

## Appendix A

### RF Test Data for BT 2.0+EDR (Conducted Measurement)

Product Name: MULTIMEDIA SPEAKERS

Trade Mark: AXESS

Test Model: MSBT3911

#### Environmental Conditions

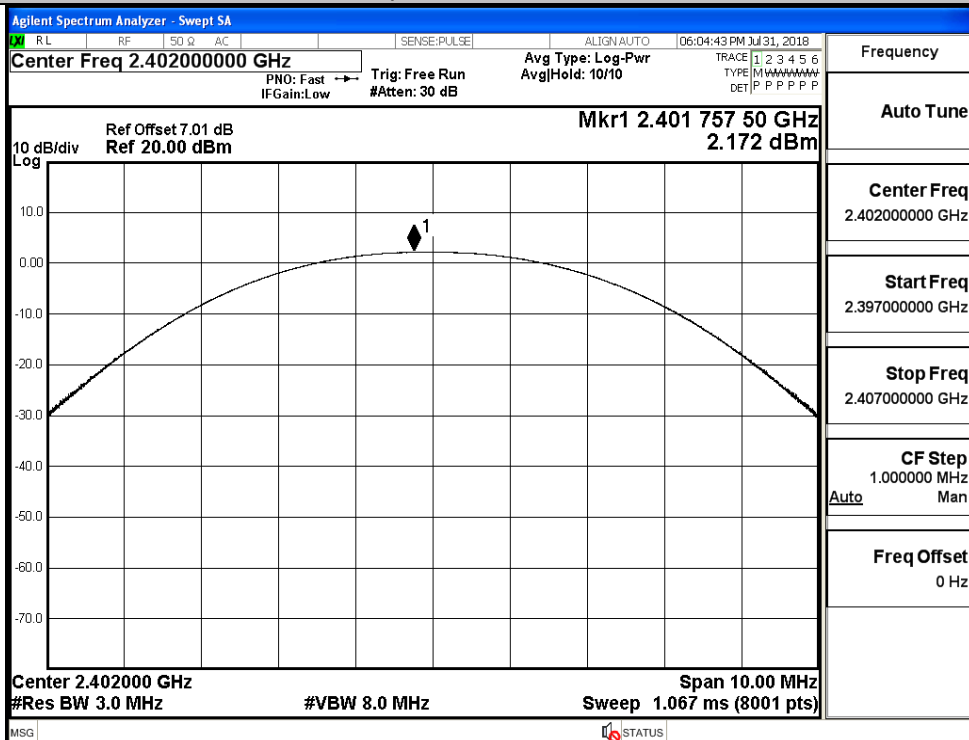
|                    |             |
|--------------------|-------------|
| Temperature:       | 23.3 ° C    |
| Relative Humidity: | 52.5%       |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Diamond.Lu  |
| Supervised by:     | Jayden.Zhuo |

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

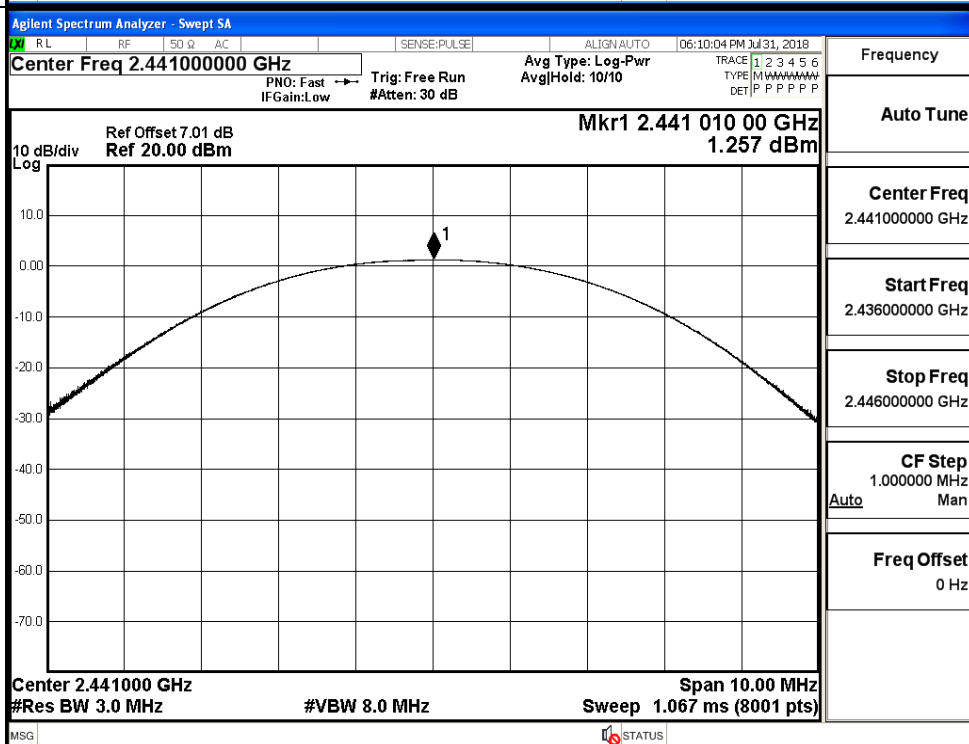
| Mode     | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|----------|----------|---------------------------------|-------------|---------|
| GFSK     | LCH      | 2.172                           | 30          | PASS    |
|          | MCH      | 1.257                           | 30          | PASS    |
|          | HCH      | 1.744                           | 30          | PASS    |
| π/4DQPSK | LCH      | 1.504                           | 21          | PASS    |
|          | MCH      | 0.695                           | 21          | PASS    |
|          | HCH      | 1.073                           | 21          | PASS    |

# Test Graphs

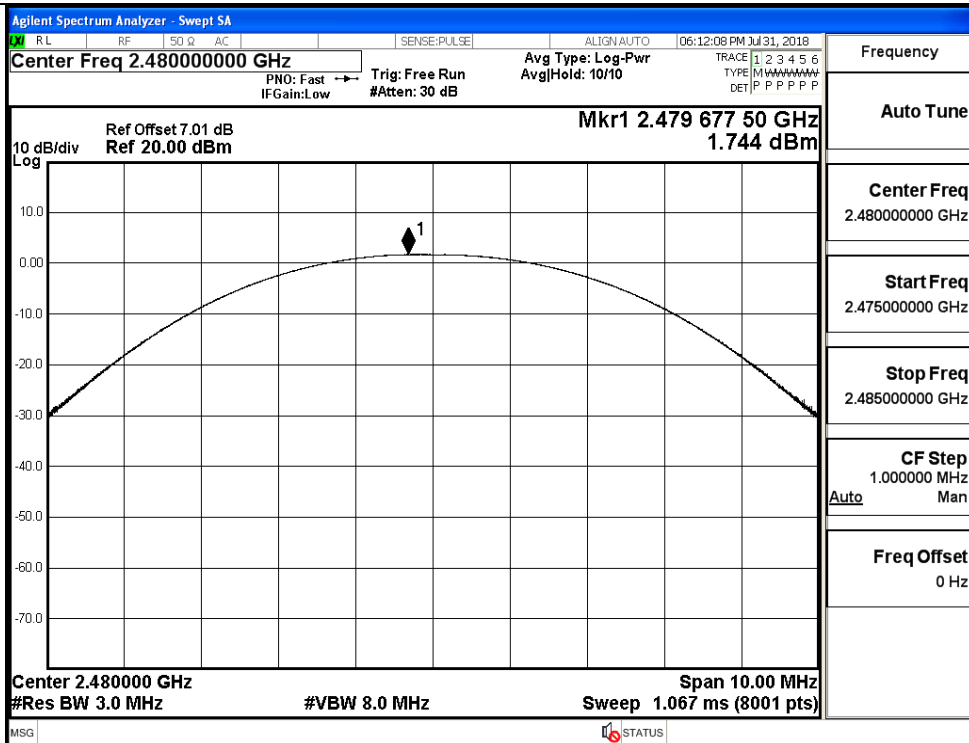
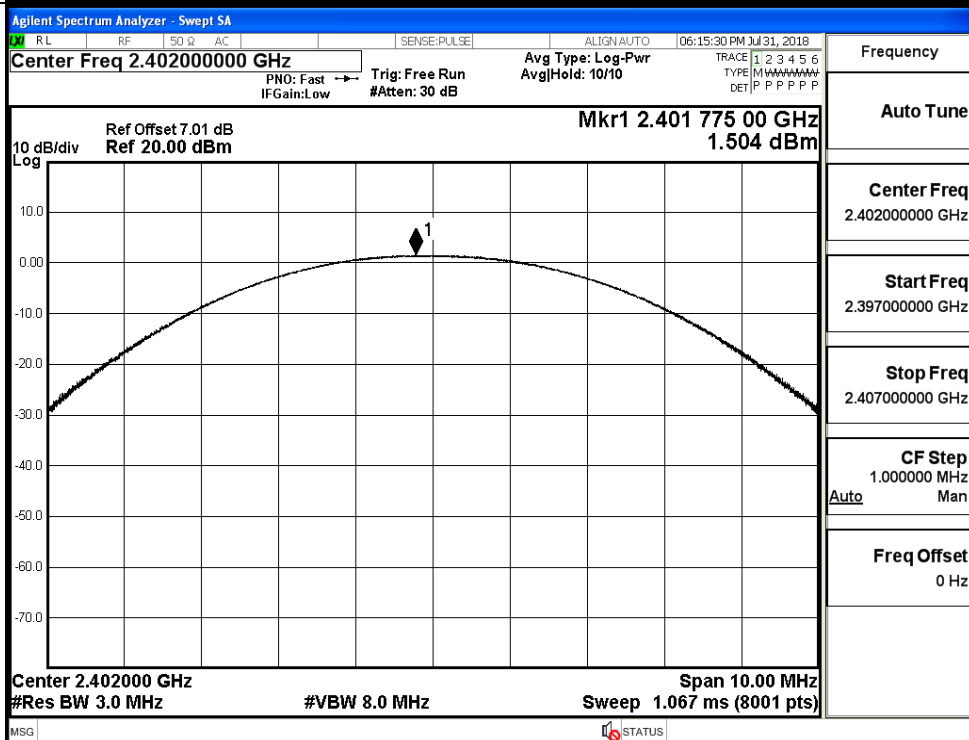
GFSK/LCH

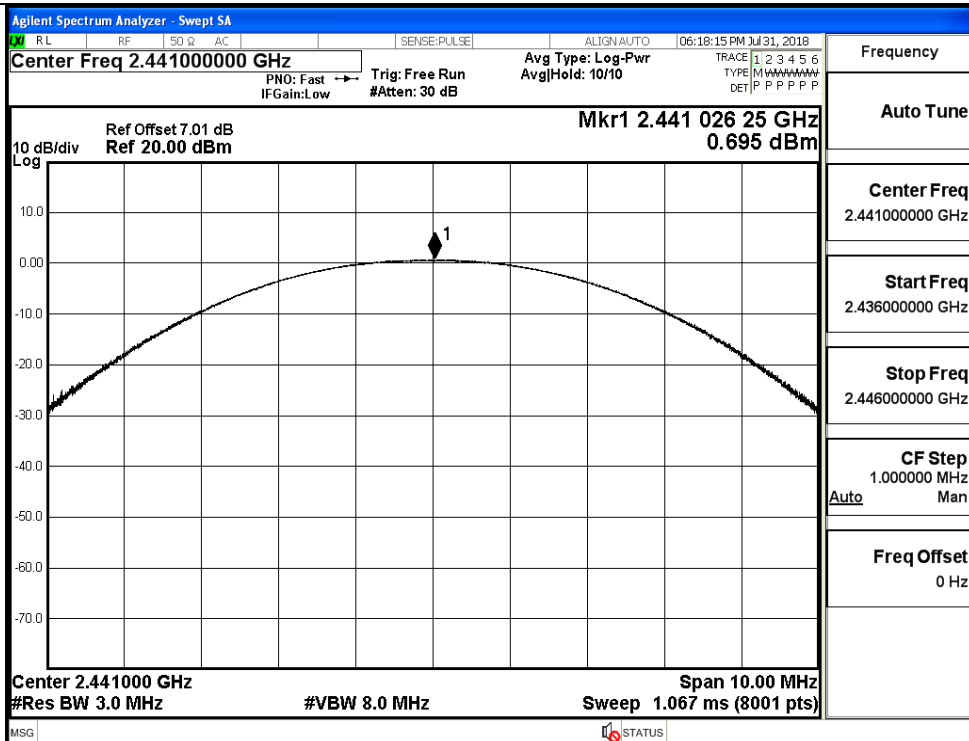
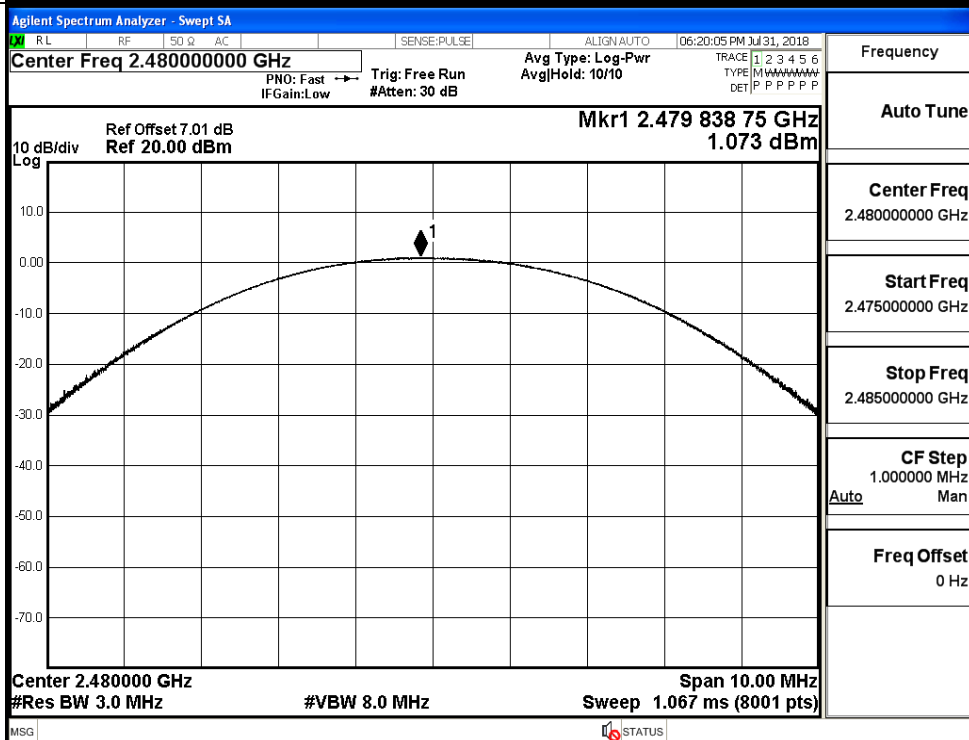


GFSK/MCH



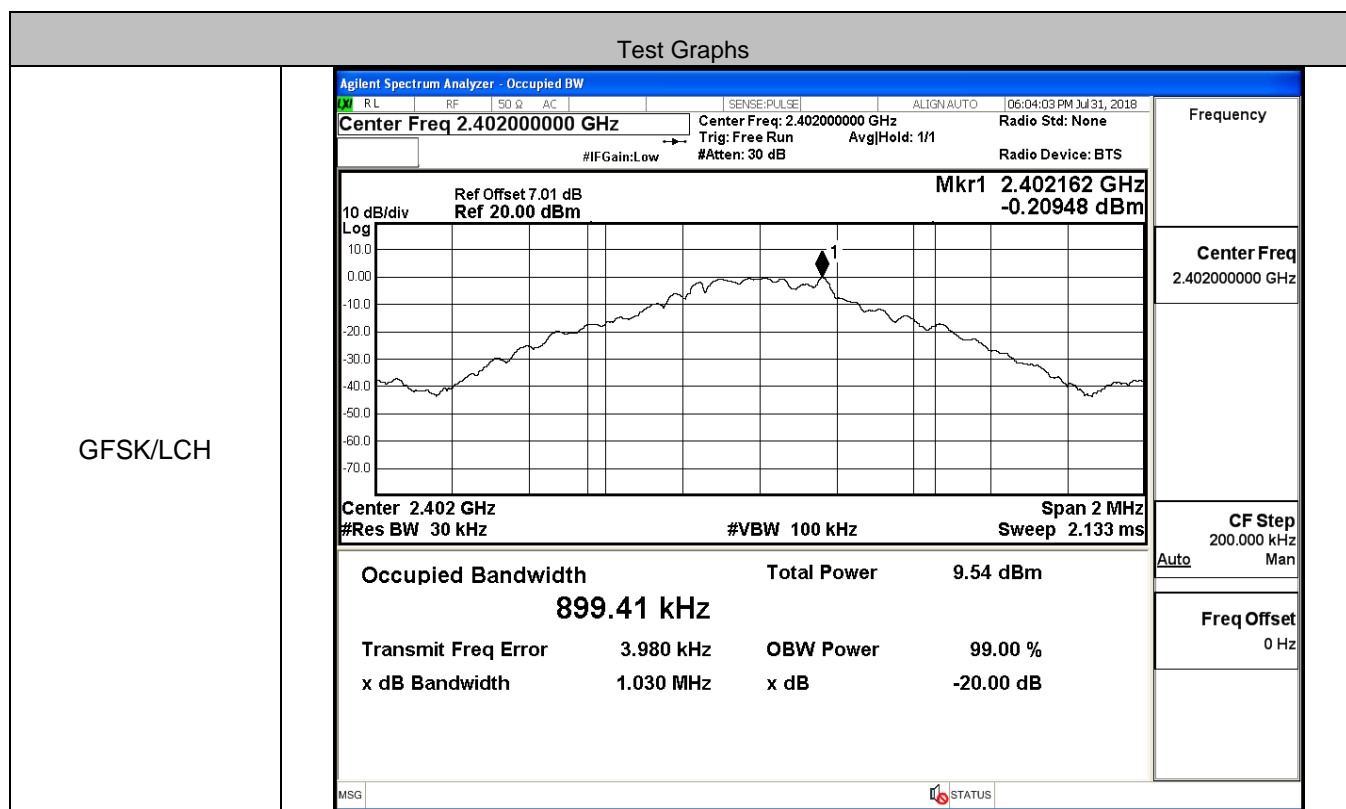
GFSK/HCH

 $\pi$ /4DQPSK/LCH

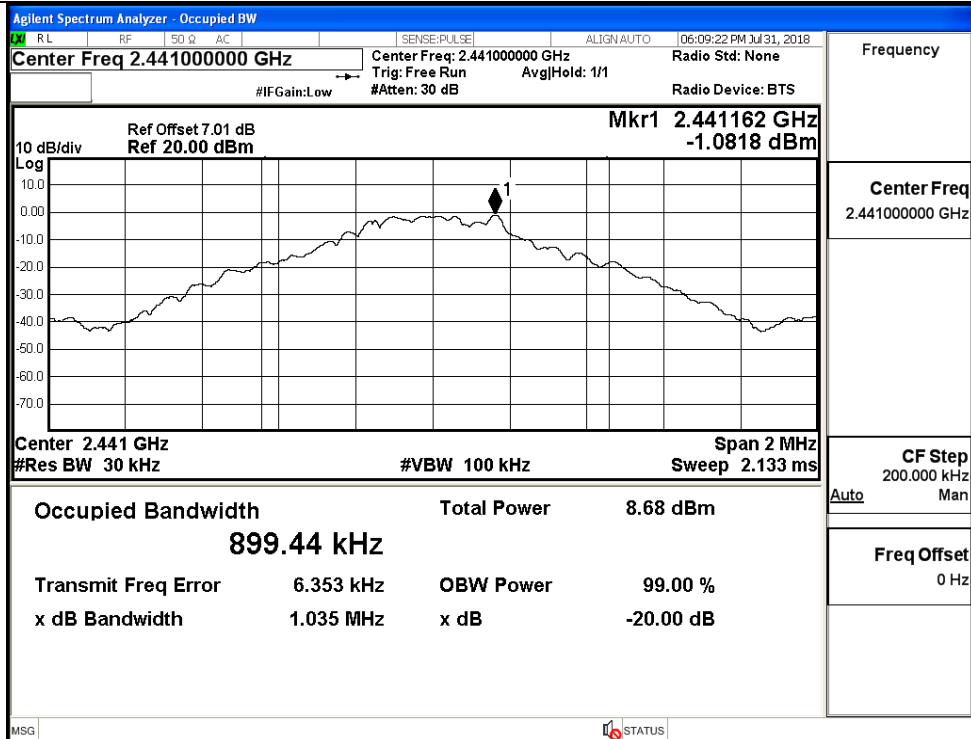
$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

## A.2 99% and 20dB Bandwidth

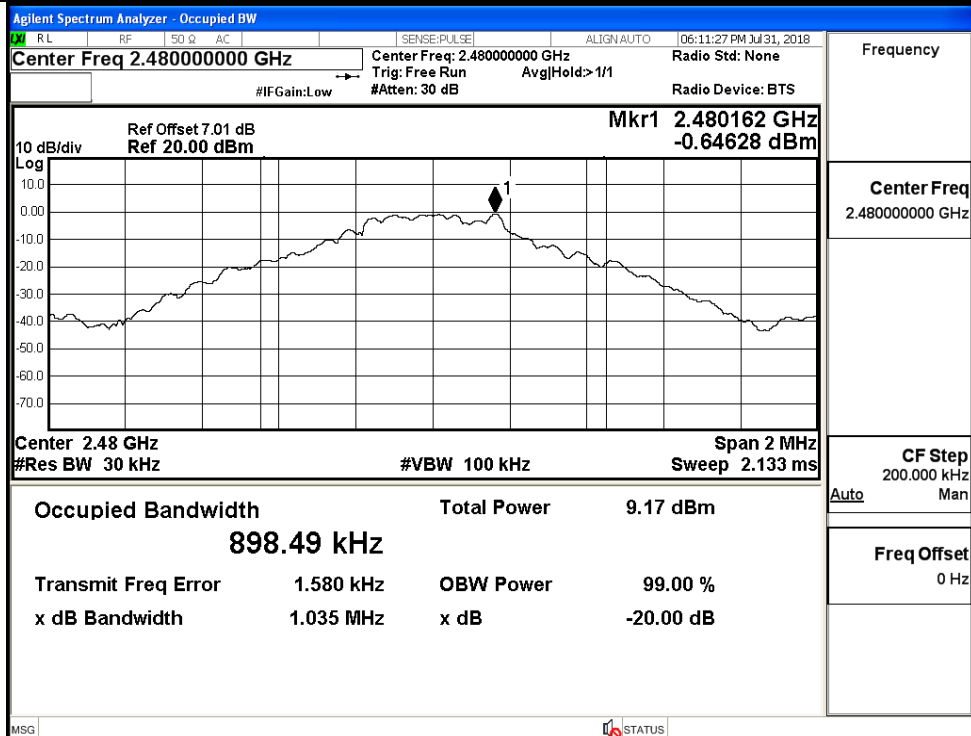
| Mode          | Channel. | 99% Bandwidth [MHz] | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|---------------|----------|---------------------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.89941             | 1.030                | Not Specified | PASS    |
|               | MCH      | 0.89944             | 1.035                | Not Specified | PASS    |
|               | HCH      | 0.89849             | 1.035                | Not Specified | PASS    |
| $\pi/4$ DQPSK | LCH      | 1.1780              | 1.291                | Not Specified | PASS    |
|               | MCH      | 1.1876              | 1.319                | Not Specified | PASS    |
|               | HCH      | 1.1781              | 1.316                | Not Specified | PASS    |

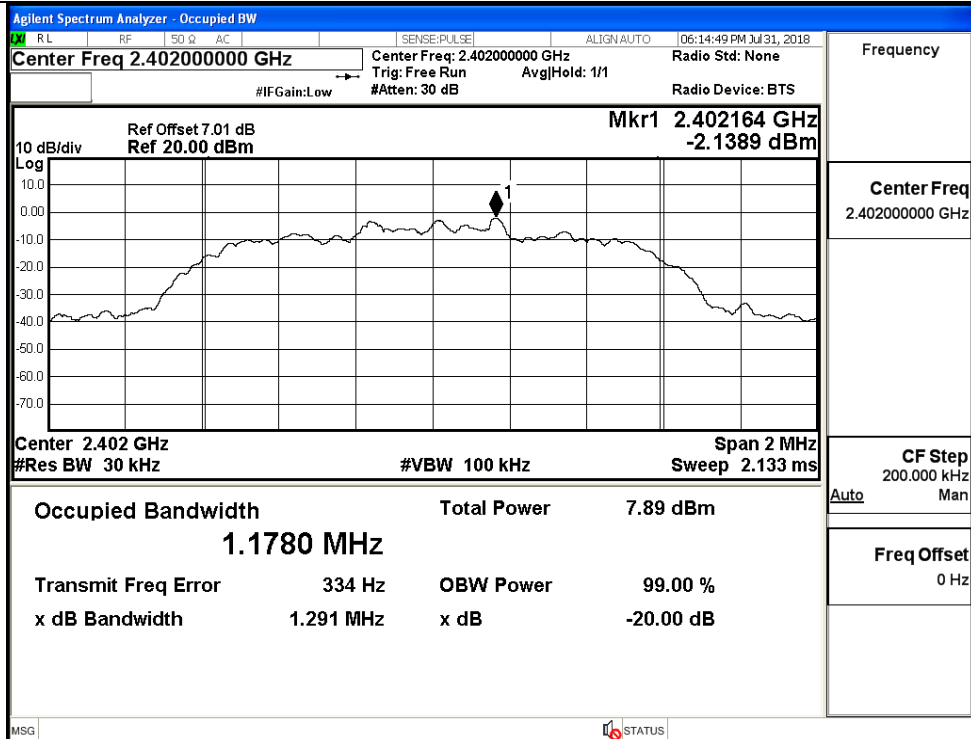
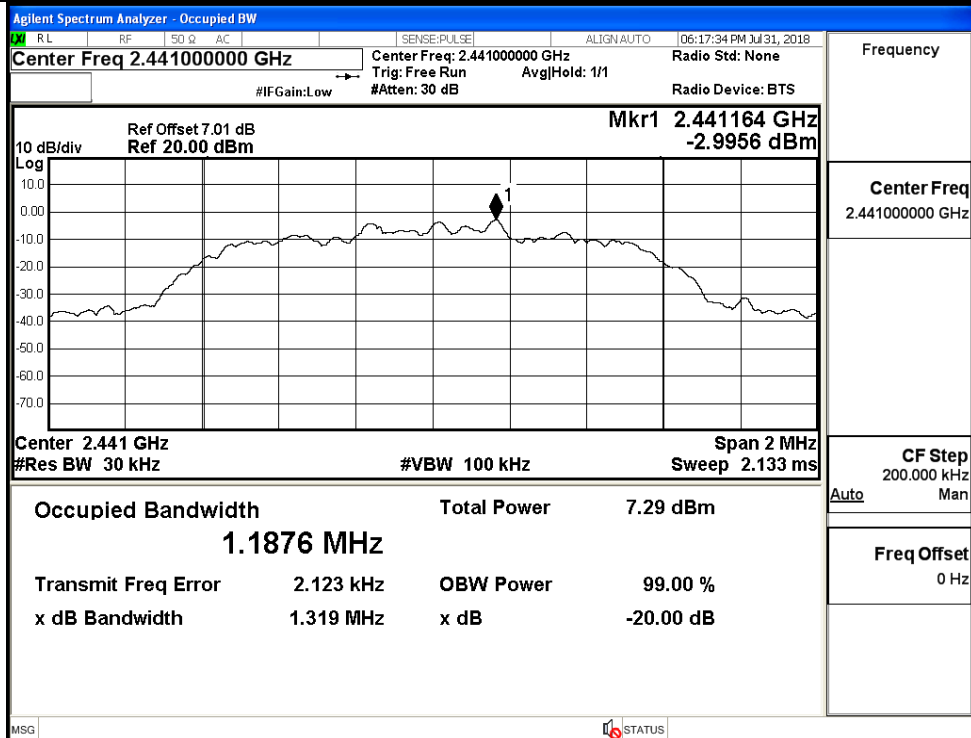


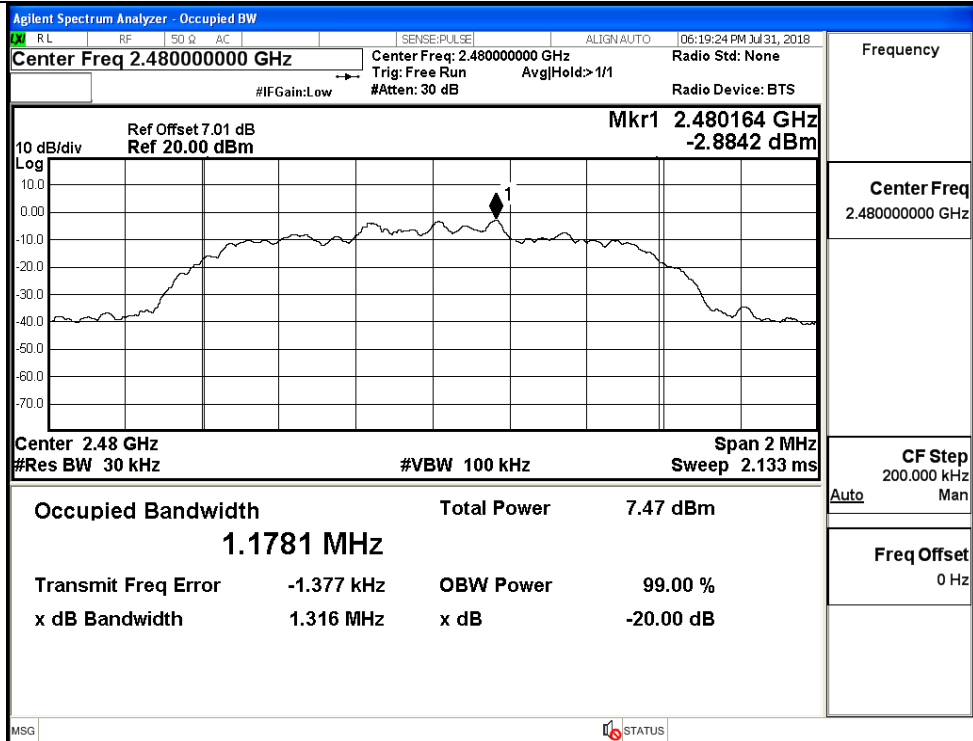
GFSK/MCH



GFSK/HCH



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

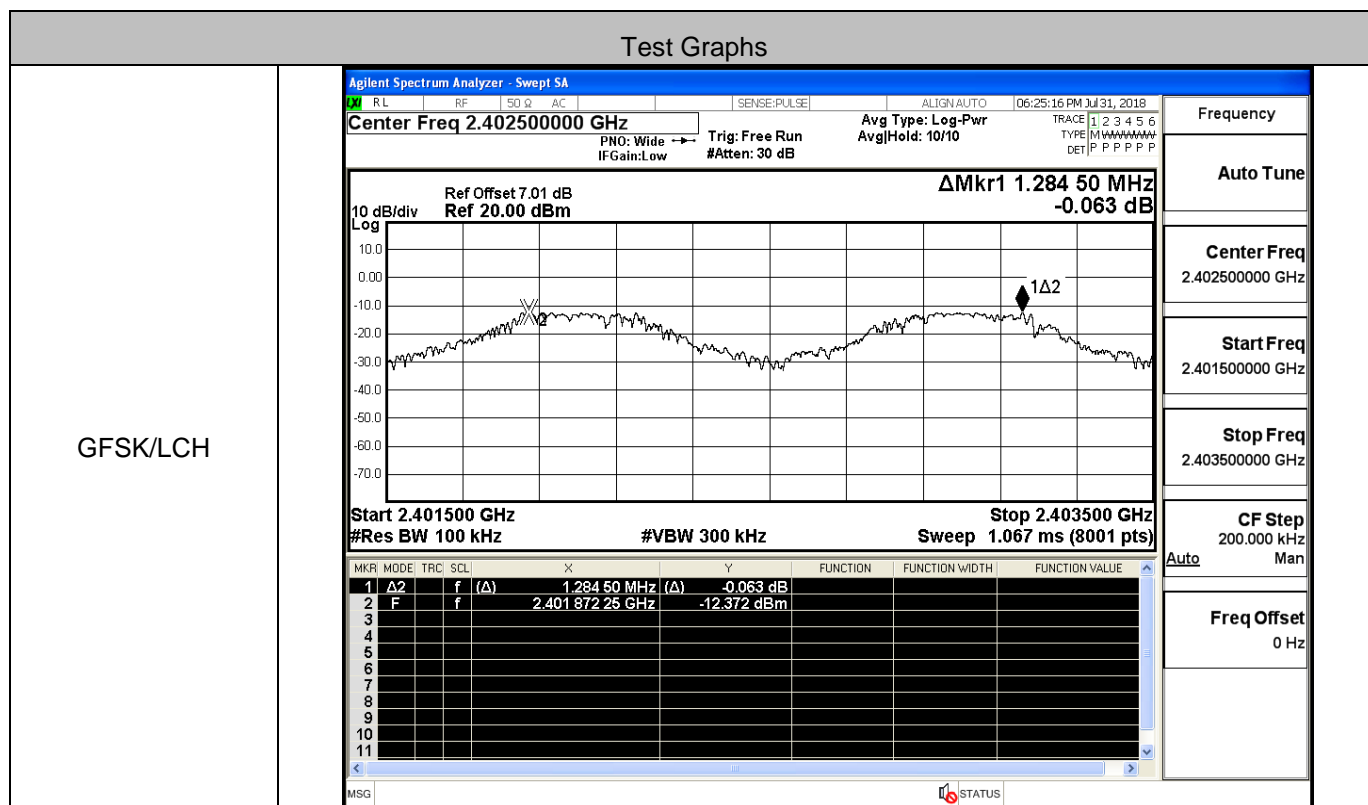
$\pi/4$ DQPSK/HCH



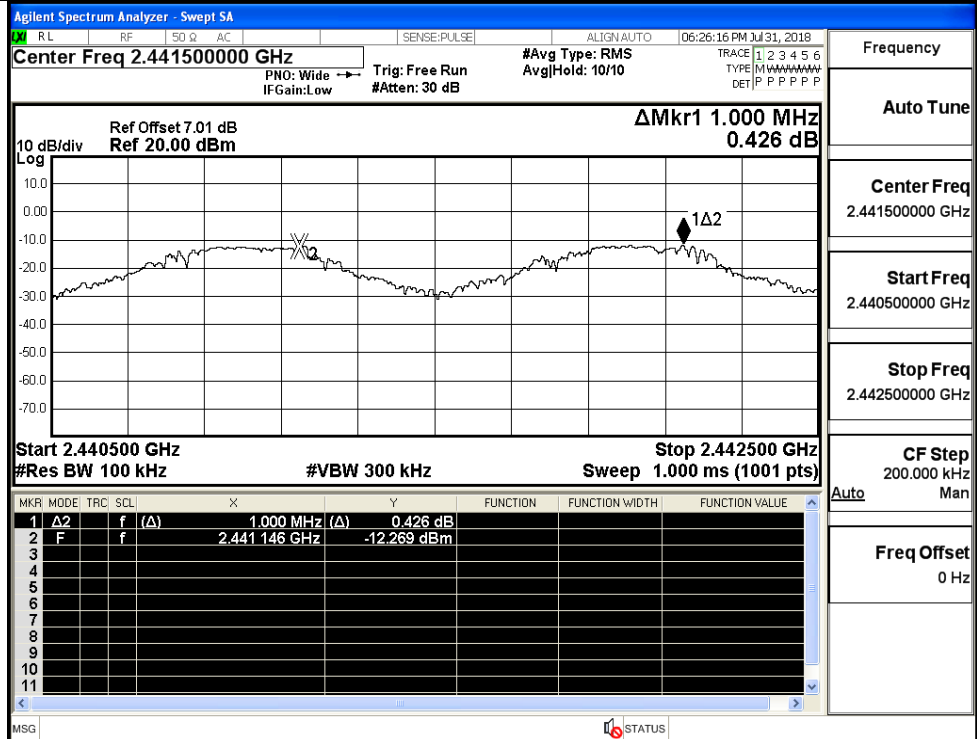
### A.3 Carrier Frequency Separation

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---------------|----------|------------------------------------|-------------|---------|
| GFSK          | LCH      | 1.285                              | 0.690       | PASS    |
|               | MCH      | 1.000                              | 0.690       | PASS    |
|               | HCH      | 1.120                              | 0.690       | PASS    |
| $\pi$ /4DQPSK | LCH      | 1.112                              | 0.879       | PASS    |
|               | MCH      | 0.844                              | 0.879       | PASS    |
|               | HCH      | 0.932                              | 0.879       | PASS    |

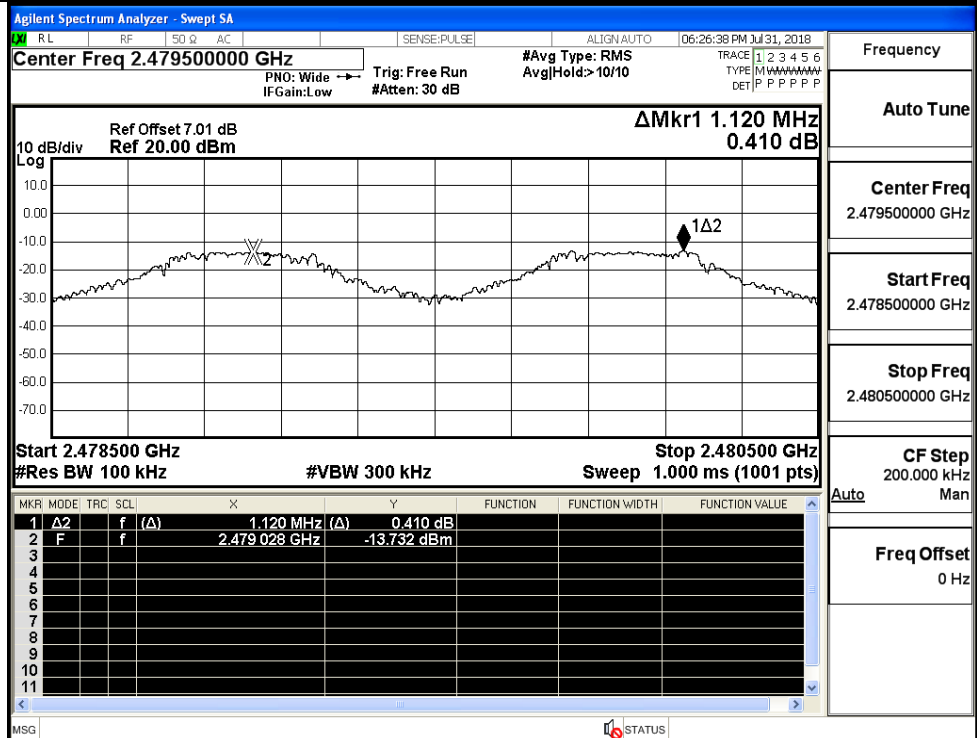
Test Graphs

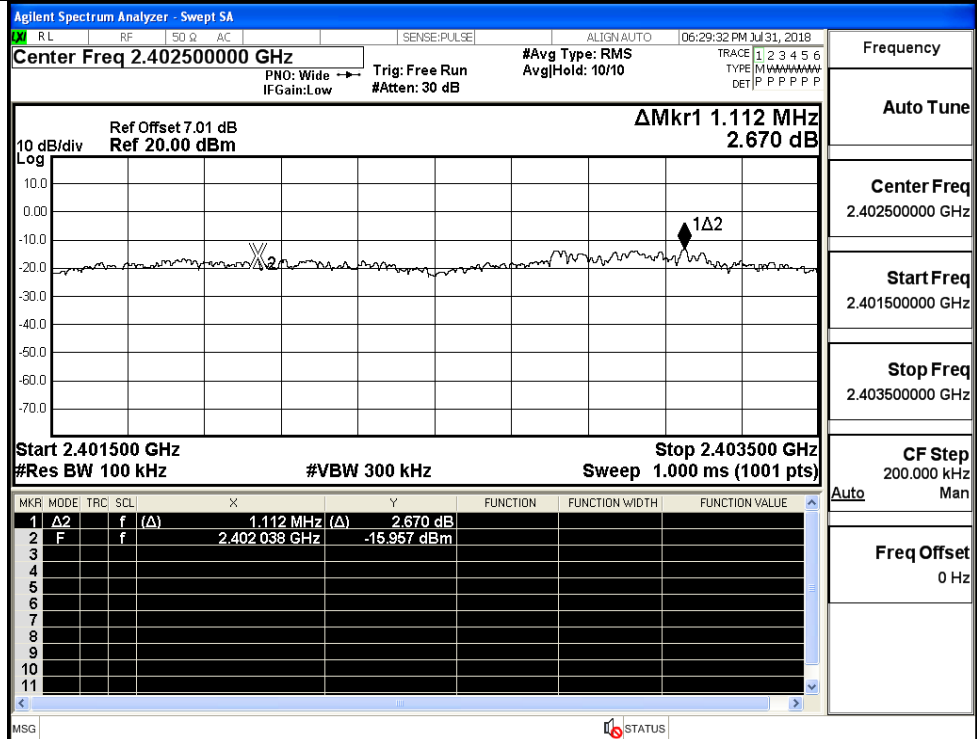
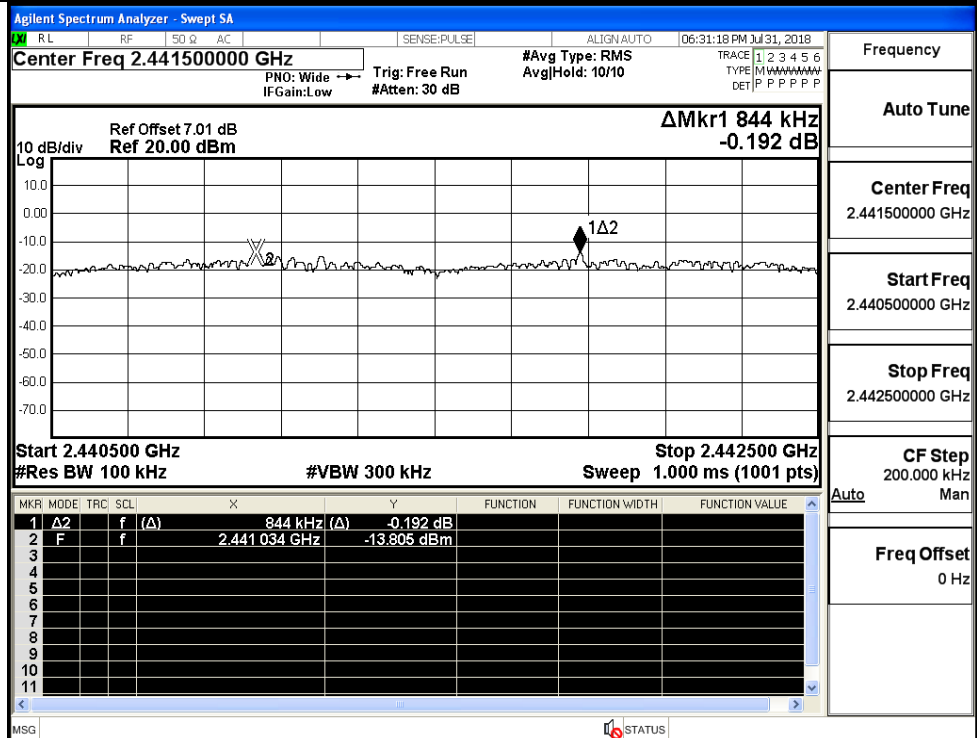


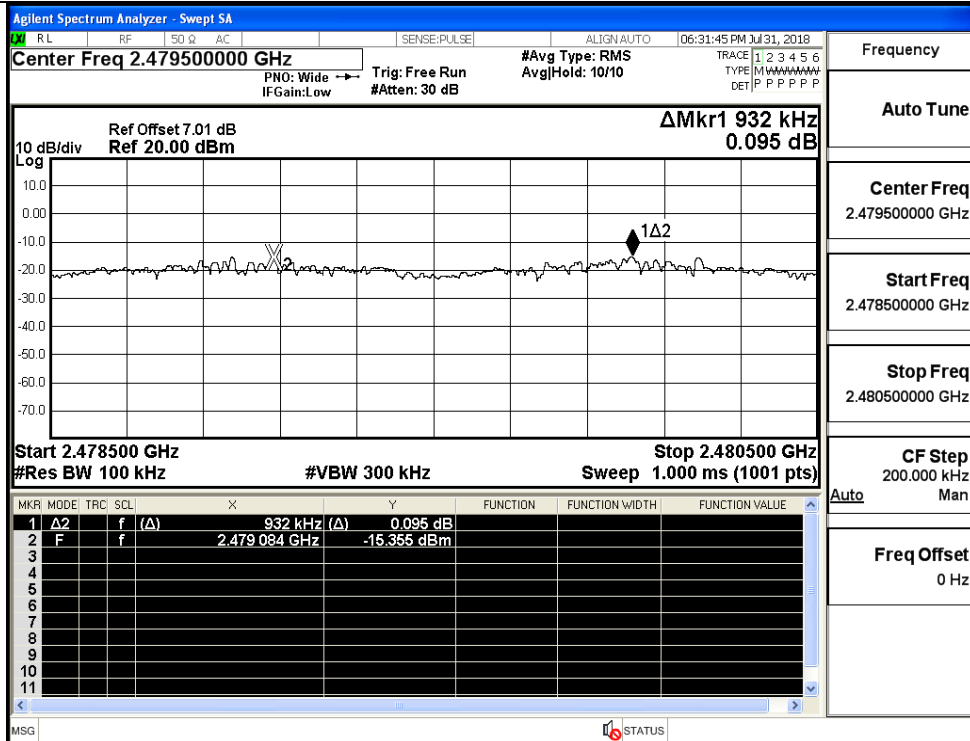
GFSK/MCH



GFSK/HCH



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

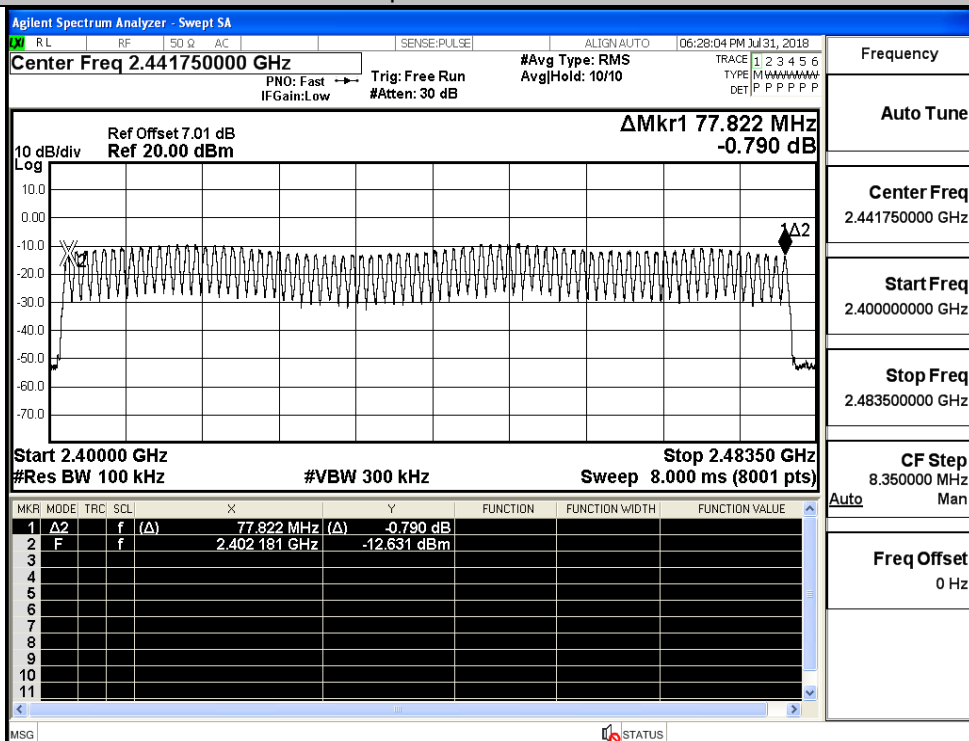
$\pi/4$ DQPSK/HCH

# A.4 Hopping Channel Number

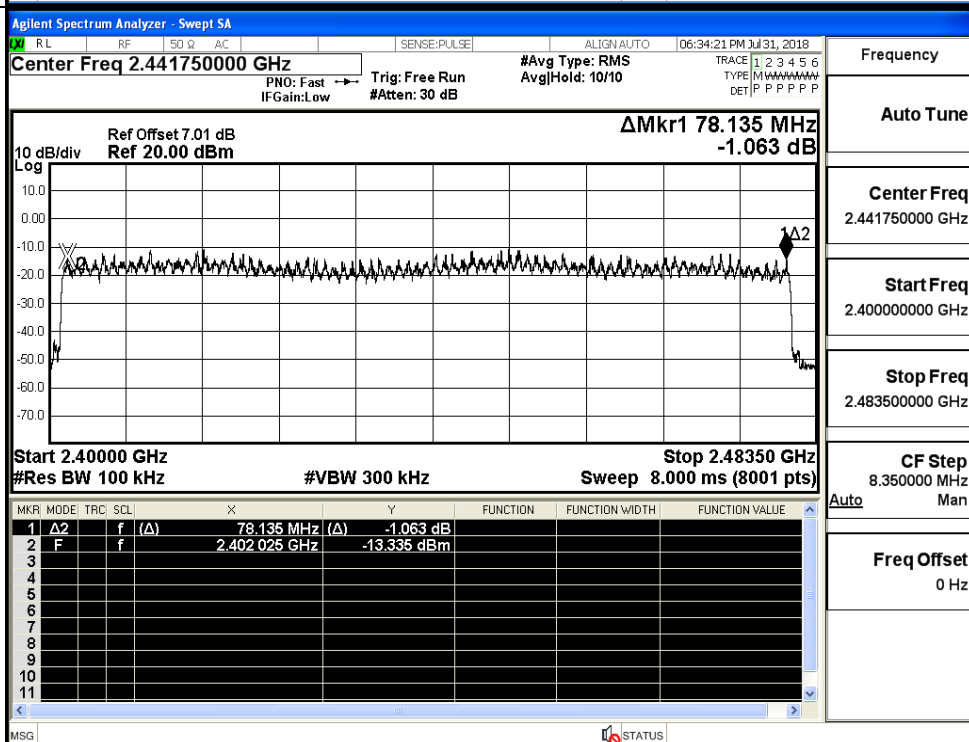
| Mode          | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK          | Hop      | 79                            | $\geq 15$ | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                    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

## Test Graphs

GFSK/Hop

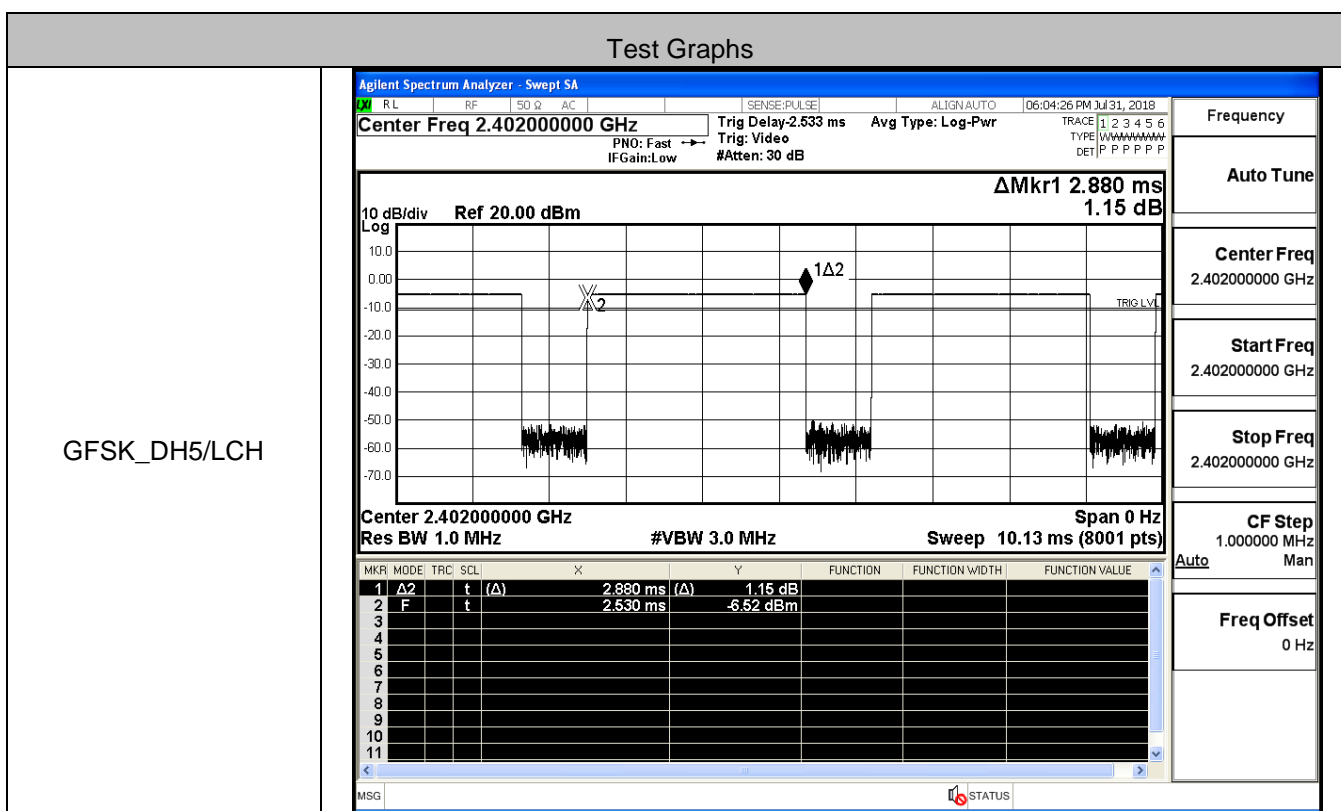


$\pi/4$ DQPSK/Hop

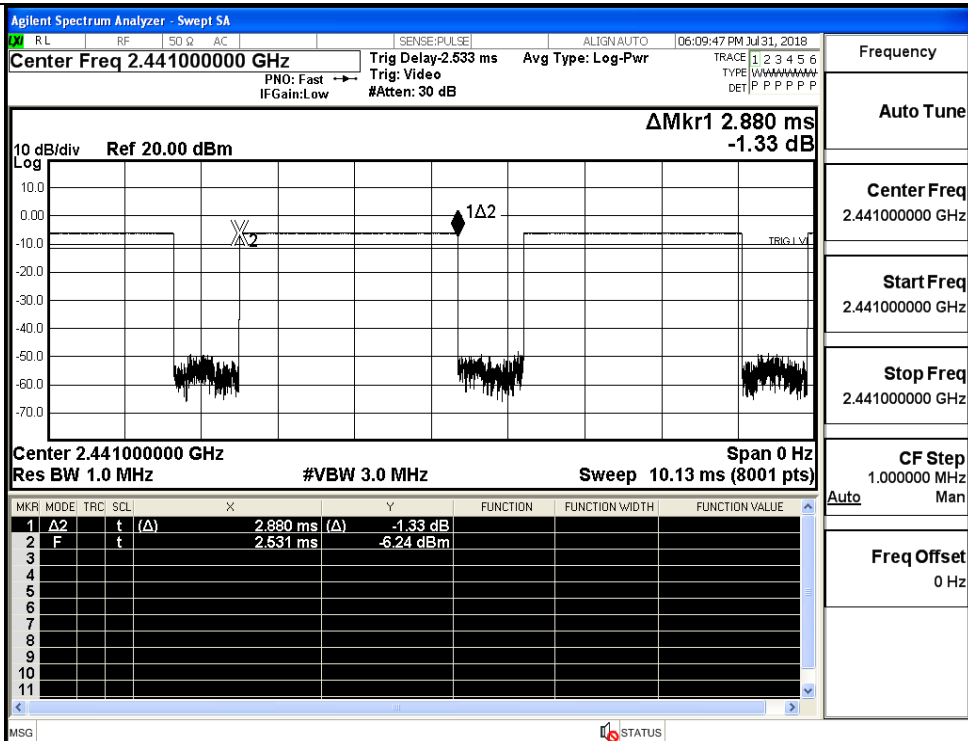


## A.5 Dwell Time

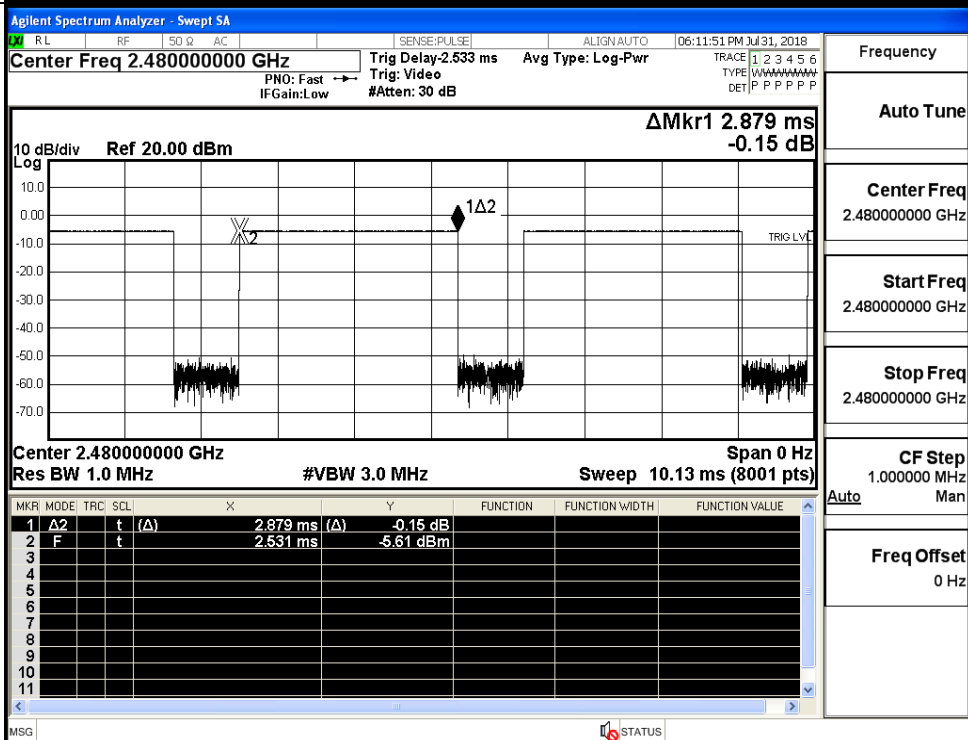
| Mode          | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---------------|--------|---------|----------------------------|-----------------------|---------------|-----------|---------|
| GFSK          | DH5    | LCH     | 2.88   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



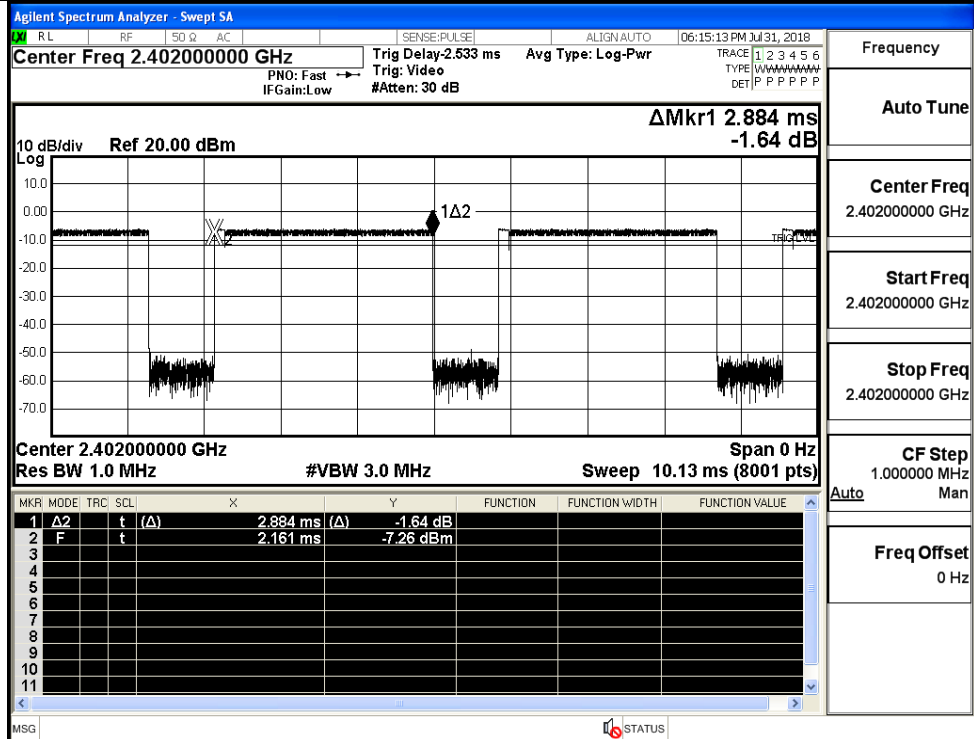
GFSK\_DH5/MCH



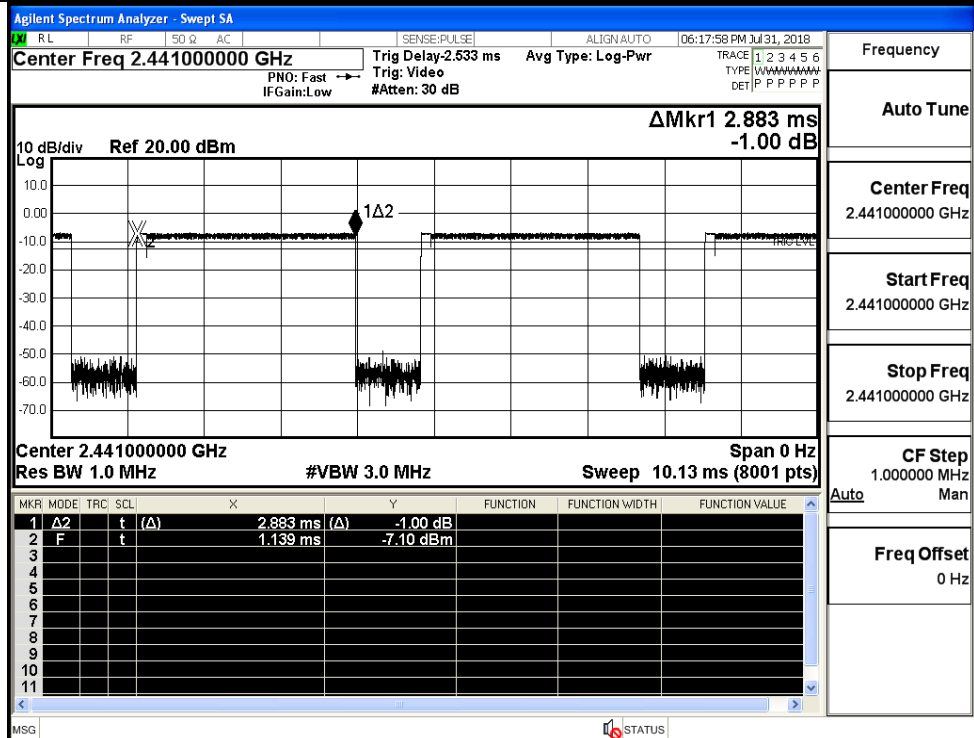
GFSK\_DH5/HCH



$\pi/4$ DQPSK  
\_2DH5/LCH

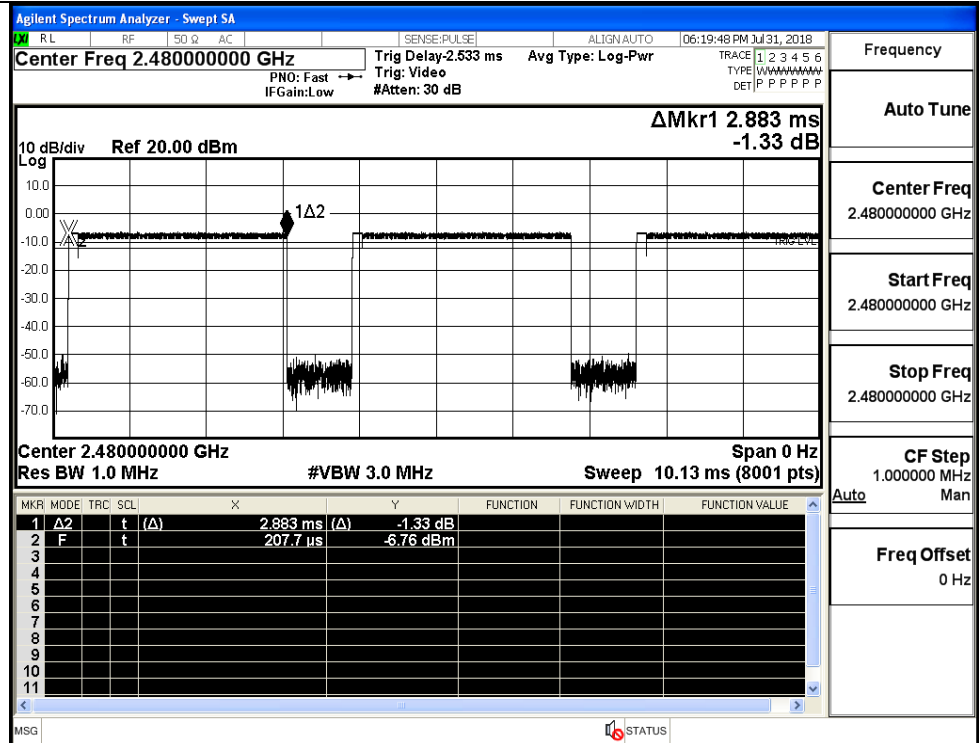


$\pi/4$ DQPSK  
\_2DH5/MCH





π/4DQPSK  
\_2DH5/HCH

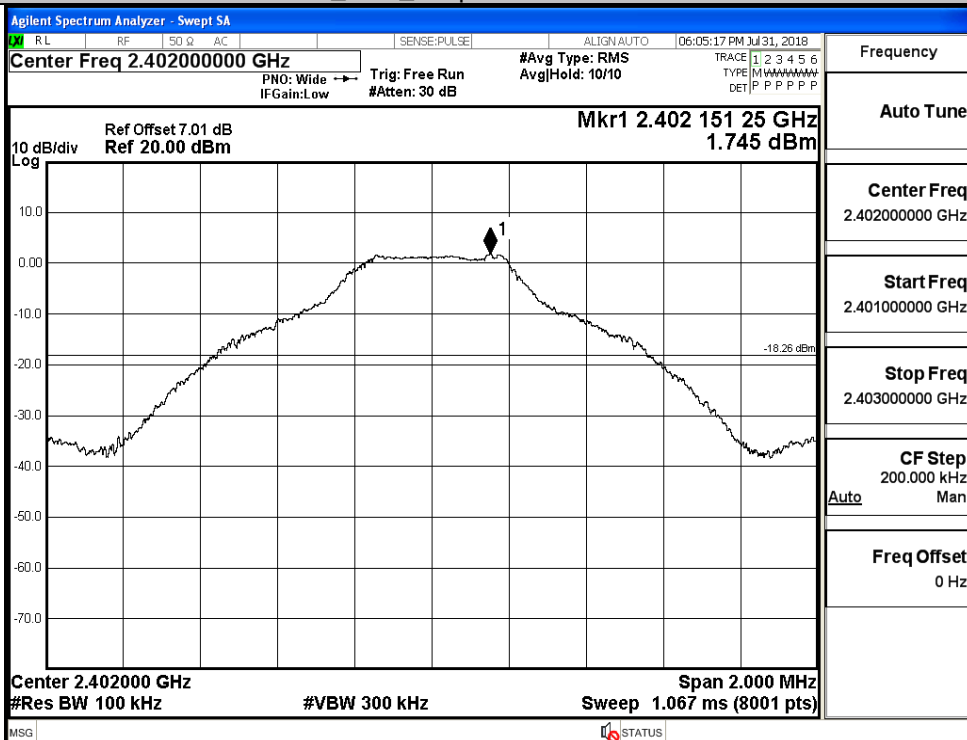


## A.6 RF Conducted Spurious Emissions

| Mode          | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK          | LCH     | 1.745      | -45.418          | -18.255     | PASS    |
|               | MCH     | 0.942      | -44.933          | -19.058     | PASS    |
|               | HCH     | 1.401      | -45.669          | -18.599     | PASS    |
| $\pi/4$ DQPSK | LCH     | 0.612      | -44.601          | -19.388     | PASS    |
|               | MCH     | -0.507     | -32.266          | -20.507     | PASS    |
|               | HCH     | 0.287      | -25.654          | -19.713     | PASS    |

# GFSK\_LCH\_Graphs

Pref



Frequency

Auto Tune

Center Freq  
2.402000000 GHz

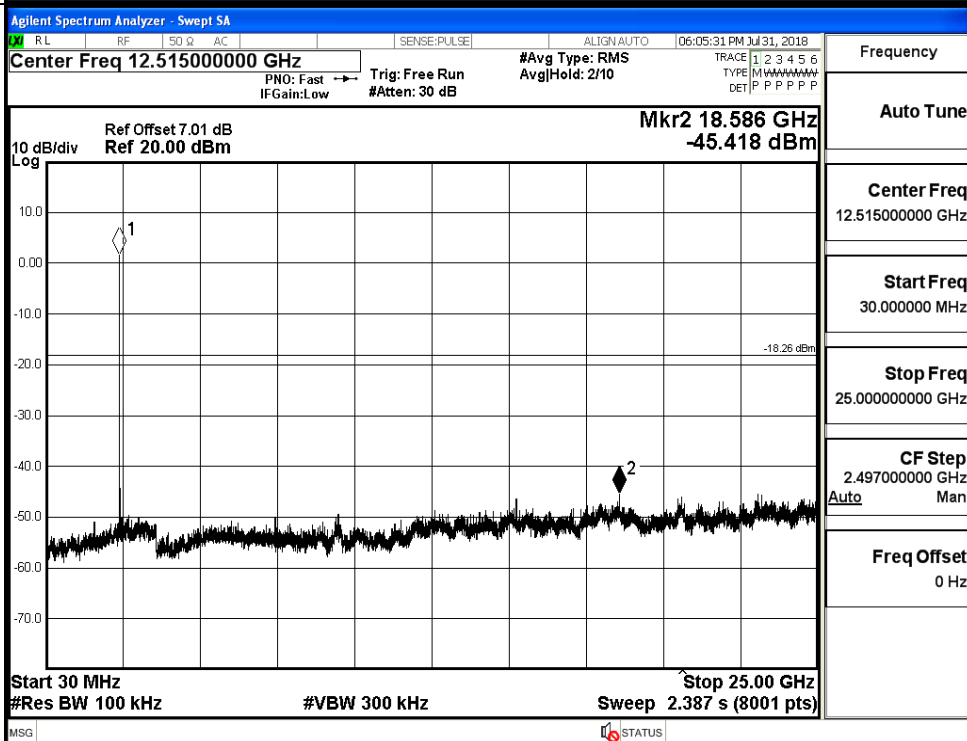
Start Freq  
2.401000000 GHz

Stop Freq  
2.403000000 GHz

CF Step  
200.000 kHz  
Auto Man

Freq Offset  
0 Hz

Puw



Frequency

Auto Tune

Center Freq  
12.515000000 GHz

Start Freq  
30.000000 MHz

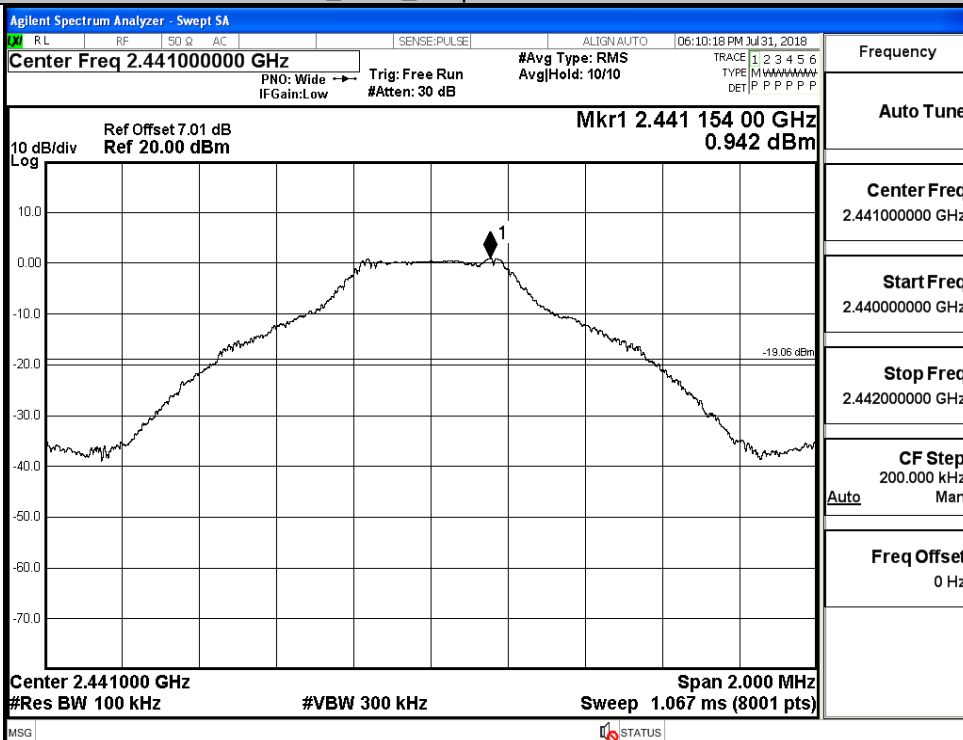
Stop Freq  
25.000000000 GHz

CF Step  
2.497000000 GHz  
Auto Man

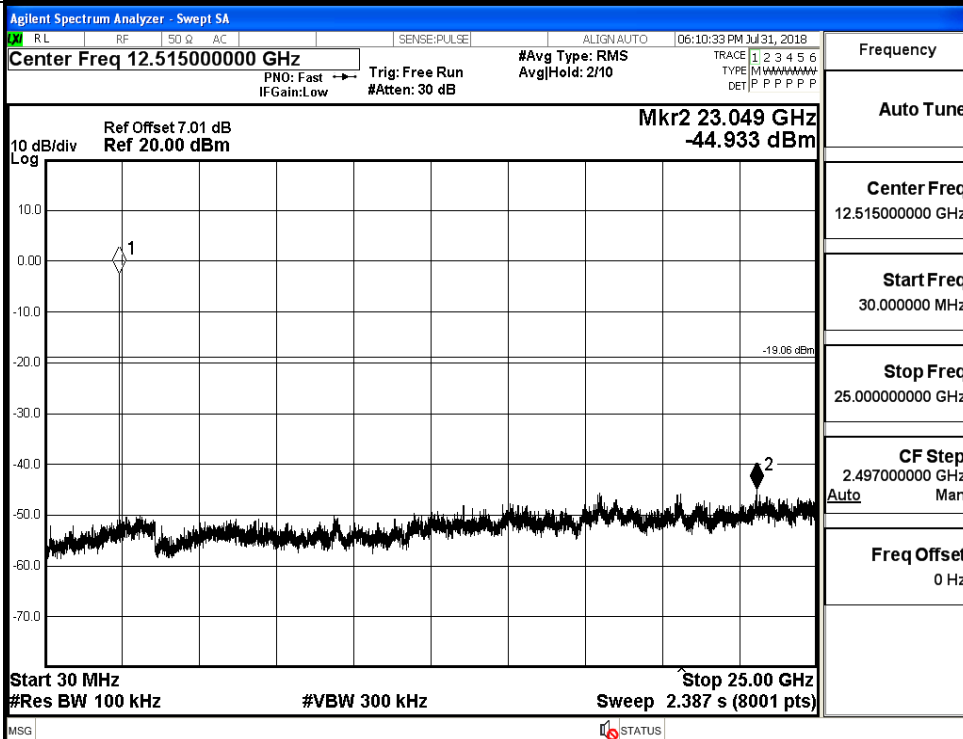
Freq Offset  
0 Hz

# GFSK\_MCH\_Graphs

Pref

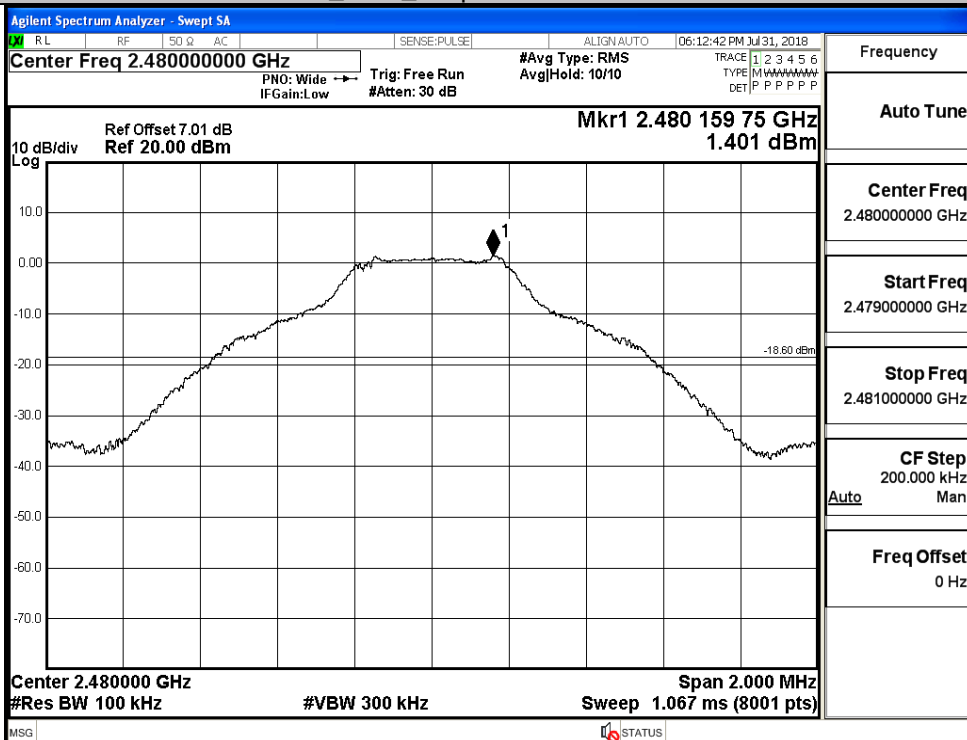


Puw

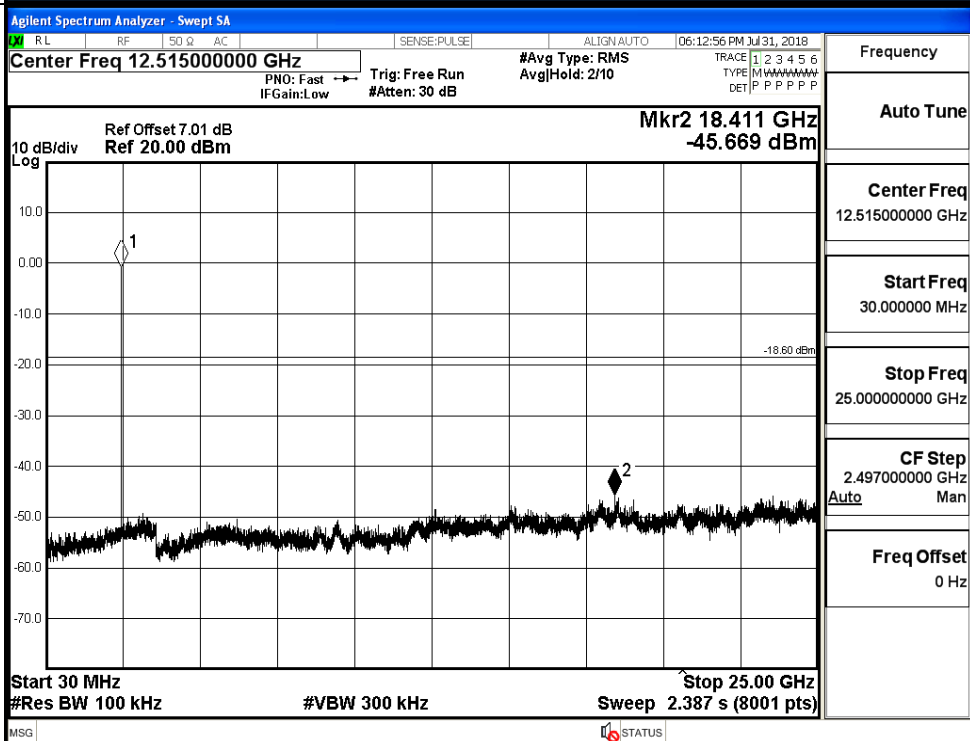


## GFSK\_HCH\_Graphs

Pref

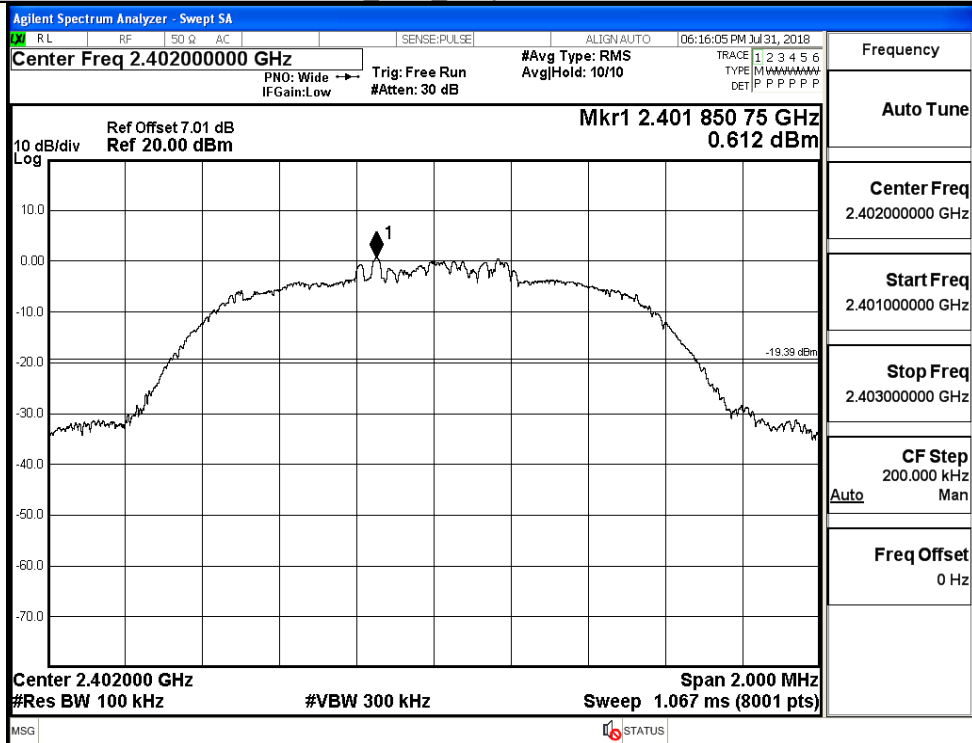


Puw

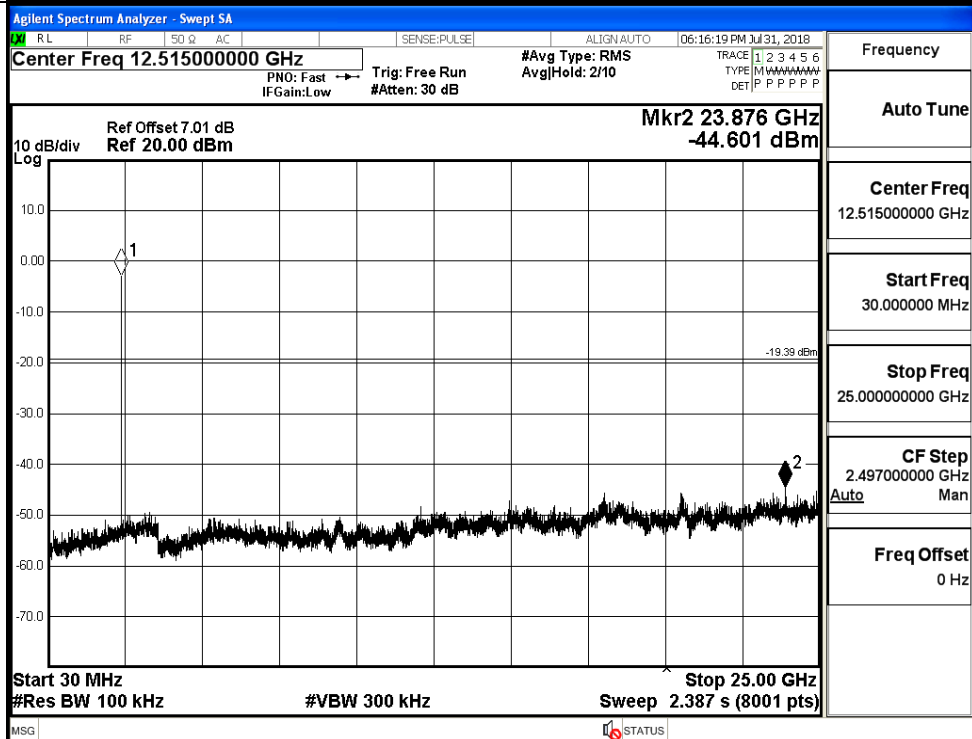


$\pi/4$ DQPSK LCH\_Graphs

Pref

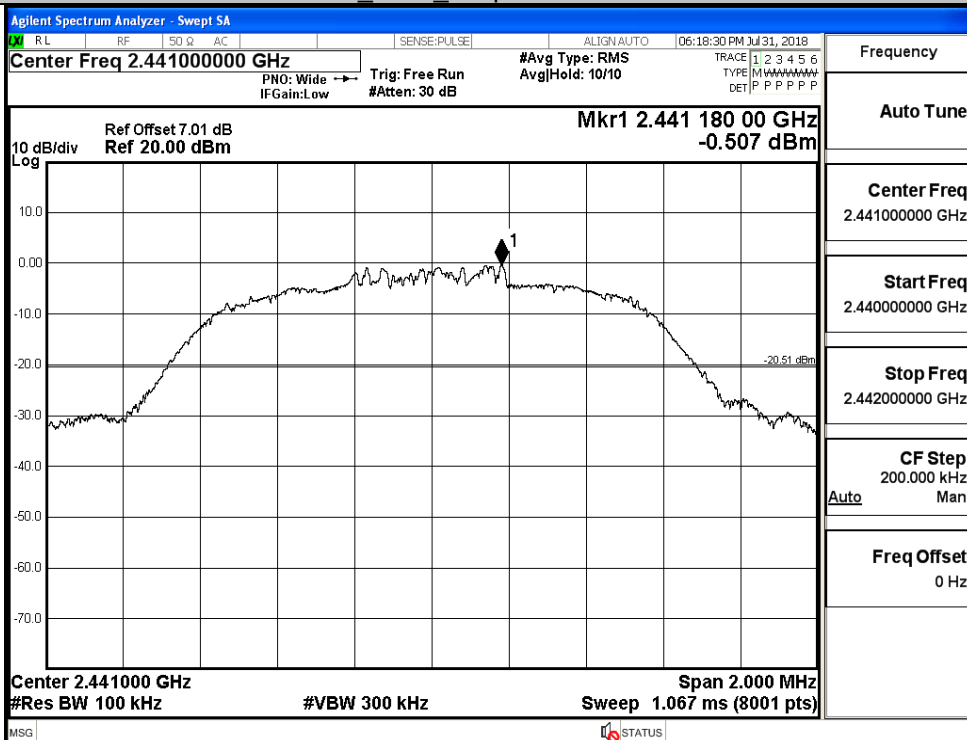


Puw

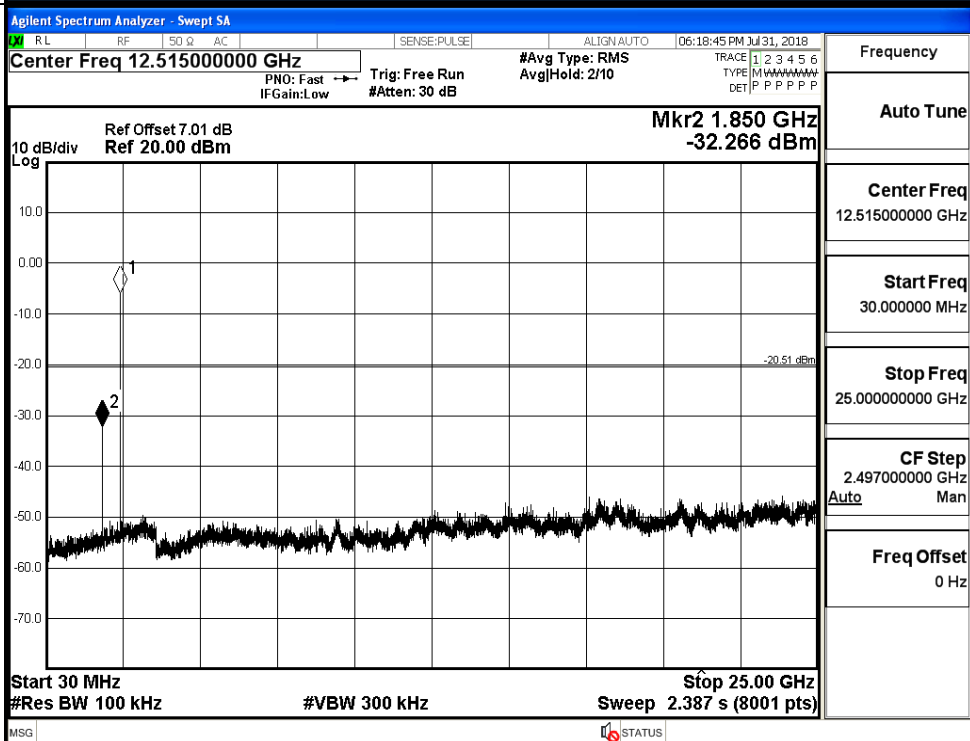


$\pi$ /4DQPSK\_MCH\_Graphs

Pref

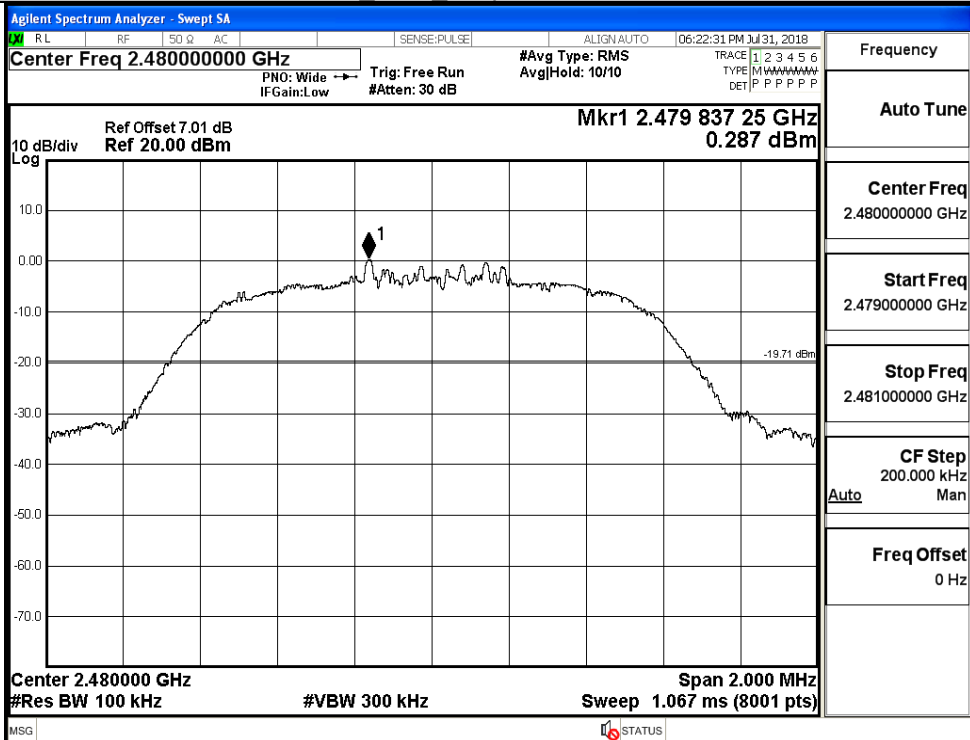


Puw

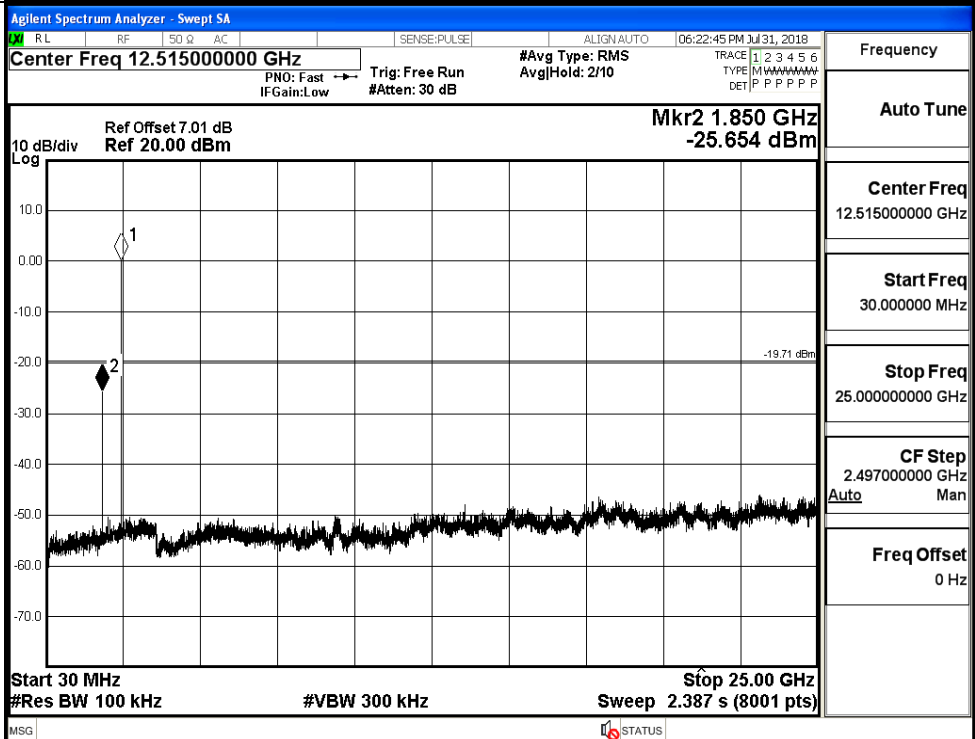


$\pi/4$ DQPSK\_HCH\_Graphs

Pref



Puw



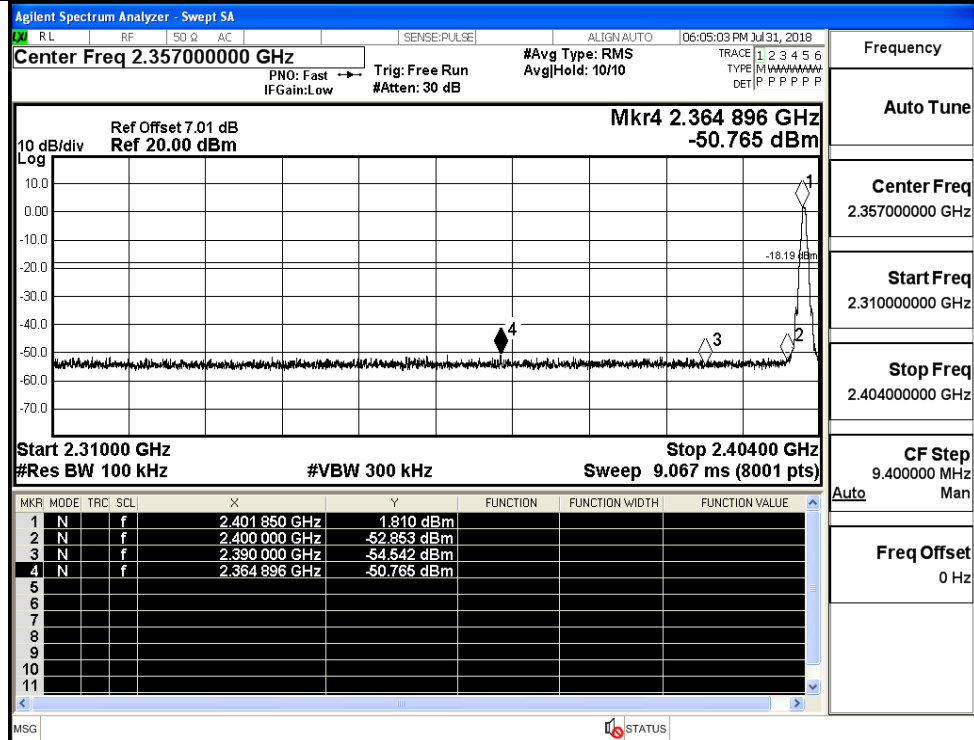


## A.7 Band-edge for RF Conducted Emissions

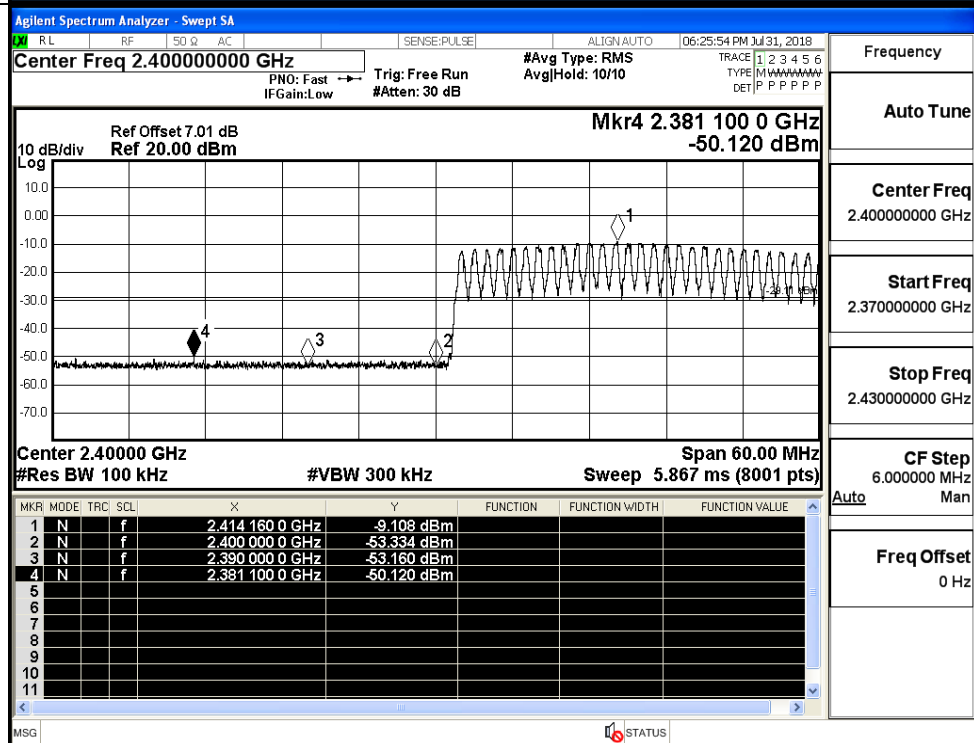
| Mode          | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | 1.810               | Off               | -50.765                  | -18.19      | PASS    |
|               |         |                         | -9.108              | On                | -50.120                  | -29.11      | PASS    |
|               | HCH     | 2480                    | 1.310               | Off               | -50.411                  | -18.69      | PASS    |
|               |         |                         | -10.080             | On                | -50.880                  | -30.08      | PASS    |
| $\pi$ /4DQPSK | LCH     | 2402                    | -0.340              | Off               | -50.936                  | -20.34      | PASS    |
|               |         |                         | -11.497             | On                | -49.865                  | -31.5       | PASS    |
|               | HCH     | 2480                    | 0.370               | Off               | -50.371                  | -19.63      | PASS    |
|               |         |                         | -12.440             | On                | -50.396                  | -32.44      | PASS    |

## Test Graphs

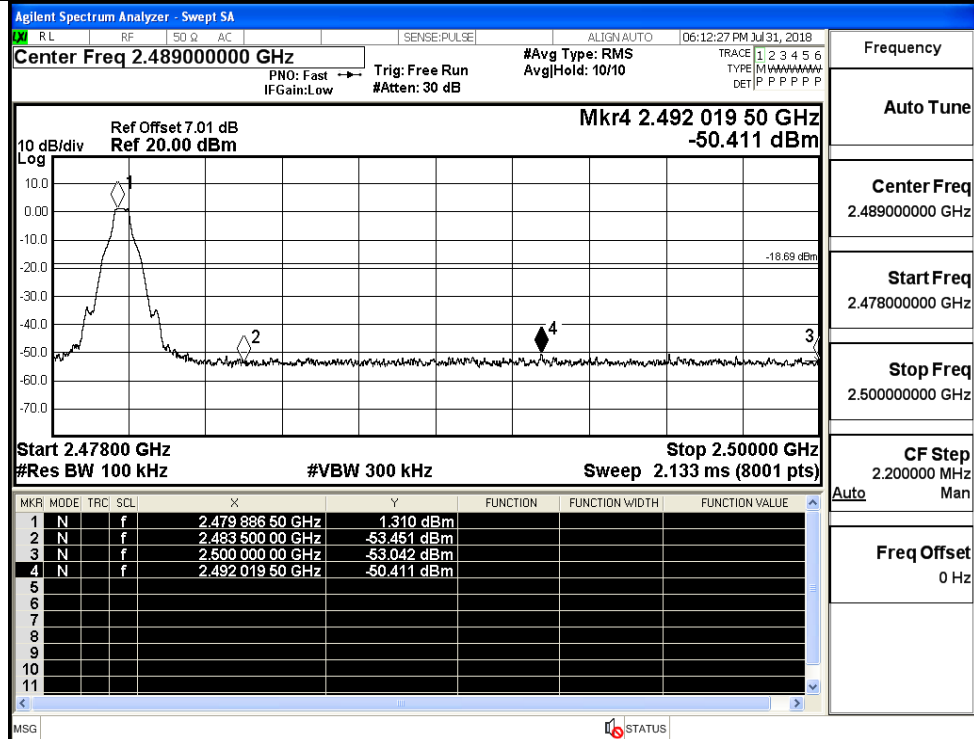
GFSK/LCH/No Hop



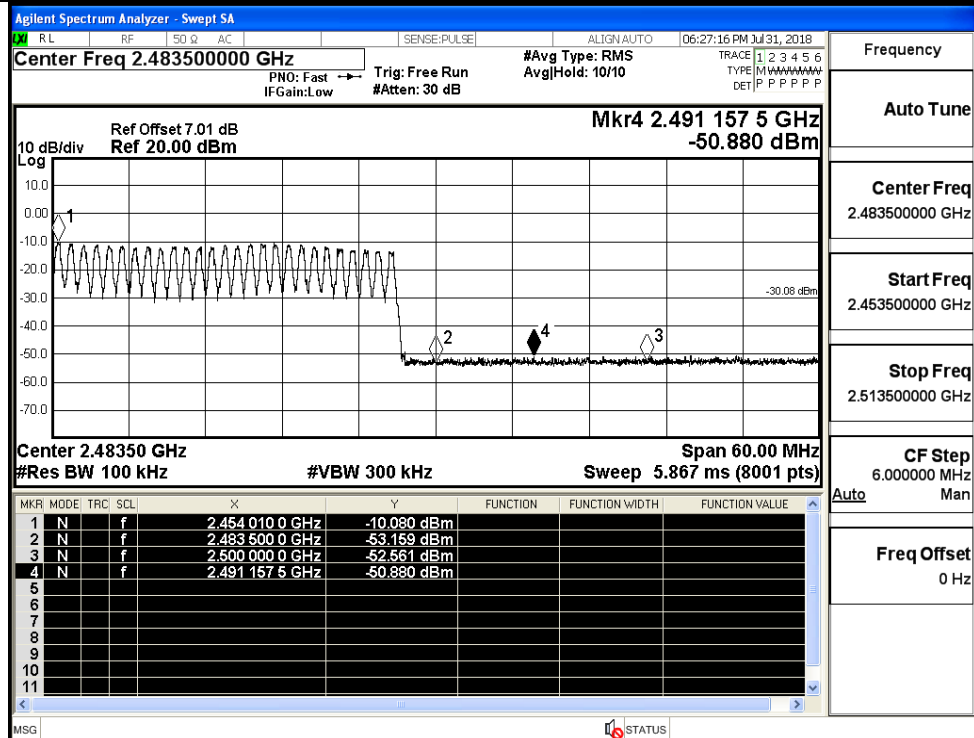
GFSK/LCH/Hop



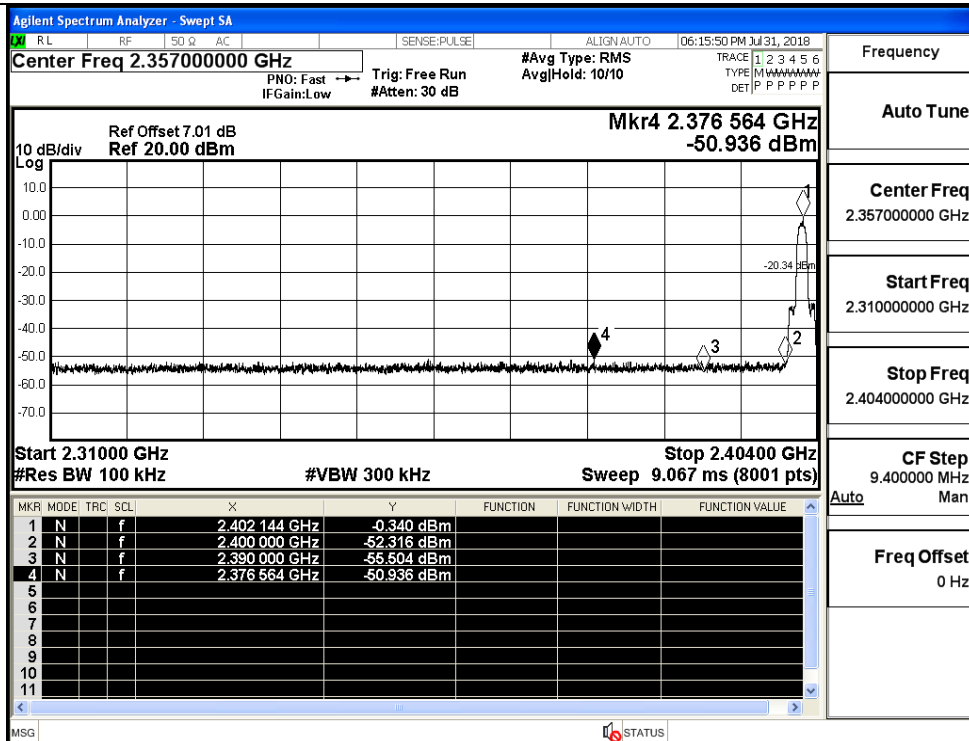
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq  
2.357000000 GHz

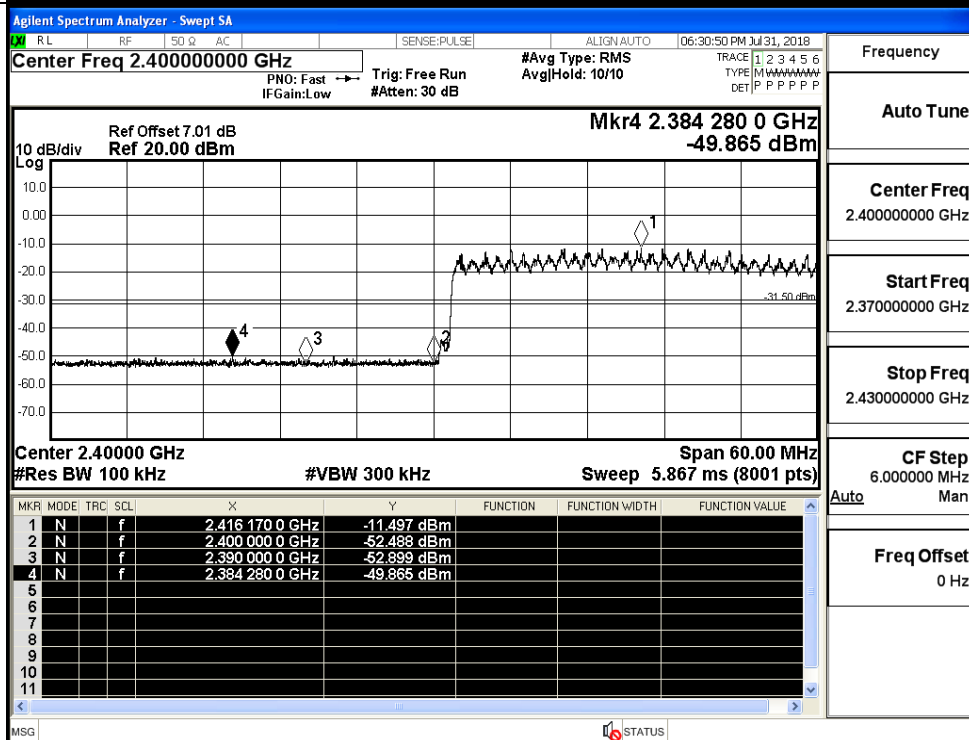
Start Freq  
2.310000000 GHz

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

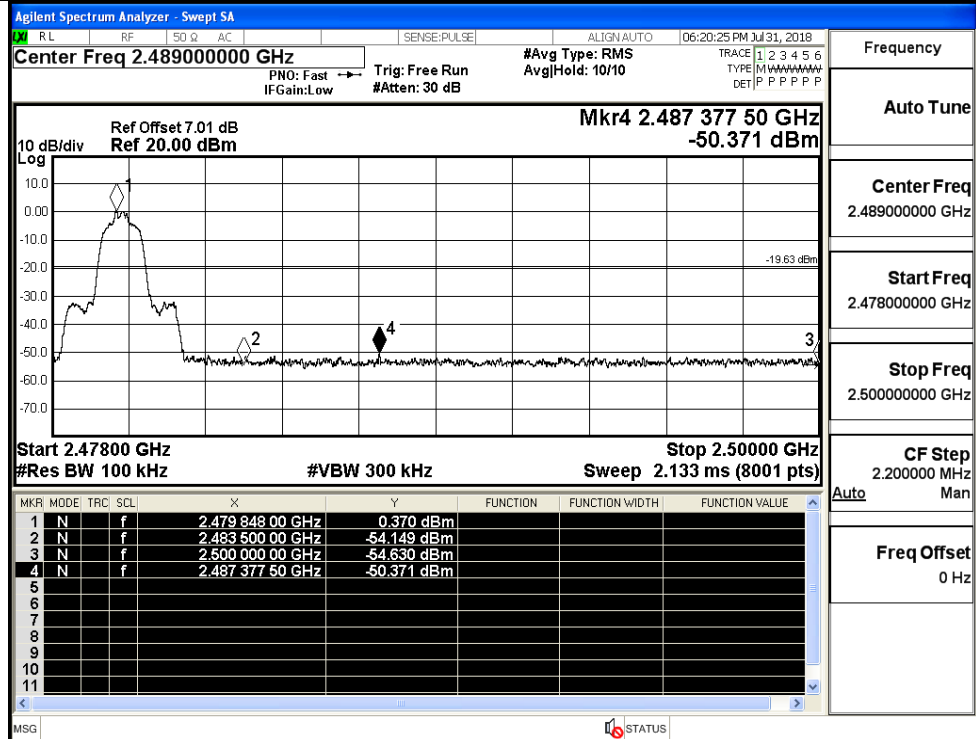
Start Freq  
2.370000000 GHz

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

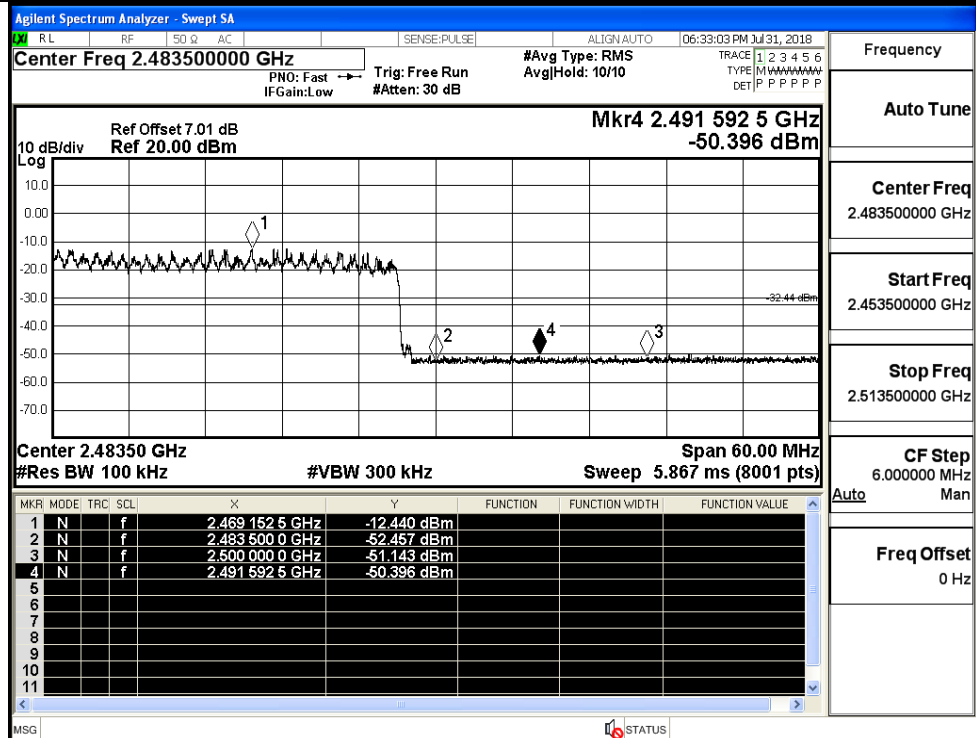
Start Freq  
2.478000000 GHz

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

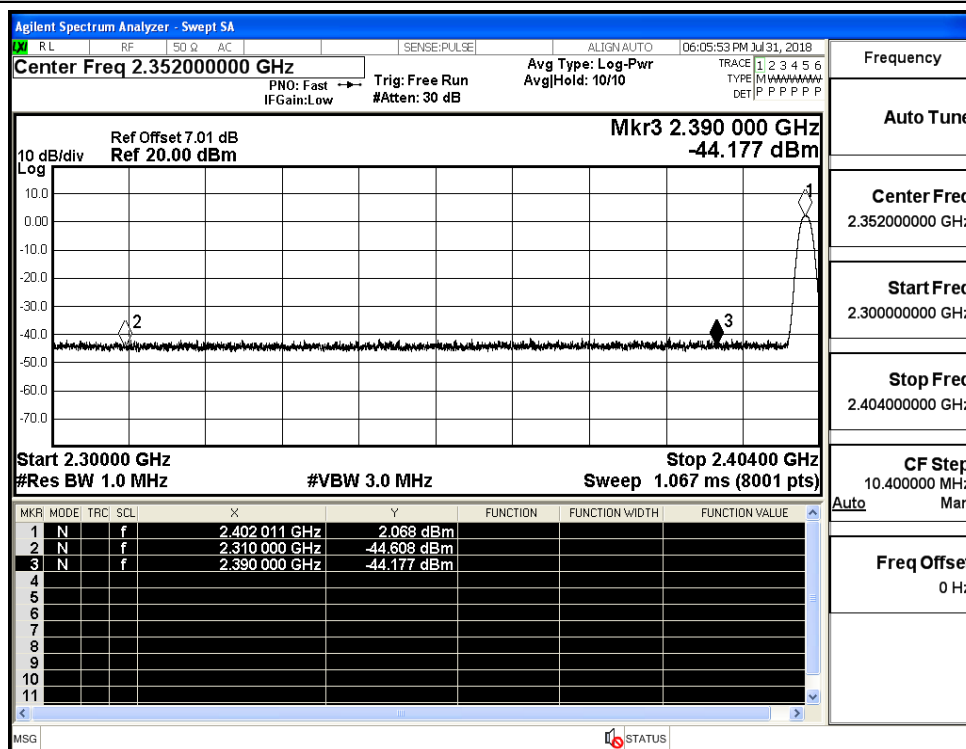
CF Step  
6.000000 MHz

Freq Offset  
0 Hz

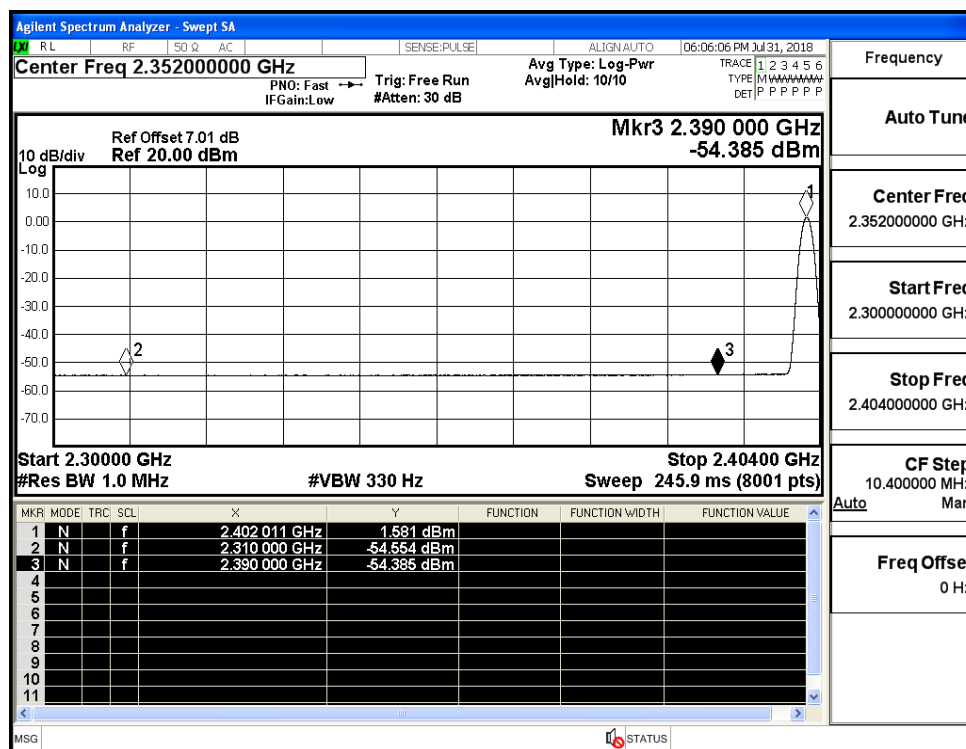
## A.8 Restrict-band band-edge measurements

| Test Mode     | Hopping | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0 | -44.61      | 2.0  | 0             | 52.65      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -54.55      | 2.0  | 0             | 42.70      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -44.18      | 2.0  | 0             | 53.08      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -54.39      | 2.0  | 0             | 42.87      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -43.36      | 2.0  | 0             | 53.90      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.95      | 2.0  | 0             | 43.31      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -44.36      | 2.0  | 0             | 52.90      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.94      | 2.0  | 0             | 43.32      | AV       | 54             | PASS    |
| $\pi/4$ DQPSK | Off     | 2310.0 | -44.41      | 2.0  | 0             | 52.84      | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -54.58      | 2.0  | 0             | 42.68      | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -45.39      | 2.0  | 0             | 51.86      | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -54.37      | 2.0  | 0             | 42.89      | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -44.52      | 2.0  | 0             | 52.74      | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -53.99      | 2.0  | 0             | 43.27      | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -42.47      | 2.0  | 0             | 54.79      | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.92      | 2.0  | 0             | 43.34      | AV       | 54             | PASS    |

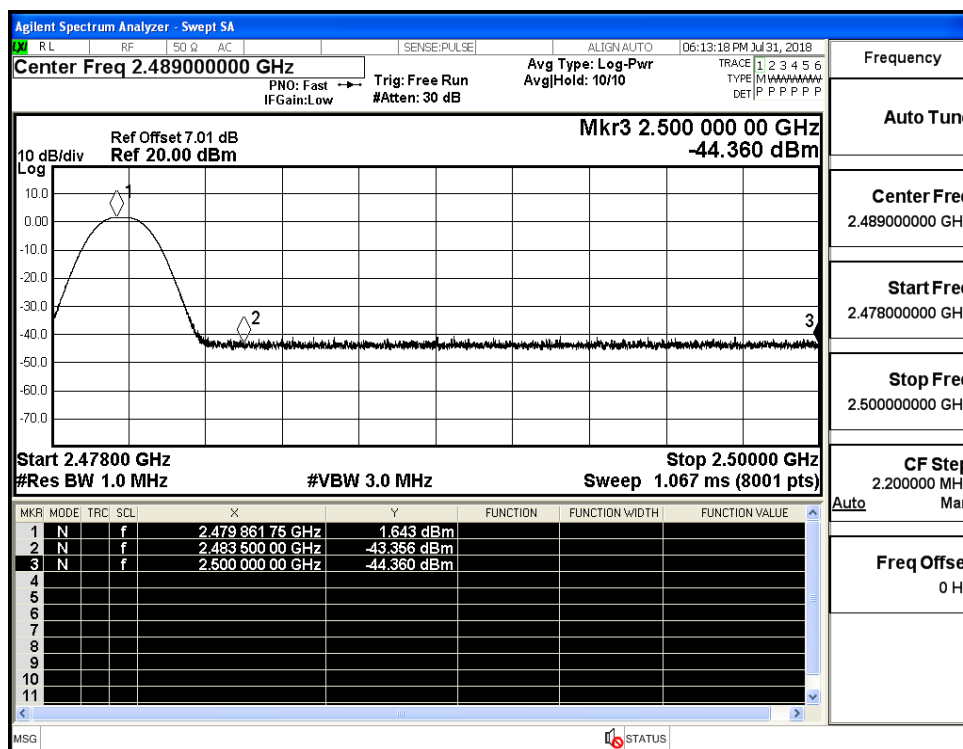
# Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



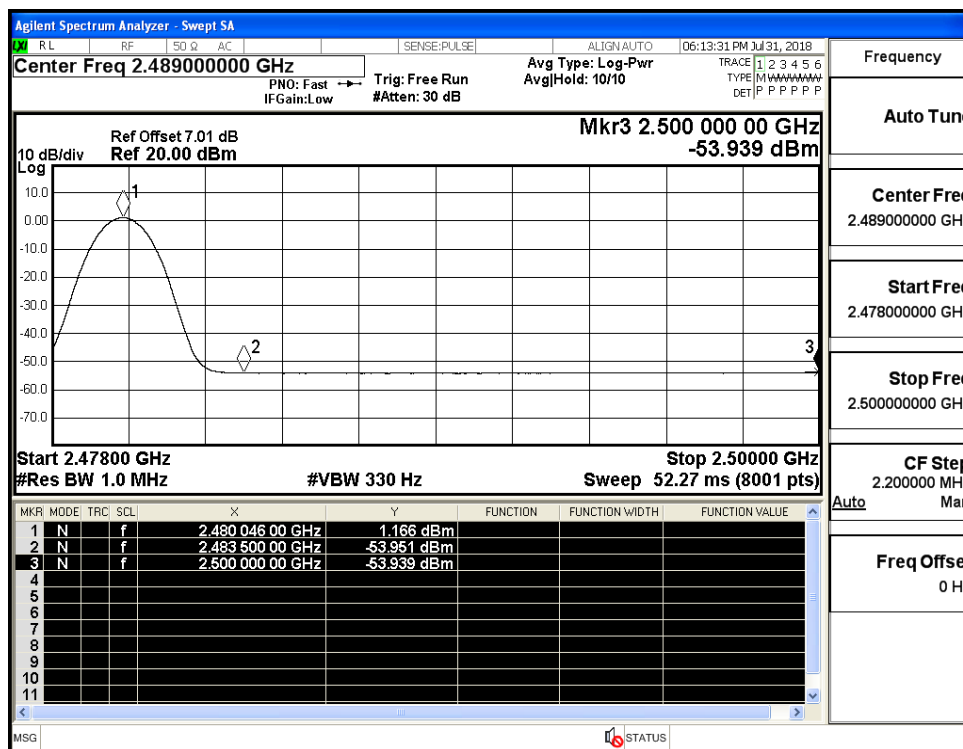
# Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



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

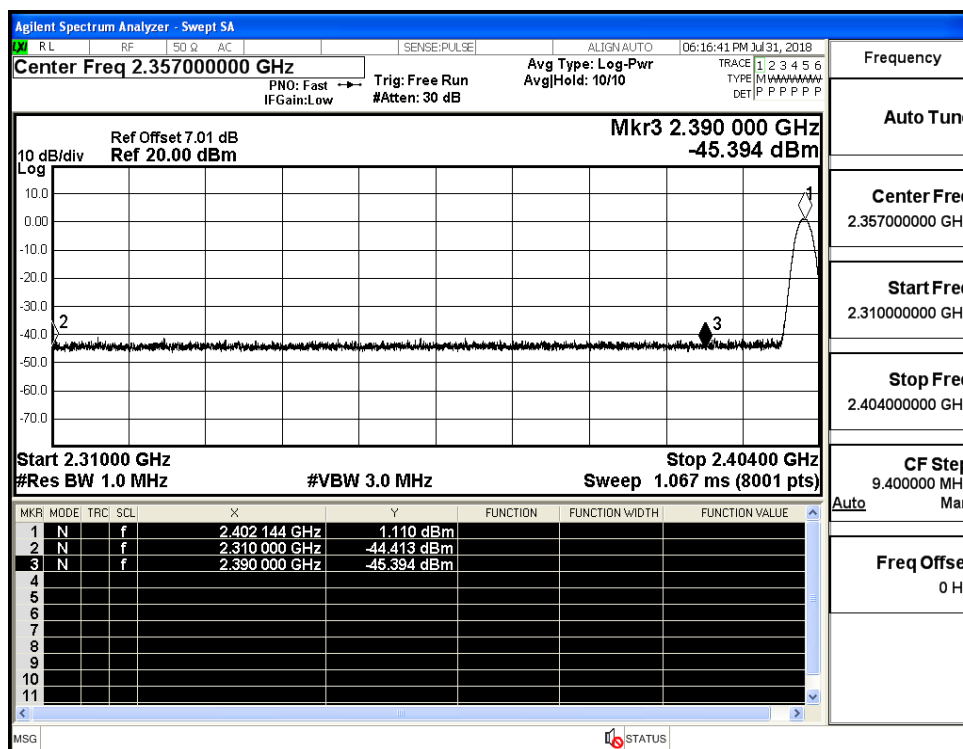


# Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)

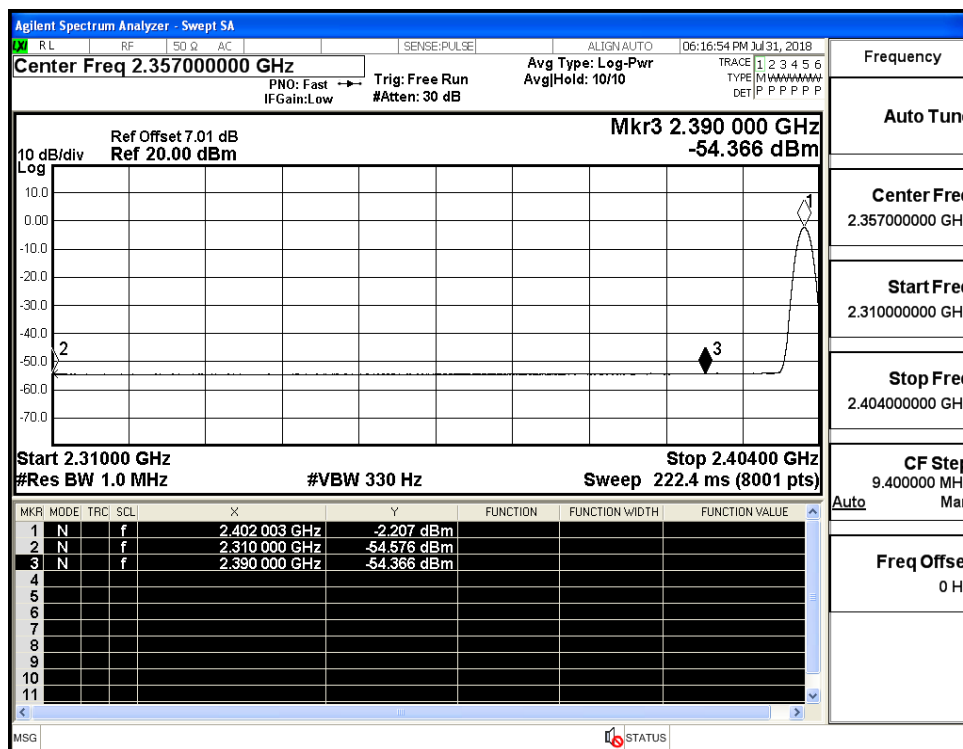




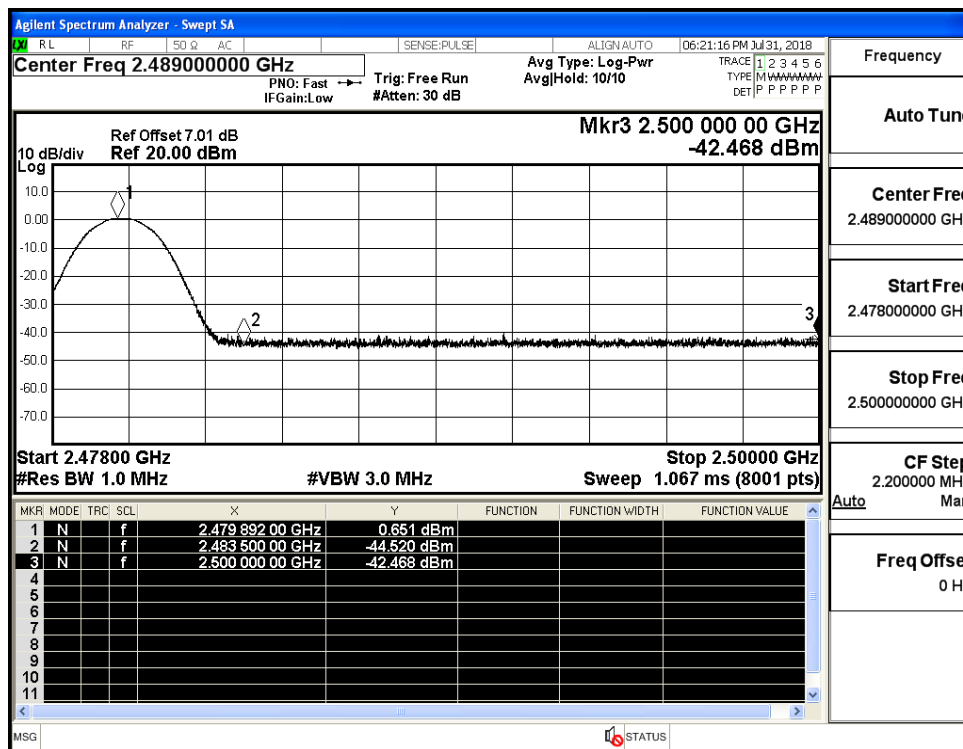
# Restrict-band band-edge measurements\_Hopping Off $\pi/4$ -DQPSK\_PEAK (Low Channel)



# 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)

