



## Appendix C

### RF Test Data for 2.4GHz WIFI (Conducted Measurement)

**Product Name:** All-in-One Live Streaming Device

**Trade Mark:** HNKJ LAB

**Test Model:** HN-V88-HD

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 24.6° C     |
| Relative Humidity: | 52.4%       |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Simba Huang |
| Supervised by:     | Seal Chen   |



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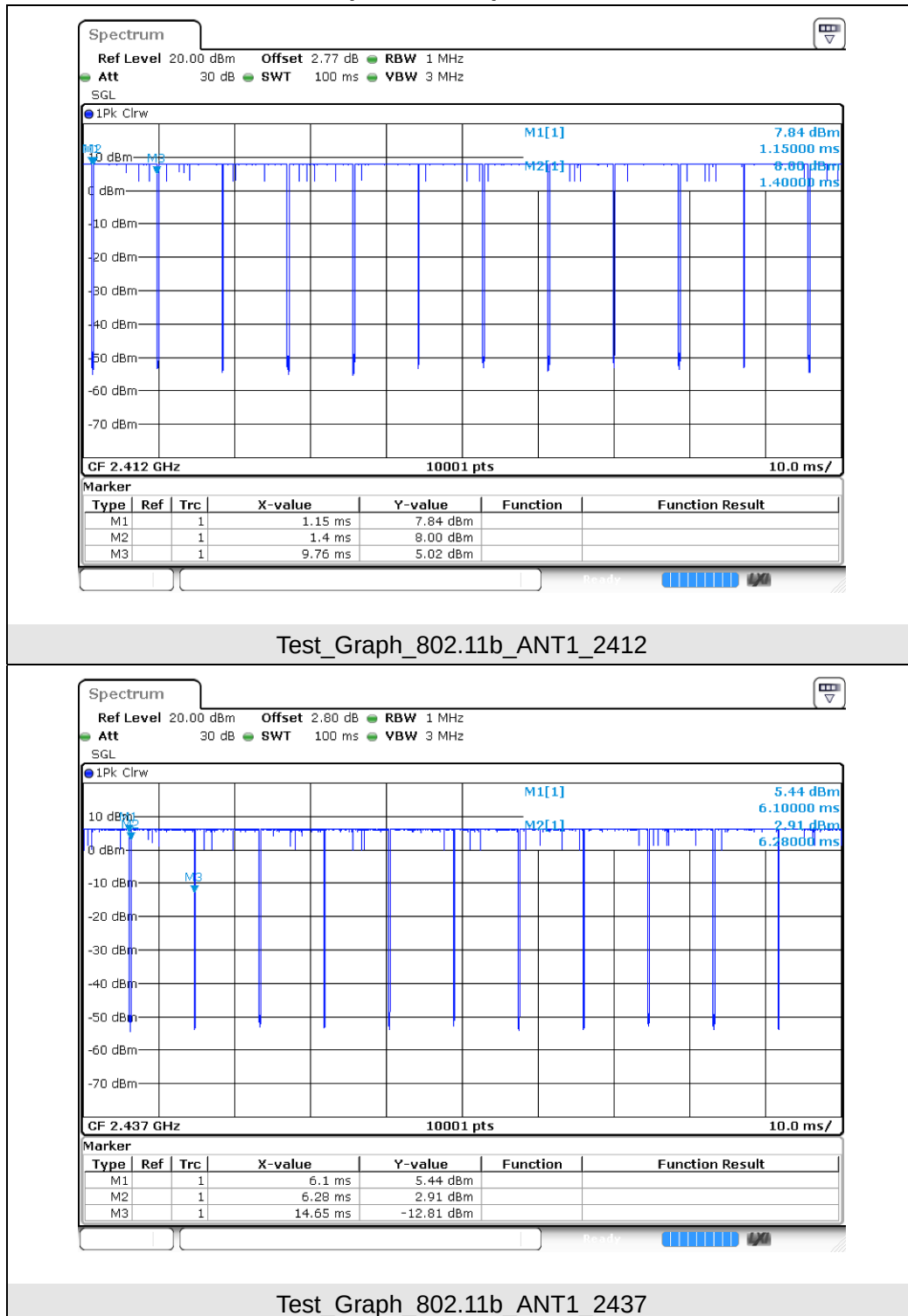
# 1 Duty Cycle

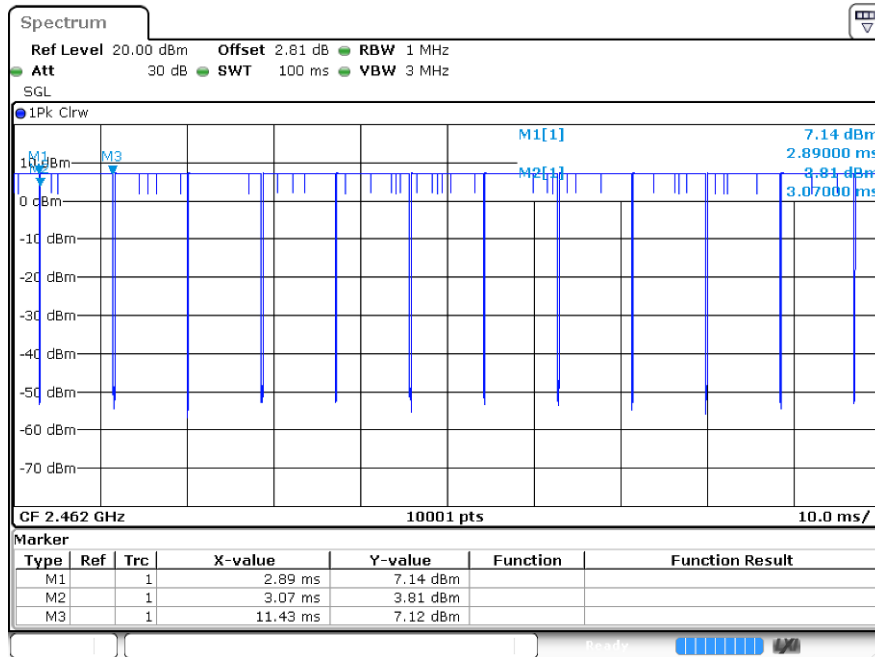
## 1.1 Test Result

| Mode      | Frequency (MHz) | Antenna | Duty Cycle (%) | 1/T (kHz) |
|-----------|-----------------|---------|----------------|-----------|
| 802.11b   | 2412            | Ant1    | 97.39          | 0.12      |
| 802.11b   | 2437            | Ant1    | 98.03          | 0.12      |
| 802.11b   | 2462            | Ant1    | 97.96          | 0.12      |
| 802.11g   | 2412            | Ant1    | 97.81          | 0.72      |
| 802.11g   | 2437            | Ant1    | 88.41          | 0.72      |
| 802.11g   | 2462            | Ant1    | 88.56          | 0.72      |
| 802.11n20 | 2412            | Ant1    | 86.09          | 0.85      |
| 802.11n20 | 2437            | Ant1    | 86.71          | 0.85      |
| 802.11n20 | 2462            | Ant1    | 86.74          | 0.85      |
| 802.11n40 | 2422            | Ant1    | 76.51          | 1.72      |
| 802.11n40 | 2437            | Ant1    | 76.53          | 1.69      |
| 802.11n40 | 2452            | Ant1    | 76.84          | 1.69      |

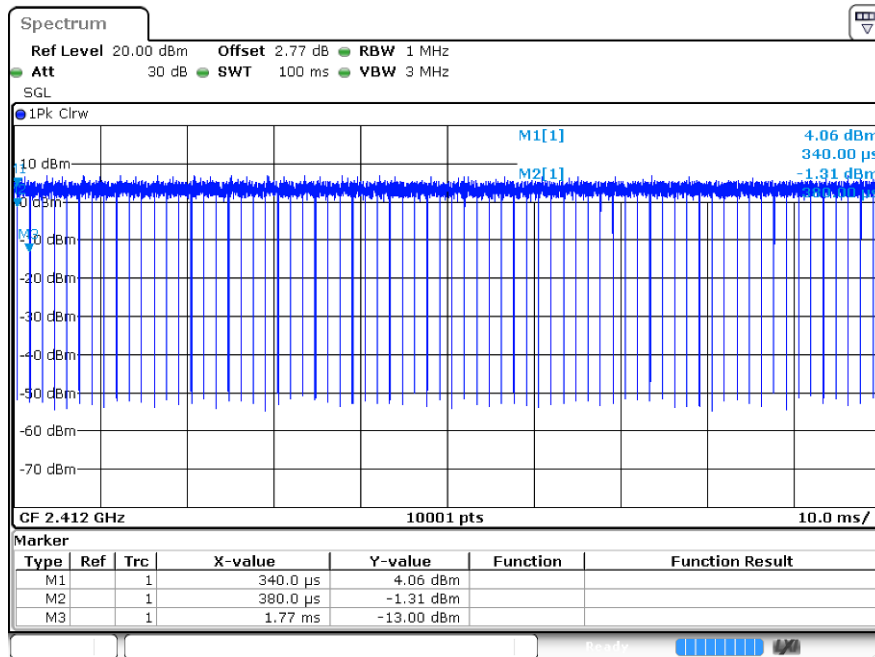
## 1.2 Test Graphs

Test Graphs of Occupied Bandwidth

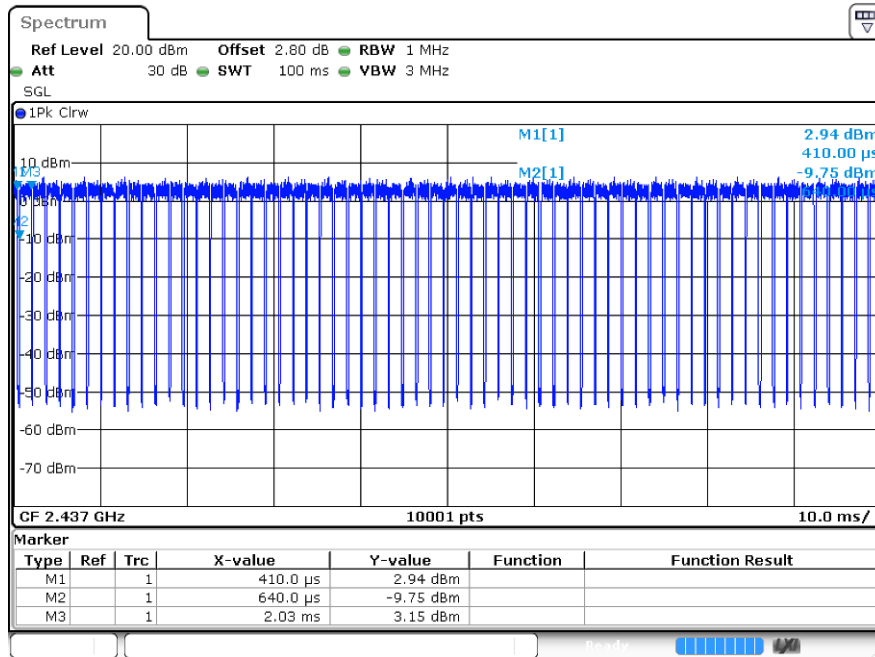




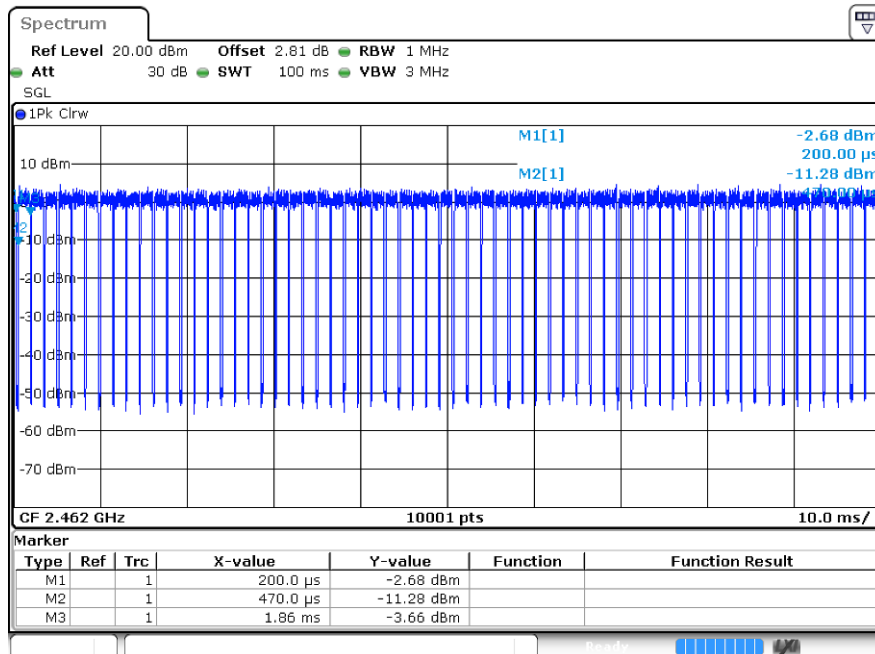
Test\_Graph\_802.11b\_ANT1\_2462



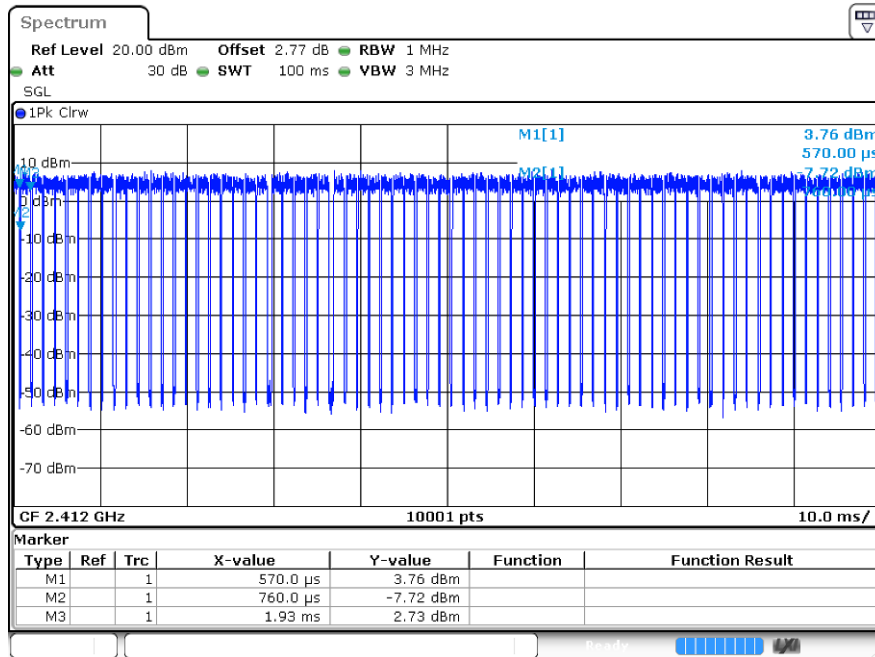
Test\_Graph\_802.11g\_ANT1\_2412



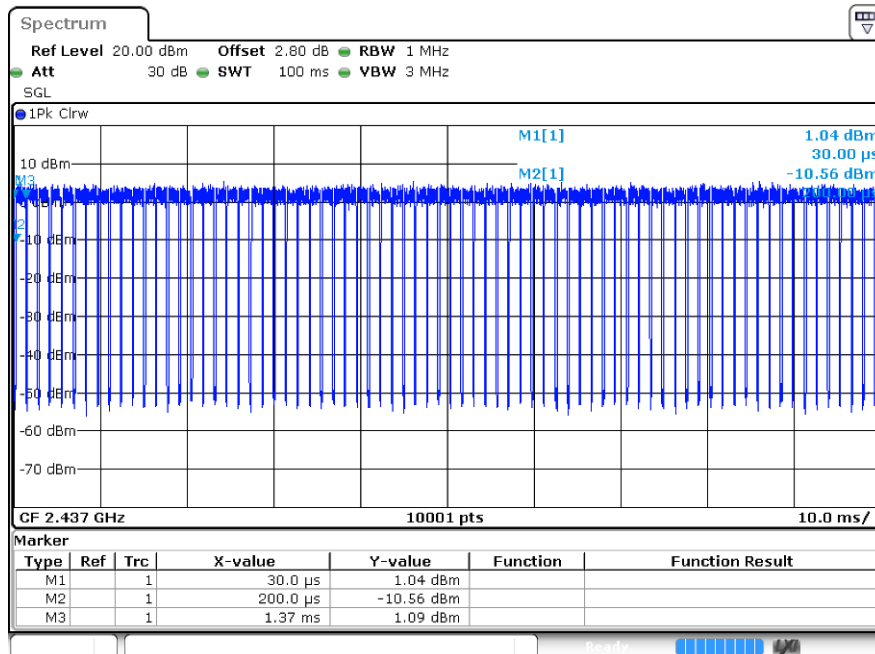
Test\_Graph\_802.11g\_ANT1\_2437



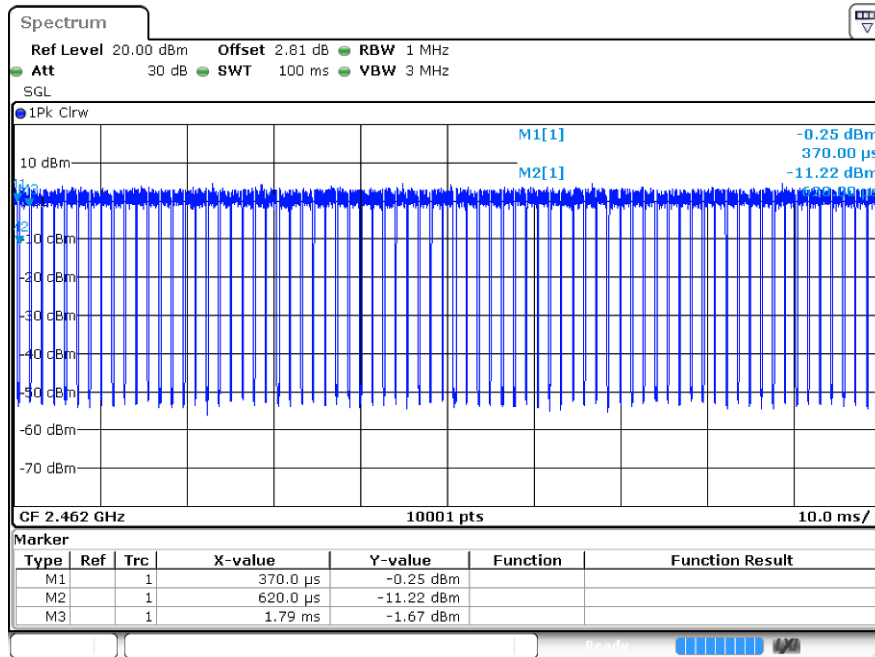
Test\_Graph\_802.11g\_ANT1\_2462



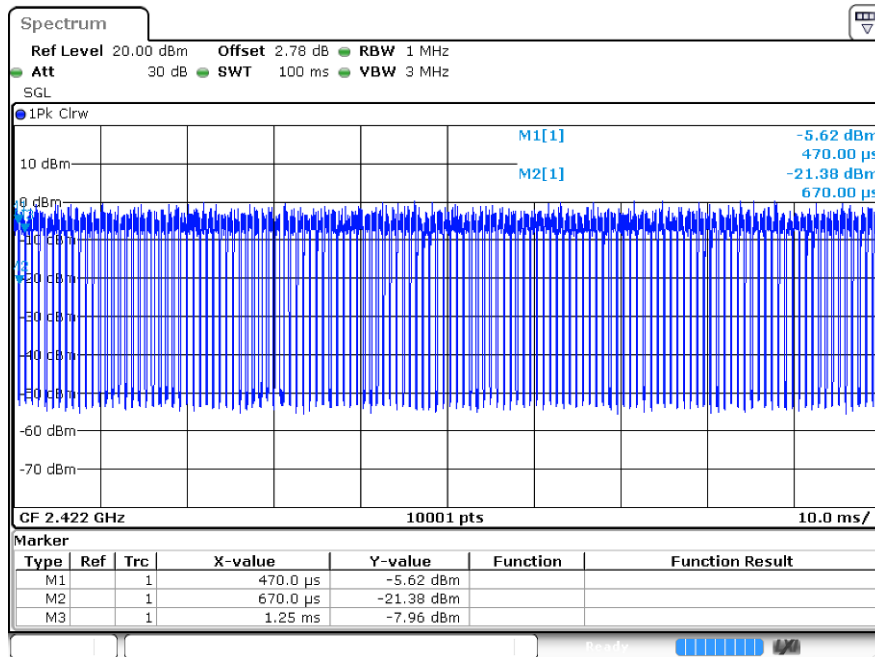
Test\_Graph\_802.11n20\_ANT1\_2412



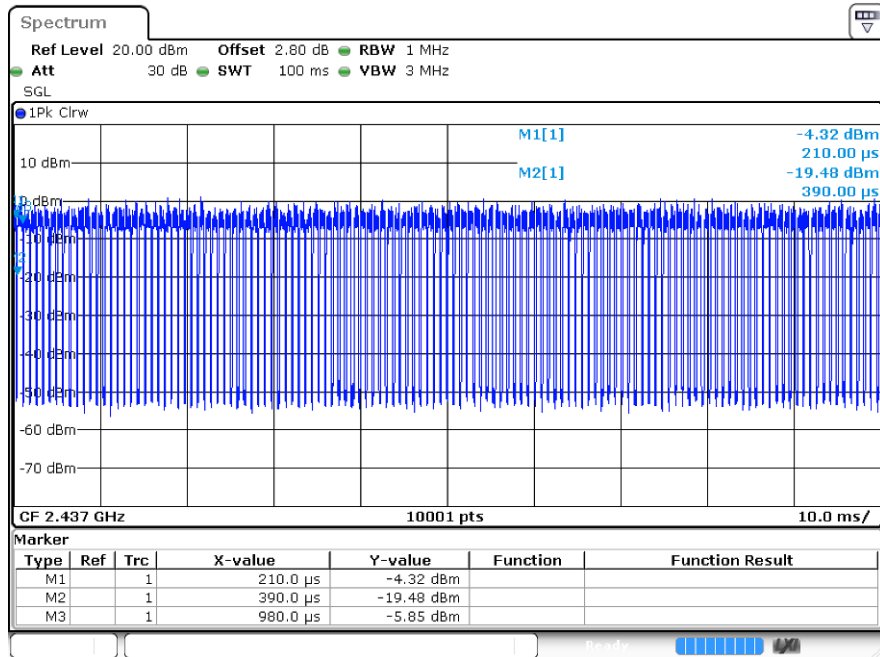
Test\_Graph\_802.11n20\_ANT1\_2437



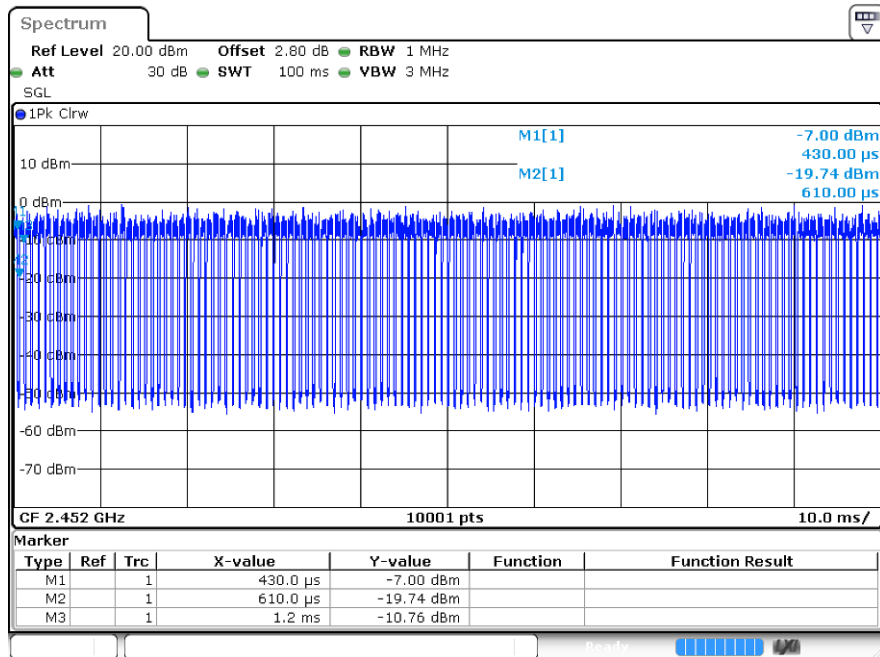
Test\_Graph\_802.11n20\_ANT1\_2462



Test\_Graph\_802.11n40\_ANT1\_2422



Test\_Graph\_802.11n40\_ANT1\_2437



Test\_Graph\_802.11n40\_ANT1\_2452



## 2 Maximum Conducted Output Power

### 2.1 Test Result

| Test Data of Conducted Output Power |                    |                  |              |              |
|-------------------------------------|--------------------|------------------|--------------|--------------|
| Test Mode                           | Test Channel (MHz) | Peak Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11b                             | 2412               | 18.65            | $\leq 30$    | Pass         |
|                                     | 2437               | 15.90            | $\leq 30$    | Pass         |
|                                     | 2462               | 17.84            | $\leq 30$    | Pass         |
| 802.11g                             | 2412               | 17.28            | $\leq 30$    | Pass         |
|                                     | 2437               | 15.52            | $\leq 30$    | Pass         |
|                                     | 2462               | 14.37            | $\leq 30$    | Pass         |
| 802.11n20                           | 2412               | 18.39            | $\leq 30$    | Pass         |
|                                     | 2437               | 14.48            | $\leq 30$    | Pass         |
|                                     | 2462               | 14.49            | $\leq 30$    | Pass         |
| 802.11n40                           | 2422               | 16.38            | $\leq 30$    | Pass         |
|                                     | 2437               | 14.78            | $\leq 30$    | Pass         |
|                                     | 2452               | 15.73            | $\leq 30$    | Pass         |



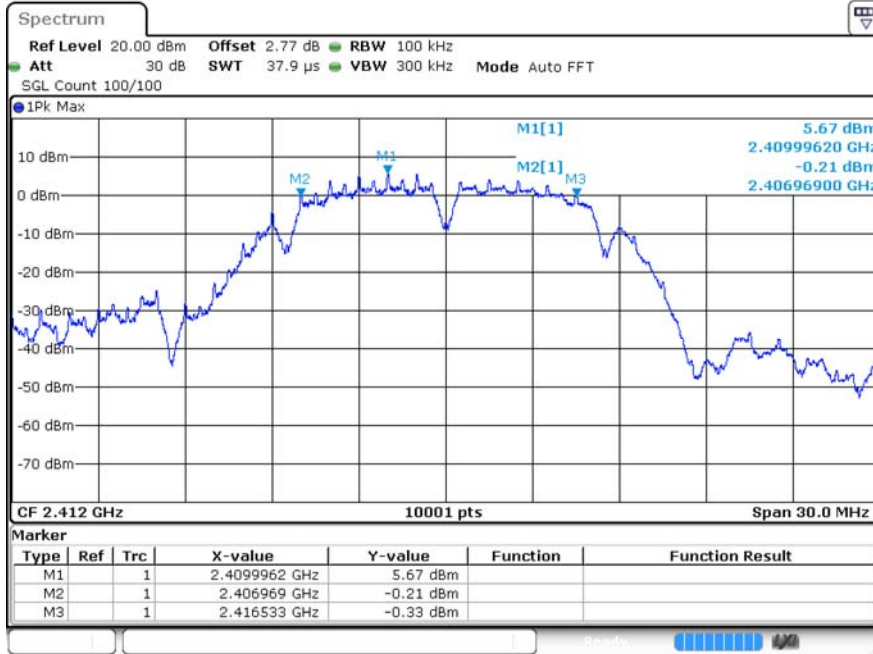
### 3 -6dB Bandwidth

#### 3.1 Test Result

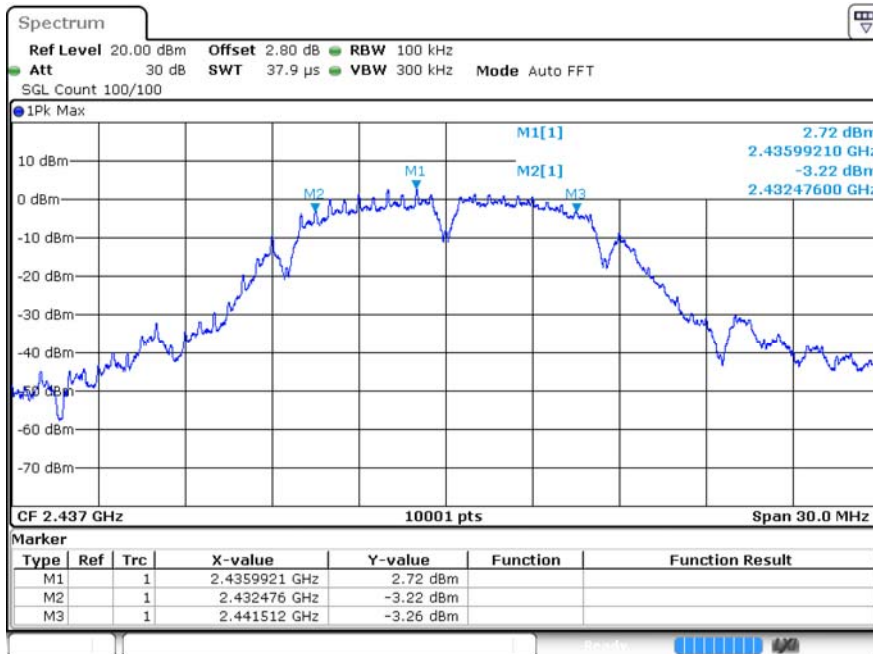
| Test Data of Occupied Bandwidth and DTS Bandwidth |                    |                      |              |              |
|---------------------------------------------------|--------------------|----------------------|--------------|--------------|
| Test Mode                                         | Test Channel (MHz) | -6dB Bandwidth (MHz) | Limits (MHz) | Pass or Fail |
| 802.11b                                           | 2412               | 9.564                | $\geq 0.5$   | Pass         |
|                                                   | 2437               | 9.036                | $\geq 0.5$   | Pass         |
|                                                   | 2462               | 9.084                | $\geq 0.5$   | Pass         |
| 802.11g                                           | 2412               | 10.047               | $\geq 0.5$   | Pass         |
|                                                   | 2437               | 15.728               | $\geq 0.5$   | Pass         |
|                                                   | 2462               | 16.158               | $\geq 0.5$   | Pass         |
| 802.11n20                                         | 2412               | 16.269               | $\geq 0.5$   | Pass         |
|                                                   | 2437               | 15.321               | $\geq 0.5$   | Pass         |
|                                                   | 2462               | 12.414               | $\geq 0.5$   | Pass         |
| 802.11n40                                         | 2422               | 36.45                | $\geq 0.5$   | Pass         |
|                                                   | 2437               | 27.552               | $\geq 0.5$   | Pass         |
|                                                   | 2452               | 21.312               | $\geq 0.5$   | Pass         |

## 3.2 Test Graphs

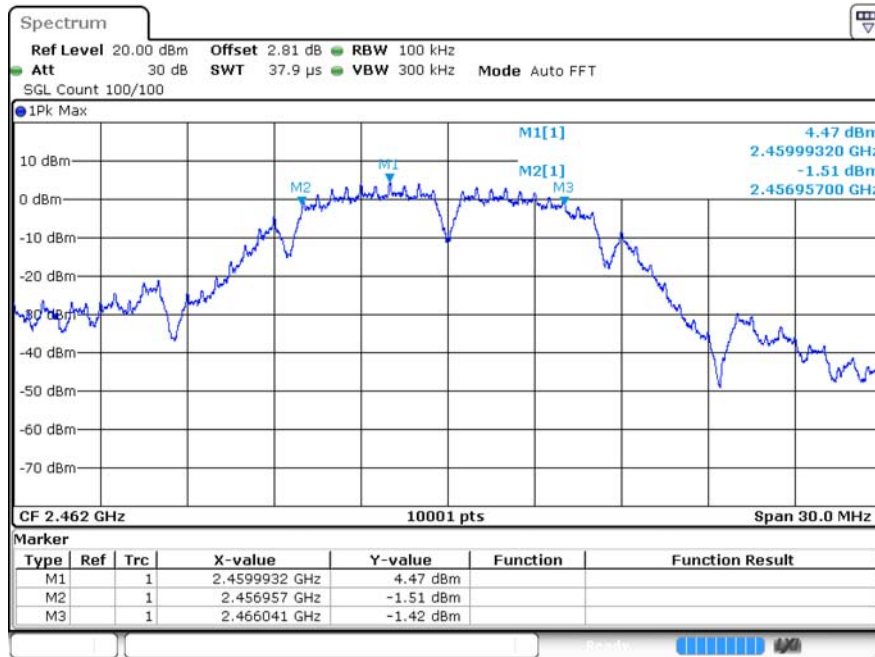
### Test Graphs of Occupied Bandwidth



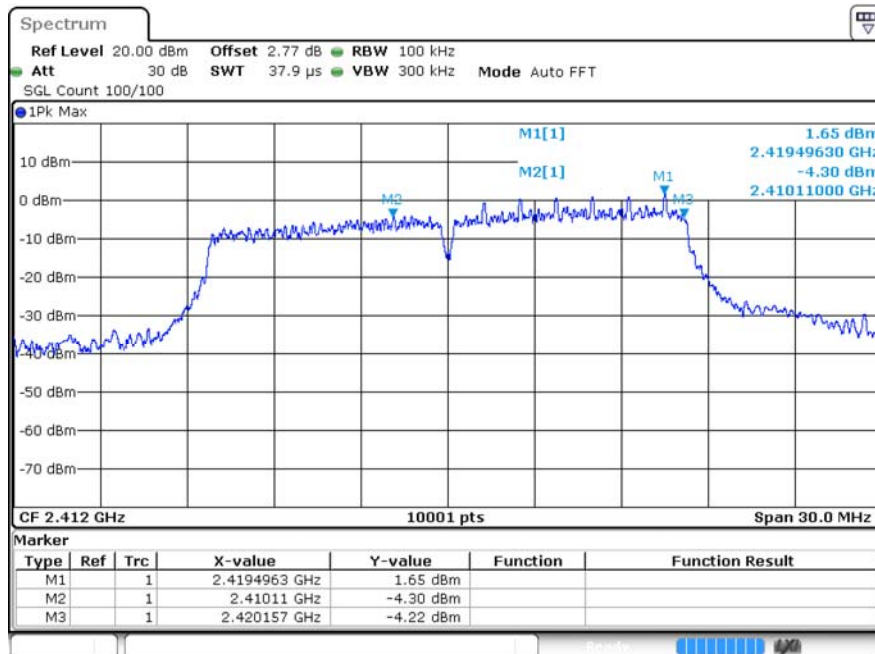
Test\_Graph\_802.11b\_ANT1\_2412



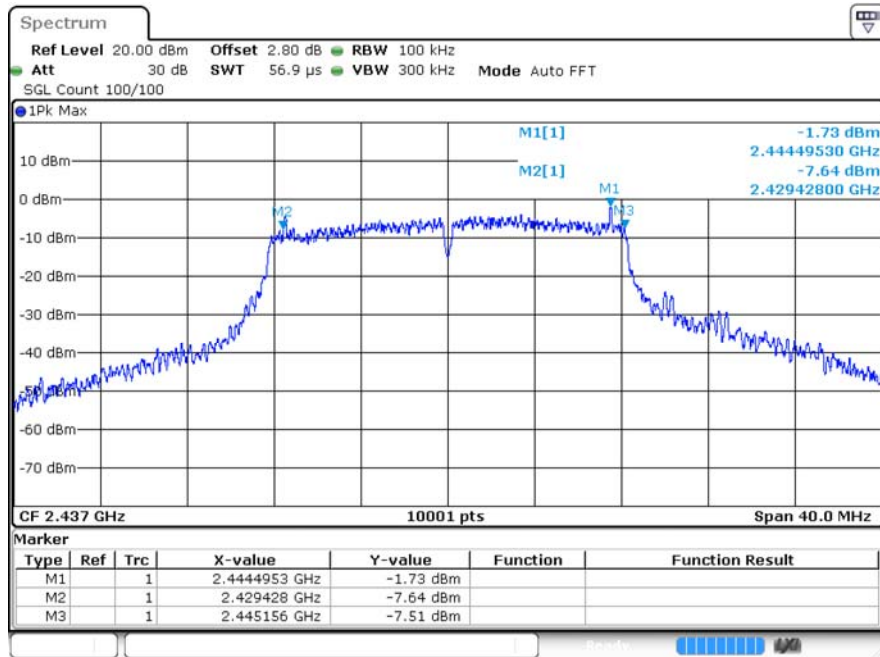
Test\_Graph\_802.11b\_ANT1\_2437



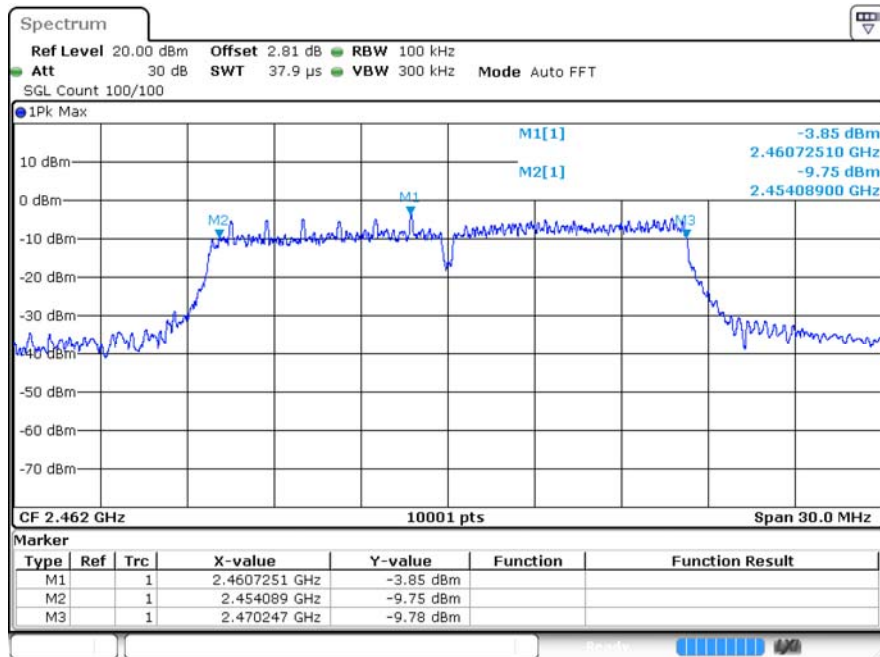
Test\_Graph\_802.11b\_ANT1\_2462



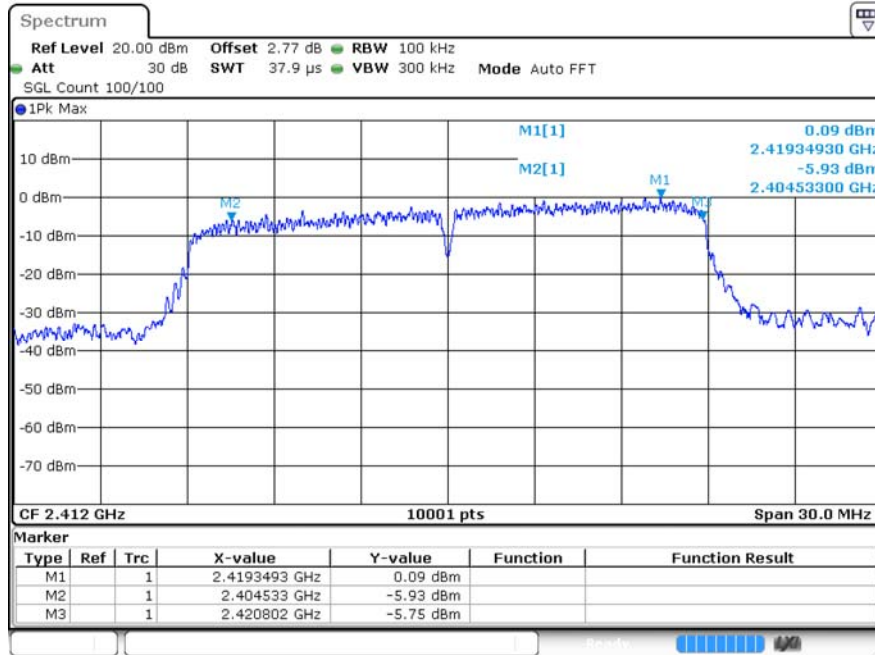
Test\_Graph\_802.11g\_ANT1\_2412



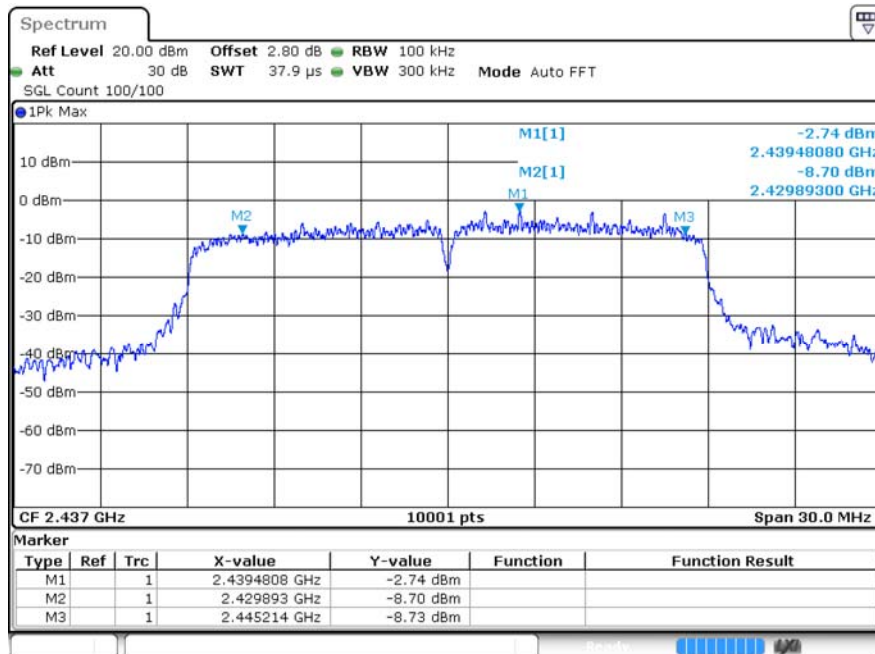
Test\_Graph\_802.11g\_ANT1\_2437



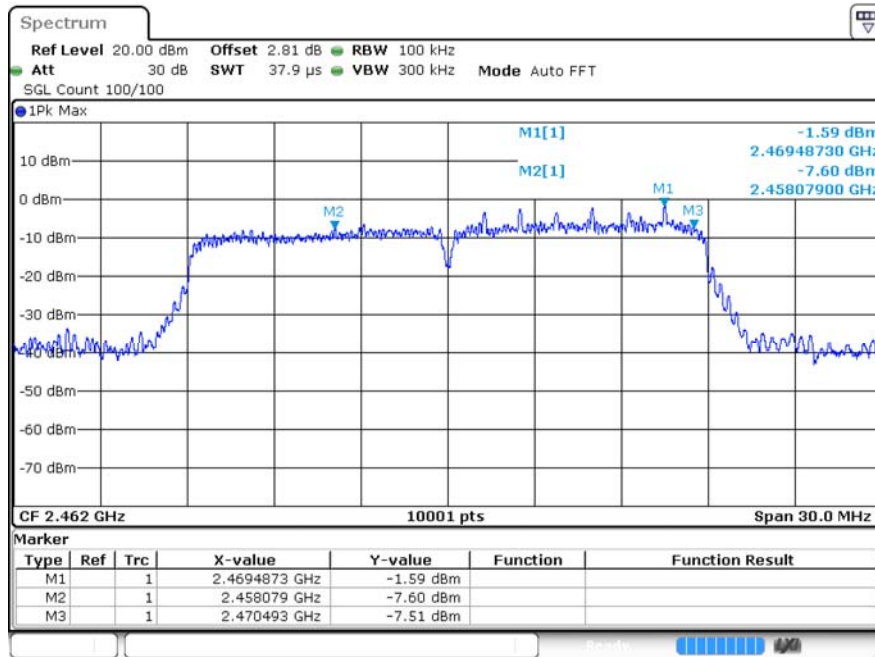
Test\_Graph\_802.11g\_ANT1\_2462



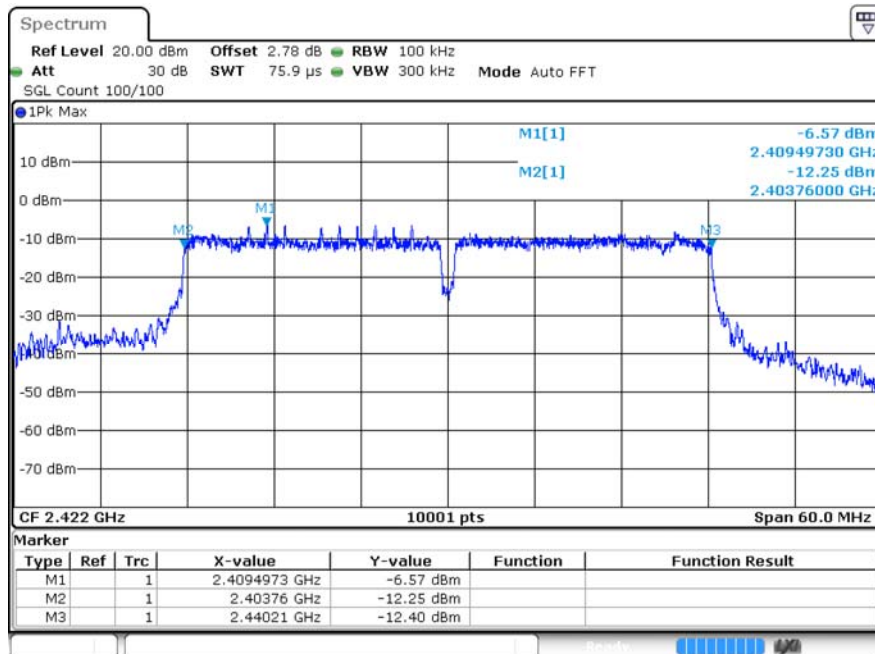
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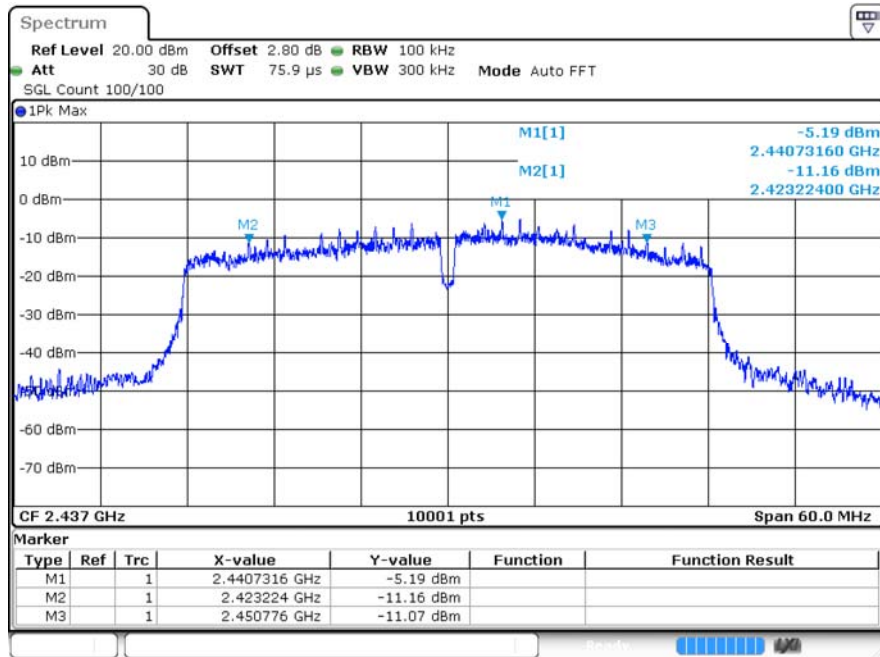
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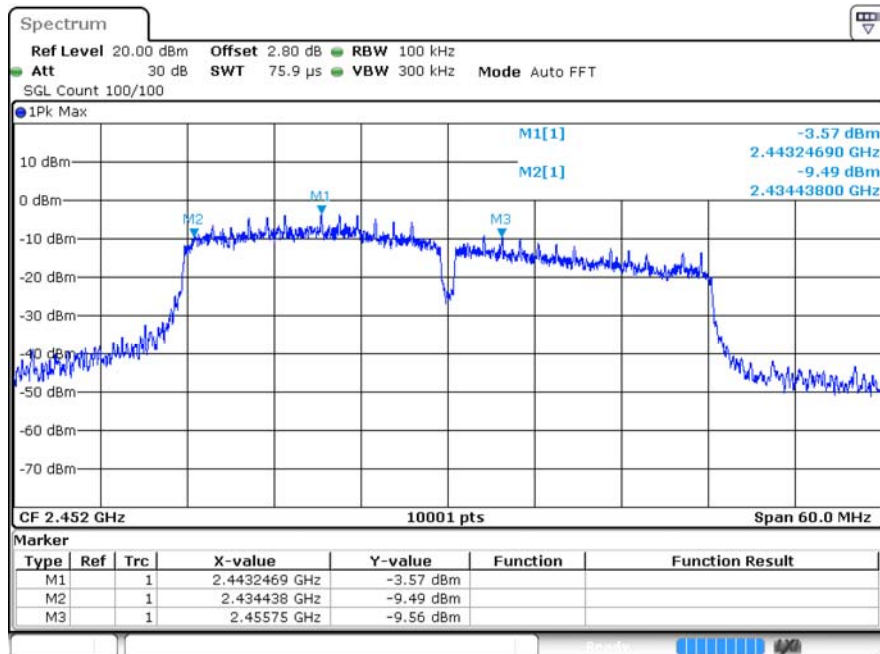
Test\_Graph\_802.11n20\_ANT1\_2462



Test\_Graph\_802.11n40\_ANT1\_2422



Test\_Graph\_802.11n40\_ANT1\_2437



Test\_Graph\_802.11n40\_ANT1\_2452



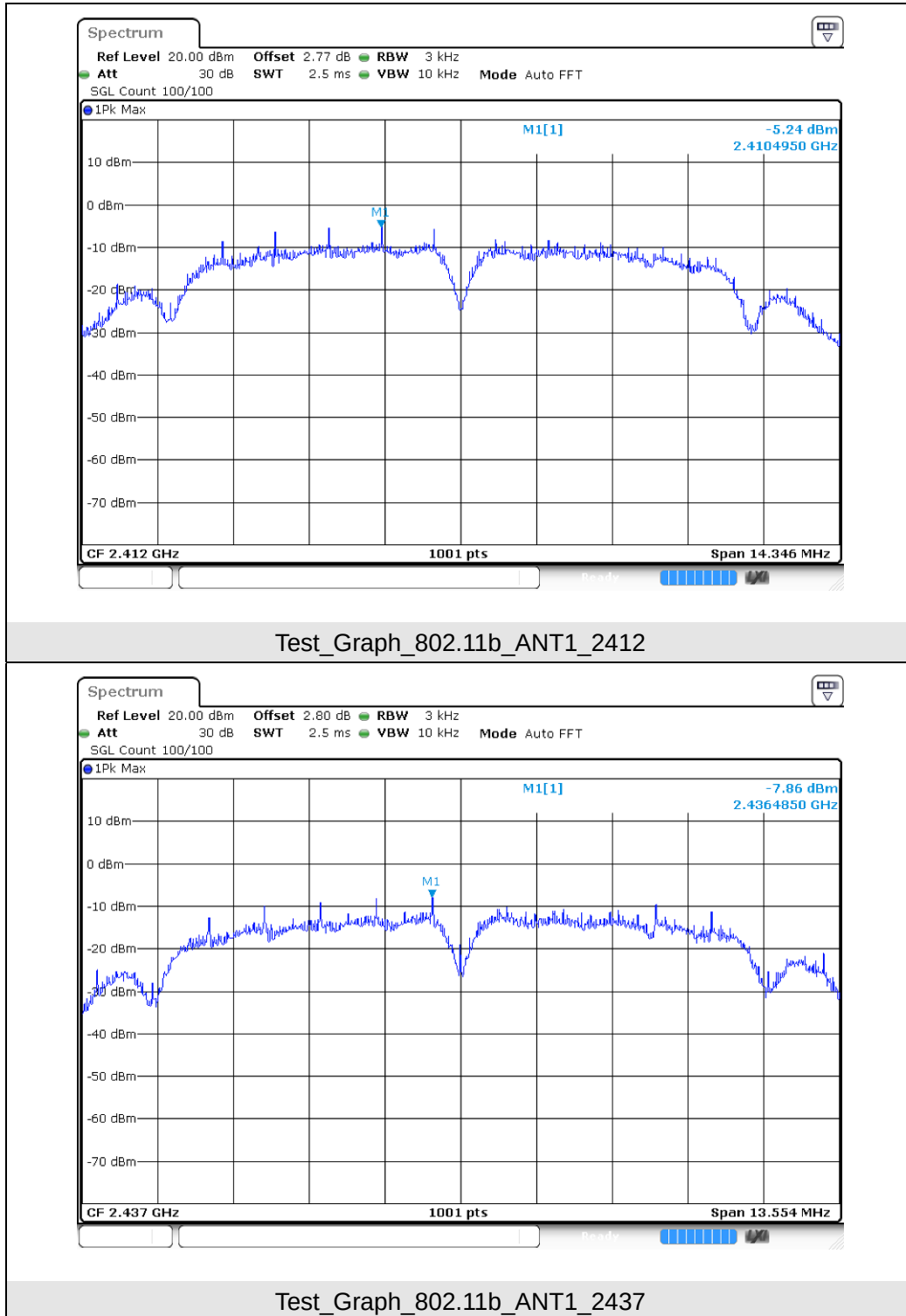
## 4 Maximum Power Spectral Density Level

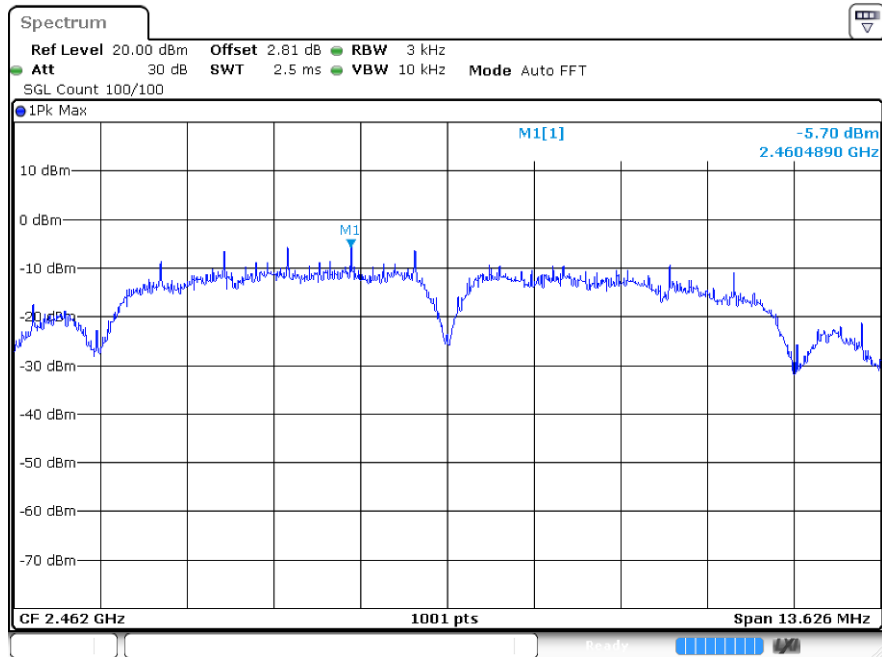
### 4.1 Test Result

| Test Data of Conducted Output Power Spectral Density |              |                          |                  |              |
|------------------------------------------------------|--------------|--------------------------|------------------|--------------|
| Test Mode                                            | Test Channel | Power density (dBm/3kHz) | Limit (dBm/3kHz) | Pass or Fail |
| 802.11b                                              | 2412         | -5.24                    | $\leq 8$         | Pass         |
|                                                      | 2437         | -7.86                    | $\leq 8$         | Pass         |
|                                                      | 2462         | -5.7                     | $\leq 8$         | Pass         |
| 802.11g                                              | 2412         | -12.76                   | $\leq 8$         | Pass         |
|                                                      | 2437         | -14.88                   | $\leq 8$         | Pass         |
|                                                      | 2462         | -16.78                   | $\leq 8$         | Pass         |
| 802.11n20                                            | 2412         | -11.3                    | $\leq 8$         | Pass         |
|                                                      | 2437         | -16.51                   | $\leq 8$         | Pass         |
|                                                      | 2462         | -16.04                   | $\leq 8$         | Pass         |
| 802.11n40                                            | 2422         | -19.64                   | $\leq 8$         | Pass         |
|                                                      | 2437         | -20.47                   | $\leq 8$         | Pass         |
|                                                      | 2452         | -18.81                   | $\leq 8$         | Pass         |

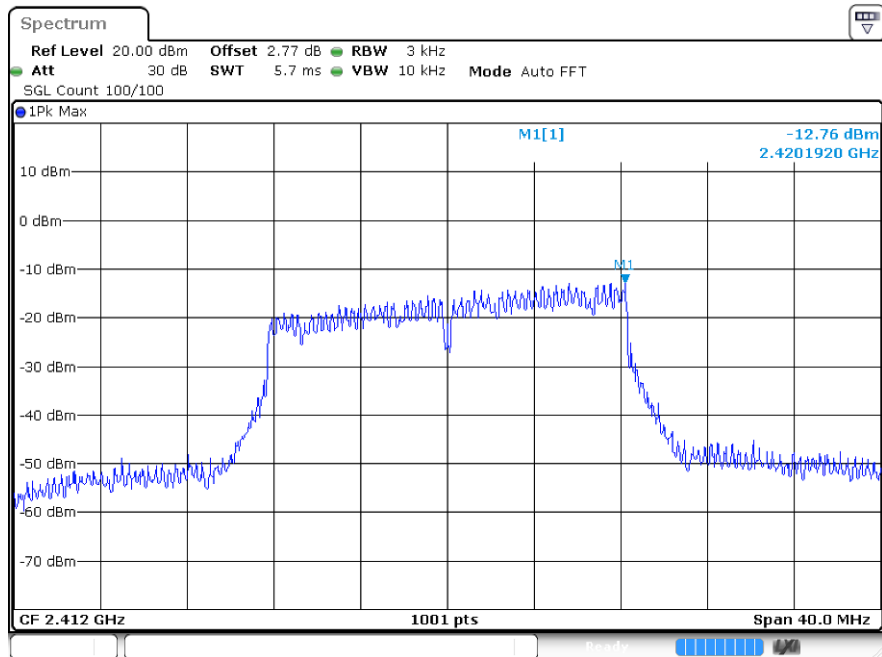
## 4.2 Test Graphs

### Test Graphs of Conducted Output Power Spectral Density

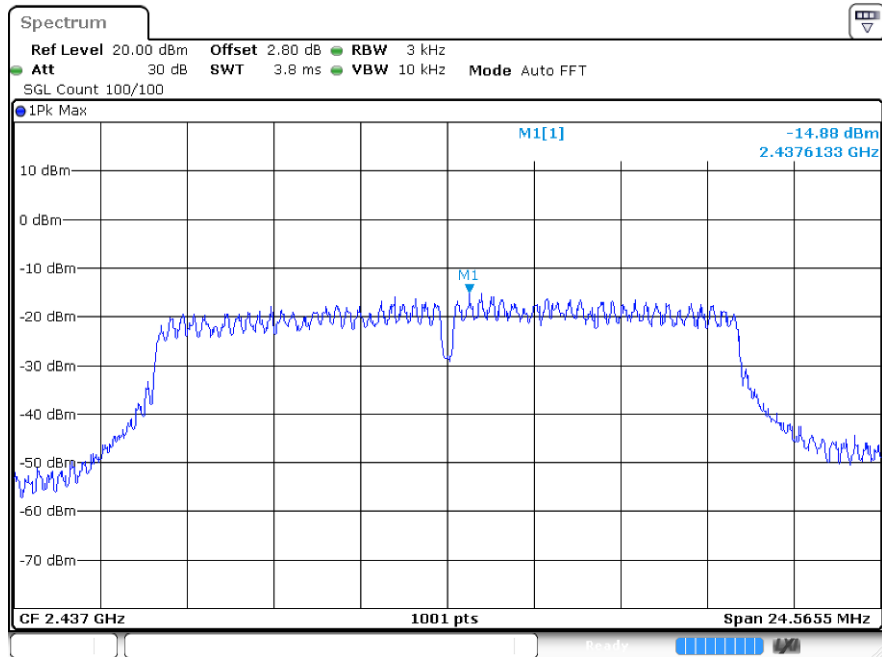




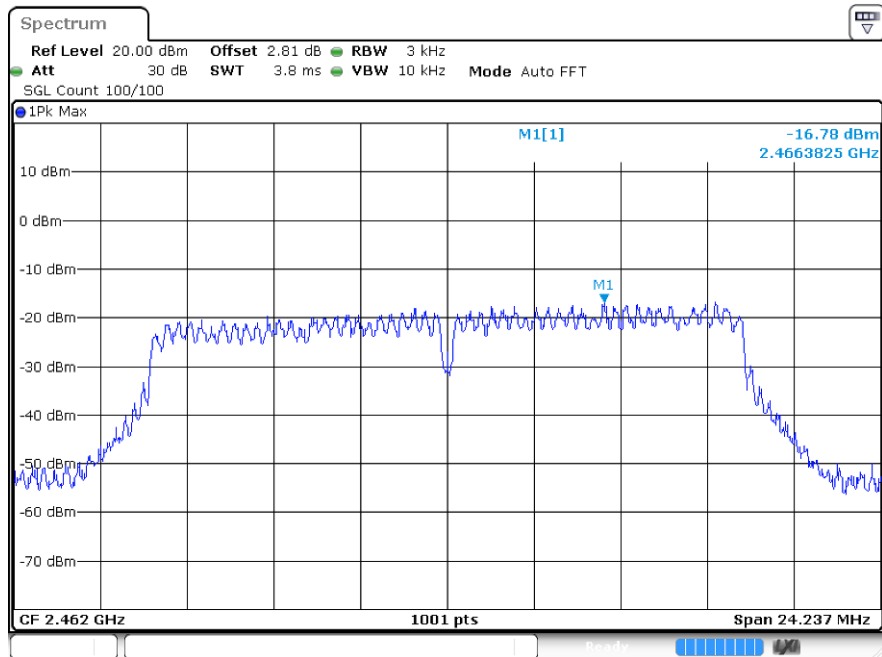
Test\_Graph\_802.11b\_ANT1\_2462



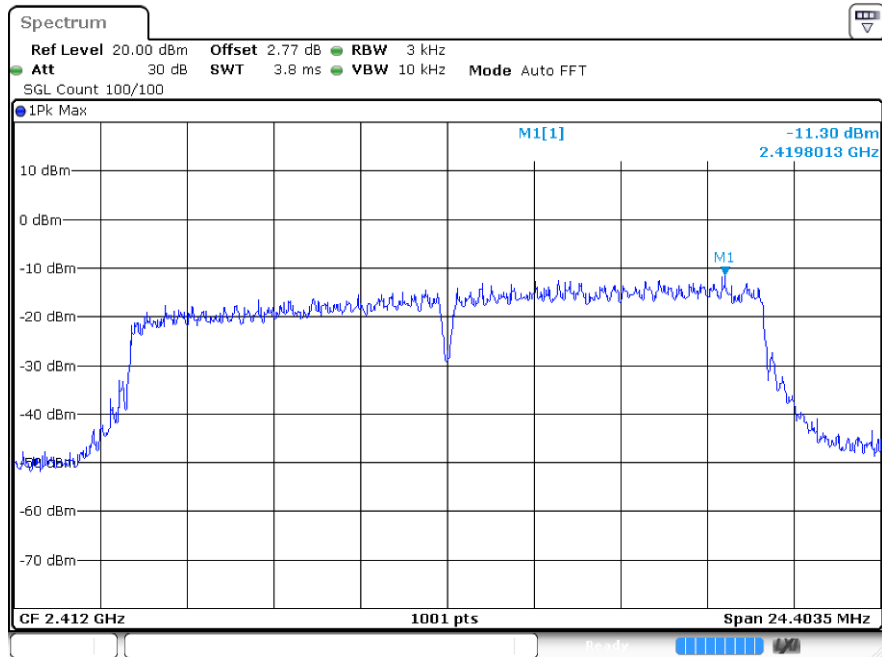
Test\_Graph\_802.11g\_ANT1\_2412



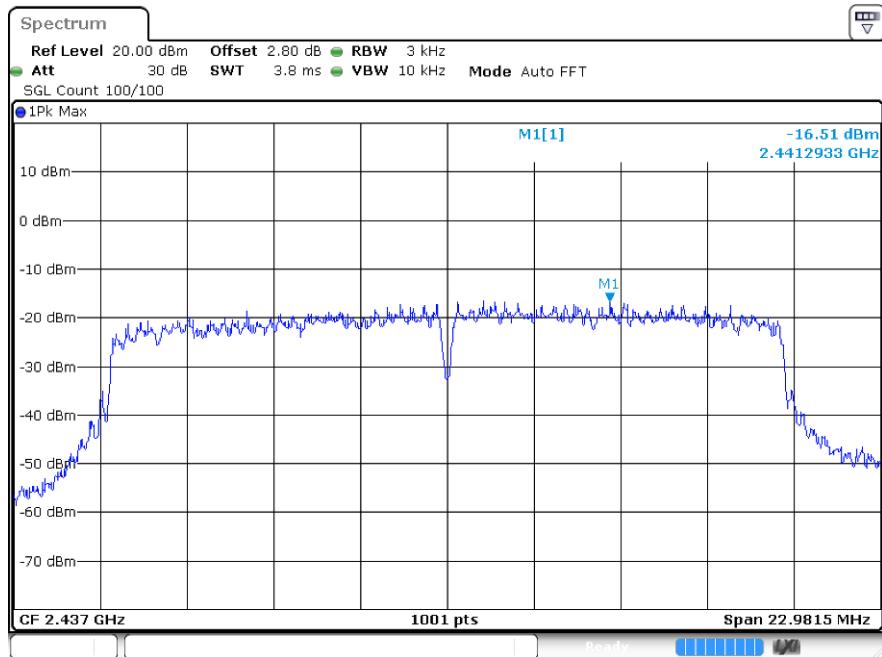
Test\_Graph\_802.11g\_ANT1\_2437



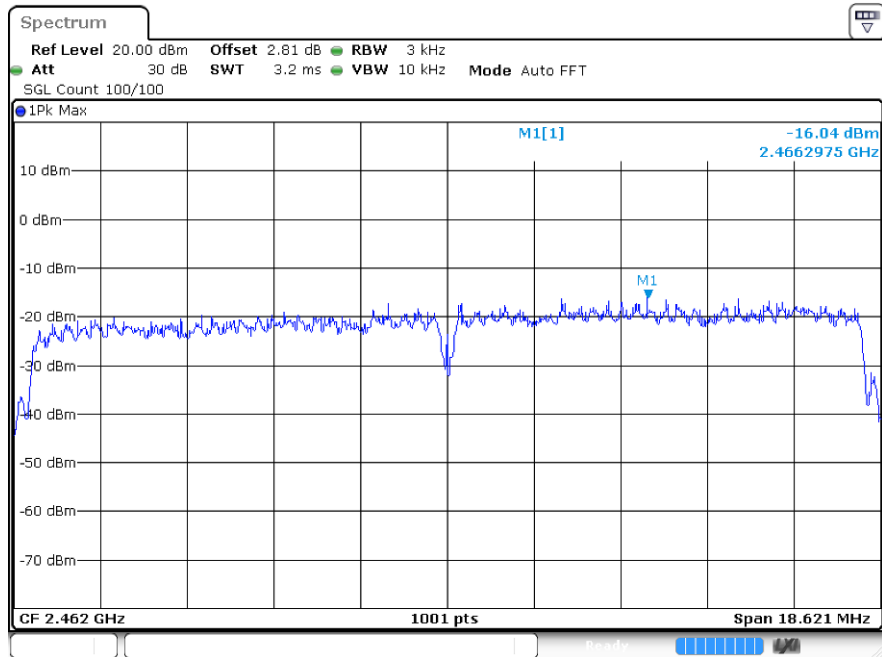
Test\_Graph\_802.11g\_ANT1\_2462



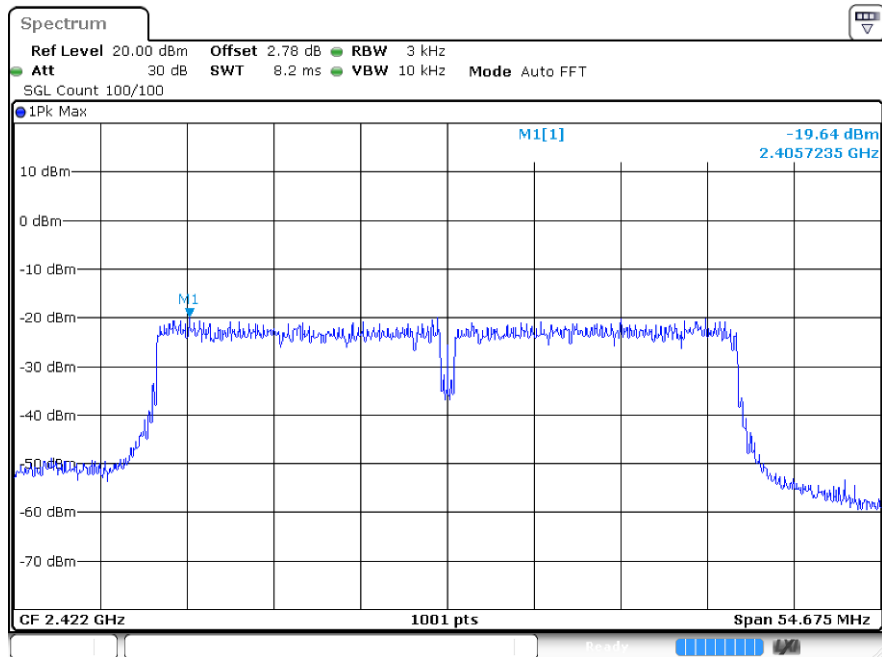
Test\_Graph\_802.11n20\_ANT1\_2412



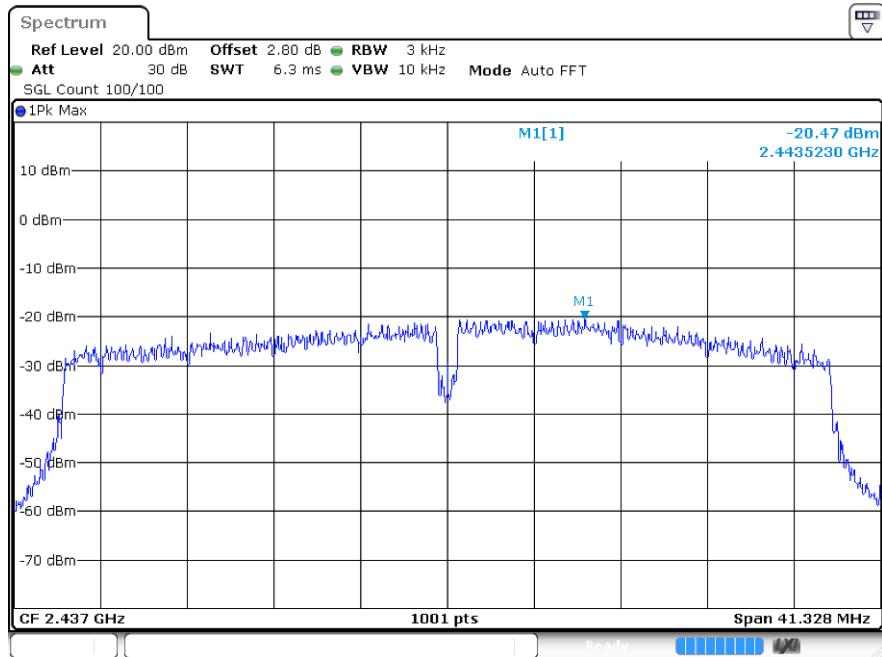
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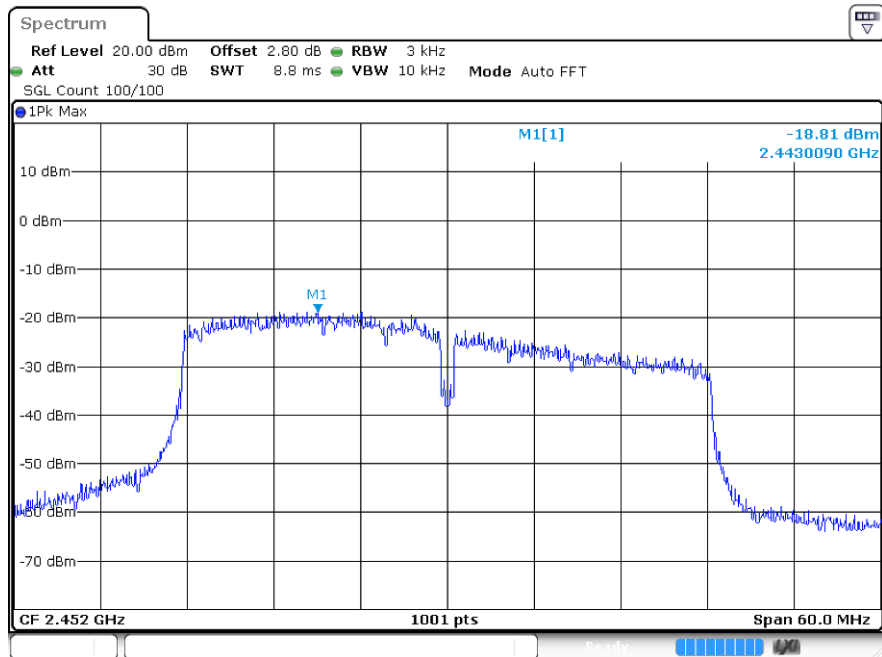
Test\_Graph\_802.11n20\_ANT1\_2462



Test\_Graph\_802.11n40\_ANT1\_2412



Test\_Graph\_802.11n40\_ANT1\_2437



Test\_Graph\_802.11n40\_ANT1\_2452

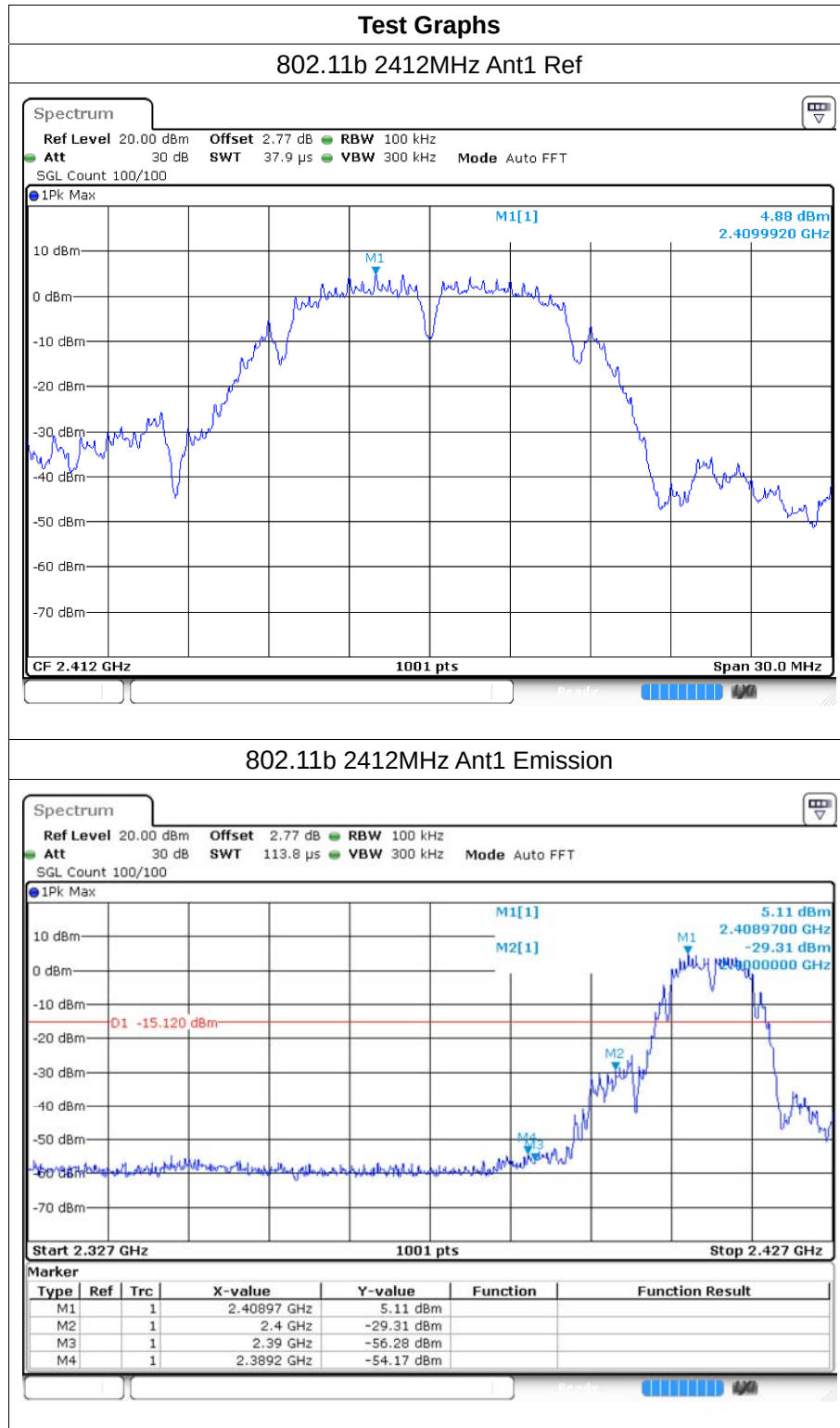


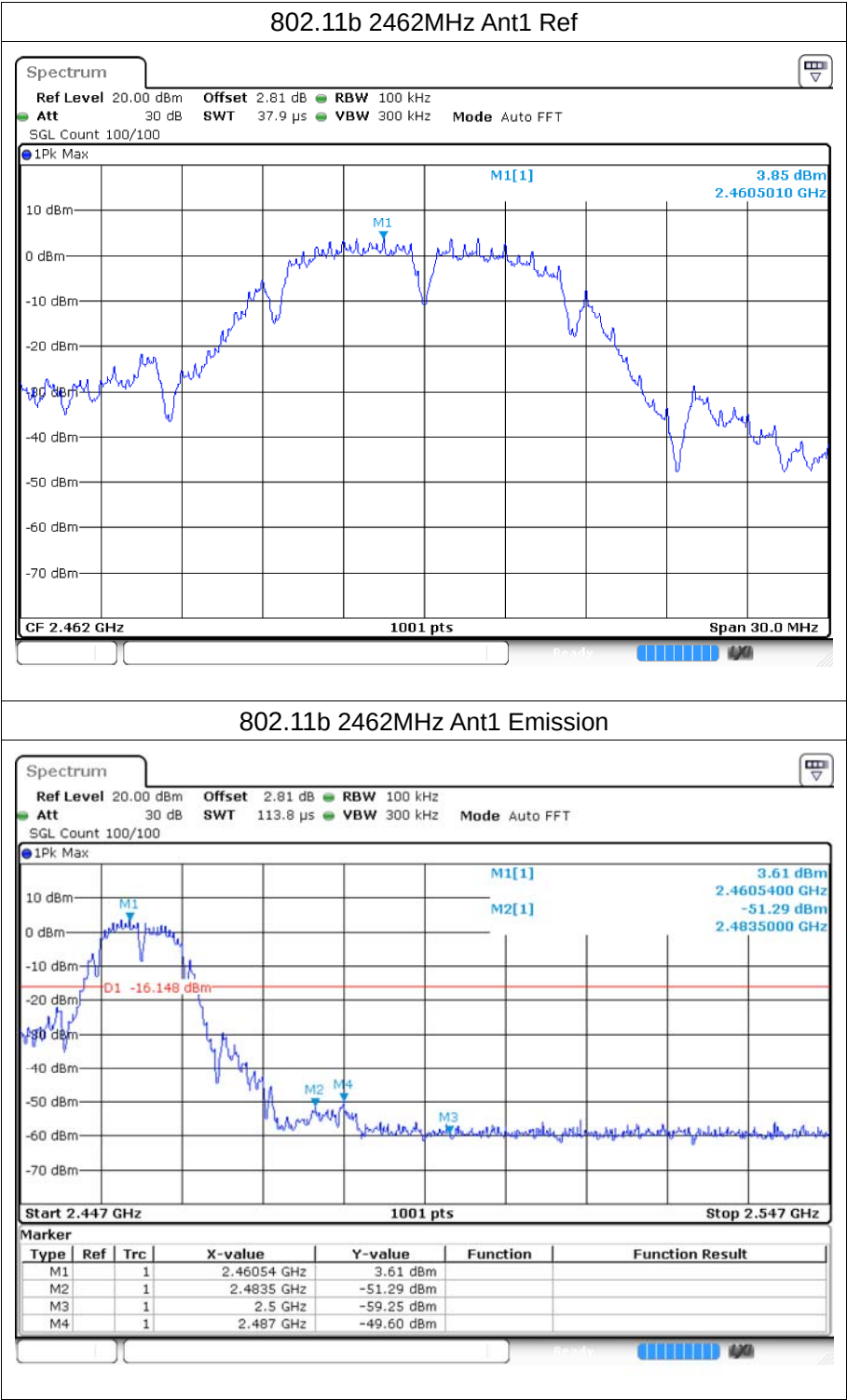
## 5 Band Edge

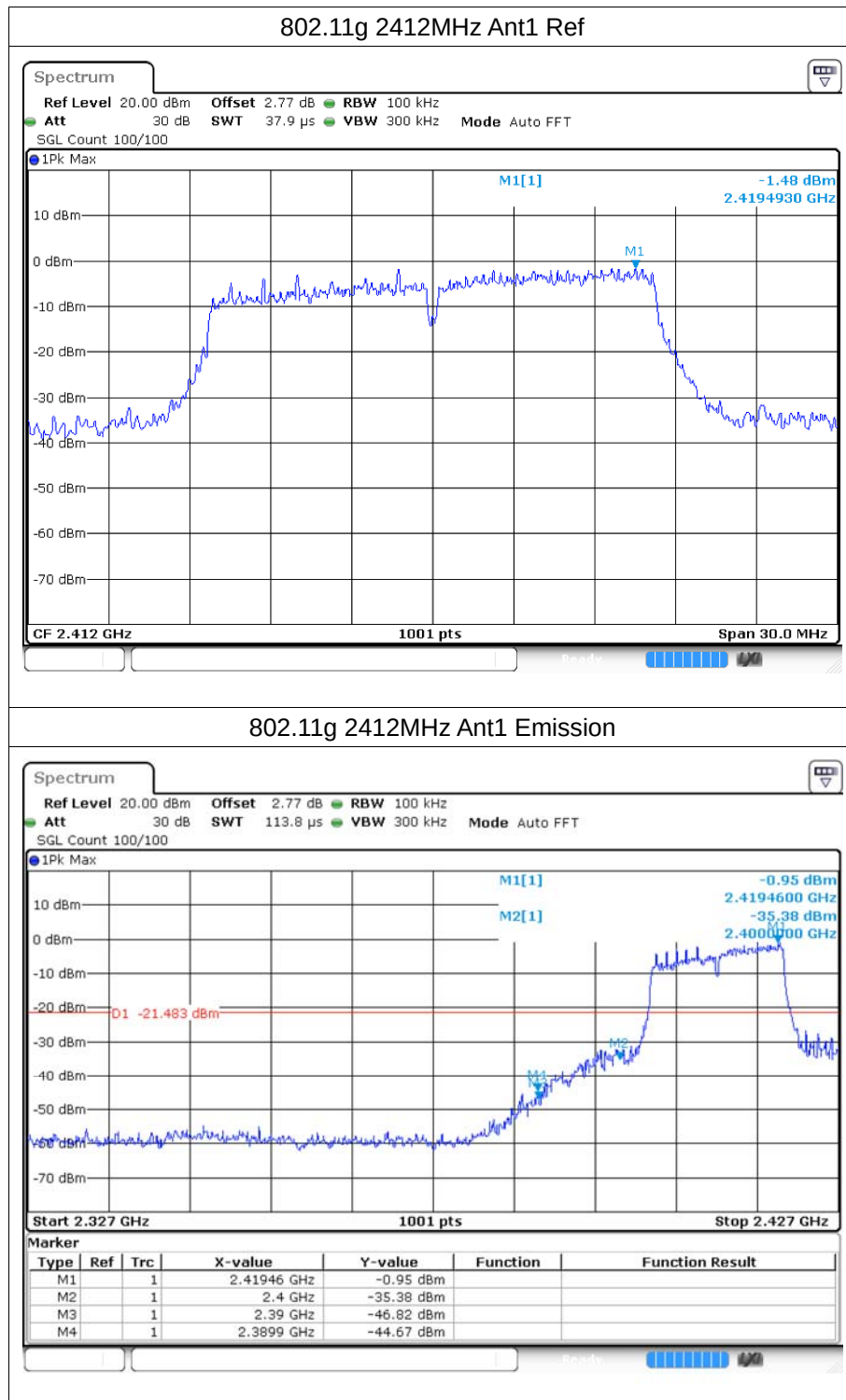
### 5.1 Test Result

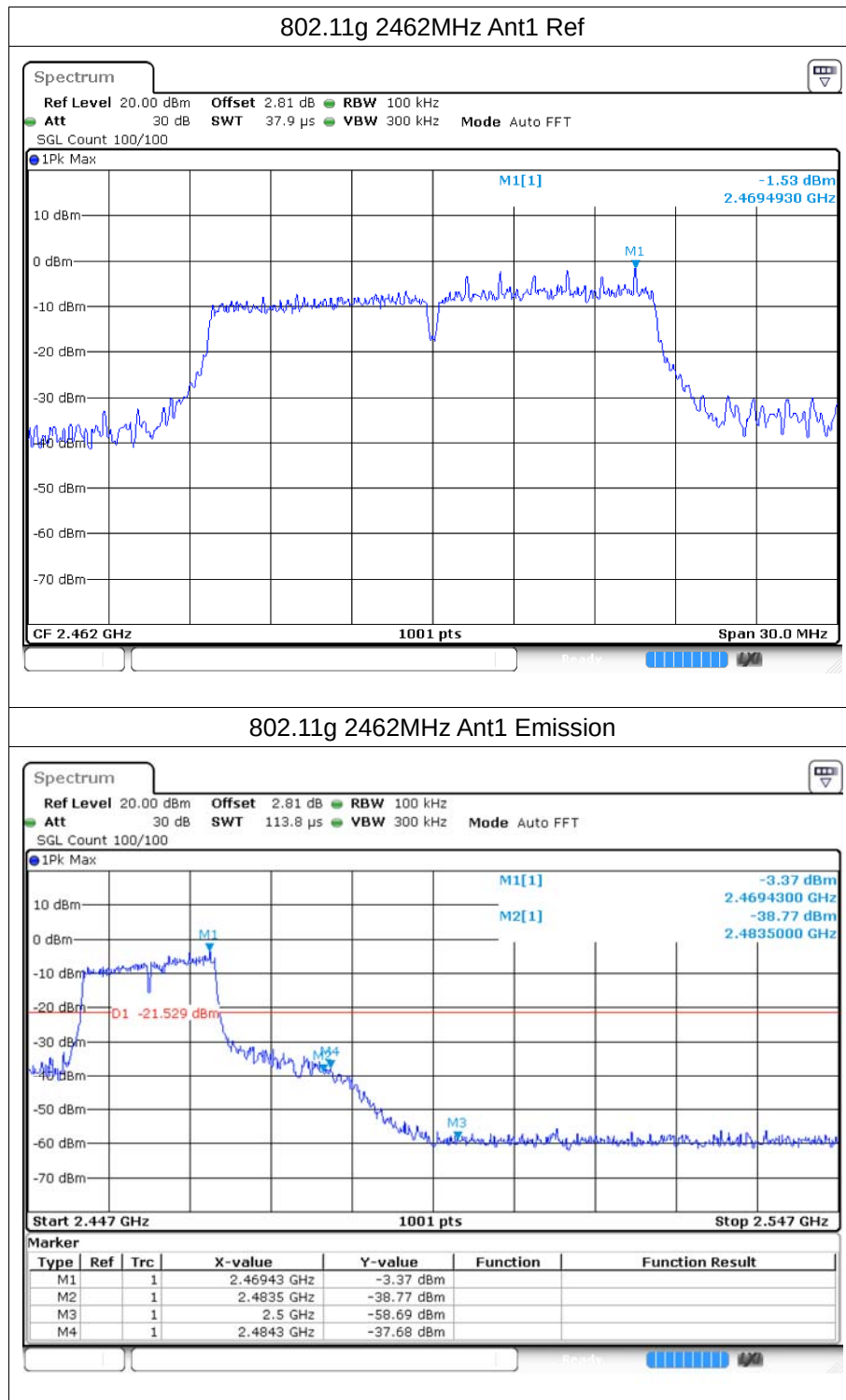
| Mode      | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|-----------------|---------|-----------------|-------------|---------|
| 802.11b   | 2412            | Ant1    | -59.05          | -20         | Pass    |
| 802.11b   | 2462            | Ant1    | -53.45          | -20         | Pass    |
| 802.11g   | 2412            | Ant1    | -43.19          | -20         | Pass    |
| 802.11g   | 2462            | Ant1    | -36.15          | -20         | Pass    |
| 802.11n20 | 2412            | Ant1    | -42.92          | -20         | Pass    |
| 802.11n20 | 2462            | Ant1    | -34.0           | -20         | Pass    |
| 802.11n40 | 2422            | Ant1    | -35.47          | -20         | Pass    |
| 802.11n40 | 2452            | Ant1    | -43.97          | -20         | Pass    |

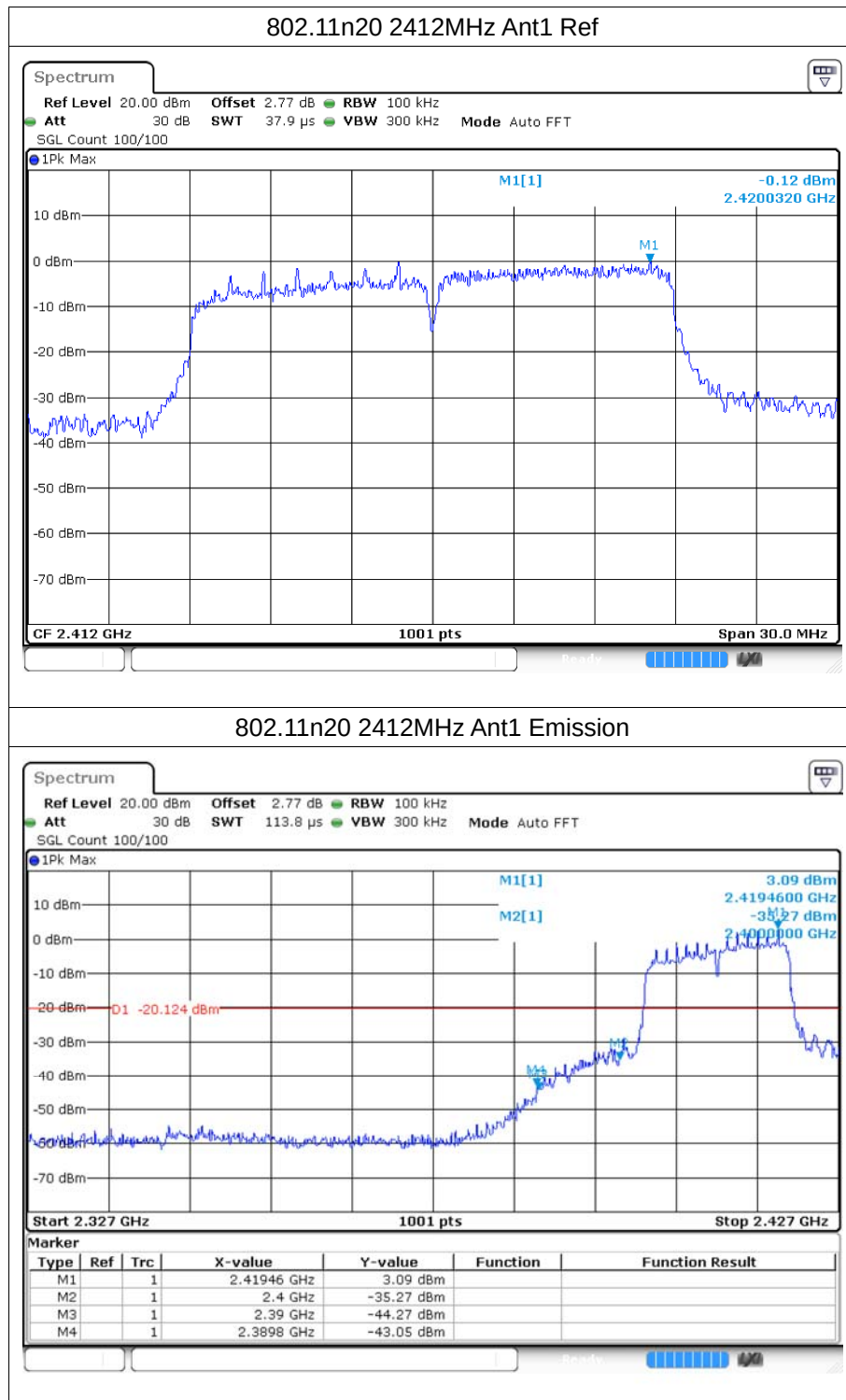
## 5.2 Test Graphs

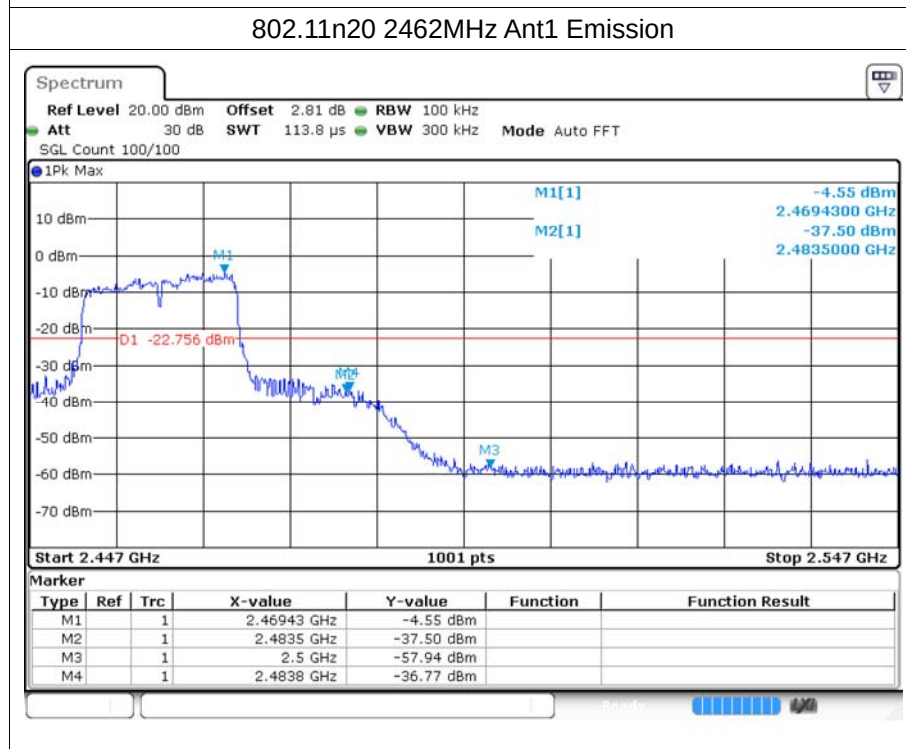
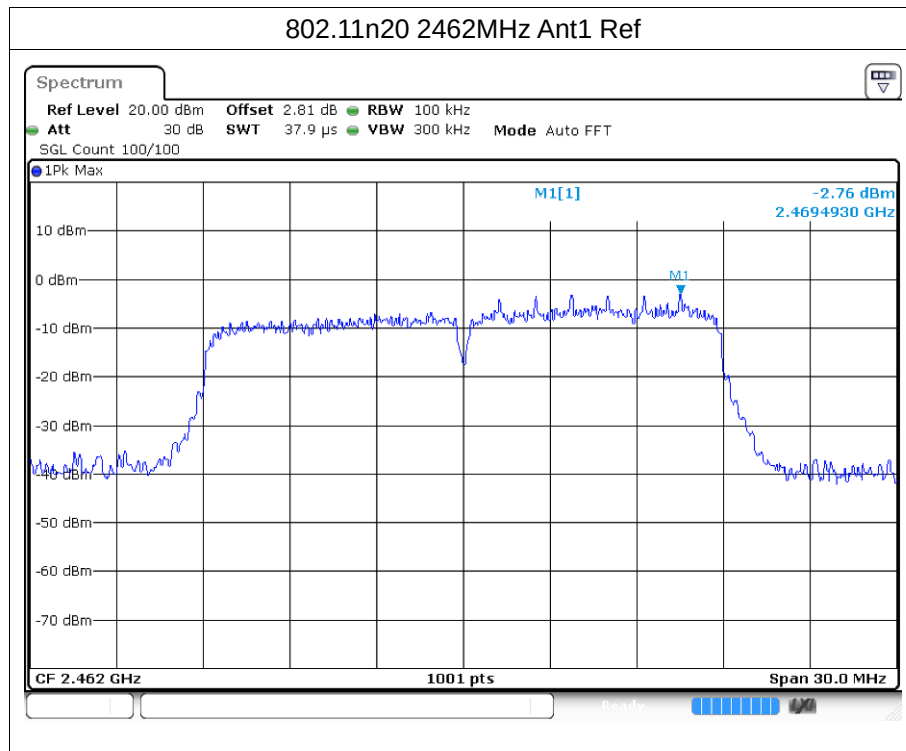


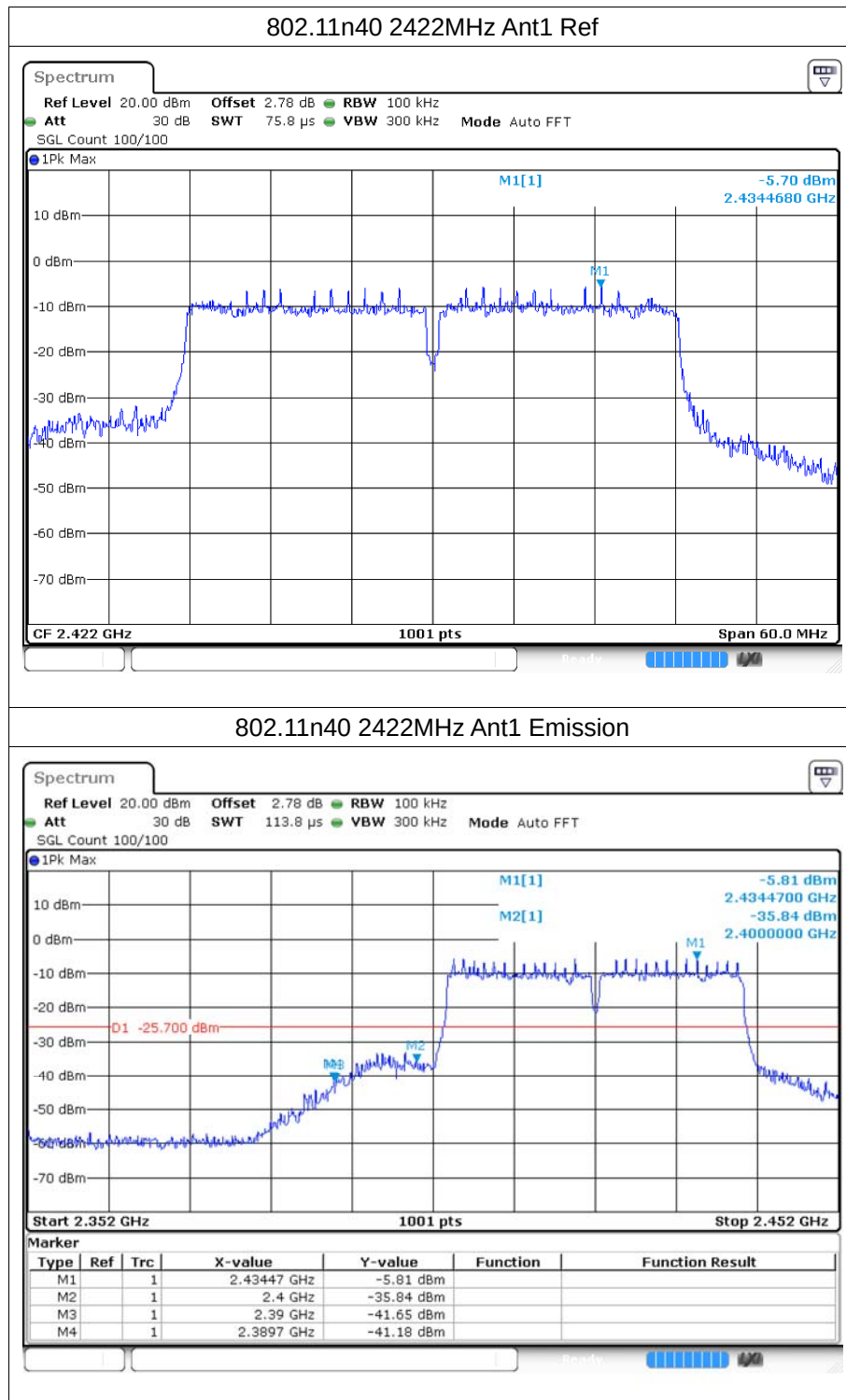


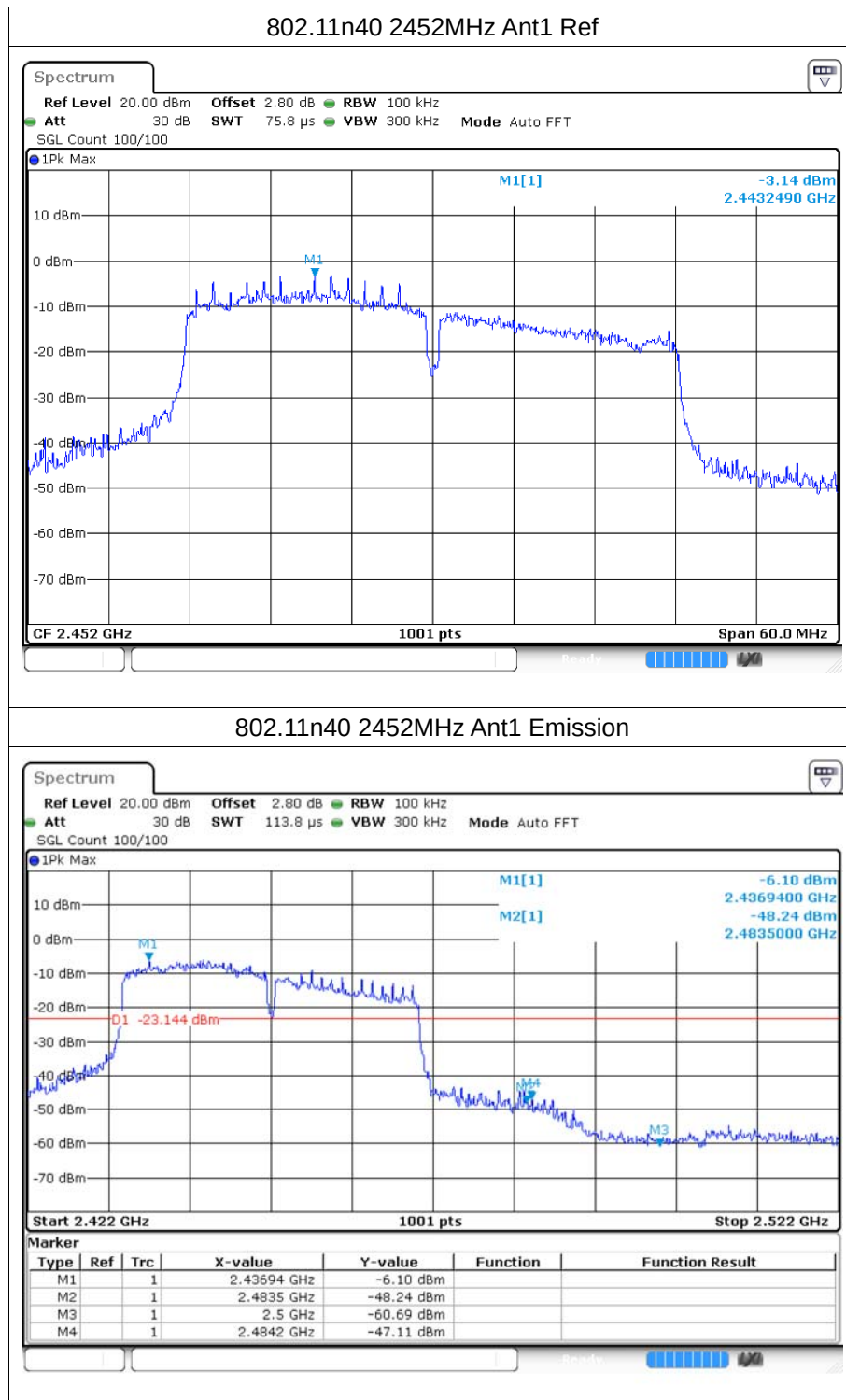














## 6 Conducted RF Spurious Emission

### 6.1 Test Result

| Mode      | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|-----------------|---------|-----------------|-------------|---------|
| 802.11b   | 2412            | Ant1    | -47.15          | -20         | Pass    |
| 802.11b   | 2437            | Ant1    | -46.17          | -20         | Pass    |
| 802.11b   | 2462            | Ant1    | -46.85          | -20         | Pass    |
| 802.11g   | 2412            | Ant1    | -43.26          | -20         | Pass    |
| 802.11g   | 2437            | Ant1    | -41.75          | -20         | Pass    |
| 802.11g   | 2462            | Ant1    | -37.75          | -20         | Pass    |
| 802.11n20 | 2412            | Ant1    | -45.4           | -20         | Pass    |
| 802.11n20 | 2437            | Ant1    | -38.21          | -20         | Pass    |
| 802.11n20 | 2462            | Ant1    | -41.41          | -20         | Pass    |
| 802.11n40 | 2422            | Ant1    | -33.55          | -20         | Pass    |
| 802.11n40 | 2437            | Ant1    | -38.78          | -20         | Pass    |
| 802.11n40 | 2452            | Ant1    | -39.65          | -20         | Pass    |

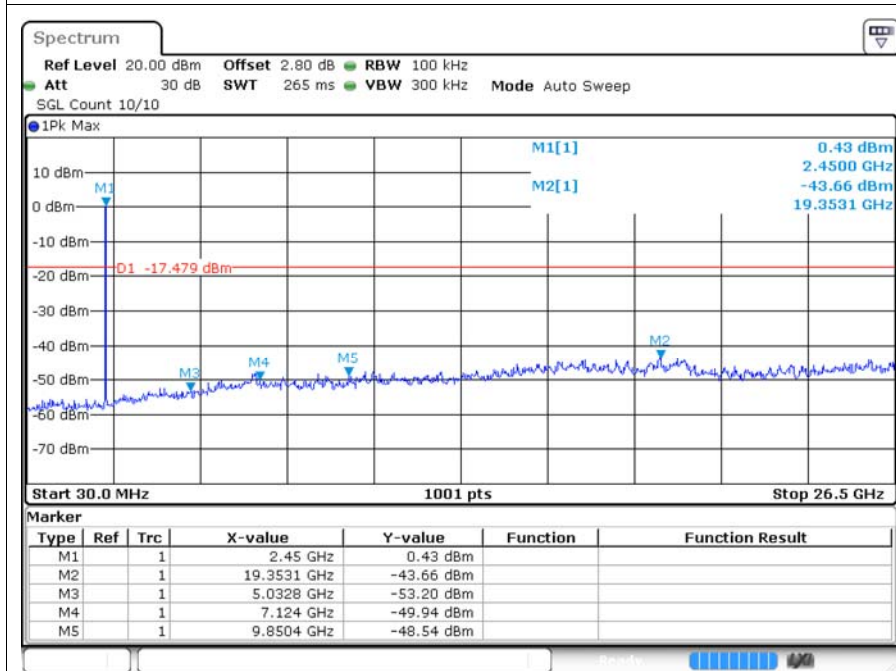
## 6.2 Test Graphs



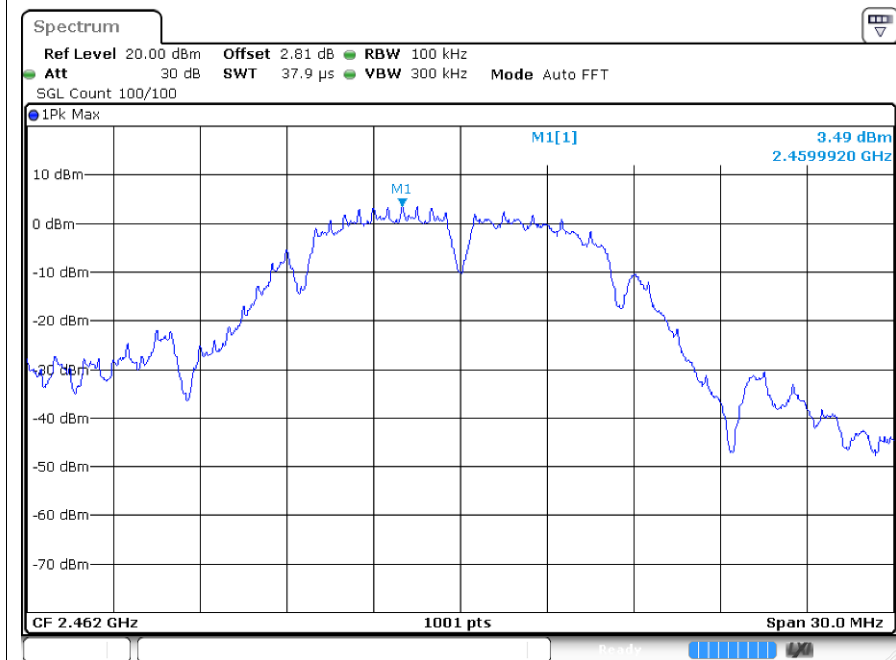
### 802.11b 2437MHz Ant1 Ref



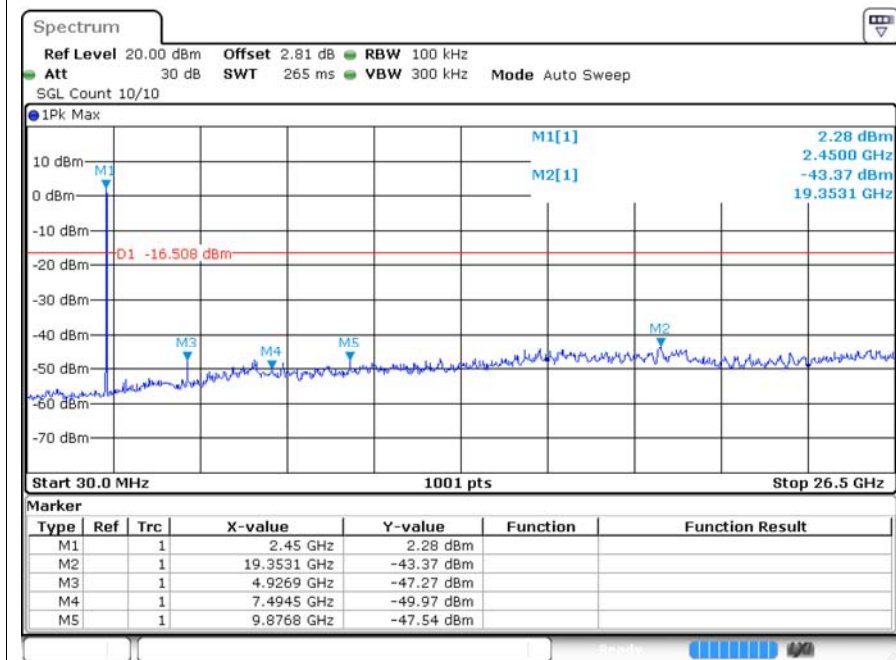
### 802.11b 2437MHz Ant1 Emission



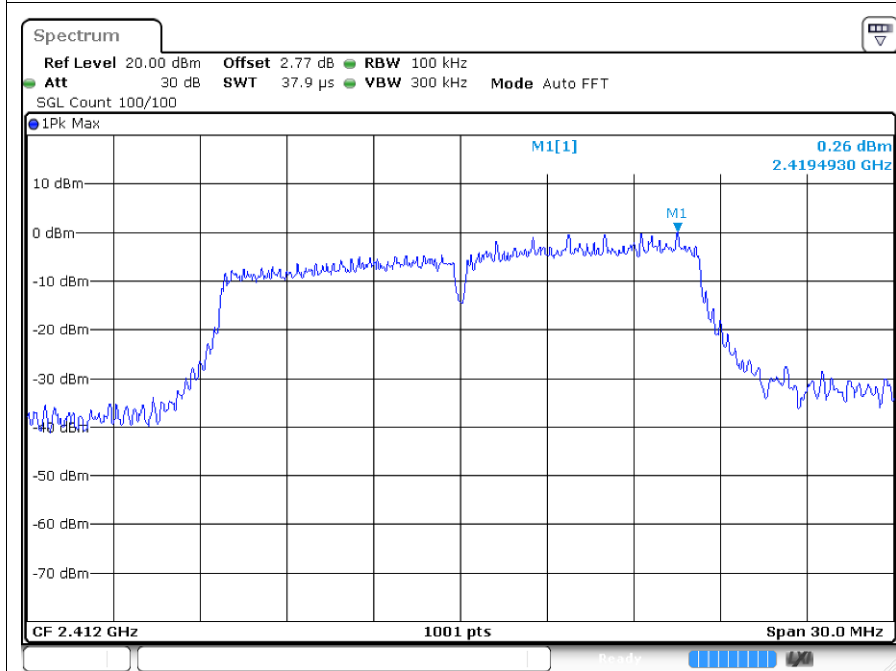
### 802.11b 2462MHz Ant1 Ref



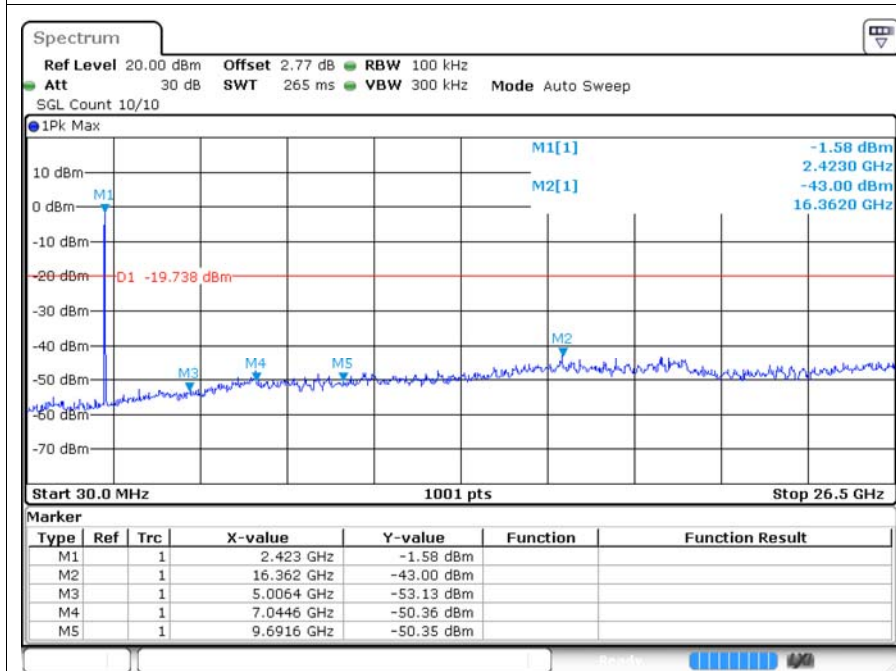
### 802.11b 2462MHz Ant1 Emission

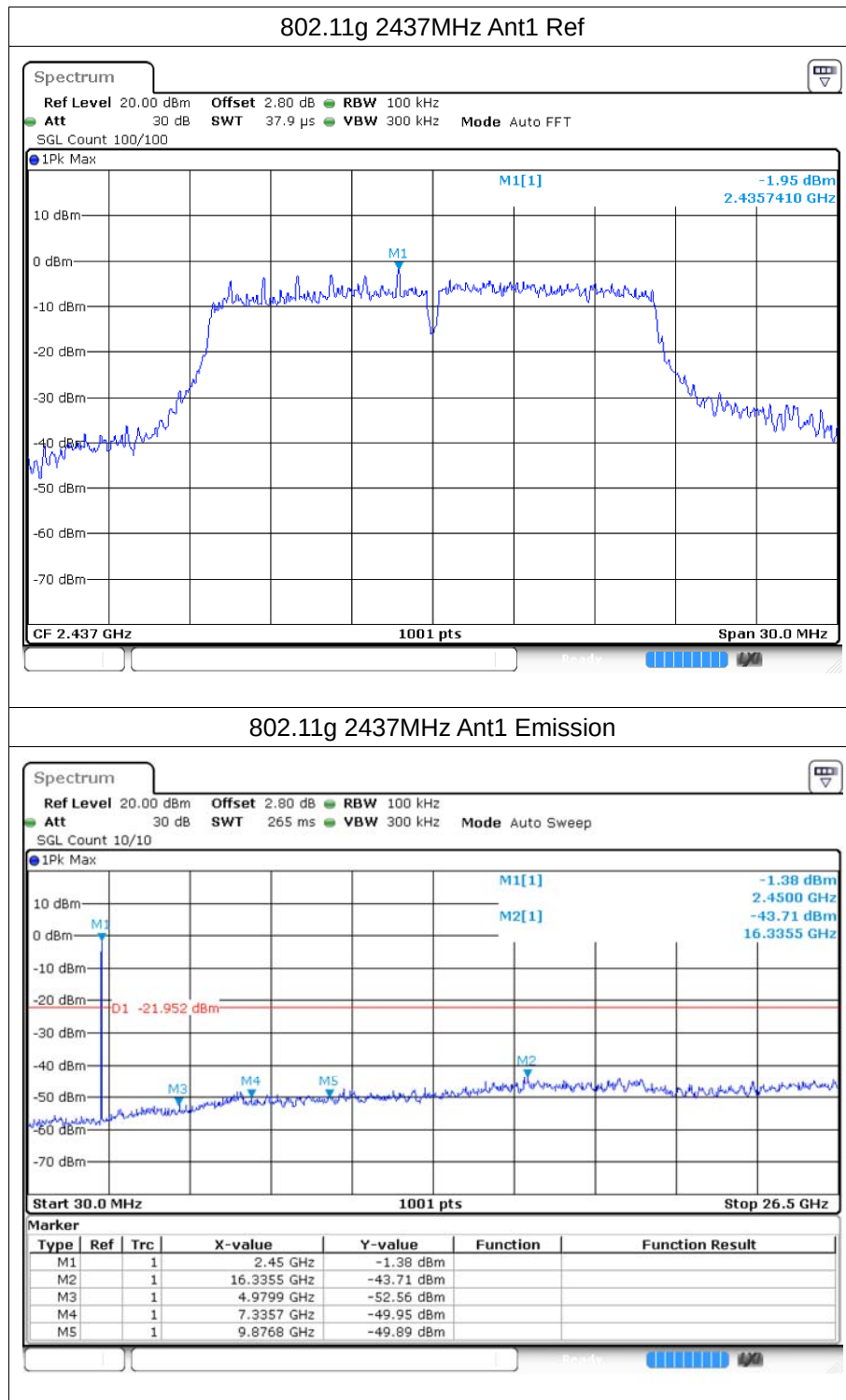


### 802.11g 2412MHz Ant1 Ref

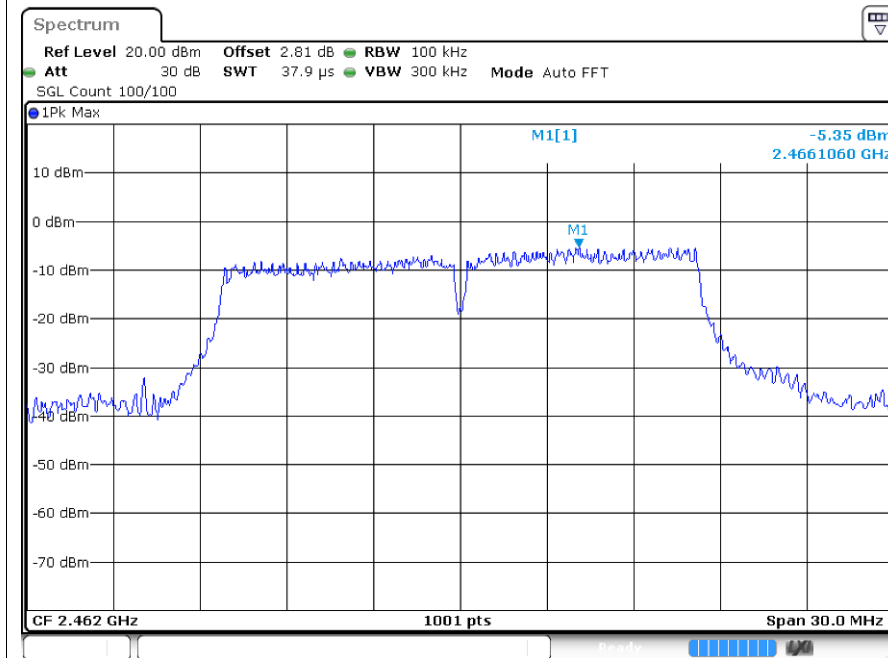


### 802.11g 2412MHz Ant1 Emission

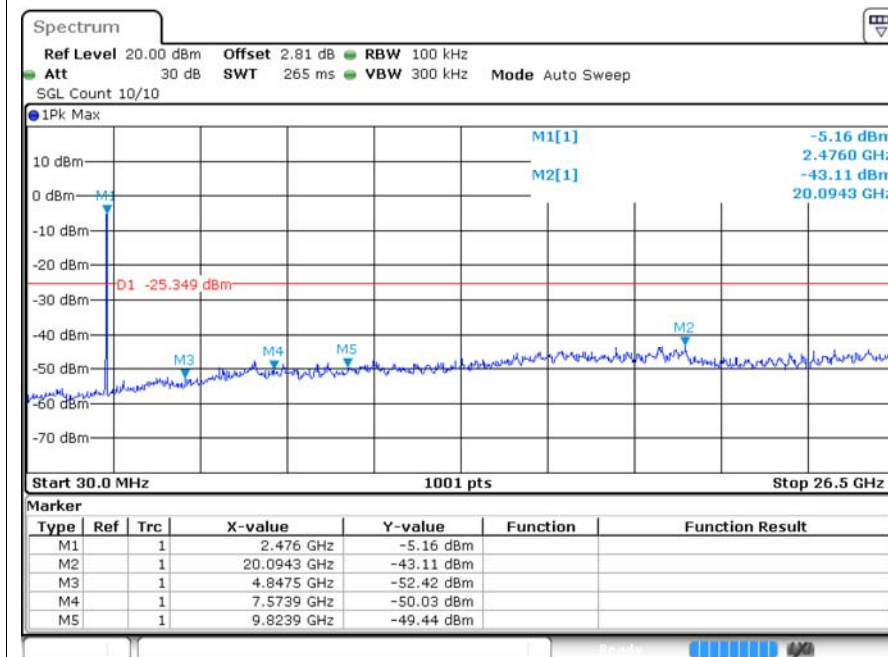


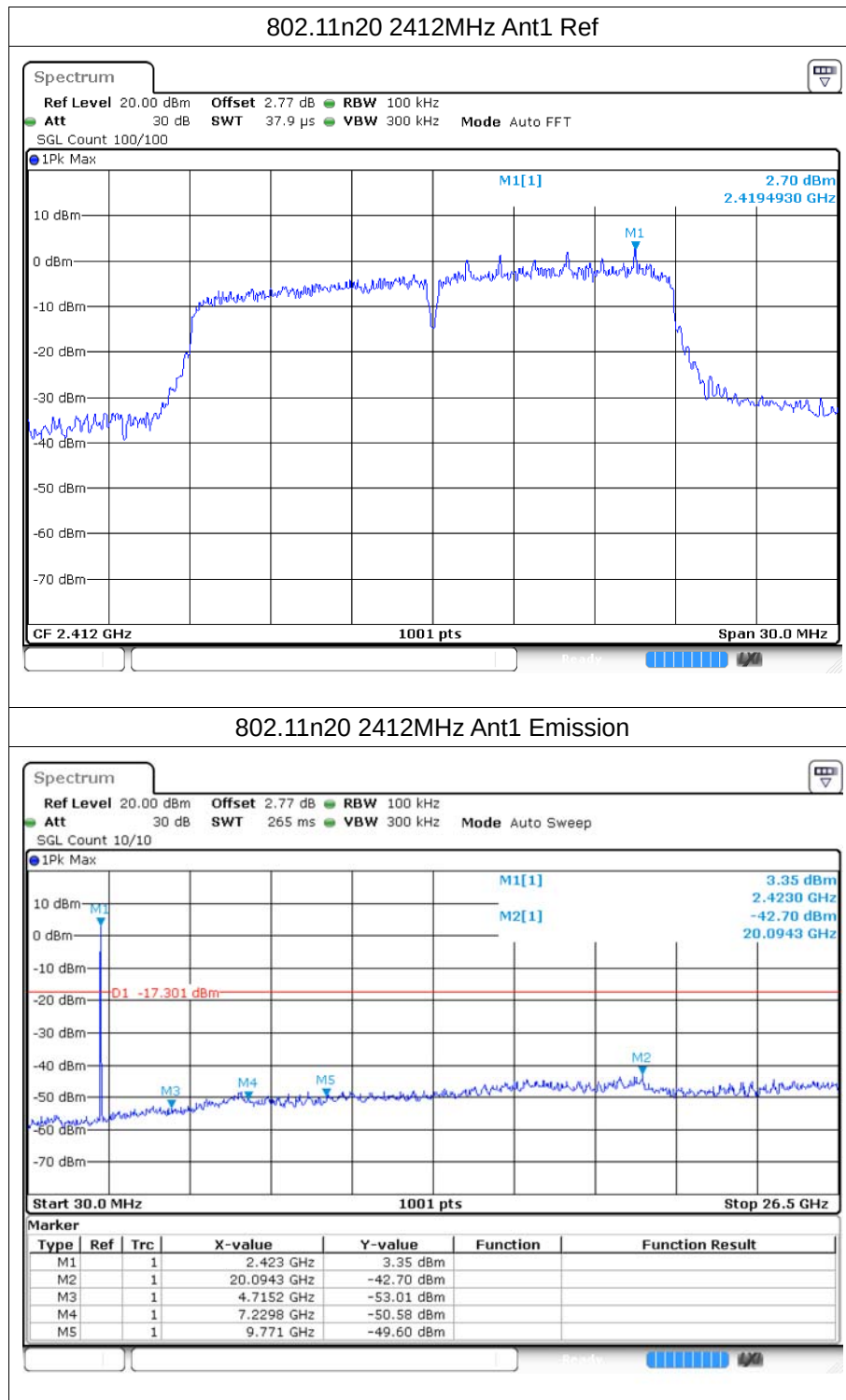


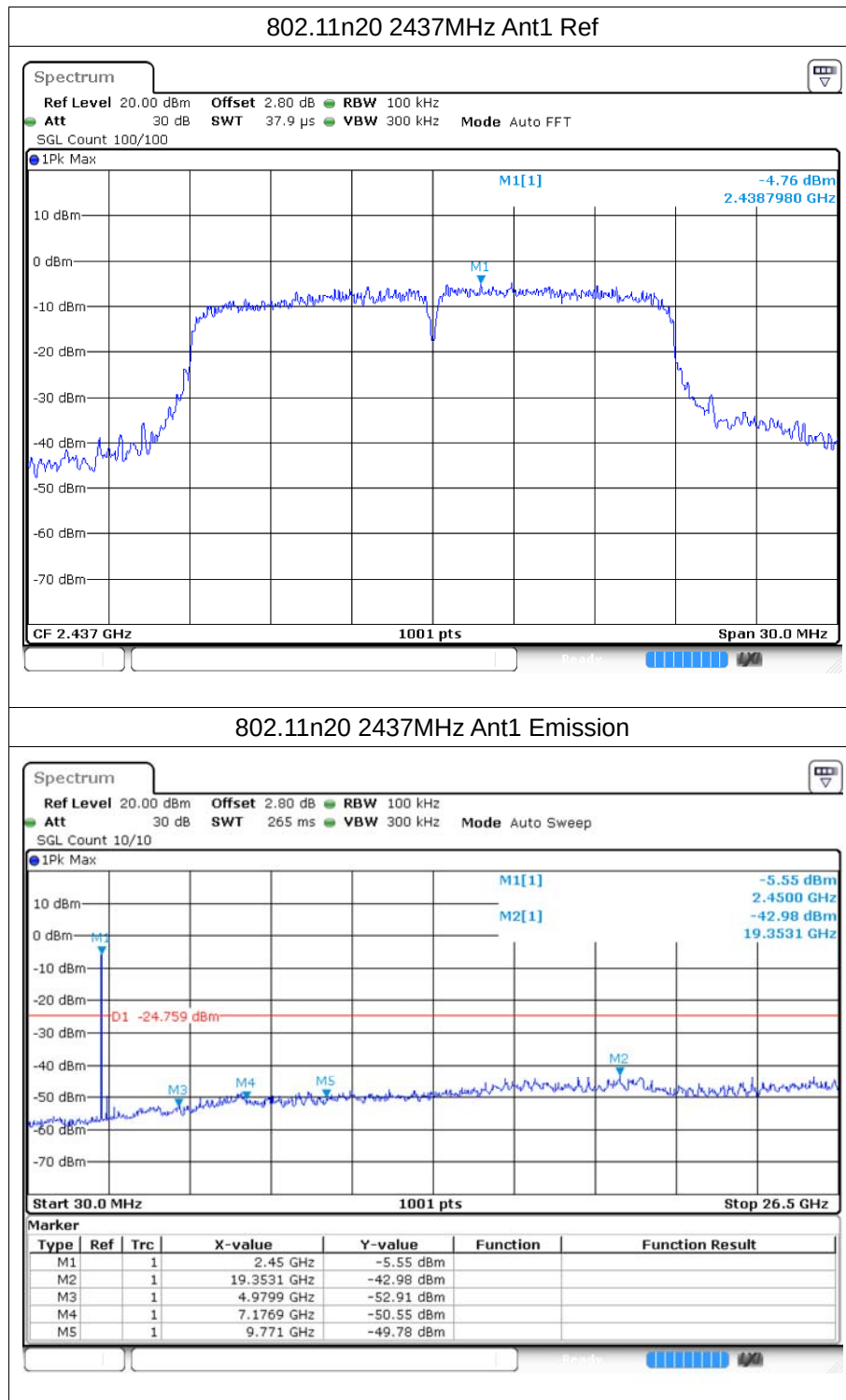
## 802.11g 2462MHz Ant1 Ref

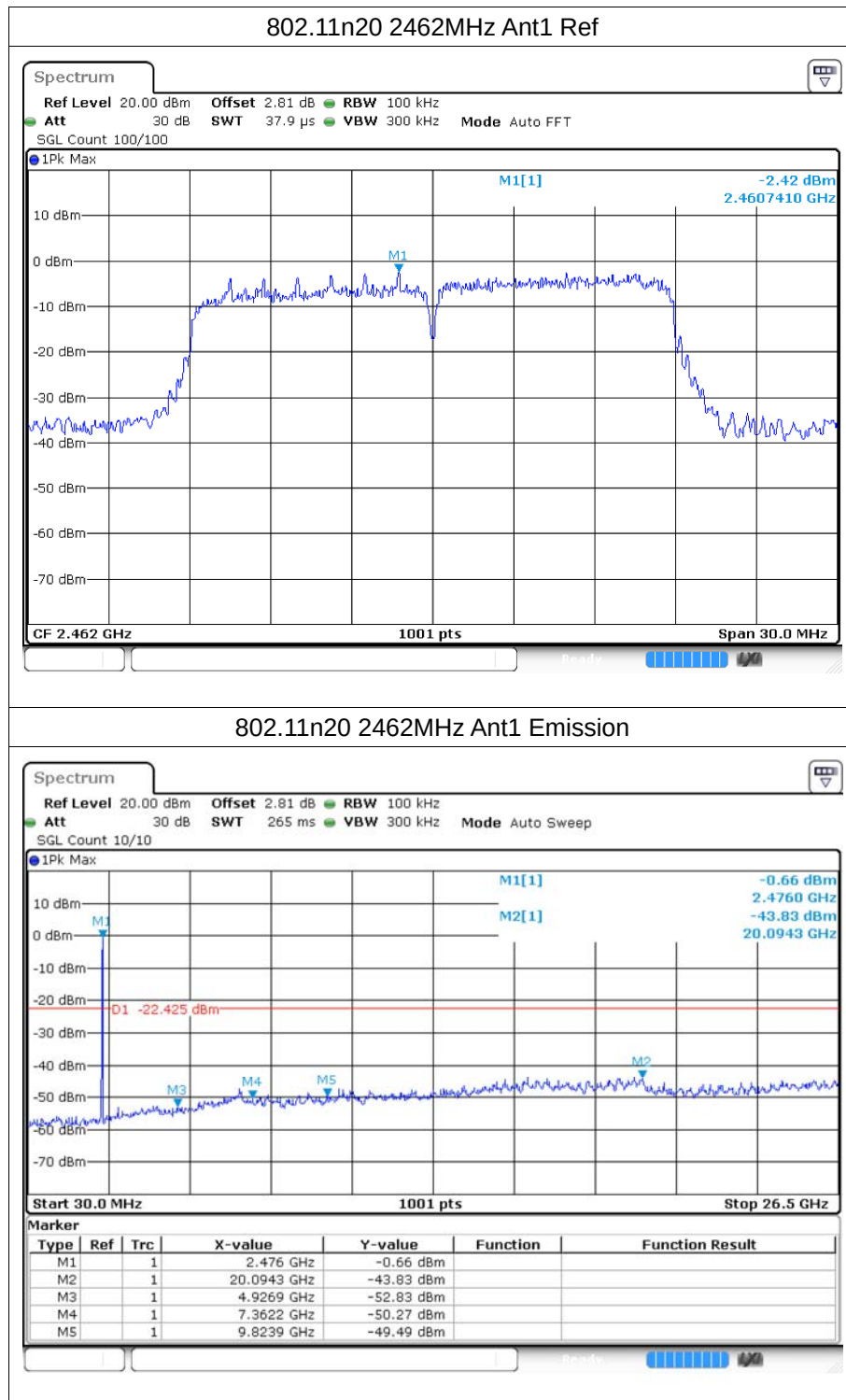


## 802.11g 2462MHz Ant1 Emission

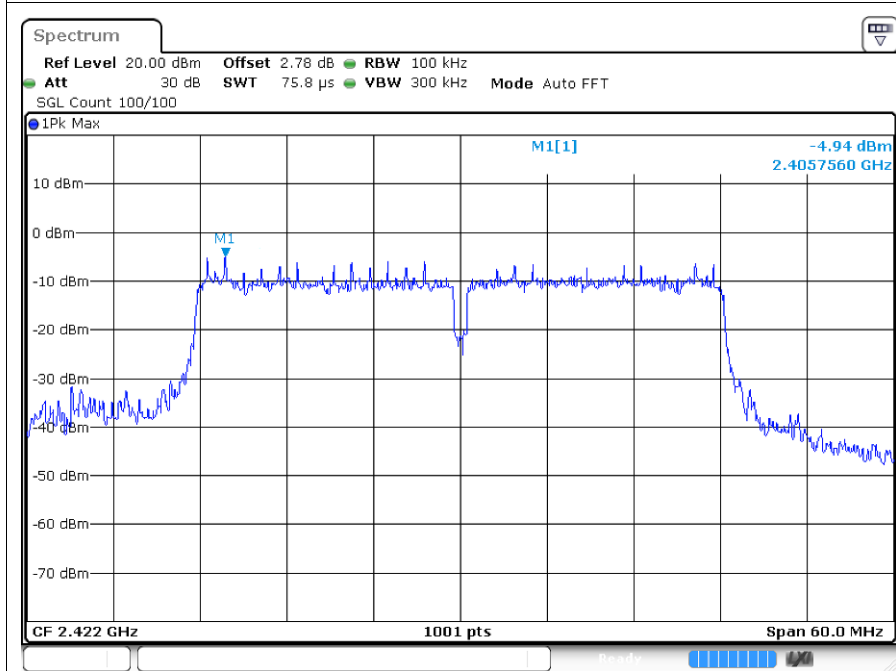




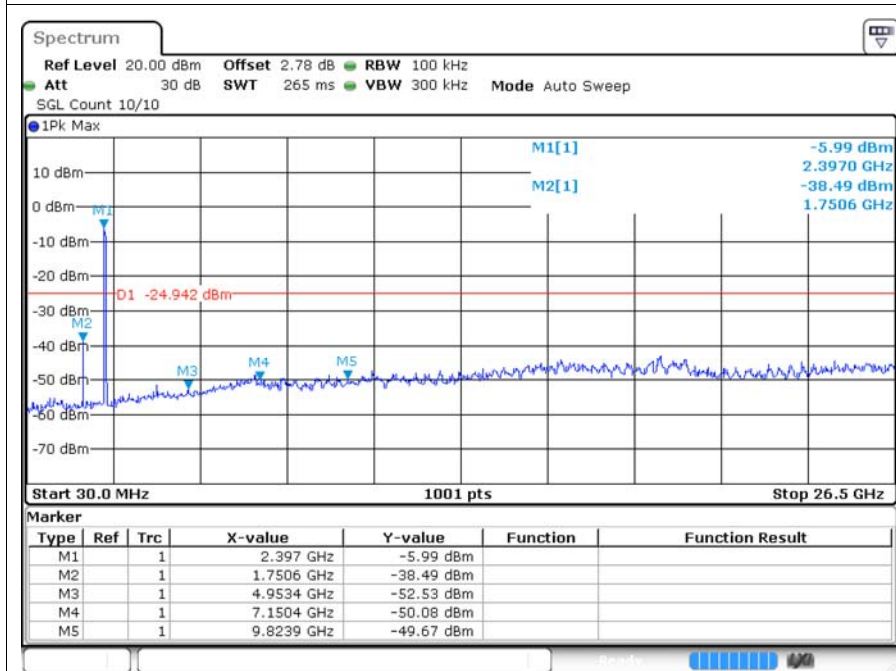


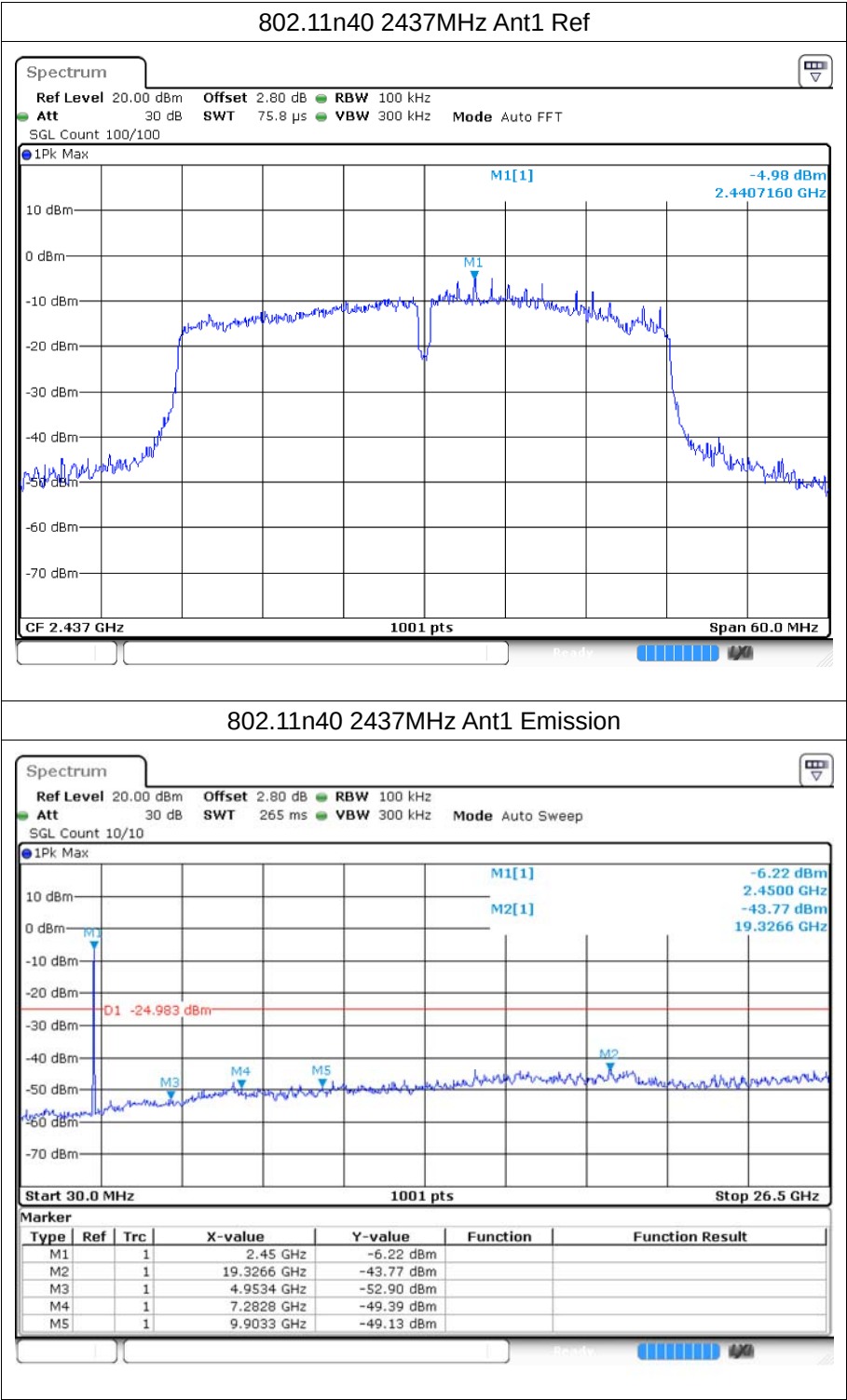


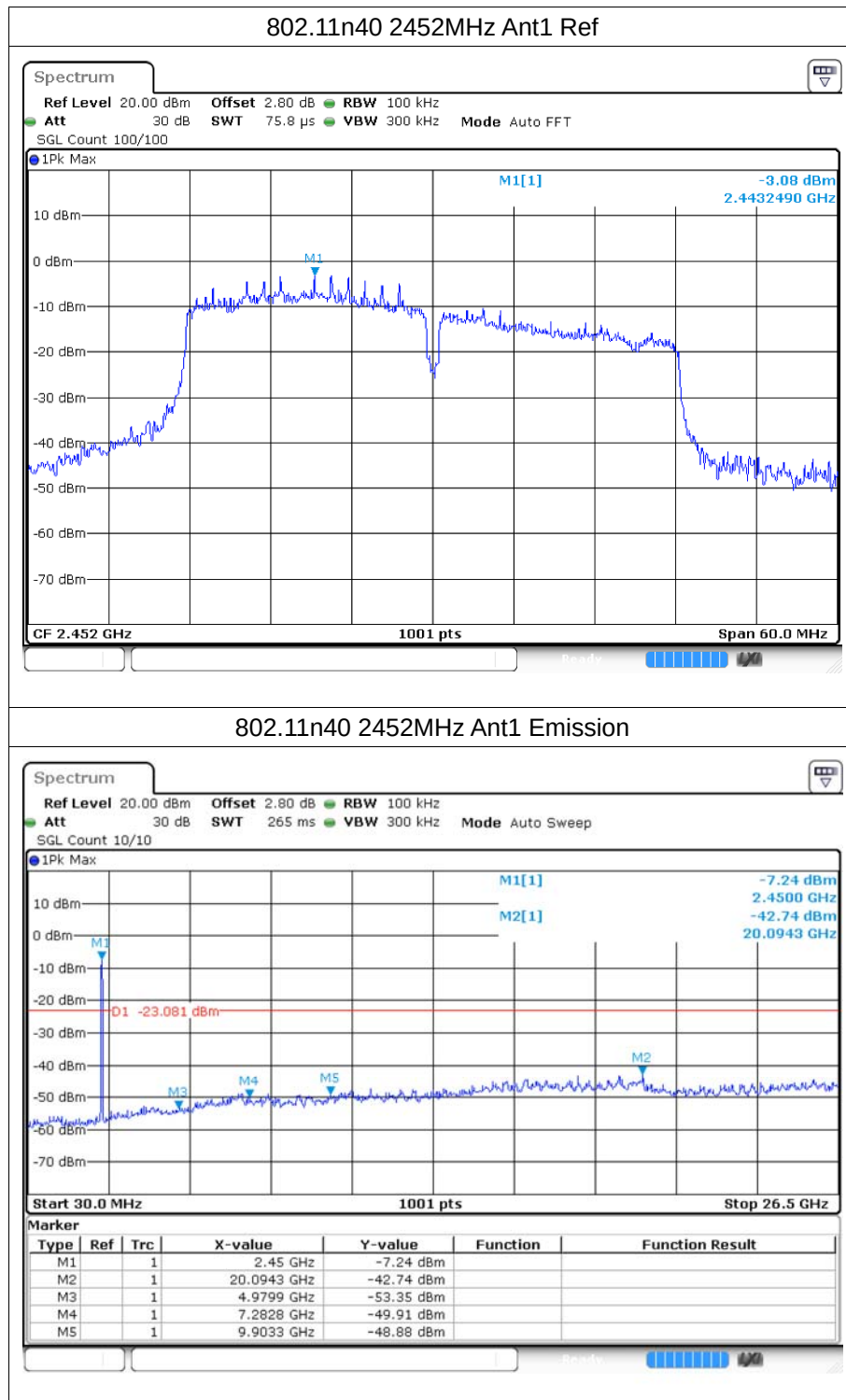
### 802.11n40 2422MHz Ant1 Ref



### 802.11n40 2422MHz Ant1 Emission









## 7 Restrict Band

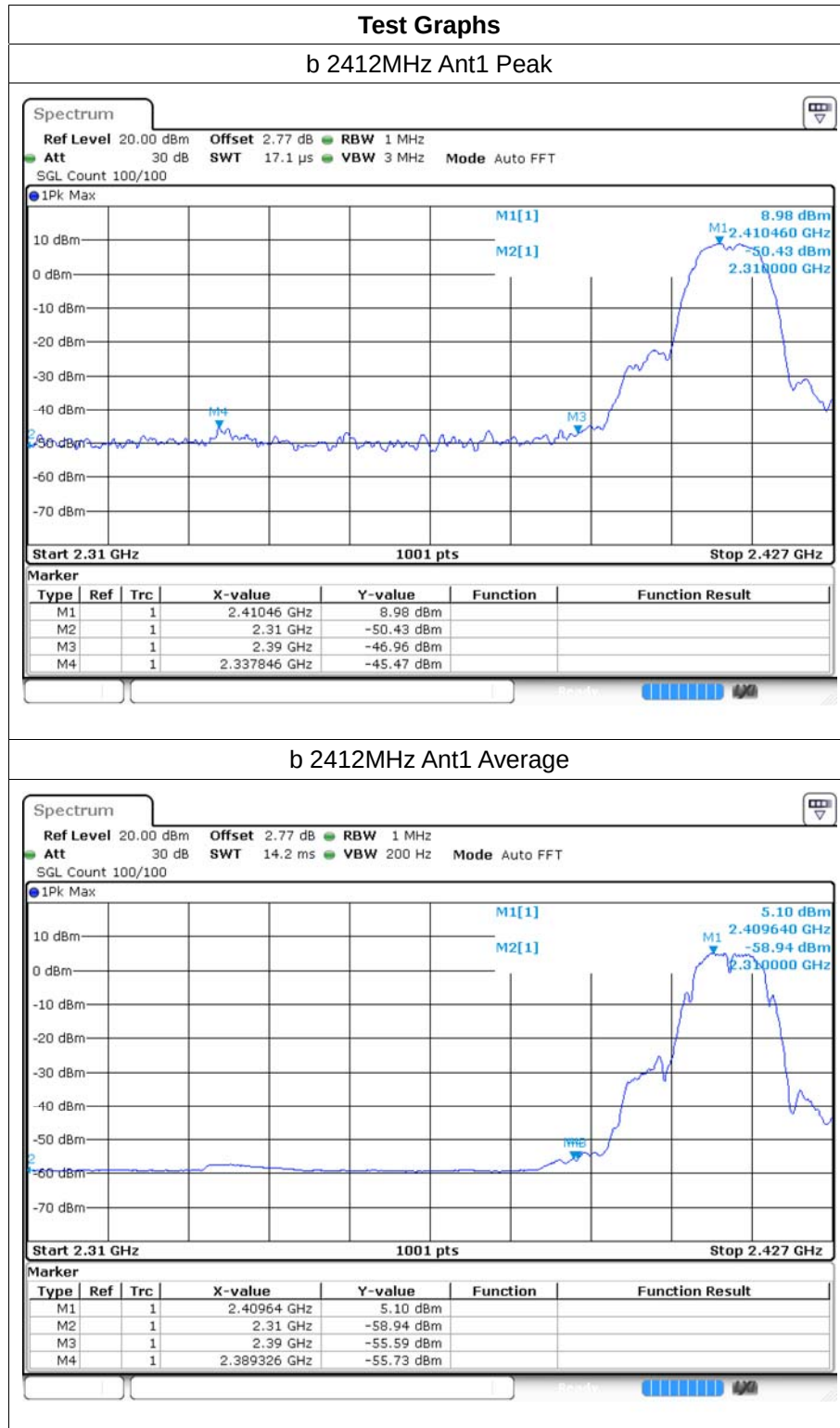
### 7.1 Test Result

| Mode      | Frequency (MHz) | Ant. | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|-----------------|------|-----------------|-------------|------------|------------|----------|----------------|---------|
| 802.11b   | 2412            | Ant1 | 2310            | -50.43      | 2          | 46.83      | Peak     | 74             | Pass    |
| 802.11b   | 2412            | Ant1 | 2310            | -58.93      | 2          | 38.33      | Average  | 54             | Pass    |
| 802.11b   | 2412            | Ant1 | 2337.846        | -45.47      | 2          | 51.79      | Peak     | 74             | Pass    |
| 802.11b   | 2412            | Ant1 | 2389.326        | -55.73      | 2          | 41.53      | Average  | 54             | Pass    |
| 802.11b   | 2412            | Ant1 | 2390            | -46.96      | 2          | 50.3       | Peak     | 74             | Pass    |
| 802.11b   | 2412            | Ant1 | 2390            | -55.59      | 2          | 41.67      | Average  | 54             | Pass    |
| 802.11b   | 2462            | Ant1 | 2483.5          | -45.64      | 2          | 51.62      | Peak     | 74             | 51.62   |
| 802.11b   | 2462            | Ant1 | 2483.5          | -52.63      | 2          | 44.63      | Average  | 54             | Pass    |
| 802.11b   | 2462            | Ant1 | 2484.365        | -43.91      | 2          | 53.35      | Peak     | 74             | Pass    |
| 802.11b   | 2462            | Ant1 | 2486.803        | -51.34      | 2          | 45.92      | Average  | 54             | Pass    |
| 802.11b   | 2462            | Ant1 | 2500            | -49.79      | 2          | 47.47      | Peak     | 74             | Pass    |
| 802.11b   | 2462            | Ant1 | 2500            | -58.76      | 2          | 38.5       | Average  | 54             | Pass    |
| 802.11g   | 2412            | Ant1 | 2310            | -48.01      | 2          | 49.25      | Peak     | 74             | Pass    |
| 802.11g   | 2412            | Ant1 | 2310            | -58.48      | 2          | 38.78      | Average  | 54             | Pass    |
| 802.11g   | 2412            | Ant1 | 2389.911        | -37.42      | 2          | 59.84      | Peak     | 74             | Pass    |
| 802.11g   | 2412            | Ant1 | 2389.911        | -48.69      | 2          | 48.57      | Average  | 54             | Pass    |
| 802.11g   | 2412            | Ant1 | 2390            | -36.83      | 2          | 50.3       | Peak     | 74             | Pass    |
| 802.11g   | 2412            | Ant1 | 2390            | -48.42      | 2          | 48.84      | Average  | 54             | Pass    |
| 802.11g   | 2462            | Ant1 | 2483.5          | -28.37      | 2          | 68.89      | Peak     | 74             | Pass    |
| 802.11g   | 2462            | Ant1 | 2483.5          | -47.5       | 2          | 49.76      | Average  | 54             | Pass    |
| 802.11g   | 2462            | Ant1 | 2484.365        | -28.37      | 2          | 68.89      | Peak     | 74             | Pass    |
| 802.11g   | 2462            | Ant1 | 2483.517        | -47.5       | 2          | 49.76      | Average  | 54             | Pass    |
| 802.11g   | 2462            | Ant1 | 2500            | -49.08      | 2          | 47.47      | Peak     | 74             | Pass    |
| 802.11g   | 2462            | Ant1 | 2500            | -58.08      | 2          | 39.18      | Average  | 54             | Pass    |
| 802.11n20 | 2412            | Ant1 | 2310            | -50.01      | 2          | 47.25      | Peak     | 74             | Pass    |
| 802.11n20 | 2412            | Ant1 | 2310            | -58.39      | 2          | 38.87      | Average  | 54             | Pass    |
| 802.11n20 | 2412            | Ant1 | 2389.911        | -33.18      | 2          | 64.08      | Peak     | 74             | Pass    |
| 802.11n20 | 2412            | Ant1 | 2389.911        | -46.8       | 2          | 50.46      | Average  | 54             | Pass    |
| 802.11n20 | 2412            | Ant1 | 2390            | -32.94      | 2          | 64.32      | Peak     | 74             | Pass    |
| 802.11n20 | 2412            | Ant1 | 2390            | -46.44      | 2          | 50.82      | Average  | 54             | Pass    |
| 802.11n20 | 2462            | Ant1 | 2483.5          | -24.05      | 2          | 73.21      | Peak     | 74             | Pass    |
| 802.11n20 | 2462            | Ant1 | 2483.5          | -45.27      | 2          | 51.99      | Average  | 54             | Pass    |
| 802.11n20 | 2462            | Ant1 | 2483.782        | -23.82      | 2          | 73.44      | Peak     | 74             | Pass    |
| 802.11n20 | 2462            | Ant1 | 2483.623        | -45.23      | 2          | 52.03      | Average  | 54             | Pass    |
| 802.11n20 | 2462            | Ant1 | 2500            | -49.33      | 2          | 47.93      | Peak     | 74             | Pass    |

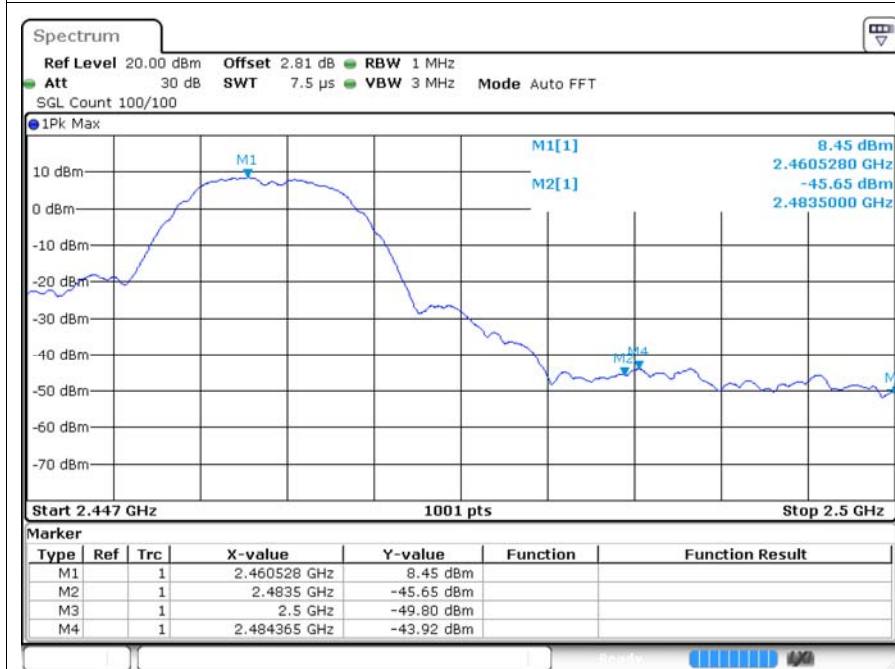


|           |      |      |          |        |   |       |         |    |      |
|-----------|------|------|----------|--------|---|-------|---------|----|------|
| 802.11n20 | 2462 | Ant1 | 2500     | -57.99 | 2 | 39.27 | Average | 54 | Pass |
| 802.11n40 | 2422 | Ant1 | 2310     | -50.36 | 2 | 46.9  | Peak    | 74 | Pass |
| 802.11n40 | 2422 | Ant1 | 2310     | -58.25 | 2 | 39.01 | Average | 54 | Pass |
| 802.11n40 | 2422 | Ant1 | 2389.946 | -33.95 | 2 | 63.31 | Peak    | 74 | Pass |
| 802.11n40 | 2422 | Ant1 | 2389.946 | -44.85 | 2 | 52.41 | Average | 54 | Pass |
| 802.11n40 | 2422 | Ant1 | 2390     | -33.8  | 2 | 63.46 | Peak    | 74 | Pass |
| 802.11n40 | 2422 | Ant1 | 2390     | -44.57 | 2 | 52.69 | Average | 54 | Pass |
| 802.11n40 | 2452 | Ant1 | 2483.5   | -35.88 | 2 | 61.38 | Peak    | 74 | Pass |
| 802.11n40 | 2452 | Ant1 | 2483.5   | -49.12 | 2 | 48.14 | Average | 54 | Pass |
| 802.11n40 | 2452 | Ant1 | 2483.932 | -35    | 2 | 62.26 | Peak    | 74 | Pass |
| 802.11n40 | 2452 | Ant1 | 2483.542 | -49.12 | 2 | 48.14 | Average | 54 | Pass |
| 802.11n40 | 2452 | Ant1 | 2500     | -49.93 | 2 | 47.33 | Peak    | 74 | Pass |
| 802.11n40 | 2452 | Ant1 | 2500     | -58.15 | 2 | 39.11 | Average | 54 | Pass |

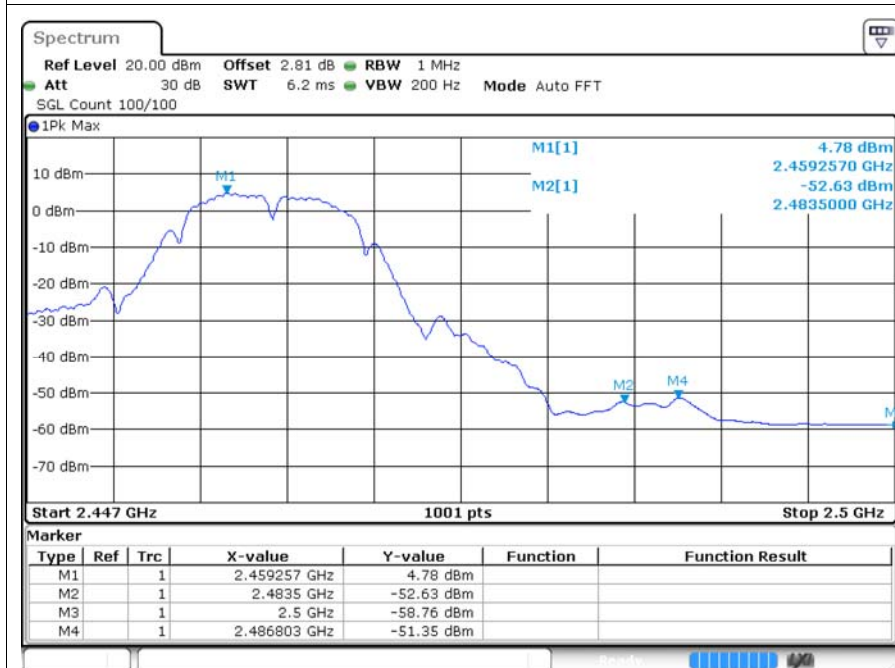
## 7.2 Test Graphs



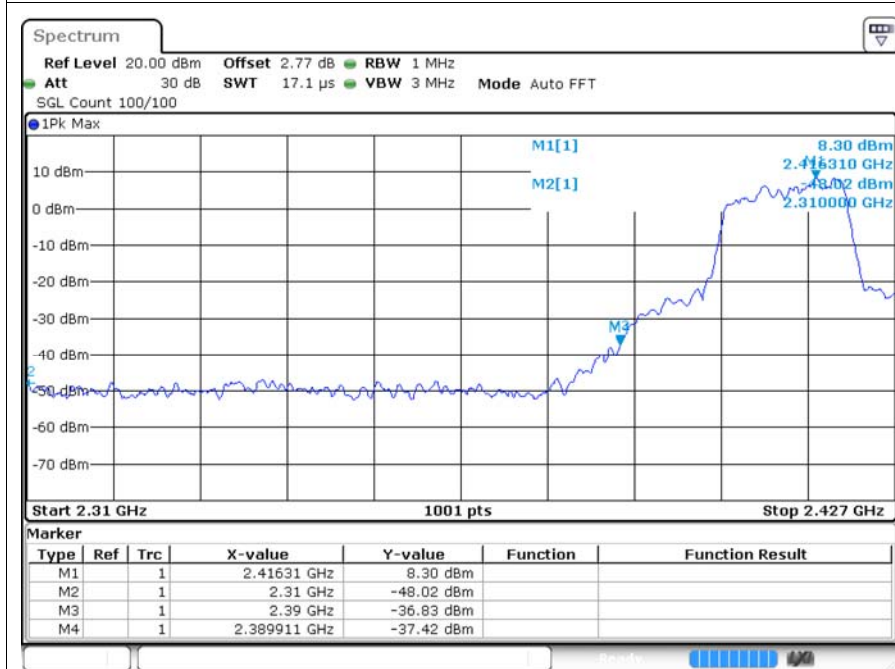
## b 2462MHz Ant1 Peak



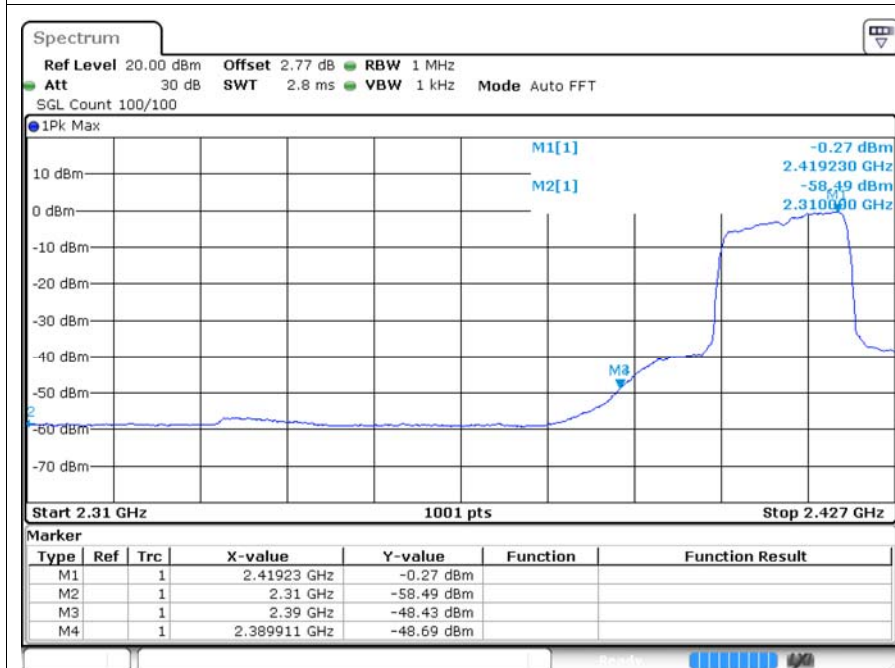
## b 2462MHz Ant1 Average



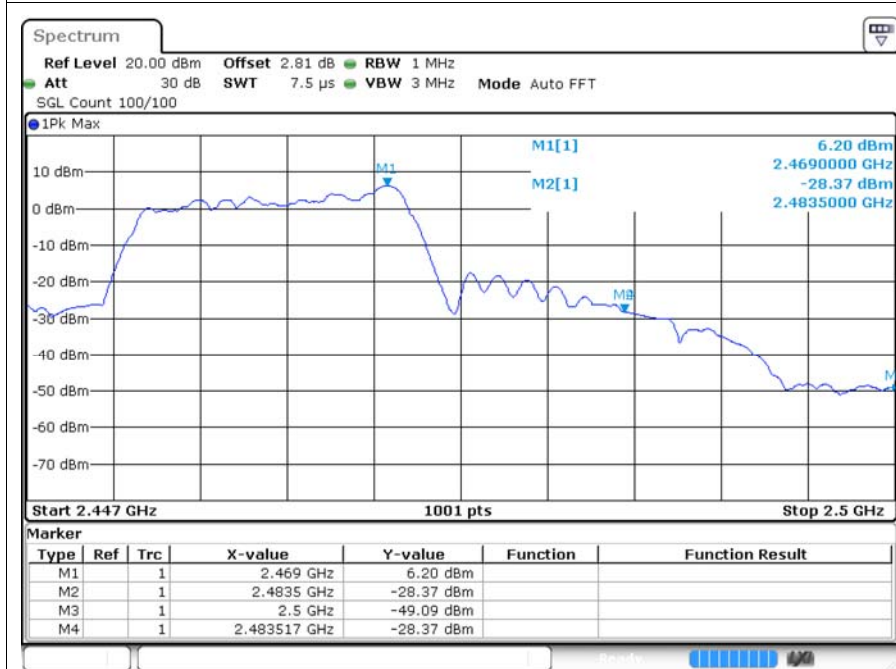
### g 2412MHz Ant1 Peak



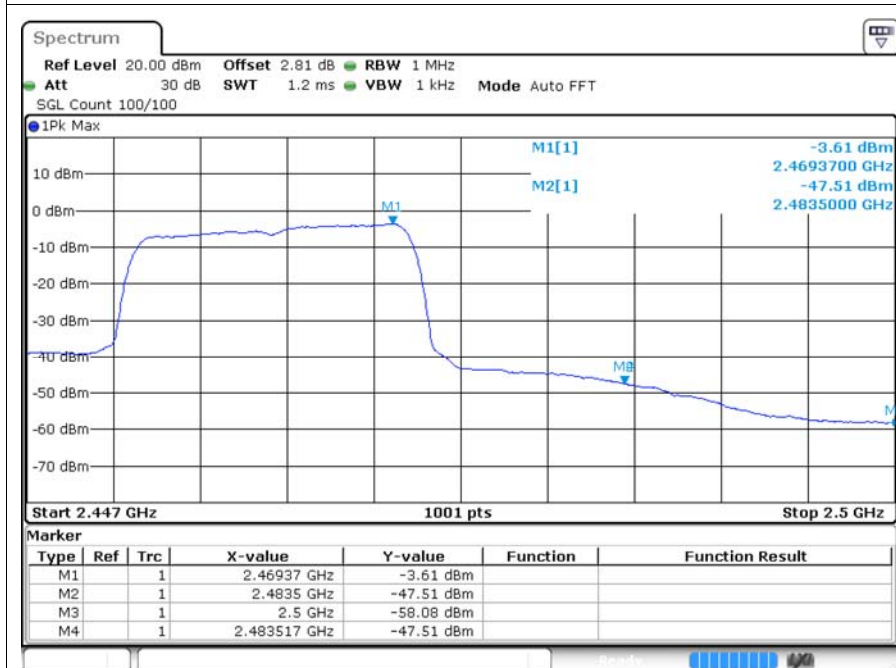
### g 2412MHz Ant1 Average

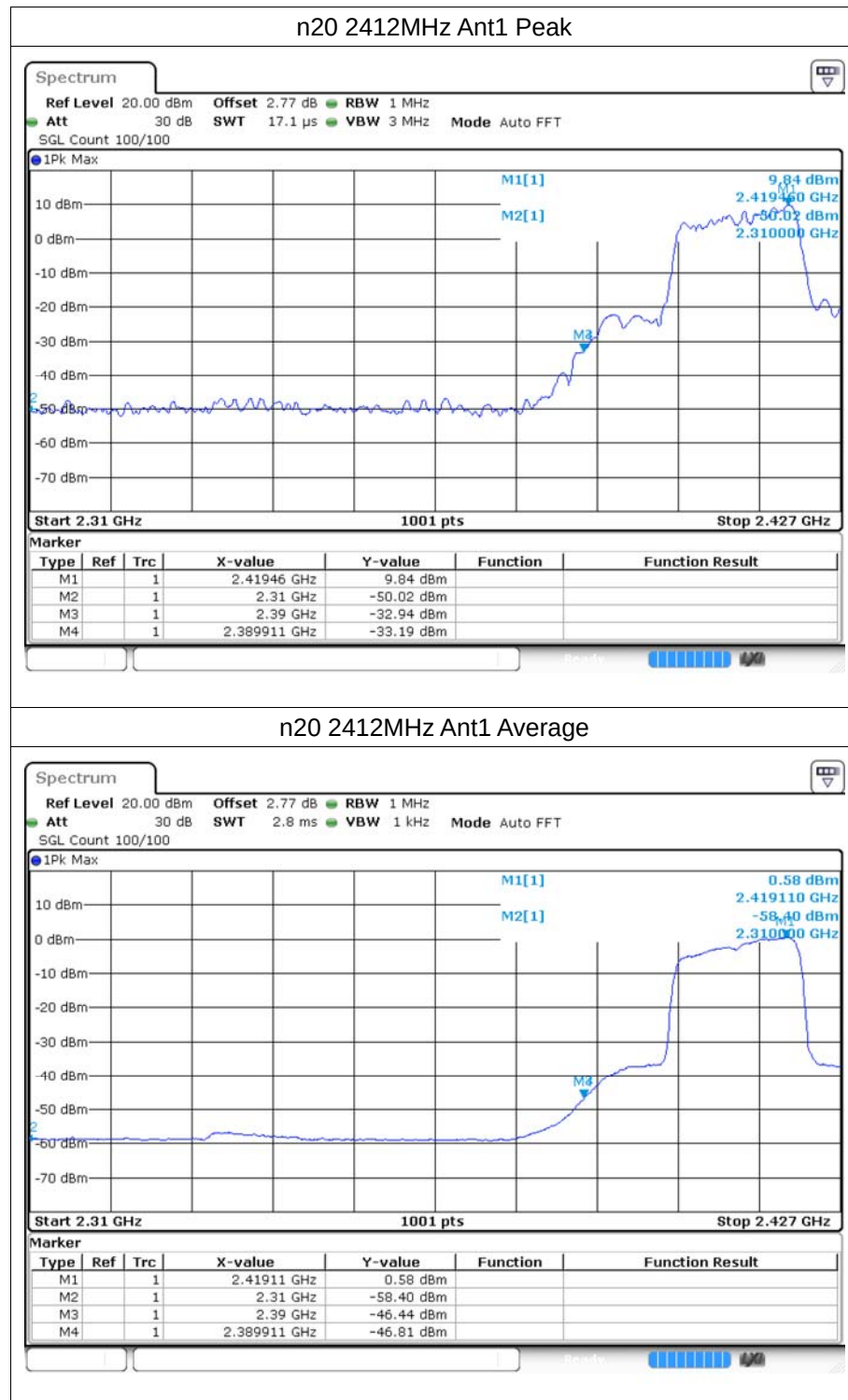


### g 2462MHz Ant1 Peak

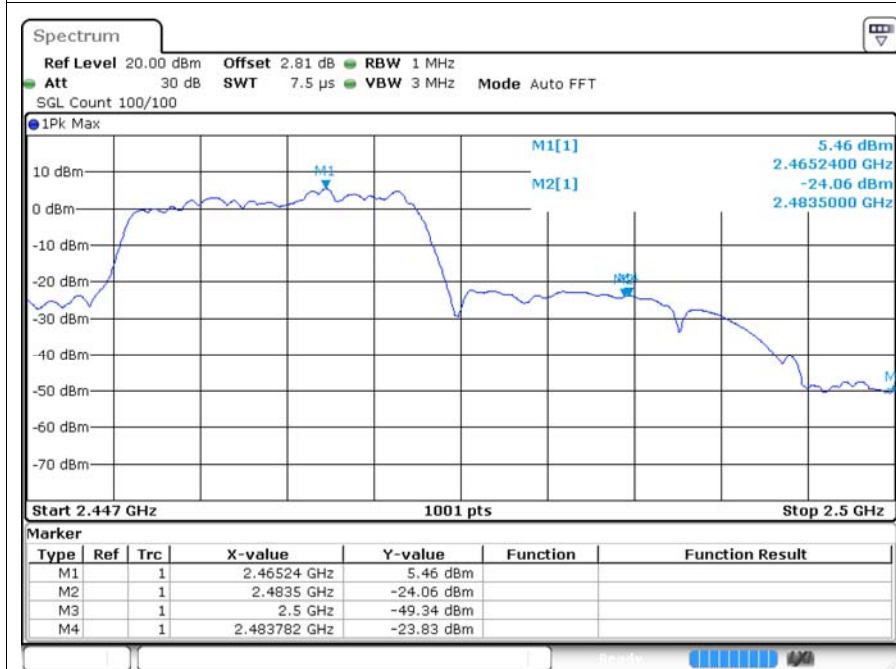


### g 2462MHz Ant1 Average

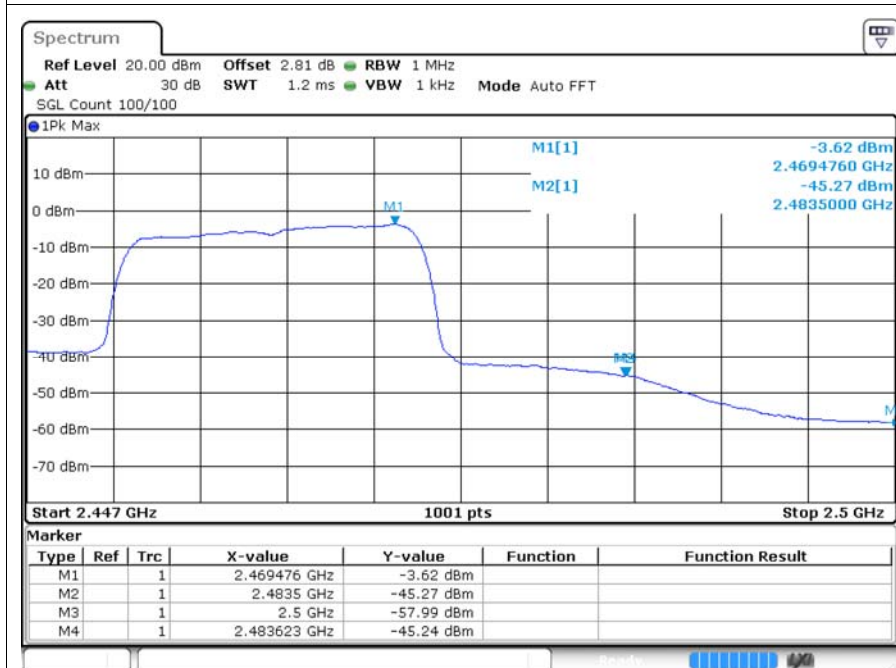




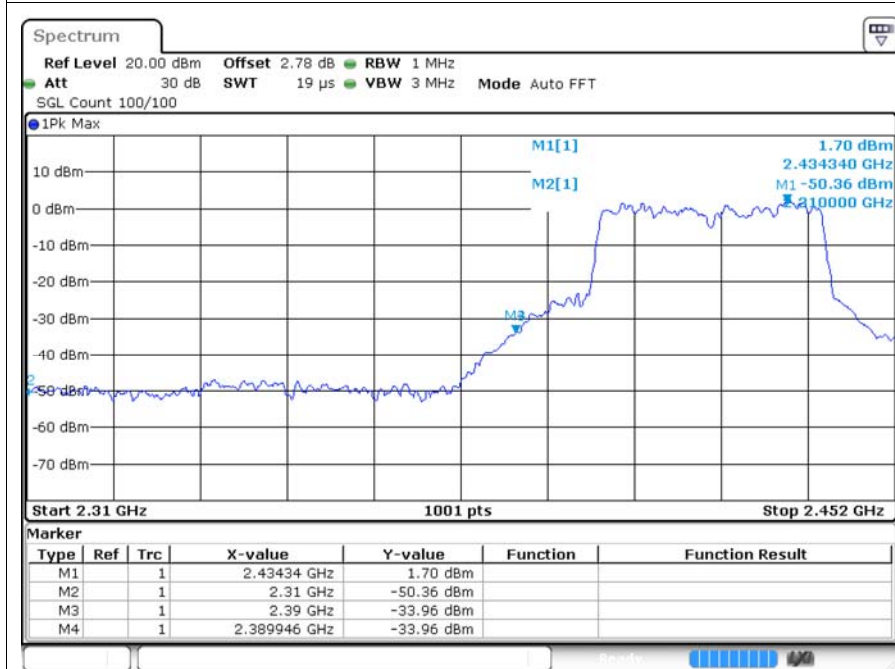
### n20 2462MHz Ant1 Peak



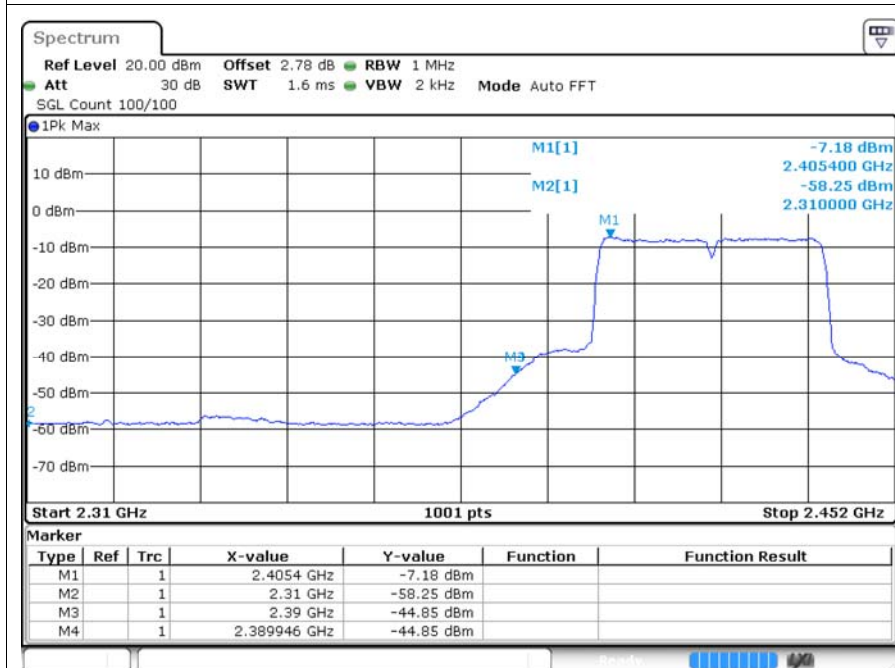
### n20 2462MHz Ant1 Average

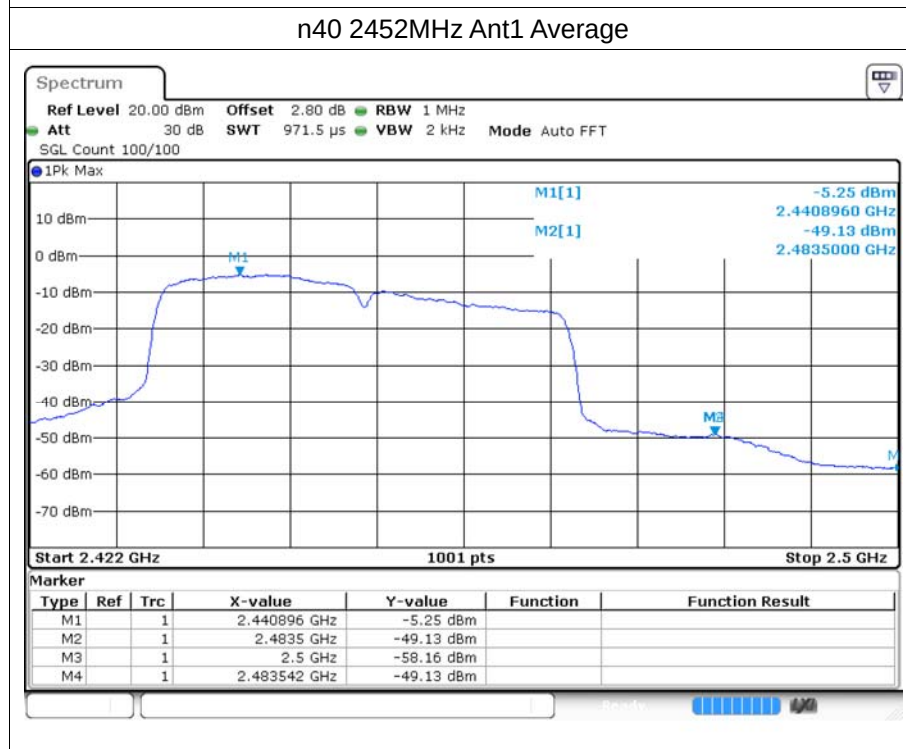
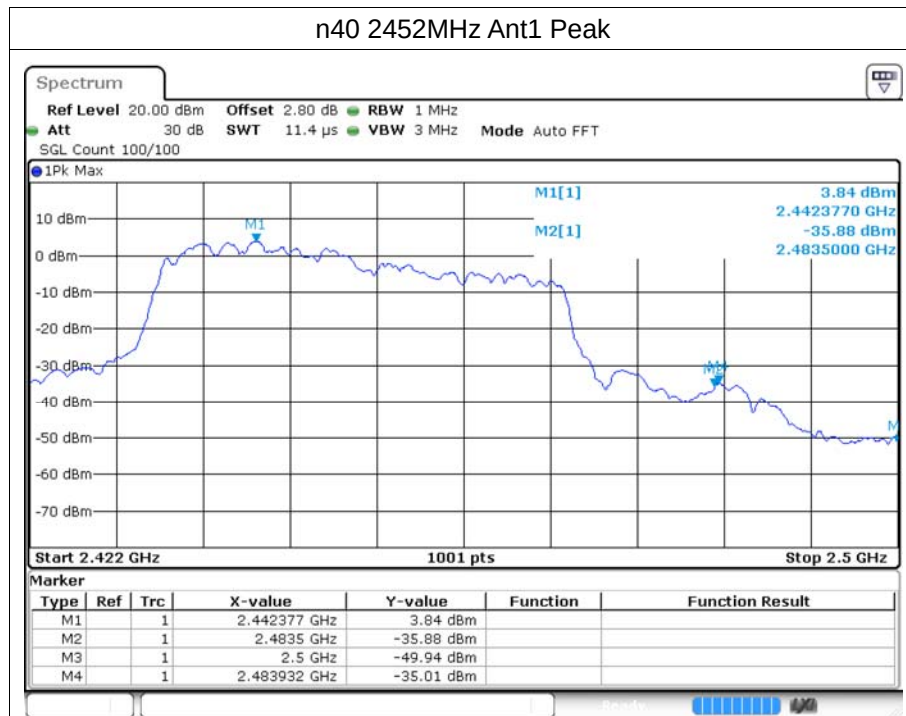


### n40 2422MHz Ant1 Peak



### n40 2422MHz Ant1 Average





----End Of The Report----