

## Appendix A

### RF Test Data for BR\_EDR(Conducted Measurement)

**Product Name:** SMARTPHONE

**Trade Mark:** SIRAGON

**Test Model:** SP-7200

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 24.3℃       |
| Relative Humidity: | 43%         |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Simba Huang |
| Supervised by:     | Seal Chen   |

# Contents

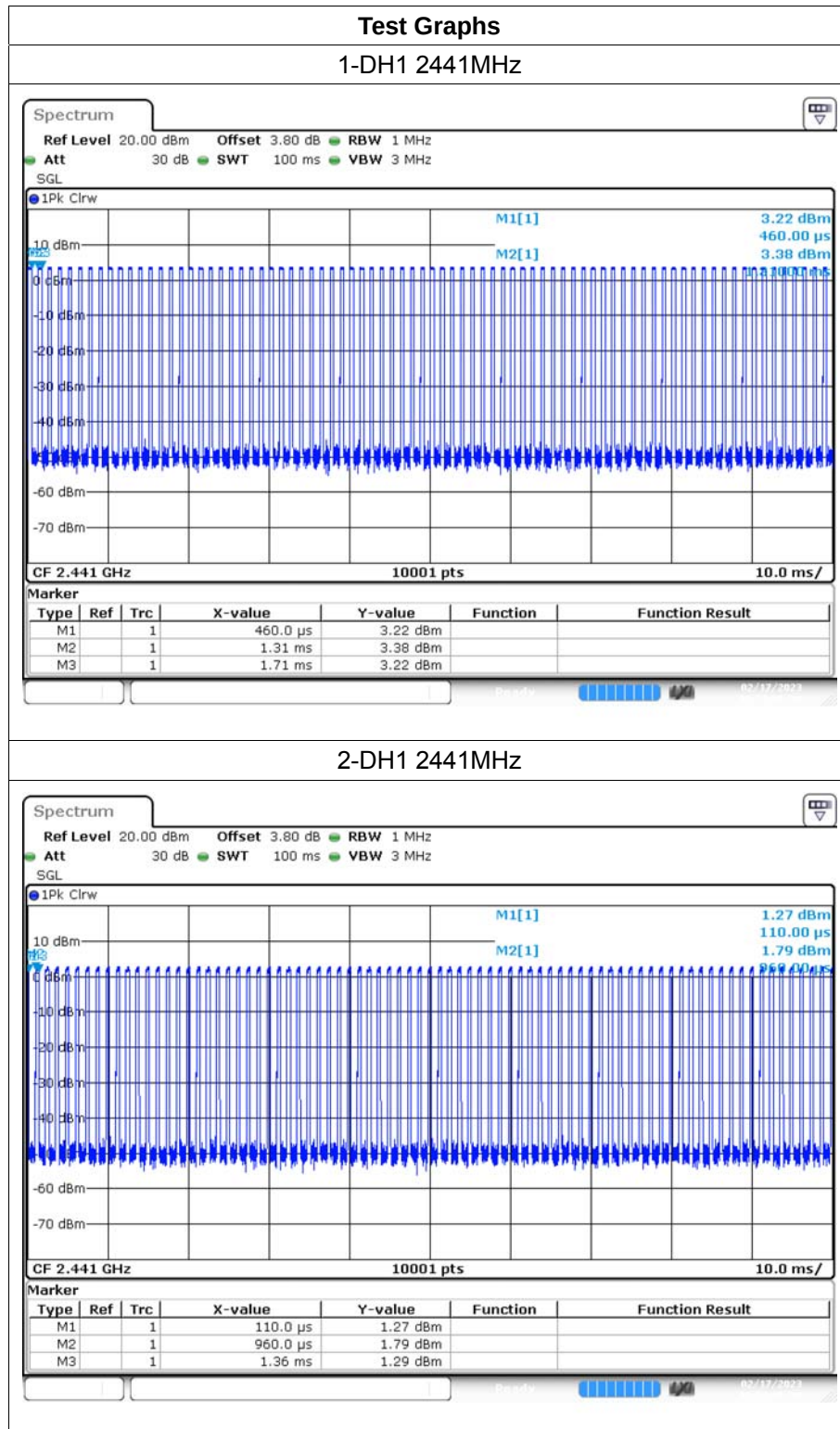
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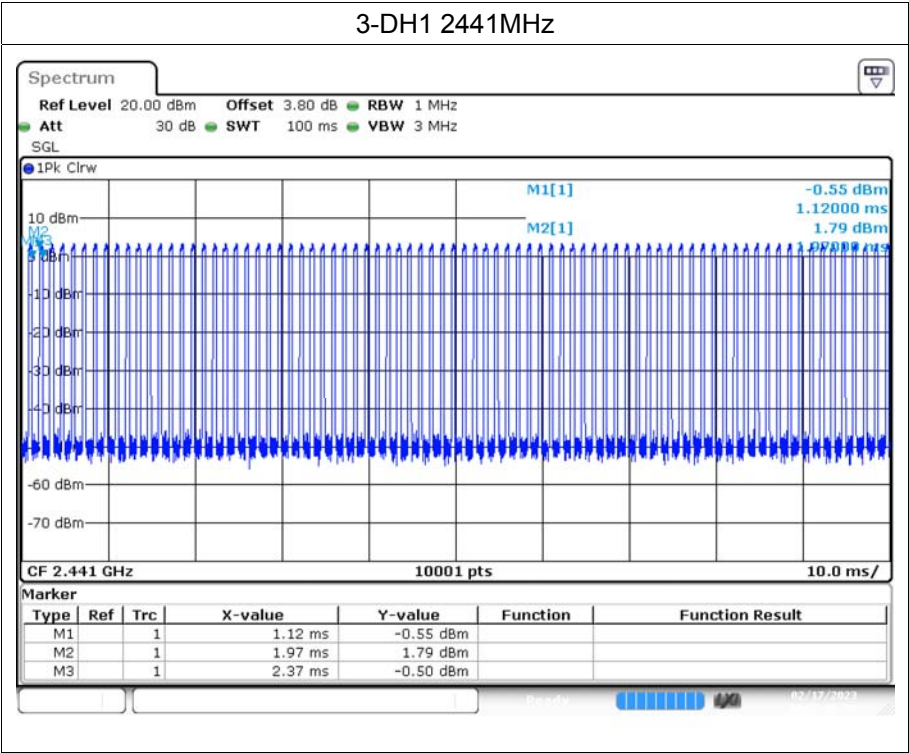
# 1 .Duty Cycle

## 1.1 Test Result

| Mode  | Frequency<br>(MHz) | Duty Cycle<br>(%) | 1/T<br>(kHz) |
|-------|--------------------|-------------------|--------------|
| 1-DH1 | 2441               | 33.28             | 2.5          |
| 2-DH1 | 2441               | 32.81             | 2.5          |
| 3-DH1 | 2441               | 32.8              | 2.5          |

## 1.2 Test Graphs



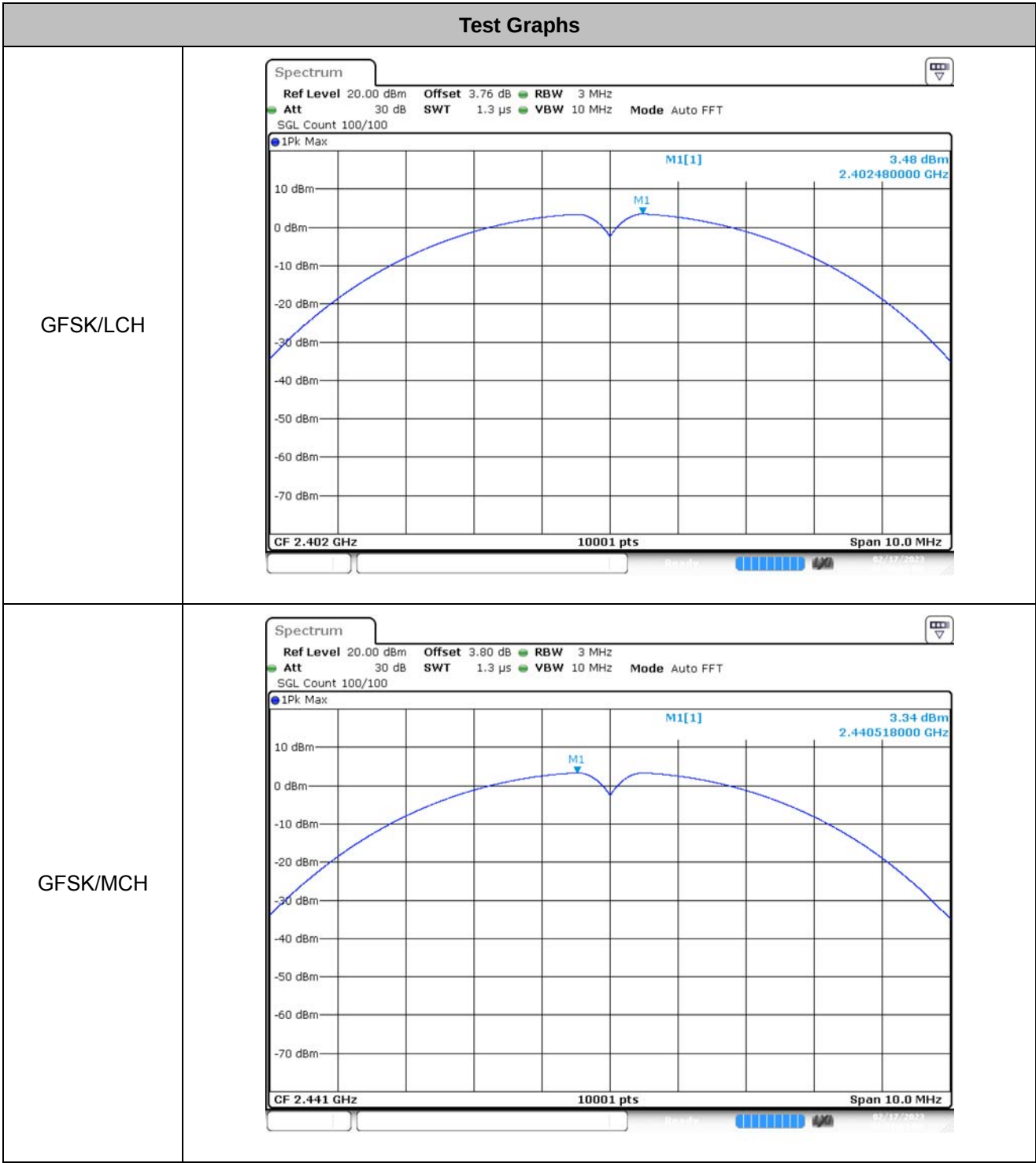


## 2 Maximum Conducted Peak Output Power

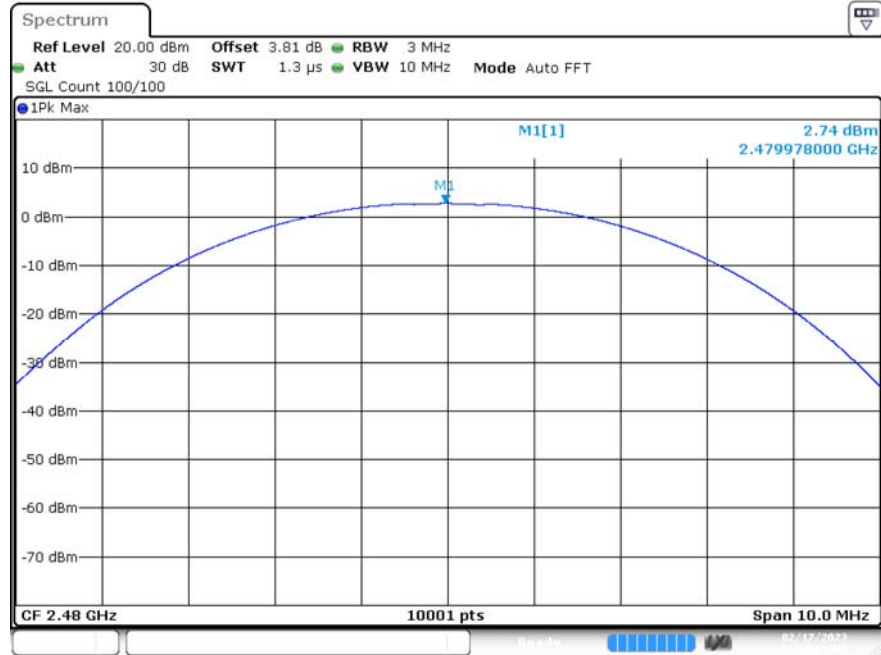
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | 3.48                            | $\leq 21$   | Pass    |
|               | MCH      | 3.34                            | $\leq 21$   | Pass    |
|               | HCH      | 2.74                            | $\leq 21$   | Pass    |
| $\pi/4$ DQPSK | LCH      | 3.0                             | $\leq 21$   | Pass    |
|               | MCH      | 3.25                            | $\leq 21$   | Pass    |
|               | HCH      | 2.58                            | $\leq 21$   | Pass    |
| 8DPSK         | LCH      | 3.44                            | $\leq 21$   | Pass    |
|               | MCH      | 3.37                            | $\leq 21$   | Pass    |
|               | HCH      | 2.53                            | $\leq 21$   | Pass    |

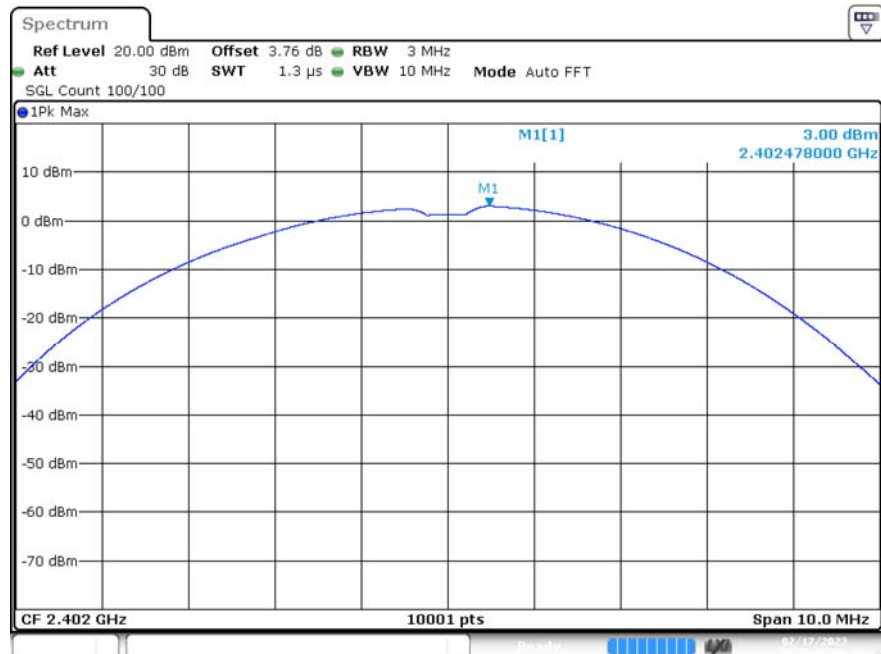
## 2.2 Test Graphs



GFSK/HCH

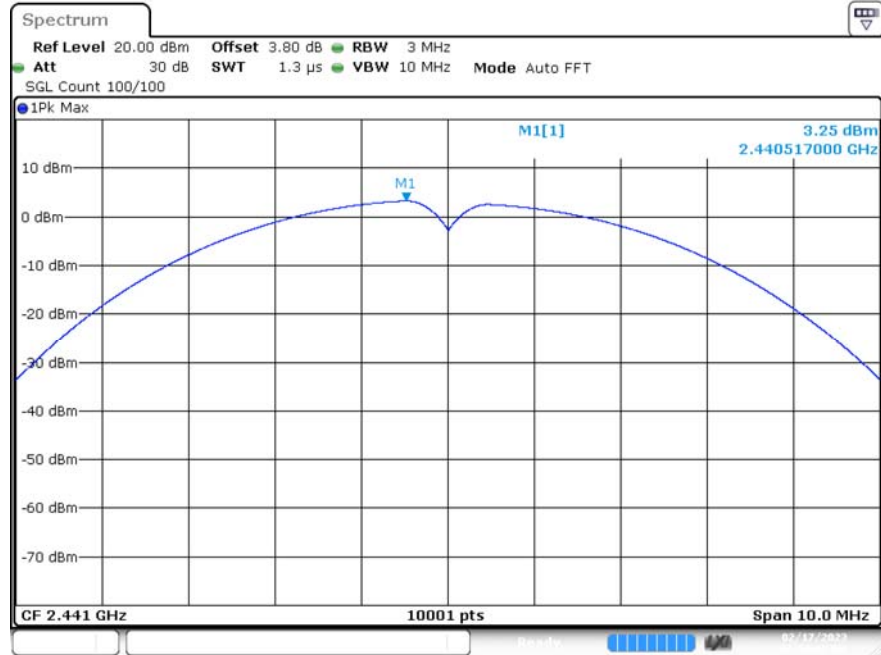


$\pi/4$ DQPSK/LCH

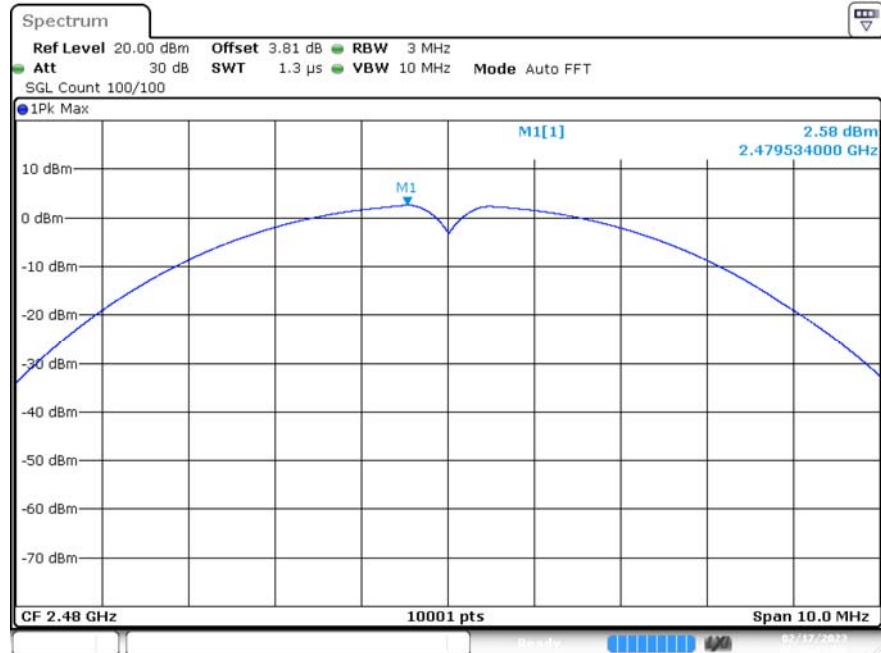




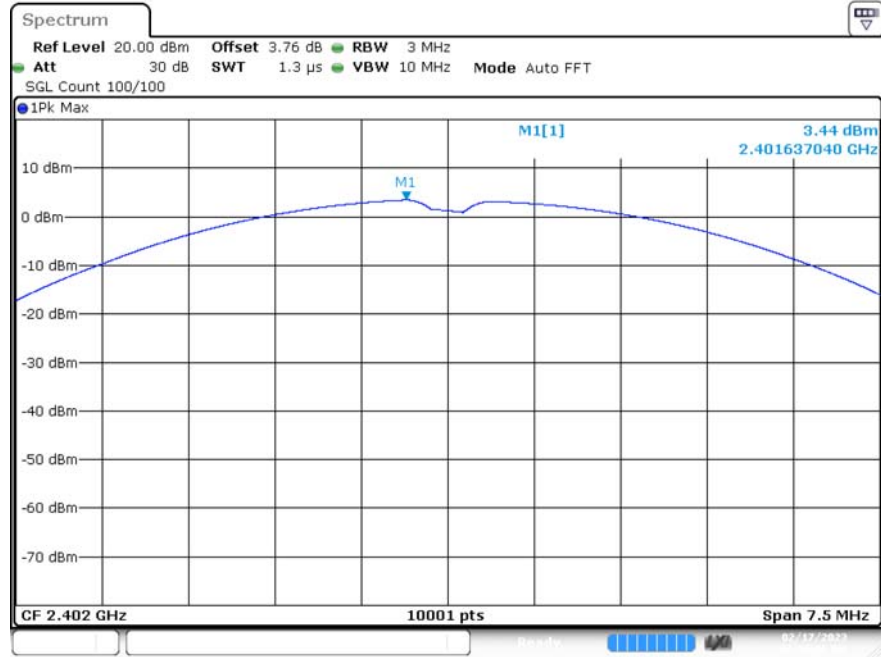
$\pi/4$ DQPSK/MC  
H



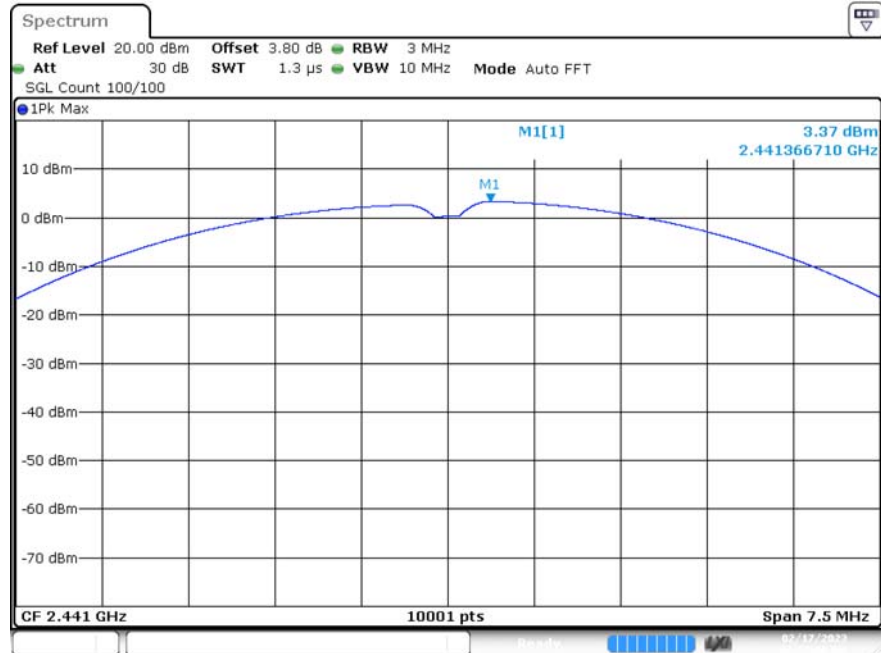
$\pi/4$ DQPSK/HCH



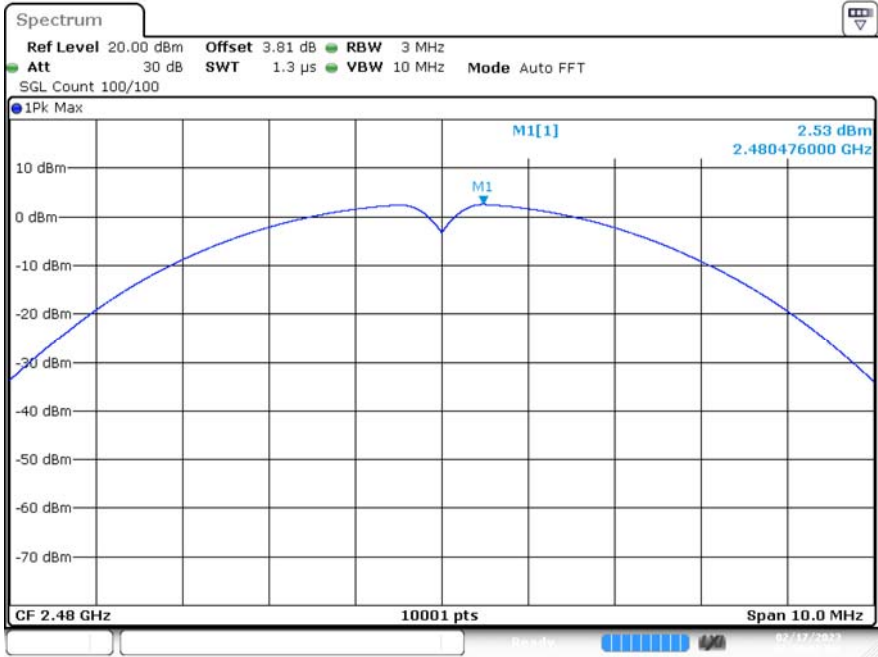
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

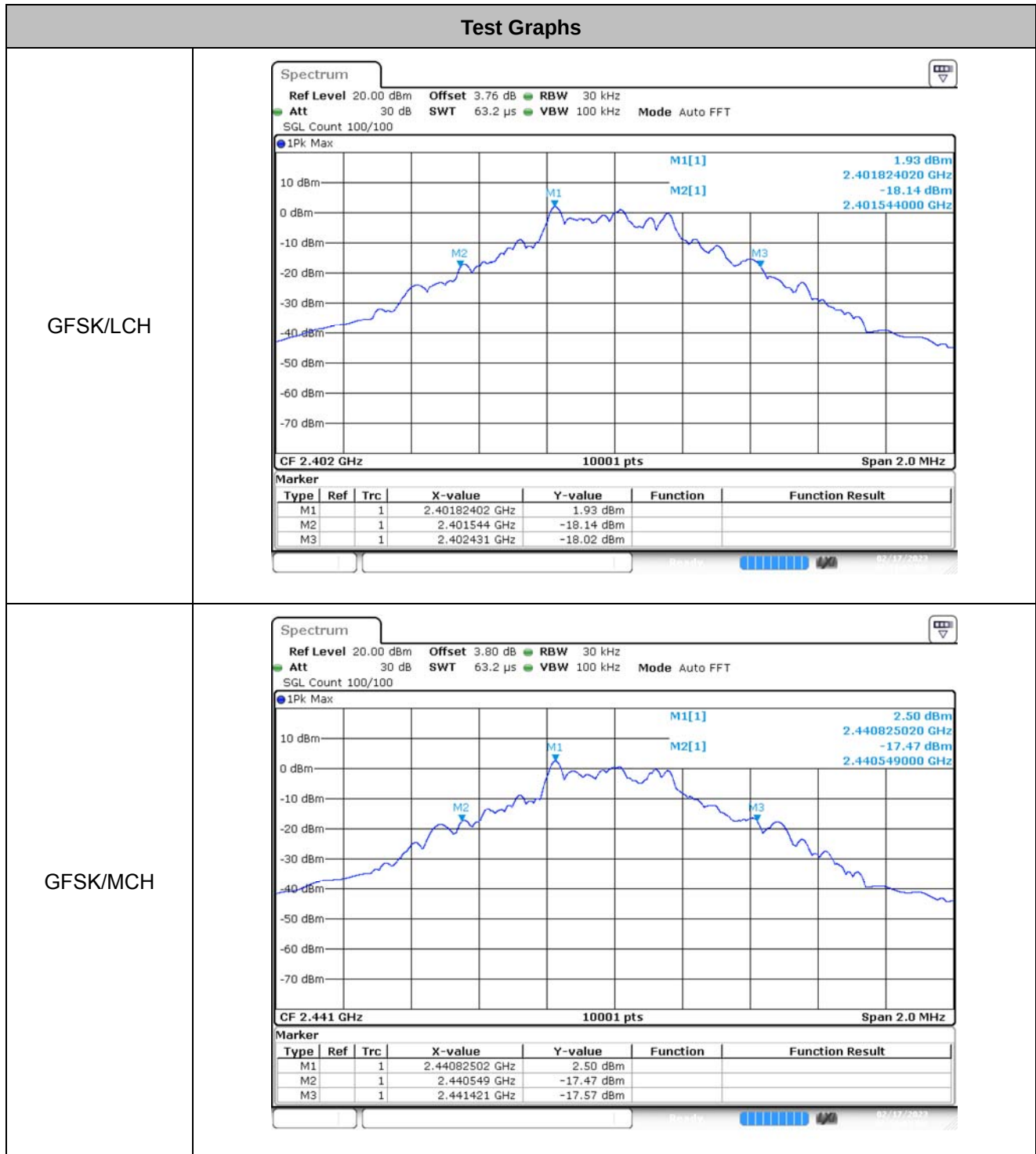


### 3 20dB Bandwidth

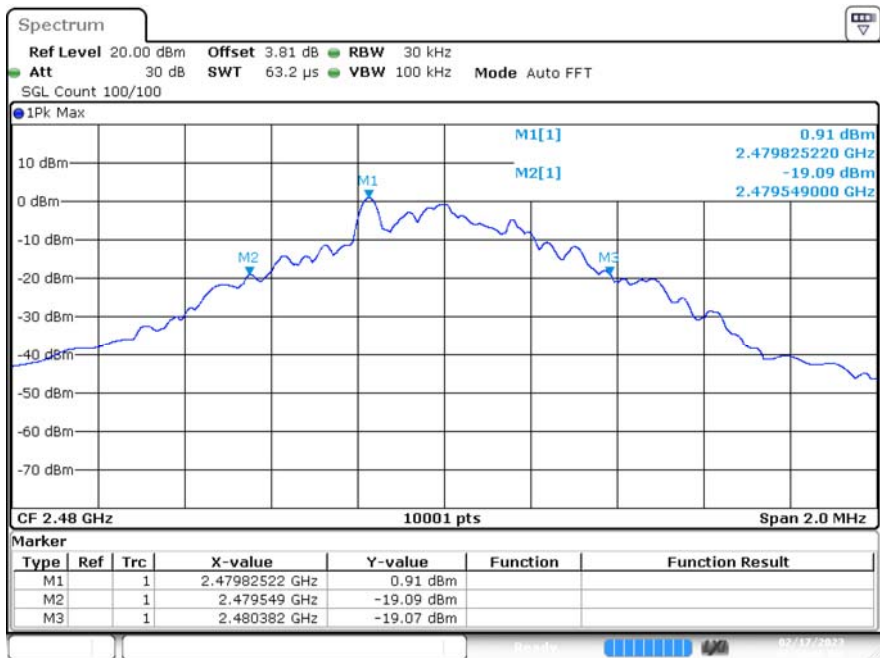
#### 3.1 Test Result

| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.887                | Not Specified | Pass    |
|               | MCH      | 0.872                | Not Specified | Pass    |
|               | HCH      | 0.833                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.25                 | Not Specified | Pass    |
|               | MCH      | 1.244                | Not Specified | Pass    |
|               | HCH      | 1.255                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.222                | Not Specified | Pass    |
|               | MCH      | 1.222                | Not Specified | Pass    |
|               | HCH      | 1.249                | Not Specified | Pass    |

## 3.2 Test Graphs



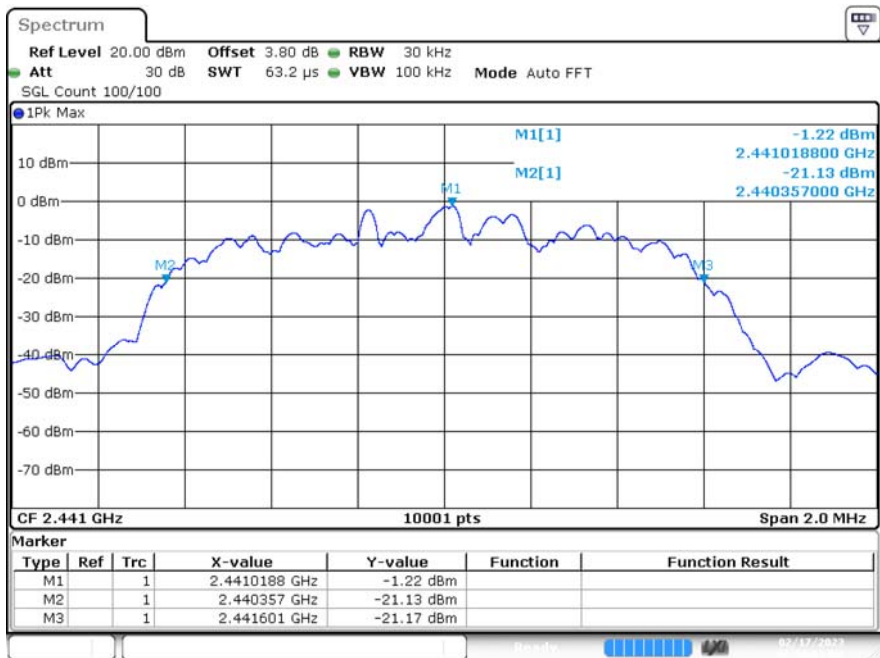
GFSK/HCH



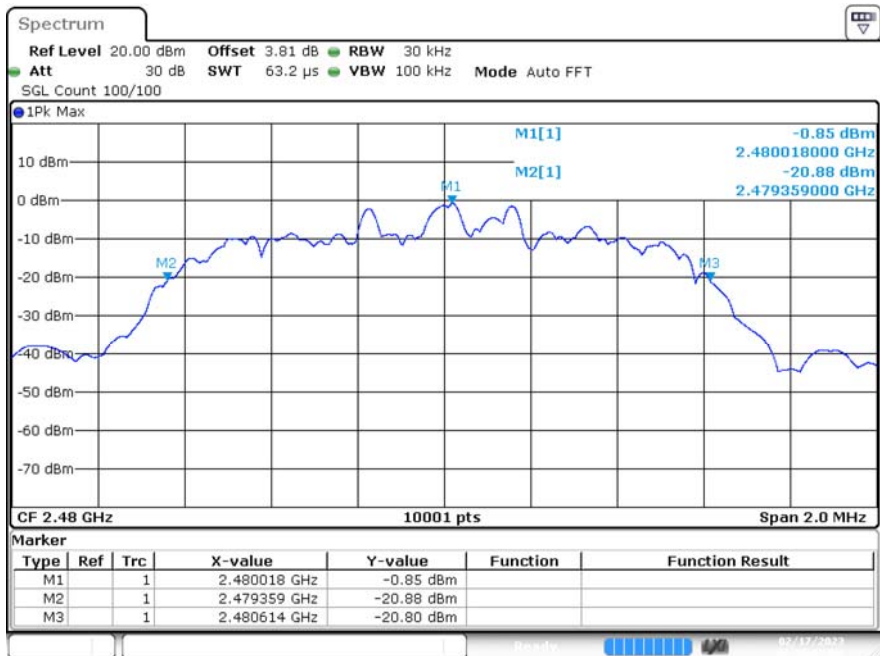
$\pi$ /4DQPSK/LCH



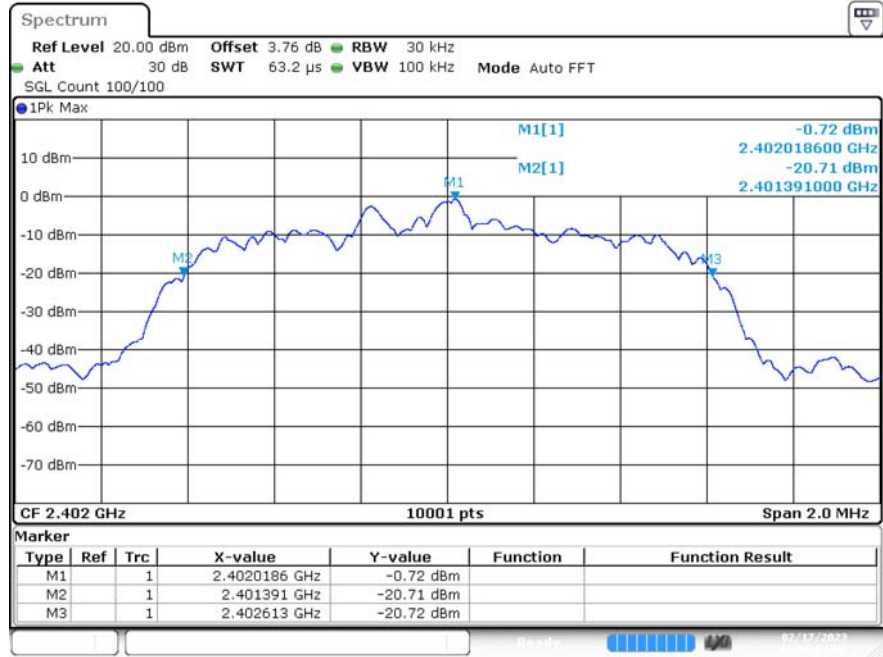
$\pi/4$ DQPSK/MCH



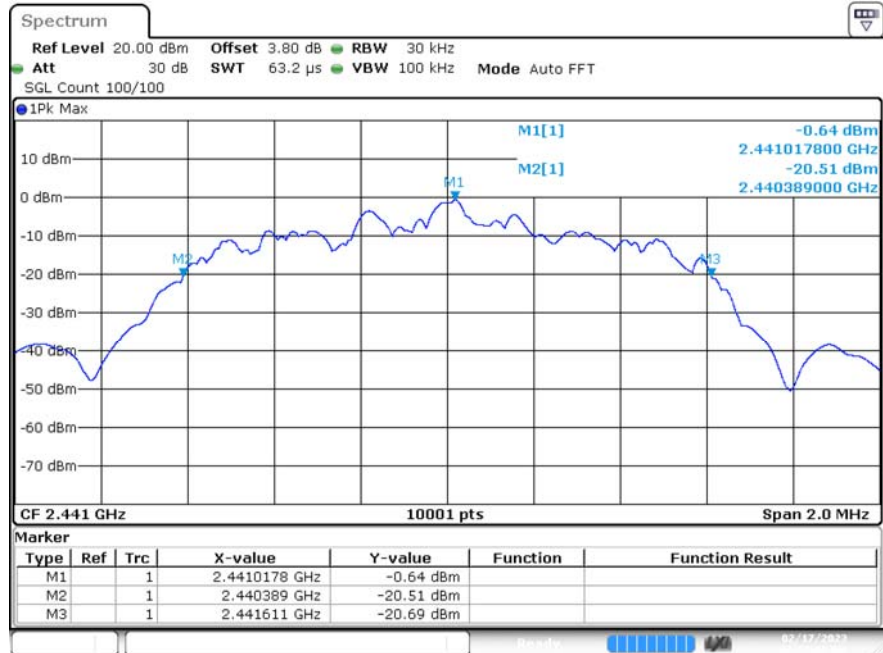
$\pi/4$ DQPSK/HCH



8DPSK/LCH

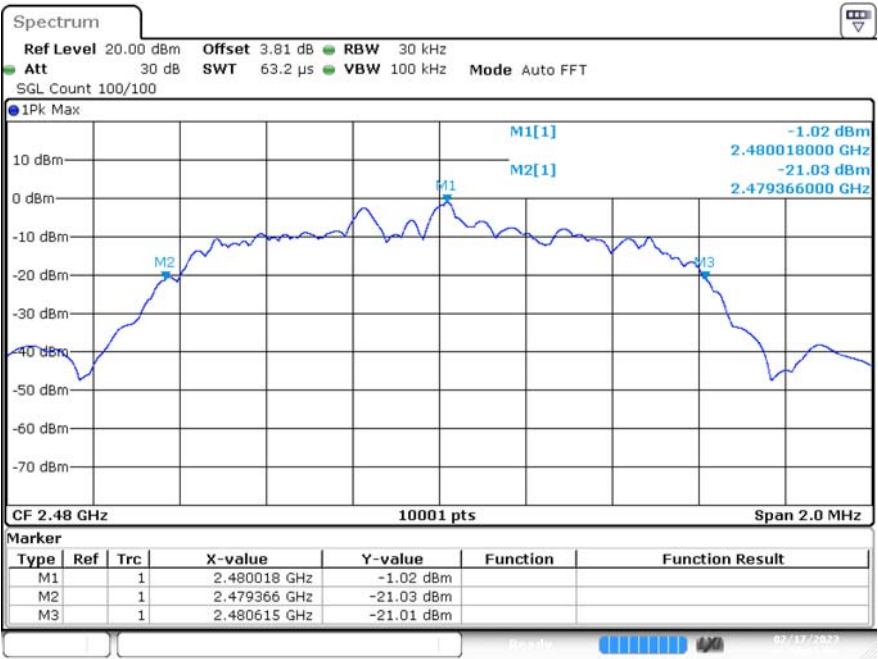


8DPSK/MCH





8DPSK/HCH

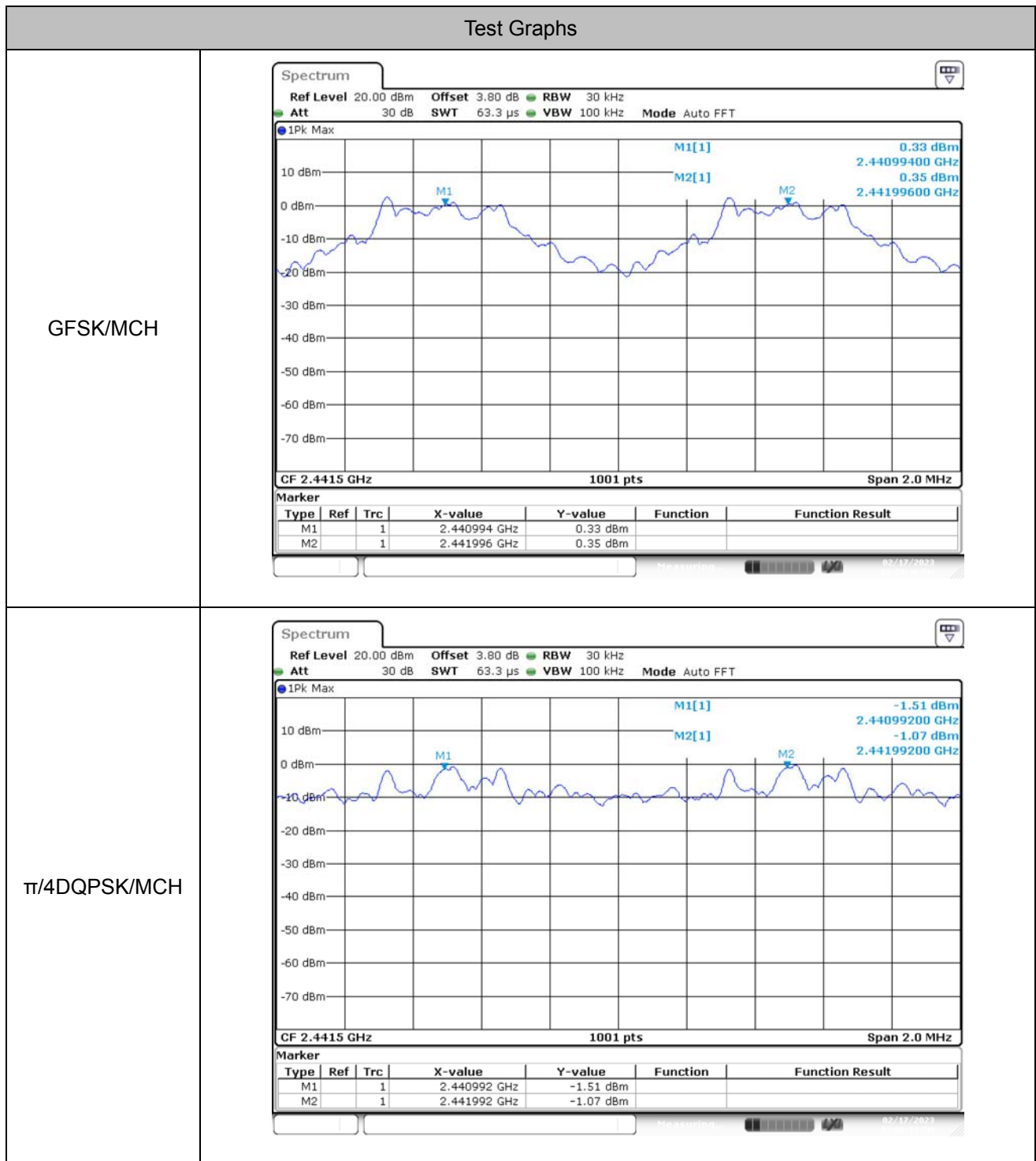


## 4 Carrier Frequency Separation

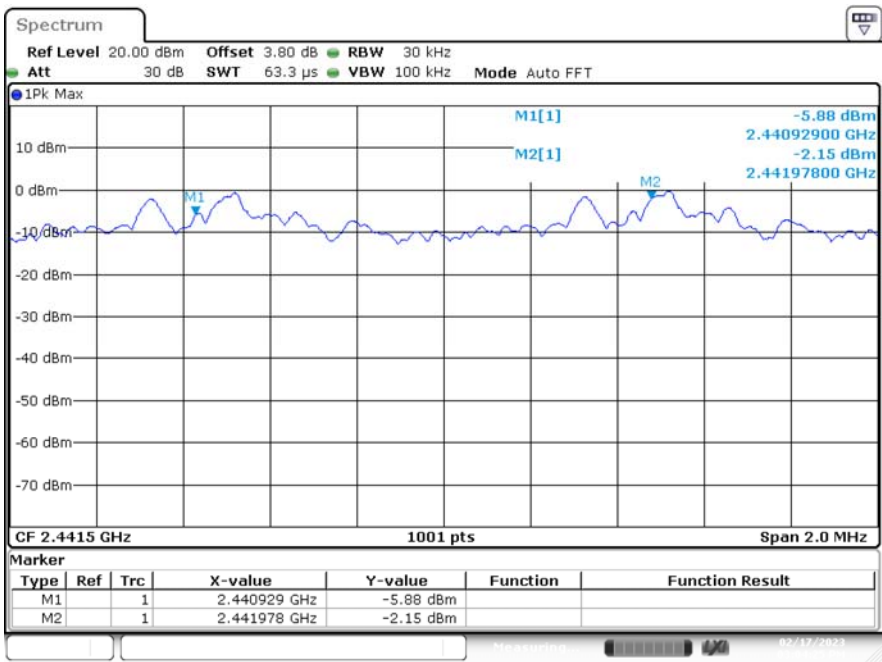
### 4.1 Test Result

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 1.002                              | 0.581       | Pass    |
| $\pi/4$ DQPSK | MCH      | 1                                  | 0.829       | Pass    |
| 8DPSK         | MCH      | 1.049                              | 0.815       | Pass    |

## 4.2 Test Graphs



8DPSK/MCH

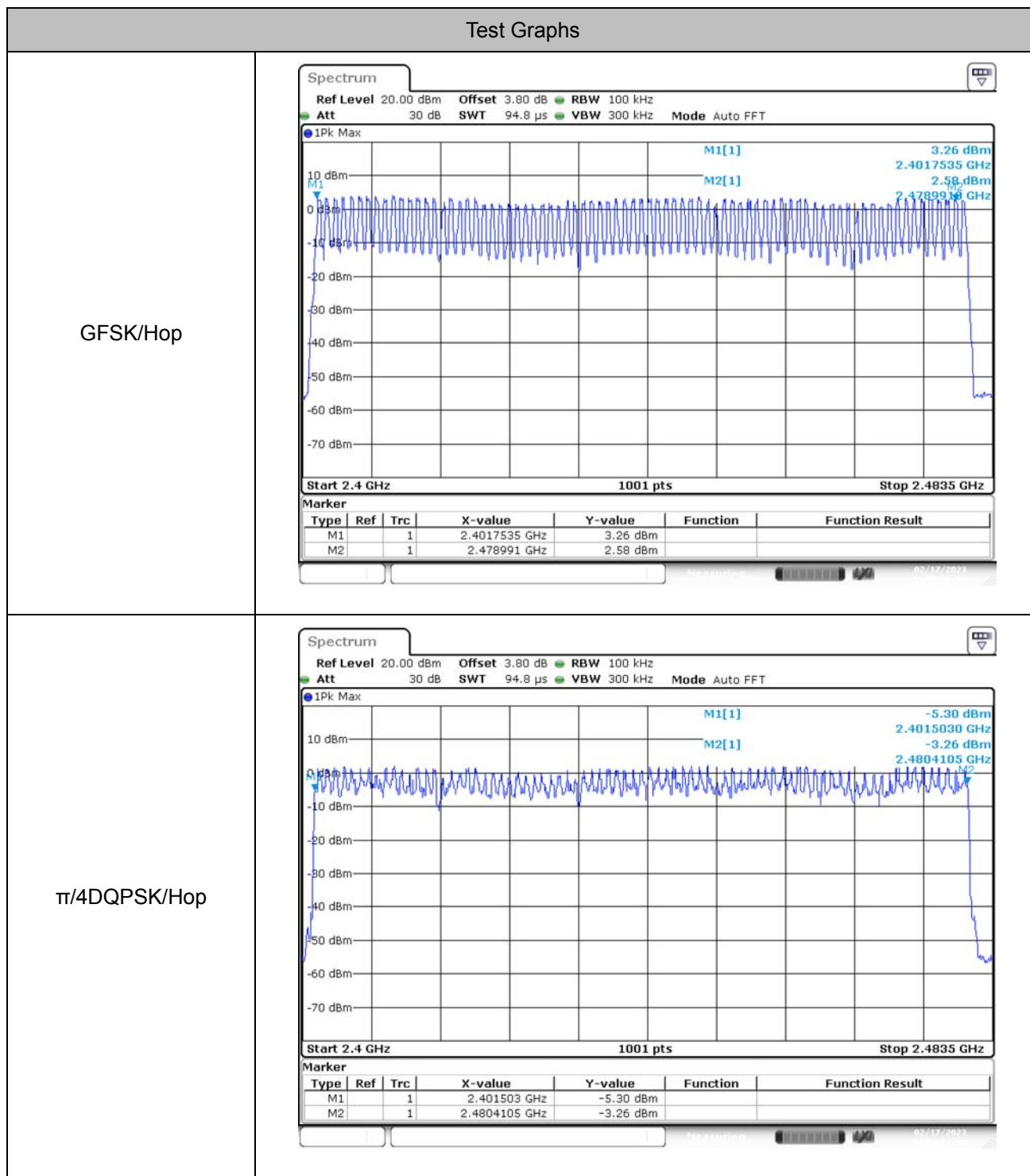


## 5 Hopping Channel Number

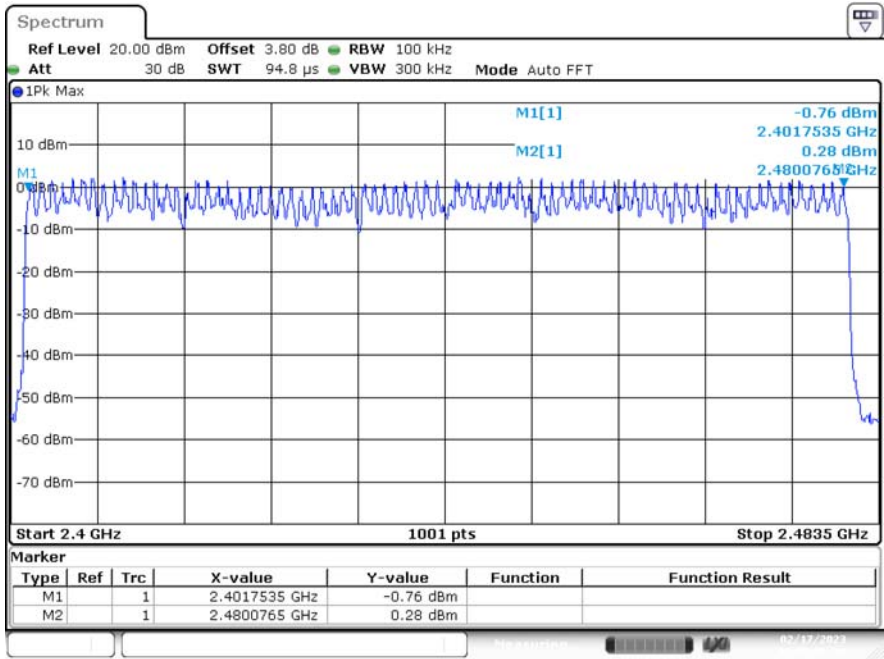
### 5.1 Test Result

| 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



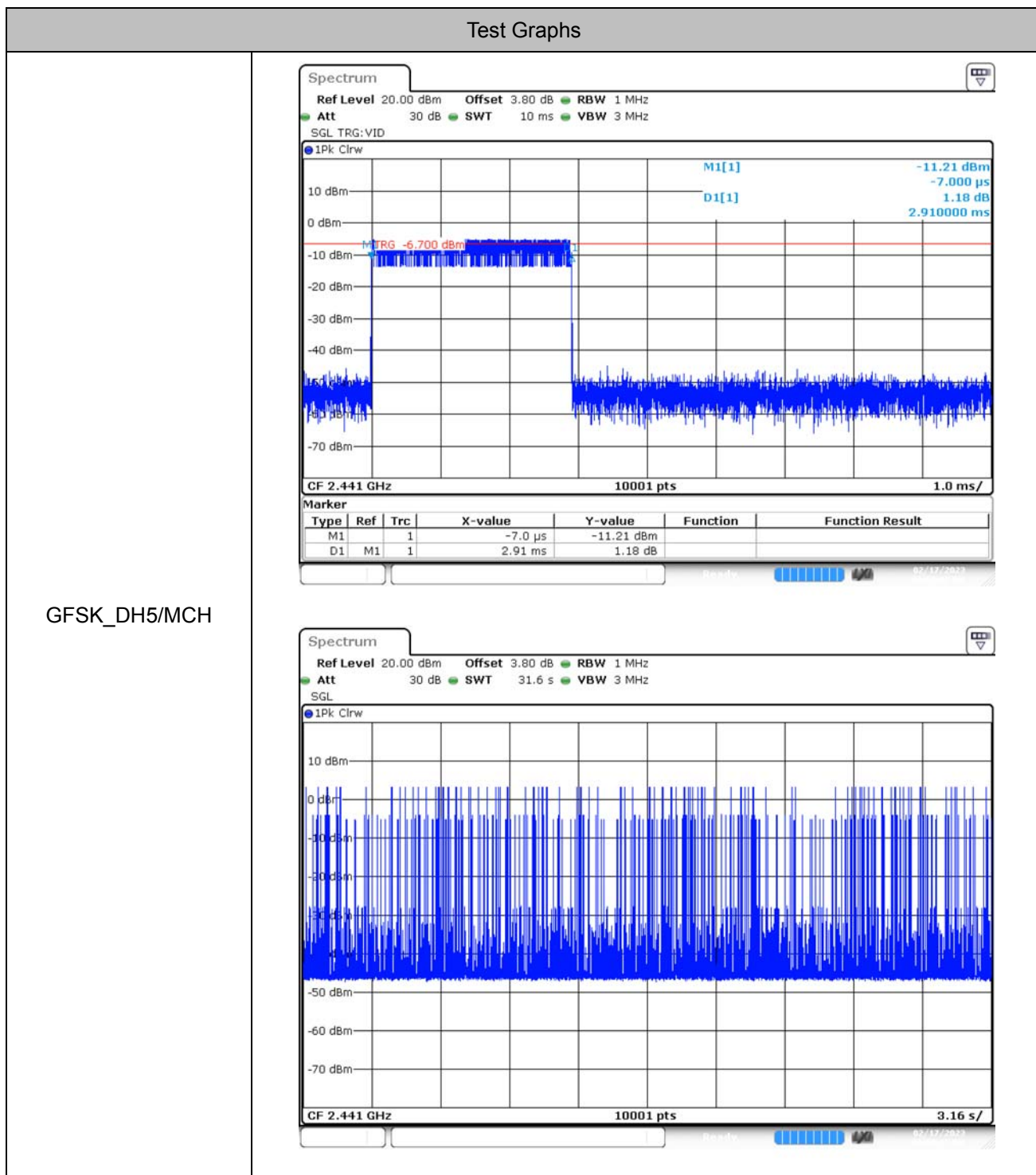
## 6 Dwell Time

### 6.1 Test Result

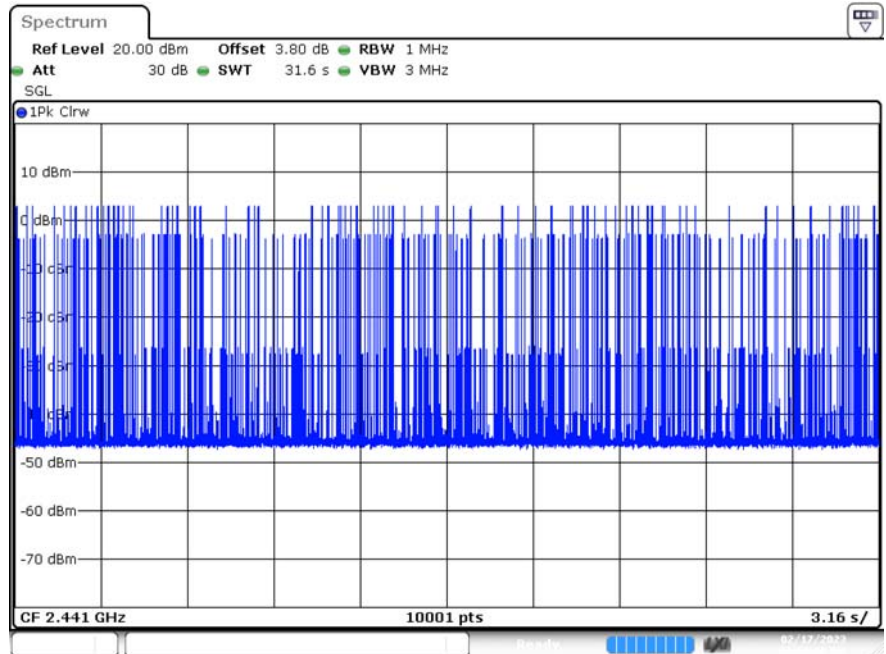
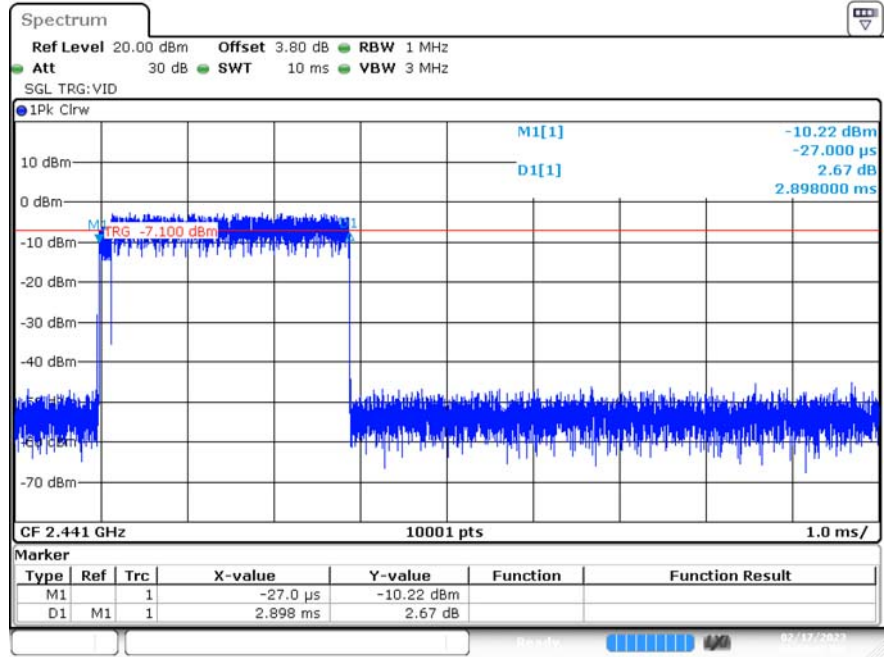
| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit<br>[s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|--------------|---------|
| GFSK          | DH5    | MCH     | 2.91                       | 107                   | 311.37         | 0.4          | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.898                      | 98                    | 284.004        | 0.4          | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.898                      | 116                   | 336.168        | 0.4          | Pass    |



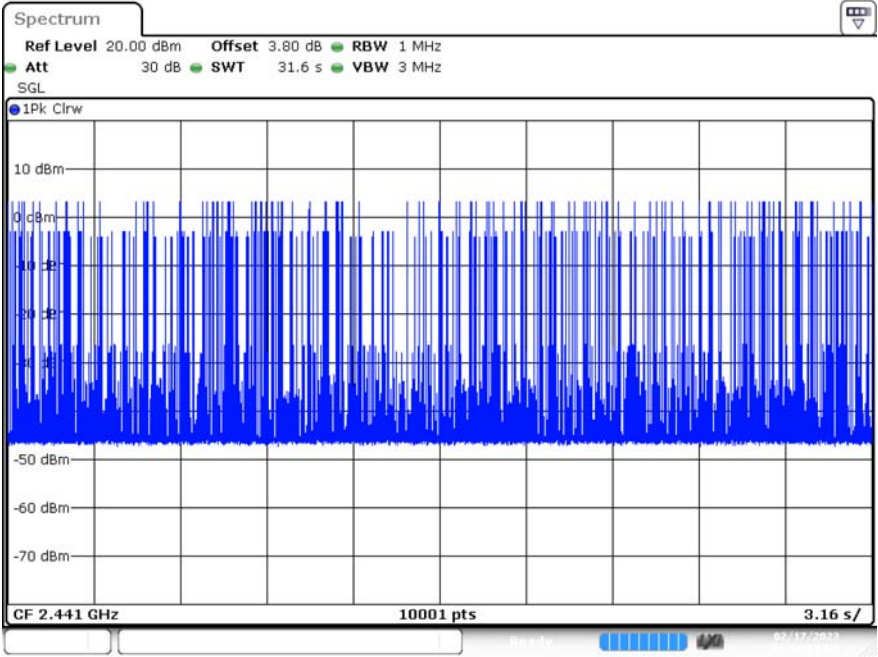
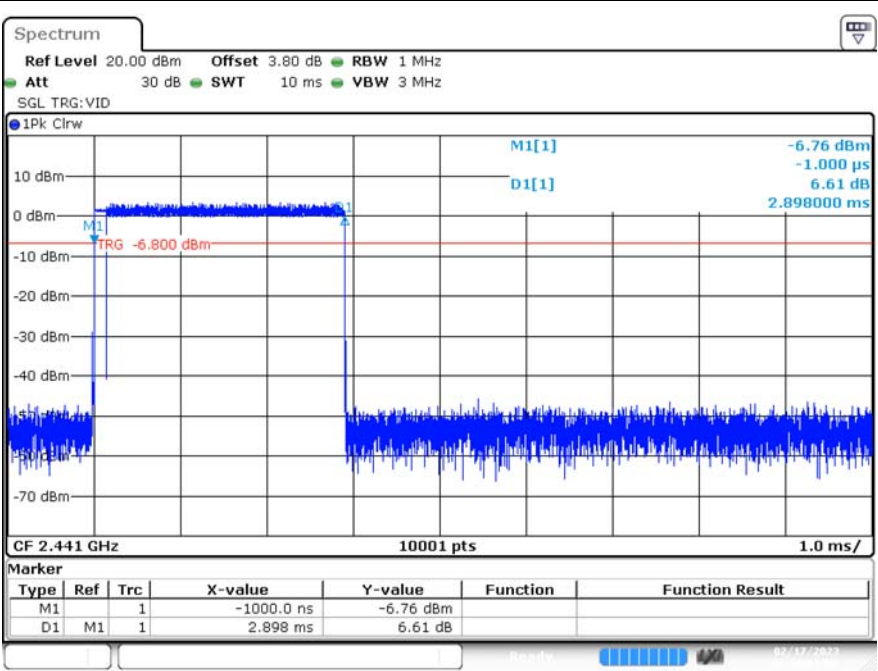
## 6.2 Test Graphs



$\pi/4$ DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH

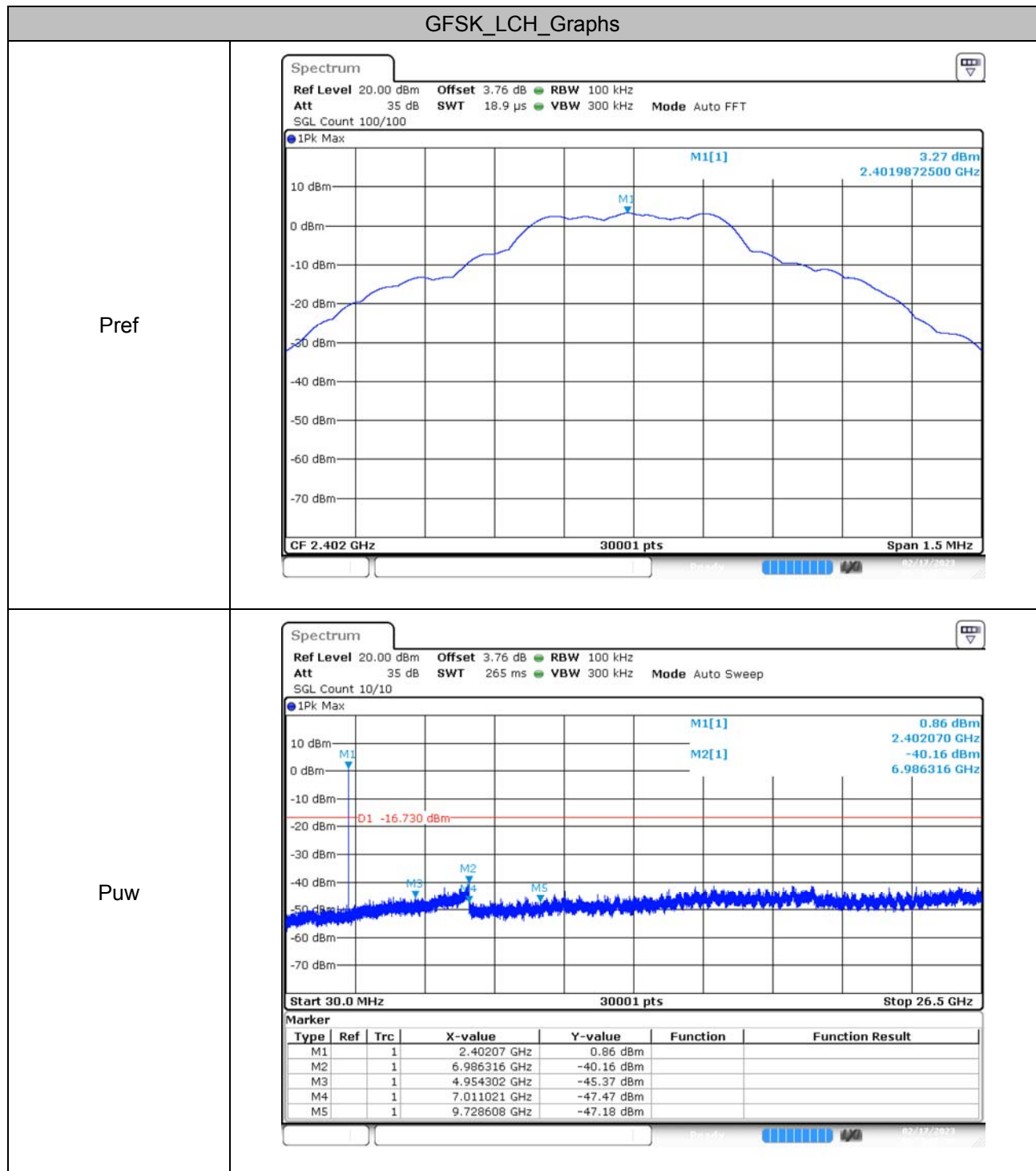


## 7 RF Conducted Spurious Emissions

### 7.1 Test Result

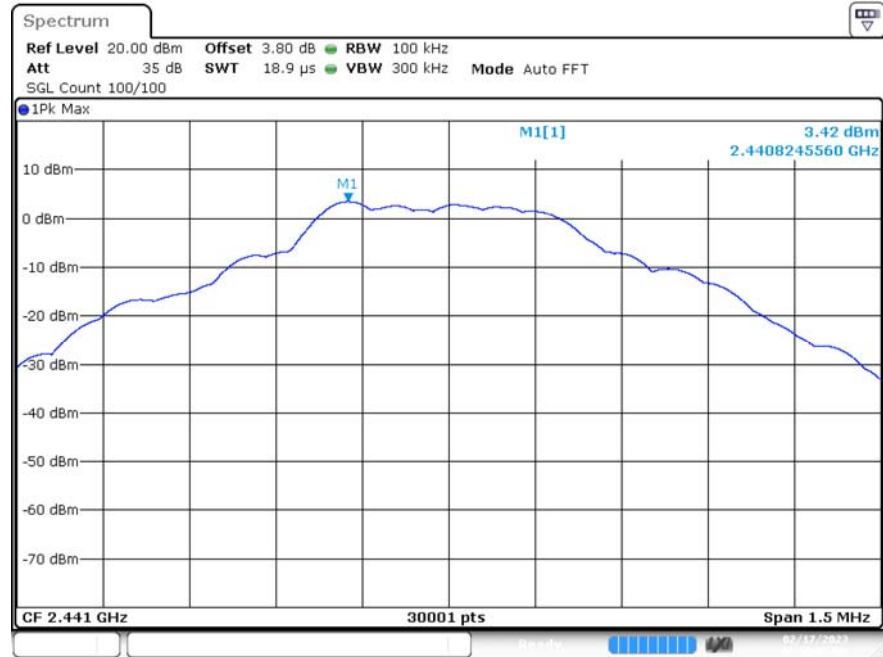
| Mode          | Channel | Max. Level<br>[dBc] | Limit<br>[dBc] | Verdict |
|---------------|---------|---------------------|----------------|---------|
| GFSK          | LCH     | -43.43              | -20            | Pass    |
|               | MCH     | -43.94              | -20            | Pass    |
|               | HCH     | -41.59              | -20            | Pass    |
| $\pi/4$ DQPSK | LCH     | -41.25              | -20            | Pass    |
|               | MCH     | -42.29              | -20            | Pass    |
|               | HCH     | -42.47              | -20            | Pass    |
| 8DPSK         | LCH     | -42.53              | -20            | Pass    |
|               | MCH     | -41.48              | -20            | Pass    |
|               | HCH     | -41.69              | -20            | Pass    |

## 7.2 Test Graphs

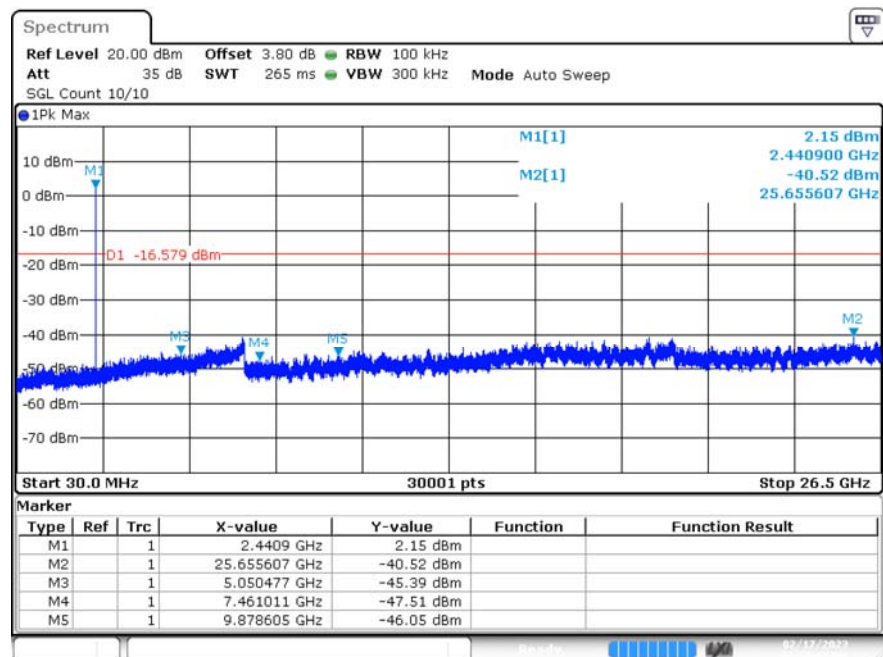


## GFSK\_MCH\_Graphs

Pref

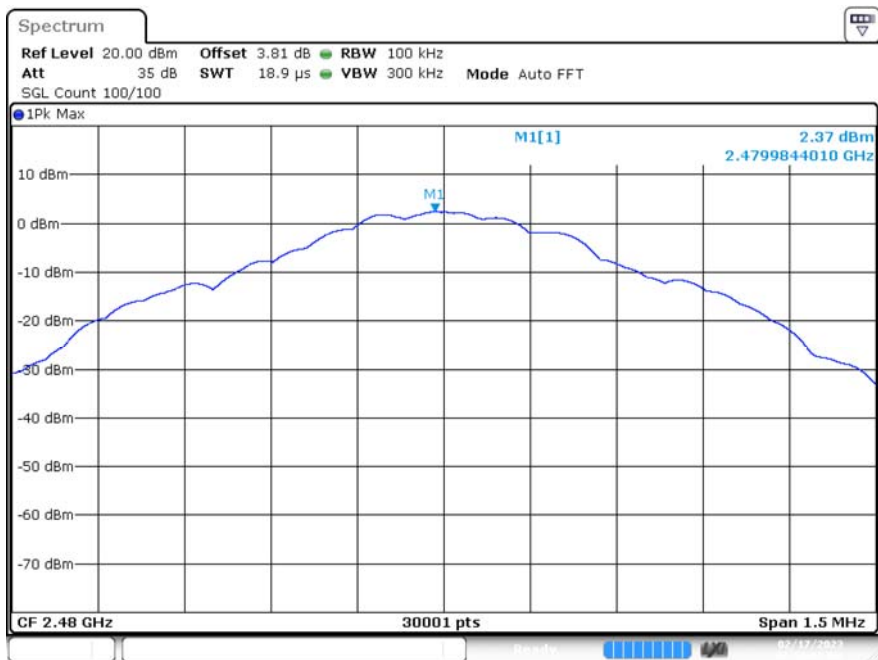


Puw

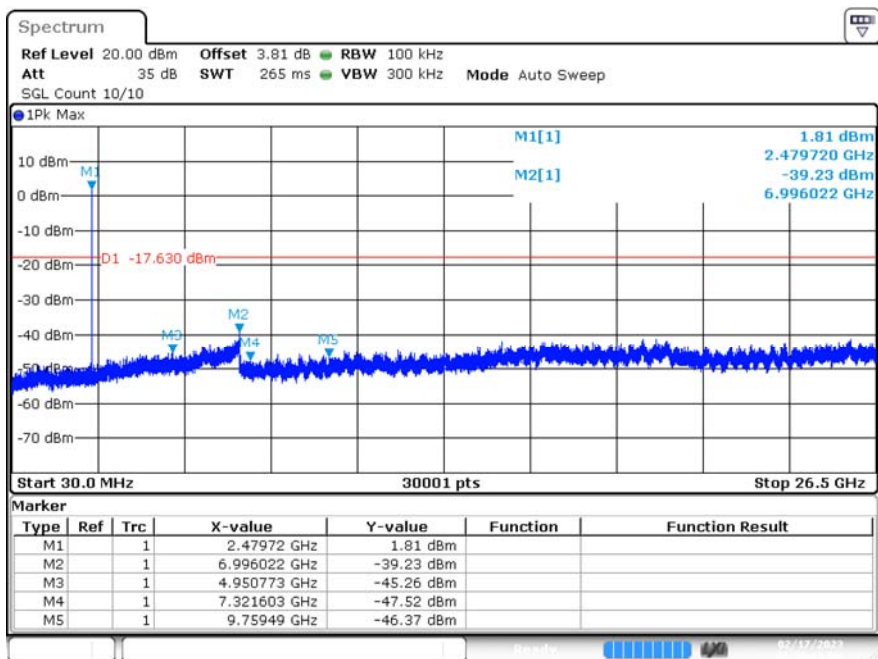


## GFSK\_HCH\_Graphs

Pref



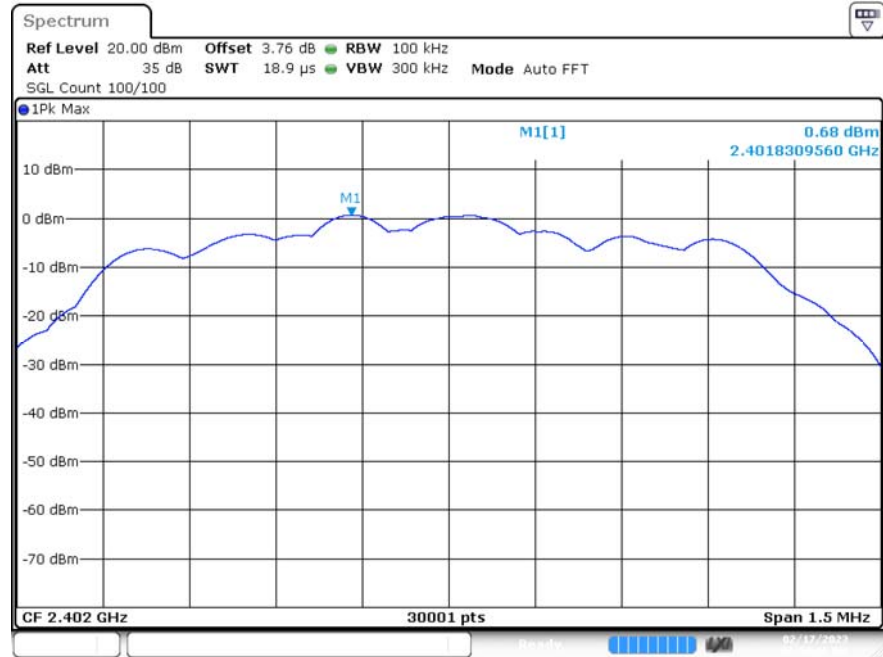
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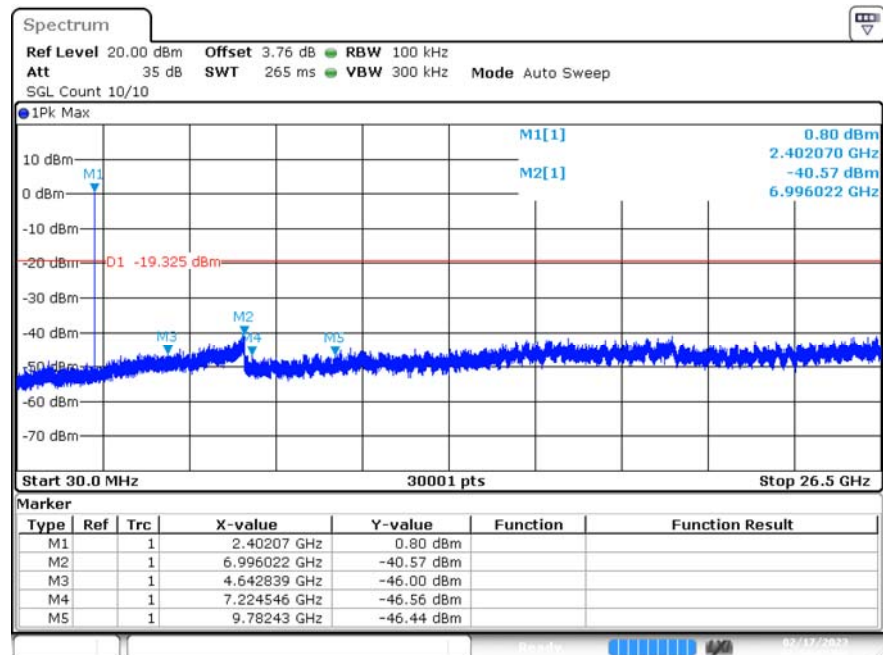


$\pi/4$ DQPSK\_LCH\_Graphs

Pref



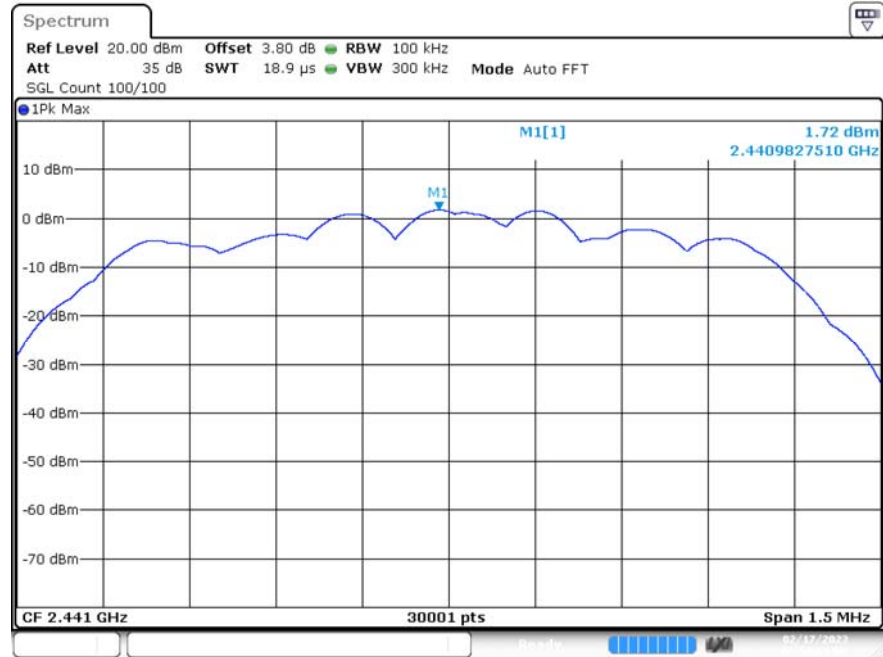
Puw



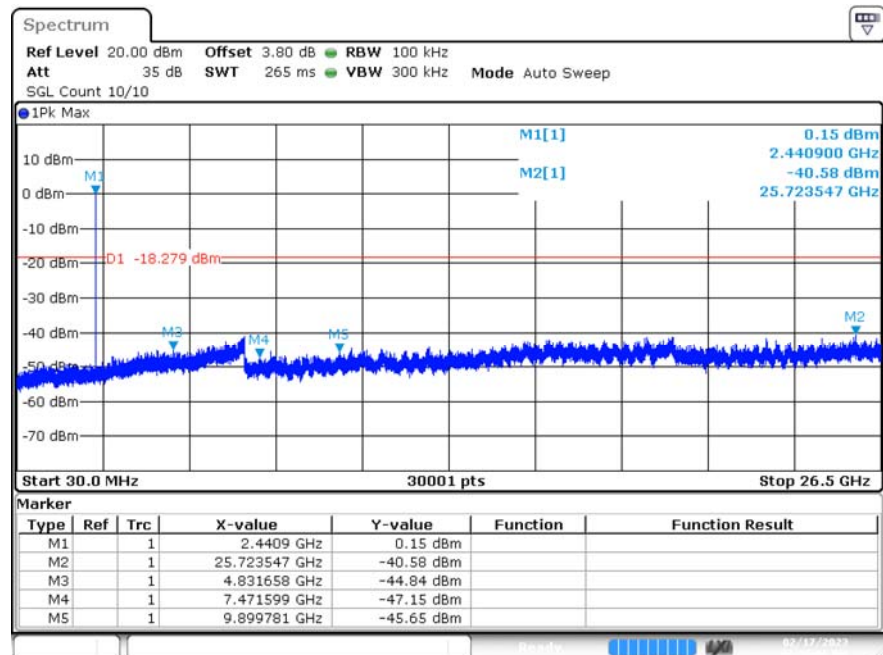


### $\pi$ /4DQPSK\_MCH\_Graphs

Pref

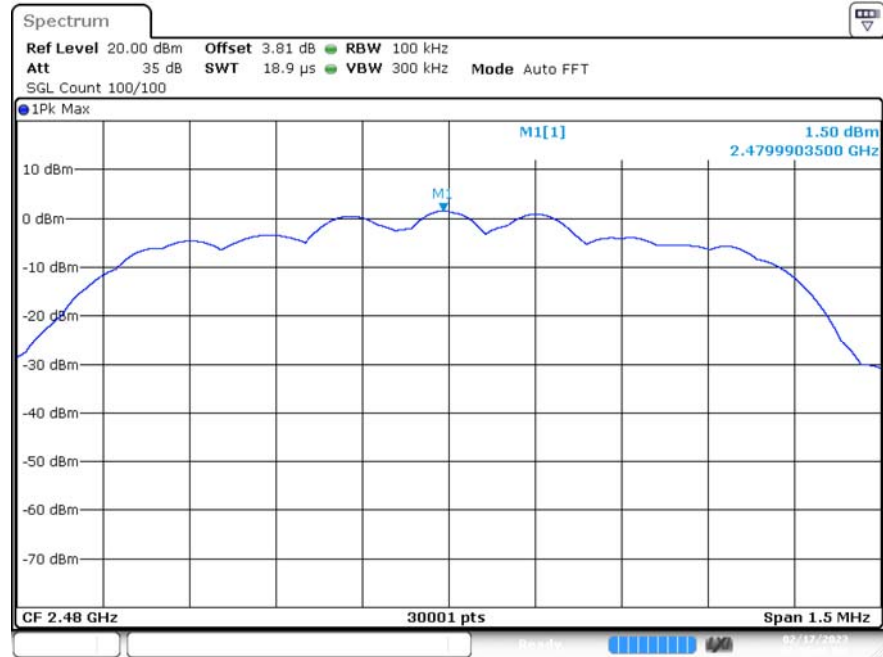


Puw

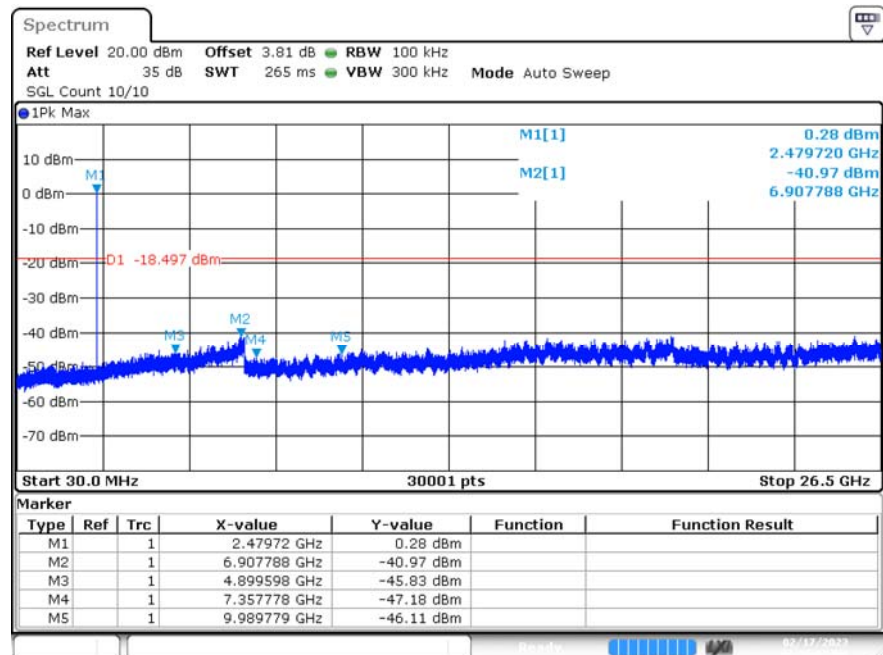


### $\pi$ /4DQPSK\_HCH\_Graphs

Pref

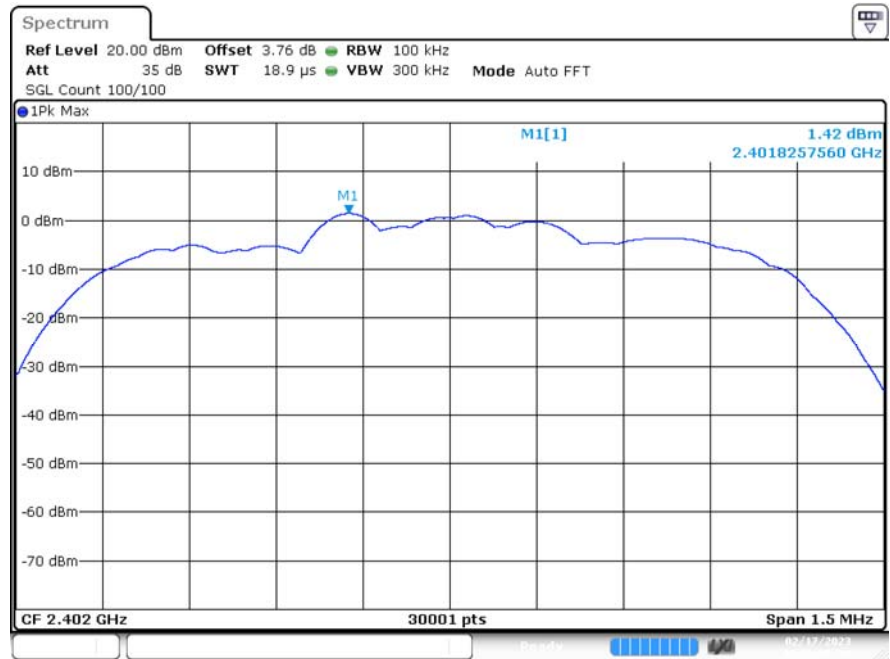


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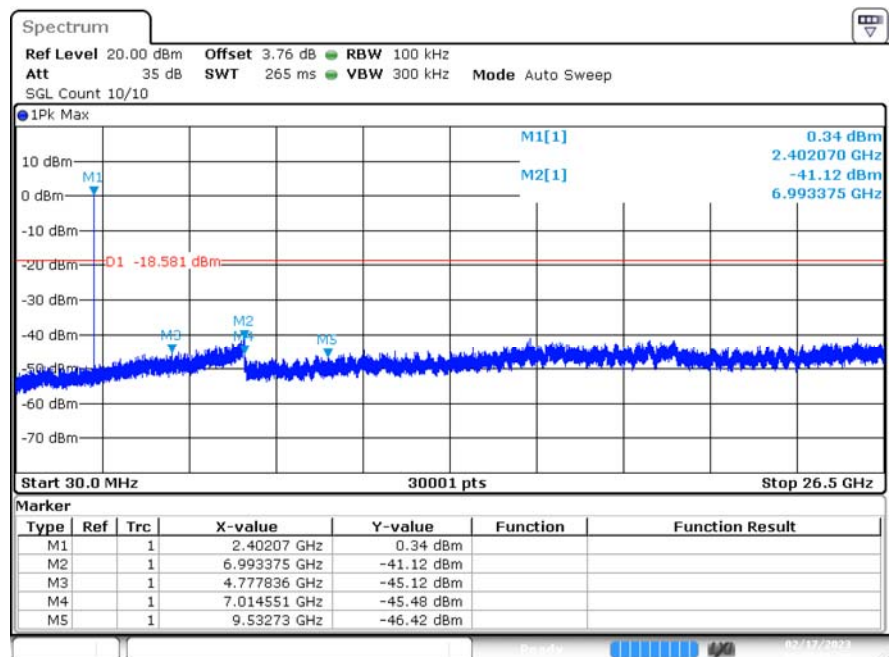


## 8DPSK\_LCH\_Graphs

Pref

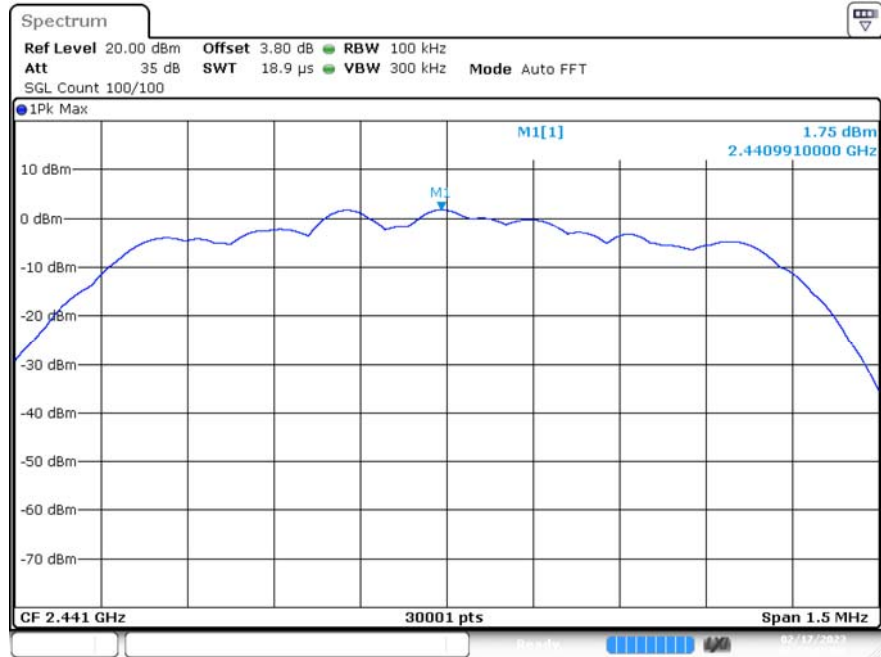


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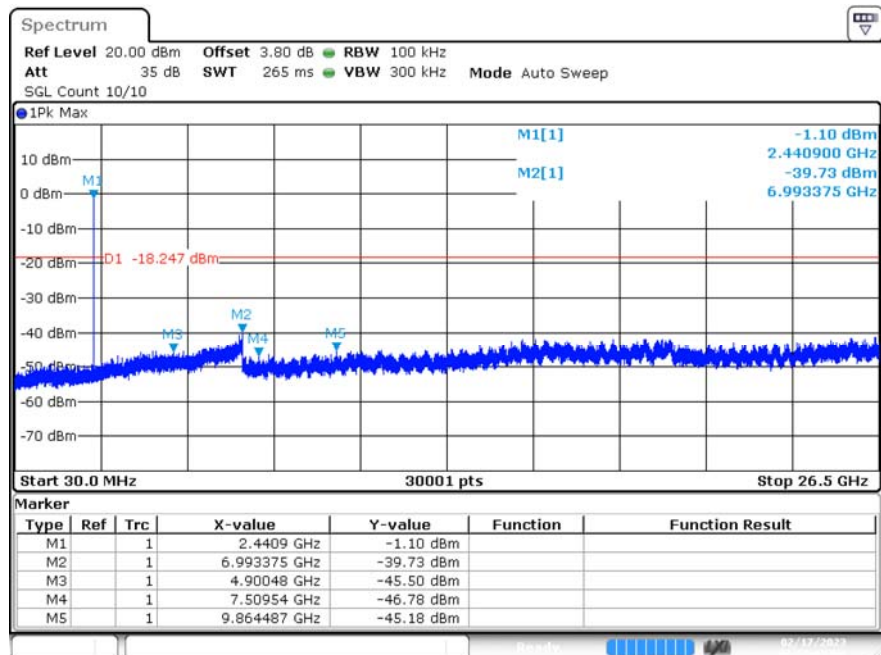


### 8DPSK\_MCH\_Graphs

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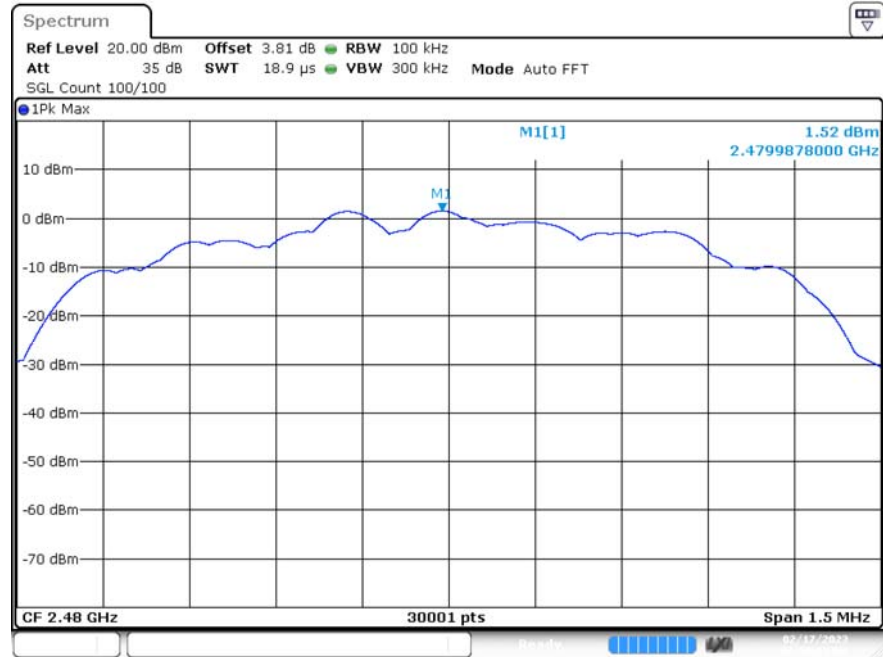


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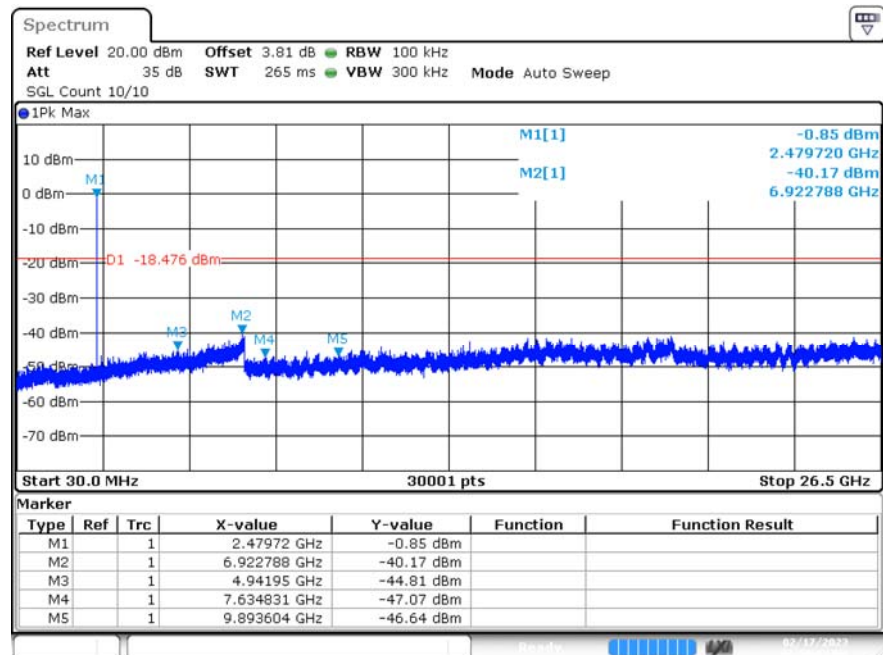


## 8DPSK\_HCH\_Graphs

Pref



Puw

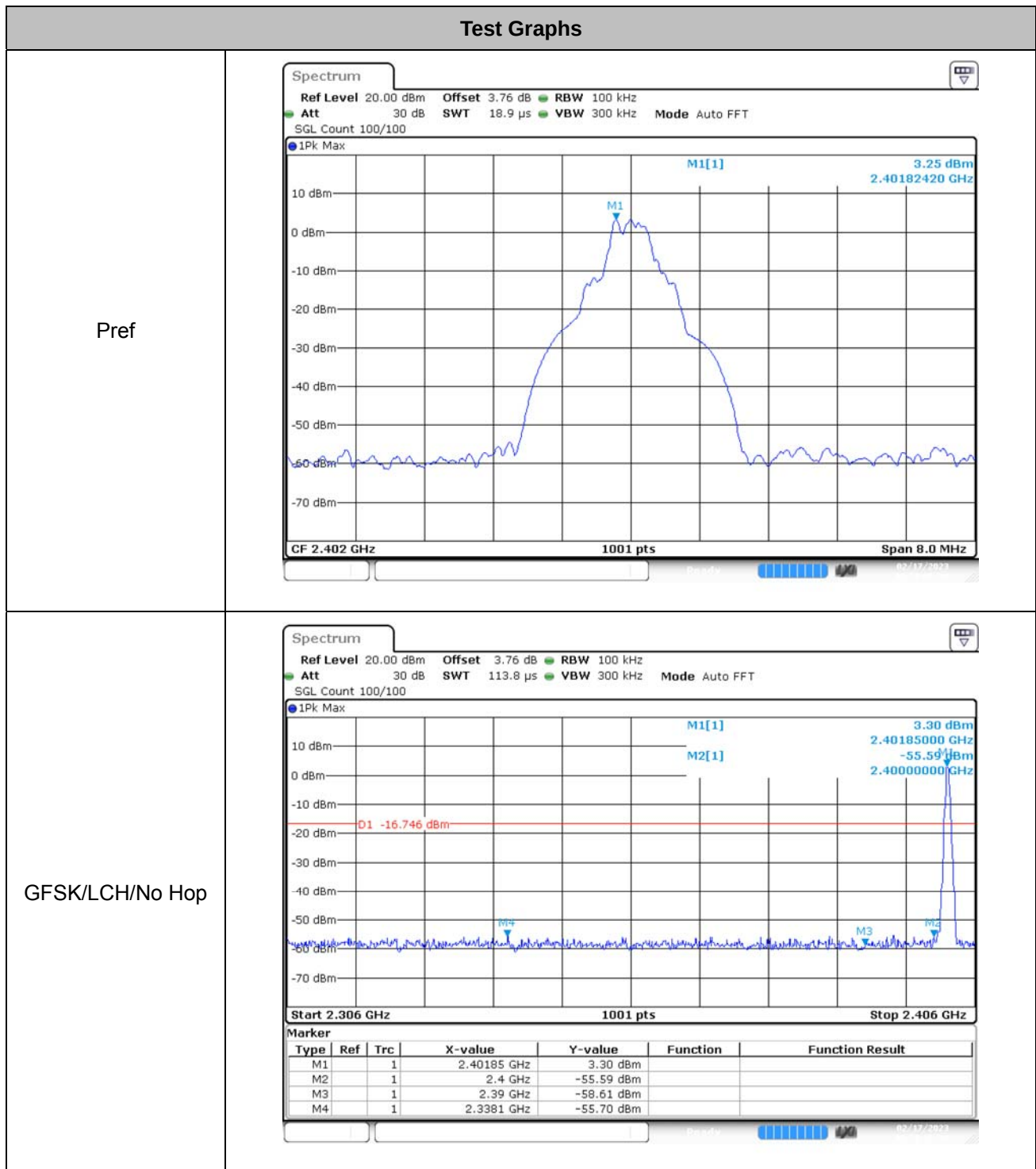


## 8 Band-edge for RF Conducted Emissions

### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -58.94                   | -20         | Pass    |
|               |         |                         | On                | -57.95                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -57.89                   | -20         | Pass    |
|               |         |                         | On                | -57.13                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -56.45                   | -20         | Pass    |
|               |         |                         | On                | -56.01                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -56.54                   | -20         | Pass    |
|               |         |                         | On                | -54.48                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -55.97                   | -20         | Pass    |
|               |         |                         | On                | -56.22                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -55.39                   | -20         | Pass    |
|               |         |                         | On                | -54.84                   | -20         | Pass    |

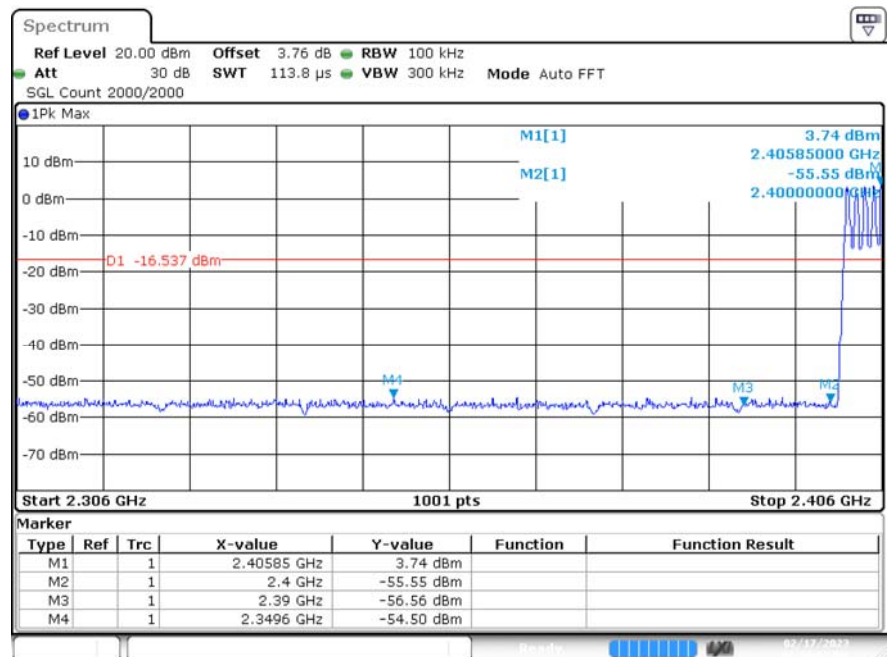
## 8.2 Test Graphs



Ref

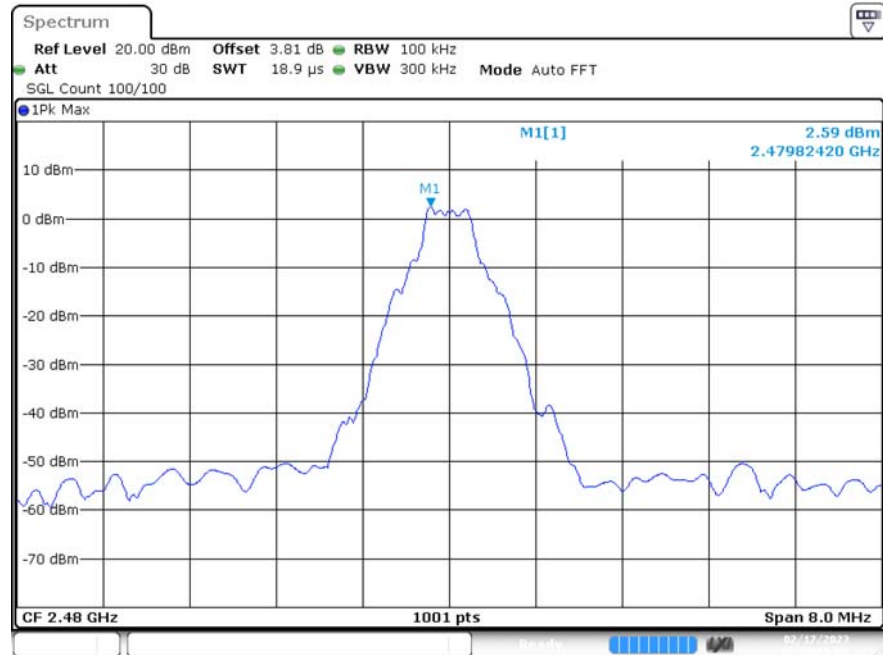


GFSK/LCH/Hop

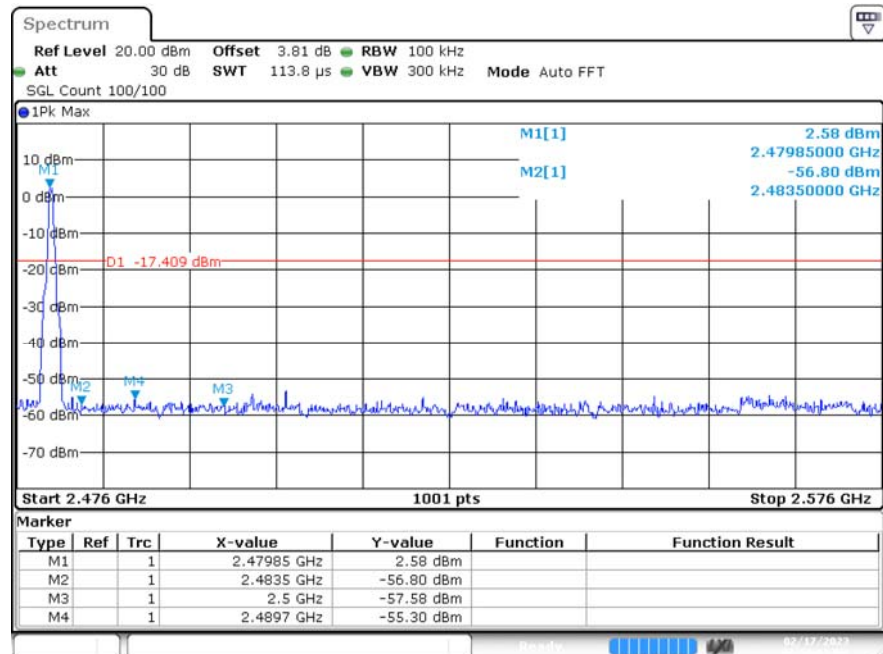




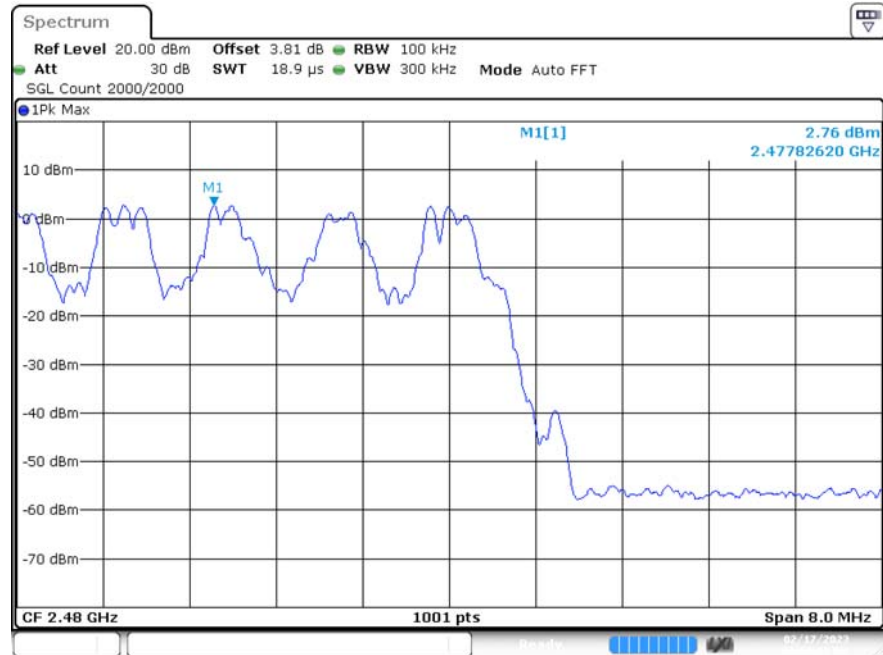
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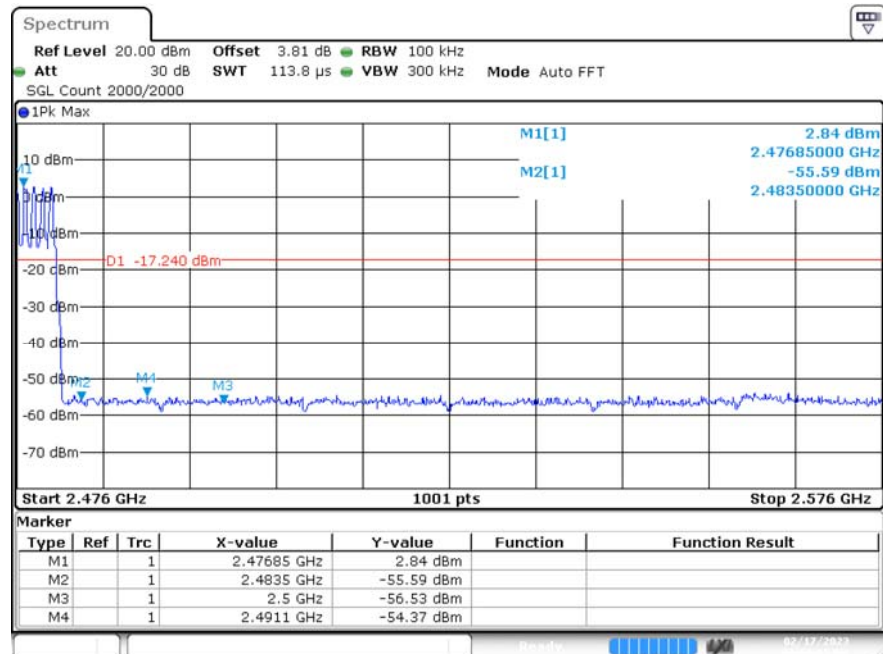
GFSK/HCH/No Hop



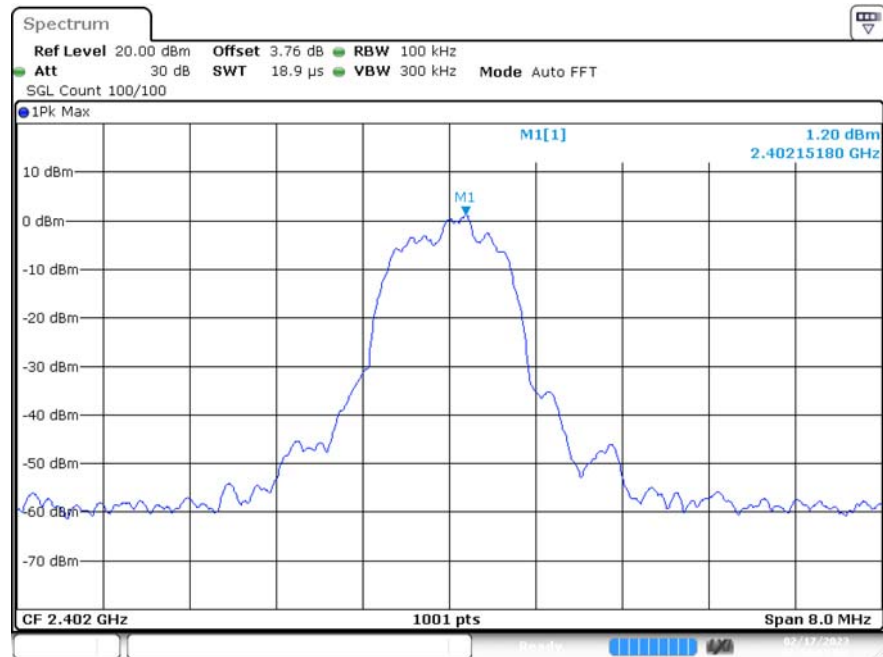
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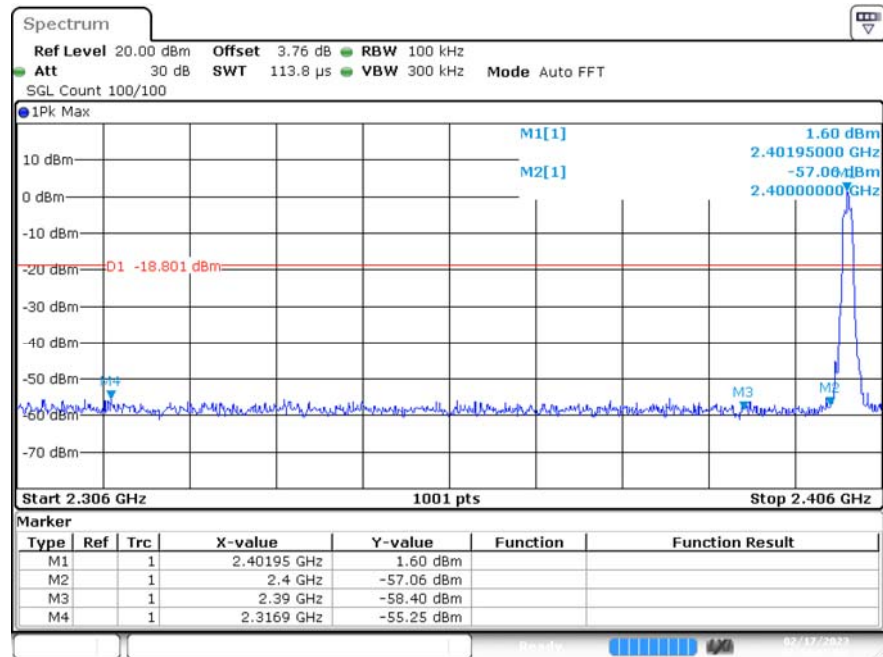
GFSK/HCH/Hop



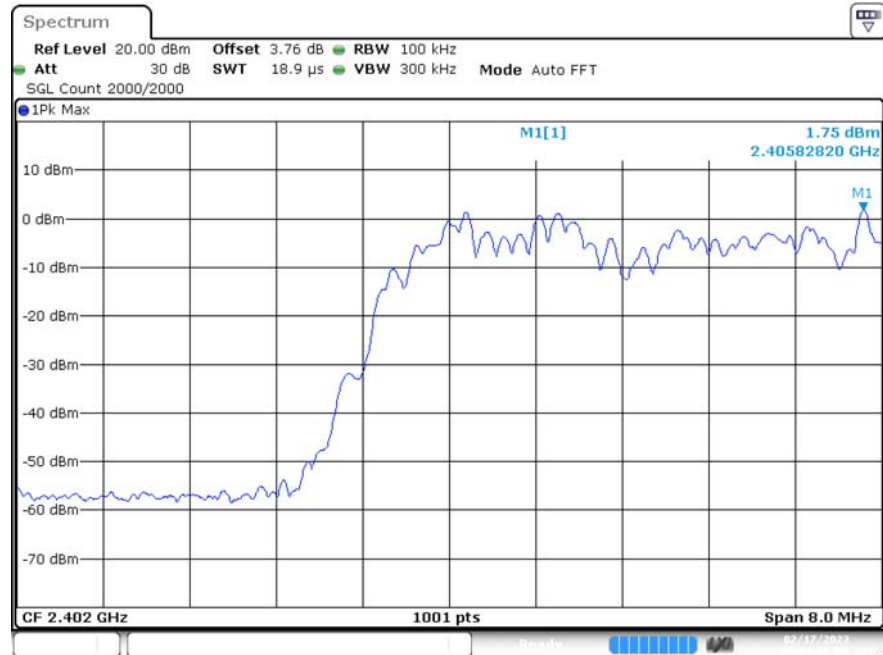
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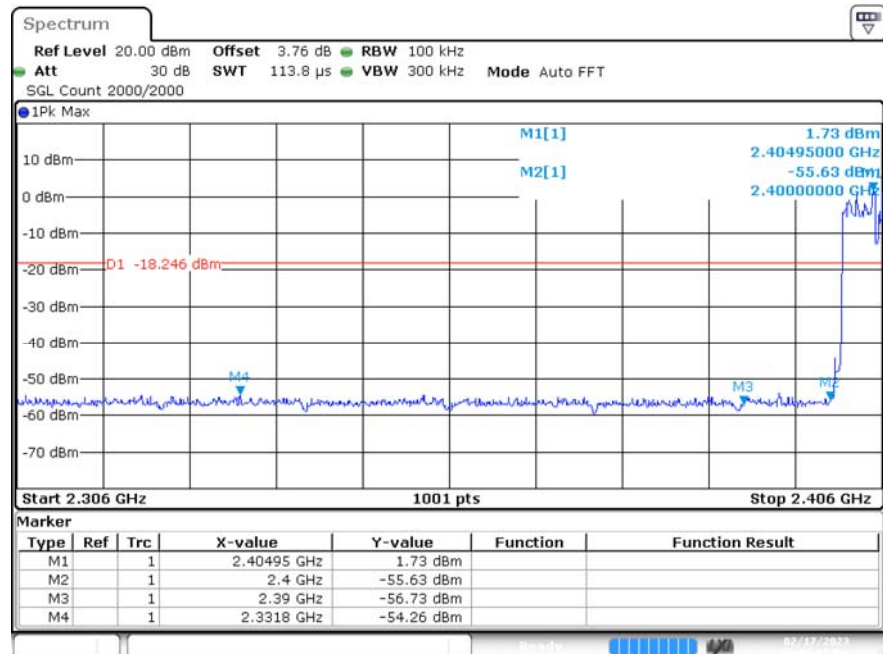
$\pi/4$ DQPSK/LCH/No  
Hop



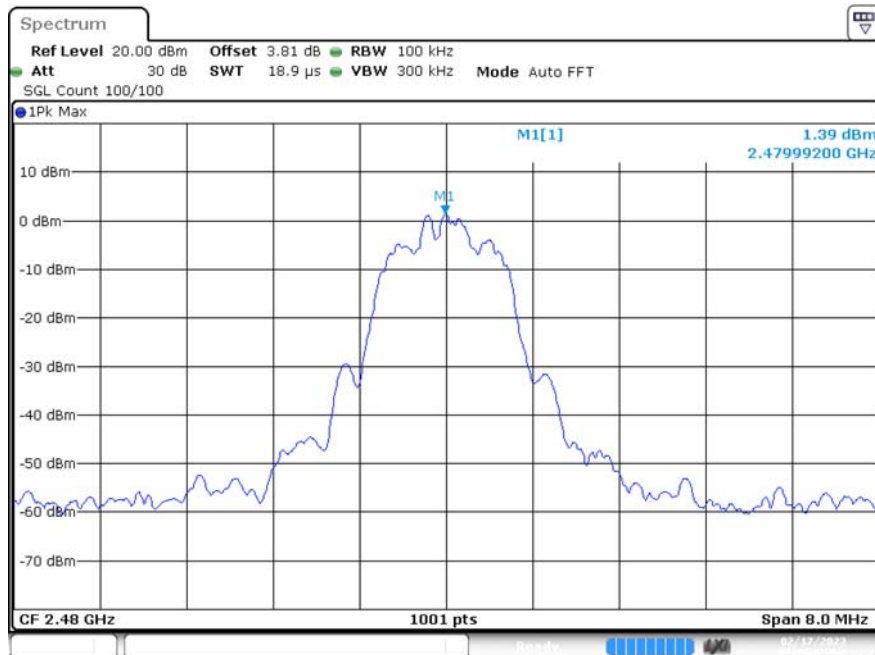
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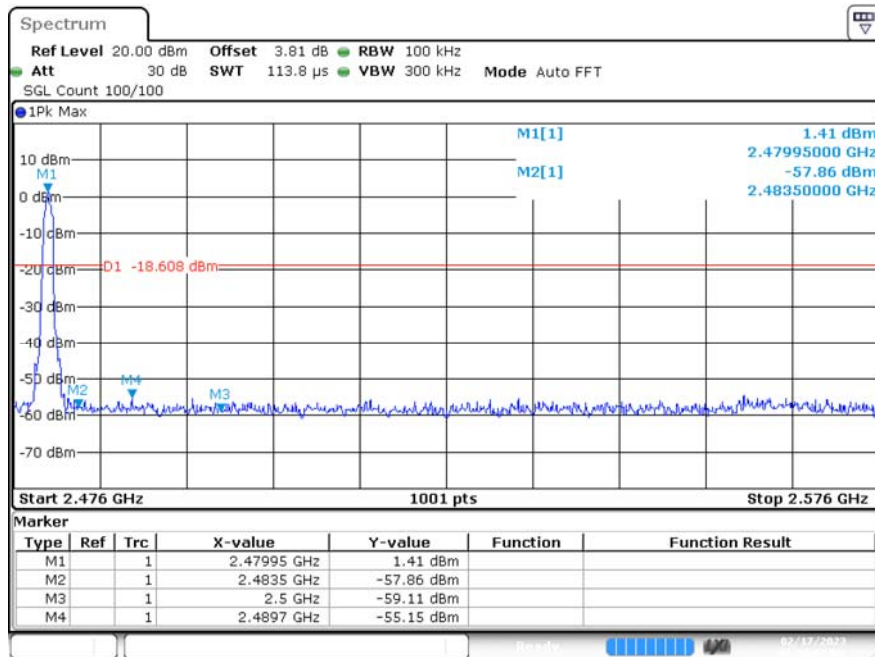
$\pi/4$ DQPSK/LCH/Hop



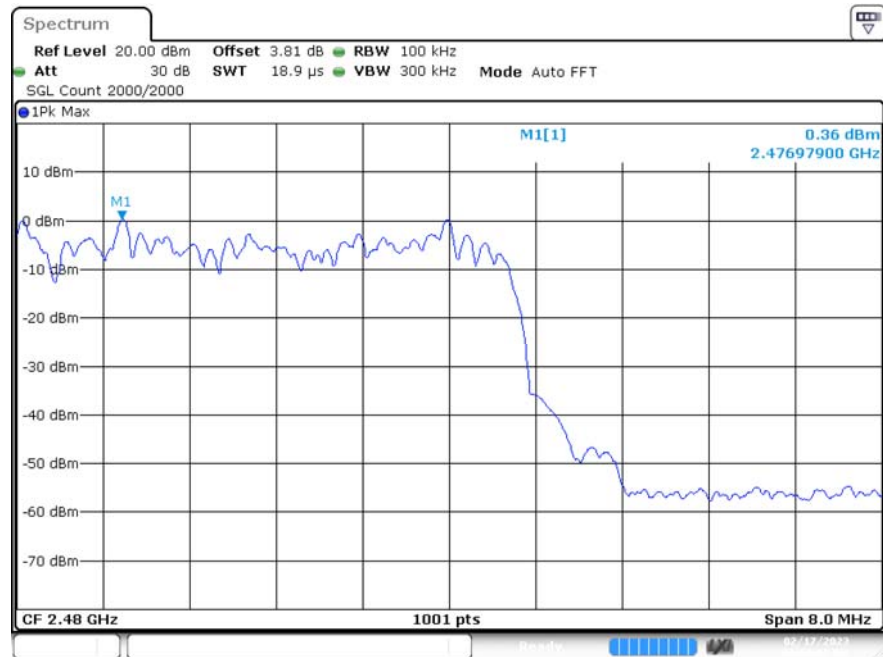
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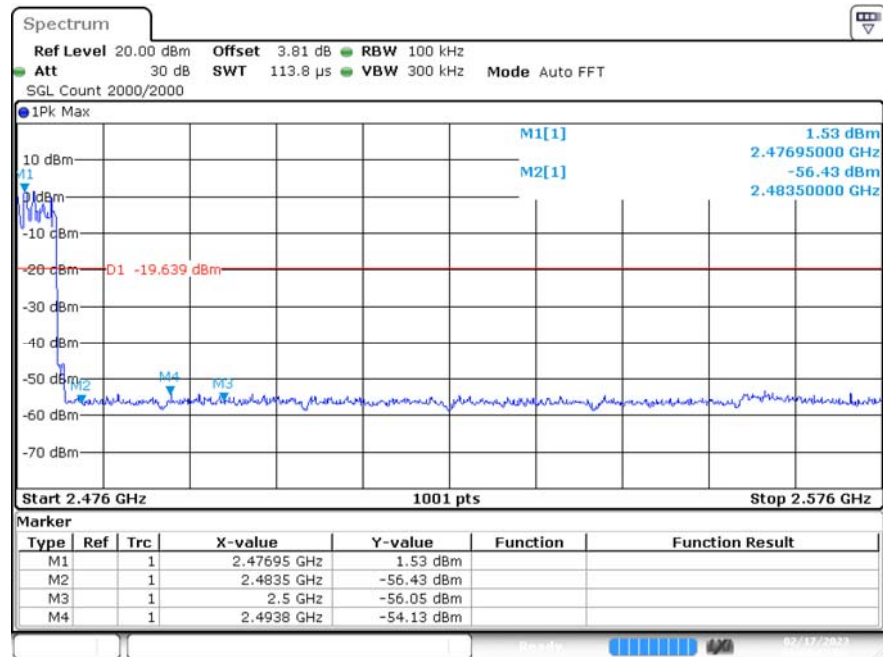
$\pi/4$ DQPSK/HCH/No  
Hop



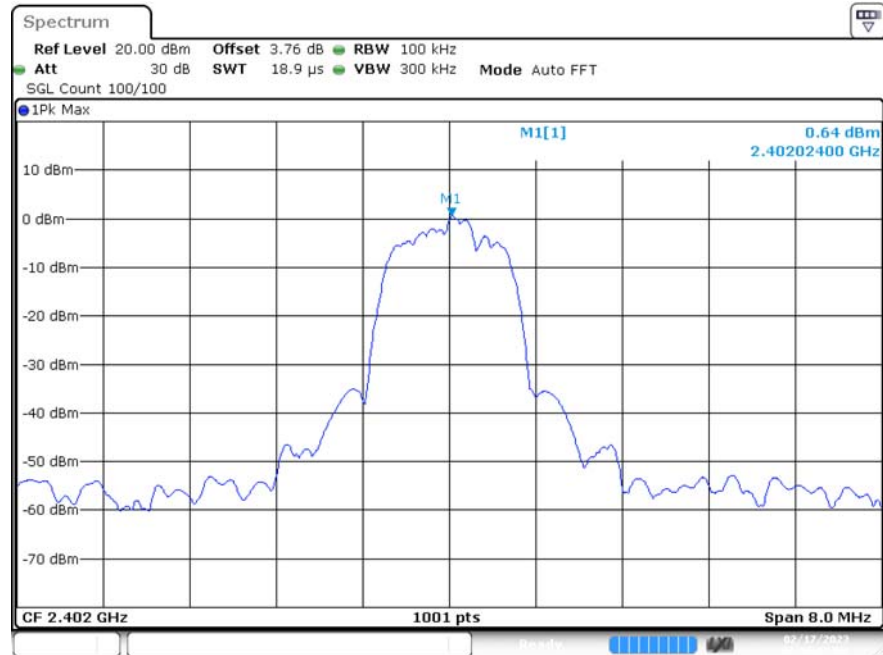
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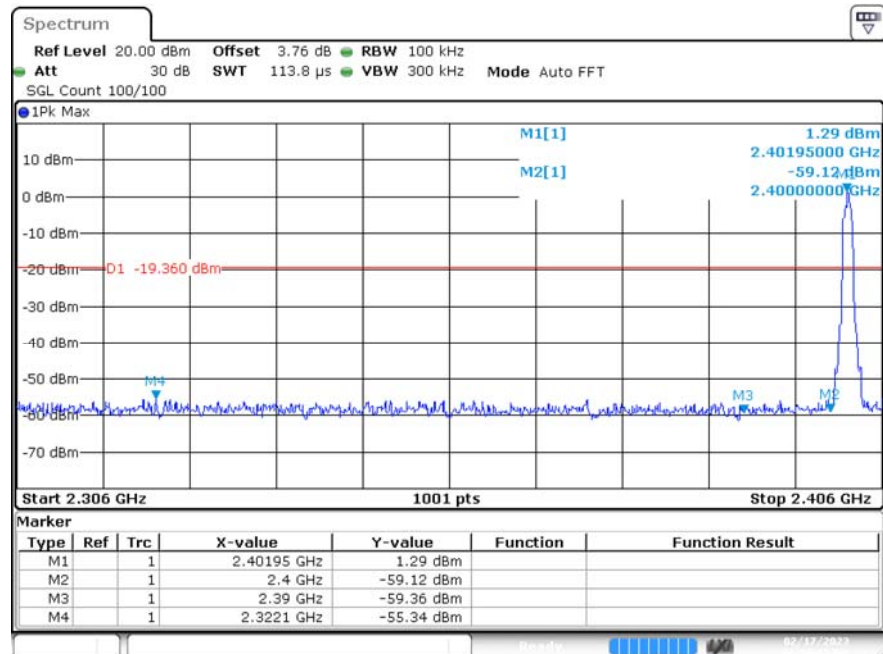
$\pi/4$ DQPSK/HCH/Hop



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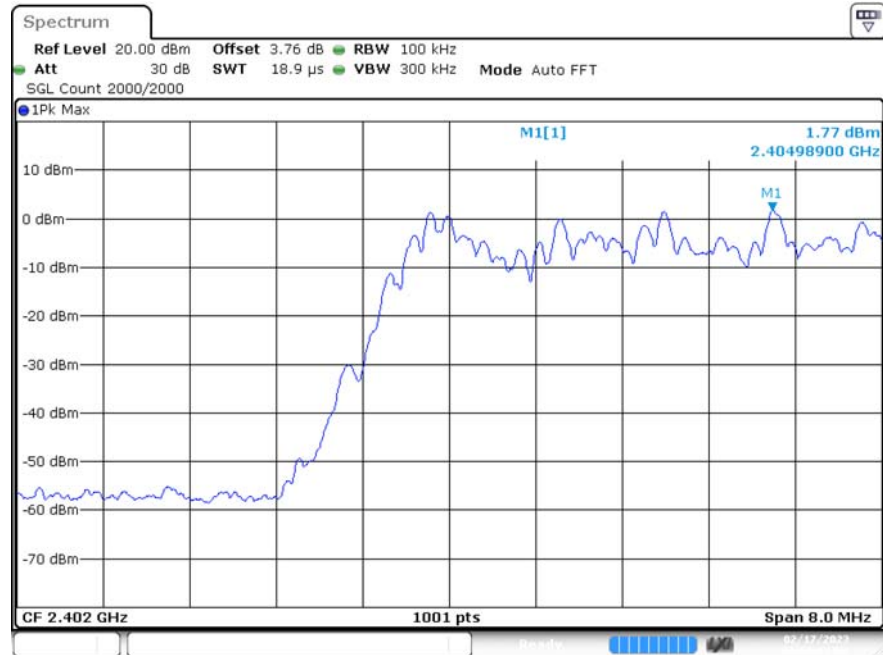


8DPSK/LCH/No Hop

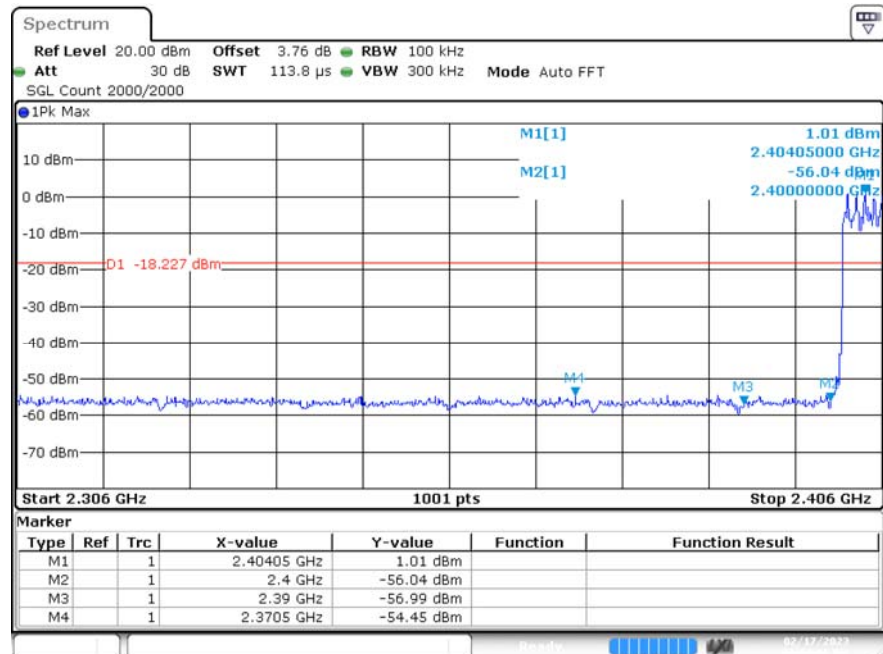




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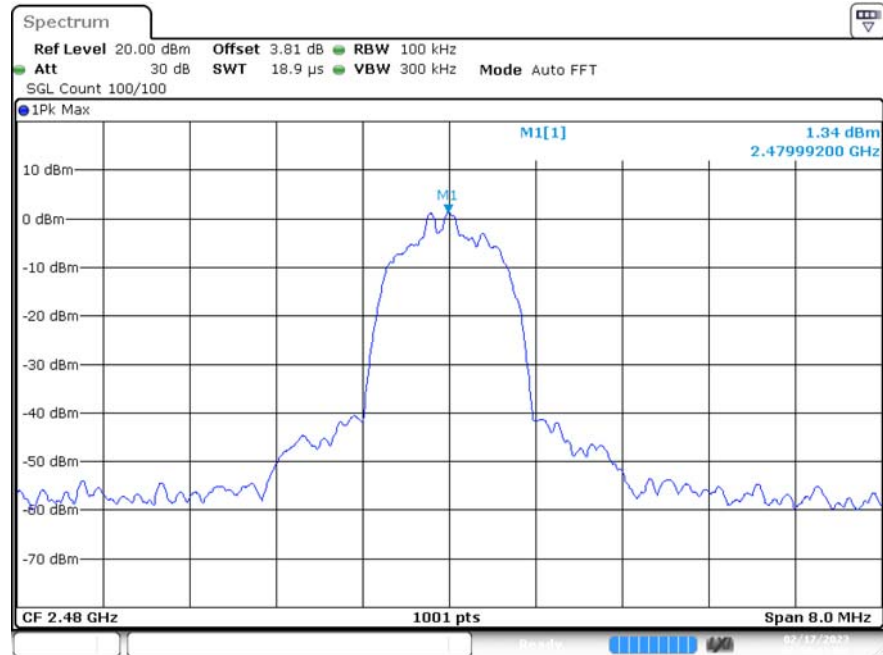


8DPSK/LCH/Hop

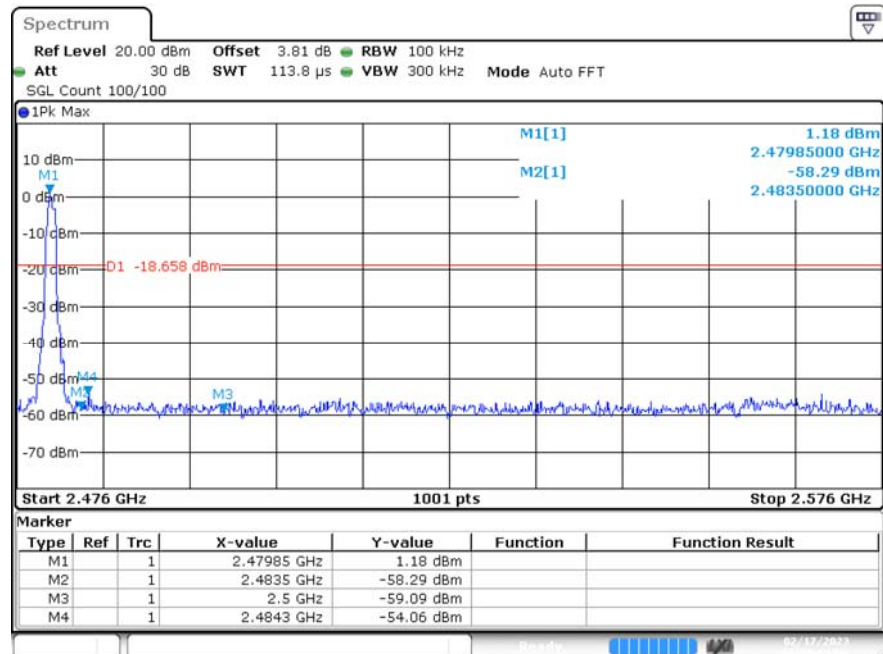




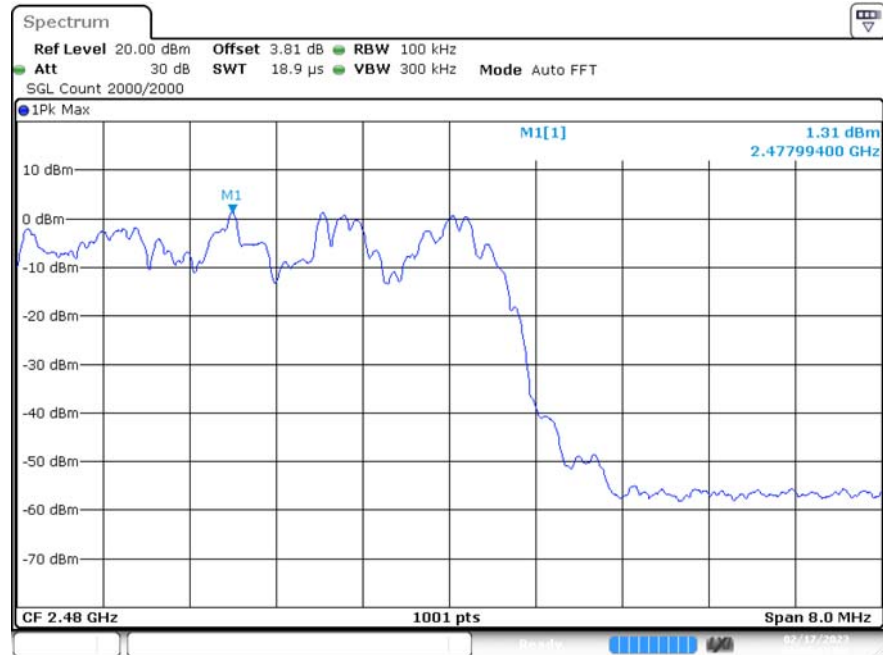
Ref



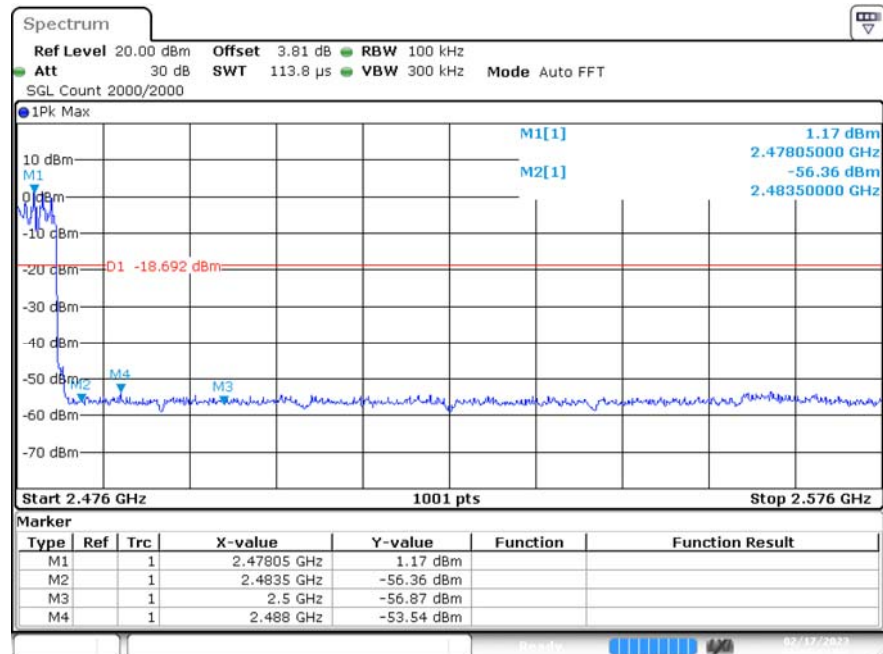
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

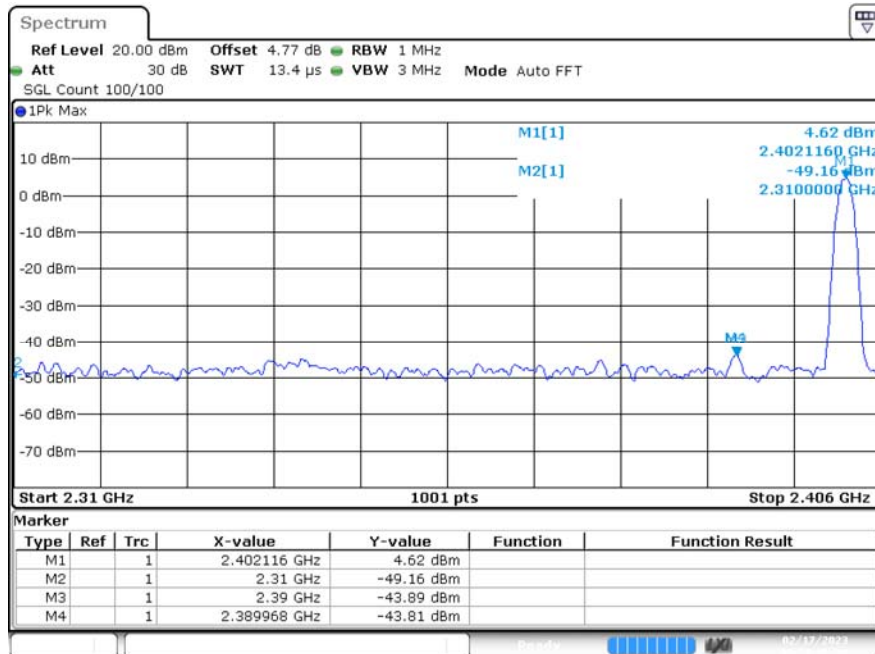
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -49.16      | 1.01 | 47.08      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.35      | 1.01 | 39.89      | AV       | 54             | Pass    |
|               | Off     | 2389.968 | -43.8       | 1.01 | 52.44      | PEAK     | 74             | Pass    |
|               | Off     | 2340.528 | -54.27      | 1.01 | 41.97      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -43.88      | 1.01 | 52.36      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.25      | 1.01 | 39.99      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -45.96      | 1.01 | 50.28      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -55.46      | 1.01 | 40.78      | AV       | 54             | Pass    |
|               | Off     | 2496.76  | -45.21      | 1.01 | 51.03      | PEAK     | 74             | Pass    |
|               | Off     | 2487.352 | -55.34      | 1.01 | 40.9       | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -46.16      | 1.01 | 50.08      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -56.29      | 1.01 | 39.95      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -46.85      | 1.01 | 49.39      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -55.97      | 1.01 | 40.27      | AV       | 54             | Pass    |
|               | Off     | 2322.864 | -44.74      | 1.01 | 51.5       | PEAK     | 74             | Pass    |
|               | Off     | 2338.032 | -54.14      | 1.01 | 42.1       | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -49.9       | 1.01 | 46.34      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.41      | 1.01 | 39.83      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -47.85      | 1.01 | 48.39      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -55.94      | 1.01 | 40.3       | AV       | 54             | Pass    |
|               | Off     | 2492.368 | -45.65      | 1.01 | 50.59      | PEAK     | 74             | Pass    |
|               | Off     | 2488.984 | -55.36      | 1.01 | 40.88      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -47.04      | 1.01 | 49.2       | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -56         | 1.01 | 40.24      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -47.38      | 1.01 | 48.86      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.12      | 1.01 | 40.12      | AV       | 54             | Pass    |
|               | Off     | 2385.456 | -44.56      | 1.01 | 51.68      | PEAK     | 74             | Pass    |
|               | Off     | 2340.912 | -54.22      | 1.01 | 42.02      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -48.87      | 1.01 | 47.37      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.2       | 1.01 | 40.04      | AV       | 54             | Pass    |



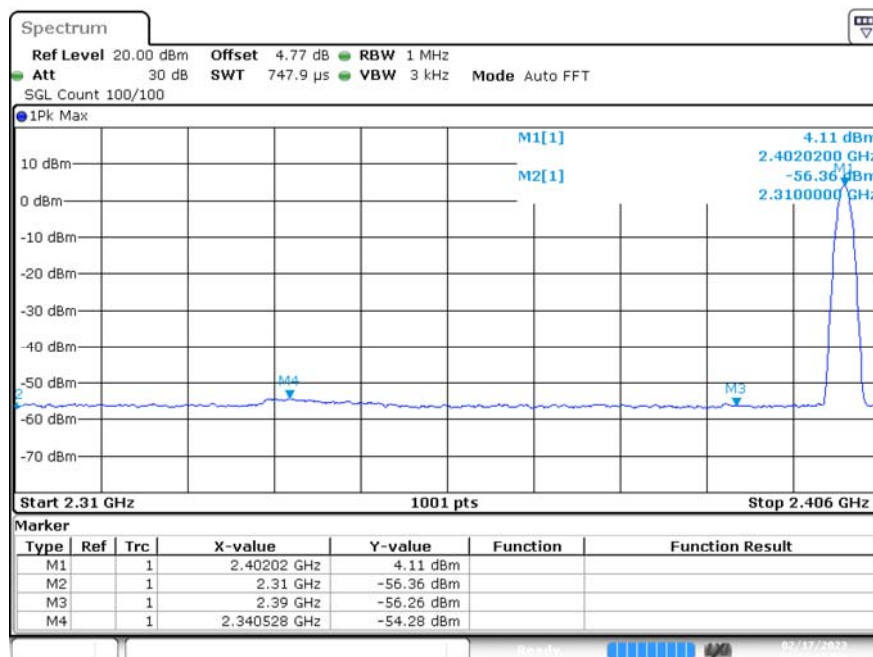
|  |     |          |        |      |       |      |    |      |
|--|-----|----------|--------|------|-------|------|----|------|
|  | Off | 2483.5   | -49.65 | 1.01 | 46.59 | PEAK | 74 | Pass |
|  | Off | 2483.5   | -55.91 | 1.01 | 40.33 | AV   | 54 | Pass |
|  | Off | 2495.68  | -44.34 | 1.01 | 51.9  | PEAK | 74 | Pass |
|  | Off | 2490.568 | -55.13 | 1.01 | 41.11 | AV   | 54 | Pass |
|  | Off | 2500.0   | -47.71 | 1.01 | 48.53 | PEAK | 74 | Pass |
|  | Off | 2500.0   | -56.01 | 1.01 | 40.23 | AV   | 54 | Pass |

## 9.2 Test Graphs

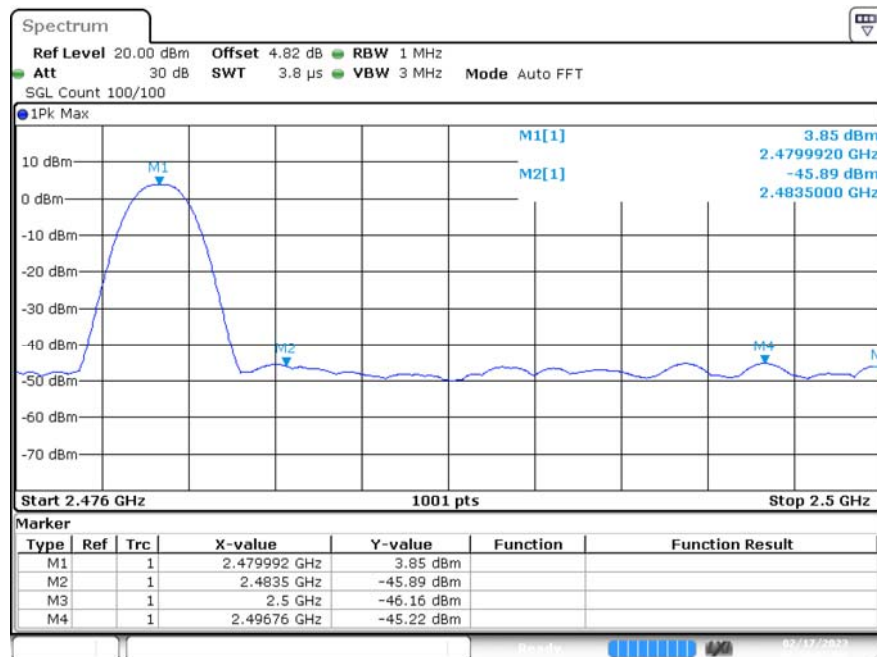
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



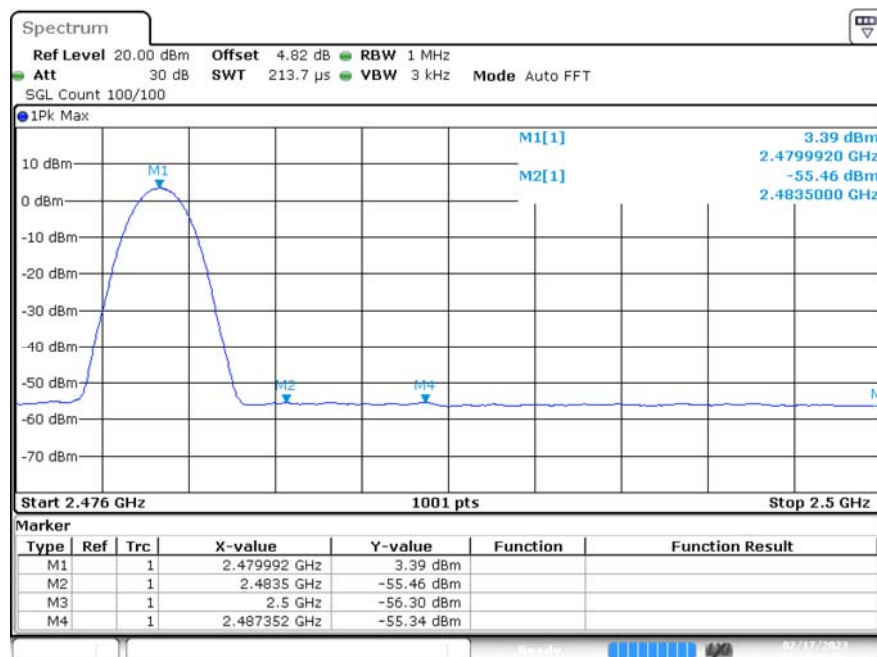
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



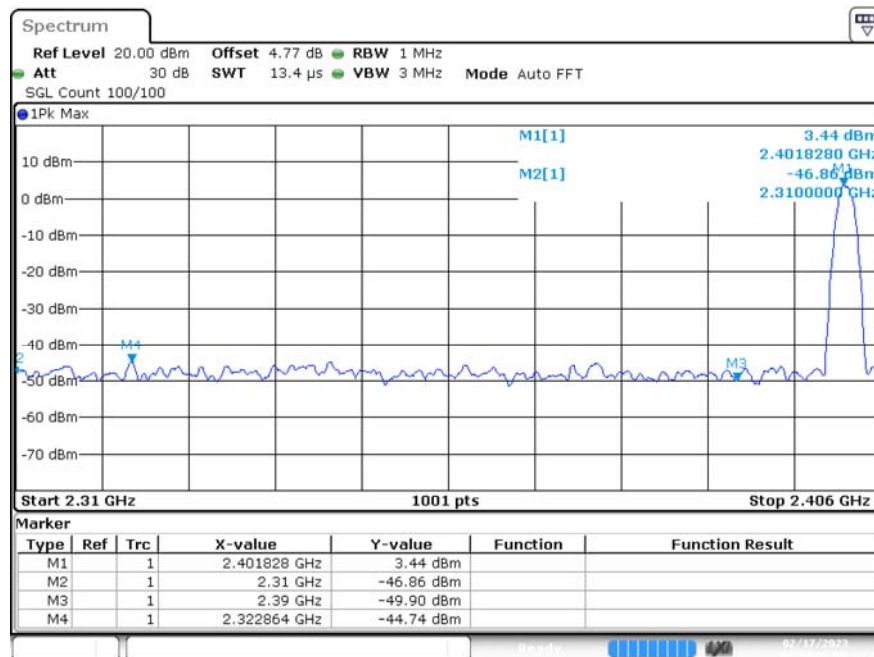
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



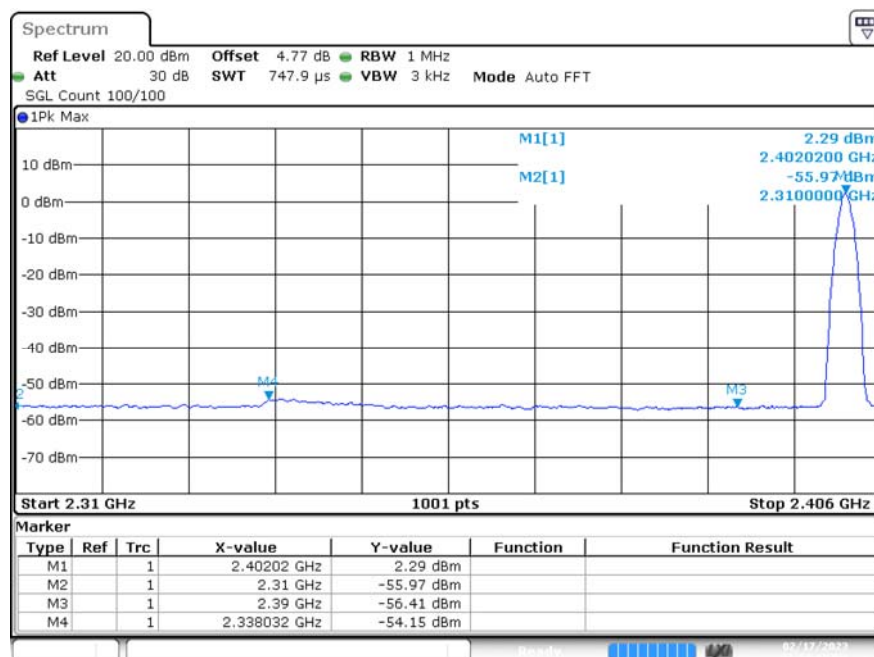
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



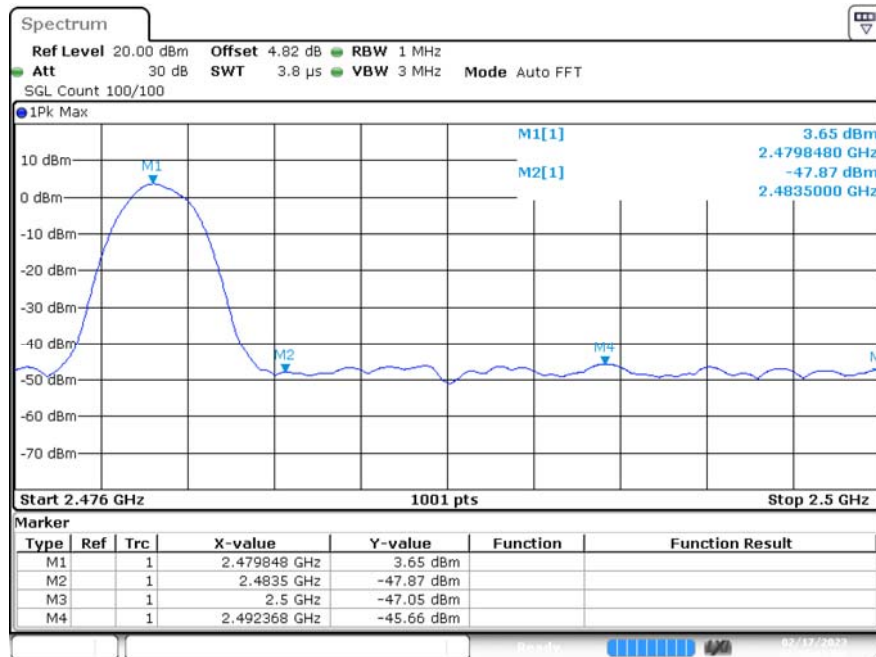
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



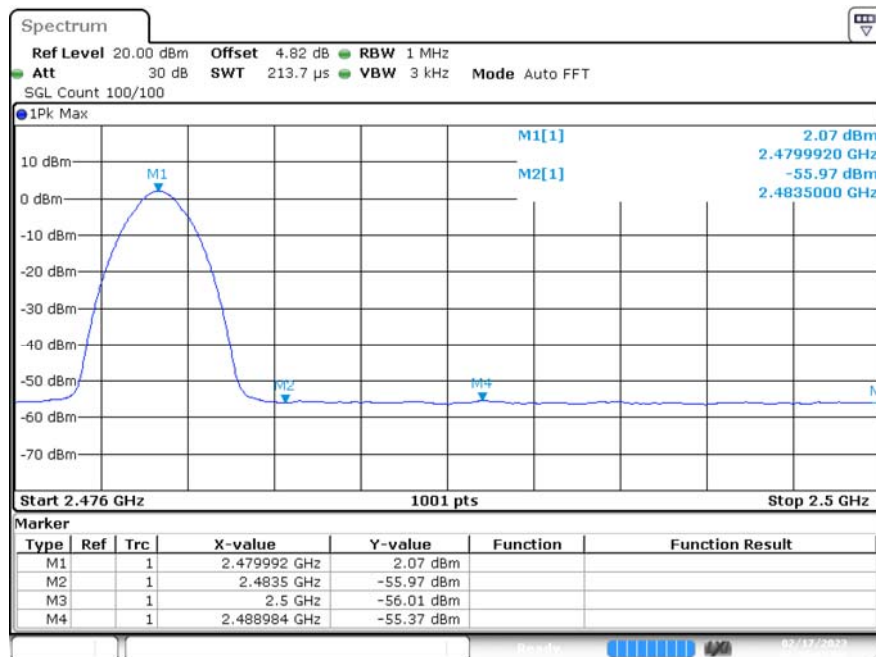
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



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

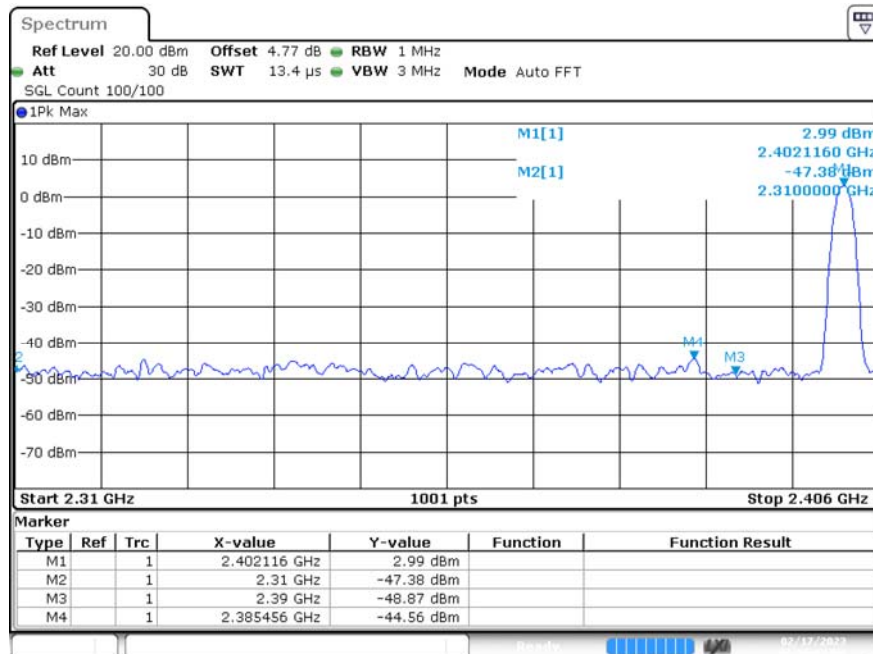


## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)

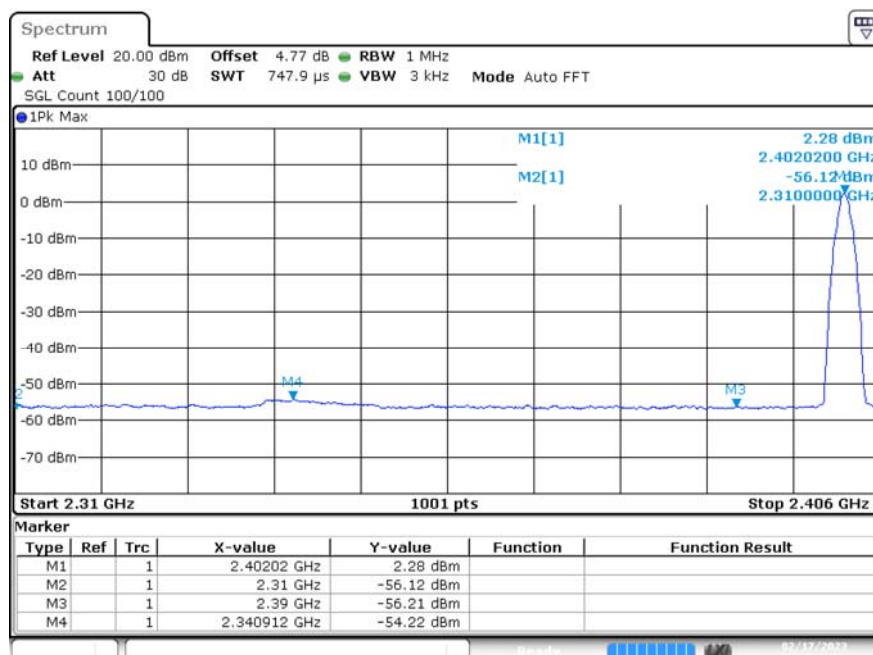




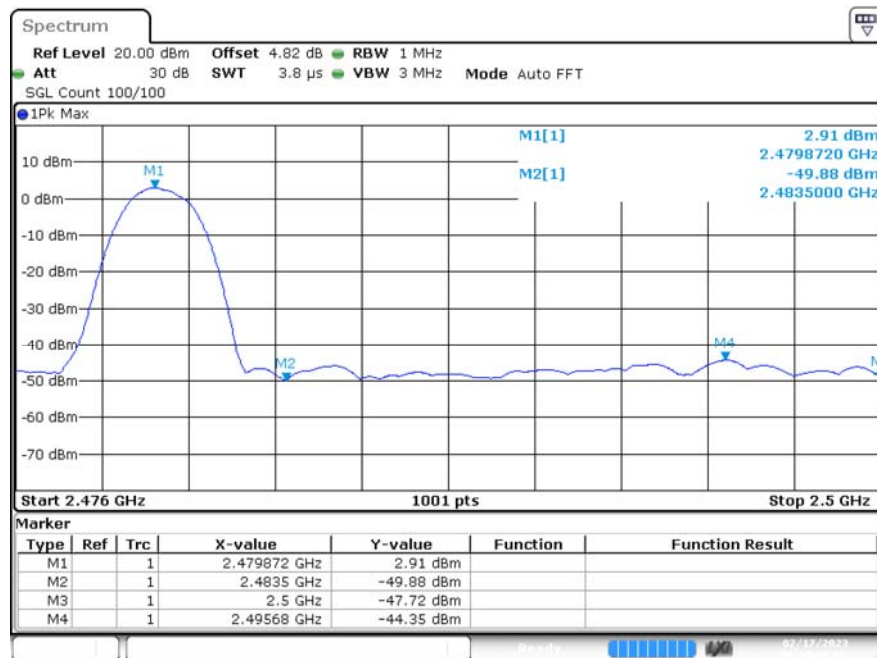
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



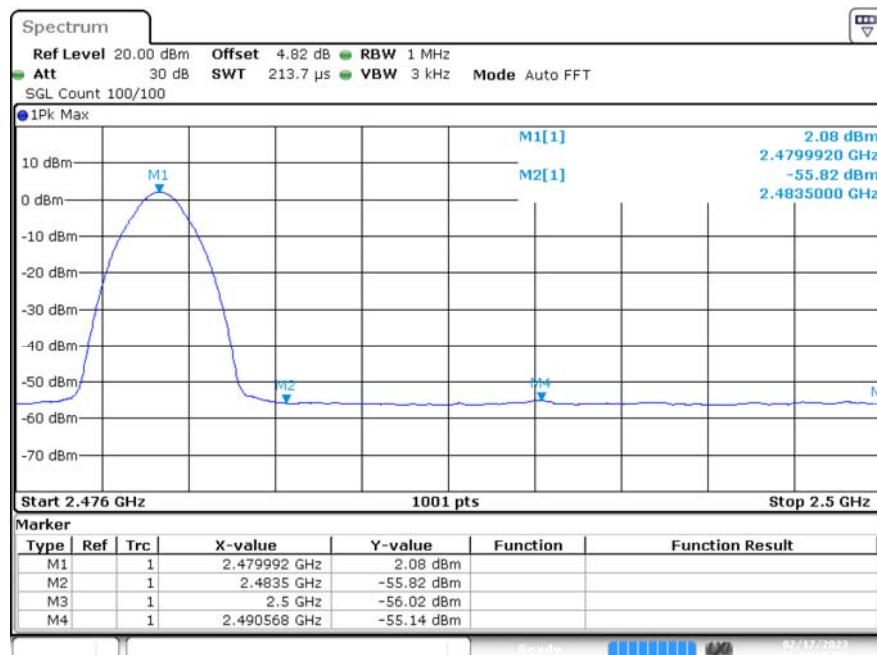
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---