



## Appendix A

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

Product Name: bluetooth speaker

Trade Mark: N/A

Test Model: MOS-2058

Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 25.1°C      |
| Relative Humidity: | 56.1%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Emiya lin   |
| Supervised by:     | Simba Haung |



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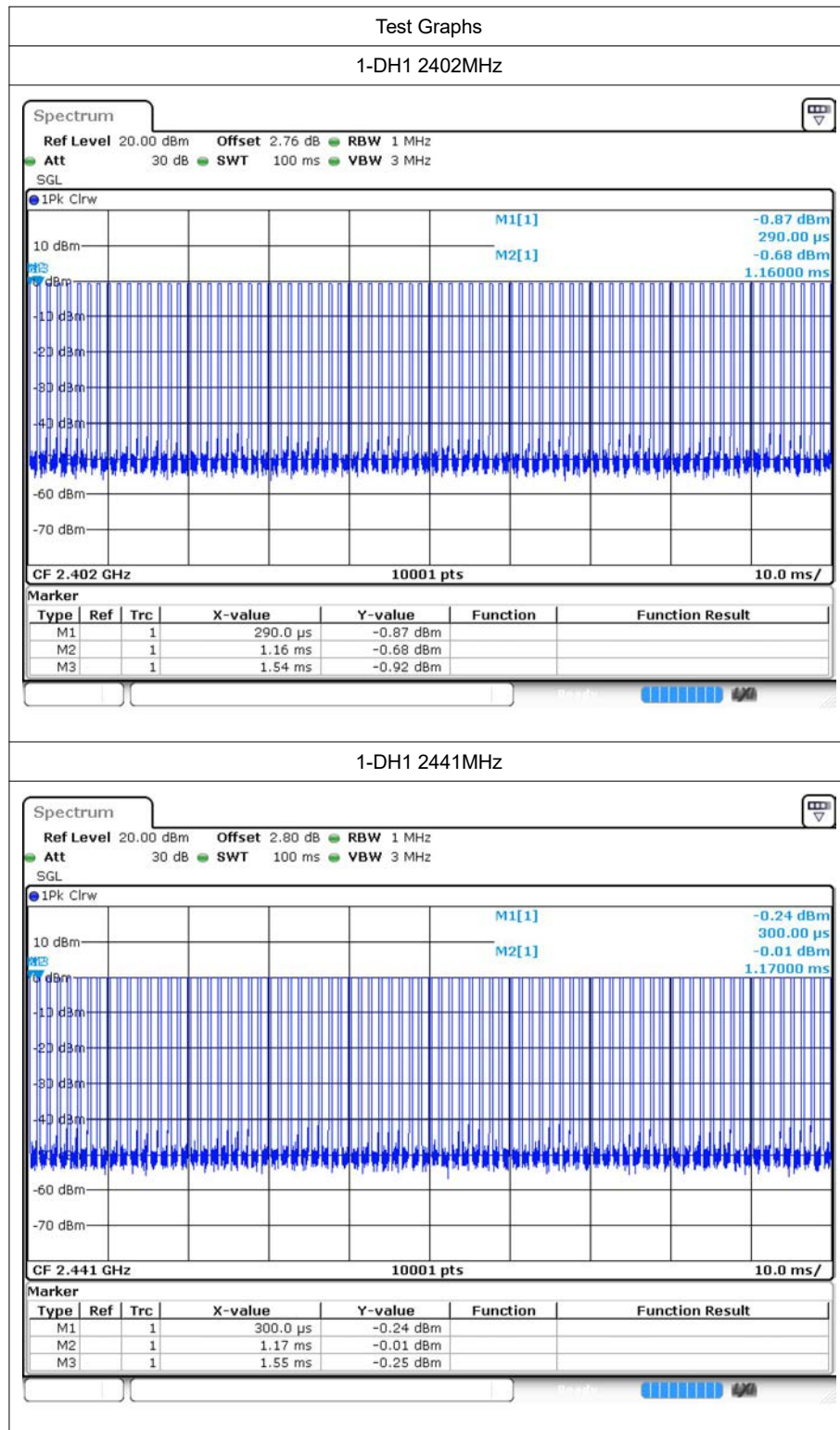
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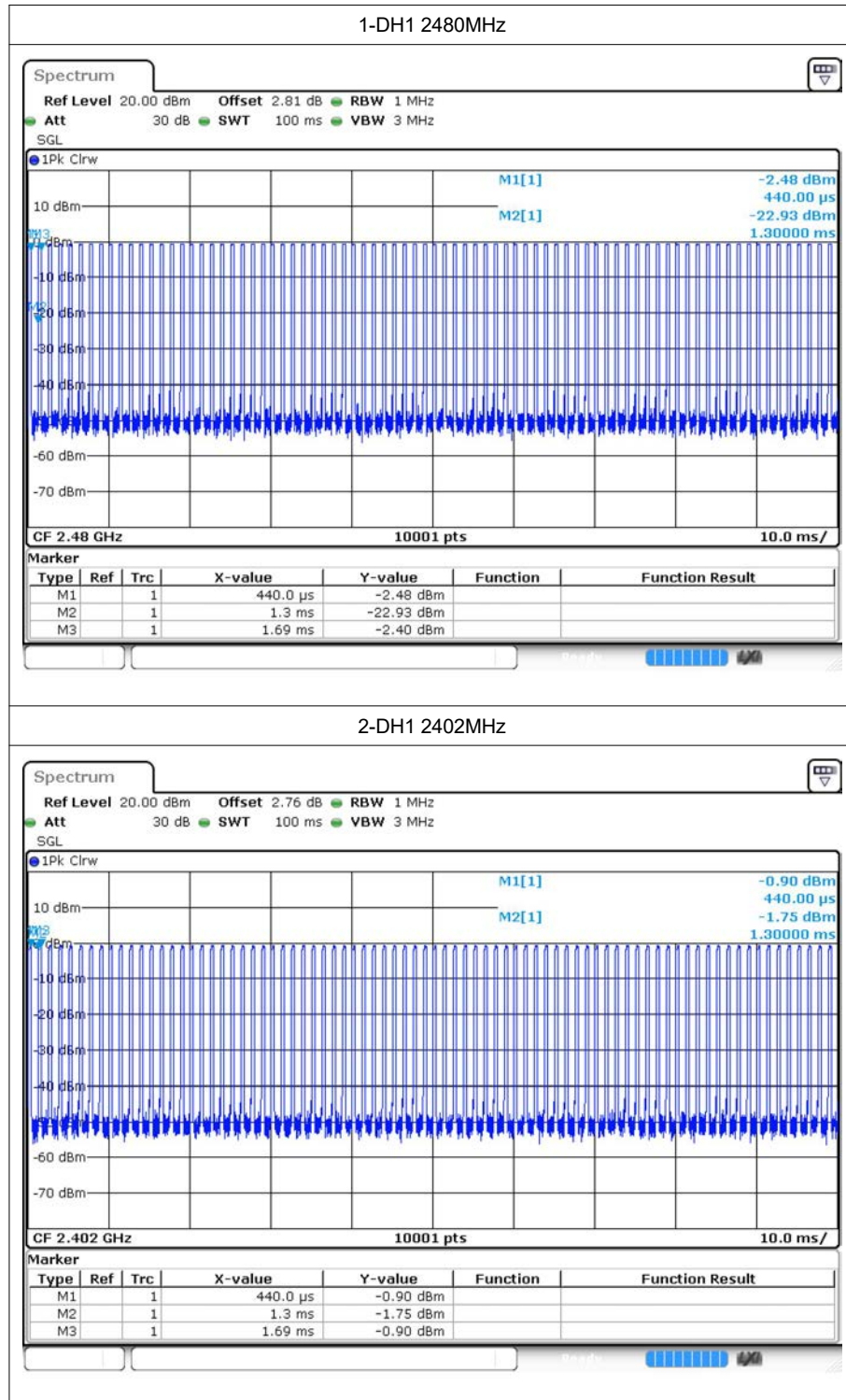
# 1 Duty Cycle

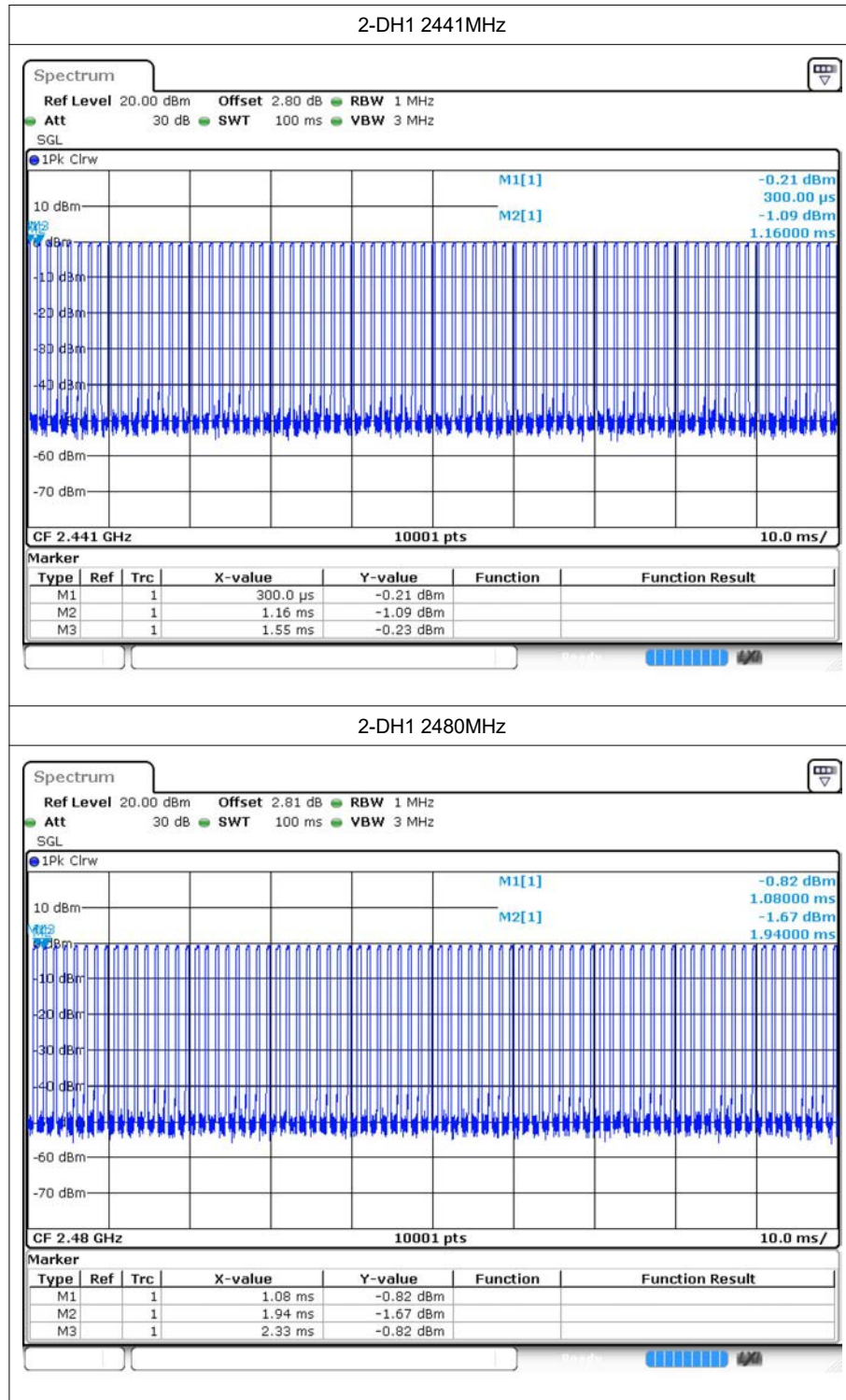
## 1.1 Test Result

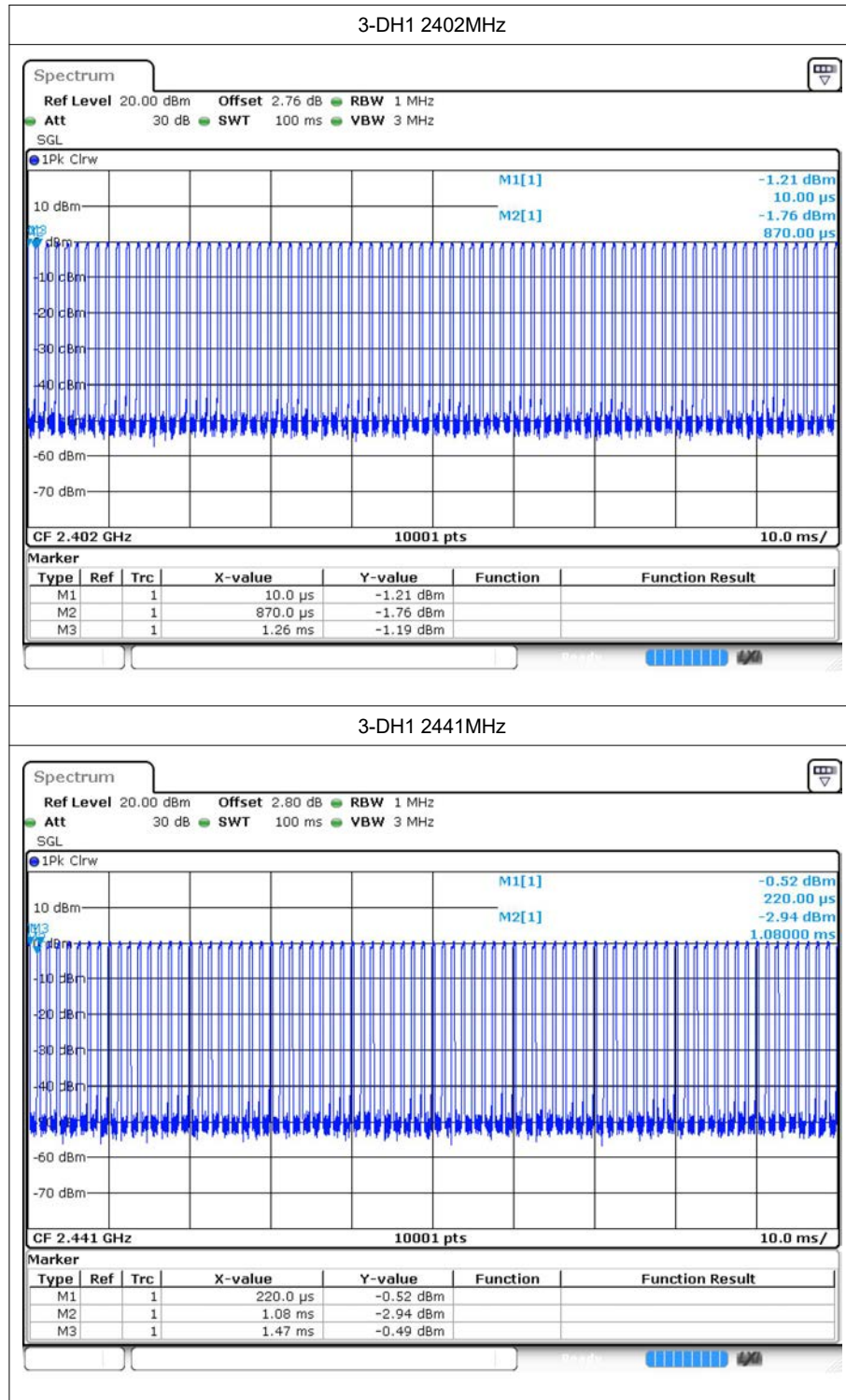
| Mode  | Frequency (MHz) | Duty Cycle (%) | Correction Factor | 1/T (kHz) |
|-------|-----------------|----------------|-------------------|-----------|
| 1-DH1 | 2402            | 31.21          | 5.06              | 2.63      |
| 1-DH1 | 2441            | 31.21          | 5.06              | 2.63      |
| 1-DH1 | 2480            | 31.24          | 5.05              | 2.56      |
| 2-DH1 | 2402            | 32             | 4.95              | 2.56      |
| 2-DH1 | 2441            | 32.01          | 4.95              | 2.56      |
| 2-DH1 | 2480            | 32             | 4.95              | 2.56      |
| 3-DH1 | 2402            | 32.01          | 4.95              | 2.56      |
| 3-DH1 | 2441            | 32.01          | 4.95              | 2.56      |
| 3-DH1 | 2480            | 31.96          | 4.95              | 2.56      |

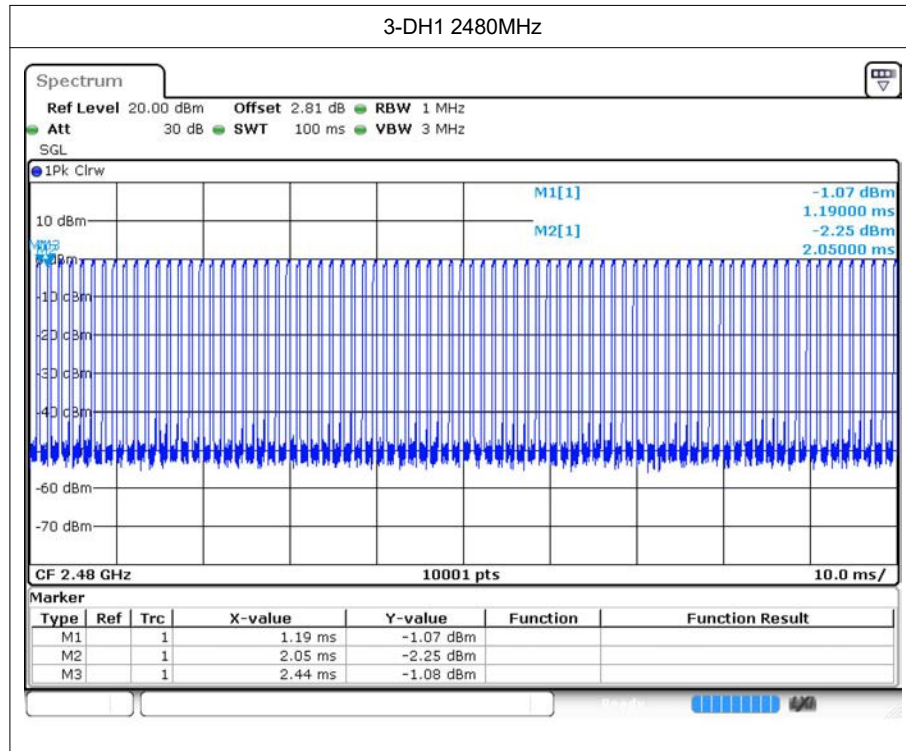
## 1.2 Test Graphs









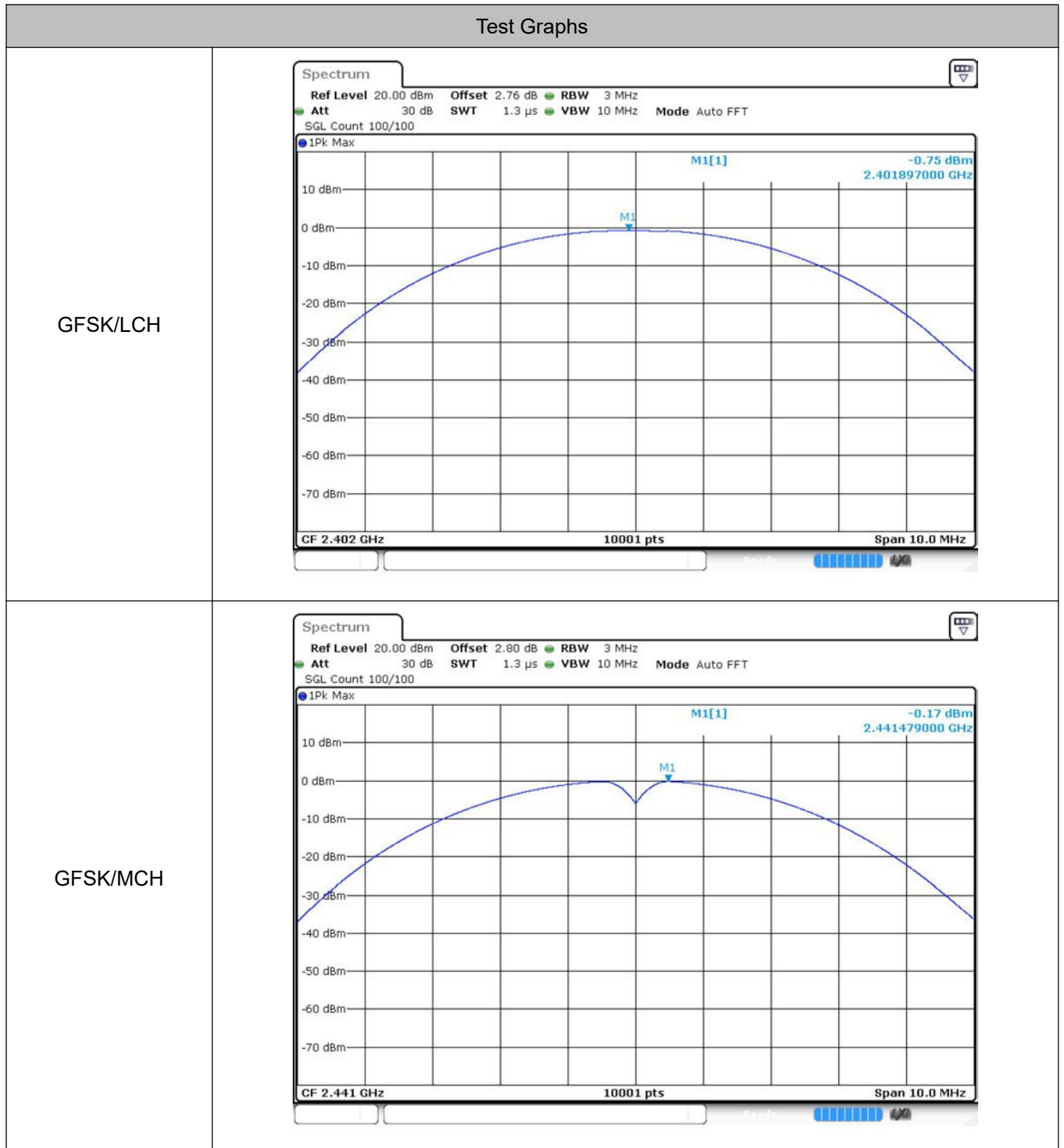


## 2 Maximum Conducted Peak Output Power

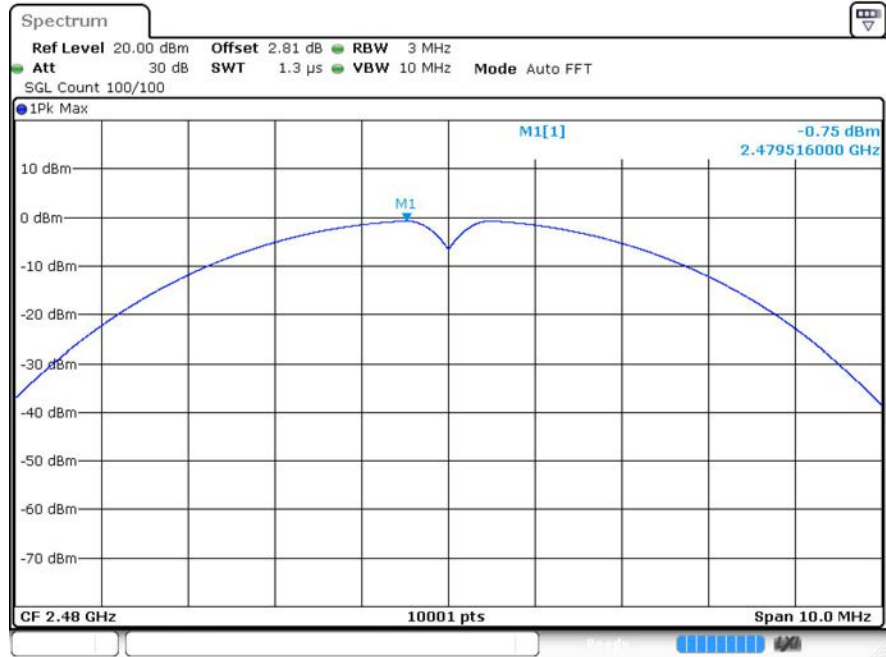
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | -0.75                           | 21          | Pass    |
|               | MCH      | -0.17                           | 21          | Pass    |
|               | HCH      | -0.75                           | 21          | Pass    |
| $\pi/4$ DQPSK | LCH      | 0.36                            | 21          | Pass    |
|               | MCH      | 0.82                            | 21          | Pass    |
|               | HCH      | 0.23                            | 21          | Pass    |
| 8DPSK         | LCH      | 0.36                            | 21          | Pass    |
|               | MCH      | 1.04                            | 21          | Pass    |
|               | HCH      | 0.52                            | 21          | Pass    |

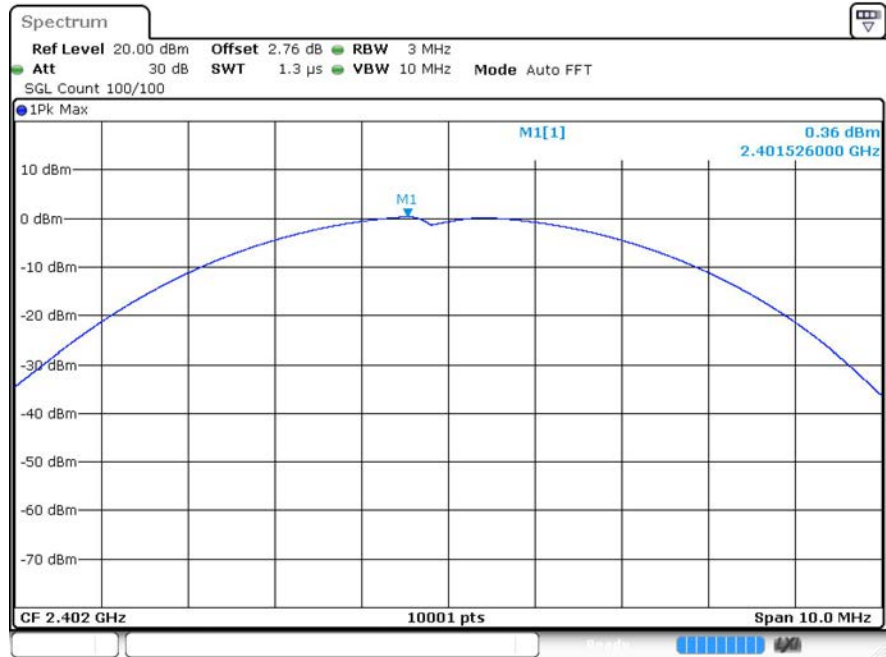
## 2.2 Test Graphs



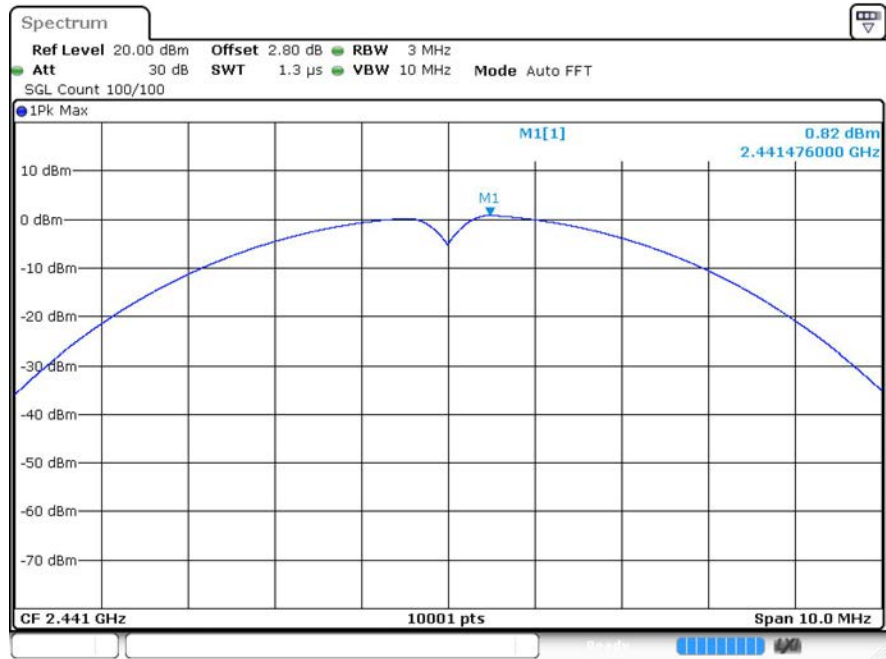
GFSK/HCH



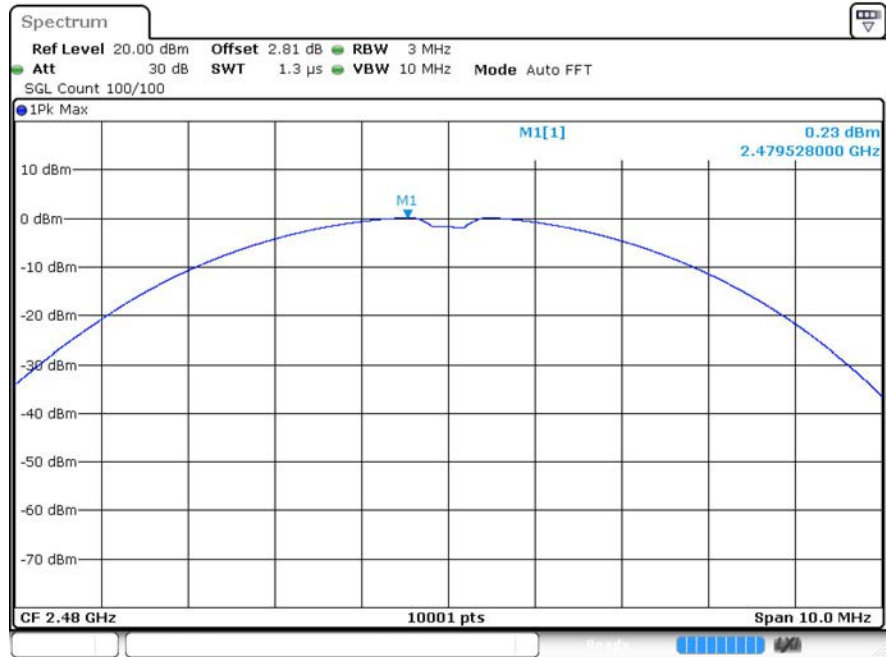
$\pi/4$ DQPSK/LCH



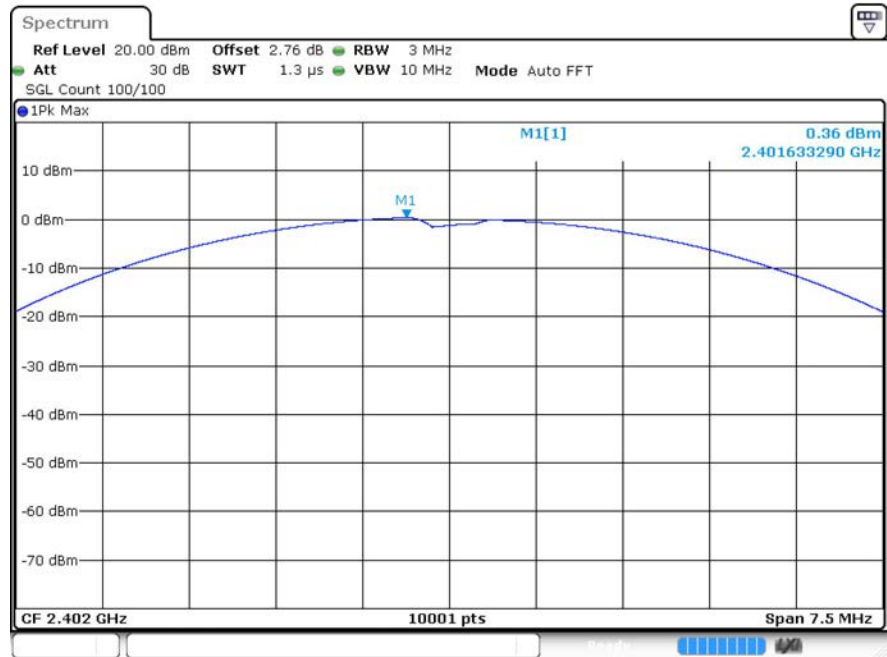
$\pi/4$ DQPSK/MCH



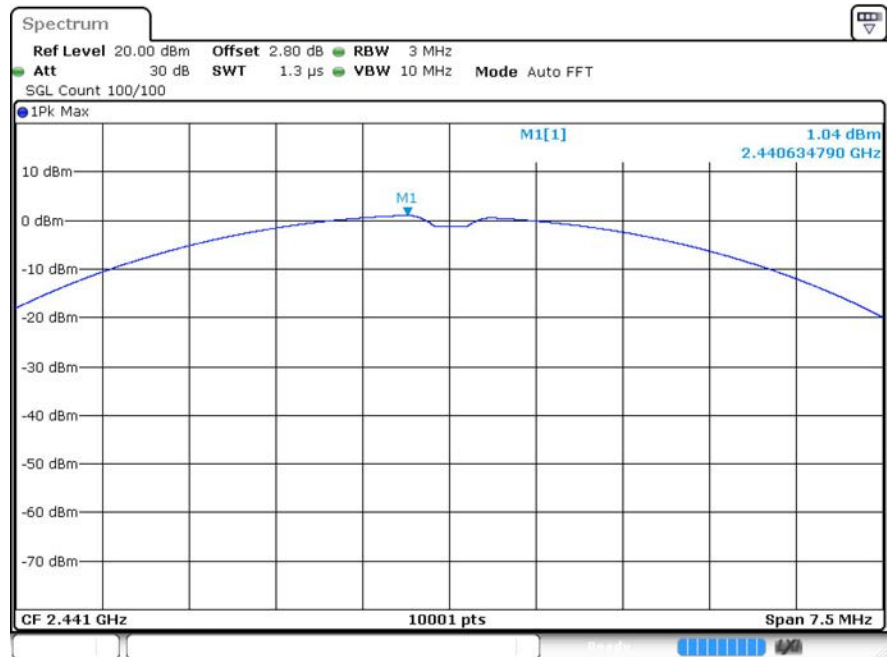
$\pi/4$ DQPSK/HCH



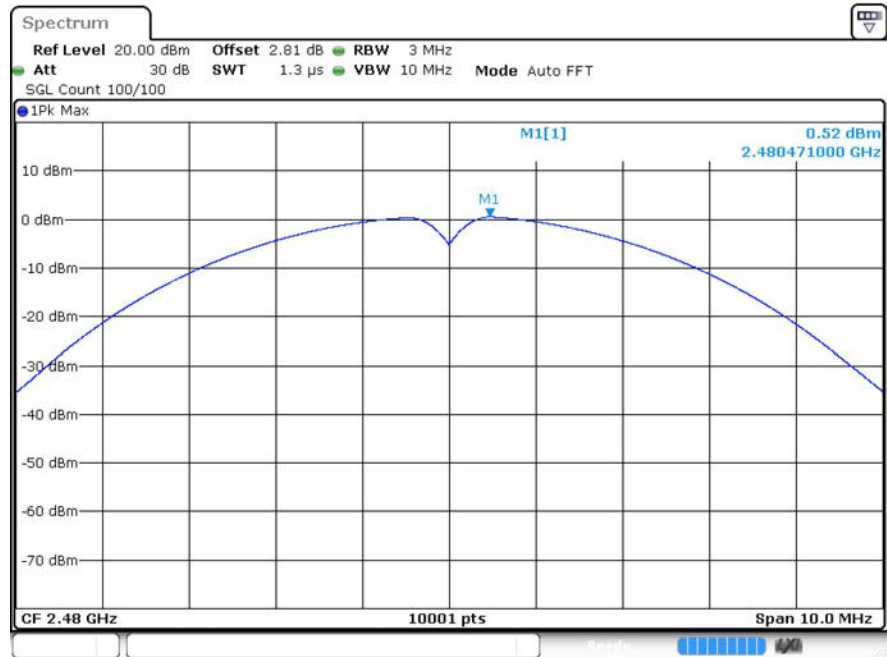
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

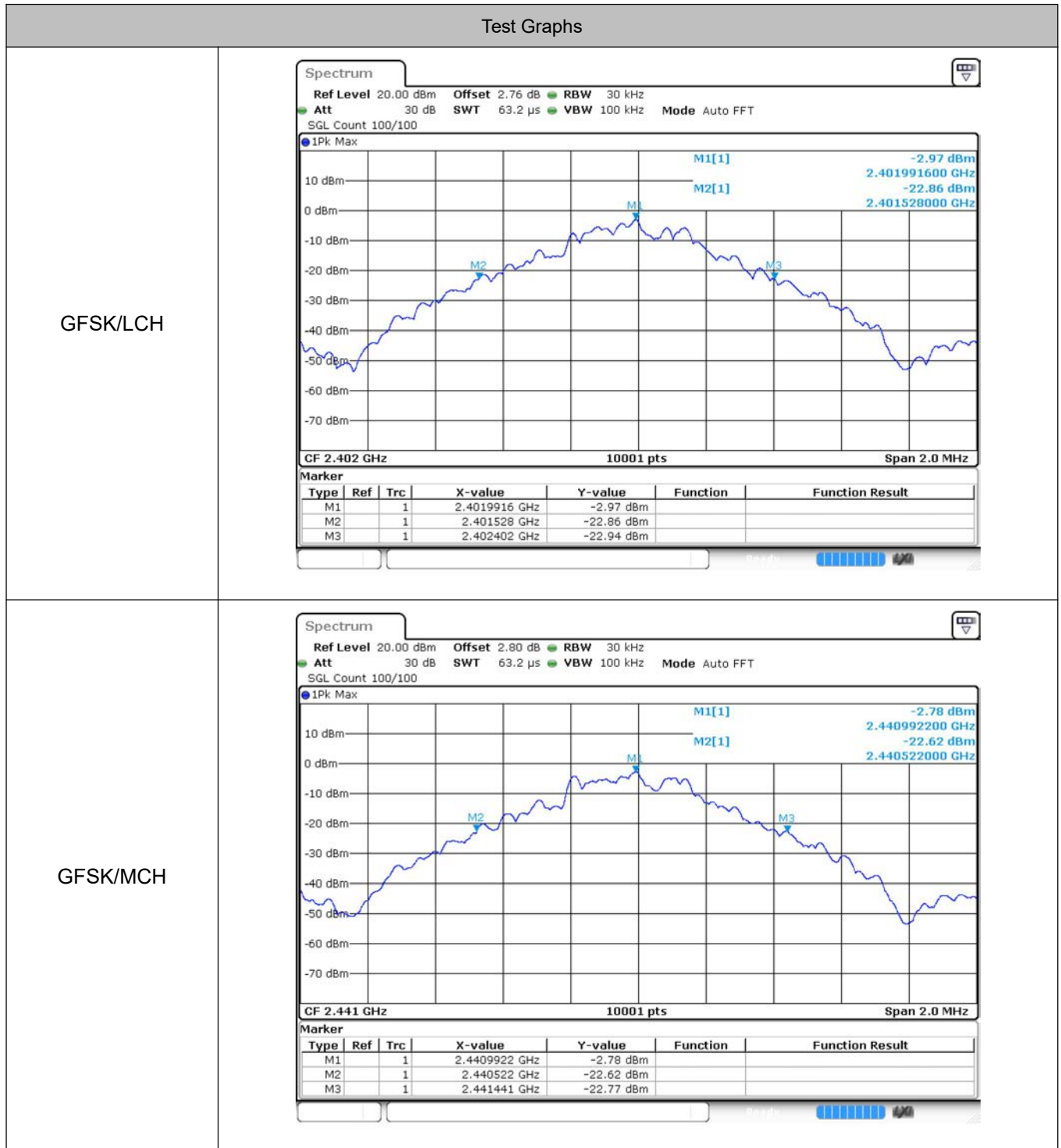


### 3 20dB Bandwidth

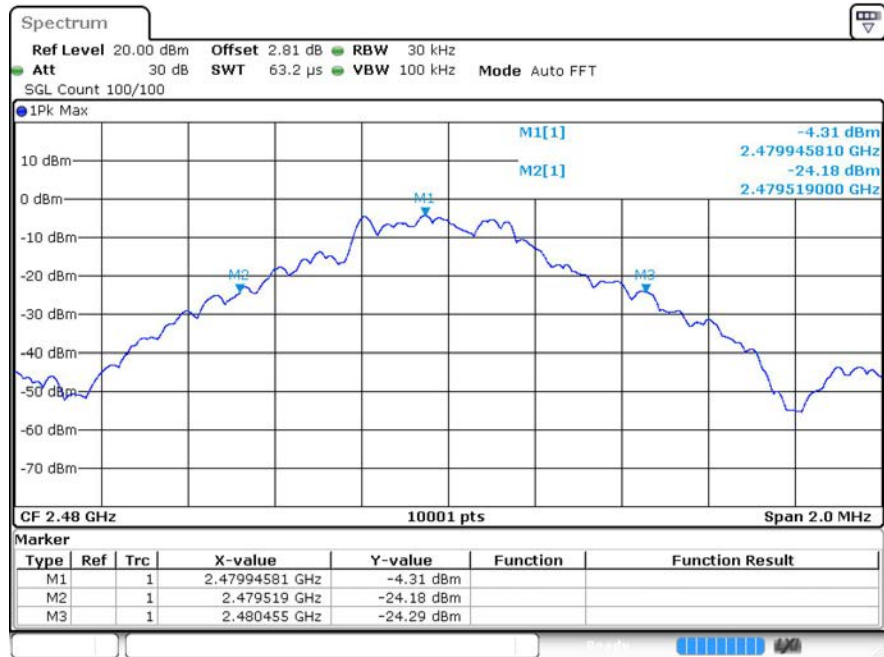
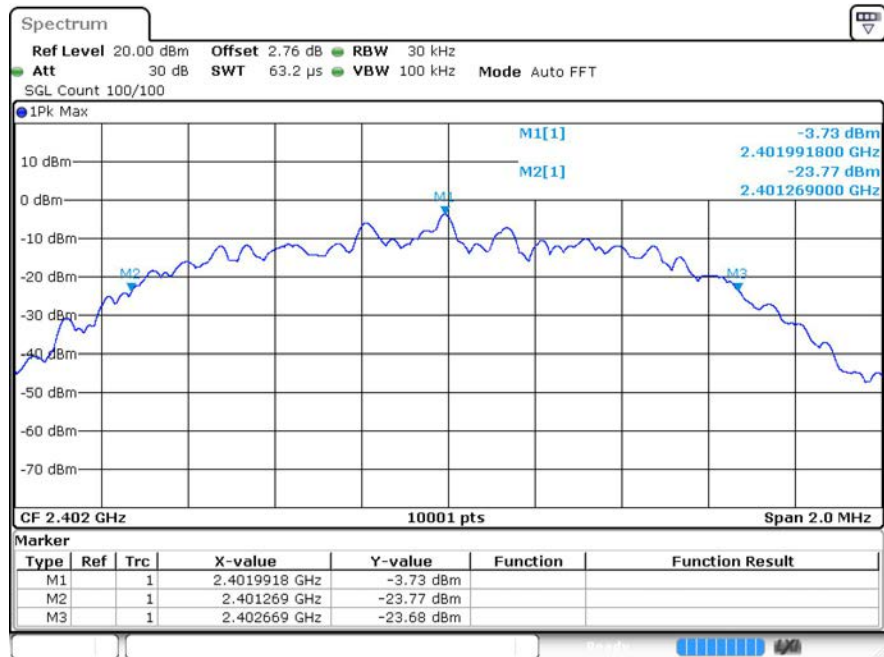
#### 3.1 Test Result

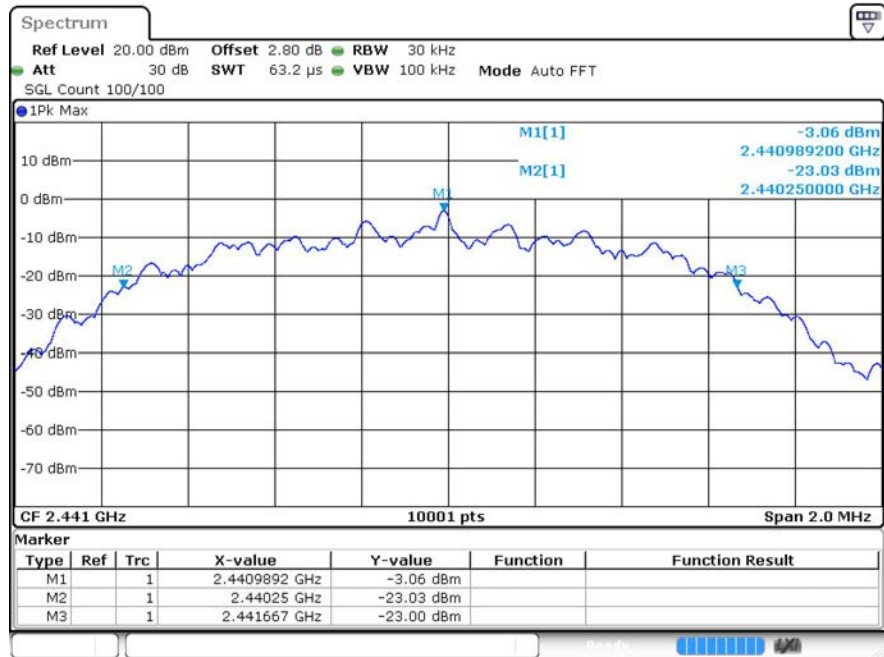
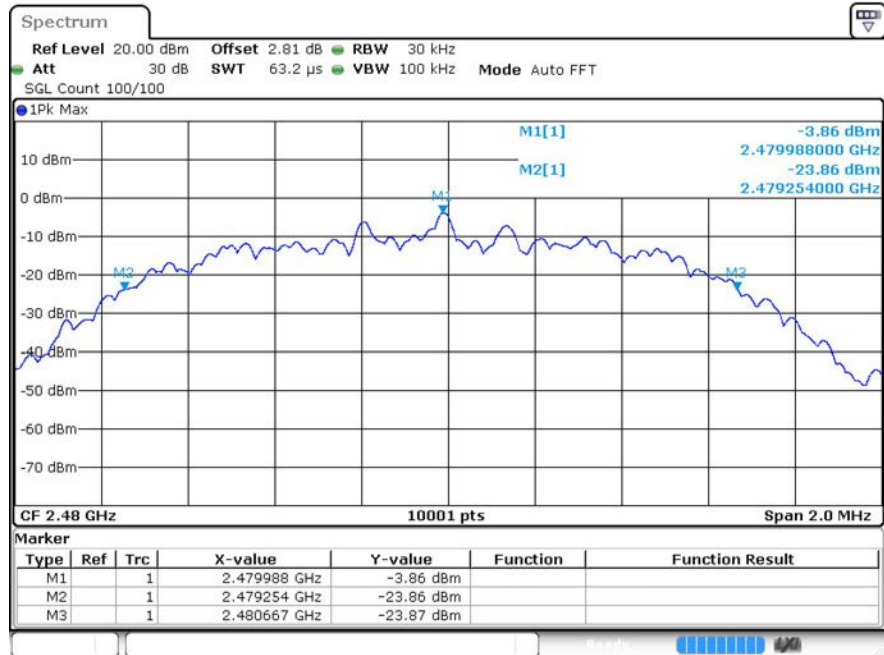
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.875                | Not Specified | Pass    |
|               | MCH      | 0.92                 | Not Specified | Pass    |
|               | HCH      | 0.937                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.4                  | Not Specified | Pass    |
|               | MCH      | 1.418                | Not Specified | Pass    |
|               | HCH      | 1.413                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.438                | Not Specified | Pass    |
|               | MCH      | 1.429                | Not Specified | Pass    |
|               | HCH      | 1.45                 | Not Specified | Pass    |

### 3.2 Test Graphs

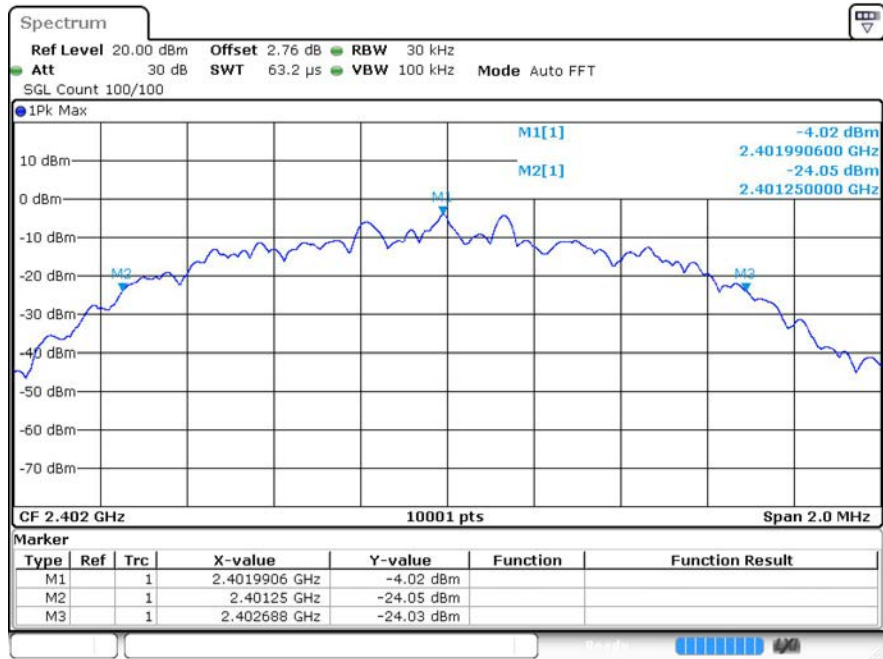


GFSK/HCH

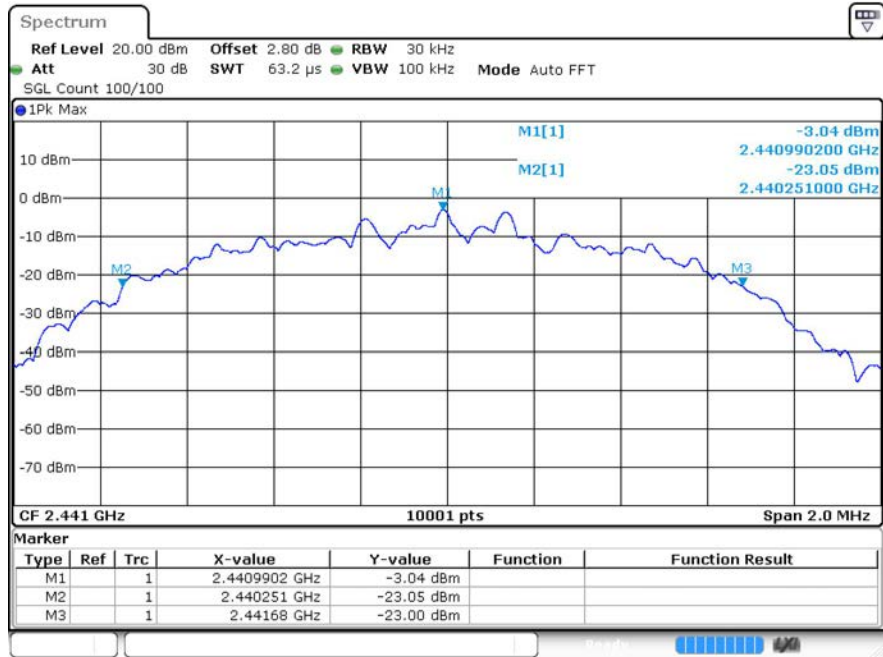

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


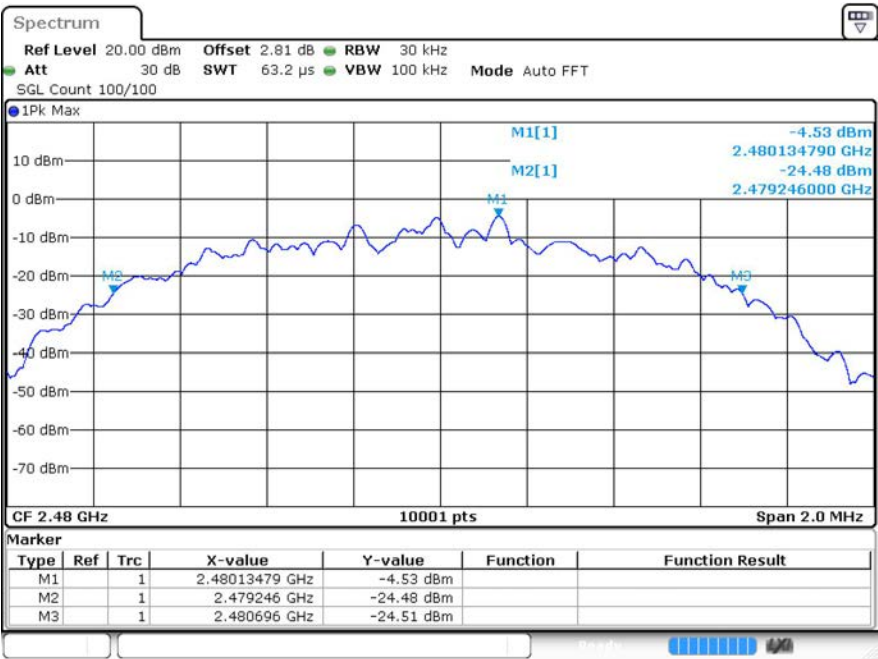
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



## 4 Carrier Frequency Separation

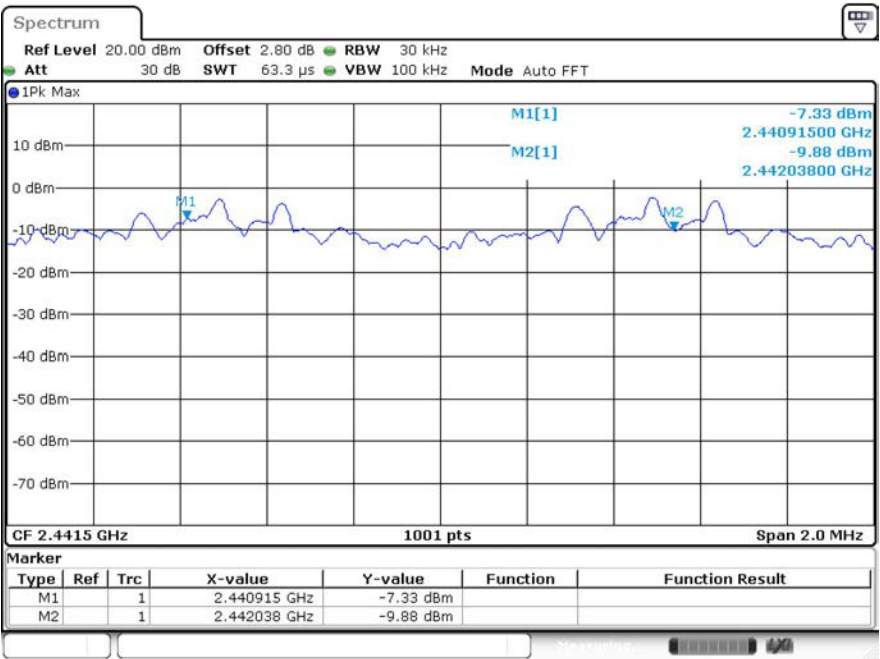
### 4.1 Test Result

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 0.999                              | 0.613       | Pass    |
| $\pi/4$ DQPSK | MCH      | 1.068                              | 0.945       | Pass    |
| 8DPSK         | MCH      | 1.123                              | 0.953       | Pass    |

## 4.2 Test Graphs



8DPSK/MCH

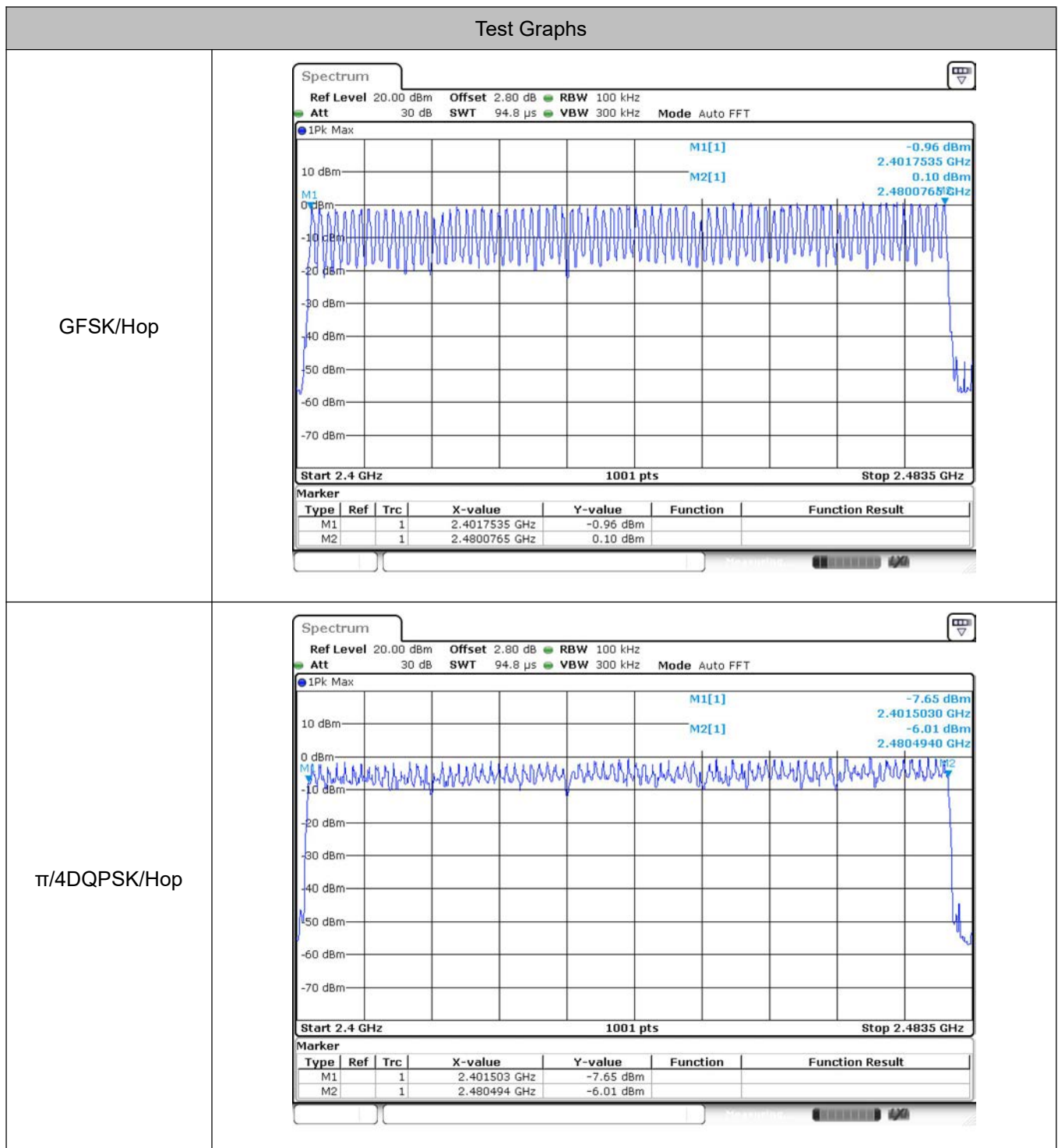


## 5 Hopping Channel Number

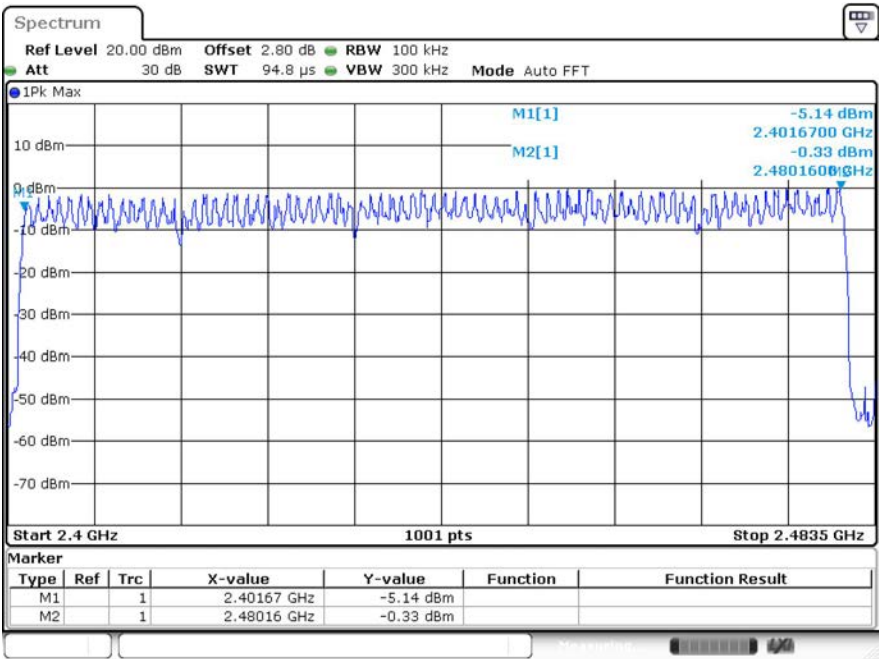
### 5.1 Test Result

| 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

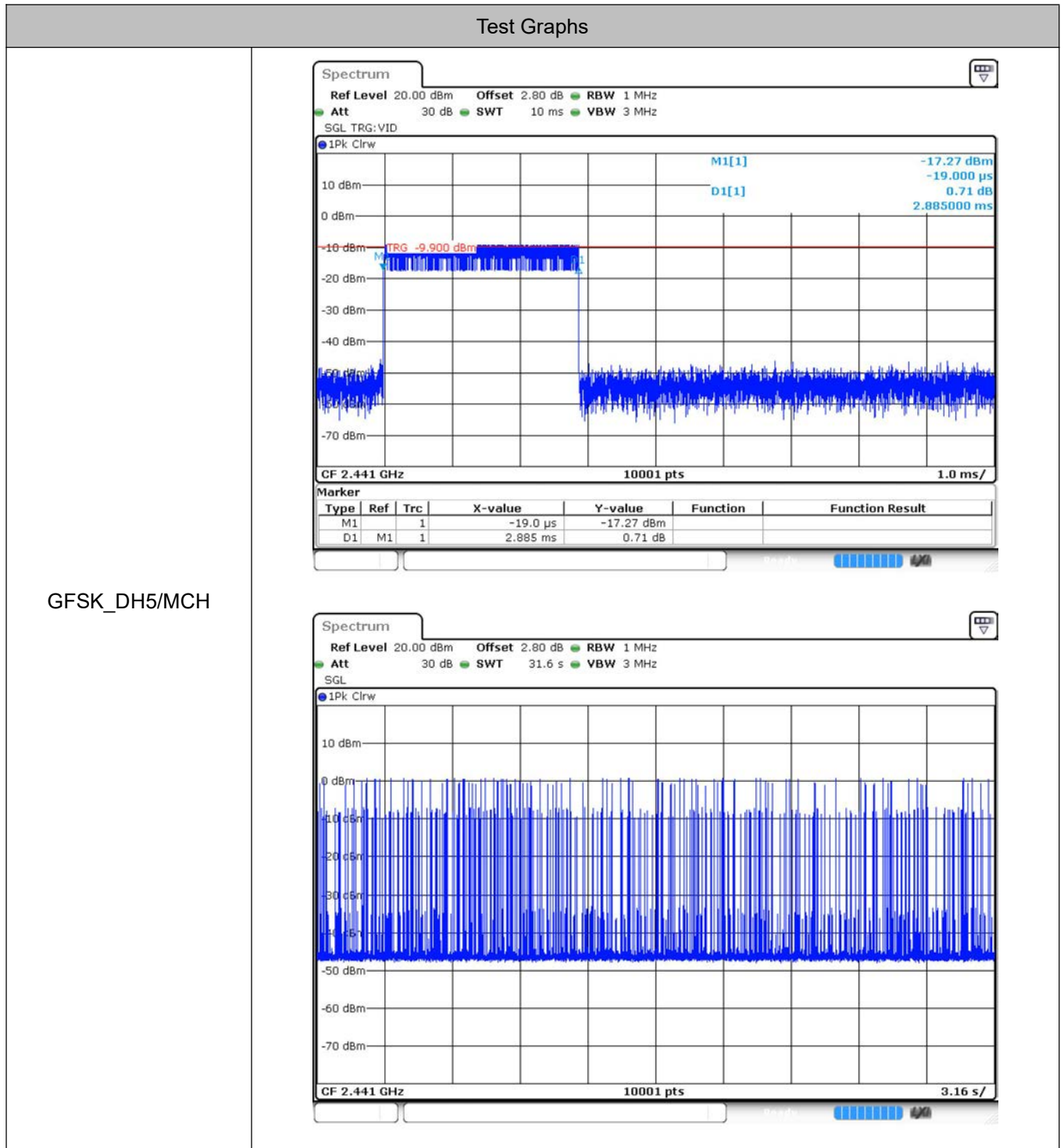


## 6 Dwell Time

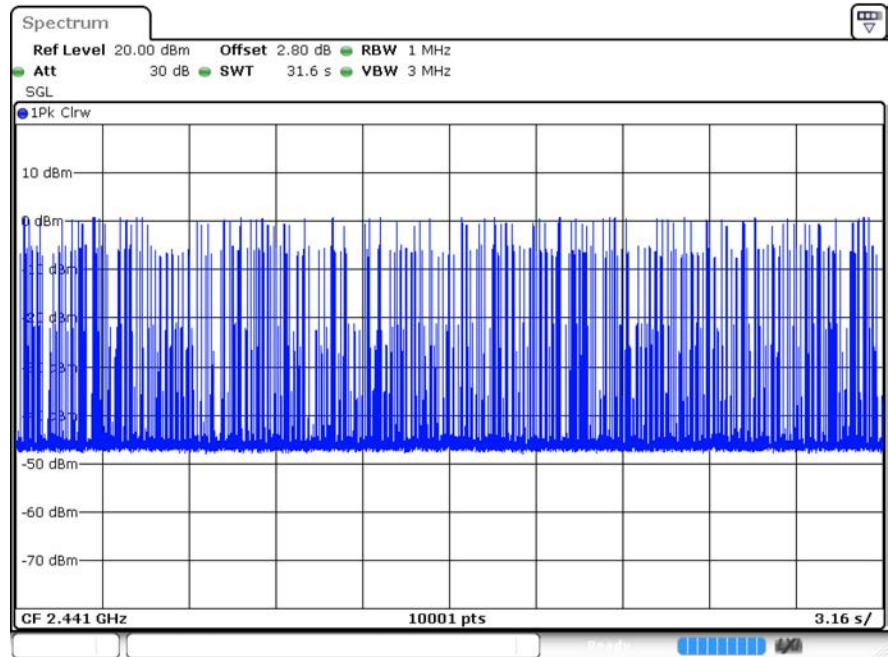
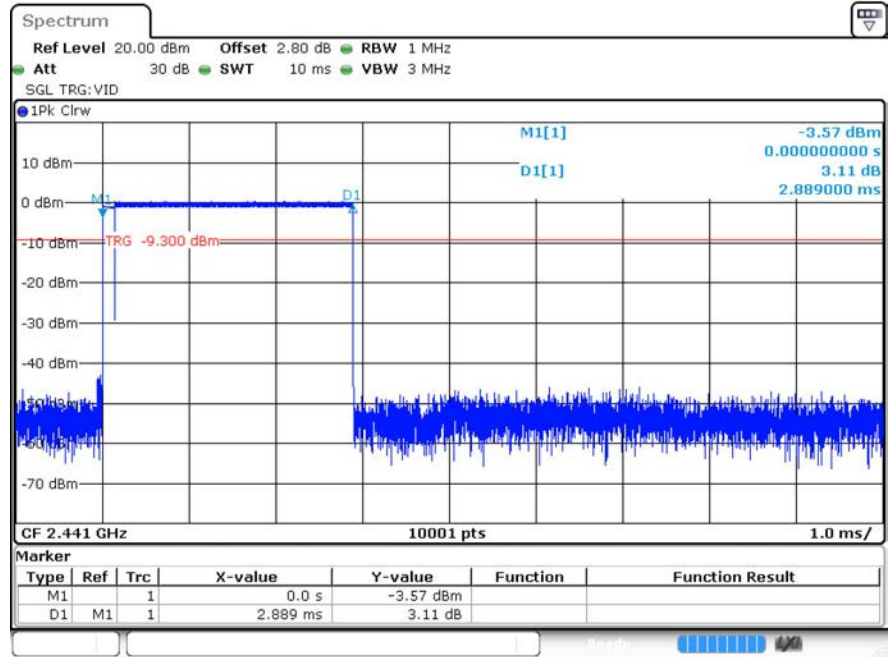
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.885                      | 109                   | 314.465        | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.889                      | 104                   | 300.456        | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.891                      | 103                   | 297.773        | 0.4       | Pass    |

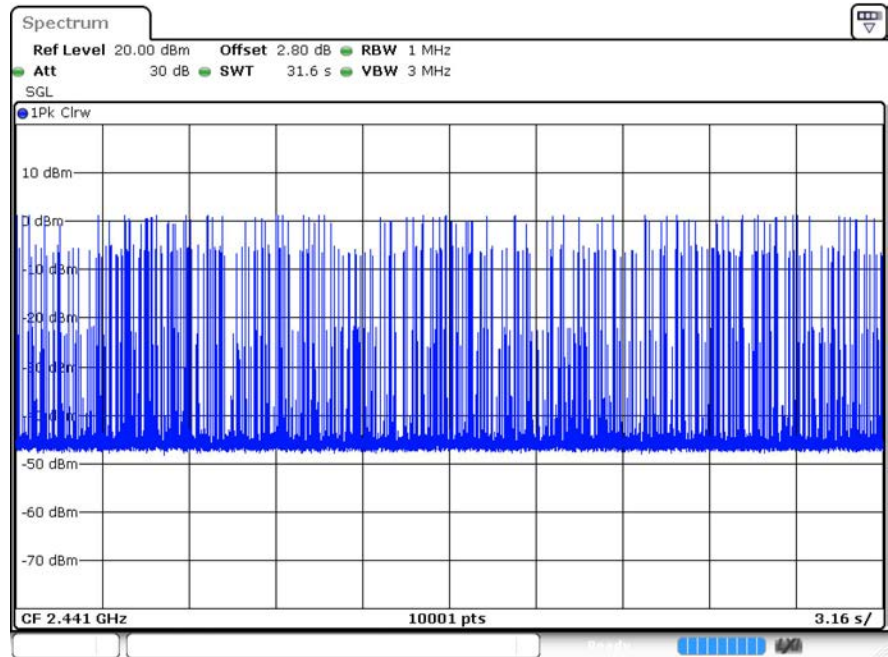
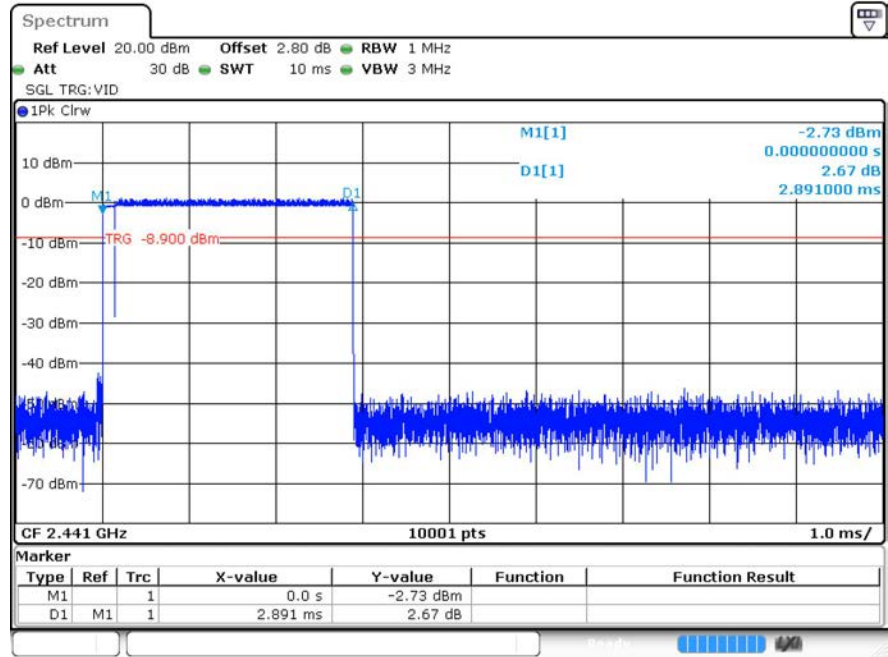
## 6.2 Test Graphs



$\pi/4$ DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH



## 7 RF Conducted Spurious Emissions

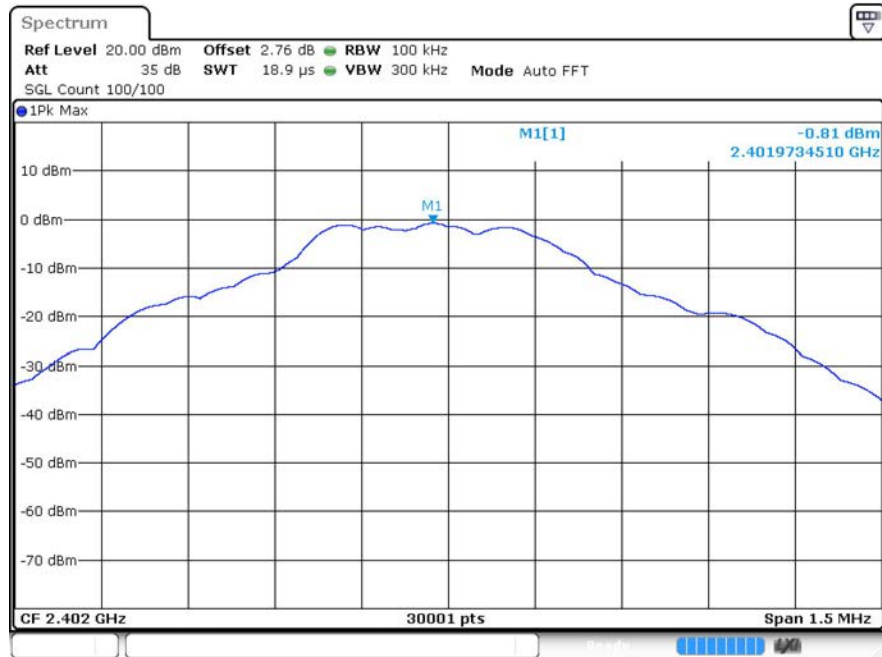
### 7.1 Test Result

| Mode          | Channel | Max. Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|------------------|-------------|---------|
| GFSK          | LCH     | -40.45           | -20         | Pass    |
|               | MCH     | -40.64           | -20         | Pass    |
|               | HCH     | -40.53           | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -39.58           | -20         | Pass    |
|               | MCH     | -39.27           | -20         | Pass    |
|               | HCH     | -39.34           | -20         | Pass    |
| 8DPSK         | LCH     | -38.24           | -20         | Pass    |
|               | MCH     | -39.12           | -20         | Pass    |
|               | HCH     | -37.73           | -20         | Pass    |

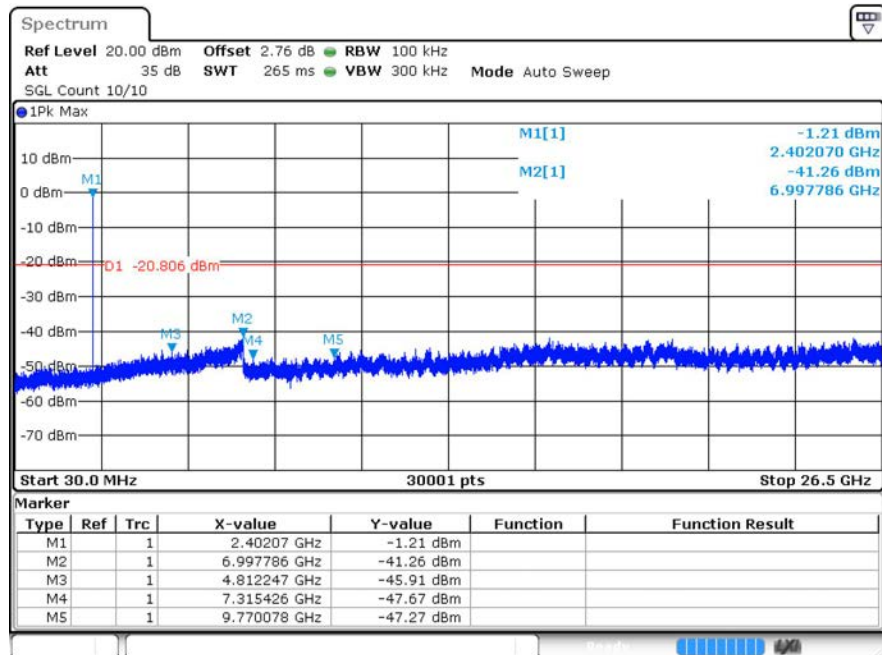
## 7.2 Test Graphs

GFSK\_LCH\_Graphs

Pref

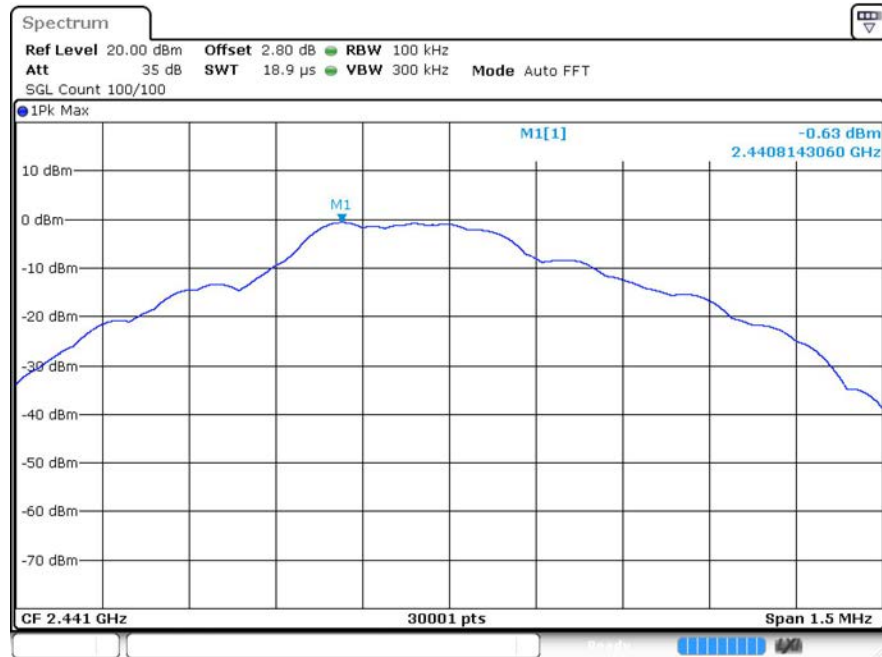


Puw

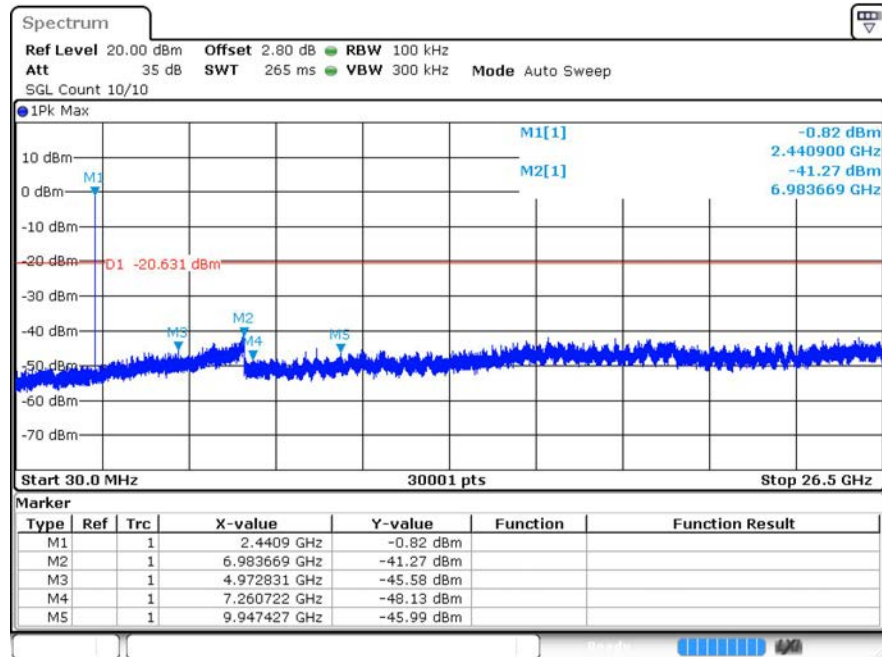


## GFSK\_MCH\_Graphs

Pref

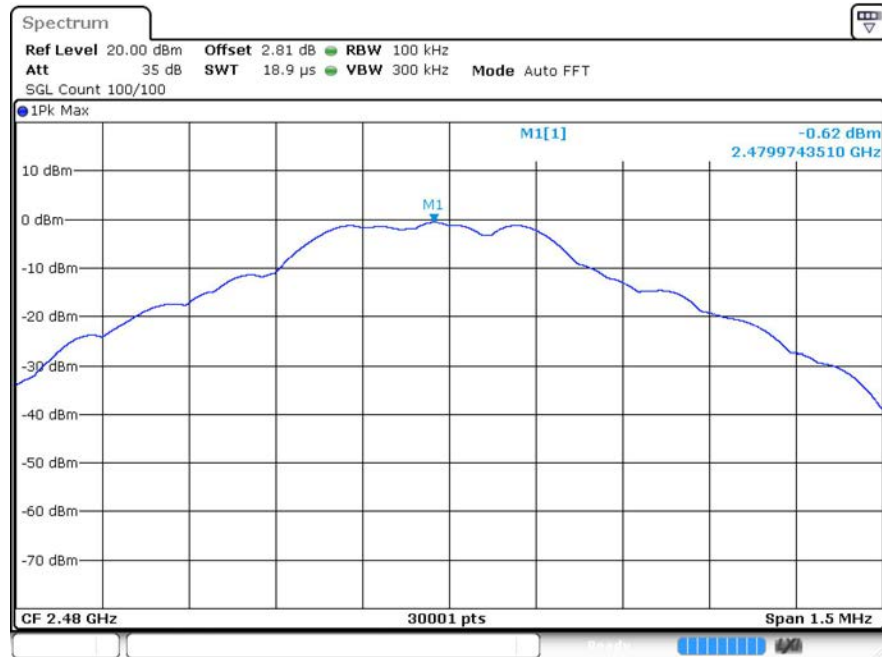


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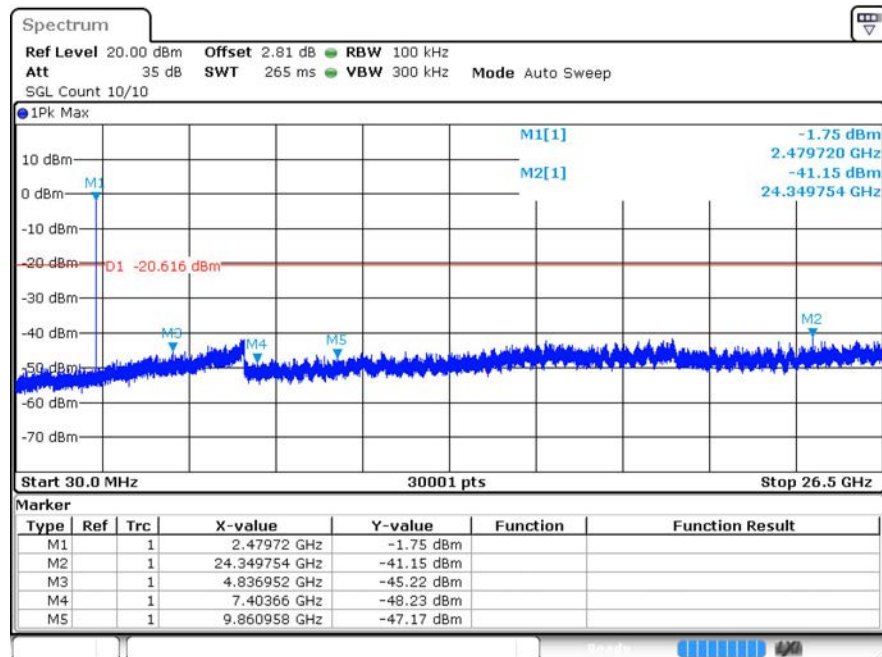


## GFSK\_HCH\_Graphs

Pref

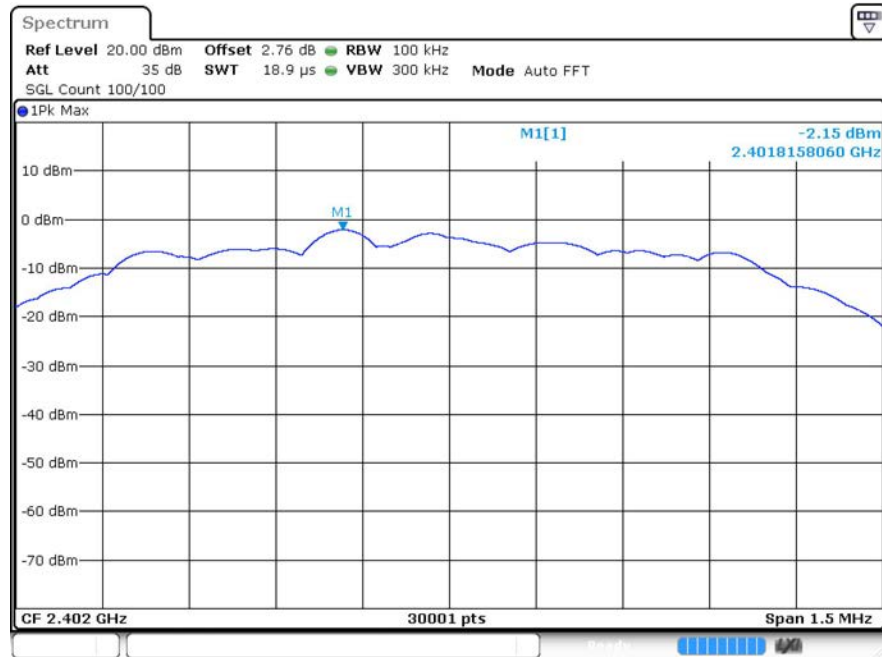


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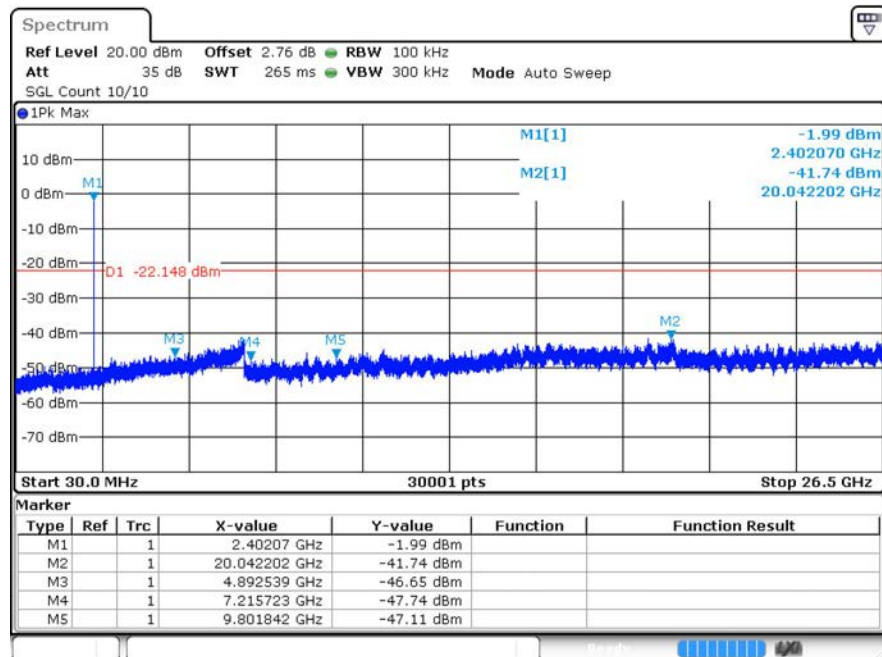


### $\pi/4$ DQPSK\_LCH\_Graphs

Pref

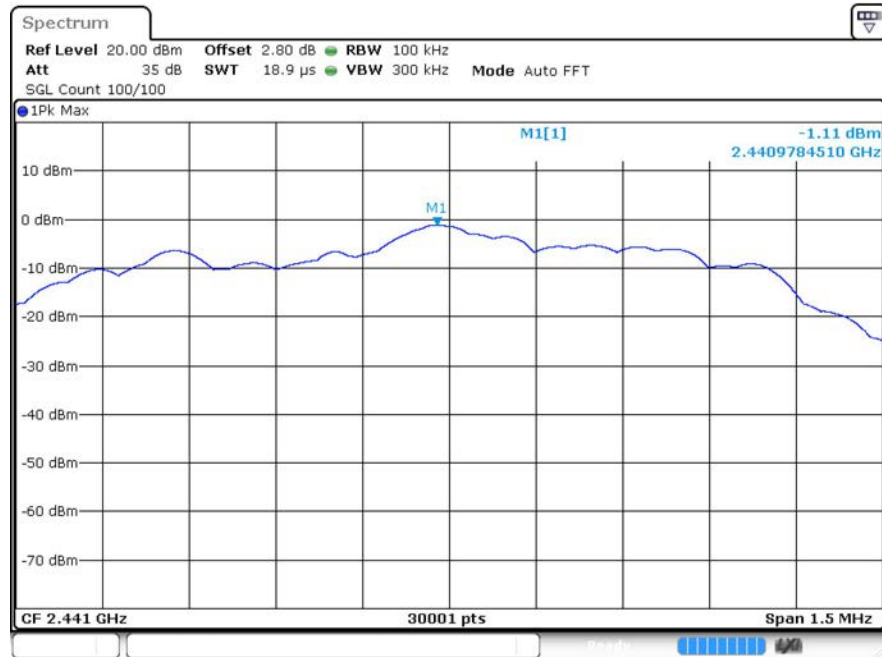


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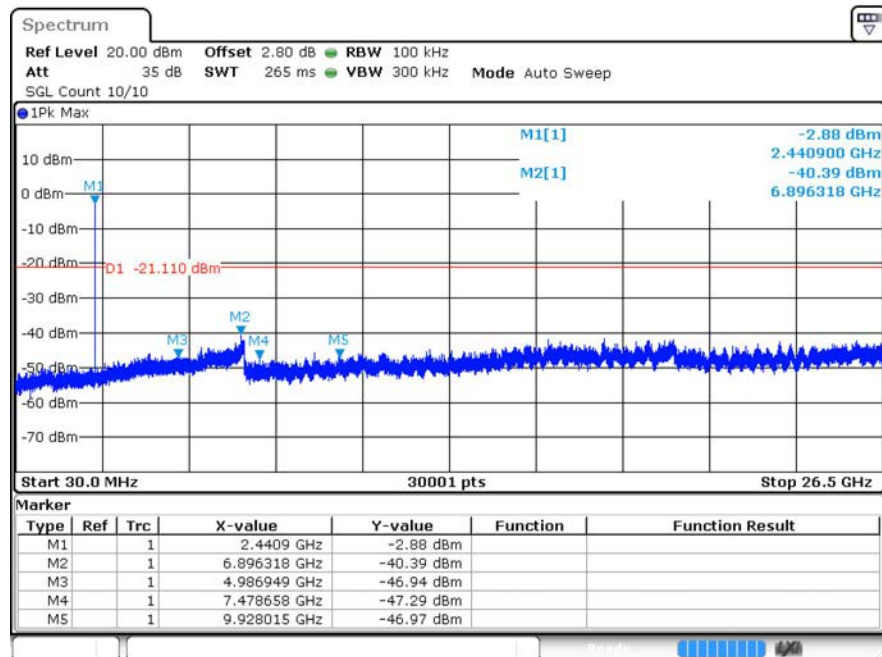


$\pi$ /4DQPSK\_MCH\_Graphs

Pref

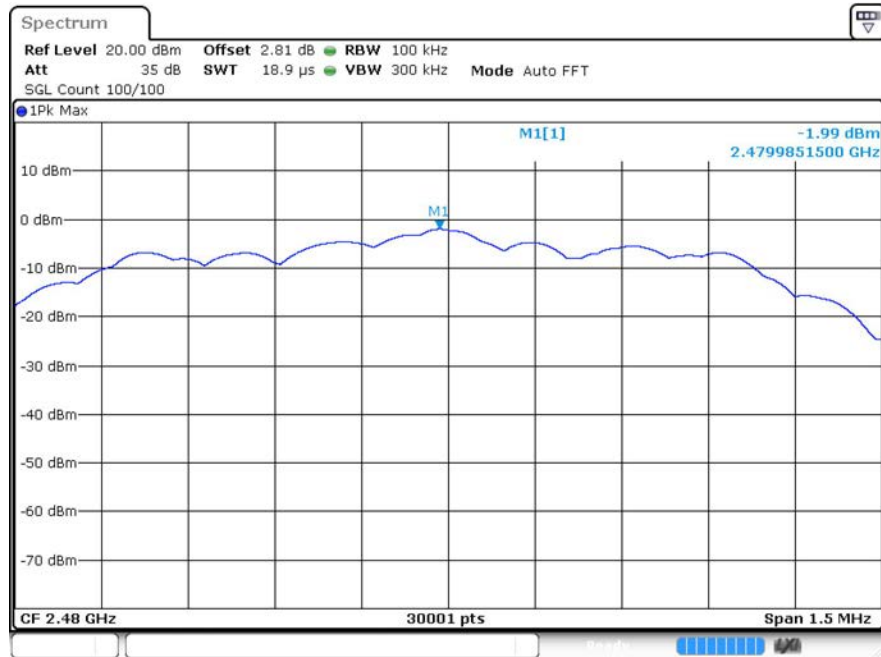


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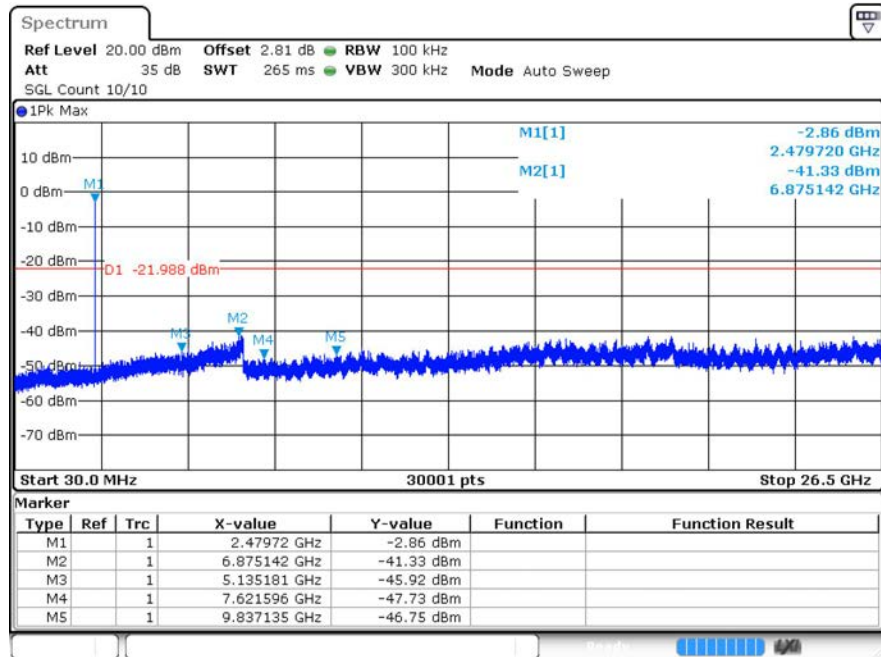


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref

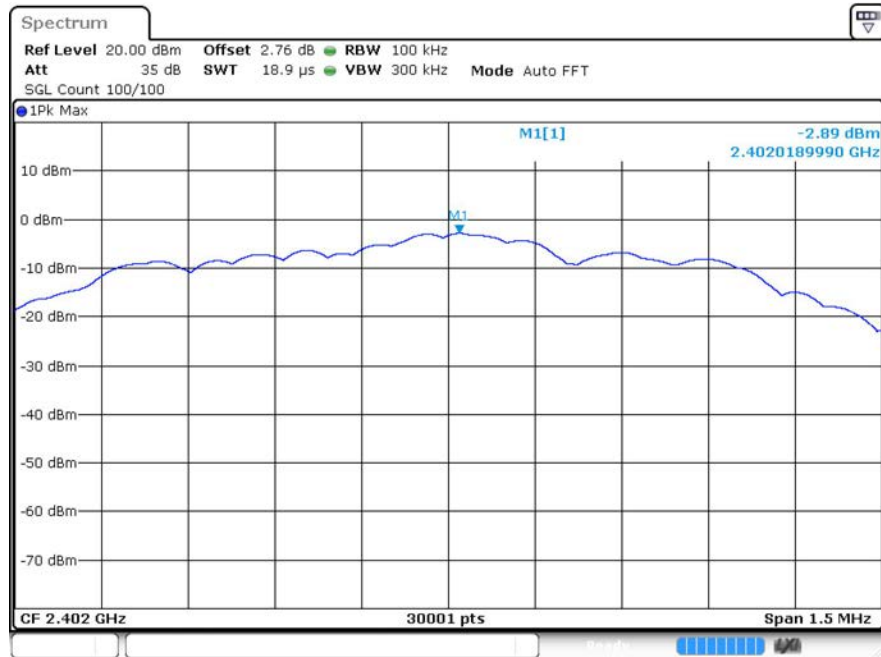


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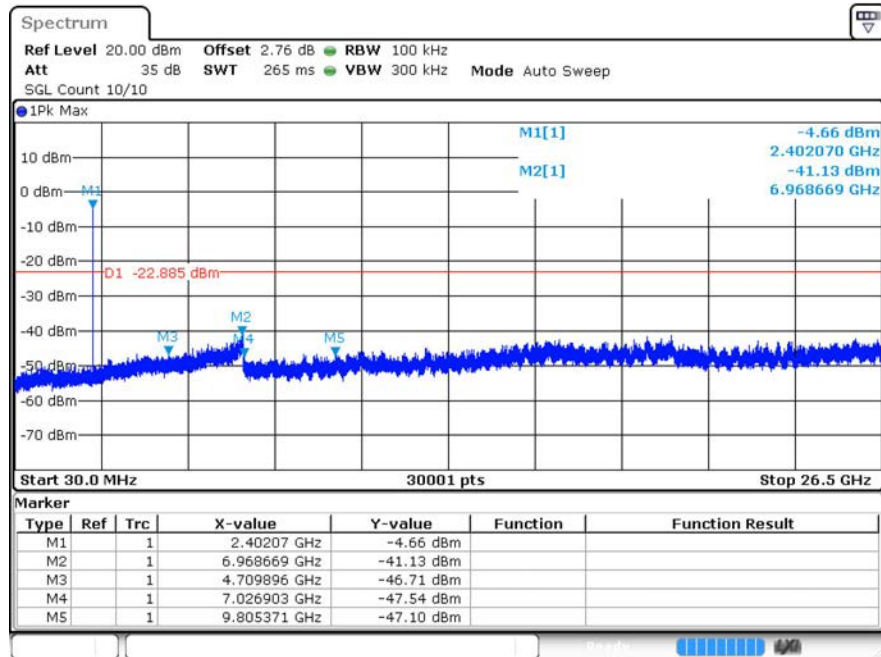


## 8DPSK\_LCH\_Graphs

Pref

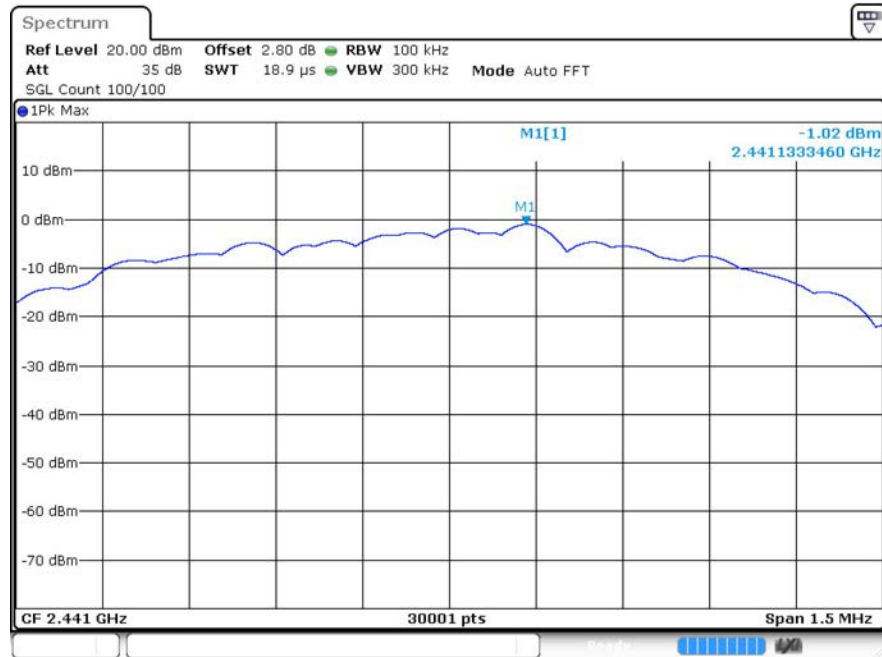


Puw

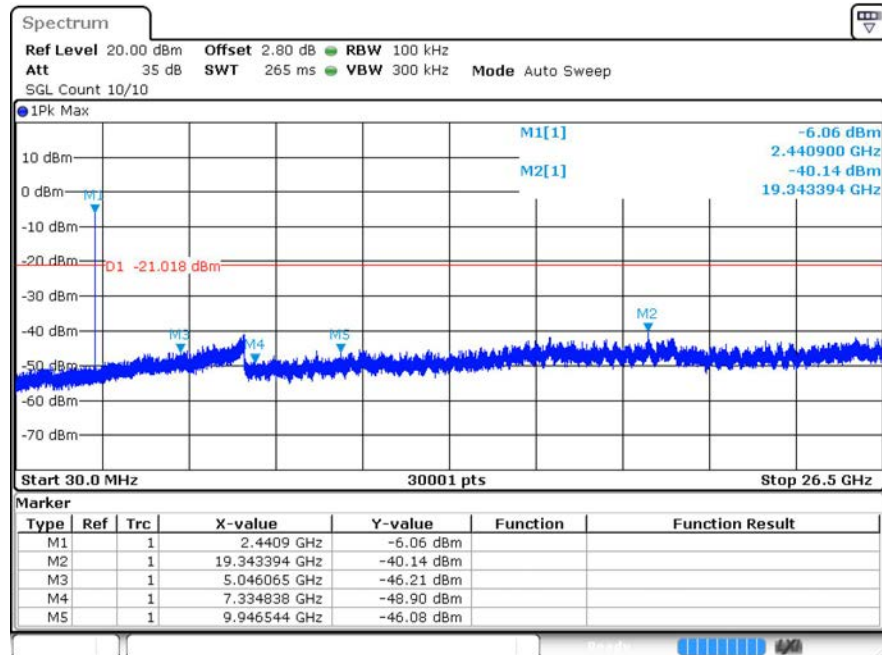


## 8DPSK\_MCH\_Graphs

Pref

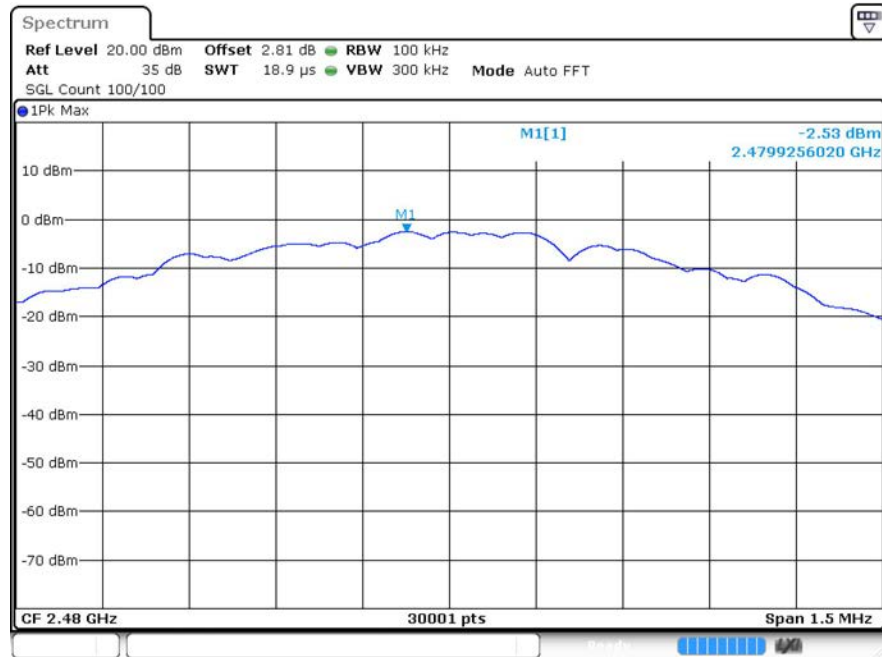


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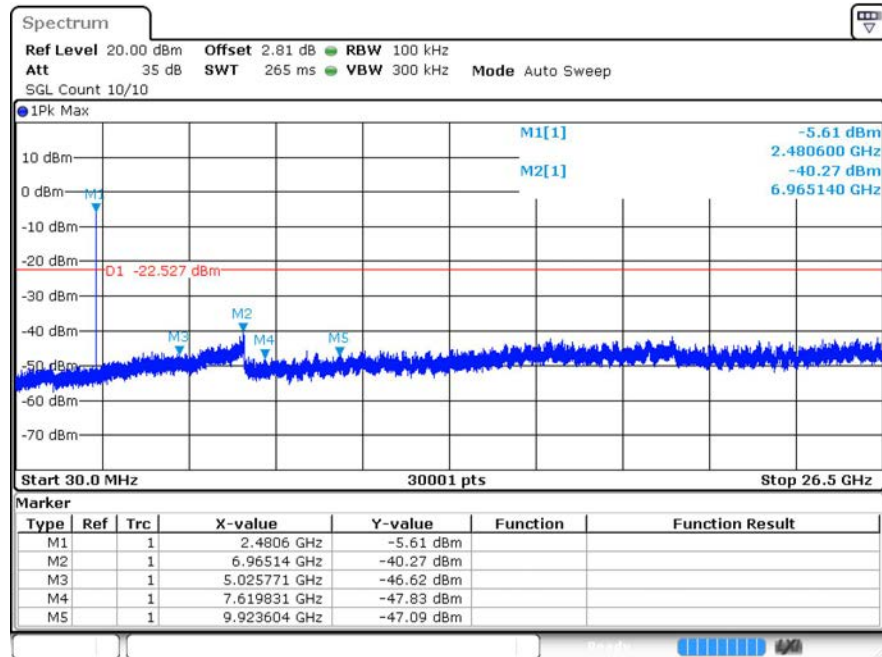


## 8DPSK\_HCH\_Graphs

Pref



Puw

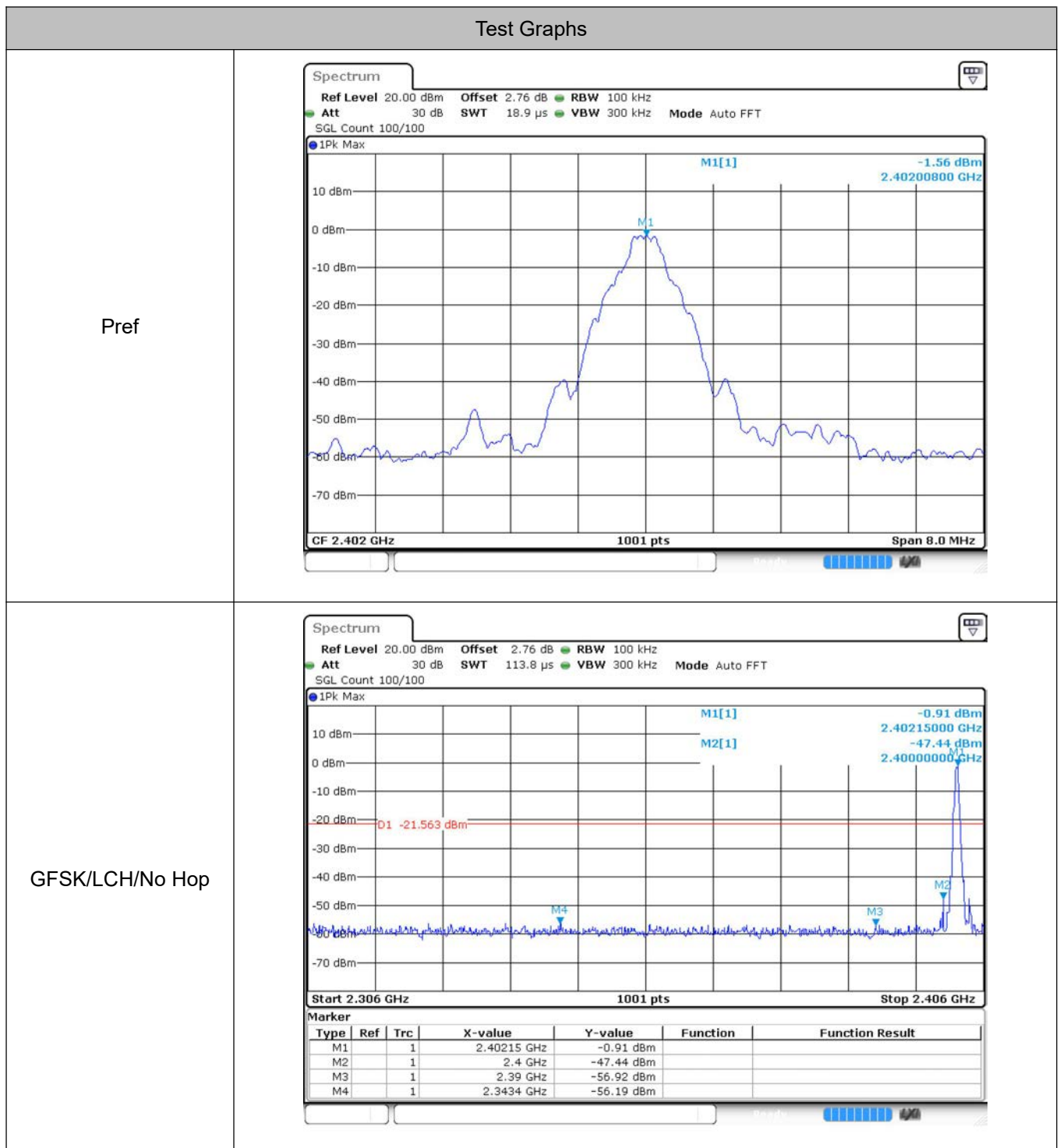


## 8 Band-edge for RF Conducted Emissions

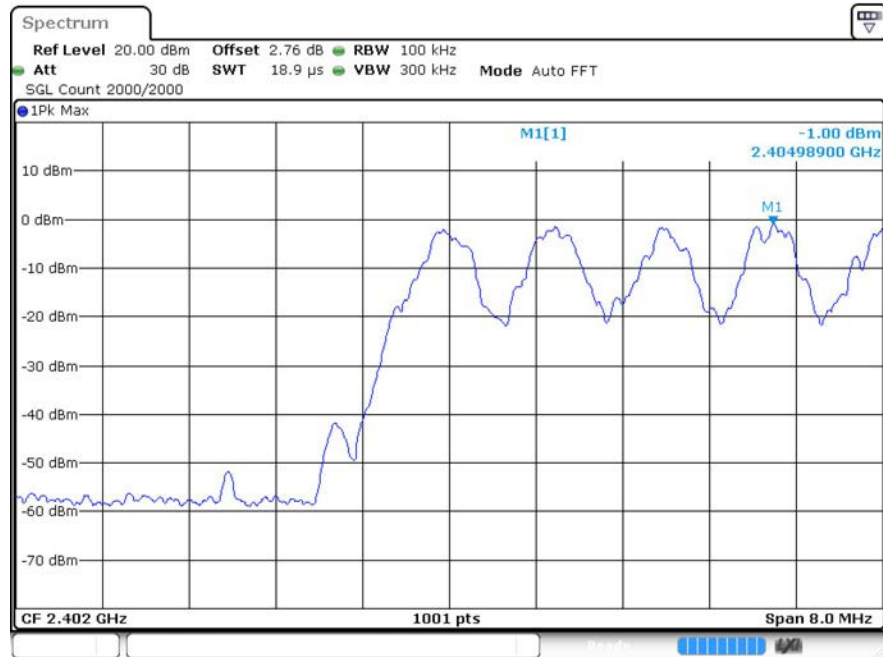
### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -54.63                   | -20         | Pass    |
|               |         |                         | On                | -54.03                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -53.42                   | -20         | Pass    |
|               |         |                         | On                | -46.59                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -52.55                   | -20         | Pass    |
|               |         |                         | On                | -51.79                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -44.27                   | -20         | Pass    |
|               |         |                         | On                | -45.04                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -53.35                   | -20         | Pass    |
|               |         |                         | On                | -52.84                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -45.28                   | -20         | Pass    |
|               |         |                         | On                | -47.38                   | -20         | Pass    |

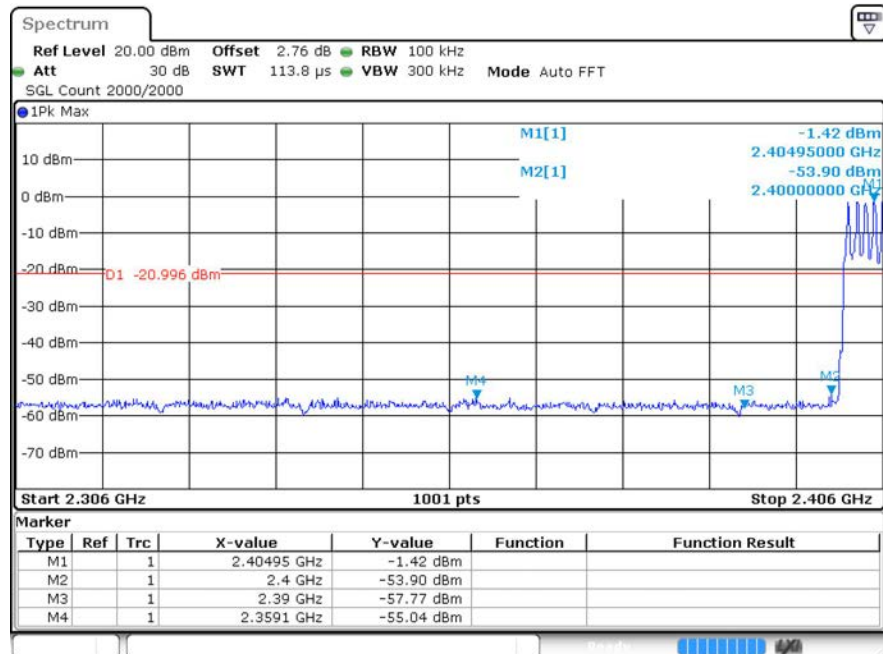
## 8.2 Test Graphs



Ref



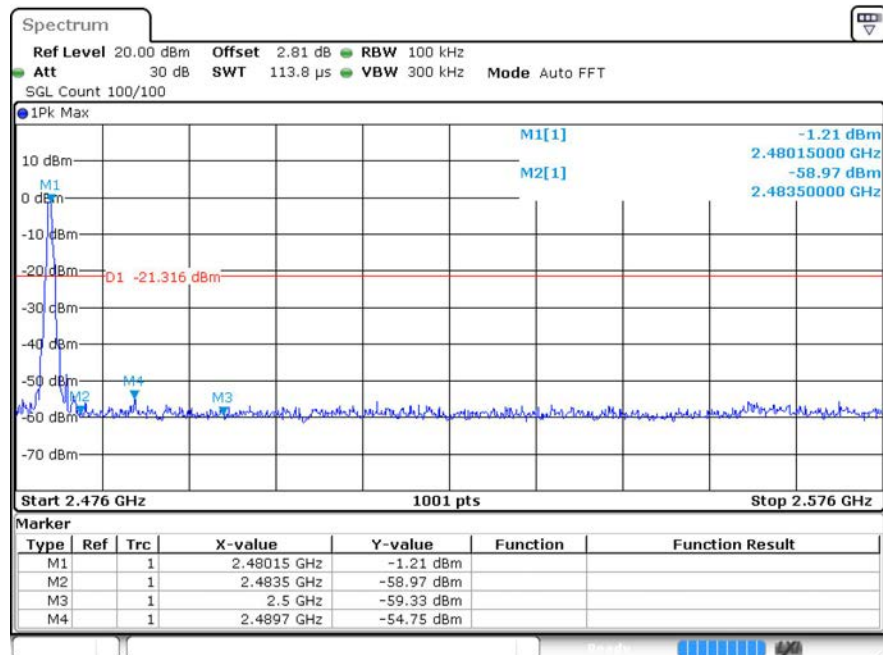
GFSK/LCH/Hop



Ref



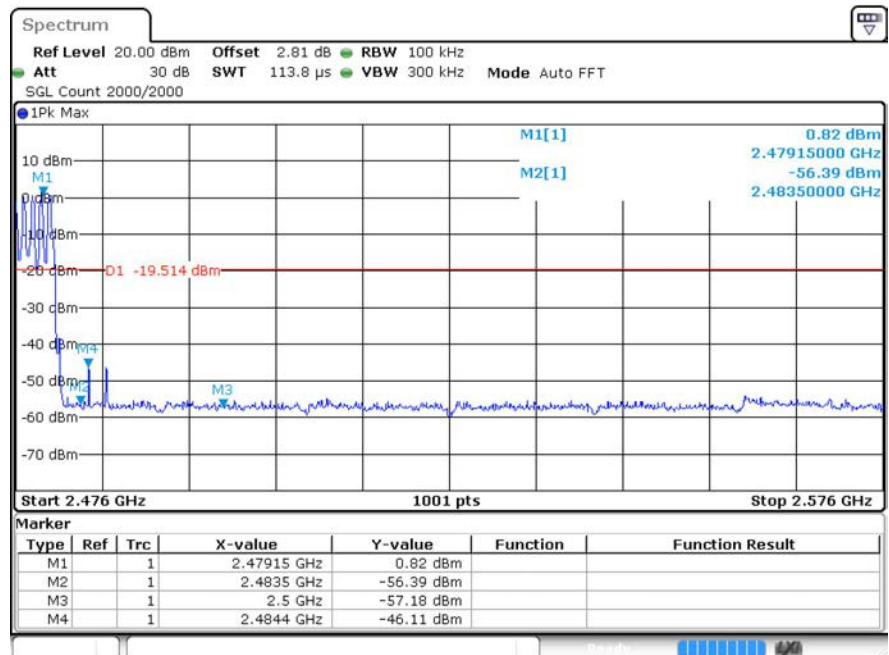
GFSK/HCH/No Hop



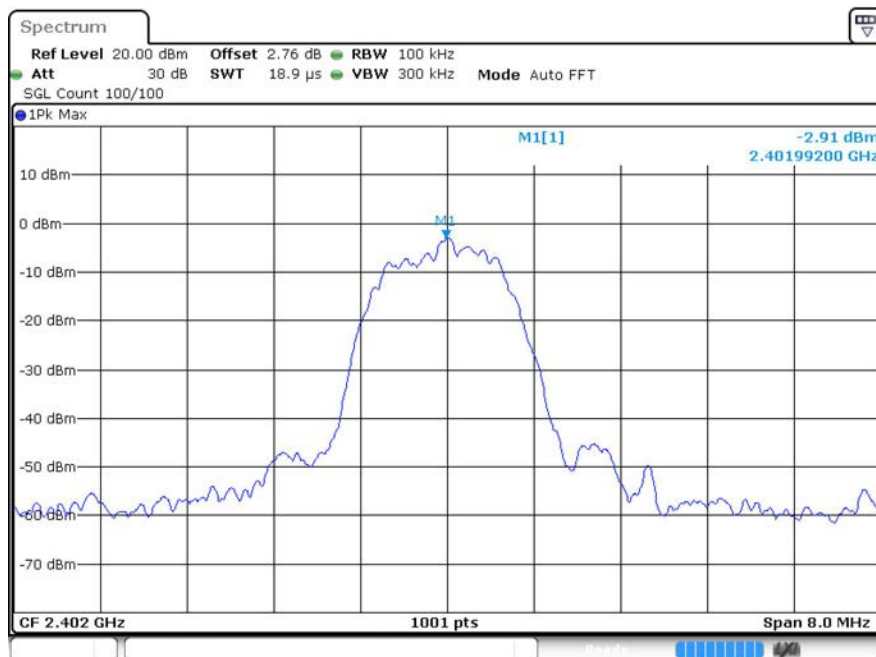
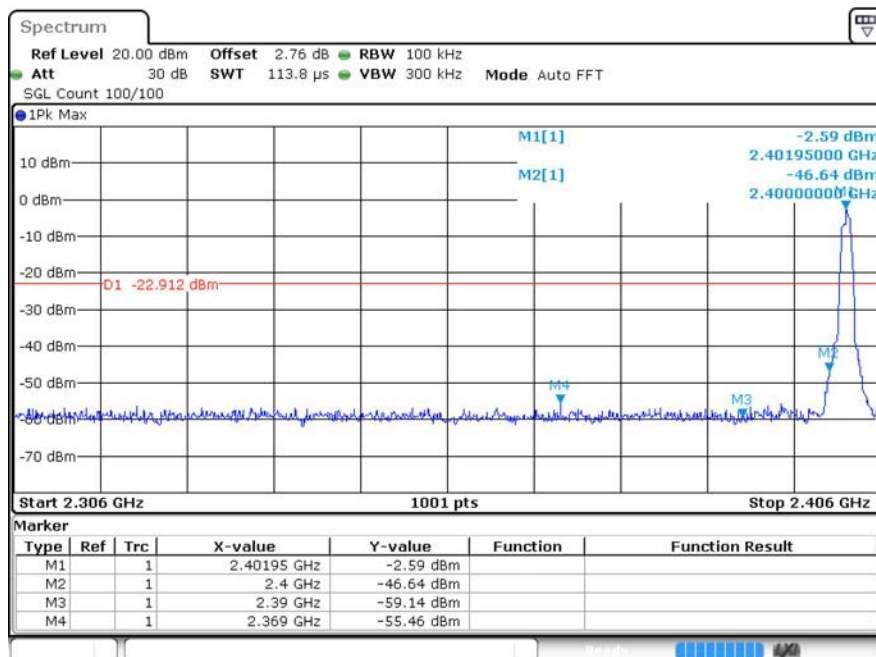
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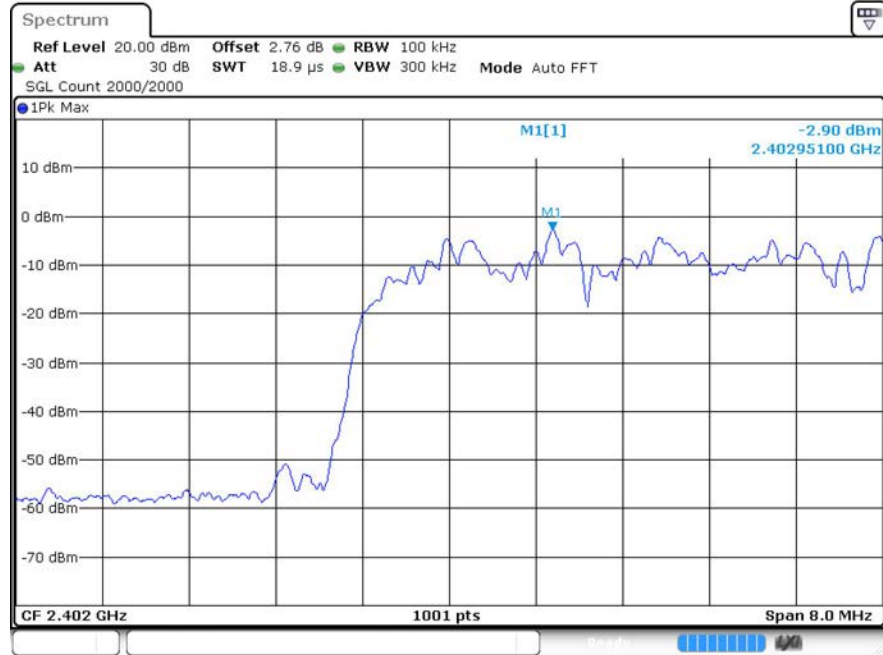
GFSK/HCH/Hop



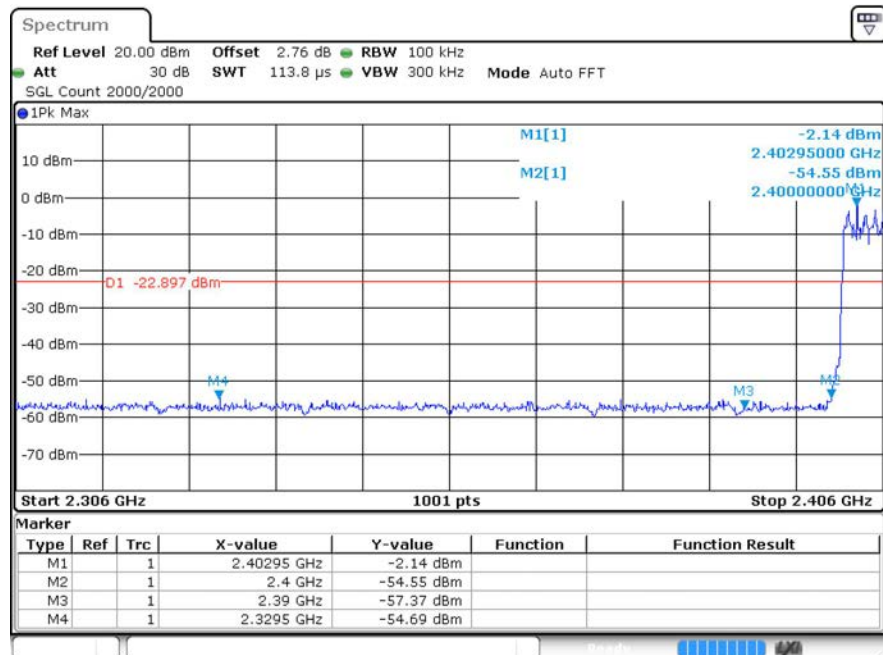
Ref


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


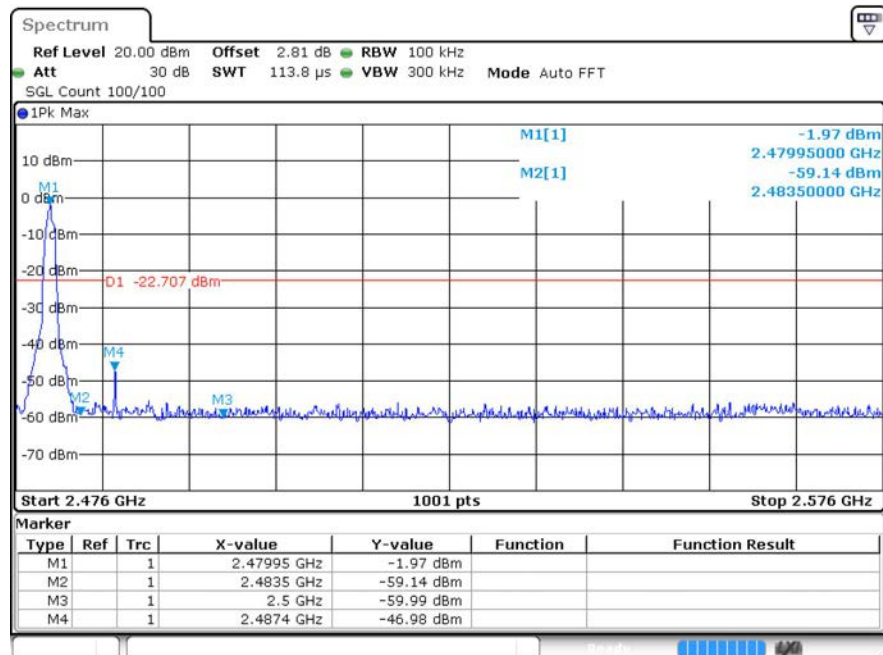
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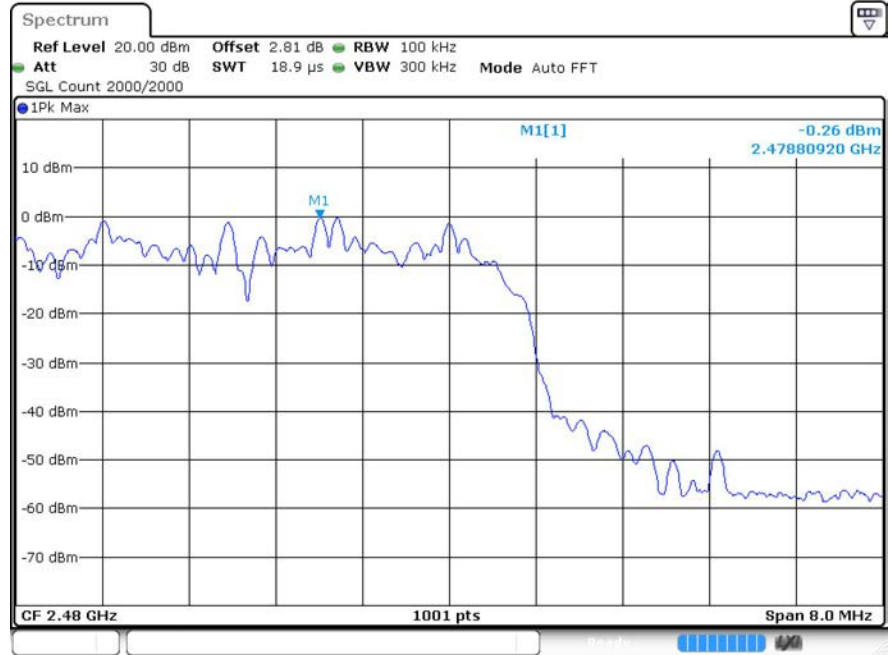
$\pi/4$ DQPSK/LCH/Hop



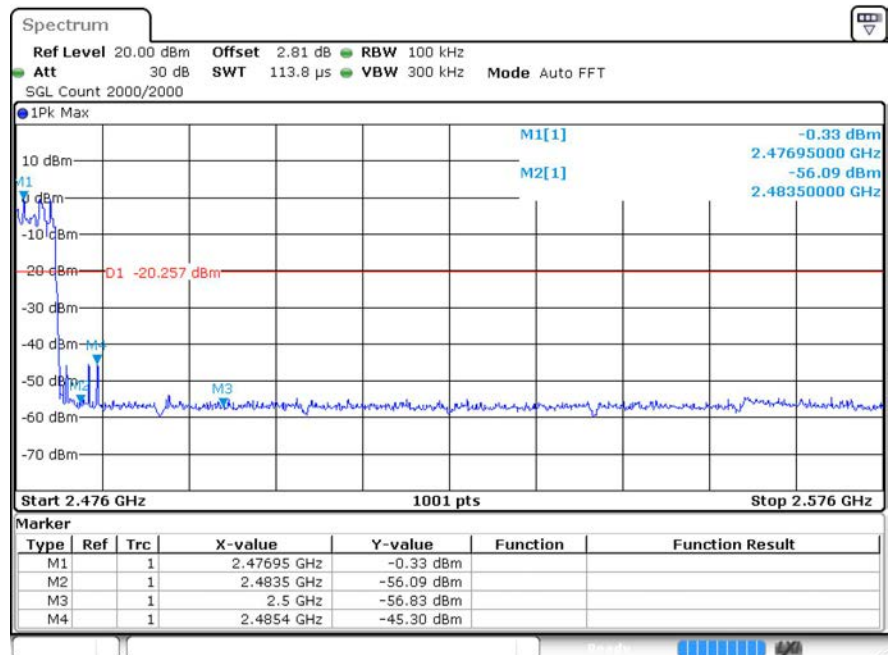
Ref


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


Ref



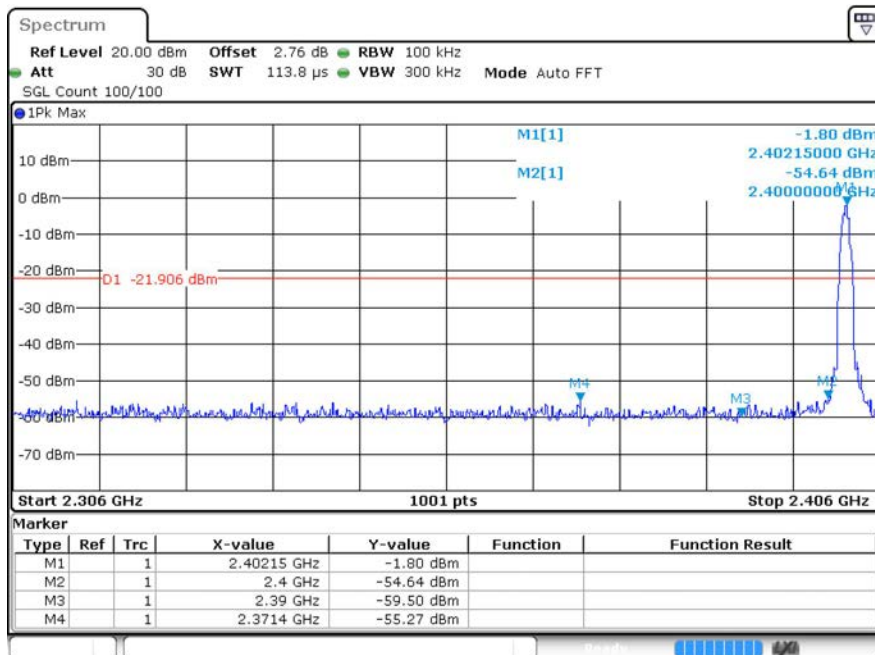
$\pi/4$ DQPSK/HCH/Hop



Ref



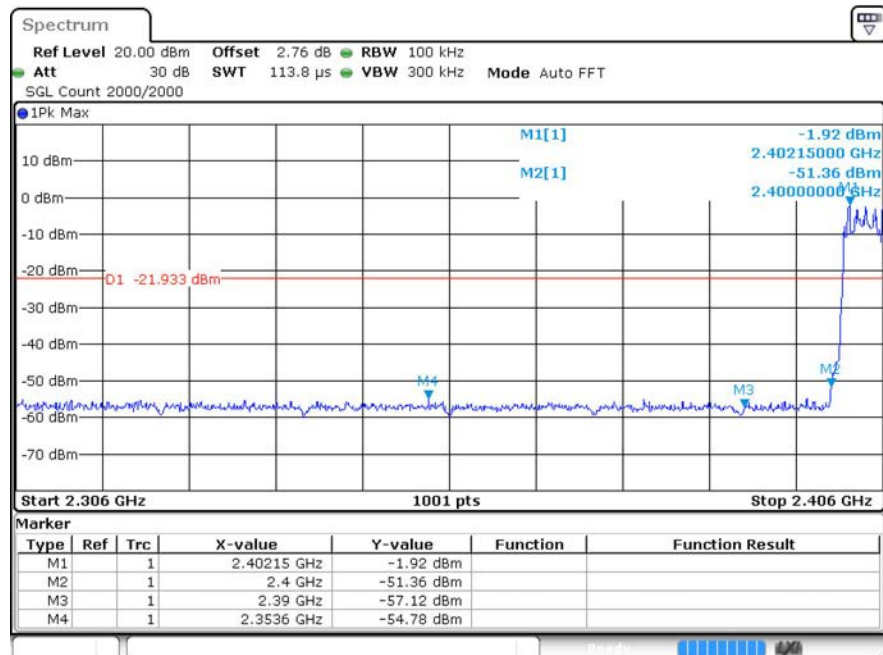
8DPSK/LCH/No Hop



Ref



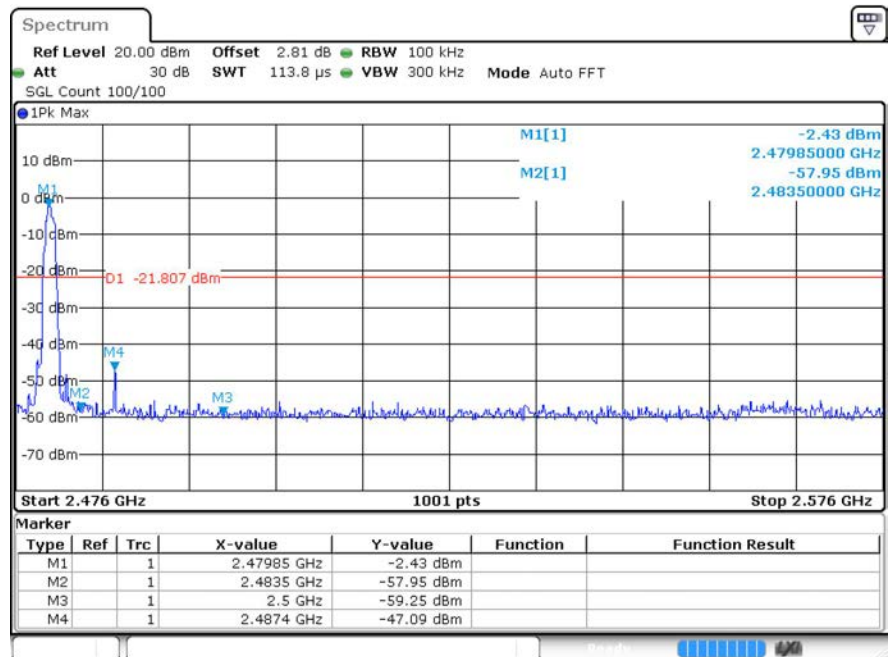
8DPSK/LCH/Hop



Ref



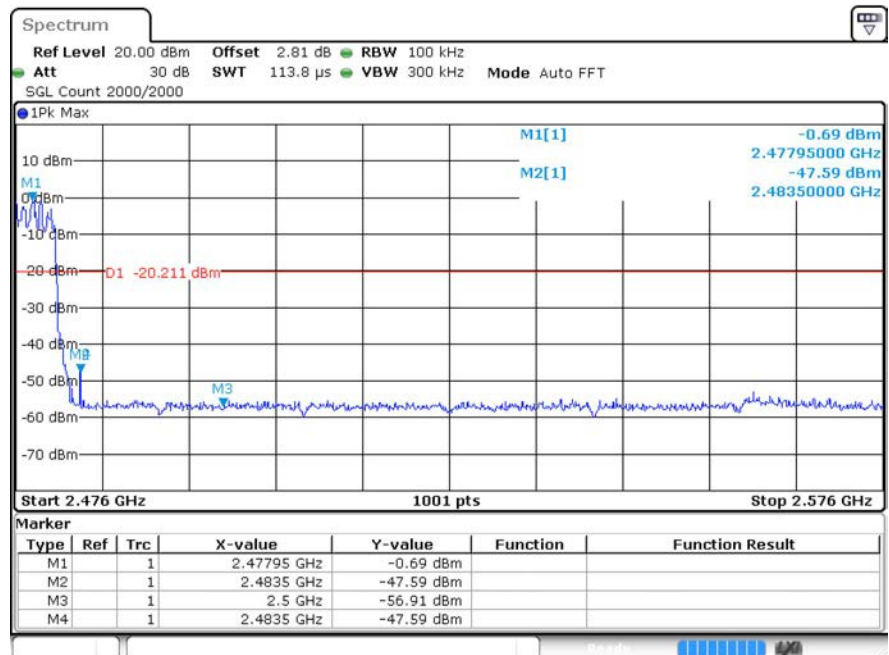
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

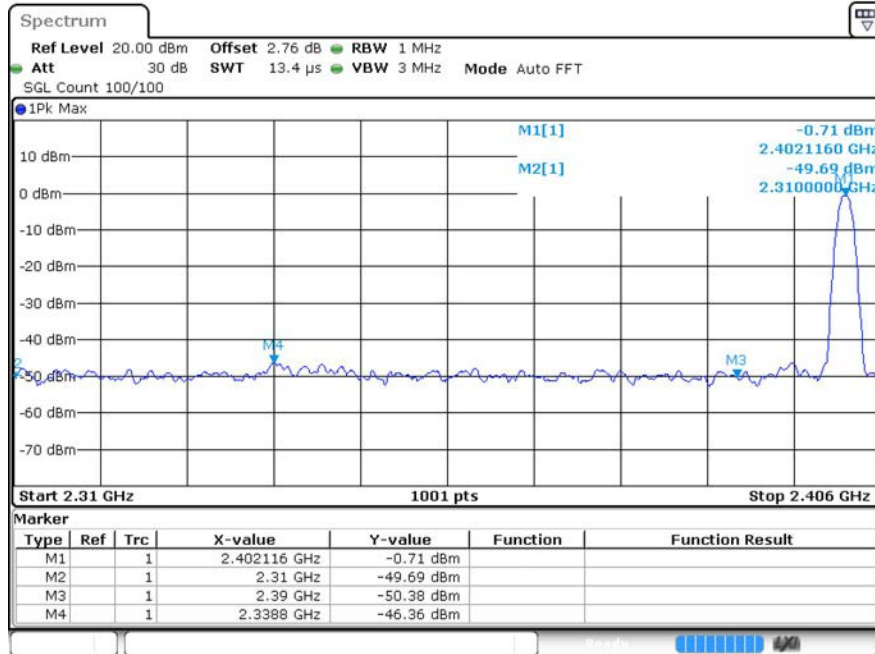
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | Duty Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|-------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -49.69      | 4.5  | -           | 50.07      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -57.43      | 4.5  | 5.06        | 47.39      | AV       | 54             | Pass    |
|               | Off     | 2338.8   | -46.35      | 4.5  | -           | 53.41      | PEAK     | 74             | Pass    |
|               | Off     | 2338.128 | -53.73      | 4.5  | 5.06        | 51.09      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -50.38      | 4.5  | -           | 49.38      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.95      | 4.5  | 5.06        | 47.87      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -49.67      | 4.5  | -           | 50.09      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -56.63      | 4.5  | 5.05        | 48.18      | AV       | 54             | Pass    |
|               | Off     | 2487.4   | -43.7       | 4.5  | -           | 56.06      | PEAK     | 74             | Pass    |
|               | Off     | 2487.448 | -55.64      | 4.5  | 5.05        | 49.17      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -48.8       | 4.5  | -           | 50.96      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -55.67      | 4.5  | 5.05        | 49.14      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -49.76      | 4.5  | -           | 50         | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.36      | 4.5  | 4.95        | 48.35      | AV       | 54             | Pass    |
|               | Off     | 2338.608 | -46.2       | 4.5  | -           | 53.56      | PEAK     | 74             | Pass    |
|               | Off     | 2338.032 | -54.6       | 4.5  | 4.95        | 50.11      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -49.95      | 4.5  | -           | 49.81      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.45      | 4.5  | 4.95        | 48.26      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -49.82      | 4.5  | -           | 49.94      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -56.33      | 4.5  | 4.95        | 48.38      | AV       | 54             | Pass    |
|               | Off     | 2492.128 | -47.28      | 4.5  | -           | 52.48      | PEAK     | 74             | Pass    |
|               | Off     | 2492.896 | -55.49      | 4.5  | 4.95        | 49.22      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -50.74      | 4.5  | -           | 49.02      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -57.83      | 4.5  | 4.95        | 46.88      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -50.78      | 4.5  | -           | 48.98      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.44      | 4.5  | 4.95        | 48.27      | AV       | 54             | Pass    |
|               | Off     | 2344.752 | -46.54      | 4.5  | -           | 53.22      | PEAK     | 74             | Pass    |
|               | Off     | 2339.28  | -54.22      | 4.5  | 4.95        | 50.49      | AV       | 54             | Pass    |



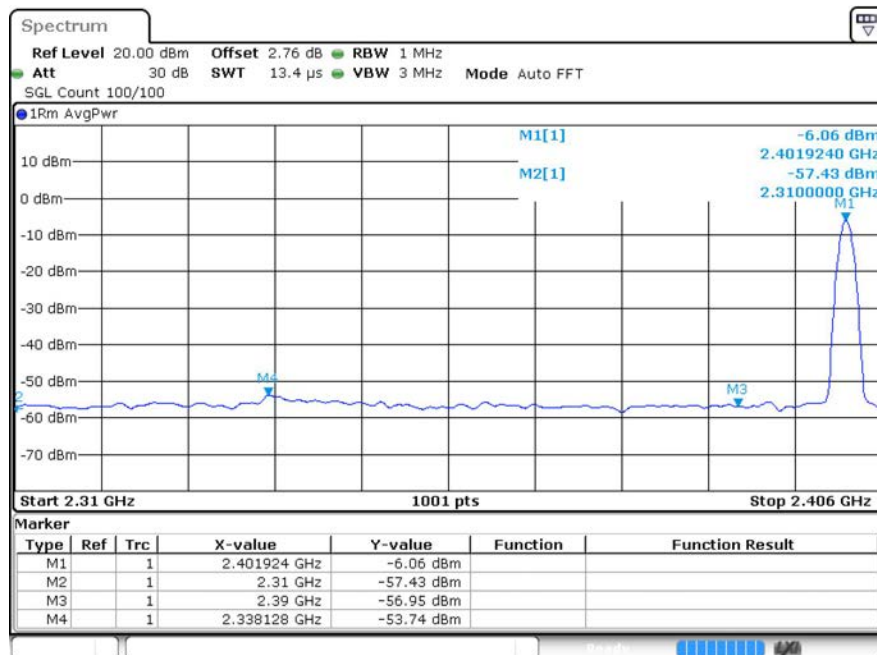
|     |          |        |     |      |       |      |    |      |
|-----|----------|--------|-----|------|-------|------|----|------|
| Off | 2390.0   | -50.24 | 4.5 | -    | 49.52 | PEAK | 74 | Pass |
| Off | 2390.0   | -56.74 | 4.5 | 4.95 | 47.97 | AV   | 54 | Pass |
| Off | 2483.5   | -48.07 | 4.5 | -    | 51.69 | PEAK | 74 | Pass |
| Off | 2483.5   | -55.39 | 4.5 | 4.95 | 49.32 | AV   | 54 | Pass |
| Off | 2497.216 | -46.1  | 4.5 | -    | 53.66 | PEAK | 74 | Pass |
| Off | 2483.992 | -54.92 | 4.5 | 4.95 | 49.79 | AV   | 54 | Pass |
| Off | 2500.0   | -47.96 | 4.5 | -    | 51.8  | PEAK | 74 | Pass |
| Off | 2500.0   | -56.42 | 4.5 | 4.95 | 48.29 | AV   | 54 | Pass |

## 9.2 Test Graphs

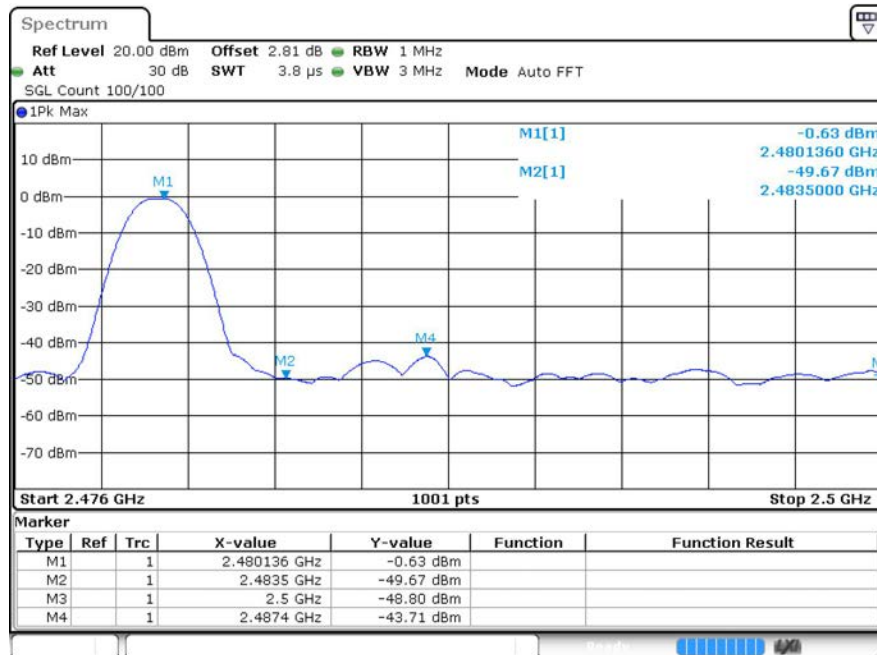
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



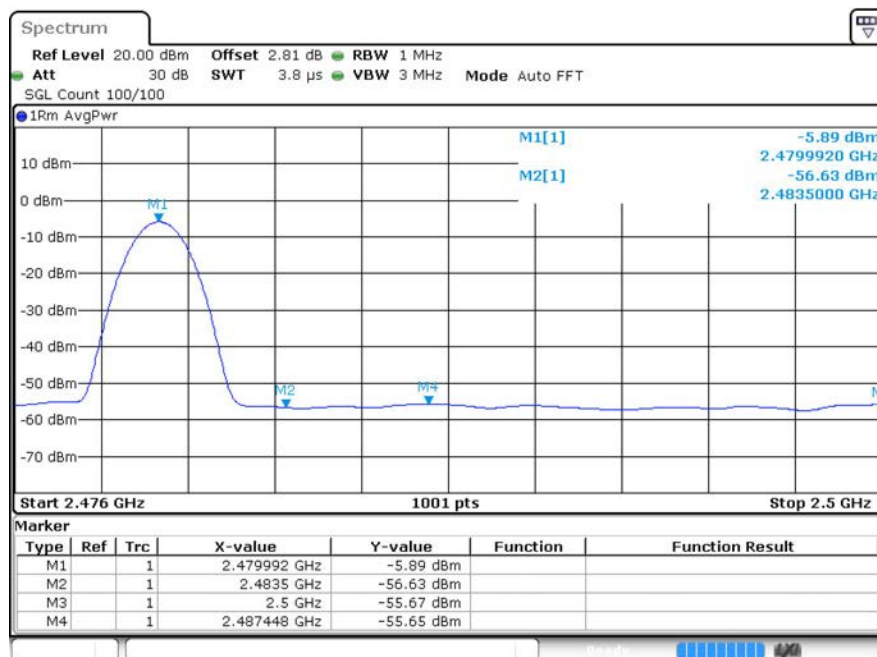
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



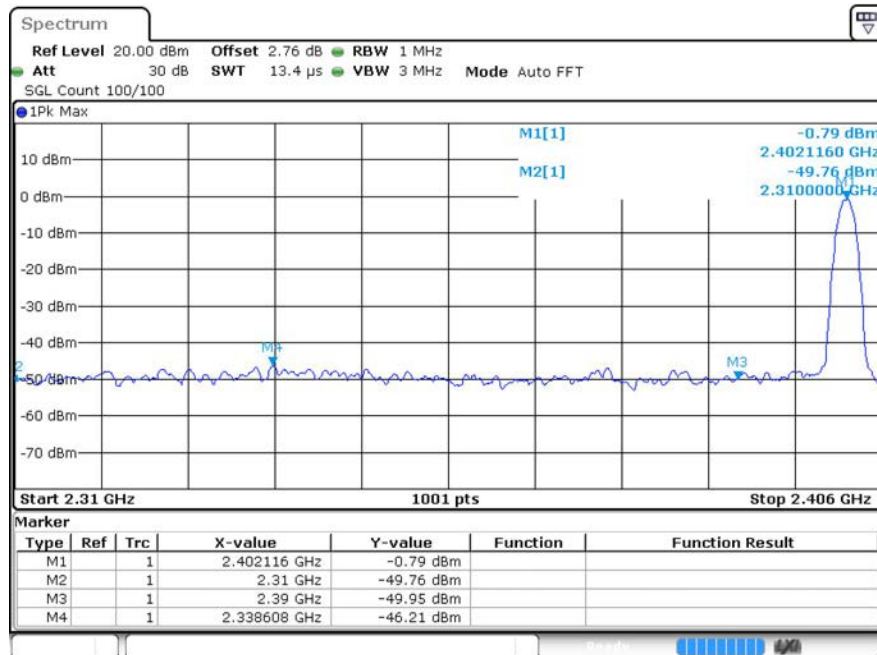
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



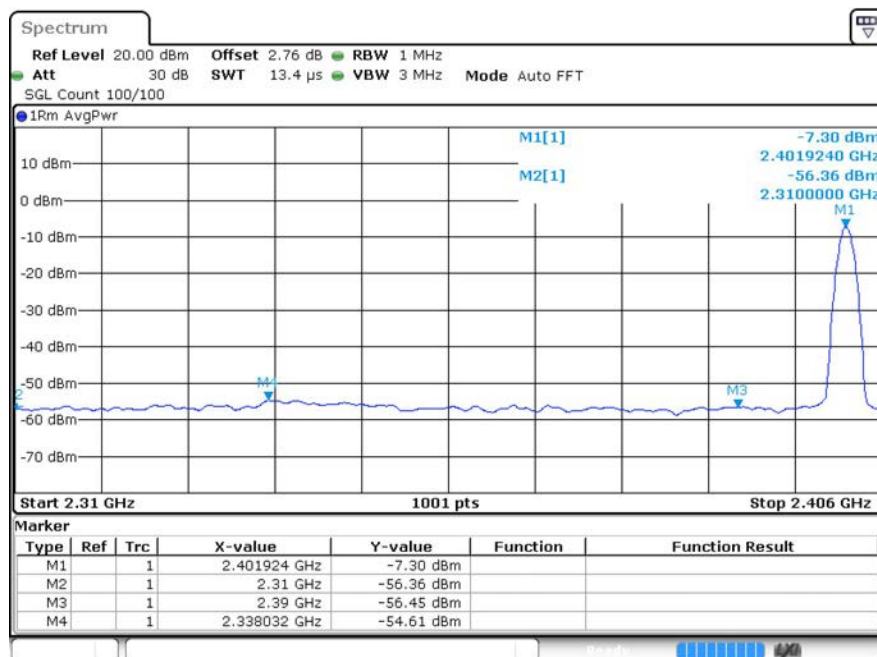
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



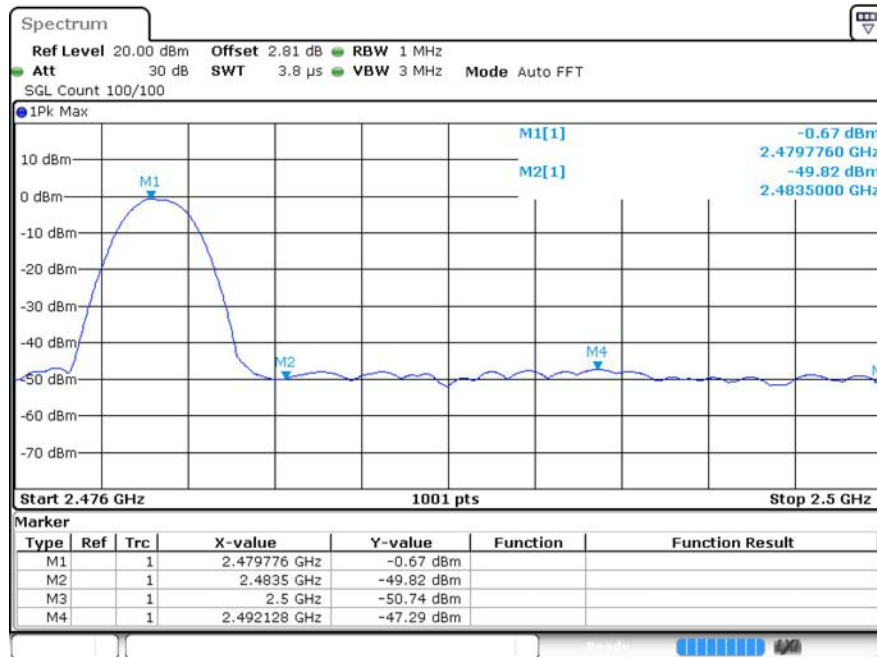
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



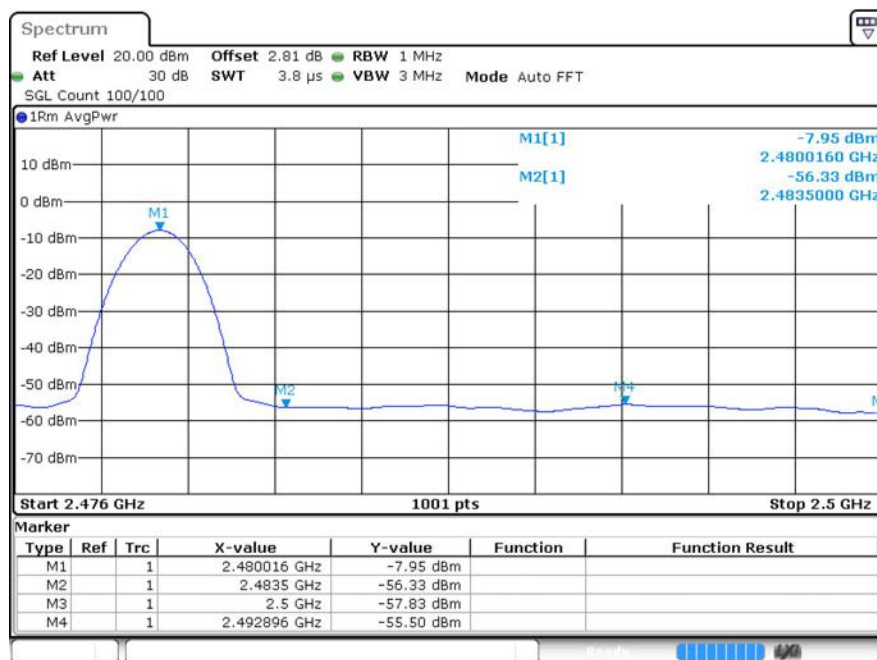
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



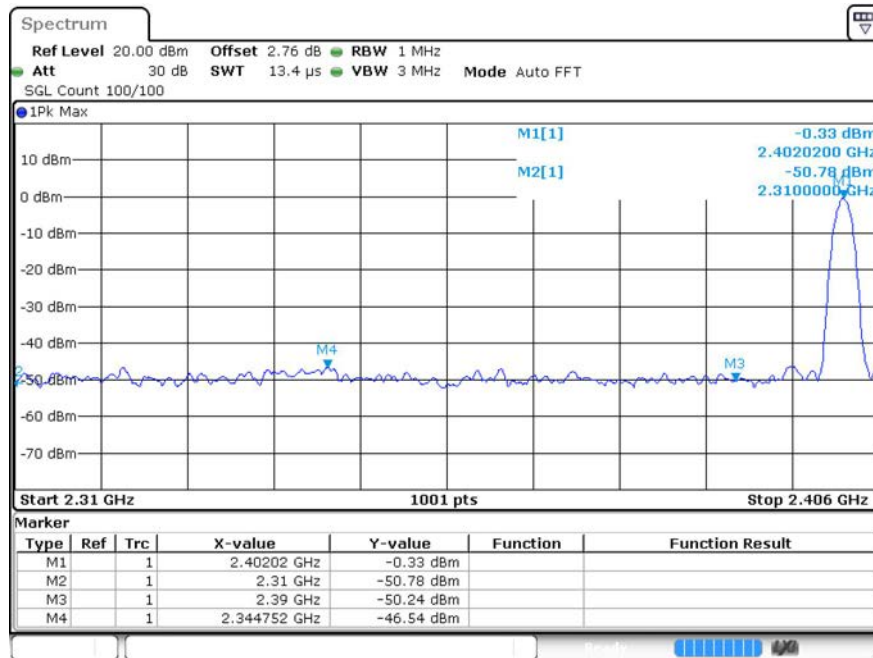
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



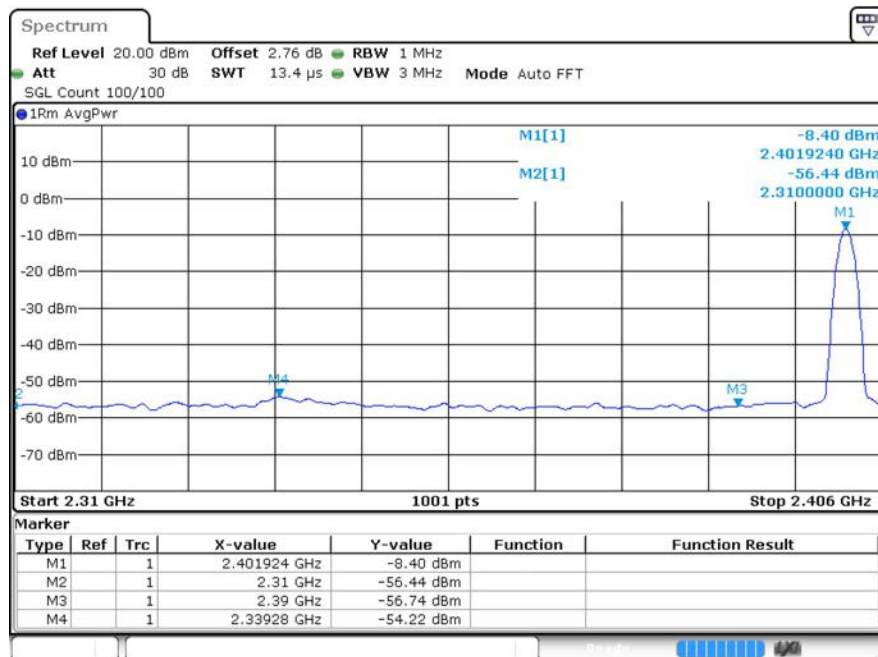
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



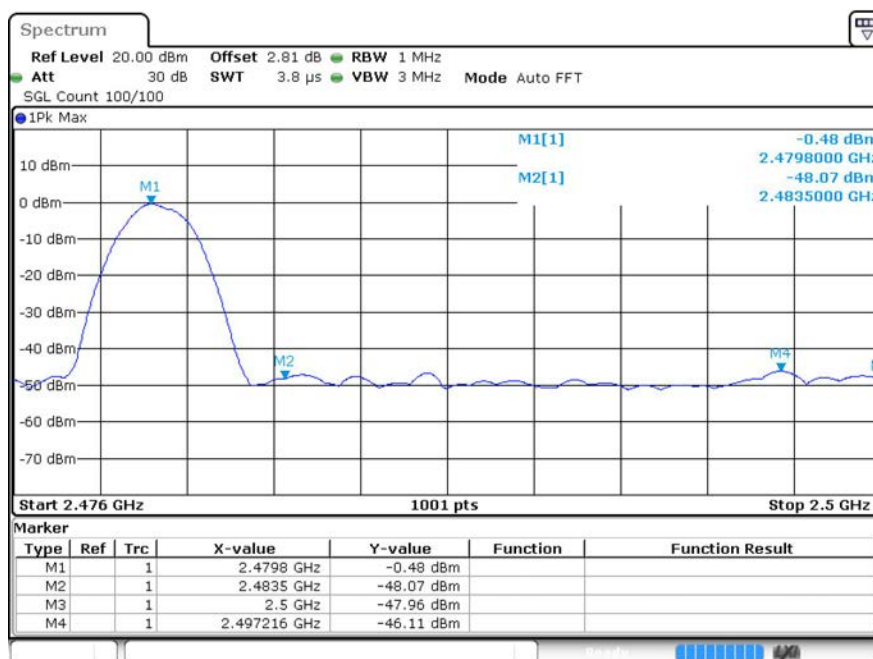
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



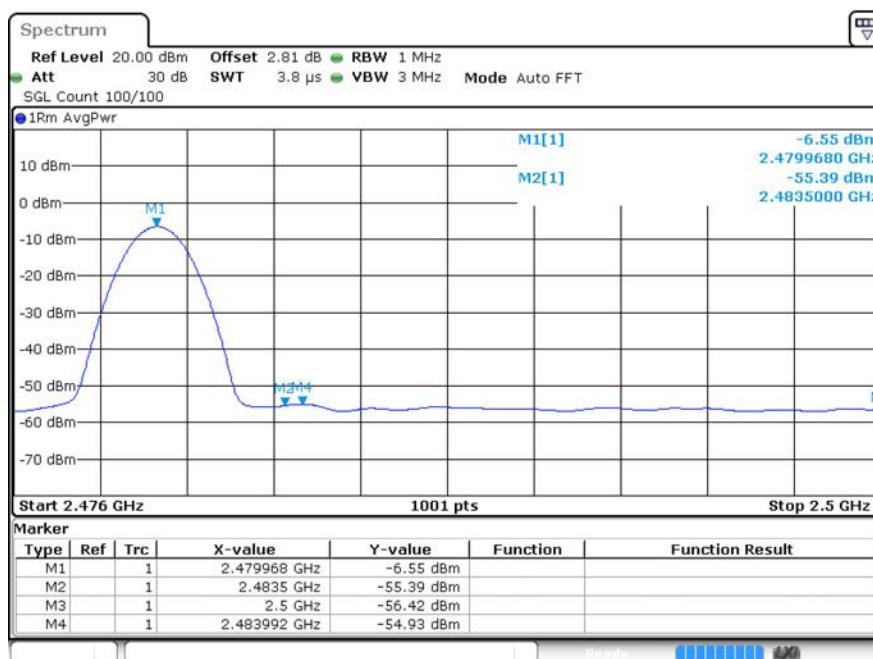
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---