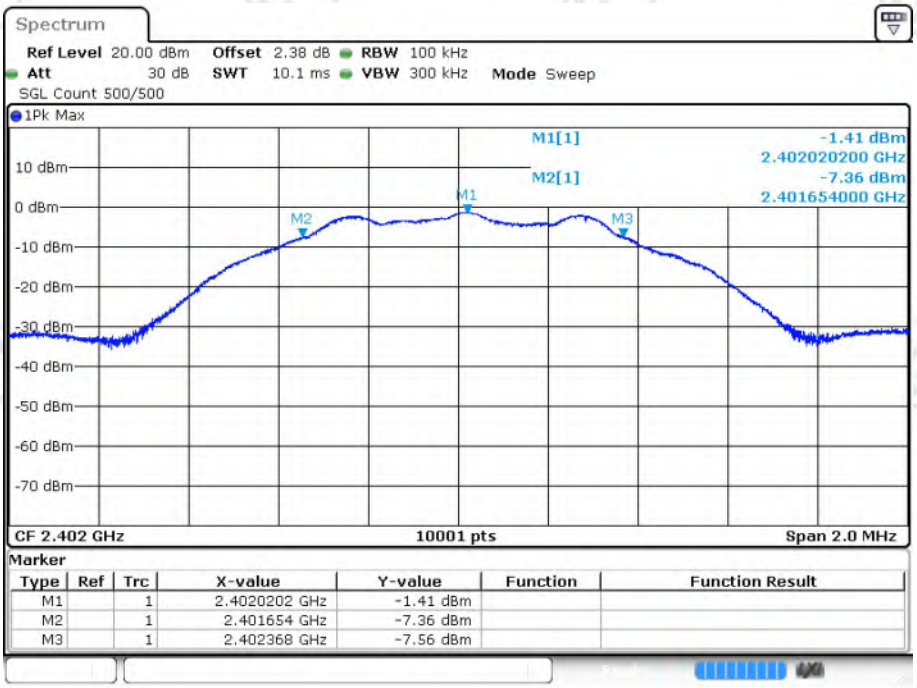


## -6dB Bandwidth

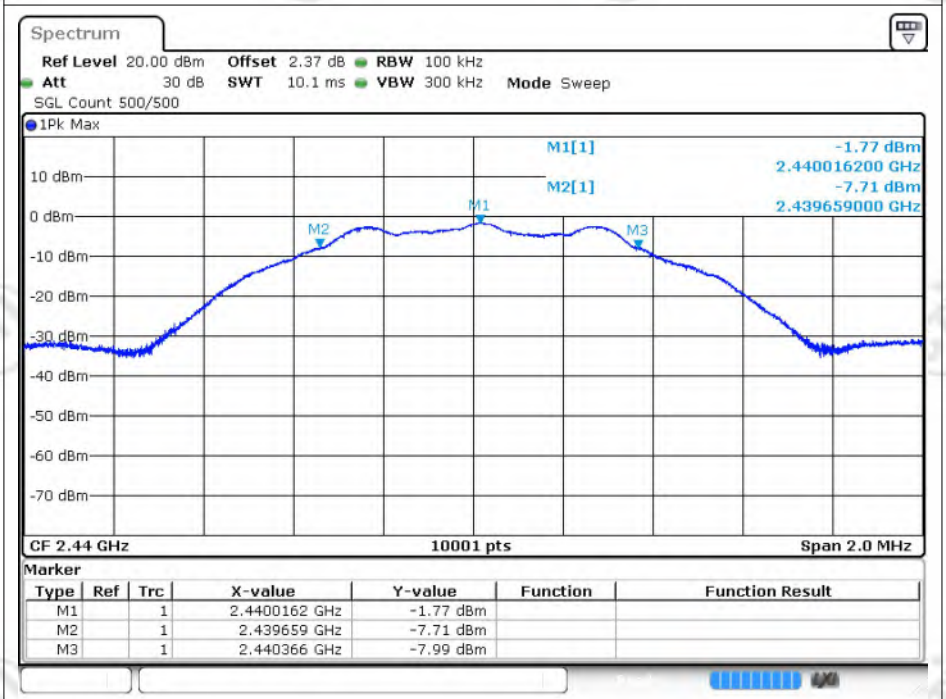
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 0.714 | 0.5 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | 0.707 | 0.5 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 0.705 | 0.5 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | 1.135 | 0.5 | Pass |
| NVNT | BLE 2M | 2440 | Ant1 | 1.127 | 0.5 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | 1.136 | 0.5 | Pass |

Test Graphs

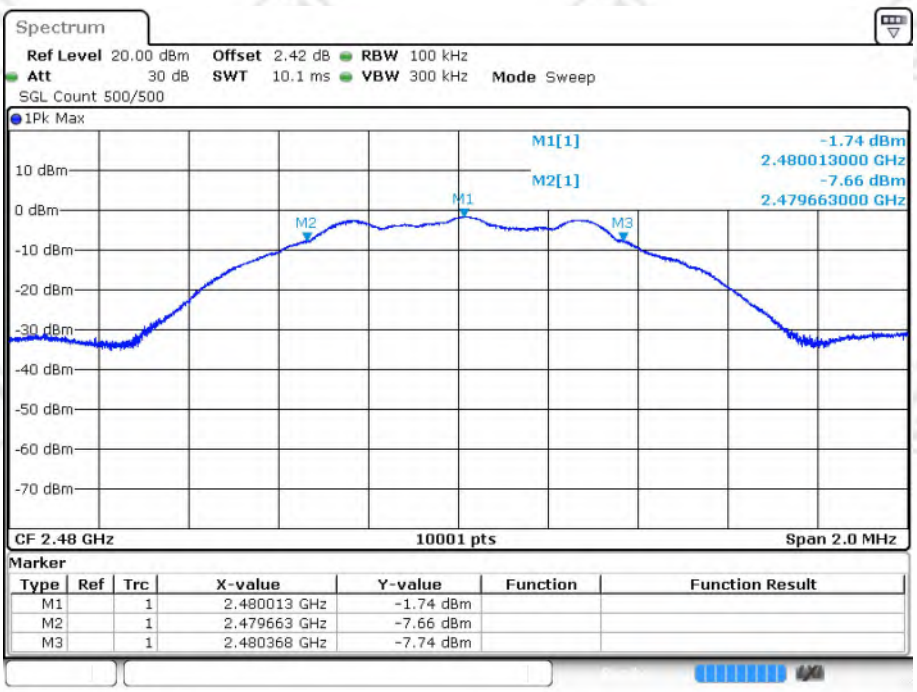
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1




-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

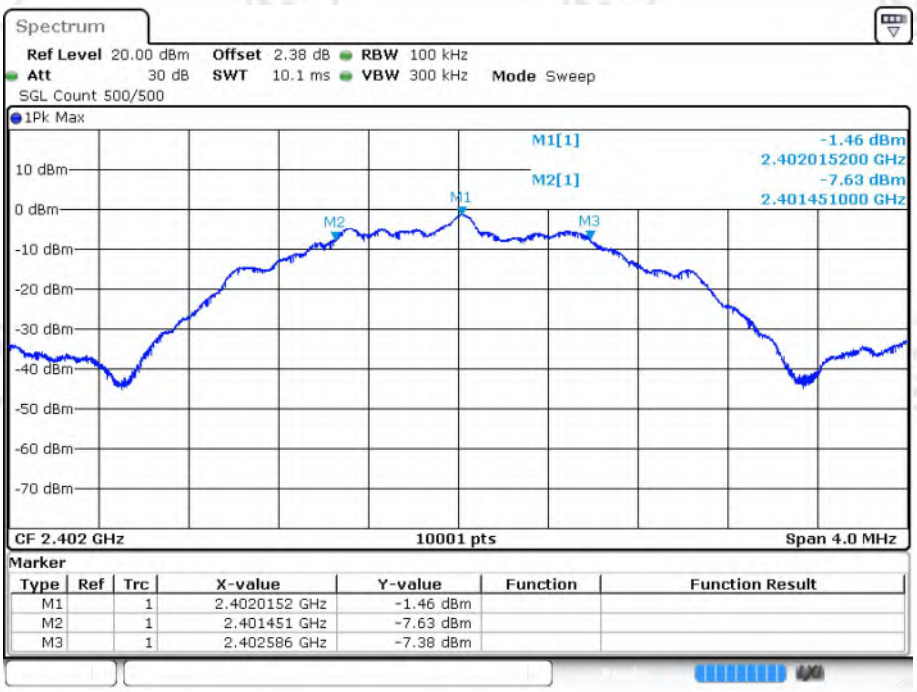


-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



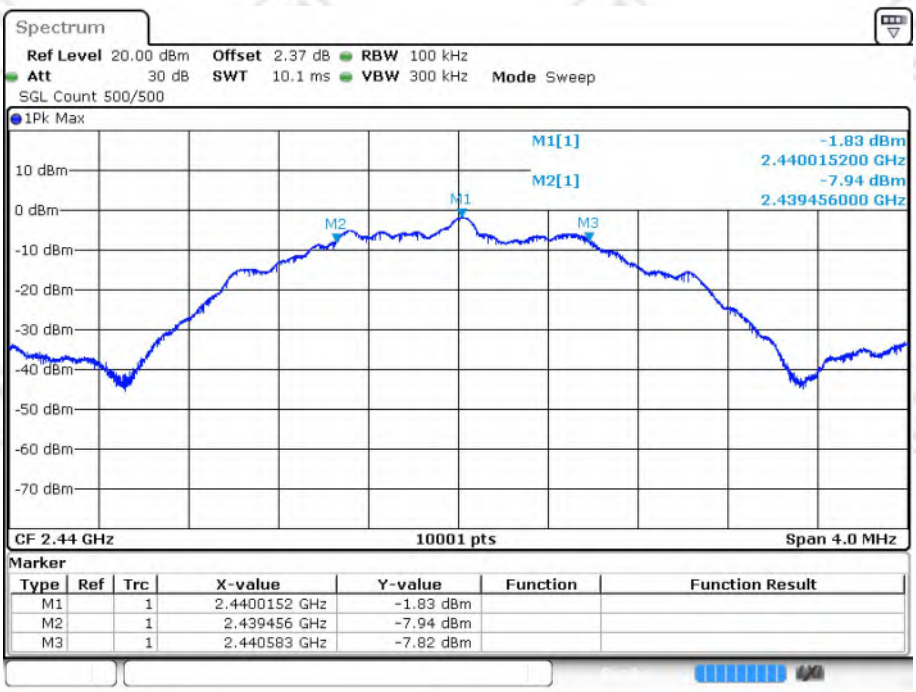

Date: 16.DEC.2024 08:38:07

-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



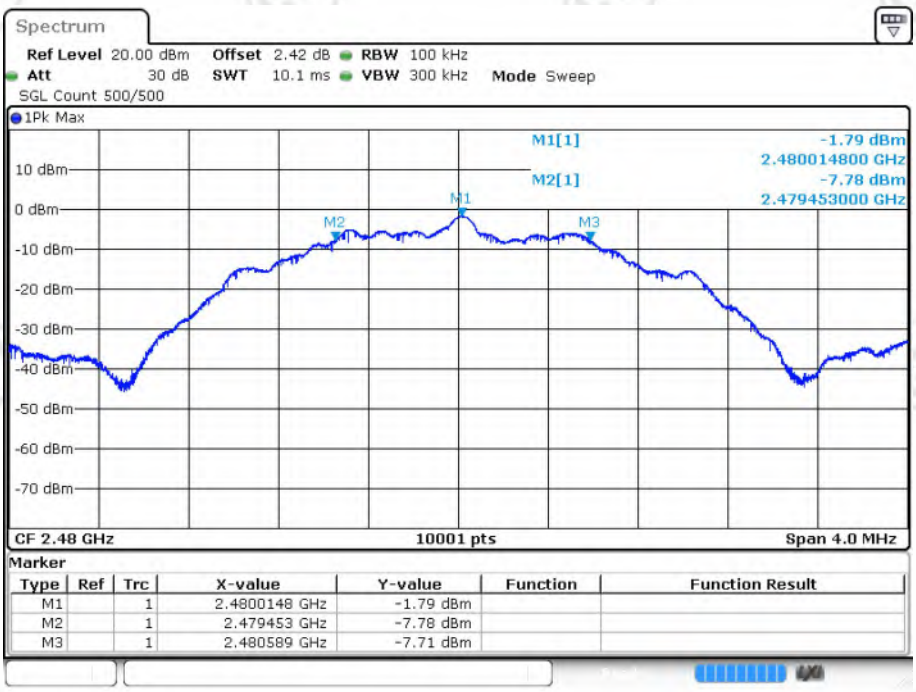

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-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1




Date: 16.DEC.2024 08:41:40

-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1

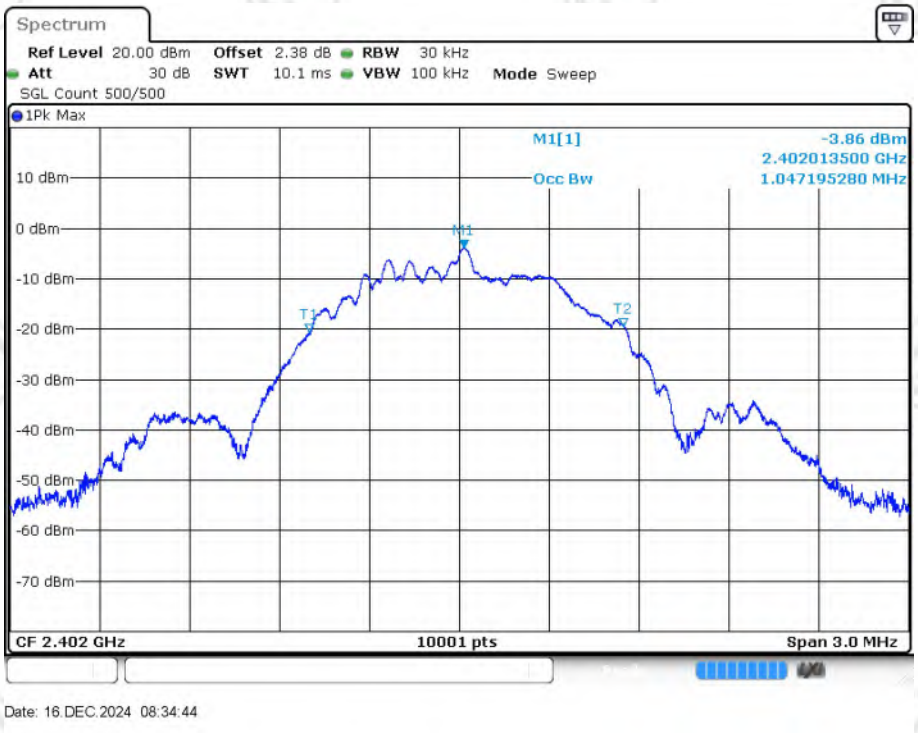



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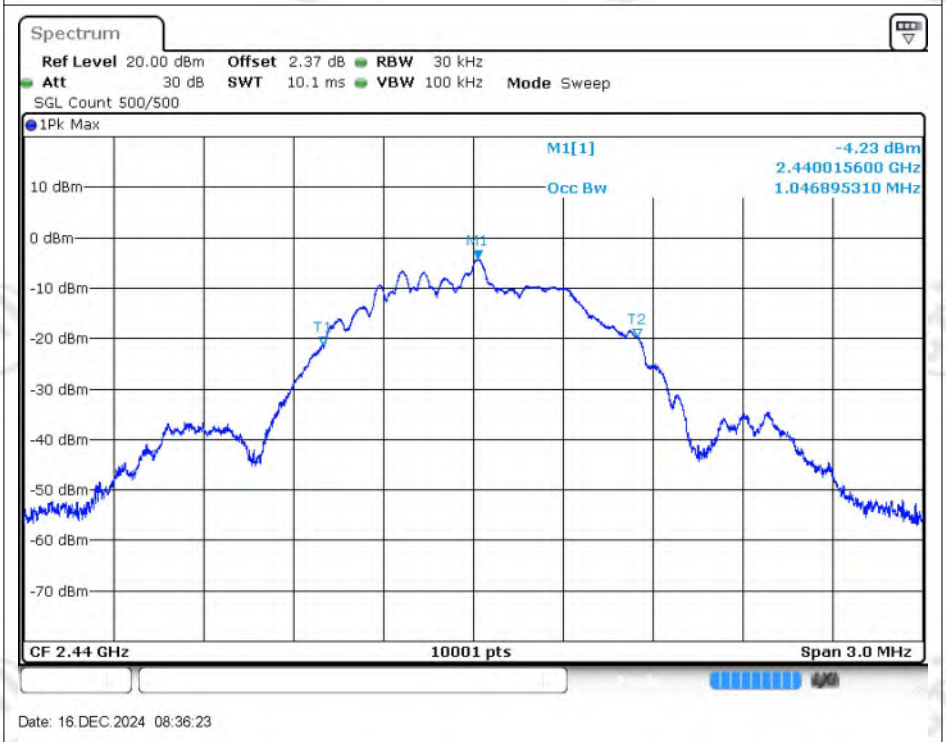
# Occupied Channel Bandwidth

| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 1.047 |
| NVNT | BLE 1M | 2440 | Ant1 | 1.047 |
| NVNT | BLE 1M | 2480 | Ant1 | 1.048 |
| NVNT | BLE 2M | 2402 | Ant1 | 2.045 |
| NVNT | BLE 2M | 2440 | Ant1 | 2.049 |
| NVNT | BLE 2M | 2480 | Ant1 | 2.051 |

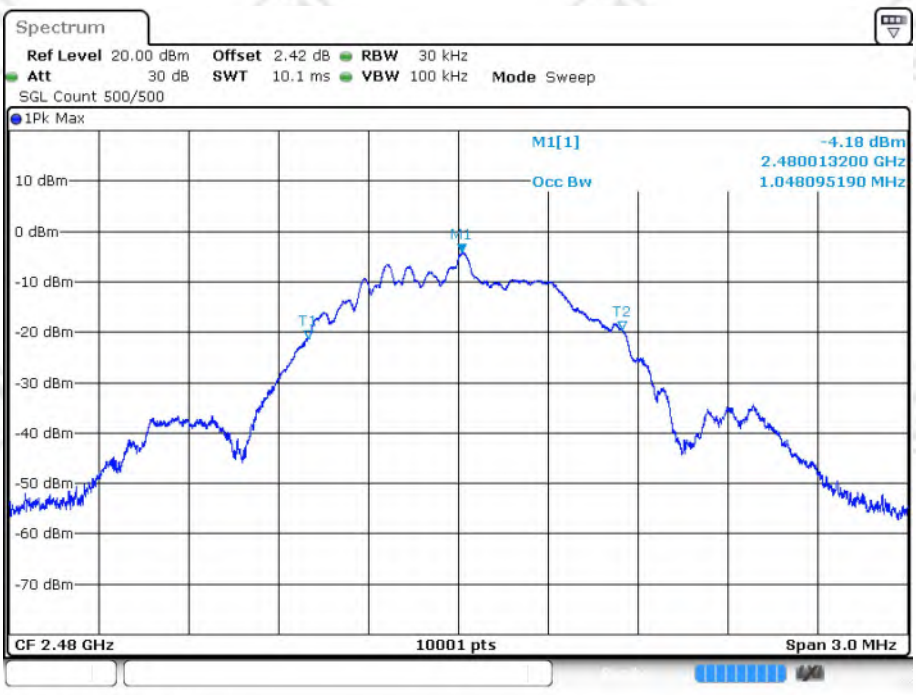
| Test Graphs |
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| OBW NVNT BLE 1M 2402MHz Ant1 |



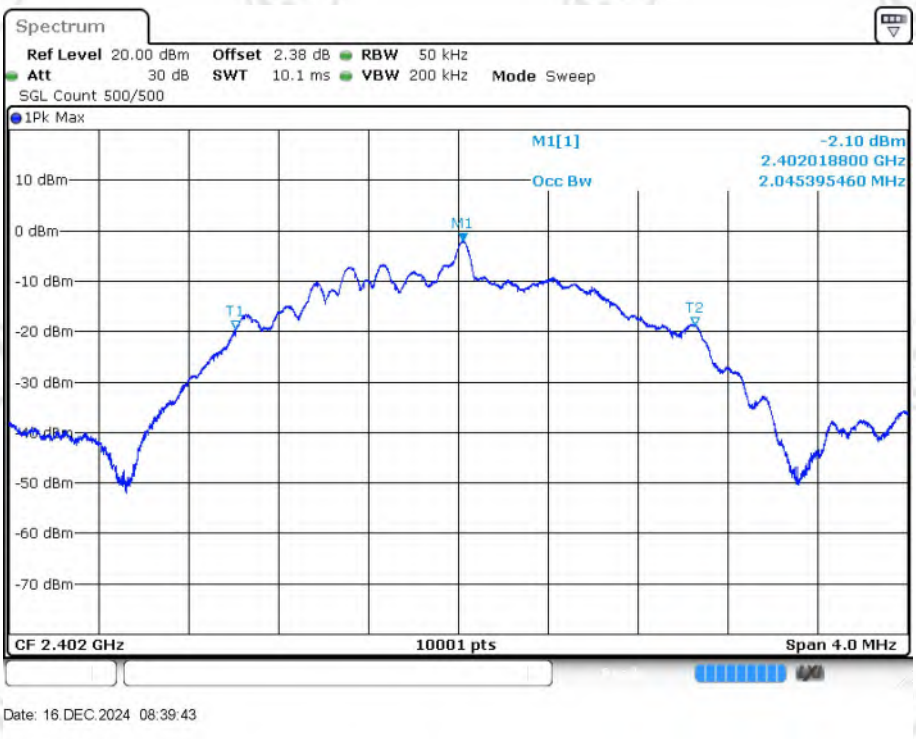

| OBW NVNT BLE 1M 2440MHz Ant1 |
| --- |



OBW NVNT BLE 1M 2480MHz Ant1



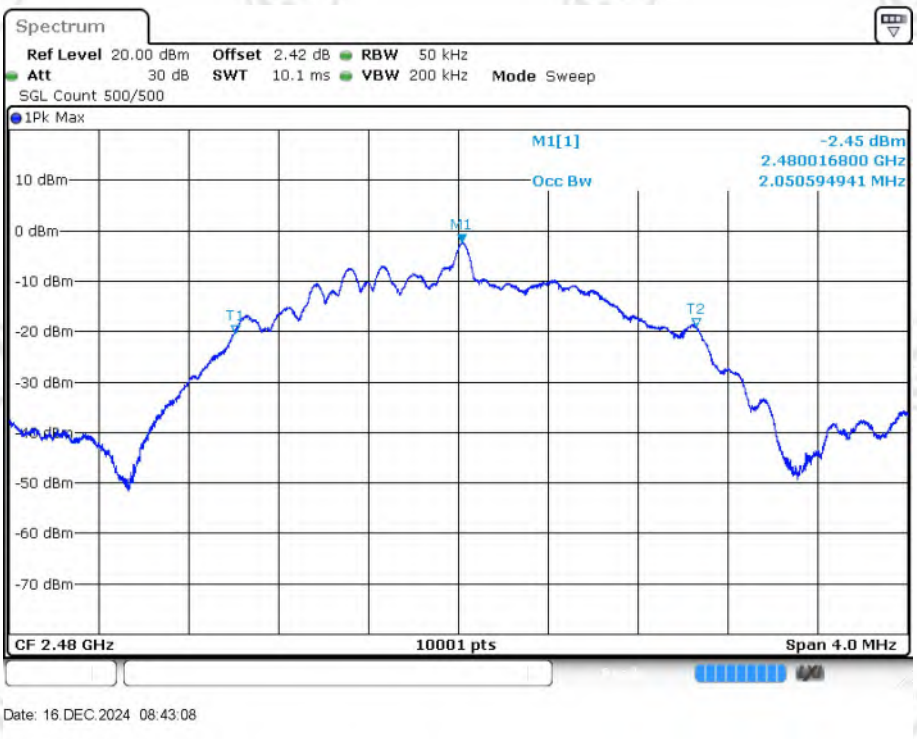

OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2440MHz Ant1



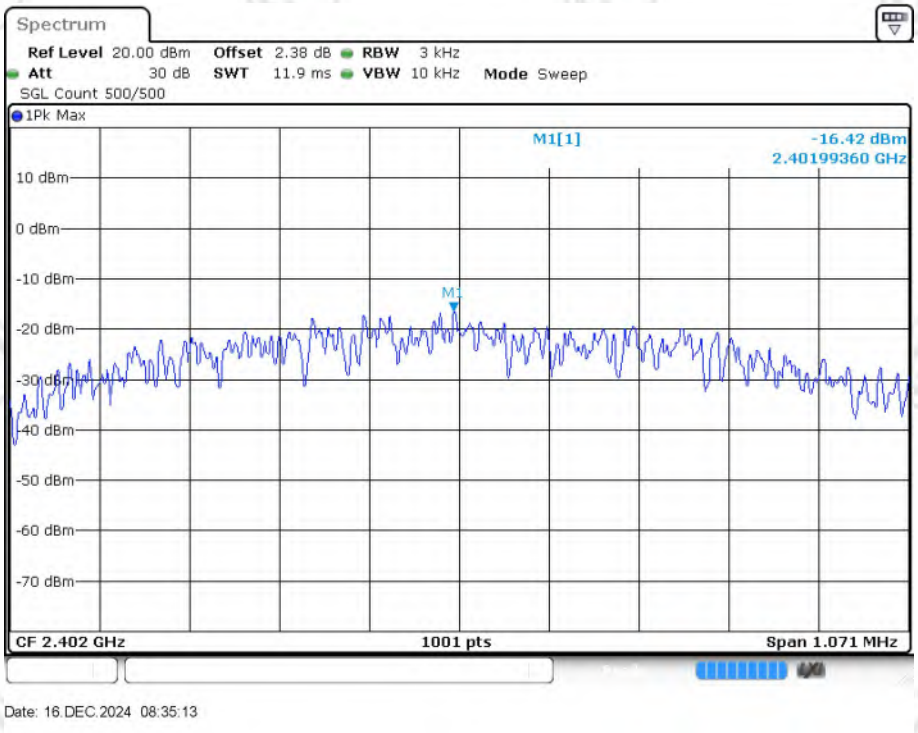

OBW NVNT BLE 2M 2480MHz Ant1



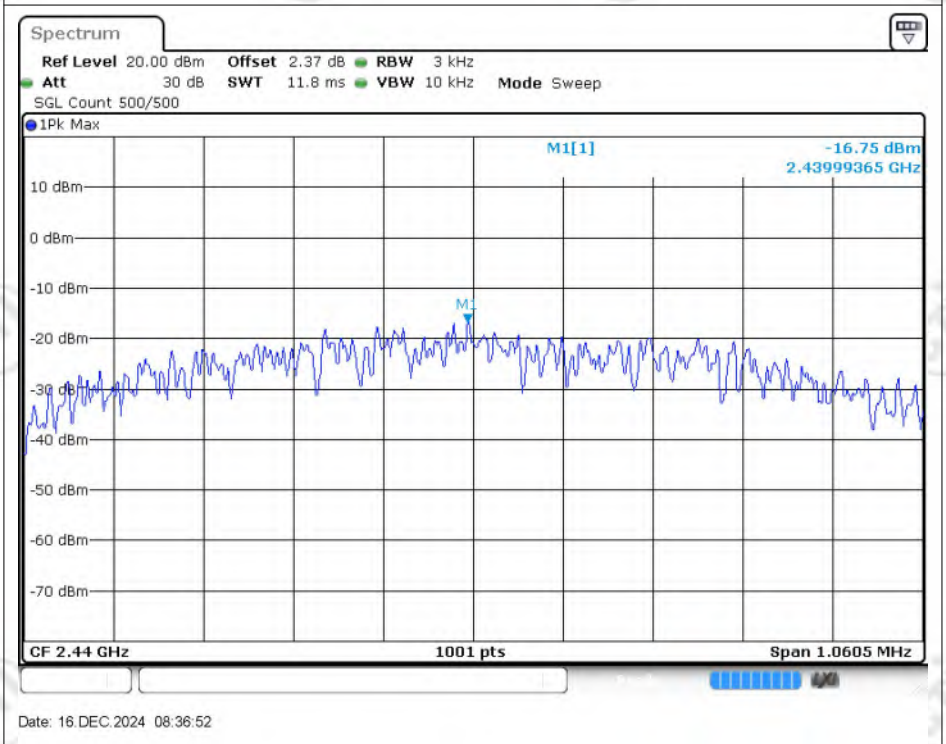
# Maximum Power Spectral Density Level

| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -16.42 | 8 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | -16.75 | 8 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -16.84 | 8 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | -19.09 | 8 | Pass |
| NVNT | BLE 2M | 2440 | Ant1 | -19.47 | 8 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | -19.47 | 8 | Pass |

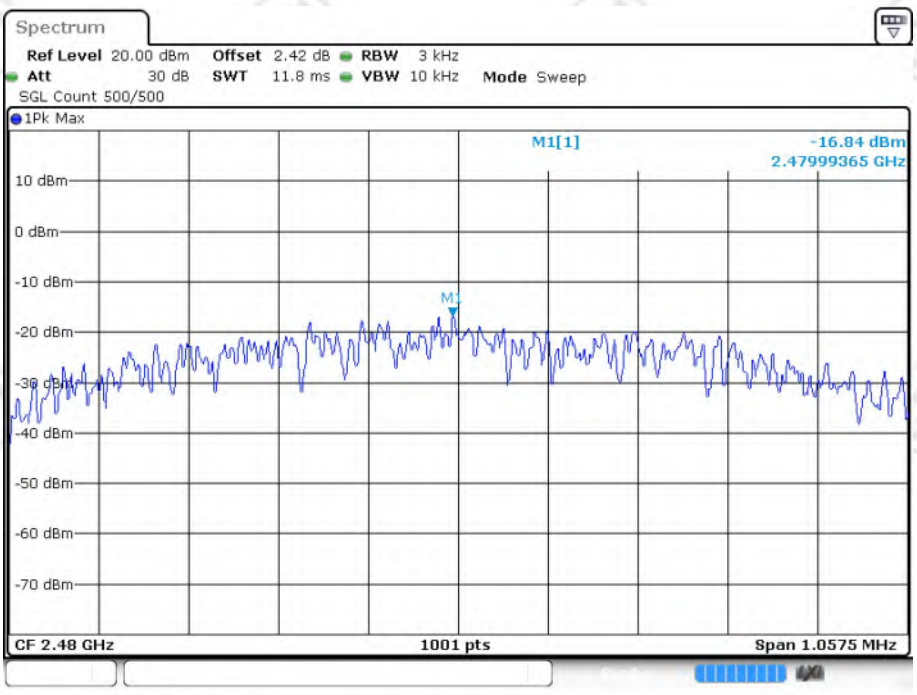
| Test Graphs |
| --- |
| PSD NVNT BLE 1M 2402MHz Ant1 |



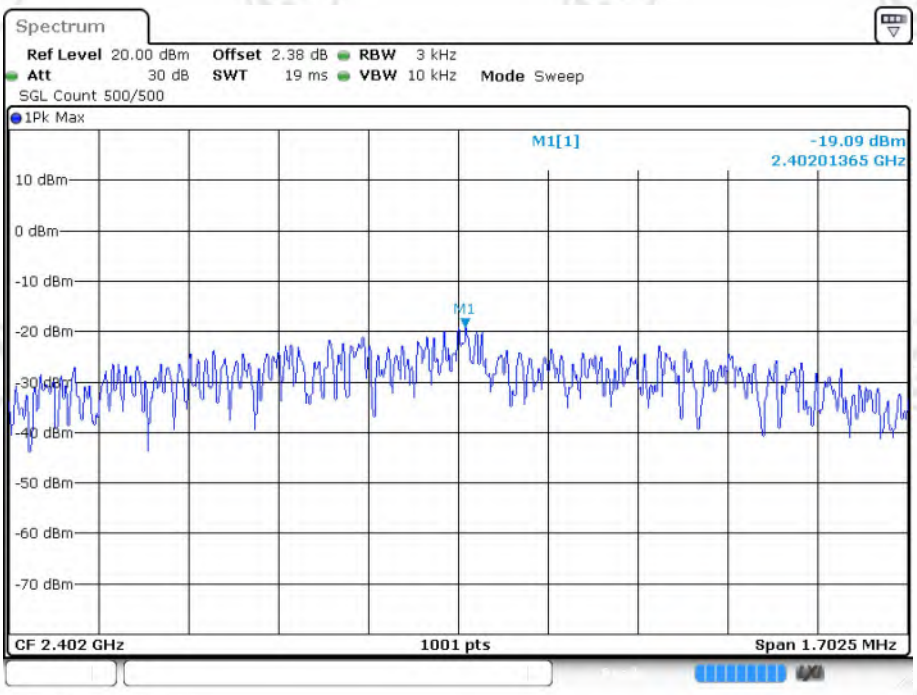

| PSD NVNT BLE 1M 2440MHz Ant1 |
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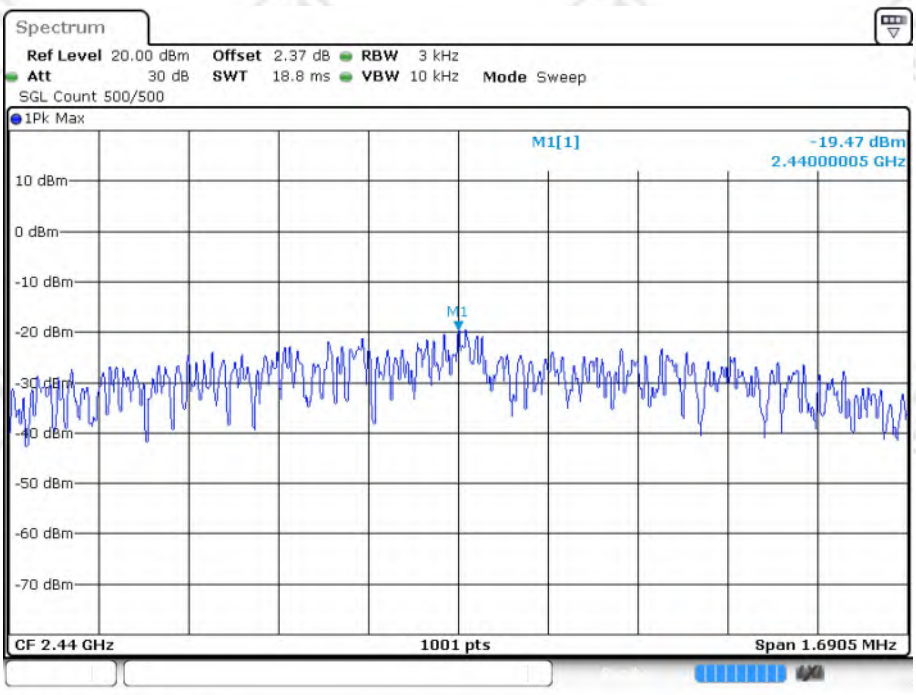
PSD NVNT BLE 1M 2480MHz Ant1



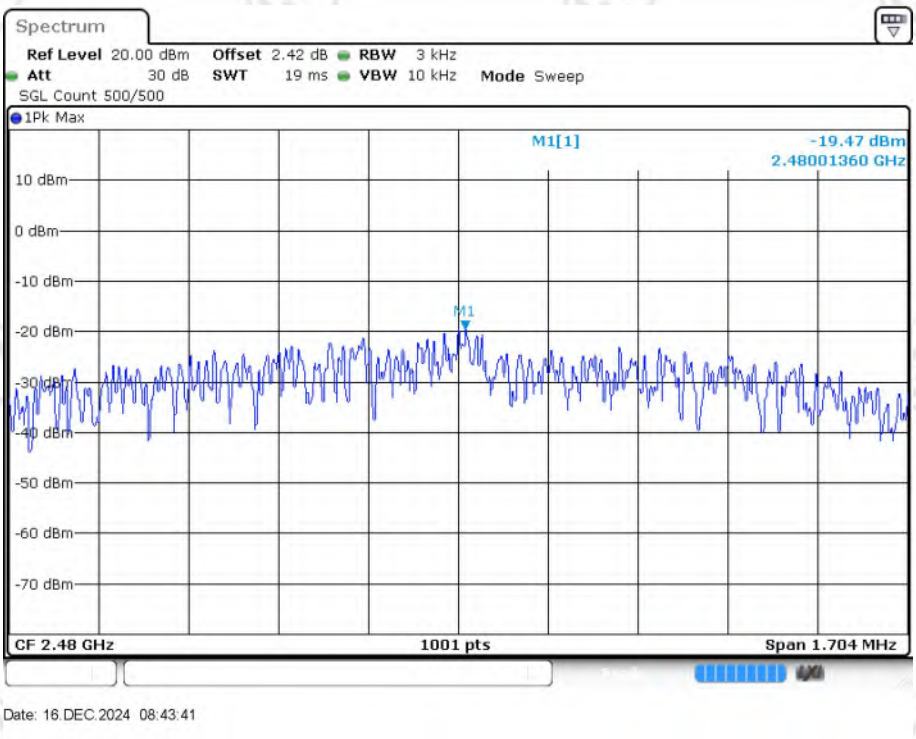

PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



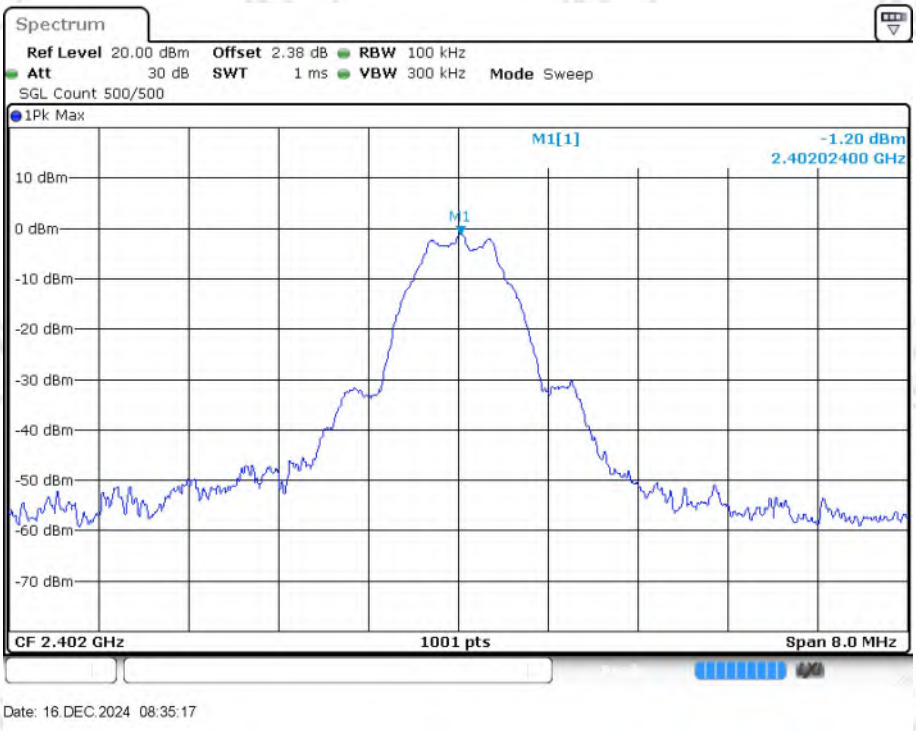

PSD NVNT BLE 2M 2480MHz Ant1



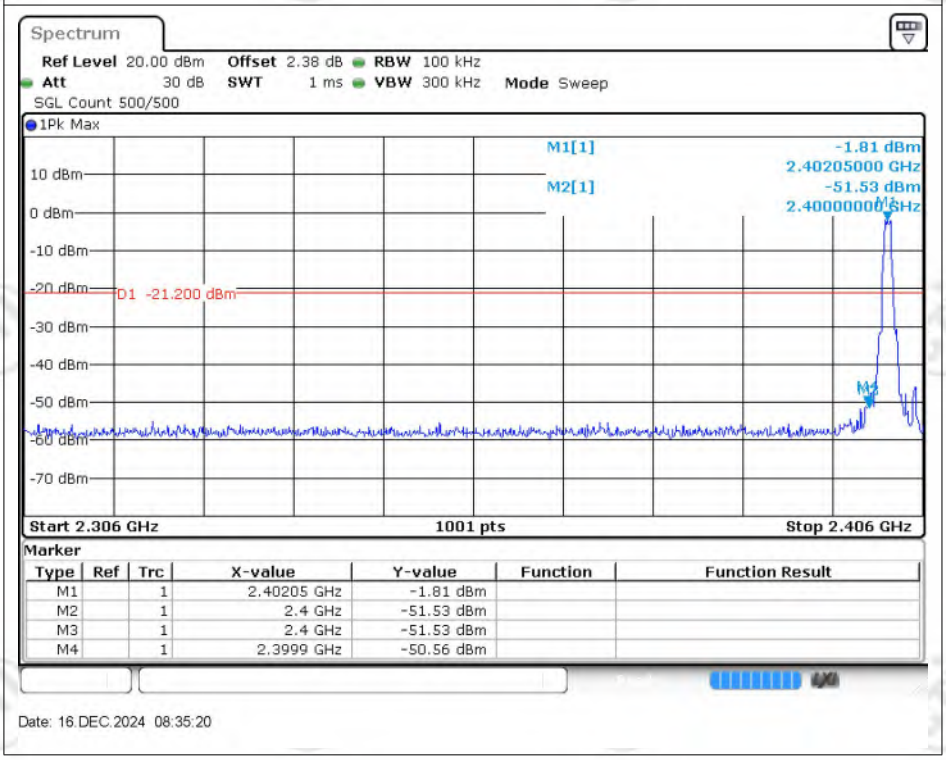
## Band Edge

| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -49.35 | -20 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -52.52 | -20 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | -36.07 | -20 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | -53.64 | -20 | Pass |

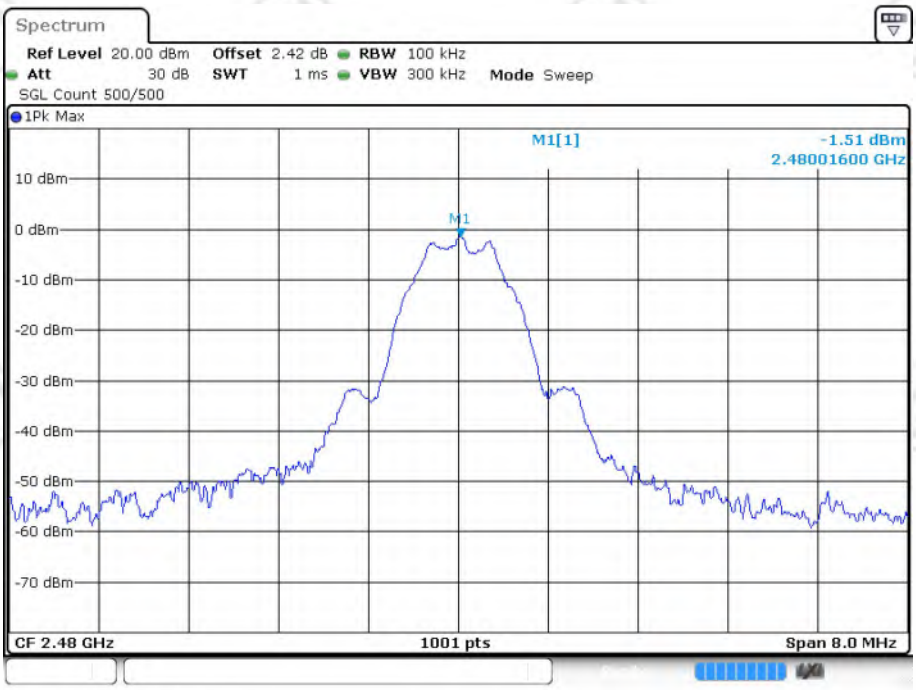
| Test Graphs |
| --- |
| Band Edge NVNT BLE 1M 2402MHz Ant1 Ref |



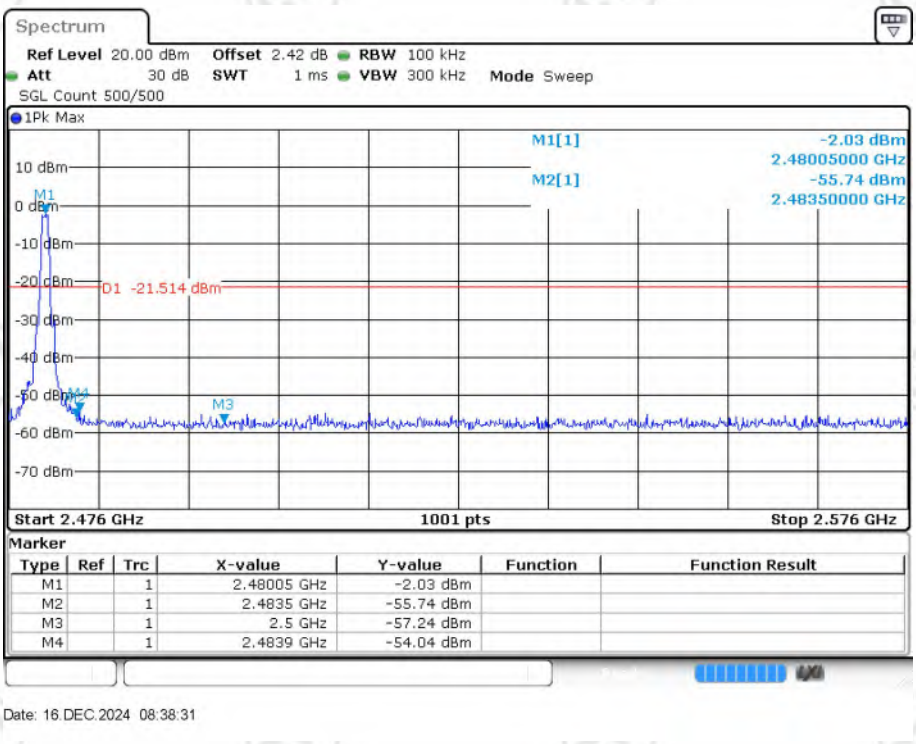

| Band Edge NVNT BLE 1M 2402MHz Ant1 Emission |
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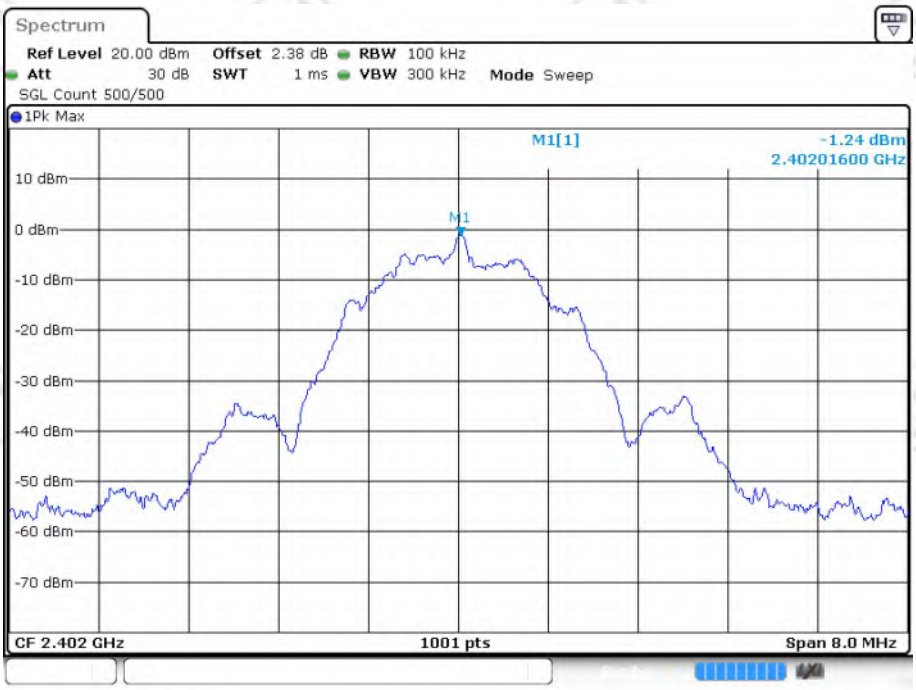
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



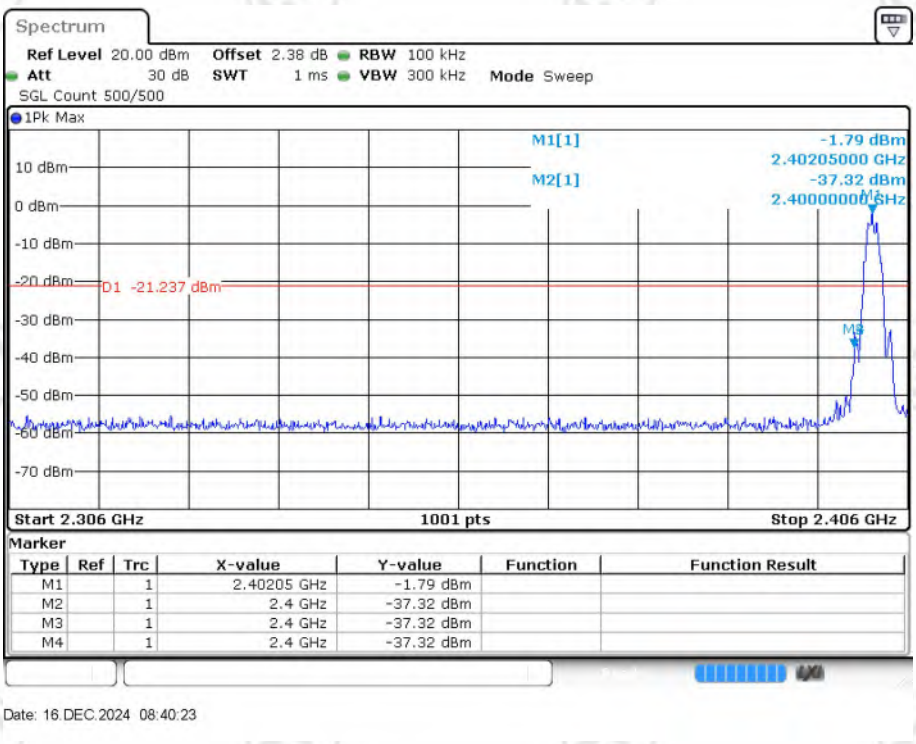

Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



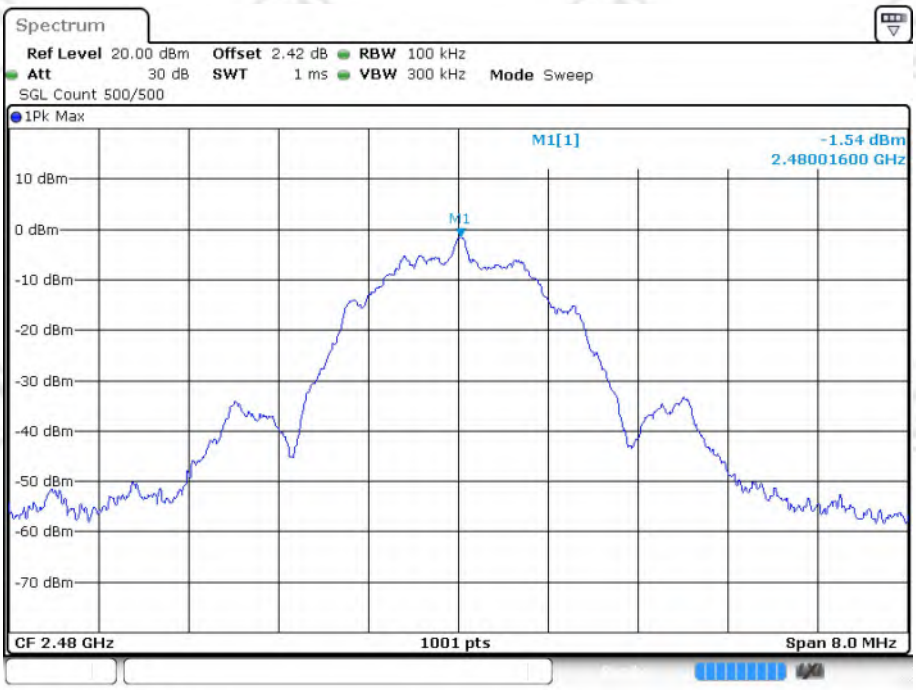
Band Edge NVNT BLE 2M 2402MHz Ant1 Ref




Band Edge NVNT BLE 2M 2402MHz Ant1 Emission

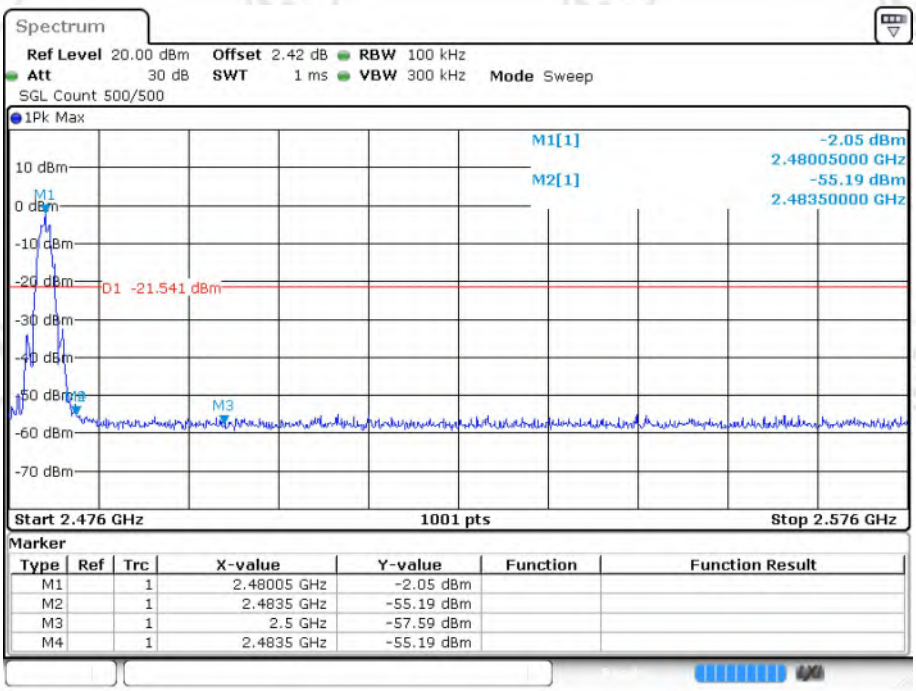


Band Edge NVNT BLE 2M 2480MHz Ant1 Ref




Date: 16.DEC.2024 08:43:45

Band Edge NVNT BLE 2M 2480MHz Ant1 Emission




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.48005 GHz | -2.05 dBm | | |
| M2 | | 1 | 2.4835 GHz | -55.19 dBm | | |
| M3 | | 1 | 2.5 GHz | -57.59 dBm | | |
| M4 | | 1 | 2.4835 GHz | -55.19 dBm | | |

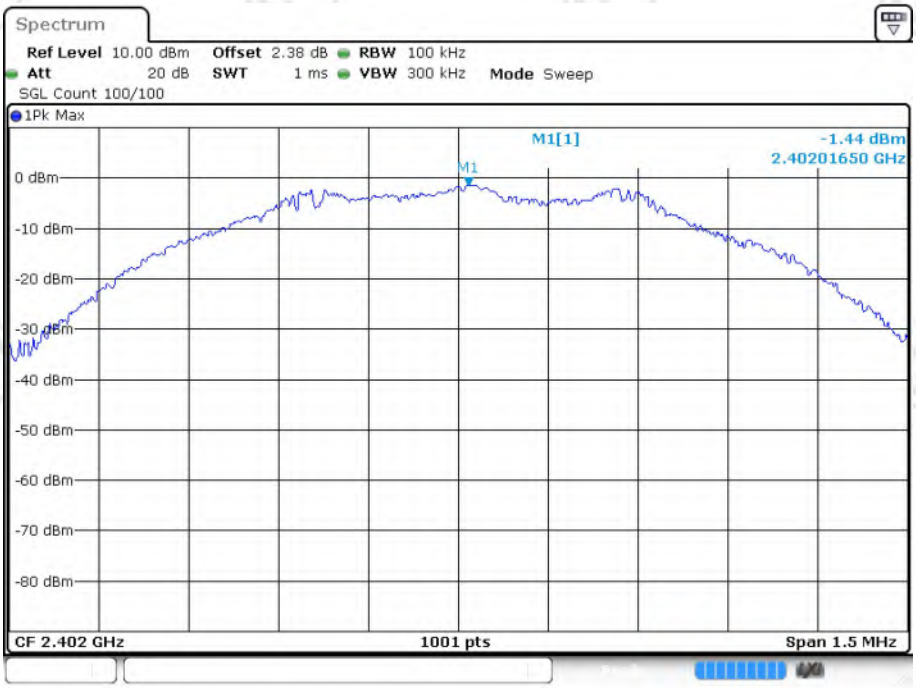
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# Conducted RF Spurious Emission

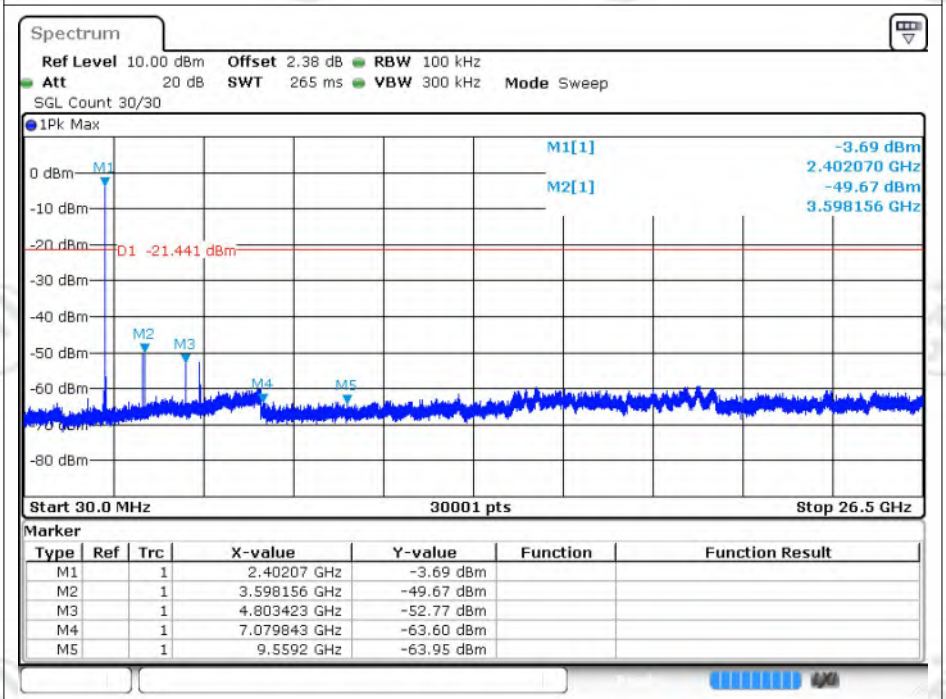
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | -48.23 | -20 | Pass |
| NVNT | BLE 1M | 2440 | Ant1 | -51.48 | -20 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | -50.89 | -20 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | -50.38 | -20 | Pass |
| NVNT | BLE 2M | 2440 | Ant1 | -52.87 | -20 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | -50.18 | -20 | Pass |

Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



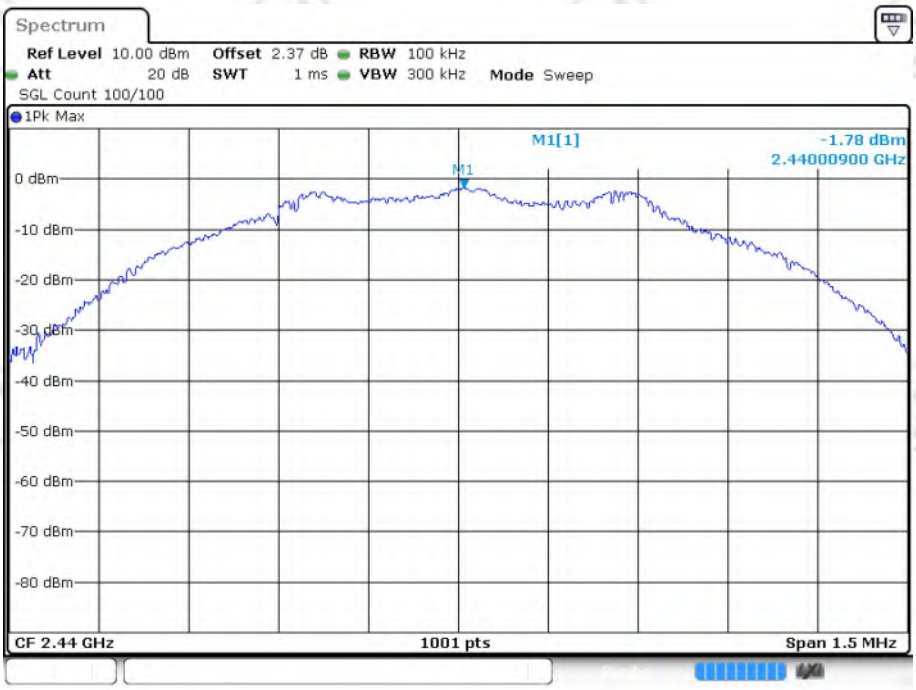

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission




Marker

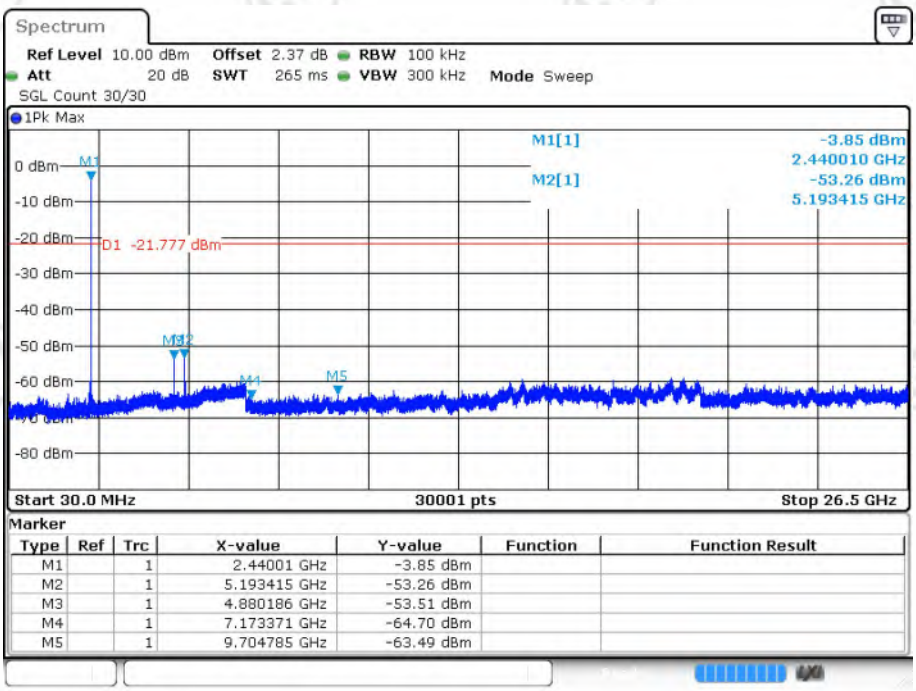
| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.40207 GHz | -3.69 dBm | | |
| M2 | | 1 | 3.598156 GHz | -49.67 dBm | | |
| M3 | | 1 | 4.803423 GHz | -52.77 dBm | | |
| M4 | | 1 | 7.079843 GHz | -63.60 dBm | | |
| M5 | | 1 | 9.5592 GHz | -63.95 dBm | | |

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref




Date: 16.DEC.2024 08:36:55

Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

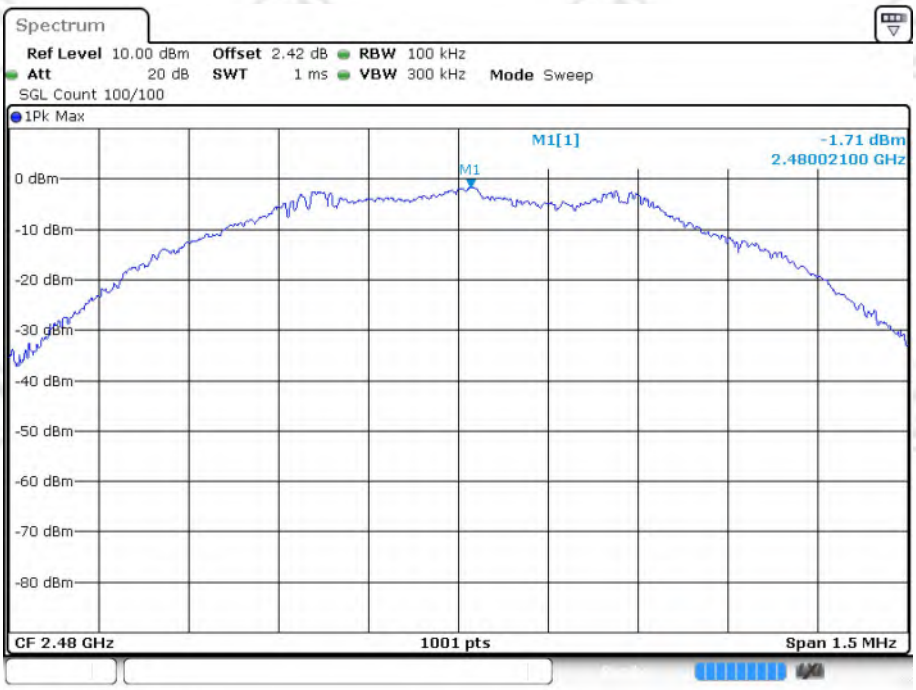



Marker

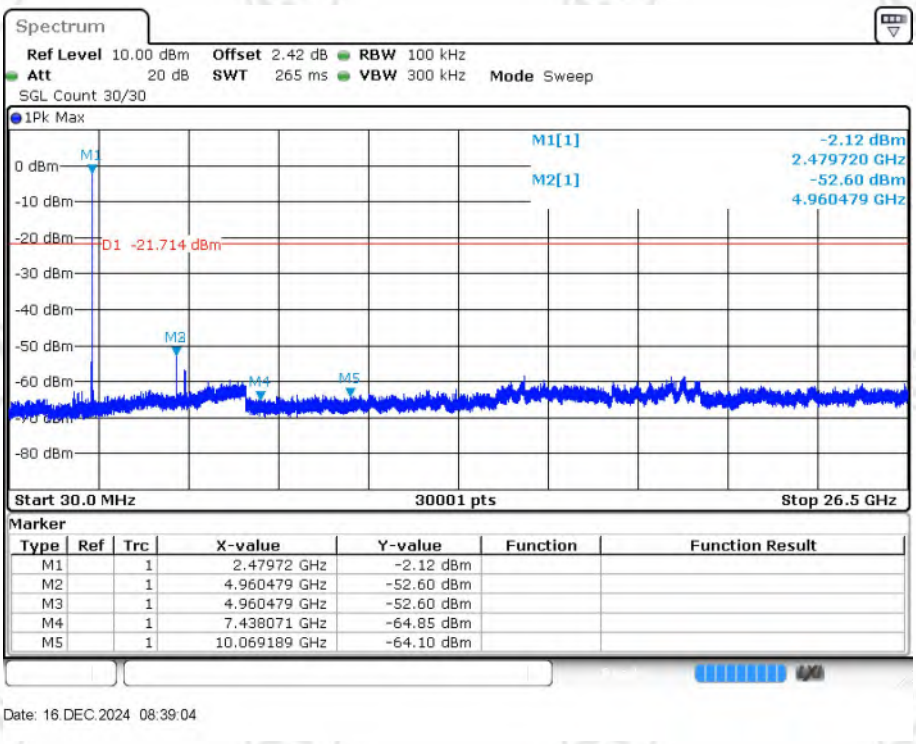
| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.44001 GHz | -3.85 dBm | | |
| M2 | | 1 | 5.193415 GHz | -53.26 dBm | | |
| M3 | | 1 | 4.880186 GHz | -53.51 dBm | | |
| M4 | | 1 | 7.173371 GHz | -64.70 dBm | | |
| M5 | | 1 | 9.704785 GHz | -63.49 dBm | | |

Date: 16.DEC.2024 08:37:24

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



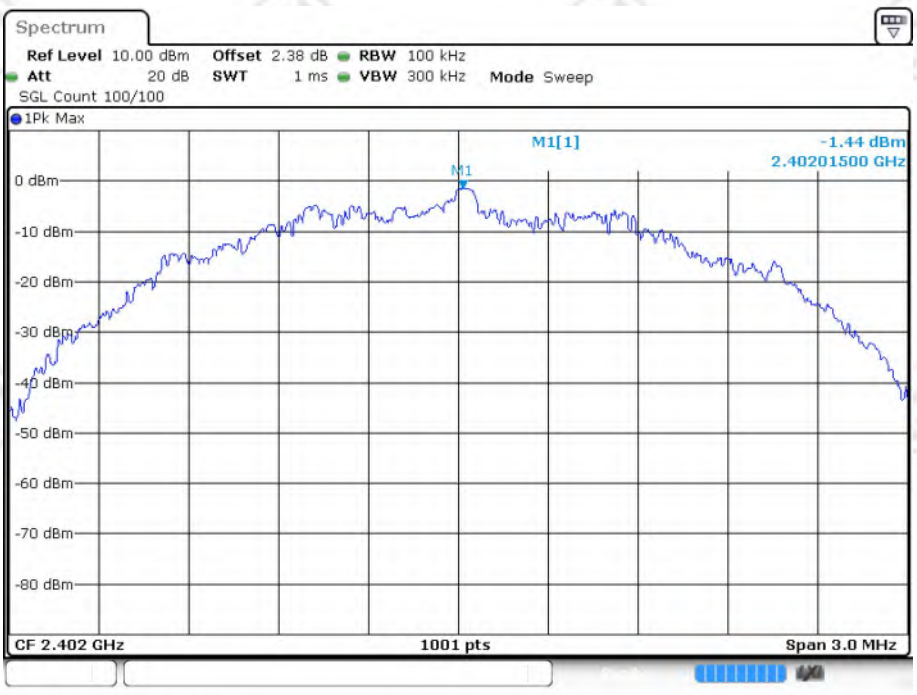

Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission




Marker

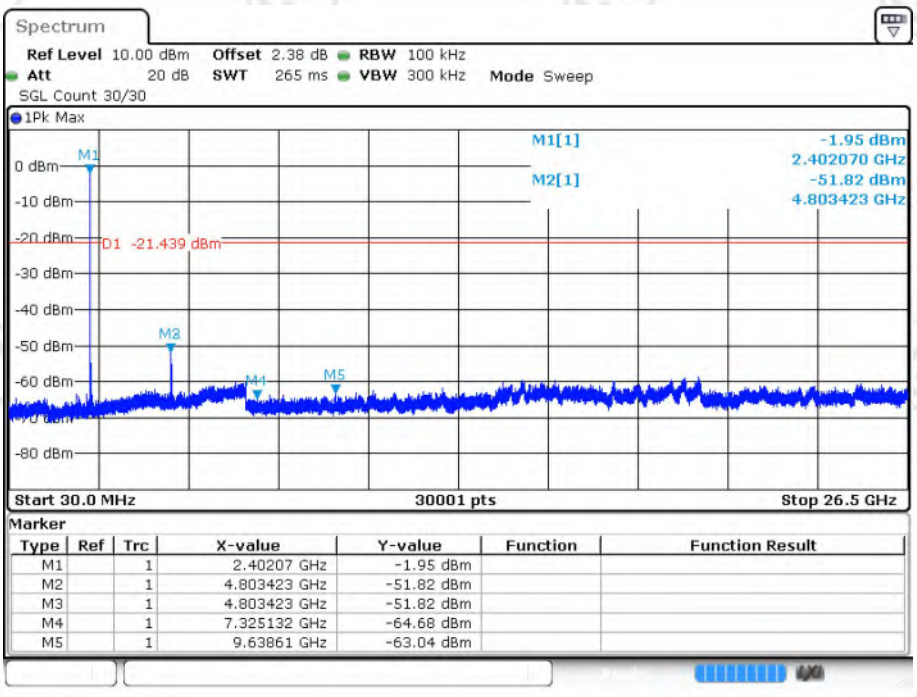
| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.47972 GHz | -2.12 dBm | | |
| M2 | | 1 | 4.960479 GHz | -52.60 dBm | | |
| M3 | | 1 | 4.960479 GHz | -52.60 dBm | | |
| M4 | | 1 | 7.438071 GHz | -64.85 dBm | | |
| M5 | | 1 | 10.069189 GHz | -64.10 dBm | | |

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref




Date: 16.DEC.2024 08:40:26

Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission

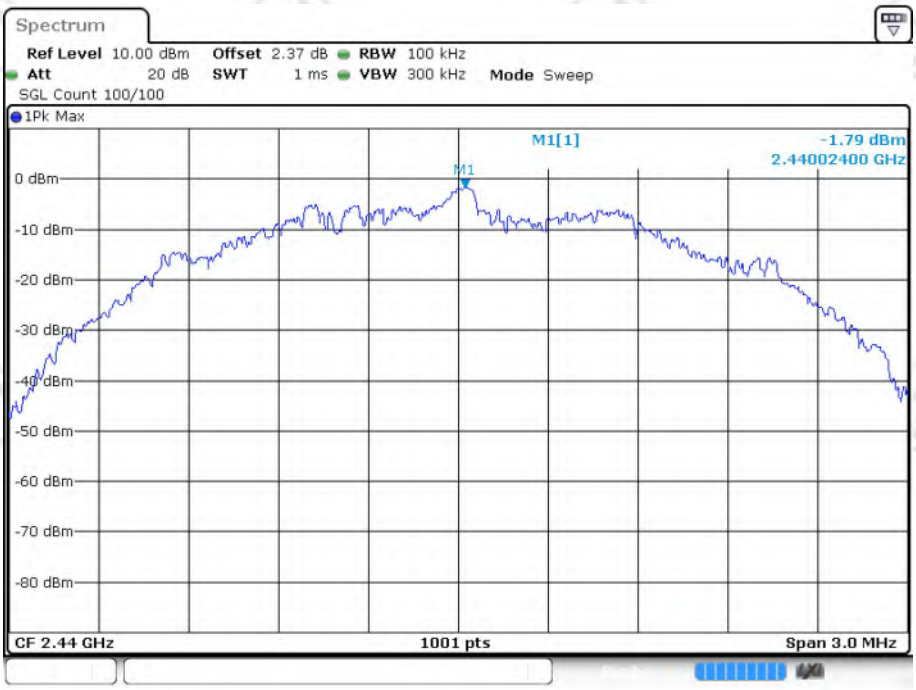



Marker

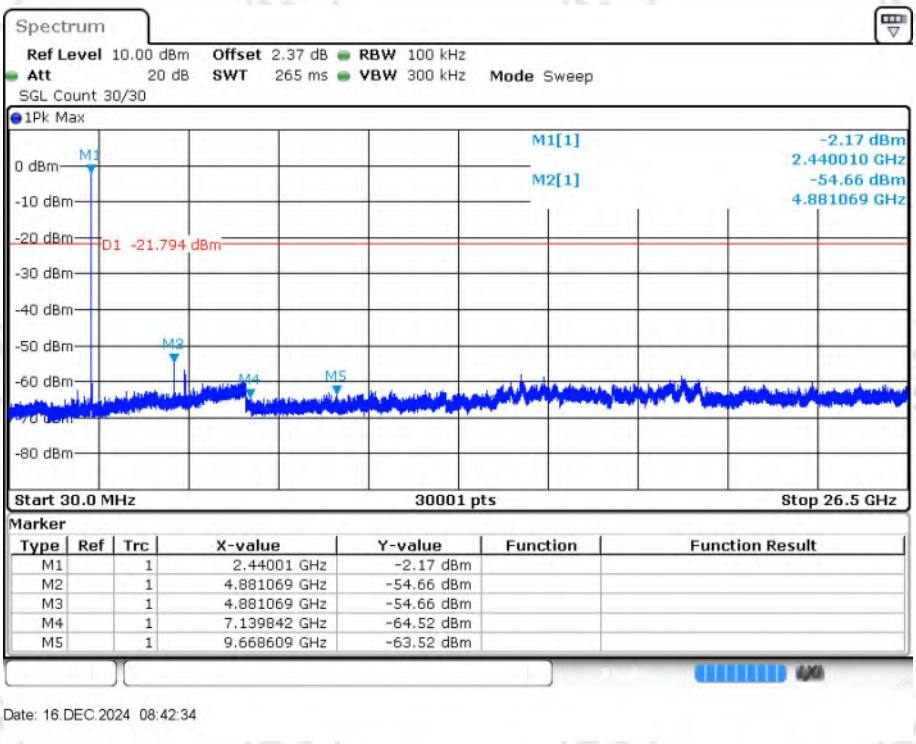
| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.40207 GHz | -1.95 dBm | | |
| M2 | | 1 | 4.803423 GHz | -51.82 dBm | | |
| M3 | | 1 | 4.803423 GHz | -51.82 dBm | | |
| M4 | | 1 | 7.325132 GHz | -64.68 dBm | | |
| M5 | | 1 | 9.63861 GHz | -63.04 dBm | | |

Date: 16.DEC.2024 08:40:56

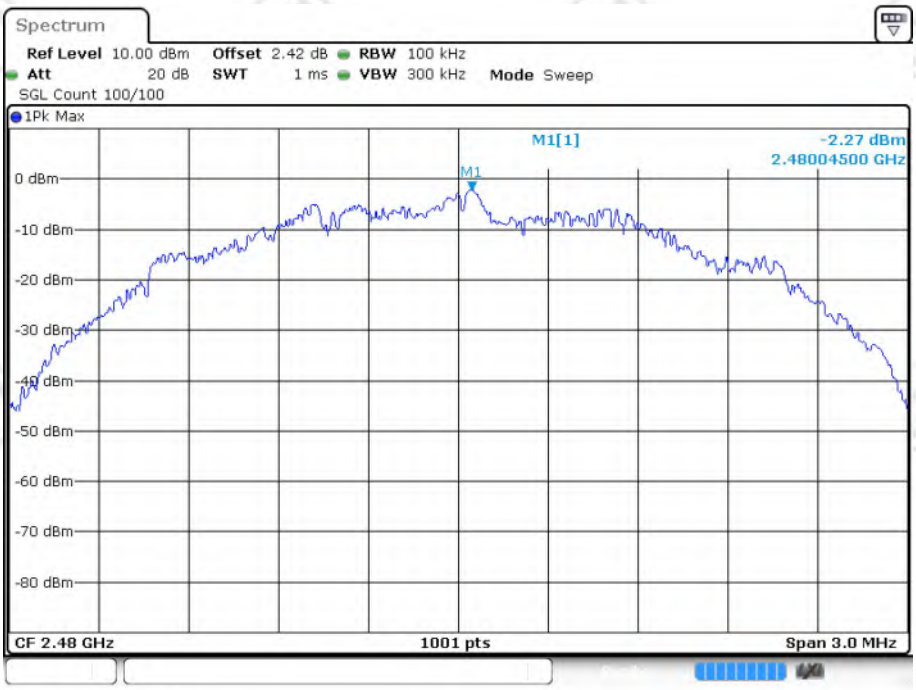
Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



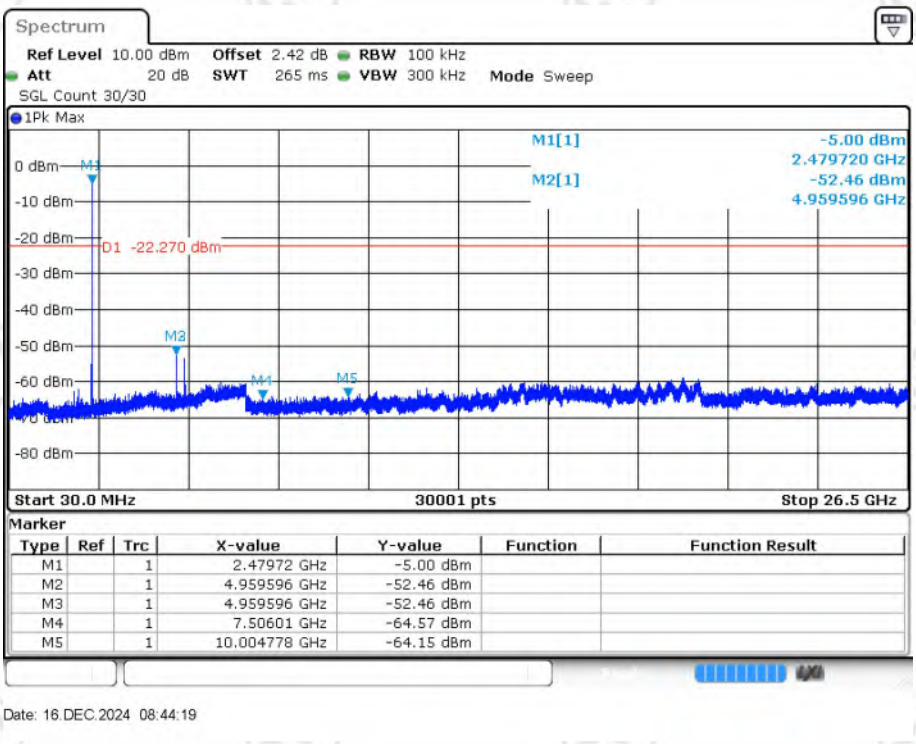

Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref




Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.47972 GHz | -5.00 dBm | | |
| M2 | | 1 | 4.959596 GHz | -52.46 dBm | | |
| M3 | | 1 | 4.959596 GHz | -52.46 dBm | | |
| M4 | | 1 | 7.50601 GHz | -64.57 dBm | | |
| M5 | | 1 | 10.004778 GHz | -64.15 dBm | | |

***END OF REPORT***