



## Appendix A

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

Product Name: Wireless Lavalier Microphone

Trade Mark: Zwide

Test Model: M1 Plus

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 25.5℃       |
| Relative Humidity: | 52.2%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Simba Huang |
| Supervised by:     | Seal Chen   |

# Contents

Page

**COVER PAGE**

|     |                                            |    |
|-----|--------------------------------------------|----|
| 1   | Duty Cycle .....                           | 3  |
| 1.1 | Test Result.....                           | 3  |
| 1.2 | Test Graphs .....                          | 4  |
| 2   | Maximum Conducted Peak Output Power .....  | 9  |
| 2.1 | Test Result.....                           | 9  |
| 2.2 | Test Graphs .....                          | 10 |
| 3   | 20dB Bandwidth .....                       | 15 |
| 3.1 | Test Result.....                           | 15 |
| 3.2 | Test Graphs .....                          | 16 |
| 4   | Carrier Frequency Separation .....         | 21 |
| 4.1 | Test Result.....                           | 21 |
| 4.2 | Test Graphs .....                          | 22 |
| 5   | Hopping Channel Number.....                | 24 |
| 5.1 | Test Result.....                           | 24 |
| 5.2 | Test Graphs .....                          | 25 |
| 6   | Dwell Time .....                           | 27 |
| 6.1 | Test Result.....                           | 27 |
| 6.2 | Test Graphs .....                          | 28 |
| 7   | RF Conducted Spurious Emissions.....       | 31 |
| 7.1 | Test Result.....                           | 31 |
| 7.2 | Test Graphs .....                          | 32 |
| 8   | Band-edge for RF Conducted Emissions ..... | 41 |
| 8.1 | Test Result.....                           | 41 |
| 8.2 | Test Graphs .....                          | 42 |
| 9   | Restrict-band band-edge measurements ..... | 54 |
| 9.1 | Test Result.....                           | 54 |
| 9.2 | Test Graphs .....                          | 56 |

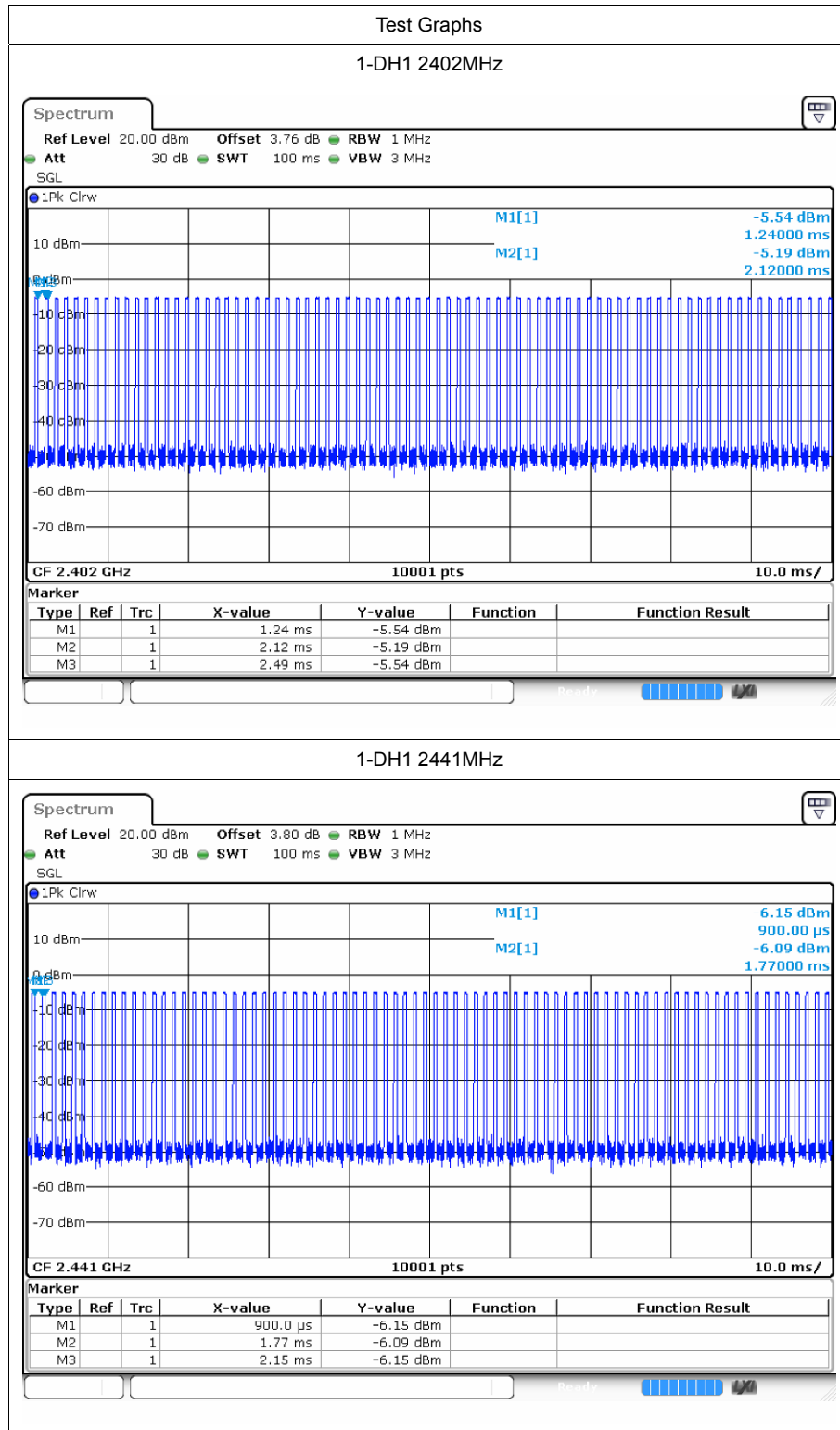


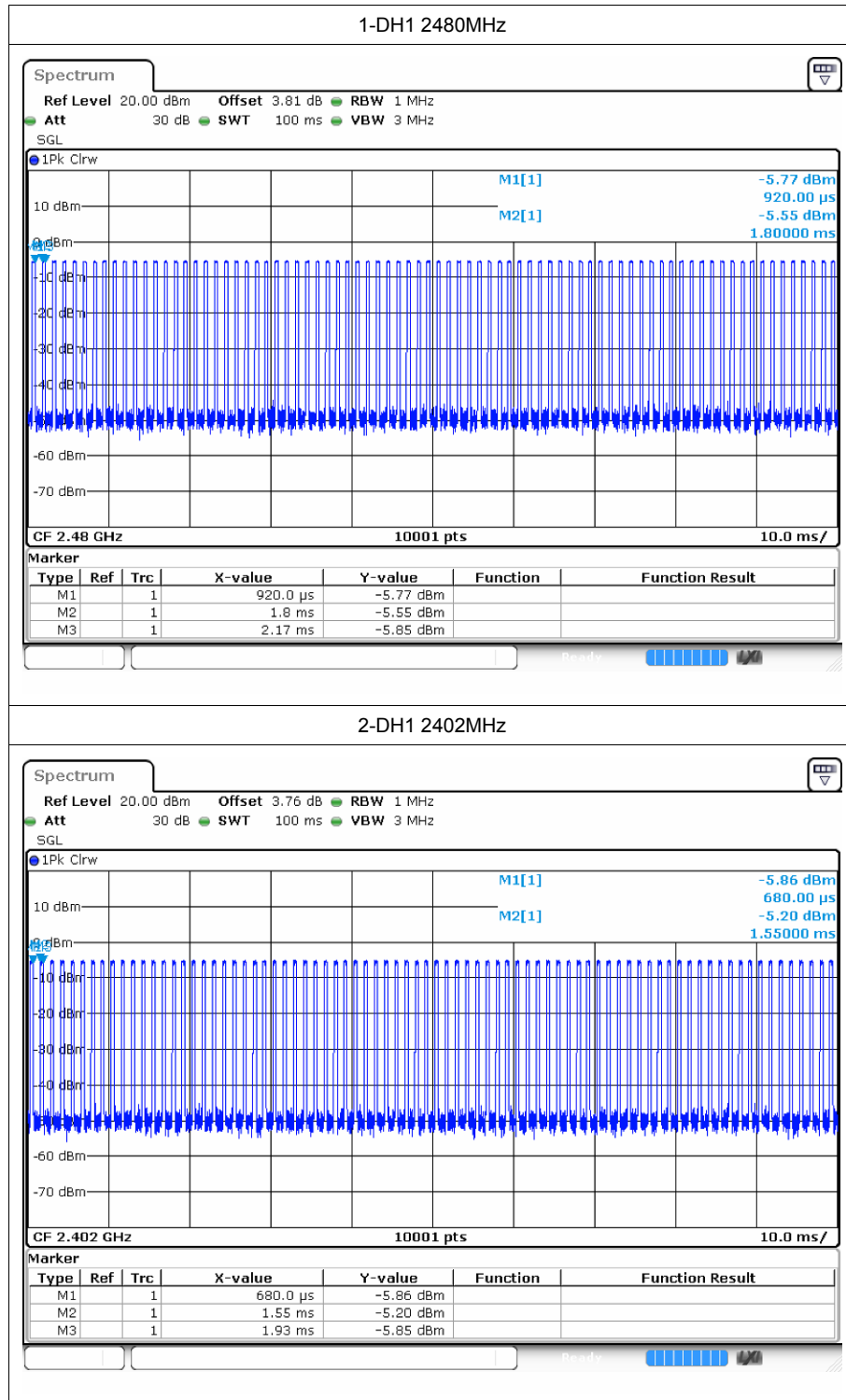
# 1 Duty Cycle

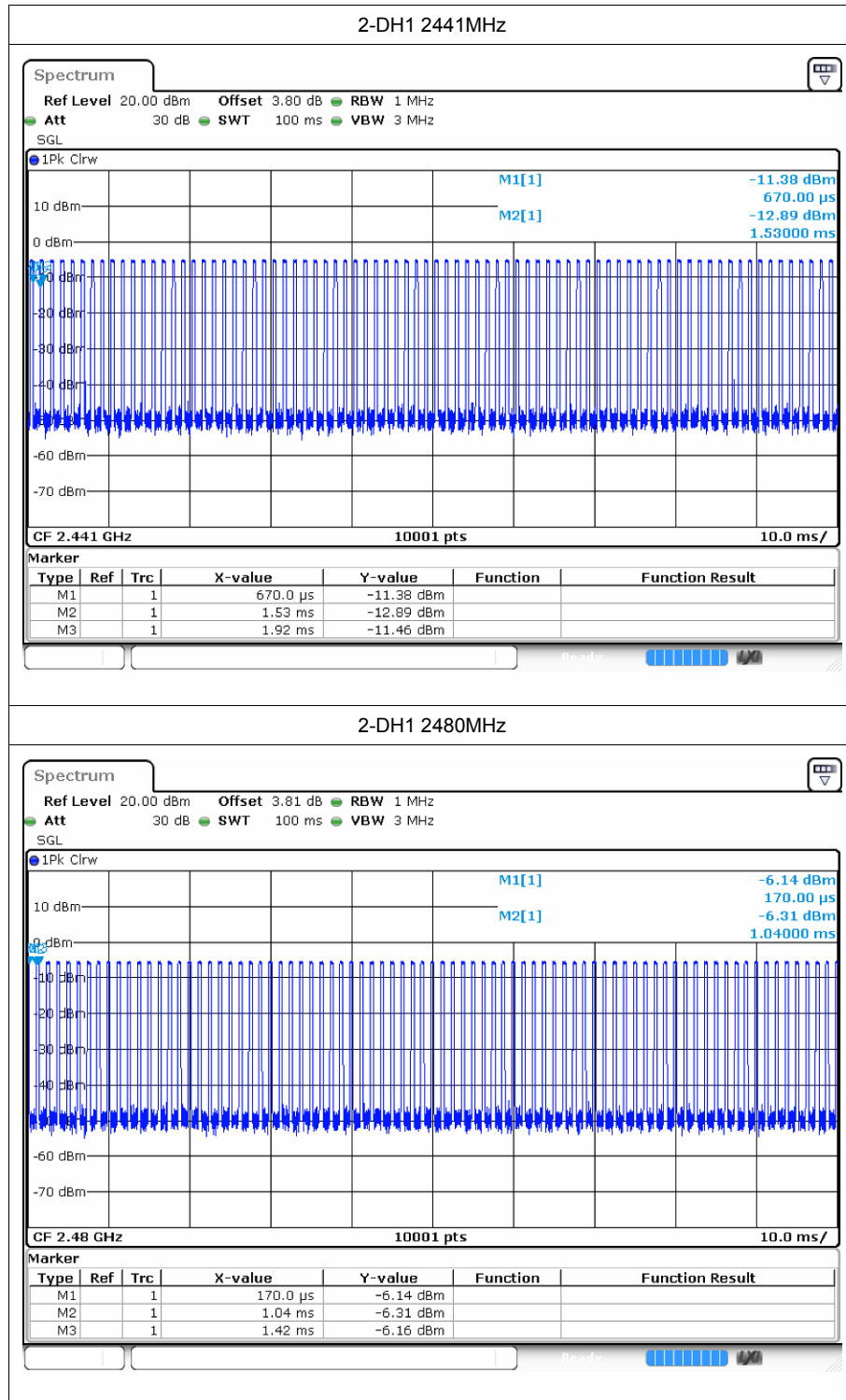
## 1.1 Test Result

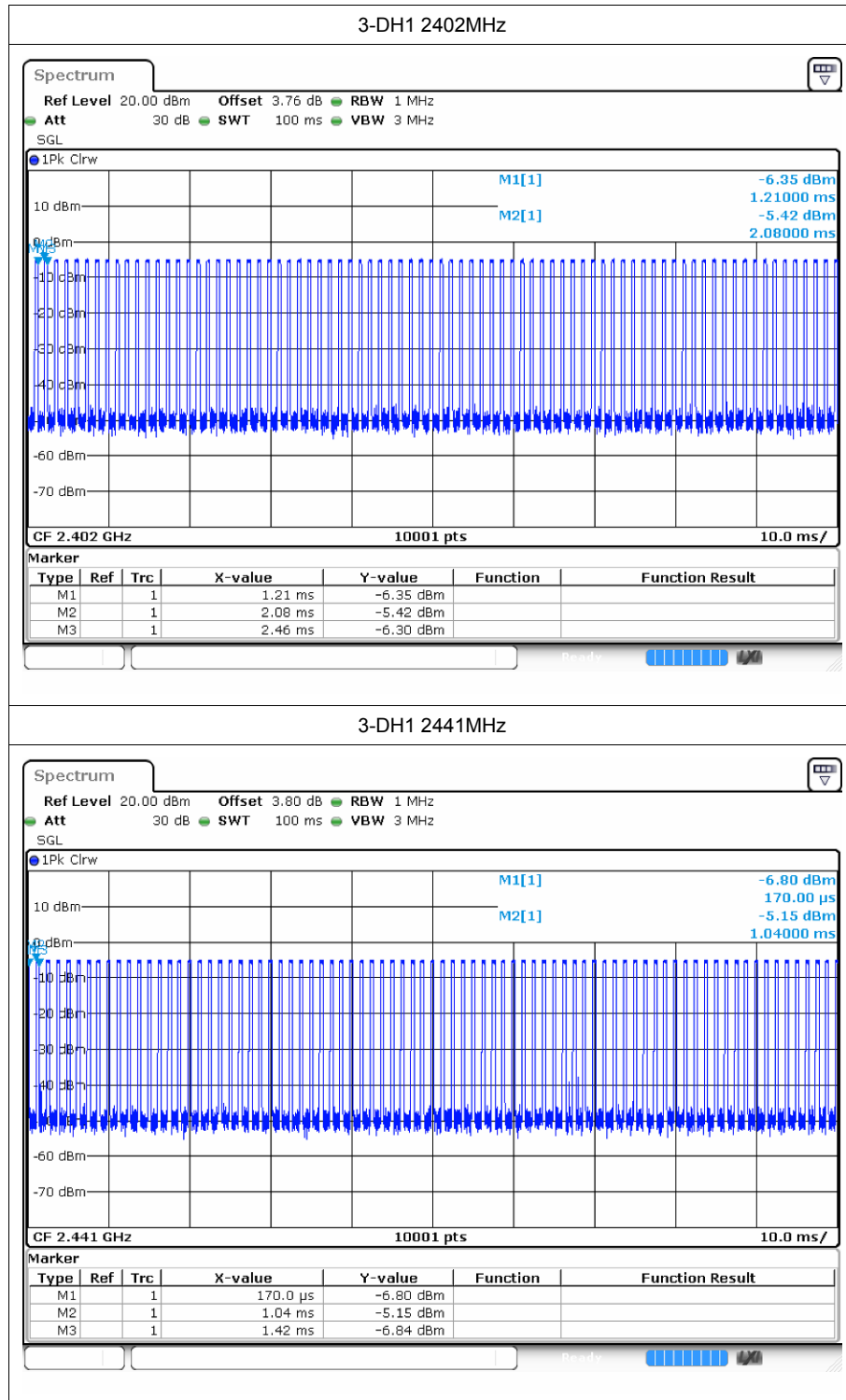
| Mode  | Frequency (MHz) | Duty Cycle (%) | 1/T (kHz) |
|-------|-----------------|----------------|-----------|
| 1-DH1 | 2402            | 30.4           | 2.7       |
| 1-DH1 | 2441            | 31.2           | 2.63      |
| 1-DH1 | 2480            | 30.4           | 2.7       |
| 2-DH1 | 2402            | 31.2           | 2.63      |
| 2-DH1 | 2441            | 32             | 2.56      |
| 2-DH1 | 2480            | 31.21          | 2.63      |
| 3-DH1 | 2402            | 31.2           | 2.63      |
| 3-DH1 | 2441            | 31.21          | 2.63      |
| 3-DH1 | 2480            | 32             | 2.56      |

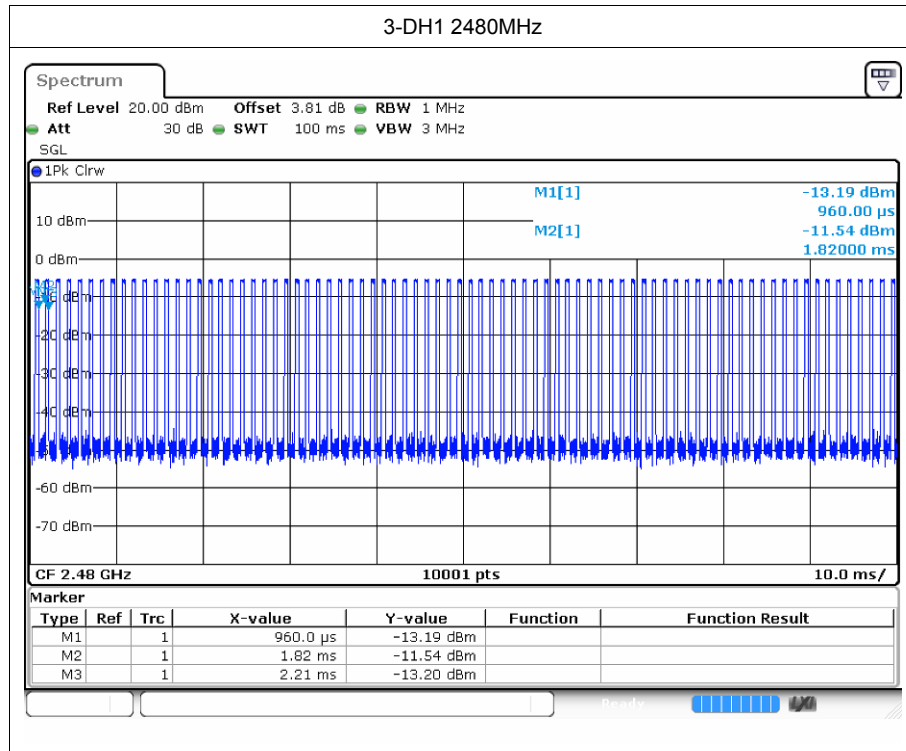
## 1.2 Test Graphs









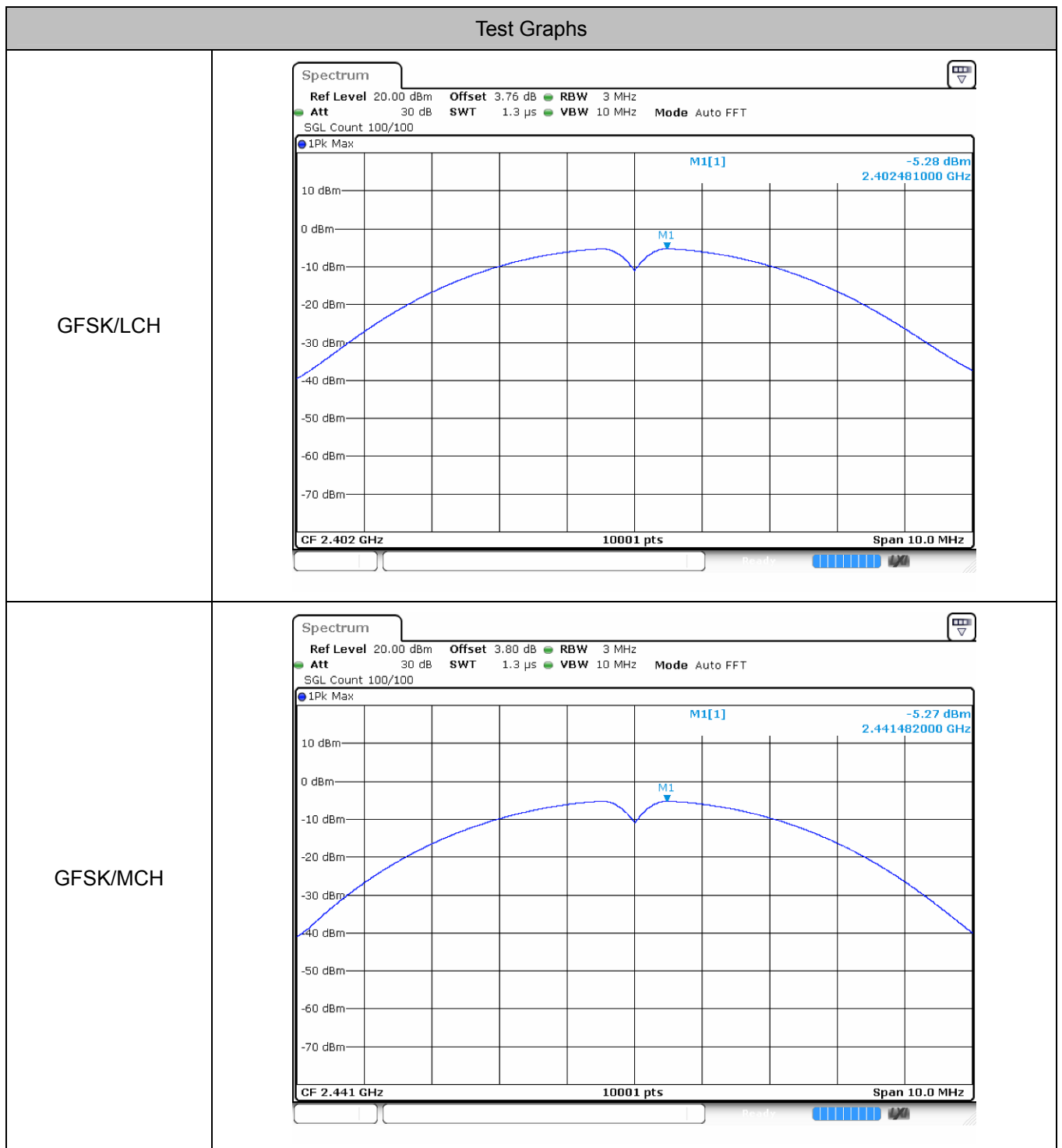


## 2 Maximum Conducted Peak Output Power

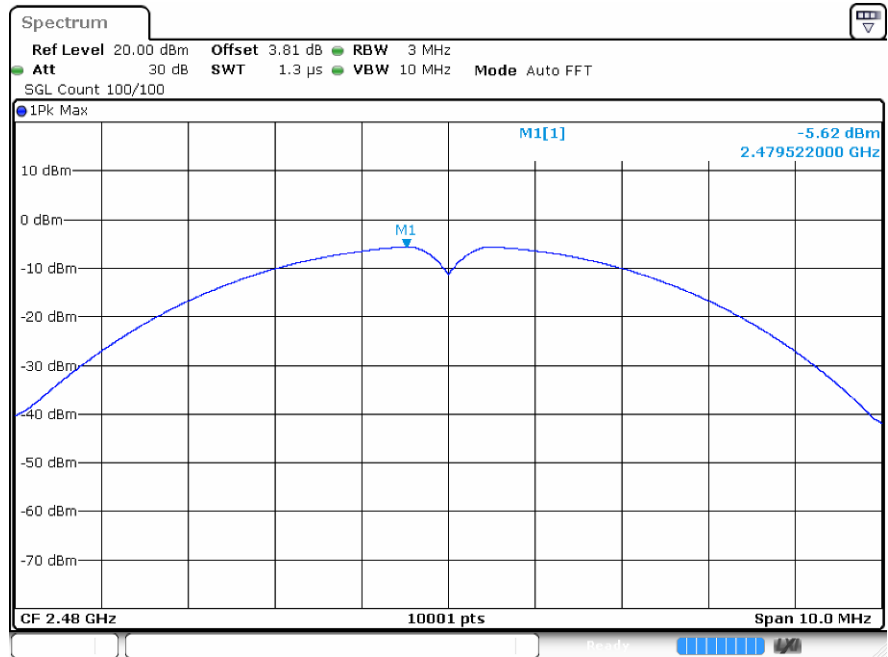
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power<br>[dBm] | Limit<br>[dBm] | Verdict |
|---------------|----------|------------------------------------|----------------|---------|
| GFSK          | LCH      | -5.28                              | 21             | Pass    |
|               | MCH      | -5.27                              | 21             | Pass    |
|               | HCH      | -5.62                              | 21             | Pass    |
| $\pi/4$ DQPSK | LCH      | -4.91                              | 21             | Pass    |
|               | MCH      | -5.23                              | 21             | Pass    |
|               | HCH      | -5.61                              | 21             | Pass    |
| 8DPSK         | LCH      | -4.95                              | 21             | Pass    |
|               | MCH      | -5.09                              | 21             | Pass    |
|               | HCH      | -5.55                              | 21             | Pass    |

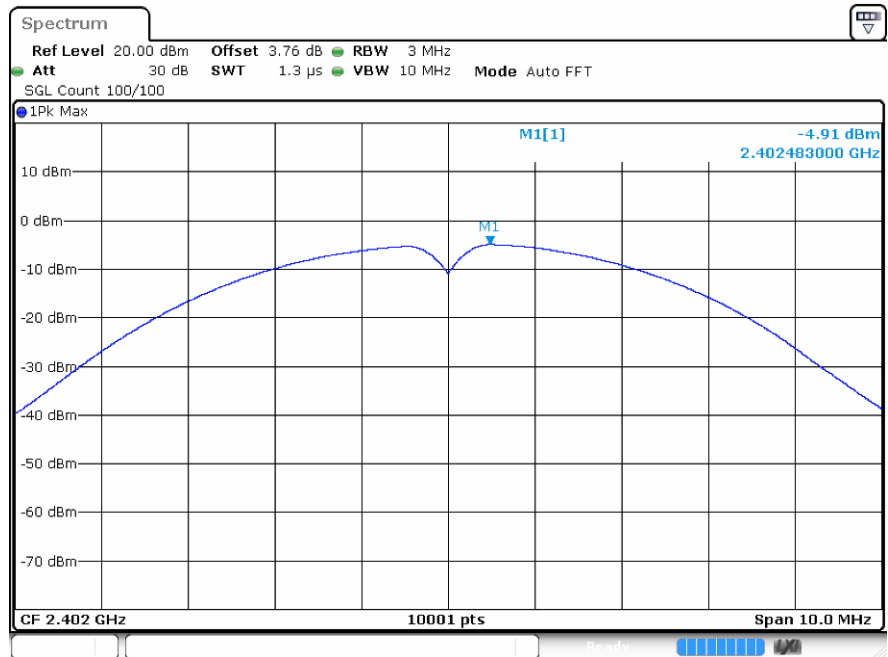
## 2.2 Test Graphs



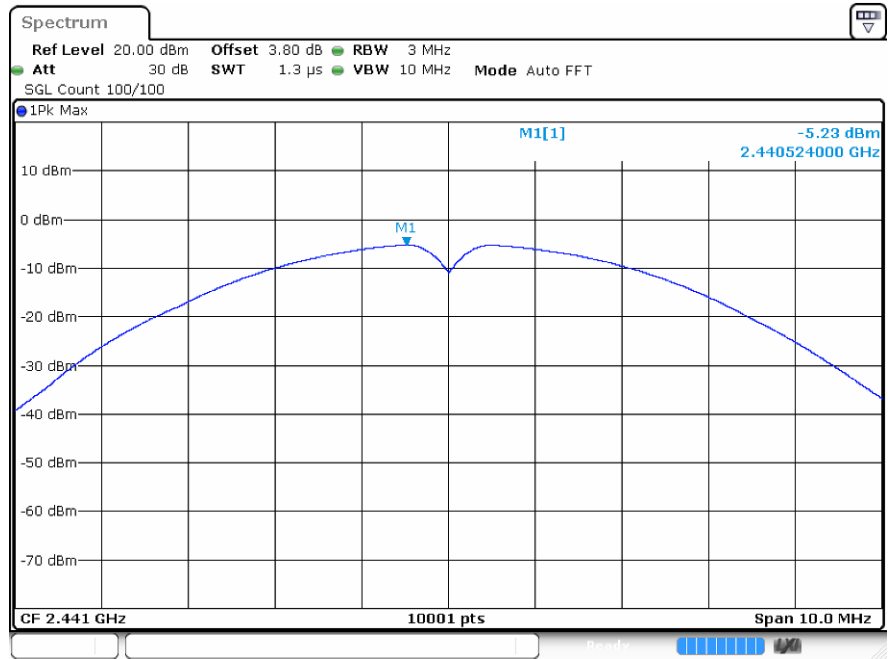
GFSK/HCH



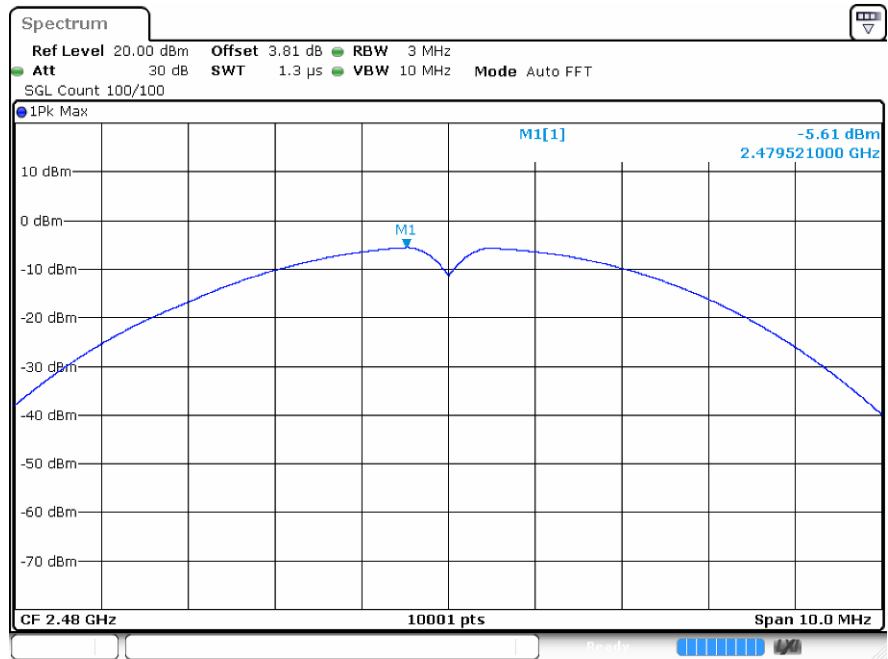
$\pi/4$ DQPSK/LCH



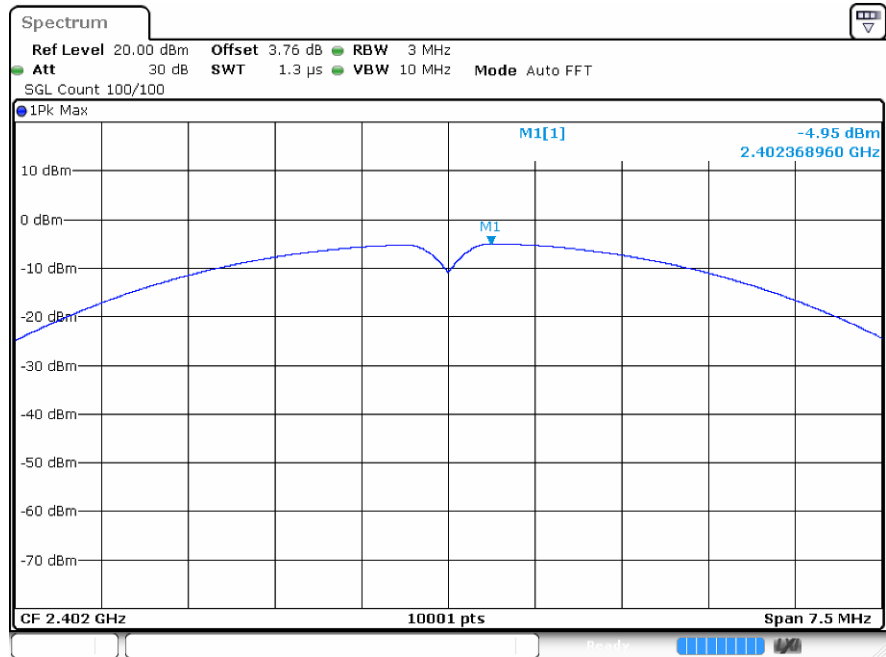
$\pi/4$ DQPSK/MCH



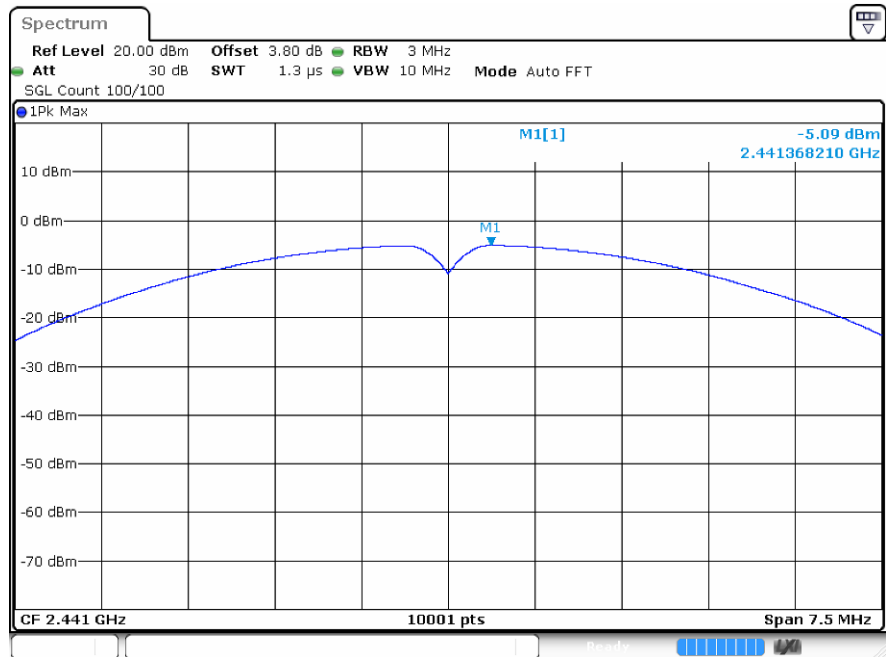
$\pi/4$ DQPSK/HCH



8DPSK/LCH

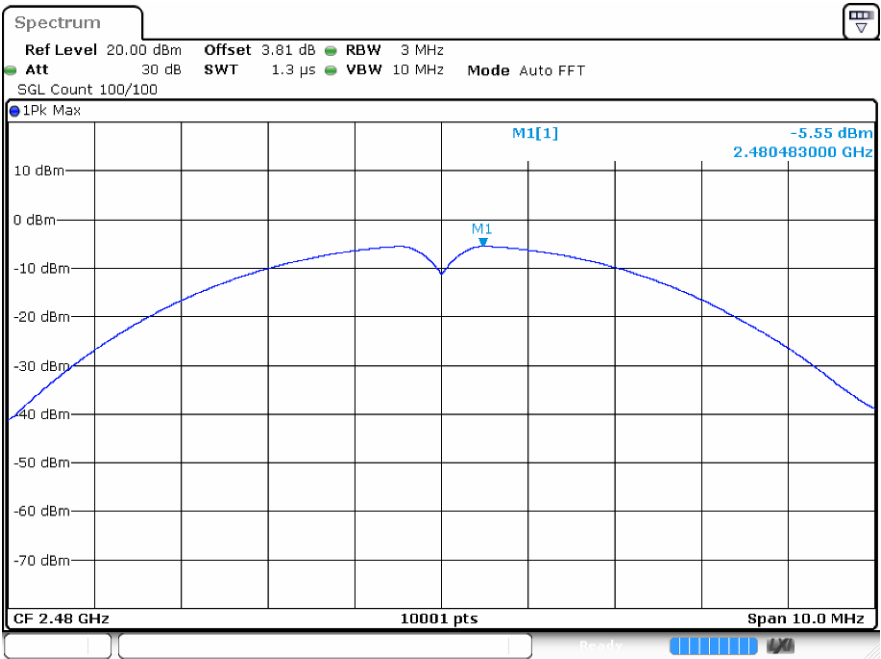


8DPSK/MCH





8DPSK/HCH



### 3 20dB Bandwidth

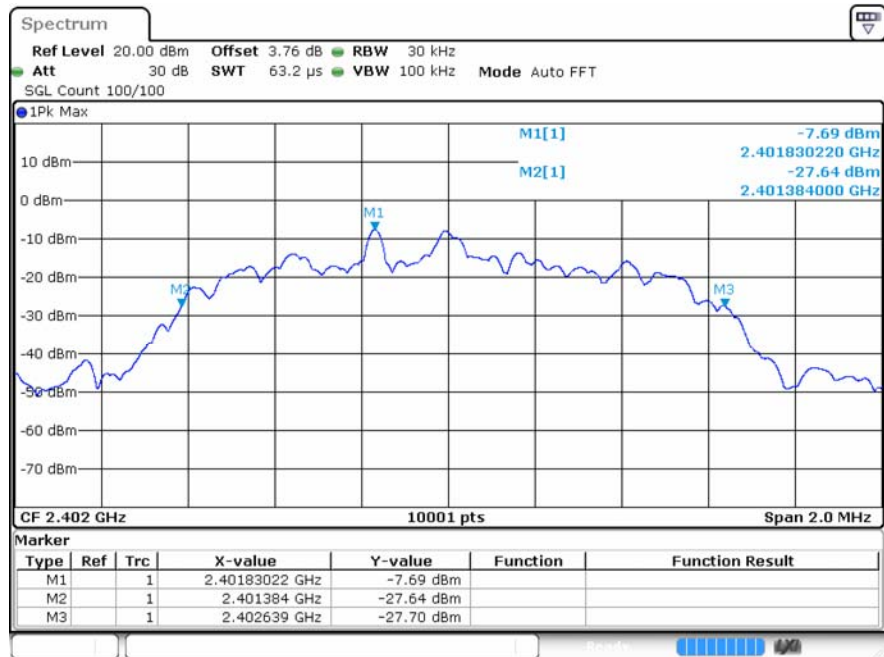
#### 3.1 Test Result

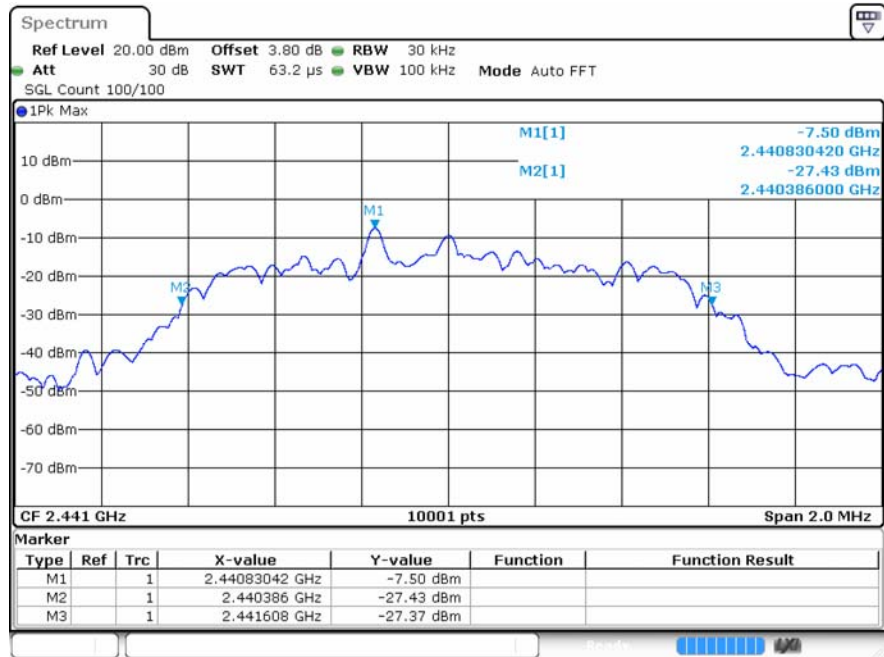
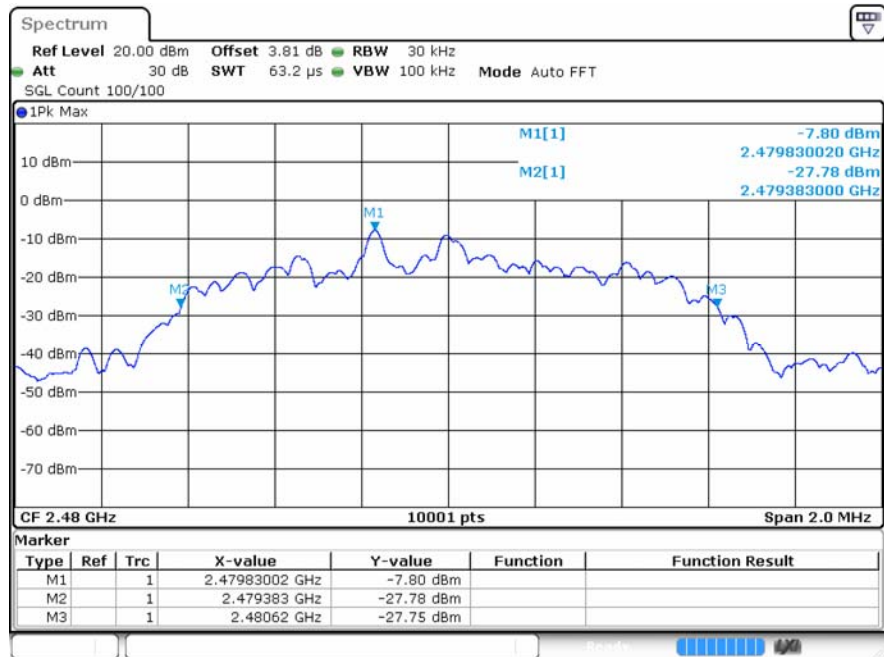
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.832                | Not Specified | Pass    |
|               | MCH      | 0.928                | Not Specified | Pass    |
|               | HCH      | 0.974                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.255                | Not Specified | Pass    |
|               | MCH      | 1.223                | Not Specified | Pass    |
|               | HCH      | 1.237                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.214                | Not Specified | Pass    |
|               | MCH      | 1.222                | Not Specified | Pass    |
|               | HCH      | 1.218                | Not Specified | Pass    |

## 3.2 Test Graphs

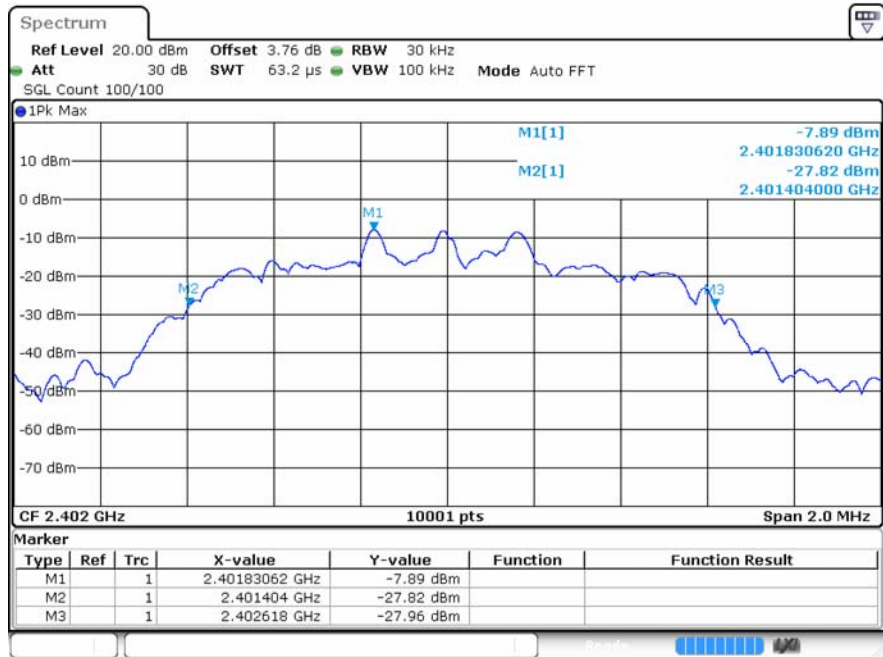


GFSK/HCH

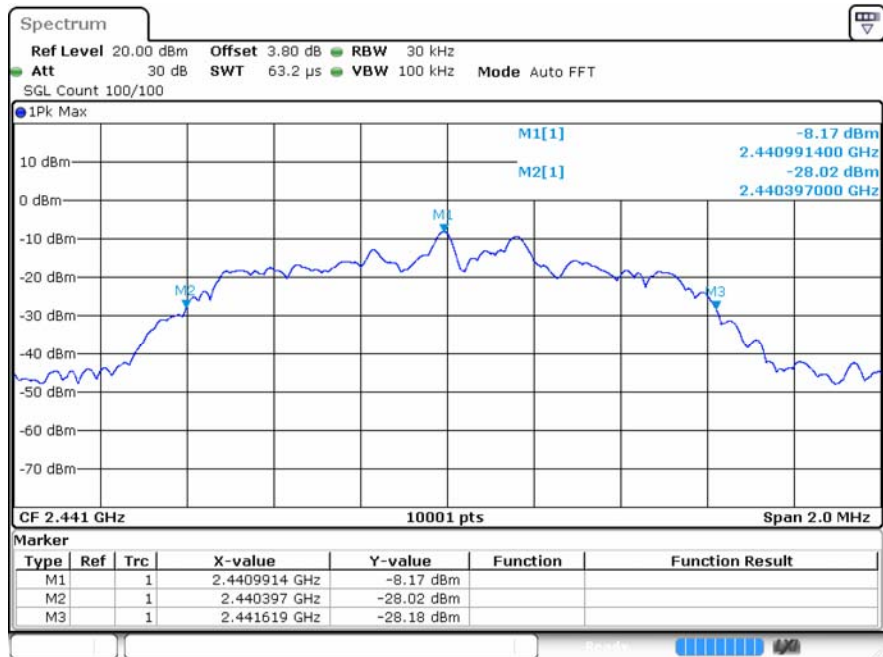

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


8DPSK/LCH



8DPSK/MCH





8DPSK/HCH

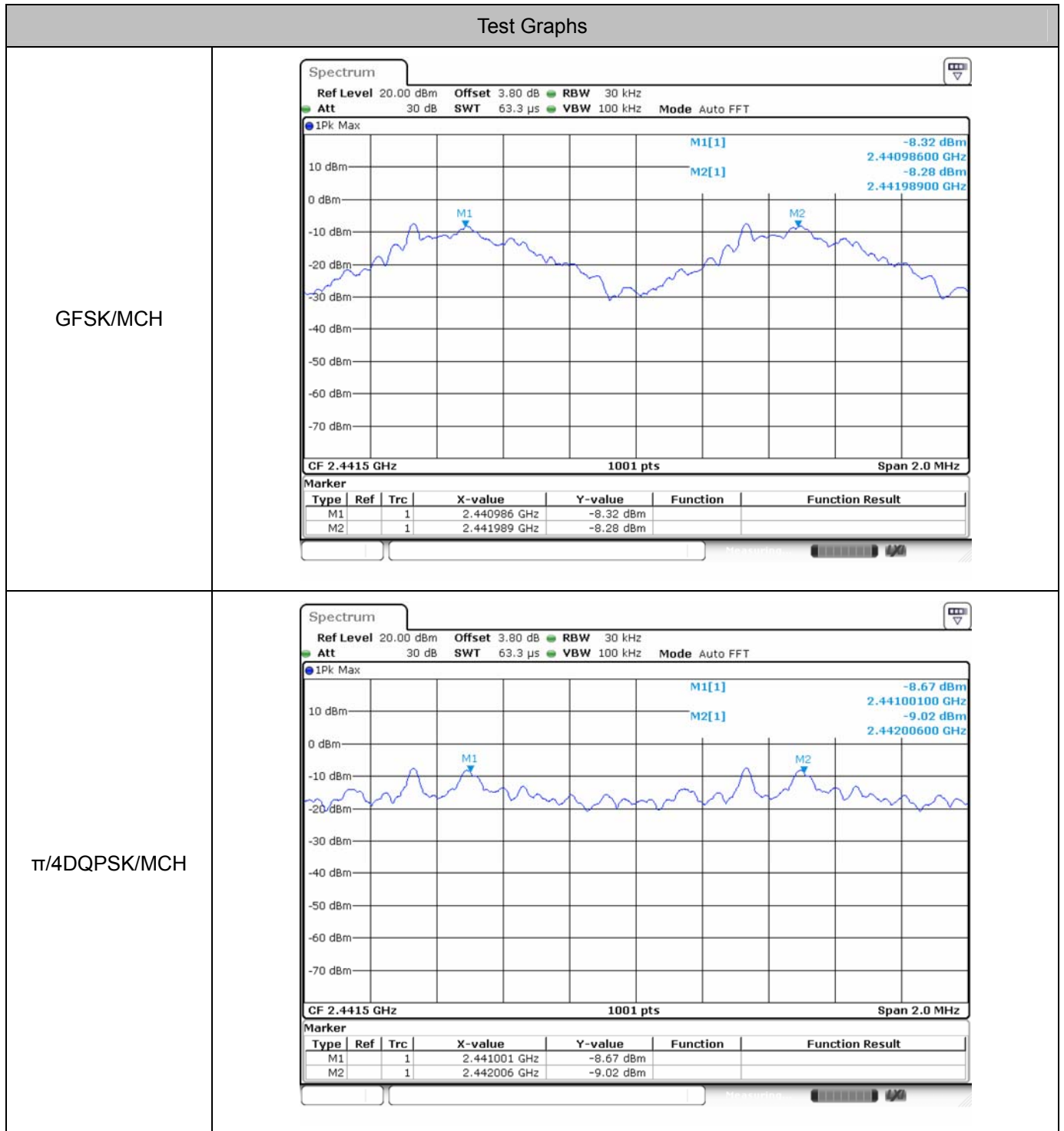


## 4 Carrier Frequency Separation

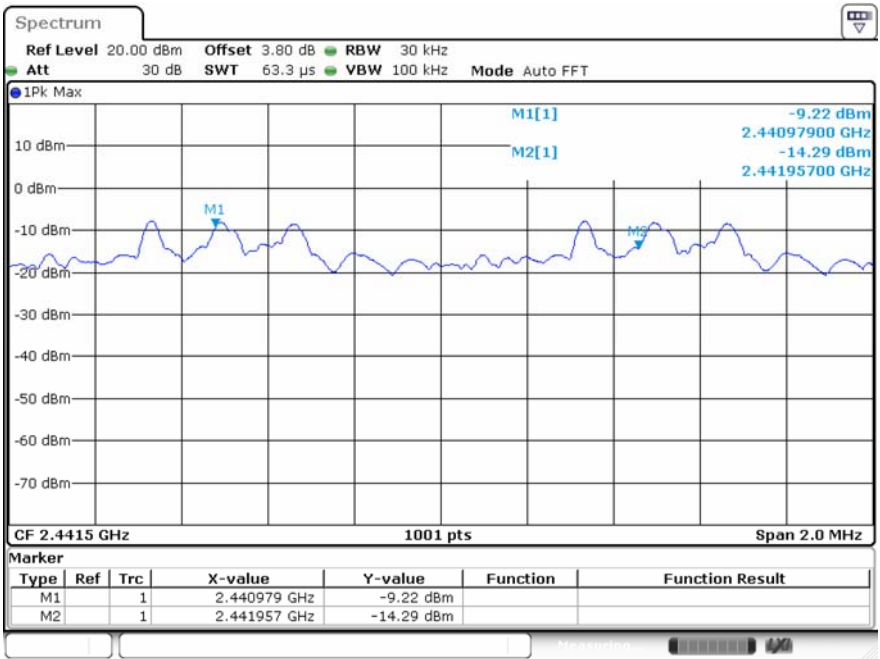
### 4.1 Test Result

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 1.003                              | 0.619       | Pass    |
| $\pi/4$ DQPSK | MCH      | 1.005                              | 0.815       | Pass    |
| 8DPSK         | MCH      | 0.978                              | 0.815       | Pass    |

## 4.2 Test Graphs



8DPSK/MCH

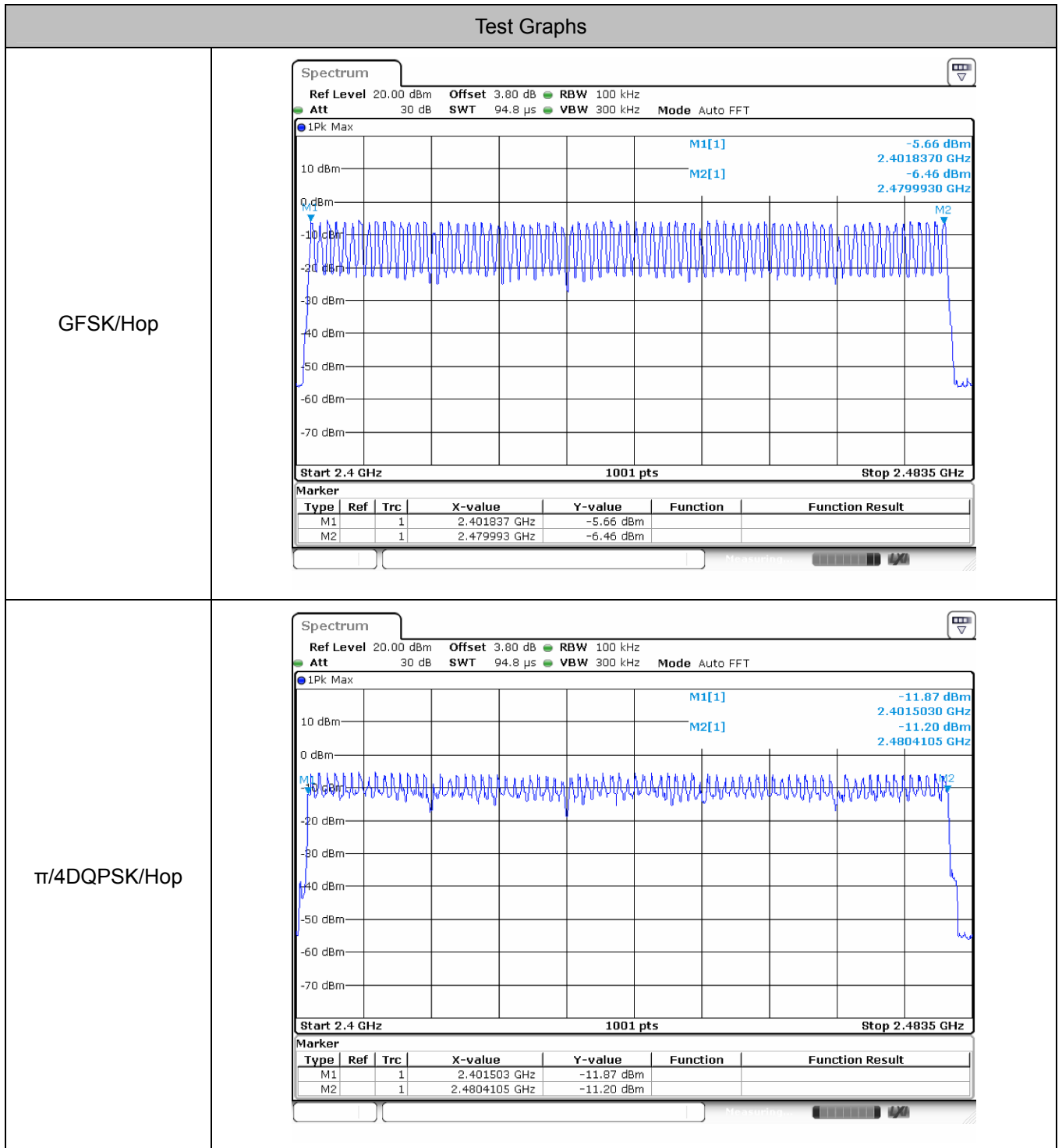


## 5 Hopping Channel Number

### 5.1 Test Result

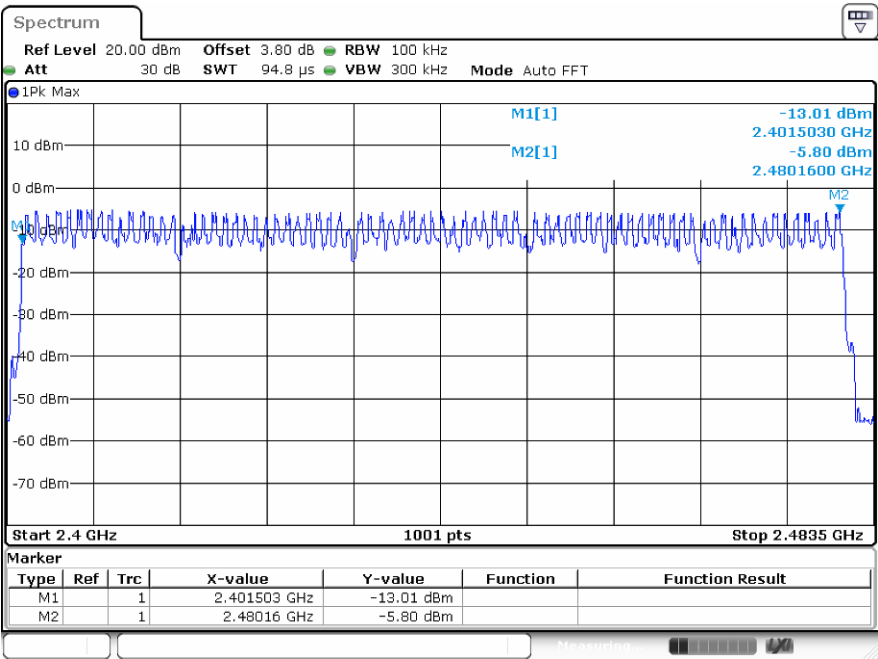
| Mode          | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK          | Hop      | 79                            | $\geq 15$ | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                    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

## 5.2 Test Graphs





8DPSK/Hop

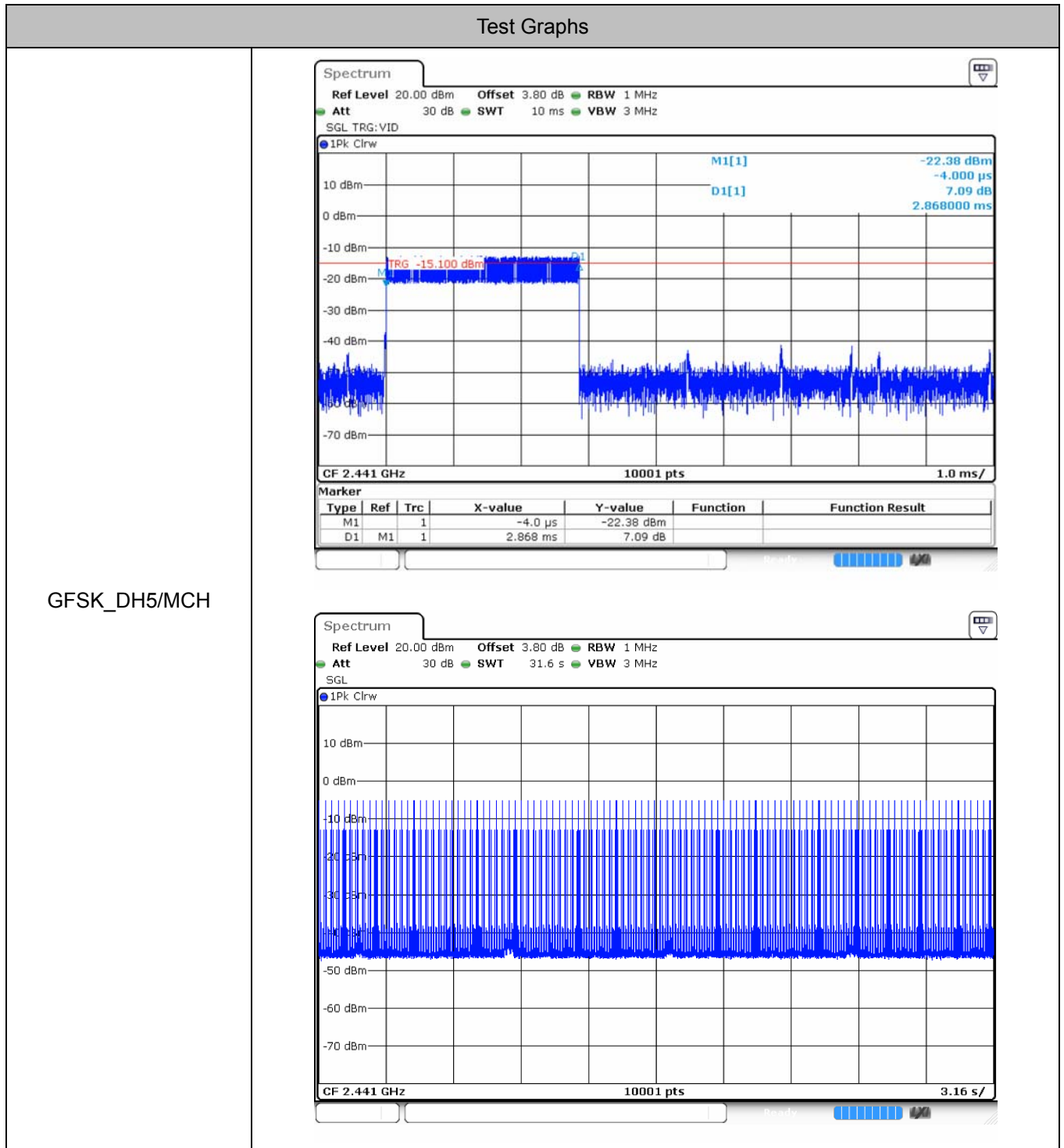


## 6 Dwell Time

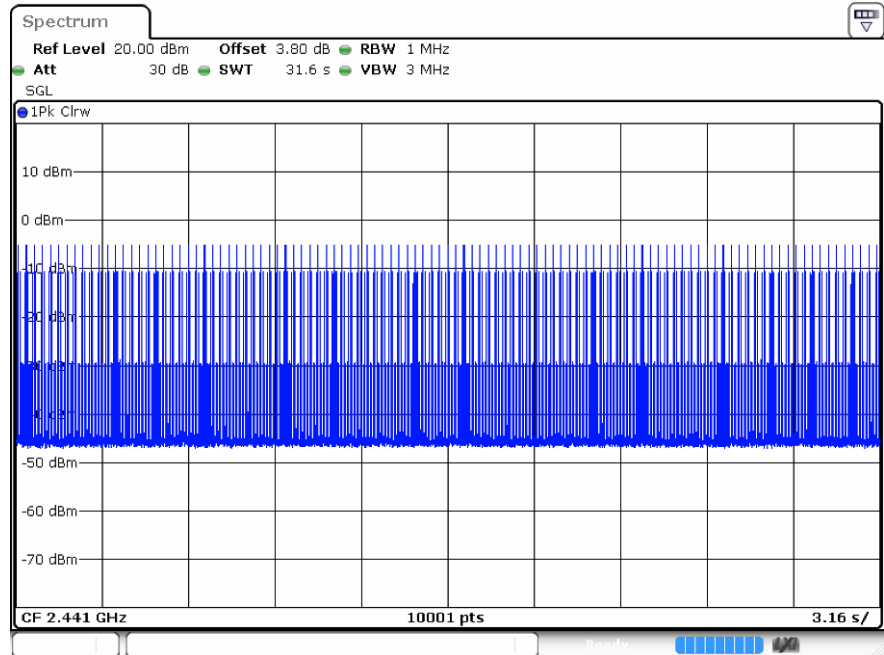
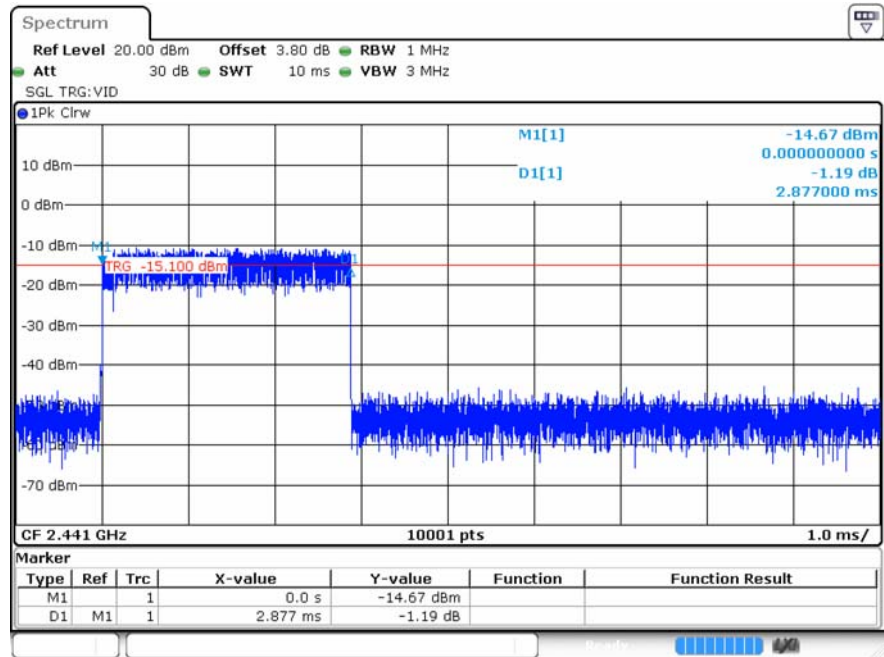
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.868                      | 107                   | 306.876        | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.877                      | 107                   | 307.839        | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.88                       | 106                   | 305.28         | 0.4       | Pass    |

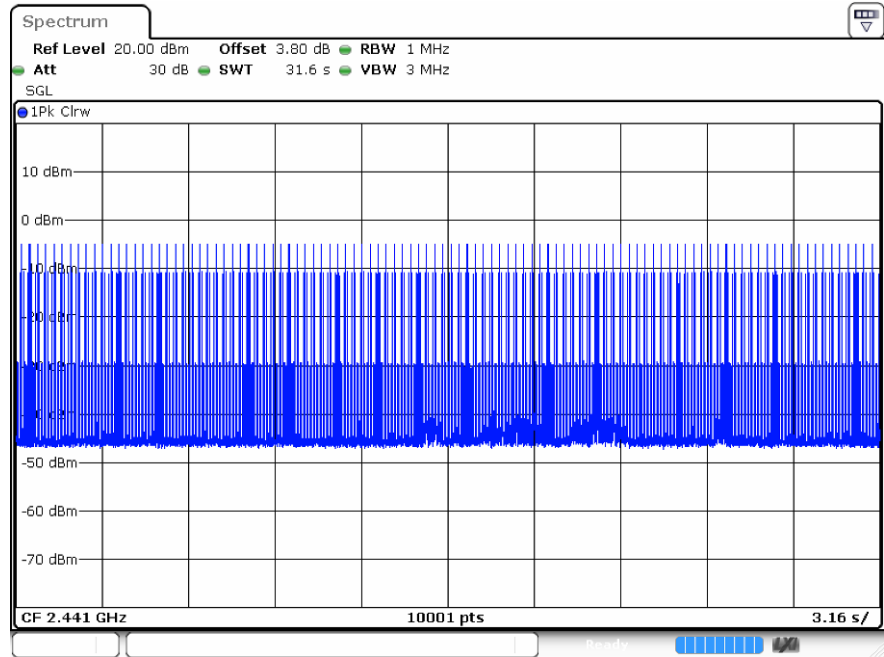
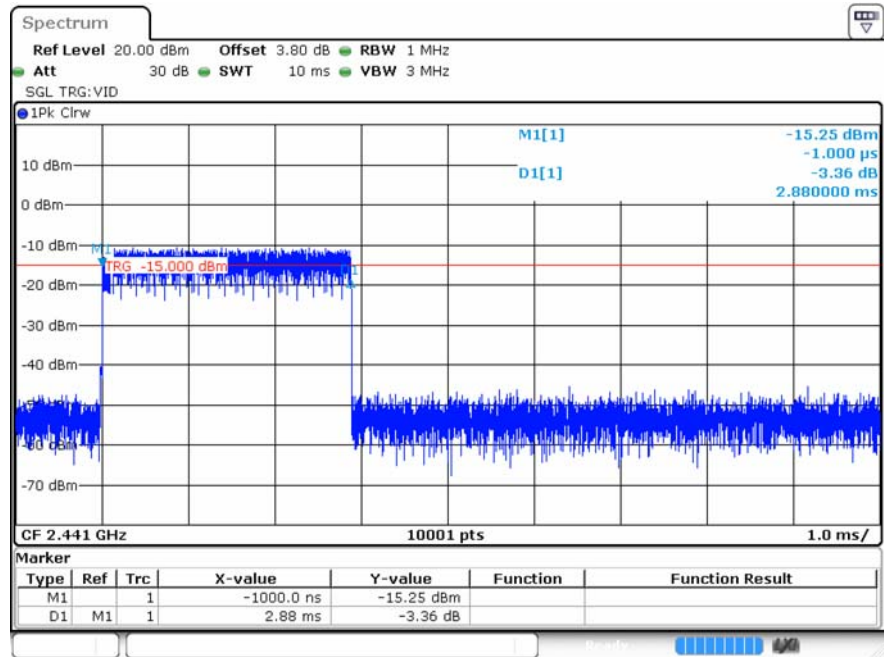
## 6.2 Test Graphs



$\pi/4$ DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH

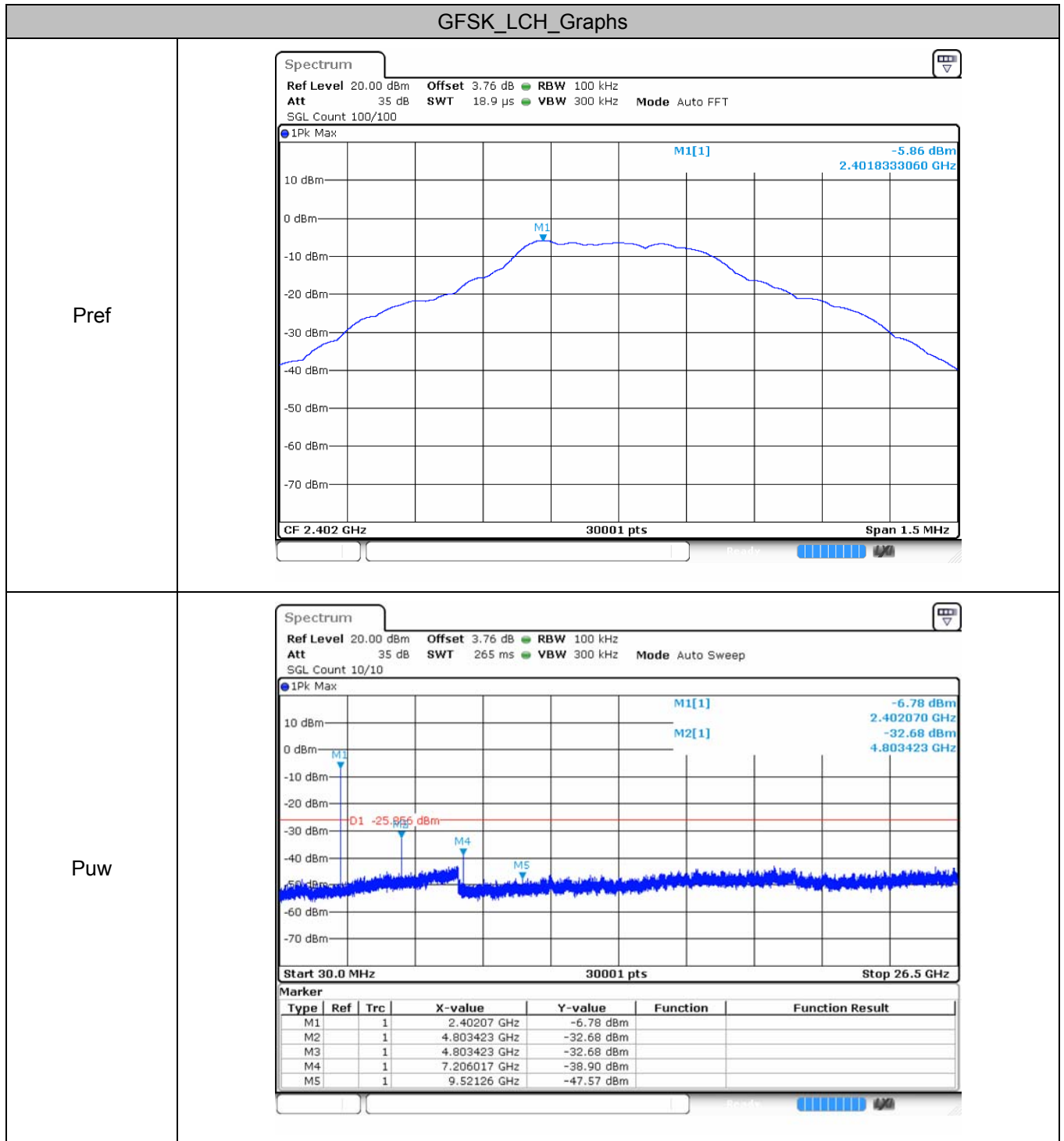


## 7 RF Conducted Spurious Emissions

### 7.1 Test Result

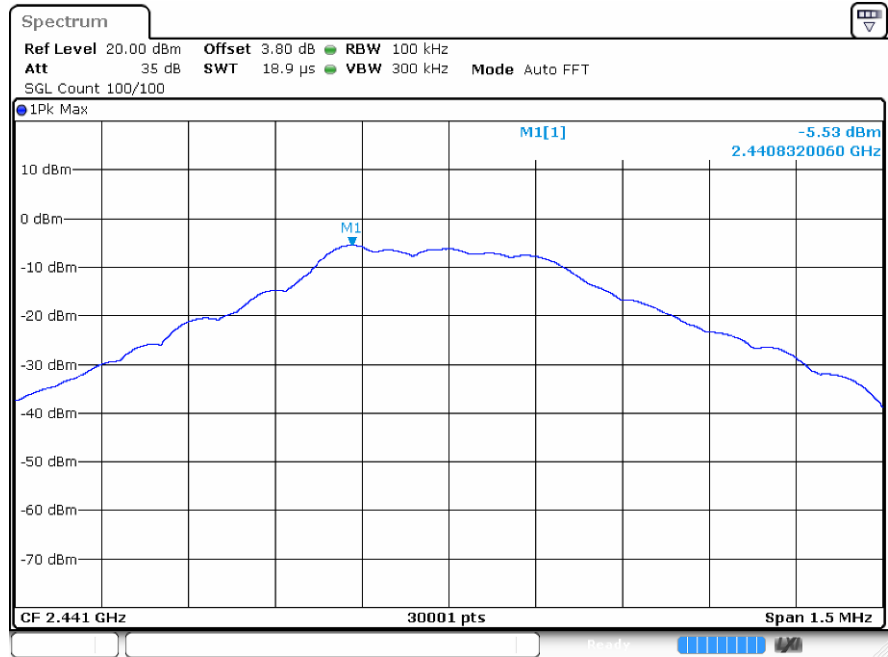
| Mode          | Channel | Max. Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|------------------|-------------|---------|
| GFSK          | LCH     | -26.82           | -20         | Pass    |
|               | MCH     | -28.8            | -20         | Pass    |
|               | HCH     | -29.75           | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -23.18           | -20         | Pass    |
|               | MCH     | -29.76           | -20         | Pass    |
|               | HCH     | -28.19           | -20         | Pass    |
| 8DPSK         | LCH     | -31.33           | -20         | Pass    |
|               | MCH     | -29.91           | -20         | Pass    |
|               | HCH     | -32.49           | -20         | Pass    |

## 7.2 Test Graphs

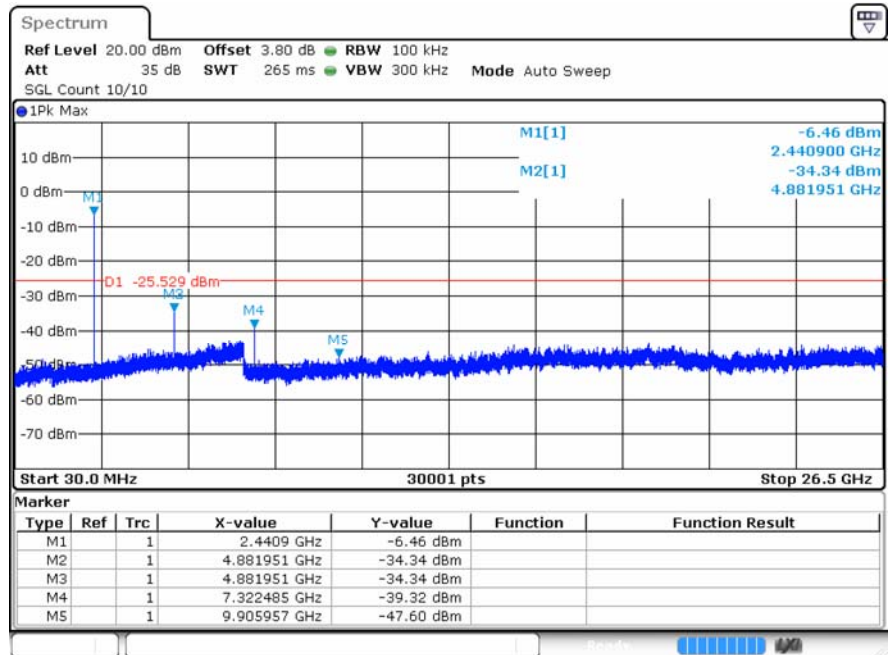


## GFSK\_MCH\_Graphs

Pref

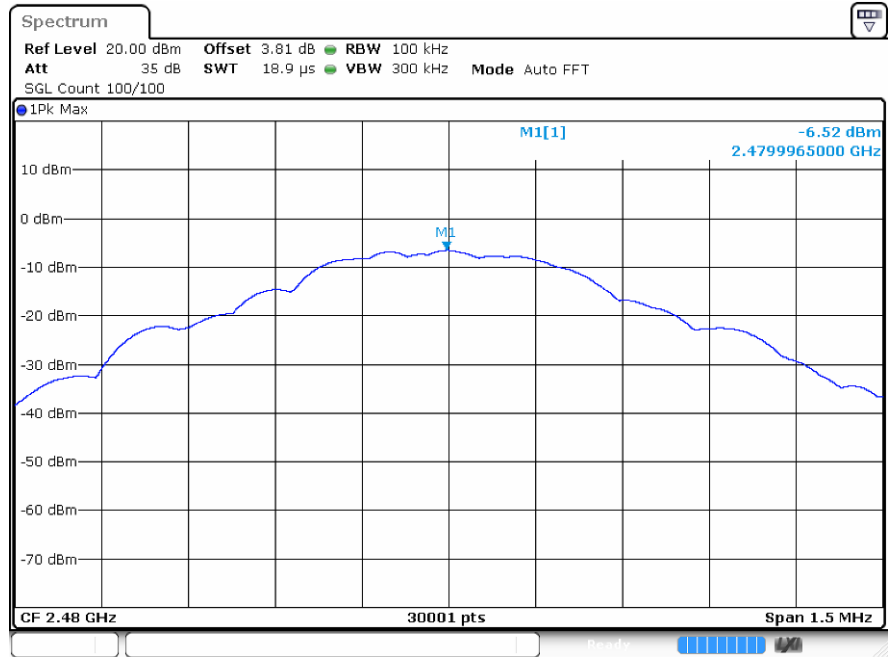


Puw

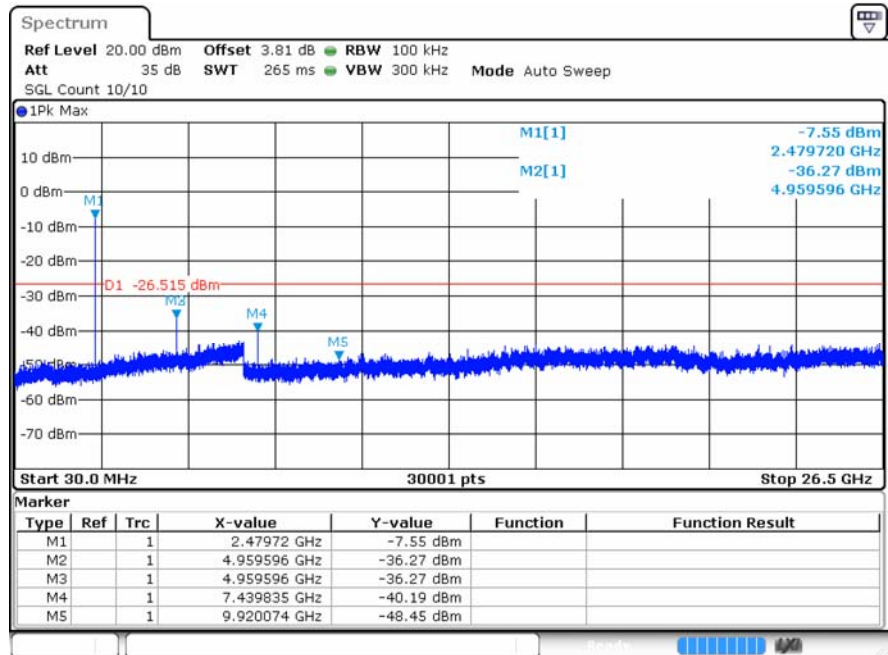


## GFSK\_HCH\_Graphs

Pref

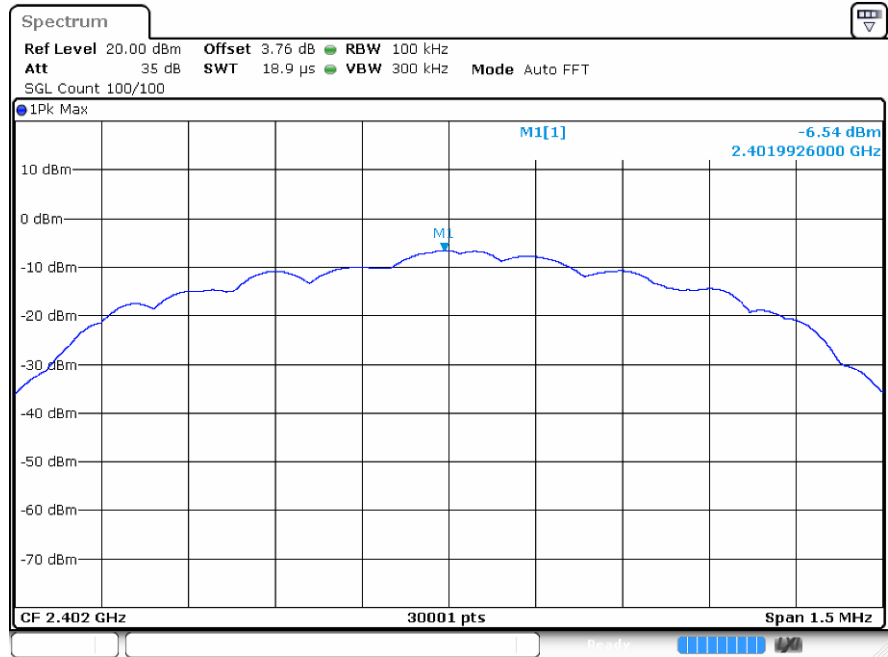


Puw

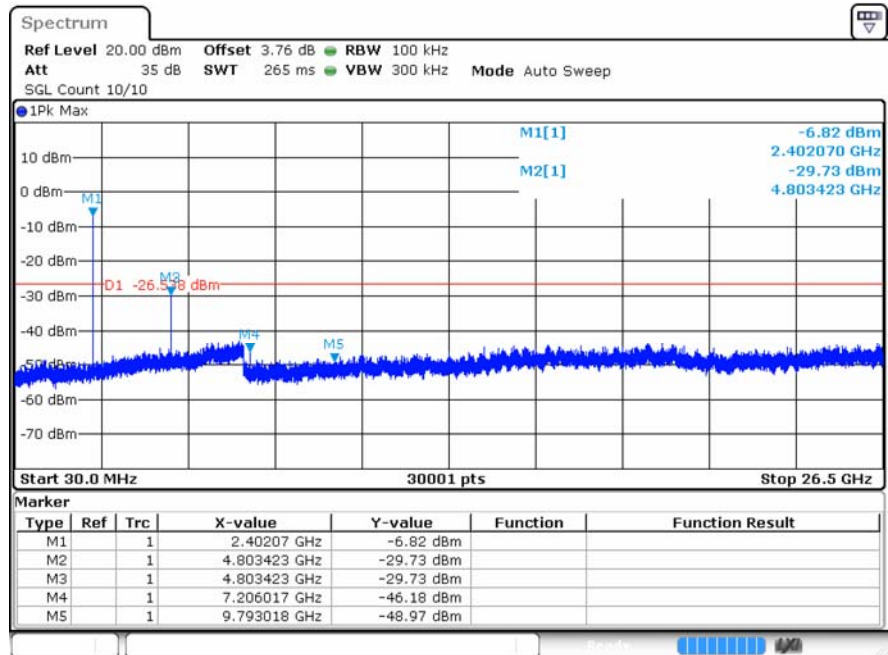


# $\pi/4$ DQPSK\_LCH\_Graphs

Pref

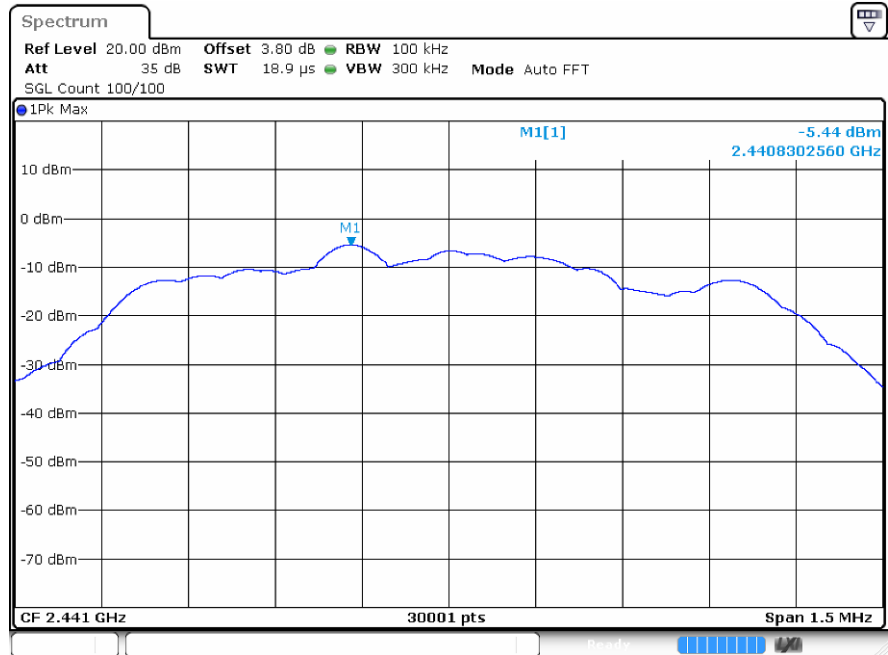


Puw

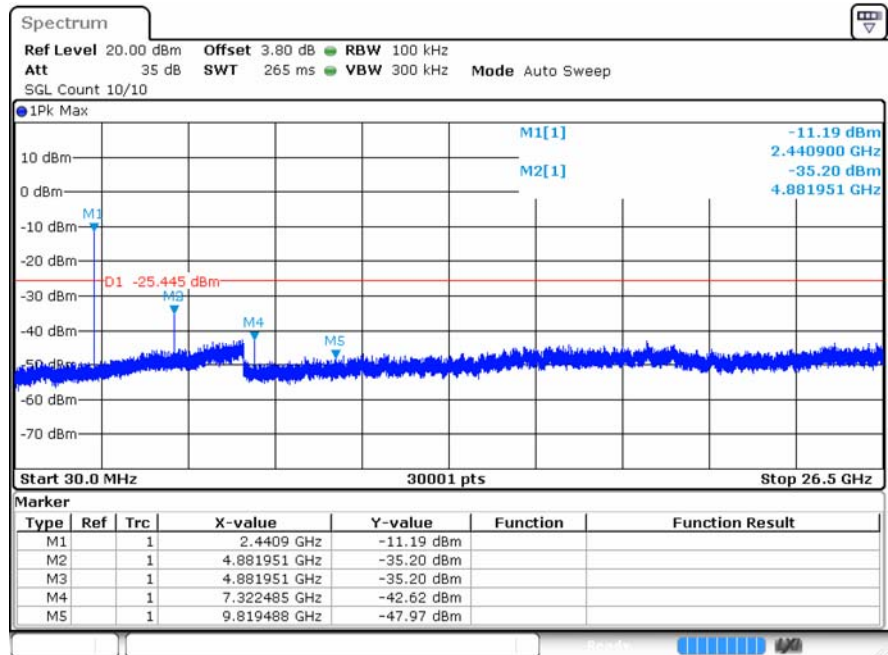


# $\pi/4$ DQPSK\_MCH\_Graphs

Pref

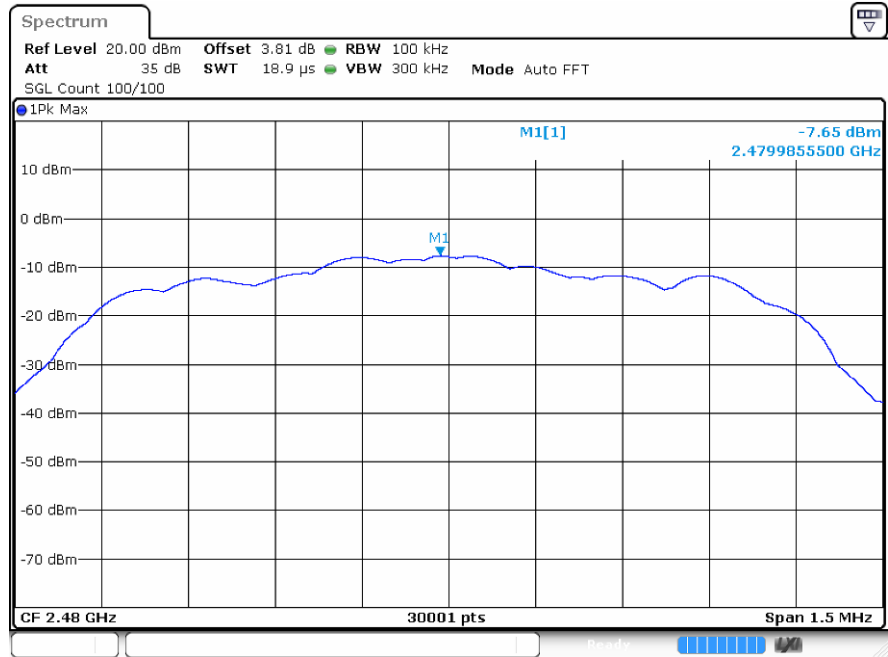


Puw

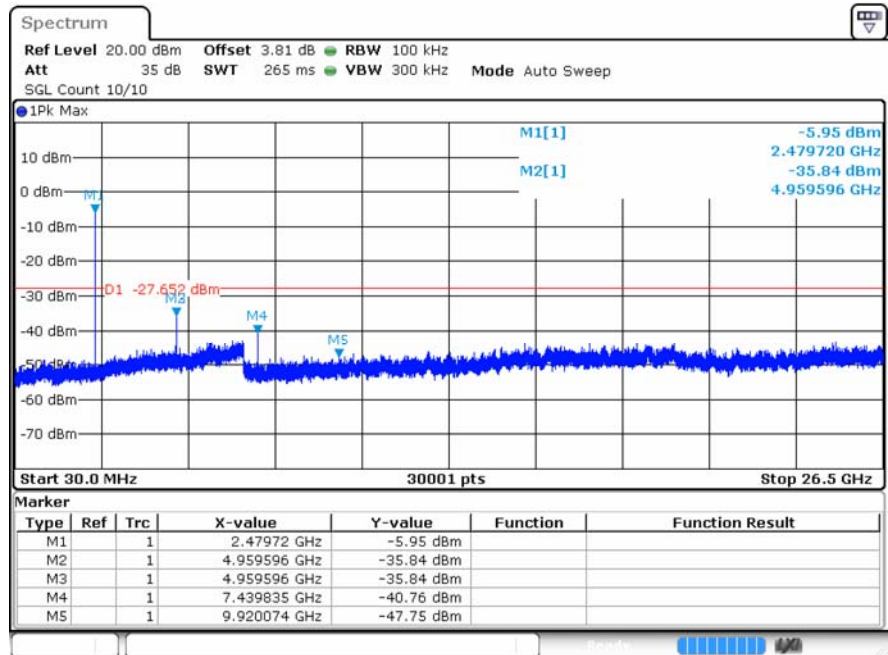


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref

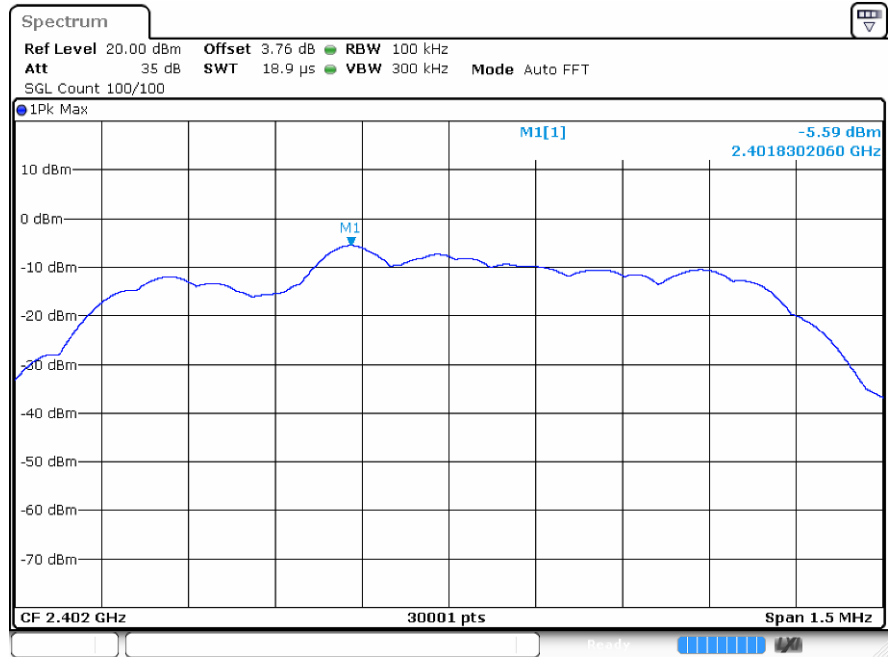


Puw

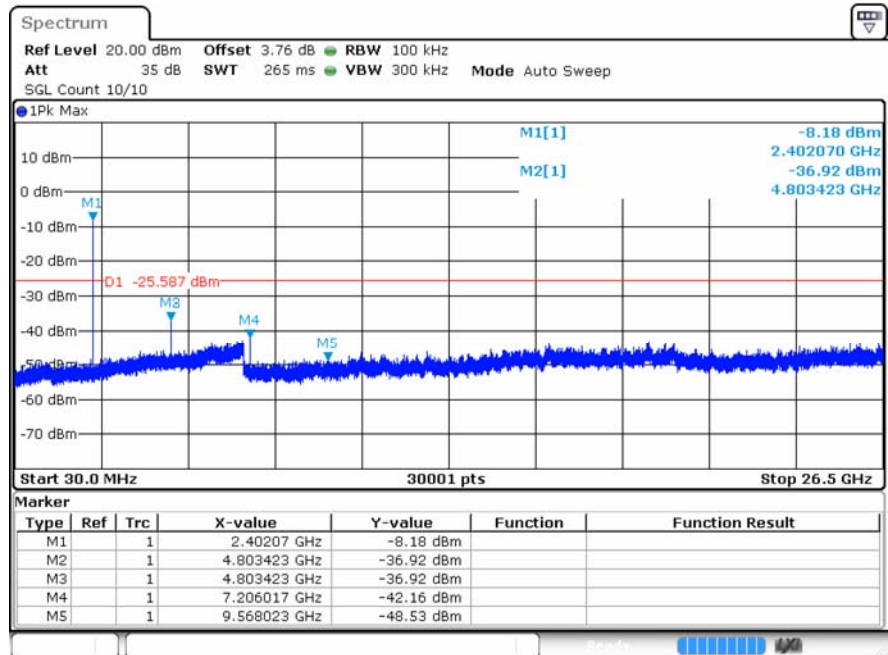


## 8DPSK\_LCH\_Graphs

Pref

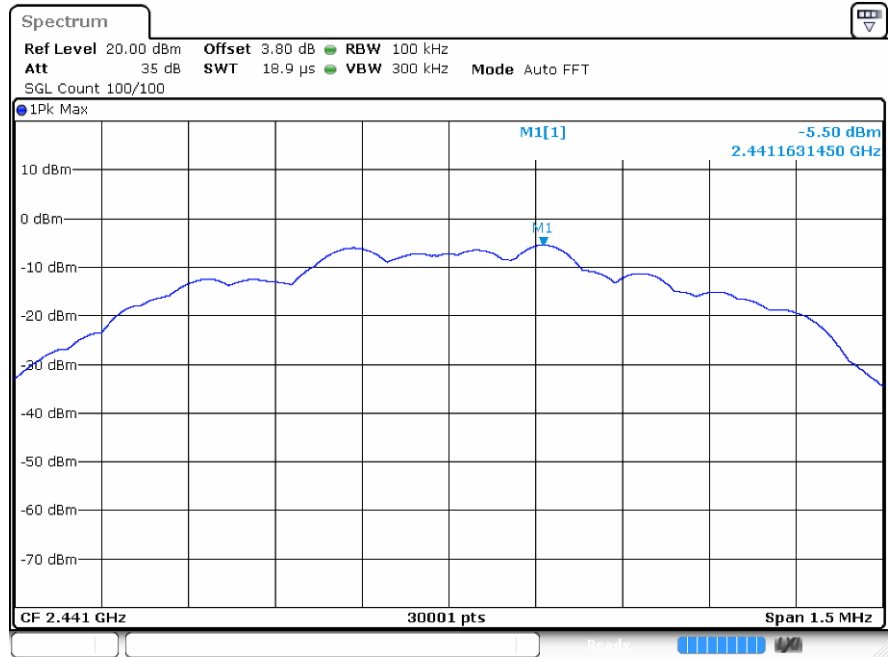


Puw

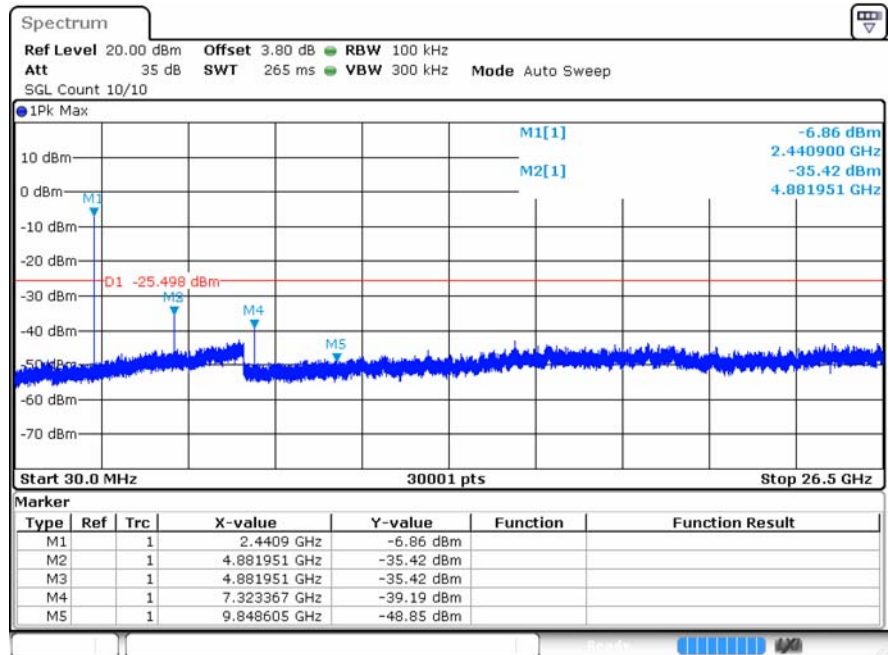


## 8DPSK\_MCH\_Graphs

Pref

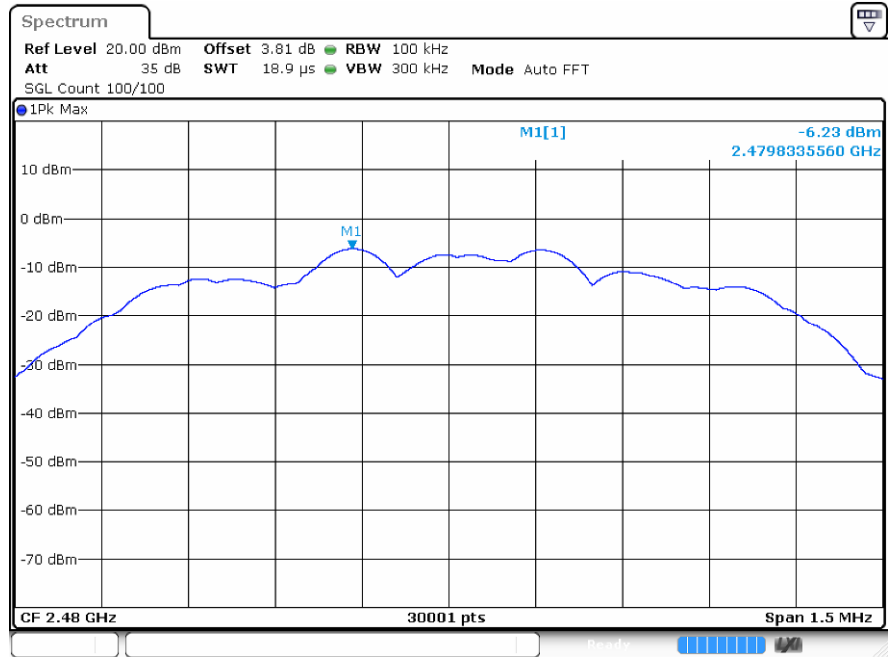


Puw

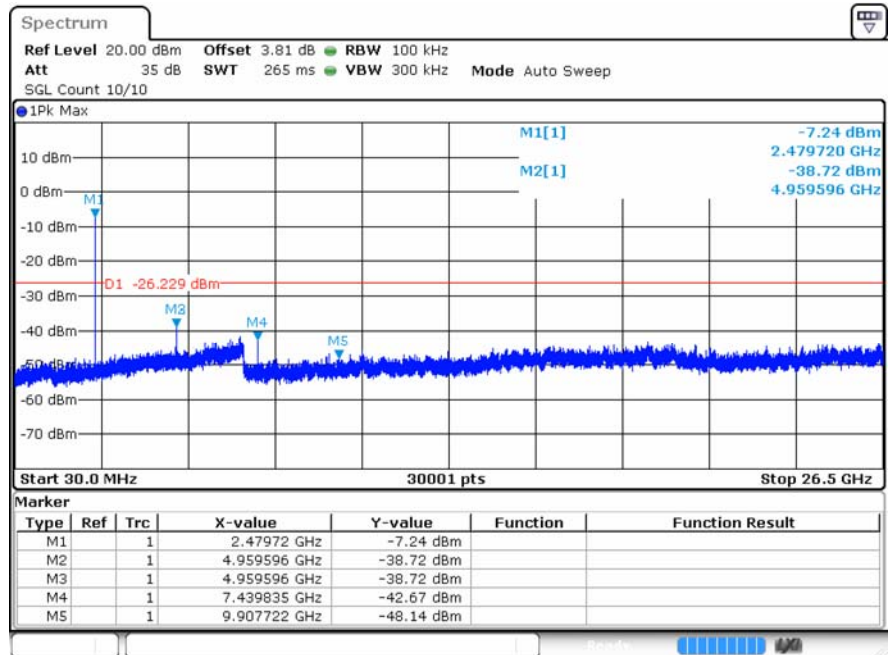


## 8DPSK\_HCH\_Graphs

Pref



Puw

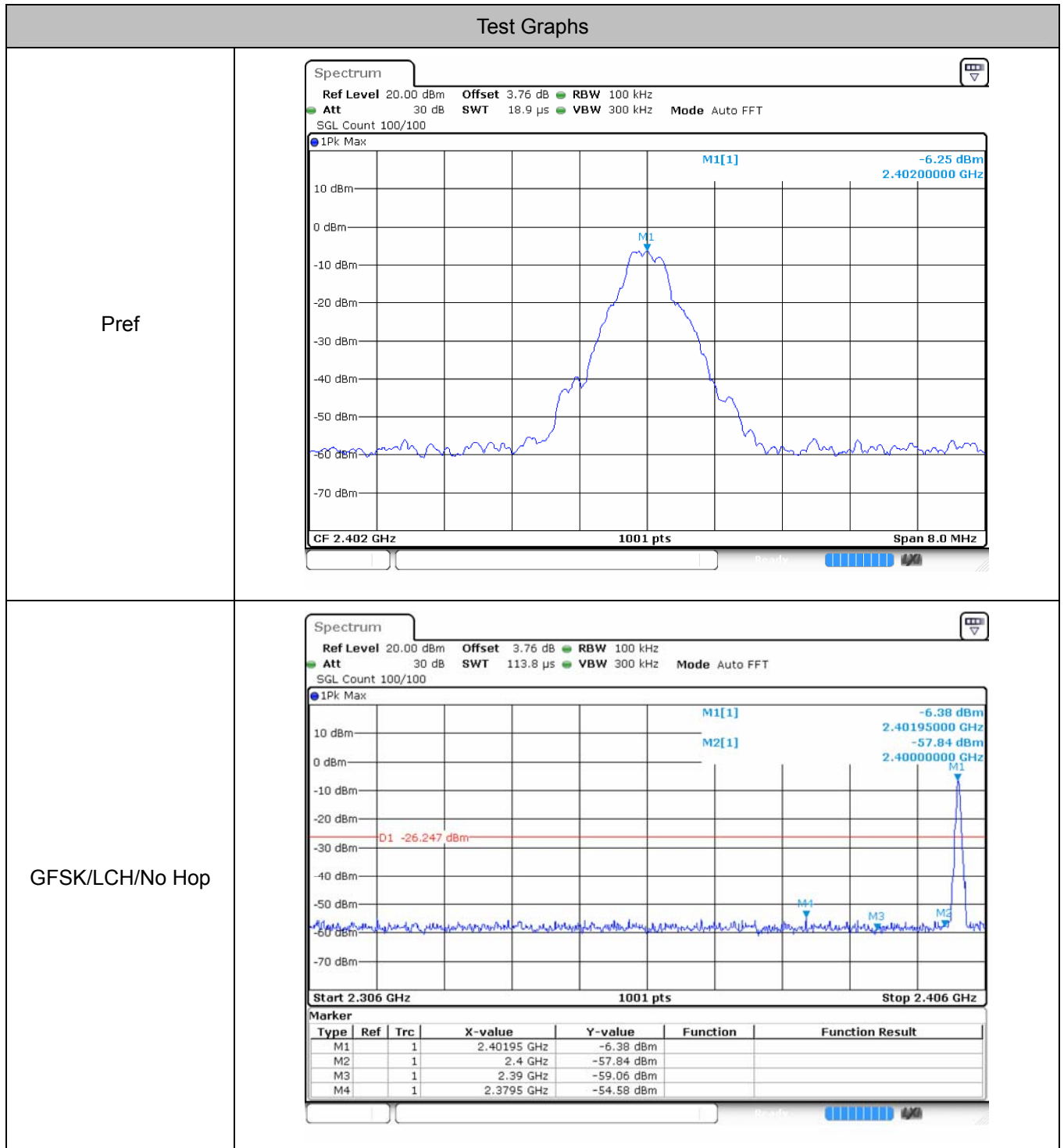


## 8 Band-edge for RF Conducted Emissions

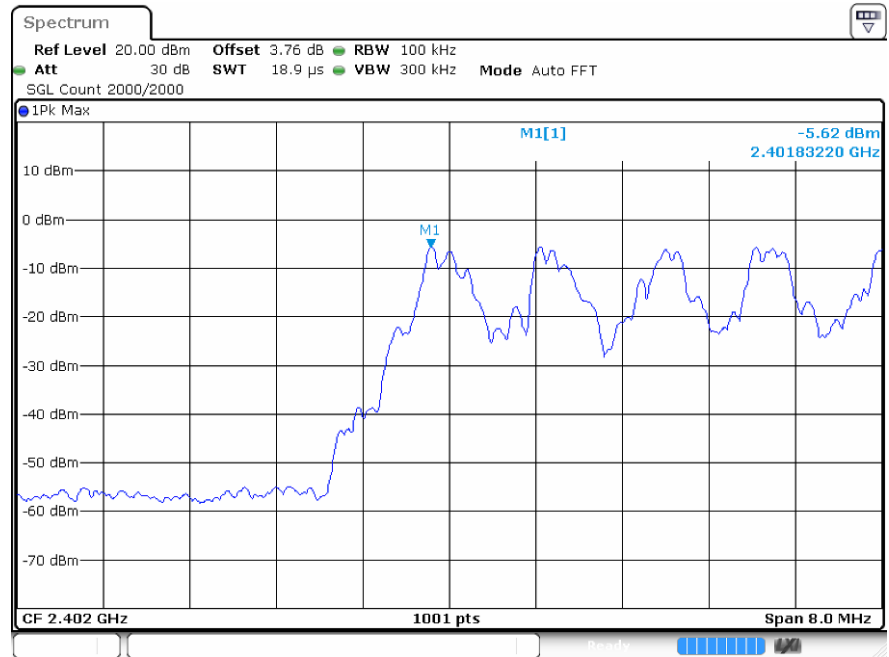
### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -48.32                   | -20         | Pass    |
|               |         |                         | On                | -47.9                    | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -48.67                   | -20         | Pass    |
|               |         |                         | On                | -47.78                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -49.06                   | -20         | Pass    |
|               |         |                         | On                | -48.09                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -47.81                   | -20         | Pass    |
|               |         |                         | On                | -48                      | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -48.4                    | -20         | Pass    |
|               |         |                         | On                | -47.43                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -49.39                   | -20         | Pass    |
|               |         |                         | On                | -48.33                   | -20         | Pass    |

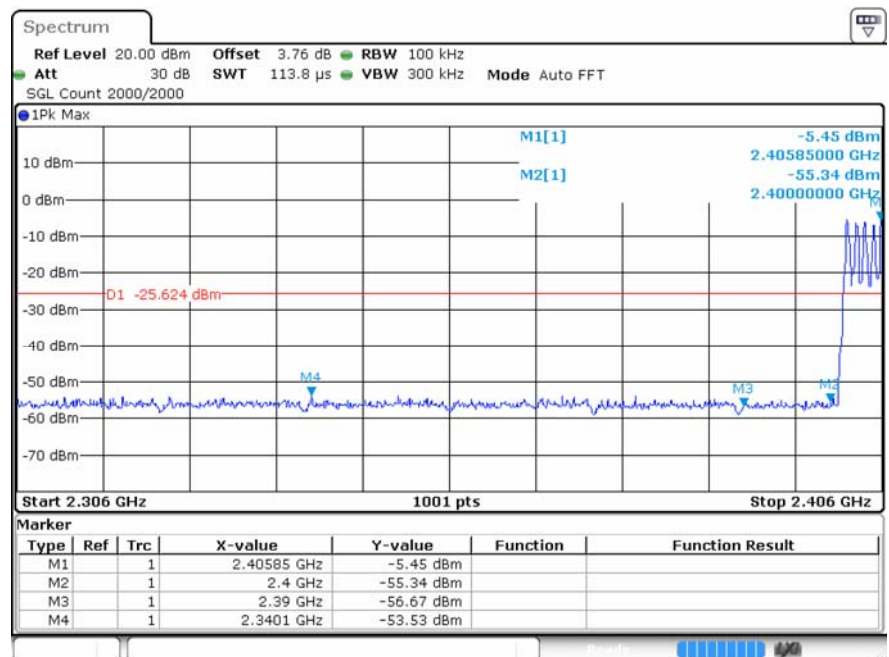
## 8.2 Test Graphs



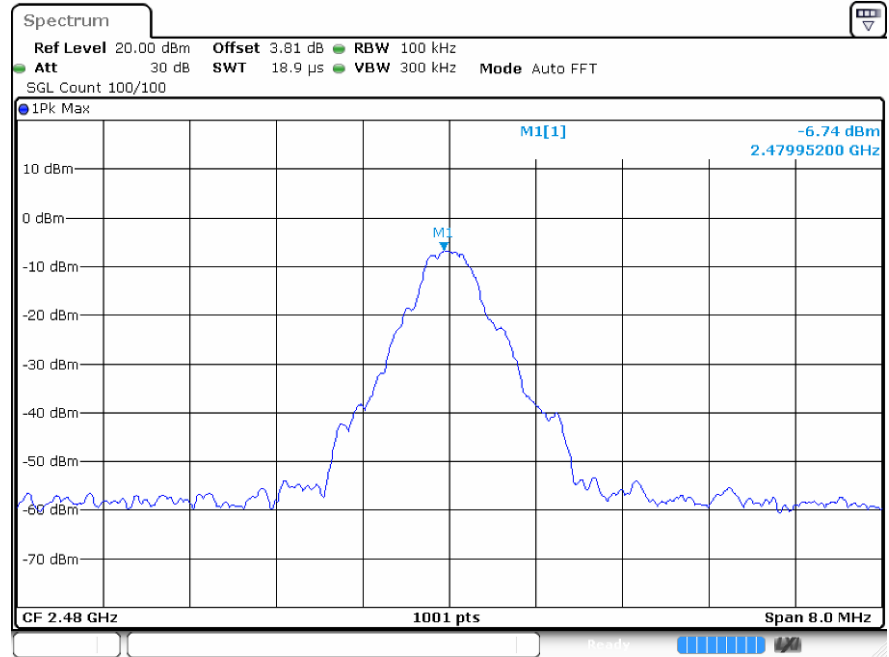
Ref



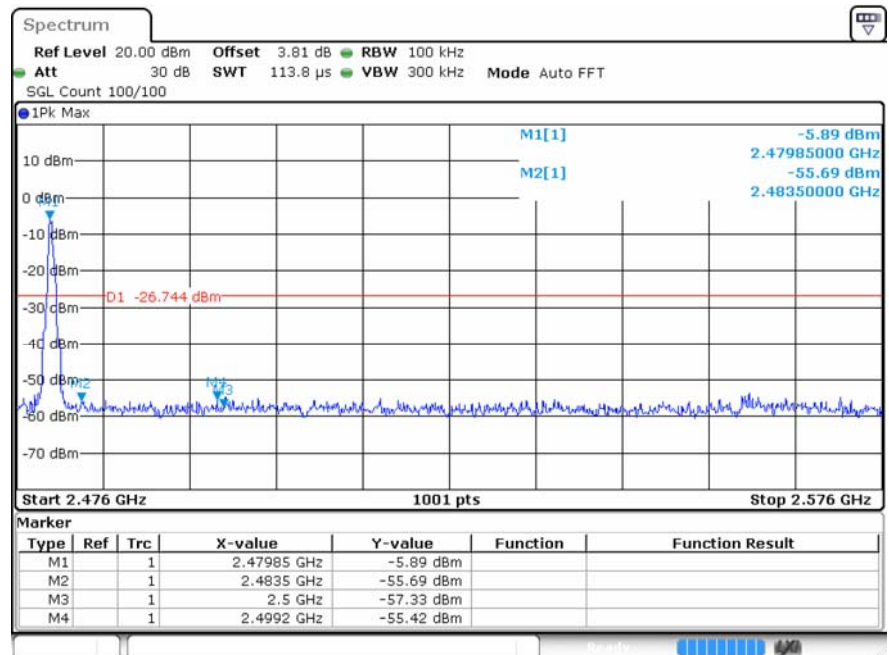
GFSK/LCH/Hop



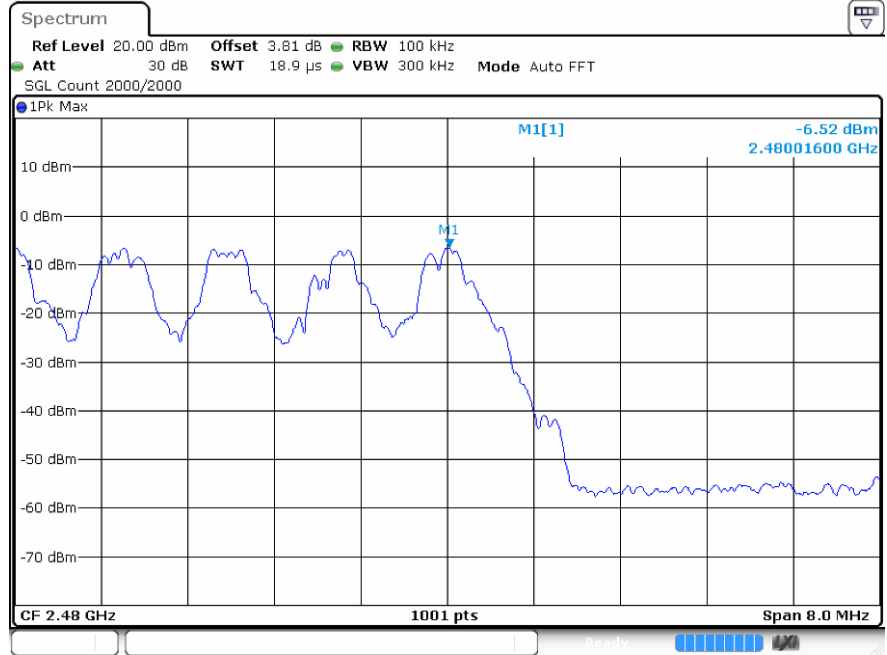
Ref



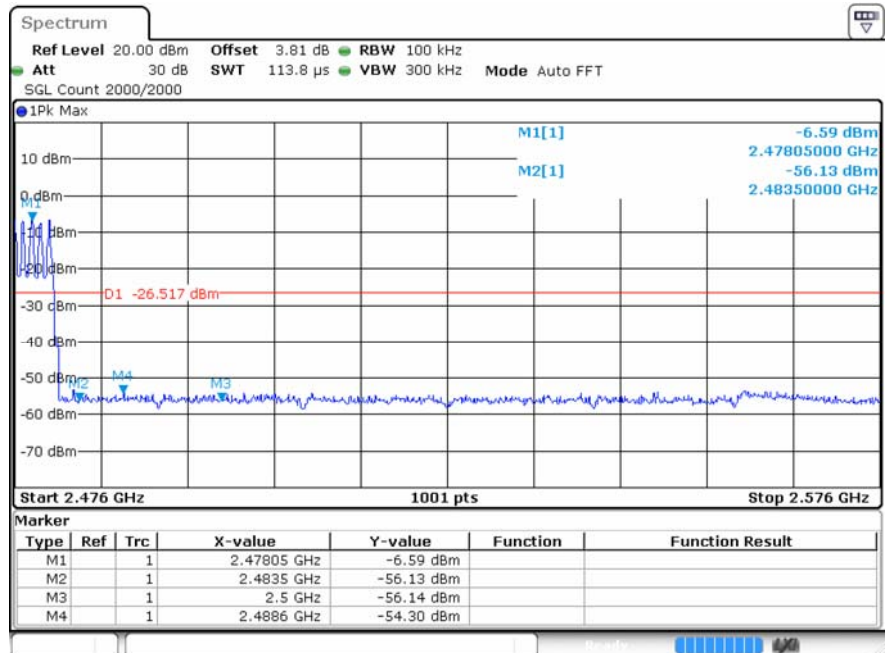
GFSK/HCH/No Hop



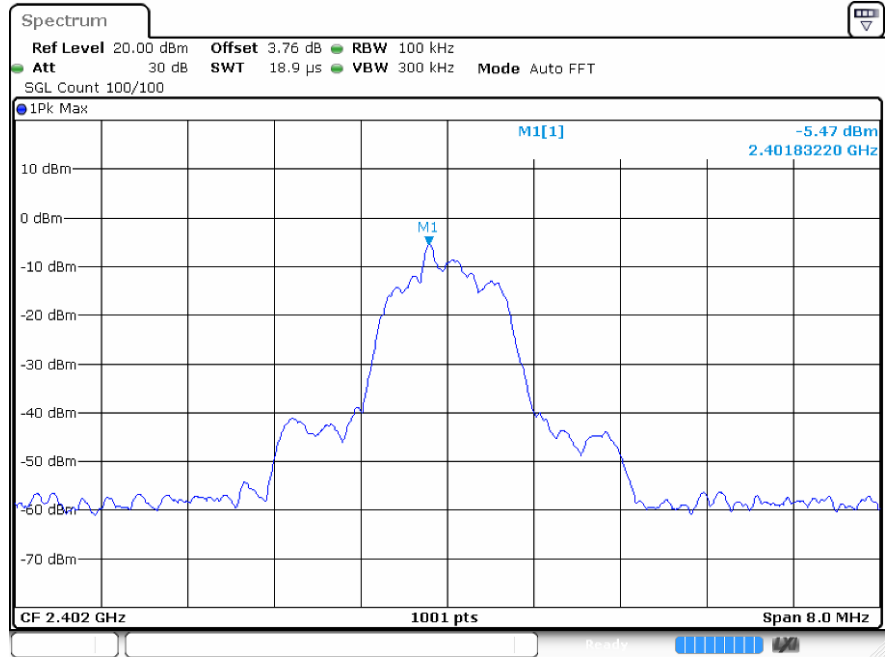
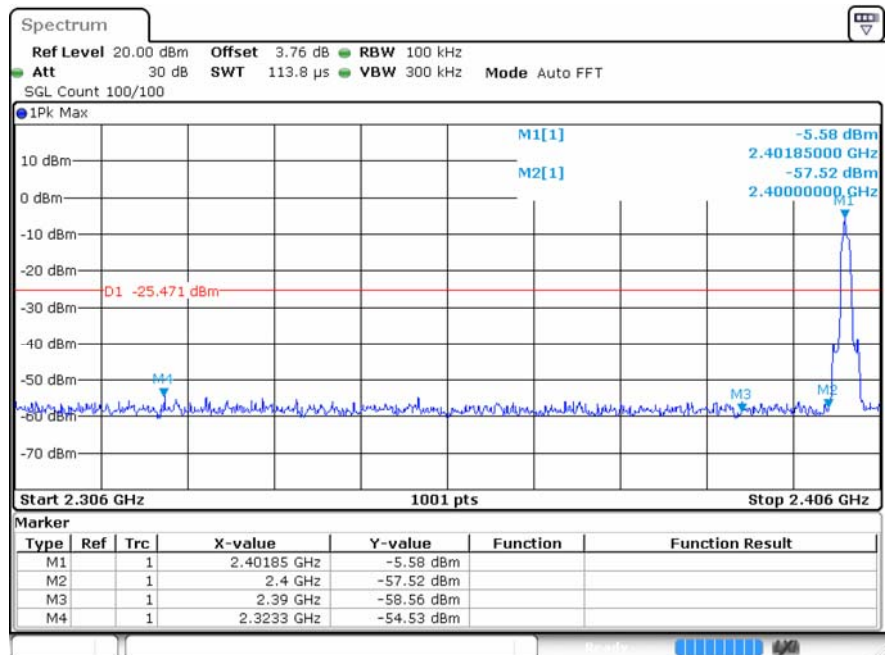
Ref.



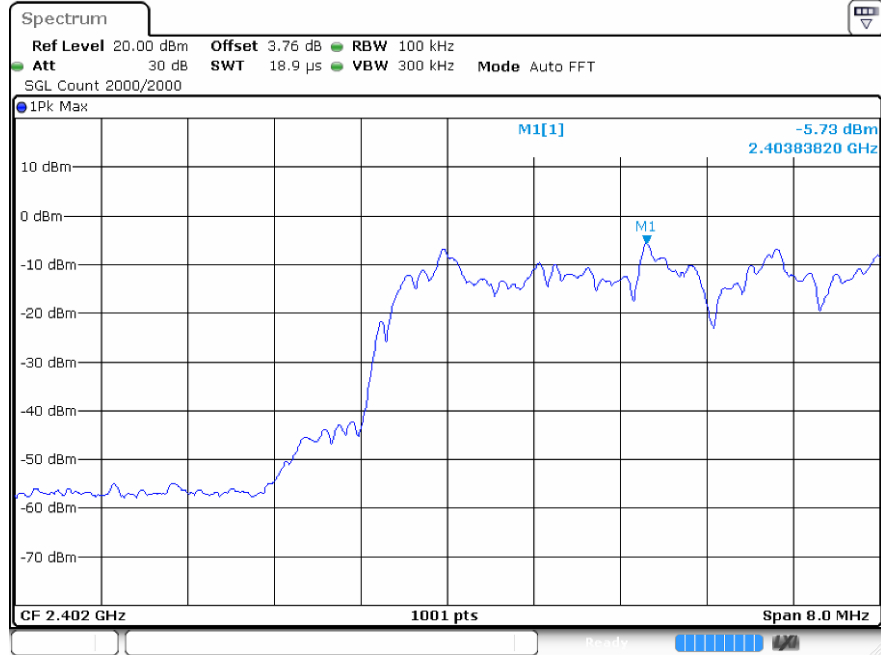
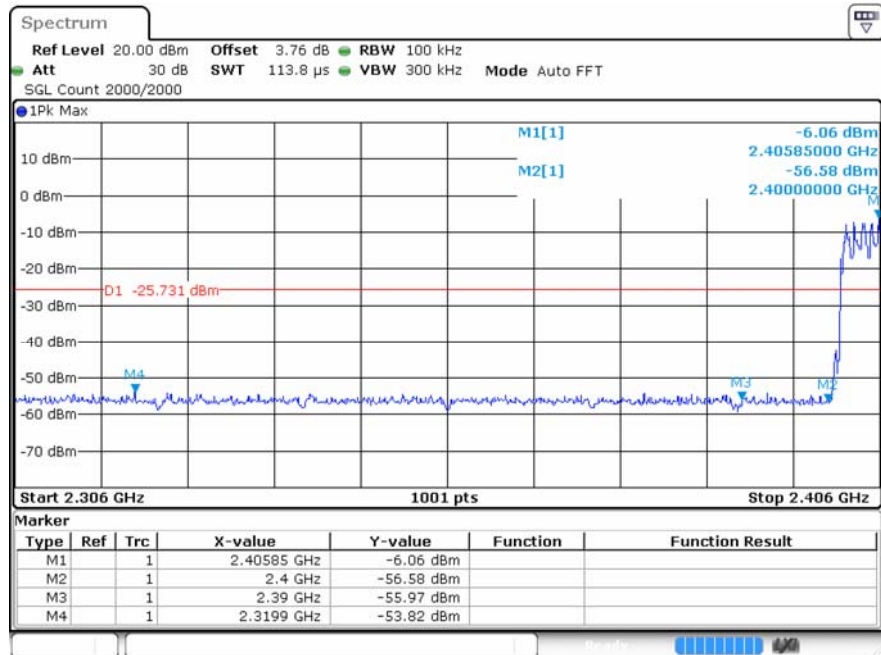
GFSK/HCH/Hop



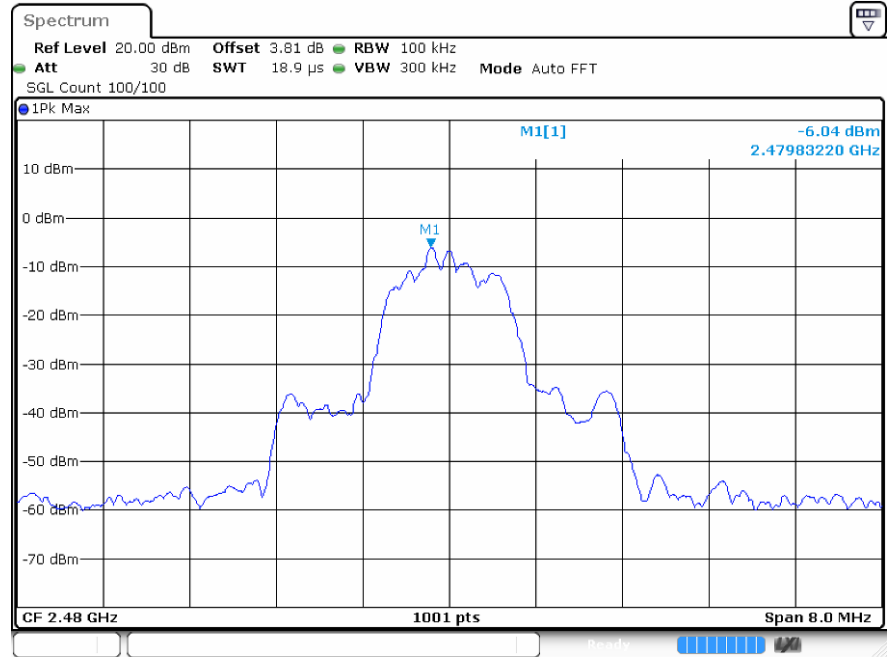
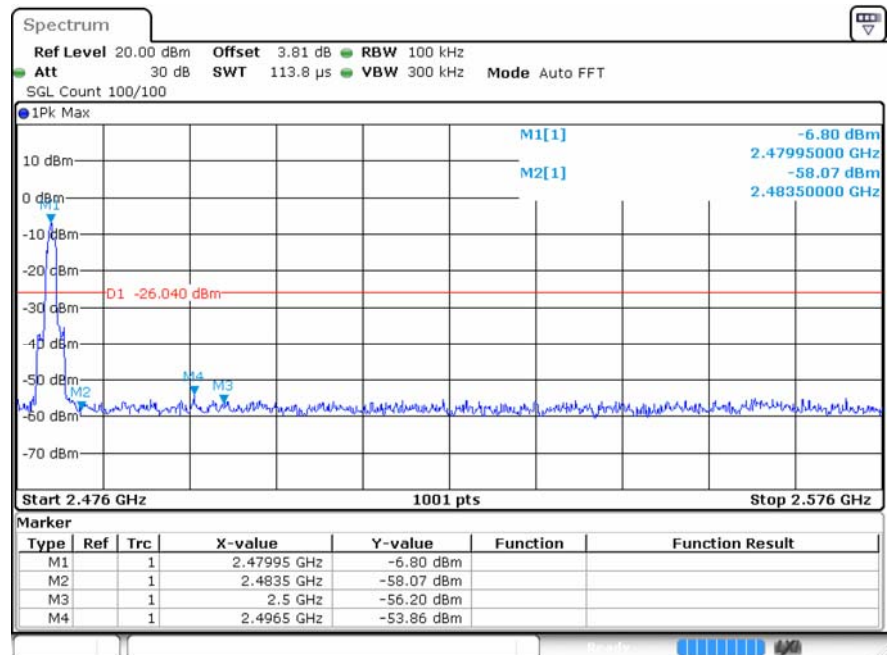
Ref


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


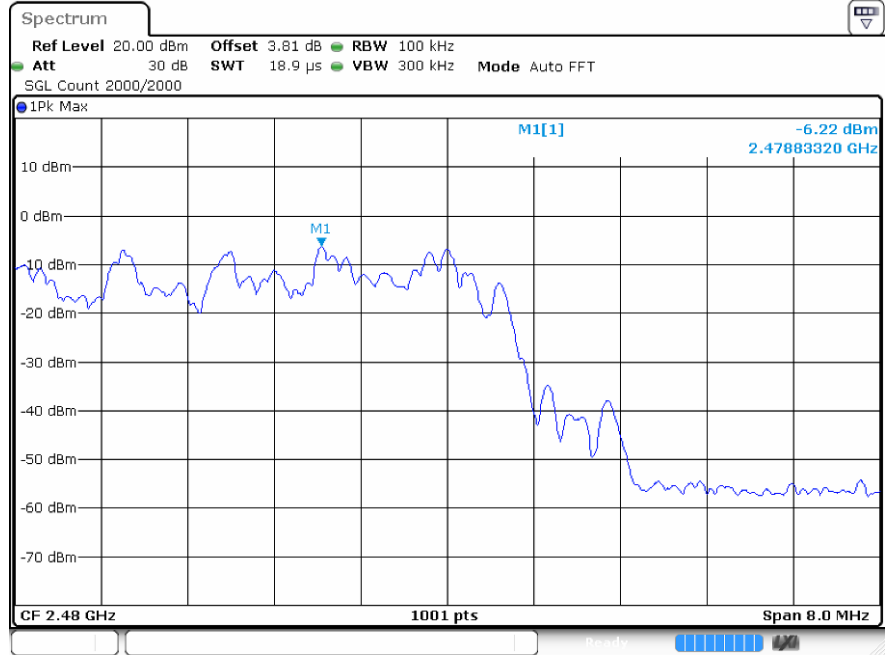
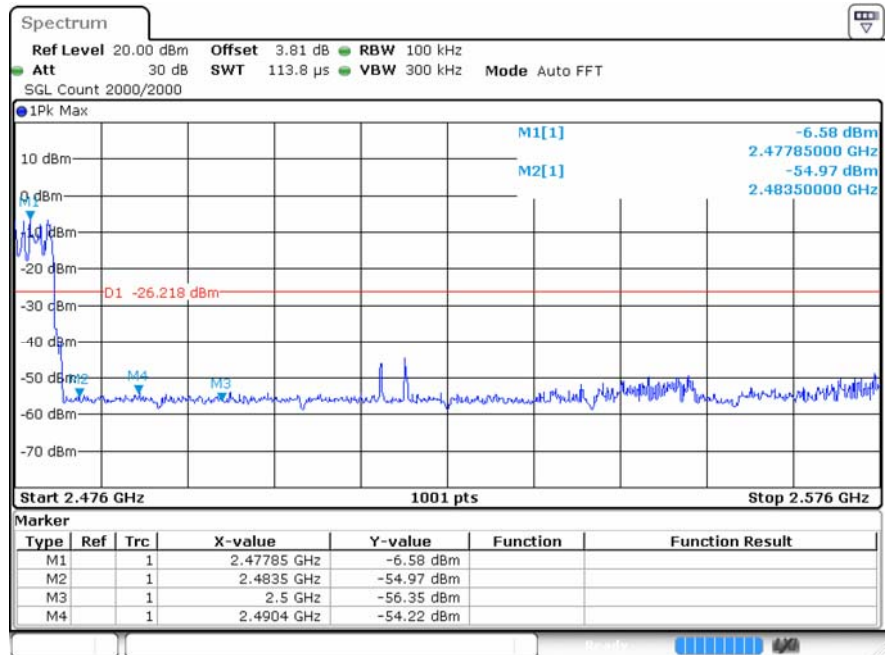
Ref


 $\pi/4$ DQPSK/LCH/Hop


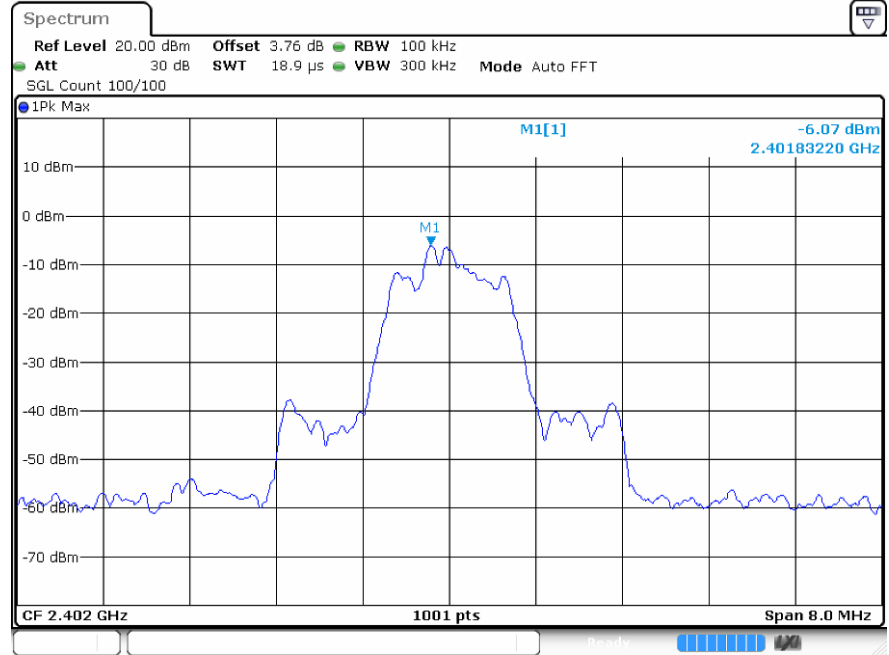
Ref


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


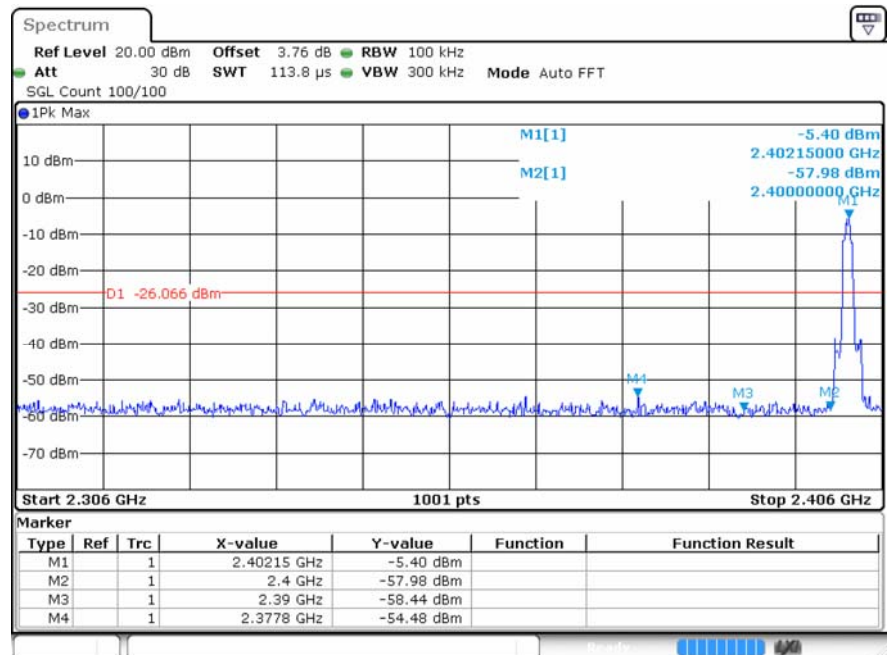
Ref


 $\pi/4$ DQPSK/HCH/Hop


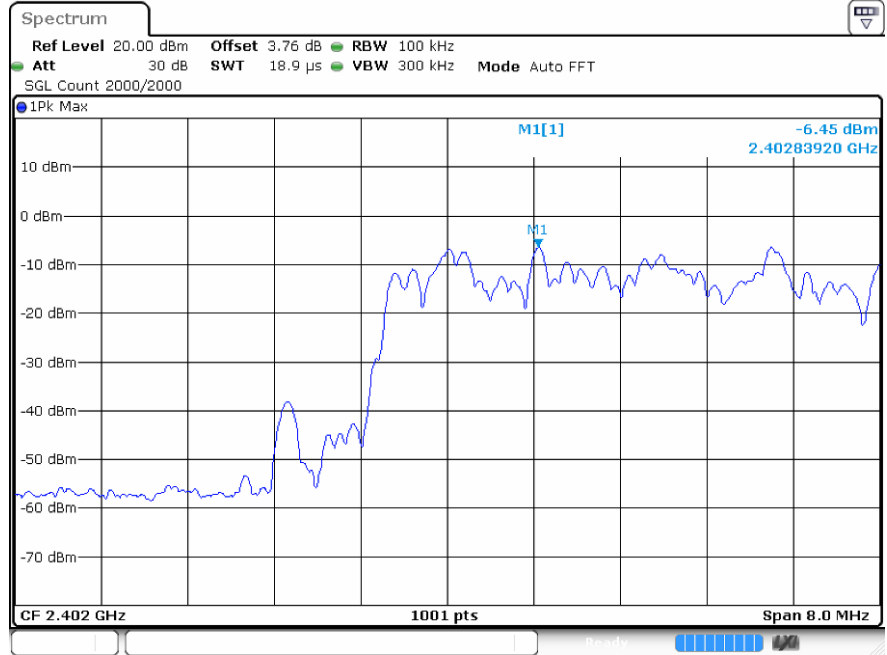
Ref



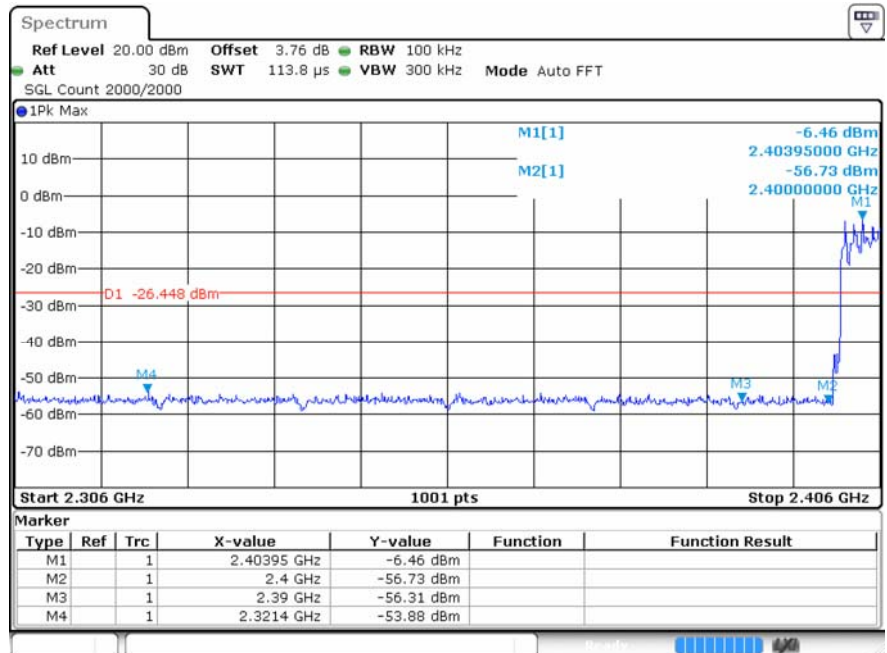
8DPSK/LCH/No Hop



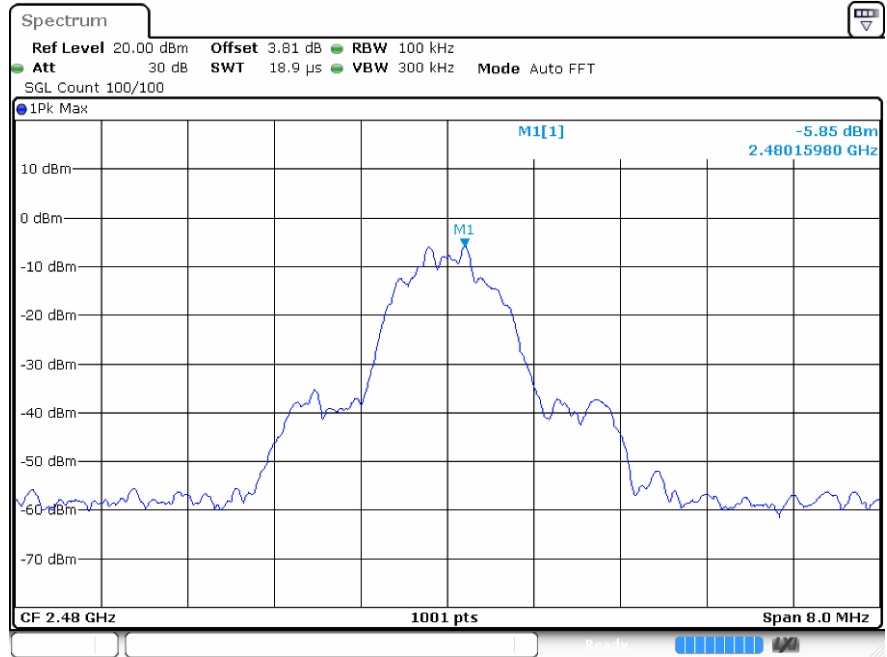
Ref



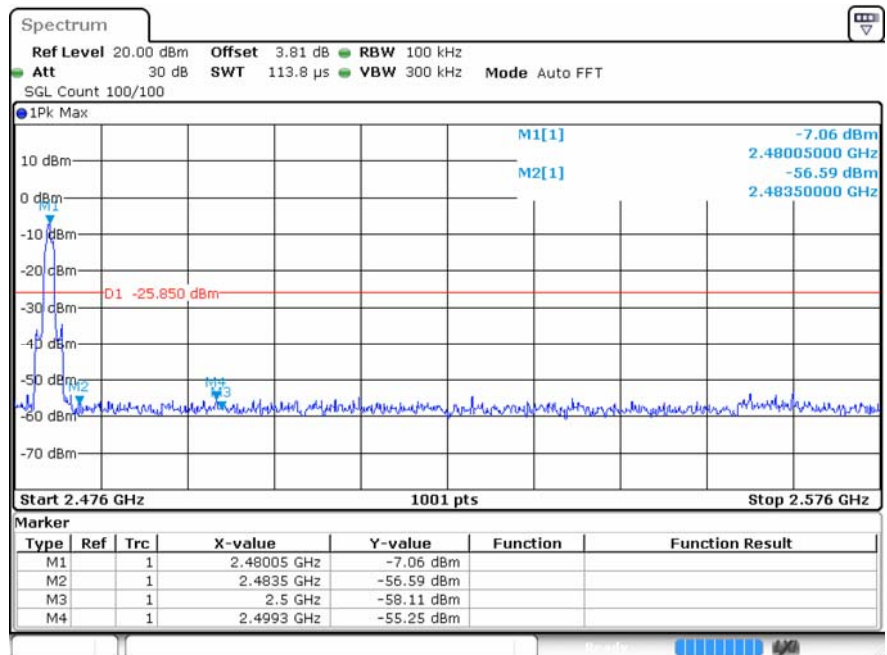
8DPSK/LCH/Hop



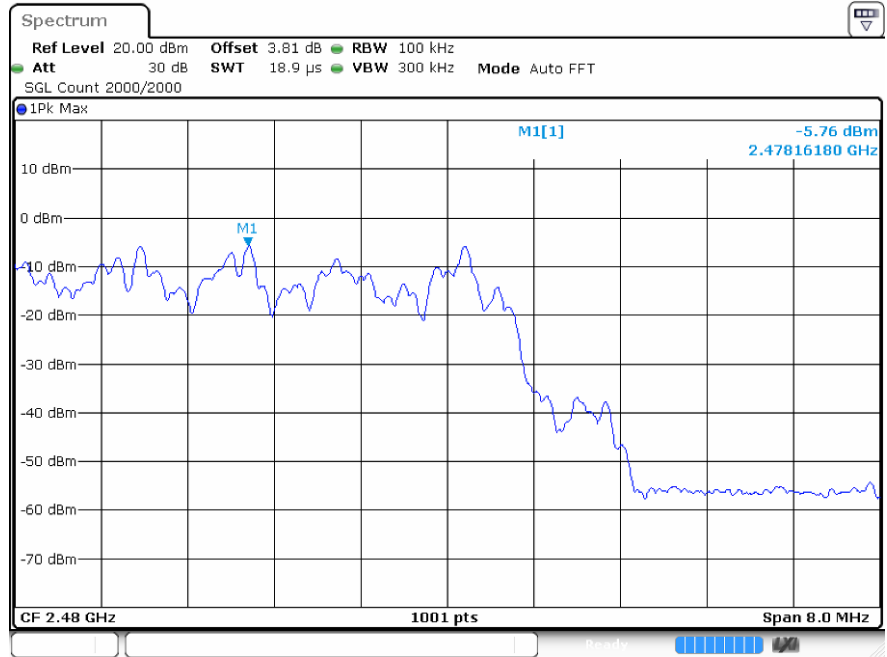
Ref



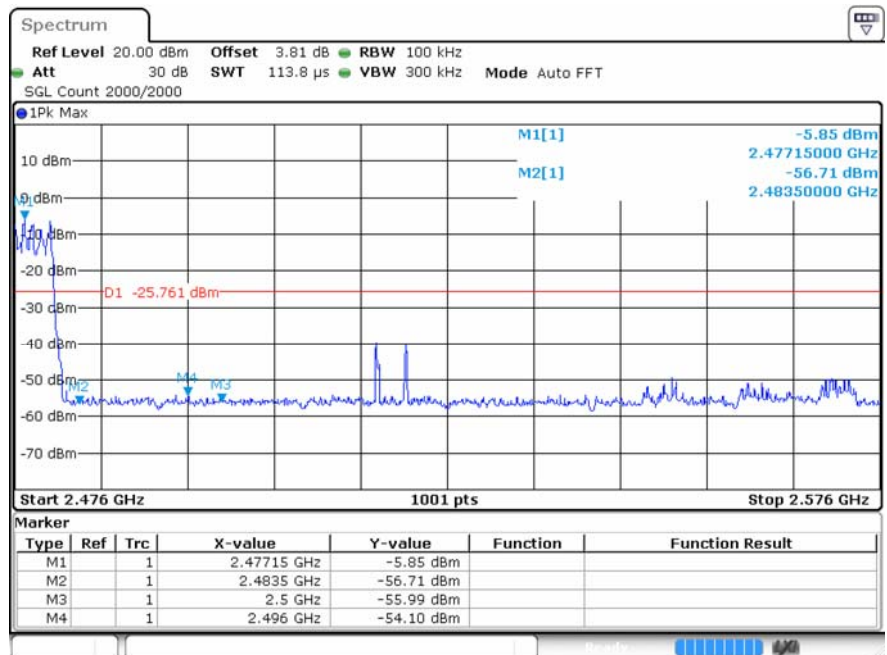
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

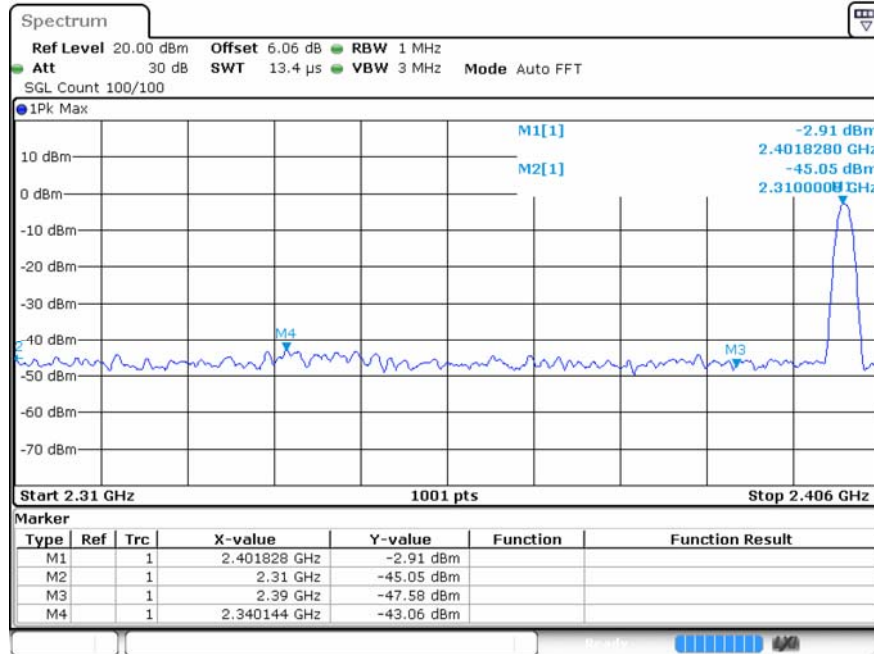
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -45.04      | 2.3  | 52.52      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -54.46      | 2.3  | 43.1       | AV       | 54             | Pass    |
|               | Off     | 2340.144 | -43.05      | 2.3  | 54.51      | PEAK     | 74             | Pass    |
|               | Off     | 2338.224 | -52.5       | 2.3  | 45.06      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -47.58      | 2.3  | 49.98      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -55.01      | 2.3  | 42.55      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -47.27      | 2.3  | 50.29      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -53.87      | 2.3  | 43.69      | AV       | 54             | Pass    |
|               | Off     | 2492.128 | -44.44      | 2.3  | 53.12      | PEAK     | 74             | Pass    |
|               | Off     | 2483.56  | -53.83      | 2.3  | 43.73      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -45.75      | 2.3  | 51.81      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -54.68      | 2.3  | 42.88      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -44.63      | 2.3  | 52.93      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -54.5       | 2.3  | 43.06      | AV       | 54             | Pass    |
|               | Off     | 2343.216 | -43.45      | 2.3  | 54.11      | PEAK     | 74             | Pass    |
|               | Off     | 2338.512 | -52.42      | 2.3  | 45.14      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -46.11      | 2.3  | 51.45      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -54.82      | 2.3  | 42.74      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -46.42      | 2.3  | 51.14      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -54.39      | 2.3  | 43.17      | AV       | 54             | Pass    |
|               | Off     | 2491.216 | -43.18      | 2.3  | 54.38      | PEAK     | 74             | Pass    |
|               | Off     | 2498.992 | -54.08      | 2.3  | 43.48      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -45.5       | 2.3  | 52.06      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -54.67      | 2.3  | 42.89      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -45.49      | 2.3  | 52.07      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -54.46      | 2.3  | 43.1       | AV       | 54             | Pass    |
|               | Off     | 2354.352 | -43.1       | 2.3  | 54.46      | PEAK     | 74             | Pass    |
|               | Off     | 2338.032 | -52.54      | 2.3  | 45.02      | AV       | 54             | Pass    |



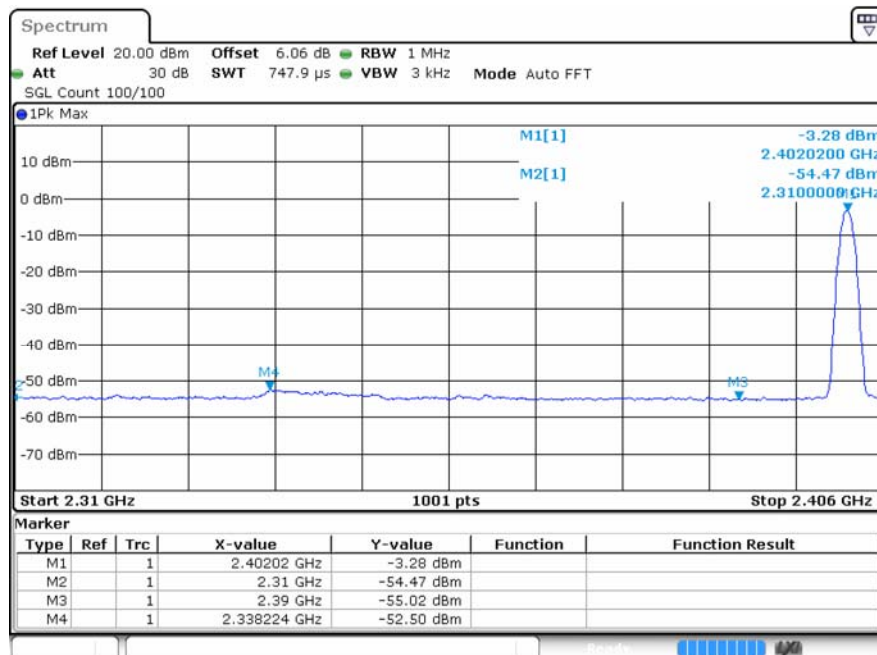
|  |     |          |        |     |       |      |    |      |
|--|-----|----------|--------|-----|-------|------|----|------|
|  | Off | 2390.0   | -45.1  | 2.3 | 52.46 | PEAK | 74 | Pass |
|  | Off | 2390.0   | -54.95 | 2.3 | 42.61 | AV   | 54 | Pass |
|  | Off | 2483.5   | -45.51 | 2.3 | 52.05 | PEAK | 74 | Pass |
|  | Off | 2483.5   | -54.44 | 2.3 | 43.12 | AV   | 54 | Pass |
|  | Off | 2490.832 | -44.6  | 2.3 | 52.96 | PEAK | 74 | Pass |
|  | Off | 2487.184 | -53.81 | 2.3 | 43.75 | AV   | 54 | Pass |
|  | Off | 2500.0   | -47.03 | 2.3 | 50.53 | PEAK | 74 | Pass |
|  | Off | 2500.0   | -54.61 | 2.3 | 42.95 | AV   | 54 | Pass |

## 9.2 Test Graphs

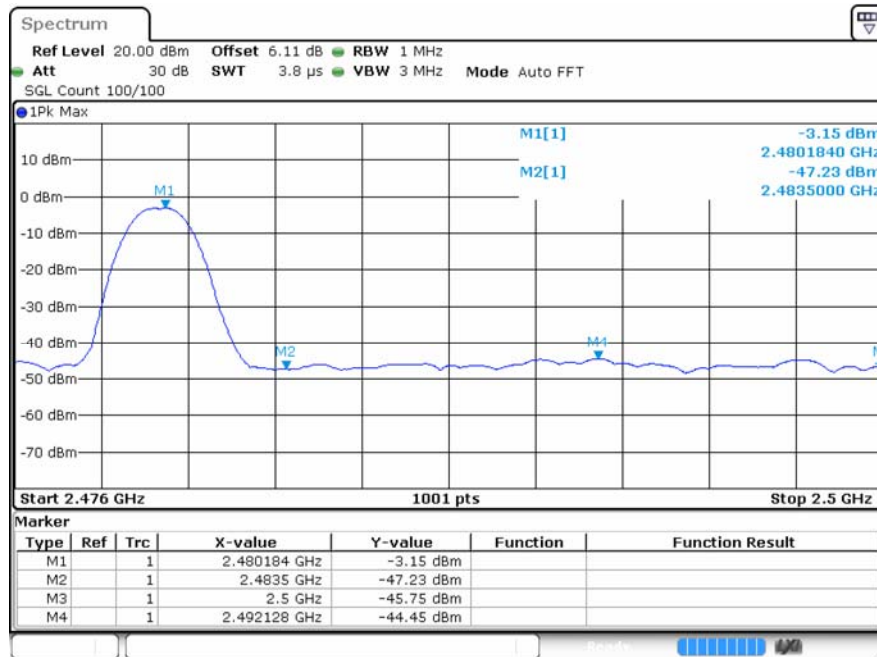
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



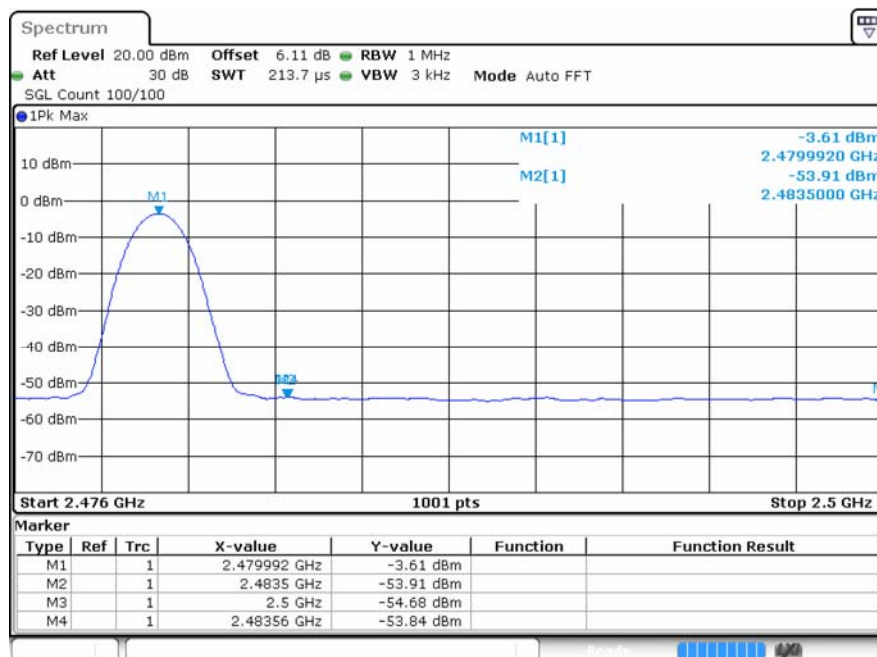
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



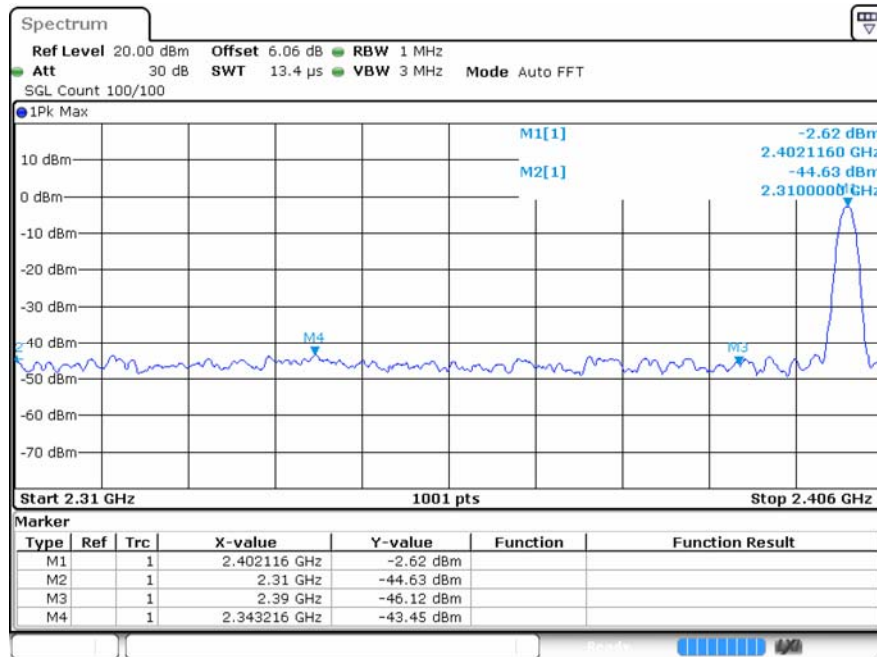
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



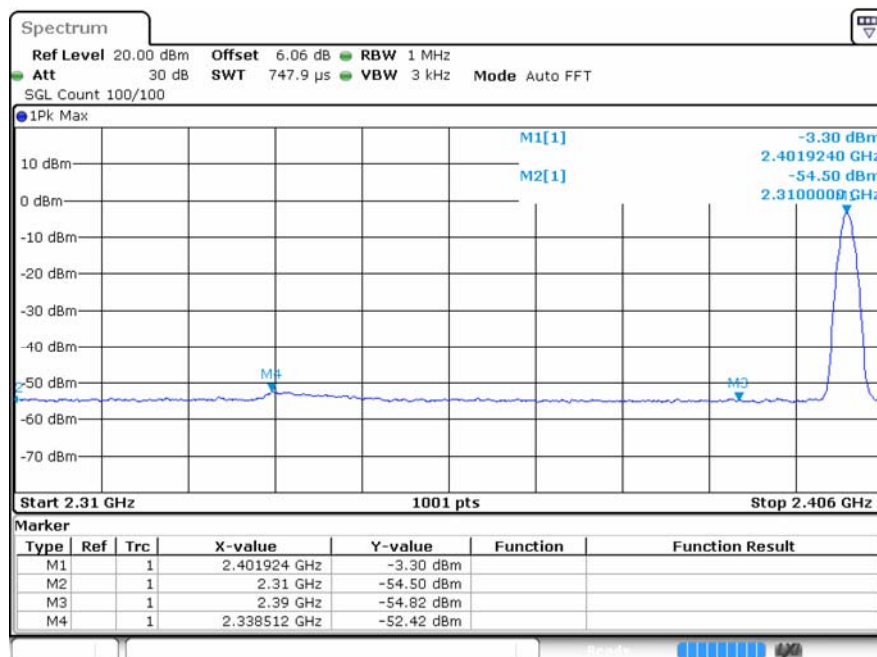
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



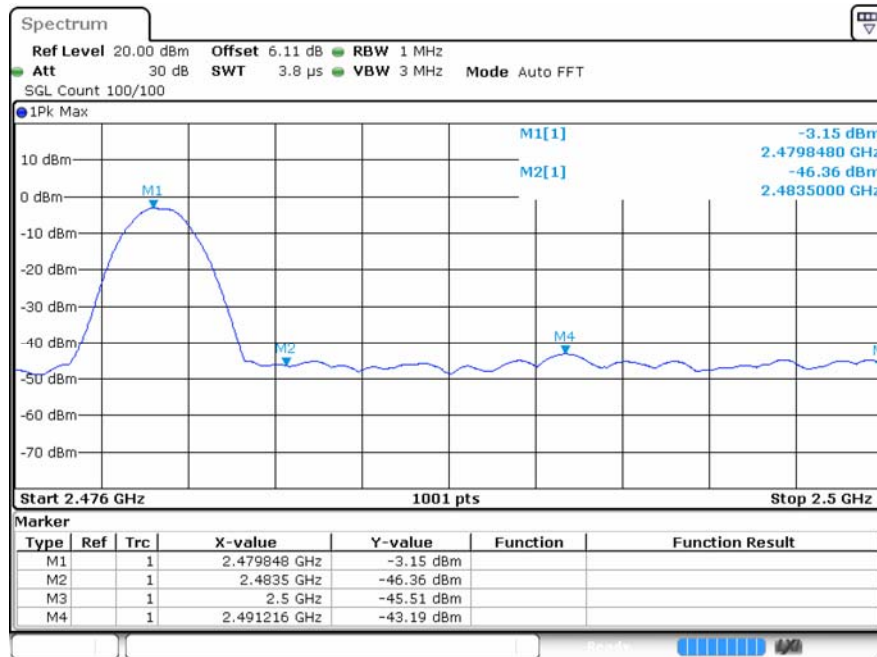
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



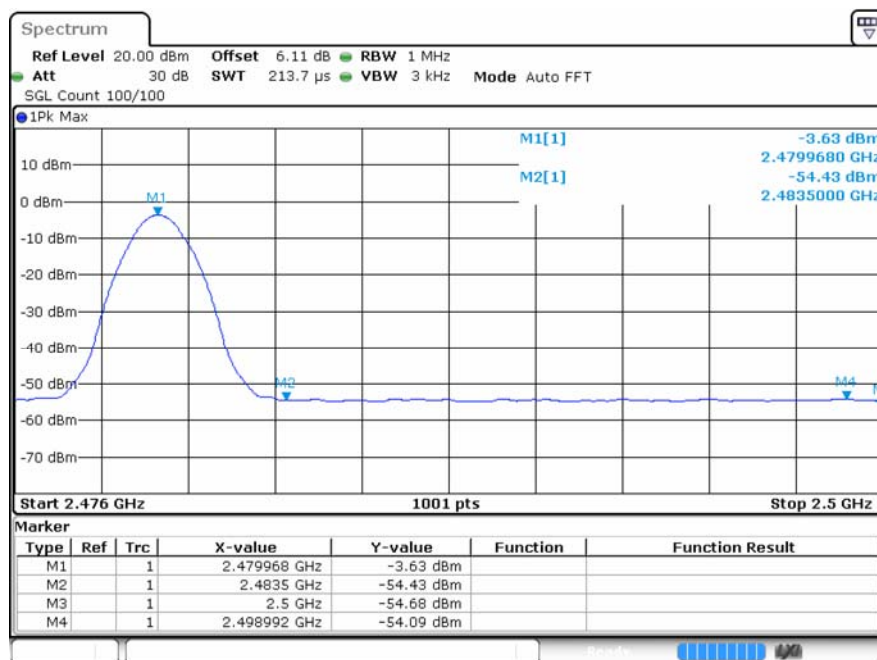
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



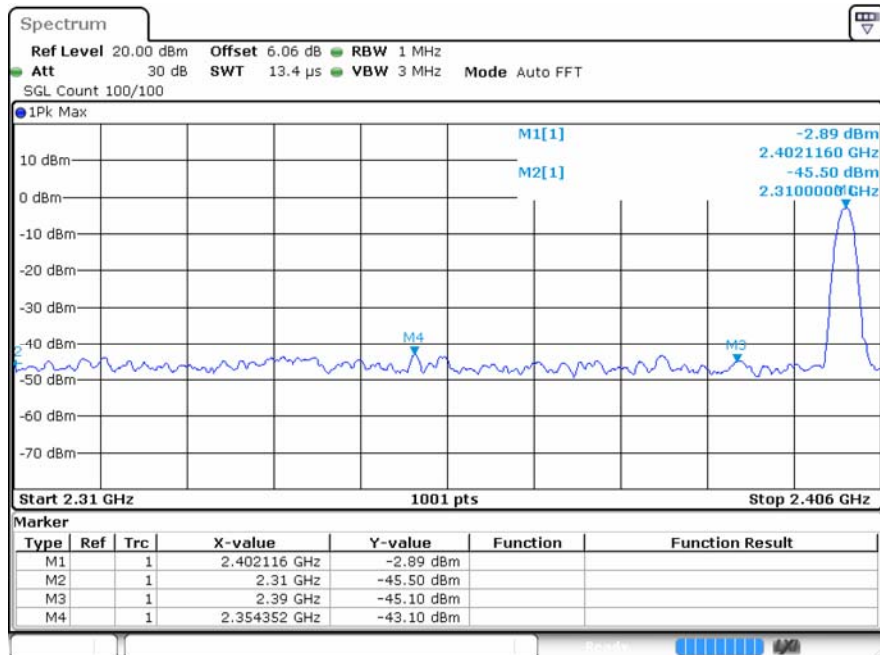
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



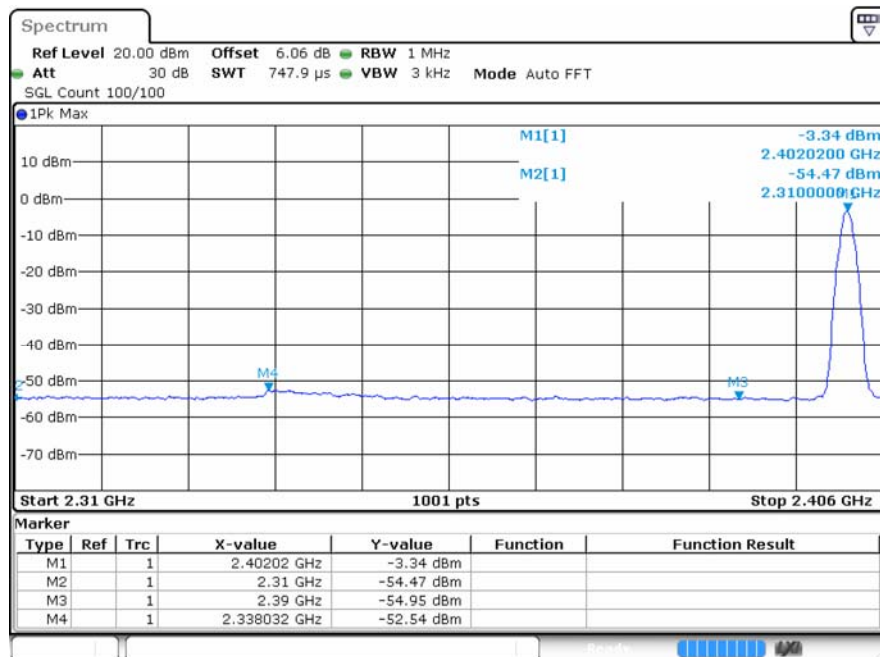
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



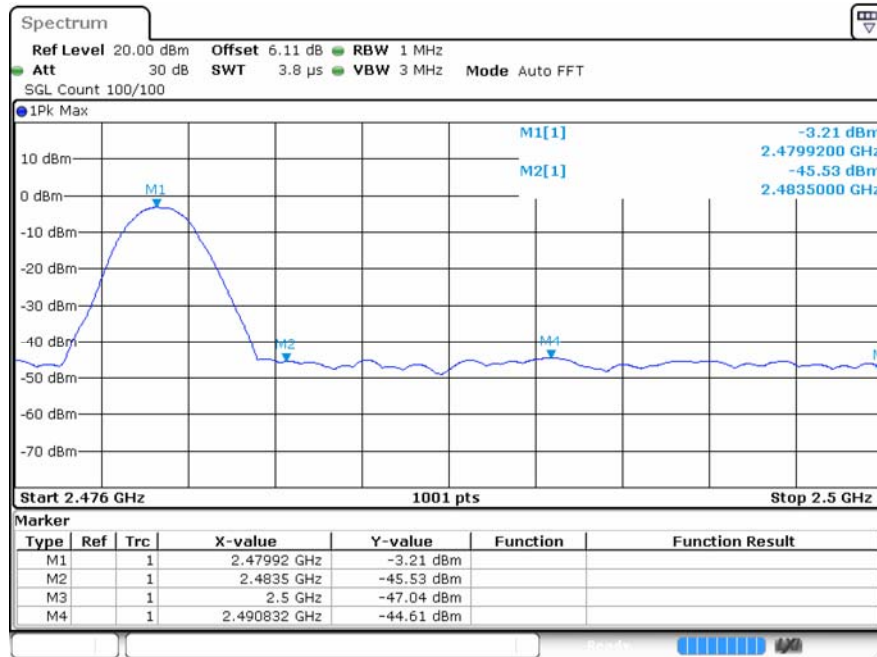
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



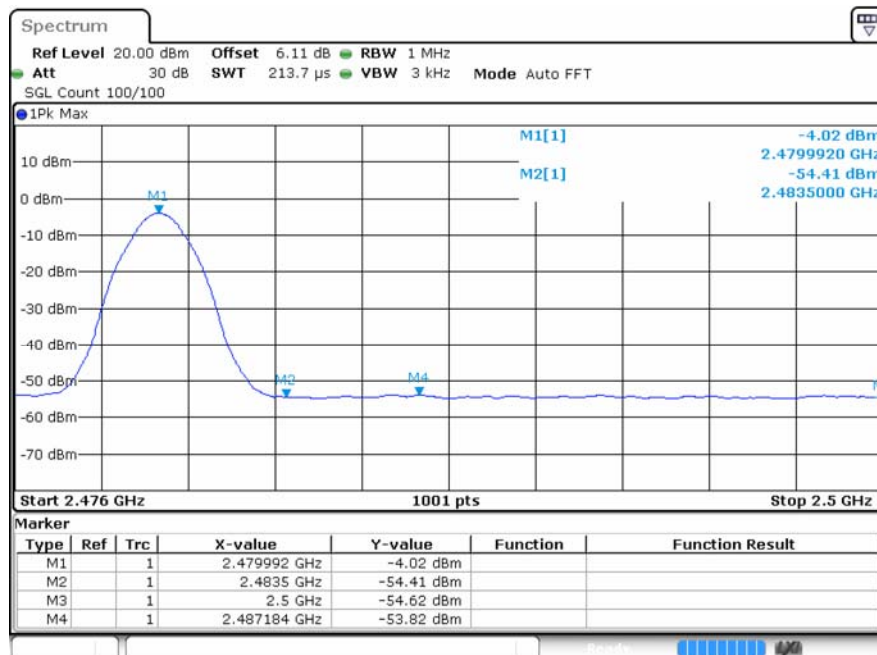
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---