

## Appendix A

### RF Test Data for BT V4.2 (Conducted Measurement)

Product Name: Lantern Speaker

Trade Mark: N/A

Test Model: JWT2811L-2

#### Environmental Conditions

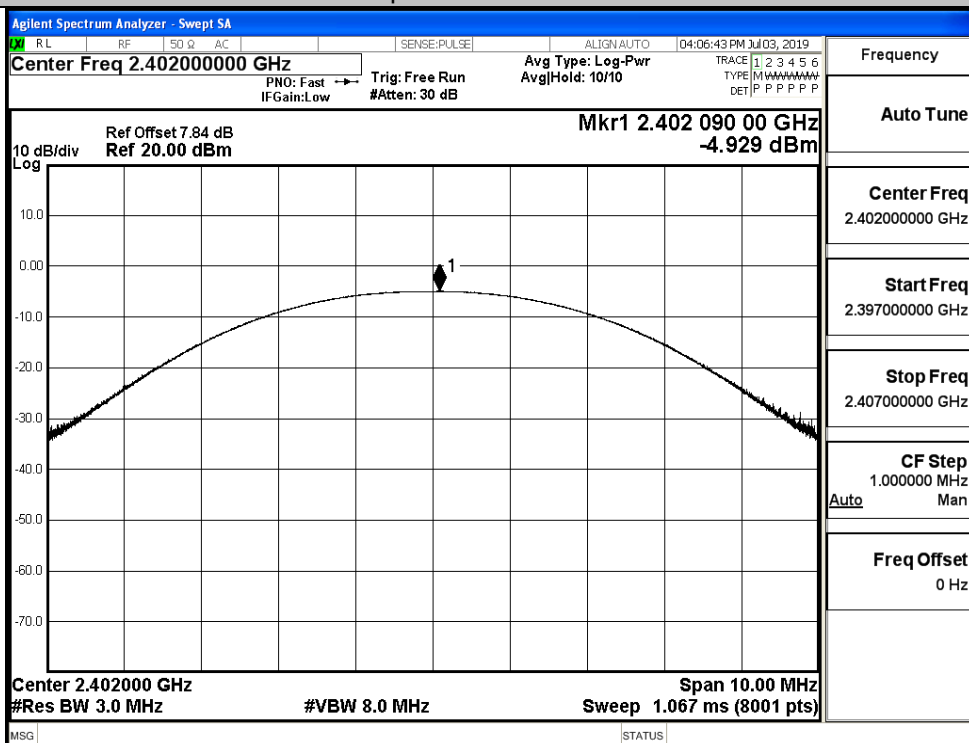
|                    |            |
|--------------------|------------|
| Temperature:       | 24.1°C     |
| Relative Humidity: | 53.8%      |
| ATM Pressure:      | 100.0 kPa  |
| Test Engineer:     | WANGCHUANG |
| Supervised by:     | TOM.LIU    |

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

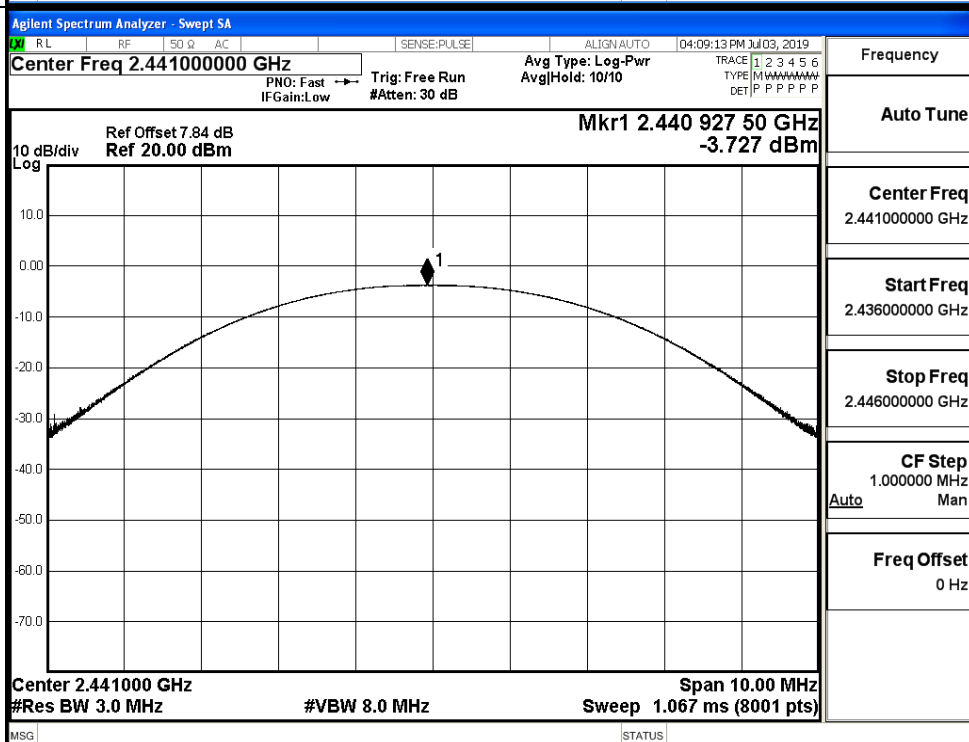
| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | -4.929                          | 21          | PASS    |
|               | MCH      | -3.727                          | 21          | PASS    |
|               | HCH      | -4.385                          | 21          | PASS    |
| $\pi/4$ DQPSK | LCH      | -5.582                          | 21          | PASS    |
|               | MCH      | -4.347                          | 21          | PASS    |
|               | HCH      | -4.981                          | 21          | PASS    |

## Test Graphs

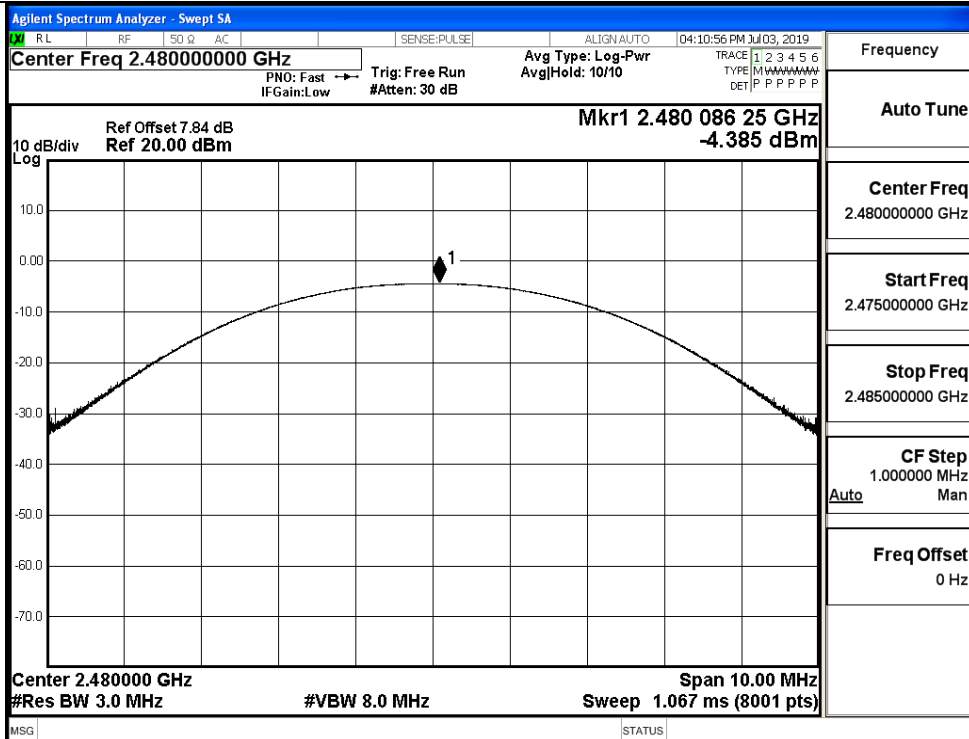
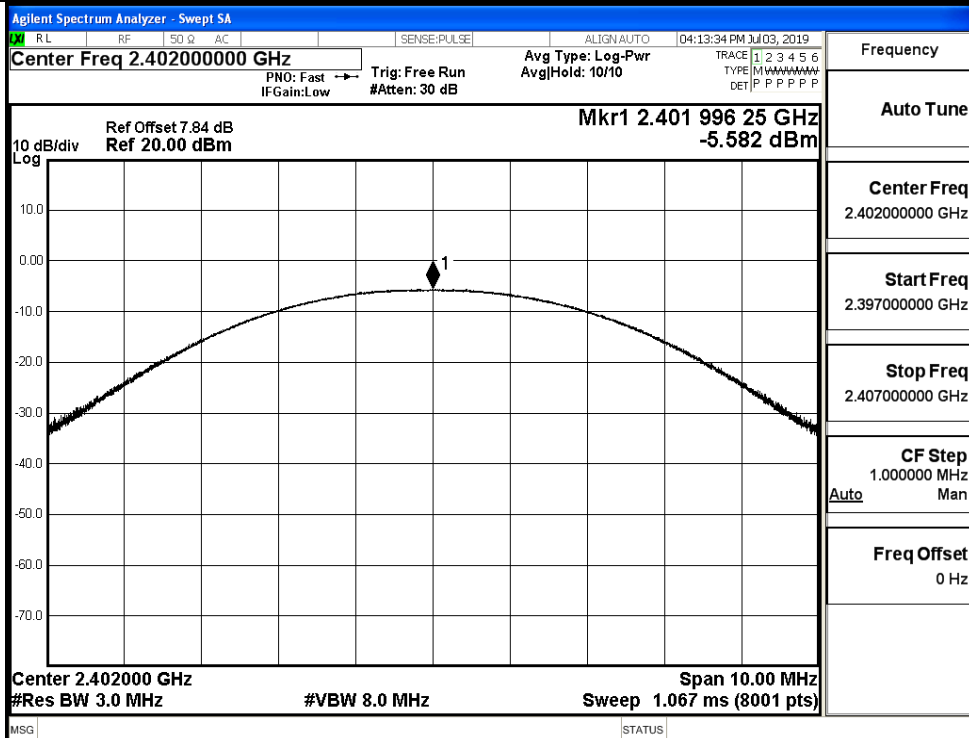
GFSK/LCH

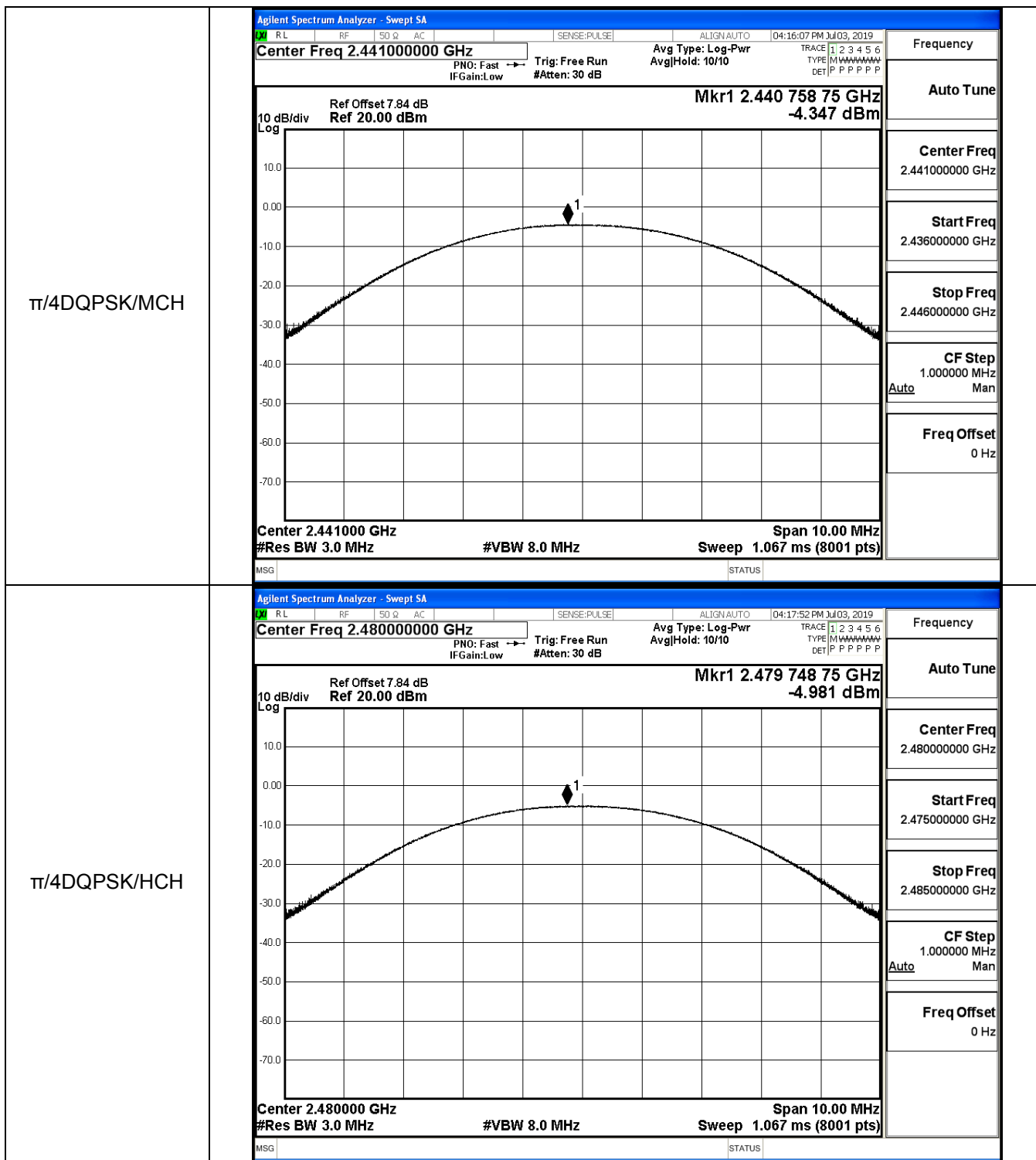


GFSK/MCH



GFSK/HCH

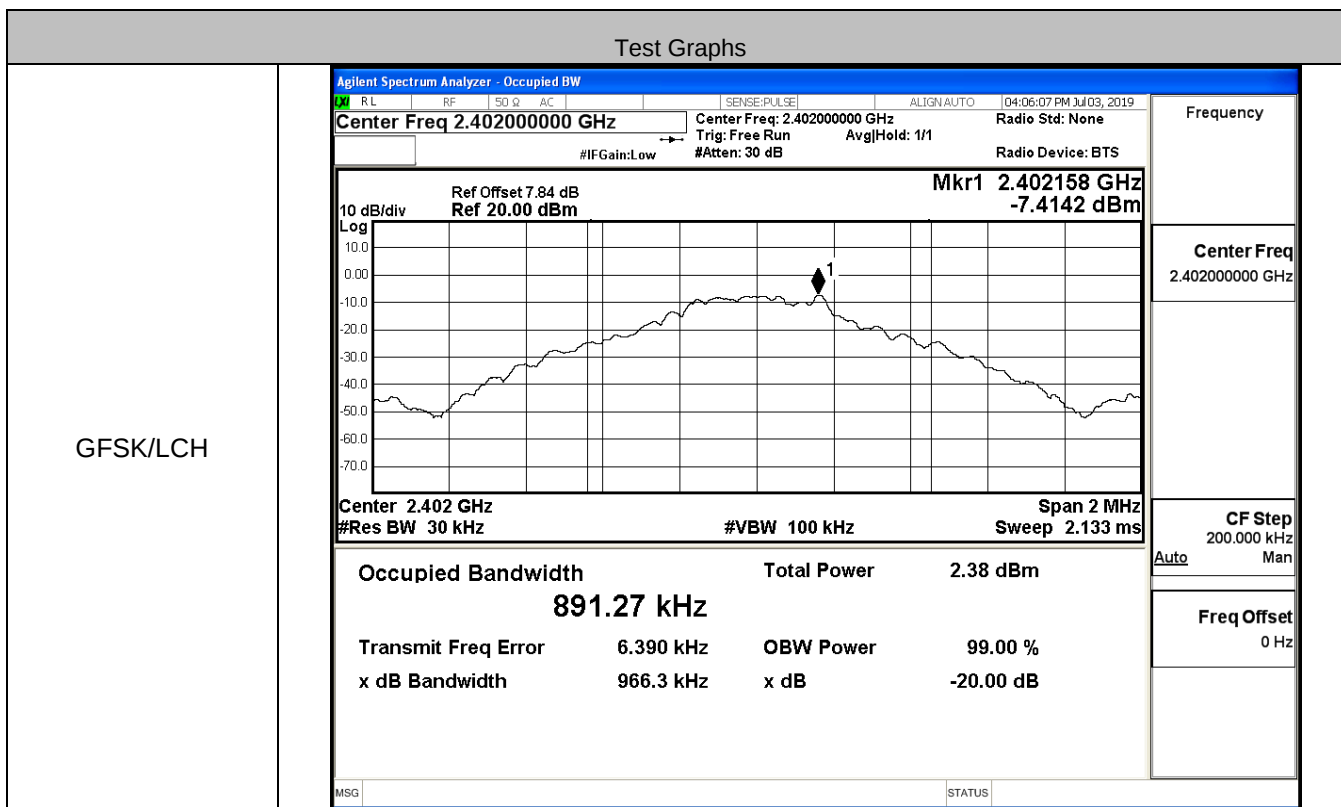
 $\pi/4$ DQPSK/LCH



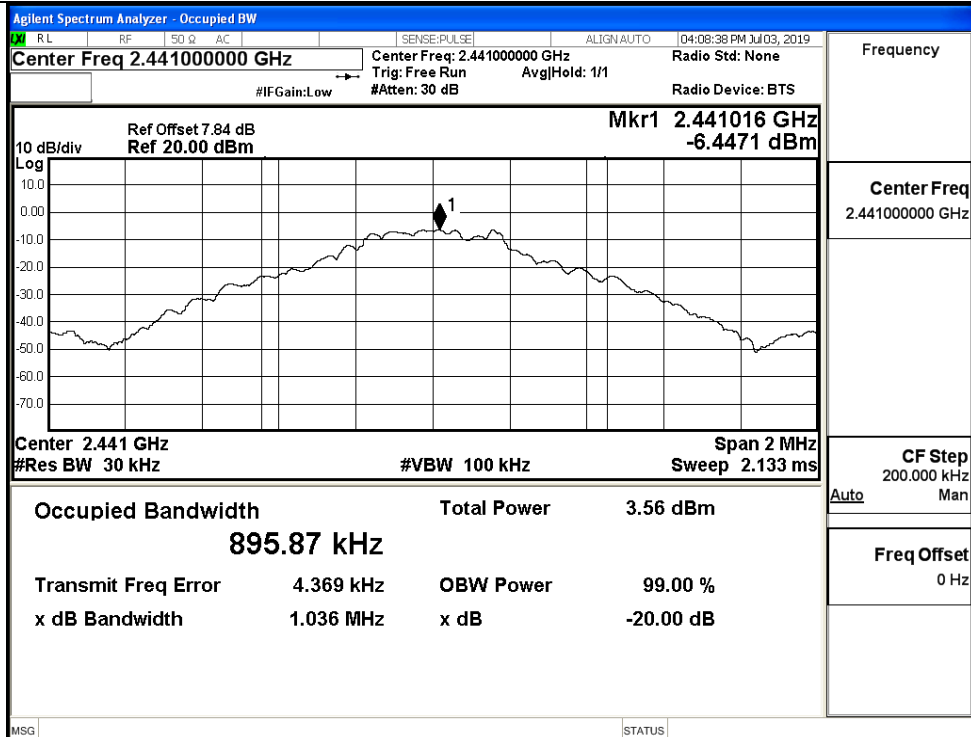
## A.2 20dB Bandwidth

| Mode          | Channel. | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.9663               | Not Specified | PASS    |
|               | MCH      | 1.036                | Not Specified | PASS    |
|               | HCH      | 1.024                | Not Specified | PASS    |
| $\pi/4$ DQPSK | LCH      | 1.293                | Not Specified | PASS    |
|               | MCH      | 1.291                | Not Specified | PASS    |
|               | HCH      | 1.292                | Not Specified | PASS    |

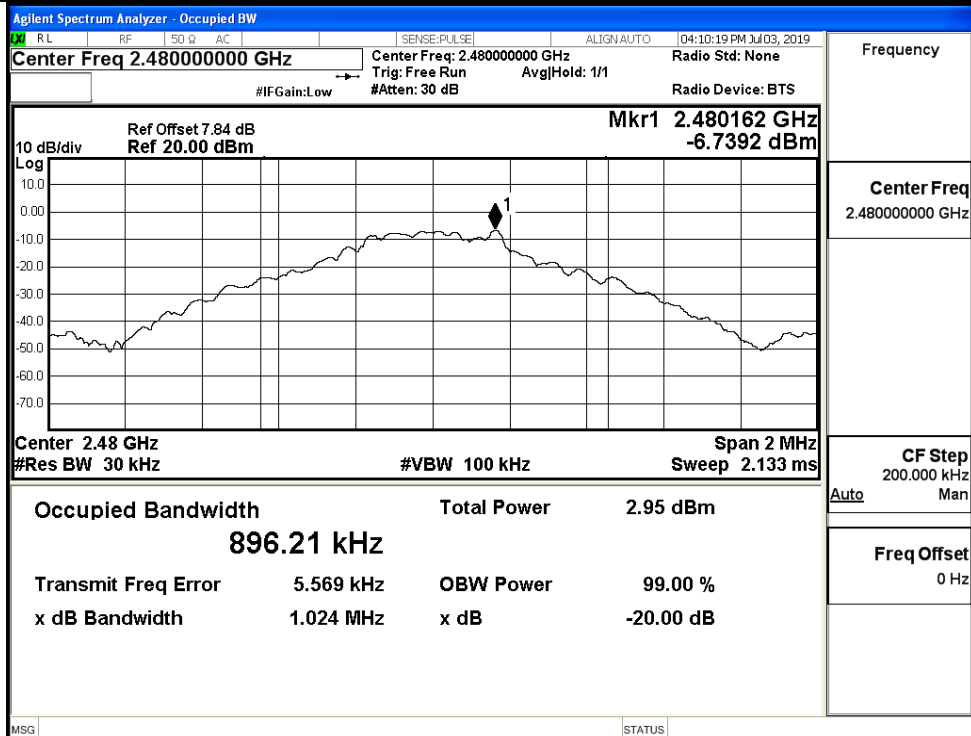
Test Graphs

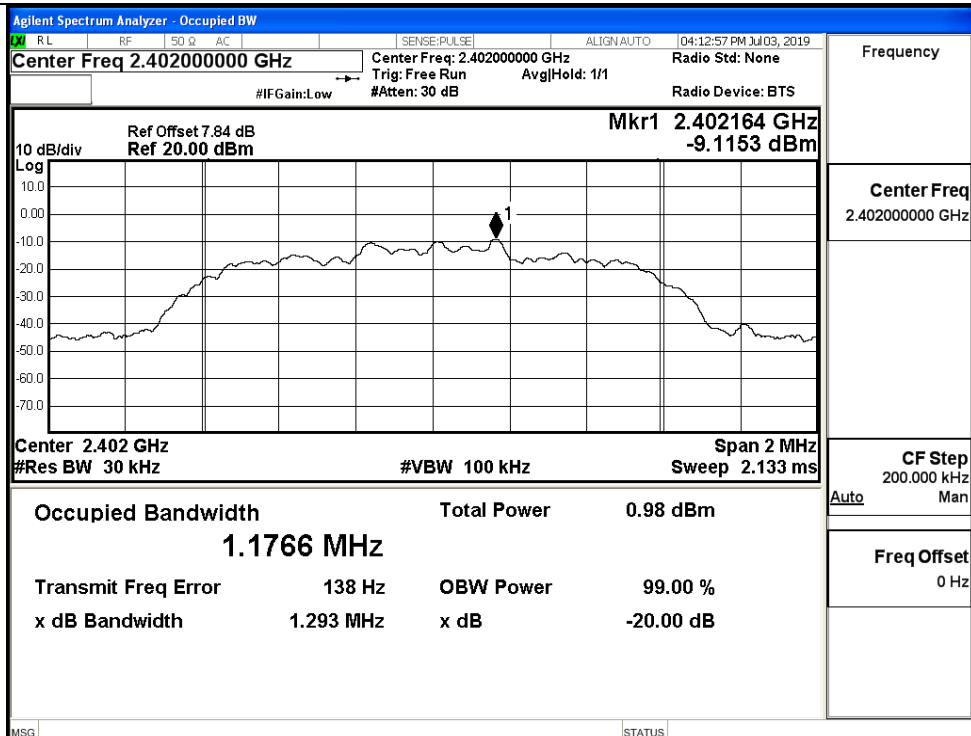
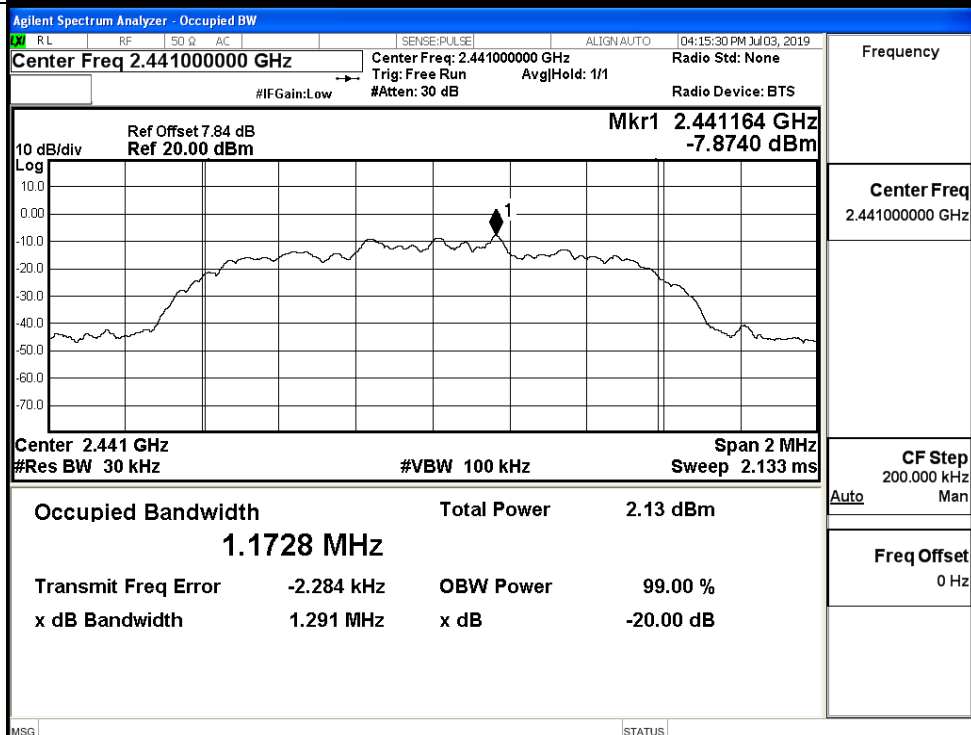


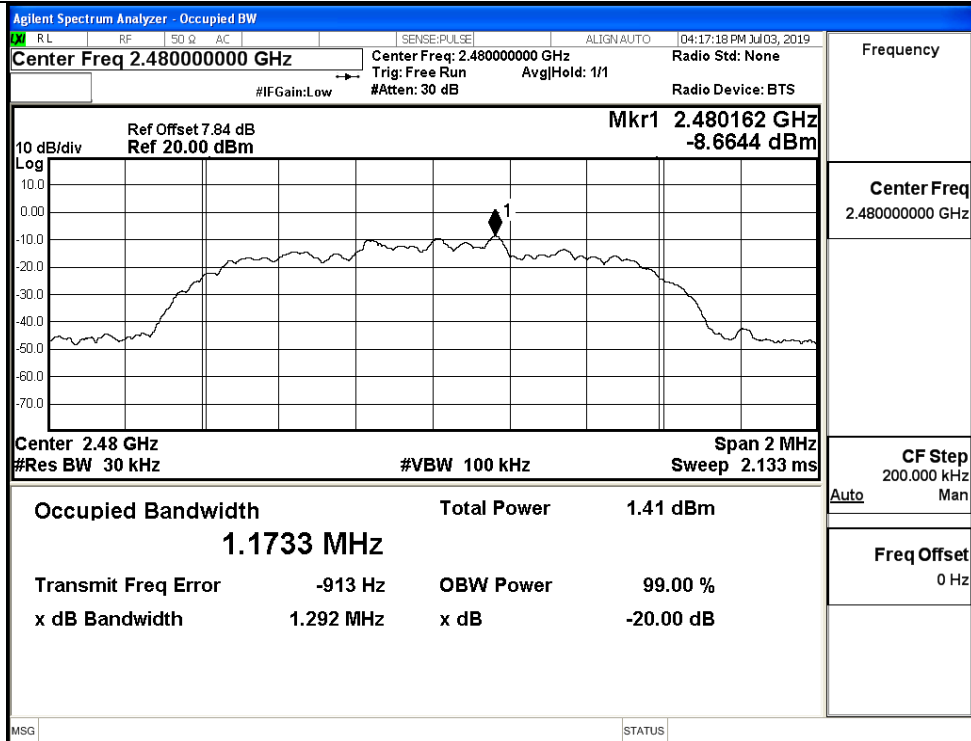
GFSK/MCH



GFSK/HCH



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

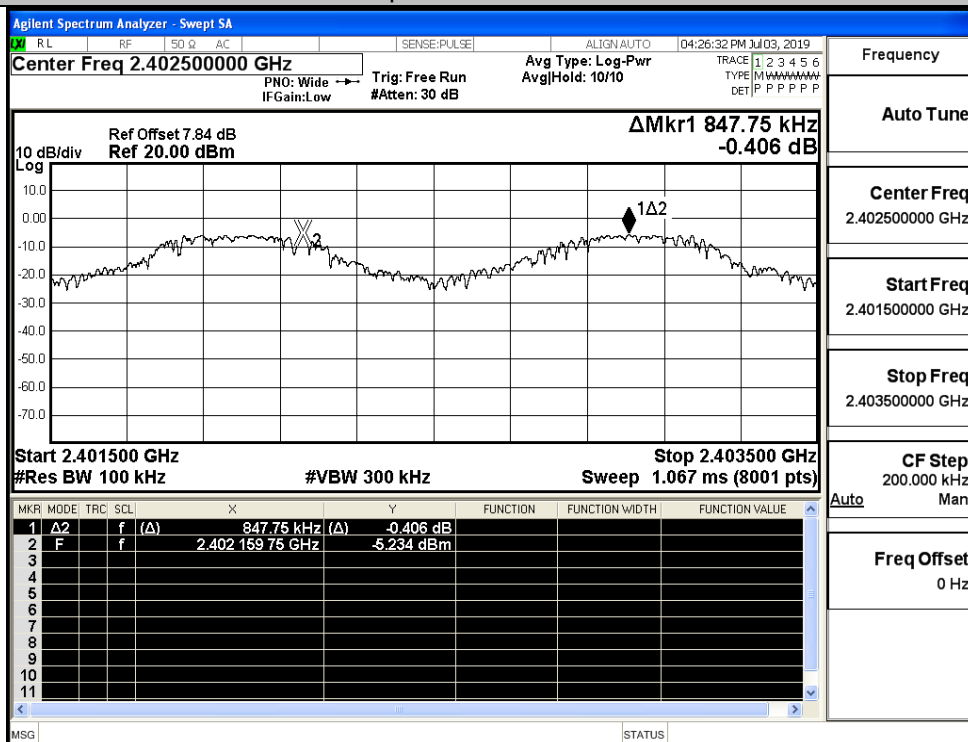
$\pi/4$ DQPSK/HCH

### A.3 Carrier Frequency Separation

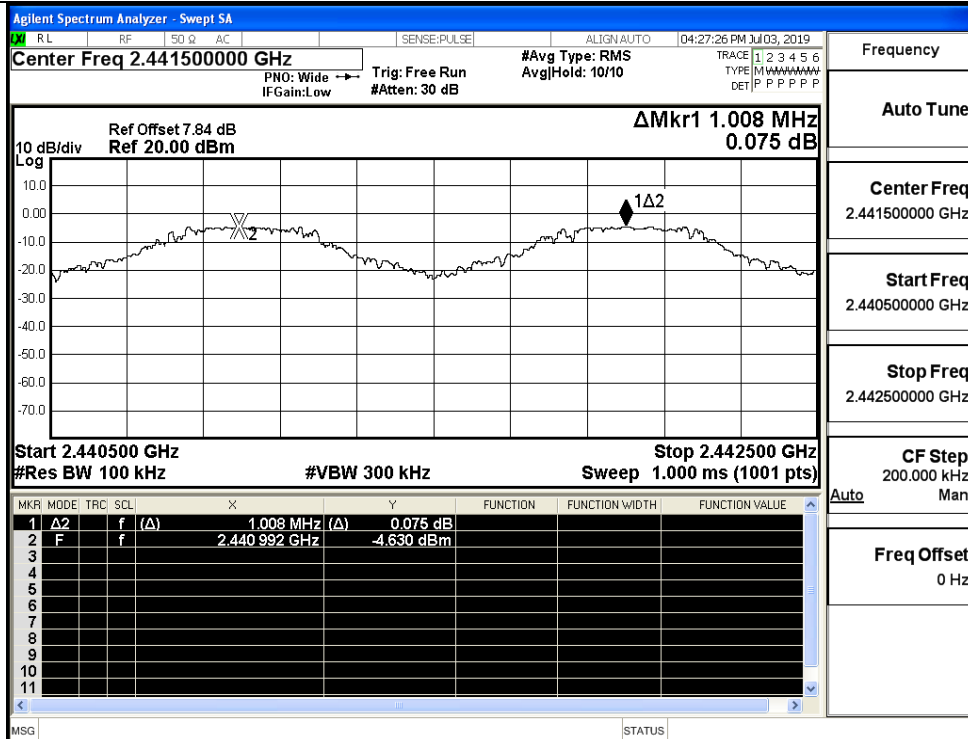
| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | LCH      | 0.848                              | 0.691       | PASS    |
|               | MCH      | 1.008                              | 0.691       | PASS    |
|               | HCH      | 1.150                              | 0.691       | PASS    |
| $\pi$ /4DQPSK | LCH      | 1.010                              | 0.862       | PASS    |
|               | MCH      | 1.112                              | 0.862       | PASS    |
|               | HCH      | 1.126                              | 0.862       | PASS    |

Test Graphs

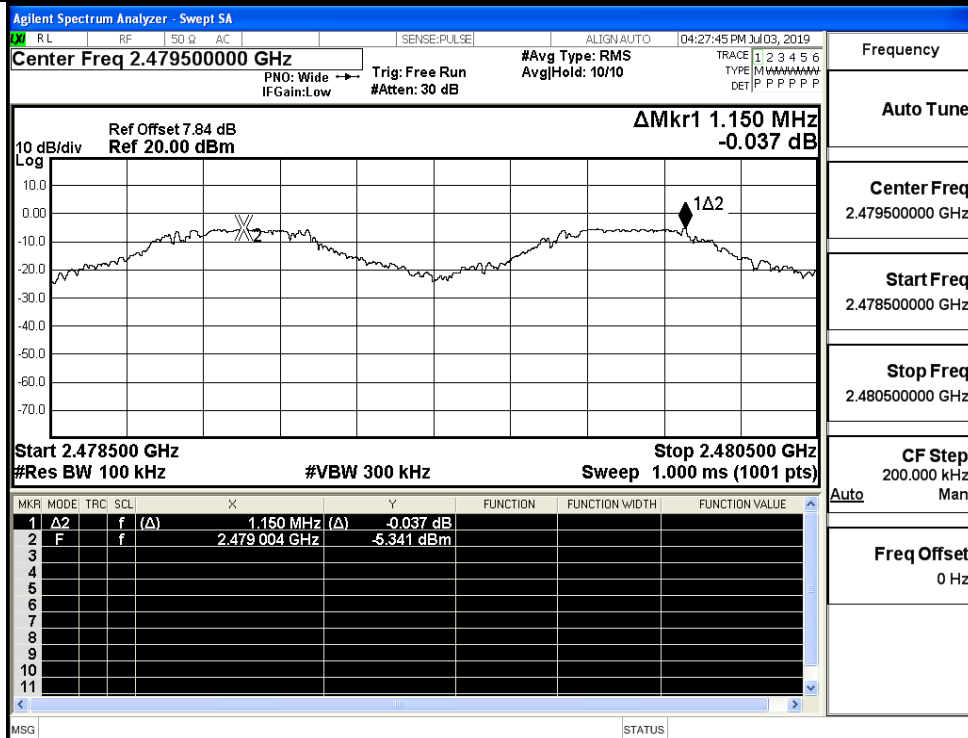
GFSK/LCH

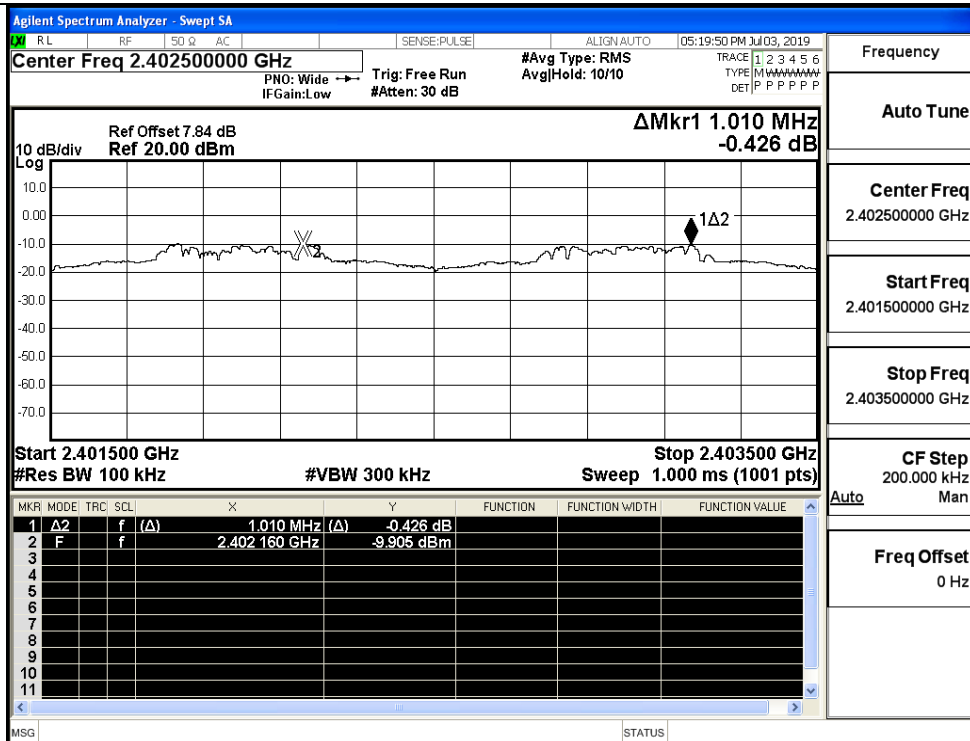


GFSK/MCH



GFSK/HCH



$\pi/4$ DQPSK/LCH

Frequency

Auto Tune

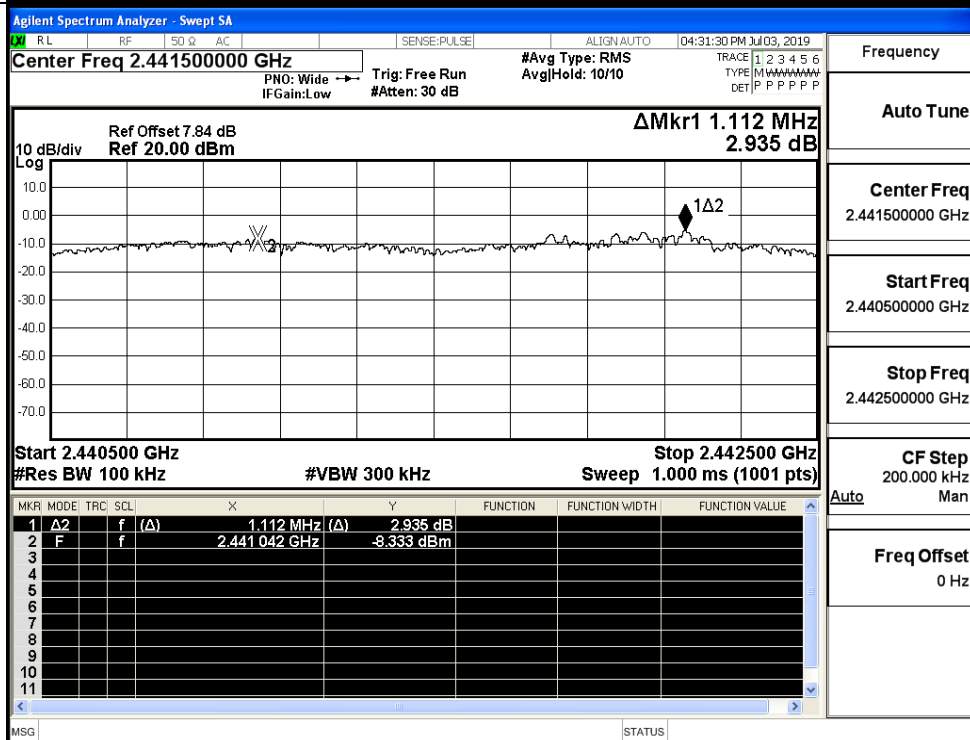
Center Freq  
2.402500000 GHz

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

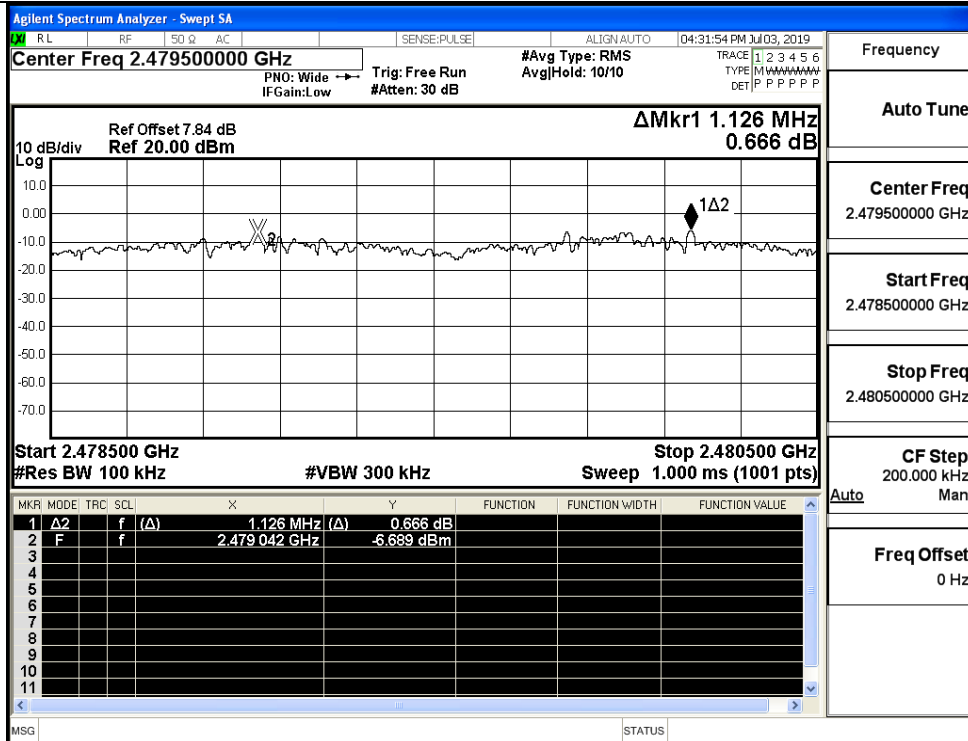
Center Freq  
2.441500000 GHz

Start Freq  
2.440500000 GHz

Stop Freq  
2.442500000 GHz

CF Step  
200.000 kHz  
Man

Freq Offset  
0 Hz

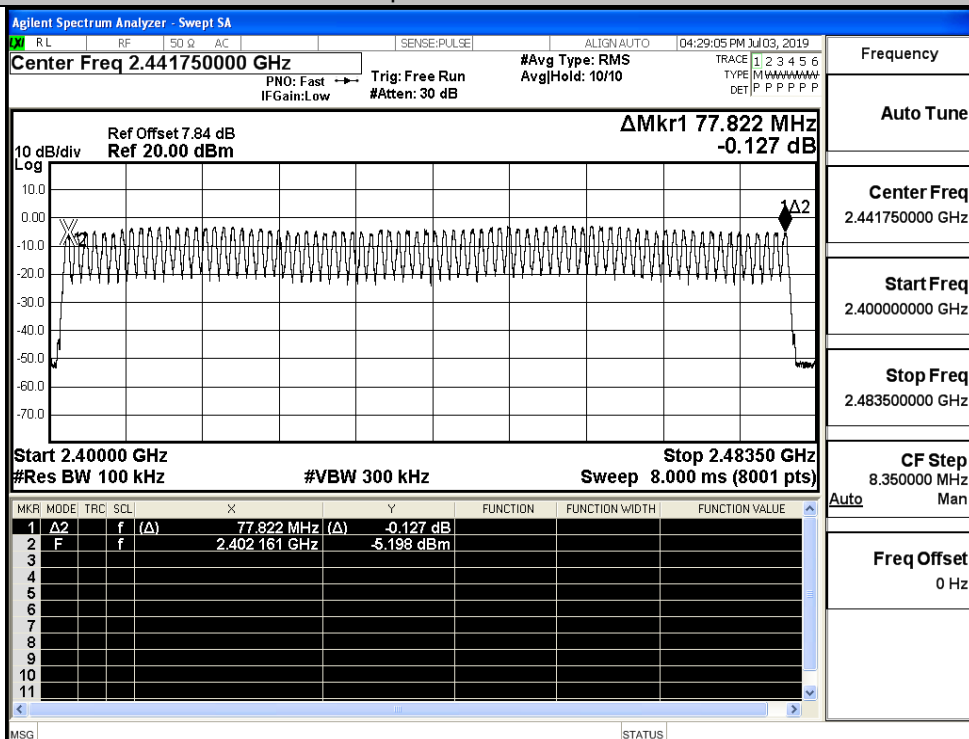
$\pi/4$ DQPSK/HCH

## 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    |

## Test Graphs

GFSK/Hop



Frequency

Auto Tune

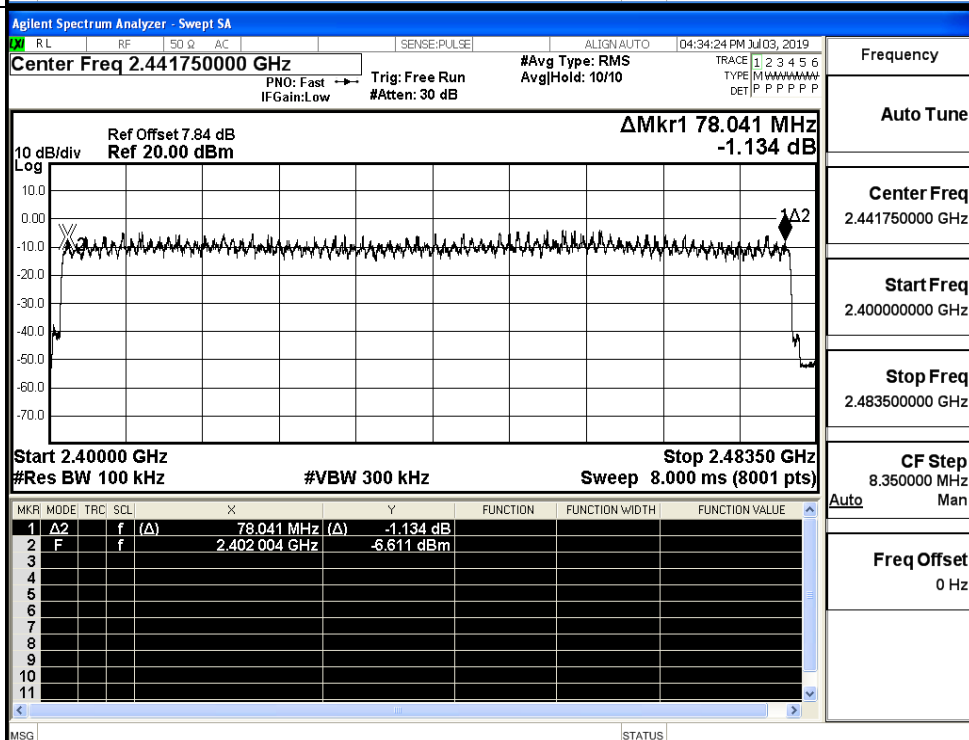
Center Freq  
2.441750000 GHz

Start Freq  
2.400000000 GHz

Stop Freq  
2.483500000 GHz

CF Step  
8.350000 MHz  
Man

Freq Offset  
0 Hz

 $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq  
2.441750000 GHz

Start Freq  
2.400000000 GHz

Stop Freq  
2.483500000 GHz

CF Step  
8.350000 MHz  
Man

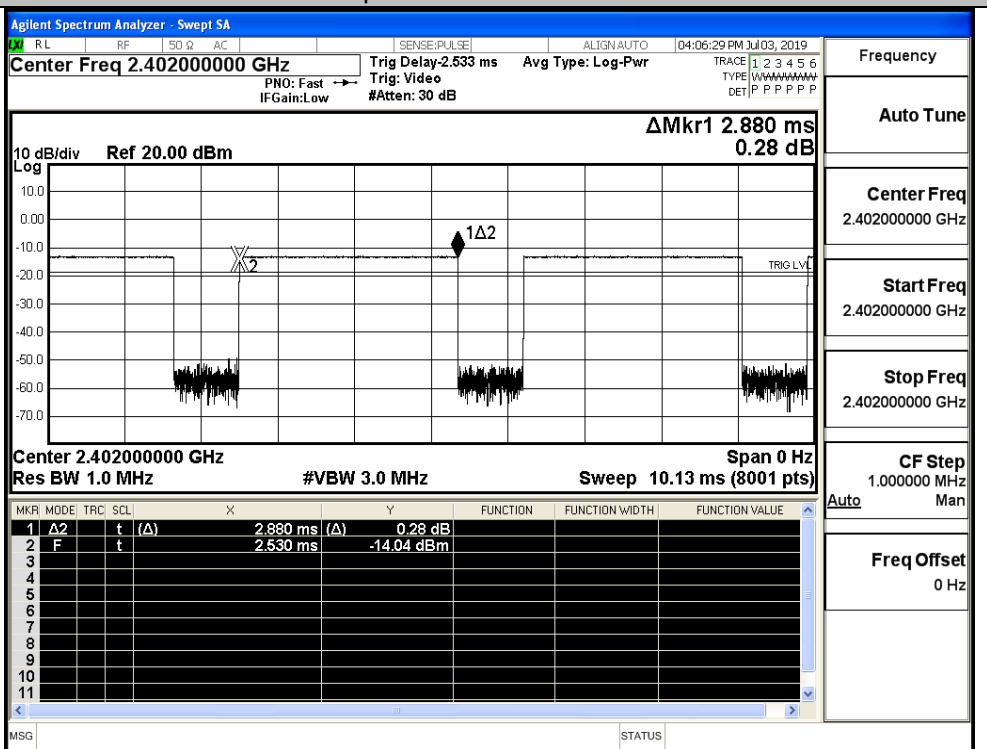
Freq Offset  
0 Hz

## A.5 Dwell Time

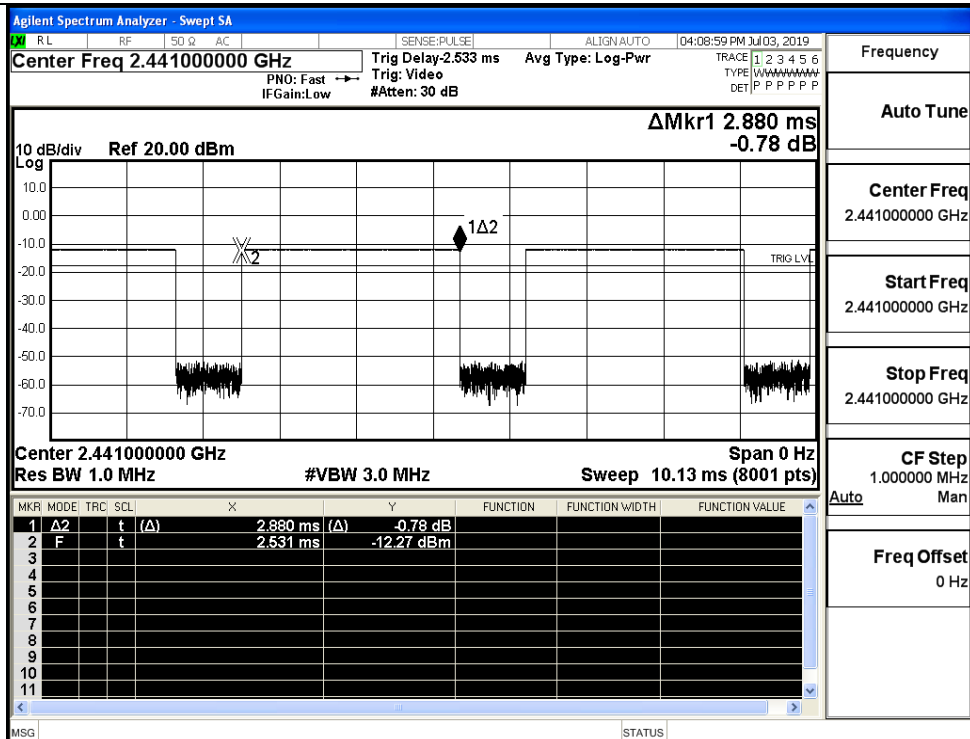
| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|---------------|-----------|---------|
| GFSK          | DH5    | LCH     | 2.88                       | 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    |

## Test Graphs

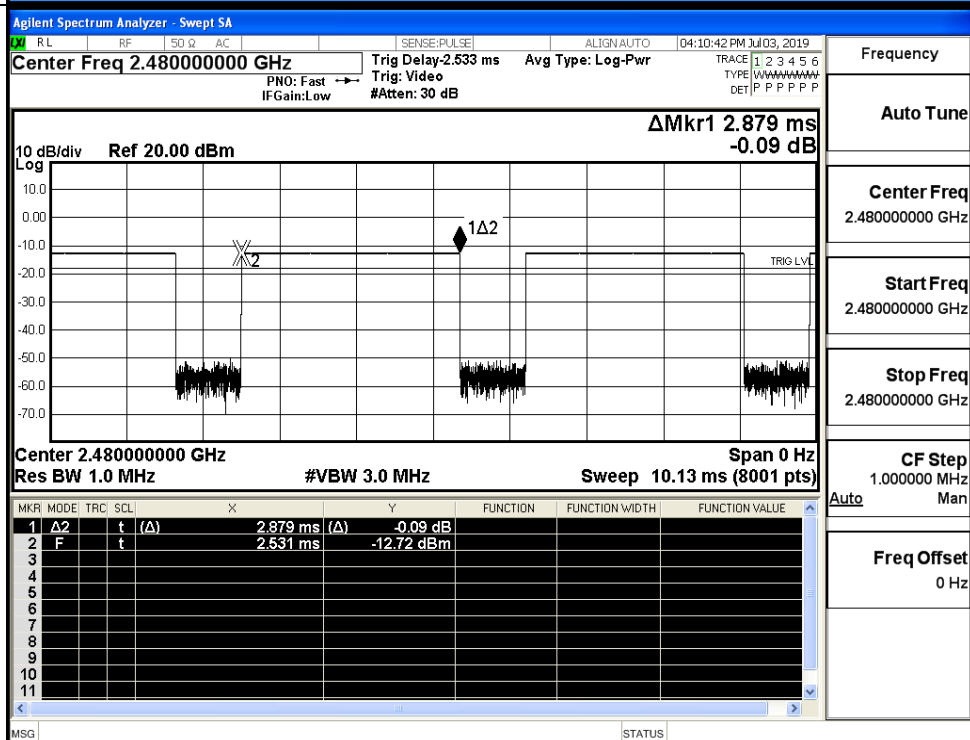
GFSK\_DH5/LCH



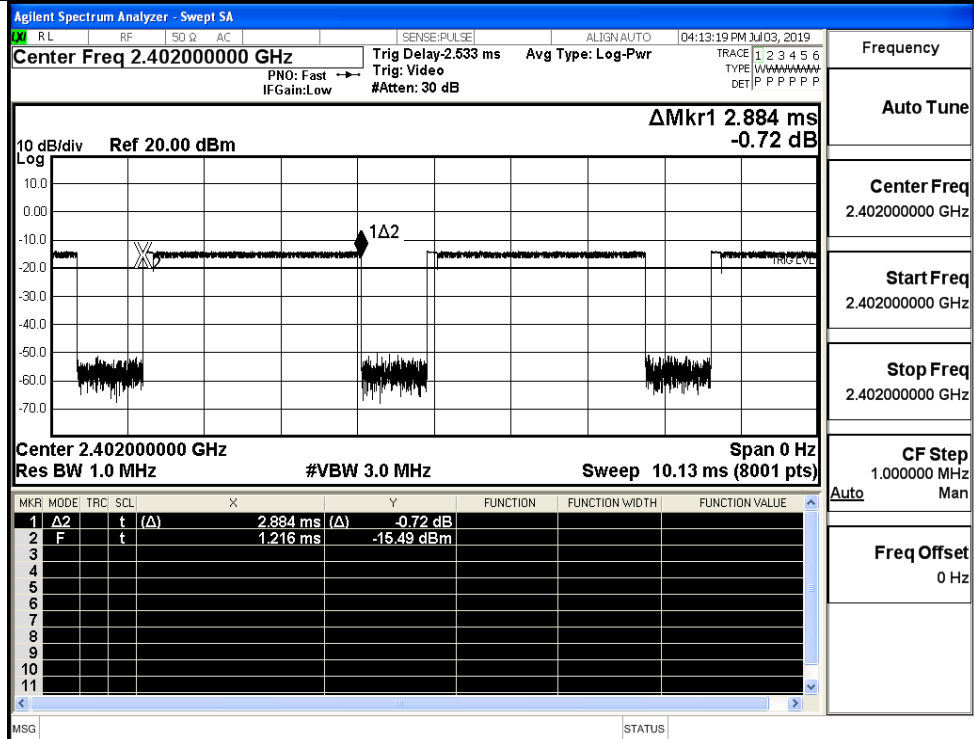
GFSK\_DH5/MCH



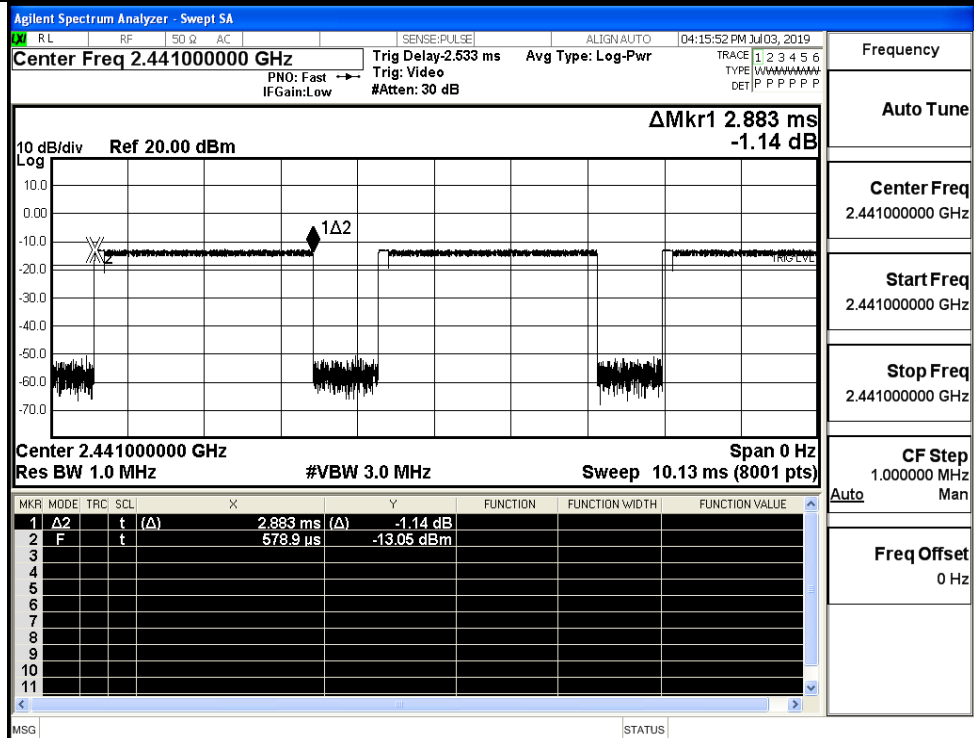
GFSK\_DH5/HCH



$\pi/4$ DQPSK  
\_2DH5/LCH



$\pi/4$ DQPSK  
\_2DH5/MCH



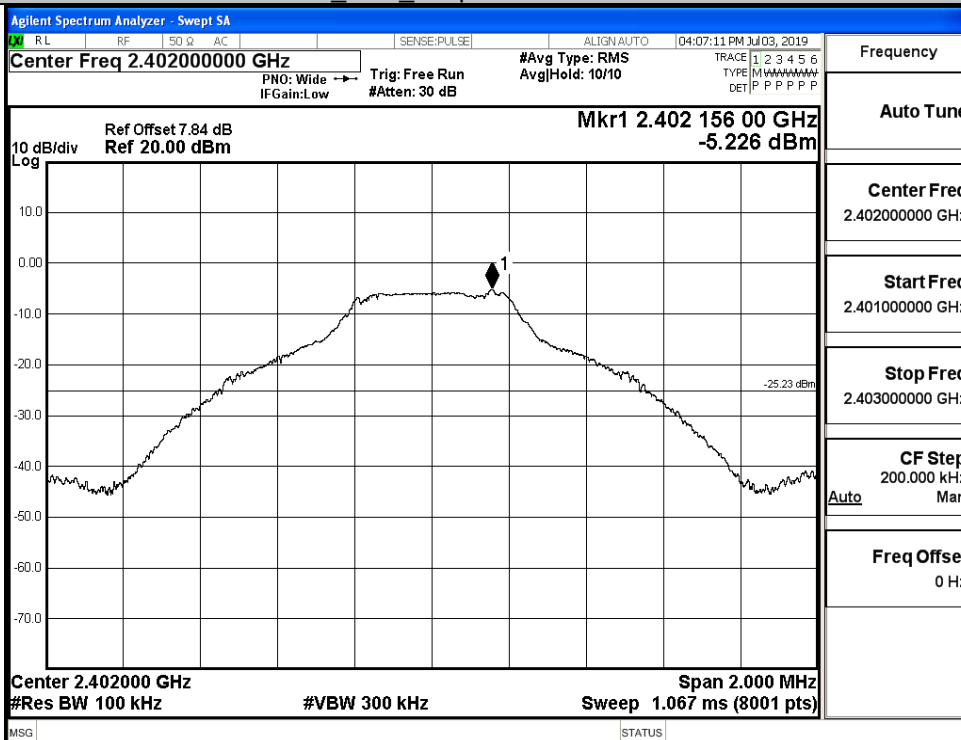
[illegible]

## A.6 RF Conducted Spurious Emissions

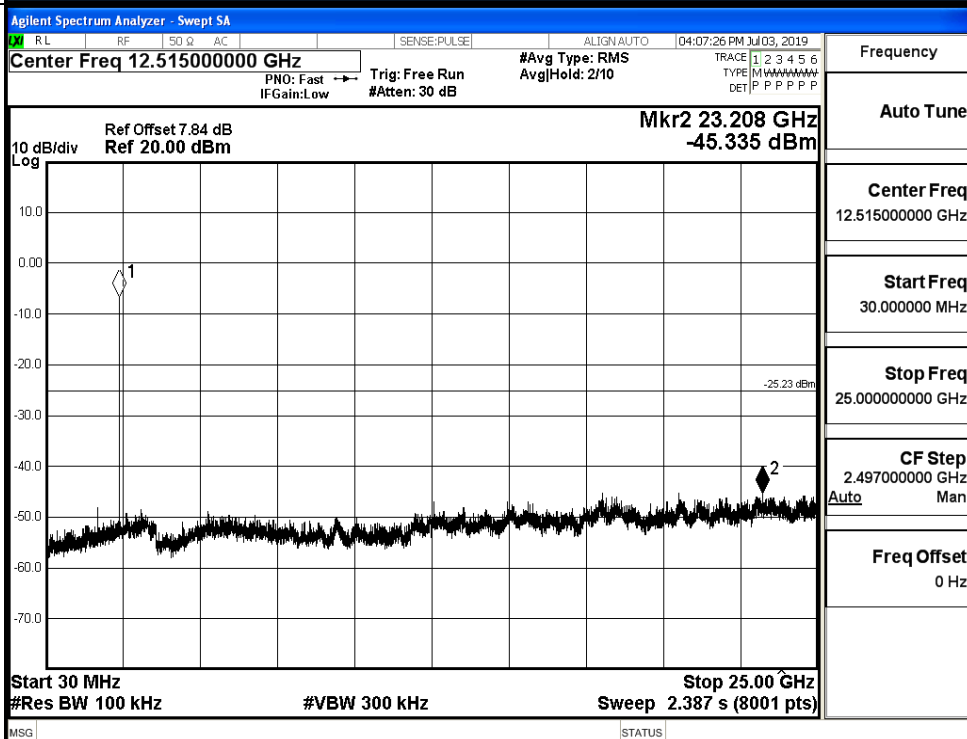
| Mode          | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK          | LCH     | -5.226     | -45.335          | -25.226     | PASS    |
|               | MCH     | -4.008     | -45.493          | -24.008     | PASS    |
|               | HCH     | -4.714     | -44.267          | -24.714     | PASS    |
| $\pi/4$ DQPSK | LCH     | -6.364     | -44.759          | -26.364     | PASS    |
|               | MCH     | -5.248     | -45.352          | -25.248     | PASS    |
|               | HCH     | -6.008     | -44.753          | -26.008     | PASS    |

## GFSK LCH Graphs

Pref

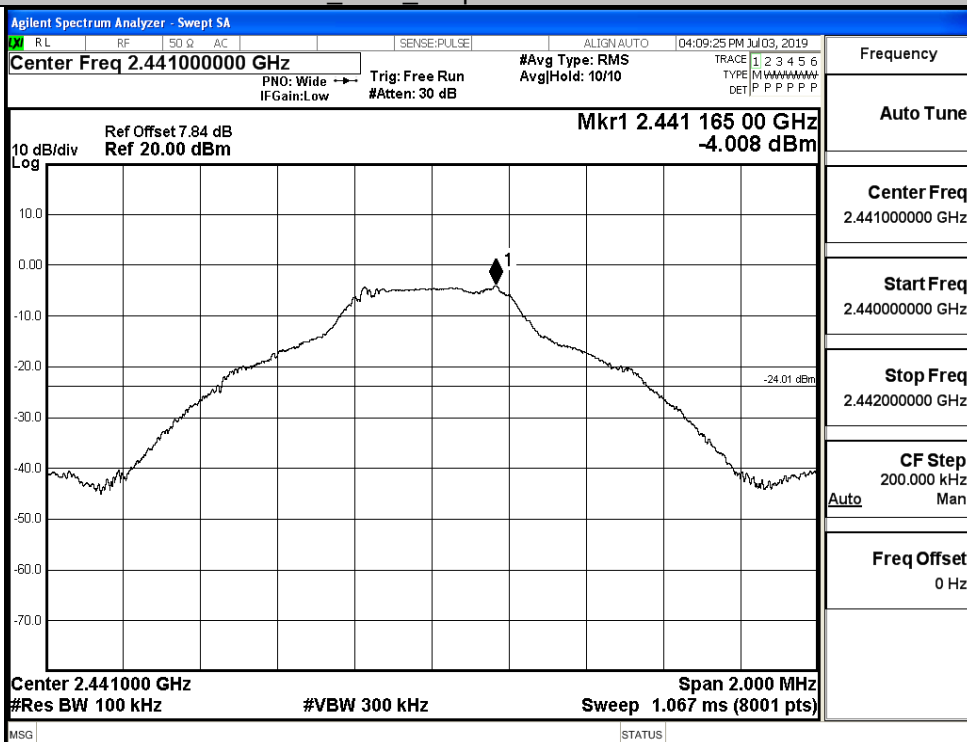


Puw

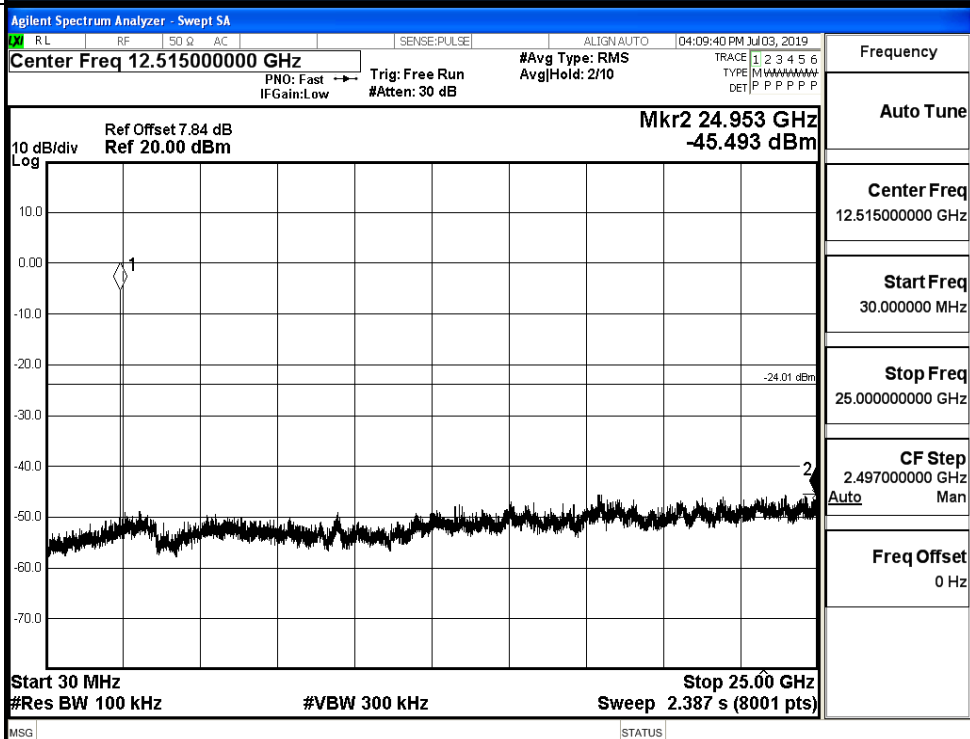


## GFSK\_MCH\_Graphs

Pref

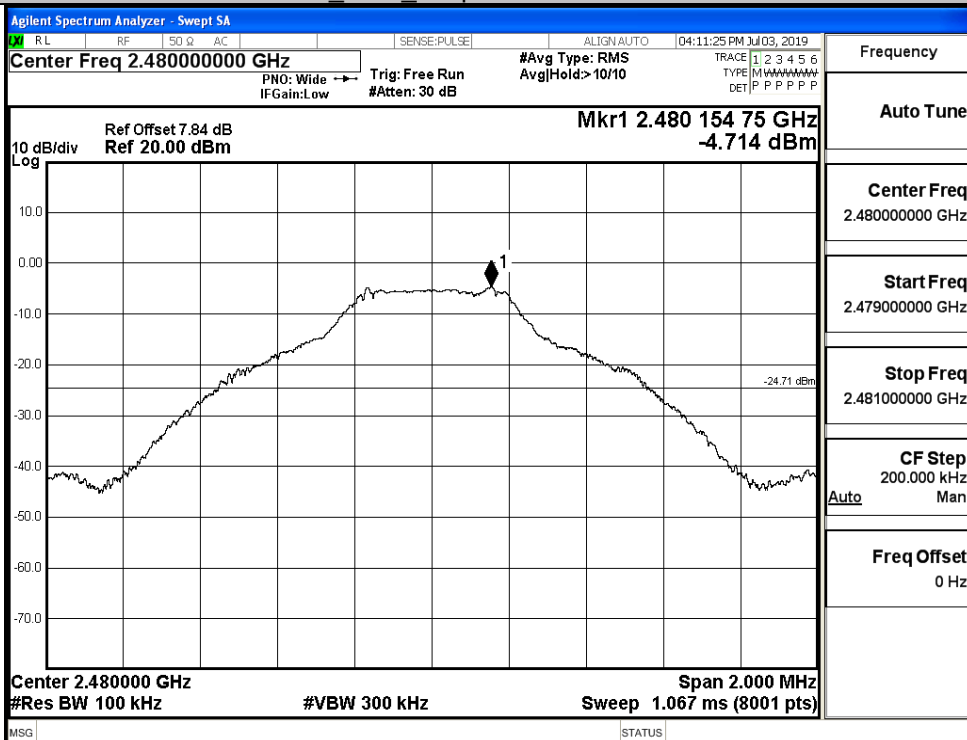


Puw

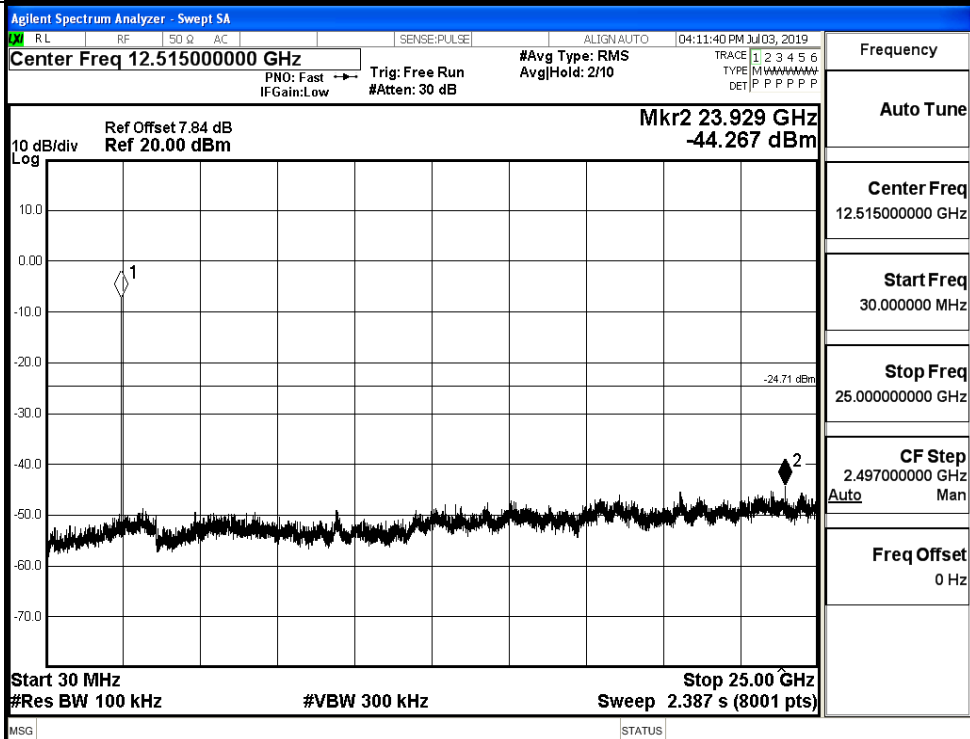


## GFSK\_HCH\_Graphs

Pref

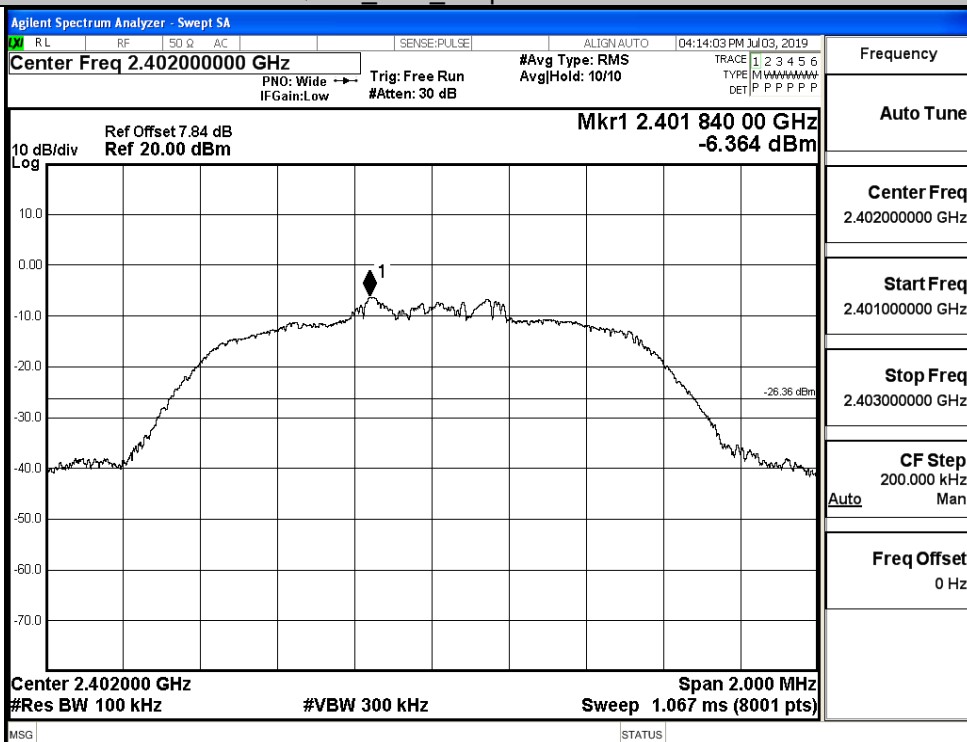


Puw

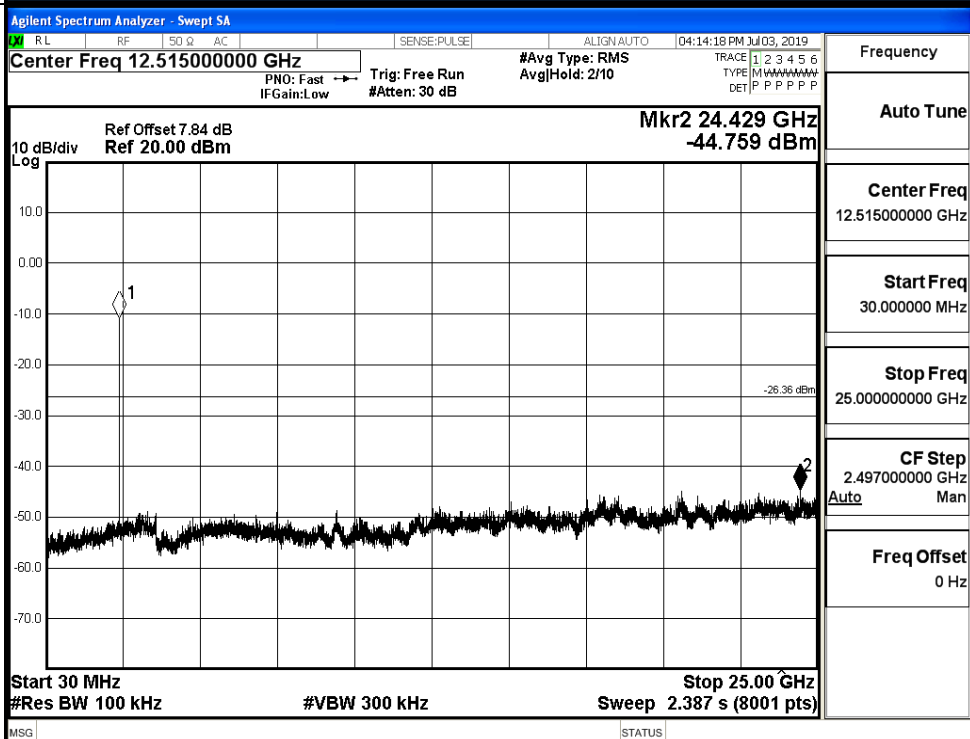


$\pi/4$ DQPSK\_LCH\_Graphs

Pref

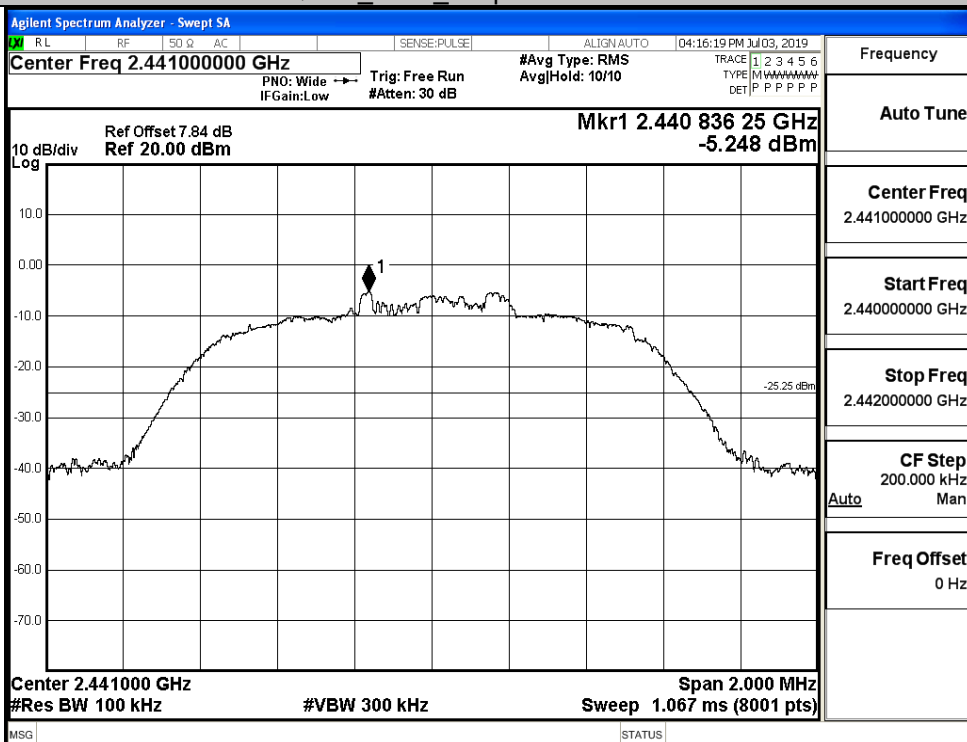


Puw

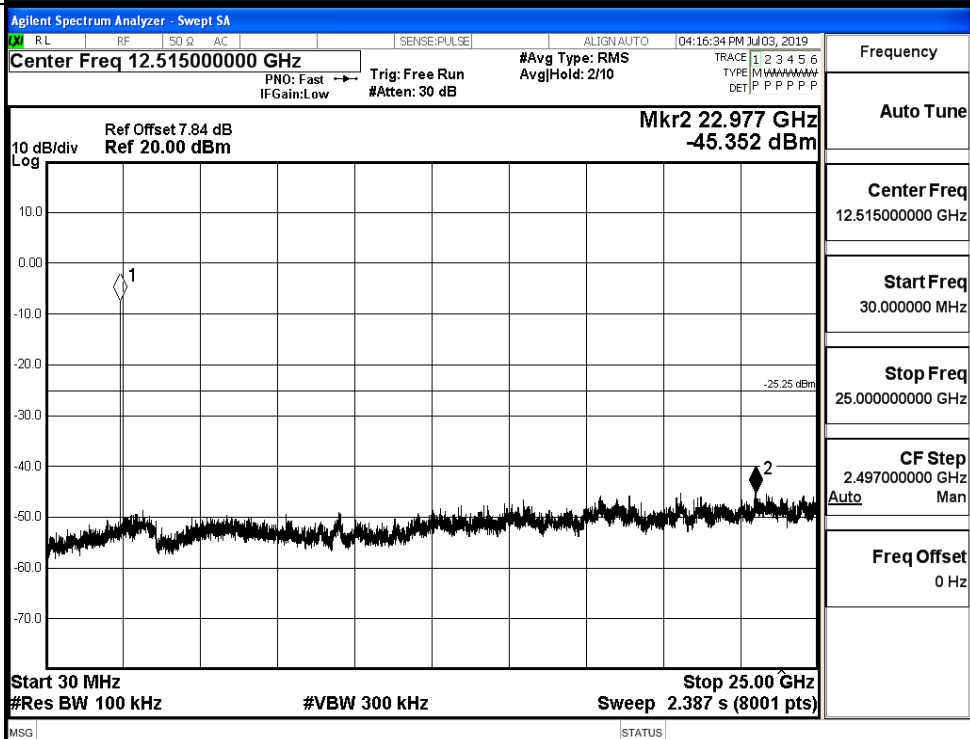


$\pi$ /4DQPSK\_MCH\_Graphs

Pref

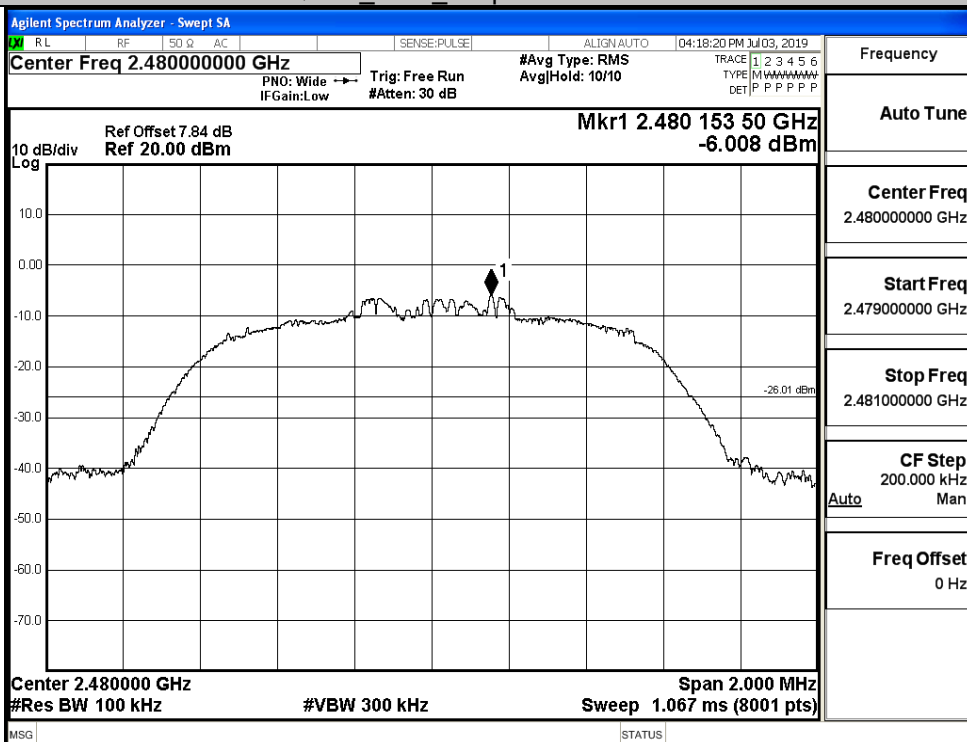


Puw

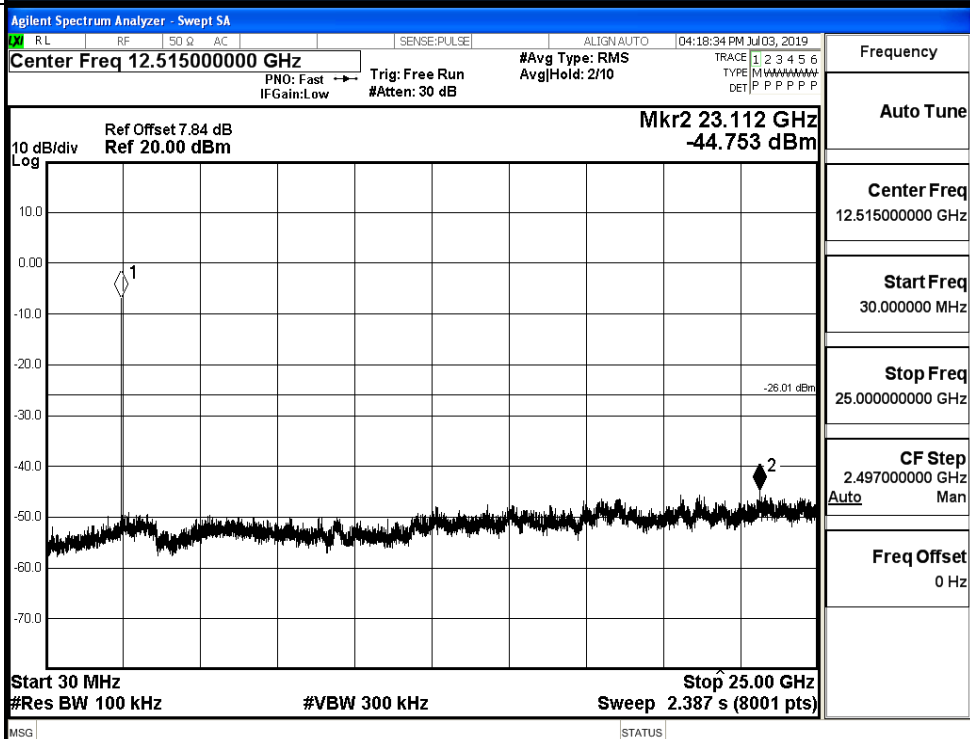


$\pi$ /4DQPSK\_HCH\_Graphs

Pref



Puw

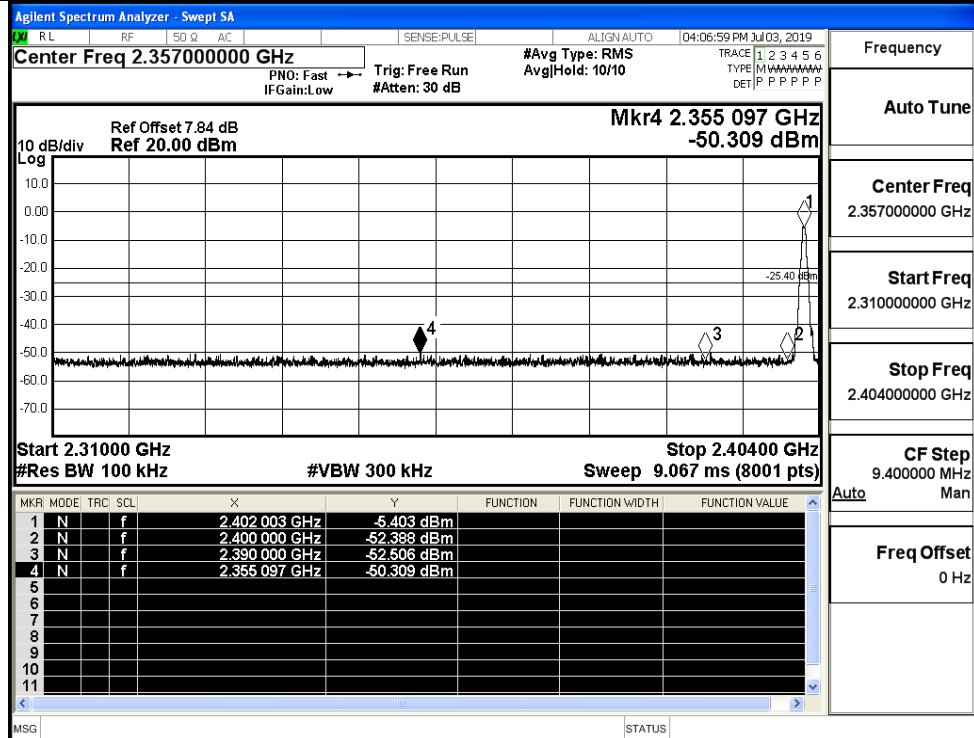


## A.7 Band-edge for RF Conducted Emissions

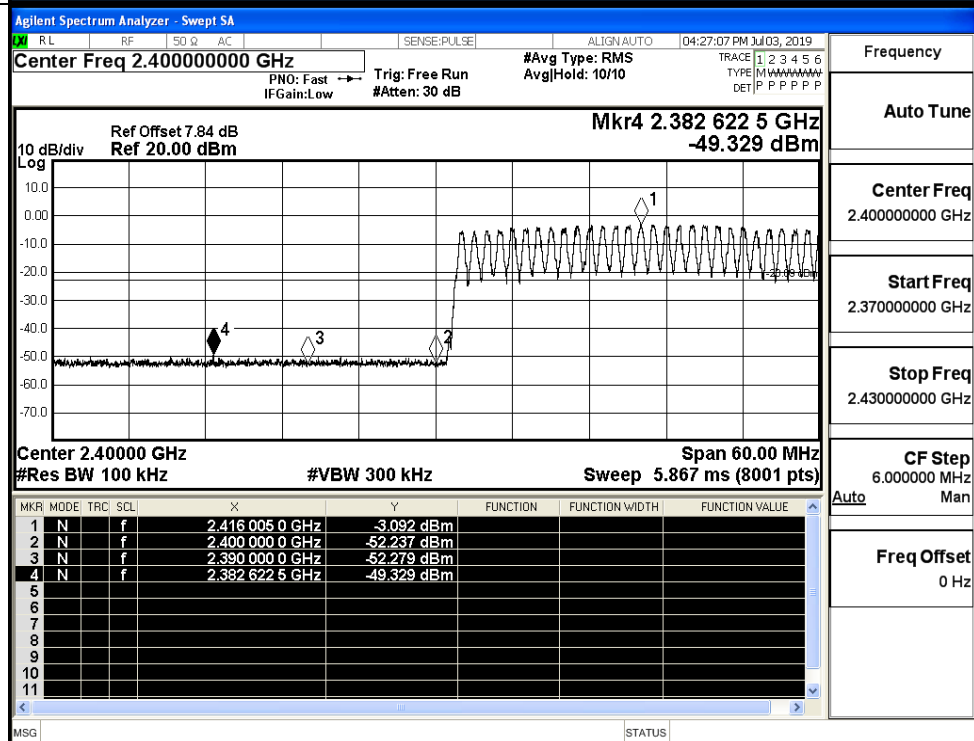
| Mode          | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | -5.403              | Off               | -50.309                  | -25.4       | PASS    |
|               |         |                         | -3.092              | On                | -49.329                  | -23.09      | PASS    |
|               | HCH     | 2480                    | -4.650              | Off               | -49.036                  | -24.65      | PASS    |
|               |         |                         | -2.730              | On                | -49.531                  | -22.73      | PASS    |
| $\pi/4$ DQPSK | LCH     | 2402                    | -6.788              | Off               | -49.758                  | -26.79      | PASS    |
|               |         |                         | -4.287              | On                | -49.490                  | -24.29      | PASS    |
|               | HCH     | 2480                    | -6.077              | Off               | -50.124                  | -26.08      | PASS    |
|               |         |                         | -4.090              | On                | -49.088                  | -24.09      | PASS    |

## Test Graphs

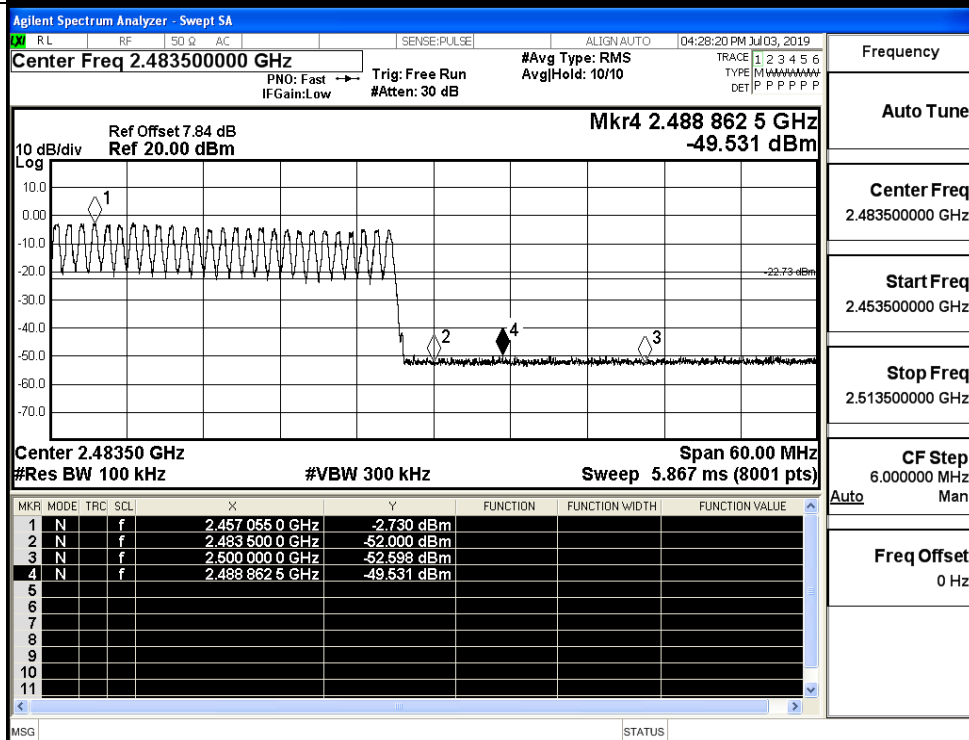
GFSK/LCH/No Hop



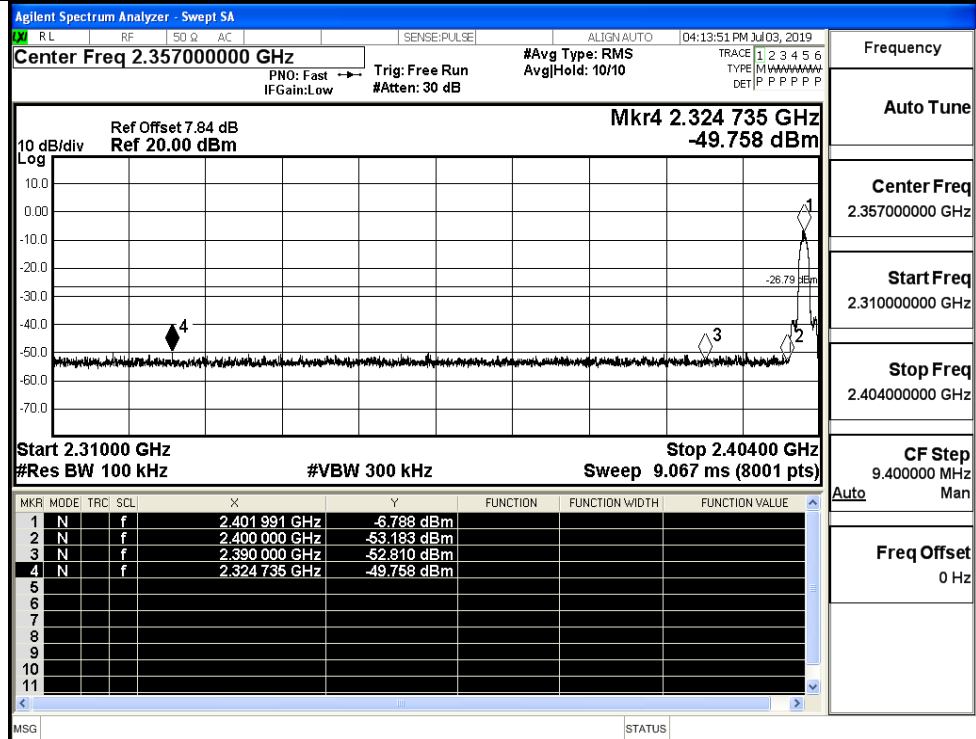
GFSK/LCH/Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq  
2.357000000 GHz

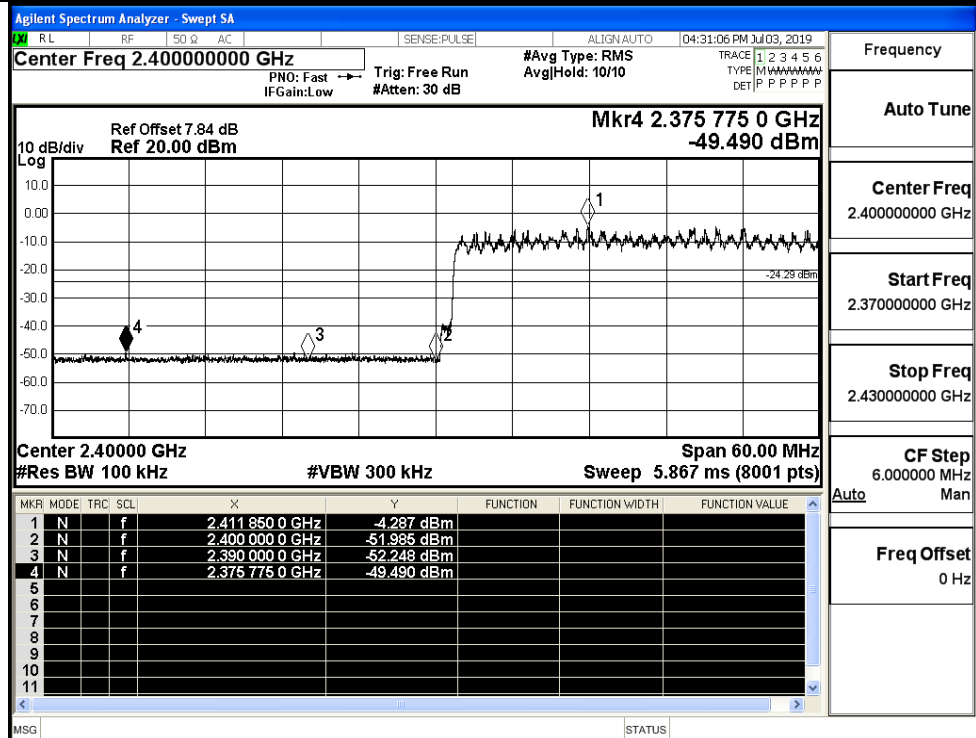
Start Freq  
2.310000000 GHz

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

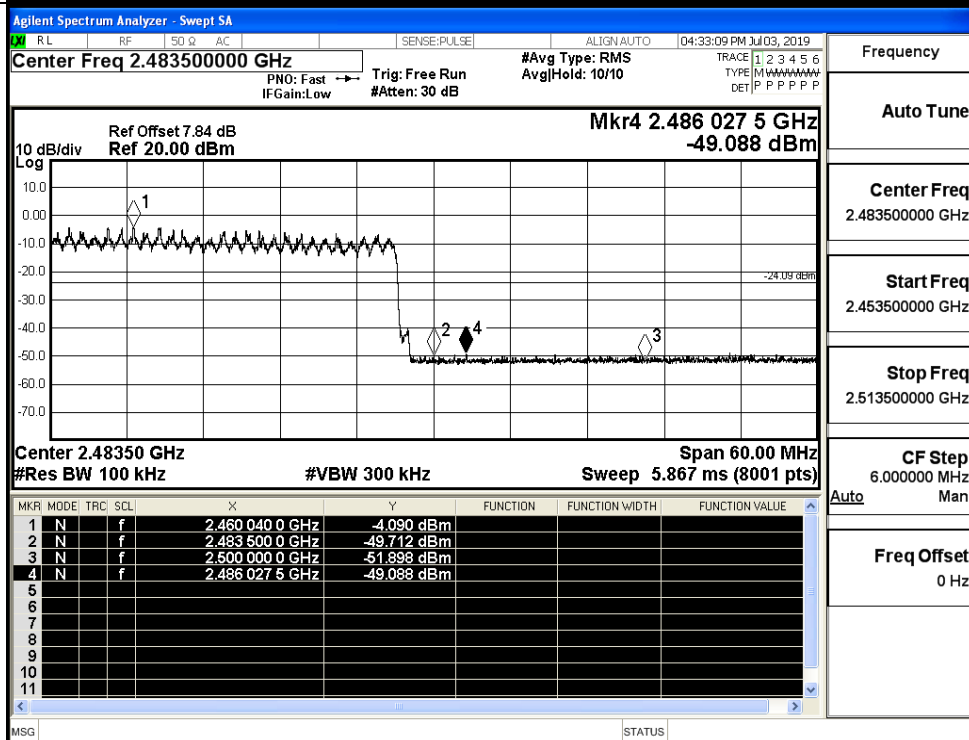
Start Freq  
2.370000000 GHz

Stop Freq  
2.430000000 GHz

CF Step  
6.000000 MHz  
Auto Man

Freq Offset  
0 Hz

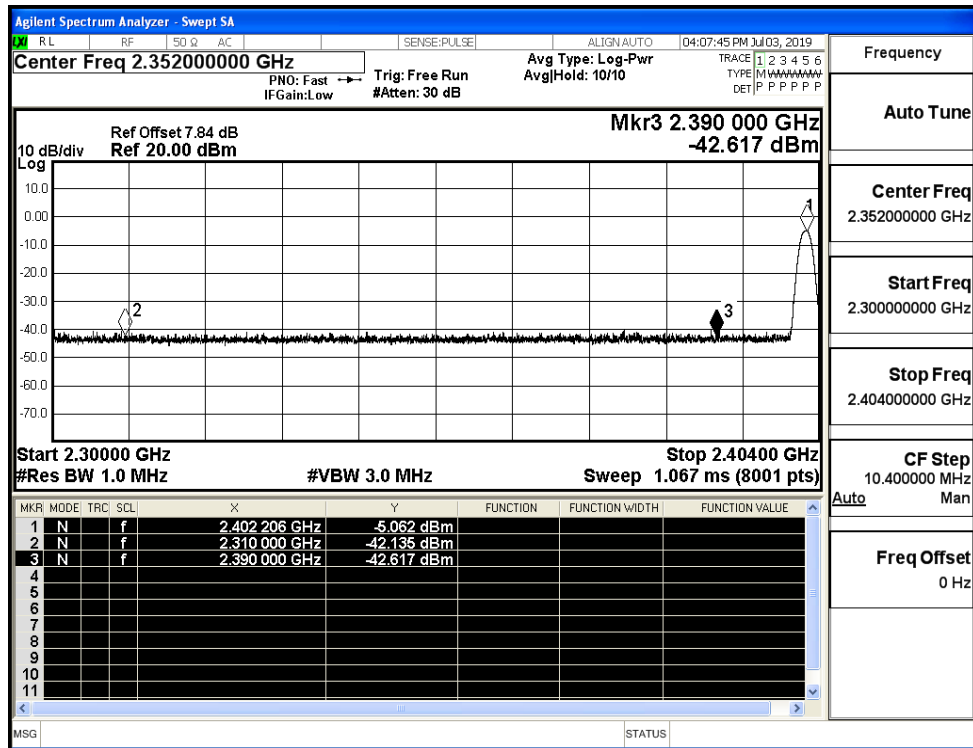
$\pi/4$ DQPSK/HCH/Hop



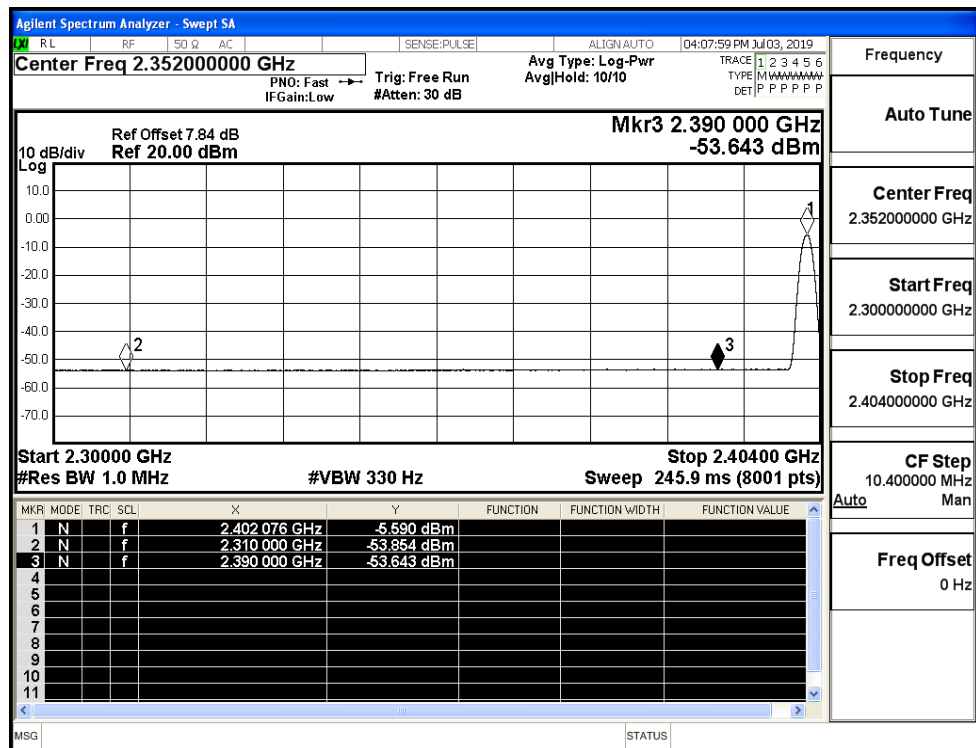
## A.8 Restrict-band band-edge measurements

| Test Mode     | Hopping | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0 | -42.14      | 2.0  | 0             | 53.12      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.85      | 2.0  | 0             | 41.40      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -42.62      | 2.0  | 0             | 52.64      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.64      | 2.0  | 0             | 41.61      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -44.55      | 2.0  | 0             | 50.71      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.28      | 2.0  | 0             | 41.98      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -44.16      | 2.0  | 0             | 51.10      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.19      | 2.0  | 0             | 42.07      | AV       | 54             | PASS    |
| $\pi/4$ DQPSK | Off     | 2310.0 | -43.74      | 2.0  | 0             | 51.52      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.90      | 2.0  | 0             | 41.36      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -42.07      | 2.0  | 0             | 53.18      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -53.60      | 2.0  | 0             | 41.66      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -44.00      | 2.0  | 0             | 51.26      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.31      | 2.0  | 0             | 41.94      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -43.16      | 2.0  | 0             | 52.10      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.19      | 2.0  | 0             | 42.07      | AV       | 54             | PASS    |

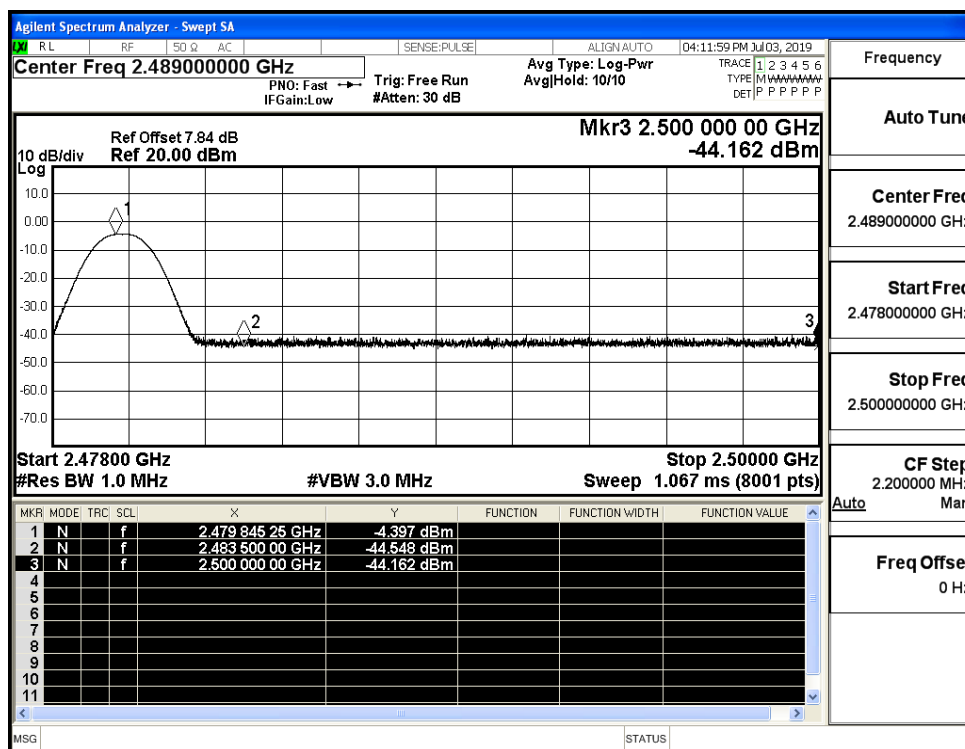
## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



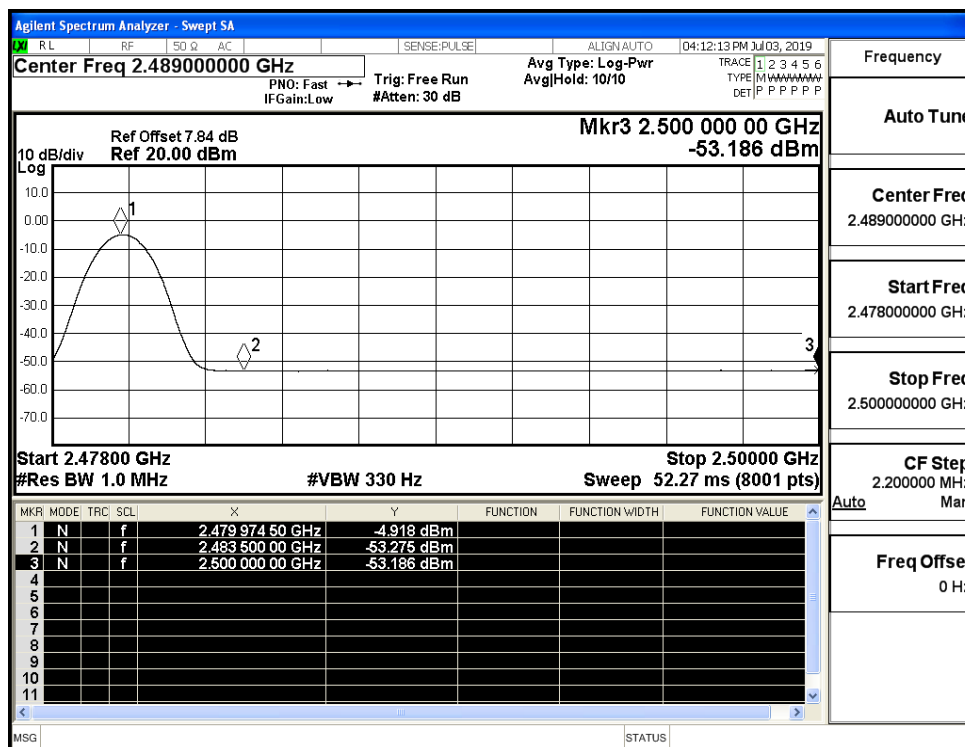
## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)

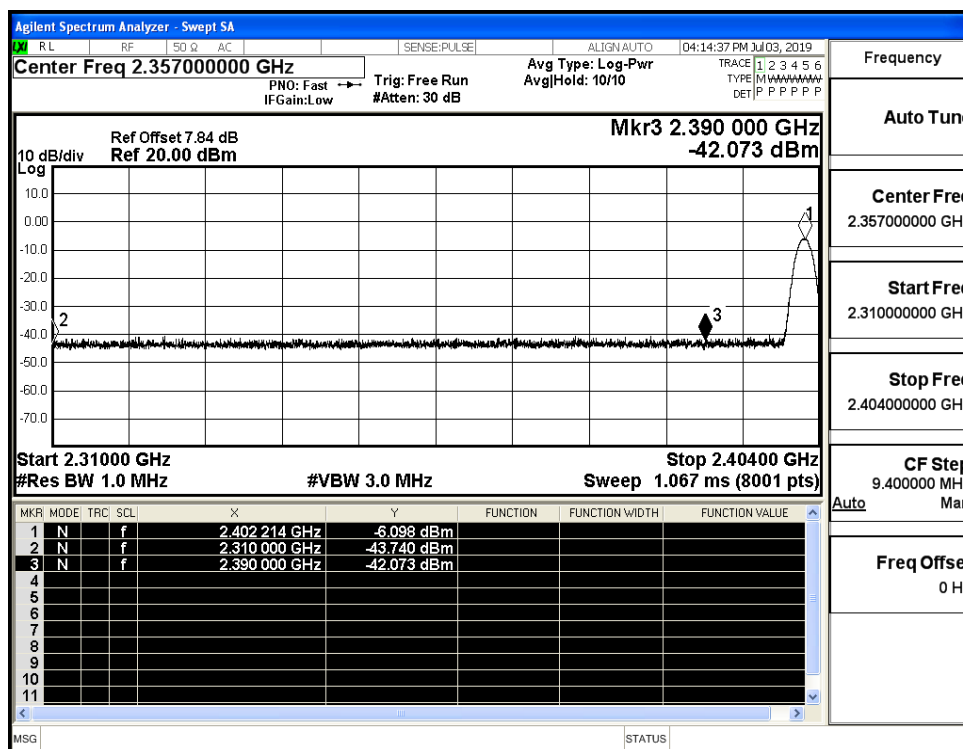
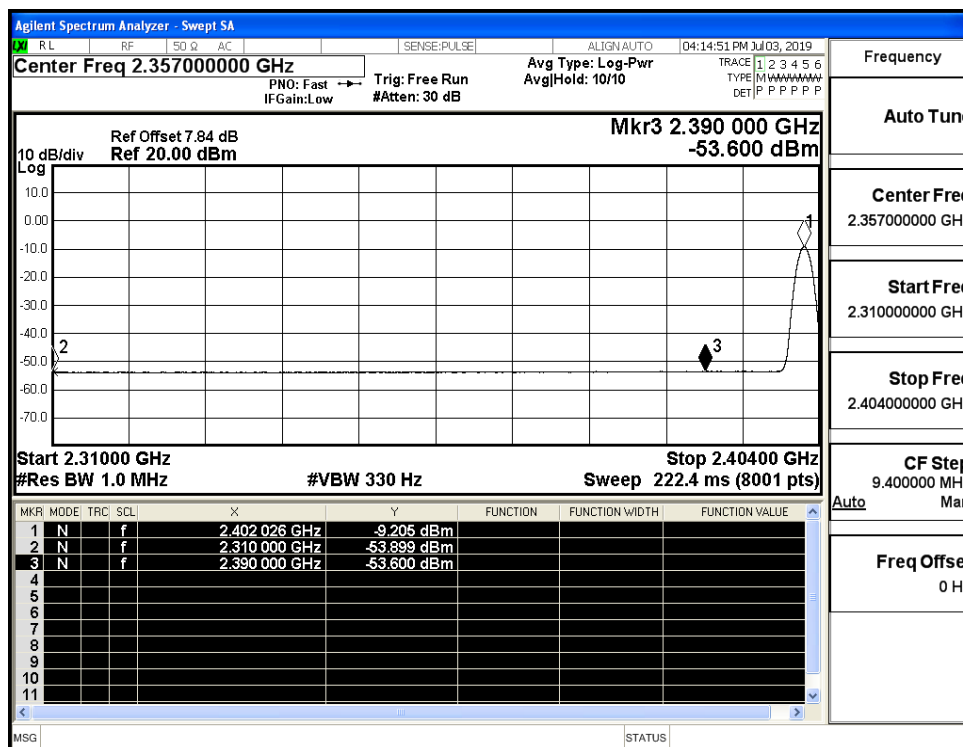


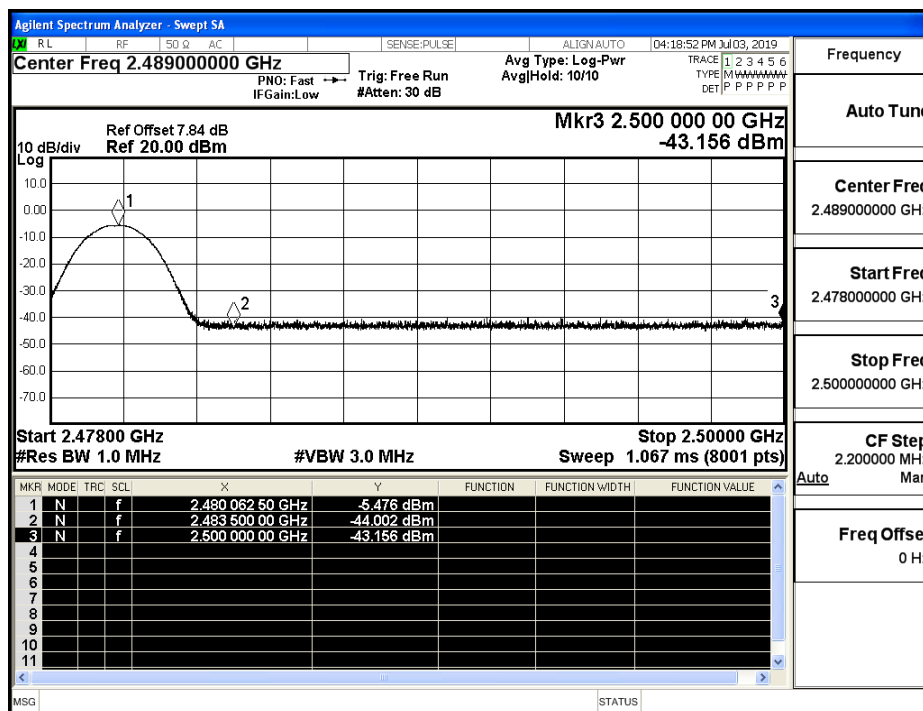
## Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



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