



## Appendix RF test data for 5G WIFI (Conducted Measurement)

Product Name: Carplay/Android Auto

Trade Mark: N/A

Test Model: M1

### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 24.5° C    |
| Relative Humidity: | 52.4%      |
| ATM Pressure:      | 100.0 kPa  |
| Test Engineer:     | Aalen.Ye   |
| Supervised by:     | Allen Wang |



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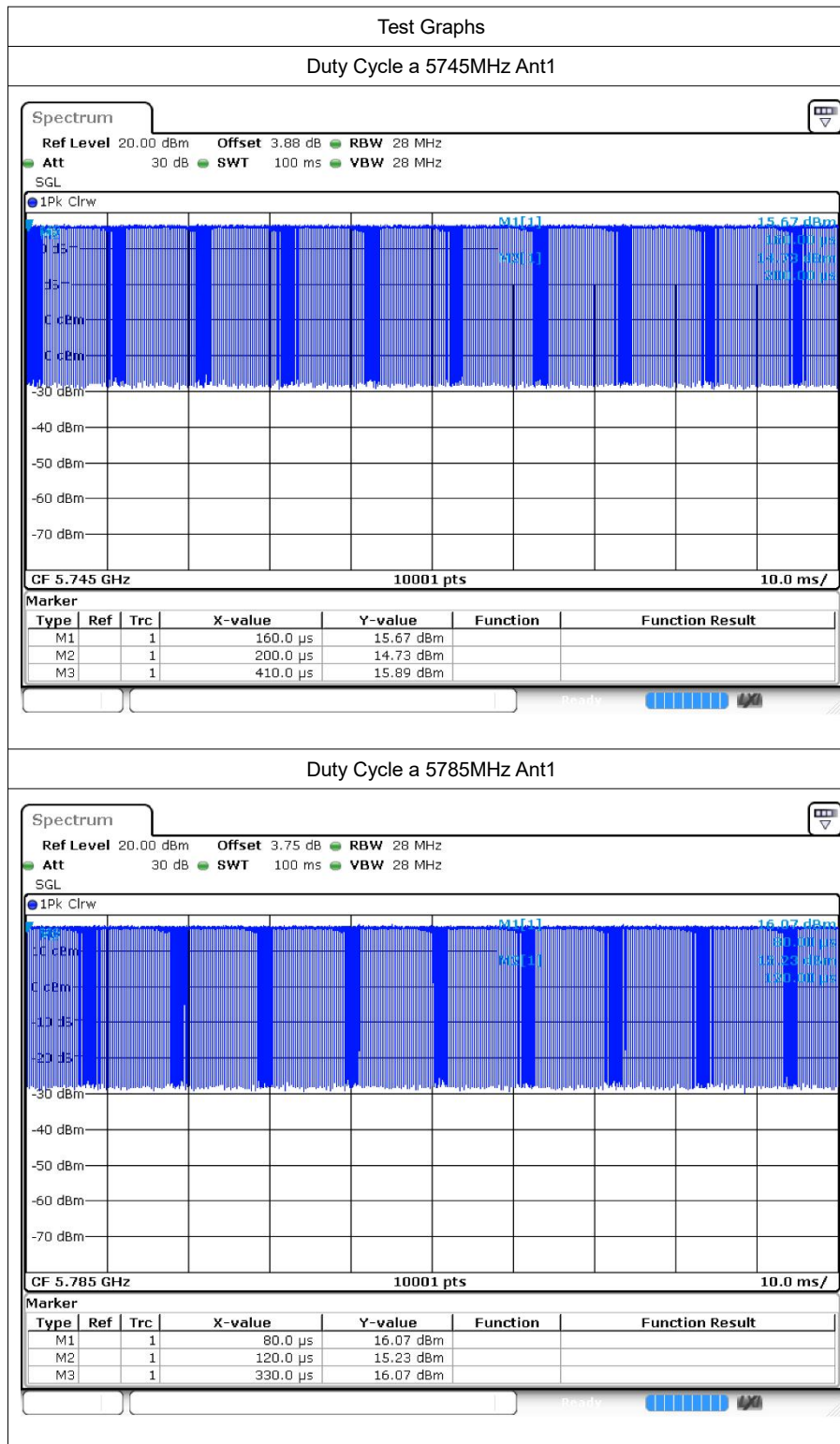


# 1 Duty Cycle

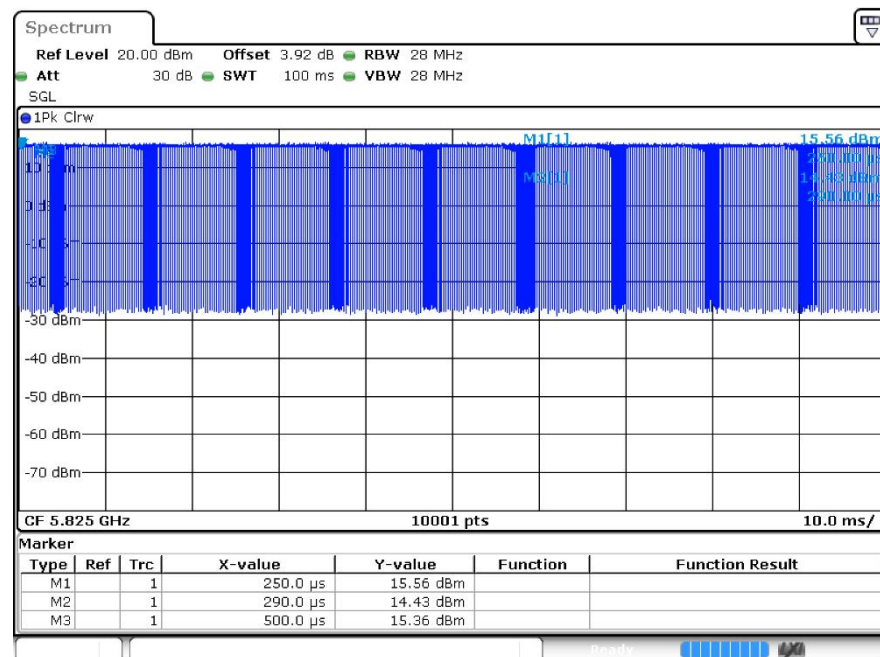
## 1.1 Test Result

| Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|------|-----------------|---------|----------------|------------------------|-----------|
| a    | 5745            | Ant1    | 86.84          | 0.61                   | 4.76      |
| a    | 5785            | Ant1    | 86.88          | 0.61                   | 4.76      |
| a    | 5825            | Ant1    | 87.03          | 0.6                    | 4.76      |
| n20  | 5745            | Ant1    | 87.53          | 0.58                   | 4.35      |
| n20  | 5785            | Ant1    | 87.54          | 0.58                   | 4.17      |
| n20  | 5825            | Ant1    | 87.66          | 0.57                   | 4.35      |
| n40  | 5755            | Ant1    | 87.99          | 0.56                   | 4         |
| n40  | 5795            | Ant1    | 88.03          | 0.55                   | 4         |

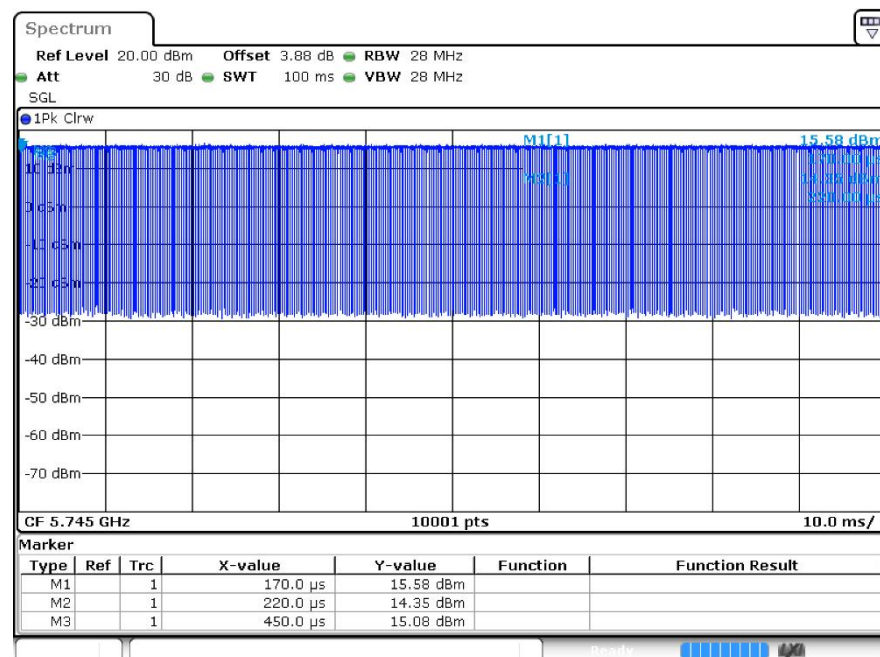
## 1.2 Test Graphs

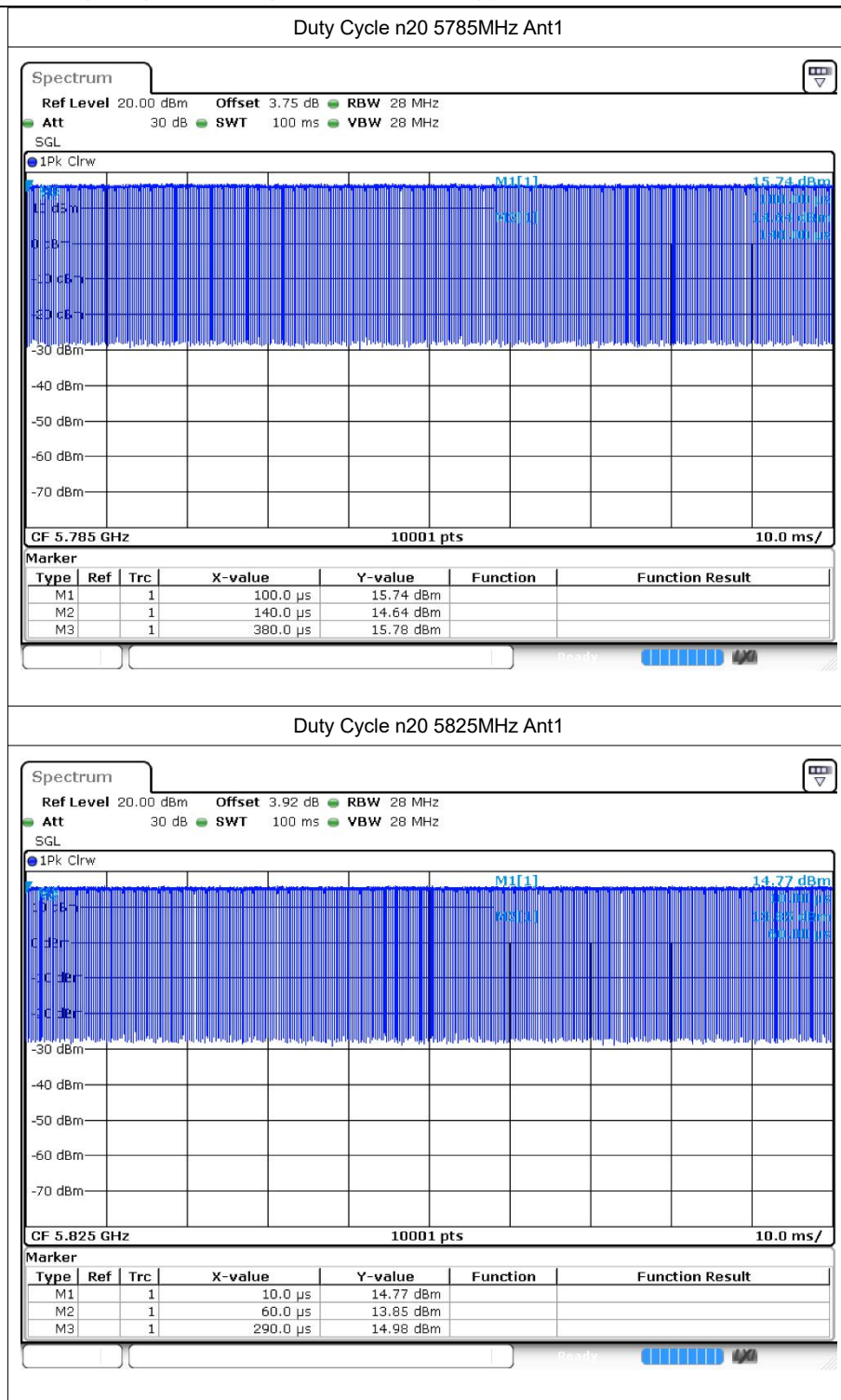


## Duty Cycle a 5825MHz Ant1

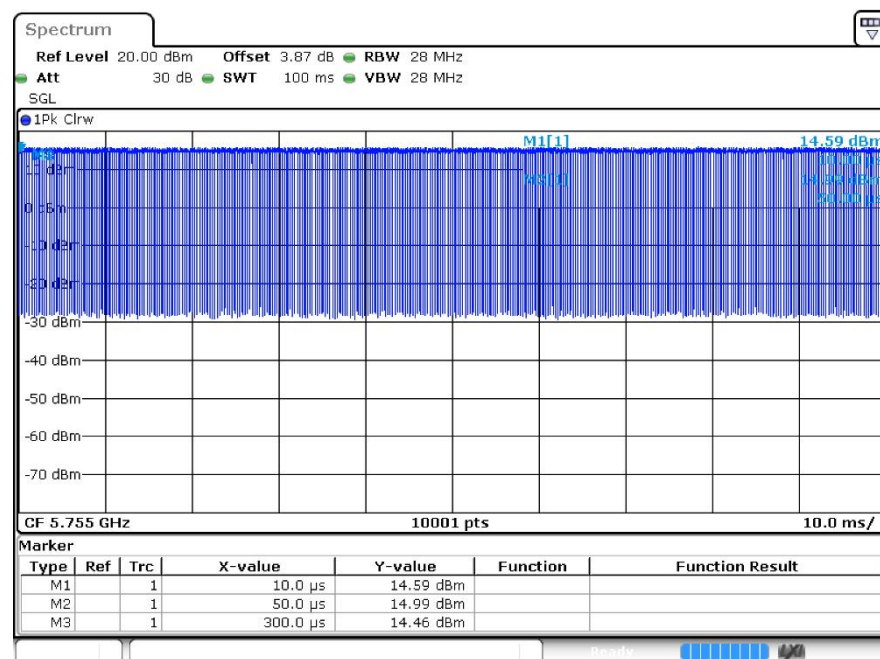


## Duty Cycle n20 5745MHz Ant1

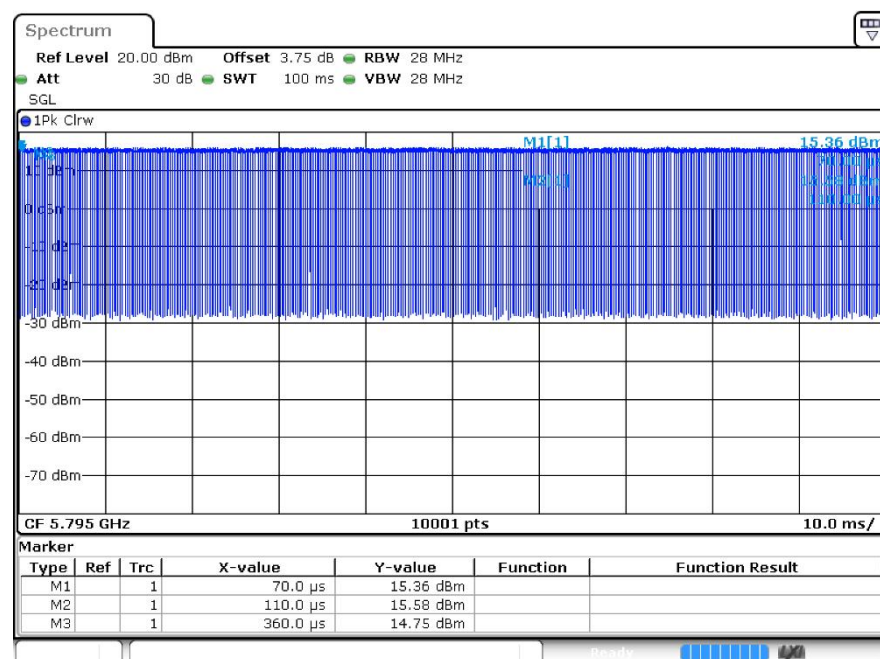




## Duty Cycle n40 5755MHz Ant1



## Duty Cycle n40 5795MHz Ant1



## 2 Maximum Conducted Output Power

### 2.1 Test Result

| Mode | Frequency<br>(MHz) | Antenna | Conducted Power<br>(dBm) | Limit<br>(dBm) | Verdict |
|------|--------------------|---------|--------------------------|----------------|---------|
| a    | 5745               | Ant1    | 15.01                    | 30             | Pass    |
| a    | 5785               | Ant1    | 15.37                    | 30             | Pass    |
| a    | 5825               | Ant1    | 14.71                    | 30             | Pass    |
| n20  | 5745               | Ant1    | 14.41                    | 30             | Pass    |
| n20  | 5785               | Ant1    | 14.78                    | 30             | Pass    |
| n20  | 5825               | Ant1    | 14.05                    | 30             | Pass    |
| n40  | 5755               | Ant1    | 14.07                    | 30             | Pass    |
| n40  | 5795               | Ant1    | 14.5                     | 30             | Pass    |

Note:

The duty factor has been compensated into the result.

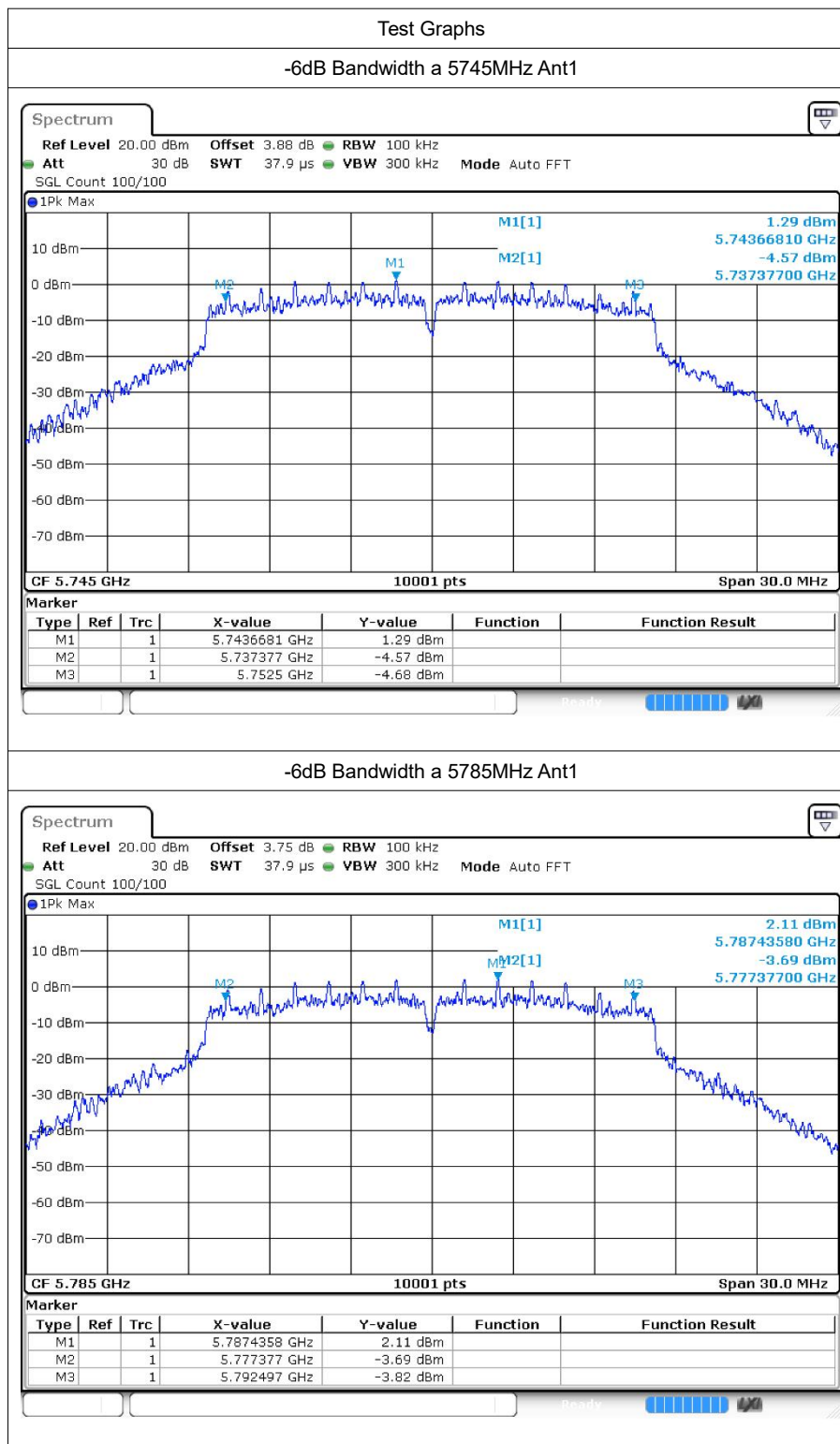


### 3 -6dB Bandwidth

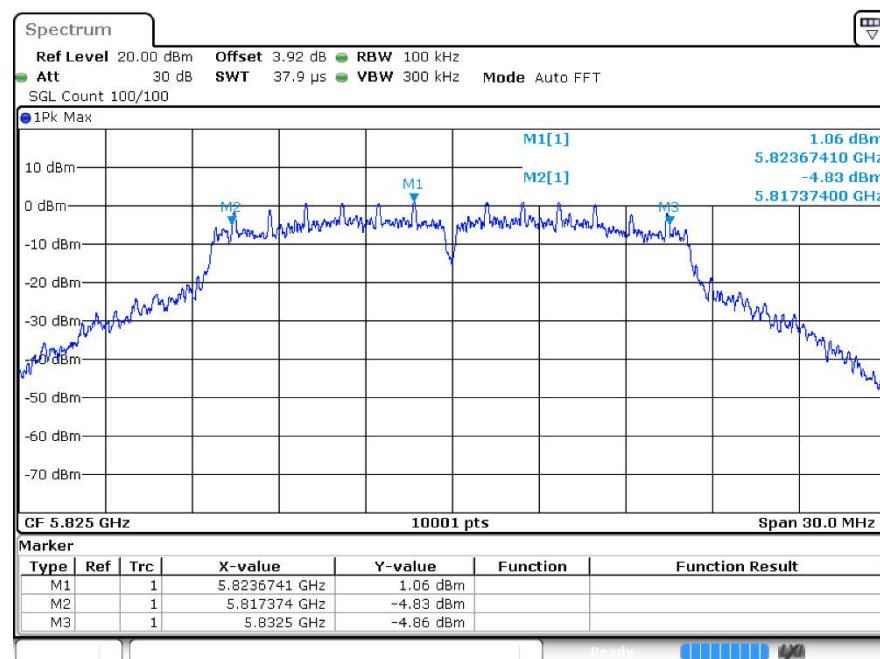
#### 3.1 Test Result

| Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|------|-----------------|---------|-----------------------|-----------------------------|---------|
| a    | 5745            | Ant1    | 15.123                | 0.5                         | Pass    |
| a    | 5785            | Ant1    | 15.12                 | 0.5                         | Pass    |
| a    | 5825            | Ant1    | 15.126                | 0.5                         | Pass    |
| n20  | 5745            | Ant1    | 15.114                | 0.5                         | Pass    |
| n20  | 5785            | Ant1    | 15.117                | 0.5                         | Pass    |
| n20  | 5825            | Ant1    | 15.117                | 0.5                         | Pass    |
| n40  | 5755            | Ant1    | 35.088                | 0.5                         | Pass    |
| n40  | 5795            | Ant1    | 35.088                | 0.5                         | Pass    |

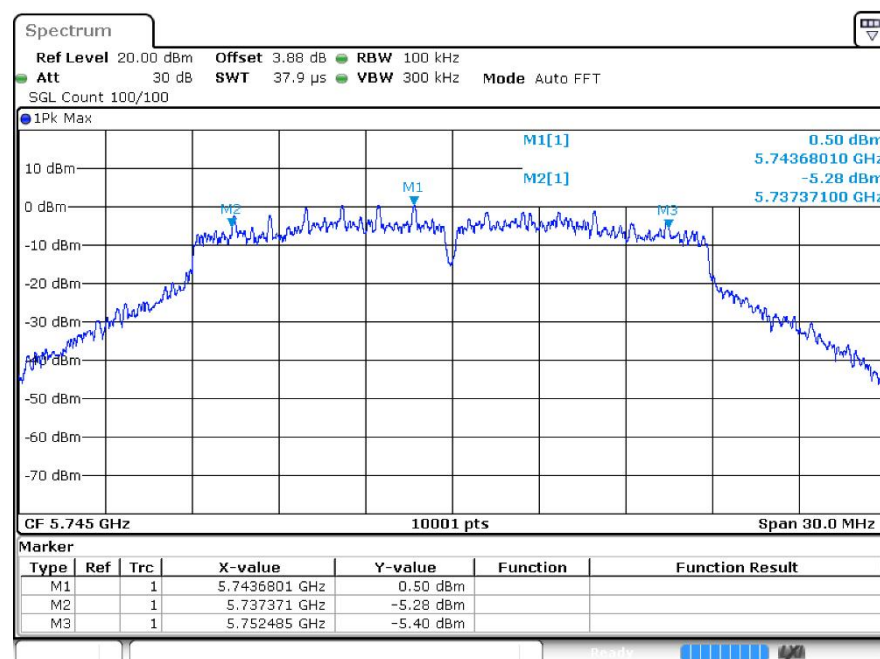
## 3.2 Test Graphs



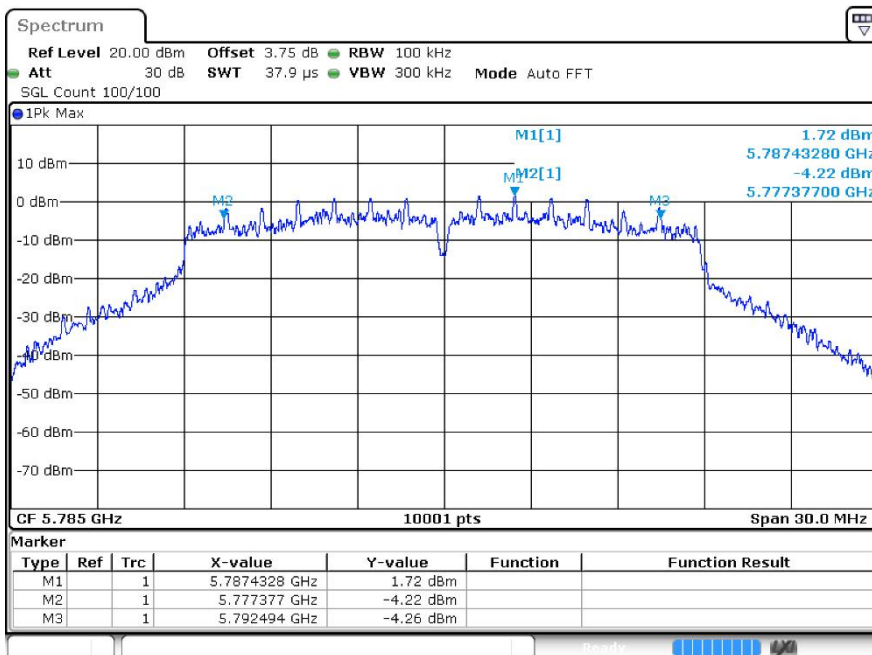
## -6dB Bandwidth a 5825MHz Ant1



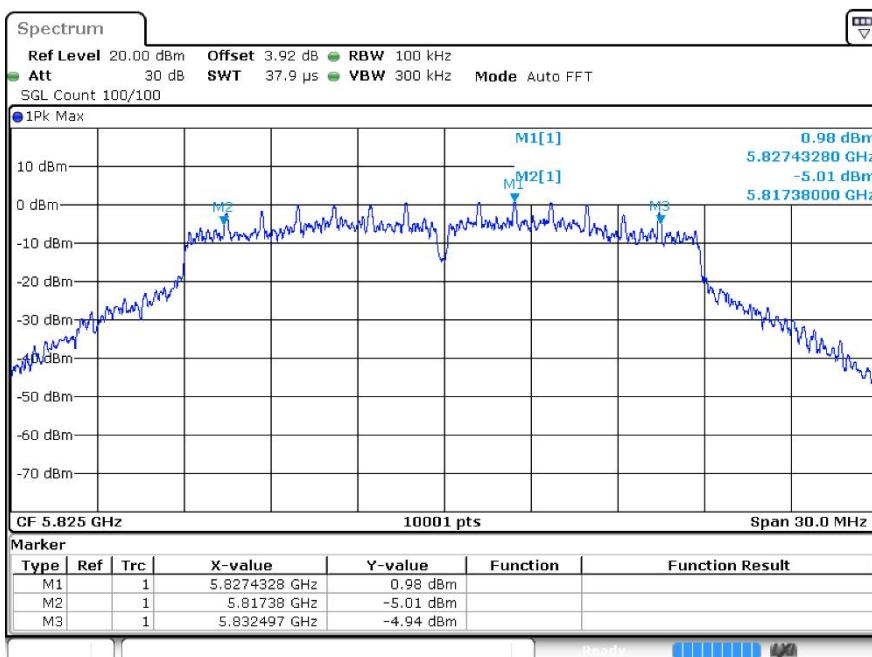
## -6dB Bandwidth n20 5745MHz Ant1



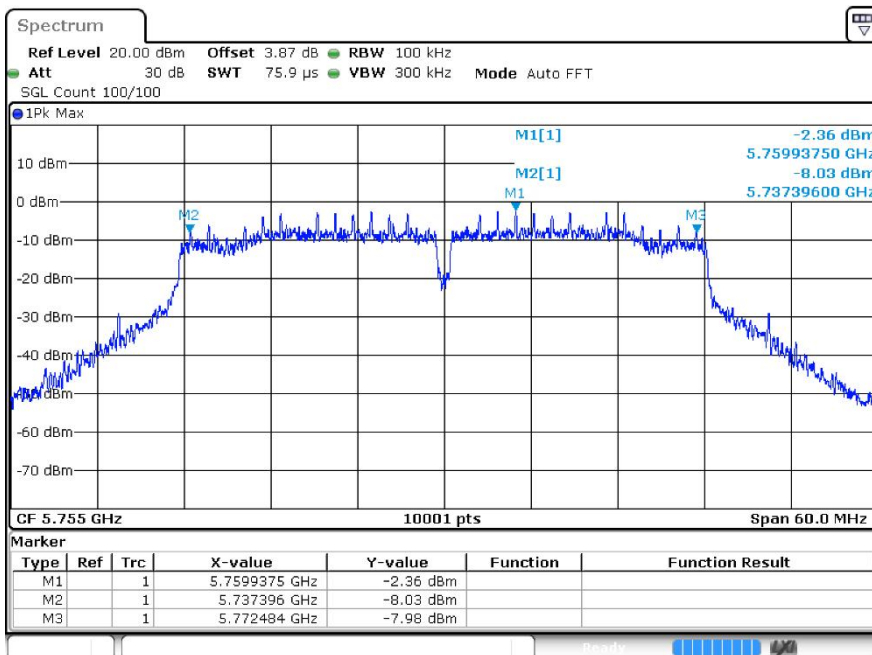
## -6dB Bandwidth n20 5785MHz Ant1



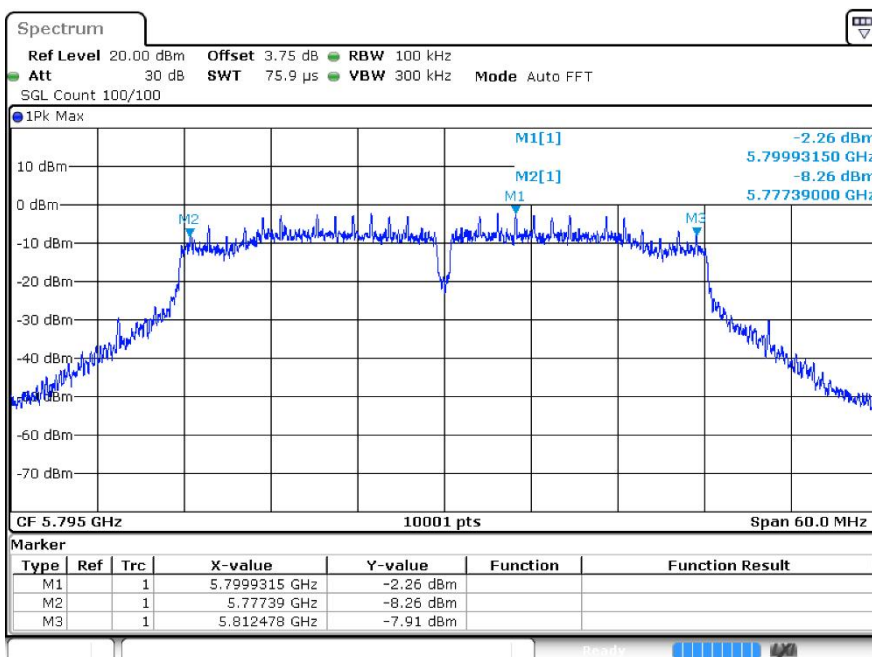
## -6dB Bandwidth n20 5825MHz Ant1



## -6dB Bandwidth n40 5755MHz Ant1



## -6dB Bandwidth n40 5795MHz Ant1



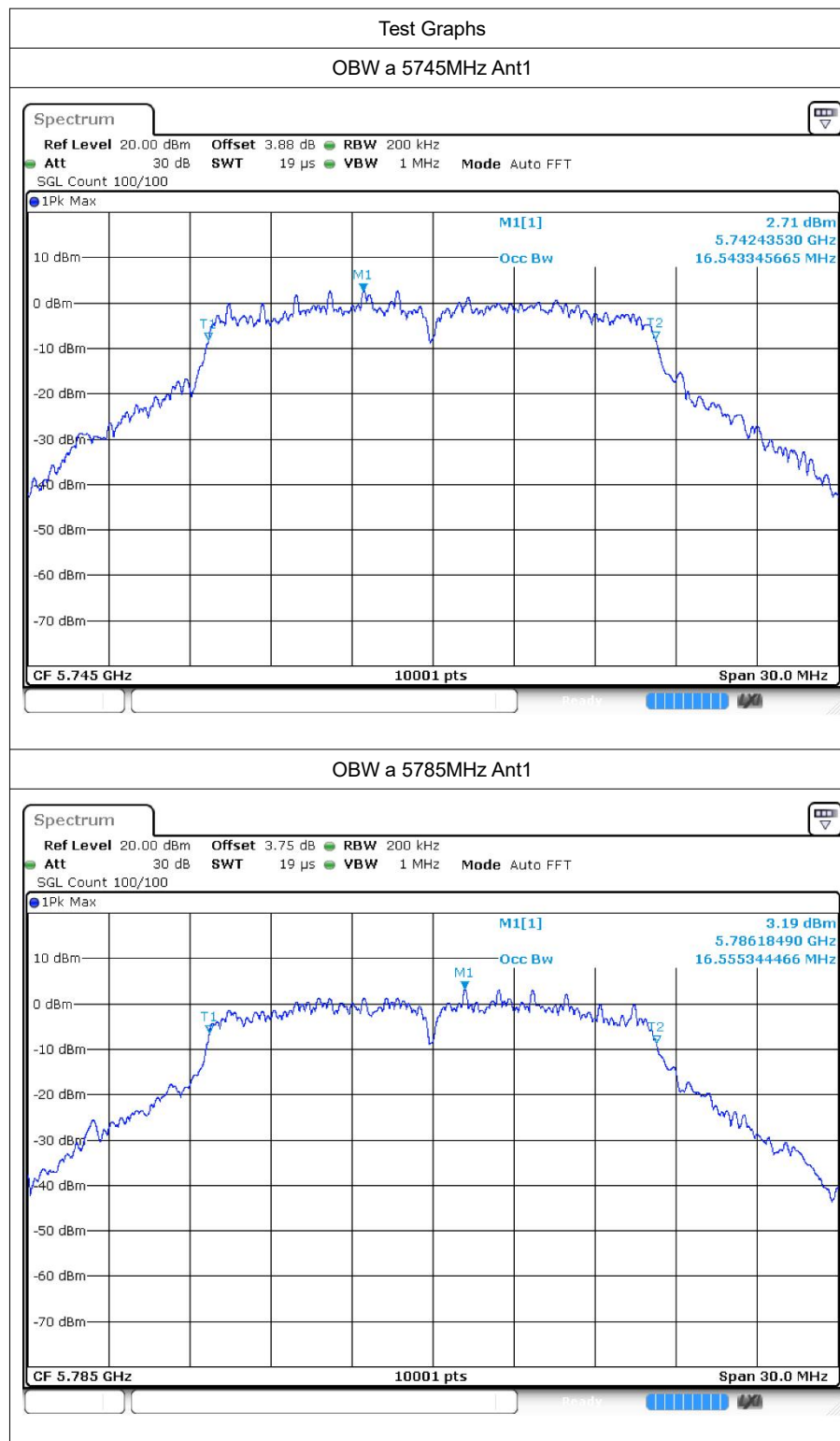


## 4 Occupied Channel Bandwidth

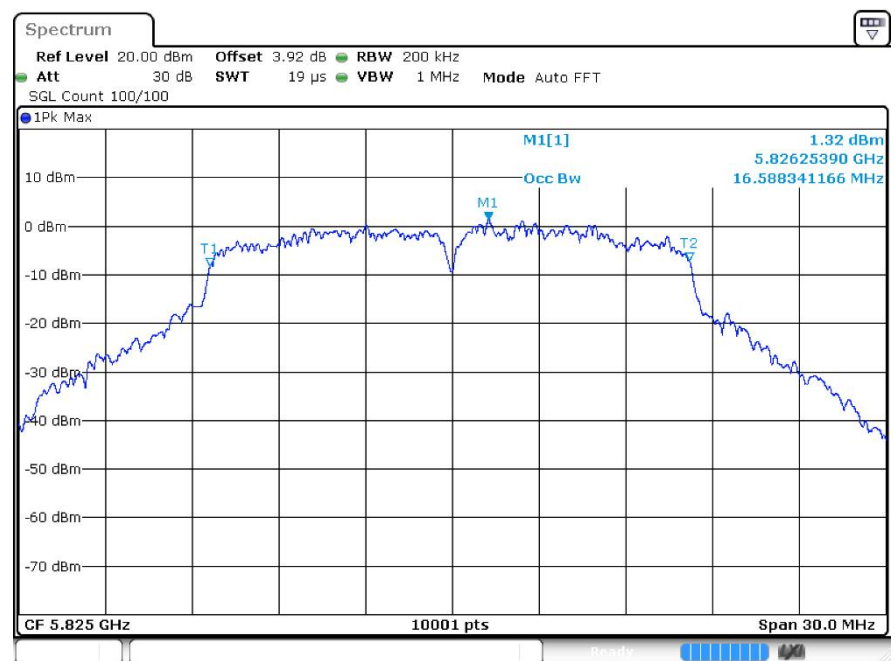
### 4.1 Test Result

| Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|------|-----------------|---------|---------------|
| a    | 5745            | Ant1    | 16.543        |
| a    | 5785            | Ant1    | 16.555        |
| a    | 5825            | Ant1    | 16.588        |
| n20  | 5745            | Ant1    | 17.56         |
| n20  | 5785            | Ant1    | 17.581        |
| n20  | 5825            | Ant1    | 17.596        |
| n40  | 5755            | Ant1    | 36.098        |
| n40  | 5795            | Ant1    | 36.002        |

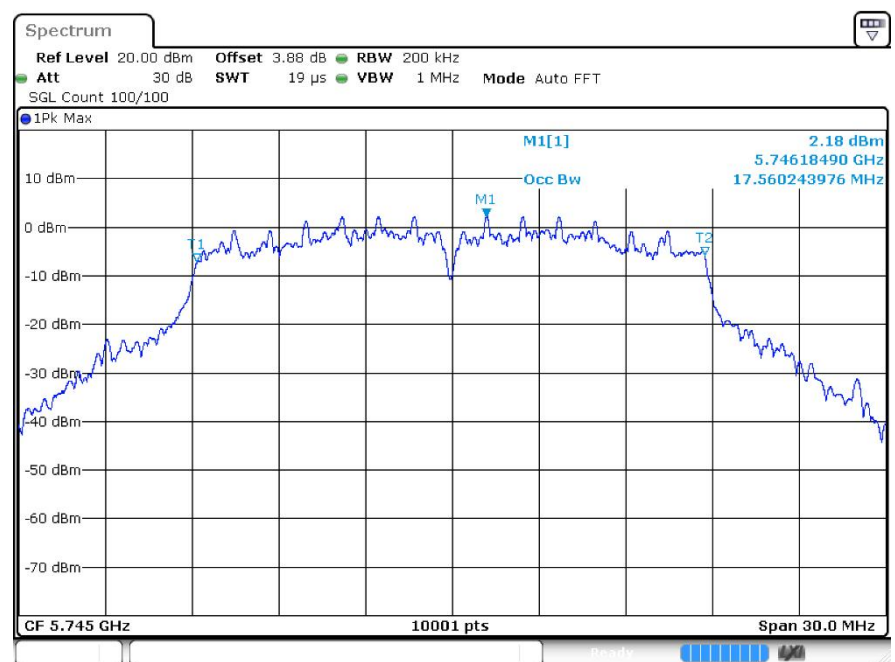
## 4.2 Test Graphs



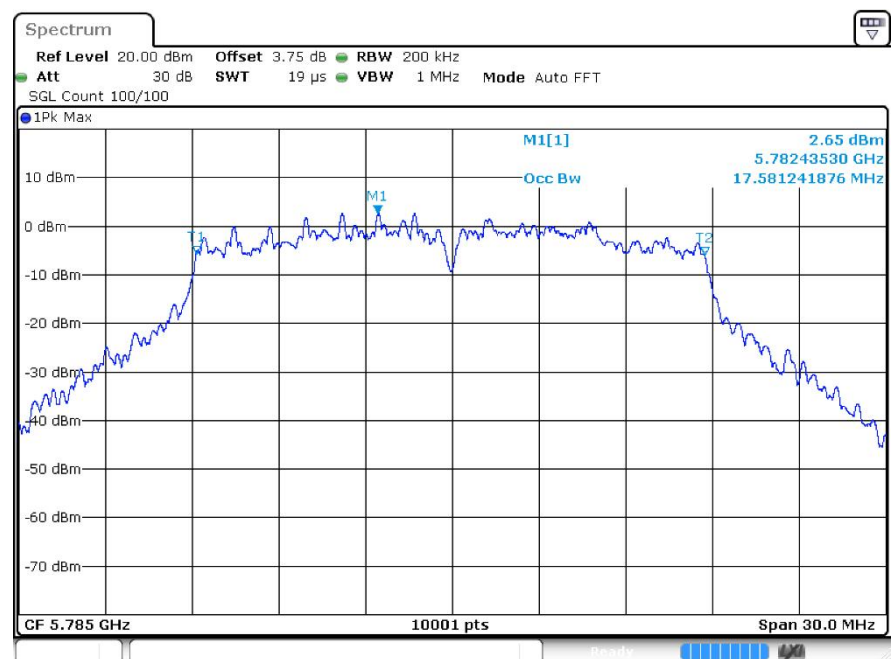
OBW a 5825MHz Ant1



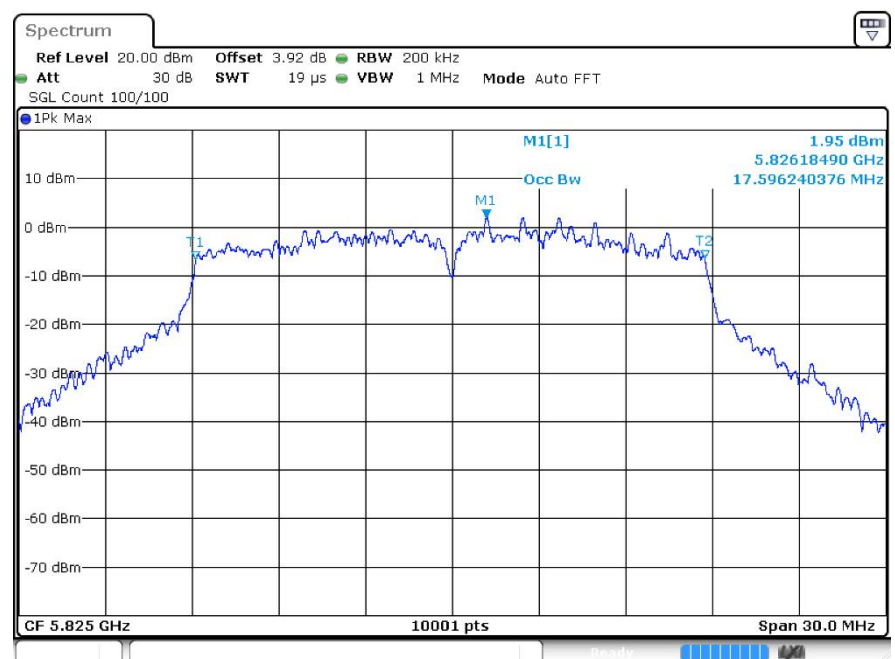
OBW n20 5745MHz Ant1



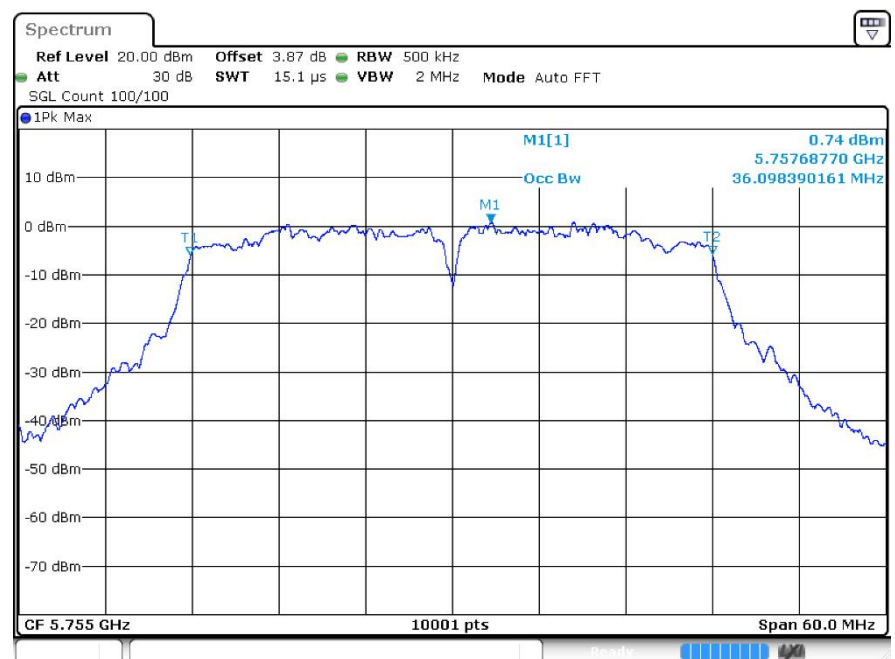
## OBW n20 5785MHz Ant1



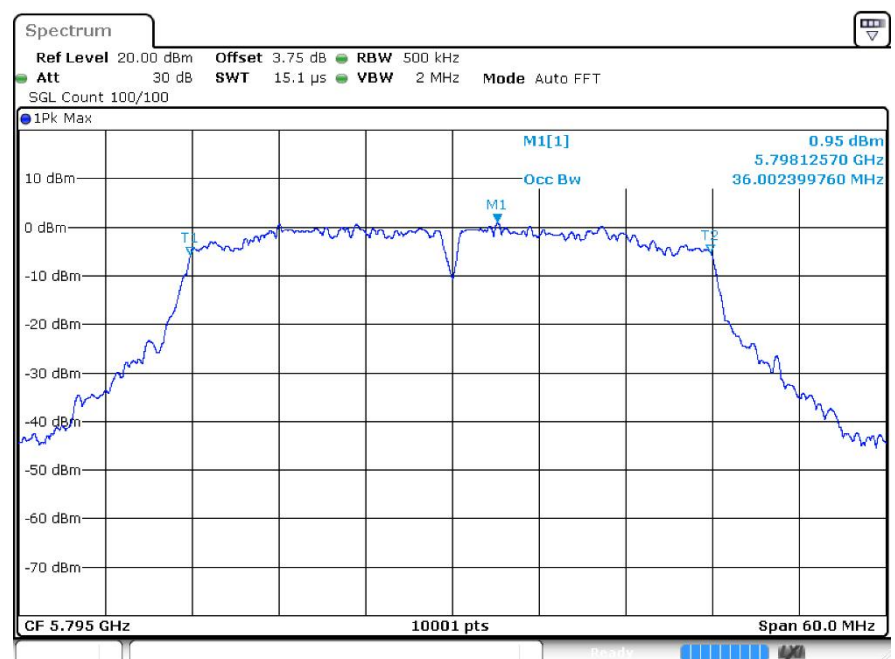
## OBW n20 5825MHz Ant1



## OBW n40 5755MHz Ant1



## OBW n40 5795MHz Ant1

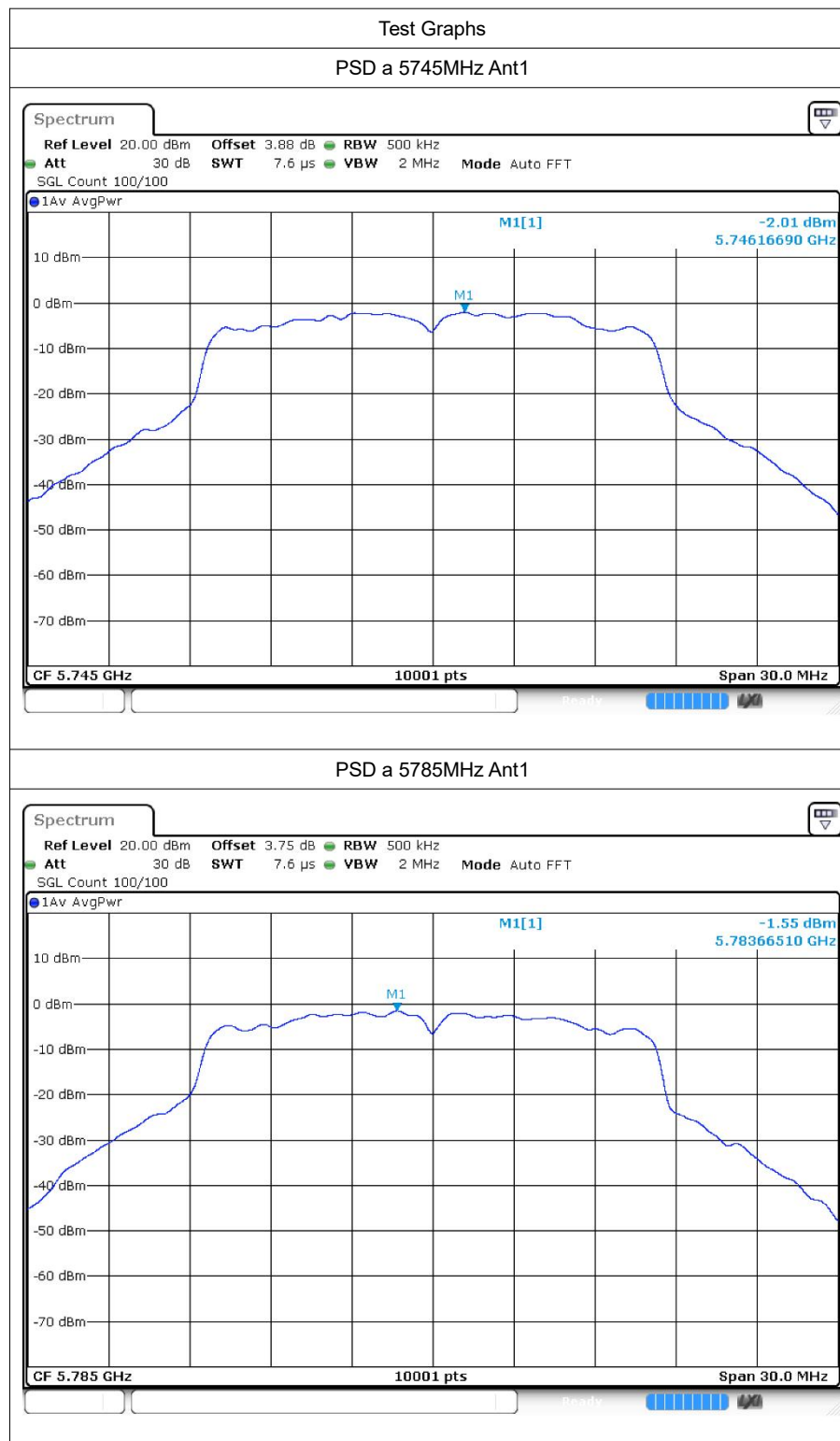


## 5 Maximum Power Spectral Density Level

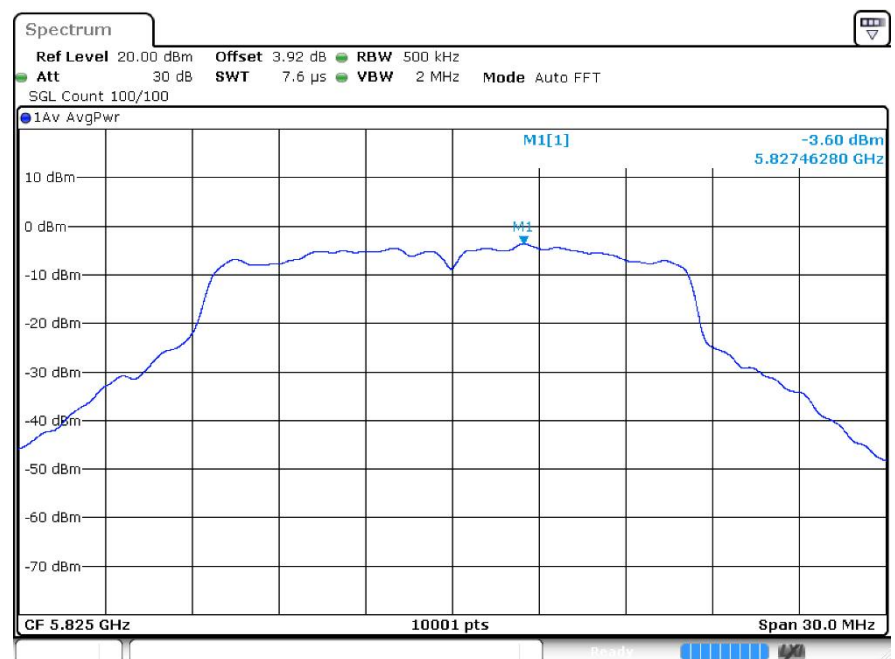
### 5.1 Test Result

| Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm) | Duty Factor (dB) | Total PSD (dBm) | Limit (dBm) | Verdict |
|------|-----------------|---------|---------------------|------------------|-----------------|-------------|---------|
| a    | 5745            | Ant1    | -2.01               | 0.61             | -1.4            | 30          | Pass    |
| a    | 5785            | Ant1    | -1.55               | 0.61             | -0.94           | 30          | Pass    |
| a    | 5825            | Ant1    | -3.6                | 0.6              | -3              | 30          | Pass    |
| n20  | 5745            | Ant1    | -2.57               | 0.58             | -1.99           | 30          | Pass    |
| n20  | 5785            | Ant1    | -2.47               | 0.58             | -1.89           | 30          | Pass    |
| n20  | 5825            | Ant1    | -3.24               | 0.57             | -2.67           | 30          | Pass    |
| n40  | 5755            | Ant1    | -6.25               | 0.56             | -5.69           | 30          | Pass    |
| n40  | 5795            | Ant1    | -5.73               | 0.55             | -5.18           | 30          | Pass    |

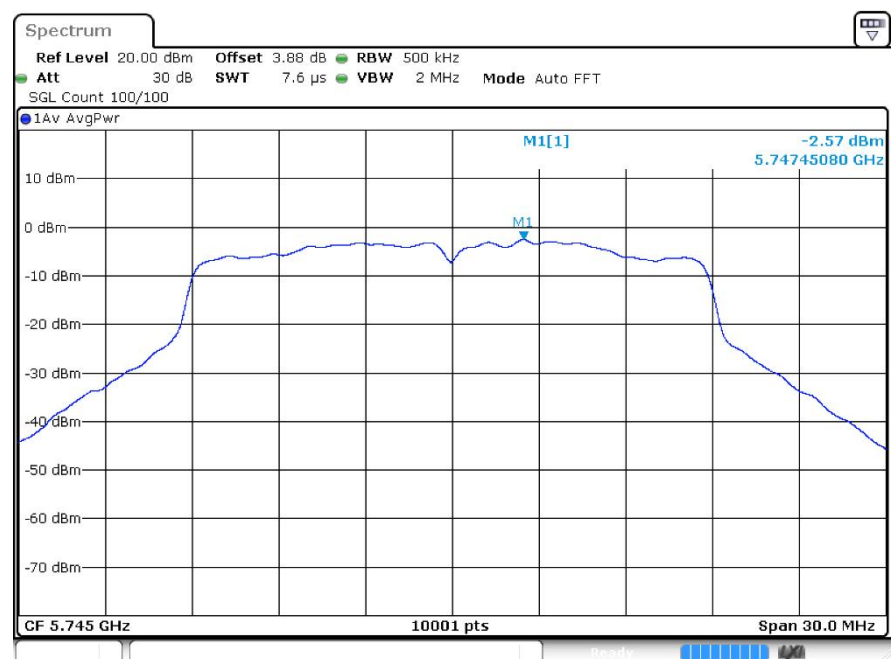
## 5.2 Test Graphs



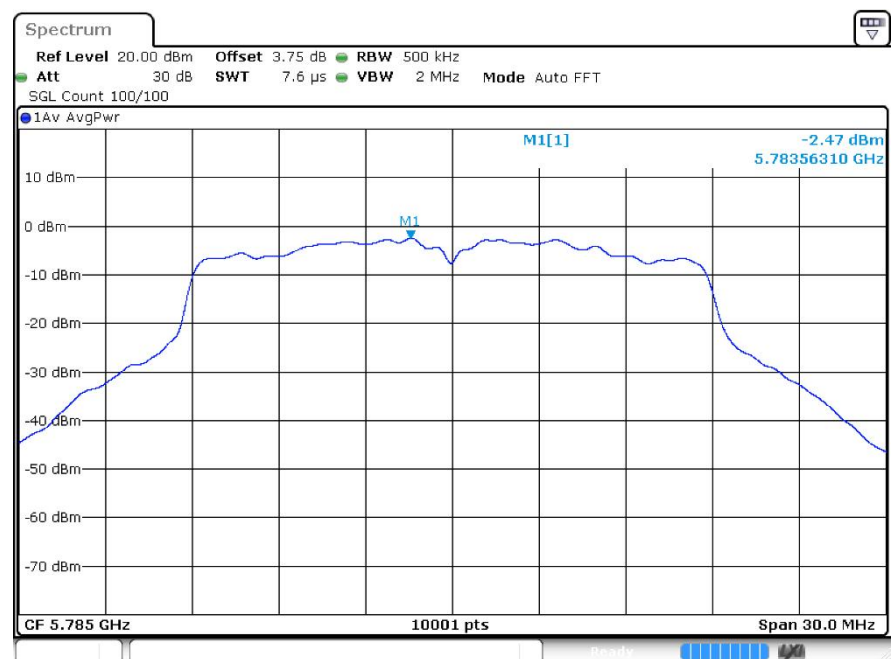
PSD a 5825MHz Ant1



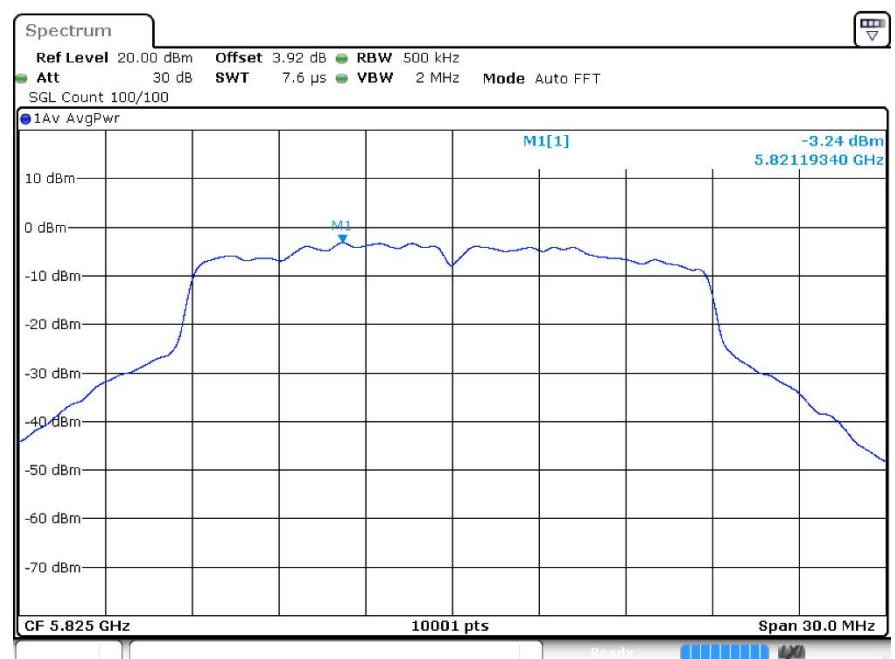
PSD n20 5745MHz Ant1



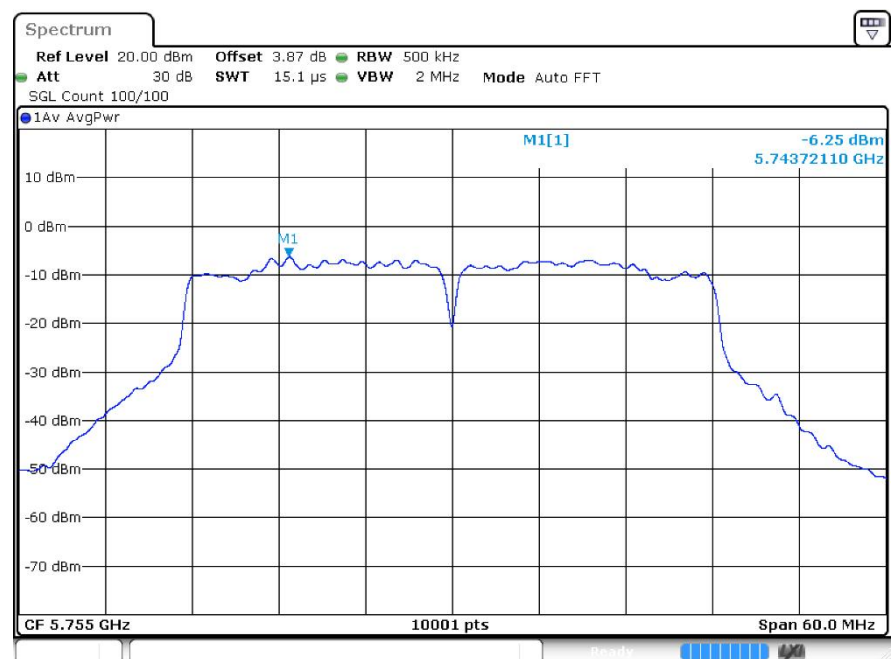
PSD n20 5785MHz Ant1



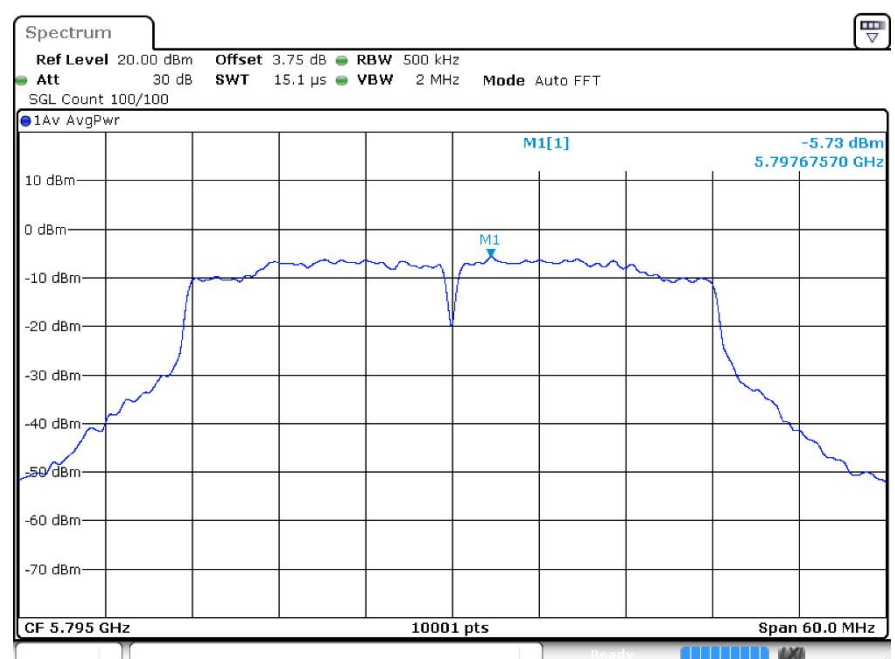
PSD n20 5825MHz Ant1



PSD n40 5755MHz Ant1



PSD n40 5795MHz Ant1





## 6 Frequency Stability

### 6.1 Test Result

| Condition | Mode | Frequency (MHz) | Antenna | Measured Frequency (MHz) | Frequency Error (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
|-----------|------|-----------------|---------|--------------------------|----------------------|-----------------|-------------|---------|
| 20C 4.5V  | a    | 5745            | Ant1    | 5744.9                   | -100000              | -17.41          | 25          | Pass    |
| 20C 5.0V  | a    | 5745            | Ant1    | 5744.92                  | -80000               | -13.93          | 25          | Pass    |
| 20C 5.5V  | a    | 5745            | Ant1    | 5744.9                   | -100000              | -17.41          | 25          | Pass    |
| -20C 5.0V | a    | 5745            | Ant1    | 5744.94                  | -60000               | -10.44          | 25          | Pass    |
| -10C 5.0V | a    | 5745            | Ant1    | 5744.96                  | -40000               | -6.96           | 25          | Pass    |
| 0C 5.0V   | a    | 5745            | Ant1    | 5744.9                   | -100000              | -17.41          | 25          | Pass    |
| 10C 5.0V  | a    | 5745            | Ant1    | 5744.94                  | -60000               | -10.44          | 25          | Pass    |
| 30C 5.0V  | a    | 5745            | Ant1    | 5744.94                  | -60000               | -10.44          | 25          | Pass    |
| 40C 5.0V  | a    | 5745            | Ant1    | 5744.92                  | -80000               | -13.93          | 25          | Pass    |
| 50C 5.0V  | a    | 5745            | Ant1    | 5744.96                  | -40000               | -6.96           | 25          | Pass    |
| 20C 4.5V  | a    | 5785            | Ant1    | 5784.94                  | -60000               | -10.37          | 25          | Pass    |
| 20C 5.0V  | a    | 5785            | Ant1    | 5784.9                   | -100000              | -17.29          | 25          | Pass    |
| 20C 5.5V  | a    | 5785            | Ant1    | 5784.92                  | -80000               | -13.83          | 25          | Pass    |
| -20C 5.0V | a    | 5785            | Ant1    | 5784.94                  | -60000               | -10.37          | 25          | Pass    |
| -10C 5.0V | a    | 5785            | Ant1    | 5784.96                  | -40000               | -6.91           | 25          | Pass    |
| 0C 5.0V   | a    | 5785            | Ant1    | 5784.92                  | -80000               | -13.83          | 25          | Pass    |
| 10C 5.0V  | a    | 5785            | Ant1    | 5784.94                  | -60000               | -10.37          | 25          | Pass    |
| 30C 5.0V  | a    | 5785            | Ant1    | 5784.92                  | -80000               | -13.83          | 25          | Pass    |
| 40C 5.0V  | a    | 5785            | Ant1    | 5784.92                  | -80000               | -13.83          | 25          | Pass    |
| 50C 5.0V  | a    | 5785            | Ant1    | 5784.94                  | -60000               | -10.37          | 25          | Pass    |
| 20C 4.5V  | a    | 5825            | Ant1    | 5824.92                  | -80000               | -13.73          | 25          | Pass    |
| 20C 5.0V  | a    | 5825            | Ant1    | 5824.94                  | -60000               | -10.3           | 25          | Pass    |
| 20C 5.5V  | a    | 5825            | Ant1    | 5824.94                  | -60000               | -10.3           | 25          | Pass    |
| -20C 5.0V | a    | 5825            | Ant1    | 5824.9                   | -100000              | -17.17          | 25          | Pass    |
| -10C 5.0V | a    | 5825            | Ant1    | 5824.94                  | -60000               | -10.3           | 25          | Pass    |
| 0C 5.0V   | a    | 5825            | Ant1    | 5824.92                  | -80000               | -13.73          | 25          | Pass    |
| 10C 5.0V  | a    | 5825            | Ant1    | 5824.92                  | -80000               | -13.73          | 25          | Pass    |
| 30C 5.0V  | a    | 5825            | Ant1    | 5824.92                  | -80000               | -13.73          | 25          | Pass    |
| 40C 5.0V  | a    | 5825            | Ant1    | 5824.96                  | -40000               | -6.87           | 25          | Pass    |
| 50C 5.0V  | a    | 5825            | Ant1    | 5824.92                  | -80000               | -13.73          | 25          | Pass    |
| 20C 4.5V  | n20  | 5745            | Ant1    | 5744.94                  | -60000               | -10.44          | 25          | Pass    |
| 20C 5.0V  | n20  | 5745            | Ant1    | 5744.92                  | -80000               | -13.93          | 25          | Pass    |
| 20C 5.5V  | n20  | 5745            | Ant1    | 5744.92                  | -80000               | -13.93          | 25          | Pass    |
| -20C 5.0V | n20  | 5745            | Ant1    | 5744.94                  | -60000               | -10.44          | 25          | Pass    |
| -10C 5.0V | n20  | 5745            | Ant1    | 5744.92                  | -80000               | -13.93          | 25          | Pass    |
| 0C 5.0V   | n20  | 5745            | Ant1    | 5744.98                  | -20000               | -3.48           | 25          | Pass    |



|           |     |      |      |         |         |        |    |      |
|-----------|-----|------|------|---------|---------|--------|----|------|
| 10C 5.0V  | n20 | 5745 | Ant1 | 5744.94 | -60000  | -10.44 | 25 | Pass |
| 30C 5.0V  | n20 | 5745 | Ant1 | 5744.94 | -60000  | -10.44 | 25 | Pass |
| 40C 5.0V  | n20 | 5745 | Ant1 | 5744.94 | -60000  | -10.44 | 25 | Pass |
| 50C 5.0V  | n20 | 5745 | Ant1 | 5744.92 | -80000  | -13.93 | 25 | Pass |
| 20C 4.5V  | n20 | 5785 | Ant1 | 5784.98 | -20000  | -3.46  | 25 | Pass |
| 20C 5.0V  | n20 | 5785 | Ant1 | 5784.94 | -60000  | -10.37 | 25 | Pass |
| 20C 5.5V  | n20 | 5785 | Ant1 | 5784.94 | -60000  | -10.37 | 25 | Pass |
| -20C 5.0V | n20 | 5785 | Ant1 | 5784.94 | -60000  | -10.37 | 25 | Pass |
| -10C 5.0V | n20 | 5785 | Ant1 | 5784.94 | -60000  | -10.37 | 25 | Pass |
| 0C 5.0V   | n20 | 5785 | Ant1 | 5784.94 | -60000  | -10.37 | 25 | Pass |
| 10C 5.0V  | n20 | 5785 | Ant1 | 5784.94 | -60000  | -10.37 | 25 | Pass |
| 30C 5.0V  | n20 | 5785 | Ant1 | 5784.96 | -40000  | -6.91  | 25 | Pass |
| 40C 5.0V  | n20 | 5785 | Ant1 | 5784.92 | -80000  | -13.83 | 25 | Pass |
| 50C 5.0V  | n20 | 5785 | Ant1 | 5784.9  | -100000 | -17.29 | 25 | Pass |
| 20C 4.5V  | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| 20C 5.0V  | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| 20C 5.5V  | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| -20C 5.0V | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| -10C 5.0V | n20 | 5825 | Ant1 | 5824.96 | -40000  | -6.87  | 25 | Pass |
| 0C 5.0V   | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| 10C 5.0V  | n20 | 5825 | Ant1 | 5824.96 | -40000  | -6.87  | 25 | Pass |
| 30C 5.0V  | n20 | 5825 | Ant1 | 5824.92 | -80000  | -13.73 | 25 | Pass |
| 40C 5.0V  | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| 50C 5.0V  | n20 | 5825 | Ant1 | 5824.94 | -60000  | -10.3  | 25 | Pass |
| 20C 4.5V  | n40 | 5755 | Ant1 | 5754.92 | -80000  | -13.9  | 25 | Pass |
| 20C 5.0V  | n40 | 5755 | Ant1 | 5754.92 | -80000  | -13.9  | 25 | Pass |
| 20C 5.5V  | n40 | 5755 | Ant1 | 5754.96 | -40000  | -6.95  | 25 | Pass |
| -20C 5.0V | n40 | 5755 | Ant1 | 5754.92 | -80000  | -13.9  | 25 | Pass |
| -10C 5.0V | n40 | 5755 | Ant1 | 5754.92 | -80000  | -13.9  | 25 | Pass |
| 0C 5.0V   | n40 | 5755 | Ant1 | 5754.96 | -40000  | -6.95  | 25 | Pass |
| 10C 5.0V  | n40 | 5755 | Ant1 | 5754.96 | -40000  | -6.95  | 25 | Pass |
| 30C 5.0V  | n40 | 5755 | Ant1 | 5754.96 | -40000  | -6.95  | 25 | Pass |
| 40C 5.0V  | n40 | 5755 | Ant1 | 5754.96 | -40000  | -6.95  | 25 | Pass |
| 50C 5.0V  | n40 | 5755 | Ant1 | 5754.92 | -80000  | -13.9  | 25 | Pass |
| 20C 4.5V  | n40 | 5795 | Ant1 | 5794.92 | -80000  | -13.81 | 25 | Pass |
| 20C 5.0V  | n40 | 5795 | Ant1 | 5794.88 | -120000 | -20.71 | 25 | Pass |
| 20C 5.5V  | n40 | 5795 | Ant1 | 5794.92 | -80000  | -13.81 | 25 | Pass |
| -20C 5.0V | n40 | 5795 | Ant1 | 5794.92 | -80000  | -13.81 | 25 | Pass |
| -10C 5.0V | n40 | 5795 | Ant1 | 5794.96 | -40000  | -6.9   | 25 | Pass |
| 0C 5.0V   | n40 | 5795 | Ant1 | 5794.88 | -120000 | -20.71 | 25 | Pass |
| 10C 5.0V  | n40 | 5795 | Ant1 | 5794.96 | -40000  | -6.9   | 25 | Pass |
| 30C 5.0V  | n40 | 5795 | Ant1 | 5795    | 0       | 0      | 25 | Pass |
| 40C 5.0V  | n40 | 5795 | Ant1 | 5794.92 | -80000  | -13.81 | 25 | Pass |



|          |     |      |      |         |        |        |    |      |
|----------|-----|------|------|---------|--------|--------|----|------|
| 50C 5.0V | n40 | 5795 | Ant1 | 5794.92 | -80000 | -13.81 | 25 | Pass |
|----------|-----|------|------|---------|--------|--------|----|------|

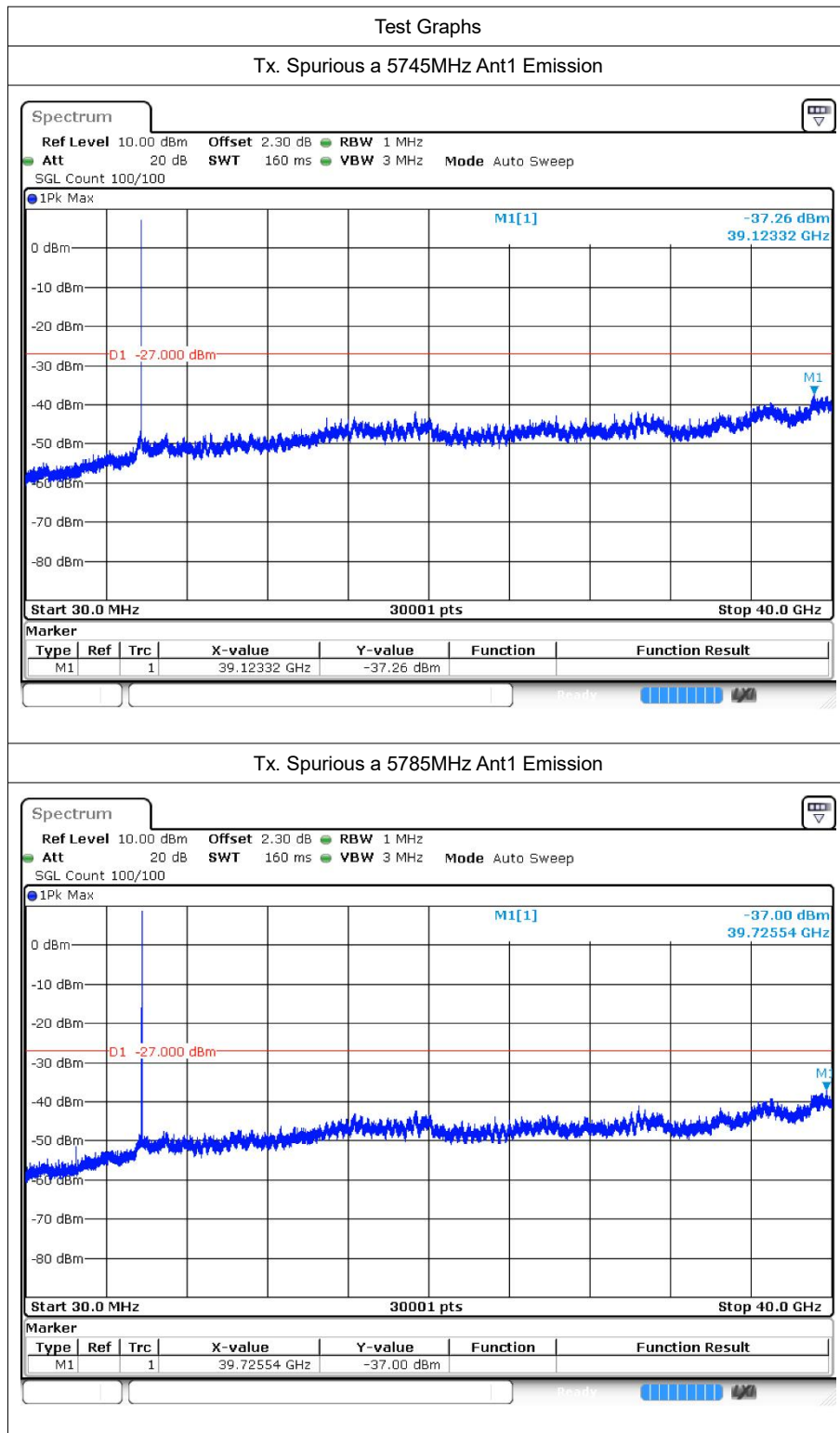


## 7 Conducted RF Spurious Emission

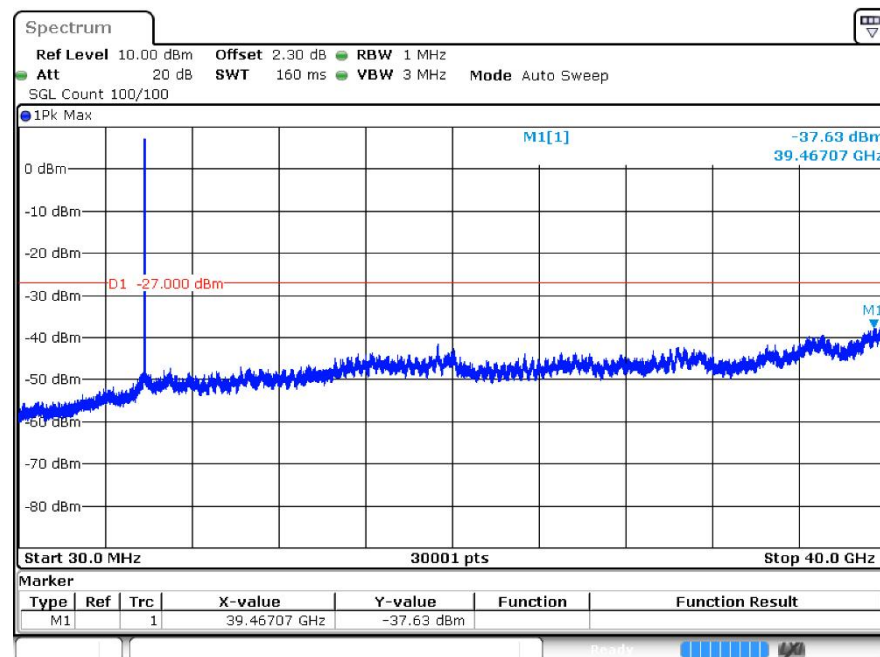
### 7.1 Test Result

| Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|------|-----------------|---------|-----------------|-------------|---------|
| a    | 5745            | Ant1    | -37.25          | -27         | Pass    |
| a    | 5785            | Ant1    | -36.99          | -27         | Pass    |
| a    | 5825            | Ant1    | -37.63          | -27         | Pass    |
| n20  | 5745            | Ant1    | -37.38          | -27         | Pass    |
| n20  | 5785            | Ant1    | -37.03          | -27         | Pass    |
| n20  | 5825            | Ant1    | -37.06          | -27         | Pass    |
| n40  | 5755            | Ant1    | -37.54          | -27         | Pass    |
| n40  | 5795            | Ant1    | -37.39          | -27         | Pass    |

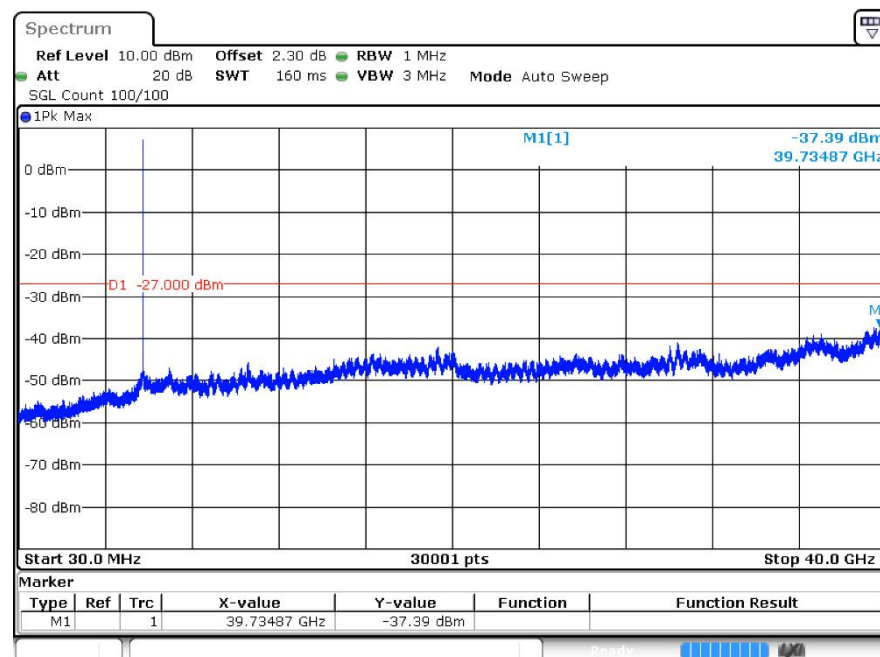
## 7.2 Test Graphs



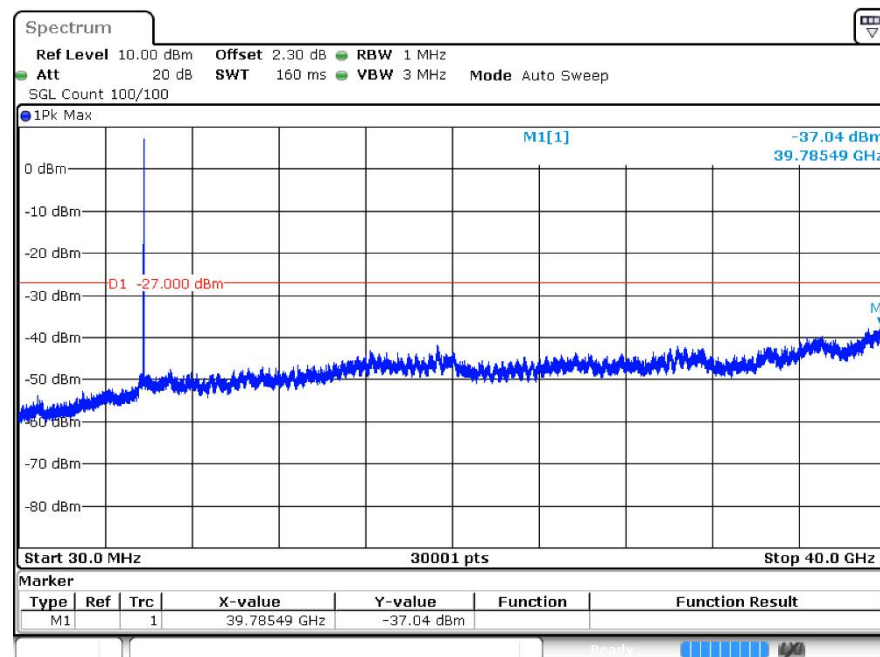
## Tx. Spurious a 5825MHz Ant1 Emission



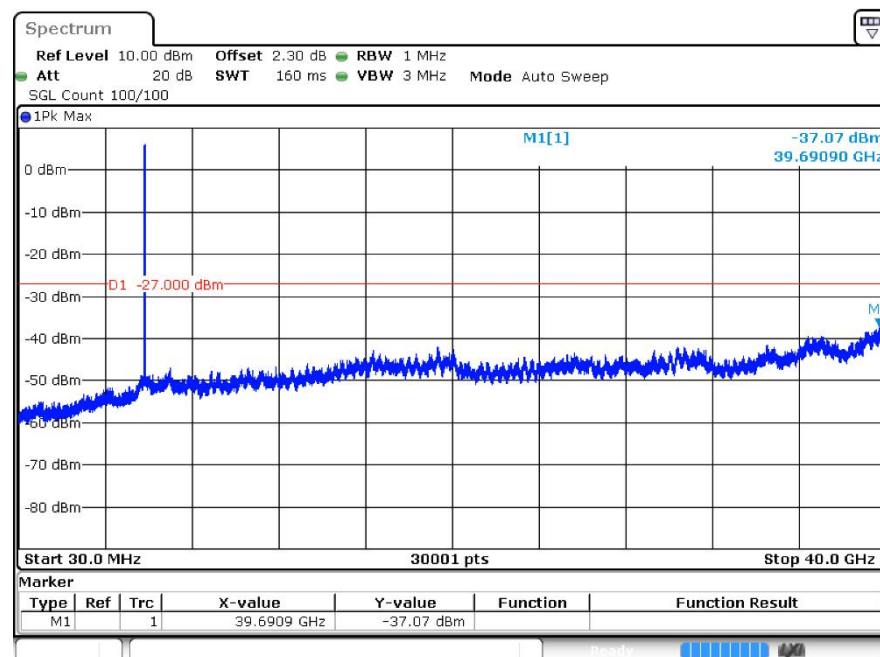
## Tx. Spurious n20 5745MHz Ant1 Emission



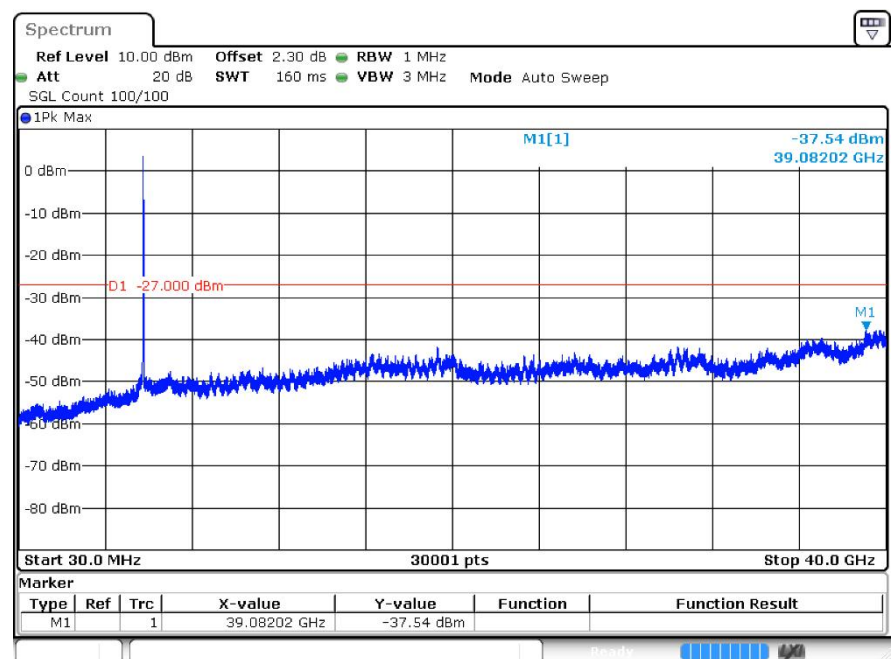
## Tx. Spurious n20 5785MHz Ant1 Emission



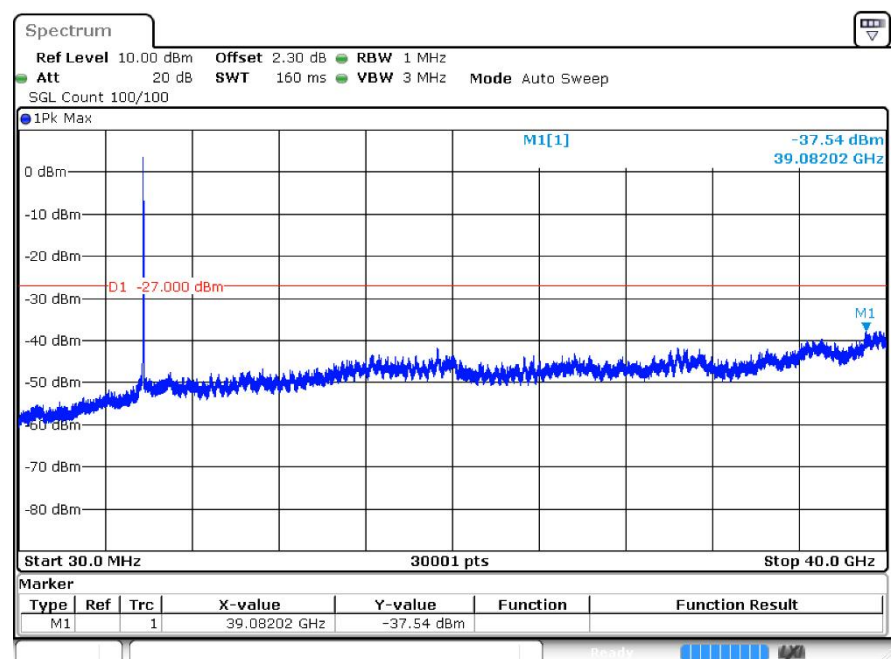
## Tx. Spurious n20 5825MHz Ant1 Emission



## Tx. Spurious n40 5755MHz Ant1 Emission



## Tx. Spurious n40 5795MHz Ant1 Emission



---The End---