

## Appendix A

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

Product Name: LinkLens

Trade Mark: 

Test Model: RY19101

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 23.1℃       |
| Relative Humidity: | 45.8%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Simba Huang |
| Supervised by:     | Seal Chen   |



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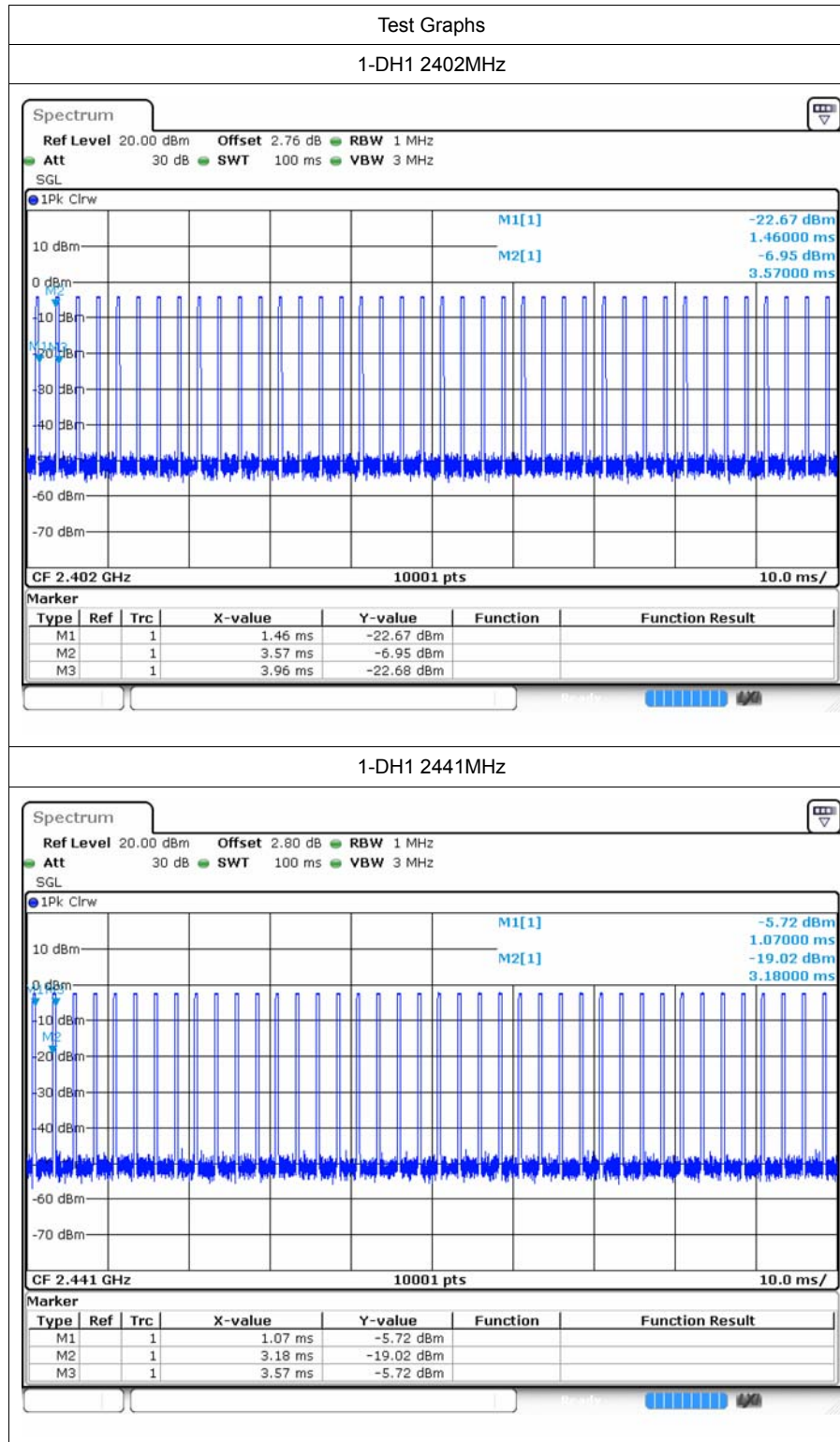


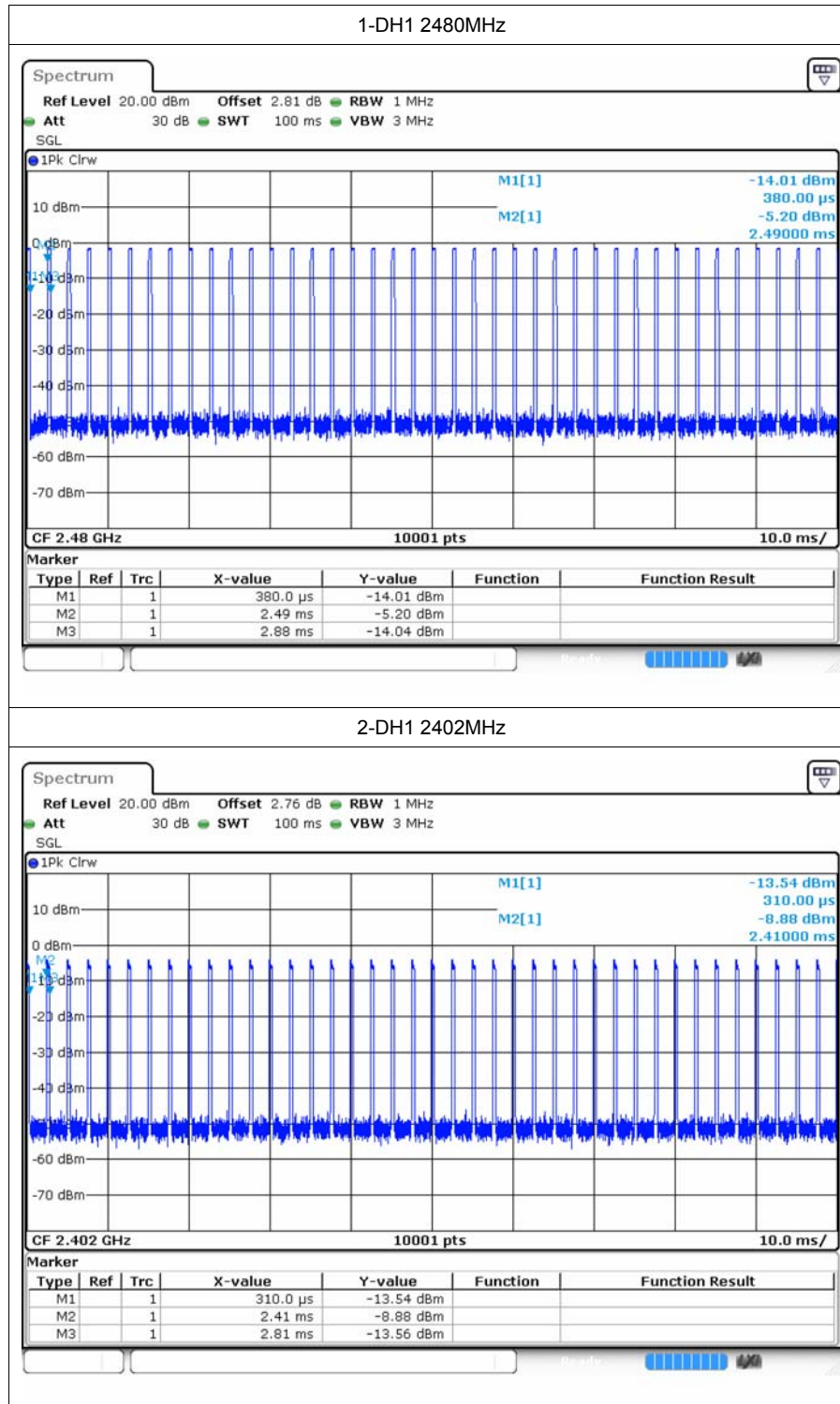
# 1 Duty Cycle

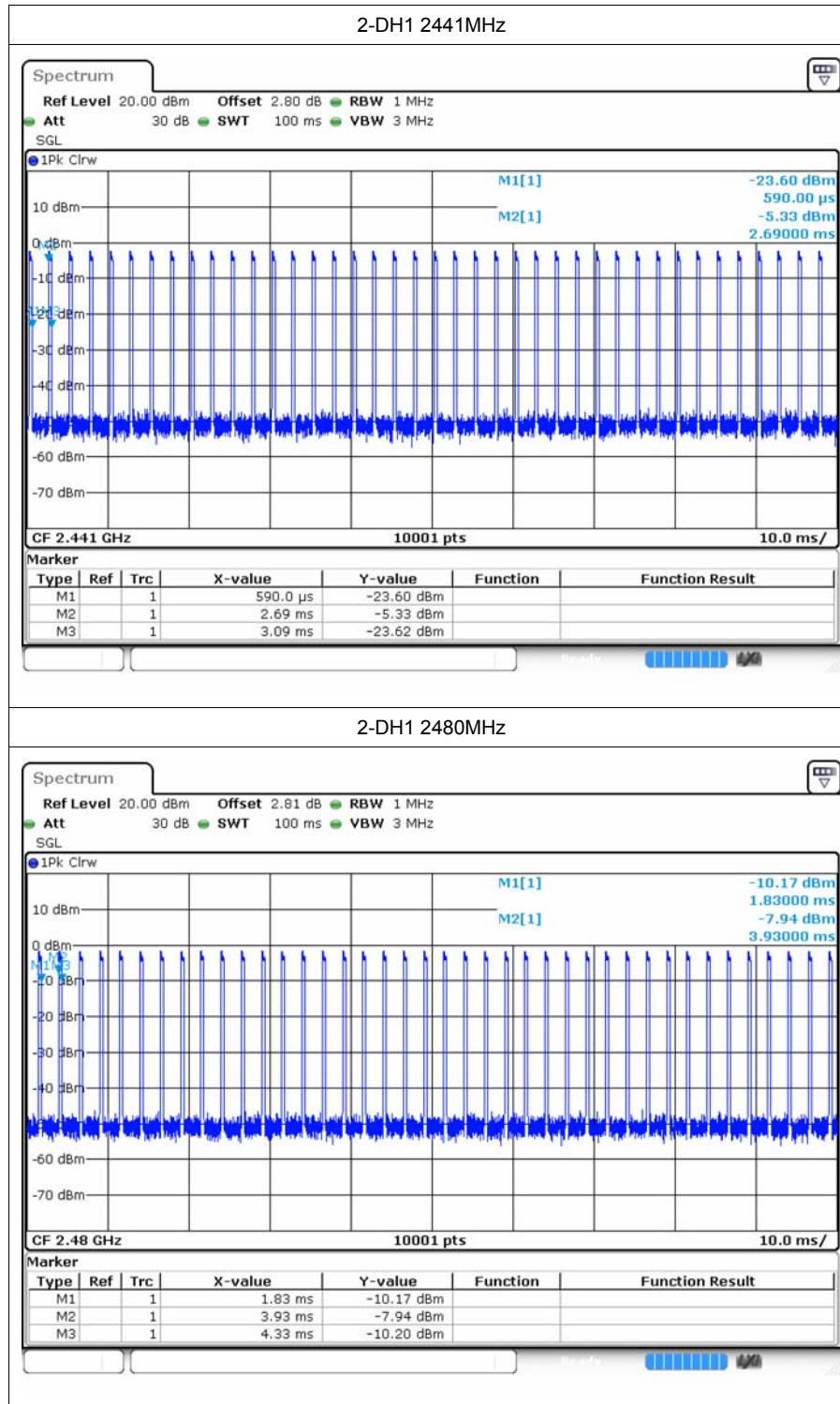
## 1.1 Test Result

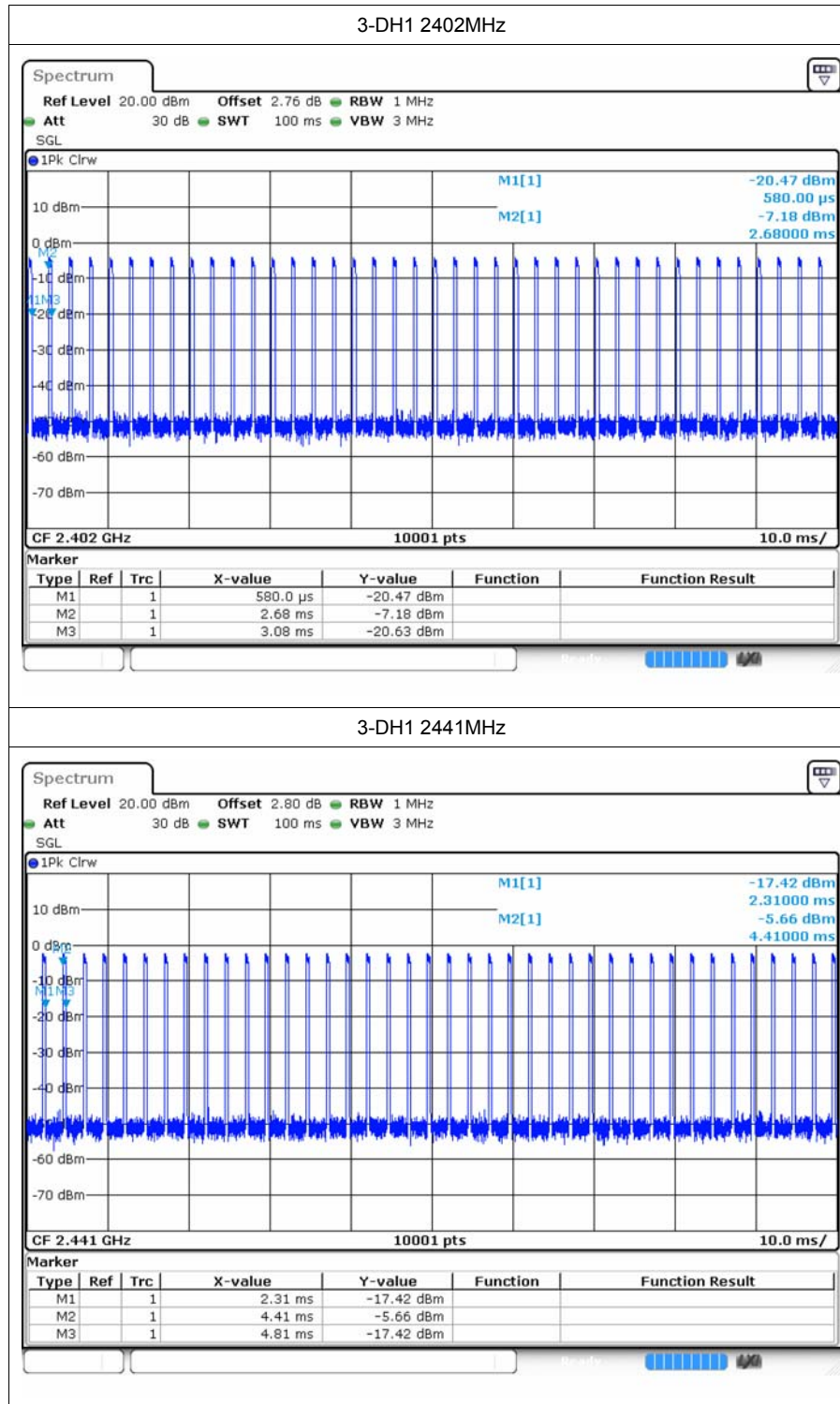
| Mode  | Frequency (MHz) | Duty Cycle (%) | 1/T (kHz) |
|-------|-----------------|----------------|-----------|
| 1-DH1 | 2402            | 15.72          | 2.56      |
| 1-DH1 | 2441            | 16             | 2.56      |
| 1-DH1 | 2480            | 16.01          | 2.56      |
| 2-DH1 | 2402            | 16.41          | 2.5       |
| 2-DH1 | 2441            | 16.07          | 2.5       |
| 2-DH1 | 2480            | 16.4           | 2.5       |
| 3-DH1 | 2402            | 16.24          | 2.5       |
| 3-DH1 | 2441            | 16.4           | 2.5       |
| 3-DH1 | 2480            | 16.4           | 2.5       |

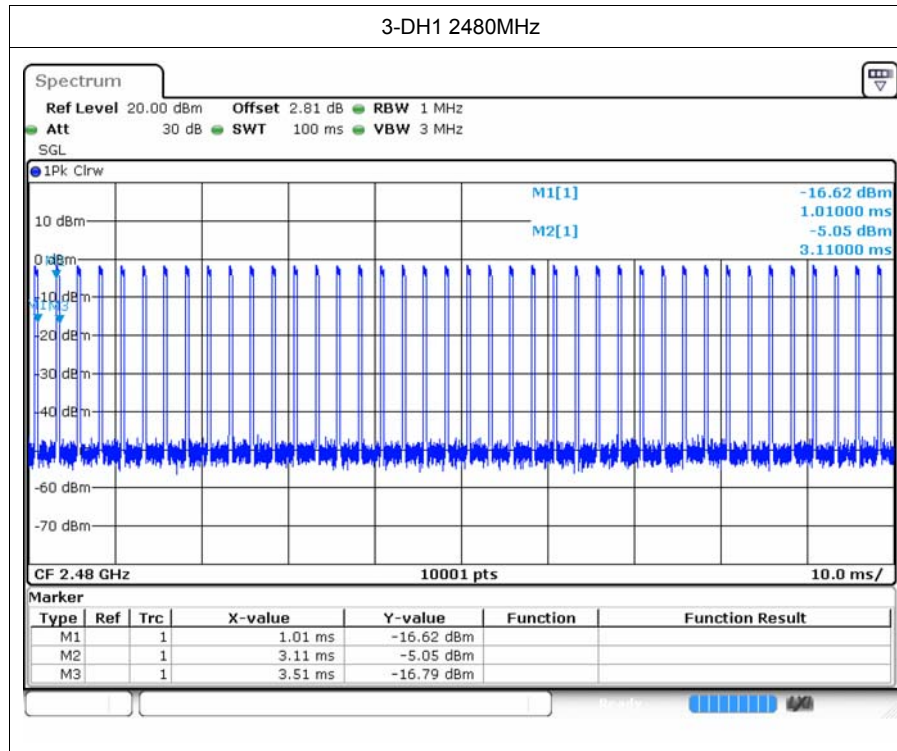
## 1.2 Test Graphs









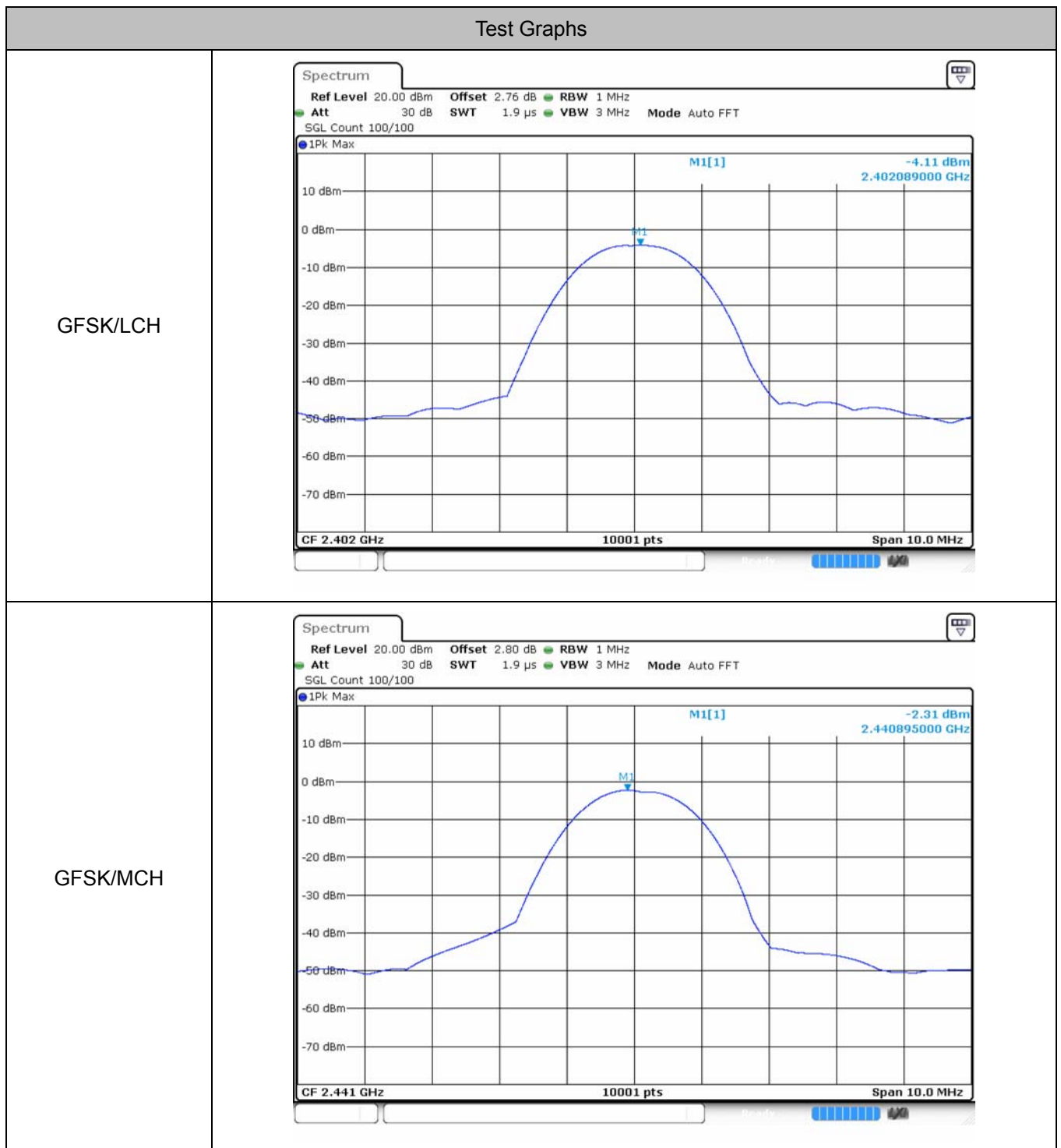


## 2 Maximum Conducted Peak Output Power

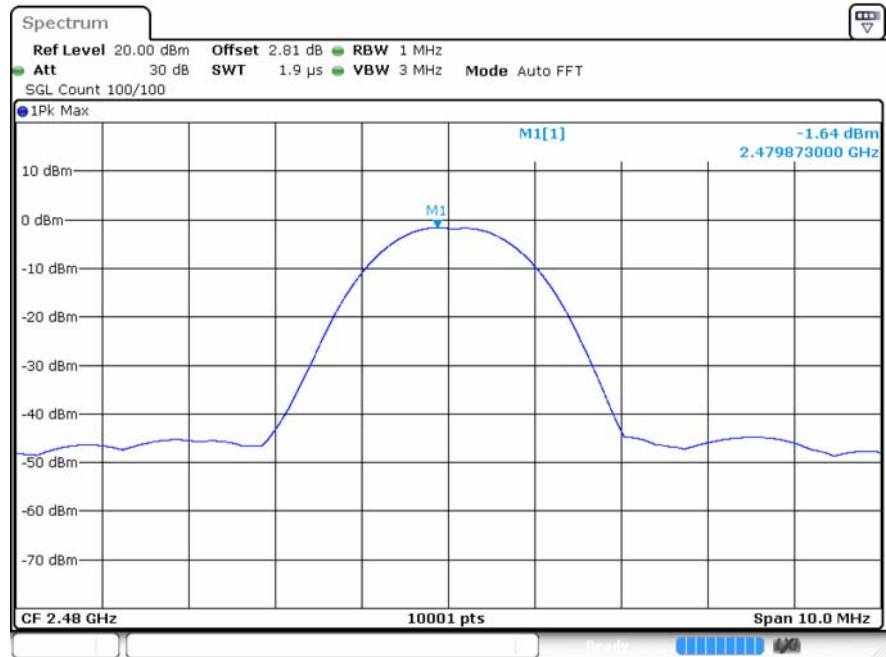
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power<br>[dBm] | Limit<br>[dBm] | Verdict |
|---------------|----------|------------------------------------|----------------|---------|
| GFSK          | LCH      | -4.11                              | 21             | Pass    |
|               | MCH      | -2.31                              | 21             | Pass    |
|               | HCH      | -1.64                              | 21             | Pass    |
| $\pi/4$ DQPSK | LCH      | -4.41                              | 21             | Pass    |
|               | MCH      | -2.32                              | 21             | Pass    |
|               | HCH      | -1.85                              | 21             | Pass    |
| 8DPSK         | LCH      | -4.08                              | 21             | Pass    |
|               | MCH      | -2.47                              | 21             | Pass    |
|               | HCH      | -2.00                              | 21             | Pass    |

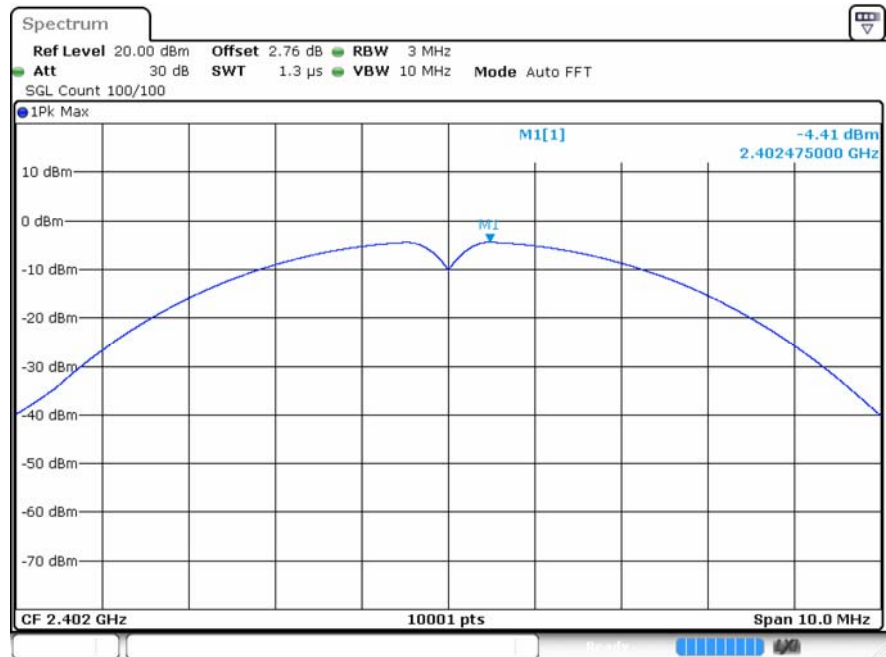
## 2.2 Test Graphs



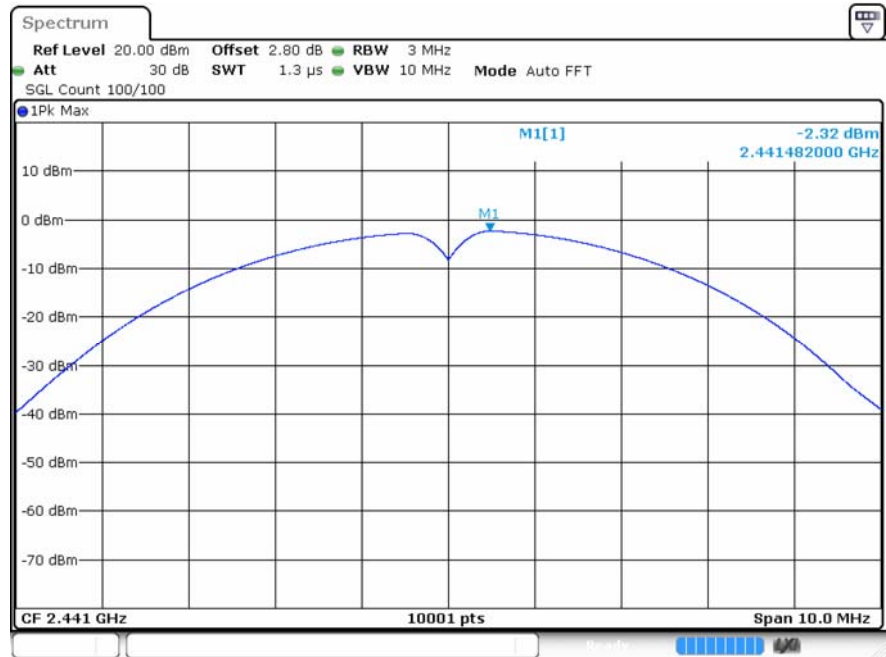
GFSK/HCH



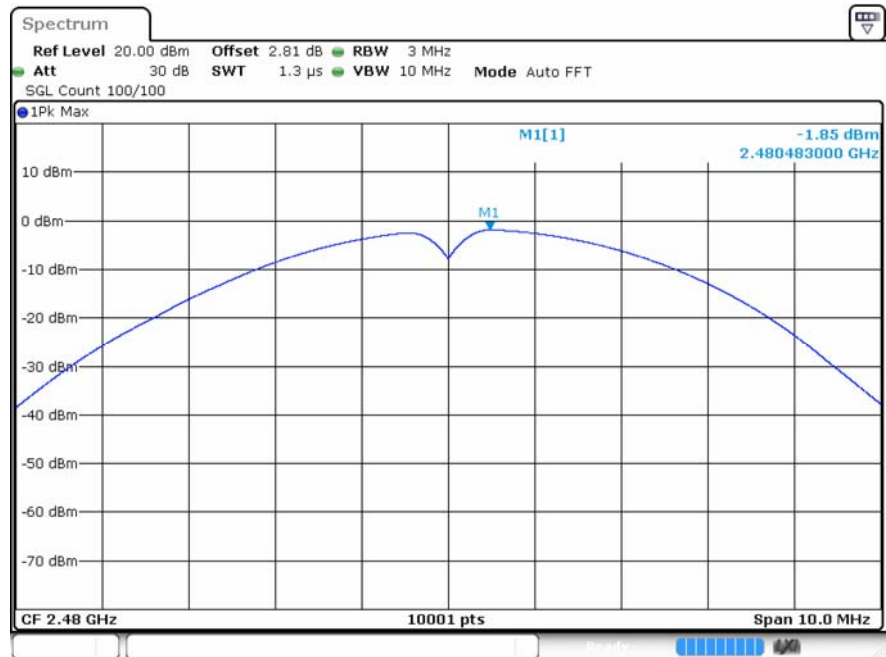
$\pi/4$ DQPSK/LCH



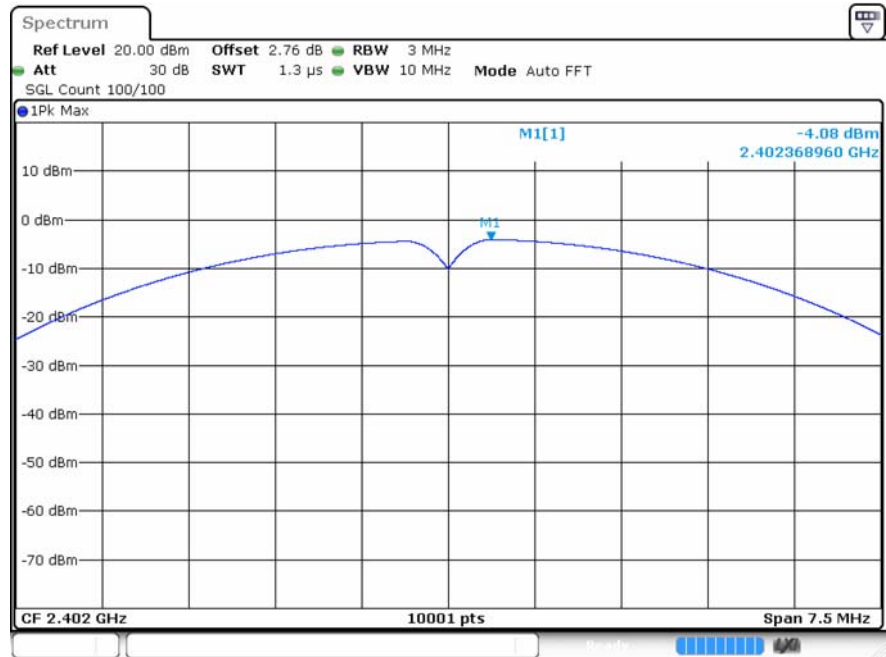
$\pi/4$ DQPSK/MCH



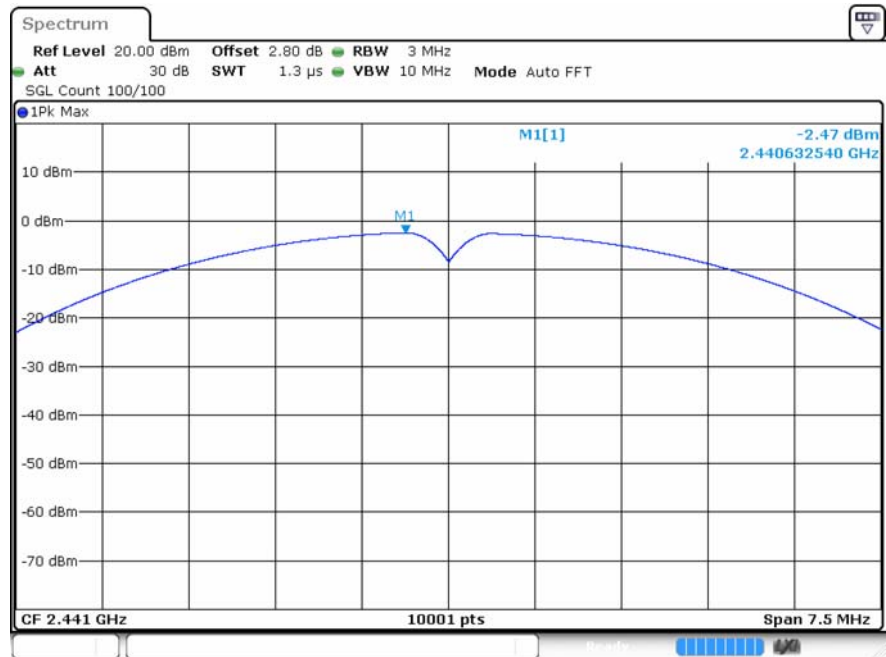
$\pi/4$ DQPSK/HCH



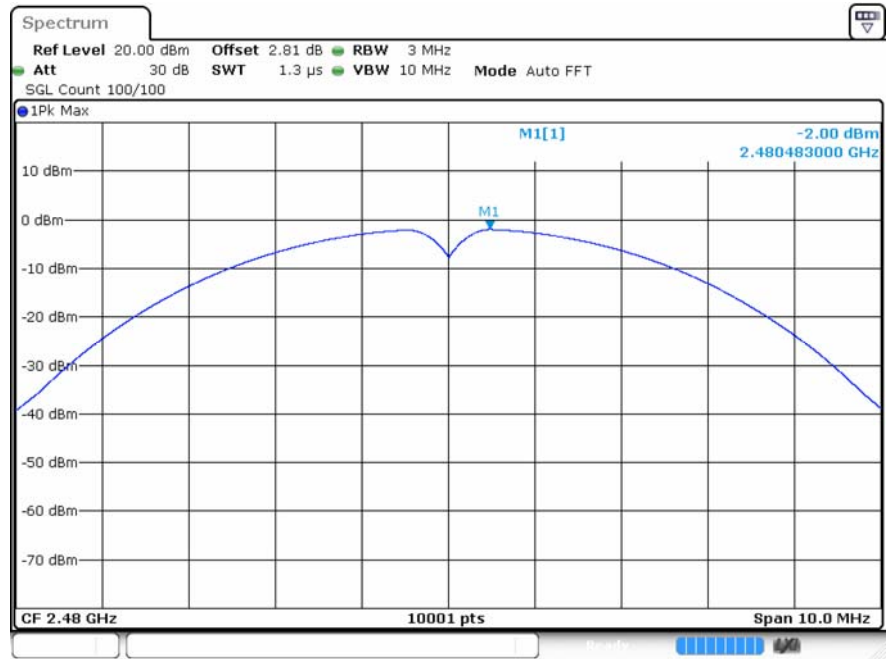
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

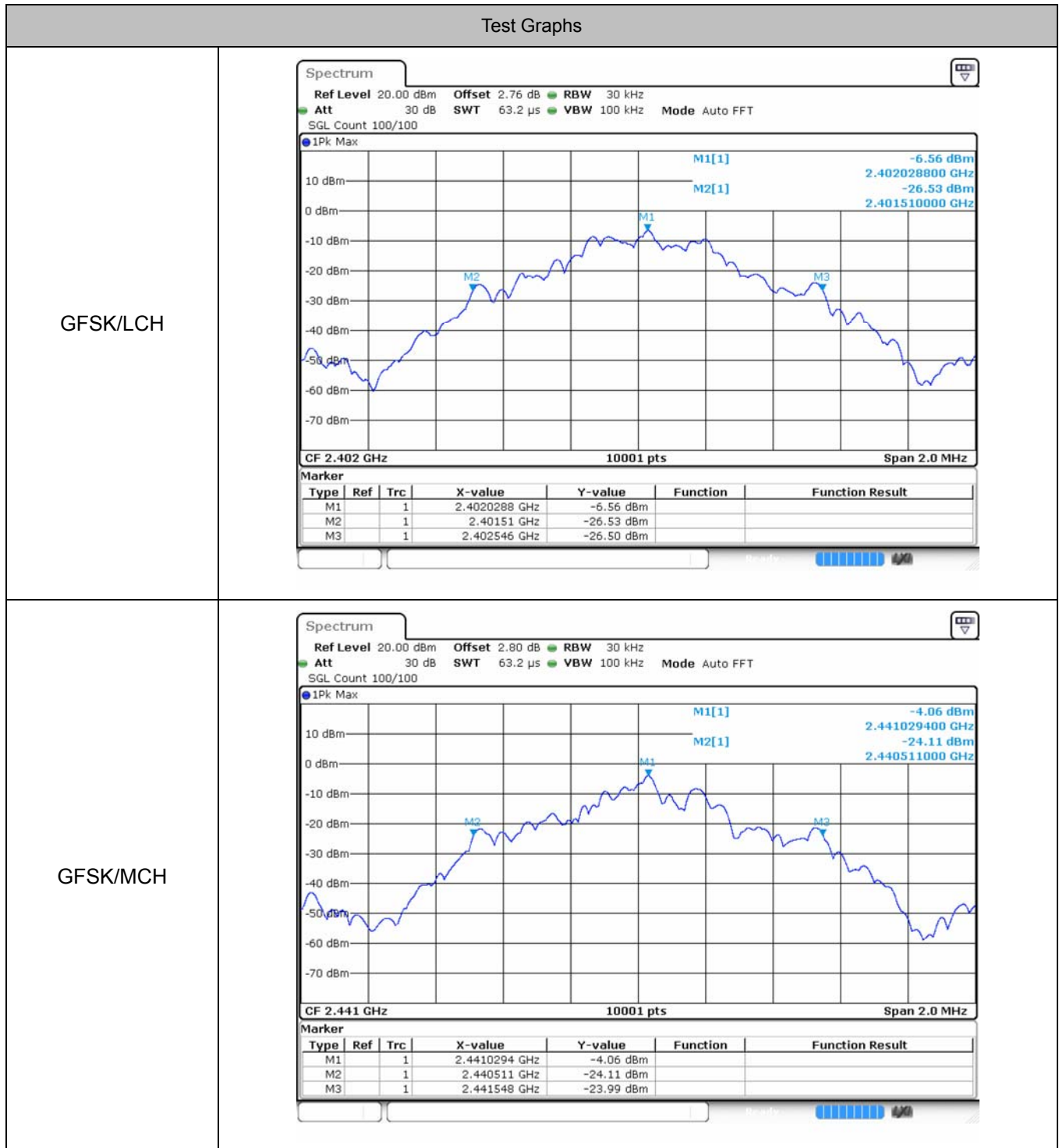


### 3 20dB Bandwidth

#### 3.1 Test Result

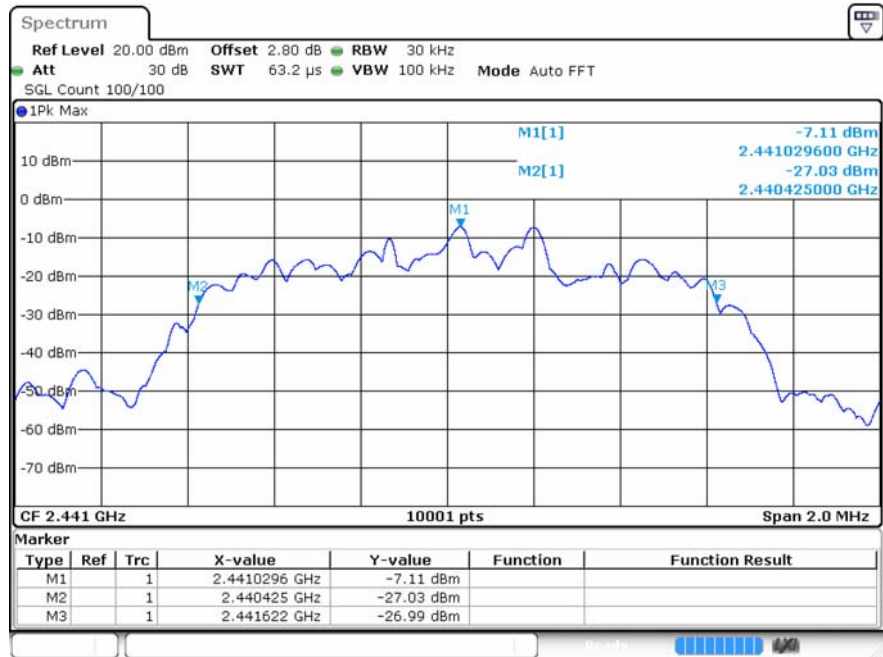
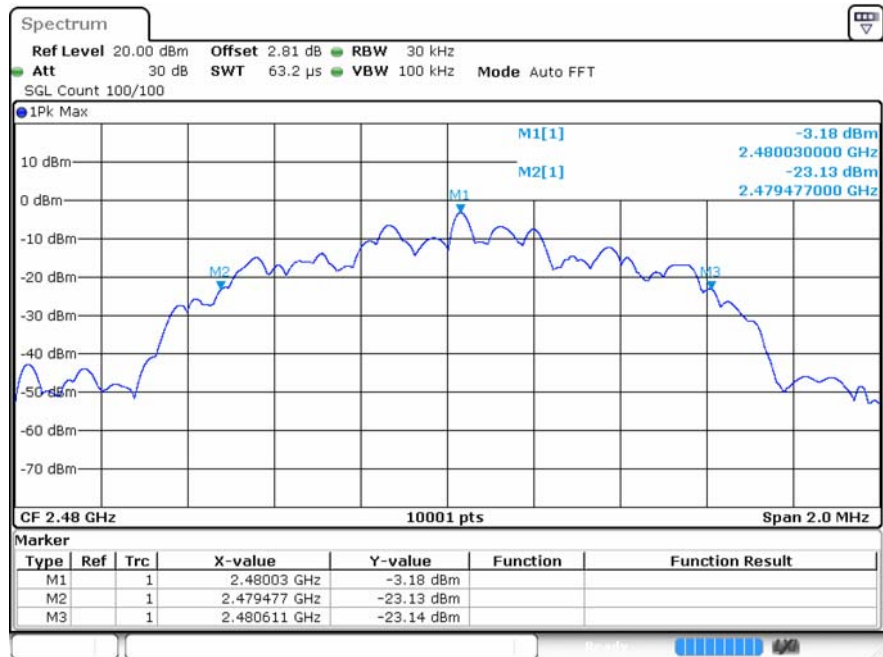
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 1.036                | Not Specified | Pass    |
|               | MCH      | 1.037                | Not Specified | Pass    |
|               | HCH      | 1.042                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.214                | Not Specified | Pass    |
|               | MCH      | 1.197                | Not Specified | Pass    |
|               | HCH      | 1.135                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.196                | Not Specified | Pass    |
|               | MCH      | 1.099                | Not Specified | Pass    |
|               | HCH      | 1.169                | Not Specified | Pass    |

### 3.2 Test Graphs

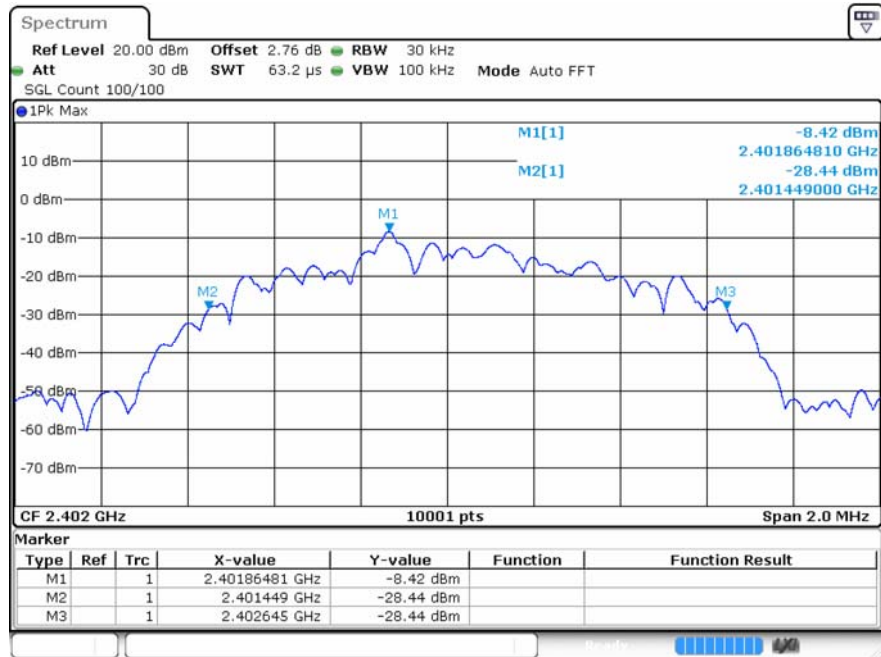


GFSK/HCH


 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


8DPSK/LCH



8DPSK/MCH





8DPSK/HCH

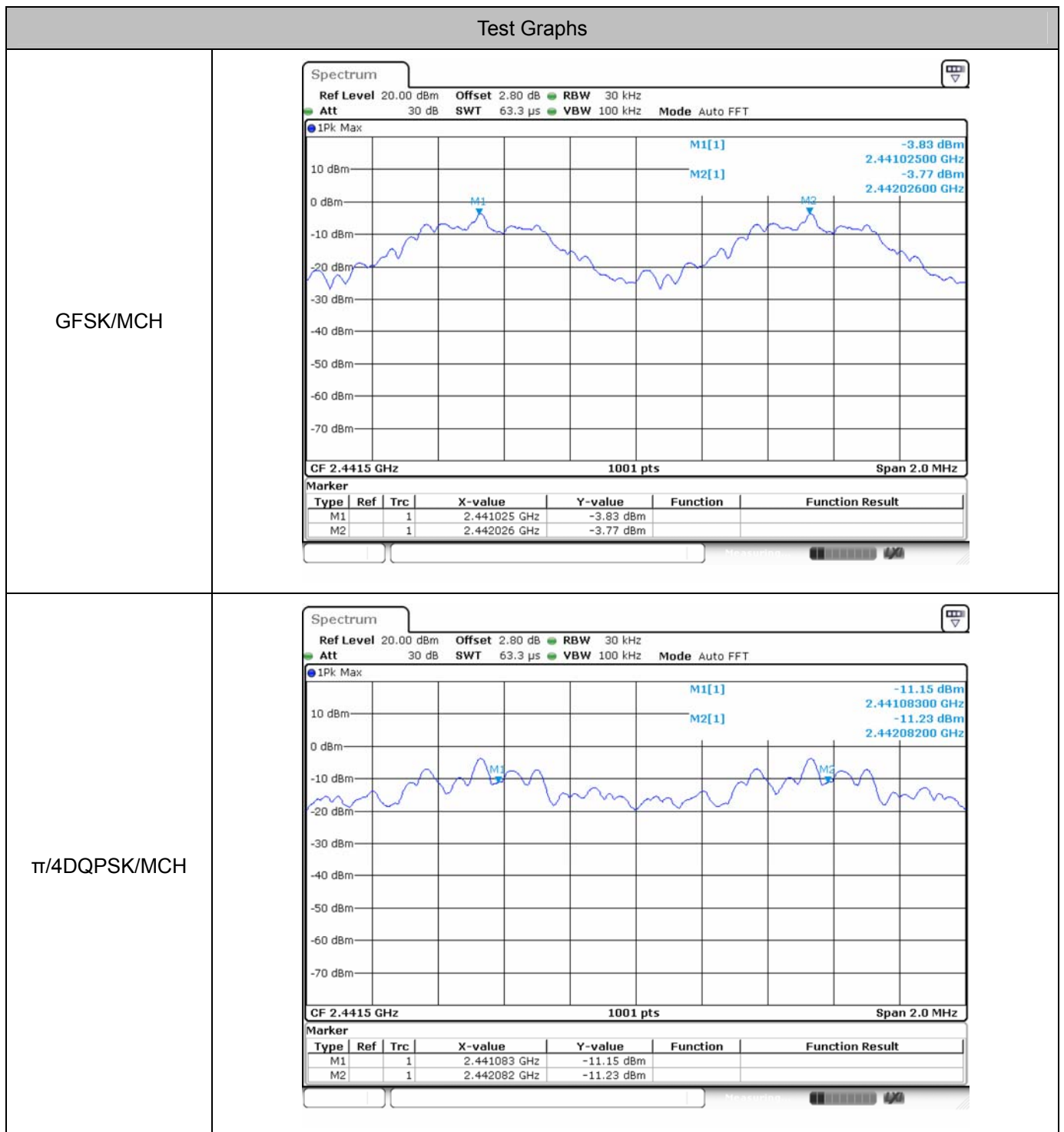


## 4 Carrier Frequency Separation

### 4.1 Test Result

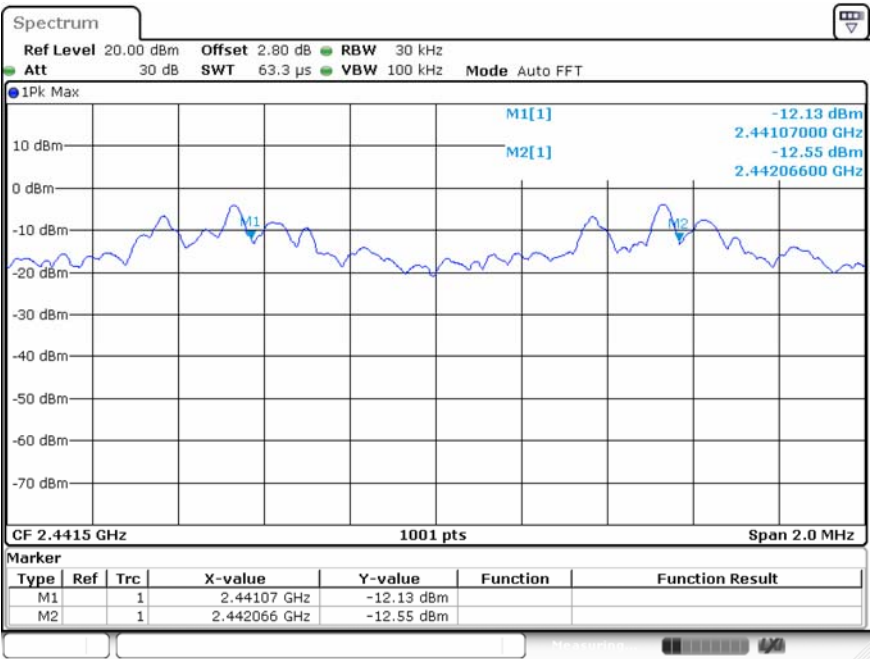
| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 1.001                              | 0.691       | Pass    |
| $\pi/4$ DQPSK | MCH      | 0.999                              | 0.798       | Pass    |
| 8DPSK         | MCH      | 0.996                              | 0.733       | Pass    |

## 4.2 Test Graphs





8DPSK/MCH

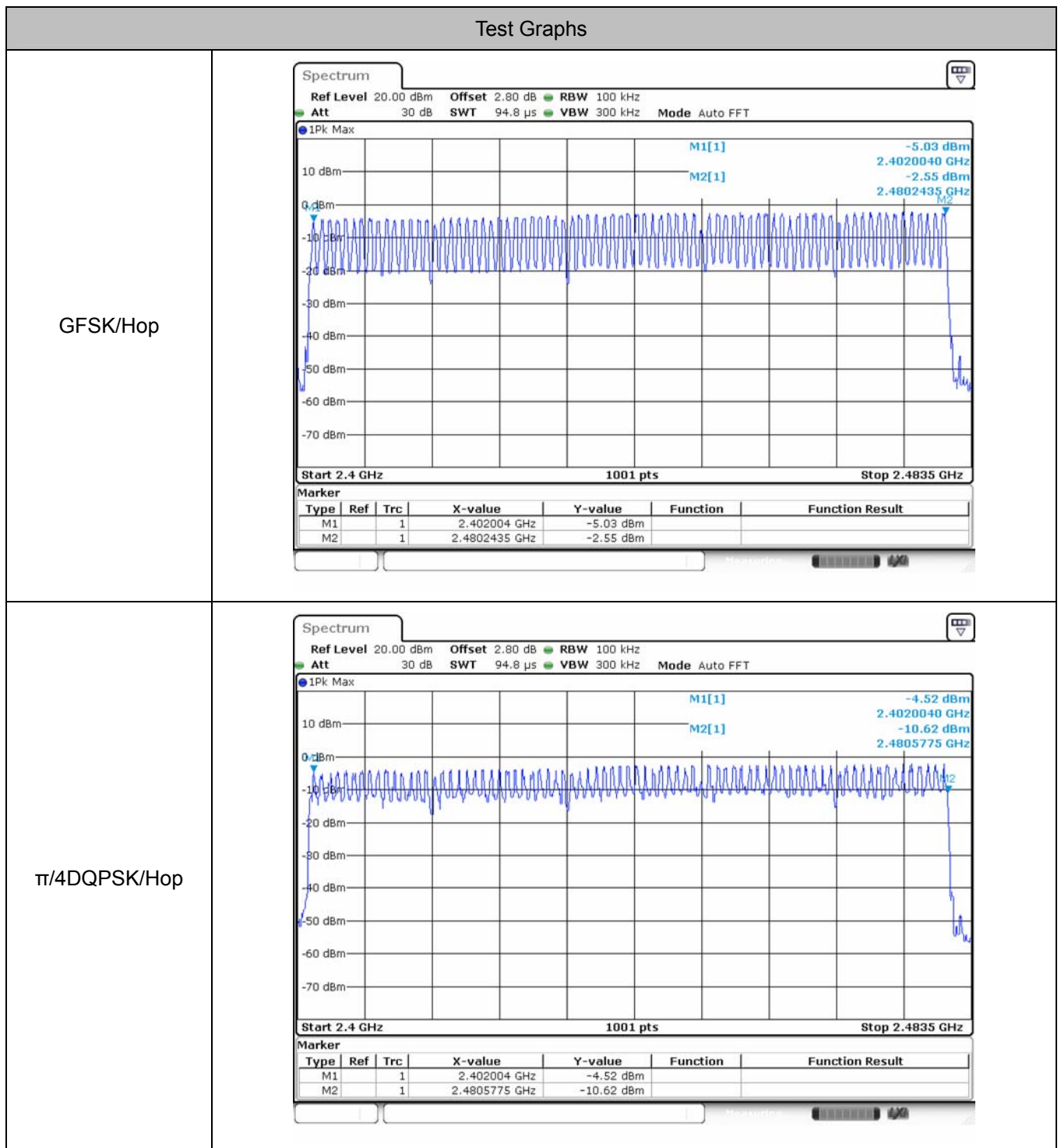


## 5 Hopping Channel Number

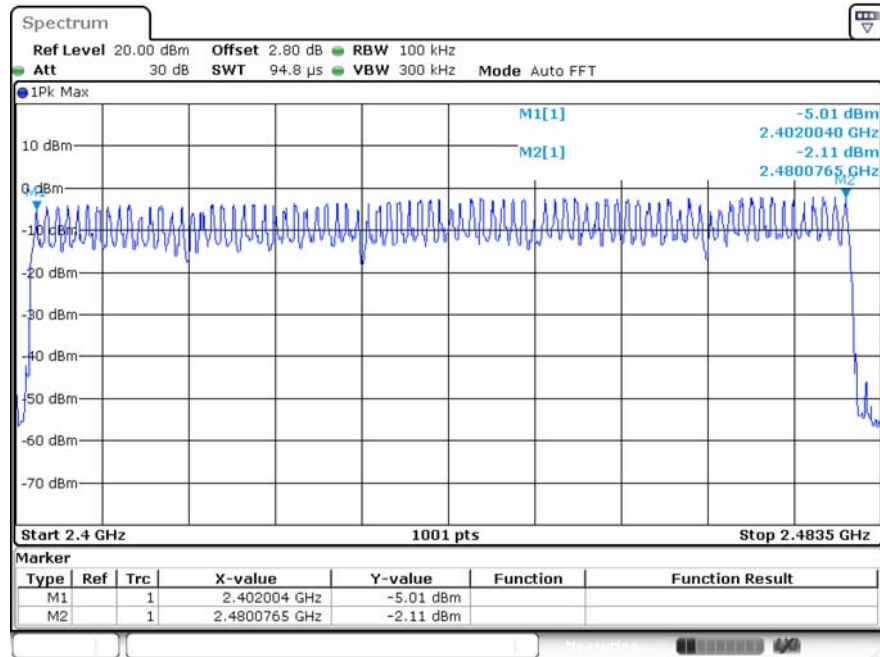
### 5.1 Test Result

| 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

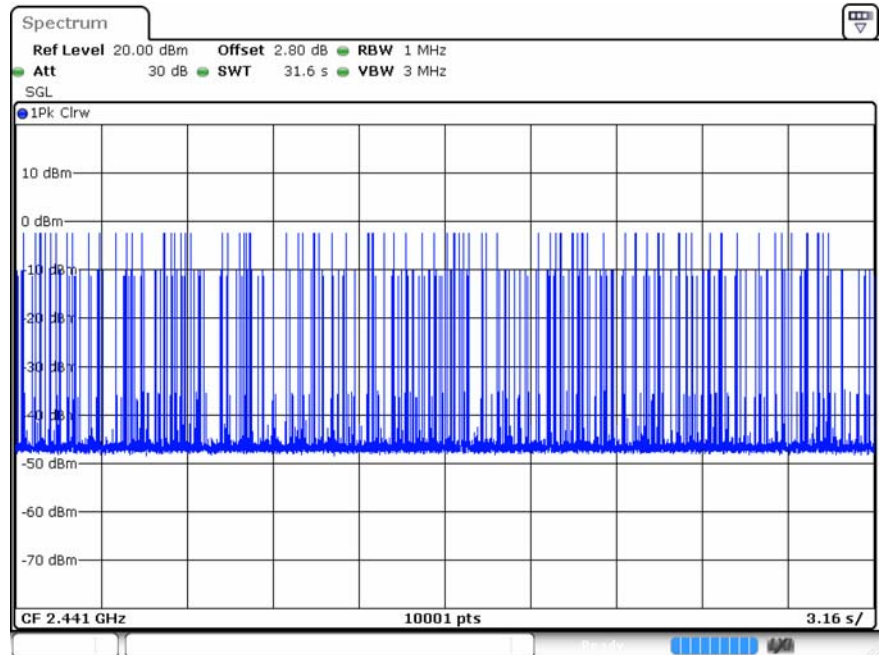
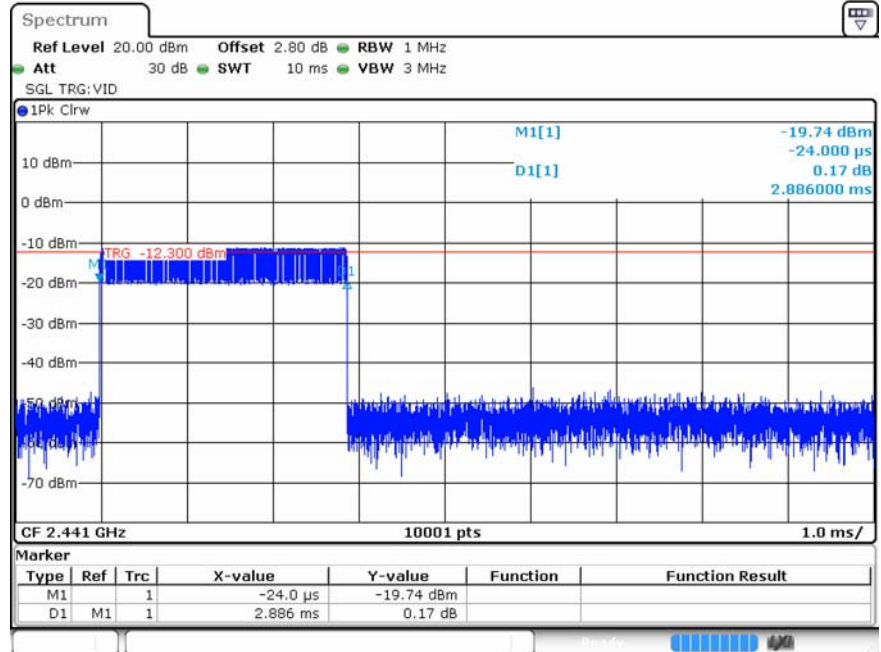
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|---------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.886                      | 86                    | 248.196       | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.89                       | 68                    | 196.52        | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.893                      | 79                    | 228.547       | 0.4       | Pass    |

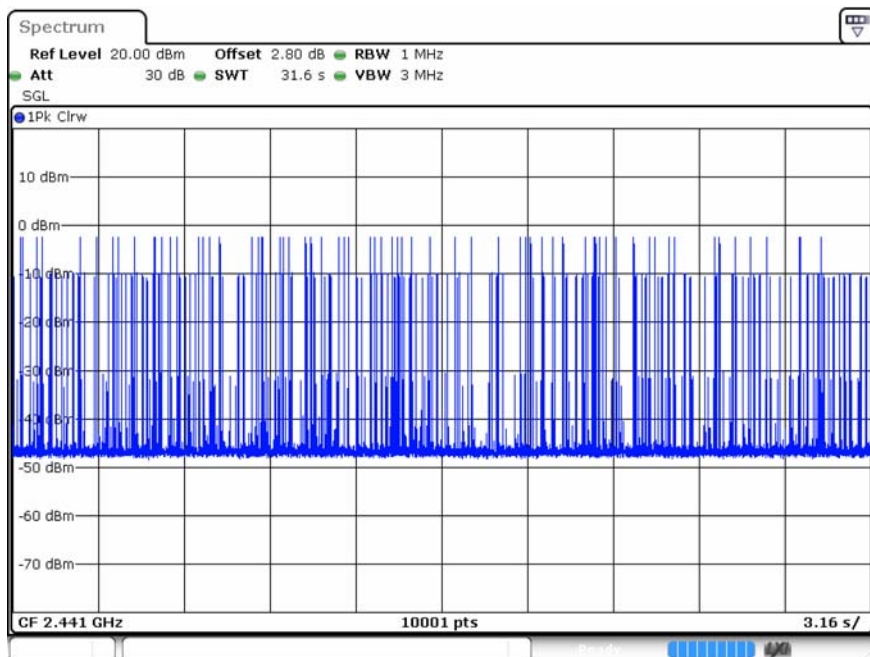
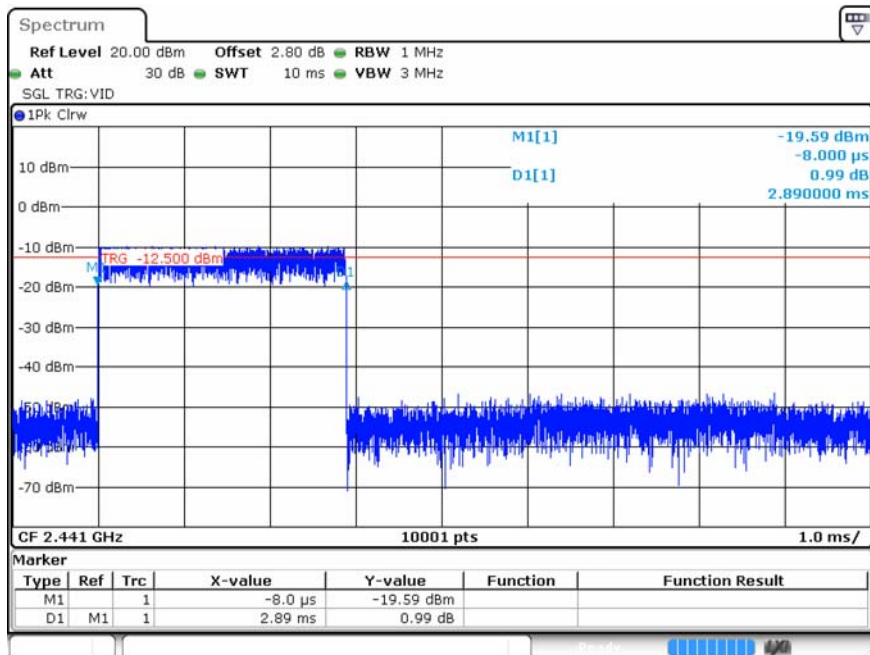
## 6.2 Test Graphs

### Test Graphs

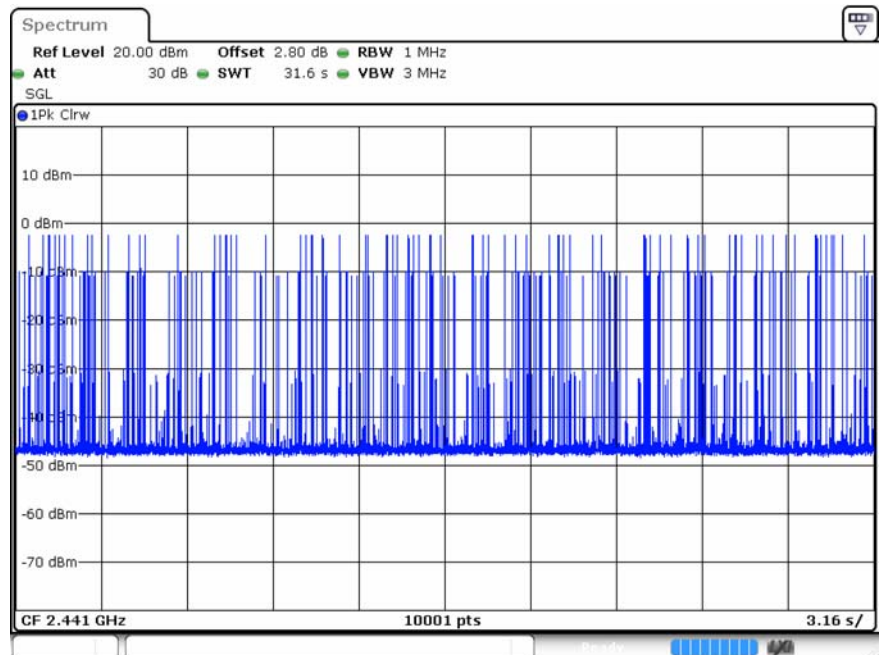
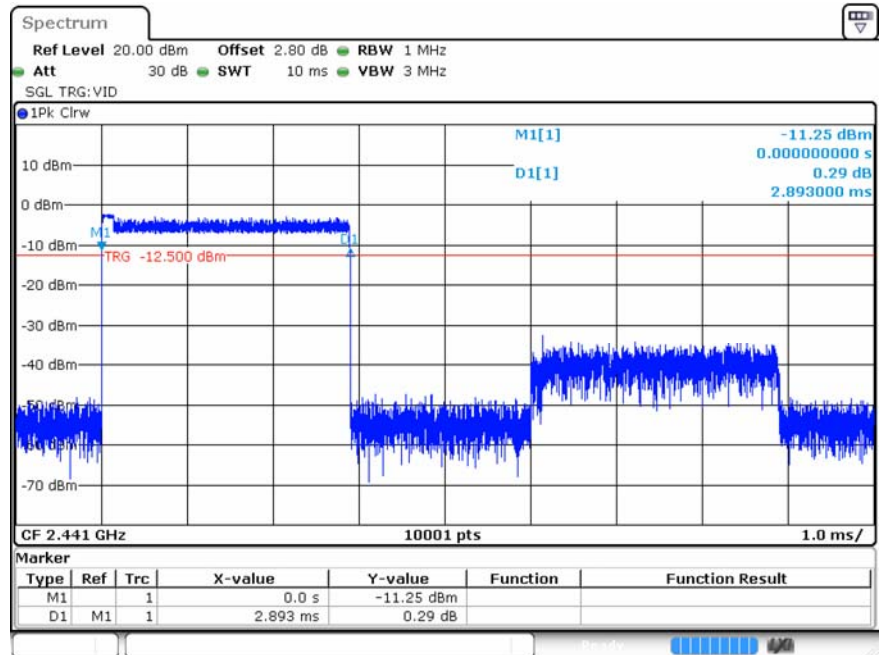
GFSK\_DH5/MCH



$\pi/4$ DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH

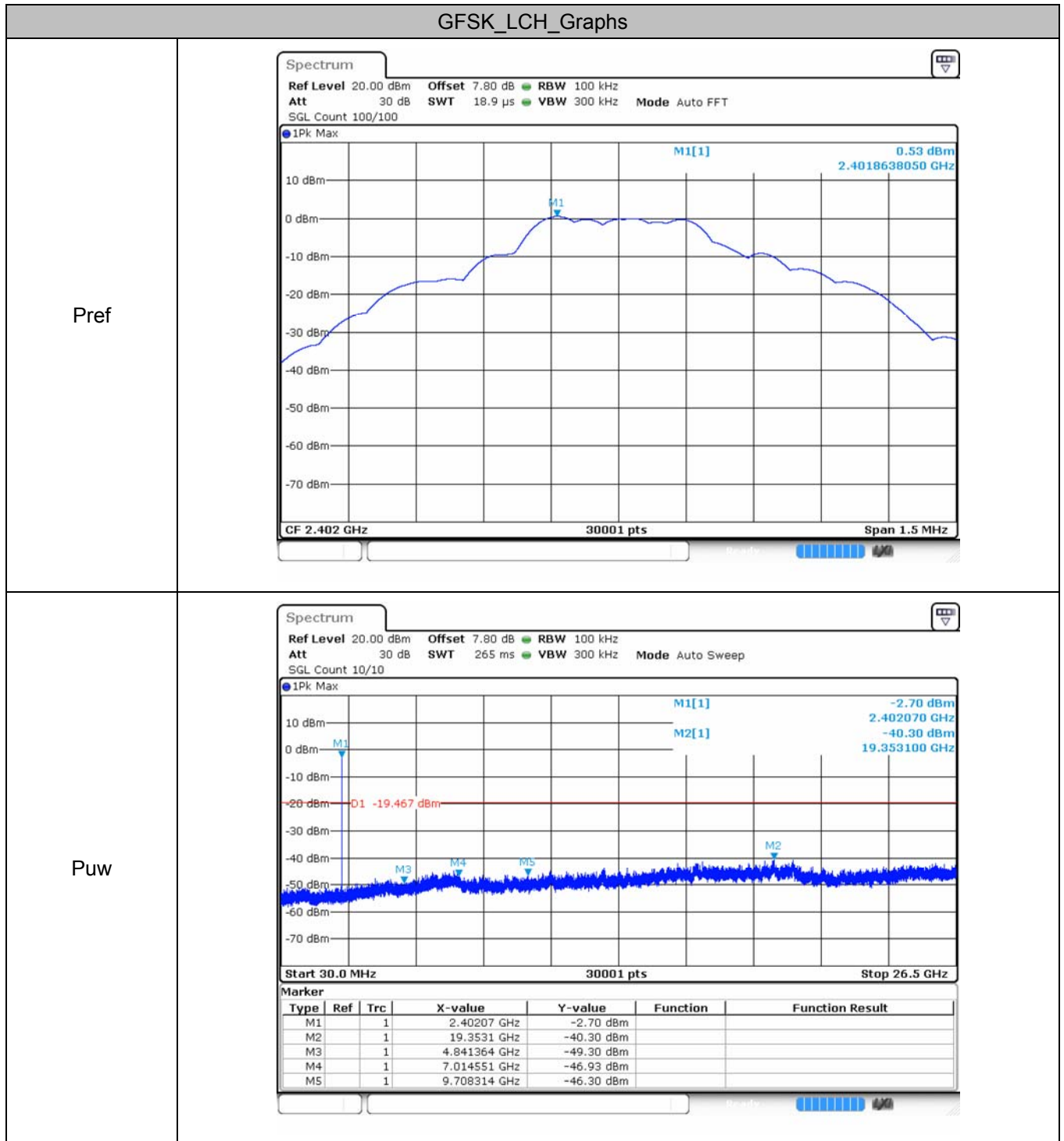


## 7 RF Conducted Spurious Emissions

### 7.1 Test Result

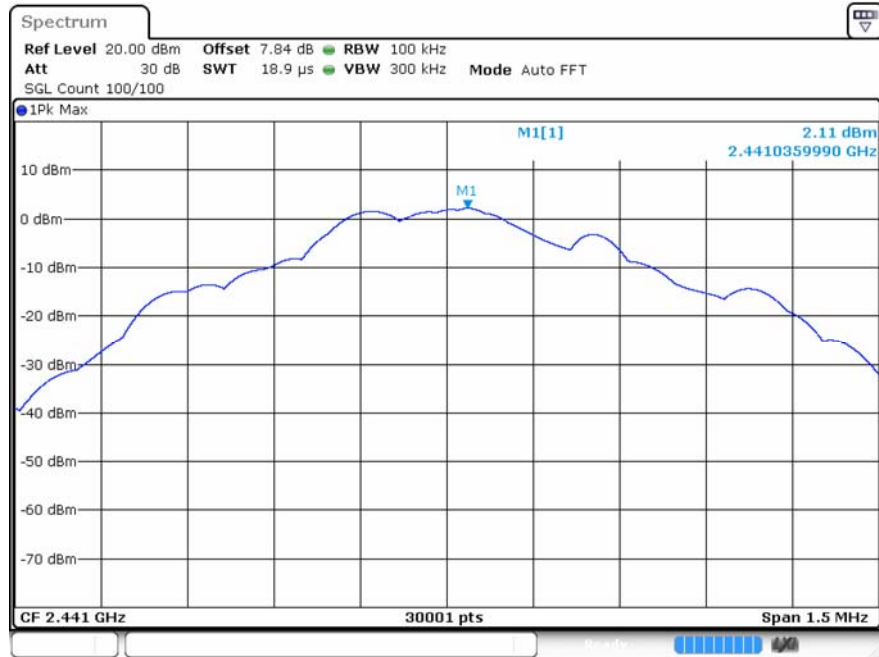
| Mode          | Channel | Max. Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|------------------|-------------|---------|
| GFSK          | LCH     | -40.83           | -20         | Pass    |
|               | MCH     | -43.22           | -20         | Pass    |
|               | HCH     | -44.09           | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -40.95           | -20         | Pass    |
|               | MCH     | -42.69           | -20         | Pass    |
|               | HCH     | -43.01           | -20         | Pass    |
| 8DPSK         | LCH     | -40.61           | -20         | Pass    |
|               | MCH     | -43.07           | -20         | Pass    |
|               | HCH     | -42.6            | -20         | Pass    |

## 7.2 Test Graphs

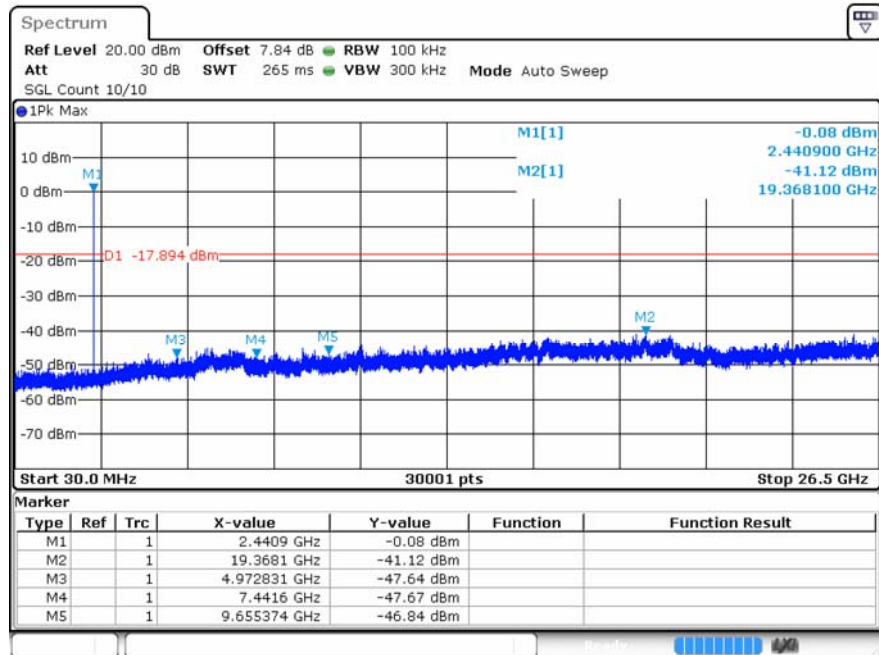


## GFSK\_MCH\_Graphs

Pref

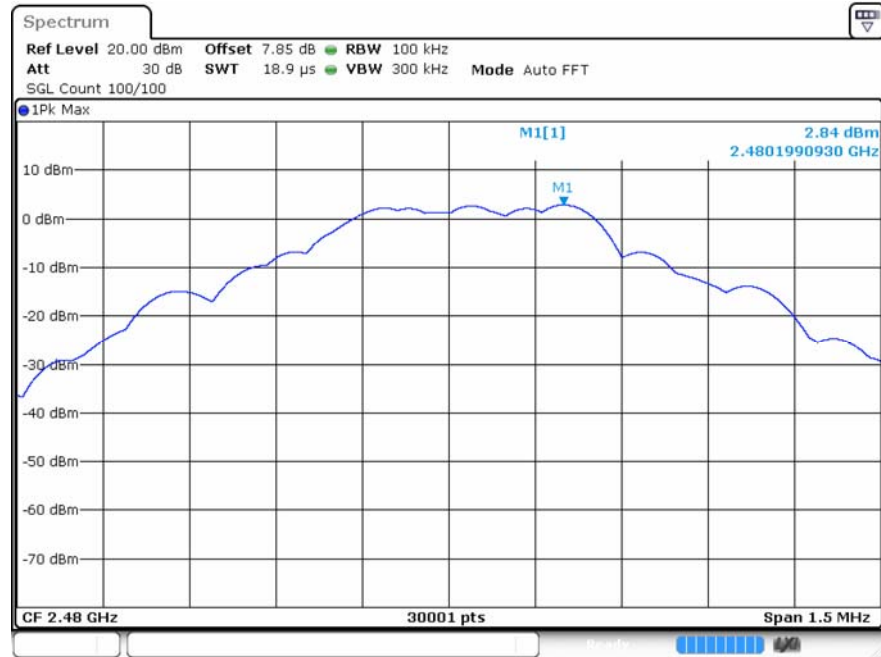


Puw

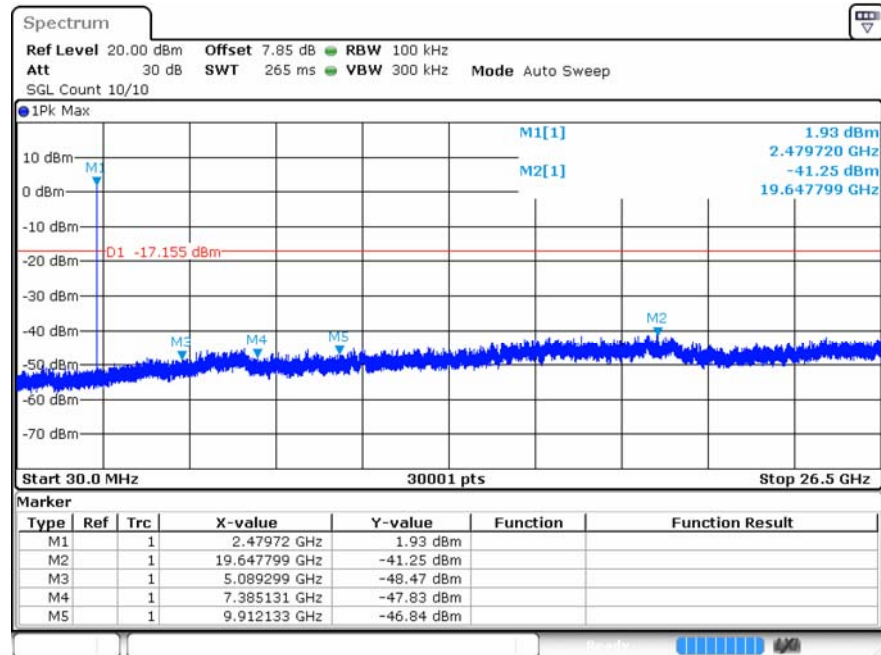


## GFSK\_HCH\_Graphs

Pref



Puw

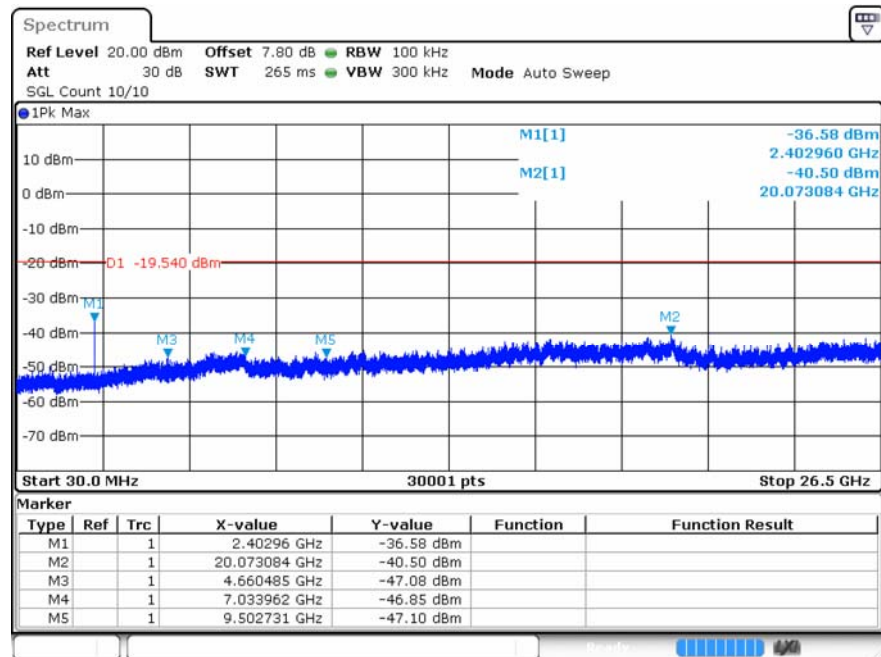


# $\pi/4$ DQPSK\_LCH\_Graphs

Pref

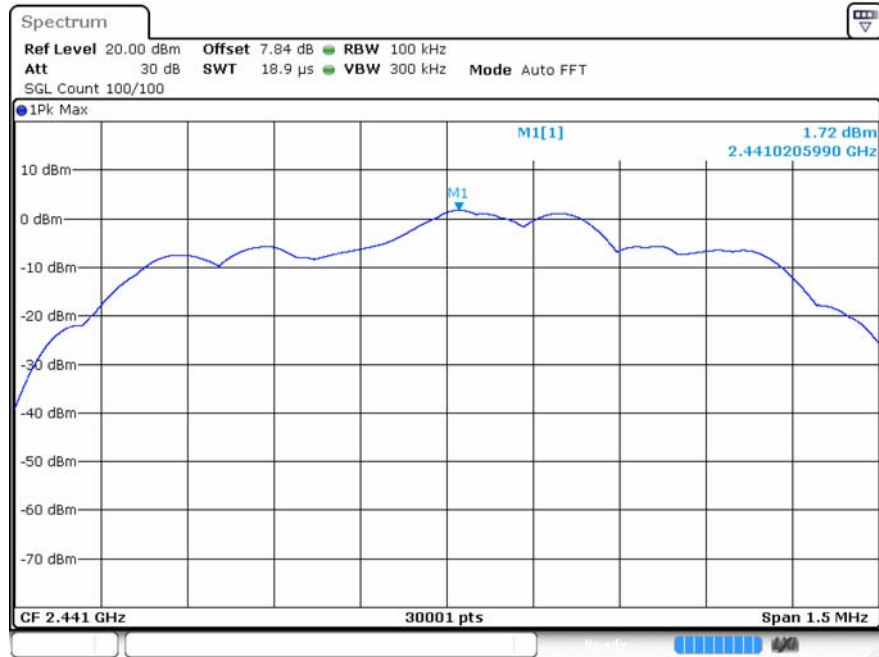


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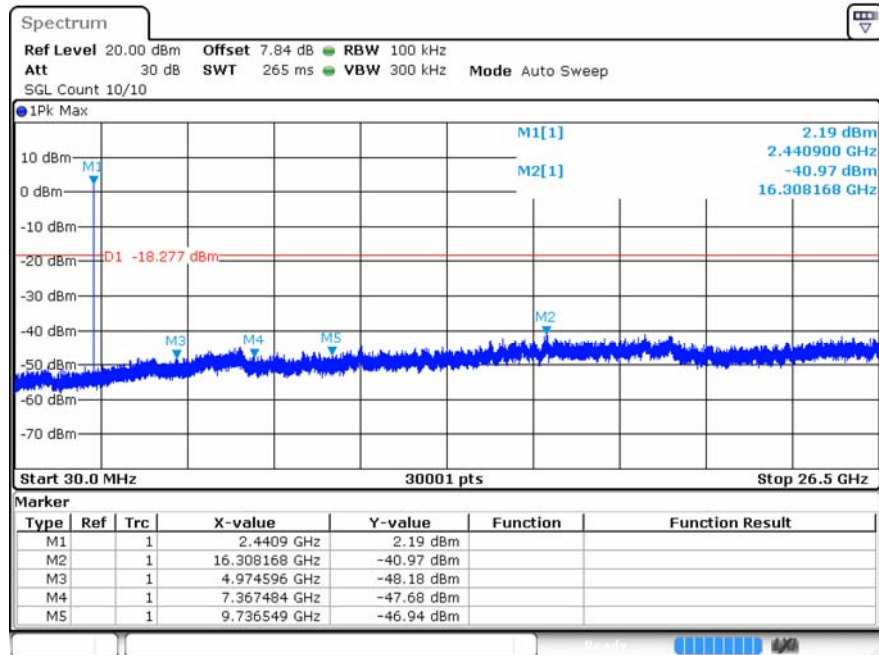


$\pi/4$ DQPSK\_MCH\_Graphs

Pref

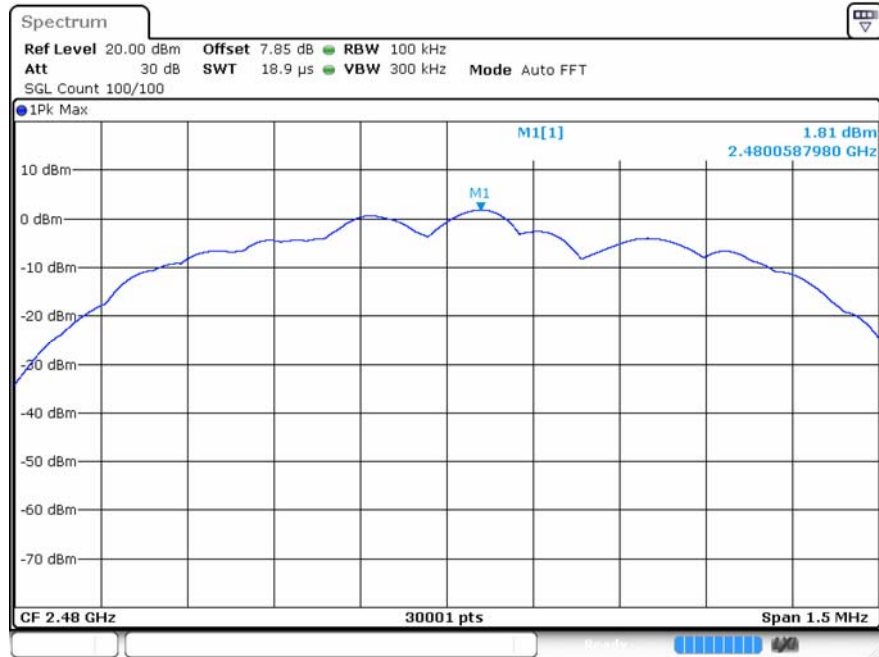


Puw

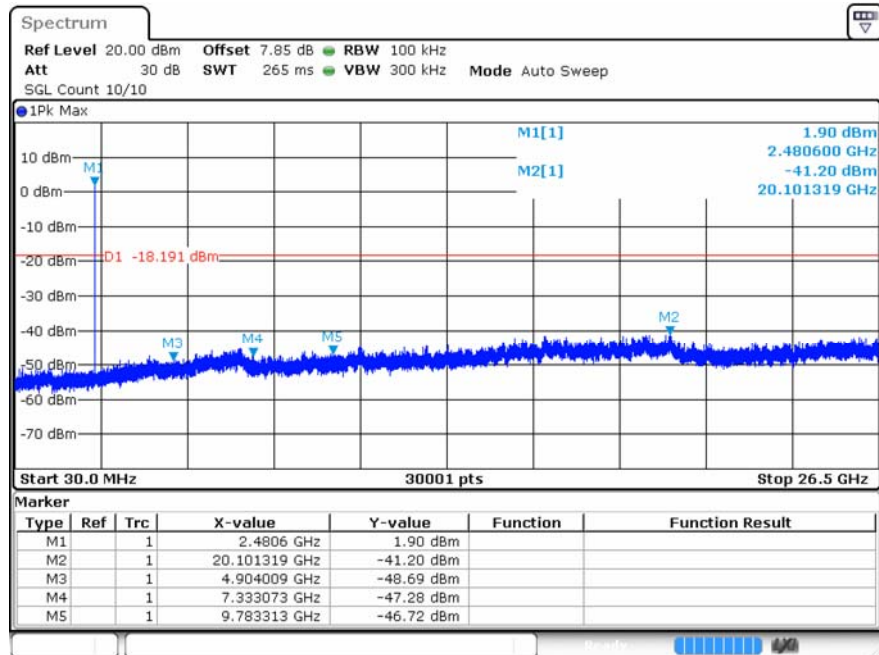


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref



Puw

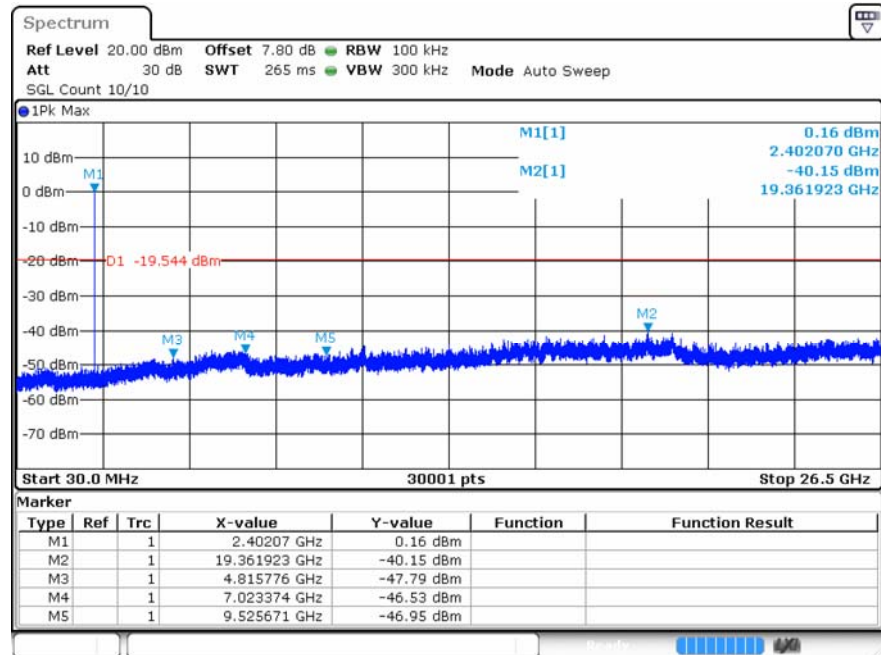


## 8DPSK\_LCH\_Graphs

Pref

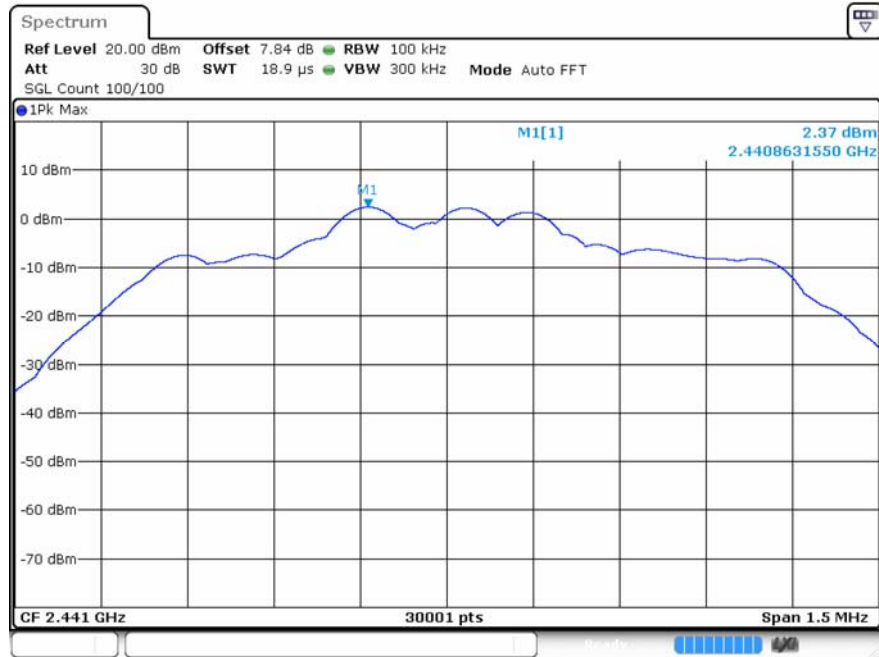


Puw

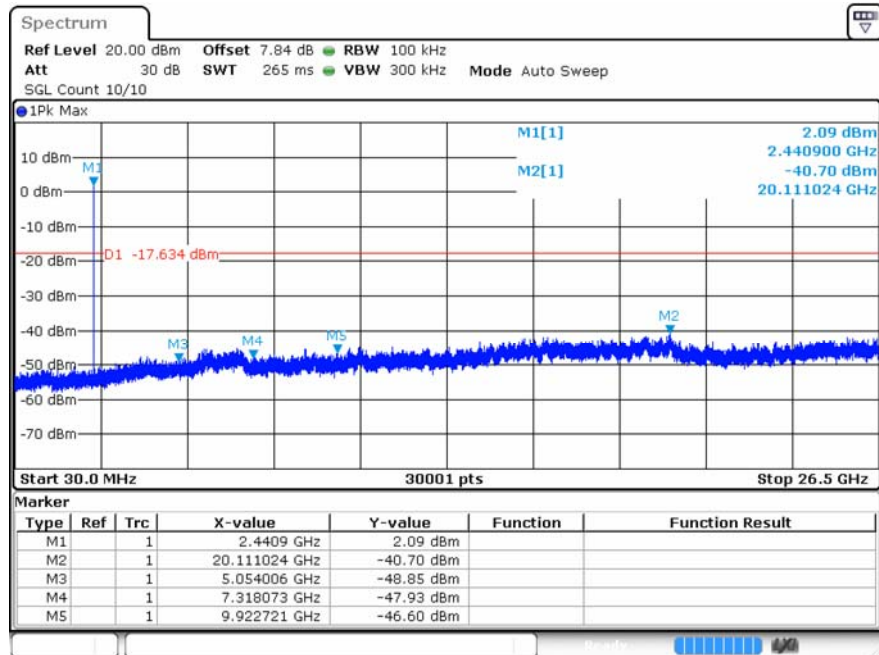


## 8DPSK\_MCH\_Graphs

Pref

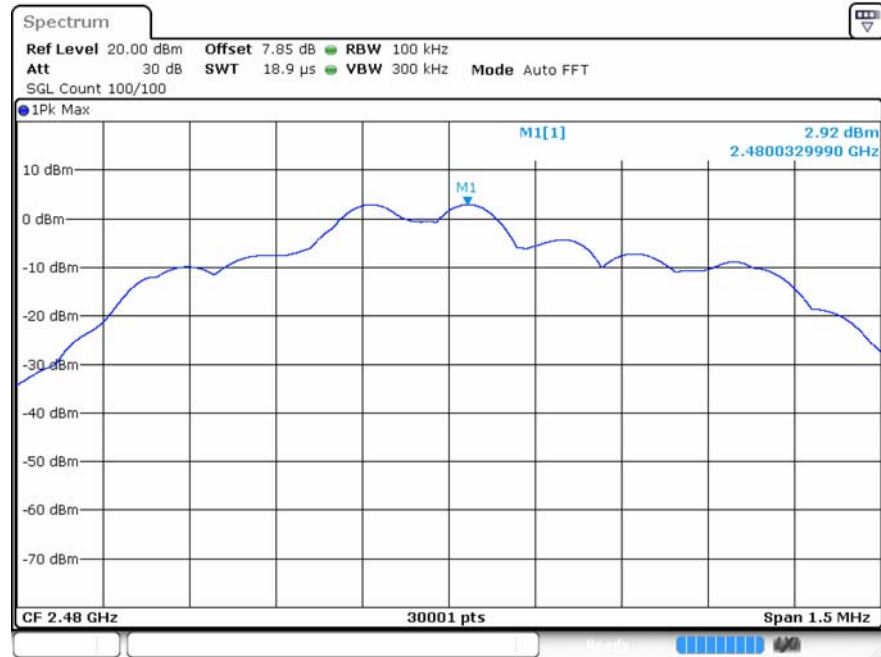


Puw

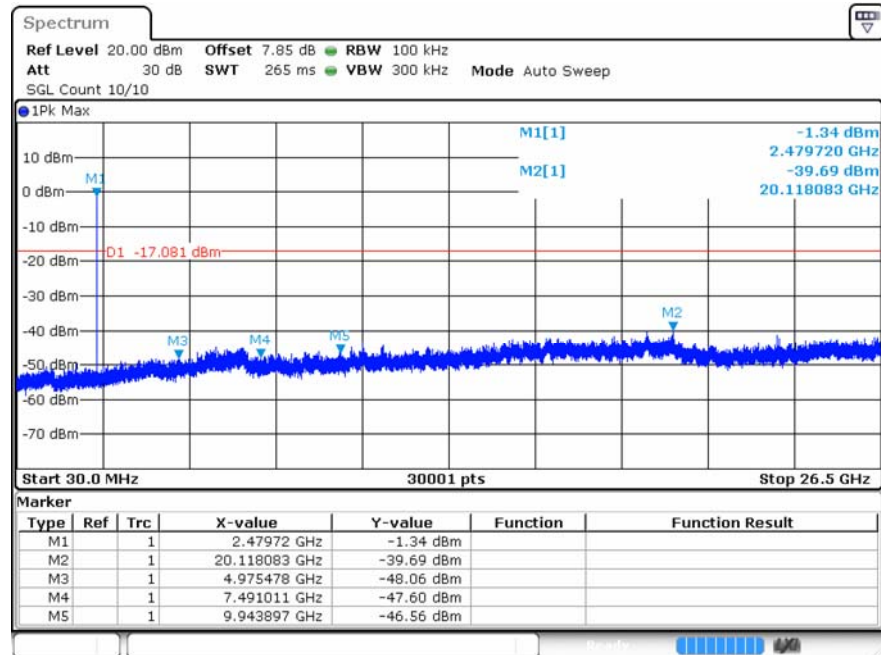


## 8DPSK\_HCH\_Graphs

Pref



Puw

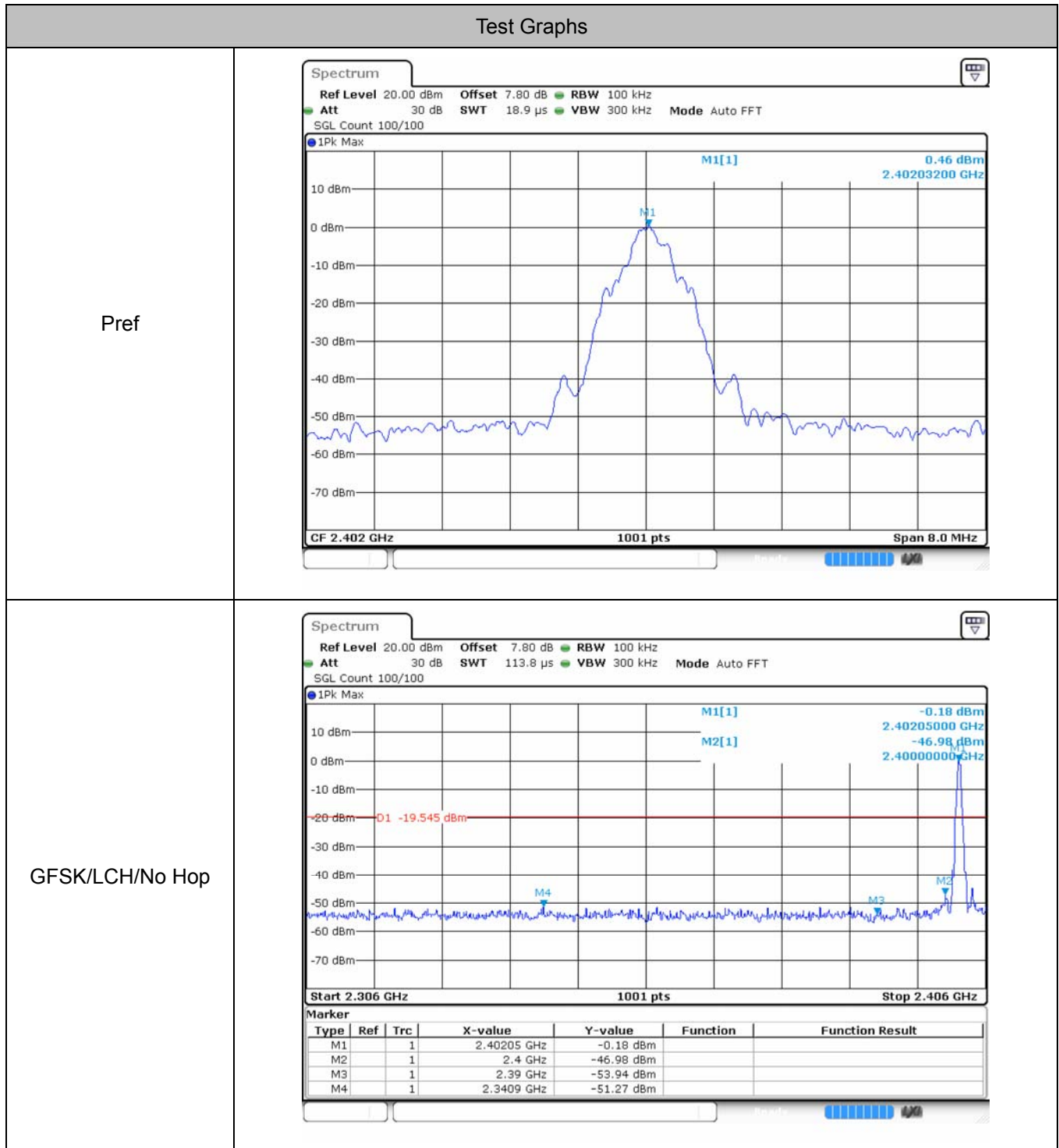


## 8 Band-edge for RF Conducted Emissions

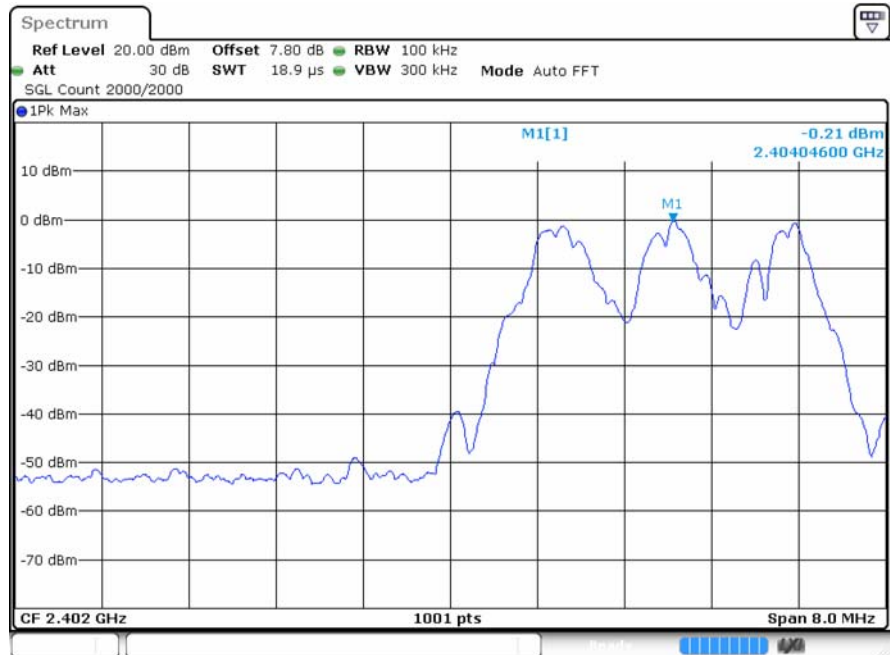
### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -51.72                   | -20         | Pass    |
|               |         |                         | On                | -50.11                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -53.01                   | -20         | Pass    |
|               |         |                         | On                | -52.69                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -50.93                   | -20         | Pass    |
|               |         |                         | On                | -50.28                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -53.09                   | -20         | Pass    |
|               |         |                         | On                | -53.01                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -50.82                   | -20         | Pass    |
|               |         |                         | On                | -50.98                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -54.08                   | -20         | Pass    |
|               |         |                         | On                | -53.44                   | -20         | Pass    |

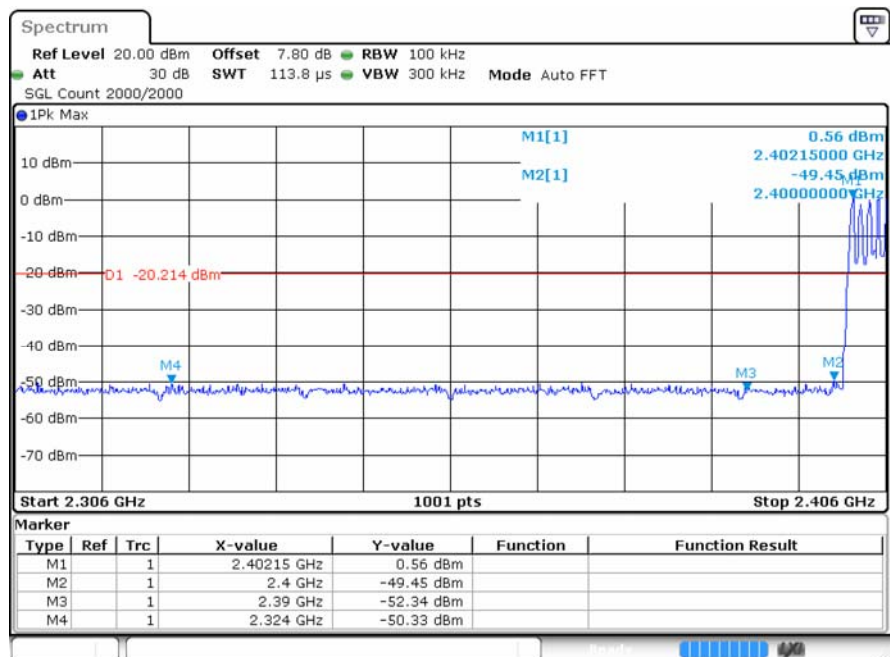
## 8.2 Test Graphs



Ref



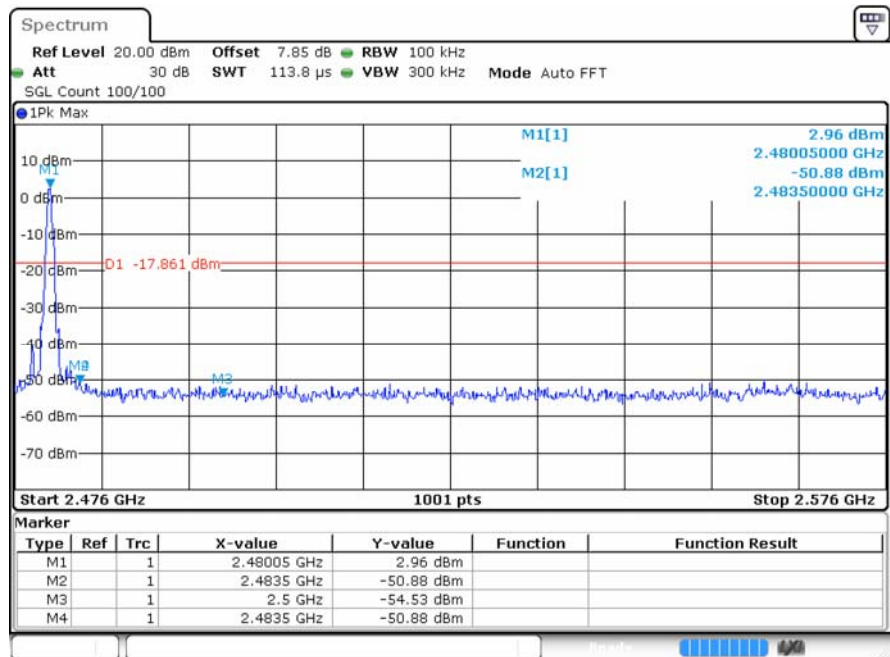
GFSK/LCH/Hop



Ref



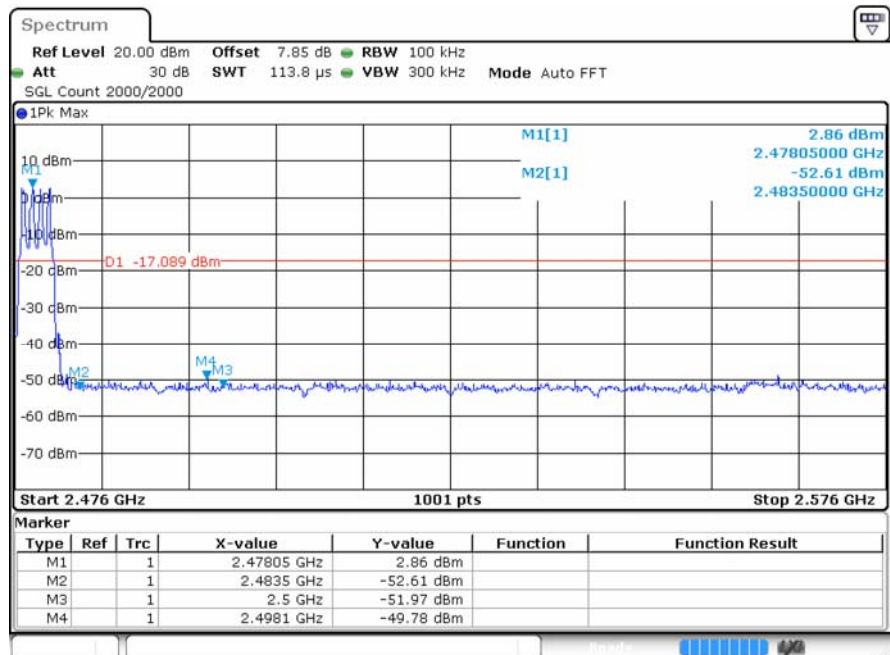
GFSK/HCH/No Hop



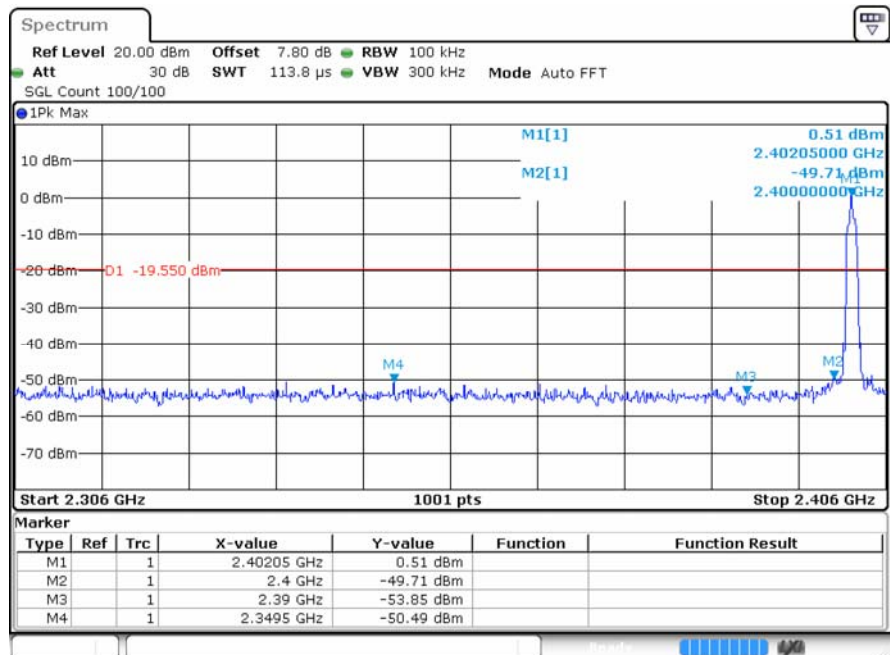
Ref.



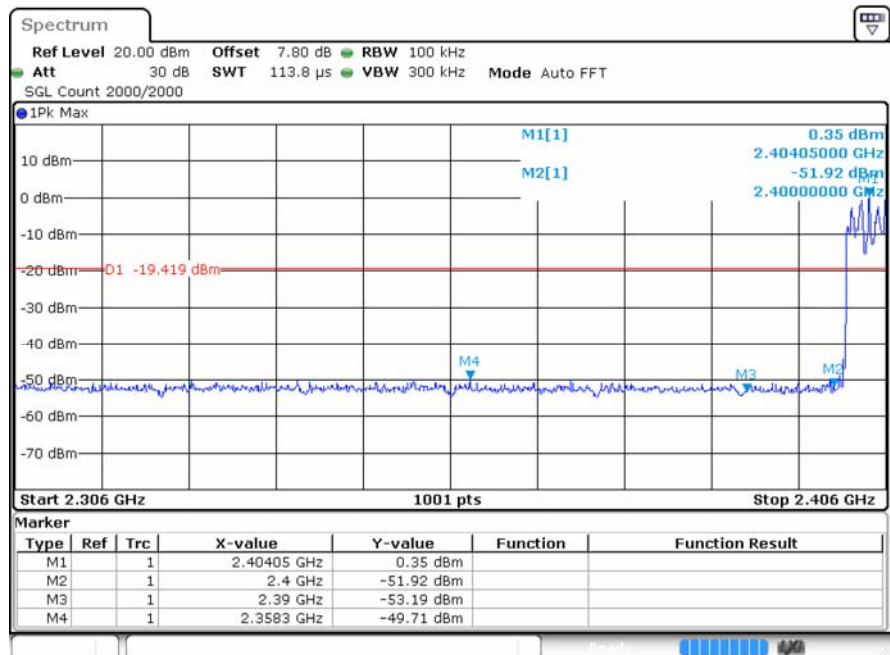
GFSK/HCH/Hop



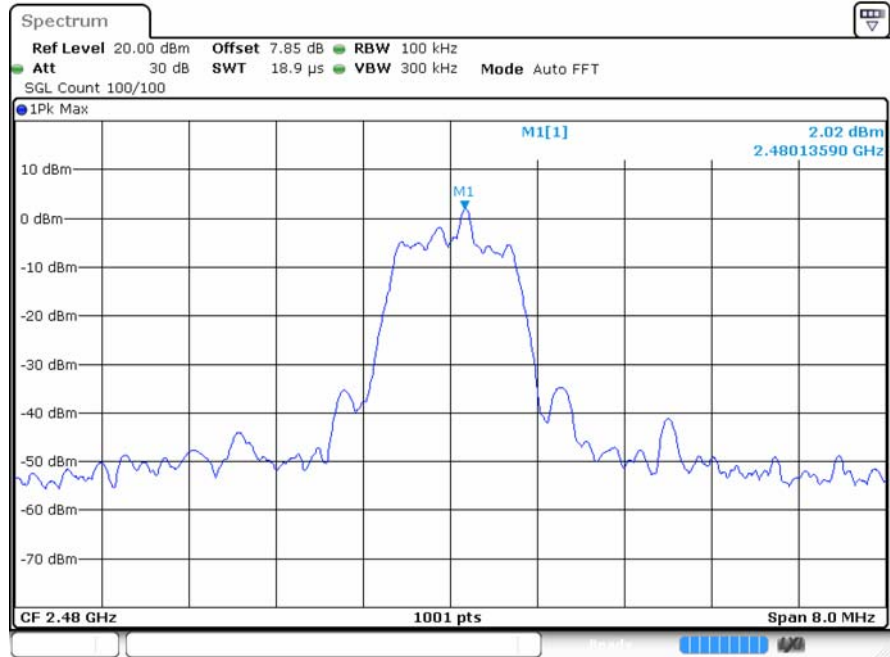
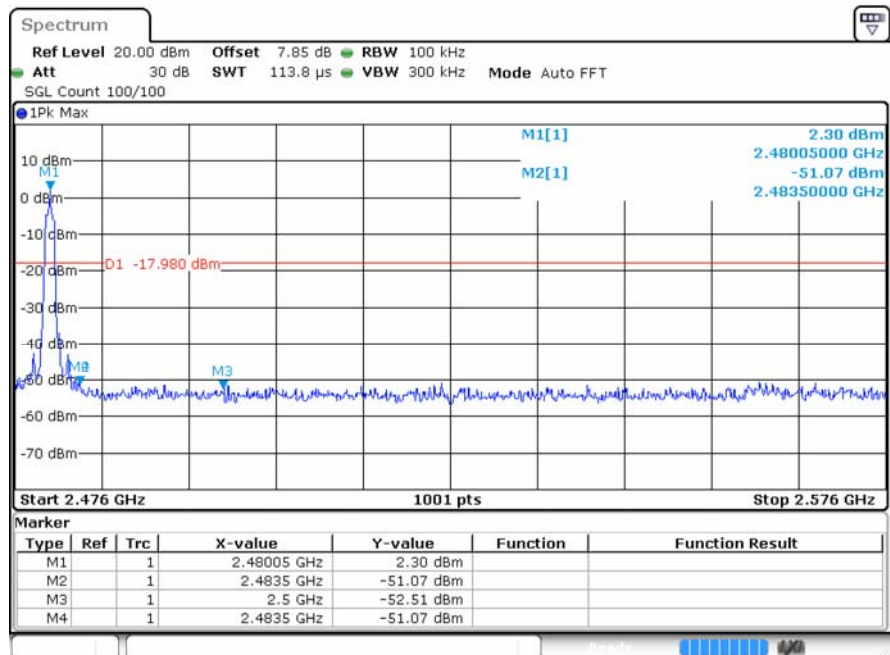
Ref


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


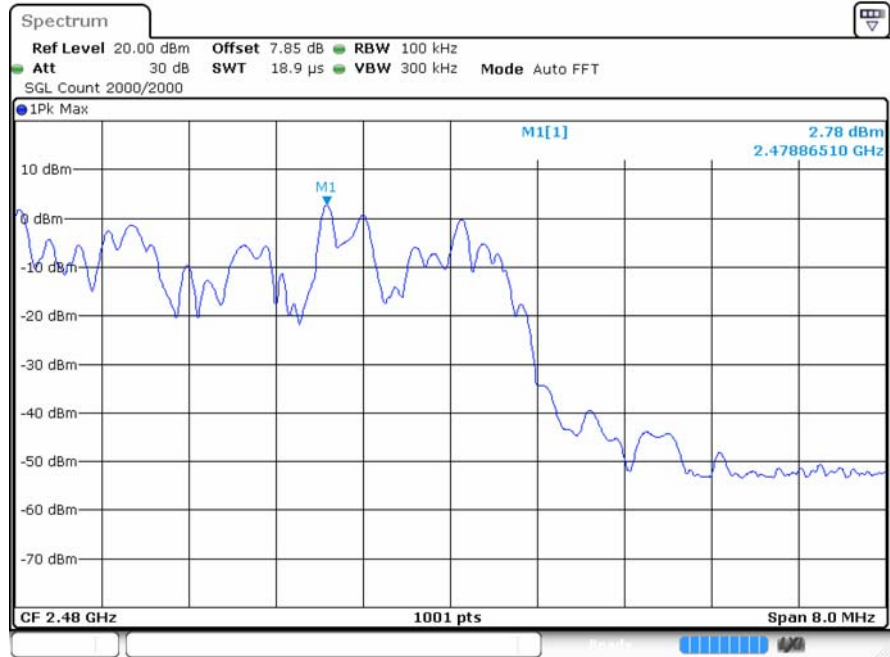
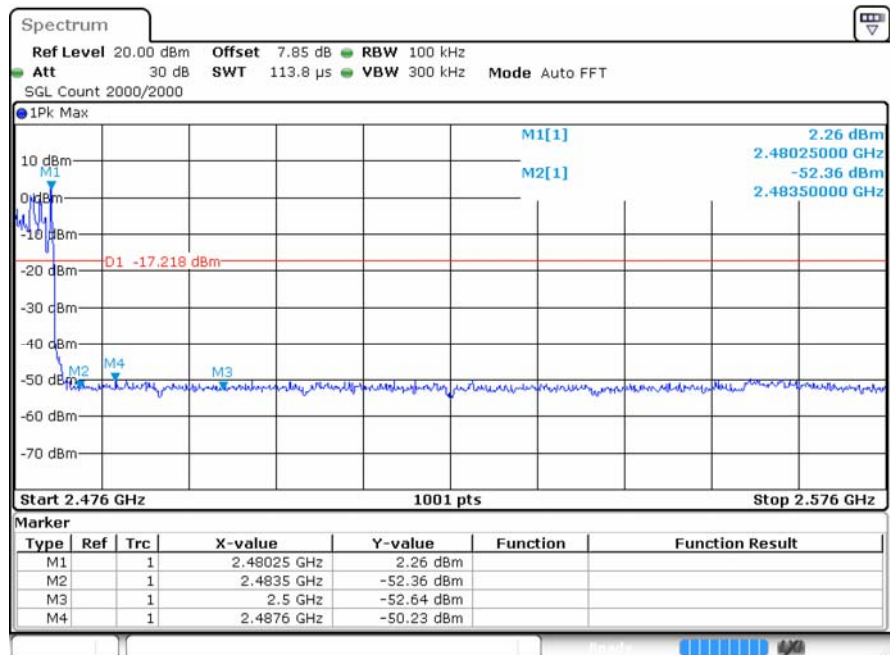
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 $\pi/4$ DQPSK/LCH/Hop


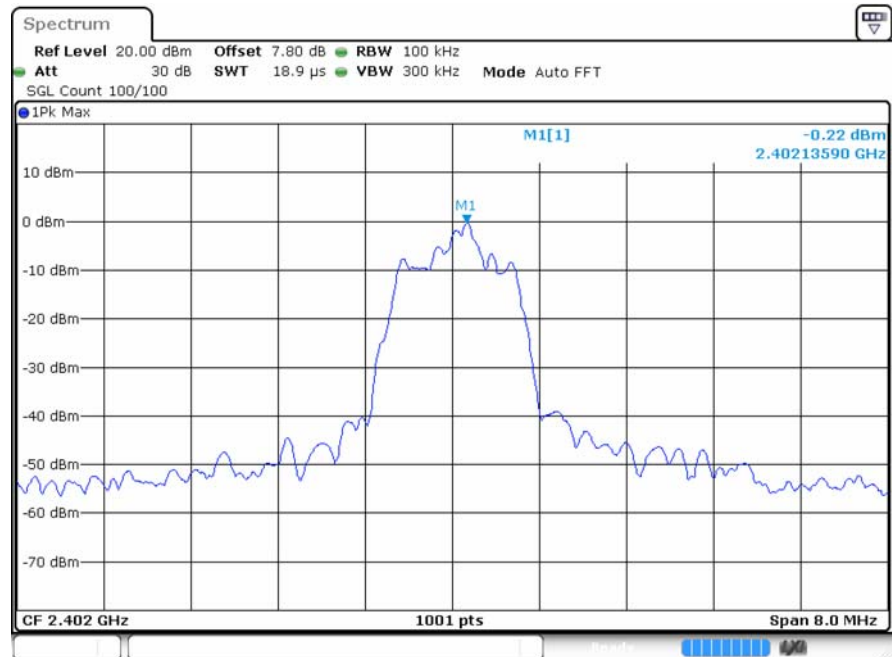
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 $\pi/4$ DQPSK/HCH/No  
Hop


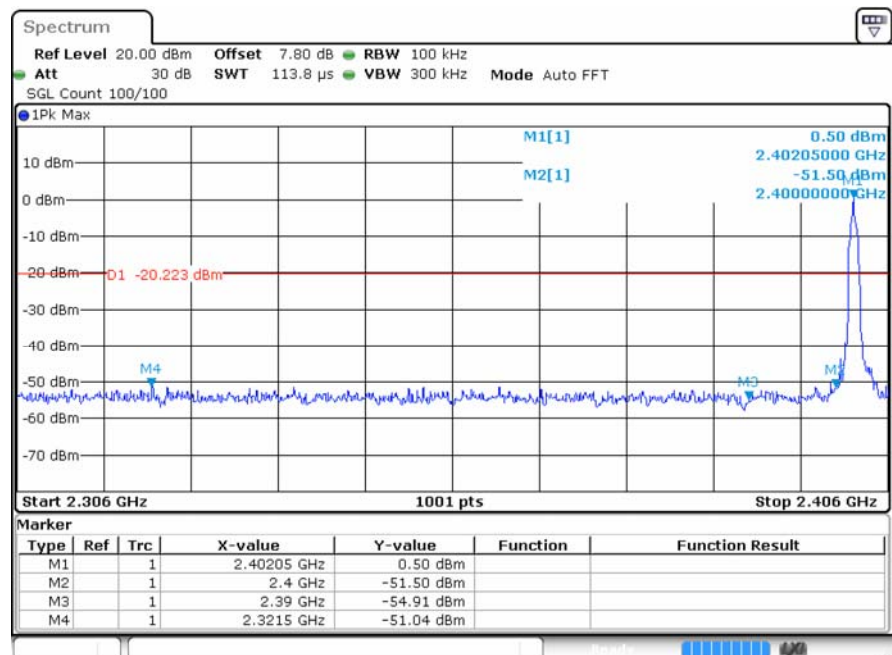
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 $\pi/4$ DQPSK/HCH/Hop


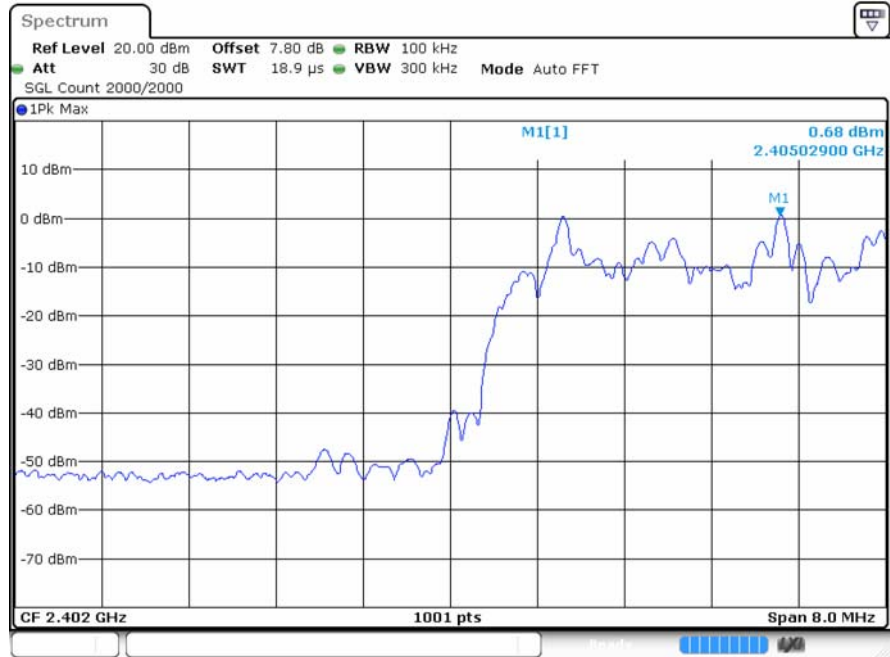
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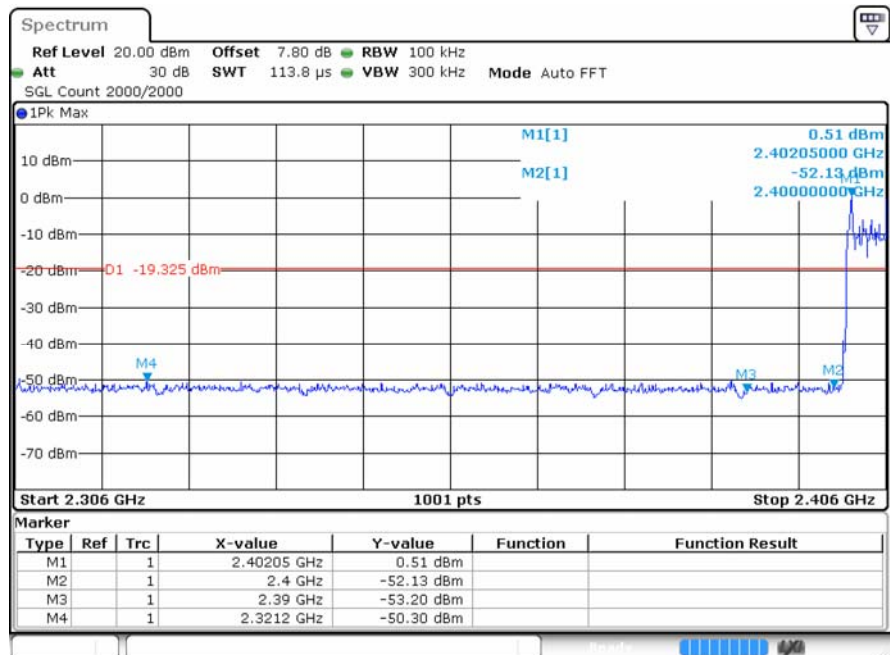
8DPSK/LCH/No Hop



Ref



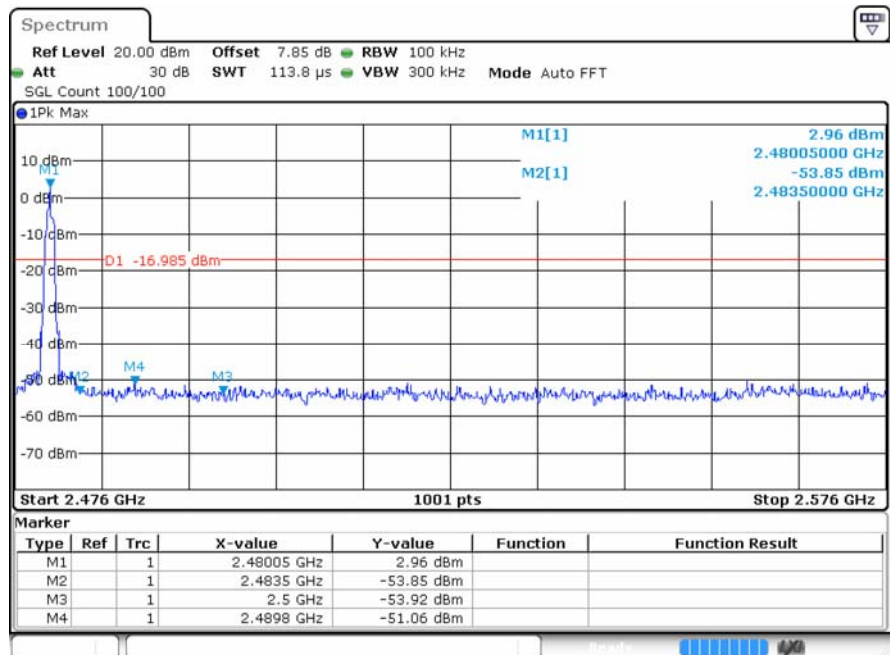
8DPSK/LCH/Hop



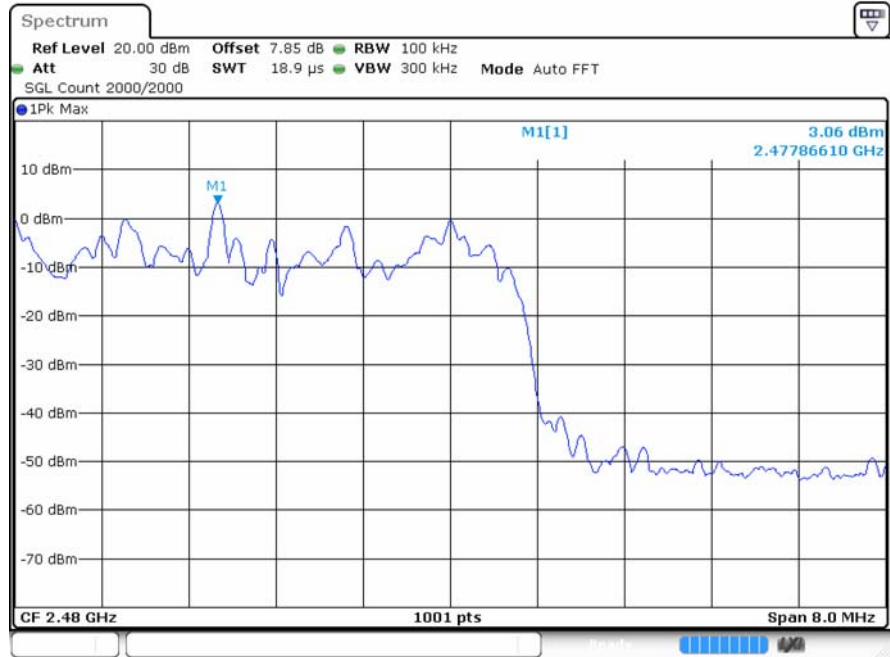
Ref



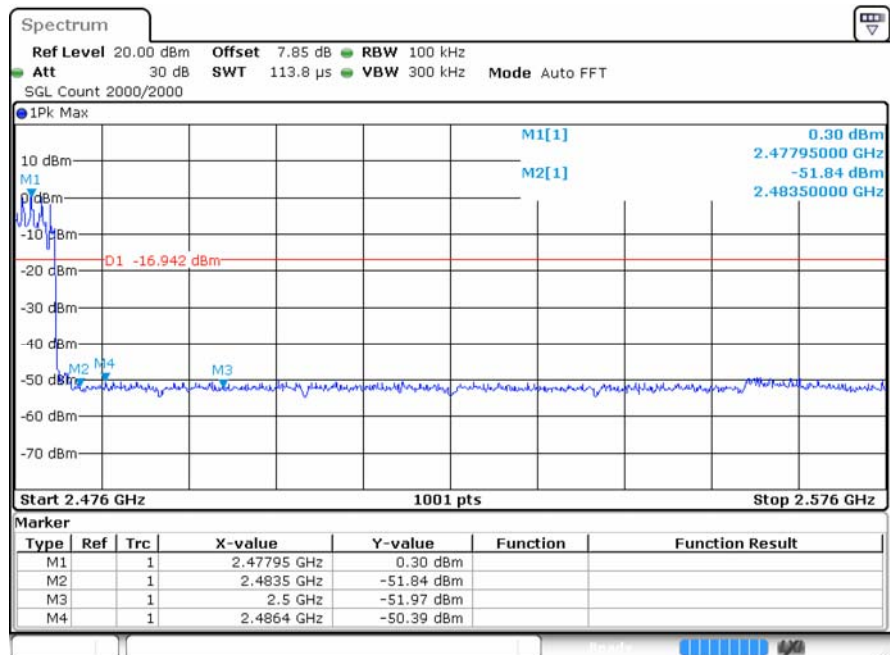
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

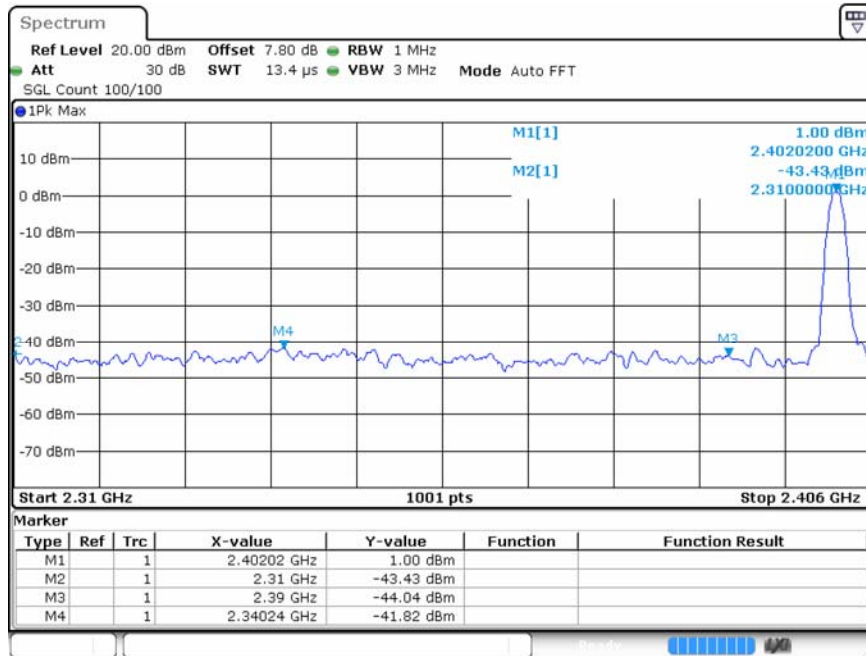
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -43.42      | 5.04 | 56.88      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -52.99      | 5.04 | 47.31      | AV       | 54             | Pass    |
|               | Off     | 2340.24  | -41.81      | 5.04 | 58.49      | PEAK     | 74             | Pass    |
|               | Off     | 2338.128 | -51.15      | 5.04 | 49.15      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -44.04      | 5.04 | 56.26      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -53.57      | 5.04 | 46.73      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -44.5       | 5.04 | 55.8       | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -50.28      | 5.04 | 50.02      | AV       | 54             | Pass    |
|               | Off     | 2494.792 | -42.66      | 5.04 | 57.64      | PEAK     | 74             | Pass    |
|               | Off     | 2483.512 | -50.28      | 5.04 | 50.02      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -44.96      | 5.04 | 55.34      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -52.73      | 5.04 | 47.57      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -44.41      | 5.04 | 55.89      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -53         | 5.04 | 47.3       | AV       | 54             | Pass    |
|               | Off     | 2353.2   | -42.38      | 5.04 | 57.92      | PEAK     | 74             | Pass    |
|               | Off     | 2340.048 | -51.18      | 5.04 | 49.12      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -46.27      | 5.04 | 54.03      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -52.95      | 5.04 | 47.35      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -41.38      | 5.04 | 58.92      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -50.7       | 5.04 | 49.6       | AV       | 54             | Pass    |
|               | Off     | 2483.512 | -41.38      | 5.04 | 58.92      | PEAK     | 74             | Pass    |
|               | Off     | 2483.512 | -50.7       | 5.04 | 49.6       | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -44.44      | 5.04 | 55.86      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -52.68      | 5.04 | 47.62      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -42.41      | 5.04 | 57.89      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -53.15      | 5.04 | 47.15      | AV       | 54             | Pass    |
|               | Off     | 2342.928 | -40.41      | 5.04 | 59.89      | PEAK     | 74             | Pass    |
|               | Off     | 2339.664 | -50.91      | 5.04 | 49.39      | AV       | 54             | Pass    |



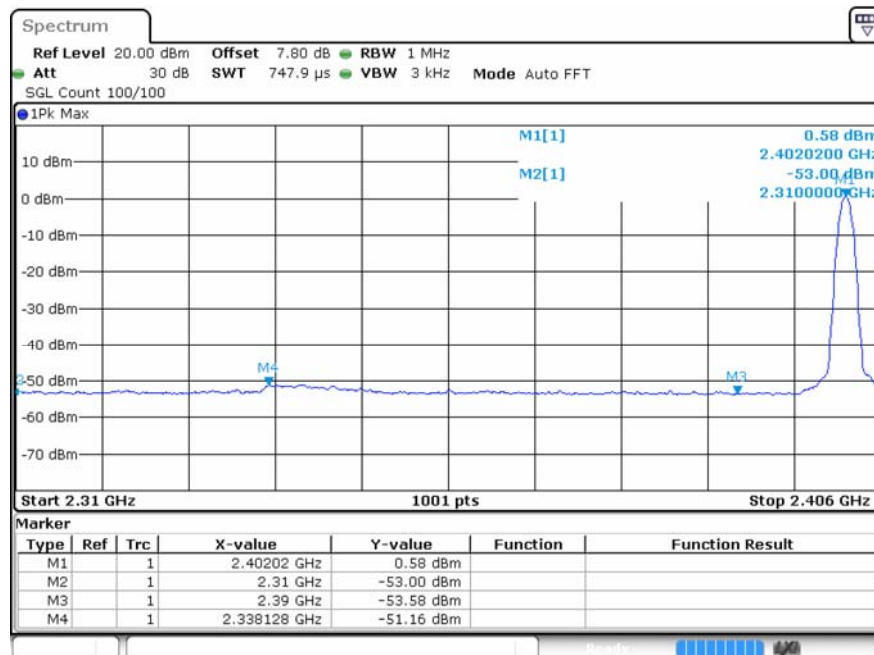
|  |     |          |        |      |       |      |    |      |
|--|-----|----------|--------|------|-------|------|----|------|
|  | Off | 2390.0   | -45.41 | 5.04 | 54.89 | PEAK | 74 | Pass |
|  | Off | 2390.0   | -52.91 | 5.04 | 47.39 | AV   | 54 | Pass |
|  | Off | 2483.5   | -44.33 | 5.04 | 55.97 | PEAK | 74 | Pass |
|  | Off | 2483.5   | -50.49 | 5.04 | 49.81 | AV   | 54 | Pass |
|  | Off | 2489.032 | -42.32 | 5.04 | 57.98 | PEAK | 74 | Pass |
|  | Off | 2483.512 | -50.49 | 5.04 | 49.81 | AV   | 54 | Pass |
|  | Off | 2500.0   | -46.01 | 5.04 | 54.29 | PEAK | 74 | Pass |
|  | Off | 2500.0   | -53.09 | 5.04 | 47.21 | AV   | 54 | Pass |

## 9.2 Test Graphs

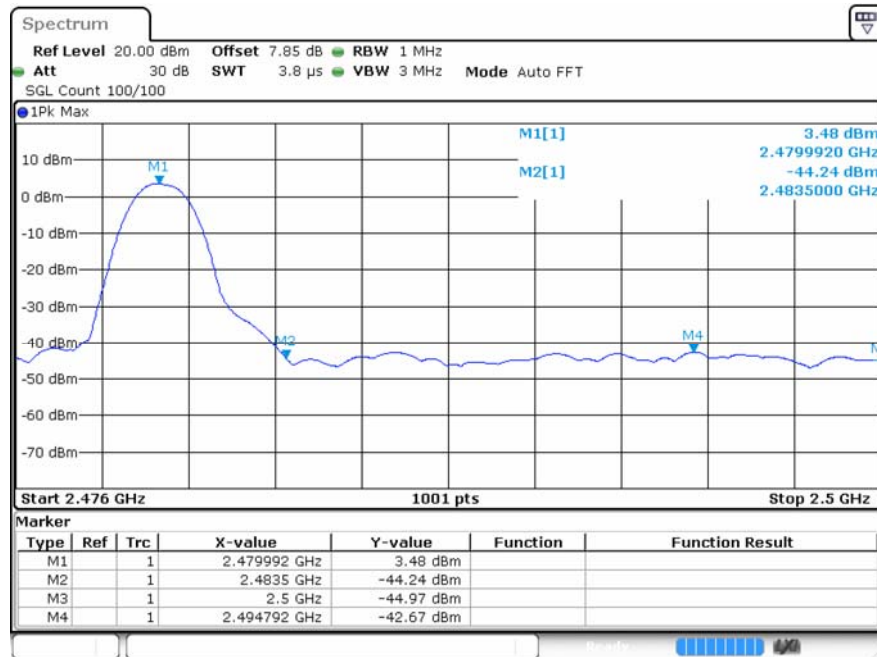
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



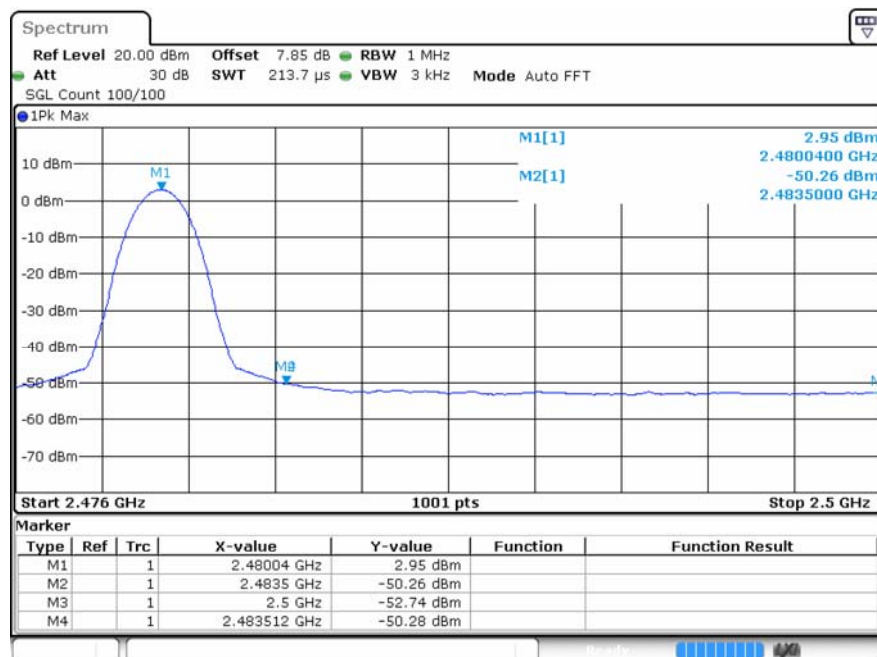
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



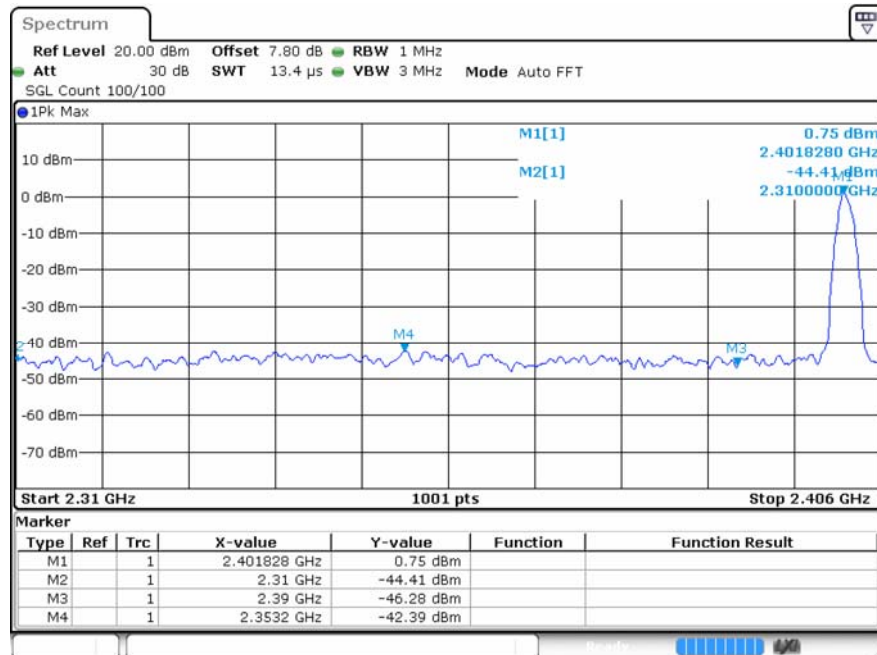
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



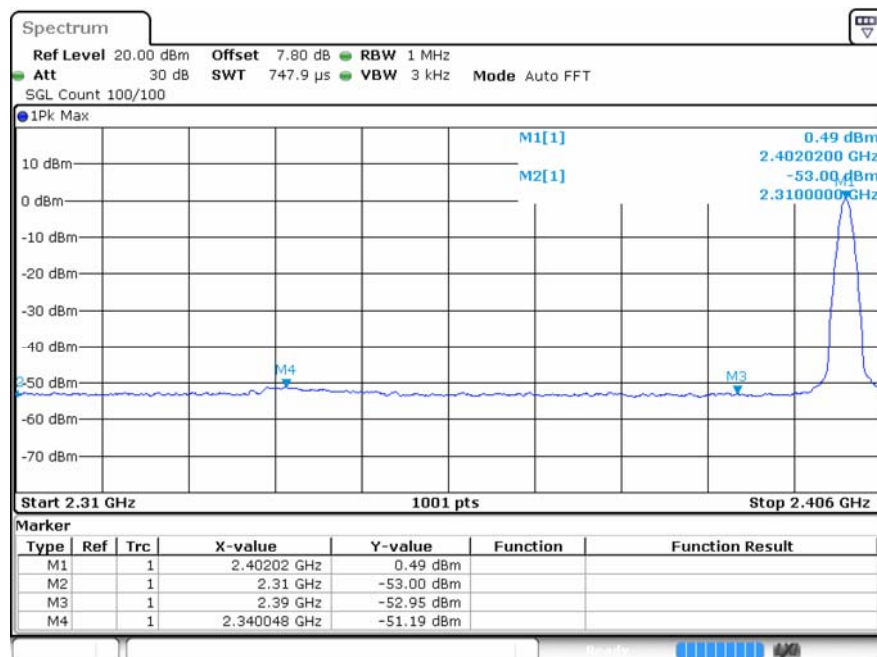
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



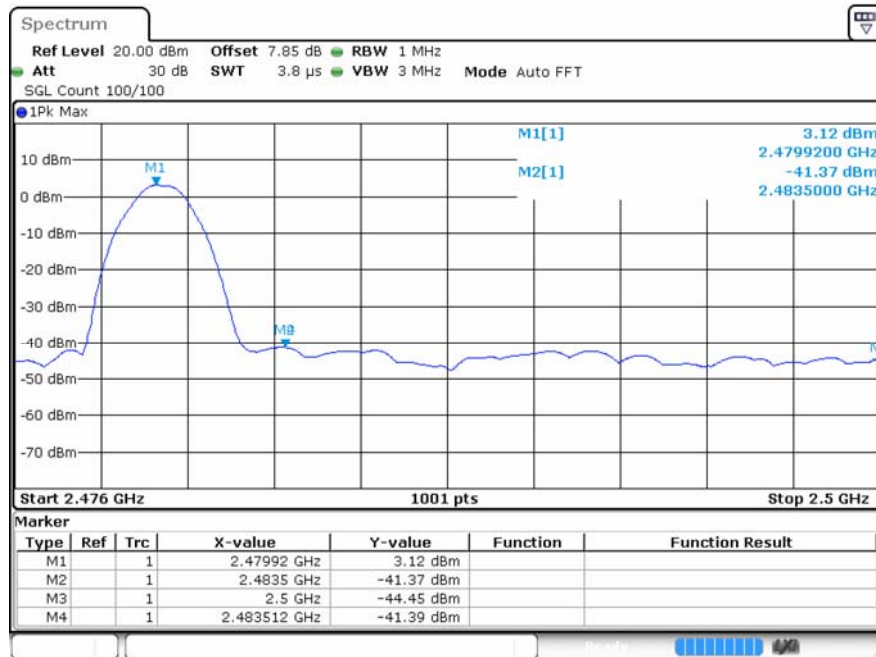
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



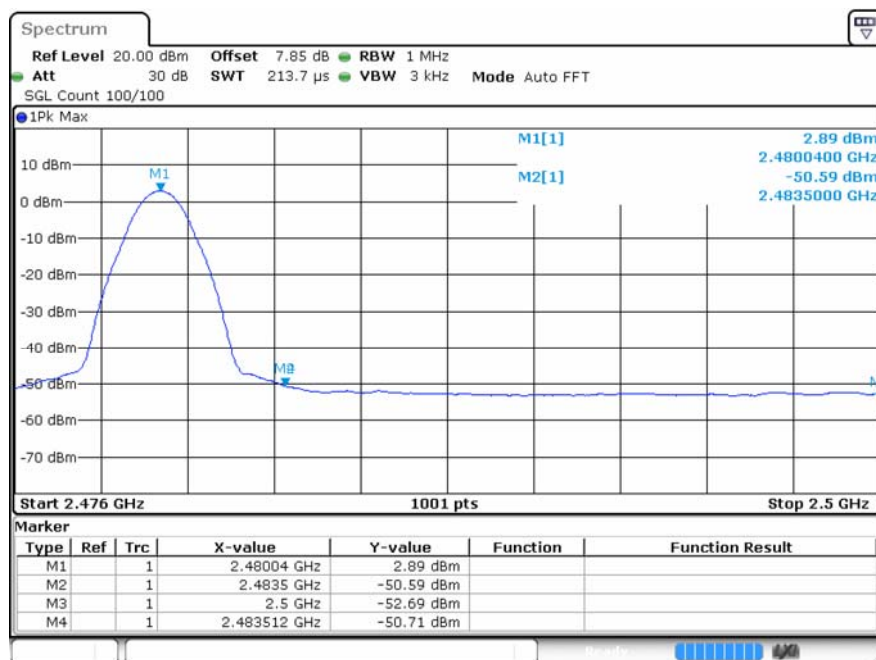
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



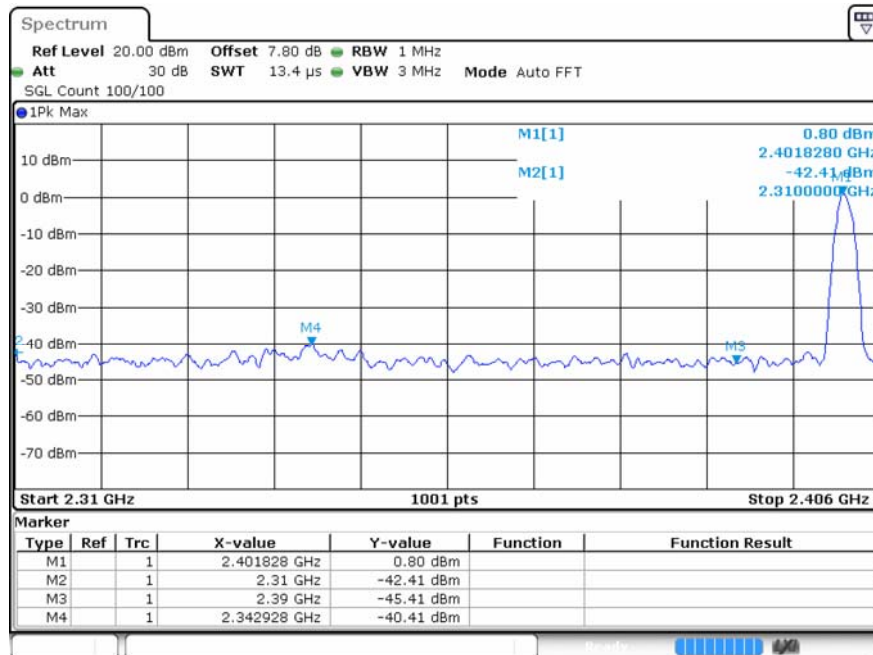
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



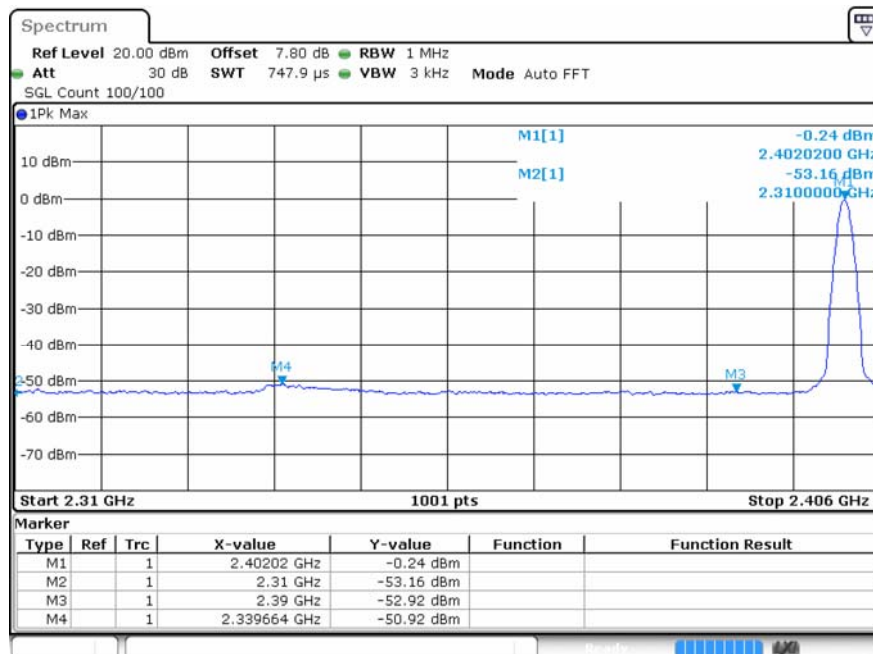
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



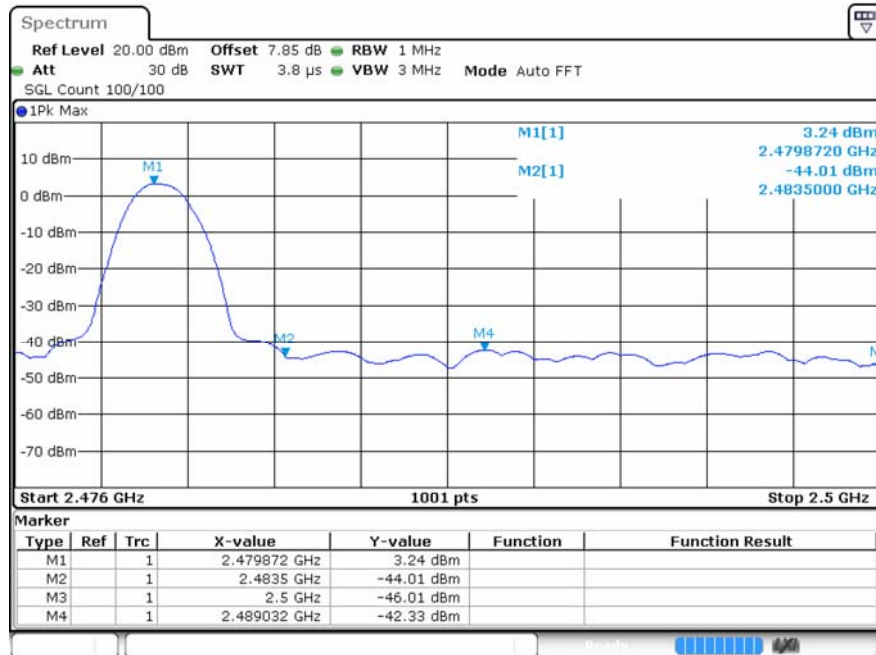
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



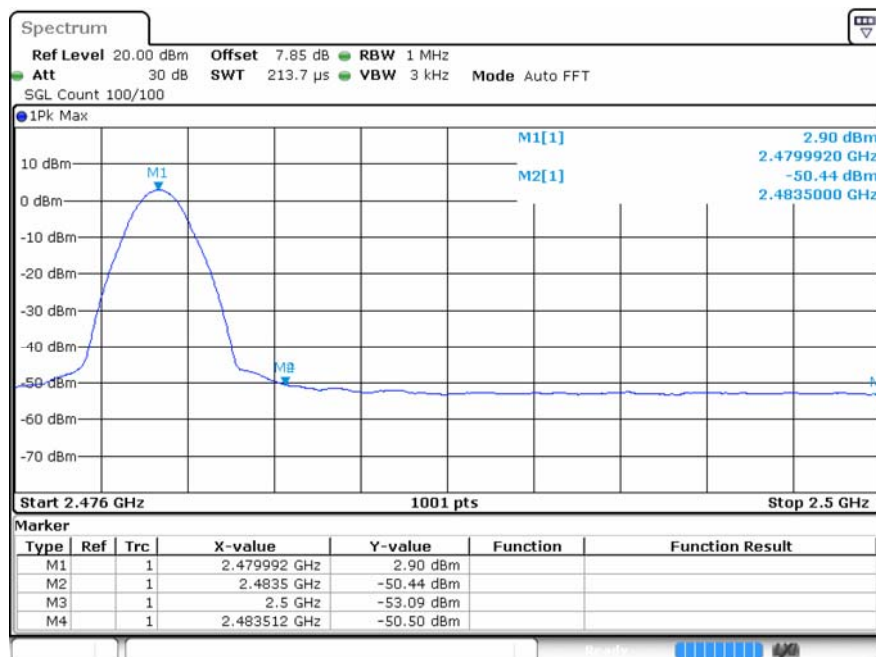
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---