

## Appendix A

### RF Test Data for BT V4.0 (BDR/EDR) (Conducted Measurement)

Product Name: GNSS RECEIVER

Trade Mark: SOUTH, KOLIDA, SANDING, RUIDE, TIANYU

Test Model: K5

#### Environmental Conditions

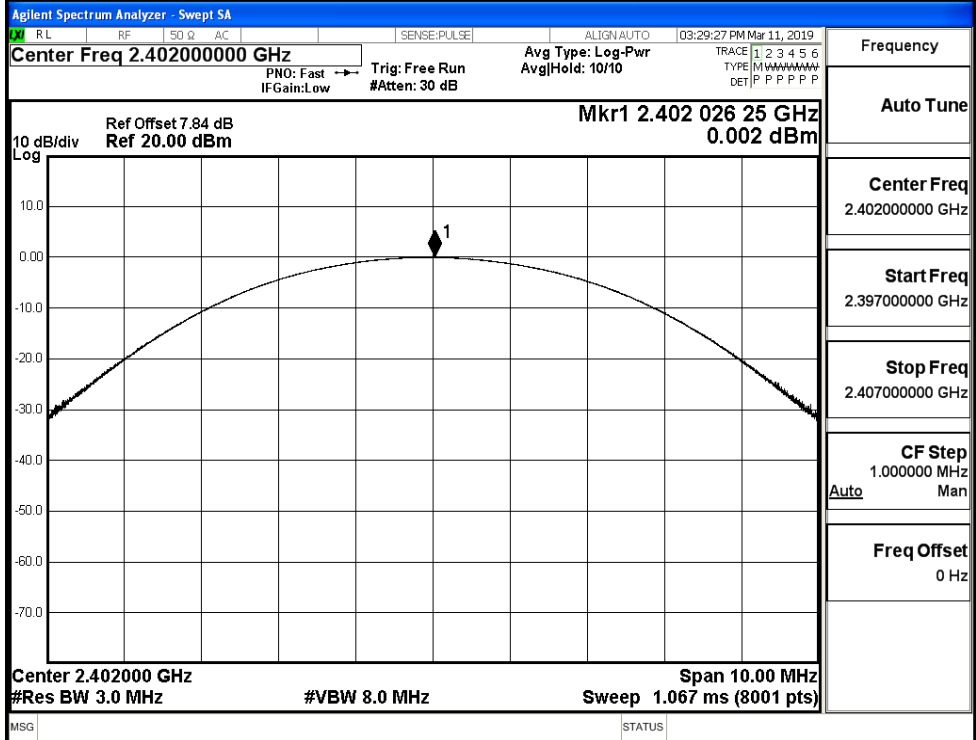
|                    |           |
|--------------------|-----------|
| Temperature:       | 23.2 ° C  |
| Relative Humidity: | 53.4%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Mina.Xu   |
| Supervised by:     | Tom.Liu   |

#### A.1 Maximum Conducted Peak Output Power

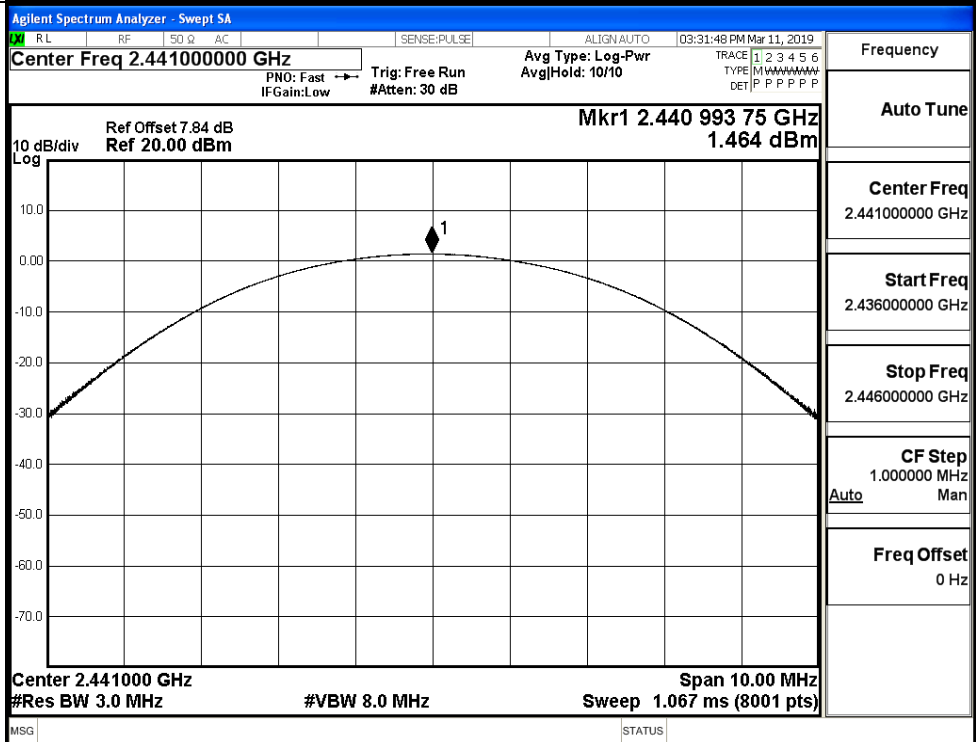
| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | 0.002                           | 21          | PASS    |
|               | MCH      | 1.464                           | 21          | PASS    |
|               | HCH      | 1.572                           | 21          | PASS    |
| $\pi/4$ DQPSK | LCH      | -0.507                          | 21          | PASS    |
|               | MCH      | 0.652                           | 21          | PASS    |
|               | HCH      | 0.542                           | 21          | PASS    |
| 8DPSK         | LCH      | -0.549                          | 21          | PASS    |
|               | MCH      | 0.566                           | 21          | PASS    |
|               | HCH      | 0.621                           | 21          | PASS    |

Test Graphs

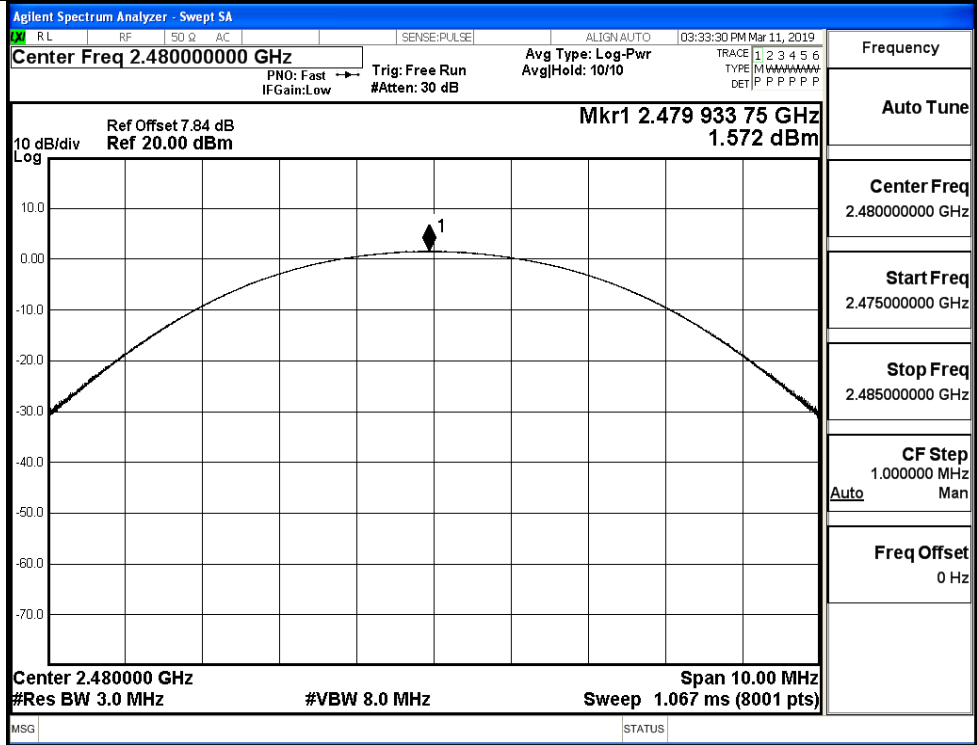
GFSK/LCH



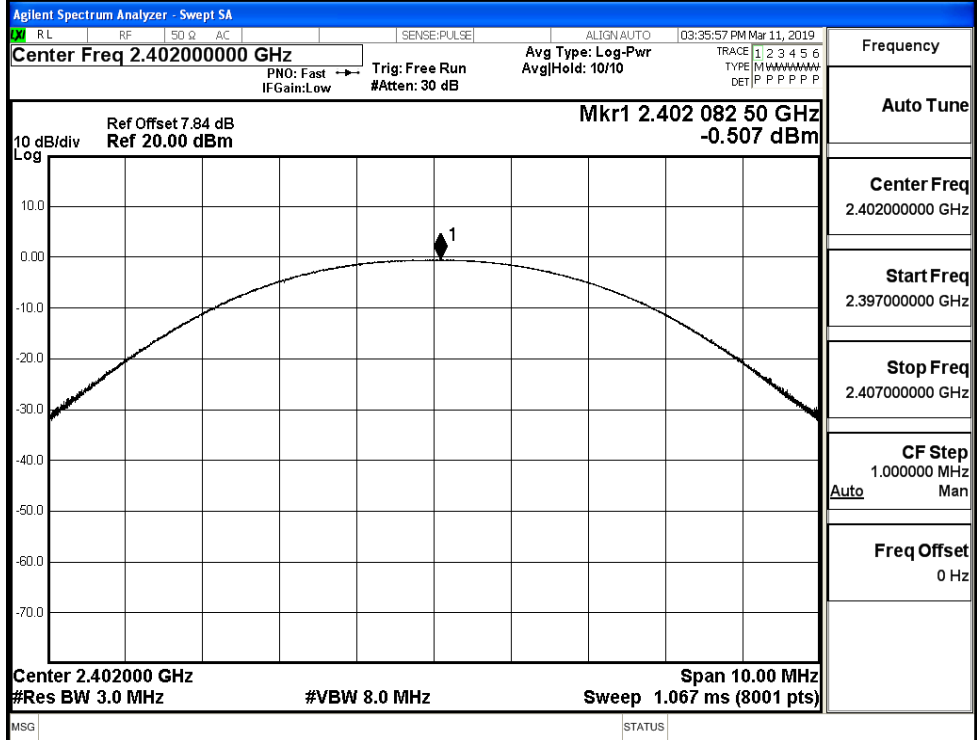
GFSK/MCH



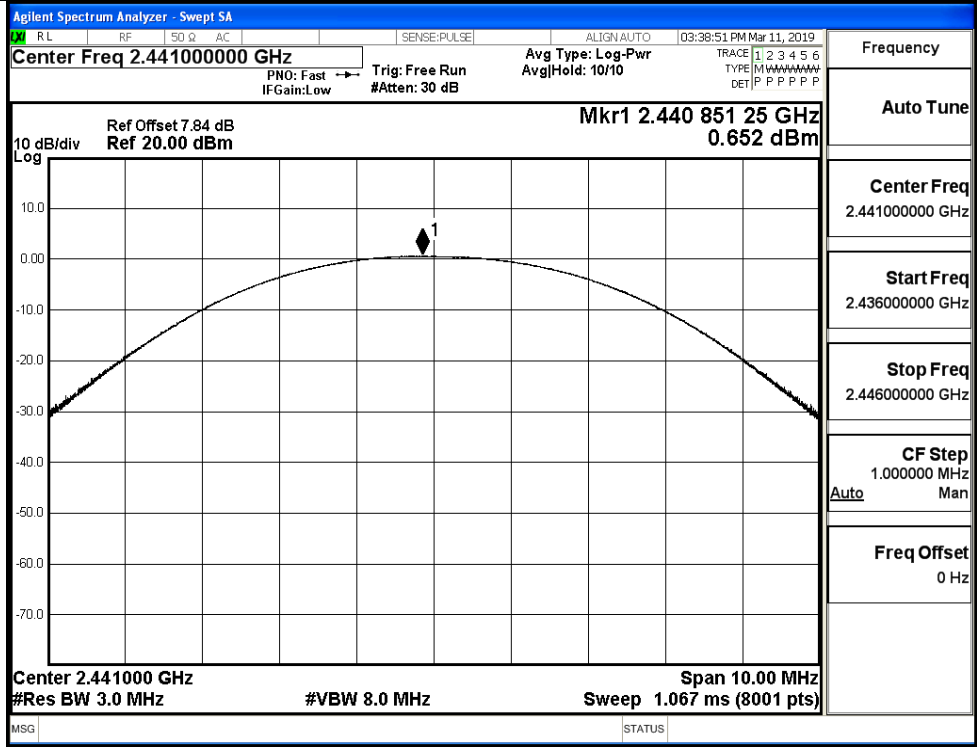
GFSK/HCH



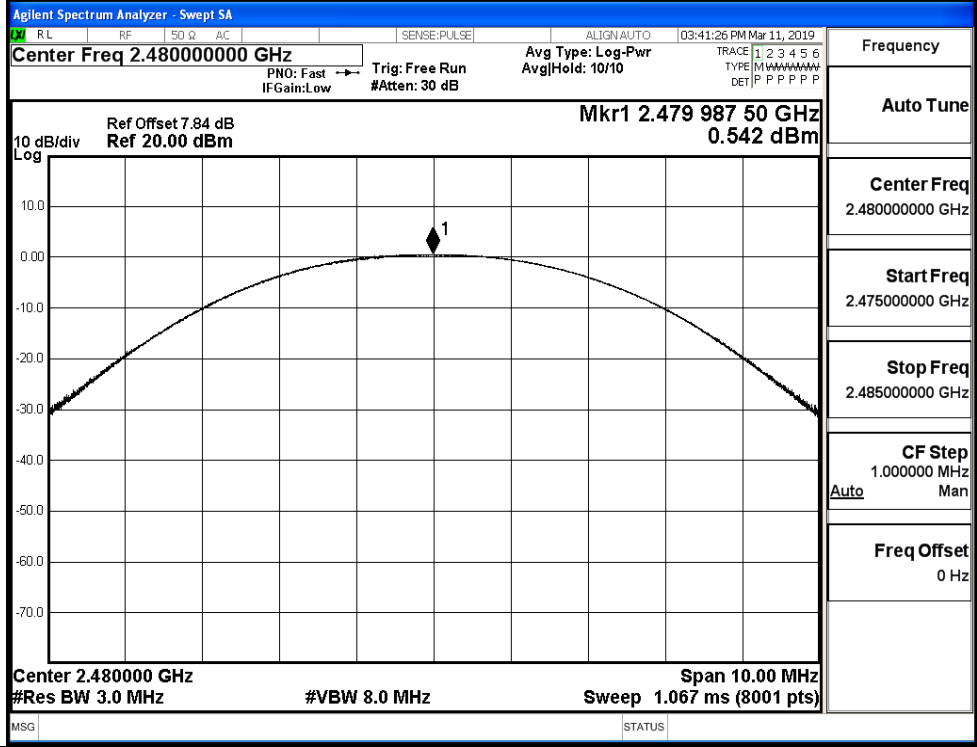
$\pi/4$ DQPSK/LCH



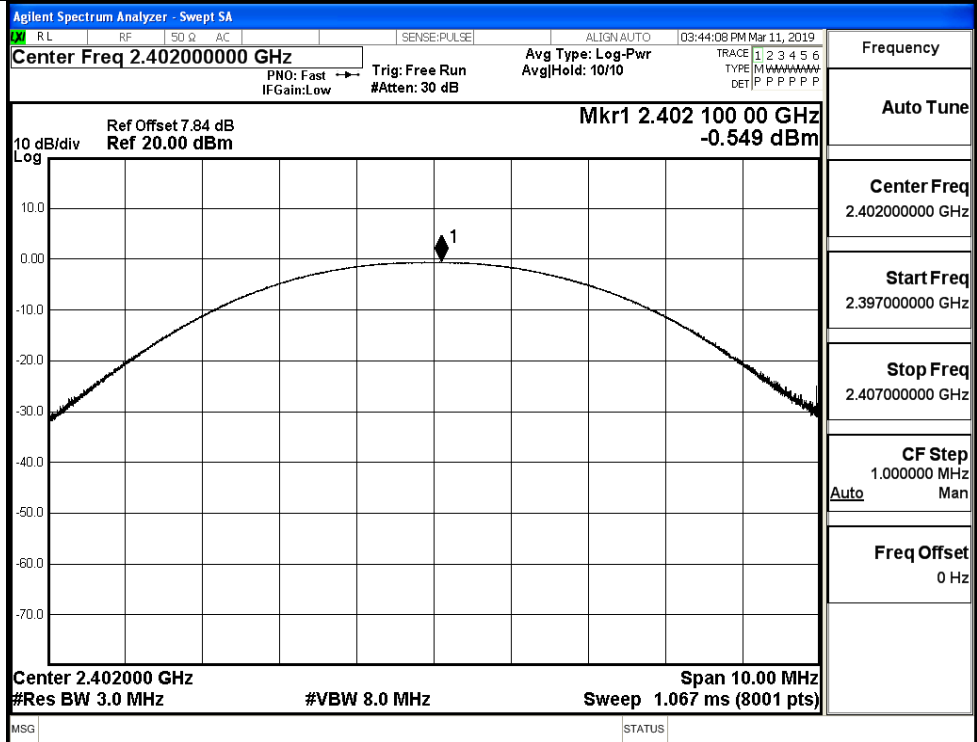
$\pi/4$ DQPSK/MCH



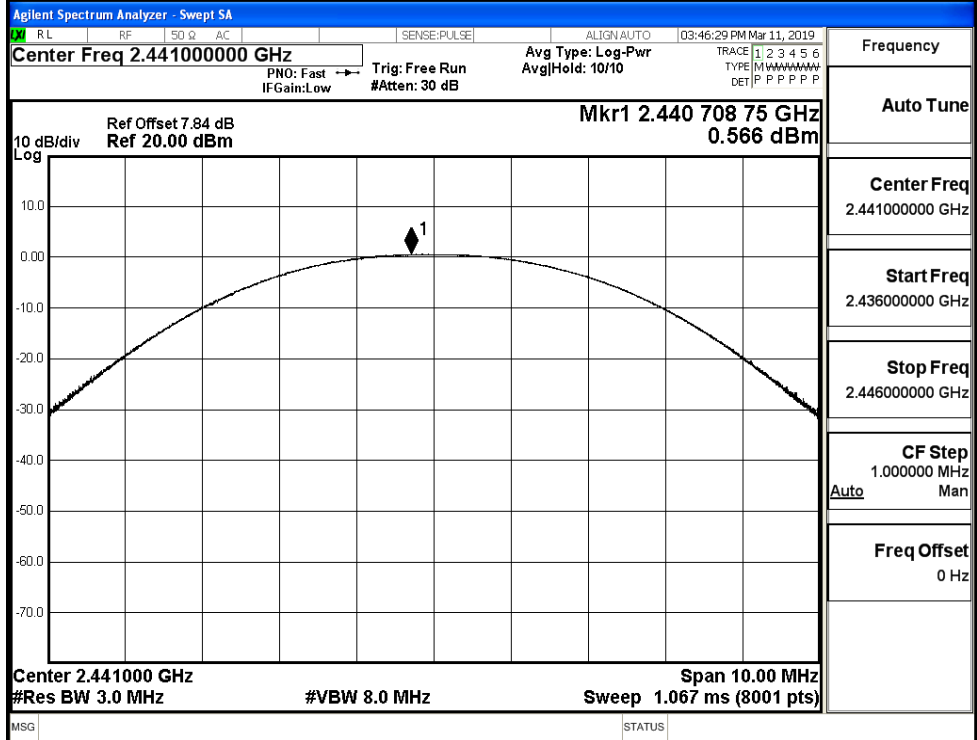
$\pi/4$ DQPSK/HCH



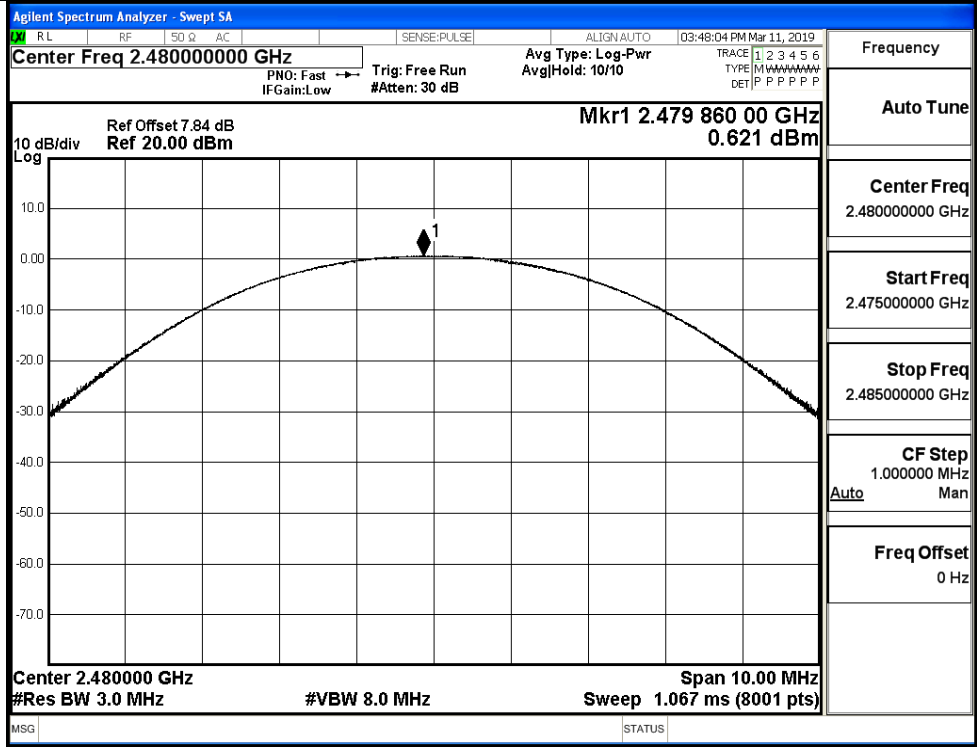
8DPSK/LCH



8DPSK/MCH

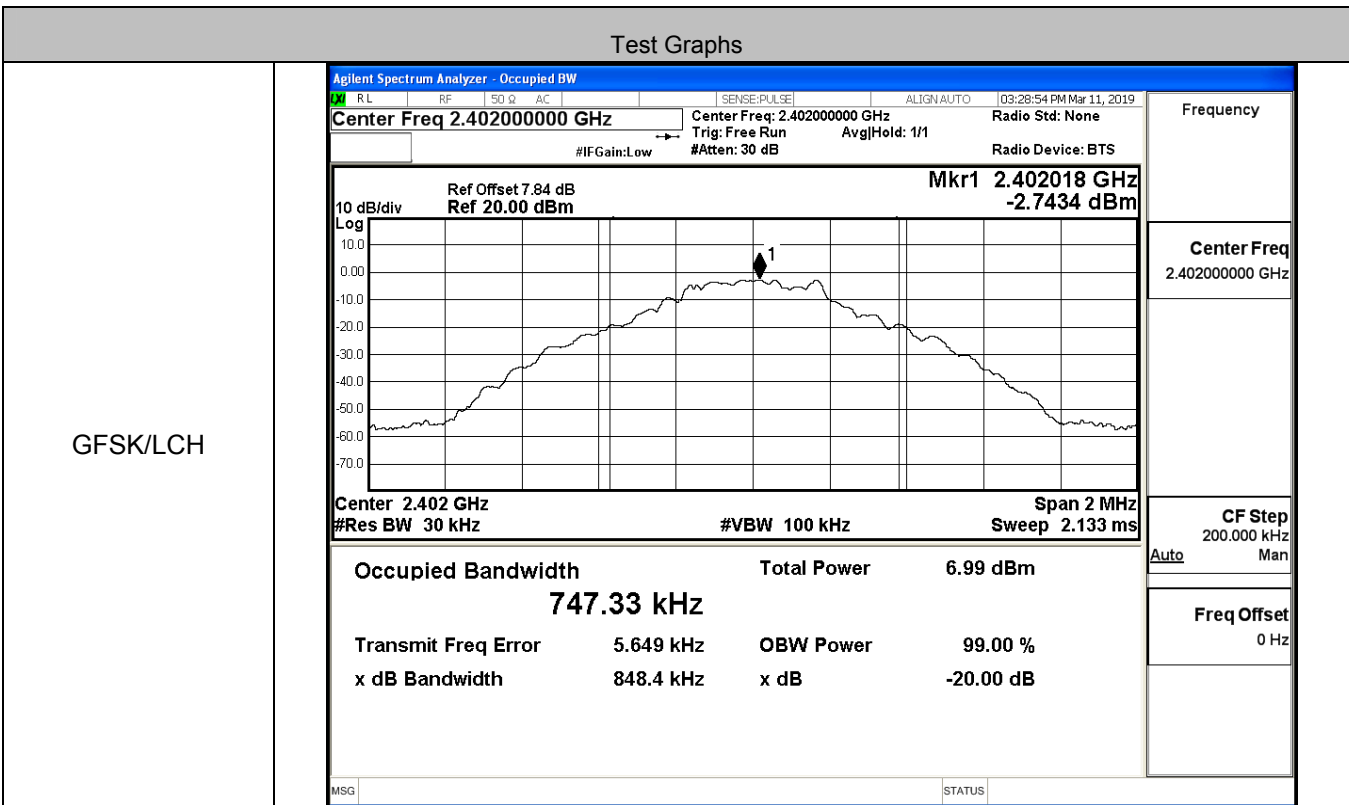


8DPSK/HCH

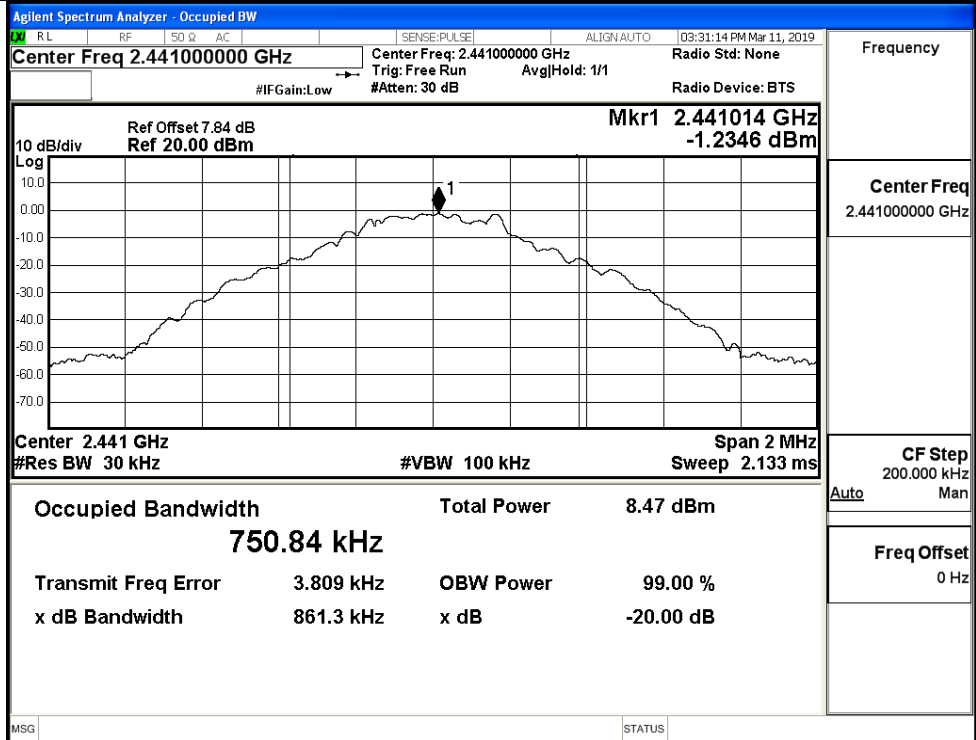


**A.2 20dB Bandwidth**

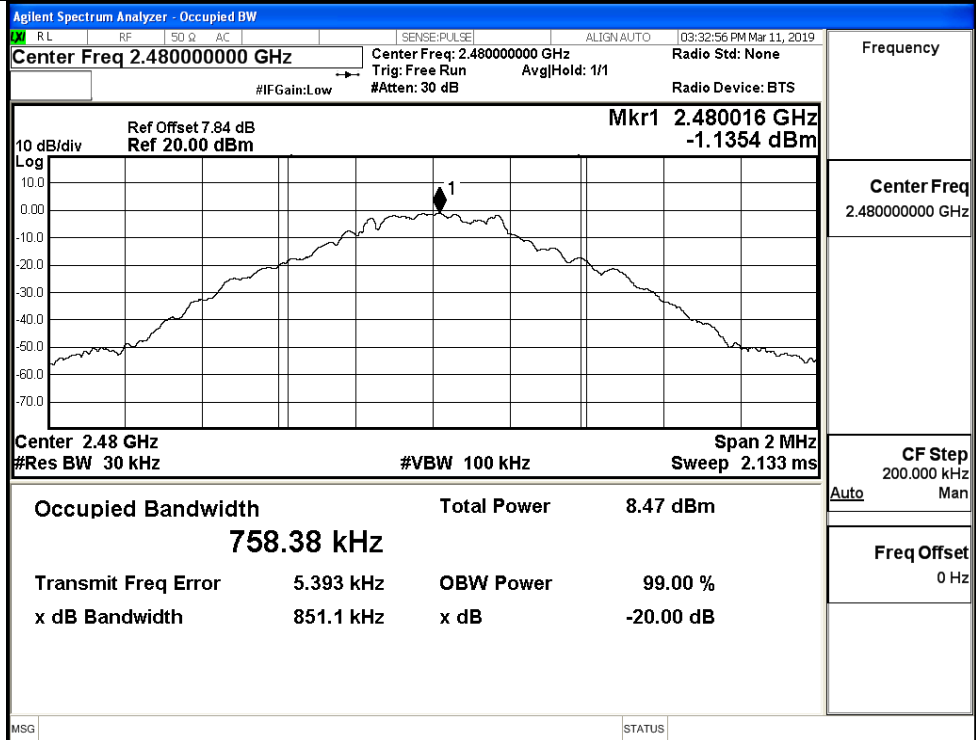
| Mode     | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|----------|----------|----------------------|---------------|---------|
| GFSK     | LCH      | 0.8484               | Not Specified | PASS    |
|          | MCH      | 0.8613               | Not Specified | PASS    |
|          | HCH      | 0.8511               | Not Specified | PASS    |
| π/4DQPSK | LCH      | 1.268                | Not Specified | PASS    |
|          | MCH      | 1.273                | Not Specified | PASS    |
|          | HCH      | 1.273                | Not Specified | PASS    |
| 8DPSK    | LCH      | 1.268                | Not Specified | PASS    |
|          | MCH      | 1.268                | Not Specified | PASS    |
|          | HCH      | 1.269                | Not Specified | PASS    |



GFSK/MCH

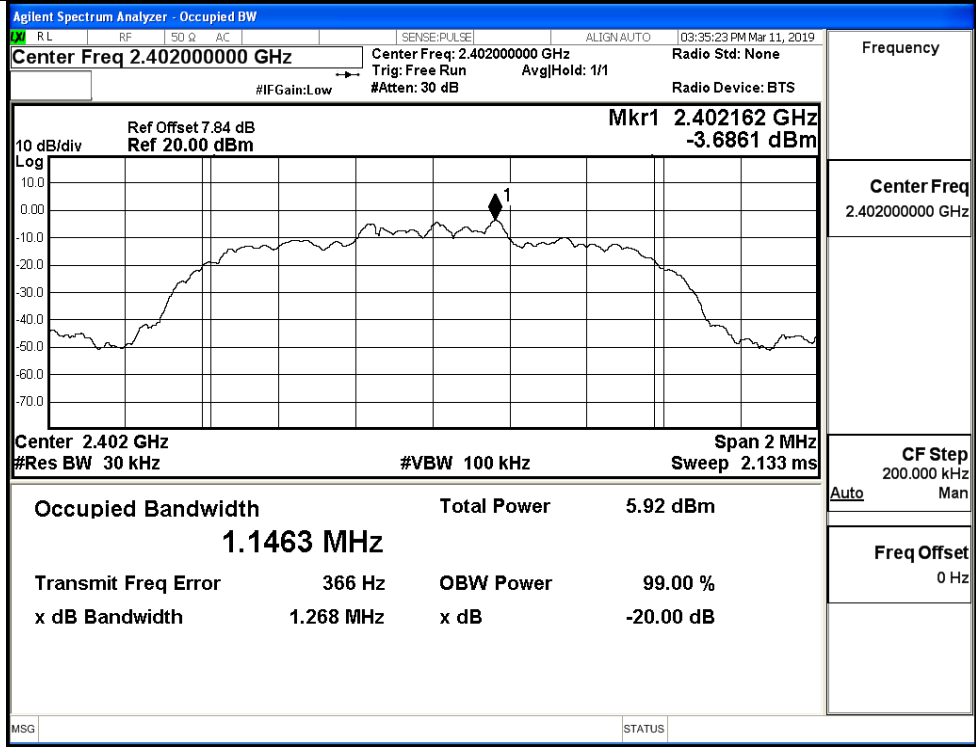


GFSK/HCH

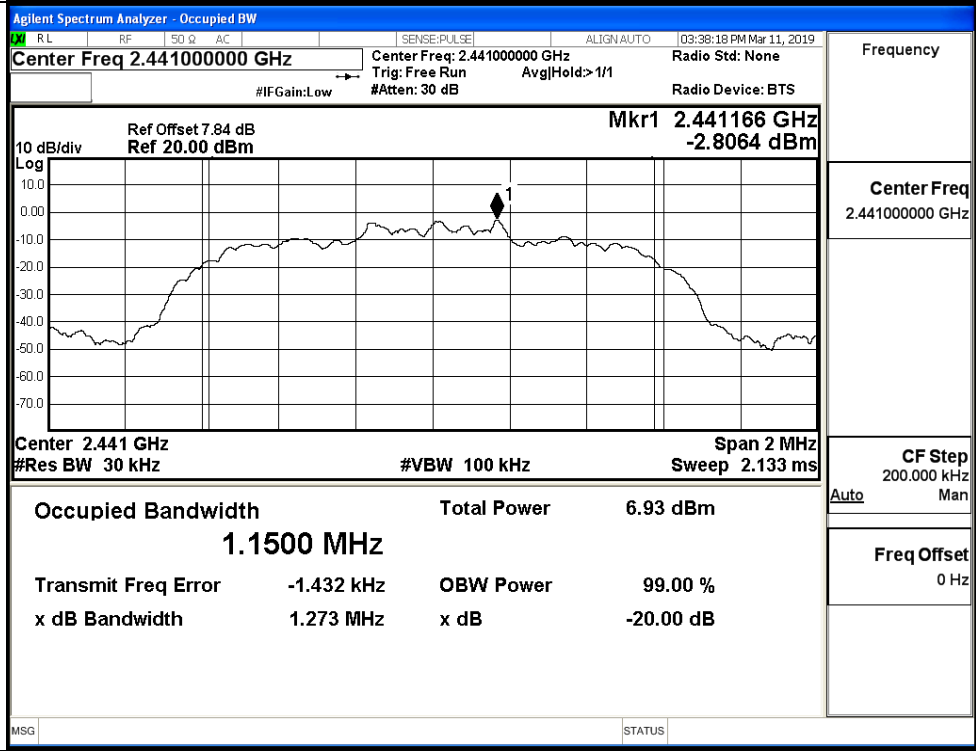




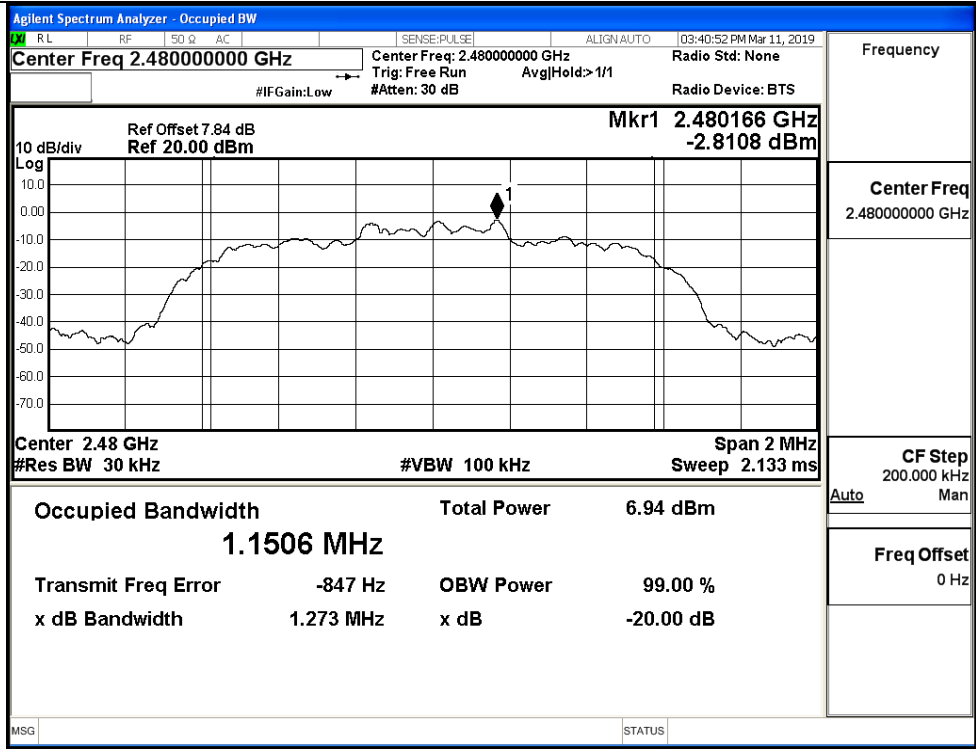
$\pi/4$ DQPSK/LCH



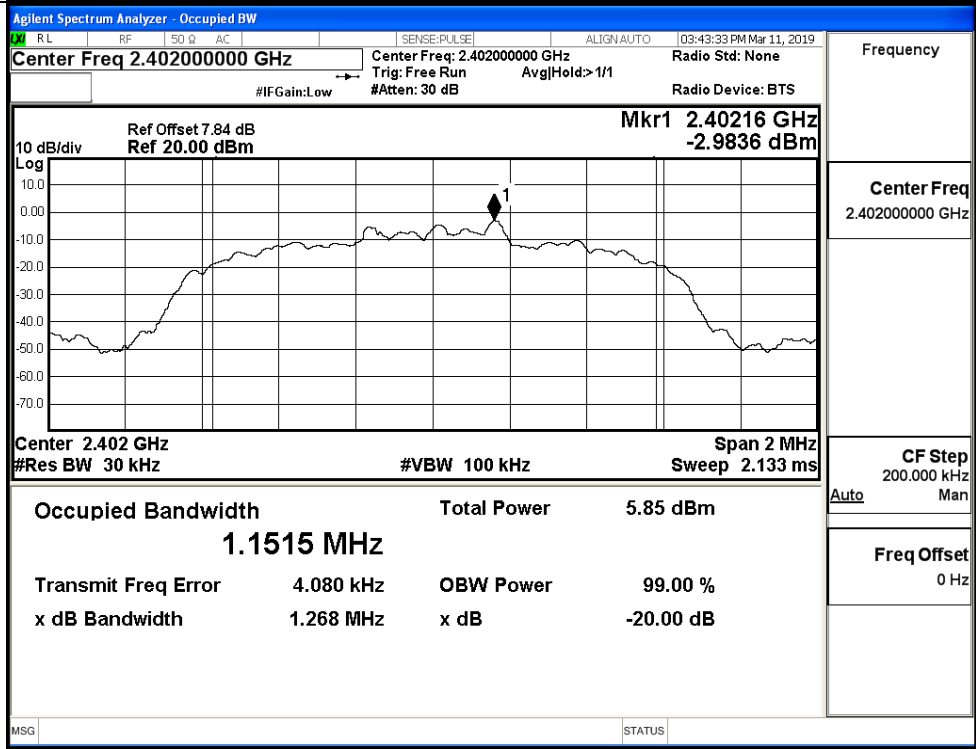
$\pi/4$ DQPSK/MCH



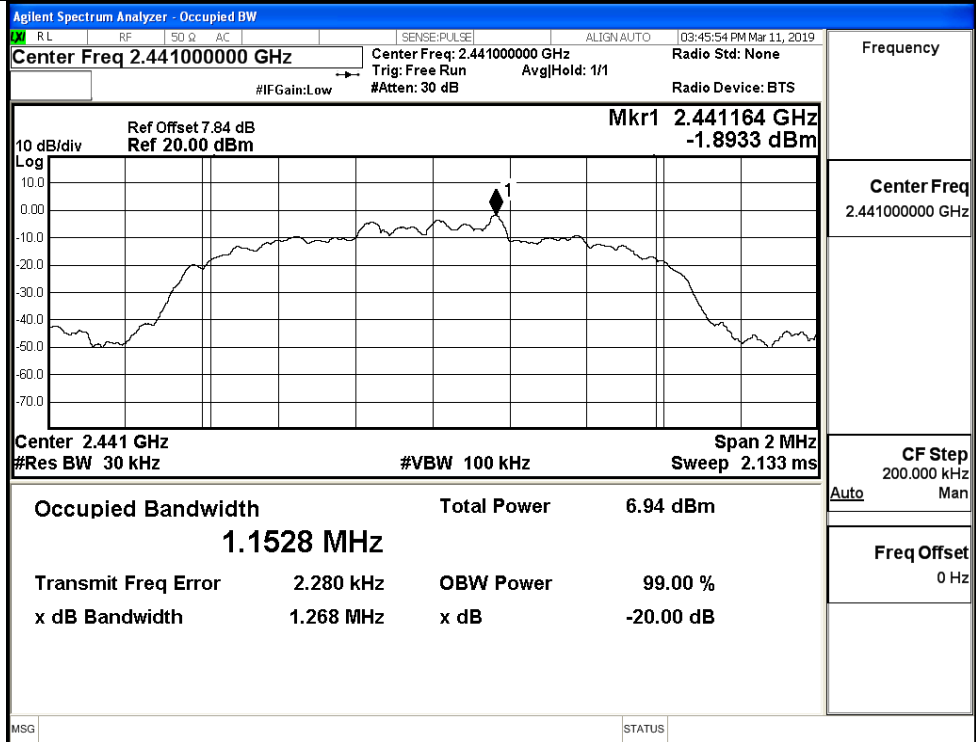
$\pi/4$ DQPSK/HCH



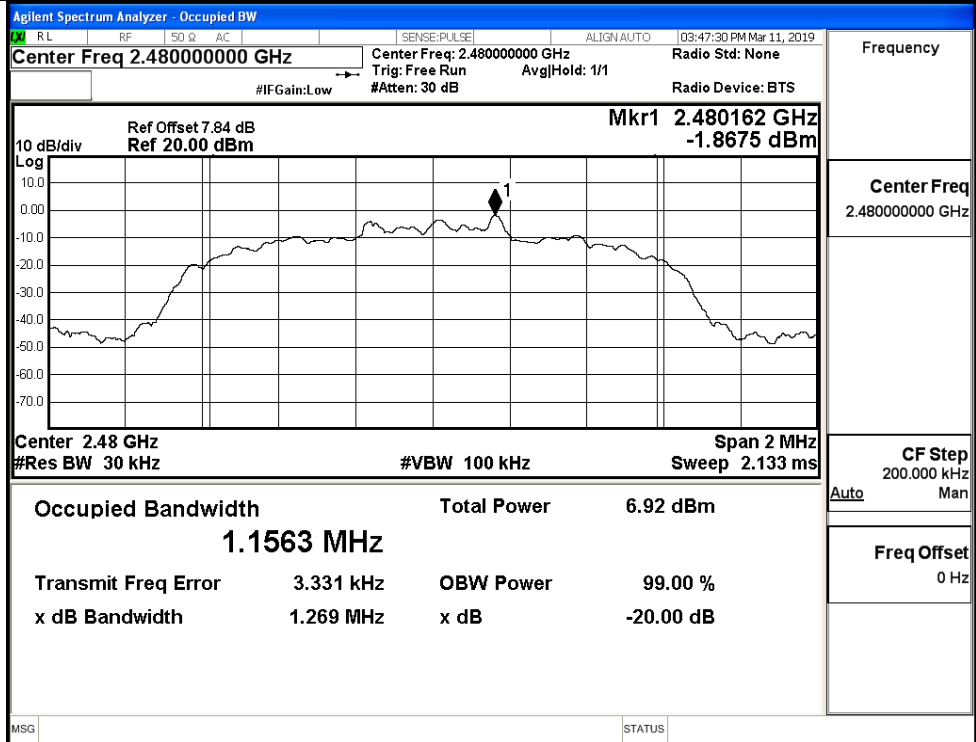
8DPSK/LCH



8DPSK/MCH

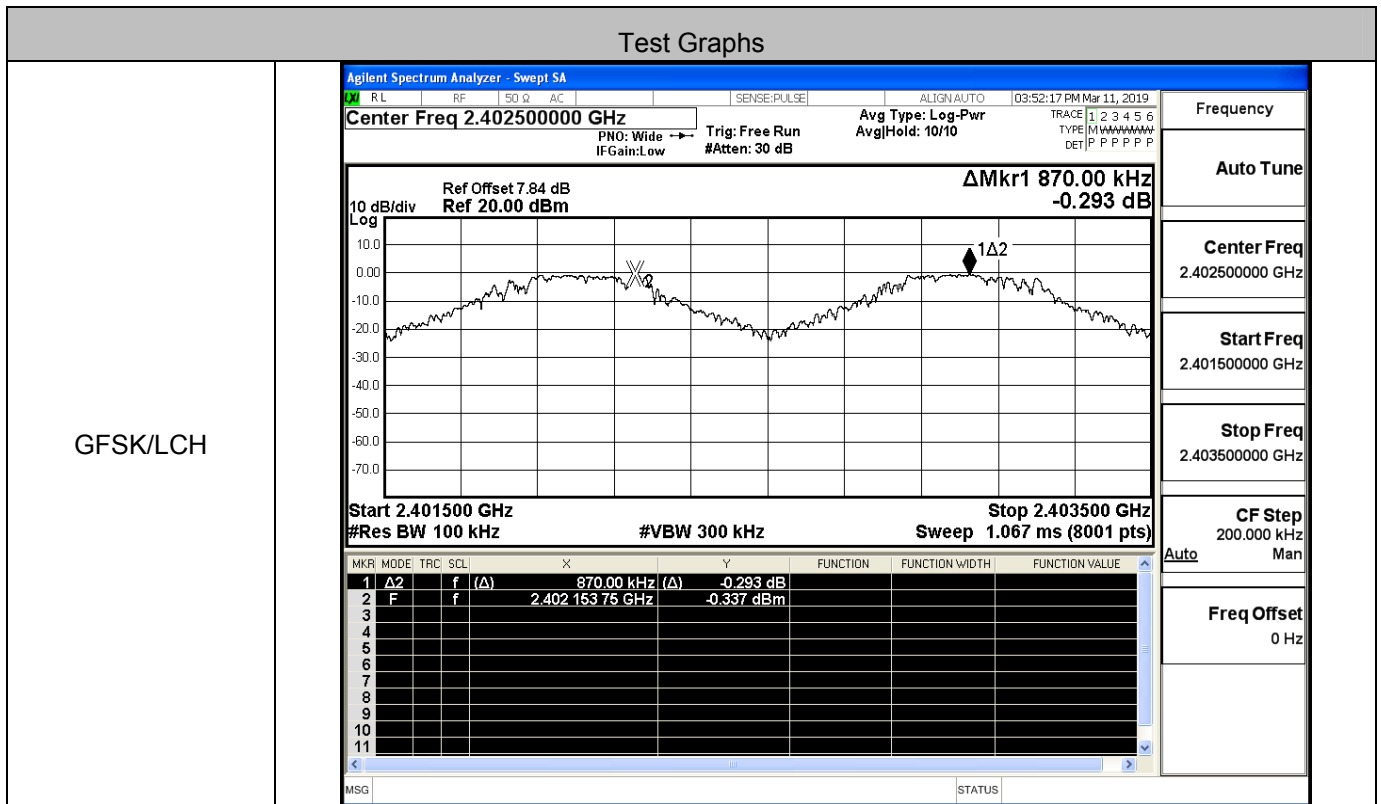


8DPSK/HCH

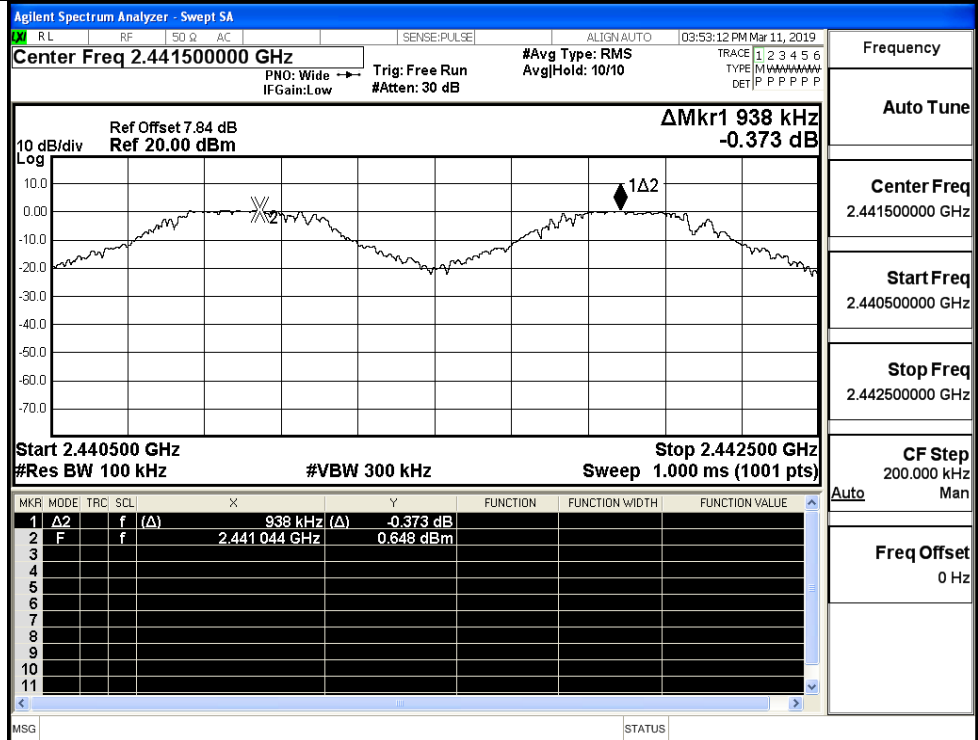


### A.3 Carrier Frequency Separation

| Mode     | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|----------|------------------------------------|-------------|---------|
| GFSK     | LCH      | 0.870                              | 0.566       | PASS    |
|          | MCH      | 0.938                              | 0.574       | PASS    |
|          | HCH      | 0.986                              | 0.567       | PASS    |
| π/4DQPSK | LCH      | 1.042                              | 0.845       | PASS    |
|          | MCH      | 0.970                              | 0.849       | PASS    |
|          | HCH      | 1.132                              | 0.849       | PASS    |
| 8DPSK    | LCH      | 1.028                              | 0.845       | PASS    |
|          | MCH      | 0.996                              | 0.845       | PASS    |
|          | HCH      | 1.114                              | 0.846       | PASS    |

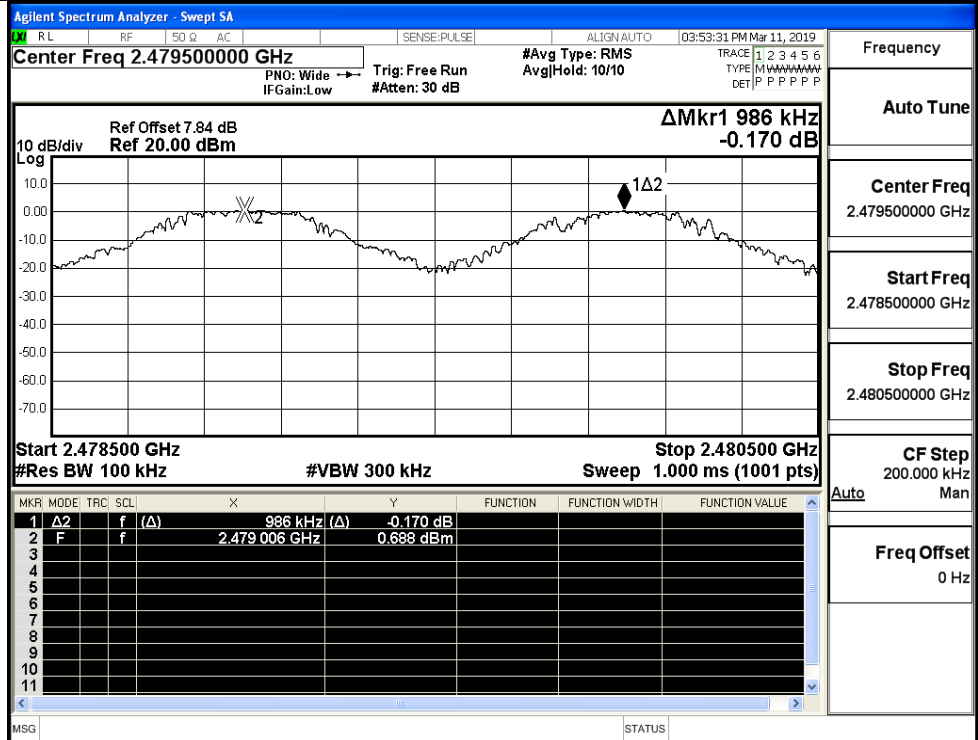


GFSK/MCH



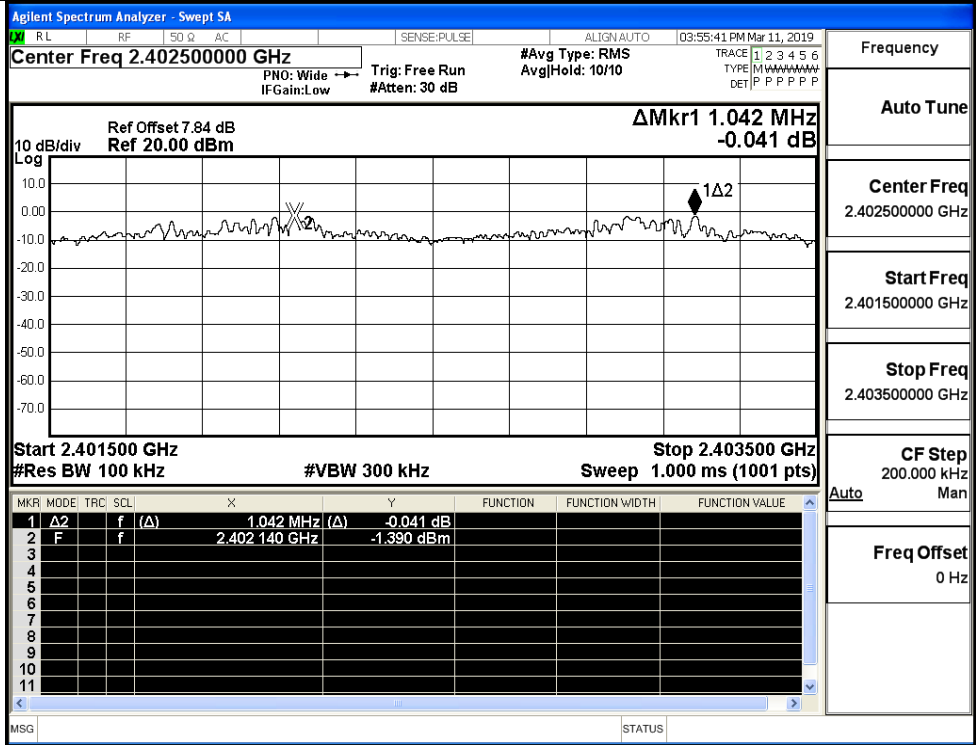
Frequency  
Auto Tune  
Center Freq  
2.441500000 GHz  
Start Freq  
2.440500000 GHz  
Stop Freq  
2.442500000 GHz  
CF Step  
200.000 kHz  
Auto Man  
Freq Offset  
0 Hz

GFSK/HCH

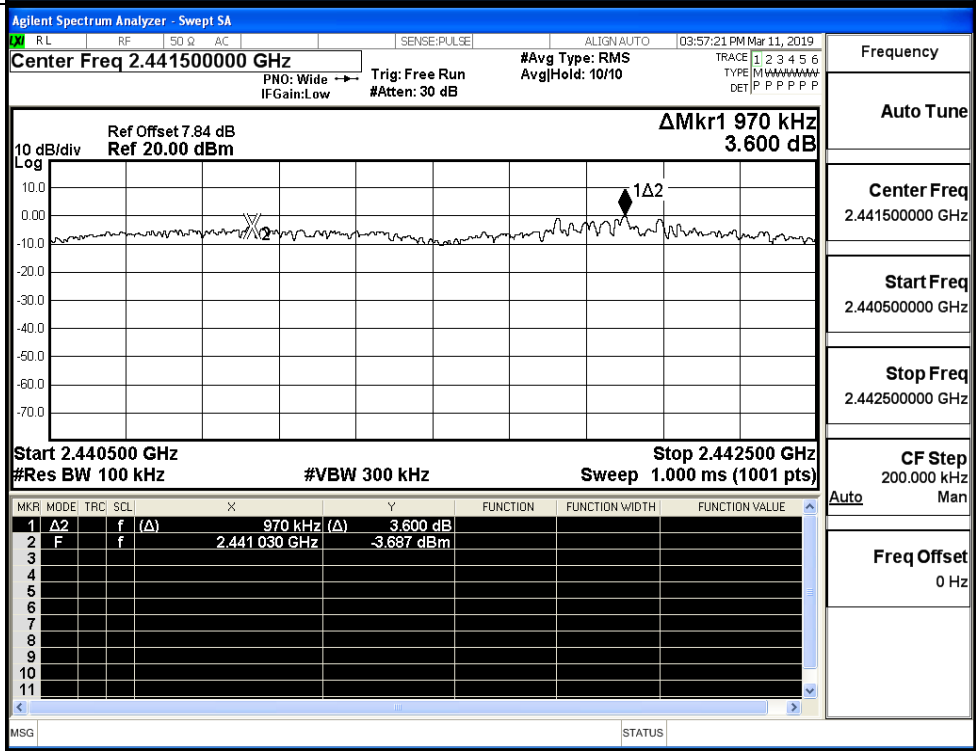


Frequency  
Auto Tune  
Center Freq  
2.479500000 GHz  
Start Freq  
2.478500000 GHz  
Stop Freq  
2.480500000 GHz  
CF Step  
200.000 kHz  
Auto Man  
Freq Offset  
0 Hz

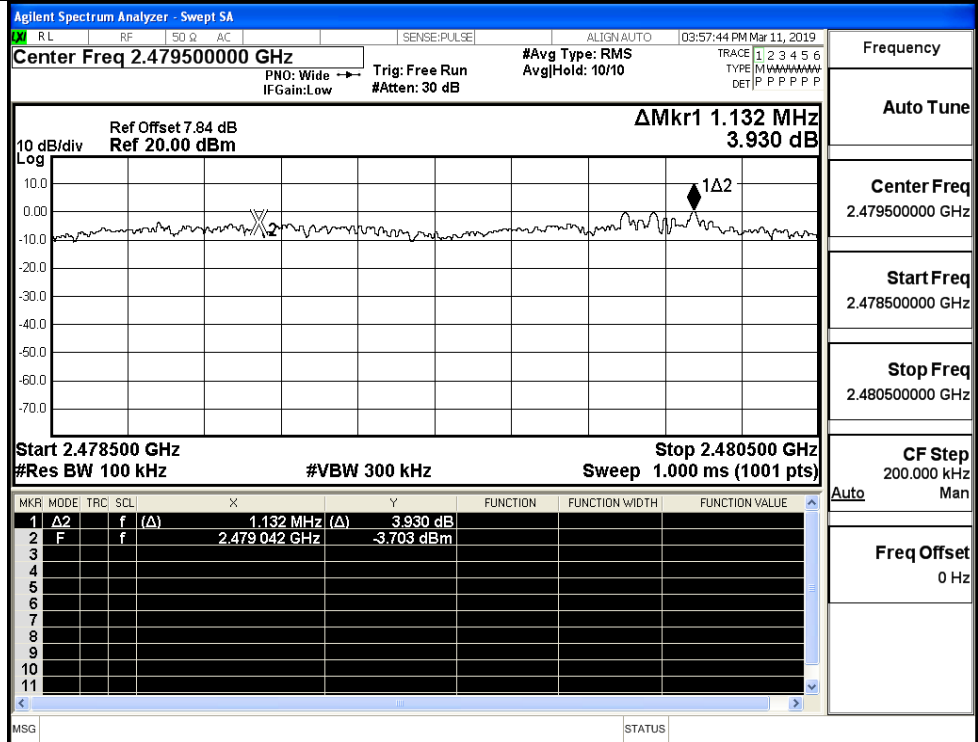
π/4DQPSK/LCH



π/4DQPSK/MCH

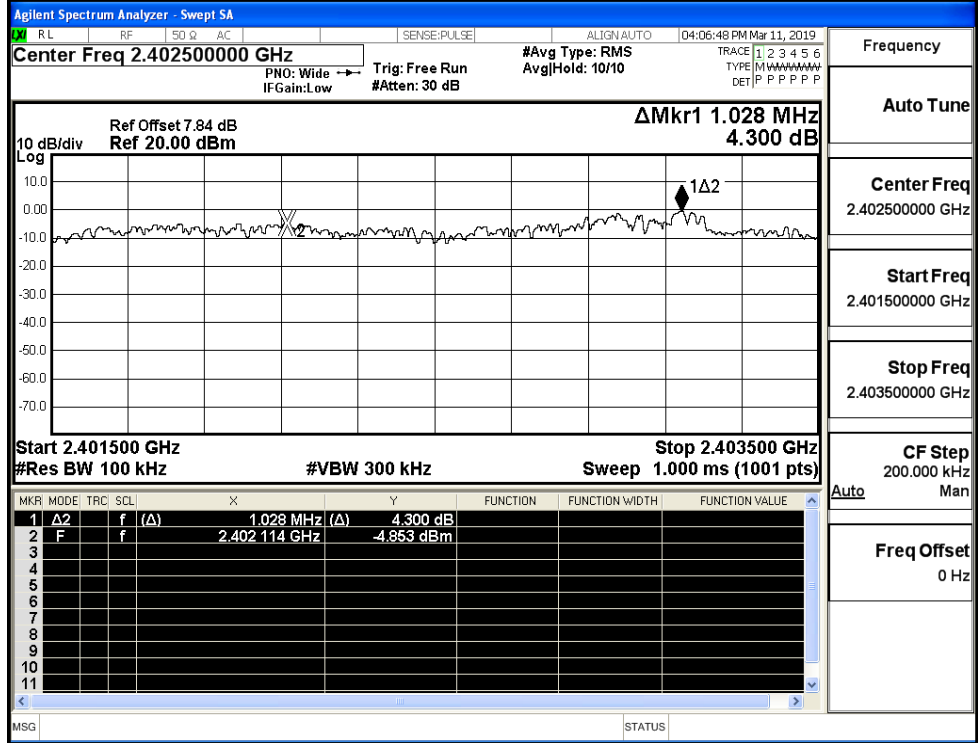


π/4DQPSK/HCH

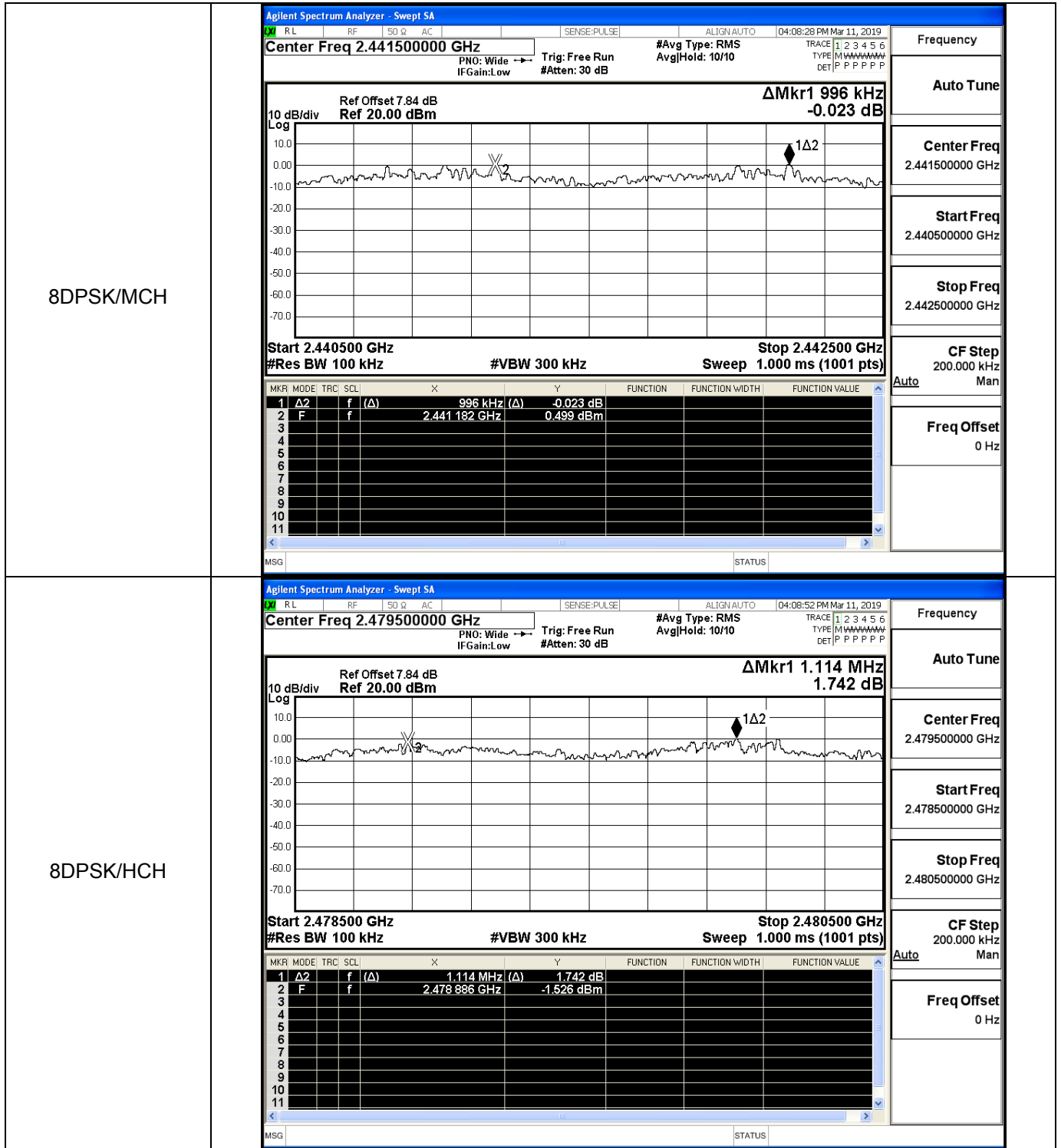


|             |                 |
|-------------|-----------------|
| Frequency   | 2.479500000 GHz |
| Auto Tune   |                 |
| Center Freq | 2.479500000 GHz |
| Start Freq  | 2.478500000 GHz |
| Stop Freq   | 2.480500000 GHz |
| CF Step     | 200.000 kHz     |
| Auto        | Man             |
| Freq Offset | 0 Hz            |

8DPSK/LCH



|             |                 |
|-------------|-----------------|
| Frequency   | 2.402500000 GHz |
| Auto Tune   |                 |
| Center Freq | 2.402500000 GHz |
| Start Freq  | 2.401500000 GHz |
| Stop Freq   | 2.403500000 GHz |
| CF Step     | 200.000 kHz     |
| Auto        | Man             |
| Freq Offset | 0 Hz            |



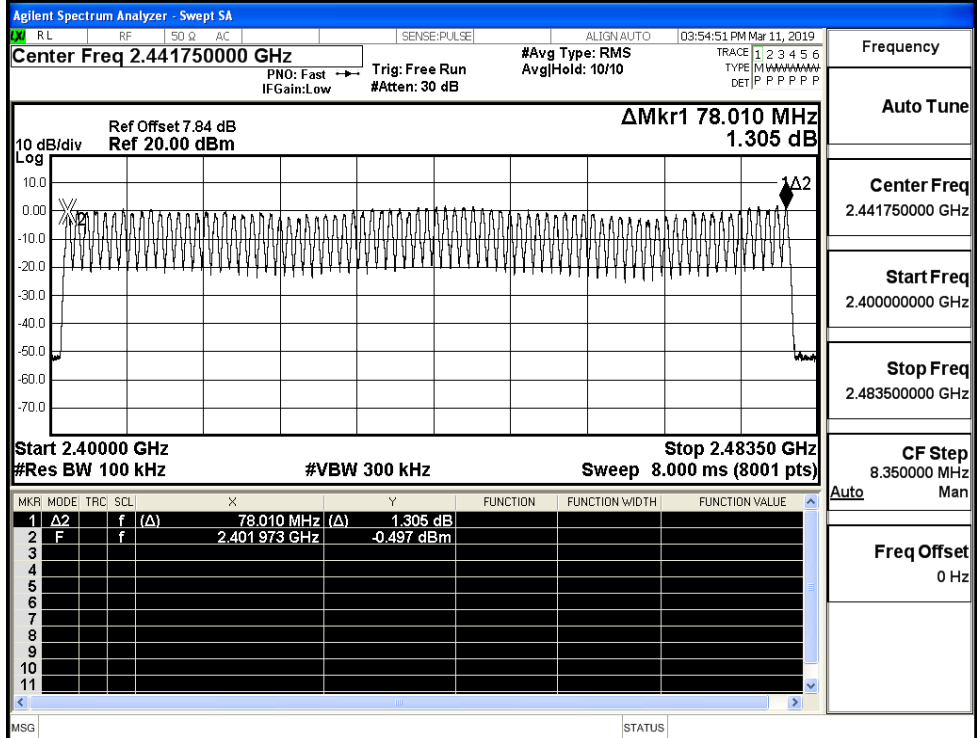
**A.4 Hopping Channel Number**

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

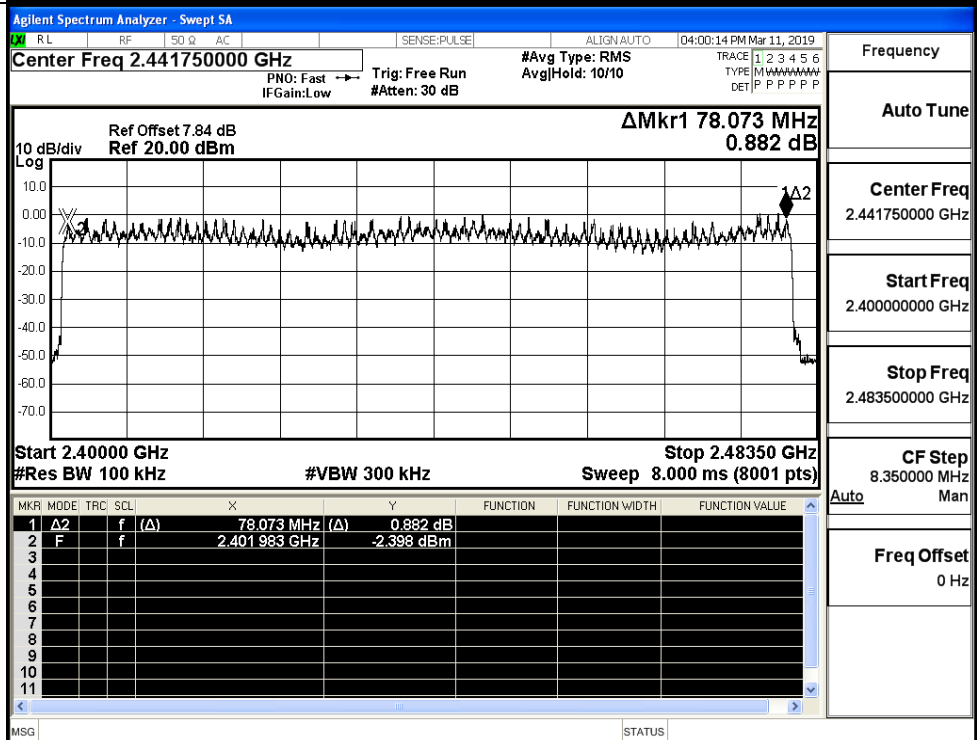


Test Graphs

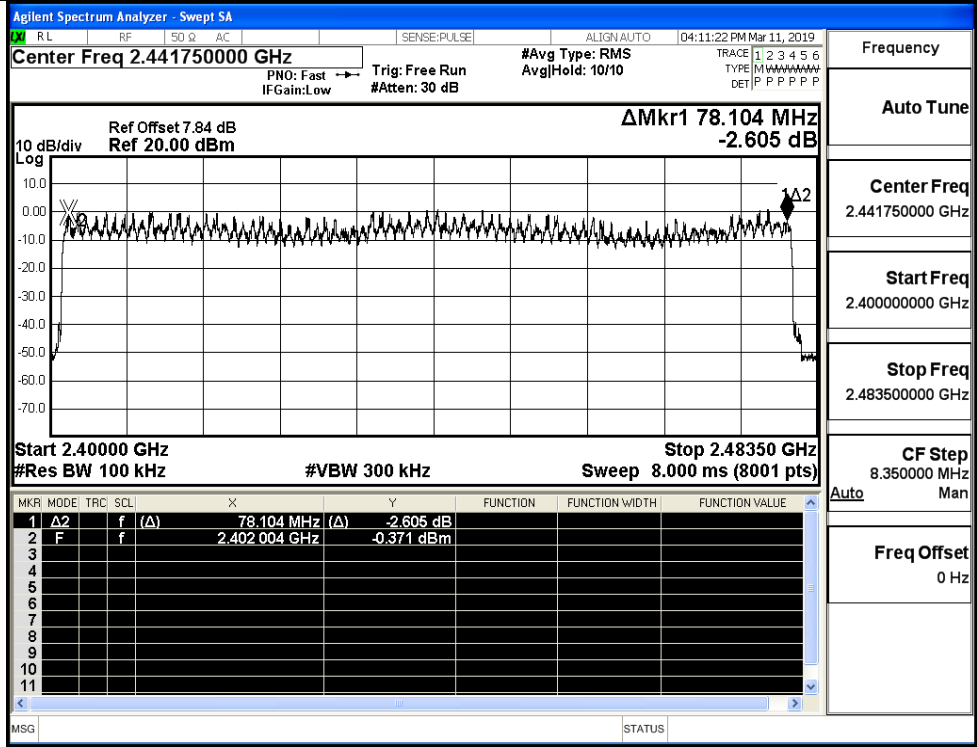
GFSK/Hop



$\pi/4$ DQPSK/Hop

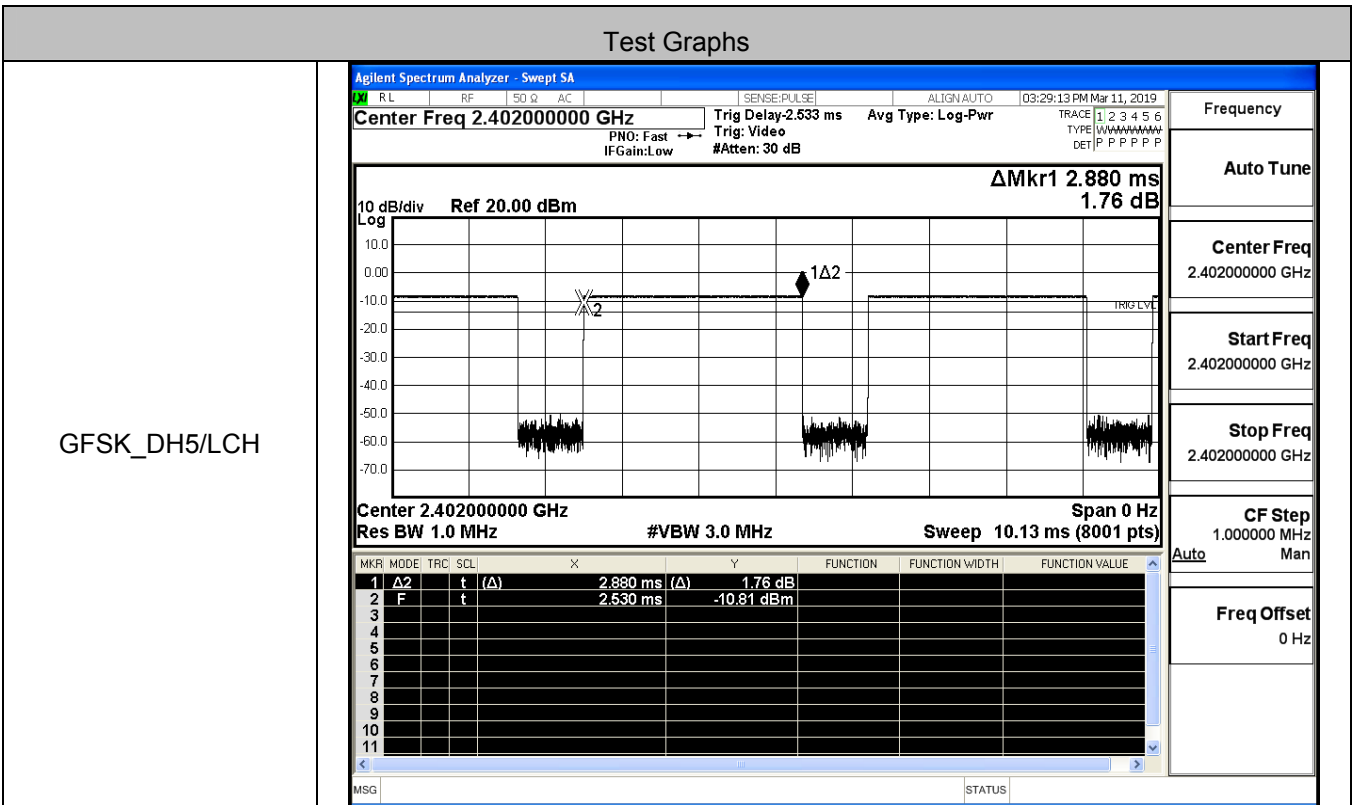


8DPSK/Hop

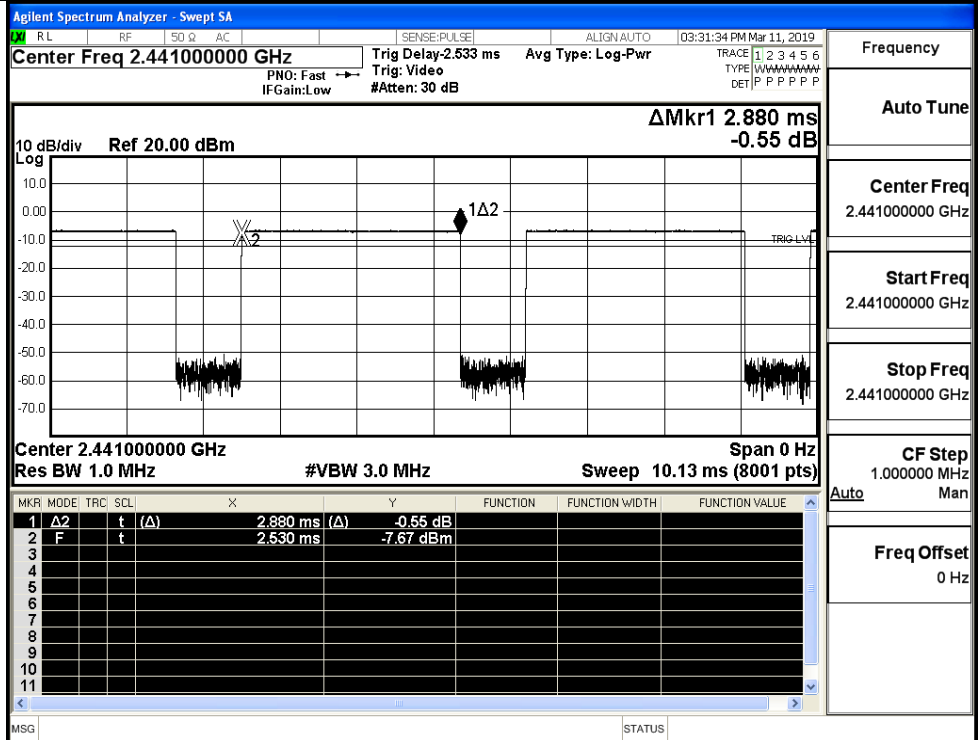


A.5 Dwell Time

| Mode          | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---------------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK          | DH5    | LCH     | 2.88                    | 106.7              | 0.307         | 0.4       | PASS    |
|               | DH5    | MCH     | 2.88                    | 106.7              | 0.307         | 0.4       | PASS    |
|               | DH5    | HCH     | 2.88                    | 106.7              | 0.307         | 0.4       | PASS    |
| $\pi/4$ DQPSK | 2DH5   | LCH     | 2.88                    | 106.7              | 0.307         | 0.4       | PASS    |
|               | 2DH5   | MCH     | 2.88                    | 106.7              | 0.307         | 0.4       | PASS    |
|               | 2DH5   | HCH     | 2.88                    | 106.7              | 0.307         | 0.4       | PASS    |
| 8DPSK         | 3DH5   | LCH     | 2.88                    | 106.7              | 0.308         | 0.4       | PASS    |
|               | 3DH5   | MCH     | 2.88                    | 106.7              | 0.308         | 0.4       | PASS    |
|               | 3DH5   | HCH     | 2.88                    | 106.7              | 0.308         | 0.4       | PASS    |



GFSK\_DH5/MCH



Frequency

Auto Tune

Center Freq  
2.441000000 GHz

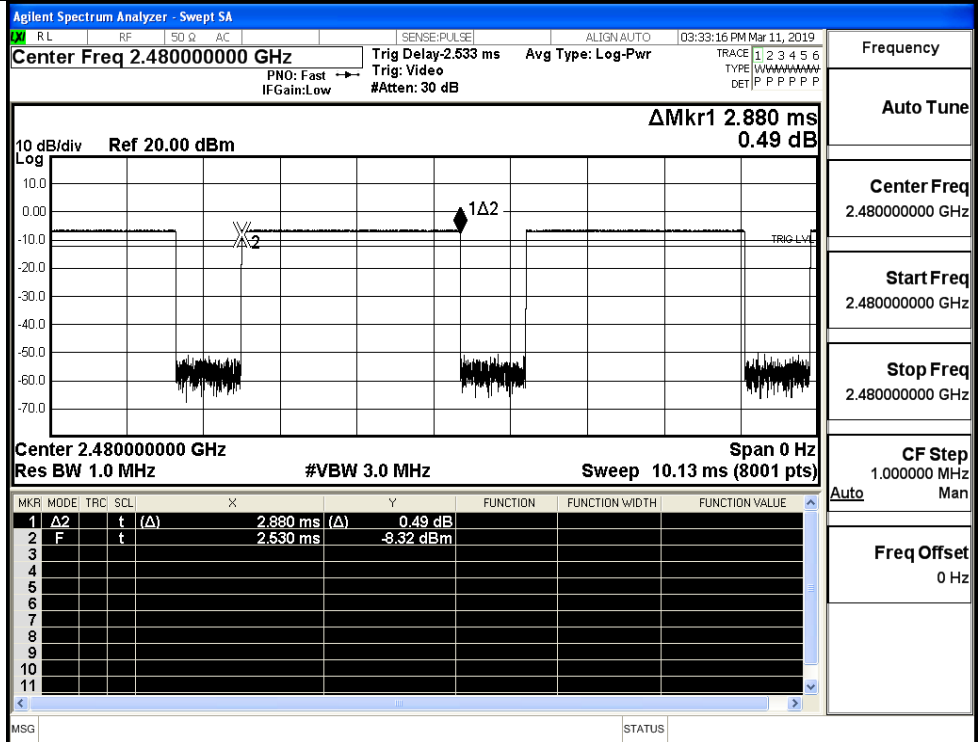
Start Freq  
2.441000000 GHz

Stop Freq  
2.441000000 GHz

CF Step  
1.000000 MHz

Freq Offset  
0 Hz

GFSK\_DH5/HCH



Frequency

Auto Tune

Center Freq  
2.480000000 GHz

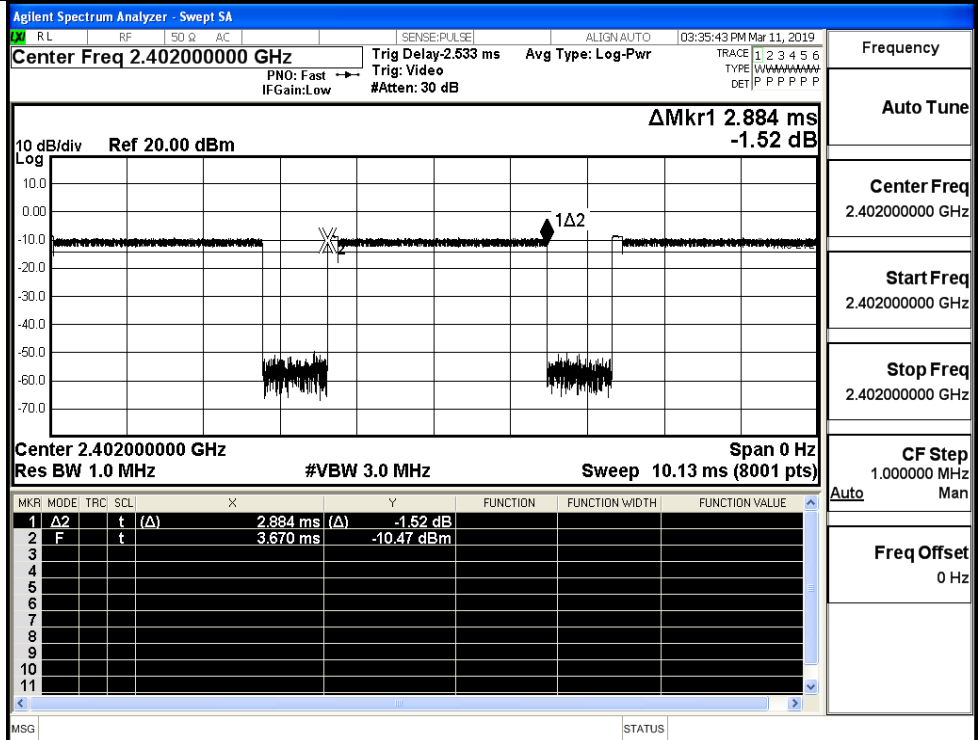
Start Freq  
2.480000000 GHz

Stop Freq  
2.480000000 GHz

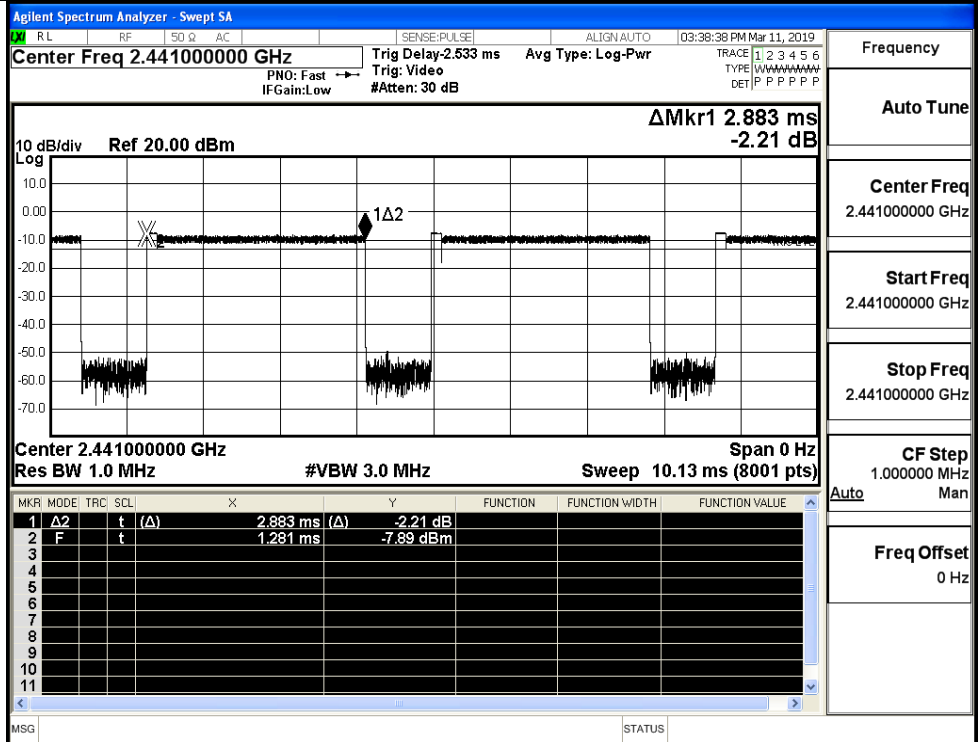
CF Step  
1.000000 MHz

Freq Offset  
0 Hz

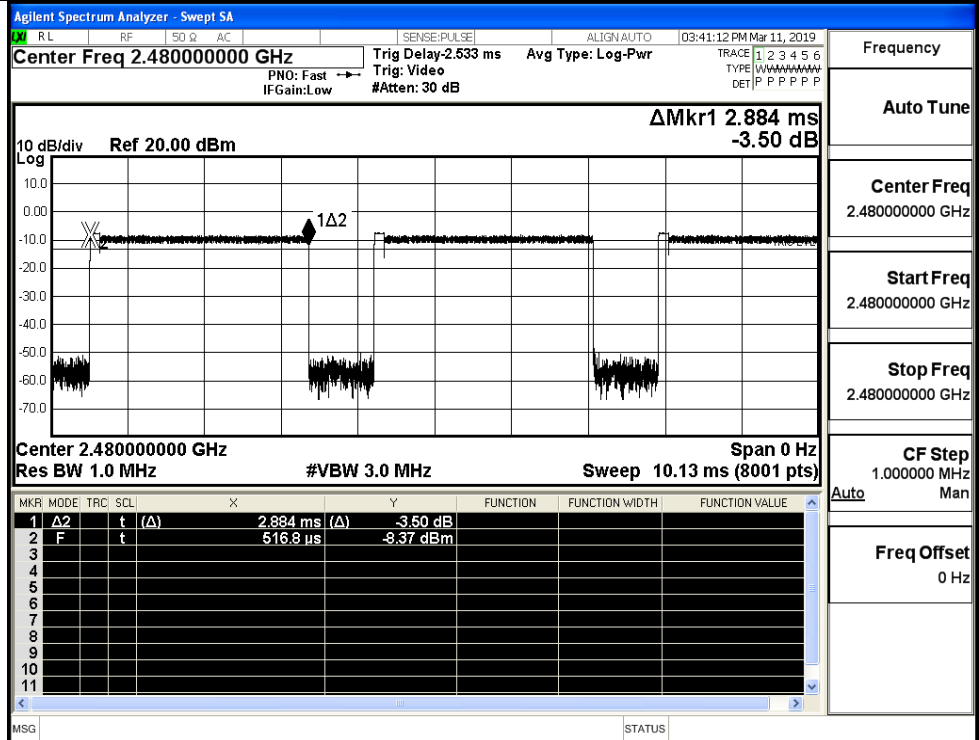
$\pi/4$ DQPSK  
\_2DH5/LCH



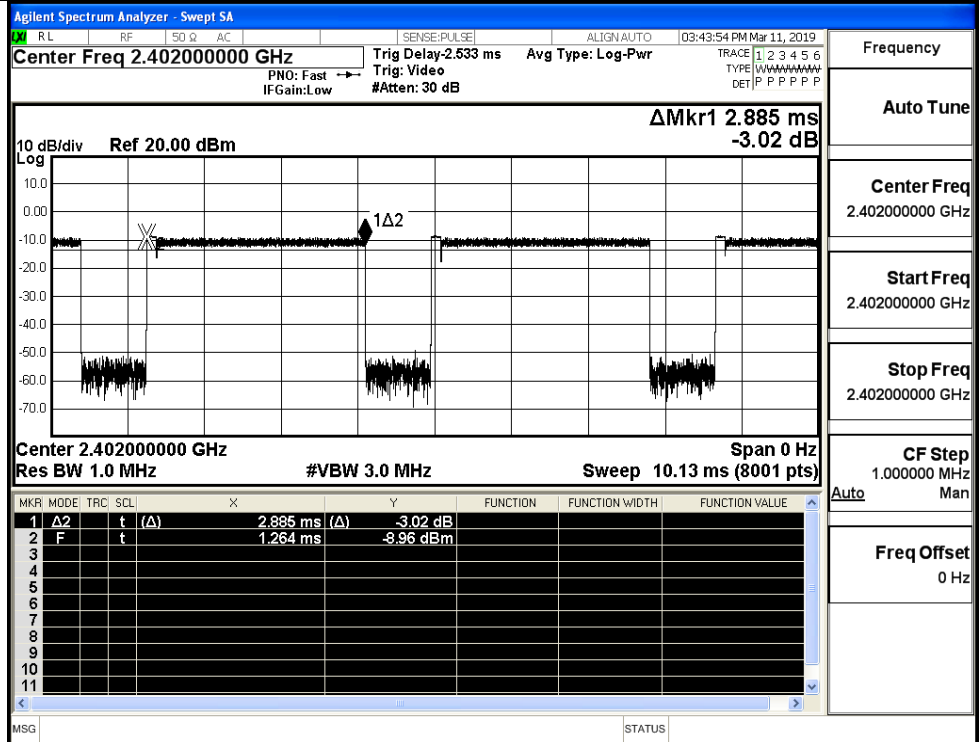
$\pi/4$ DQPSK  
\_2DH5/MCH



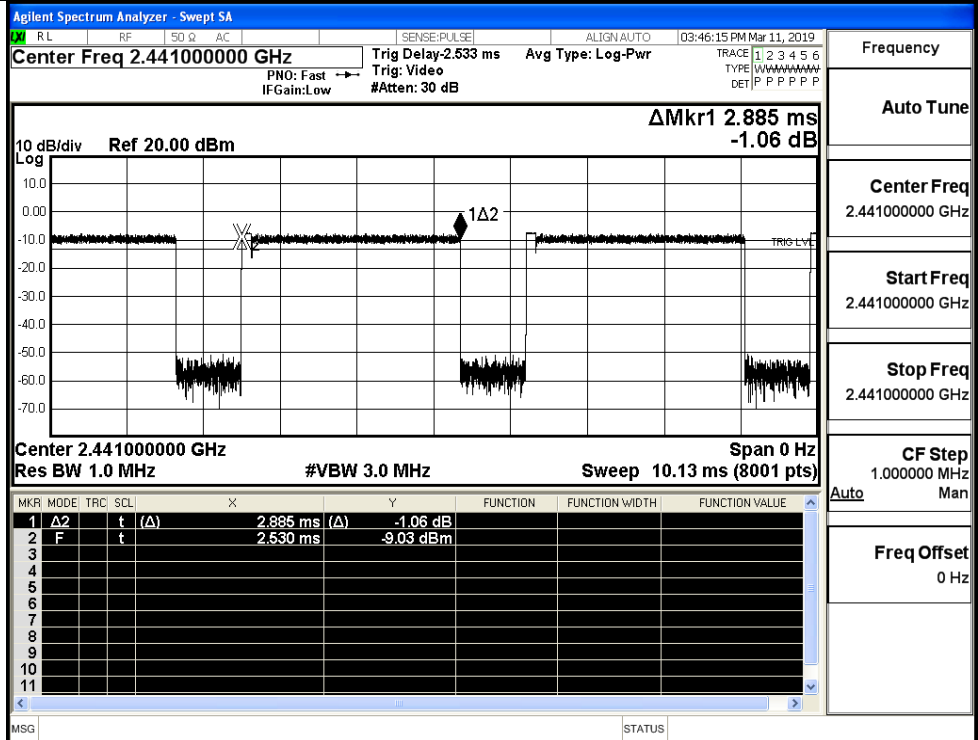
$\pi/4$ DQPSK  
\_2DH5/HCH



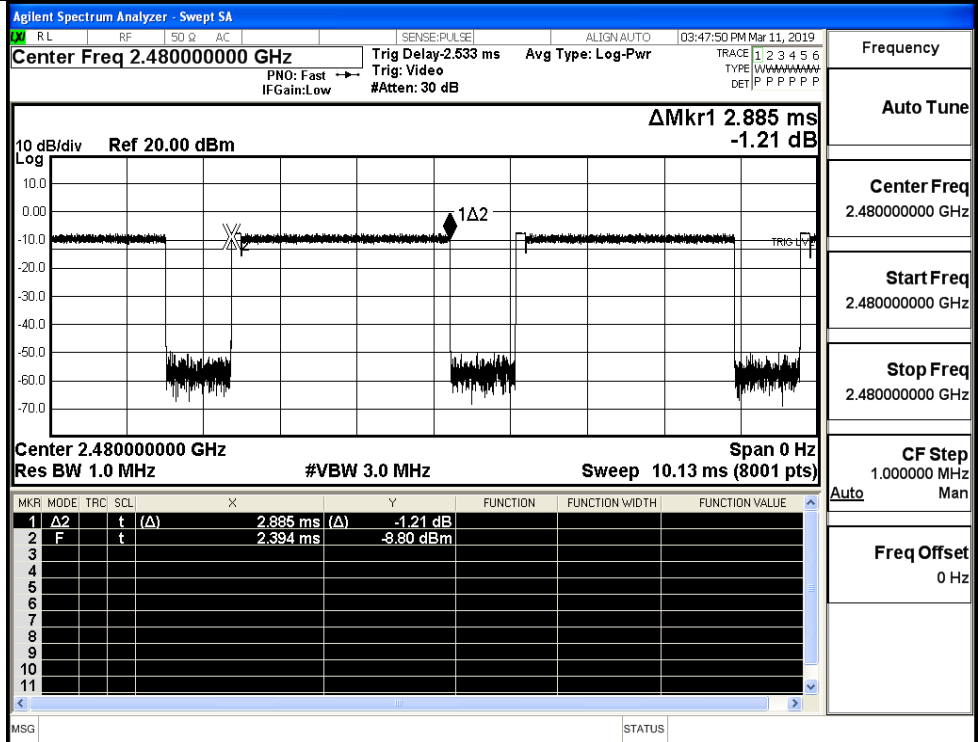
8DPSK\_3DH5/LCH



8DPSK\_3DH5/MCH



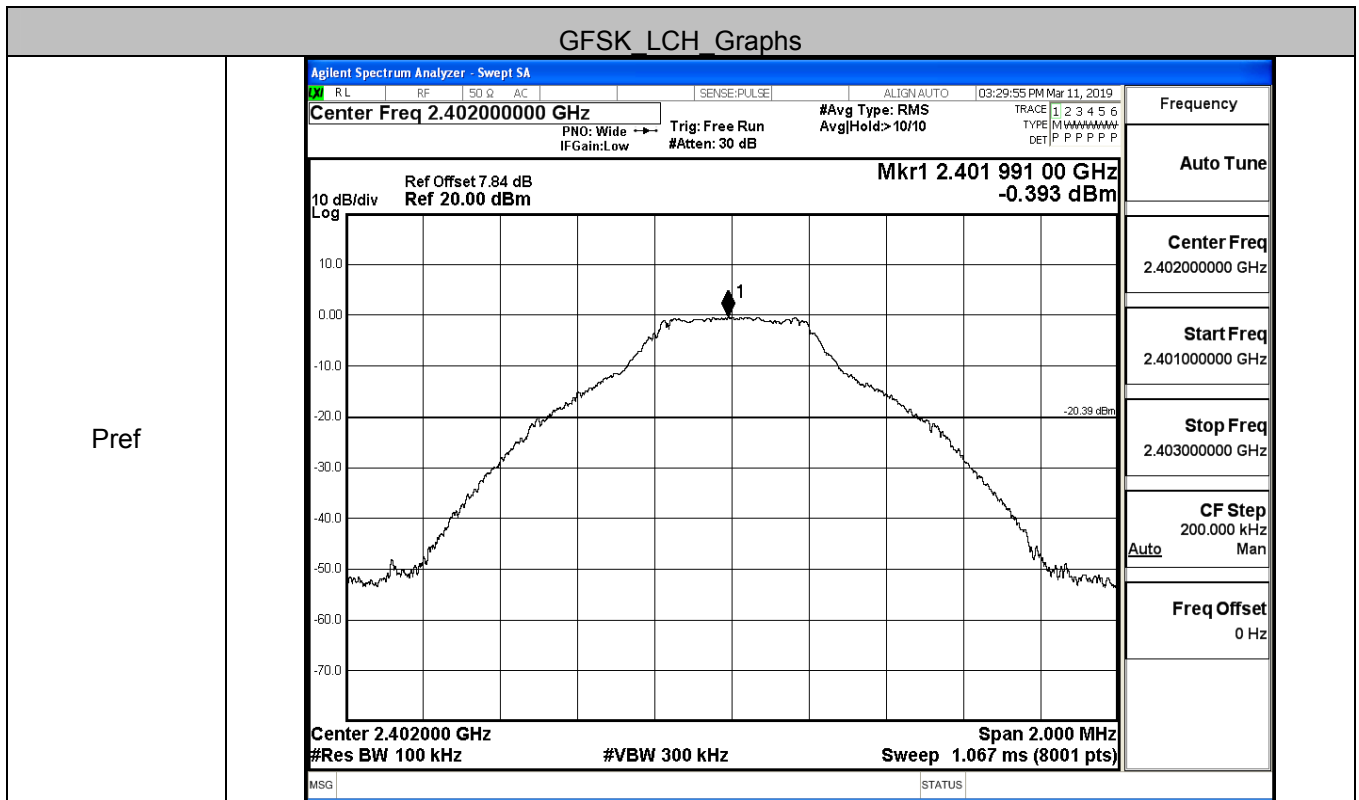
8DPSK\_3DH5/HCH



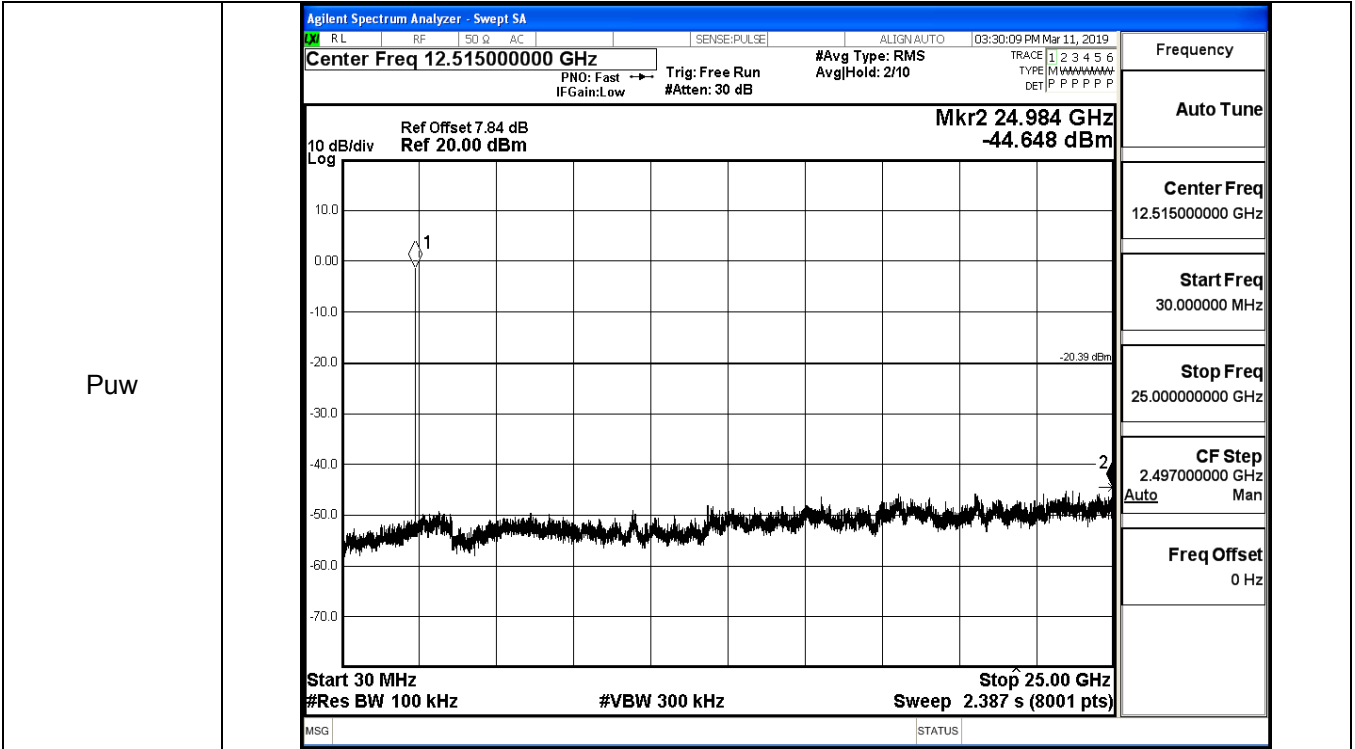
**A.6 RF Conducted Spurious Emissions**

| Mode          | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK          | LCH     | -0.393     | -44.648          | -20.393     | PASS    |
|               | MCH     | 0.864      | -44.409          | -19.136     | PASS    |
|               | HCH     | 0.879      | -44.546          | -19.121     | PASS    |
| $\pi/4$ DQPSK | LCH     | -0.494     | -30.757          | -20.494     | PASS    |
|               | MCH     | 0.333      | -45.374          | -19.667     | PASS    |
|               | HCH     | 0.181      | -45.157          | -19.819     | PASS    |
| 8DPSK         | LCH     | -0.858     | -44.803          | -20.858     | PASS    |
|               | MCH     | 0.169      | -45.456          | -19.831     | PASS    |
|               | HCH     | 0.053      | -45.443          | -19.947     | PASS    |

GFSK LCH Graphs

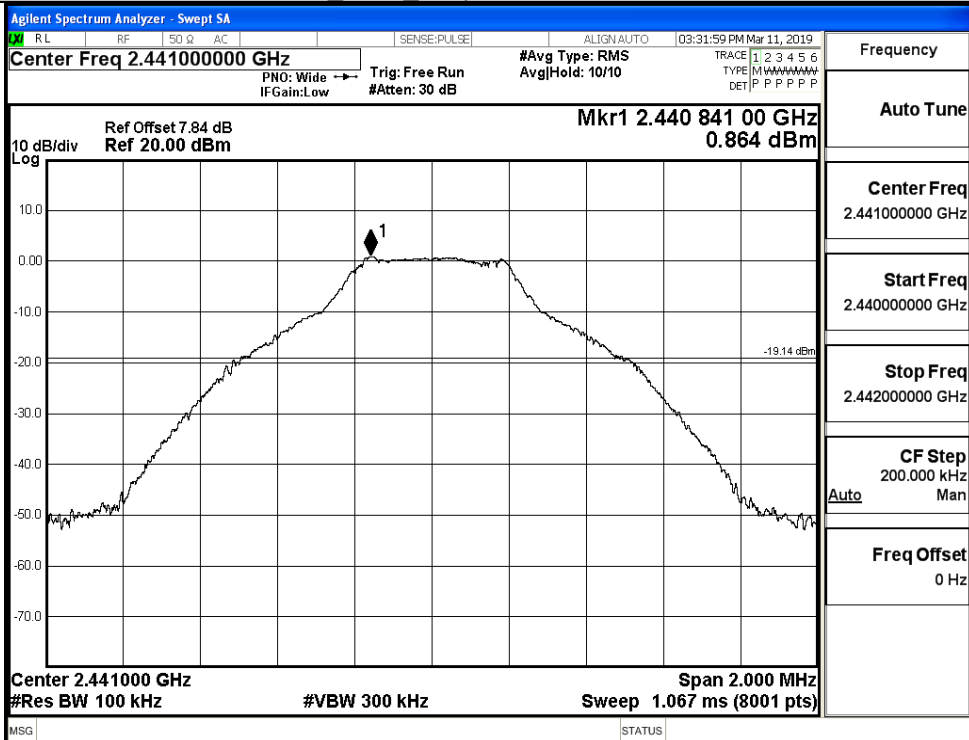




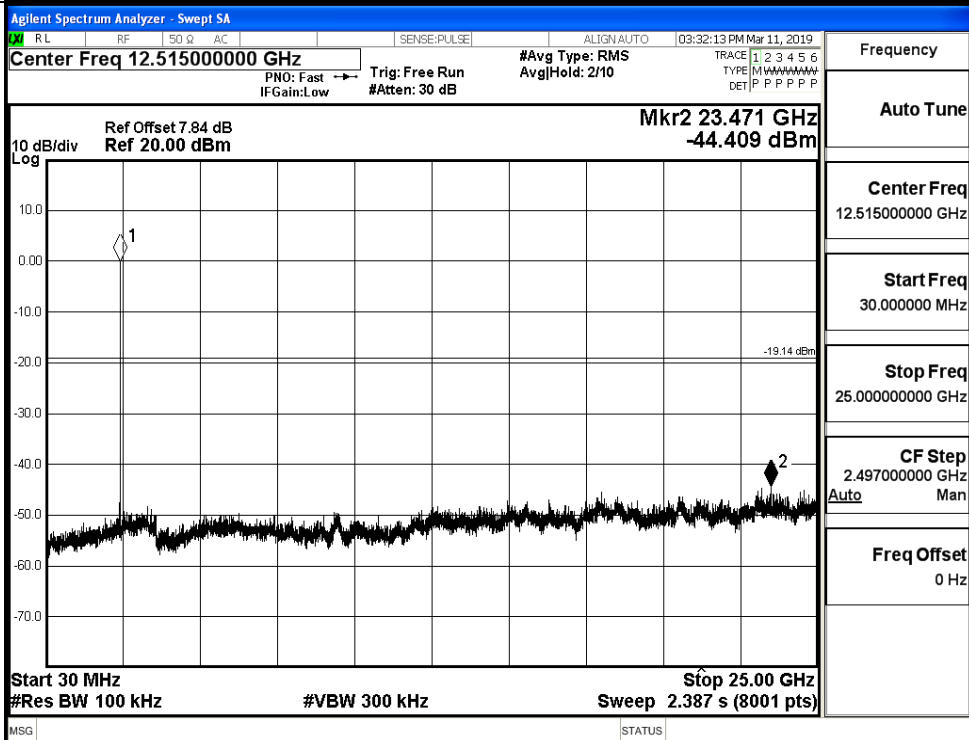


GFSK\_MCH\_Graphs

Pref

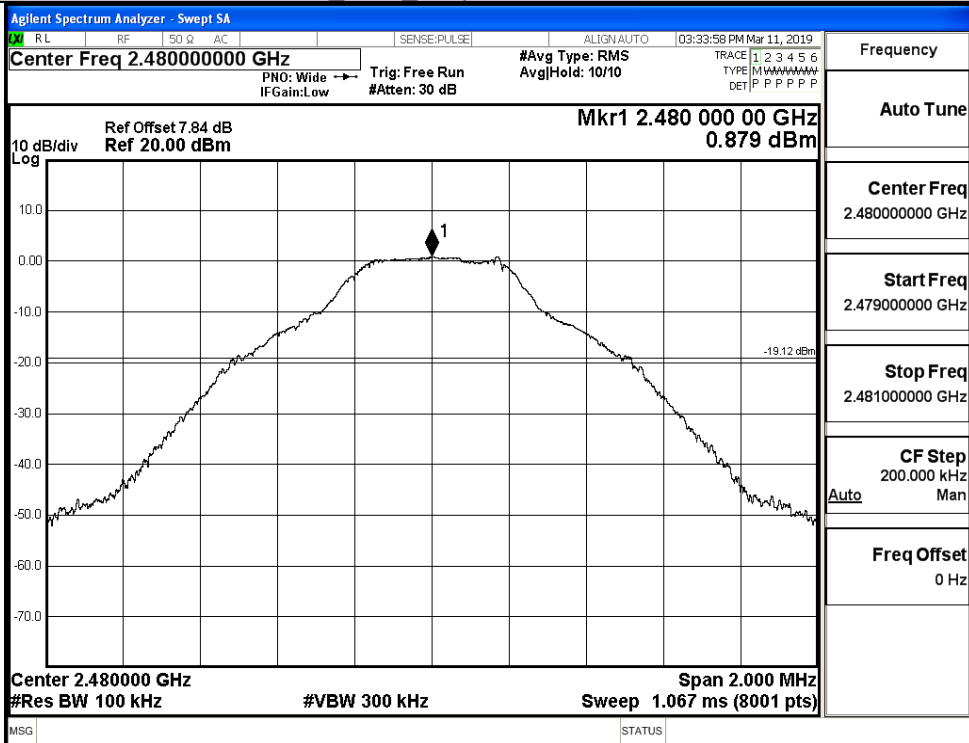


Puw

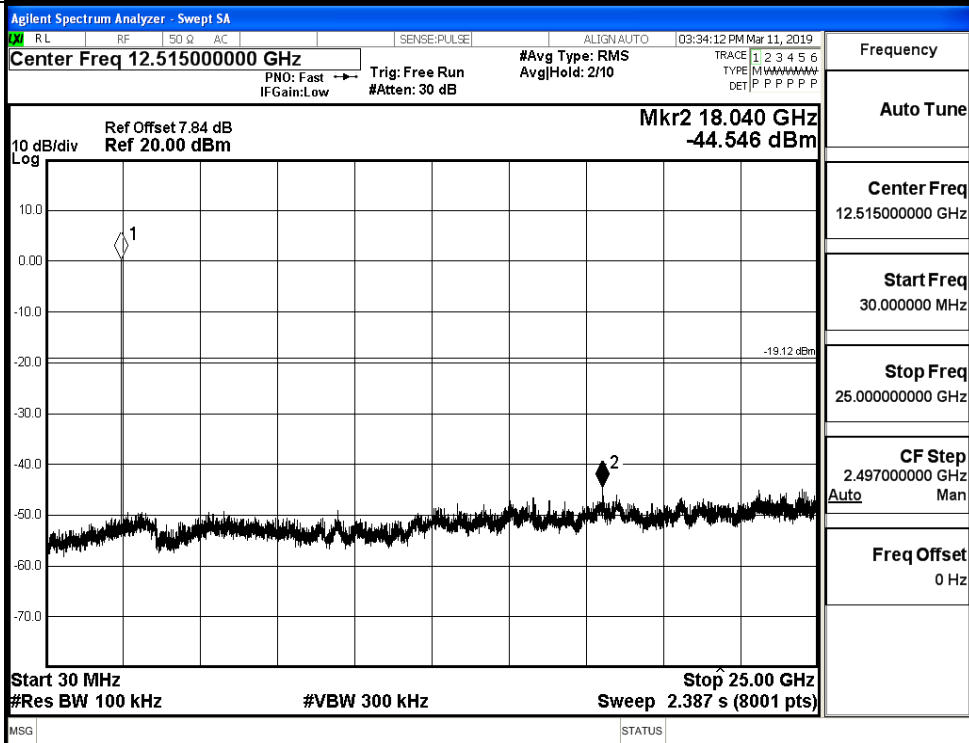


GFSK\_HCH\_Graphs

Pref

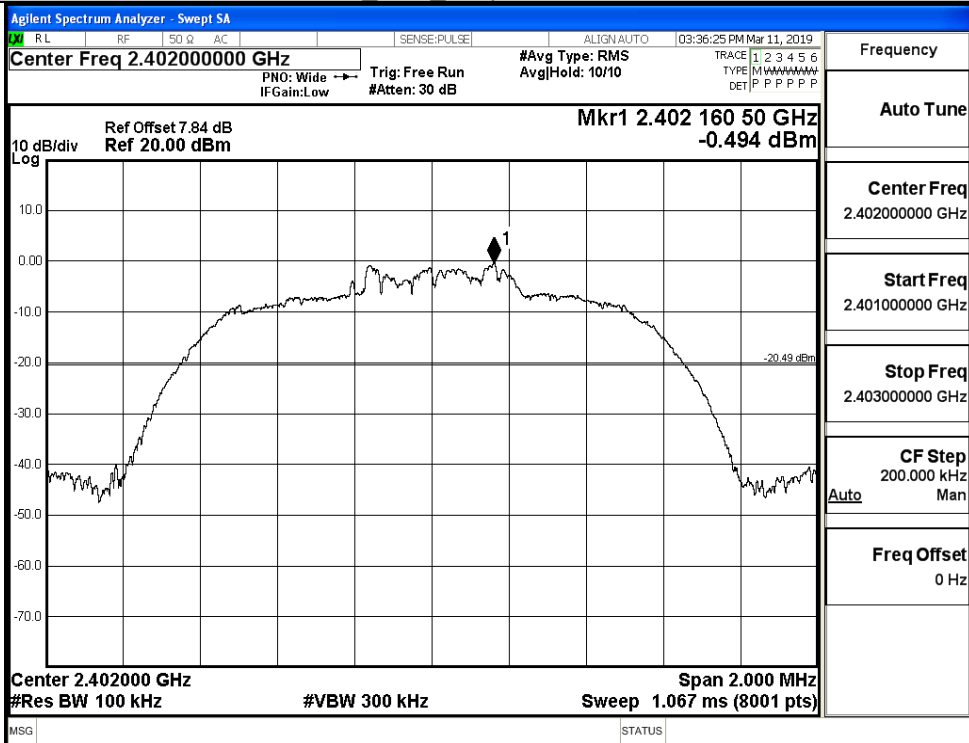


Puw

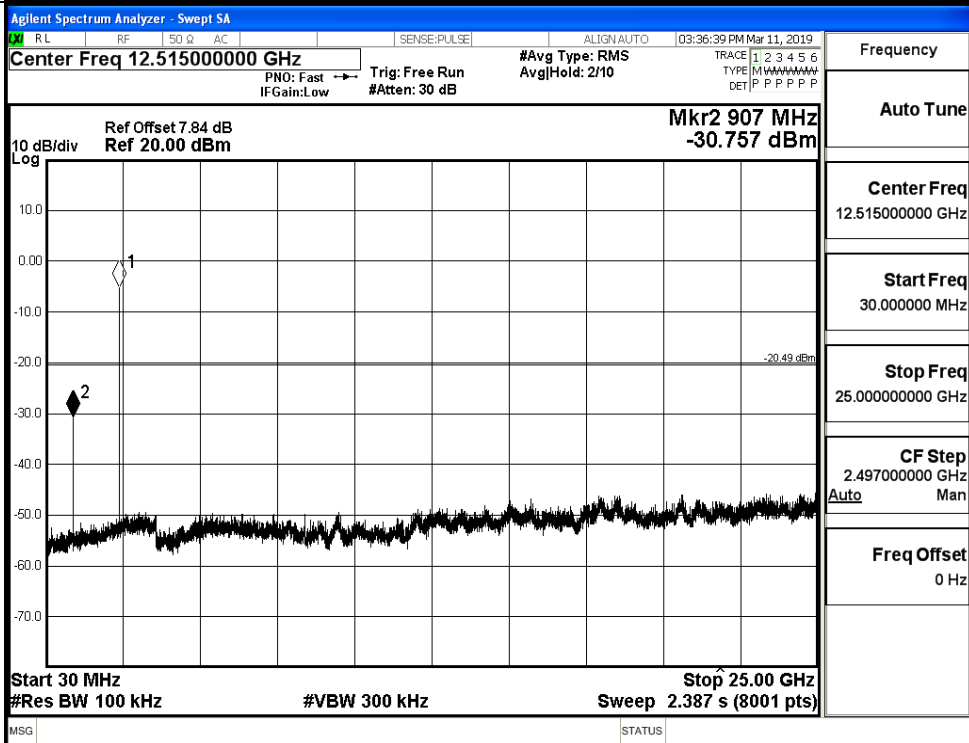


$\pi/4$ DQPSK\_LCH\_Graphs

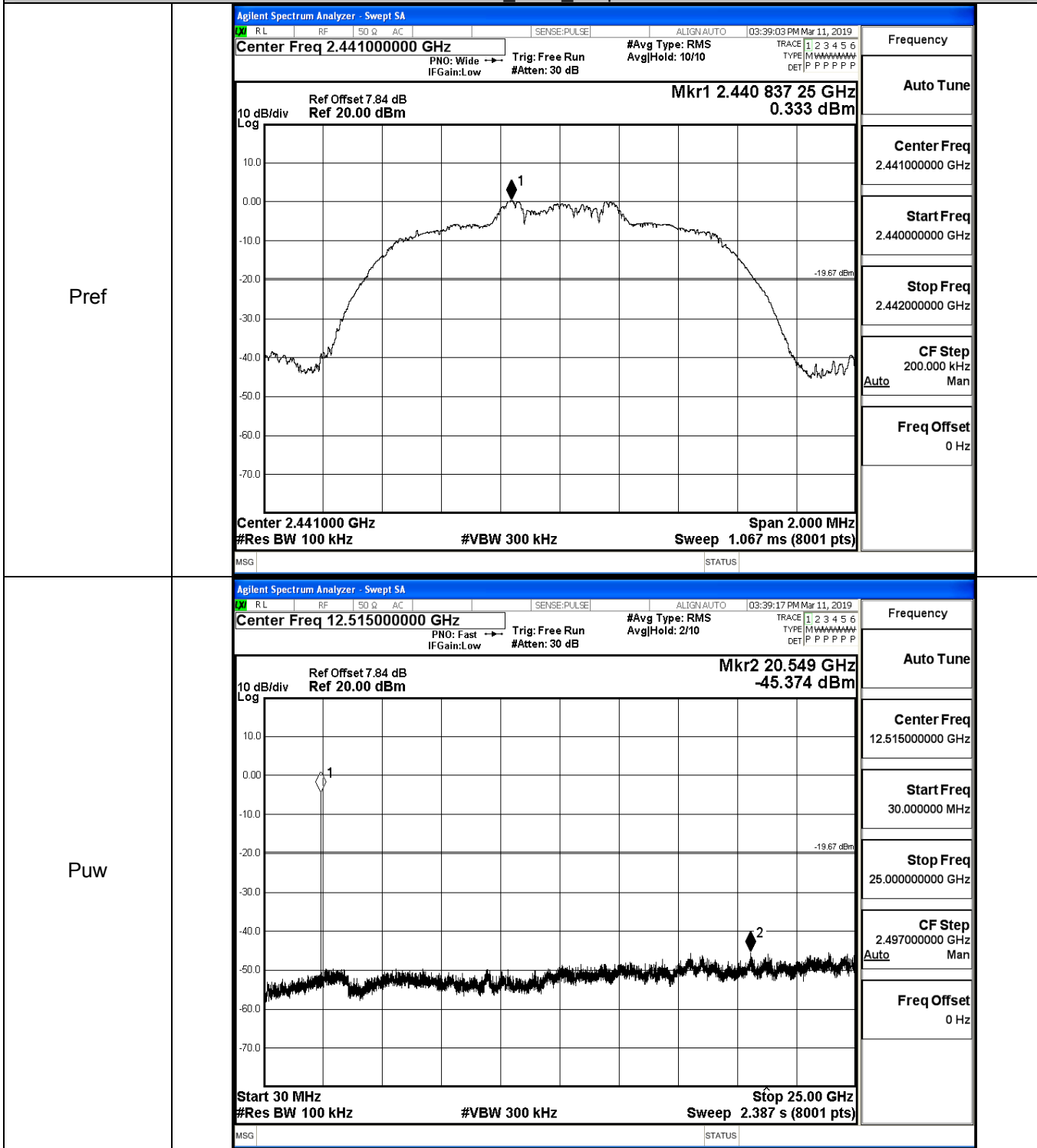
Pref



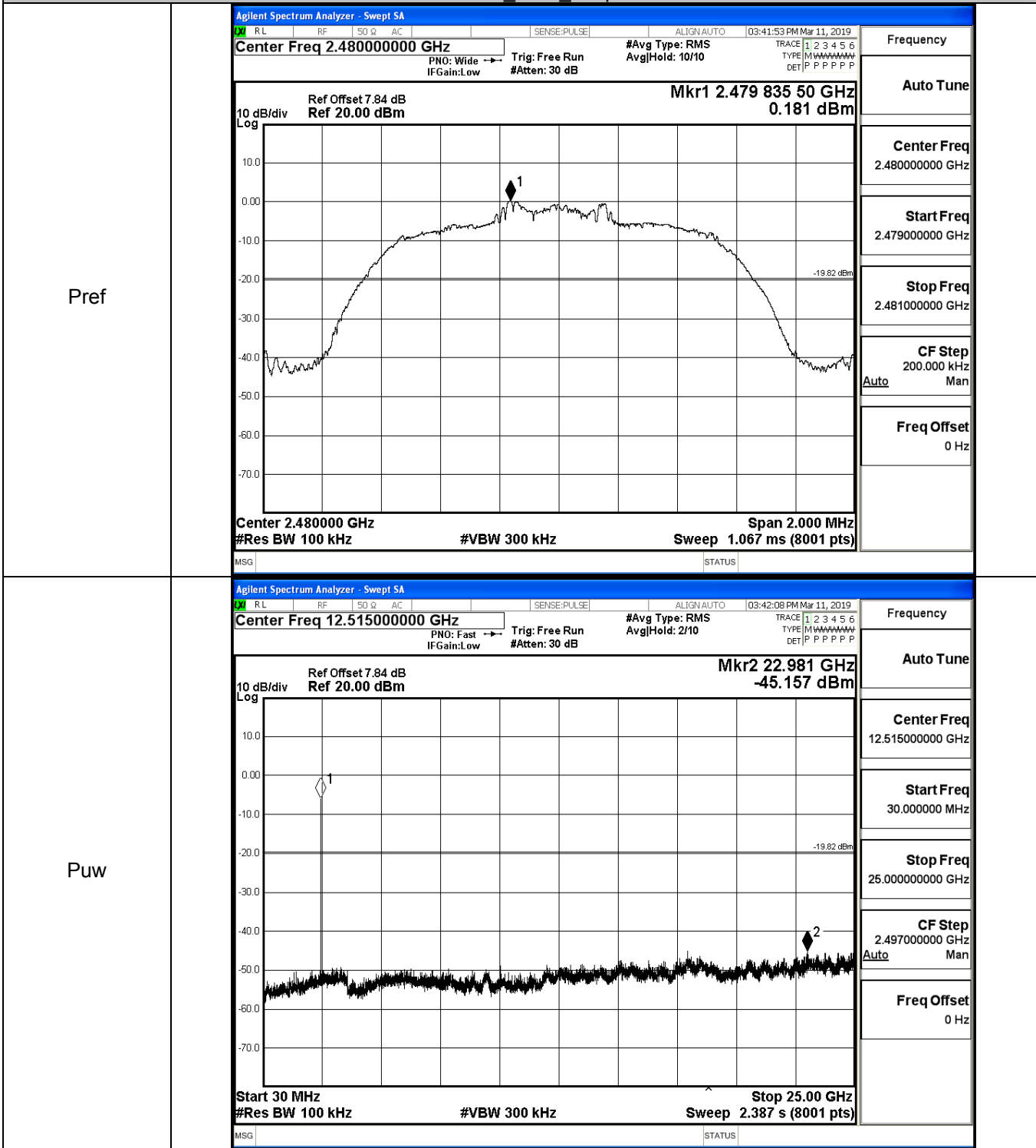
Puw



$\pi/4$ DQPSK\_MCH\_Graphs

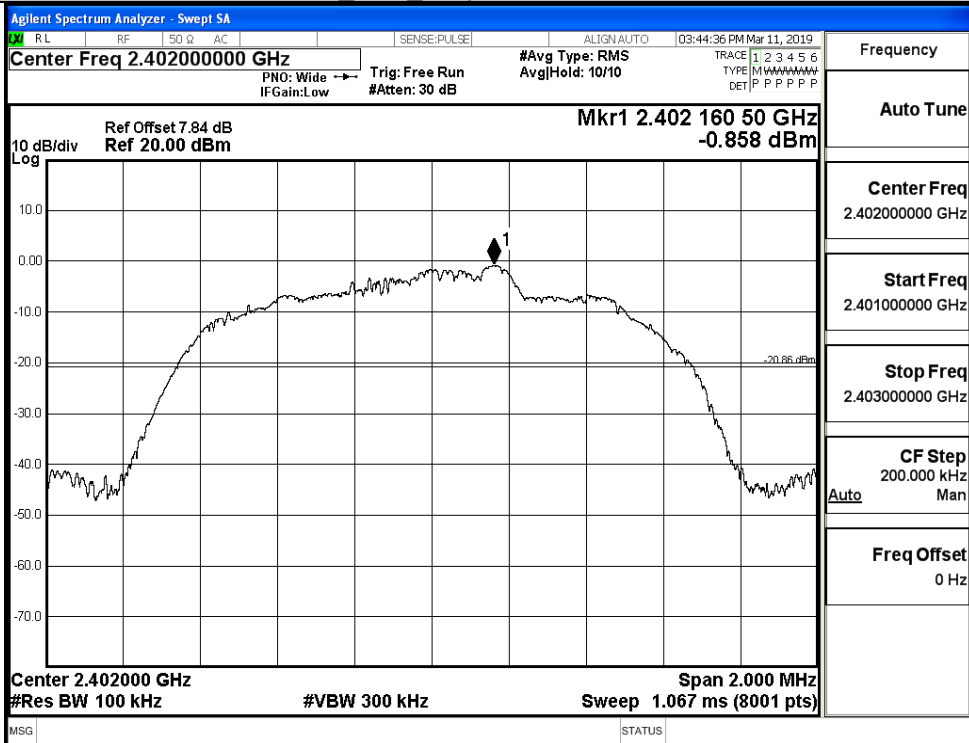


$\pi/4$ DQPSK\_HCH\_Graphs

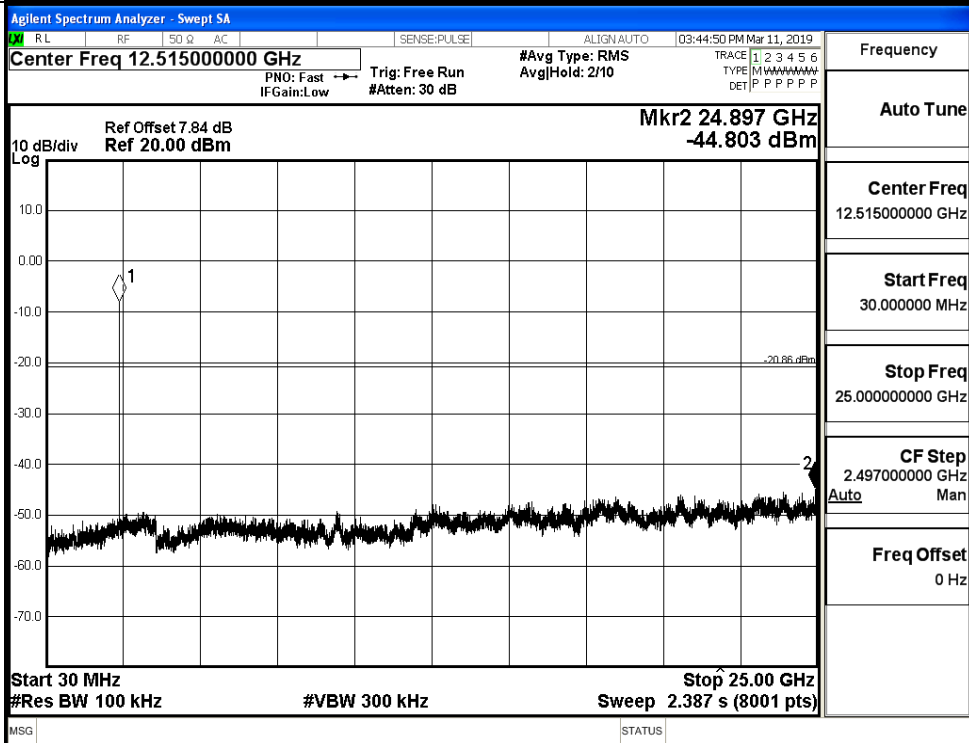


8DPSK\_LCH\_Graphs

Pref

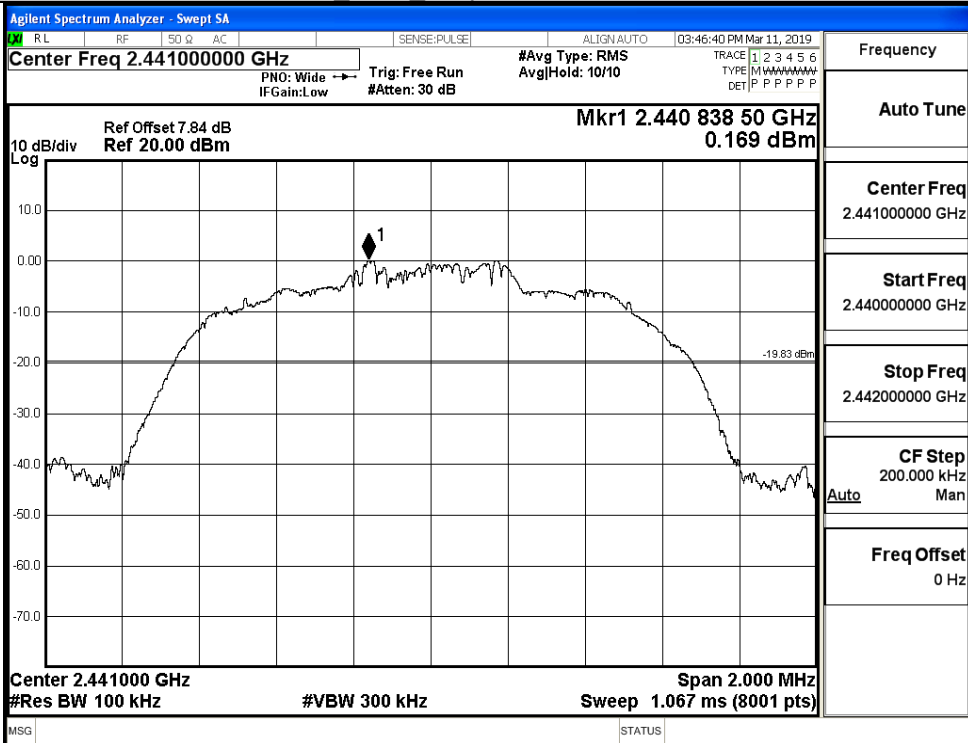


Puw

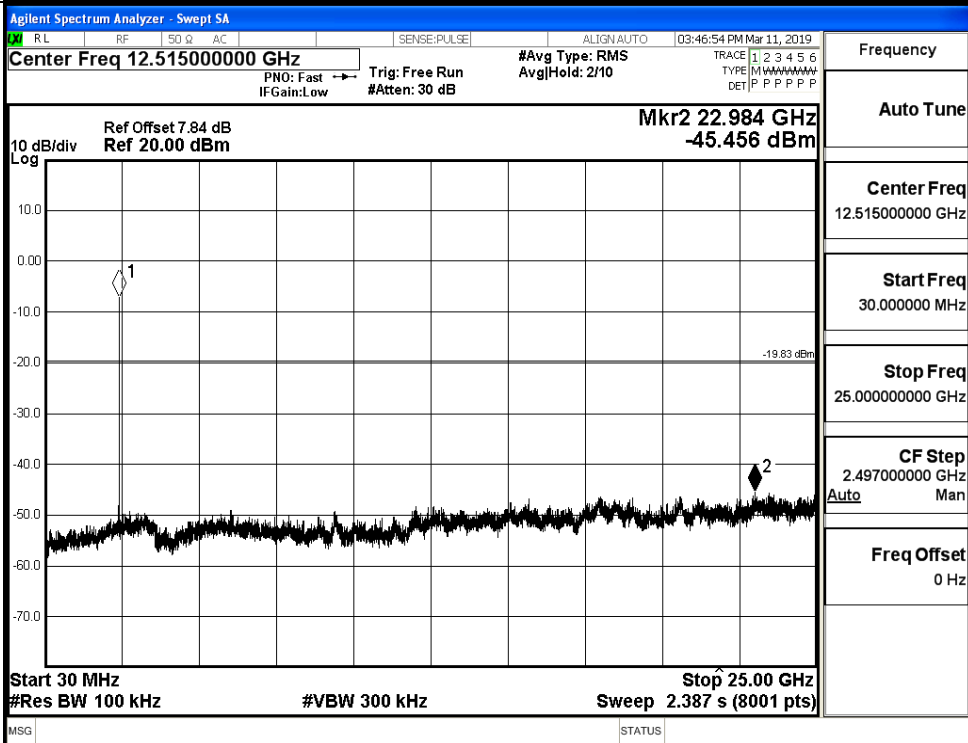


8DPSK\_MCH\_Graphs

Pref



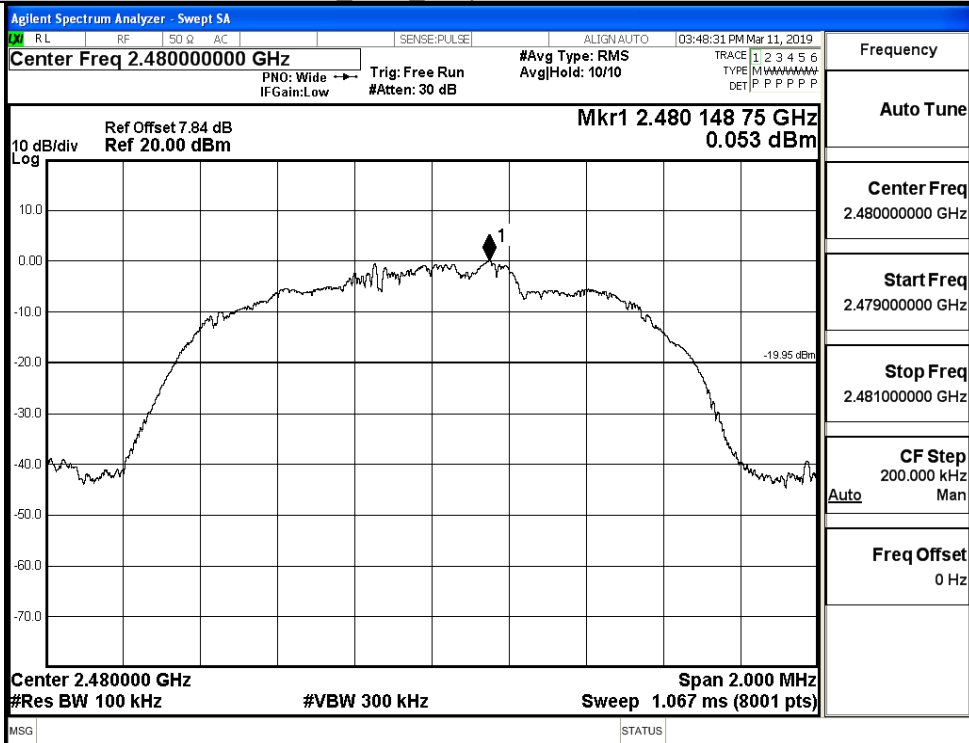
Puw



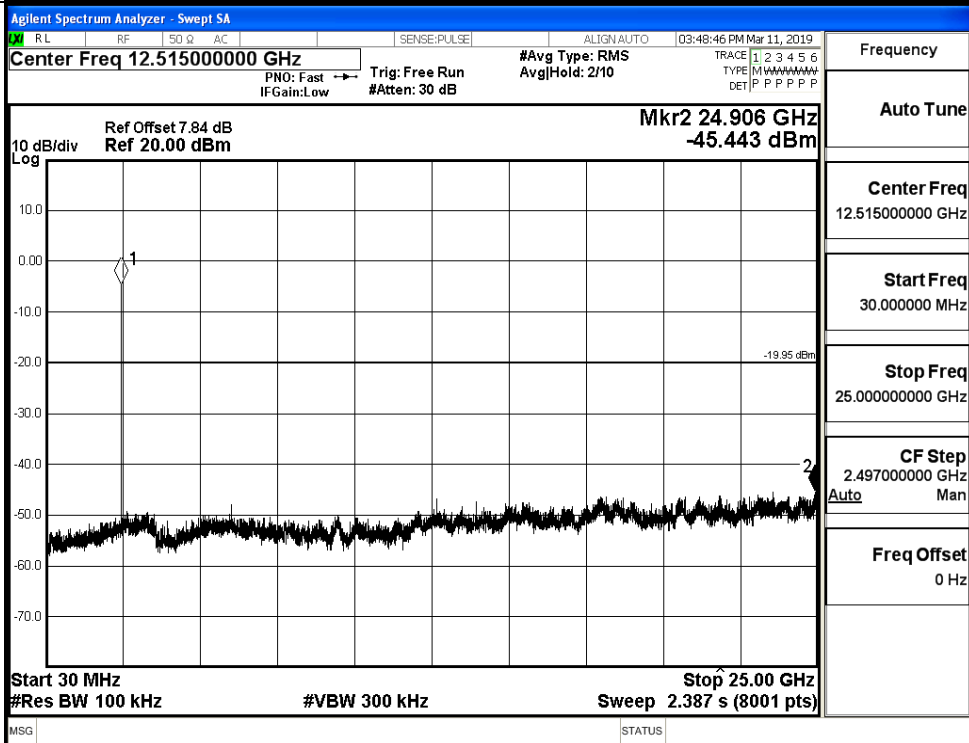


8DPSK\_HCH\_Graphs

Pref



Puw

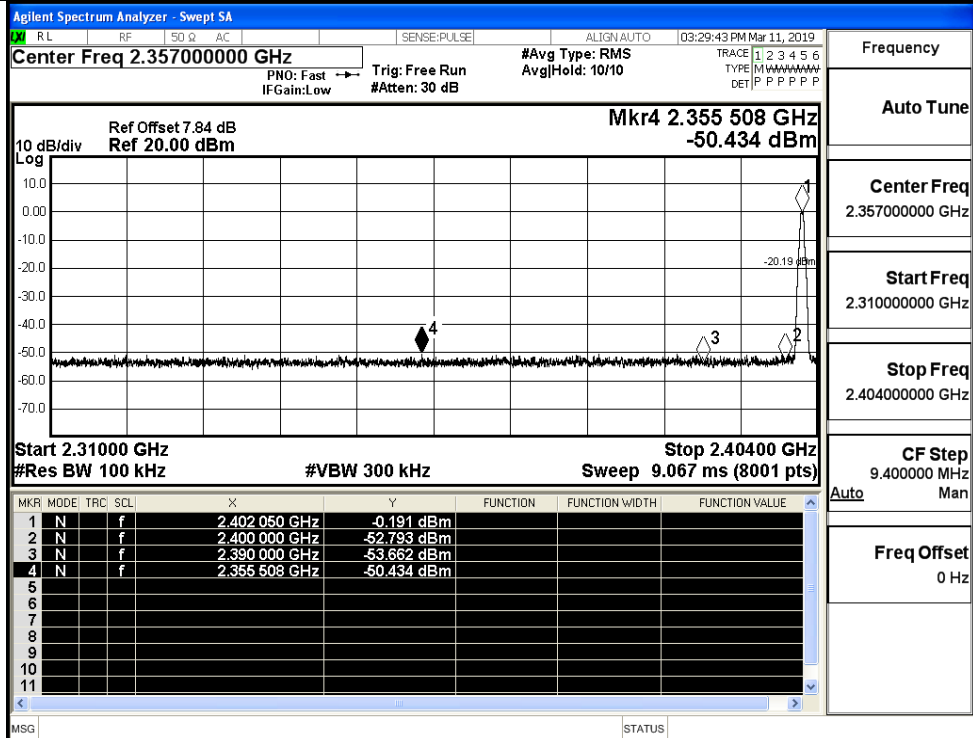


## A.7 Band-edge for RF Conducted Emissions

| Mode          | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | -0.191              | Off               | -50.434                  | -20.19      | PASS    |
|               |         |                         | 0.036               | On                | -49.516                  | -19.96      | PASS    |
|               | HCH     | 2480                    | 1.130               | Off               | -49.561                  | -18.87      | PASS    |
|               |         |                         | 1.000               | On                | -49.933                  | -19         | PASS    |
| $\pi/4$ DQPSK | LCH     | 2402                    | -0.095              | Off               | -50.522                  | -20.1       | PASS    |
|               |         |                         | -0.514              | On                | -49.289                  | -20.51      | PASS    |
|               | HCH     | 2480                    | 1.892               | Off               | -49.844                  | -18.11      | PASS    |
|               |         |                         | 0.542               | On                | -49.252                  | -19.46      | PASS    |
| 8DPSK         | LCH     | 2402                    | -2.057              | Off               | -49.930                  | -22.06      | PASS    |
|               |         |                         | -0.116              | On                | -49.733                  | -20.12      | PASS    |
|               | HCH     | 2480                    | 0.295               | Off               | -50.916                  | -19.71      | PASS    |
|               |         |                         | 0.628               | On                | -48.982                  | -19.37      | PASS    |

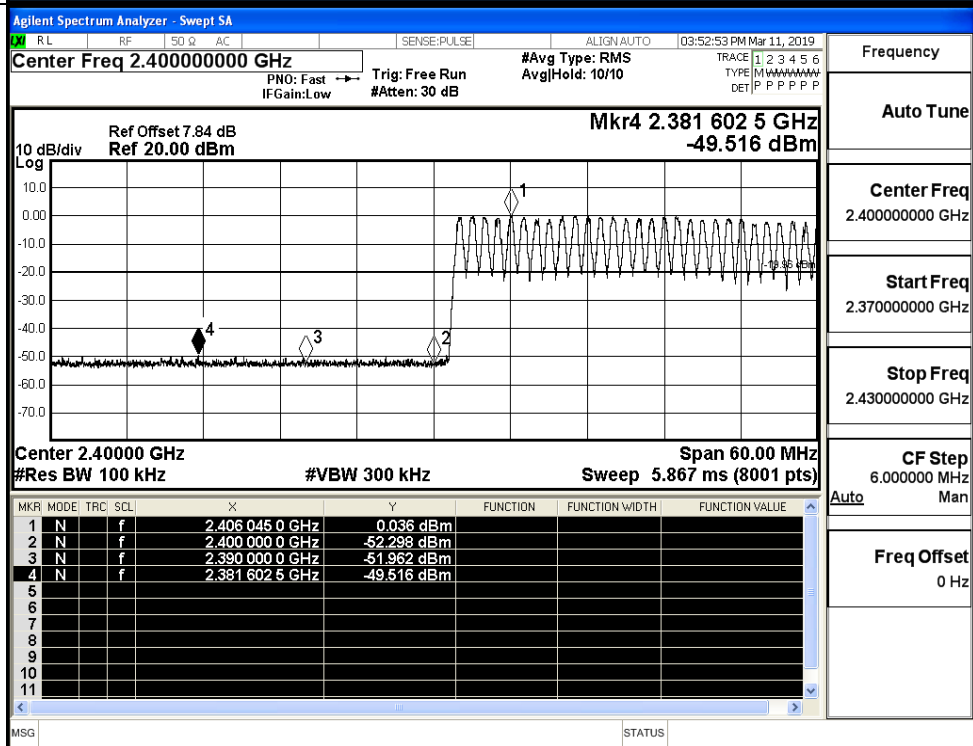
Test Graphs

GFSK/LCH/No Hop



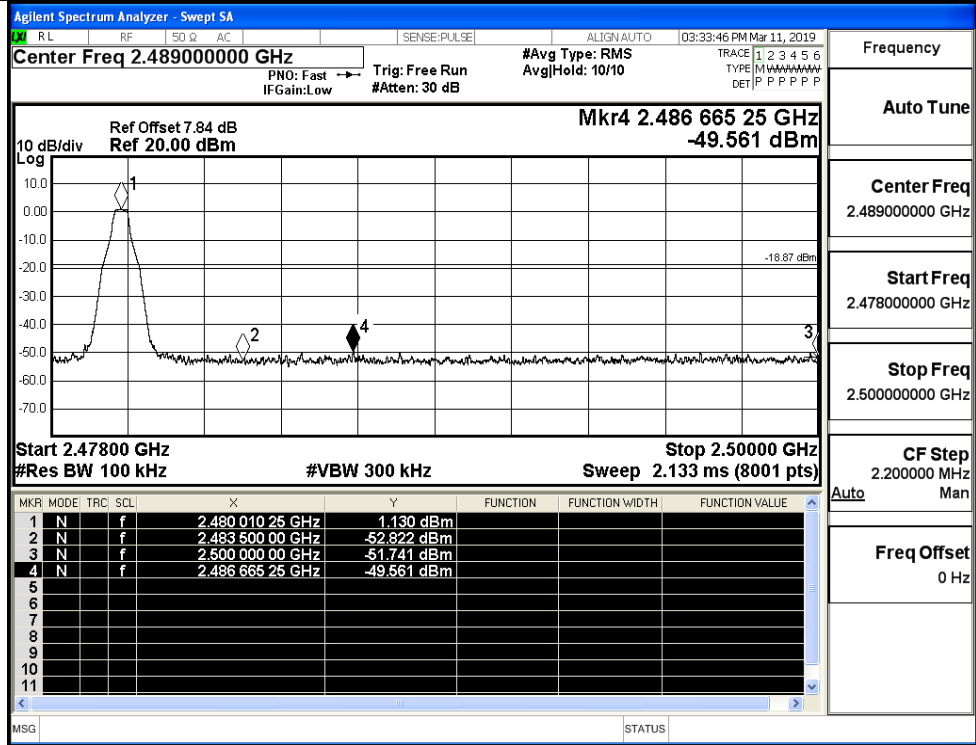
|             |                 |
|-------------|-----------------|
| Frequency   | Auto Tune       |
| Center Freq | 2.357000000 GHz |
| Start Freq  | 2.310000000 GHz |
| Stop Freq   | 2.404000000 GHz |
| CF Step     | 9.400000 MHz    |
| Auto        | Man             |
| Freq Offset | 0 Hz            |

GFSK/LCH/Hop

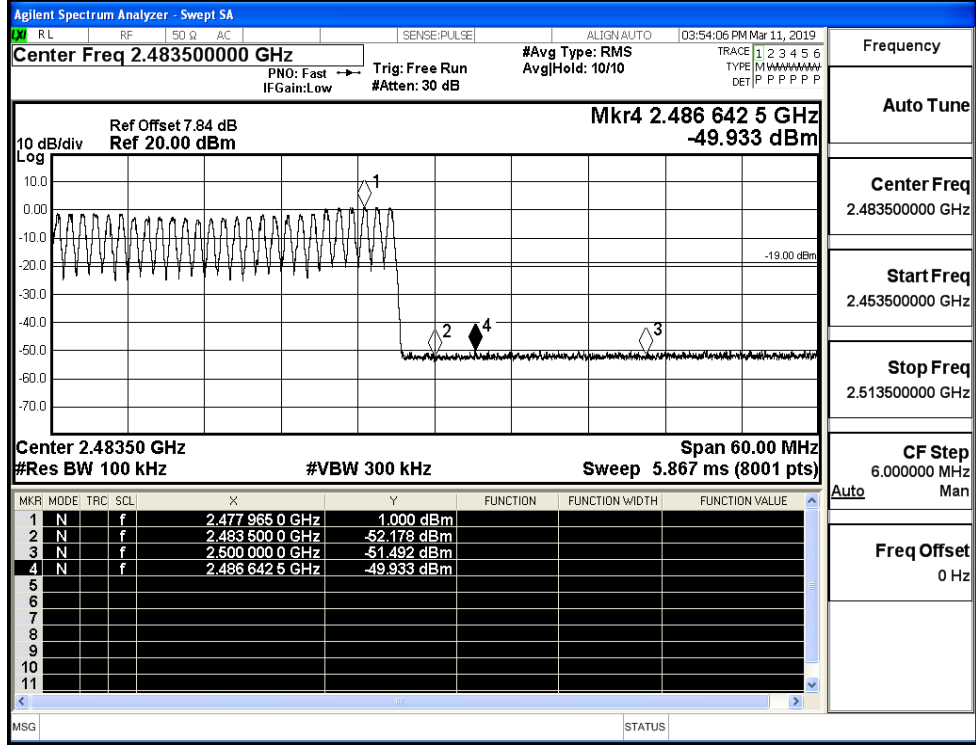


|             |                 |
|-------------|-----------------|
| Frequency   | Auto Tune       |
| Center Freq | 2.400000000 GHz |
| Start Freq  | 2.370000000 GHz |
| Stop Freq   | 2.430000000 GHz |
| CF Step     | 6.000000 MHz    |
| Auto        | Man             |
| Freq Offset | 0 Hz            |

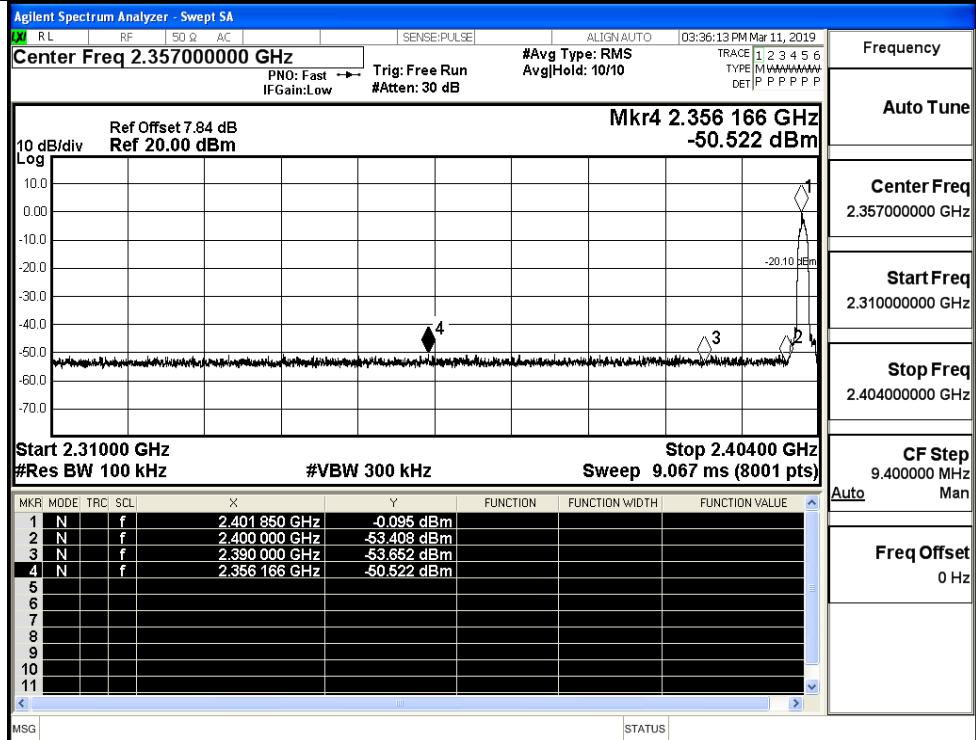
GFSK/HCH/No Hop



GFSK/HCH/Hop

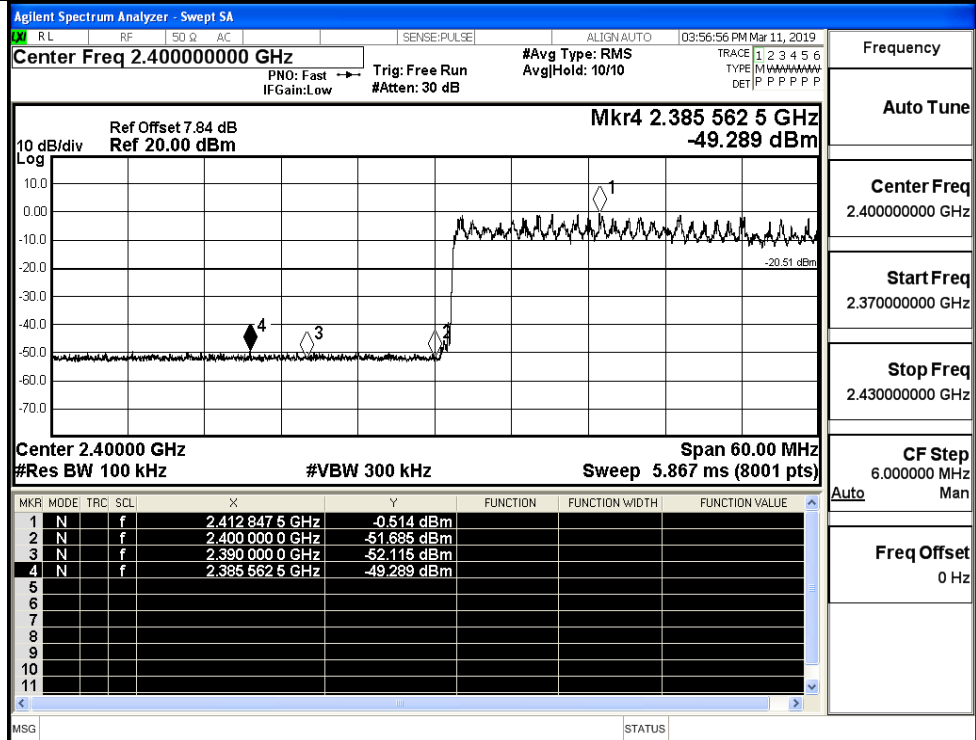


$\pi/4$ DQPSK/LCH/No  
Hop



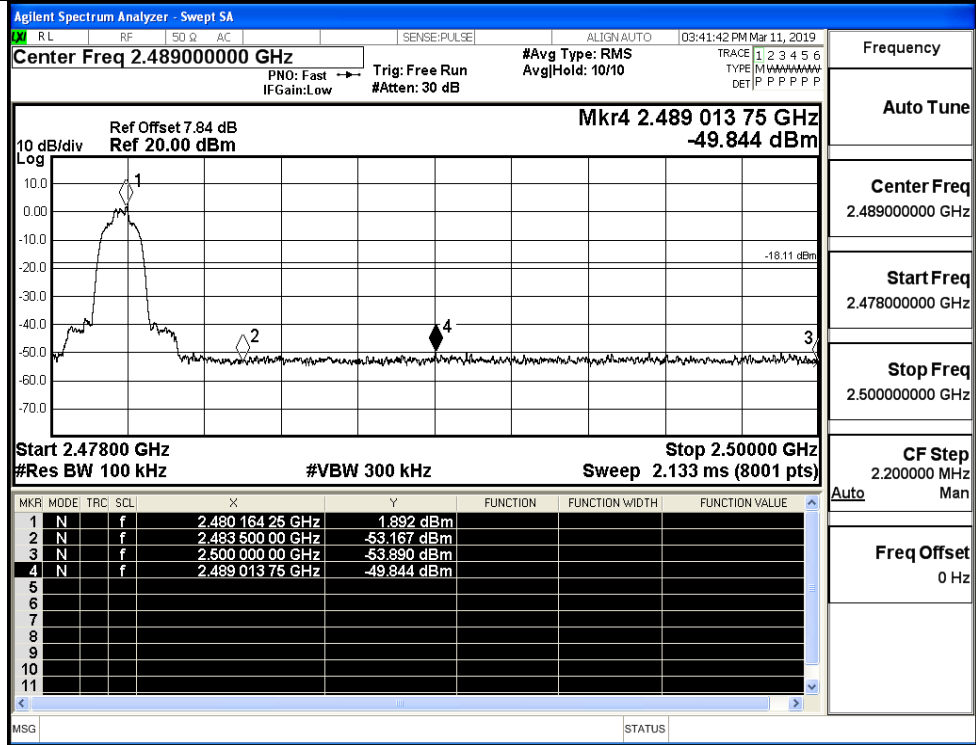
|             |                 |
|-------------|-----------------|
| Frequency   |                 |
| Auto Tune   |                 |
| Center Freq | 2.357000000 GHz |
| Start Freq  | 2.310000000 GHz |
| Stop Freq   | 2.404000000 GHz |
| CF Step     | 9.400000 MHz    |
| Auto        | Man             |
| Freq Offset | 0 Hz            |

$\pi/4$ DQPSK/LCH/Hop



|             |                 |
|-------------|-----------------|
| Frequency   |                 |
| Auto Tune   |                 |
| Center Freq | 2.400000000 GHz |
| Start Freq  | 2.370000000 GHz |
| Stop Freq   | 2.430000000 GHz |
| CF Step     | 6.000000 MHz    |
| Auto        | Man             |
| Freq Offset | 0 Hz            |

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



Frequency

Auto Tune

Center Freq  
2.489000000 GHz

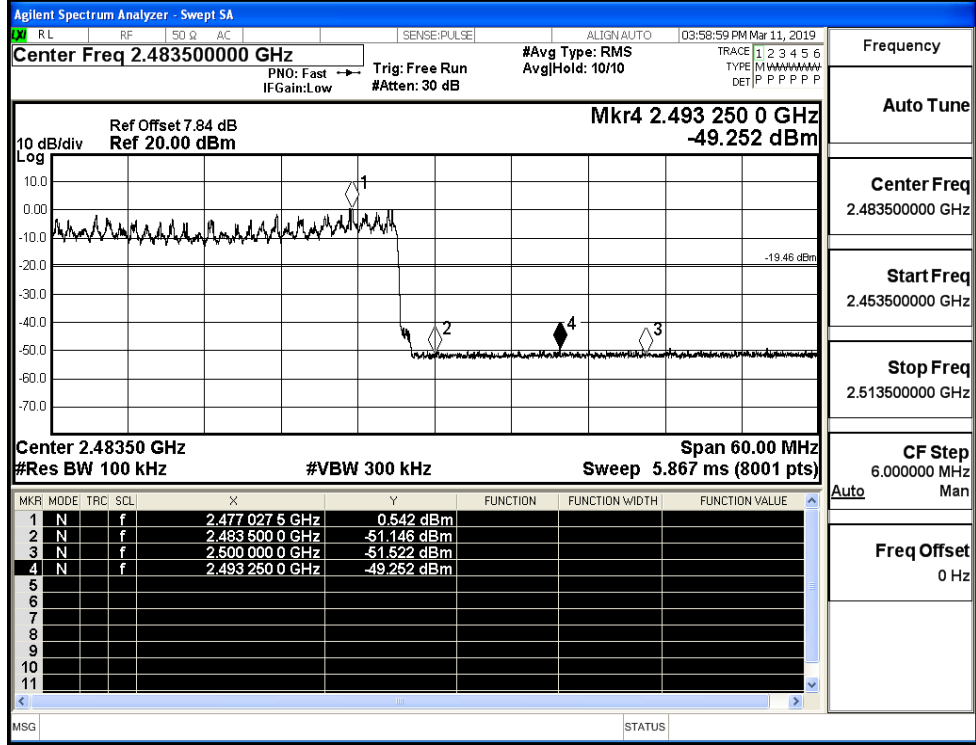
Start Freq  
2.478000000 GHz

Stop Freq  
2.500000000 GHz

CF Step  
2.200000 MHz

Freq Offset  
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq  
2.483500000 GHz

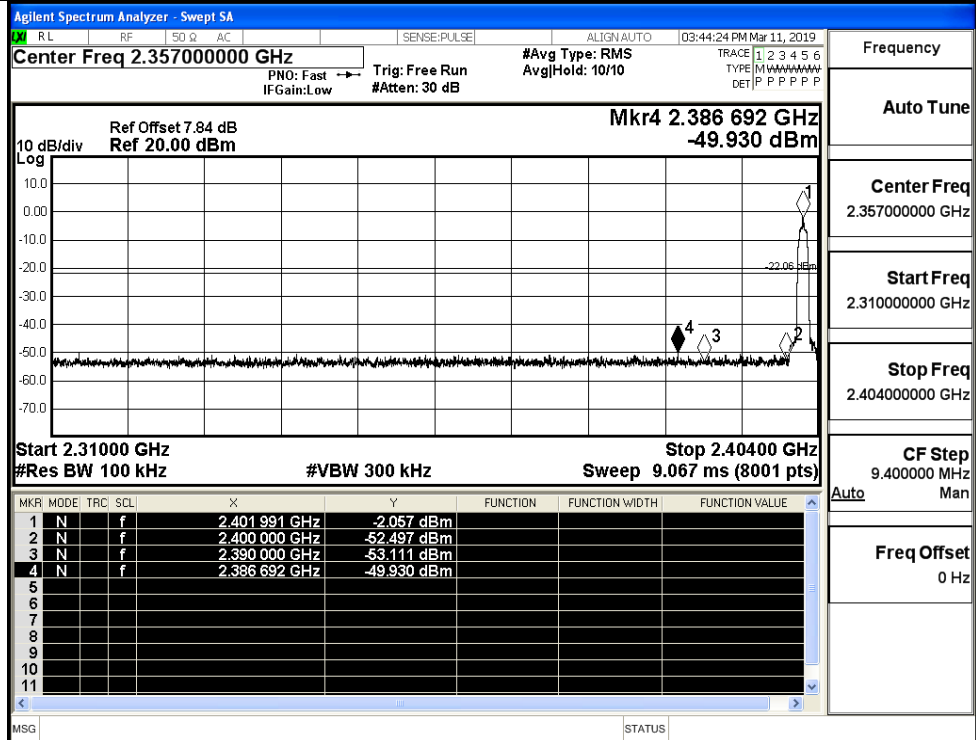
Start Freq  
2.453500000 GHz

Stop Freq  
2.513500000 GHz

CF Step  
6.000000 MHz

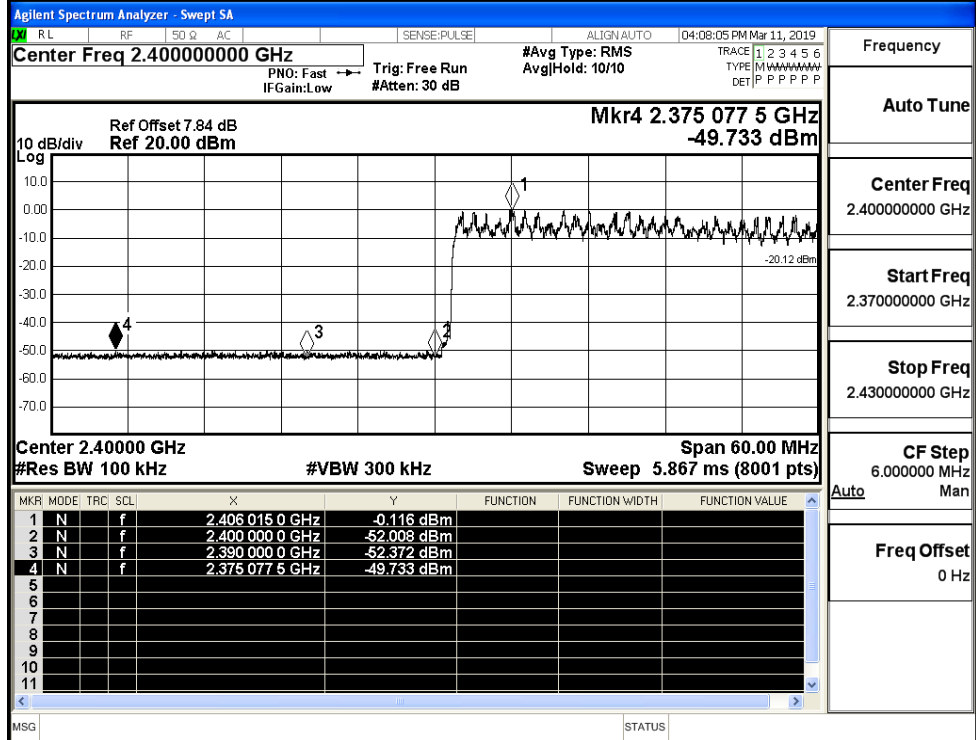
Freq Offset  
0 Hz

8DPSK/LCH/No Hop



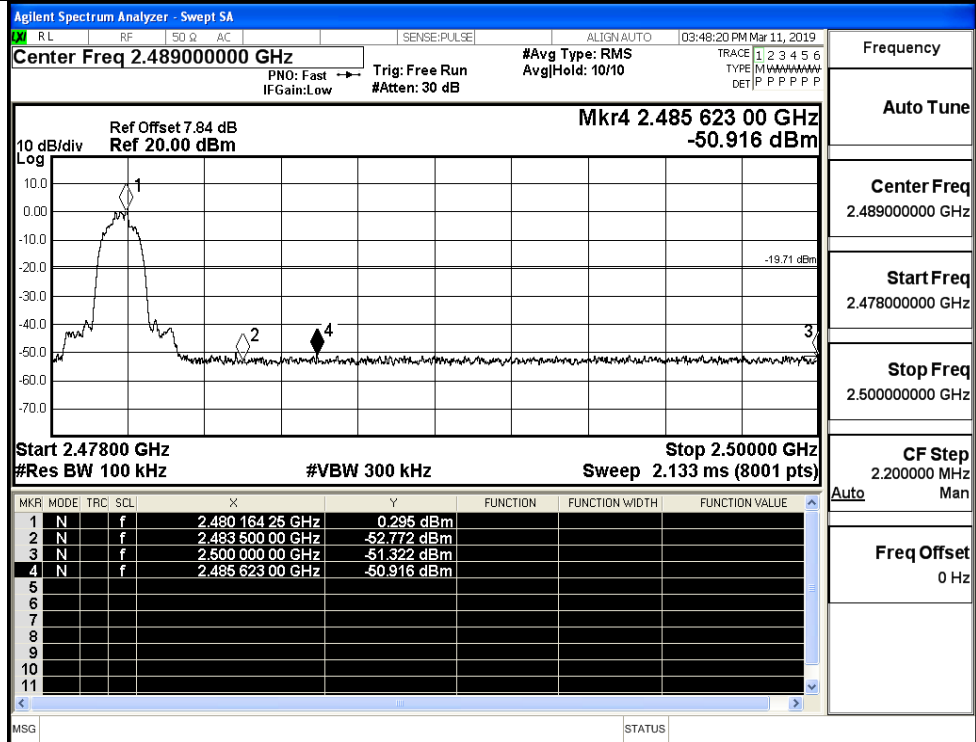
Frequency  
Auto Tune  
Center Freq  
2.357000000 GHz  
Start Freq  
2.310000000 GHz  
Stop Freq  
2.404000000 GHz  
CF Step  
9.400000 MHz  
Auto Man  
Freq Offset  
0 Hz

8DPSK/LCH/Hop



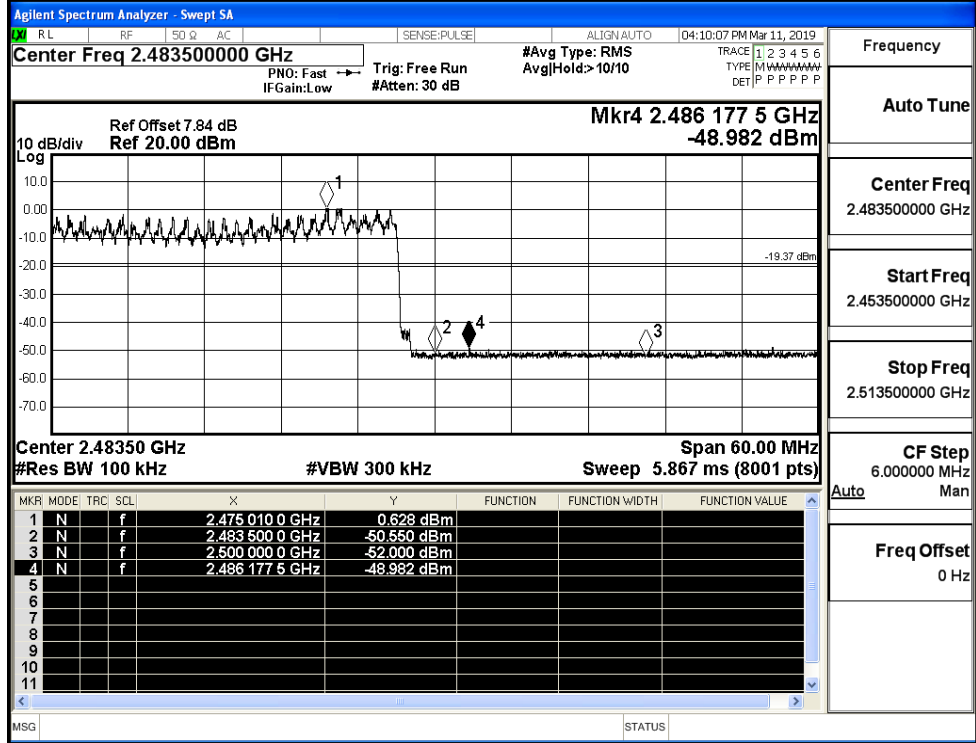
Frequency  
Auto Tune  
Center Freq  
2.400000000 GHz  
Start Freq  
2.370000000 GHz  
Stop Freq  
2.430000000 GHz  
CF Step  
6.000000 MHz  
Auto Man  
Freq Offset  
0 Hz

8DPSK/HCH/No Hop



|             |                 |
|-------------|-----------------|
| Frequency   | 2.489000000 GHz |
| Auto Tune   |                 |
| Center Freq | 2.489000000 GHz |
| Start Freq  | 2.478000000 GHz |
| Stop Freq   | 2.500000000 GHz |
| CF Step     | 2.200000 MHz    |
| Freq Offset | 0 Hz            |

8DPSK/HCH/Hop



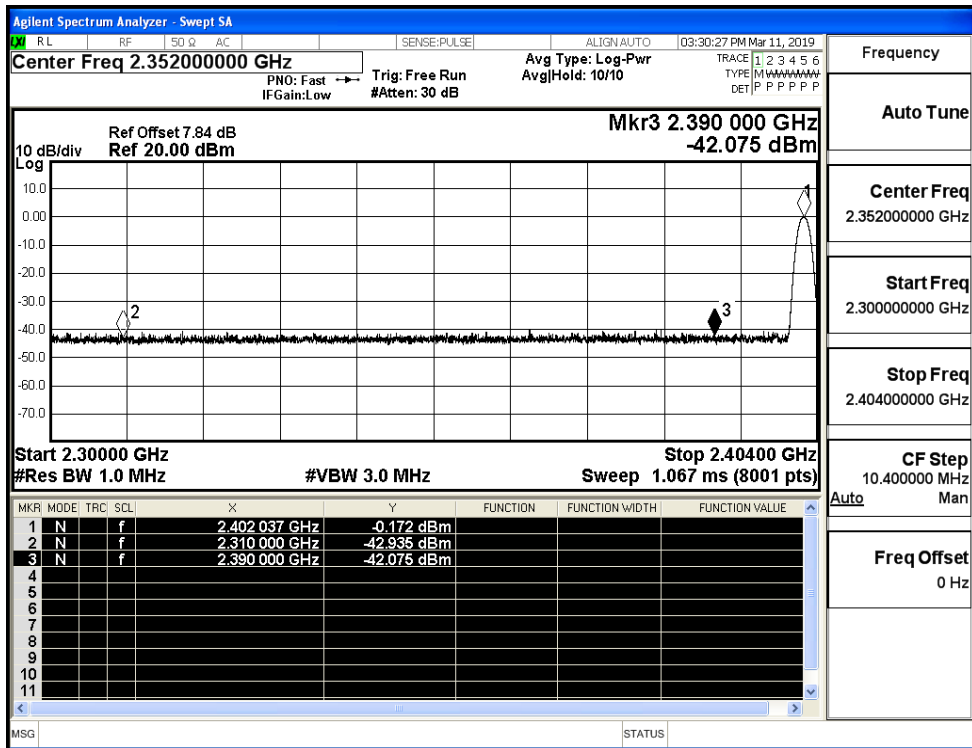
|             |                 |
|-------------|-----------------|
| Frequency   | 2.483500000 GHz |
| Auto Tune   |                 |
| Center Freq | 2.483500000 GHz |
| Start Freq  | 2.453500000 GHz |
| Stop Freq   | 2.513500000 GHz |
| CF Step     | 6.000000 MHz    |
| Freq Offset | 0 Hz            |



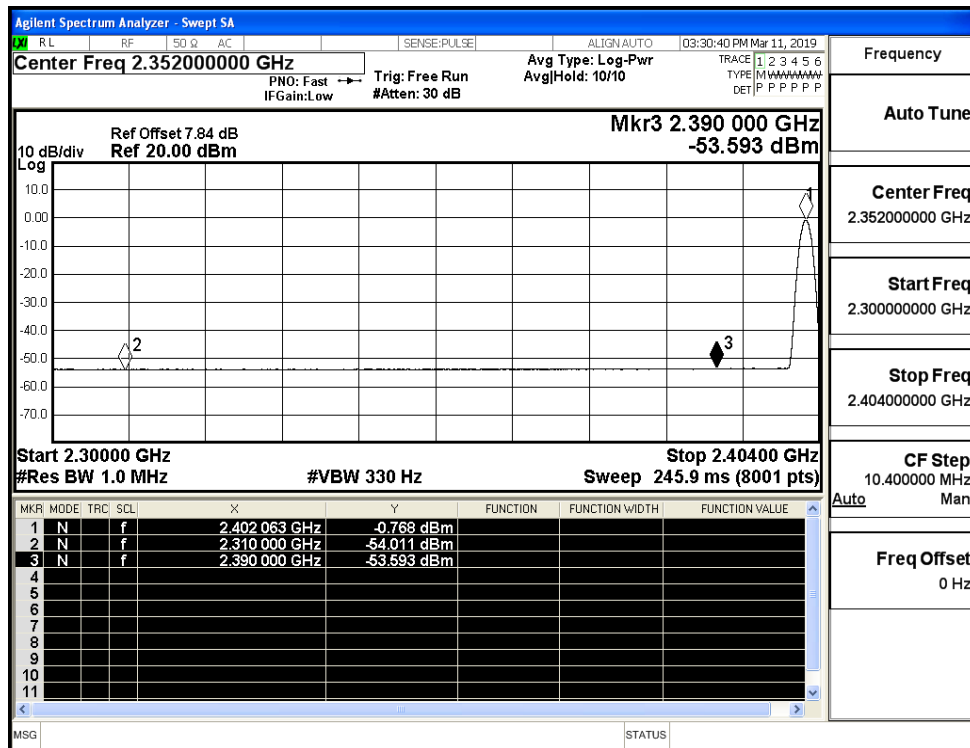
## A.8 Restrict-band band-edge measurements

| Test Mode     | Hopping | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0 | -42.94      | 2.0  | 0             | 54.32      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -54.01      | 2.0  | 0             | 43.25      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -42.08      | 2.0  | 0             | 55.18      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.59      | 2.0  | 0             | 43.66      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -43.31      | 2.0  | 0             | 53.95      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.26      | 2.0  | 0             | 44.00      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -42.94      | 2.0  | 0             | 54.31      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.20      | 2.0  | 0             | 44.06      | AV       | 54             | PASS    |
| $\pi/4$ DQPSK | Off     | 2310.0 | -41.93      | 2.0  | 0             | 55.32      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.86      | 2.0  | 0             | 43.39      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -44.52      | 2.0  | 0             | 52.74      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.67      | 2.0  | 0             | 43.59      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -42.76      | 2.0  | 0             | 54.50      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.30      | 2.0  | 0             | 43.96      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -42.62      | 2.0  | 0             | 54.63      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.35      | 2.0  | 0             | 43.91      | AV       | 54             | PASS    |
| 8DPSK         | Off     | 2310.0 | -41.49      | 2.0  | 0             | 55.77      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.84      | 2.0  | 0             | 43.42      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -42.94      | 2.0  | 0             | 54.32      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.64      | 2.0  | 0             | 43.61      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -42.70      | 2.0  | 0             | 54.56      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.31      | 2.0  | 0             | 43.95      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -42.05      | 2.0  | 0             | 55.21      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.28      | 2.0  | 0             | 43.97      | AV       | 54             | PASS    |

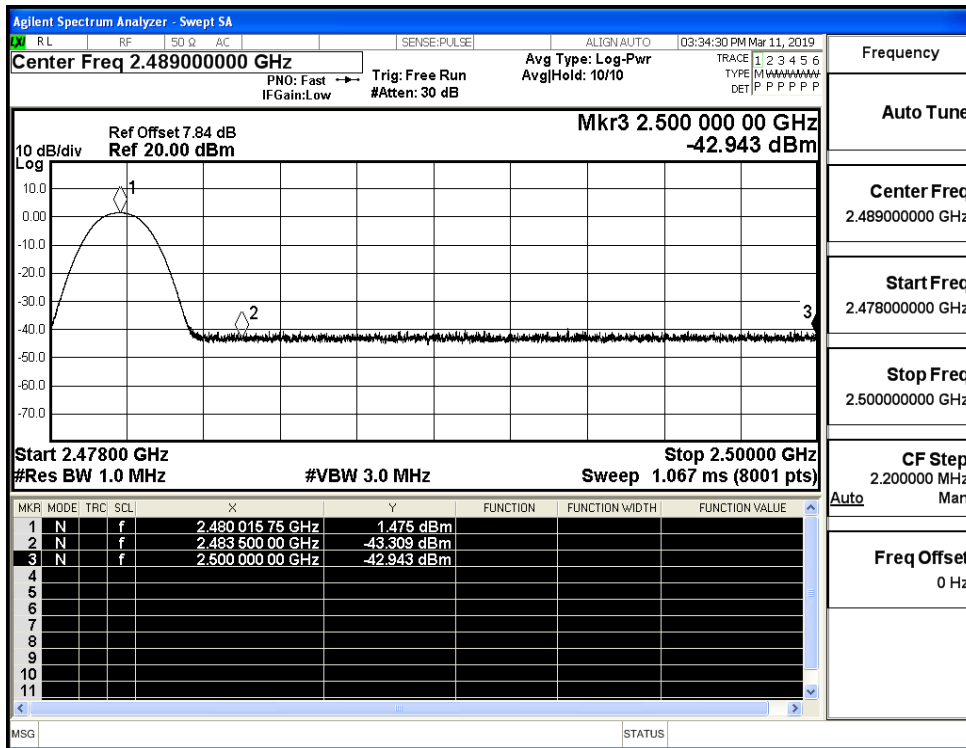
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



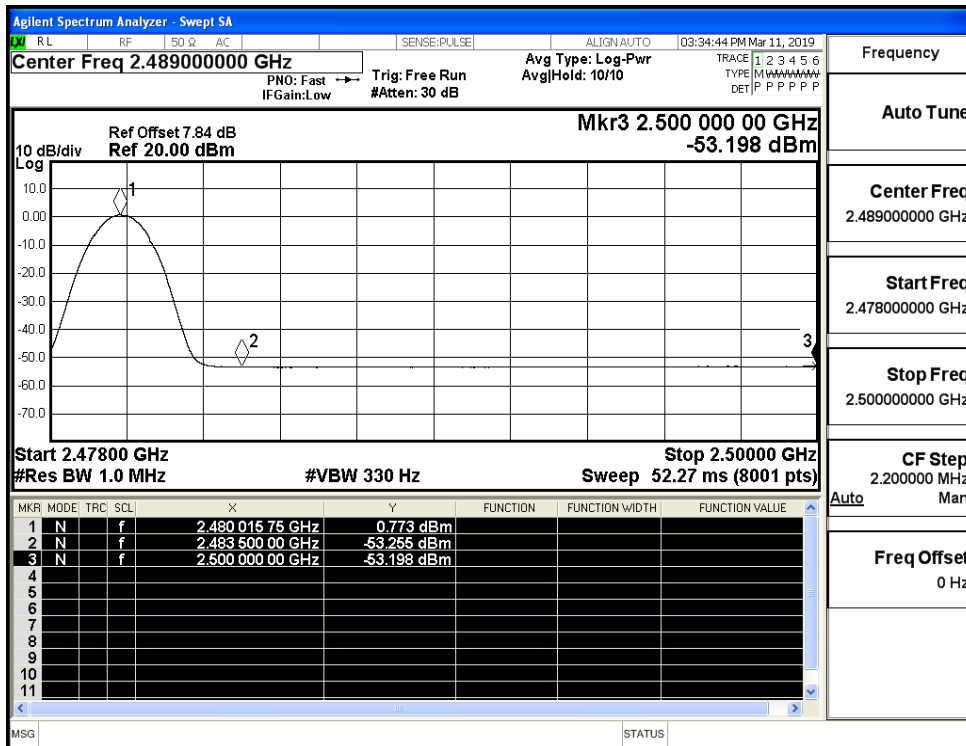
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



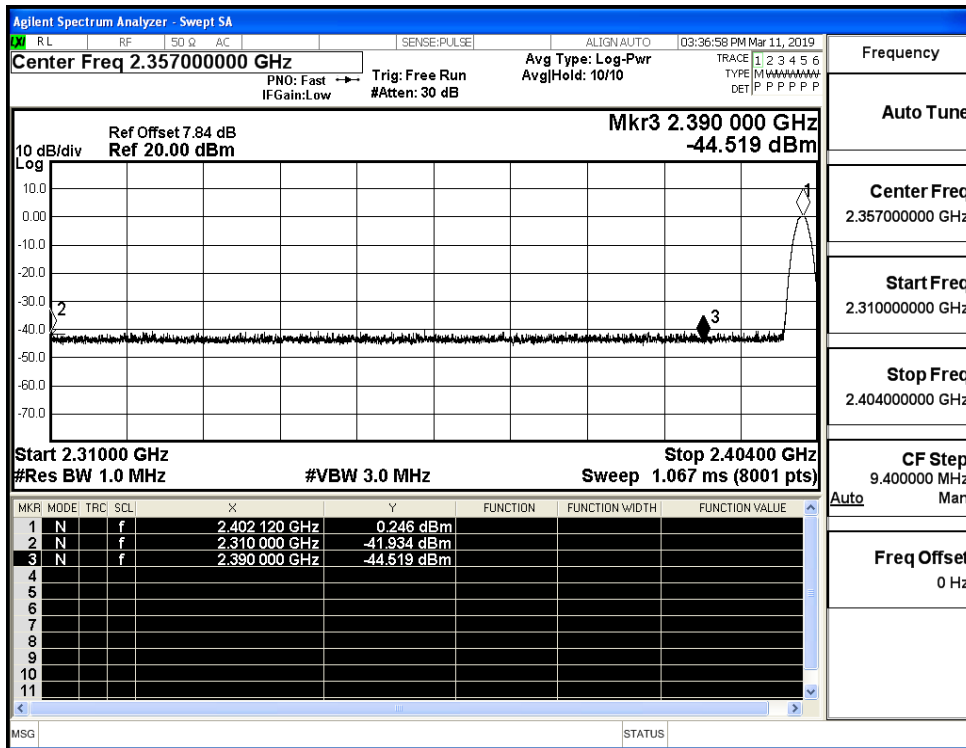
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



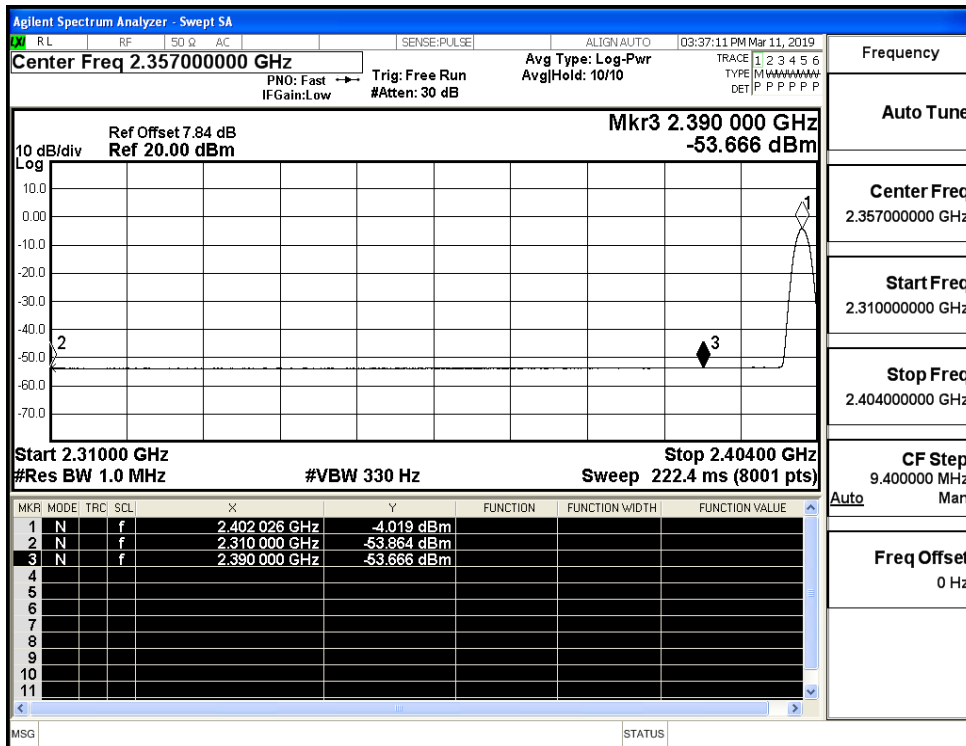
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



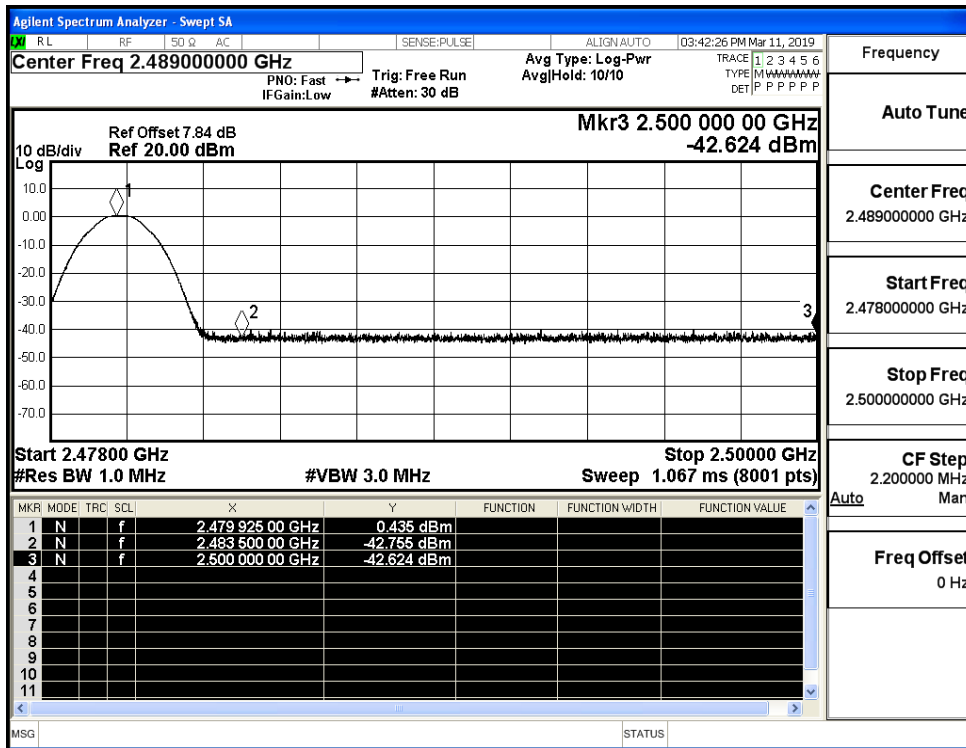
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



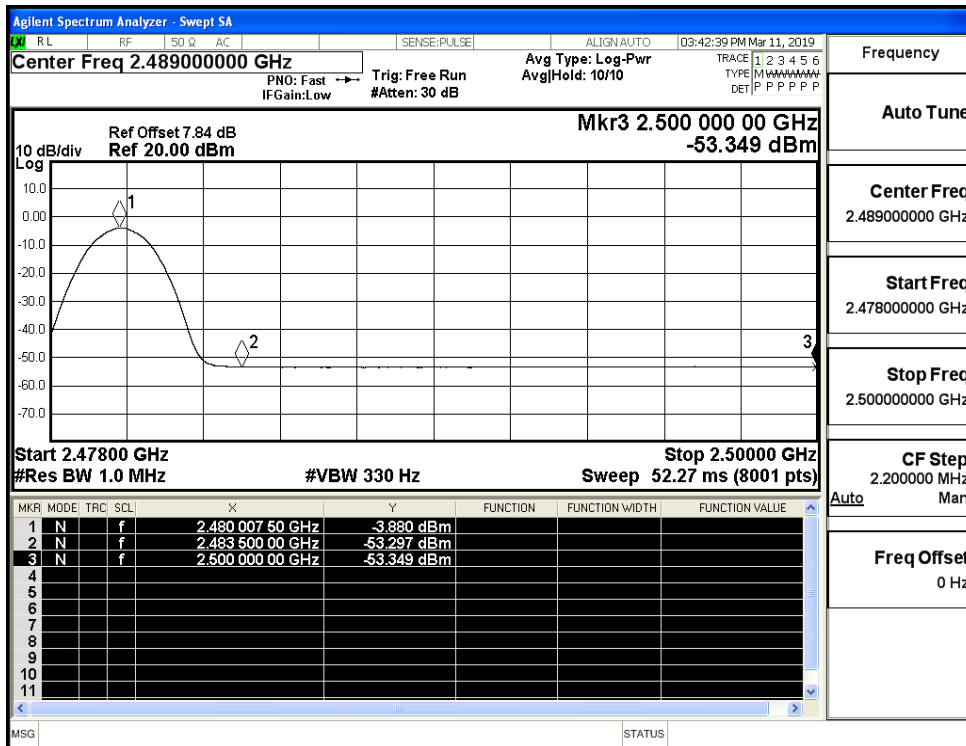
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)



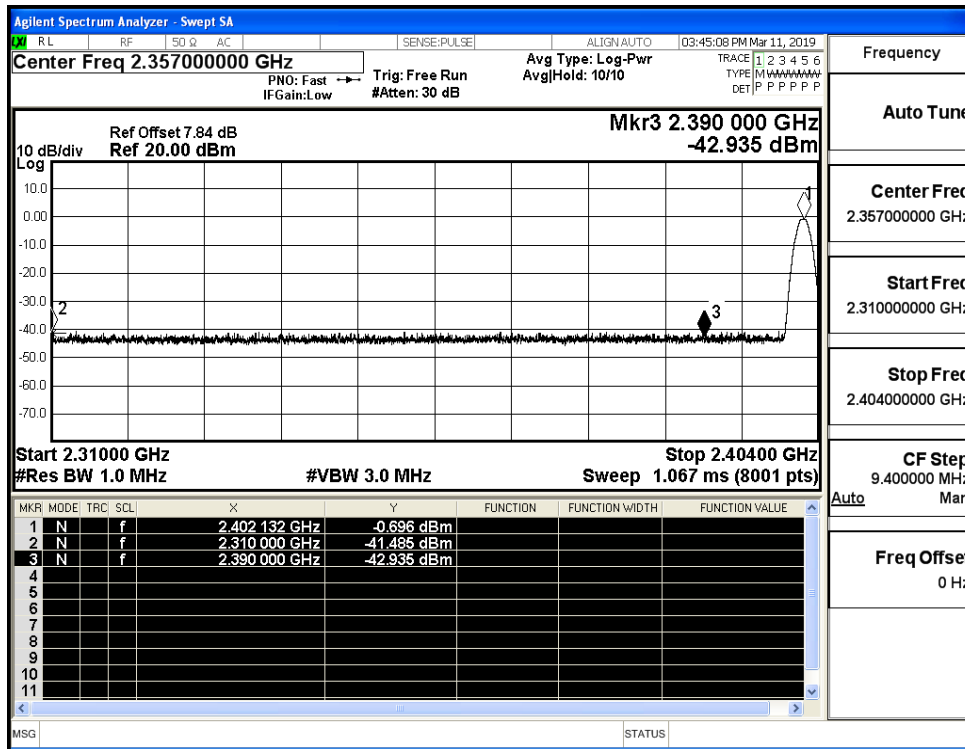
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



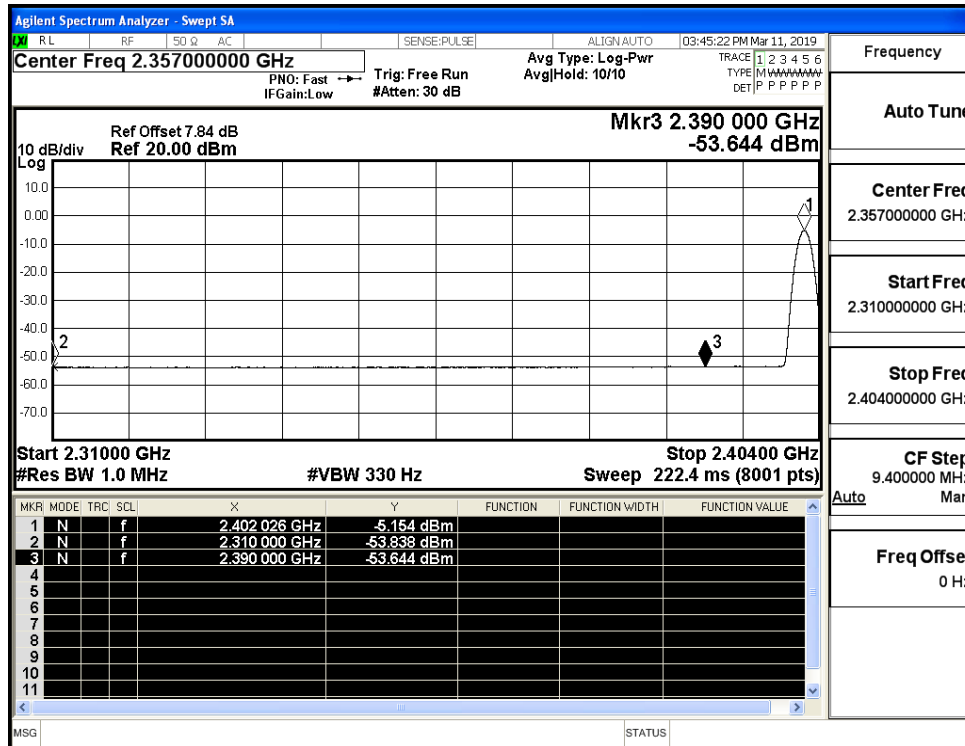
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



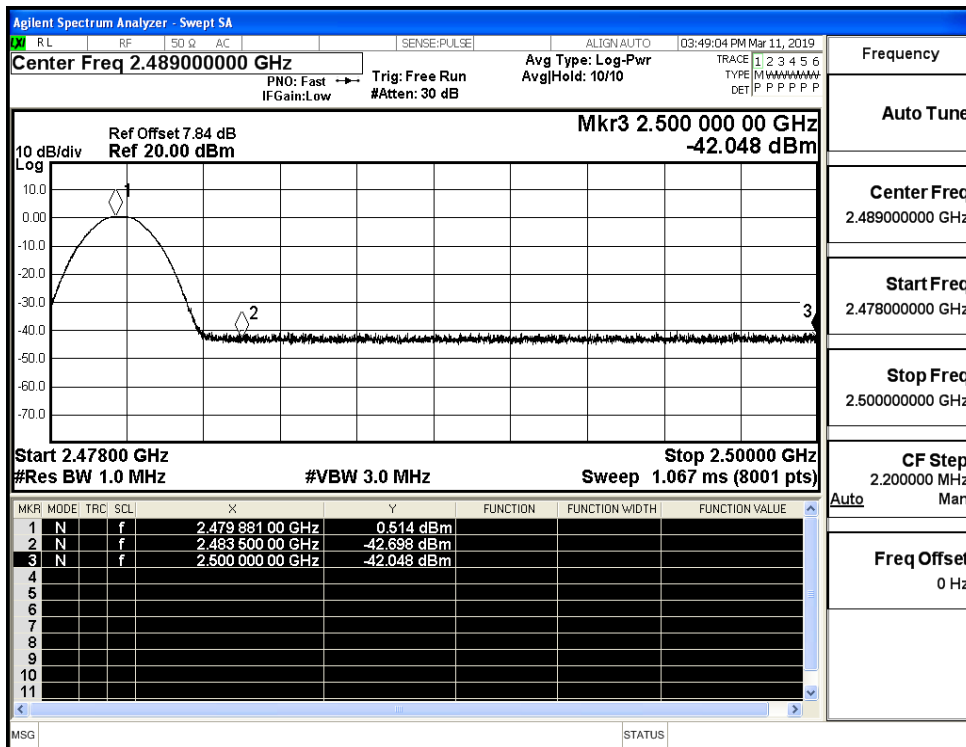
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

