

RF Test Data for ZigBee (Conducted Measurements)

| General Description of EUT | |
|--|-------------------------------|
| Product Name: | Wireless Handwheel Controller |
| Test Model: | 4295 |
| Sample ID: | HC-C-202401-0340-02-01 |
| Environmental Conditions | |
| Temperature: | 24.6°C |
| Relative Humidity: | 46% |
| Test Voltage: | DC 3.7V |
| Test Engineer: | Mike Yan |
| Note: For a more detailed features description, please refer to the report TBR-C-202401-0340-22 The report only show the worst case data. | |

Contents

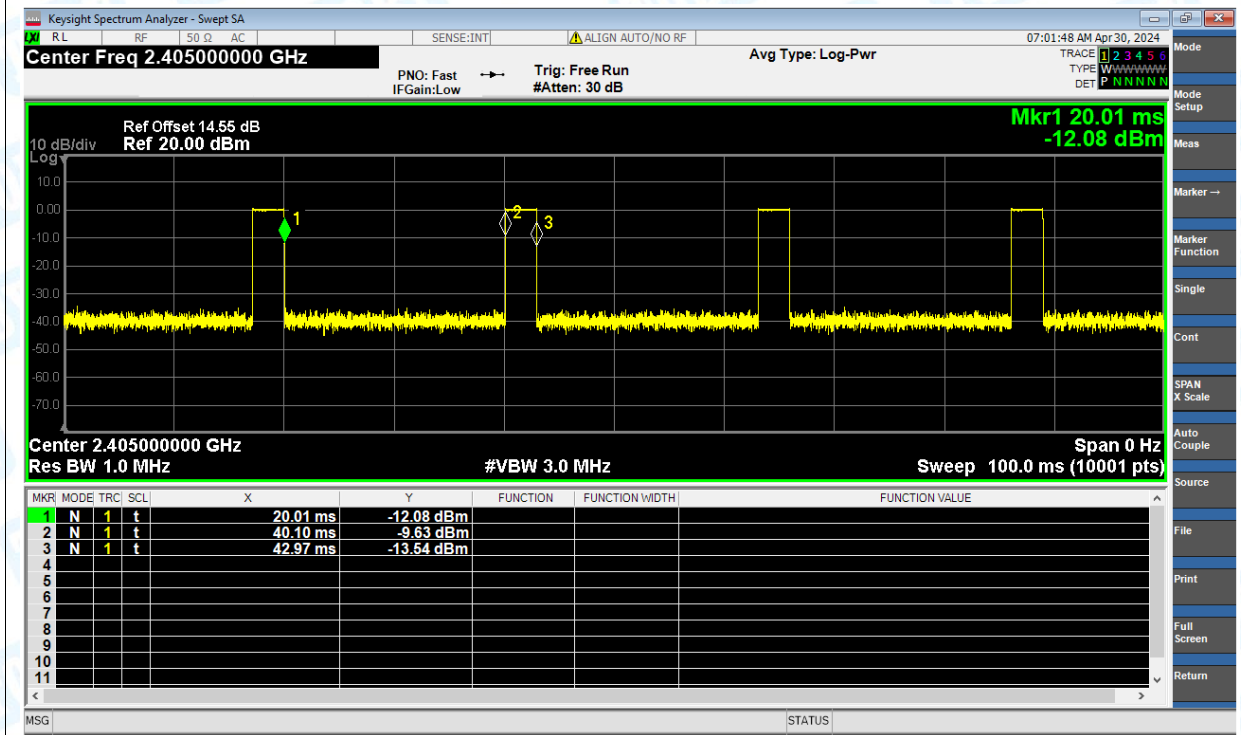
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1. Duty Cycle

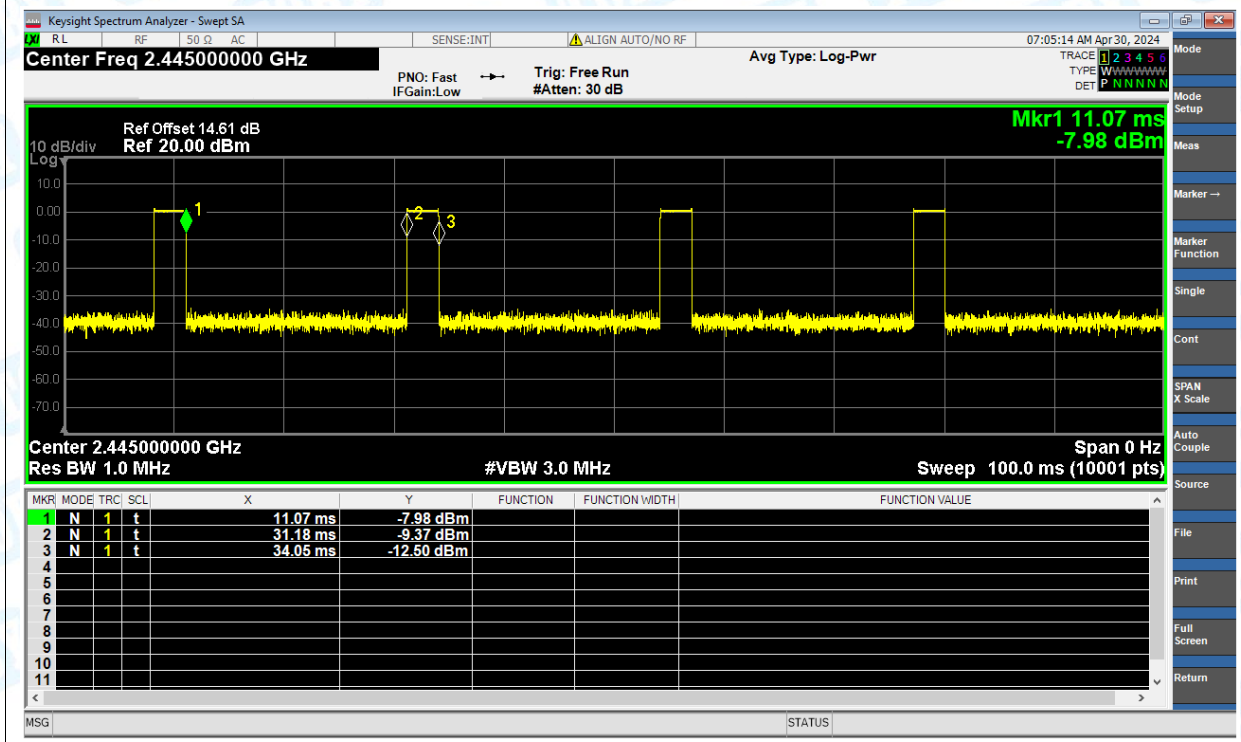
| Condition | Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT | ZigBee | 2405 | Ant1 | 12.5 | 9.03 | 0.35 |
| NVNT | ZigBee | 2445 | Ant1 | 12.49 | 9.03 | 0.35 |
| NVNT | ZigBee | 2480 | Ant1 | 12.48 | 9.04 | 0.35 |

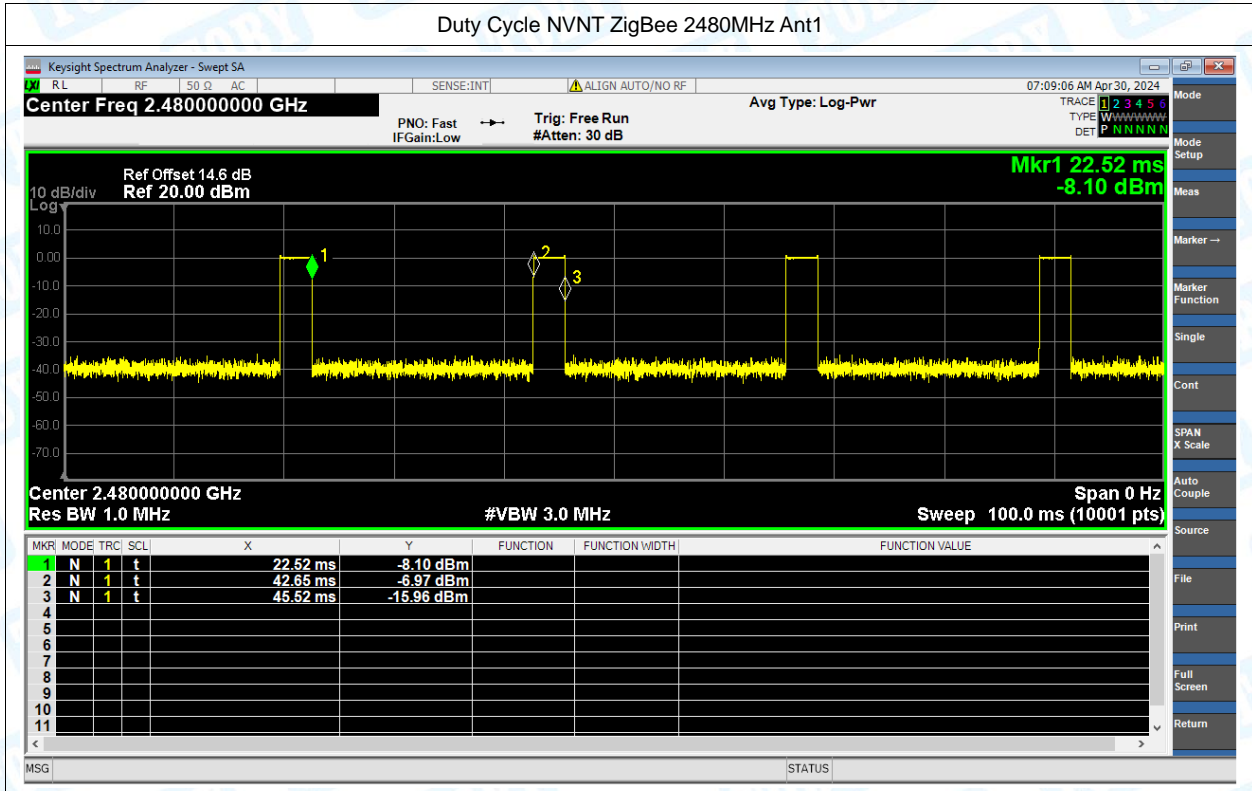
Test Graphs

Duty Cycle NVNT ZigBee 2405MHz Ant1



Duty Cycle NVNT ZigBee 2445MHz Ant1





2. Maximum Conducted Output Power

| Condition | Mode | Frequency (MHz) | Antenna | Total Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-------------------|-------------|---------|
| NVNT | ZigBee | 2405 | Ant1 | 1.292 | 30 | Pass |
| NVNT | ZigBee | 2445 | Ant1 | 1.284 | 30 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 0.919 | 30 | Pass |

Test Graphs

Power NVNT ZigBee 2405MHz Ant1



Power NVNT ZigBee 2445MHz Ant1





3. -6dB Bandwidth

| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT | ZigBee | 2405 | Ant1 | 1.71 | 0.5 | Pass |
| NVNT | ZigBee | 2445 | Ant1 | 1.85 | 0.5 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 1.72 | 0.5 | Pass |

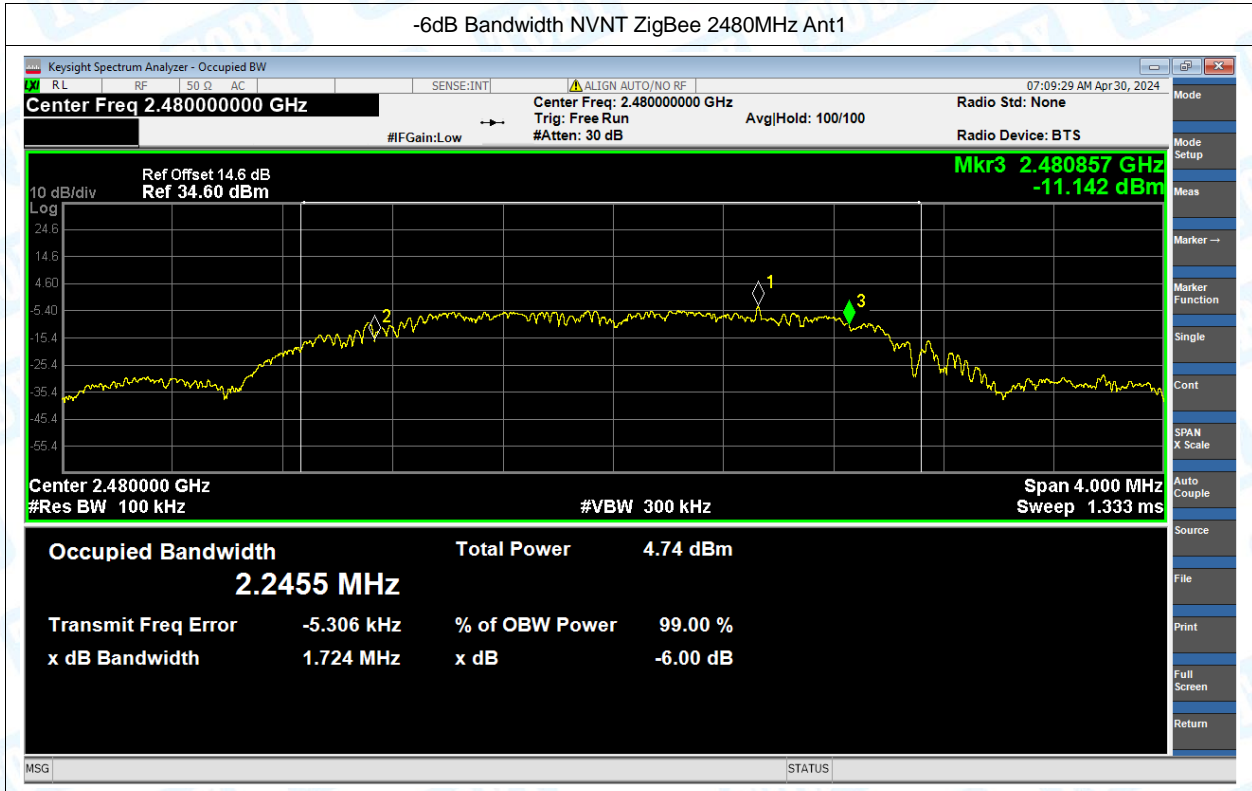
Test Graphs

-6dB Bandwidth NVNT ZigBee 2405MHz Ant1



-6dB Bandwidth NVNT ZigBee 2445MHz Ant1



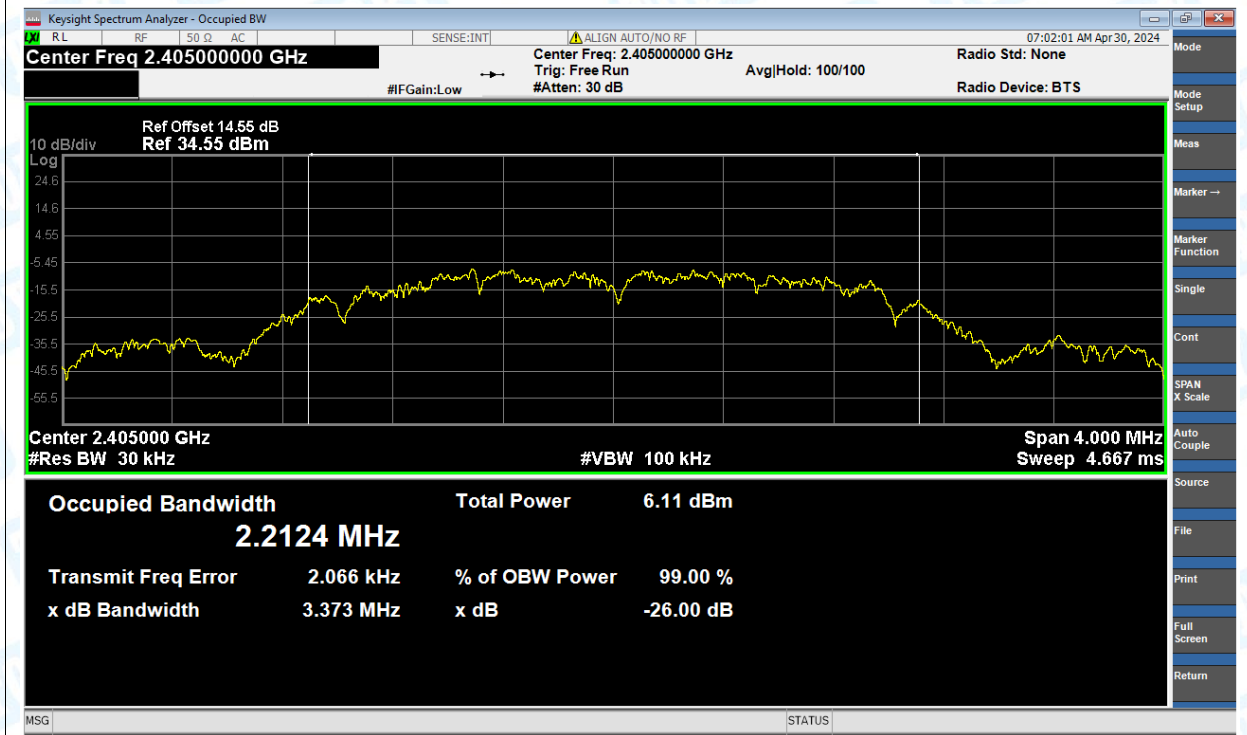


3. Occupied Channel Bandwidth

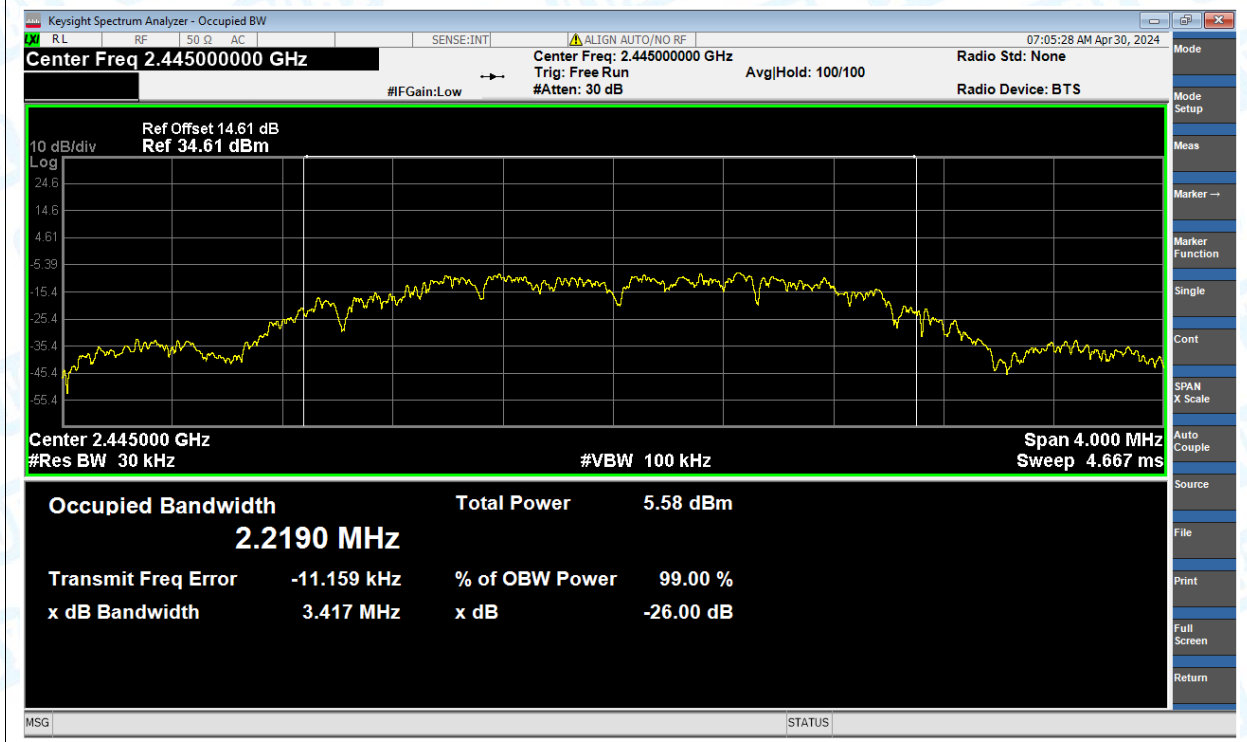
| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|-----------|--------|-----------------|---------|---------------|
| NVNT | ZigBee | 2405 | Ant1 | 2.212 |
| NVNT | ZigBee | 2445 | Ant1 | 2.219 |
| NVNT | ZigBee | 2480 | Ant1 | 2.206 |

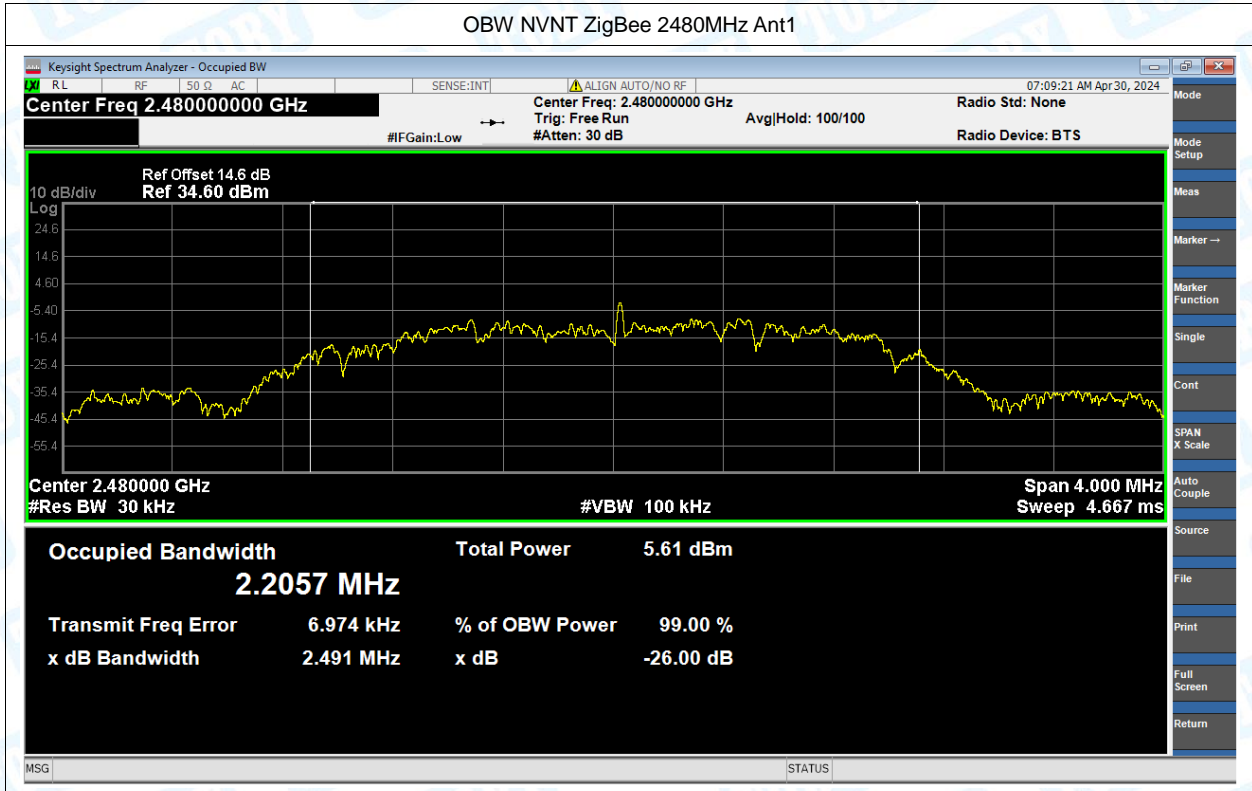
Test Graphs

OBW NVNT ZigBee 2405MHz Ant1



OBW NVNT ZigBee 2445MHz Ant1



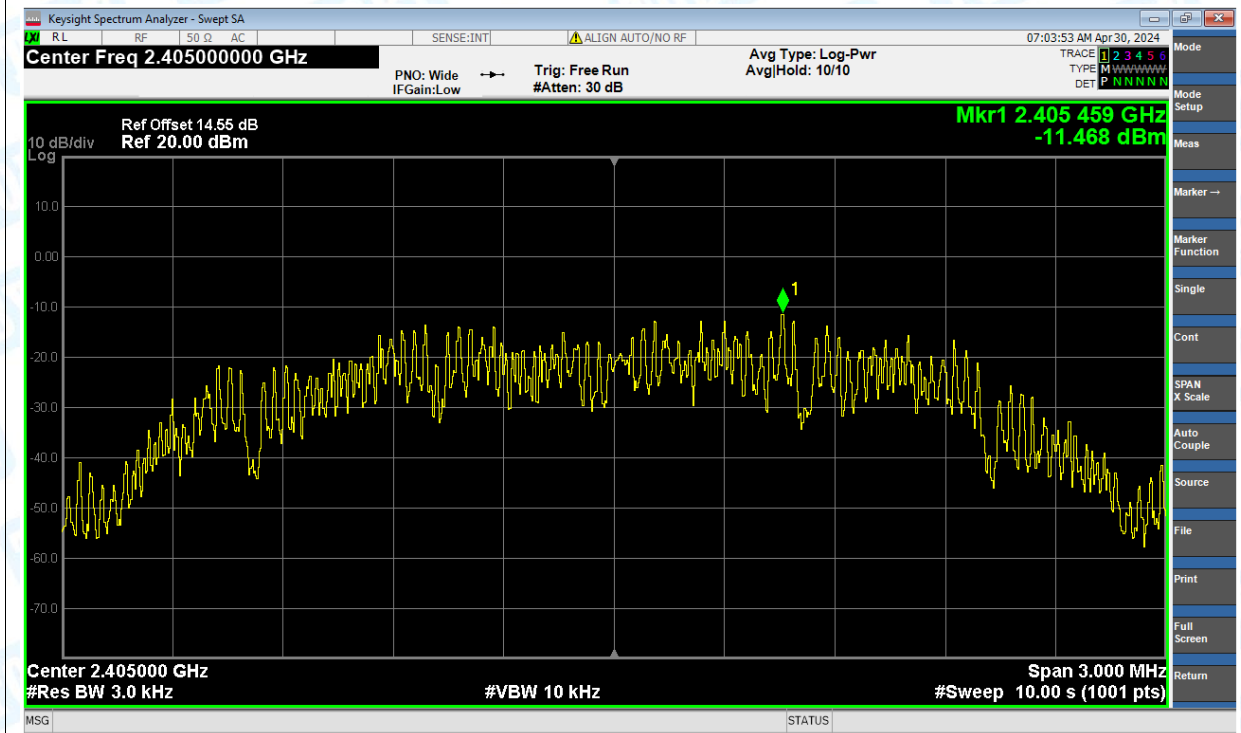


4. Maximum Power Spectral Density Level

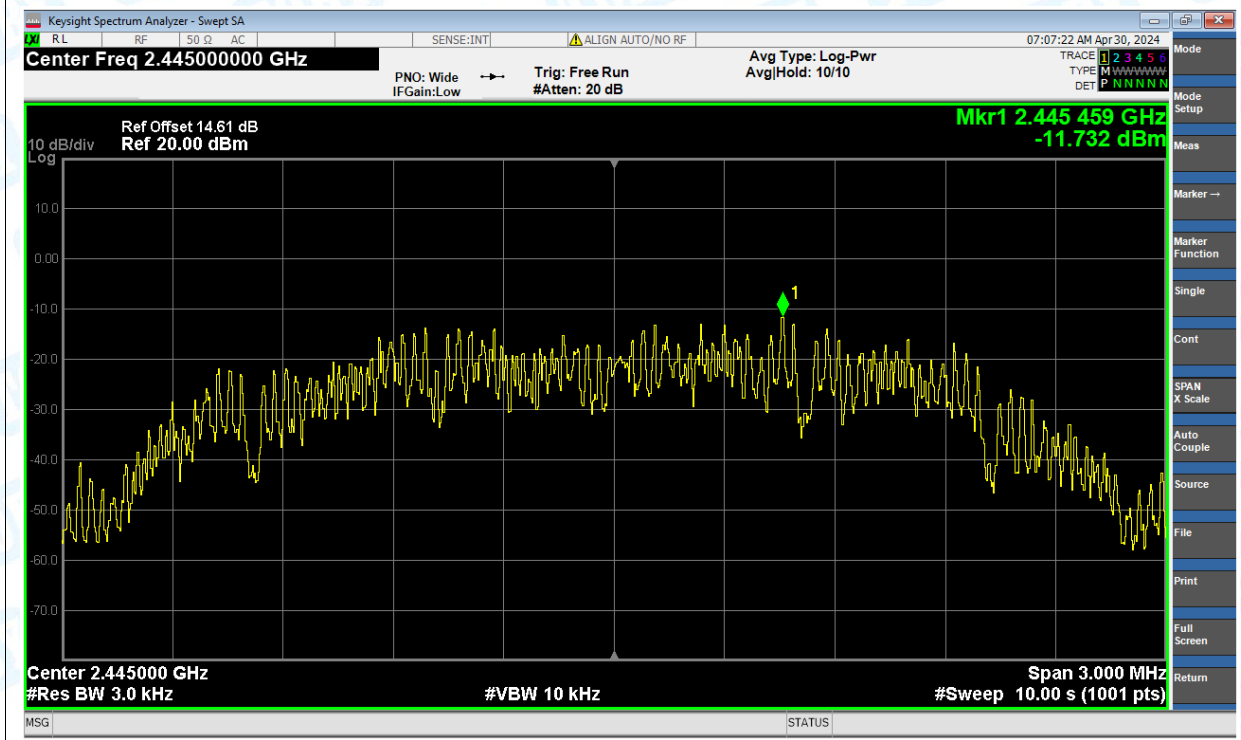
| Condition | Mode | Frequency (MHz) | Antenna | Max PSD (dBm/3KHz) | Max PSD (dBm/3KHz) | Verdict |
|-----------|--------|-----------------|---------|--------------------|--------------------|---------|
| NVNT | ZigBee | 2405 | Ant1 | -11.468 | 8 | Pass |
| NVNT | ZigBee | 2445 | Ant1 | -11.732 | 8 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -12.148 | 8 | Pass |

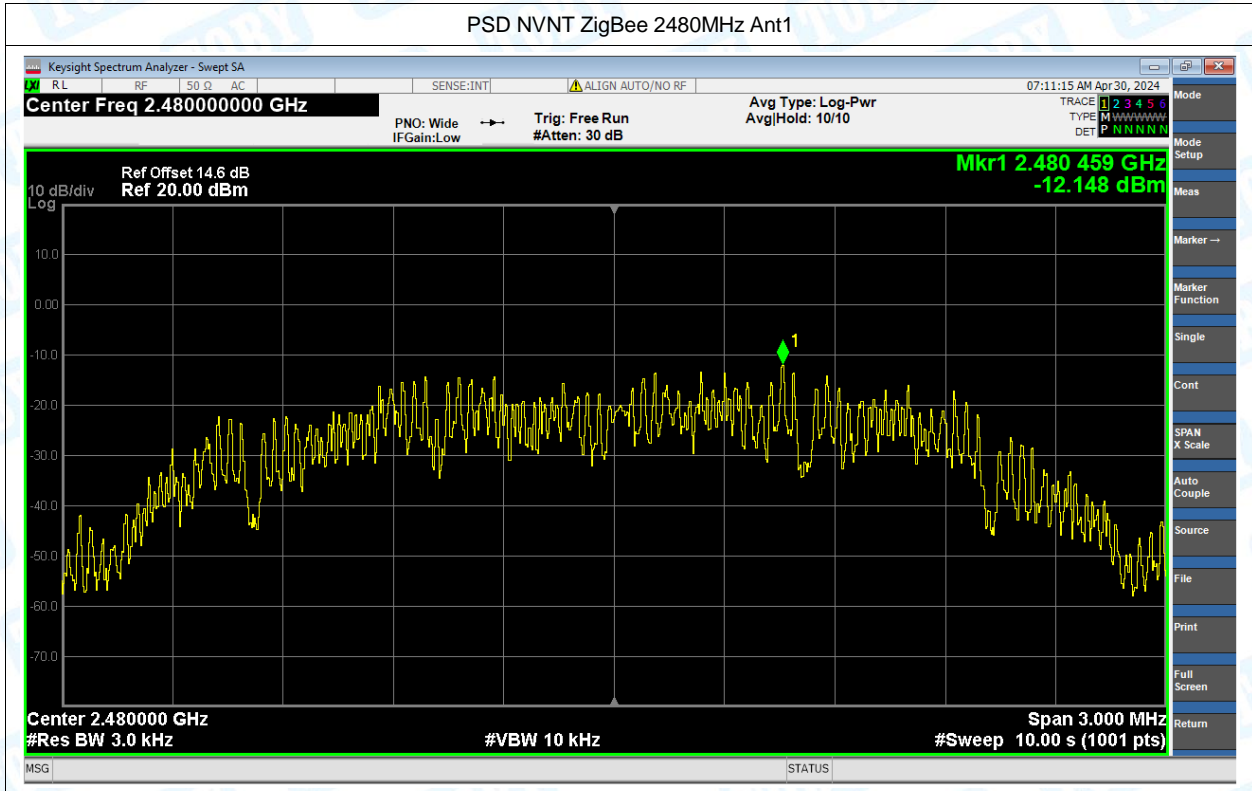
Test Graphs

PSD NVNT ZigBee 2405MHz Ant1



PSD NVNT ZigBee 2445MHz Ant1





4. Band Edge

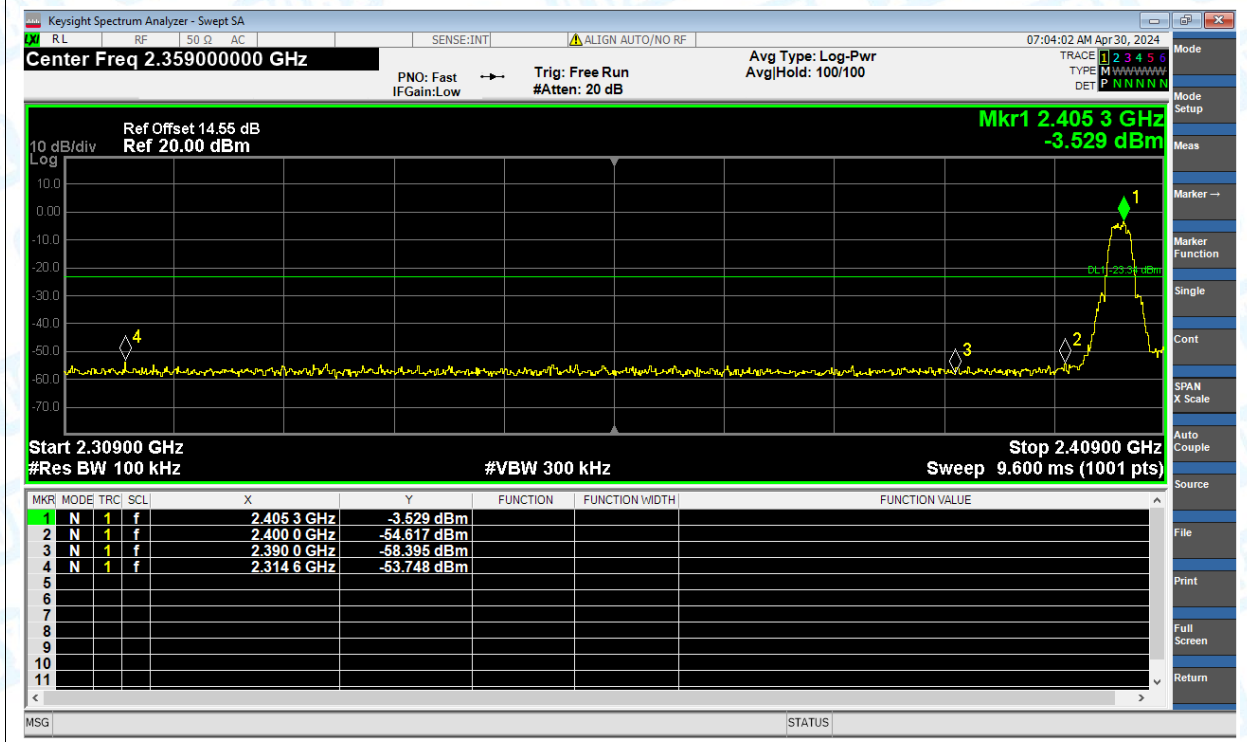
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT | ZigBee | 2405 | Ant1 | -50.41 | -20 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -39.88 | -20 | Pass |

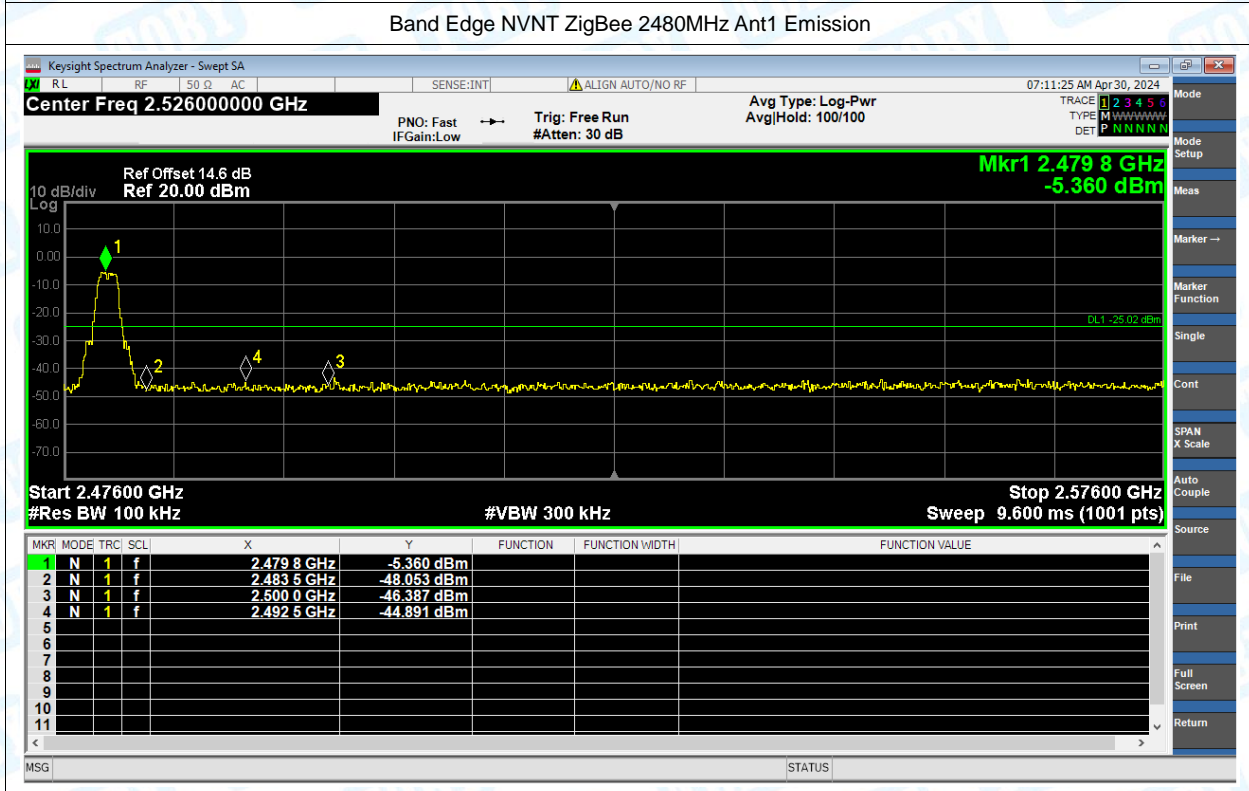
Test Graphs

Band Edge NVNT ZigBee 2405MHz Ant1 Ref



Band Edge NVNT ZigBee 2405MHz Ant1 Emission





5. Conducted RF Spurious Emission

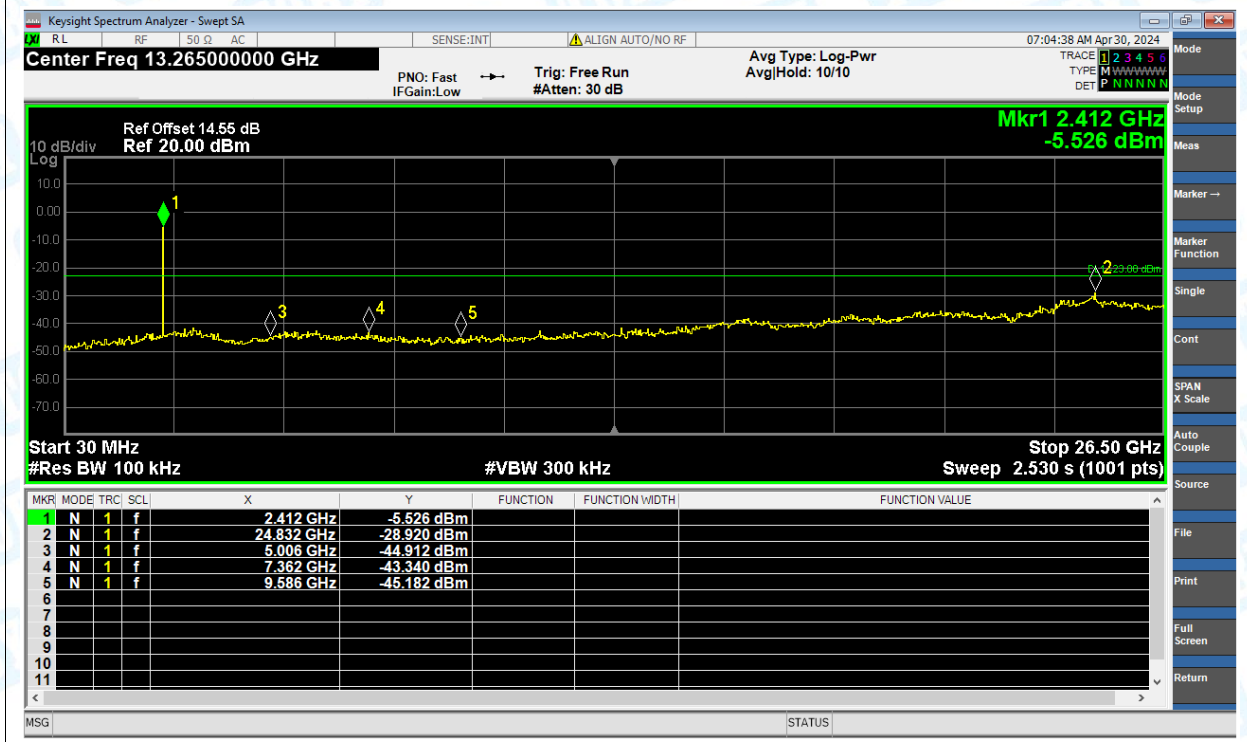
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT | ZigBee | 2405 | Ant1 | -25.85 | -20 | Pass |
| NVNT | ZigBee | 2445 | Ant1 | -36.98 | -20 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | -39.23 | -20 | Pass |

Test Graphs

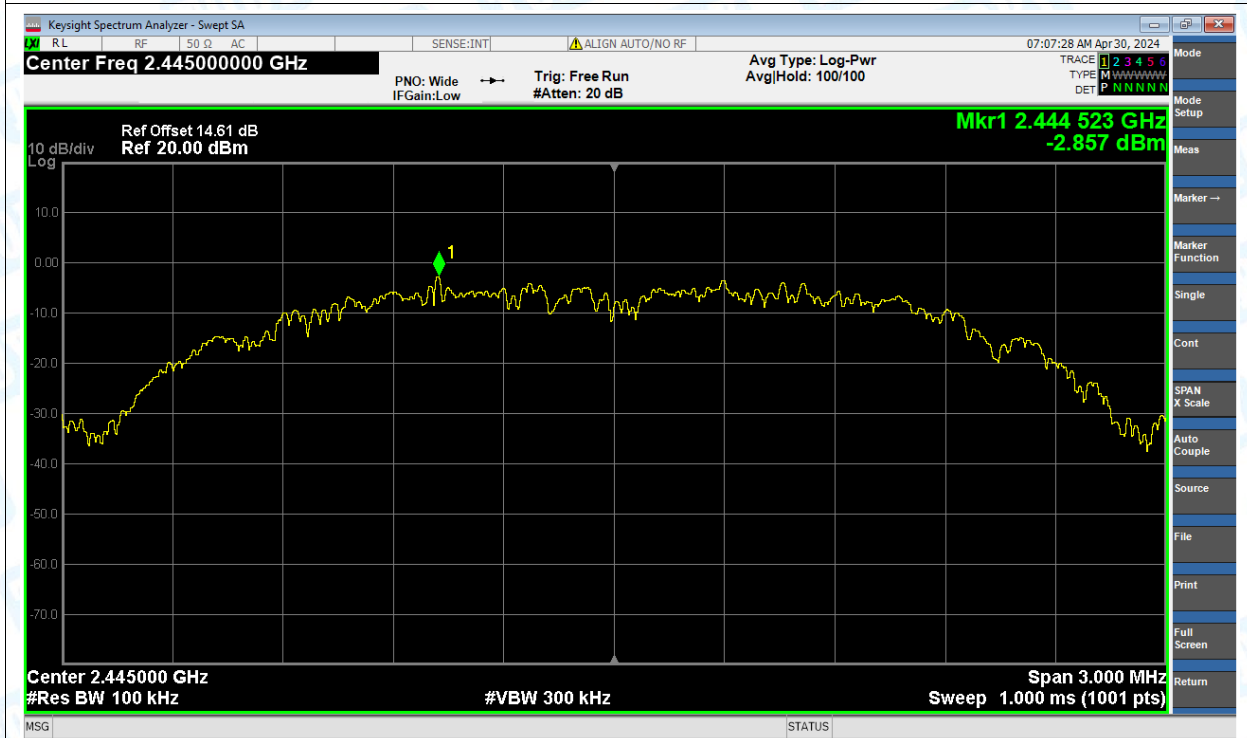
Tx. Spurious NVNT ZigBee 2405MHz Ant1 Ref



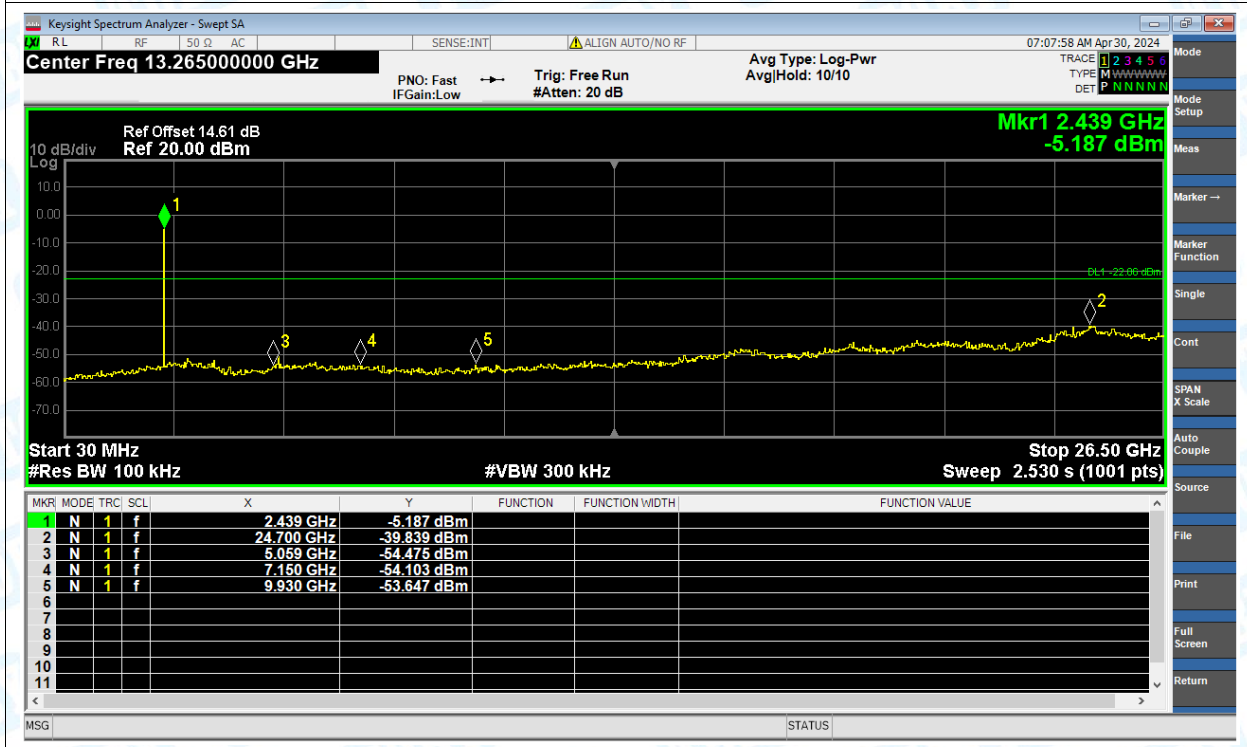
Tx. Spurious NVNT ZigBee 2405MHz Ant1 Emission



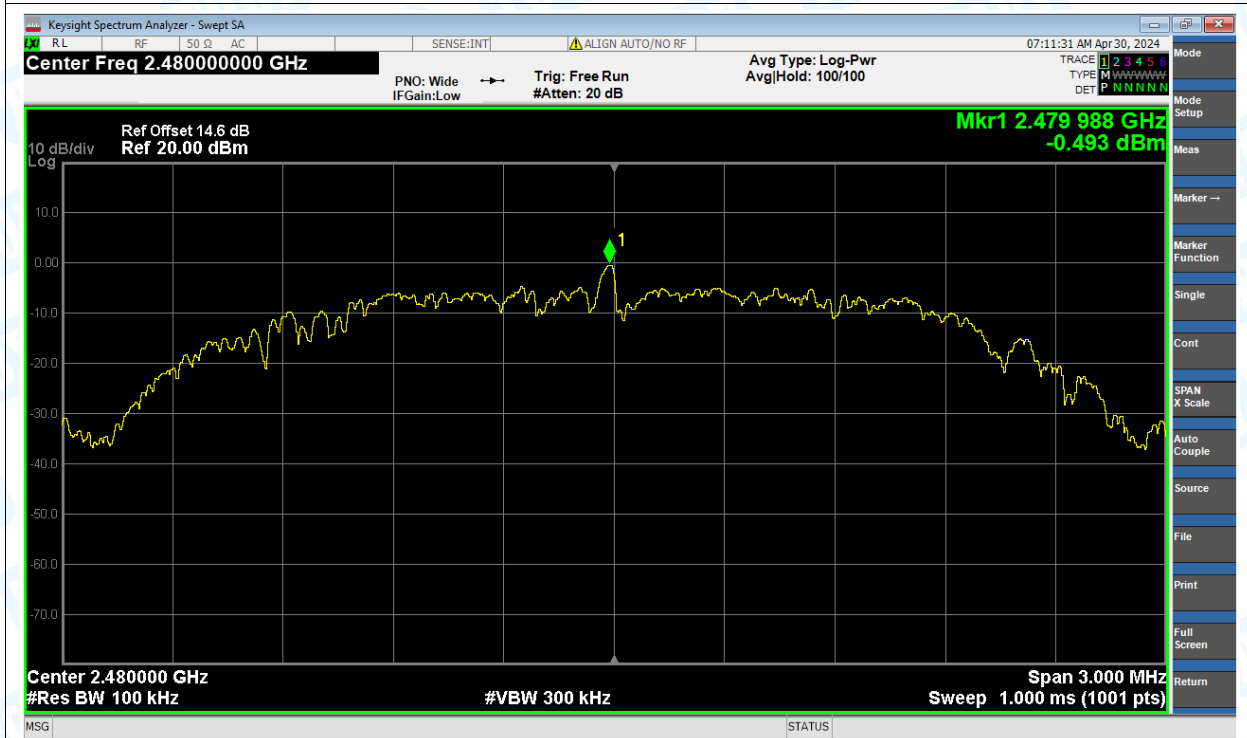
Tx. Spurious NVNT ZigBee 2445MHz Ant1 Ref



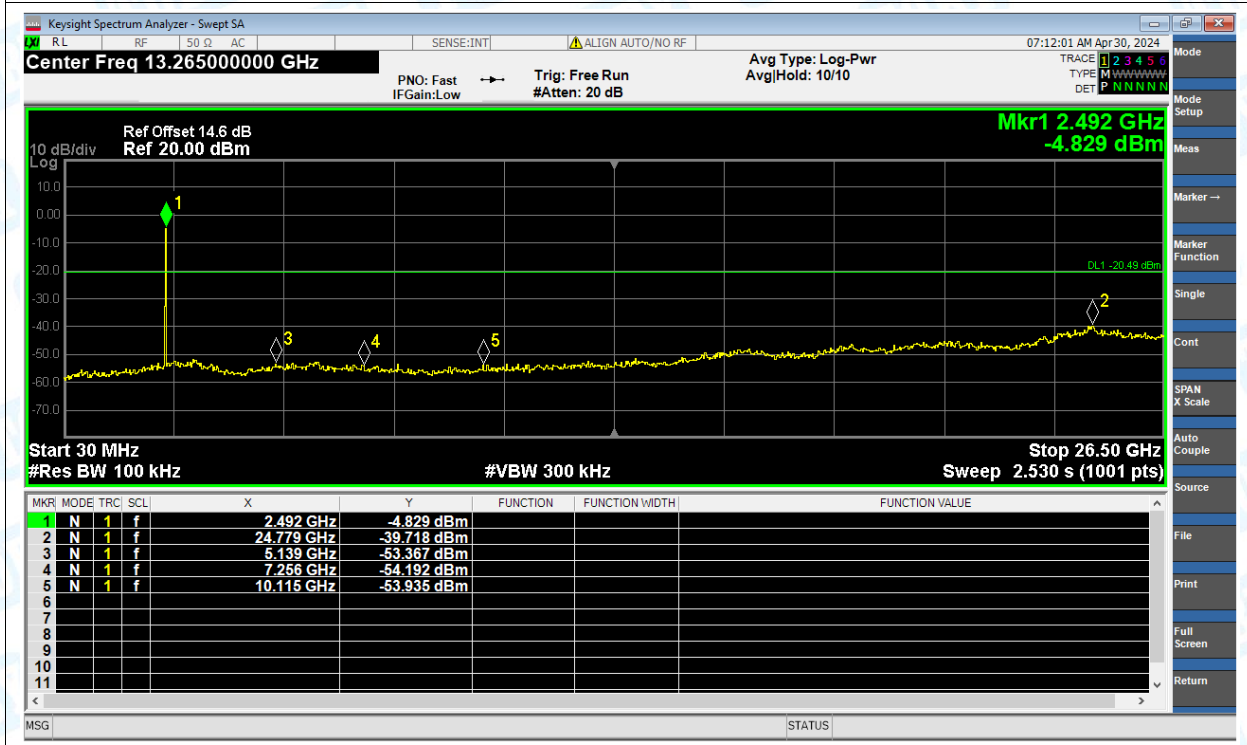
Tx. Spurious NVNT ZigBee 2445MHz Ant1 Emission



Tx. Spurious NVNT ZigBee 2480MHz Ant1 Ref



Tx. Spurious NVNT ZigBee 2480MHz Ant1 Emission

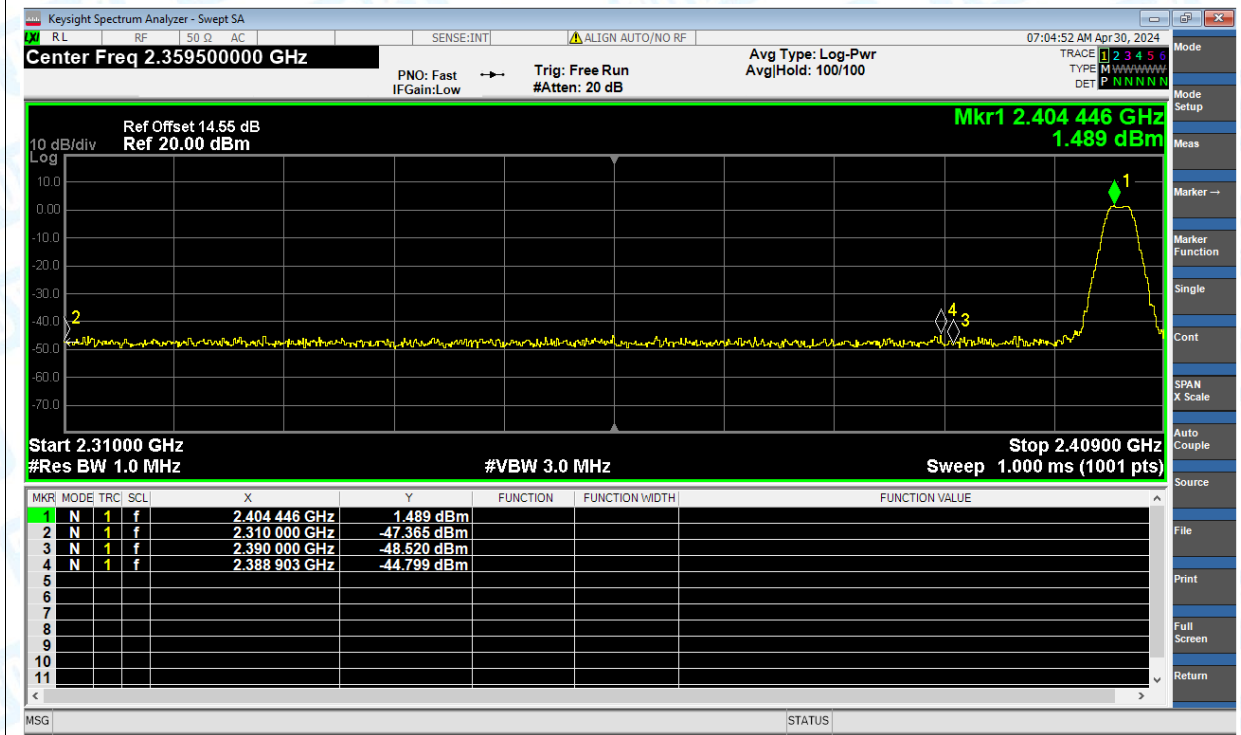


6. Restrict Band

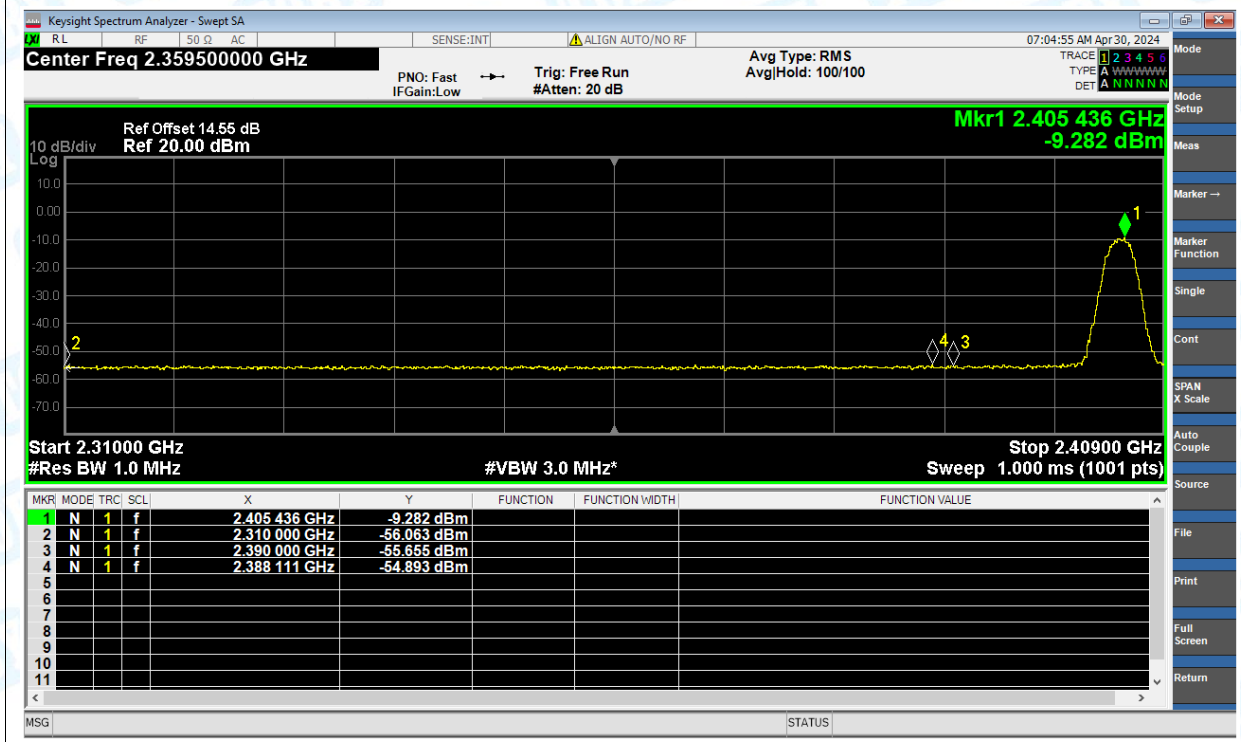
| Condition | Mode | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | Duty Factor (dB) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|------------|------------------|------------|----------|----------------|---------|
| NVNT | ZigBee | 2405 | Ant1 | 2310 | -47.37 | 2 | - | 49.89 | Peak | 74 | Pass |
| NVNT | ZigBee | 2405 | Ant1 | 2310 | -56.06 | 2 | 9.03 | 50.23 | Average | 54 | Pass |
| NVNT | ZigBee | 2405 | Ant1 | 2388.903 | -44.8 | 2 | - | 52.46 | Peak | 74 | Pass |
| NVNT | ZigBee | 2405 | Ant1 | 2388.111 | -54.89 | 2 | 9.03 | 51.4 | Average | 54 | Pass |
| NVNT | ZigBee | 2405 | Ant1 | 2390 | -48.52 | 2 | - | 48.74 | Peak | 74 | Pass |
| NVNT | ZigBee | 2405 | Ant1 | 2390 | -55.66 | 2 | 9.03 | 50.63 | Average | 54 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 2483.5 | -41.83 | 2 | - | 55.43 | Peak | 74 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 2483.5 | -56.74 | 2 | 9.04 | 49.56 | Average | 54 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 2483.512 | -41.83 | 2 | - | 55.43 | Peak | 74 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 2483.536 | -56.16 | 2 | 9.04 | 50.14 | Average | 54 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 2500 | -50.97 | 2 | - | 46.29 | Peak | 74 | Pass |
| NVNT | ZigBee | 2480 | Ant1 | 2500 | -59.4 | 2 | 9.04 | 46.9 | Average | 54 | Pass |

Test Graphs

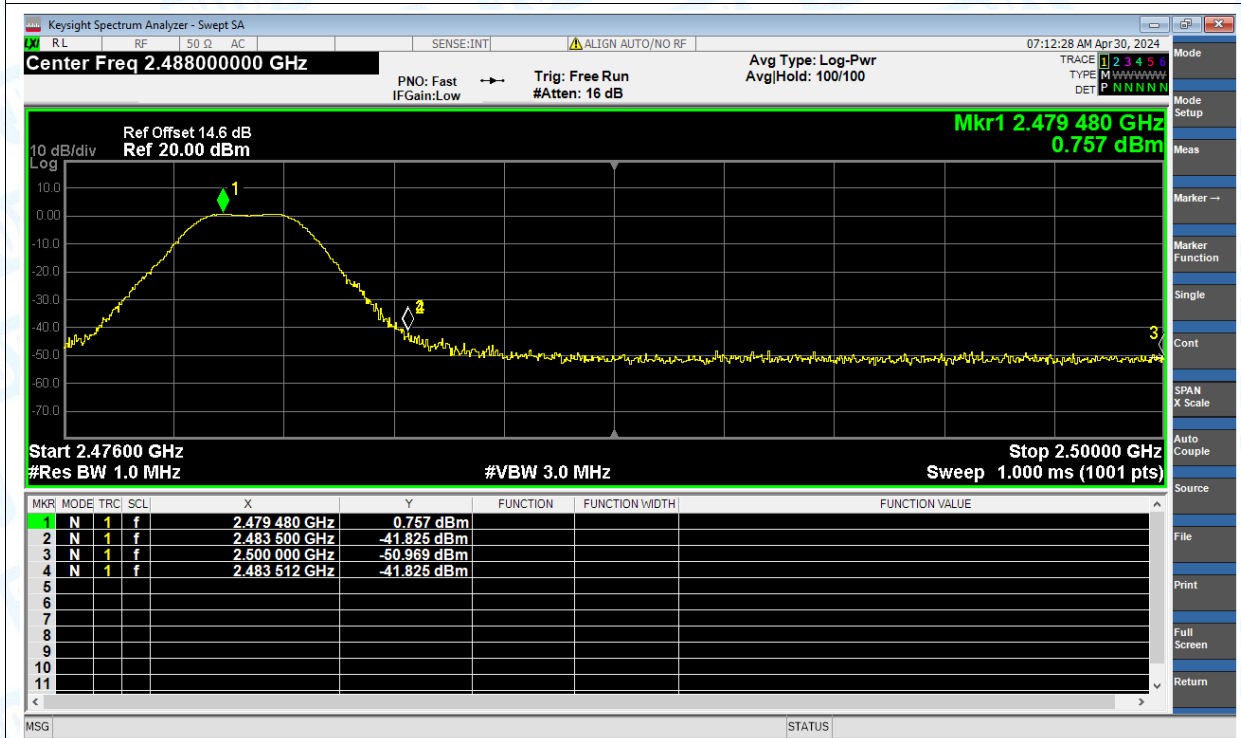
Restrict Band NVNT ZigBee 2405MHz Ant1 Peak



Restrict Band NVNT ZigBee 2405MHz Ant1 Average



Restrict Band NVNT ZigBee 2480MHz Ant1 Peak



Restrict Band NVNT ZigBee 2480MHz Ant1 Average

