



## Appendix A

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

Product Name: AIREWAVE PRO OPEN EARBUDS

Trade Mark: IINVICTOR

Test Model: 9E04-101

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 25.1°C      |
| Relative Humidity: | 50.5%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Emiya Lin   |
| Supervised by:     | Simba Huang |



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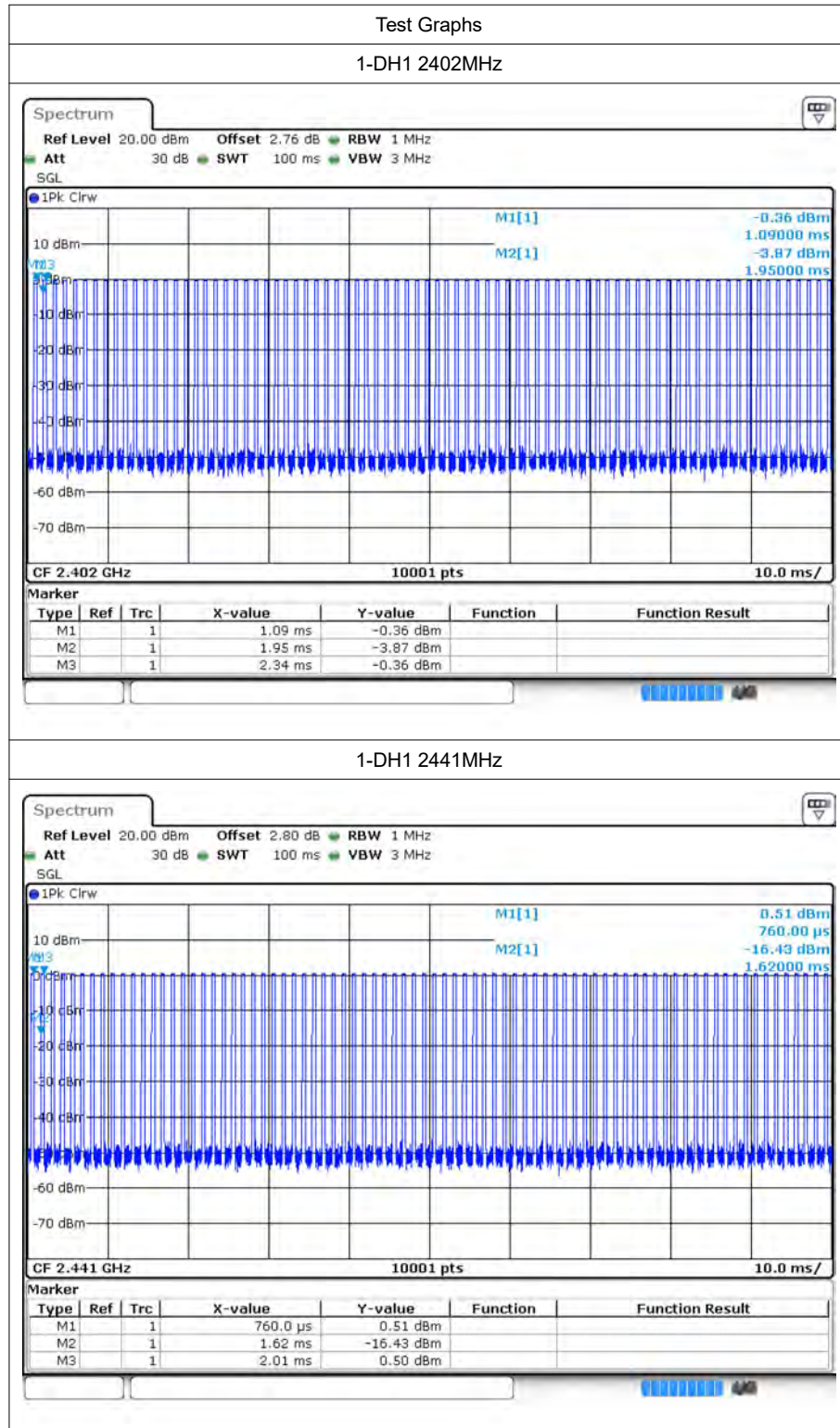
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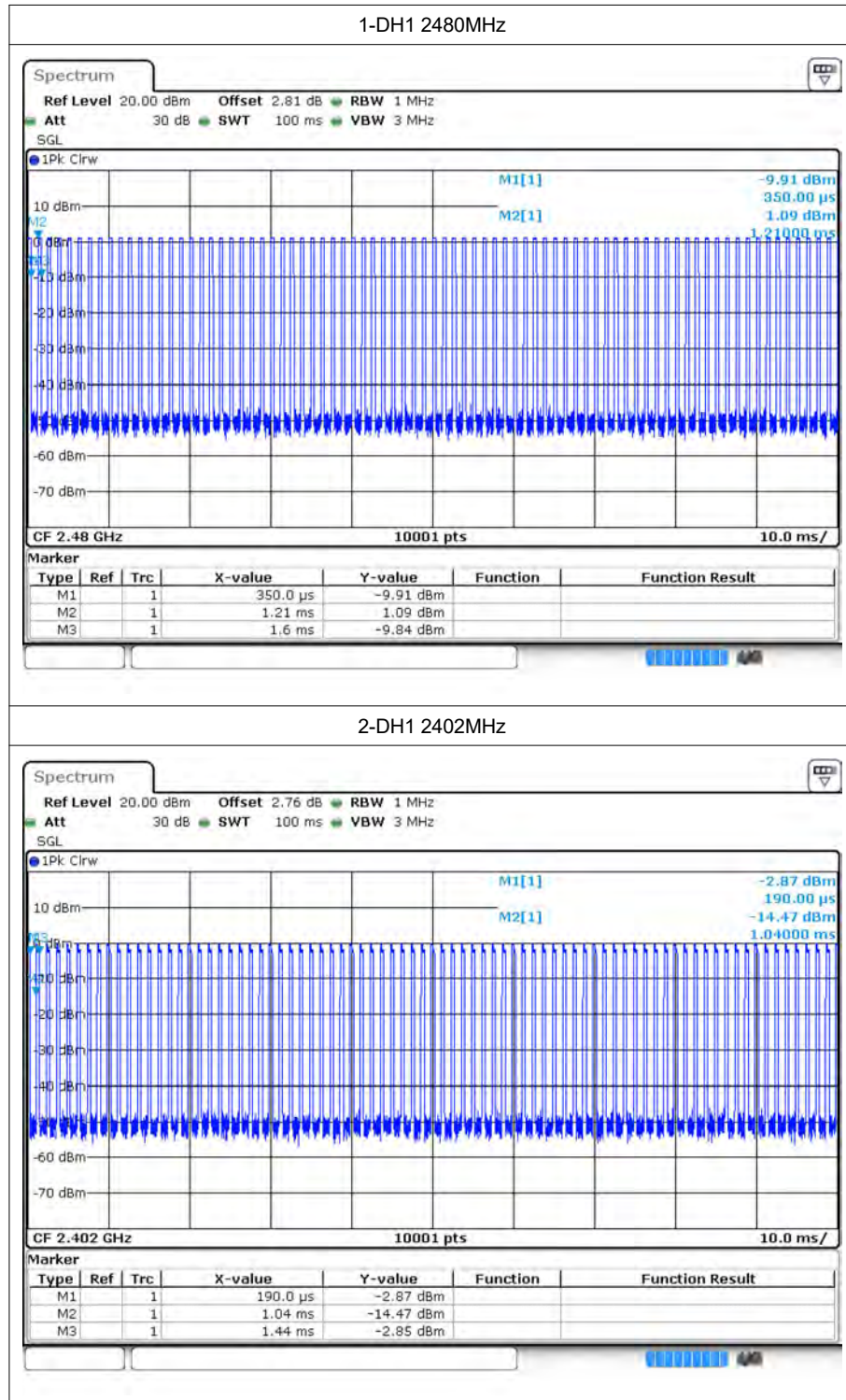
# 1 Duty Cycle

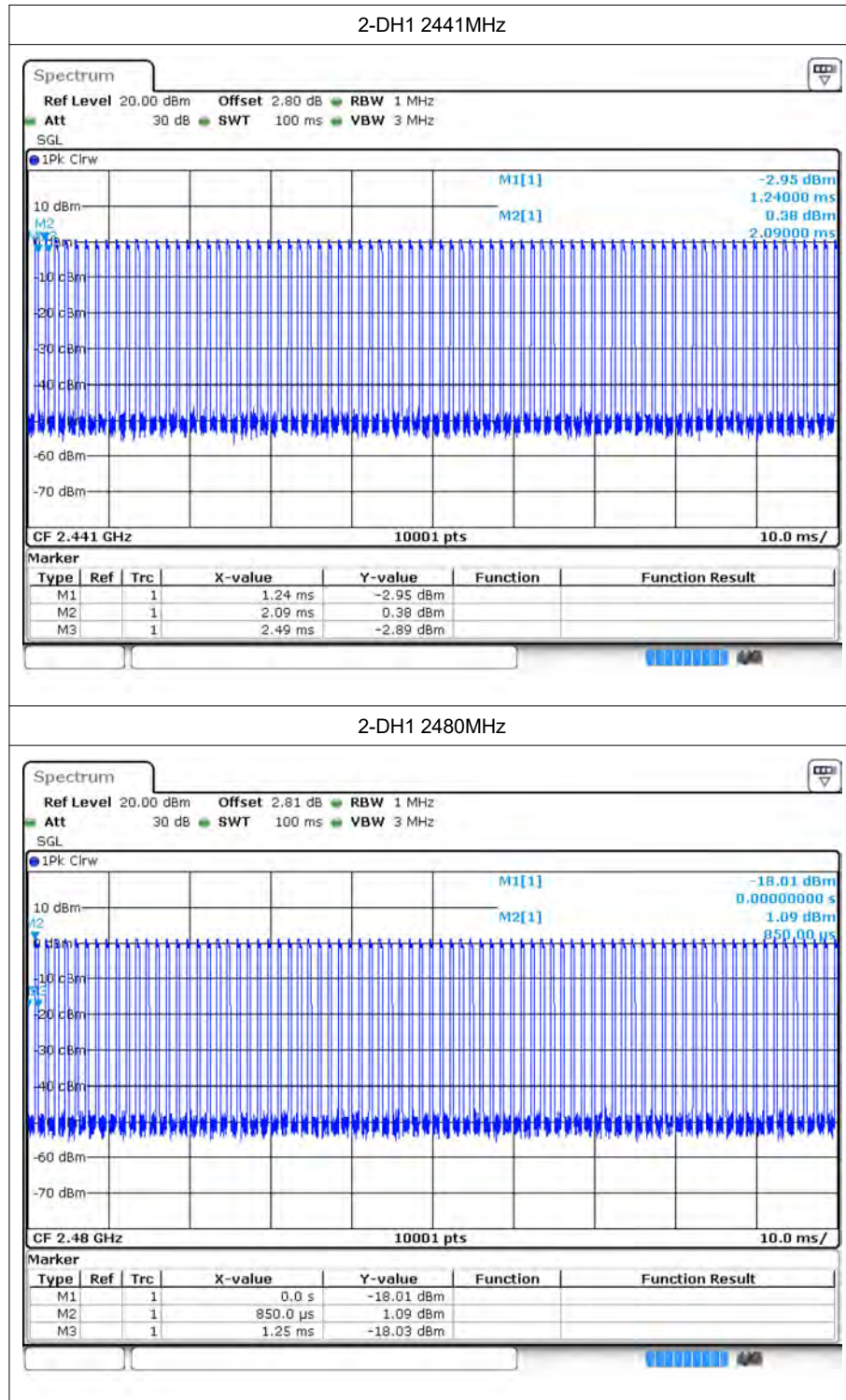
## 1.1 Test Result

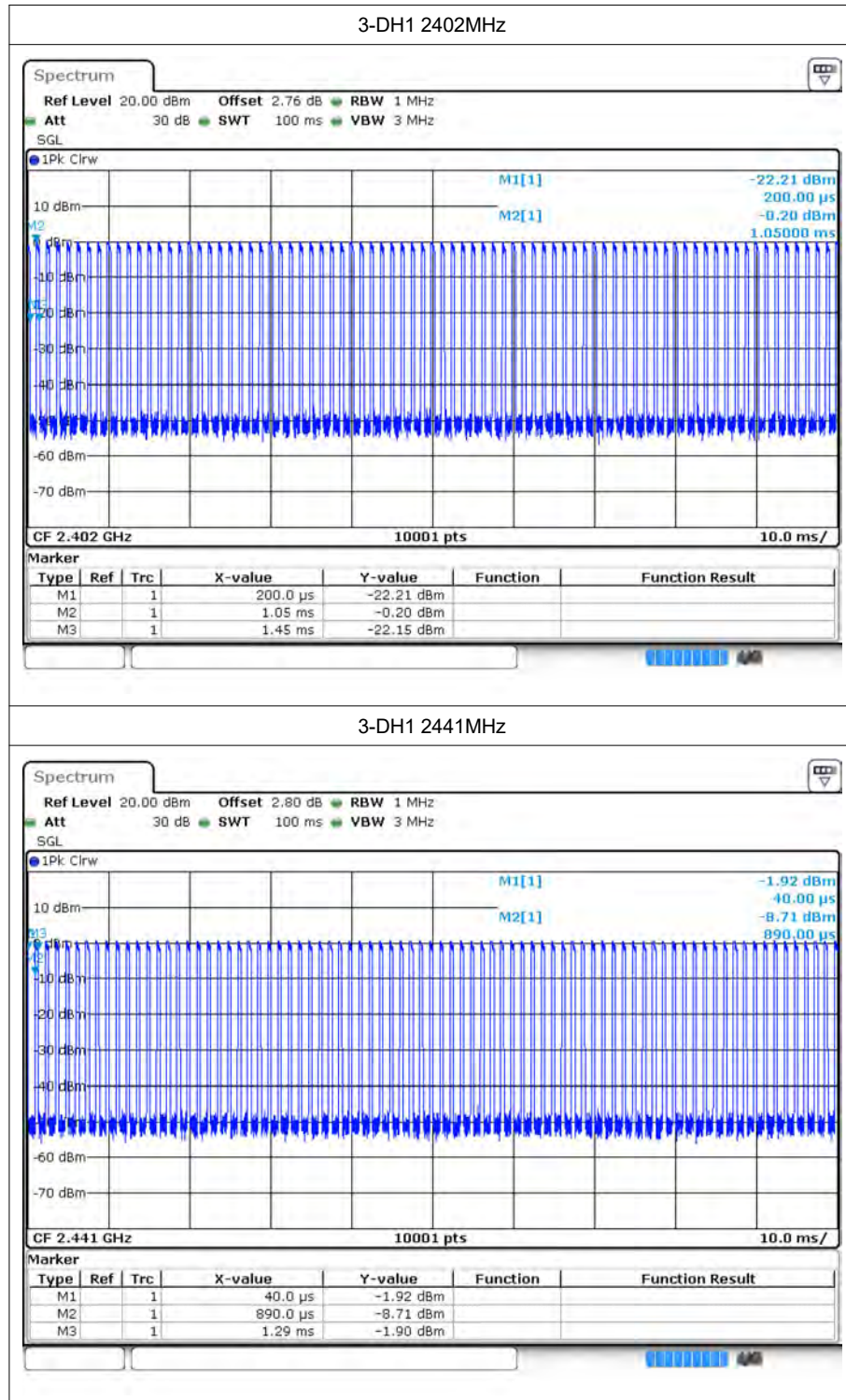
| Mode  | Frequency (MHz) | Duty Cycle (%) | Correction Factor | 1/T (kHz) |
|-------|-----------------|----------------|-------------------|-----------|
| 1-DH1 | 2402            | 32             | 4.95              | 2.56      |
| 1-DH1 | 2441            | 32             | 4.95              | 2.56      |
| 1-DH1 | 2480            | 32.01          | 4.95              | 2.56      |
| 2-DH1 | 2402            | 32.81          | 4.84              | 2.5       |
| 2-DH1 | 2441            | 32.8           | 4.84              | 2.5       |
| 2-DH1 | 2480            | 32.81          | 4.84              | 2.5       |
| 3-DH1 | 2402            | 32.81          | 4.84              | 2.5       |
| 3-DH1 | 2441            | 32.81          | 4.84              | 2.5       |
| 3-DH1 | 2480            | 32.81          | 4.84              | 2.5       |

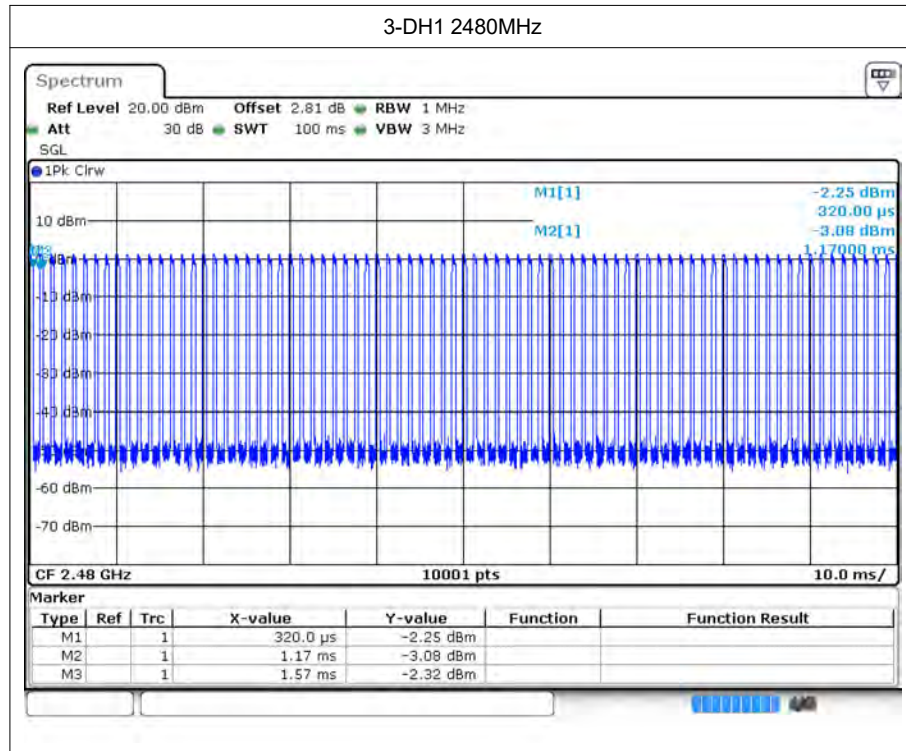
## 1.2 Test Graphs









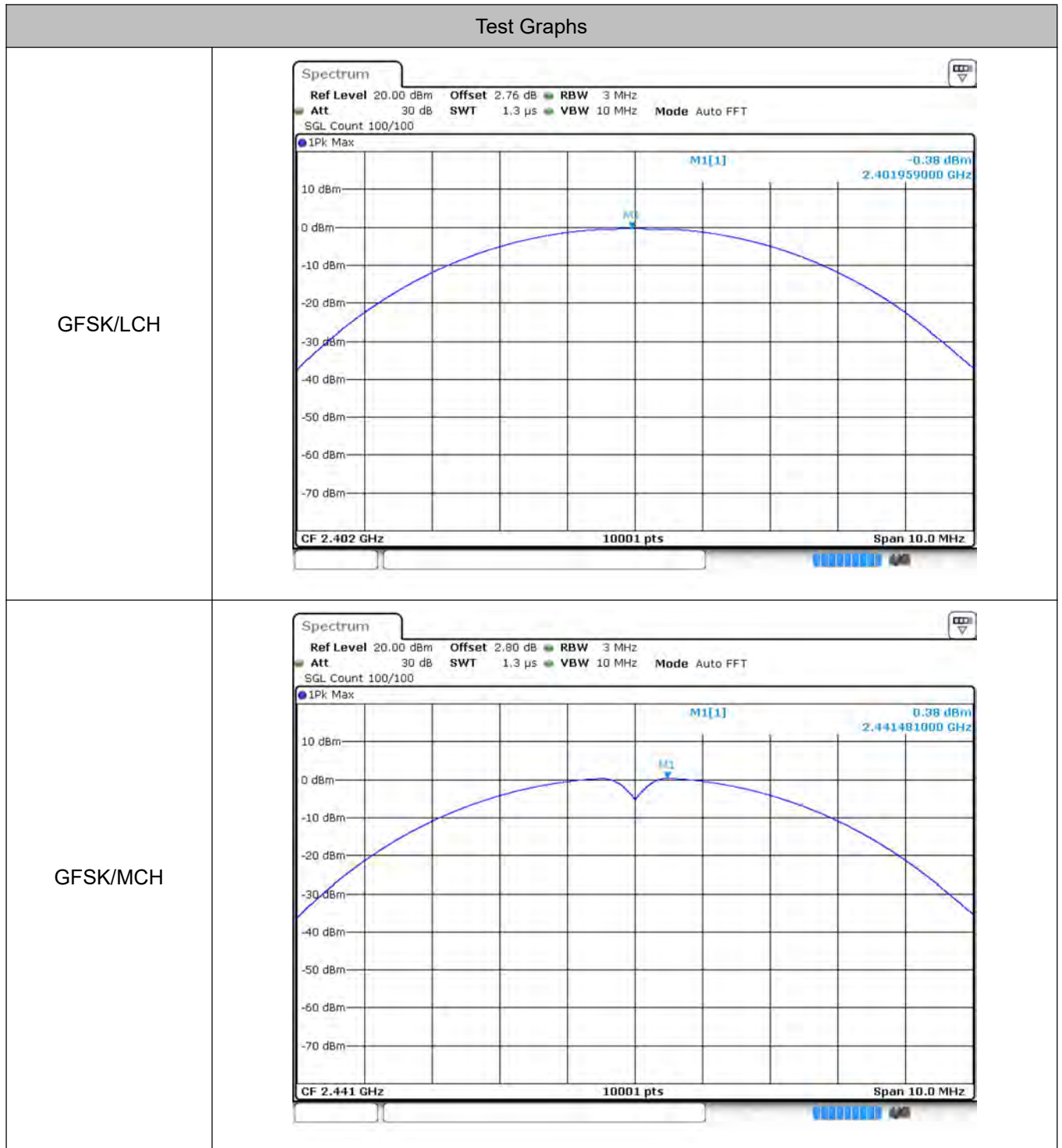


## 2 Maximum Conducted Peak Output Power

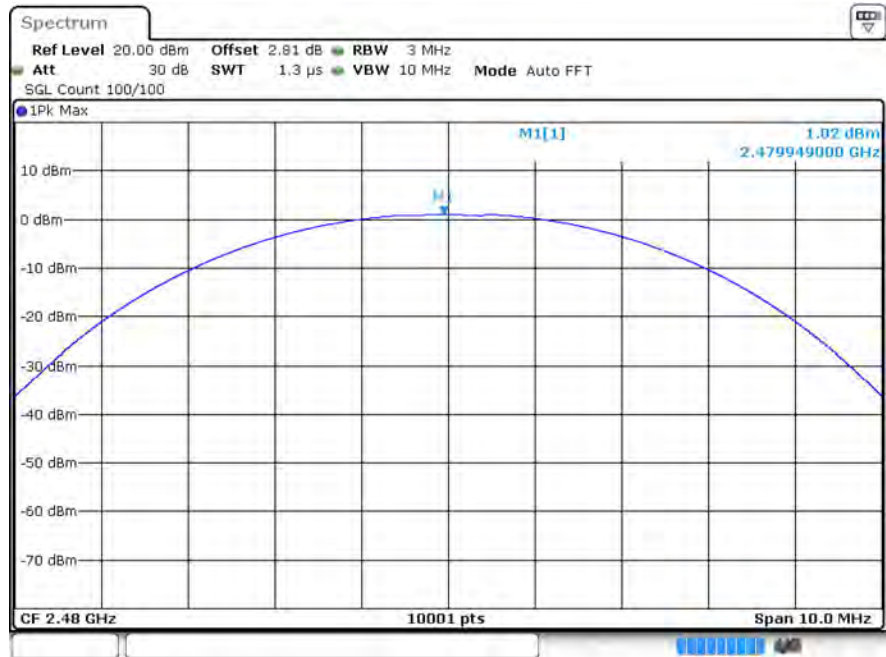
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | -0.38                           | 21          | Pass    |
|               | MCH      | 0.38                            | 21          | Pass    |
|               | HCH      | 1.02                            | 21          | Pass    |
| $\pi/4$ DQPSK | LCH      | -0.44                           | 21          | Pass    |
|               | MCH      | 0.35                            | 21          | Pass    |
|               | HCH      | 0.86                            | 21          | Pass    |
| 8DPSK         | LCH      | -0.41                           | 21          | Pass    |
|               | MCH      | 0.36                            | 21          | Pass    |
|               | HCH      | 0.89                            | 21          | Pass    |

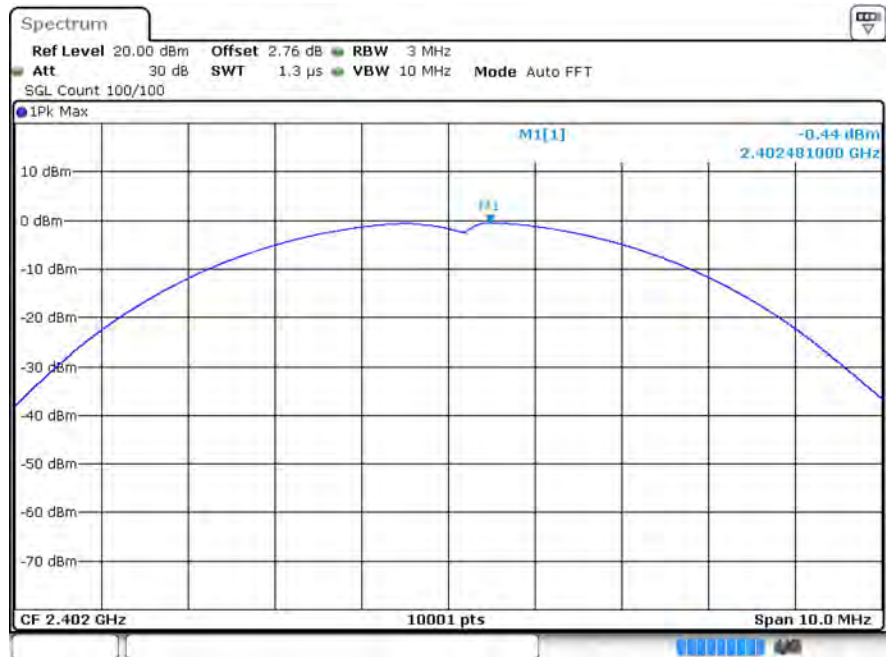
## 2.2 Test Graphs



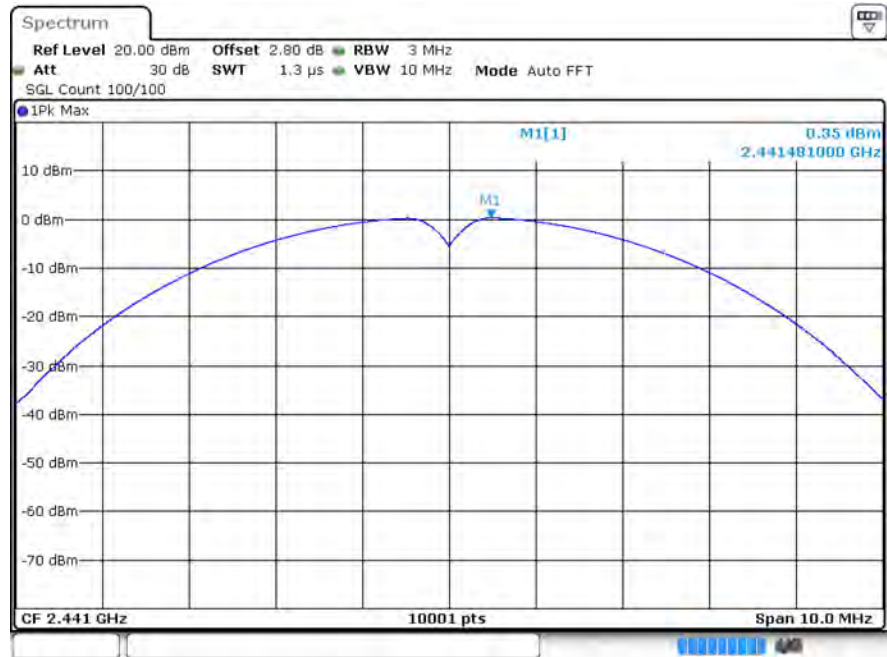
GFSK/HCH



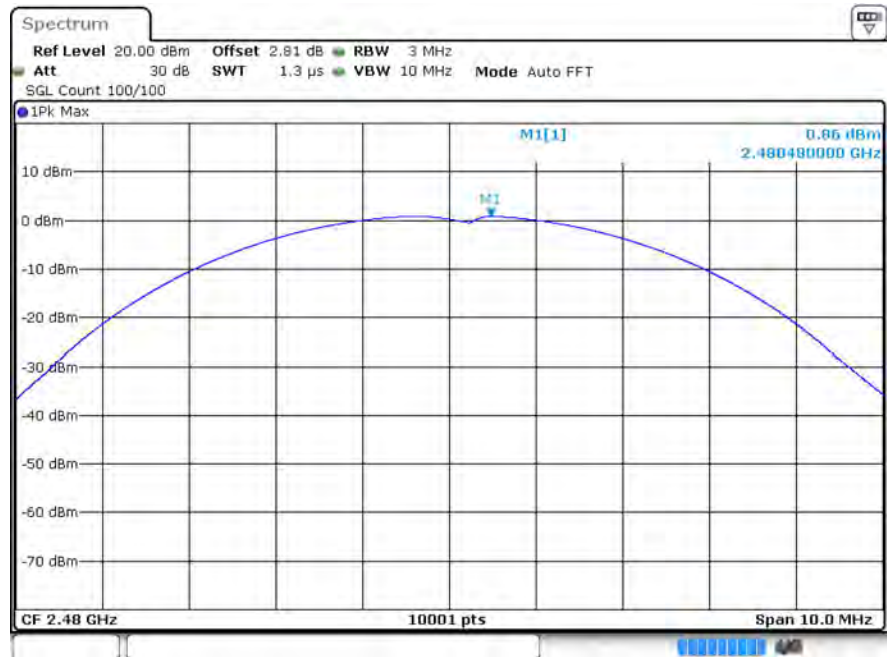
$\pi/4$ DQPSK/LCH



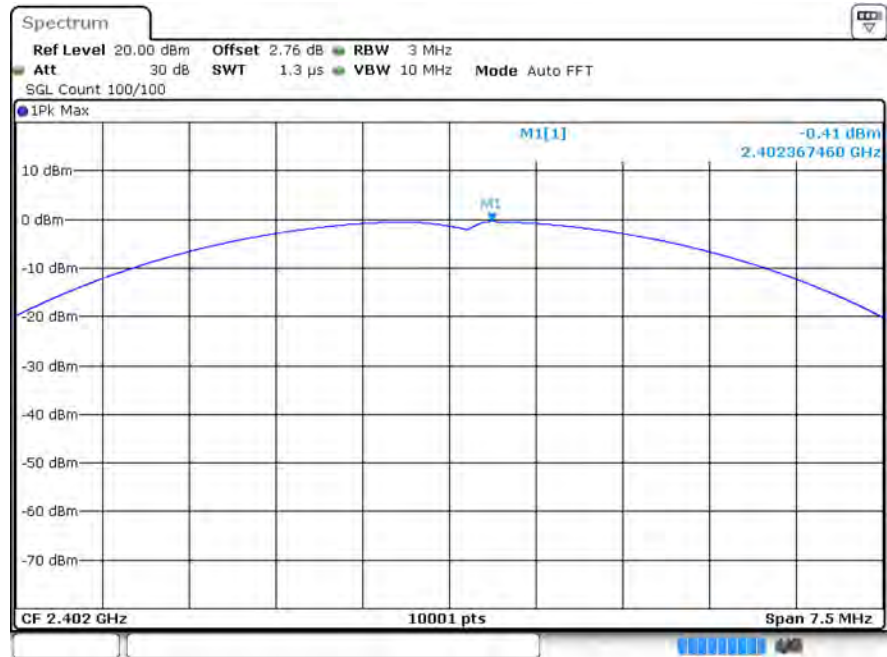
$\pi/4$ DQPSK/MCH



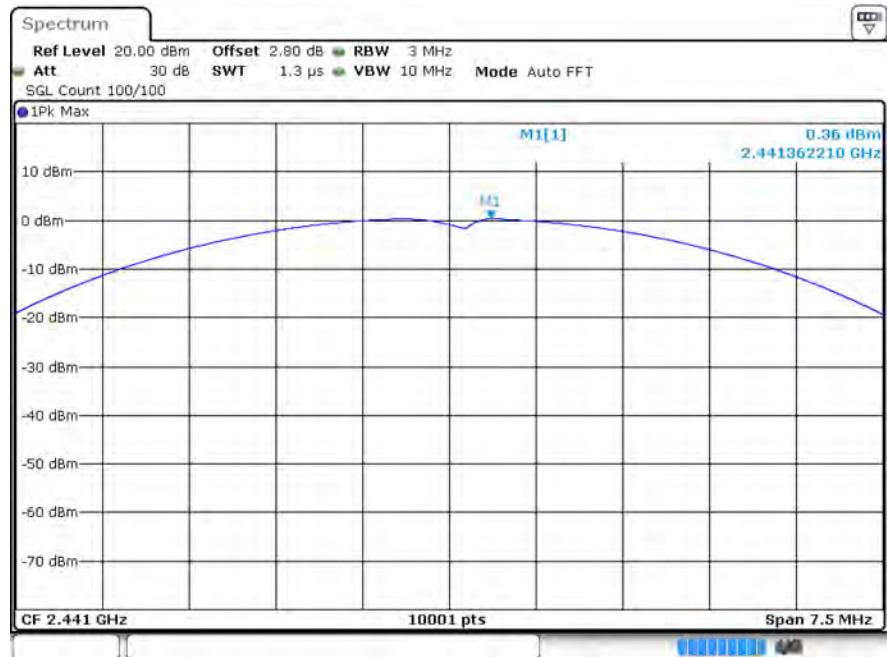
$\pi/4$ DQPSK/HCH



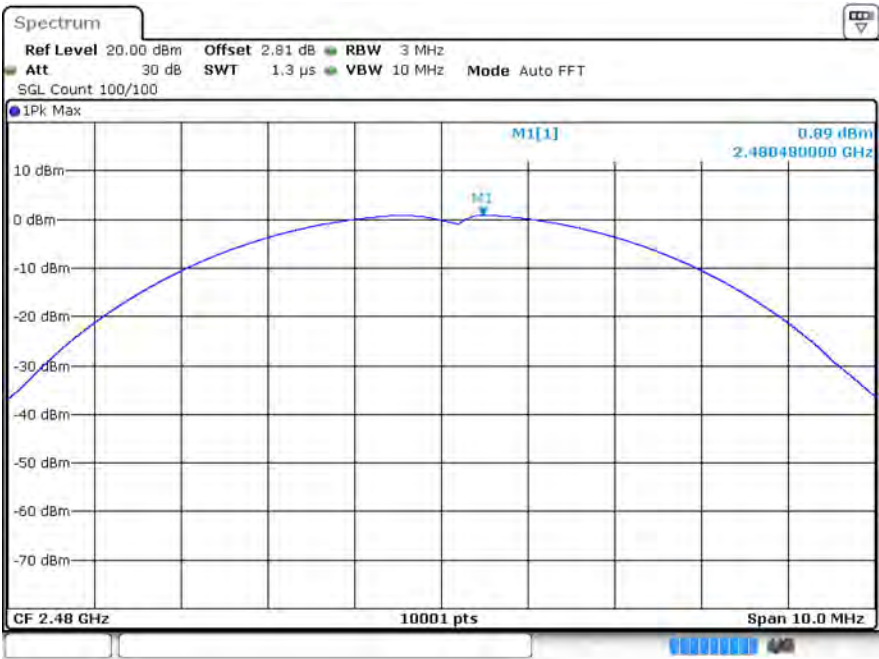
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

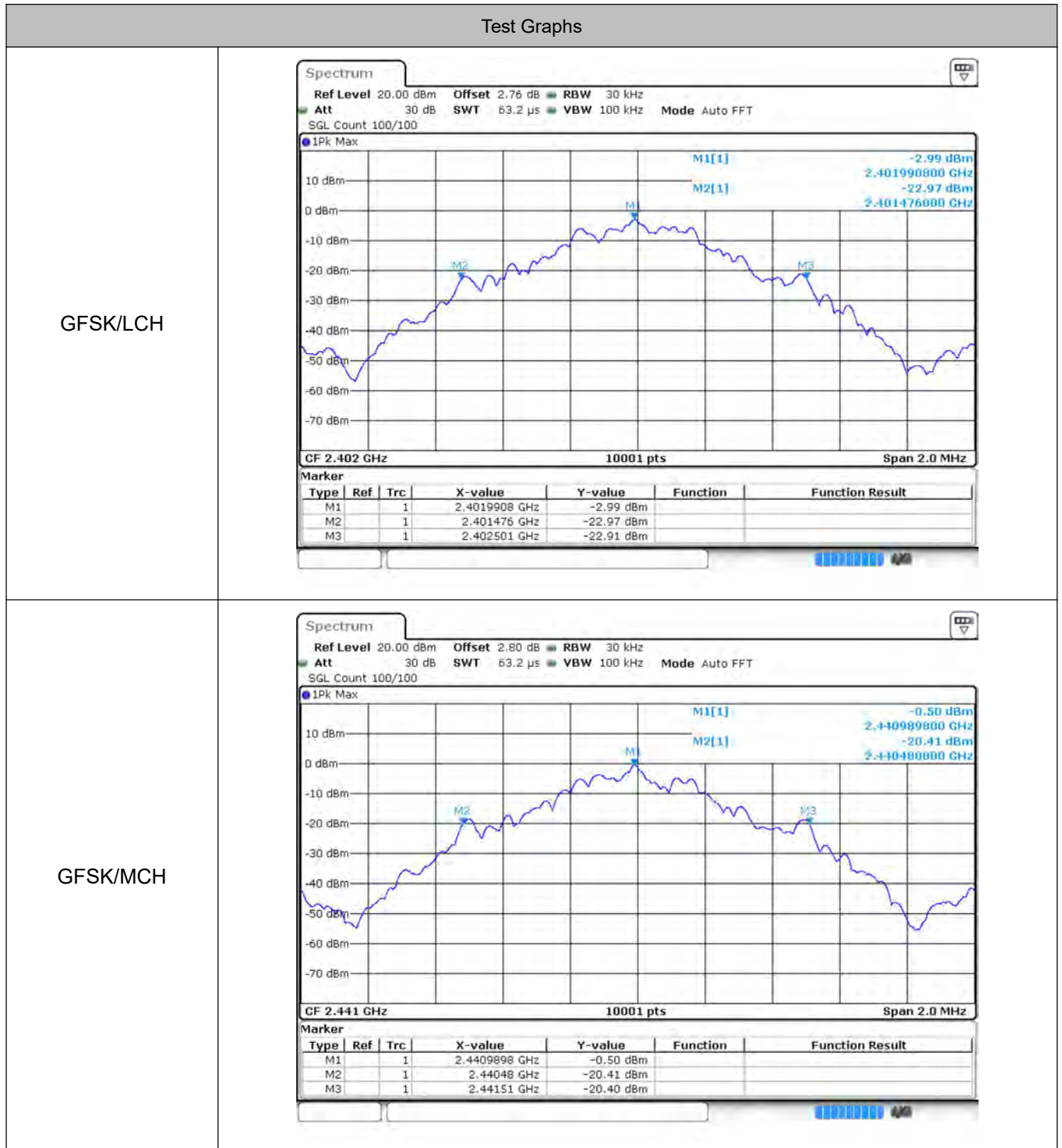


### 3 20dB Bandwidth

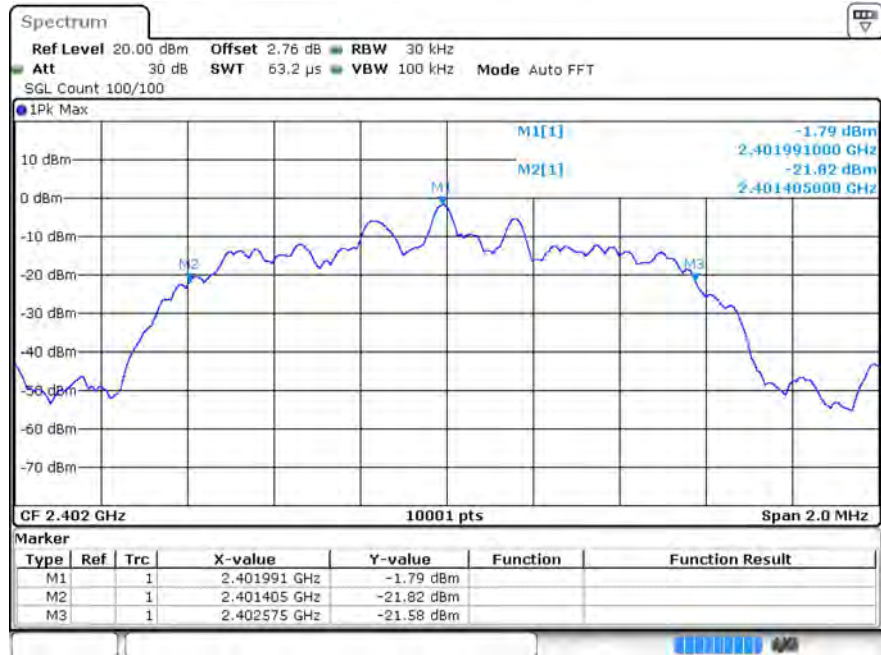
#### 3.1 Test Result

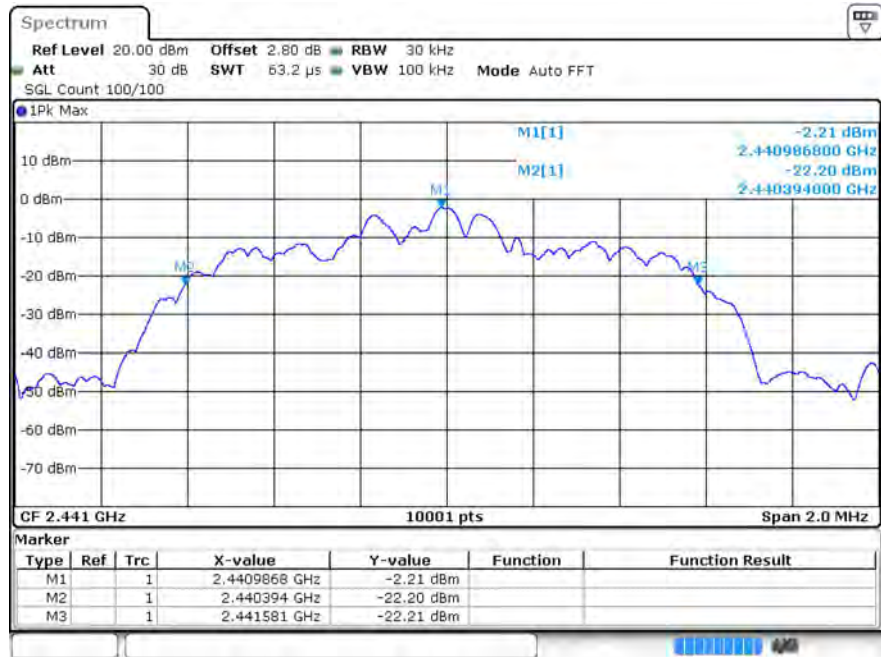
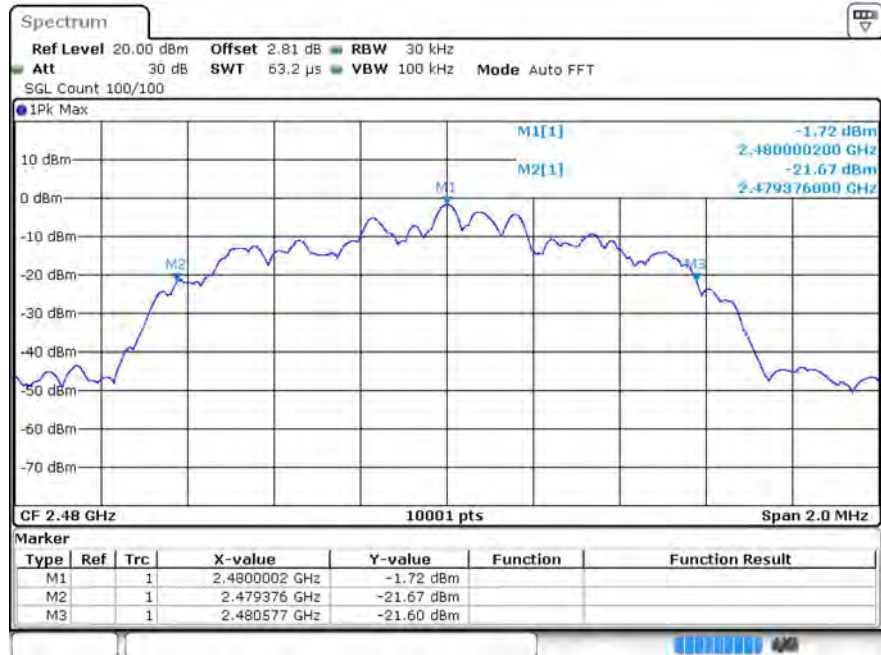
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 1.025                | Not Specified | Pass    |
|               | MCH      | 1.031                | Not Specified | Pass    |
|               | HCH      | 1.03                 | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.17                 | Not Specified | Pass    |
|               | MCH      | 1.187                | Not Specified | Pass    |
|               | HCH      | 1.202                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.188                | Not Specified | Pass    |
|               | MCH      | 1.179                | Not Specified | Pass    |
|               | HCH      | 1.114                | Not Specified | Pass    |

### 3.2 Test Graphs



GFSK/HCH

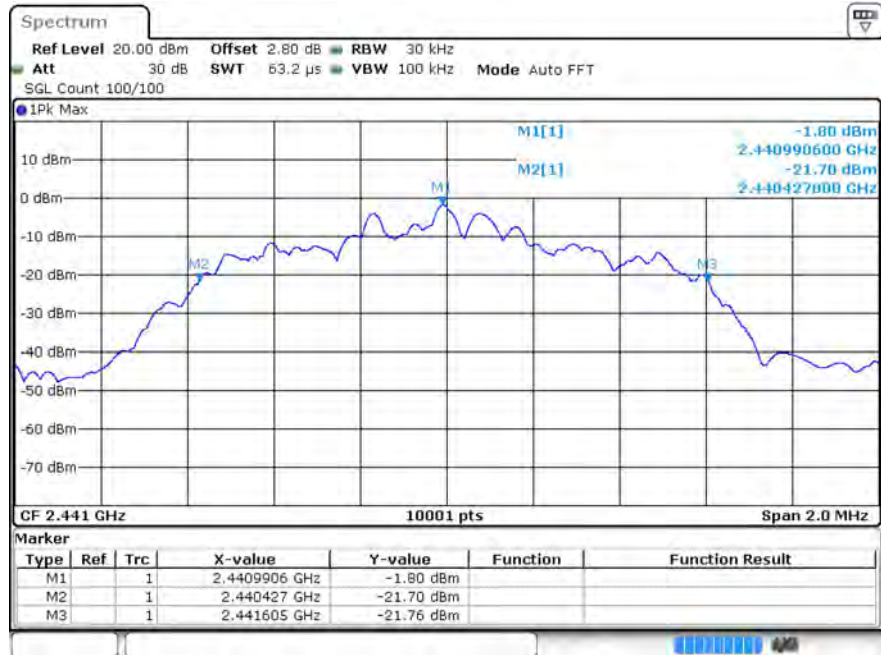

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



## 4 Carrier Frequency Separation

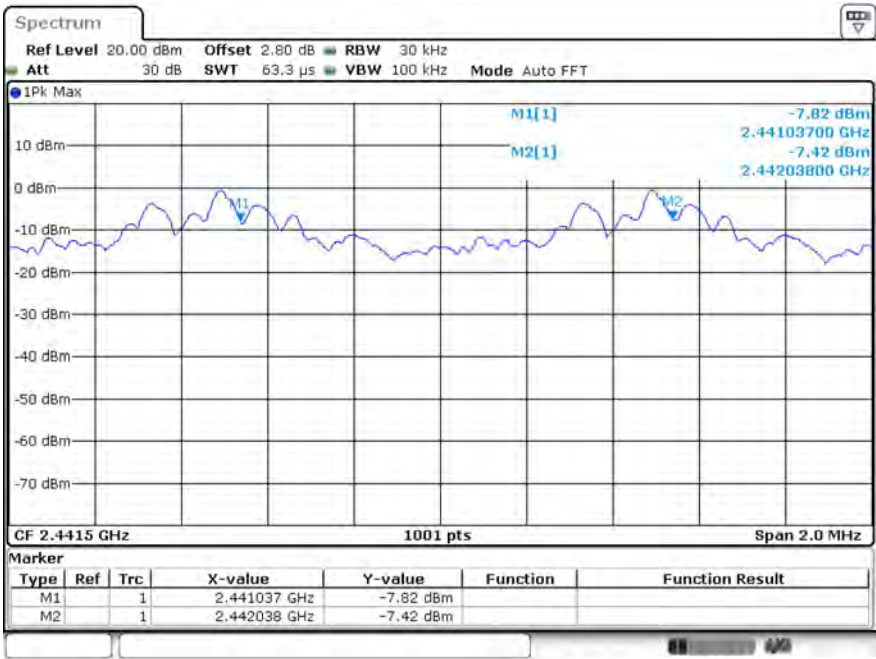
### 4.1 Test Result

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 0.999                              | 0.687       | Pass    |
| $\pi/4$ DQPSK | MCH      | 1.001                              | 0.791       | Pass    |
| 8DPSK         | MCH      | 1.001                              | 0.786       | Pass    |

## 4.2 Test Graphs



8DPSK/MCH

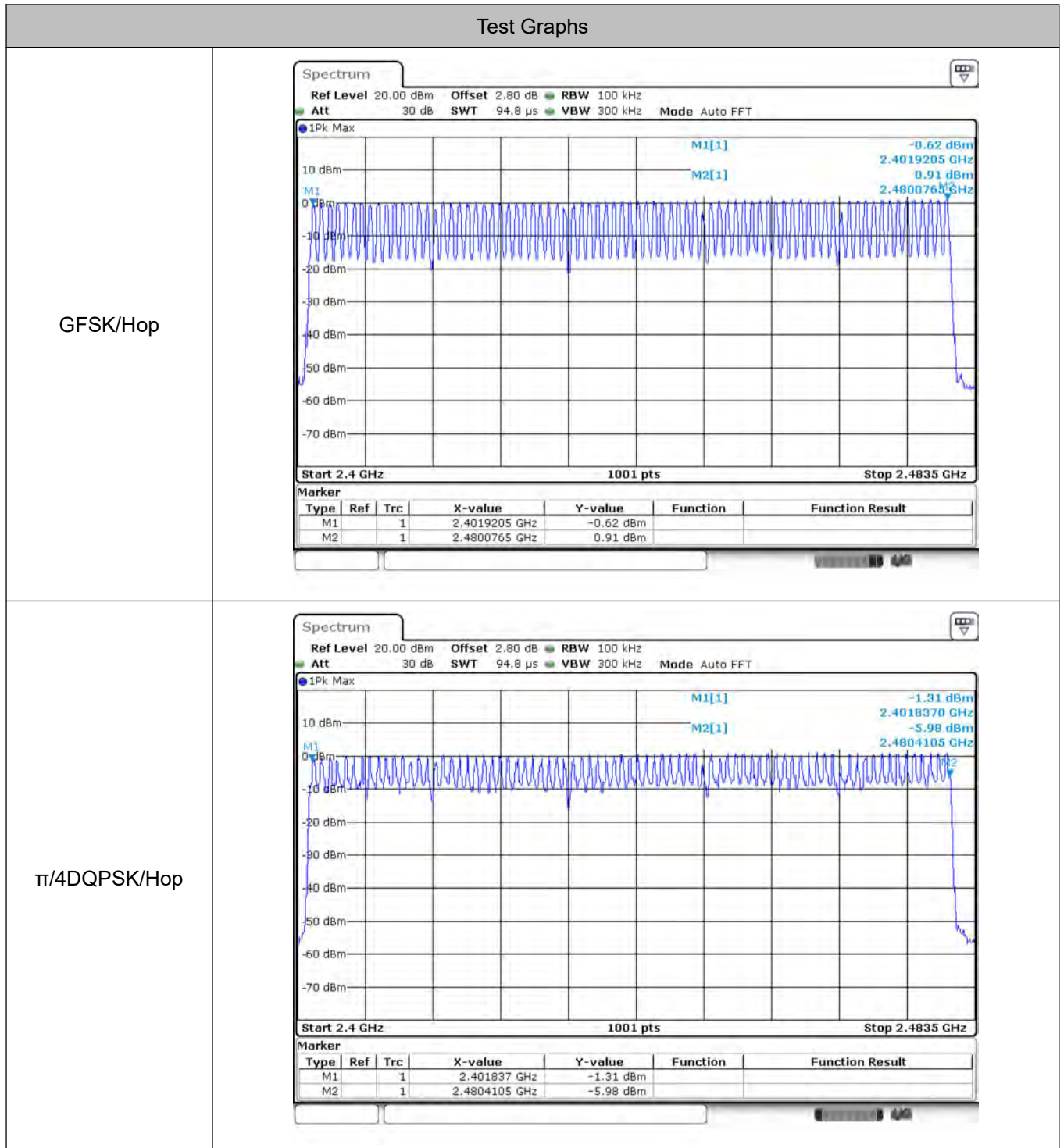


## 5 Hopping Channel Number

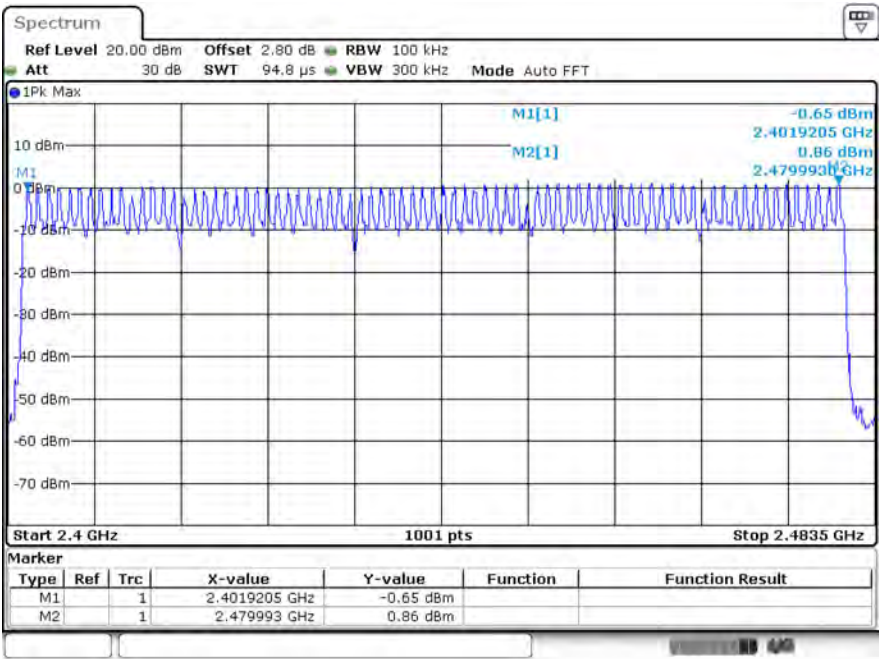
### 5.1 Test Result

| 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

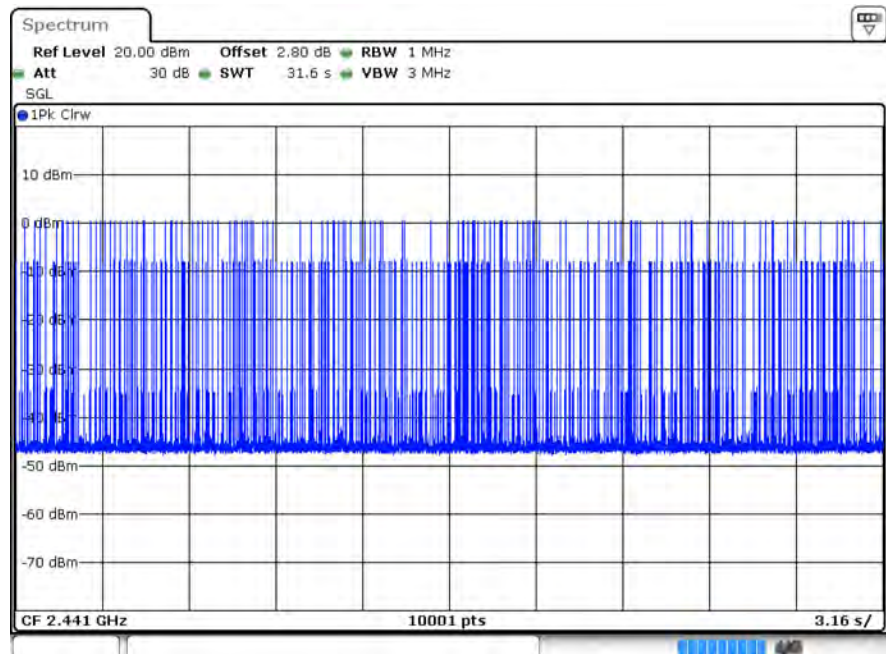
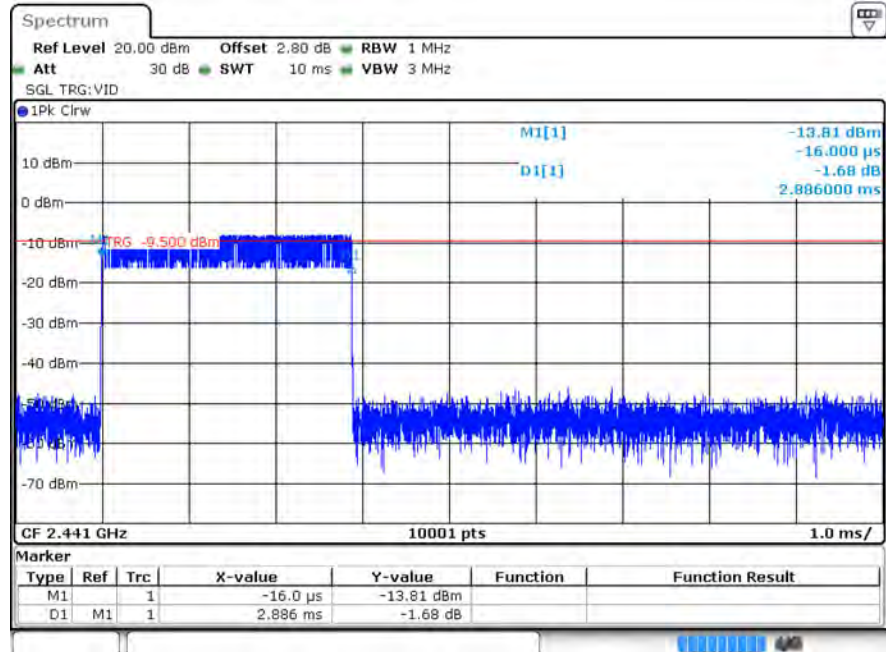
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.886                      | 116                   | 334.776        | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.892                      | 106                   | 306.552        | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.893                      | 106                   | 306.658        | 0.4       | Pass    |

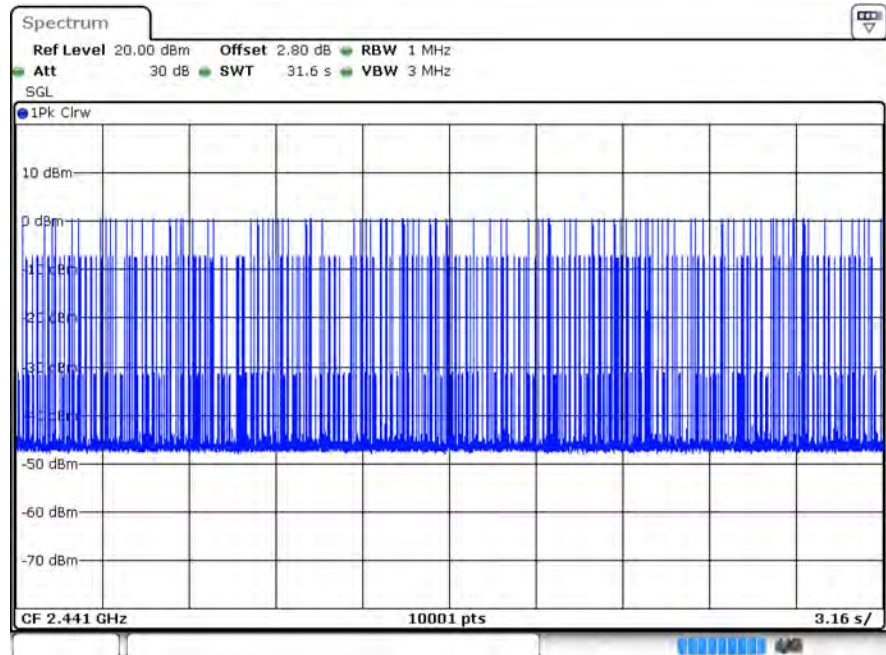
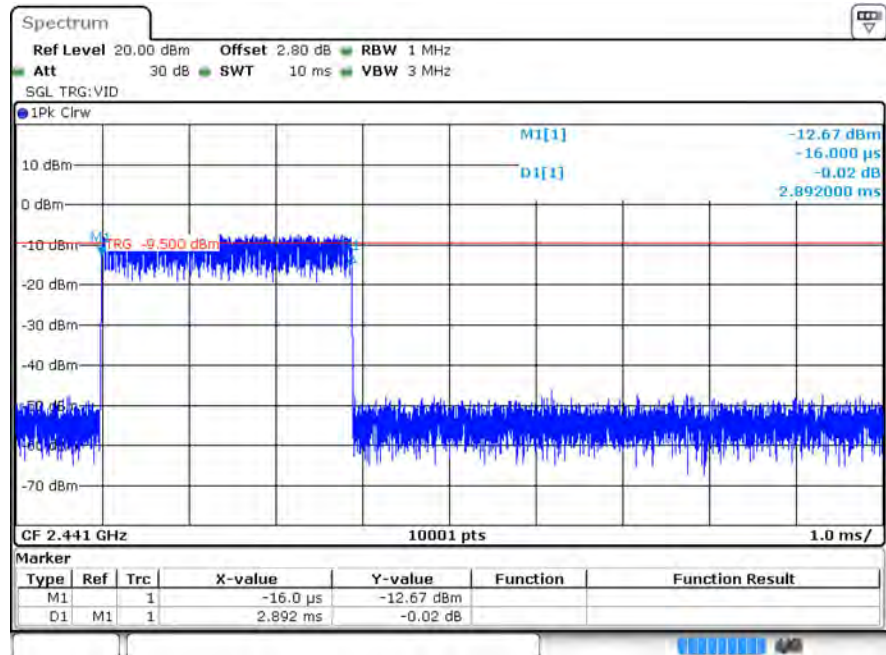
## 6.2 Test Graphs

### Test Graphs

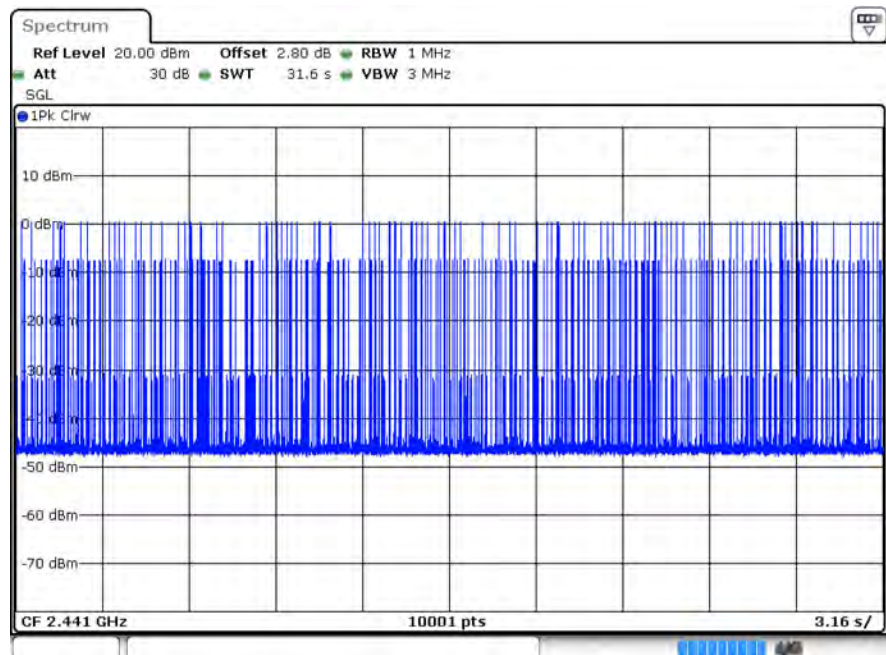
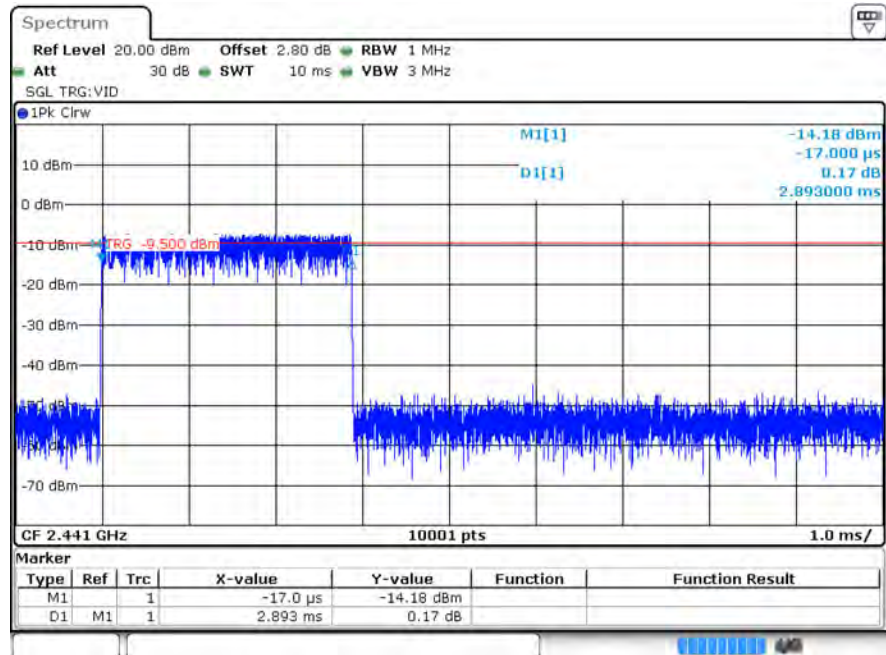
GFSK\_DH5/MCH



$\pi/4$ 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     | -38.8            | -20         | Pass    |
|               | MCH     | -37.75           | -20         | Pass    |
|               | HCH     | -36.48           | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -39.65           | -20         | Pass    |
|               | MCH     | -41.96           | -20         | Pass    |
|               | HCH     | -34.14           | -20         | Pass    |
| 8DPSK         | LCH     | -33.31           | -20         | Pass    |
|               | MCH     | -37.85           | -20         | Pass    |
|               | HCH     | -34.29           | -20         | Pass    |

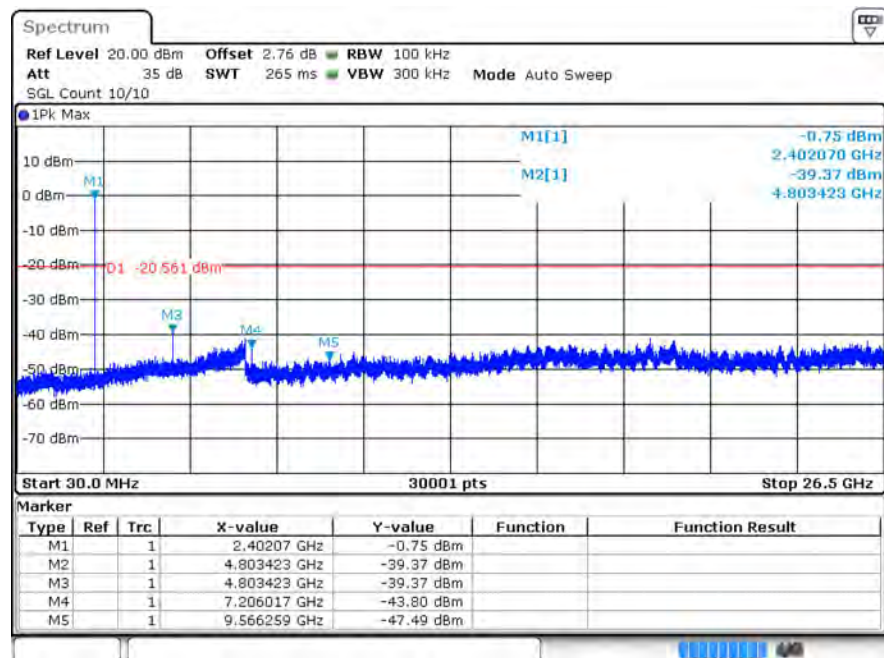
## 7.2 Test Graphs

GFSK\_LCH\_Graphs

Pref



Puw

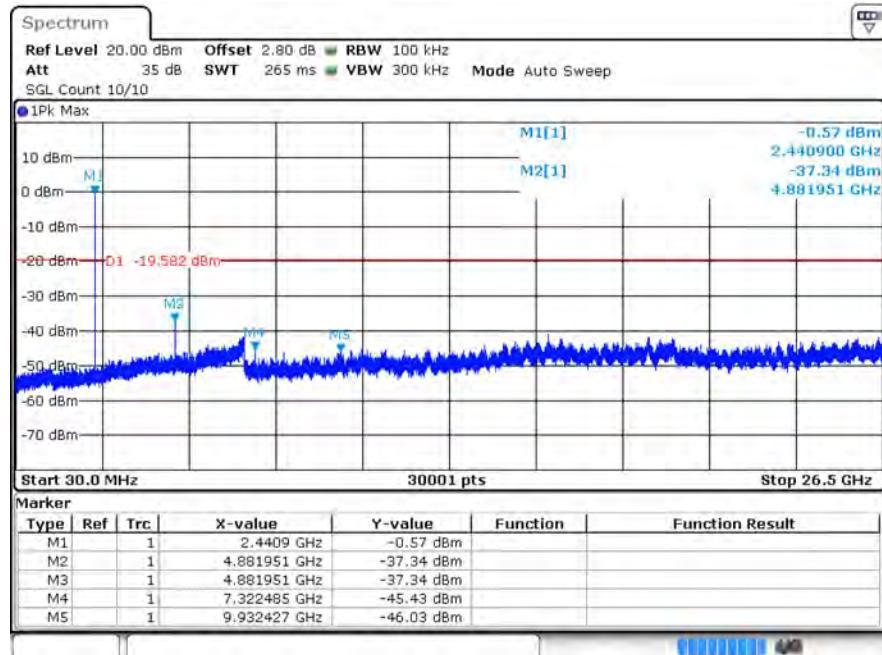


## GFSK\_MCH\_Graphs

Pref



Puw

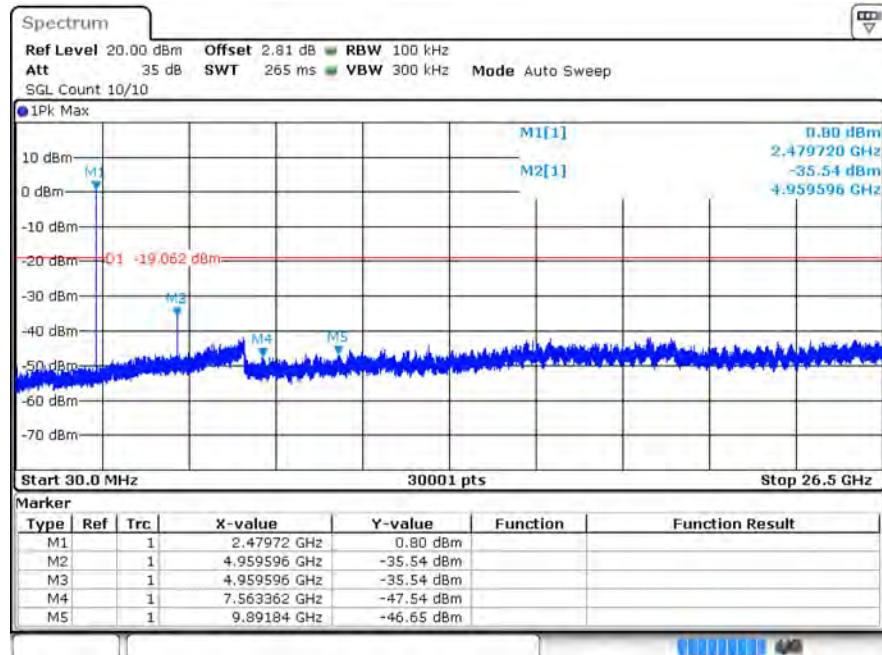


## GFSK\_HCH\_Graphs

Pref

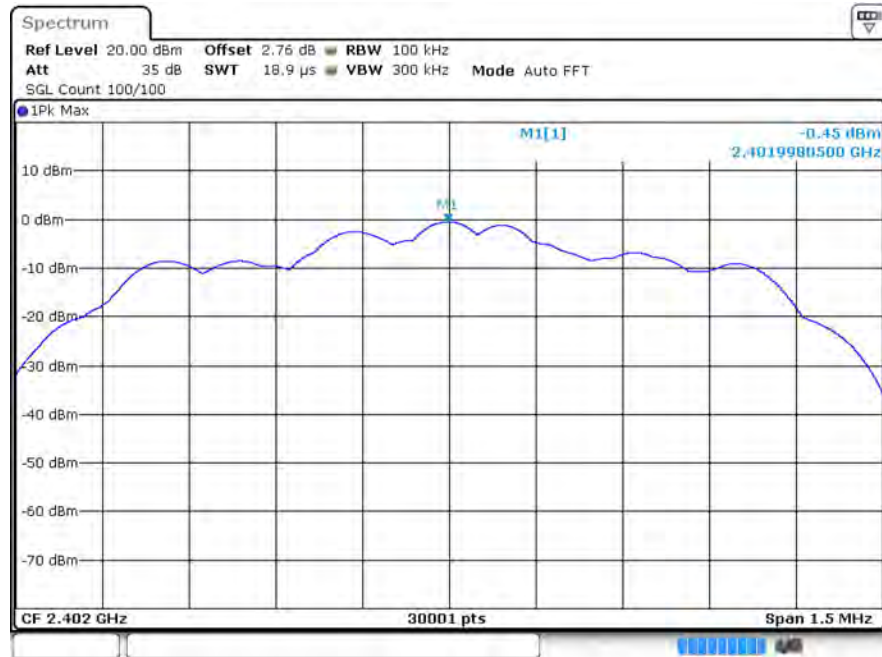


Puw

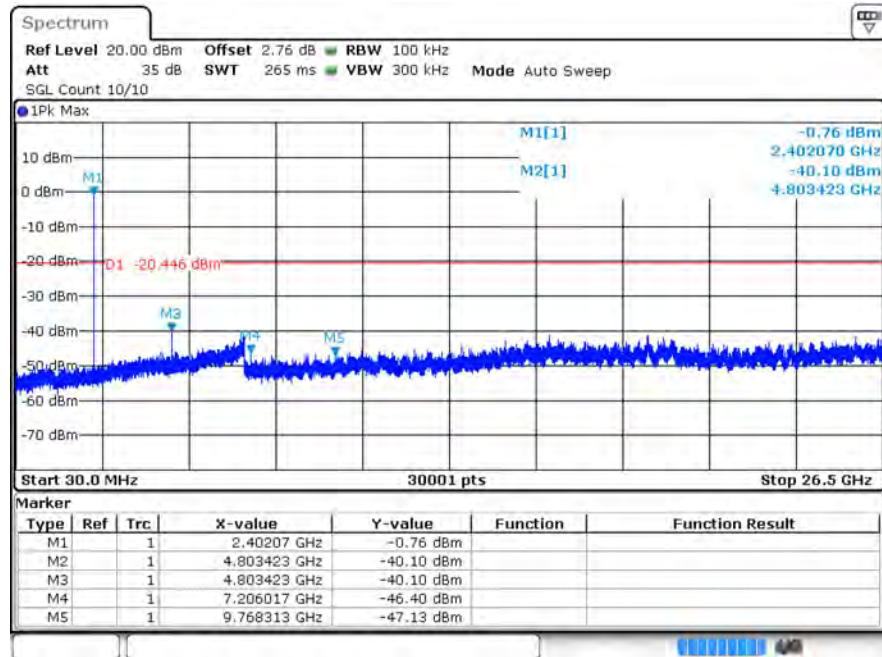


$\pi/4$ DQPSK\_LCH\_Graphs

Pref



Puw

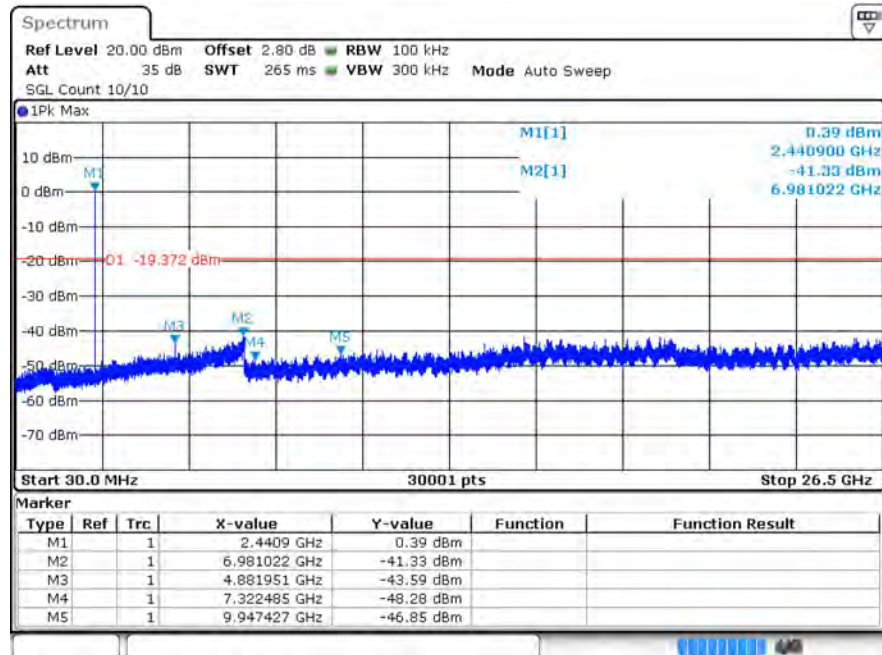


# $\pi/4$ DQPSK\_MCH\_Graphs

Pref



Puw

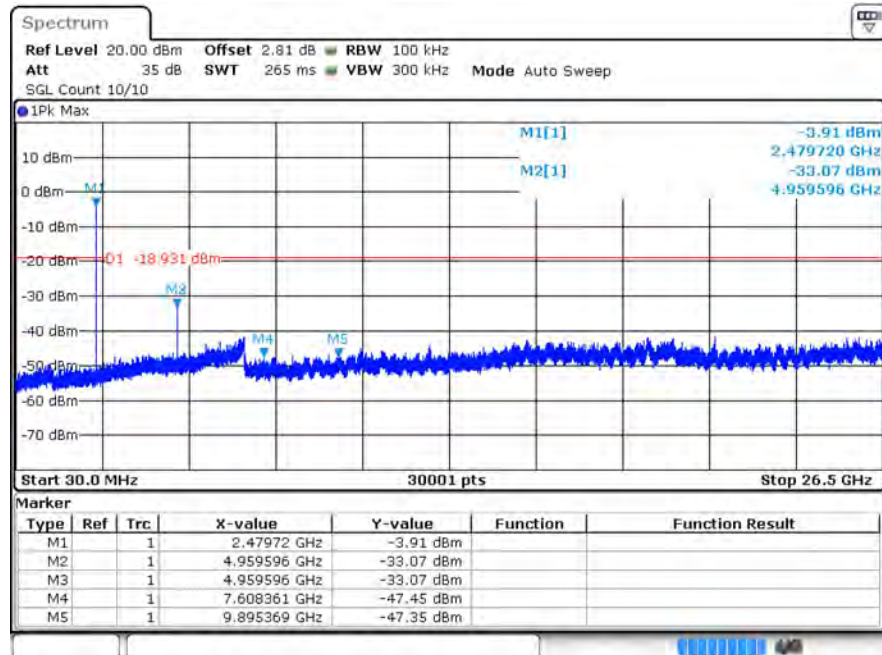


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref



Puw

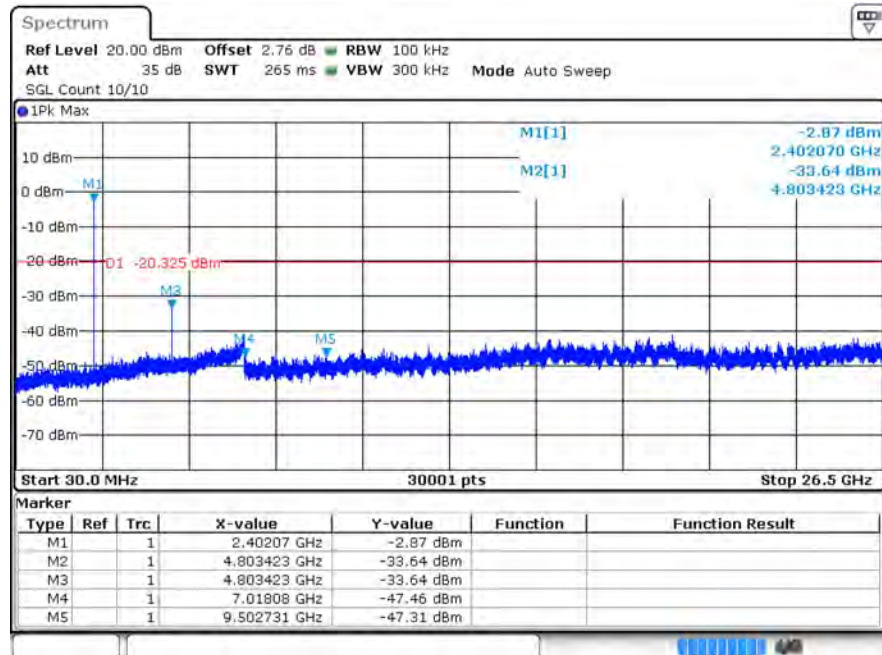


## 8DPSK\_LCH\_Graphs

Pref

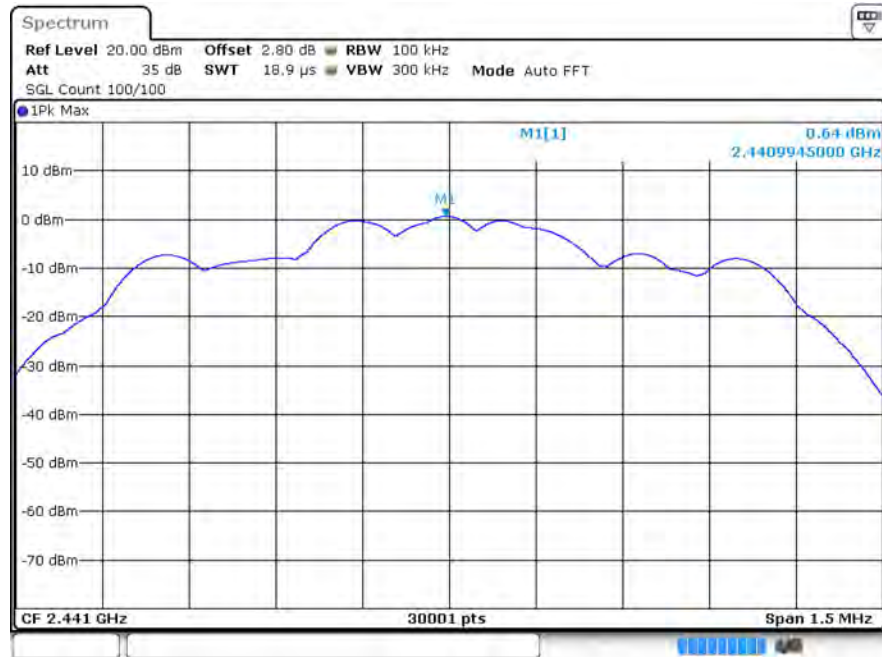


Puw

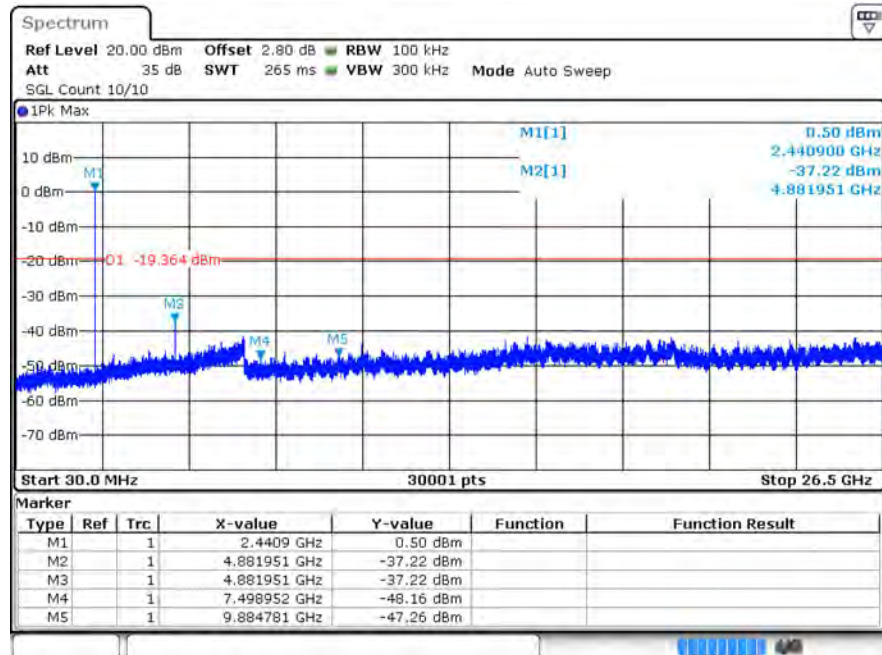


## 8DPSK\_MCH\_Graphs

Pref



Puw

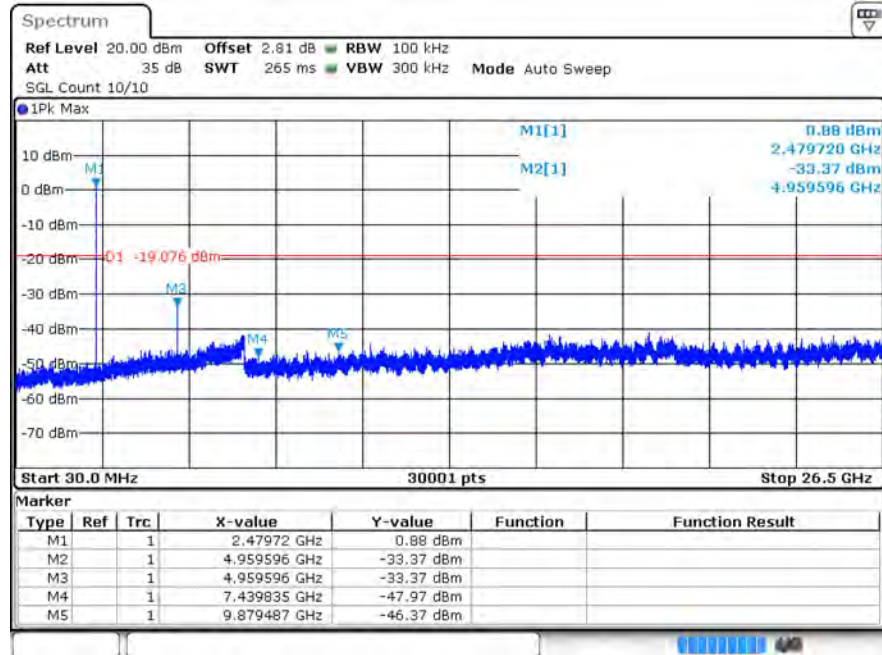


## 8DPSK\_HCH\_Graphs

Pref



Puw

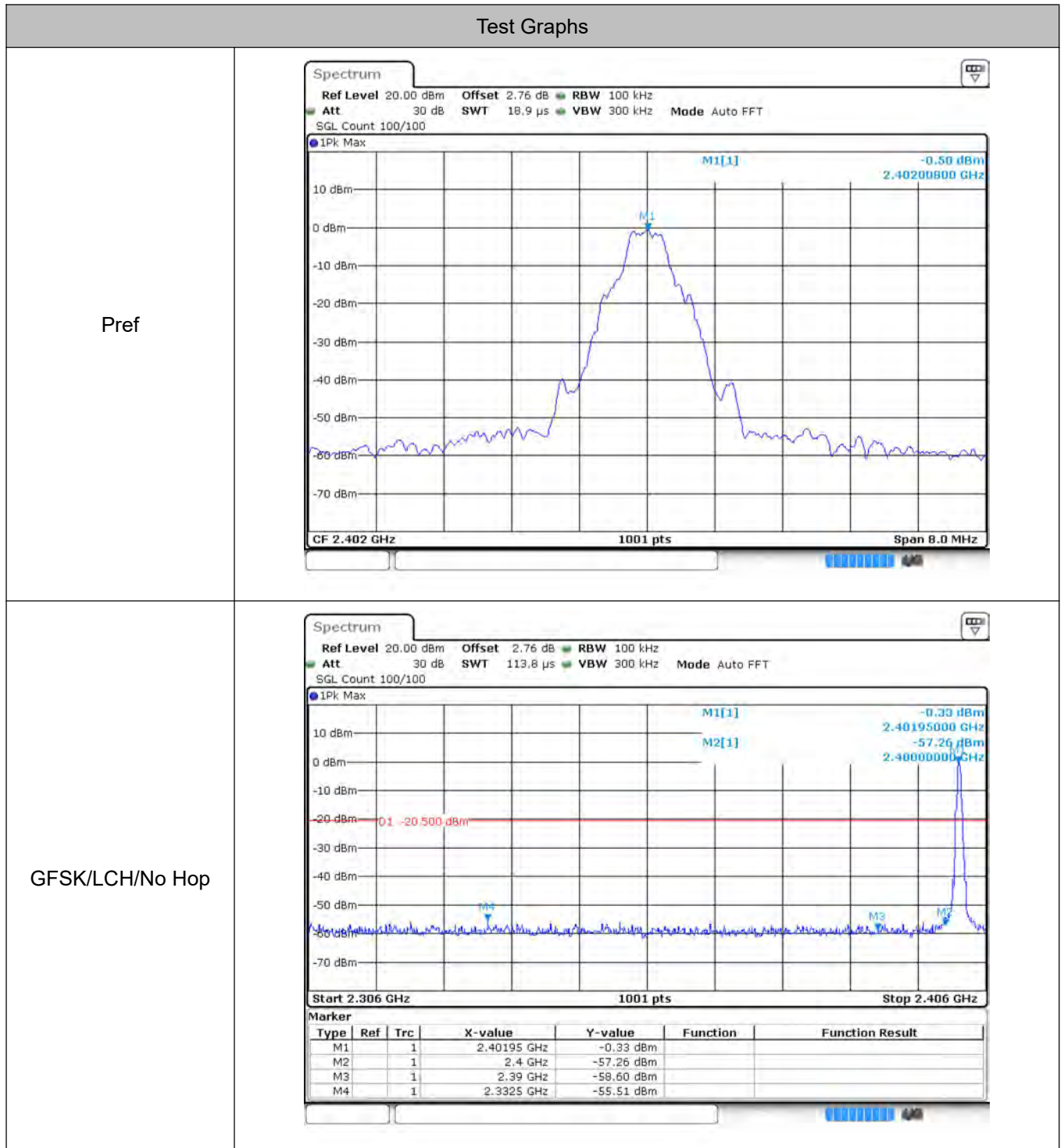


## 8 Band-edge for RF Conducted Emissions

### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -55                      | -20         | Pass    |
|               |         |                         | On                | -54.62                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -56.65                   | -20         | Pass    |
|               |         |                         | On                | -55.44                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -55.58                   | -20         | Pass    |
|               |         |                         | On                | -54.83                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -57.26                   | -20         | Pass    |
|               |         |                         | On                | -55.61                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -55.17                   | -20         | Pass    |
|               |         |                         | On                | -54.17                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -57.24                   | -20         | Pass    |
|               |         |                         | On                | -55.61                   | -20         | Pass    |

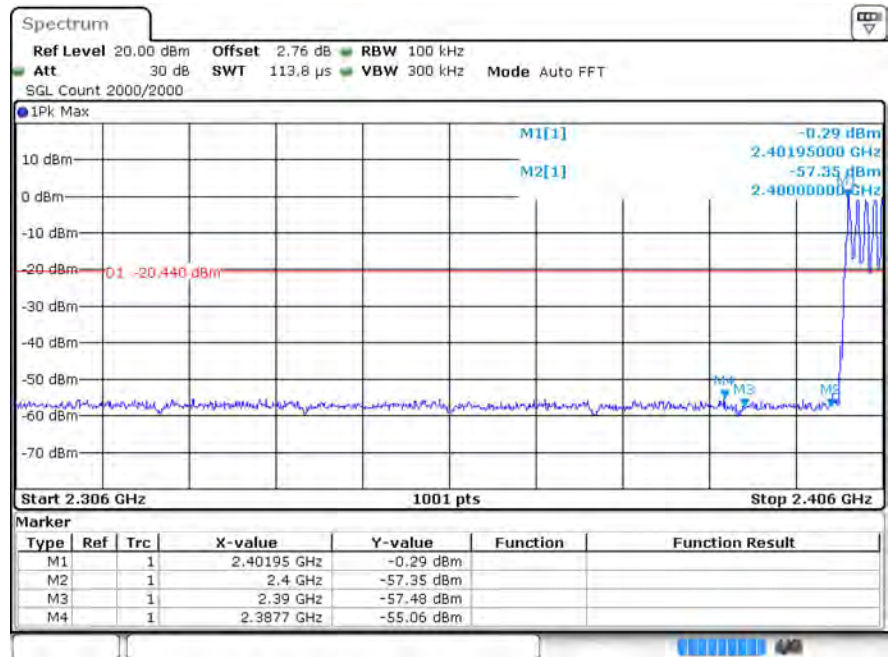
## 8.2 Test Graphs



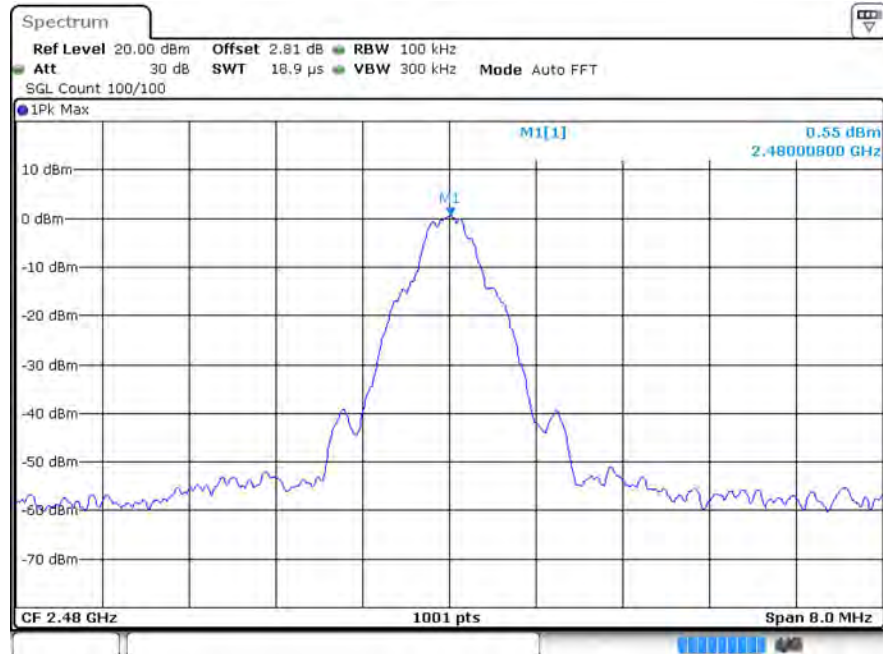
Ref



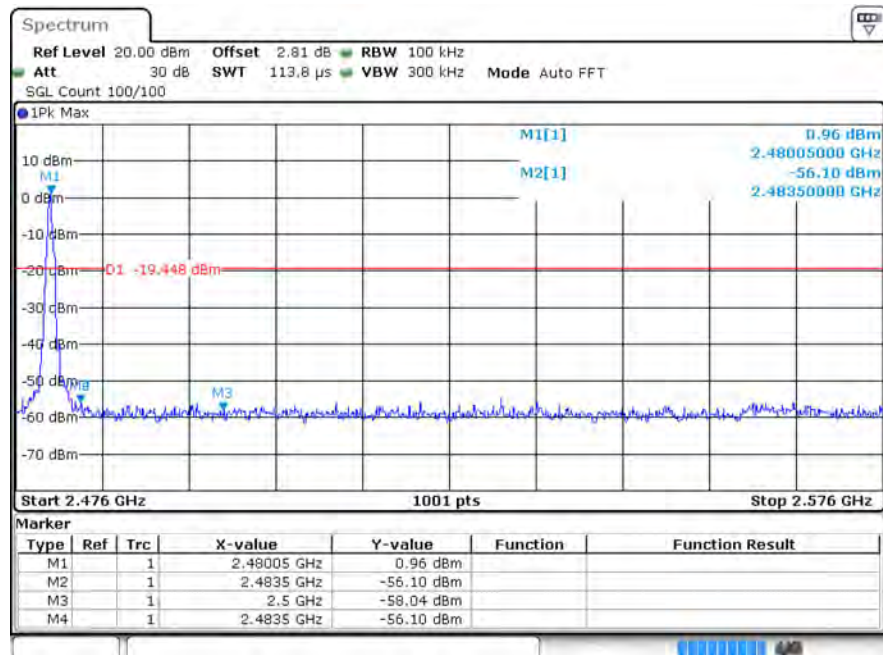
GFSK/LCH/Hop



Ref



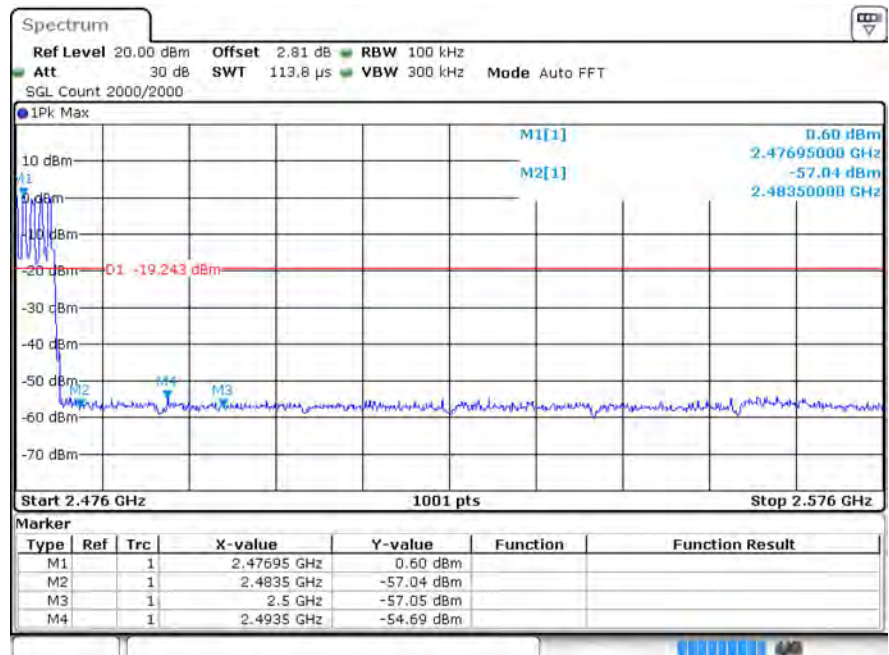
GFSK/HCH/No Hop



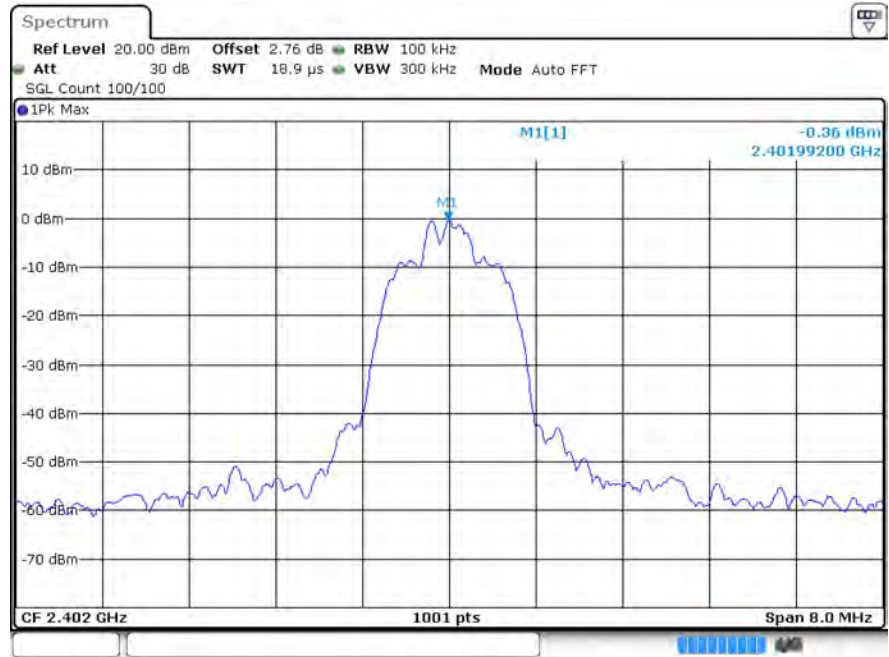
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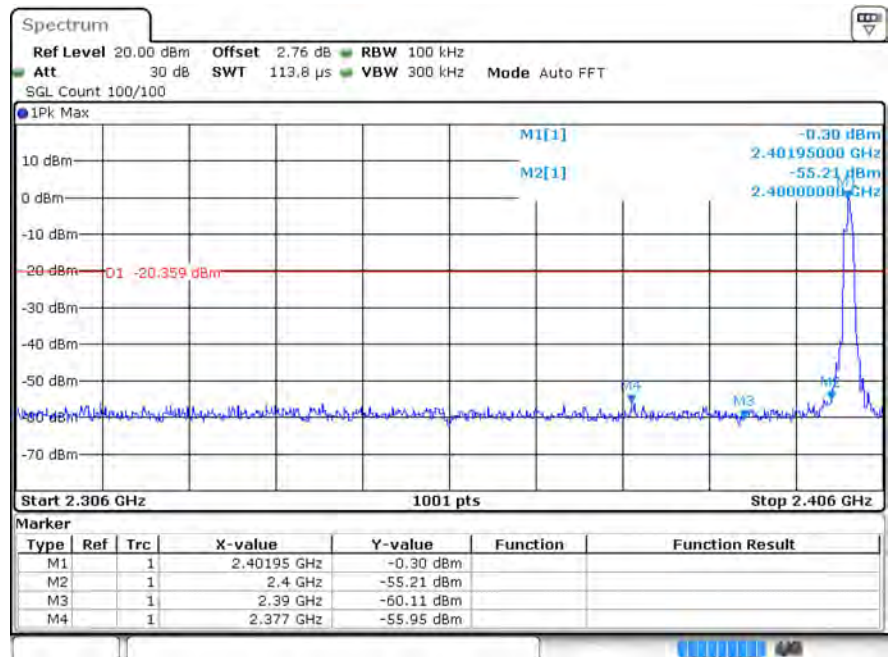
GFSK/HCH/Hop



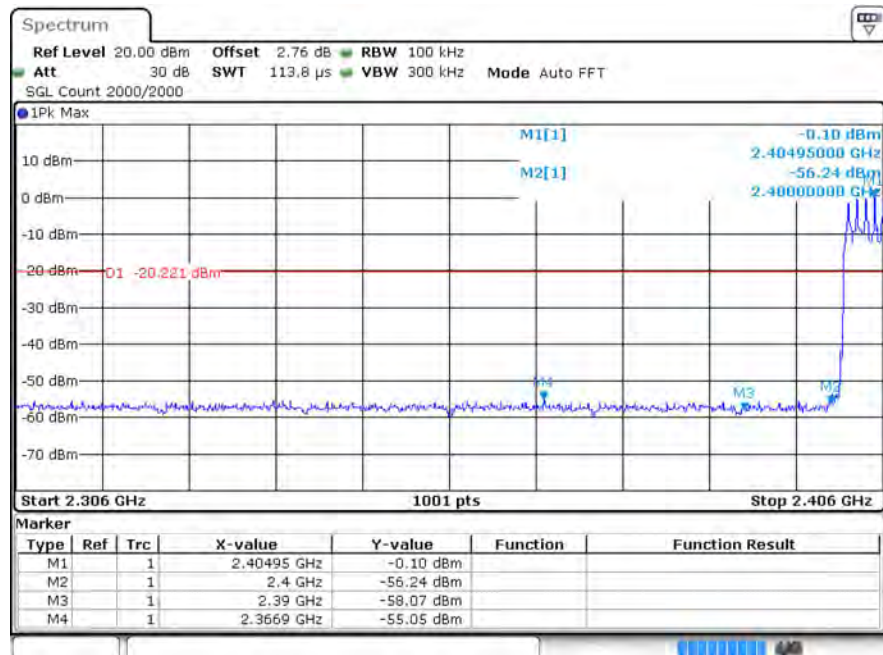
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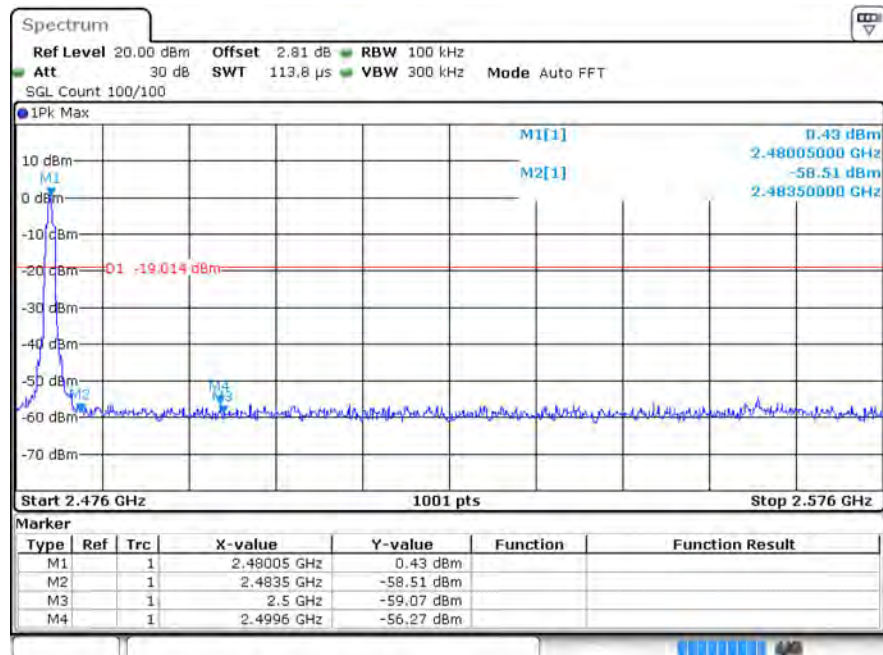
$\pi/4$ DQPSK/LCH/No Hop



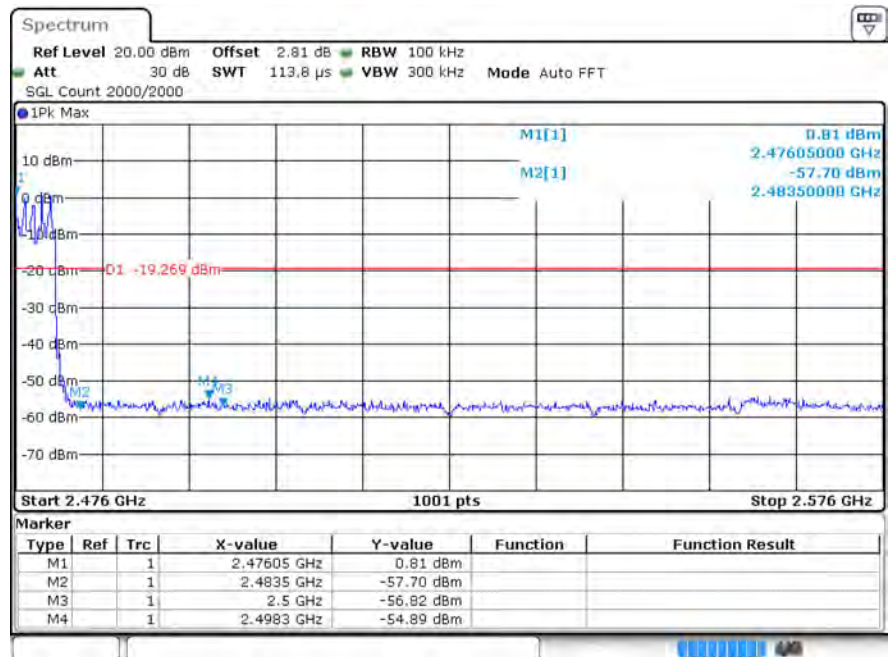
Ref


 $\pi/4$ DQPSK/LCH/Hop


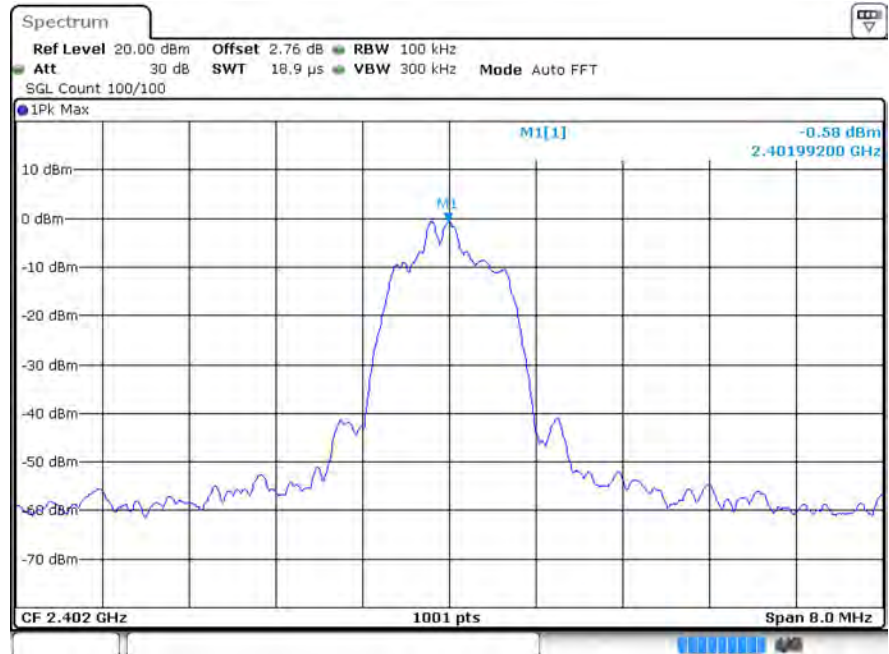
Ref


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


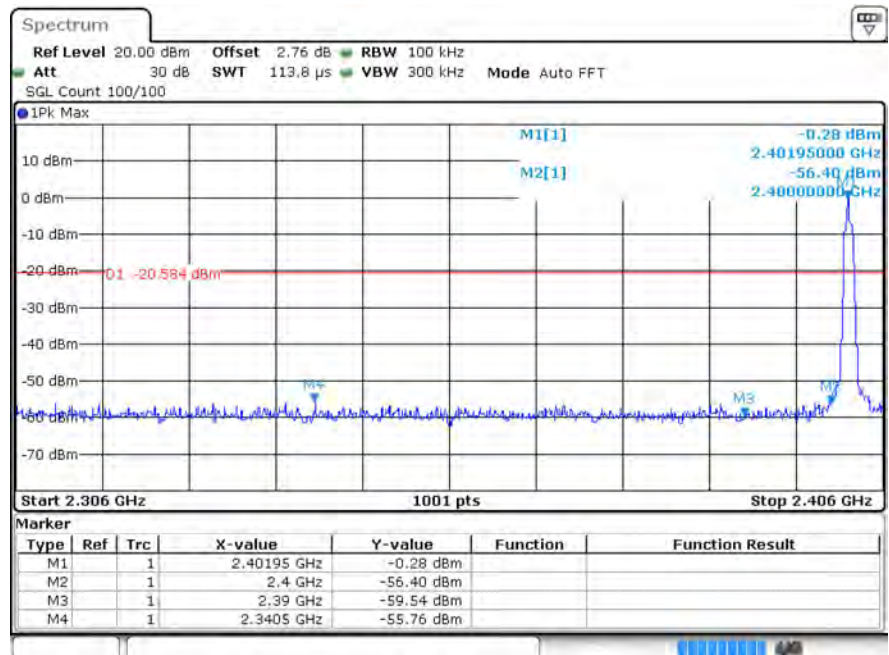
Ref


 $\pi/4$ DQPSK/HCH/Hop


Ref



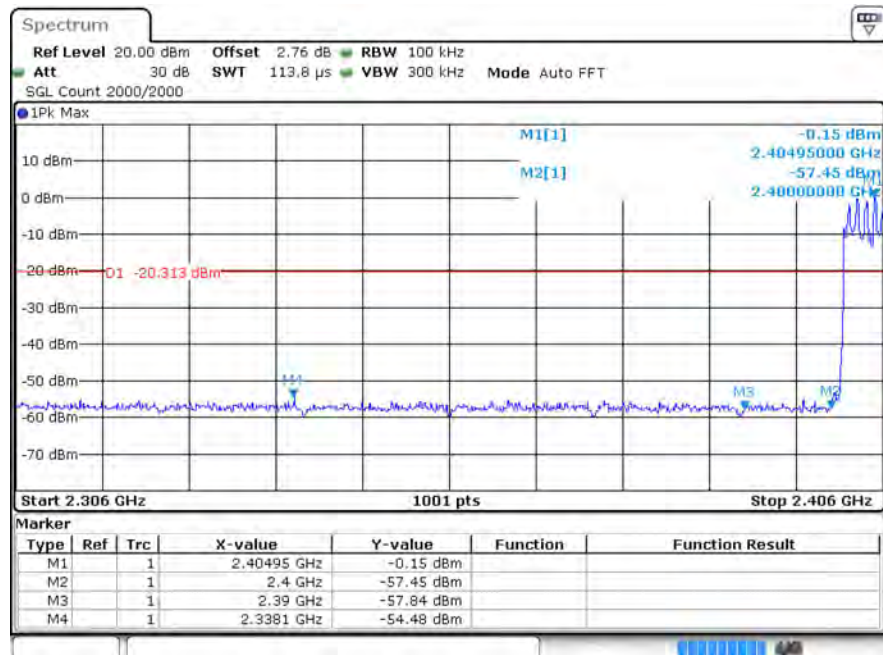
8DPSK/LCH/No Hop



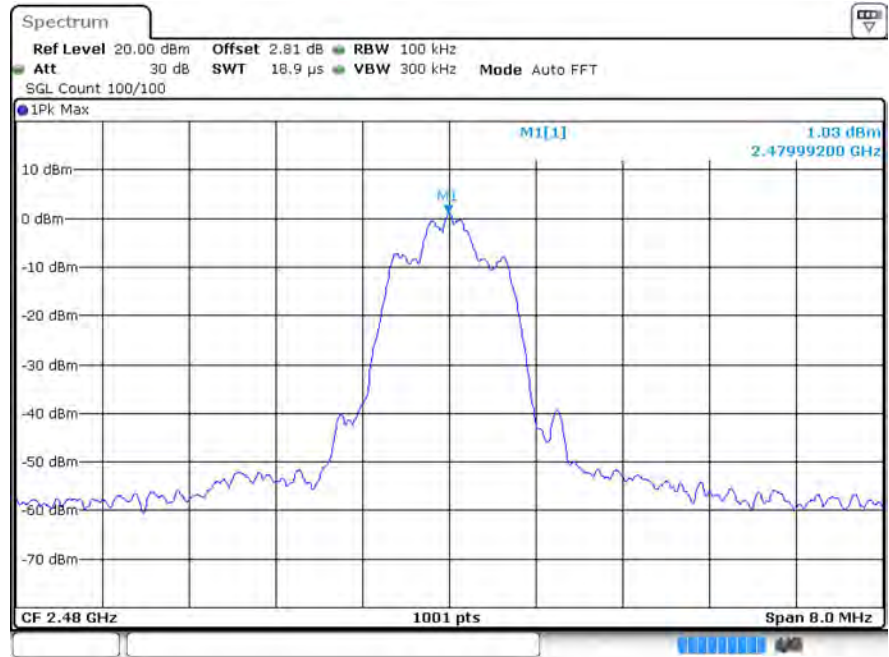
Ref



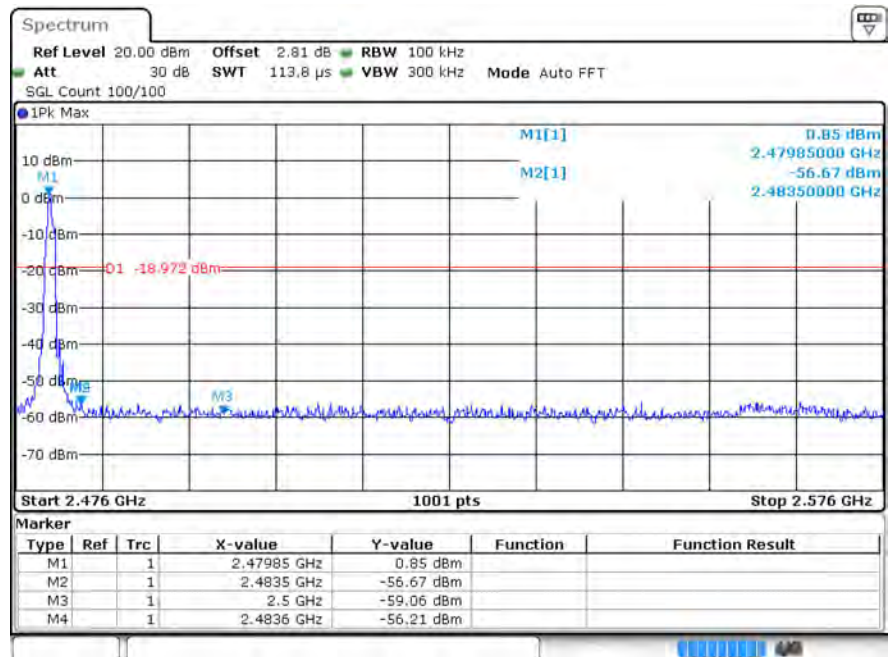
8DPSK/LCH/Hop



Ref



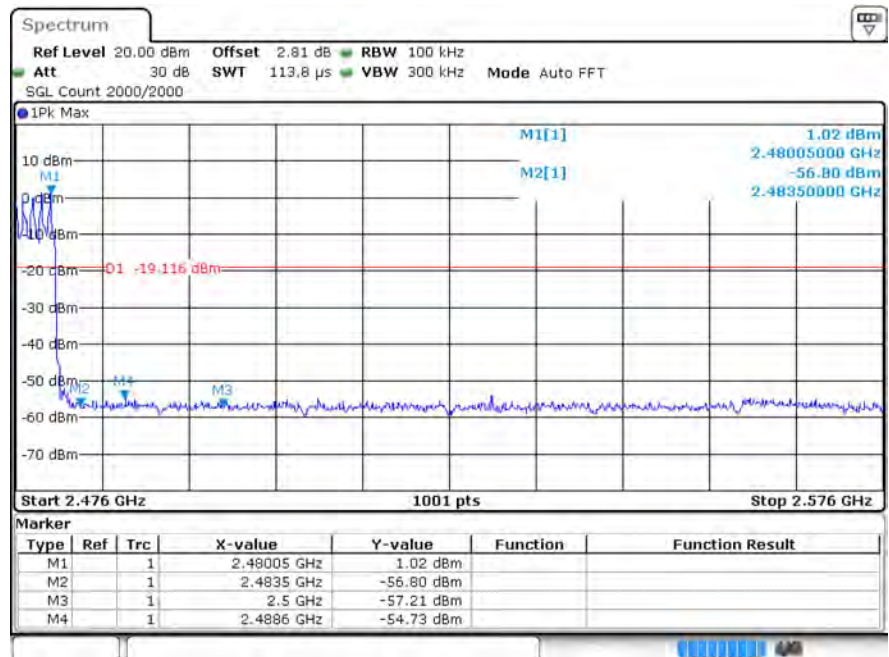
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

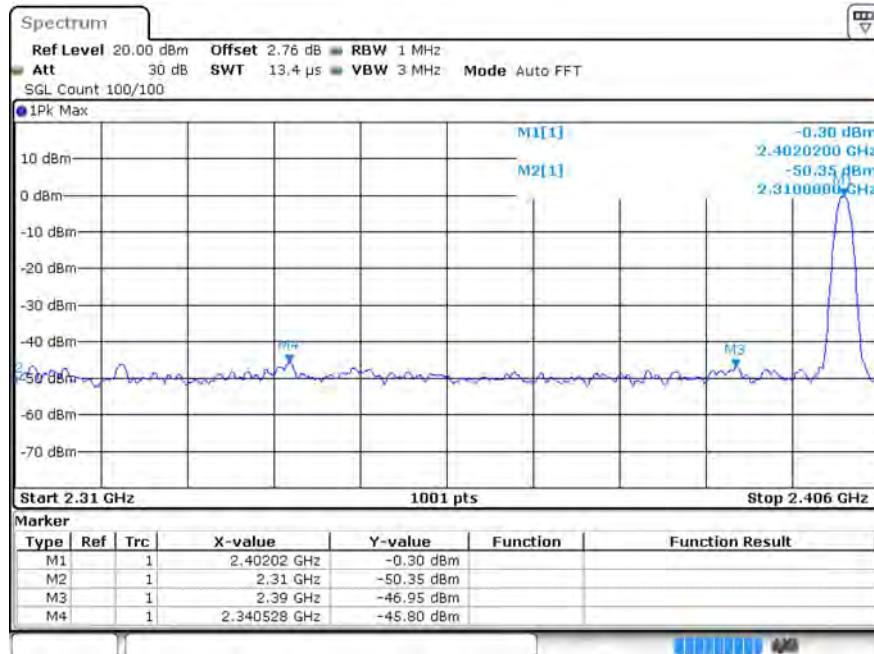
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | Duty Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|-------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -50.35      | 2    | -           | 46.91      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.1       | 2    | 4.95        | 46.11      | AV       | 54             | Pass    |
|               | Off     | 2340.528 | -45.8       | 2    | -           | 51.46      | PEAK     | 74             | Pass    |
|               | Off     | 2338.416 | -54.11      | 2    | 4.95        | 48.1       | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -46.95      | 2    | -           | 50.31      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.7       | 2    | 4.95        | 45.51      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -47.71      | 2    | -           | 49.55      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -55.77      | 2    | 4.95        | 46.44      | AV       | 54             | Pass    |
|               | Off     | 2495.632 | -47.23      | 2    | -           | 50.03      | PEAK     | 74             | Pass    |
|               | Off     | 2484.856 | -55.49      | 2    | 4.95        | 46.72      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -49.5       | 2    | -           | 47.76      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -56.38      | 2    | 4.95        | 45.83      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -48.44      | 2    | -           | 48.82      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.98      | 2    | 4.84        | 45.12      | AV       | 54             | Pass    |
|               | Off     | 2342.256 | -46         | 2    | -           | 51.26      | PEAK     | 74             | Pass    |
|               | Off     | 2342.352 | -54.38      | 2    | 4.84        | 47.72      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -49.84      | 2    | -           | 47.42      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -57.75      | 2    | 4.84        | 44.35      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -48.91      | 2    | -           | 48.35      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -55.34      | 2    | 4.84        | 46.76      | AV       | 54             | Pass    |
|               | Off     | 2499.16  | -46.76      | 2    | -           | 50.5       | PEAK     | 74             | Pass    |
|               | Off     | 2483.824 | -55.22      | 2    | 4.84        | 46.88      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -48.79      | 2    | -           | 48.47      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -56.72      | 2    | 4.84        | 45.38      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -50.22      | 2    | -           | 47.04      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.4       | 2    | 4.84        | 45.7       | AV       | 54             | Pass    |
|               | Off     | 2346.384 | -46.27      | 2    | -           | 50.99      | PEAK     | 74             | Pass    |
|               | Off     | 2340.144 | -54.42      | 2    | 4.84        | 47.68      | AV       | 54             | Pass    |



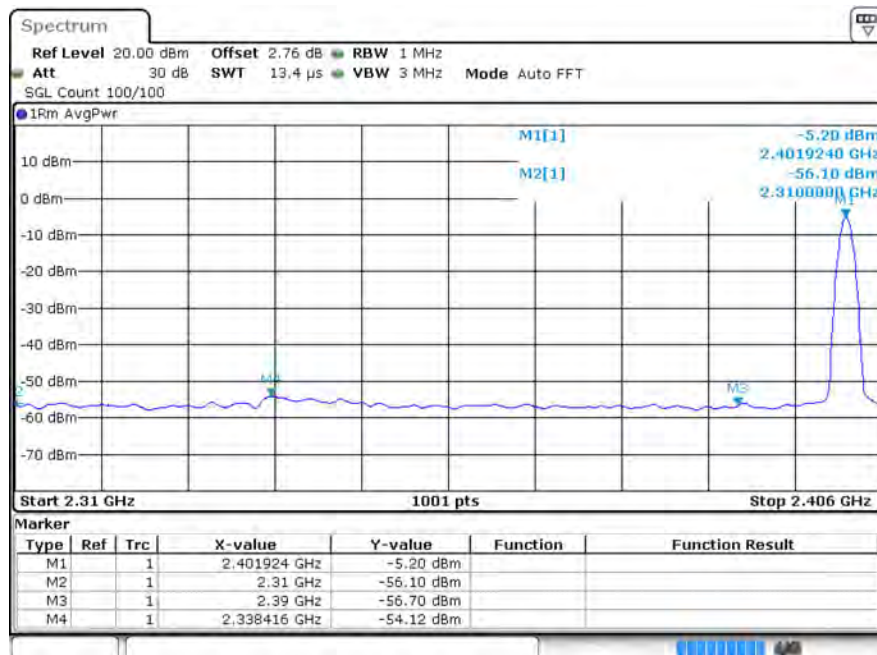
|     |          |        |   |      |       |      |    |      |
|-----|----------|--------|---|------|-------|------|----|------|
| Off | 2390.0   | -51.71 | 2 | -    | 45.55 | PEAK | 74 | Pass |
| Off | 2390.0   | -57.12 | 2 | 4.84 | 44.98 | AV   | 54 | Pass |
| Off | 2483.5   | -49.31 | 2 | -    | 47.95 | PEAK | 74 | Pass |
| Off | 2483.5   | -55.3  | 2 | 4.84 | 46.8  | AV   | 54 | Pass |
| Off | 2485.096 | -47.71 | 2 | -    | 49.55 | PEAK | 74 | Pass |
| Off | 2483.512 | -55.31 | 2 | 4.84 | 46.79 | AV   | 54 | Pass |
| Off | 2500.0   | -50.26 | 2 | -    | 47    | PEAK | 74 | Pass |
| Off | 2500.0   | -57.25 | 2 | 4.84 | 44.85 | AV   | 54 | Pass |

## 9.2 Test Graphs

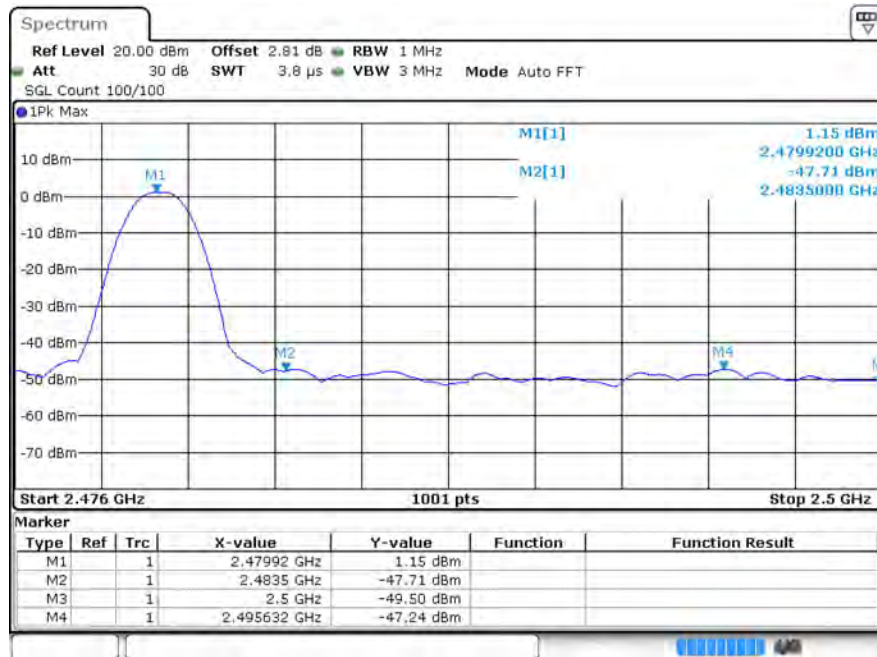
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



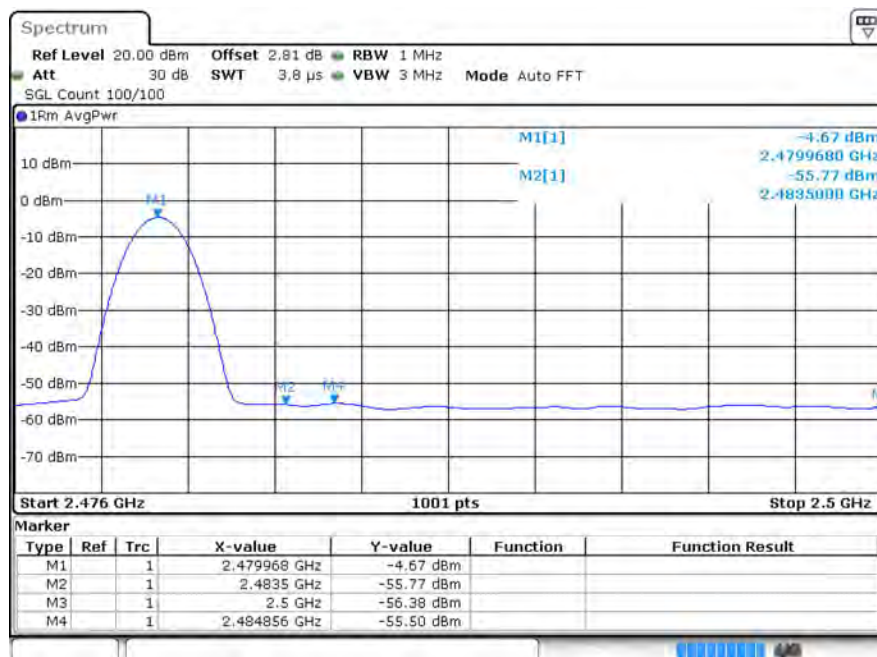
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



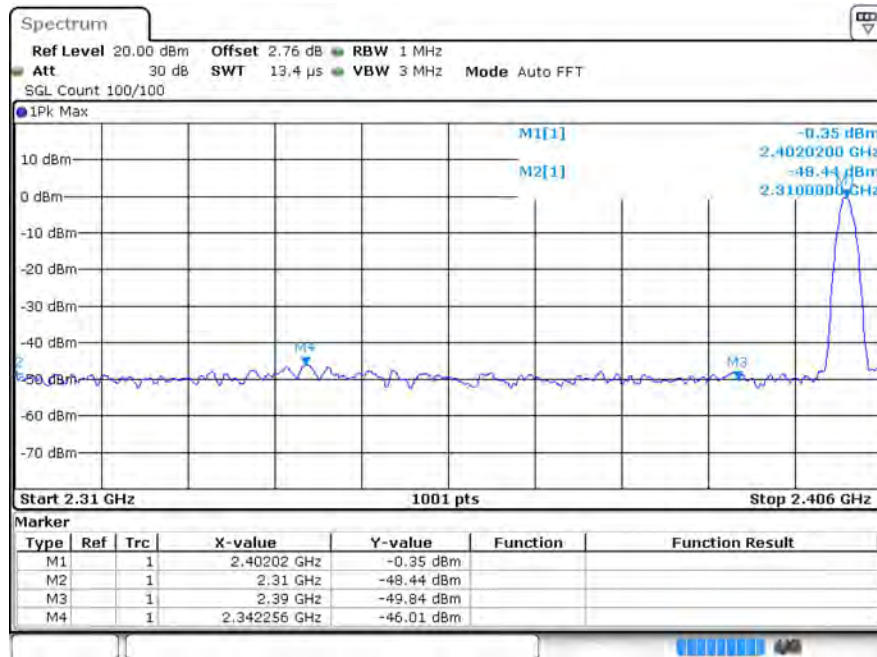
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



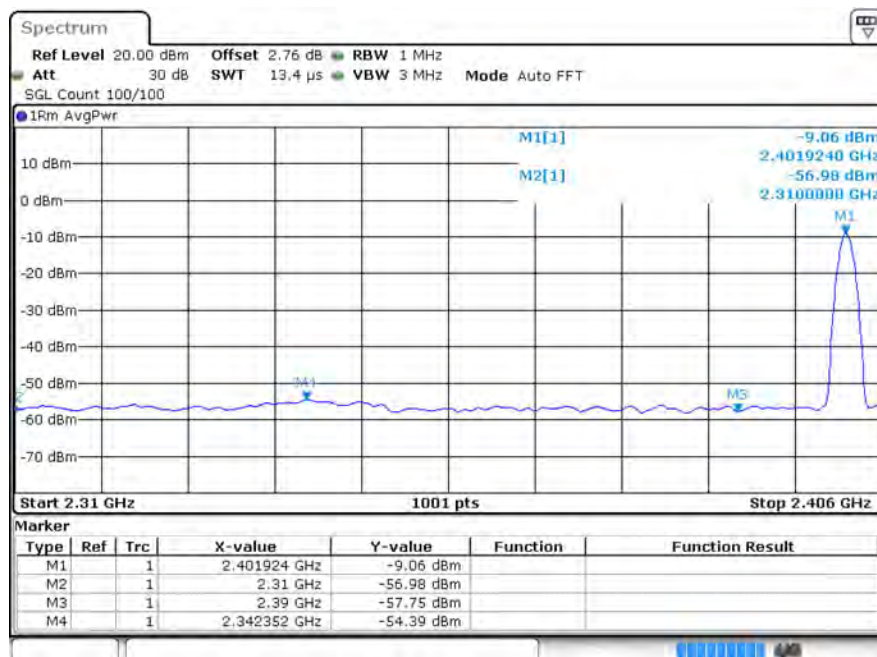
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



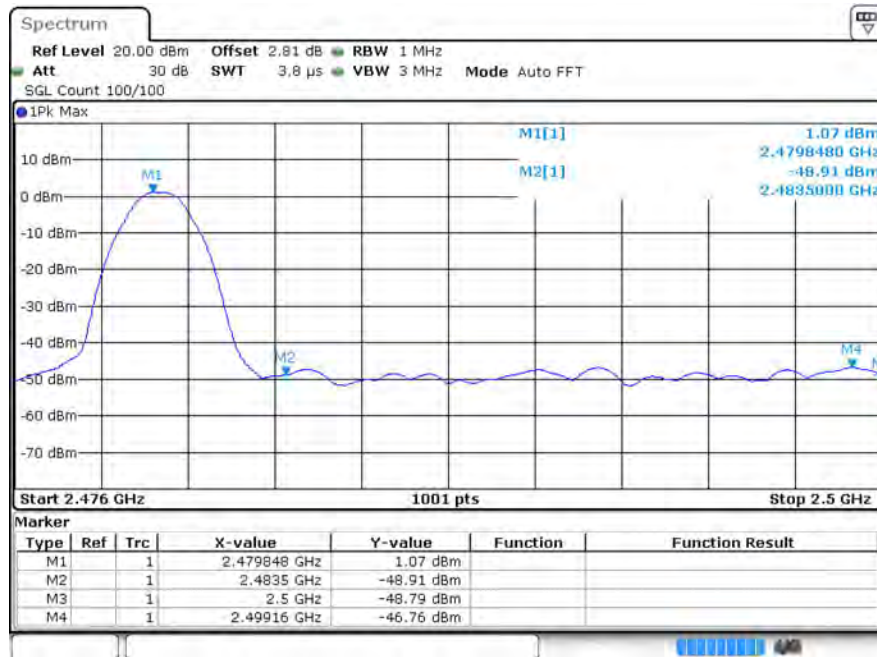
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



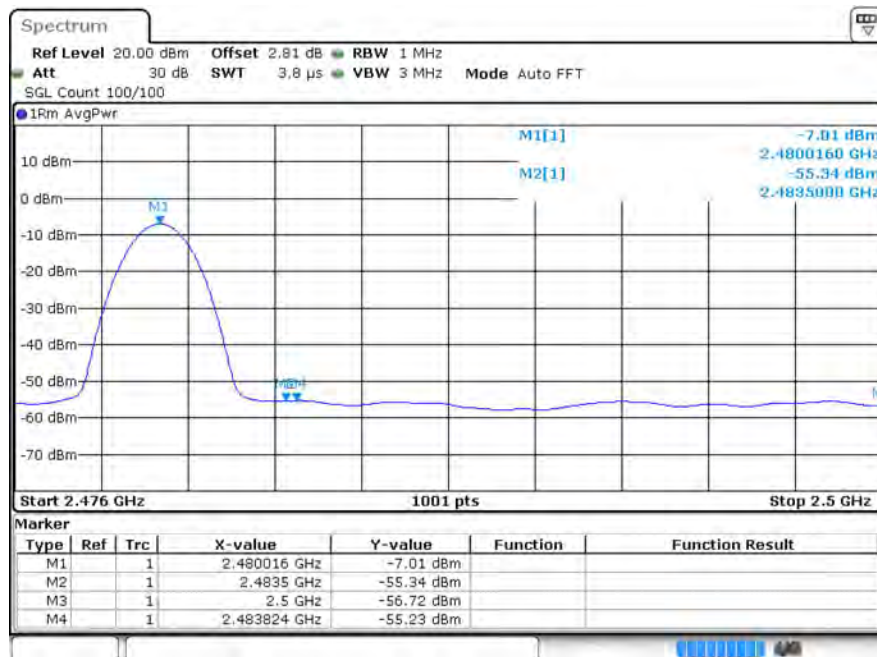
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



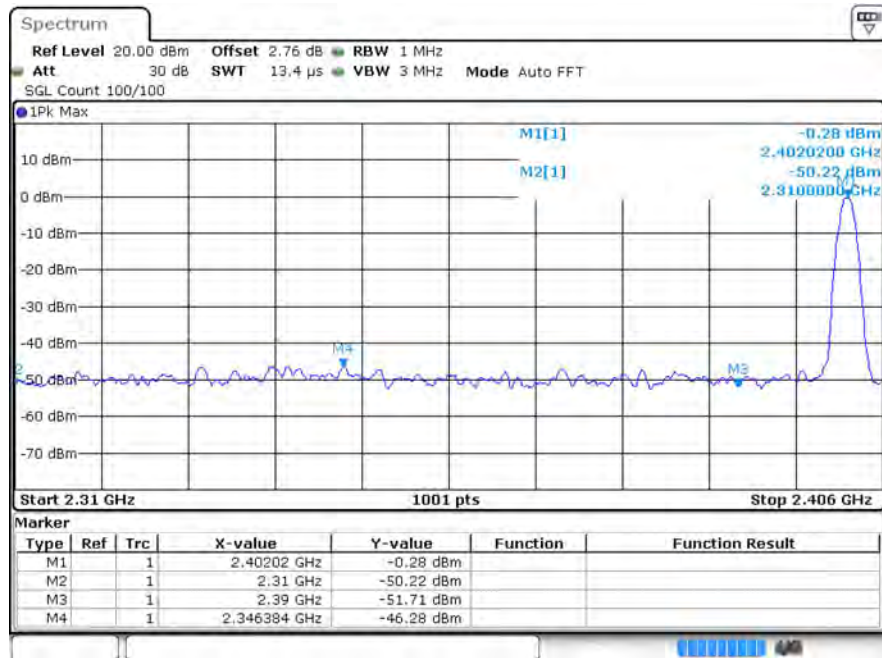
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



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



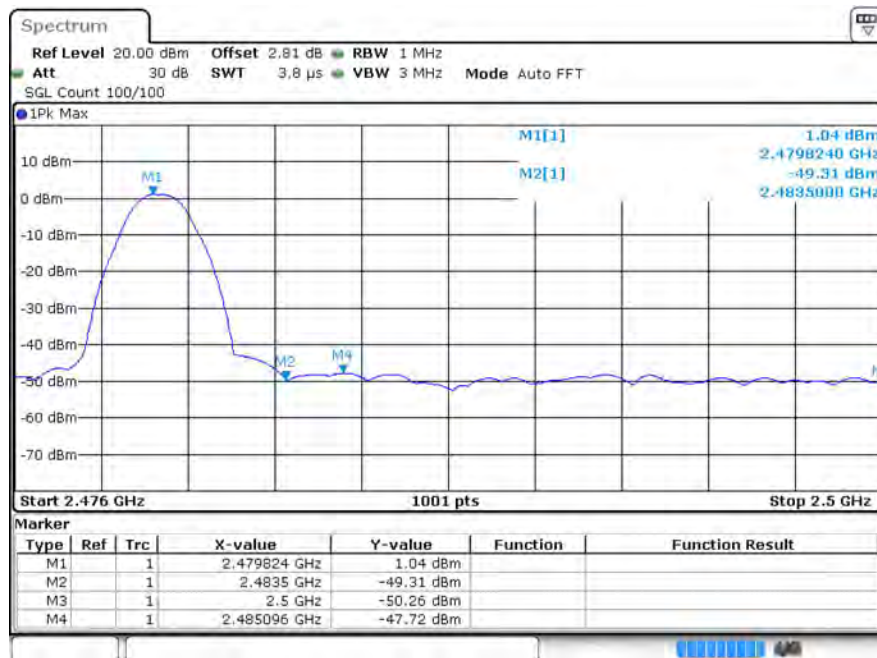
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



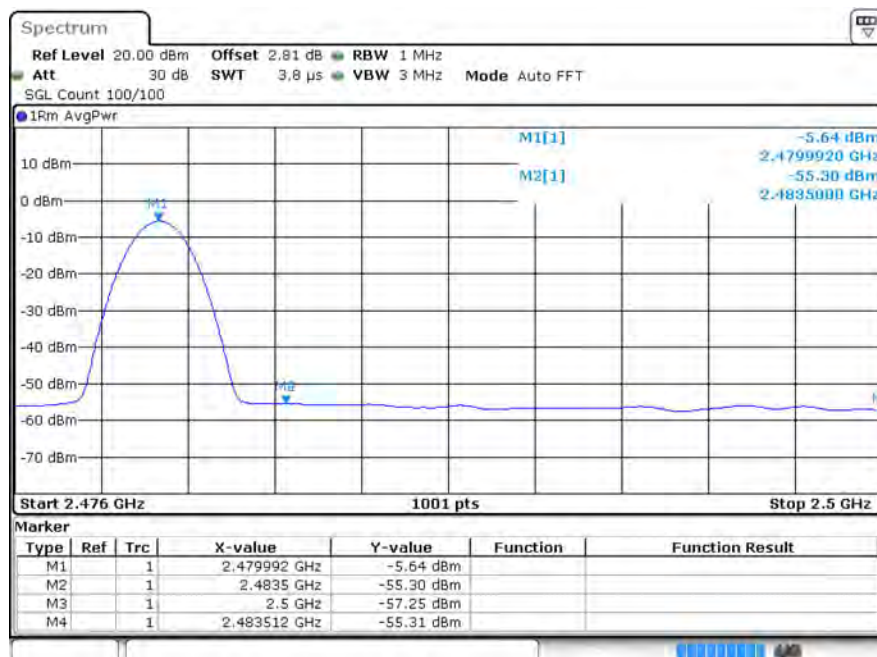
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---