

Appendix A

RF Test Data for BT 3.0(BDR/EDR) (Conducted Measurement)

Product Name: Neckband wireless earphone

Trade Mark: N/A

Test Model: NE03

Environmental Conditions

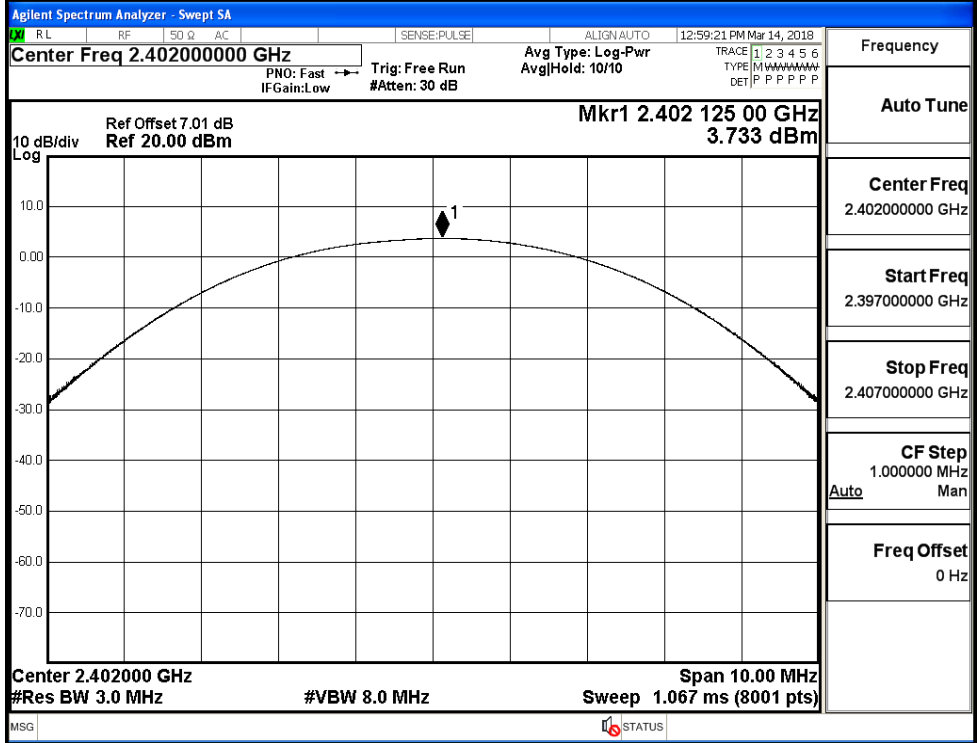
| | |
|--------------------|-------------|
| Temperature: | 22.5 ° C |
| Relative Humidity: | 52.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Jayden.zhao |
| Supervised by: | Tom.Liu |

A.1 Maximum Conducted Peak Output Power

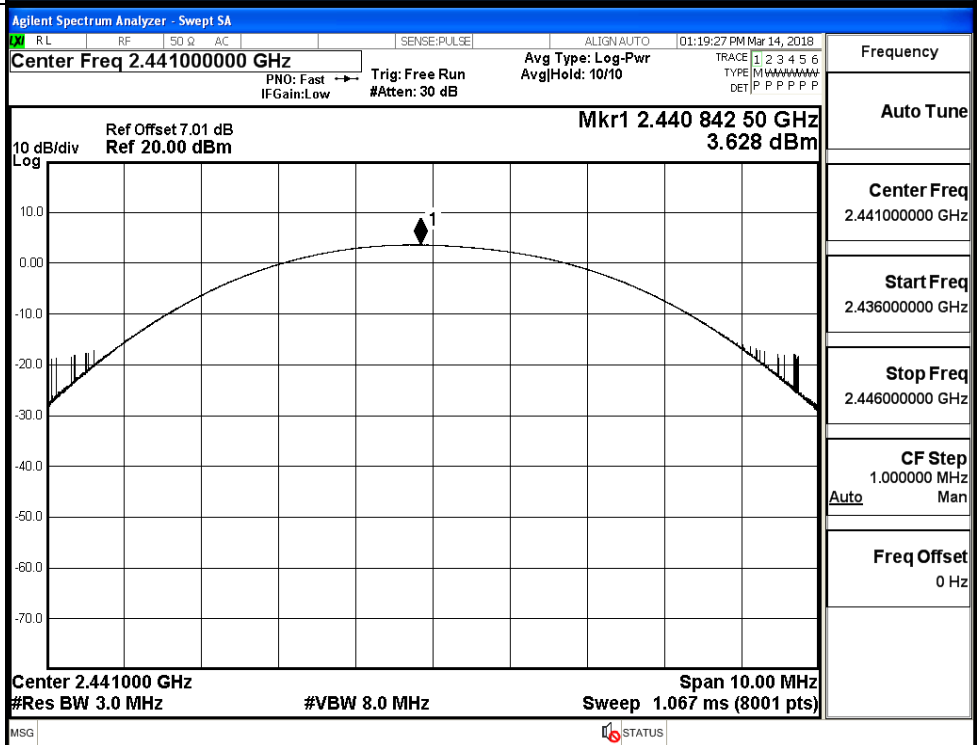
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK | LCH | 3.733 | 30 | PASS |
| | MCH | 3.628 | 30 | PASS |
| | HCH | 3.255 | 30 | PASS |
| $\pi/4$ DQPSK | LCH | 3.514 | 21 | PASS |
| | MCH | 3.448 | 21 | PASS |
| | HCH | 3.755 | 21 | PASS |
| 8DPSK | LCH | 3.954 | 21 | PASS |
| | MCH | 3.987 | 21 | PASS |
| | HCH | 3.467 | 21 | PASS |

Test Graphs

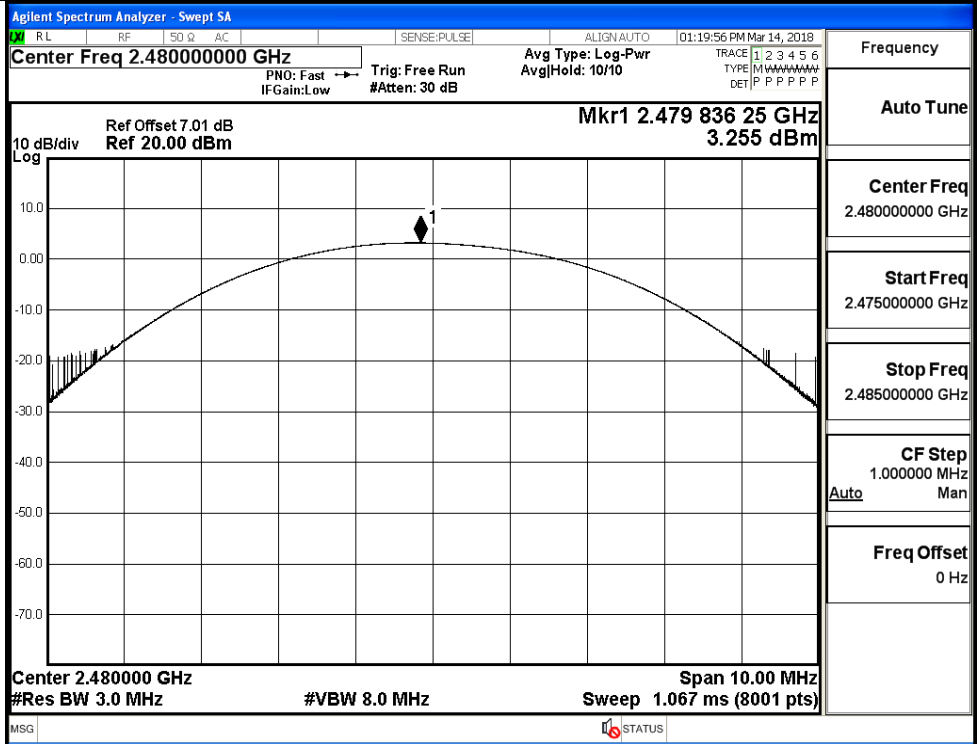
GFSK/LCH



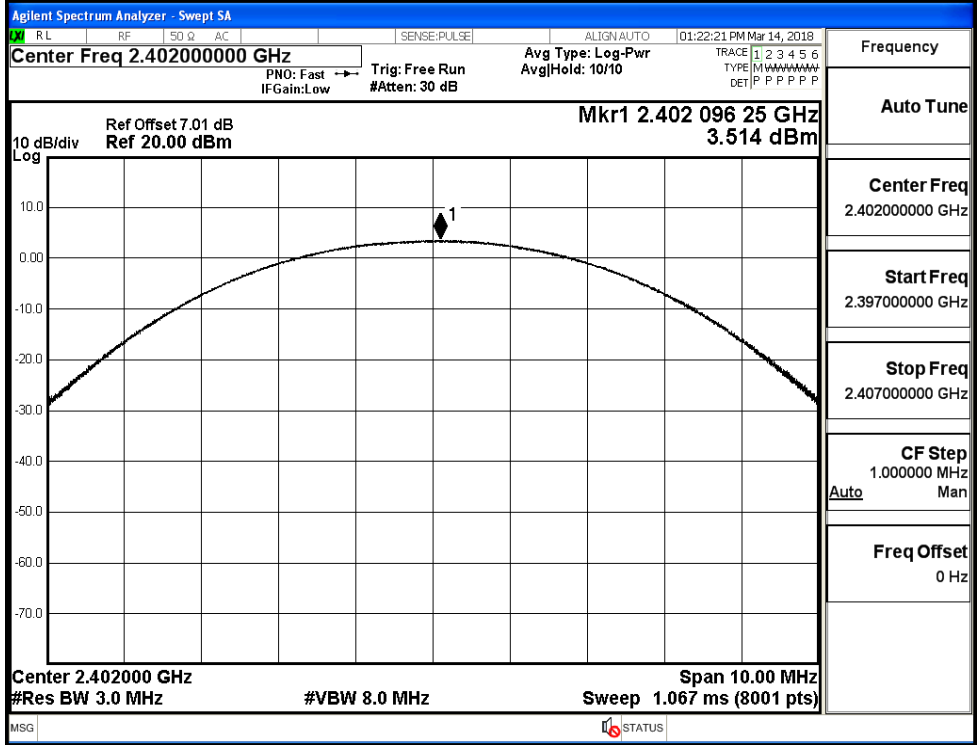
GFSK/MCH



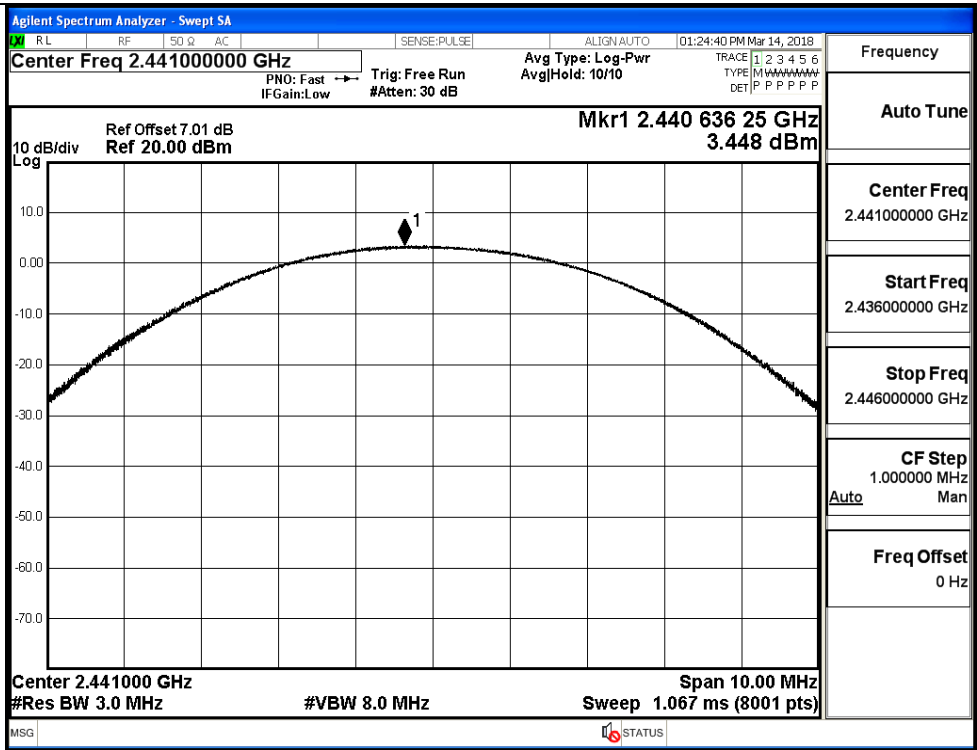
GFSK/HCH



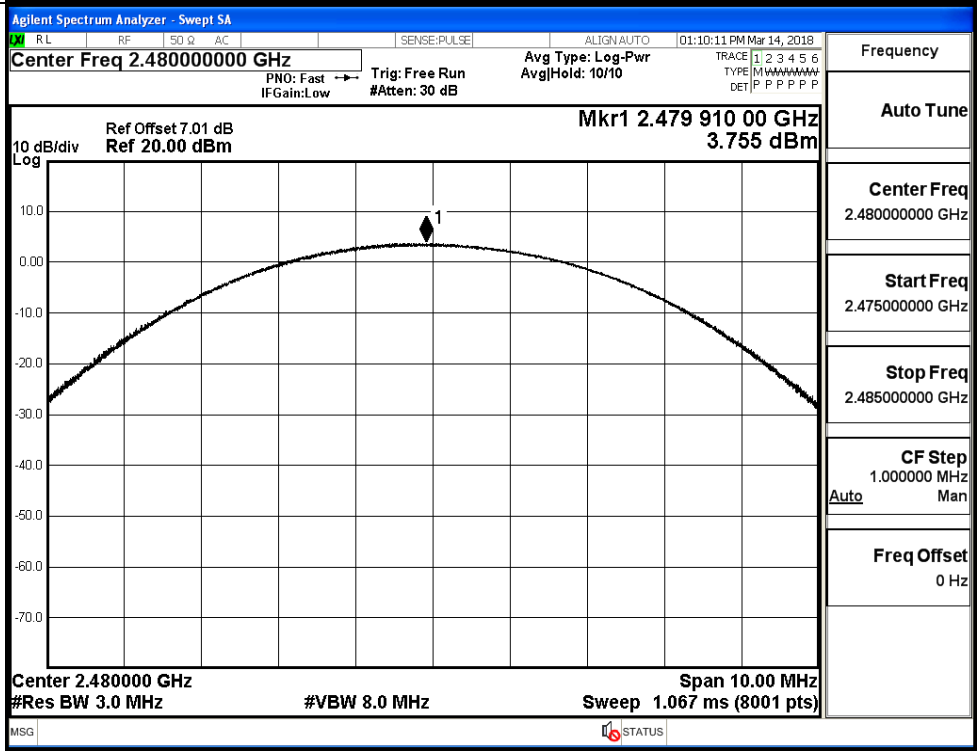
π /4DQPSK/LCH



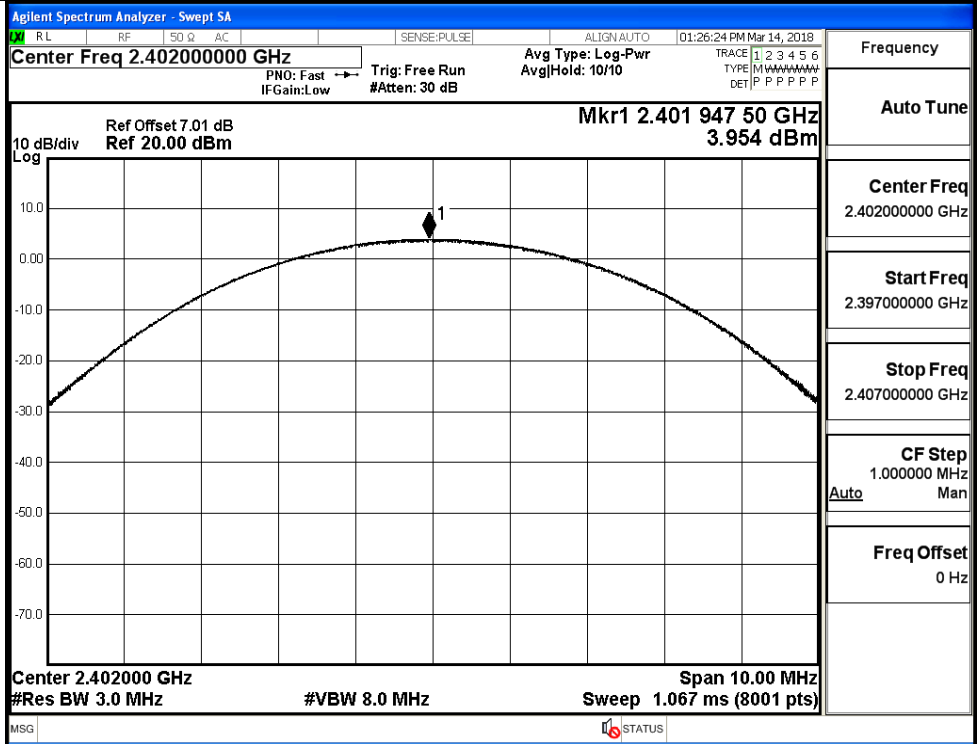
π /4DQPSK/MCH



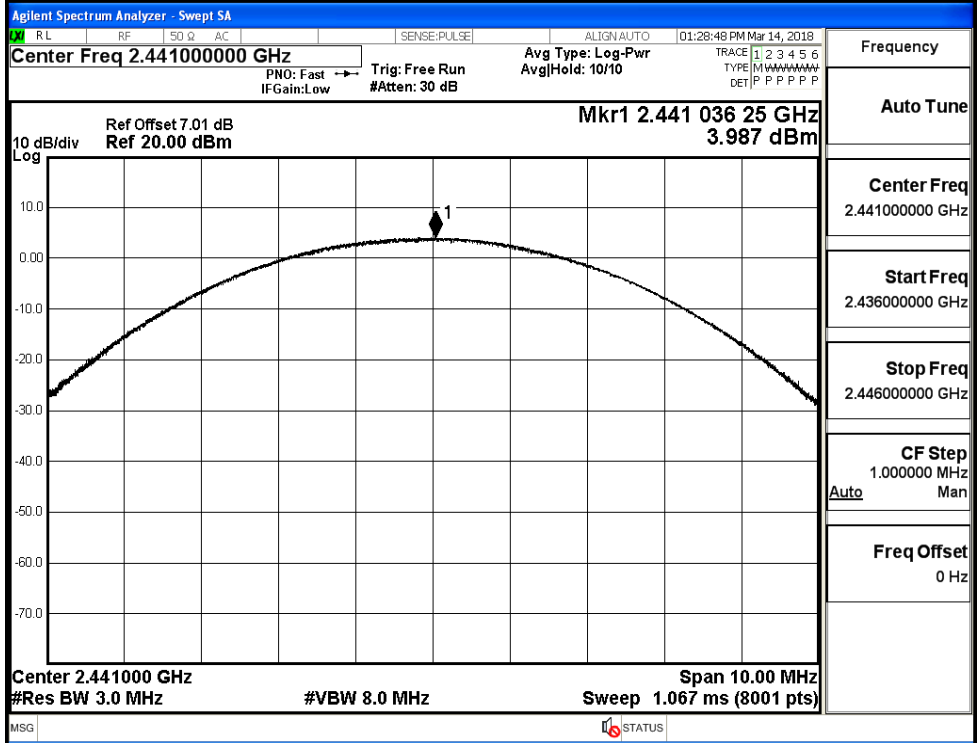
π /4DQPSK/HCH



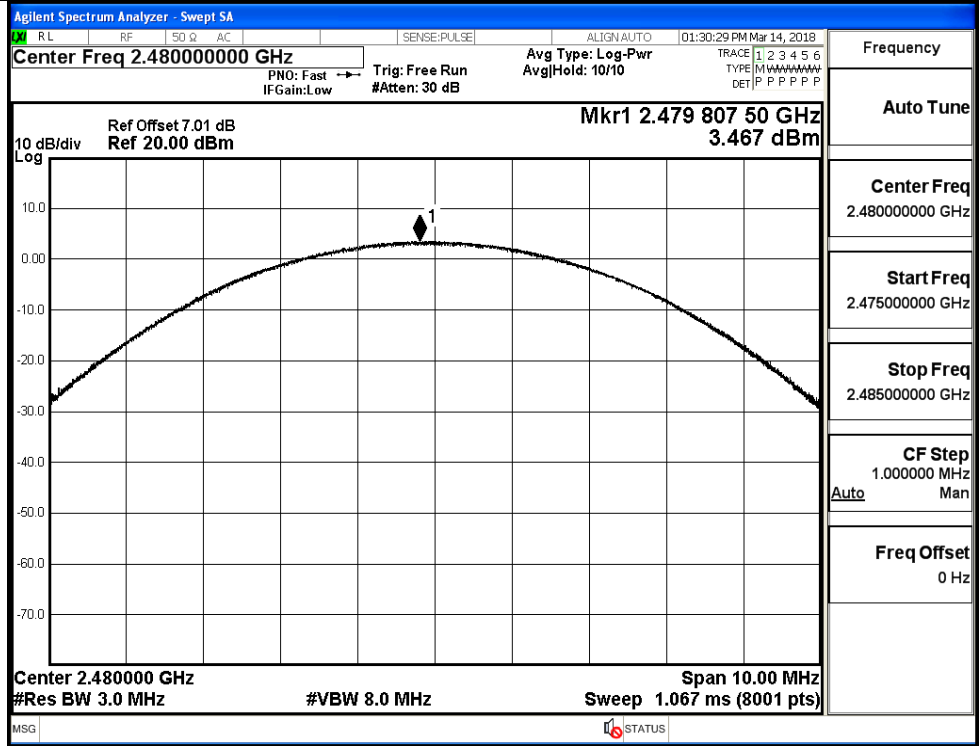
8DPSK/LCH



8DPSK/MCH

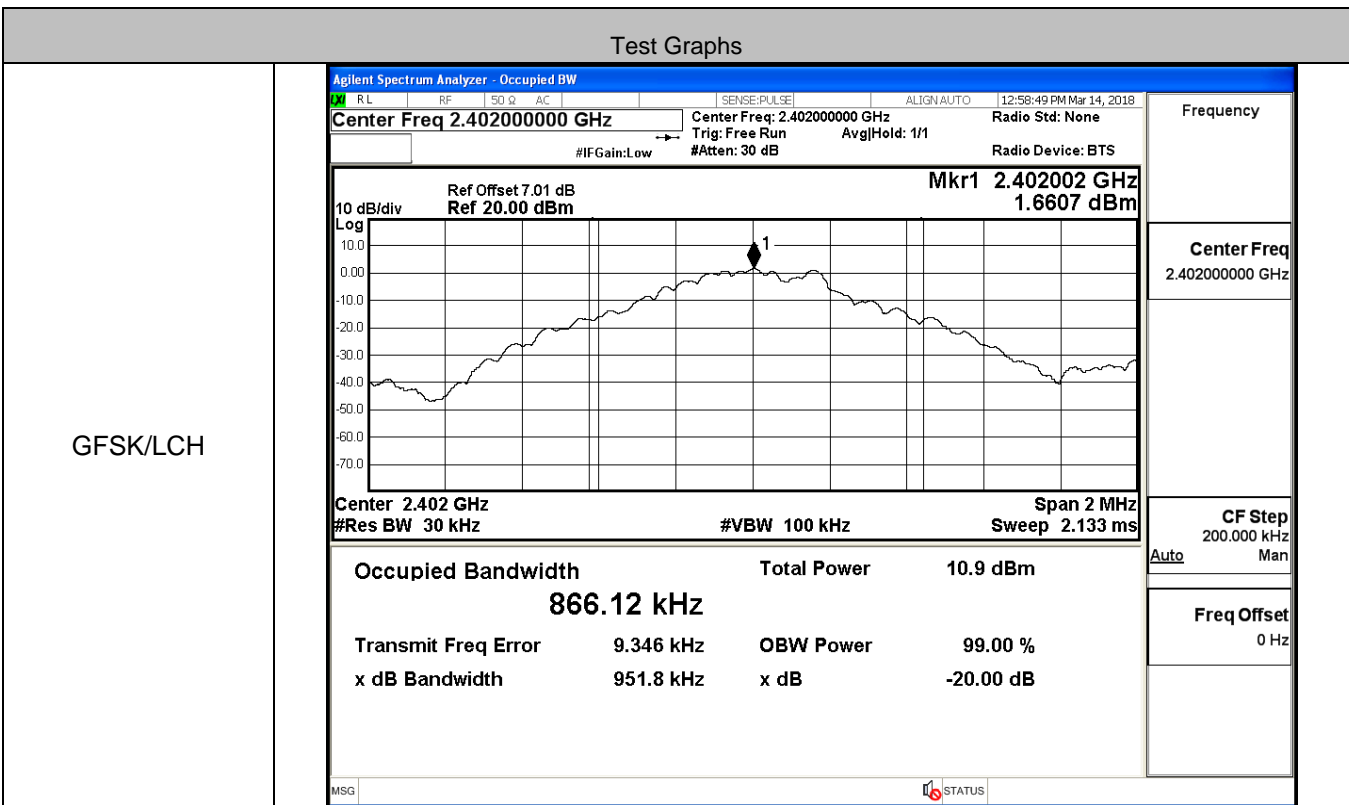


8DPSK/HCH

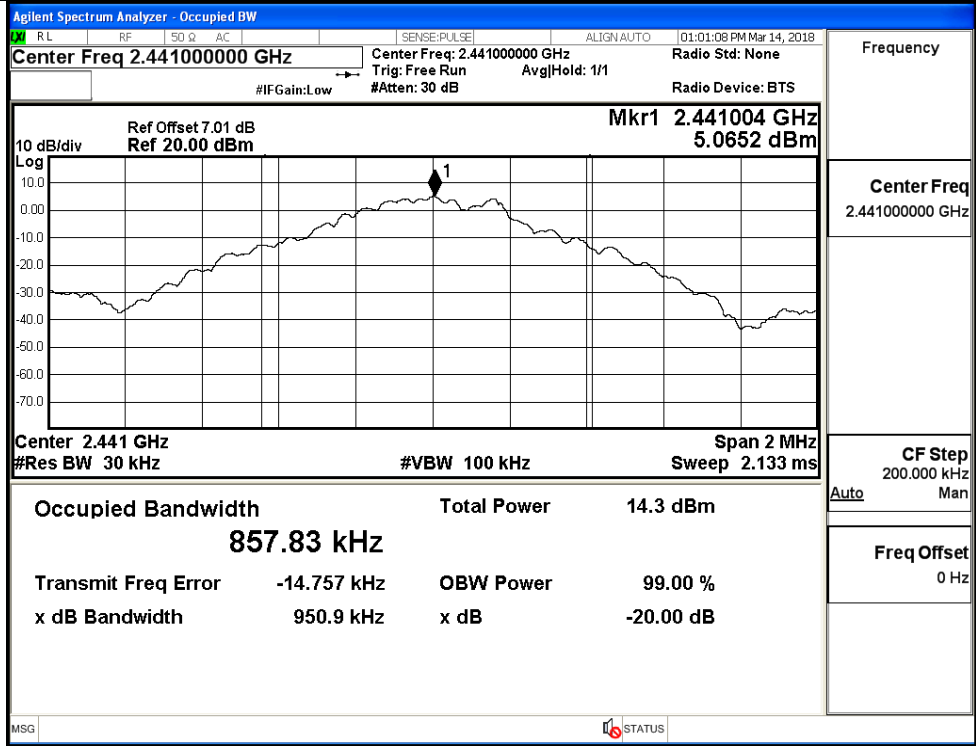


A.2 20dB Bandwidth

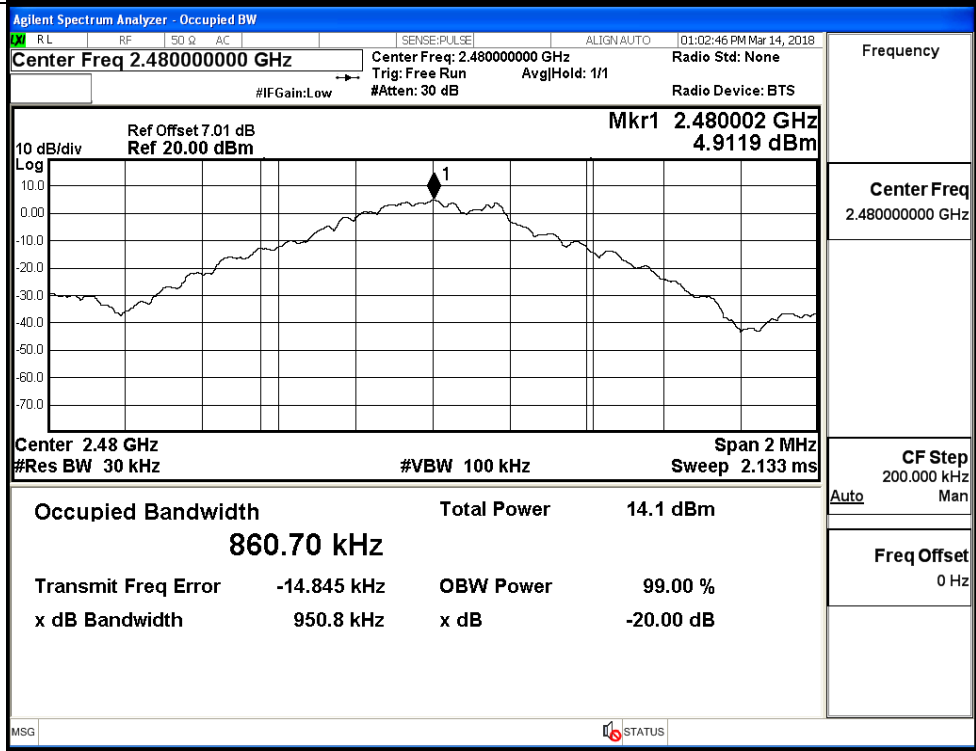
| Mode | Channel. | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK | LCH | 0.9518 | Not Specified | PASS |
| | MCH | 0.9509 | Not Specified | PASS |
| | HCH | 0.9508 | Not Specified | PASS |
| $\pi/4$ DQPSK | LCH | 1.258 | Not Specified | PASS |
| | MCH | 1.231 | Not Specified | PASS |
| | HCH | 1.260 | Not Specified | PASS |
| 8DPSK | LCH | 1.263 | Not Specified | PASS |
| | MCH | 1.255 | Not Specified | PASS |
| | HCH | 1.254 | Not Specified | PASS |



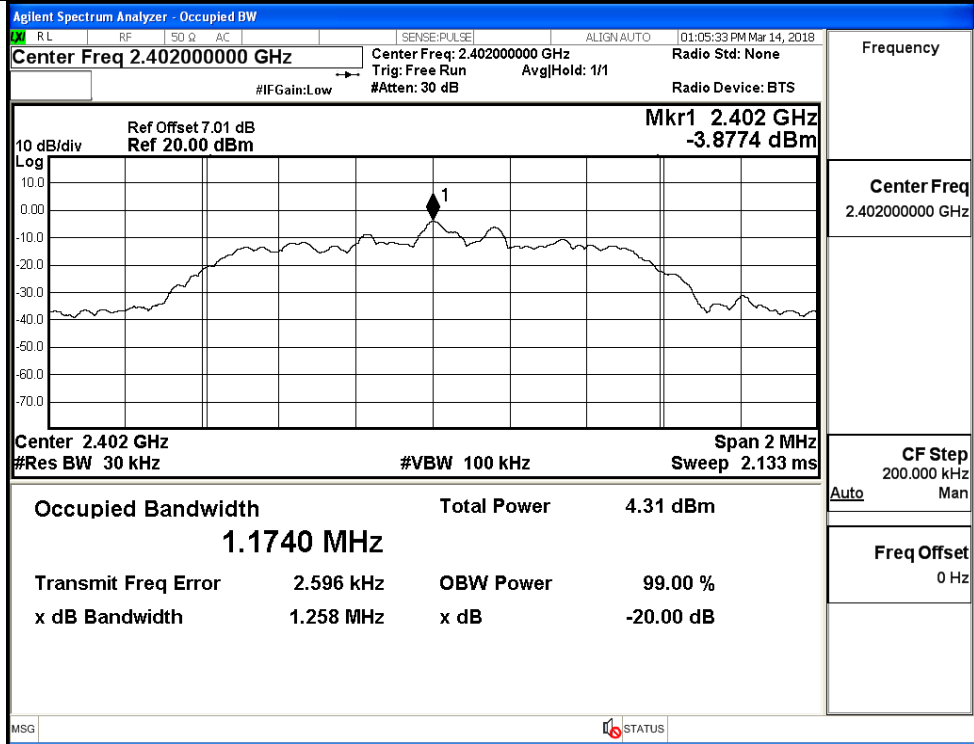
GFSK/MCH



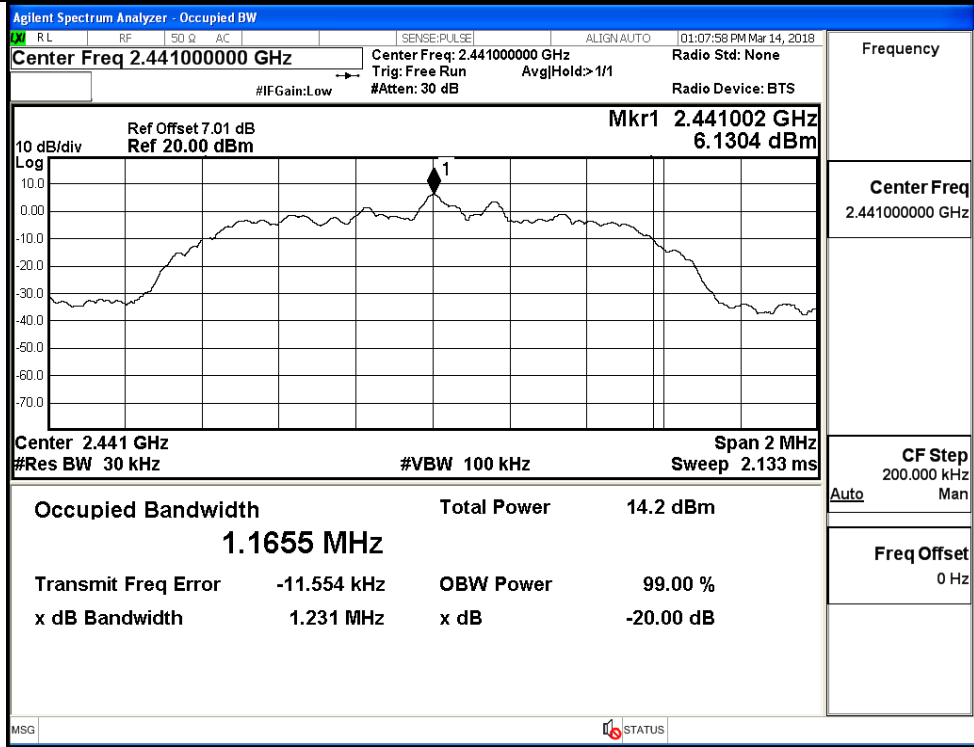
GFSK/HCH



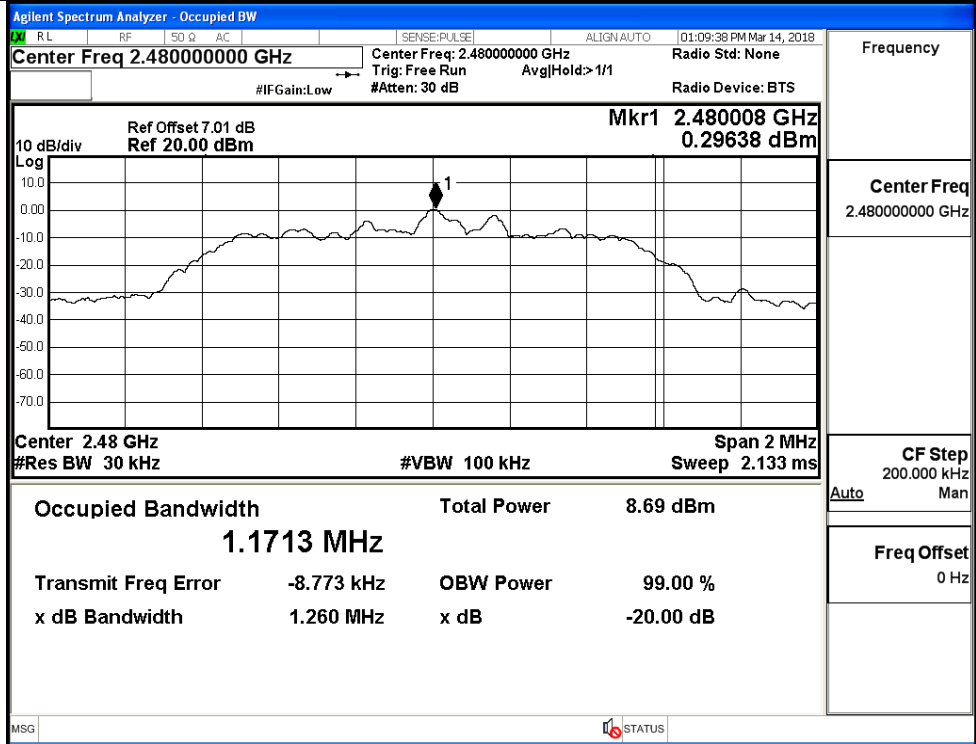
$\pi/4$ DQPSK/LCH



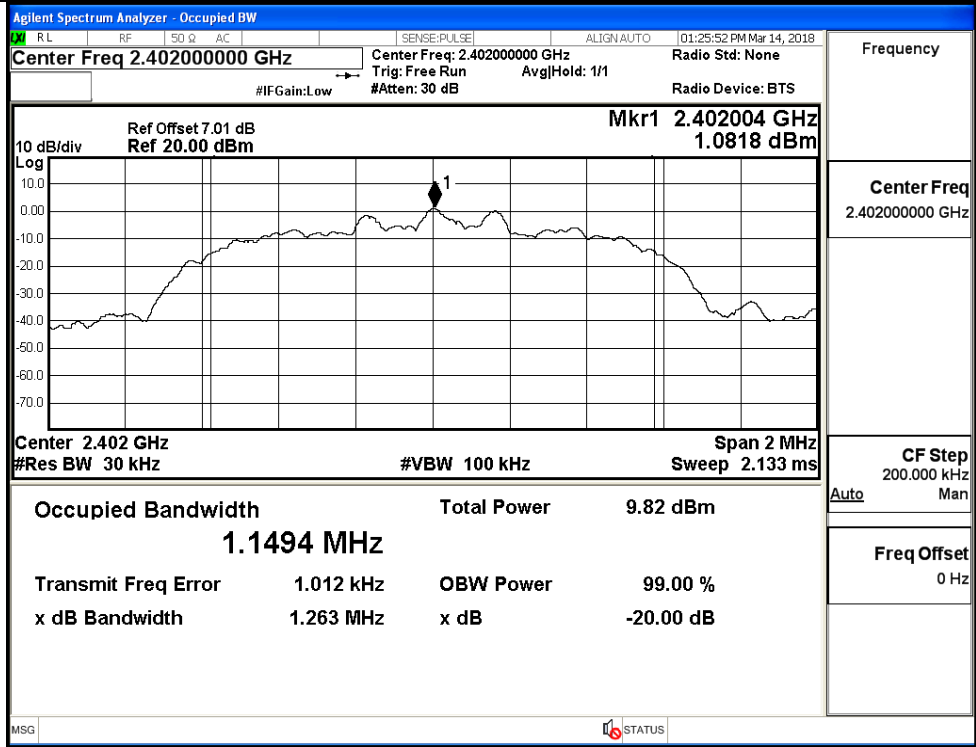
$\pi/4$ DQPSK/MCH



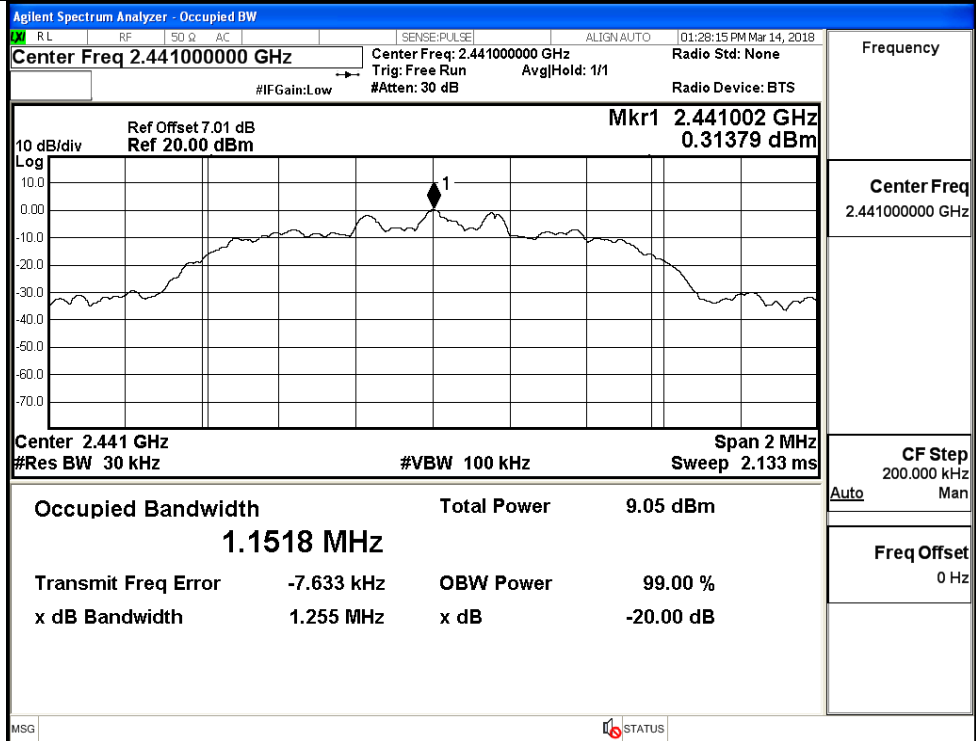
$\pi/4$ DQPSK/HCH



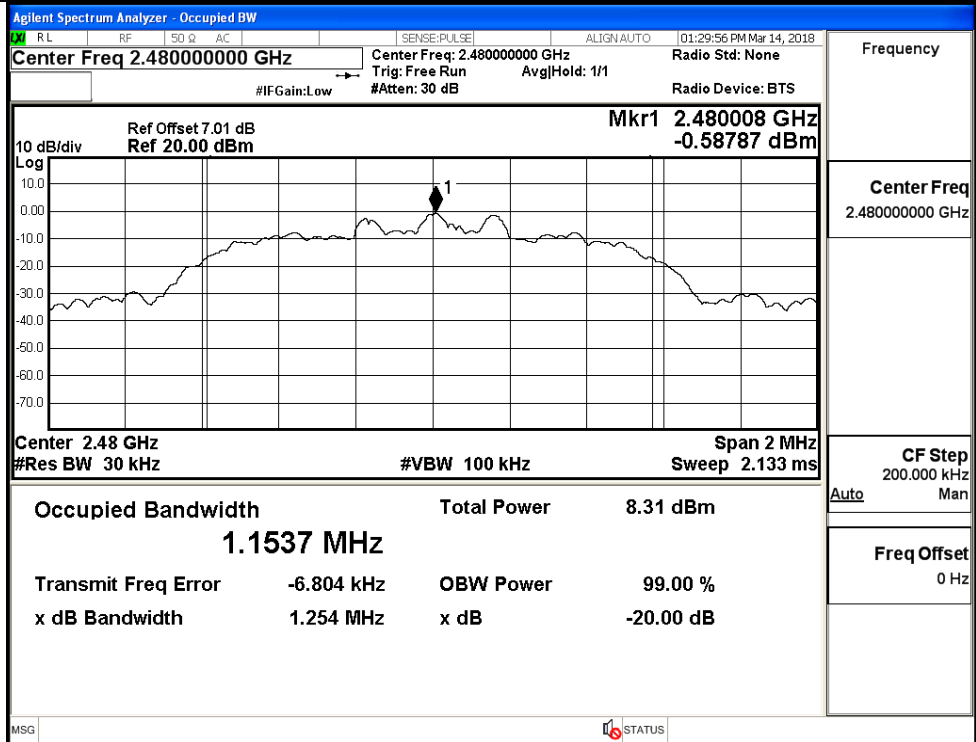
8DPSK/LCH



8DPSK/MCH

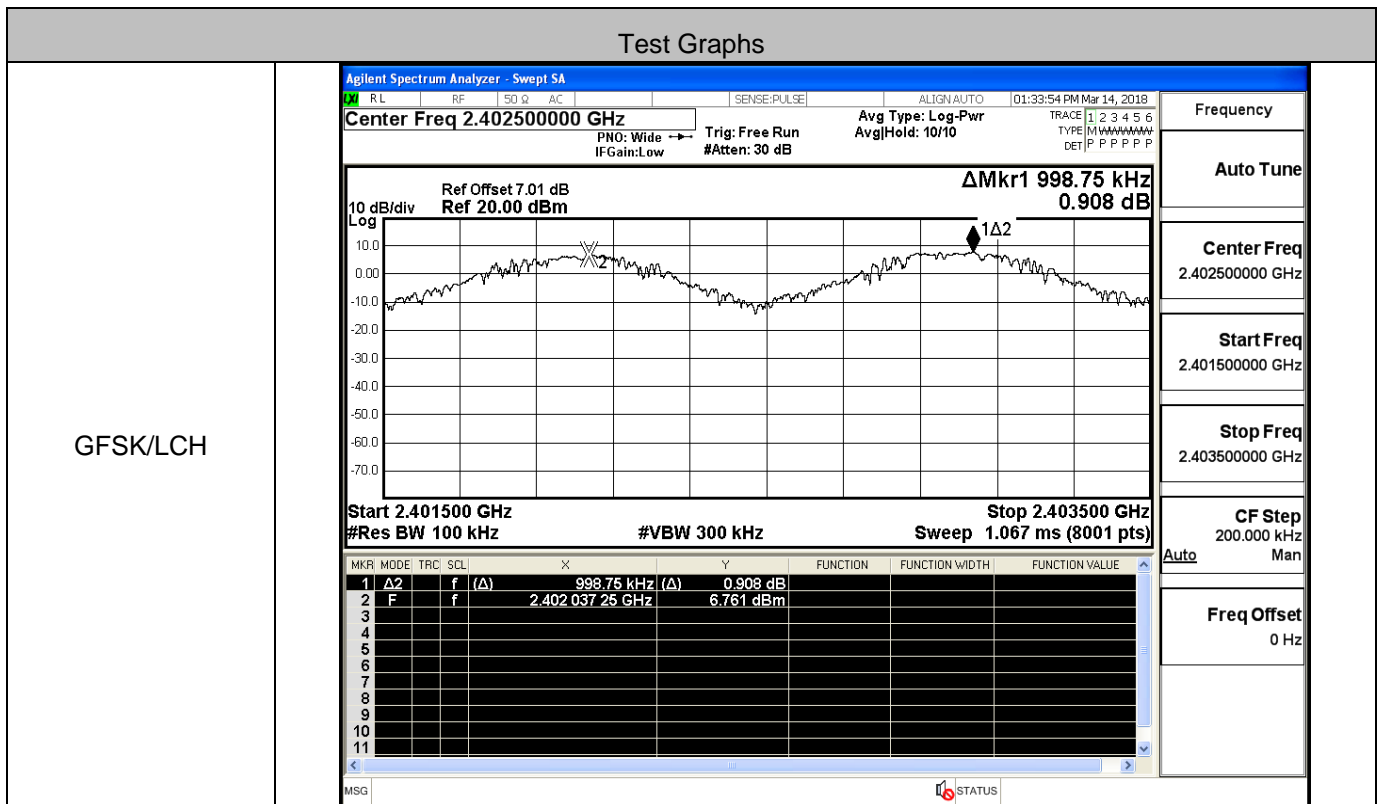


8DPSK/HCH

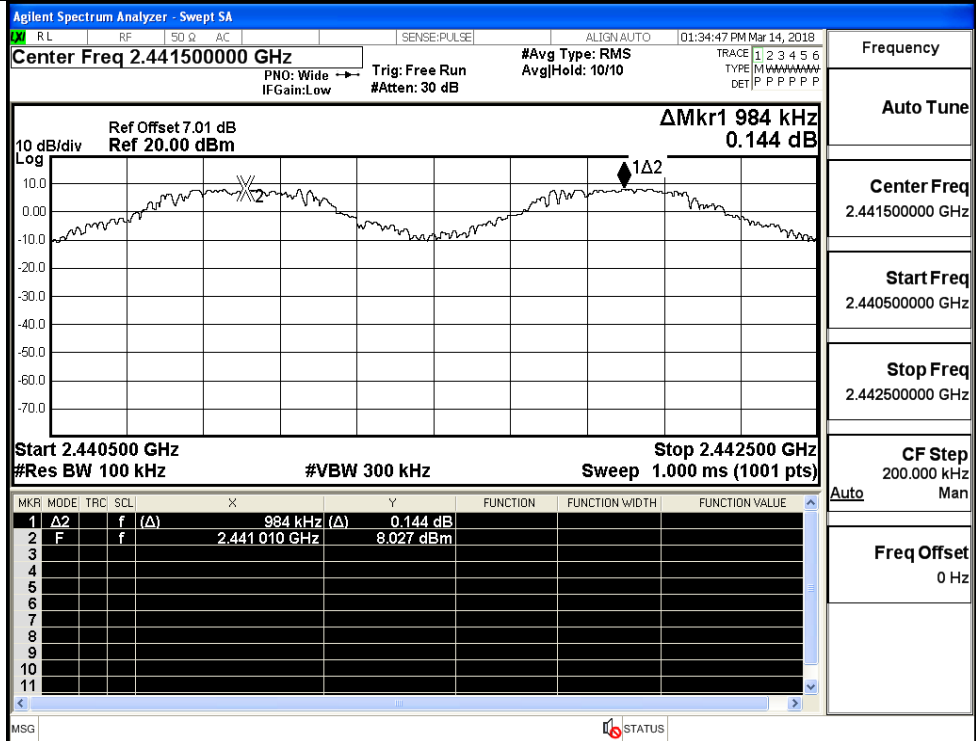


A.3 Carrier Frequency Separation

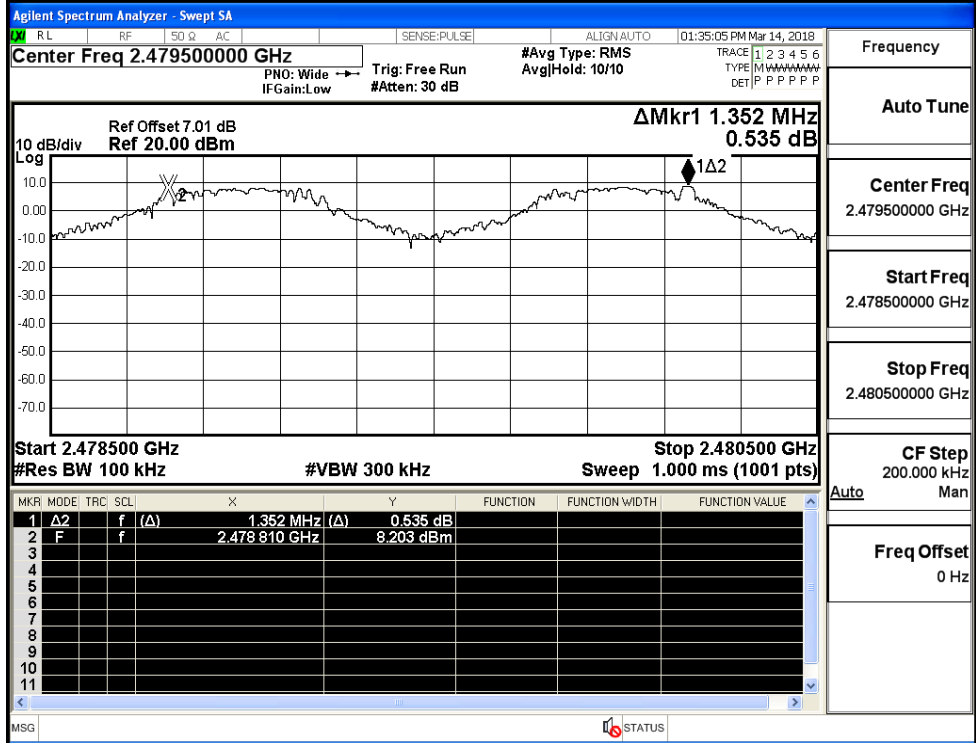
| Mode | Channel | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|---------|------------------------------------|-------------|---------|
| GFSK | LCH | 0.999 | 0.635 | PASS |
| | MCH | 0.984 | 0.635 | PASS |
| | HCH | 1.352 | 0.635 | PASS |
| π/4DQPSK | LCH | 1.018 | 0.840 | PASS |
| | MCH | 1.028 | 0.840 | PASS |
| | HCH | 1.164 | 0.840 | PASS |
| 8DPSK | LCH | 0.916 | 0.842 | PASS |
| | MCH | 1.174 | 0.842 | PASS |
| | HCH | 1.206 | 0.842 | PASS |



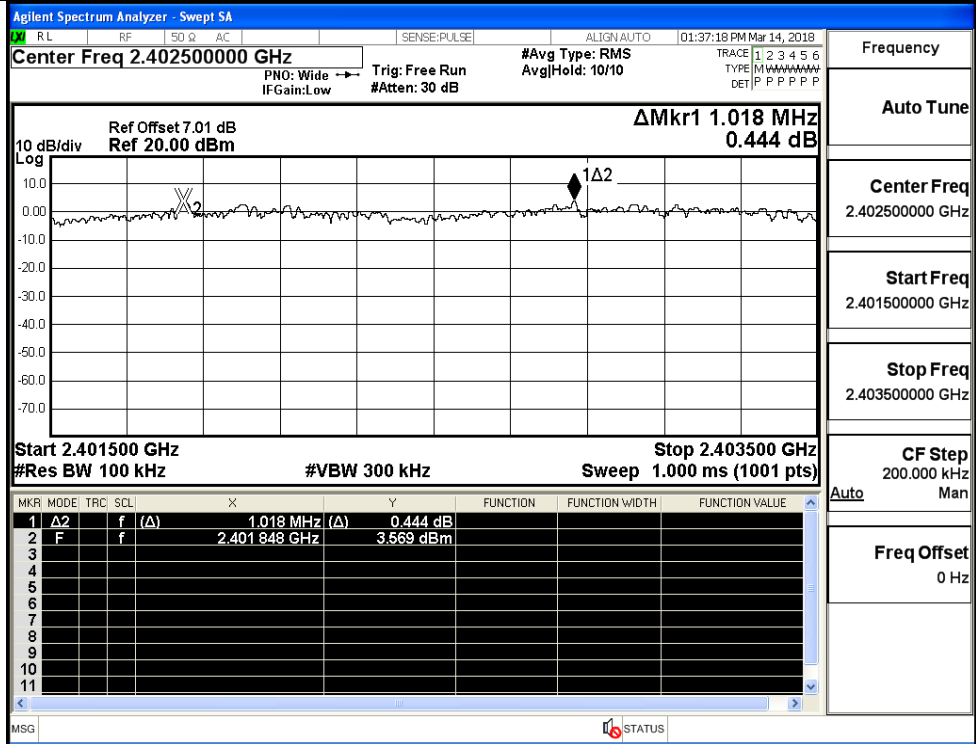
GFSK/MCH



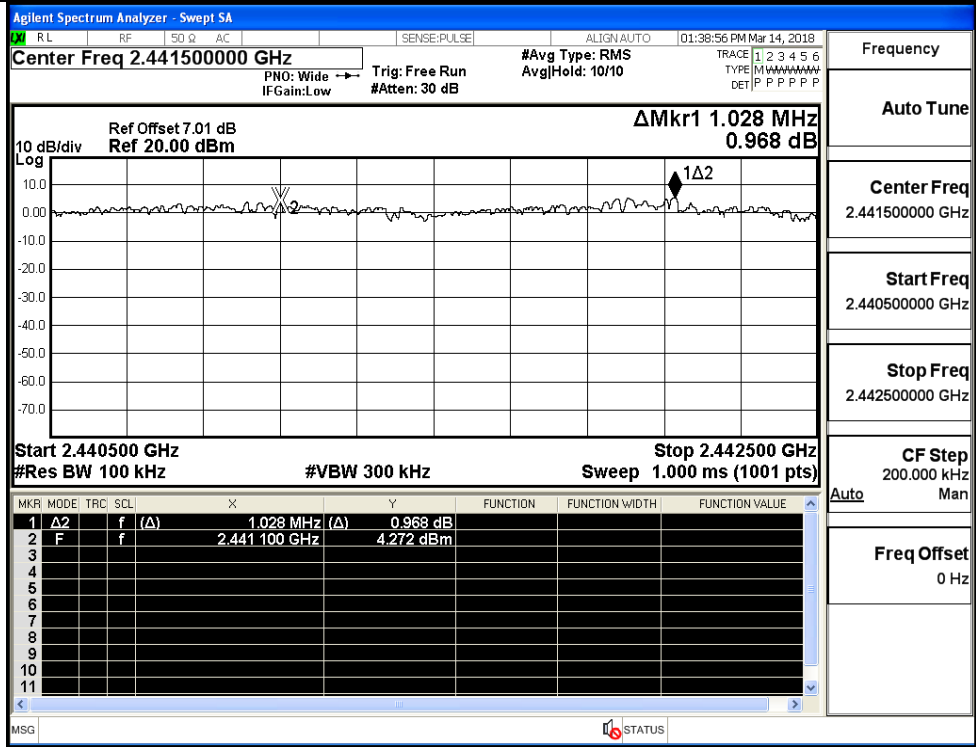
GFSK/HCH



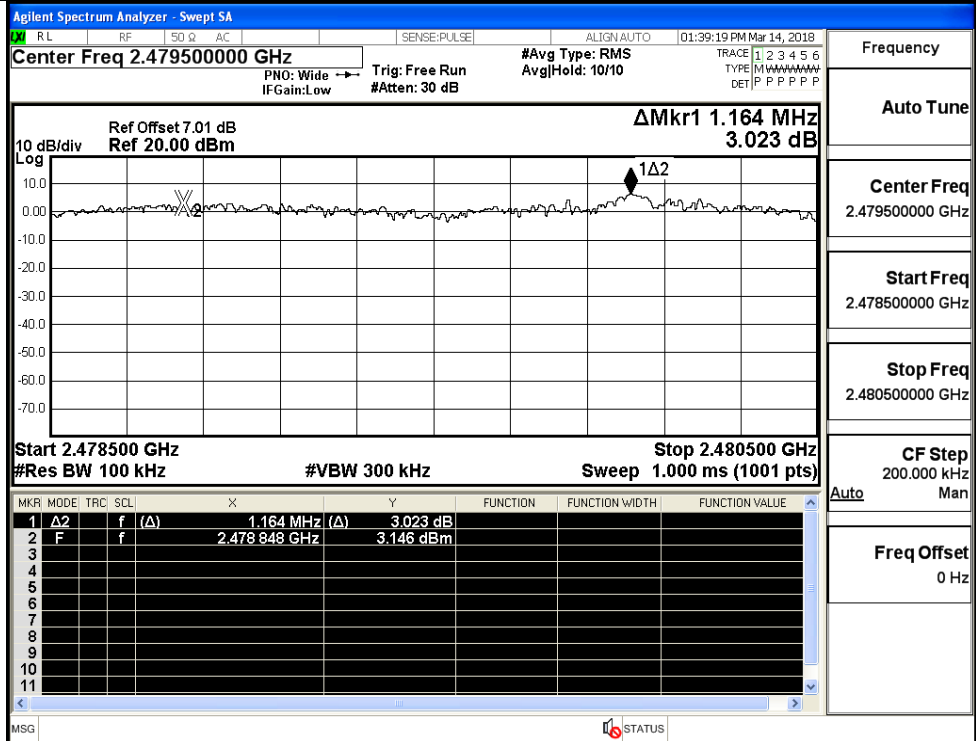
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

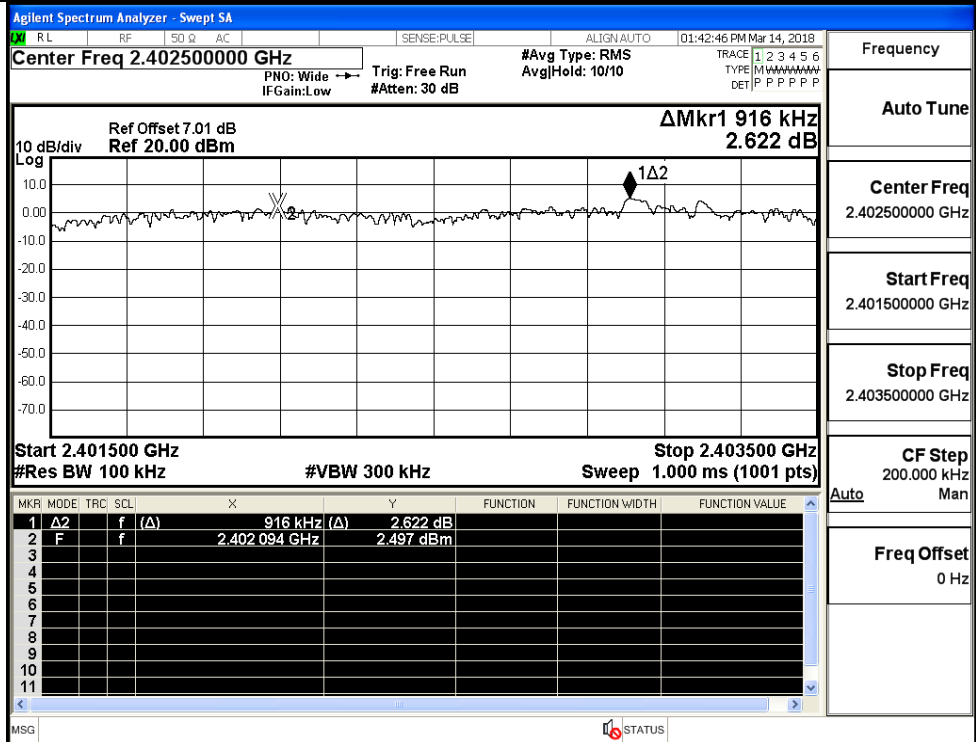
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

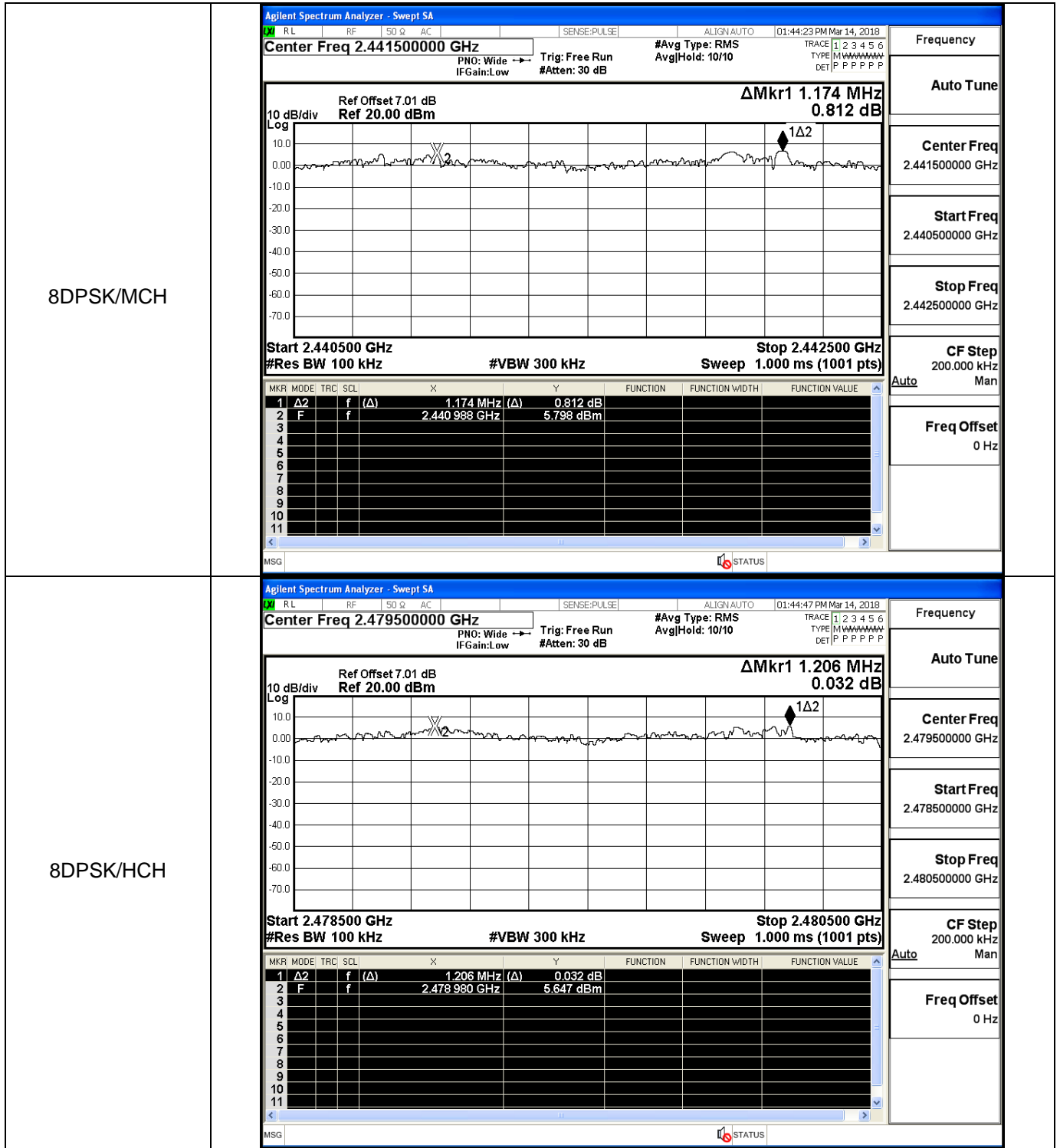
Center Freq
2.402500000 GHz

Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

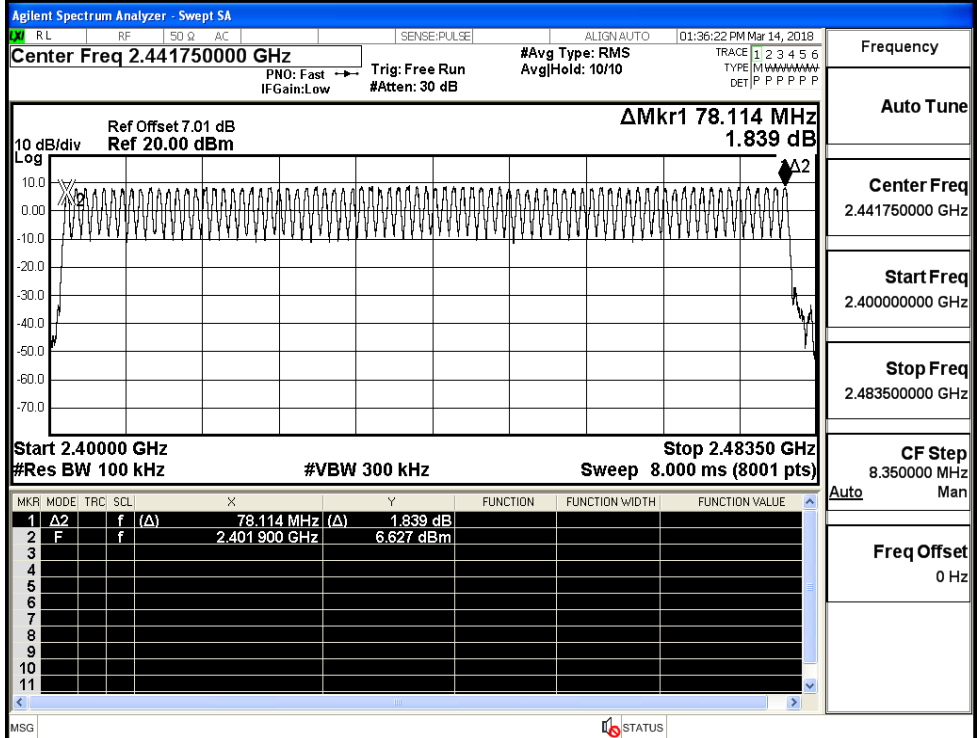


A.4 Hopping Channel Number

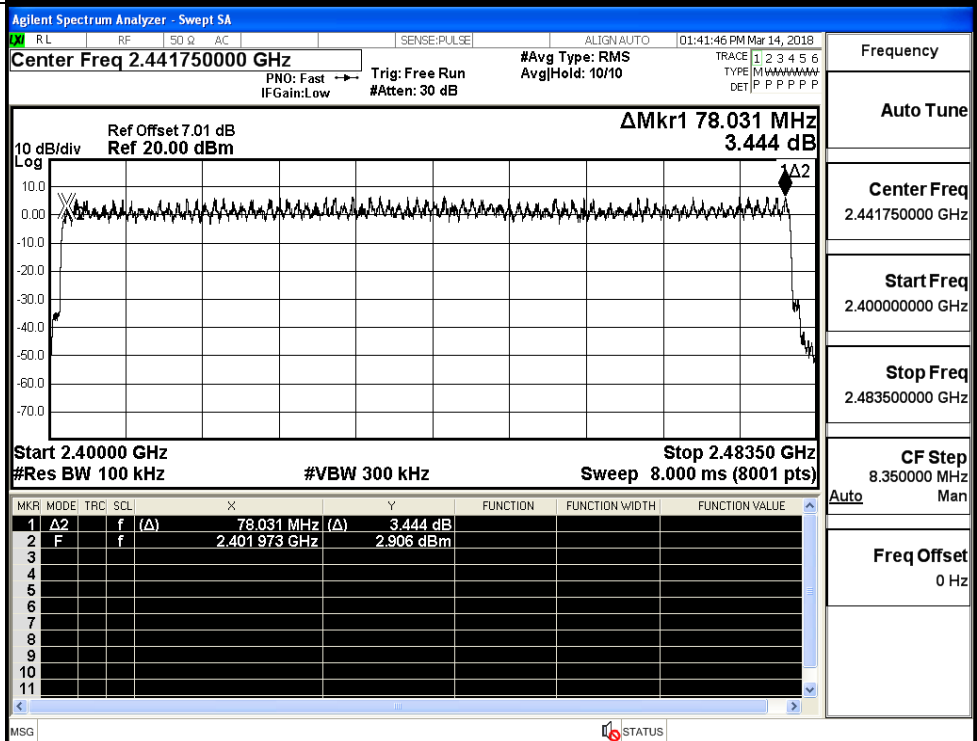
| Mode | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|----------|----------|-------------------------------|-----------|---------|
| GFSK | Hop | 79 | >=15 | PASS |
| π/4DQPSK | Hop | 79 | >=15 | PASS |
| 8DPSK | Hop | 79 | >=15 | PASS |

Test Graphs

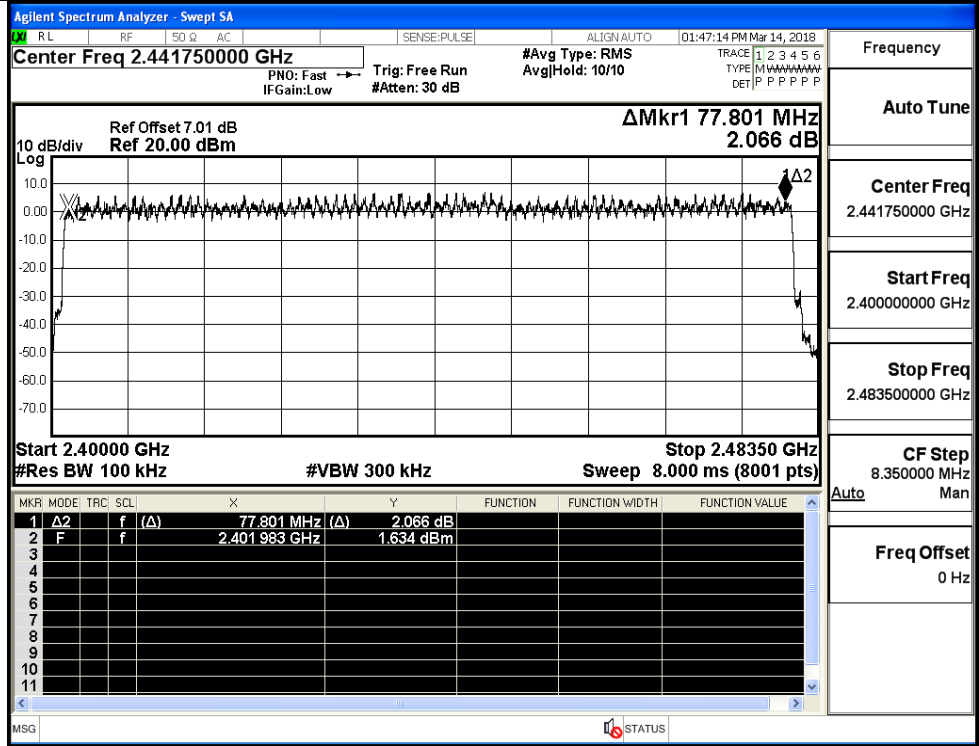
GFSK/Hop



$\pi/4$ DQPSK/Hop

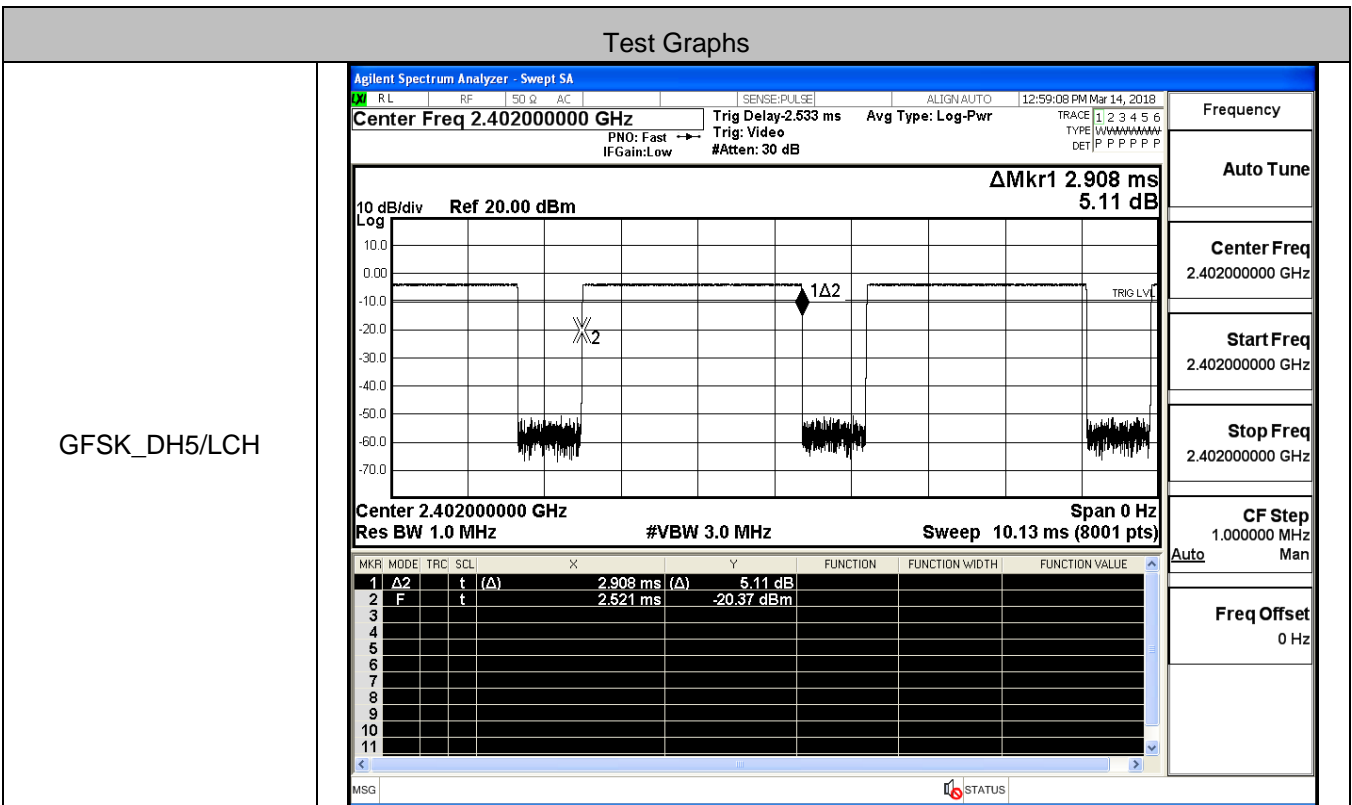


8DPSK/Hop

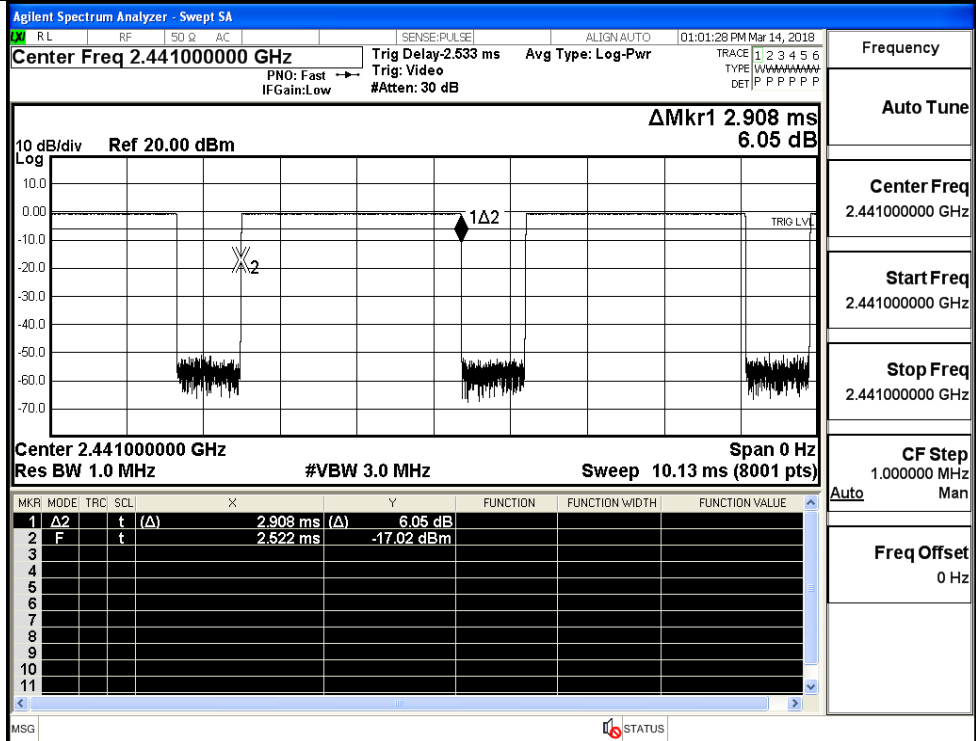


A.5 Dwell Time

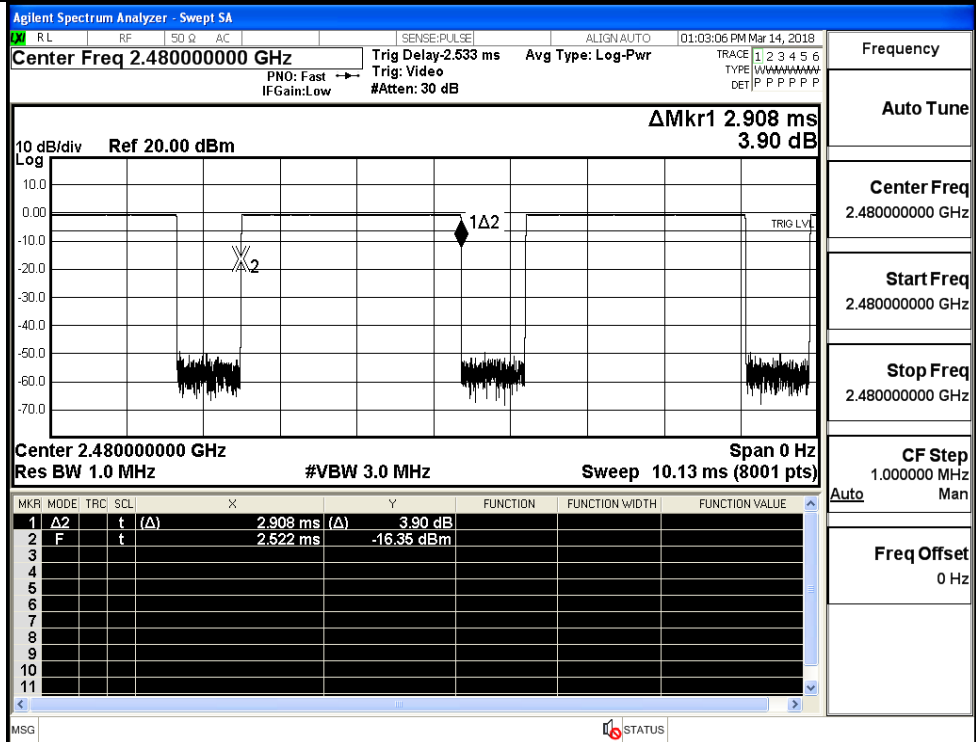
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK | DH5 | LCH | 2.91 | 106.7 | 0.31 | 0.4 | PASS |
| | DH5 | MCH | 2.91 | 106.7 | 0.31 | 0.4 | PASS |
| | DH5 | HCH | 2.91 | 106.7 | 0.31 | 0.4 | PASS |
| π/4DQPSK | 2DH5 | LCH | 2.91 | 106.7 | 0.312 | 0.4 | PASS |
| | 2DH5 | MCH | 2.91 | 106.7 | 0.312 | 0.4 | PASS |
| | 2DH5 | HCH | 2.91 | 106.7 | 0.312 | 0.4 | PASS |
| 8DPSK | 3DH5 | LCH | 2.91 | 106.7 | 0.312 | 0.4 | PASS |
| | 3DH5 | MCH | 2.91 | 106.7 | 0.312 | 0.4 | PASS |
| | 3DH5 | HCH | 2.91 | 106.7 | 0.312 | 0.4 | PASS |



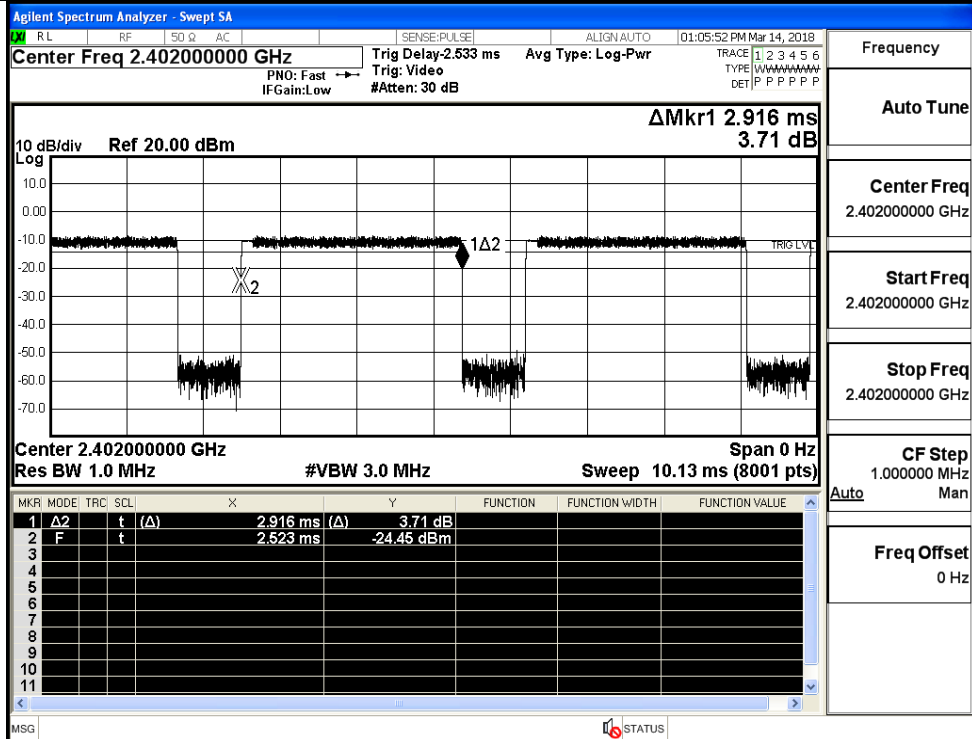
GFSK_DH5/MCH



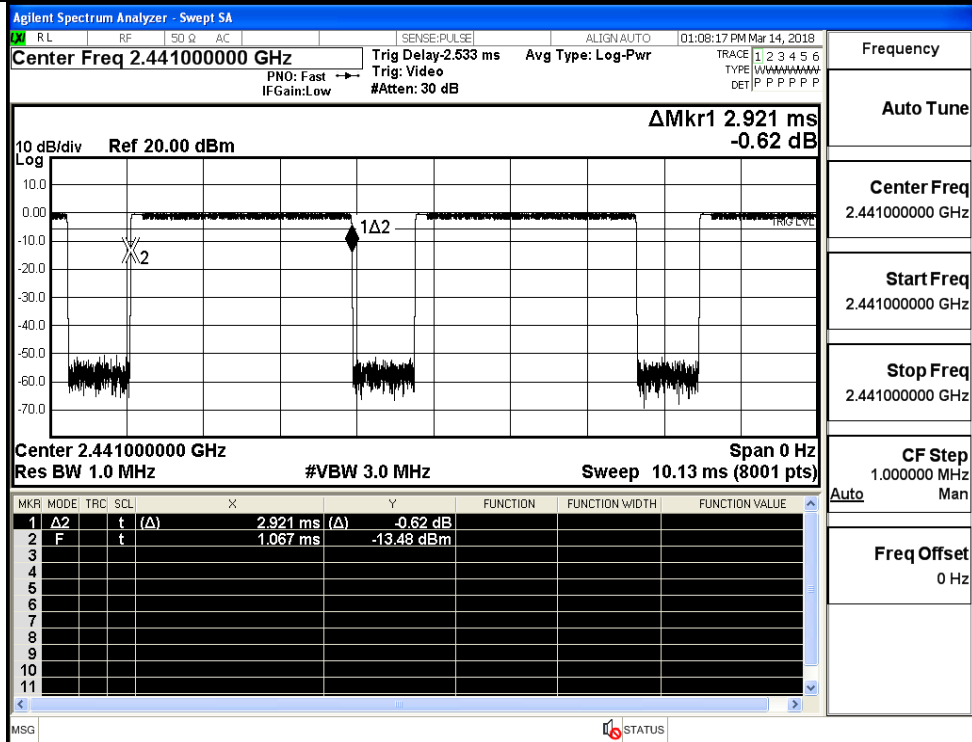
GFSK_DH5/HCH



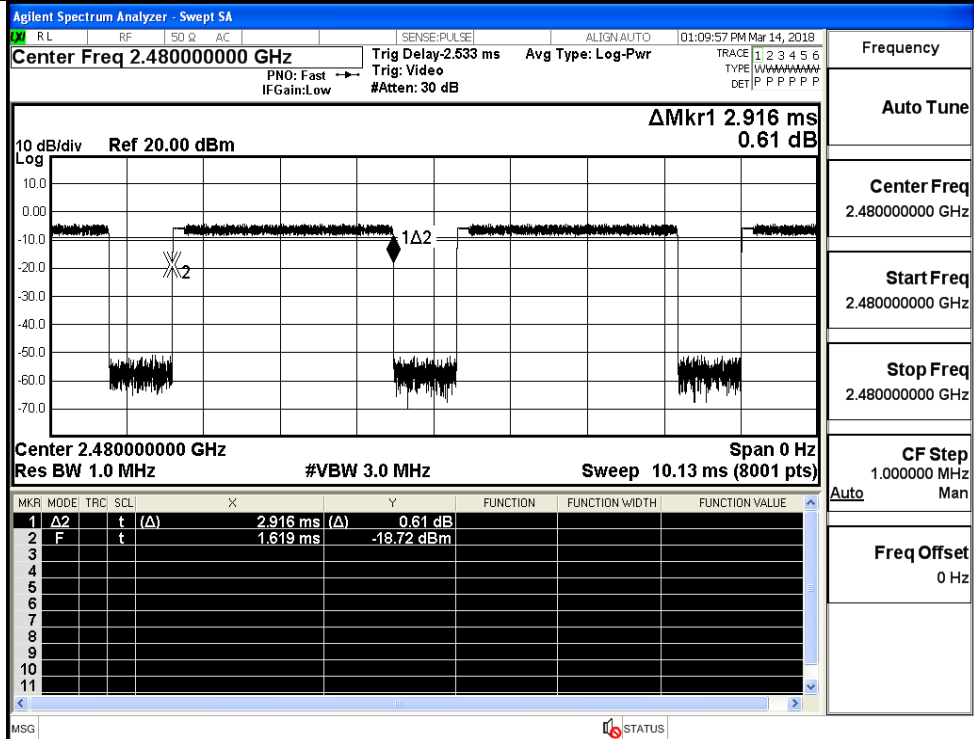
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



$\pi/4$ DQPSK
_2DH5/HCH



Frequency

Auto Tune

Center Freq
2.480000000 GHz

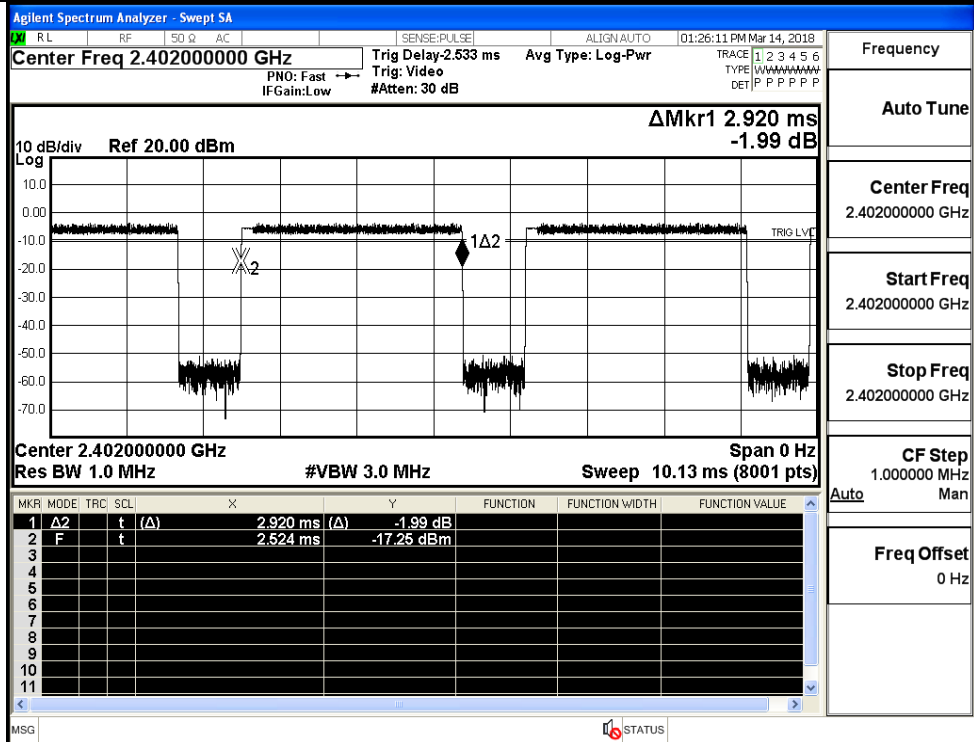
Start Freq
2.480000000 GHz

Stop Freq
2.480000000 GHz

CF Step
1.000000 MHz

Freq Offset
0 Hz

8DPSK_3DH5/LCH



Frequency

Auto Tune

Center Freq
2.402000000 GHz

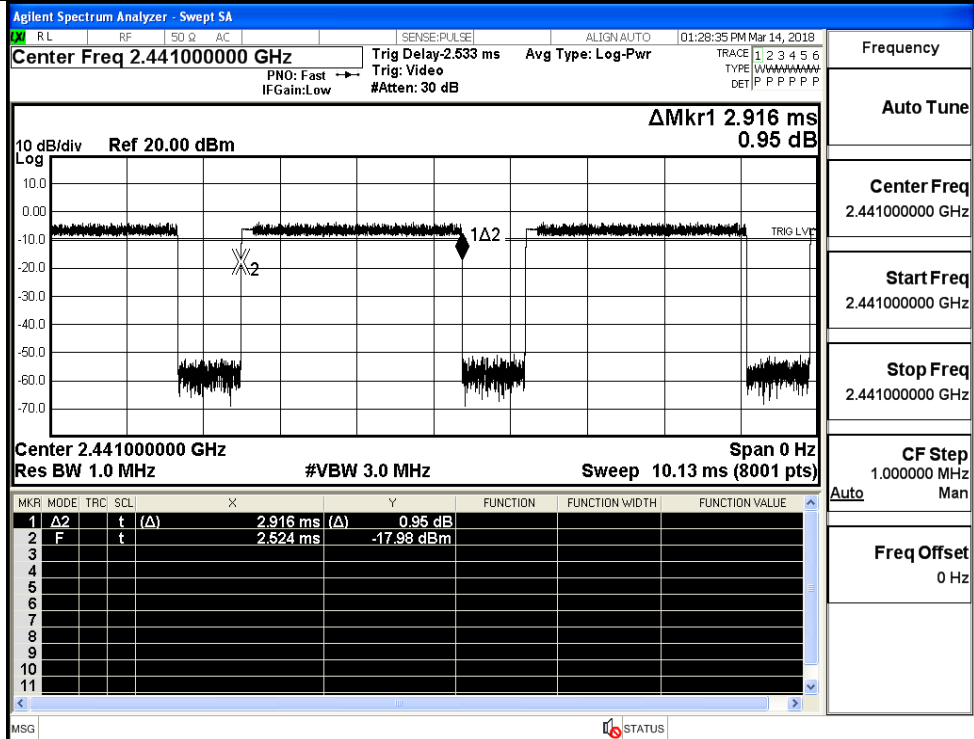
Start Freq
2.402000000 GHz

Stop Freq
2.402000000 GHz

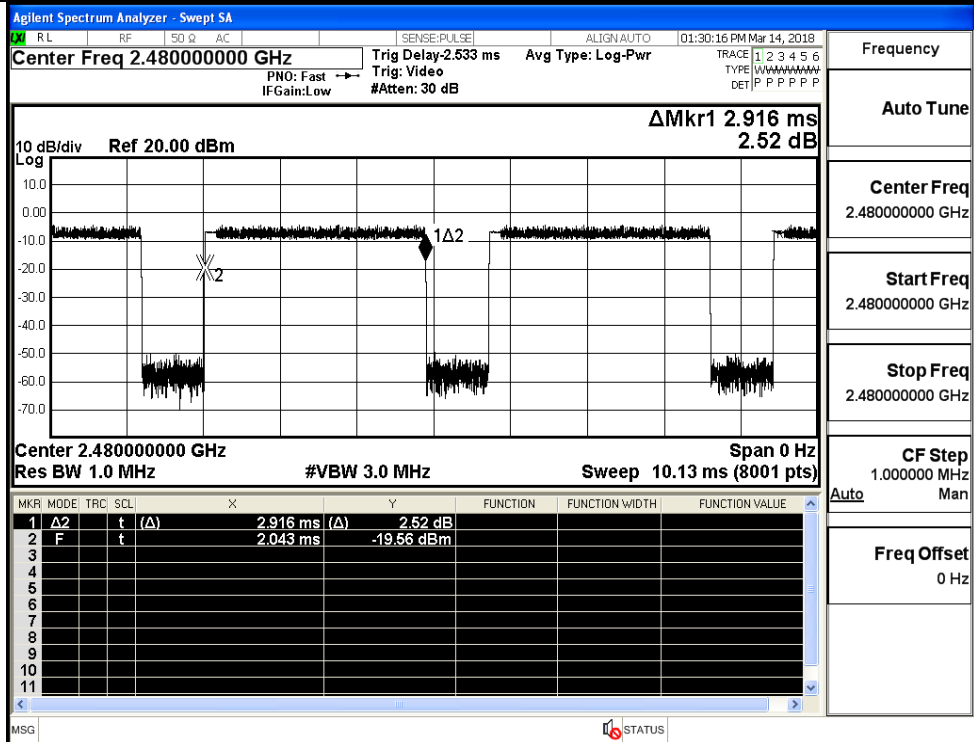
CF Step
1.000000 MHz

Freq Offset
0 Hz

8DPSK_3DH5/MCH



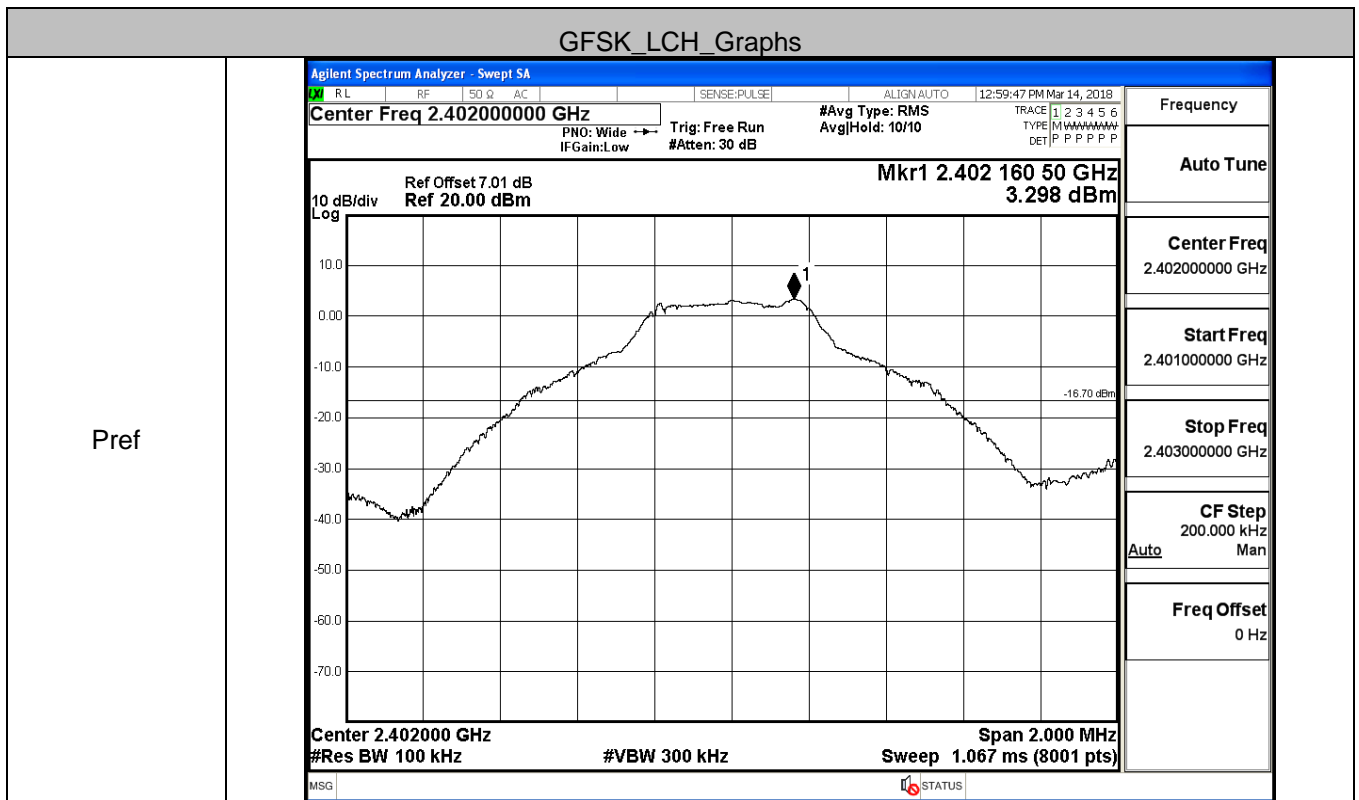
8DPSK_3DH5/HCH

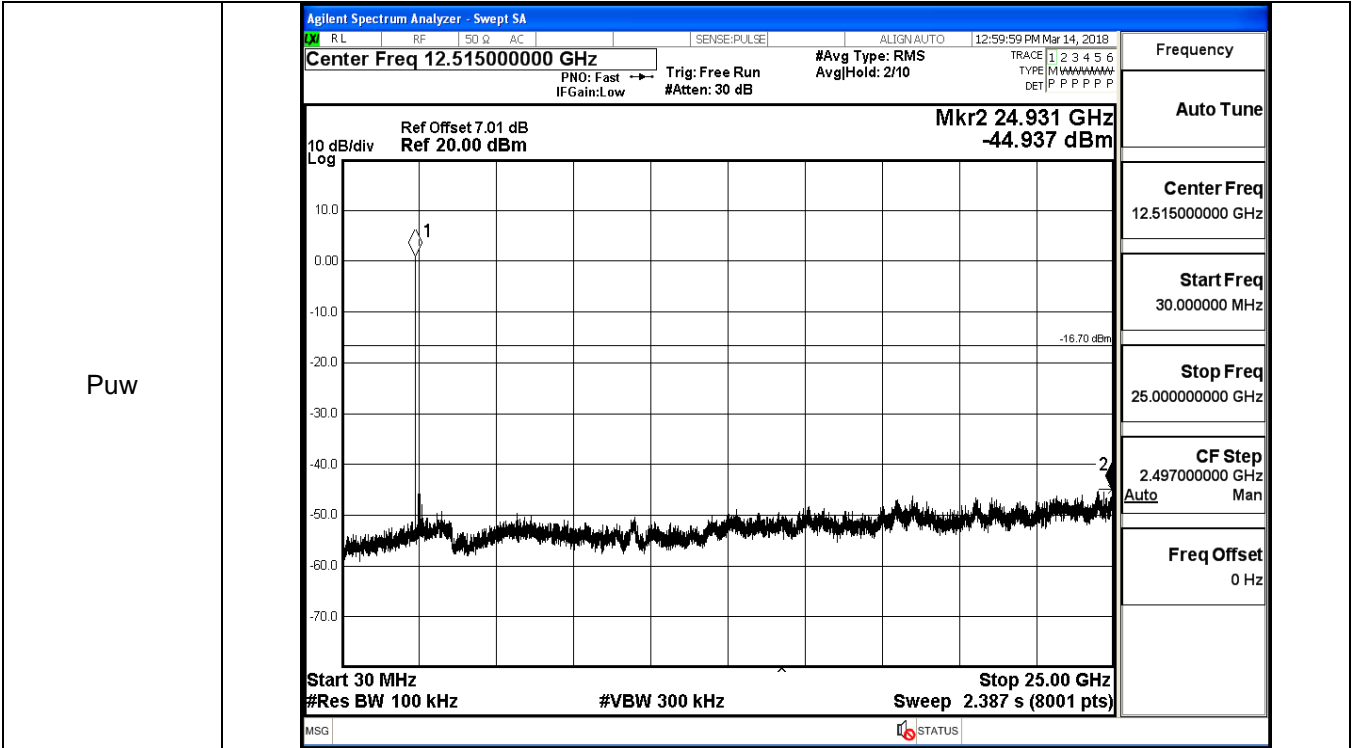


A.6 RF Conducted Spurious Emissions

| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK | LCH | 3.298 | -44.937 | -16.702 | PASS |
| | MCH | 6.467 | -44.857 | -13.533 | PASS |
| | HCH | 6.34 | -44.283 | -13.660 | PASS |
| π /4DQPSK | LCH | -3.198 | -45.669 | -23.198 | PASS |
| | MCH | 6.498 | -44.635 | -13.502 | PASS |
| | HCH | 1.147 | -45.461 | -18.853 | PASS |
| 8DPSK | LCH | 1.548 | -35.485 | -18.452 | PASS |
| | MCH | 1.158 | -45.808 | -18.842 | PASS |
| | HCH | 0.409 | -45.173 | -19.591 | PASS |

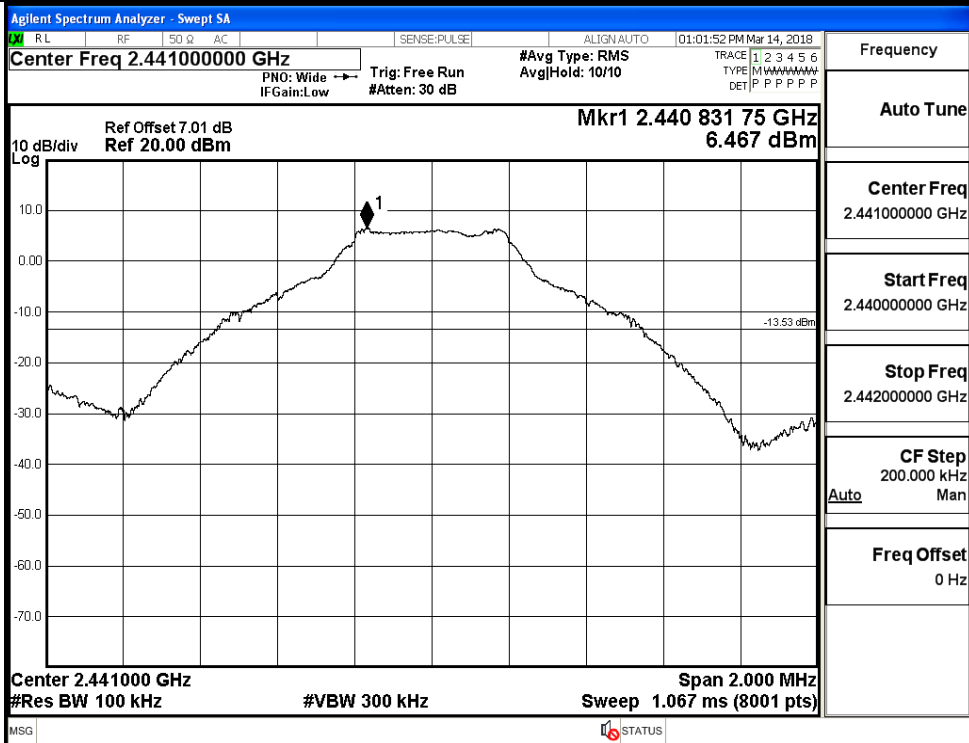
GFSK_LCH_Graphs



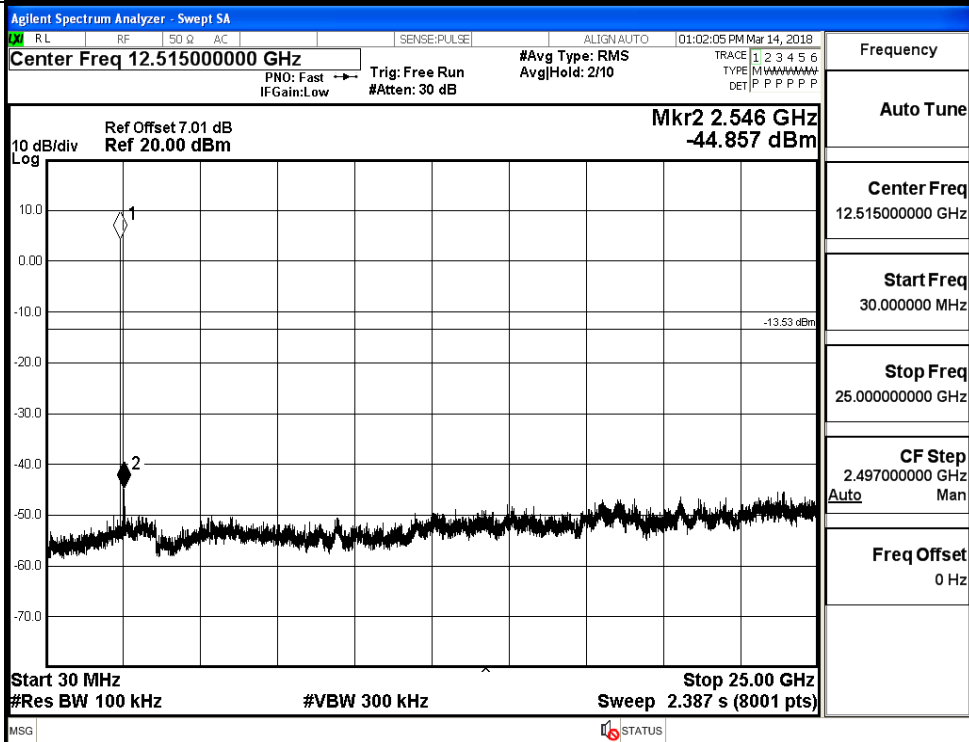


GFSK_MCH_Graphs

Pref

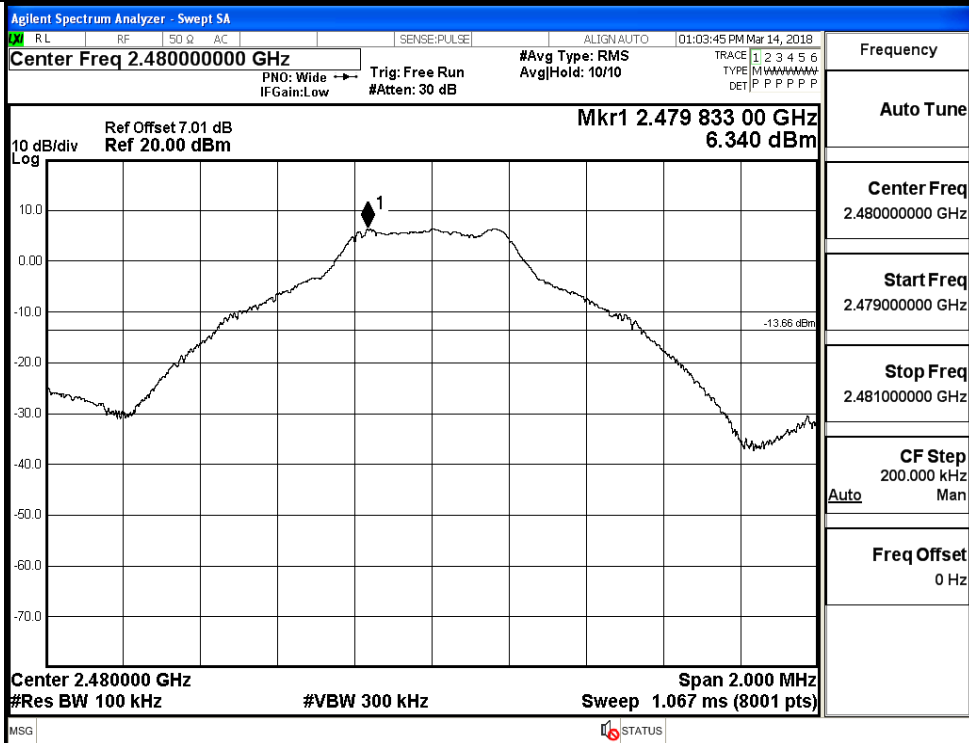


Puw

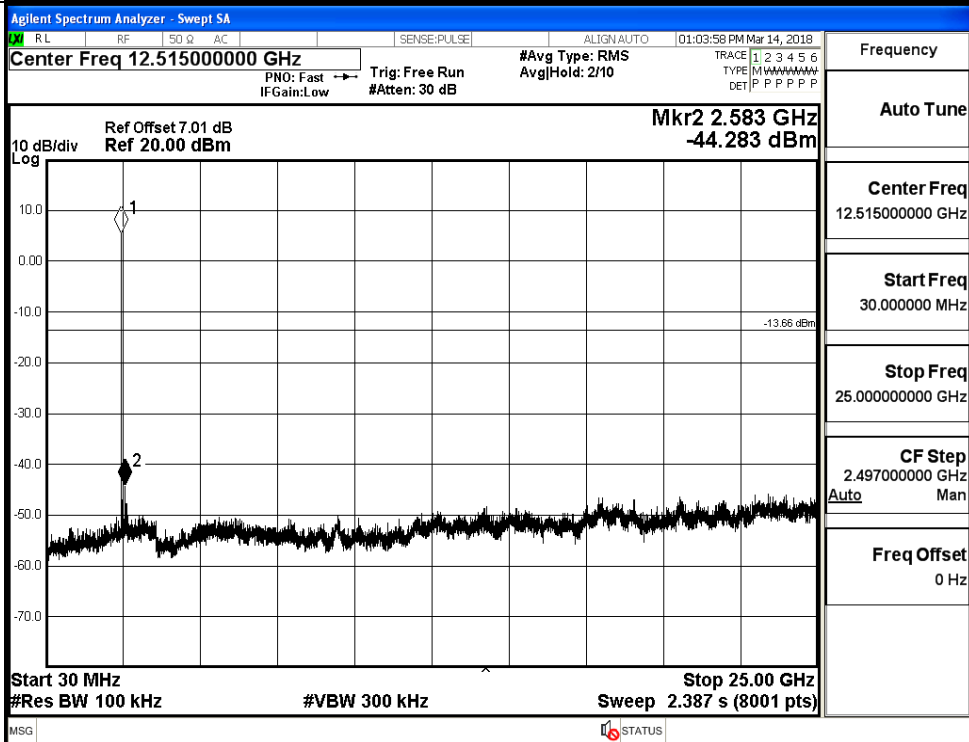


GFSK_HCH_Graphs

Pref

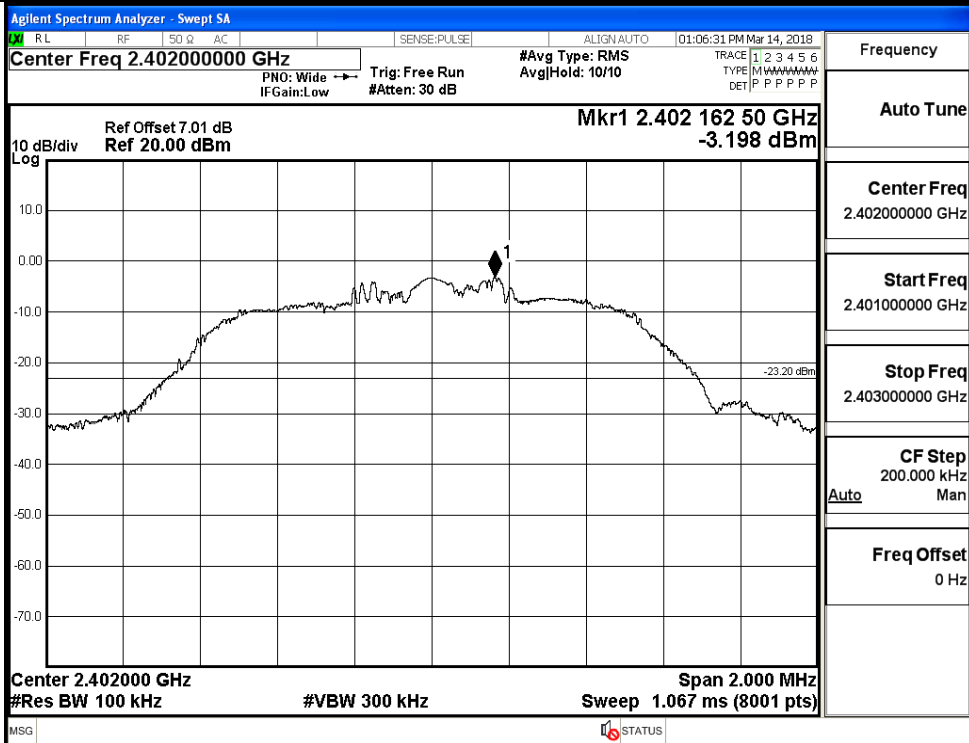


Puw

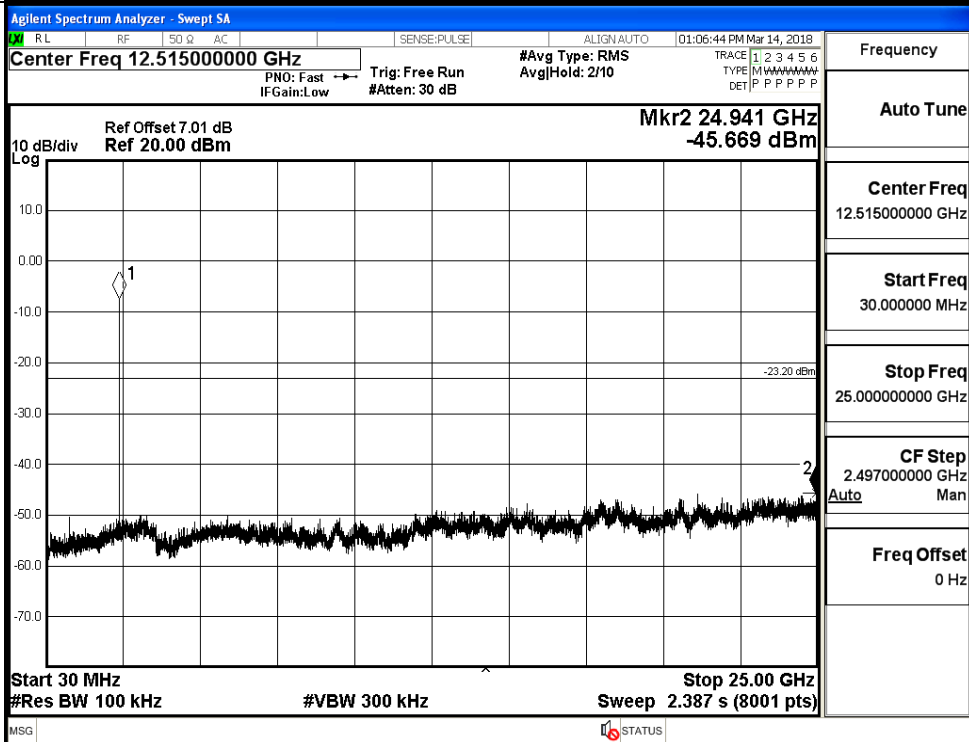


$\pi/4$ DQPSK LCH Graphs

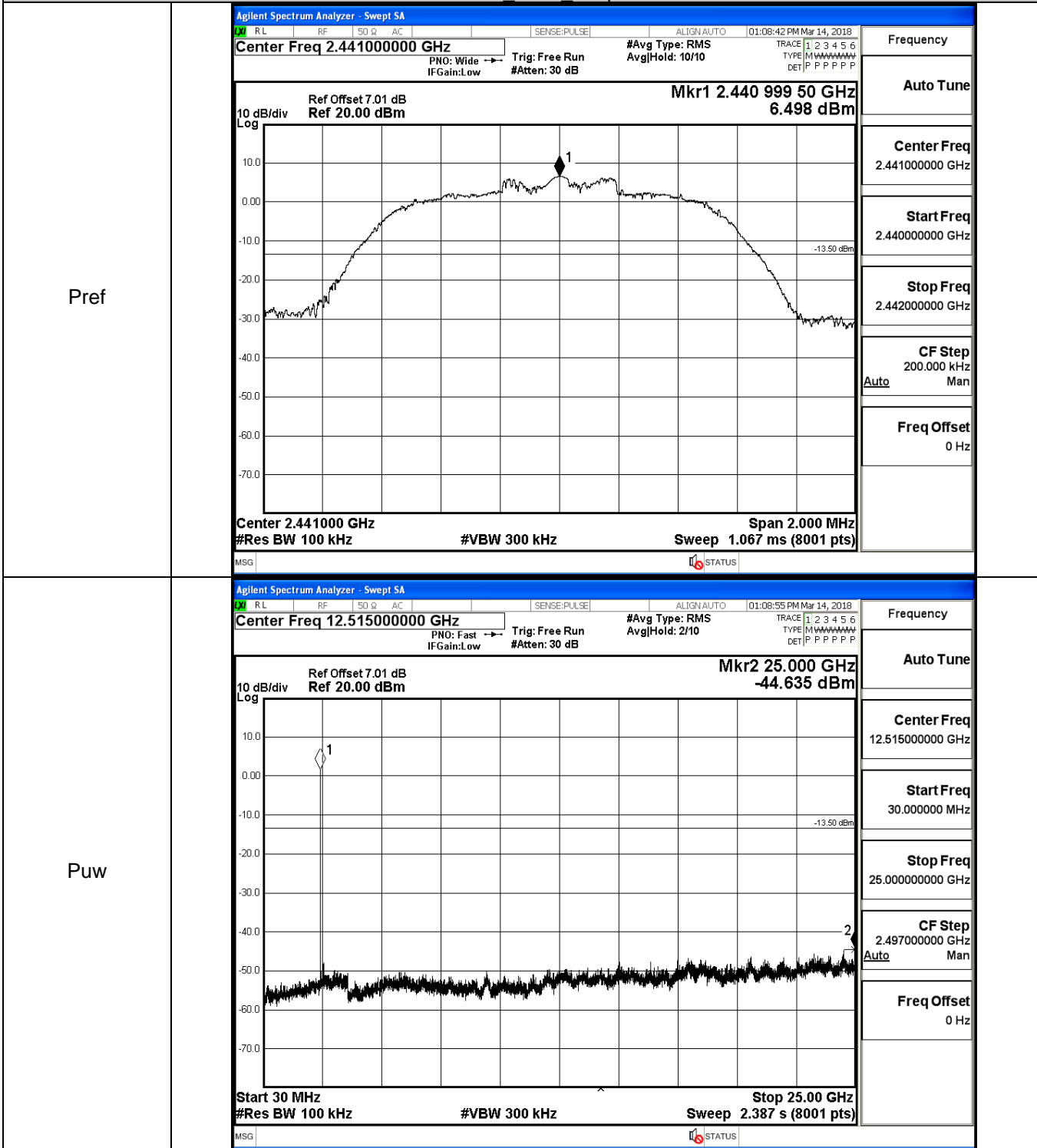
Pref



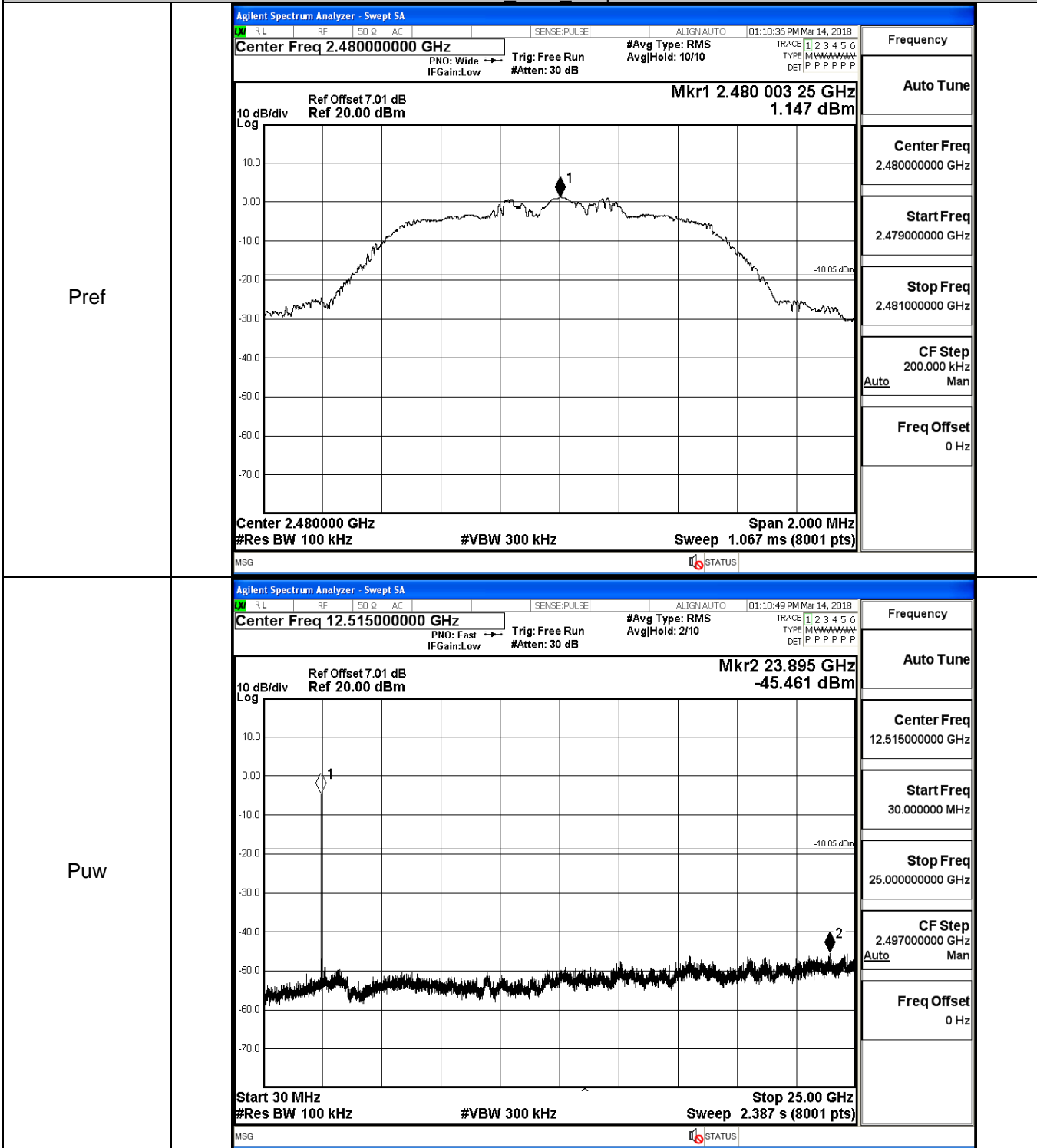
Puw



$\pi/4$ DQPSK MCH Graphs

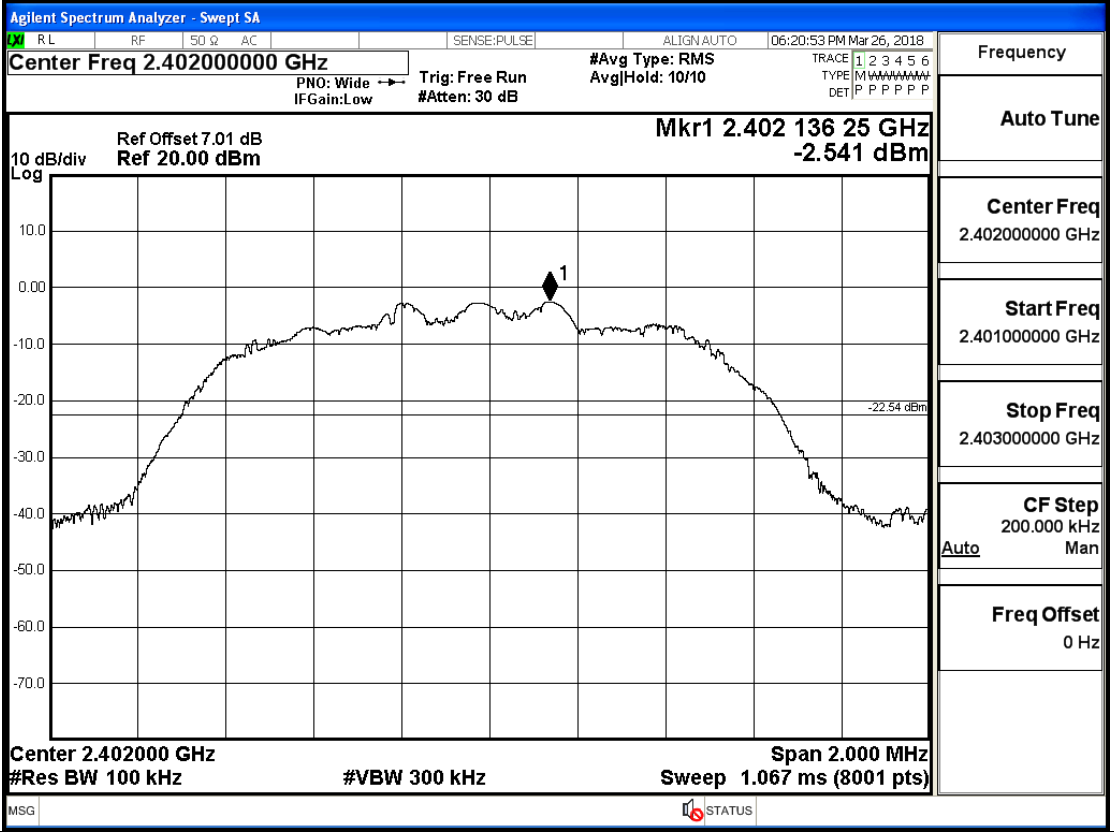


$\pi/4$ DQPSK HCH Graphs

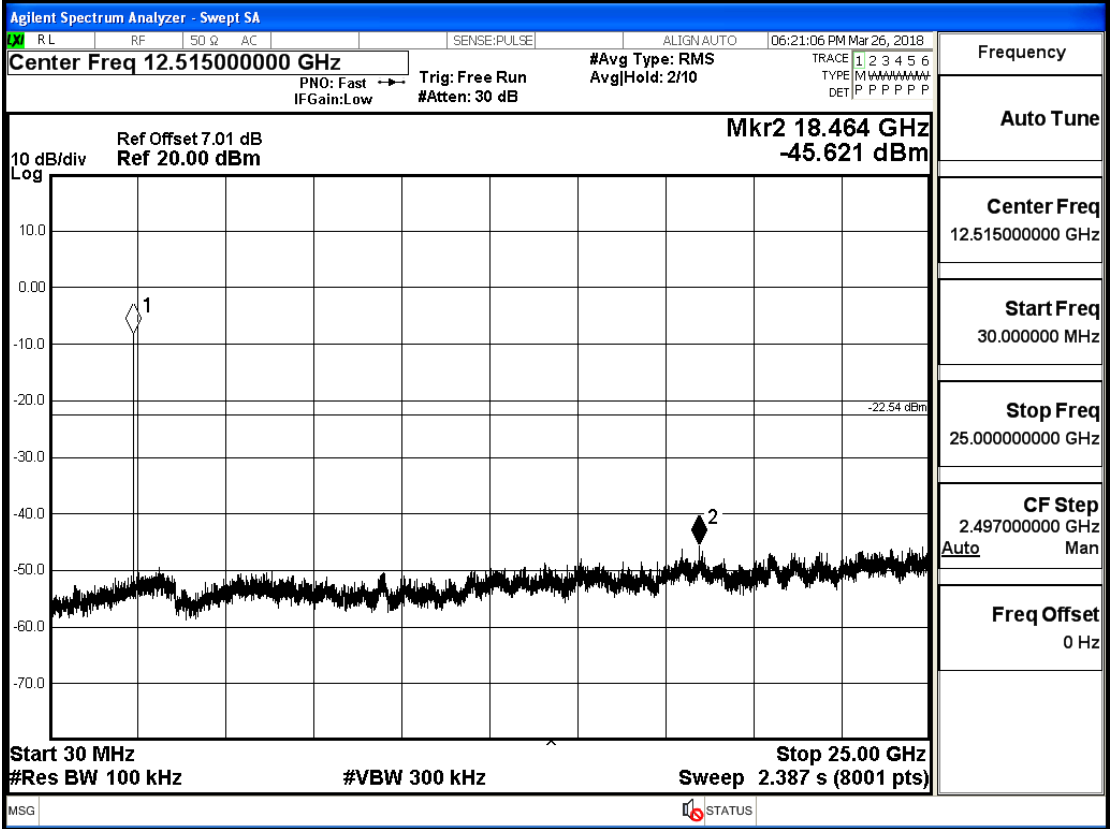


8DPSK_LCH_Graphs

Pref

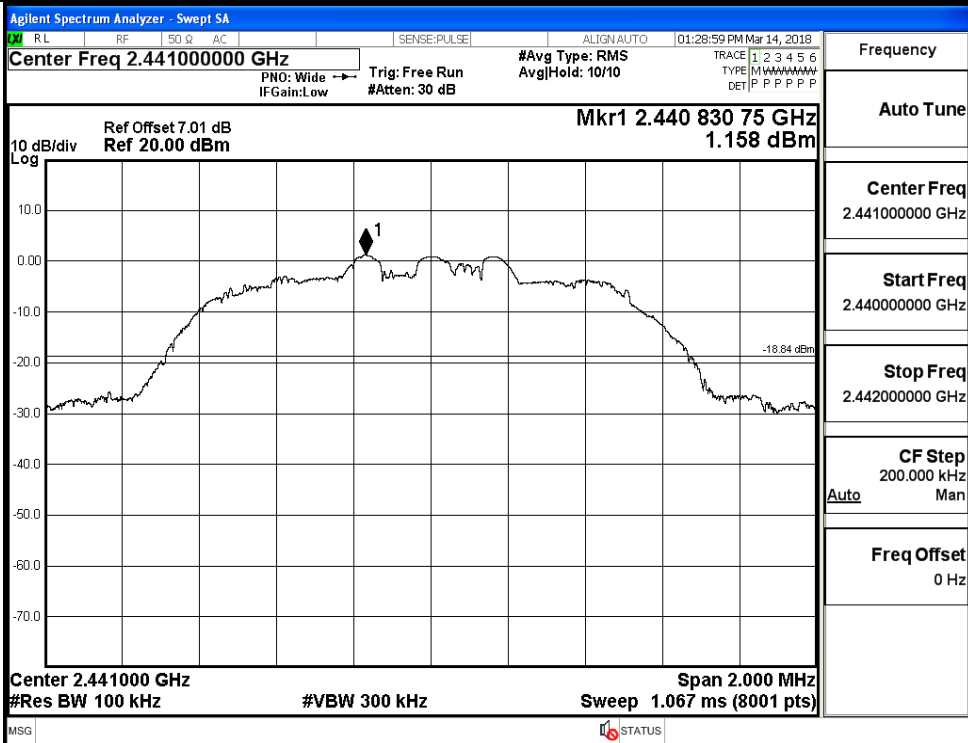


Puw

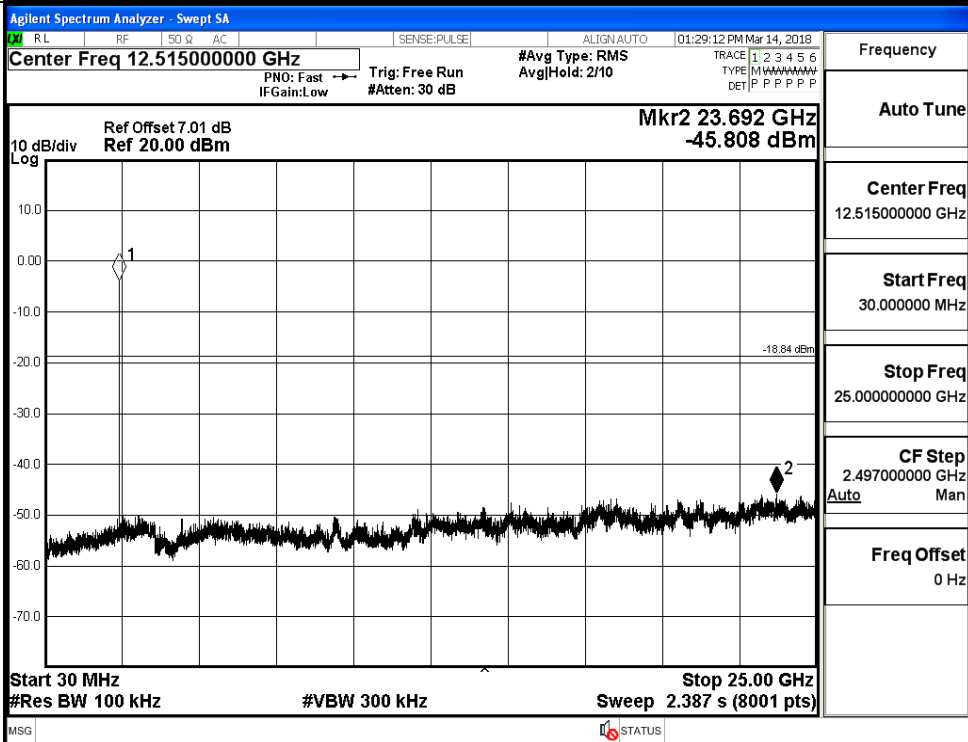


8DPSK_MCH_Graphs

Pref

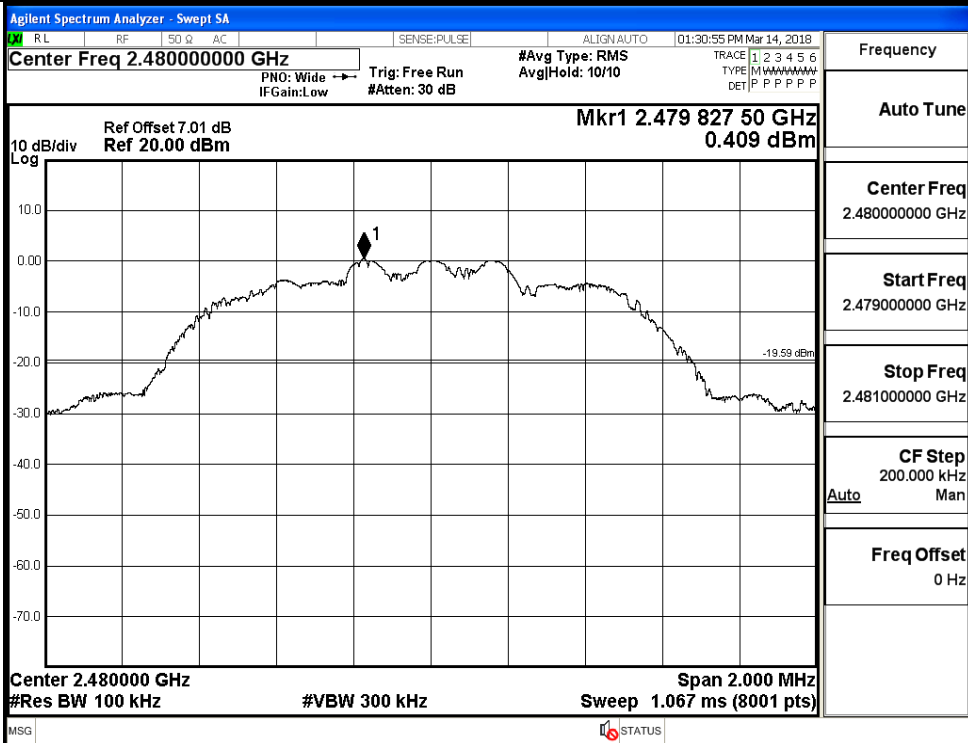


Puw

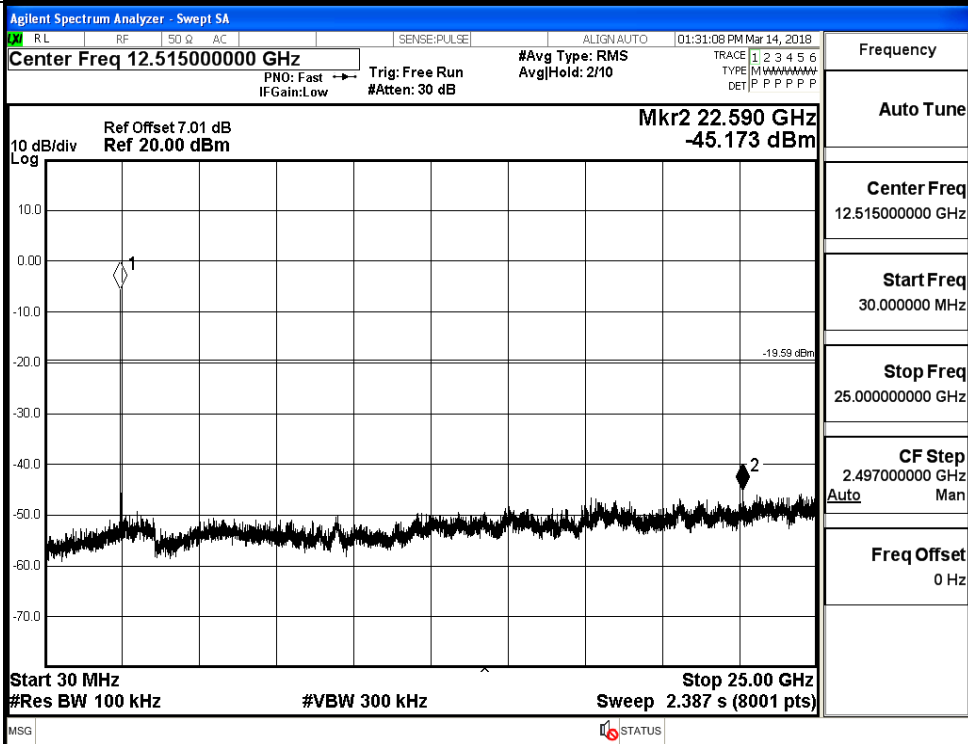


8DPSK_HCH_Graphs

Pref



Puw

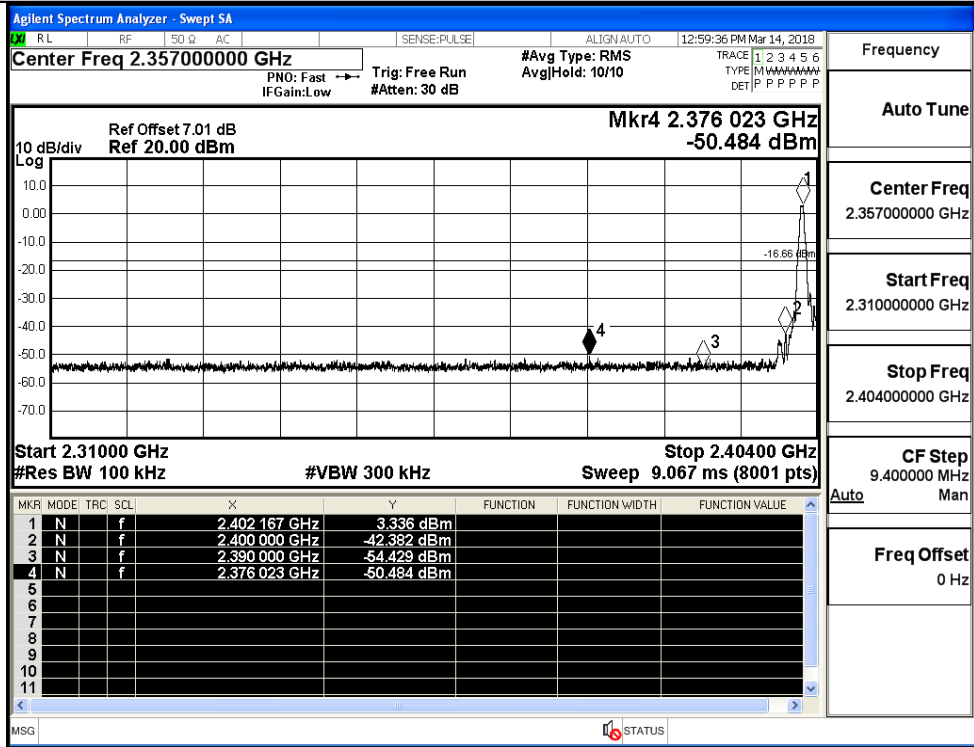


A.7 Band-edge for RF Conducted Emissions

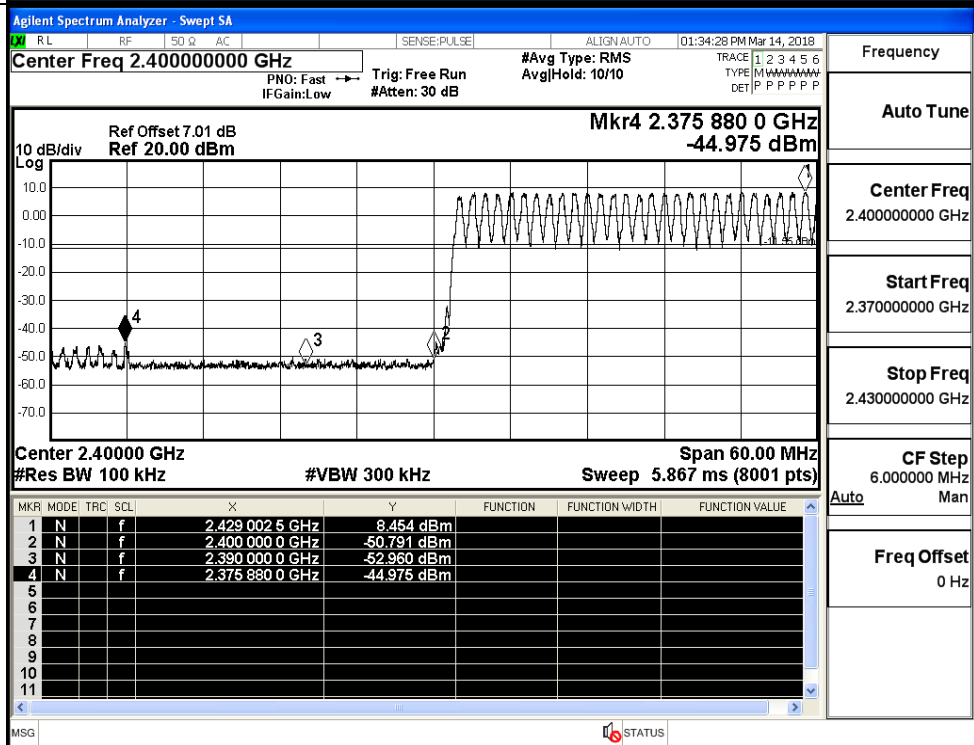
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK | LCH | 2402 | 3.336 | Off | -50.484 | -16.66 | PASS |
| | | | 8.454 | On | -44.975 | -11.55 | PASS |
| | HCH | 2480 | 6.512 | Off | -51.100 | -13.49 | PASS |
| | | | 8.620 | On | -48.771 | -11.38 | PASS |
| $\pi/4$ DQPSK | LCH | 2402 | -3.173 | Off | -50.765 | -23.17 | PASS |
| | | | 6.162 | On | -50.095 | -13.84 | PASS |
| | HCH | 2480 | 1.231 | Off | -50.814 | -18.77 | PASS |
| | | | 6.587 | On | -49.571 | -13.41 | PASS |
| 8DPSK | LCH | 2402 | 0.209 | Off | -50.894 | -19.79 | PASS |
| | | | 6.365 | On | -49.667 | -13.64 | PASS |
| | HCH | 2480 | 0.445 | Off | -51.076 | -19.56 | PASS |
| | | | 6.621 | On | -48.465 | -13.38 | PASS |

Test Graphs

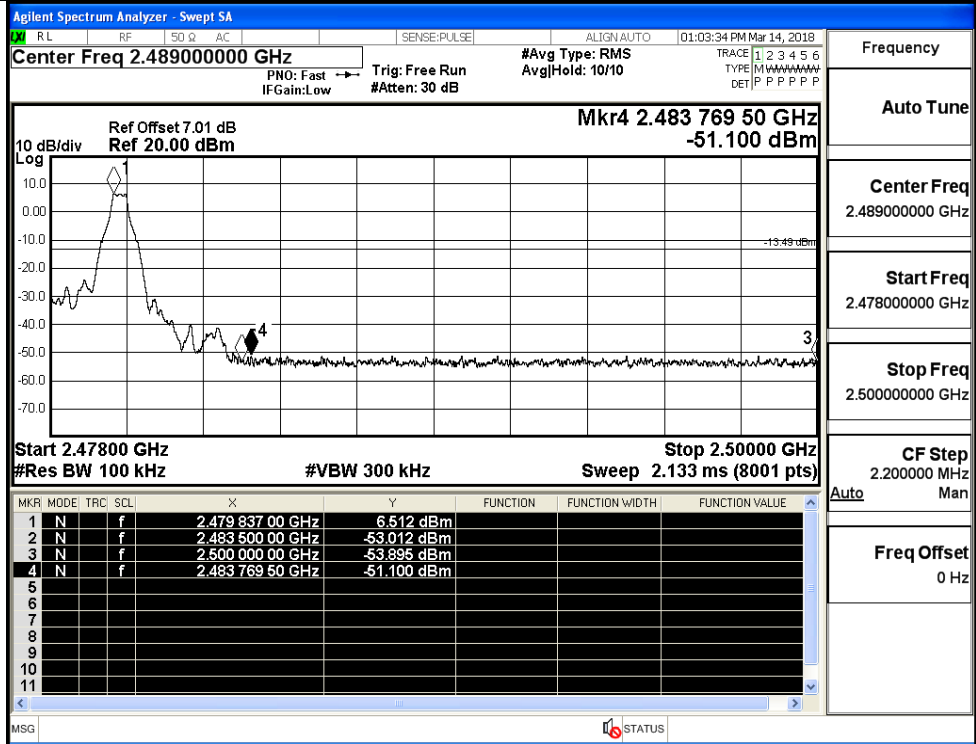
GFSK/LCH/No Hop



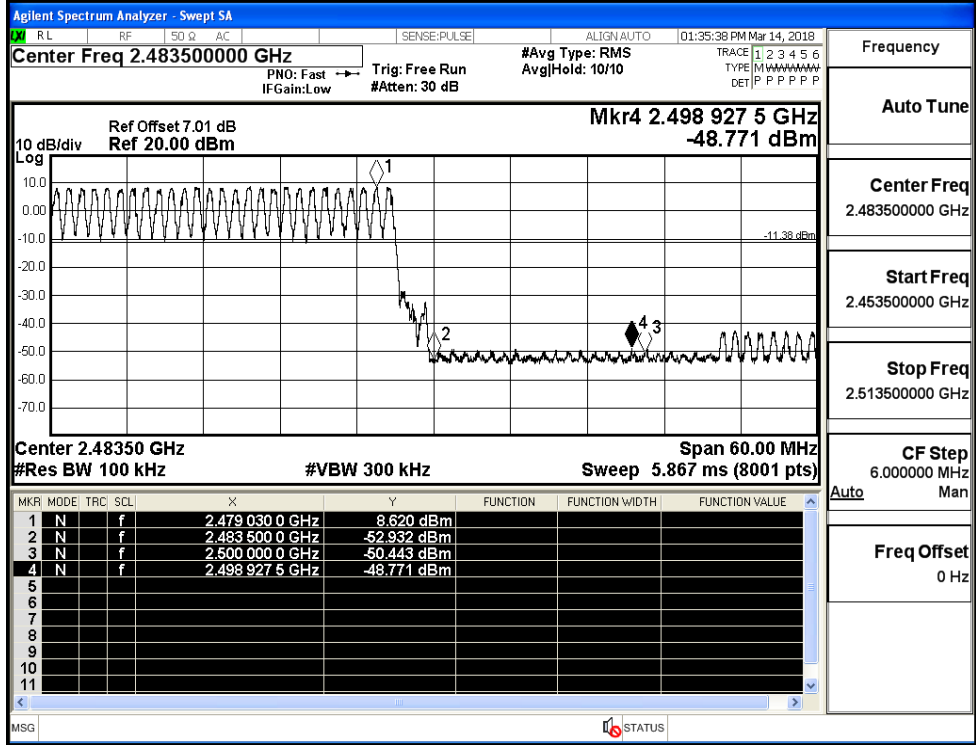
GFSK/LCH/Hop



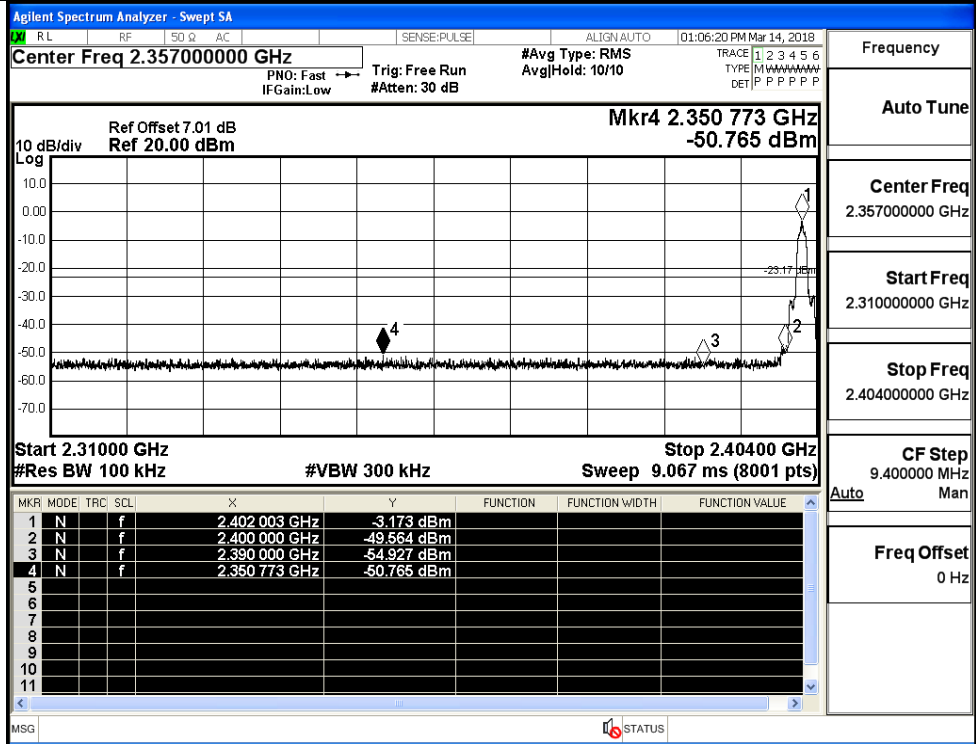
GFSK/HCH/No Hop



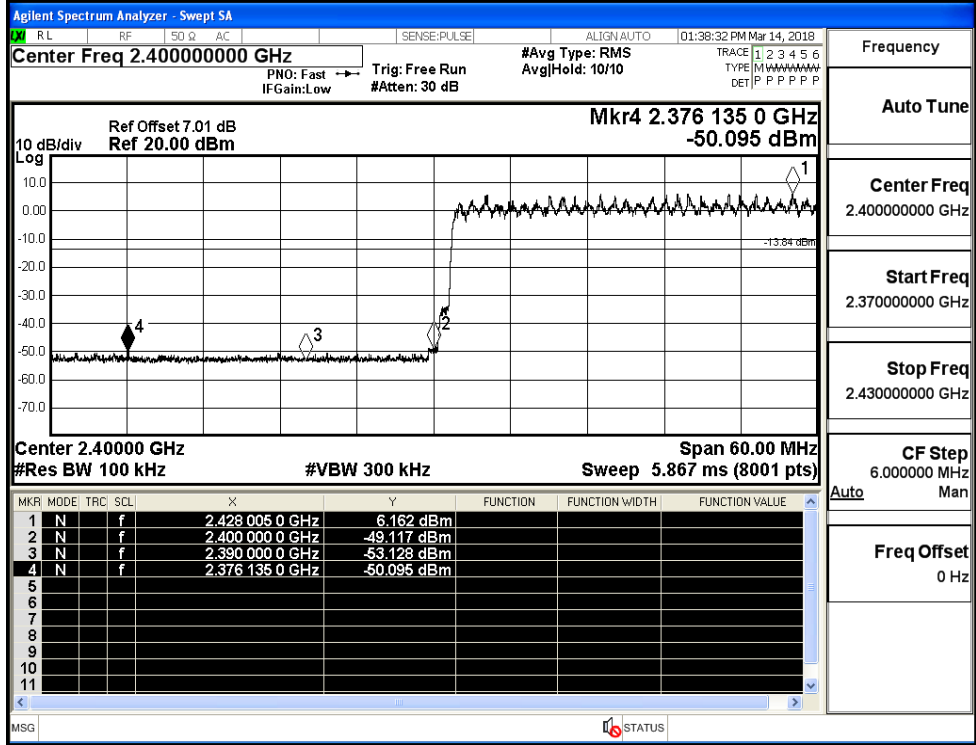
GFSK/HCH/Hop



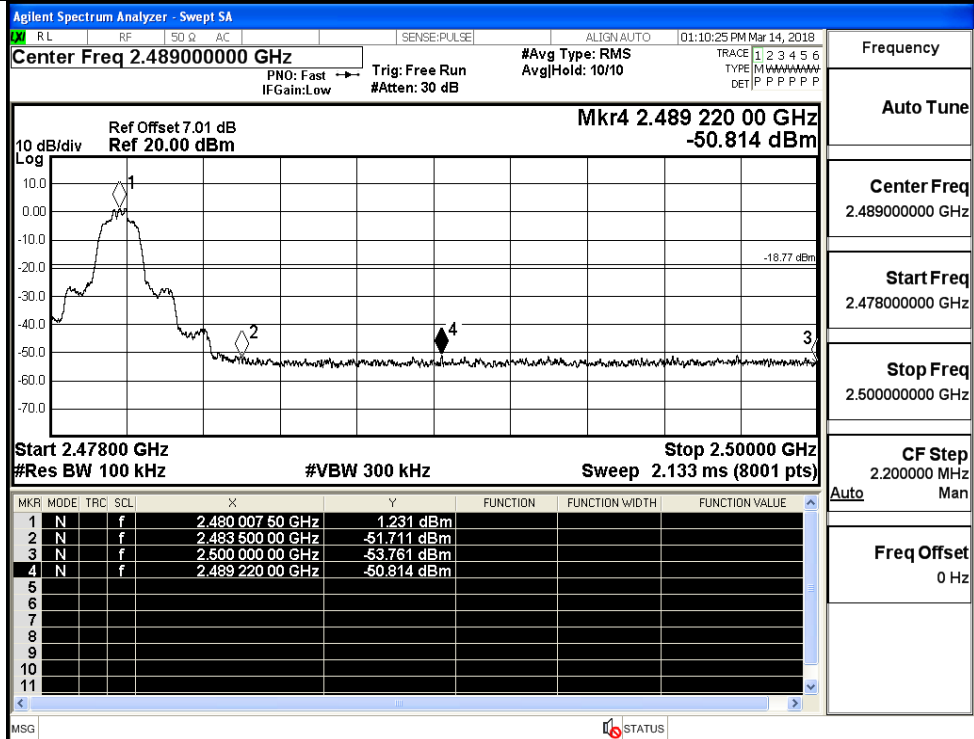
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop

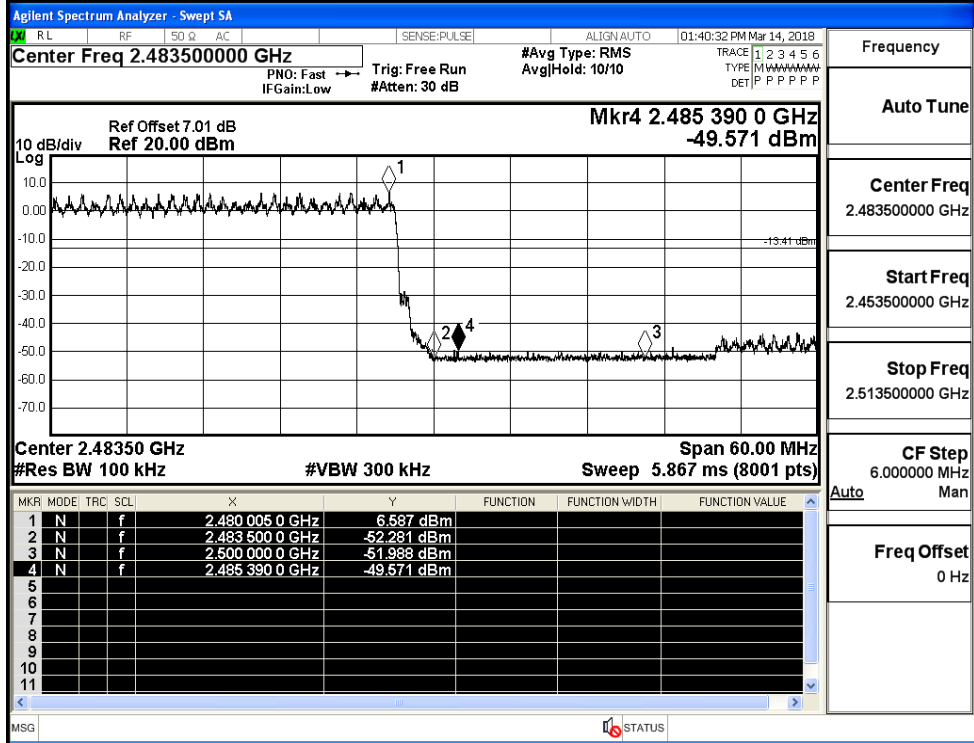


π /4DQPSK/HCH/No
Hop



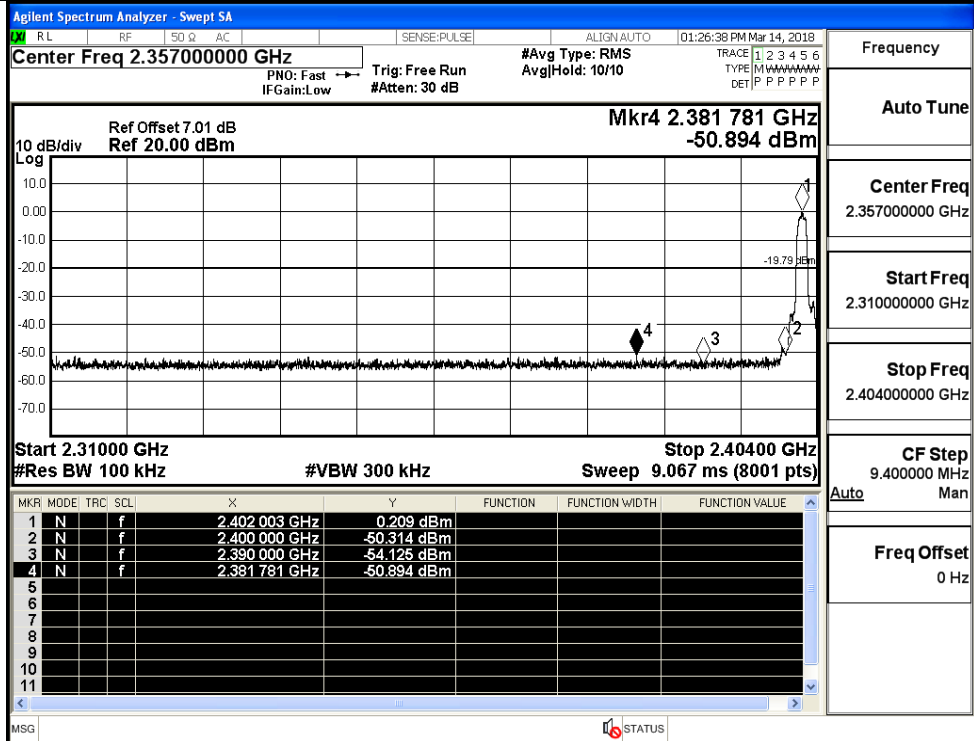
| | |
|-------------|-----------------|
| Frequency | |
| Auto Tune | |
| Center Freq | 2.489000000 GHz |
| Start Freq | 2.478000000 GHz |
| Stop Freq | 2.500000000 GHz |
| CF Step | 2.200000 MHz |
| Freq Offset | 0 Hz |

π /4DQPSK/HCH/Hop



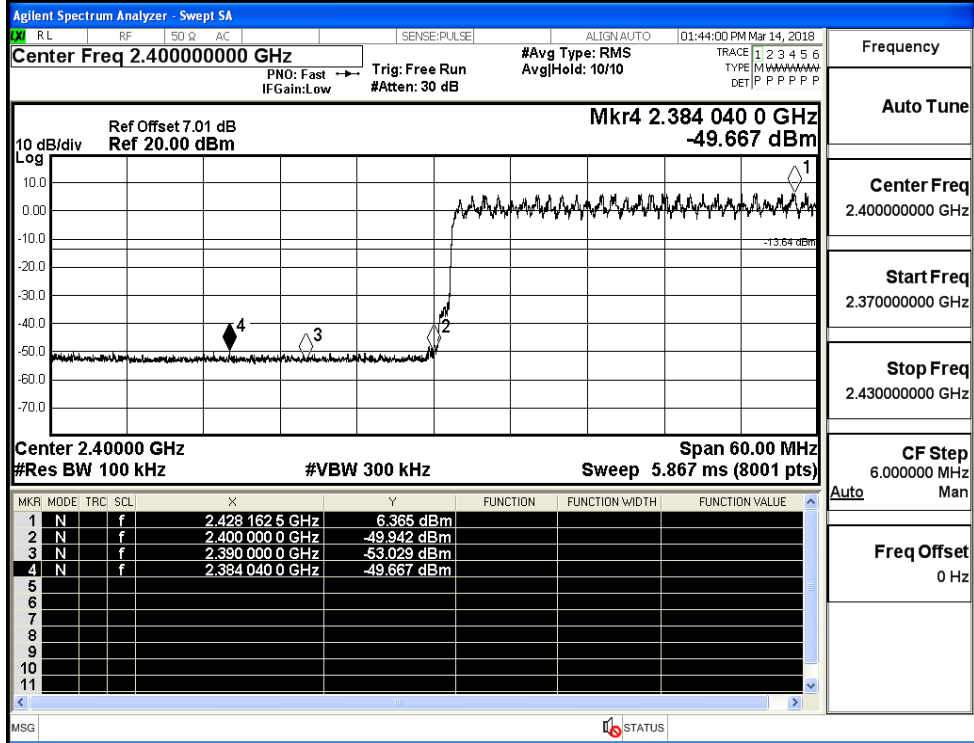
| | |
|-------------|-----------------|
| Frequency | |
| Auto Tune | |
| Center Freq | 2.483500000 GHz |
| Start Freq | 2.453500000 GHz |
| Stop Freq | 2.513500000 GHz |
| CF Step | 6.000000 MHz |
| Freq Offset | 0 Hz |

8DPSK/LCH/No Hop



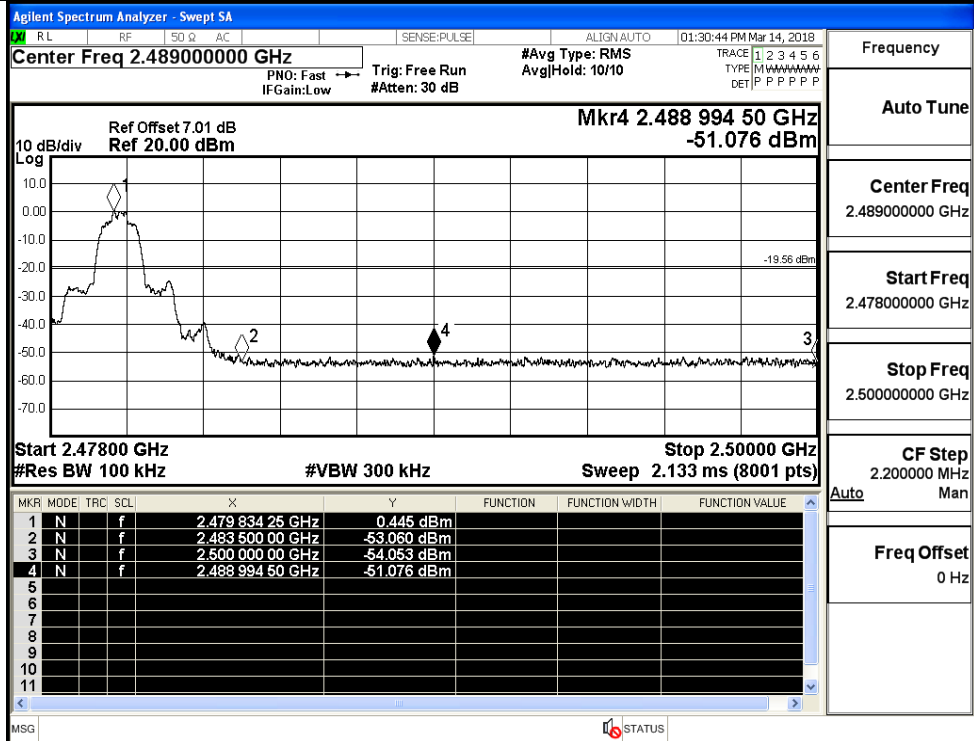
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



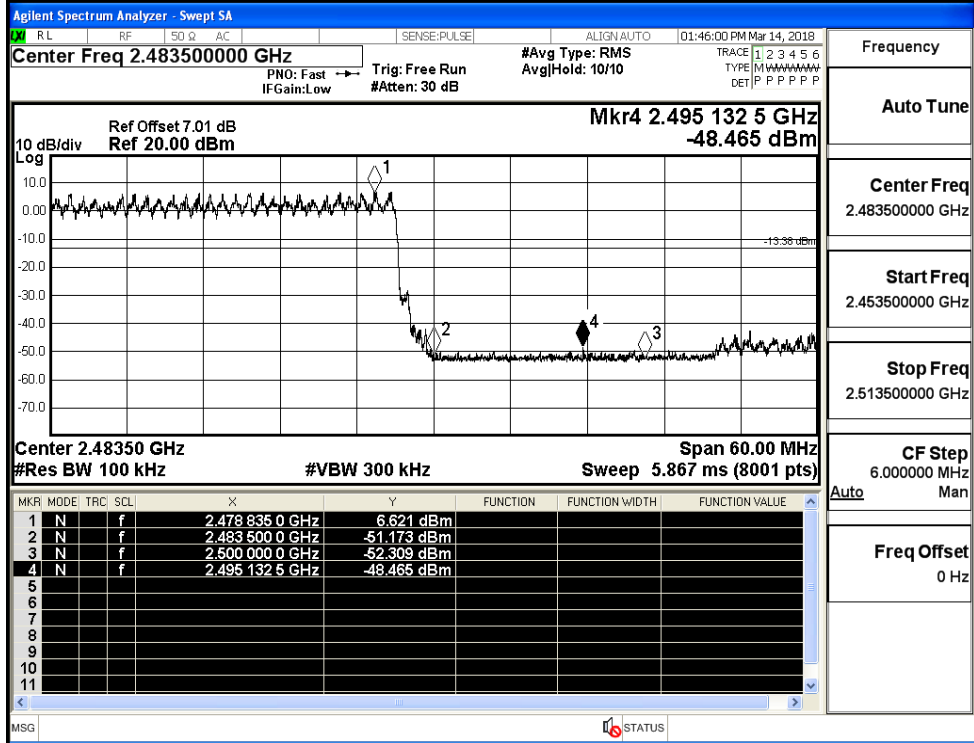
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

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

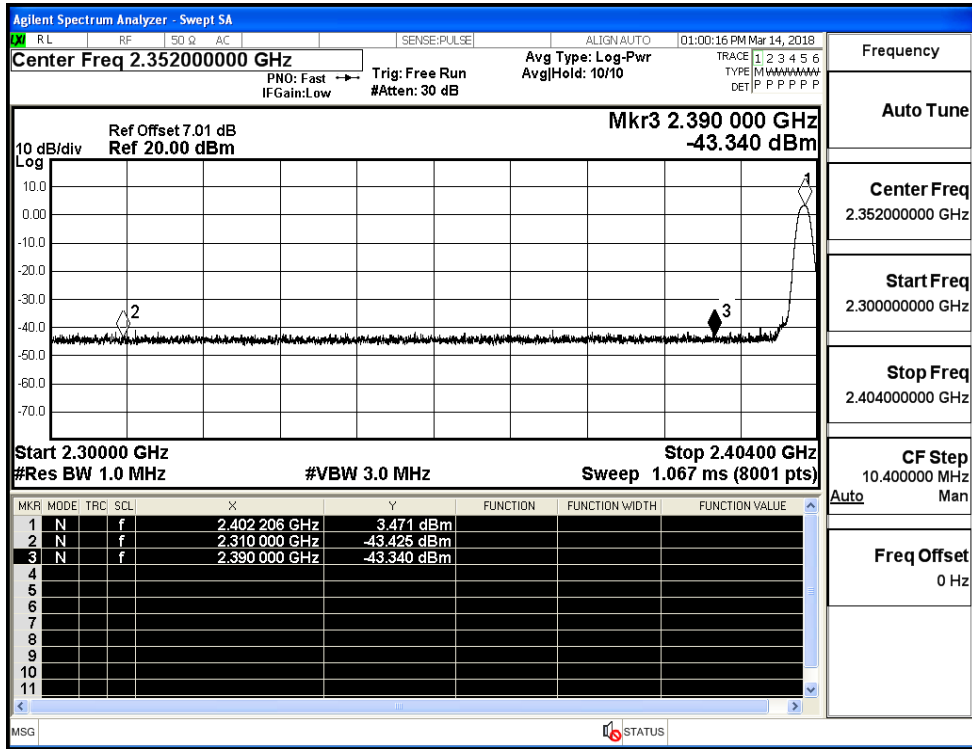


| |
|--------------------------------|
| Frequency |
| Auto Tune |
| Center Freq 2.483500000 GHz |
| Start Freq 2.453500000 GHz |
| Stop Freq 2.513500000 GHz |
| CF Step 6.000000 MHz |
| Freq Offset 0 Hz |

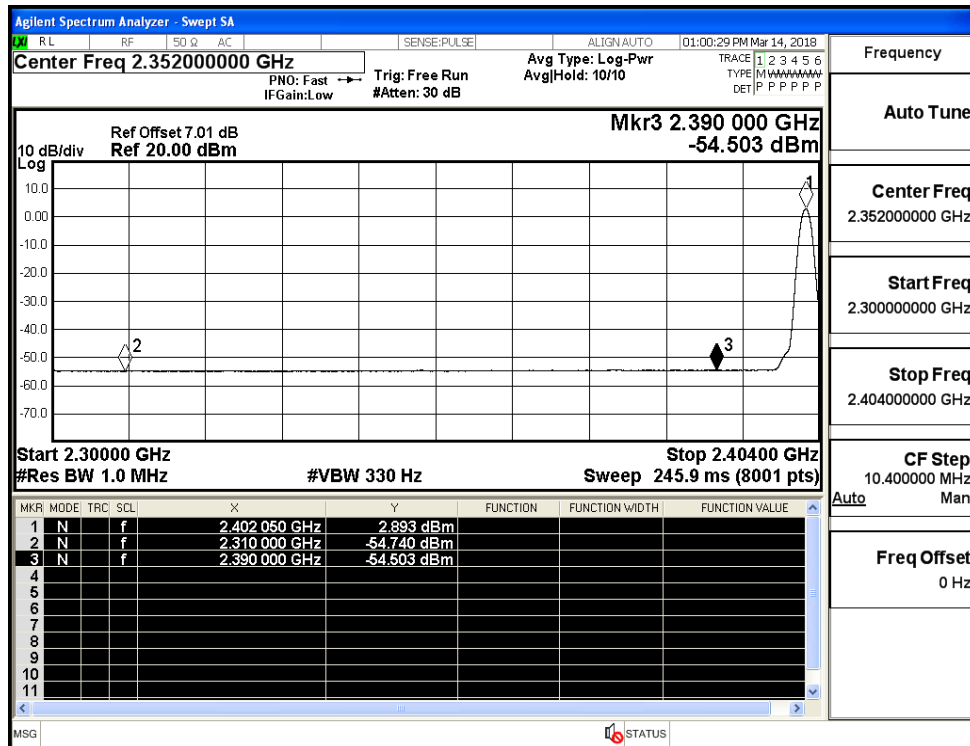
A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK | Off | 2310.0 | -43.43 | 2.0 | 0 | 53.83 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.74 | 2.0 | 0 | 42.52 | AV | 54 | PASS |
| | Off | 2390.0 | -43.34 | 2.0 | 0 | 53.92 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.50 | 2.0 | 0 | 42.75 | AV | 54 | PASS |
| | Off | 2483.5 | -39.84 | 2.0 | 0 | 57.42 | PEAK | 74 | PASS |
| | Off | 2483.5 | -50.59 | 2.0 | 0 | 46.67 | AV | 54 | PASS |
| | Off | 2500.0 | -44.80 | 2.0 | 0 | 52.46 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.10 | 2.0 | 0 | 43.16 | AV | 54 | PASS |
| $\pi/4$ DQPSK | Off | 2310.0 | -43.09 | 2.0 | 0 | 54.17 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.76 | 2.0 | 0 | 42.50 | AV | 54 | PASS |
| | Off | 2390.0 | -44.83 | 2.0 | 0 | 52.42 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.55 | 2.0 | 0 | 42.71 | AV | 54 | PASS |
| | Off | 2483.5 | -40.22 | 2.0 | 0 | 57.03 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.96 | 2.0 | 0 | 44.30 | AV | 54 | PASS |
| | Off | 2500.0 | -43.52 | 2.0 | 0 | 53.74 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.21 | 2.0 | 0 | 43.05 | AV | 54 | PASS |
| 8DPSK | Off | 2310.0 | -44.63 | 2.0 | 0 | 52.62 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.79 | 2.0 | 0 | 42.47 | AV | 54 | PASS |
| | Off | 2390.0 | -44.90 | 2.0 | 0 | 52.35 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.52 | 2.0 | 0 | 42.73 | AV | 54 | PASS |
| | Off | 2483.5 | -41.70 | 2.0 | 0 | 55.55 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.87 | 2.0 | 0 | 44.39 | AV | 54 | PASS |
| | Off | 2500.0 | -44.86 | 2.0 | 0 | 52.40 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.16 | 2.0 | 0 | 43.10 | AV | 54 | PASS |

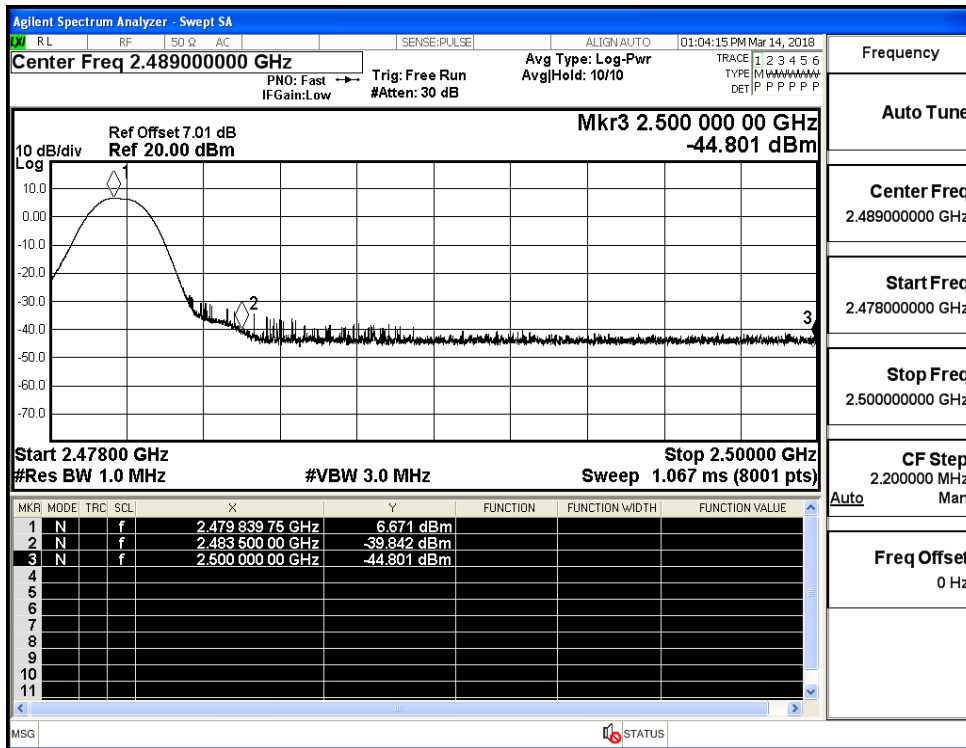
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



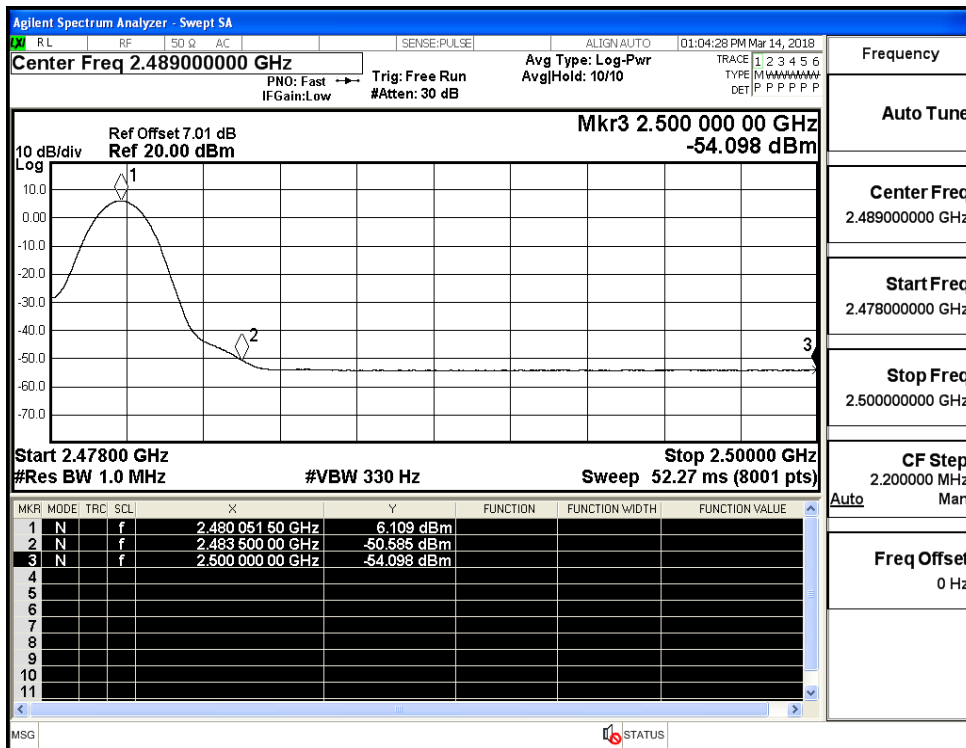
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



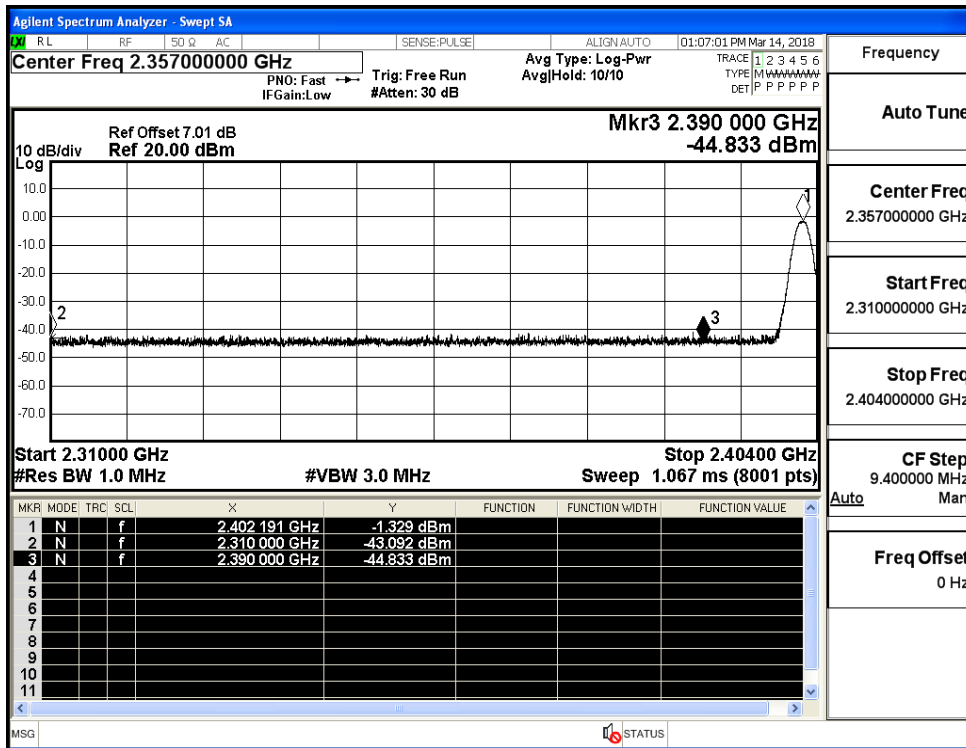
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



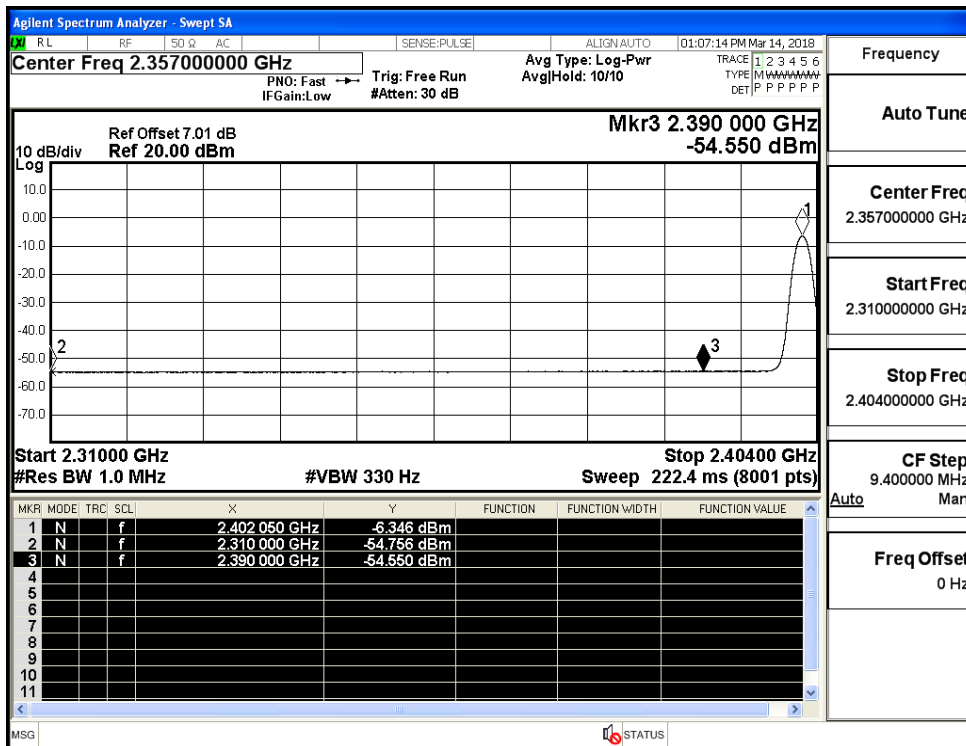
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



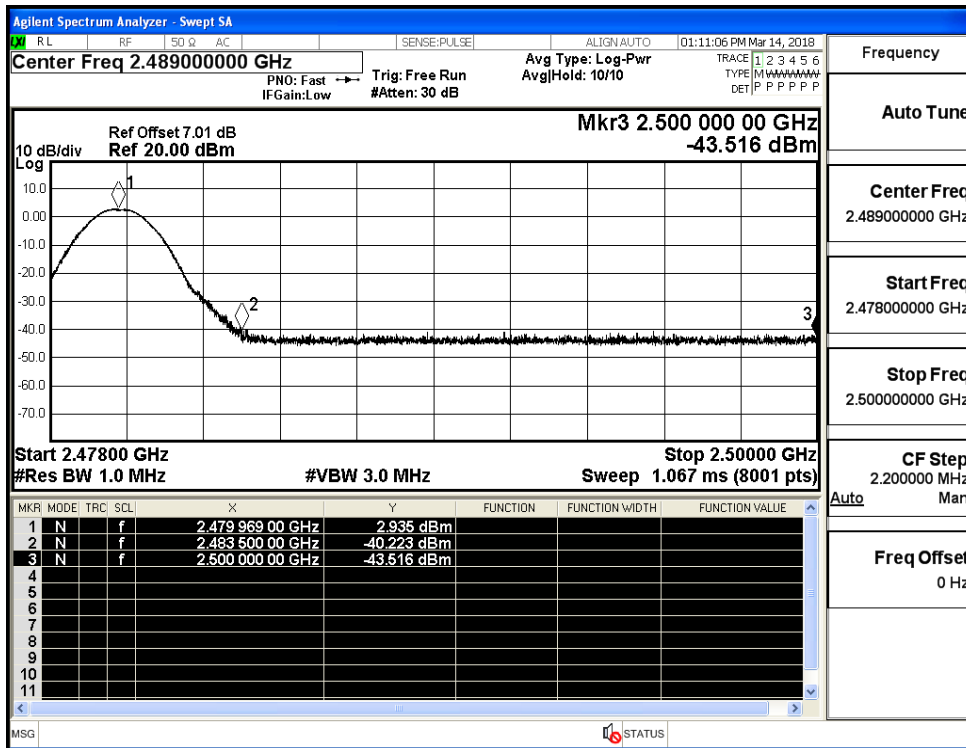
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



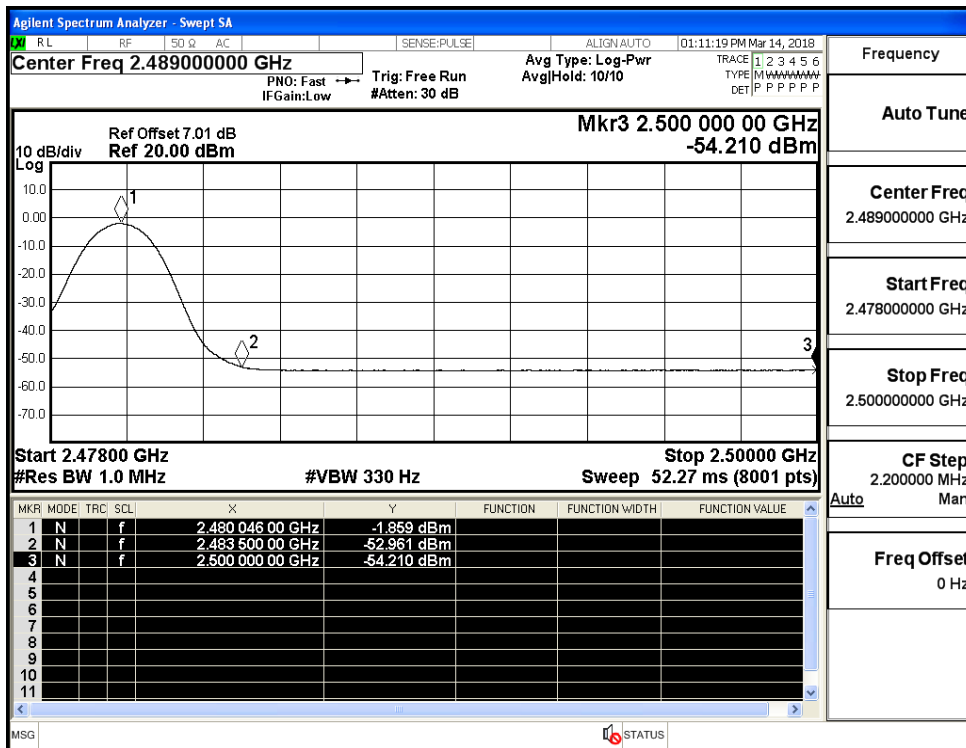
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



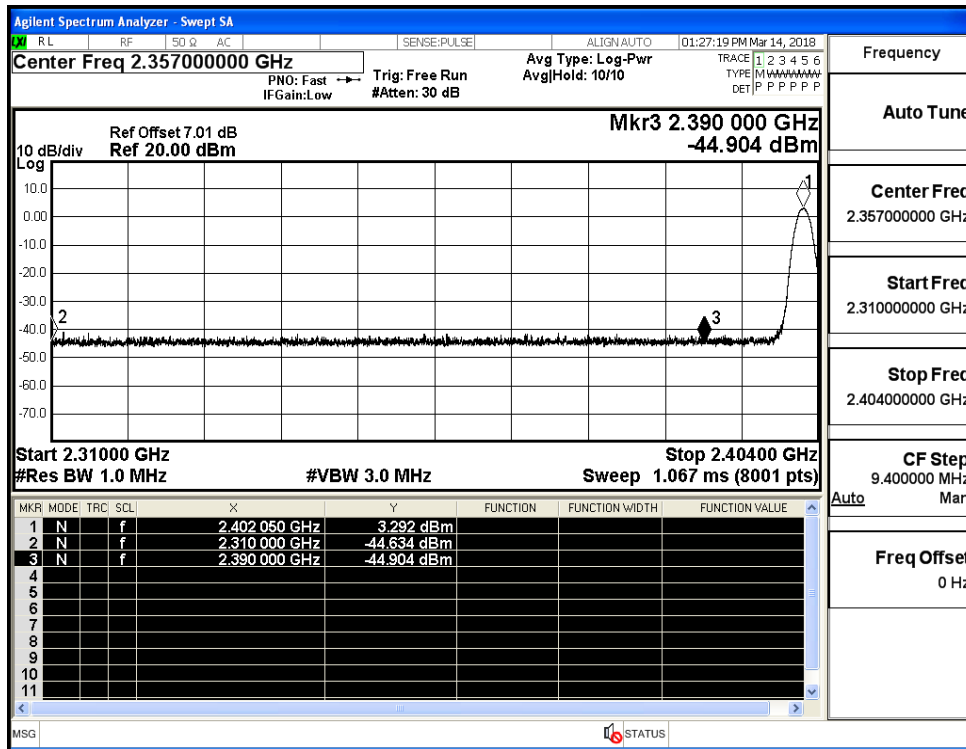
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



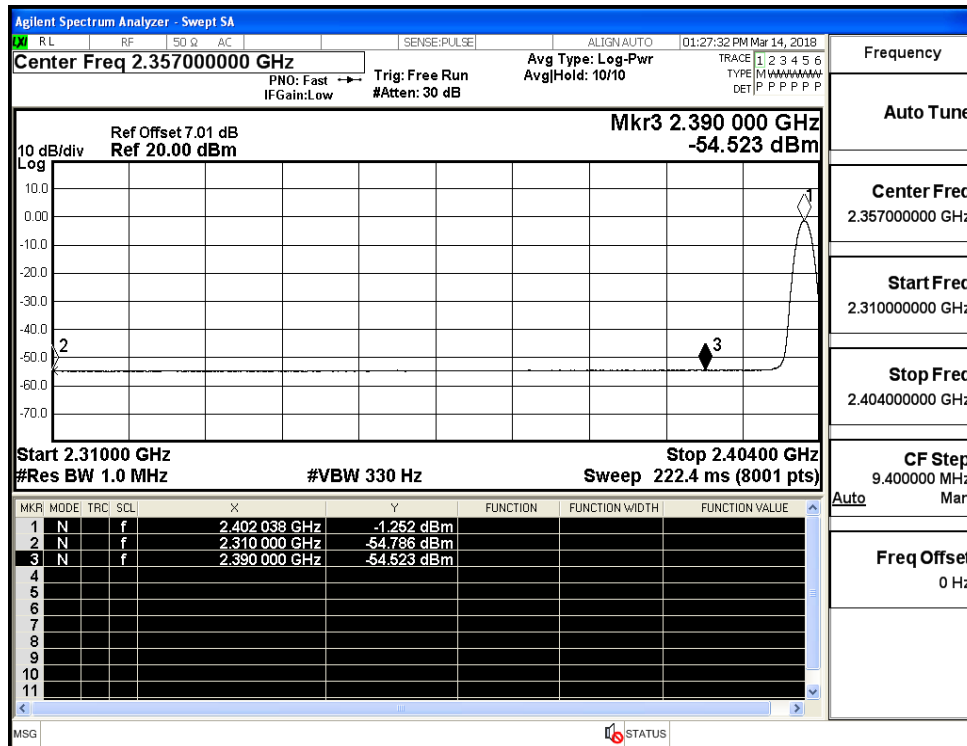
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



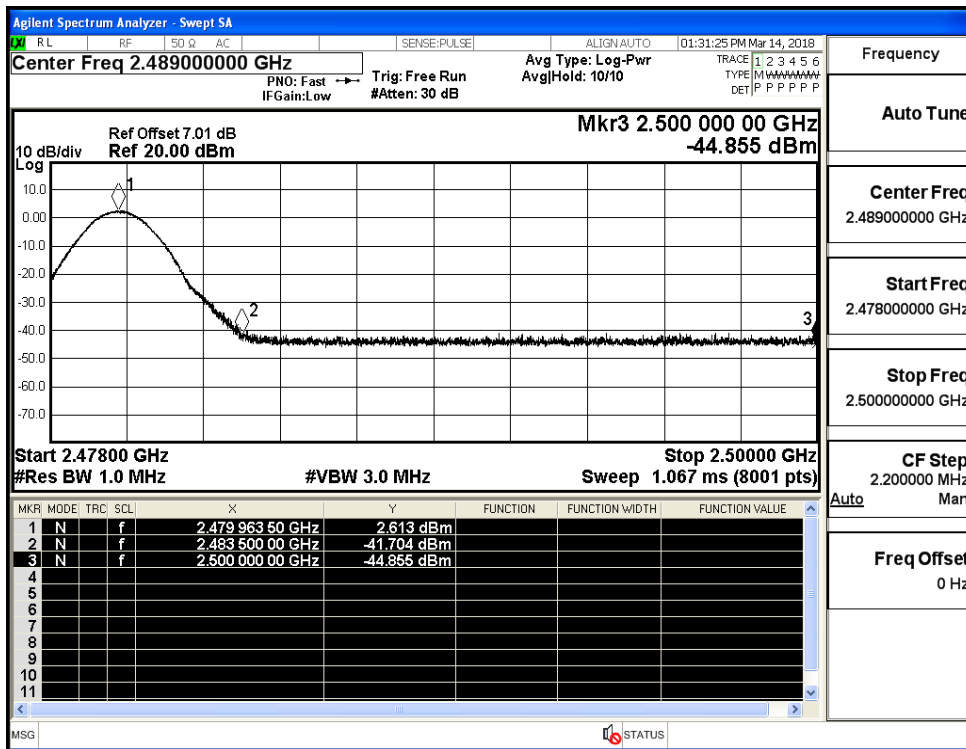
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

