

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: BLUETOOTH SPEAKER

Trade Mark: N/A

Test Model: B102

Environmental Conditions

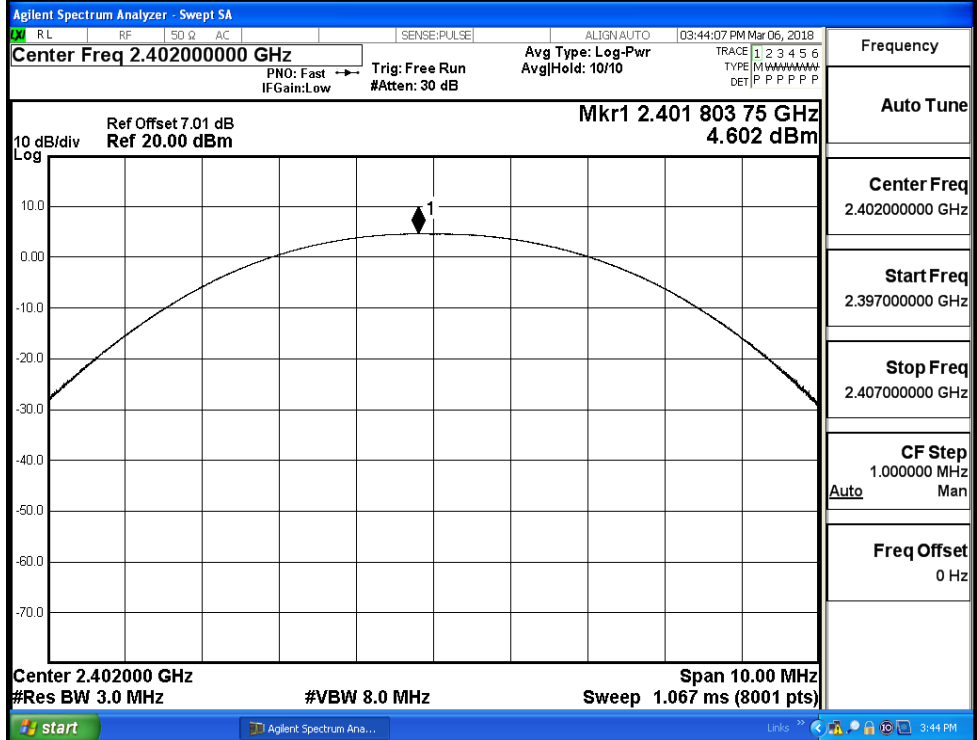
| | |
|--------------------|-------------|
| Temperature: | 22.5 ° C |
| Relative Humidity: | 53.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Jayden Zhuo |
| Supervised by: | Tom.Liu |

A.1 Maxmum Conducted Peak Output Power

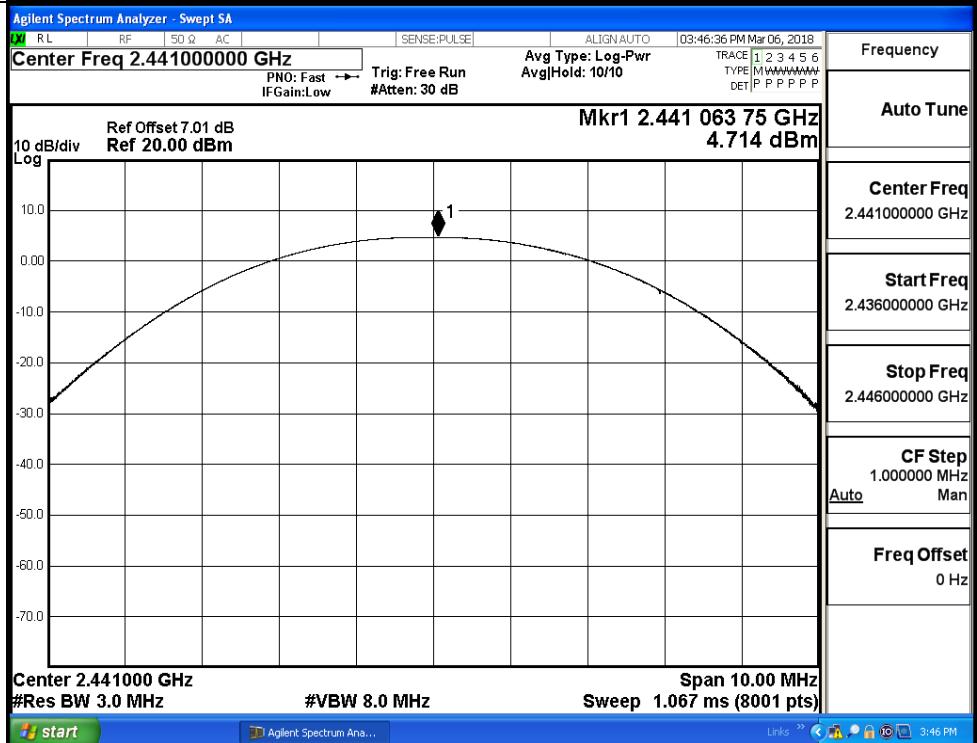
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK | LCH | 4.602 | 30 | PASS |
| | MCH | 4.714 | 30 | PASS |
| | HCH | 4.616 | 30 | PASS |
| $\pi/4$ DQPSK | LCH | 3.947 | 21 | PASS |
| | MCH | 4.478 | 21 | PASS |
| | HCH | 4.439 | 21 | PASS |
| 8DPSK | LCH | 4.333 | 21 | PASS |
| | MCH | 4.446 | 21 | PASS |
| | HCH | 4.397 | 21 | PASS |

Test Graphs

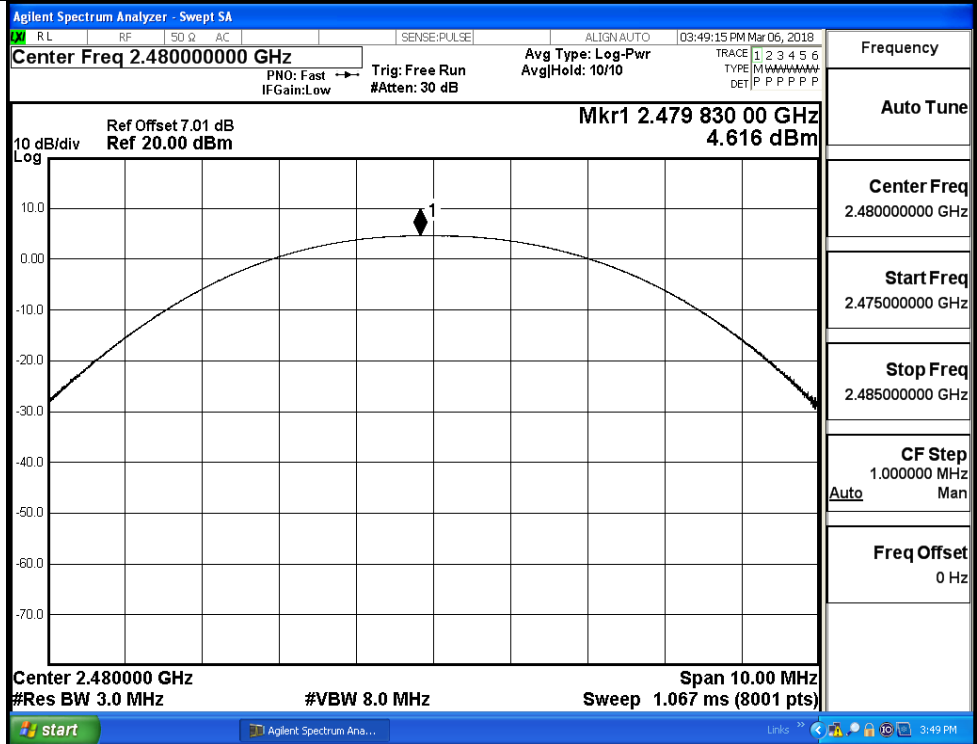
GFSK/LCH



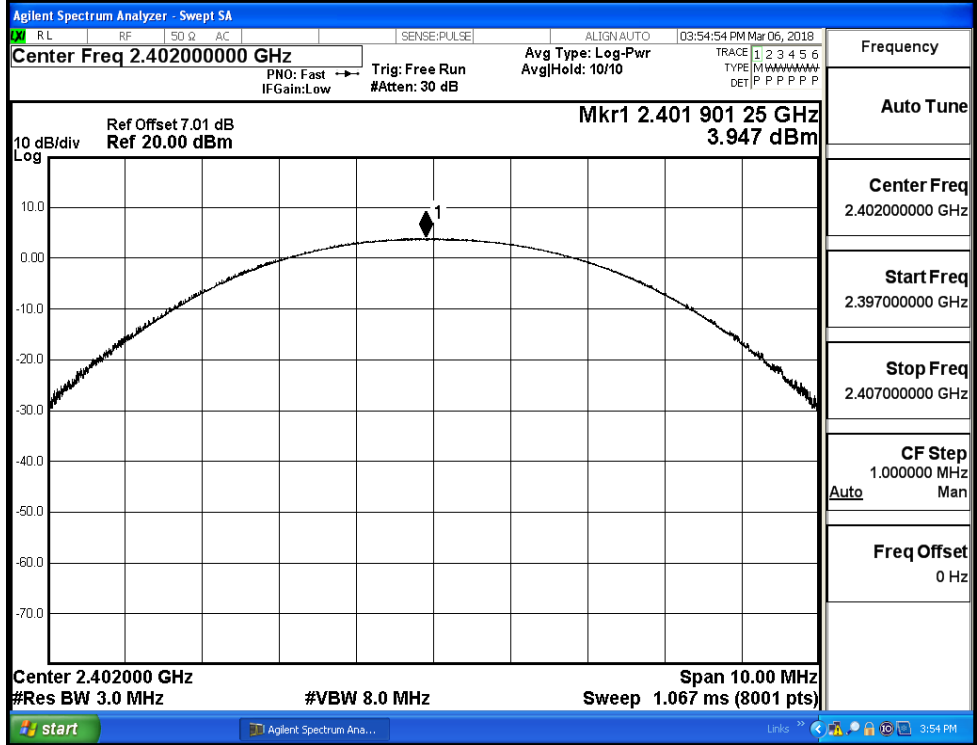
GFSK/MCH



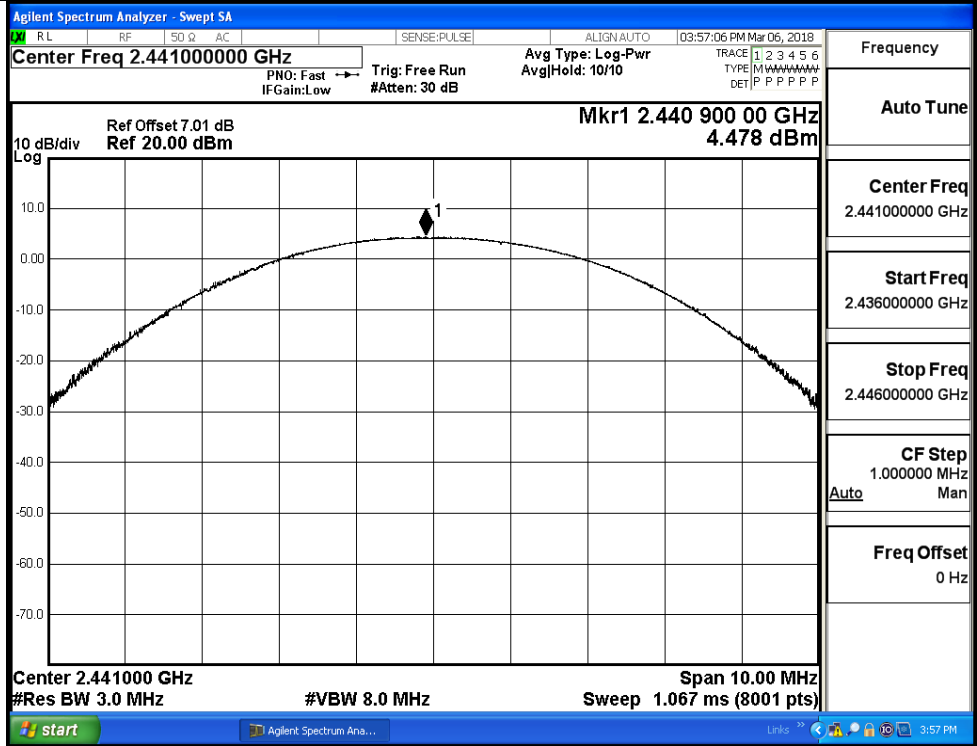
GFSK/HCH



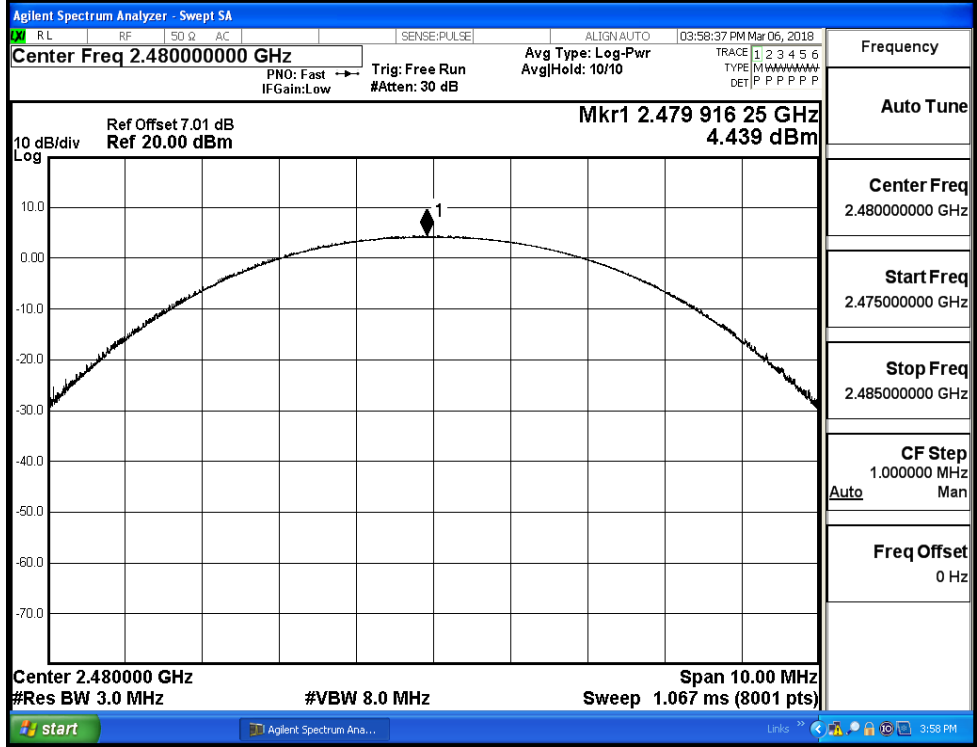
$\pi/4$ DQPSK/LCH



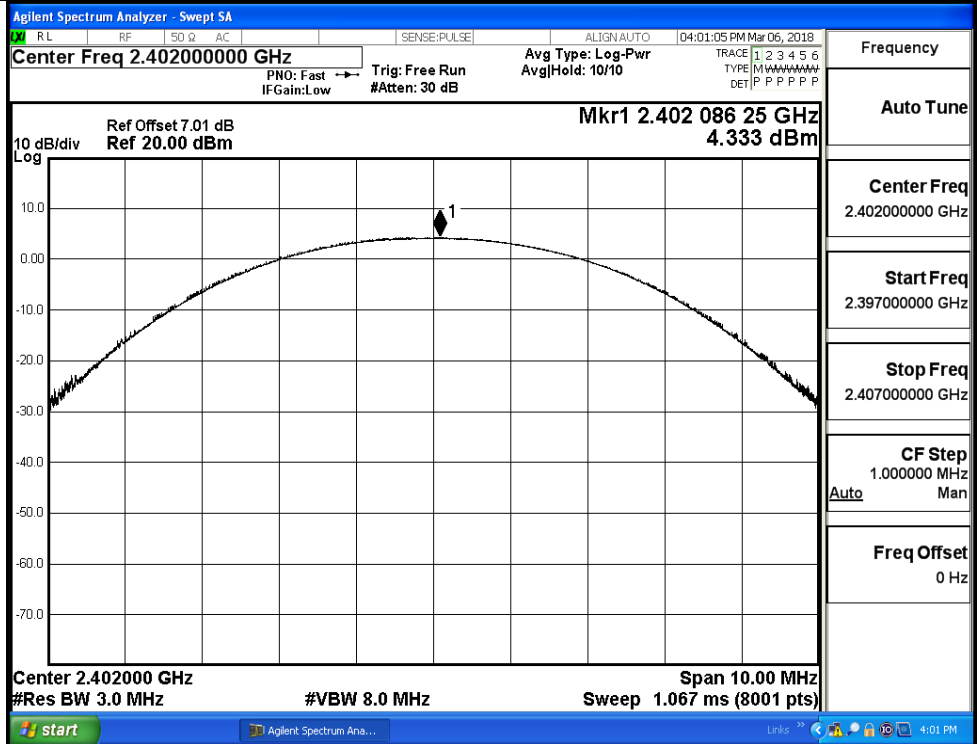
$\pi/4$ DQPSK/MCH



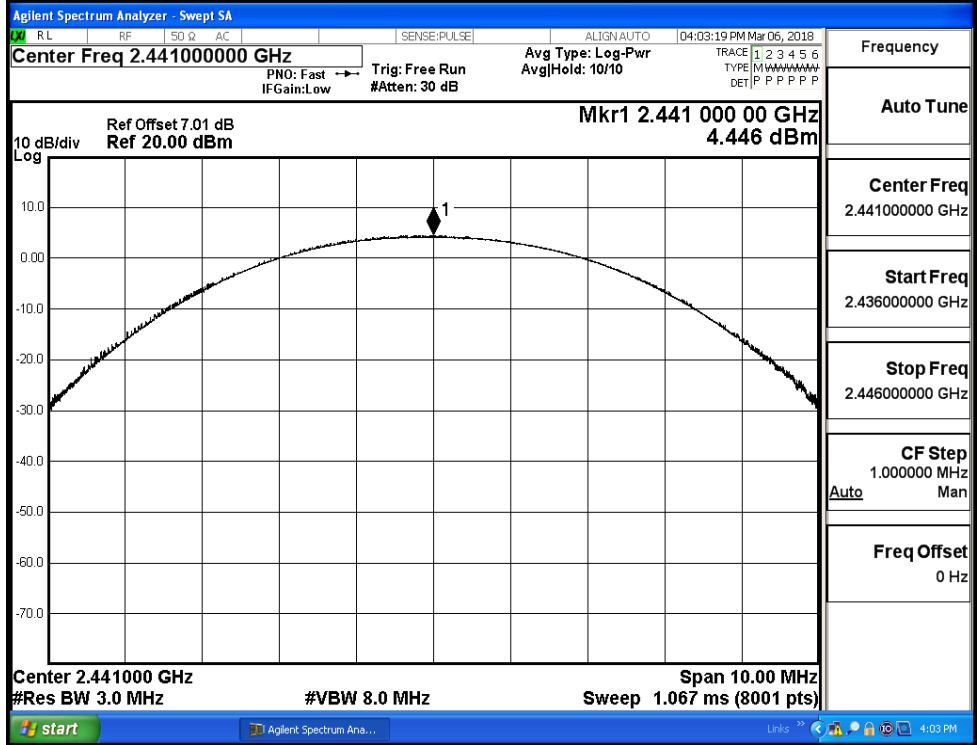
$\pi/4$ DQPSK/HCH



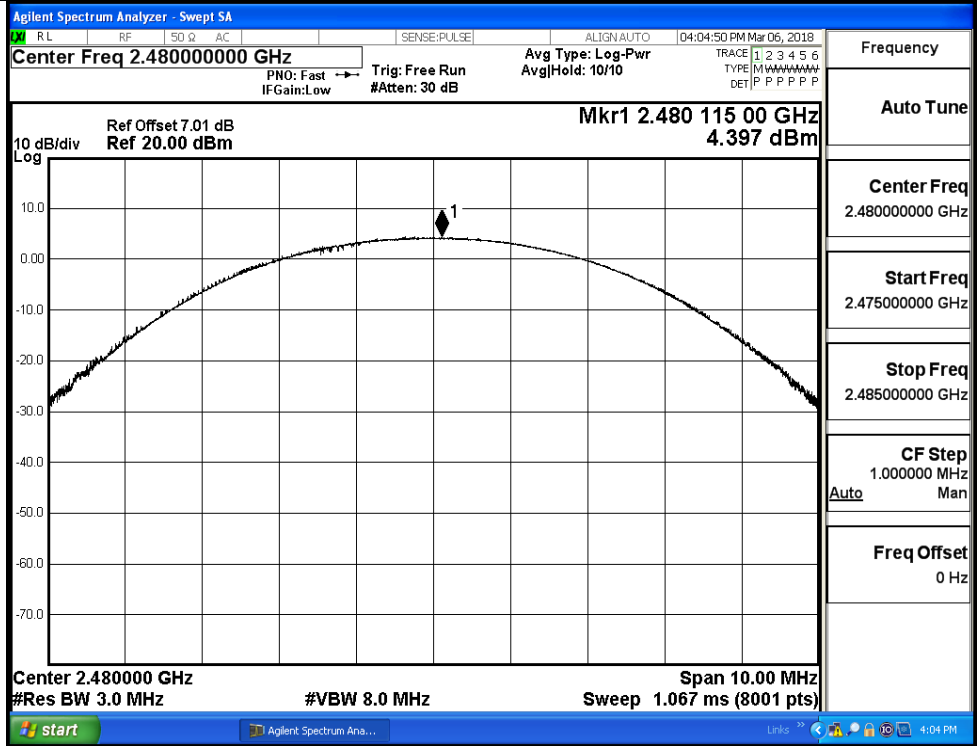
8DPSK/LCH



8DPSK/MCH

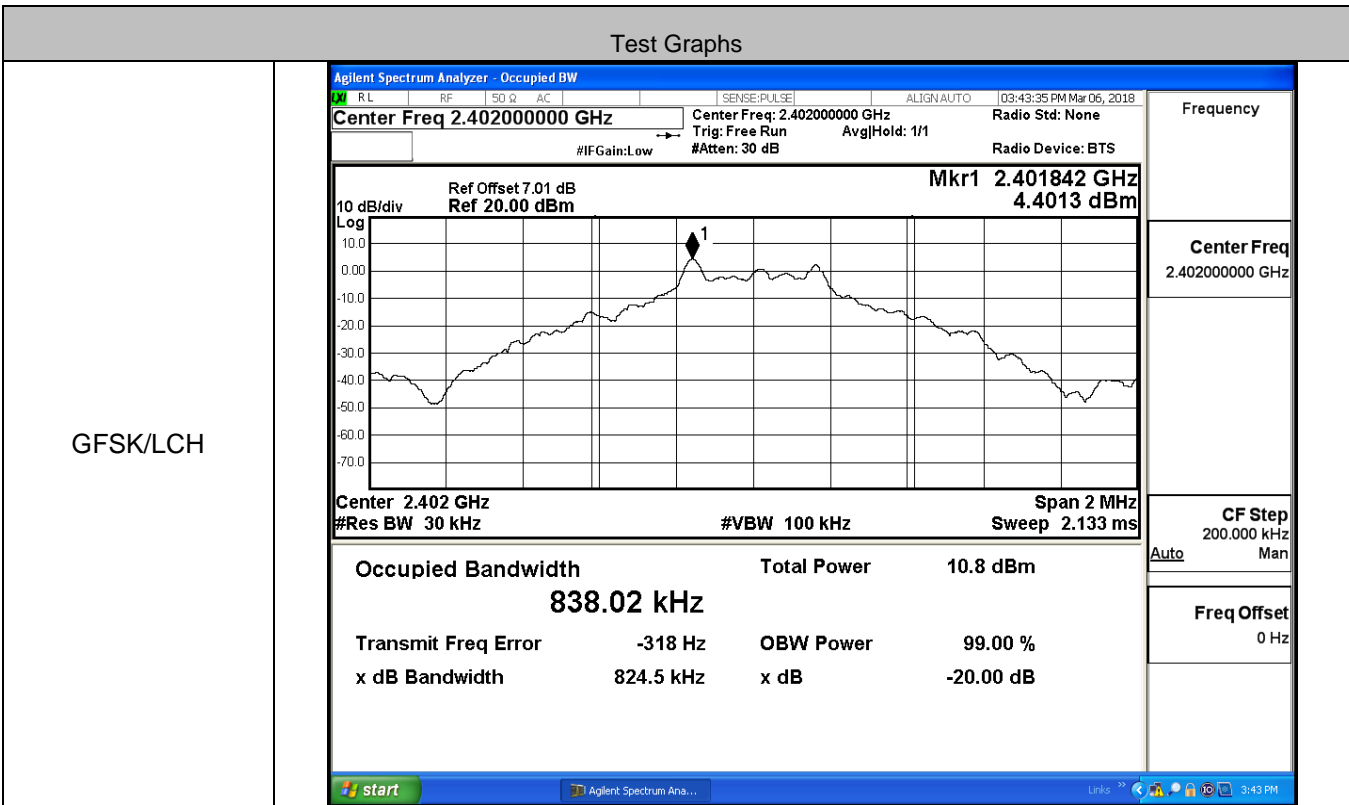


8DPSK/HCH

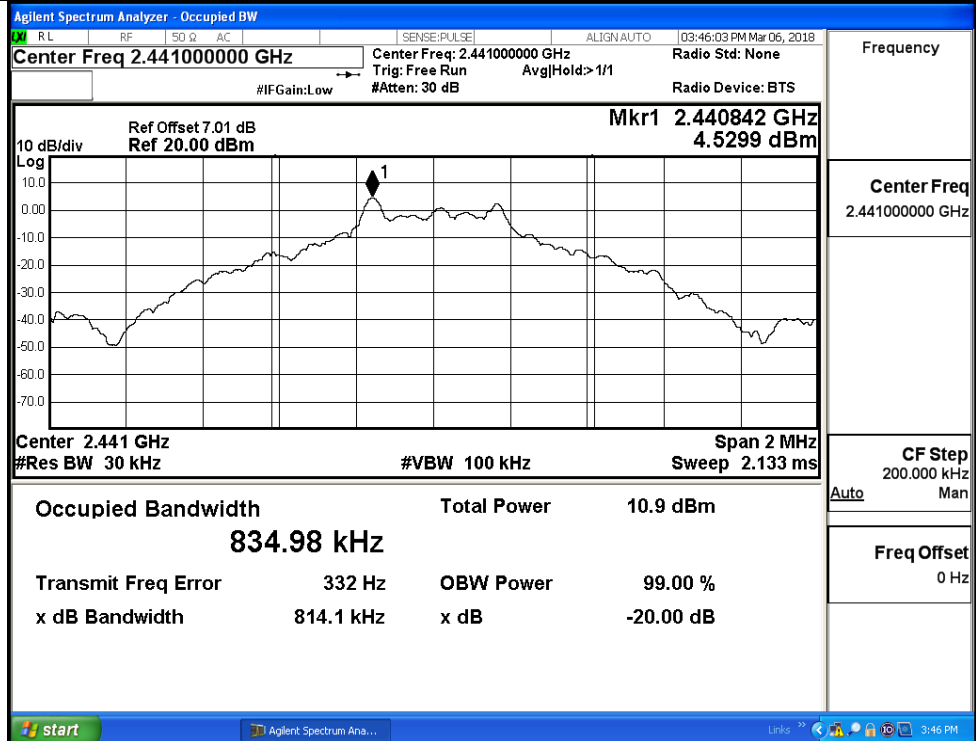


A.2 20dB Bandwidth

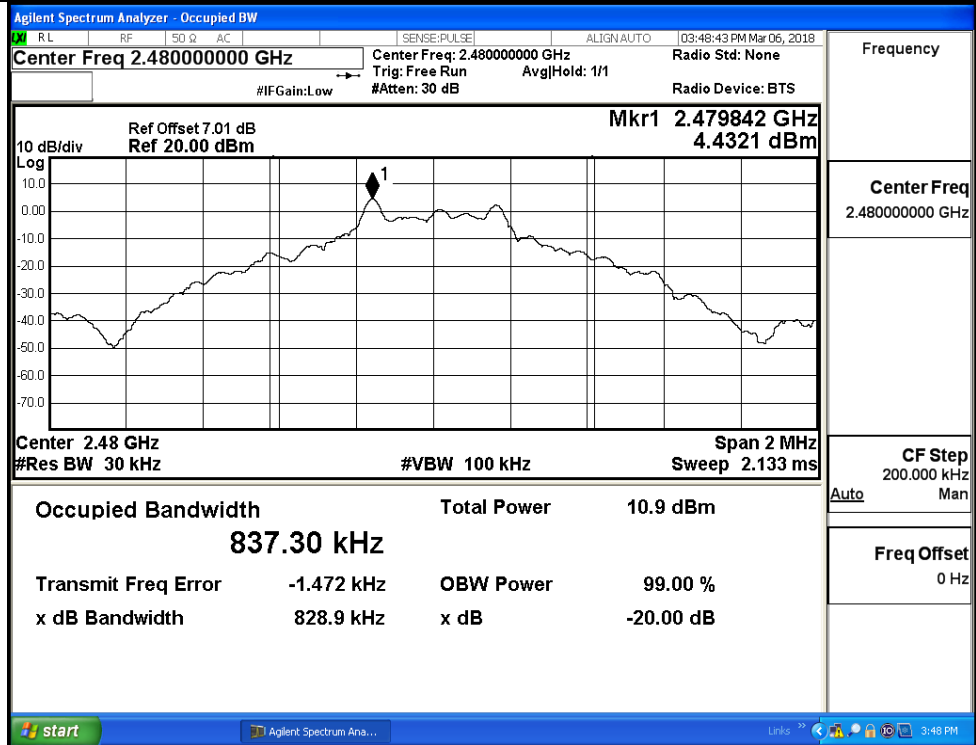
| Mode | Channel. | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK | LCH | 0.8245 | Not Specified | PASS |
| | MCH | 0.8141 | Not Specified | PASS |
| | HCH | 0.8289 | Not Specified | PASS |
| $\pi/4$ DQPSK | LCH | 1.123 | Not Specified | PASS |
| | MCH | 1.120 | Not Specified | PASS |
| | HCH | 1.120 | Not Specified | PASS |
| 8DPSK | LCH | 1.128 | Not Specified | PASS |
| | MCH | 1.122 | Not Specified | PASS |
| | HCH | 1.131 | Not Specified | PASS |



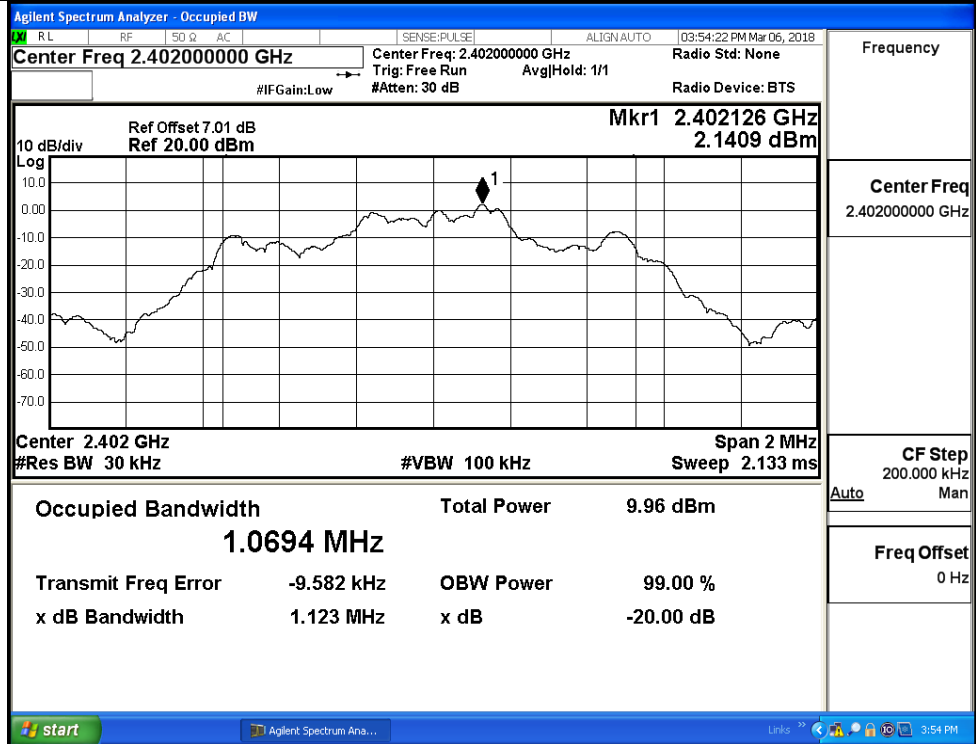
GFSK/MCH



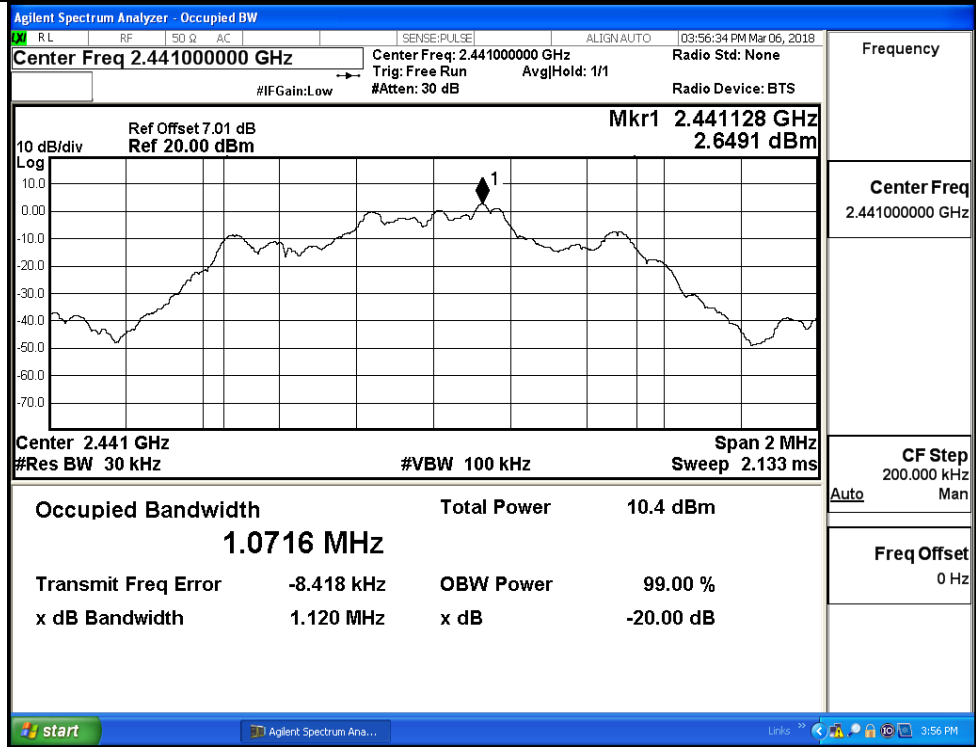
GFSK/HCH



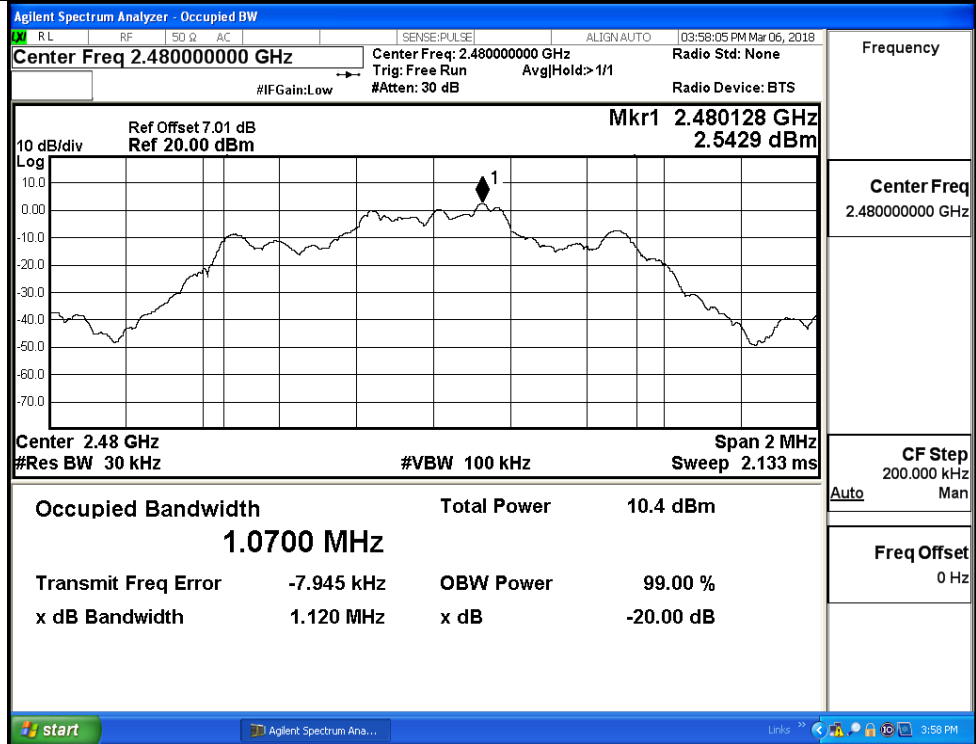
$\pi/4$ DQPSK/LCH



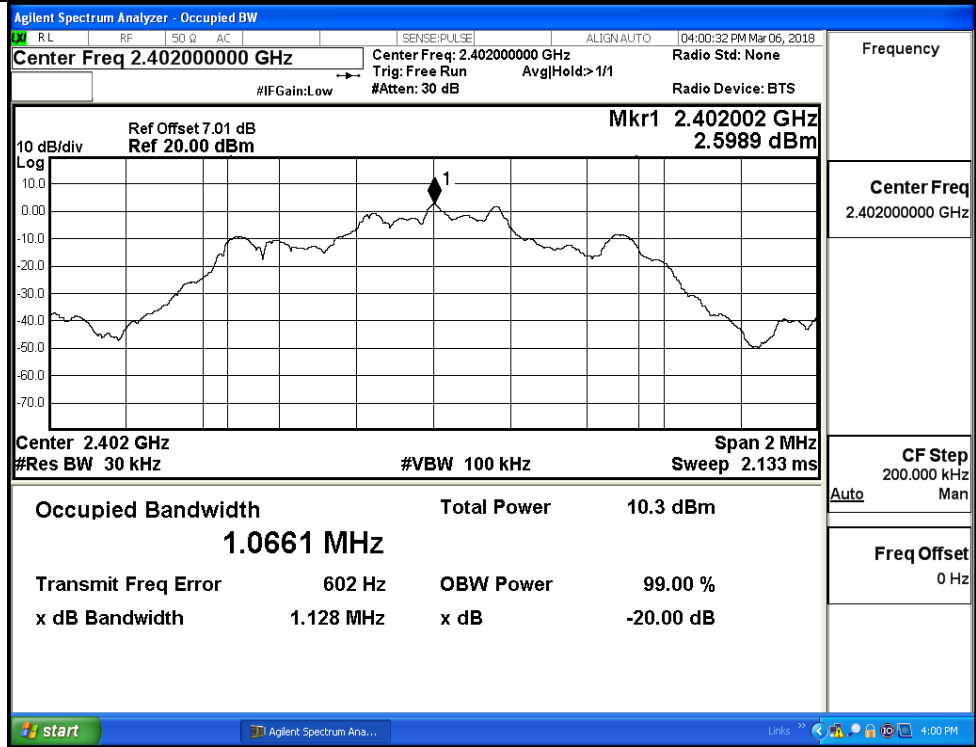
$\pi/4$ DQPSK/MCH



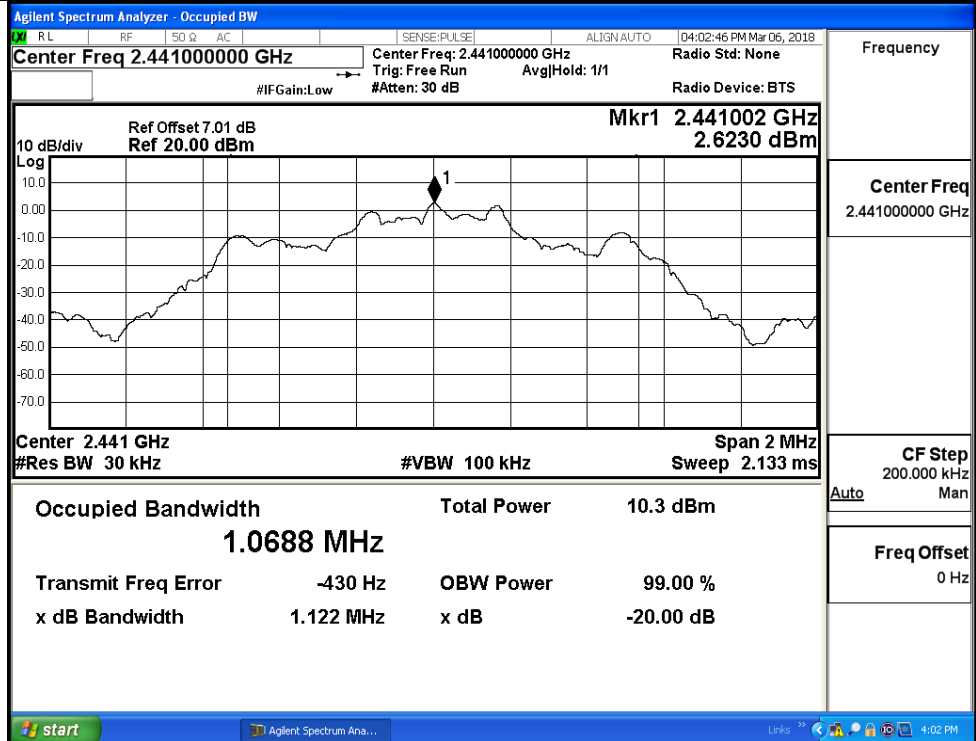
$\pi/4$ DQPSK/HCH



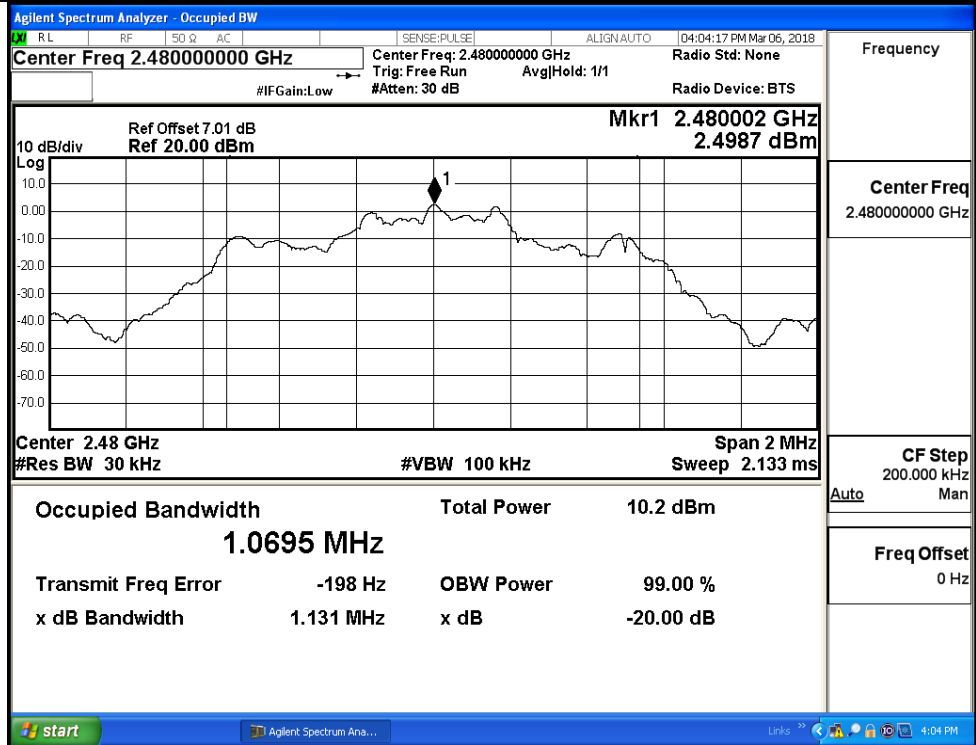
8DPSK/LCH



8DPSK/MCH

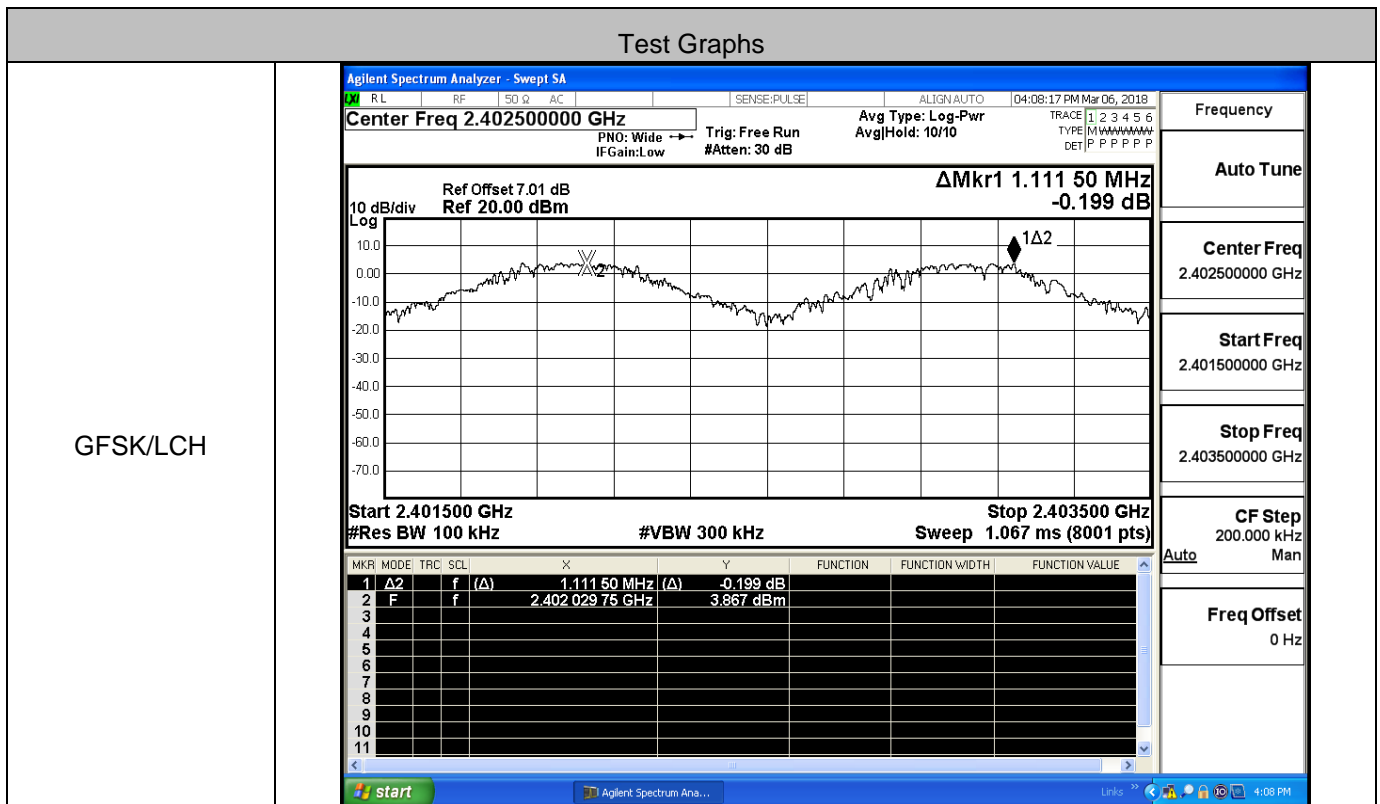


8DPSK/HCH

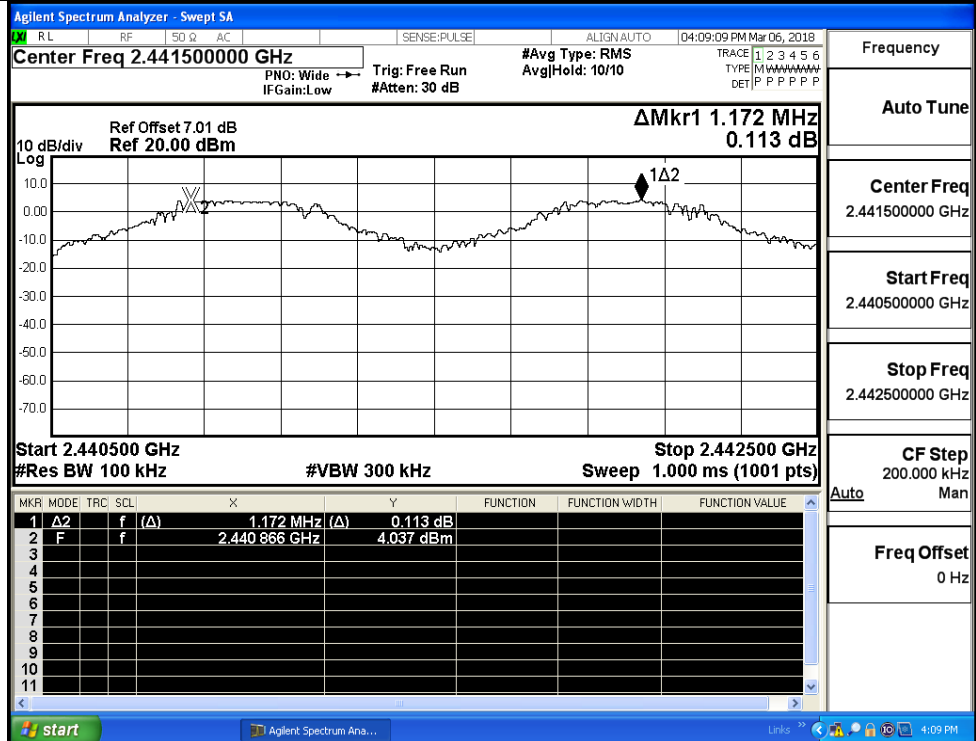


A.3 Carrier Frequency Separation

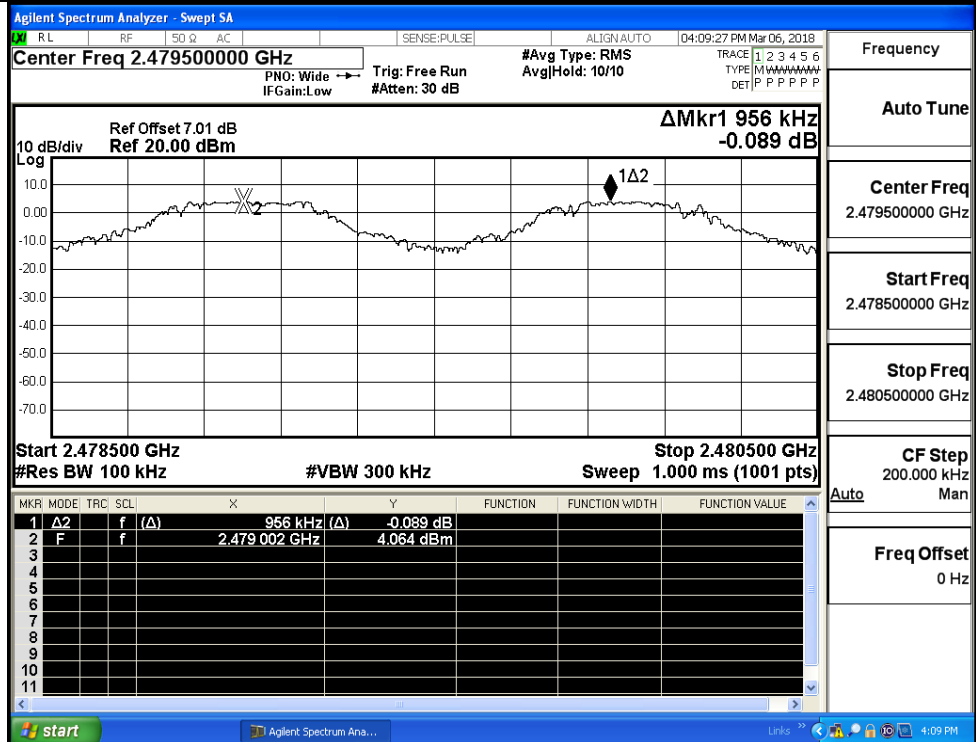
| Mode | Channel | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|---------|------------------------------------|-------------|---------|
| GFSK | LCH | 1.111 | 0.8245 | PASS |
| | MCH | 1.172 | 0.8141 | PASS |
| | HCH | 0.956 | 0.8289 | PASS |
| π/4DQPSK | LCH | 0.972 | 0.749 | PASS |
| | MCH | 0.892 | 0.749 | PASS |
| | HCH | 1.056 | 0.749 | PASS |
| 8DPSK | LCH | 0.838 | 0.754 | PASS |
| | MCH | 0.986 | 0.754 | PASS |
| | HCH | 1.344 | 0.754 | PASS |



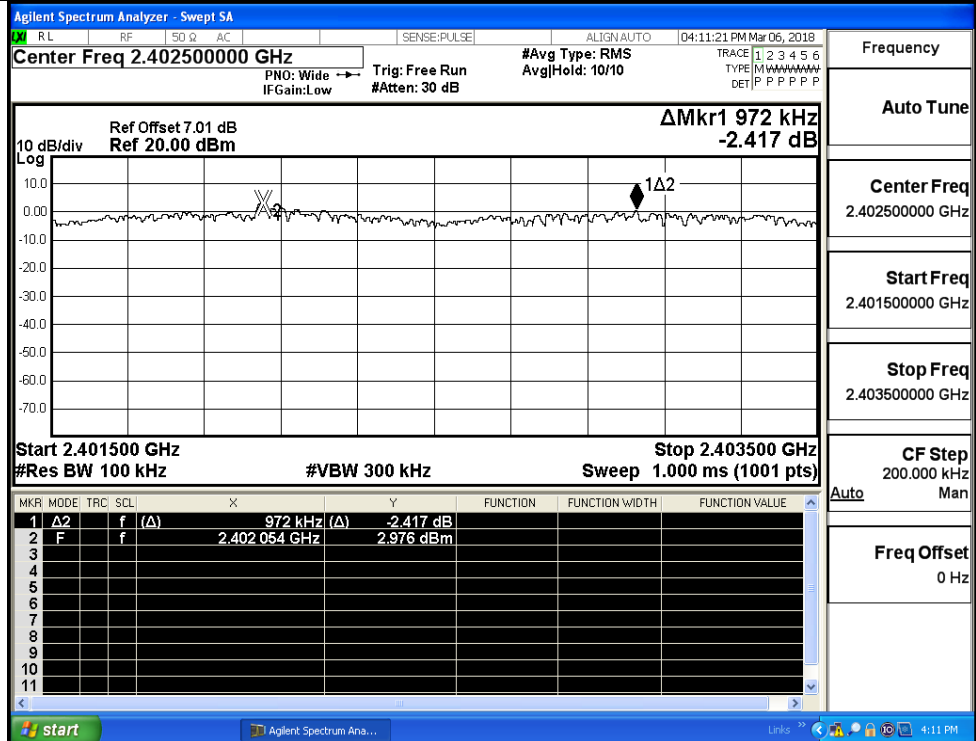
GFSK/MCH



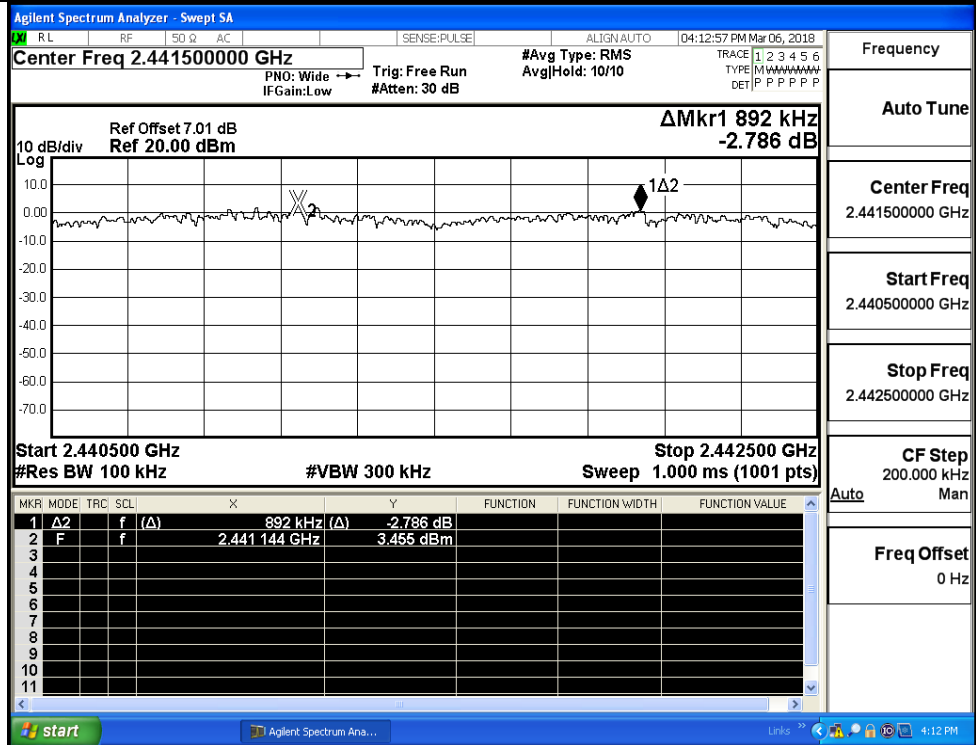
GFSK/HCH



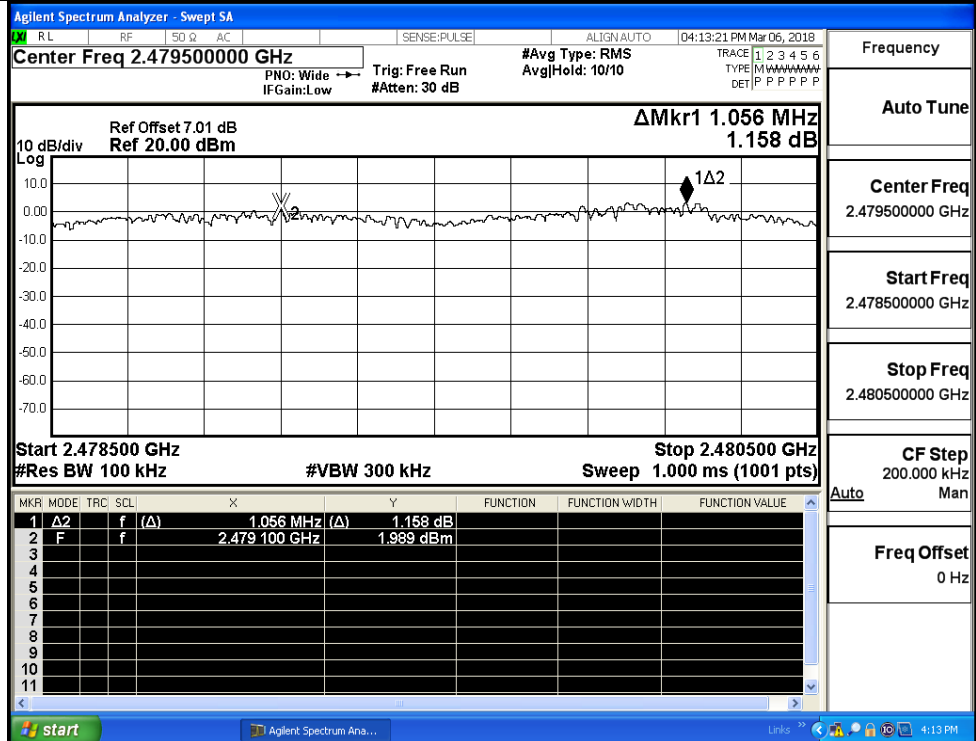
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

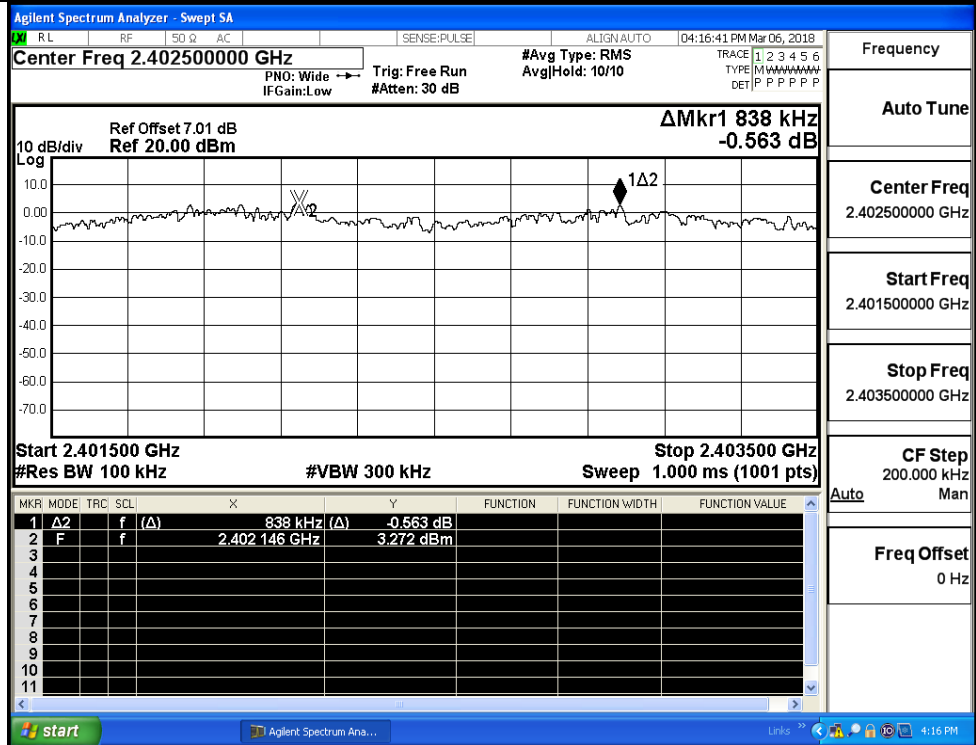
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

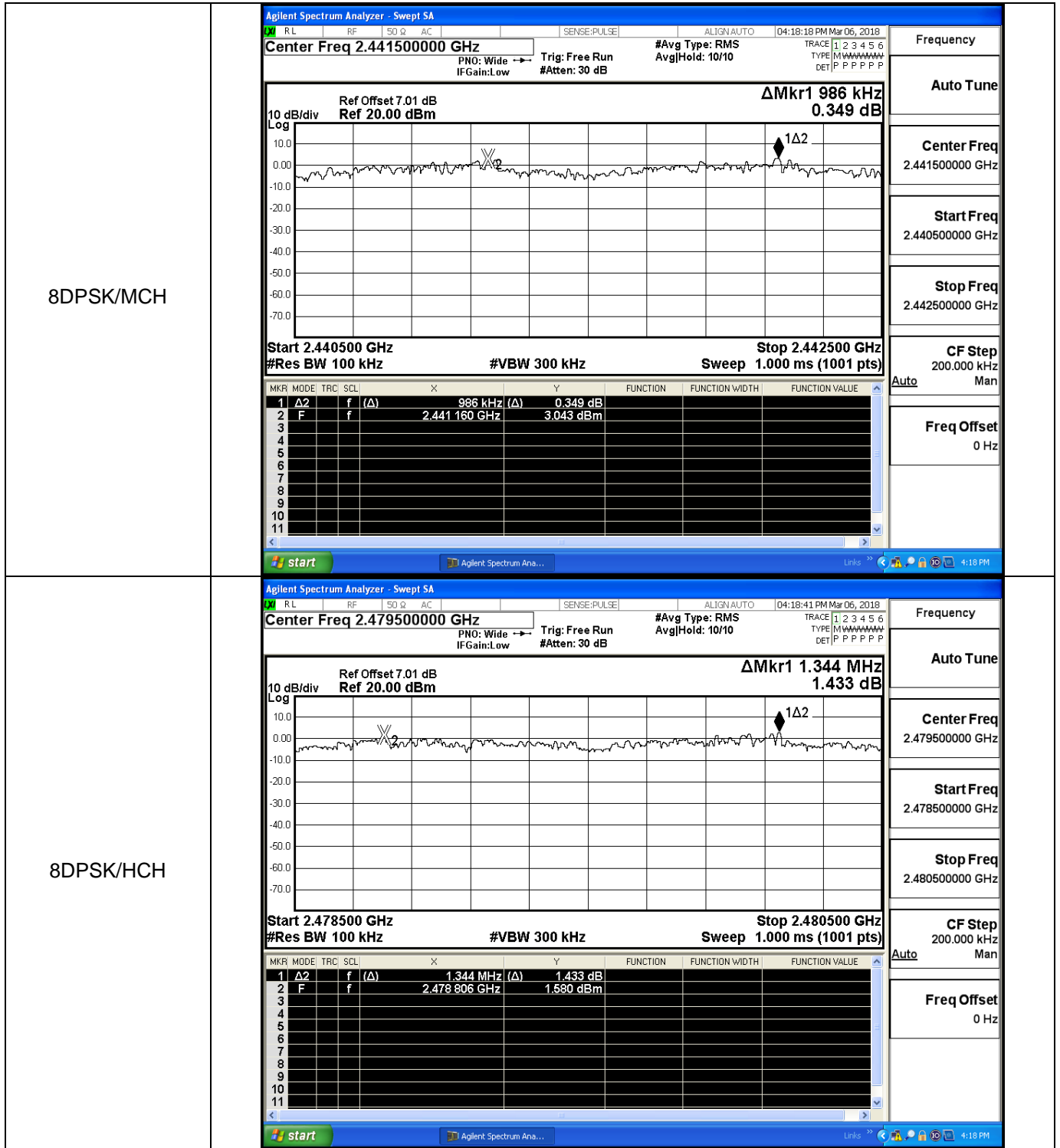
Center Freq
2.402500000 GHz

Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

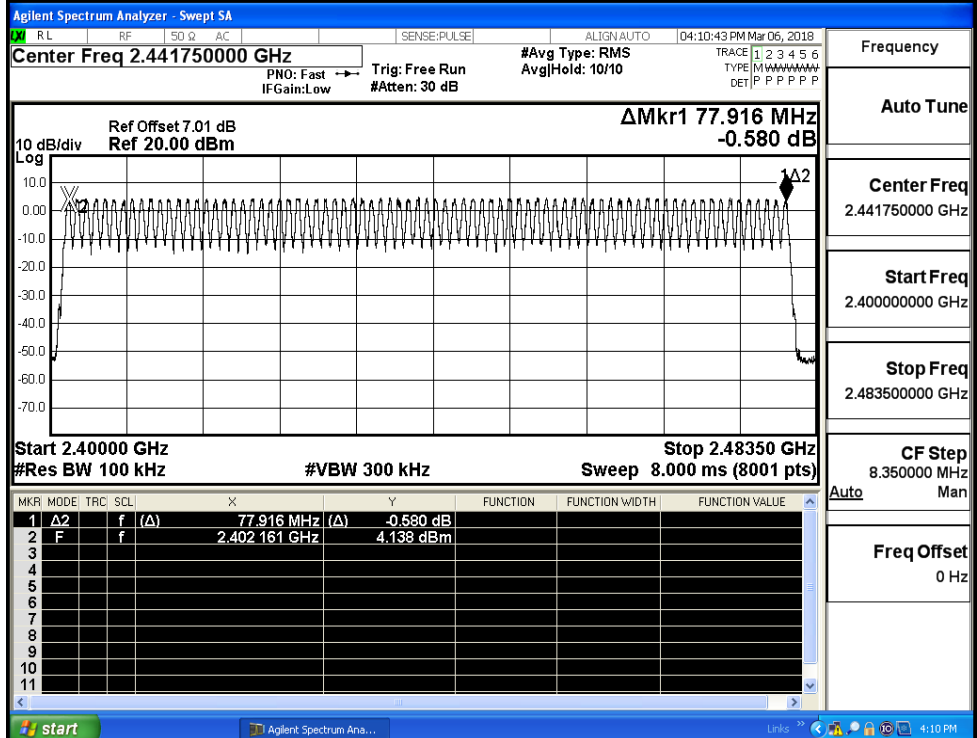


A.4 Hopping Channel Number

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

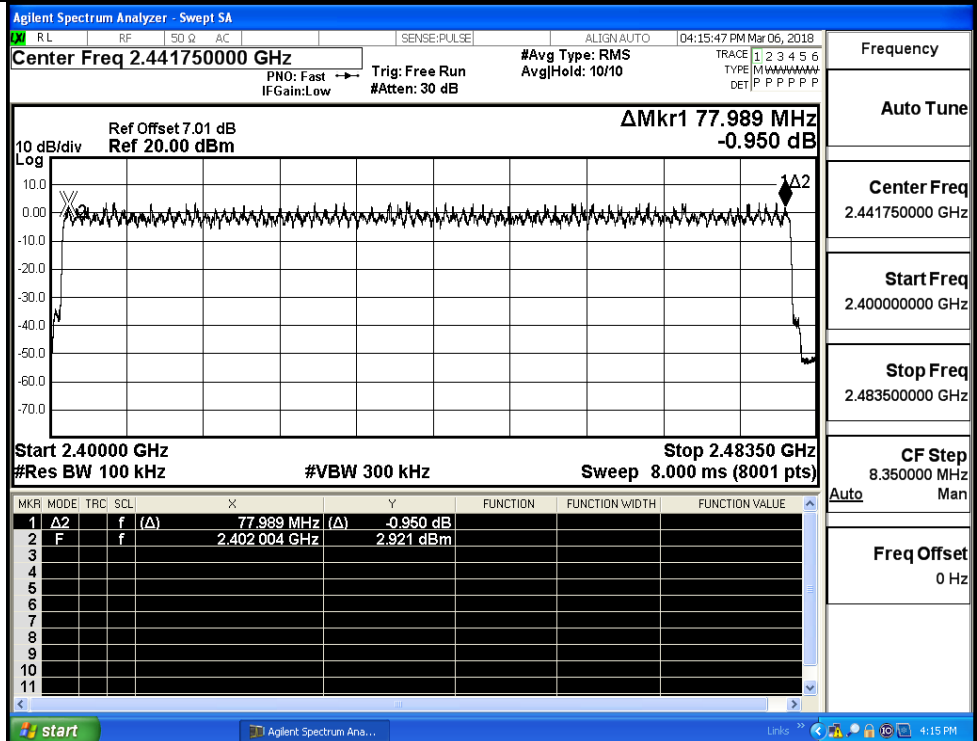
Test Graphs

GFSK/Hop



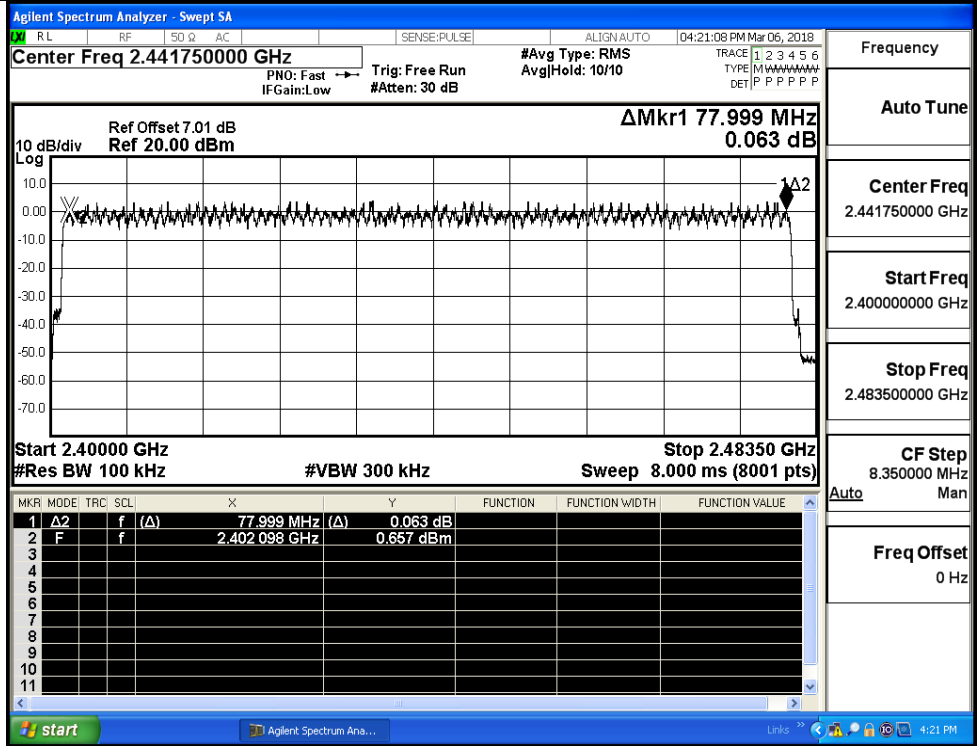
| | |
|-------------|-----------------|
| Frequency | Auto Tune |
| Center Freq | 2.441750000 GHz |
| Start Freq | 2.400000000 GHz |
| Stop Freq | 2.483500000 GHz |
| CF Step | 8.350000 MHz |
| Freq Offset | 0 Hz |

$\pi/4$ DQPSK/Hop



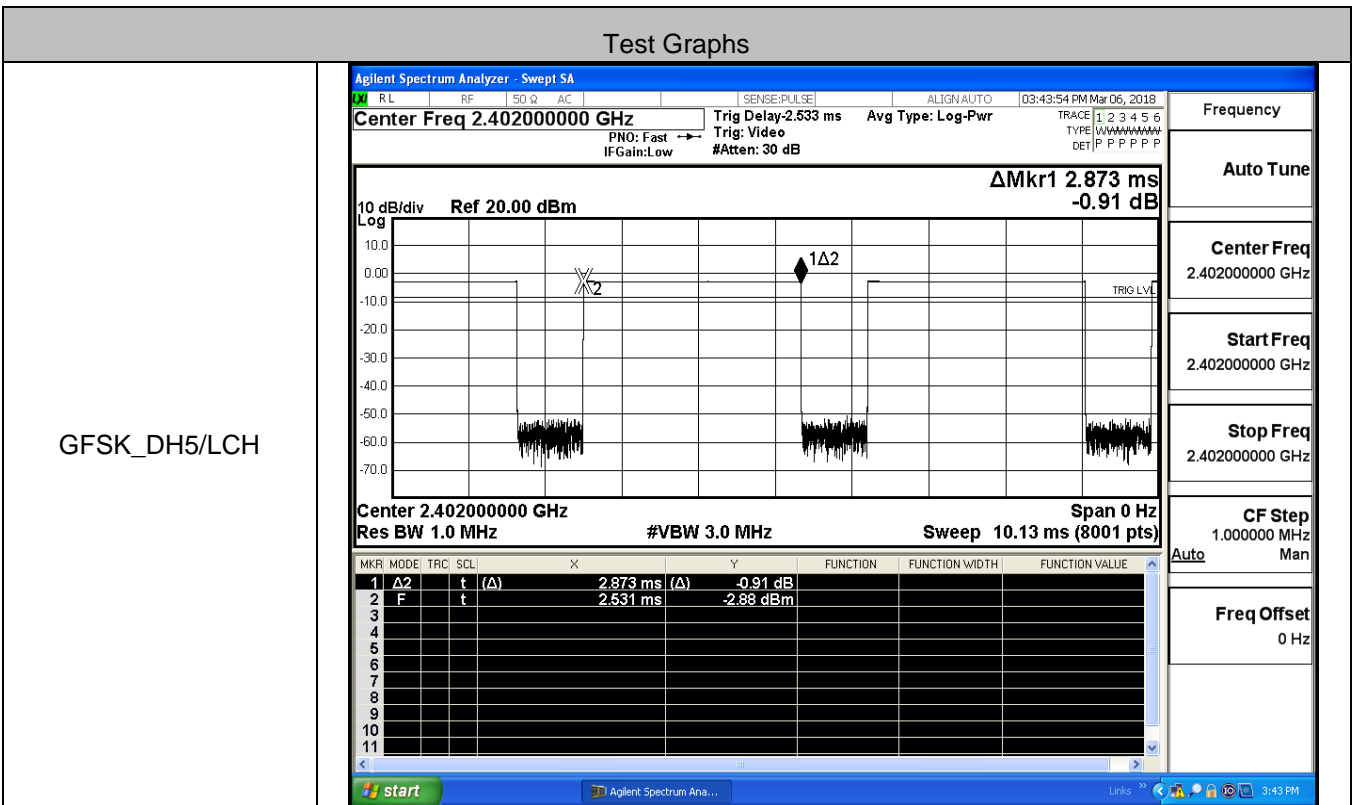
| | |
|-------------|-----------------|
| Frequency | Auto Tune |
| Center Freq | 2.441750000 GHz |
| Start Freq | 2.400000000 GHz |
| Stop Freq | 2.483500000 GHz |
| CF Step | 8.350000 MHz |
| Freq Offset | 0 Hz |

8DPSK/Hop

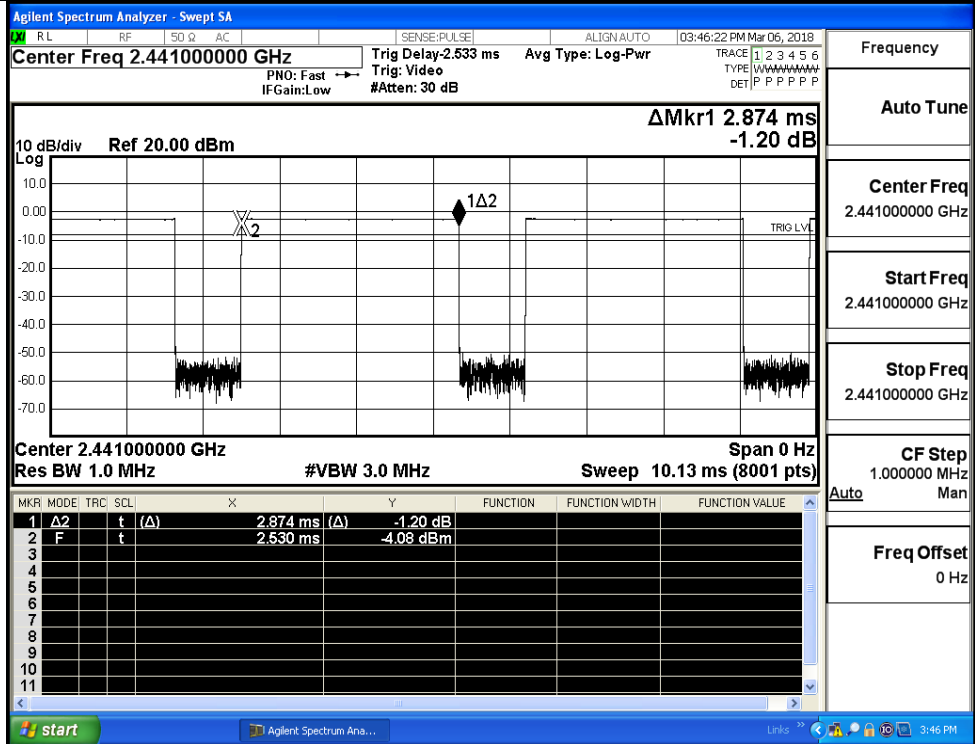


A.5 Dwell Time

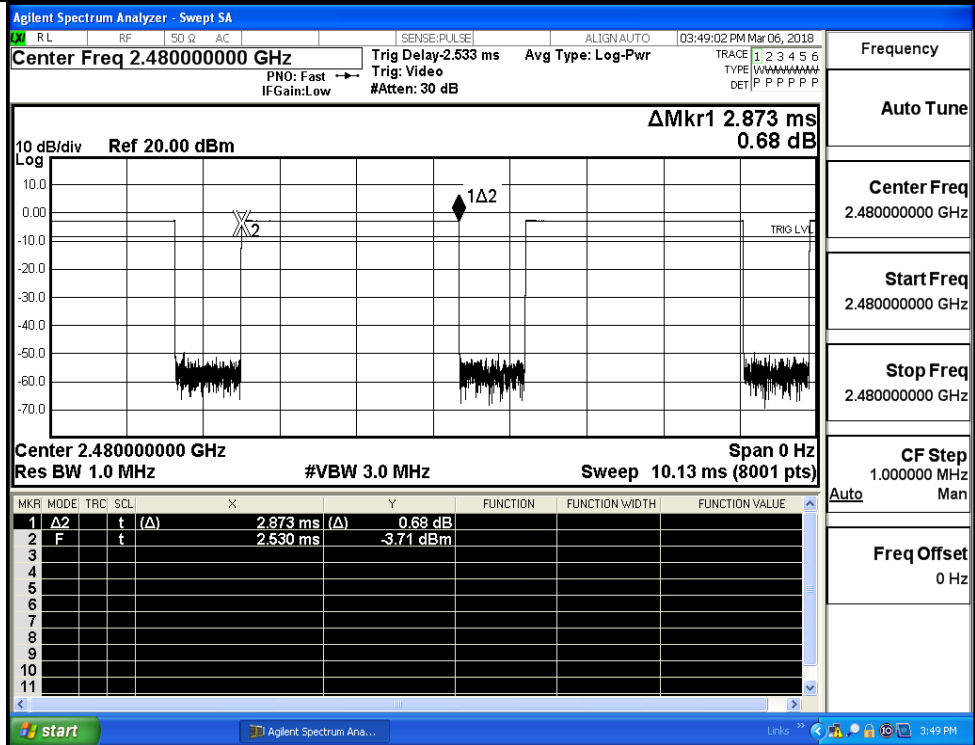
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK | DH5 | LCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |
| | DH5 | MCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |
| | DH5 | HCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |
| π/4DQPSK | 2DH5 | LCH | 2.87 | 106.7 | 0.307 | 0.4 | PASS |
| | 2DH5 | MCH | 2.87 | 106.7 | 0.307 | 0.4 | PASS |
| | 2DH5 | HCH | 2.87 | 106.7 | 0.307 | 0.4 | PASS |
| 8DPSK | 3DH5 | LCH | 2.87 | 106.7 | 0.307 | 0.4 | PASS |
| | 3DH5 | MCH | 2.87 | 106.7 | 0.307 | 0.4 | PASS |
| | 3DH5 | HCH | 2.87 | 106.7 | 0.307 | 0.4 | PASS |



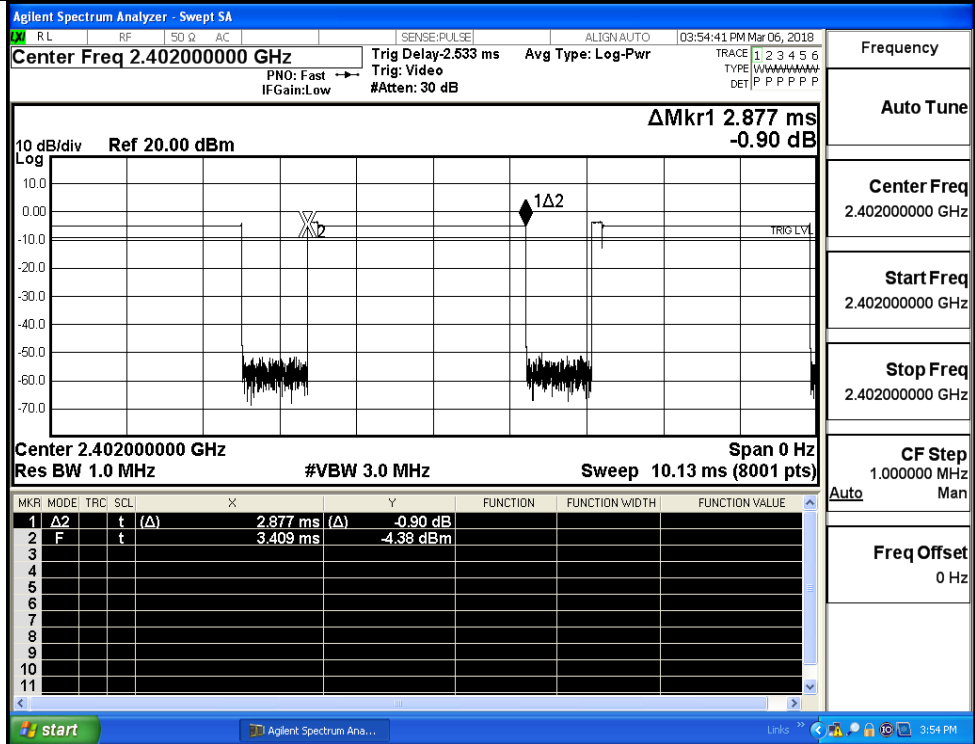
GFSK_DH5/MCH



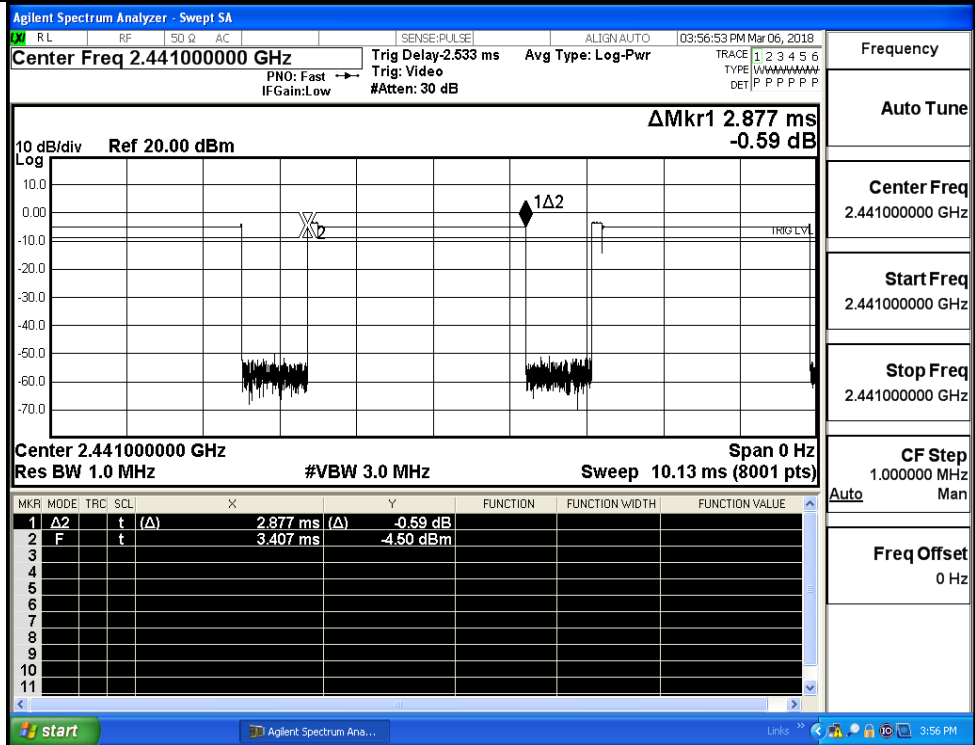
GFSK_DH5/HCH



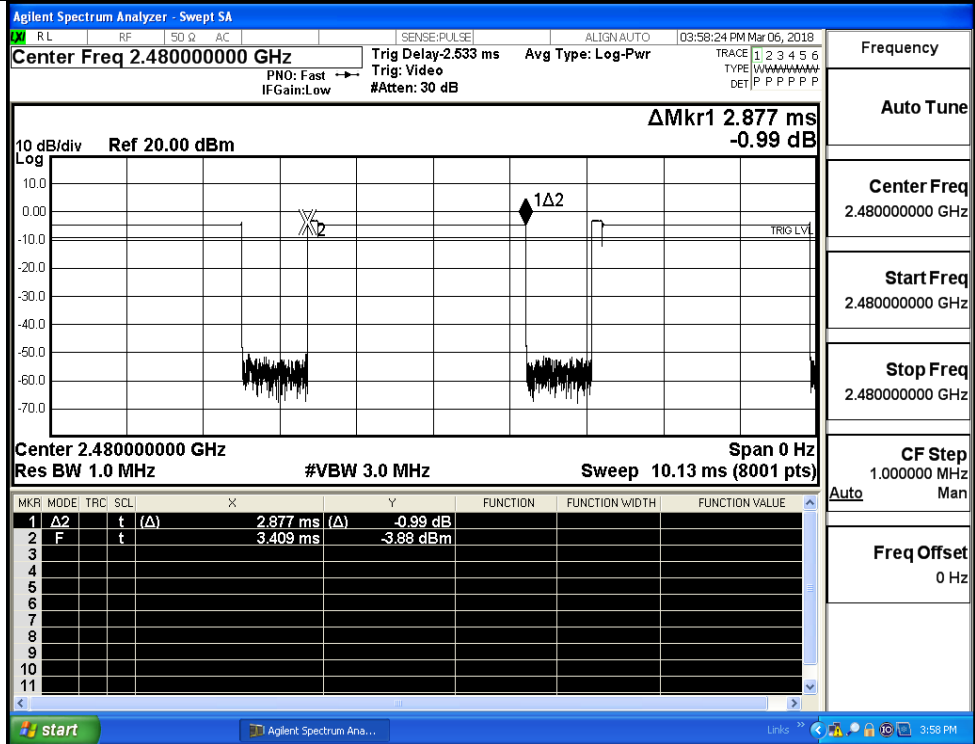
$\pi/4$ DQPSK
_2DH5/LCH



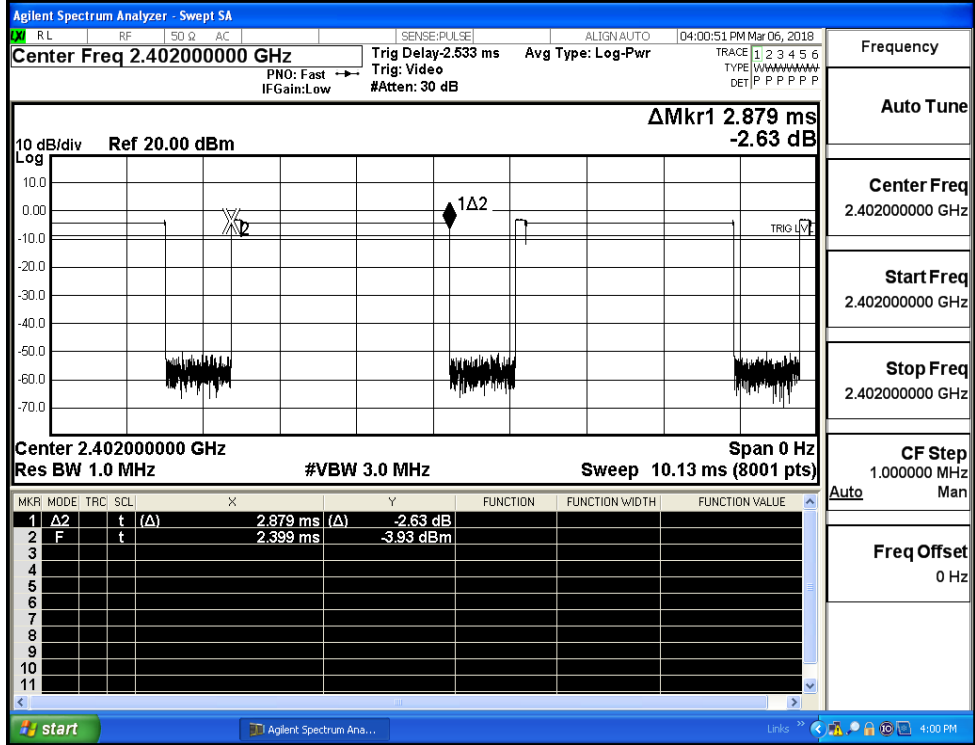
$\pi/4$ DQPSK
_2DH5/MCH



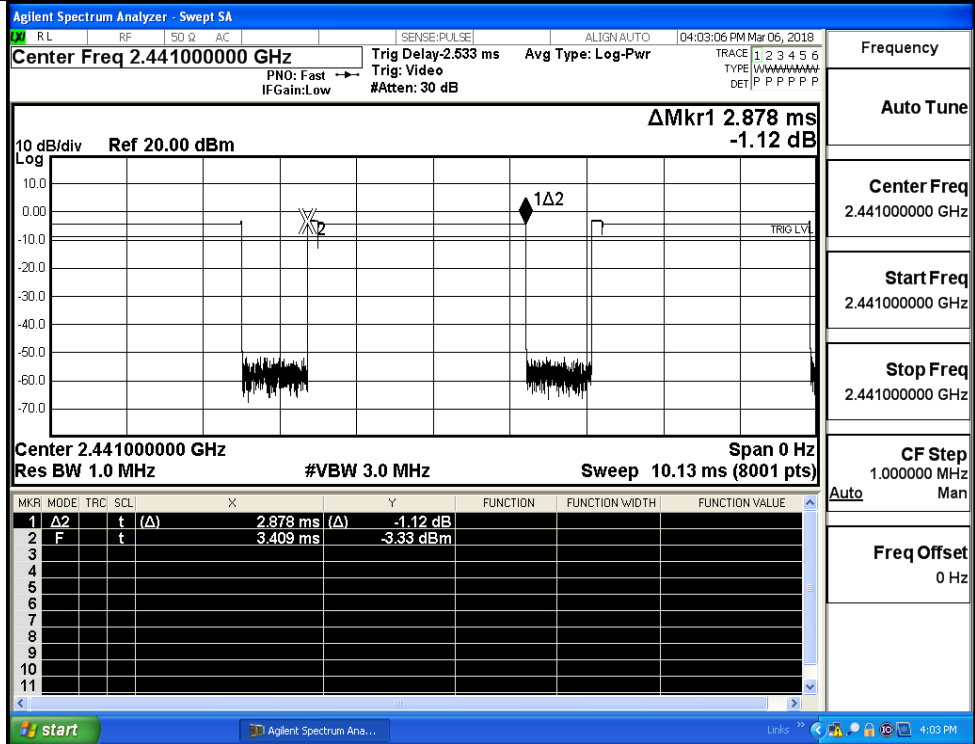
π /4DQPSK
_2DH5/HCH



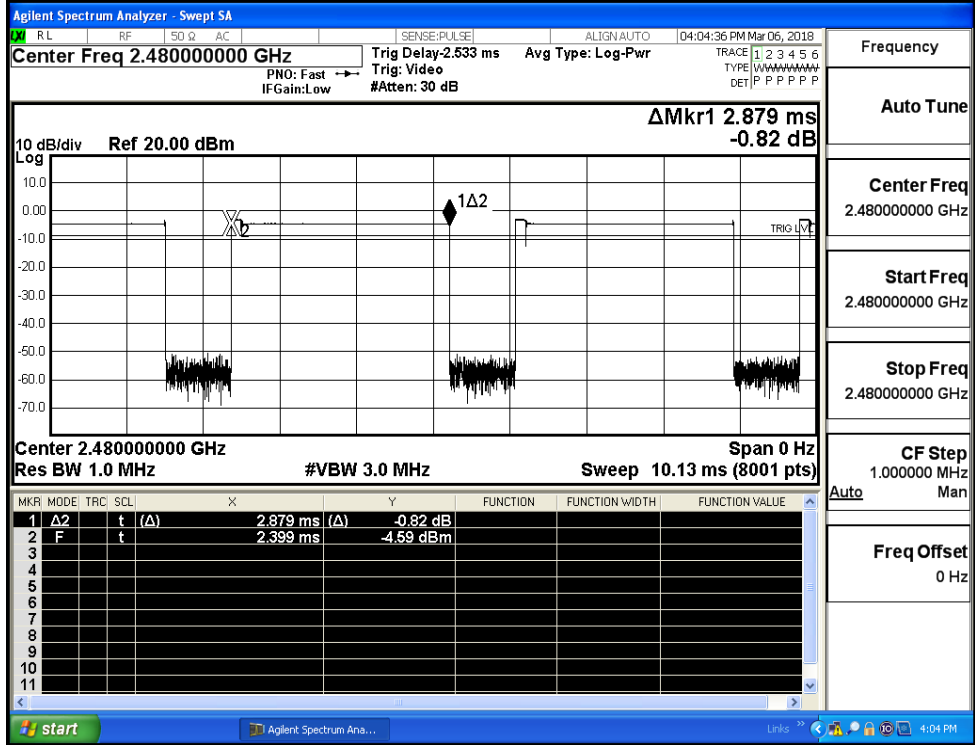
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



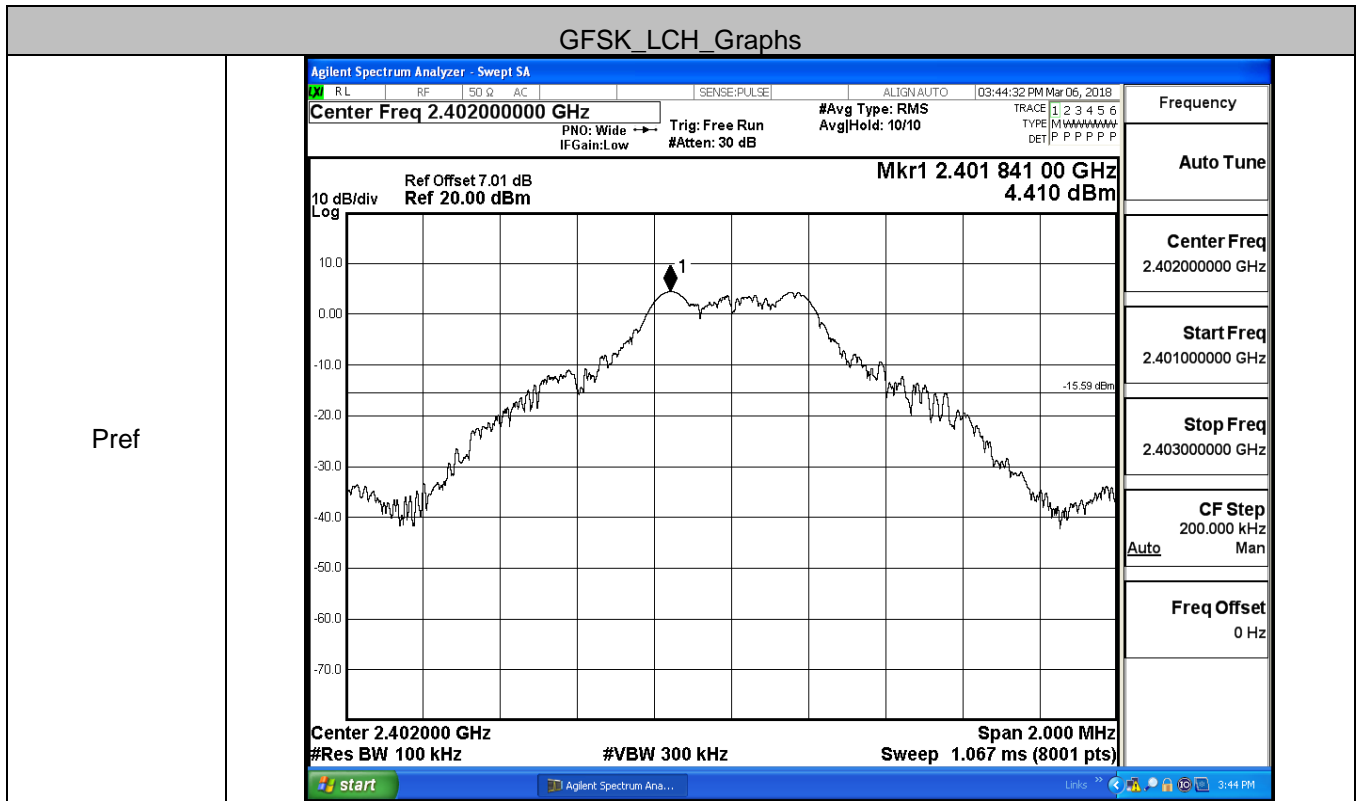
8DPSK_3DH5/HCH

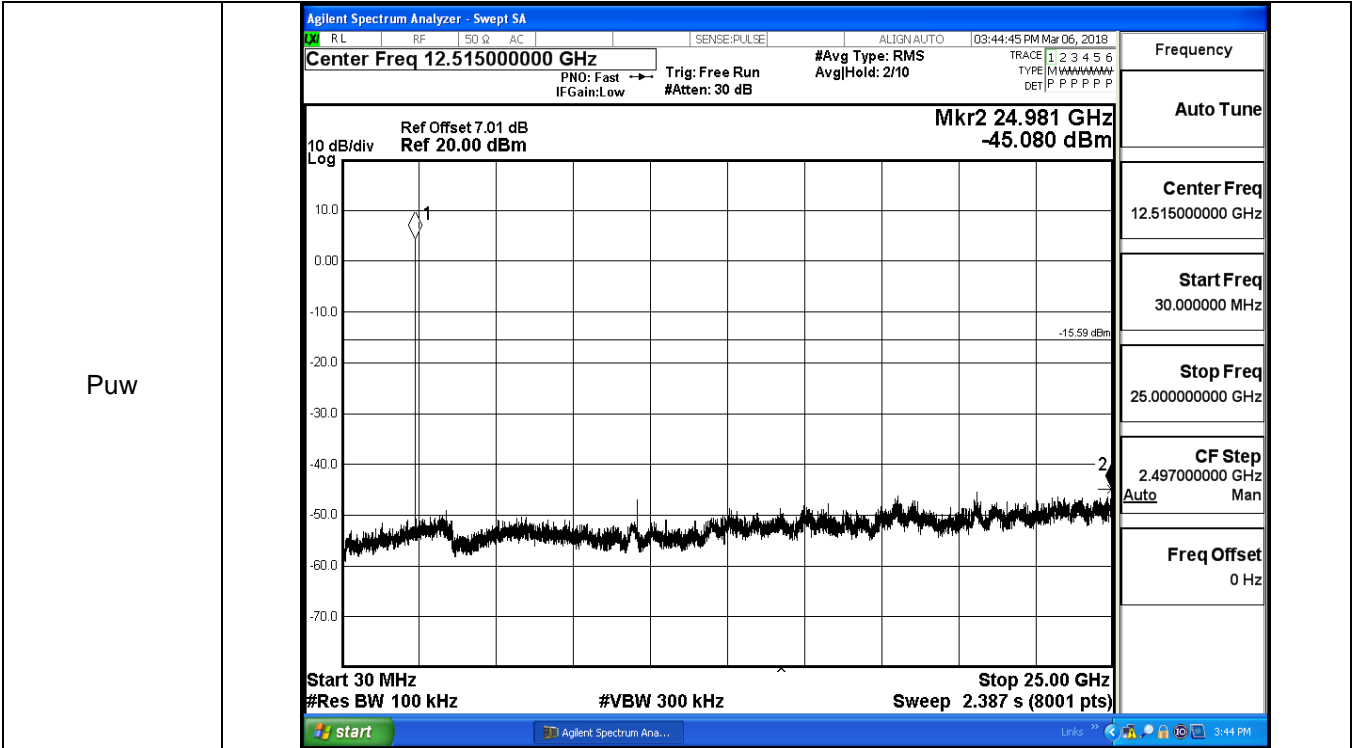


A.6 RF Conducted Spurious Emissions

| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK | LCH | 4.41 | -45.080 | -15.590 | PASS |
| | MCH | 4.512 | -46.103 | -15.488 | PASS |
| | HCH | 4.418 | -44.683 | -15.582 | PASS |
| π /4DQPSK | LCH | 3.287 | -45.007 | -16.713 | PASS |
| | MCH | 3.403 | -45.894 | -16.597 | PASS |
| | HCH | 3.658 | -45.860 | -16.342 | PASS |
| 8DPSK | LCH | 3.549 | -45.388 | -16.451 | PASS |
| | MCH | 3.791 | -45.090 | -16.209 | PASS |
| | HCH | 3.855 | -45.339 | -16.145 | PASS |

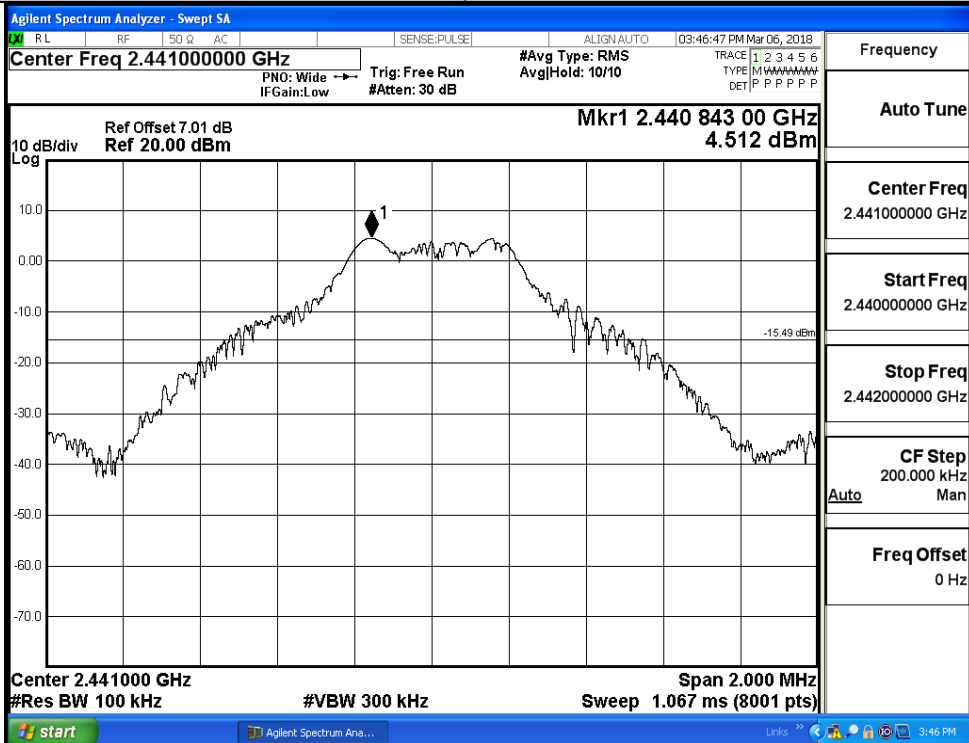
GFSK_LCH_Graphs



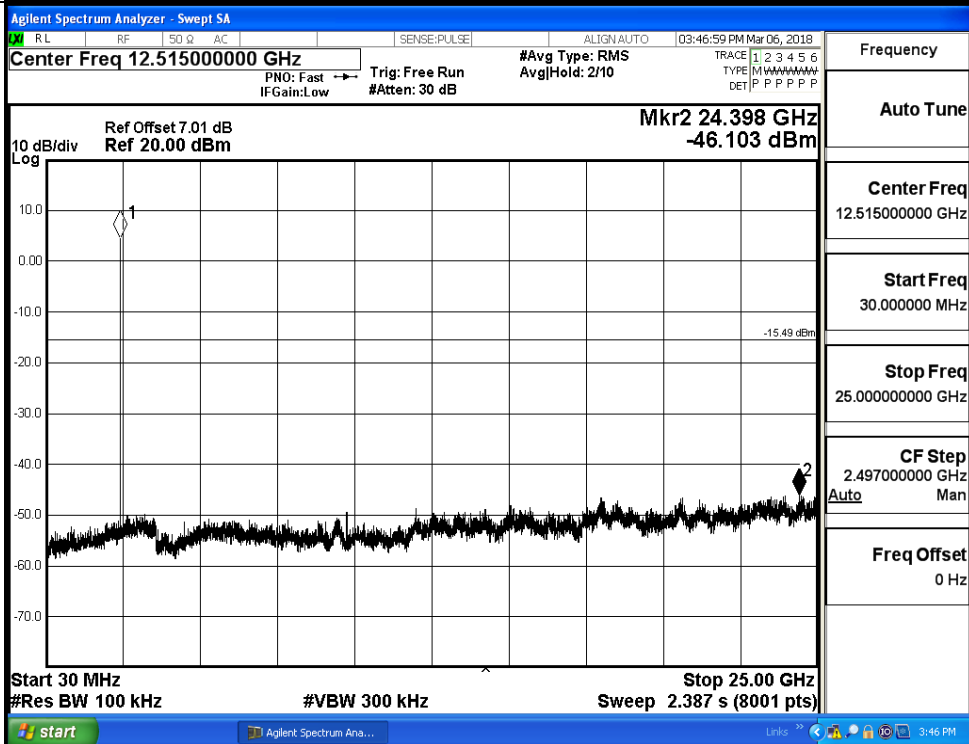


GFSK_MCH_Graphs

Pref



Puw

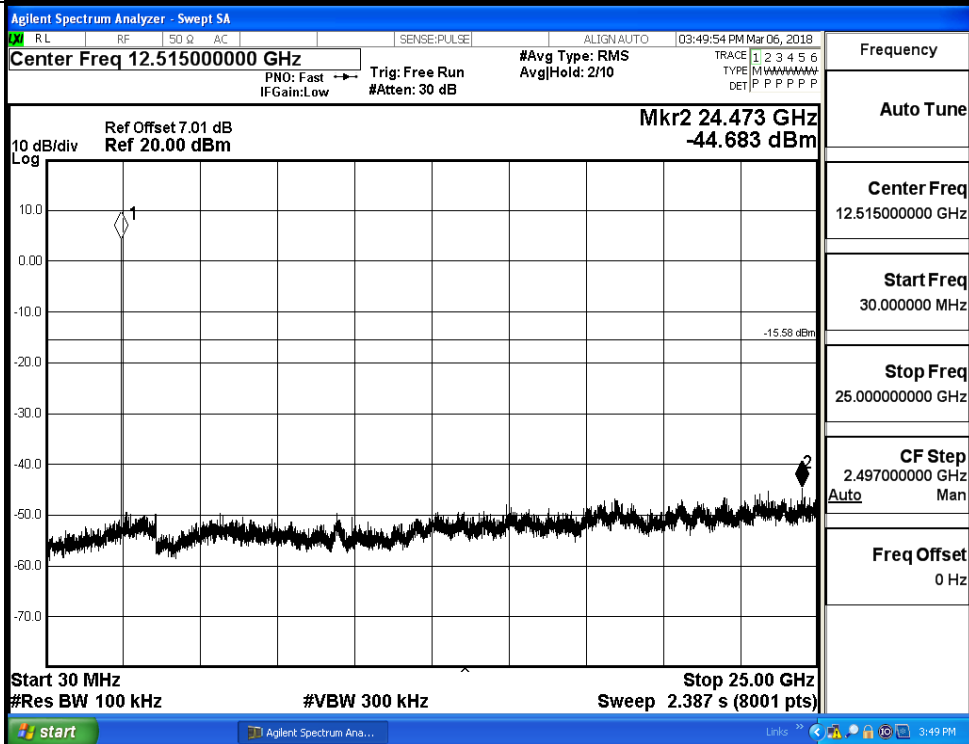


GFSK_HCH_Graphs

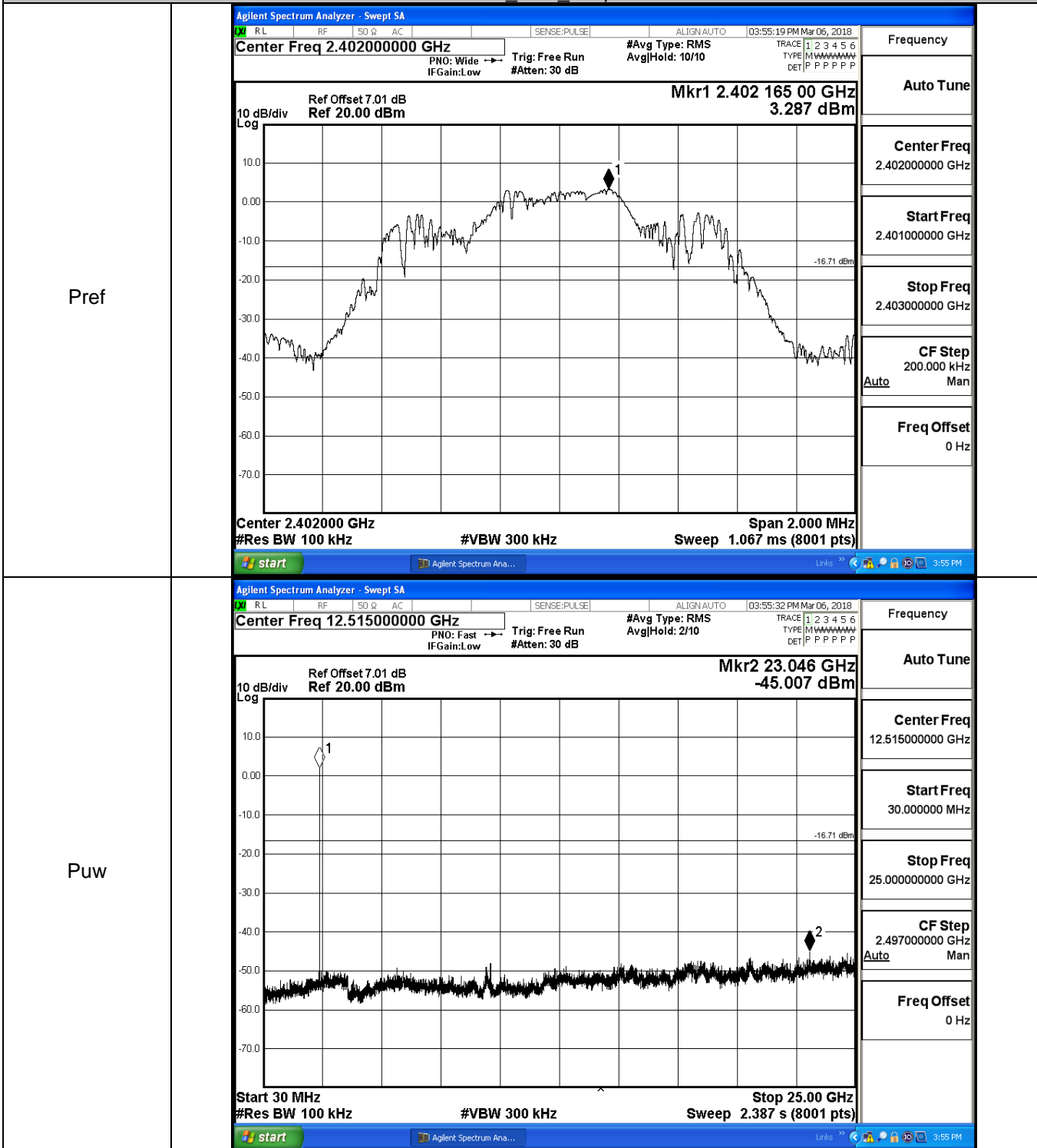
Pref



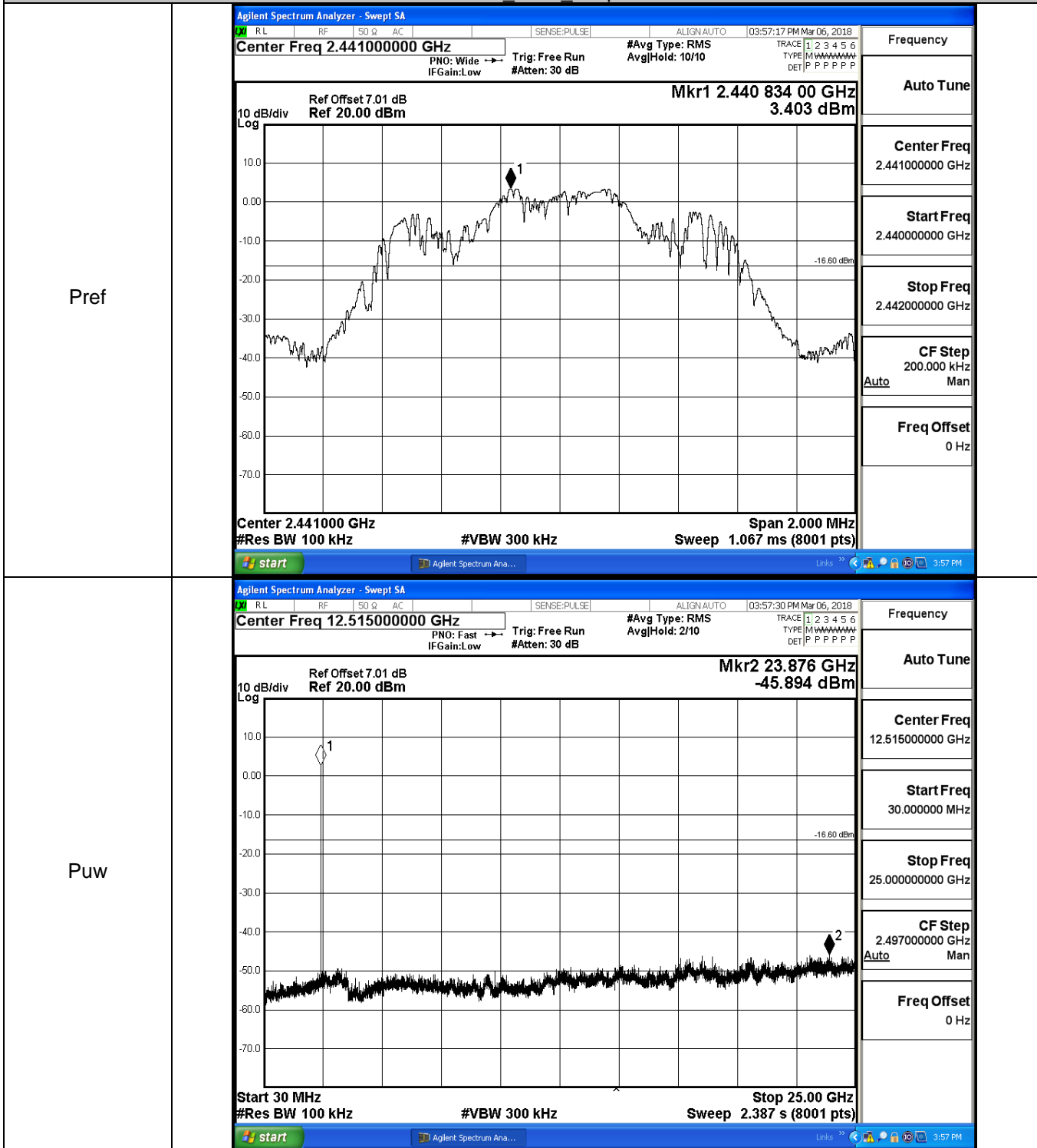
Puw



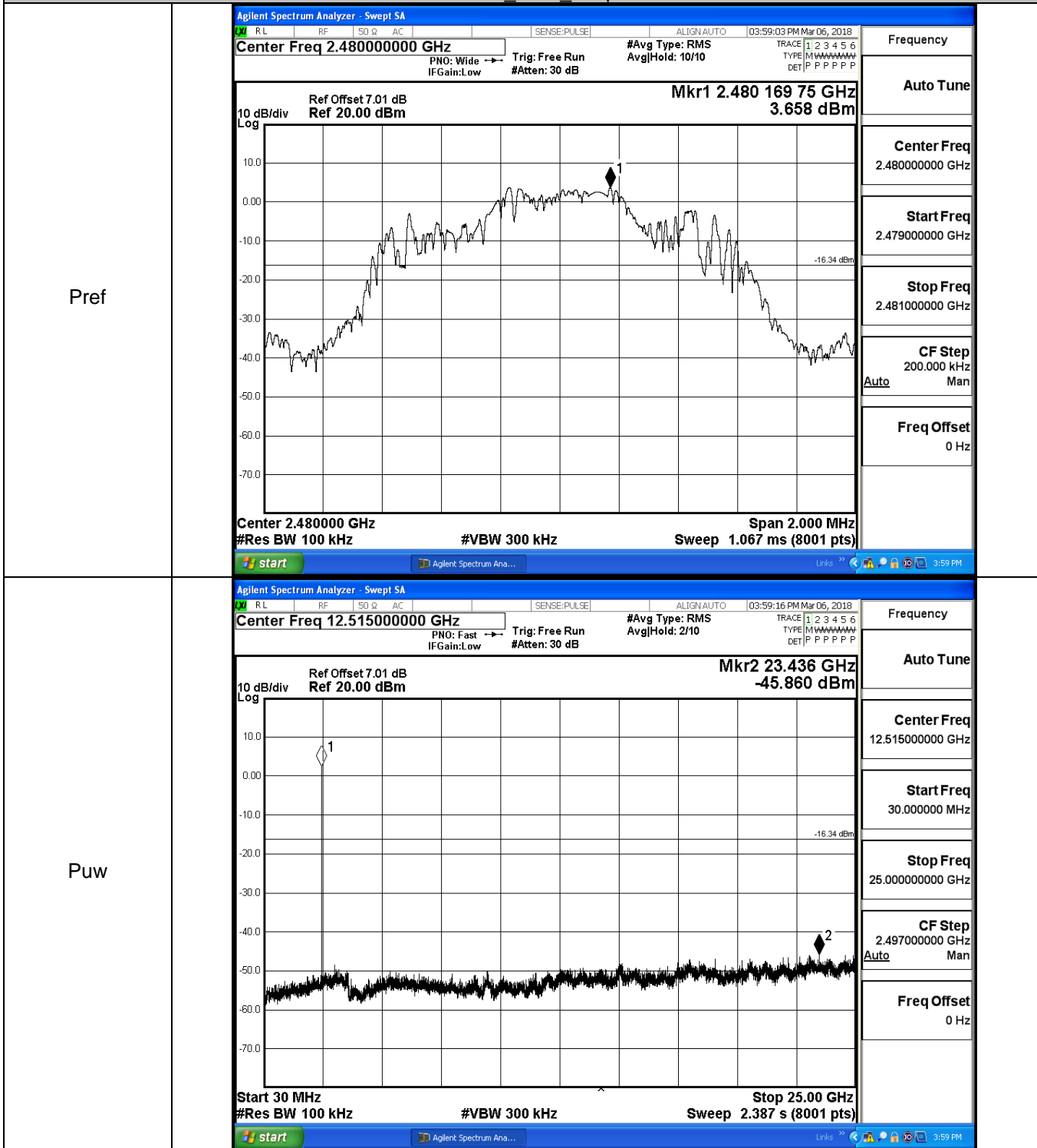
$\pi/4$ DQPSK_LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs



$\pi/4$ DQPSK_HCH_Graphs

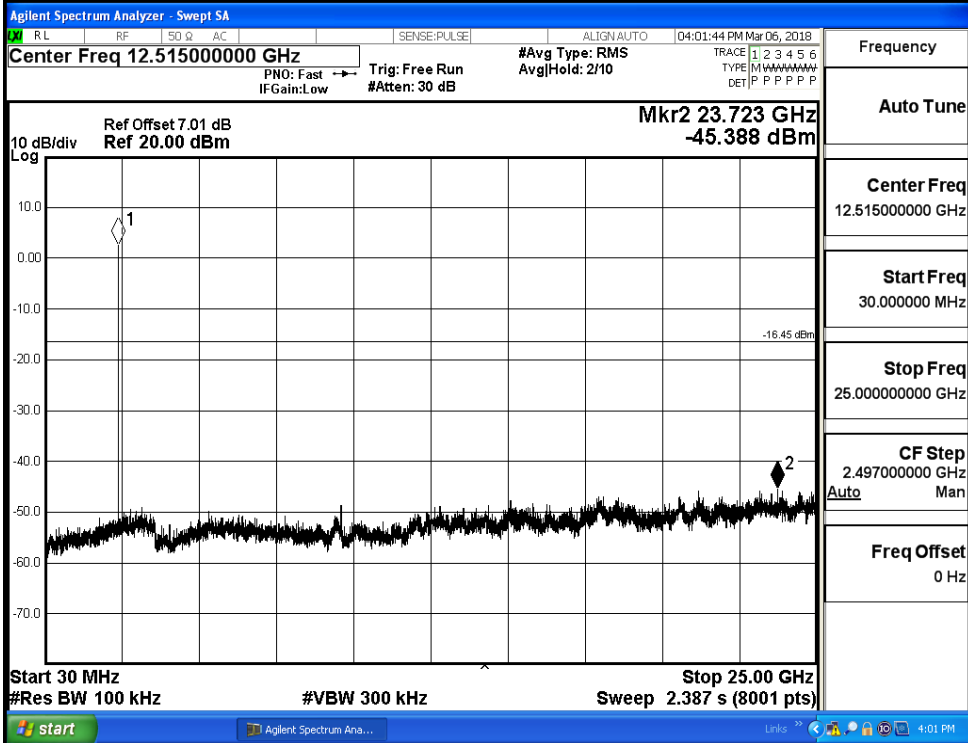


8DPSK_LCH_Graphs

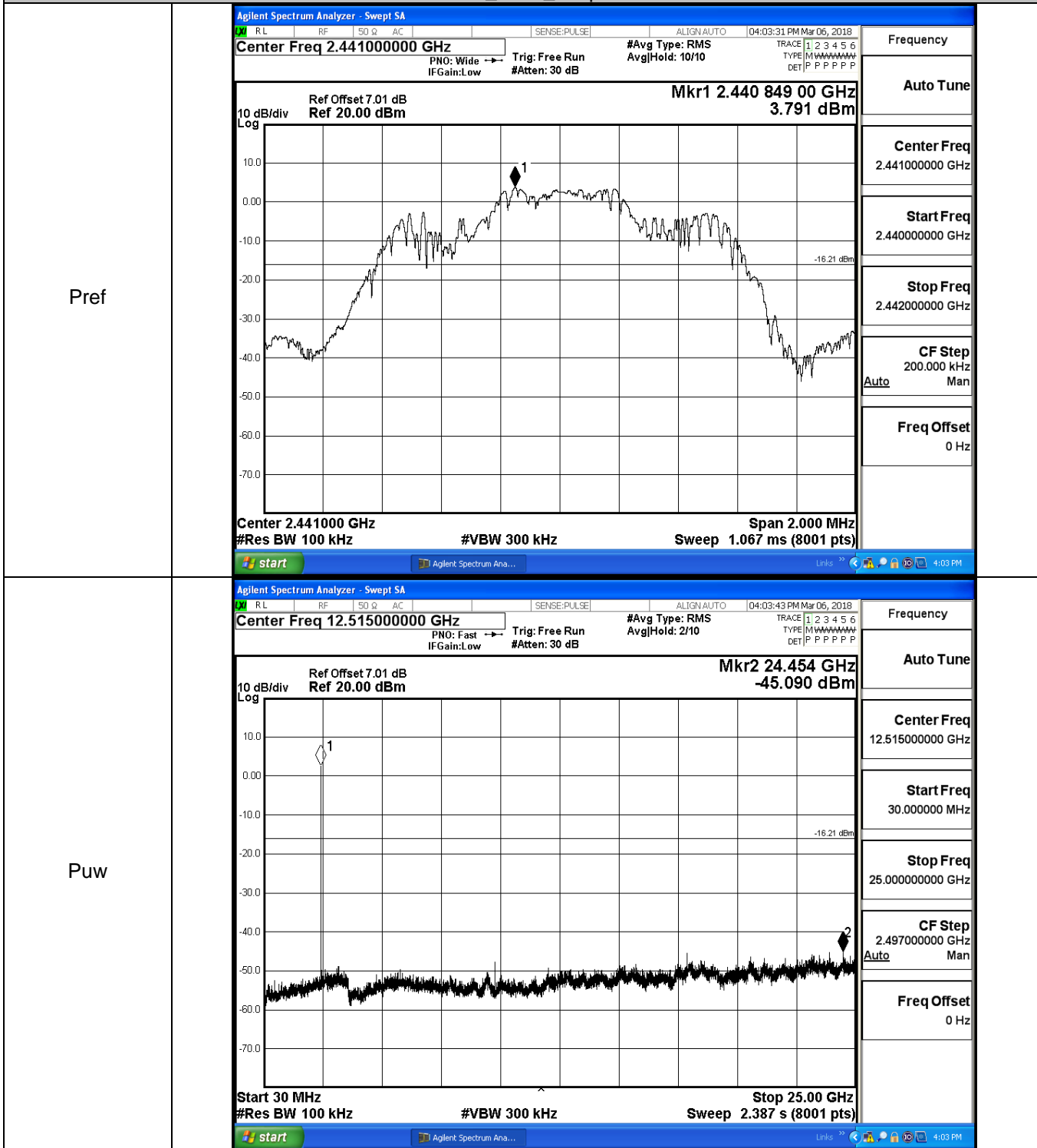
Pref



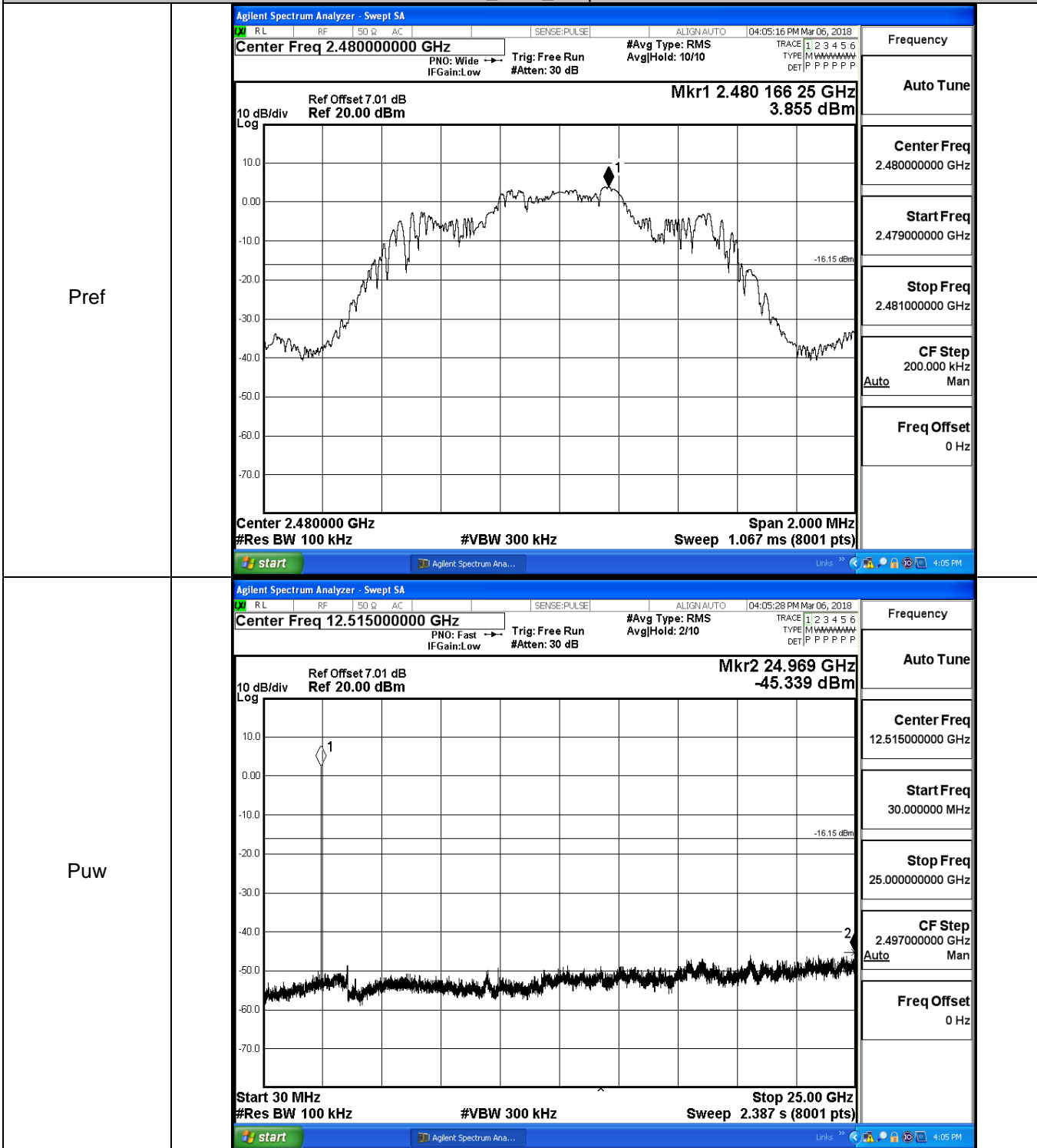
Puw



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

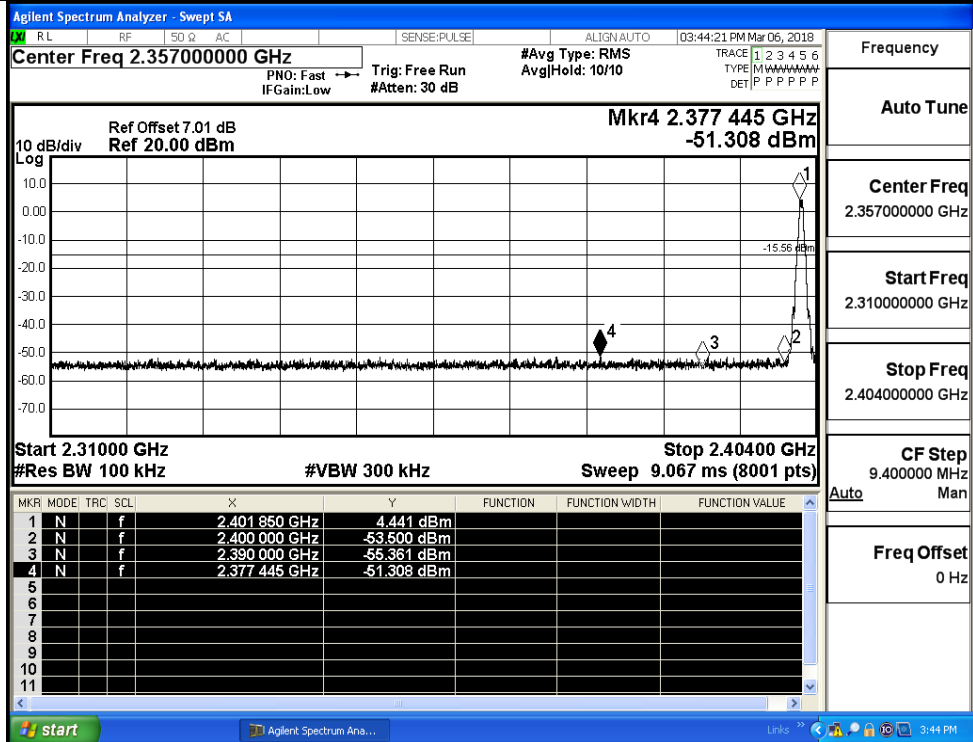


A.7 Band-edge for RF Conducted Emissions

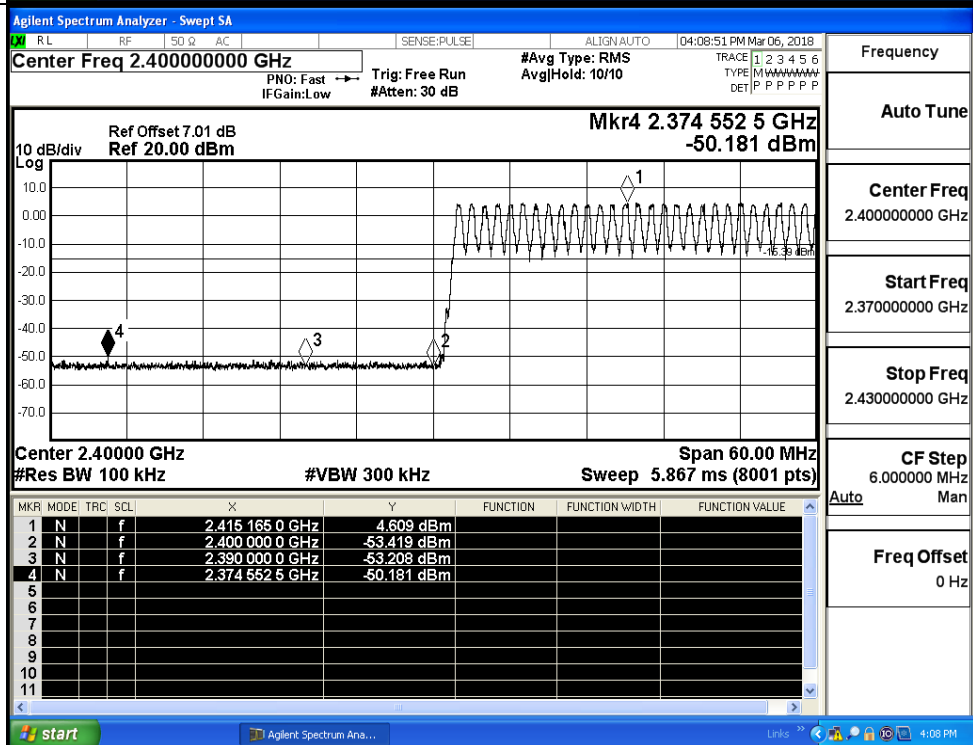
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK | LCH | 2402 | 4.441 | Off | -51.308 | -15.56 | PASS |
| | | | 4.609 | On | -50.181 | -15.39 | PASS |
| | HCH | 2480 | 4.450 | Off | -50.476 | -15.55 | PASS |
| | | | 4.675 | On | -50.760 | -15.33 | PASS |
| $\pi/4$ DQPSK | LCH | 2402 | 2.161 | Off | -50.615 | -17.84 | PASS |
| | | | 3.683 | On | -50.634 | -16.32 | PASS |
| | HCH | 2480 | 3.717 | Off | -50.705 | -16.28 | PASS |
| | | | 3.921 | On | -50.361 | -16.08 | PASS |
| 8DPSK | LCH | 2402 | 3.888 | Off | -50.397 | -16.11 | PASS |
| | | | 3.675 | On | -50.087 | -16.33 | PASS |
| | HCH | 2480 | 3.925 | Off | -50.477 | -16.08 | PASS |
| | | | 3.803 | On | -50.229 | -16.2 | PASS |

Test Graphs

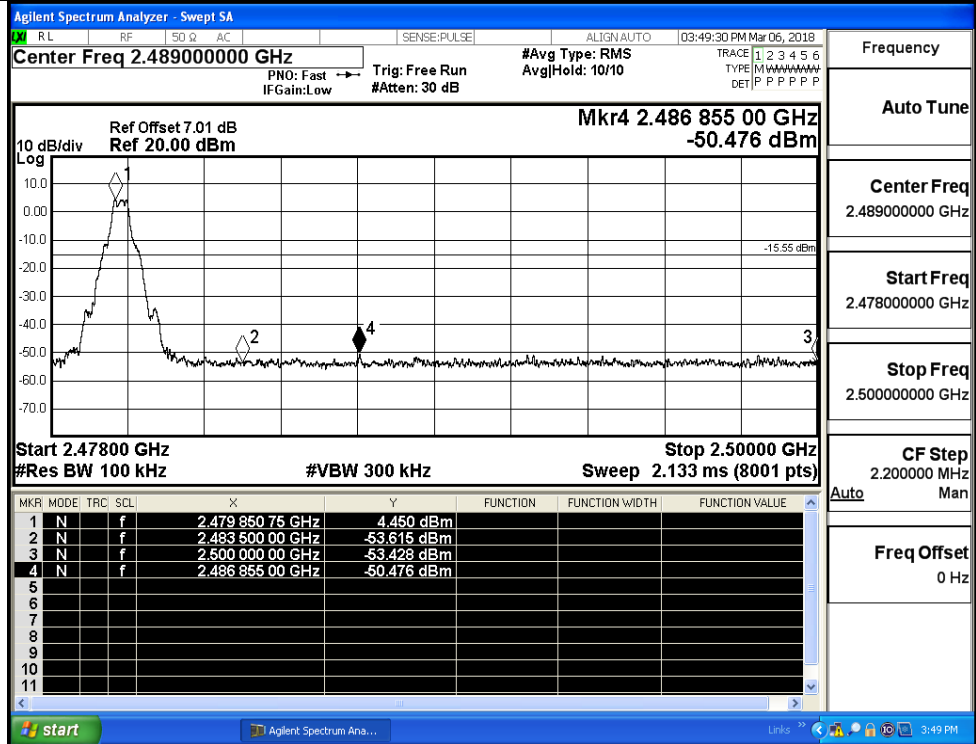
GFSK/LCH/No Hop



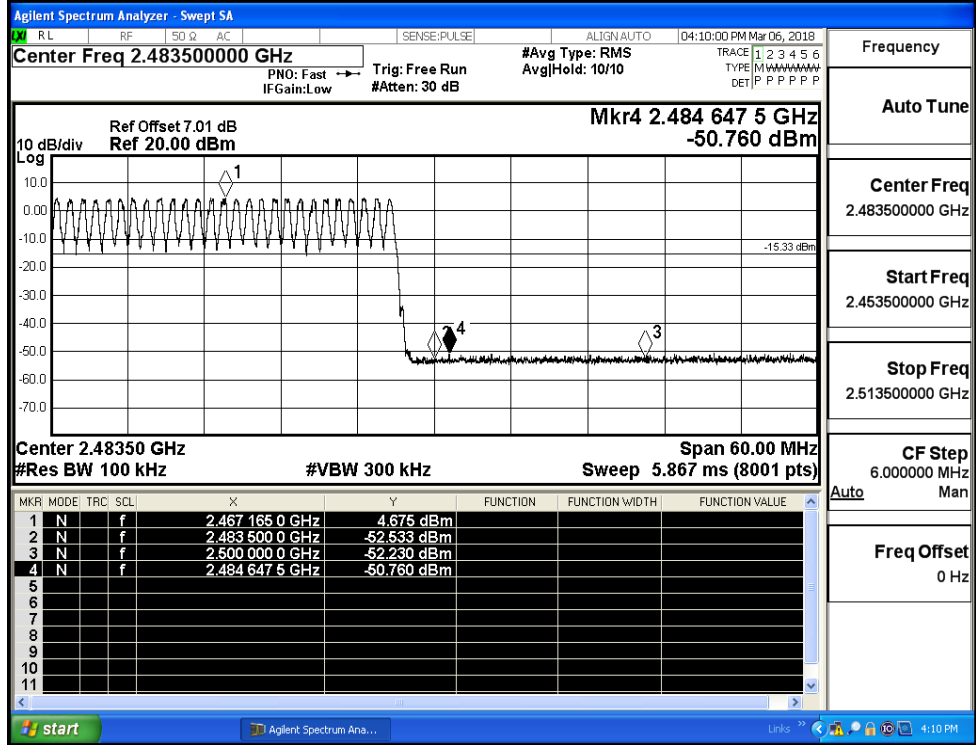
GFSK/LCH/Hop



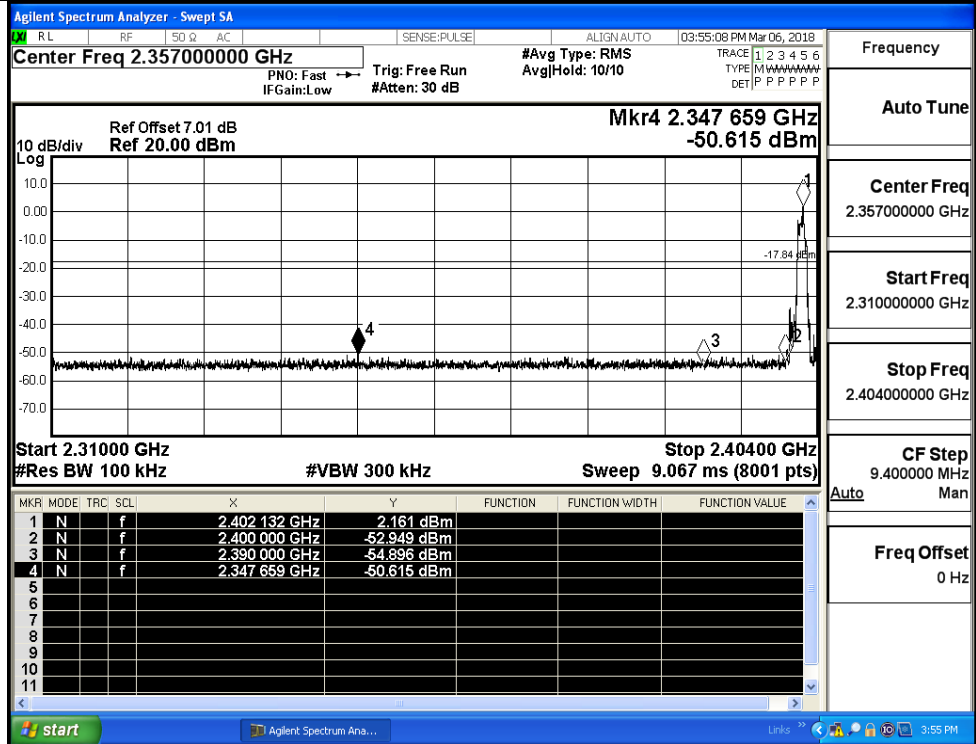
GFSK/HCH/No Hop



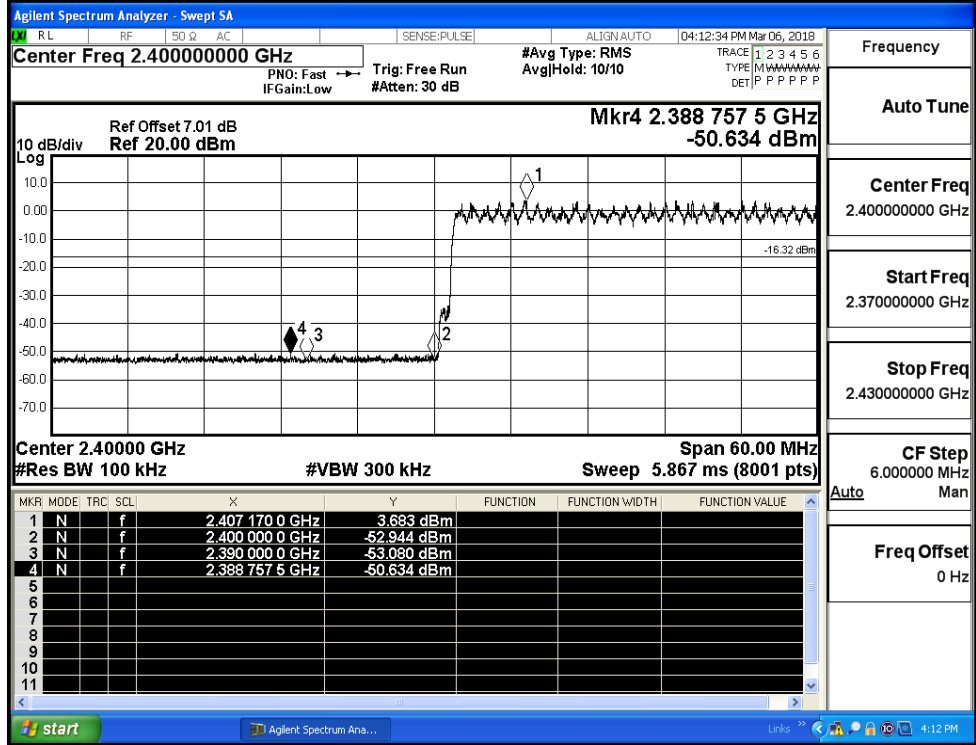
GFSK/HCH/Hop



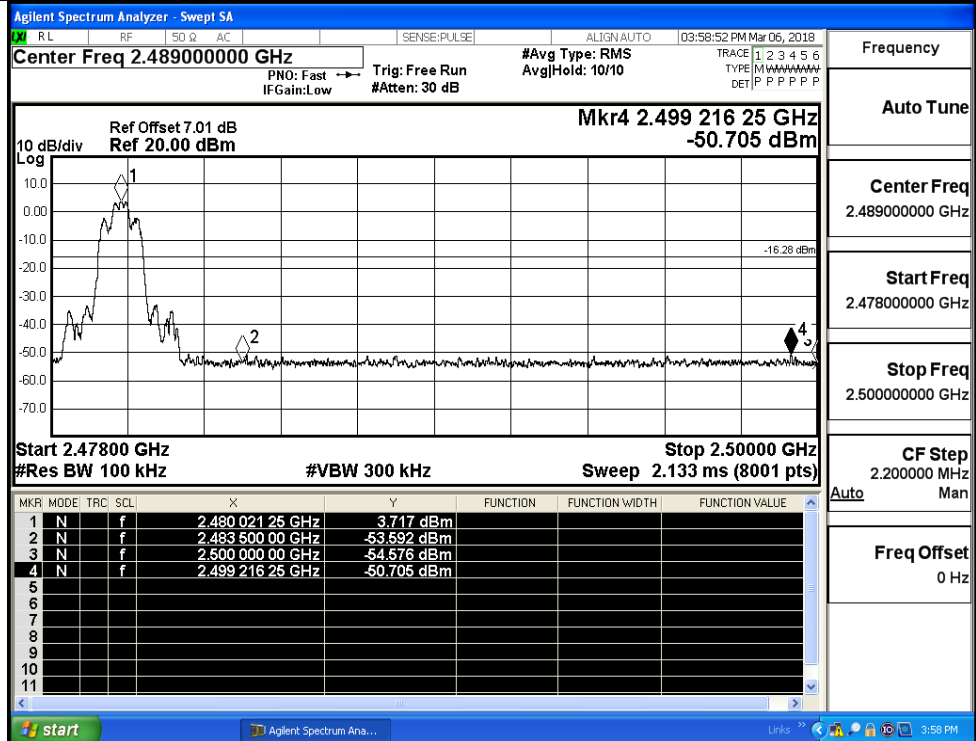
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop

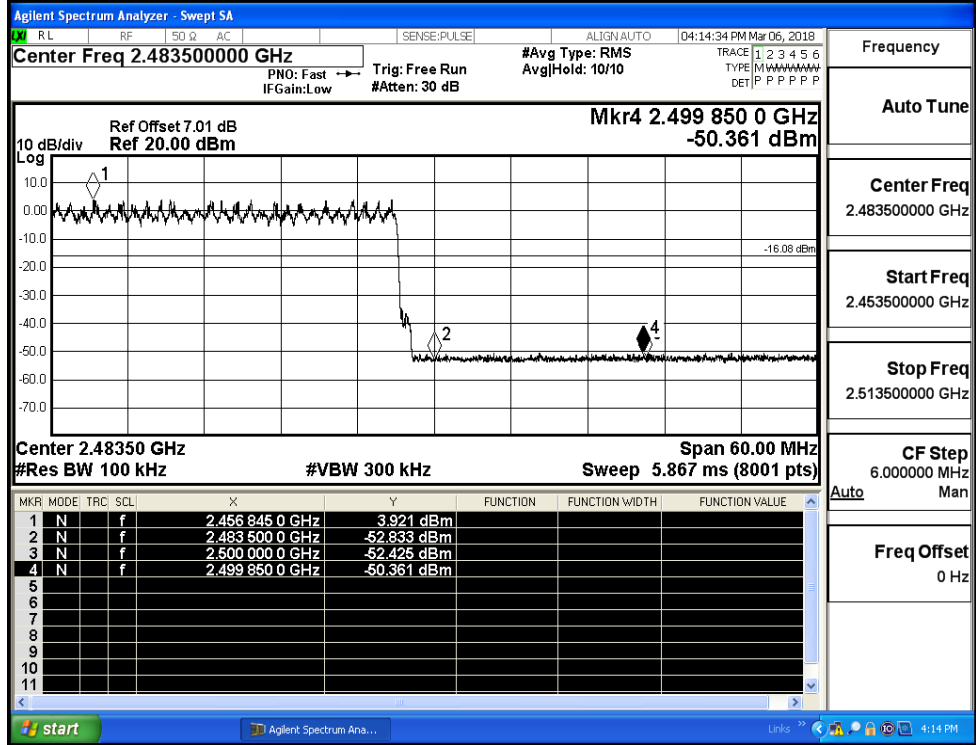


π /4DQPSK/HCH/No
Hop



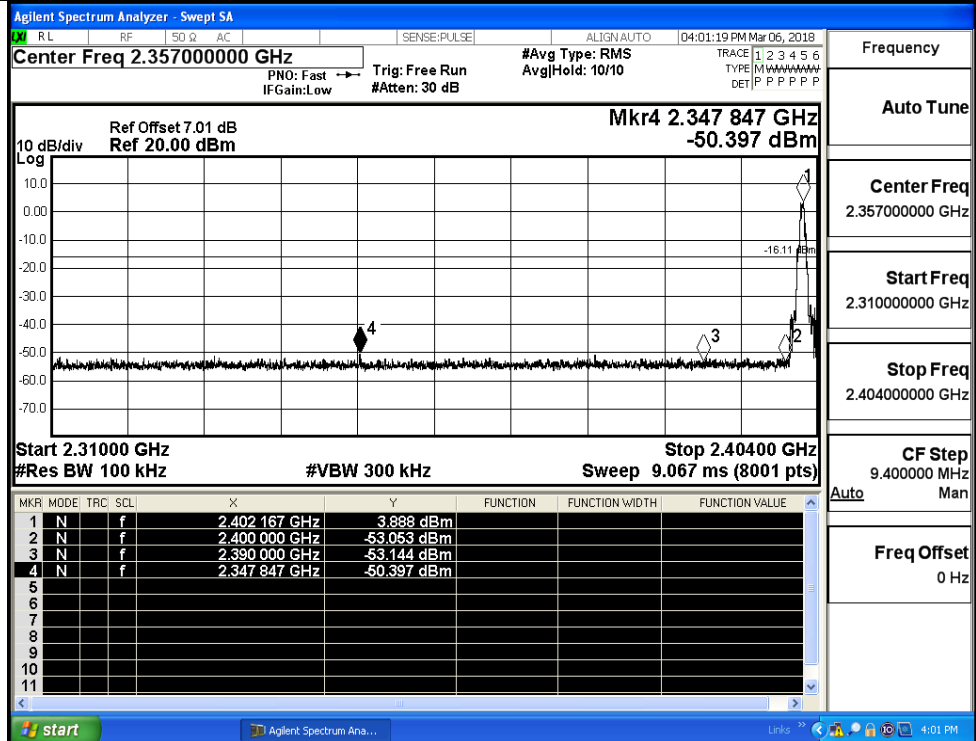
Frequency
Auto Tune
Center Freq
2.489000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.500000000 GHz
CF Step
2.200000 MHz
Freq Offset
0 Hz

π /4DQPSK/HCH/Hop



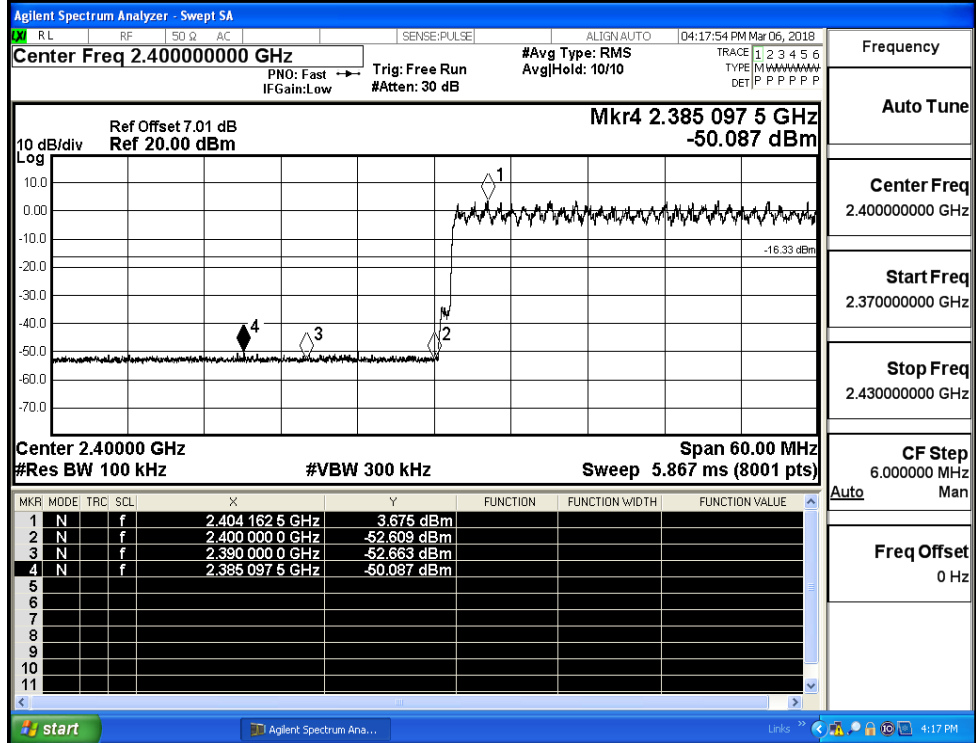
Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.453500000 GHz
Stop Freq
2.513500000 GHz
CF Step
6.000000 MHz
Freq Offset
0 Hz

8DPSK/LCH/No Hop



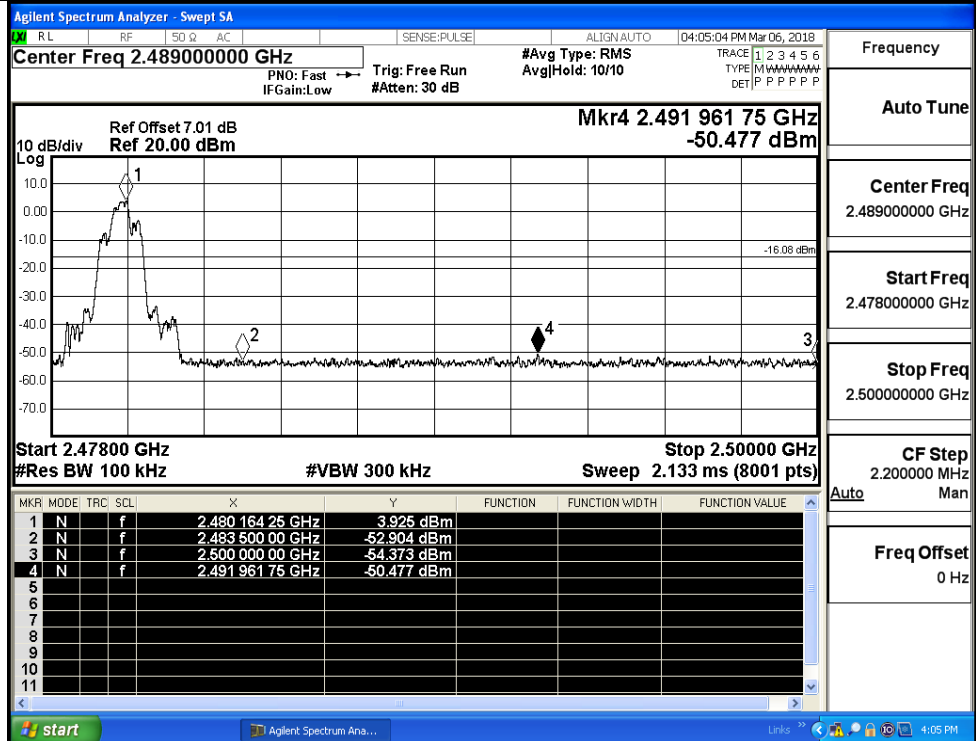
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



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

8DPSK/HCH/No Hop



Frequency

Auto Tune

Center Freq
2.489000000 GHz

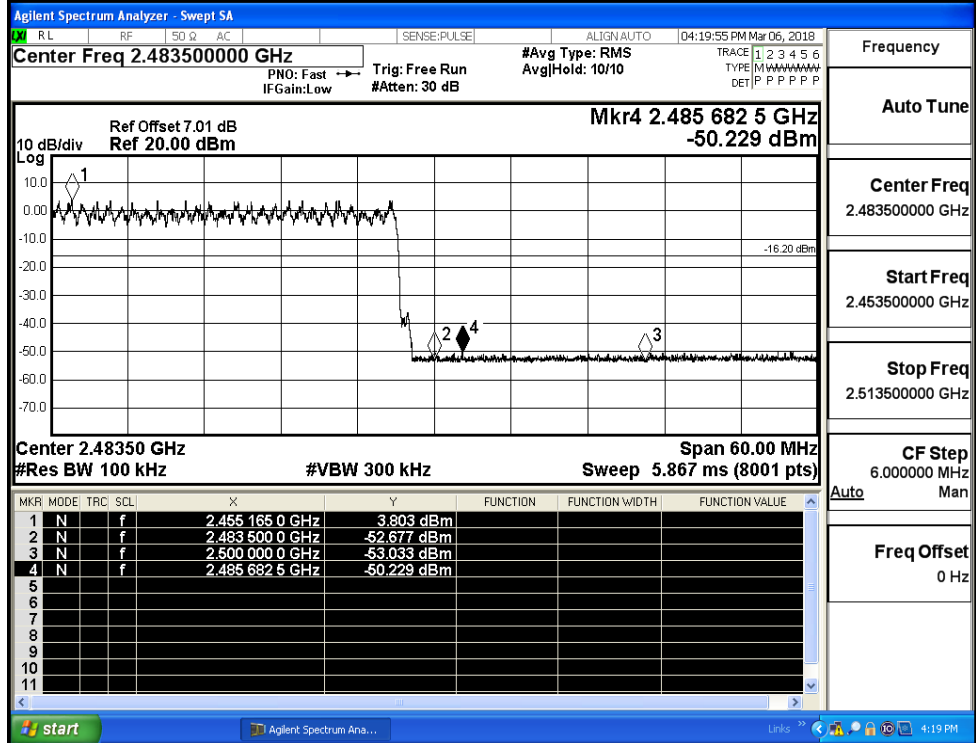
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz

Freq Offset
0 Hz

8DPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

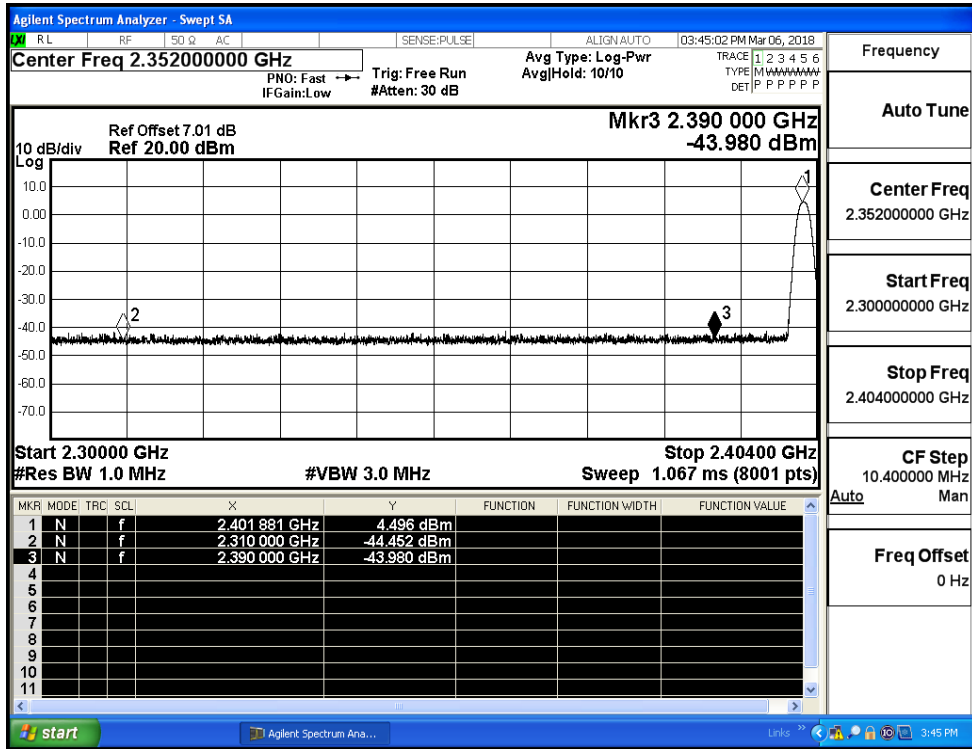
CF Step
6.000000 MHz

Freq Offset
0 Hz

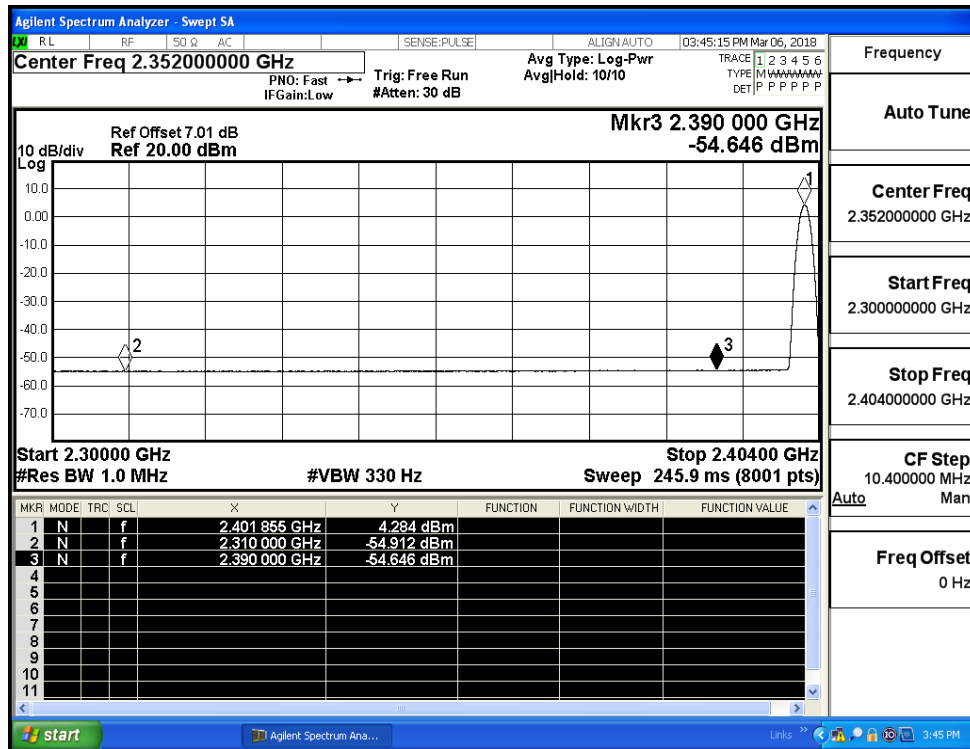
A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK | Off | 2310.0 | -44.45 | 2.0 | 0 | 50.81 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.91 | 2.0 | 0 | 40.35 | AV | 54 | PASS |
| | Off | 2390.0 | -43.98 | 2.0 | 0 | 51.28 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.65 | 2.0 | 0 | 40.61 | AV | 54 | PASS |
| | Off | 2483.5 | -44.51 | 2.0 | 0 | 50.75 | PEAK | 74 | PASS |
| | Off | 2483.5 | -53.99 | 2.0 | 0 | 41.27 | AV | 54 | PASS |
| | Off | 2500.0 | -44.15 | 2.0 | 0 | 51.10 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.26 | 2.0 | 0 | 41.00 | AV | 54 | PASS |
| $\pi/4$ DQPSK | Off | 2310.0 | -44.53 | 2.0 | 0 | 50.73 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.85 | 2.0 | 0 | 40.41 | AV | 54 | PASS |
| | Off | 2390.0 | -44.08 | 2.0 | 0 | 51.18 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.53 | 2.0 | 0 | 40.72 | AV | 54 | PASS |
| | Off | 2483.5 | -43.41 | 2.0 | 0 | 51.85 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.15 | 2.0 | 0 | 41.10 | AV | 54 | PASS |
| | Off | 2500.0 | -45.37 | 2.0 | 0 | 49.89 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.22 | 2.0 | 0 | 41.04 | AV | 54 | PASS |
| 8DPSK | Off | 2310.0 | -44.09 | 2.0 | 0 | 51.16 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.96 | 2.0 | 0 | 40.30 | AV | 54 | PASS |
| | Off | 2390.0 | -45.12 | 2.0 | 0 | 50.14 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.50 | 2.0 | 0 | 40.76 | AV | 54 | PASS |
| | Off | 2483.5 | -44.04 | 2.0 | 0 | 51.22 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.33 | 2.0 | 0 | 40.93 | AV | 54 | PASS |
| | Off | 2500.0 | -43.31 | 2.0 | 0 | 51.95 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.24 | 2.0 | 0 | 41.02 | AV | 54 | PASS |

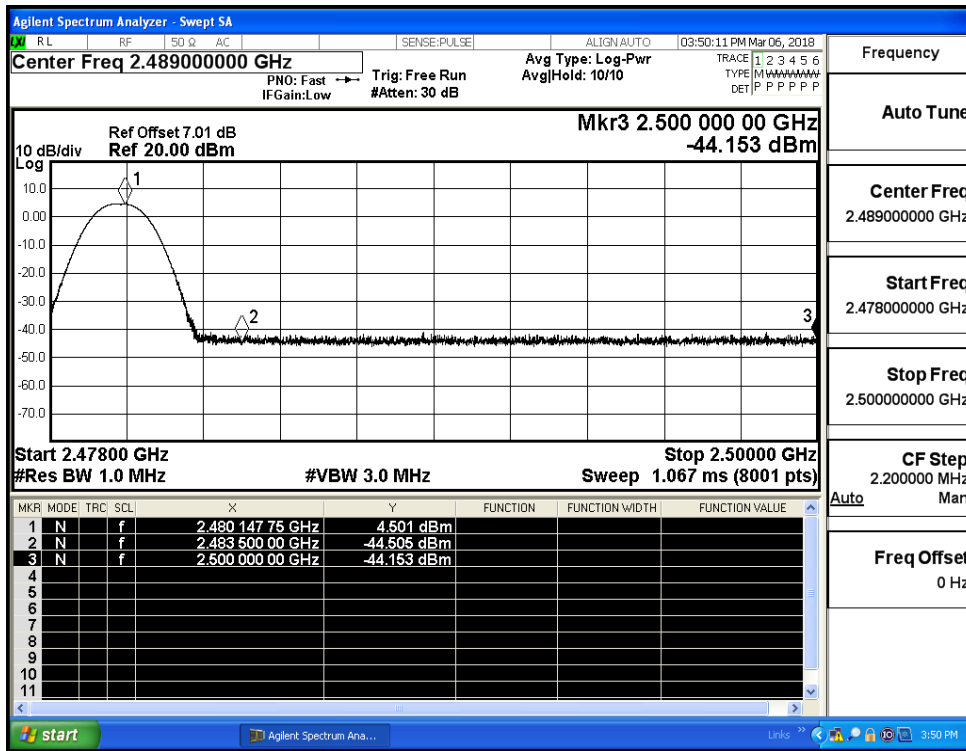
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



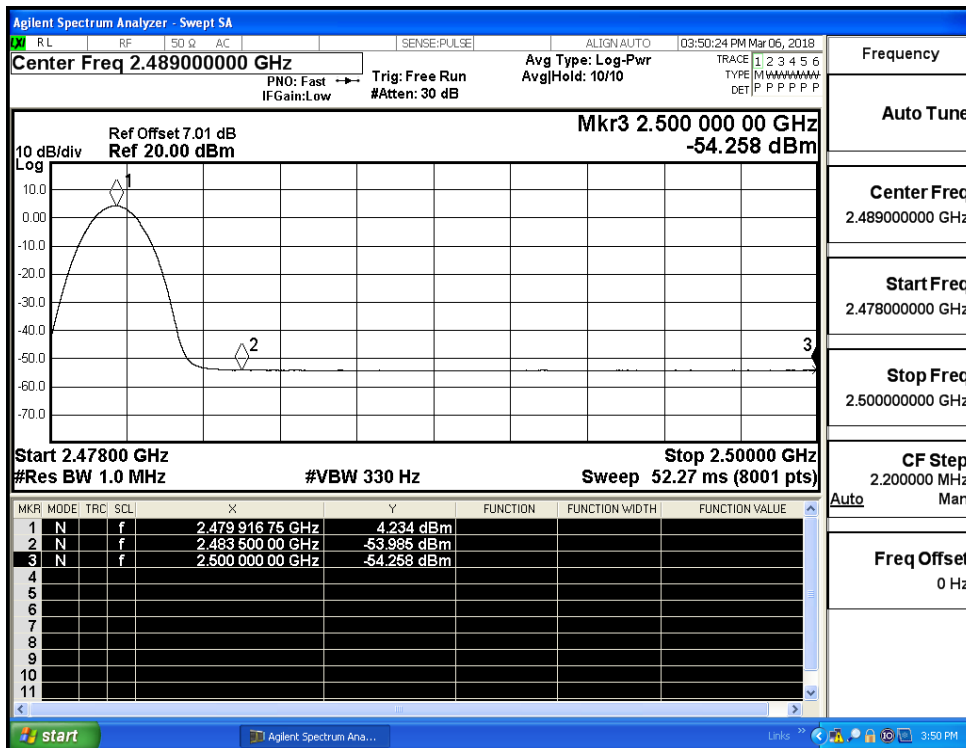
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



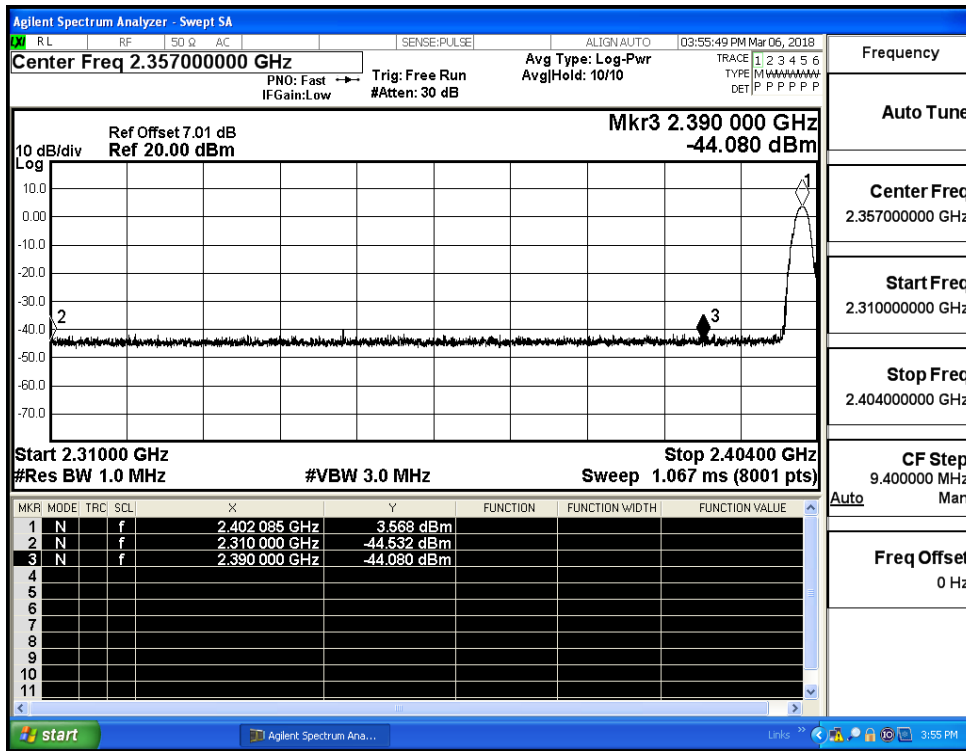
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



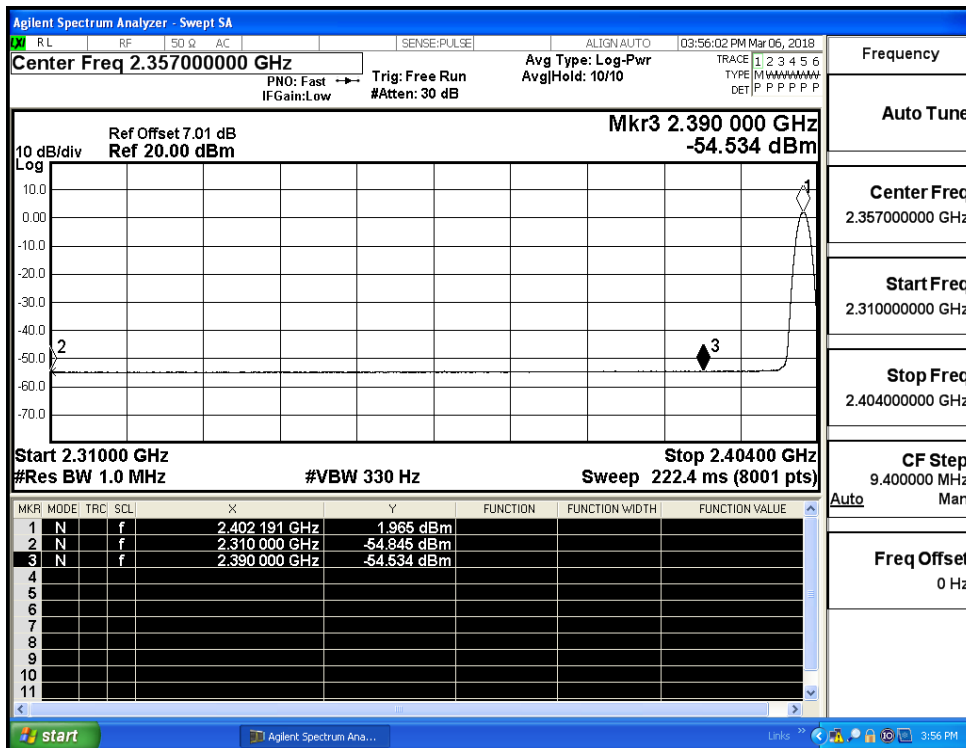
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



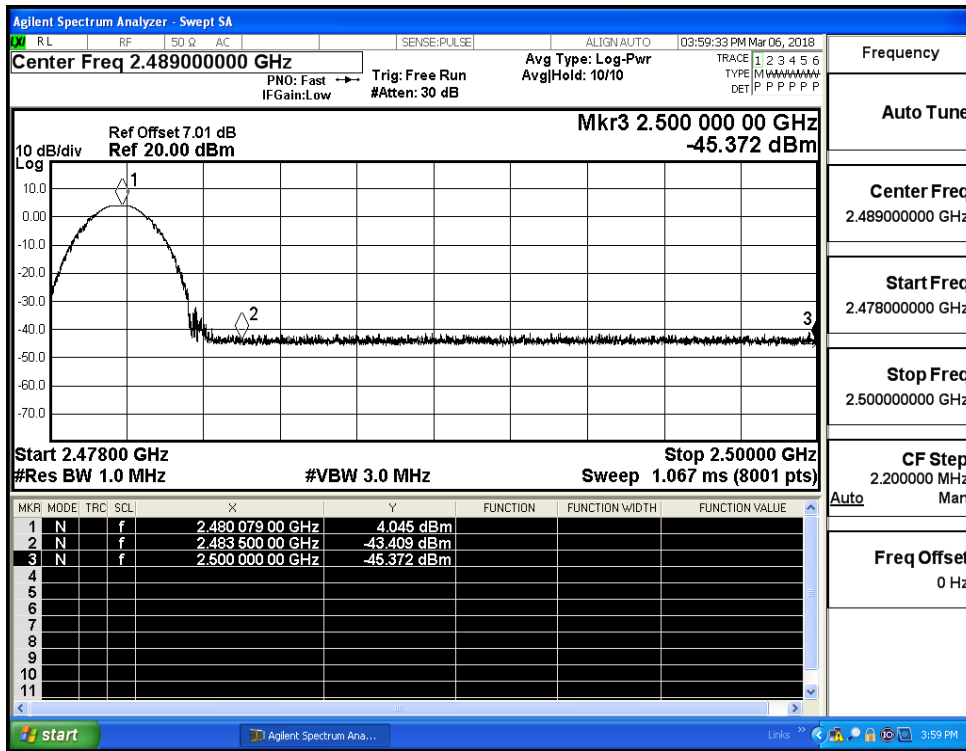
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



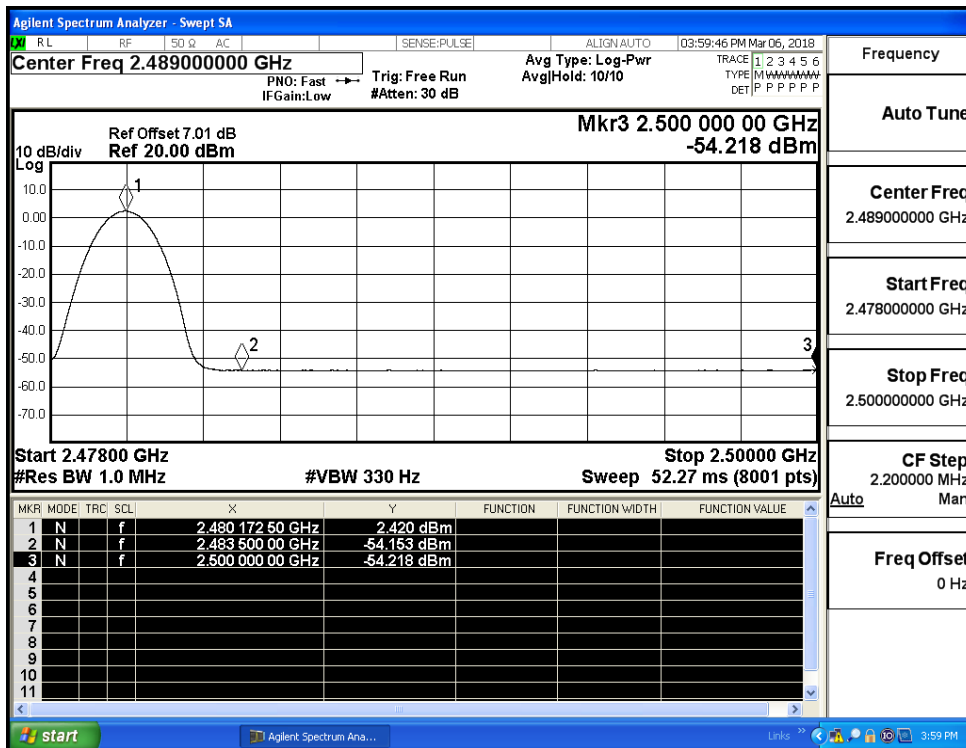
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



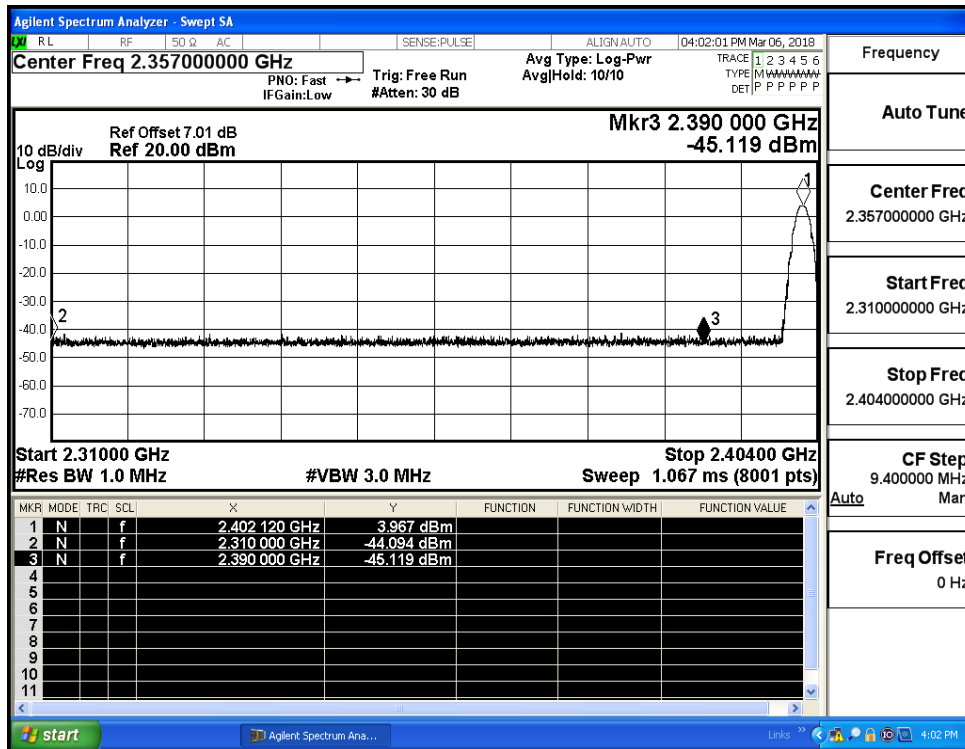
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



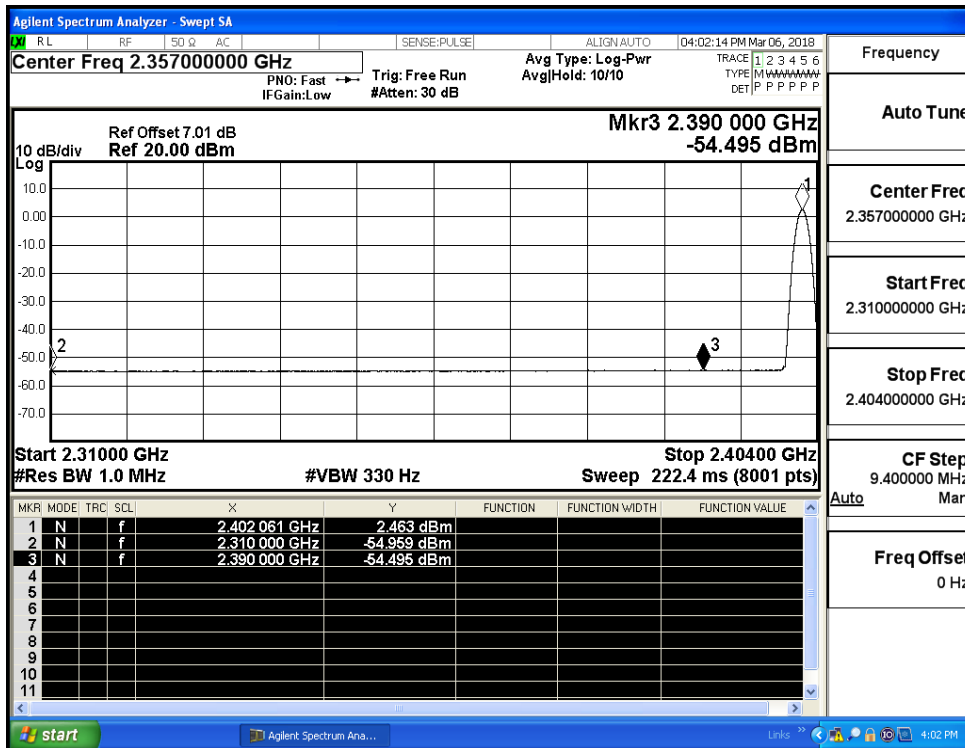
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



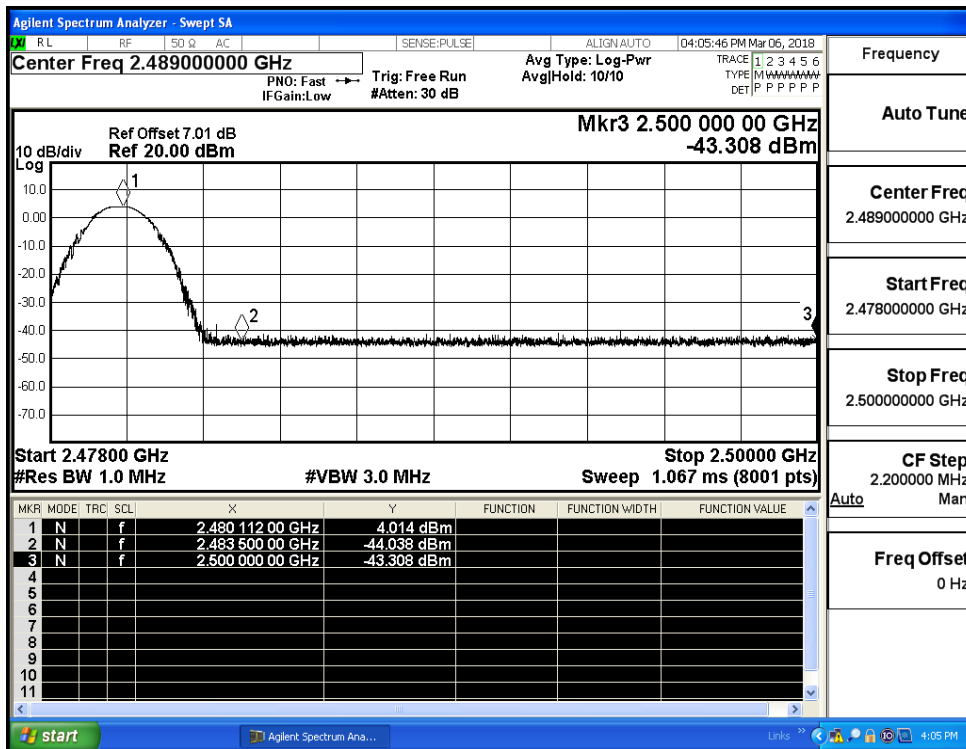
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

