

## Appendix A

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

Product Name: Wireless Sports Earphones

Trade Mark: AWEI

Test Model: X680BL

#### Environmental Conditions

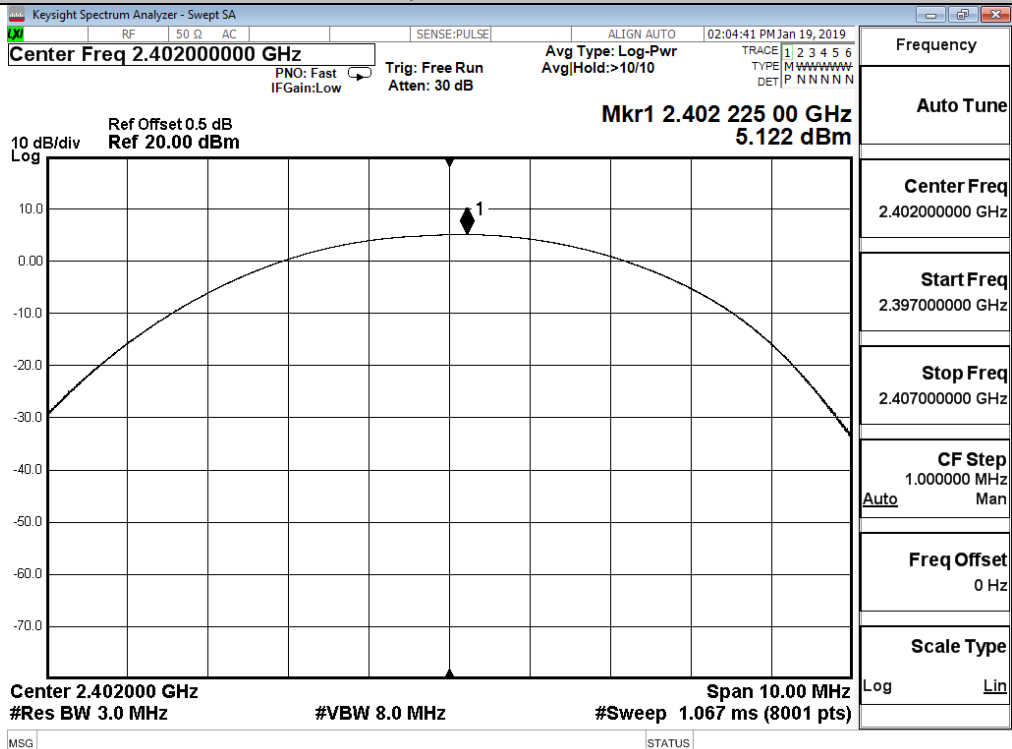
|                    |             |
|--------------------|-------------|
| Temperature:       | 23.5 °C     |
| Relative Humidity: | 55%         |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Mina.Xu     |
| Supervised by:     | Jayden.Zhuo |

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

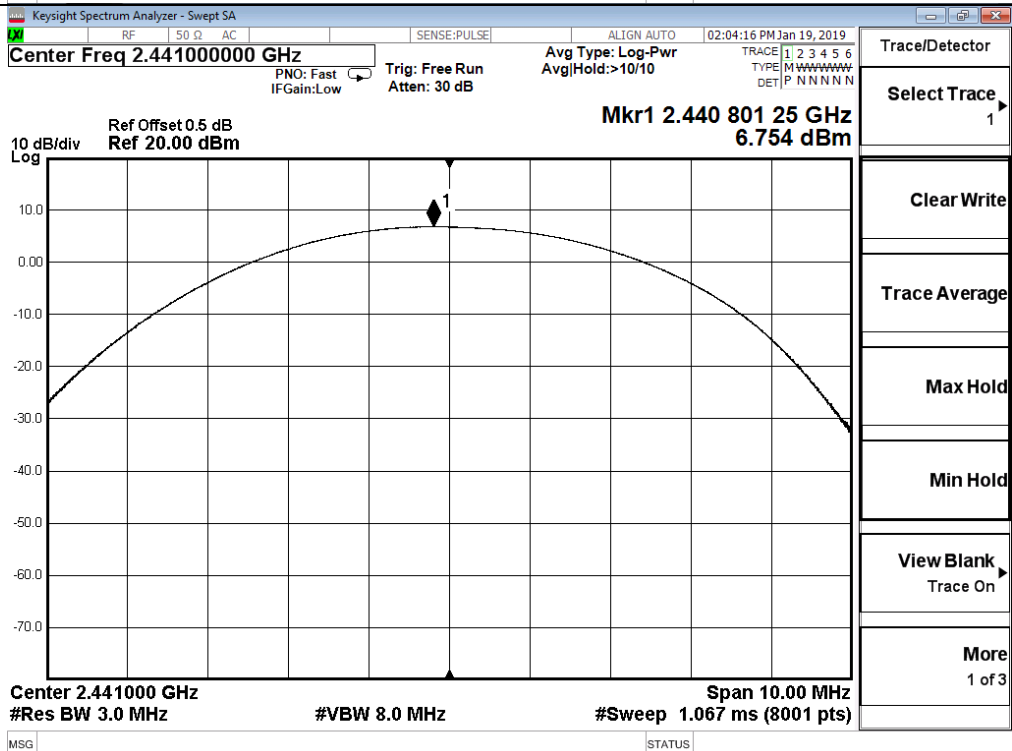
| Mode          | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK          | LCH      | 5.504                           | 21          | PASS    |
|               | MCH      | 6.754                           | 21          | PASS    |
|               | HCH      | 6.416                           | 21          | PASS    |
| $\pi/4$ DQPSK | LCH      | 2.823                           | 21          | PASS    |
|               | MCH      | 4.883                           | 21          | PASS    |
|               | HCH      | 4.340                           | 21          | PASS    |
| 8DPSK         | LCH      | 3.433                           | 21          | PASS    |
|               | MCH      | 5.188                           | 21          | PASS    |
|               | HCH      | 4.752                           | 21          | PASS    |

Test Graphs

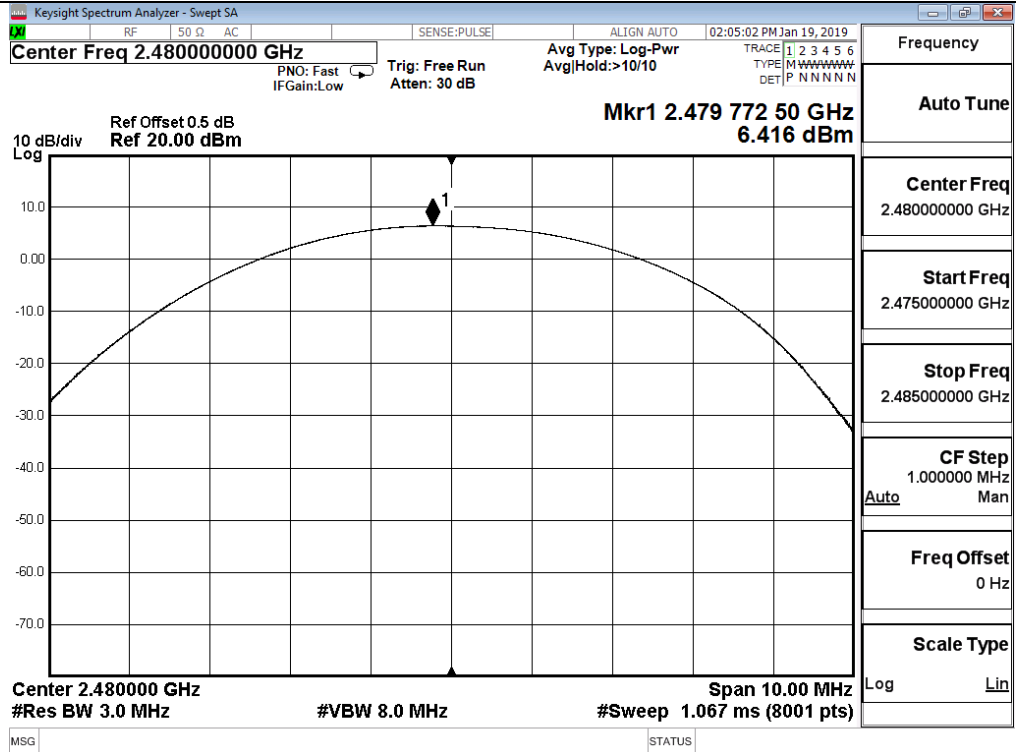
GFSK/LCH



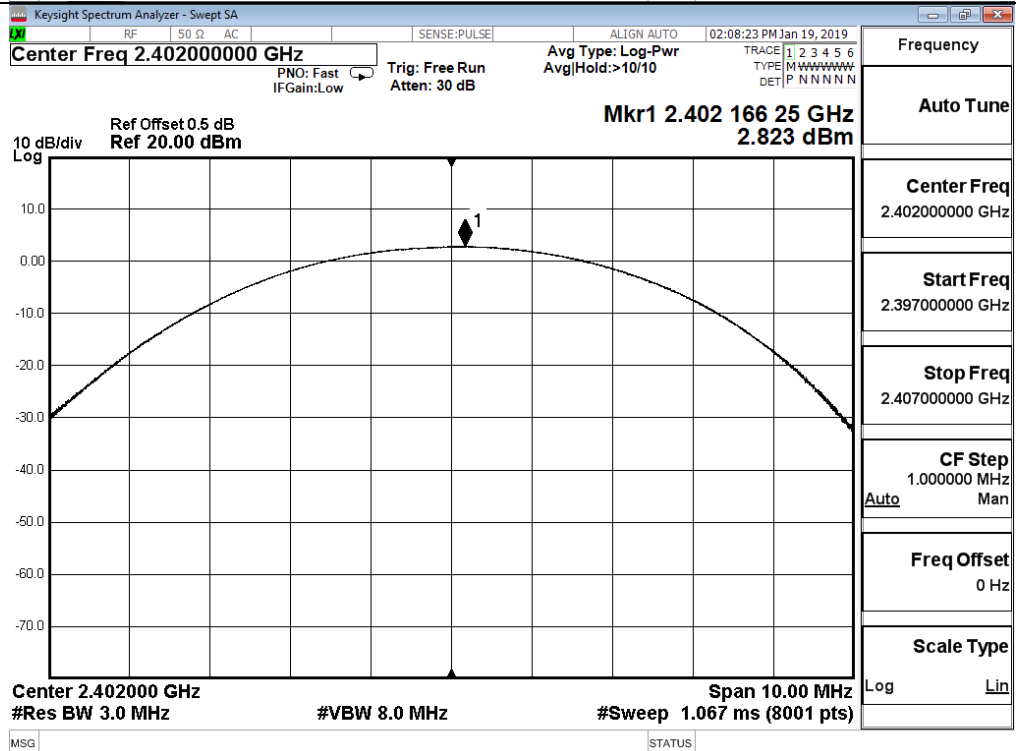
GFSK/MCH



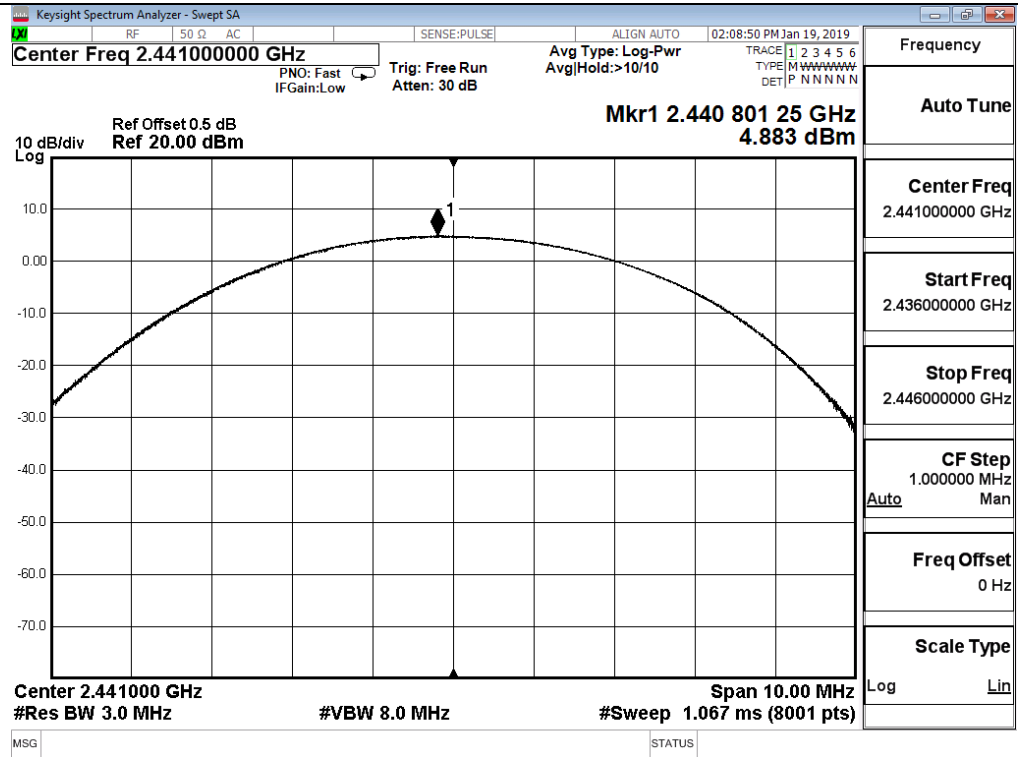
GFSK/HCH



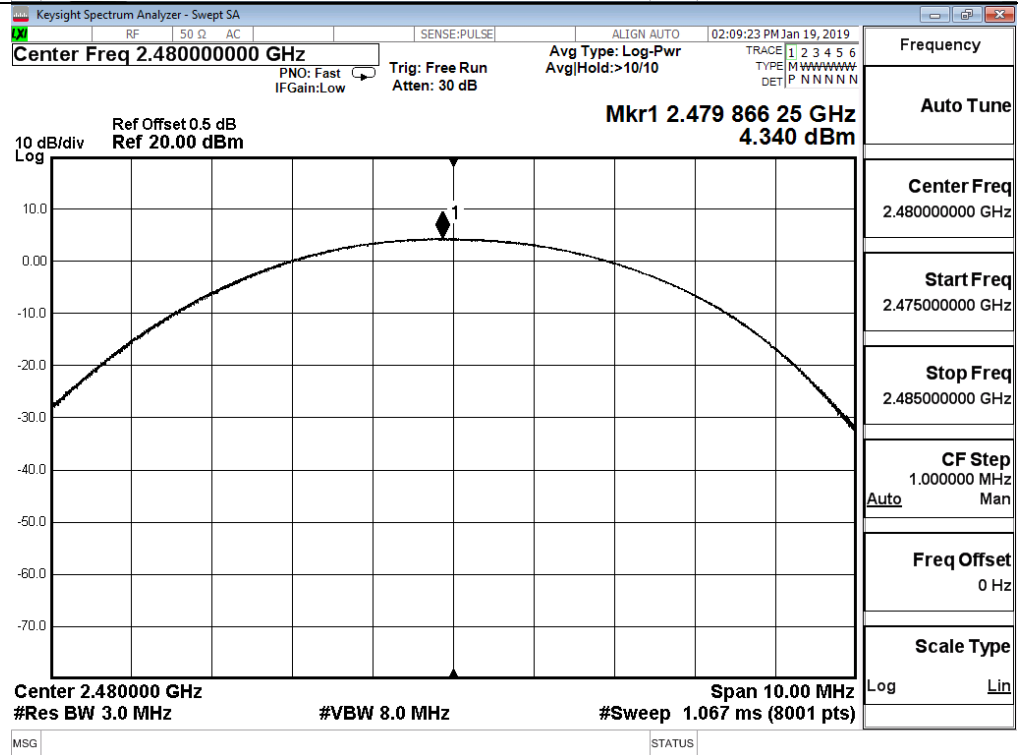
$\pi/4$ DQPSK/LCH



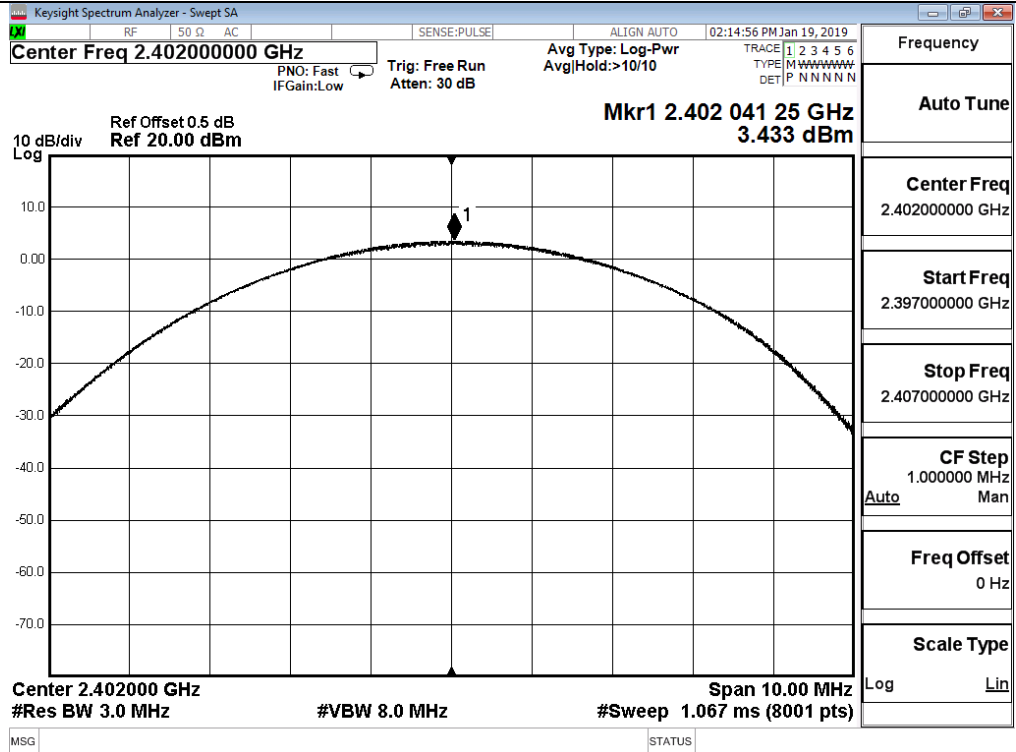
$\pi$ /4DQPSK/MCH



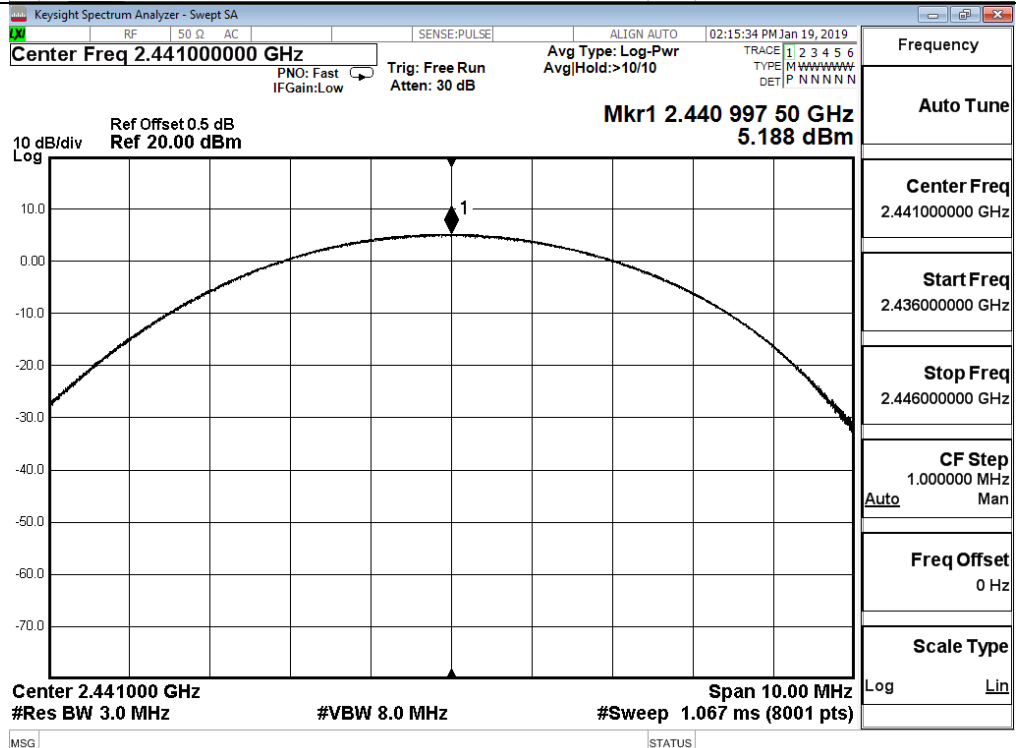
$\pi$ /4DQPSK/HCH

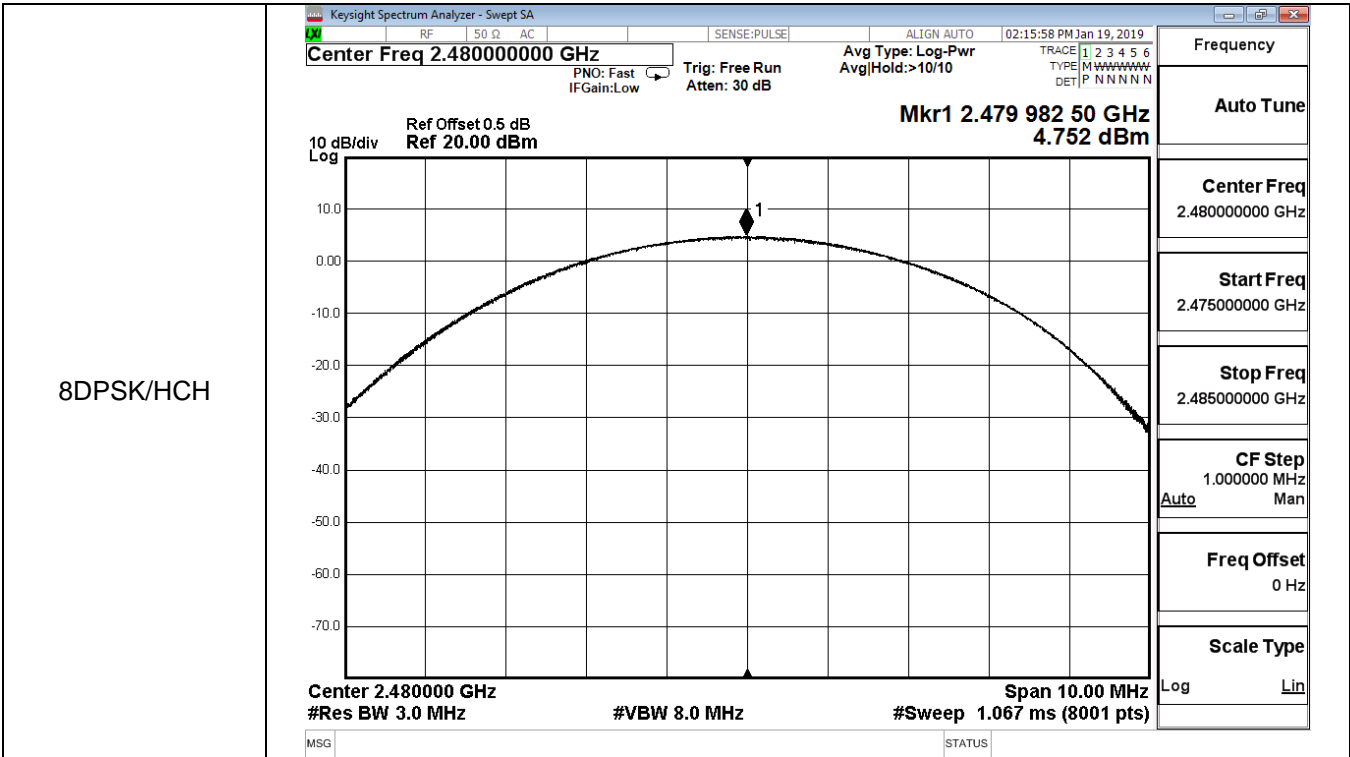


8DPSK/LCH



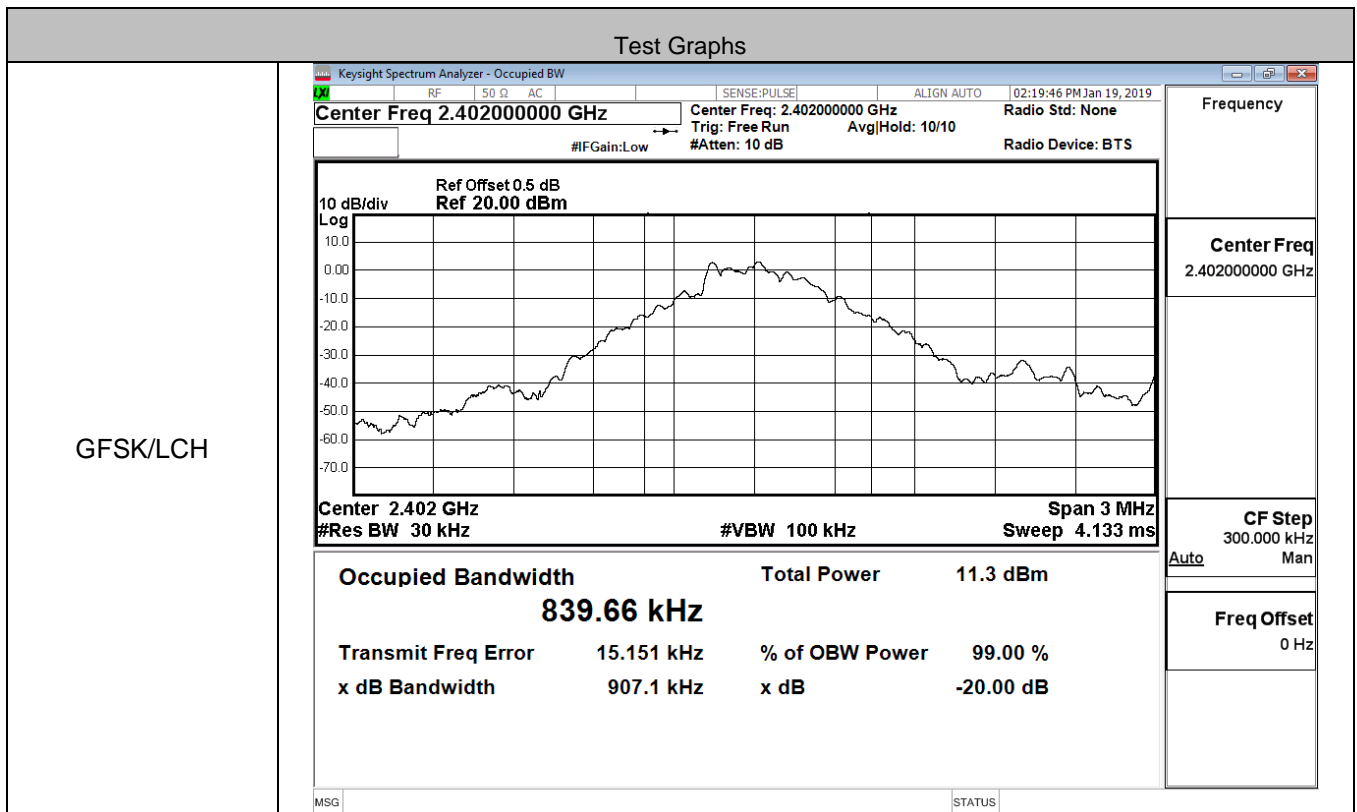
8DPSK/MCH



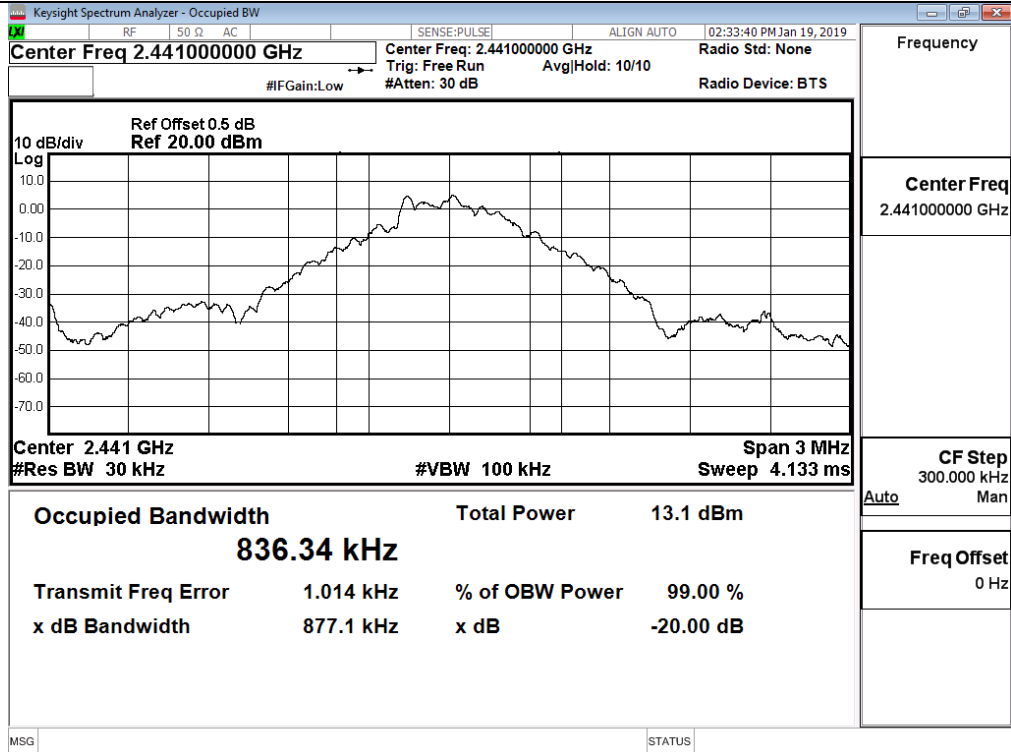


**A.2 99% and 20dB Bandwidth**

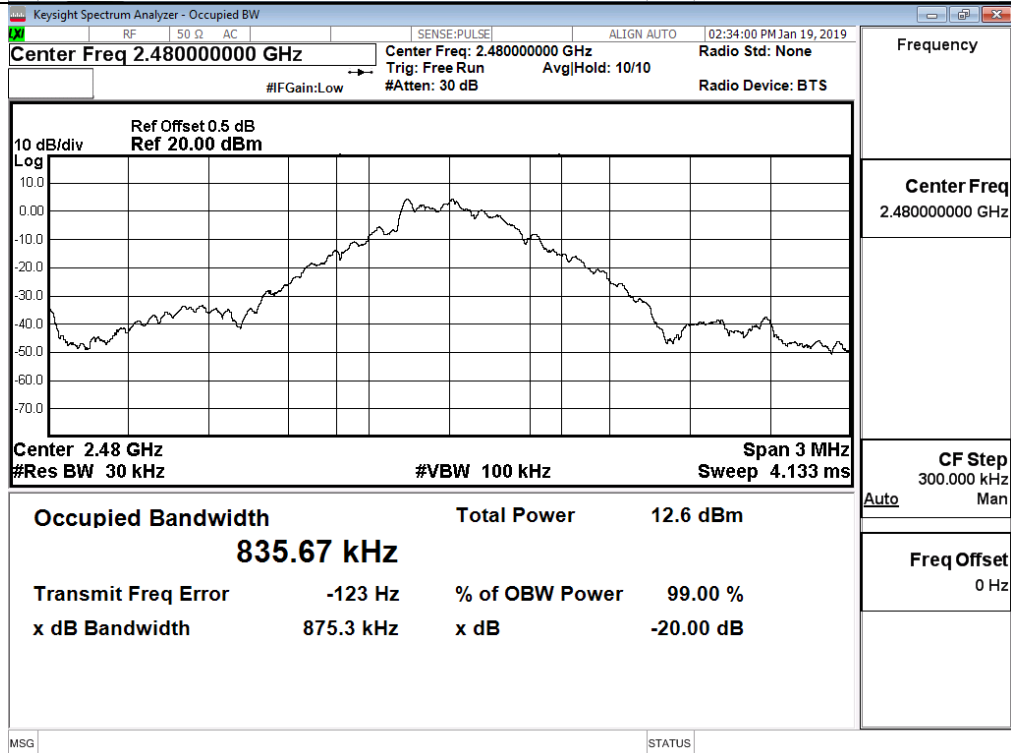
| Mode     | Channel. | 99% Bandwidth [MHz] | 20dB Bandwidth [MHz] | Limit [MHz]   | Verdict |
|----------|----------|---------------------|----------------------|---------------|---------|
| GFSK     | LCH      | 0.83966             | 0.9071               | Not Specified | PASS    |
|          | MCH      | 0.83634             | 0.8771               | Not Specified | PASS    |
|          | HCH      | 0.83567             | 0.8753               | Not Specified | PASS    |
| π/4DQPSK | LCH      | 1.1562              | 1.198                | Not Specified | PASS    |
|          | MCH      | 1.1601              | 1.215                | Not Specified | PASS    |
|          | HCH      | 1.1609              | 1.214                | Not Specified | PASS    |
| 8DPSK    | LCH      | 1.1449              | 1.207                | Not Specified | PASS    |
|          | MCH      | 1.1429              | 1.207                | Not Specified | PASS    |
|          | HCH      | 1.1390              | 1.207                | Not Specified | PASS    |



GFSK/MCH

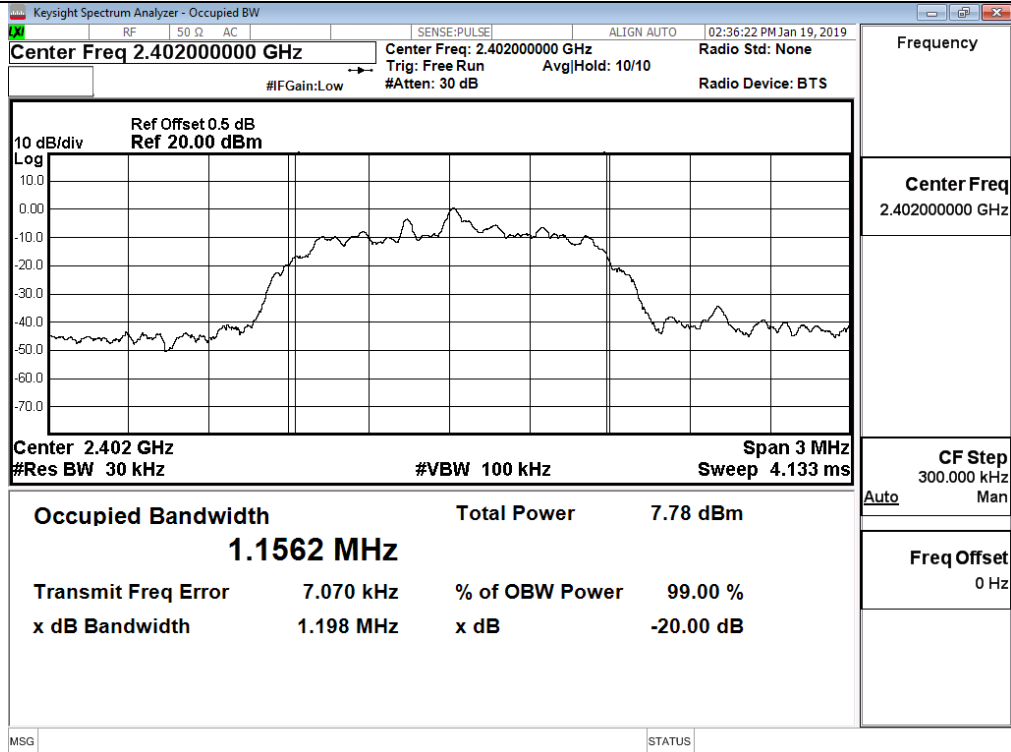


GFSK/HCH



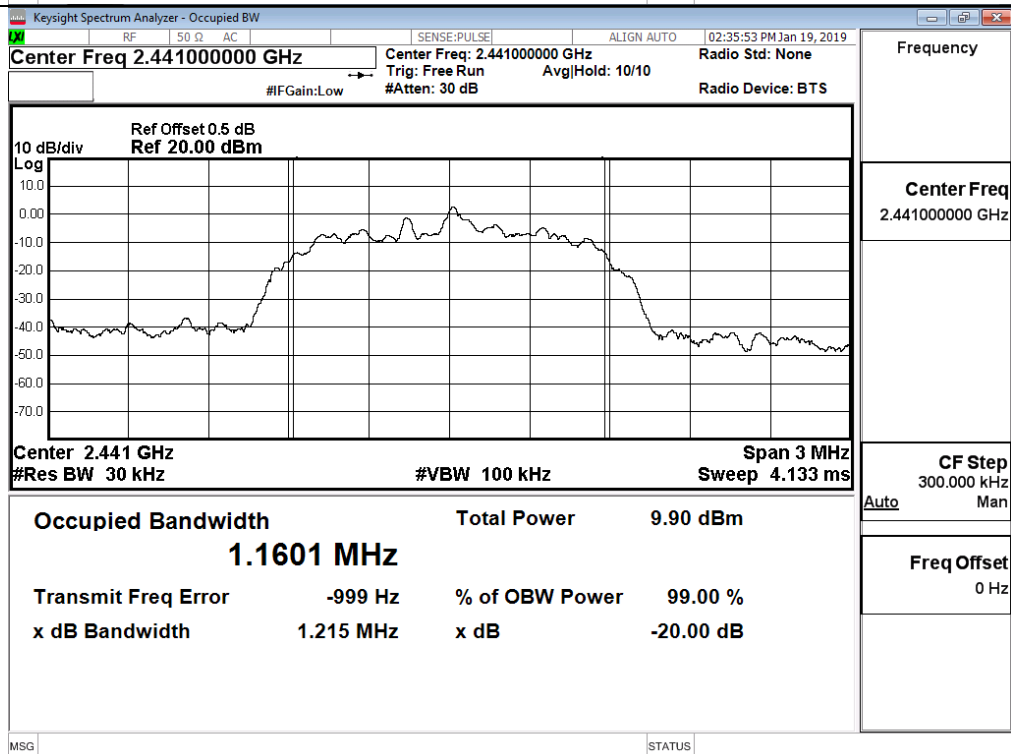


$\pi/4$ DQPSK/LCH



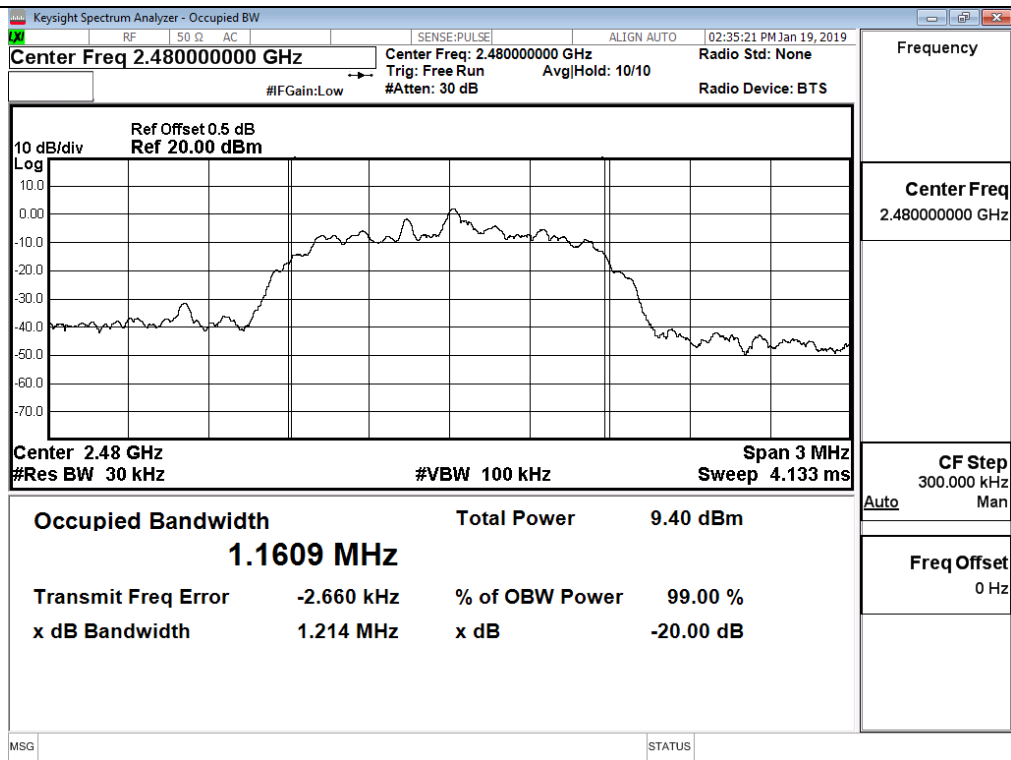
|             |                |
|-------------|----------------|
| Frequency   | 2.40200000 GHz |
| Center Freq | 2.40200000 GHz |
| CF Step     | 300.000 kHz    |
| Auto        | Man            |
| Freq Offset | 0 Hz           |

$\pi/4$ DQPSK/MCH

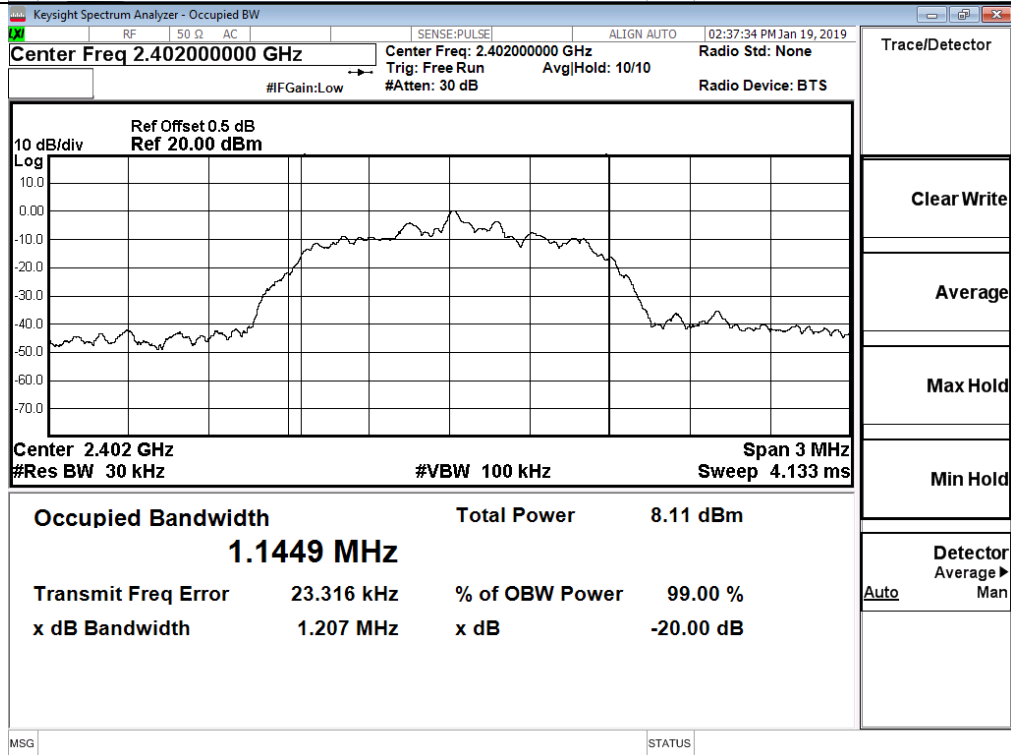


|             |                 |
|-------------|-----------------|
| Frequency   | 2.44100000 GHz  |
| Center Freq | 2.441000000 GHz |
| CF Step     | 300.000 kHz     |
| Auto        | Man             |
| Freq Offset | 0 Hz            |

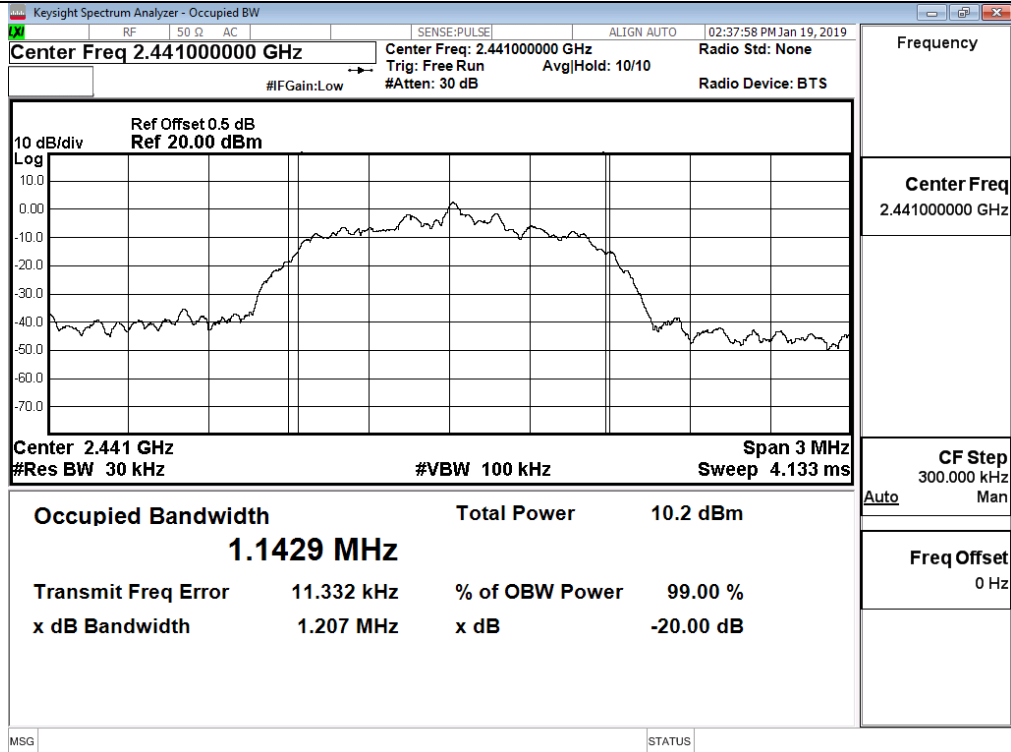
$\pi/4$ DQPSK/HCH



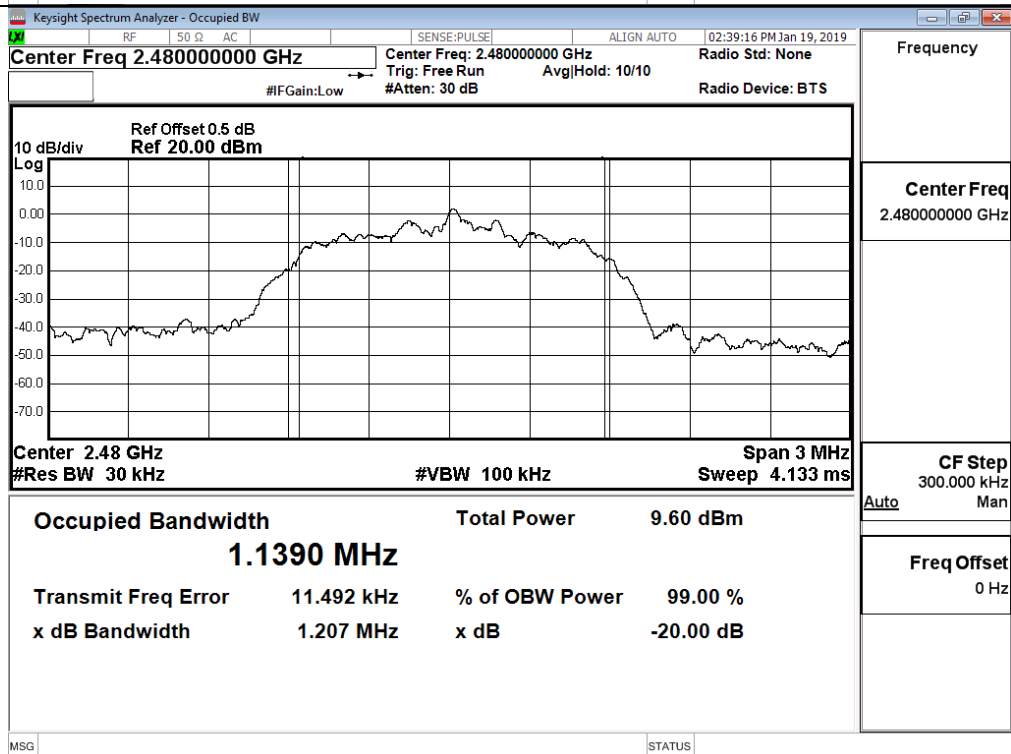
8DPSK/LCH



8DPSK/MCH

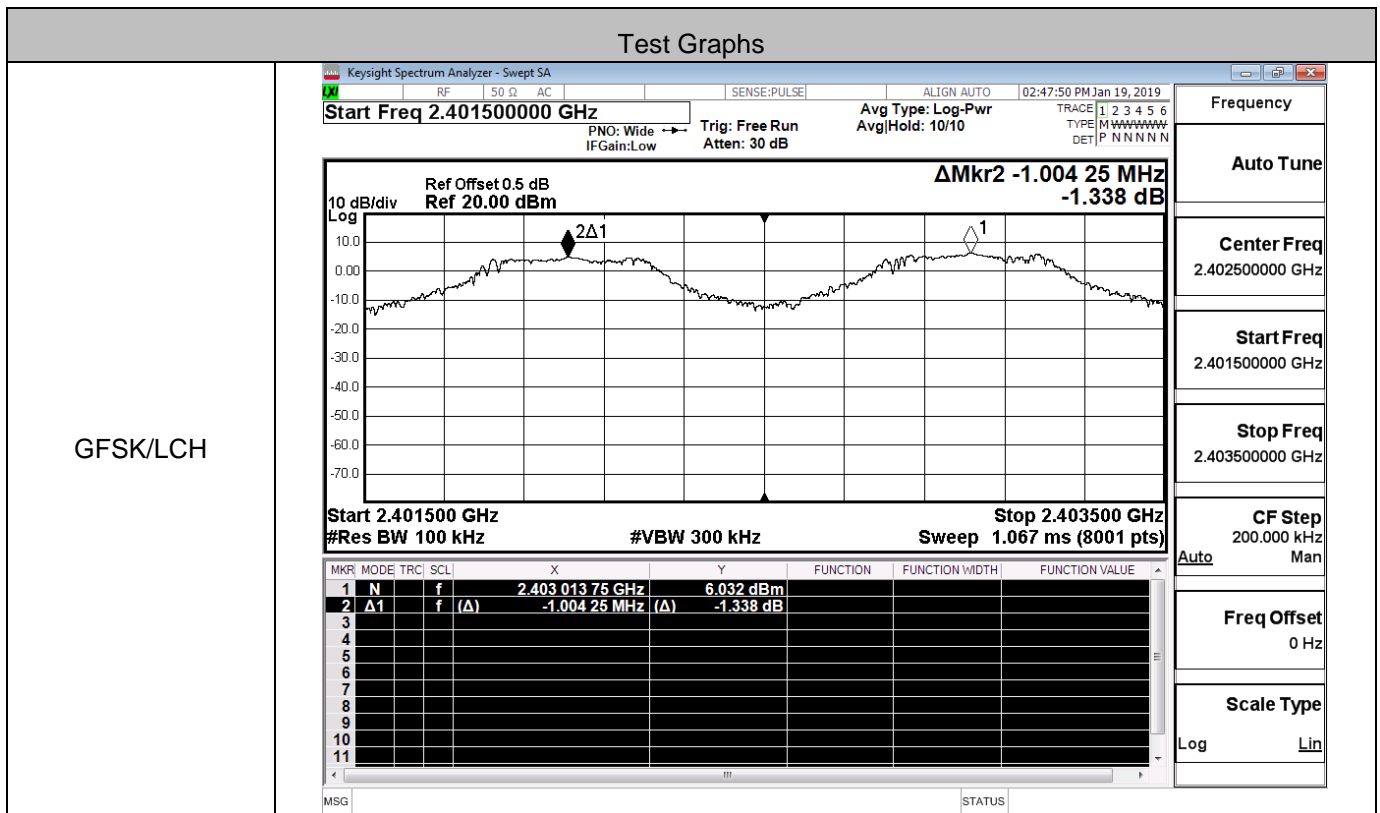


8DPSK/HCH

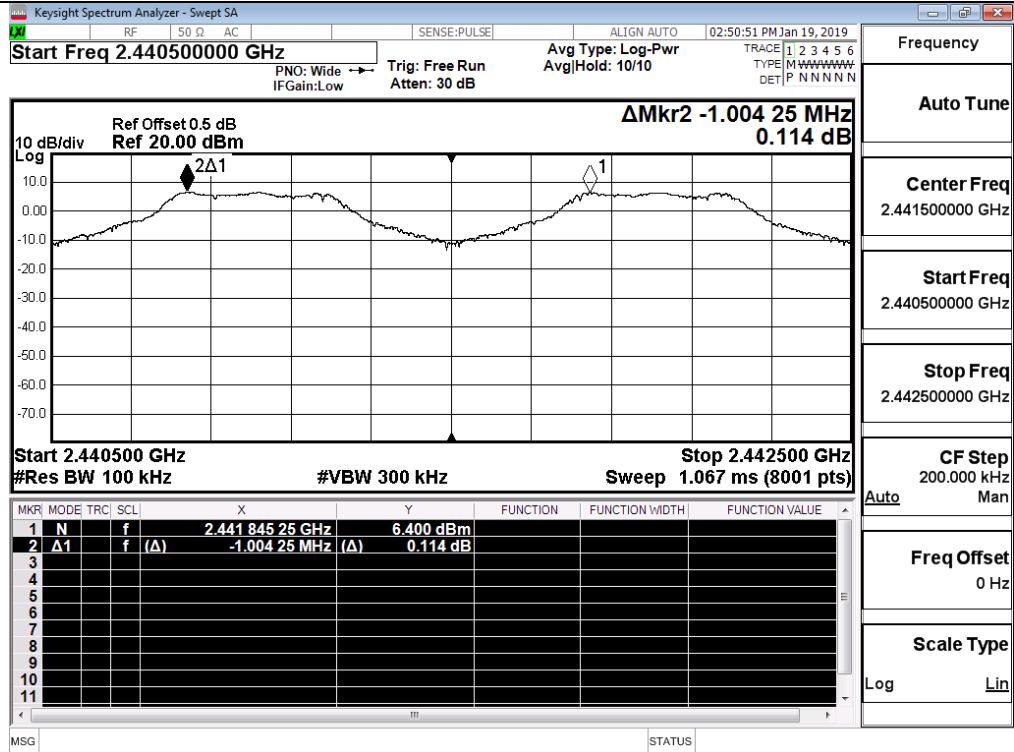


### A.3 Carrier Frequency Separation

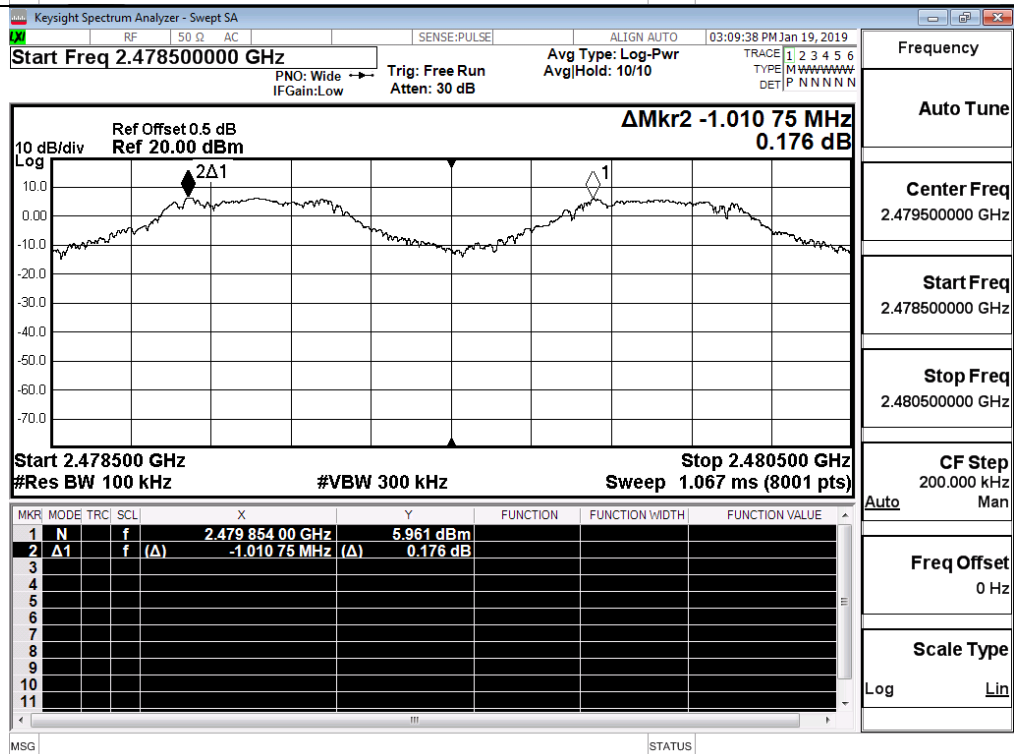
| Mode     | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|----------|------------------------------------|-------------|---------|
| GFSK     | LCH      | 1.004                              | 0.6047      | PASS    |
|          | MCH      | 1.004                              | 0.6047      | PASS    |
|          | HCH      | 1.010                              | 0.6047      | PASS    |
| π/4DQPSK | LCH      | 1.001                              | 0.810       | PASS    |
|          | MCH      | 1.002                              | 0.810       | PASS    |
|          | HCH      | 1.002                              | 0.810       | PASS    |
| 8DPSK    | LCH      | 1.001                              | 0.805       | PASS    |
|          | MCH      | 1.007                              | 0.805       | PASS    |
|          | HCH      | 0.997                              | 0.805       | PASS    |



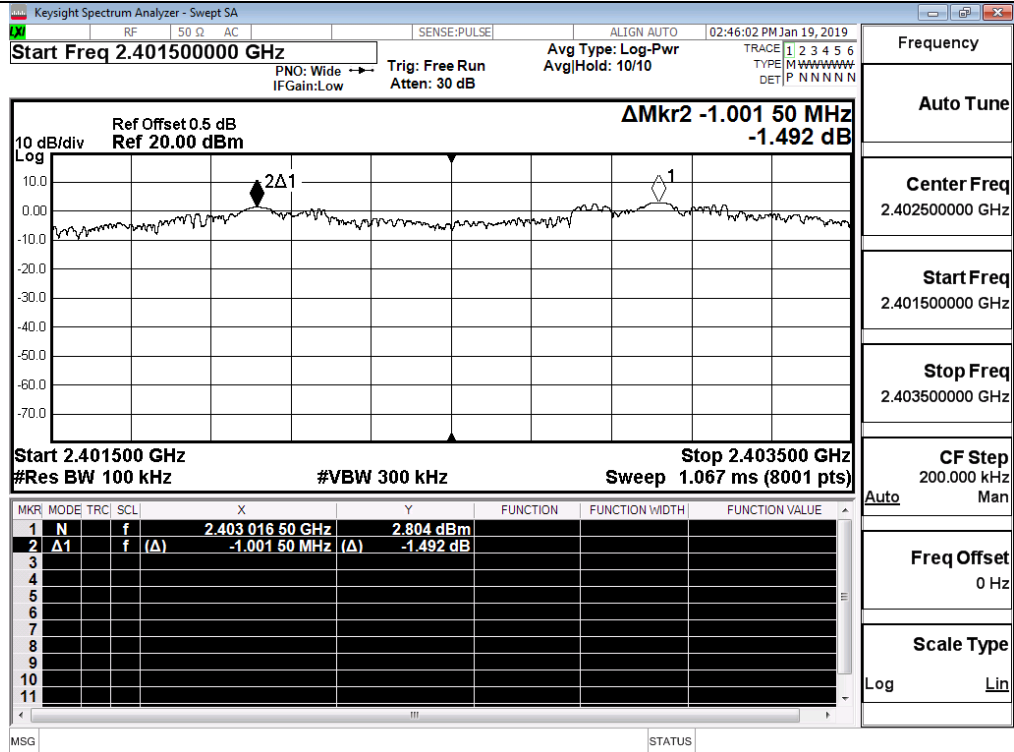
GFSK/MCH



GFSK/HCH

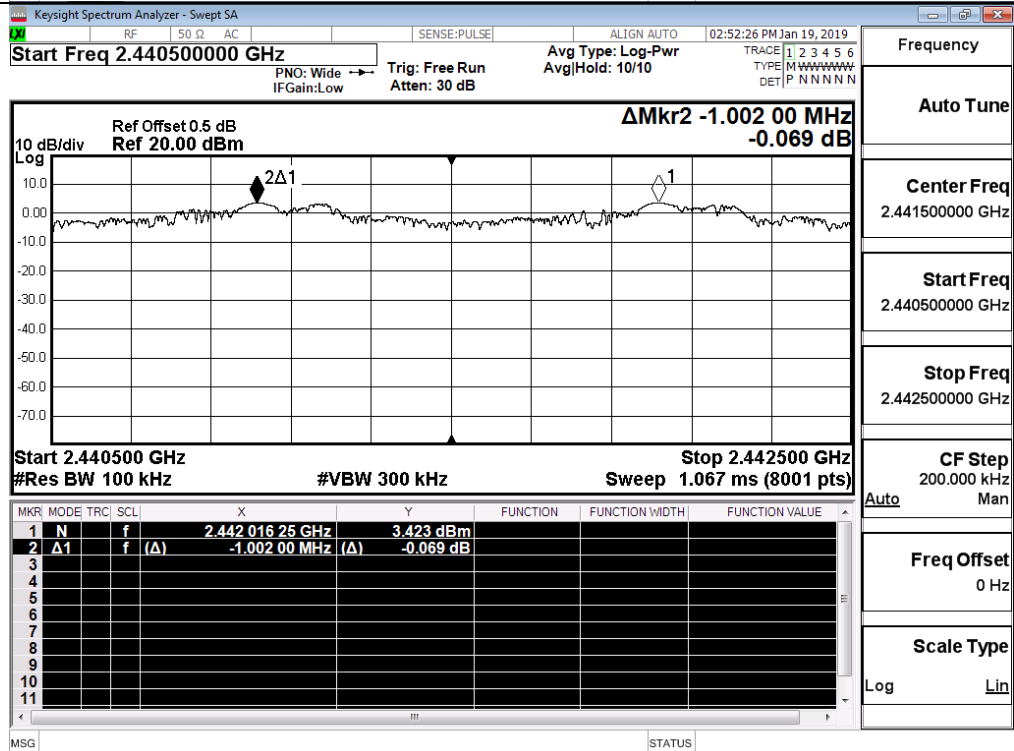


$\pi$ /4DQPSK/LCH



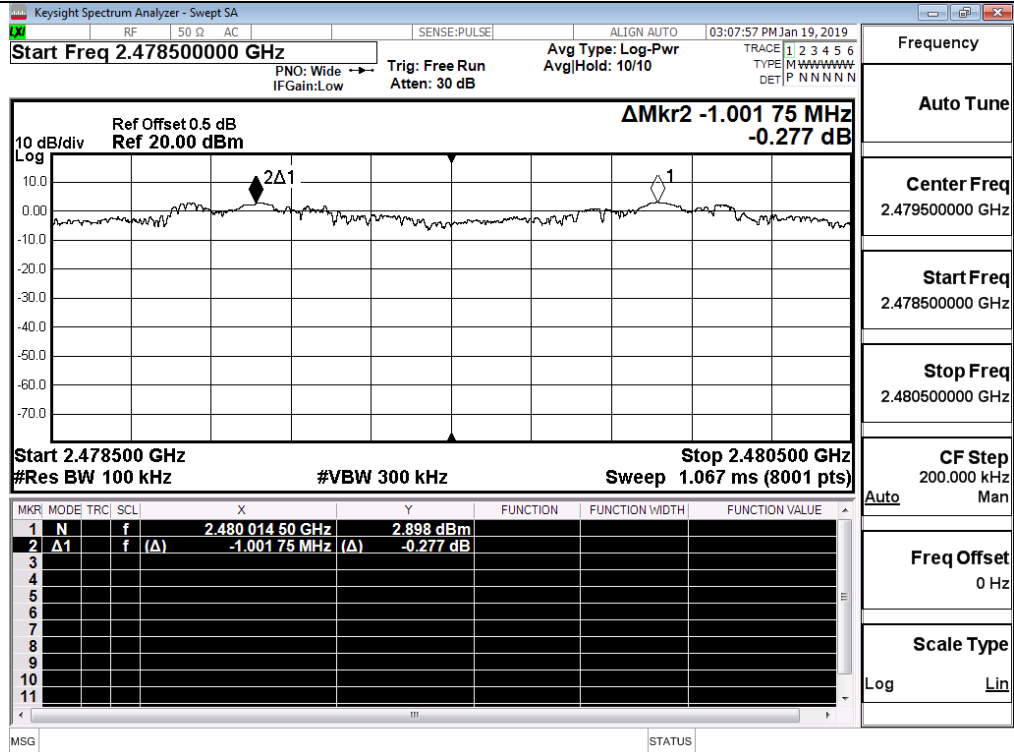
|             |                 |
|-------------|-----------------|
| Frequency   |                 |
| Auto Tune   |                 |
| Center Freq | 2.402500000 GHz |
| Start Freq  | 2.401500000 GHz |
| Stop Freq   | 2.403500000 GHz |
| CF Step     | 200.000 kHz     |
| Auto        | Man         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

$\pi$ /4DQPSK/MCH

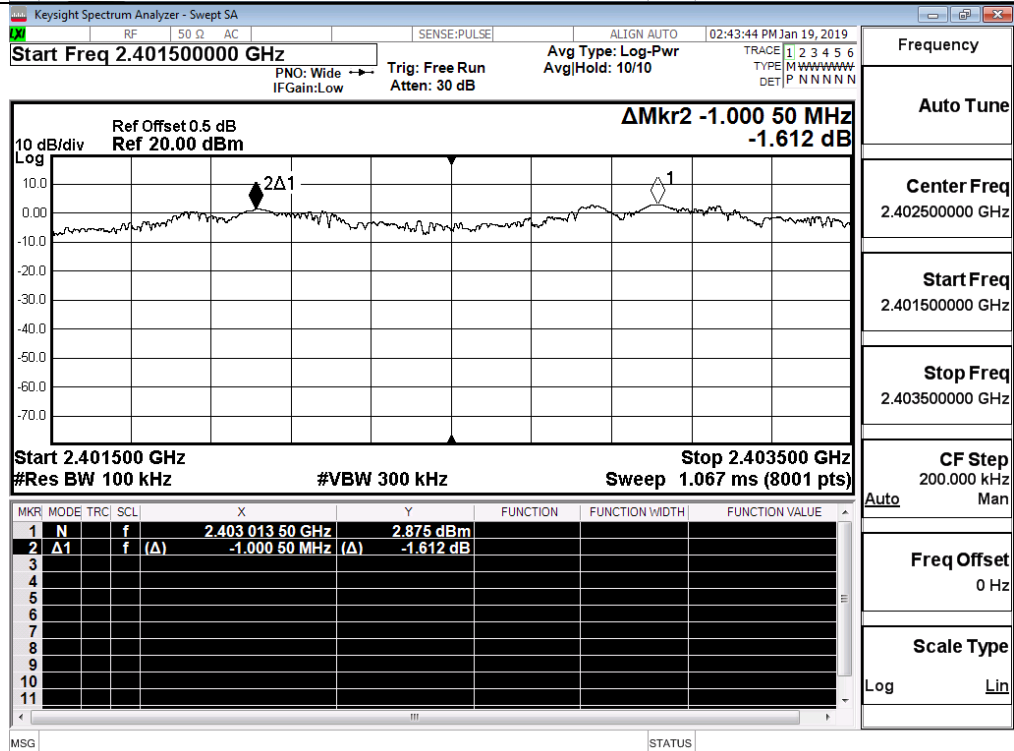


|             |                 |
|-------------|-----------------|
| Frequency   |                 |
| Auto Tune   |                 |
| Center Freq | 2.441500000 GHz |
| Start Freq  | 2.440500000 GHz |
| Stop Freq   | 2.442500000 GHz |
| CF Step     | 200.000 kHz     |
| Auto        | Man             |
| Freq Offset | 0 Hz            |
| Scale Type  | Log Lin         |

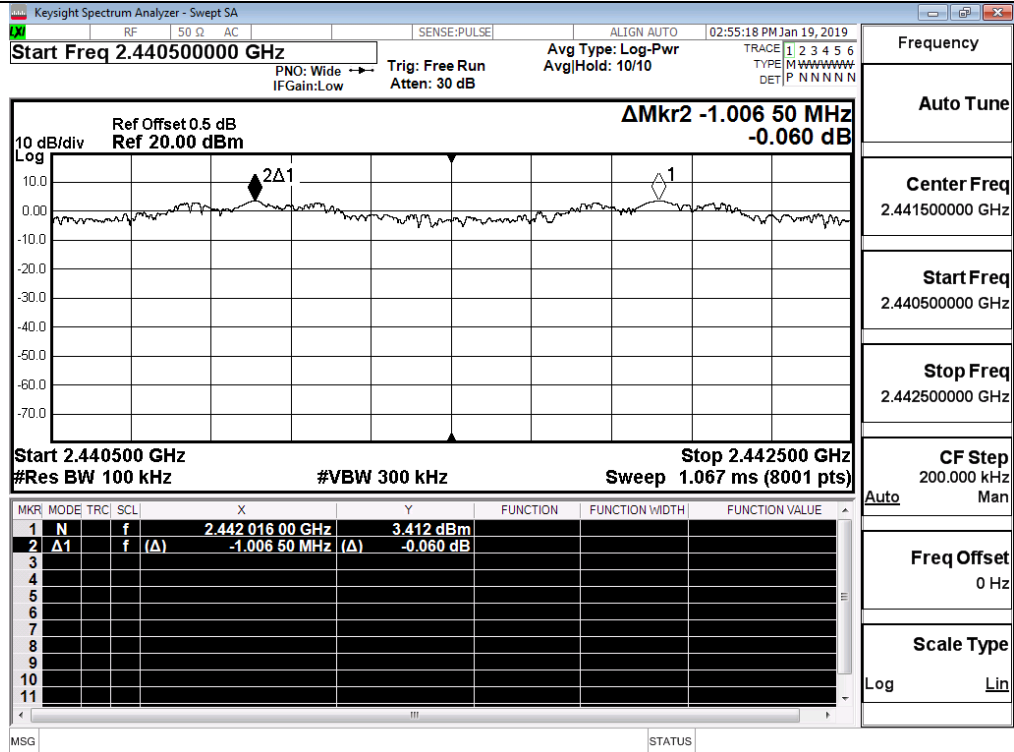
π/4DQPSK/HCH



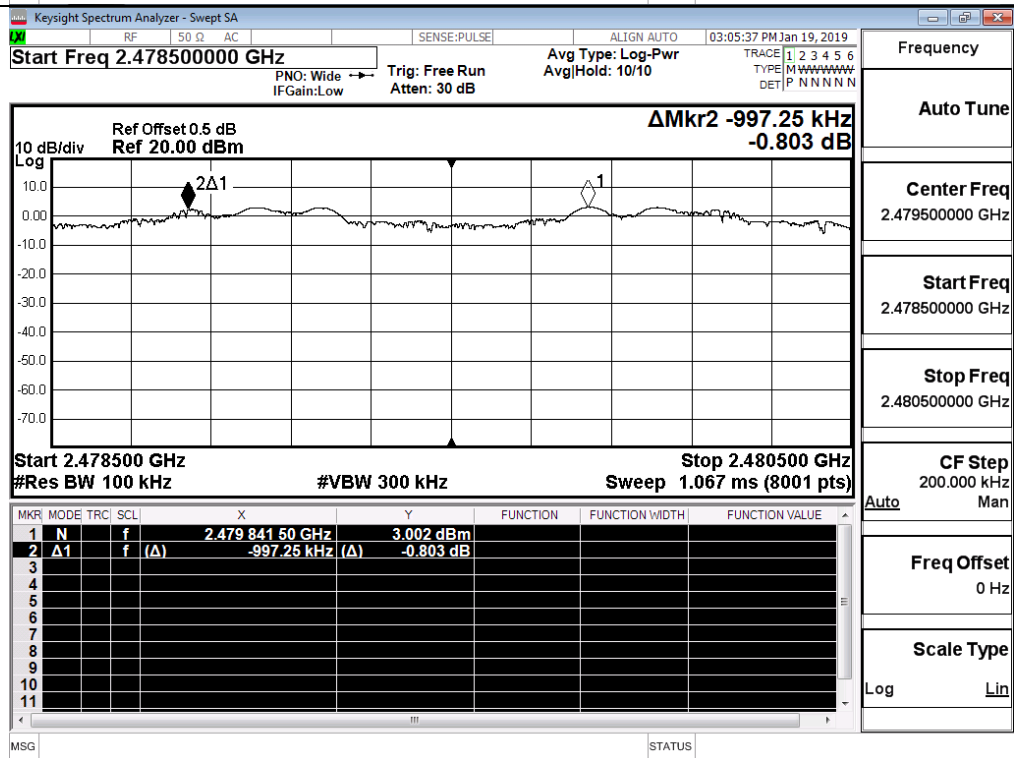
8DPSK/LCH



8DPSK/MCH



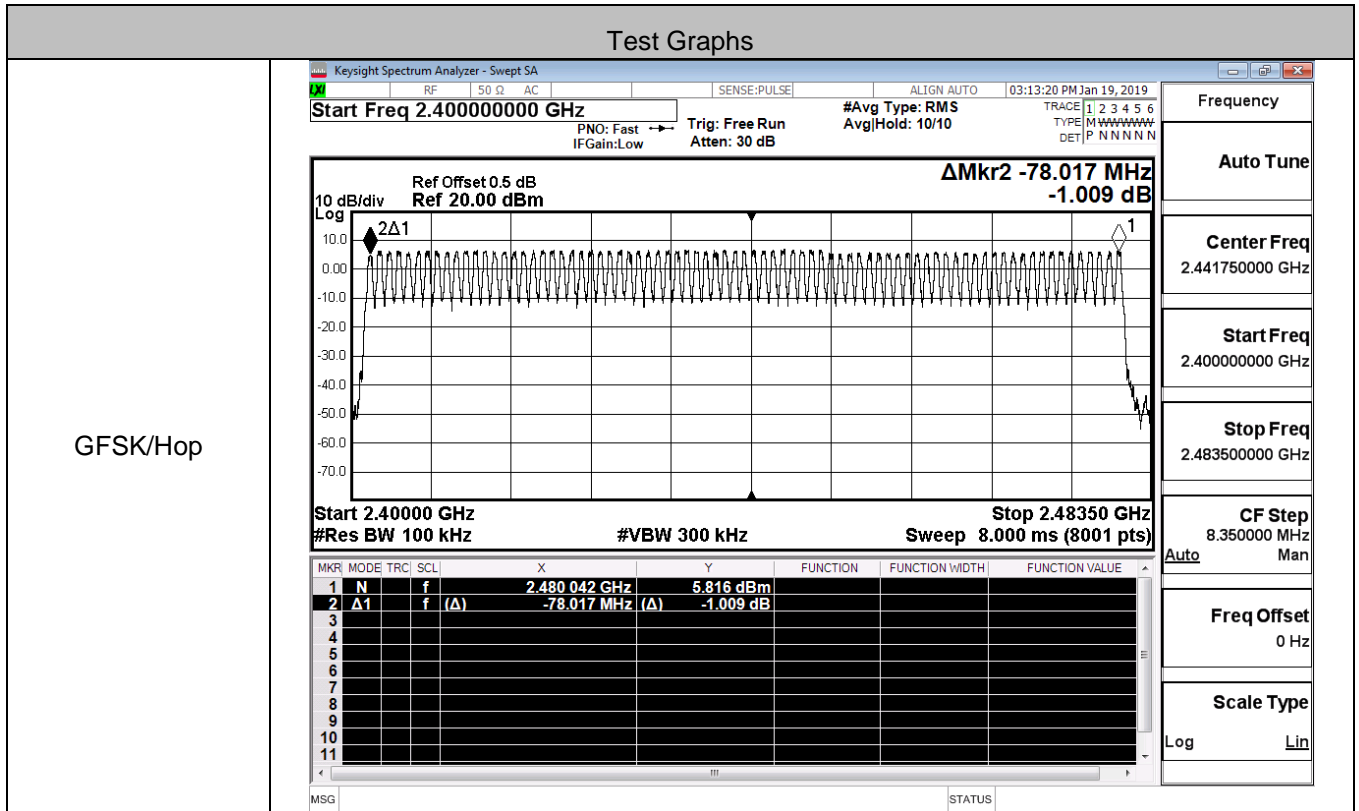
8DPSK/HCH



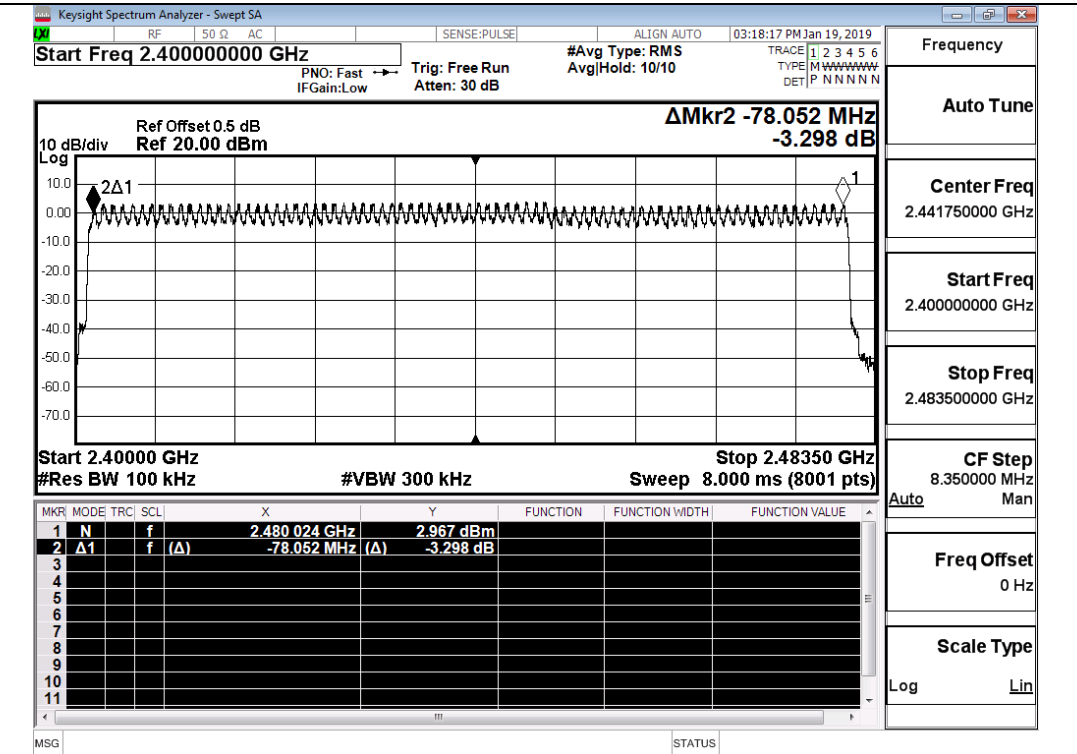


### A.4 Hopping Channel Number

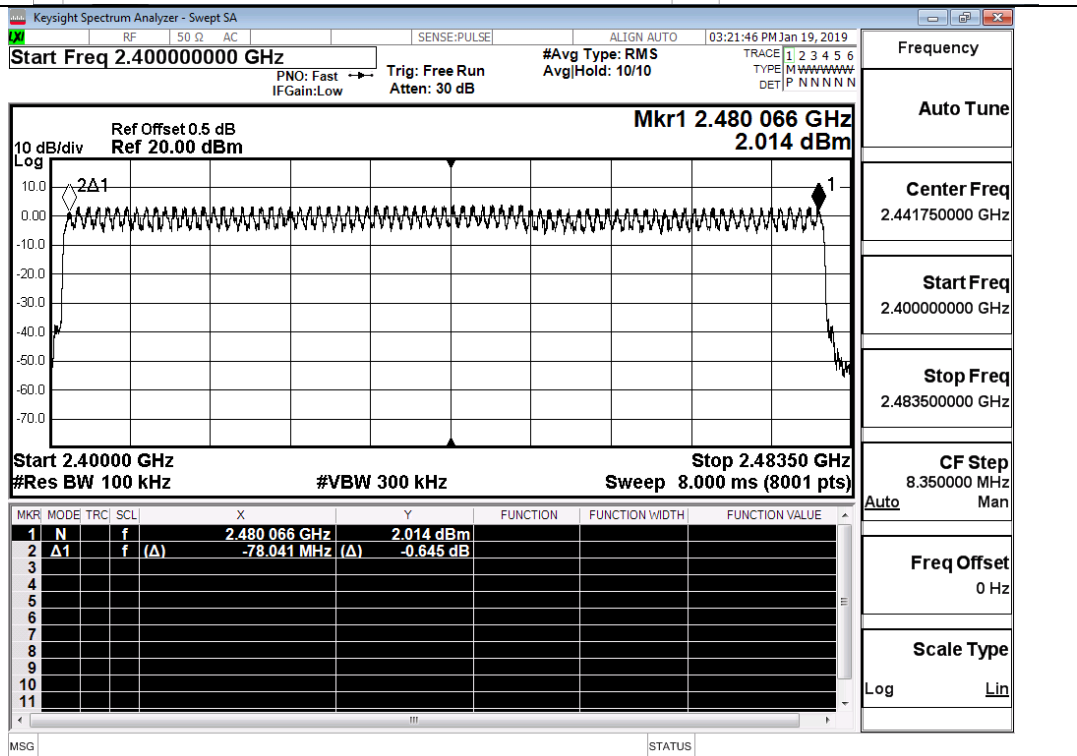
| Mode          | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK          | Hop      | 79                            | >=15      | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                    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



$\pi/4$ DQPSK/Hop

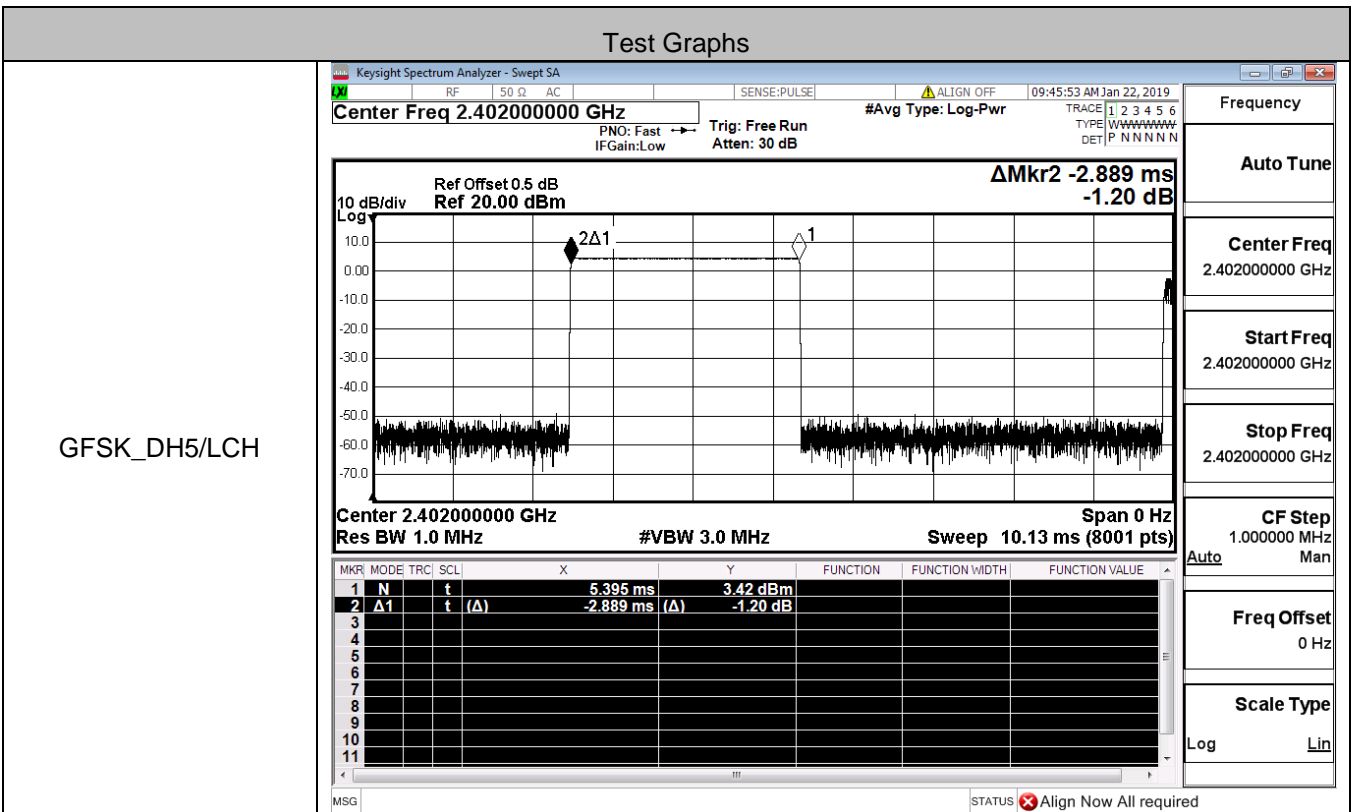


8DPSK/Hop

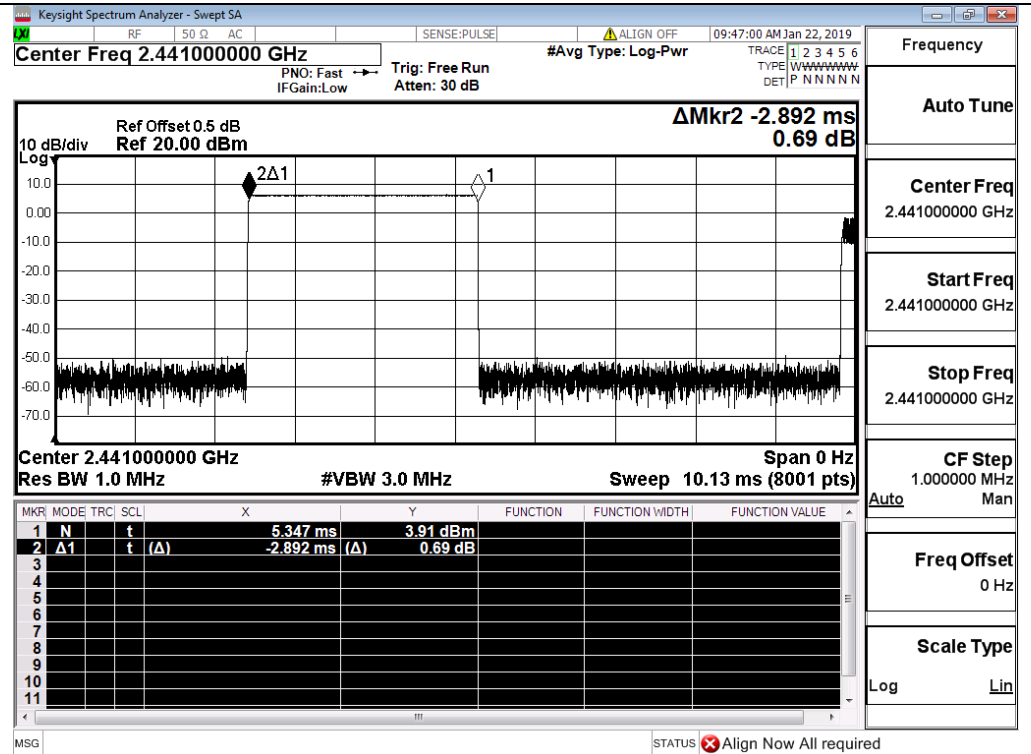


A.5 Dwell Time

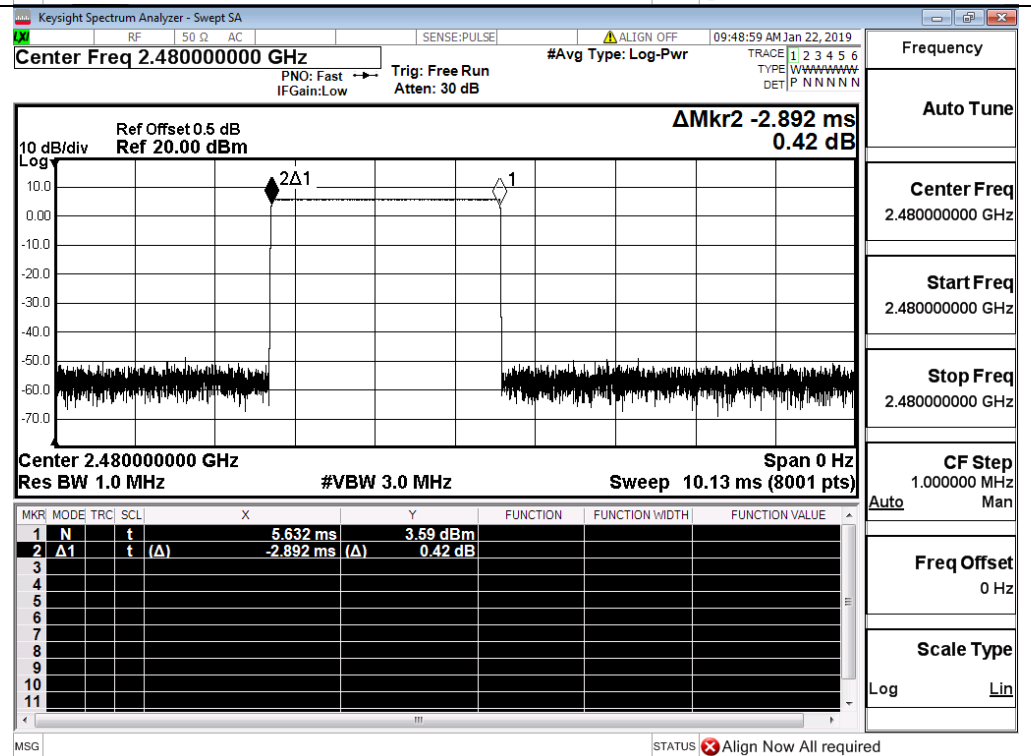
| Mode     | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK     | DH5    | LCH     | 2.889                   | 106.7              | 0.308         | 0.4       | PASS    |
|          | DH5    | MCH     | 2.892                   | 106.7              | 0.308         | 0.4       | PASS    |
|          | DH5    | HCH     | 2.892                   | 106.7              | 0.308         | 0.4       | PASS    |
| π/4DQPSK | 2DH5   | LCH     | 2.897                   | 106.7              | 0.309         | 0.4       | PASS    |
|          | 2DH5   | MCH     | 2.896                   | 106.7              | 0.309         | 0.4       | PASS    |
|          | 2DH5   | HCH     | 2.902                   | 106.7              | 0.310         | 0.4       | PASS    |
| 8DPSK    | 3DH5   | LCH     | 2.899                   | 106.7              | 0.309         | 0.4       | PASS    |
|          | 3DH5   | MCH     | 2.901                   | 106.7              | 0.309         | 0.4       | PASS    |
|          | 3DH5   | HCH     | 2.901                   | 106.7              | 0.309         | 0.4       | PASS    |



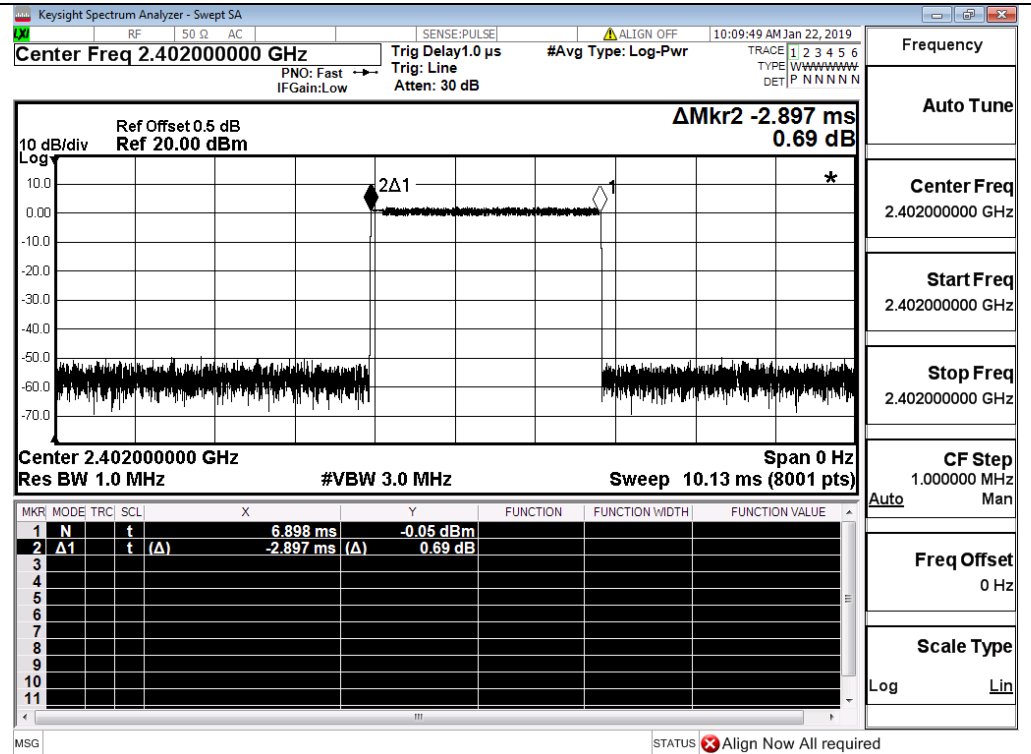
GFSK\_DH5/MCH



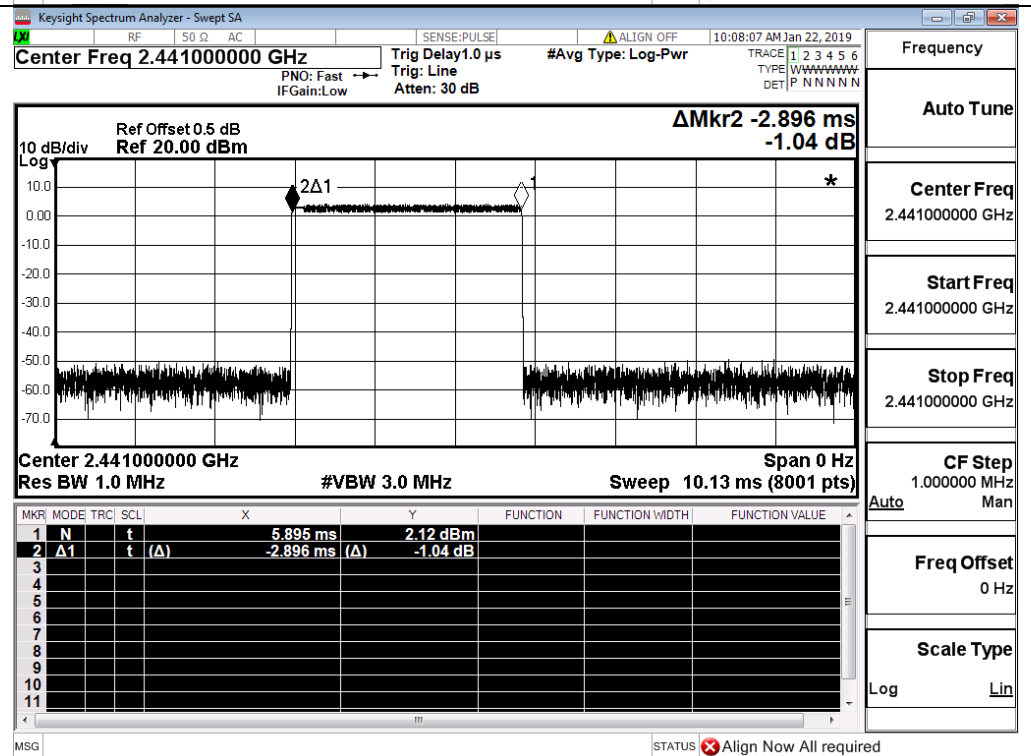
GFSK\_DH5/HCH



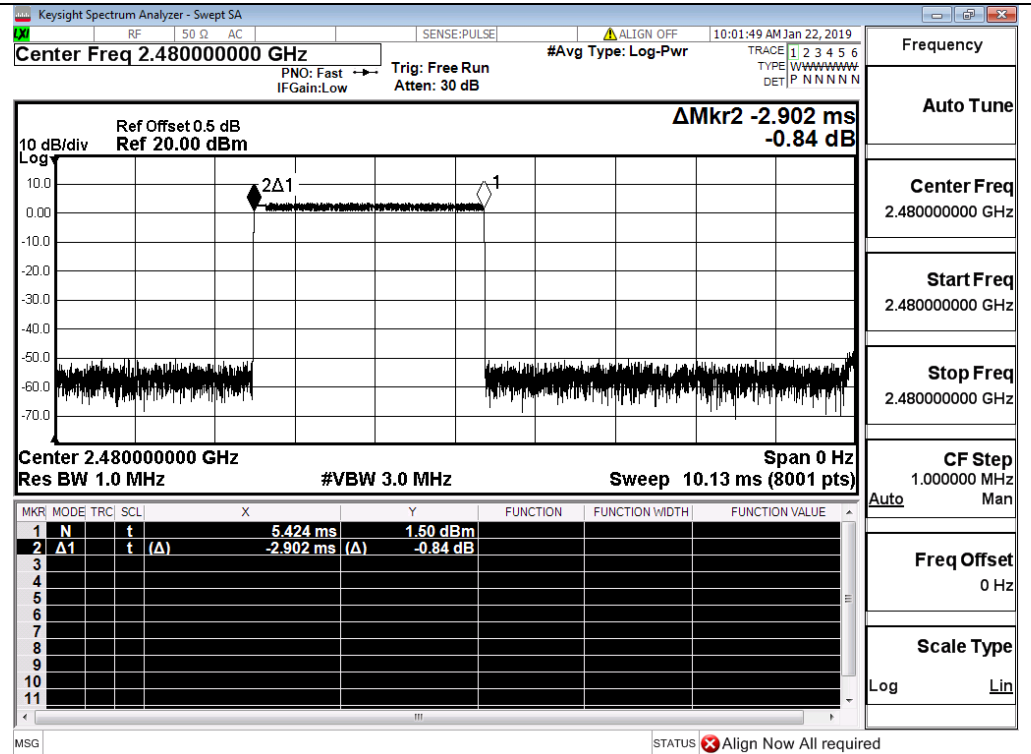
$\pi/4$ DQPSK  
\_2DH5/LCH



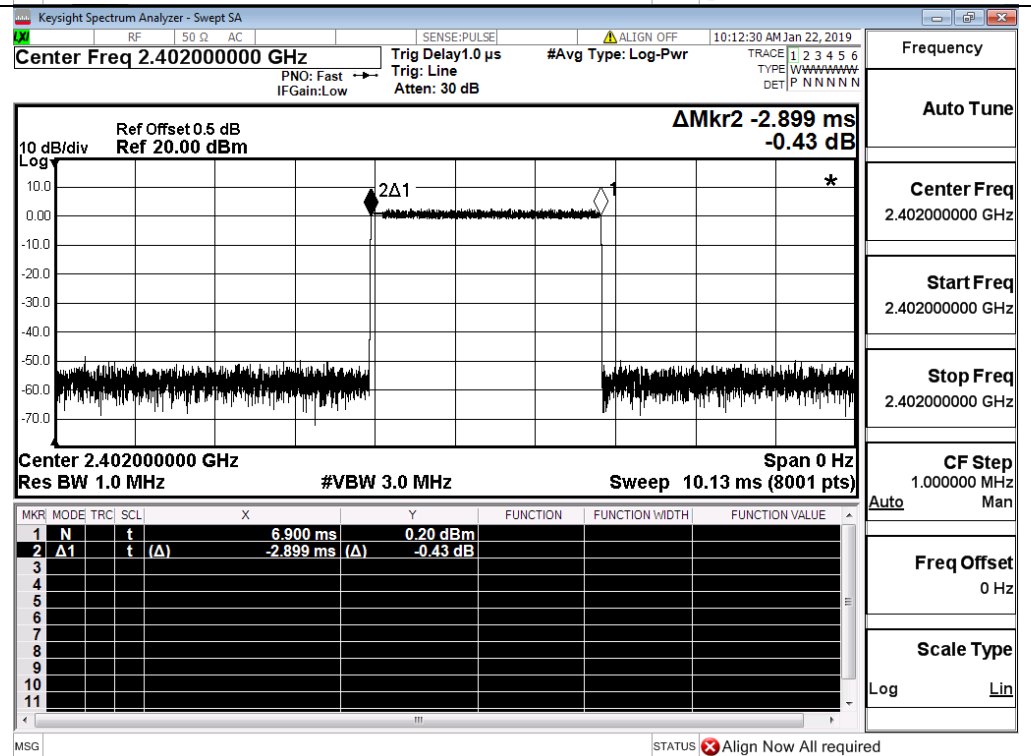
$\pi/4$ DQPSK  
\_2DH5/MCH



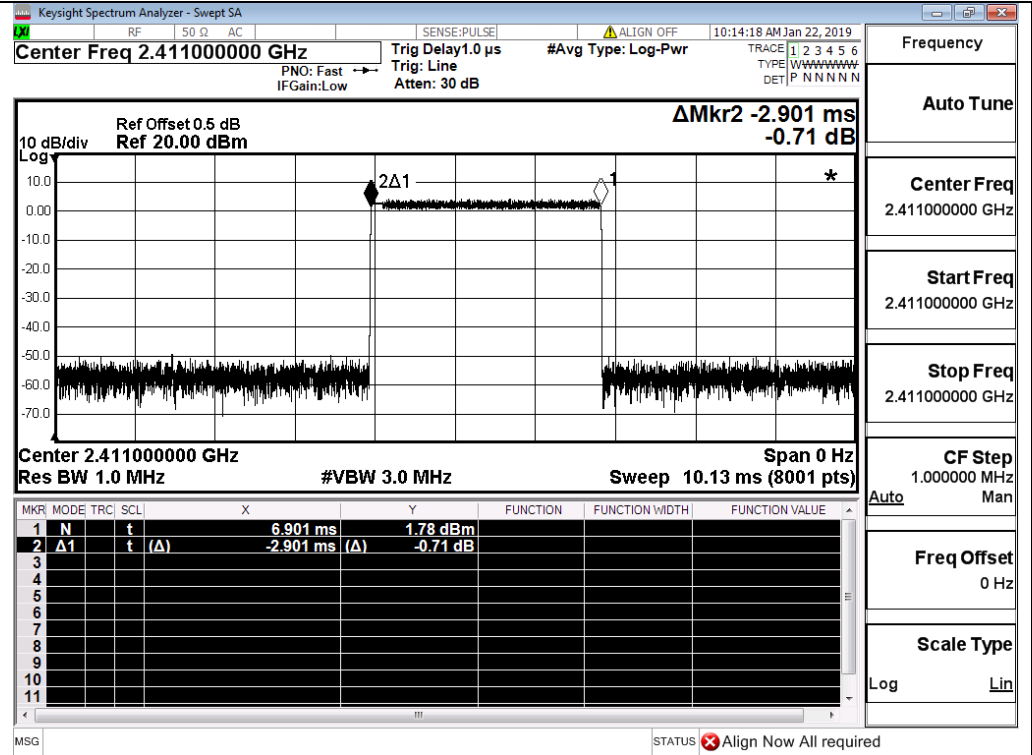
$\pi/4$ DQPSK  
\_2DH5/HCH



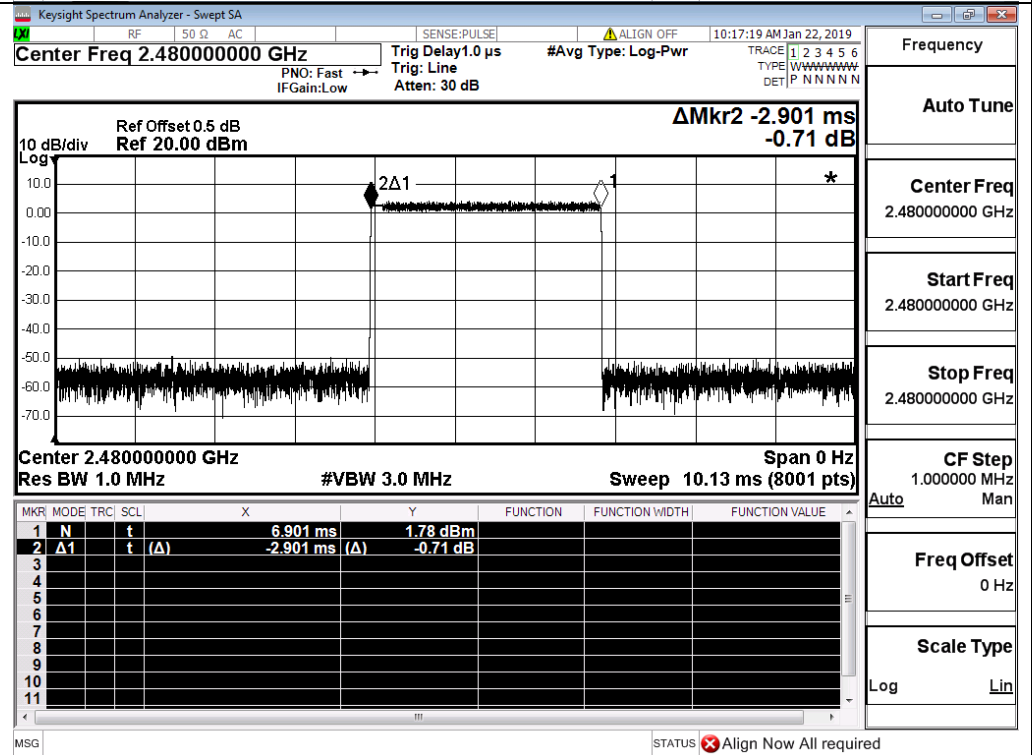
8DPSK \_3DH5/LCH



8DPSK\_3DH5/MCH



8DPSK\_3DH5/HCH



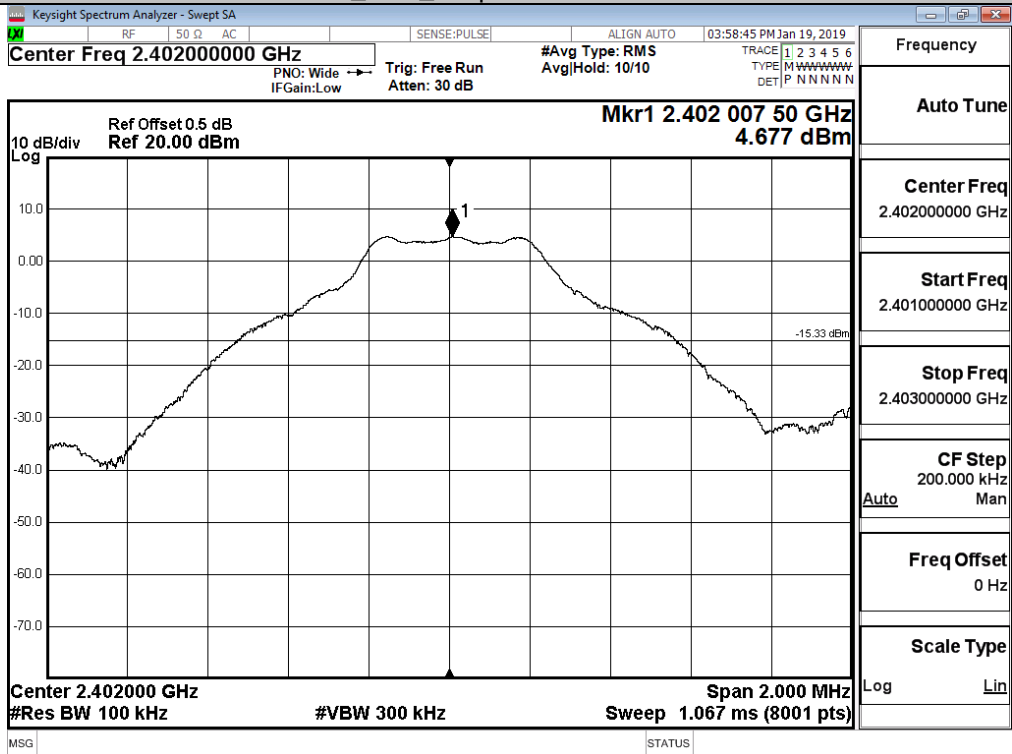
**A.6 RF Conducted Spurious Emissions**

| Mode          | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK          | LCH     | 4.677      | -38.722          | -15.323     | PASS    |
|               | MCH     | 6.529      | -34.582          | -13.471     | PASS    |
|               | HCH     | 6.116      | -35.861          | -13.884     | PASS    |
| $\pi/4$ DQPSK | LCH     | 1.286      | -45.274          | -18.714     | PASS    |
|               | MCH     | 3.386      | -39.517          | -16.614     | PASS    |
|               | HCH     | 2.865      | -35.271          | -17.135     | PASS    |
| 8DPSK         | LCH     | 1.288      | -40.593          | -18.712     | PASS    |
|               | MCH     | 3.448      | -37.587          | -16.552     | PASS    |
|               | HCH     | 2.946      | -36.970          | -17.054     | PASS    |

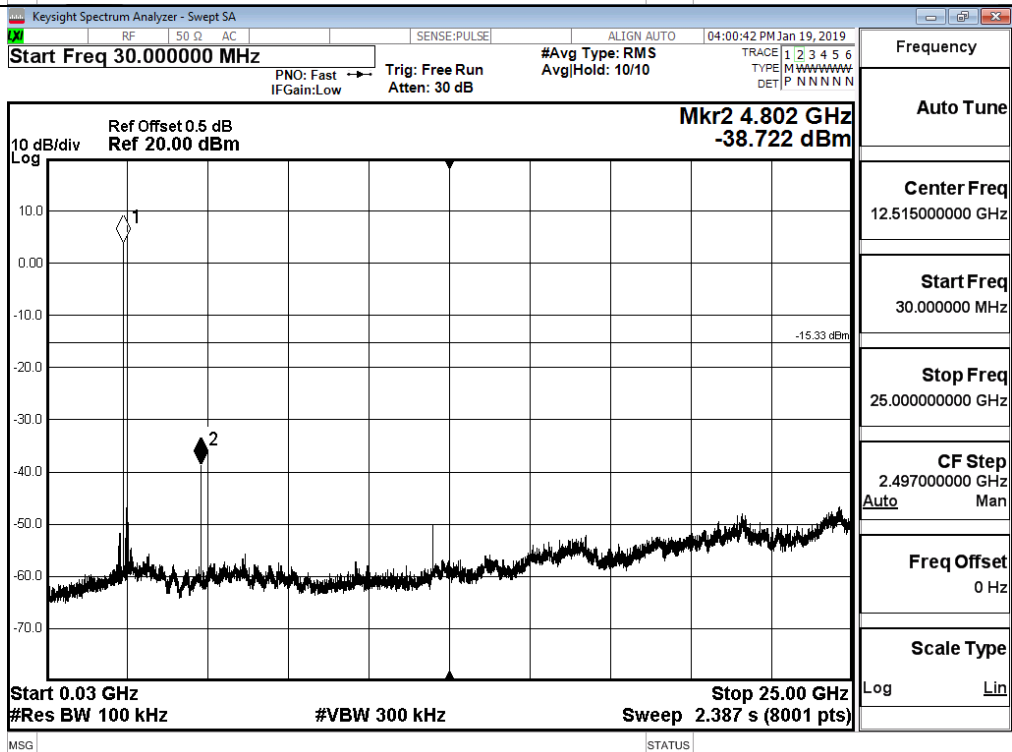


GFSK\_LCH\_Graphs

Pref

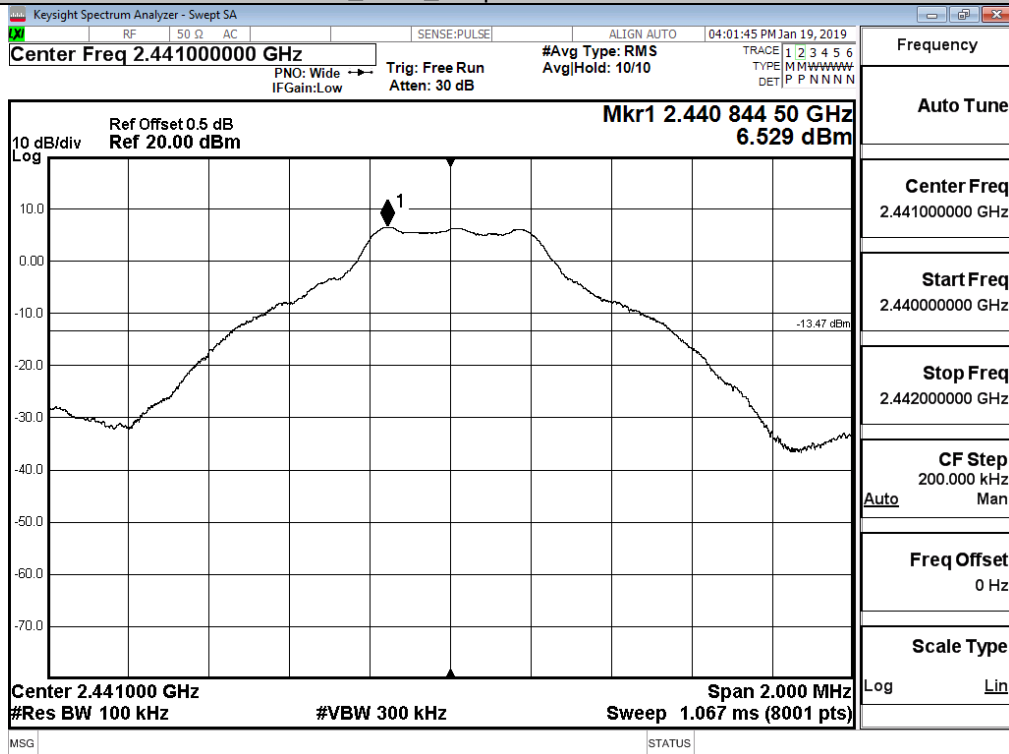


Puw

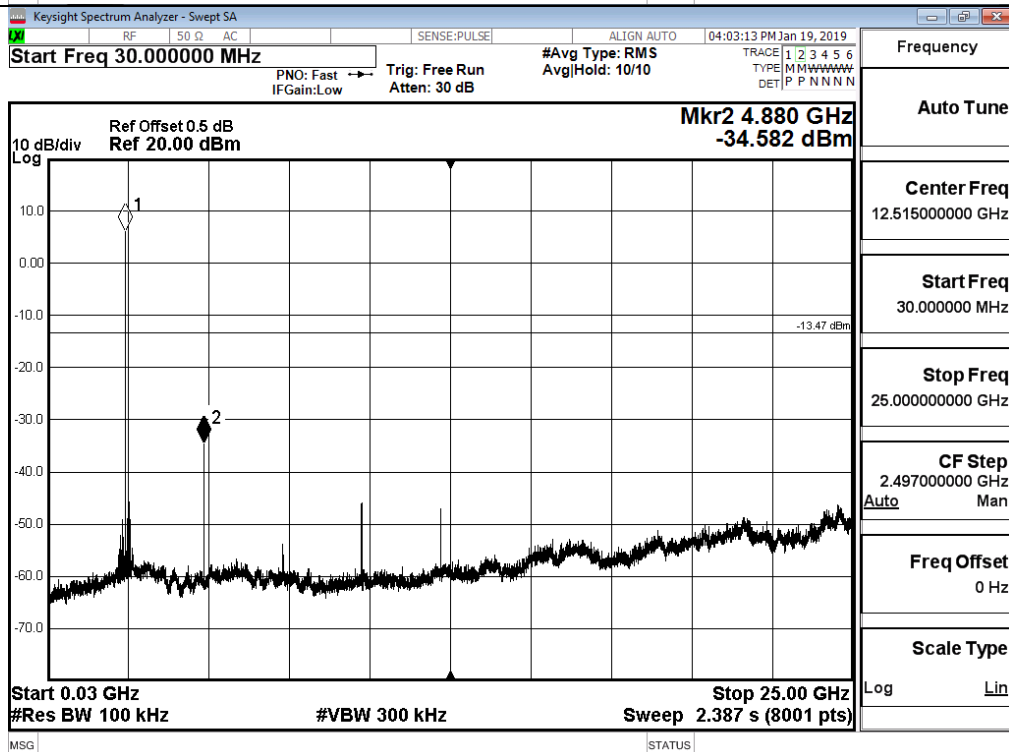


GFSK\_MCH\_Graphs

Pref

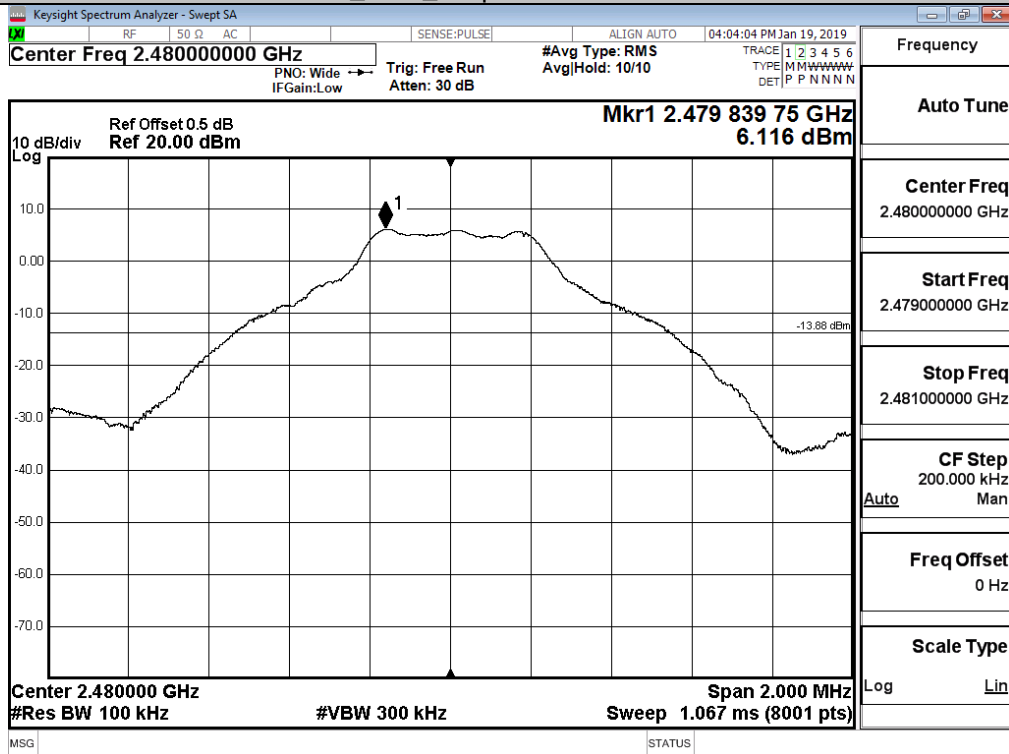


Puw

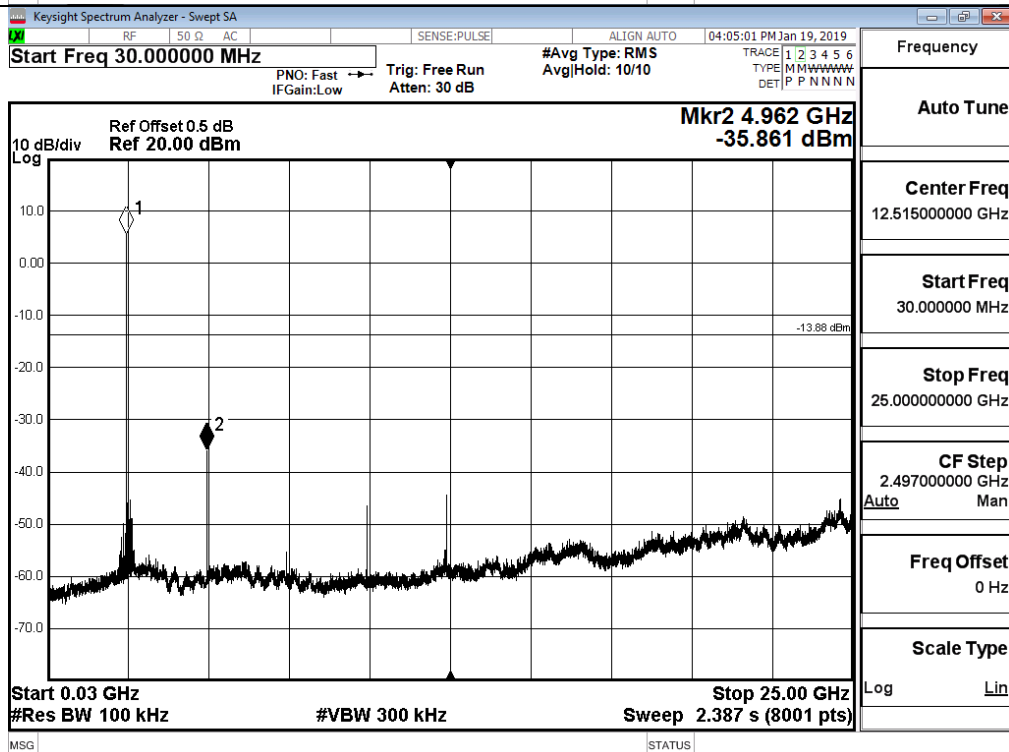


GFSK\_HCH\_Graphs

Pref

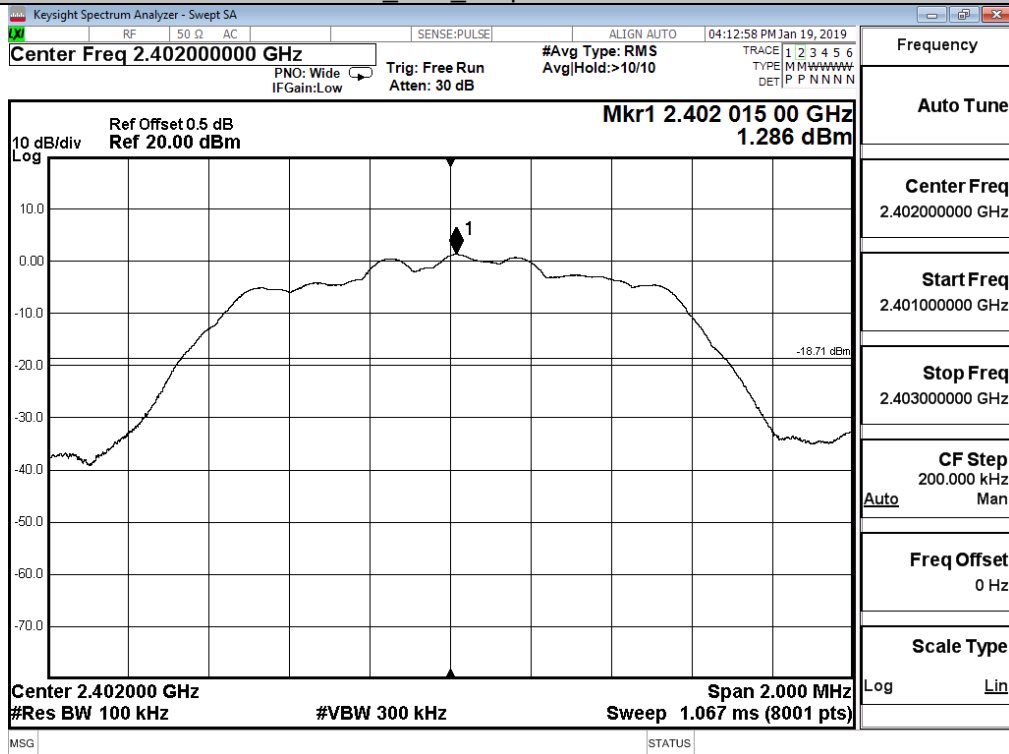


Puw

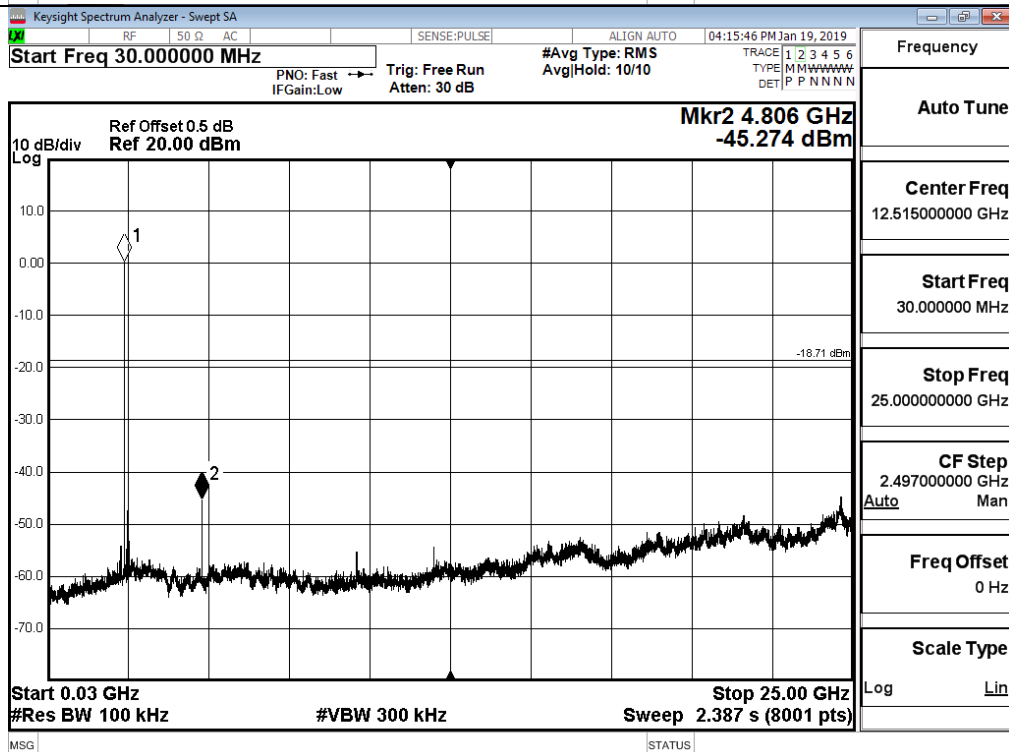


$\pi/4$ DQPSK\_LCH\_Graphs

Pref

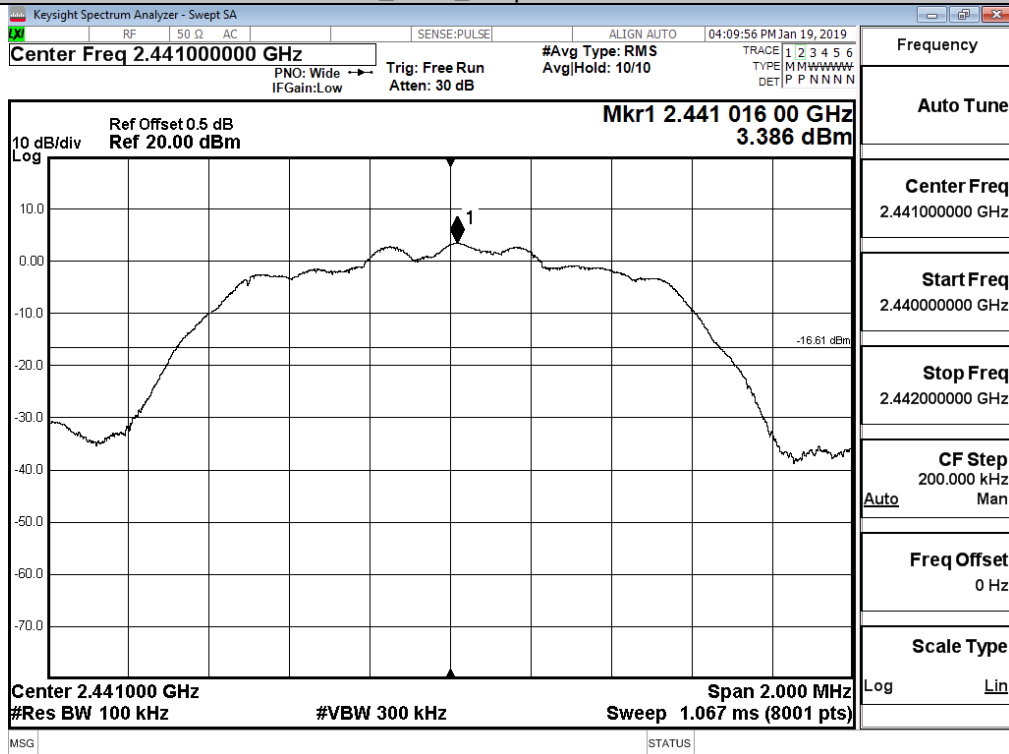


Puw

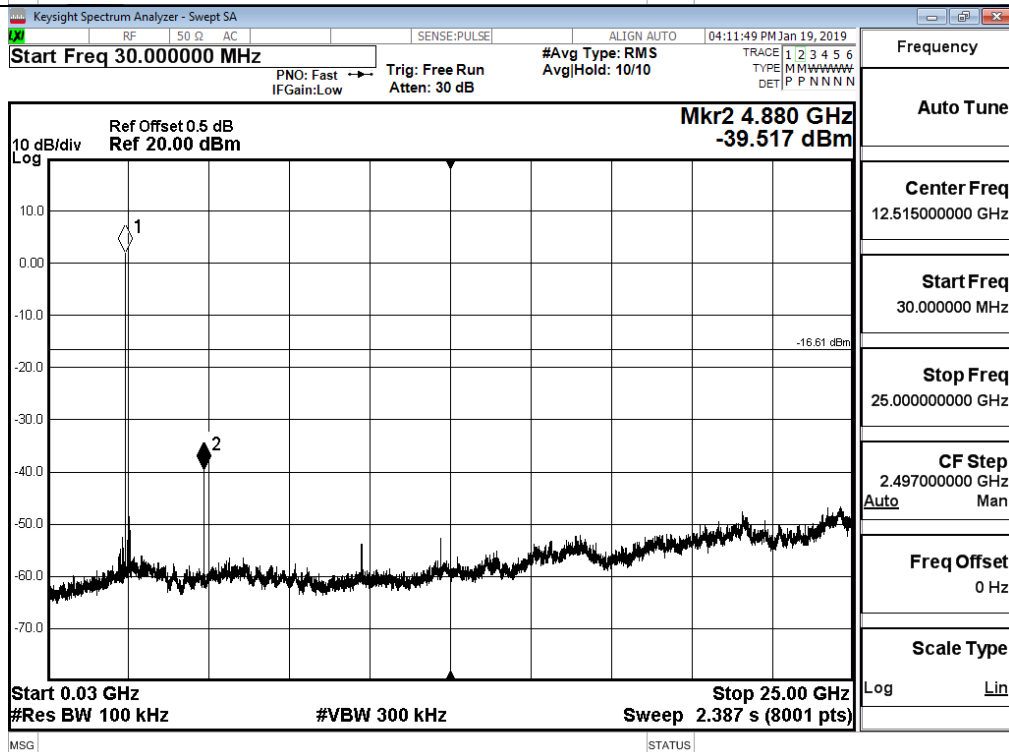


$\pi/4$ DQPSK\_MCH\_Graphs

Pref

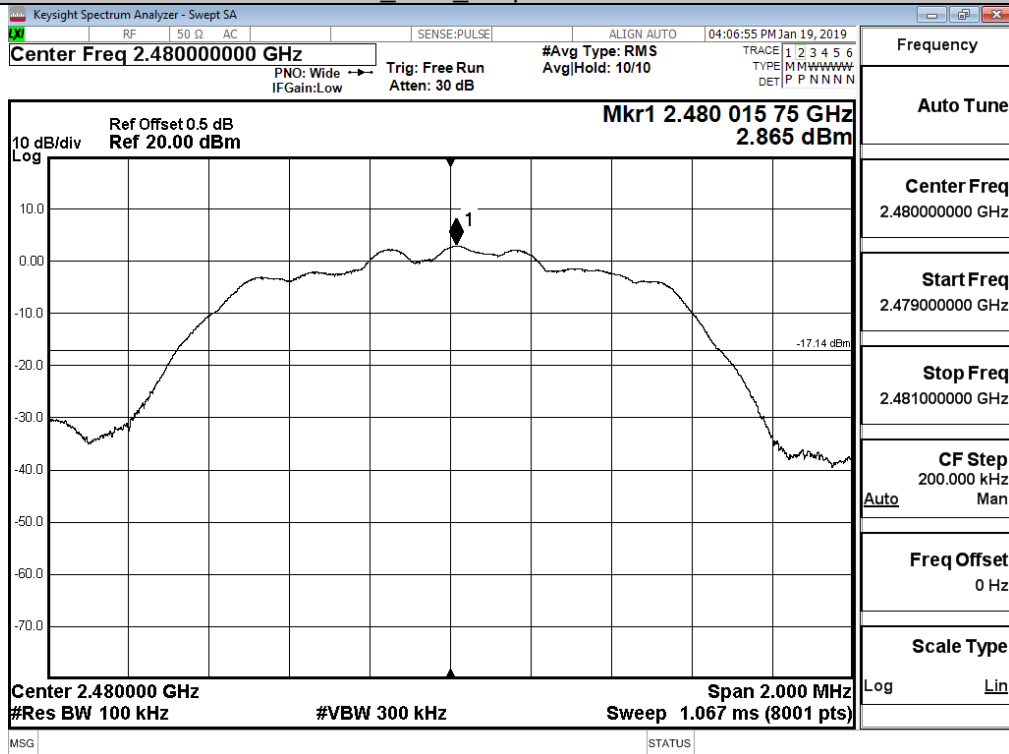


Puw

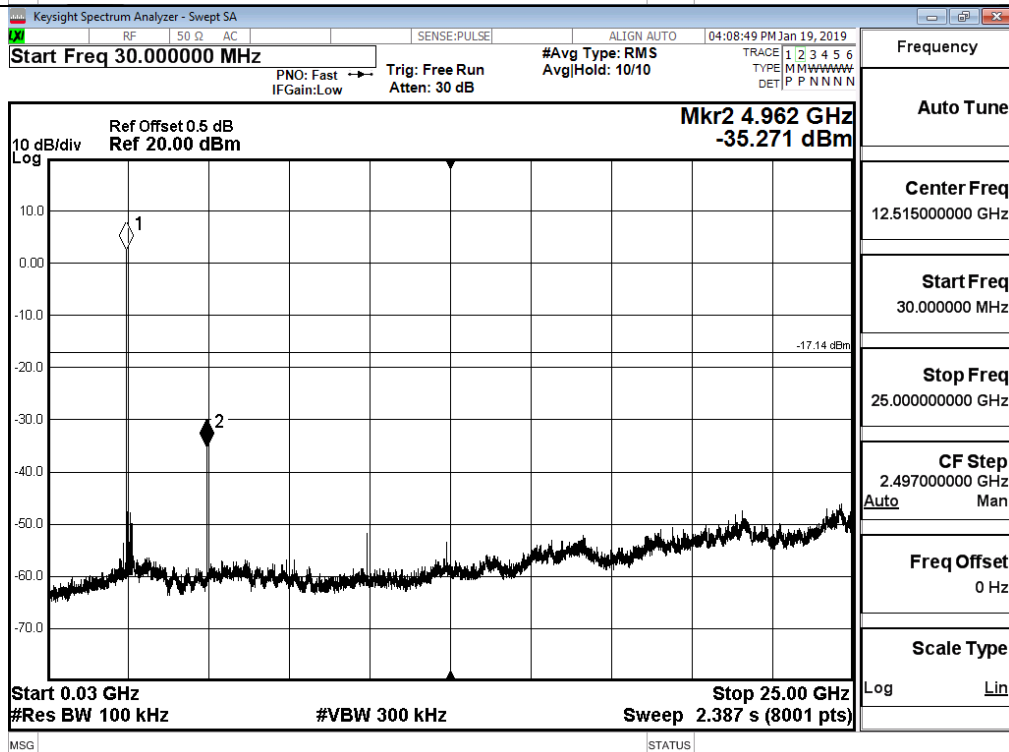


$\pi/4$ DQPSK\_HCH\_Graphs

Pref

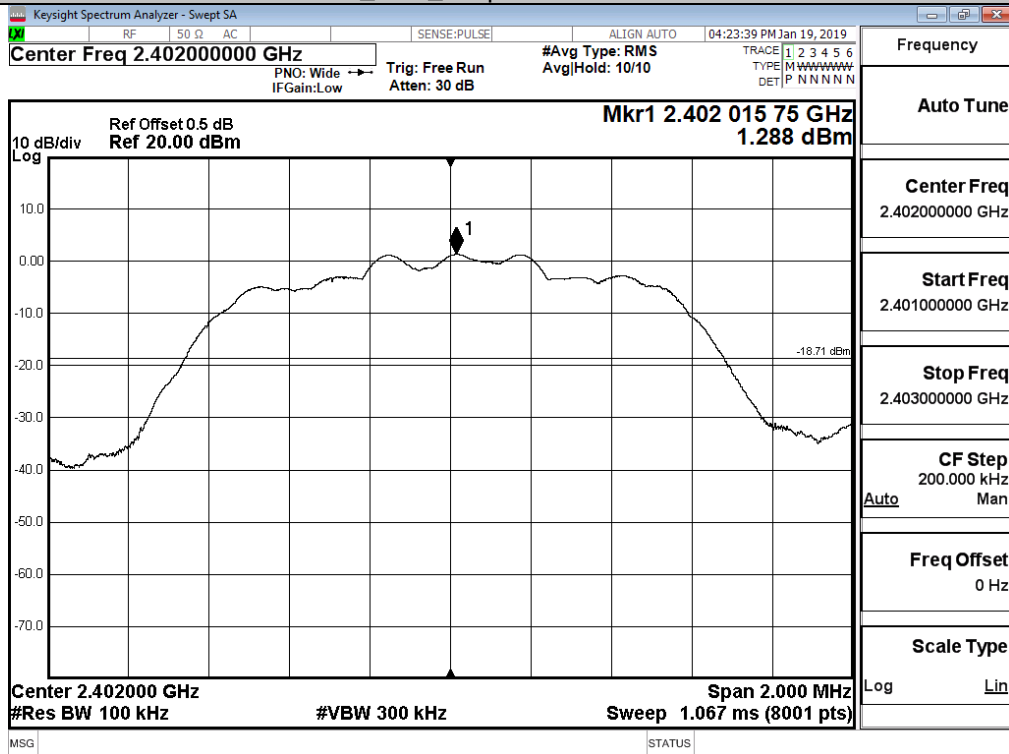


Puw

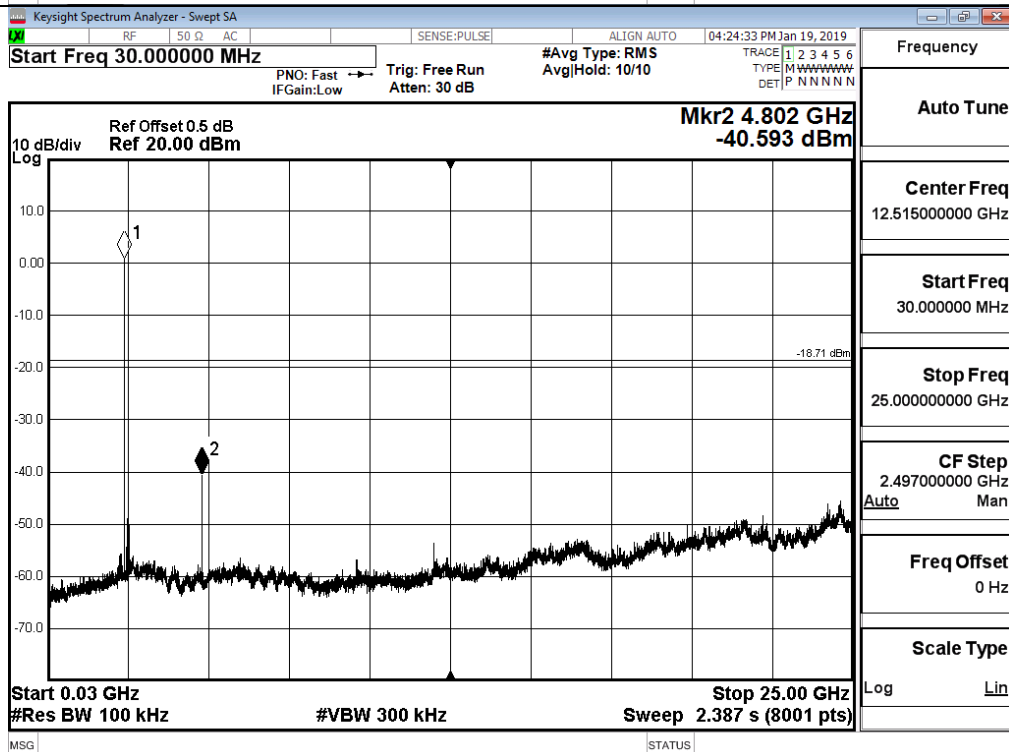


8DPSK\_LCH\_Graphs

Pref

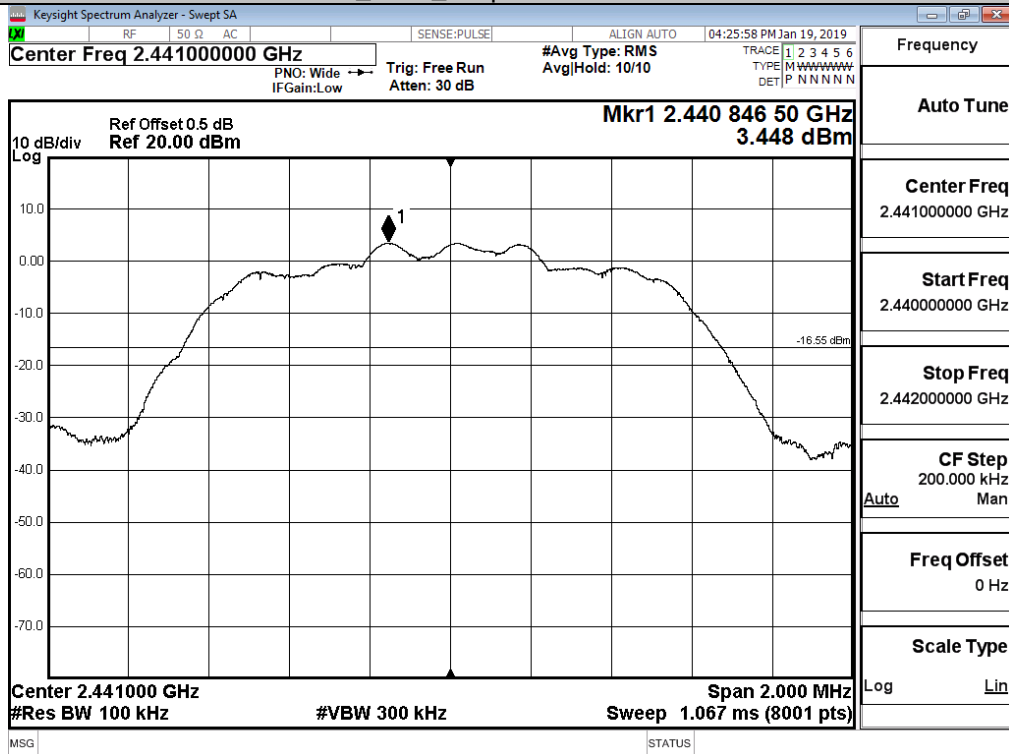


Puw

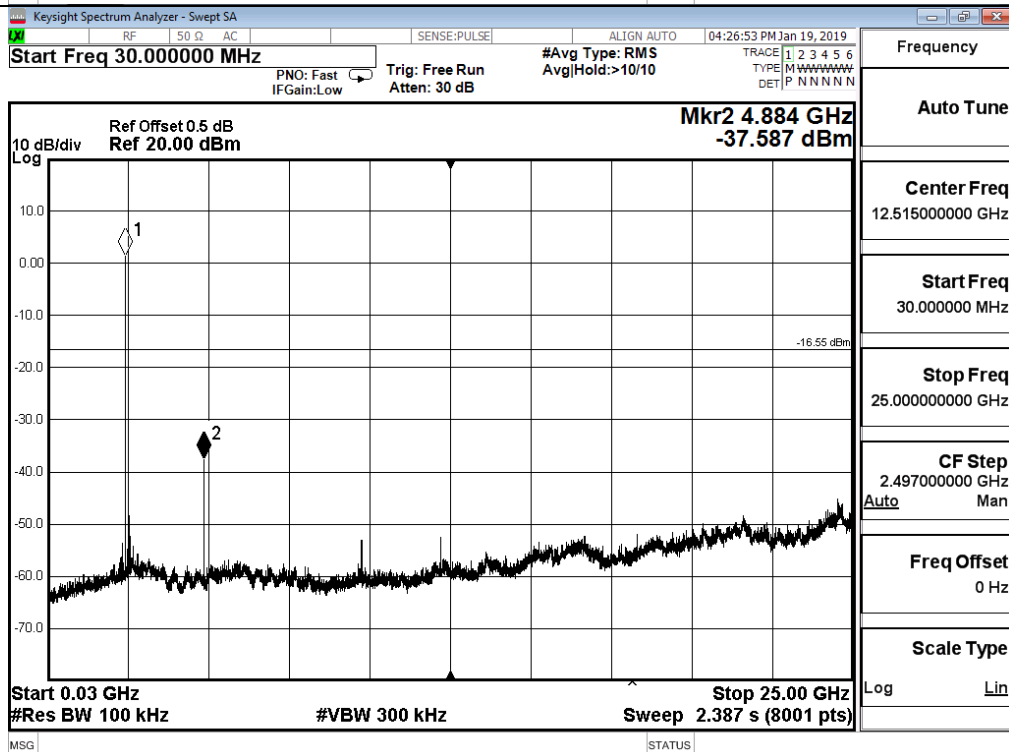


8DPSK\_MCH\_Graphs

Pref



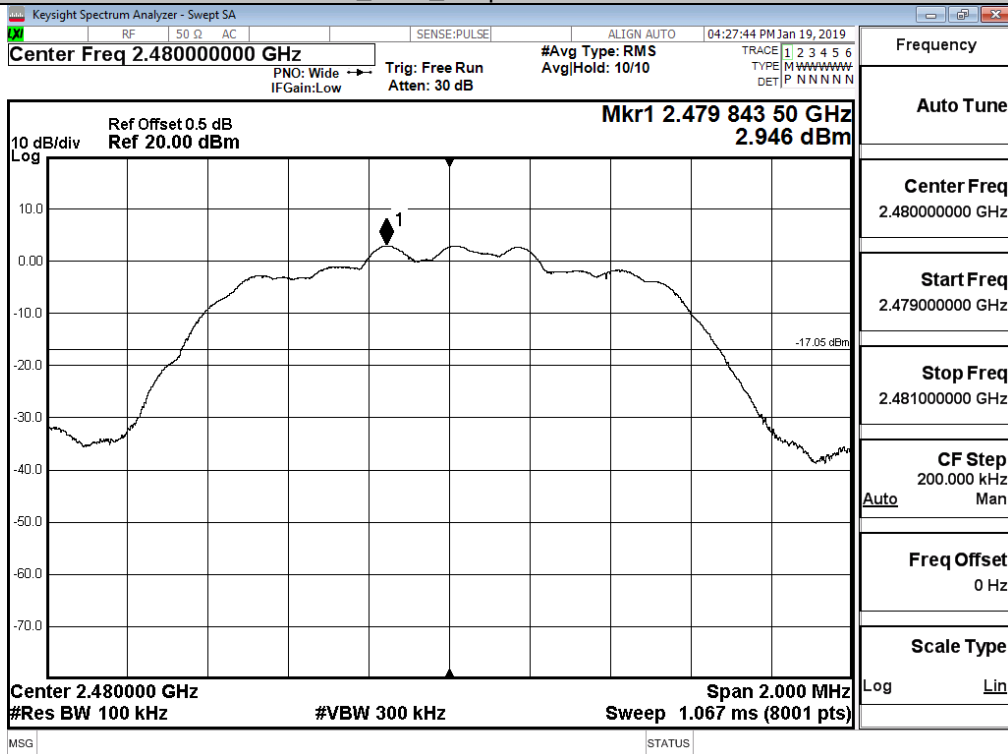
Puw



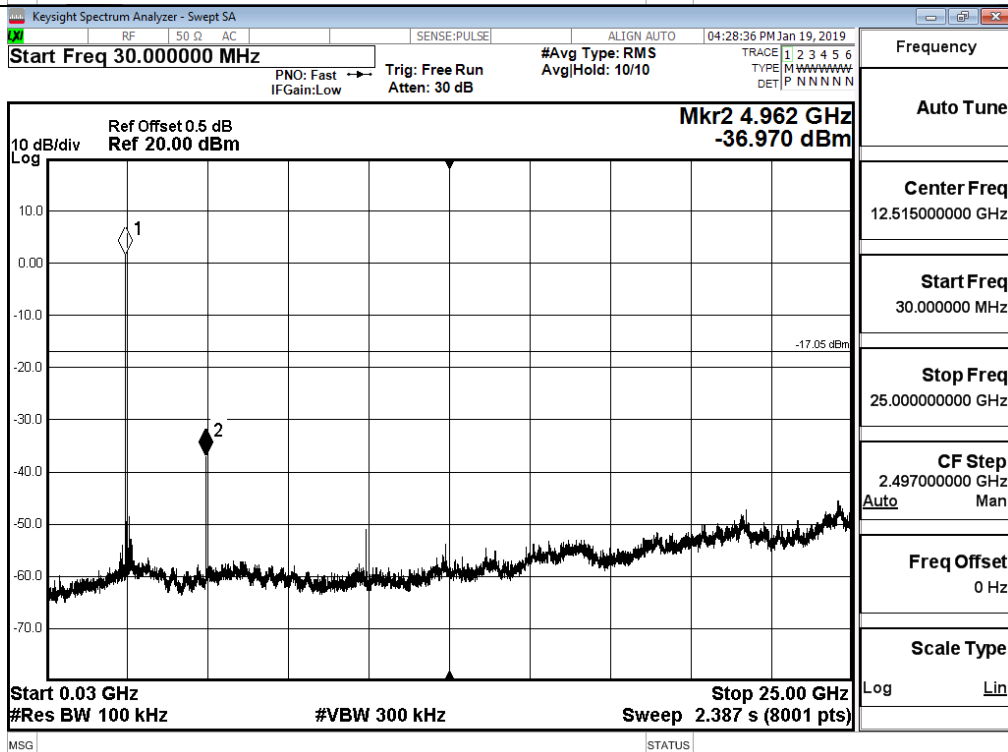


### 8DPSK\_HCH\_Graphs

Pref



Puw

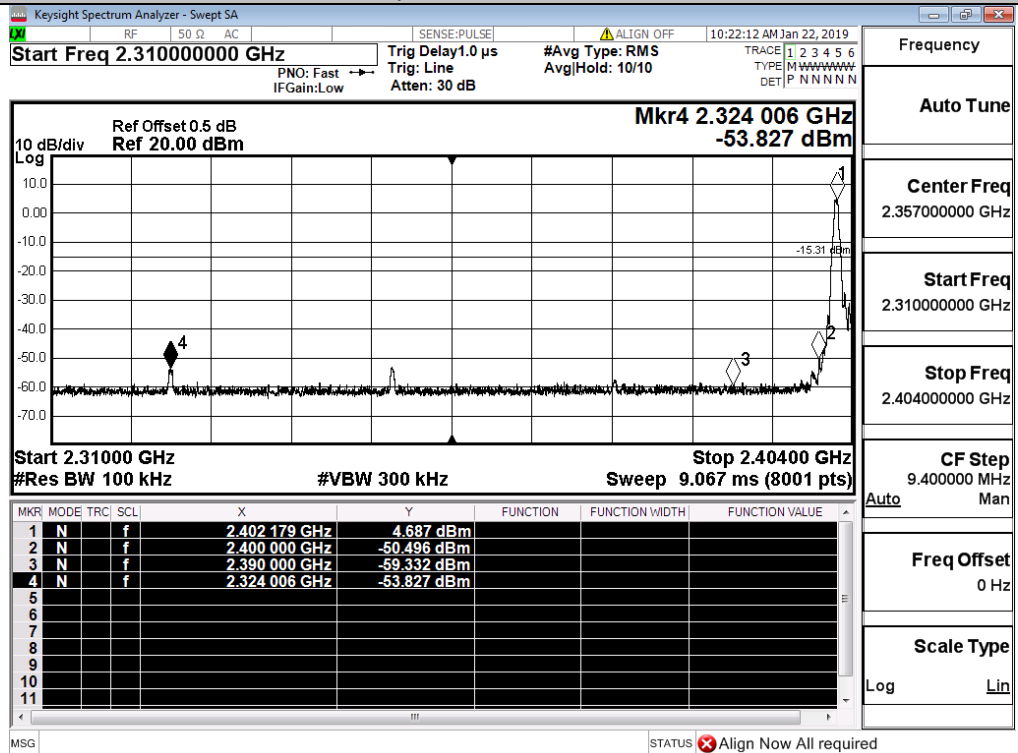


## A.7 Band-edge for RF Conducted Emissions

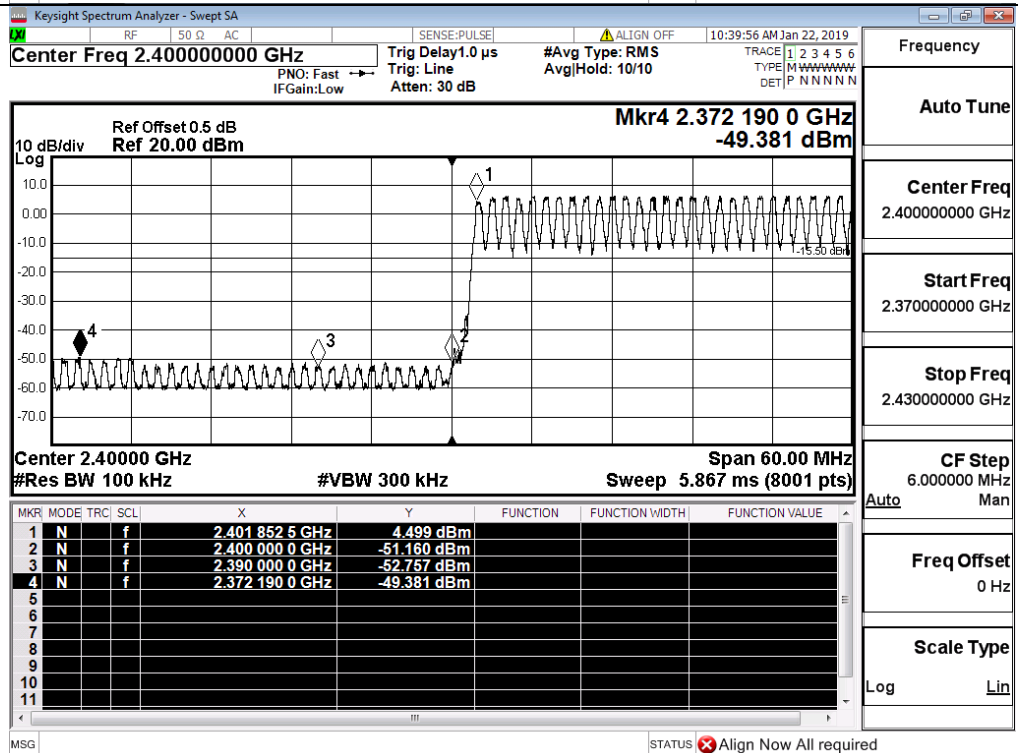
| Mode          | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | 4.687               | Off               | -50.332                  | -15.313     | PASS    |
|               |         |                         | 4.499               | On                | -49.381                  | -15.501     | PASS    |
|               | HCH     | 2480                    | 6.102               | Off               | -55.078                  | -13.898     | PASS    |
|               |         |                         | 5.806               | On                | -45.654                  | -14.194     | PASS    |
| $\pi/4$ DQPSK | LCH     | 2402                    | 1.186               | Off               | -53.245                  | -18.814     | PASS    |
|               |         |                         | 1.157               | On                | -52.729                  | -18.843     | PASS    |
|               | HCH     | 2480                    | 2.891               | Off               | -54.420                  | -17.109     | PASS    |
|               |         |                         | 2.782               | On                | -47.857                  | -17.218     | PASS    |
| 8DPSK         | LCH     | 2402                    | 1.179               | Off               | -50.393                  | -18.821     | PASS    |
|               |         |                         | 1.064               | On                | -52.645                  | -18.936     | PASS    |
|               | HCH     | 2480                    | 2.925               | Off               | -56.872                  | -17.075     | PASS    |
|               |         |                         | 2.855               | On                | -46.771                  | -17.145     | PASS    |

Test Graphs

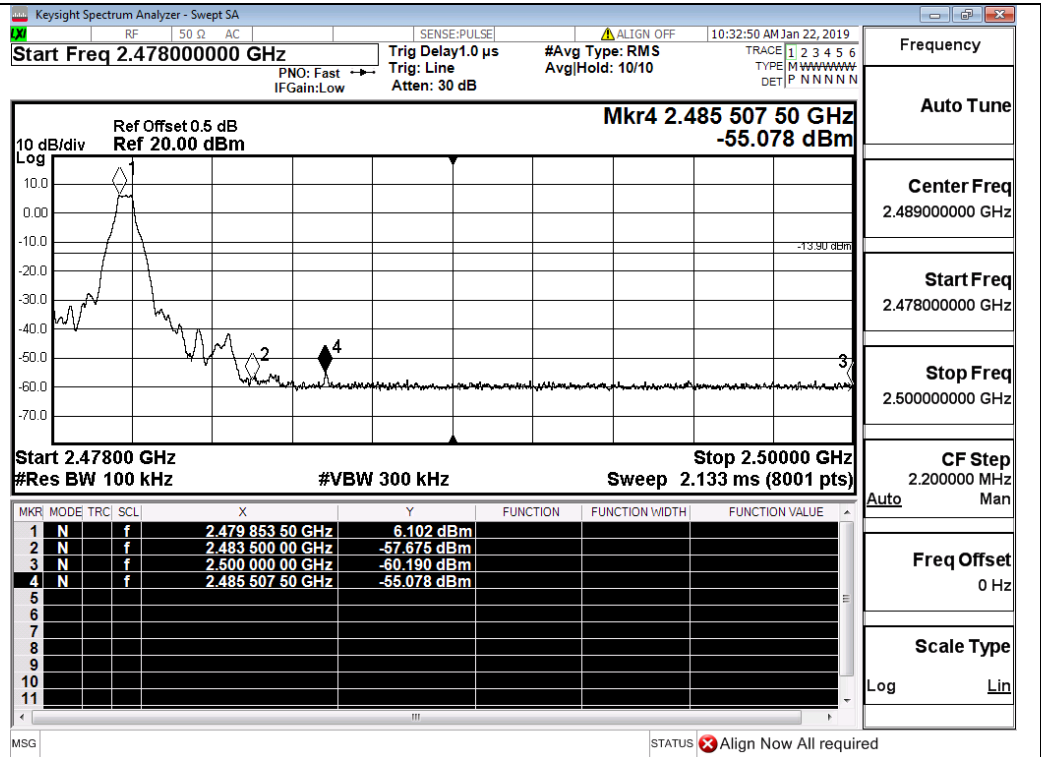
GFSK/LCH/No Hop



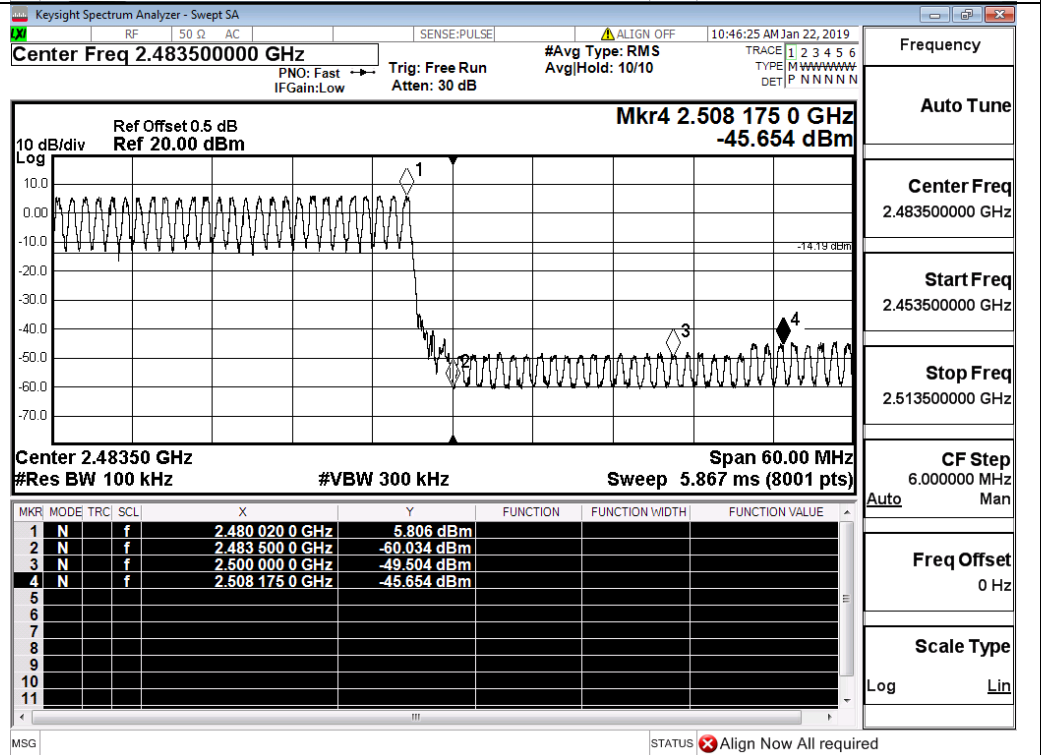
GFSK/LCH/Hop



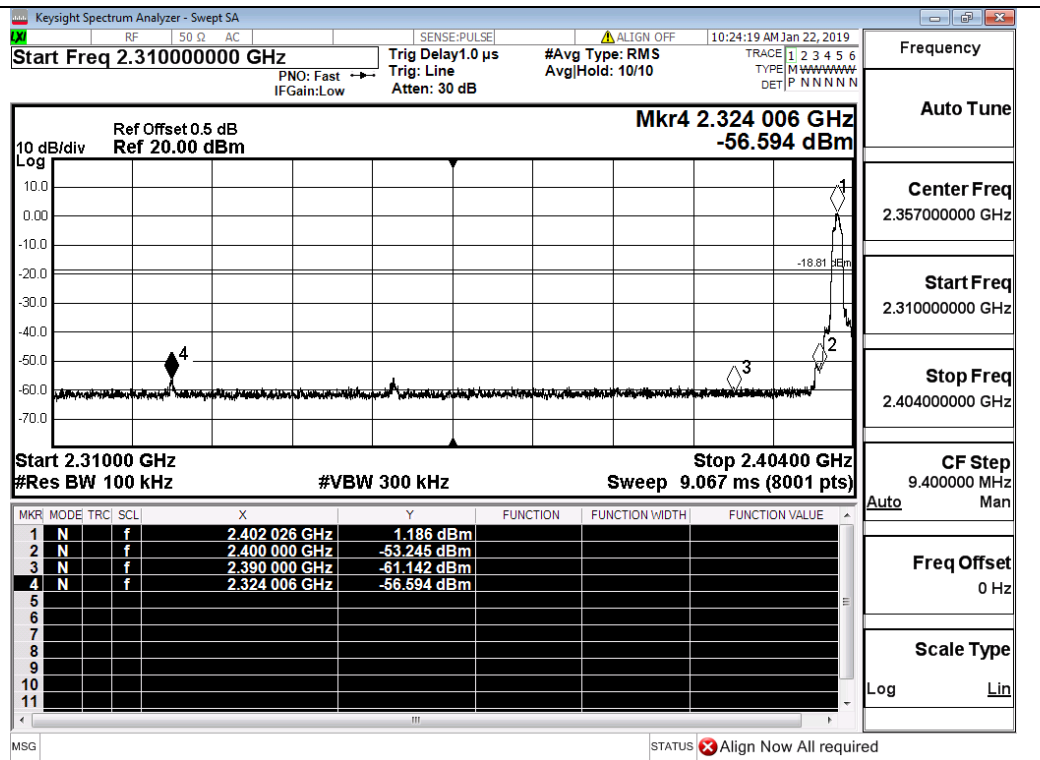
GFSK/HCH/No Hop



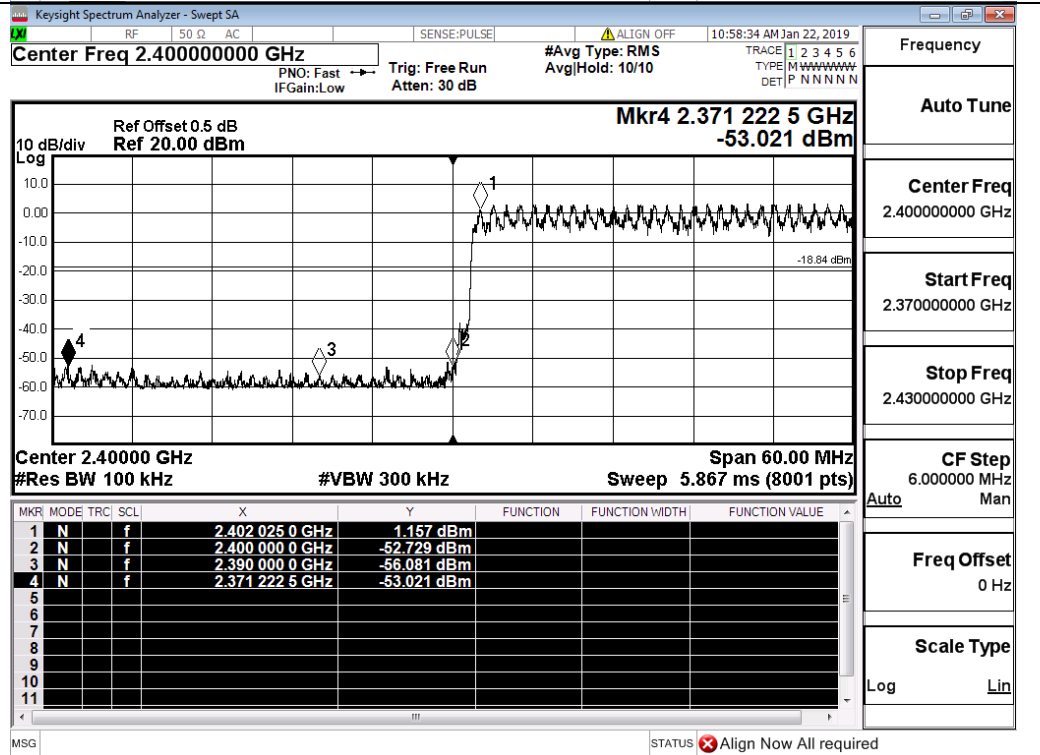
GFSK/HCH/Hop



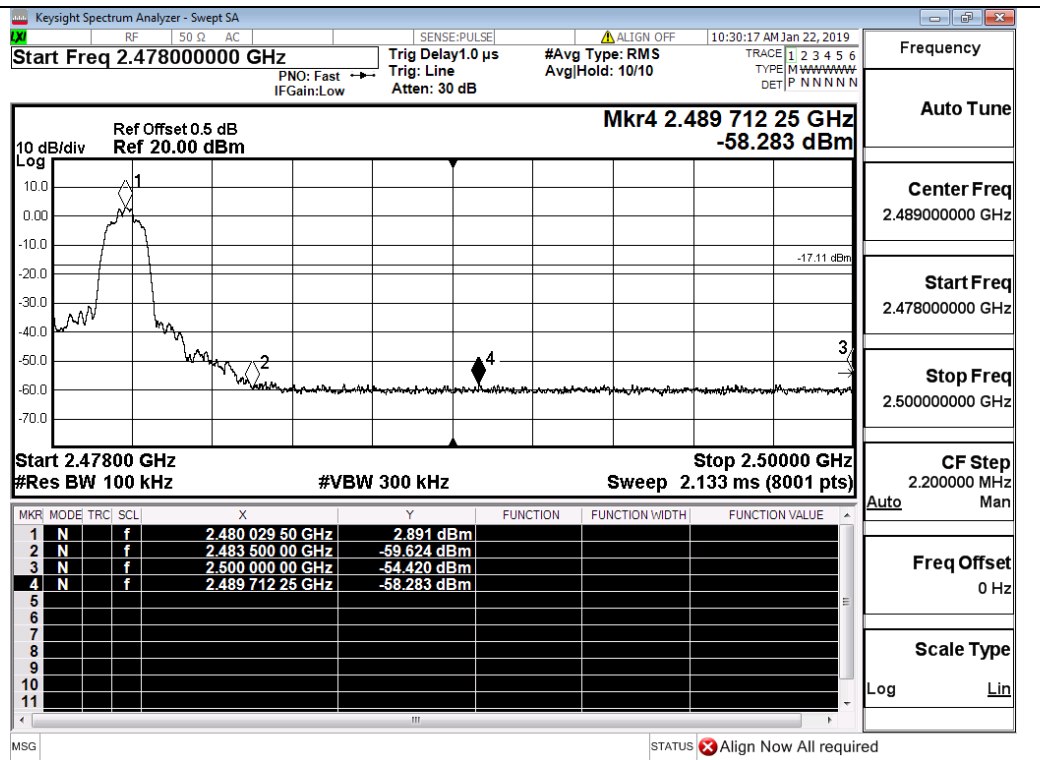
$\pi/4$ DQPSK/LCH/No  
Hop



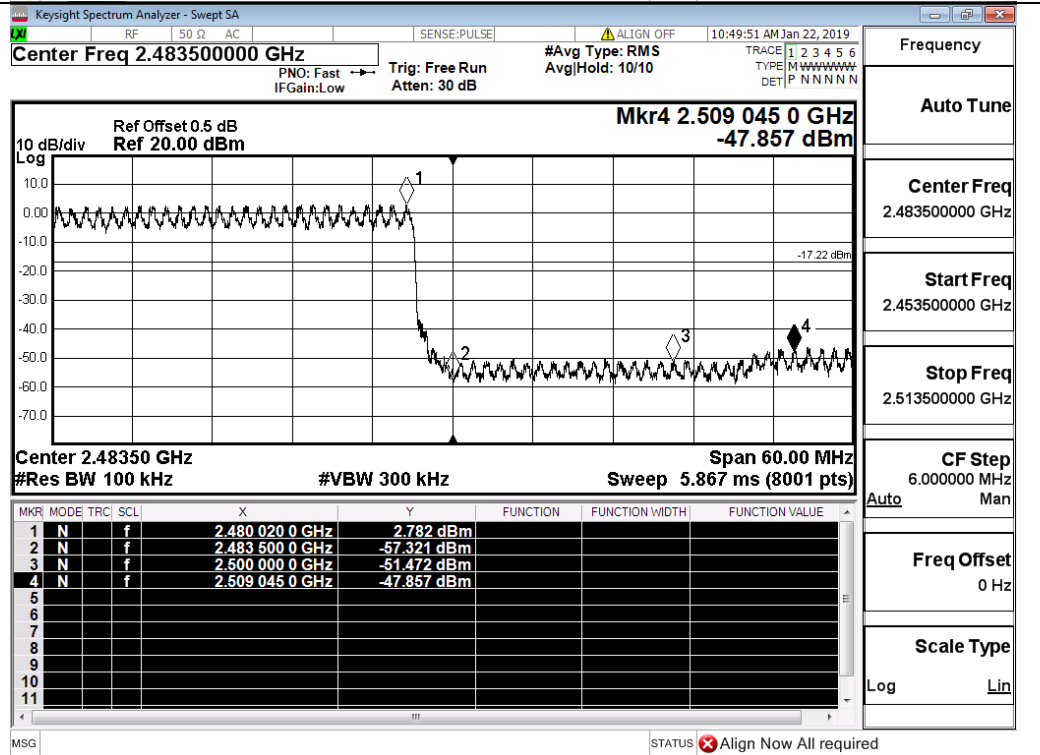
$\pi/4$ DQPSK/LCH/Hop



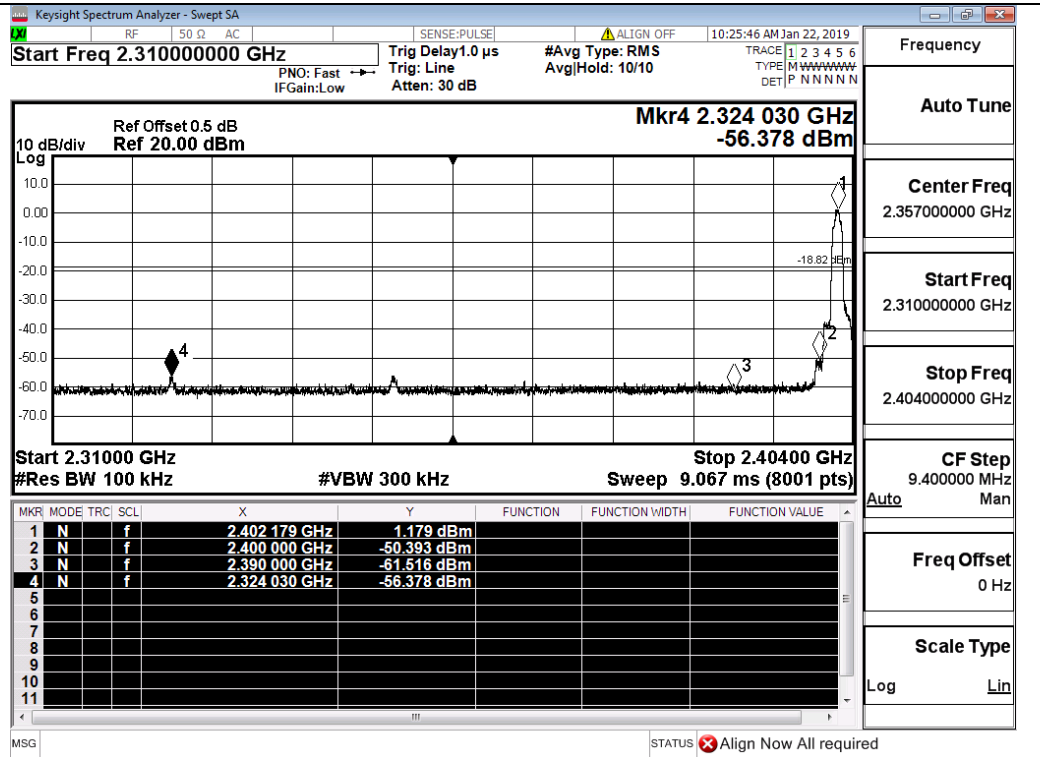
$\pi/4$ DQPSK/HCH/No  
Hop



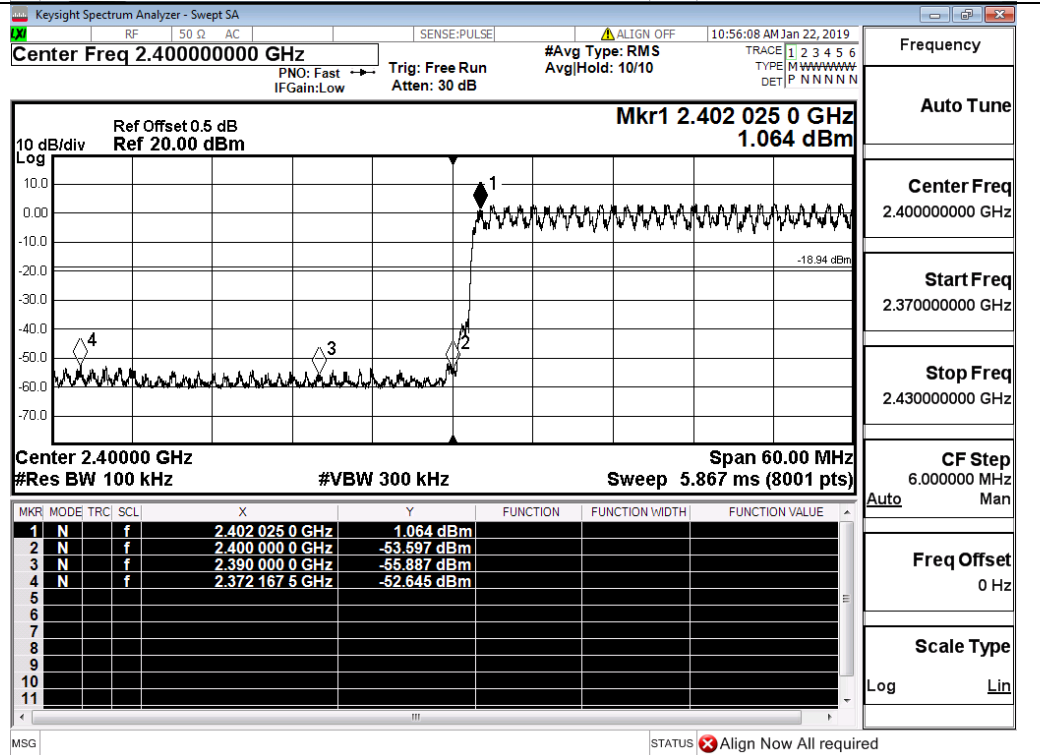
$\pi/4$ DQPSK/HCH/Hop



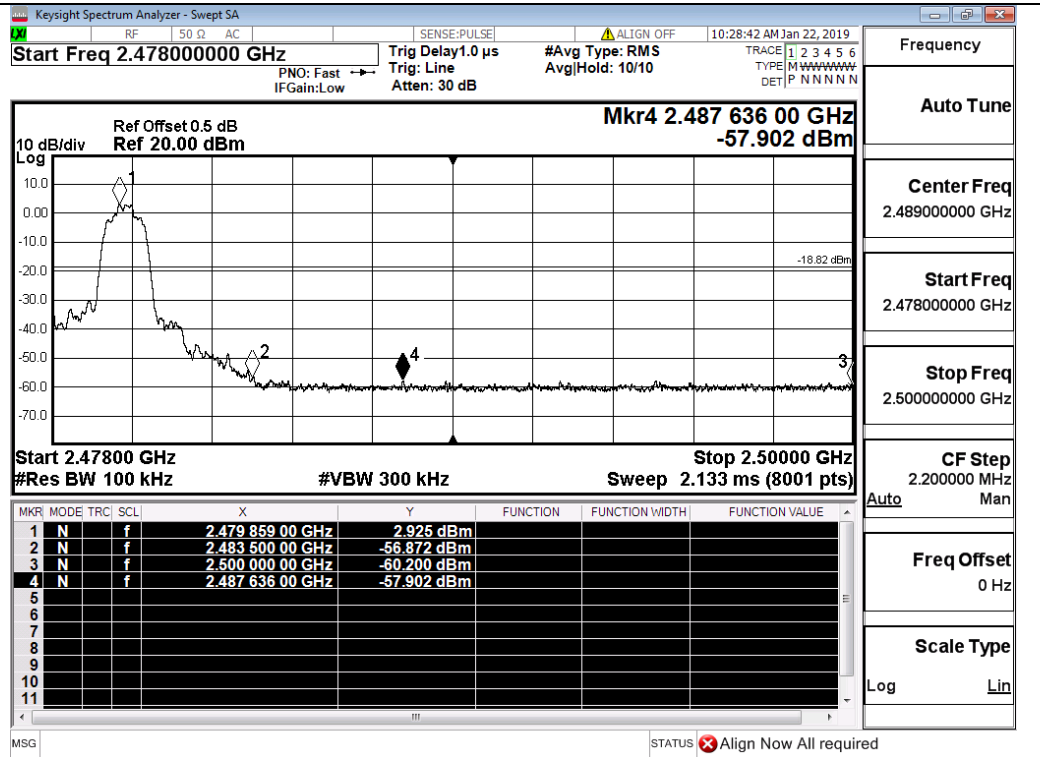
8DPSK/LCH/No Hop



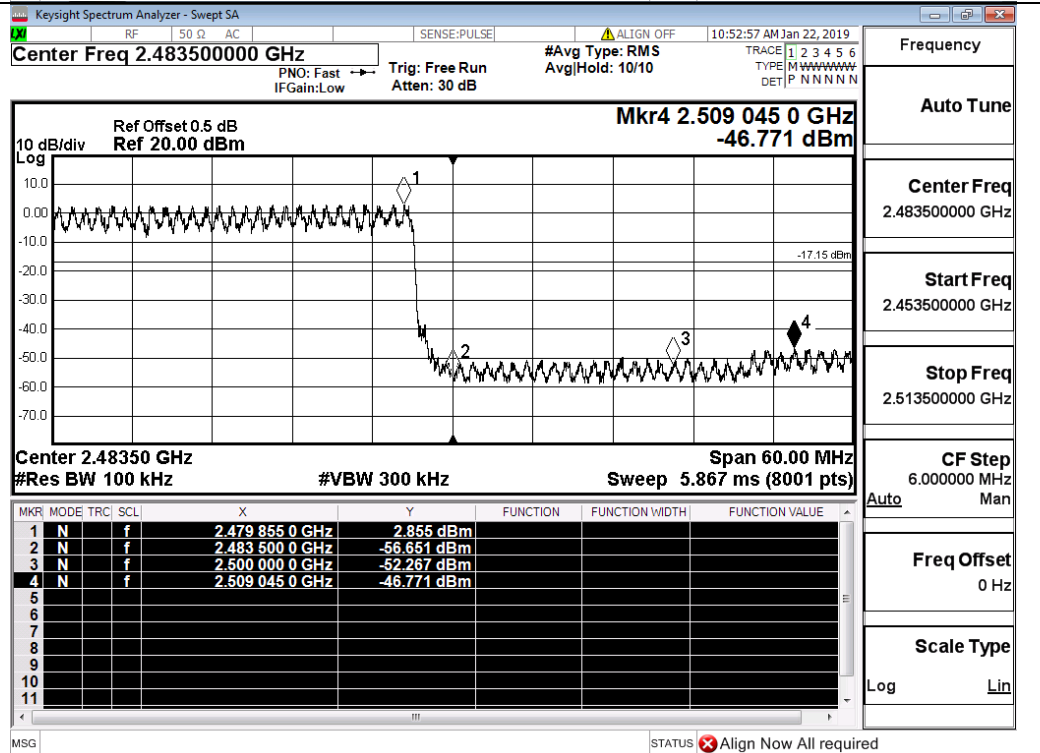
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



8DPSK/HCH/Hop

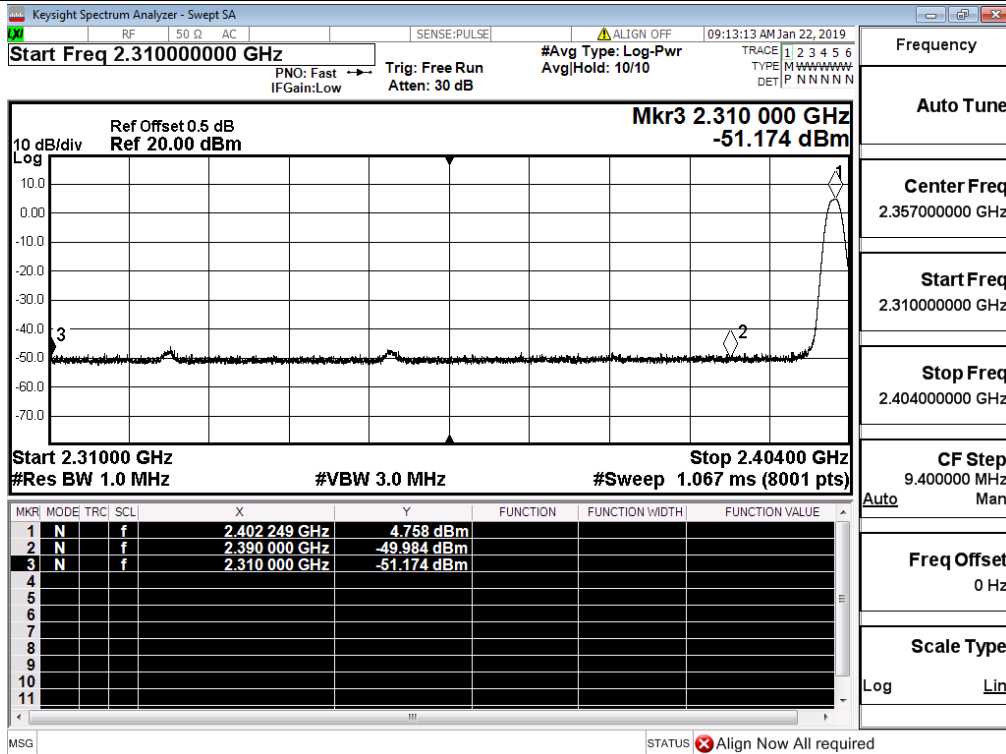




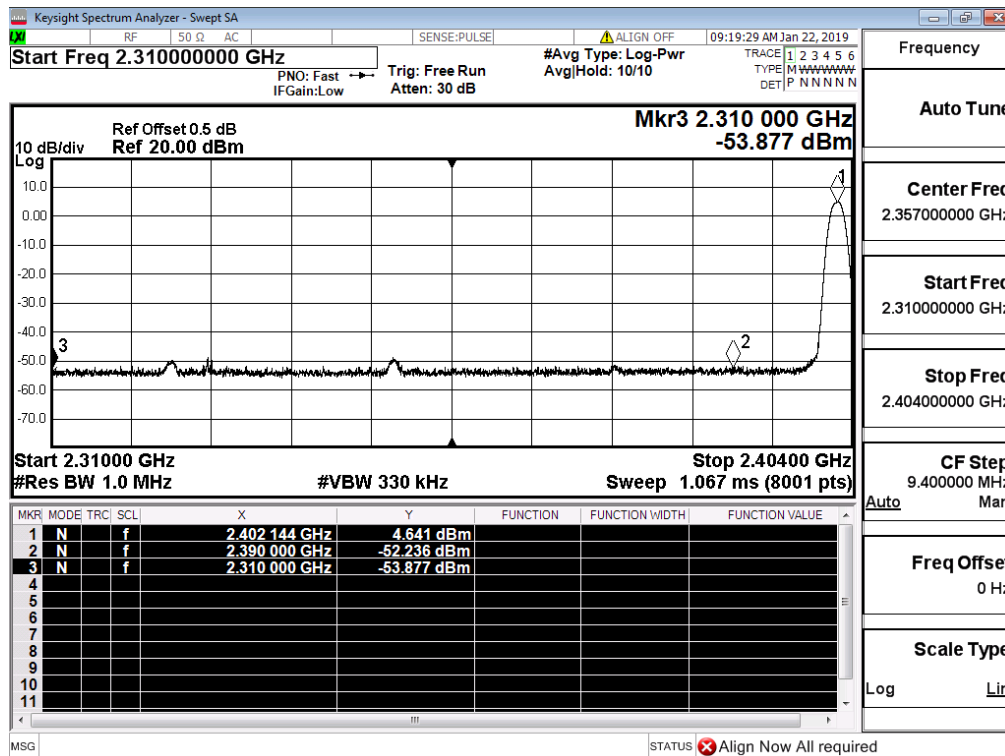
## A.8 Restrict-band band-edge measurements

| Test Mode     | Hopping | Freq.  | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK          | Off     | 2310.0 | -51.174     | 2.0  | 0             | 46.054     | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.877     | 2.0  | 0             | 43.351     | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -49.984     | 2.0  | 0             | 47.244     | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -52.236     | 2.0  | 0             | 44.992     | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -42.868     | 2.0  | 0             | 54.360     | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -44.634     | 2.0  | 0             | 52.594     | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -50.521     | 2.0  | 0             | 46.707     | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -52.291     | 2.0  | 0             | 44.937     | AV       | 54             | PASS    |
| $\pi/4$ DQPSK | Off     | 2310.0 | -51.169     | 2.0  | 0             | 46.059     | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -53.968     | 2.0  | 0             | 43.260     | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -50.537     | 2.0  | 0             | 46.691     | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -54.028     | 2.0  | 0             | 43.200     | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -44.966     | 2.0  | 0             | 52.262     | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -47.349     | 2.0  | 0             | 49.879     | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -50.430     | 2.0  | 0             | 46.798     | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.252     | 2.0  | 0             | 43.976     | AV       | 54             | PASS    |
| 8DPSK         | Off     | 2310.0 | -52.144     | 2.0  | 0             | 45.084     | PEAK     | 74             | PASS    |
|               | Off     | 2310.0 | -52.529     | 2.0  | 0             | 44.699     | AV       | 54             | PASS    |
|               | Off     | 2390.0 | -50.279     | 2.0  | 0             | 46.949     | PEAK     | 74             | PASS    |
|               | Off     | 2390.0 | -52.465     | 2.0  | 0             | 44.763     | AV       | 54             | PASS    |
|               | Off     | 2483.5 | -45.198     | 2.0  | 0             | 52.030     | PEAK     | 74             | PASS    |
|               | Off     | 2483.5 | -46.388     | 2.0  | 0             | 50.840     | AV       | 54             | PASS    |
|               | Off     | 2500.0 | -49.967     | 2.0  | 0             | 47.261     | PEAK     | 74             | PASS    |
|               | Off     | 2500.0 | -53.463     | 2.0  | 0             | 43.765     | AV       | 54             | PASS    |

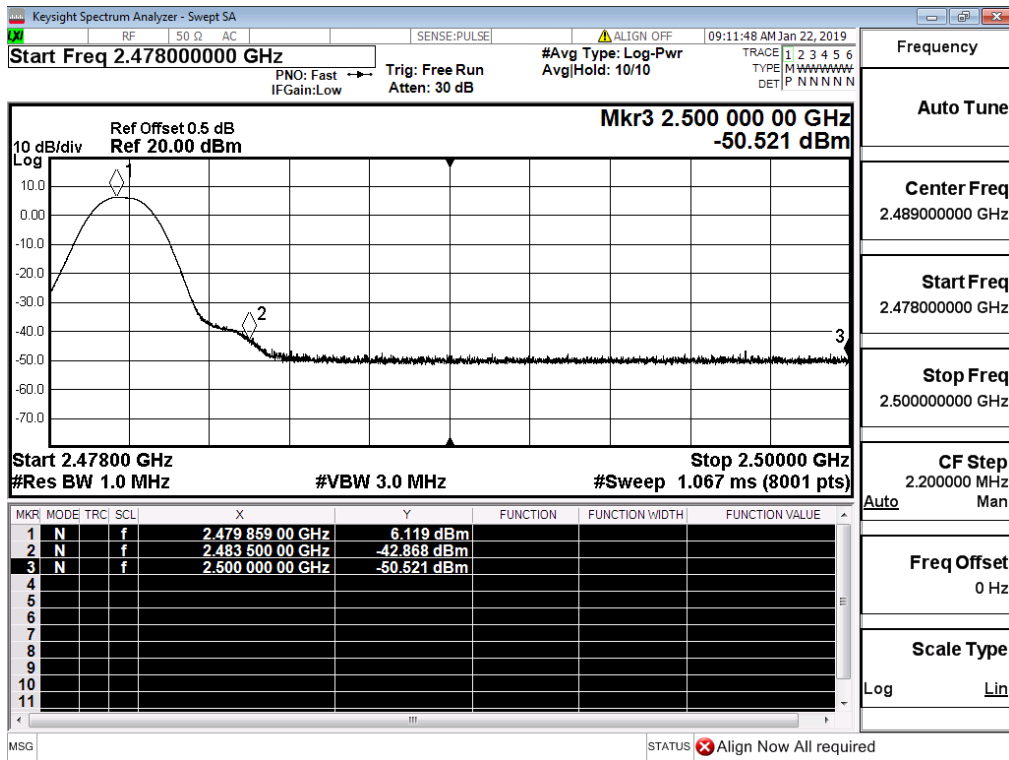
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



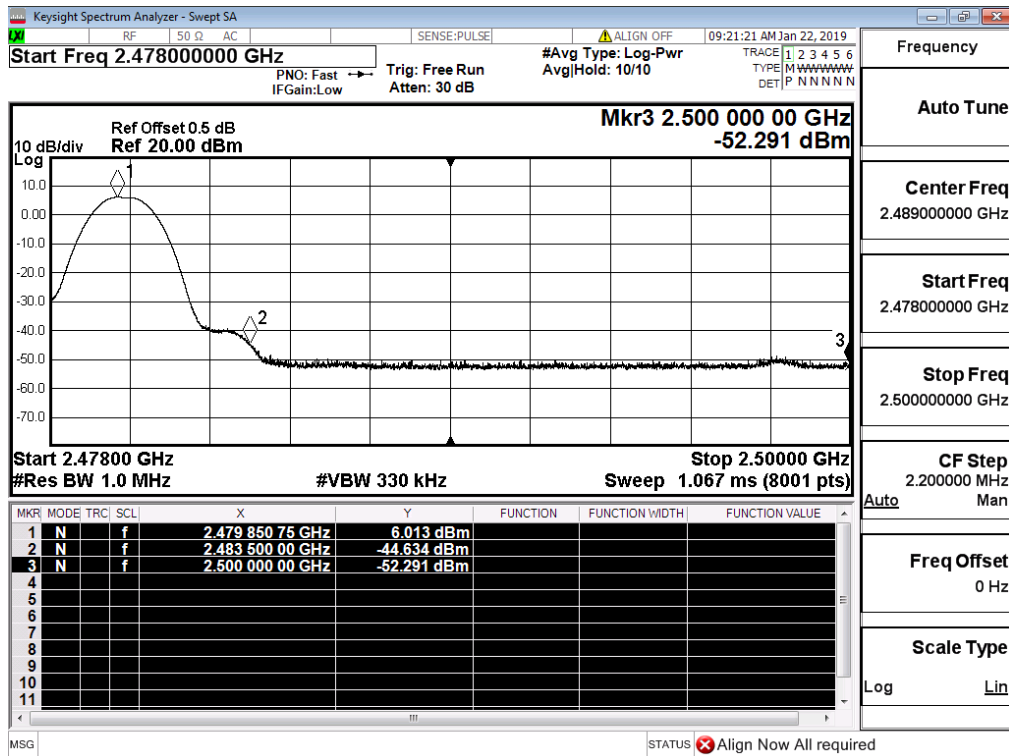
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



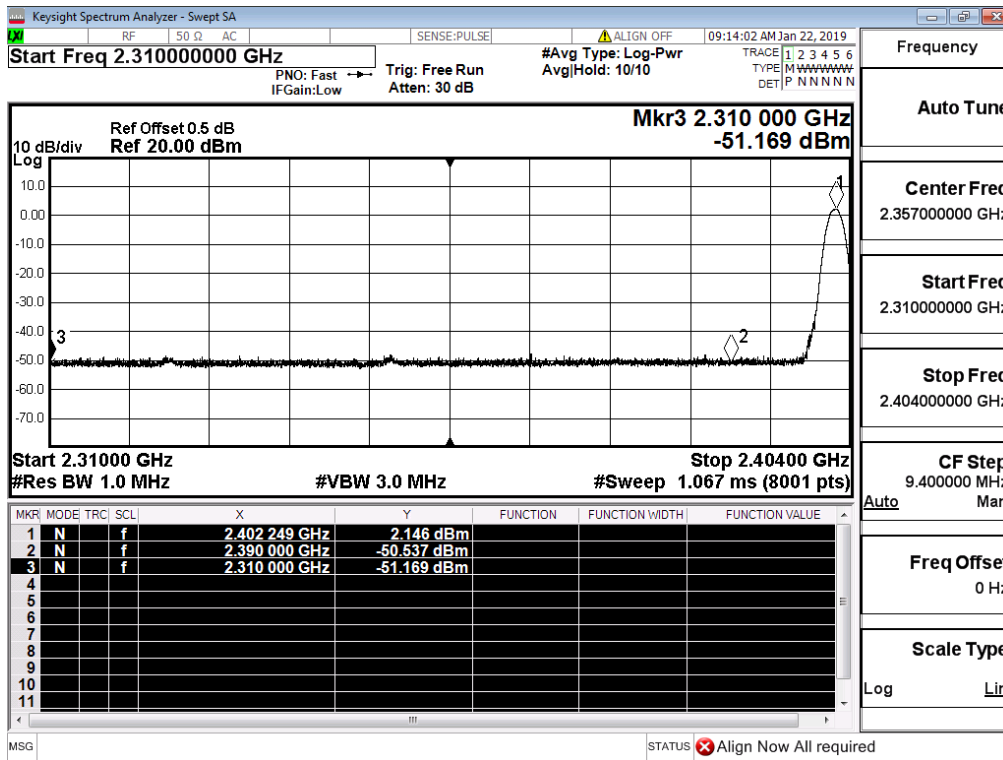
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



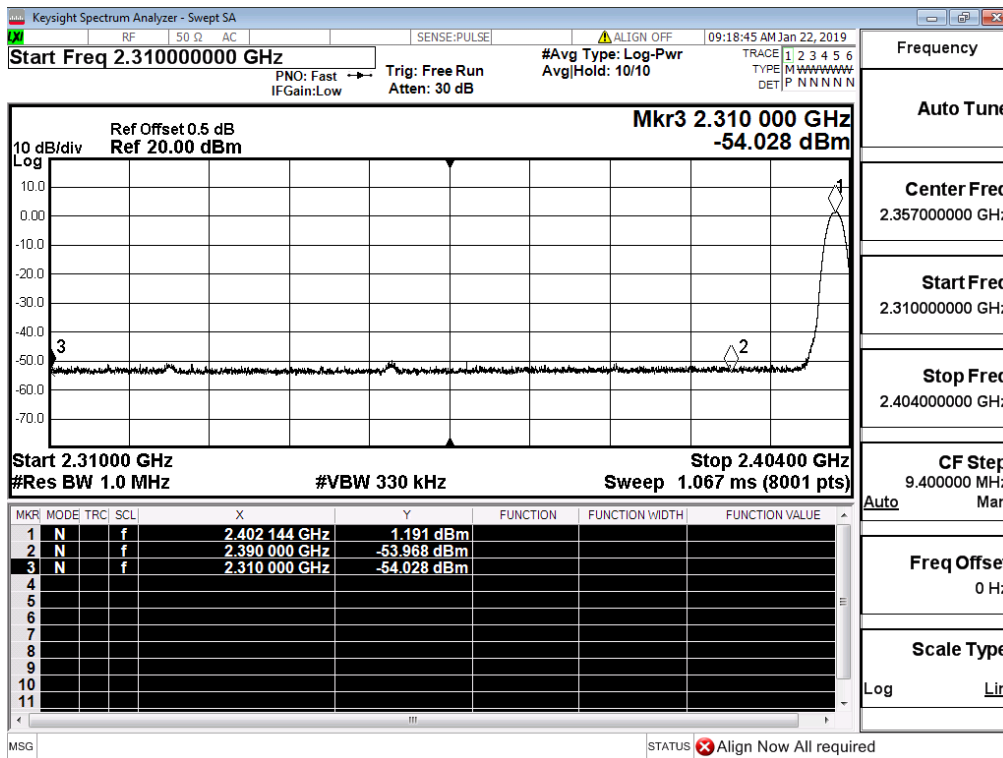
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



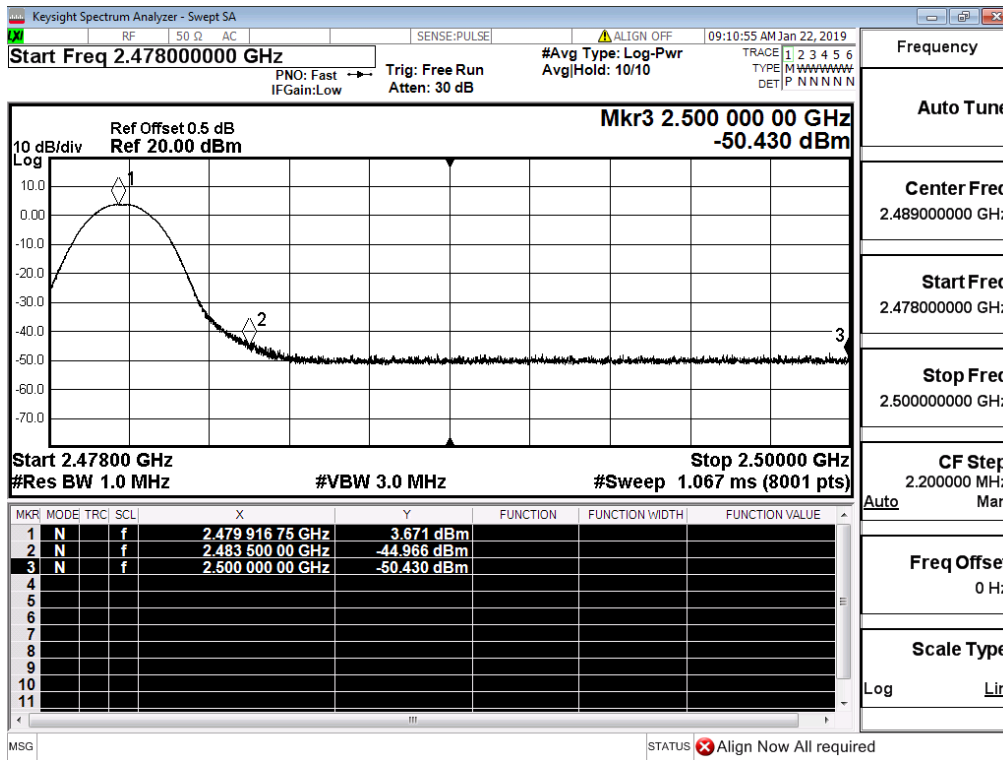
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



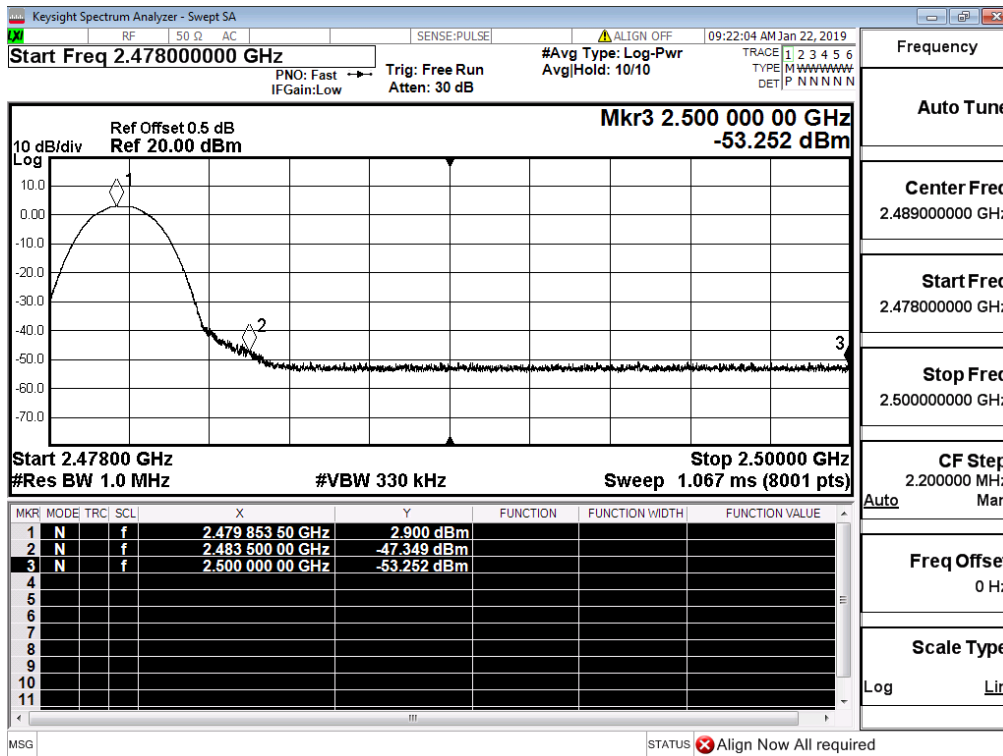
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)



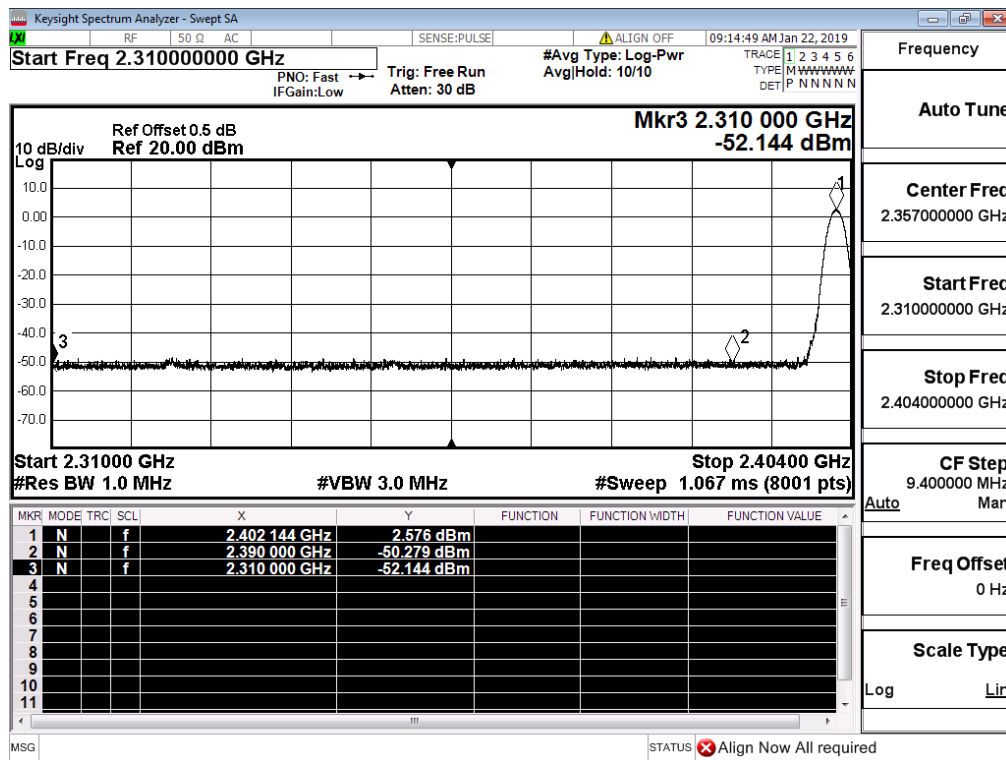
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (High Channel)



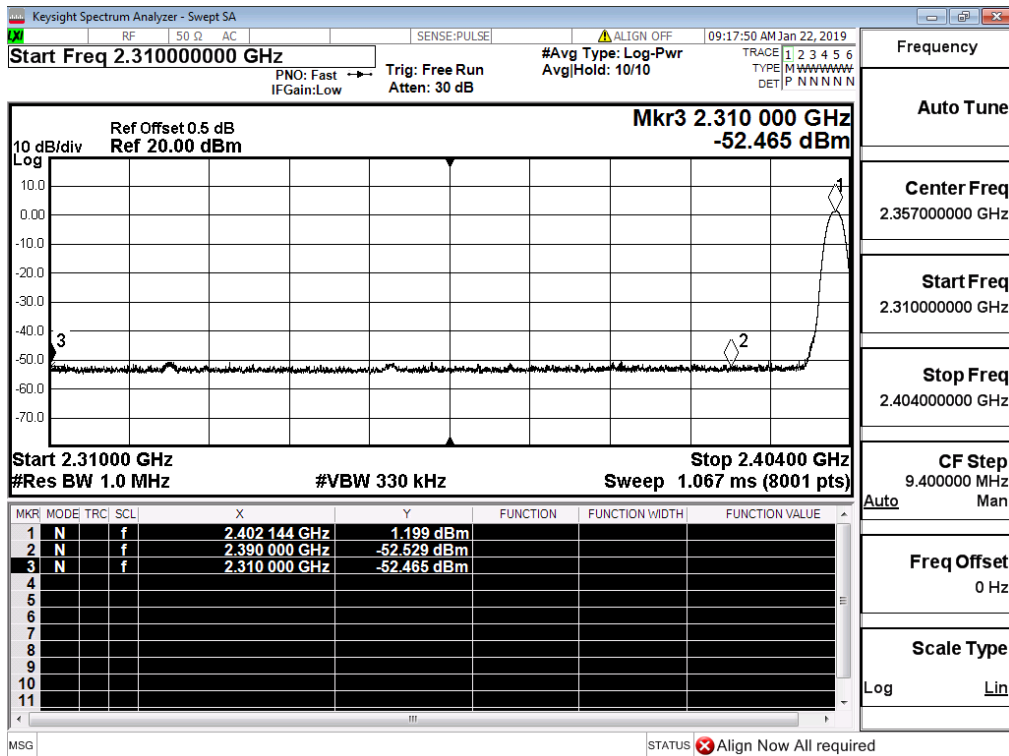
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (High Channel)



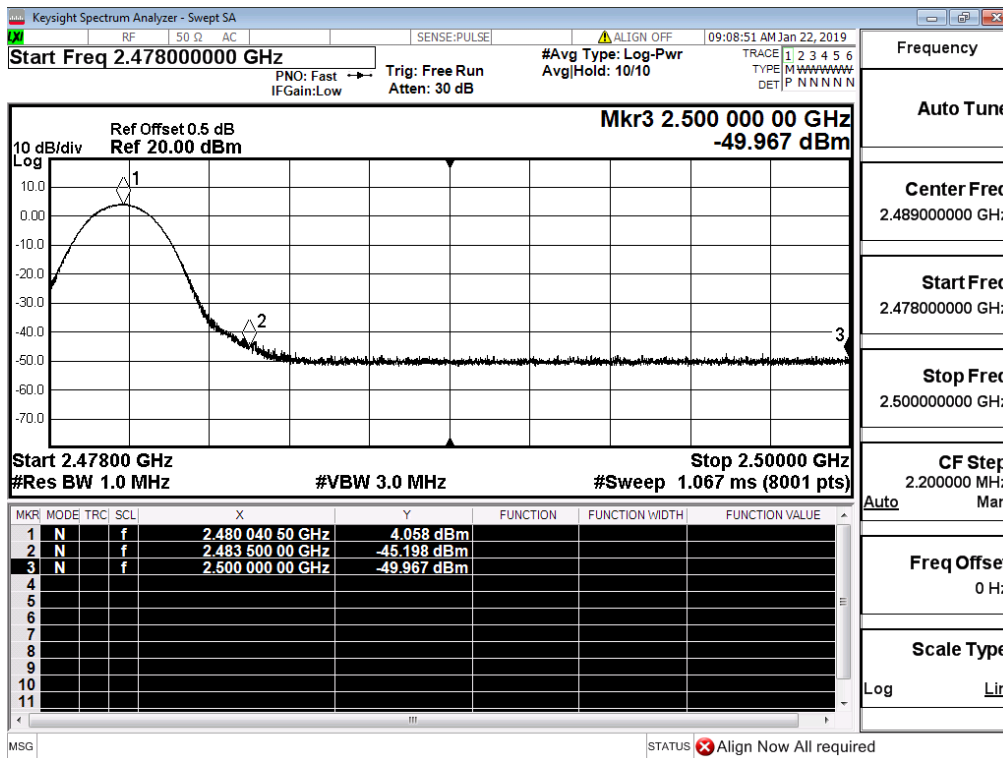
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

