

## Appendix A

### RF Test Data for BT V3.0(BDR/EDR) (Conducted Measurement)

Product Name: LineaPro 7 Industrial

Trade Mark: LineaPro 7 Industrial

Test Model: LineaPro 7 Industrial

#### Environmental Conditions

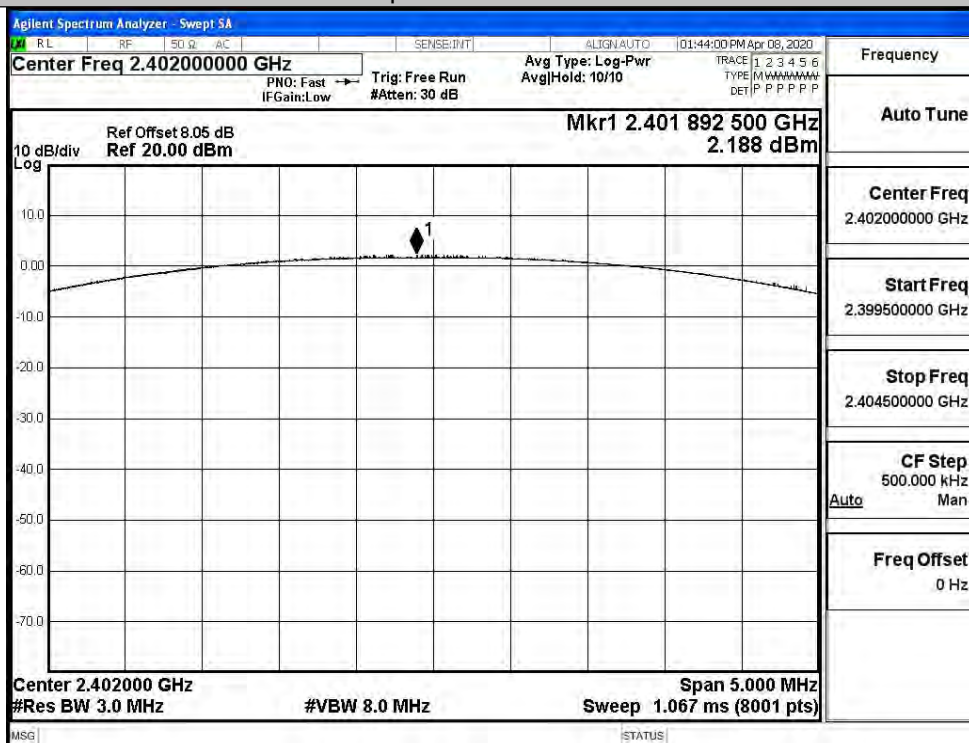
|                    |           |
|--------------------|-----------|
| Temperature:       | 23.6 °C   |
| Relative Humidity: | 53.9%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | QUXIN     |
| Supervised by:     | Li Huan   |

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

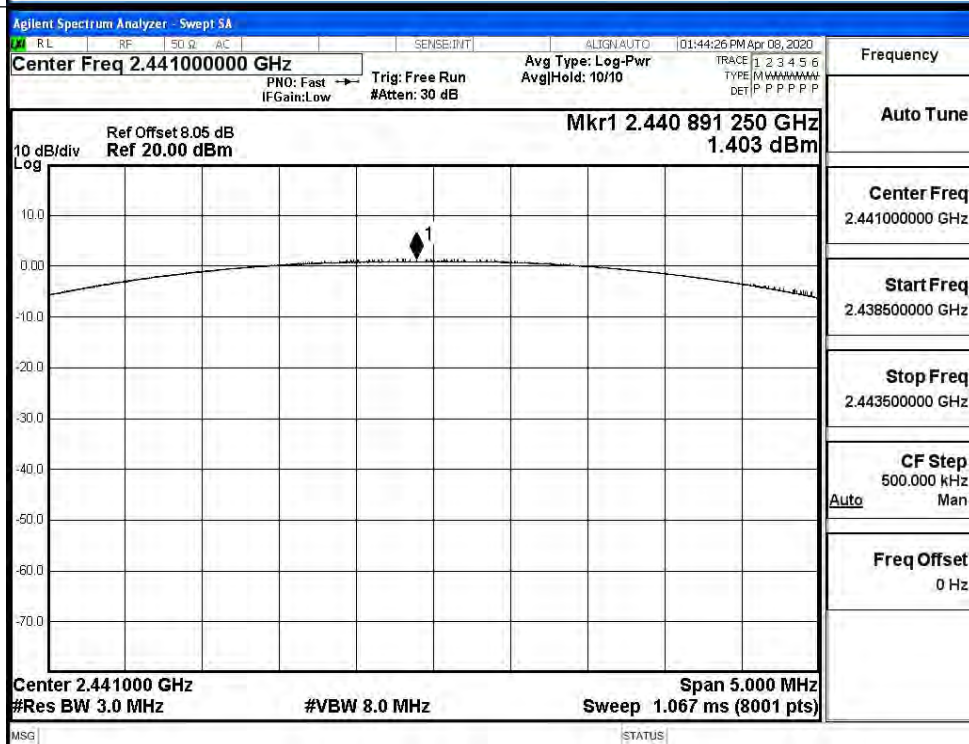
| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | 2.188                           | 30          | PASS    |
|               | MCH      | 1.403                           | 30          | PASS    |
|               | HCH      | 1.219                           | 30          | PASS    |
| $\pi/4$ DQPSK | LCH      | 2.215                           | 21          | PASS    |
|               | MCH      | 1.444                           | 21          | PASS    |
|               | HCH      | -0.183                          | 21          | PASS    |
| 8DPSK         | LCH      | 2.291                           | 21          | PASS    |
|               | MCH      | 1.493                           | 21          | PASS    |
|               | HCH      | -0.117                          | 21          | PASS    |

## Test Graphs

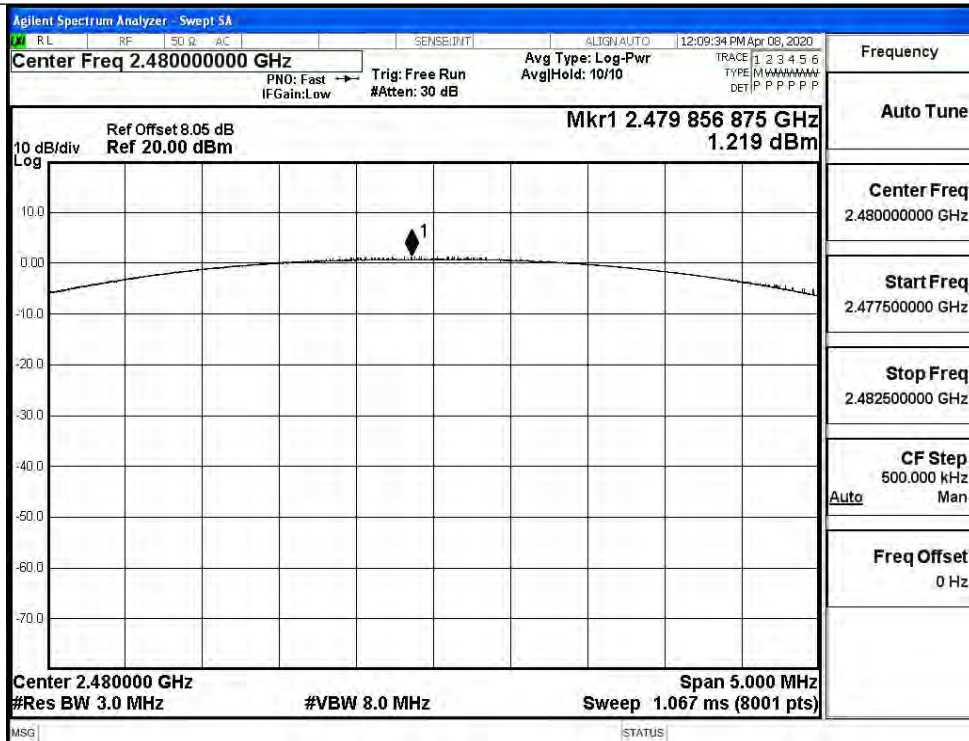
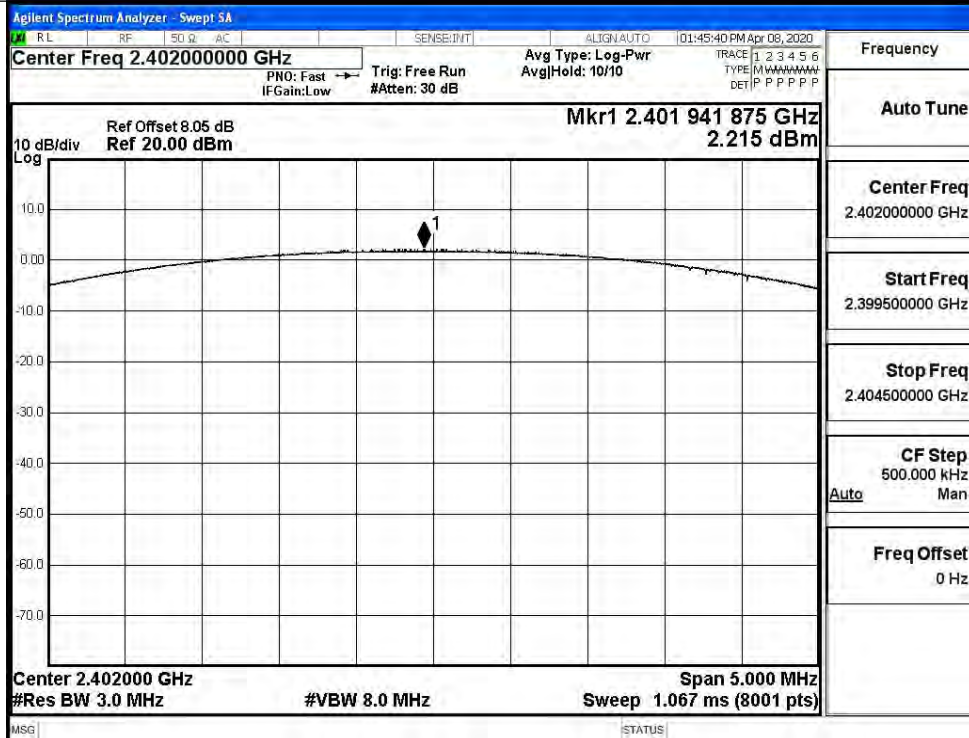
GFSK/LCH

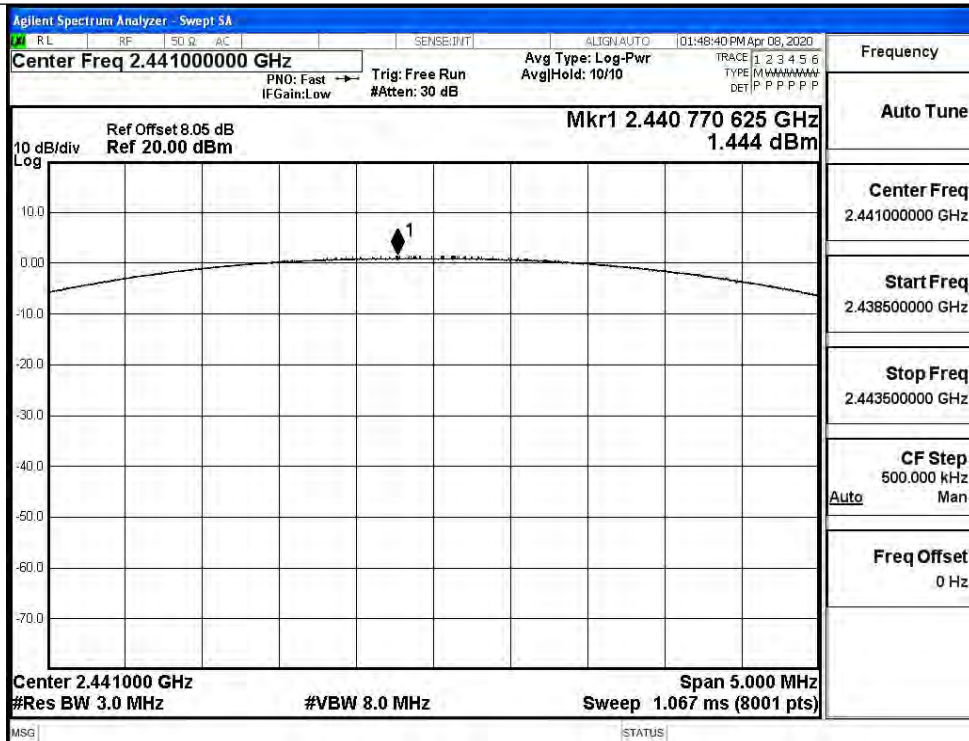
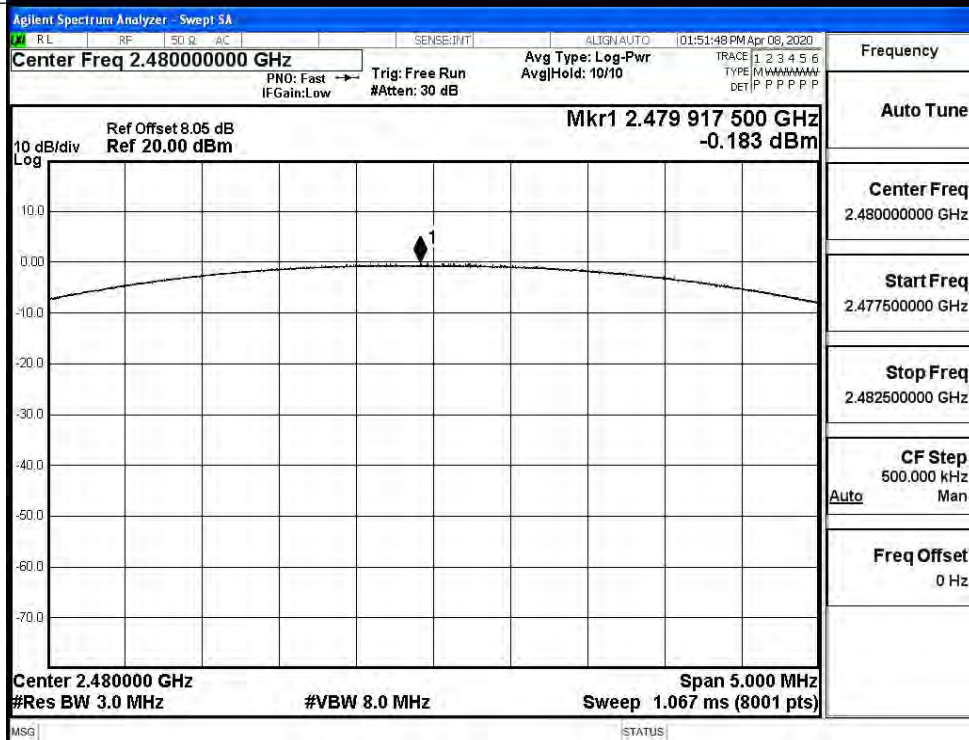


GFSK/MCH

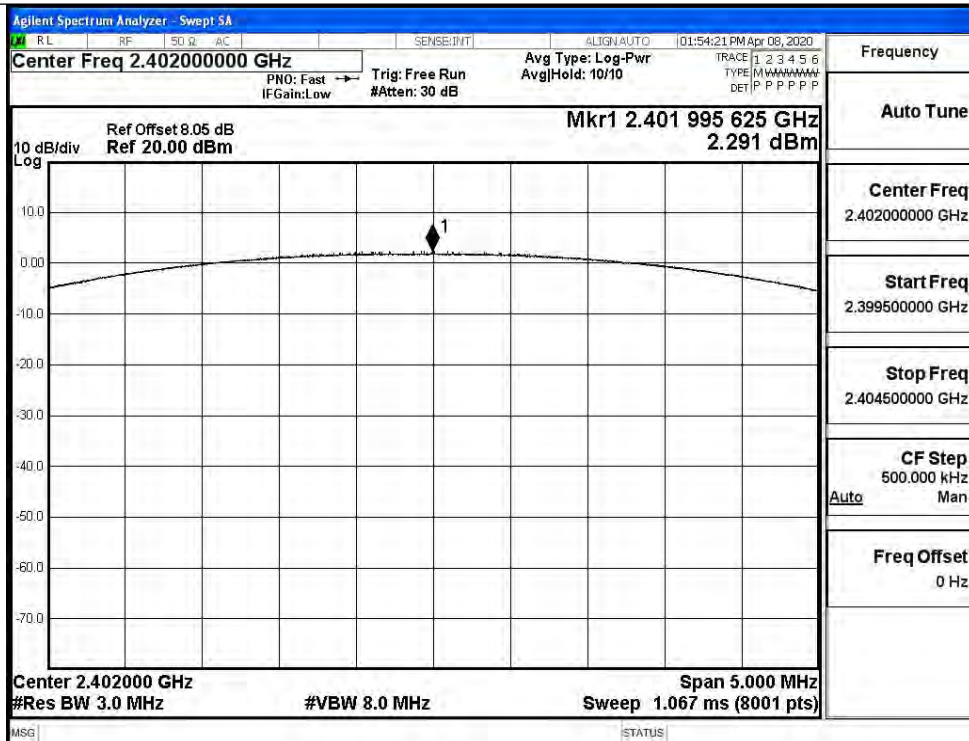


GFSK/HCH

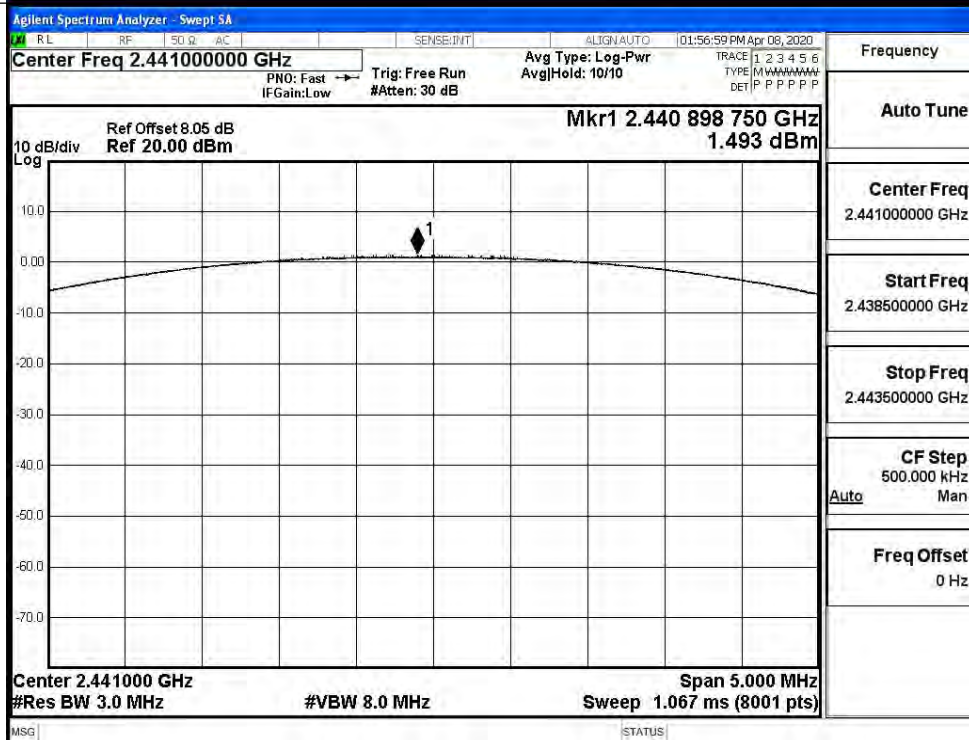
 $\pi/4$ DQPSK/LCH

$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

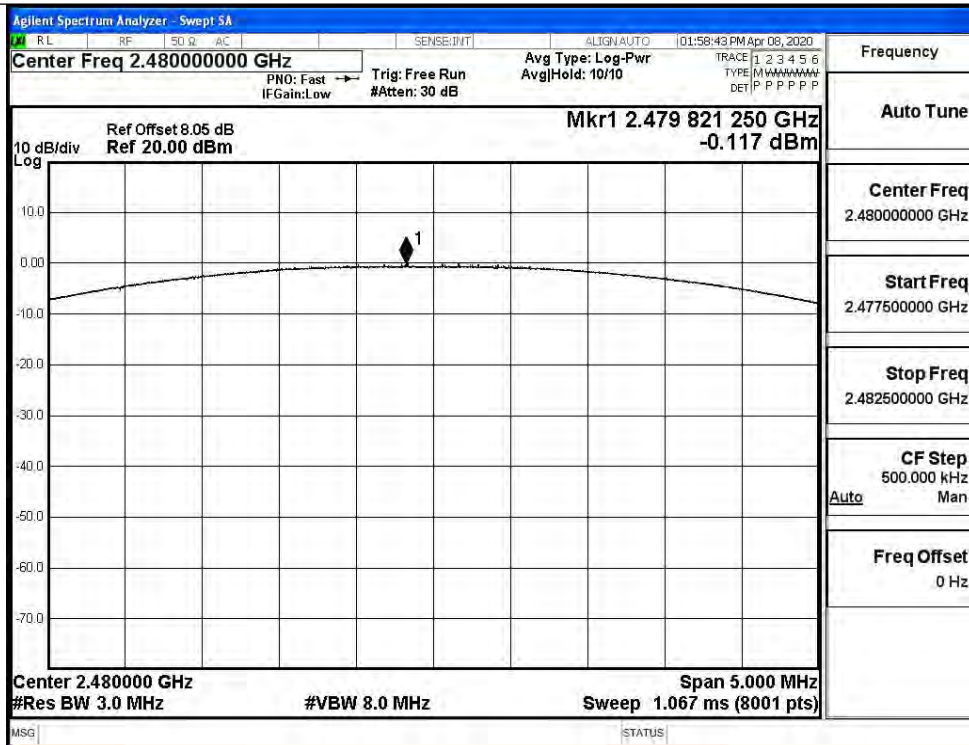
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

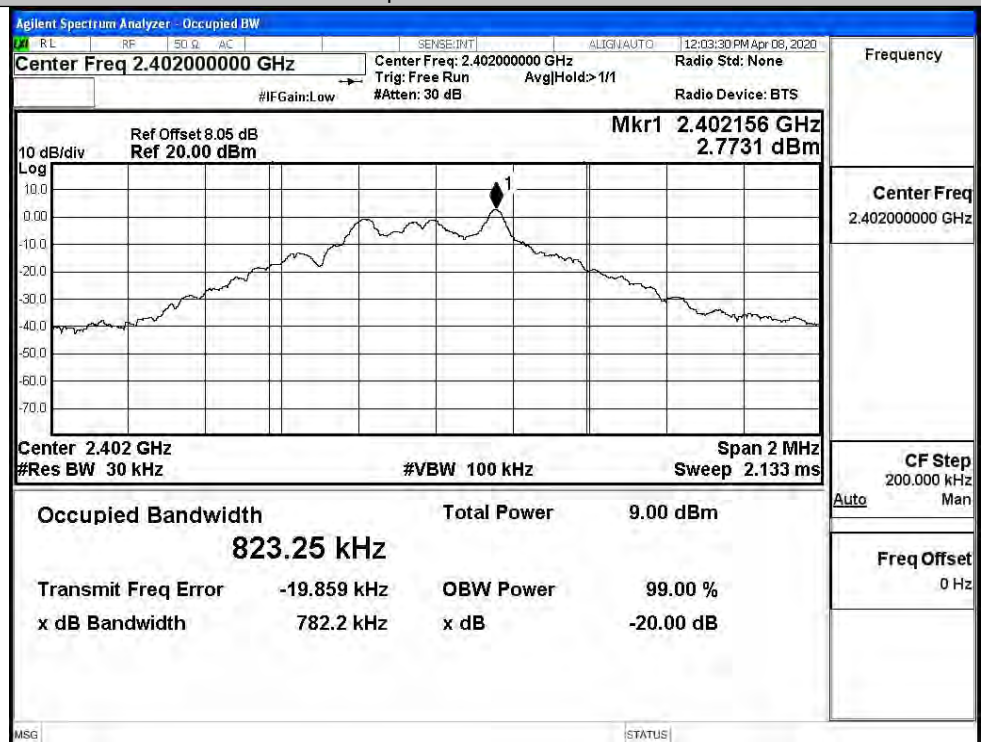


## A.2 20dB Bandwidth

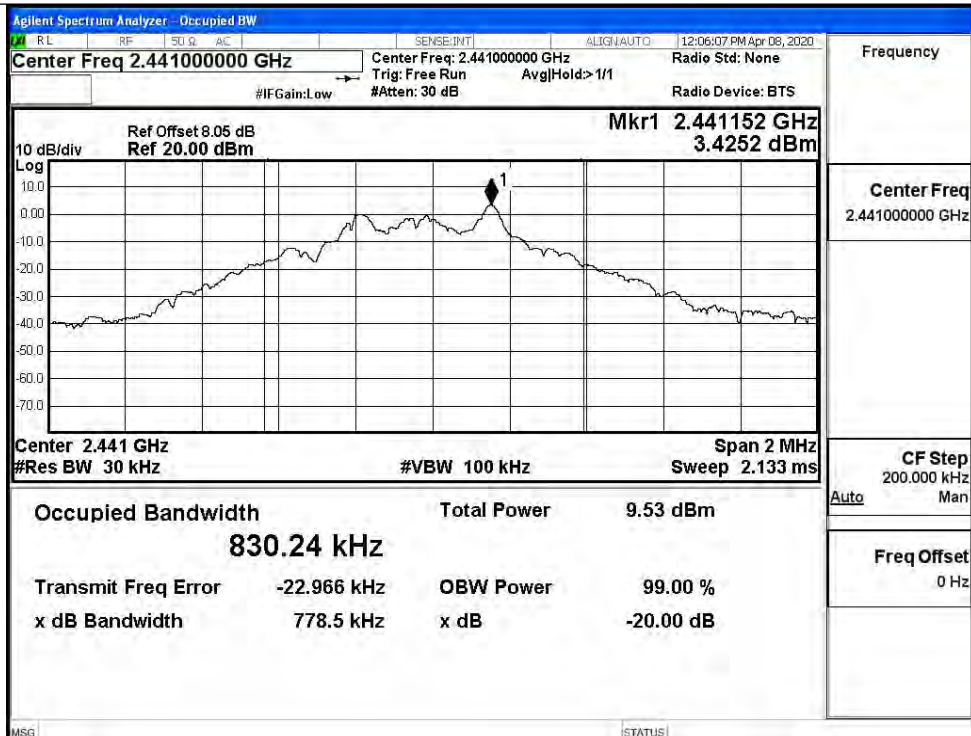
| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.7822               | Not Specified | PASS    |
|               | MCH      | 0.7785               | Not Specified | PASS    |
|               | HCH      | 0.7789               | Not Specified | PASS    |
| $\pi/4$ DQPSK | LCH      | 1.223                | Not Specified | PASS    |
|               | MCH      | 1.224                | Not Specified | PASS    |
|               | HCH      | 1.224                | Not Specified | PASS    |
| 8DPSK         | LCH      | 1.226                | Not Specified | PASS    |
|               | MCH      | 1.227                | Not Specified | PASS    |
|               | HCH      | 1.228                | Not Specified | PASS    |

Test Graphs

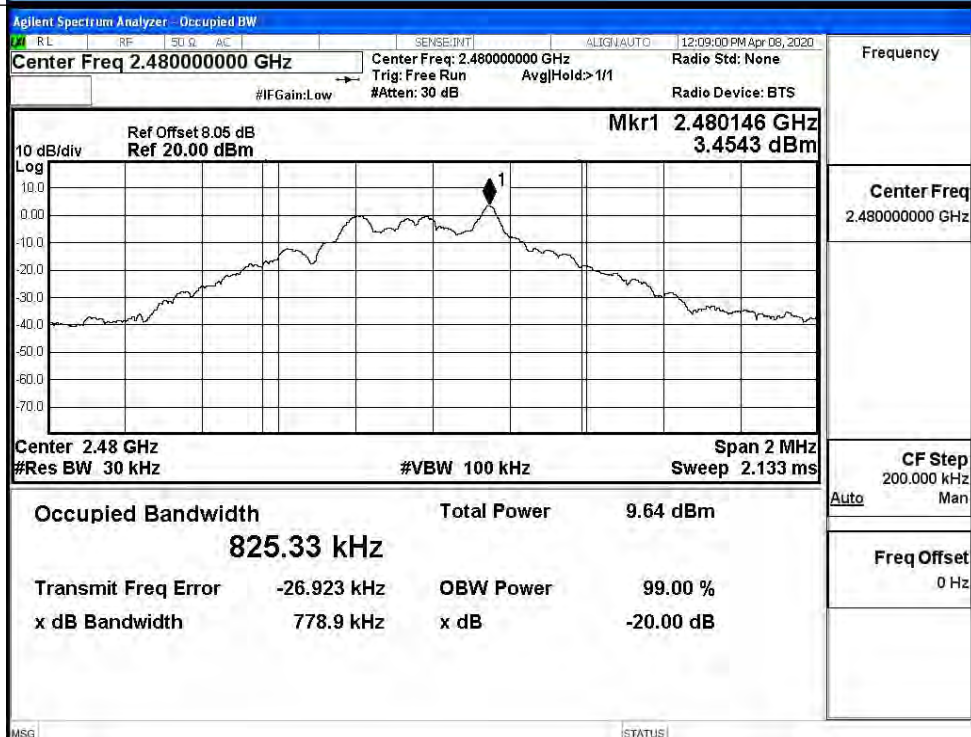
GFSK/LCH

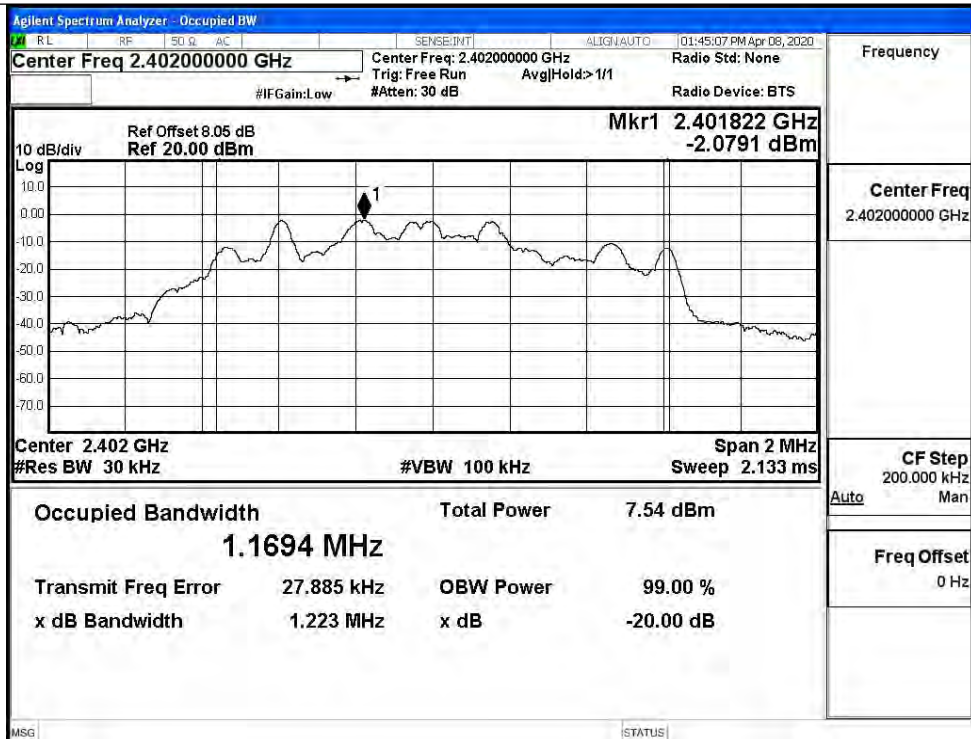
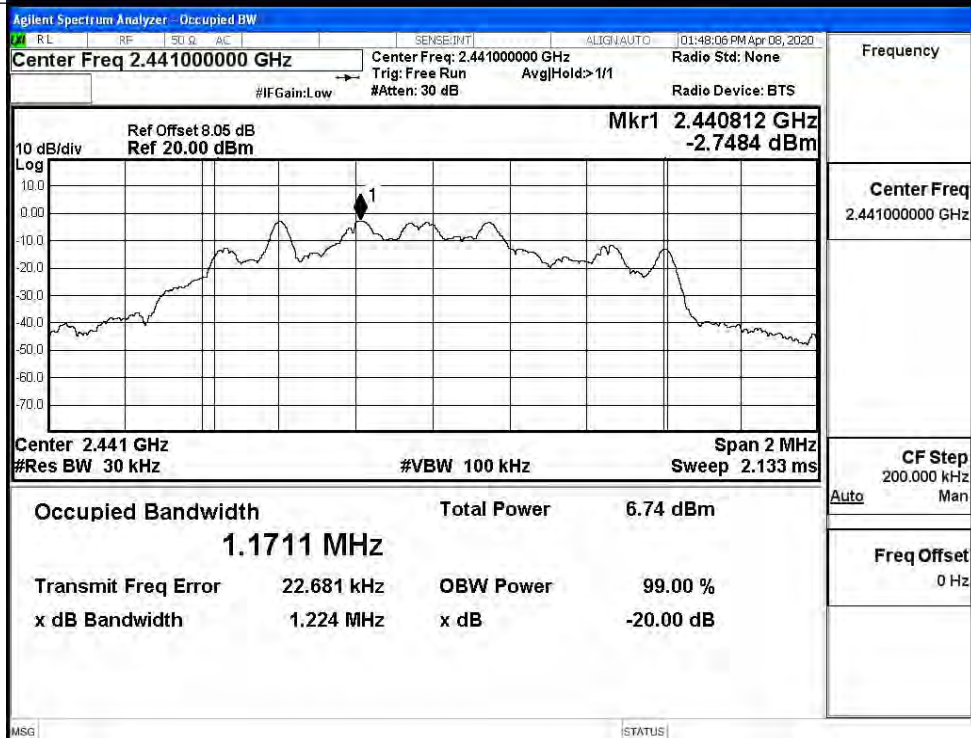


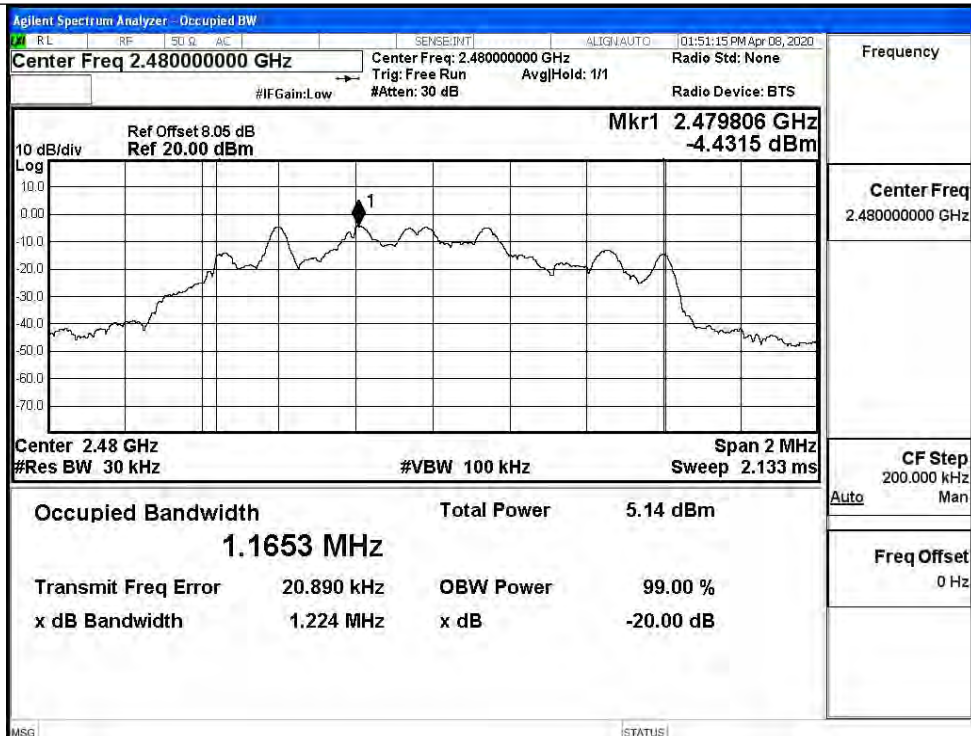
GFSK/MCH



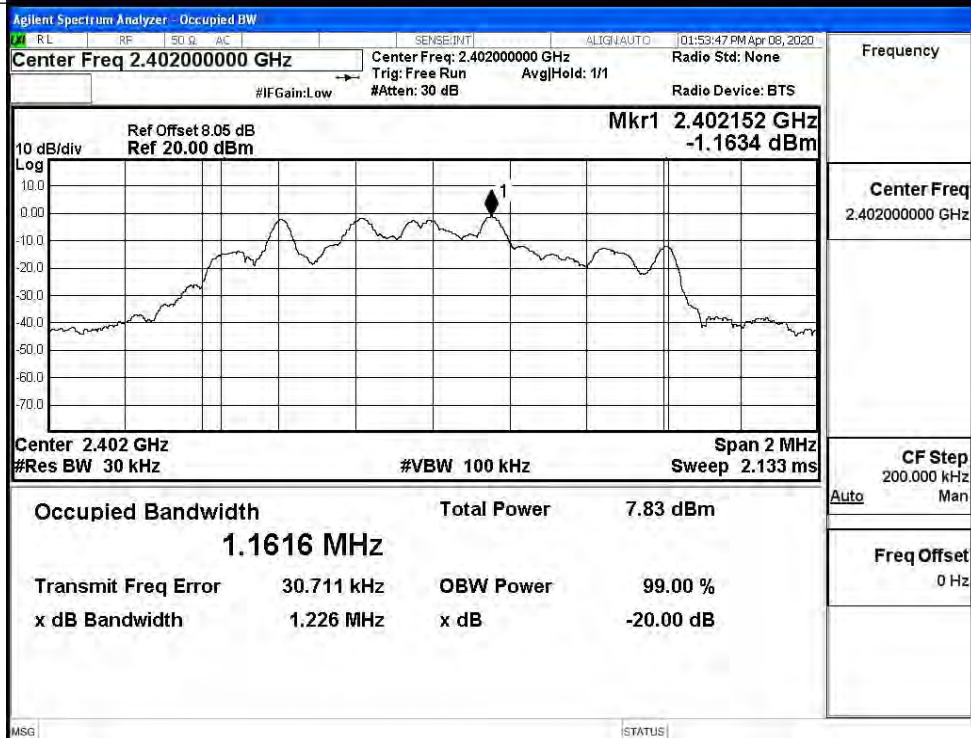
GFSK/HCH



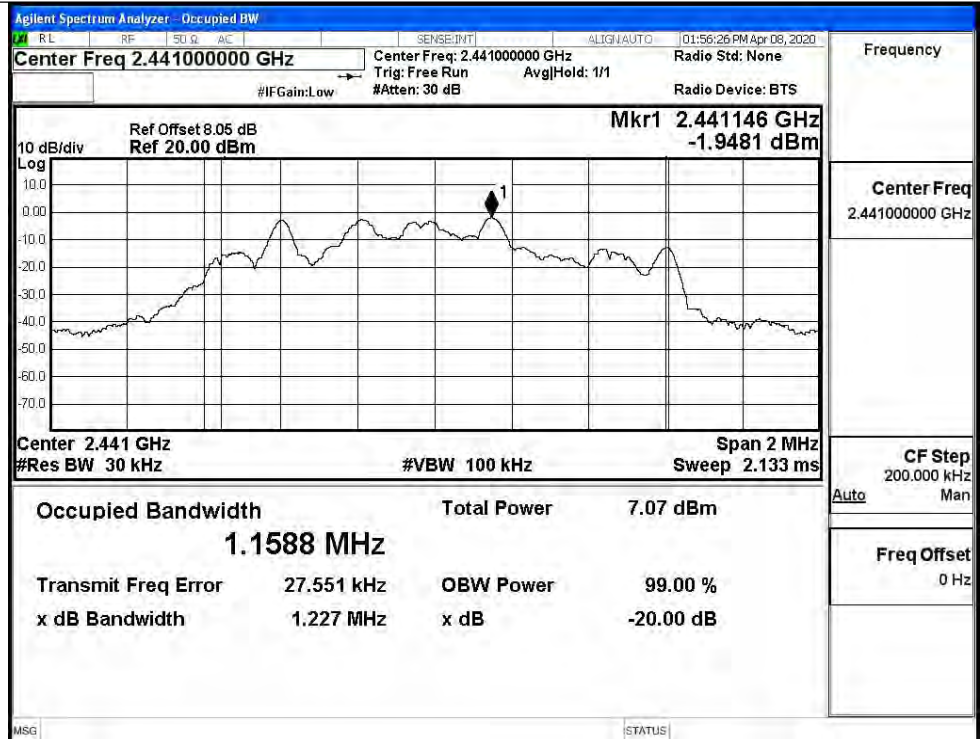
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

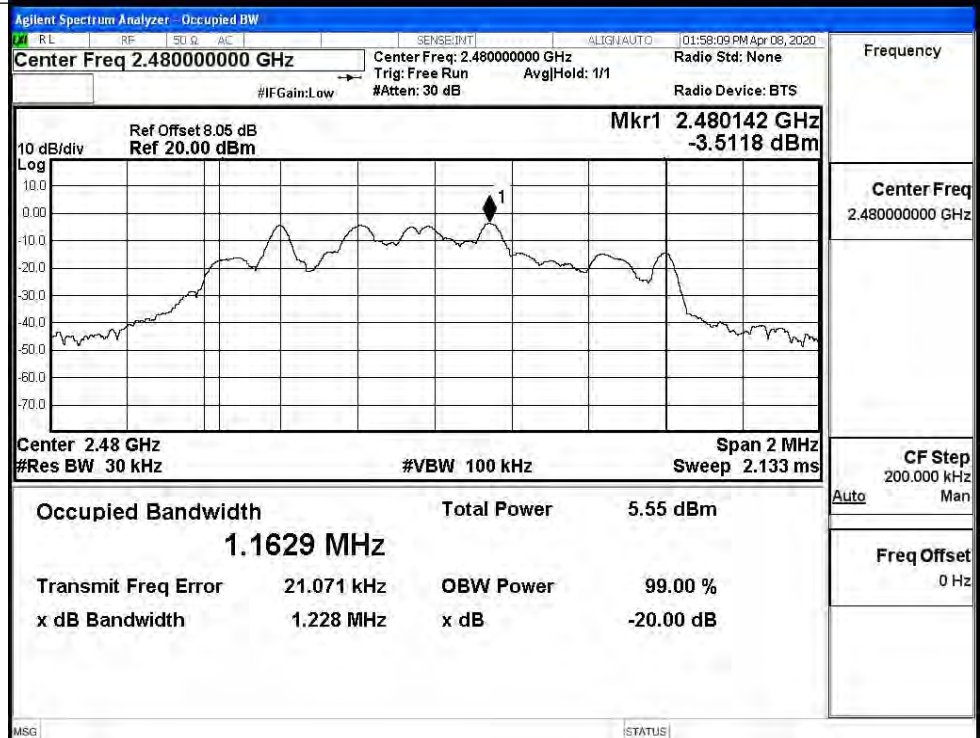
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

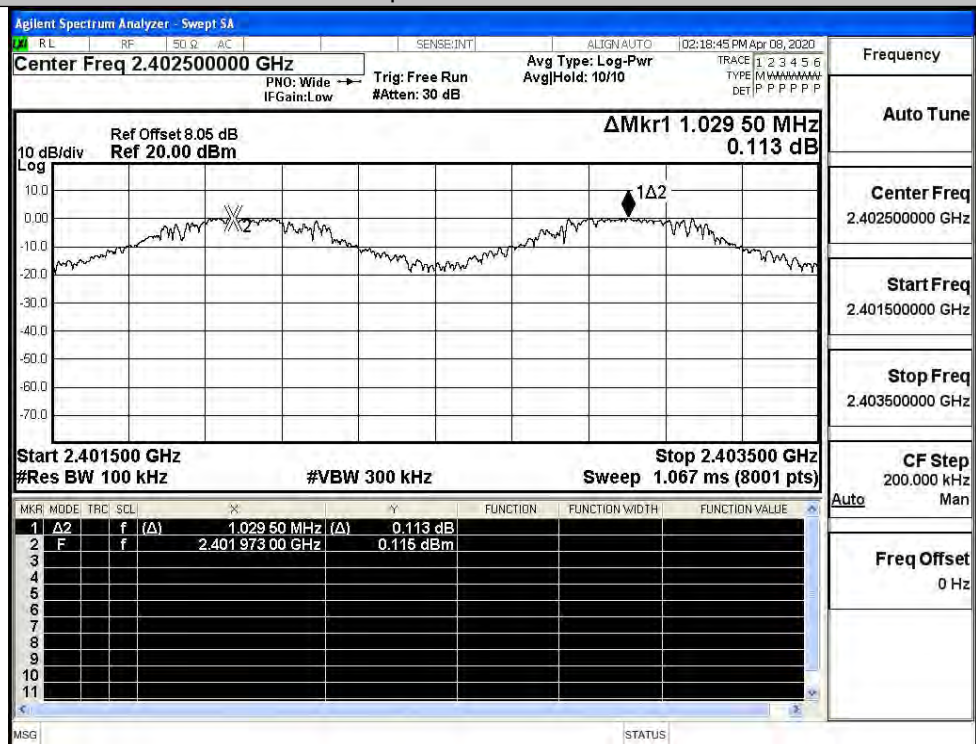


### A.3 Carrier Frequency Separation

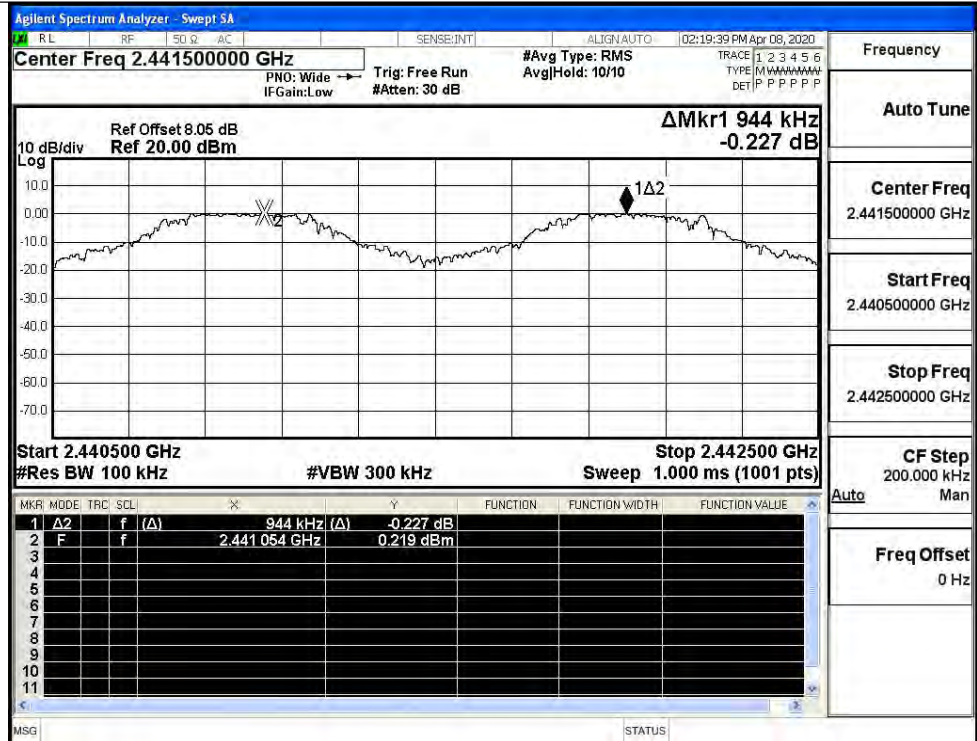
| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | LCH      | 1.030                              | 0.522       | PASS    |
|               | MCH      | 0.944                              | 0.519       | PASS    |
|               | HCH      | 1.070                              | 0.519       | PASS    |
| $\pi/4$ DQPSK | LCH      | 0.964                              | 0.815       | PASS    |
|               | MCH      | 0.866                              | 0.816       | PASS    |
|               | HCH      | 0.858                              | 0.816       | PASS    |
| 8DPSK         | LCH      | 1.056                              | 0.817       | PASS    |
|               | MCH      | 1.270                              | 0.818       | PASS    |
|               | HCH      | 1.002                              | 0.819       | PASS    |

#### Test Graphs

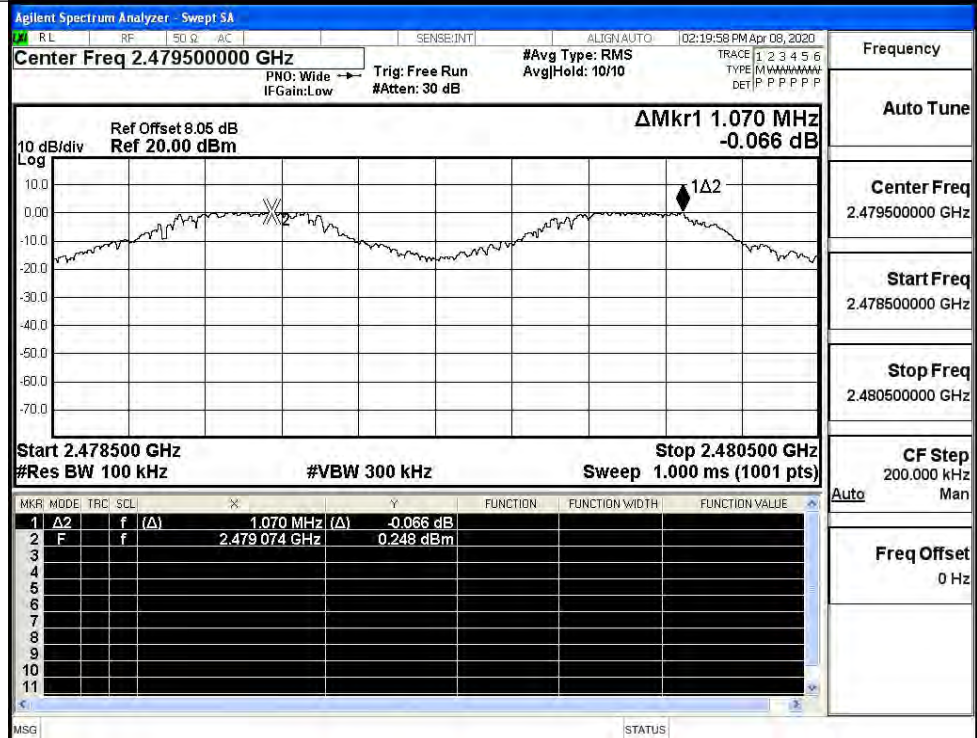
GFSK/LCH

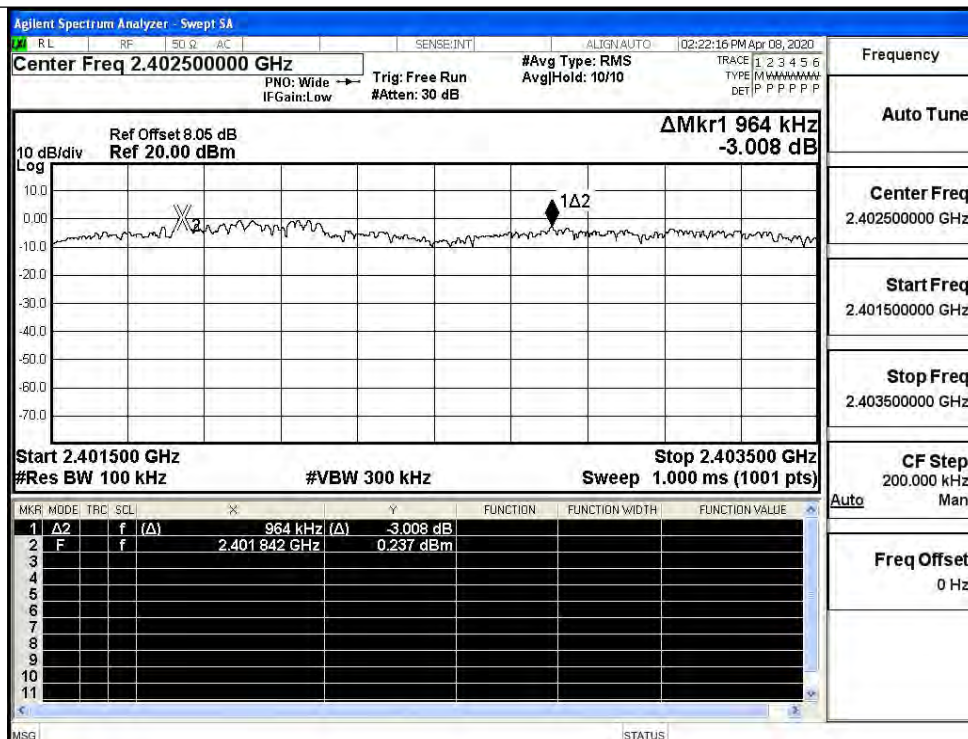


GFSK/MCH



GFSK/HCH



$\pi/4$ DQPSK/LCH

Frequency

Auto Tune

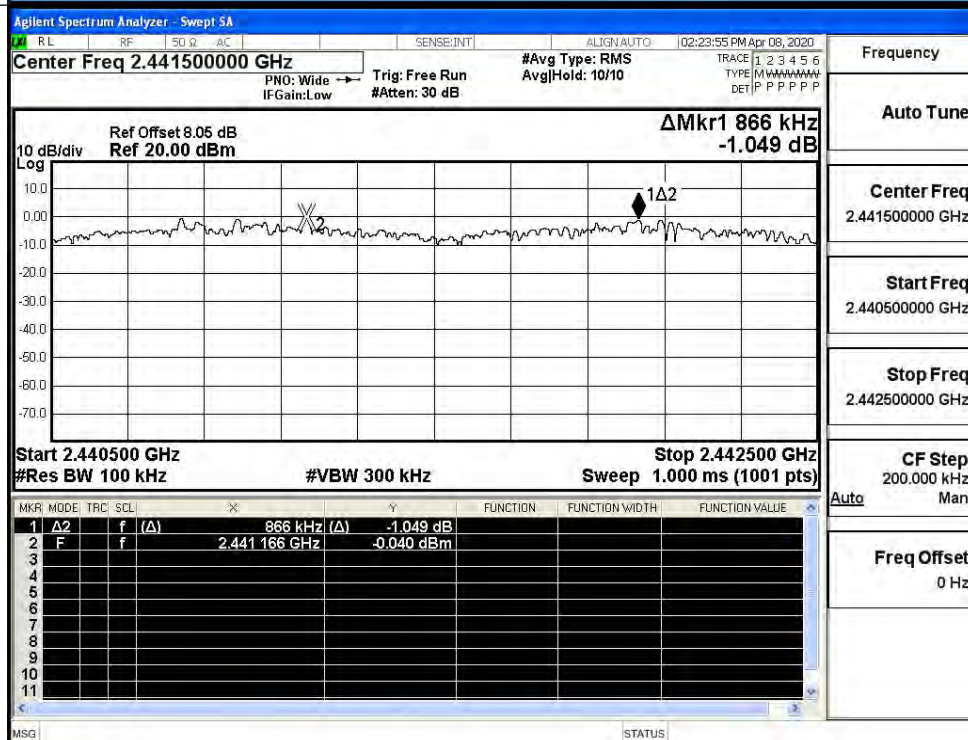
Center Freq  
2.402500000 GHz

Start Freq  
2.401500000 GHz

Stop Freq  
2.403500000 GHz

CF Step  
200.000 kHz  
Man

Freq Offset  
0 Hz

 $\pi/4$ DQPSK/MCH

Frequency

Auto Tune

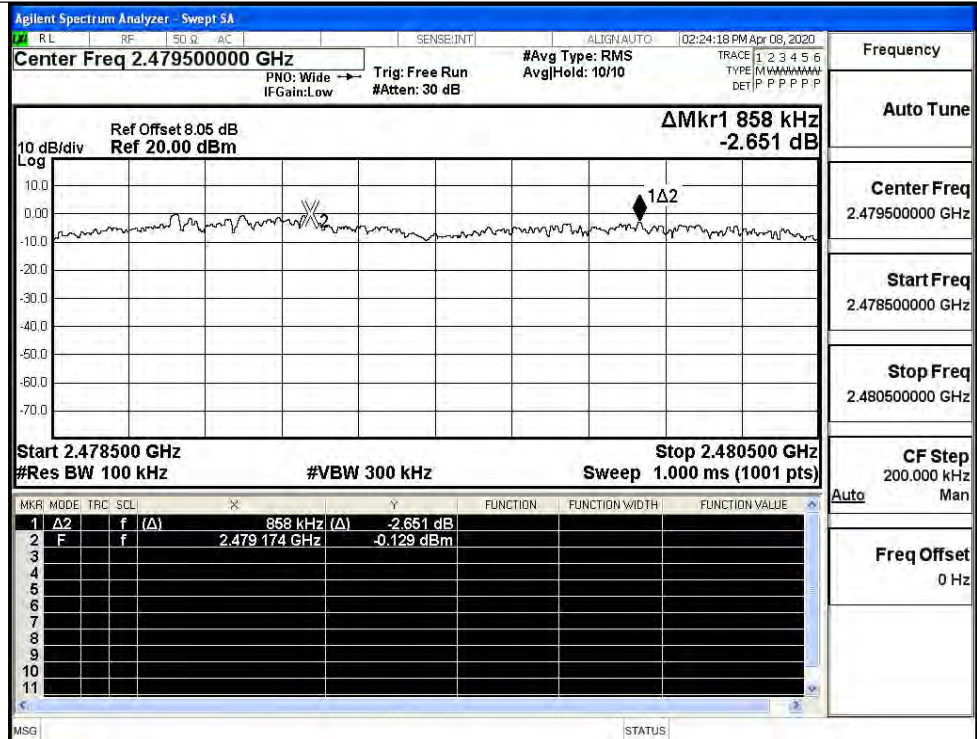
Center Freq  
2.441500000 GHz

Start Freq  
2.440500000 GHz

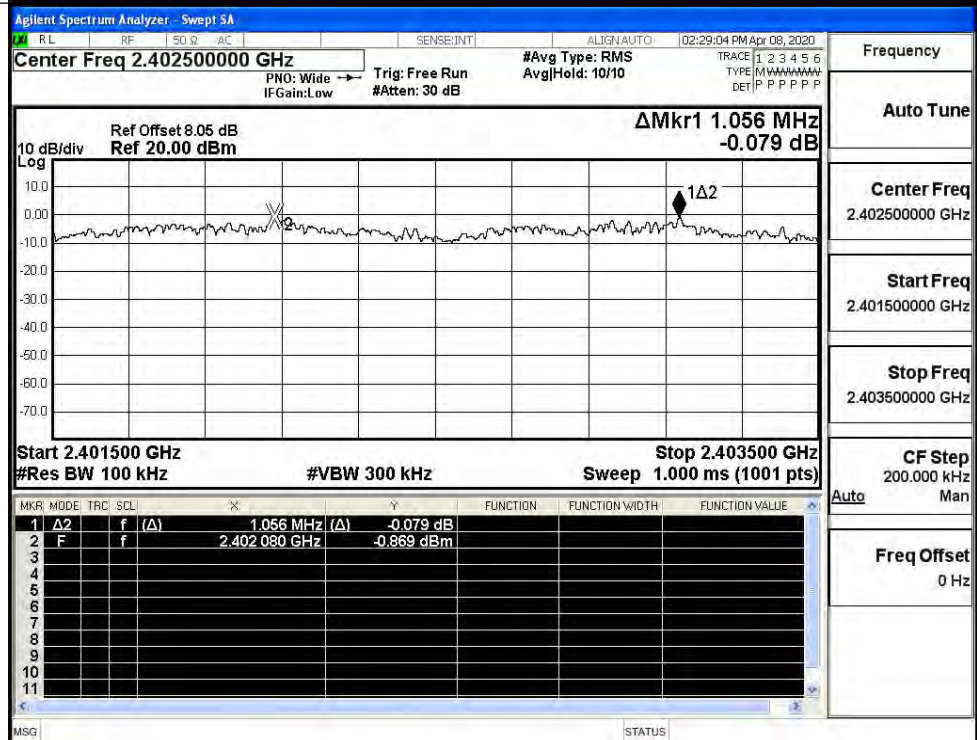
Stop Freq  
2.442500000 GHz

CF Step  
200.000 kHz  
Man

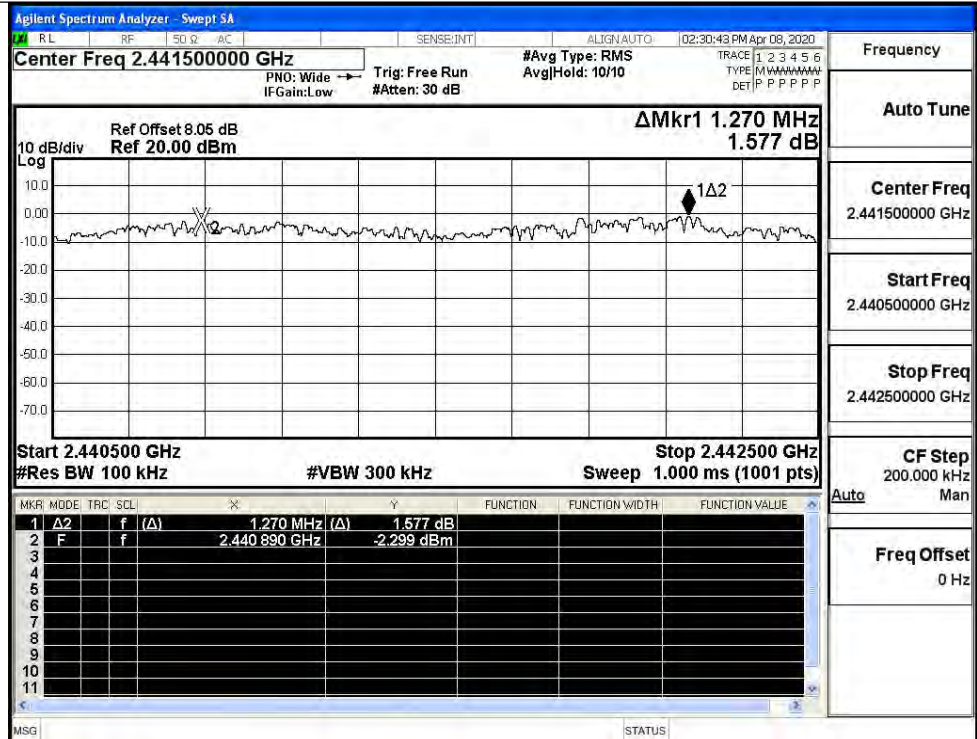
Freq Offset  
0 Hz

$\pi/4$ DQPSK/HCH

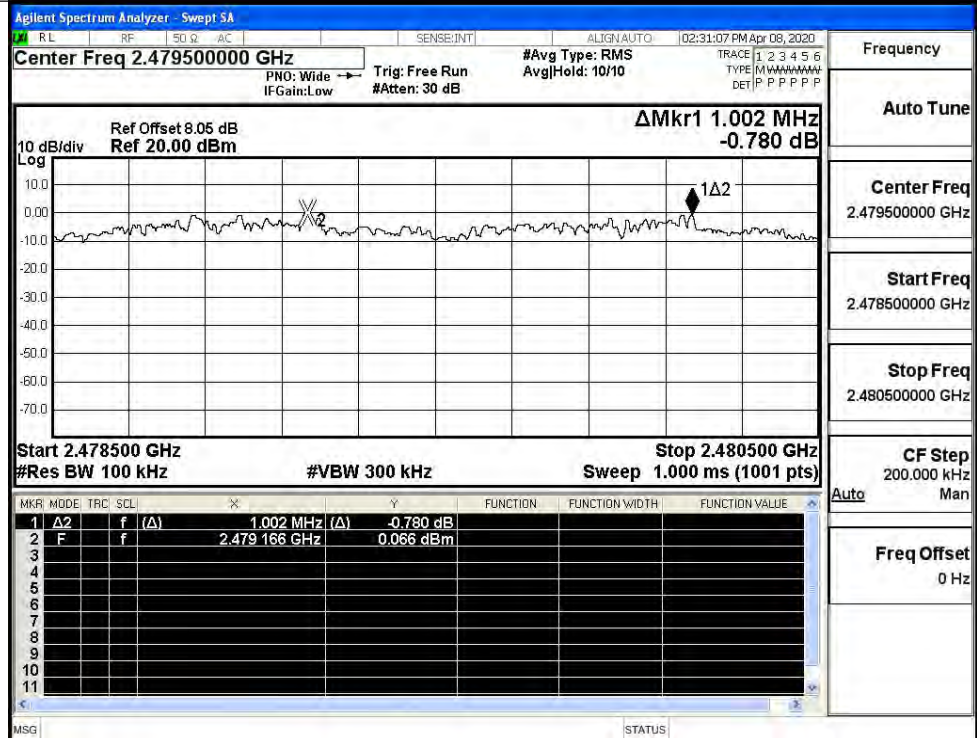
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

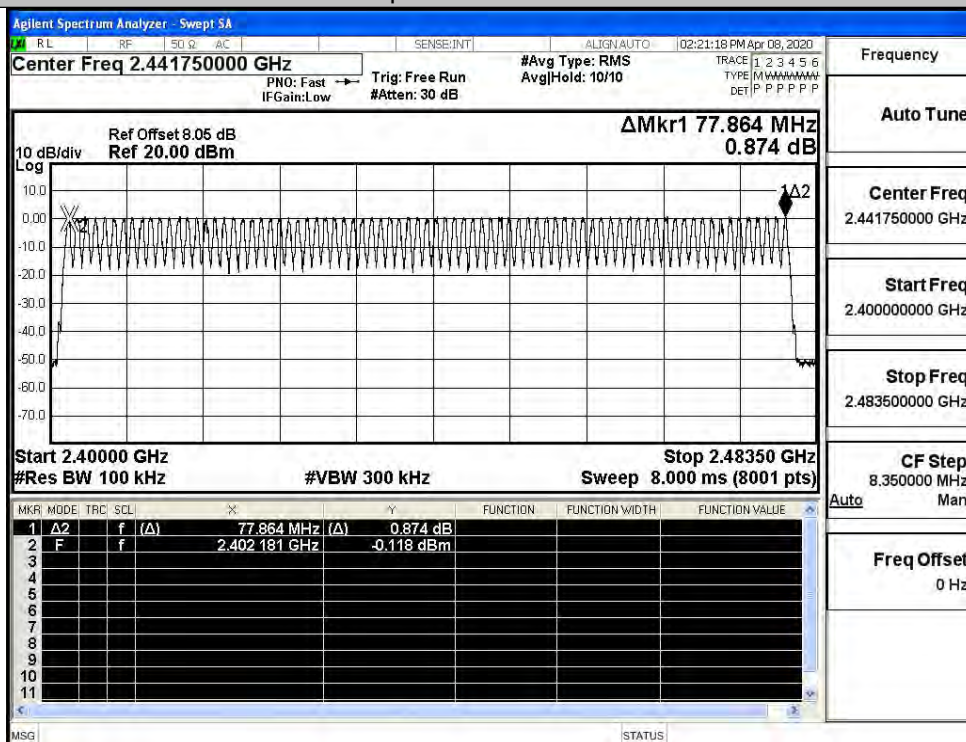
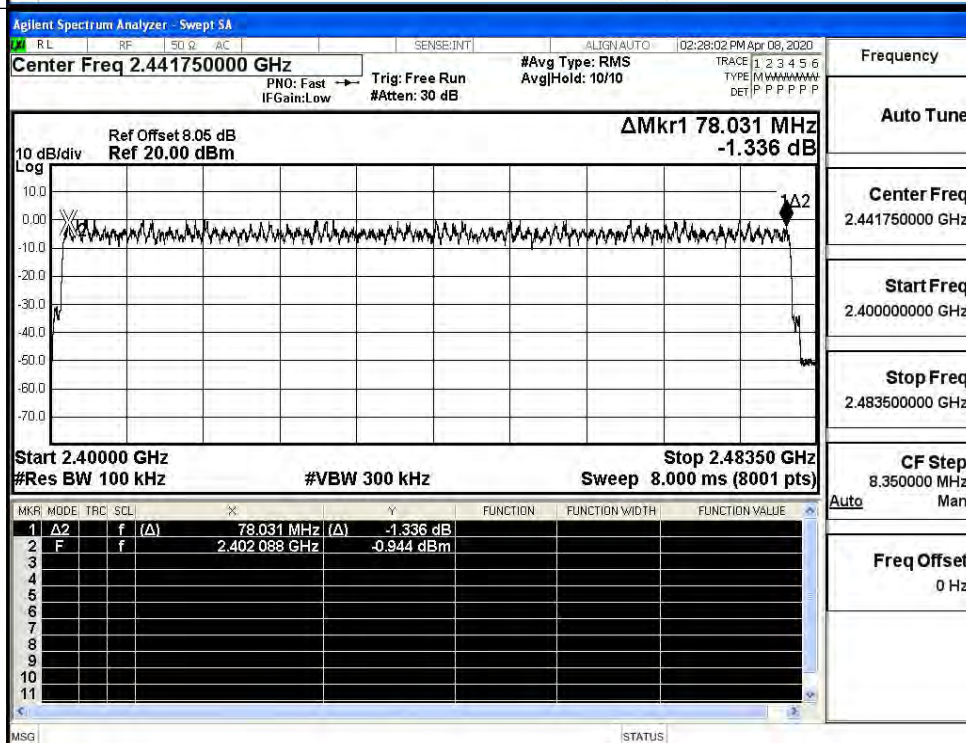


## A.4 Hopping Channel Number

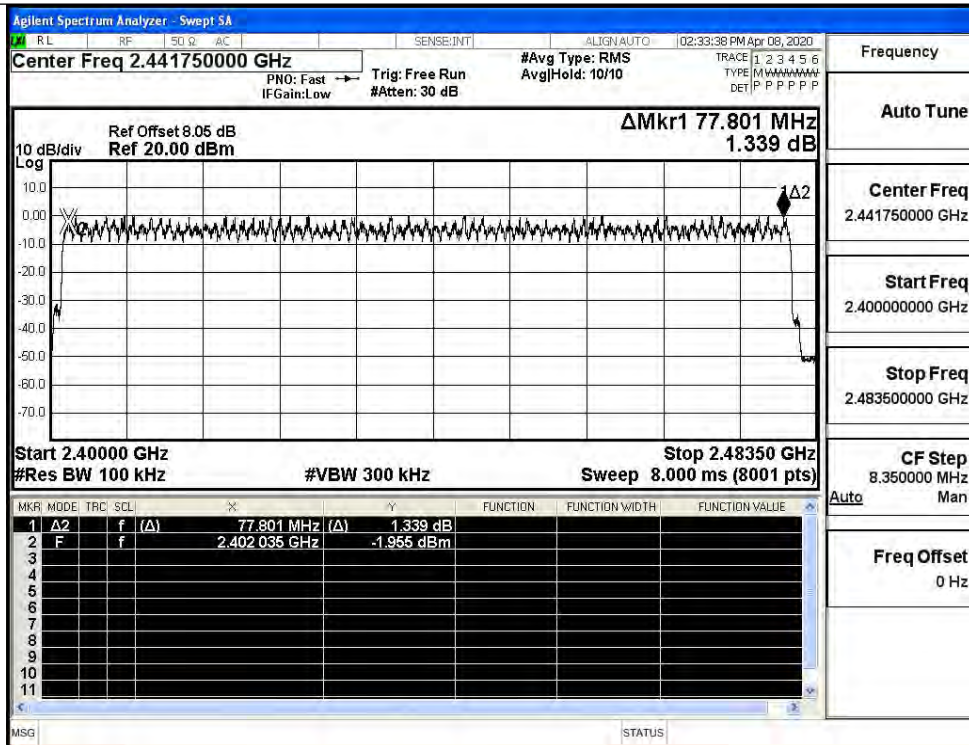
| Mode          | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK          | Hop      | 79                            | >=15      | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                    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

## Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

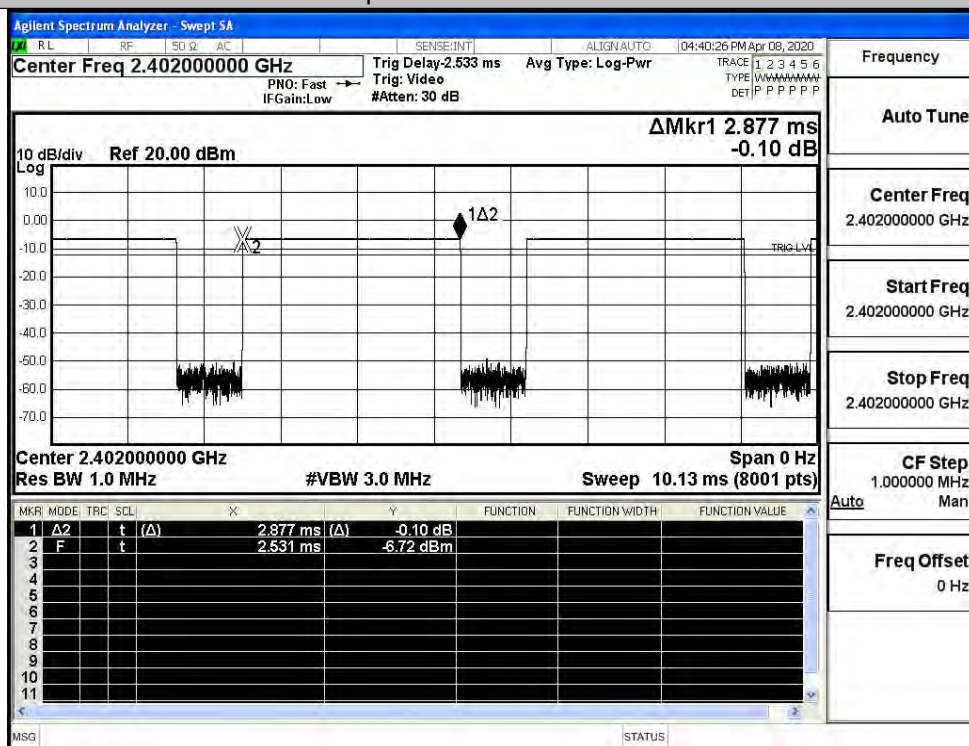


## A.5 Dwell Time

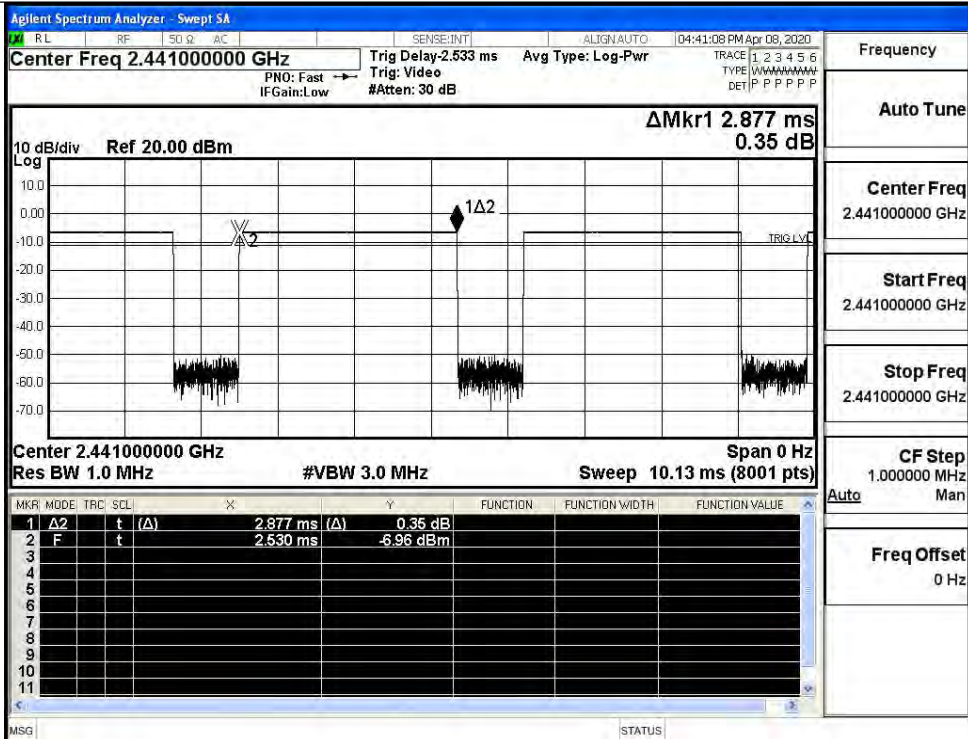
| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|---------------|-----------|---------|
| GFSK          | DH5    | LCH     | 0.82                       | 106.7                 | 0.087         | 0.4       | PASS    |
|               | DH5    | MCH     | 0.82                       | 106.7                 | 0.087         | 0.4       | PASS    |
|               | DH5    | HCH     | 0.82                       | 106.7                 | 0.087         | 0.4       | PASS    |
| $\pi/4$ DQPSK | 2DH5   | LCH     | 0.82                       | 106.7                 | 0.013         | 0.4       | PASS    |
|               | 2DH5   | MCH     | 0.82                       | 106.7                 | 0.013         | 0.4       | PASS    |
|               | 2DH5   | HCH     | 0.82                       | 106.7                 | 0.013         | 0.4       | PASS    |
| 8DPSK         | 3DH5   | LCH     | 0.82                       | 106.7                 | 0.013         | 0.4       | PASS    |
|               | 3DH5   | MCH     | 0.82                       | 106.7                 | 0.013         | 0.4       | PASS    |
|               | 3DH5   | HCH     | 0.82                       | 106.7                 | 0.087         | 0.4       | PASS    |

Test Graphs

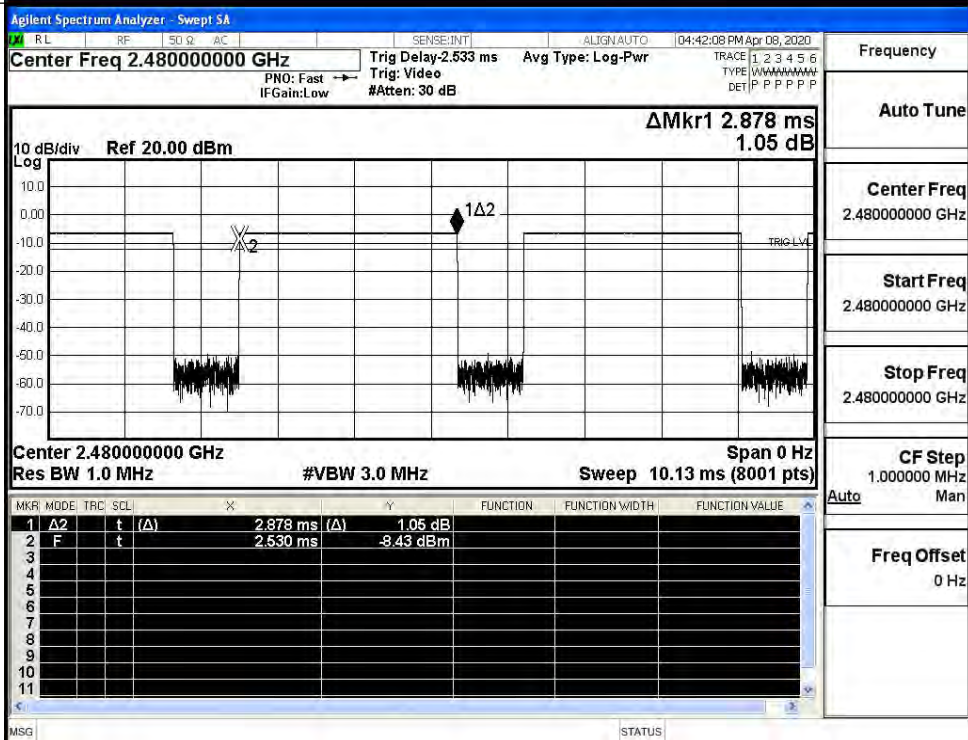
GFSK\_DH5/LCH



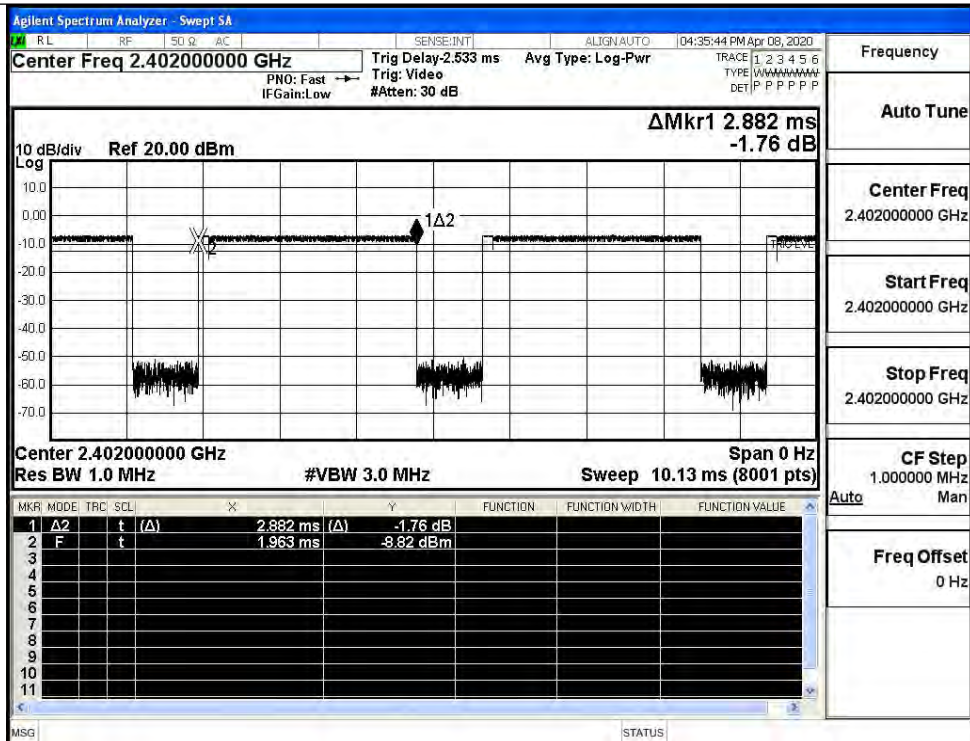
GFSK\_DH5/MCH



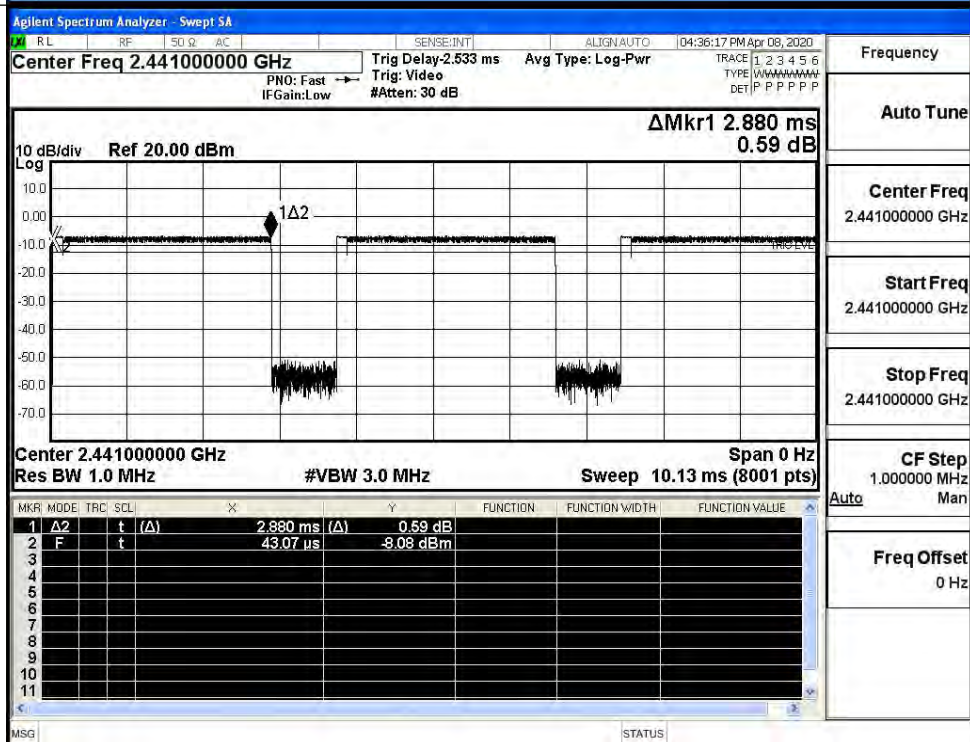
GFSK\_DH5/HCH



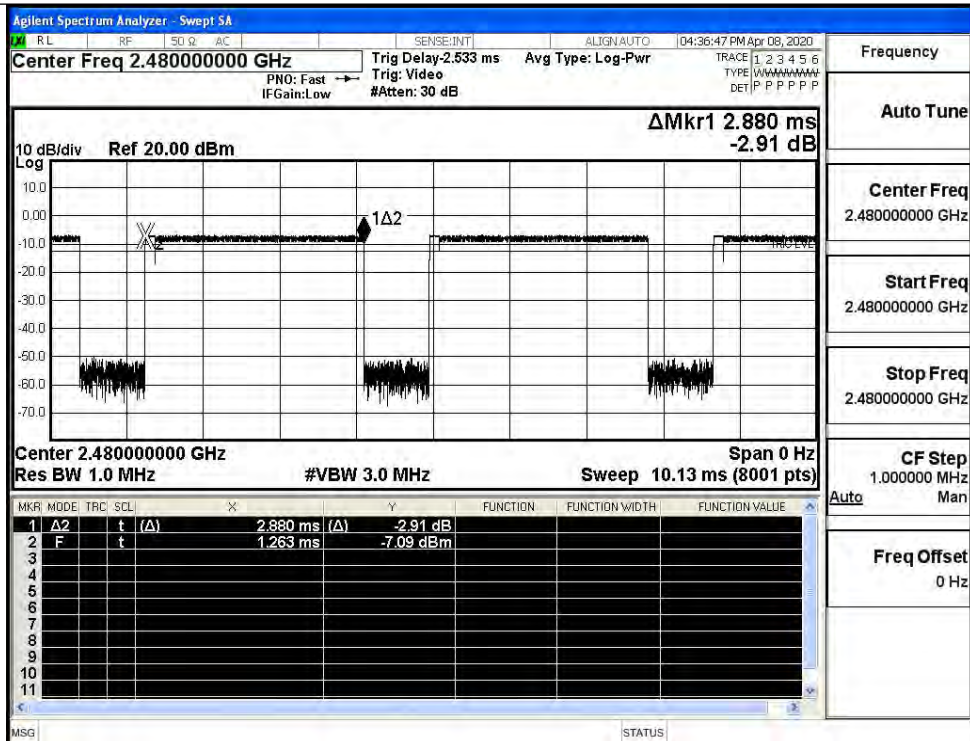
$\pi/4$ DQPSK  
\_2DH5/LCH



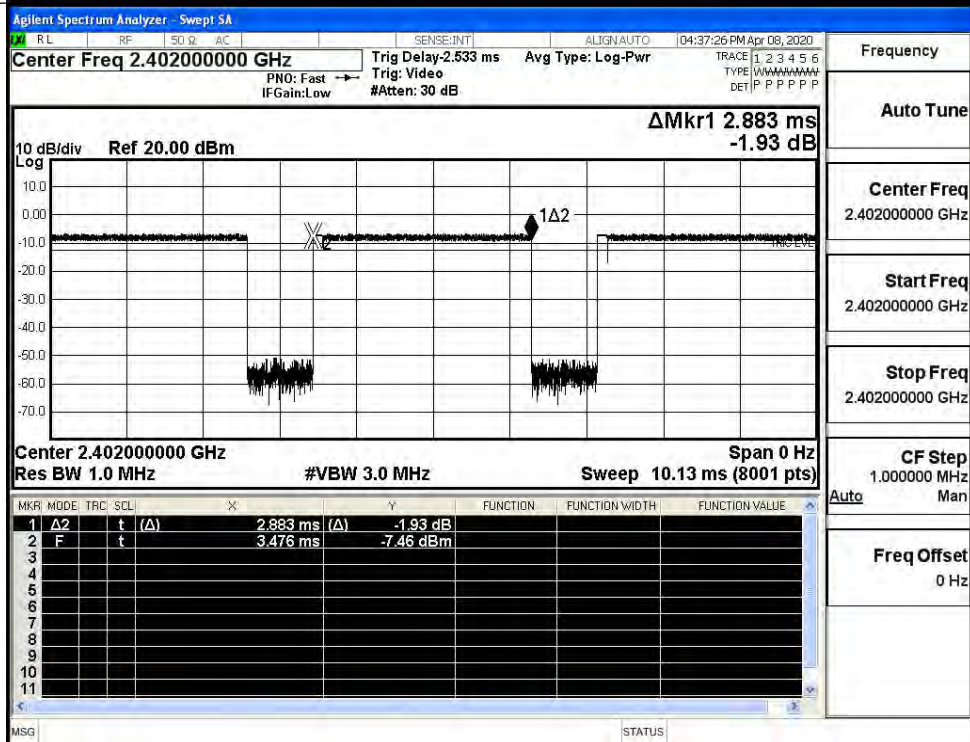
$\pi/4$ DQPSK  
\_2DH5/MCH



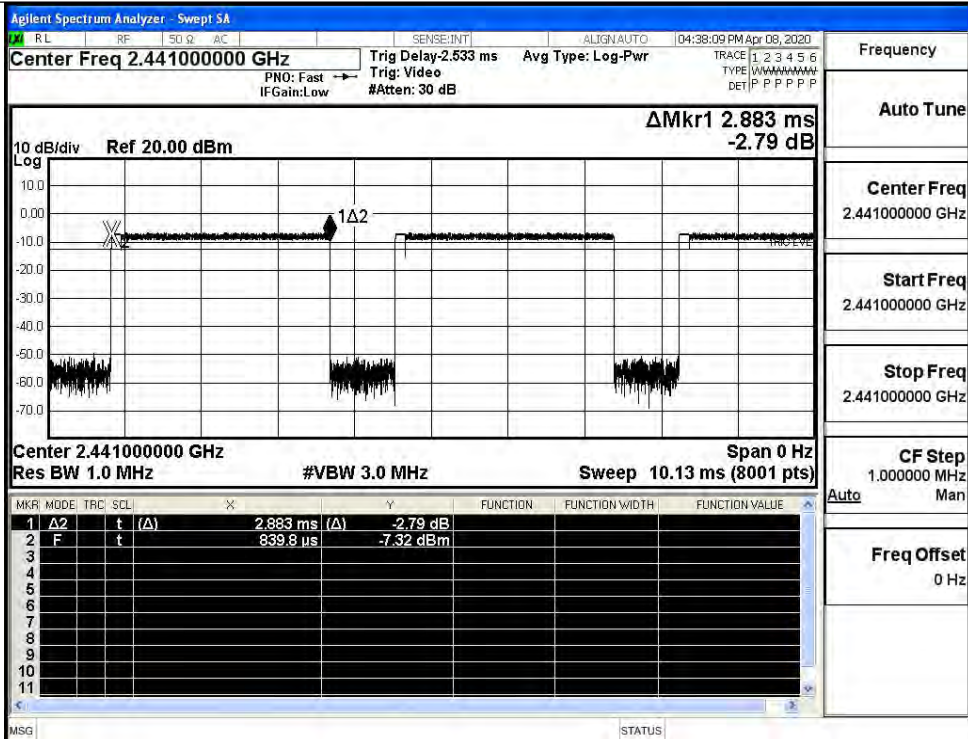
$\pi/4$ DQPSK  
\_2DH5/HCH



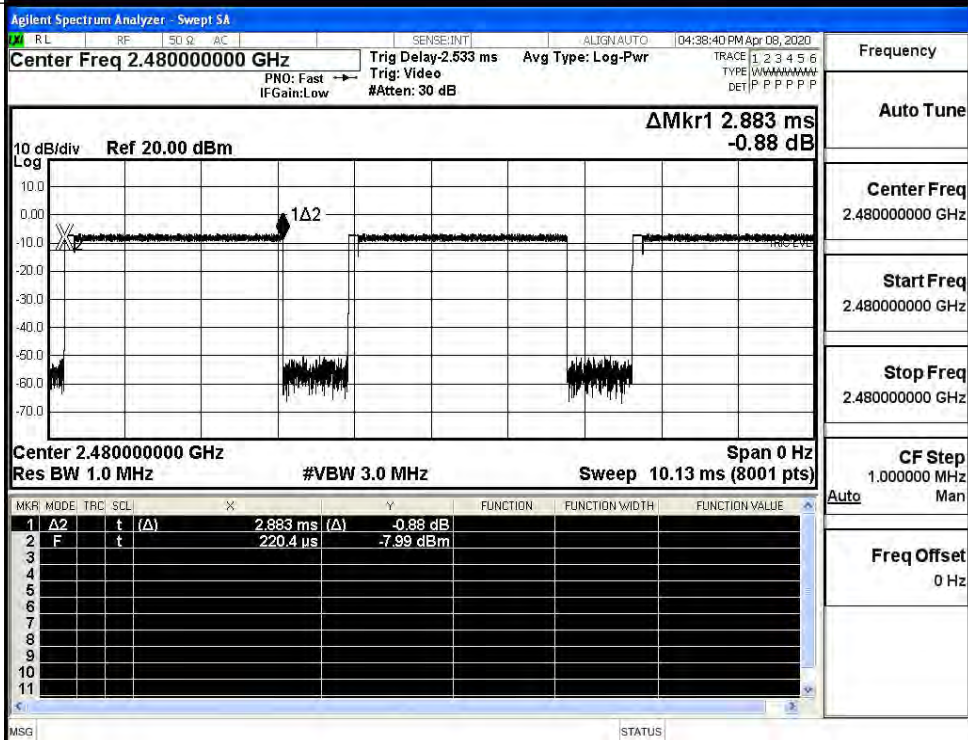
8DPSK \_3DH5/LCH



8DPSK\_3DH5/MCH



8DPSK\_3DH5/HCH

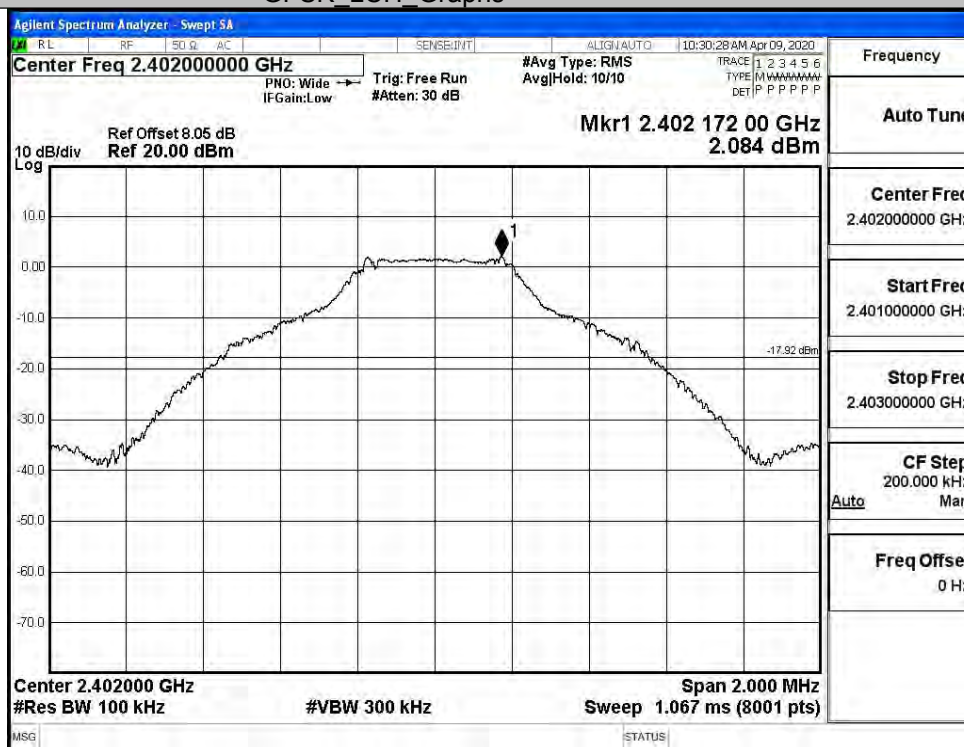


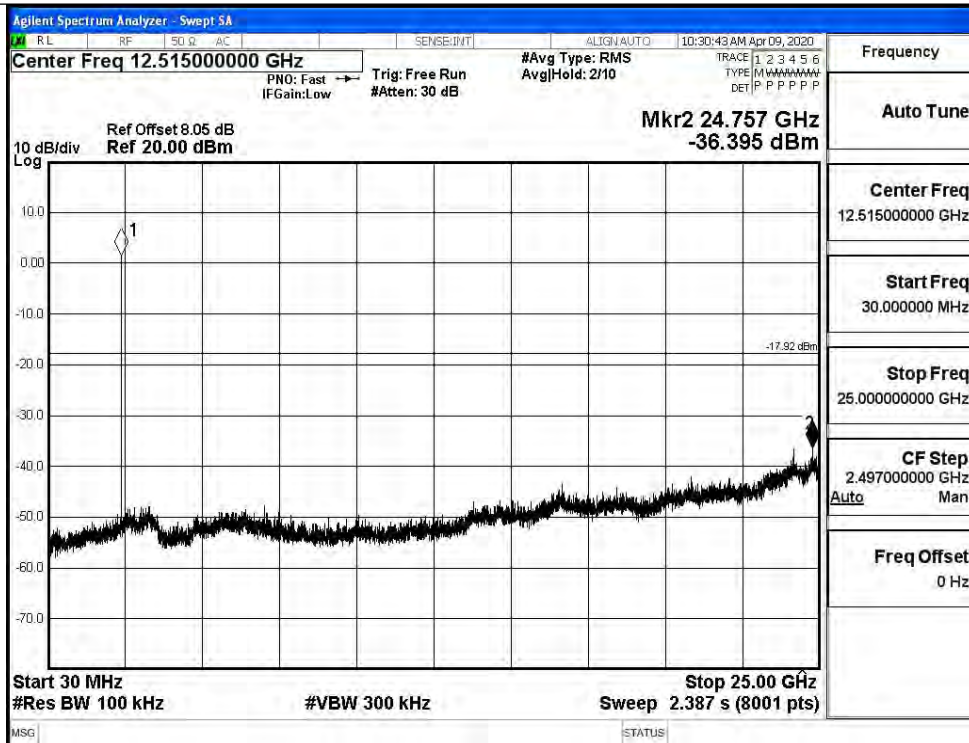
## A.6 RF Conducted Spurious Emissions

| Mode          | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK          | LCH     | 2.084      | -36.395          | -17.916     | PASS    |
|               | MCH     | 2.000      | -36.463          | -18.000     | PASS    |
|               | HCH     | 2.099      | -37.402          | -17.901     | PASS    |
| $\pi/4$ DQPSK | LCH     | 1.539      | -35.927          | -18.461     | PASS    |
|               | MCH     | 1.369      | -36.640          | -18.631     | PASS    |
|               | HCH     | 1.458      | -37.676          | -18.542     | PASS    |
| 8DPSK         | LCH     | 1.518      | -37.069          | -18.482     | PASS    |
|               | MCH     | 1.412      | -37.039          | -18.588     | PASS    |
|               | HCH     | 1.262      | -37.837          | -18.738     | PASS    |

GFSK LCH Graphs

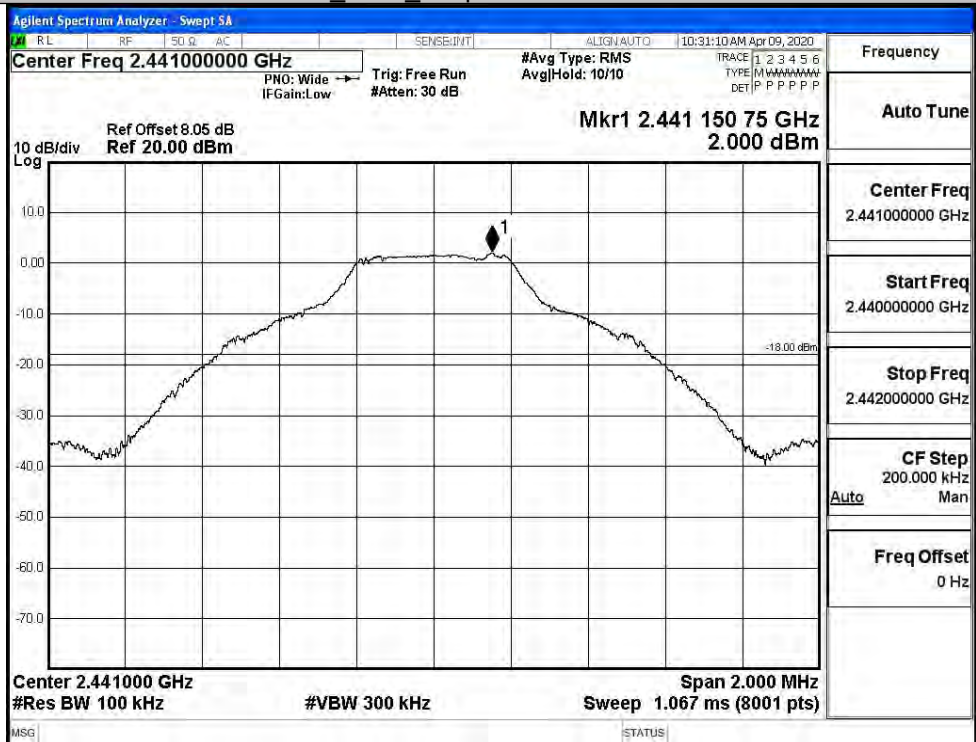
Pref



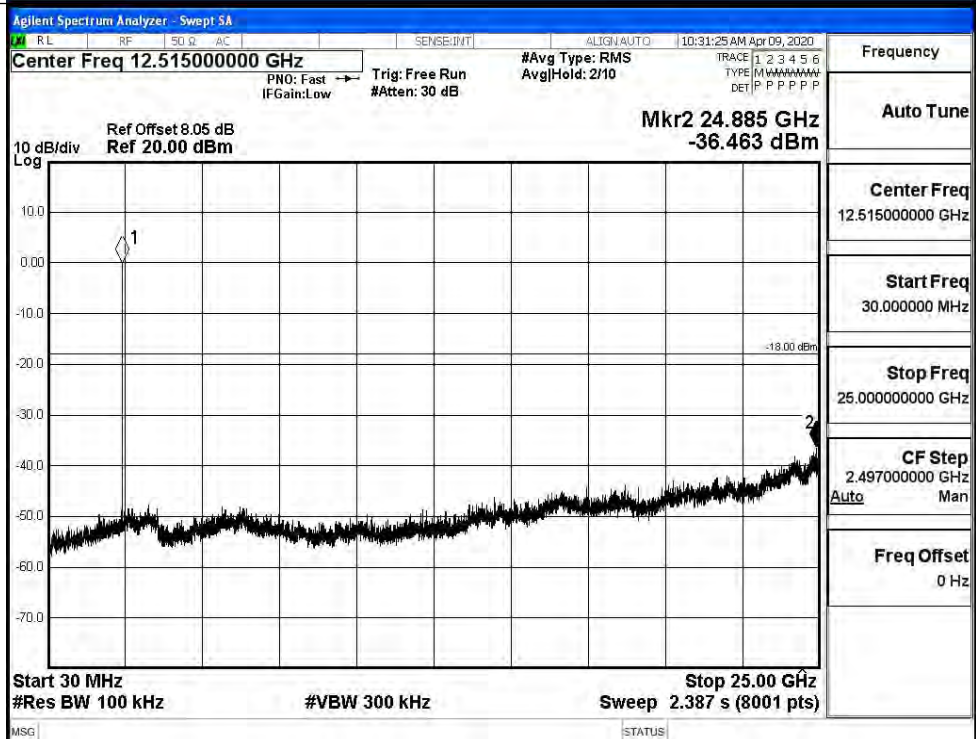
P<sub>u</sub>w

## GFSK\_MCH\_Graphs

Pref

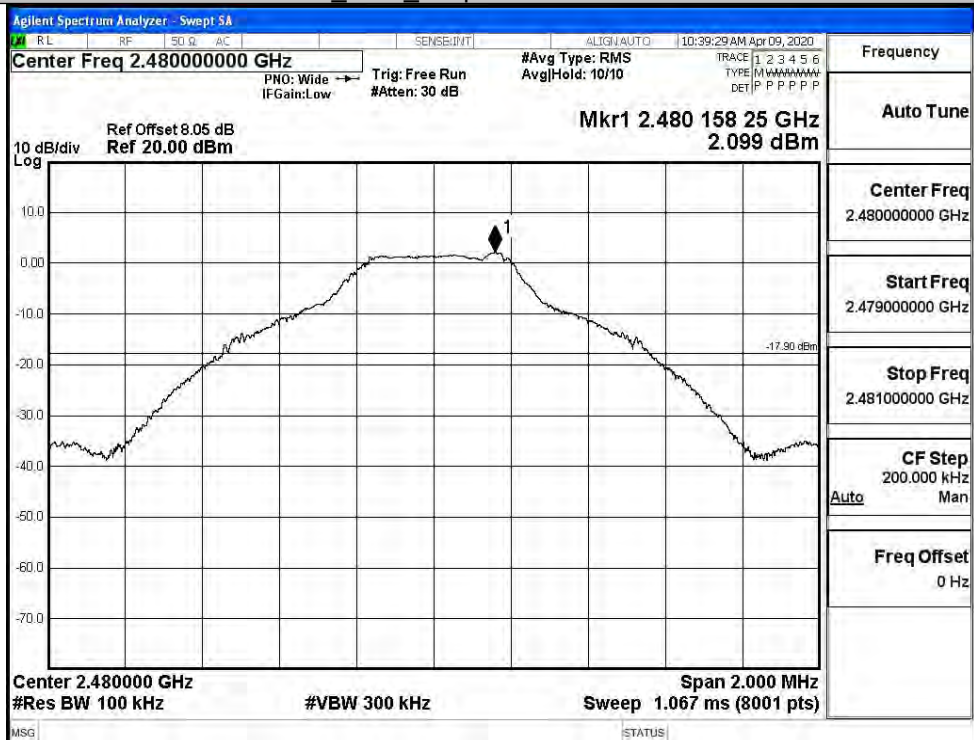


Puw

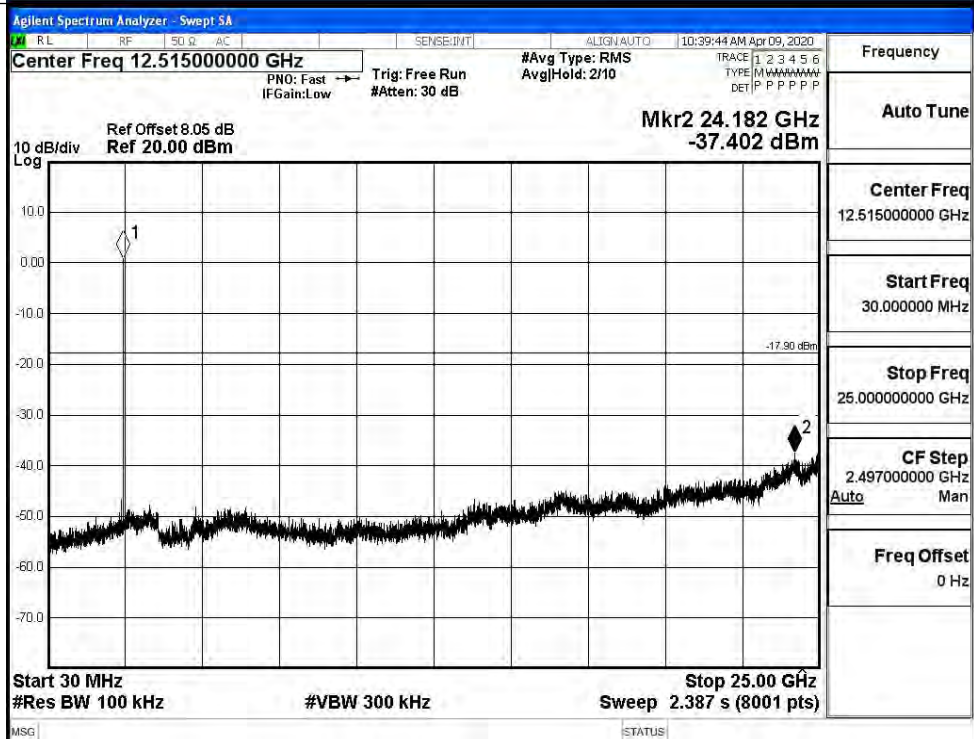


## GFSK\_HCH\_Graphs

Pref

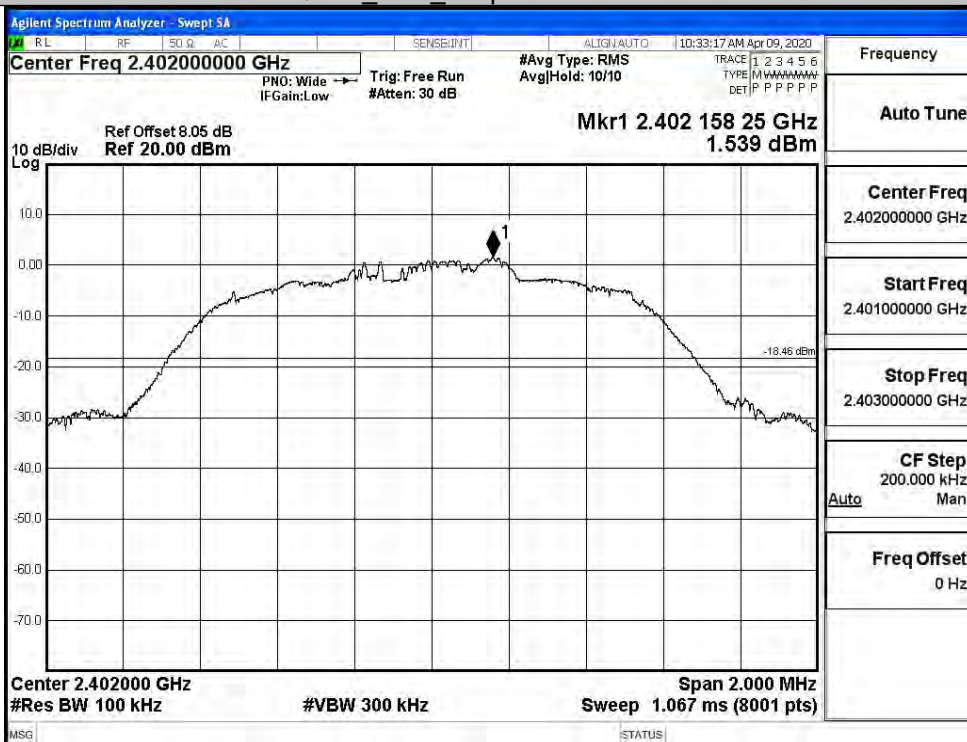


Puw

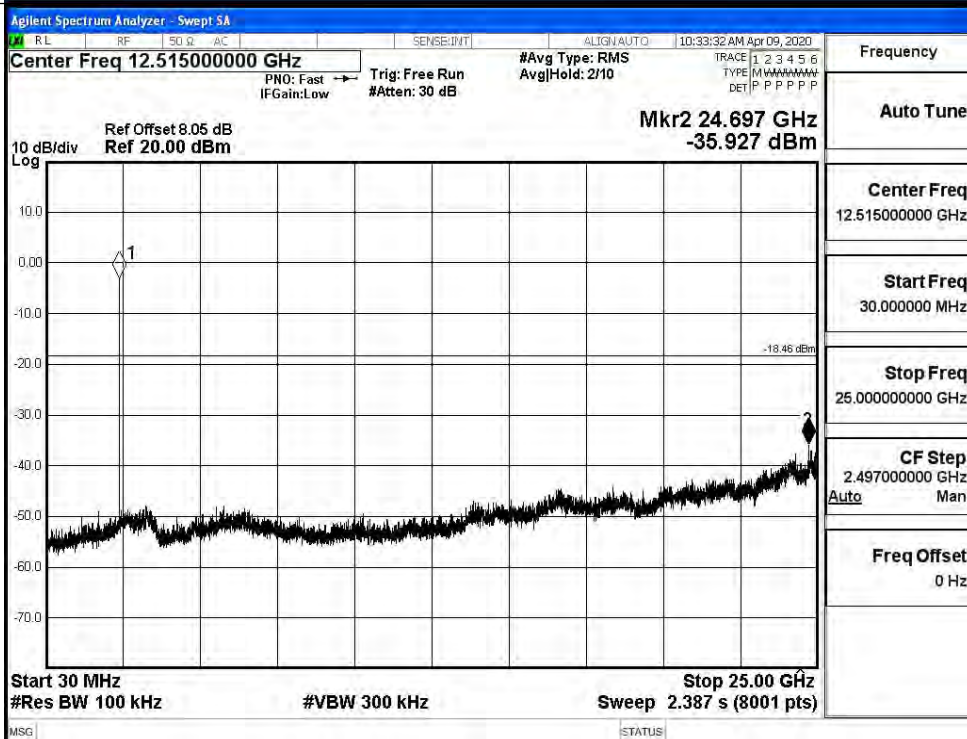


$\pi/4$ DQPSK\_LCH\_Graphs

Pref

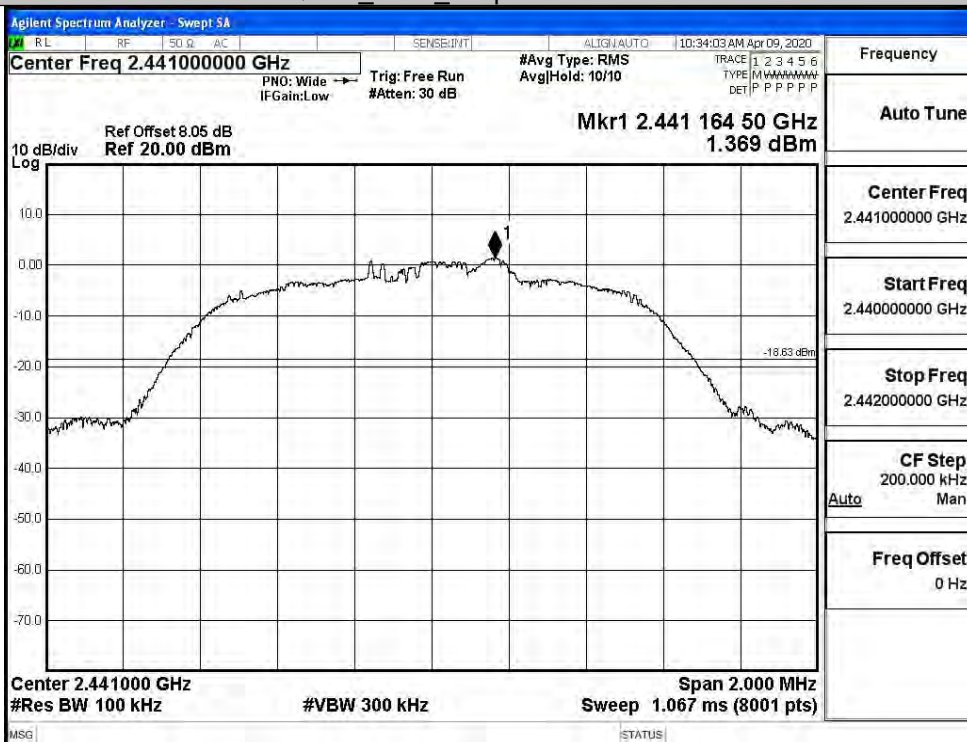


Puw

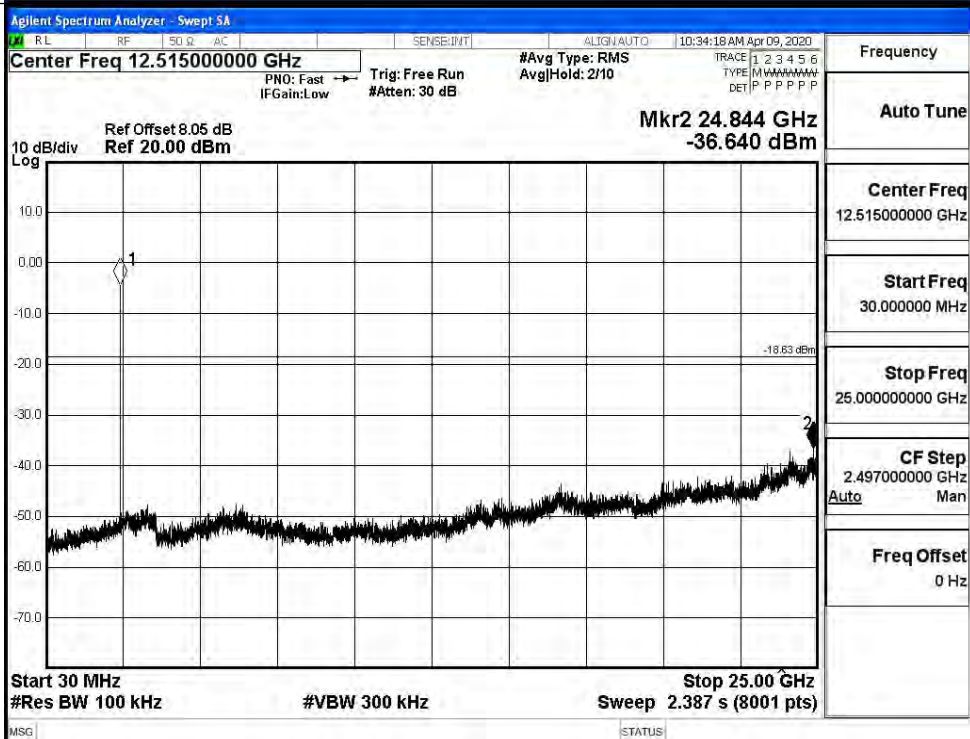


$\pi/4$ DQPSK\_MCH\_Graphs

Pref

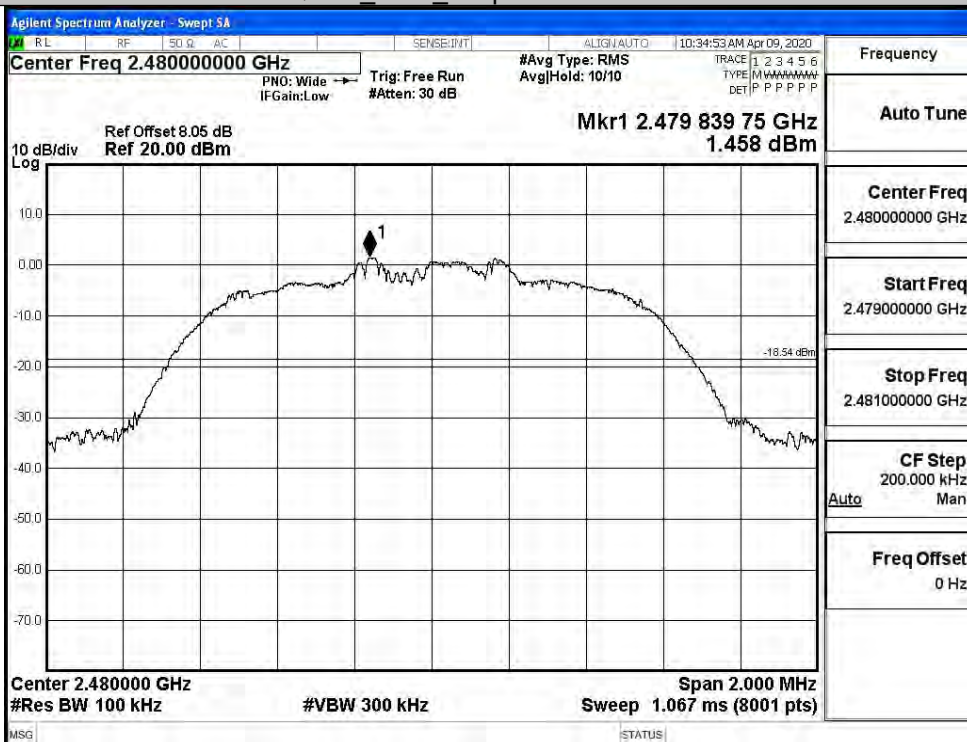


Puw

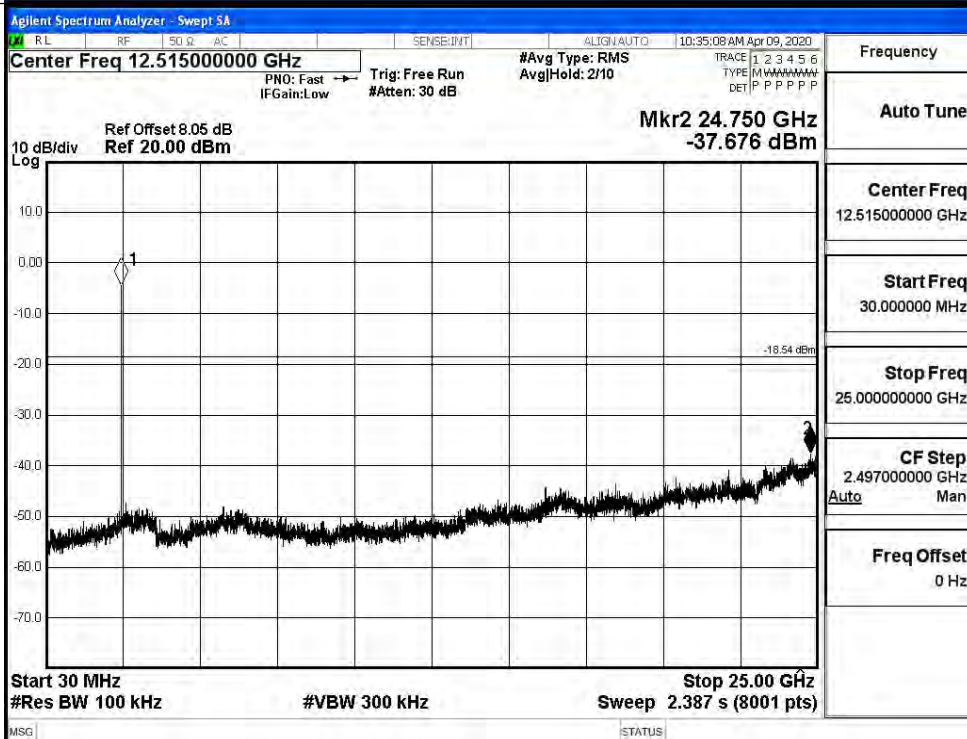


$\pi/4$ DQPSK\_HCH\_Graphs

Pref

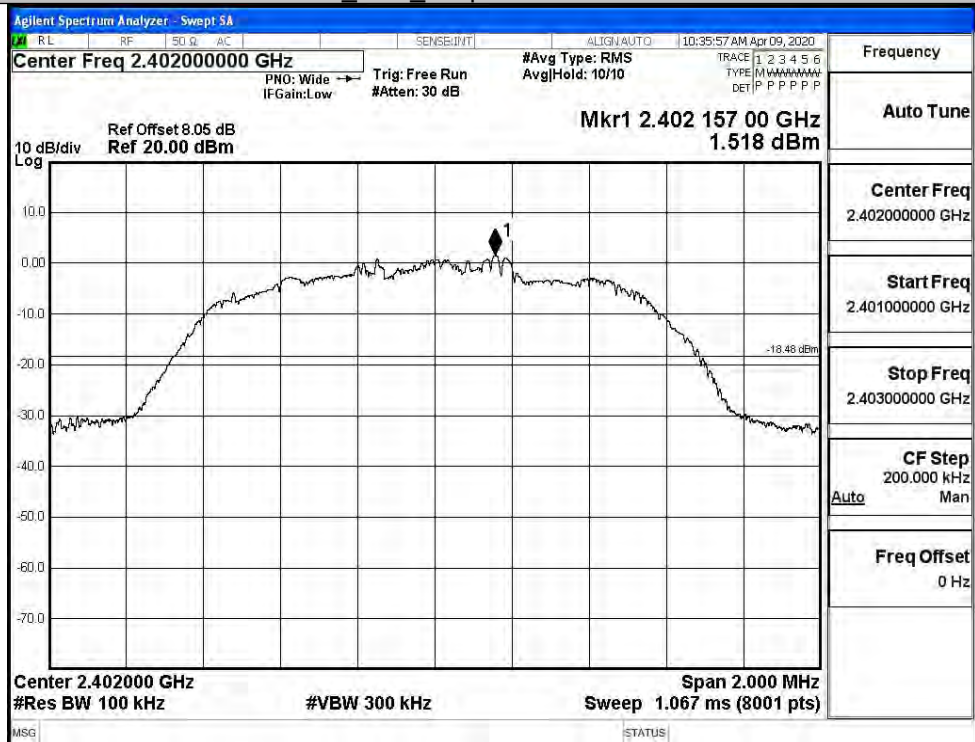


Puw

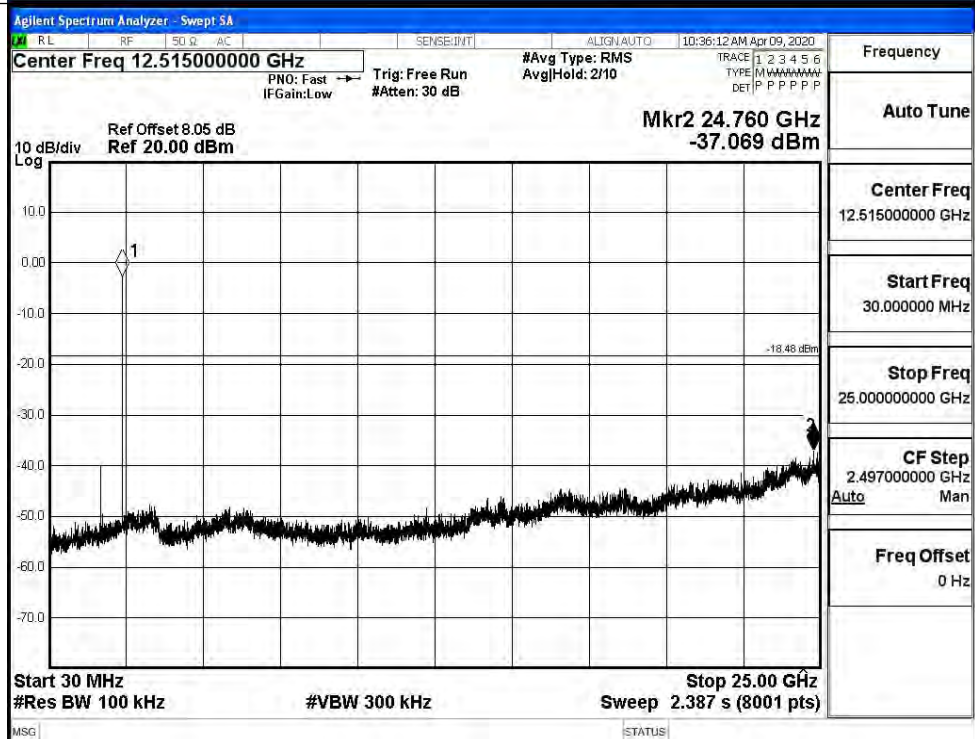


## 8DPSK\_LCH\_Graphs

Pref

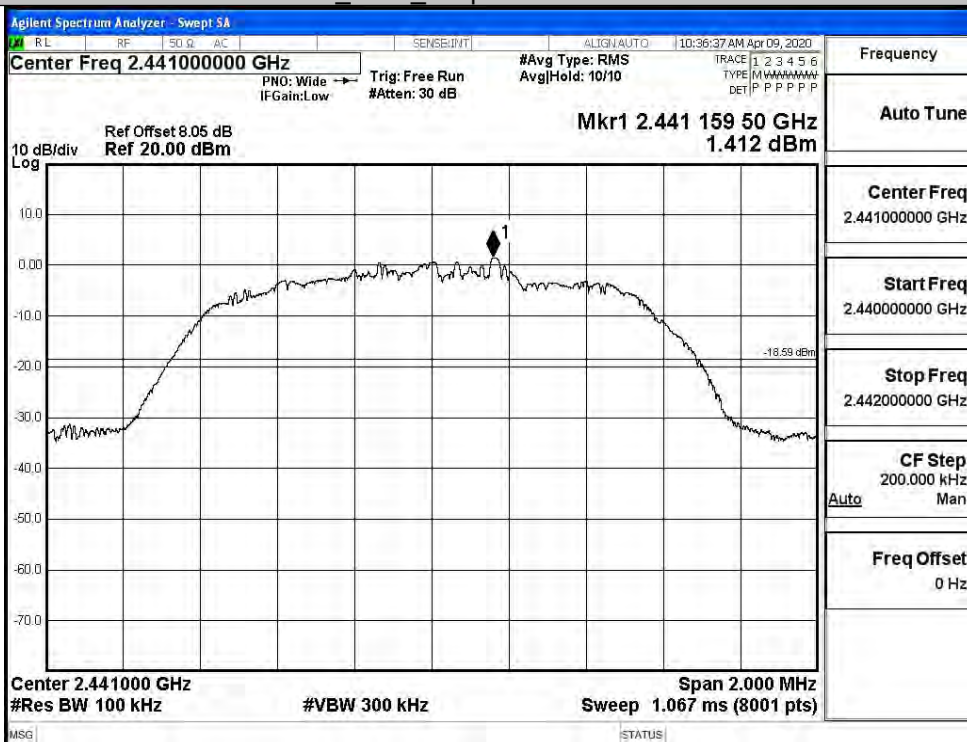


Puw

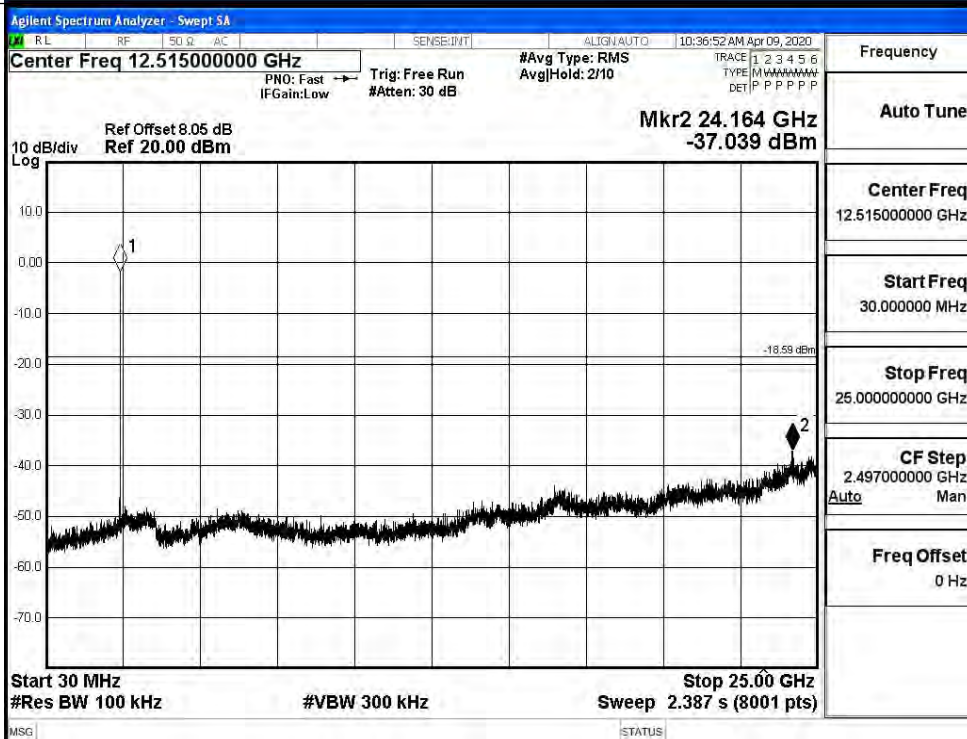


## 8DPSK\_MCH\_Graphs

Pref

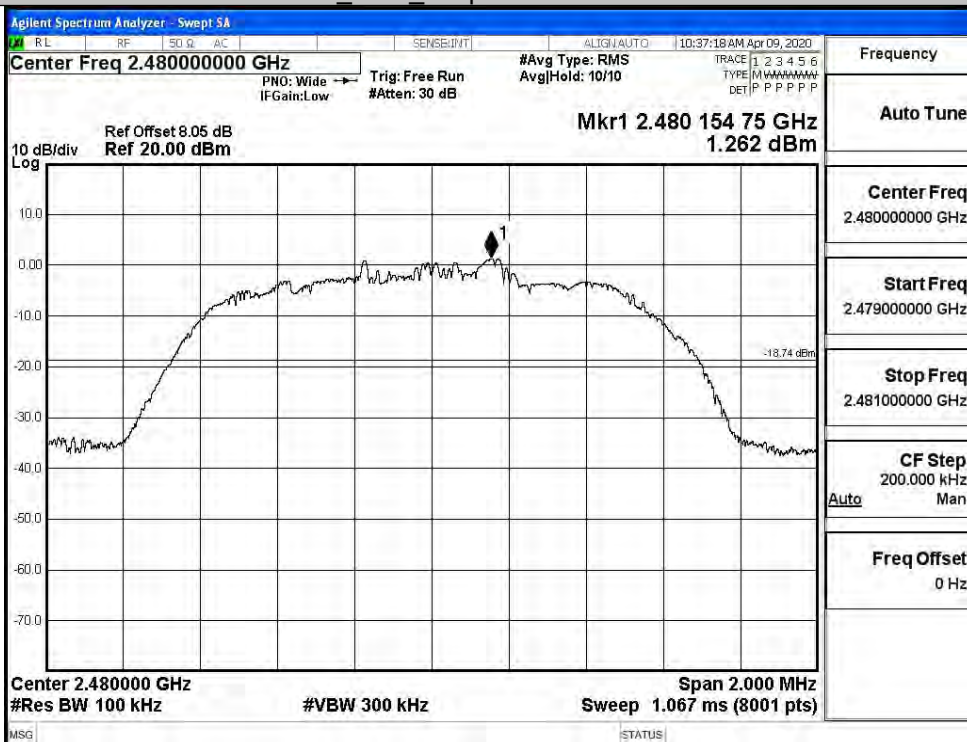


Puw

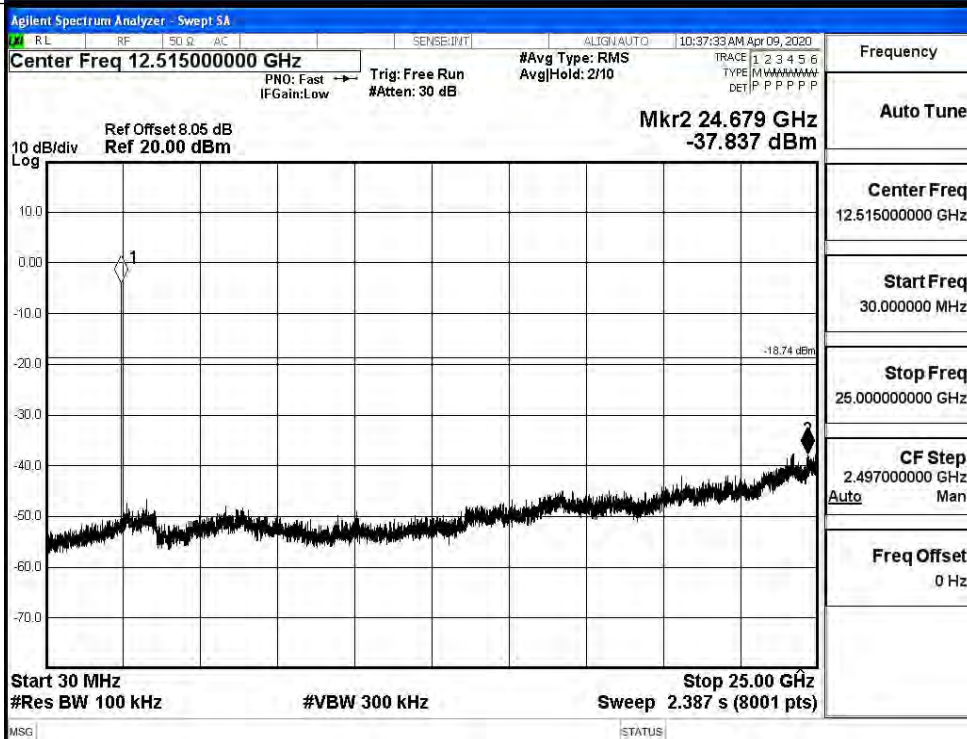


## 8DPSK\_HCH\_Graphs

Pref



Puw

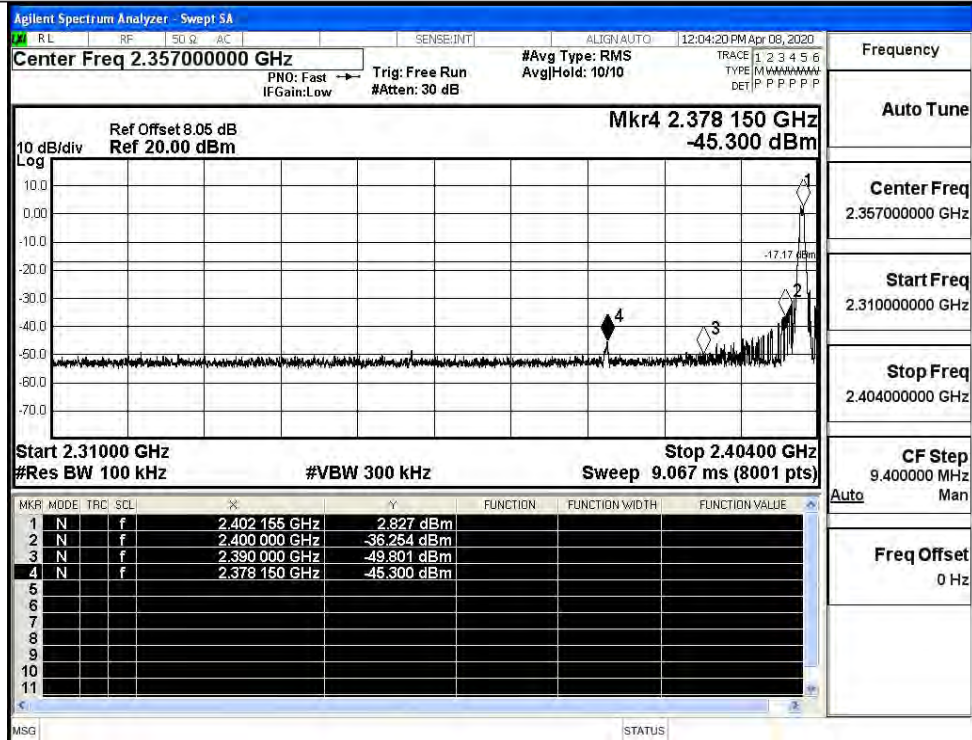


**A.7 Band-edge for RF Conducted Emissions**

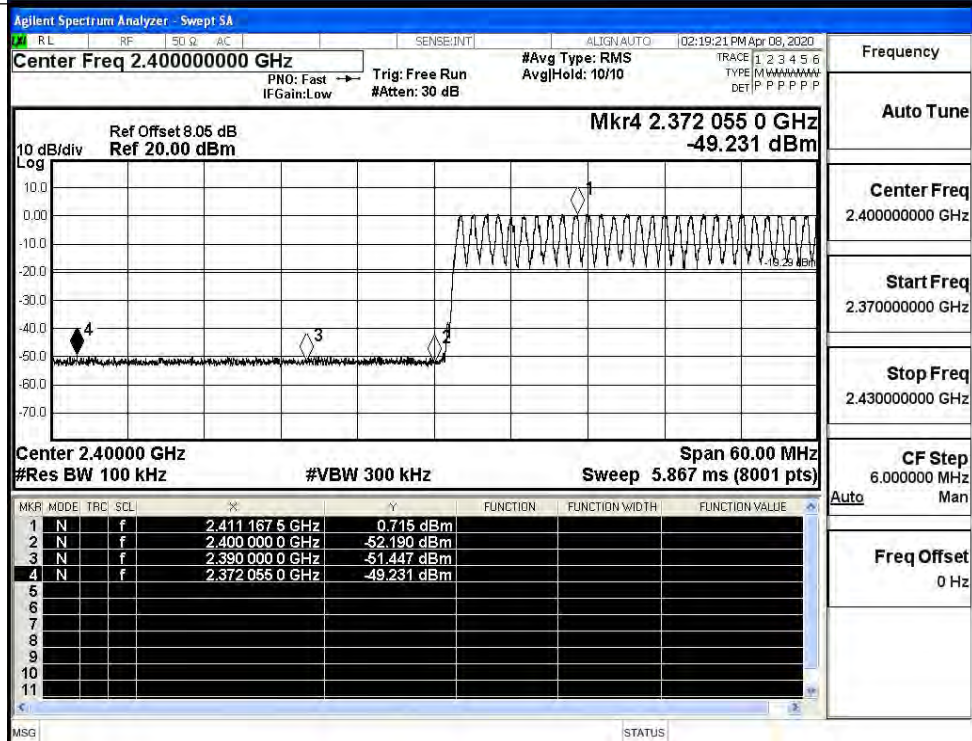
| Mode          | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | 2.827               | Off               | -45.300                  | -17.17      | PASS    |
|               |         |                         | 0.715               | On                | -49.231                  | -19.29      | PASS    |
|               | HCH     | 2480                    | 0.569               | Off               | -41.225                  | -19.43      | PASS    |
|               |         |                         | 0.961               | On                | -48.672                  | -19.04      | PASS    |
| $\pi/4$ DQPSK | LCH     | 2402                    | 1.500               | Off               | -47.962                  | -18.5       | PASS    |
|               |         |                         | 0.127               | On                | -49.284                  | -19.87      | PASS    |
|               | HCH     | 2480                    | -0.914              | Off               | -48.776                  | -20.91      | PASS    |
|               |         |                         | 0.154               | On                | -48.485                  | -19.85      | PASS    |
| 8DPSK         | LCH     | 2402                    | 1.621               | Off               | -46.869                  | -18.38      | PASS    |
|               |         |                         | 0.014               | On                | -49.134                  | -19.99      | PASS    |
|               | HCH     | 2480                    | -0.777              | Off               | -48.653                  | -20.78      | PASS    |
|               |         |                         | 0.026               | On                | -48.339                  | -19.97      | PASS    |

## Test Graphs

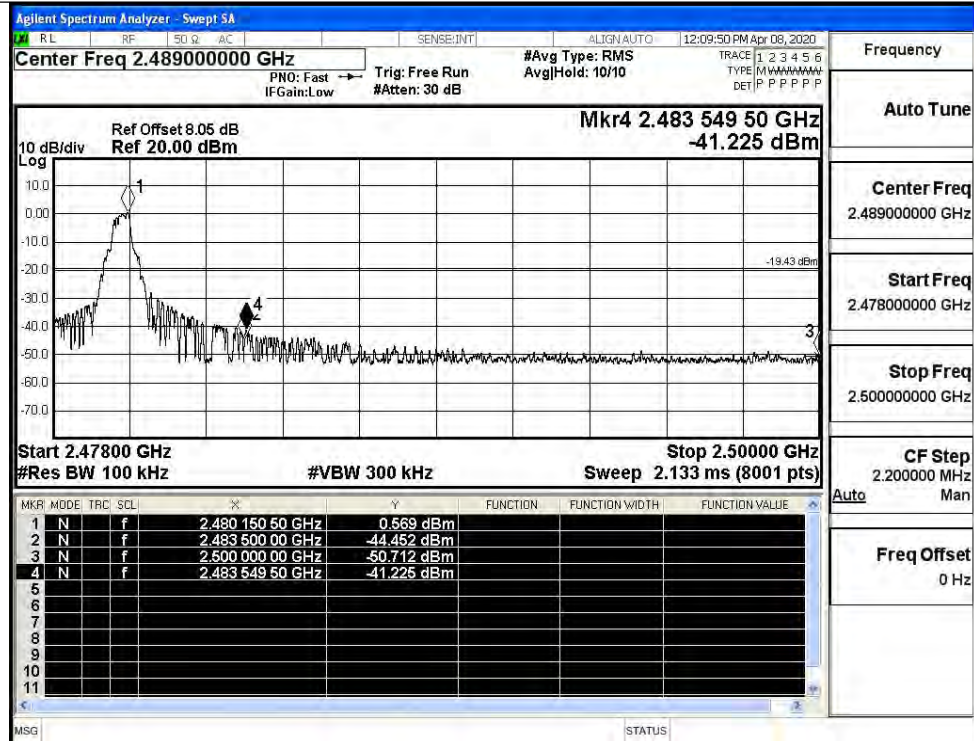
GFSK/LCH/No Hop



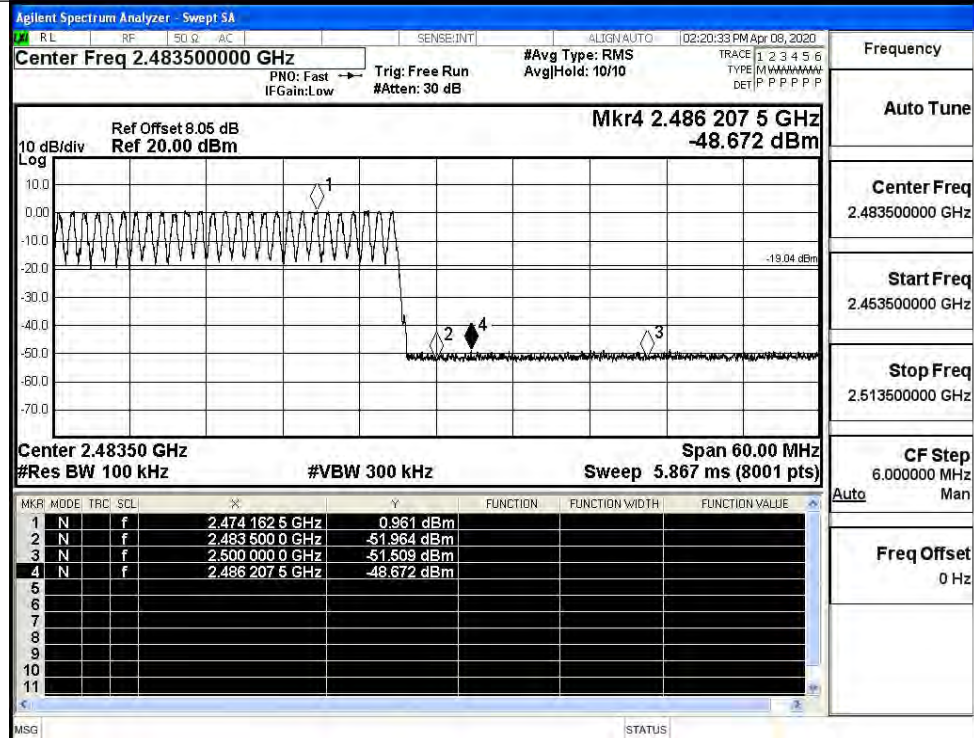
GFSK/LCH/Hop



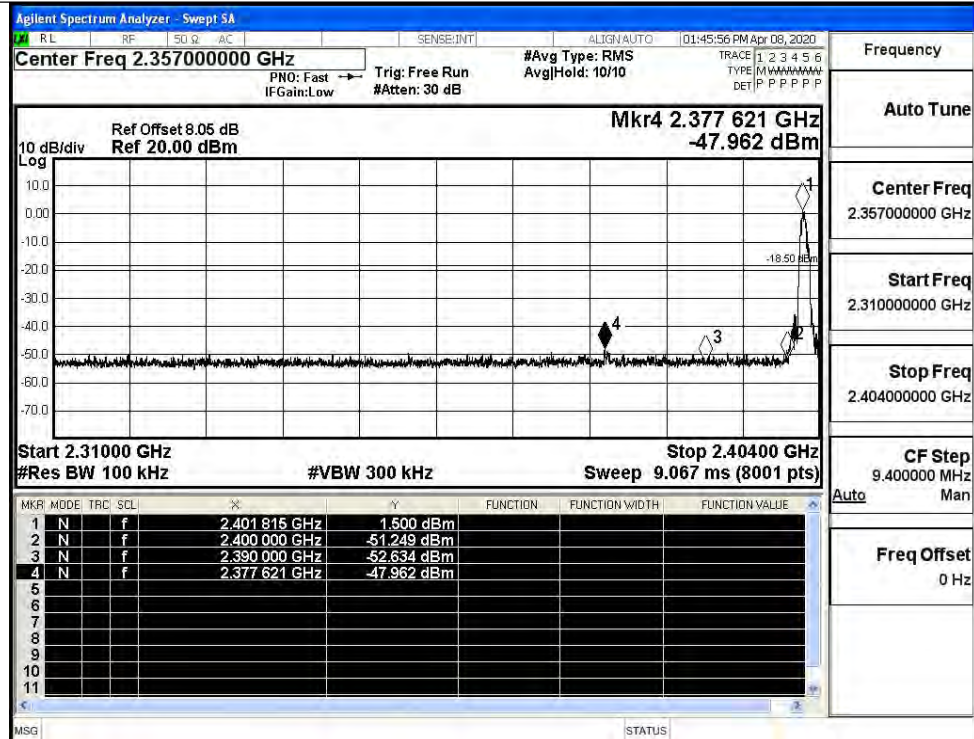
GFSK/HCH/No Hop



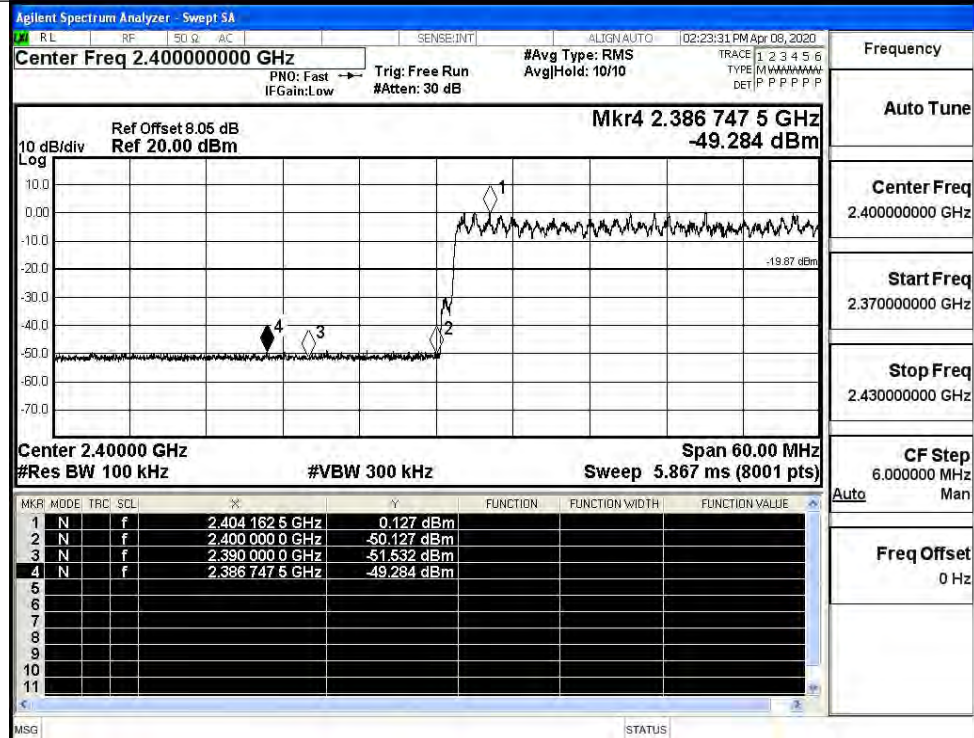
GFSK/HCH/Hop



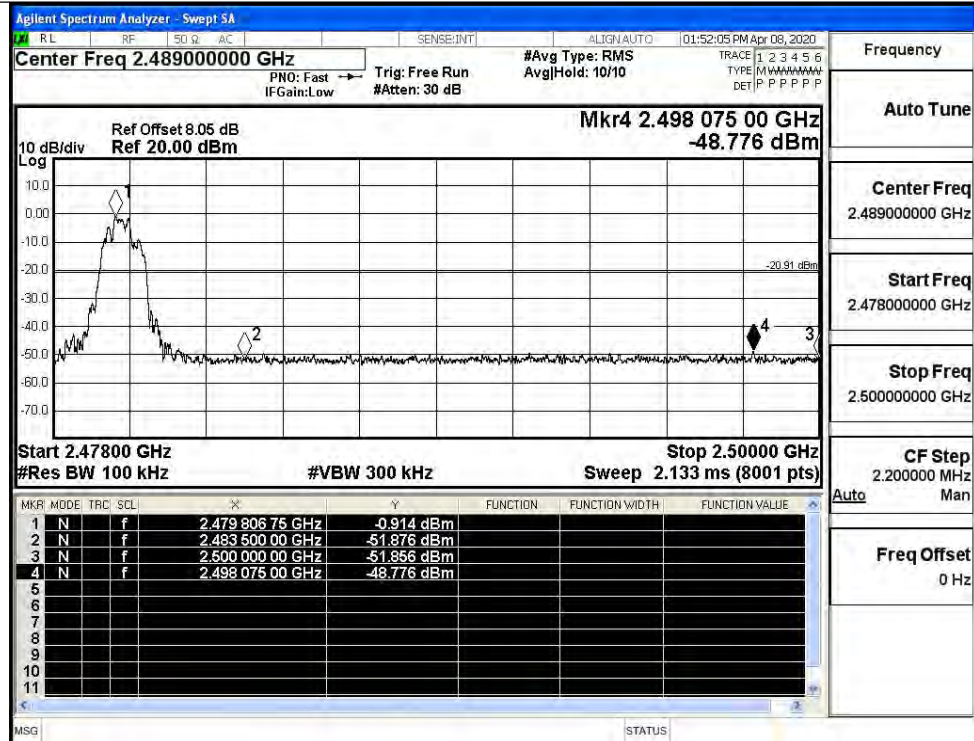
$\pi/4$ DQPSK/LCH/No  
Hop



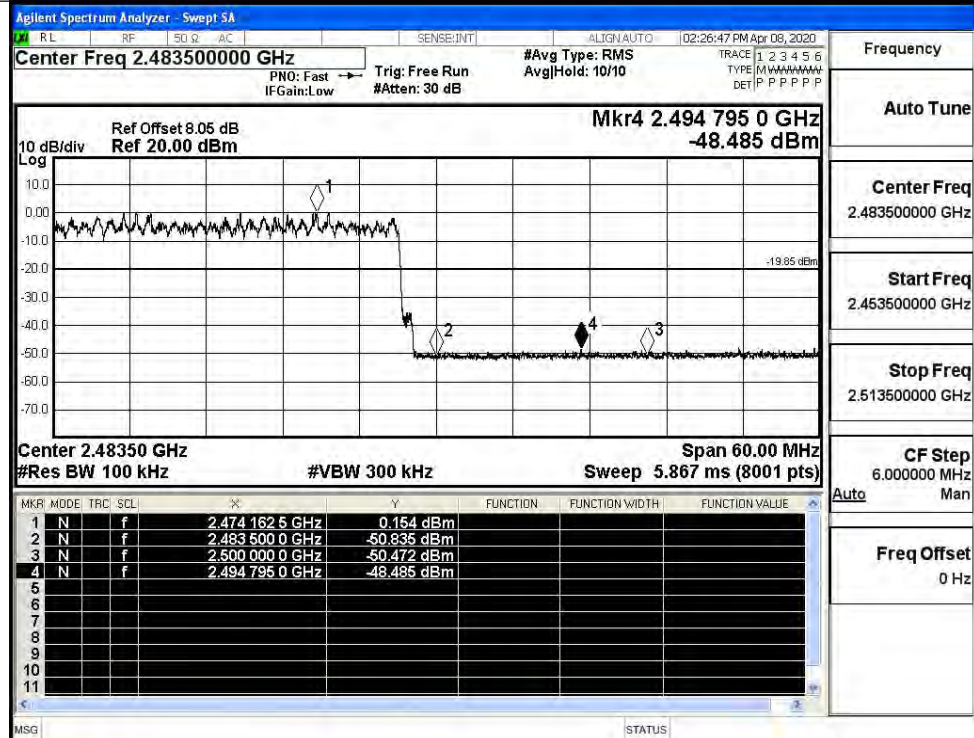
$\pi/4$ DQPSK/LCH/Hop



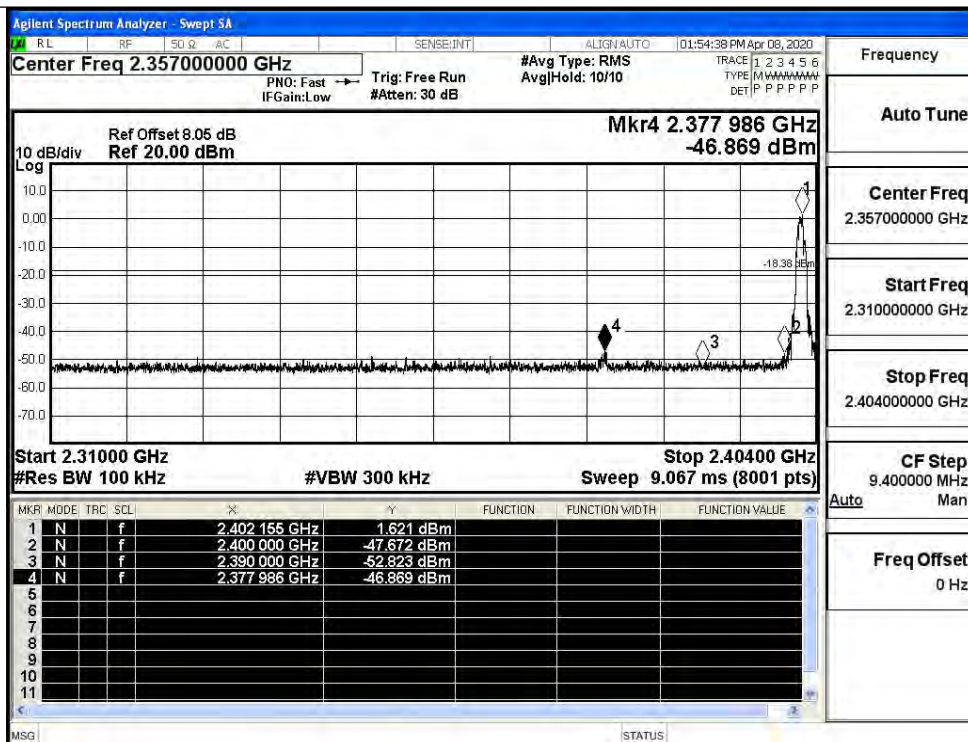
$\pi/4$ DQPSK/HCH/No  
Hop



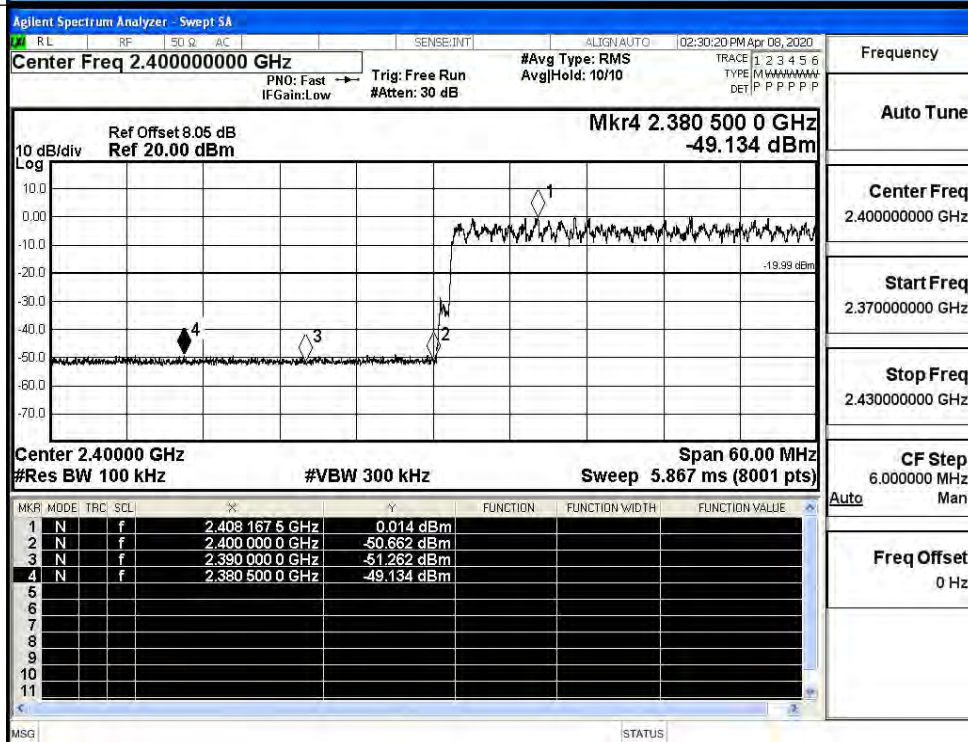
$\pi/4$ DQPSK/HCH/Hop



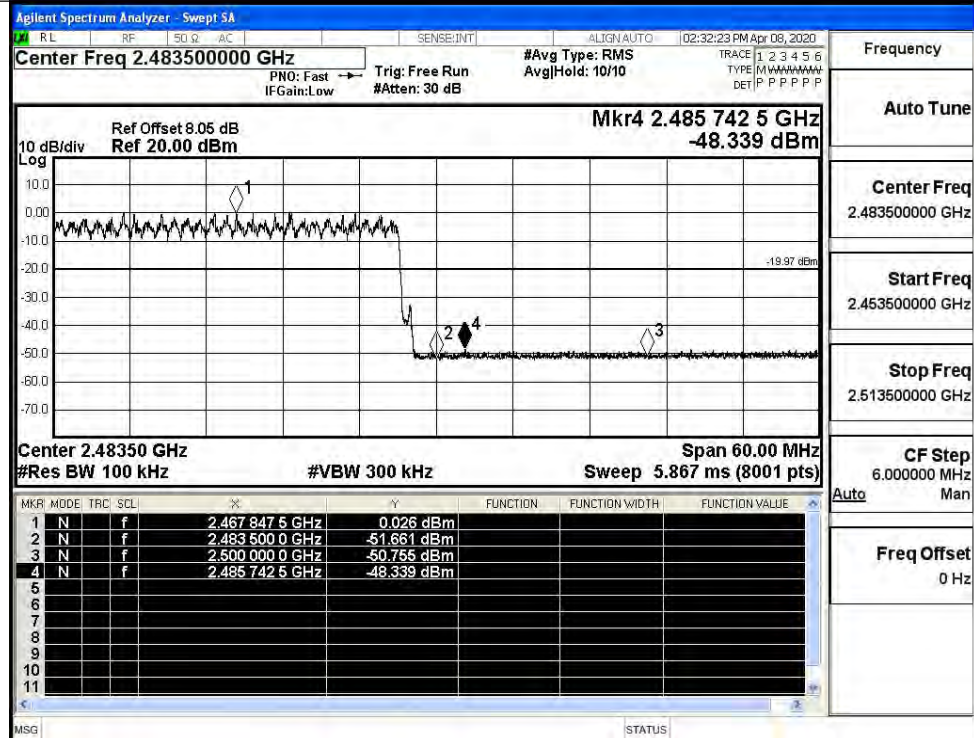
8DPSK/LCH/No Hop



8DPSK/LCH/Hop



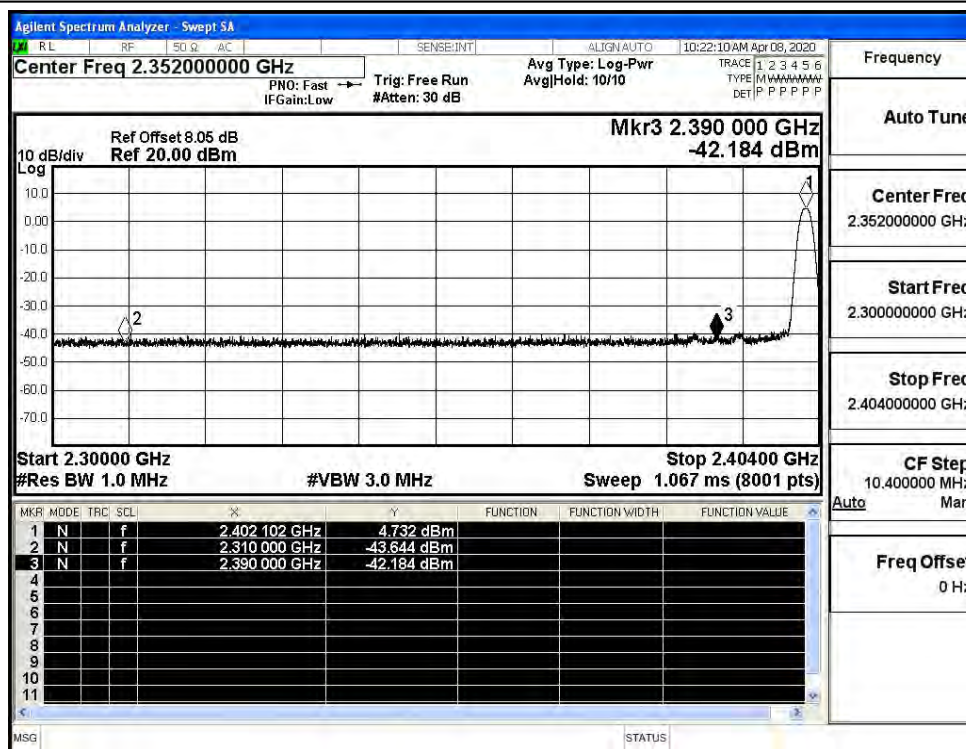
8DPSK/HCH/Hop



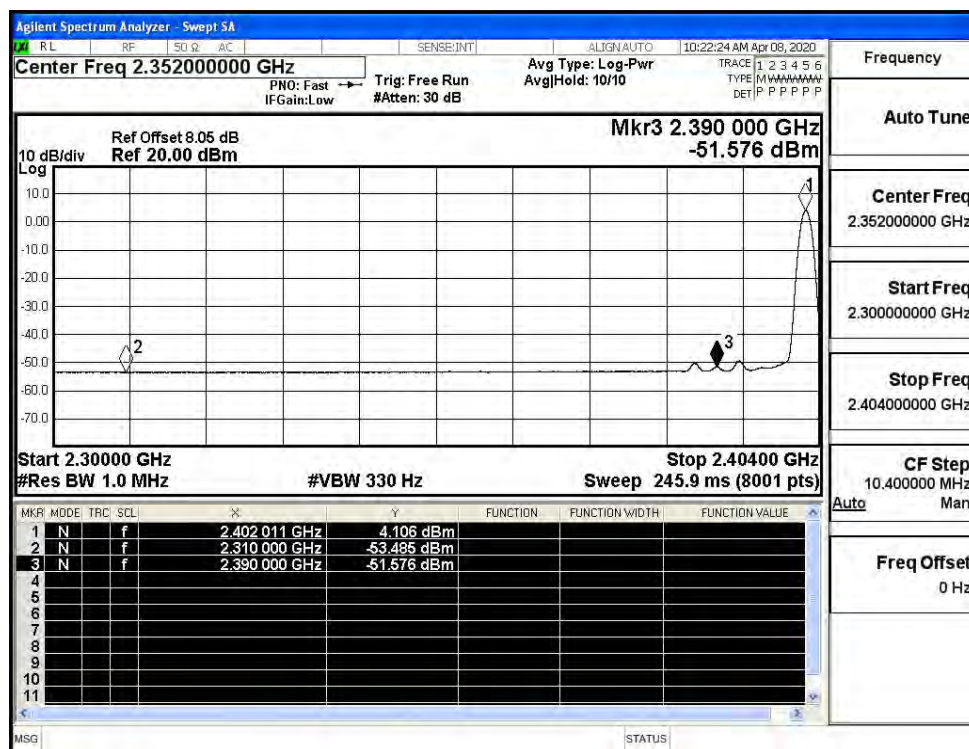
**A.8 Restrict-band band-edge measurements**

| Test Mode     | Hopping | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0 | -43.64      | 2.0  | 0             | 53.59      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.49      | 2.0  | 0             | 43.74      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -42.18      | 2.0  | 0             | 55.05      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -51.58      | 2.0  | 0             | 45.65      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -40.94      | 2.0  | 0             | 56.29      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -50.38      | 2.0  | 0             | 46.85      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -41.93      | 2.0  | 0             | 55.30      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -52.41      | 2.0  | 0             | 44.82      | AV       | 54             | PASS    |
| $\pi/4$ DQPSK | Off     | 2310.0 | -44.17      | 2.0  | 0             | 53.06      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.44      | 2.0  | 0             | 43.79      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -43.37      | 2.0  | 0             | 53.86      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.15      | 2.0  | 0             | 44.08      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -43.55      | 2.0  | 0             | 53.68      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -52.56      | 2.0  | 0             | 44.67      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -41.81      | 2.0  | 0             | 55.42      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -52.41      | 2.0  | 0             | 44.82      | AV       | 54             | PASS    |
| 8DPSK         | Off     | 2310.0 | -42.76      | 2.0  | 0             | 54.47      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.39      | 2.0  | 0             | 43.84      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -42.96      | 2.0  | 0             | 54.27      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.07      | 2.0  | 0             | 44.16      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -41.58      | 2.0  | 0             | 55.65      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -52.55      | 2.0  | 0             | 44.68      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -42.53      | 2.0  | 0             | 54.70      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -52.42      | 2.0  | 0             | 44.81      | AV       | 54             | PASS    |

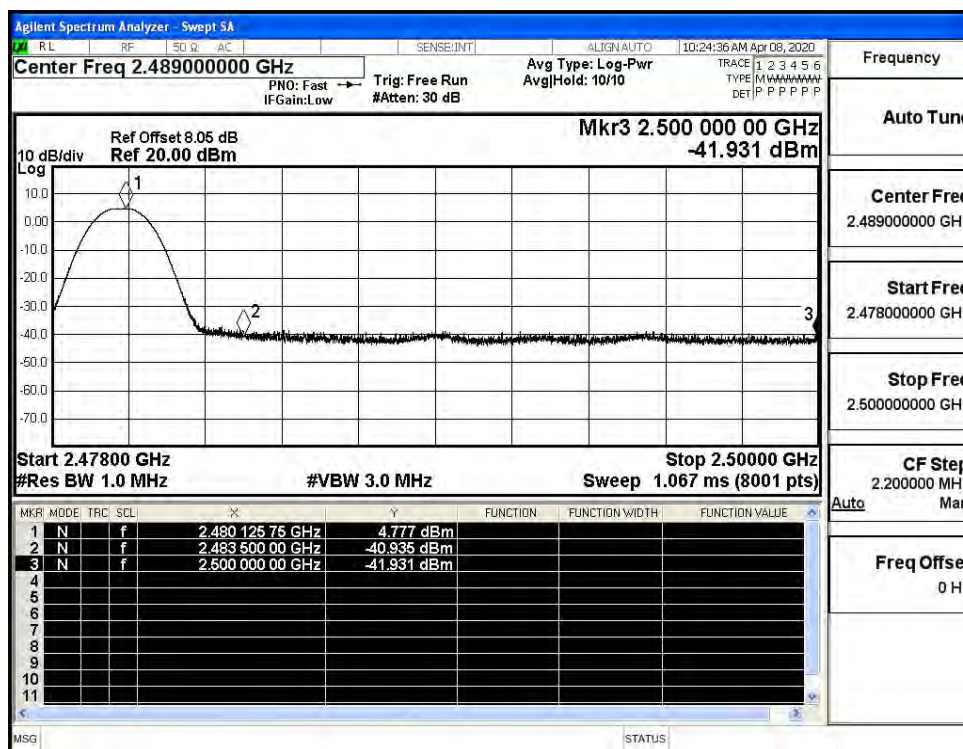
## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



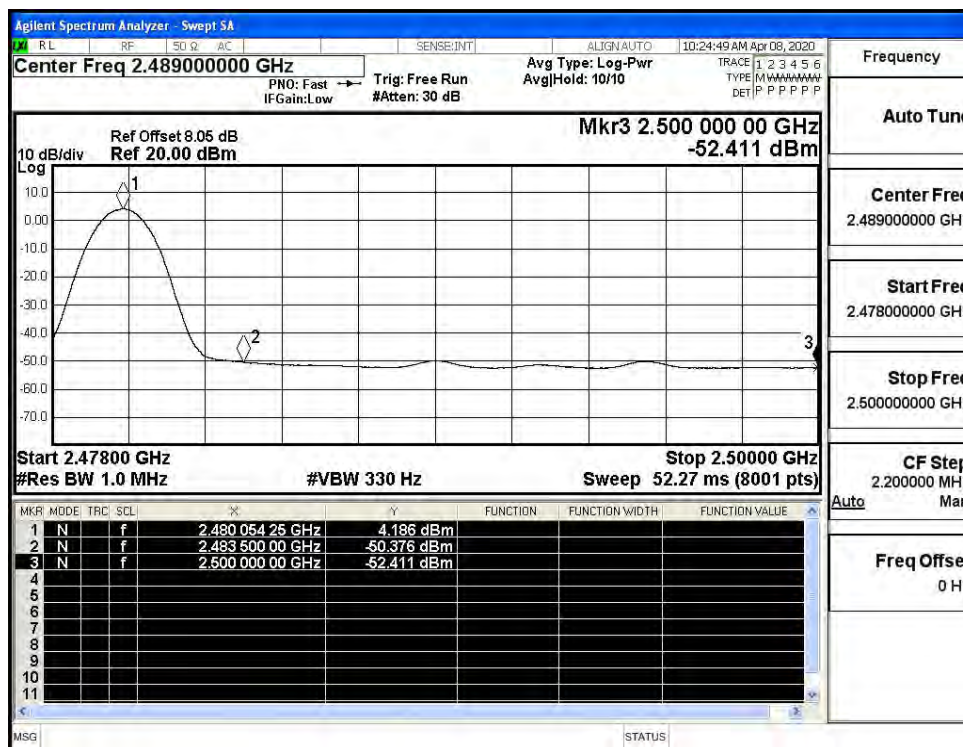
## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)

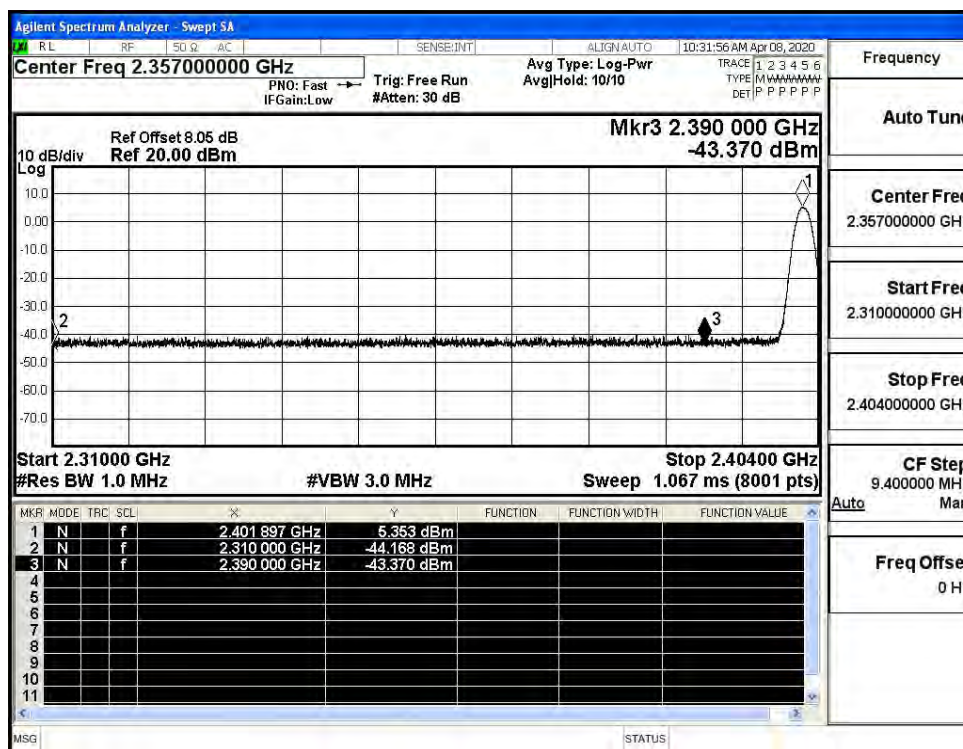
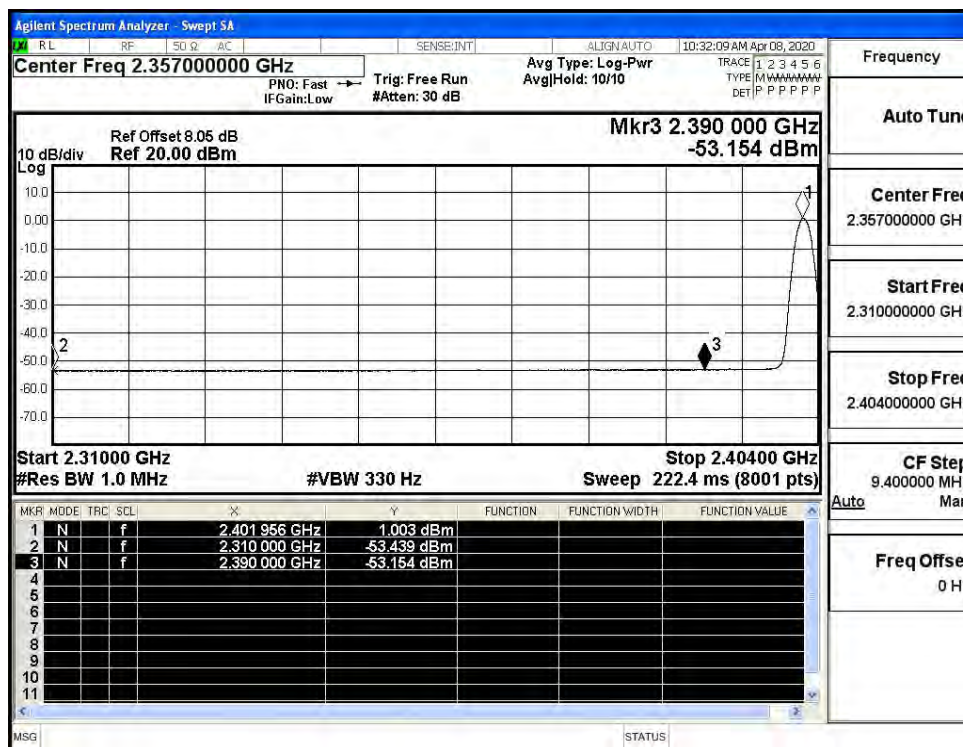


## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)

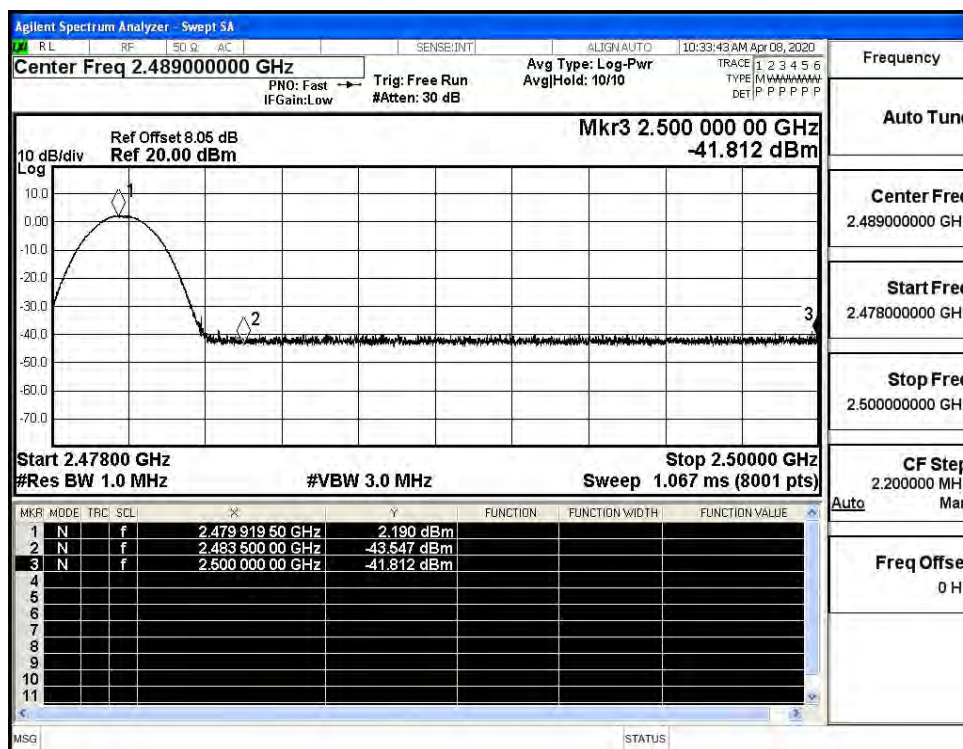


## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)

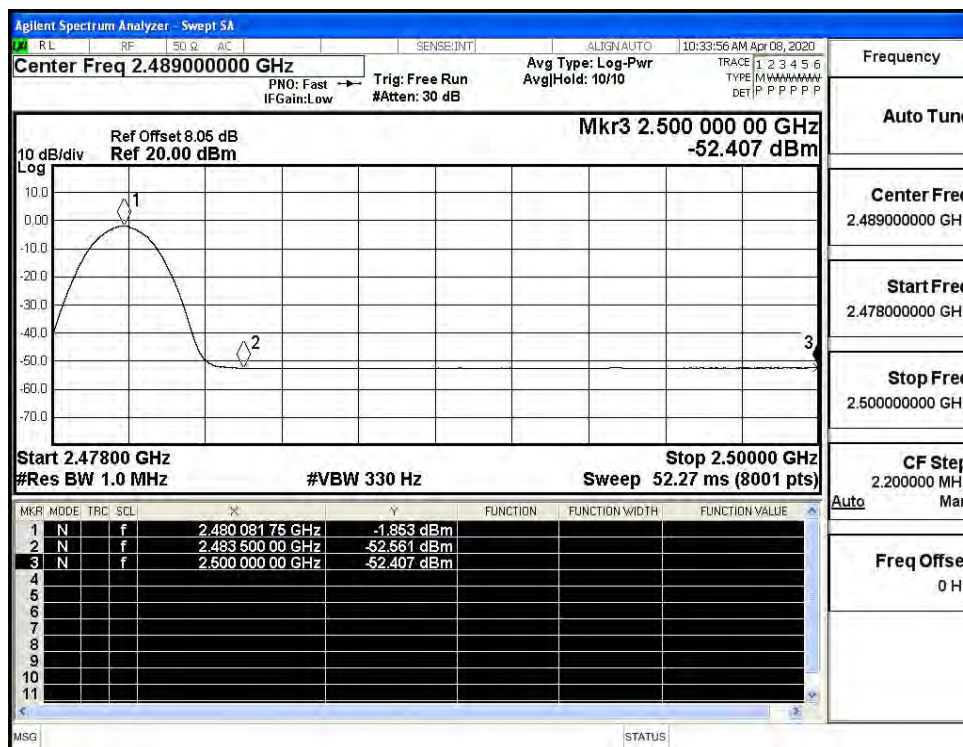


Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)

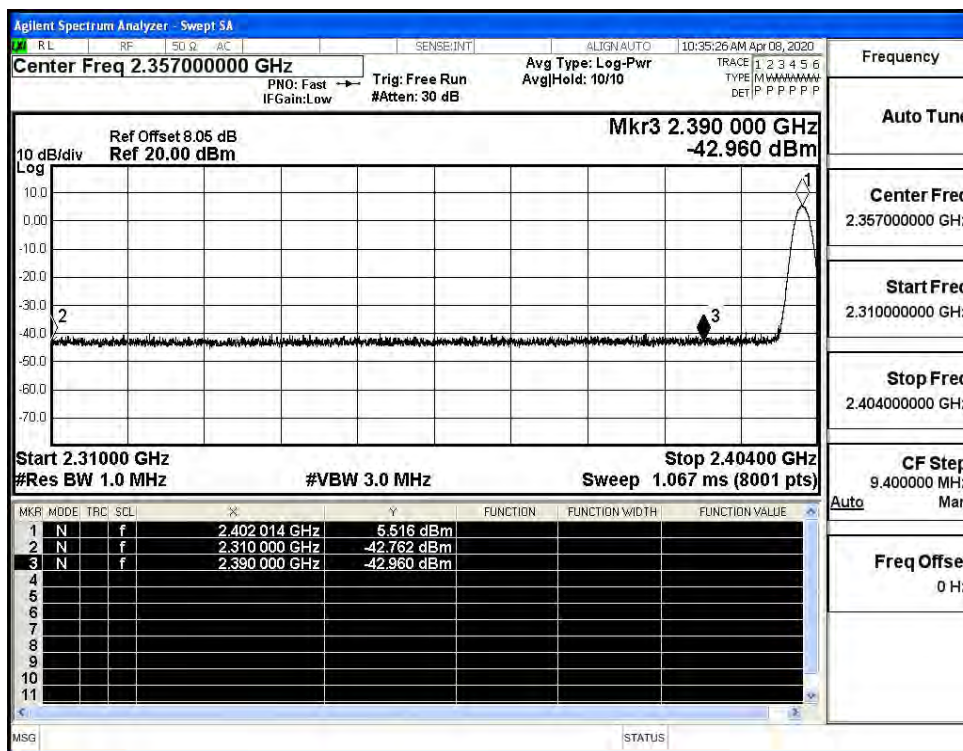
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



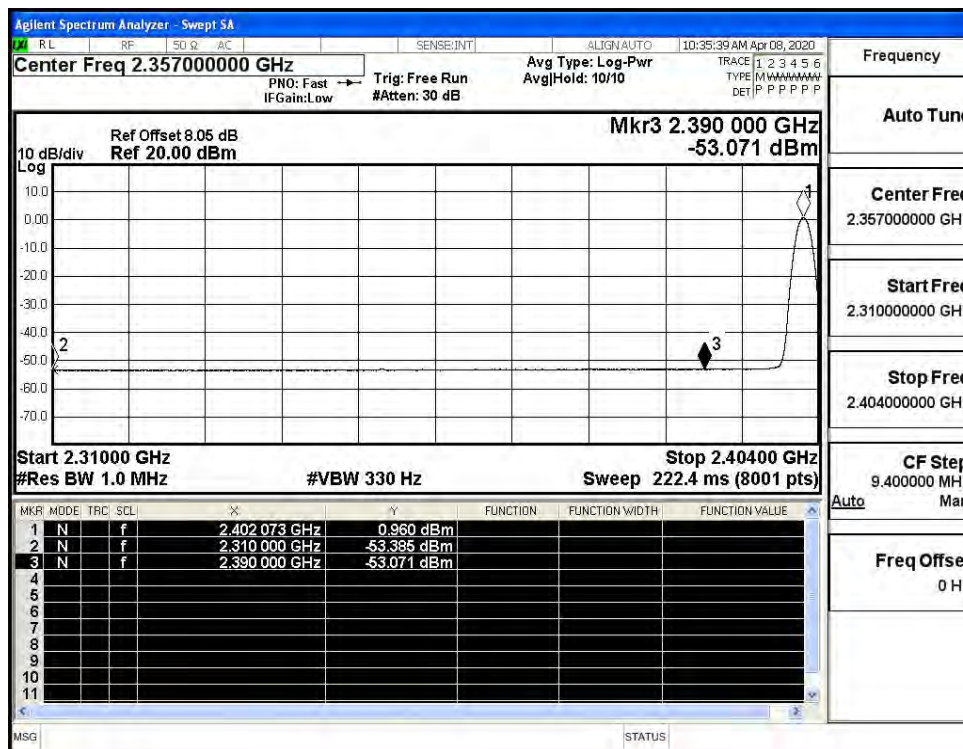
## Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



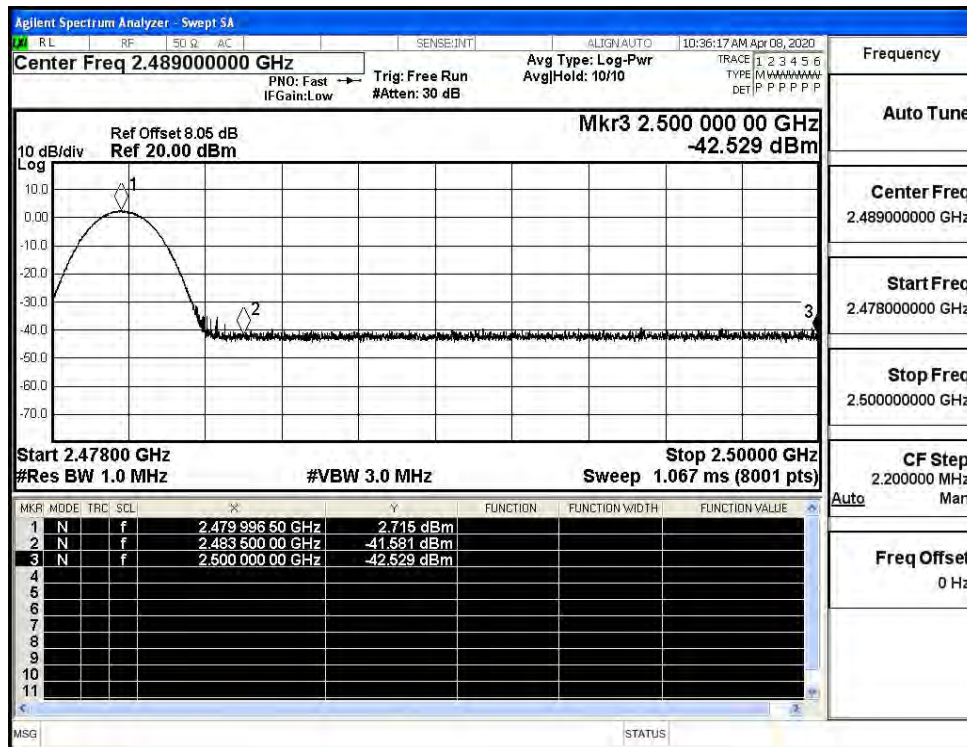
## Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



## 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)

