

## Appendix A

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

Product Name: Carplay dash camera

Trade Mark: MIROIR

Test Model: M1003-7

**Environmental Conditions**

|                    |             |
|--------------------|-------------|
| Temperature:       | 24.9℃       |
| Relative Humidity: | 52.6%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Emiya lin   |
| Supervised by:     | Simba Haung |



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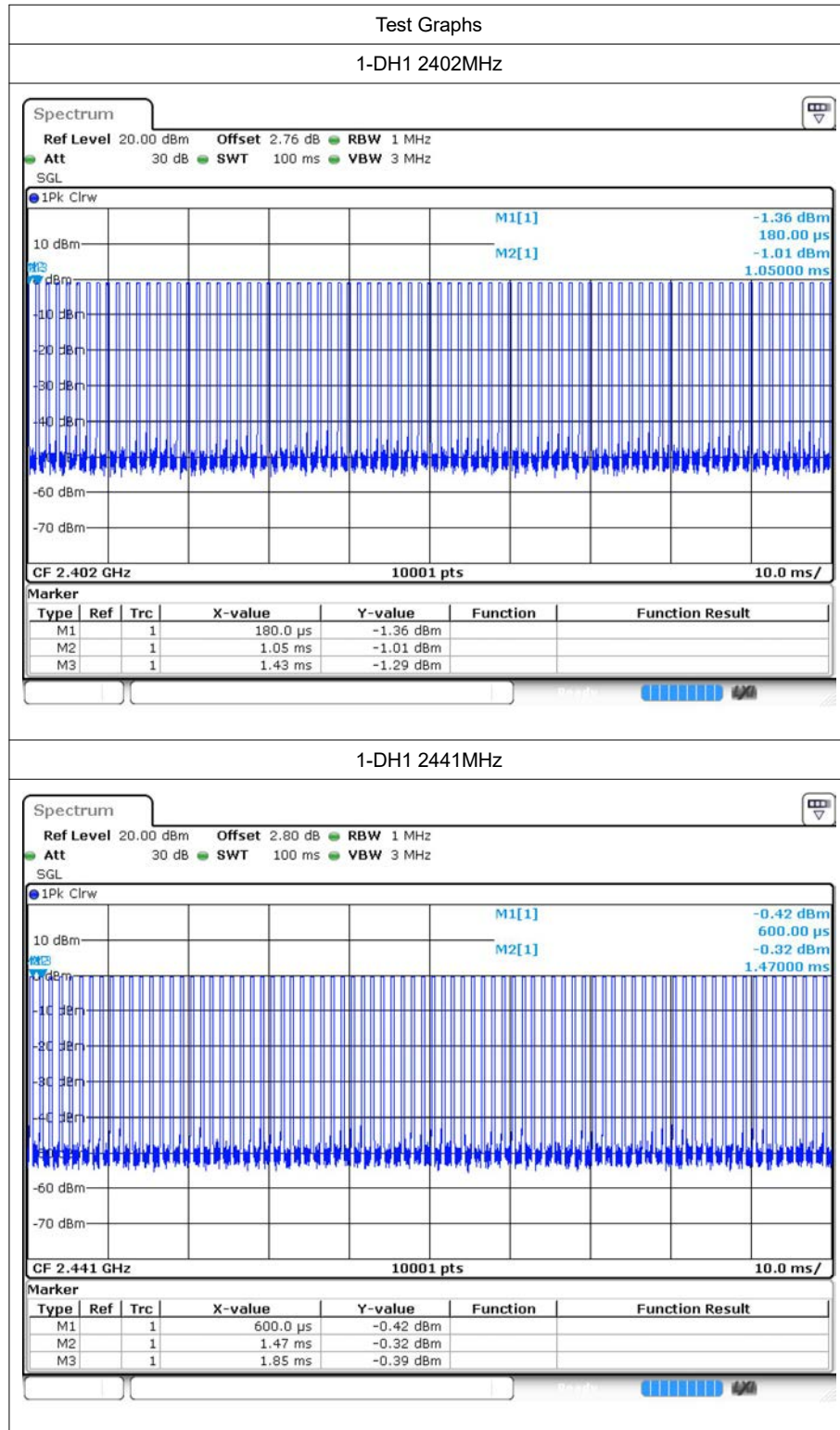
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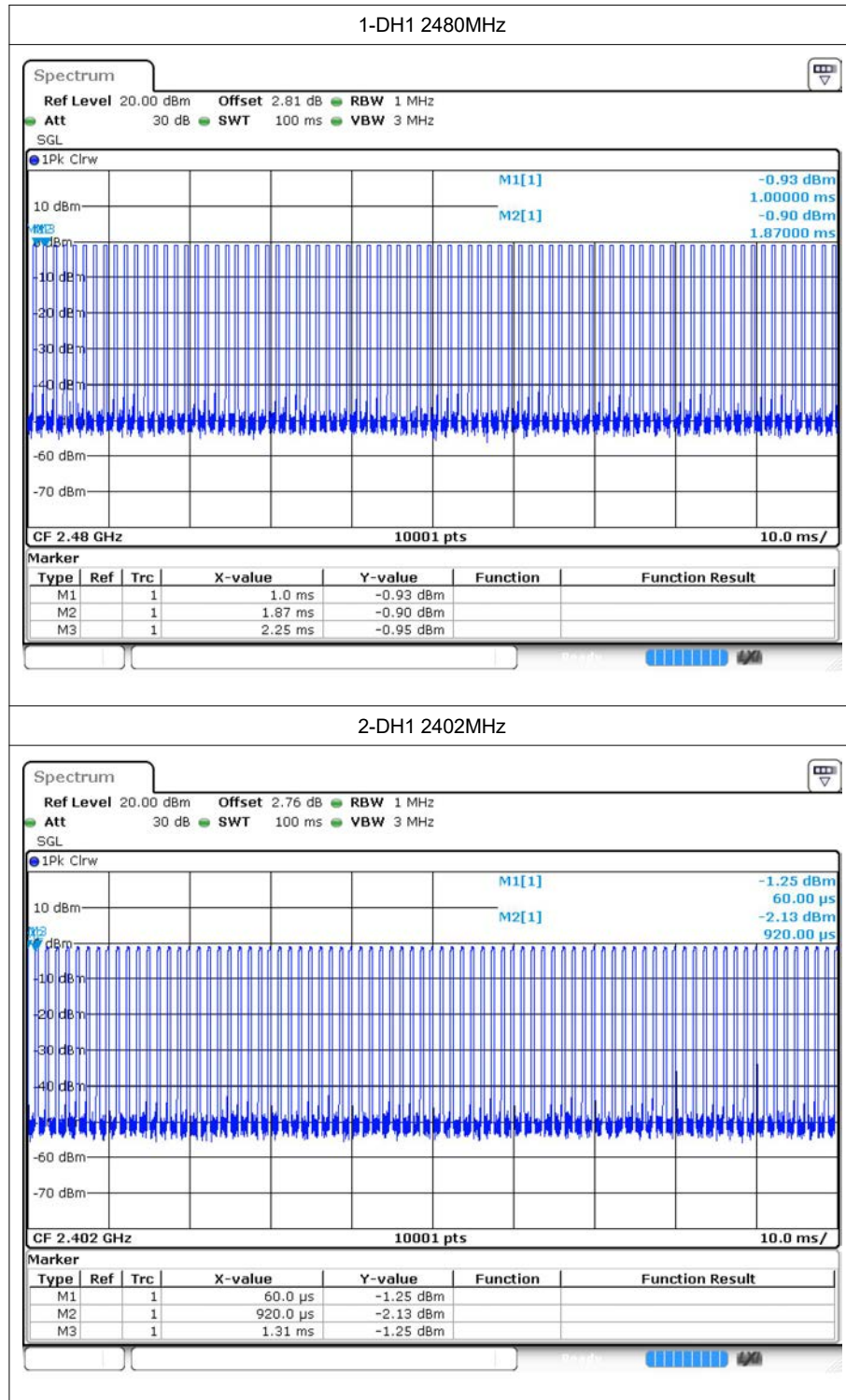
# 1 Duty Cycle

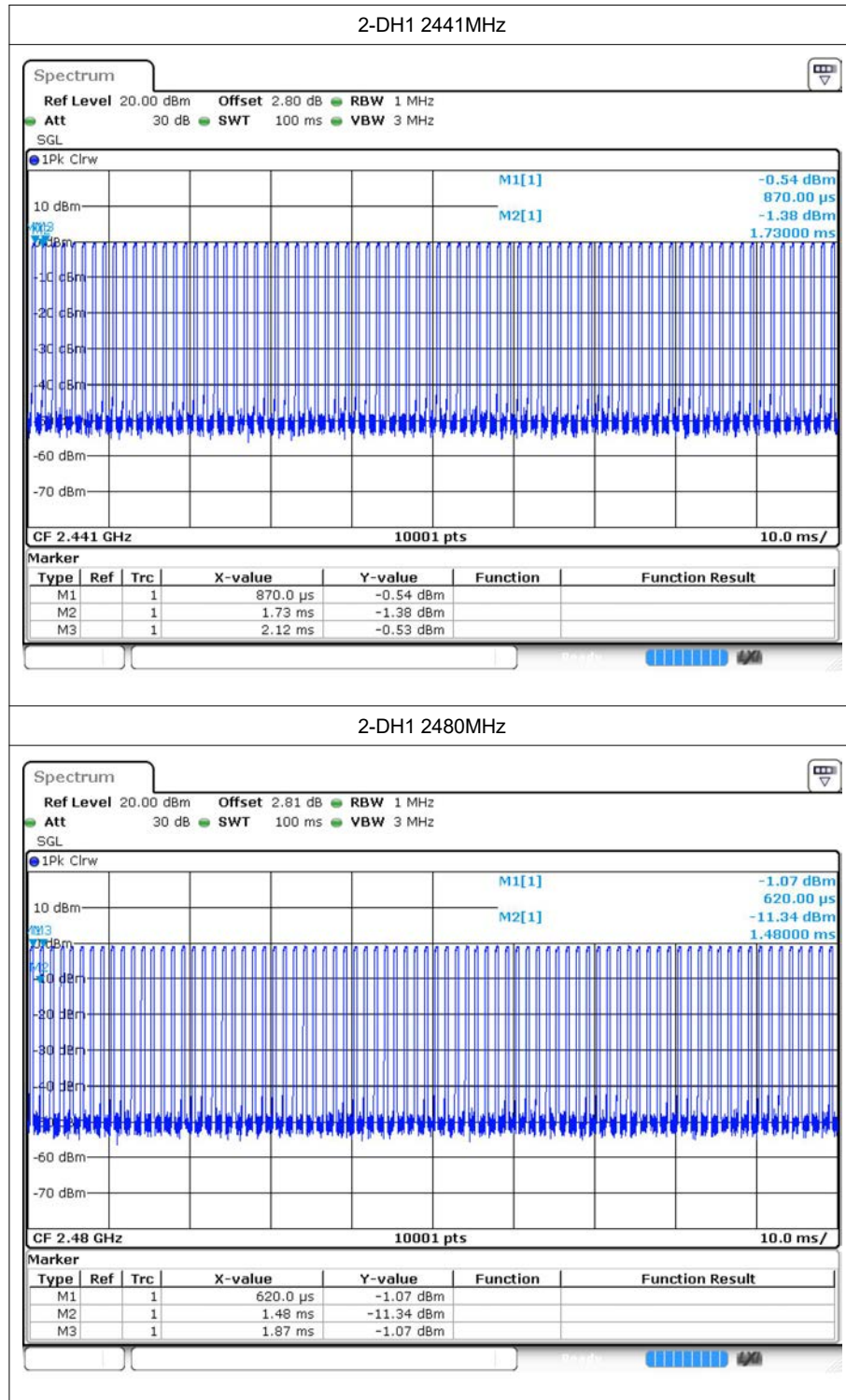
## 1.1 Test Result

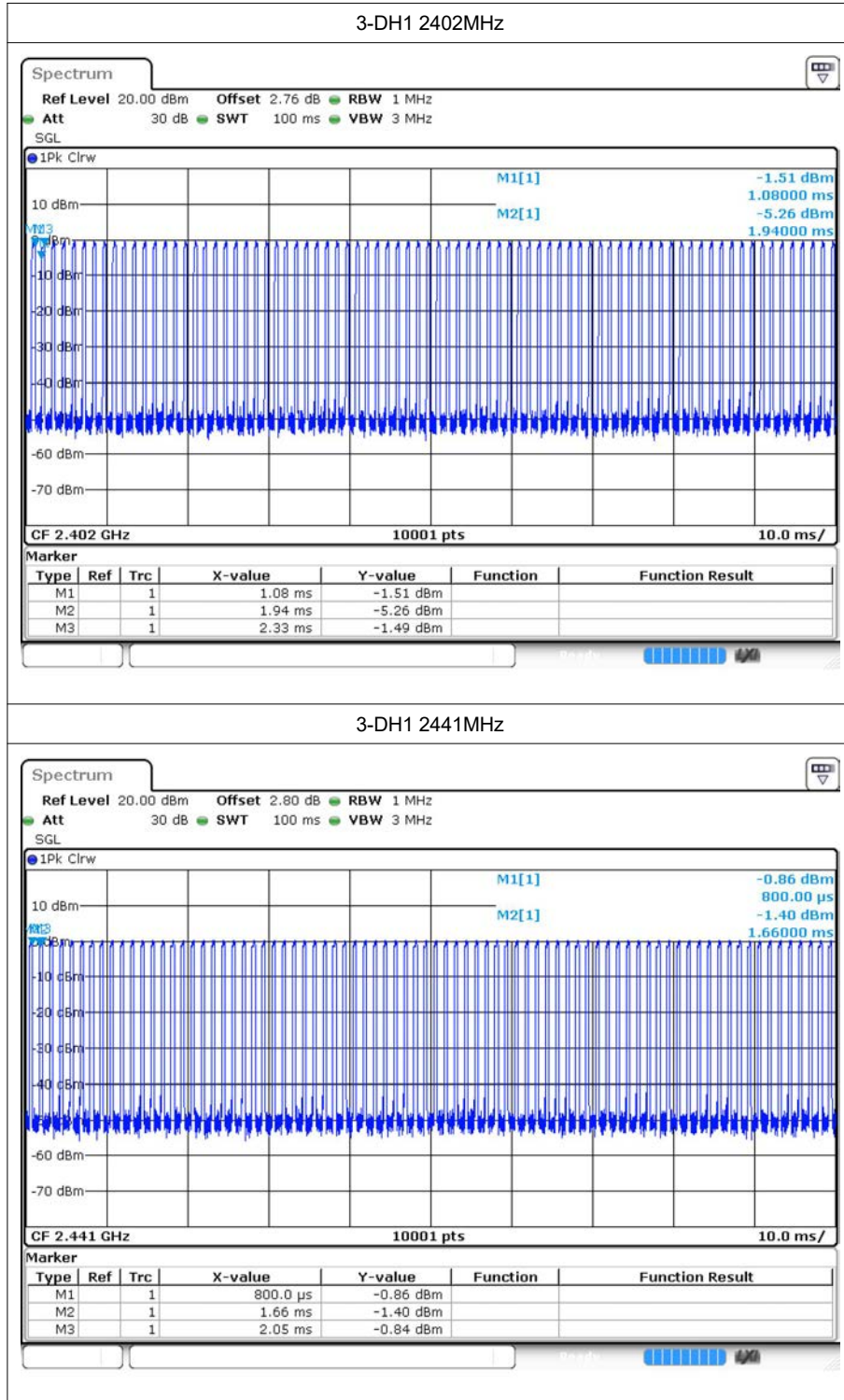
| Mode  | Frequency (MHz) | Duty Cycle (%) | Correction Factor | 1/T (kHz) |
|-------|-----------------|----------------|-------------------|-----------|
| 1-DH1 | 2402            | 31.21          | 5.06              | 2.63      |
| 1-DH1 | 2441            | 31.2           | 5.06              | 2.63      |
| 1-DH1 | 2480            | 31.86          | 4.97              | 2.63      |
| 2-DH1 | 2402            | 32.01          | 4.95              | 2.56      |
| 2-DH1 | 2441            | 32             | 4.95              | 2.56      |
| 2-DH1 | 2480            | 31.91          | 4.96              | 2.56      |
| 3-DH1 | 2402            | 32             | 4.95              | 2.56      |
| 3-DH1 | 2441            | 32             | 4.95              | 2.56      |
| 3-DH1 | 2480            | 32.01          | 4.95              | 2.56      |

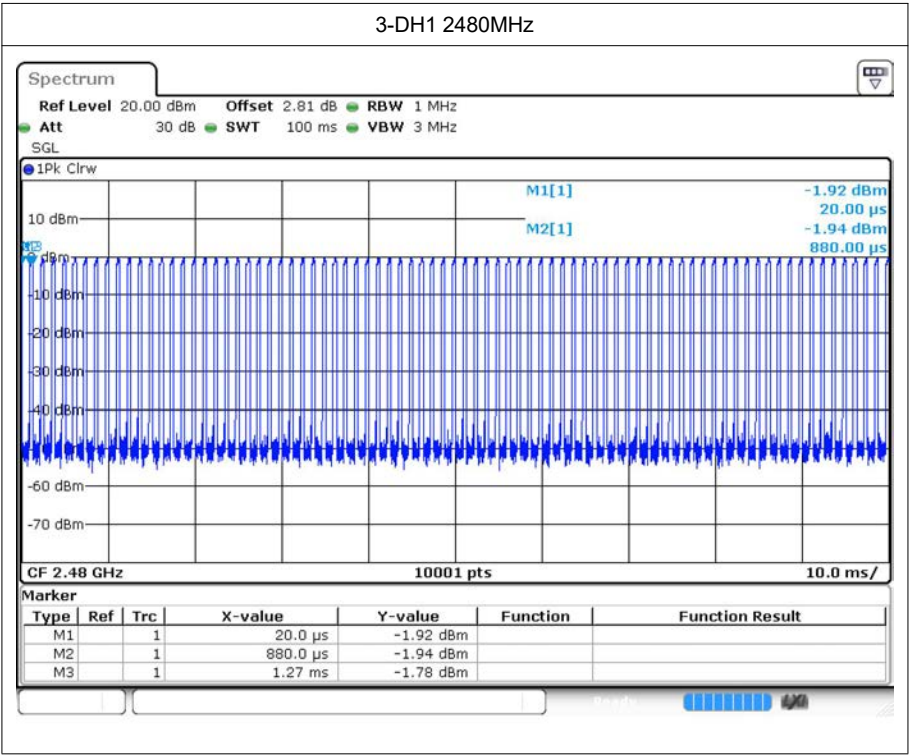
## 1.2 Test Graphs









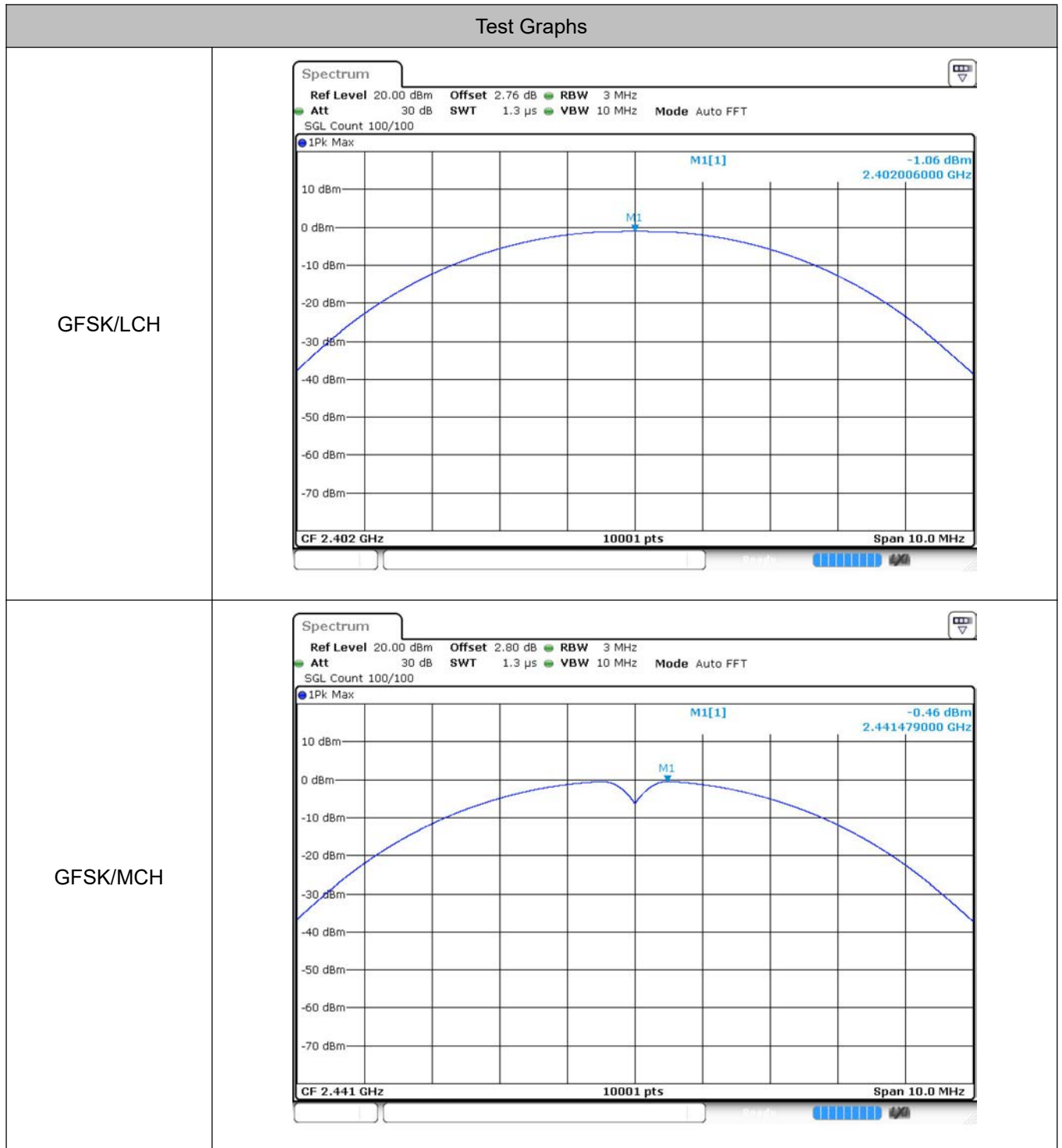


## 2 Maximum Conducted Peak Output Power

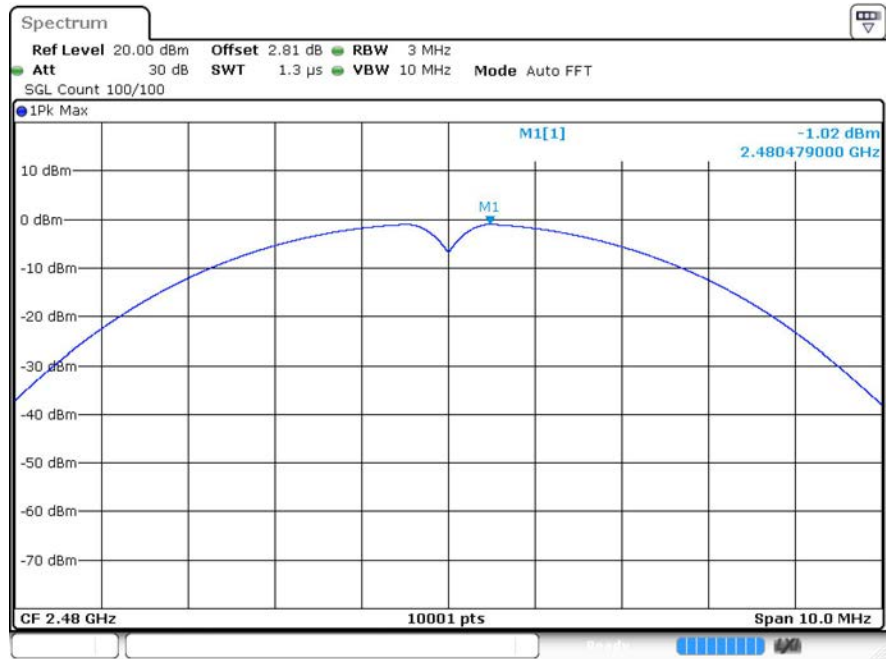
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power<br>[dBm] | Limit<br>[dBm] | Verdict |
|---------------|----------|------------------------------------|----------------|---------|
| GFSK          | LCH      | -1.06                              | 21             | Pass    |
|               | MCH      | -0.46                              | 21             | Pass    |
|               | HCH      | -1.02                              | 21             | Pass    |
| $\pi/4$ DQPSK | LCH      | -0.06                              | 21             | Pass    |
|               | MCH      | 0.43                               | 21             | Pass    |
|               | HCH      | 0.01                               | 21             | Pass    |
| 8DPSK         | LCH      | -0.4                               | 21             | Pass    |
|               | MCH      | 0.91                               | 21             | Pass    |
|               | HCH      | -0.2                               | 21             | Pass    |

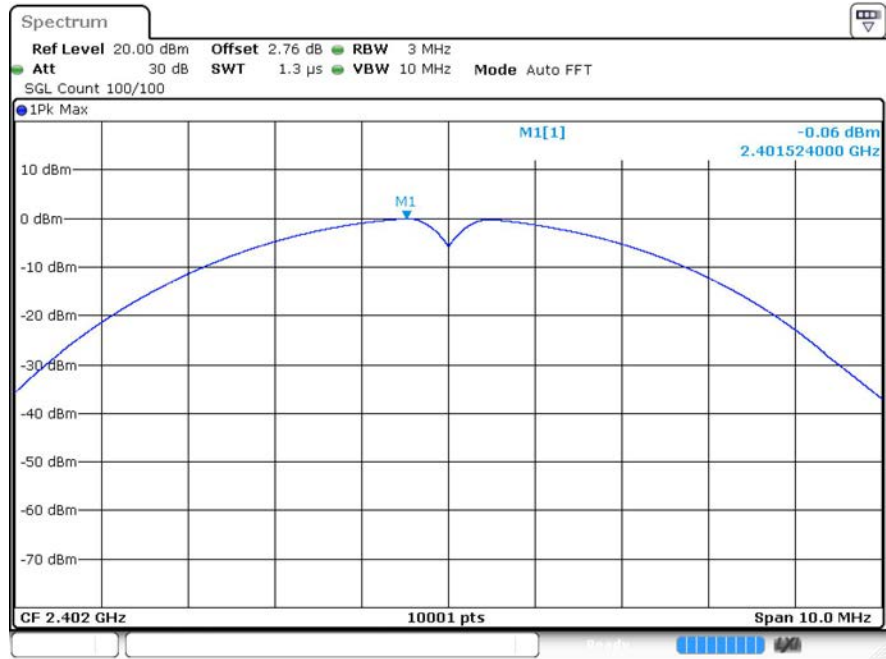
## 2.2 Test Graphs



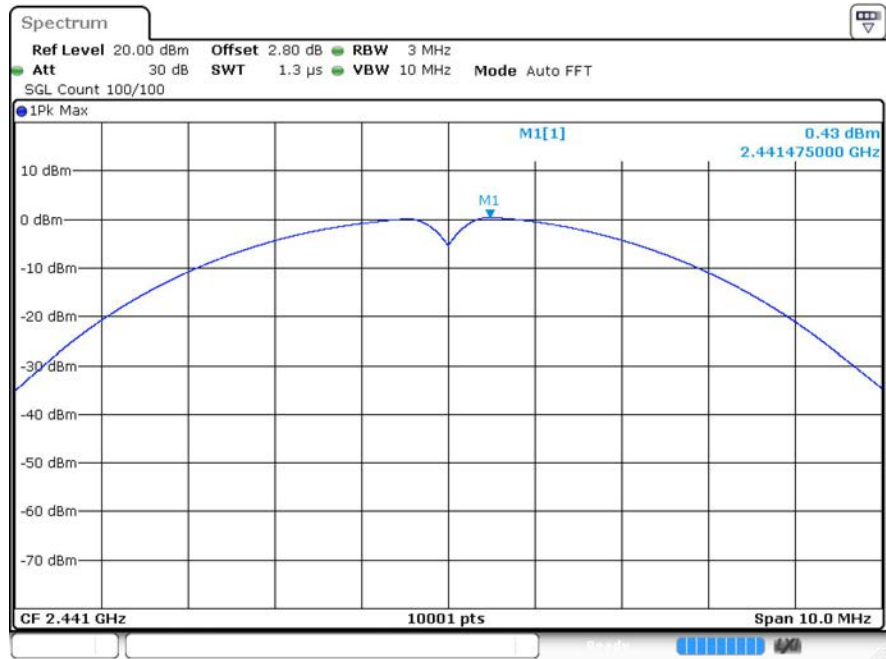
GFSK/HCH



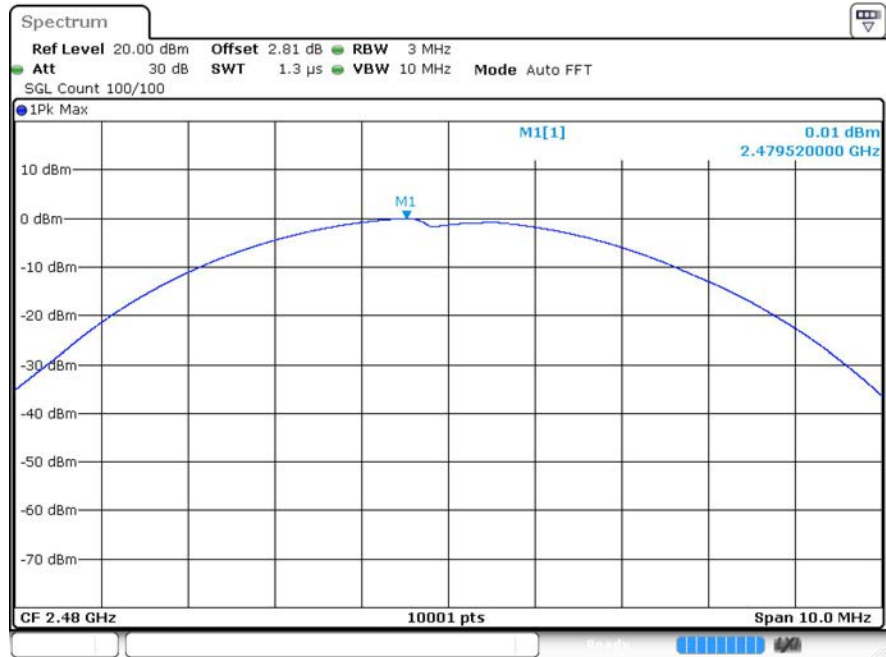
$\pi/4$ DQPSK/LCH



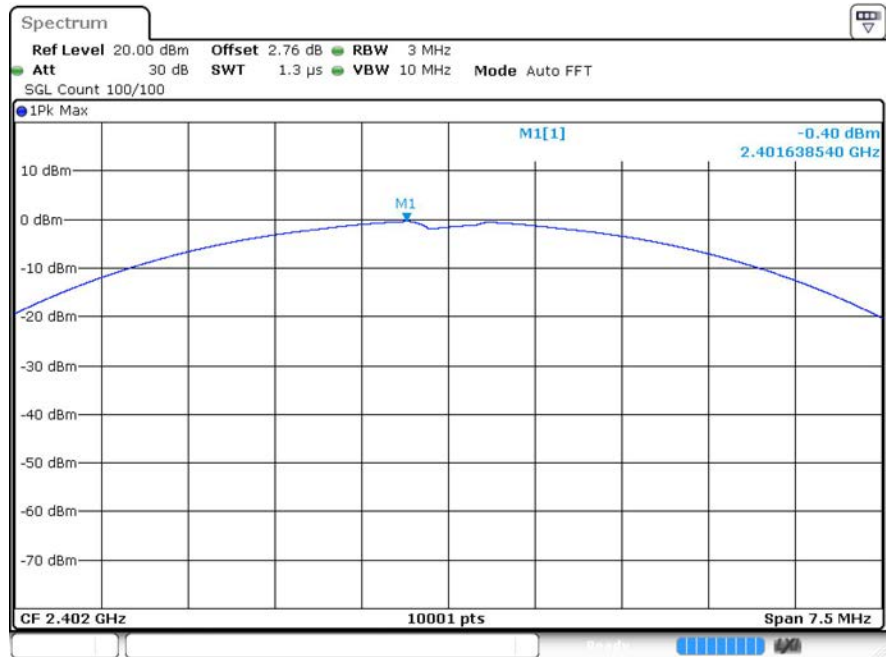
$\pi/4$ DQPSK/MCH



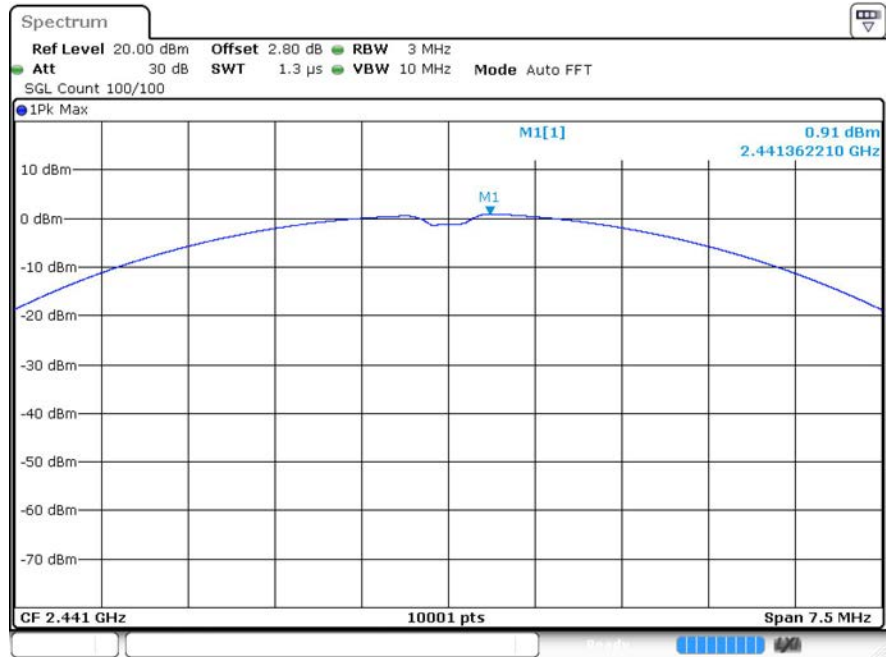
$\pi/4$ DQPSK/HCH



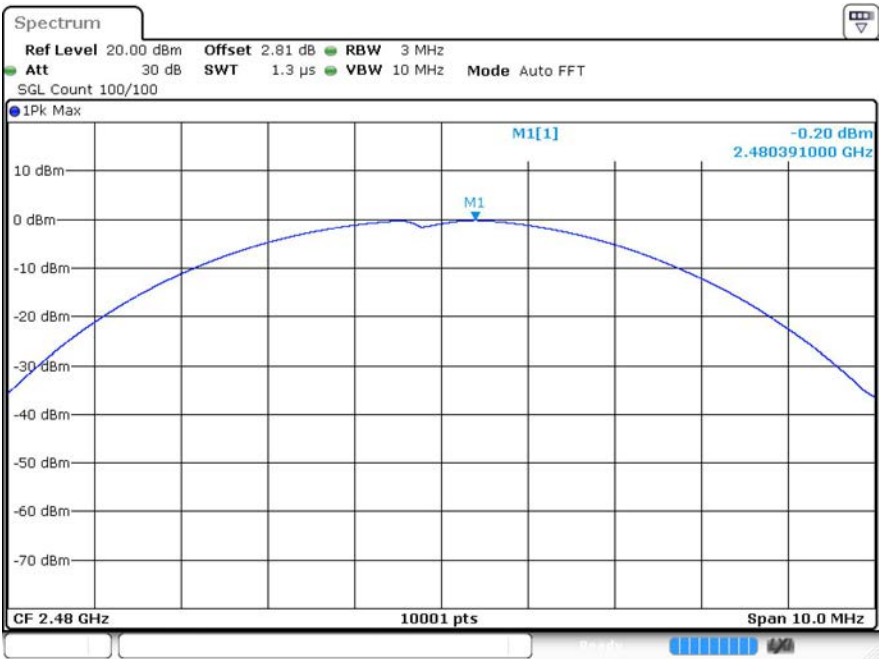
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

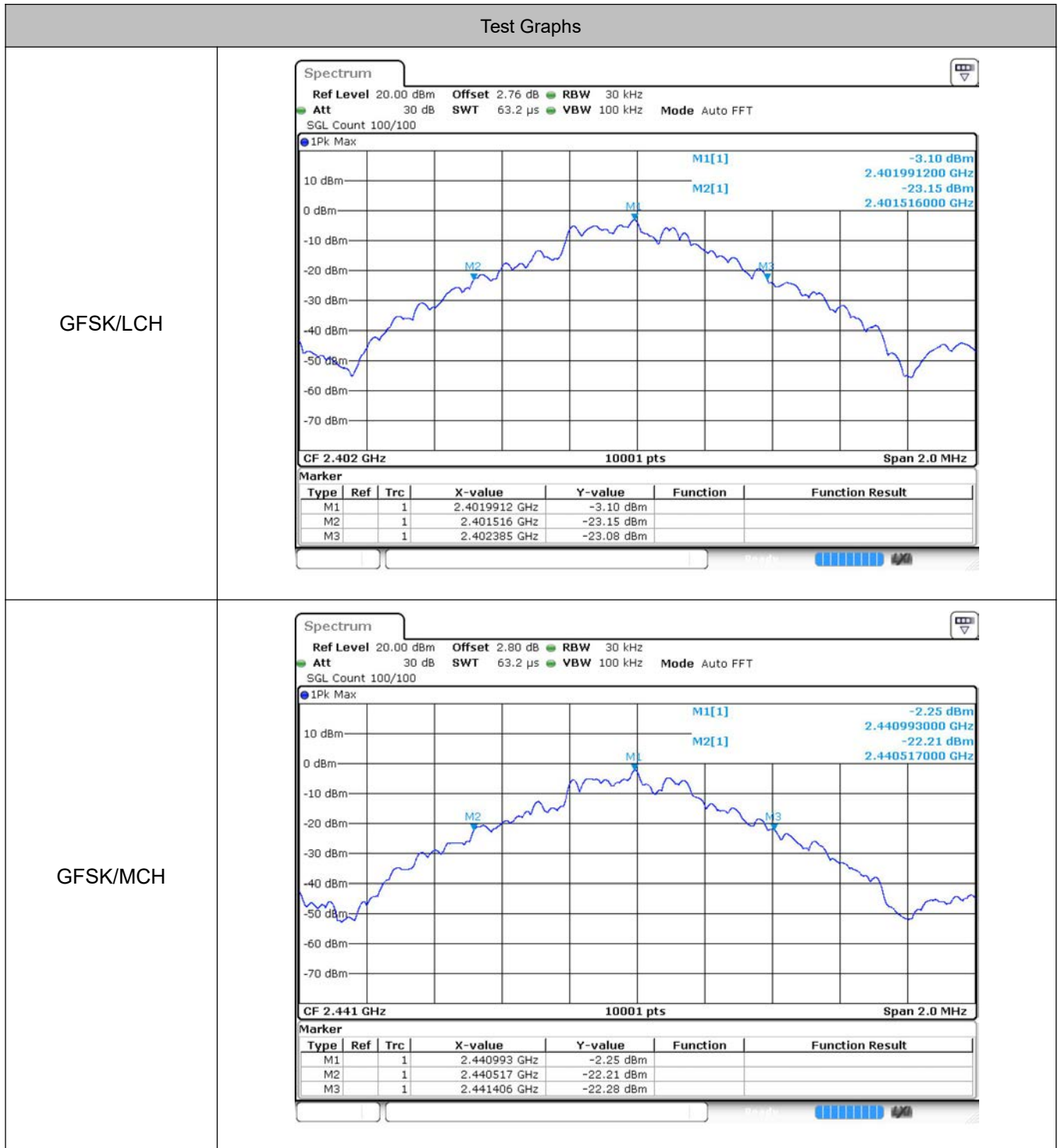


### 3 20dB Bandwidth

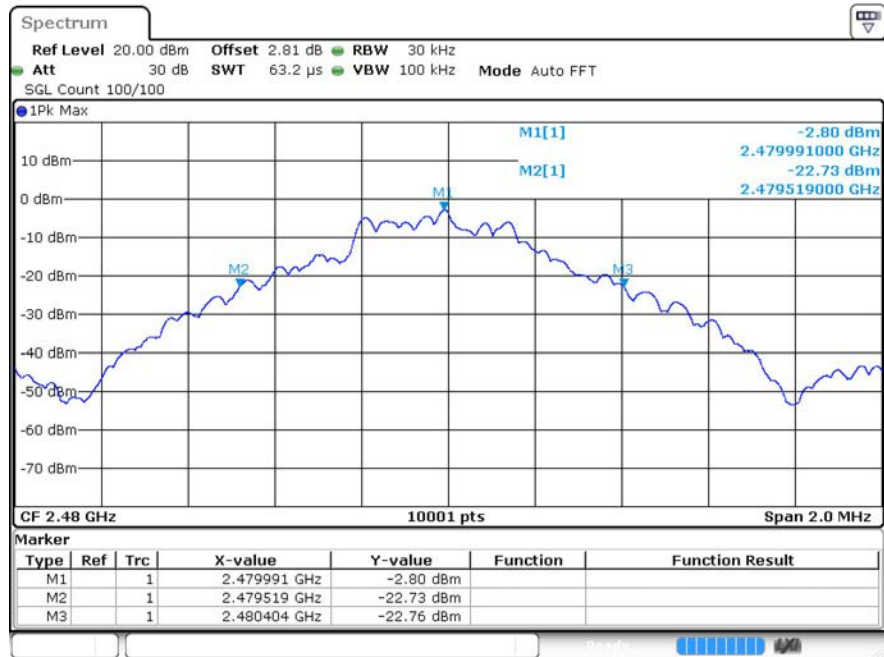
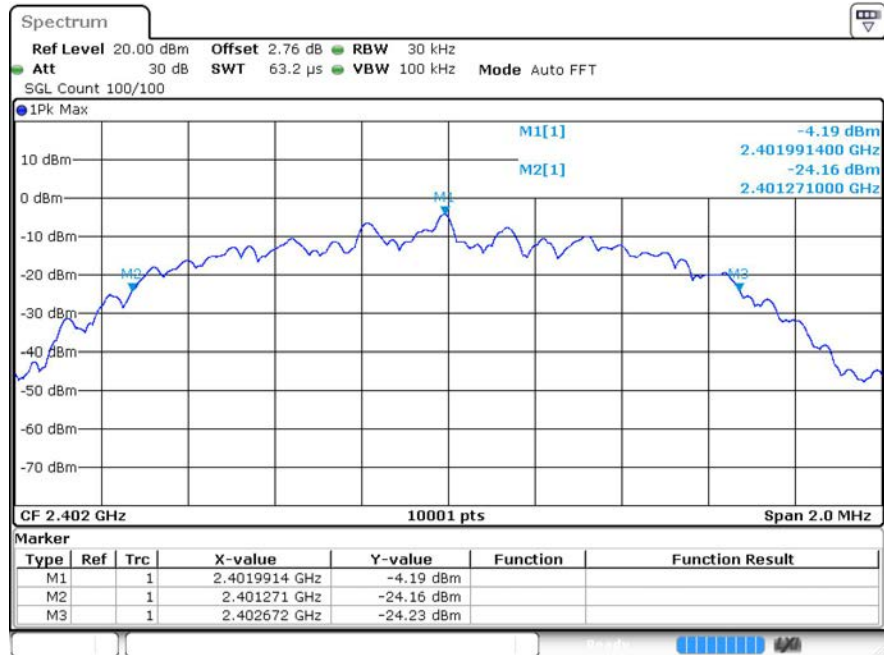
#### 3.1 Test Result

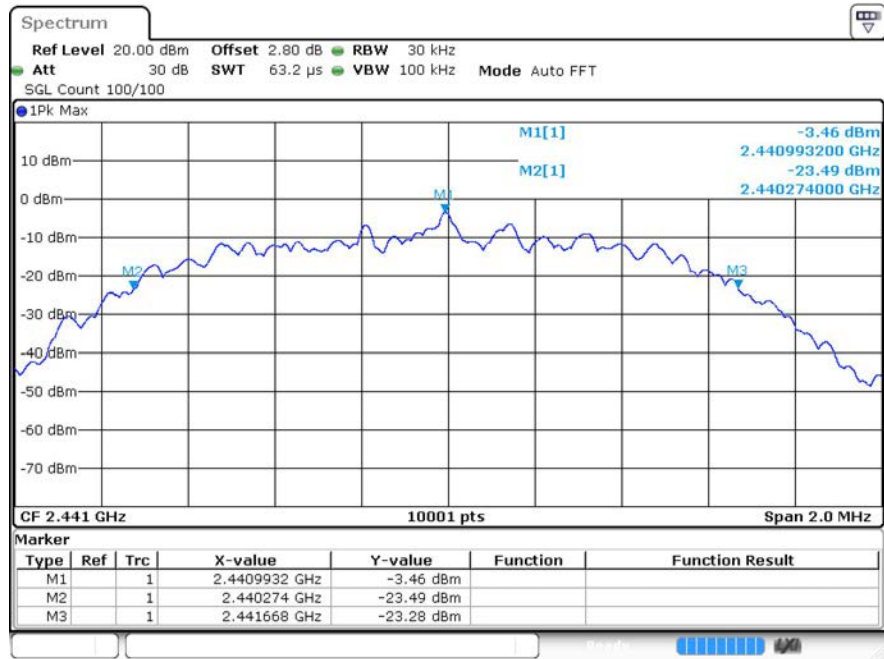
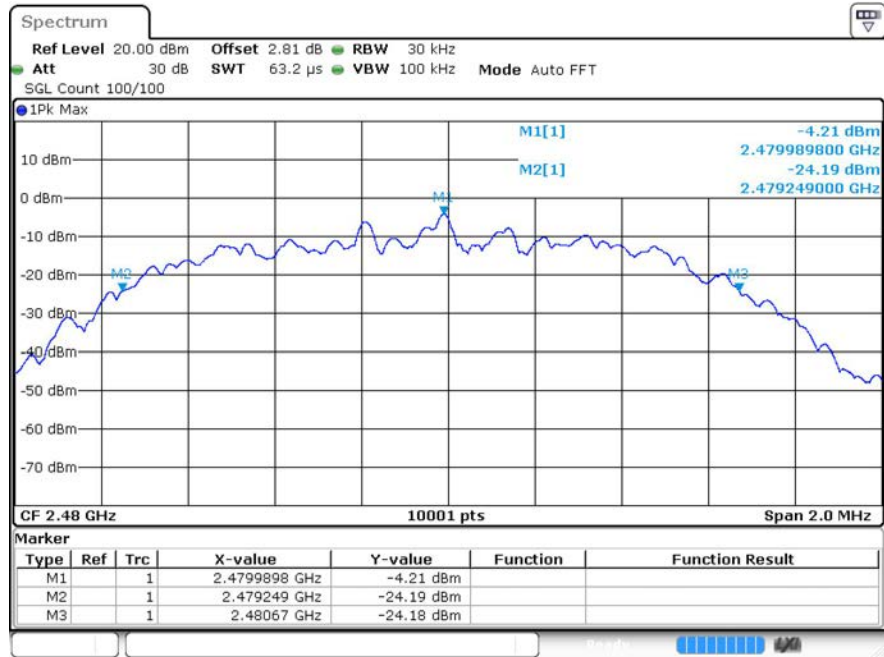
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.869                | Not Specified | Pass    |
|               | MCH      | 0.889                | Not Specified | Pass    |
|               | HCH      | 0.886                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.401                | Not Specified | Pass    |
|               | MCH      | 1.394                | Not Specified | Pass    |
|               | HCH      | 1.421                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.449                | Not Specified | Pass    |
|               | MCH      | 1.439                | Not Specified | Pass    |
|               | HCH      | 1.433                | Not Specified | Pass    |

### 3.2 Test Graphs

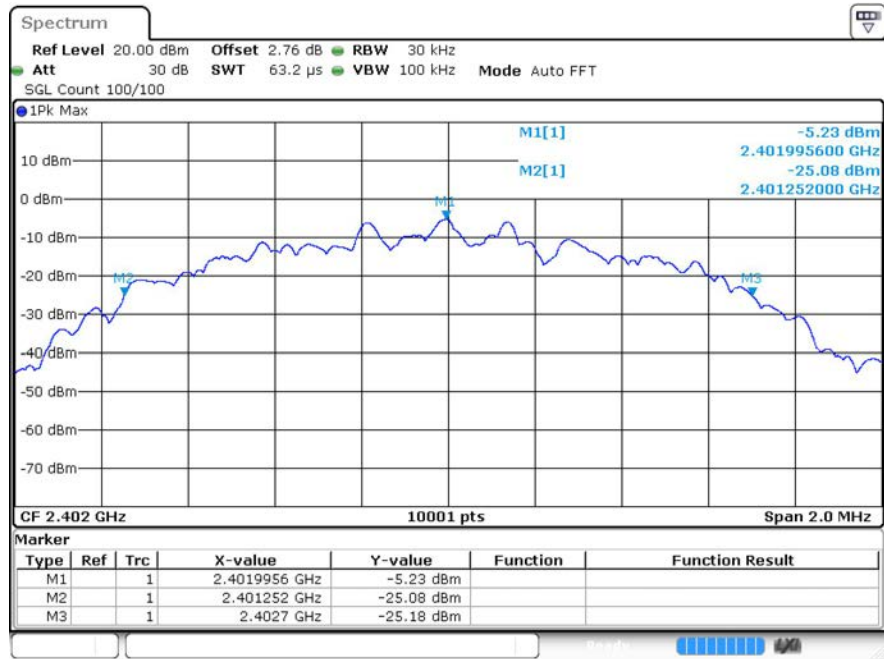


GFSK/HCH

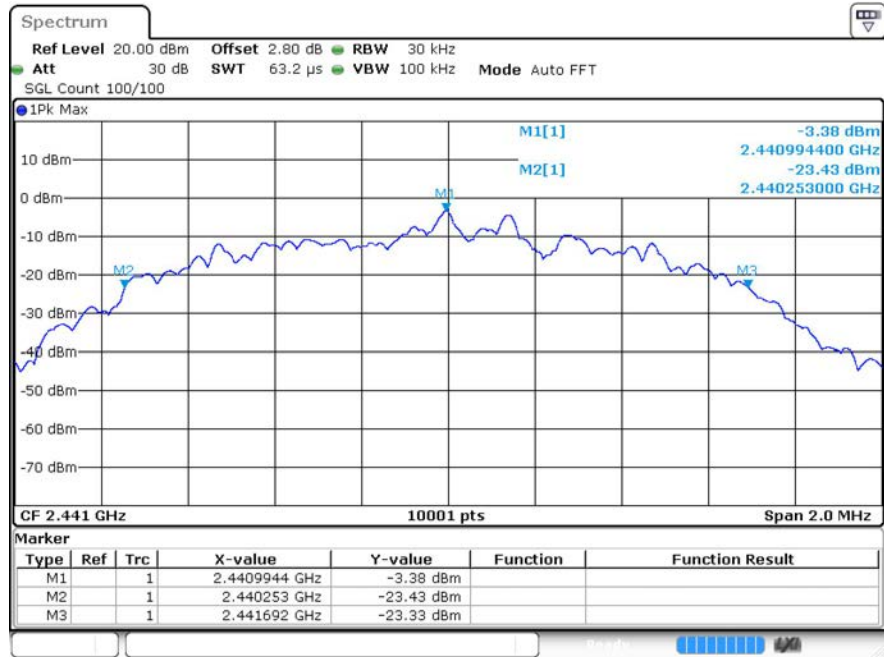

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


8DPSK/LCH

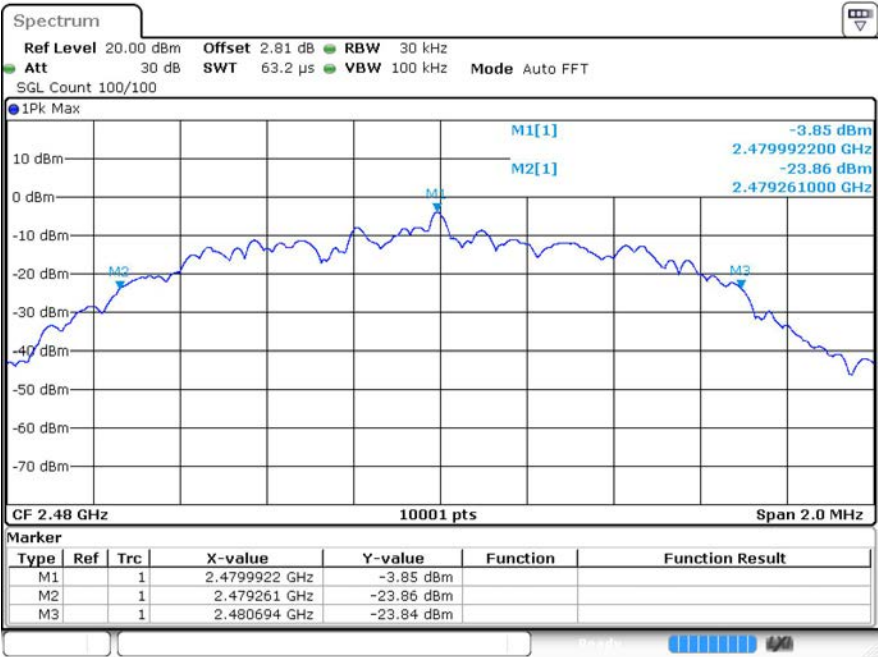


8DPSK/MCH





8DPSK/HCH

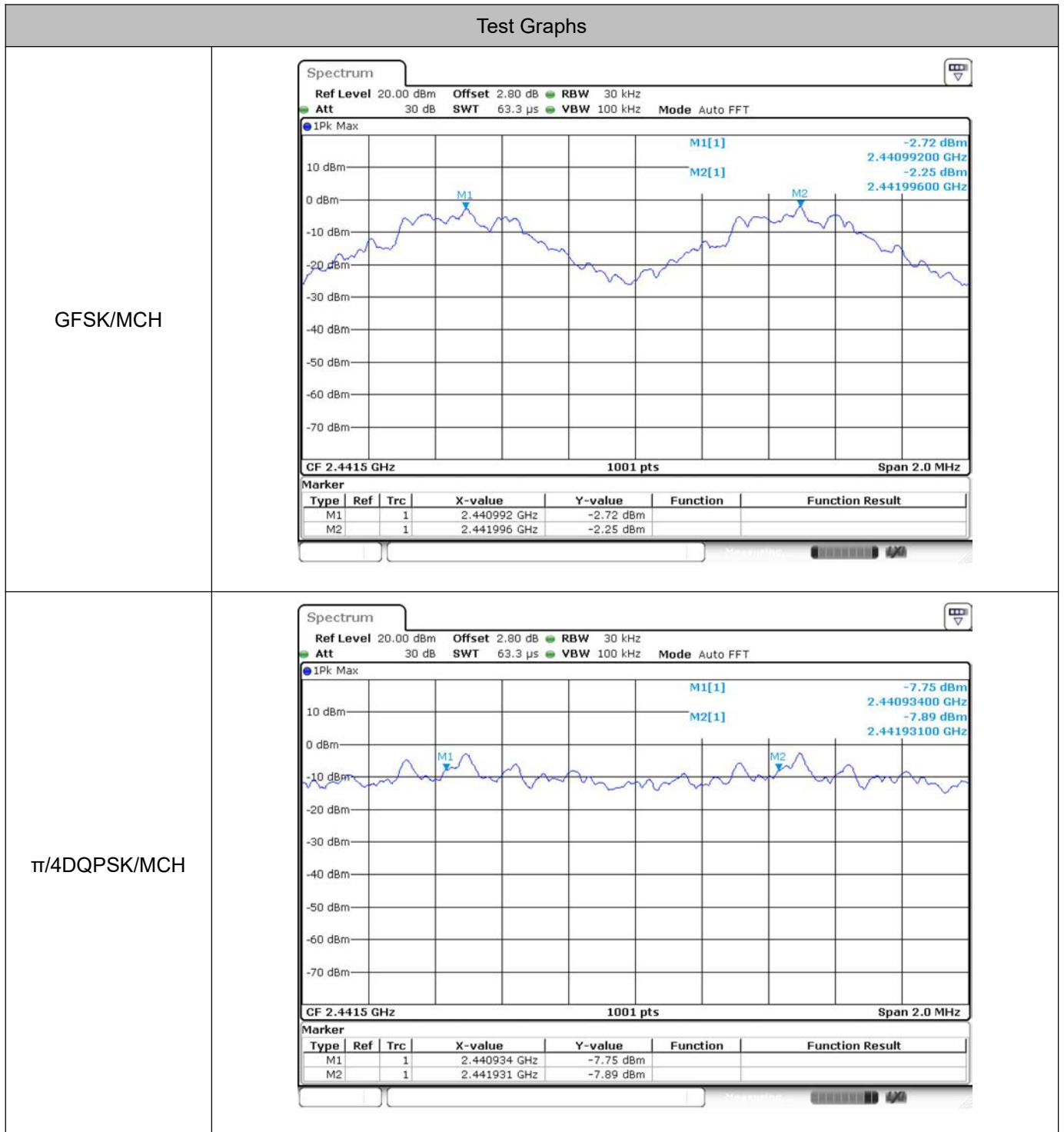


## 4 Carrier Frequency Separation

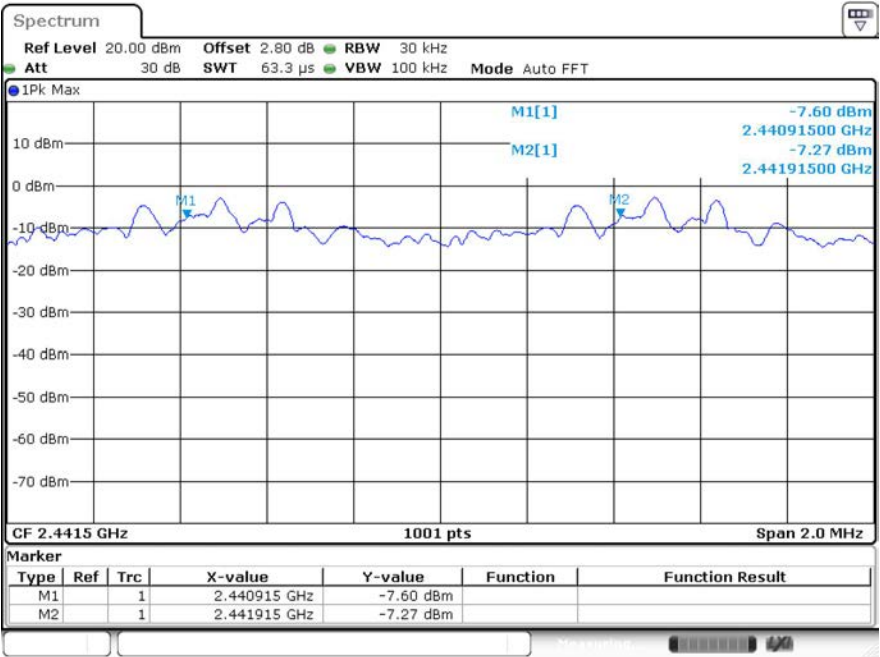
### 4.1 Test Result

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 1.004                              | 0.593       | Pass    |
| $\pi/4$ DQPSK | MCH      | 0.997                              | 0.929       | Pass    |
| 8DPSK         | MCH      | 1                                  | 0.959       | Pass    |

## 4.2 Test Graphs



8DPSK/MCH

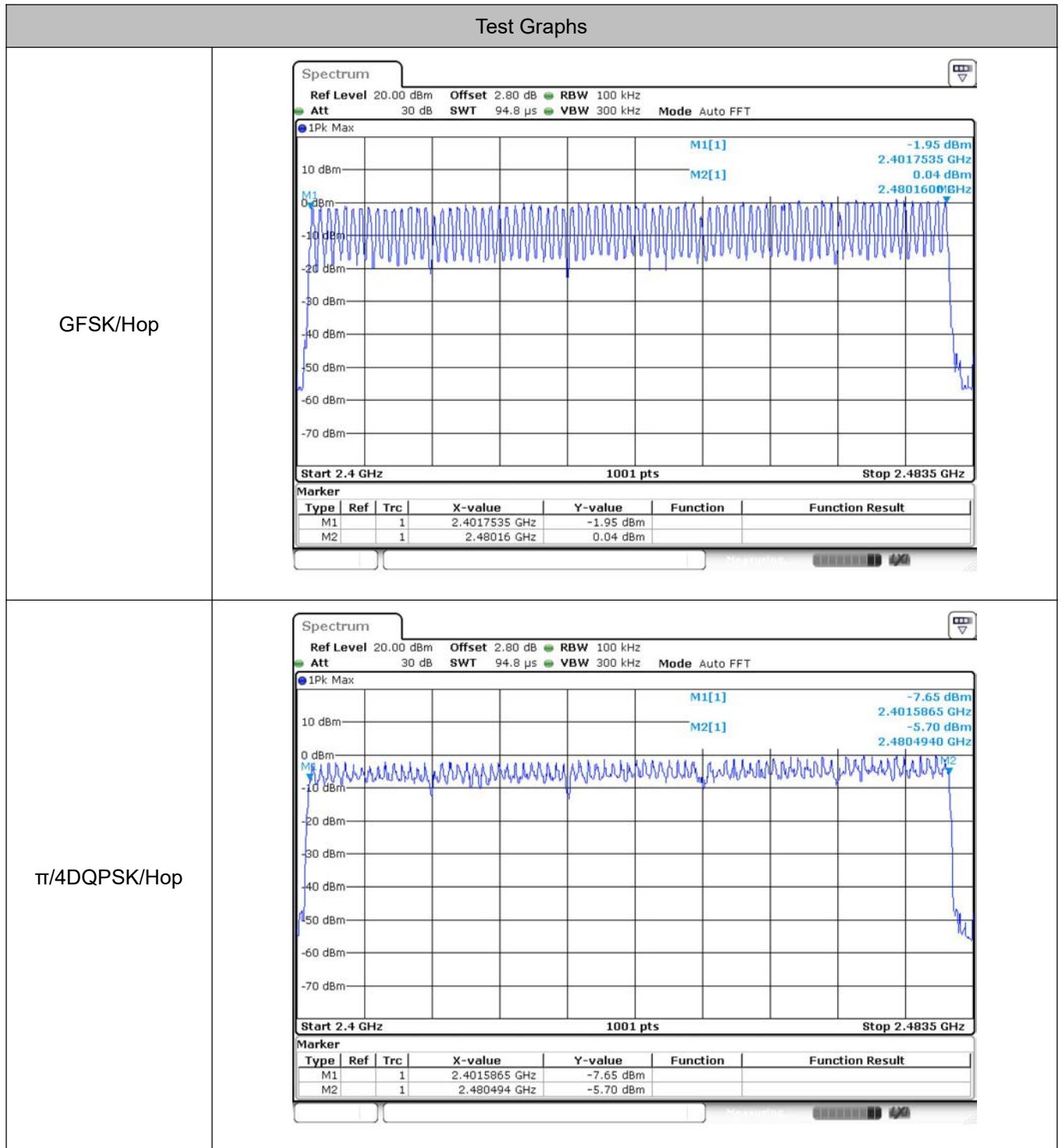


## 5 Hopping Channel Number

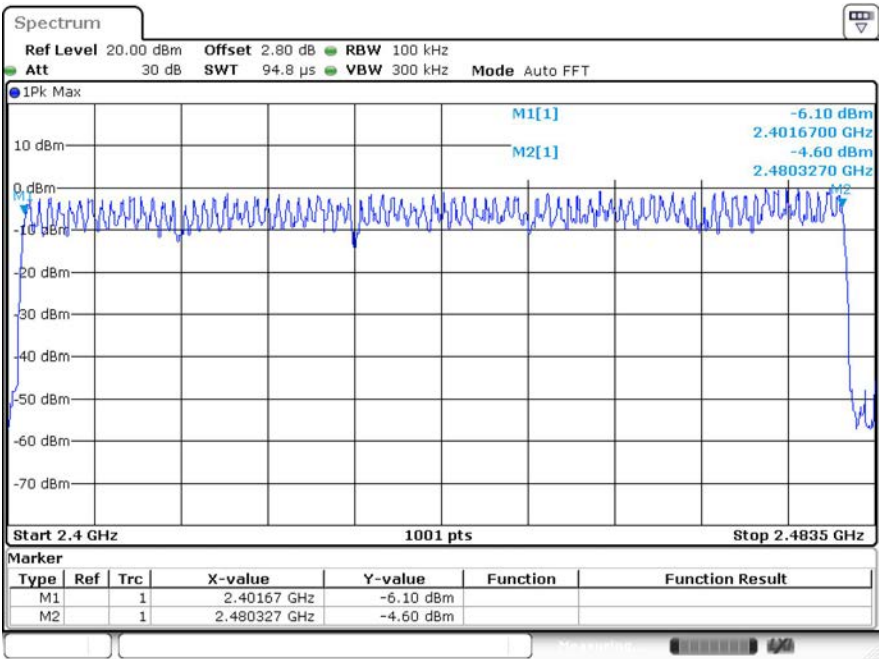
### 5.1 Test Result

| 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

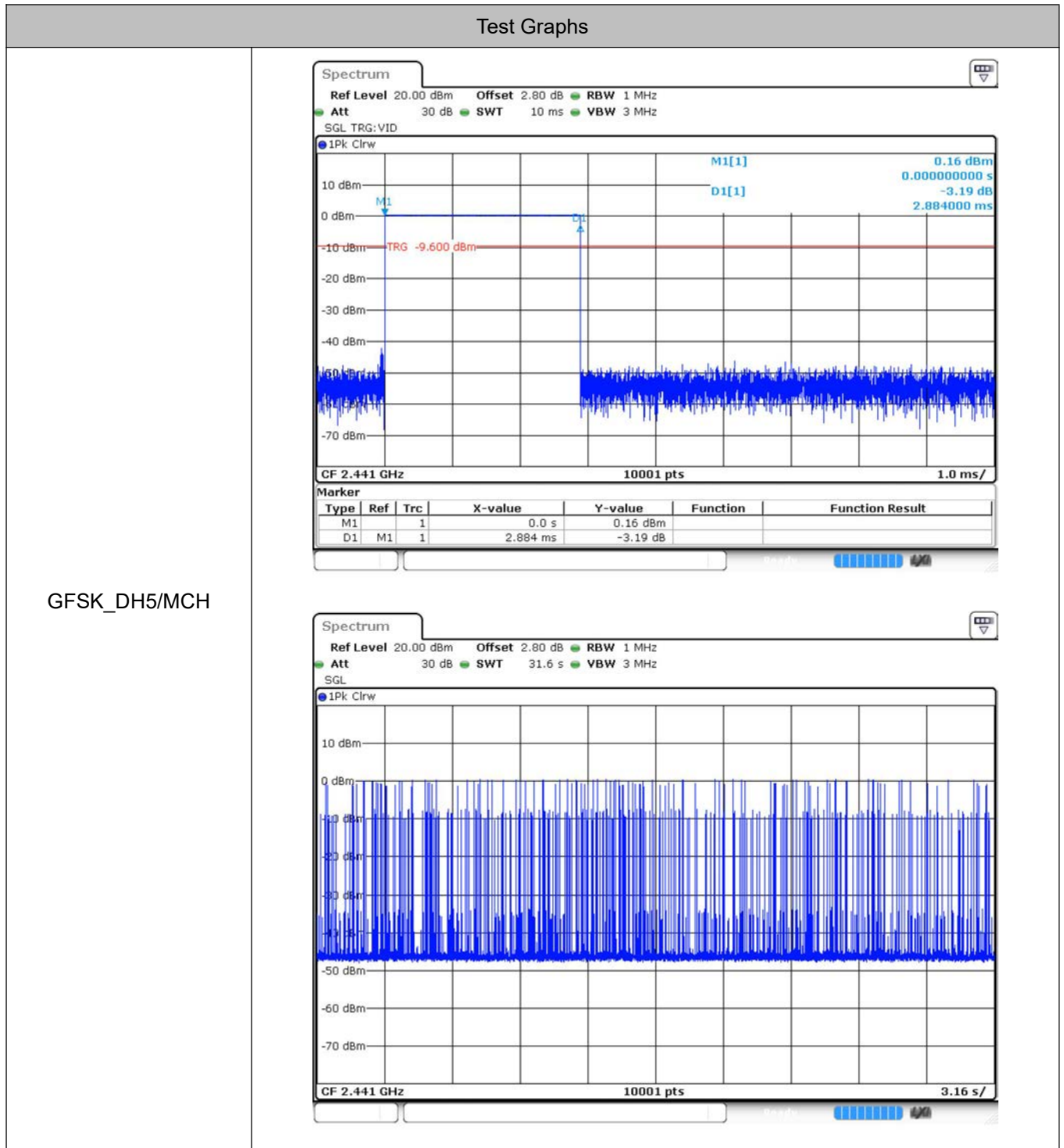


## 6 Dwell Time

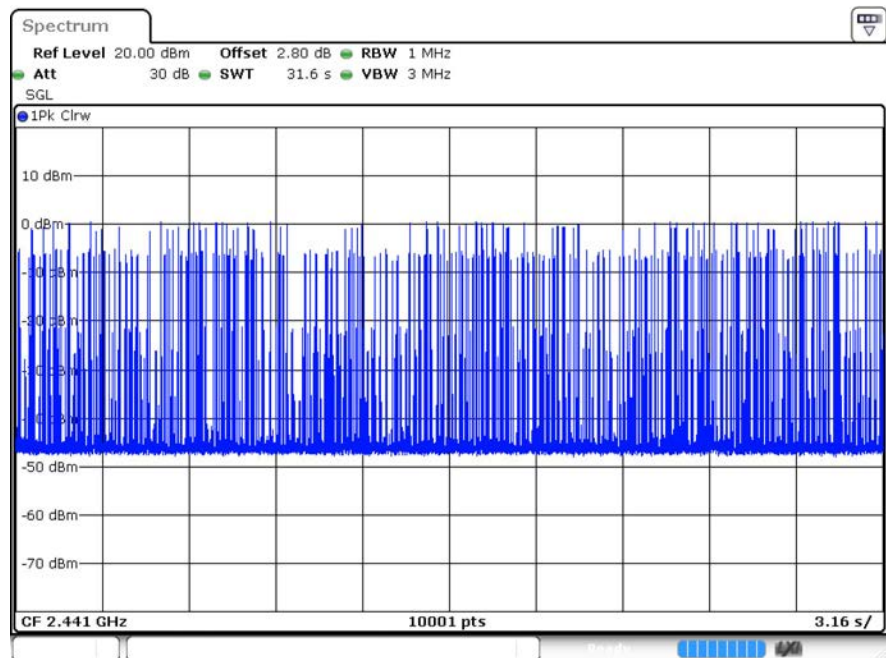
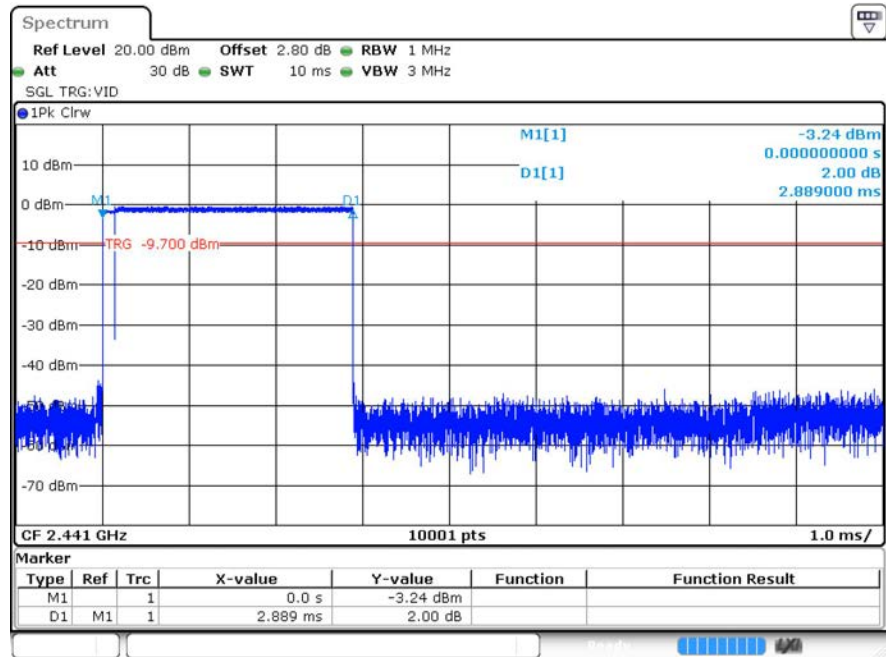
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.884                      | 113                   | 325.892        | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.889                      | 101                   | 291.789        | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.891                      | 104                   | 300.664        | 0.4       | Pass    |

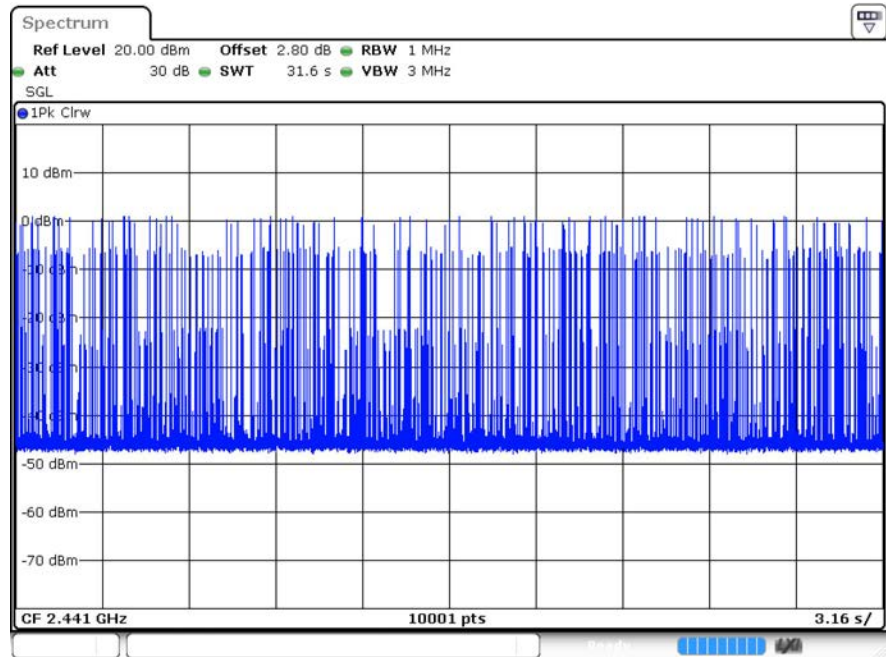
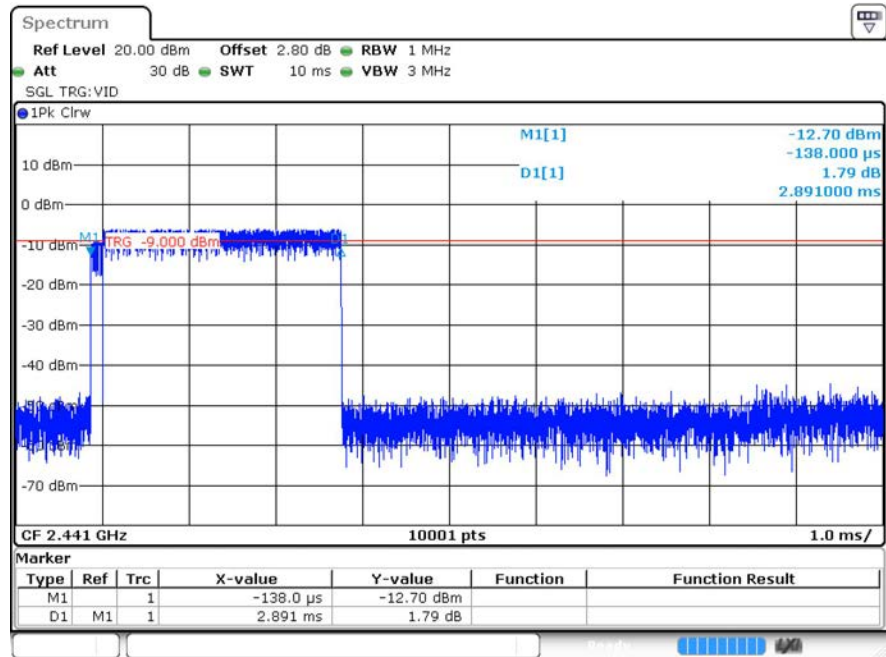
## 6.2 Test Graphs



π/4DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH



## 7 RF Conducted Spurious Emissions

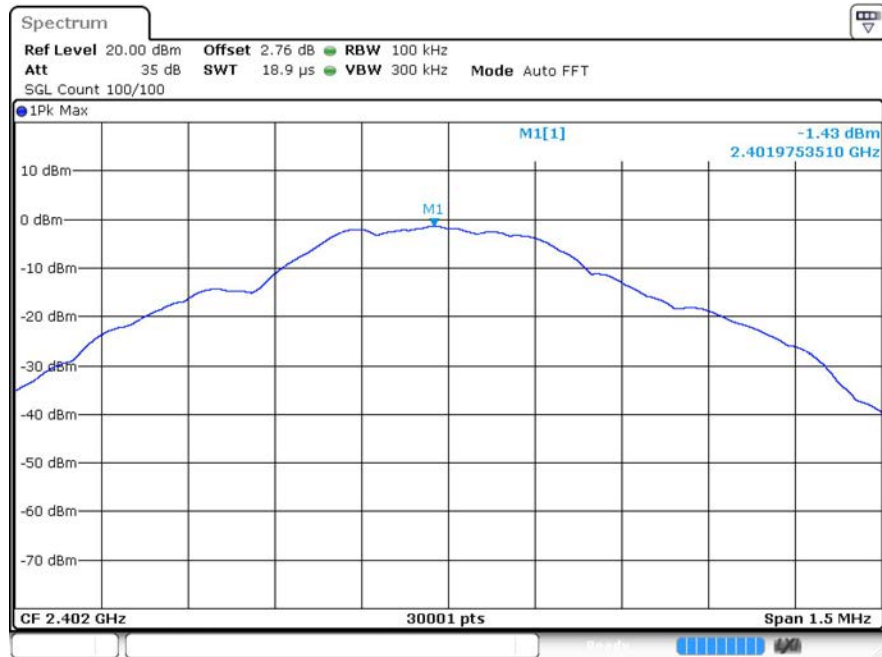
### 7.1 Test Result

| Mode          | Channel | Max. Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|------------------|-------------|---------|
| GFSK          | LCH     | -39.66           | -20         | Pass    |
|               | MCH     | -39.74           | -20         | Pass    |
|               | HCH     | -40.31           | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -39.12           | -20         | Pass    |
|               | MCH     | -40.11           | -20         | Pass    |
|               | HCH     | -38.91           | -20         | Pass    |
| 8DPSK         | LCH     | -38.63           | -20         | Pass    |
|               | MCH     | -39.5            | -20         | Pass    |
|               | HCH     | -40.16           | -20         | Pass    |

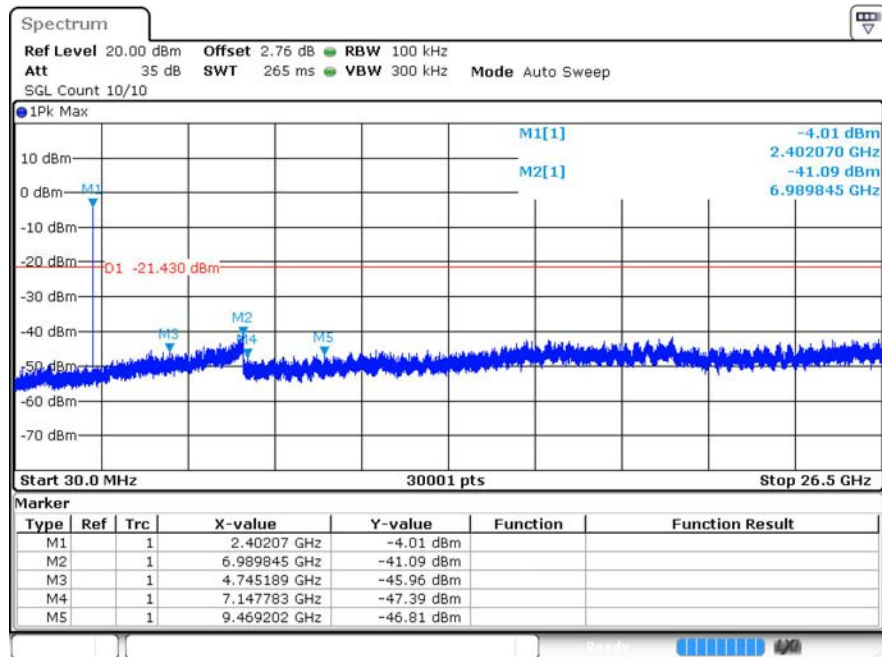
## 7.2 Test Graphs

GFSK\_LCH\_Graphs

Pref

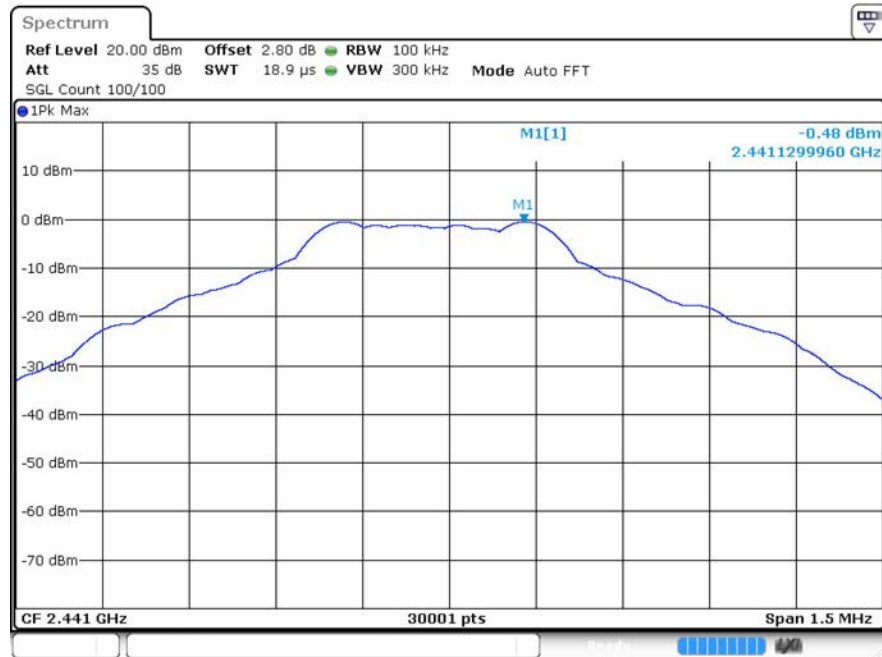


Puw

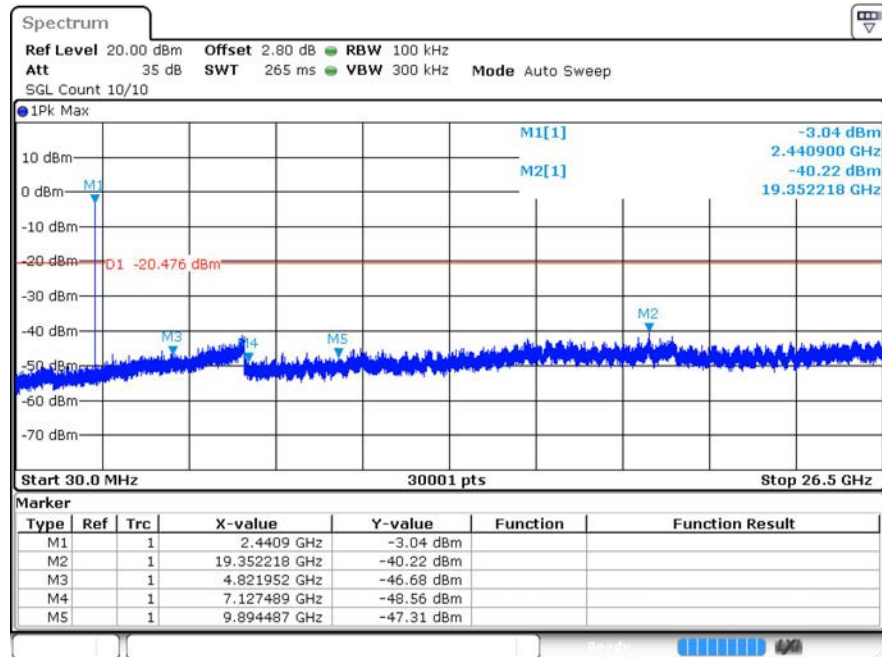


## GFSK\_MCH\_Graphs

Pref



Puw

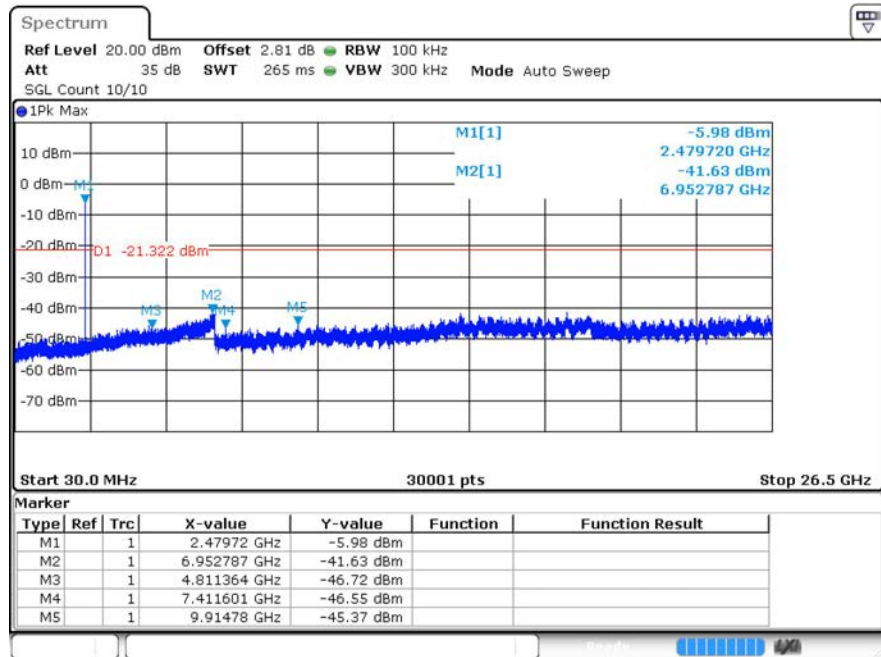


## GFSK\_HCH\_Graphs

Pref

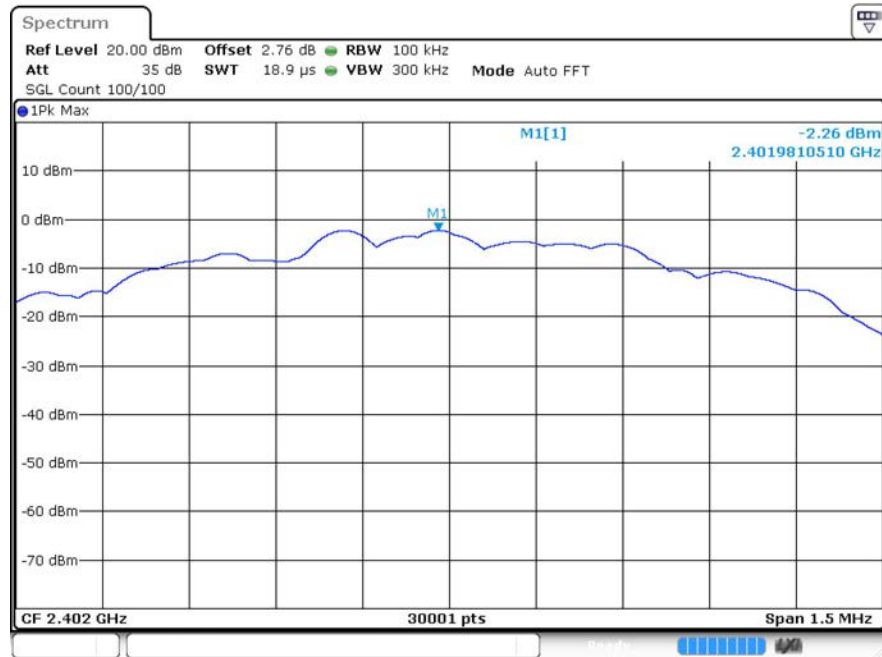


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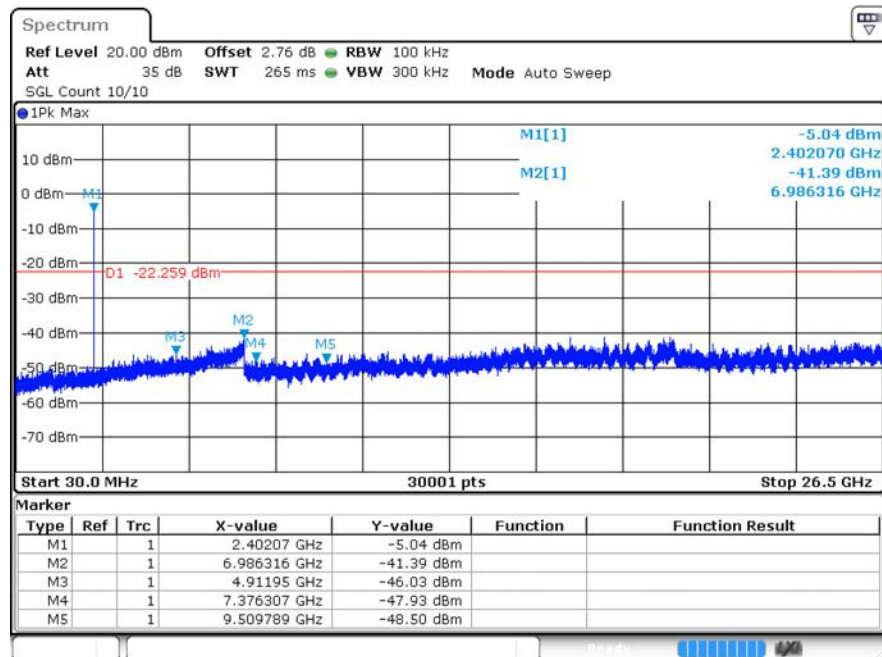


# $\pi/4$ DQPSK\_LCH\_Graphs

Pref

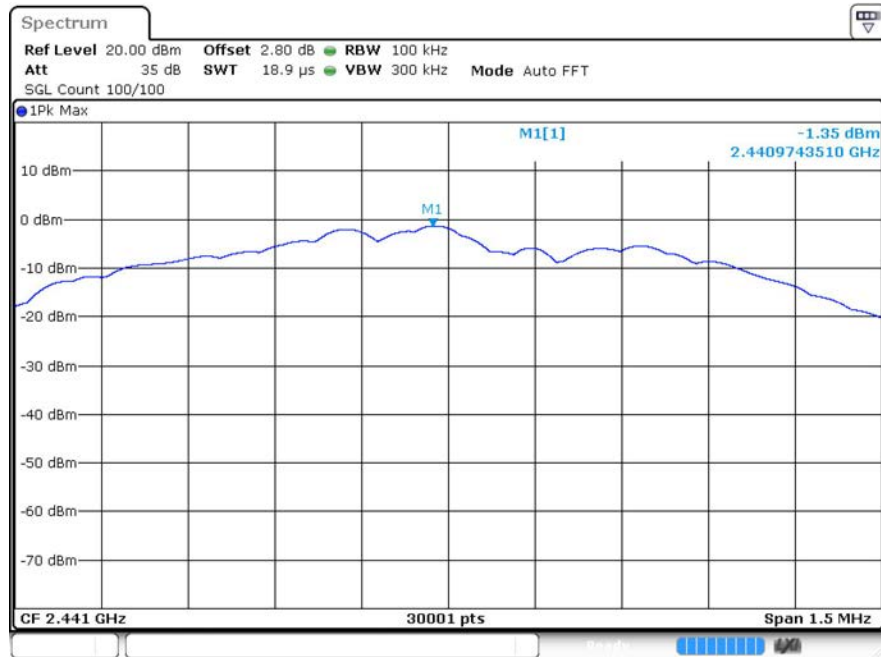


Puw

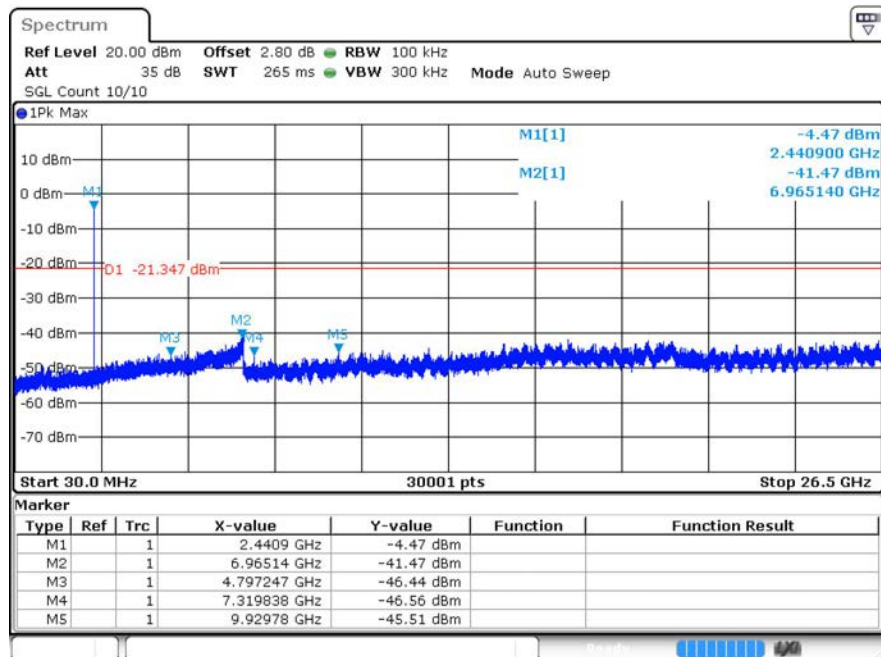


# $\pi$ /4DQPSK\_MCH\_Graphs

Pref

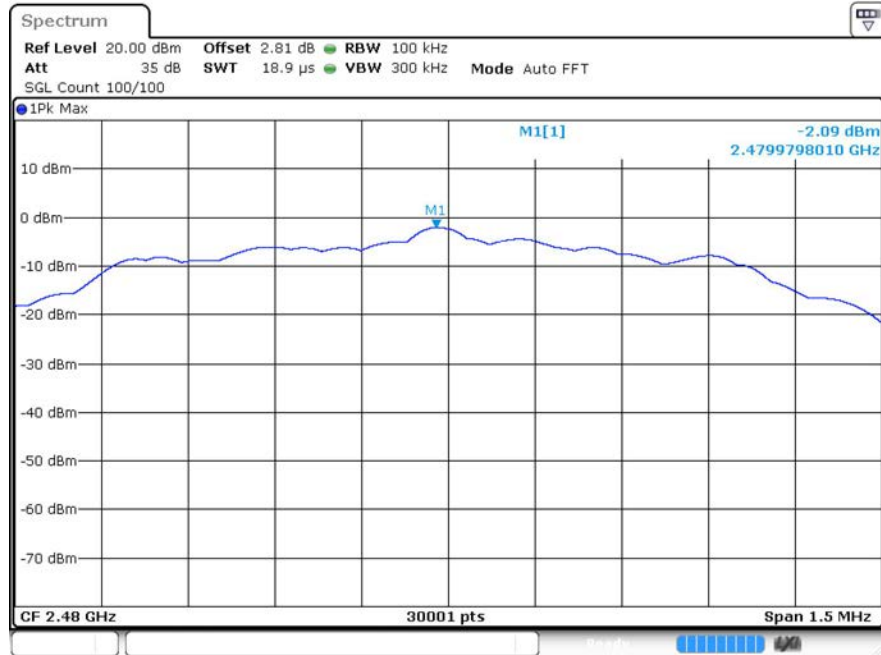


Puw

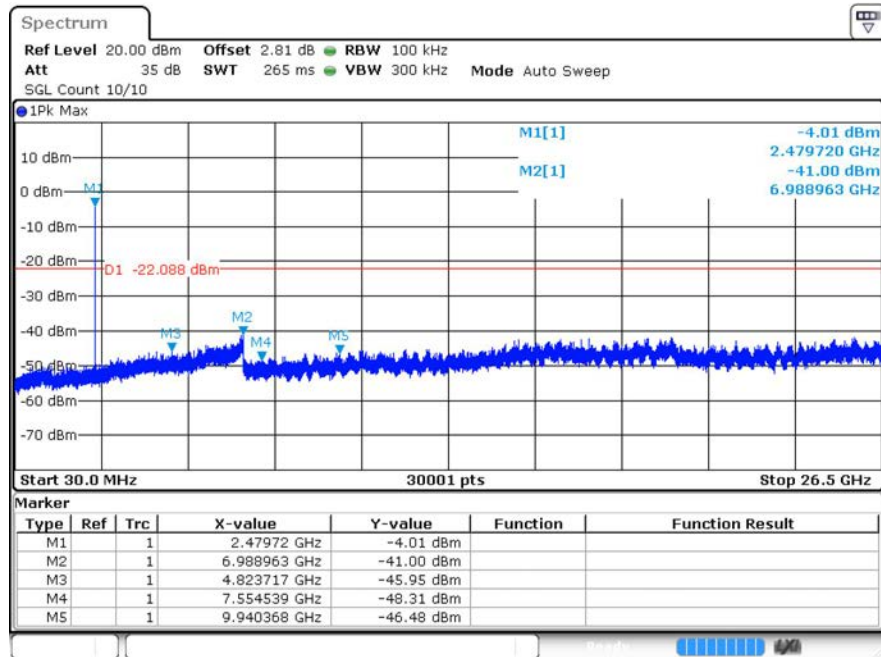


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref

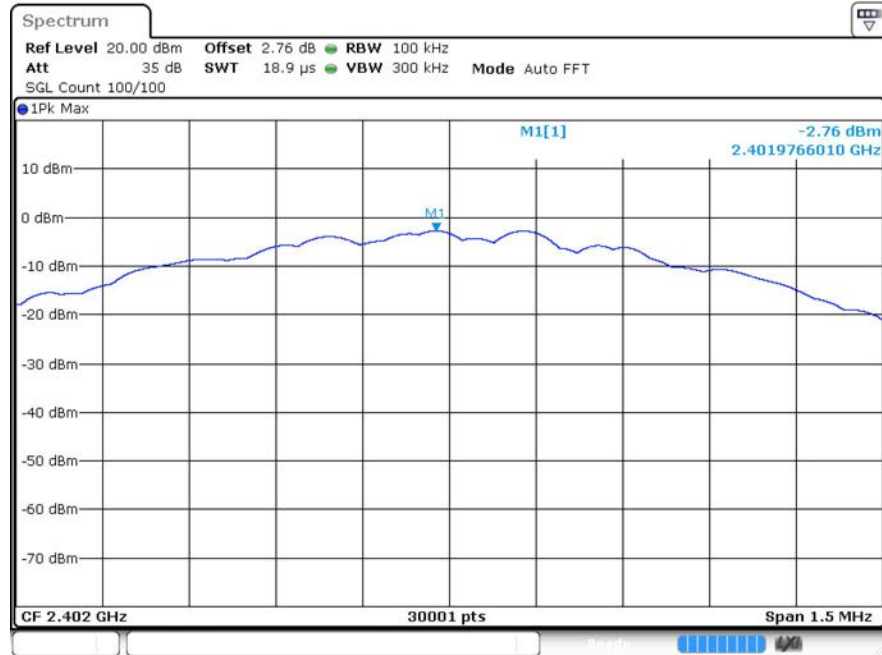


Puw

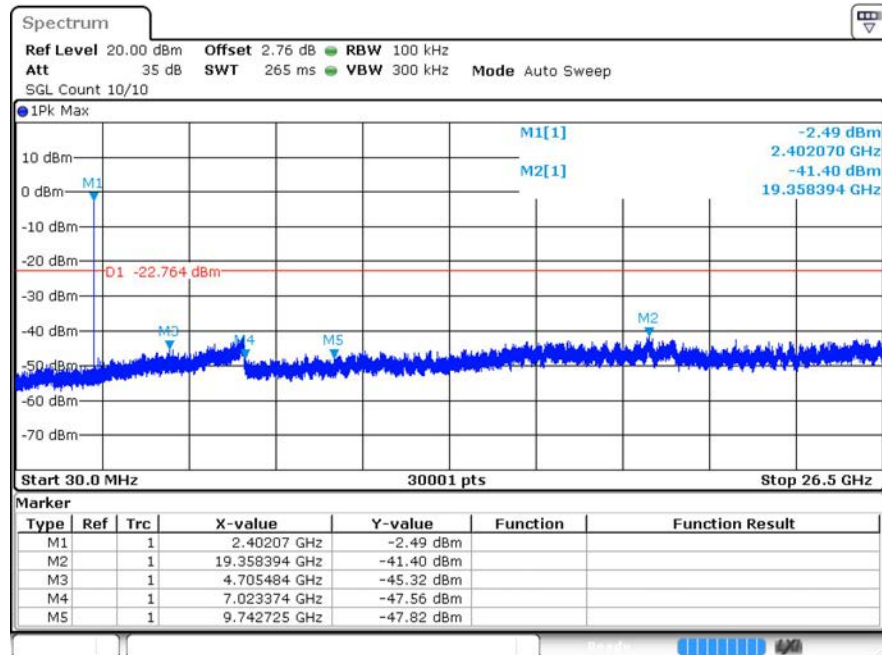


## 8DPSK\_LCH\_Graphs

Pref

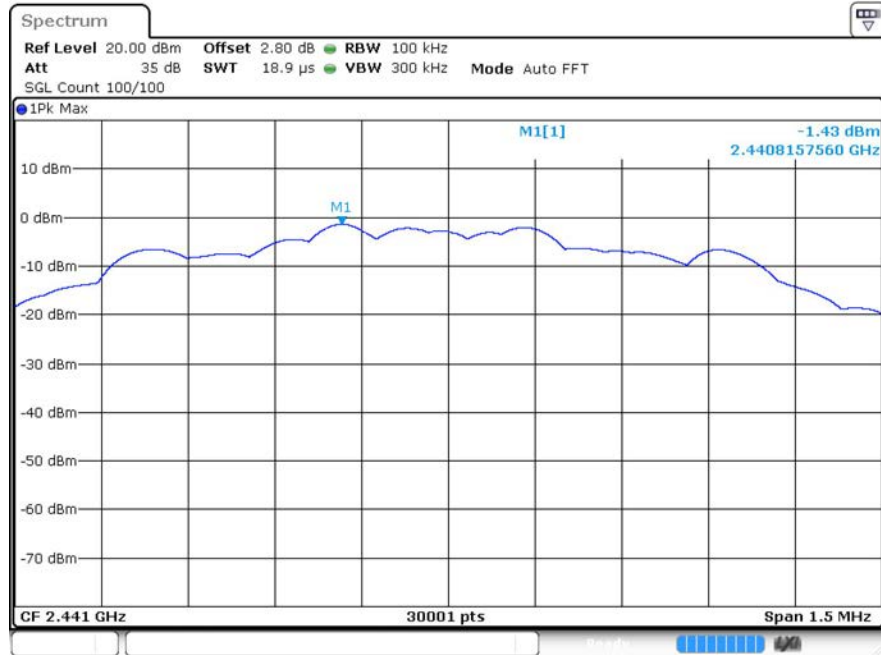


Puw

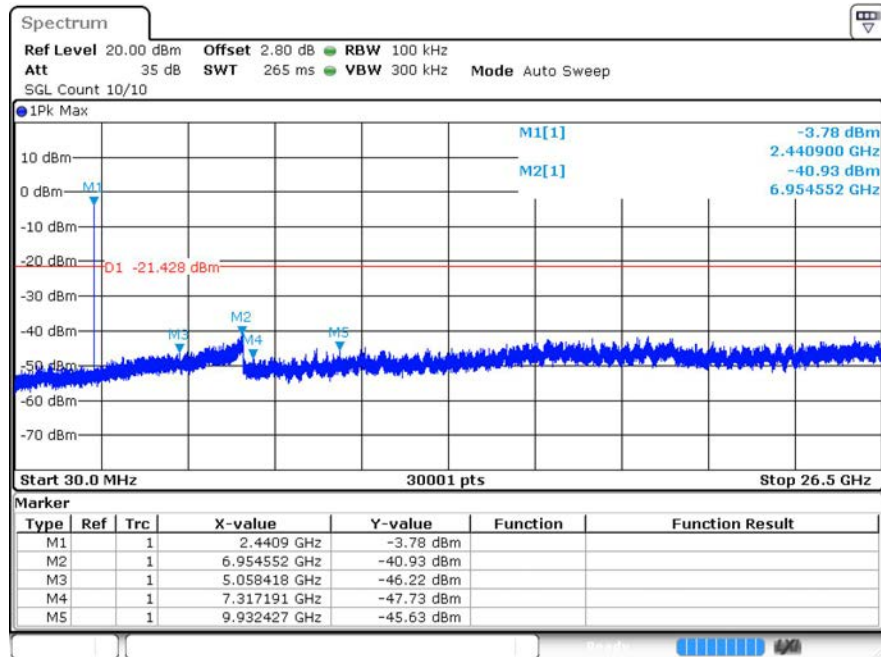


## 8DPSK\_MCH\_Graphs

Pref

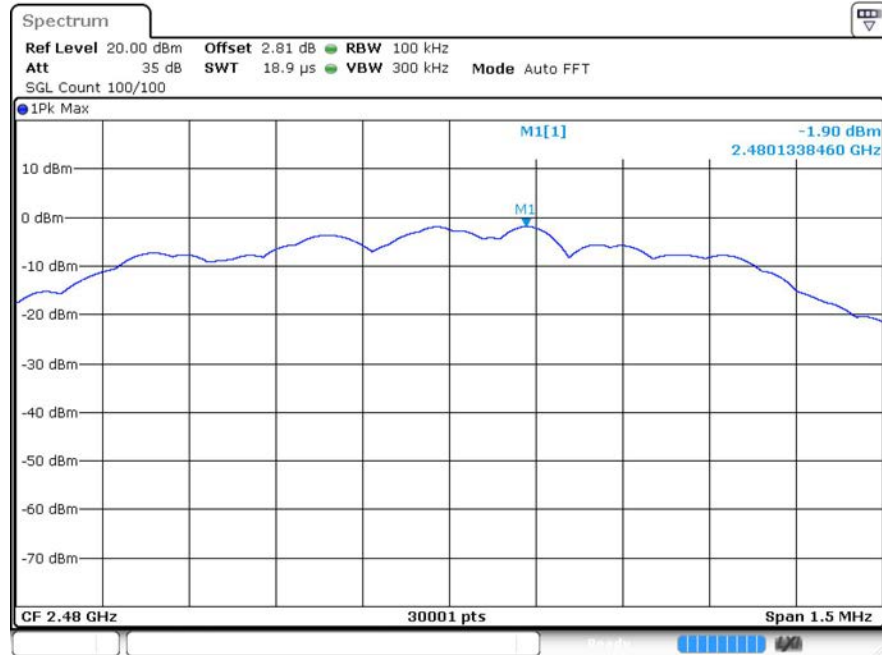


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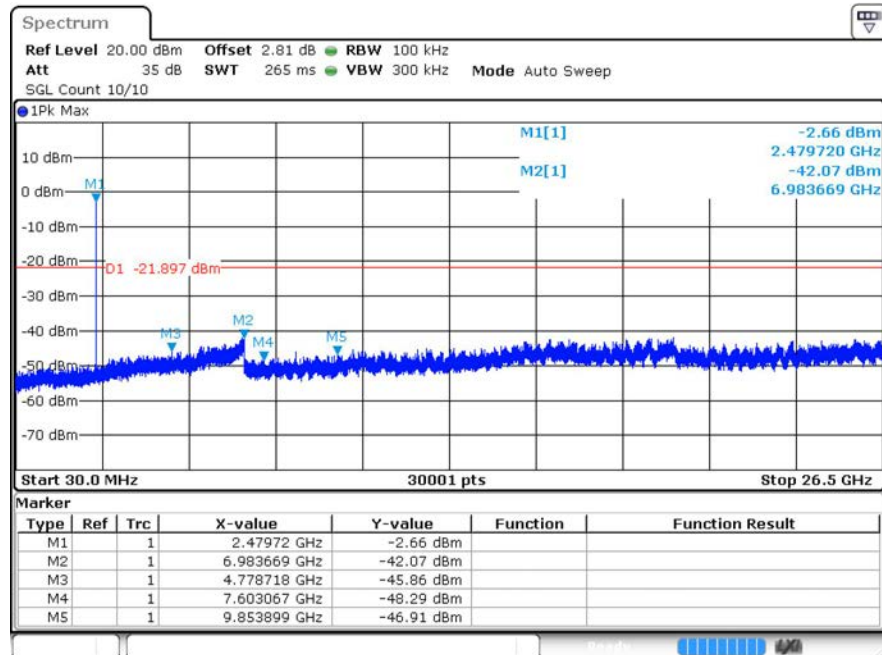


## 8DPSK\_HCH\_Graphs

Pref



Puw

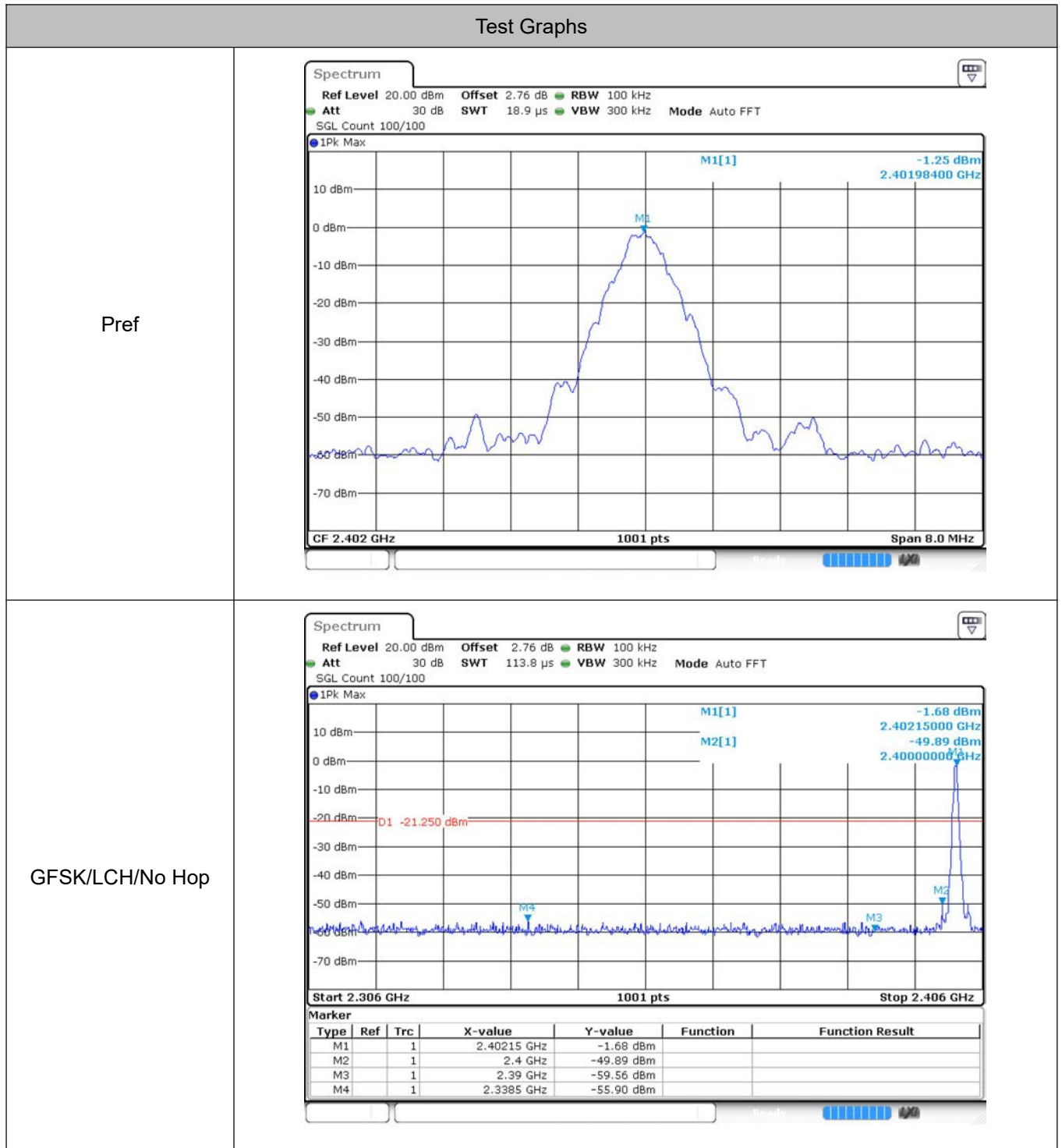


## 8 Band-edge for RF Conducted Emissions

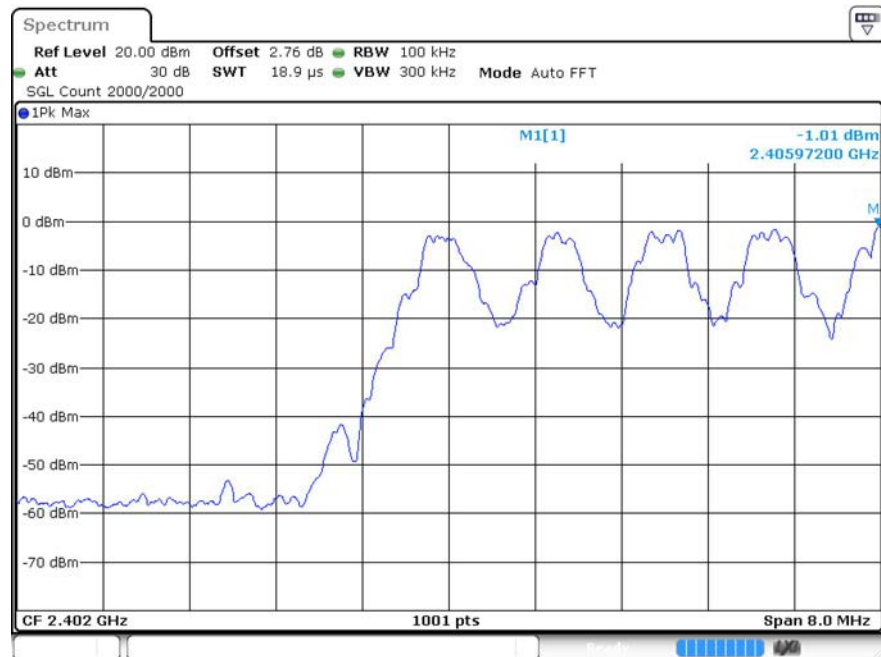
### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -54.64                   | -20         | Pass    |
|               |         |                         | On                | -53.52                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -54.34                   | -20         | Pass    |
|               |         |                         | On                | -50.02                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -53.33                   | -20         | Pass    |
|               |         |                         | On                | -51.8                    | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -44.37                   | -20         | Pass    |
|               |         |                         | On                | -51.44                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -52.17                   | -20         | Pass    |
|               |         |                         | On                | -52.03                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -45.56                   | -20         | Pass    |
|               |         |                         | On                | -45.89                   | -20         | Pass    |

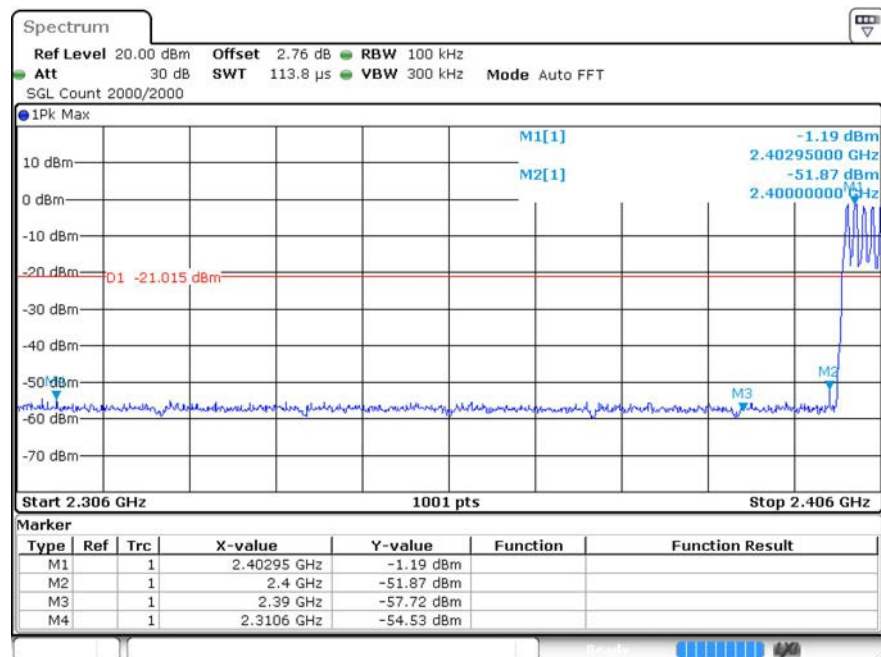
## 8.2 Test Graphs



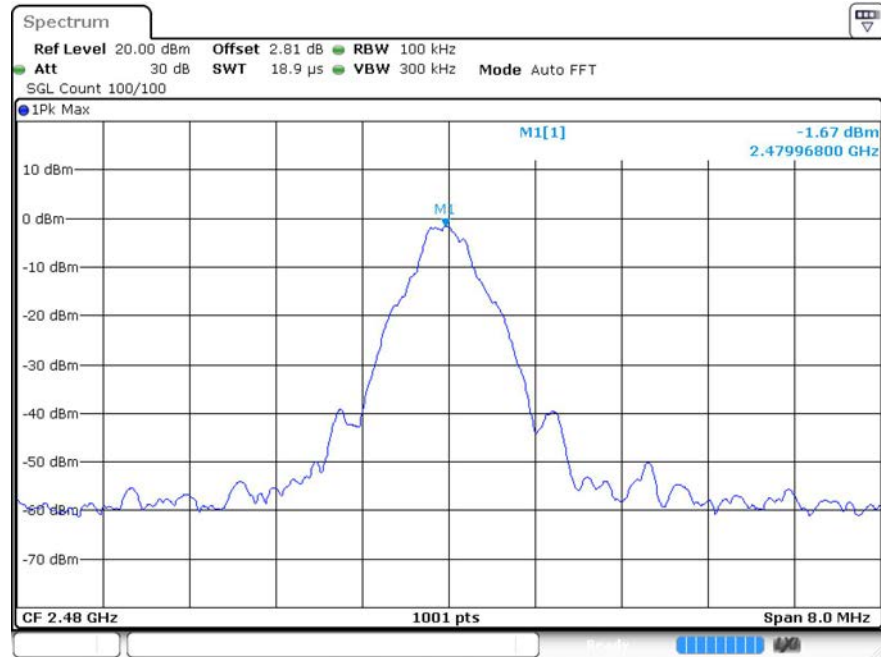
Ref



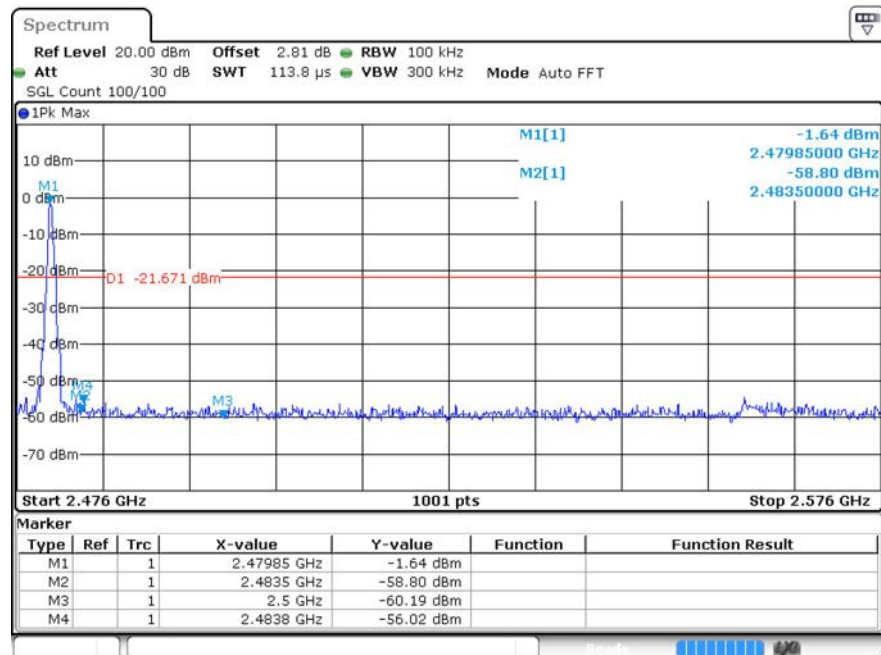
GFSK/LCH/Hop



Ref



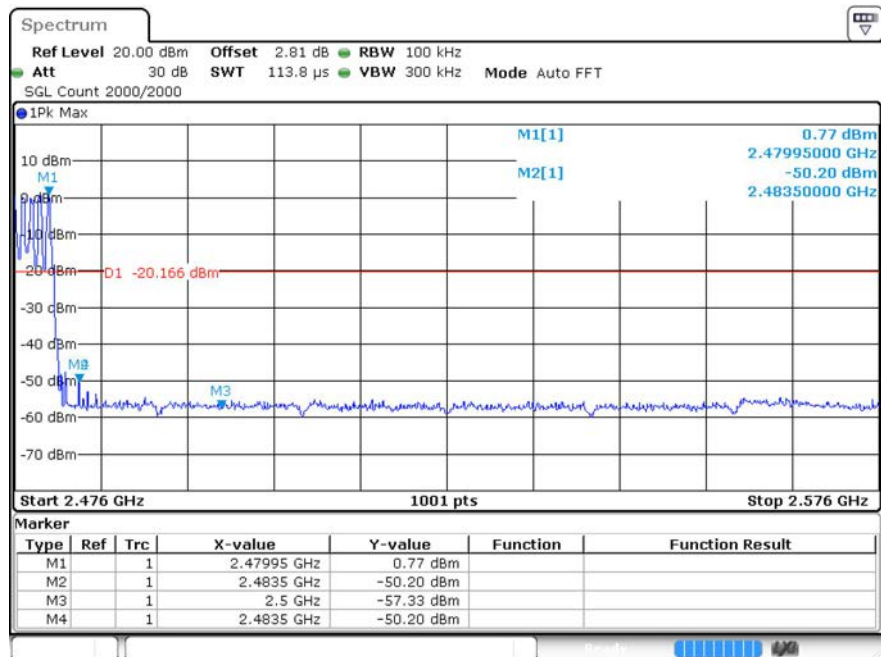
GFSK/HCH/No Hop



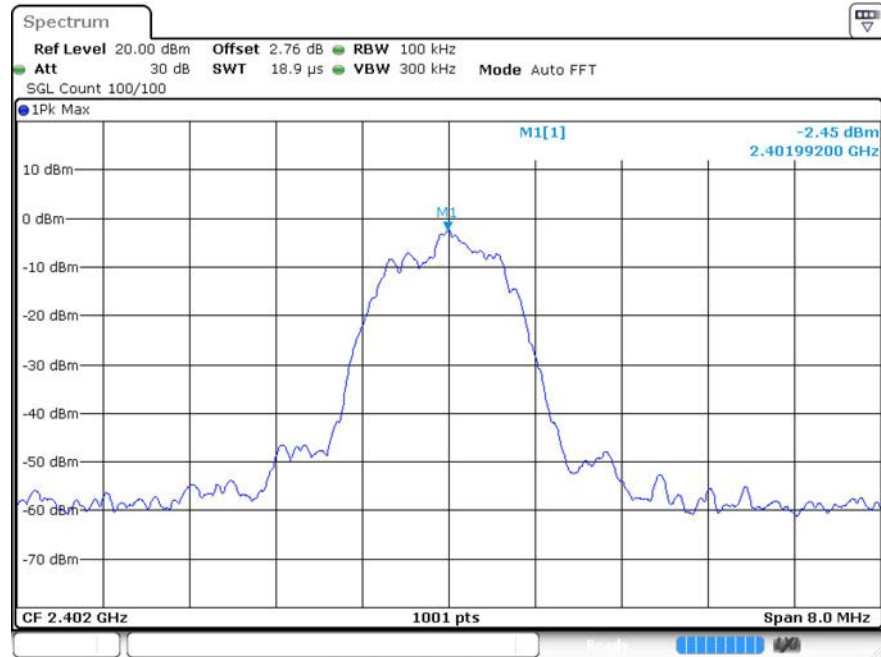
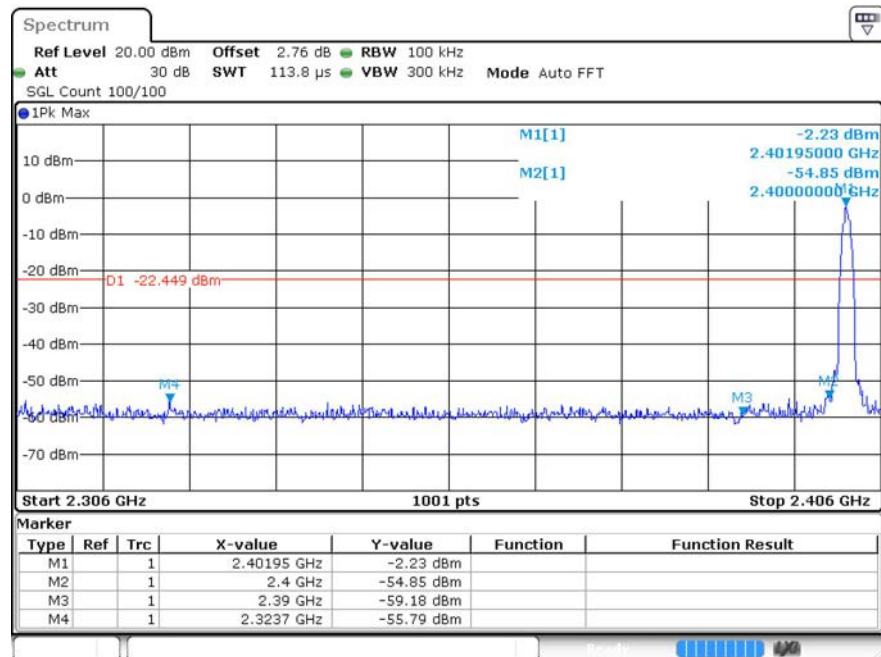
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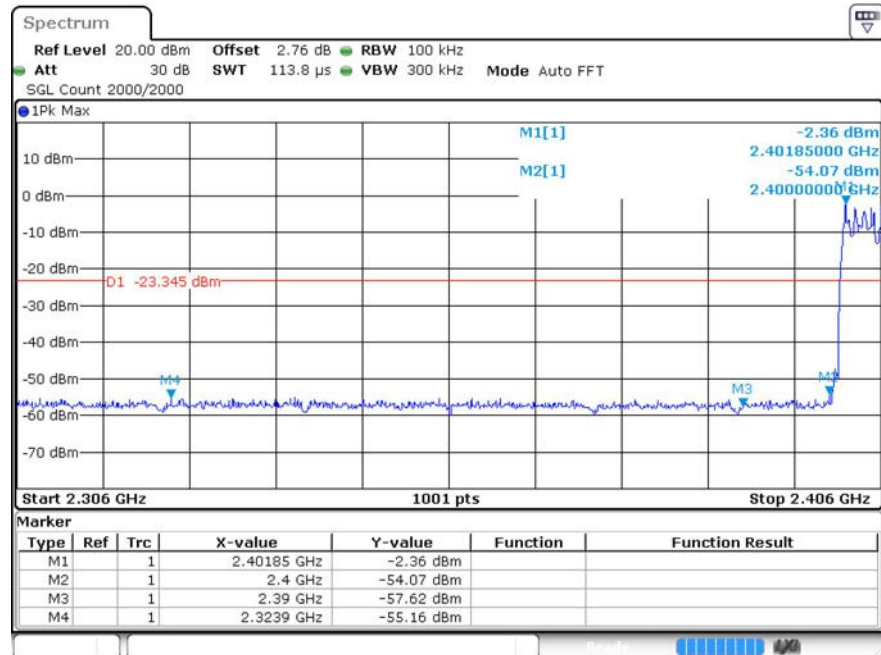
GFSK/HCH/Hop



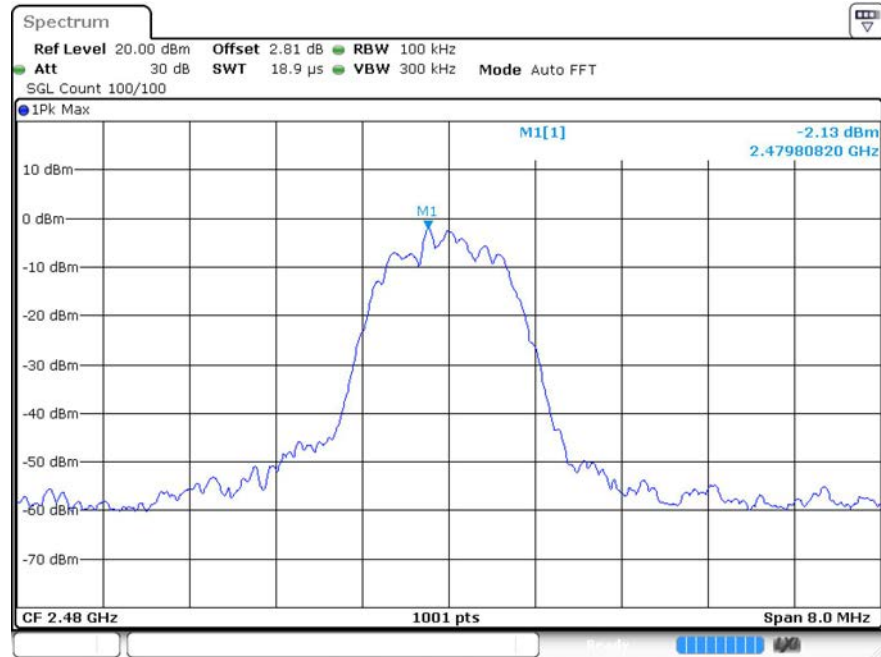
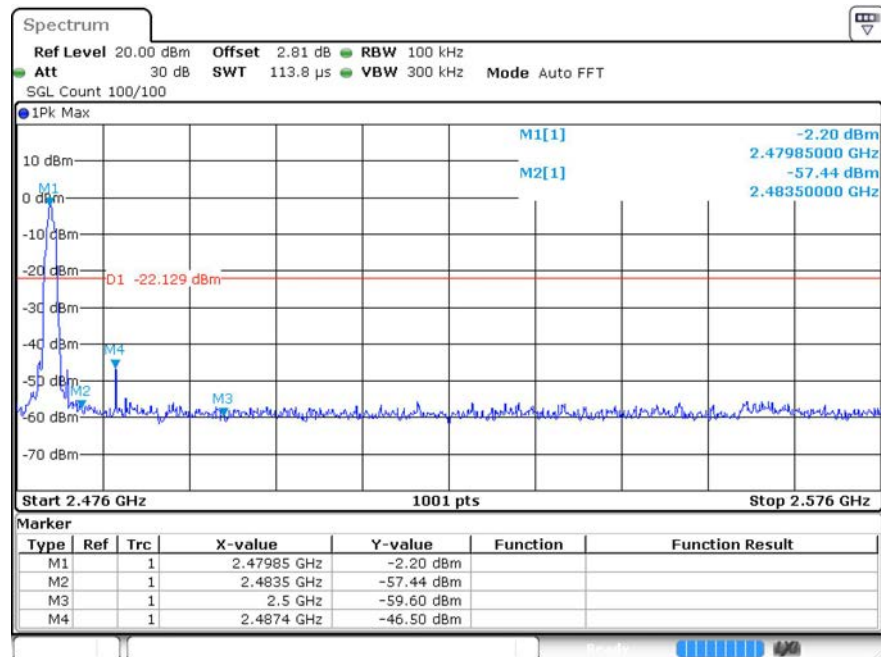
Ref


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


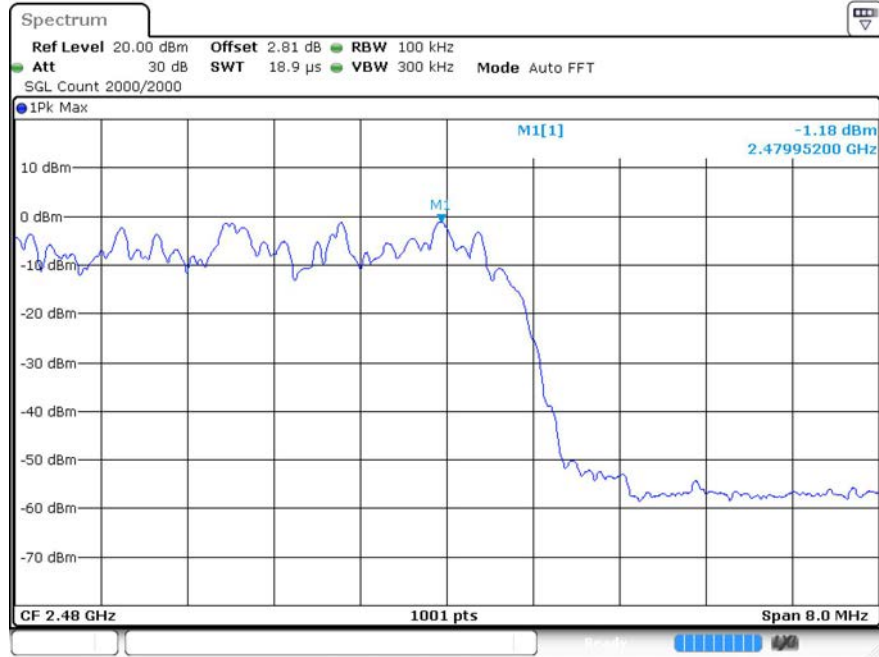
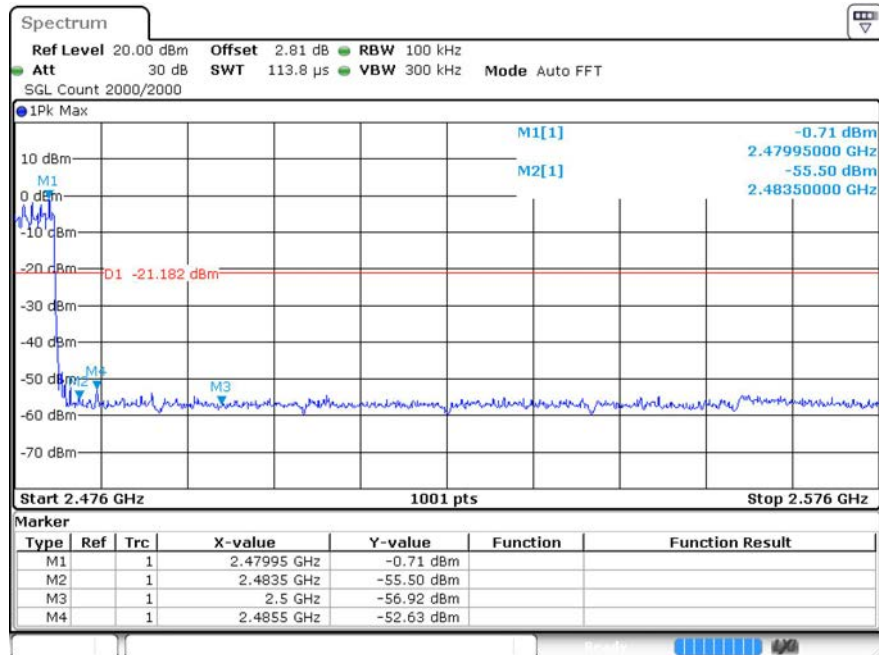
Ref


 $\pi/4$ DQPSK/LCH/Hop


Ref


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


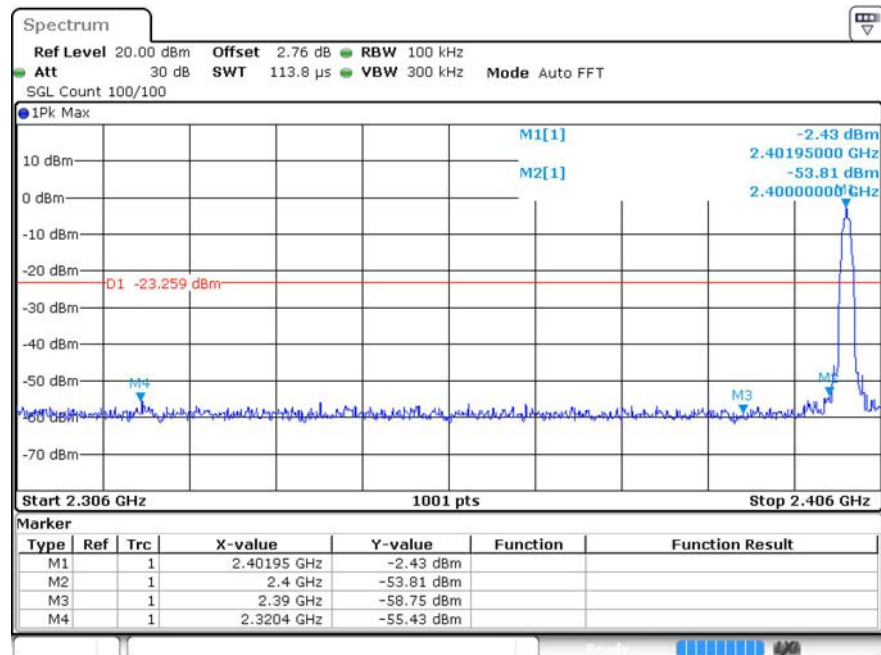
Ref


 $\pi/4$ DQPSK/HCH/Hop


Ref



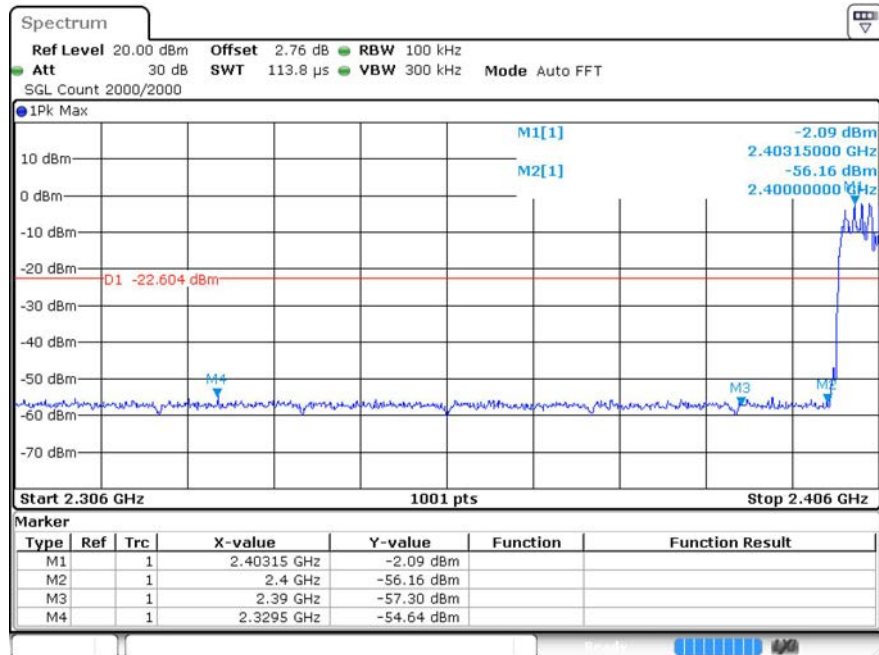
8DPSK/LCH/No Hop



Ref



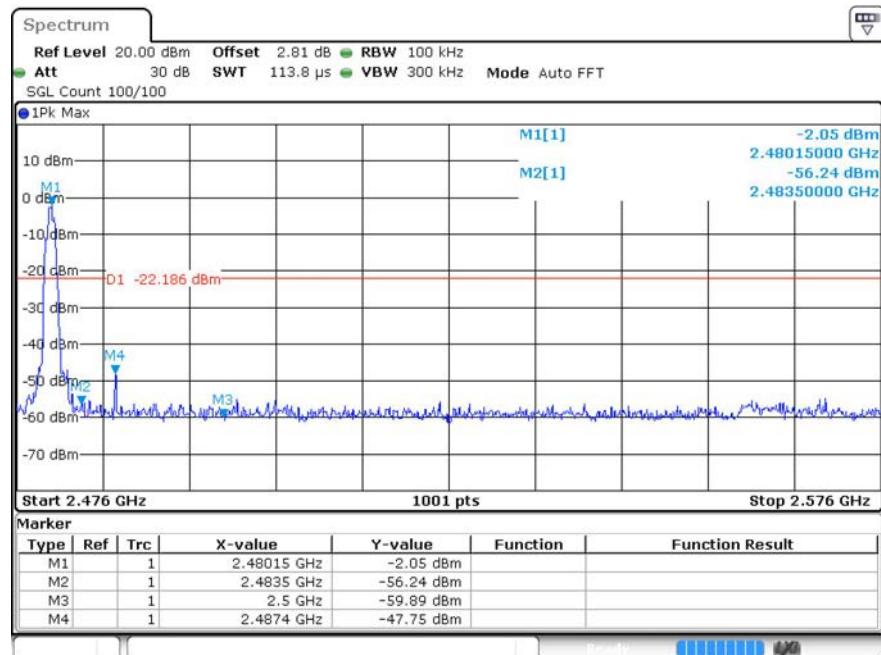
8DPSK/LCH/Hop



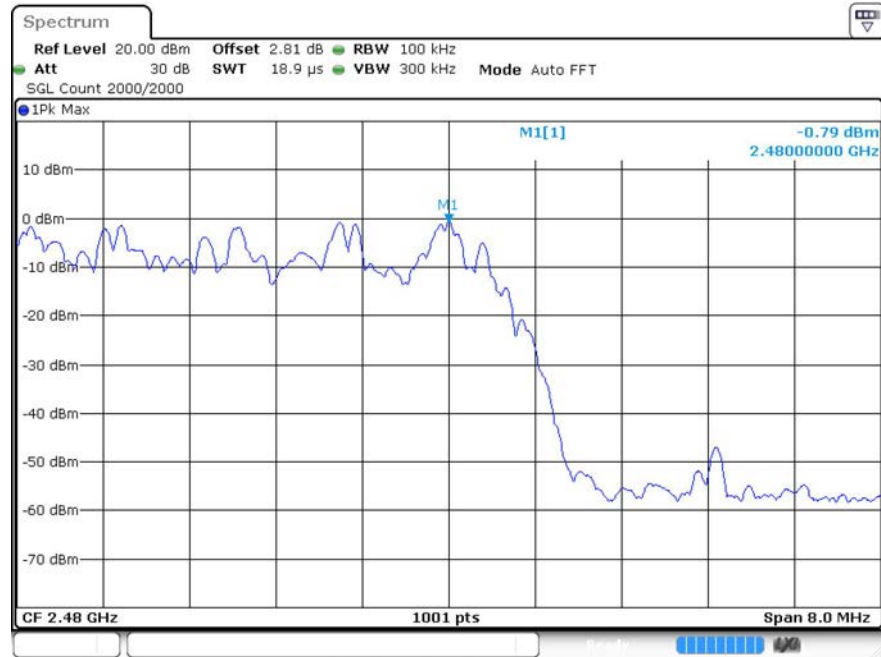
Ref



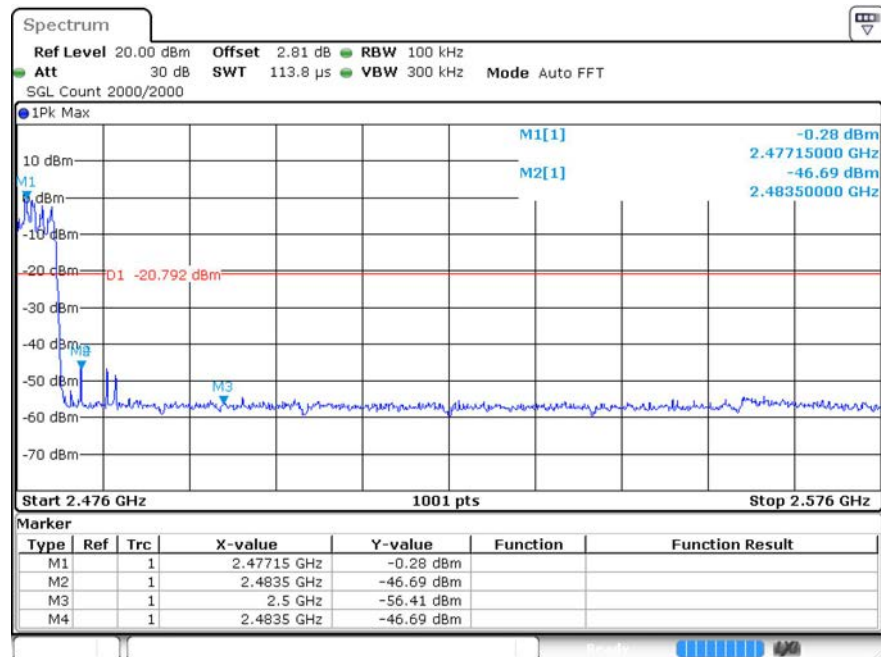
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

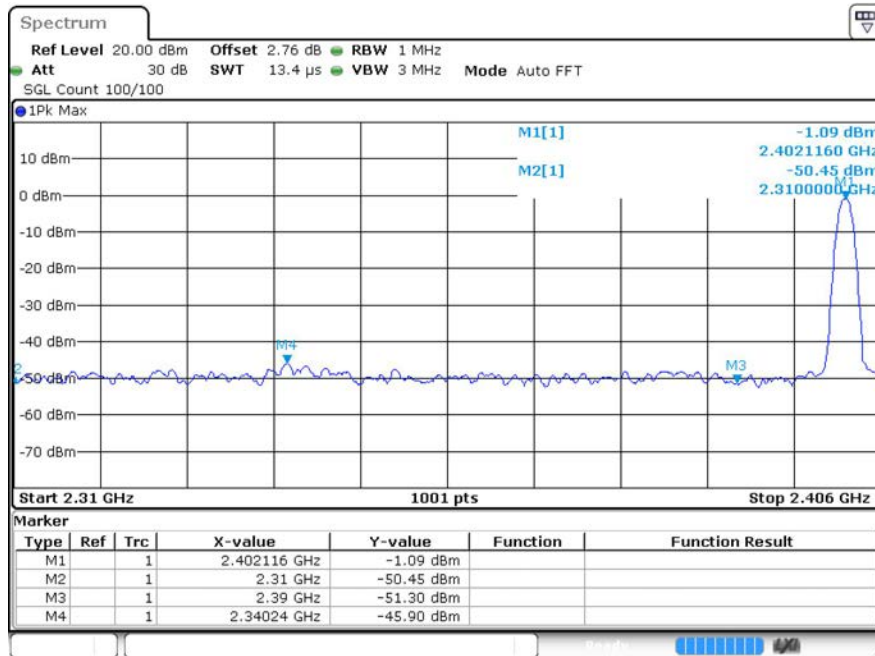
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | Duty Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|-------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -50.45      | 3.35 | -           | 48.16      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -55.97      | 3.35 | 5.06        | 47.7       | AV       | 54             | Pass    |
|               | Off     | 2340.24  | -45.9       | 3.35 | -           | 52.71      | PEAK     | 74             | Pass    |
|               | Off     | 2338.224 | -54.78      | 3.35 | 5.06        | 48.89      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -51.3       | 3.35 | -           | 47.31      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -55.88      | 3.35 | 5.06        | 47.79      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -49.63      | 3.35 | -           | 48.98      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -56.36      | 3.35 | 4.97        | 47.22      | AV       | 54             | Pass    |
|               | Off     | 2487.376 | -44.96      | 3.35 | -           | 53.65      | PEAK     | 74             | Pass    |
|               | Off     | 2486.488 | -55.78      | 3.35 | 4.97        | 47.8       | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -49.92      | 3.35 | -           | 48.69      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -57.43      | 3.35 | 4.97        | 46.15      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -50.4       | 3.35 | -           | 48.21      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.55      | 3.35 | 4.95        | 47.01      | AV       | 54             | Pass    |
|               | Off     | 2339.76  | -45.24      | 3.35 | -           | 53.37      | PEAK     | 74             | Pass    |
|               | Off     | 2338.032 | -54.34      | 3.35 | 4.95        | 49.22      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -50.99      | 3.35 | -           | 47.62      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -57.2       | 3.35 | 4.95        | 46.36      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -47.89      | 3.35 | -           | 50.72      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -55.89      | 3.35 | 4.96        | 47.68      | AV       | 54             | Pass    |
|               | Off     | 2487.256 | -45.75      | 3.35 | -           | 52.86      | PEAK     | 74             | Pass    |
|               | Off     | 2487.208 | -54.84      | 3.35 | 4.96        | 48.73      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -50.06      | 3.35 | -           | 48.55      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -57.25      | 3.35 | 4.96        | 46.32      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -50.02      | 3.35 | -           | 48.59      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -57.08      | 3.35 | 4.95        | 46.48      | AV       | 54             | Pass    |
|               | Off     | 2346.864 | -46.57      | 3.35 | -           | 52.04      | PEAK     | 74             | Pass    |
|               | Off     | 2337.744 | -54.64      | 3.35 | 4.95        | 48.92      | AV       | 54             | Pass    |



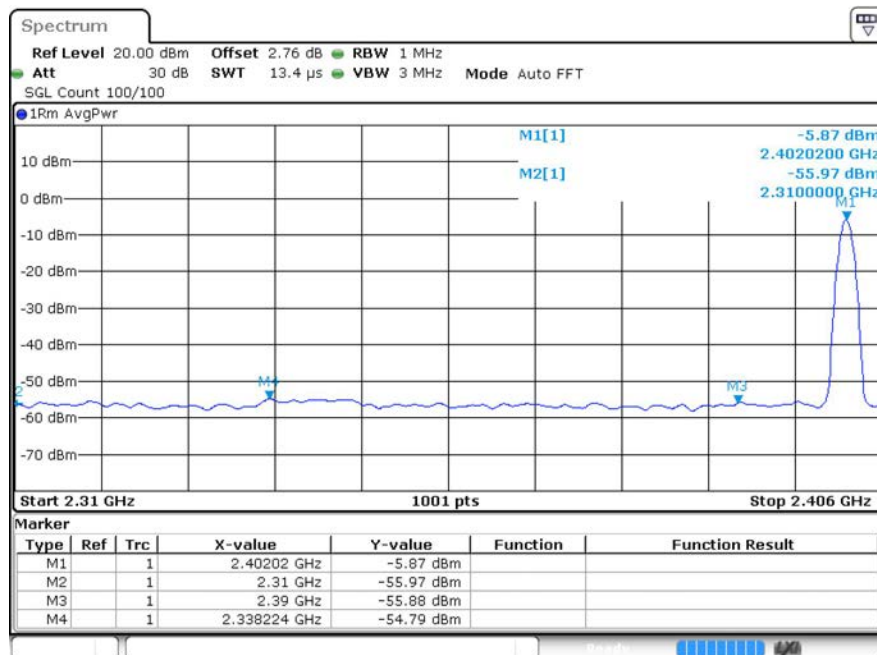
|     |          |        |      |      |       |      |    |      |
|-----|----------|--------|------|------|-------|------|----|------|
| Off | 2390.0   | -50.3  | 3.35 | -    | 48.31 | PEAK | 74 | Pass |
| Off | 2390.0   | -56.54 | 3.35 | 4.95 | 47.02 | AV   | 54 | Pass |
| Off | 2483.5   | -50.55 | 3.35 | -    | 48.06 | PEAK | 74 | Pass |
| Off | 2483.5   | -56.18 | 3.35 | 4.95 | 47.38 | AV   | 54 | Pass |
| Off | 2487.424 | -48.1  | 3.35 | -    | 50.51 | PEAK | 74 | Pass |
| Off | 2491.648 | -55.32 | 3.35 | 4.95 | 48.24 | AV   | 54 | Pass |
| Off | 2500.0   | -49.23 | 3.35 | -    | 49.38 | PEAK | 74 | Pass |
| Off | 2500.0   | -55.99 | 3.35 | 4.95 | 47.57 | AV   | 54 | Pass |

## 9.2 Test Graphs

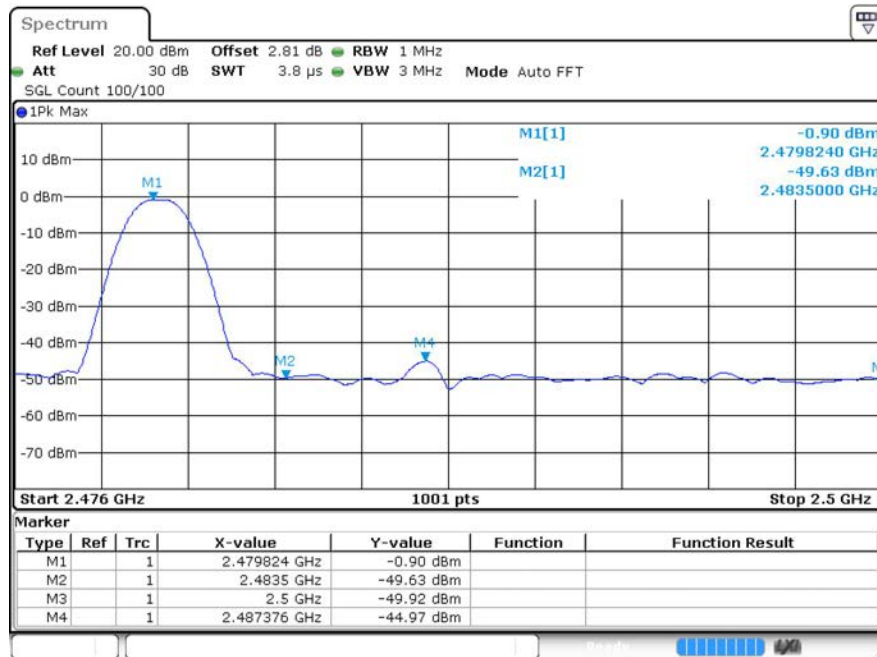
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



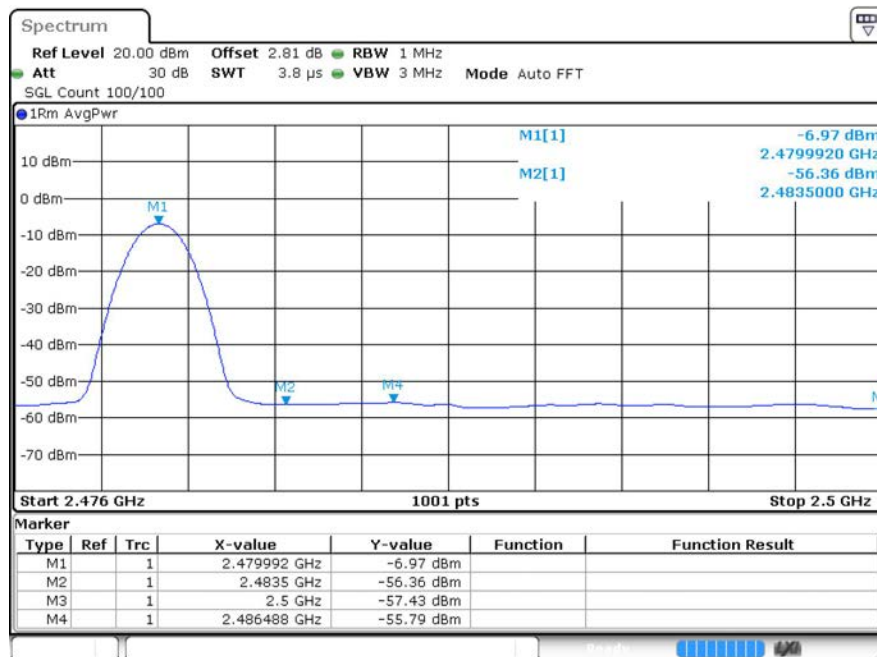
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



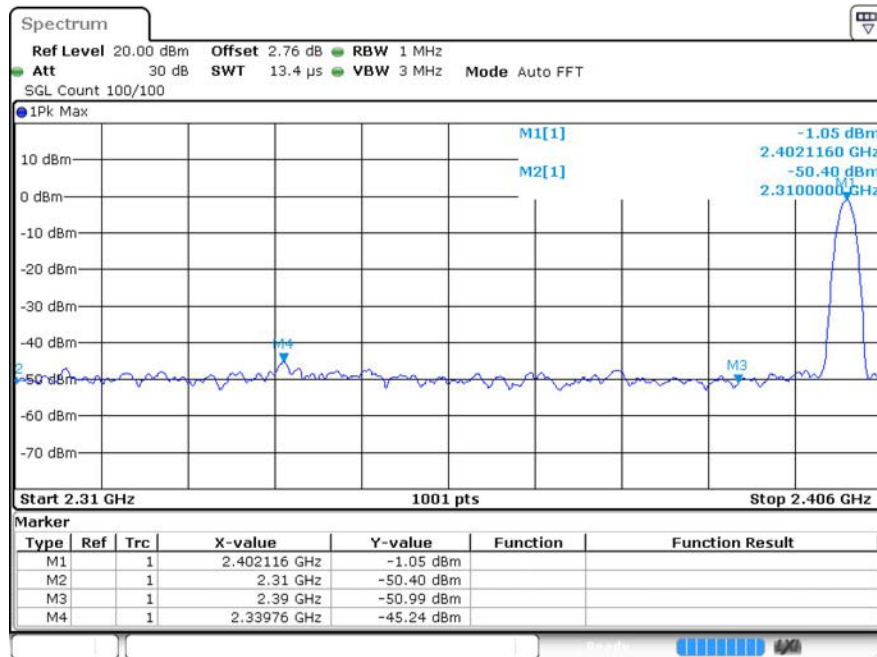
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



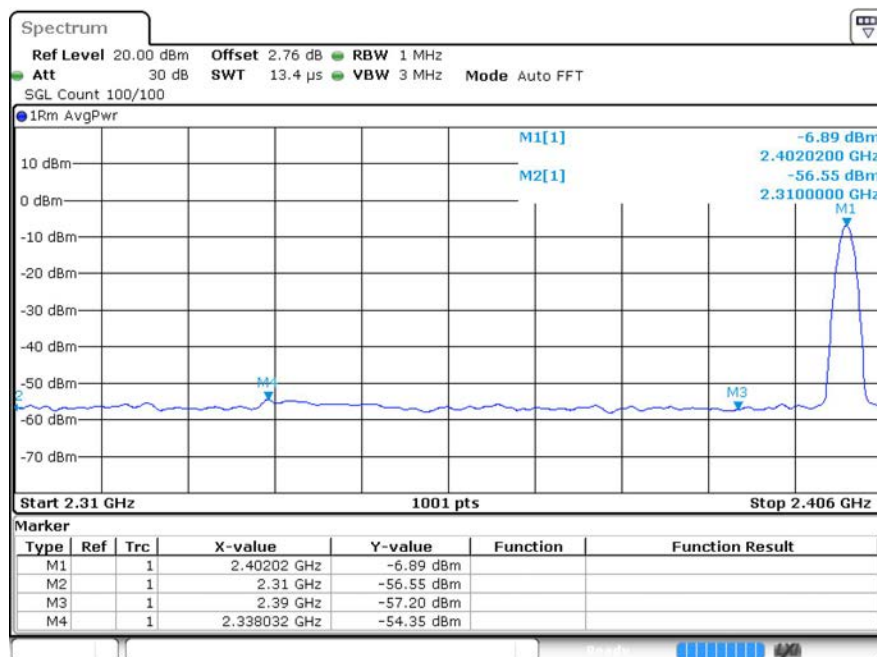
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



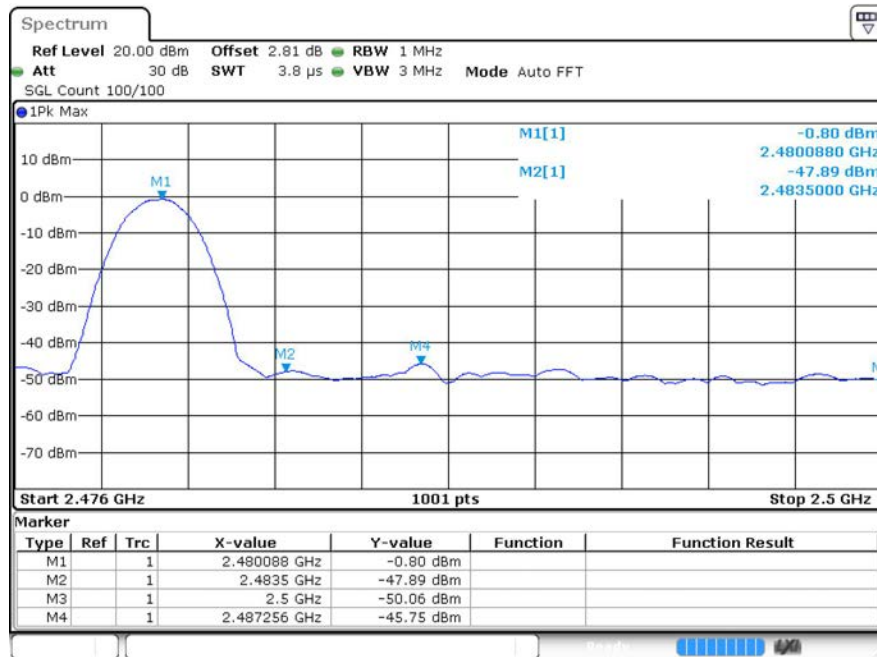
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



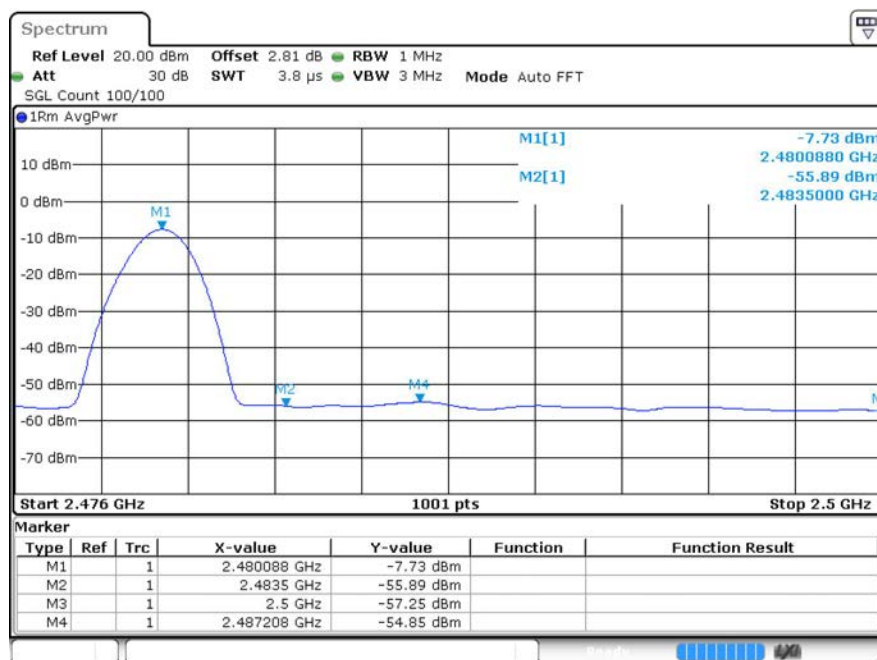
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



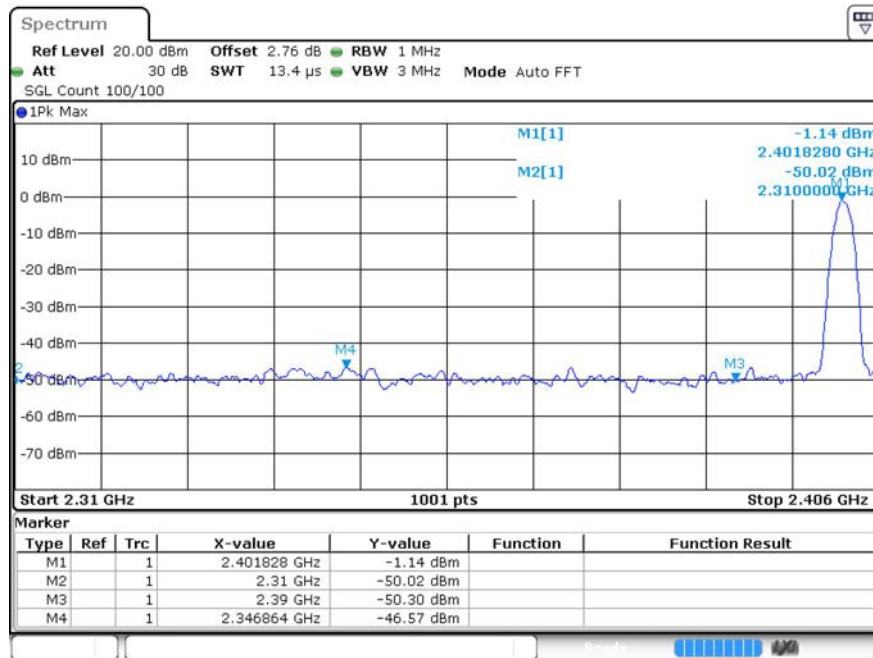
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



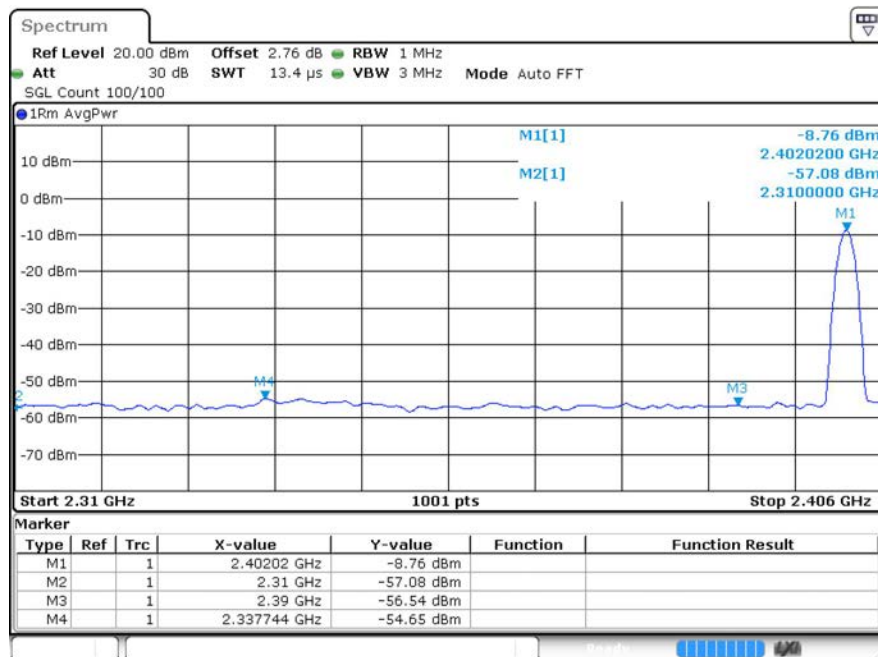
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



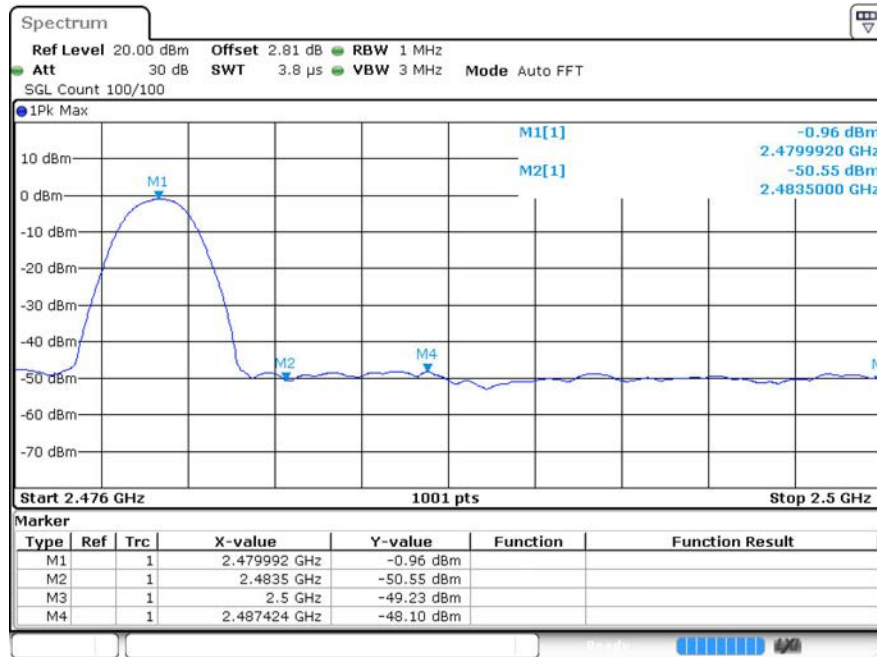
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



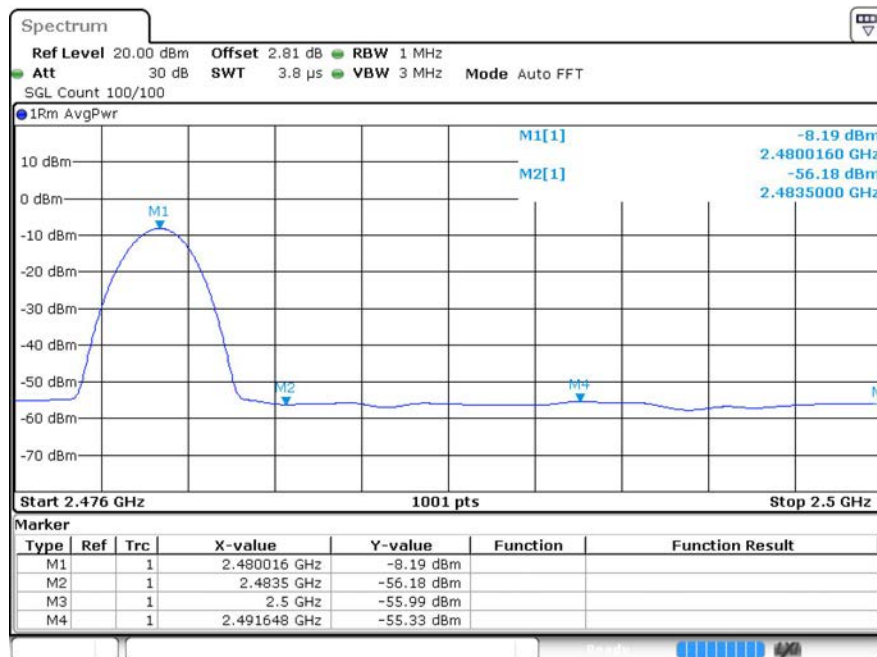
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---