



## Appendix A

### RF Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: MaxiVCI V150

Trade Mark: AUTEL

Test Model: MaxiVCI V150

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 25.2℃       |
| Relative Humidity: | 52.4%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Simba Huang |
| Supervised by:     | Seal Chen   |

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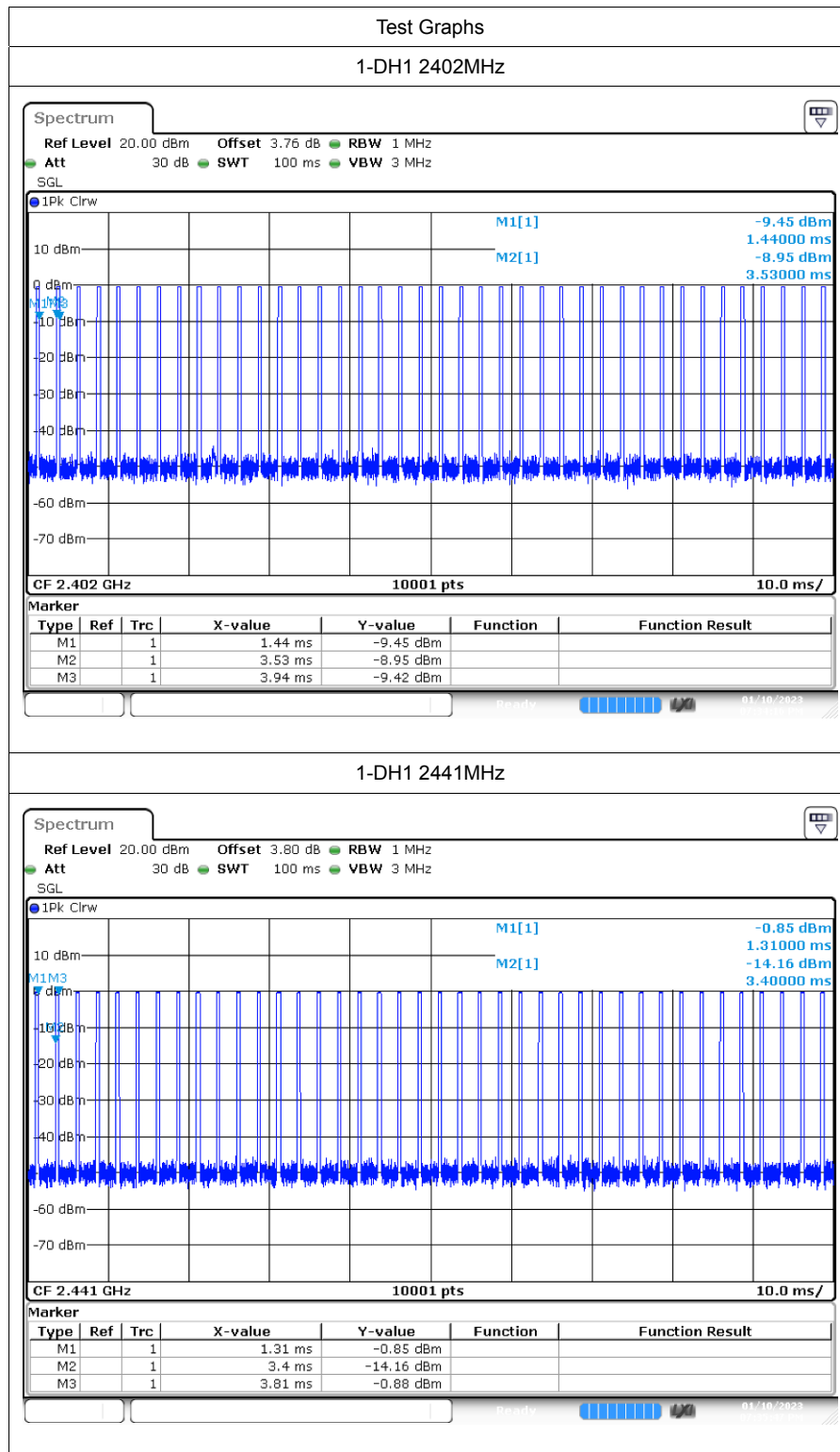
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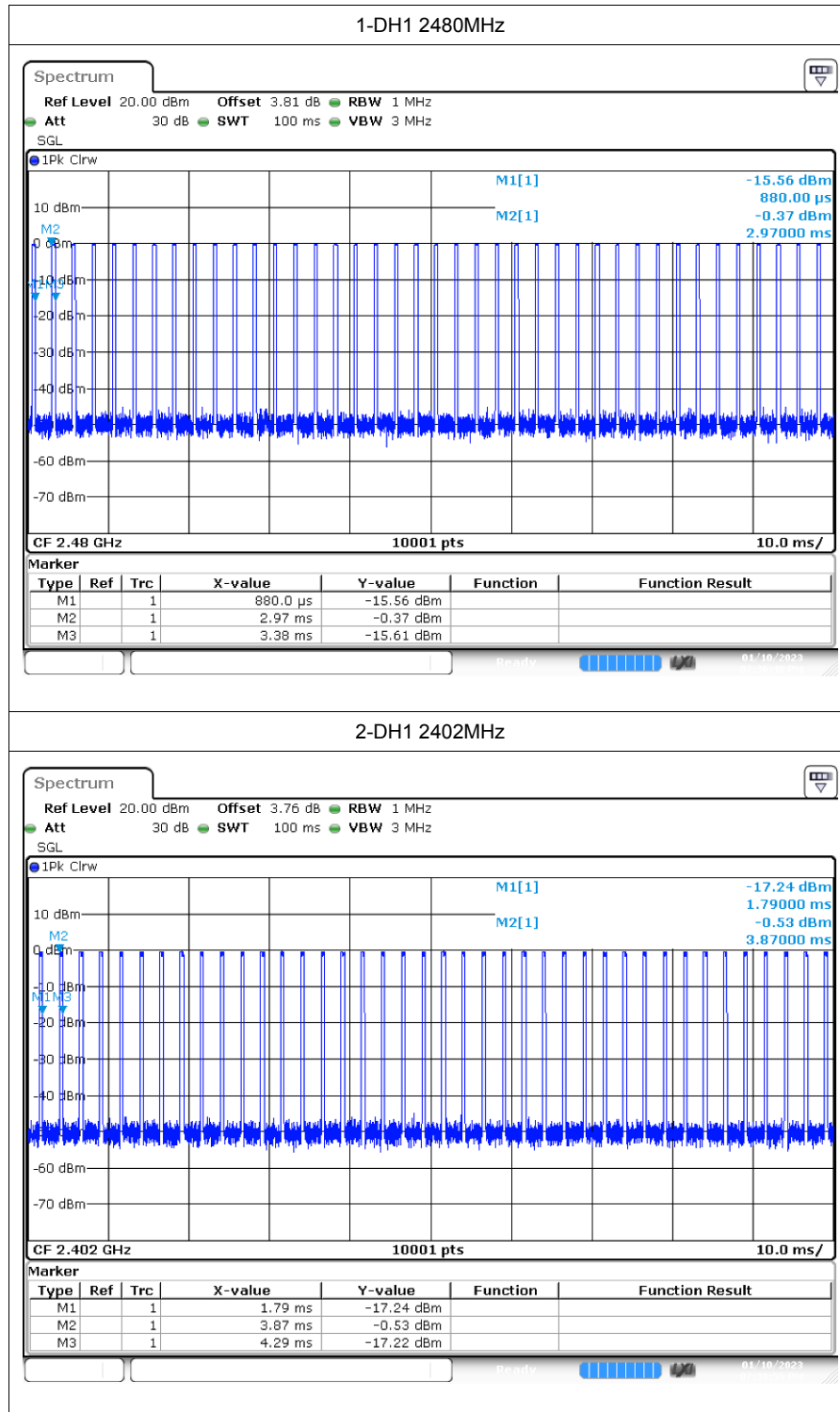
# 1 Duty Cycle

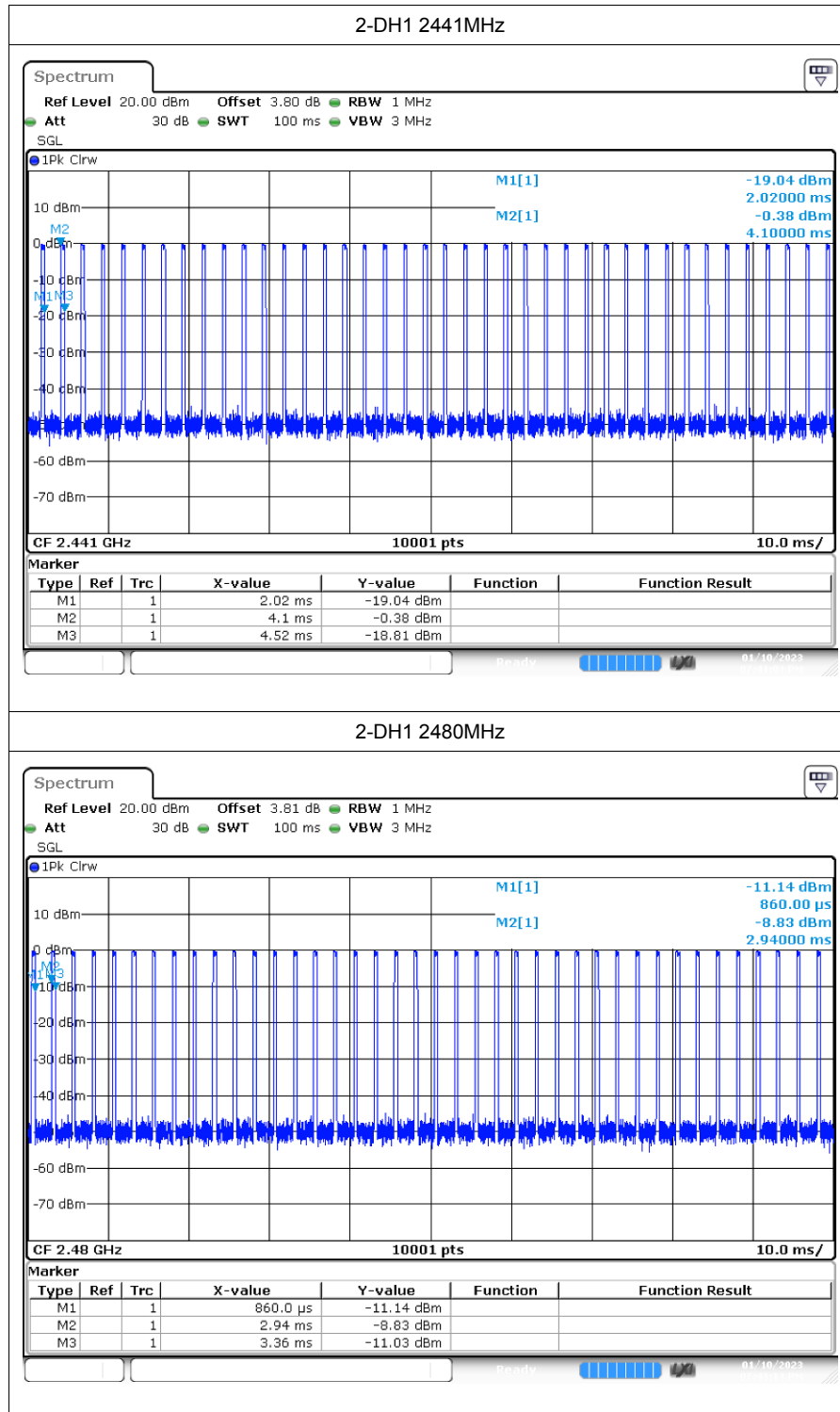
## 1.1 Test Result

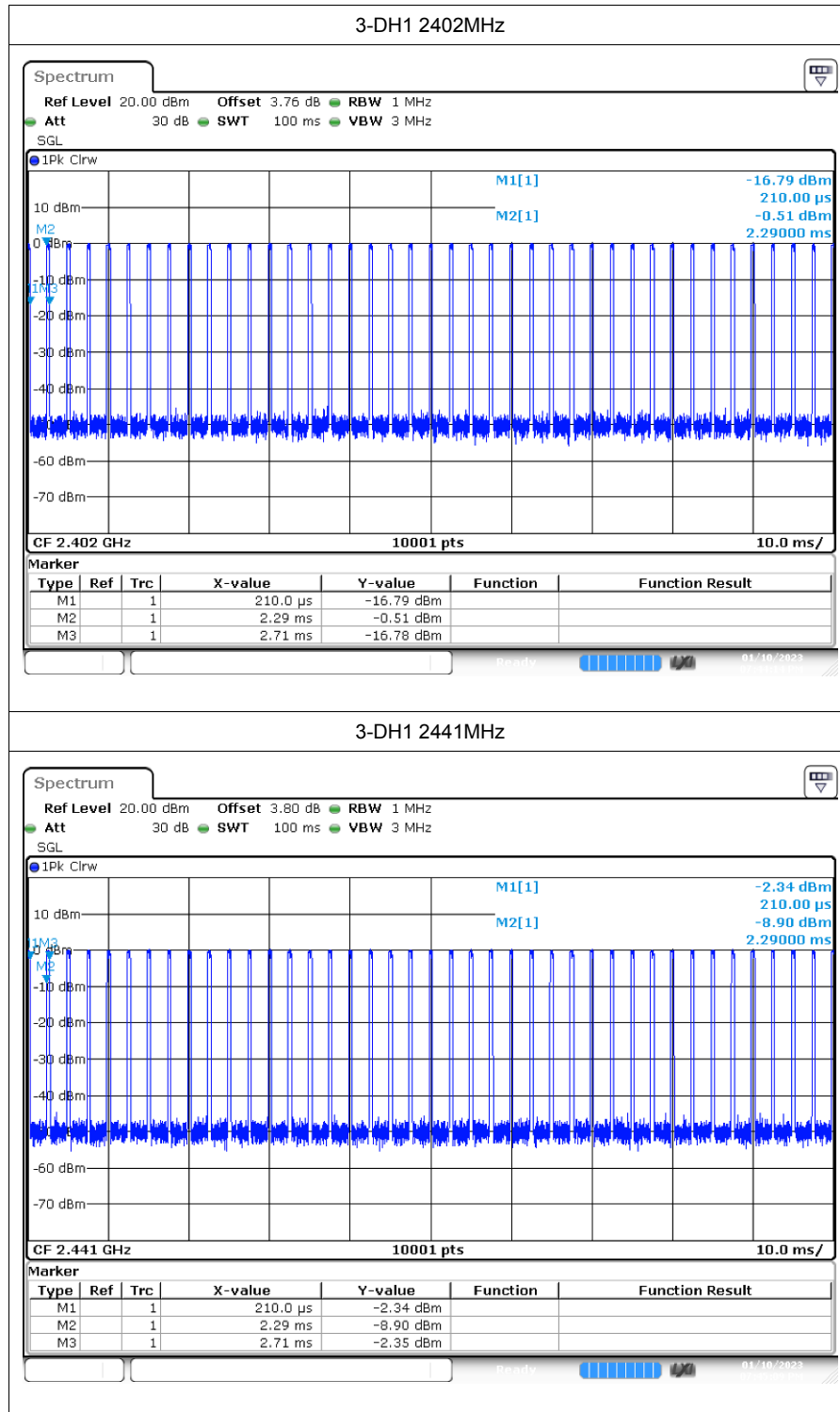
| Mode  | Frequency (MHz) | Duty Cycle (%) | 1/T (kHz) |
|-------|-----------------|----------------|-----------|
| 1-DH1 | 2402            | 16.8           | 2.44      |
| 1-DH1 | 2441            | 16.8           | 2.44      |
| 1-DH1 | 2480            | 16.8           | 2.44      |
| 2-DH1 | 2402            | 17.2           | 2.38      |
| 2-DH1 | 2441            | 17.2           | 2.38      |
| 2-DH1 | 2480            | 17.2           | 2.38      |
| 3-DH1 | 2402            | 17.21          | 2.38      |
| 3-DH1 | 2441            | 17.21          | 2.38      |
| 3-DH1 | 2480            | 17.2           | 2.38      |

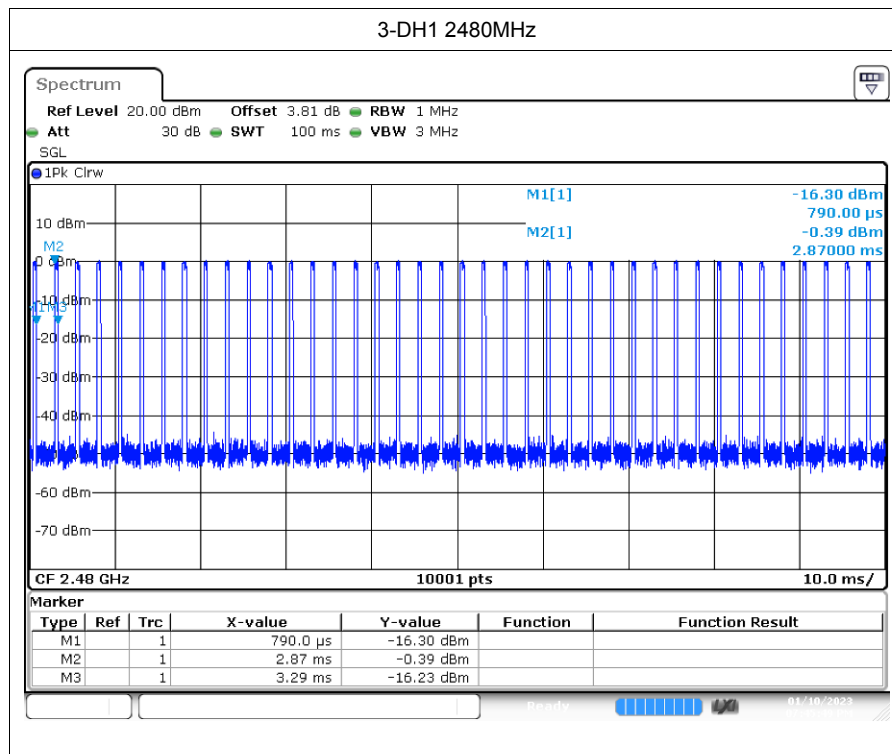
## 1.2 Test Graphs









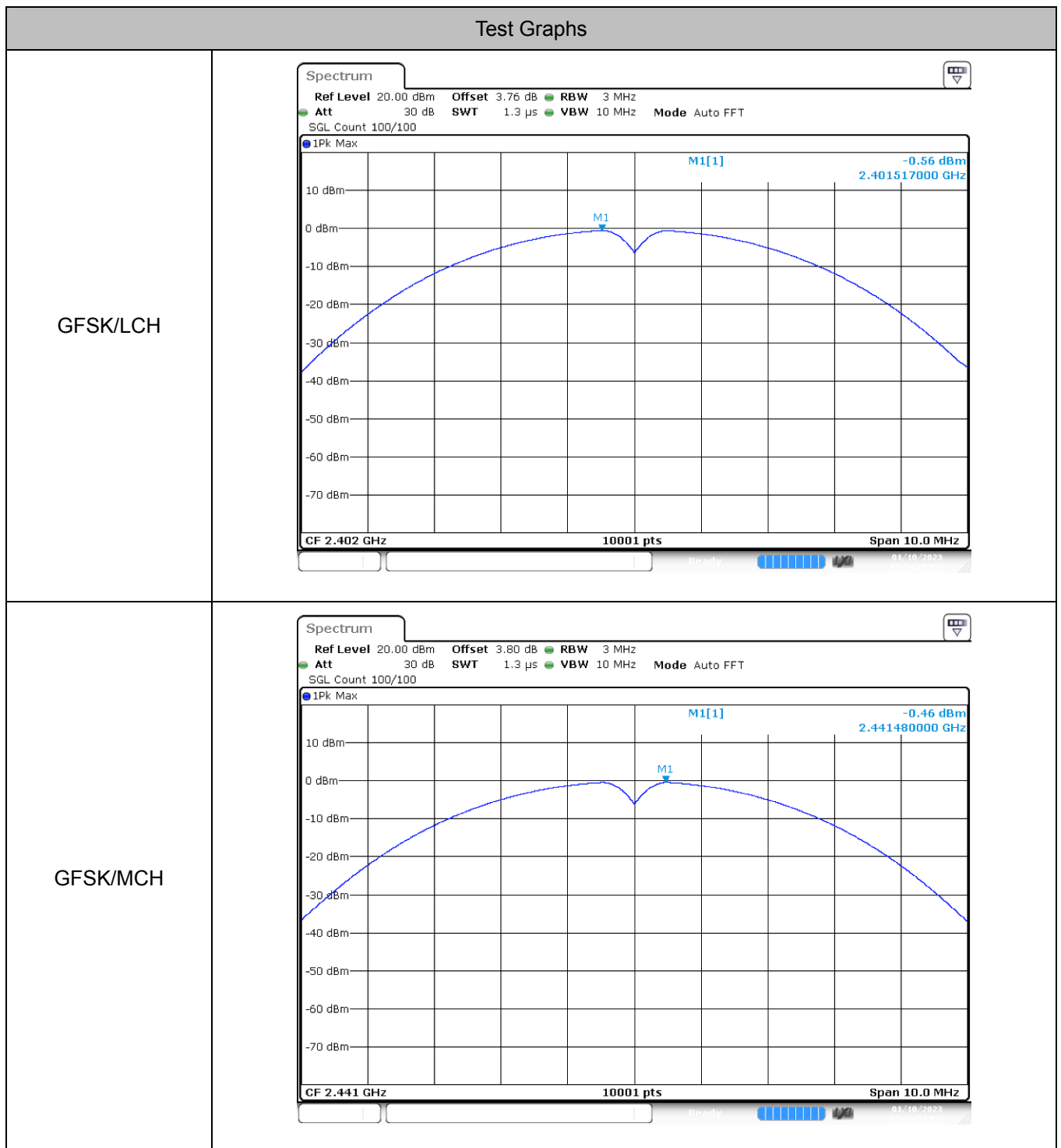


## 2 Maximum Conducted Peak Output Power

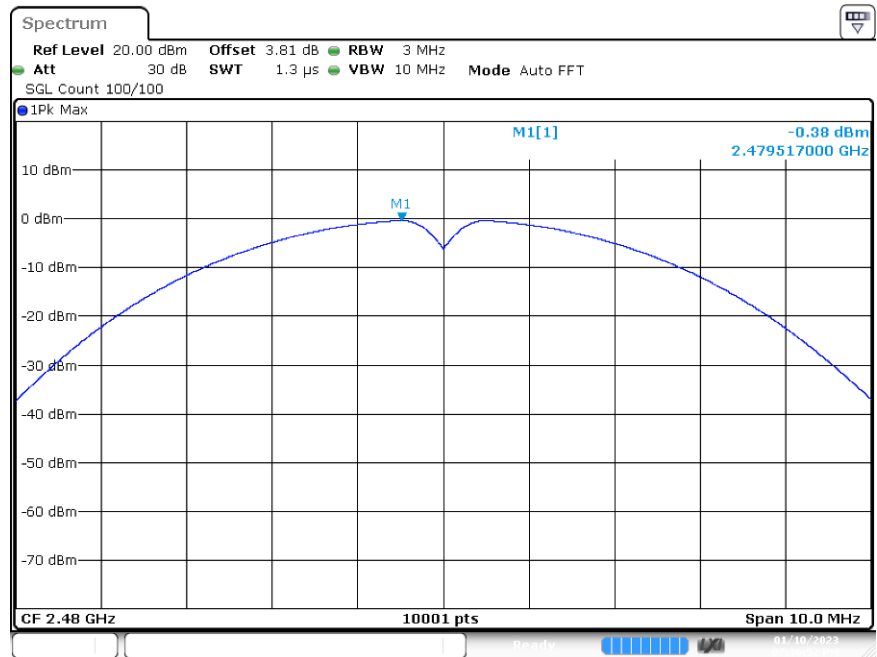
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power<br>[dBm] | Limit<br>[dBm] | Verdict |
|---------------|----------|------------------------------------|----------------|---------|
| GFSK          | LCH      | -0.56                              | 21             | Pass    |
|               | MCH      | -0.46                              | 21             | Pass    |
|               | HCH      | -0.38                              | 21             | Pass    |
| $\pi/4$ DQPSK | LCH      | -0.57                              | 21             | Pass    |
|               | MCH      | -0.53                              | 21             | Pass    |
|               | HCH      | -0.51                              | 21             | Pass    |
| 8DPSK         | LCH      | -0.38                              | 21             | Pass    |
|               | MCH      | -0.11                              | 21             | Pass    |
|               | HCH      | -0.45                              | 21             | Pass    |

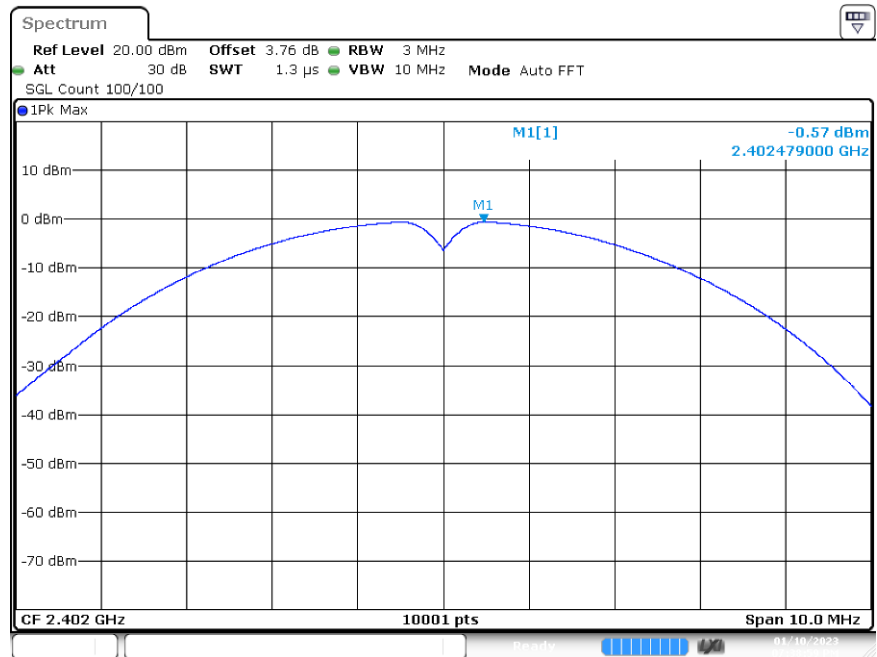
## 2.2 Test Graphs



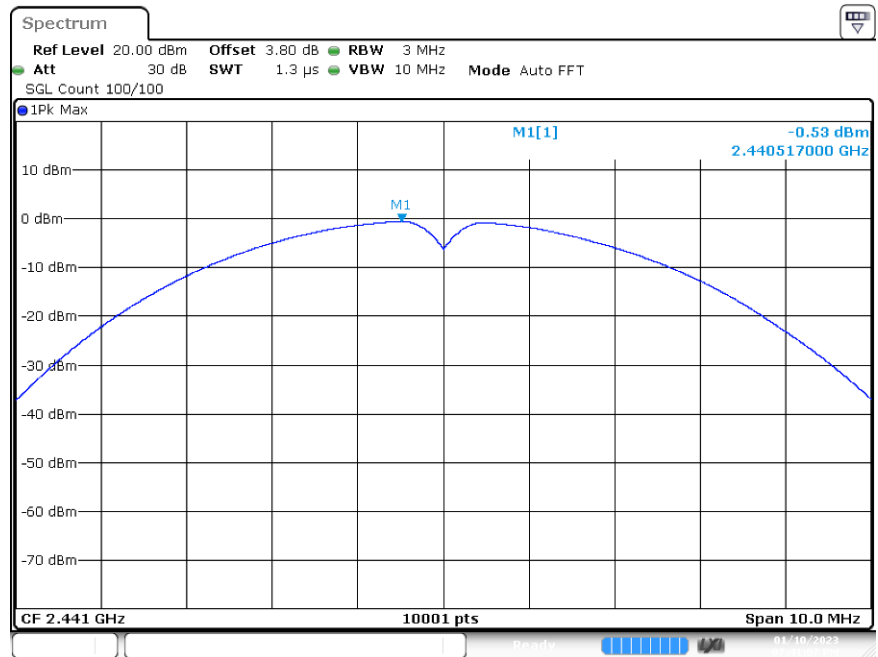
GFSK/HCH



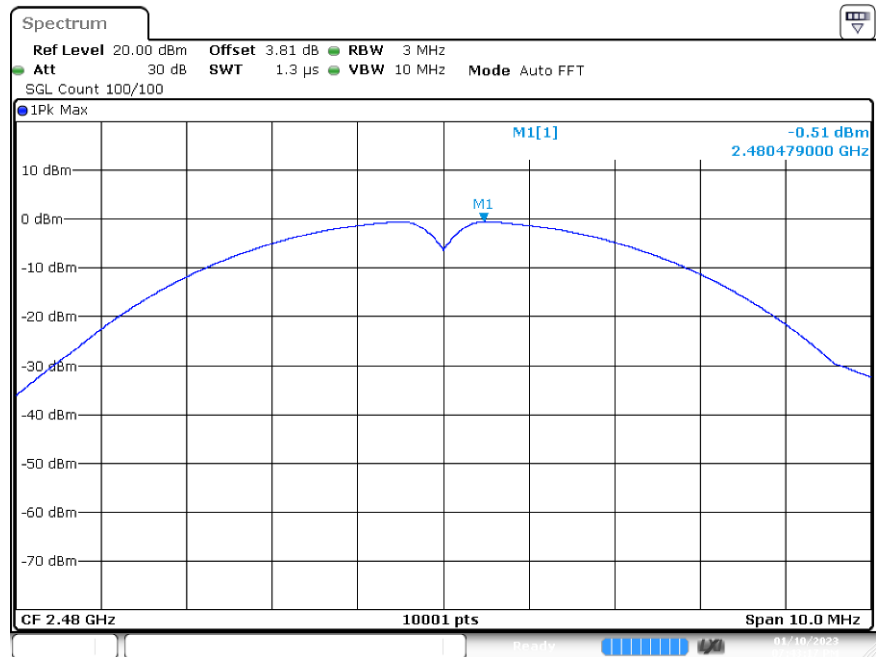
$\pi$ /4DQPSK/LCH



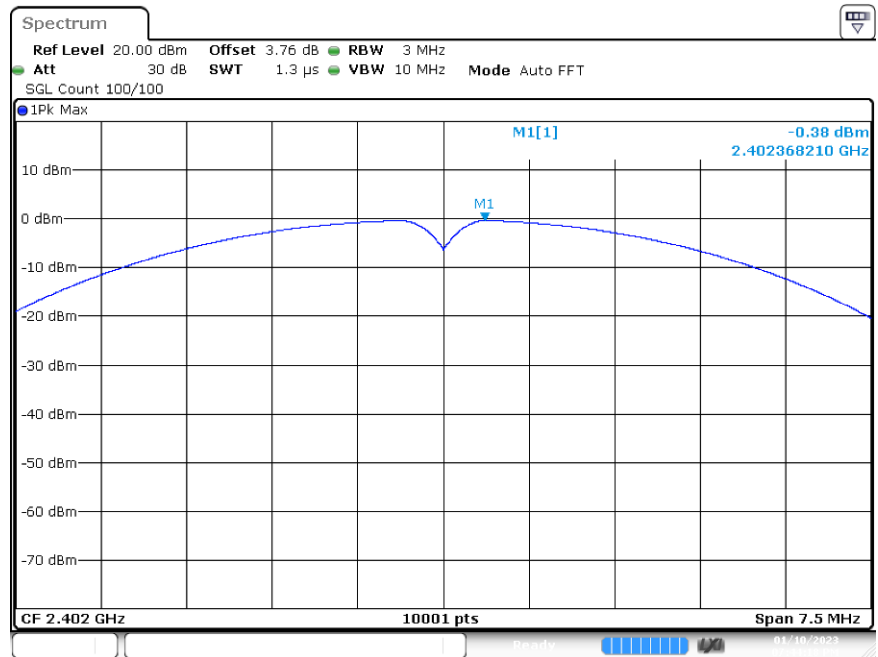
$\pi/4$ DQPSK/MCH



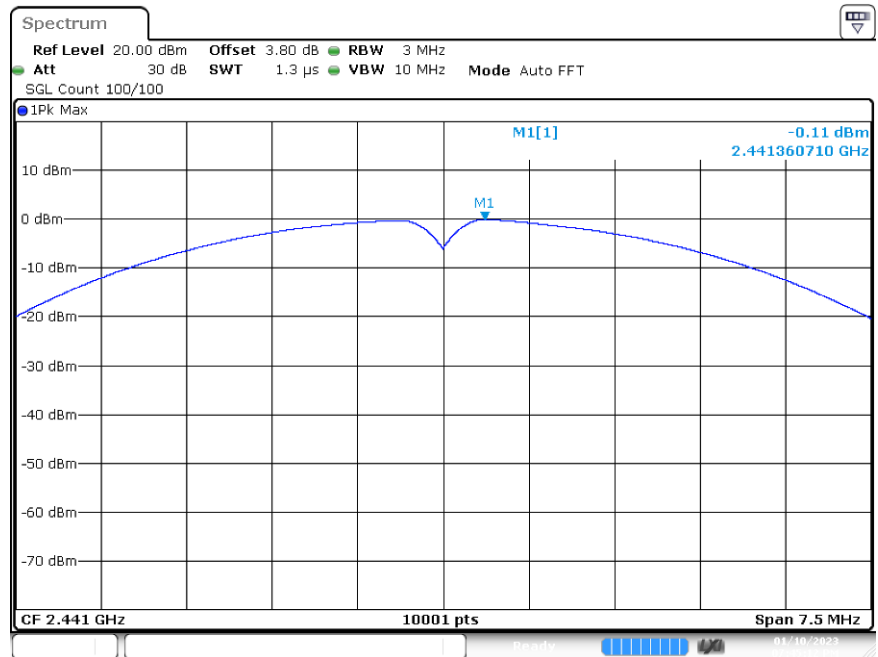
$\pi/4$ DQPSK/HCH



8DPSK/LCH

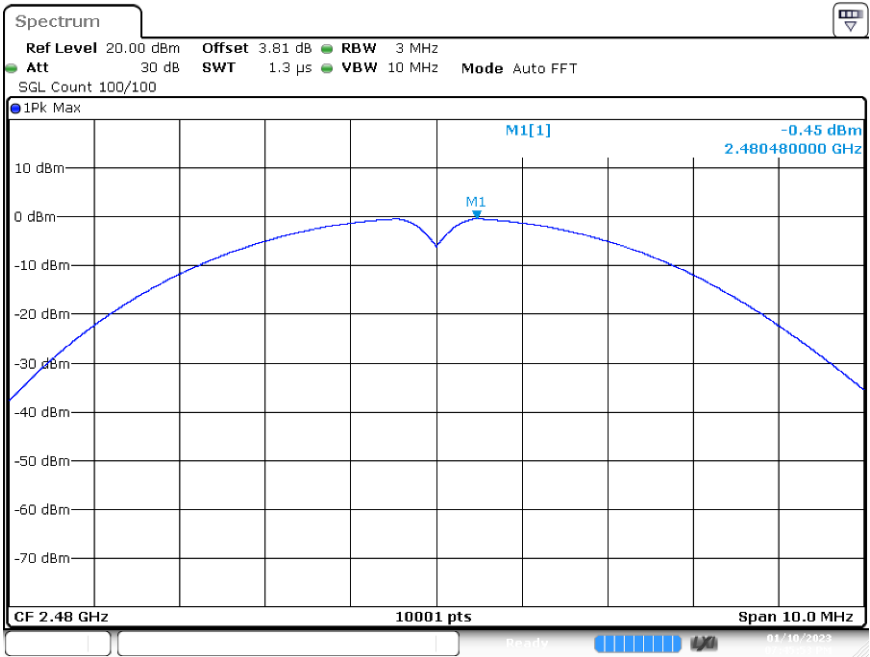


8DPSK/MCH





8DPSK/HCH

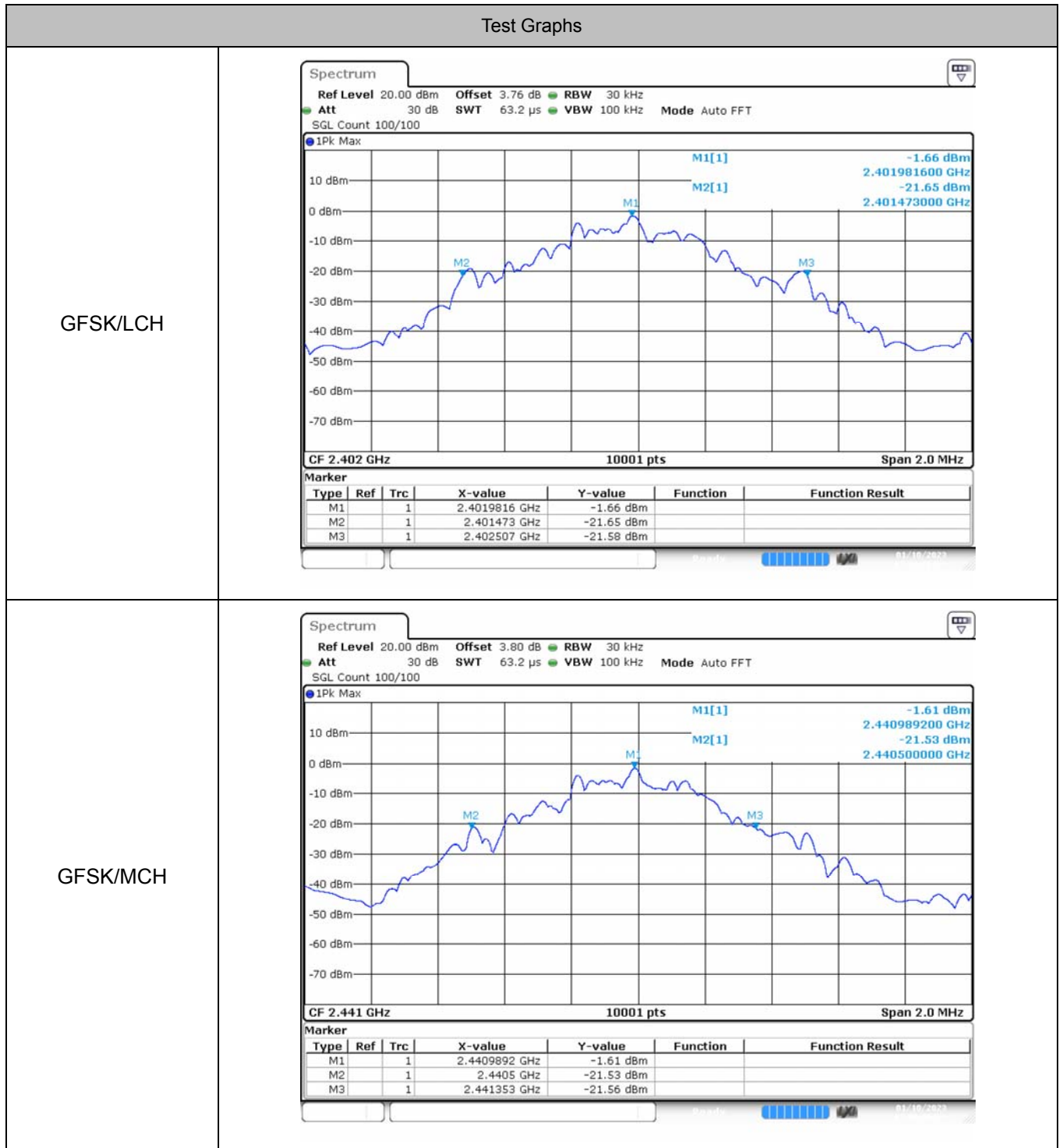


### 3 20dB Bandwidth

#### 3.1 Test Result

| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 1.034                | Not Specified | Pass    |
|               | MCH      | 0.854                | Not Specified | Pass    |
|               | HCH      | 1.039                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.107                | Not Specified | Pass    |
|               | MCH      | 1.121                | Not Specified | Pass    |
|               | HCH      | 1.189                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.173                | Not Specified | Pass    |
|               | MCH      | 1.197                | Not Specified | Pass    |
|               | HCH      | 1.184                | Not Specified | Pass    |

### 3.2 Test Graphs



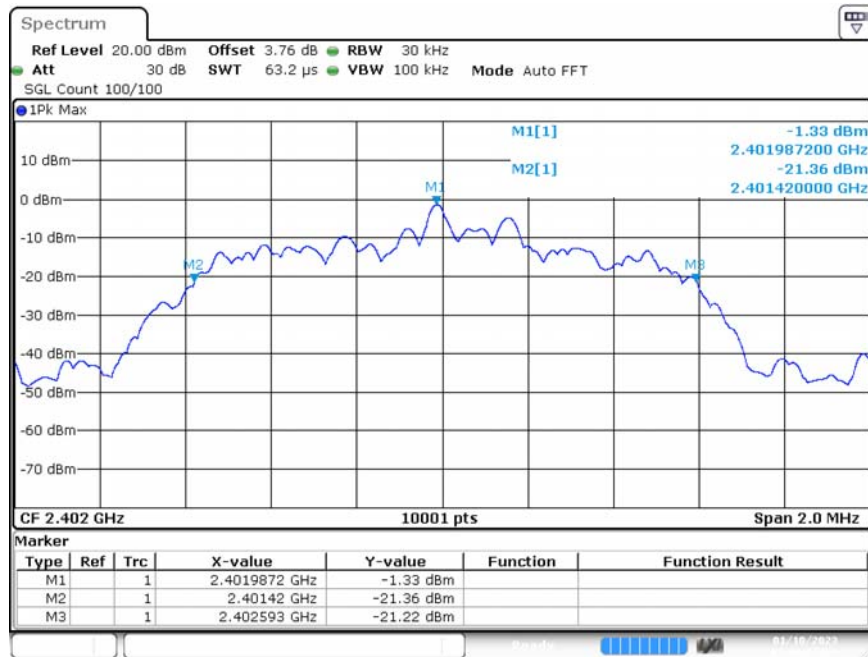
GFSK/HCH


 $\pi/4$ DQPSK/LCH

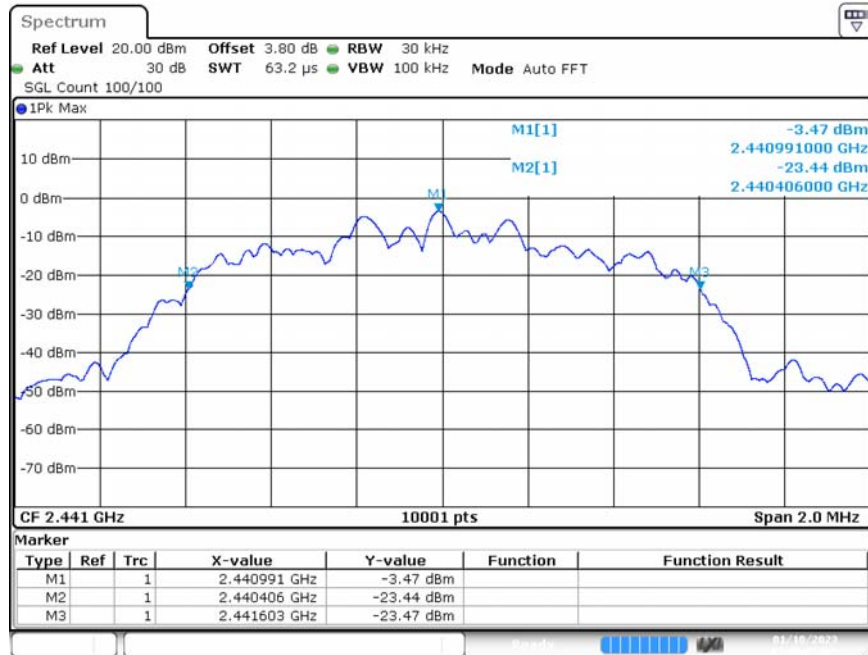

$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


8DPSK/LCH

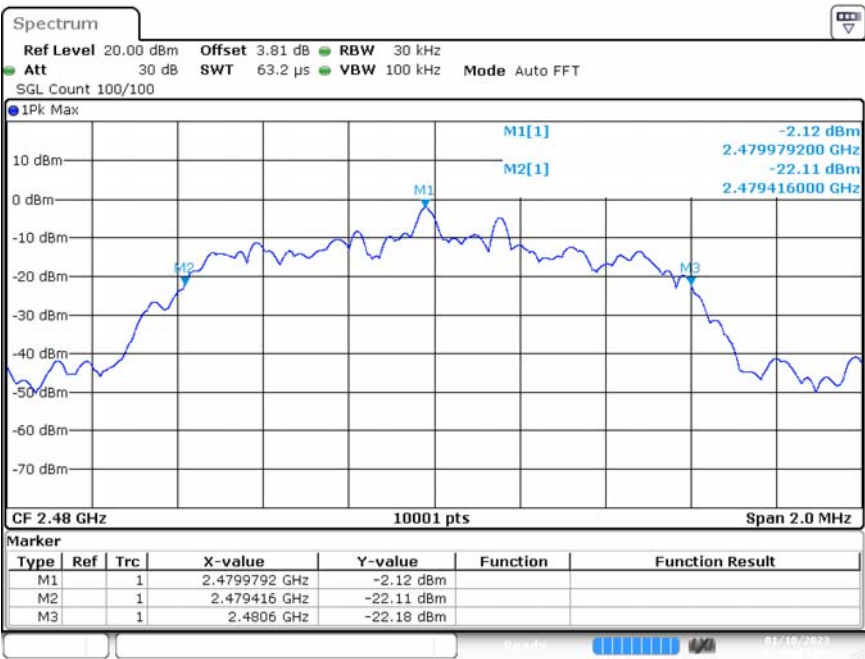


8DPSK/MCH





8DPSK/HCH

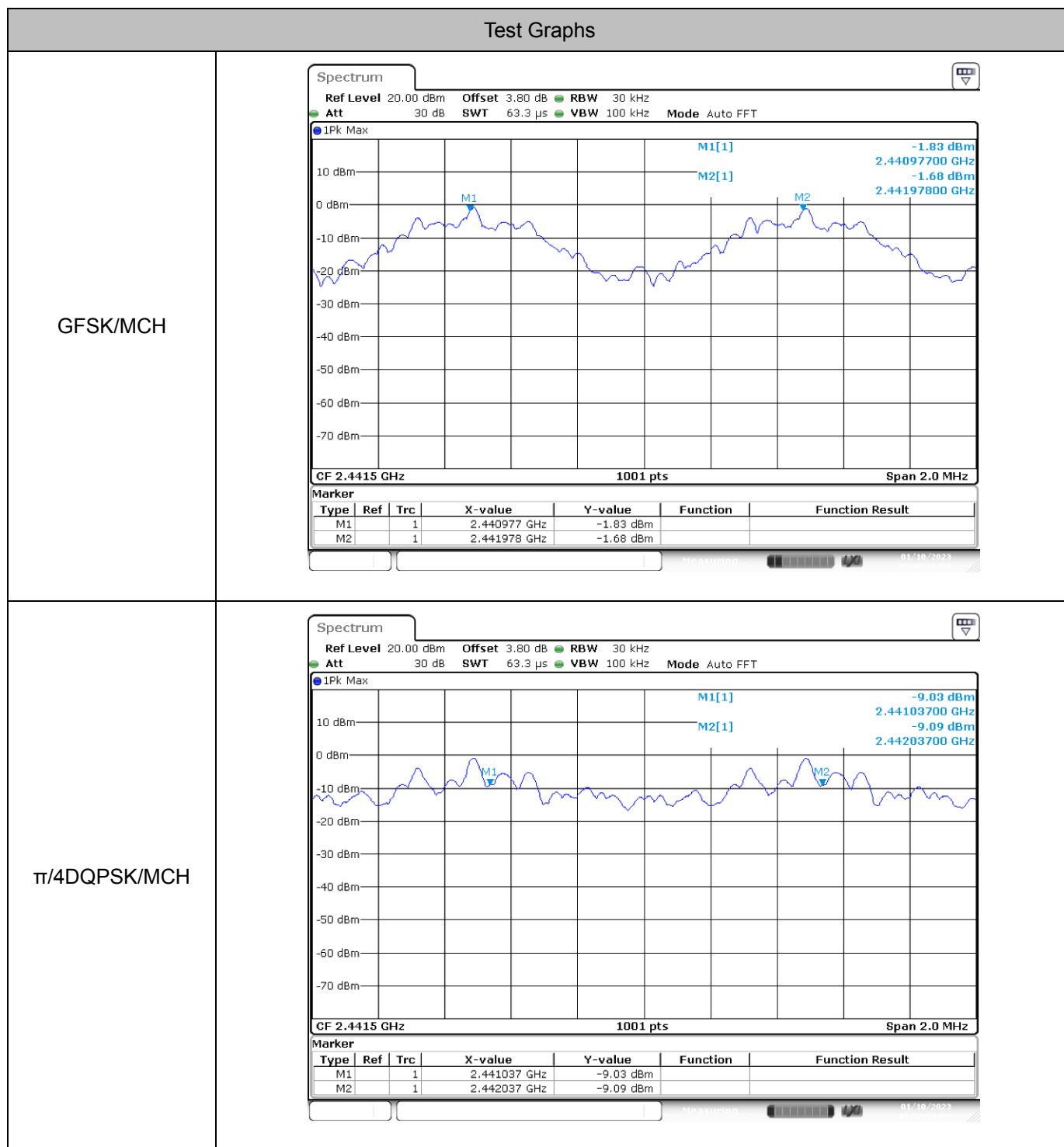


## 4 Carrier Frequency Separation

### 4.1 Test Result

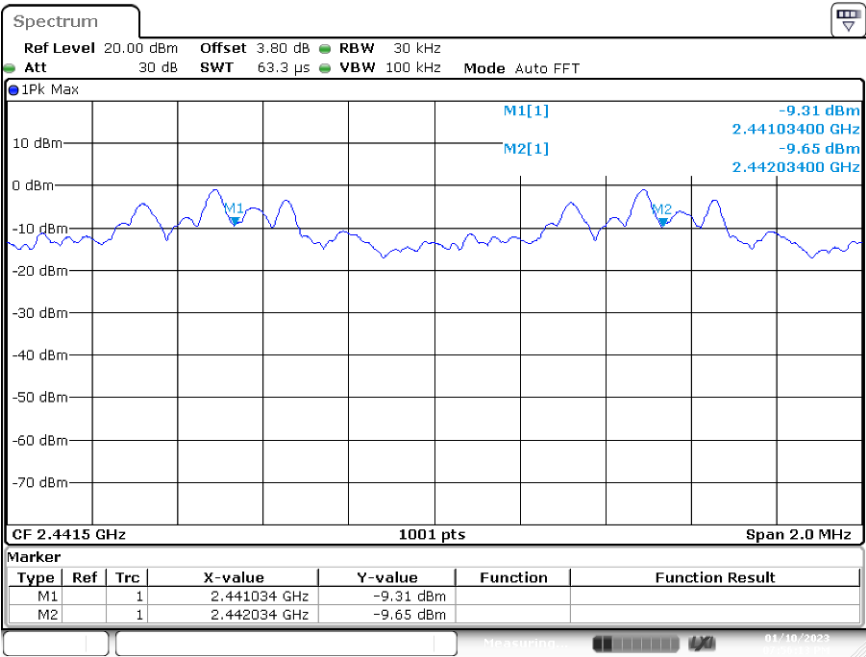
| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 1.001                              | 0.569       | Pass    |
| $\pi/4$ DQPSK | MCH      | 1                                  | 0.747       | Pass    |
| 8DPSK         | MCH      | 1                                  | 0.798       | Pass    |

## 4.2 Test Graphs





8DPSK/MCH

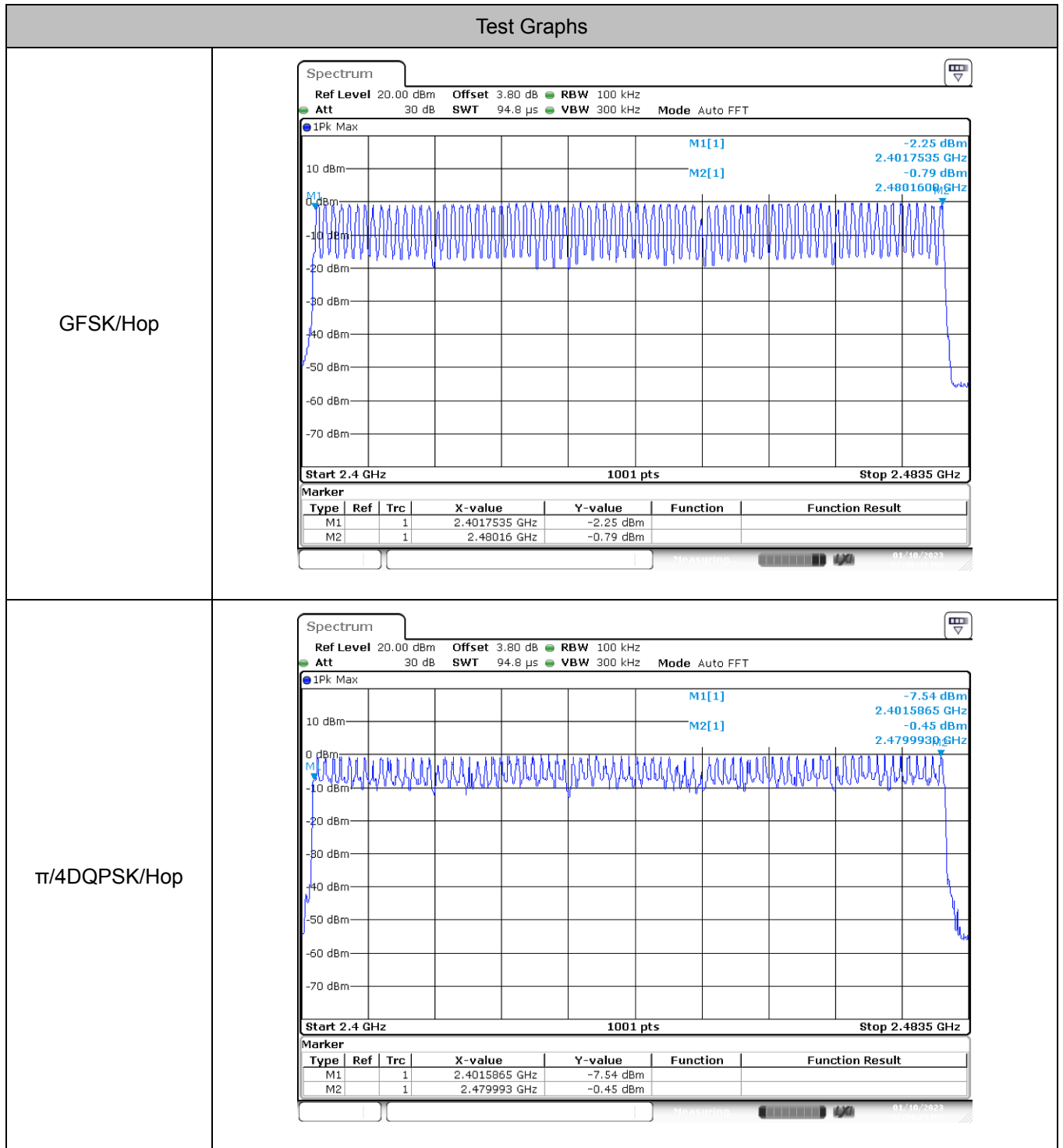


## 5 Hopping Channel Number

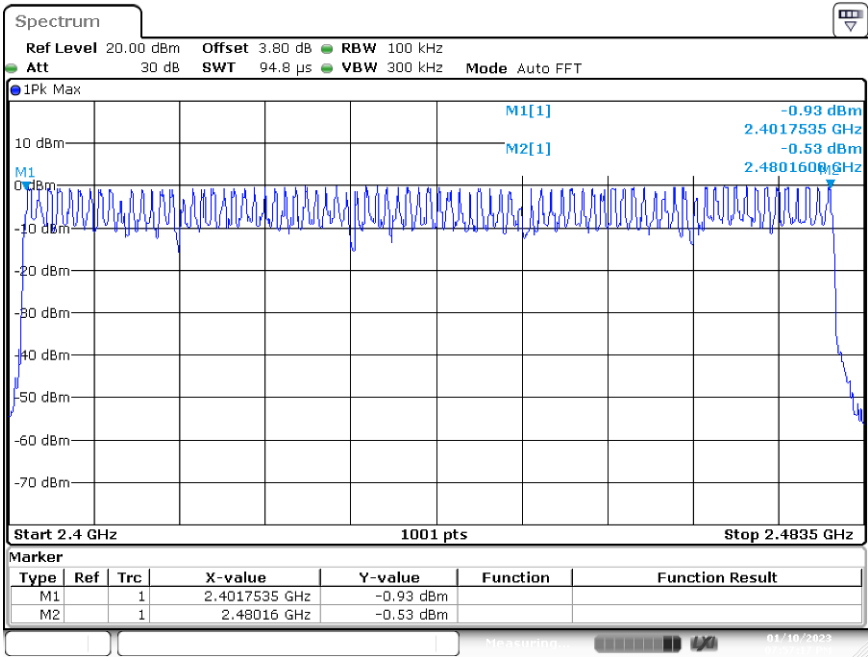
### 5.1 Test Result

| Mode          | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK          | Hop      | 79                            | $\geq 15$ | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                            | $\geq 15$ | PASS    |
| 8DPSK         | Hop      | 79                            | $\geq 15$ | PASS    |

## 5.2 Test Graphs



8DPSK/Hop

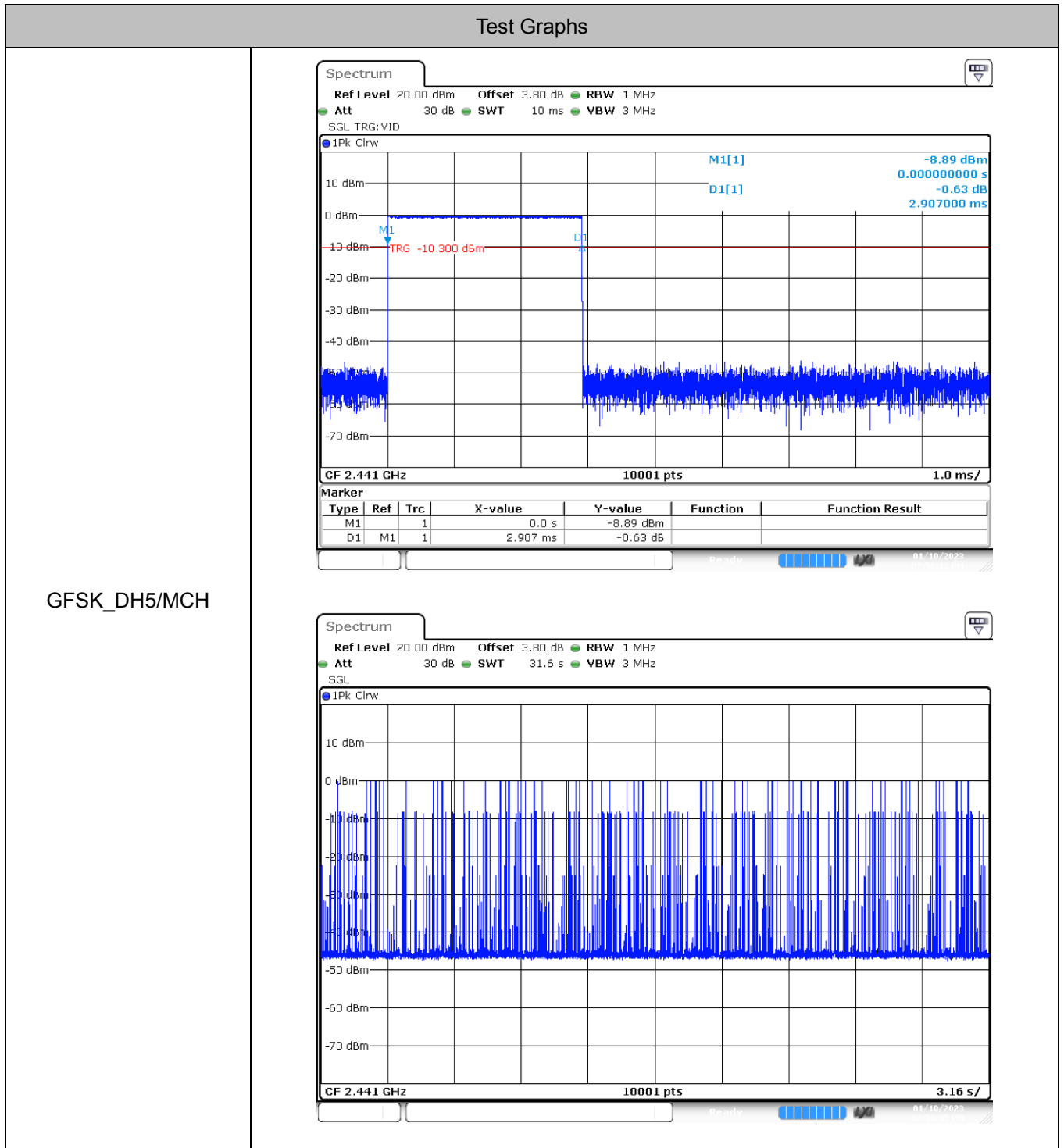


## 6 Dwell Time

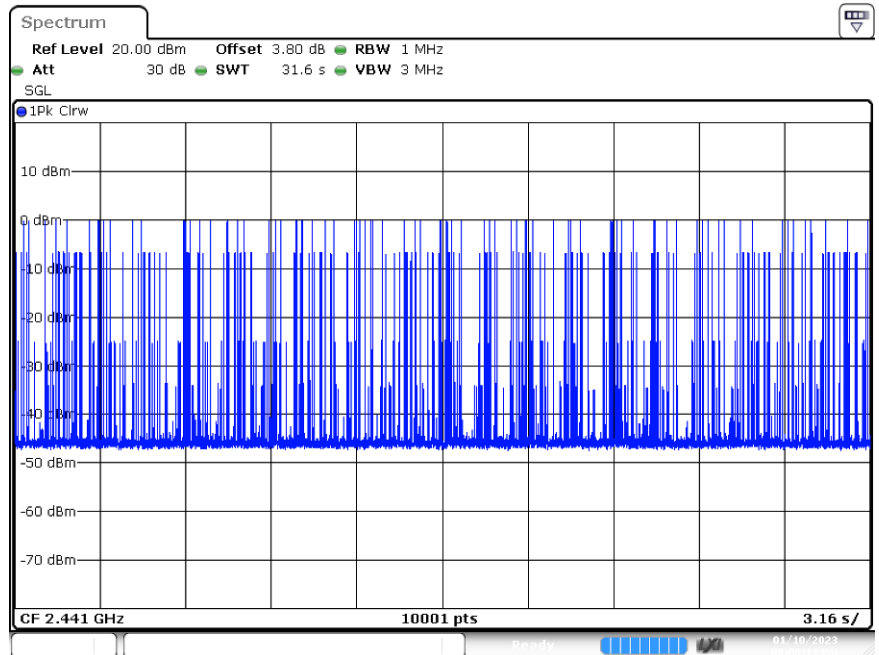
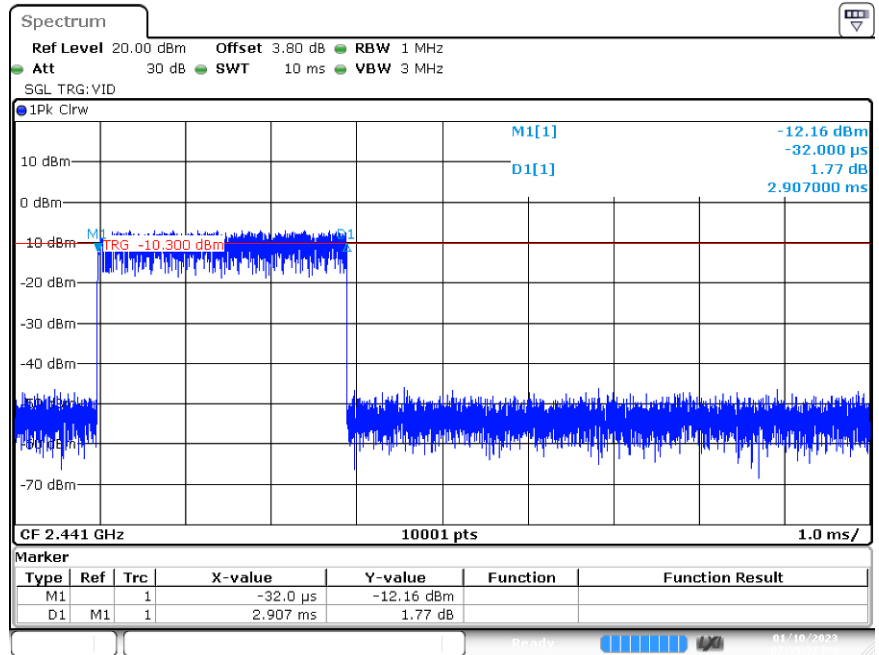
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.907                      | 80                    | 232.56         | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.907                      | 81                    | 235.467        | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.91                       | 80                    | 232.8          | 0.4       | Pass    |

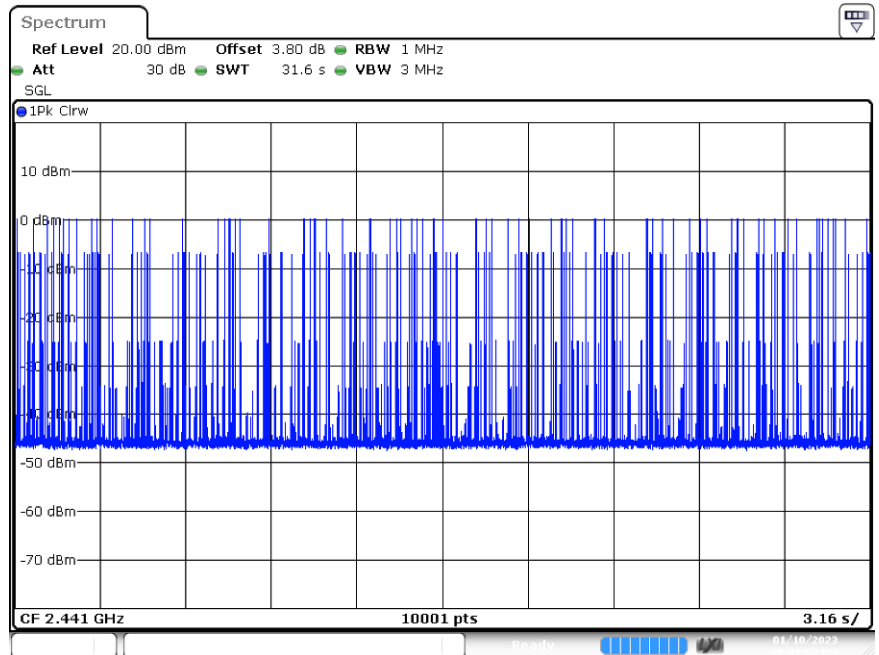
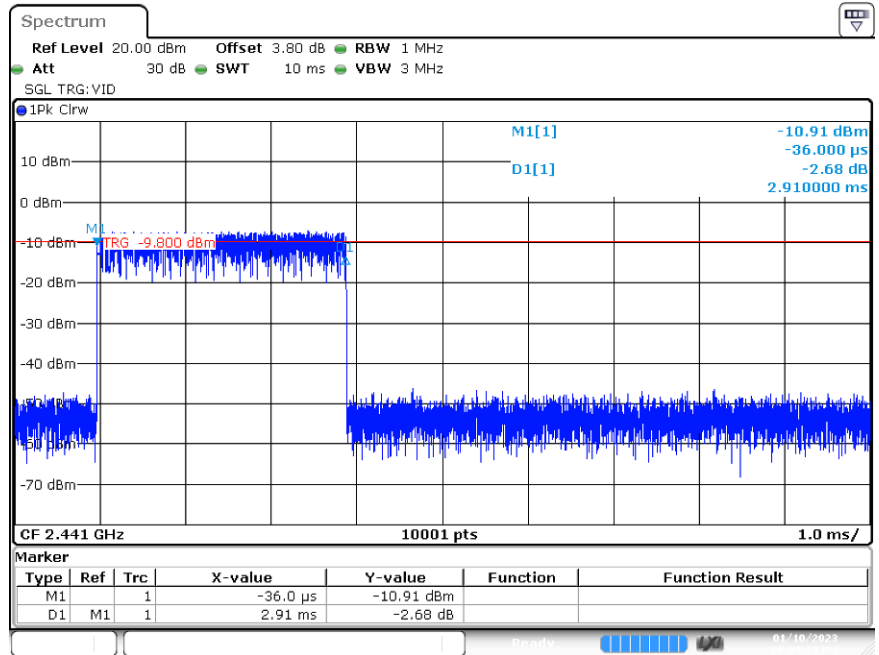
## 6.2 Test Graphs



$\pi/4$ DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH

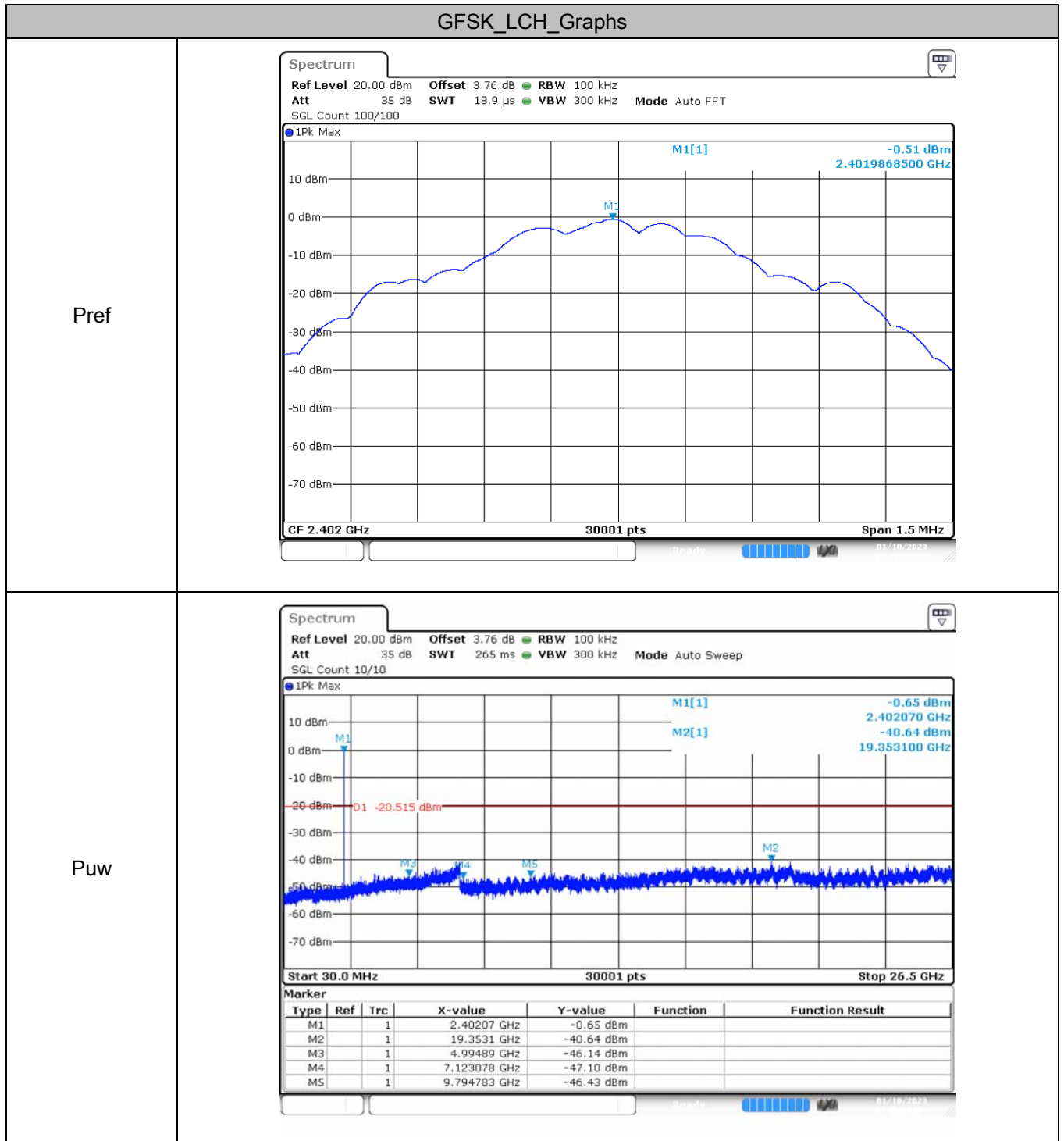


## 7 RF Conducted Spurious Emissions

### 7.1 Test Result

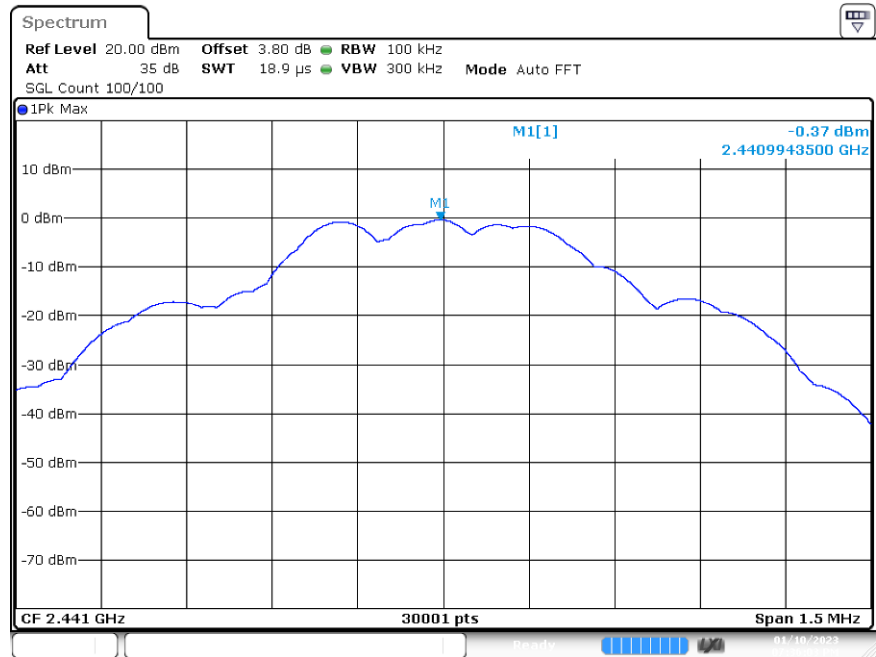
| Mode          | Channel | Max. Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|------------------|-------------|---------|
| GFSK          | LCH     | -40.12           | -20         | Pass    |
|               | MCH     | -40.65           | -20         | Pass    |
|               | HCH     | -39.97           | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -39.98           | -20         | Pass    |
|               | MCH     | -40.28           | -20         | Pass    |
|               | HCH     | -40.5            | -20         | Pass    |
| 8DPSK         | LCH     | -39.96           | -20         | Pass    |
|               | MCH     | -39.98           | -20         | Pass    |
|               | HCH     | -40.74           | -20         | Pass    |

## 7.2 Test Graphs

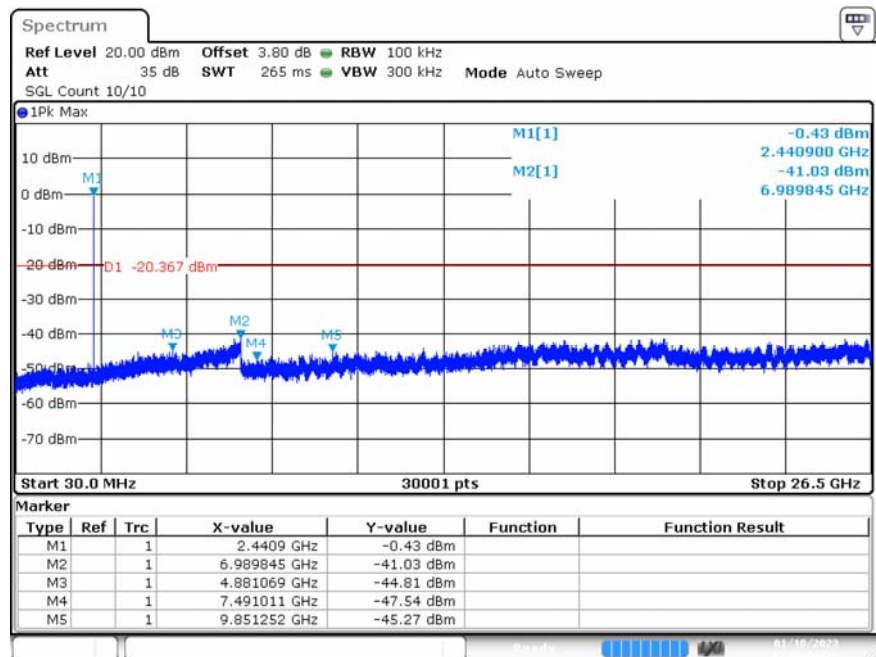


### GFSK\_MCH\_Graphs

Pref

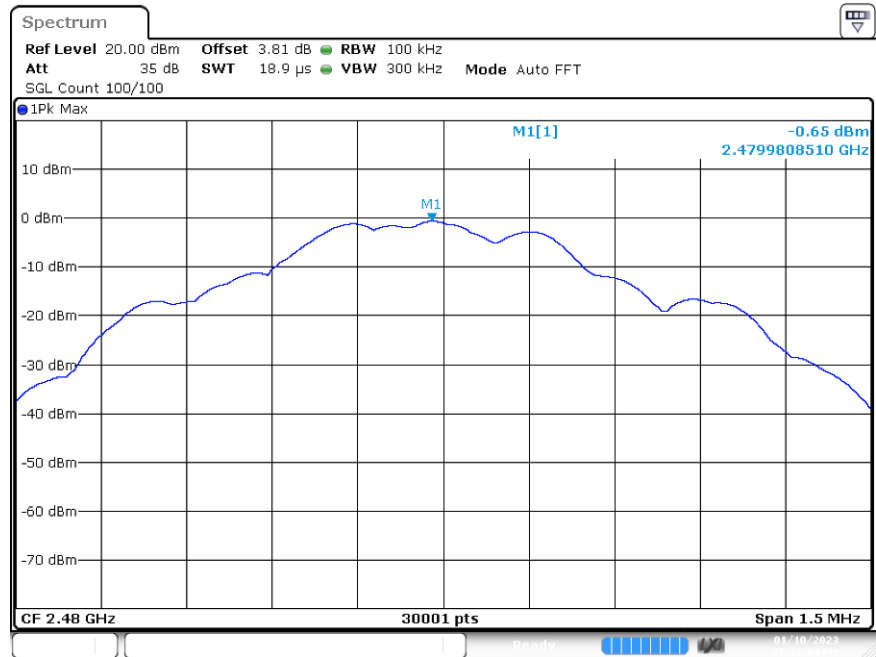


Puw

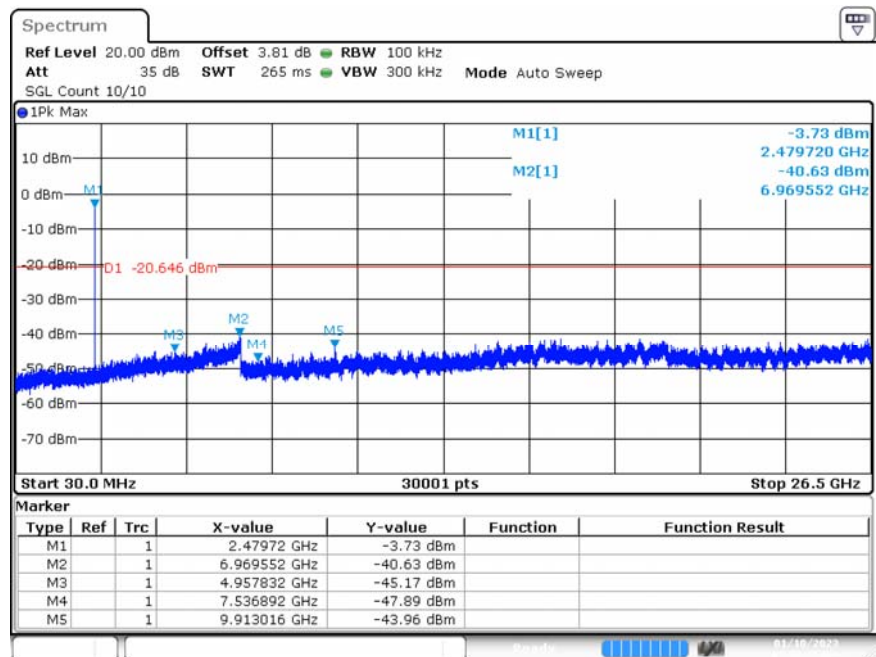


## GFSK\_HCH\_Graphs

Pref

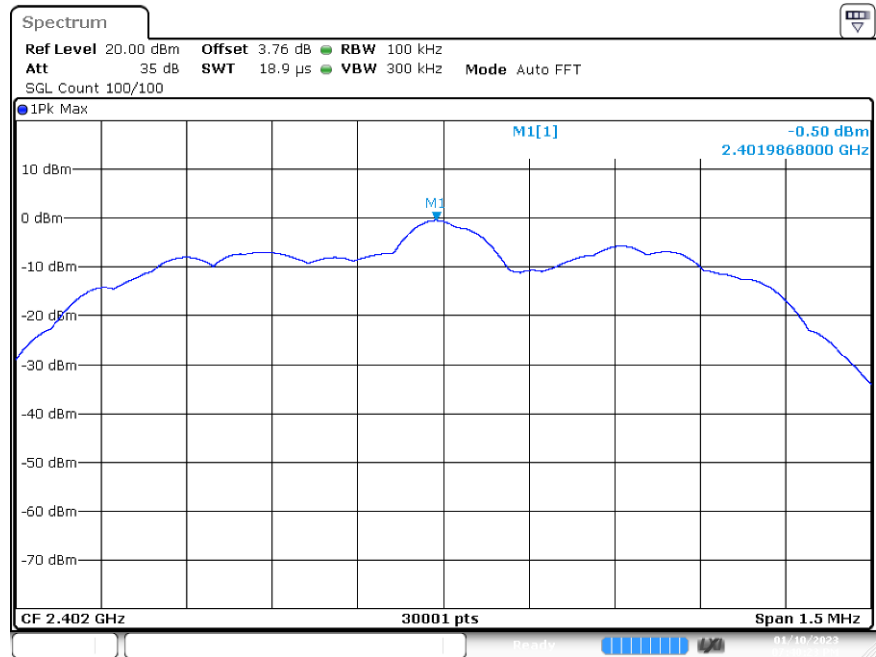


Puw

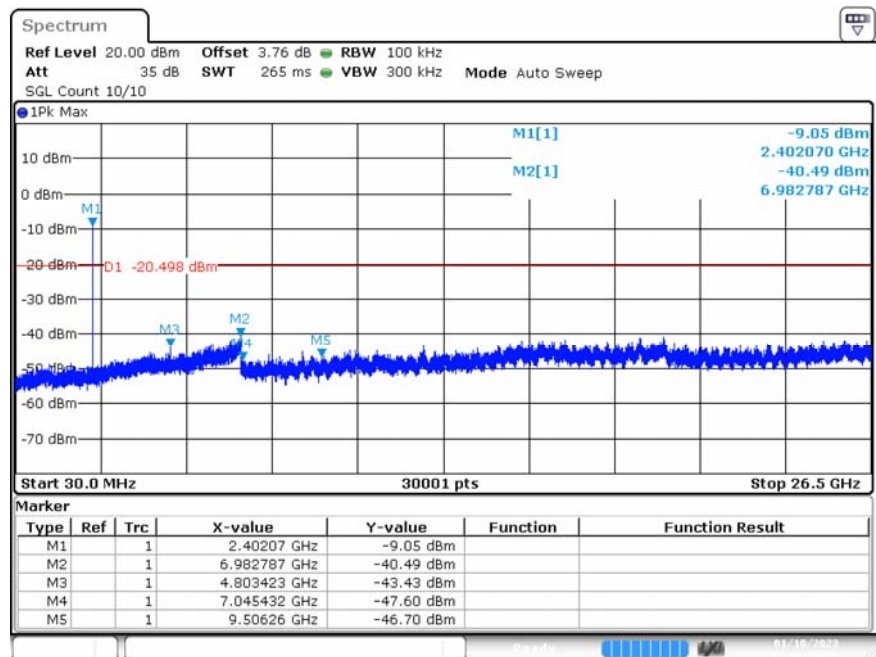


# $\pi/4$ DQPSK\_LCH\_Graphs

Pref

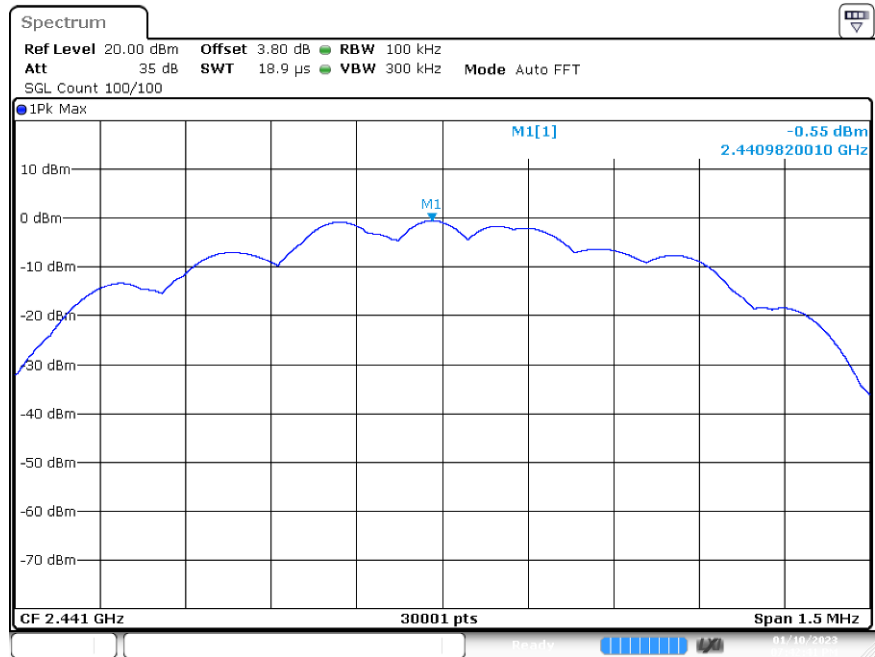


Puw

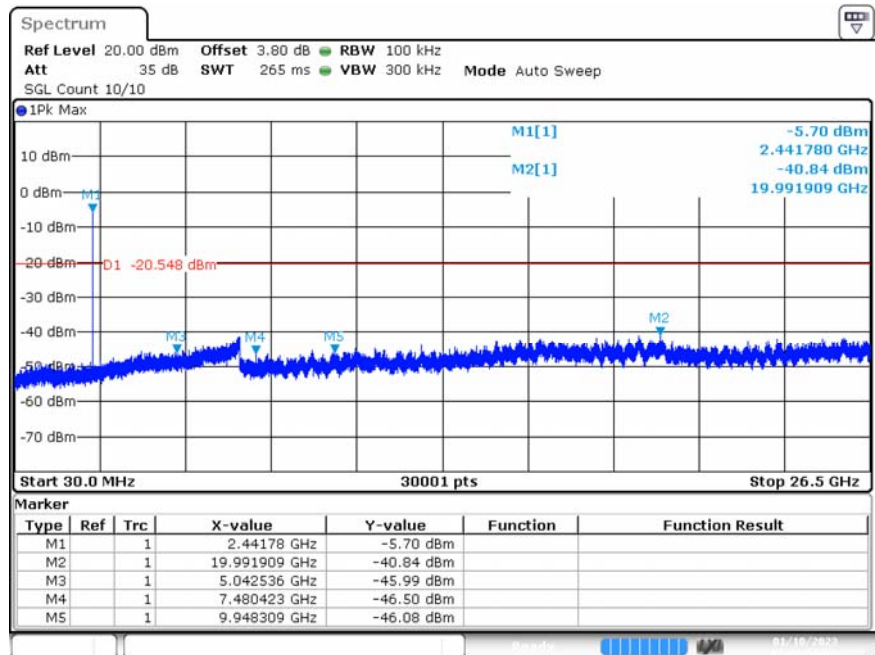


### $\pi/4$ DQPSK\_MCH\_Graphs

Pref

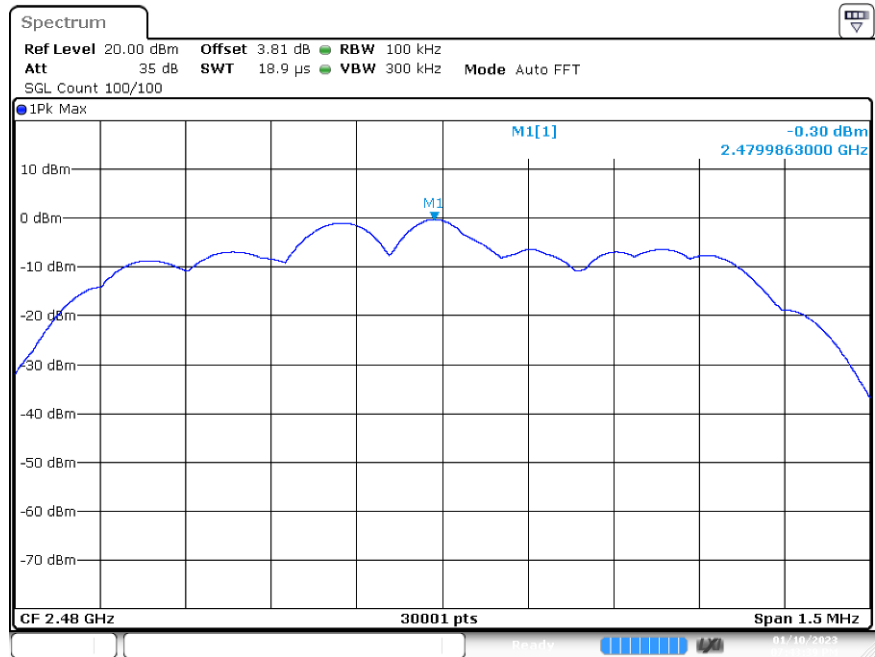


Puw

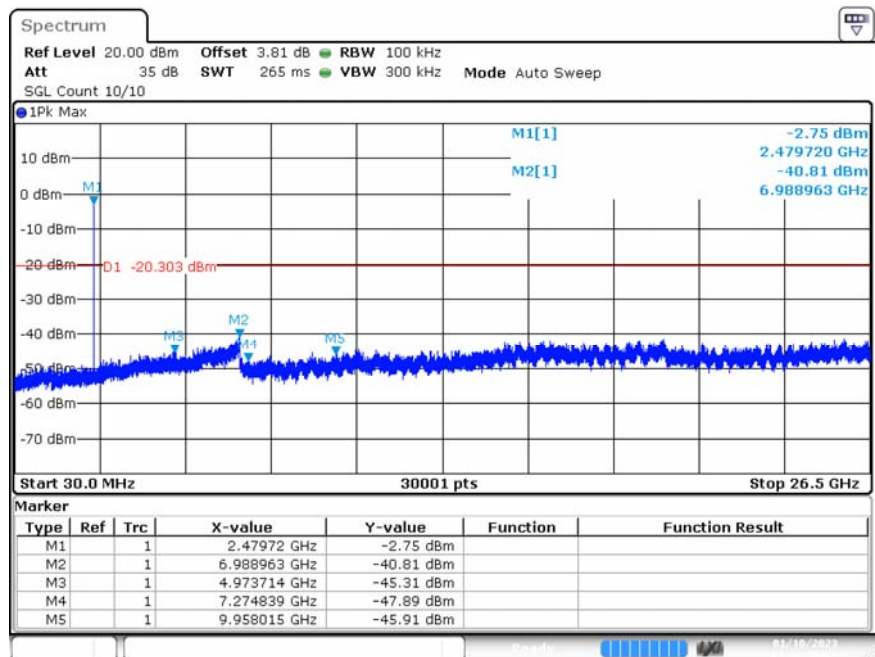


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref

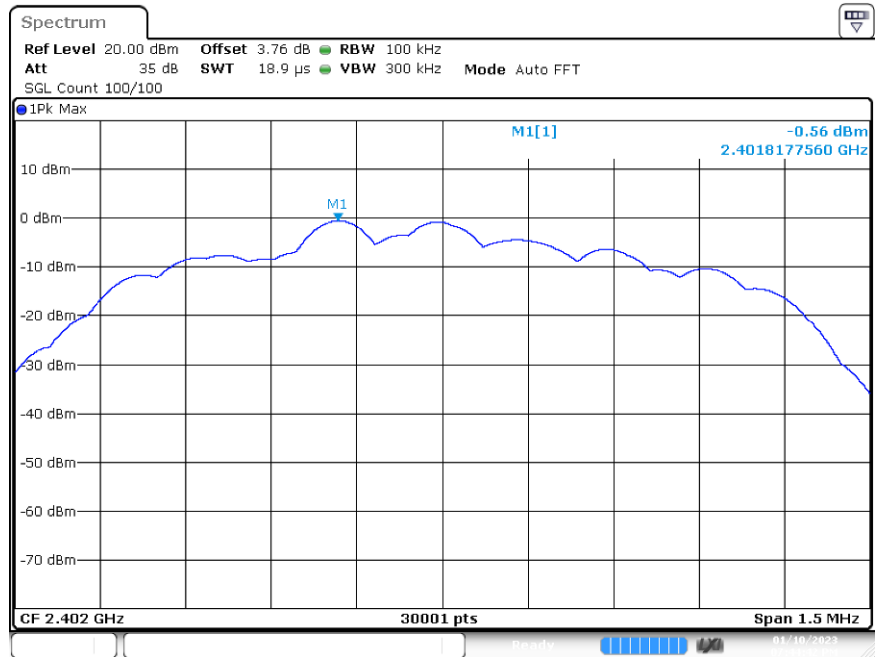


Puw

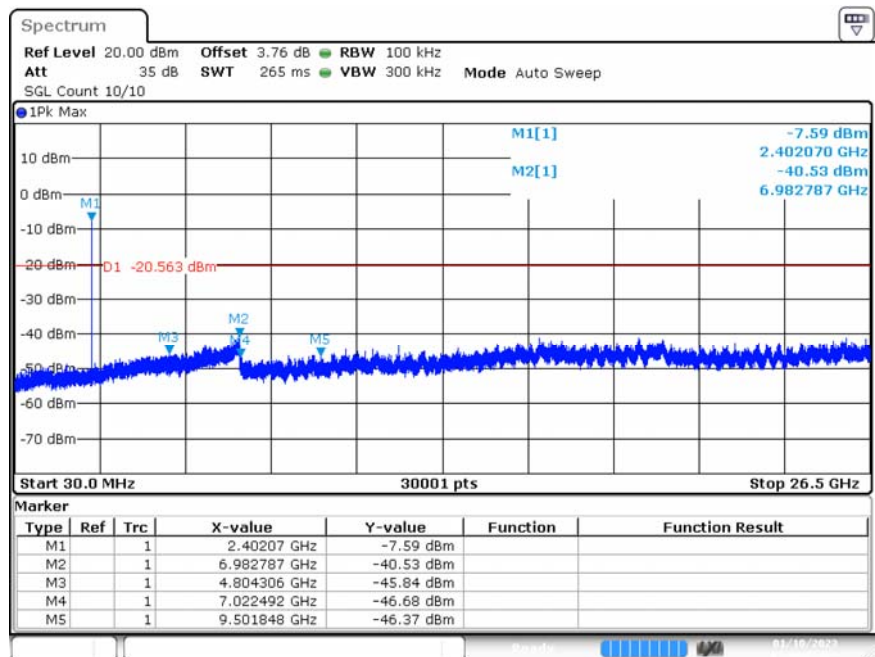


## 8DPSK\_LCH\_Graphs

Pref

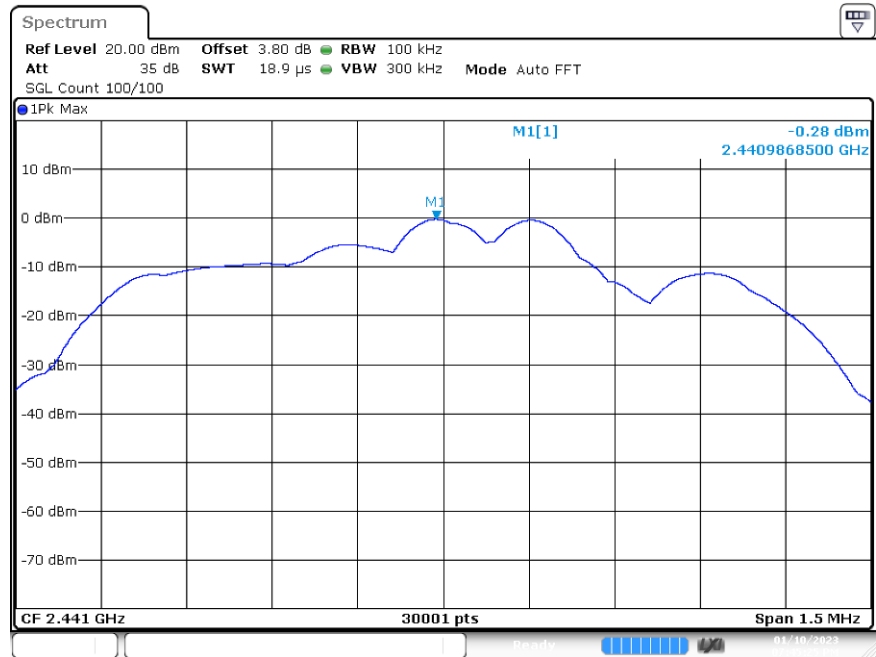


Puw

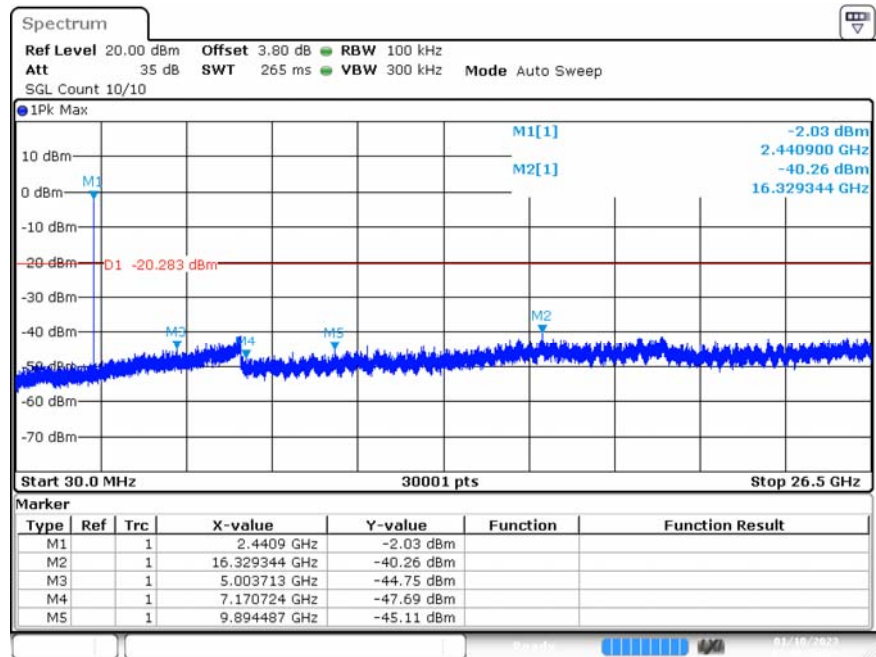


## 8DPSK\_MCH\_Graphs

Pref

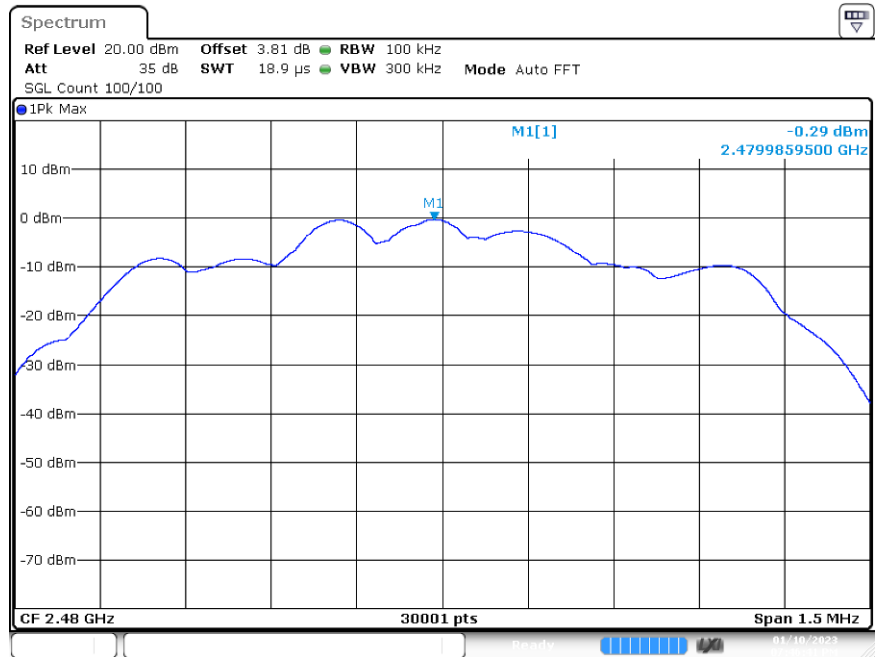


Puw

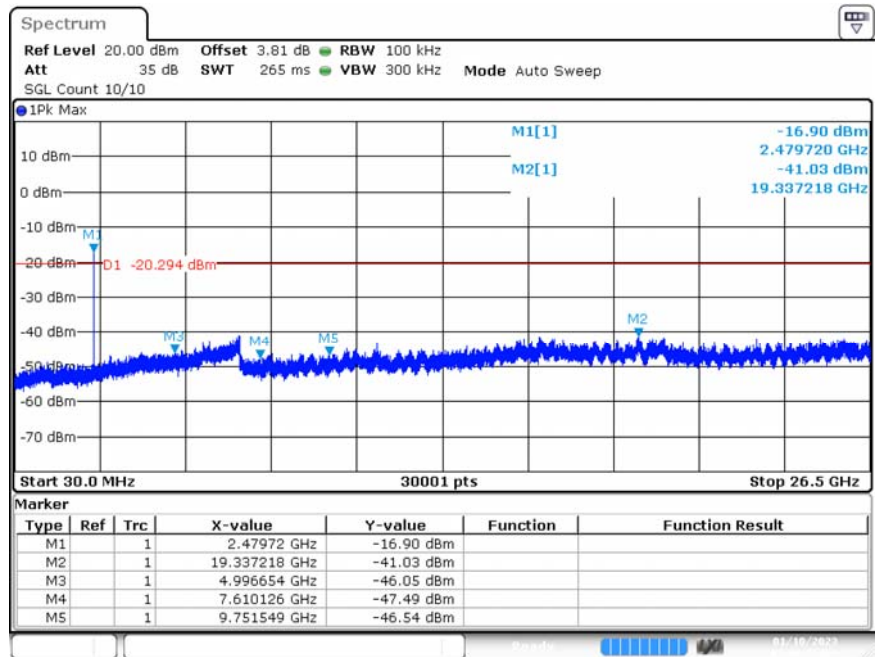


## 8DPSK\_HCH\_Graphs

Pref



Puw

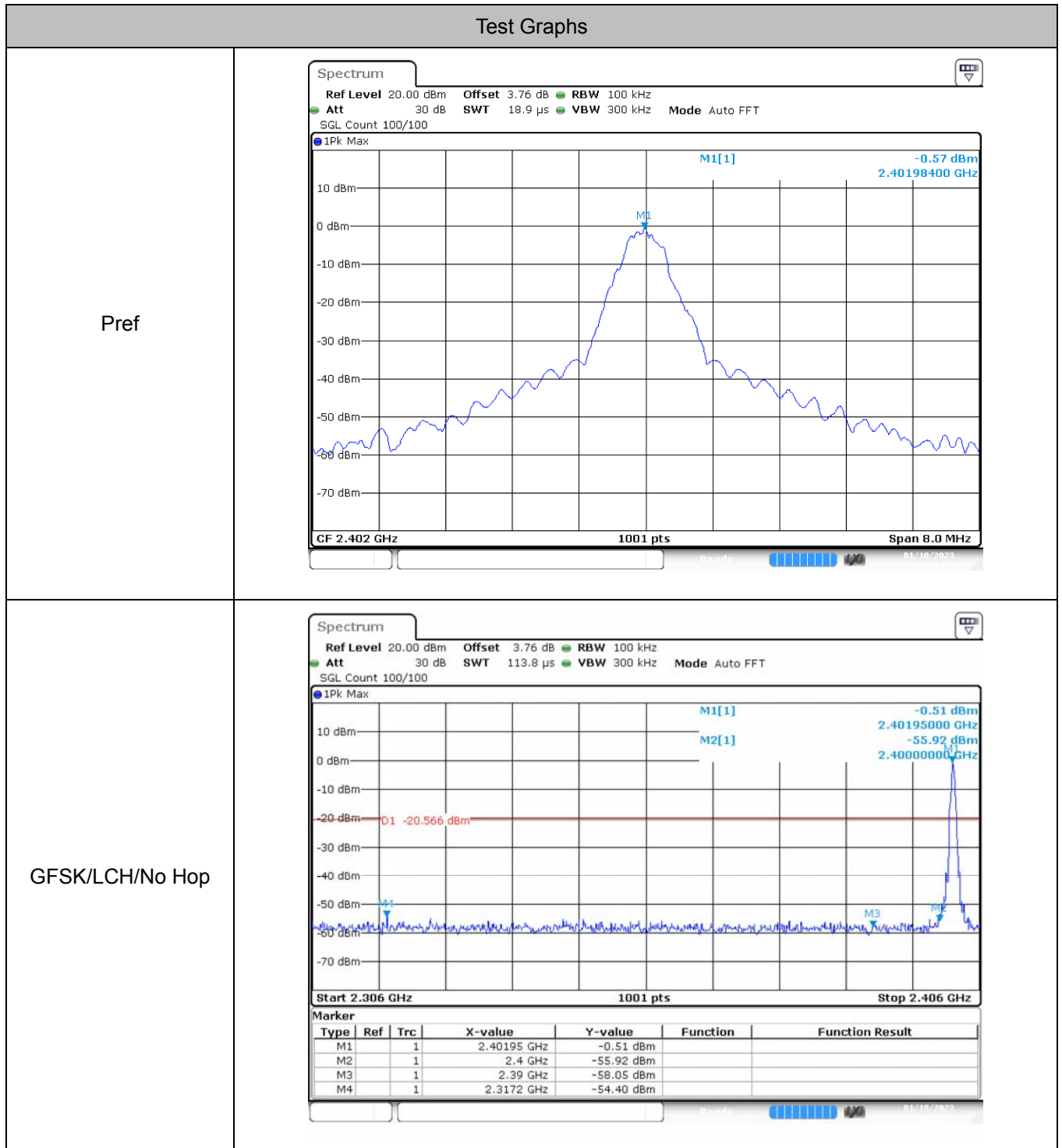


## 8 Band-edge for RF Conducted Emissions

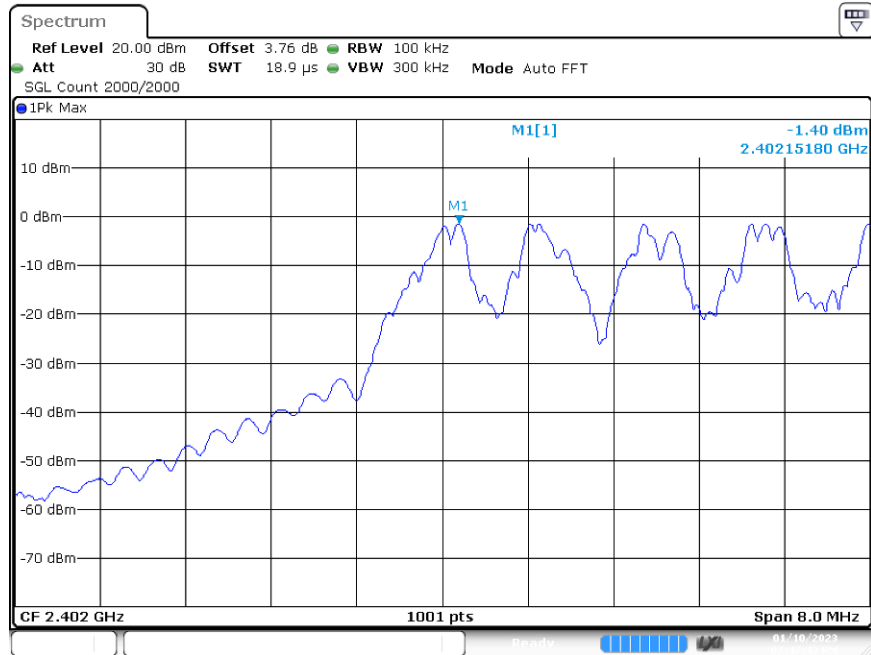
### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -53.83                   | -20         | Pass    |
|               |         |                         | On                | -52.8                    | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -53.63                   | -20         | Pass    |
|               |         |                         | On                | -52.81                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -53.84                   | -20         | Pass    |
|               |         |                         | On                | -53.2                    | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -53.92                   | -20         | Pass    |
|               |         |                         | On                | -53.35                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -54.98                   | -20         | Pass    |
|               |         |                         | On                | -53.91                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -55.03                   | -20         | Pass    |
|               |         |                         | On                | -53.29                   | -20         | Pass    |

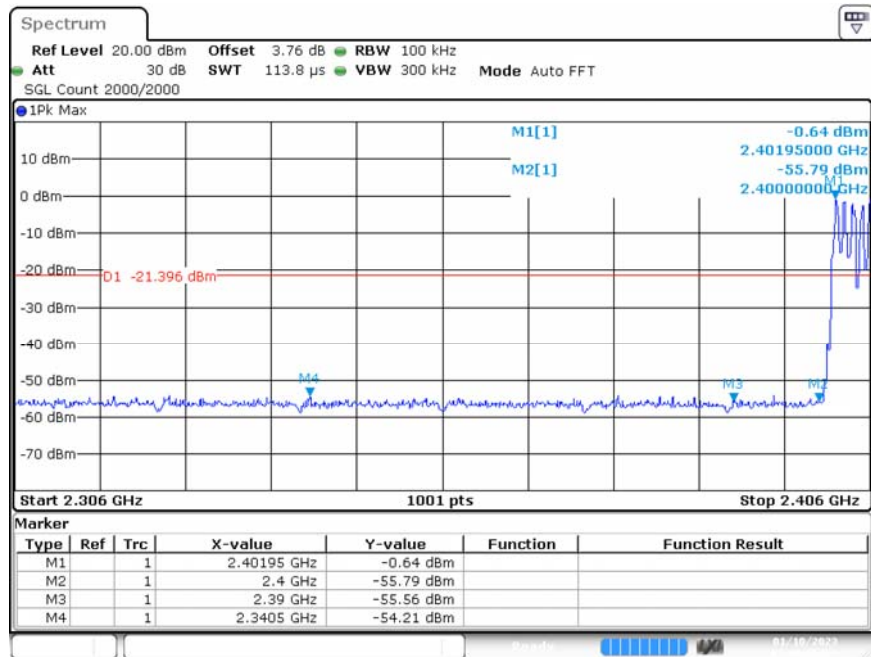
## 8.2 Test Graphs



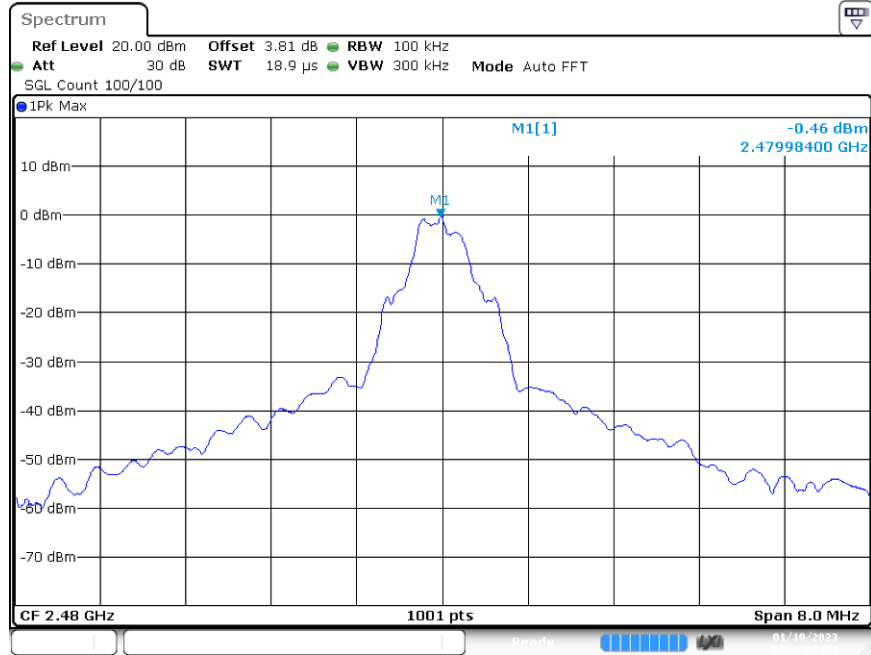
Ref



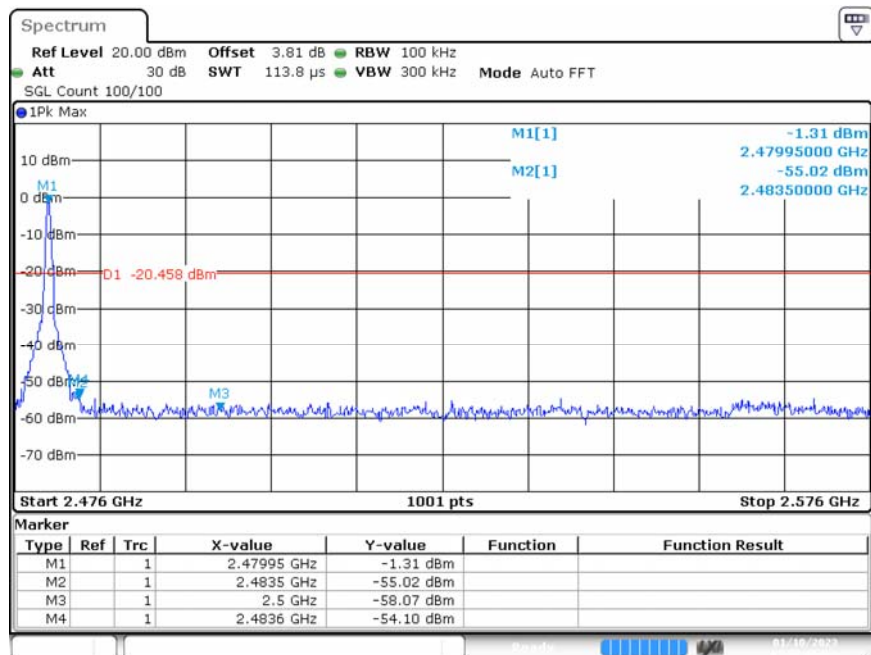
GFSK/LCH/Hop



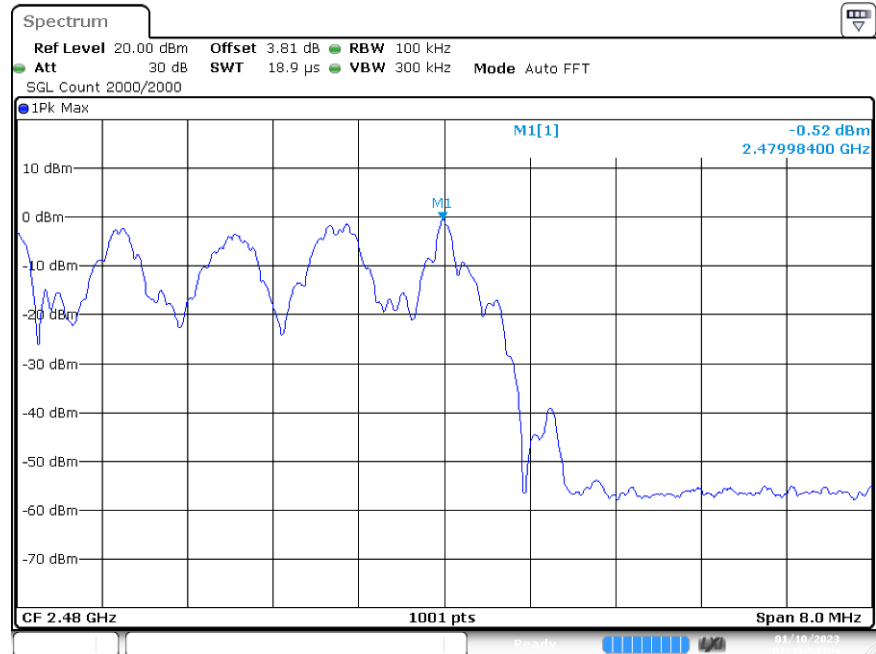
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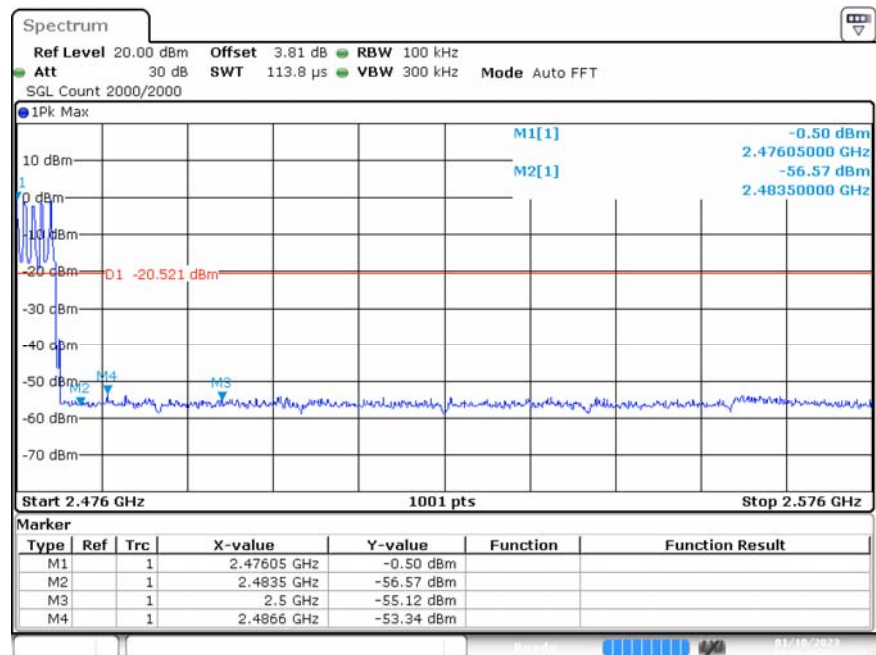
GFSK/HCH/No Hop



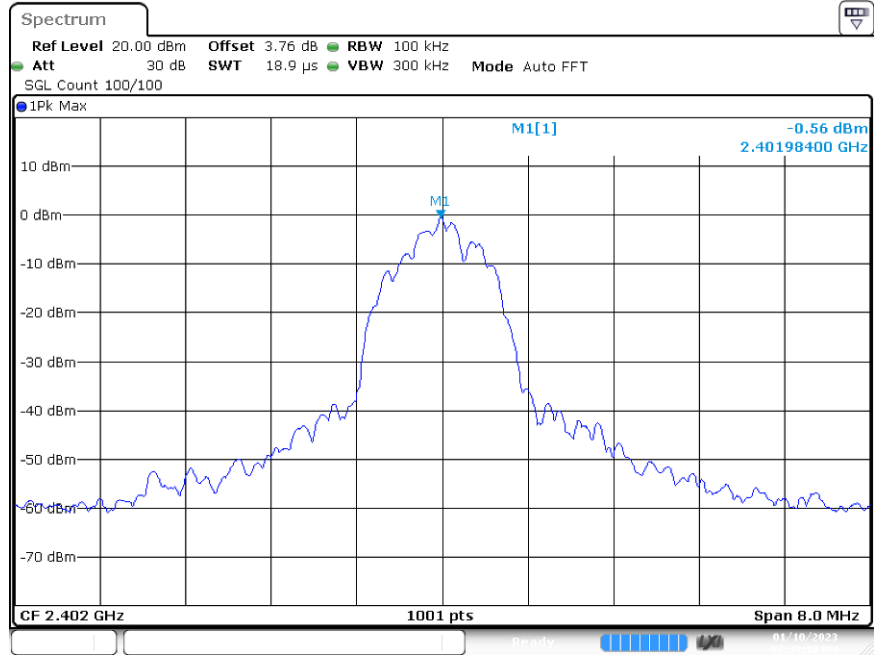
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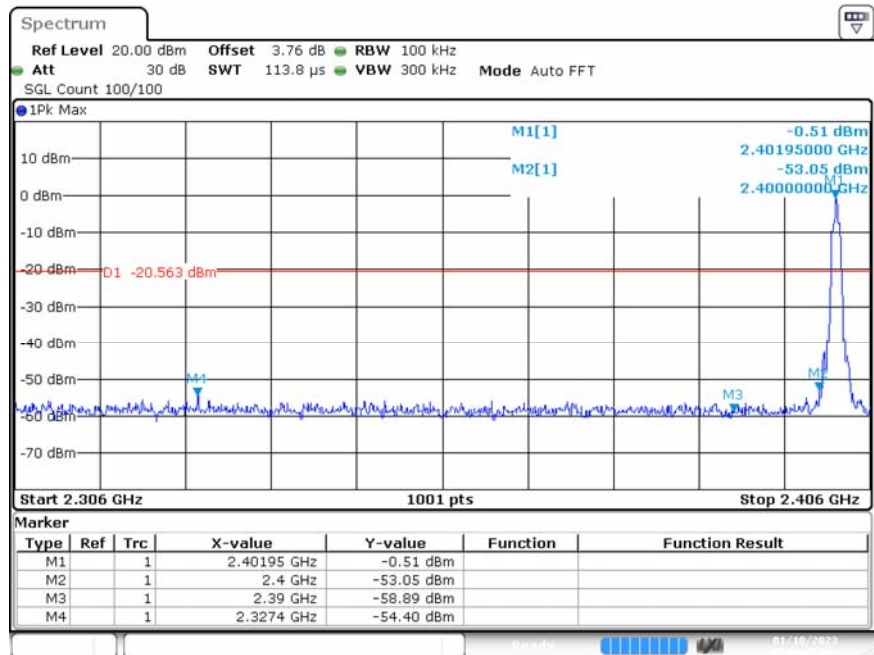
GFSK/HCH/Hop



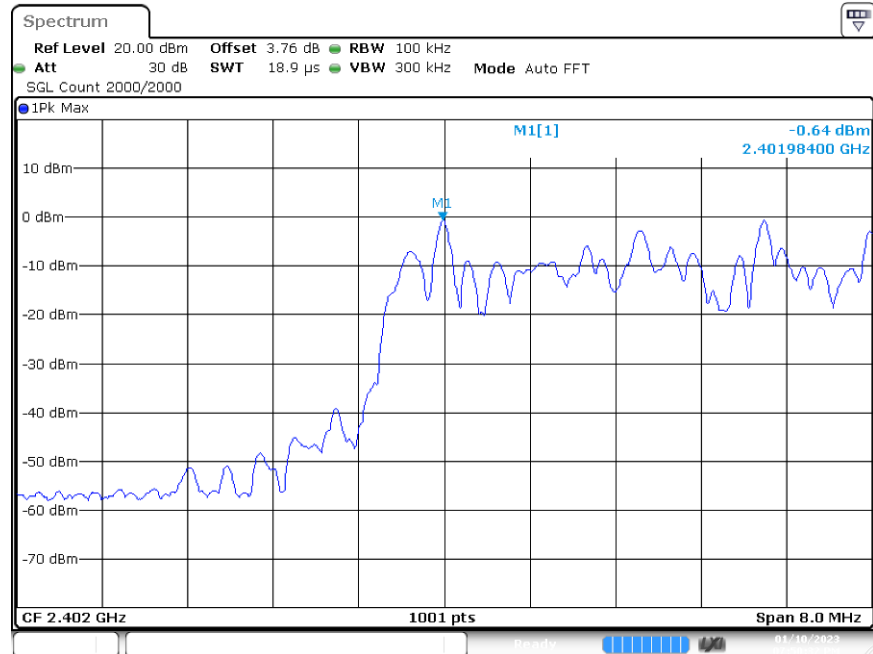
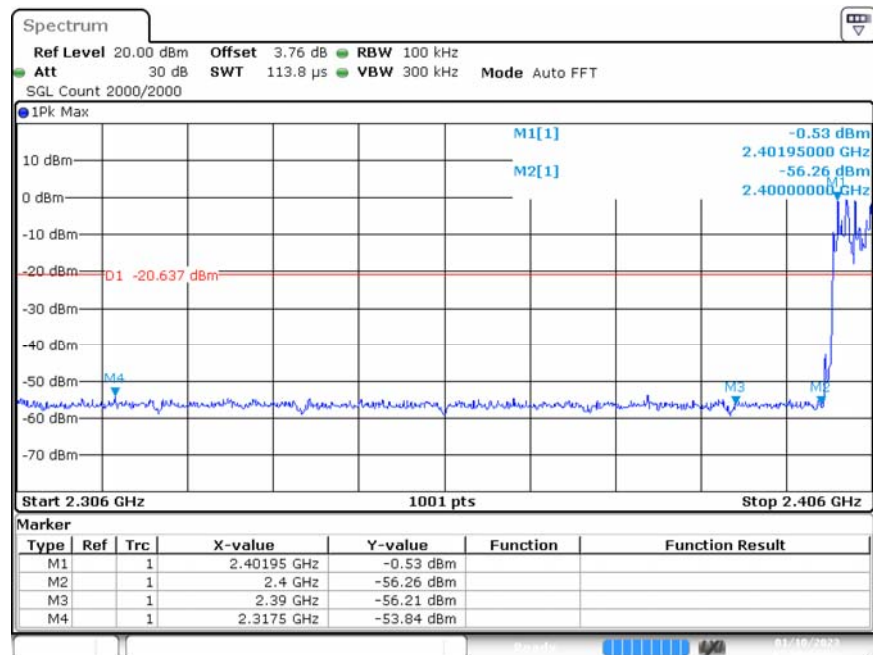
Ref



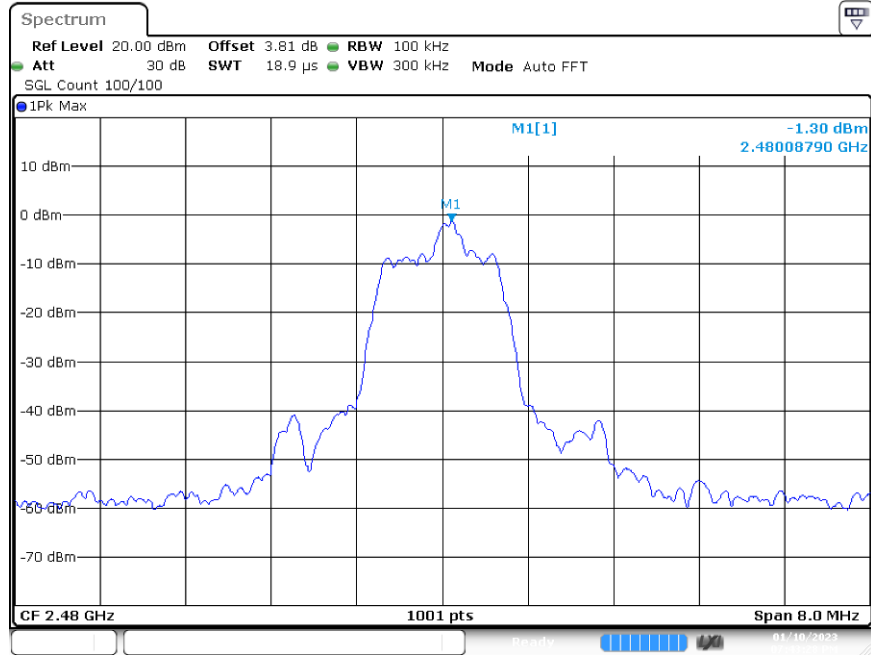
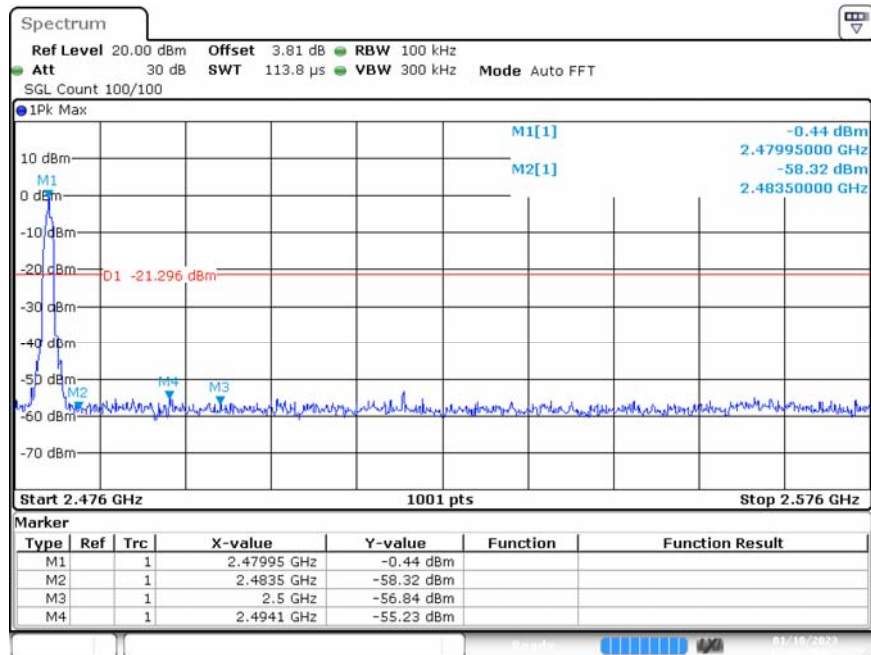
$\pi/4$ DQPSK/LCH/No  
Hop



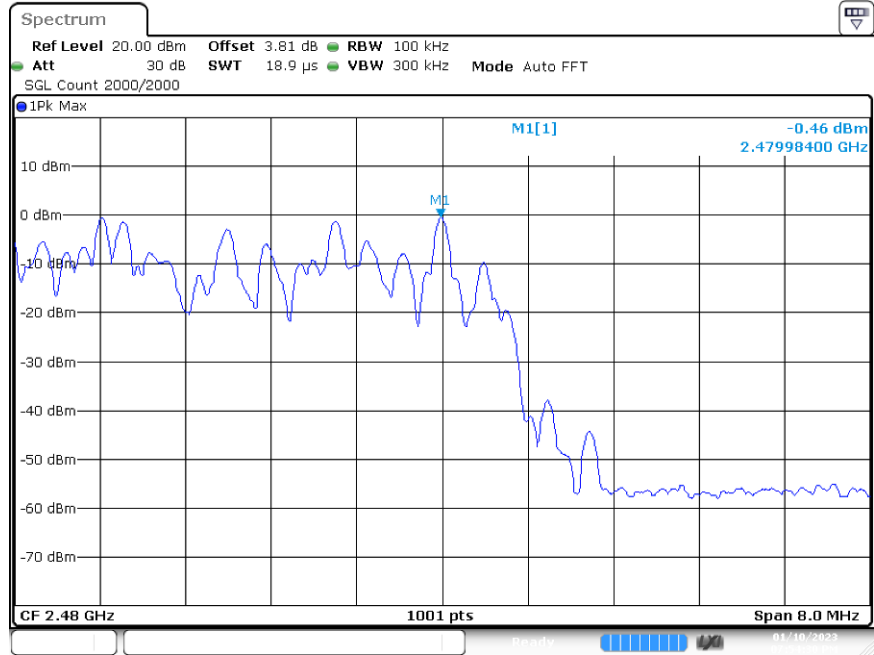
Ref


 $\pi/4$ DQPSK/LCH/Hop


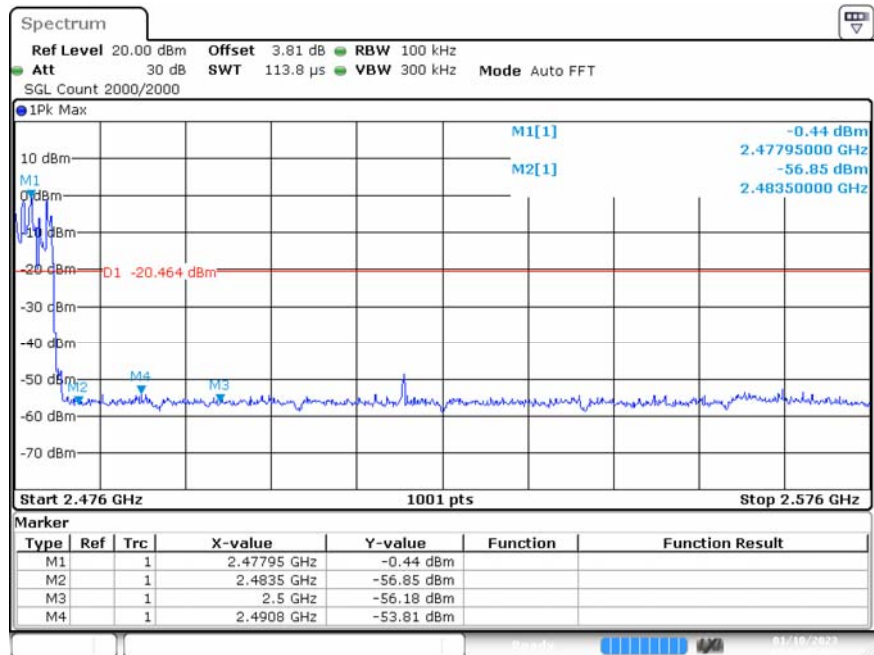
Ref


 $\pi/4$ DQPSK/HCH/No  
Hop


Ref



$\pi/4$ DQPSK/HCH/Hop



**Spectrum**

Ref Level 20.00 dBm Offset 3.76 dB RBW 100 kHz  
 Att 30 dB SWT 18.9  $\mu$ s VBW 300 kHz Mode Auto FFT  
 SGL Count 100/100

● 1PK Max

M1[1] -0.63 dBm  
 2.40198400 GHz

CF 2.402 GHz 1001 pts Span 8.0 MHz

Ready 01/10/2023

**Spectrum**

Ref Level 20.00 dBm Offset 3.76 dB RBW 100 kHz  
 Att 30 dB SWT 113.8 μs VBW 300 kHz Mode Auto FFT  
 SGL Count 100/100

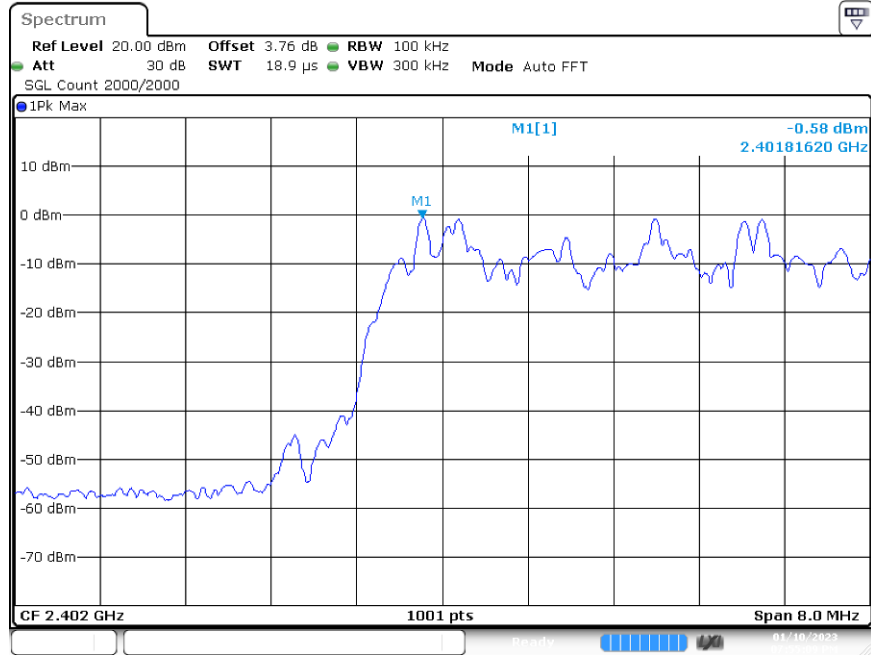
● 1Pk Max

10 dBm  
 0 dBm  
 -10 dBm  
 -20 dBm  
 -30 dBm  
 -40 dBm  
 -50 dBm  
 -60 dBm  
 -70 dBm

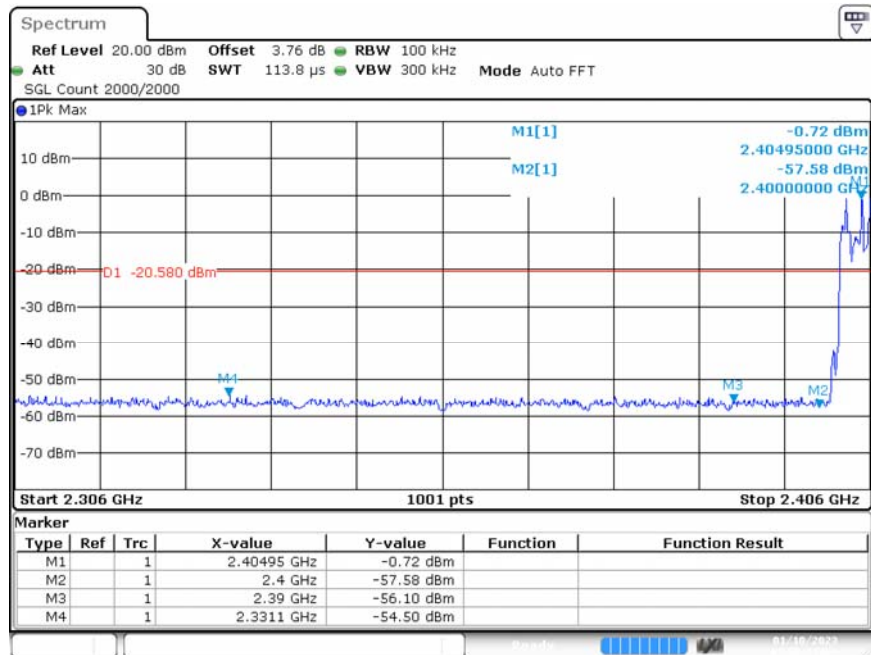
Start 2.306 GHz 1001 pts Stop 2.406 GHz

| Marker | Type | Ref | Trc | X-value     | Y-value    | Function | Function Result |
|--------|------|-----|-----|-------------|------------|----------|-----------------|
| M1     | 1    |     | 1   | 2.40195 GHz | -0.56 dBm  |          |                 |
| M2     | 1    |     | 1   | 2.4 GHz     | -47.61 dBm |          |                 |
| M3     | 1    |     | 1   | 2.39 GHz    | -57.80 dBm |          |                 |
| M4     | 1    |     | 1   | 2.3504 GHz  | -55.61 dBm |          |                 |

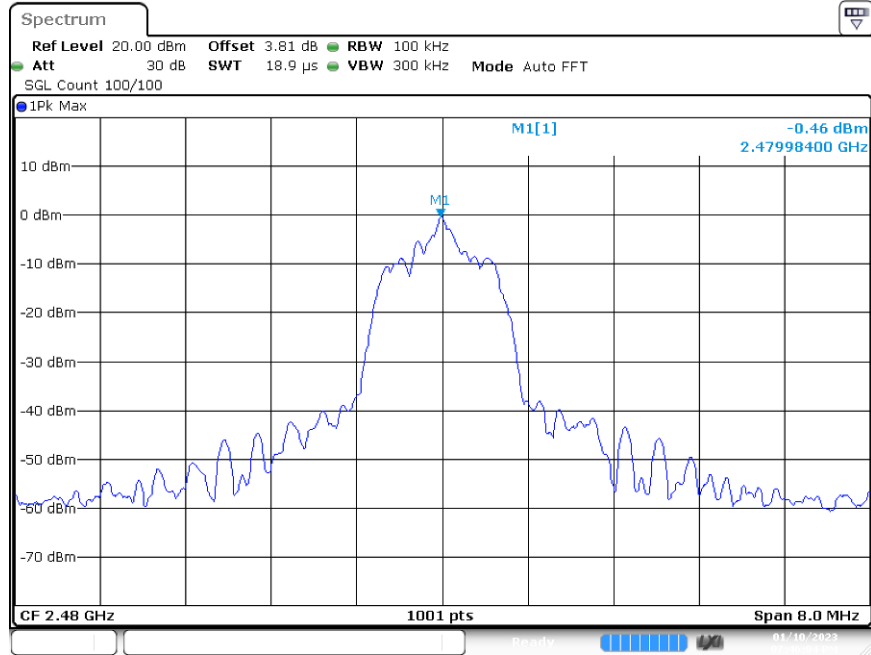
Ref



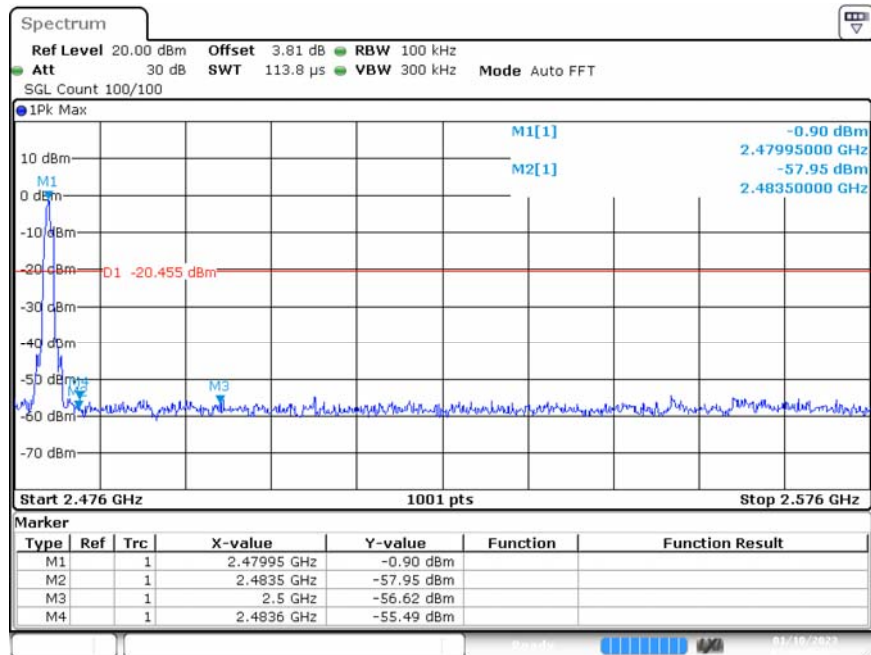
8DPSK/LCH/Hop



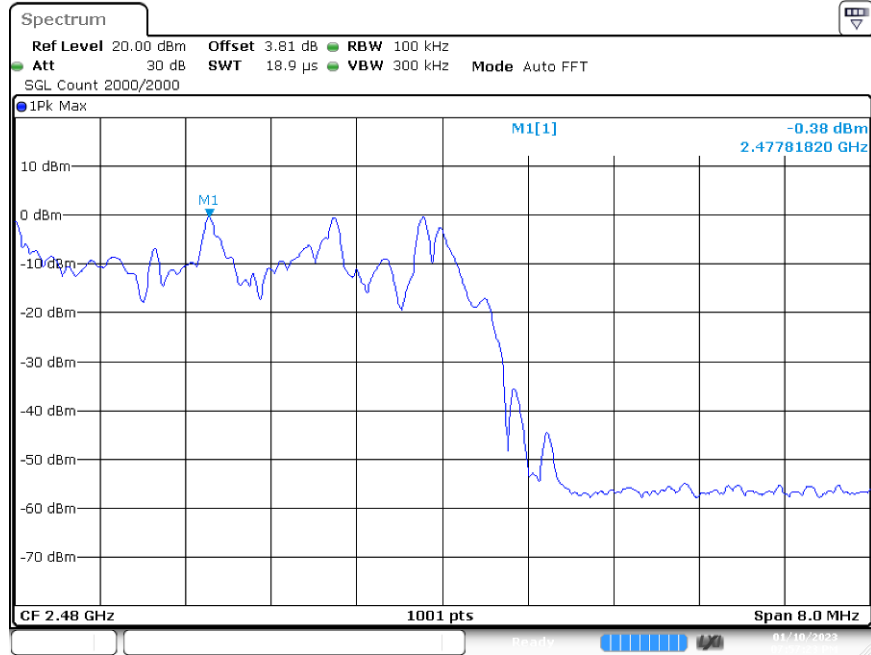
Ref



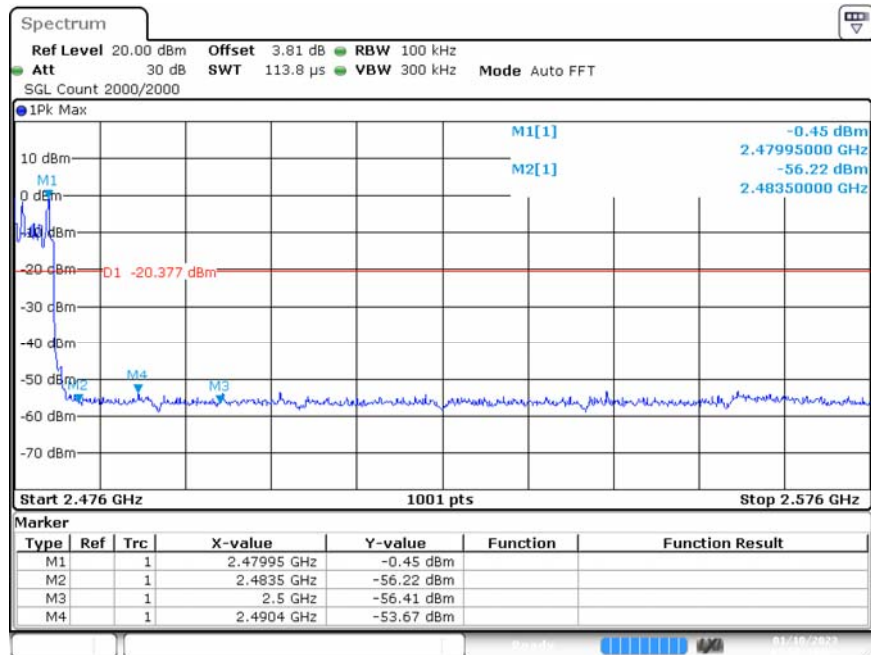
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

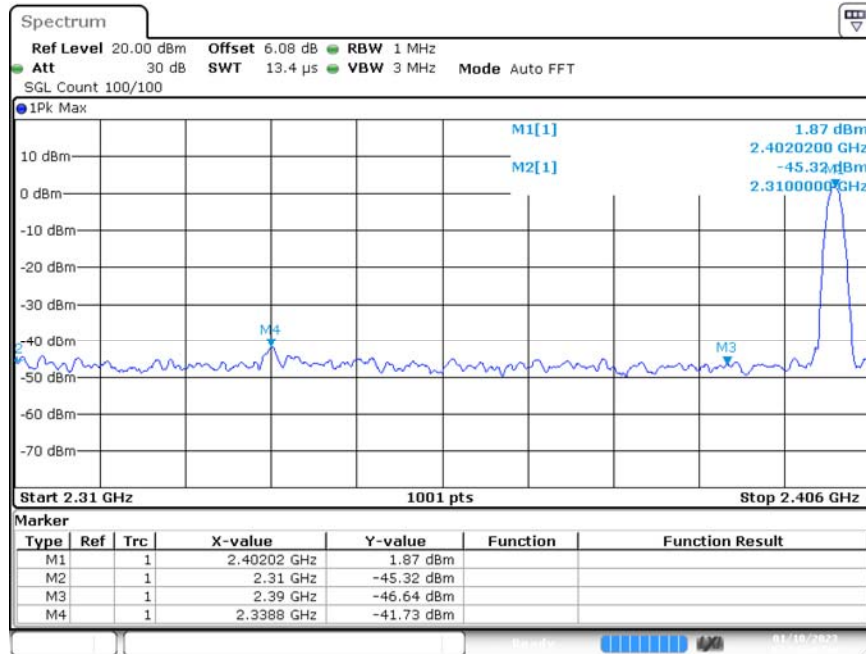
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -41.72      | 2.3  | 55.81      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -52.6       | 2.3  | 44.93      | AV       | 54             | Pass    |
|               | Off     | 2338.8   | -46.63      | 2.3  | 50.9       | PEAK     | 74             | Pass    |
|               | Off     | 2339.76  | -55.22      | 2.3  | 42.31      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -45.82      | 2.3  | 51.71      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -53.81      | 2.3  | 43.72      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -44         | 2.3  | 53.53      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -53.76      | 2.3  | 43.77      | AV       | 54             | Pass    |
|               | Off     | 2491.72  | -44.95      | 2.3  | 52.58      | PEAK     | 74             | Pass    |
|               | Off     | 2483.584 | -54.73      | 2.3  | 42.8       | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -46.84      | 2.3  | 50.69      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -54.65      | 2.3  | 42.88      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -43.24      | 2.3  | 54.29      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -52.94      | 2.3  | 44.59      | AV       | 54             | Pass    |
|               | Off     | 2340.336 | -46.55      | 2.3  | 50.98      | PEAK     | 74             | Pass    |
|               | Off     | 2339.952 | -55.18      | 2.3  | 42.35      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -45.94      | 2.3  | 51.59      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -54.23      | 2.3  | 43.3       | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -43.24      | 2.3  | 54.29      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -54.19      | 2.3  | 43.34      | AV       | 54             | Pass    |
|               | Off     | 2495.008 | -46.87      | 2.3  | 50.66      | PEAK     | 74             | Pass    |
|               | Off     | 2483.56  | -54.86      | 2.3  | 42.67      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -47.61      | 2.3  | 49.92      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -55.05      | 2.3  | 42.48      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -43.22      | 2.3  | 54.31      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -52.91      | 2.3  | 44.62      | AV       | 54             | Pass    |
|               | Off     | 2319.312 | -46.43      | 2.3  | 51.1       | PEAK     | 74             | Pass    |
|               | Off     | 2338.128 | -54.85      | 2.3  | 42.68      | AV       | 54             | Pass    |



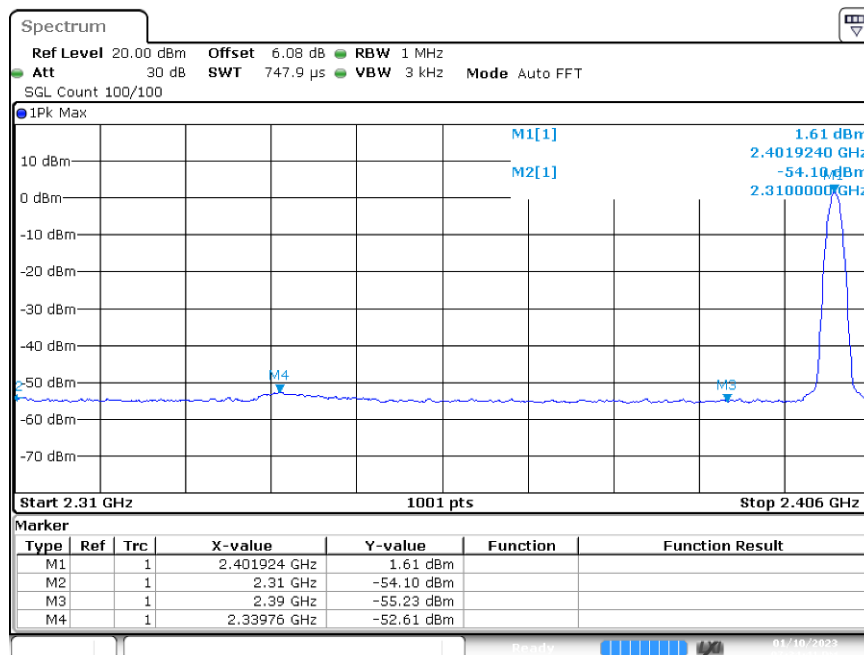
|  |     |          |        |     |       |      |    |      |
|--|-----|----------|--------|-----|-------|------|----|------|
|  | Off | 2390.0   | -46.87 | 2.3 | 50.66 | PEAK | 74 | Pass |
|  | Off | 2390.0   | -54.19 | 2.3 | 43.34 | AV   | 54 | Pass |
|  | Off | 2483.5   | -44.57 | 2.3 | 52.96 | PEAK | 74 | Pass |
|  | Off | 2483.5   | -53.86 | 2.3 | 43.67 | AV   | 54 | Pass |
|  | Off | 2489.224 | -45.78 | 2.3 | 51.75 | PEAK | 74 | Pass |
|  | Off | 2485.936 | -54.75 | 2.3 | 42.78 | AV   | 54 | Pass |
|  | Off | 2500.0   | -41.72 | 2.3 | 55.81 | PEAK | 74 | Pass |
|  | Off | 2500.0   | -52.6  | 2.3 | 44.93 | AV   | 54 | Pass |

## 9.2 Test Graphs

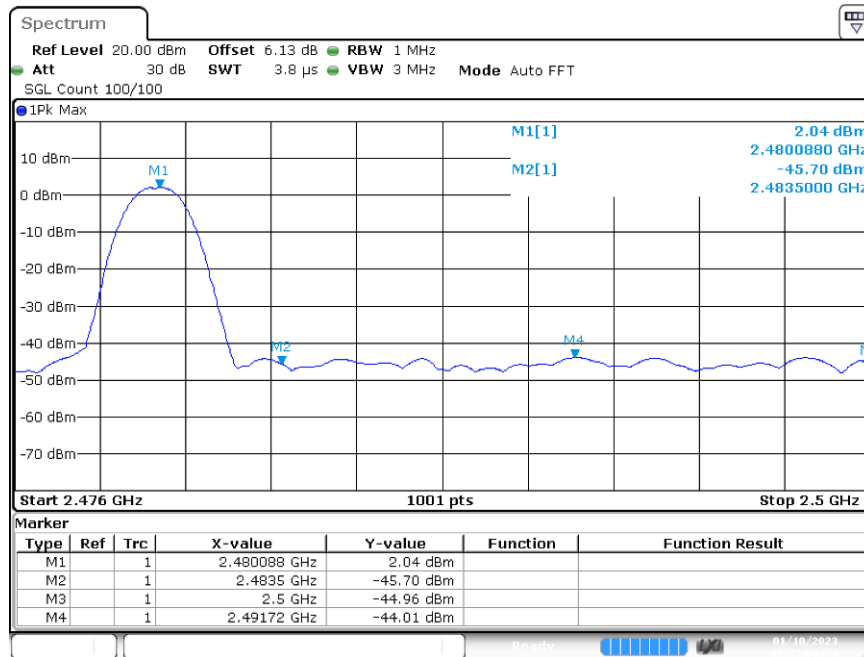
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



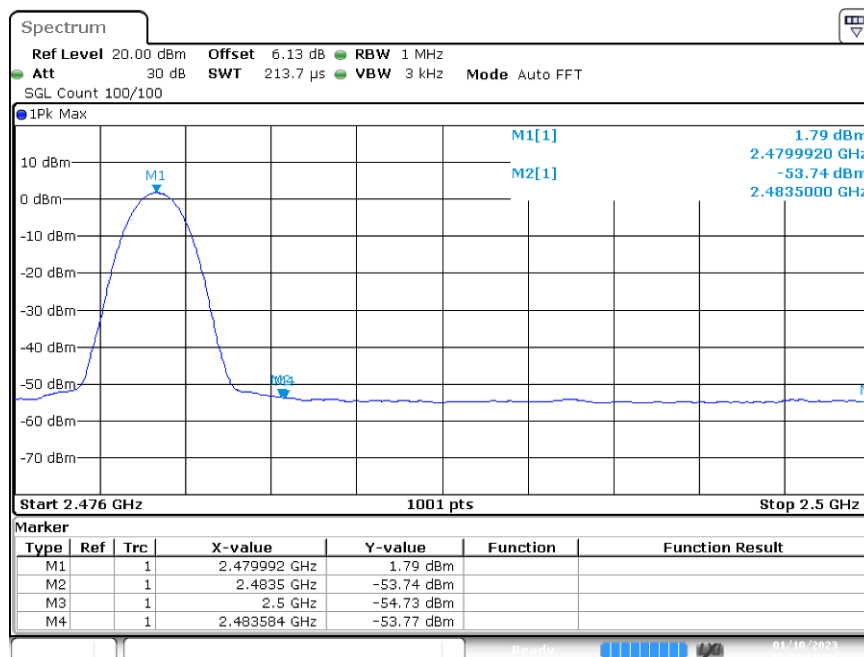
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



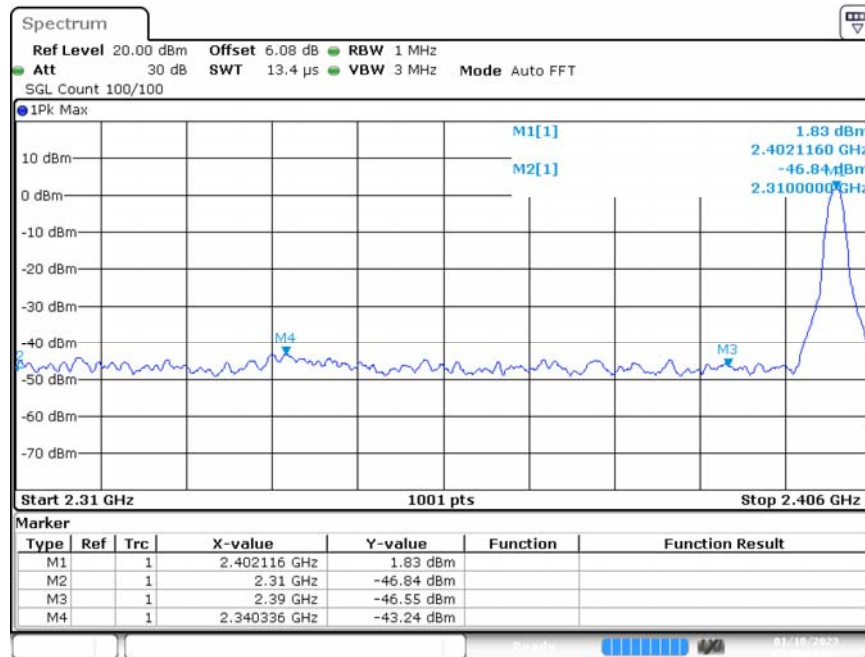
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



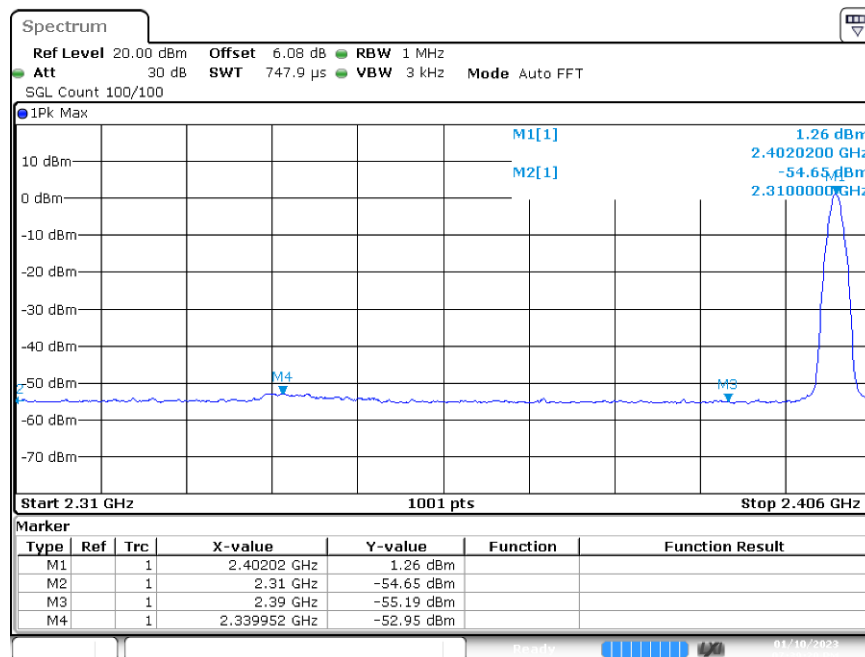
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



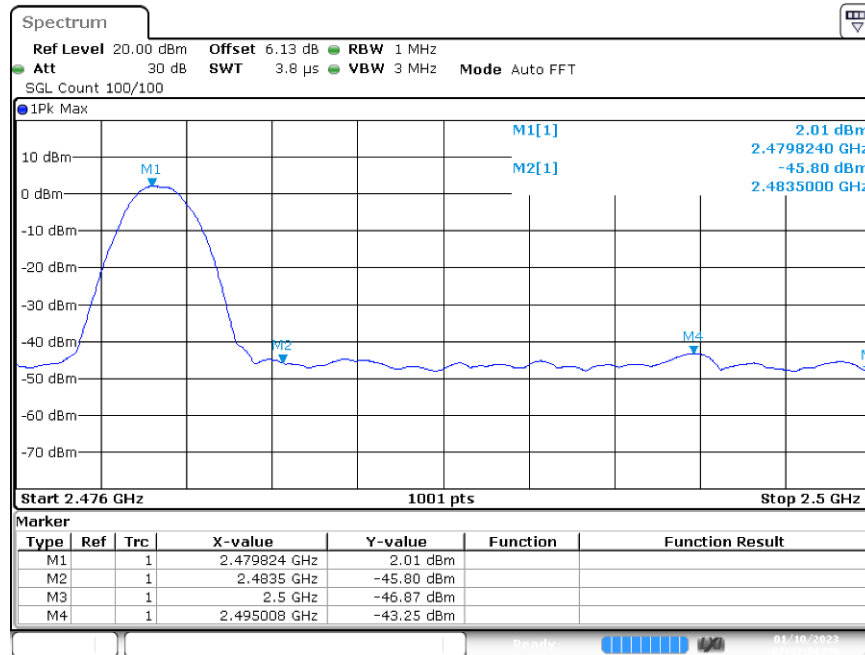
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



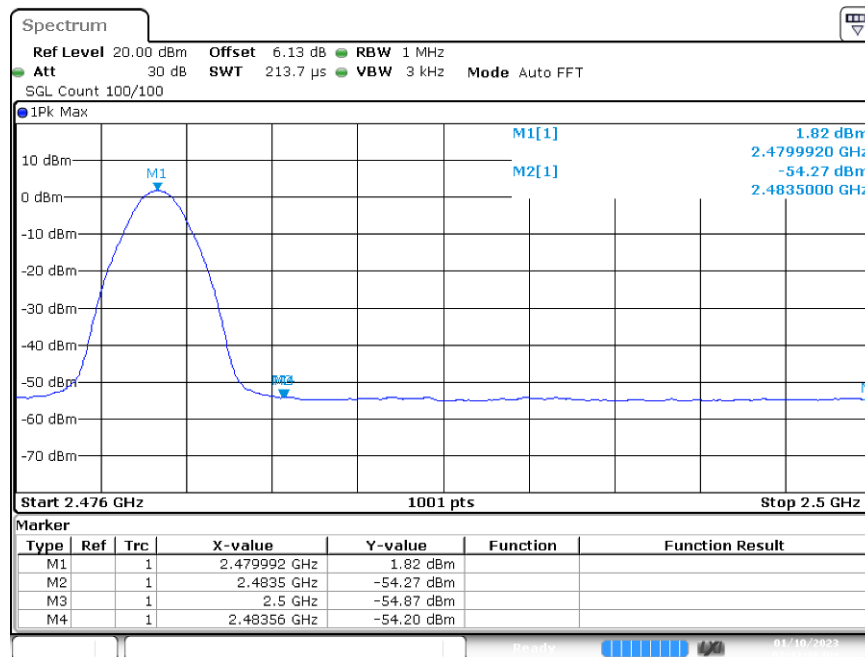
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



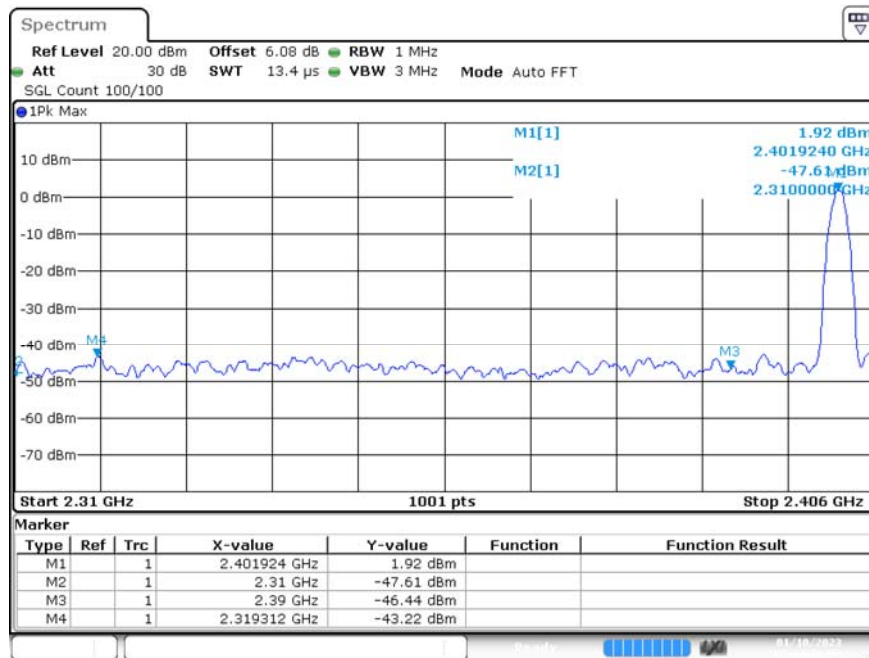
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



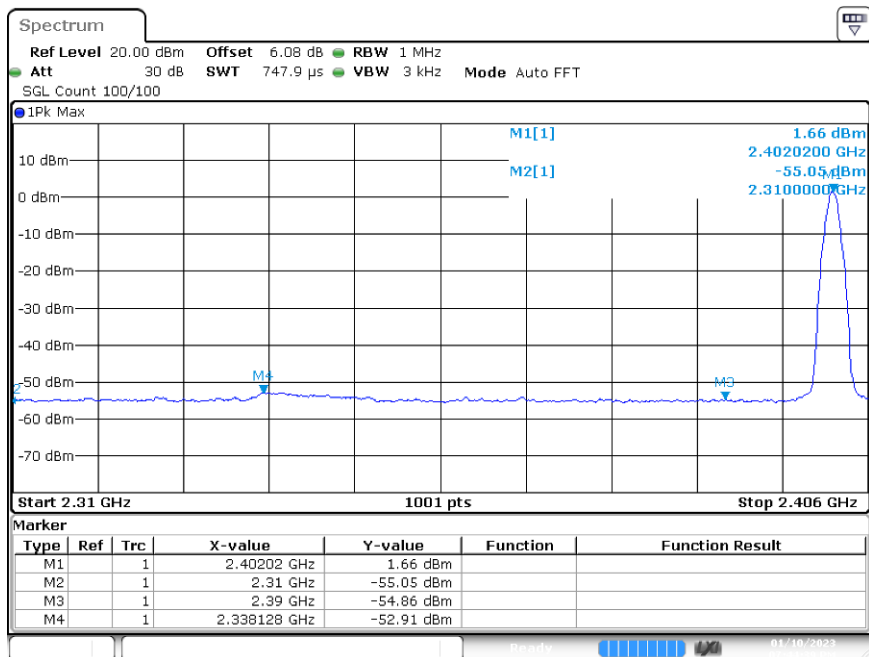
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



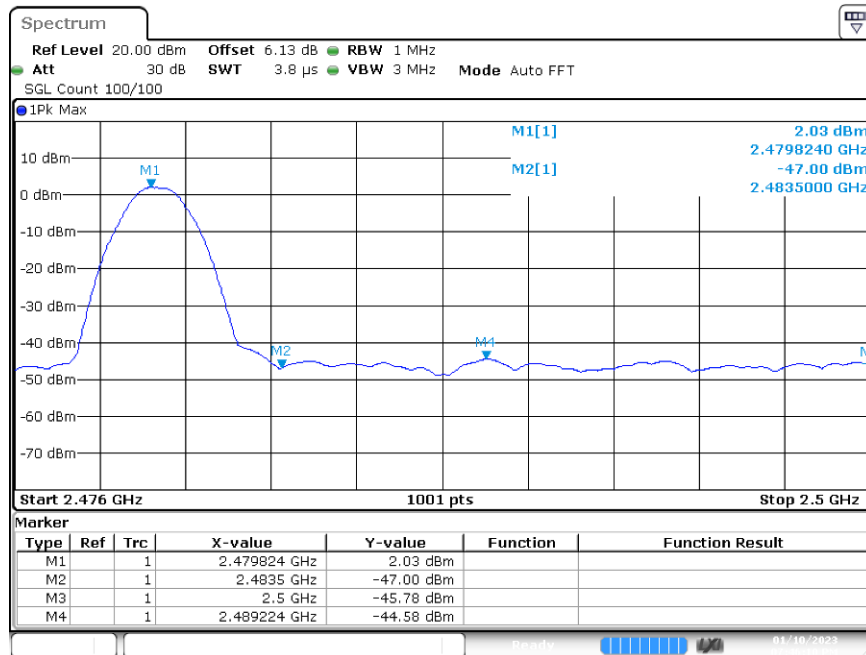
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



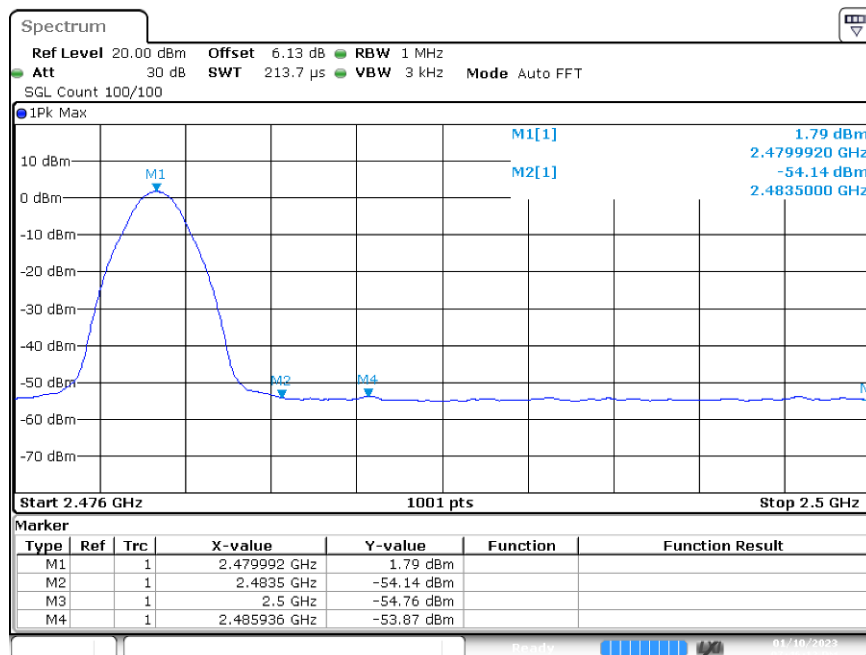
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (High Channel)



## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (High Channel)



---The End---