



## Appendix A

### RF Test Data for Zigbee (Conducted Measurement)

Product Name: Mixtile 2-in-1 Zigbee & Z-Wave mPCIe Interface Module

Test Model: ACC-ZZM01-US

#### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 23.8°C     |
| Relative Humidity: | 52.4%      |
| ATM Pressure:      | 100.0 kPa  |
| Test Engineer:     | Jay Luo    |
| Supervised by:     | Paddi Chen |



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## A.1 -6dB Bandwidth

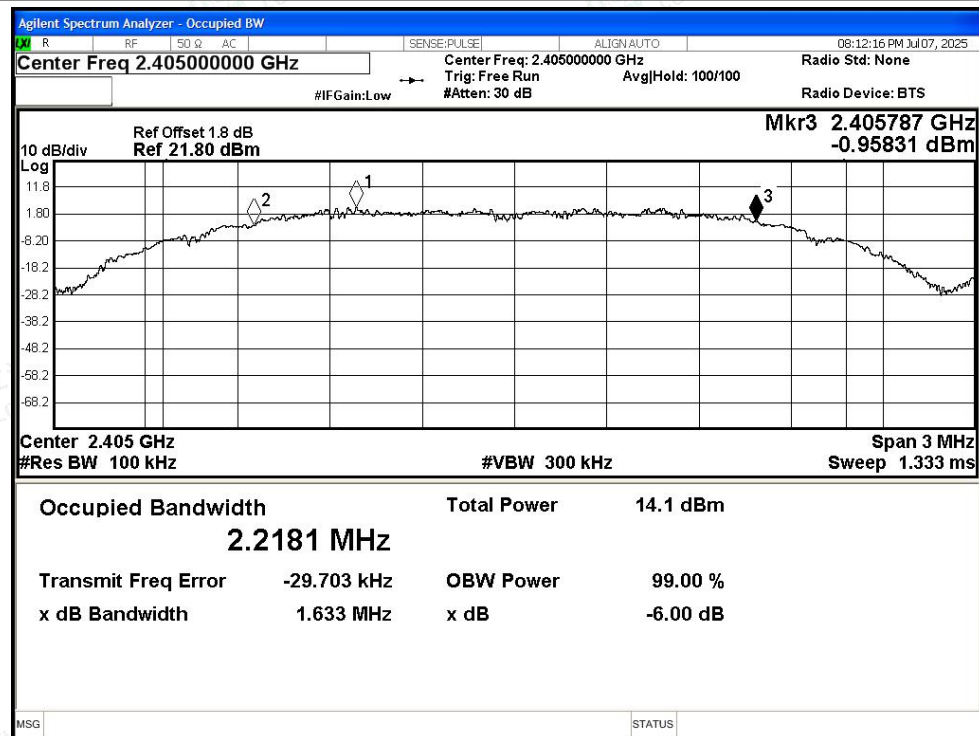
| Condition | Mode   | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | Zigbee | 2405            | Ant1    | 1.633                 | $\geq 0.5$                  | Pass    |
| NVNT      | Zigbee | 2440            | Ant1    | 1.62                  | $\geq 0.5$                  | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 1.612                 | $\geq 0.5$                  | Pass    |



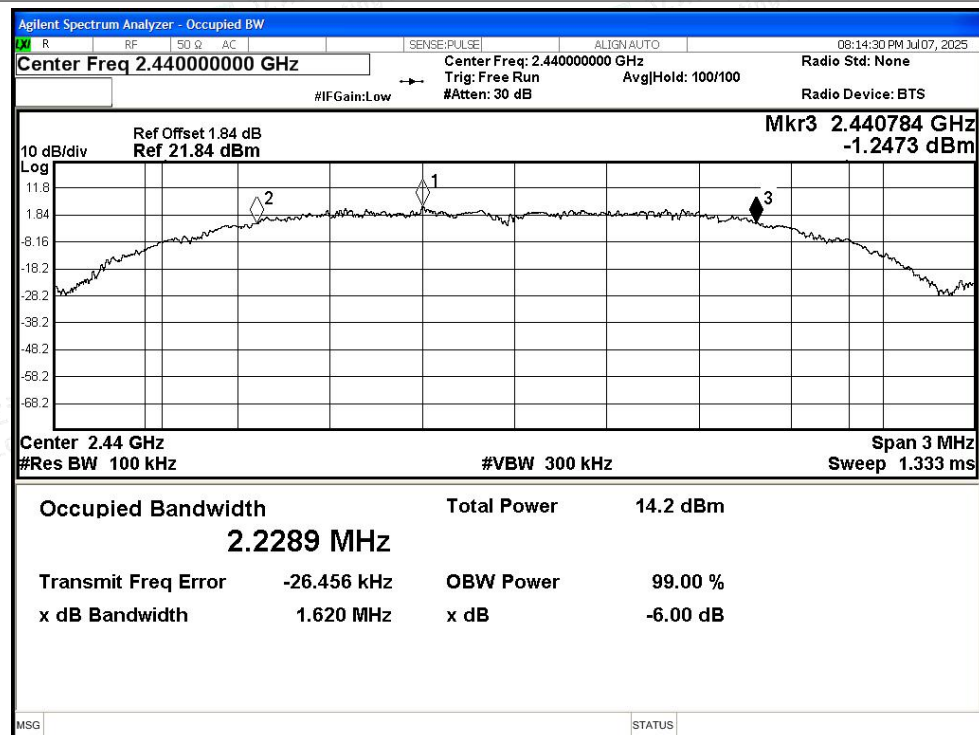


## Test Graphs

-6dB Bandwidth NVNT Zigbee 2405MHz Ant1



-6dB Bandwidth NVNT Zigbee 2440MHz Ant1

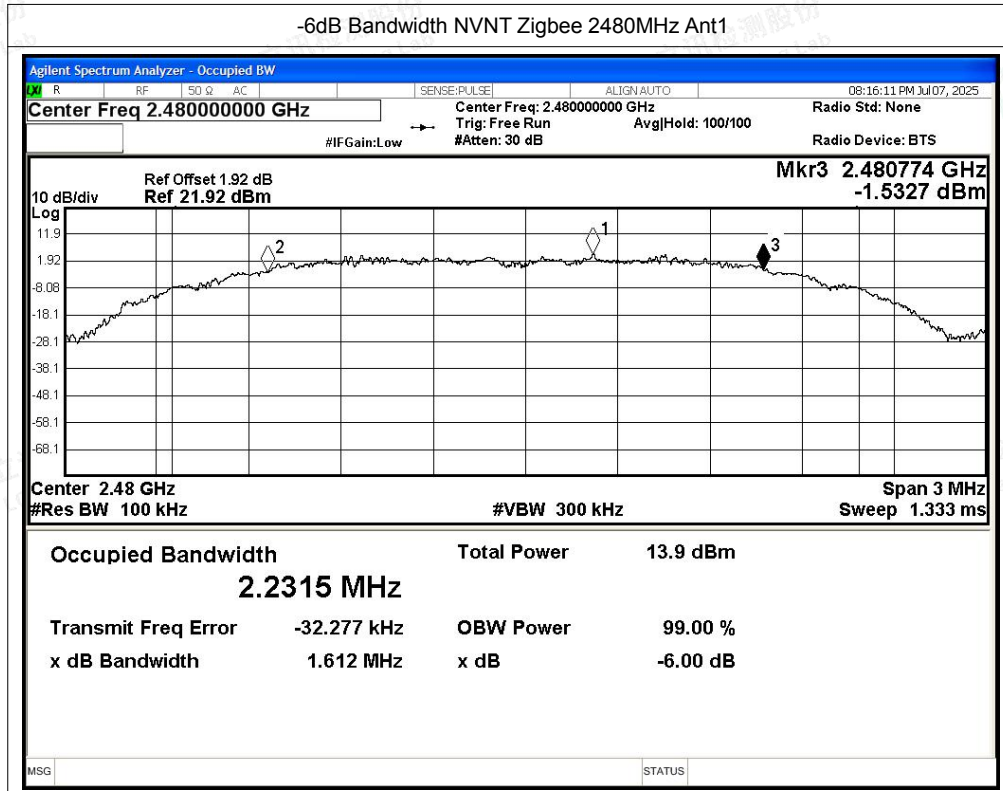


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## A.2 Maximum Peak Conducted Output Power

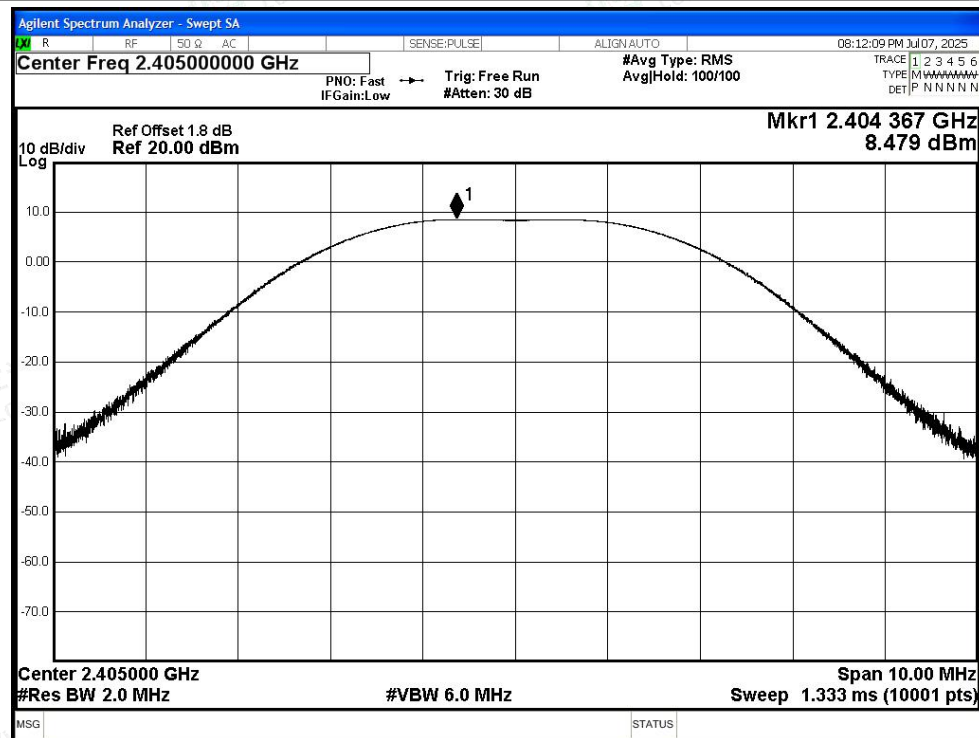
| Condition | Mode   | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | Zigbee | 2405            | Ant1    | 8.48                  | 30          | Pass    |
| NVNT      | Zigbee | 2440            | Ant1    | 8.77                  | 30          | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 8.37                  | 30          | Pass    |



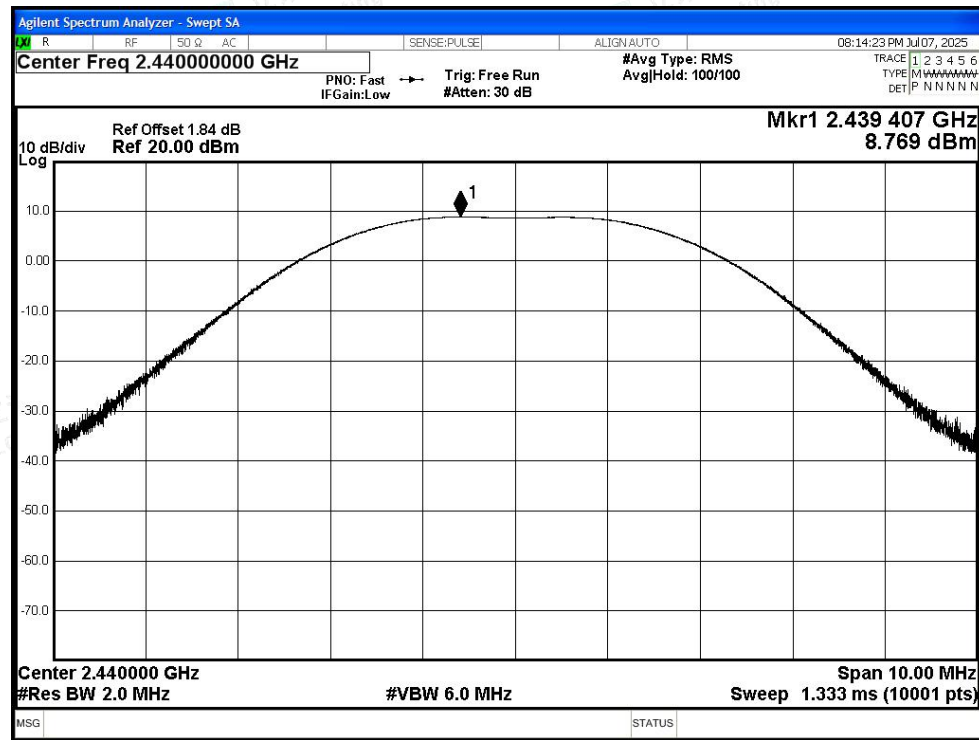


## Test Graphs

Power NVNT Zigbee 2405MHz Ant1



Power NVNT Zigbee 2440MHz Ant1

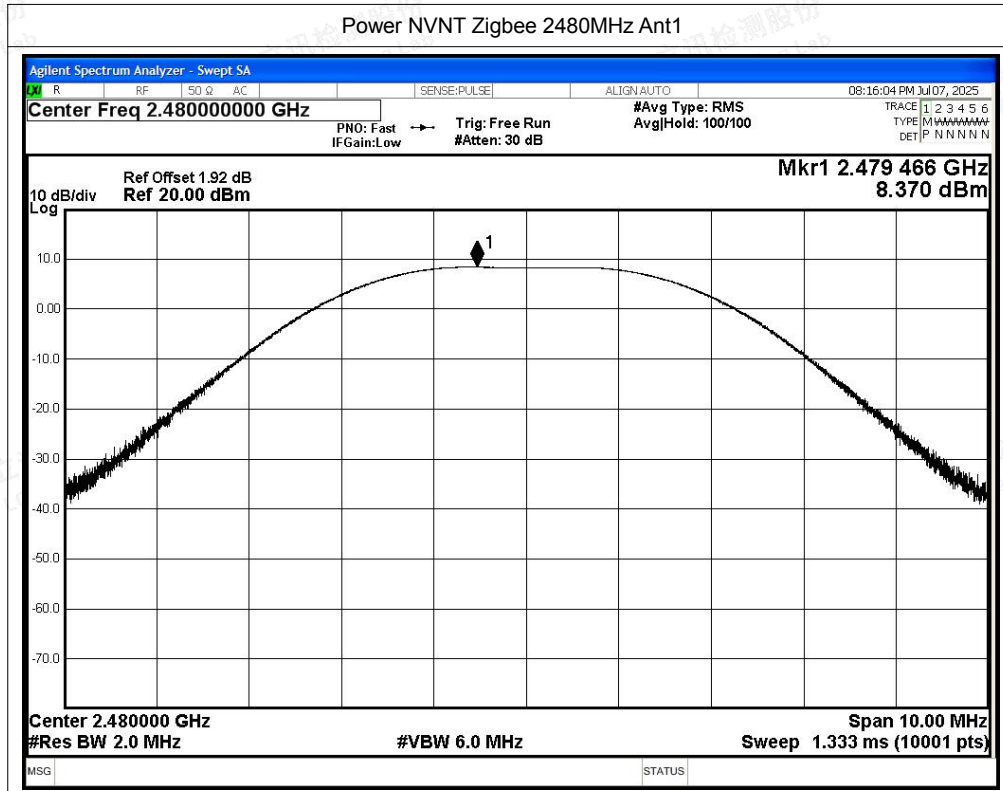


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### A.3 Maximum Power Spectral Density Level

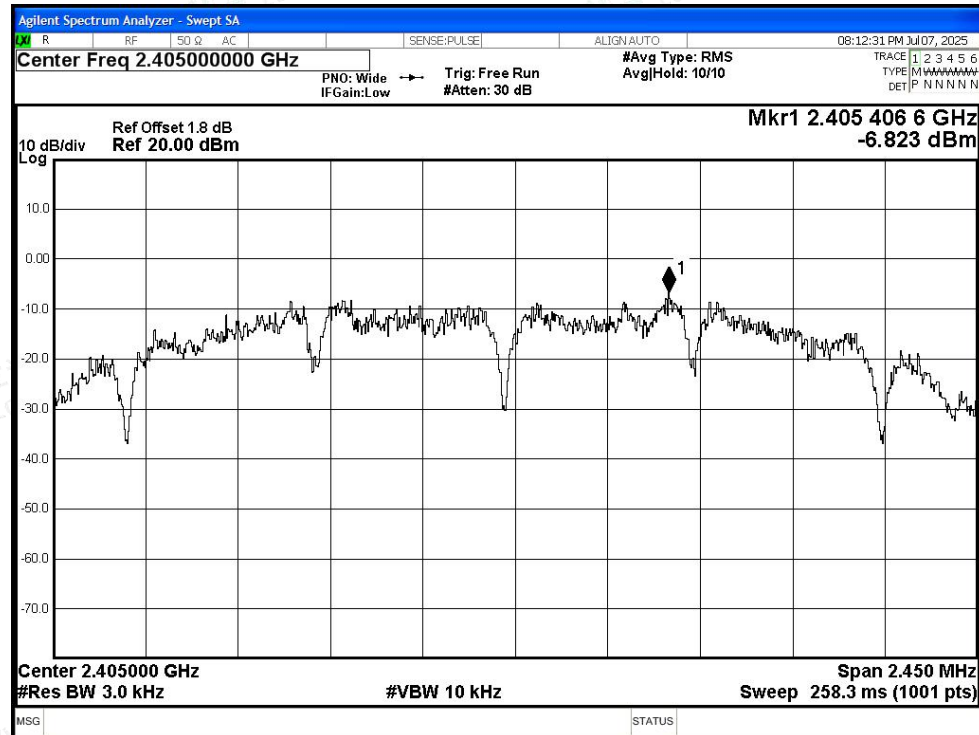
| Condition | Mode   | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|--------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | Zigbee | 2405            | Ant1    | -6.82                    | 8                | Pass    |
| NVNT      | Zigbee | 2440            | Ant1    | -7.06                    | 8                | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | -6.62                    | 8                | Pass    |



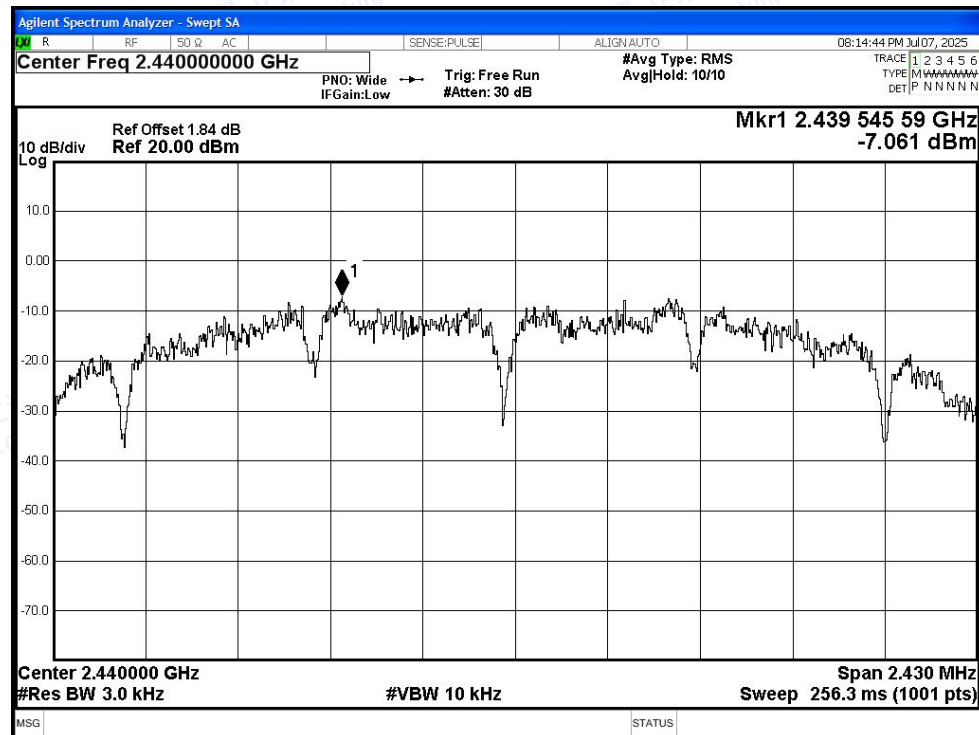


## Test Graphs

## PSD NVNT Zigbee 2405MHz Ant1



## PSD NVNT Zigbee 2440MHz Ant1

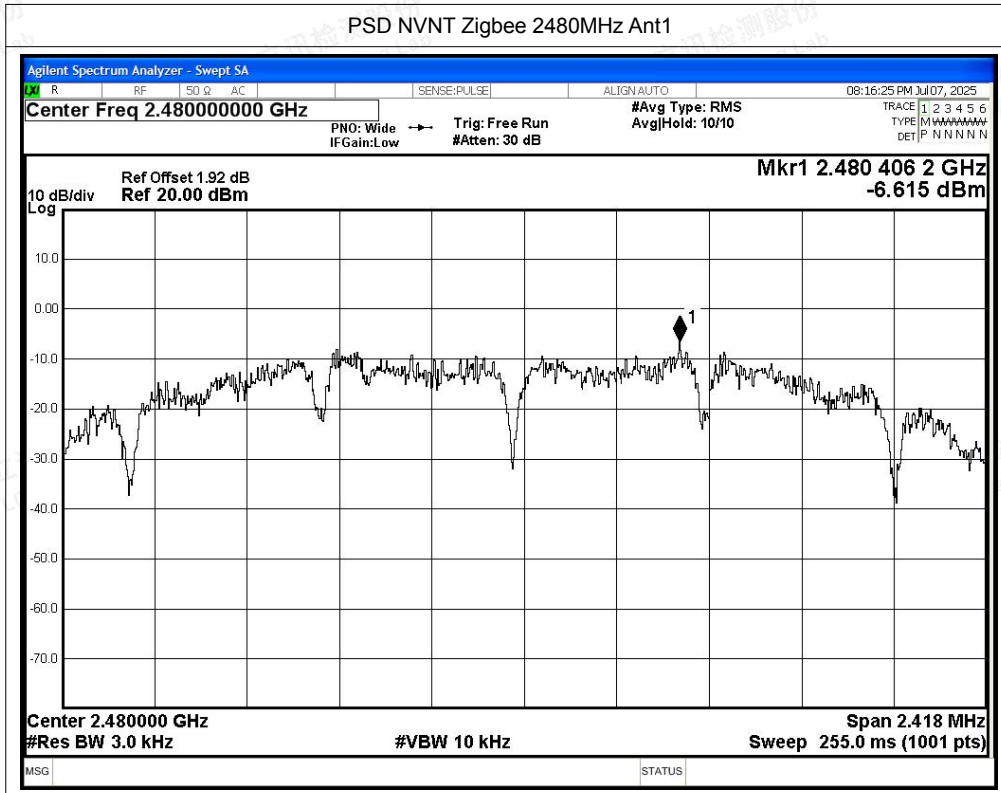


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## A.4 Band Edge

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | Zigbee | 2405            | Ant1    | -56.45          | -20         | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | -51.25          | -20         | Pass    |

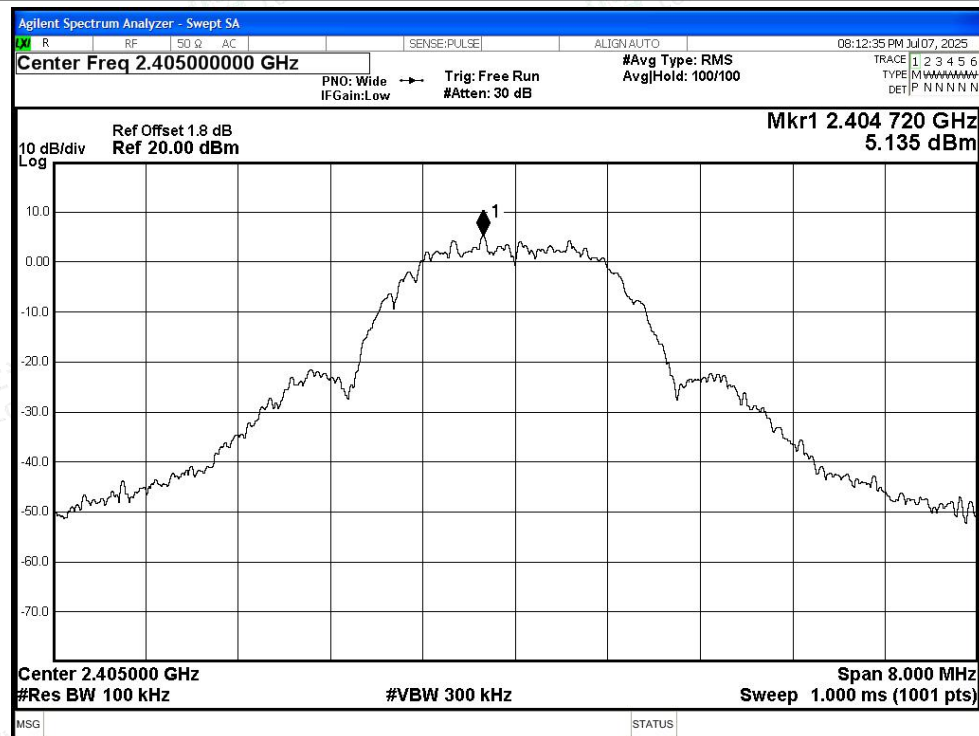


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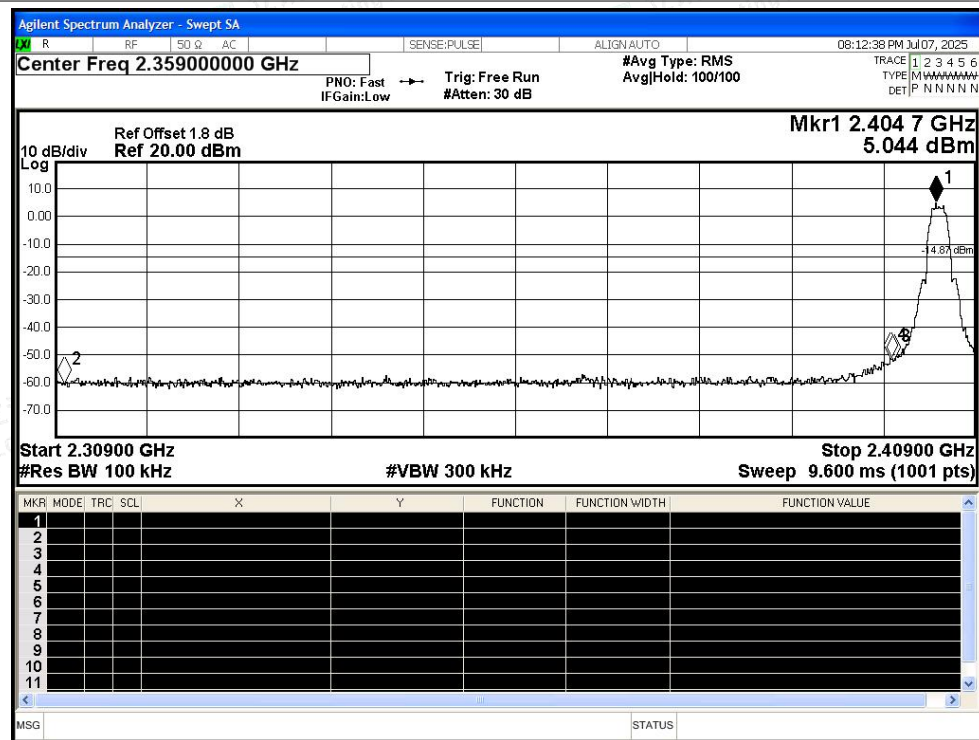


## Test Graphs

## Band Edge NVNT Zigbee 2405MHz Ant1 Ref



## Band Edge NVNT Zigbee 2405MHz Ant1 Emission



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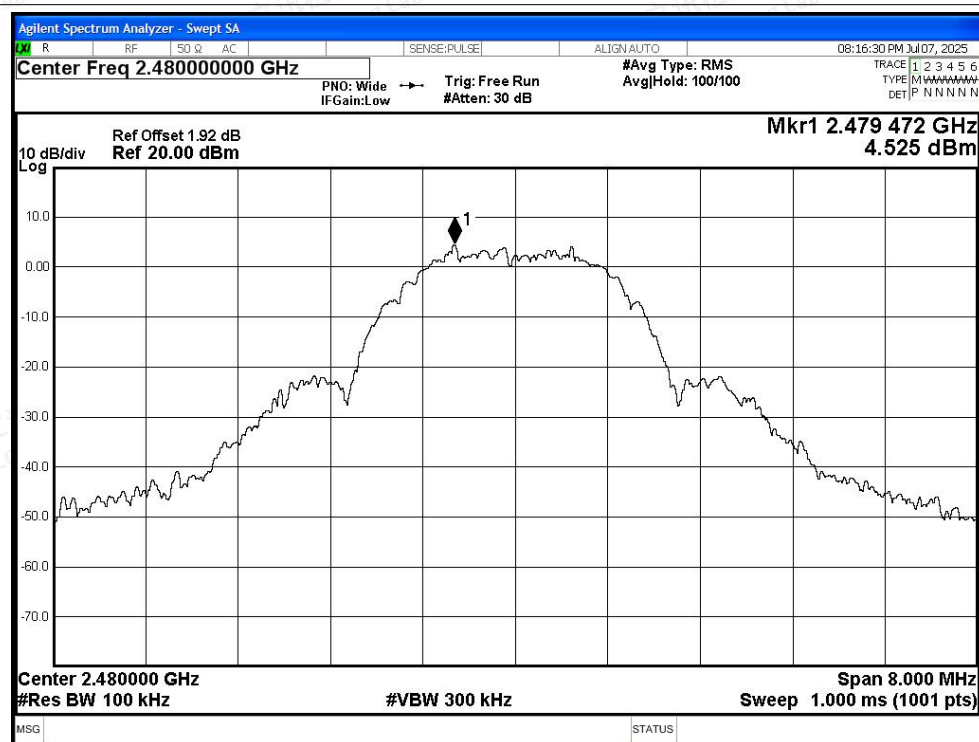
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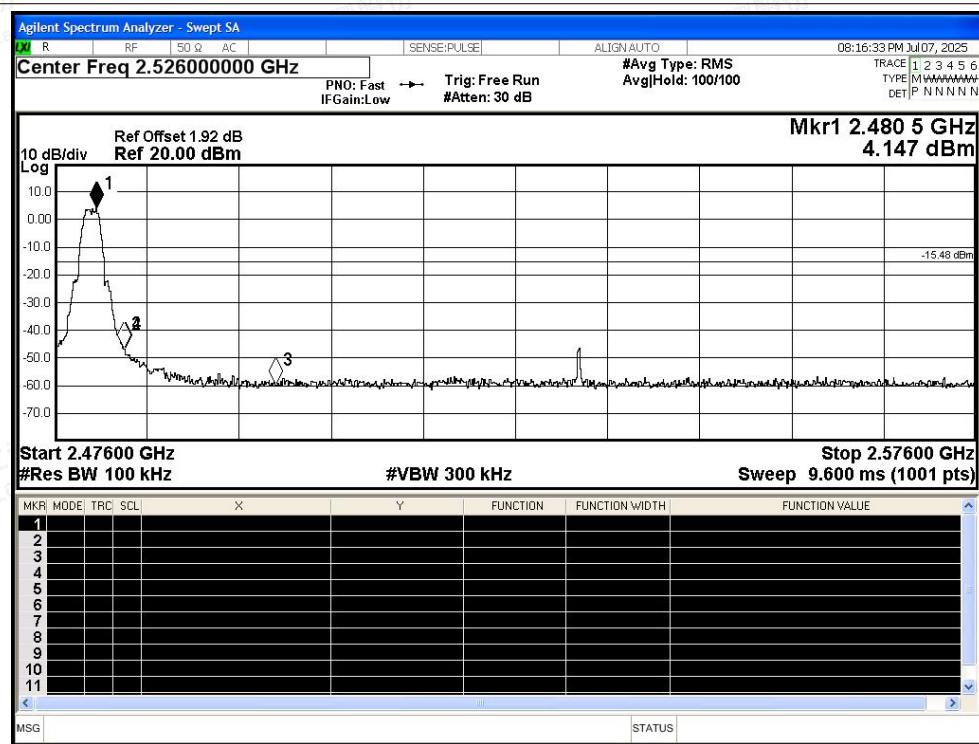
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## Band Edge NVNT Zigbee 2480MHz Ant1 Ref



## Band Edge NVNT Zigbee 2480MHz Ant1 Emission



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## A.5 Conducted RF Spurious Emission

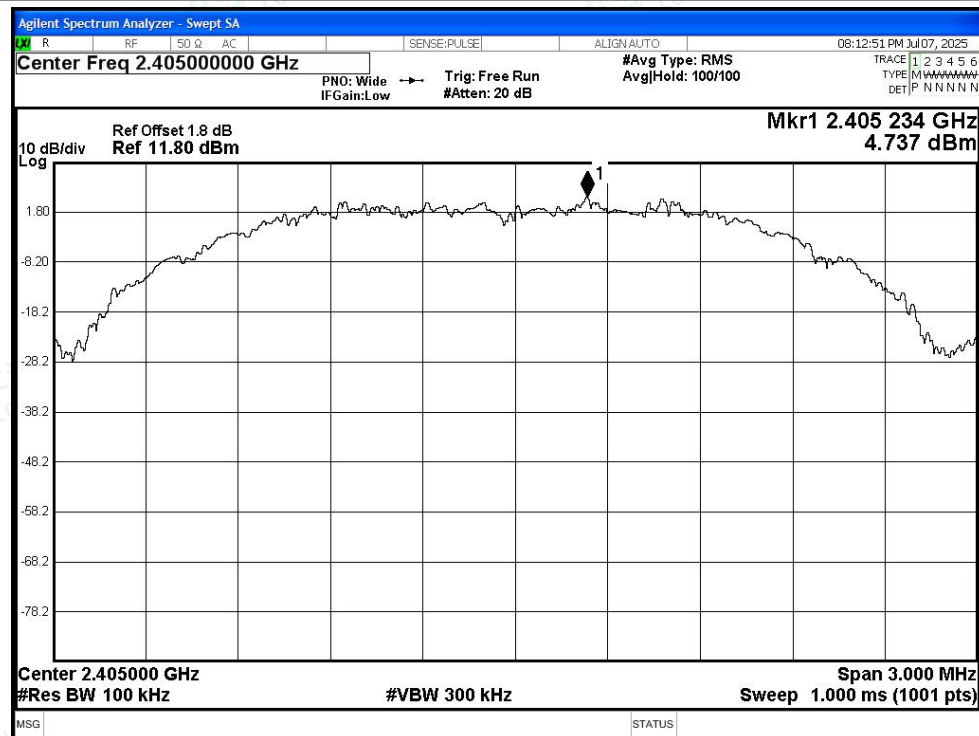
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | Zigbee | 2405            | Ant1    | -60.17          | -20         | Pass    |
| NVNT      | Zigbee | 2440            | Ant1    | -60.01          | -20         | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | -59.77          | -20         | Pass    |



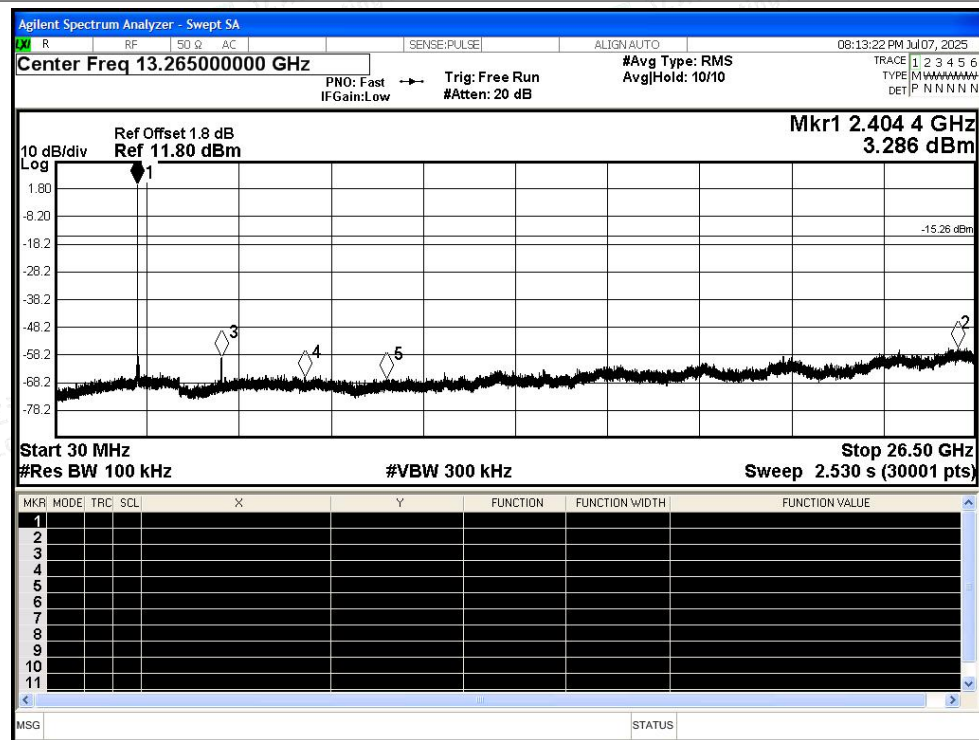


## Test Graphs

## Tx. Spurious NVNT Zigbee 2405MHz Ant1 Ref



## Tx. Spurious NVNT Zigbee 2405MHz Ant1 Emission



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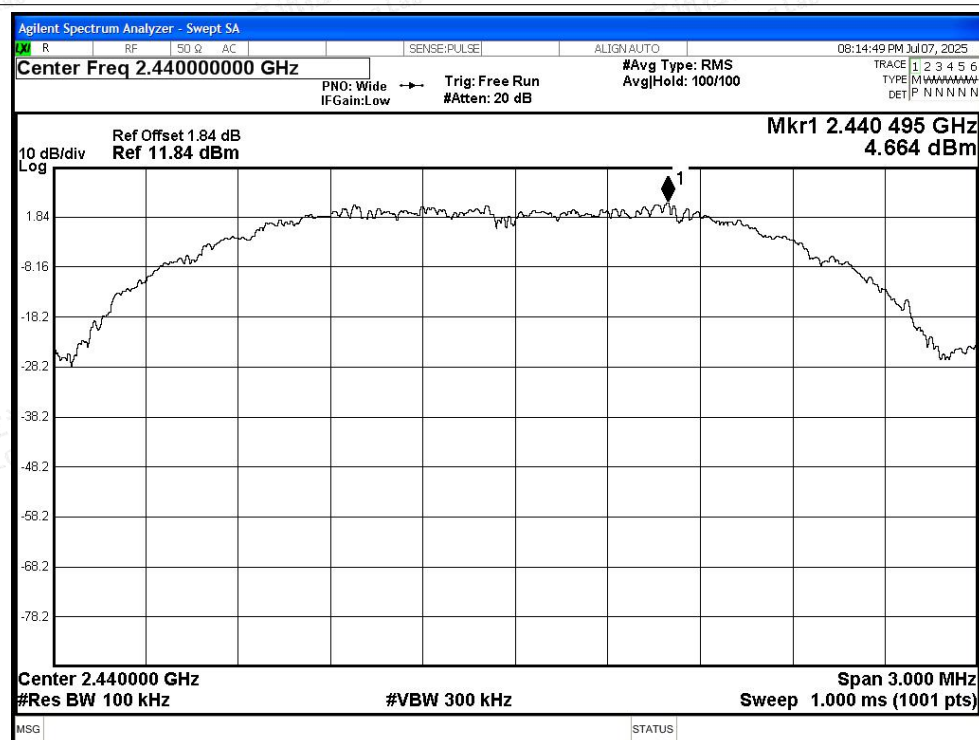
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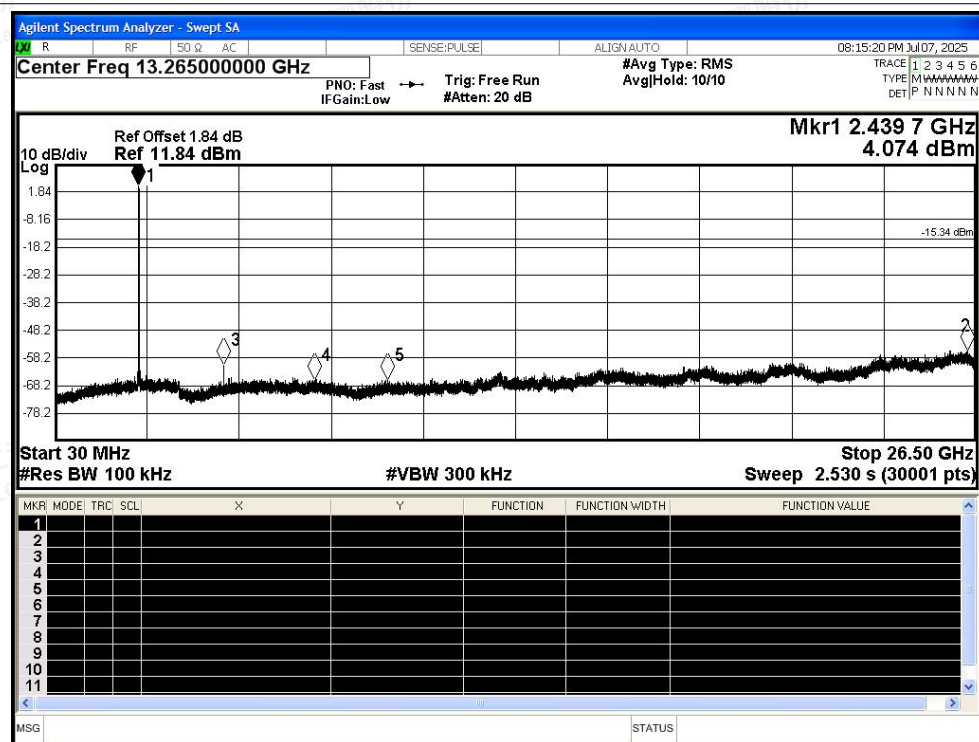
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## Tx. Spurious NVNT Zigbee 2440MHz Ant1 Ref

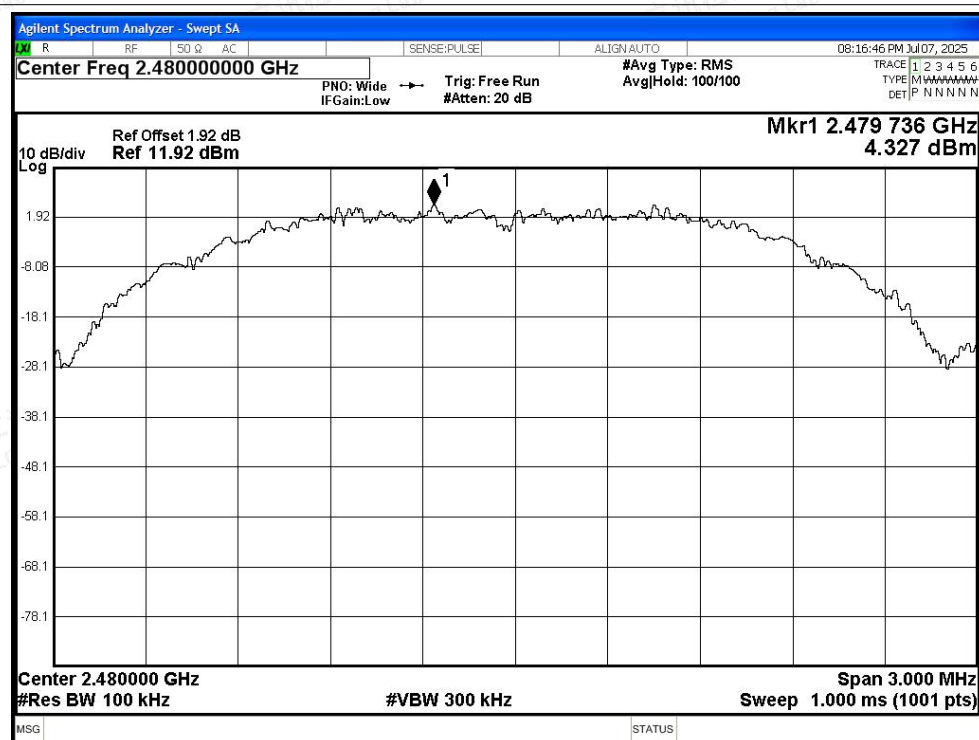


## Tx. Spurious NVNT Zigbee 2440MHz Ant1 Emission

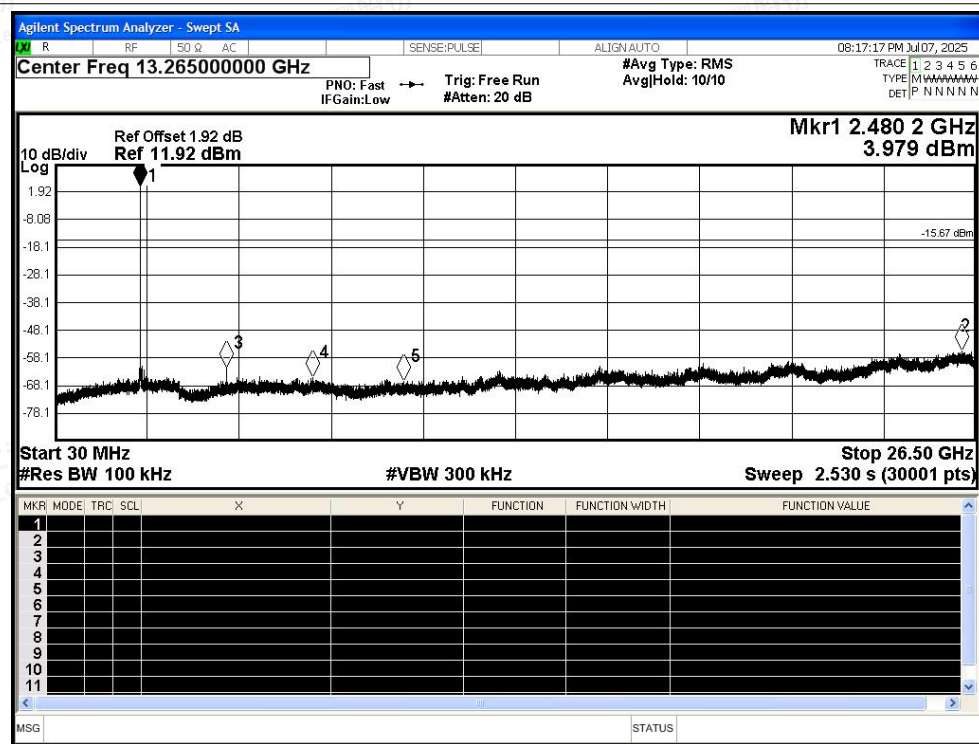




## Tx. Spurious NVNT Zigbee 2480MHz Ant1 Ref



## Tx. Spurious NVNT Zigbee 2480MHz Ant1 Emission





## A.6 Duty Cycle

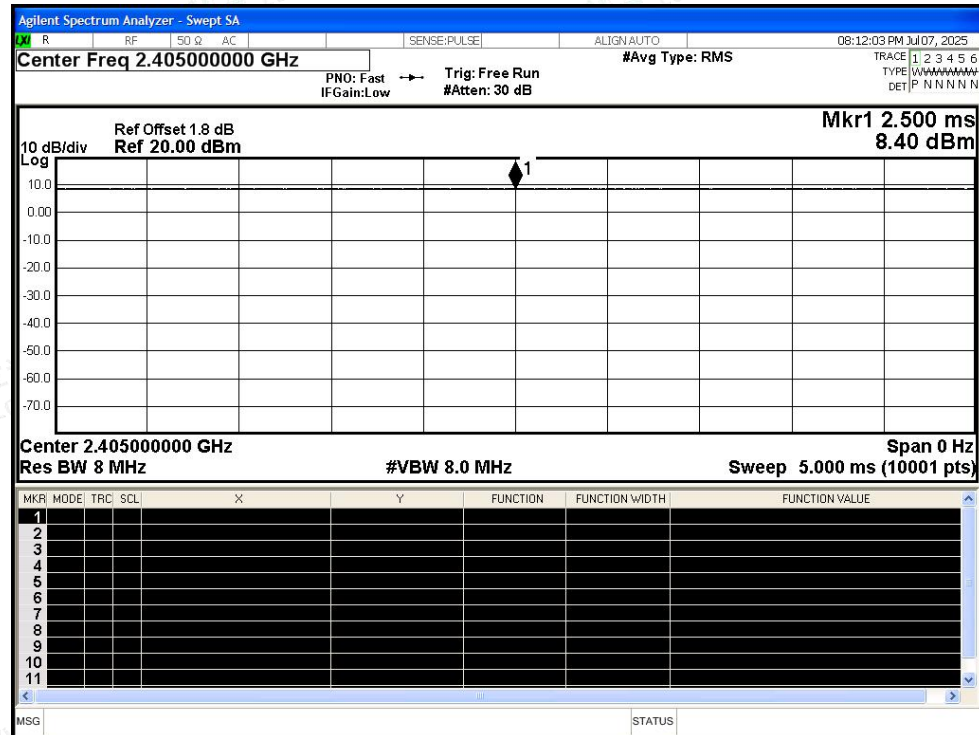
| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | Zigbee | 2405            | Ant1    | 100            | 0                     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



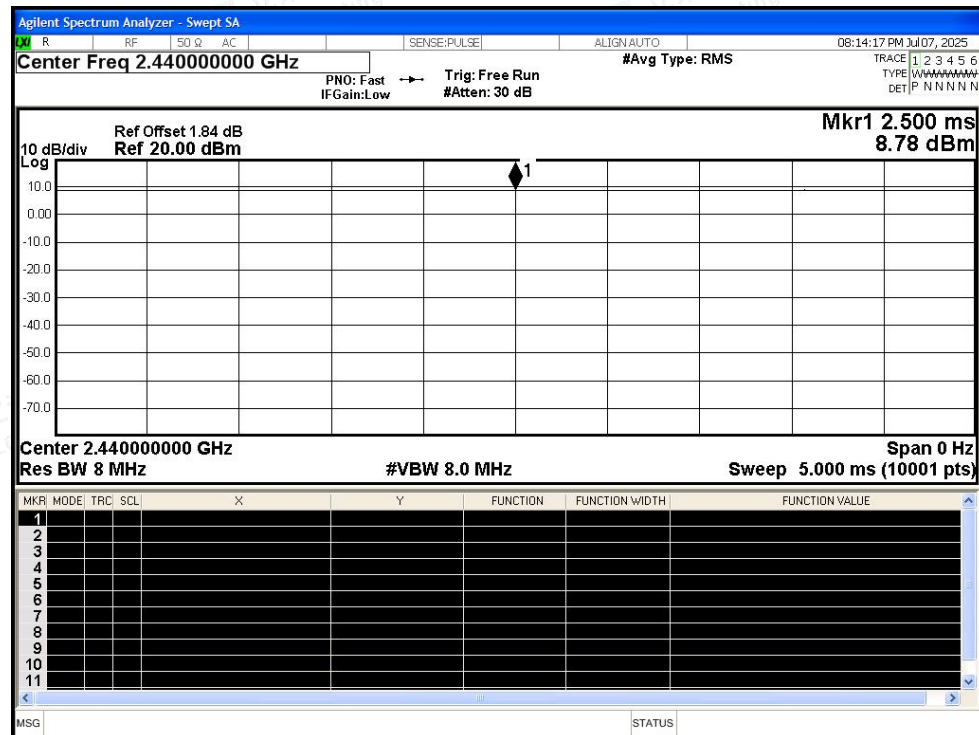


## Test Graphs

## Duty Cycle NVNT Zigbee 2405MHz Ant1



## Duty Cycle NVNT Zigbee 2440MHz Ant1

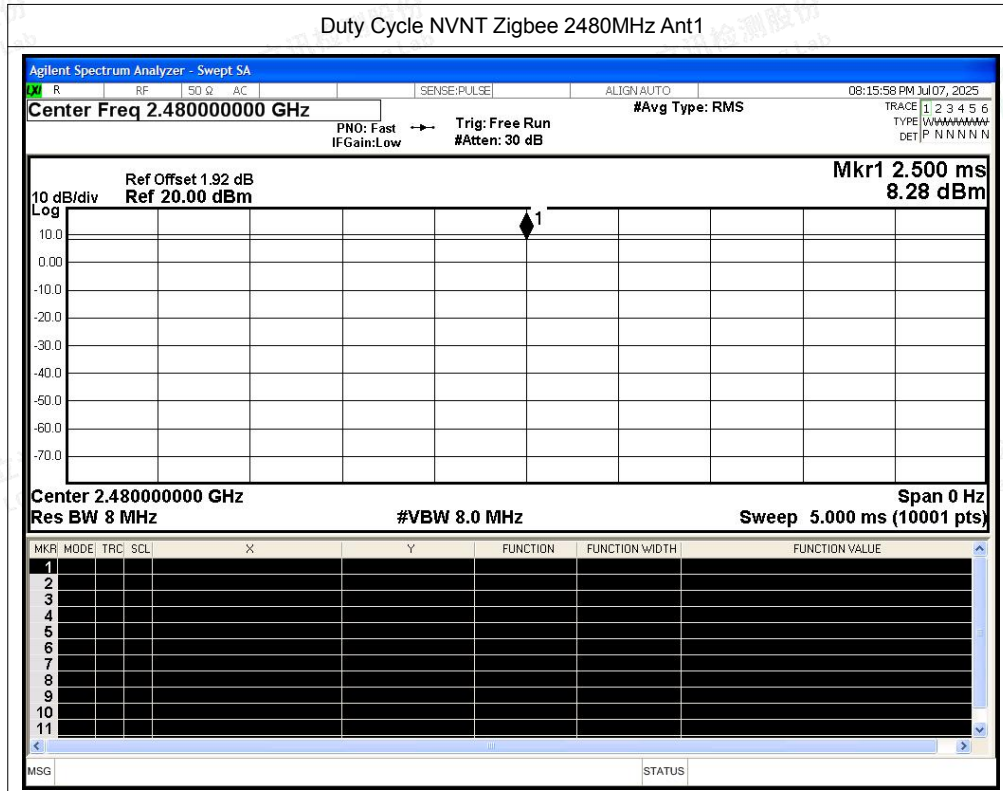


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## A.7 Restrict Band

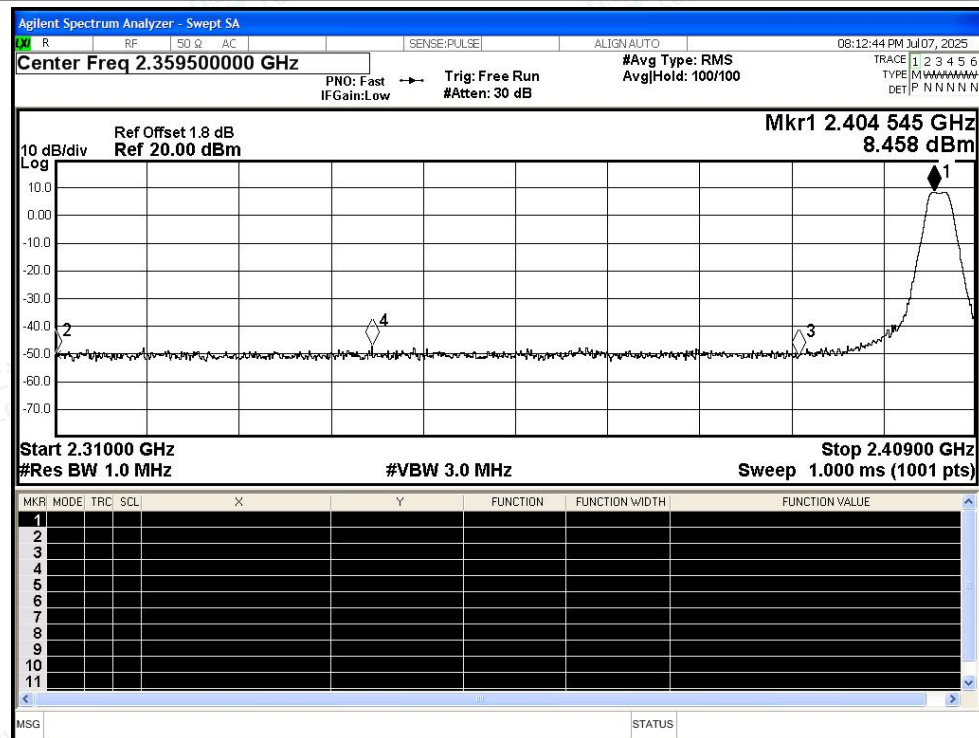
| Condition | Mode   | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | Duty Factor (dB) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|------------|------------------|------------|----------|----------------|---------|
| NVNT      | Zigbee | 2405            | Ant1    | 2310            | -50.34      | 2.72       | -                | 47.64      | Peak     | 74             | Pass    |
| NVNT      | Zigbee | 2405            | Ant1    | 2310            | -58.89      | 2.72       | 0                | 39.09      | Average  | 54             | Pass    |
| NVNT      | Zigbee | 2405            | Ant1    | 2344.155        | -47         | 2.72       | -                | 50.98      | Peak     | 74             | Pass    |
| NVNT      | Zigbee | 2405            | Ant1    | 2366.232        | -56.55      | 2.72       | 0                | 41.43      | Average  | 54             | Pass    |
| NVNT      | Zigbee | 2405            | Ant1    | 2390            | -50.81      | 2.72       | -                | 47.17      | Peak     | 74             | Pass    |
| NVNT      | Zigbee | 2405            | Ant1    | 2390            | -57.91      | 2.72       | 0                | 40.07      | Average  | 54             | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 2483.5          | -35.84      | 2.72       | -                | 62.14      | Peak     | 74             | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 2483.5          | -45.25      | 2.72       | 0                | 52.73      | Average  | 54             | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 2483.512        | -35.84      | 2.72       | -                | 62.14      | Peak     | 74             | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 2483.512        | -45.25      | 2.72       | 0                | 52.73      | Average  | 54             | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 2500            | -49.01      | 2.72       | -                | 48.97      | Peak     | 74             | Pass    |
| NVNT      | Zigbee | 2480            | Ant1    | 2500            | -58.23      | 2.72       | 0                | 39.75      | Average  | 54             | Pass    |



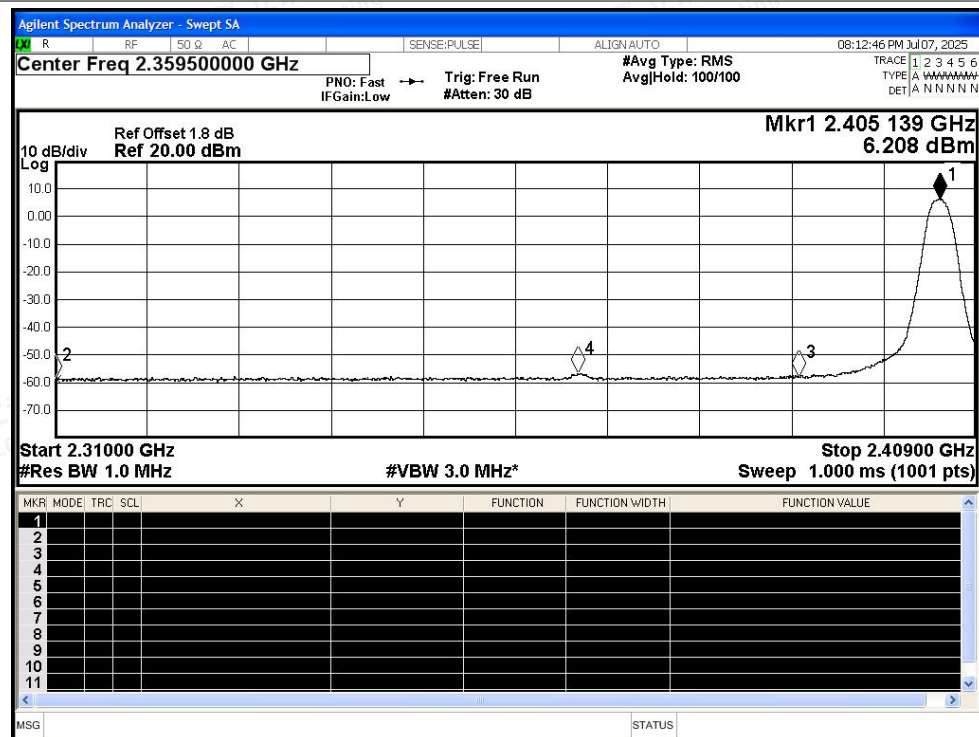


## Test Graphs

## Restrict Band NVNT Zigbee 2405MHz Ant1 Peak



## Restrict Band NVNT Zigbee 2405MHz Ant1 Average



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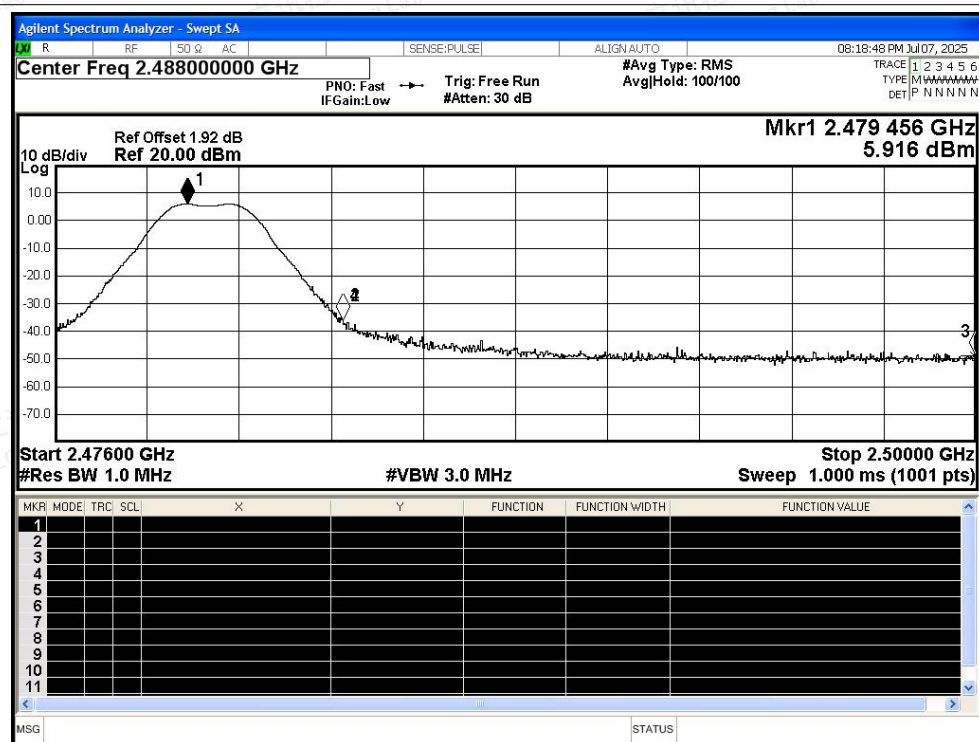
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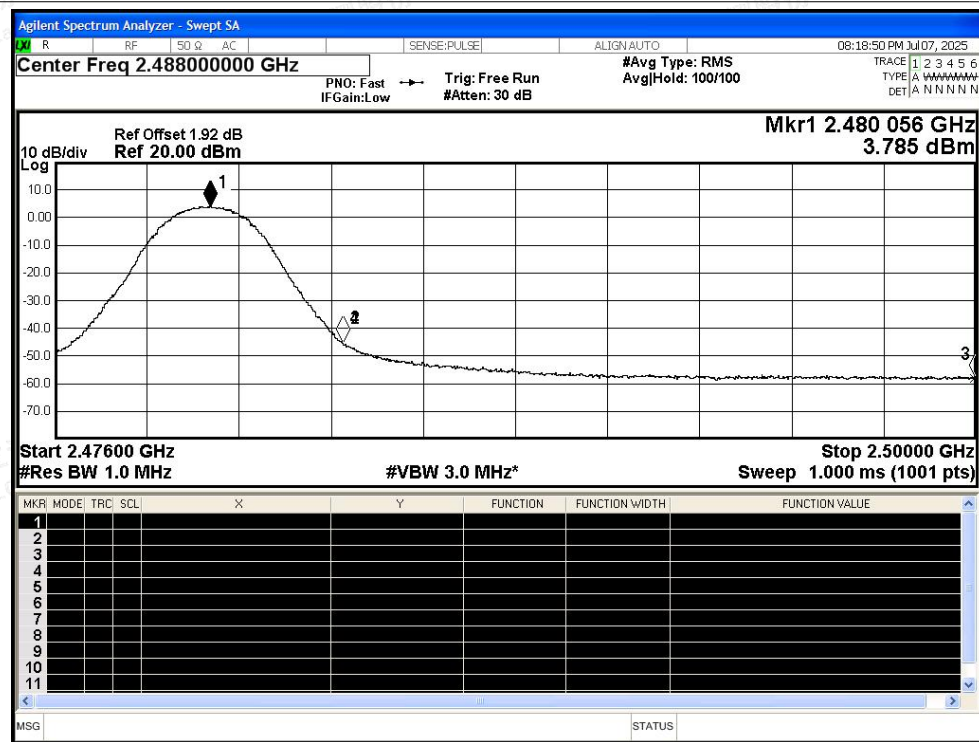
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## Restrict Band NVNT Zigbee 2480MHz Ant1 Peak



## Restrict Band NVNT Zigbee 2480MHz Ant1 Average



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