# Appendix C

## RF Test Data for Zigbee (Conducted Measurement)

**Product Name: Nucleus-M II FIZ Hand Unit**

**Test Model: WLC-T06-FIZ**

**Environmental Conditions**

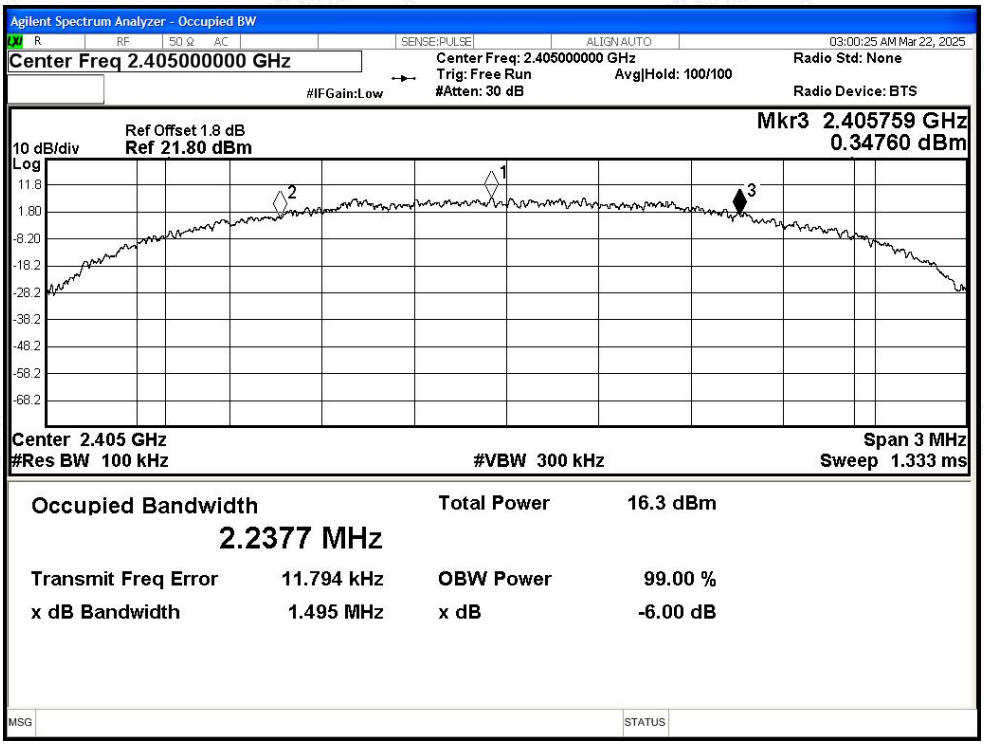
| | |
|---|---|
| Temperature: | 23.8°C |
| Relative Humidity: | 52.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Andre Tan |
| Supervised by: | Nick Peng |

# C.1 -6dB Bandwidth

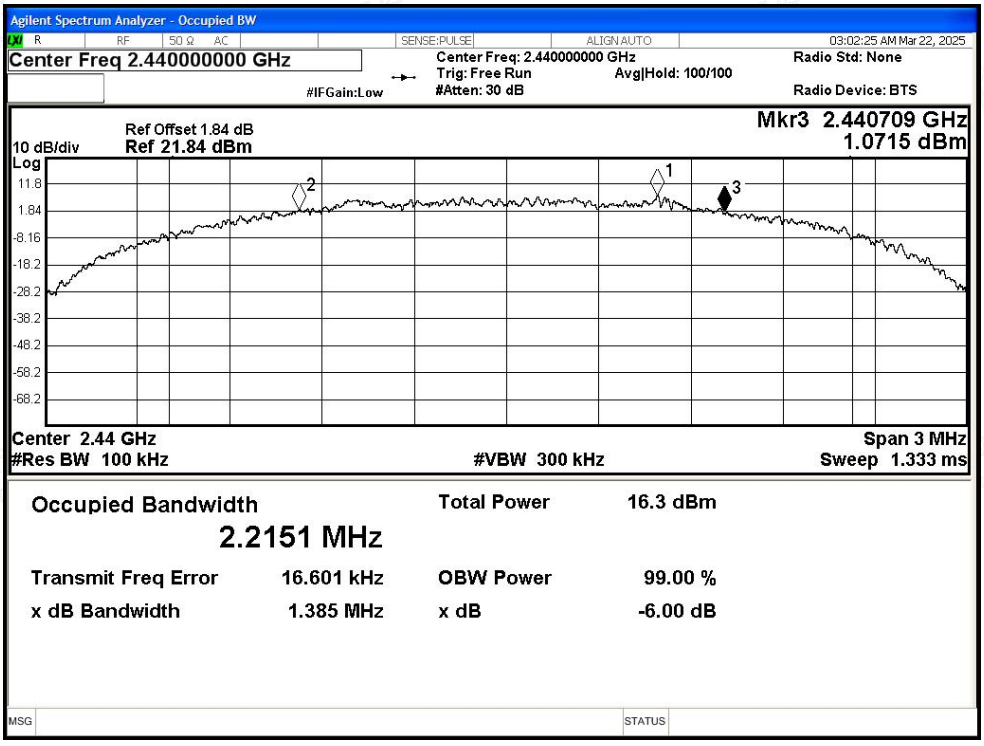
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | ZigBee | 2405 | Ant1 | 1.495 | >=0.5 | Pass |
| NVNT | ZigBee | 2440 | Ant1 | 1.385 | >=0.5 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 1.466 | >=0.5 | Pass |

Test Graphs

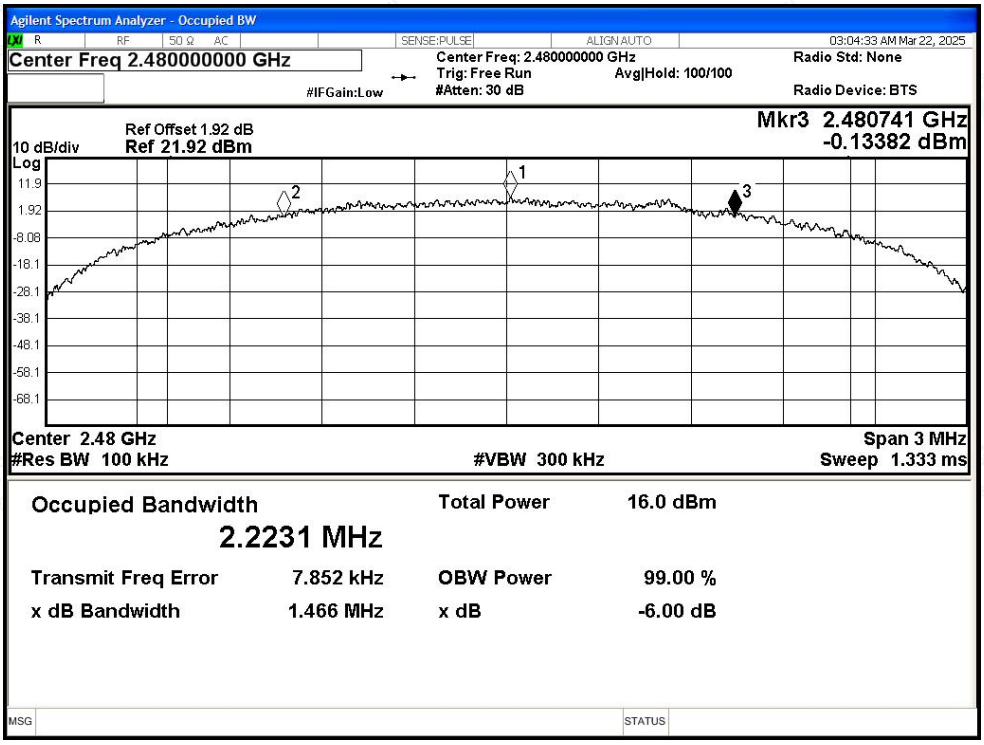
-6dB Bandwidth NVNT ZigBee 2405MHz Ant1




-6dB Bandwidth NVNT ZigBee 2440MHz Ant1



-6dB Bandwidth NVNT ZigBee 2480MHz Ant1

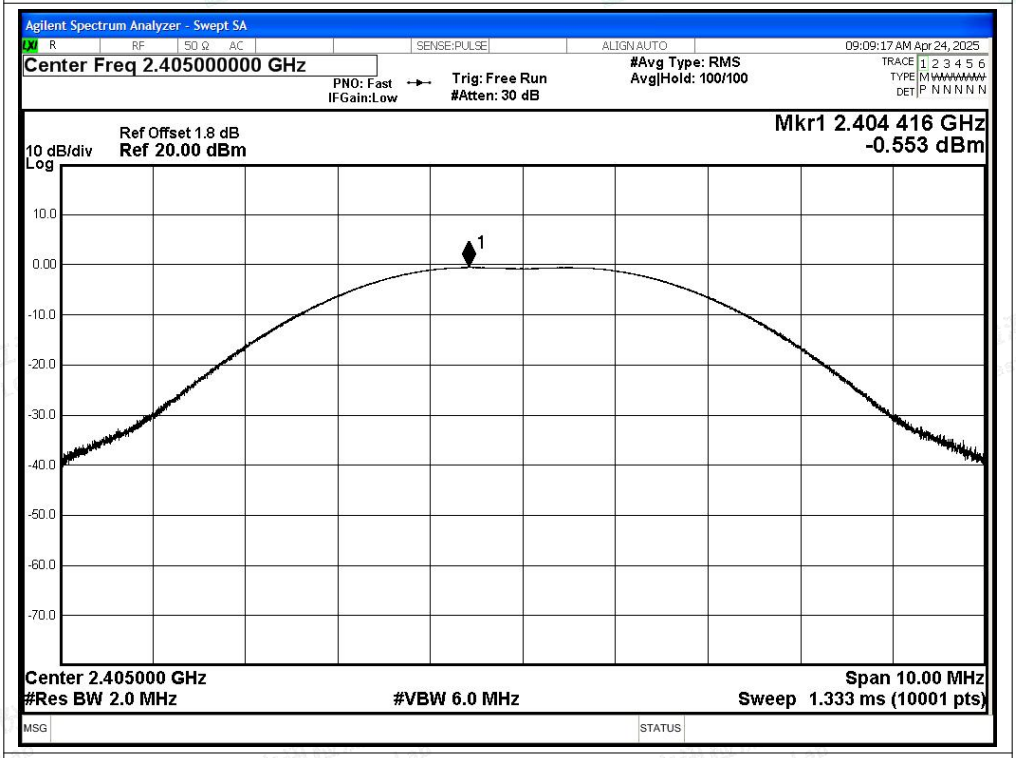


# C.2 Maximum Peak Conducted Output Power

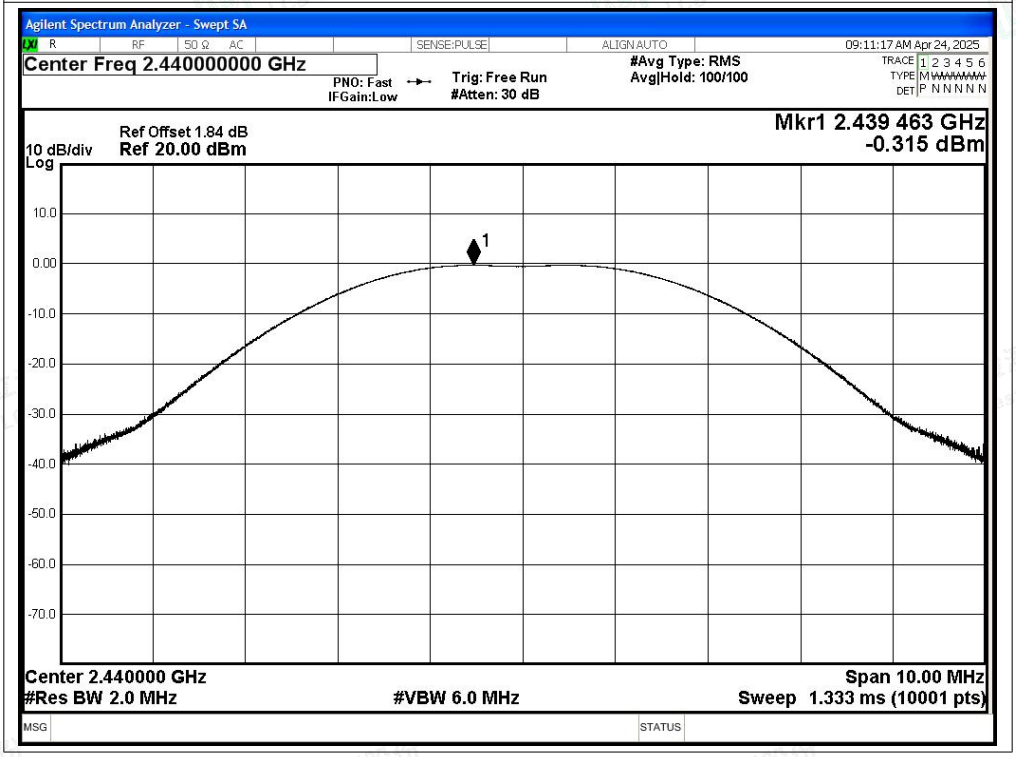
| Condition | Mode | Frequency (MHz) | Antenna | Total Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | ZigBee | 2405 | Ant1 | -0.55 | 30 | Pass |
| NVNT | ZigBee | 2440 | Ant1 | -0.32 | 30 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -0.39 | 30 | Pass |

Test Graphs

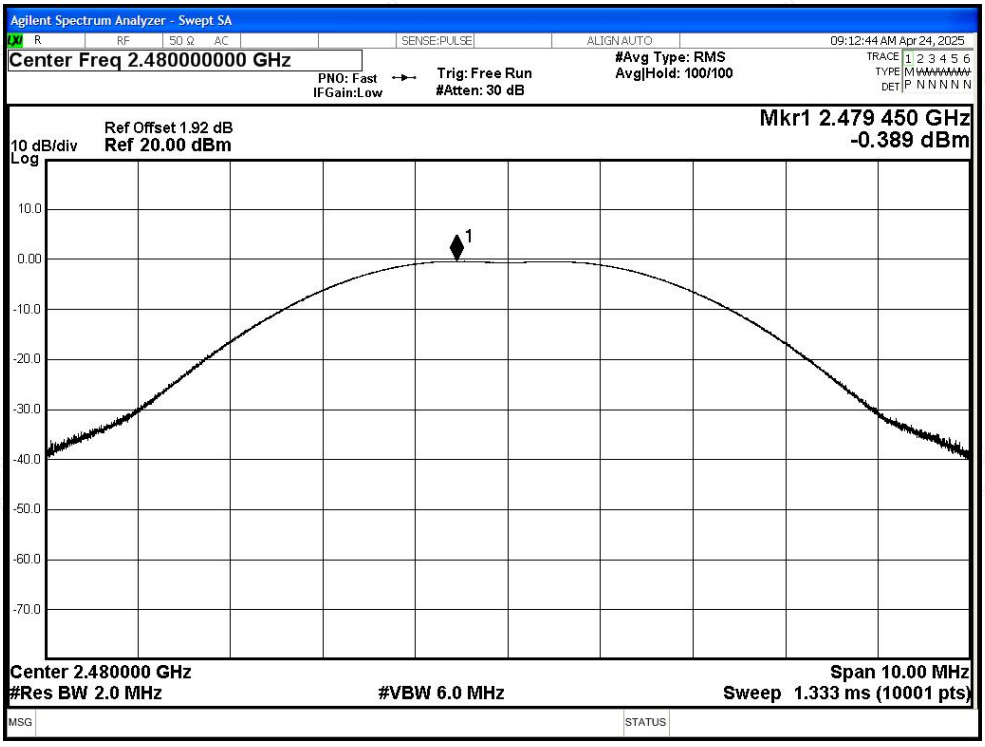
Power NVNT ZIGBEE 2405MHz Ant1




Power NVNT ZIGBEE 2440MHz Ant1



Power NVNT ZIGBEE 2480MHz Ant1

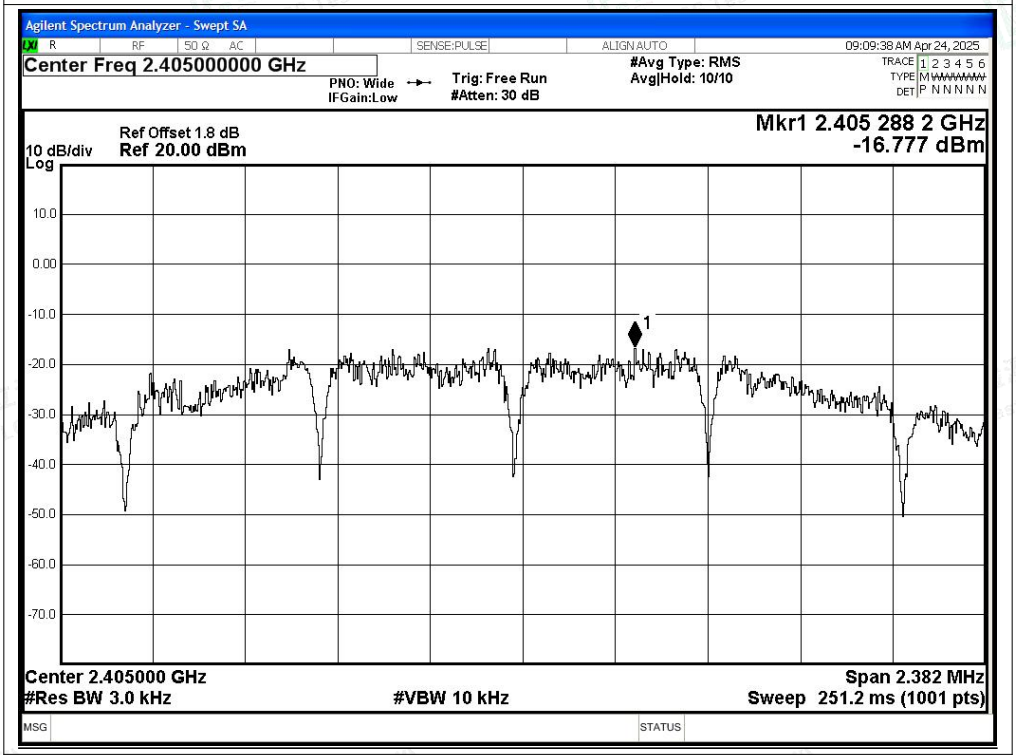


# C.3 Maximum Power Spectral Density Level

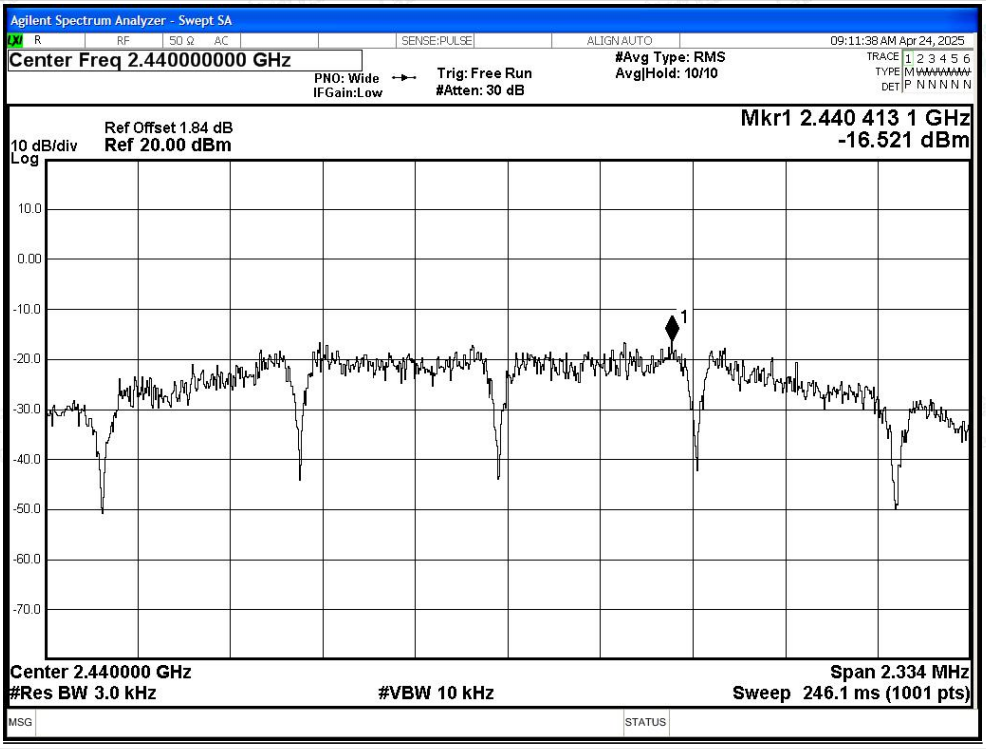
| Condition | Mode | Frequency (MHz) | Antenna | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | ZigBee | 2405 | Ant1 | -16.78 | 8 | Pass |
| NVNT | ZigBee | 2440 | Ant1 | -16.52 | 8 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -16.69 | 8 | Pass |

Test Graphs

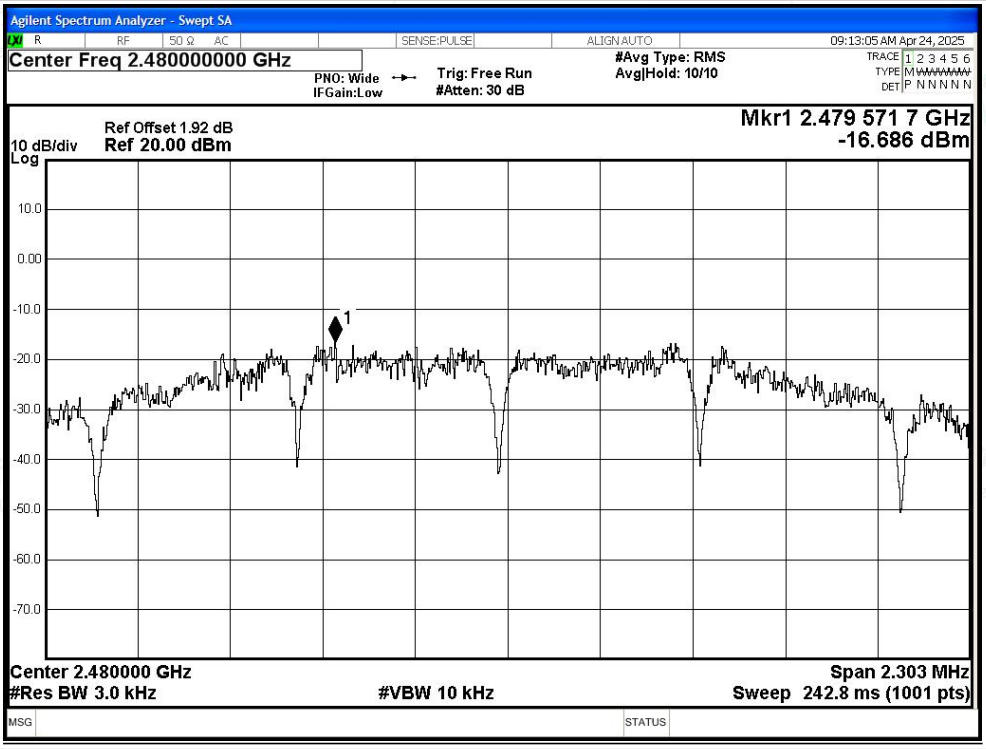
PSD NVNT ZIGBEE 2405MHz Ant1




PSD NVNT ZIGBEE 2440MHz Ant1



PSD NVNT ZIGBEE 2480MHz Ant1

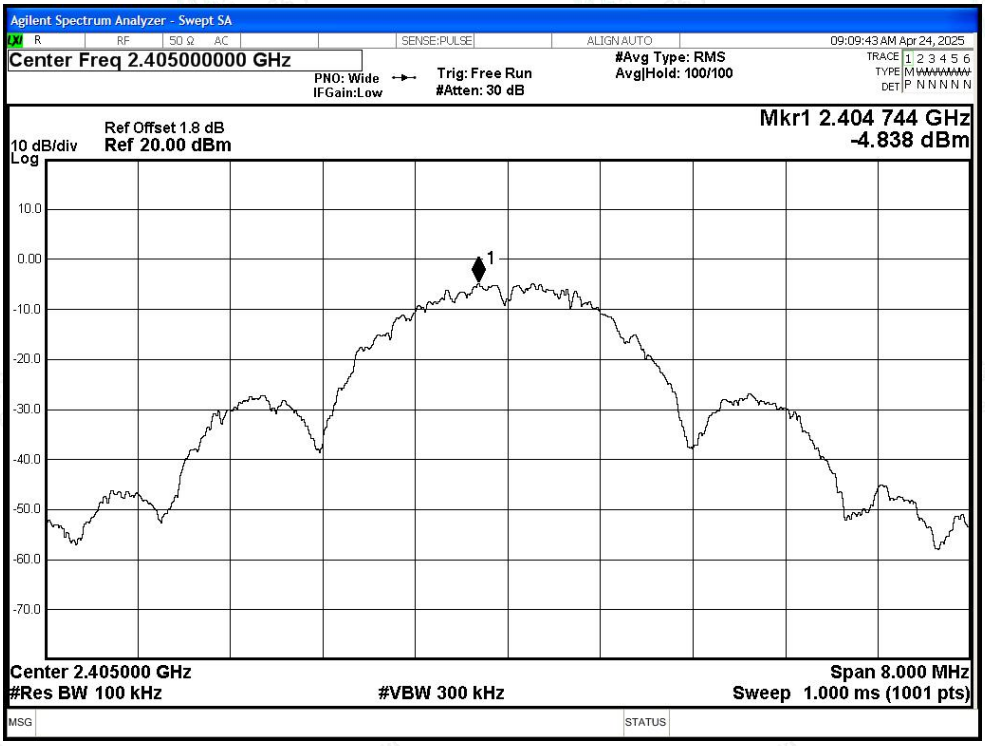


## C.4 Band Edge

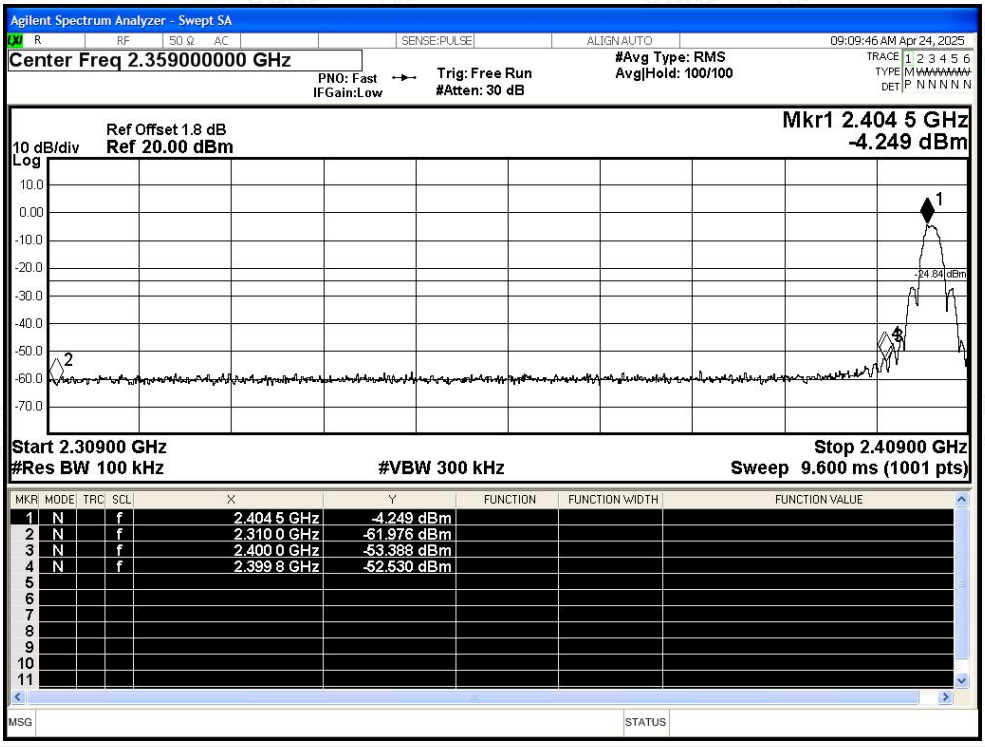
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | ZigBee | 2405 | Ant1 | -47.69 | -20 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -43.75 | -20 | Pass |

Test Graphs

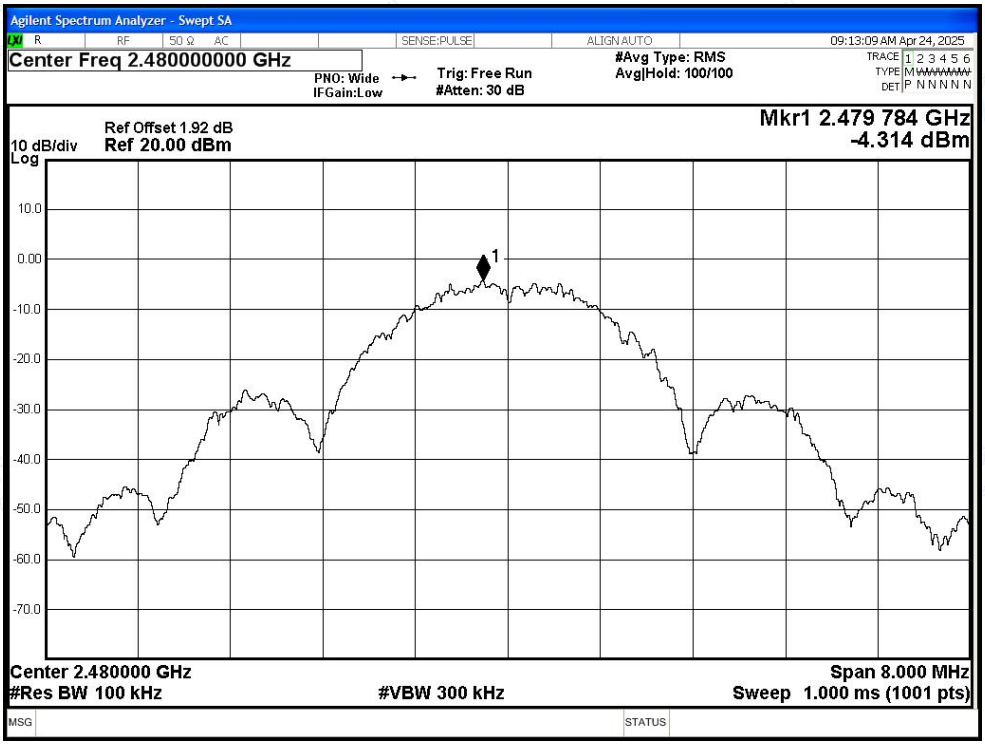
Band Edge NVNT ZIGBEE 2405MHz Ant1 Ref



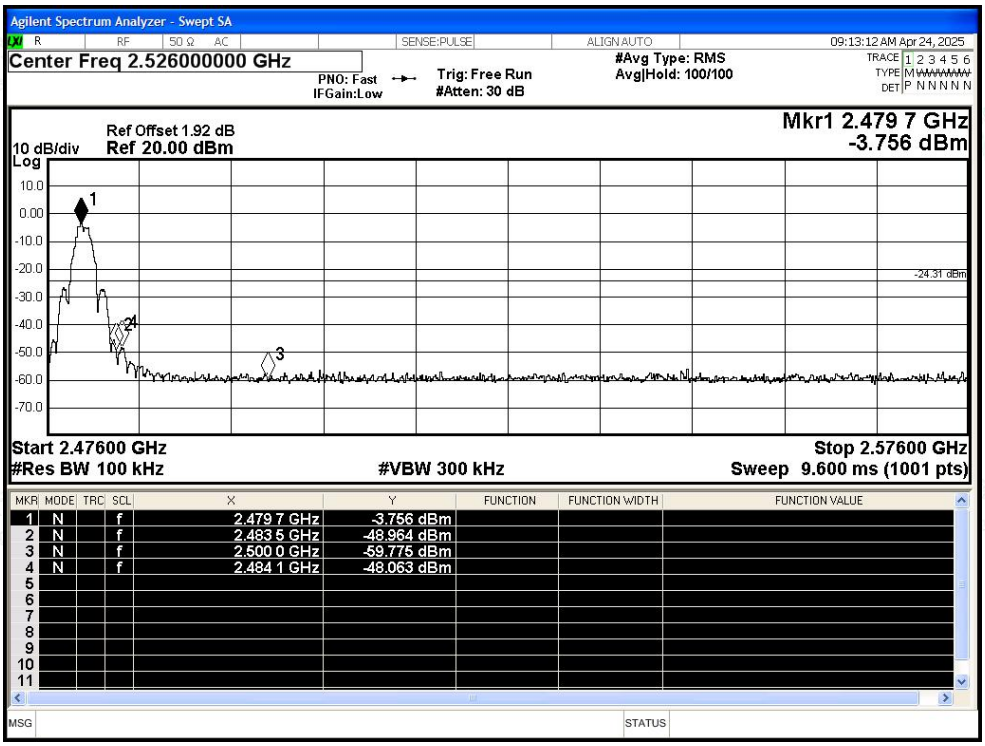

Band Edge NVNT ZIGBEE 2405MHz Ant1 Emission



Band Edge NVNT ZIGBEE 2480MHz Ant1 Ref




Band Edge NVNT ZIGBEE 2480MHz Ant1 Emission

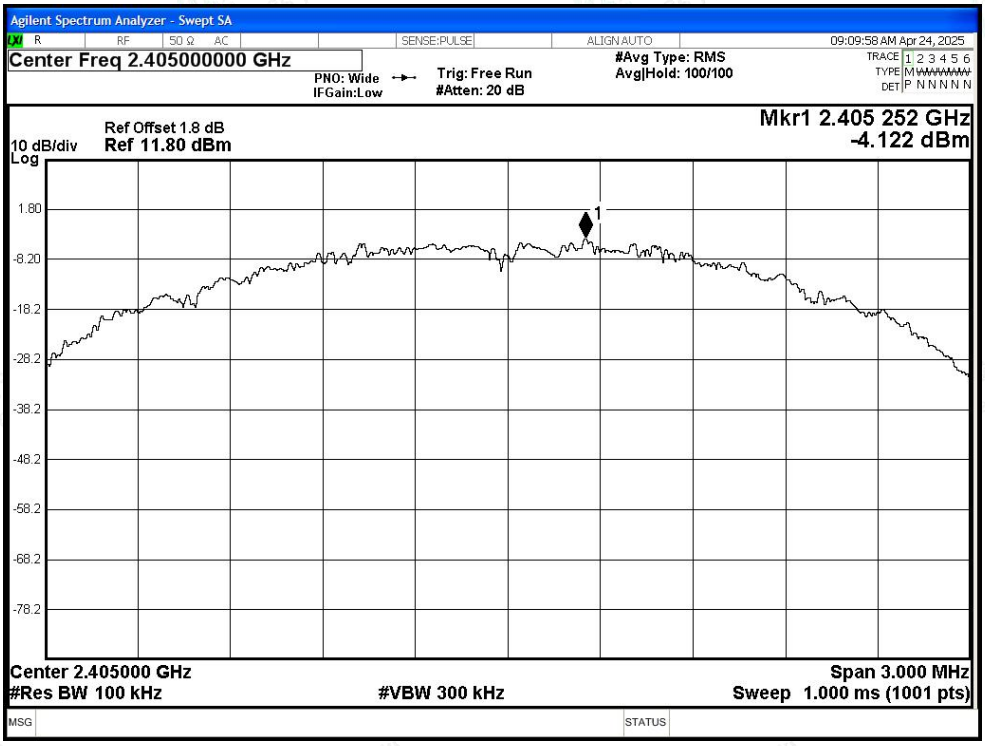


# C.5 Conducted RF Spurious Emission

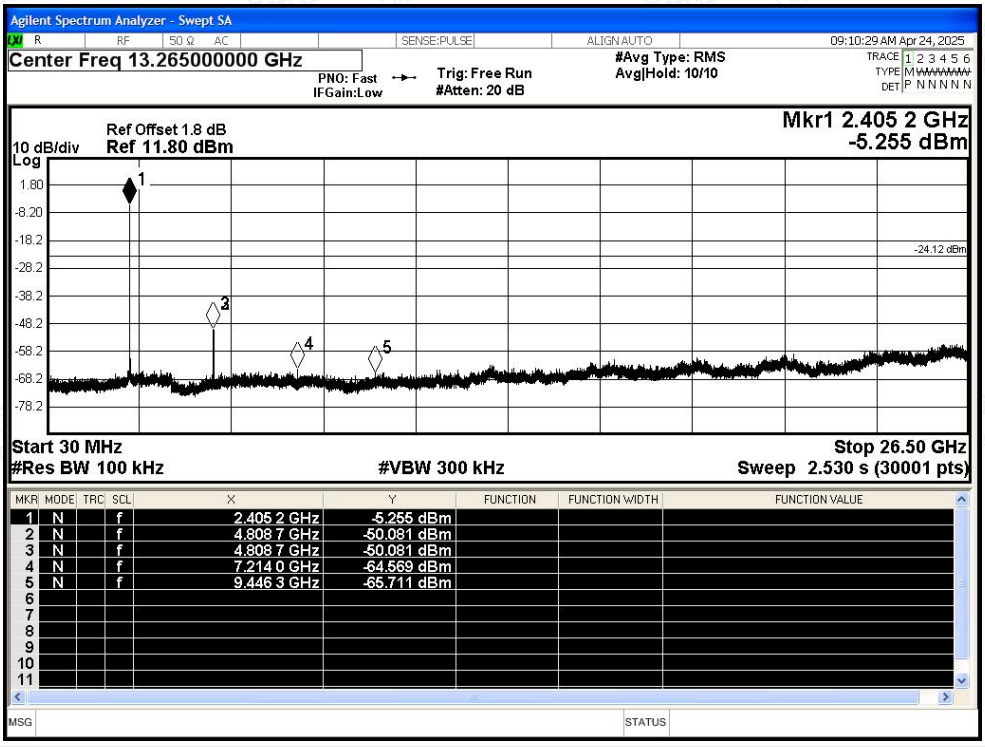
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | ZigBee | 2405 | Ant1 | -45.96 | -20 | Pass |
| NVNT | ZigBee | 2440 | Ant1 | -47.64 | -20 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -51.71 | -20 | Pass |

Test Graphs

Tx. Spurious NVNT ZIGBEE 2405MHz Ant1 Ref

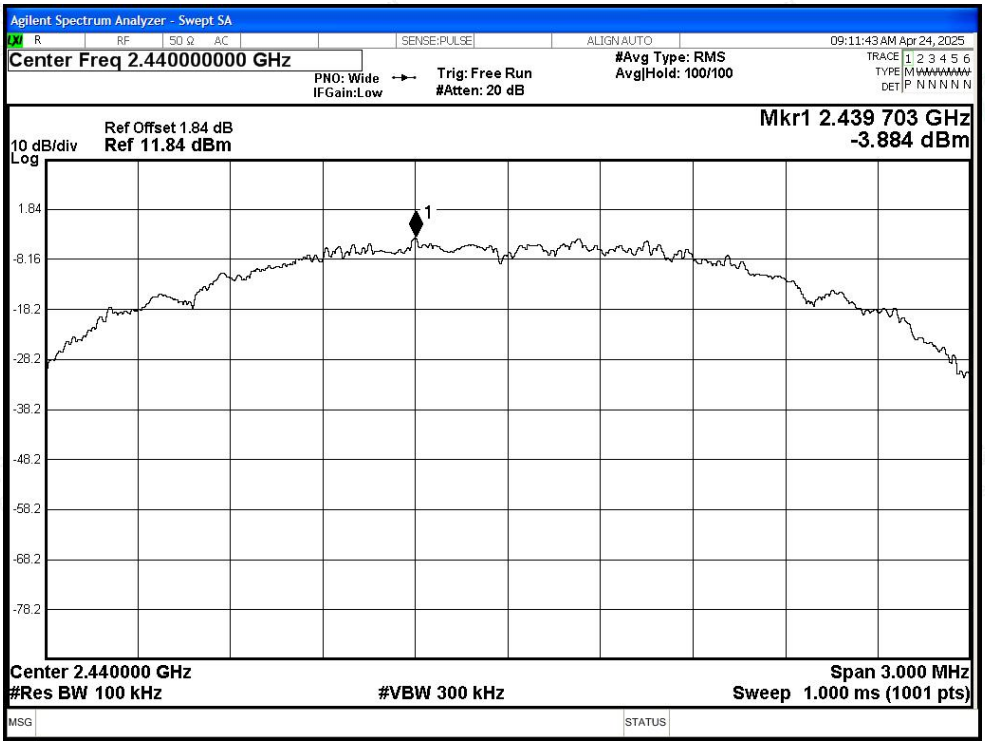



Tx. Spurious NVNT ZIGBEE 2405MHz Ant1 Emission

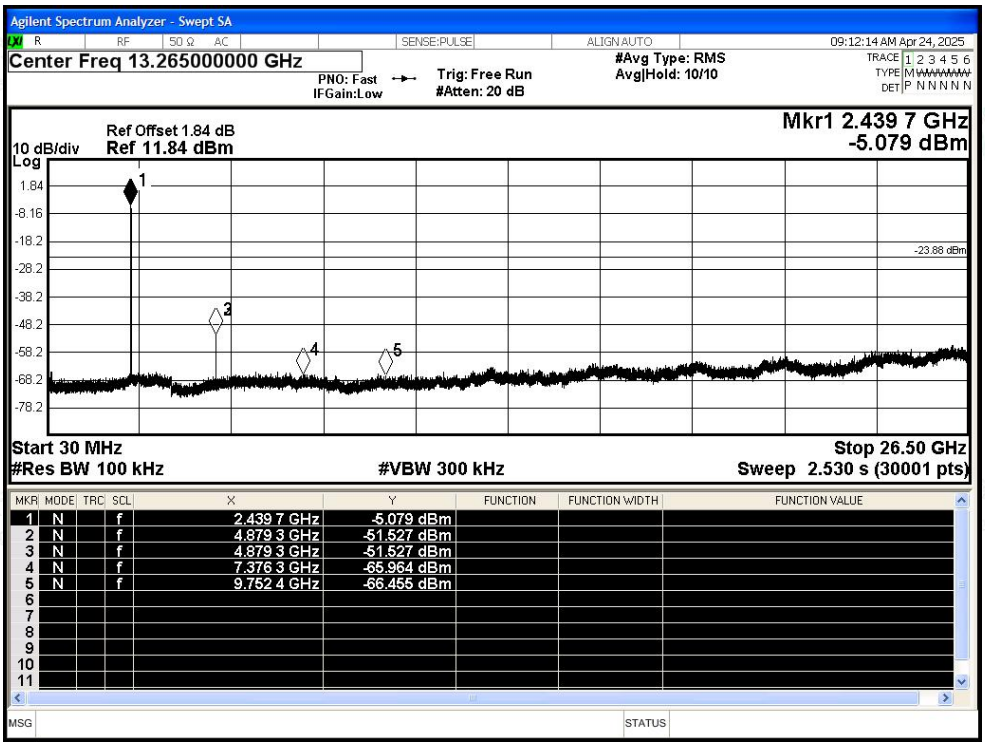



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | | f | 2.405 2 GHz | -5.255 dBm | | | |
| 2 | N | | f | 4.808 7 GHz | -50.081 dBm | | | |
| 3 | N | | f | 4.808 7 GHz | -50.081 dBm | | | |
| 4 | N | | f | 7.214 0 GHz | -64.569 dBm | | | |
| 5 | N | | f | 9.446 3 GHz | -65.711 dBm | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |

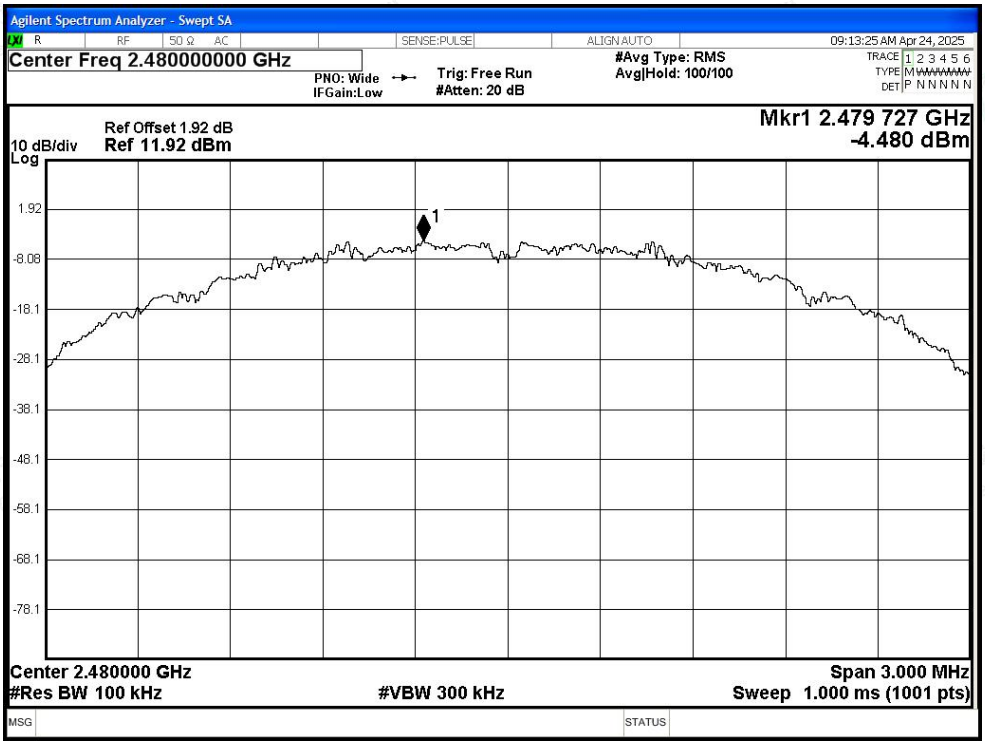
Tx. Spurious NVNT ZIGBEE 2440MHz Ant1 Ref



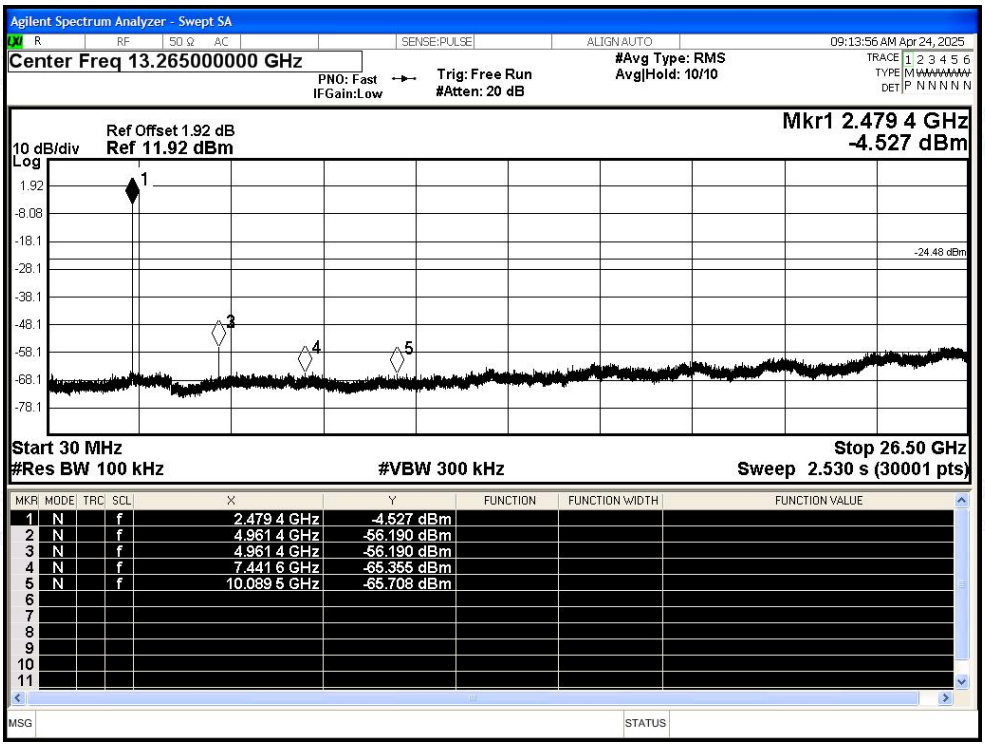

Tx. Spurious NVNT ZIGBEE 2440MHz Ant1 Emission



Tx. Spurious NVNT ZIGBEE 2480MHz Ant1 Ref




Tx. Spurious NVNT ZIGBEE 2480MHz Ant1 Emission

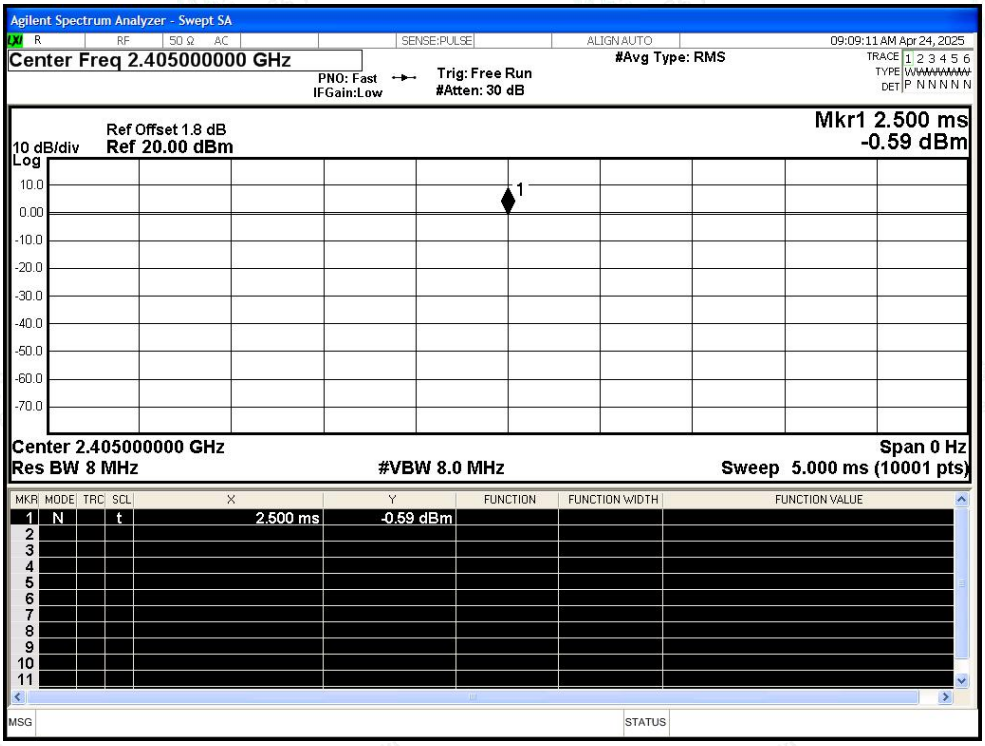


## C.6 Duty Cycle

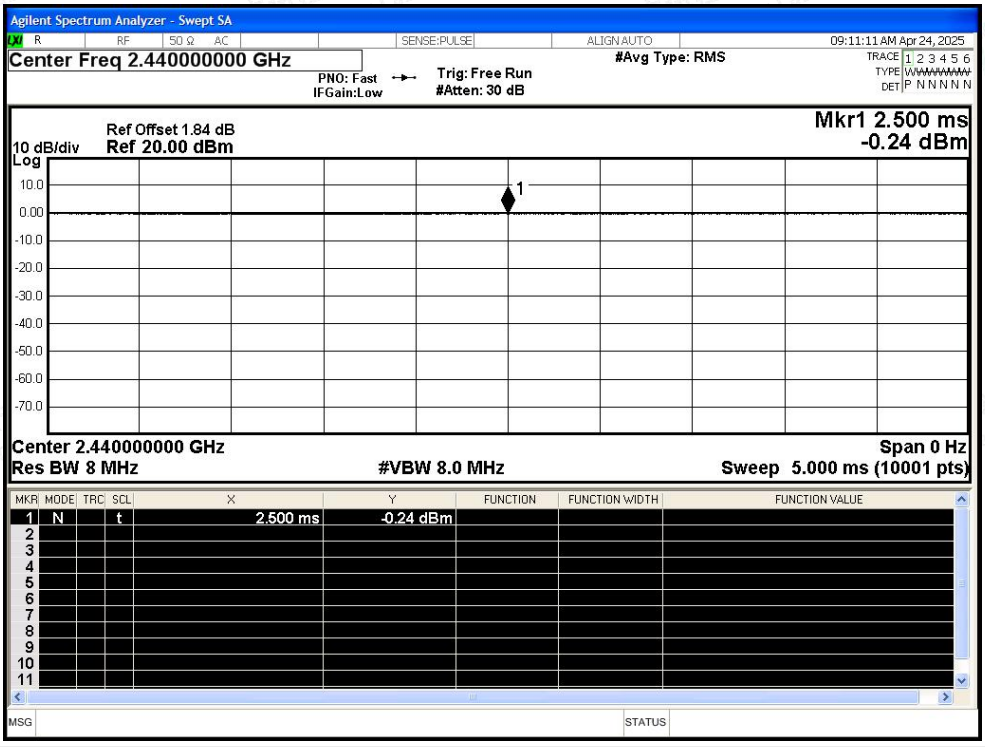
| Condition | Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|---|---|---|---|---|---|---|
| NVNT | ZigBee | 2405 | Ant1 | 100 | 0 | 0 |
| NVNT | ZigBee | 2440 | Ant1 | 100 | 0 | 0 |
| NVNT | ZigBee | 2480 | Ant1 | 100 | 0 | 0 |

Test Graphs

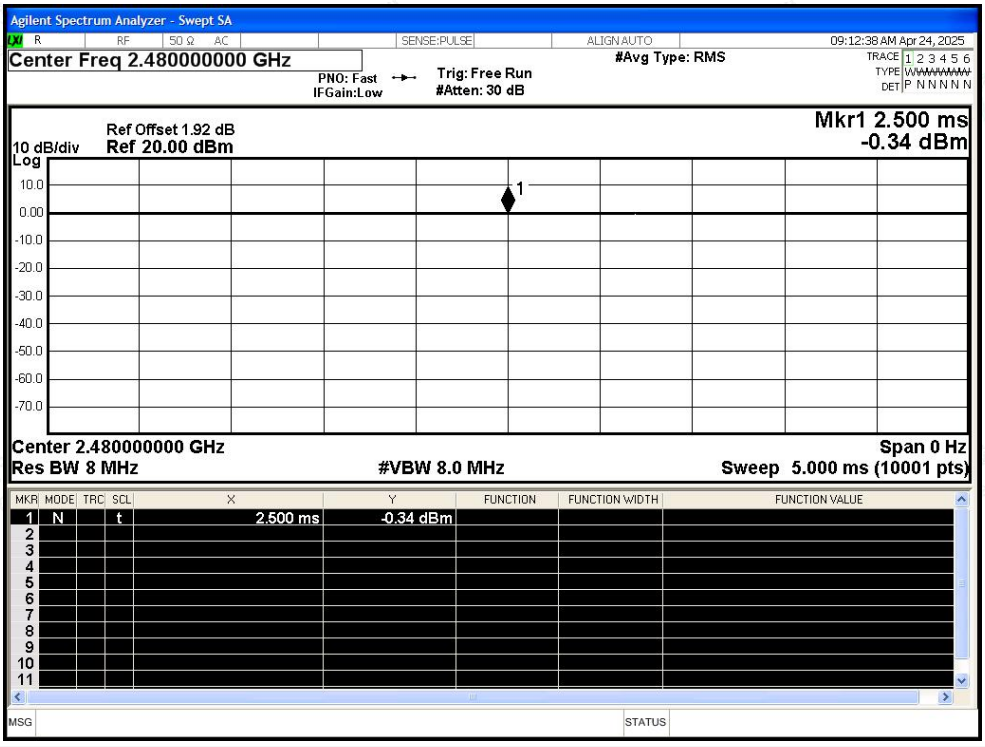
Duty Cycle NVNT BLE 2M 2405MHz Ant1




Duty Cycle NVNT BLE 2M 2440MHz Ant1



Duty Cycle NVNT BLE 2M 2480MHz Ant1

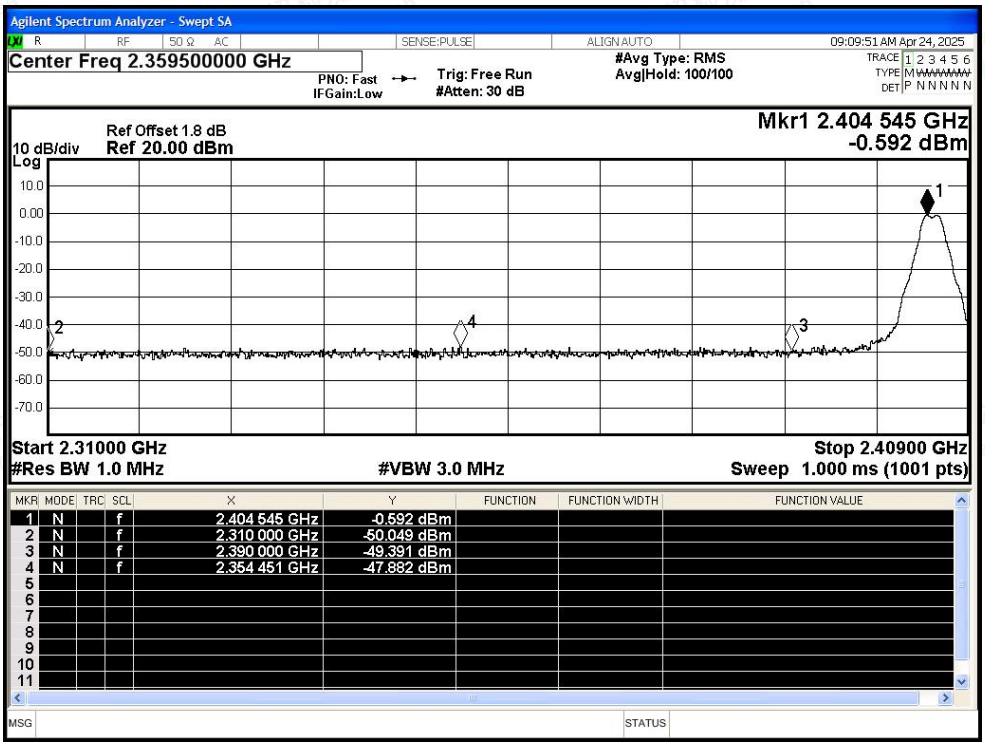


# C.7 Restrict Band

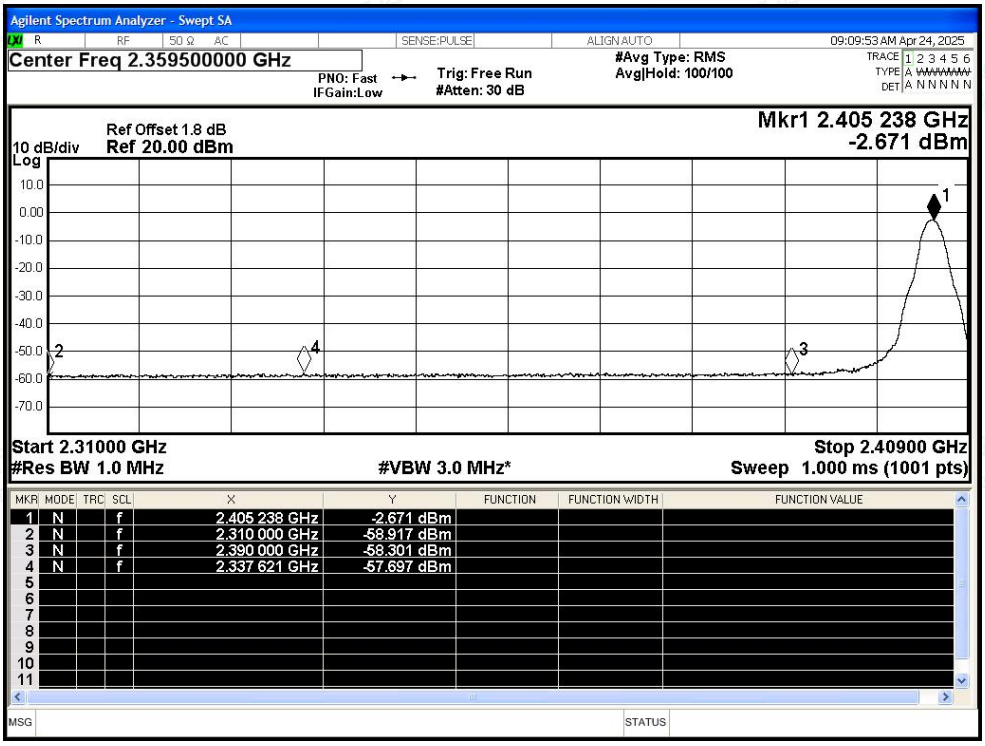
| Condition | Mode | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | Duty Factor (dB) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NVNT | ZIGBEE | 2405 | Ant1 | 2310 | -50.05 | 3.2 | - | 48.41 | Peak | 74 | Pass |
| NVNT | ZIGBEE | 2405 | Ant1 | 2310 | -58.92 | 3.2 | 0 | 39.54 | Average | 54 | Pass |
| NVNT | ZIGBEE | 2405 | Ant1 | 2354.451 | -47.88 | 3.2 | - | 50.58 | Peak | 74 | Pass |
| NVNT | ZIGBEE | 2405 | Ant1 | 2337.621 | -57.7 | 3.2 | 0 | 40.76 | Average | 54 | Pass |
| NVNT | ZIGBEE | 2405 | Ant1 | 2390 | -49.39 | 3.2 | - | 49.07 | Peak | 74 | Pass |
| NVNT | ZIGBEE | 2405 | Ant1 | 2390 | -58.3 | 3.2 | 0 | 40.16 | Average | 54 | Pass |
| NVNT | ZIGBEE | 2480 | Ant1 | 2483.5 | -41.07 | 3.2 | - | 57.39 | Peak | 74 | Pass |
| NVNT | ZIGBEE | 2480 | Ant1 | 2483.5 | -47.8 | 3.2 | 0 | 50.66 | Average | 54 | Pass |
| NVNT | ZIGBEE | 2480 | Ant1 | 2483.512 | -41.07 | 3.2 | - | 57.39 | Peak | 74 | Pass |
| NVNT | ZIGBEE | 2480 | Ant1 | 2483.512 | -47.8 | 3.2 | 0 | 50.66 | Average | 54 | Pass |
| NVNT | ZIGBEE | 2480 | Ant1 | 2500 | -49.33 | 3.2 | - | 49.13 | Peak | 74 | Pass |
| NVNT | ZIGBEE | 2480 | Ant1 | 2500 | -58 | 3.2 | 0 | 40.46 | Average | 54 | Pass |

Test Graphs

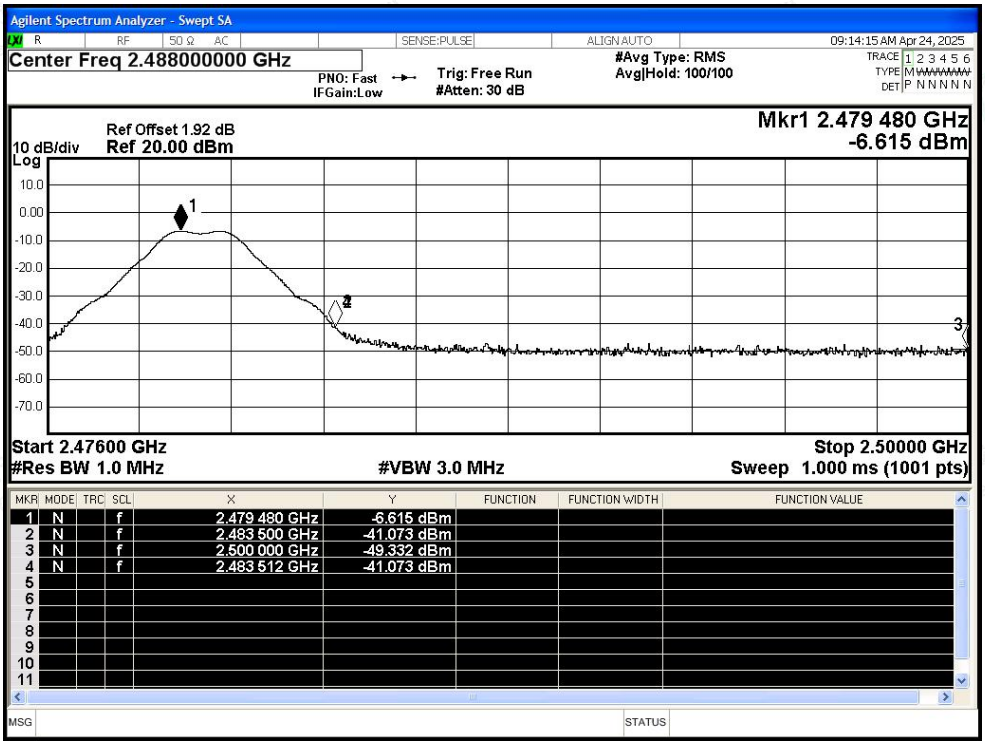
Restrict Band NVNT ZIGBEE 2405MHz Ant1 Peak

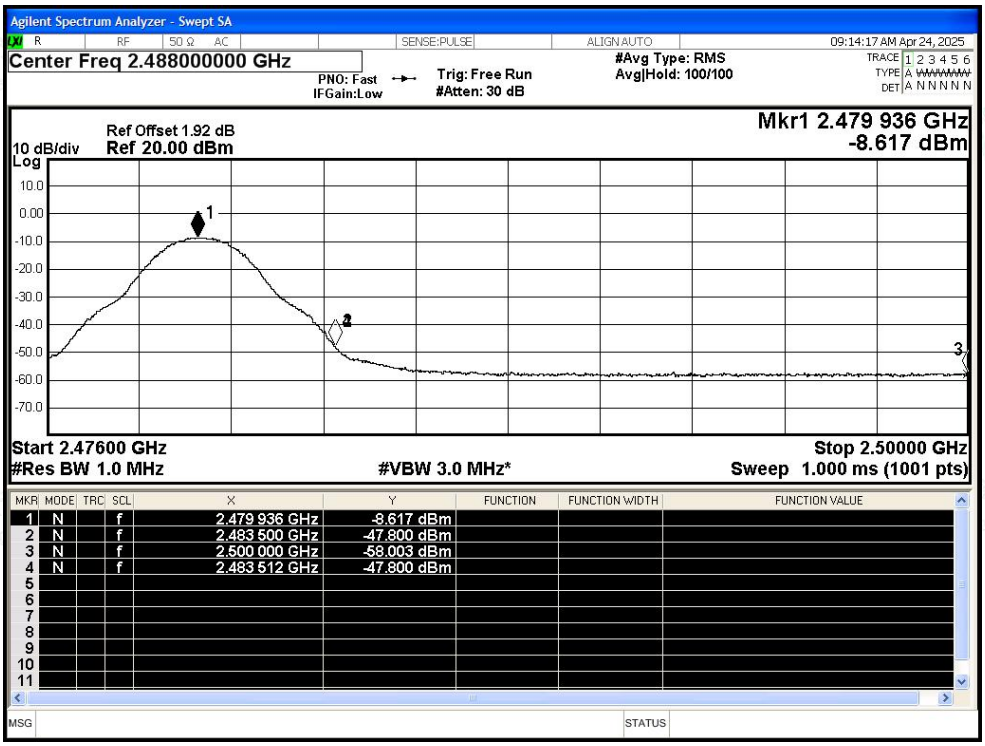



Restrict Band NVNT ZIGBEE 2405MHz Ant1 Average



Restrict Band NVNT ZIGBEE 2480MHz Ant1 Peak




Restrict Band NVNT ZIGBEE 2480MHz Ant1 Average