

Appendix A

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

Product Name: Bluetooth Headset

Trade Mark: N/A

Test Model: TX-90

Environmental Conditions

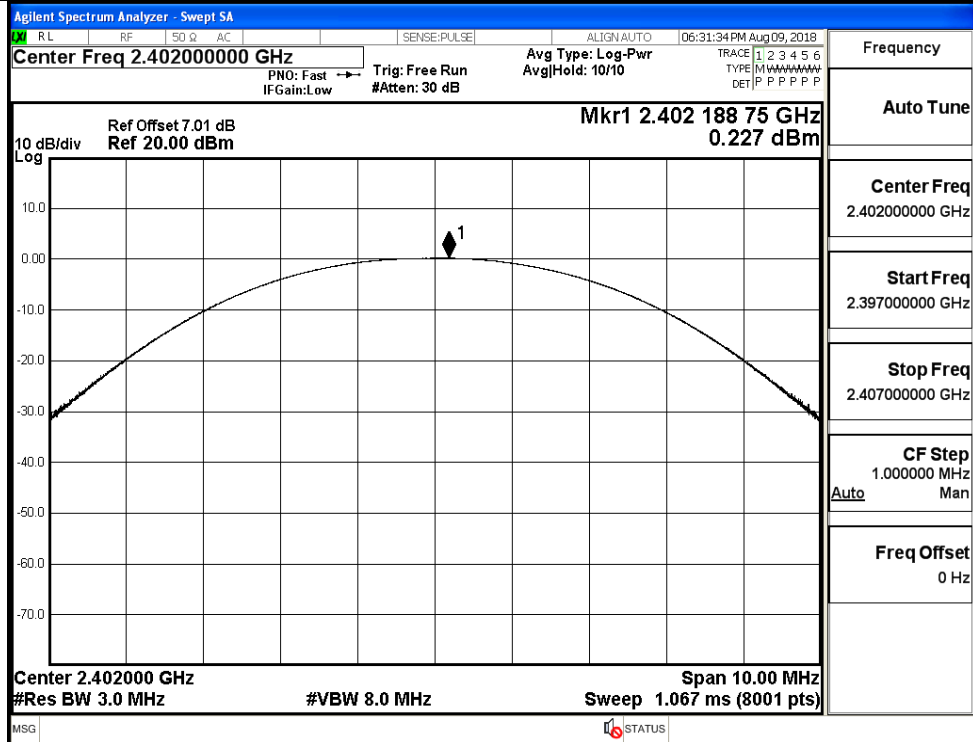
| | |
|--------------------|-------------|
| Temperature: | 24.2° C |
| Relative Humidity: | 53.8% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Mina.Xu |
| Supervised by: | Jayden.Zhuo |

A.1 Maximum Conducted Peak Output Power

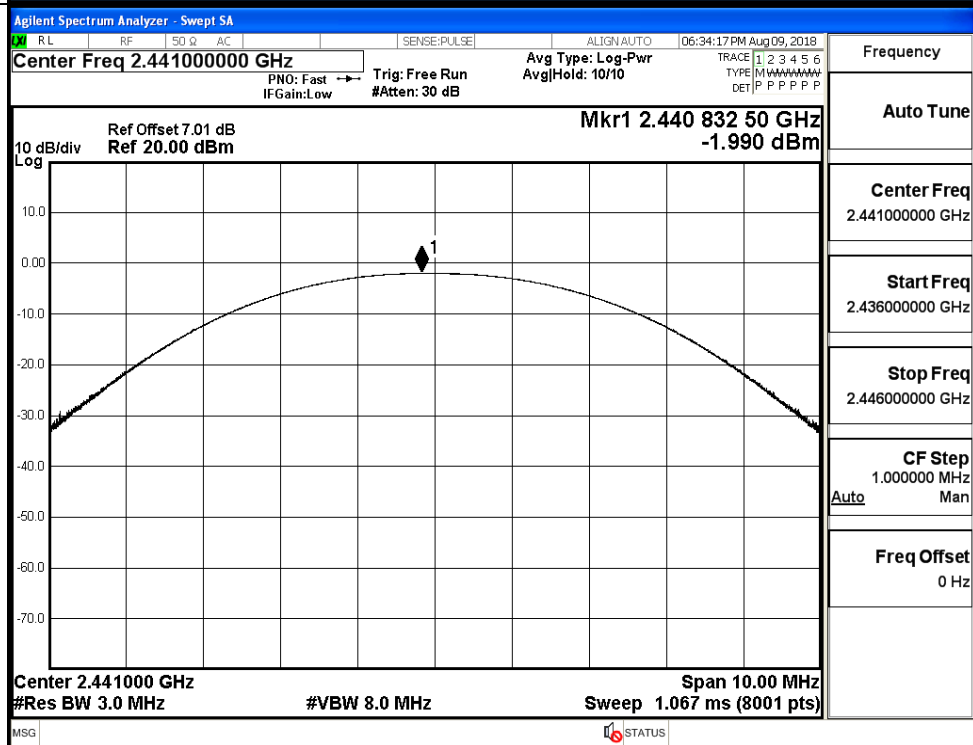
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK | LCH | 0.227 | 21 | PASS |
| | MCH | -1.990 | 21 | PASS |
| | HCH | -1.625 | 21 | PASS |
| $\pi/4$ DQPSK | LCH | -0.705 | 21 | PASS |
| | MCH | -2.743 | 21 | PASS |
| | HCH | -2.312 | 21 | PASS |
| 8DPSK | LCH | -0.596 | 21 | PASS |
| | MCH | -2.669 | 21 | PASS |
| | HCH | -2.321 | 21 | PASS |

Test Graphs

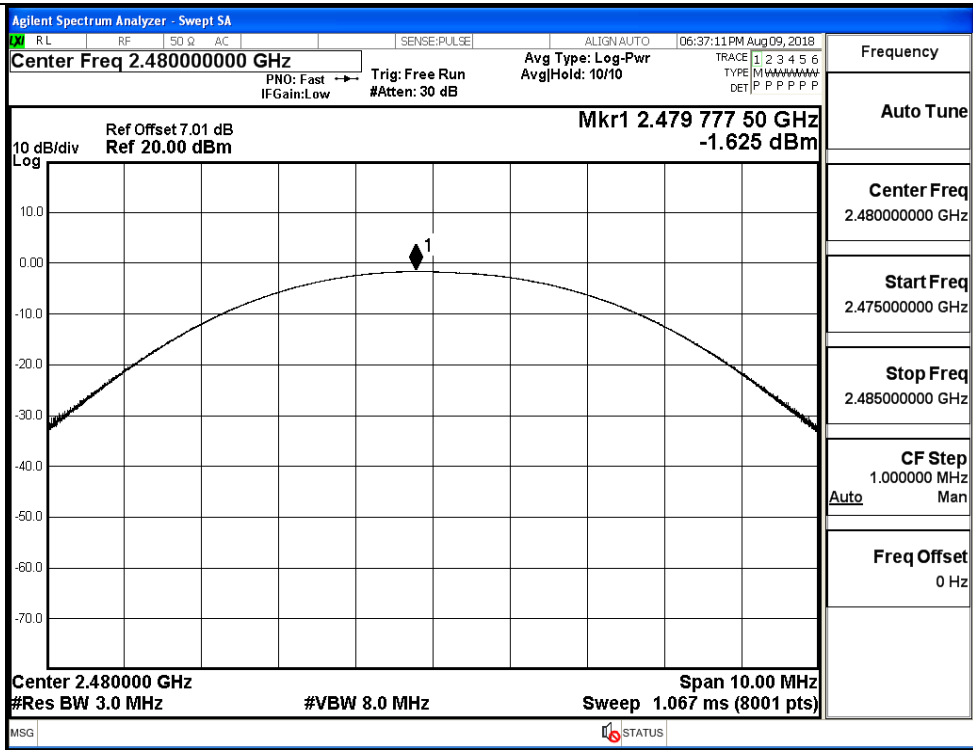
GFSK/LCH



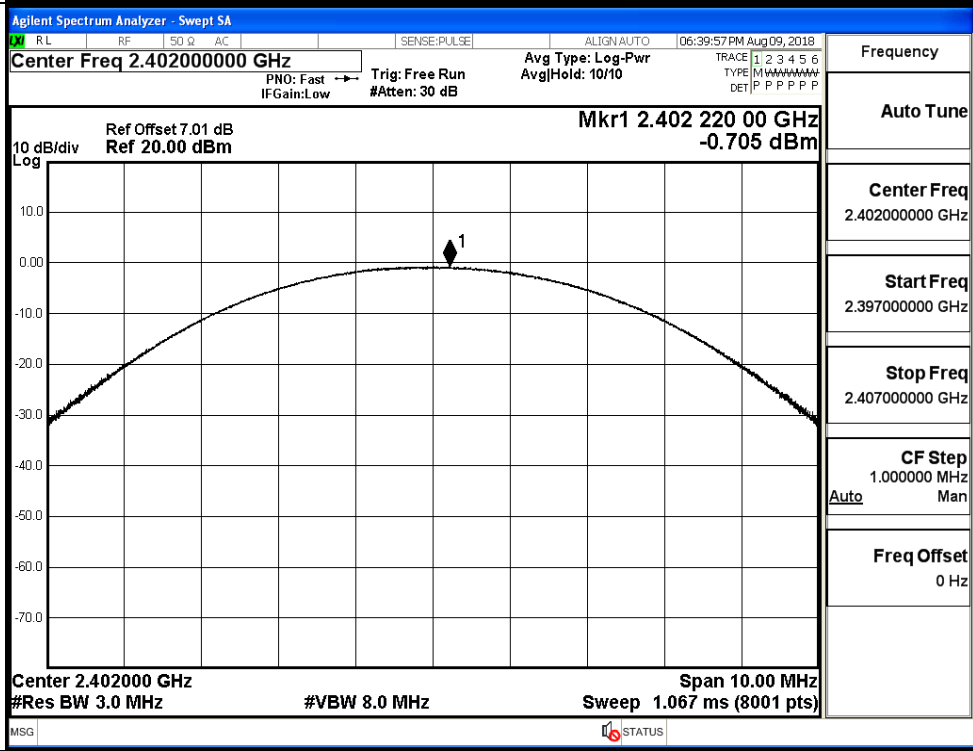
GFSK/MCH



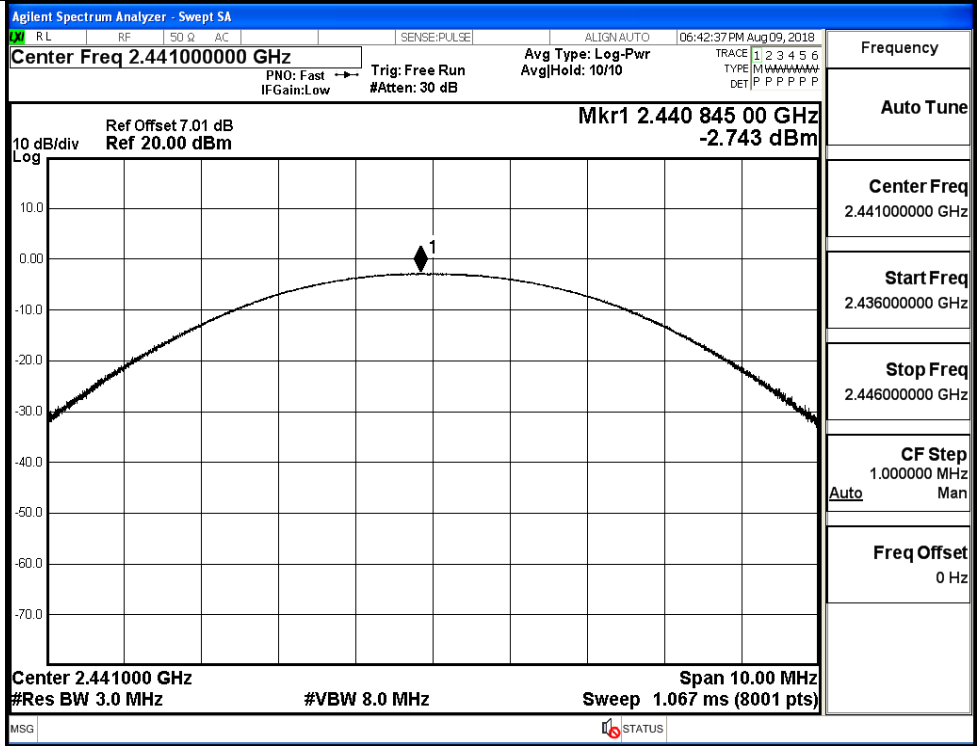
GFSK/HCH



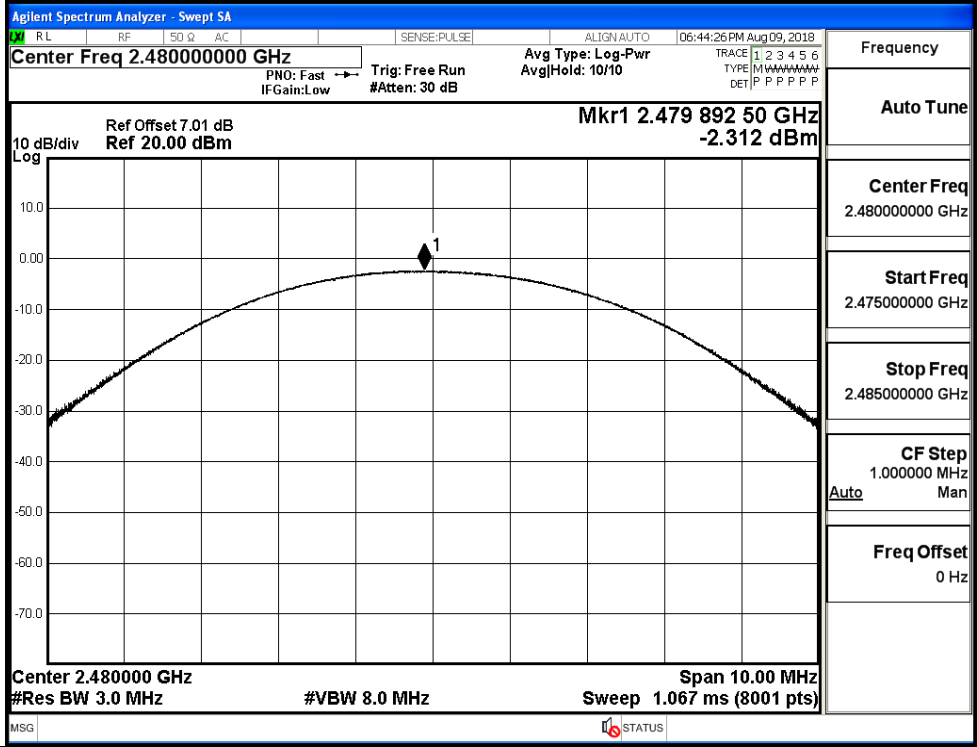
π /4DQPSK/LCH



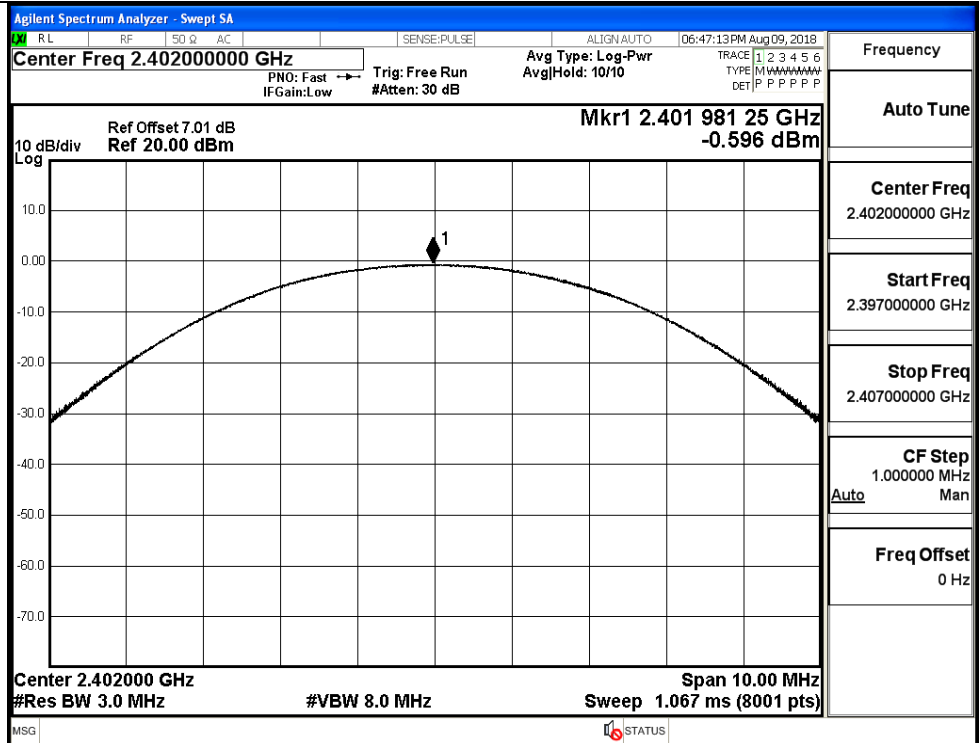
π /4DQPSK/MCH



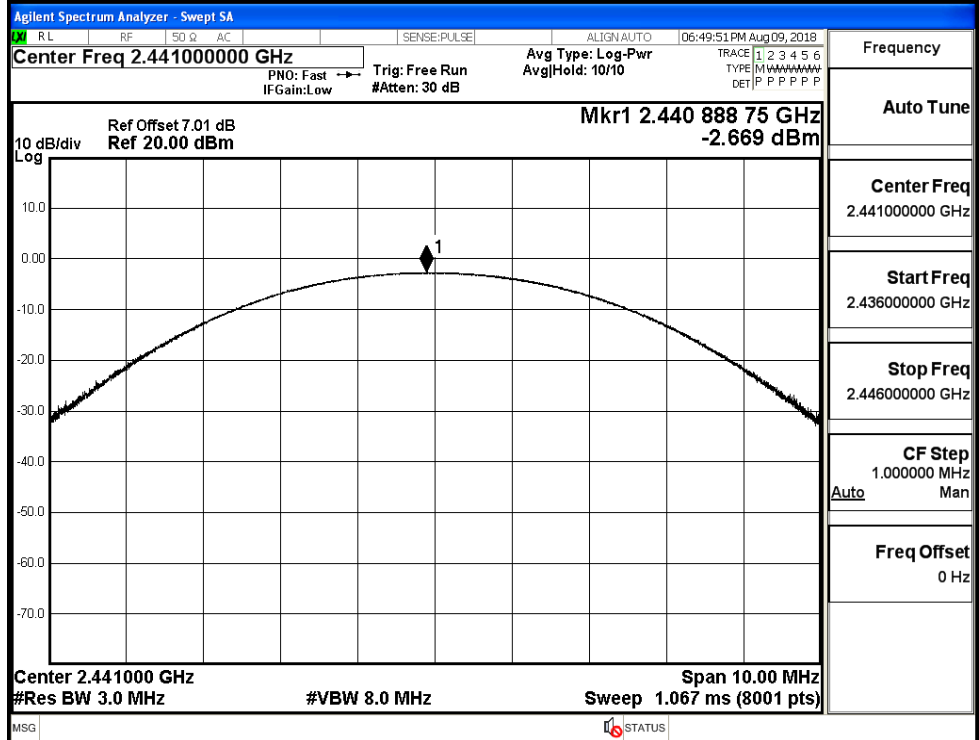
π /4DQPSK/HCH



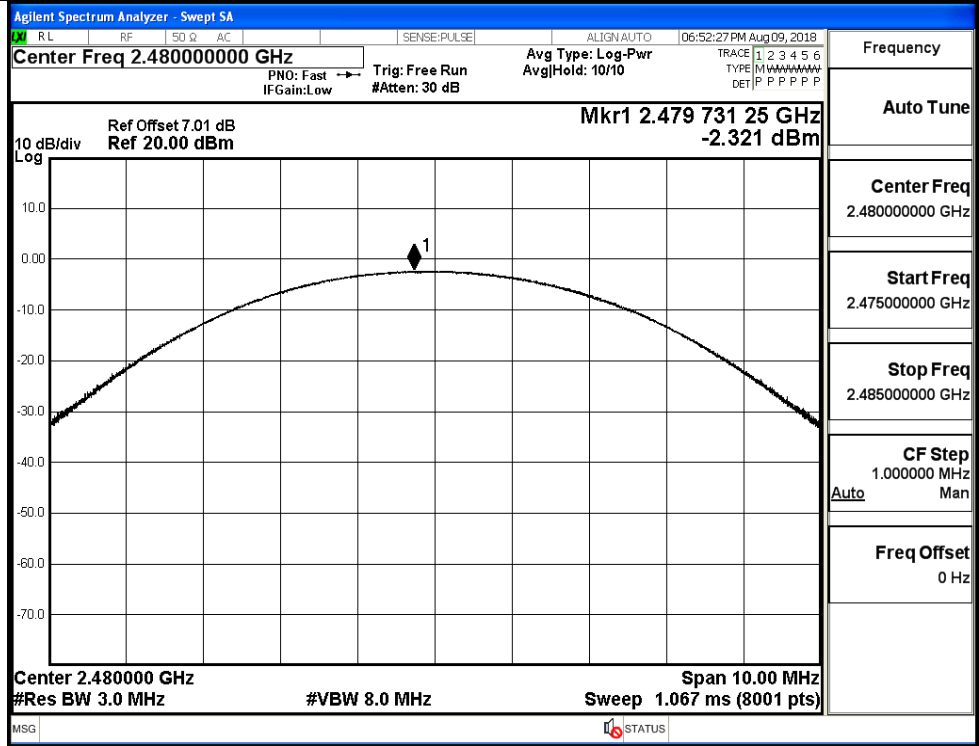
8DPSK/LCH



8DPSK/MCH

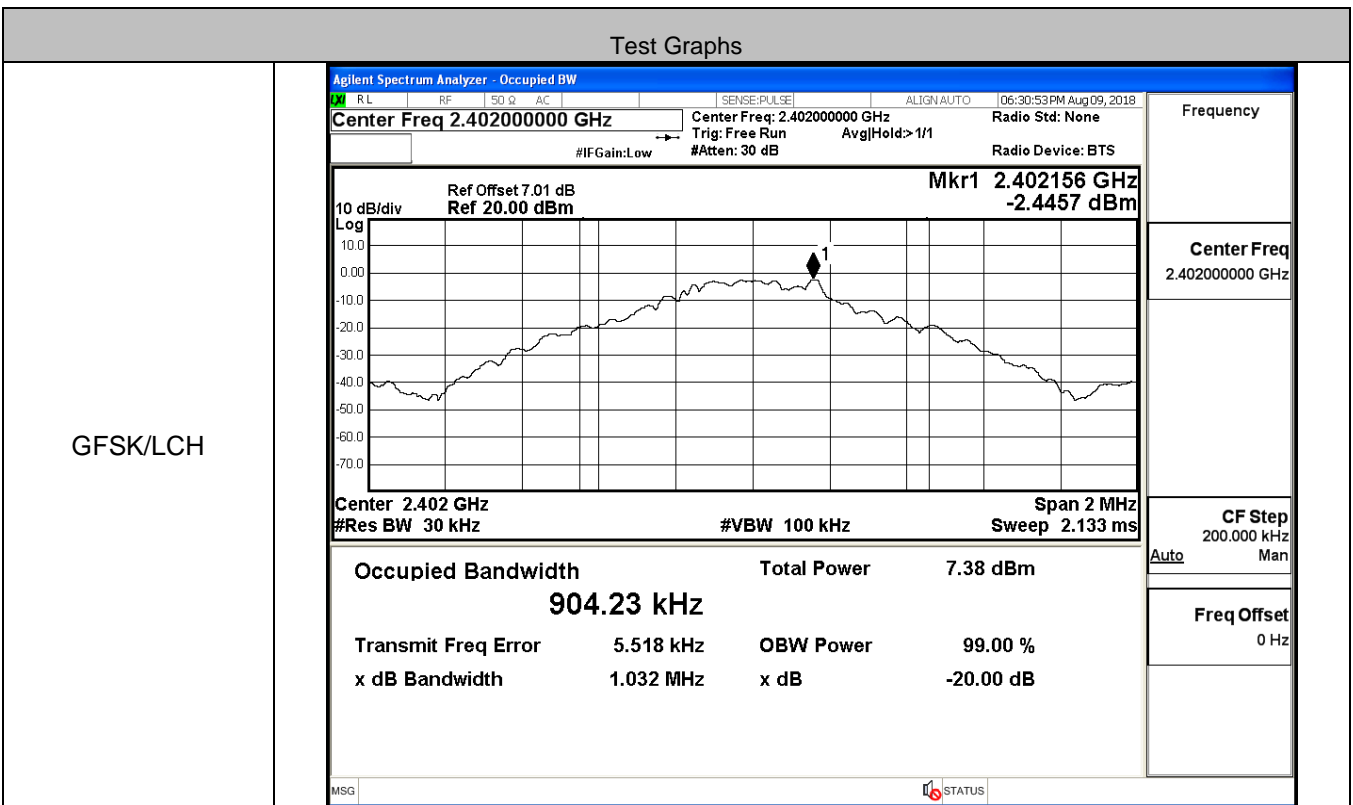


8DPSK/HCH

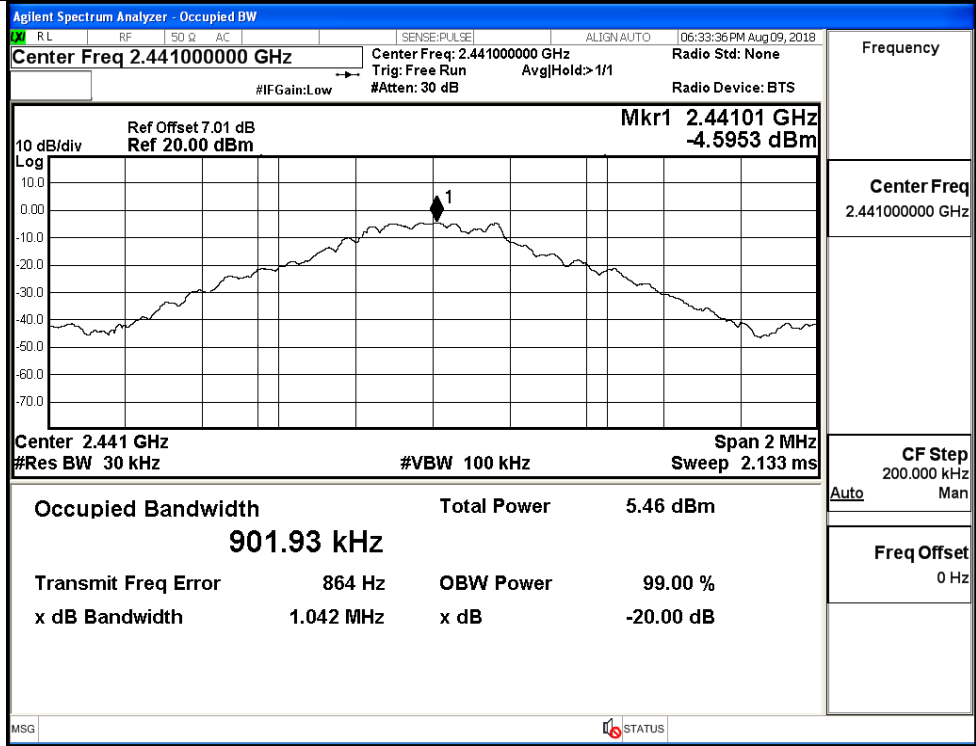


A.2 99% and 20dB Bandwidth

| Mode | Channel. | 99% Bandwidth [MHz] | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|----------|----------|---------------------|----------------------|---------------|---------|
| GFSK | LCH | 0.90423 | 1.032 | Not Specified | PASS |
| | MCH | 0.90193 | 1.042 | Not Specified | PASS |
| | HCH | 0.90047 | 1.040 | Not Specified | PASS |
| π/4DQPSK | LCH | 1.1736 | 1.291 | Not Specified | PASS |
| | MCH | 1.1851 | 1.318 | Not Specified | PASS |
| | HCH | 1.1734 | 1.312 | Not Specified | PASS |
| 8DPSK | LCH | 1.1782 | 1.296 | Not Specified | PASS |
| | MCH | 1.1975 | 1.301 | Not Specified | PASS |
| | HCH | 1.1816 | 1.297 | Not Specified | PASS |

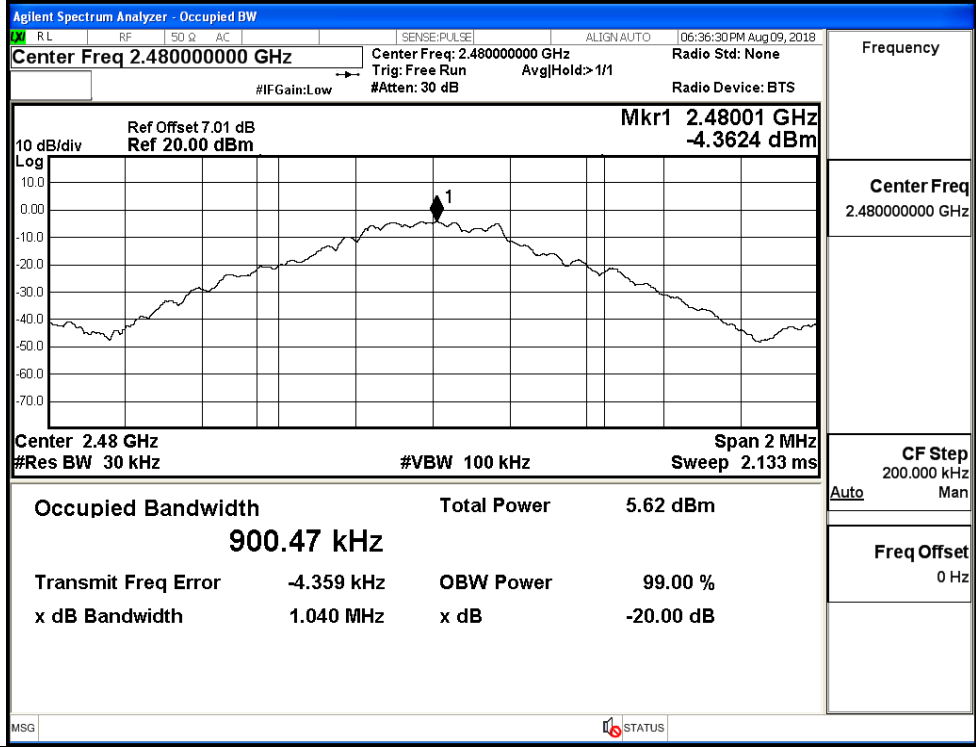


GFSK/MCH



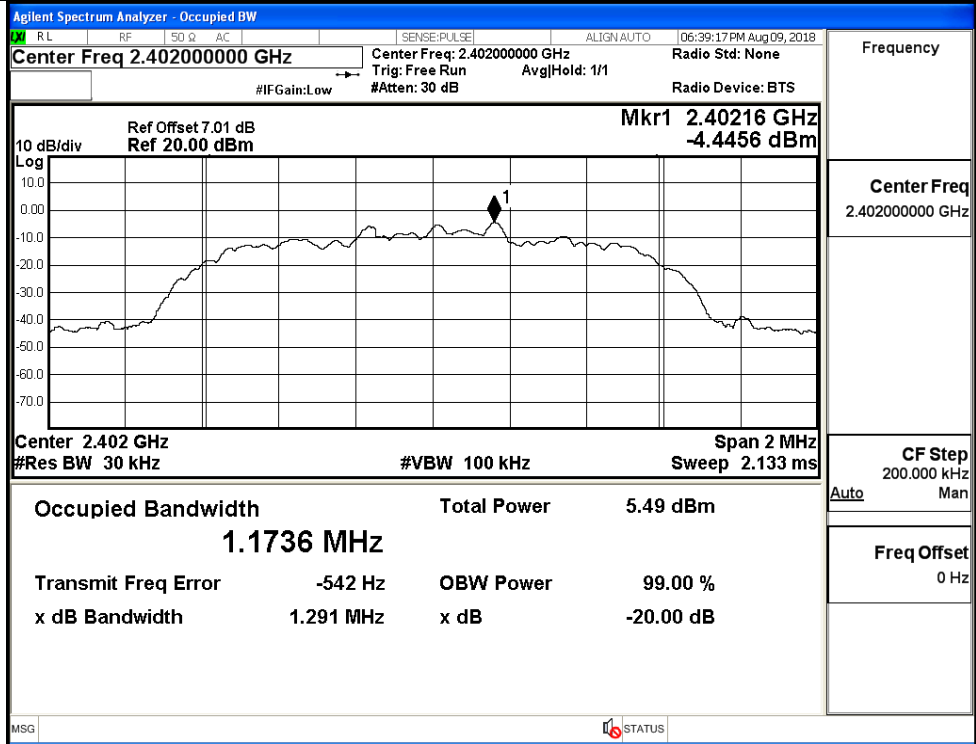
| | |
|-------------|-----------------|
| Frequency | 2.441000000 GHz |
| Center Freq | 2.441000000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

GFSK/HCH

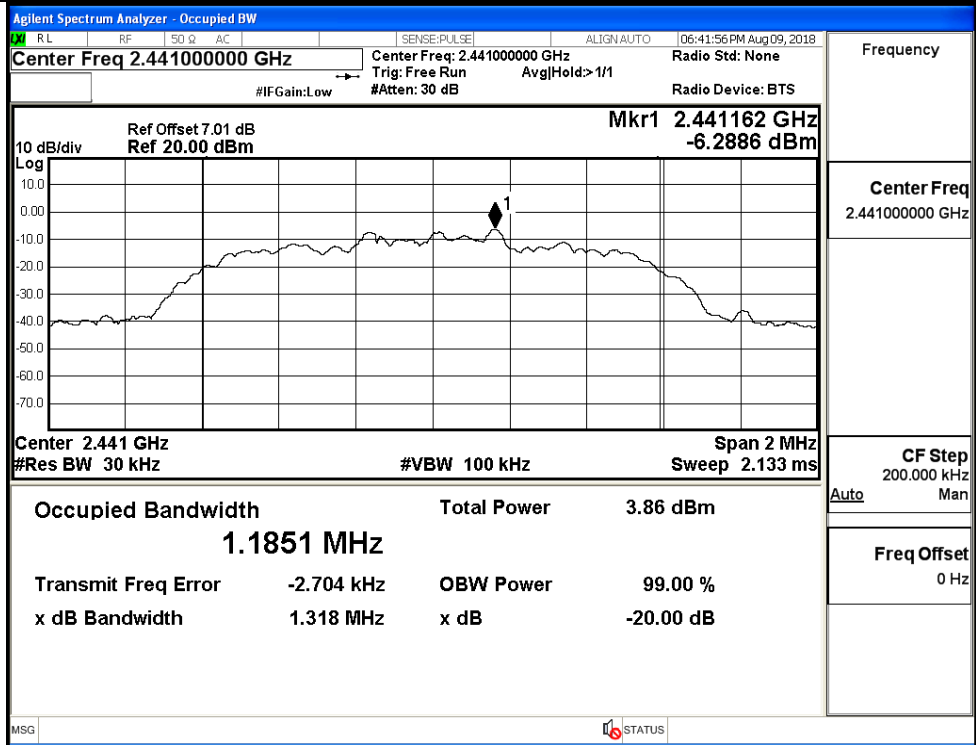


| | |
|-------------|-----------------|
| Frequency | 2.480000000 GHz |
| Center Freq | 2.480000000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

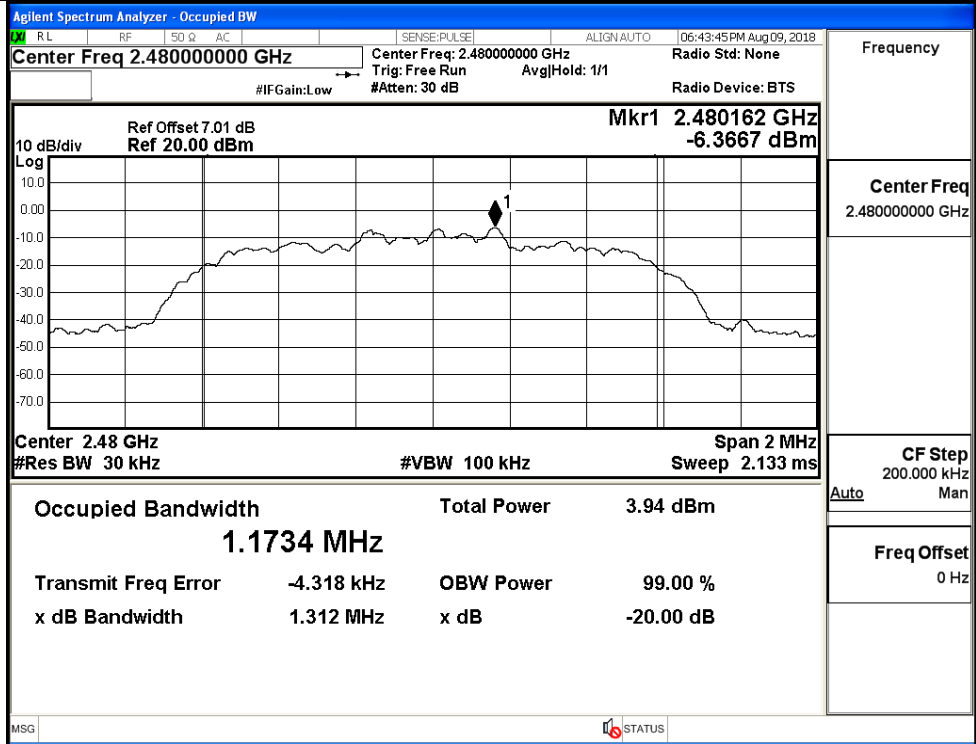
$\pi/4$ DQPSK/LCH



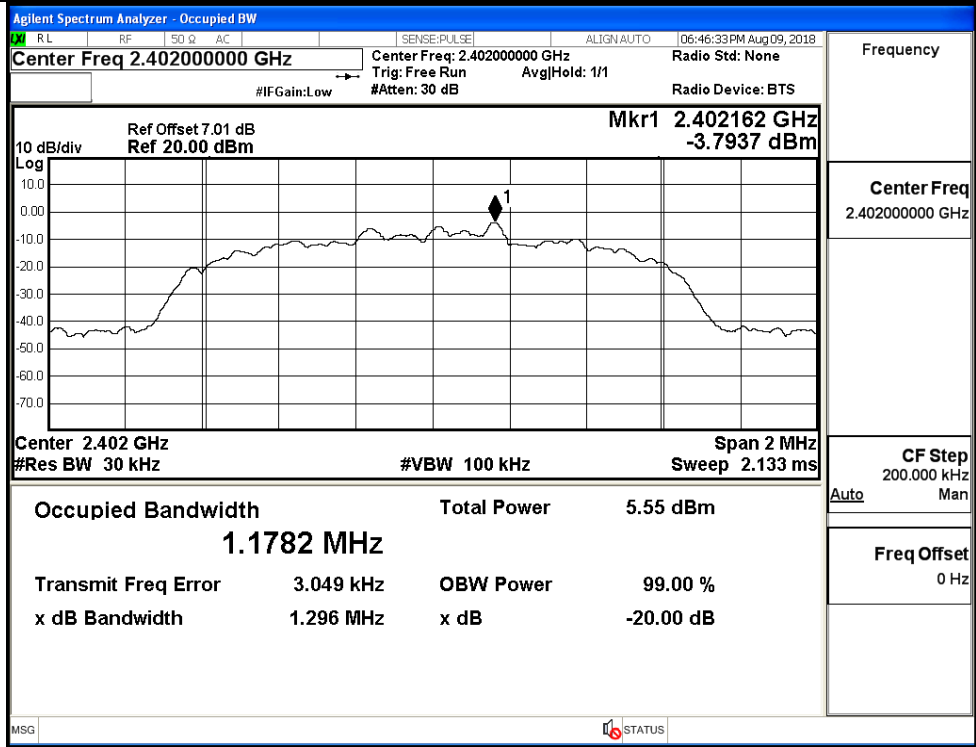
$\pi/4$ DQPSK/MCH



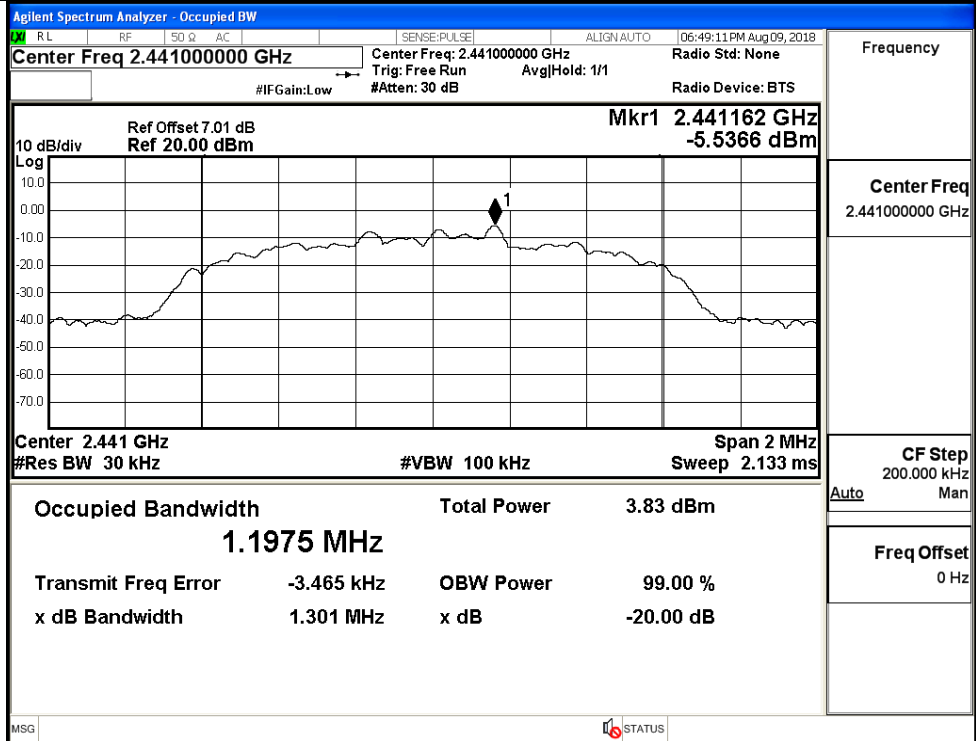
$\pi/4$ DQPSK/HCH



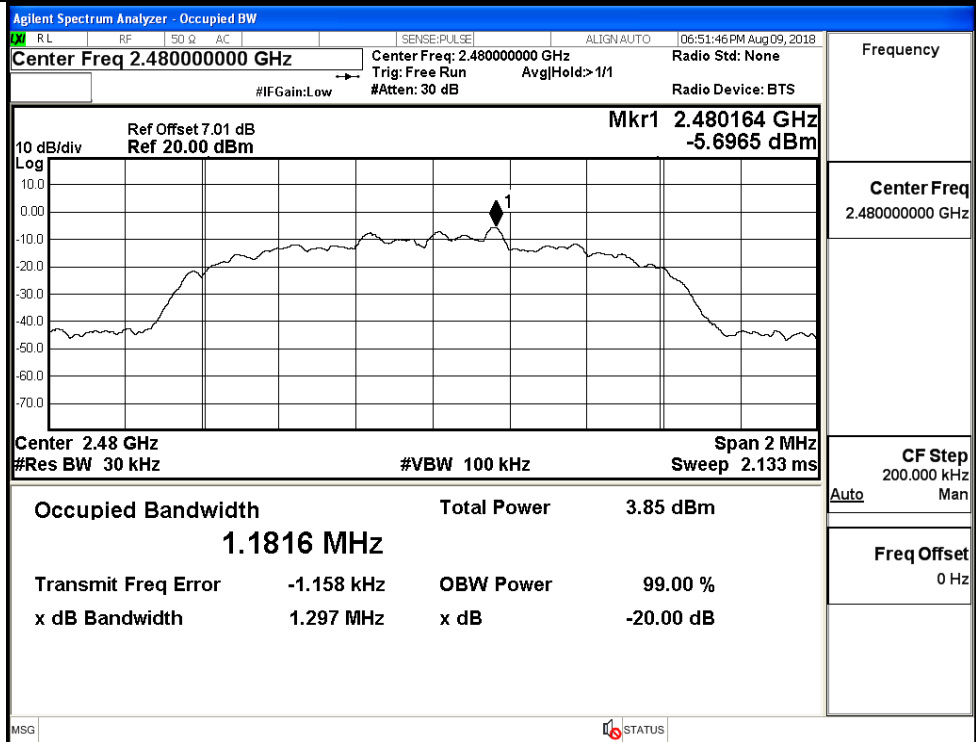
8DPSK/LCH



8DPSK/MCH

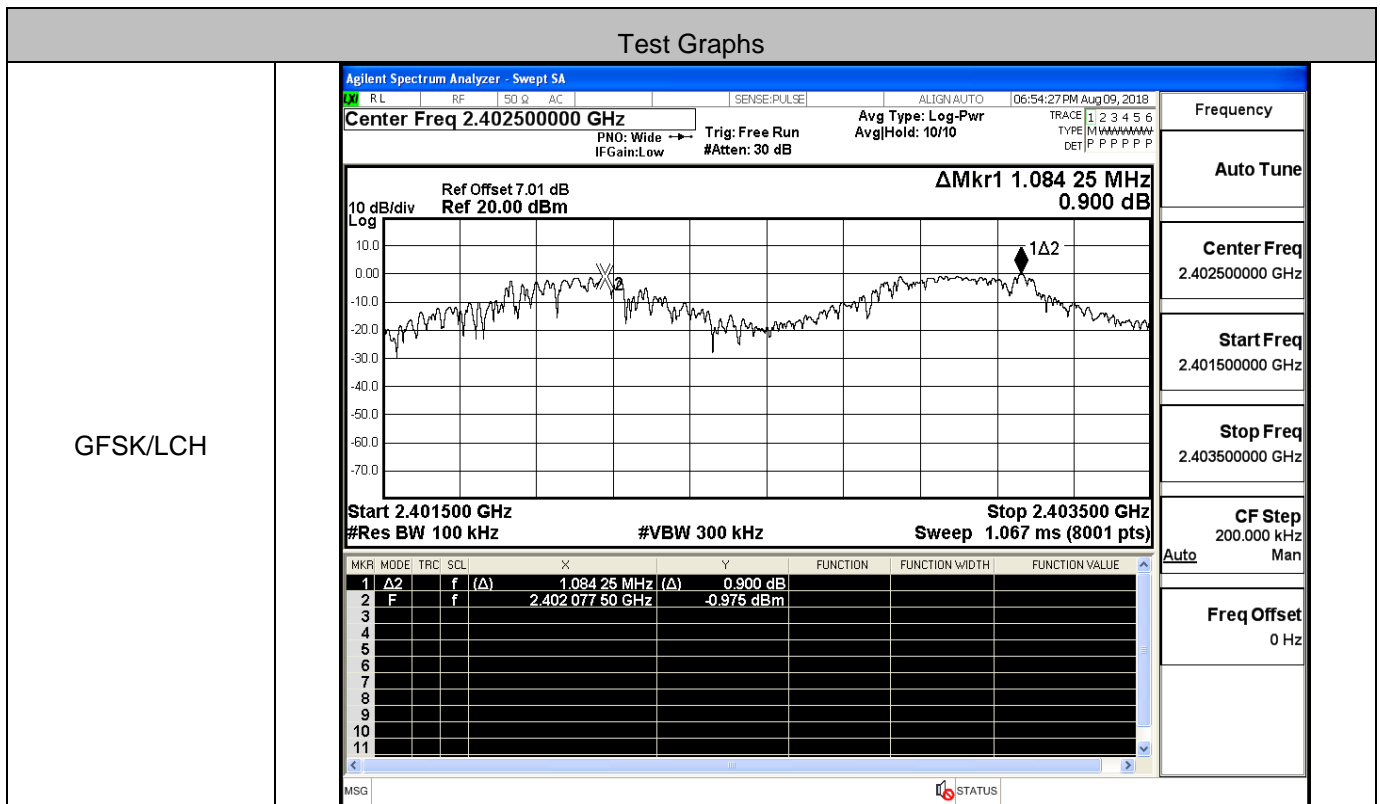


8DPSK/HCH

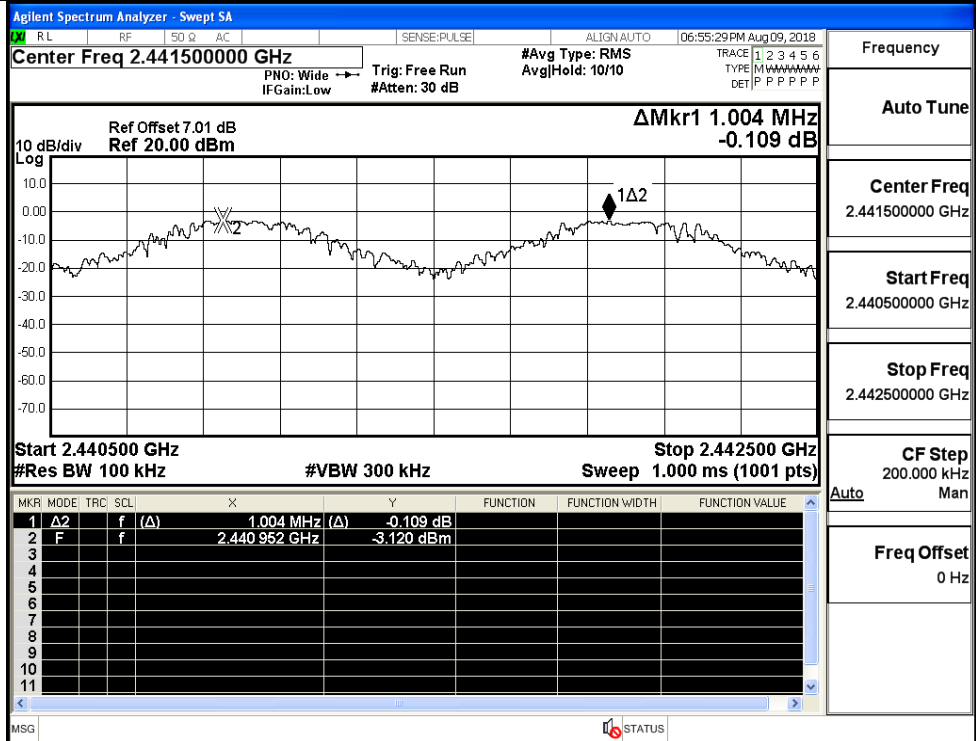


A.3 Carrier Frequency Separation

| Mode | Channel | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|---------|------------------------------------|-------------|---------|
| GFSK | LCH | 1.084 | 0.695 | PASS |
| | MCH | 1.004 | 0.695 | PASS |
| | HCH | 0.972 | 0.695 | PASS |
| π/4DQPSK | LCH | 0.906 | 0.879 | PASS |
| | MCH | 1.356 | 0.879 | PASS |
| | HCH | 1.020 | 0.879 | PASS |
| 8DPSK | LCH | 1.192 | 0.867 | PASS |
| | MCH | 0.876 | 0.867 | PASS |
| | HCH | 1.076 | 0.867 | PASS |



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

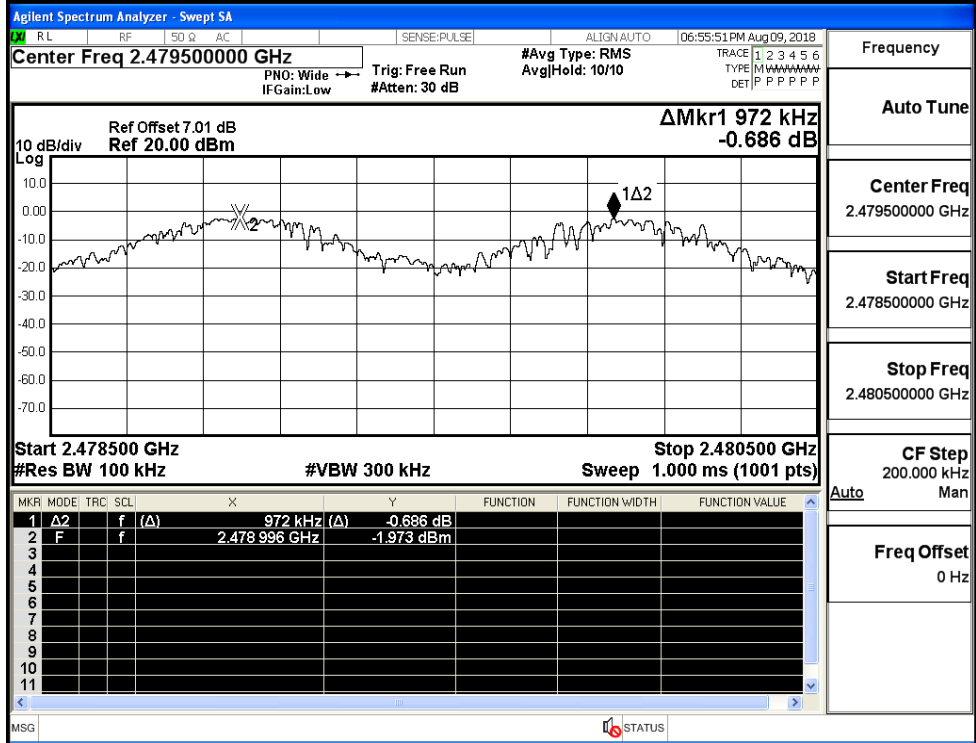
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

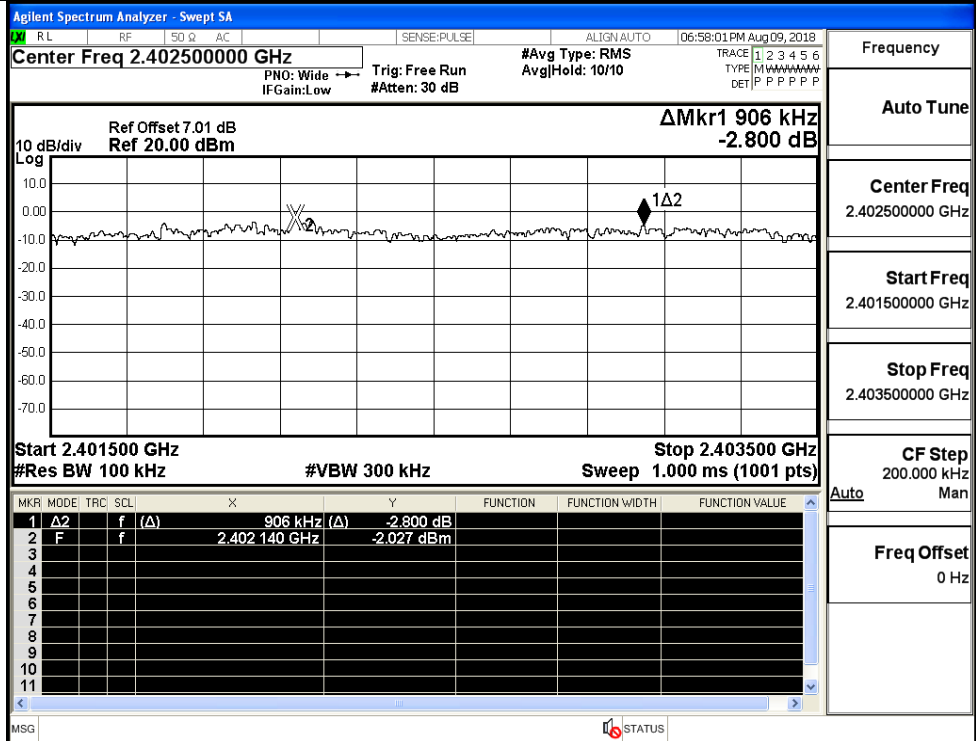
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Auto Man

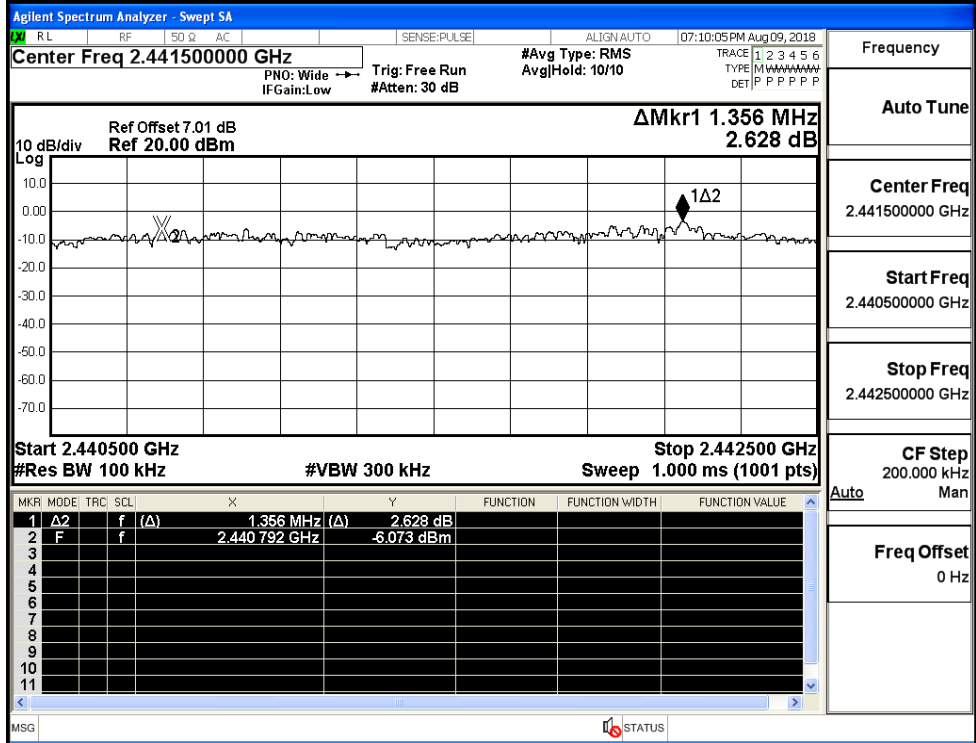
Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH



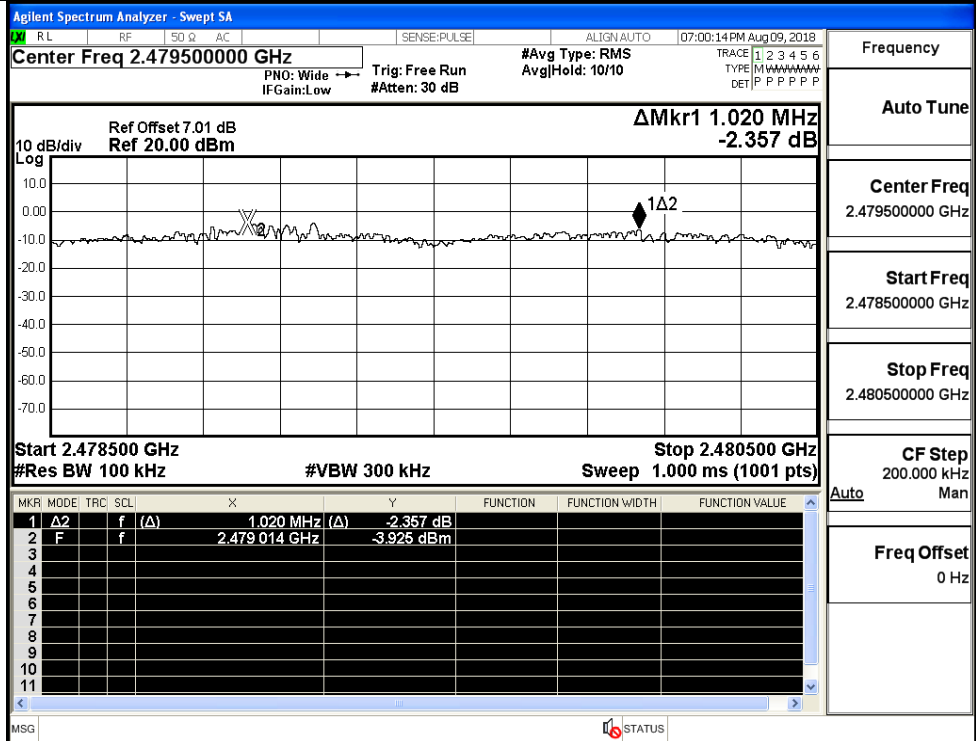
Frequency
Auto Tune
Center Freq
2.402500000 GHz
Start Freq
2.401500000 GHz
Stop Freq
2.403500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

$\pi/4$ 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
Auto
Man
Freq Offset
0 Hz

π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

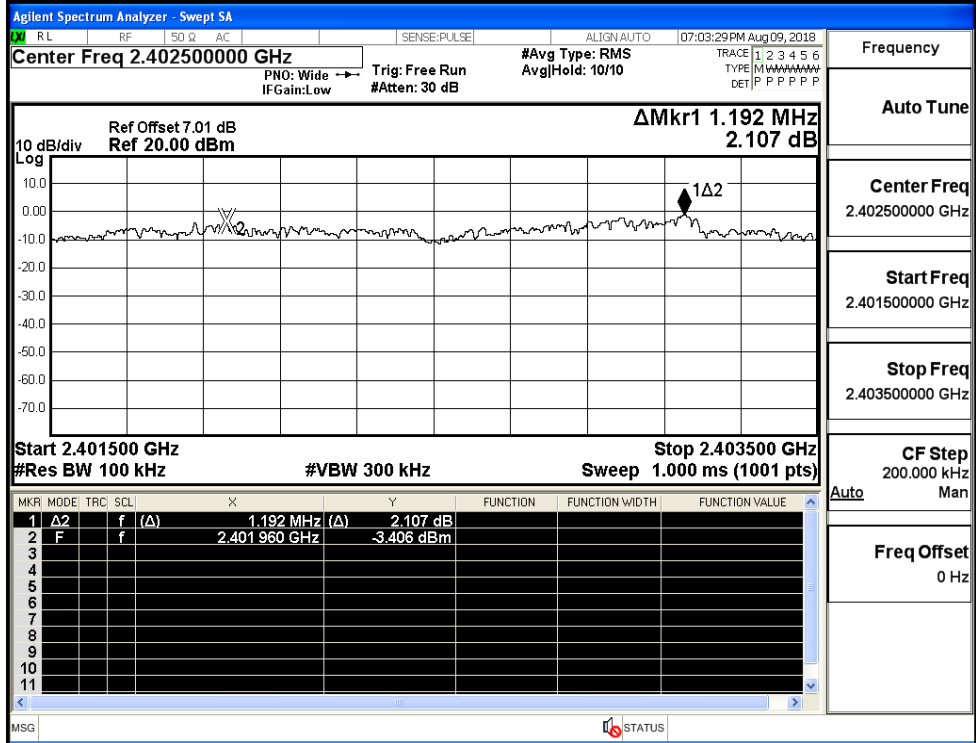
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

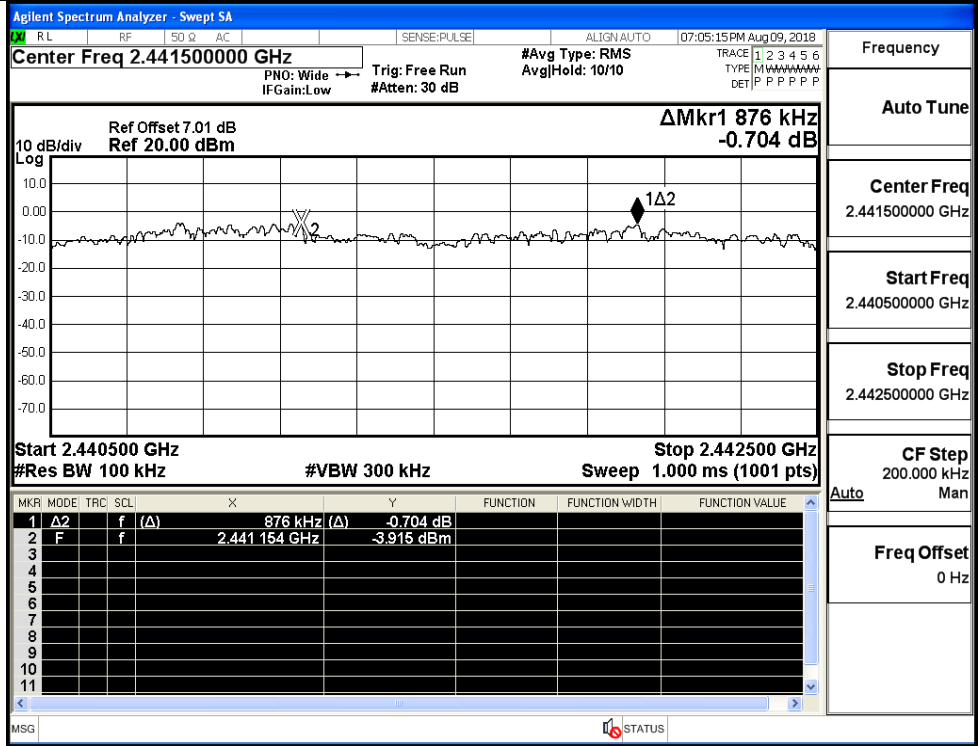
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

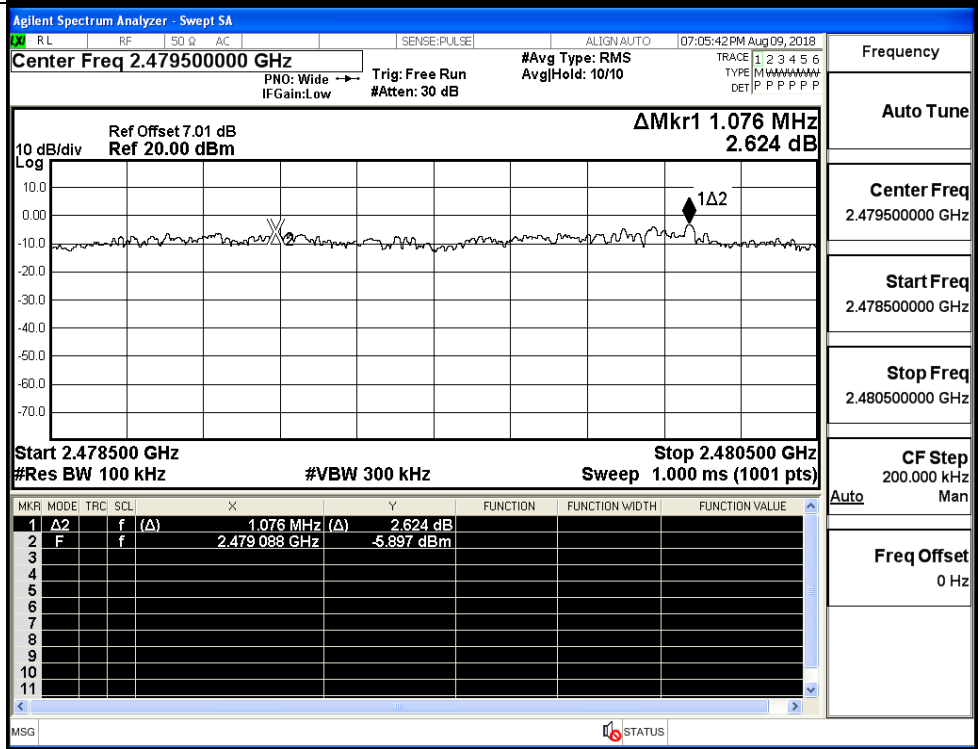
CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH

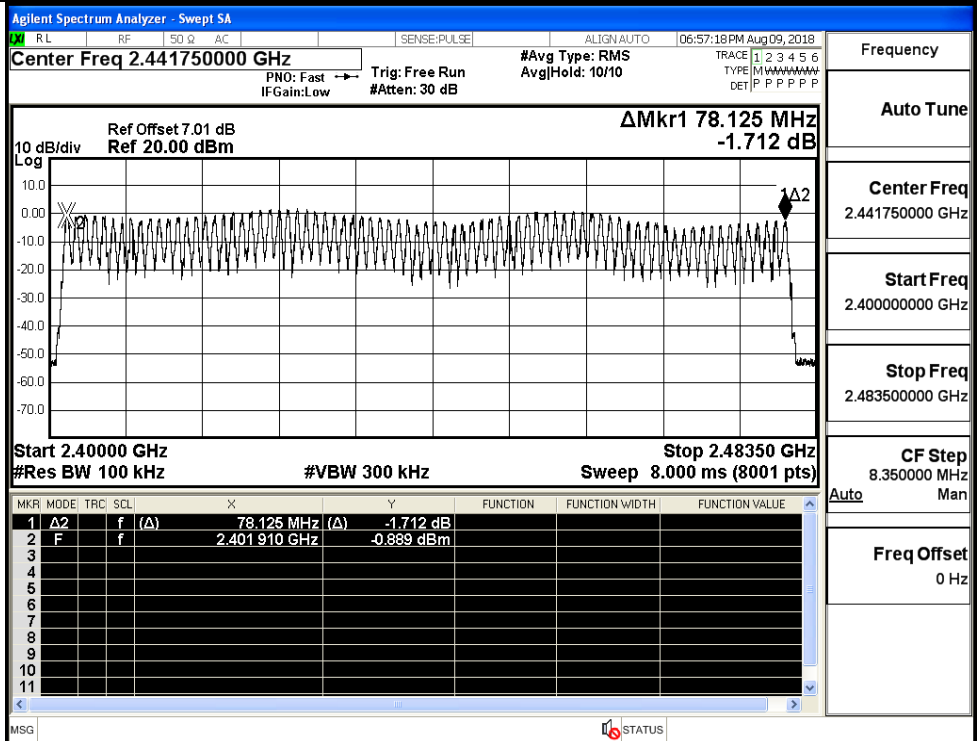


A.4 Hopping Channel Number

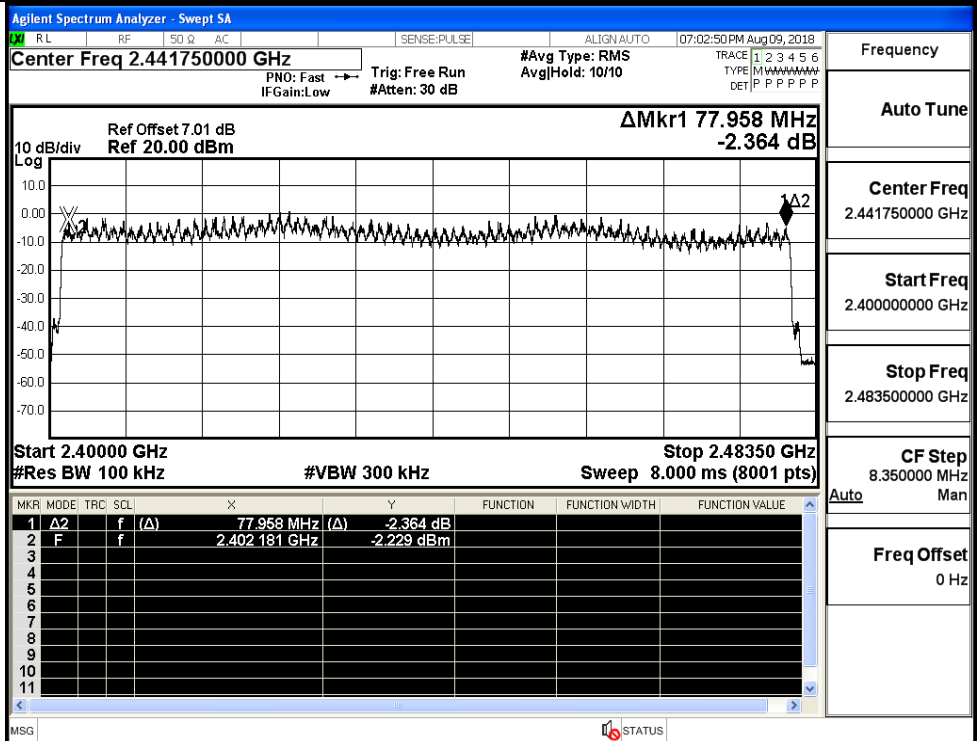
| Mode | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---------------|----------|-------------------------------|-----------|---------|
| GFSK | Hop | 79 | >=15 | PASS |
| $\pi/4$ DQPSK | Hop | 79 | >=15 | PASS |
| 8DPSK | Hop | 79 | >=15 | PASS |

Test Graphs

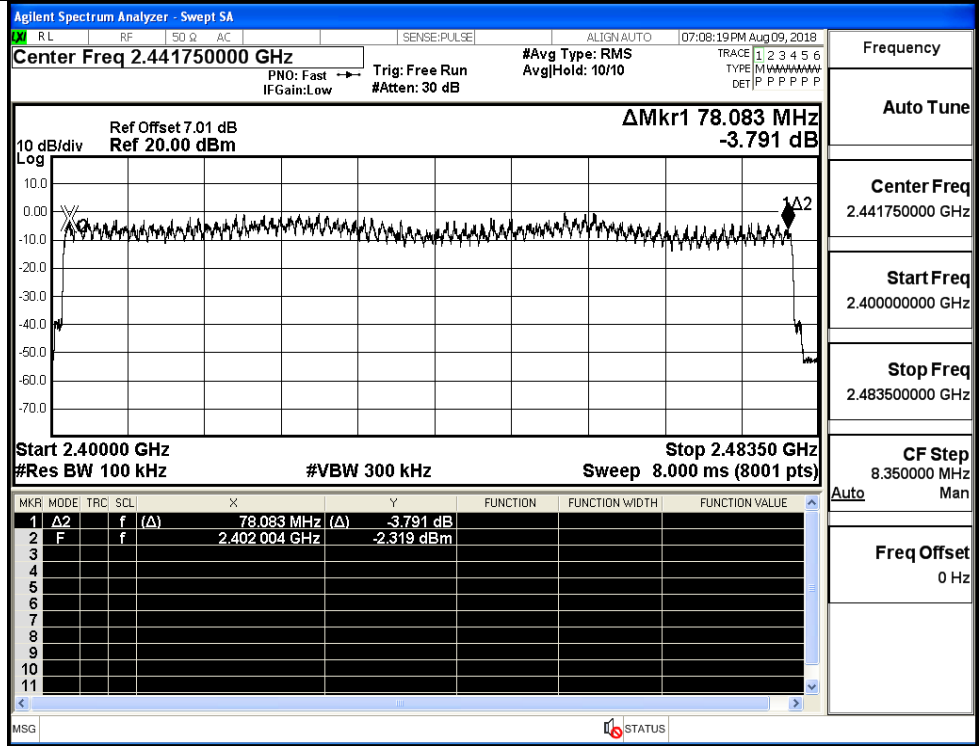
GFSK/Hop



$\pi/4$ DQPSK/Hop

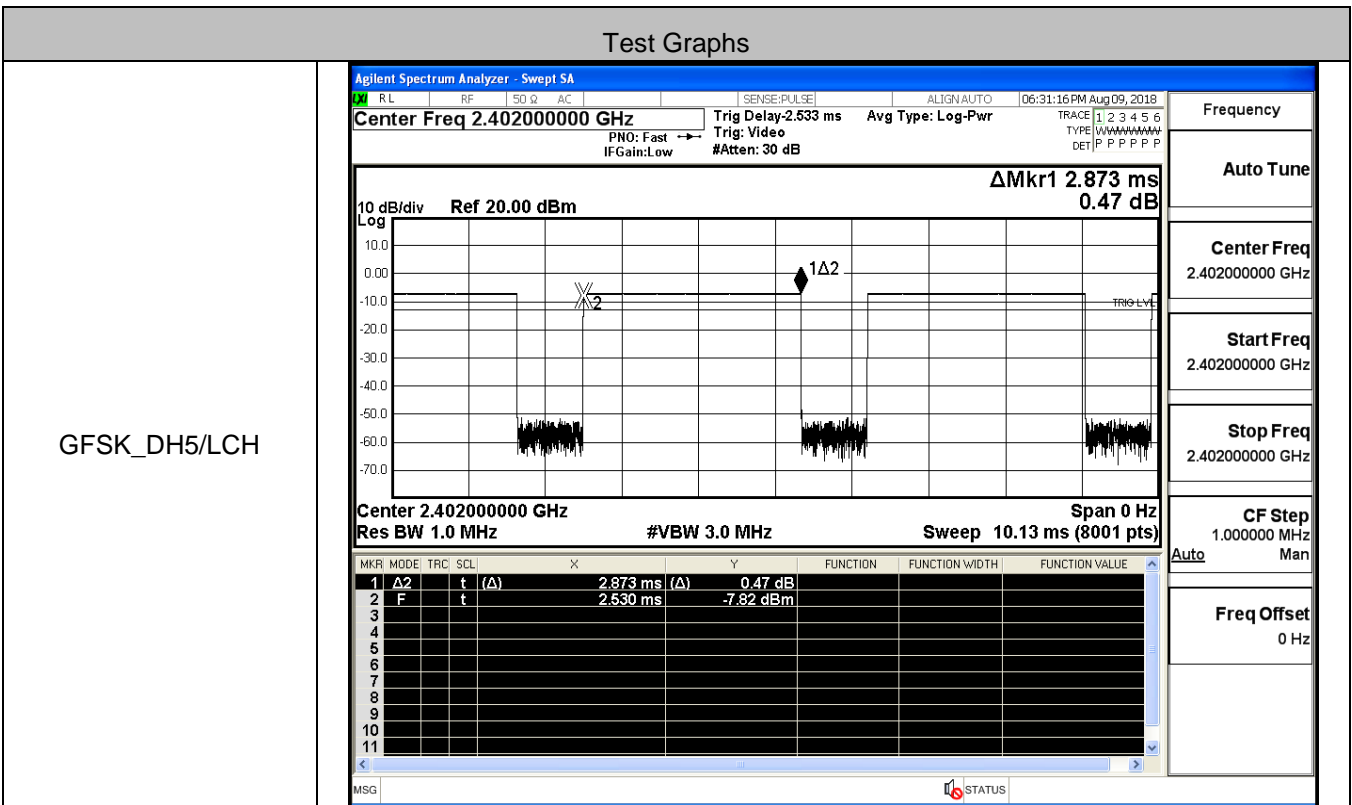


8DPSK/Hop

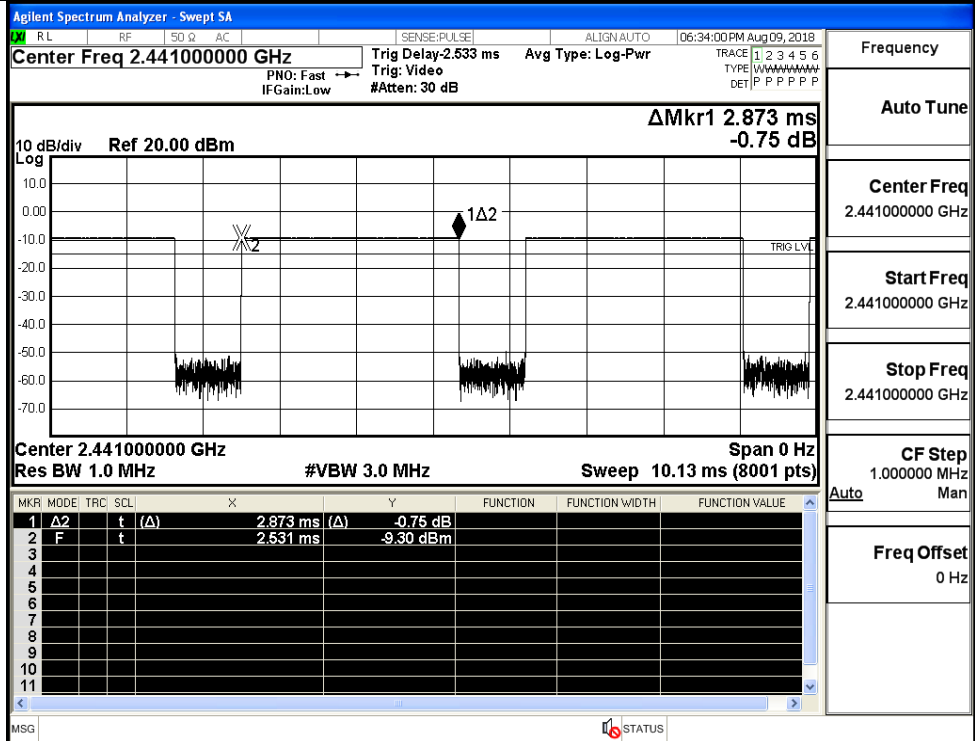


A.5 Dwell Time

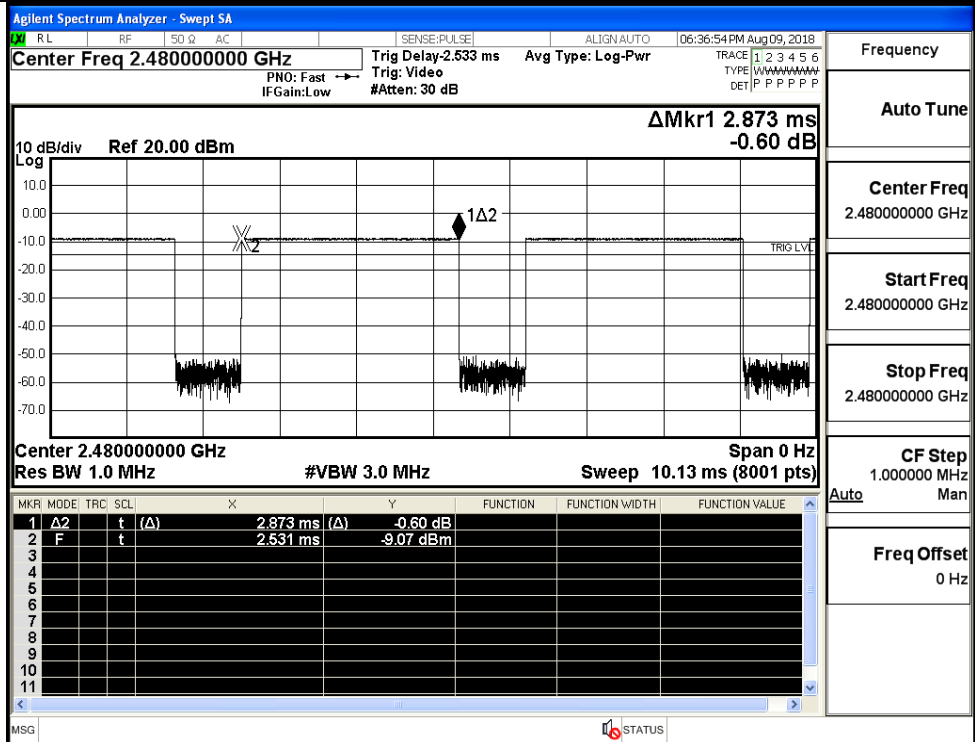
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK | DH5 | LCH | 2.873 | 106.7 | 0.306 | 0.4 | PASS |
| | DH5 | MCH | 2.873 | 106.7 | 0.306 | 0.4 | PASS |
| | DH5 | HCH | 2.873 | 106.7 | 0.306 | 0.4 | PASS |
| π/4DQPSK | 2DH5 | LCH | 2.877 | 106.7 | 0.307 | 0.4 | PASS |
| | 2DH5 | MCH | 2.877 | 106.7 | 0.307 | 0.4 | PASS |
| | 2DH5 | HCH | 2.877 | 106.7 | 0.307 | 0.4 | PASS |
| 8DPSK | 3DH5 | LCH | 2.879 | 106.7 | 0.307 | 0.4 | PASS |
| | 3DH5 | MCH | 2.879 | 106.7 | 0.307 | 0.4 | PASS |
| | 3DH5 | HCH | 2.879 | 106.7 | 0.307 | 0.4 | PASS |



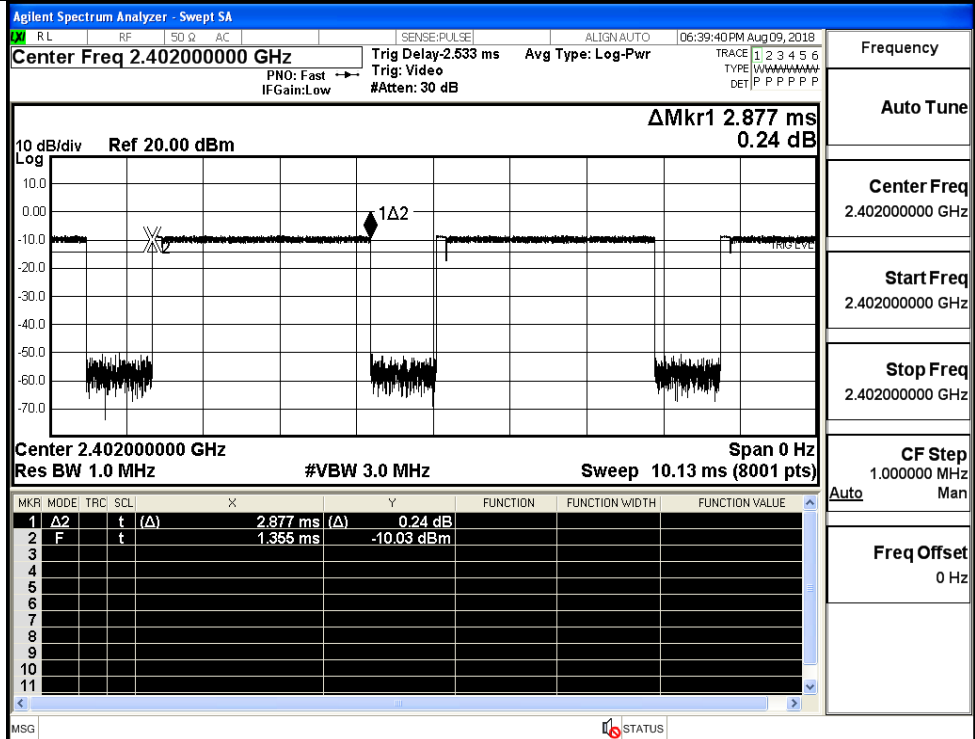
GFSK_DH5/MCH



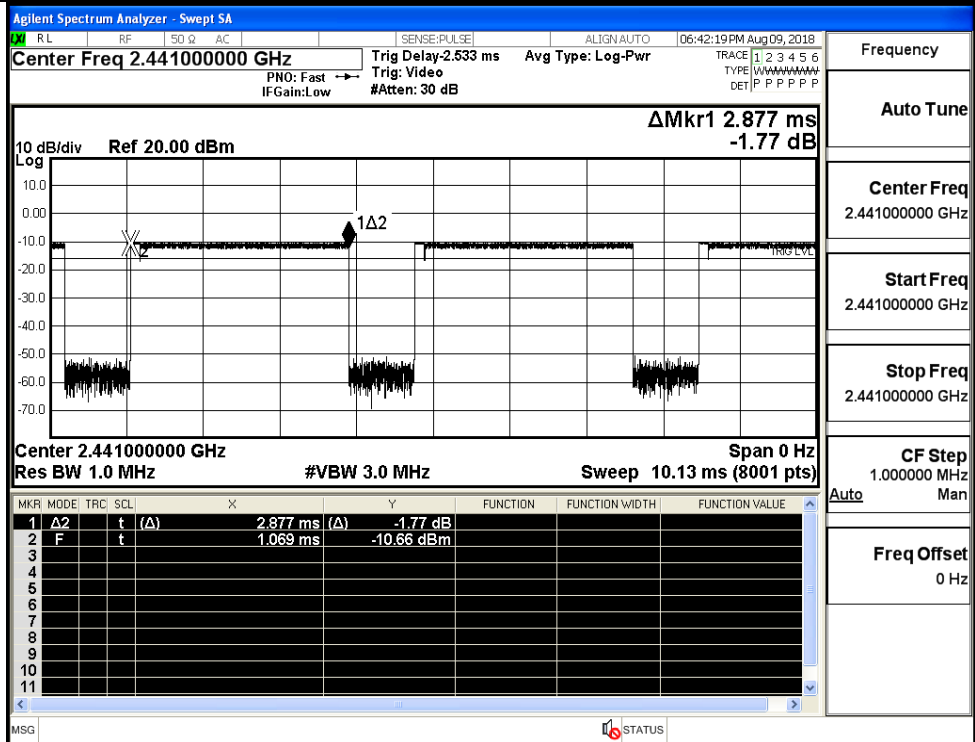
GFSK_DH5/HCH



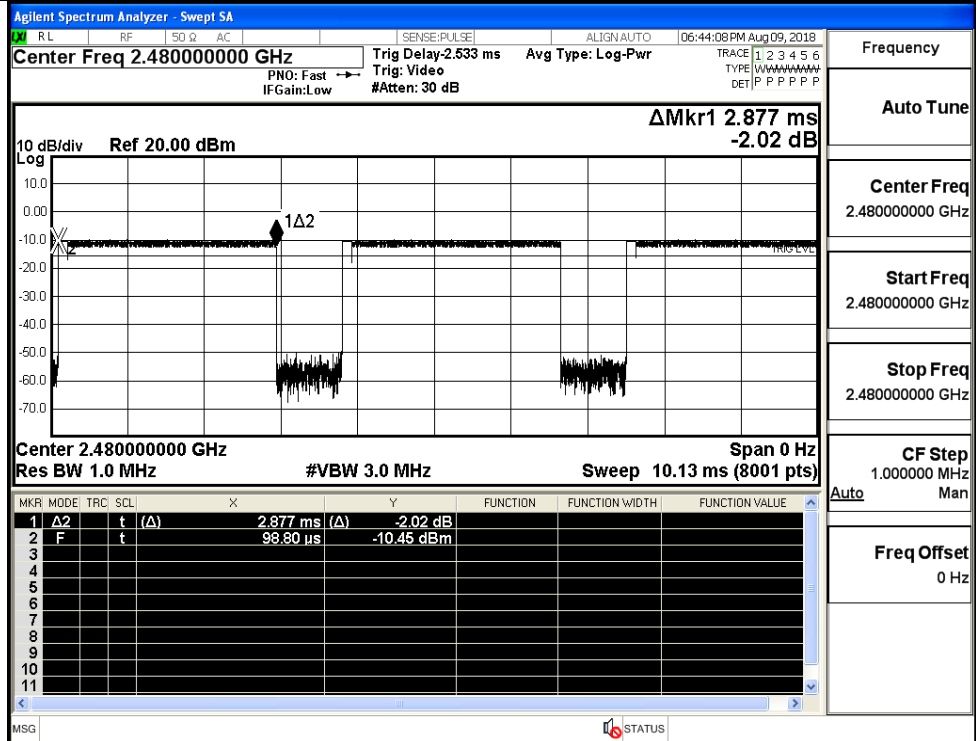
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH

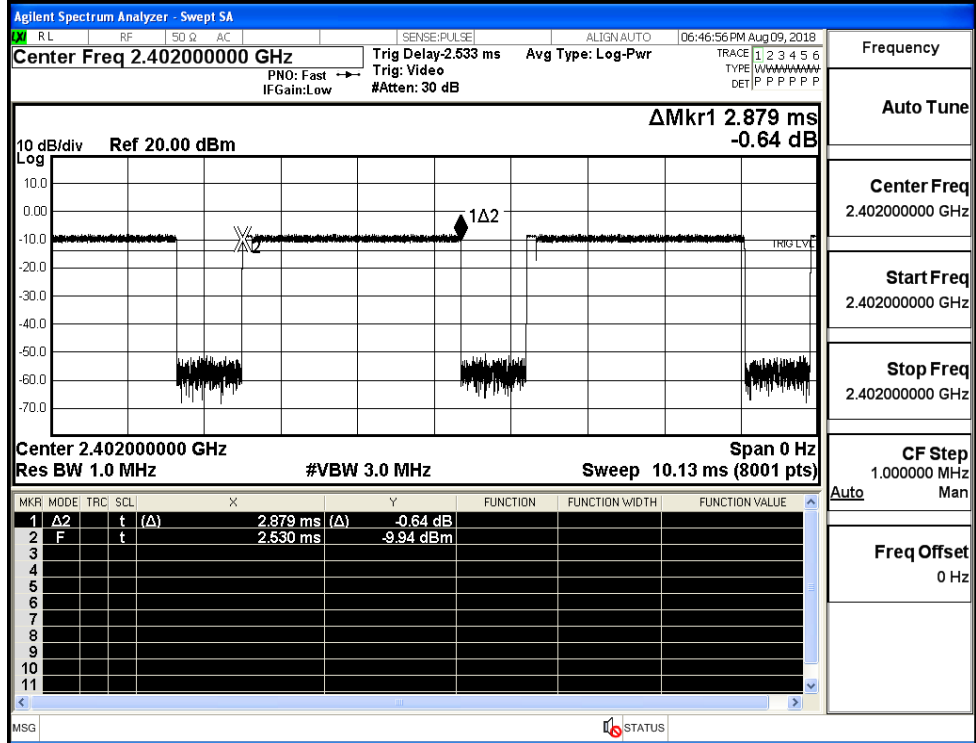


$\pi/4$ DQPSK
_2DH5/HCH



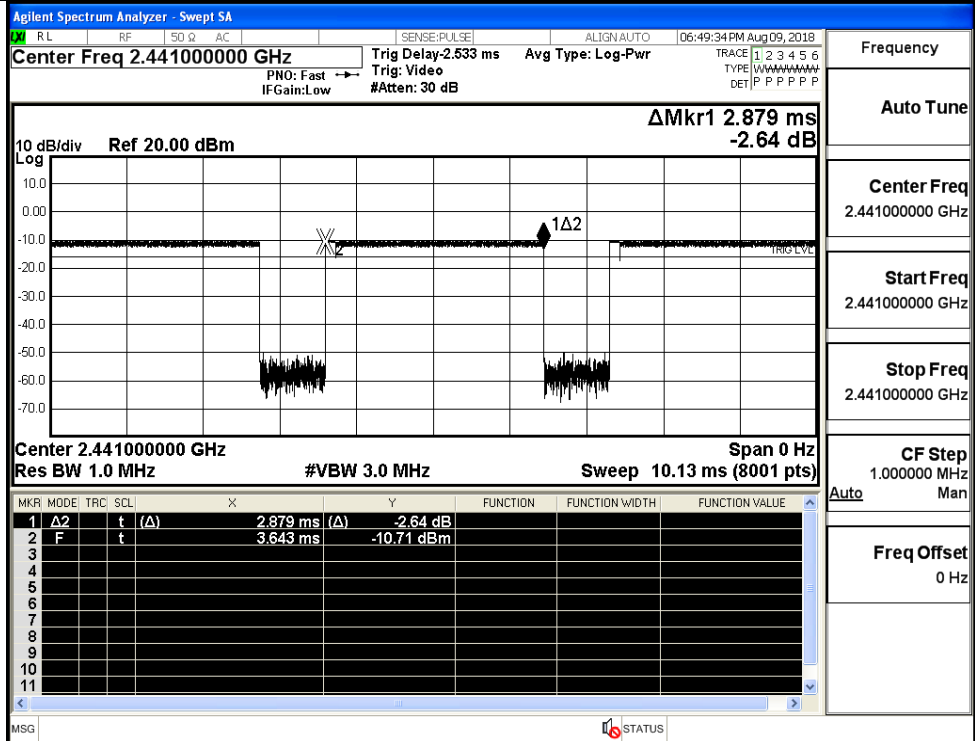
| | |
|-------------|-----------------|
| Frequency | 2.480000000 GHz |
| Auto Tune | |
| Center Freq | 2.480000000 GHz |
| Start Freq | 2.480000000 GHz |
| Stop Freq | 2.480000000 GHz |
| CF Step | 1.000000 MHz |
| Auto | Man |
| Freq Offset | 0 Hz |

8DPSK_3DH5/LCH

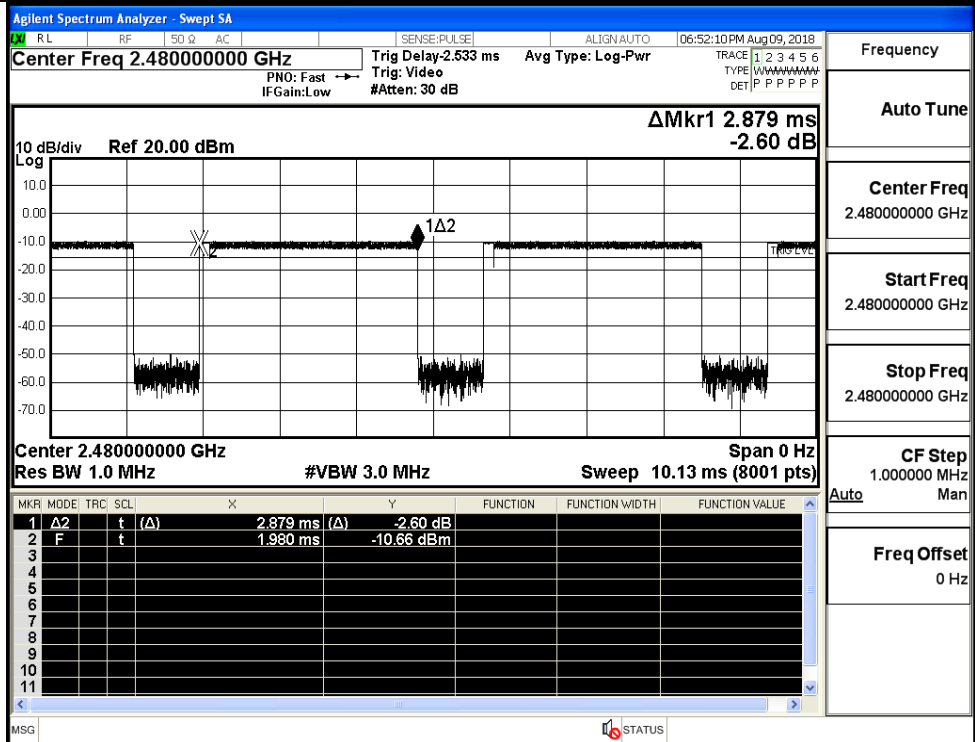


| | |
|-------------|-----------------|
| Frequency | 2.402000000 GHz |
| Auto Tune | |
| Center Freq | 2.402000000 GHz |
| Start Freq | 2.402000000 GHz |
| Stop Freq | 2.402000000 GHz |
| CF Step | 1.000000 MHz |
| Auto | Man |
| Freq Offset | 0 Hz |

8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

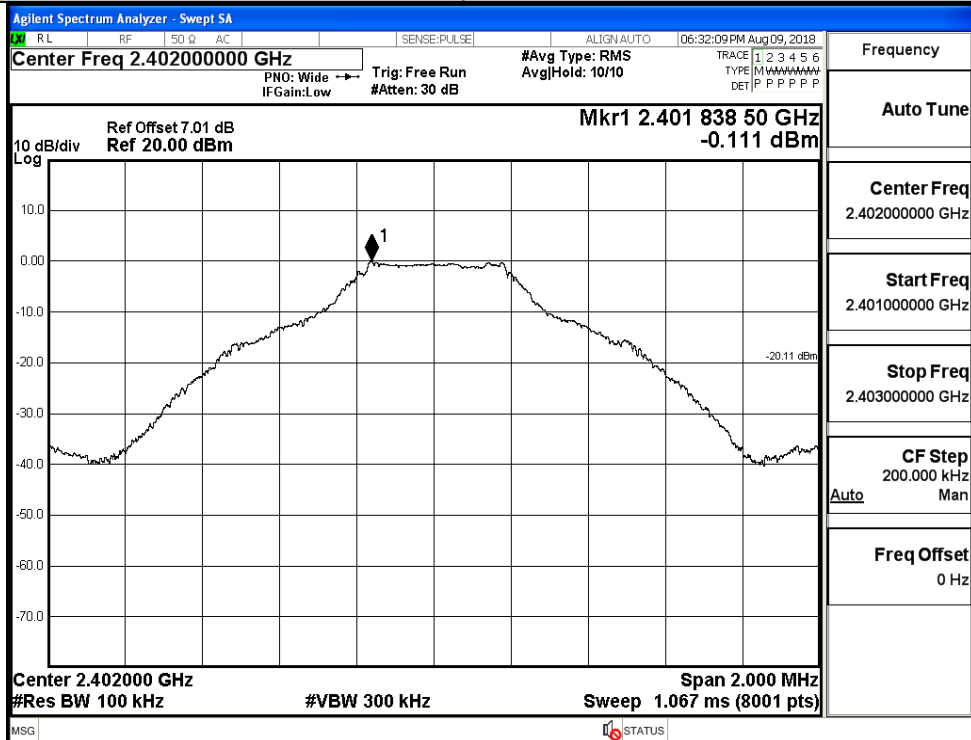


A.6 RF Conducted Spurious Emissions

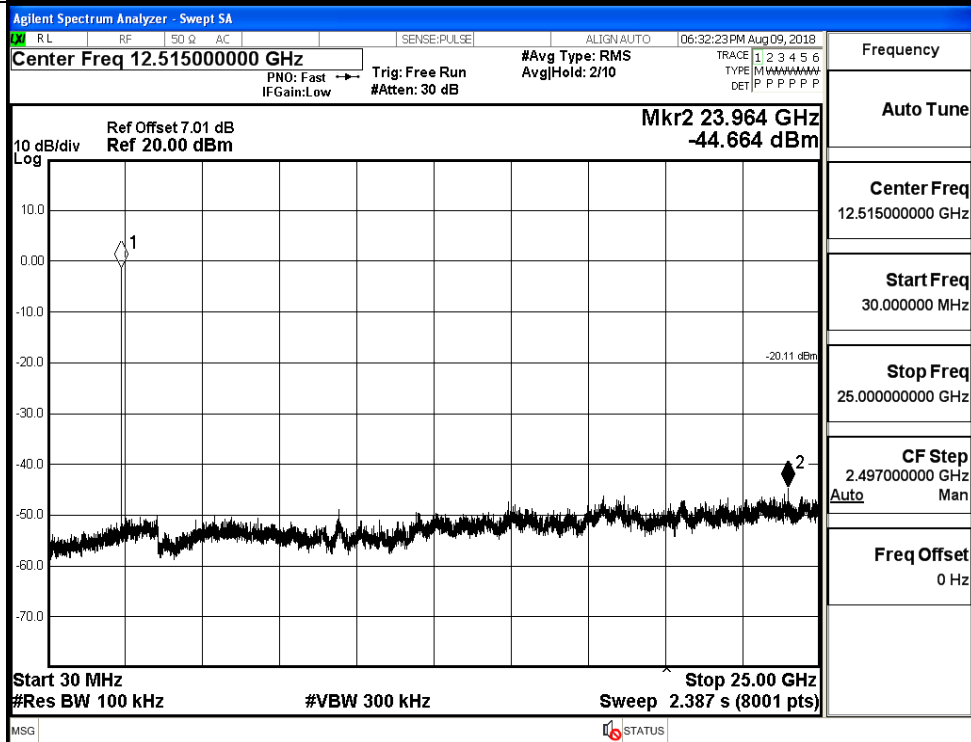
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK | LCH | -0.111 | -44.664 | -20.111 | PASS |
| | MCH | -2.291 | -45.704 | -22.291 | PASS |
| | HCH | -2.383 | -44.563 | -22.383 | PASS |
| $\pi/4$ DQPSK | LCH | -1.727 | -45.513 | -21.727 | PASS |
| | MCH | -3.713 | -46.091 | -23.713 | PASS |
| | HCH | -3.501 | -46.205 | -23.501 | PASS |
| 8DPSK | LCH | -1.568 | -46.086 | -21.568 | PASS |
| | MCH | -3.534 | -45.953 | -23.534 | PASS |
| | HCH | -3.387 | -46.332 | -23.387 | PASS |

GFSK_LCH_Graphs

Pref

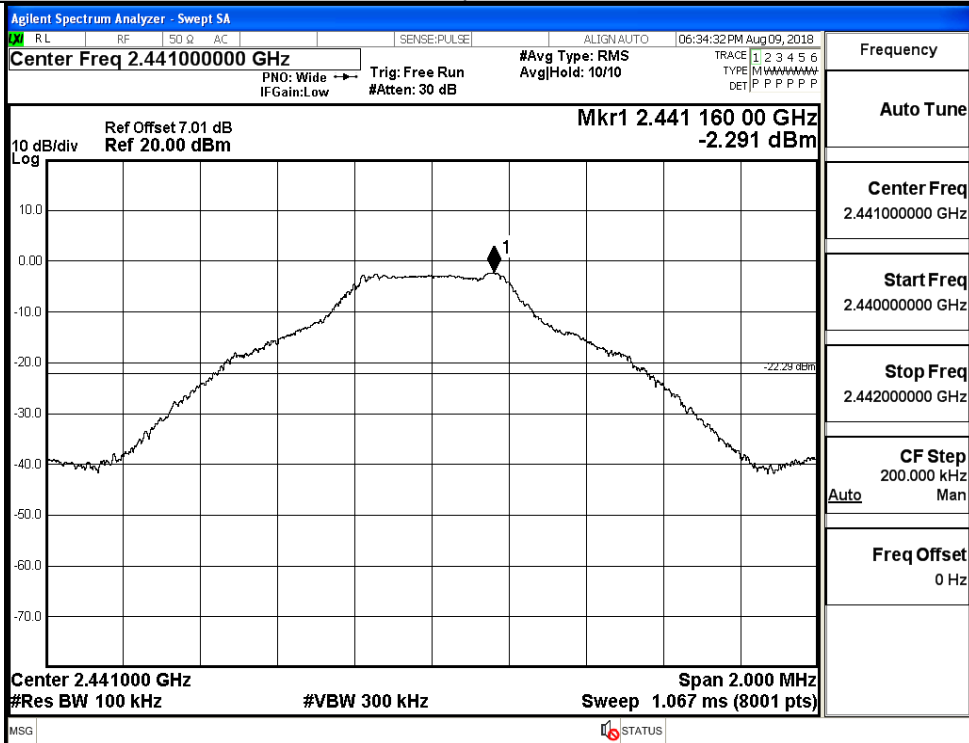


Puw

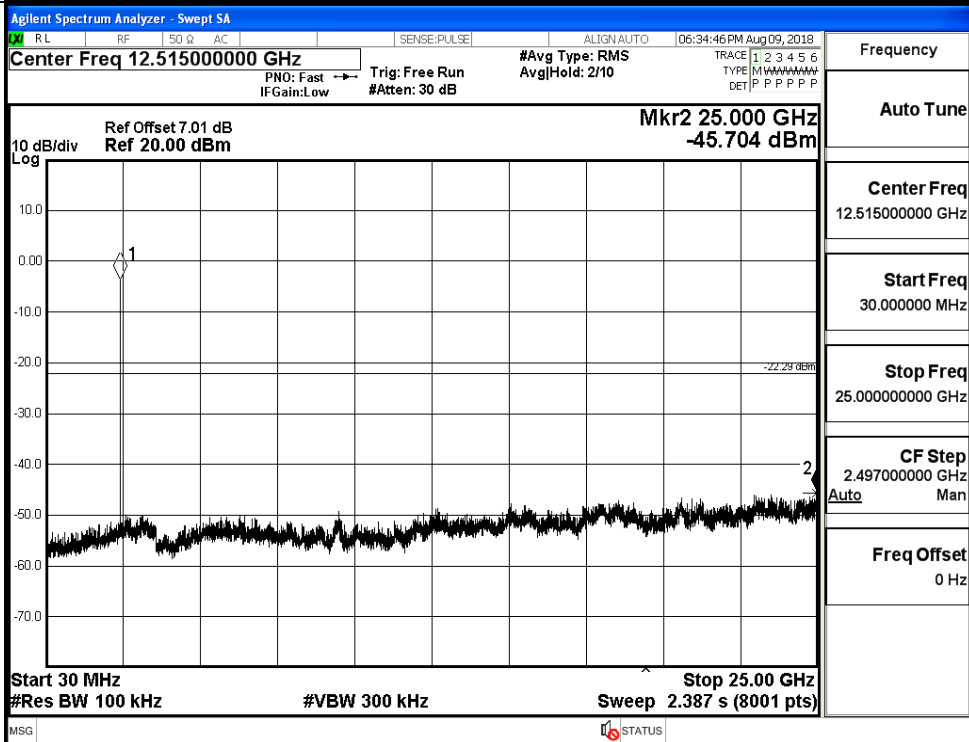


GFSK_MCH_Graphs

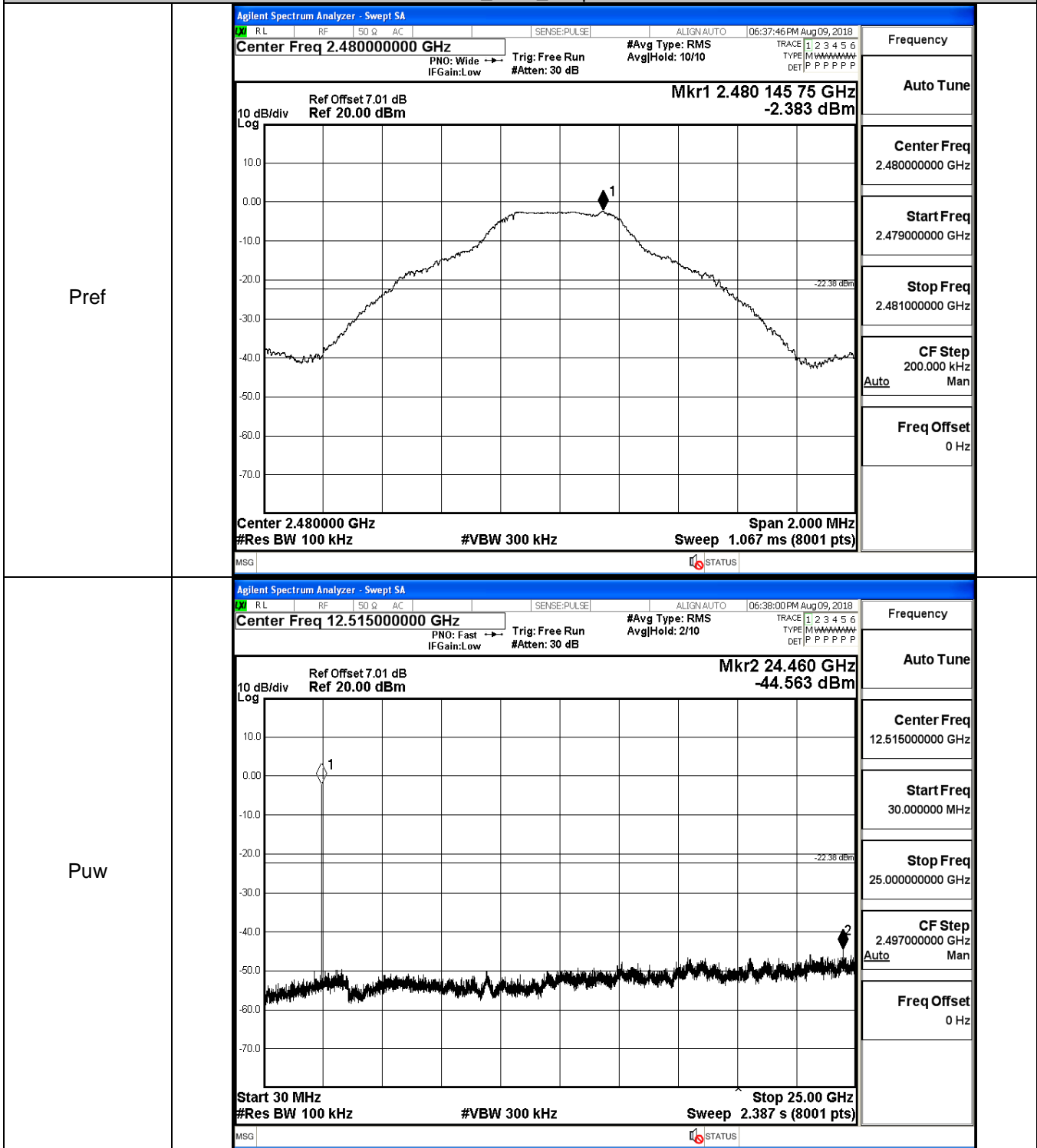
Pref



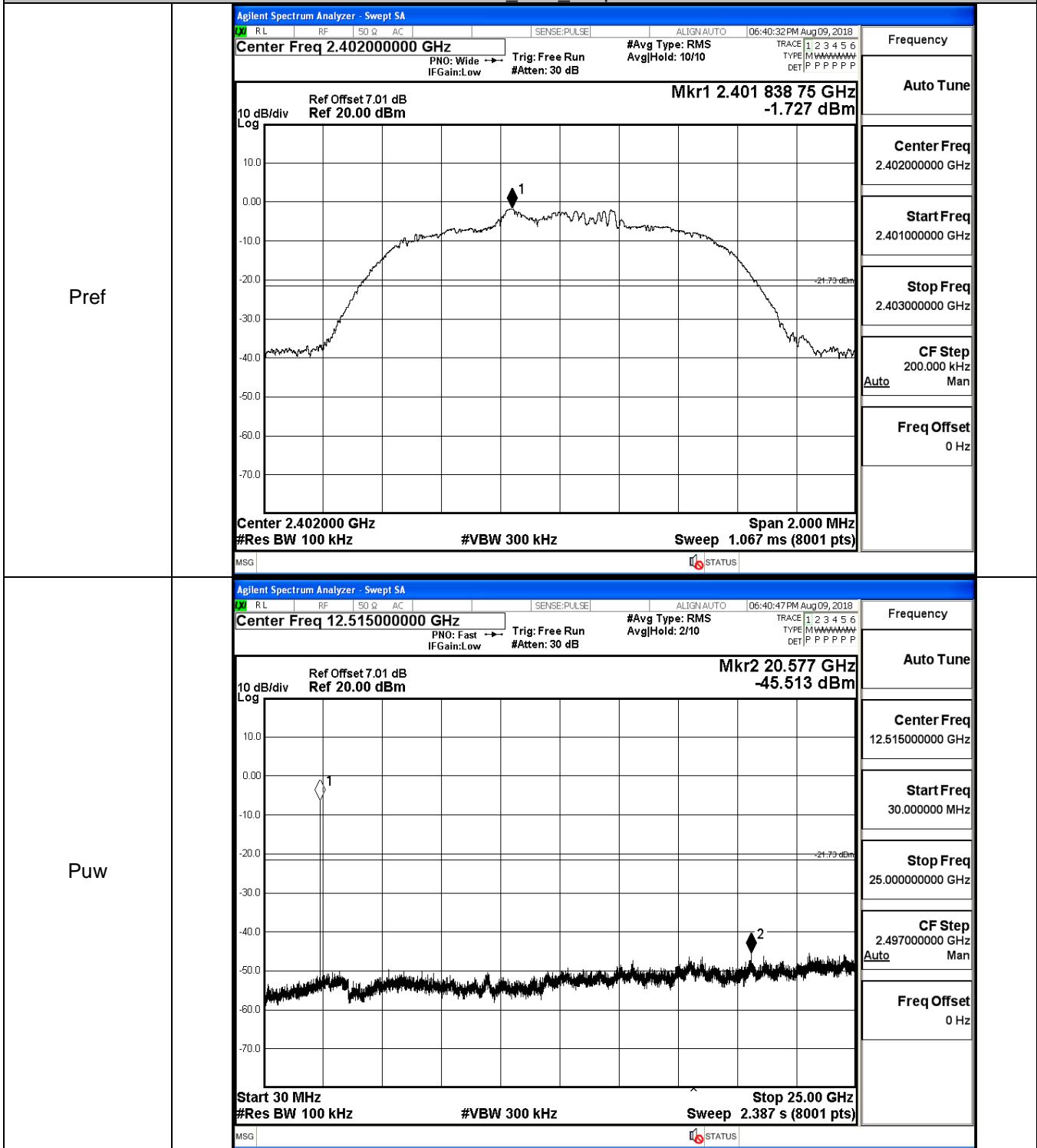
Puw



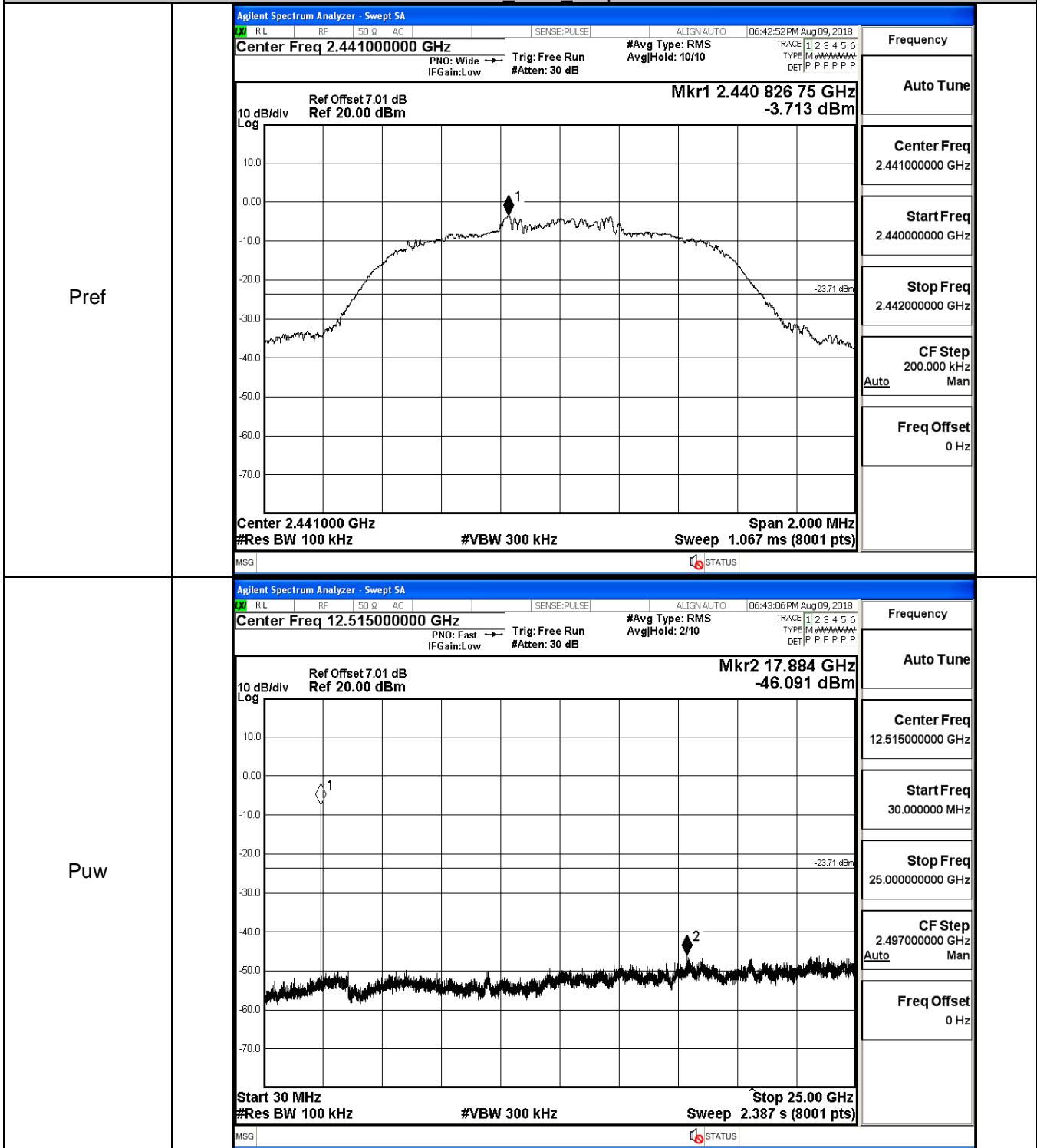
GFSK_HCH_Graphs



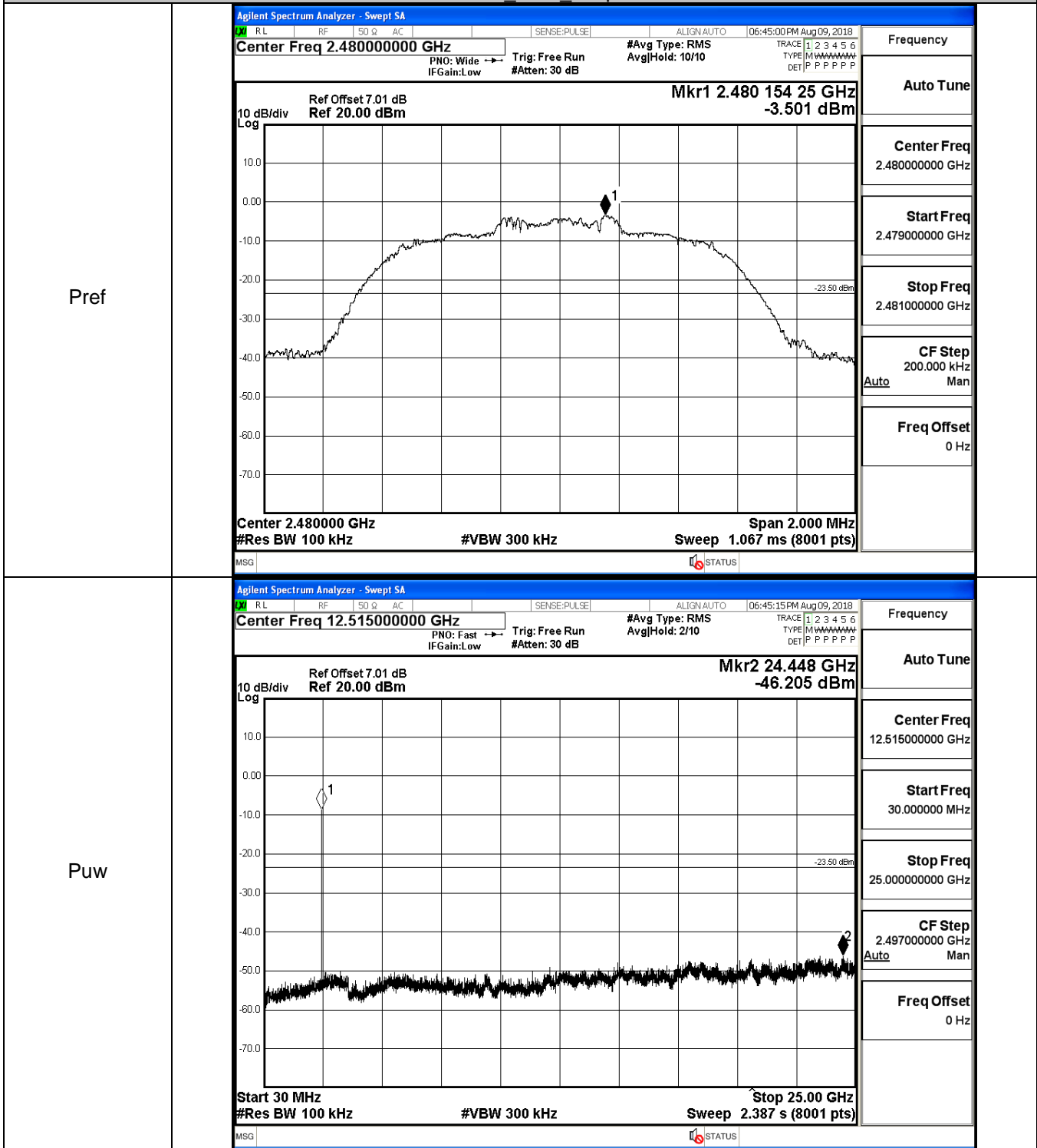
$\pi/4$ DQPSK LCH_Graphs



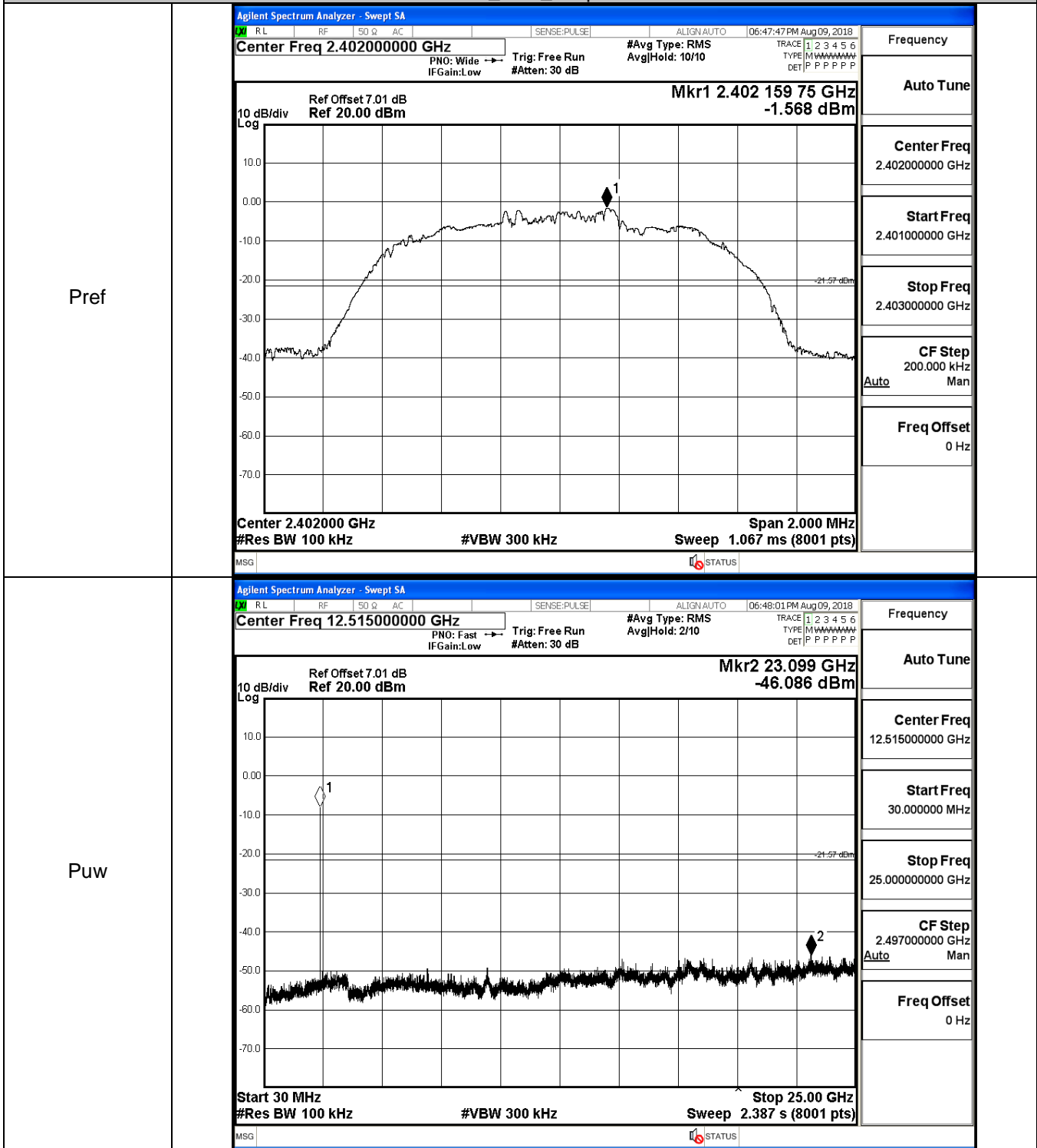
$\pi/4$ DQPSK_MCH_Graphs



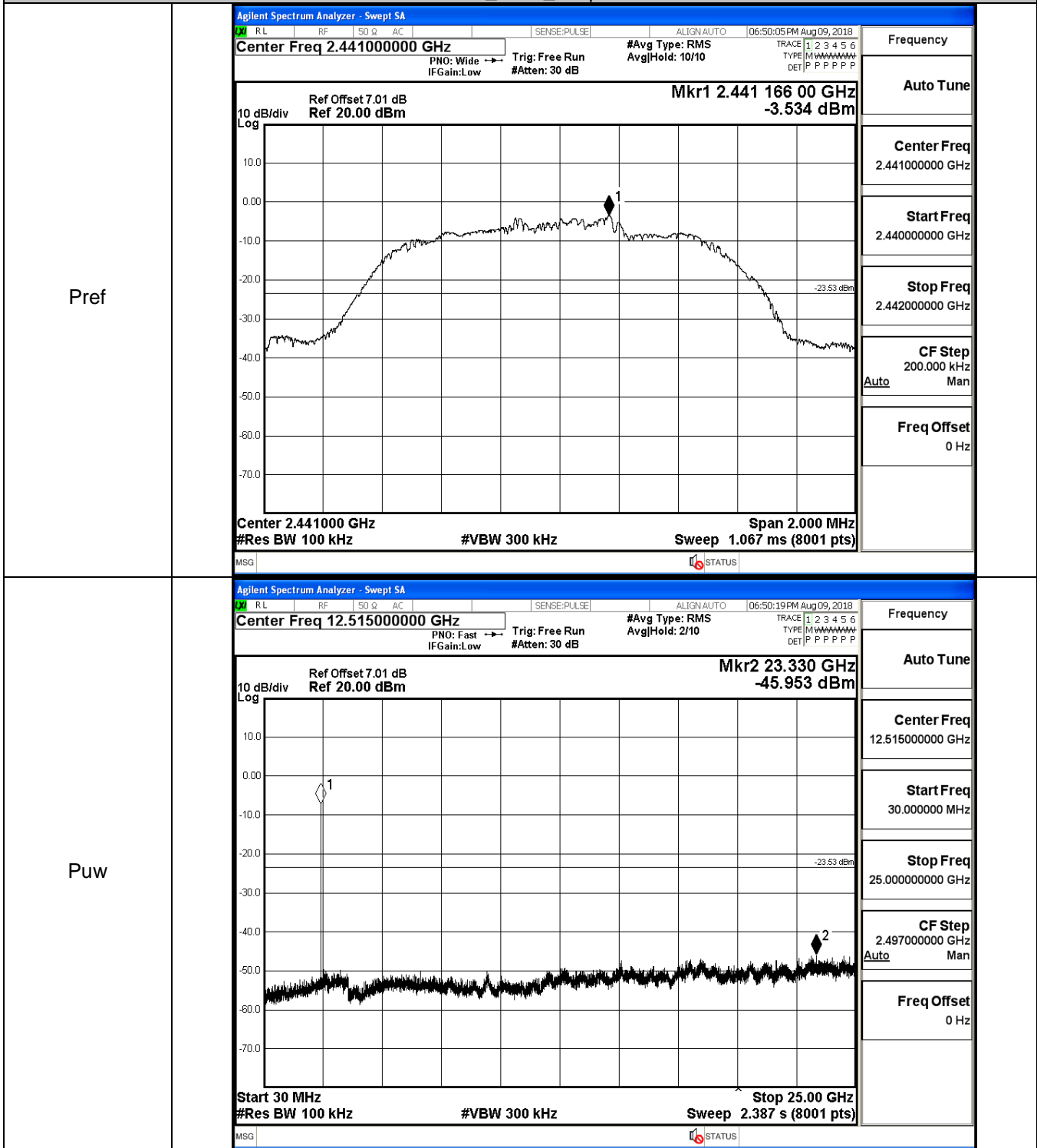
$\pi/4$ DQPSK_HCH_Graphs



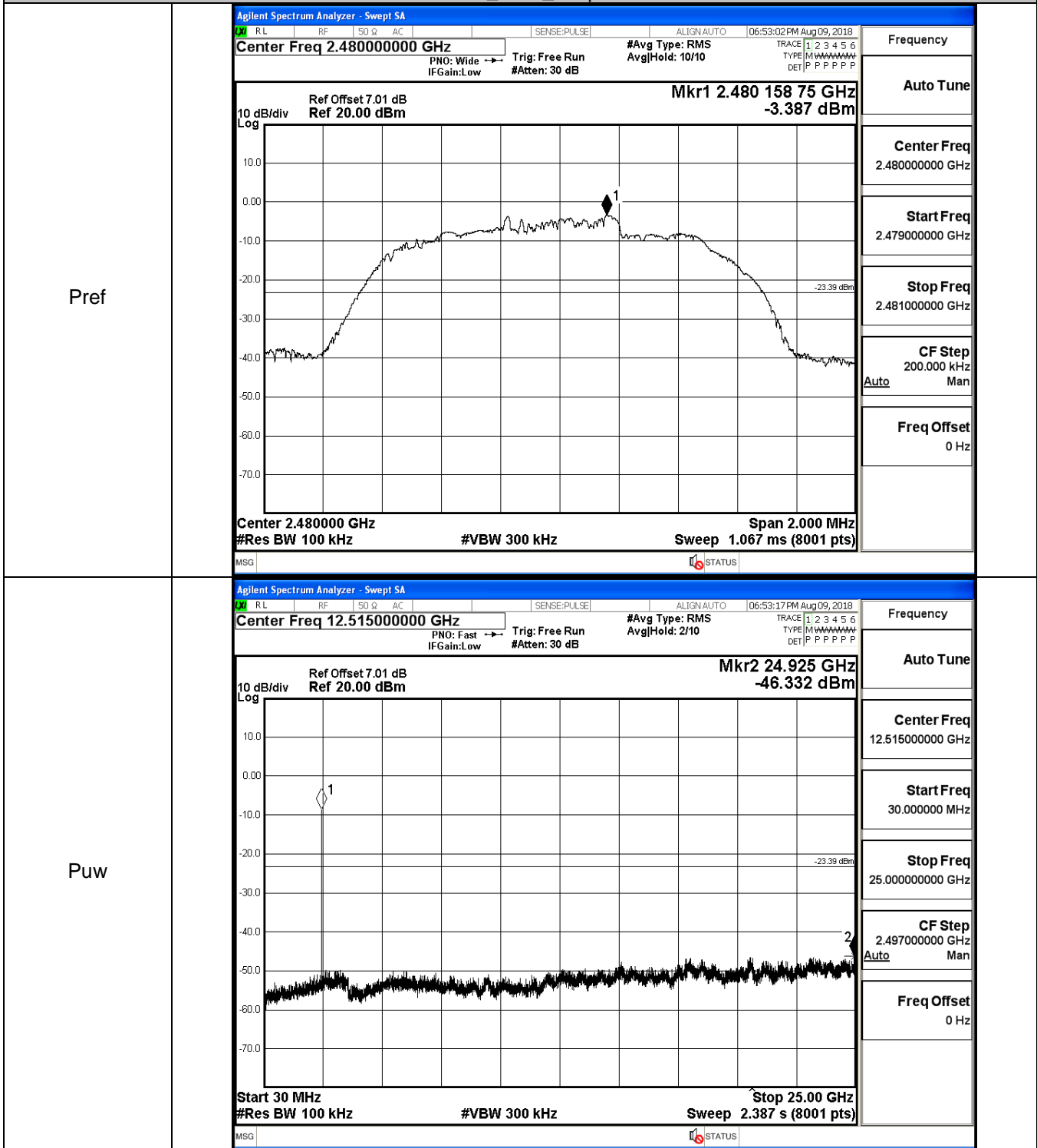
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

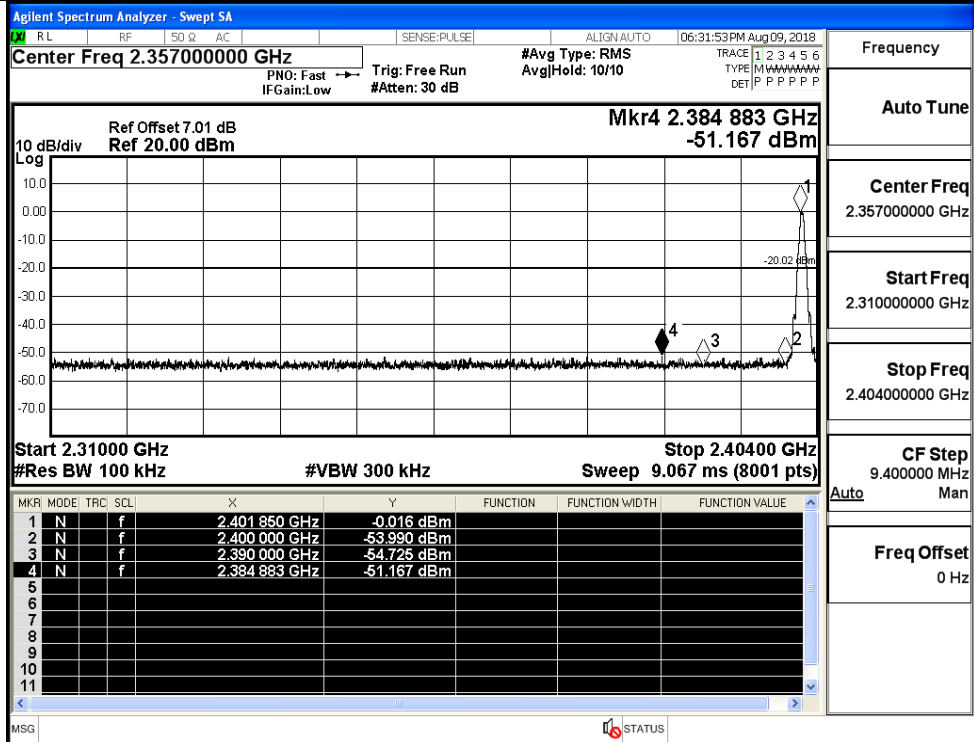


A.7 Band-edge for RF Conducted Emissions

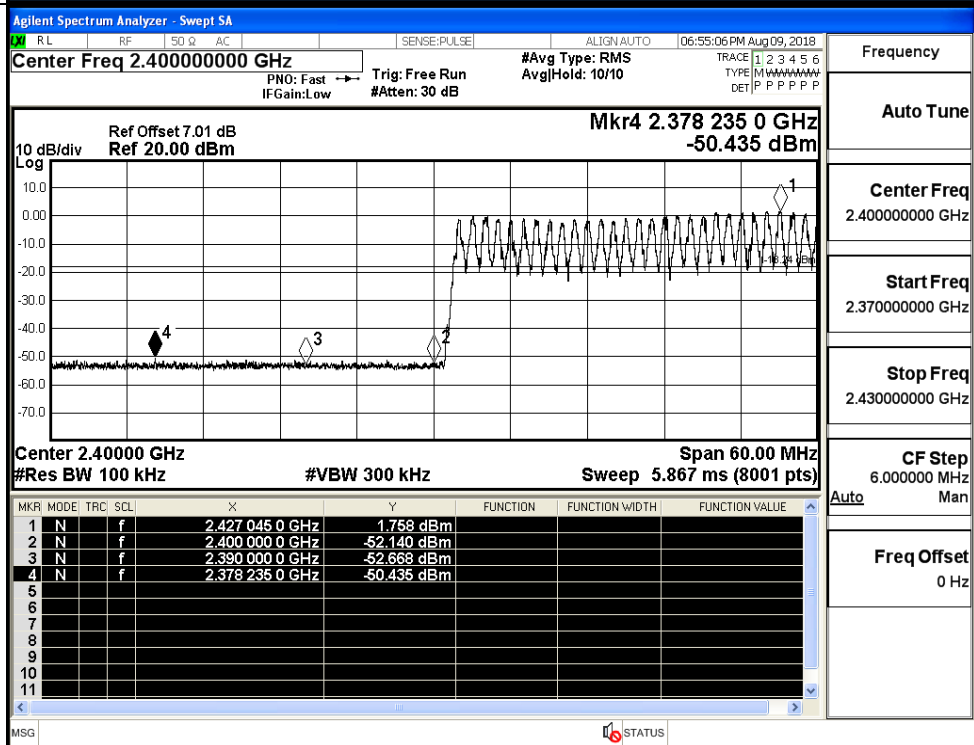
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK | LCH | 2402 | -0.016 | Off | -51.167 | -20.02 | PASS |
| | | | 1.758 | On | -50.435 | -18.24 | PASS |
| | HCH | 2480 | -1.914 | Off | -50.174 | -21.91 | PASS |
| | | | 1.010 | On | -50.169 | -18.99 | PASS |
| $\pi/4$ DQPSK | LCH | 2402 | -3.195 | Off | -50.877 | -23.2 | PASS |
| | | | 0.544 | On | -50.567 | -19.46 | PASS |
| | HCH | 2480 | -3.348 | Off | -51.169 | -23.35 | PASS |
| | | | -1.369 | On | -50.011 | -21.37 | PASS |
| 8DPSK | LCH | 2402 | -1.673 | Off | -51.126 | -21.67 | PASS |
| | | | 0.749 | On | -50.557 | -19.25 | PASS |
| | HCH | 2480 | -3.386 | Off | -50.741 | -23.39 | PASS |
| | | | -0.534 | On | -49.872 | -20.53 | PASS |

Test Graphs

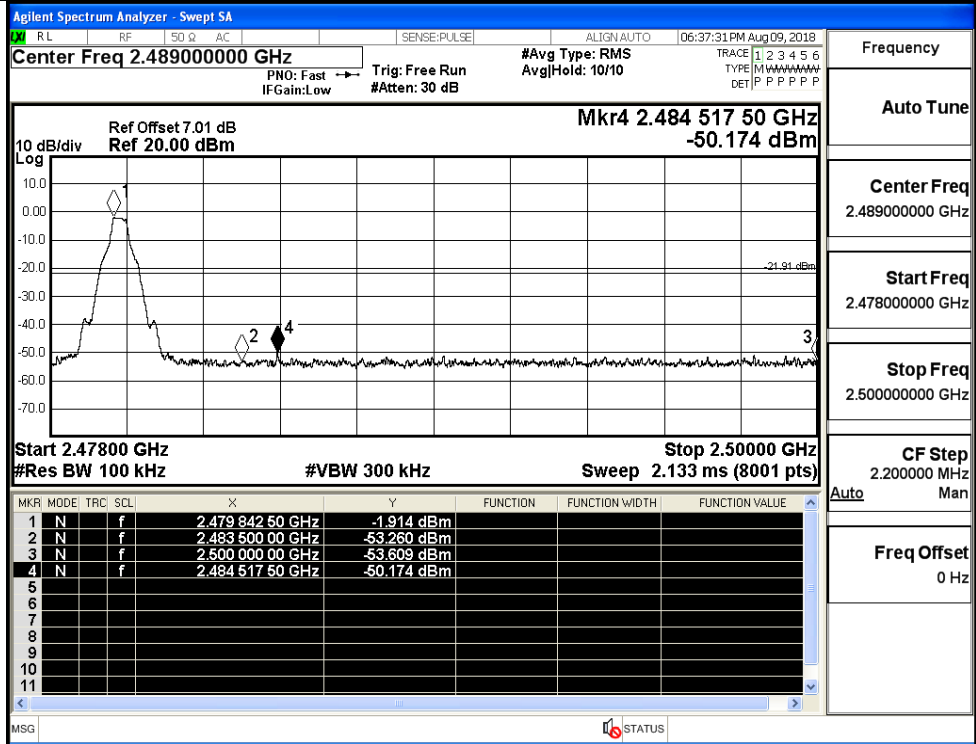
GFSK/LCH/No Hop



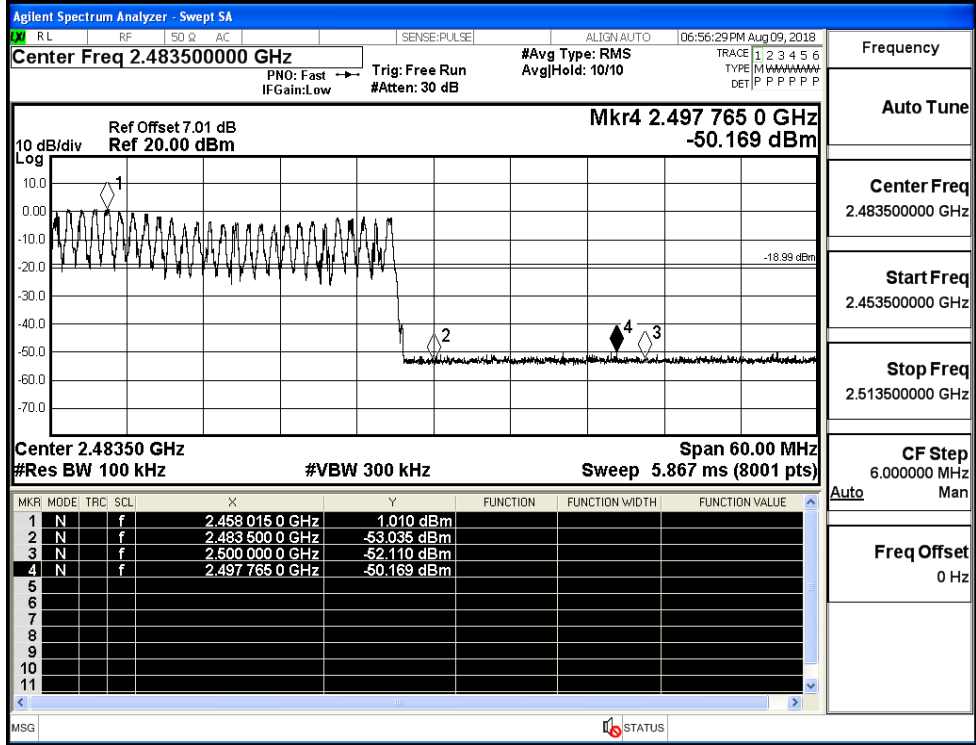
GFSK/LCH/Hop



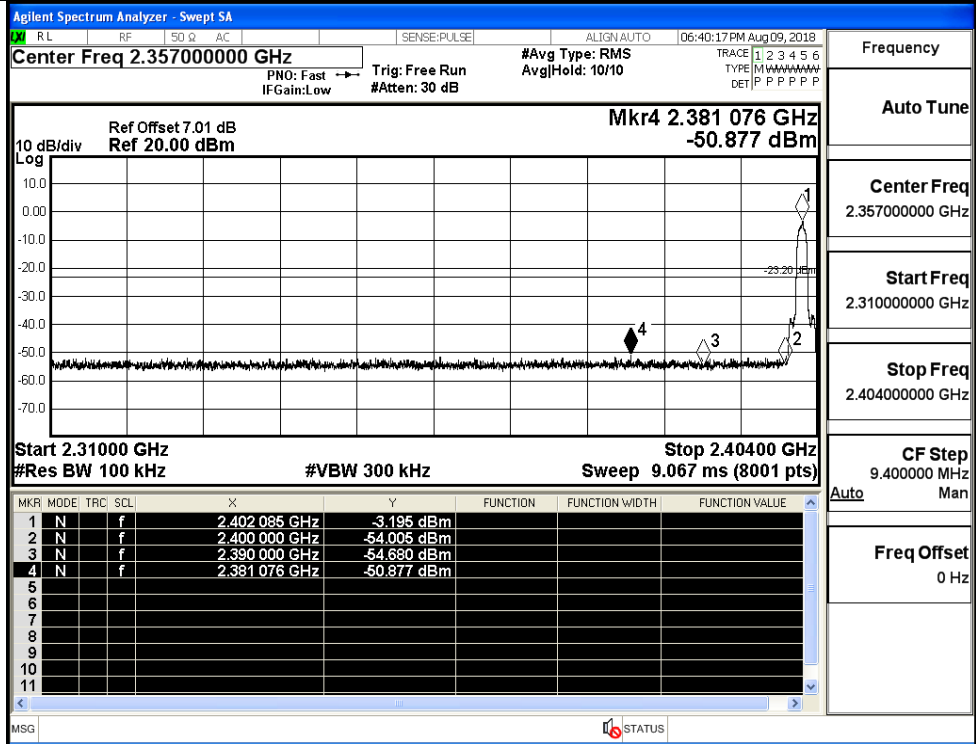
GFSK/HCH/No Hop



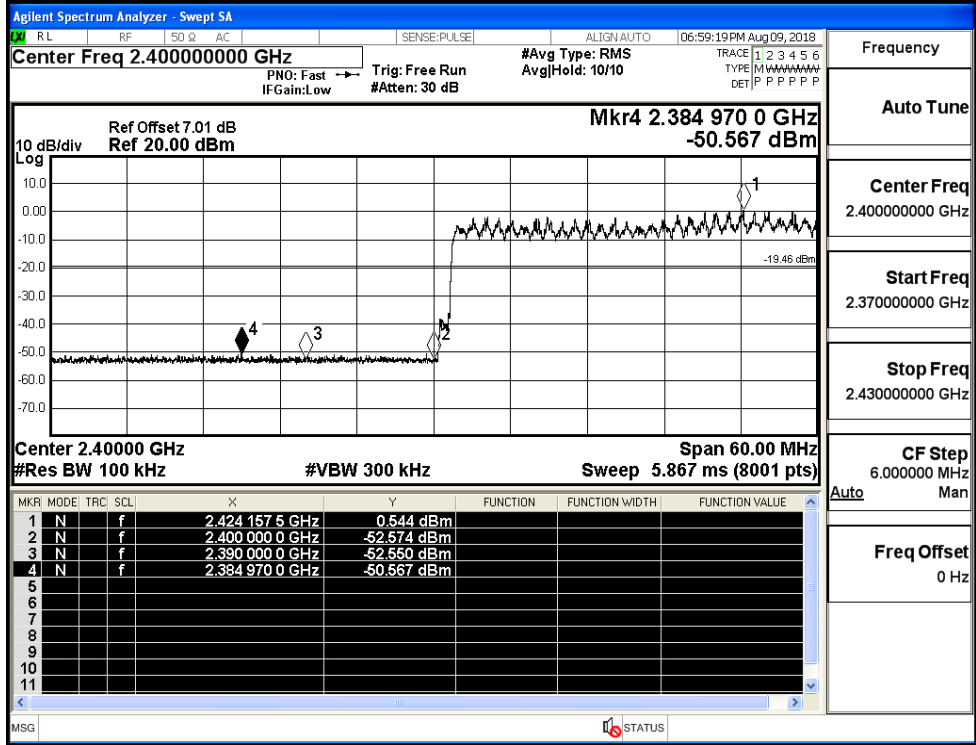
GFSK/HCH/Hop



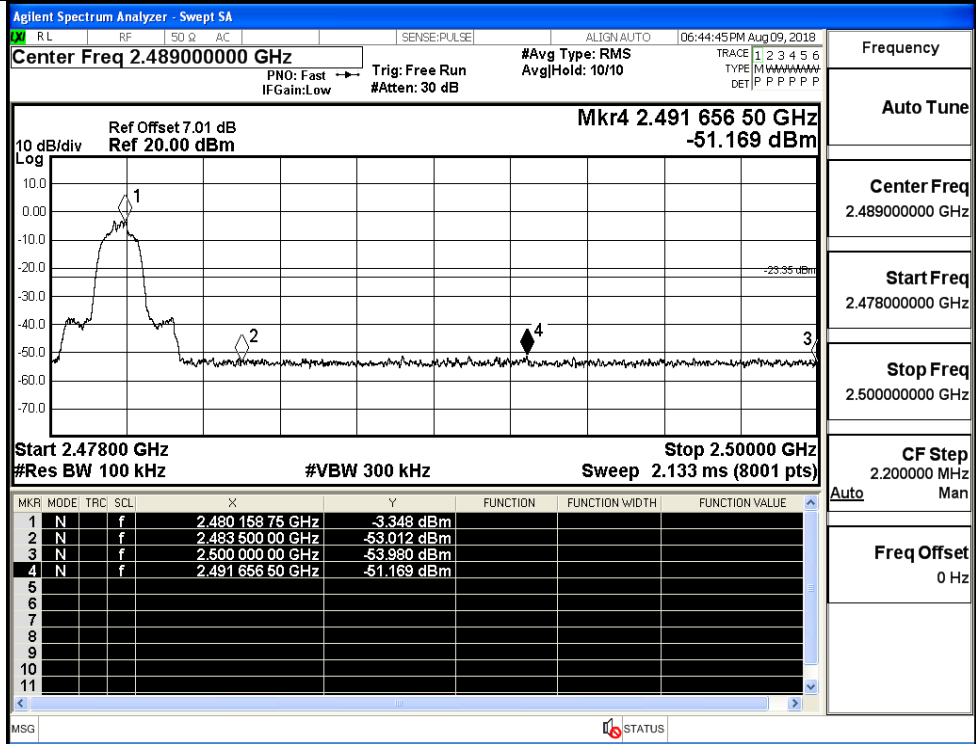
$\pi/4$ DQPSK/LCH/No Hop



$\pi/4$ DQPSK/LCH/Hop

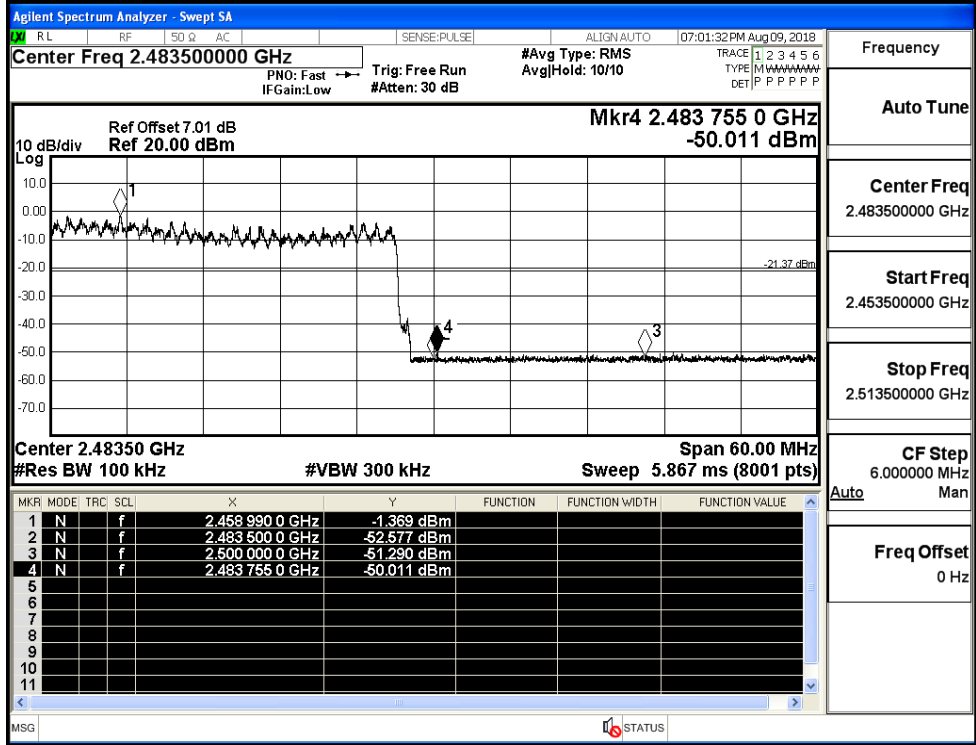


π /4DQPSK/HCH/No
Hop



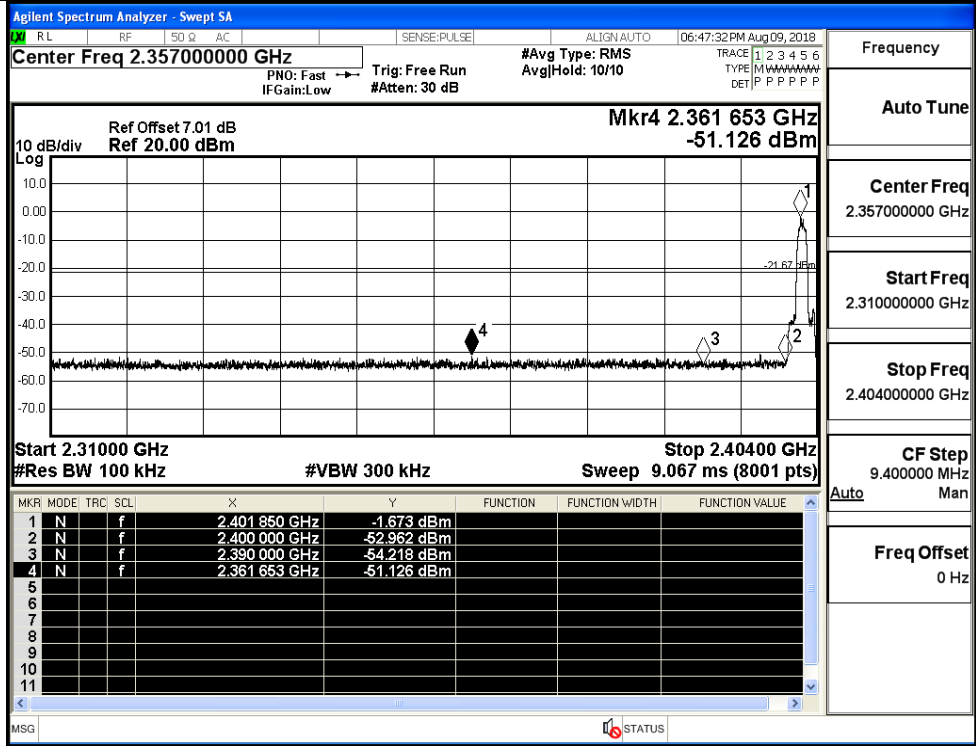
| | |
|-------------|-----------------|
| Frequency | |
| Auto Tune | |
| Center Freq | 2.489000000 GHz |
| Start Freq | 2.478000000 GHz |
| Stop Freq | 2.500000000 GHz |
| CF Step | 2.200000 MHz |
| Auto | Man |
| Freq Offset | 0 Hz |

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 |
| Auto | Man |
| Freq Offset | 0 Hz |

8DPSK/LCH/No Hop



Frequency

Auto Tune

Center Freq
2.357000000 GHz

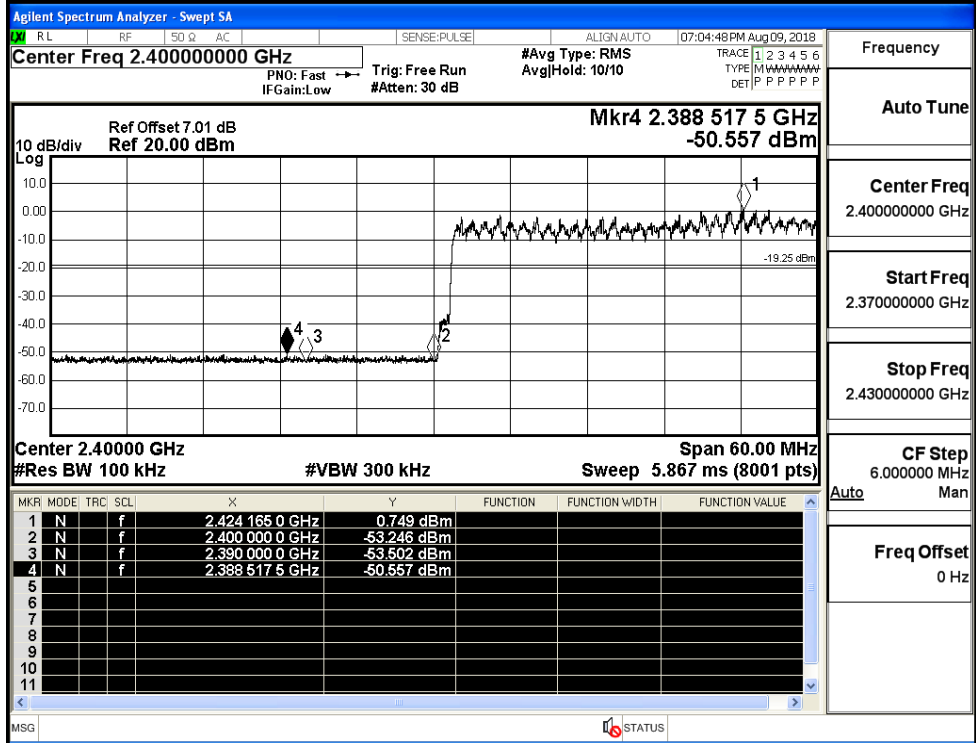
Start Freq
2.310000000 GHz

Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz

Freq Offset
0 Hz

8DPSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

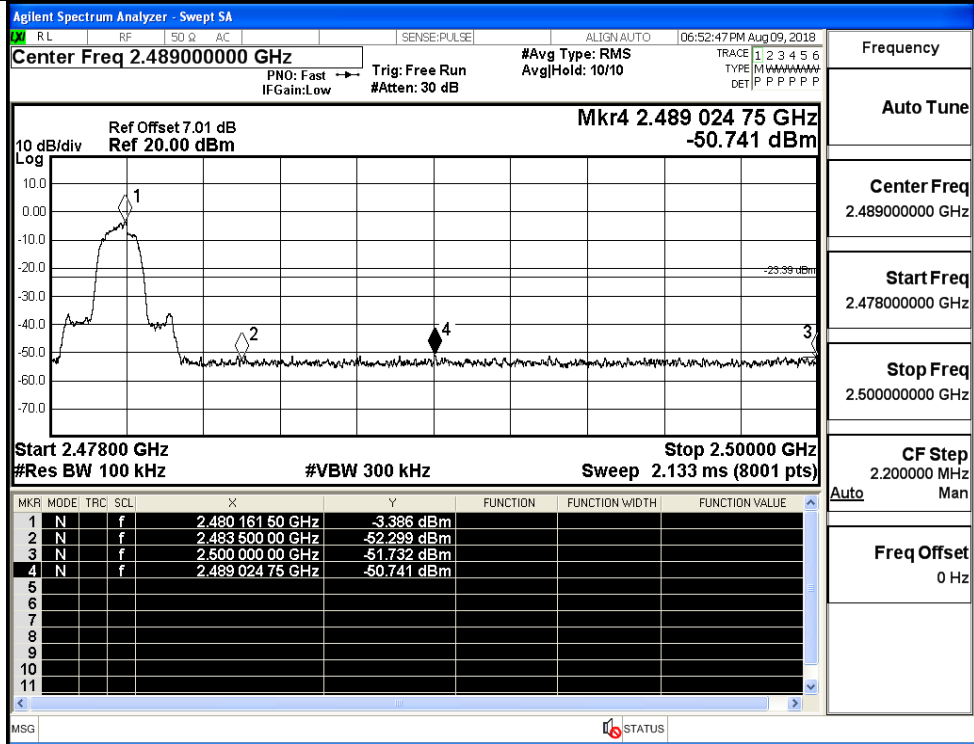
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz

Freq Offset
0 Hz

8DPSK/HCH/No Hop



Frequency

Auto Tune

Center Freq
2.489000000 GHz

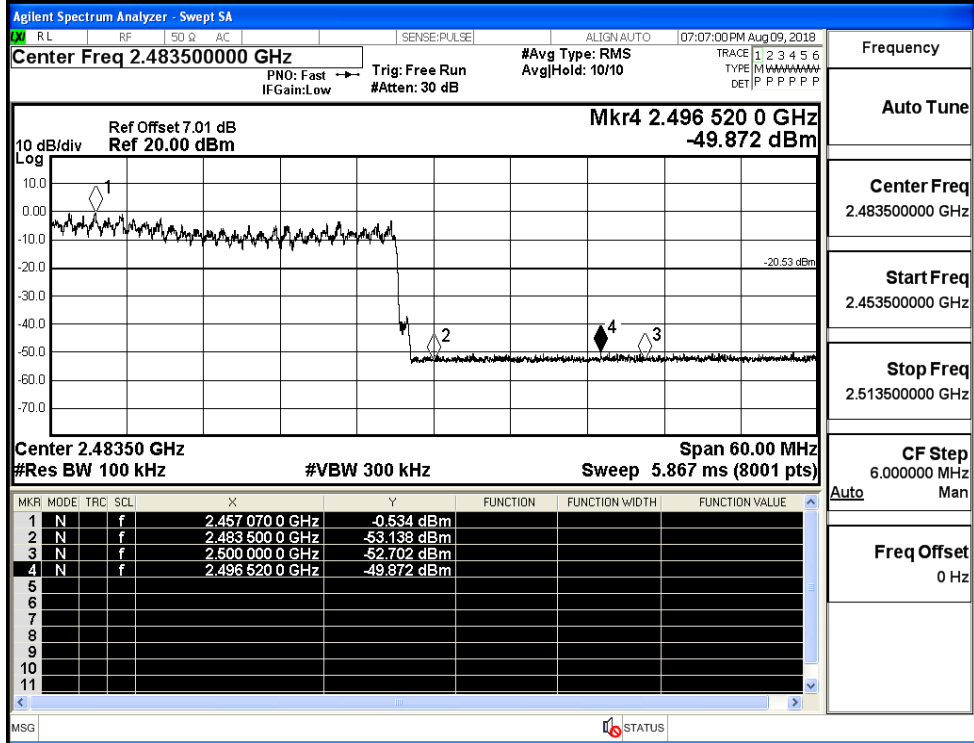
Start Freq
2.478000000 GHz

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

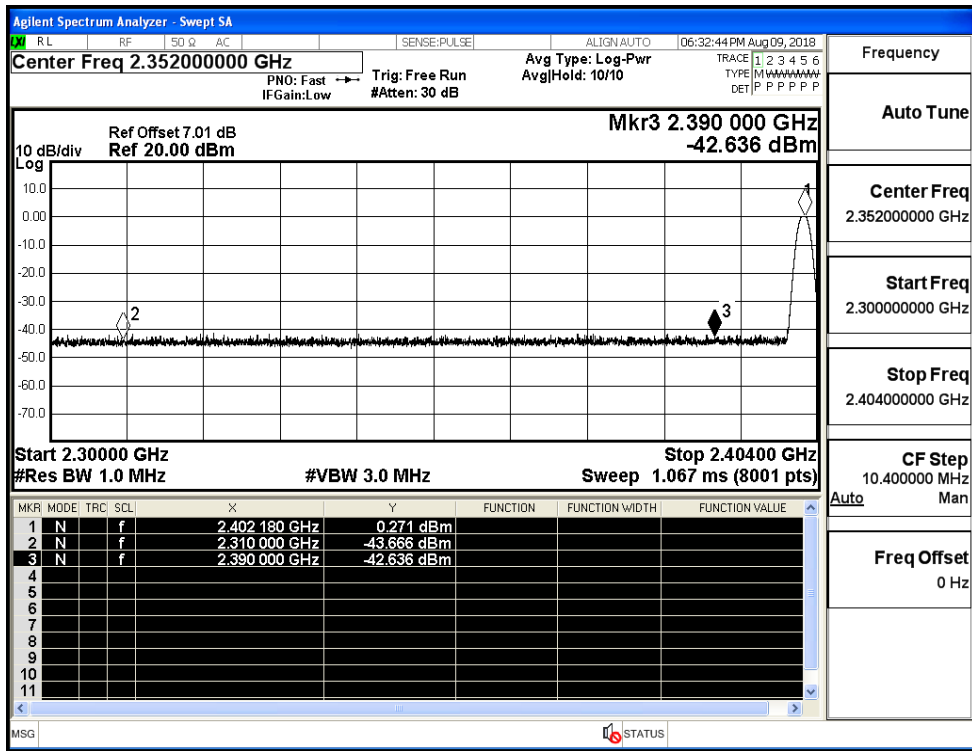
CF Step
6.000000 MHz

Freq Offset
0 Hz

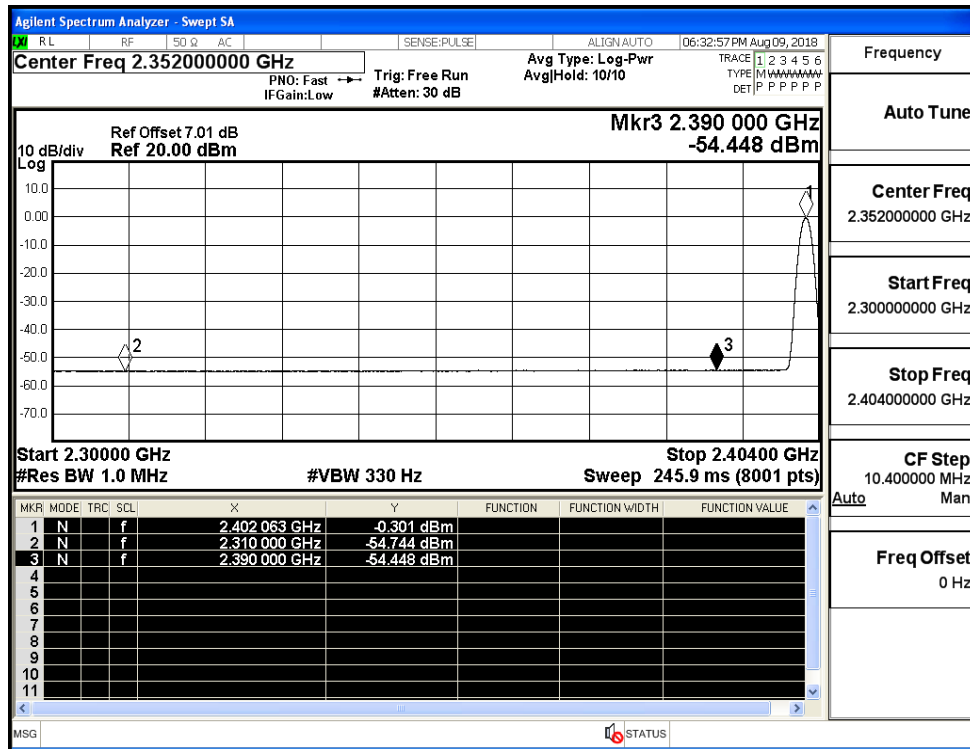
A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK | Off | 2310.0 | -43.67 | 2.0 | 0 | 53.59 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.74 | 2.0 | 0 | 42.51 | AV | 54 | PASS |
| | Off | 2390.0 | -42.64 | 2.0 | 0 | 54.62 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.45 | 2.0 | 0 | 42.81 | AV | 54 | PASS |
| | Off | 2483.5 | -43.66 | 2.0 | 0 | 53.60 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.32 | 2.0 | 0 | 42.94 | AV | 54 | PASS |
| | Off | 2500.0 | -43.22 | 2.0 | 0 | 54.04 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.16 | 2.0 | 0 | 43.10 | AV | 54 | PASS |
| $\pi/4$ DQPSK | Off | 2310.0 | -45.16 | 2.0 | 0 | 52.10 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.71 | 2.0 | 0 | 42.54 | AV | 54 | PASS |
| | Off | 2390.0 | -45.12 | 2.0 | 0 | 52.14 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.57 | 2.0 | 0 | 42.68 | AV | 54 | PASS |
| | Off | 2483.5 | -44.14 | 2.0 | 0 | 53.11 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.22 | 2.0 | 0 | 43.03 | AV | 54 | PASS |
| | Off | 2500.0 | -43.17 | 2.0 | 0 | 54.09 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.22 | 2.0 | 0 | 43.03 | AV | 54 | PASS |
| 8DPSK | Off | 2310.0 | -44.80 | 2.0 | 0 | 52.46 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.75 | 2.0 | 0 | 42.51 | AV | 54 | PASS |
| | Off | 2390.0 | -43.67 | 2.0 | 0 | 53.59 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.46 | 2.0 | 0 | 42.80 | AV | 54 | PASS |
| | Off | 2483.5 | -44.78 | 2.0 | 0 | 52.47 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.16 | 2.0 | 0 | 43.10 | AV | 54 | PASS |
| | Off | 2500.0 | -43.86 | 2.0 | 0 | 53.40 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.17 | 2.0 | 0 | 43.09 | AV | 54 | PASS |

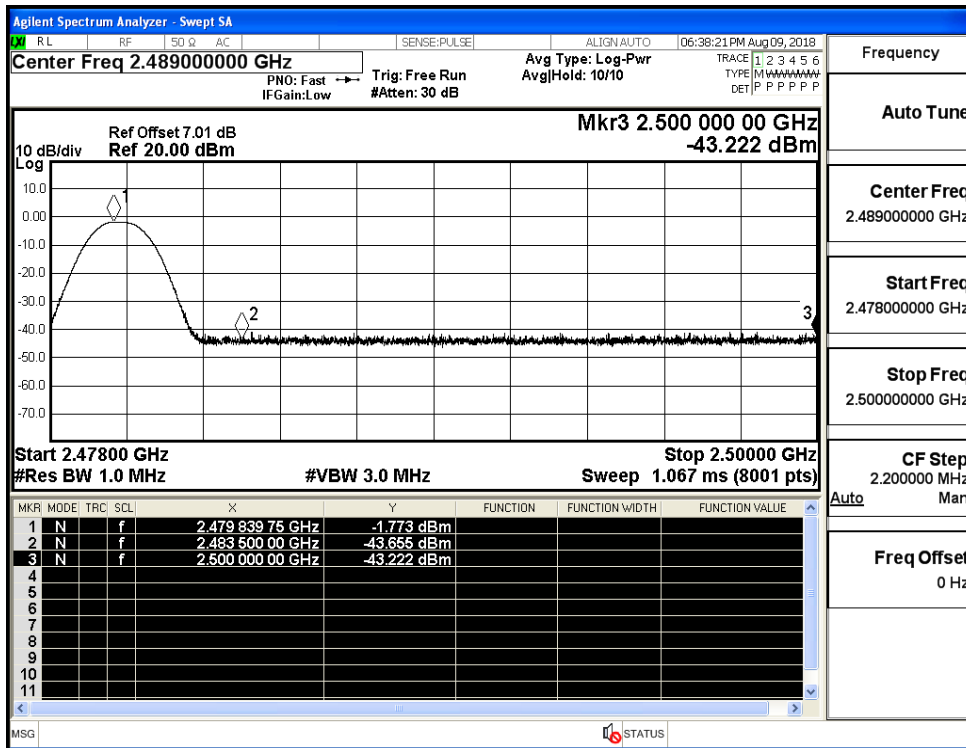
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



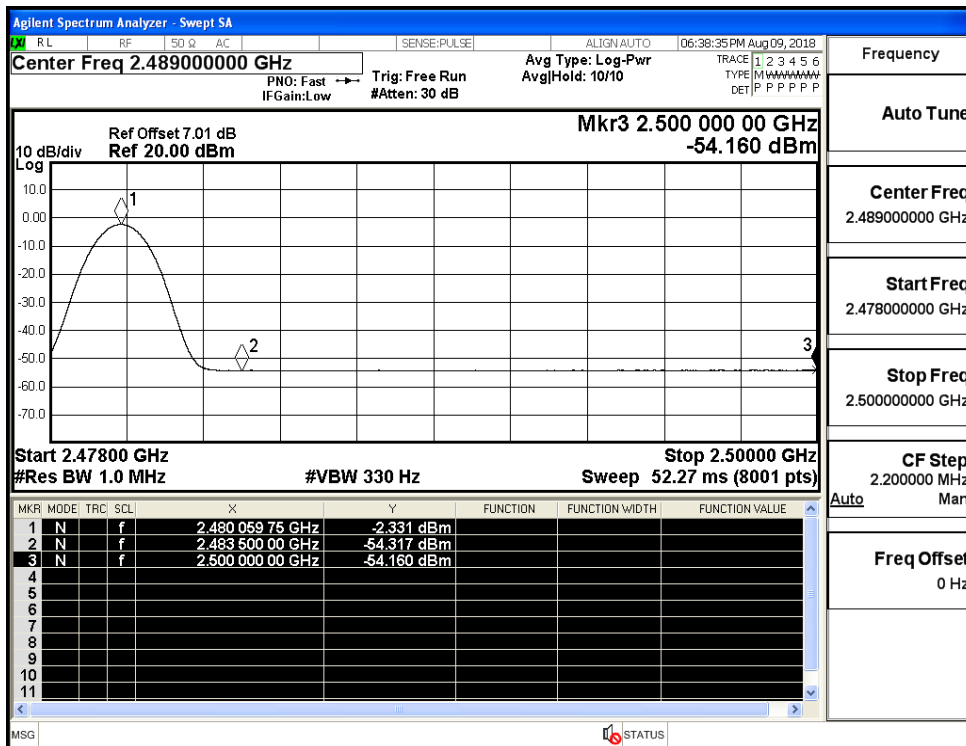
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



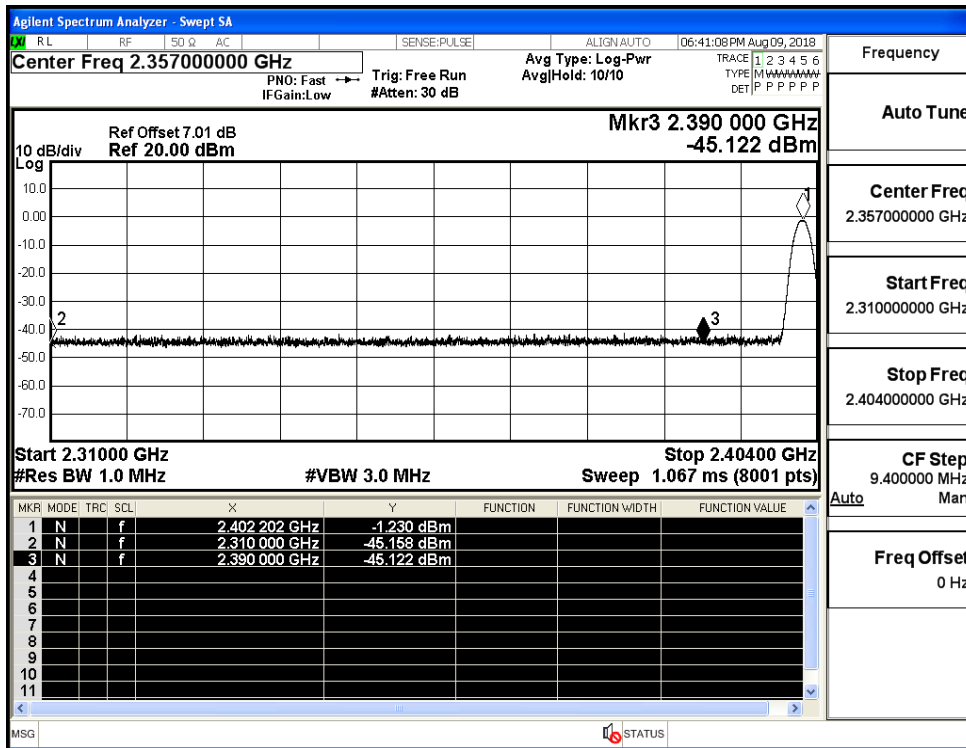
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



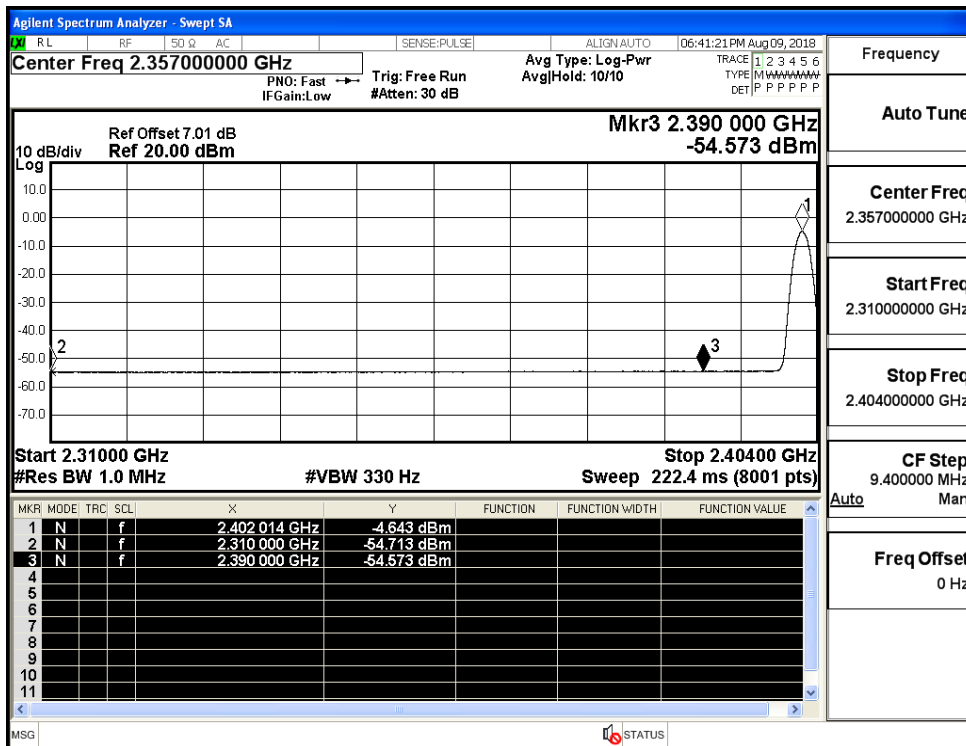
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



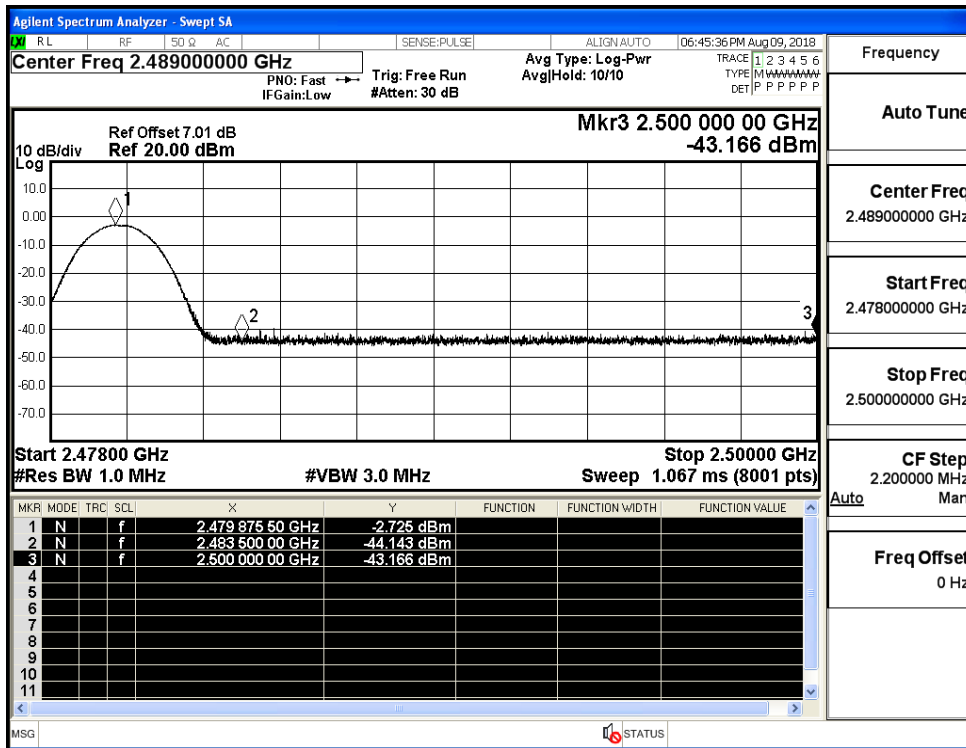
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



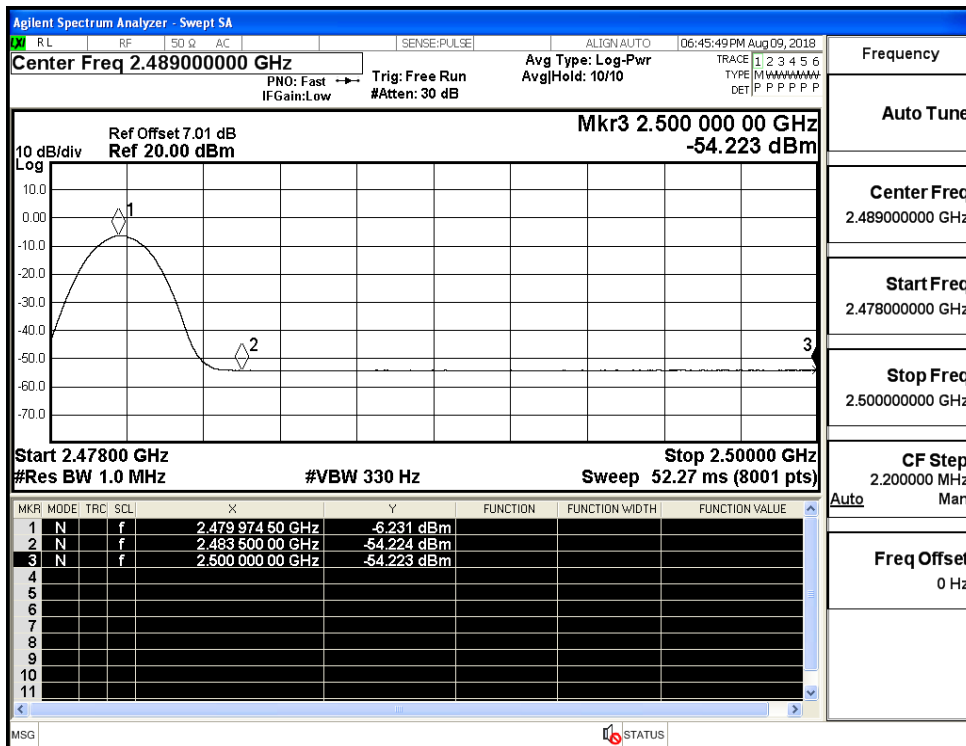
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



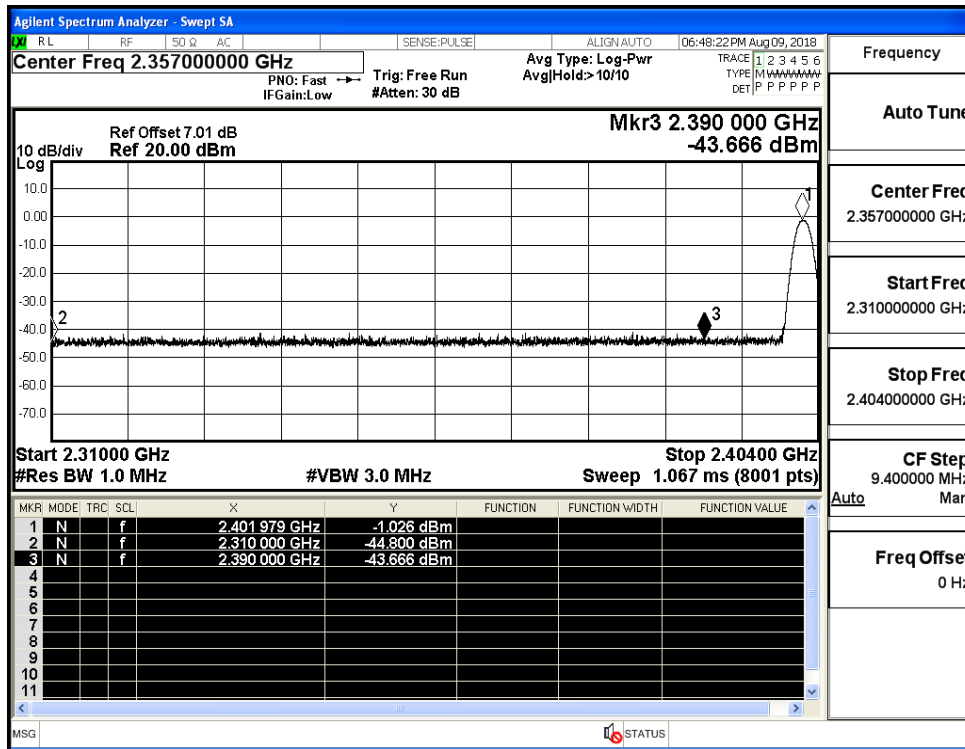
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



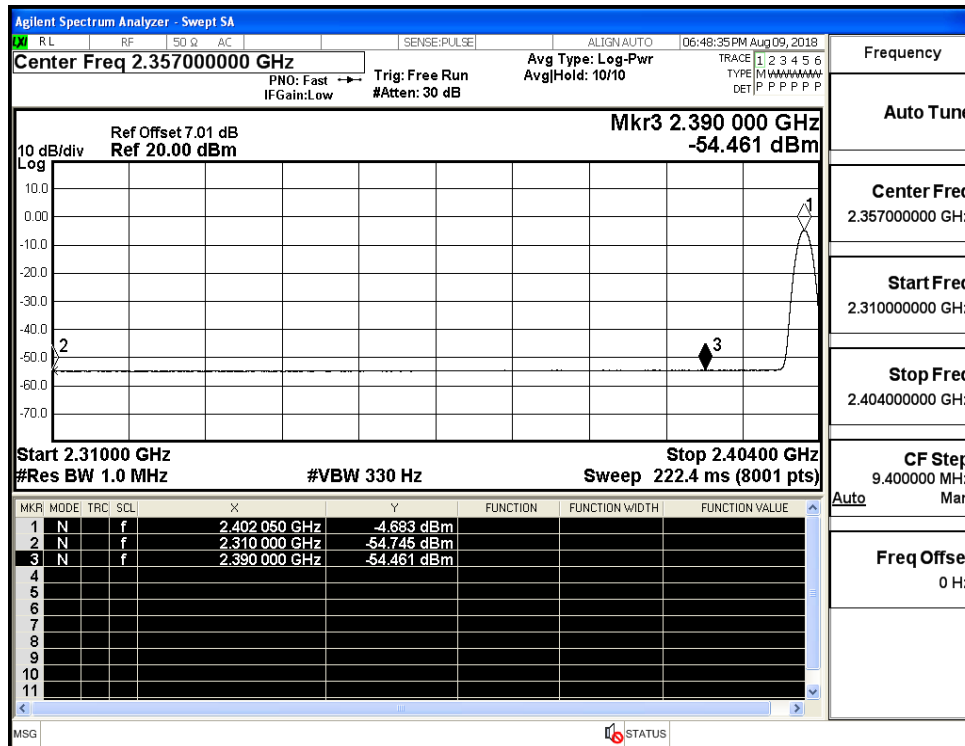
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



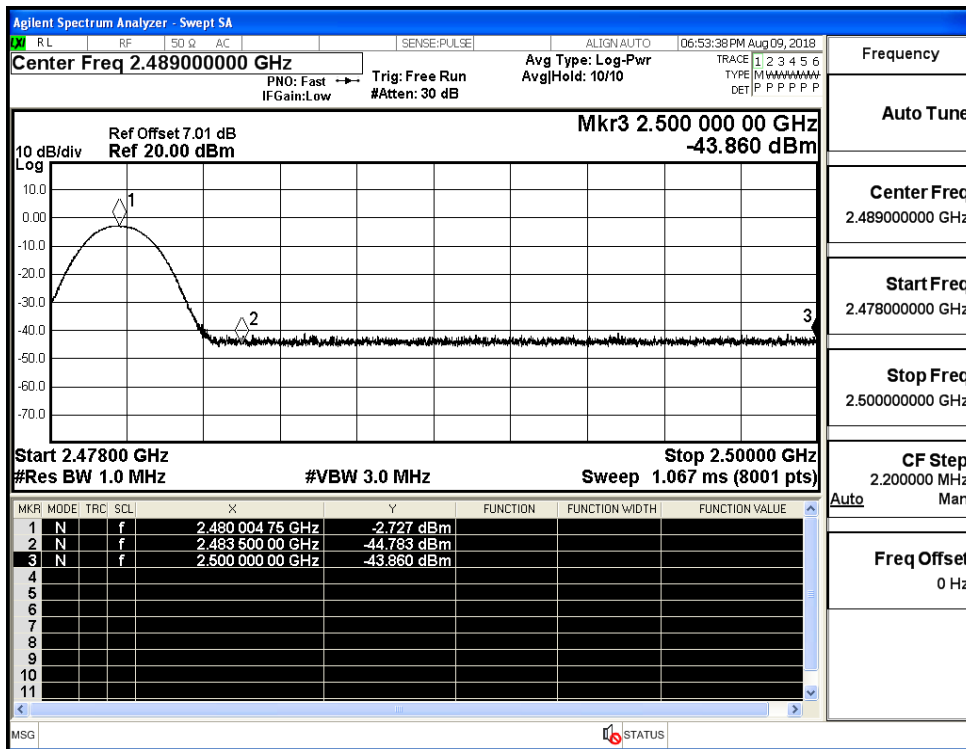
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

