



## Appendix C

### RF Test Data for 2.4GWIFI (Conducted Measurement)

**Product Name: M5CoreS3**

**Trade Mark: M5STACK**

**Test Model: CoreS3**

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 25.9° C     |
| Relative Humidity: | 51.8%       |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Simba Huang |
| Supervised by:     | Seal Chen   |



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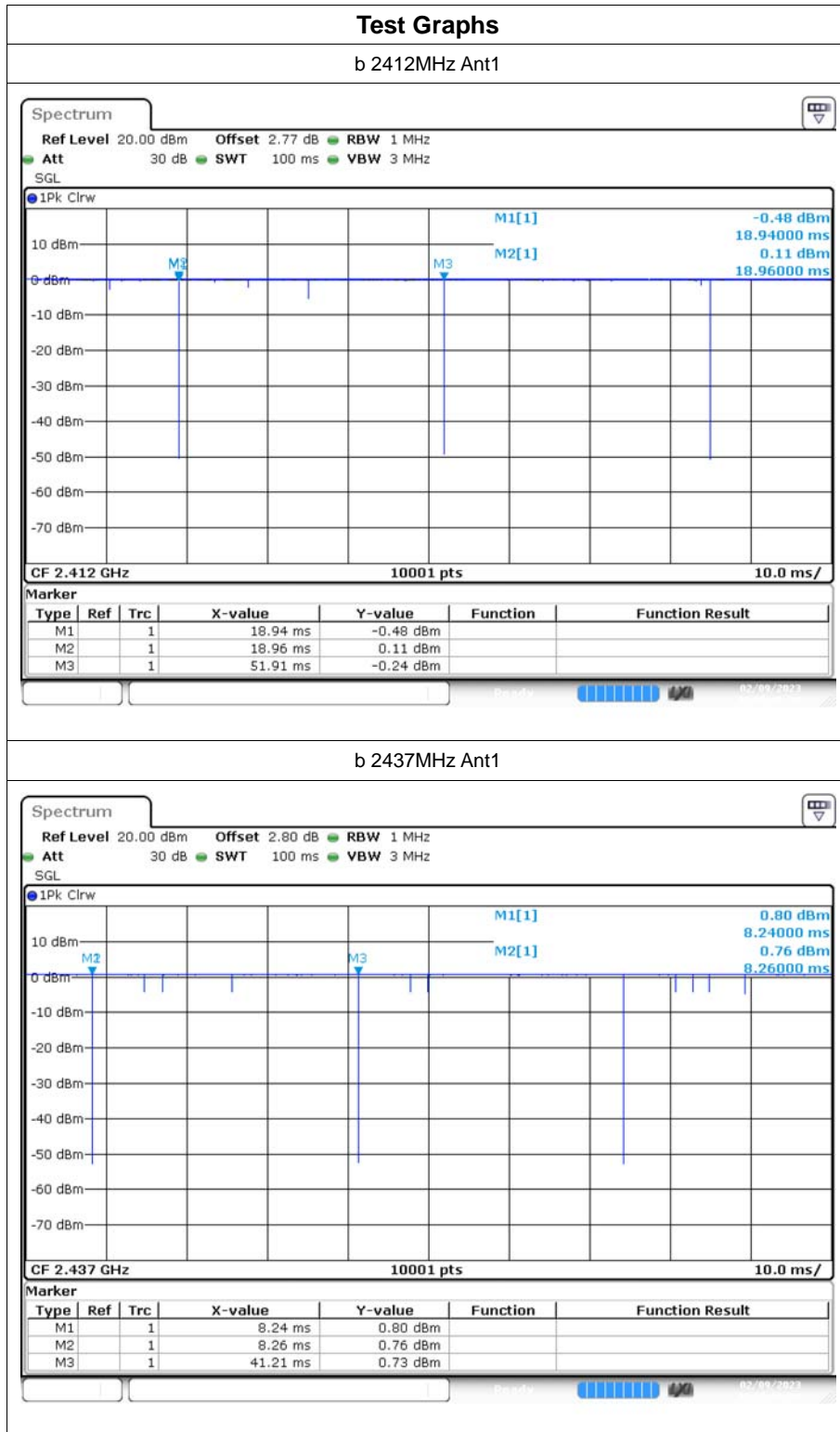
# 1 Duty Cycle

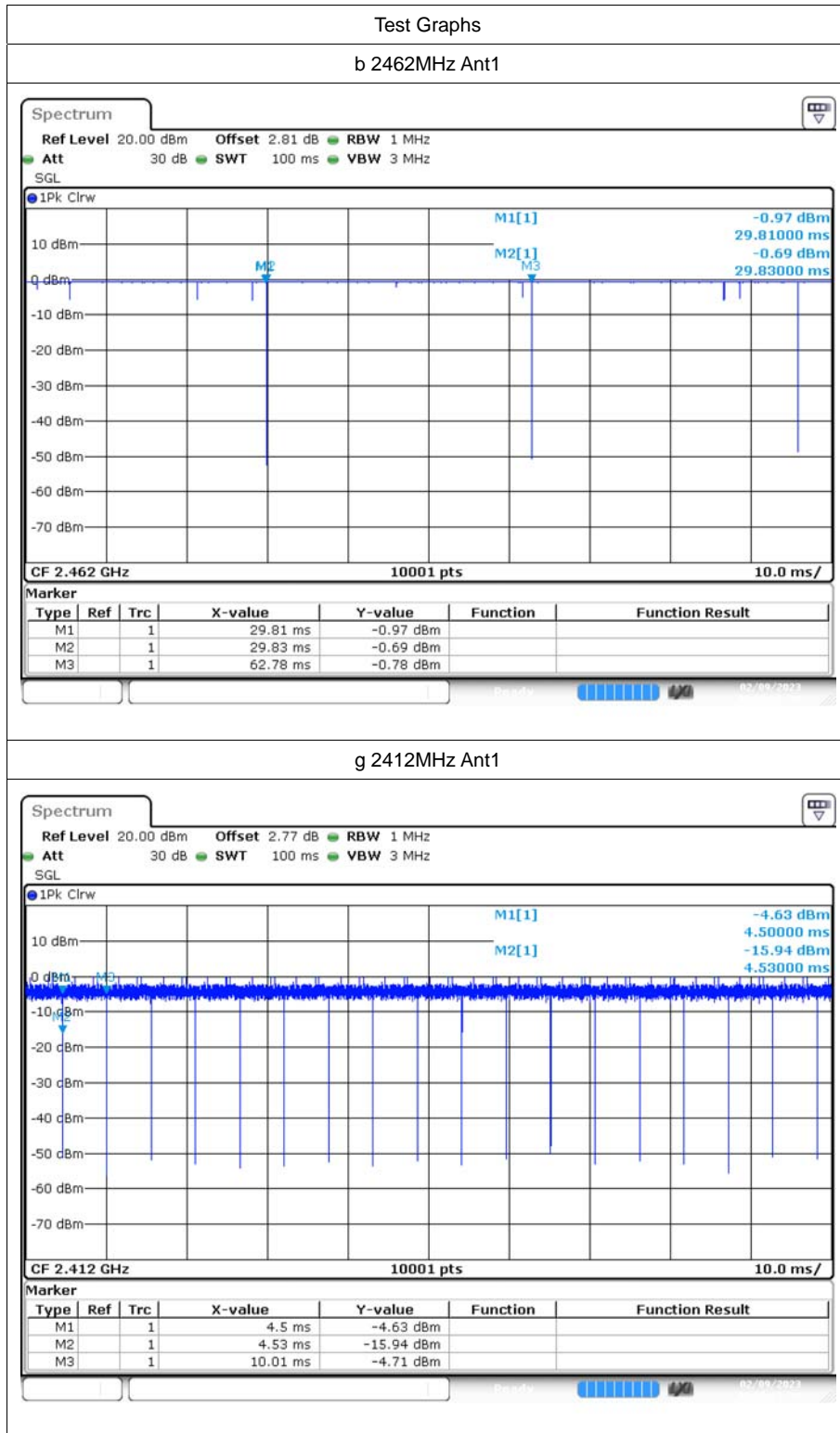
## 1.1 Test Result

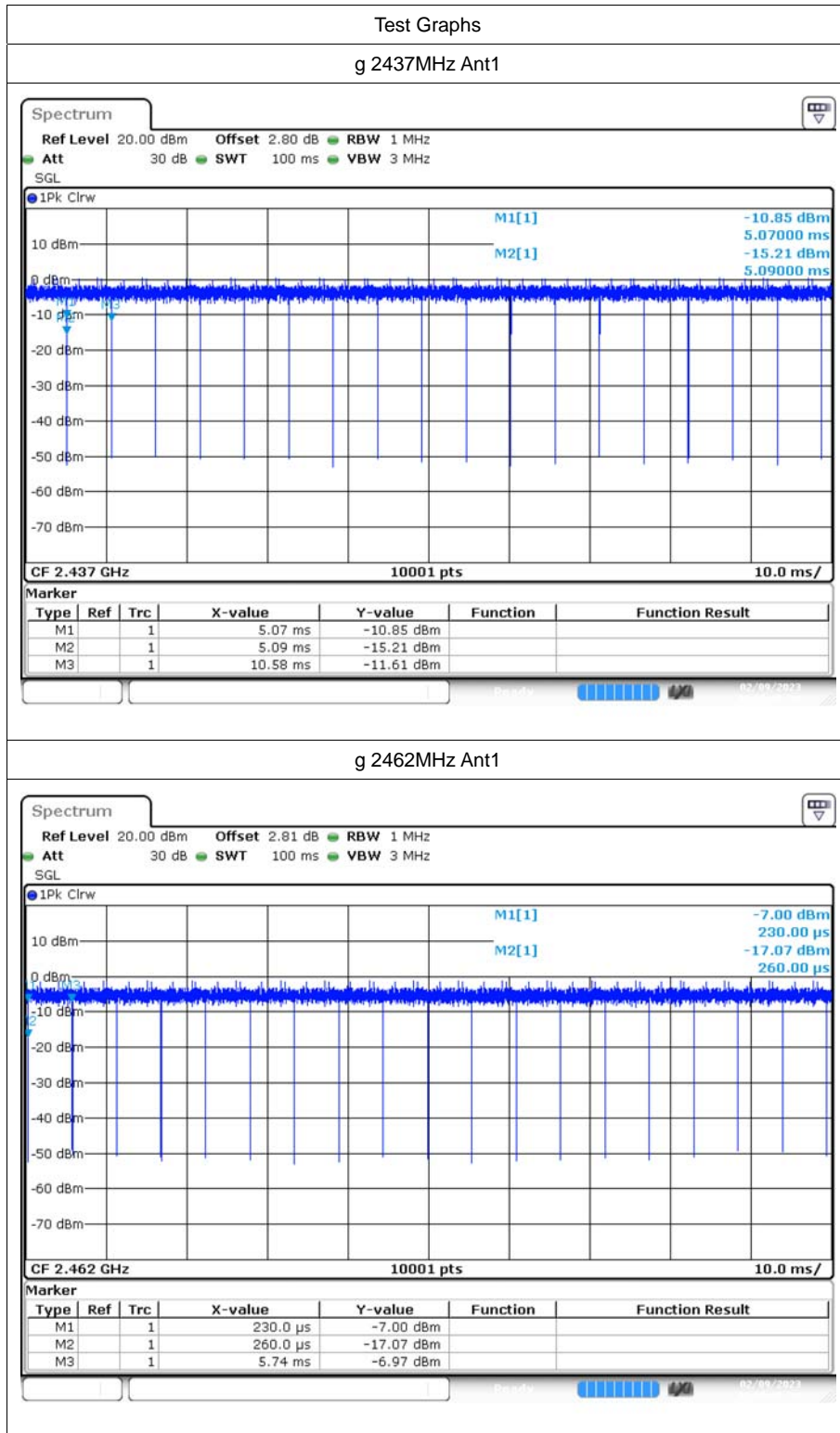
| Mode      | Frequency (MHz) | Antenna | Duty Cycle (%) | 1/T (kHz) |
|-----------|-----------------|---------|----------------|-----------|
| 802.11b   | 2412            | Ant1    | 99.97          | 0.03      |
| 802.11b   | 2437            | Ant1    | 99.97          | 0.03      |
| 802.11b   | 2462            | Ant1    | 99.97          | 0.03      |
| 802.11g   | 2412            | Ant1    | 99.64          | 0.18      |
| 802.11g   | 2437            | Ant1    | 99.73          | 0.18      |
| 802.11g   | 2462            | Ant1    | 99.67          | 0.18      |
| 802.11n20 | 2412            | Ant1    | 99.69          | 0.2       |
| 802.11n20 | 2437            | Ant1    | 99.68          | 0.2       |
| 802.11n20 | 2462            | Ant1    | 99.69          | 0.2       |
| 802.11n40 | 2422            | Ant1    | 99.04          | 0.41      |
| 802.11n40 | 2437            | Ant1    | 99.06          | 0.41      |
| 802.11n40 | 2452            | Ant1    | 99.04          | 0.41      |

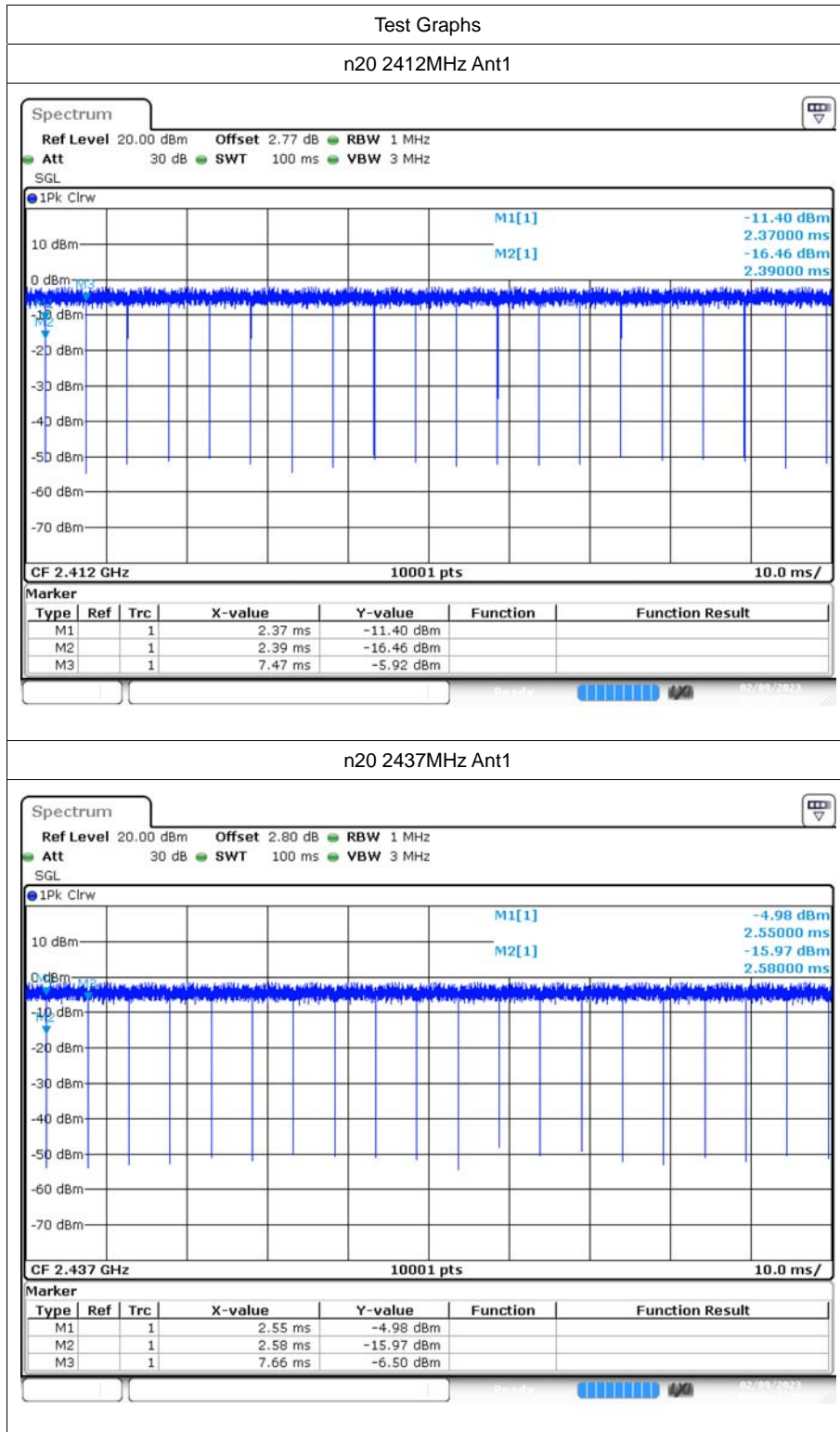


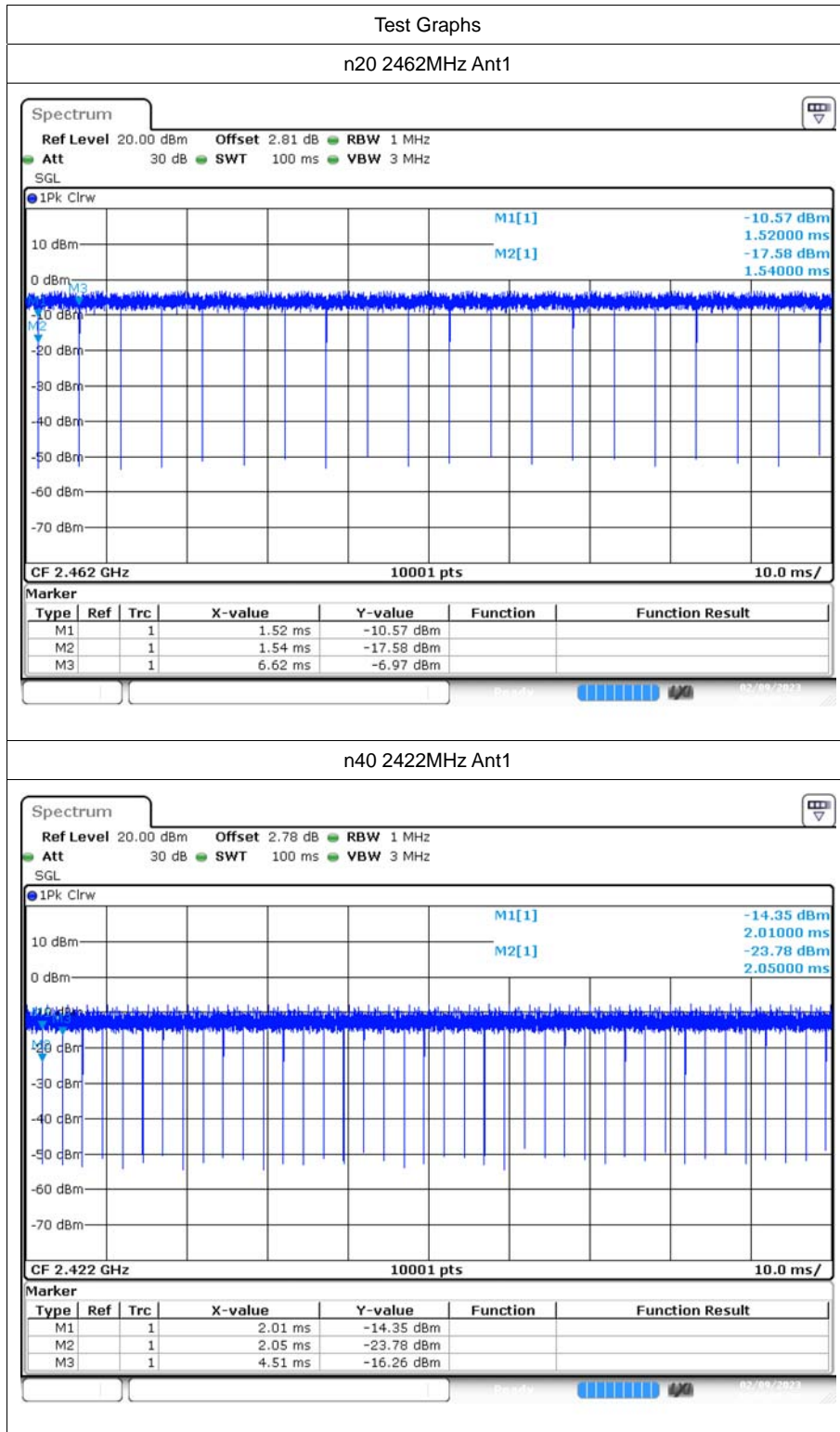
### 1.2 Test Graphs



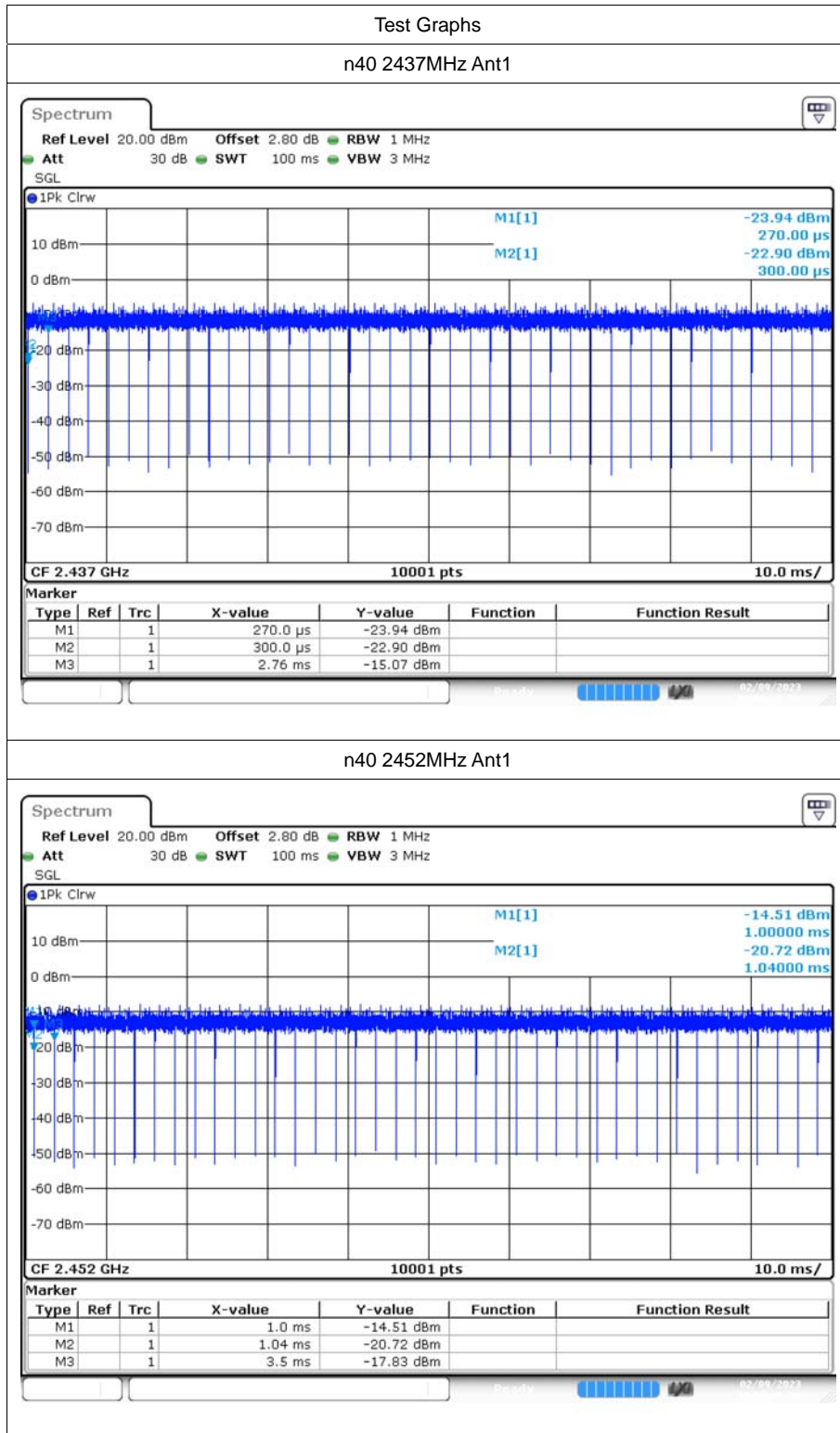














## 2 Maximum Conducted Output Power

### 2.1 Test Result

| Mode      | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|-----------------|---------|-----------------------|-------------|---------|
| 802.11b   | 2412            | Ant1    | 9.86                  | 30          | Pass    |
| 802.11b   | 2437            | Ant1    | 10.31                 | 30          | Pass    |
| 802.11b   | 2462            | Ant1    | 8.9                   | 30          | Pass    |
| 802.11g   | 2412            | Ant1    | 9.23                  | 30          | Pass    |
| 802.11g   | 2437            | Ant1    | 9.48                  | 30          | Pass    |
| 802.11g   | 2462            | Ant1    | 8.19                  | 30          | Pass    |
| 802.11n20 | 2412            | Ant1    | 8.73                  | 30          | Pass    |
| 802.11n20 | 2437            | Ant1    | 8.96                  | 30          | Pass    |
| 802.11n20 | 2462            | Ant1    | 7.6                   | 30          | Pass    |
| 802.11n40 | 2422            | Ant1    | 8.2                   | 30          | Pass    |
| 802.11n40 | 2437            | Ant1    | 8.06                  | 30          | Pass    |
| 802.11n40 | 2452            | Ant1    | 7.58                  | 30          | Pass    |



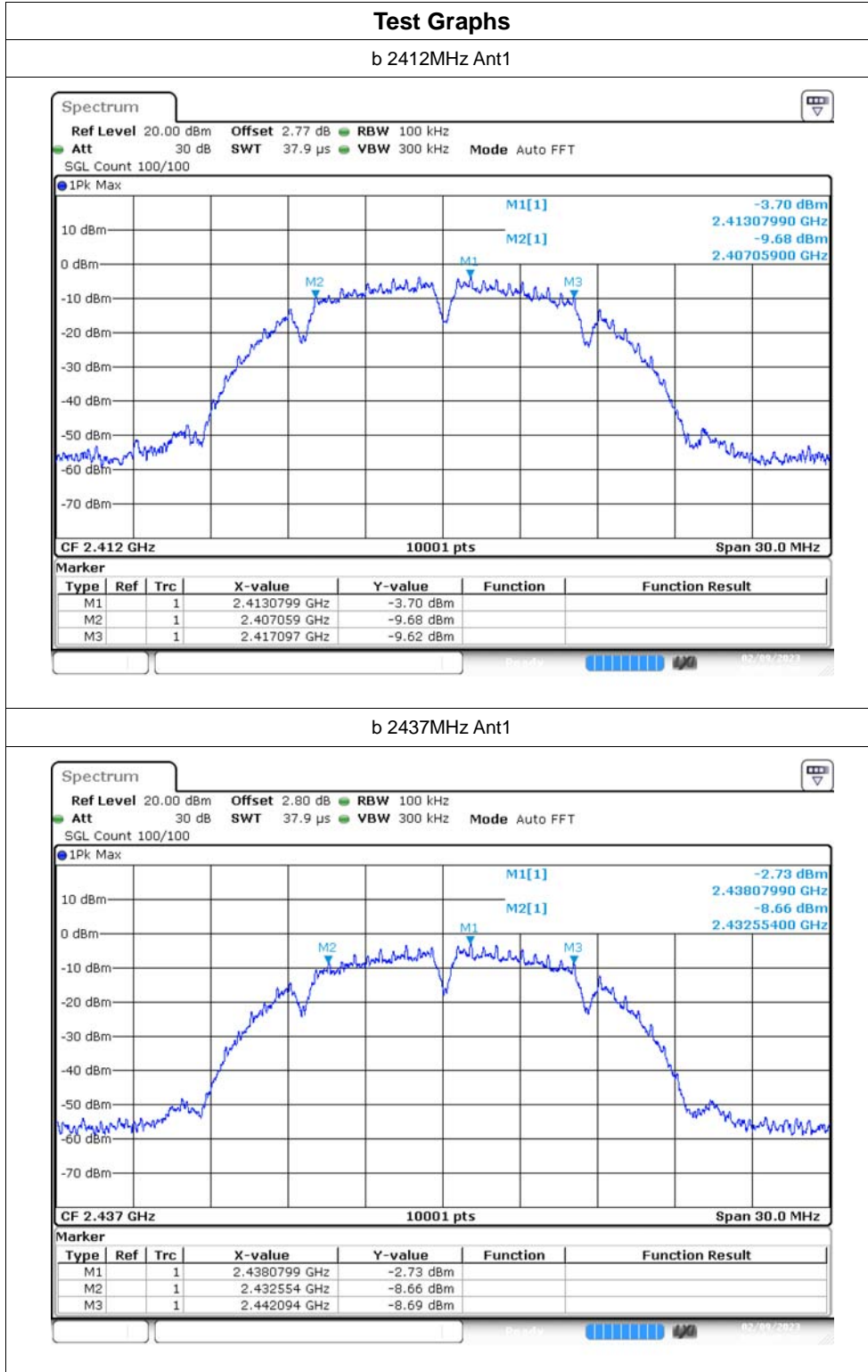
### 3 -6dB Bandwidth

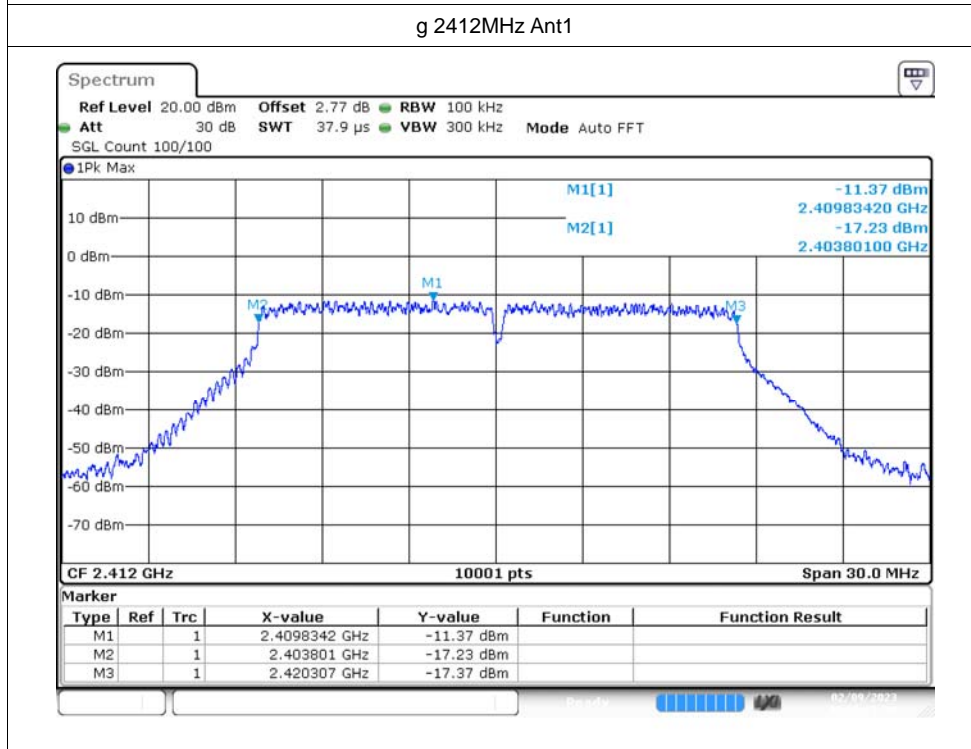
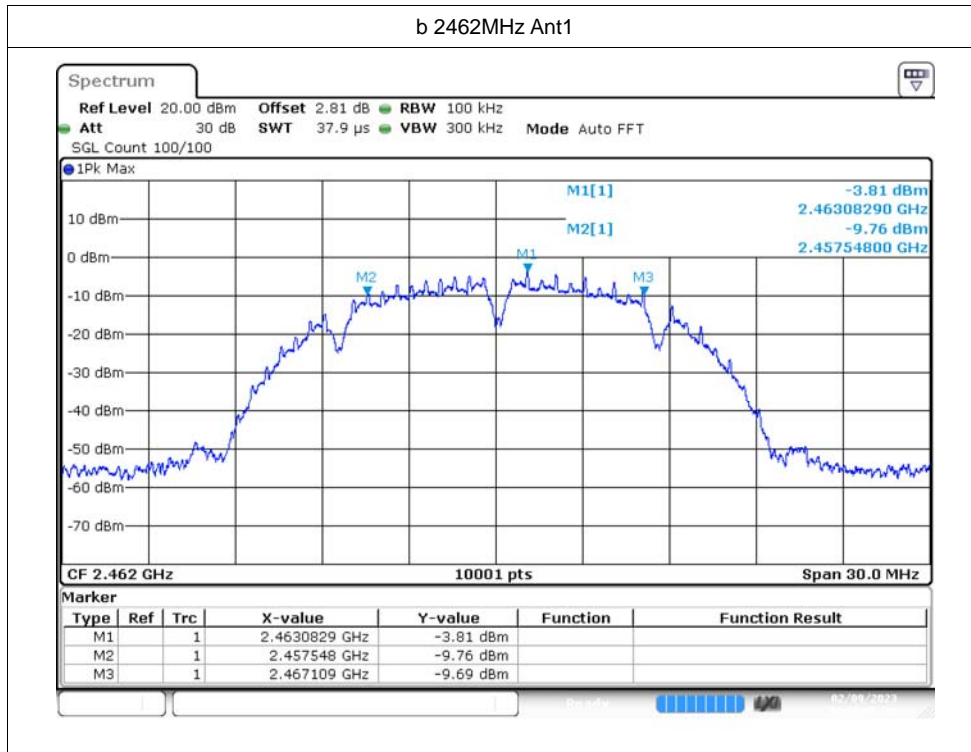
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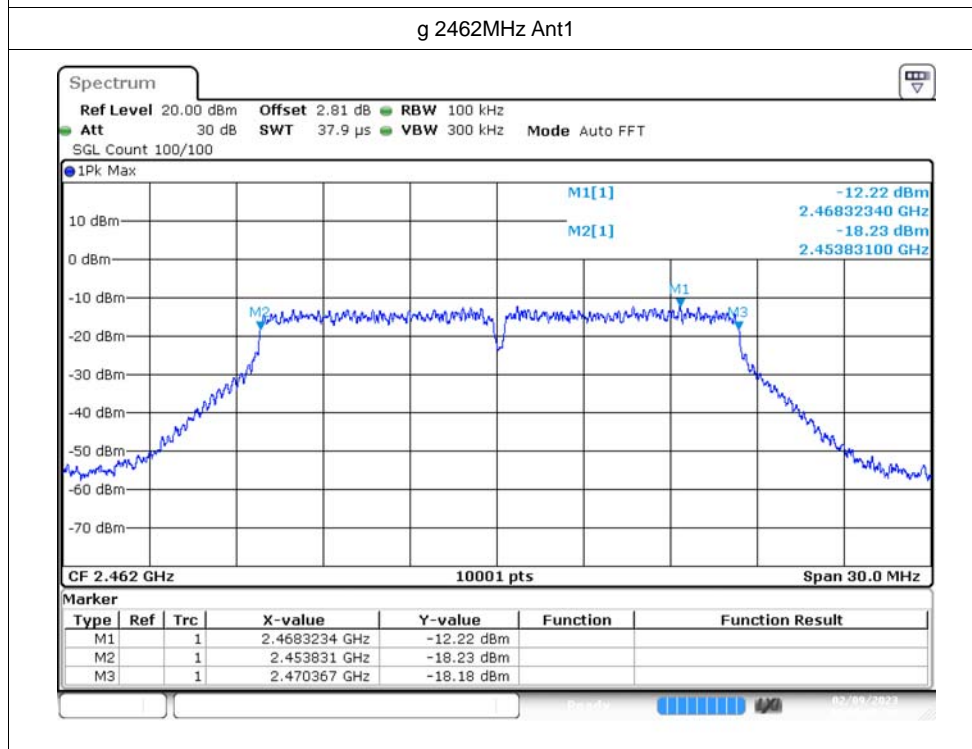
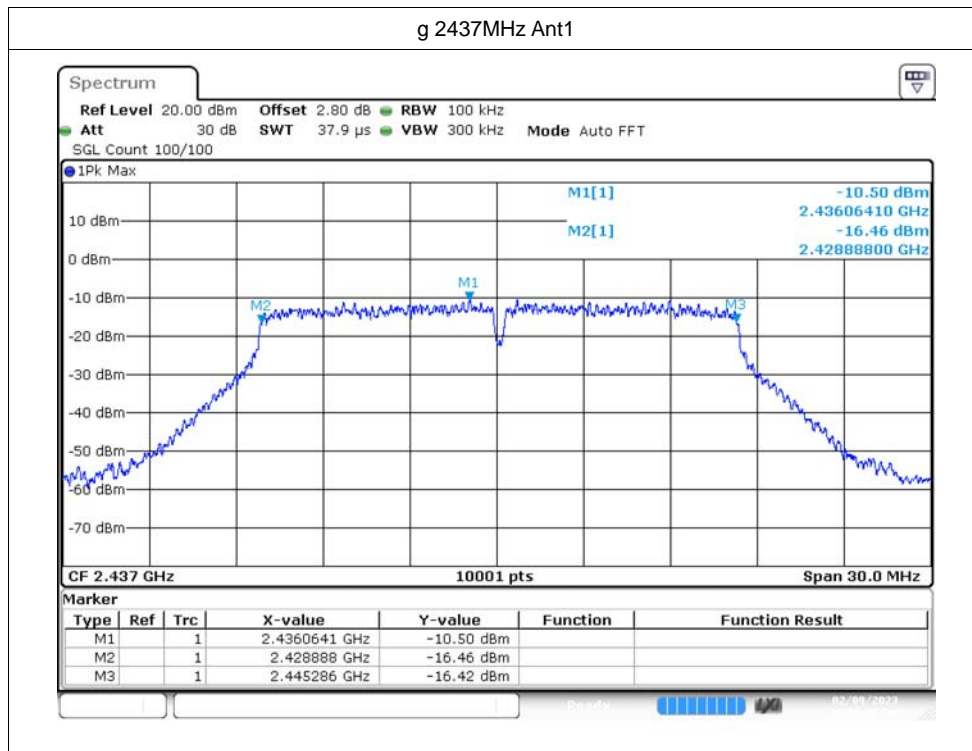
| Mode      | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|-----------------|---------|-----------------------|-----------------------------|---------|
| 802.11b   | 2412            | Ant1    | 10.038                | 0.5                         | Pass    |
| 802.11b   | 2437            | Ant1    | 9.54                  | 0.5                         | Pass    |
| 802.11b   | 2462            | Ant1    | 9.561                 | 0.5                         | Pass    |
| 802.11g   | 2412            | Ant1    | 16.506                | 0.5                         | Pass    |
| 802.11g   | 2437            | Ant1    | 16.398                | 0.5                         | Pass    |
| 802.11g   | 2462            | Ant1    | 16.536                | 0.5                         | Pass    |
| 802.11n20 | 2412            | Ant1    | 17.775                | 0.5                         | Pass    |
| 802.11n20 | 2437            | Ant1    | 17.688                | 0.5                         | Pass    |
| 802.11n20 | 2462            | Ant1    | 17.598                | 0.5                         | Pass    |
| 802.11n40 | 2422            | Ant1    | 33.552                | 0.5                         | Pass    |
| 802.11n40 | 2437            | Ant1    | 31.332                | 0.5                         | Pass    |
| 802.11n40 | 2452            | Ant1    | 32.982                | 0.5                         | Pass    |

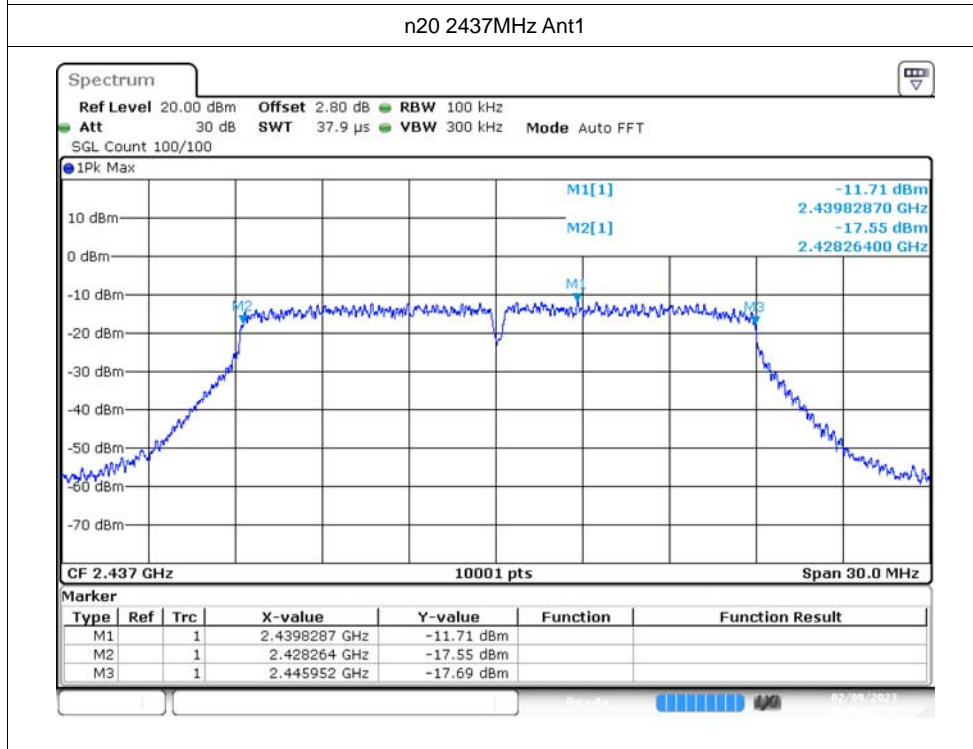
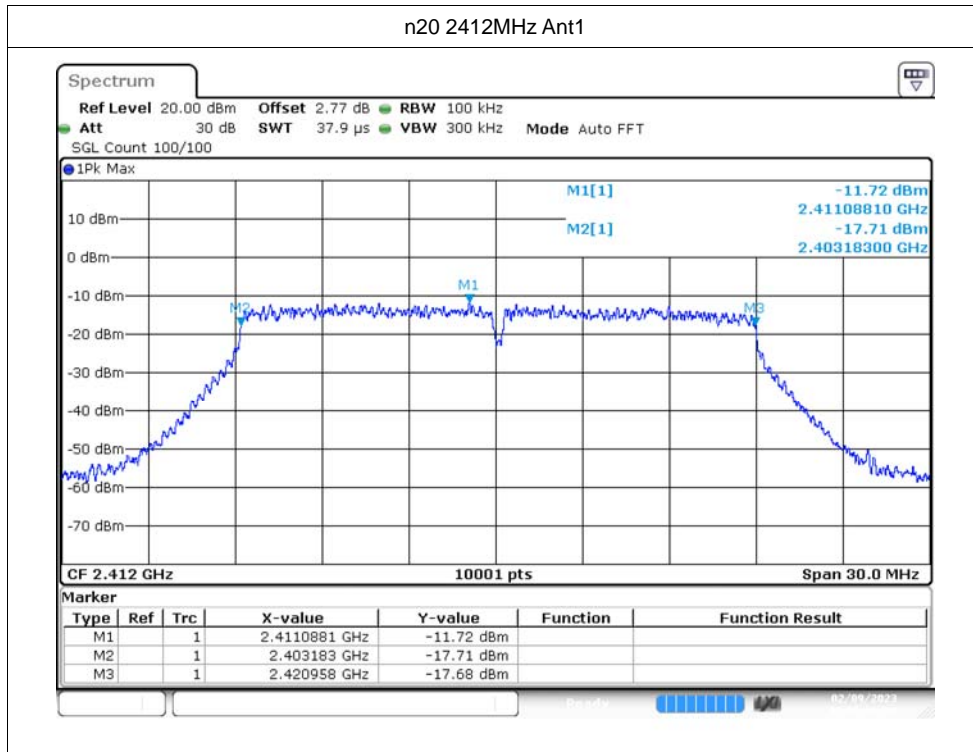


### 3.2 Test Graphs

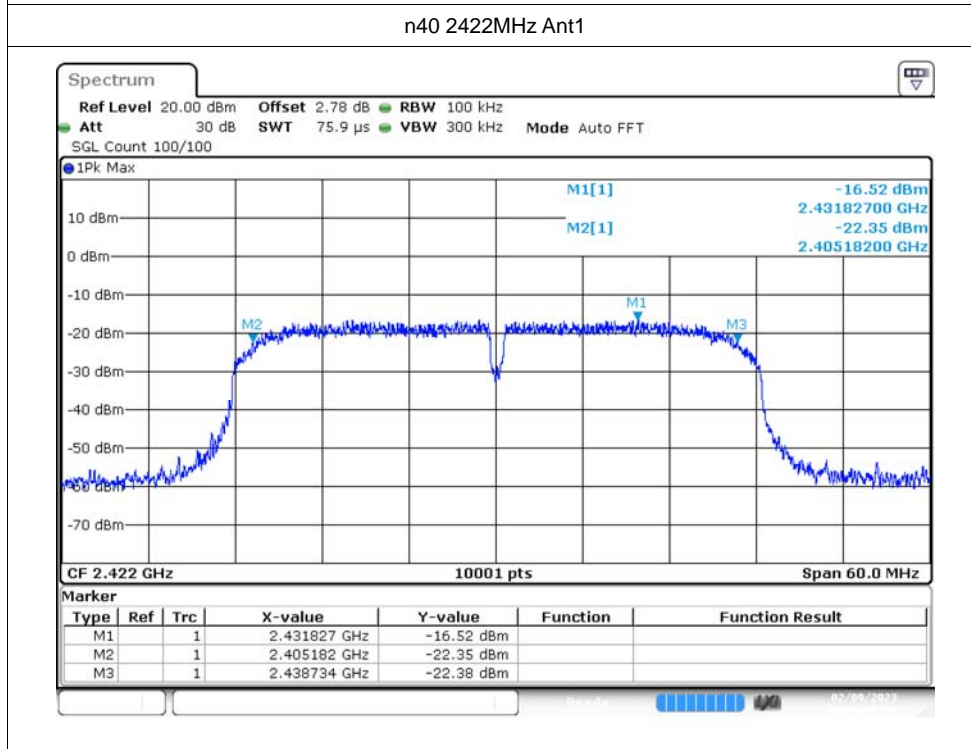
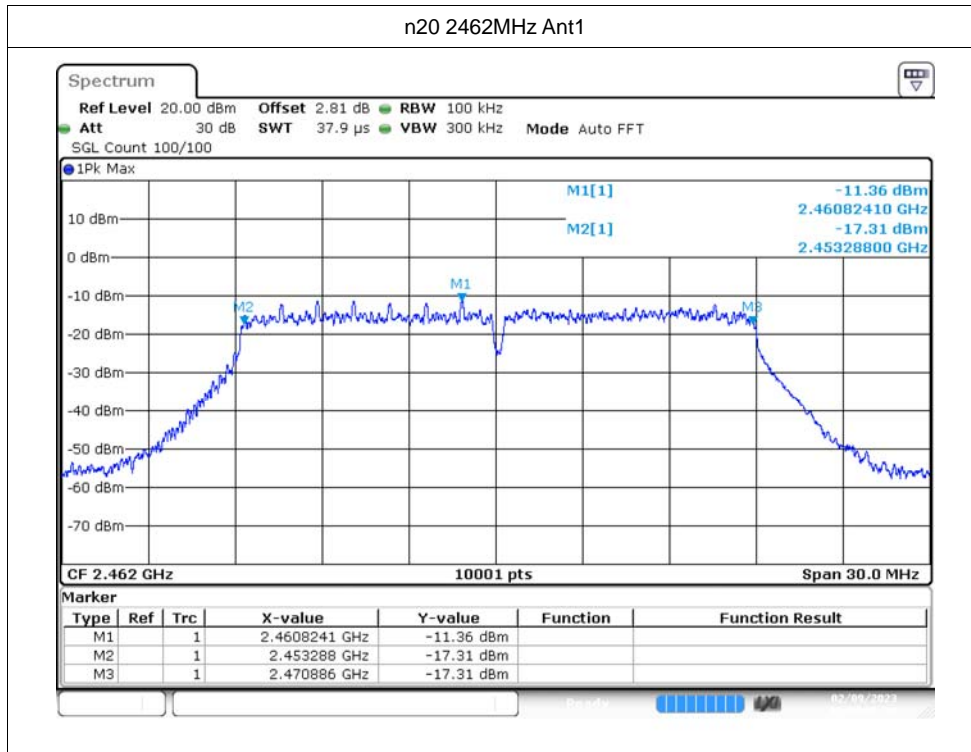




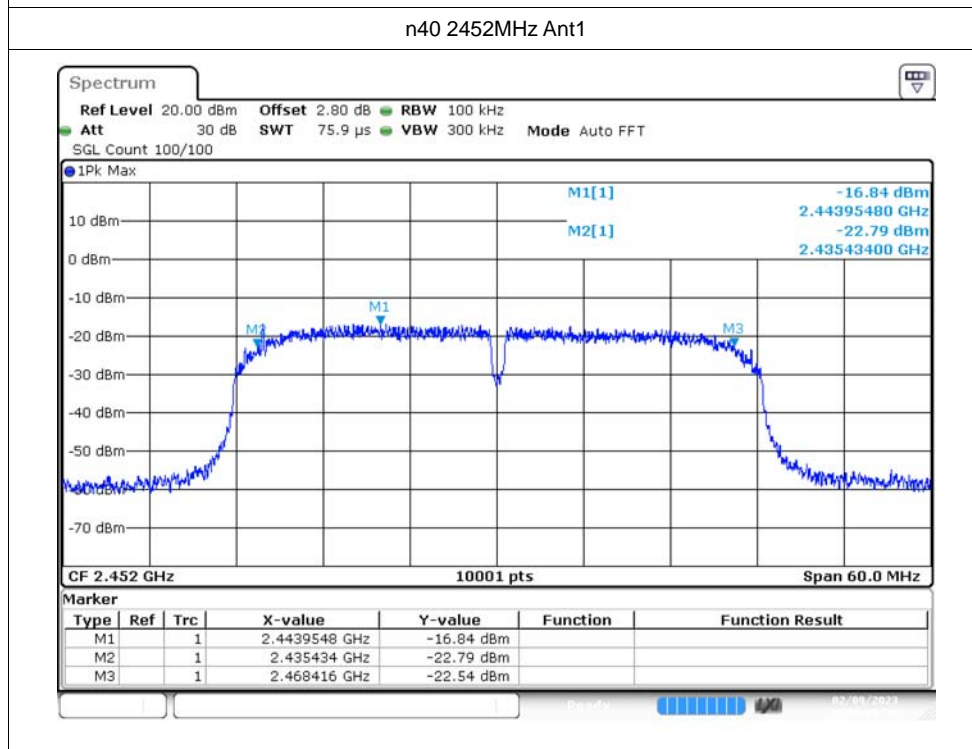
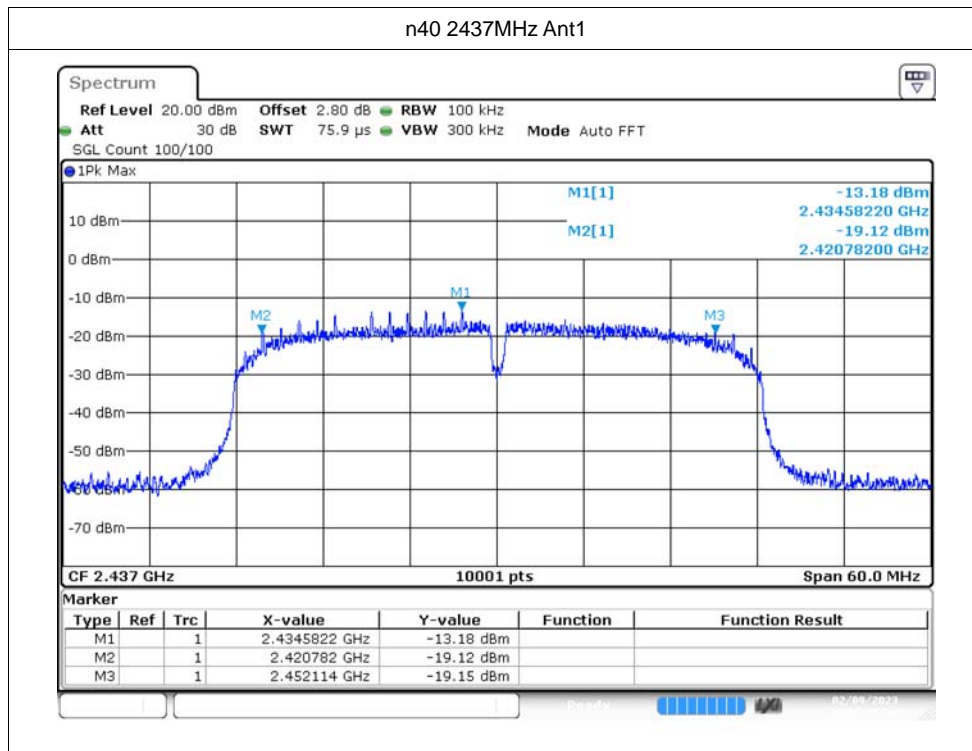












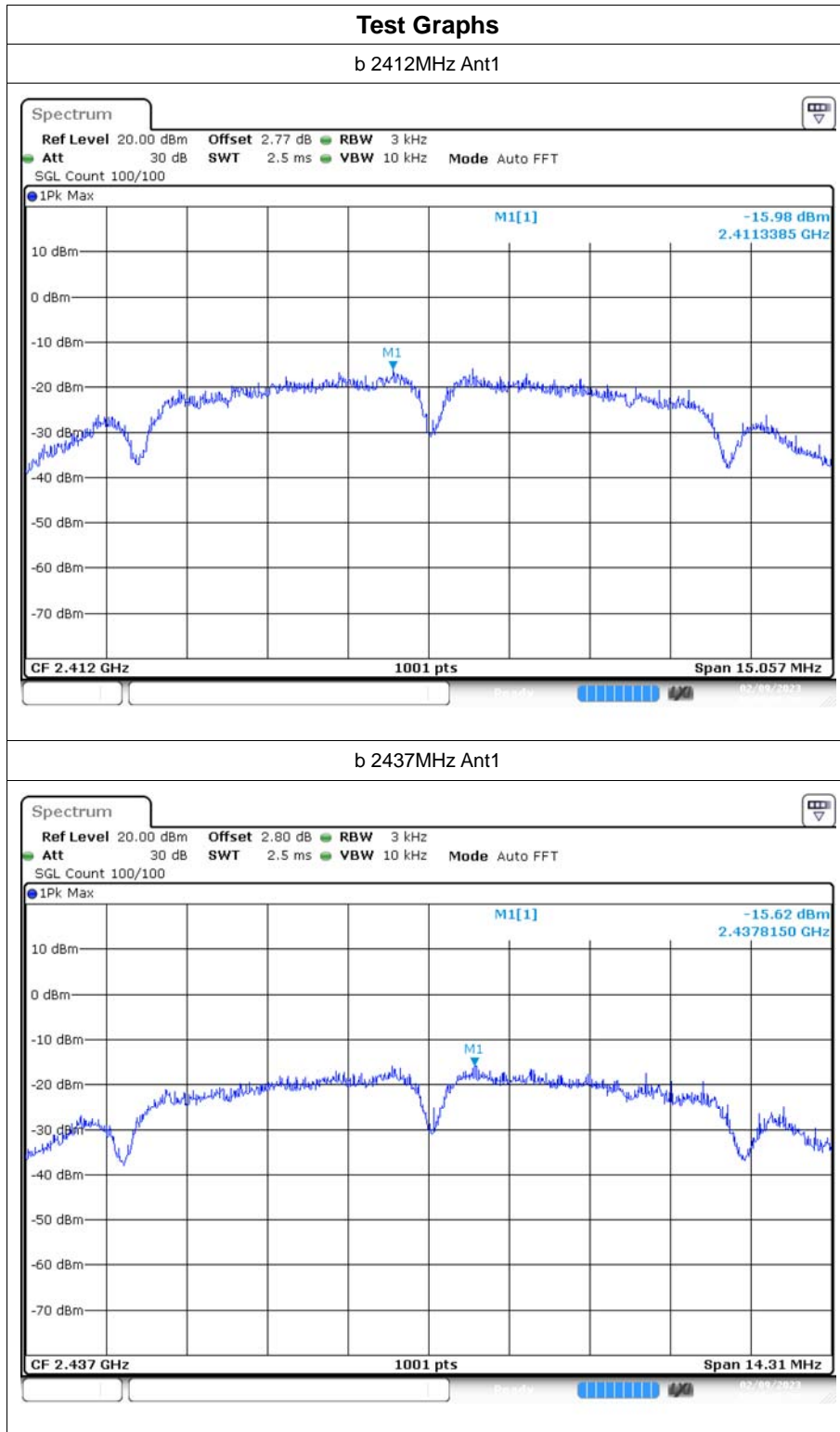


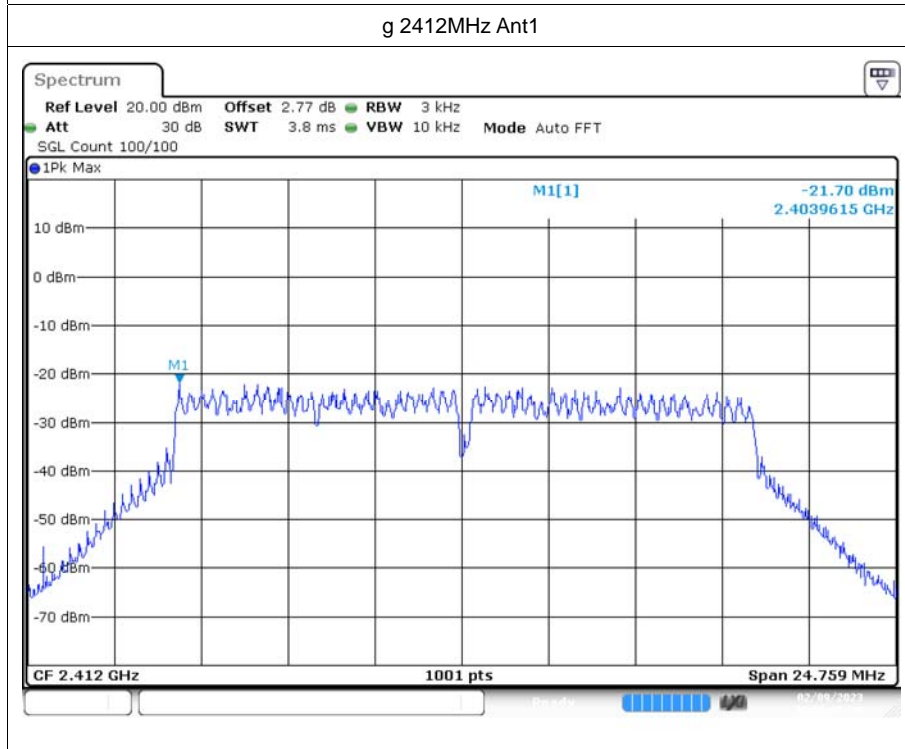
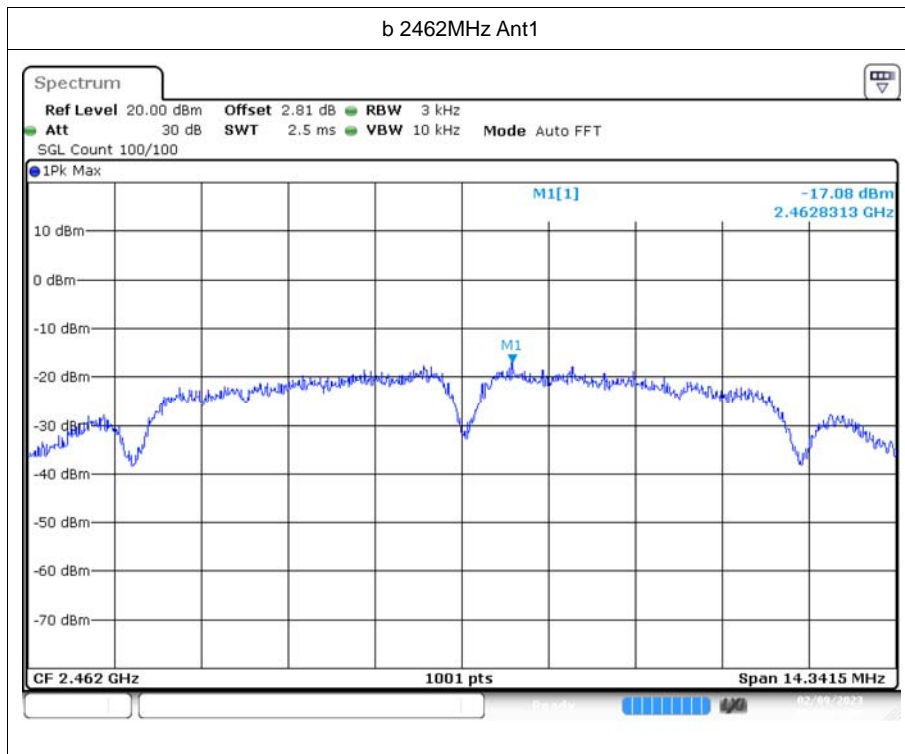
## 4 Maximum Power Spectral Density Level

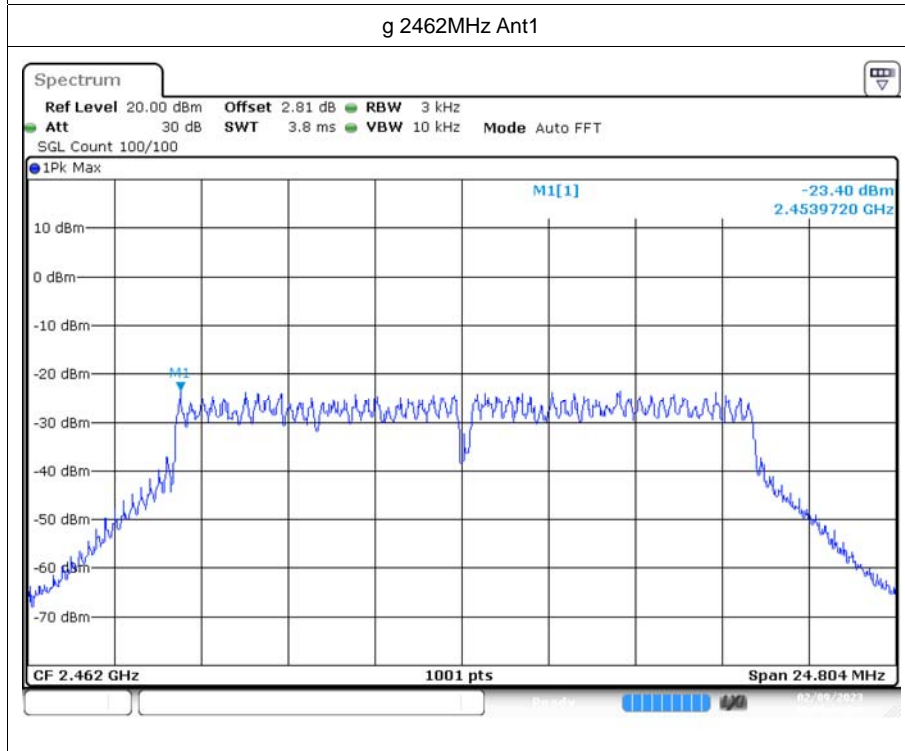
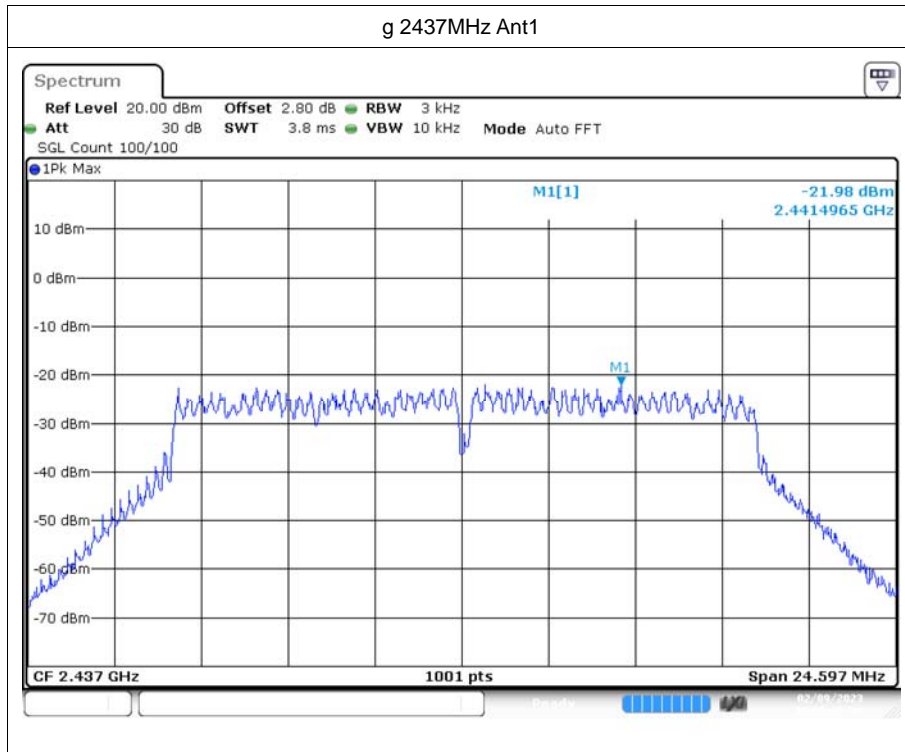
### 4.1 Test Result

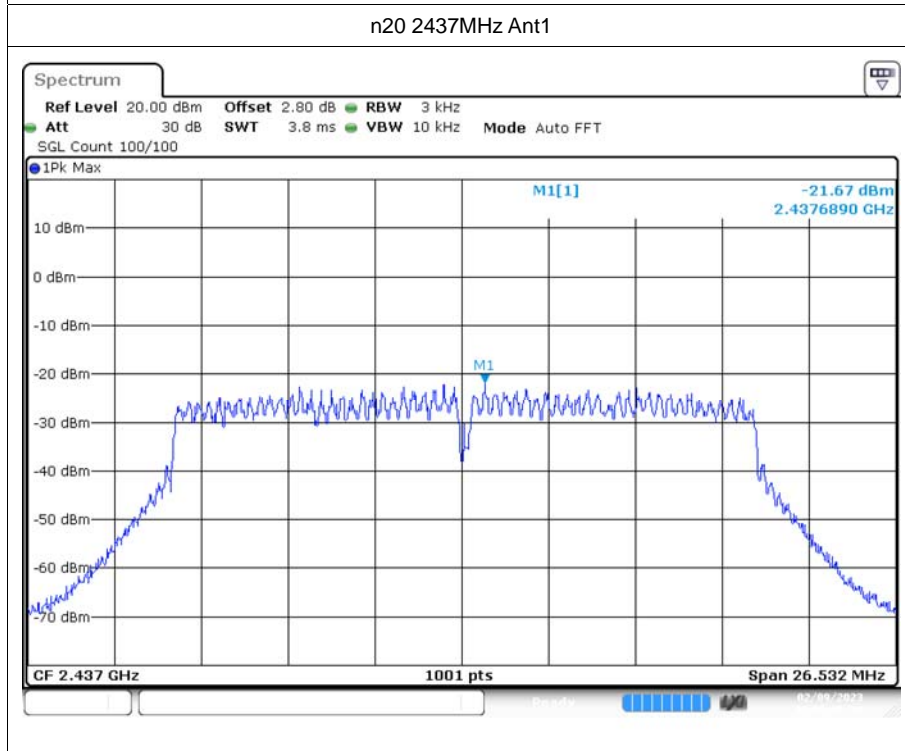
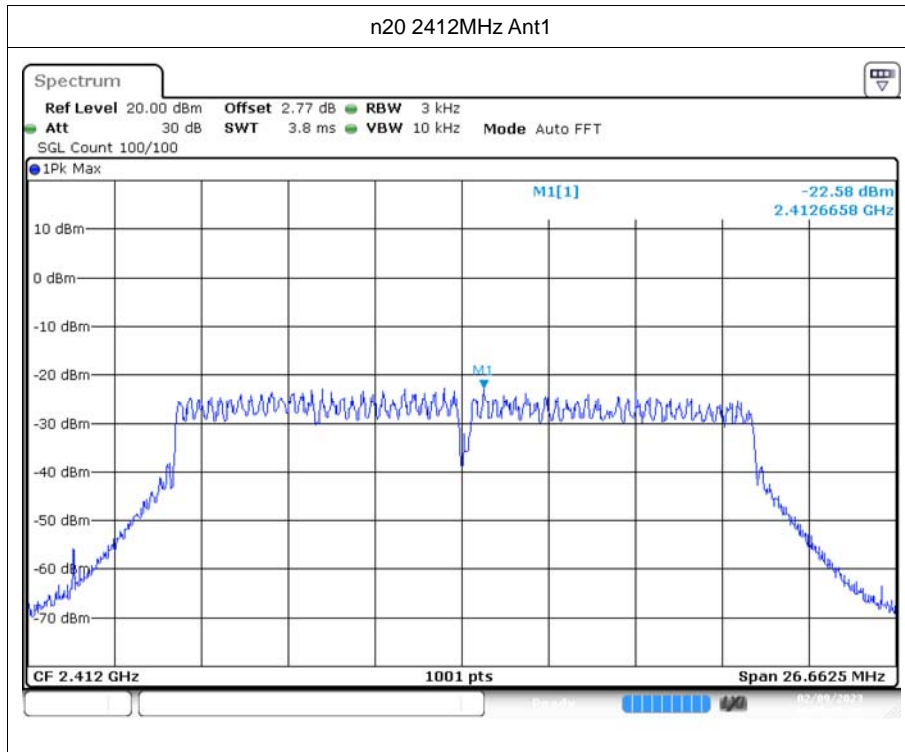
| Mode      | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|-----------------|---------|--------------------------|------------------|---------|
| 802.11b   | 2412            | Ant1    | -15.98                   | ≤8               | Pass    |
| 802.11b   | 2437            | Ant1    | -15.62                   | ≤8               | Pass    |
| 802.11b   | 2462            | Ant1    | -17.08                   | ≤8               | Pass    |
| 802.11g   | 2412            | Ant1    | -21.7                    | ≤8               | Pass    |
| 802.11g   | 2437            | Ant1    | -21.98                   | ≤8               | Pass    |
| 802.11g   | 2462            | Ant1    | -23.4                    | ≤8               | Pass    |
| 802.11n20 | 2412            | Ant1    | -22.58                   | ≤8               | Pass    |
| 802.11n20 | 2437            | Ant1    | -21.67                   | ≤8               | Pass    |
| 802.11n20 | 2462            | Ant1    | -23.27                   | ≤8               | Pass    |
| 802.11n40 | 2422            | Ant1    | -26.44                   | ≤8               | Pass    |
| 802.11n40 | 2437            | Ant1    | -25.65                   | ≤8               | Pass    |
| 802.11n40 | 2452            | Ant1    | -26.84                   | ≤8               | Pass    |

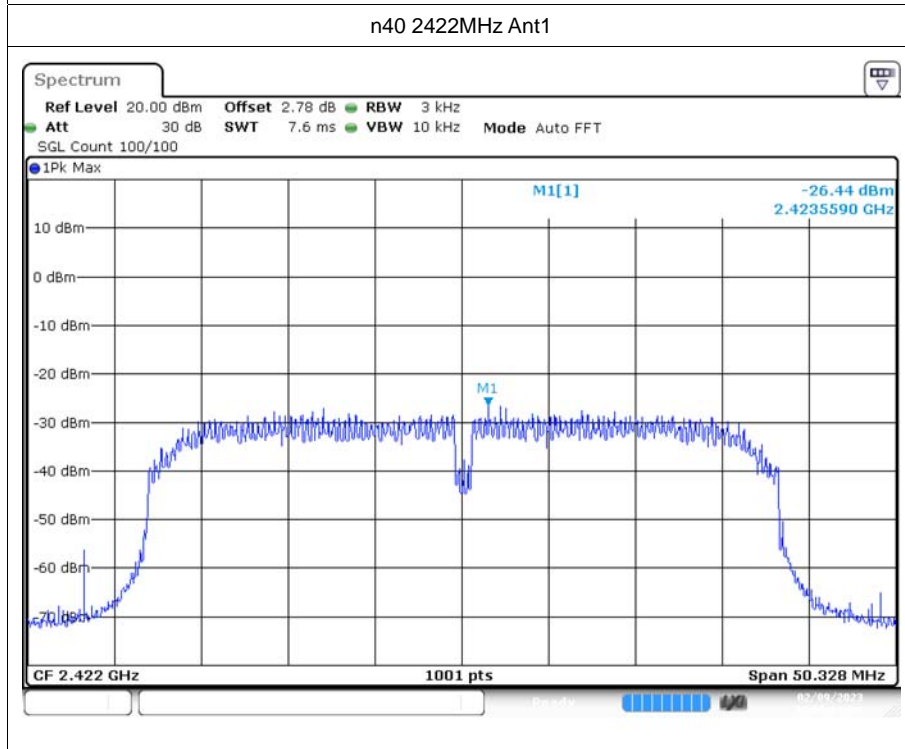
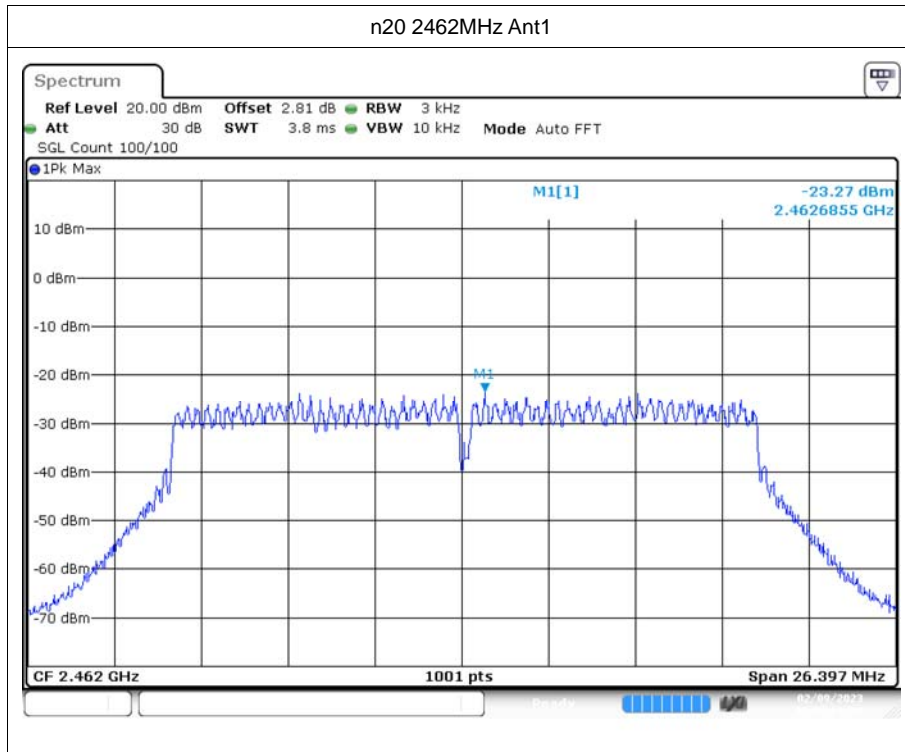
## 4.2 Test Graphs

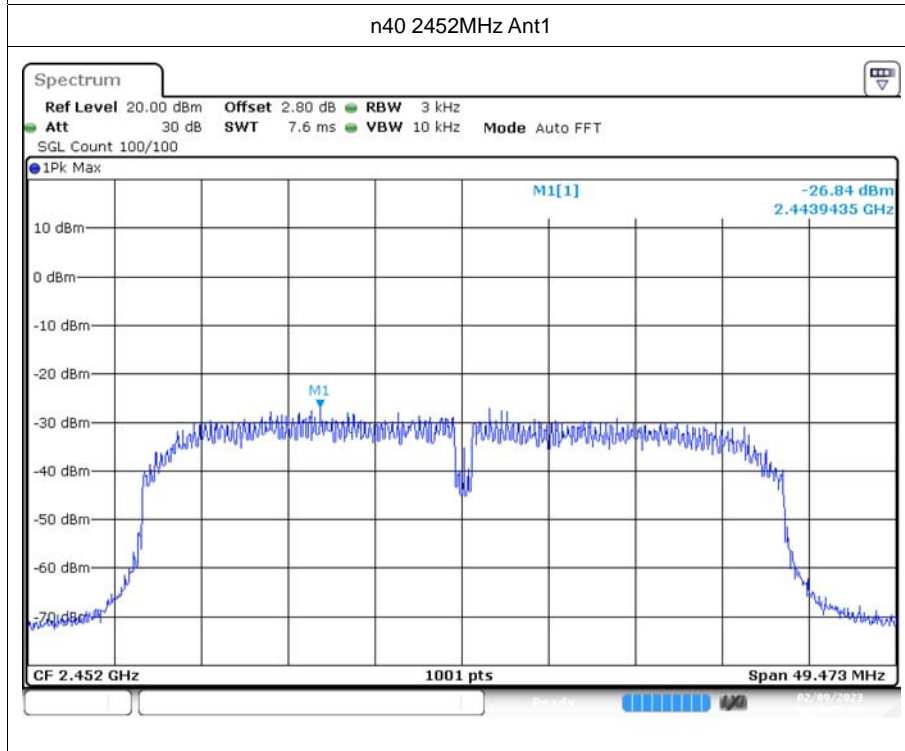
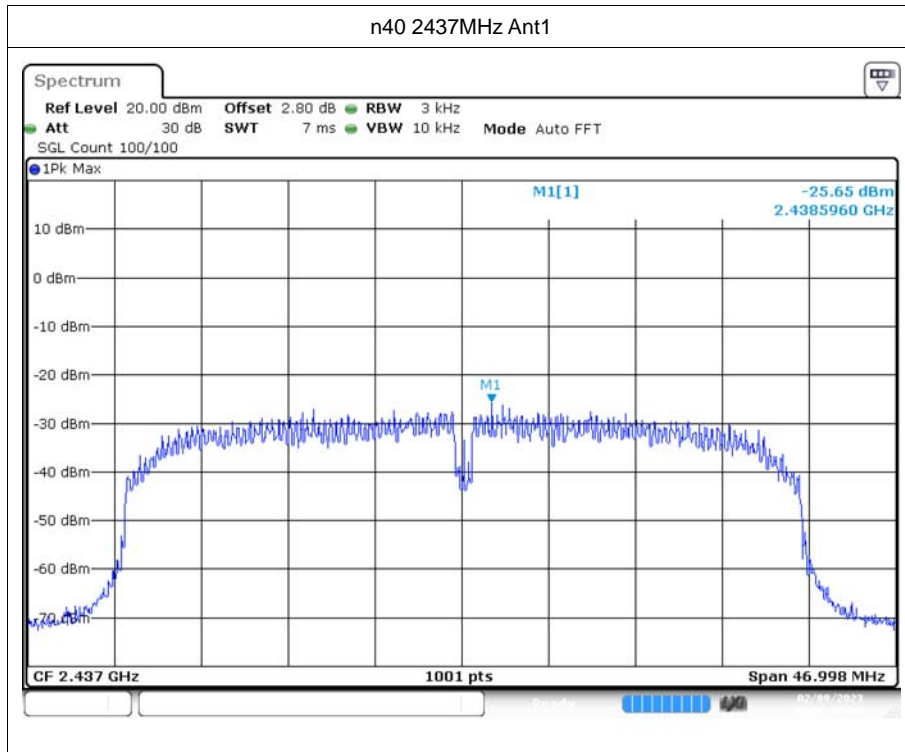














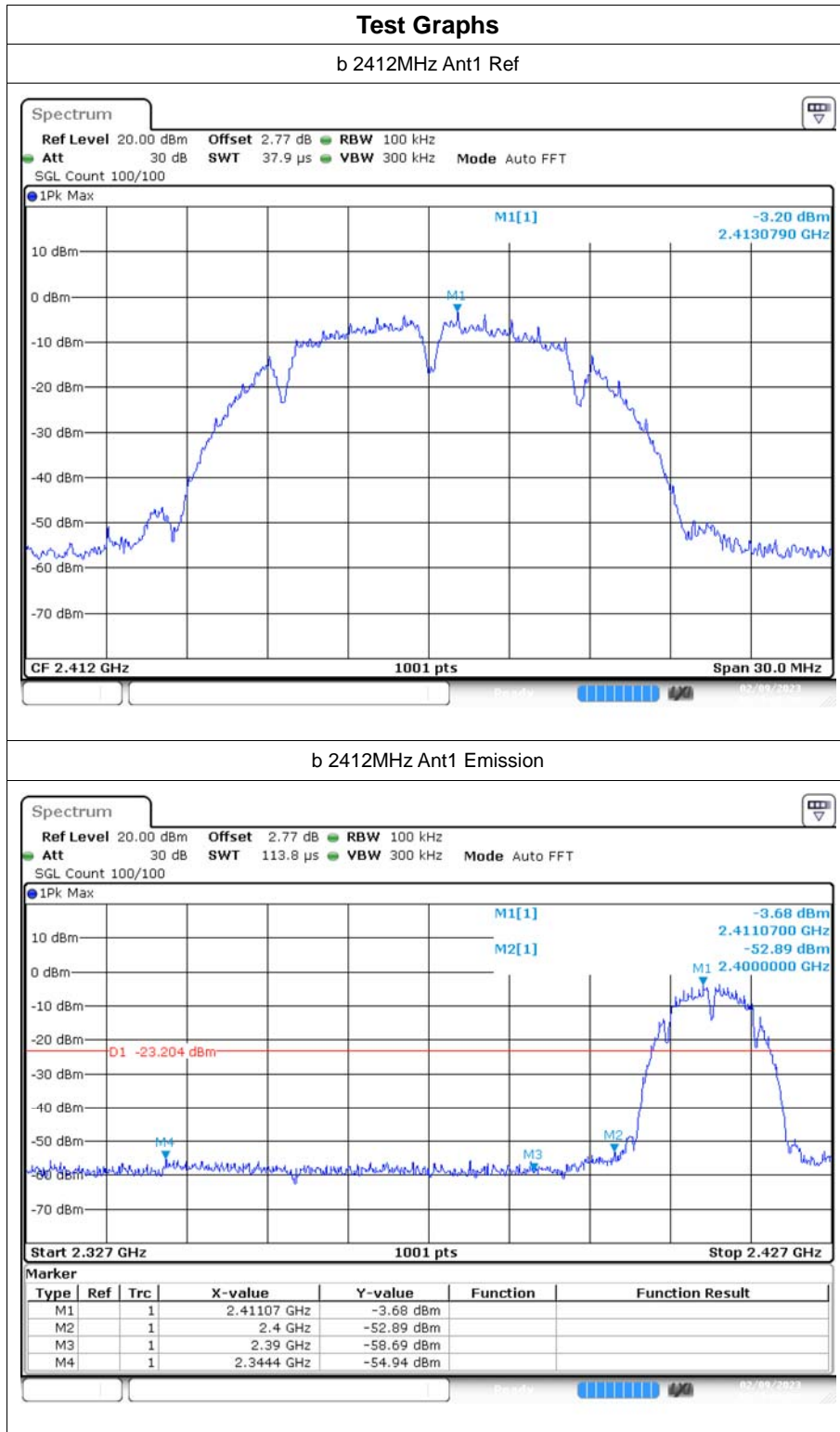


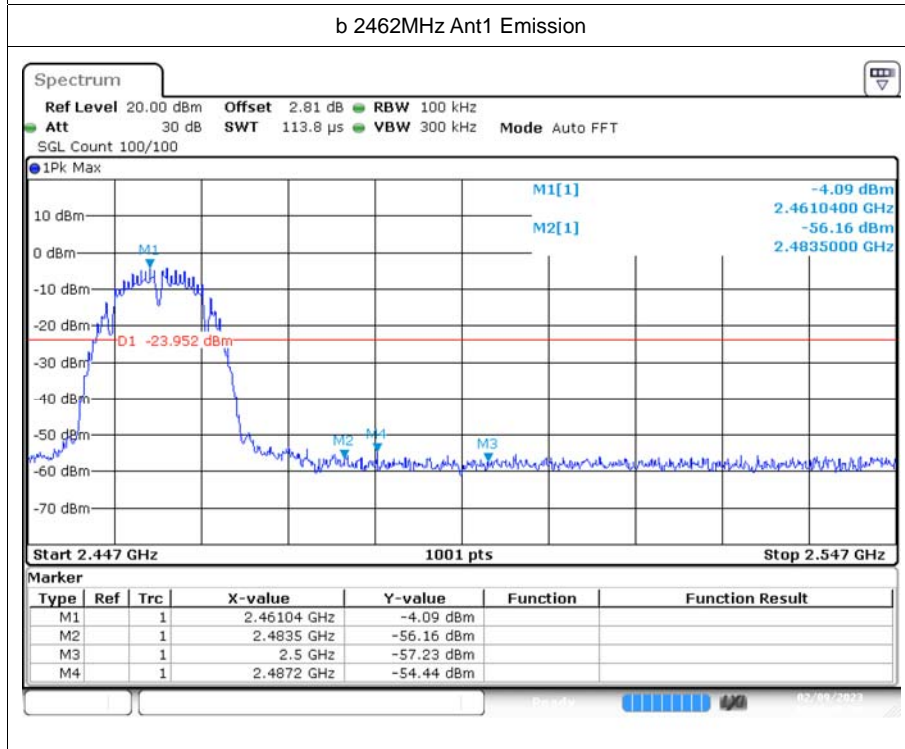
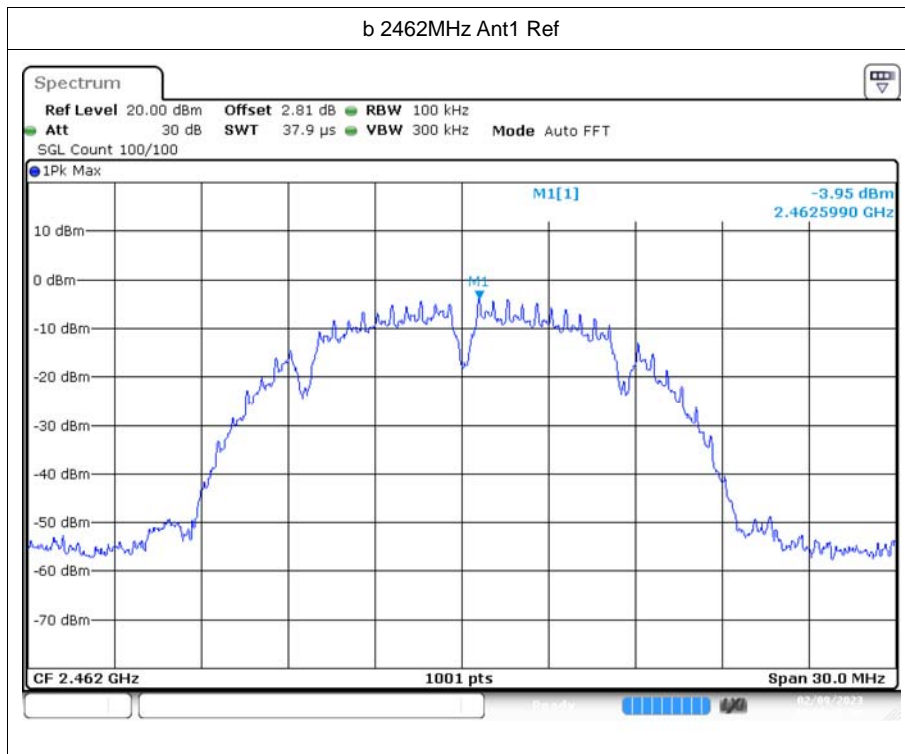
## 5 Band Edge

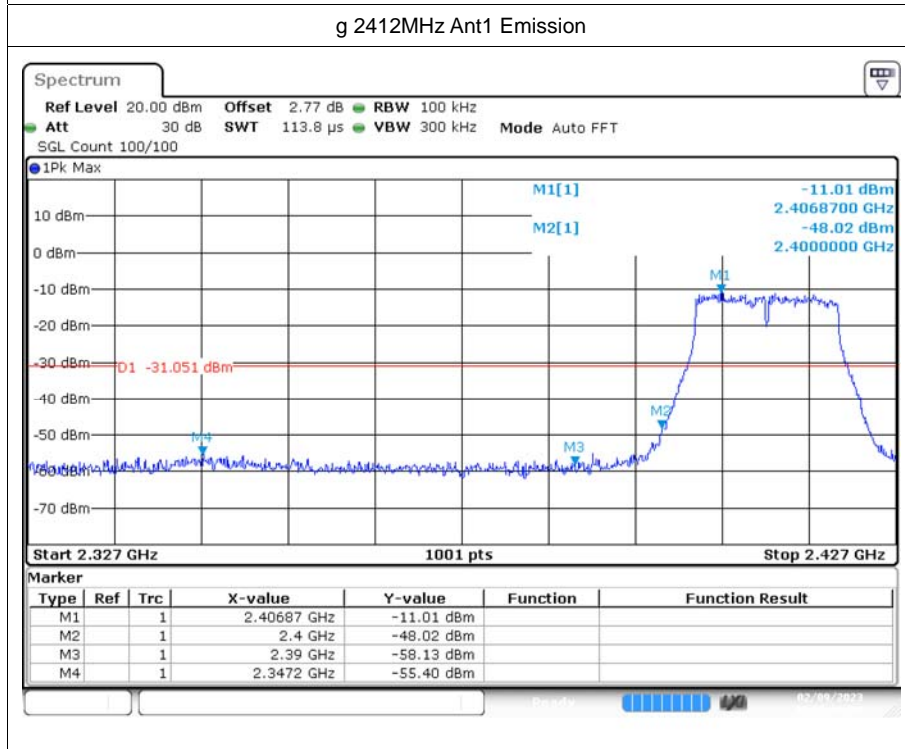
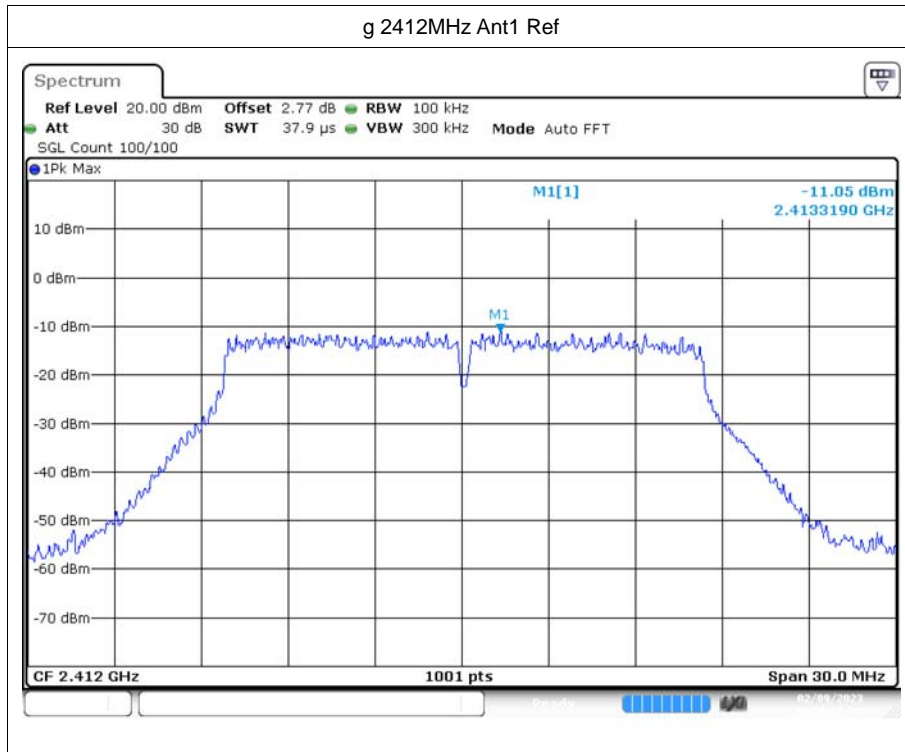
### 5.1 Test Result

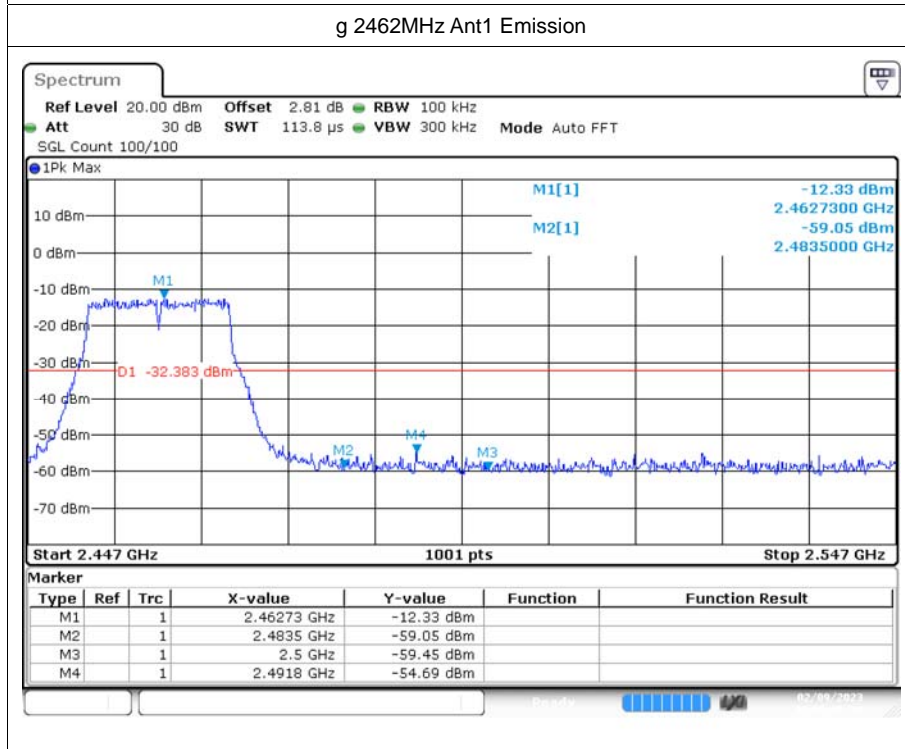
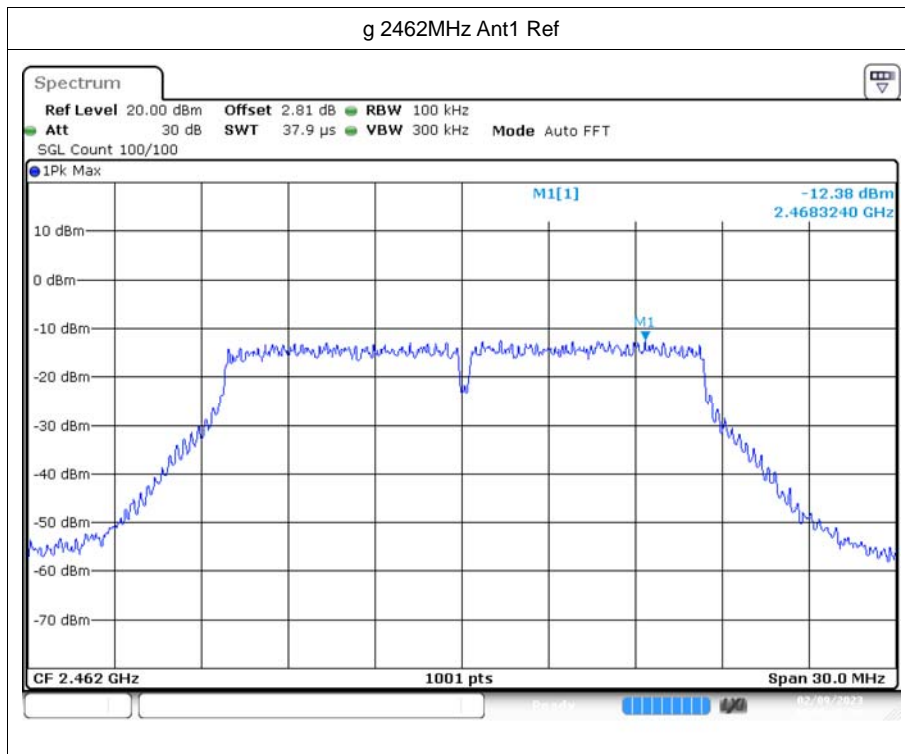
| Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|------|-----------------|---------|-----------------|-------------|---------|
| b    | 2412            | Ant1    | -51.74          | -20         | -51.74  |
| b    | 2462            | Ant1    | -50.49          | -20         | Pass    |
| g    | 2412            | Ant1    | -44.35          | -20         | Pass    |
| g    | 2462            | Ant1    | -42.31          | -20         | Pass    |
| n20  | 2412            | Ant1    | -43.62          | -20         | Pass    |
| n20  | 2462            | Ant1    | -46.36          | -20         | Pass    |
| n40  | 2422            | Ant1    | -40.35          | -20         | Pass    |
| n40  | 2452            | Ant1    | -40.08          | -20         | Pass    |

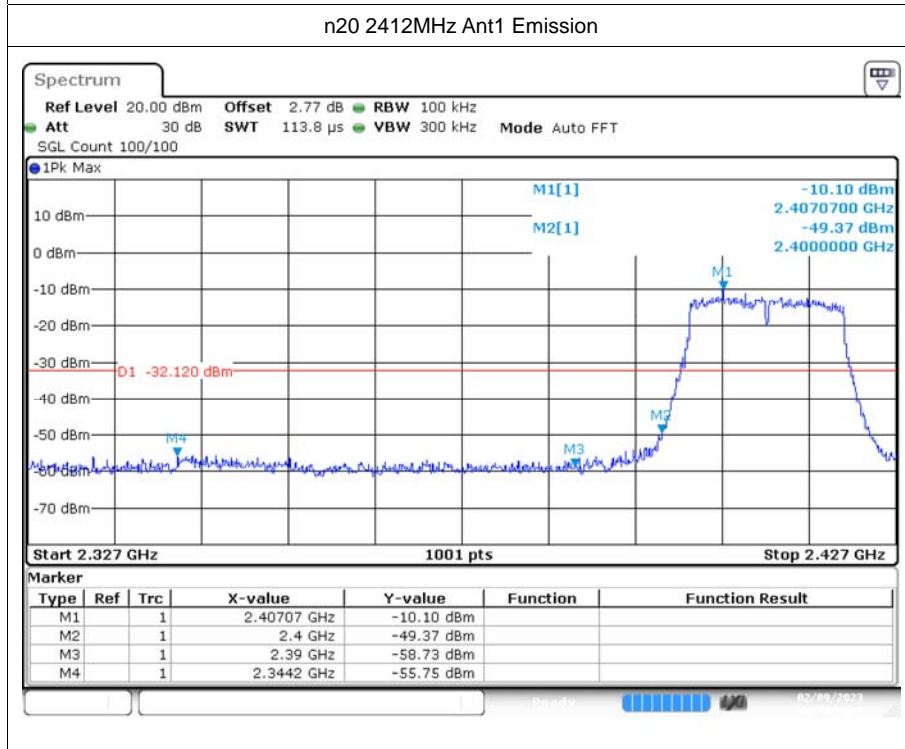
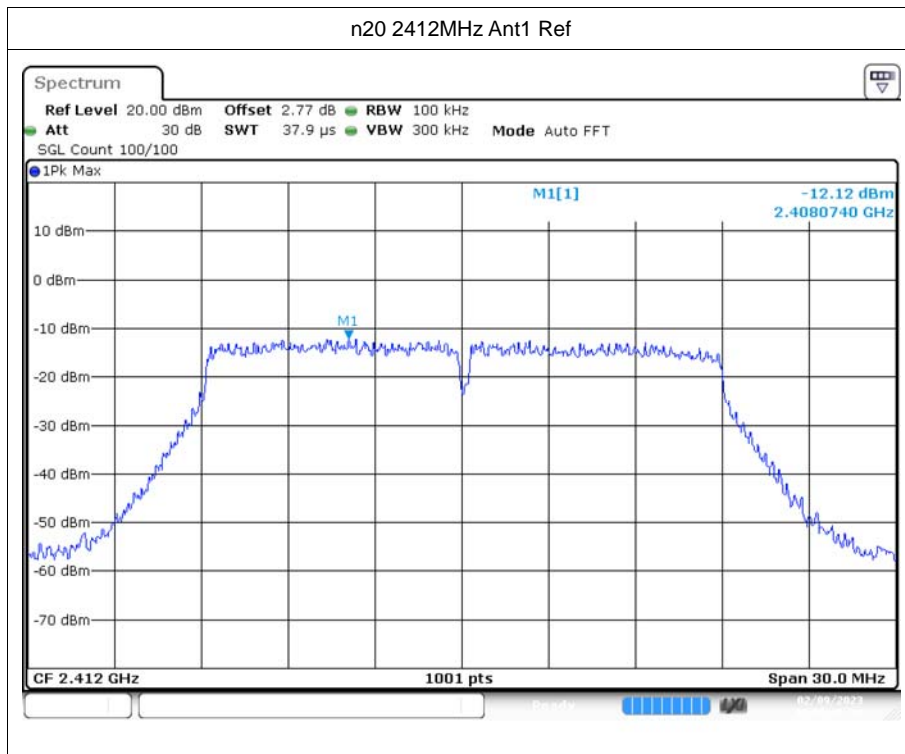
## 5.2 Test Graphs

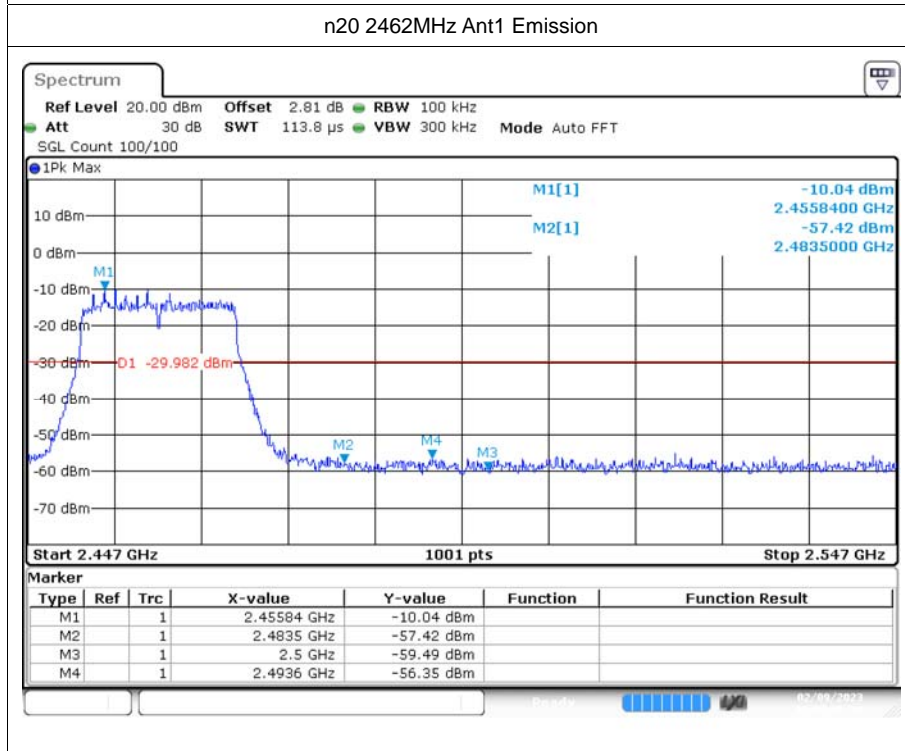
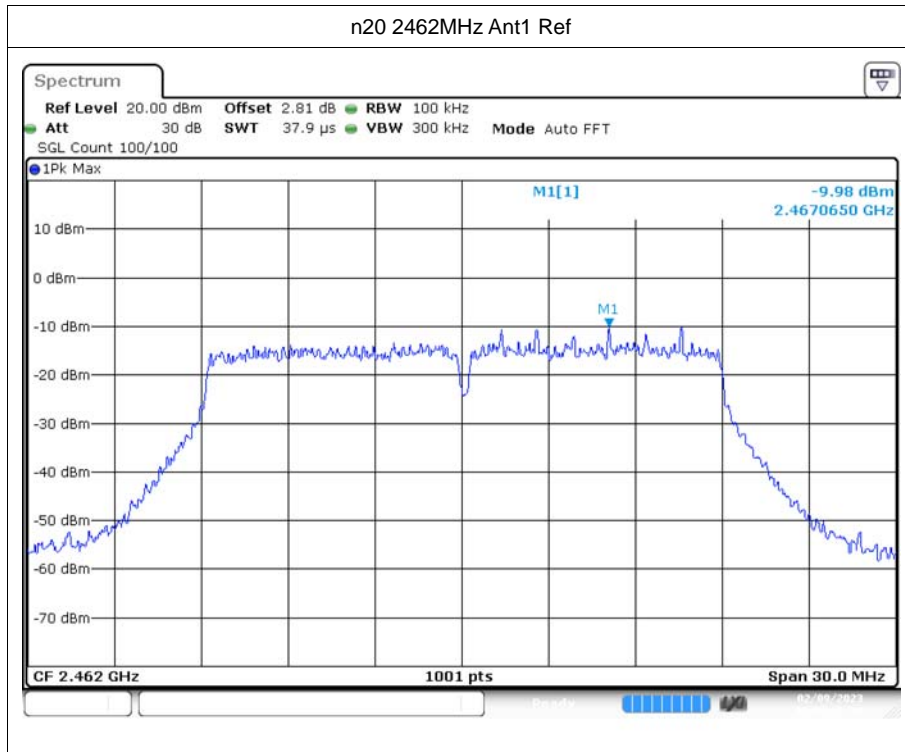


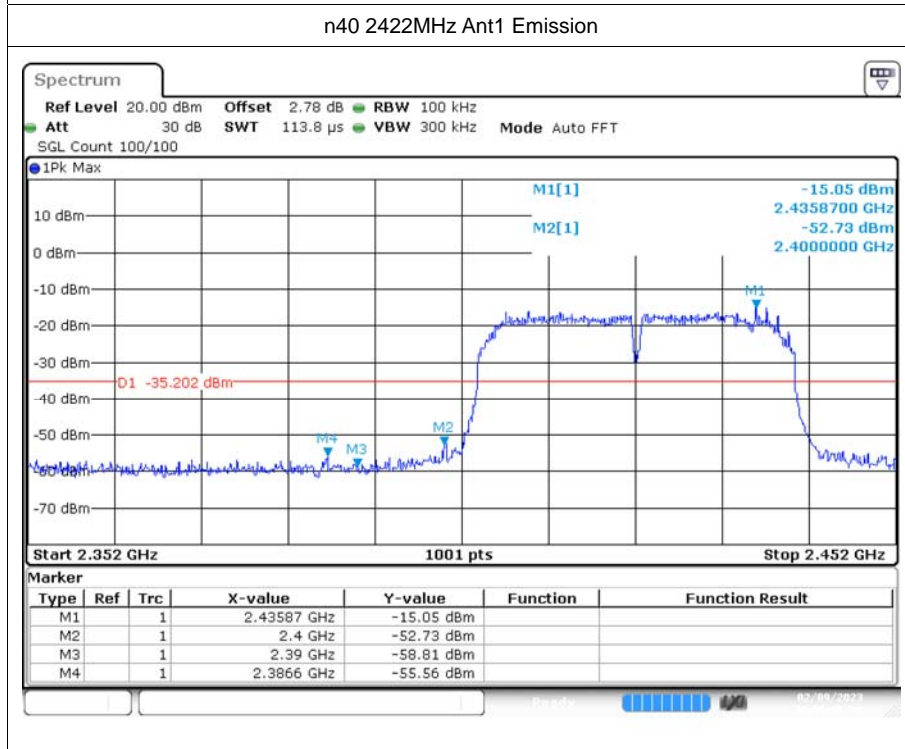
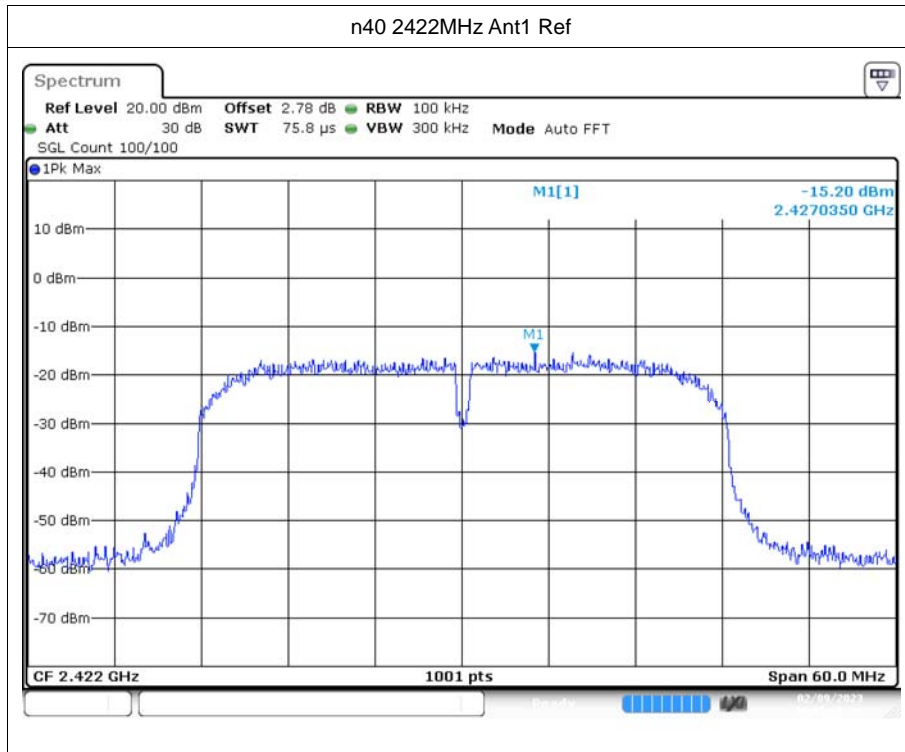




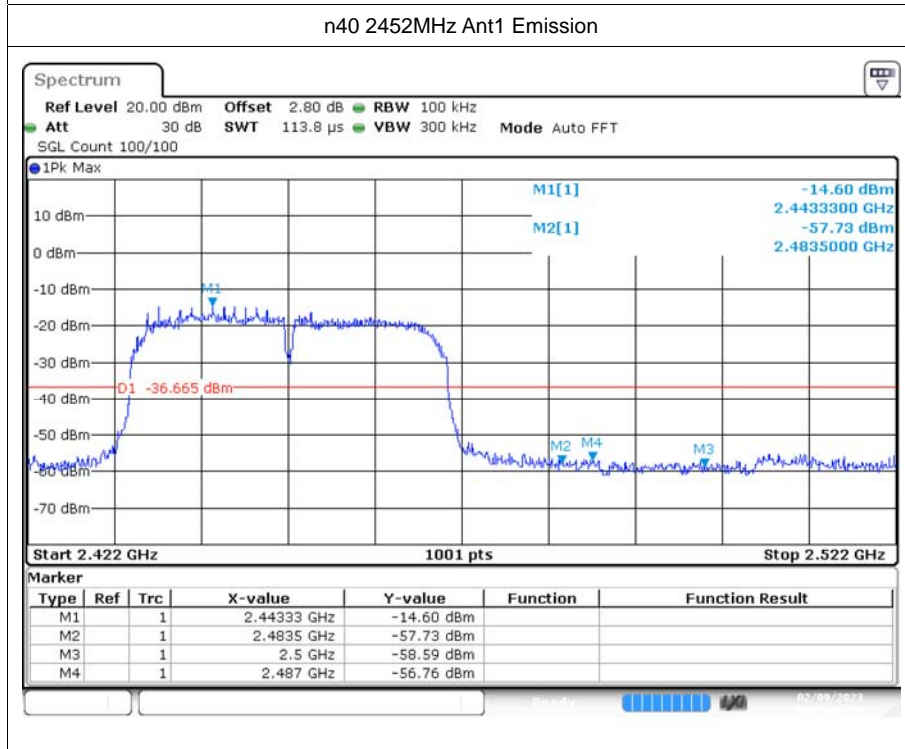
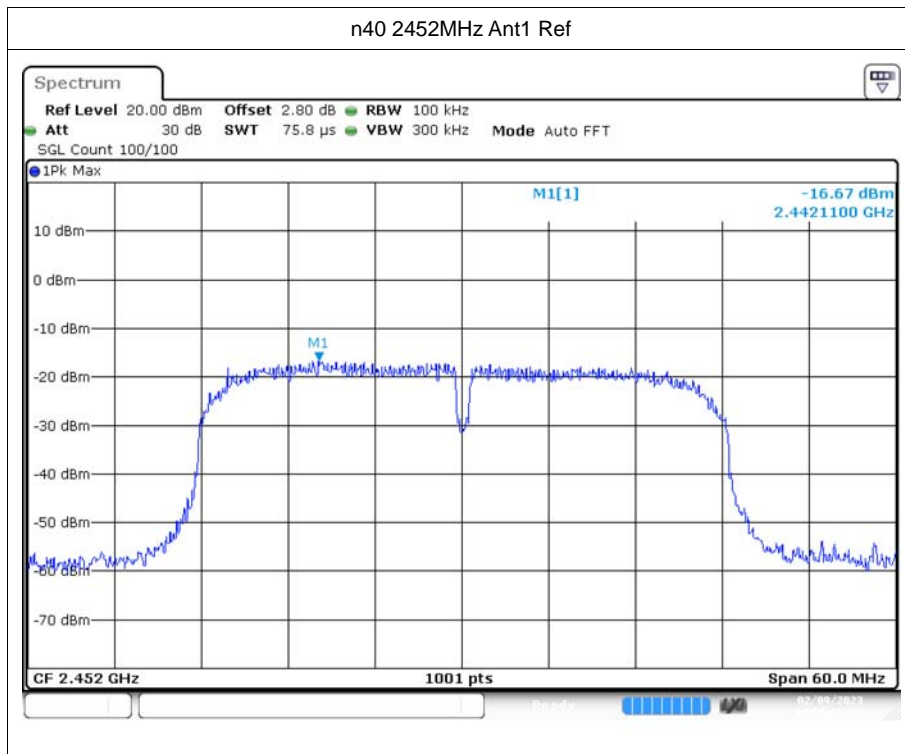














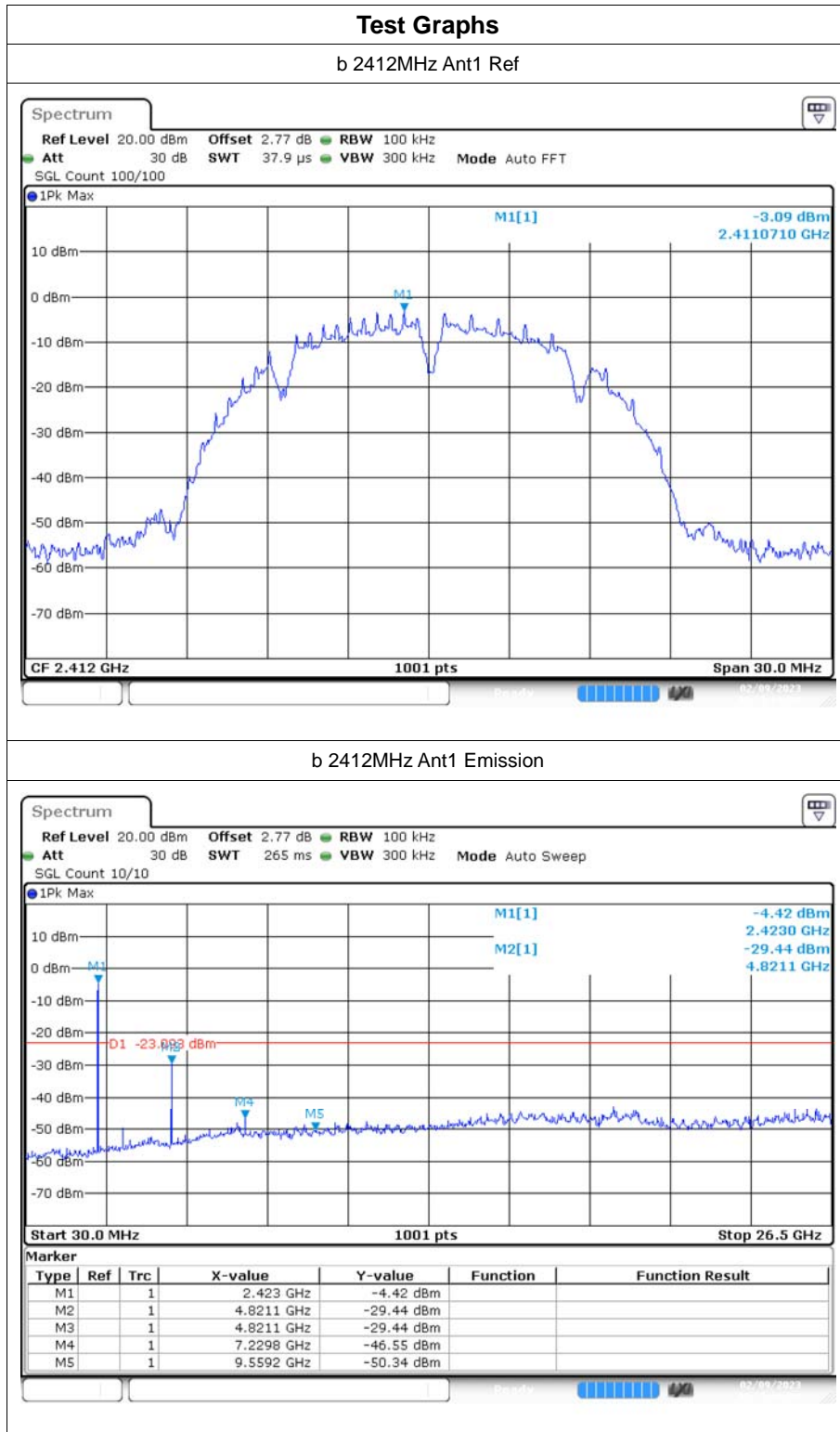
## 6 Conducted RF Spurious Emission

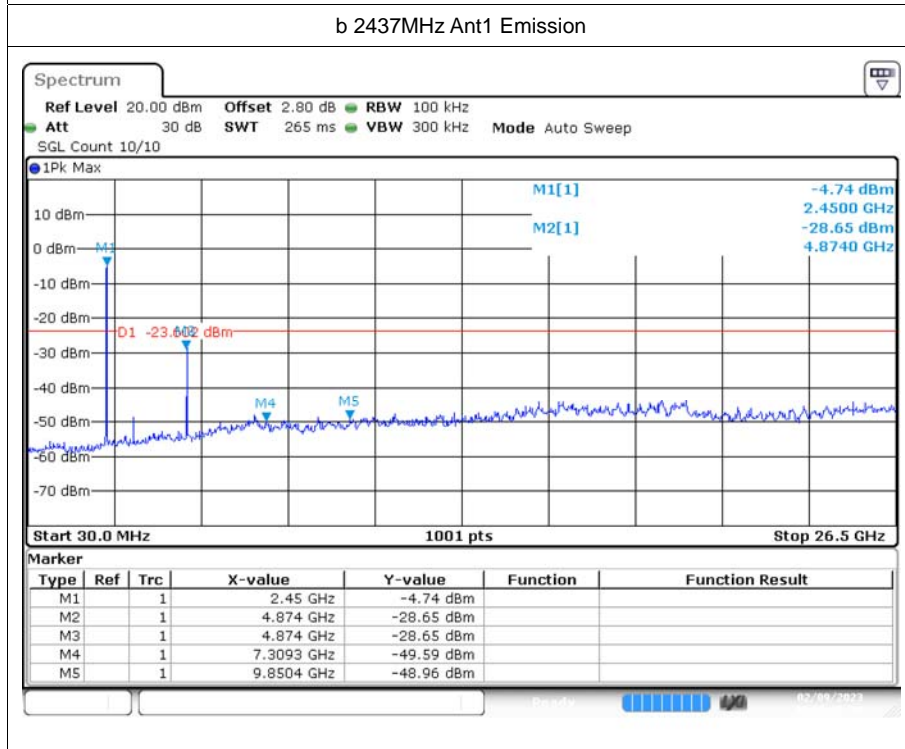
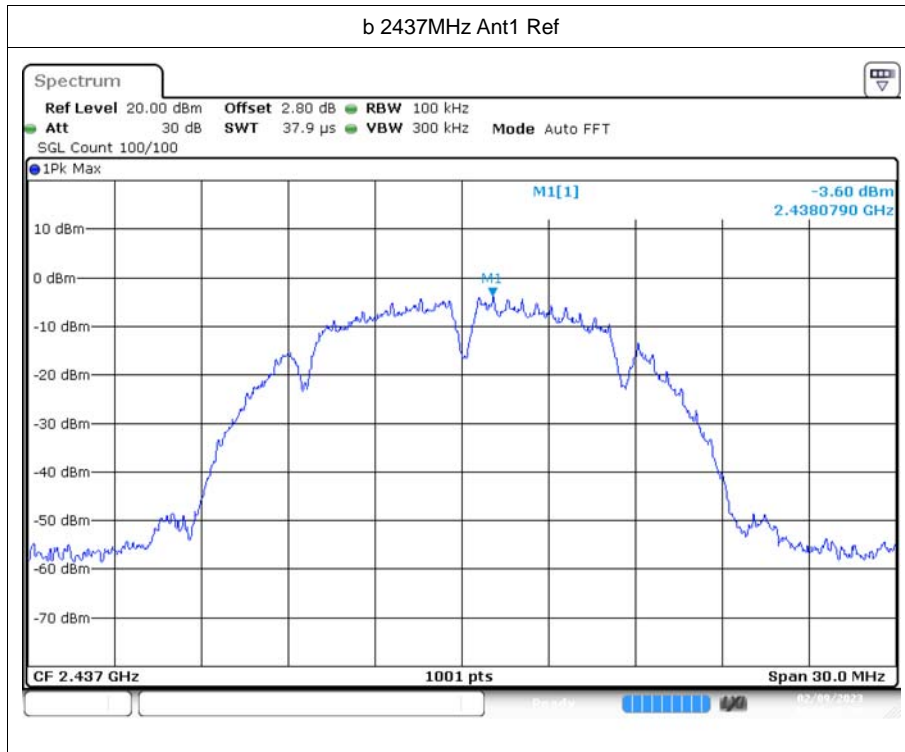
### 6.1 Test Result

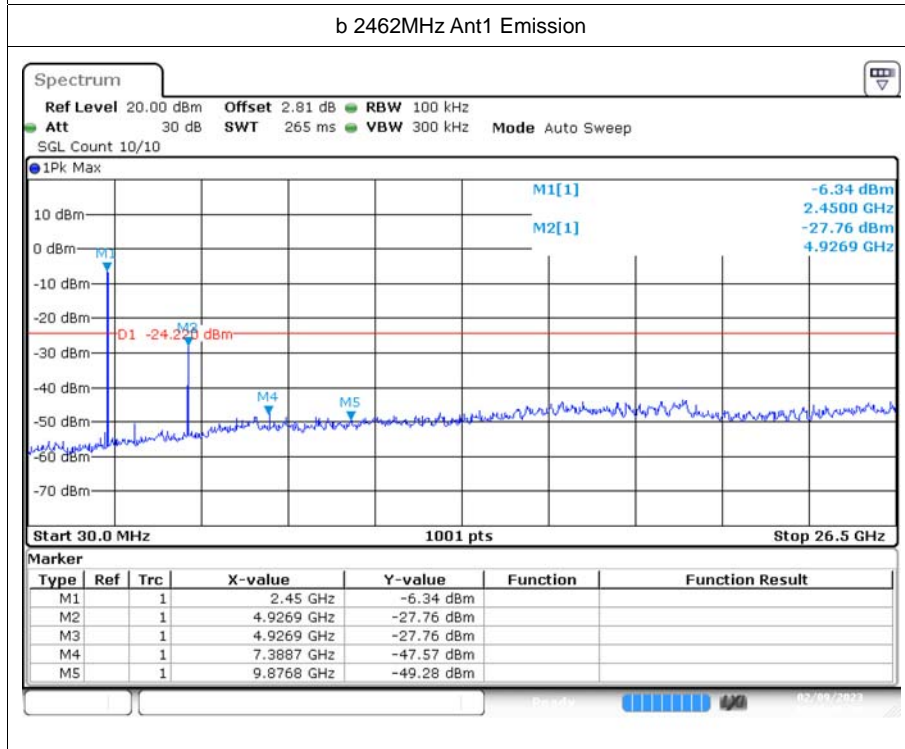
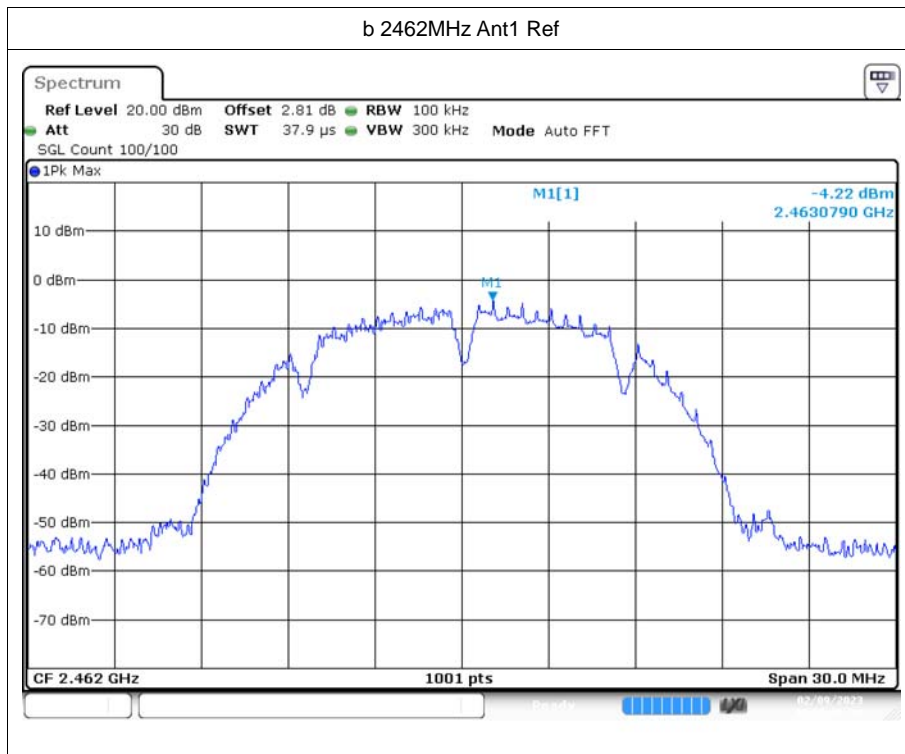
| Mode      | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|-----------------|---------|-----------------|-------------|---------|
| 802.11b   | 2412            | Ant1    | -26.35          | -20         | Pass    |
| 802.11b   | 2437            | Ant1    | -25.05          | -20         | Pass    |
| 802.11b   | 2462            | Ant1    | -23.53          | -20         | Pass    |
| 802.11g   | 2412            | Ant1    | -32.05          | -20         | Pass    |
| 802.11g   | 2437            | Ant1    | -32.16          | -20         | Pass    |
| 802.11g   | 2462            | Ant1    | -34.15          | -20         | Pass    |
| 802.11n20 | 2412            | Ant1    | -33.9           | -20         | Pass    |
| 802.11n20 | 2437            | Ant1    | -33             | -20         | Pass    |
| 802.11n20 | 2462            | Ant1    | -30.59          | -20         | Pass    |
| 802.11n40 | 2422            | Ant1    | -27.5           | -20         | Pass    |
| 802.11n40 | 2437            | Ant1    | -28.73          | -20         | Pass    |
| 802.11n40 | 2452            | Ant1    | -27.44          | -20         | Pass    |

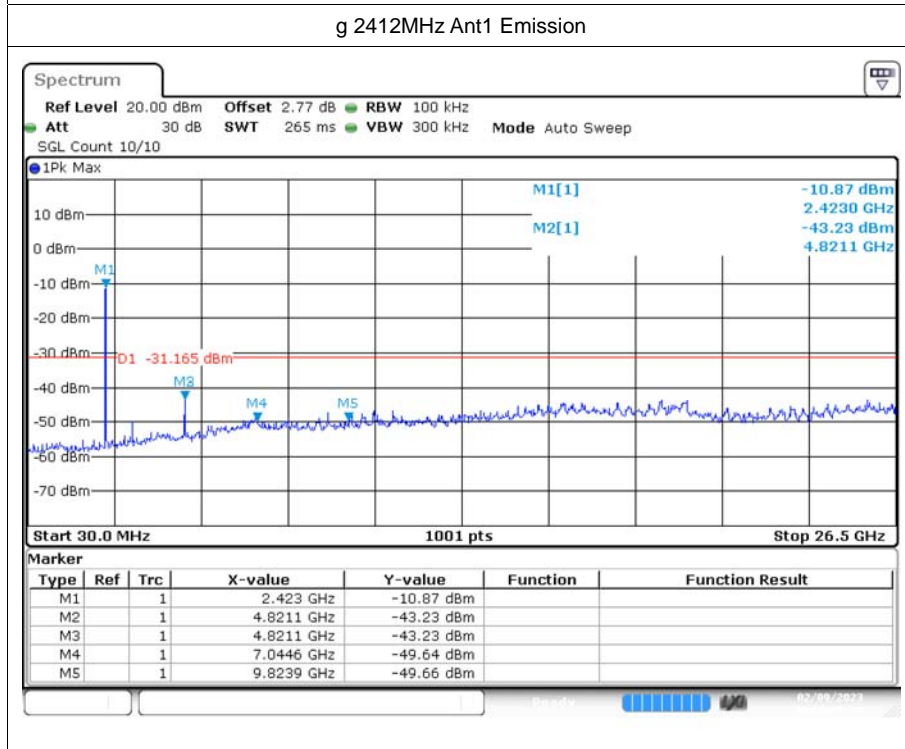
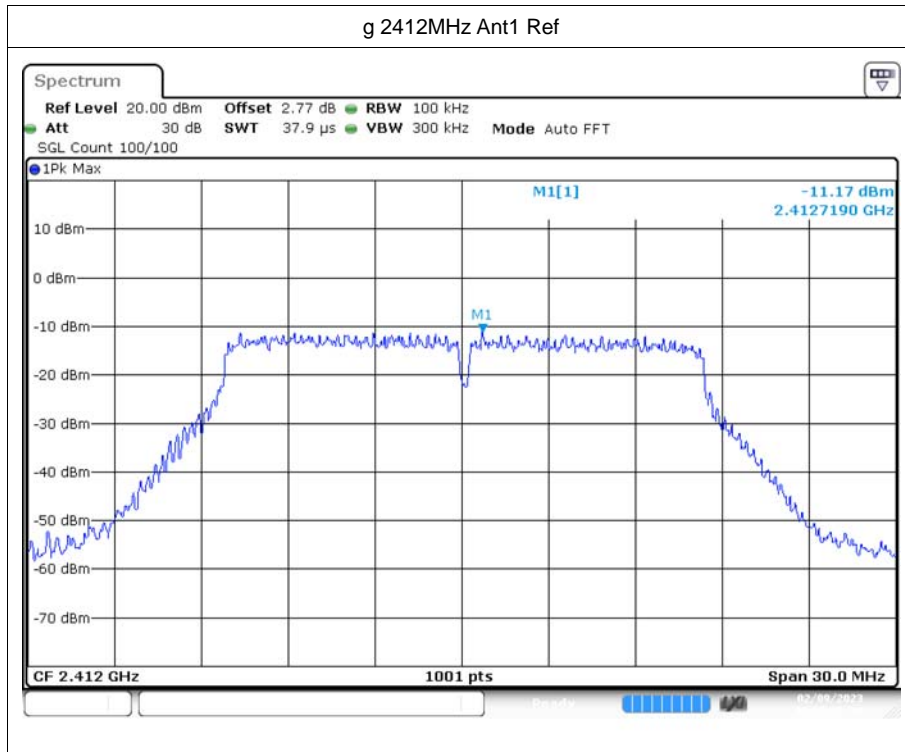


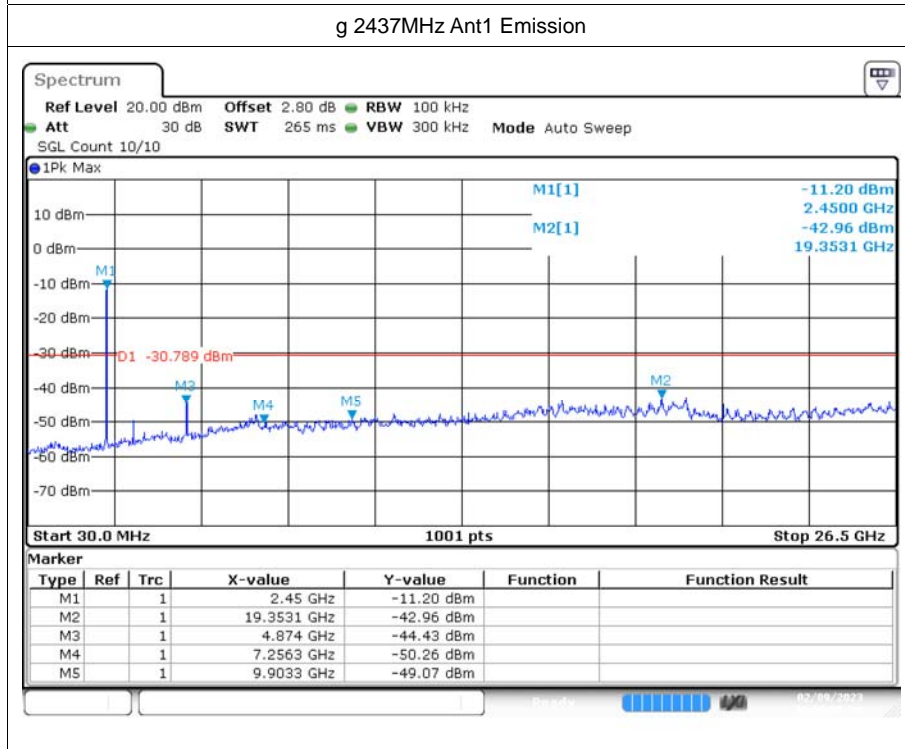
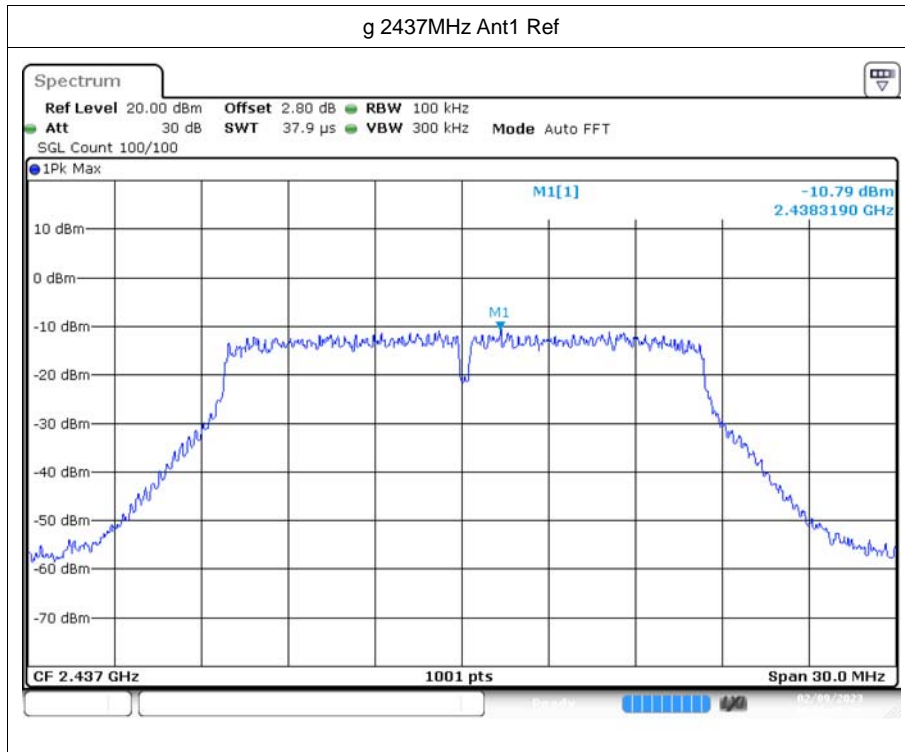
## 6.2 Test Graphs

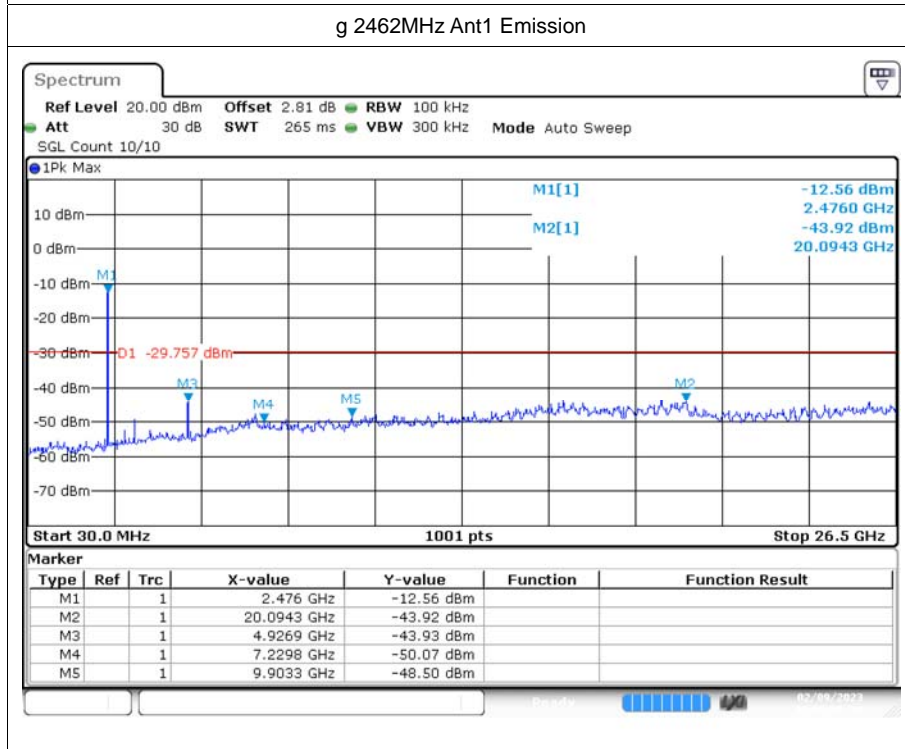
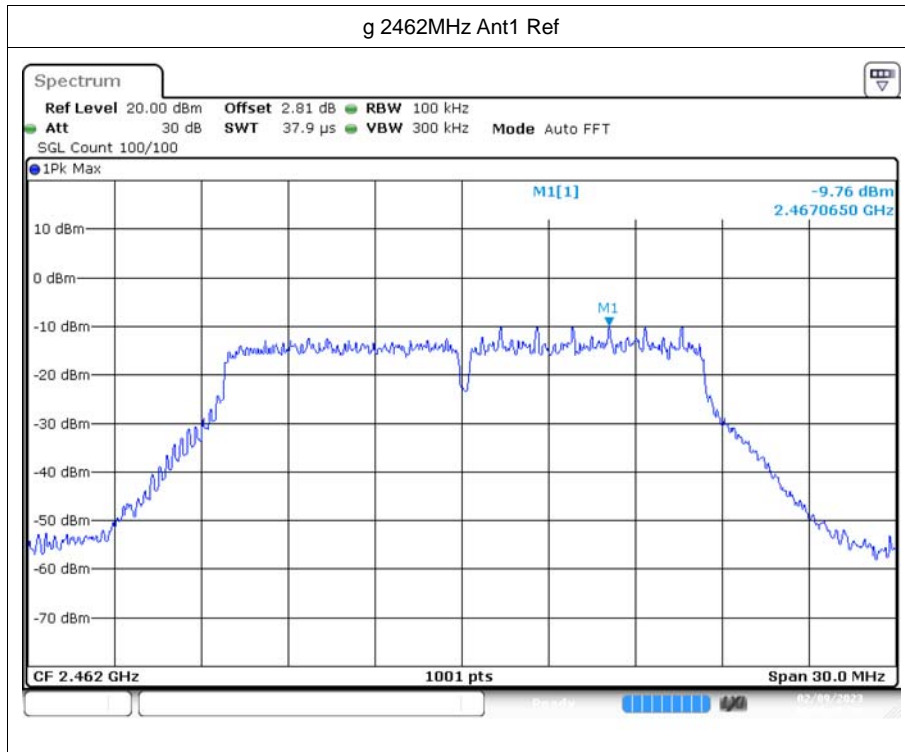




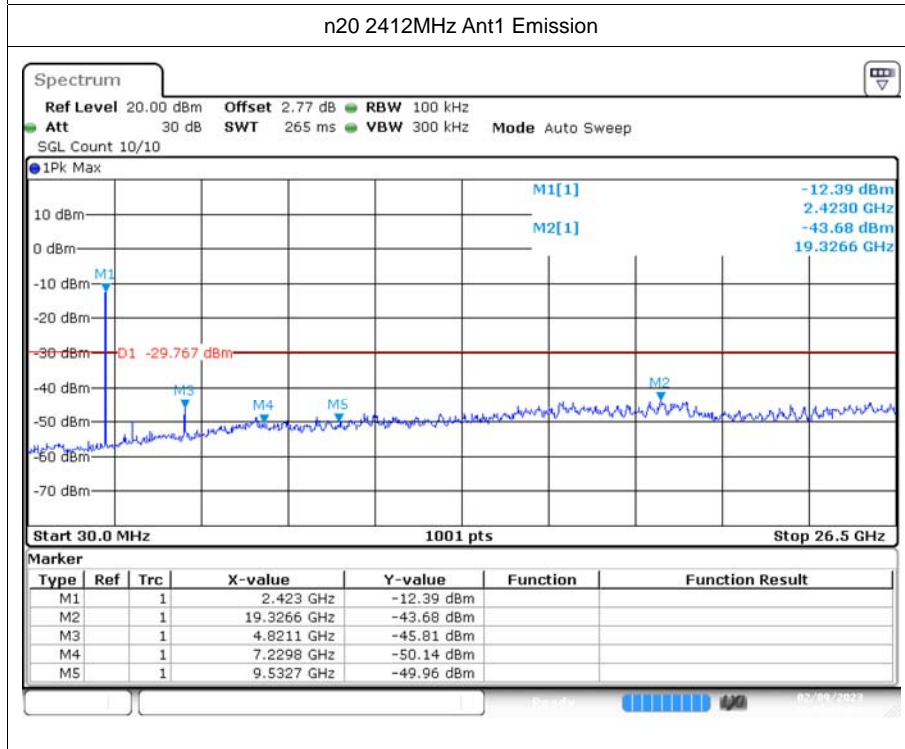
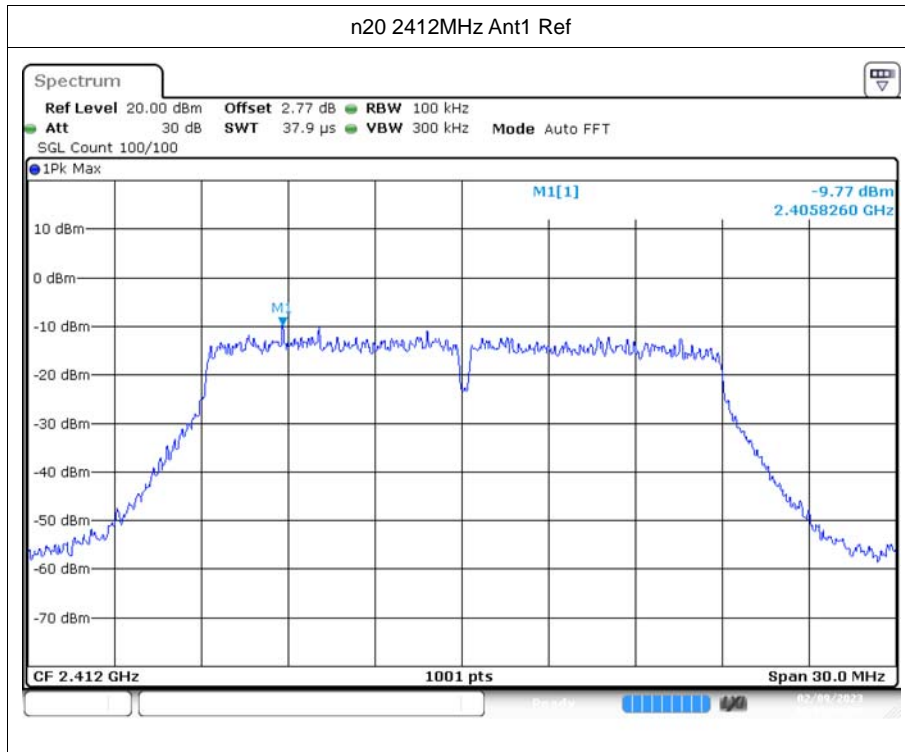


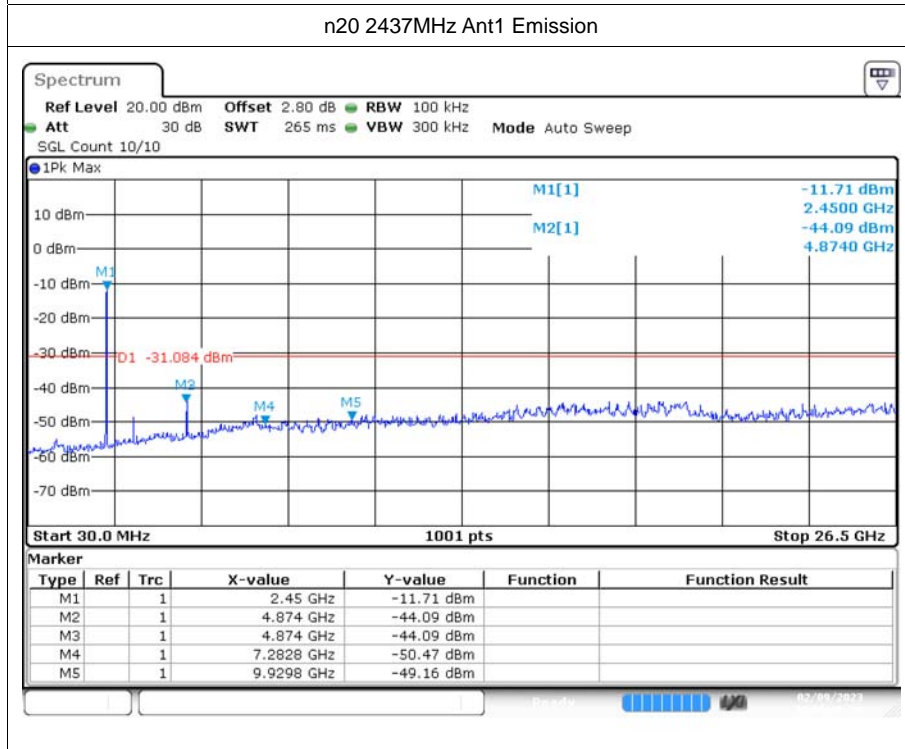
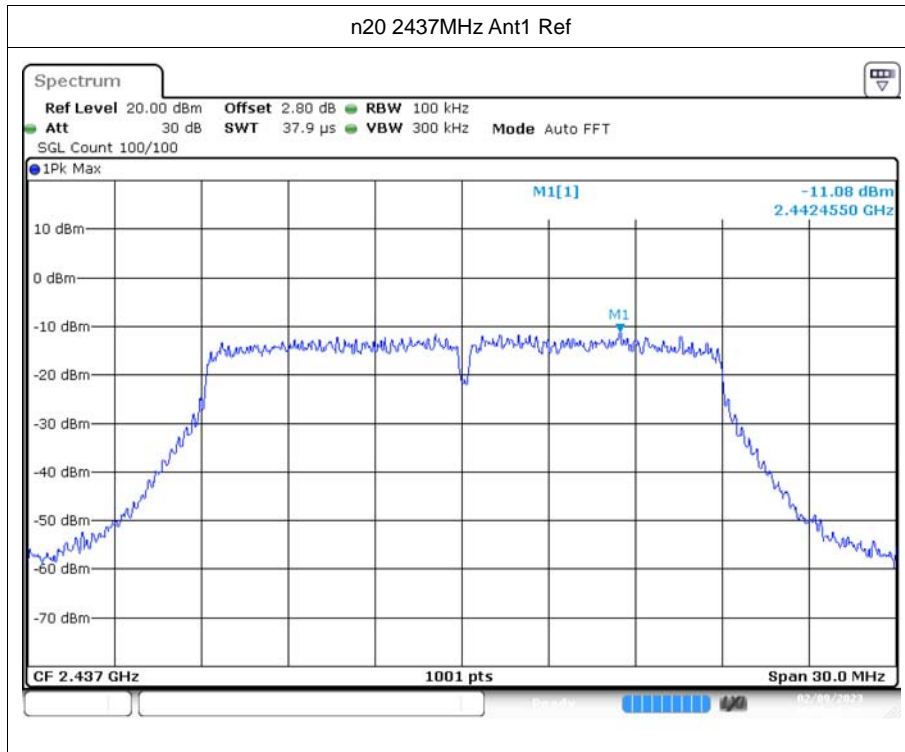


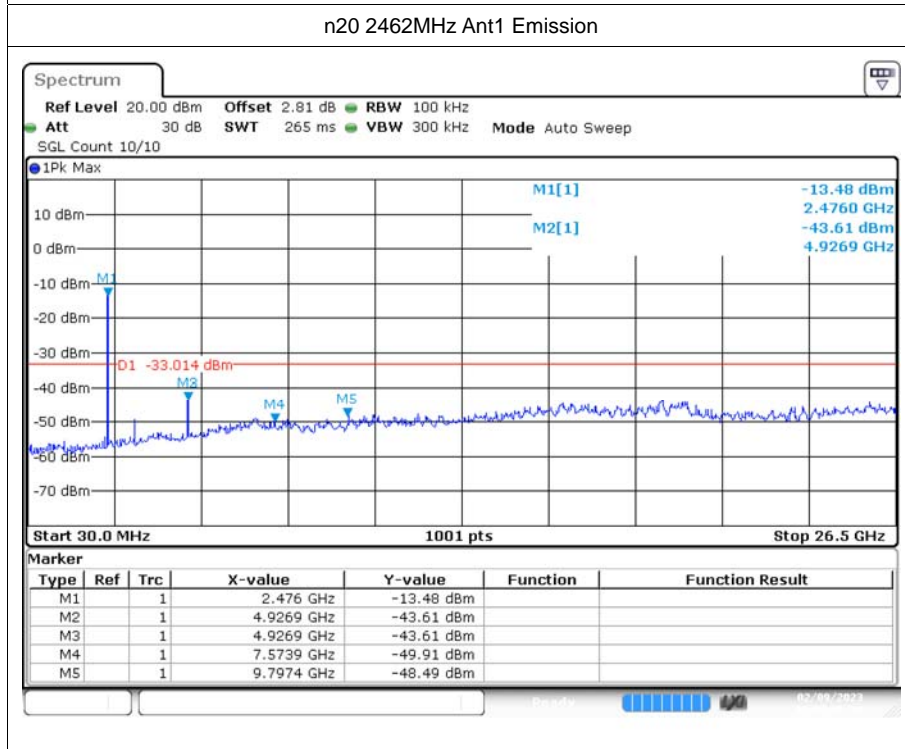
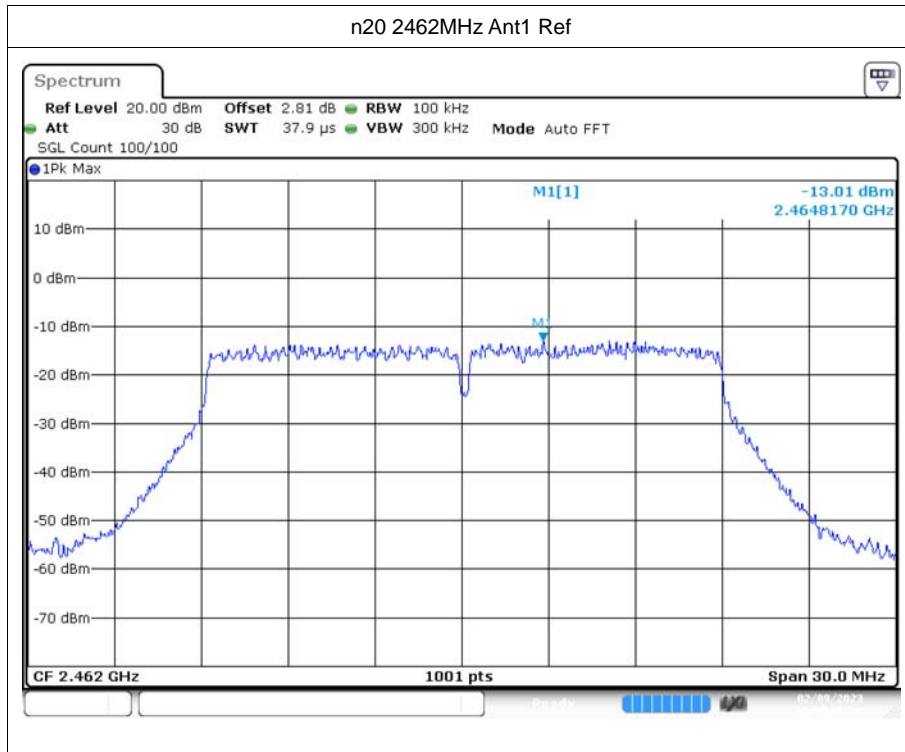


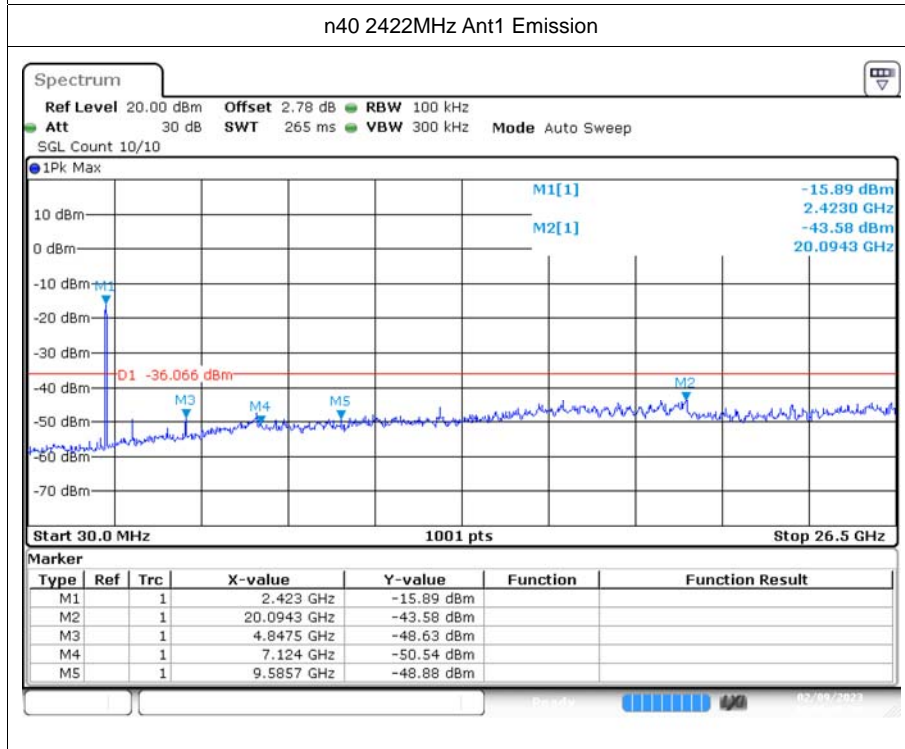
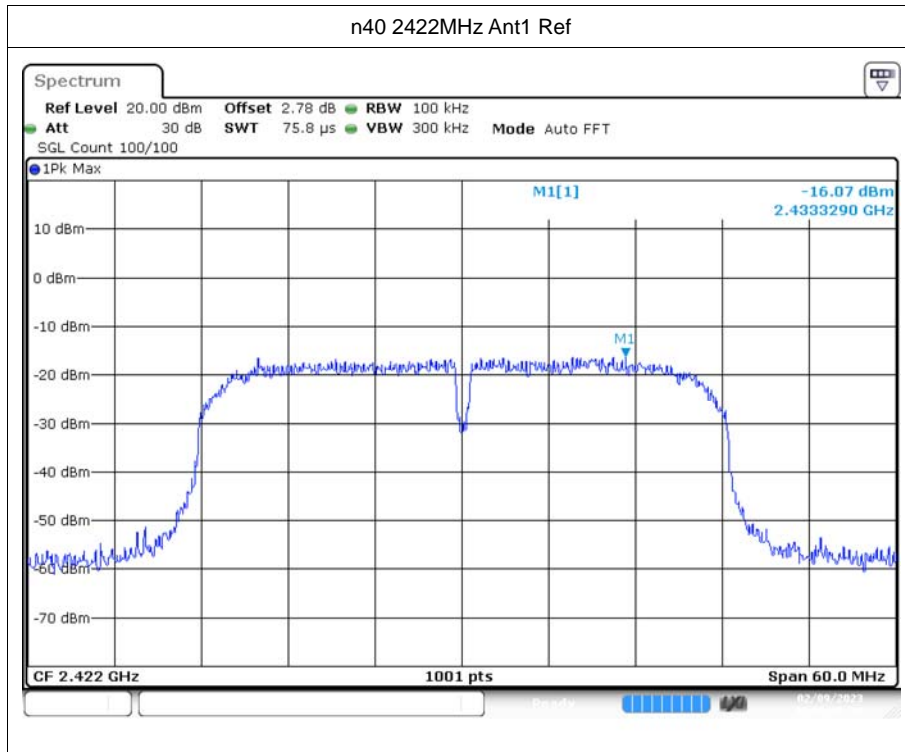


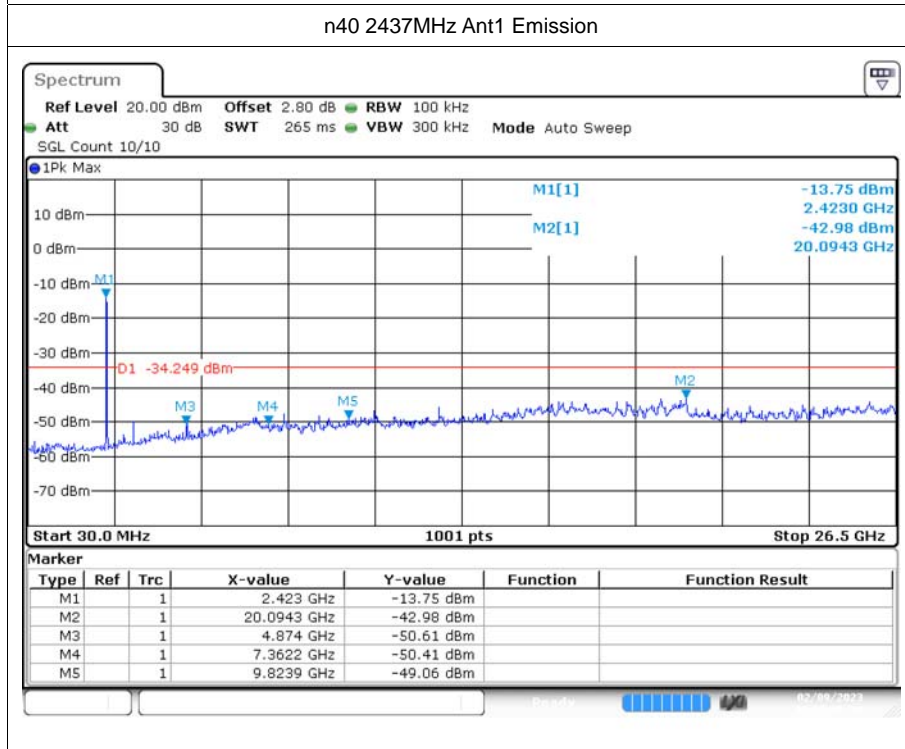
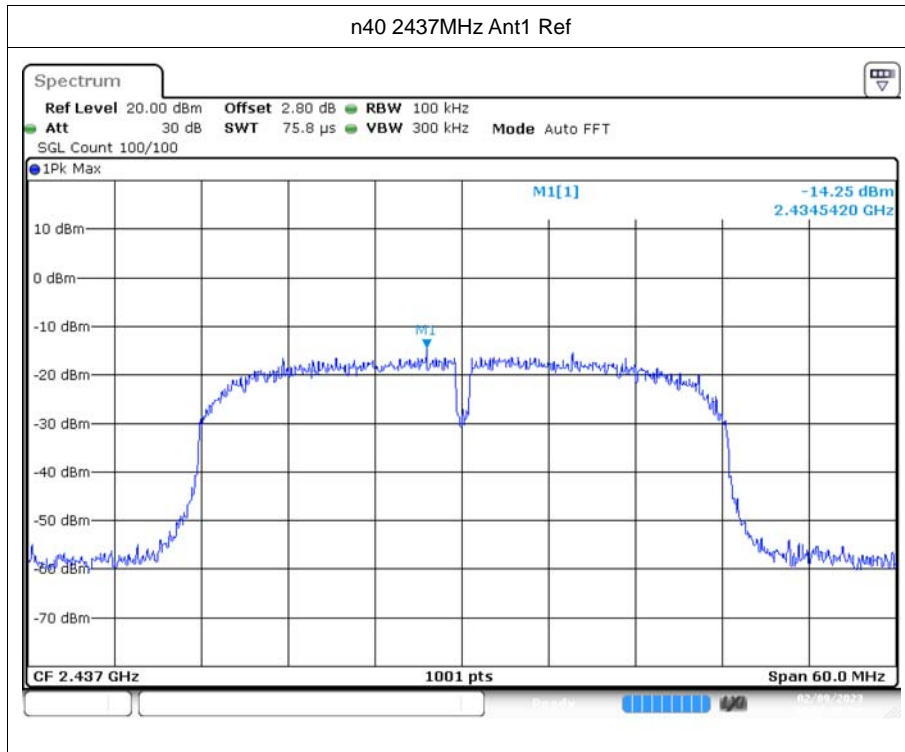


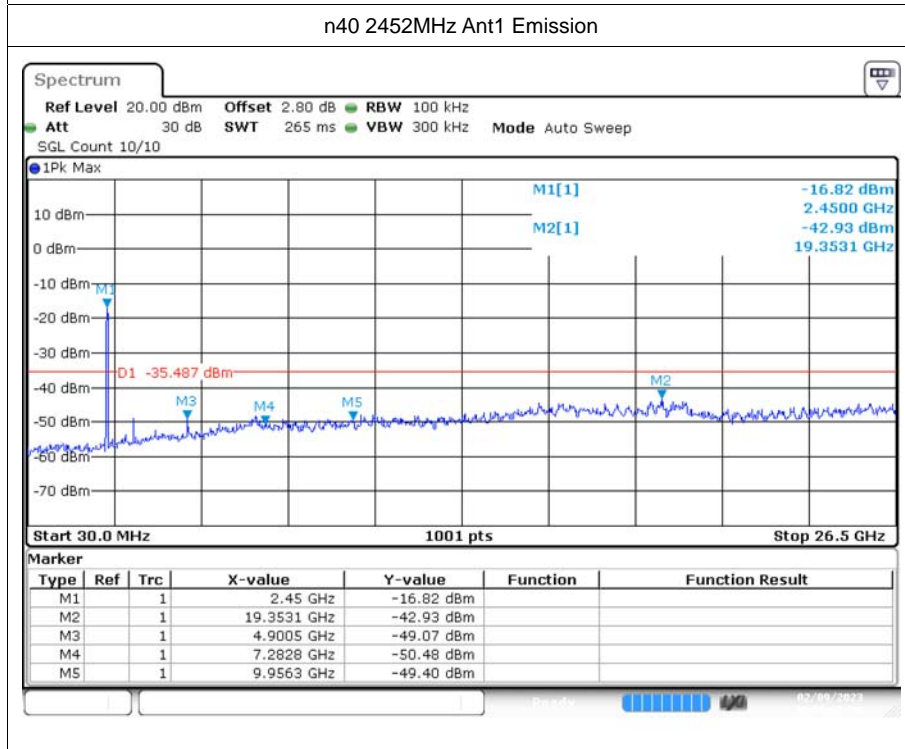
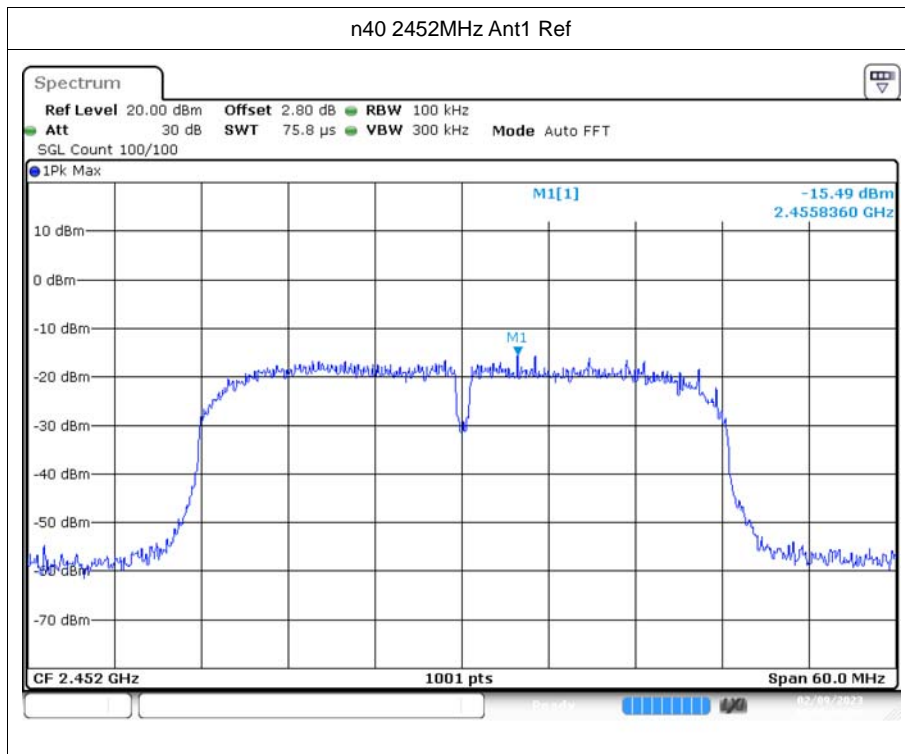














## 7 Restrict Band

### 7.1 Test Result

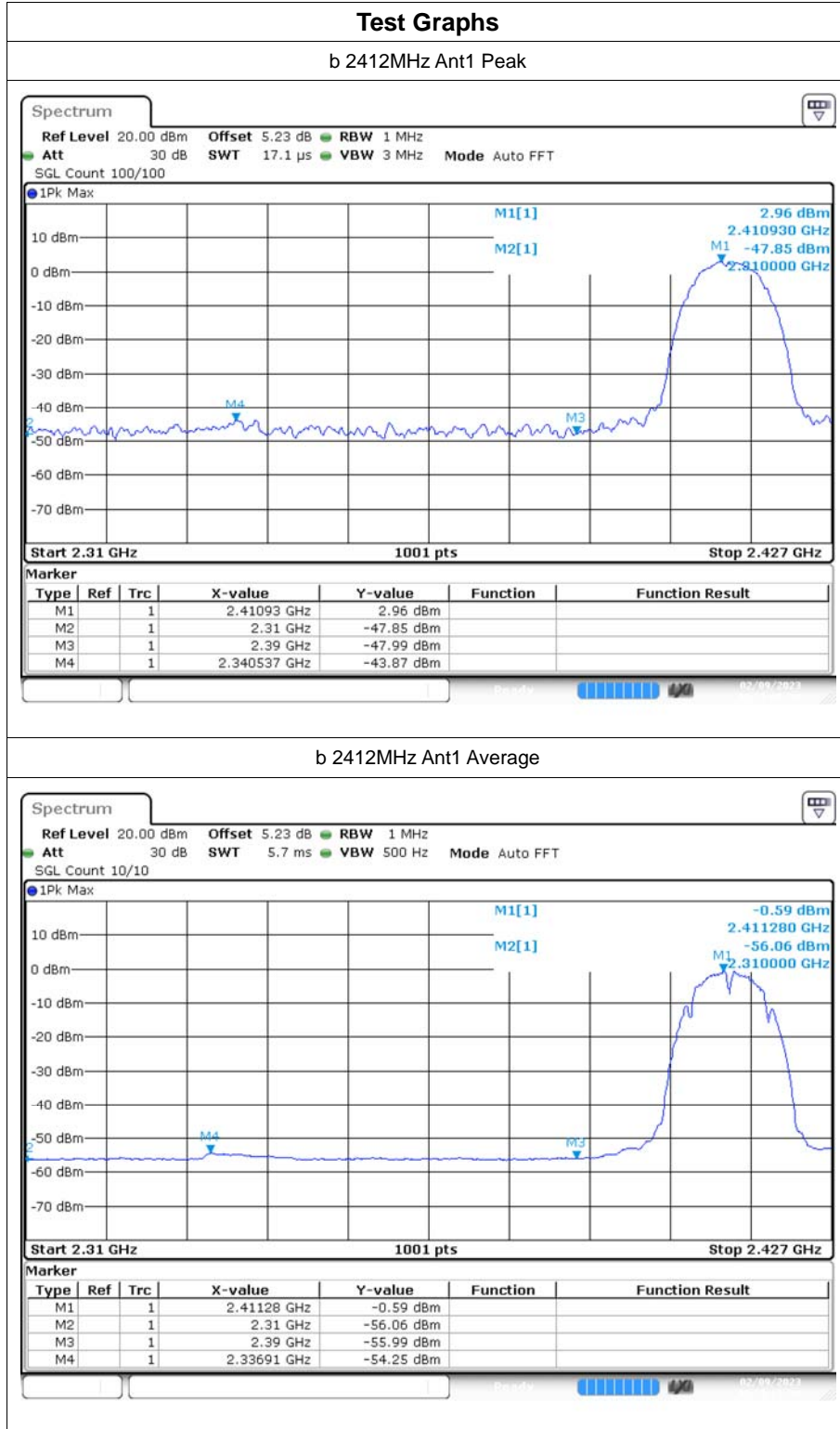
| Mode | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | E (dBuV/m) | Detecto r | Limit (dBuV/m) | Verdic t |
|------|-----------------|---------|-----------------|-------------|------------|------------|-----------|----------------|----------|
| b    | 2412            | Ant1    | 2310            | -47.84      | 2.46       | 49.88      | Peak      | 74             | Pass     |
| b    | 2412            | Ant1    | 2310            | -56.06      | 2.46       | 41.66      | Average   | 54             | Pass     |
| b    | 2412            | Ant1    | 2340.537        | -43.87      | 2.46       | 53.85      | Peak      | 74             | Pass     |
| b    | 2412            | Ant1    | 2336.91         | -54.25      | 2.46       | 43.47      | Average   | 54             | Pass     |
| b    | 2412            | Ant1    | 2390            | -47.99      | 2.46       | 49.73      | Peak      | 74             | Pass     |
| b    | 2412            | Ant1    | 2390            | -55.98      | 2.46       | 41.74      | Average   | 54             | Pass     |
| b    | 2462            | Ant1    | 2483.5          | -44.94      | 2.46       | 52.78      | Peak      | 74             | 52.78    |
| b    | 2462            | Ant1    | 2483.5          | -55.37      | 2.46       | 42.35      | Average   | 54             | Pass     |
| b    | 2462            | Ant1    | 2497.244        | -43.33      | 2.46       | 54.39      | Peak      | 74             | Pass     |
| b    | 2462            | Ant1    | 2483.517        | -55.37      | 2.46       | 42.35      | Average   | 54             | Pass     |
| b    | 2462            | Ant1    | 2500            | -45.61      | 2.46       | 52.11      | Peak      | 74             | Pass     |
| b    | 2462            | Ant1    | 2500            | -55.6       | 2.46       | 42.12      | Average   | 54             | Pass     |
| g    | 2412            | Ant1    | 2310            | -48.92      | 2.46       | 48.8       | Peak      | 74             | Pass     |
| g    | 2412            | Ant1    | 2310            | -55.46      | 2.46       | 42.26      | Average   | 54             | Pass     |
| g    | 2412            | Ant1    | 2337.963        | -43.47      | 2.46       | 54.25      | Peak      | 74             | Pass     |
| g    | 2412            | Ant1    | 2336.91         | -53.49      | 2.46       | 44.23      | Average   | 54             | Pass     |
| g    | 2412            | Ant1    | 2390            | -47.74      | 2.46       | 49.73      | Peak      | 74             | Pass     |
| g    | 2412            | Ant1    | 2390            | -54.34      | 2.46       | 43.38      | Average   | 54             | Pass     |
| g    | 2462            | Ant1    | 2483.5          | -46.99      | 2.46       | 50.73      | Peak      | 74             | Pass     |
| g    | 2462            | Ant1    | 2483.5          | -53.87      | 2.46       | 43.85      | Average   | 54             | Pass     |
| g    | 2462            | Ant1    | 2497.244        | -44.41      | 2.46       | 53.31      | Peak      | 74             | Pass     |
| g    | 2462            | Ant1    | 2483.517        | -53.87      | 2.46       | 43.85      | Average   | 54             | Pass     |
| g    | 2462            | Ant1    | 2500            | -44.77      | 2.46       | 52.11      | Peak      | 74             | Pass     |
| g    | 2462            | Ant1    | 2500            | -54.82      | 2.46       | 42.9       | Average   | 54             | Pass     |
| n20  | 2412            | Ant1    | 2310            | -47.42      | 2.46       | 50.3       | Peak      | 74             | Pass     |
| n20  | 2412            | Ant1    | 2310            | -55.13      | 2.46       | 42.59      | Average   | 54             | Pass     |
| n20  | 2412            | Ant1    | 2338.548        | -43.8       | 2.46       | 53.92      | Peak      | 74             | Pass     |
| n20  | 2412            | Ant1    | 2339.016        | -53.26      | 2.46       | 44.46      | Average   | 54             | Pass     |
| n20  | 2412            | Ant1    | 2390            | -46.11      | 2.46       | 51.61      | Peak      | 74             | Pass     |
| n20  | 2412            | Ant1    | 2390            | -55.37      | 2.46       | 42.35      | Average   | 54             | Pass     |
| n20  | 2462            | Ant1    | 2483.5          | -47.4       | 2.46       | 50.32      | Peak      | 74             | Pass     |
| n20  | 2462            | Ant1    | 2483.5          | -54.88      | 2.46       | 42.84      | Average   | 54             | Pass     |
| n20  | 2462            | Ant1    | 2484.736        | -44.74      | 2.46       | 52.98      | Peak      | 74             | Pass     |
| n20  | 2462            | Ant1    | 2492.209        | -54.24      | 2.46       | 43.48      | Average   | 54             | Pass     |
| n20  | 2462            | Ant1    | 2500            | -45.53      | 2.46       | 52.19      | Peak      | 74             | Pass     |

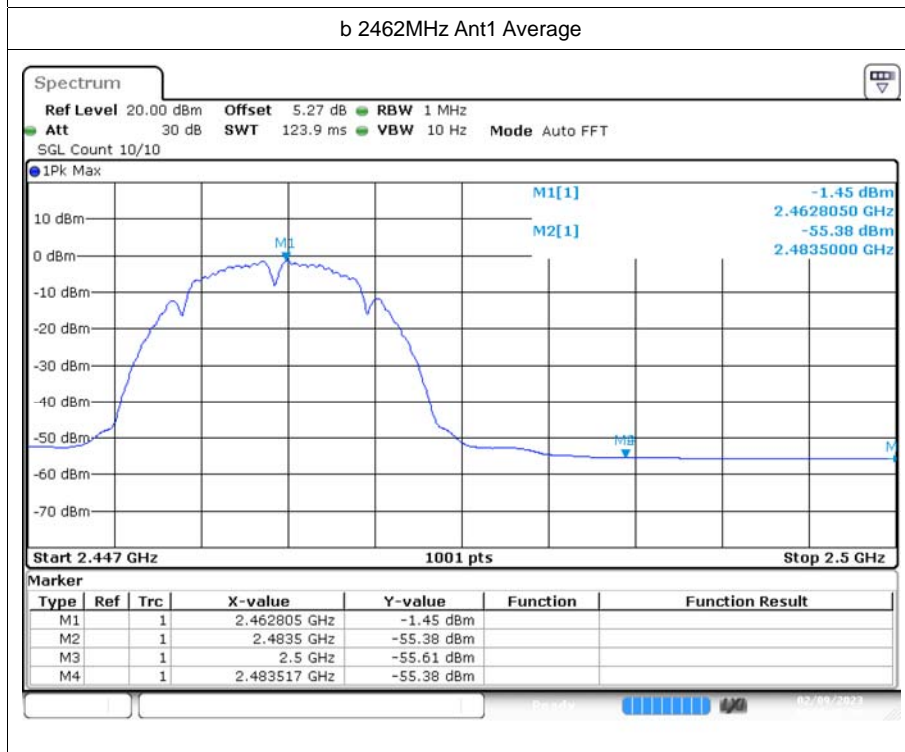
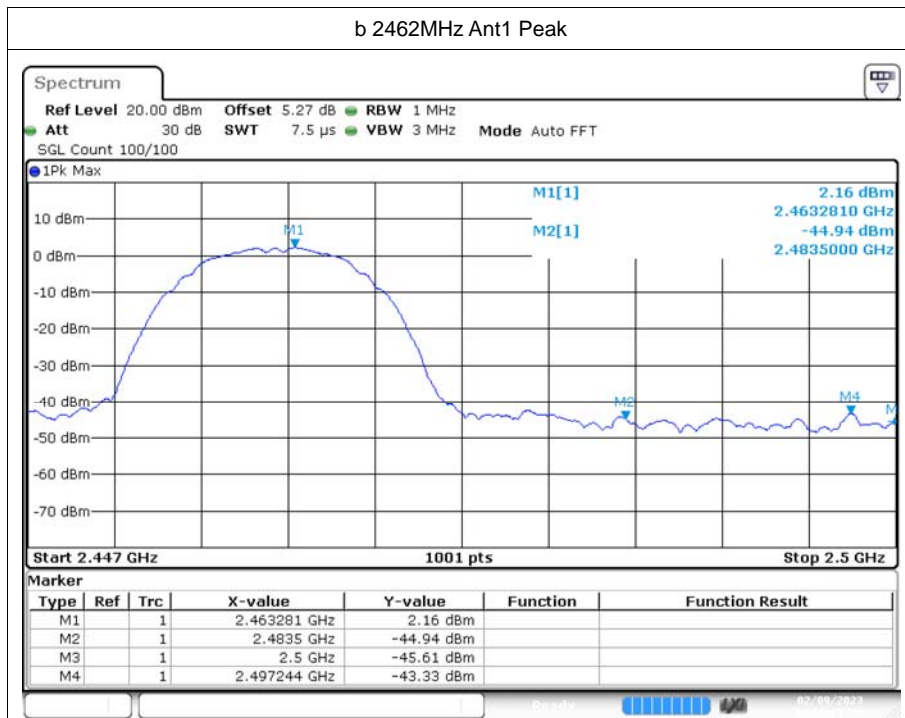


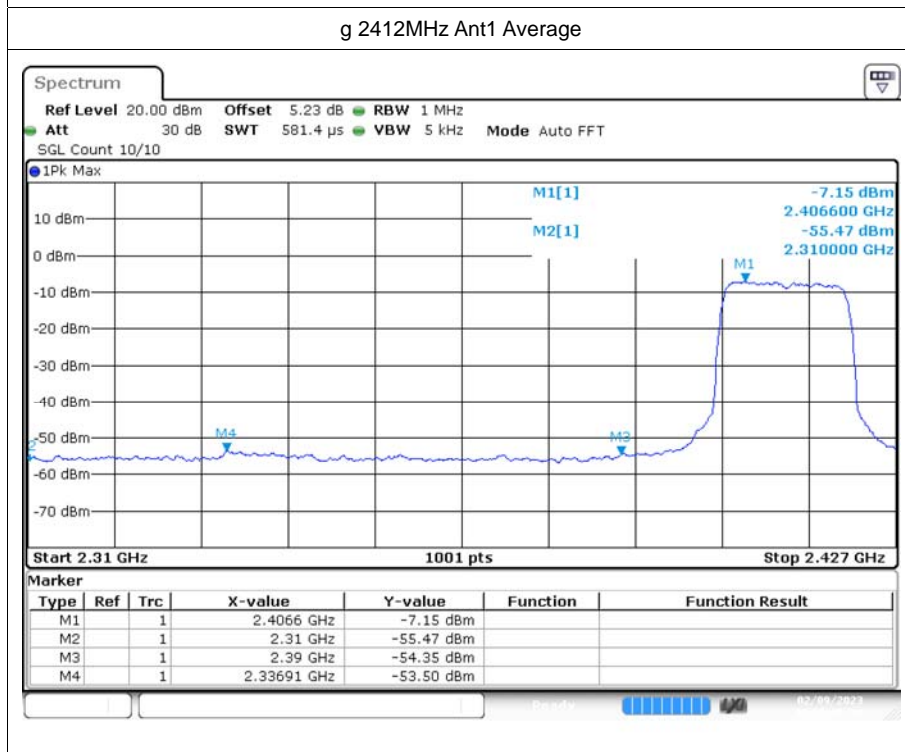
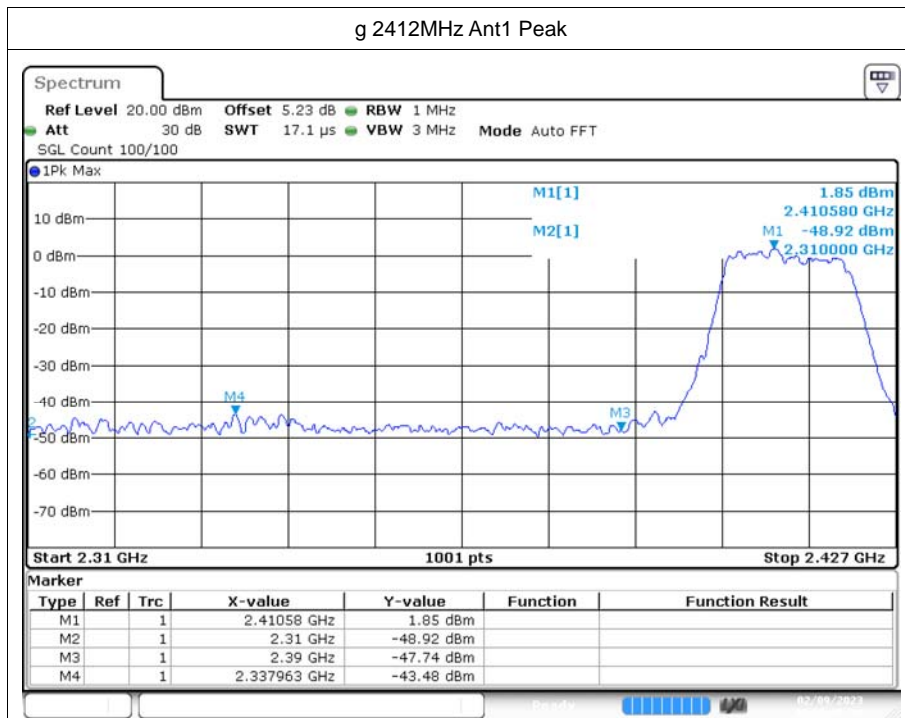
|     |      |      |          |        |      |       |         |    |      |
|-----|------|------|----------|--------|------|-------|---------|----|------|
| n20 | 2462 | Ant1 | 2500     | -55.05 | 2.46 | 42.67 | Average | 54 | Pass |
| n40 | 2422 | Ant1 | 2310     | -47.46 | 2.46 | 50.26 | Peak    | 74 | Pass |
| n40 | 2422 | Ant1 | 2310     | -55.11 | 2.46 | 42.61 | Average | 54 | Pass |
| n40 | 2422 | Ant1 | 2376.74  | -44.36 | 2.46 | 53.36 | Peak    | 74 | Pass |
| n40 | 2422 | Ant1 | 2339.394 | -53.85 | 2.46 | 43.87 | Average | 54 | Pass |
| n40 | 2422 | Ant1 | 2390     | -47.49 | 2.46 | 50.23 | Peak    | 74 | Pass |
| n40 | 2422 | Ant1 | 2390     | -55.16 | 2.46 | 42.56 | Average | 54 | Pass |
| n40 | 2452 | Ant1 | 2483.5   | -46.14 | 2.46 | 51.58 | Peak    | 74 | Pass |
| n40 | 2452 | Ant1 | 2483.5   | -54.75 | 2.46 | 42.97 | Average | 54 | Pass |
| n40 | 2452 | Ant1 | 2487.91  | -44.8  | 2.46 | 52.92 | Peak    | 74 | Pass |
| n40 | 2452 | Ant1 | 2485.18  | -53.87 | 2.46 | 43.85 | Average | 54 | Pass |
| n40 | 2452 | Ant1 | 2500     | -45.6  | 2.46 | 52.12 | Peak    | 74 | Pass |
| n40 | 2452 | Ant1 | 2500     | -55.21 | 2.46 | 42.51 | Average | 54 | Pass |

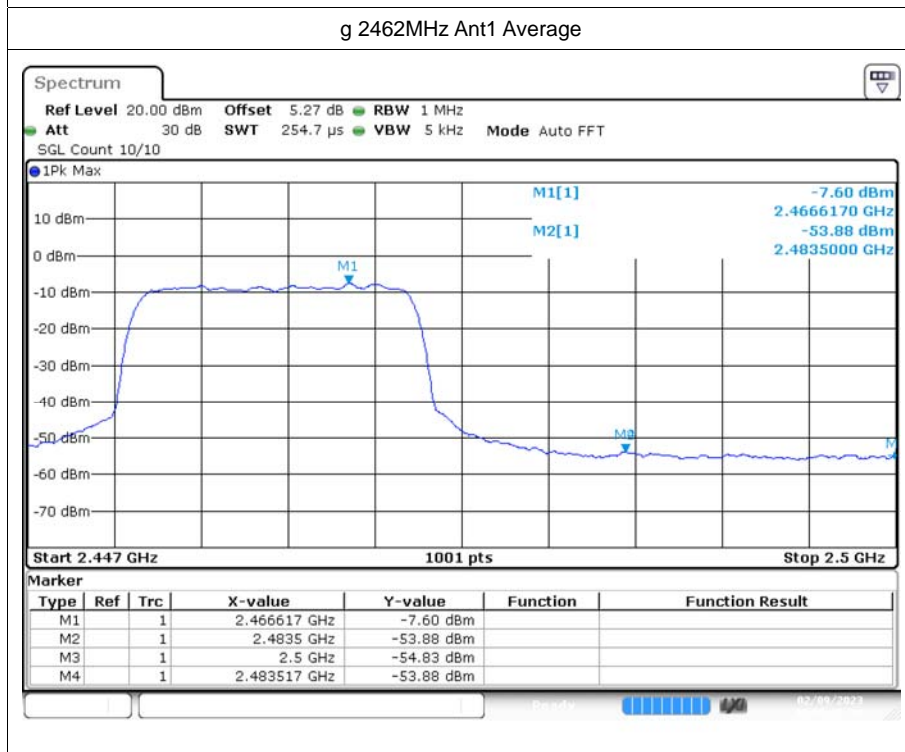
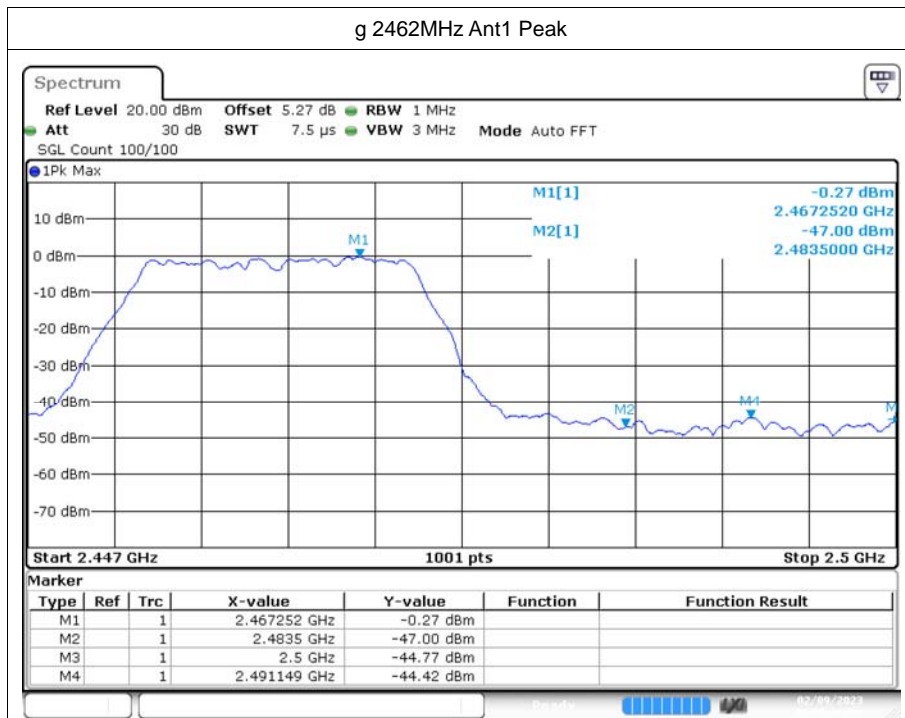


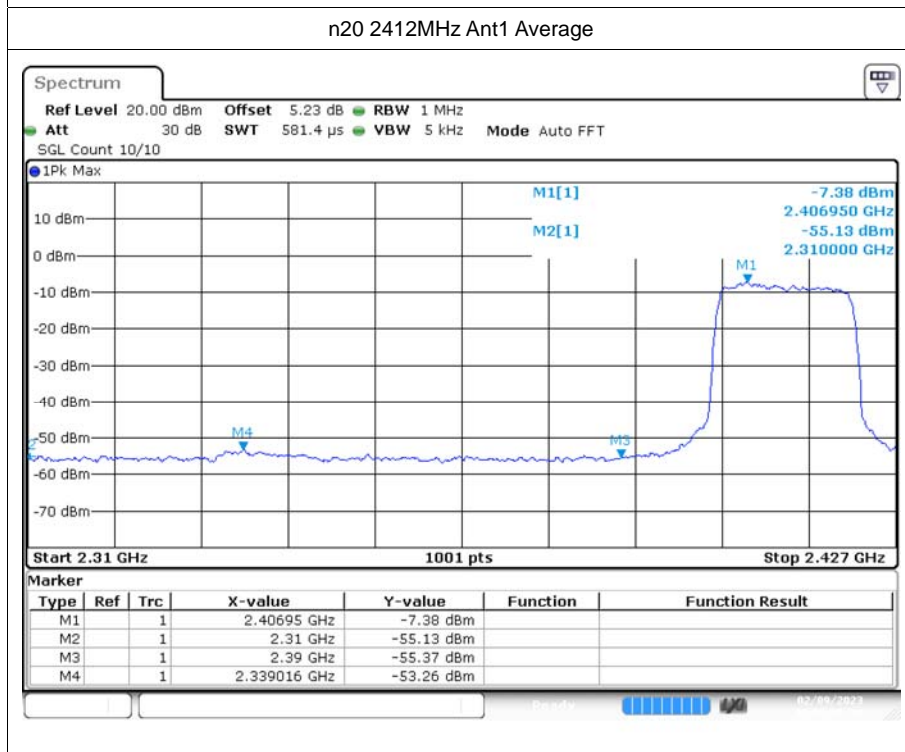
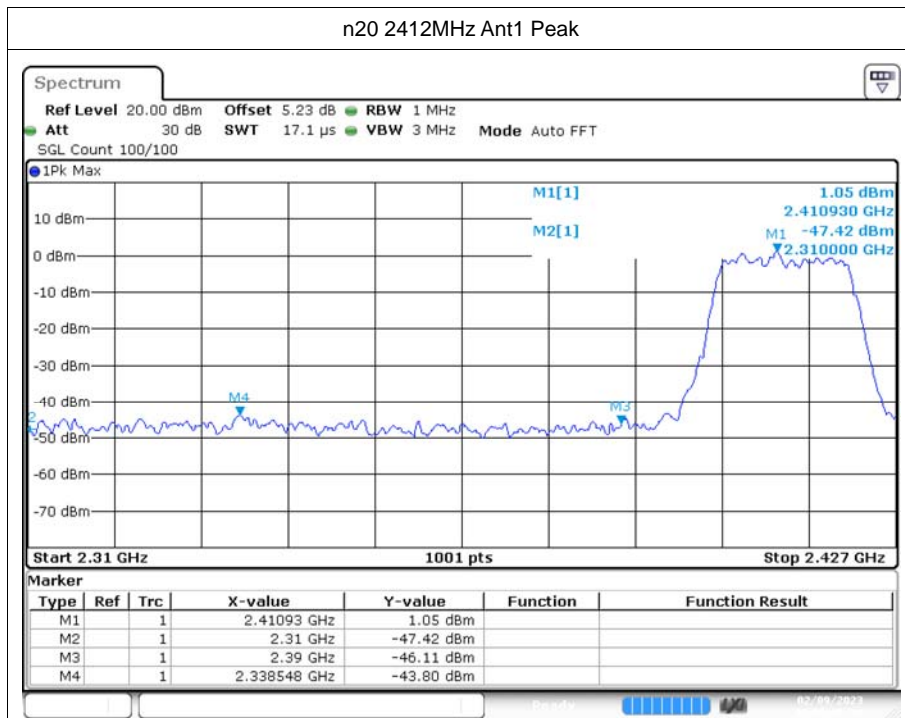
## 7.2 Test Graphs

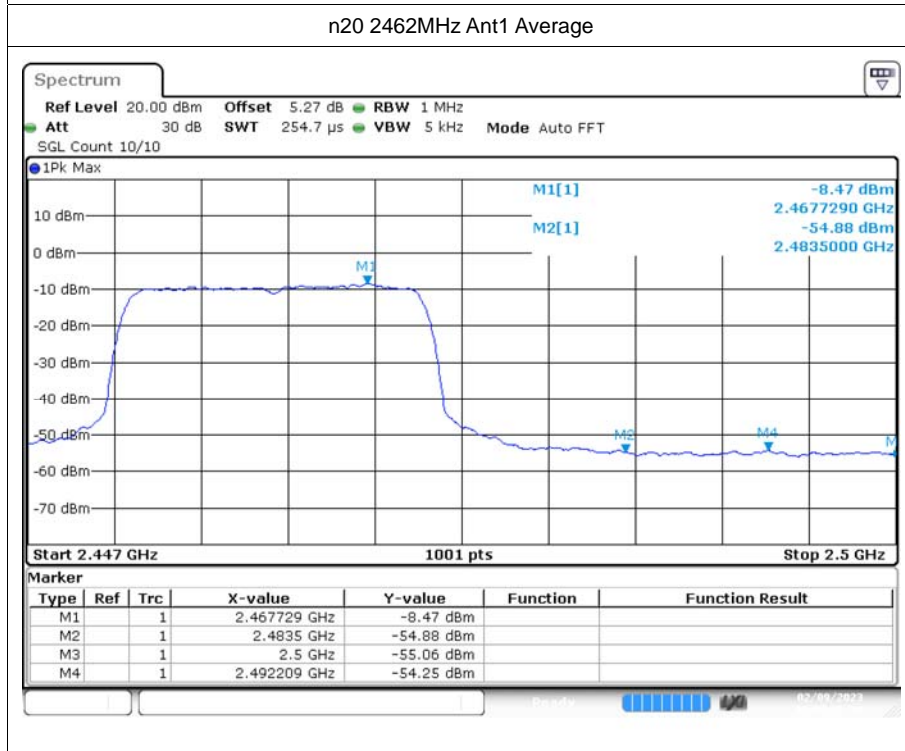
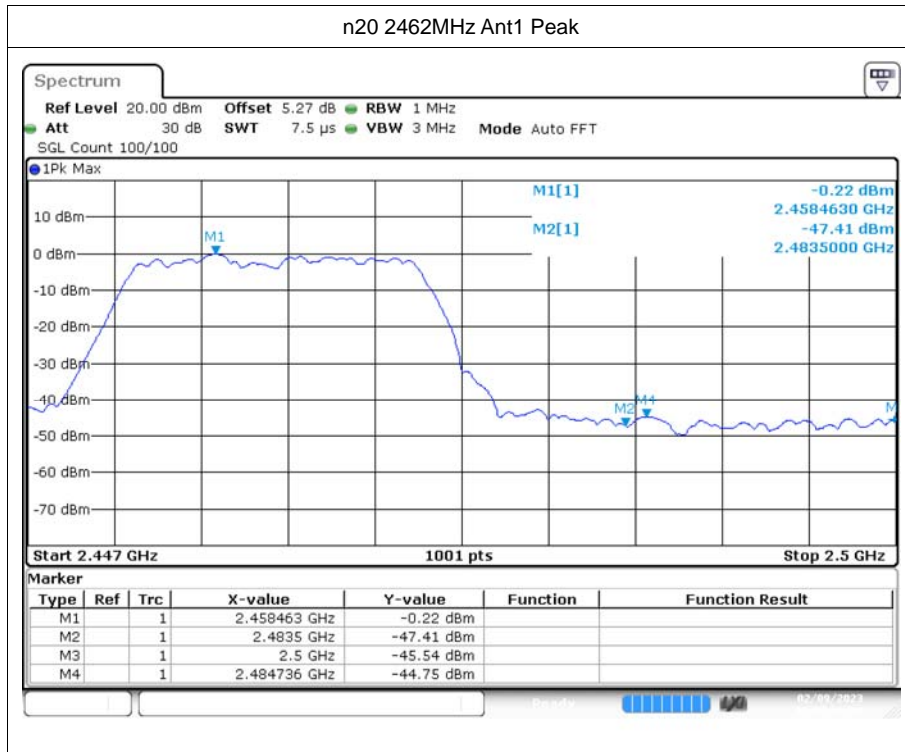


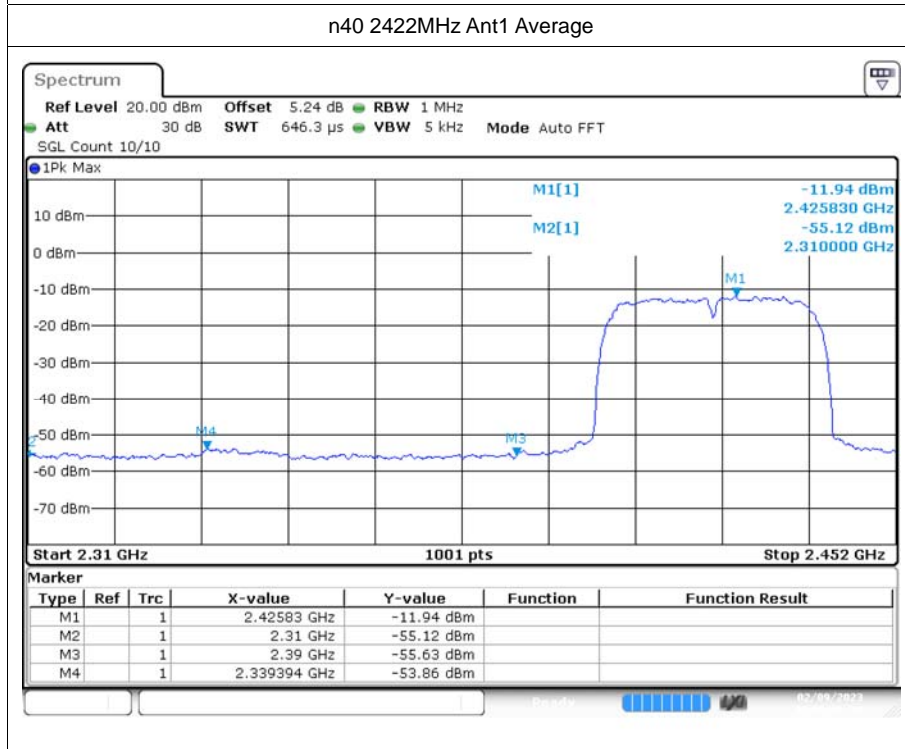
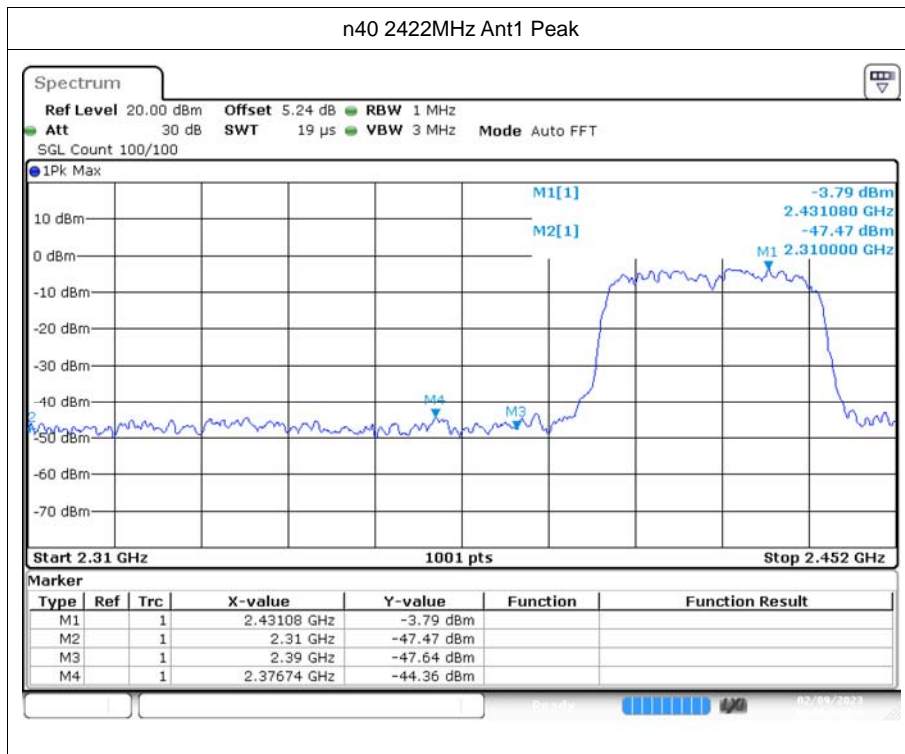




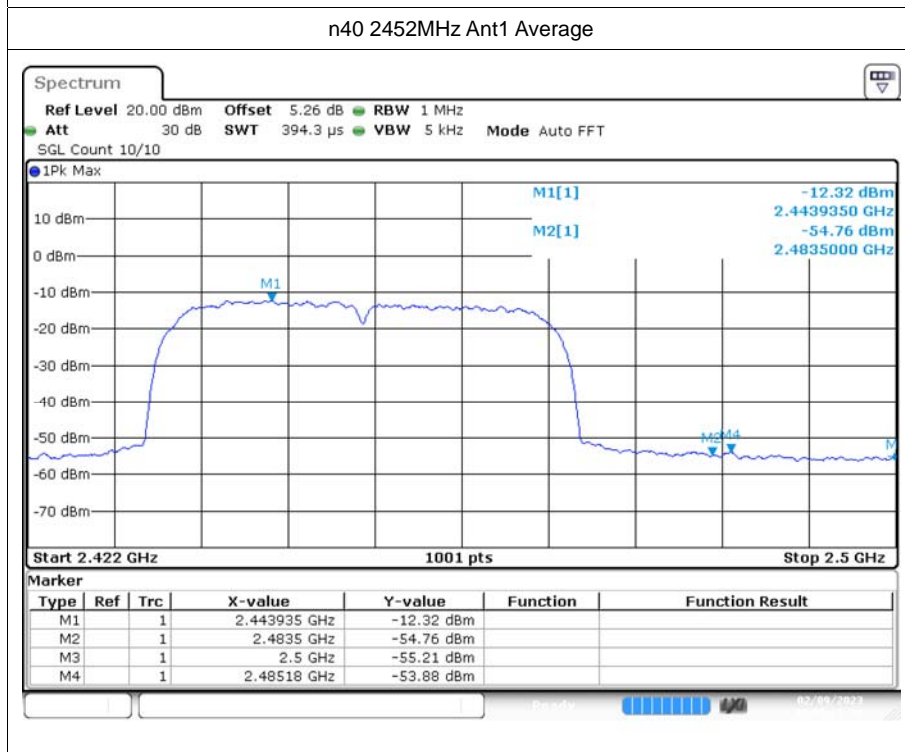
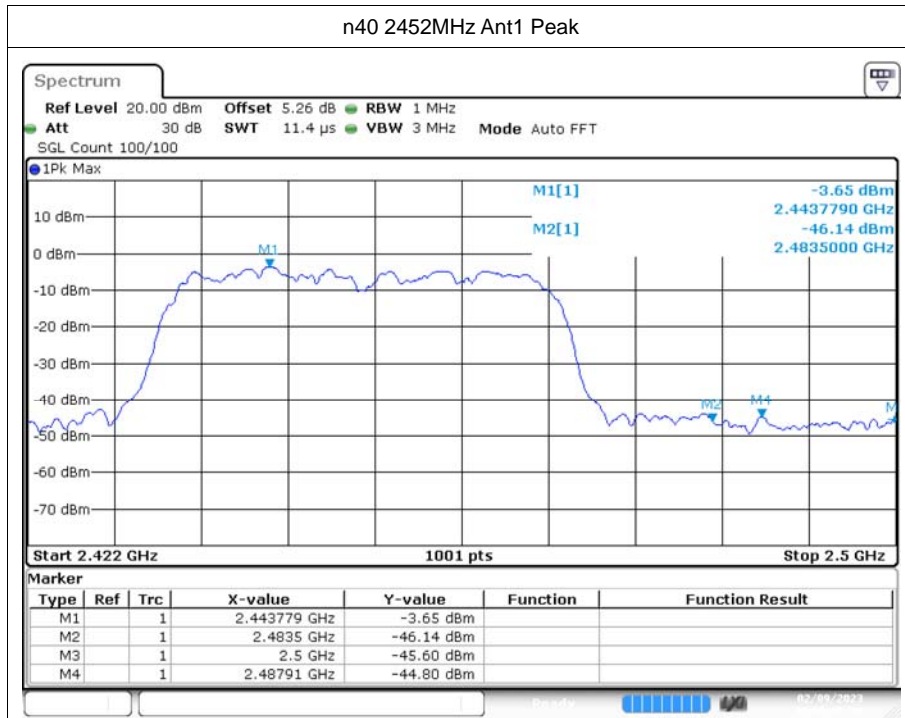












---The End---