



## Appendix A

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

Product Name: Translation headphones

Trade Mark: N/A

Test Model: T20

#### Environmental Conditions

|                    |             |
|--------------------|-------------|
| Temperature:       | 24.3℃       |
| Relative Humidity: | 52.1%       |
| ATM Pressure:      | 101Kpa      |
| Test Engineer:     | Emiya lin   |
| Supervised by:     | Simba Haung |



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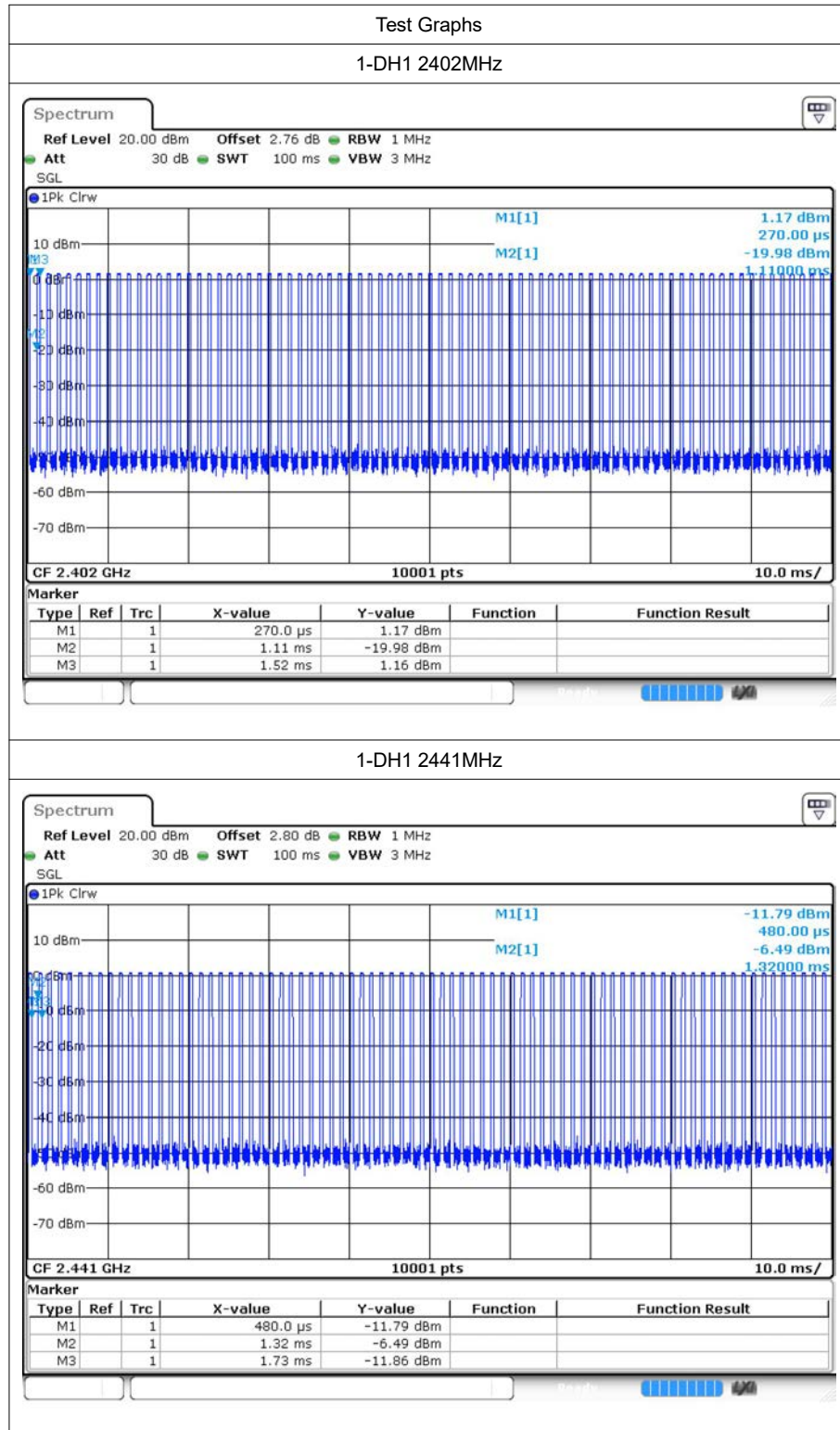
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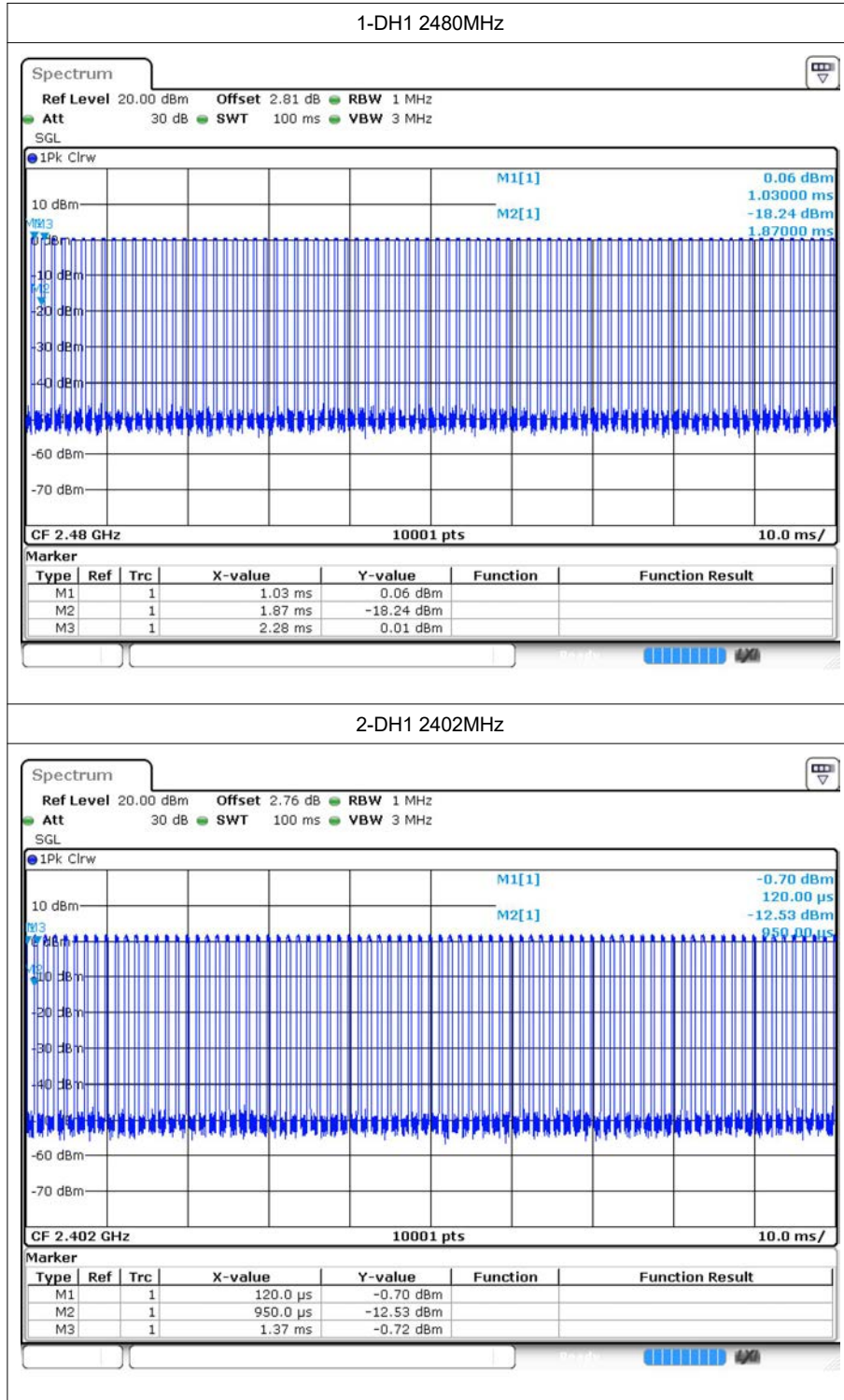
# 1 Duty Cycle

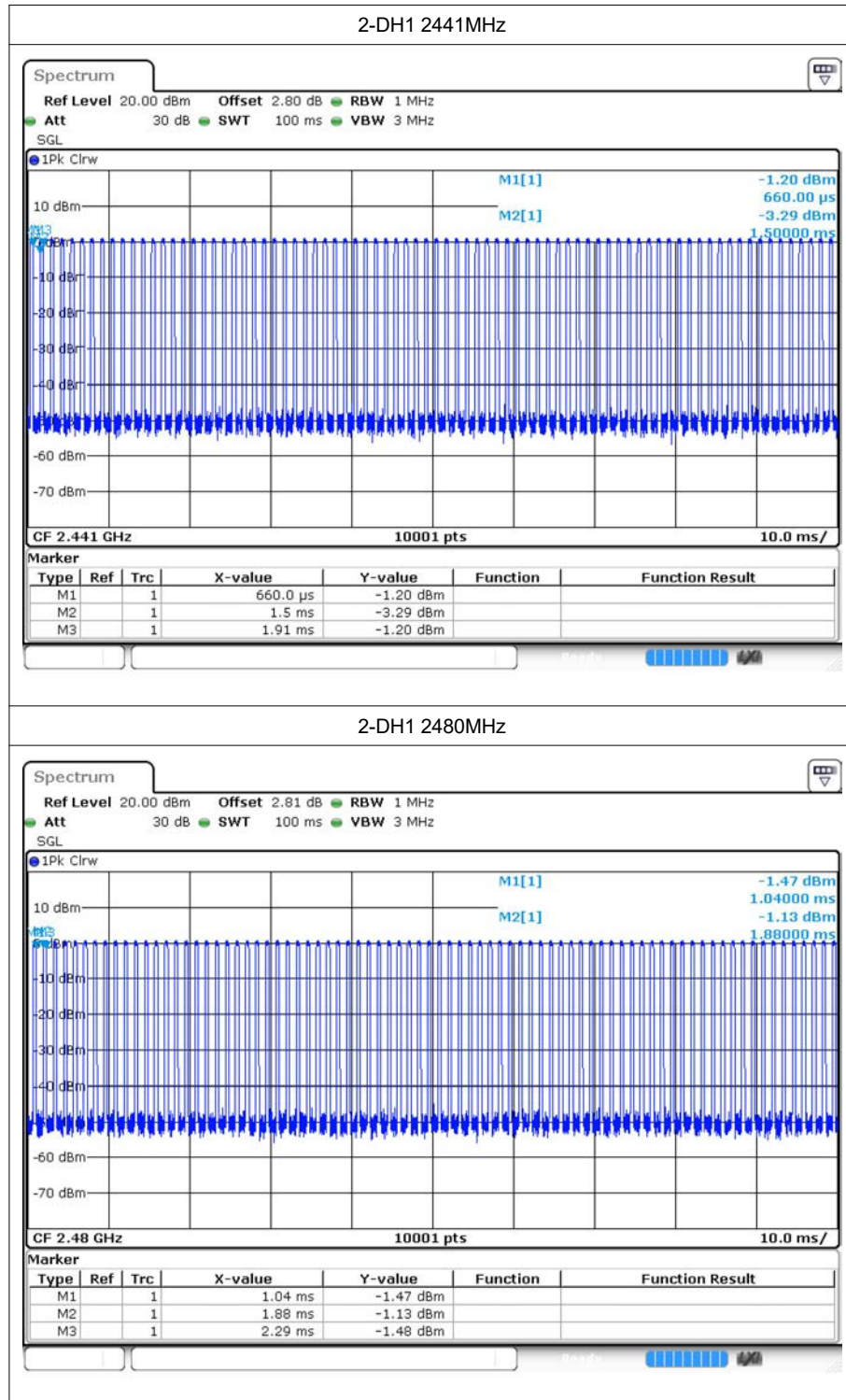
## 1.1 Test Result

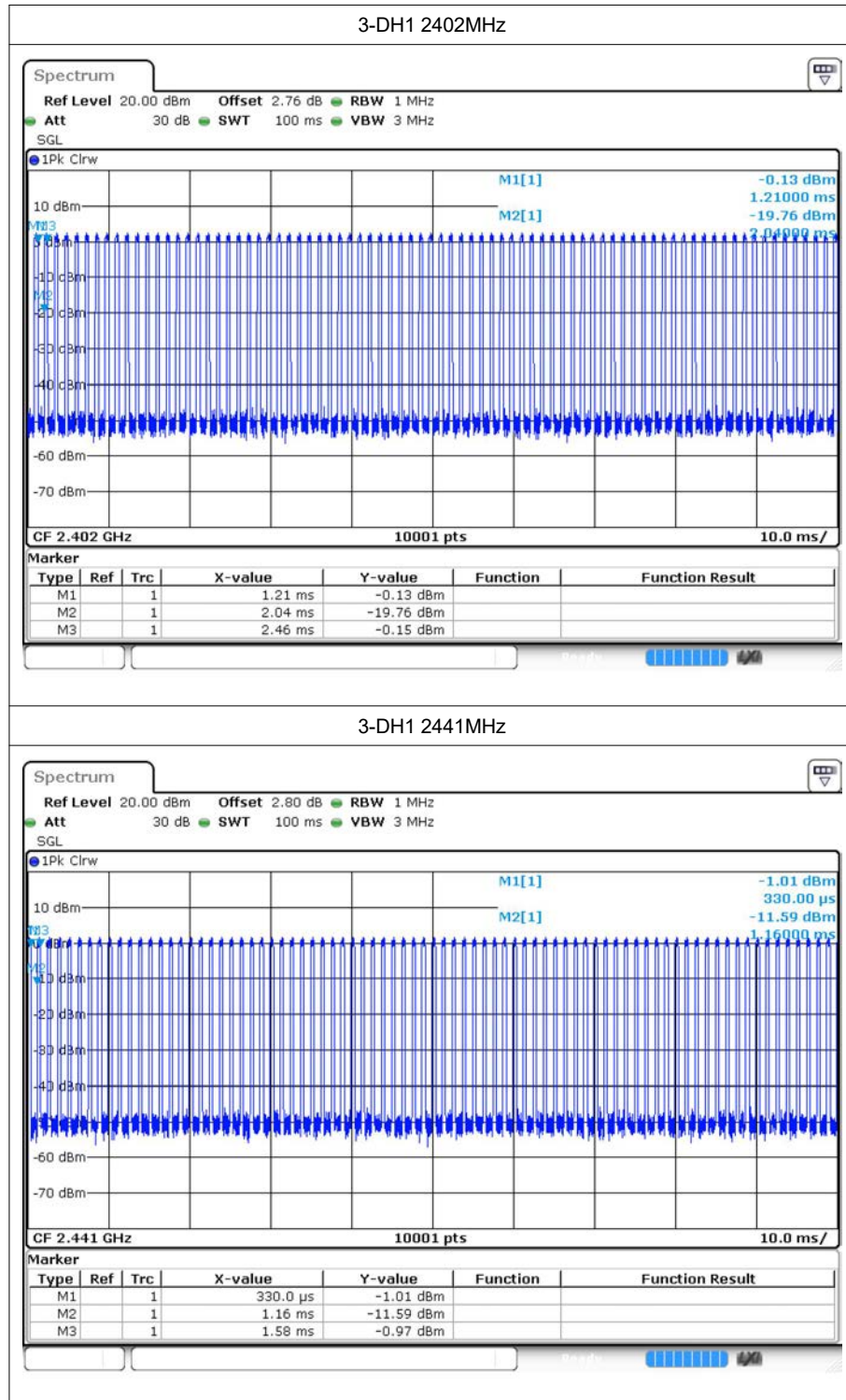
| Mode  | Frequency (MHz) | Duty Cycle (%) | Correction Factor | 1/T (kHz) |
|-------|-----------------|----------------|-------------------|-----------|
| 1-DH1 | 2402            | 33.61          | 4.74              | 2.44      |
| 1-DH1 | 2441            | 33.6           | 4.74              | 2.44      |
| 1-DH1 | 2480            | 33.6           | 4.74              | 2.44      |
| 2-DH1 | 2402            | 34.41          | 4.63              | 2.38      |
| 2-DH1 | 2441            | 33.6           | 4.74              | 2.44      |
| 2-DH1 | 2480            | 33.6           | 4.74              | 2.44      |
| 3-DH1 | 2402            | 34.4           | 4.63              | 2.38      |
| 3-DH1 | 2441            | 34.41          | 4.63              | 2.38      |
| 3-DH1 | 2480            | 34.4           | 4.63              | 2.38      |

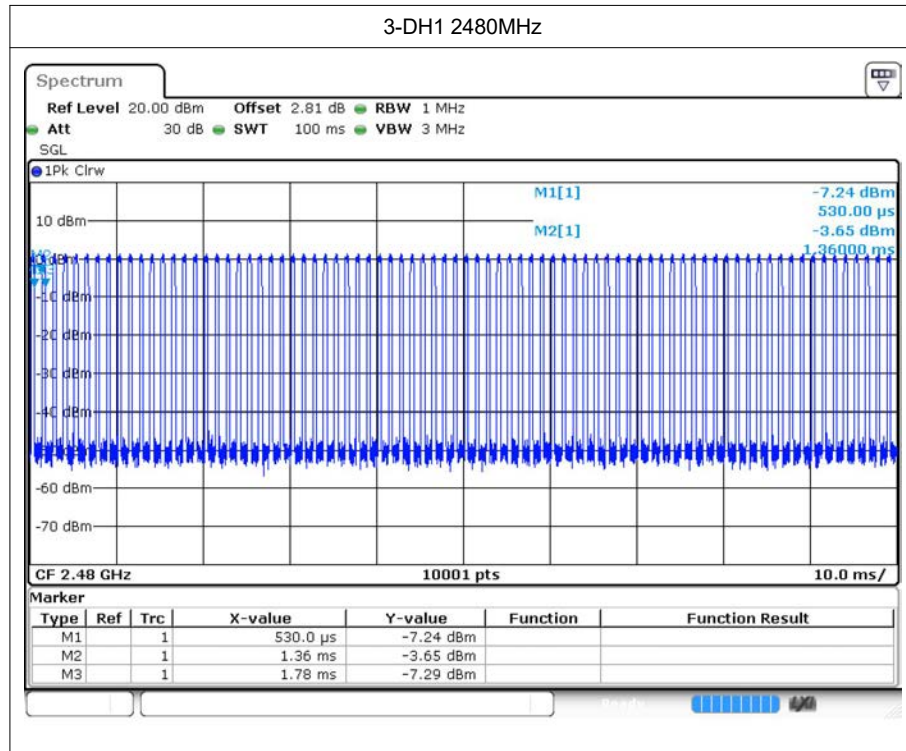
## 1.2 Test Graphs









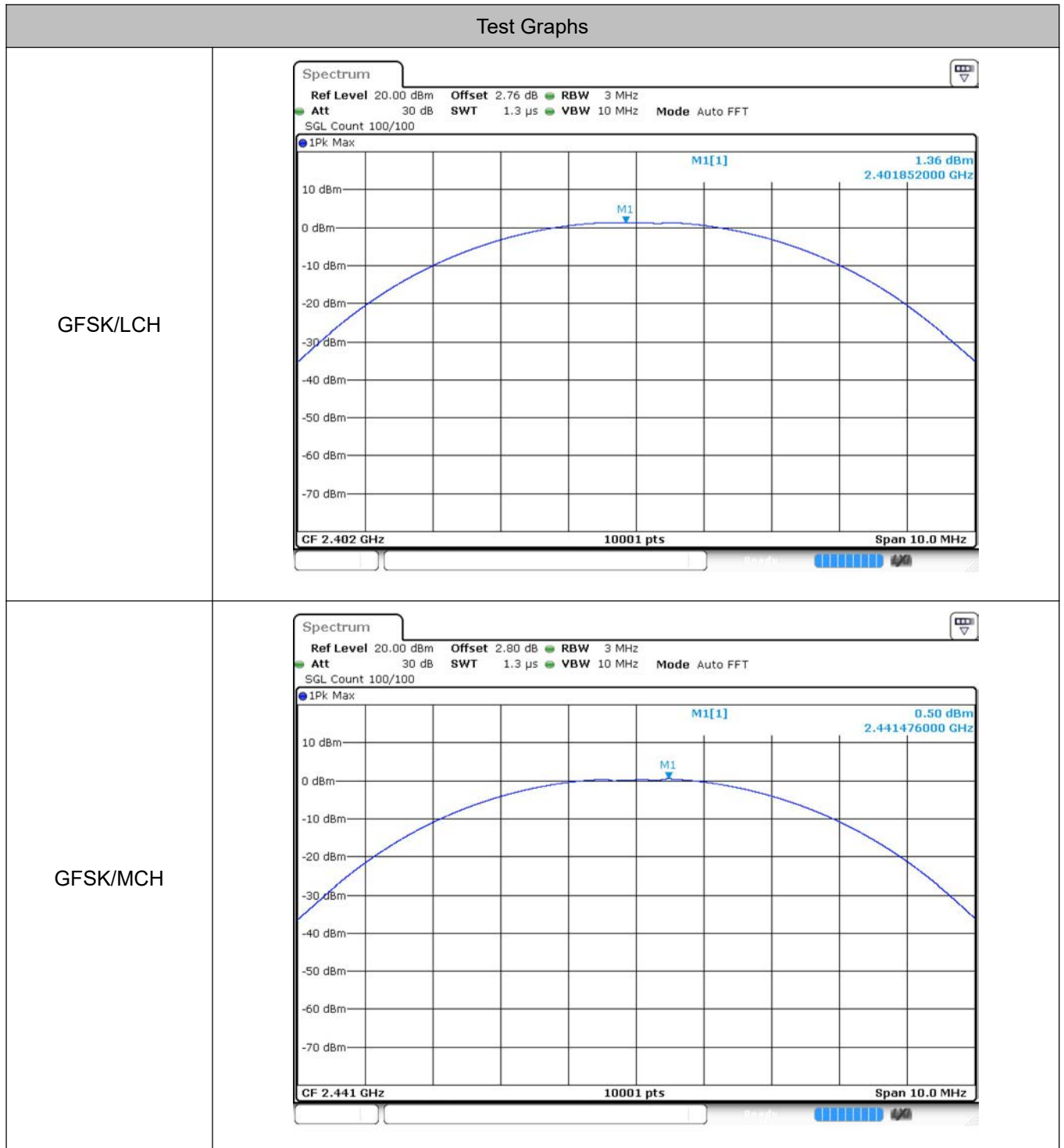


## 2 Maximum Conducted Peak Output Power

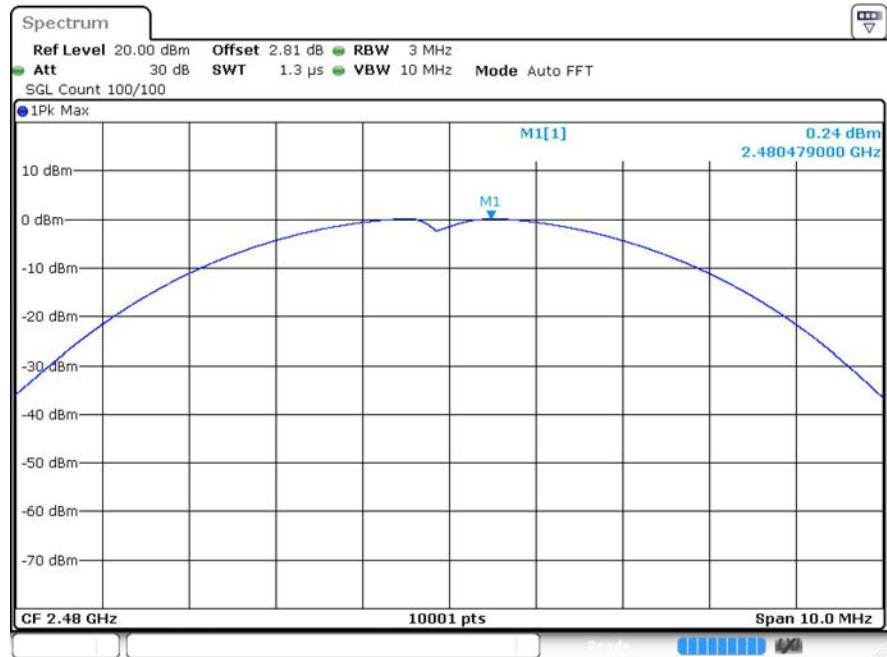
### 2.1 Test Result

| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | 1.36                            | 21          | Pass    |
|               | MCH      | 0.5                             | 21          | Pass    |
|               | HCH      | 0.24                            | 21          | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.49                            | 21          | Pass    |
|               | MCH      | 0.82                            | 21          | Pass    |
|               | HCH      | 0.56                            | 21          | Pass    |
| 8DPSK         | LCH      | 2.6                             | 21          | Pass    |
|               | MCH      | 1.98                            | 21          | Pass    |
|               | HCH      | 0.59                            | 21          | Pass    |

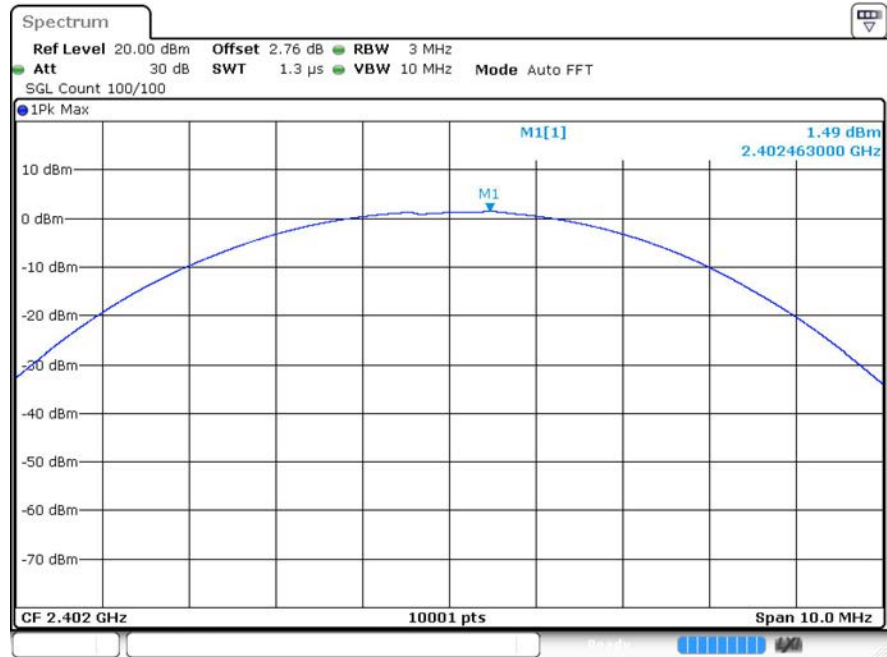
## 2.2 Test Graphs



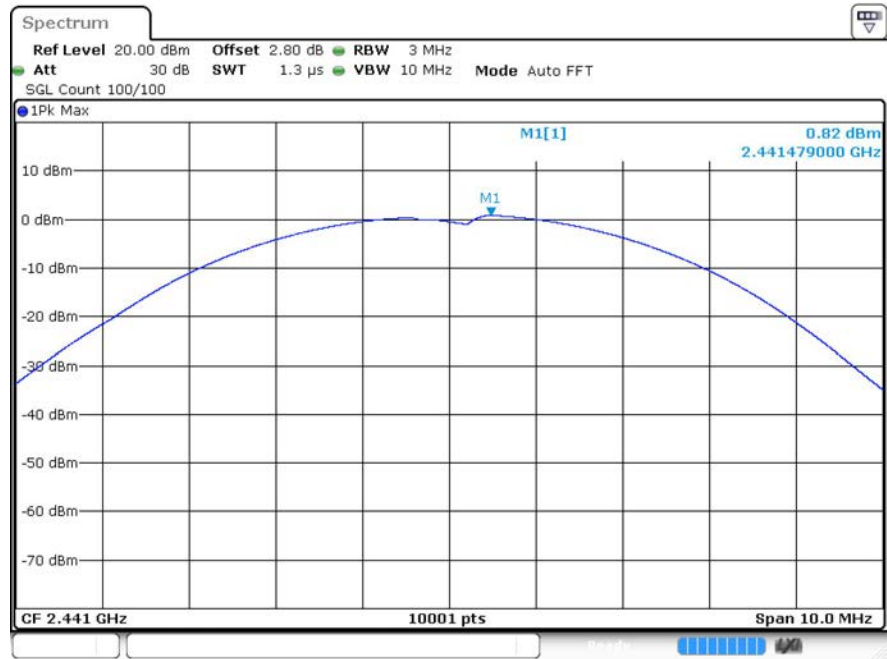
GFSK/HCH



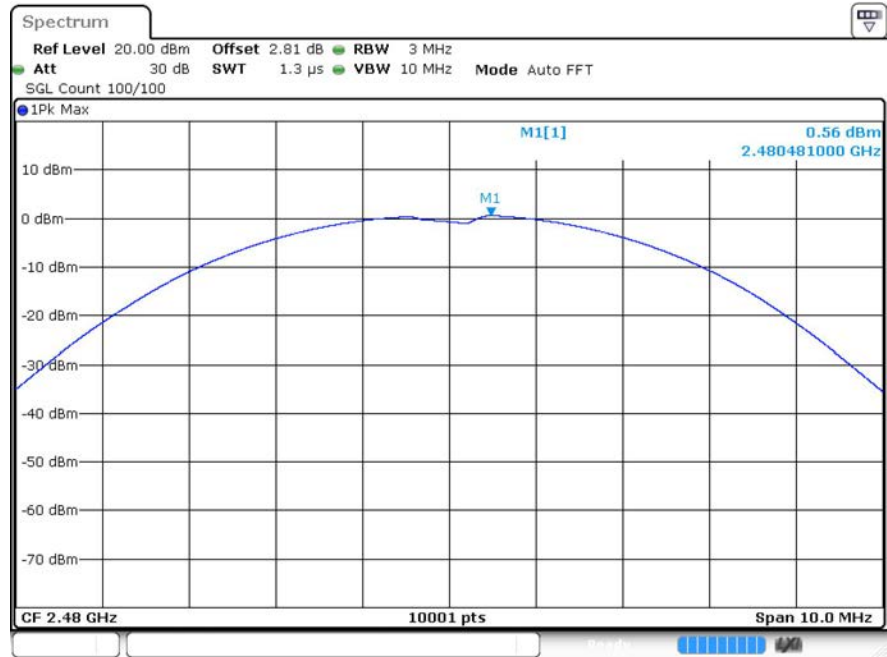
$\pi/4$ DQPSK/LCH



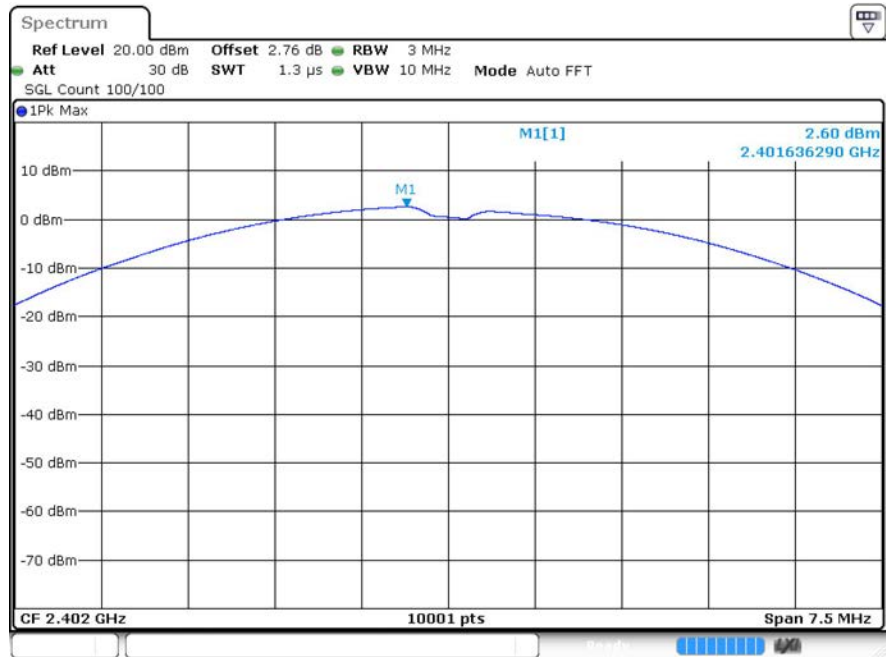
$\pi/4$ DQPSK/MCH



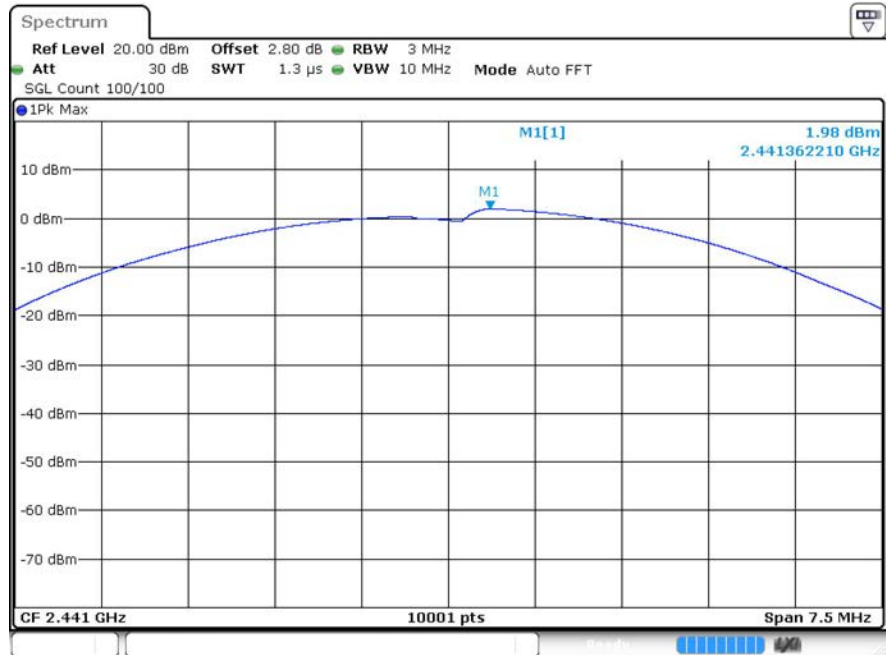
$\pi/4$ DQPSK/HCH



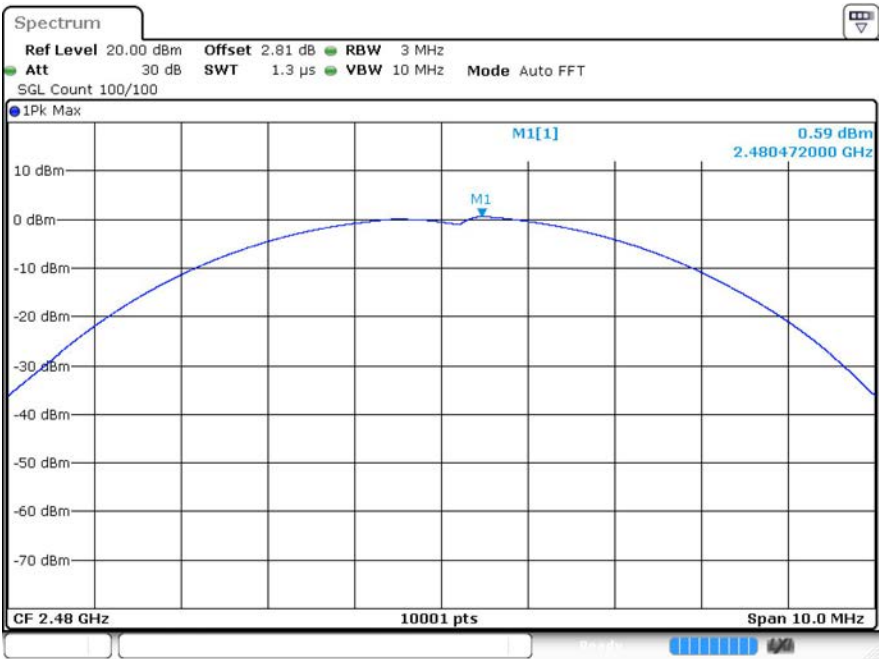
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



### 3 20dB Bandwidth

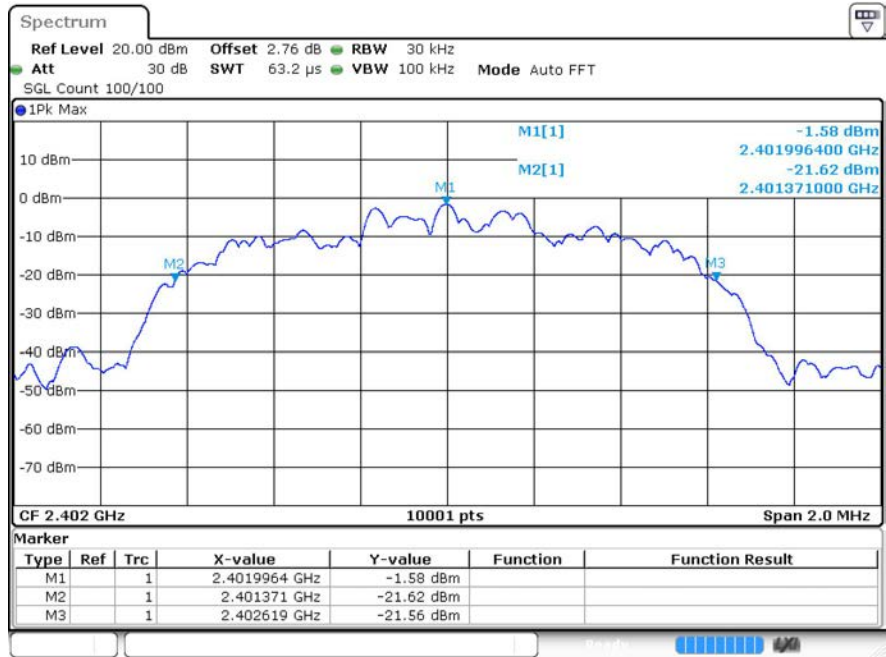
#### 3.1 Test Result

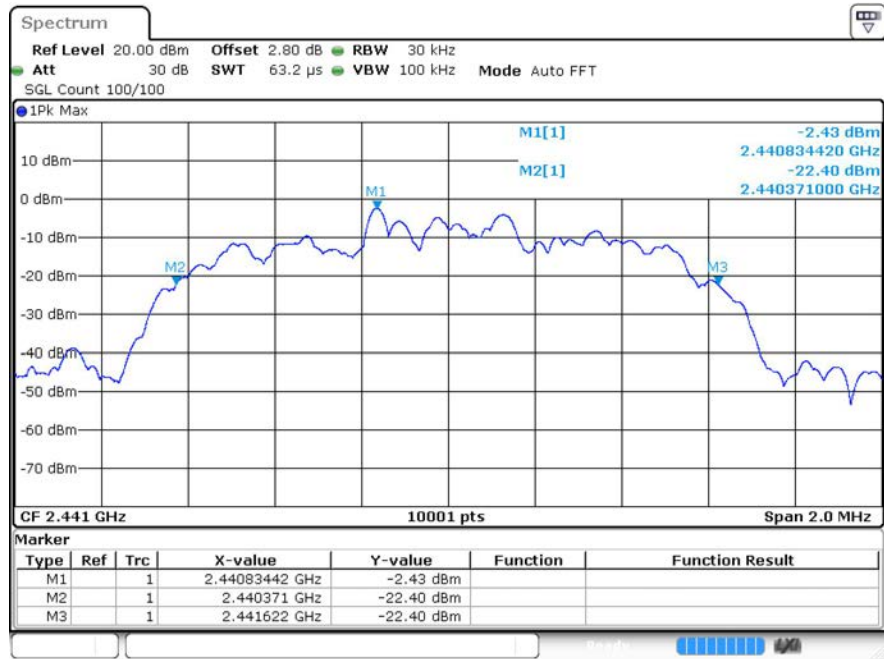
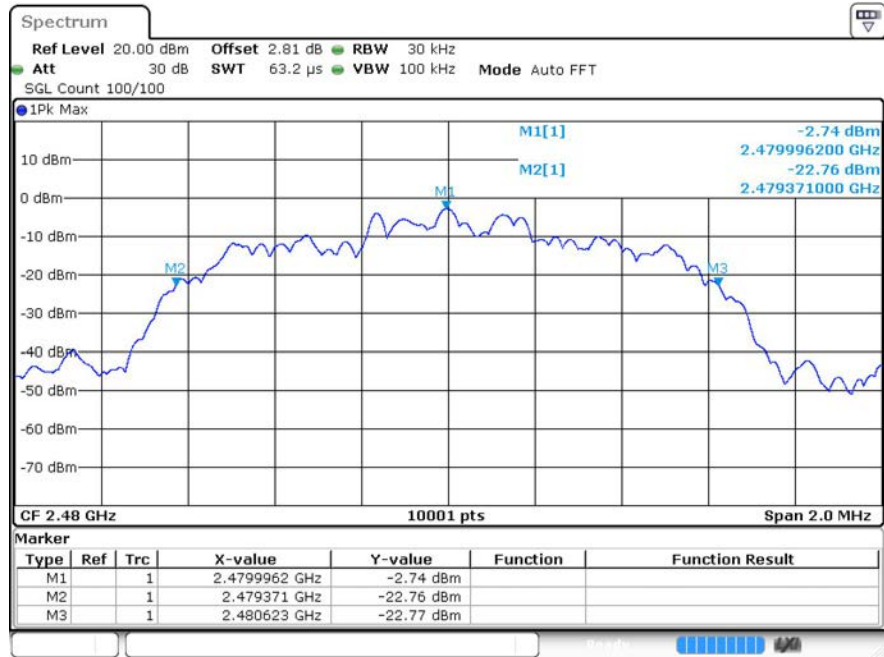
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.913                | Not Specified | Pass    |
|               | MCH      | 0.895                | Not Specified | Pass    |
|               | HCH      | 0.918                | Not Specified | Pass    |
| $\pi/4$ DQPSK | LCH      | 1.248                | Not Specified | Pass    |
|               | MCH      | 1.251                | Not Specified | Pass    |
|               | HCH      | 1.252                | Not Specified | Pass    |
| 8DPSK         | LCH      | 1.201                | Not Specified | Pass    |
|               | MCH      | 1.197                | Not Specified | Pass    |
|               | HCH      | 1.202                | Not Specified | Pass    |

### 3.2 Test Graphs

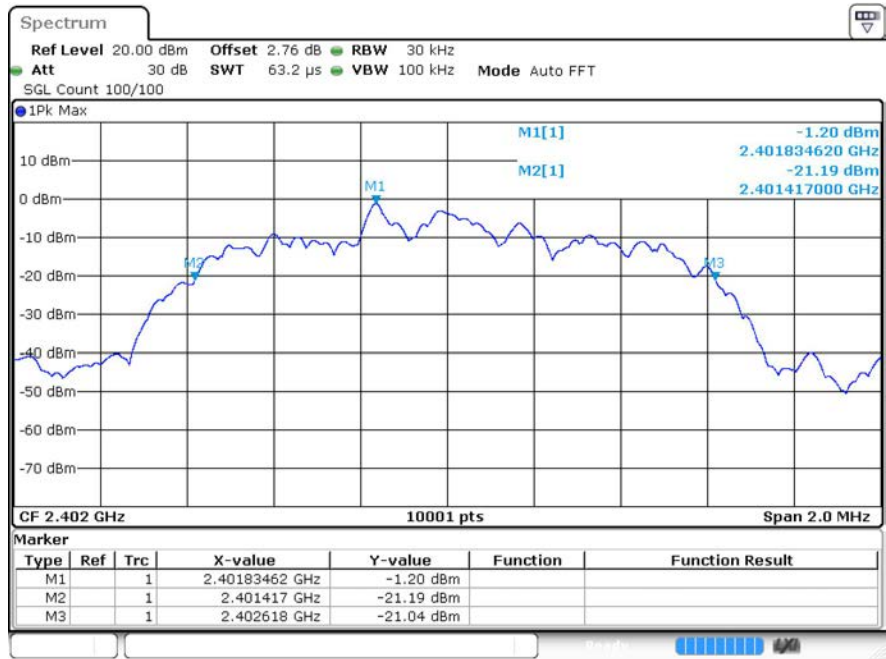


GFSK/HCH

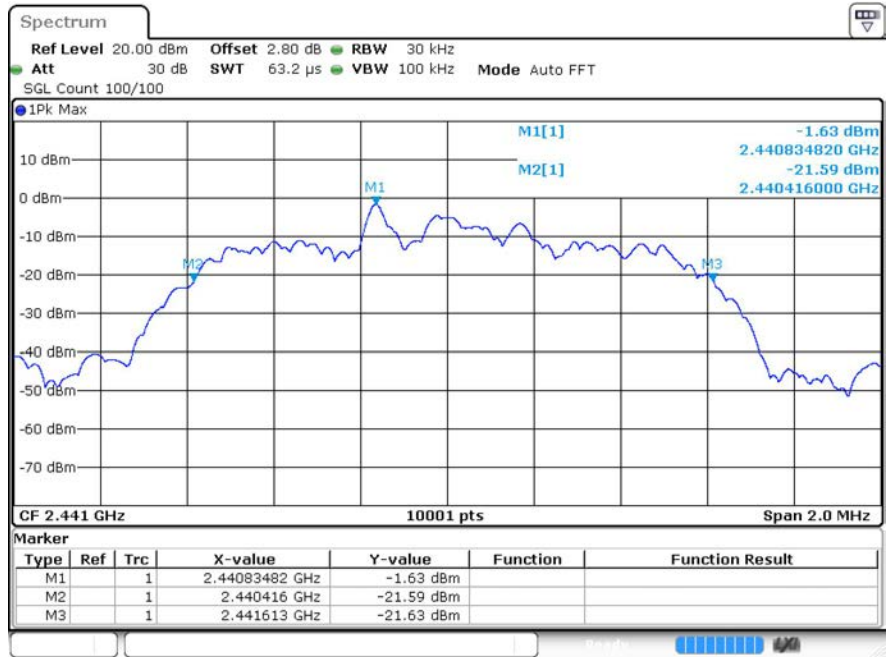

 $\pi/4$ DQPSK/LCH


$\pi/4$ DQPSK/MCH

 $\pi/4$ DQPSK/HCH


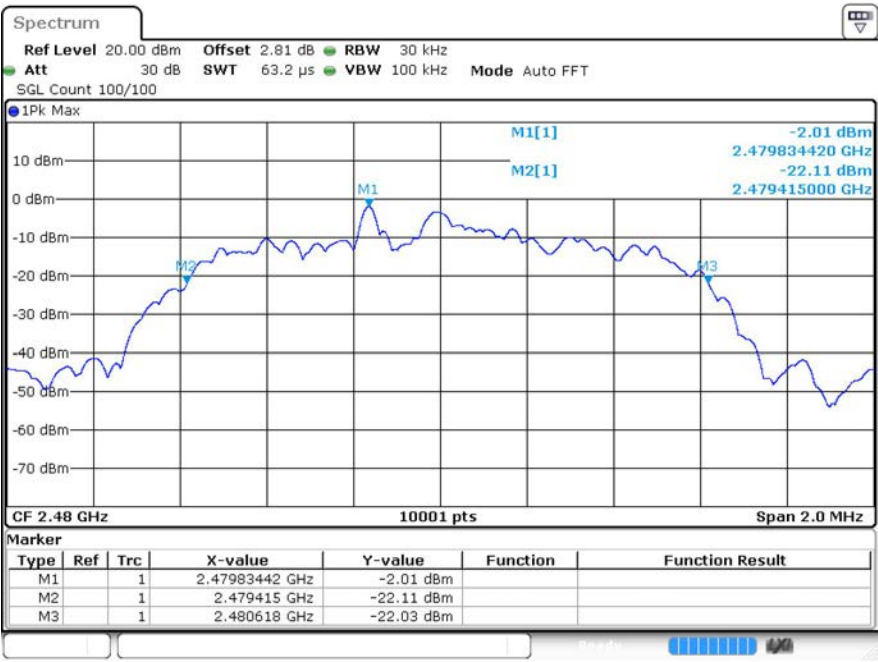
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

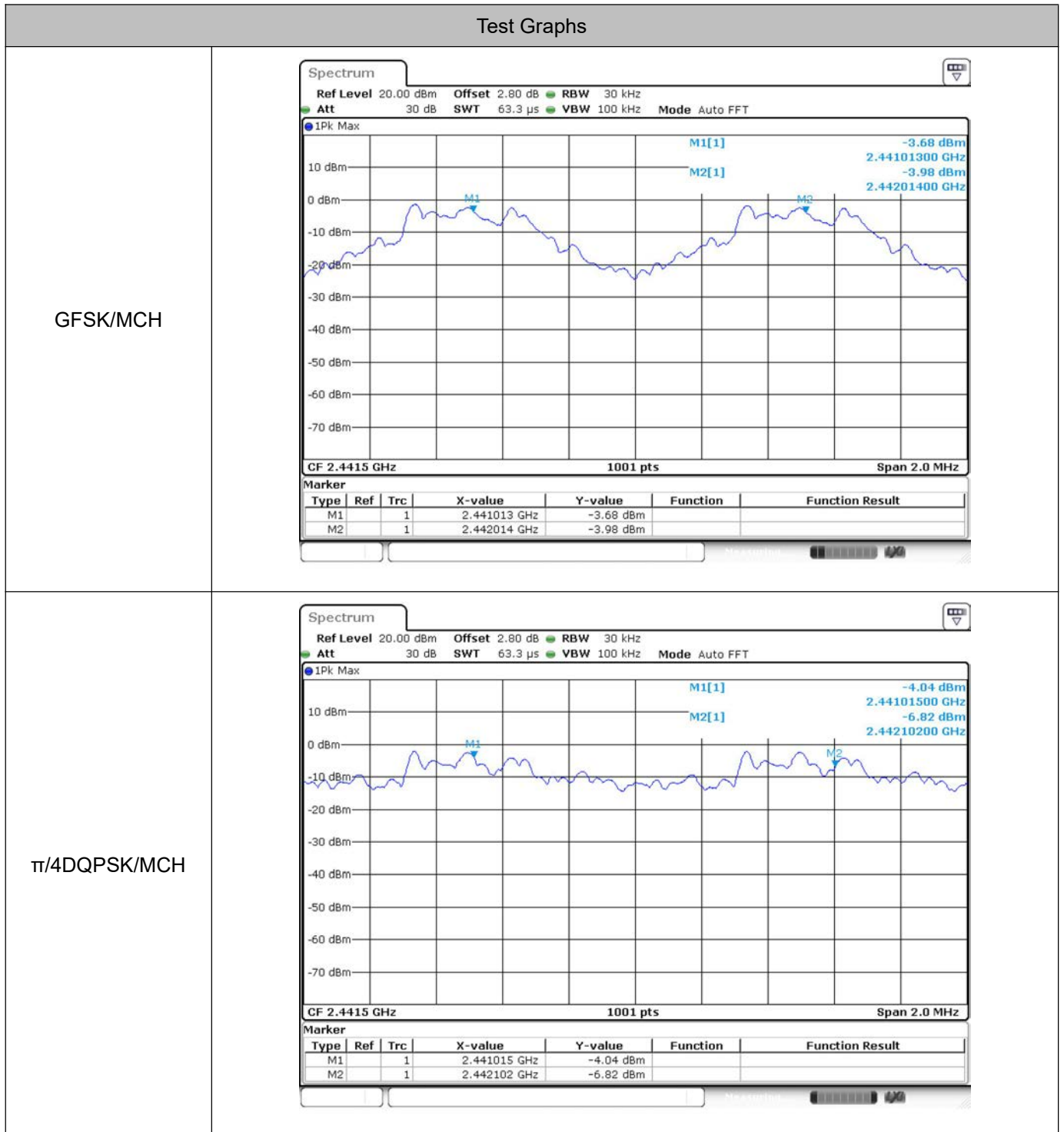


## 4 Carrier Frequency Separation

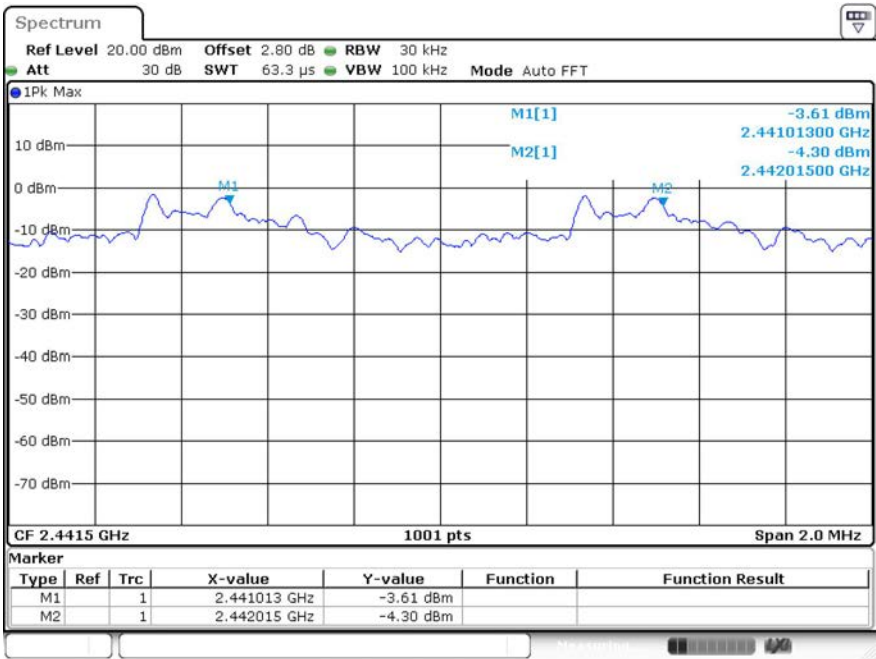
### 4.1 Test Result

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | MCH      | 1.001                              | 0.597       | Pass    |
| $\pi/4$ DQPSK | MCH      | 1.087                              | 0.834       | Pass    |
| 8DPSK         | MCH      | 1.002                              | 0.798       | Pass    |

## 4.2 Test Graphs



8DPSK/MCH

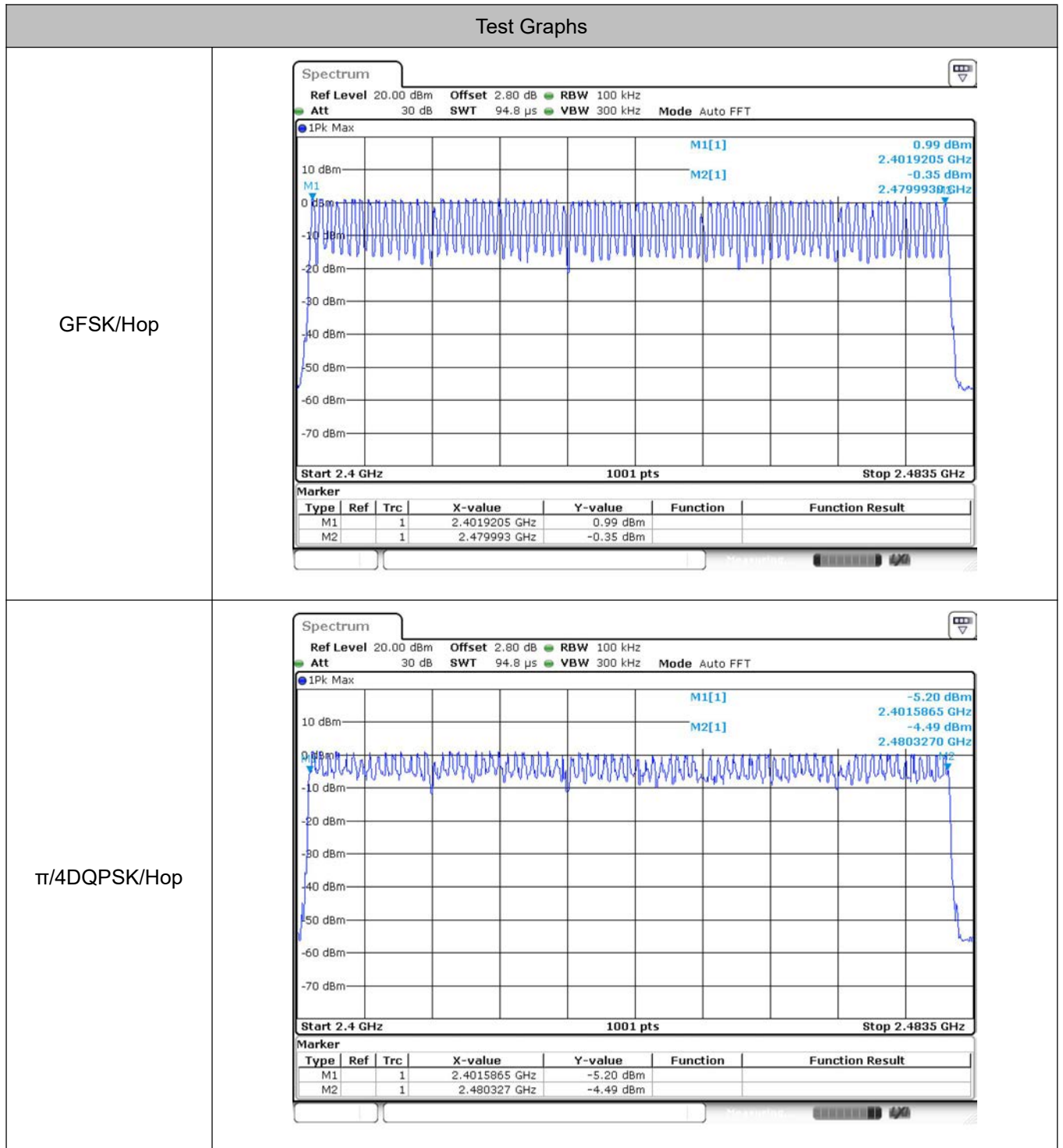


## 5 Hopping Channel Number

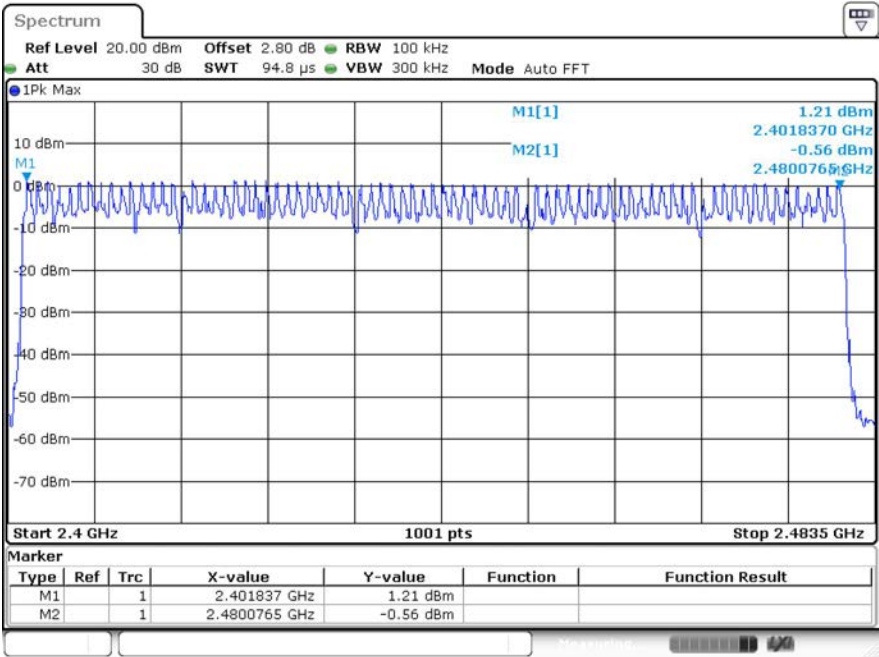
### 5.1 Test Result

| 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

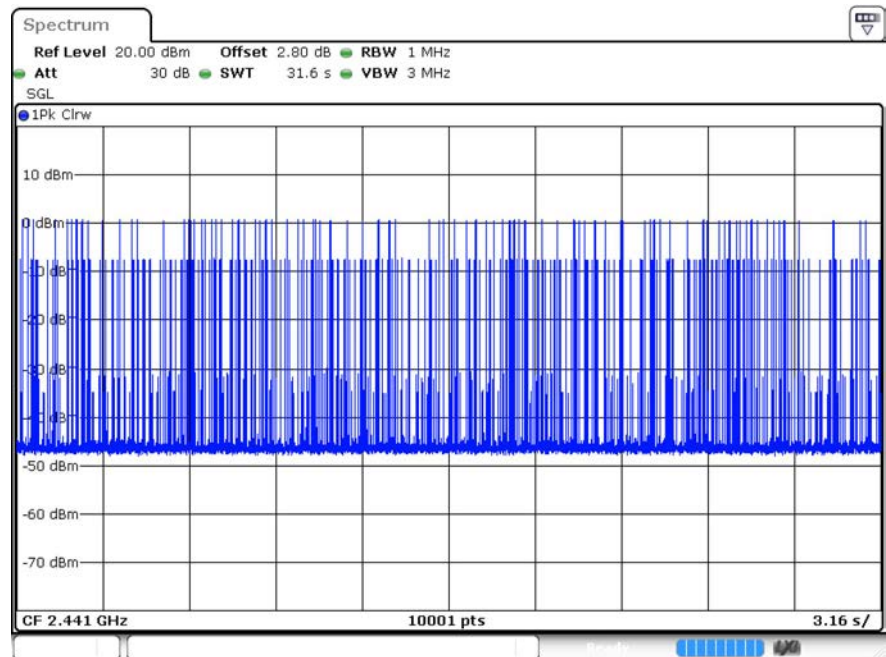
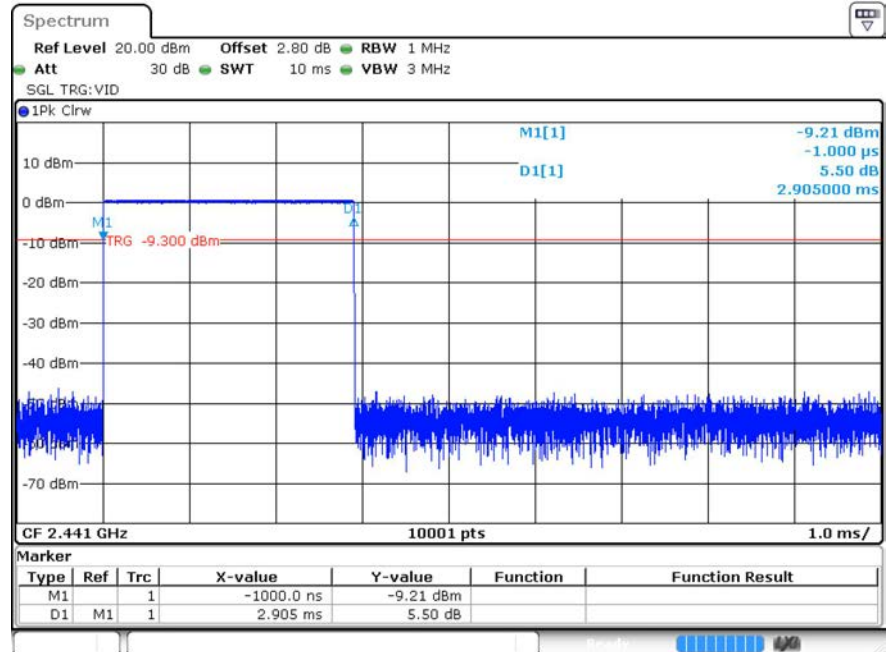
### 6.1 Test Result

| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[ms] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|----------------|-----------|---------|
| GFSK          | DH5    | MCH     | 2.905                      | 104                   | 302.12         | 0.4       | Pass    |
| $\pi/4$ DQPSK | 2DH5   | MCH     | 2.905                      | 104                   | 302.12         | 0.4       | Pass    |
| 8DPSK         | 3DH5   | MCH     | 2.913                      | 105                   | 305.865        | 0.4       | Pass    |

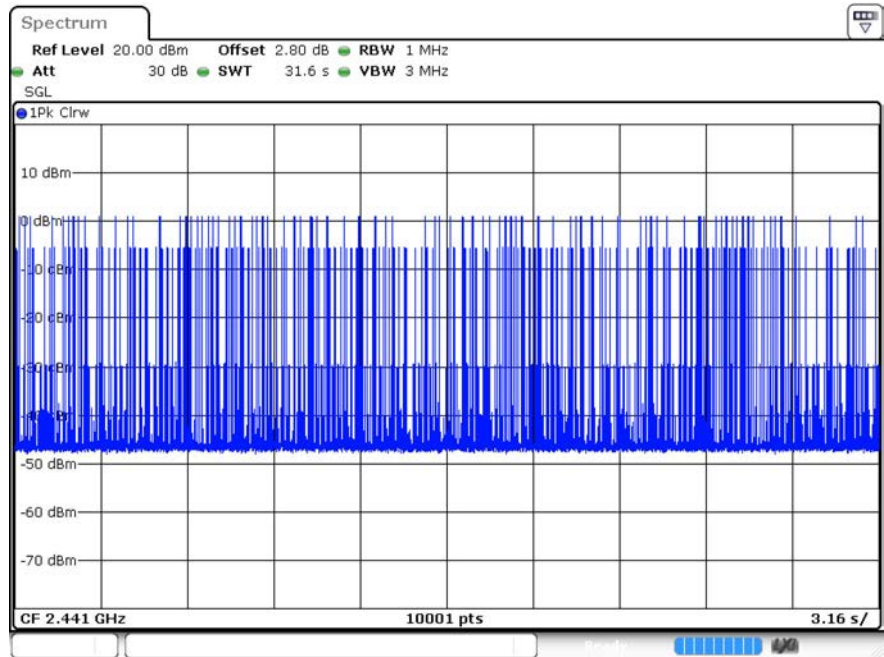
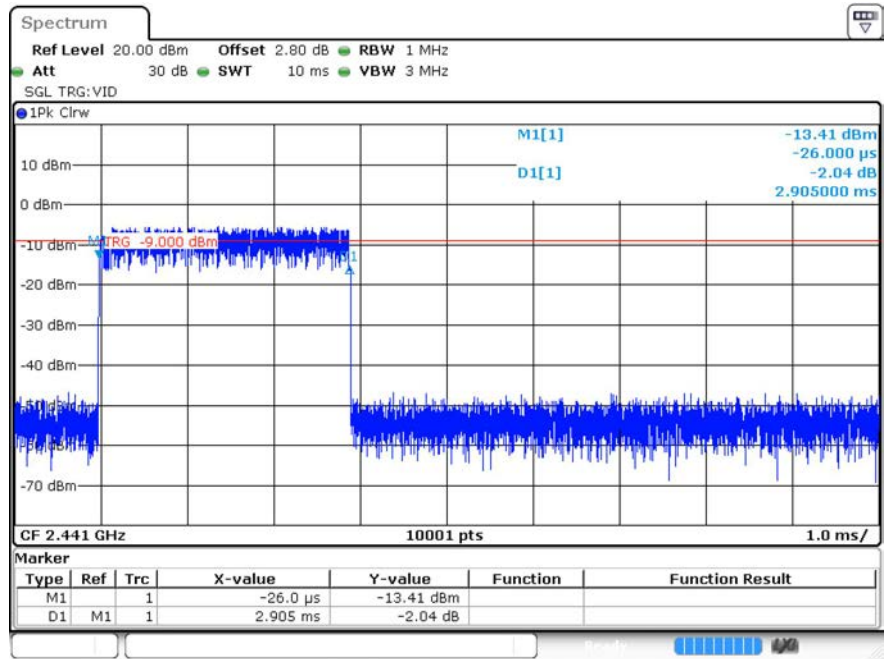
## 6.2 Test Graphs

### Test Graphs

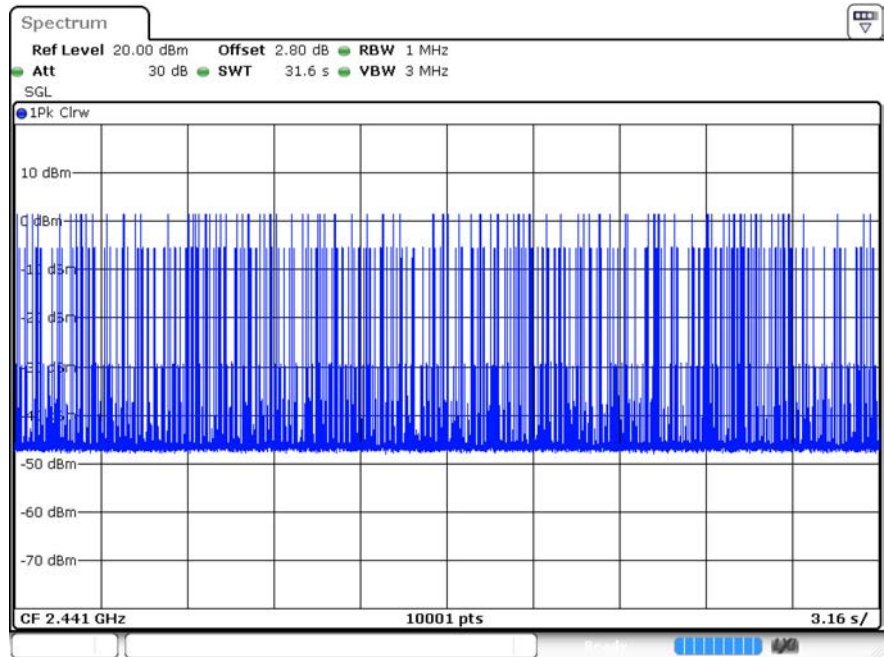
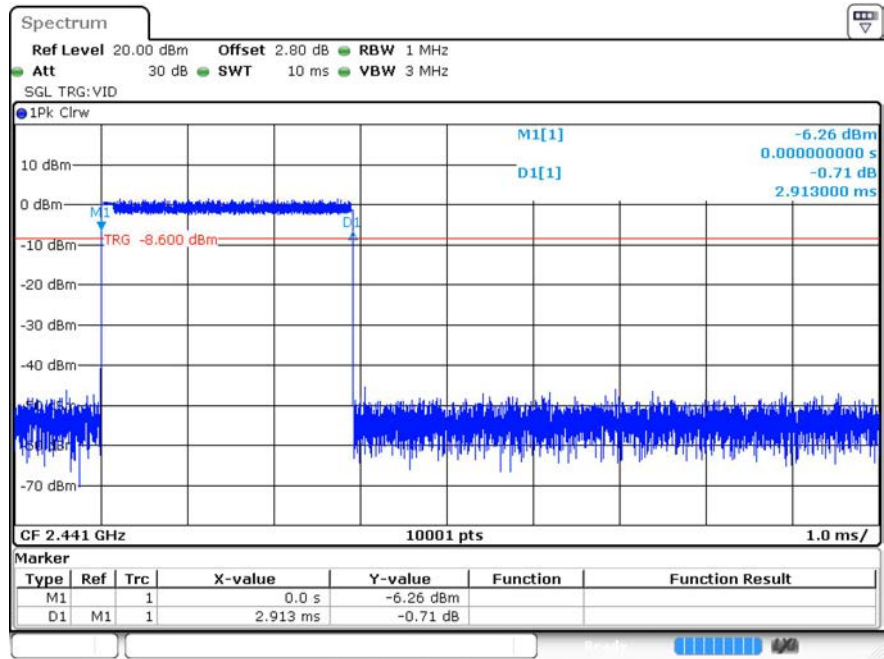
GFSK\_DH5/MCH



$\pi/4$ DQPSK  
\_2DH5/MCH



8DPSK\_3DH5/MCH



## 7 RF Conducted Spurious Emissions

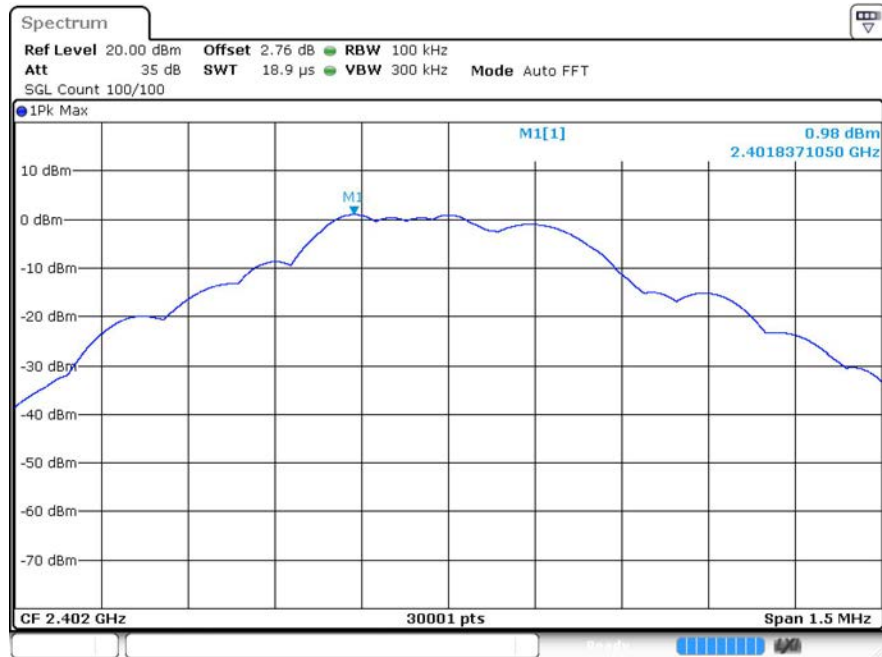
### 7.1 Test Result

| Mode          | Channel | Max. Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|------------------|-------------|---------|
| GFSK          | LCH     | -40.11           | -20         | Pass    |
|               | MCH     | -41.32           | -20         | Pass    |
|               | HCH     | -40.8            | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | -40.11           | -20         | Pass    |
|               | MCH     | -41.09           | -20         | Pass    |
|               | HCH     | -41.71           | -20         | Pass    |
| 8DPSK         | LCH     | -42.12           | -20         | Pass    |
|               | MCH     | -41.57           | -20         | Pass    |
|               | HCH     | -40.91           | -20         | Pass    |

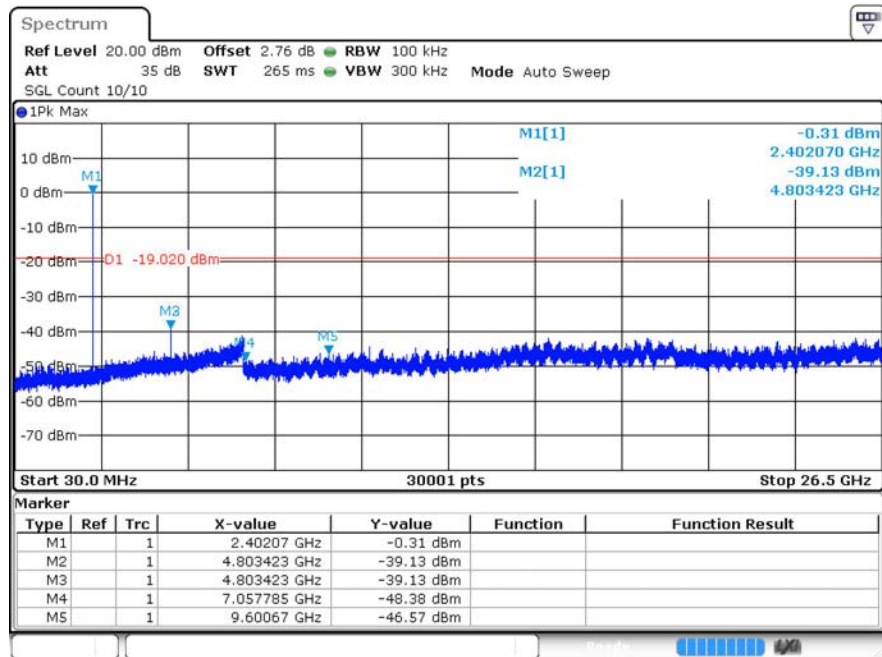
## 7.2 Test Graphs

GFSK\_LCH\_Graphs

Pref

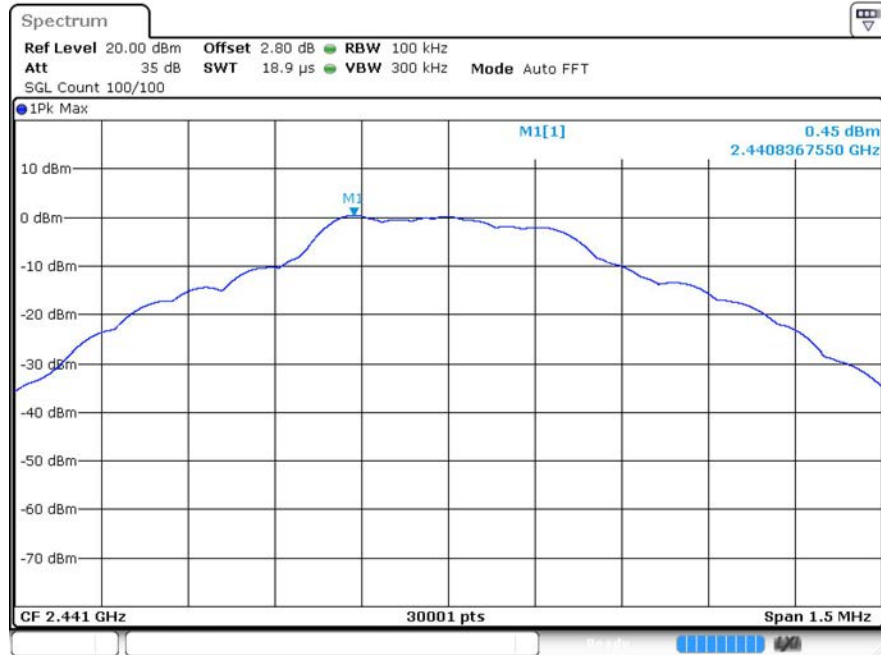


Puw

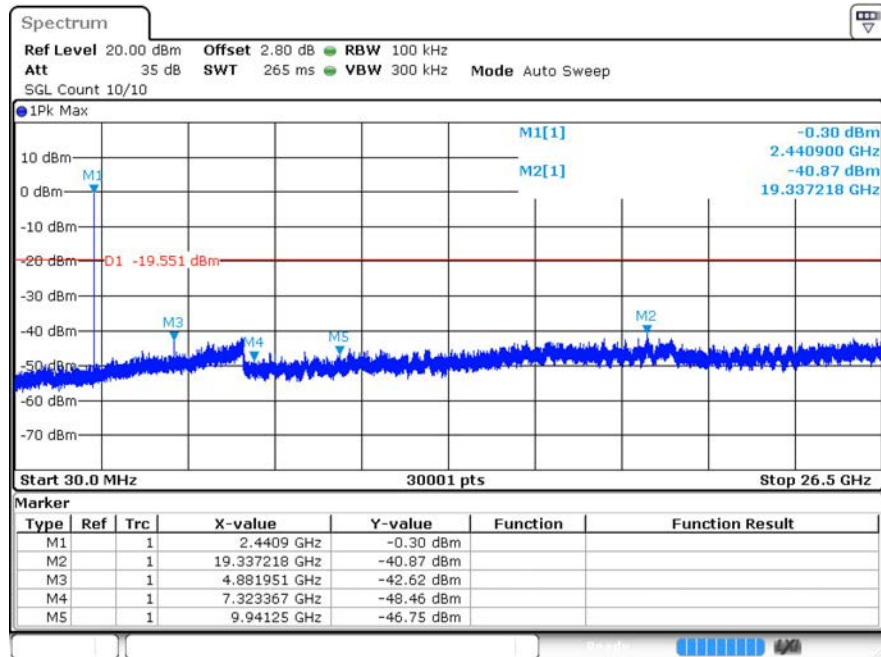


## GFSK\_MCH\_Graphs

Pref

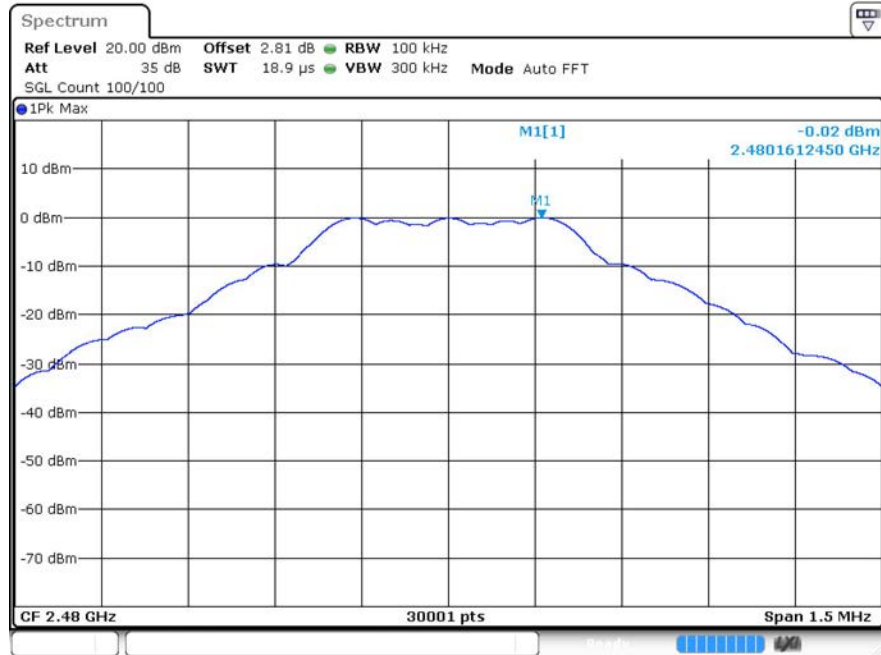


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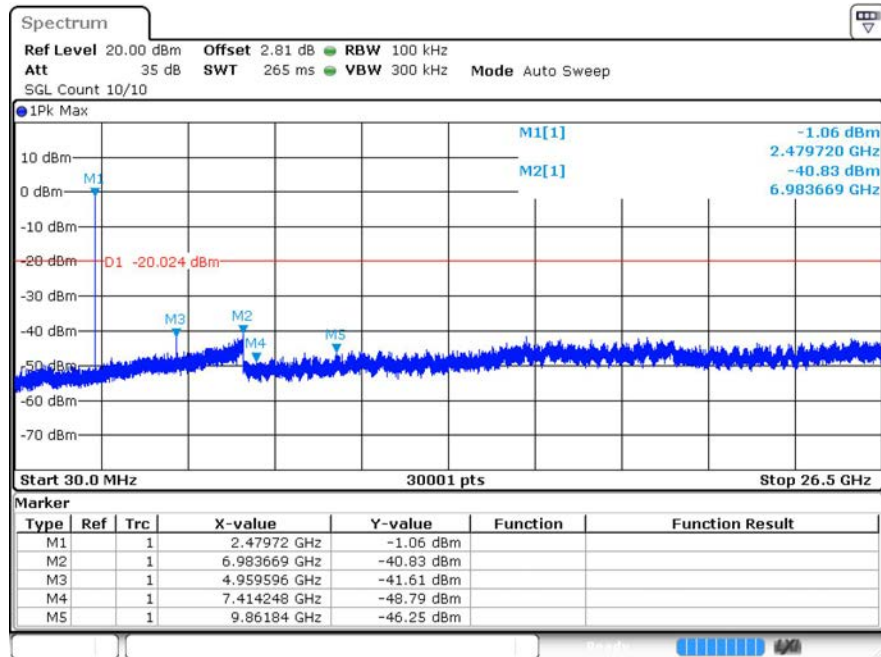


## GFSK\_HCH\_Graphs

Pref

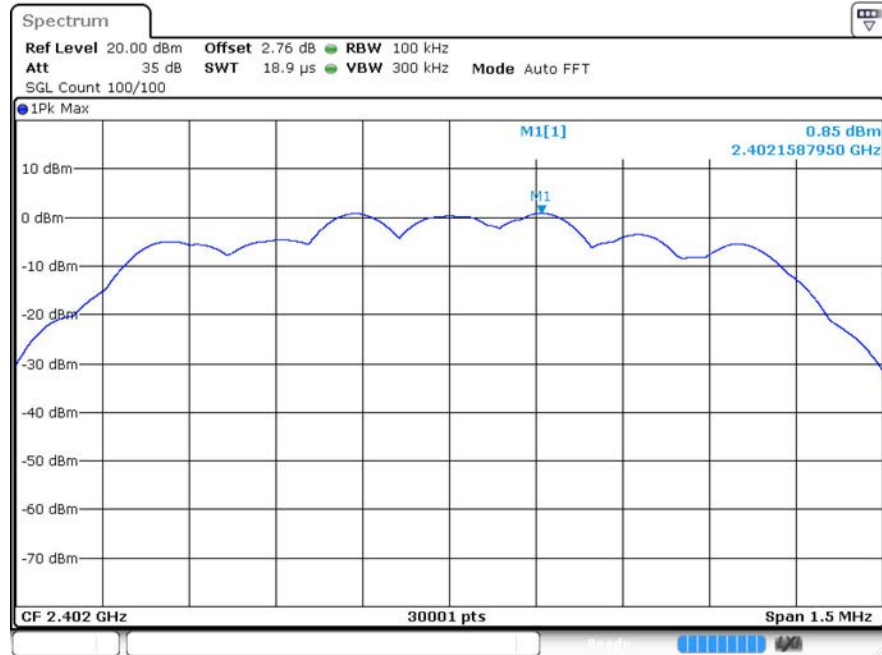


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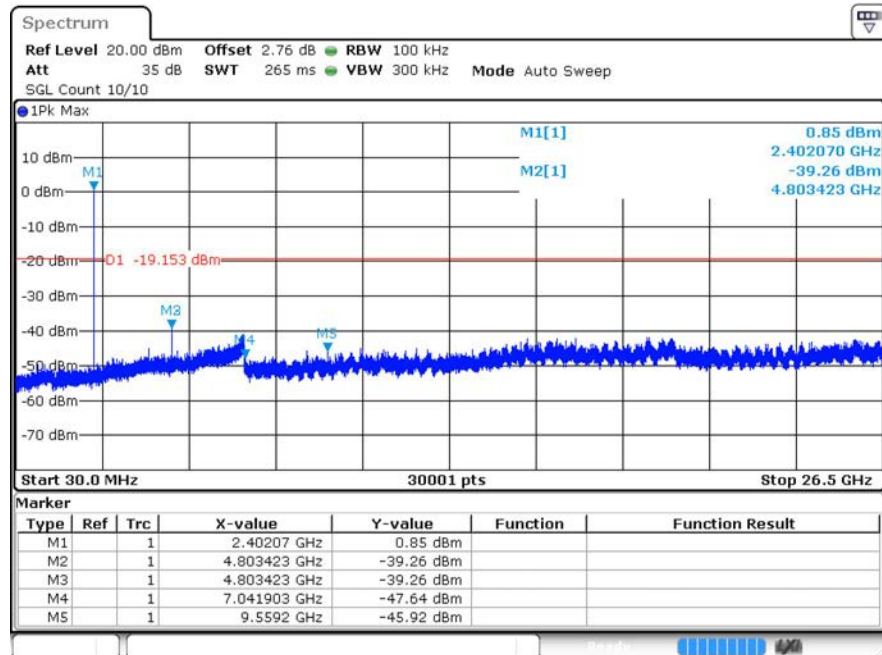


### $\pi/4$ DQPSK\_LCH\_Graphs

Pref

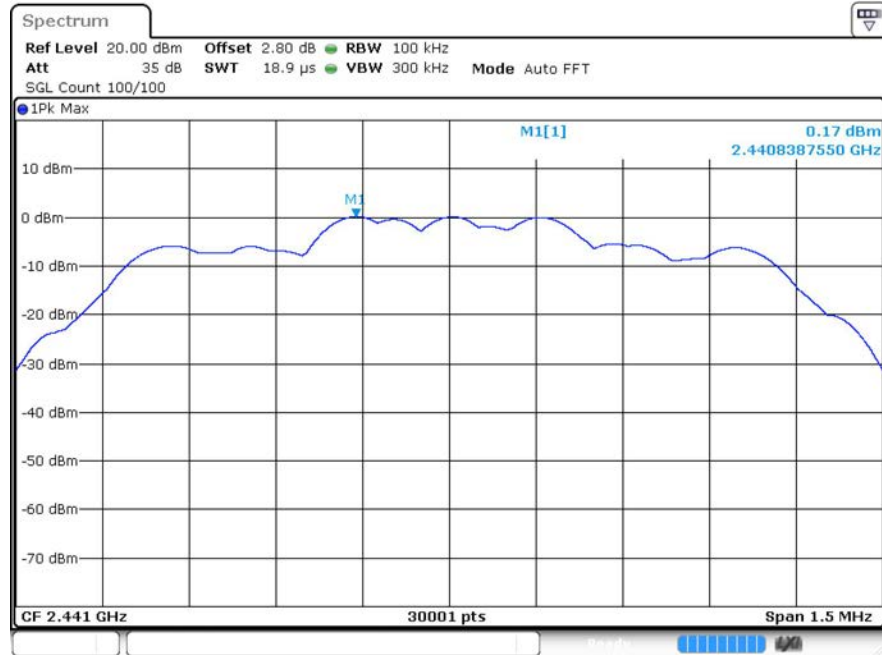


Puw

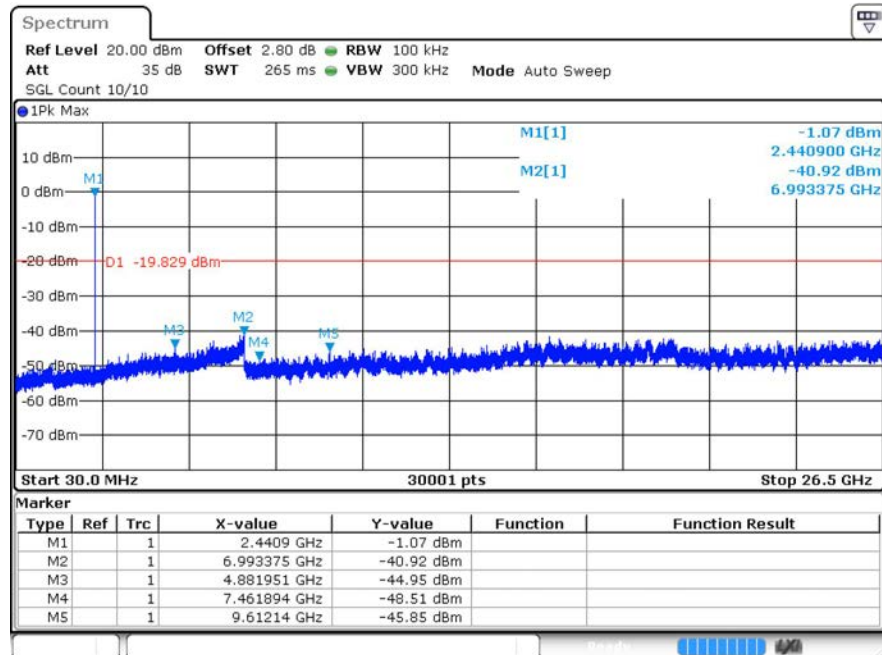


# $\pi$ /4DQPSK\_MCH\_Graphs

Pref

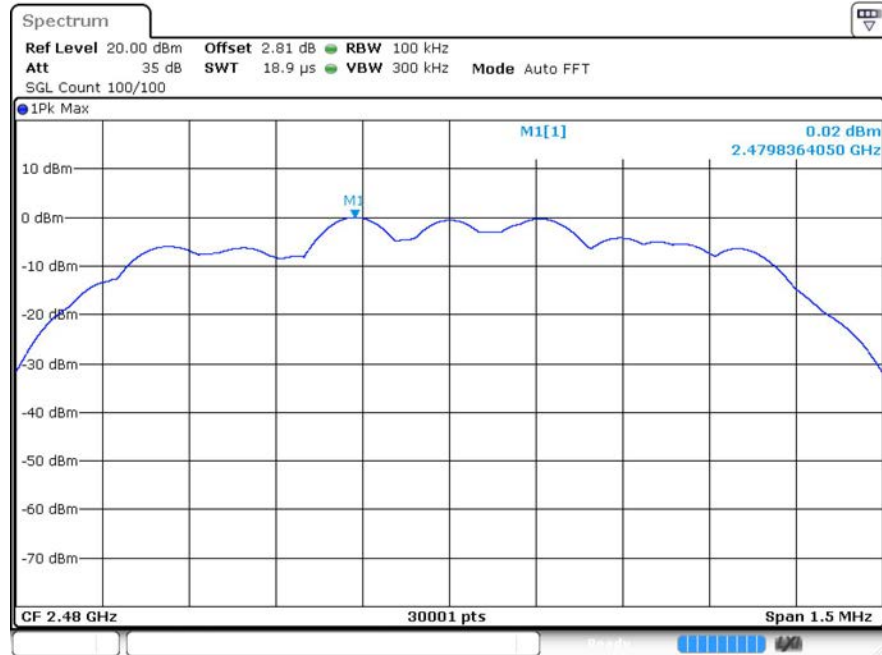


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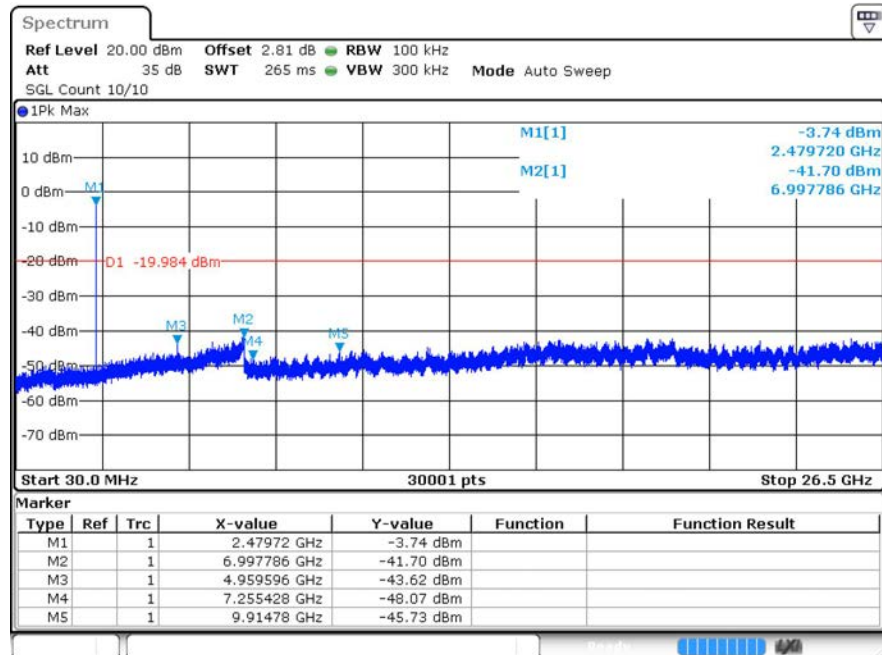


### $\pi/4$ DQPSK\_HCH\_Graphs

Pref

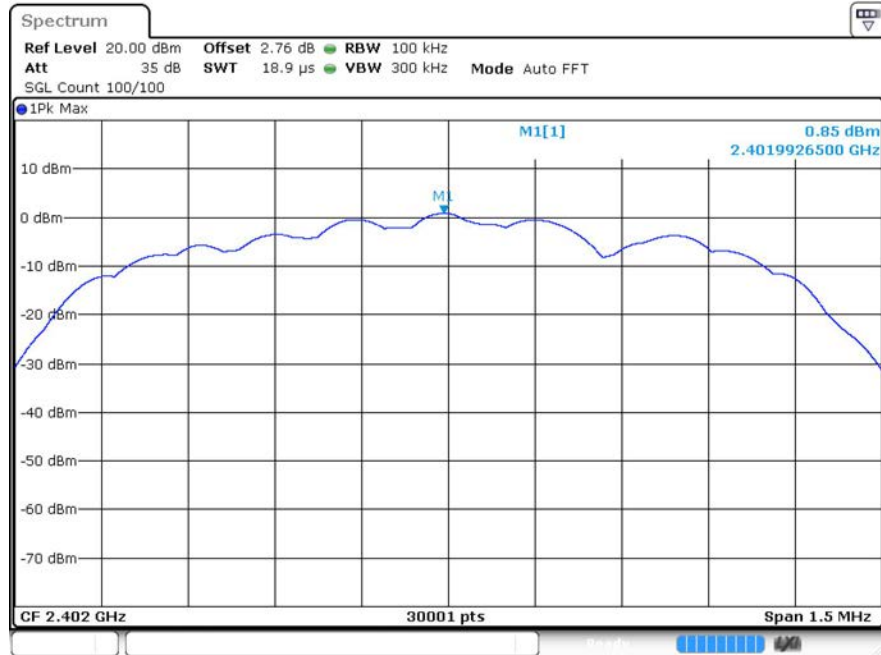


Puw

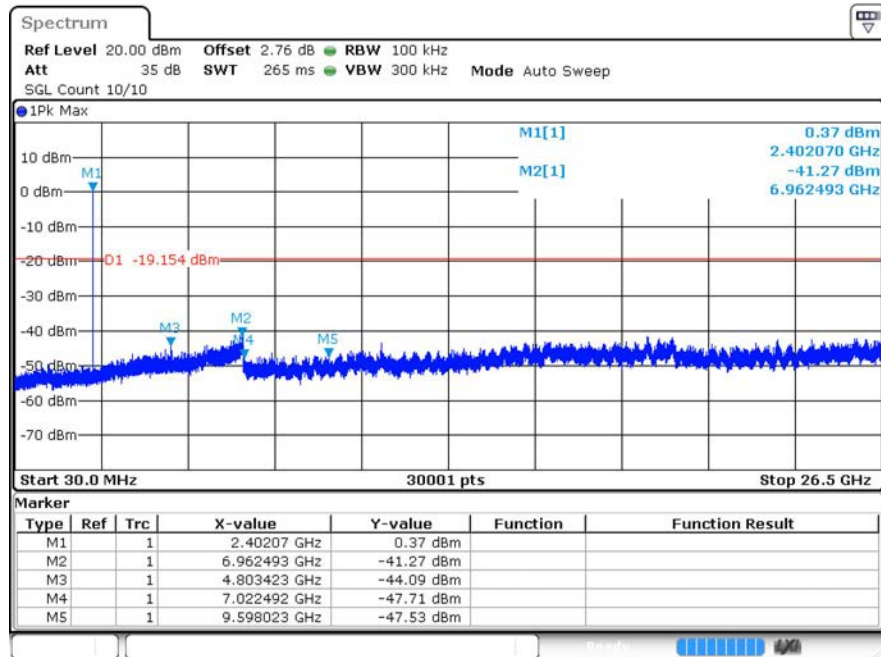


## 8DPSK\_LCH\_Graphs

Pref

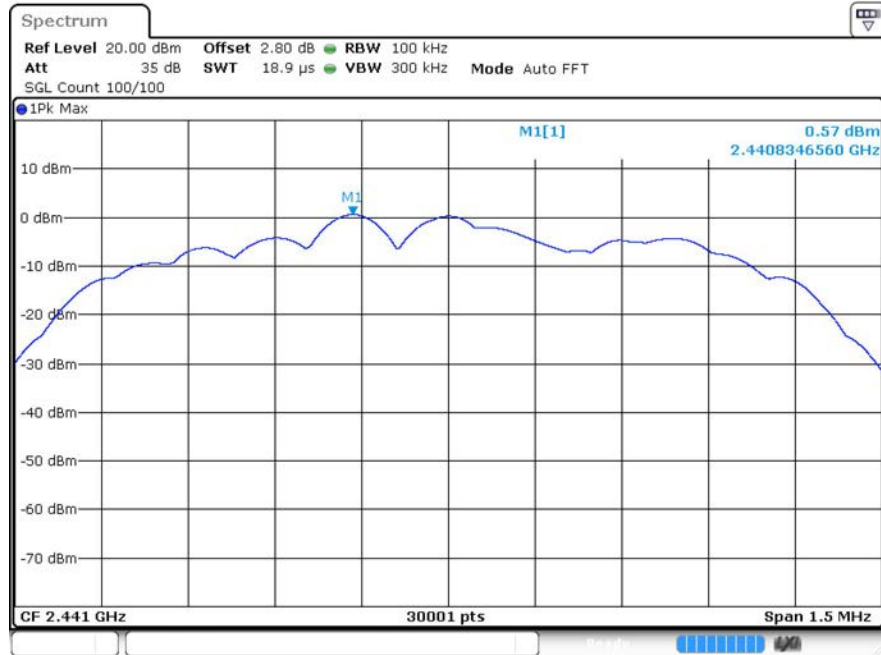


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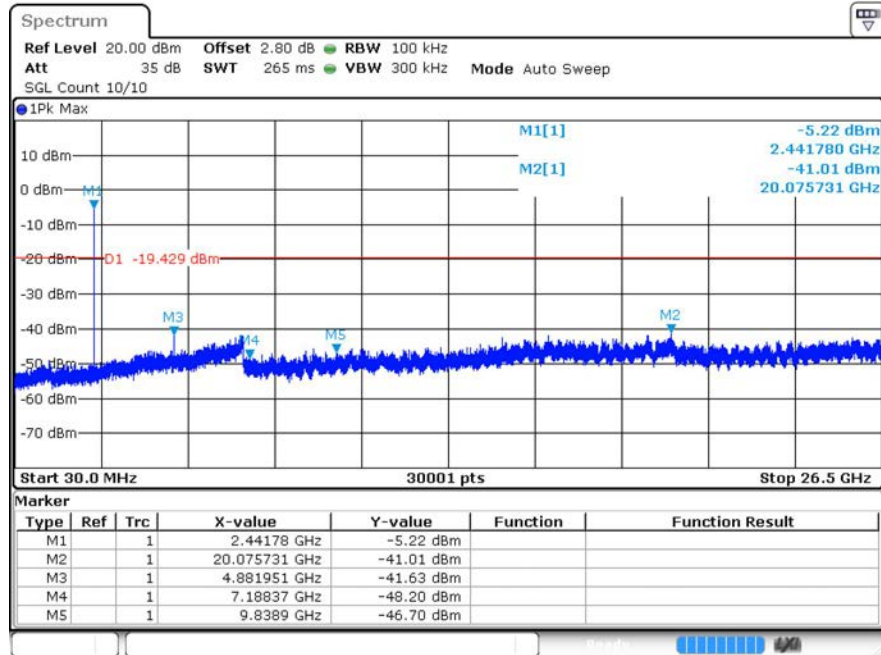


## 8DPSK\_MCH\_Graphs

Pref

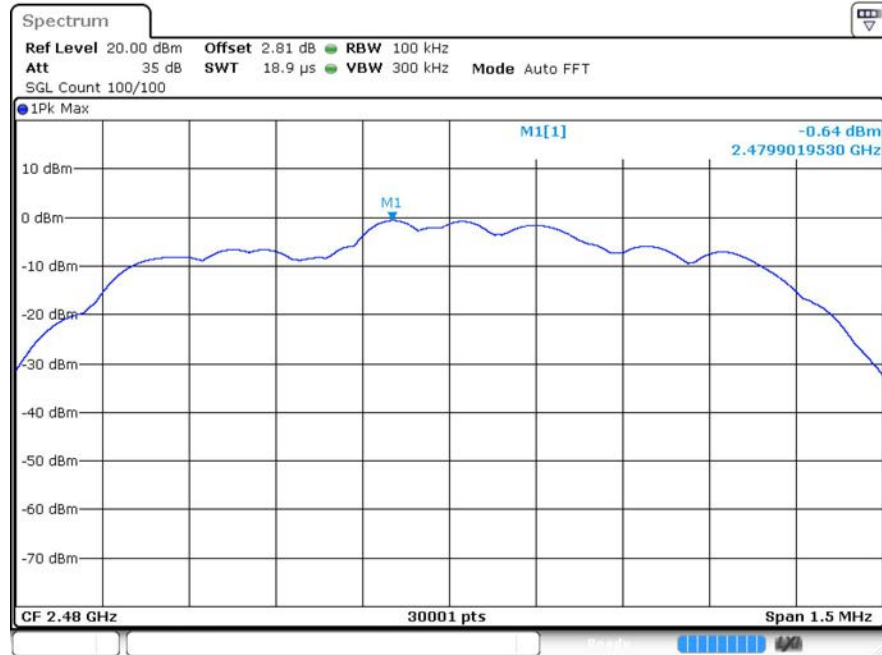


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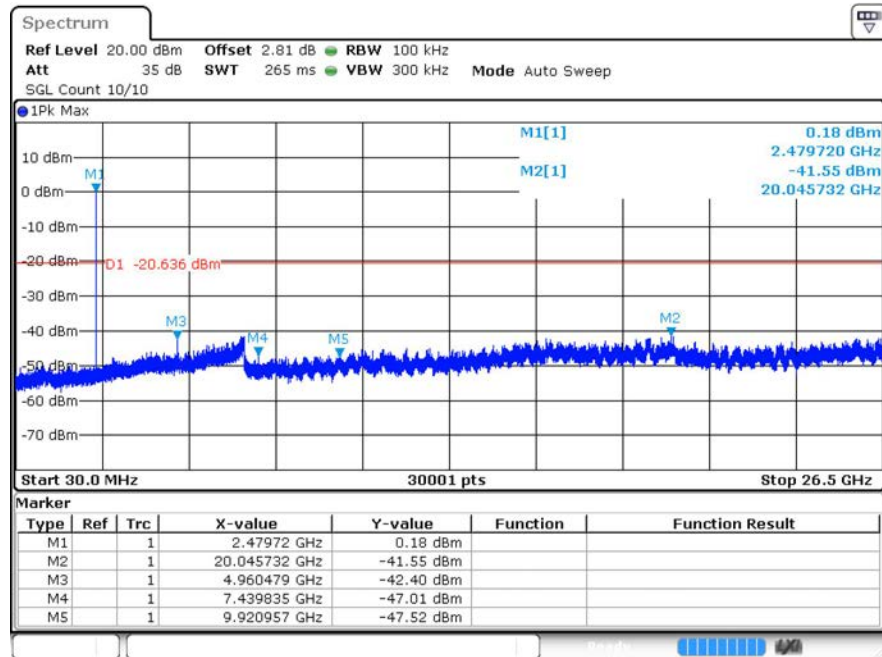


## 8DPSK\_HCH\_Graphs

Pref



Puw

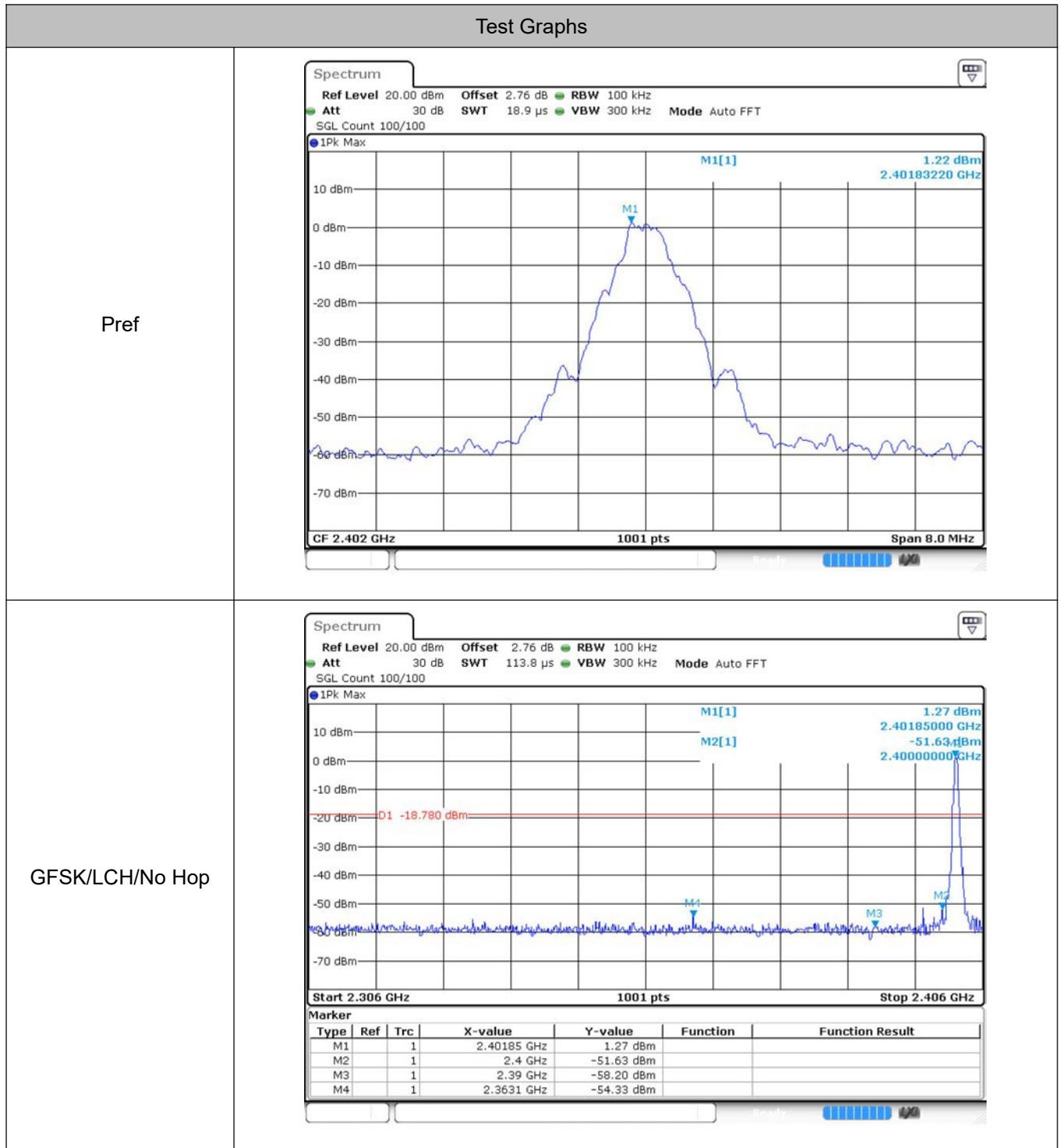


## 8 Band-edge for RF Conducted Emissions

### 8.1 Test Result

| Mode          | Channel | Carrier Frequency [MHz] | Frequency Hopping | Max Spurious Level [dBc] | Limit [dBc] | Verdict |
|---------------|---------|-------------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | Off               | -55.55                   | -20         | Pass    |
|               |         |                         | On                | -56.15                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -55.83                   | -20         | Pass    |
|               |         |                         | On                | -54.93                   | -20         | Pass    |
| $\pi/4$ DQPSK | LCH     | 2402                    | Off               | -57.34                   | -20         | Pass    |
|               |         |                         | On                | -56.09                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -55.88                   | -20         | Pass    |
|               |         |                         | On                | -54.82                   | -20         | Pass    |
| 8DPSK         | LCH     | 2402                    | Off               | -56.96                   | -20         | Pass    |
|               |         |                         | On                | -55.86                   | -20         | Pass    |
|               | HCH     | 2480                    | Off               | -55.96                   | -20         | Pass    |
|               |         |                         | On                | -53.45                   | -20         | Pass    |

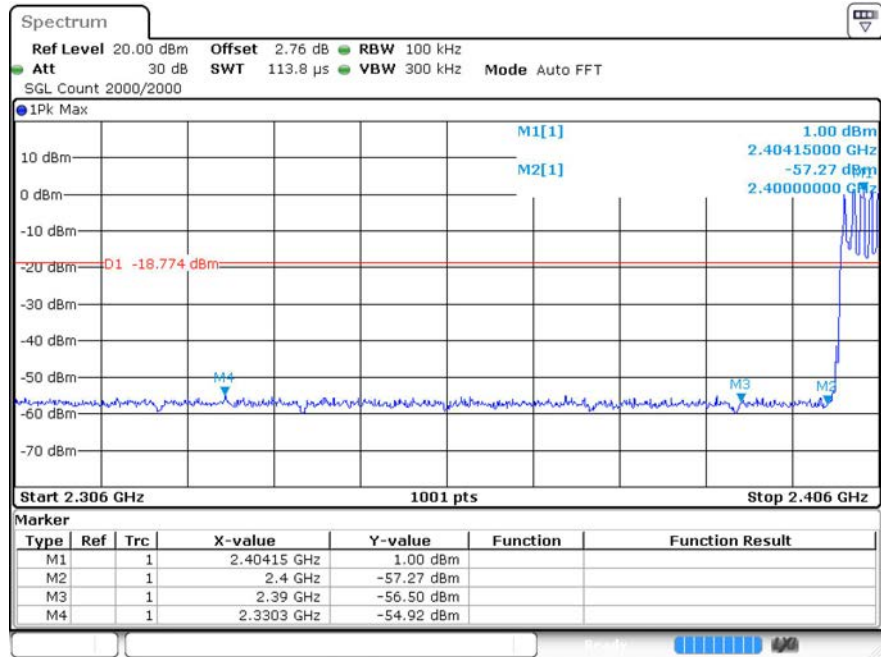
## 8.2 Test Graphs



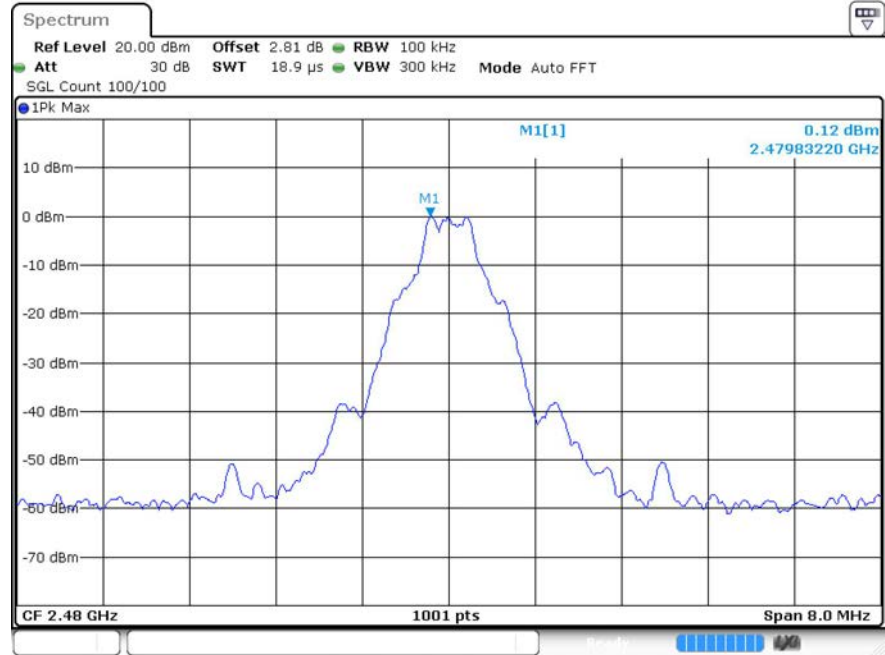
Ref



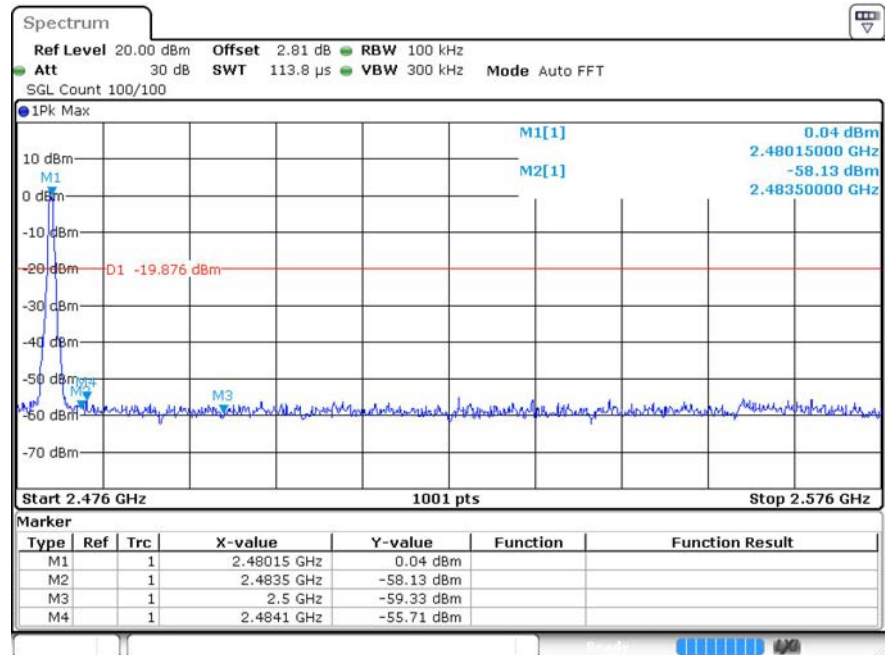
GFSK/LCH/Hop



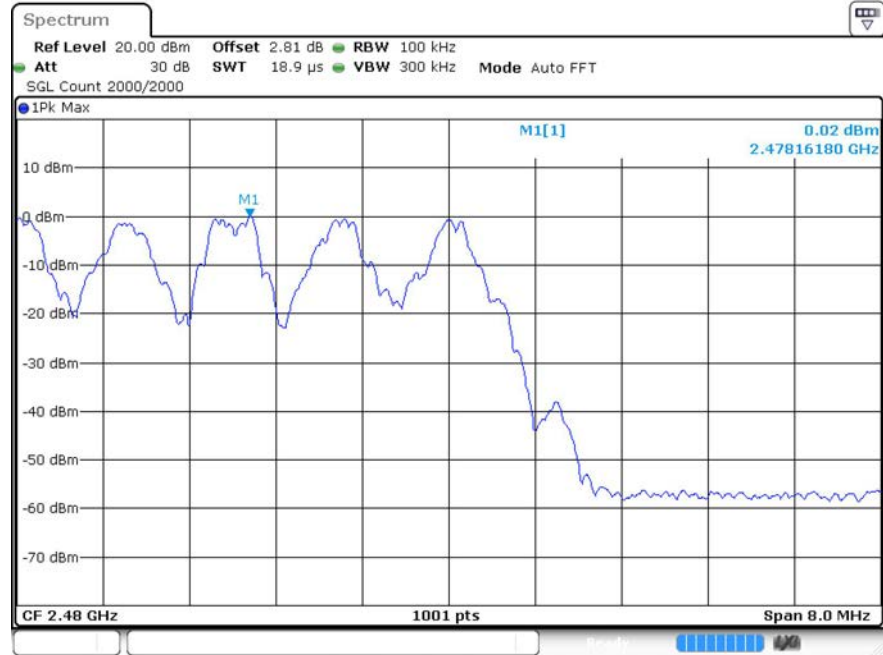
Ref



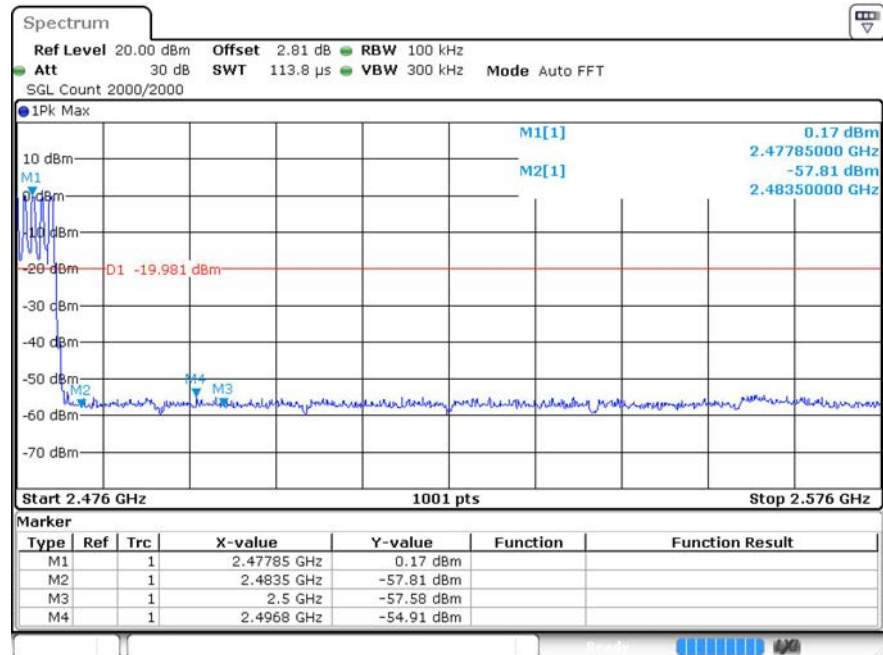
GFSK/HCH/No Hop



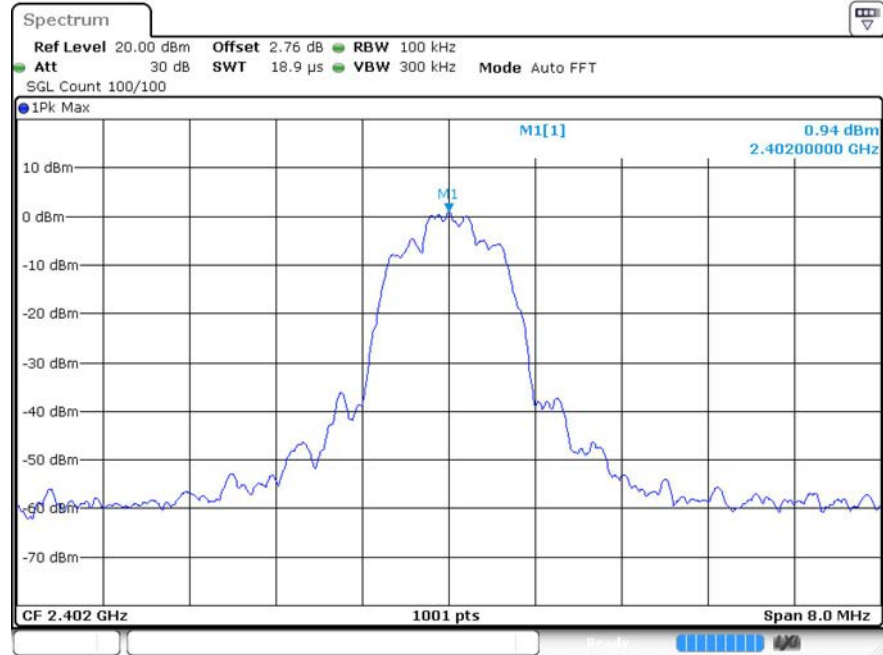
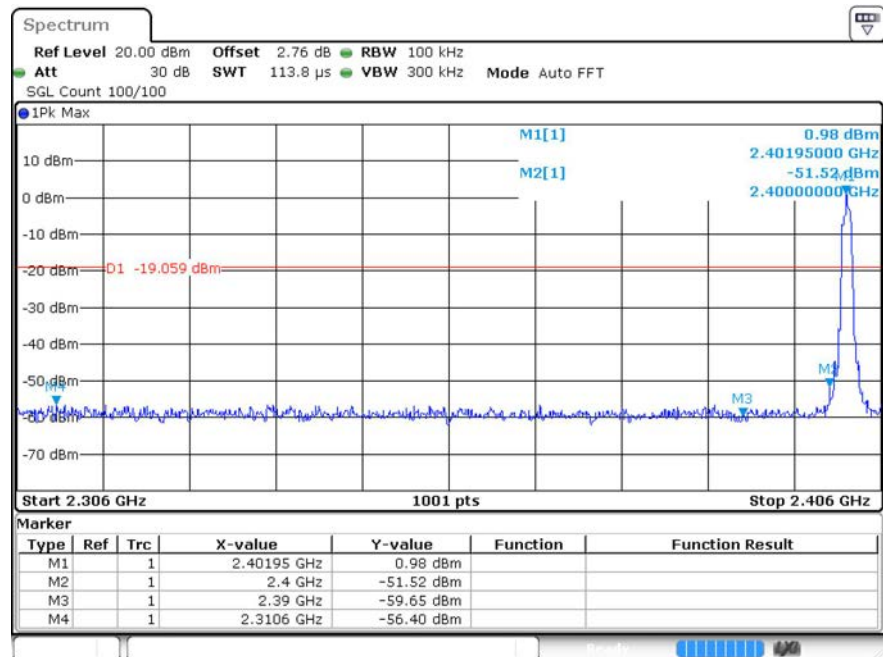
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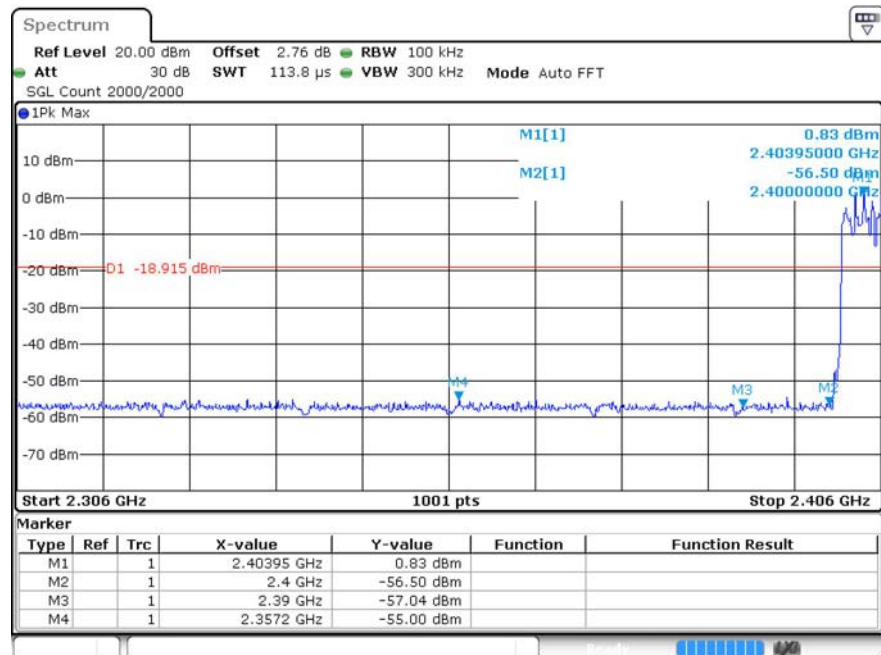
GFSK/HCH/Hop



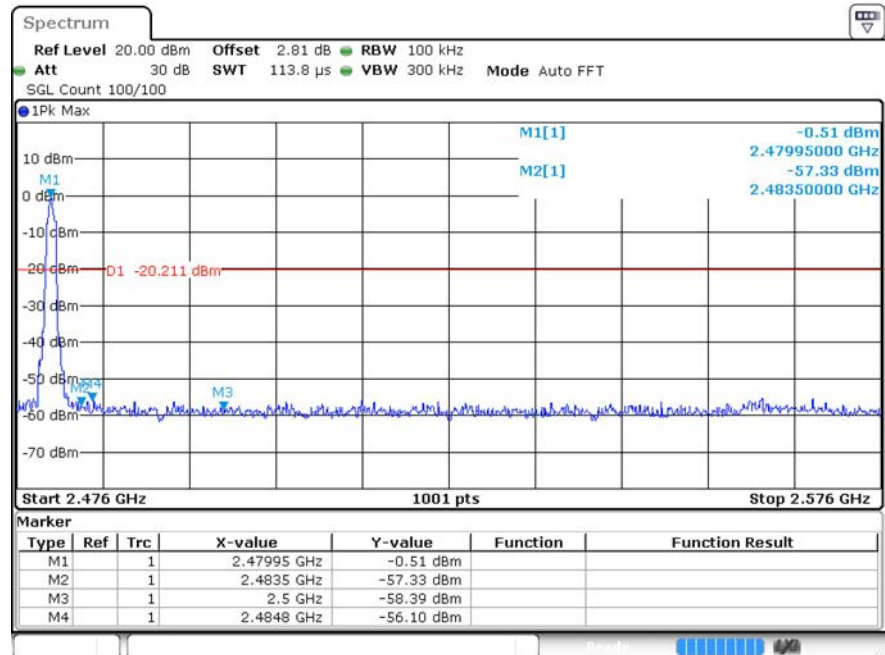
Ref


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


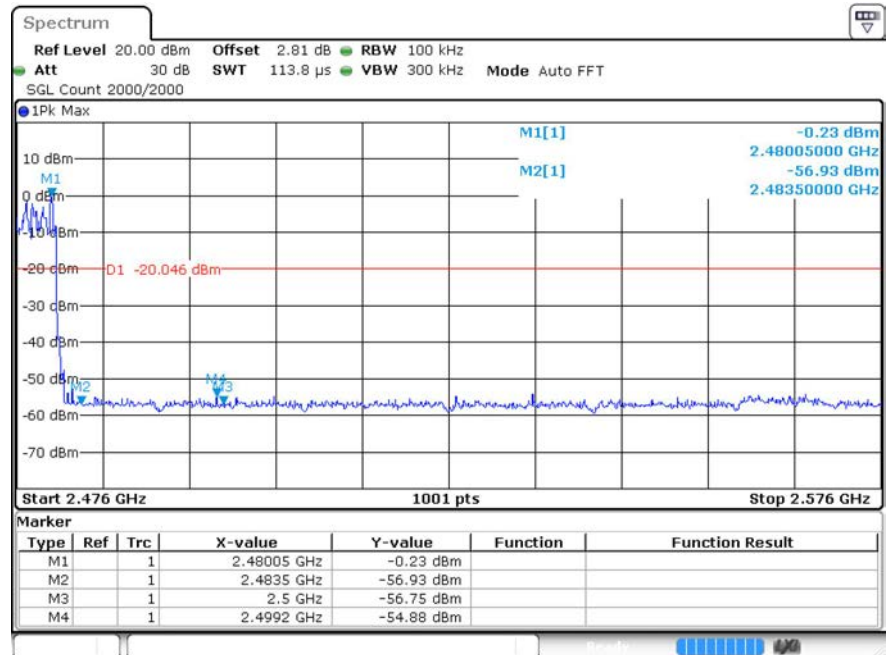
Ref


 $\pi/4$ DQPSK/LCH/Hop


Ref


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


Ref


 $\pi/4$ DQPSK/HCH/Hop


Ref

Spectrum

Ref Level 20.00 dBm Offset 2.76 dB RBW 100 kHz  
Att 30 dB SWT 18.9  $\mu$ s VBW 300 kHz Mode Auto FFT  
SGL Count 100/100

1Pk Max

M1[1] 1.04 dBm 2.40184020 GHz

M1

CF 2.402 GHz 1001 pts Span 8.0 MHz

8DPSK/LCH/No Hop

Spectrum

Ref Level 20.00 dBm Offset 2.76 dB RBW 100 kHz  
Att 30 dB SWT 113.8  $\mu$ s VBW 300 kHz Mode Auto FFT  
SGL Count 100/100

1Pk Max

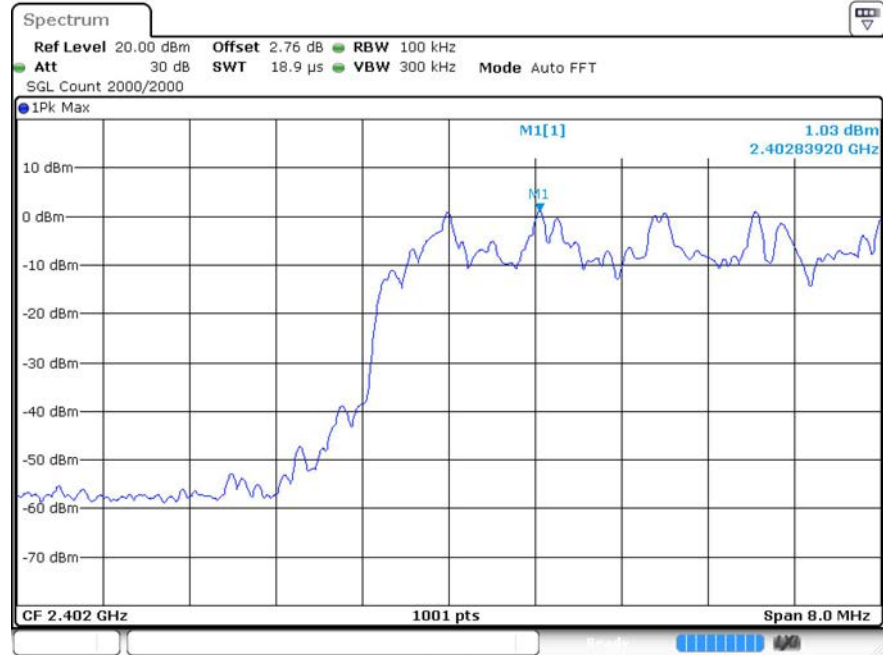
M1[1] 1.26 dBm 2.40185000 GHz  
M2[1] -54.38 dBm 2.40000000 GHz

D1 -18.957 dBm

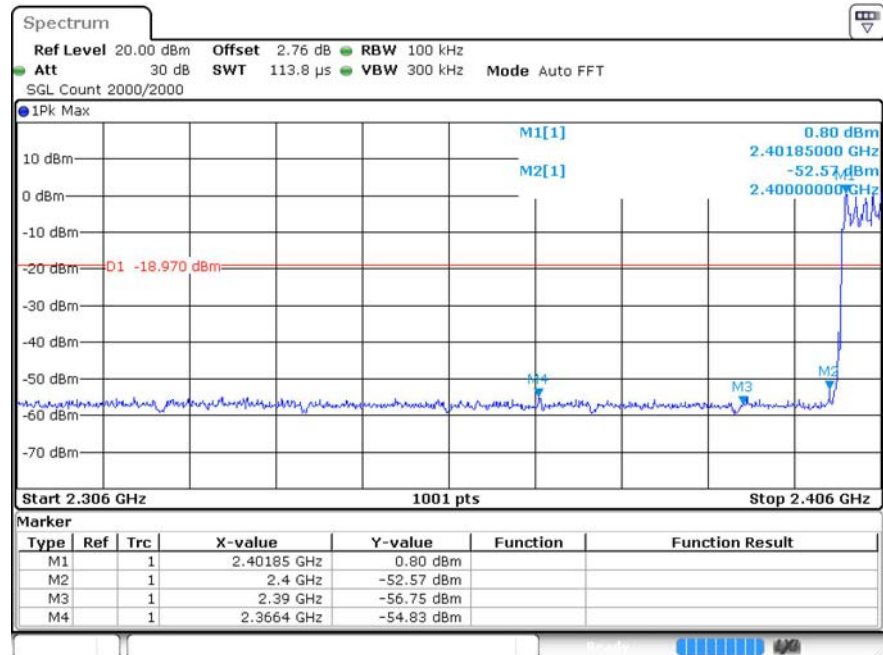
Start 2.306 GHz 1001 pts Stop 2.406 GHz

| Type | Ref | Trc | X-value     | Y-value    | Function | Function Result |
|------|-----|-----|-------------|------------|----------|-----------------|
| M1   |     | 1   | 2.40185 GHz | 1.26 dBm   |          |                 |
| M2   |     | 1   | 2.4 GHz     | -54.38 dBm |          |                 |
| M3   |     | 1   | 2.39 GHz    | -58.48 dBm |          |                 |
| M4   |     | 1   | 2.3504 GHz  | -55.93 dBm |          |                 |

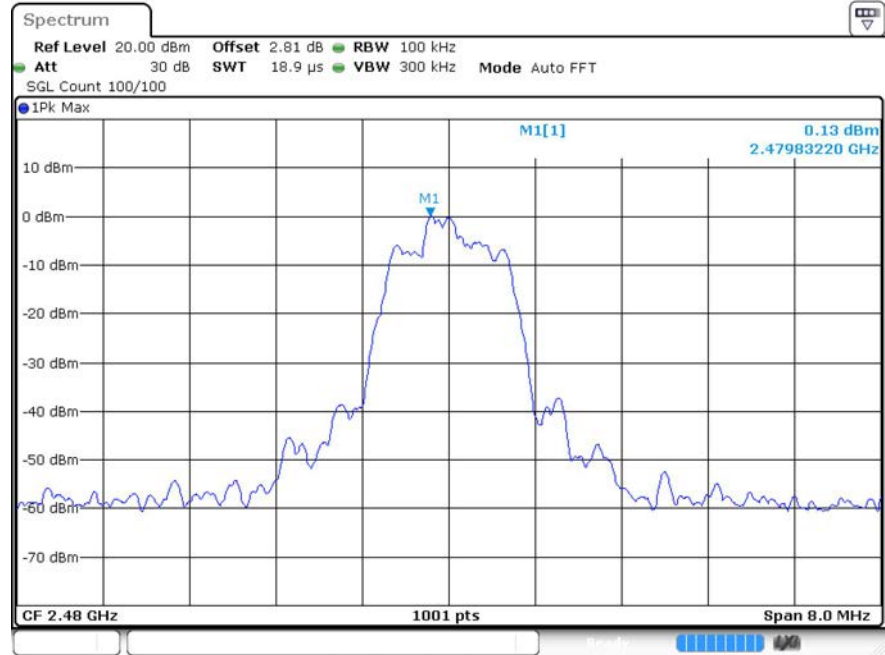
Ref



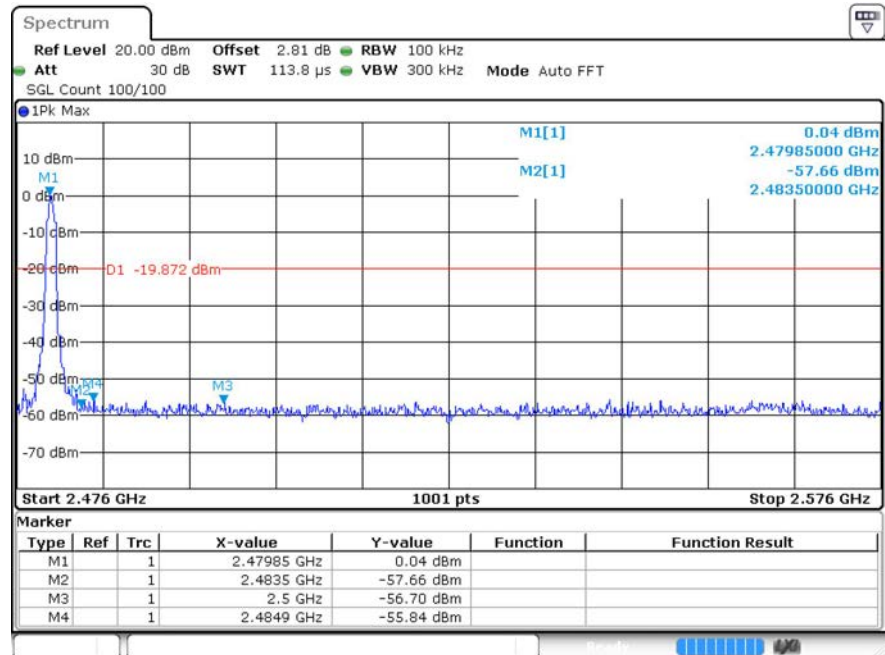
8DPSK/LCH/Hop



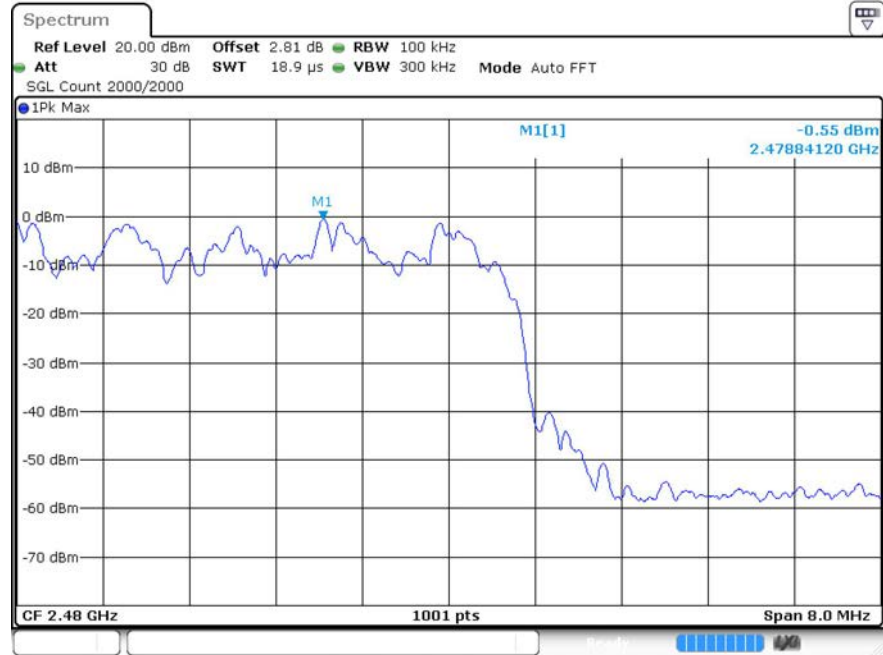
Ref



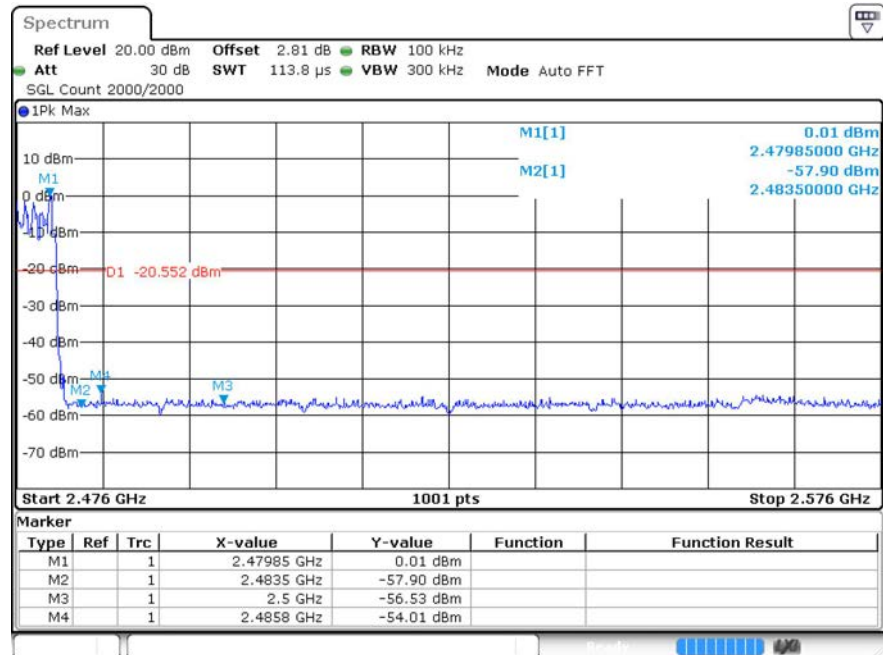
8DPSK/HCH/No Hop



Ref



8DPSK/HCH/Hop



## 9 Restrict-band band-edge measurements

### 9.1 Test Result

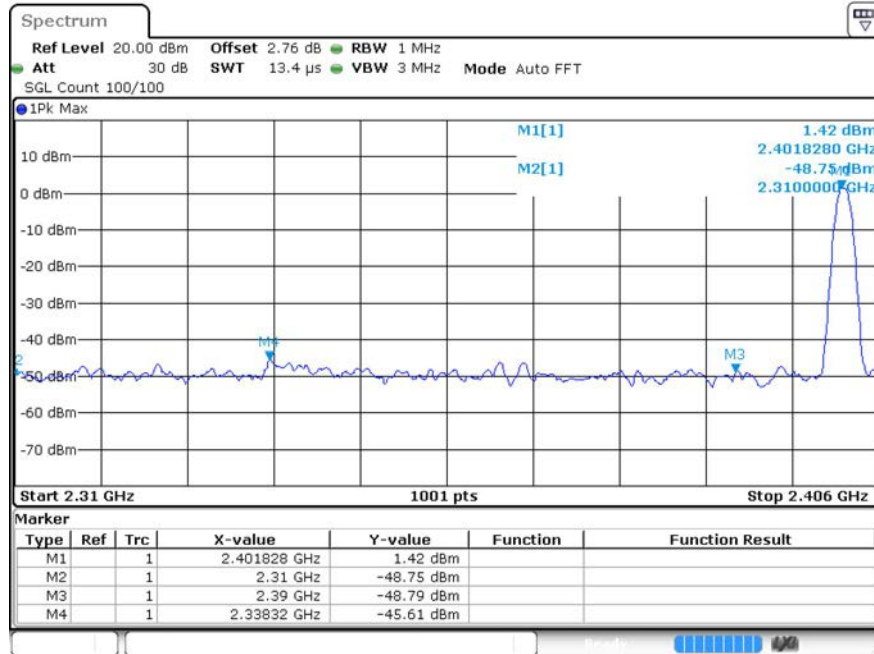
| Test Mode     | Hopping | Freq.    | Power [dBm] | Gain | Duty Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|----------|-------------|------|-------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0   | -48.75      | 2    | -           | 48.51      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.23      | 2    | 4.74        | 45.77      | AV       | 54             | Pass    |
|               | Off     | 2338.32  | -45.6       | 2    | -           | 51.66      | PEAK     | 74             | Pass    |
|               | Off     | 2339.088 | -54.77      | 2    | 4.74        | 47.23      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -48.79      | 2    | -           | 48.47      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.71      | 2    | 4.74        | 45.29      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -49.11      | 2    | -           | 48.15      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -56.11      | 2    | 4.74        | 45.89      | AV       | 54             | Pass    |
|               | Off     | 2485.072 | -45.42      | 2    | -           | 51.84      | PEAK     | 74             | Pass    |
|               | Off     | 2491.336 | -55.32      | 2    | 4.74        | 46.68      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -49.23      | 2    | -           | 48.03      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -56.85      | 2    | 4.74        | 45.15      | AV       | 54             | Pass    |
| $\pi/4$ DQPSK | Off     | 2310.0   | -48.94      | 2    | -           | 48.32      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.75      | 2    | 4.63        | 45.14      | AV       | 54             | Pass    |
|               | Off     | 2346.192 | -46.56      | 2    | -           | 50.7       | PEAK     | 74             | Pass    |
|               | Off     | 2338.32  | -54.05      | 2    | 4.63        | 47.84      | AV       | 54             | Pass    |
|               | Off     | 2390.0   | -51.1       | 2    | -           | 46.16      | PEAK     | 74             | Pass    |
|               | Off     | 2390.0   | -56.86      | 2    | 4.63        | 45.03      | AV       | 54             | Pass    |
|               | Off     | 2483.5   | -47.34      | 2    | -           | 49.92      | PEAK     | 74             | Pass    |
|               | Off     | 2483.5   | -55.56      | 2    | 4.74        | 46.44      | AV       | 54             | Pass    |
|               | Off     | 2483.8   | -47.1       | 2    | -           | 50.16      | PEAK     | 74             | Pass    |
|               | Off     | 2483.608 | -55.52      | 2    | 4.74        | 46.48      | AV       | 54             | Pass    |
|               | Off     | 2500.0   | -48.73      | 2    | -           | 48.53      | PEAK     | 74             | Pass    |
|               | Off     | 2500.0   | -56.32      | 2    | 4.74        | 45.68      | AV       | 54             | Pass    |
| 8DPSK         | Off     | 2310.0   | -50.23      | 2    | -           | 47.03      | PEAK     | 74             | Pass    |
|               | Off     | 2310.0   | -56.37      | 2    | 4.63        | 45.52      | AV       | 54             | Pass    |
|               | Off     | 2362.032 | -46.43      | 2    | -           | 50.83      | PEAK     | 74             | Pass    |
|               | Off     | 2340.528 | -54.24      | 2    | 4.63        | 47.65      | AV       | 54             | Pass    |



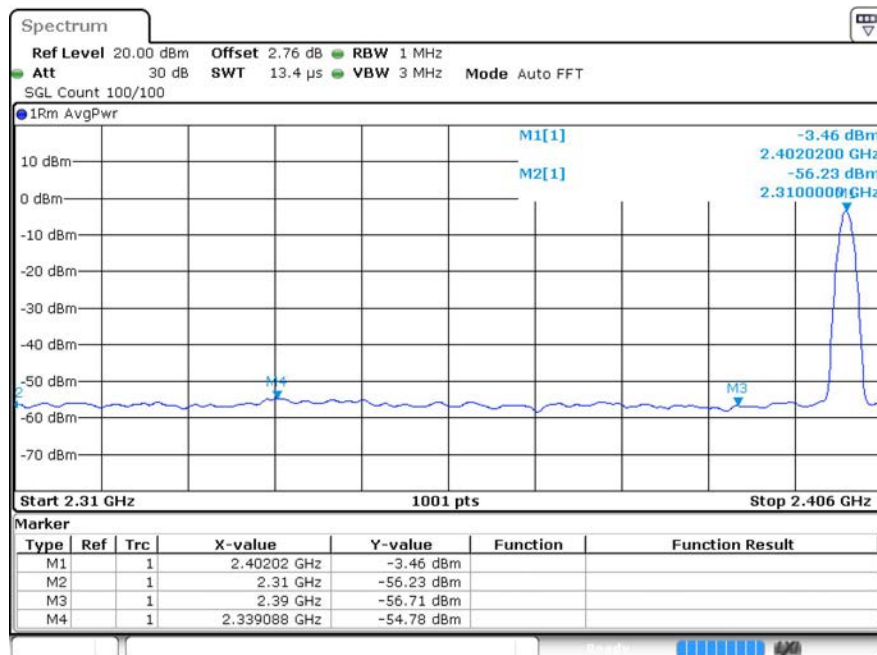
|     |          |        |   |      |       |      |    |      |
|-----|----------|--------|---|------|-------|------|----|------|
| Off | 2390.0   | -50.45 | 2 | -    | 46.81 | PEAK | 74 | Pass |
| Off | 2390.0   | -56.96 | 2 | 4.63 | 44.93 | AV   | 54 | Pass |
| Off | 2483.5   | -47.85 | 2 | -    | 49.41 | PEAK | 74 | Pass |
| Off | 2483.5   | -56.37 | 2 | 4.63 | 45.52 | AV   | 54 | Pass |
| Off | 2494.36  | -47.1  | 2 | -    | 50.16 | PEAK | 74 | Pass |
| Off | 2485.792 | -55.47 | 2 | 4.63 | 46.42 | AV   | 54 | Pass |
| Off | 2500.0   | -48.33 | 2 | -    | 48.93 | PEAK | 74 | Pass |
| Off | 2500.0   | -56.58 | 2 | 4.63 | 45.31 | AV   | 54 | Pass |

## 9.2 Test Graphs

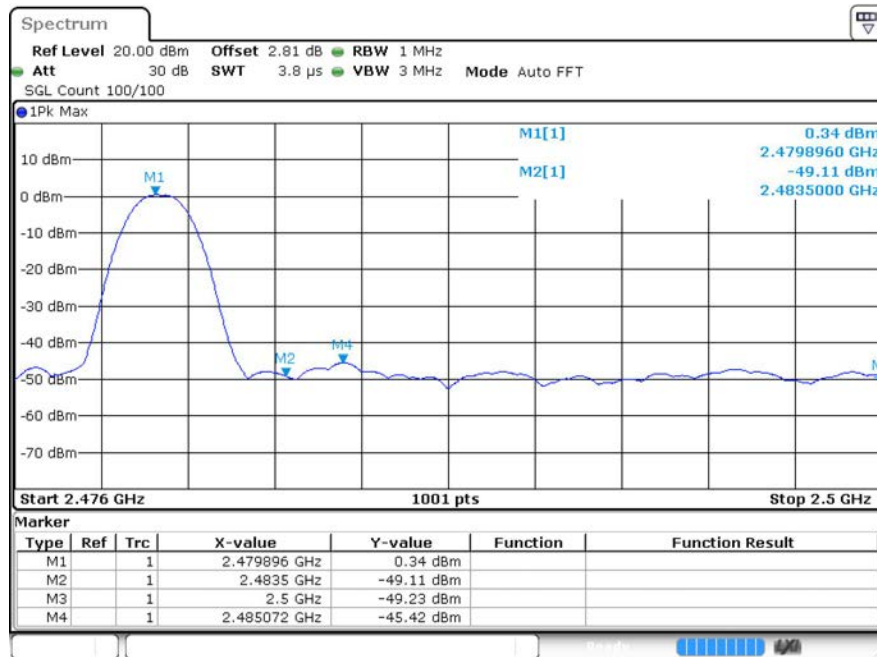
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



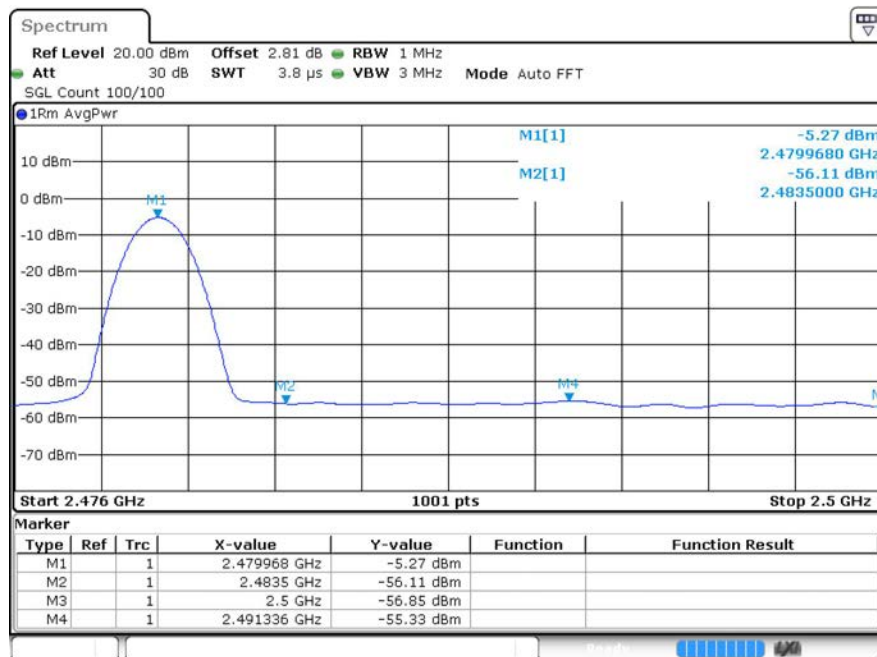
Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



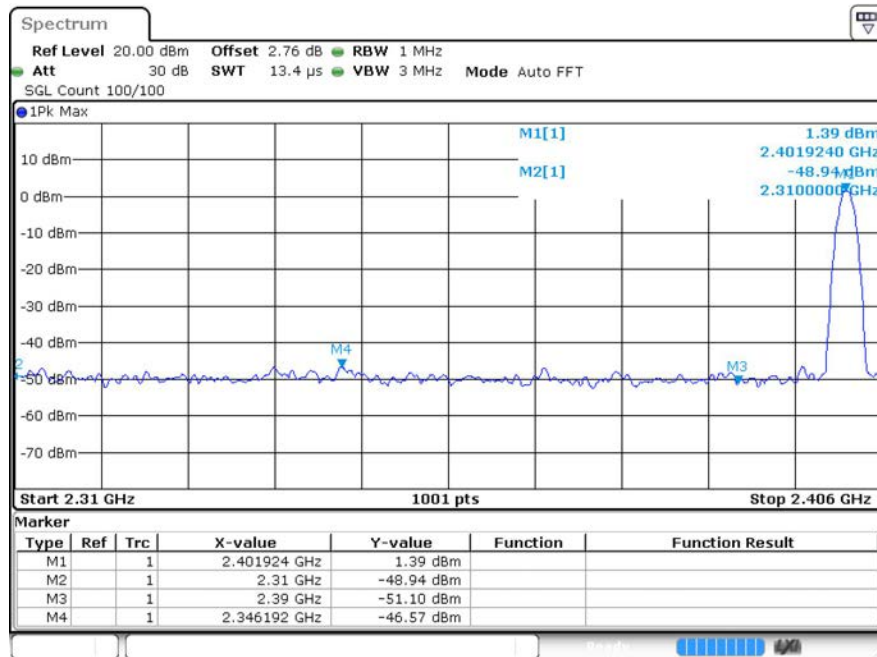
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)



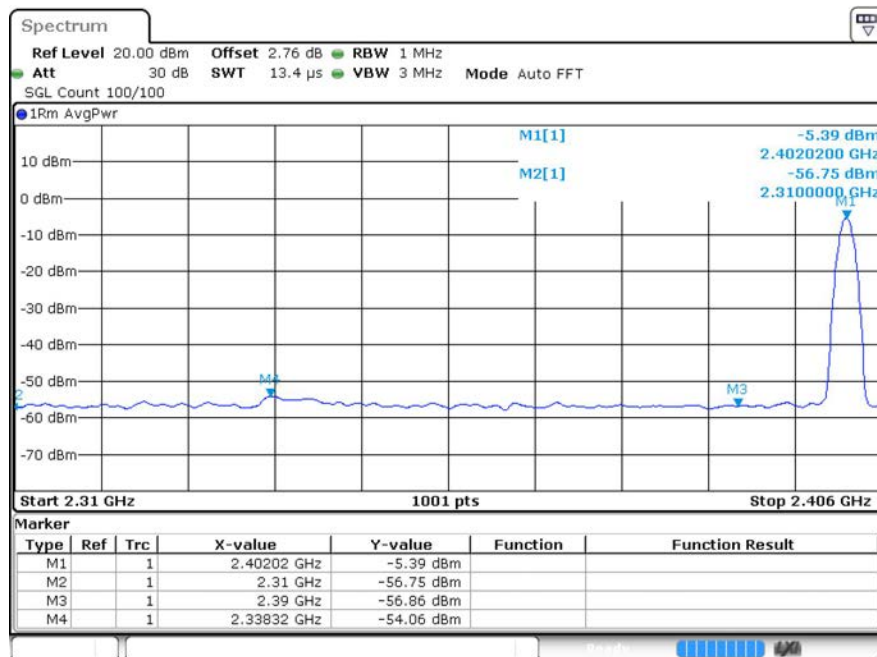
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)



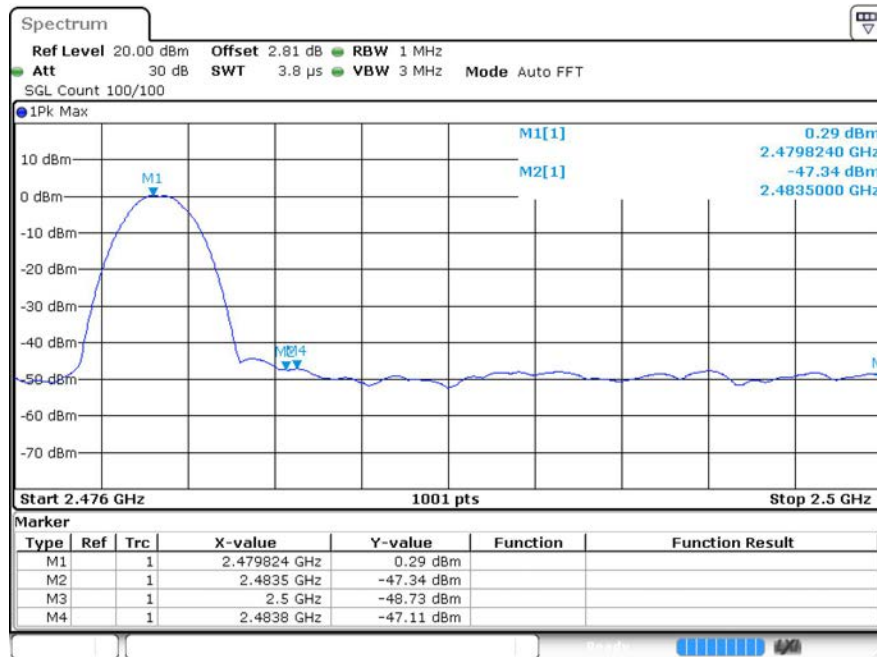
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



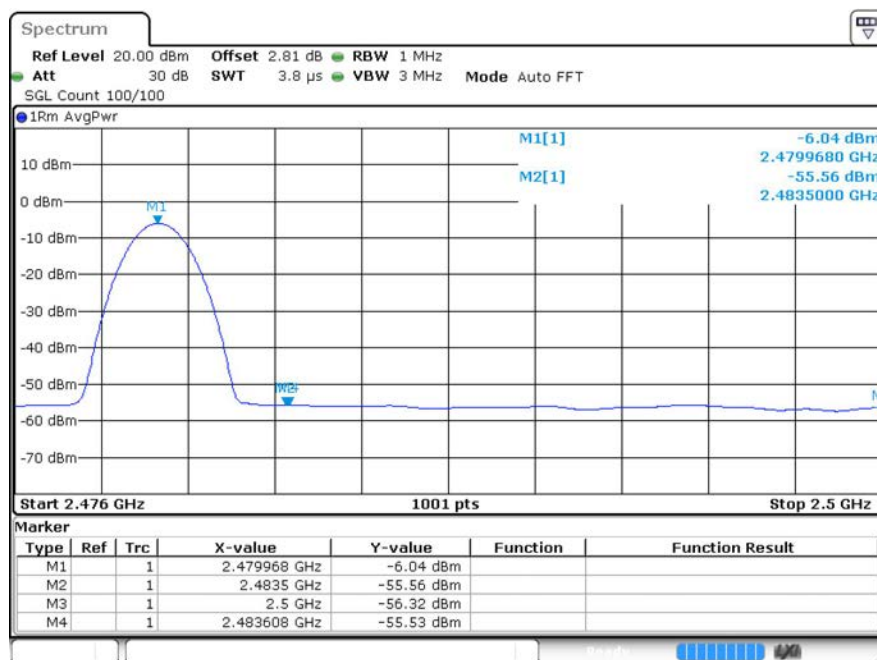
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



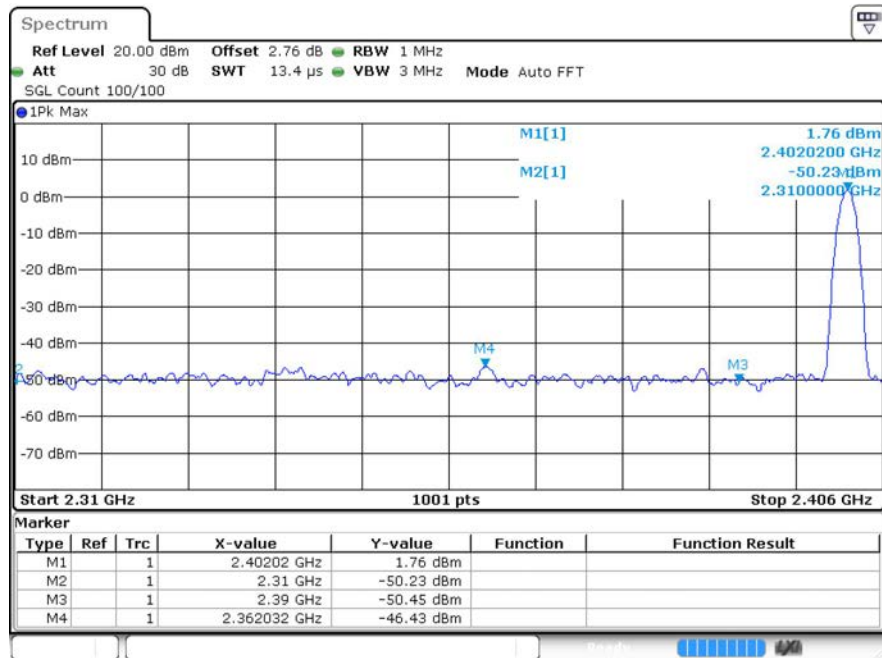
### Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



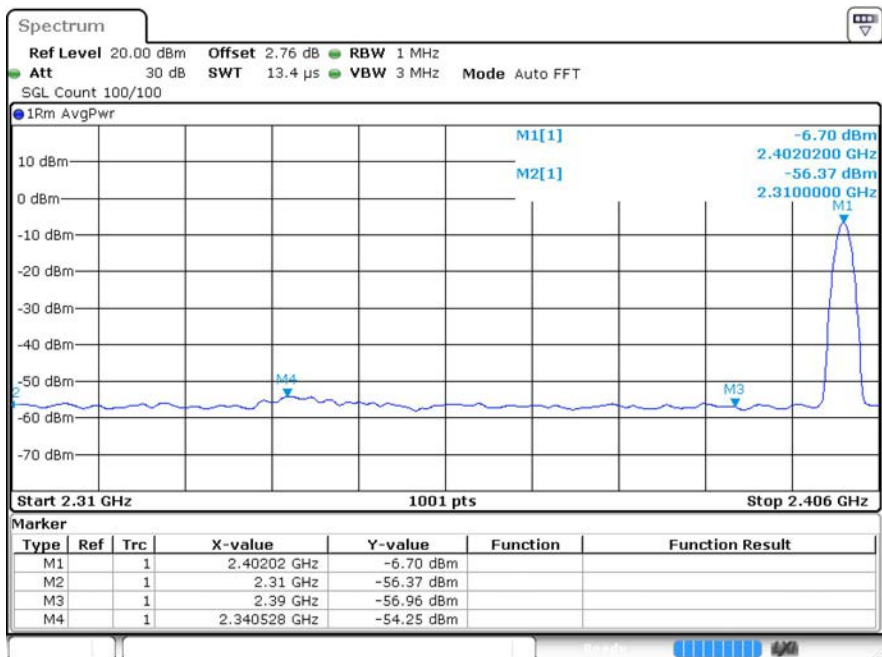
### Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



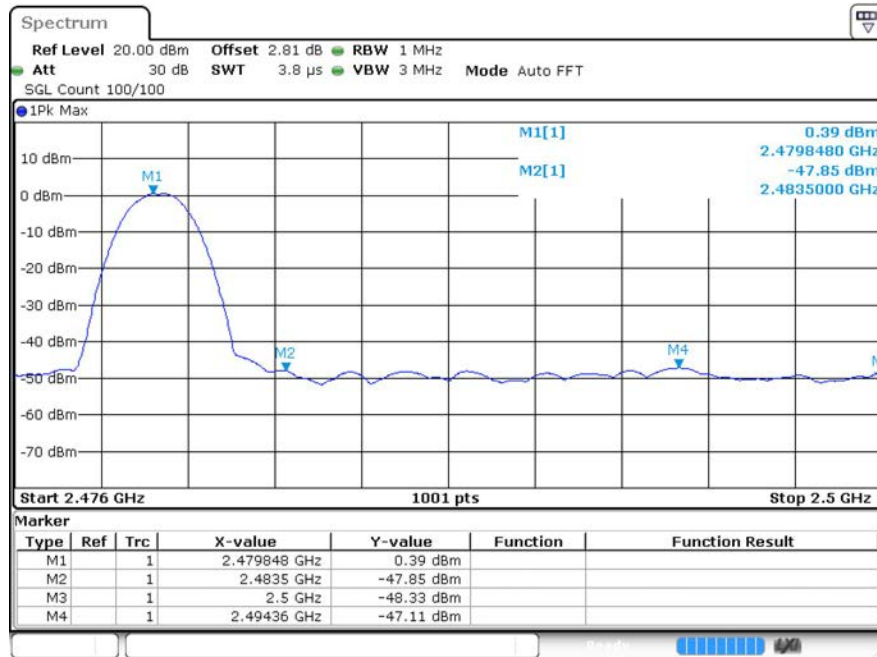
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



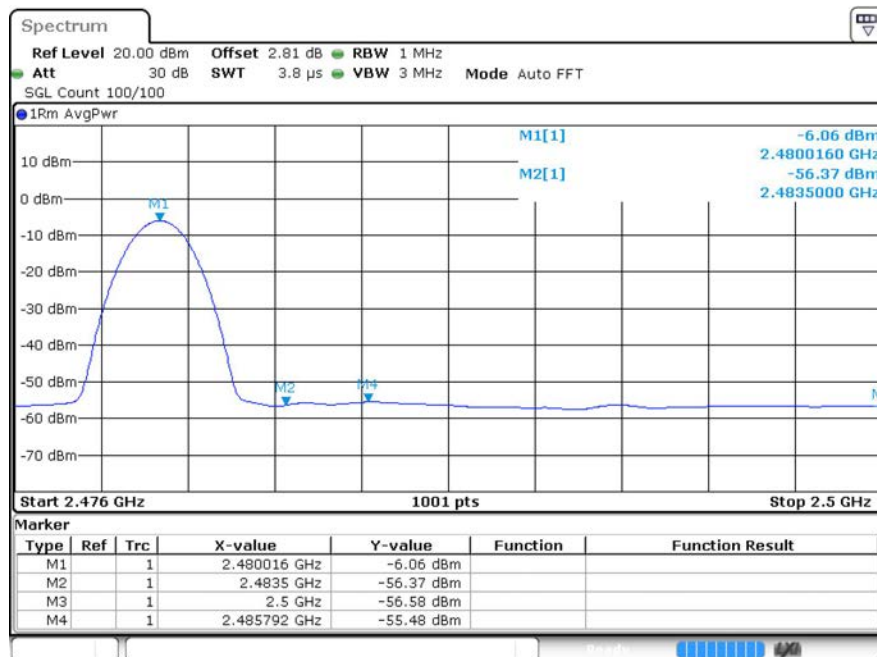
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_Average (Low Channel)



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



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



---The End---