

Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: PROTABL SPEAKERPHONE

Trade Mark: INNOTRIK, AUCTOPUS

Test Model: BT-31S-C

Environmental Conditions

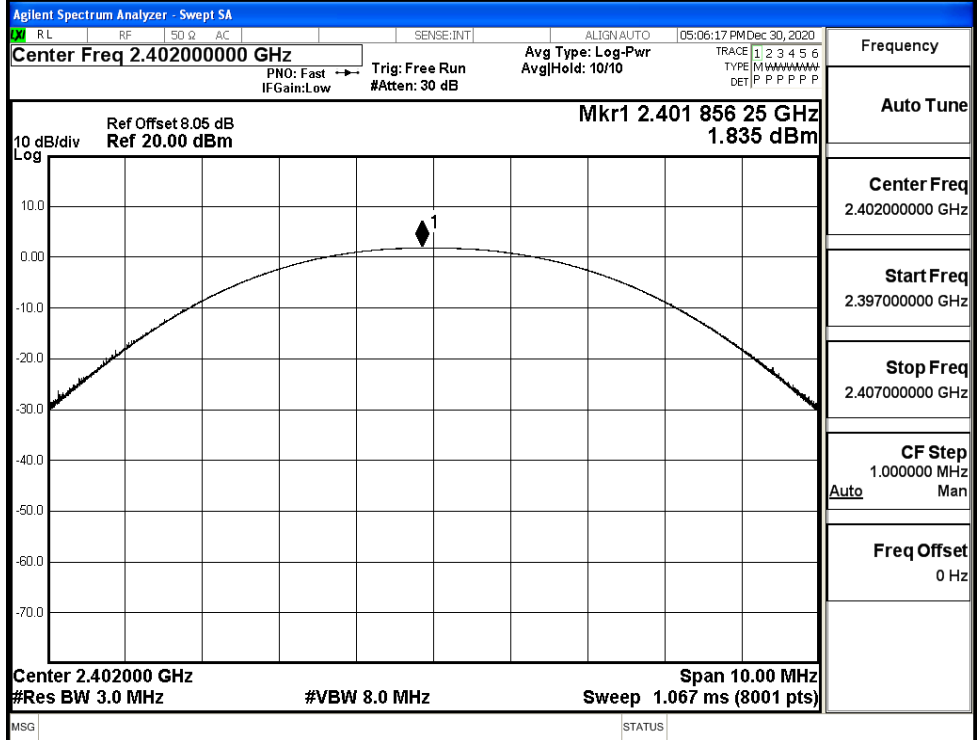
| | |
|--------------------|-----------|
| Temperature: | 21.3° C |
| Relative Humidity: | 49.6% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Carl Fu |
| Supervised by: | Li Huan |

A.1 Maximum Conducted Peak Output Power

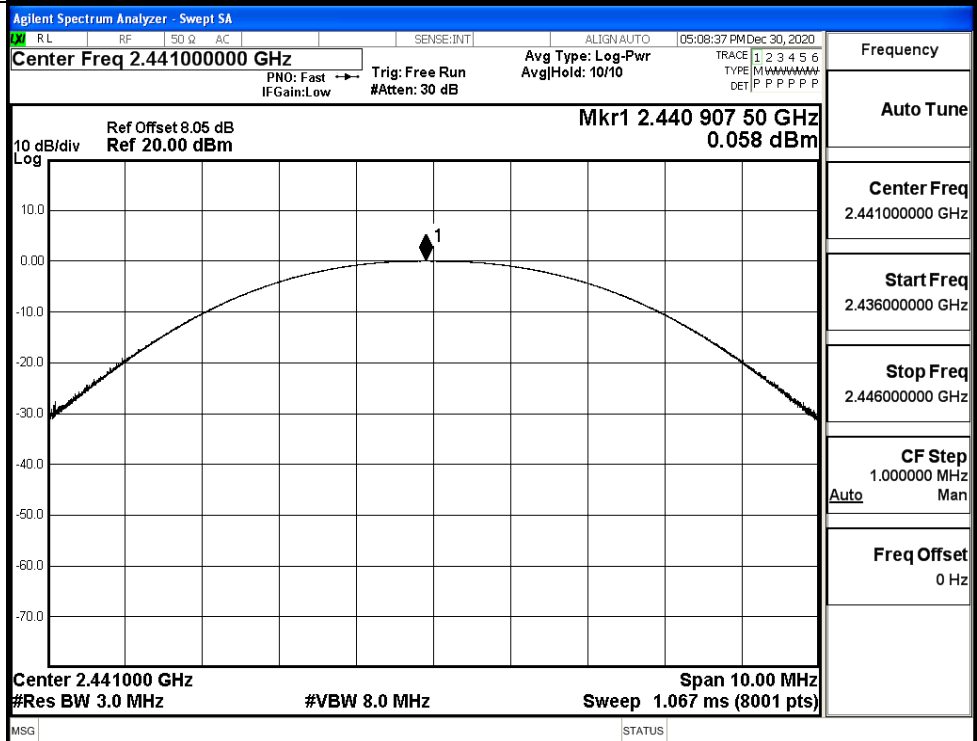
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK | LCH | 1.835 | 21 | PASS |
| | MCH | 0.058 | 21 | PASS |
| | HCH | -1.884 | 21 | PASS |
| $\pi/4$ DQPSK | LCH | 4.110 | 21 | PASS |
| | MCH | 2.245 | 21 | PASS |
| | HCH | 0.323 | 21 | PASS |
| 8DPSK | LCH | 4.557 | 21 | PASS |
| | MCH | 2.725 | 21 | PASS |
| | HCH | 0.758 | 21 | PASS |

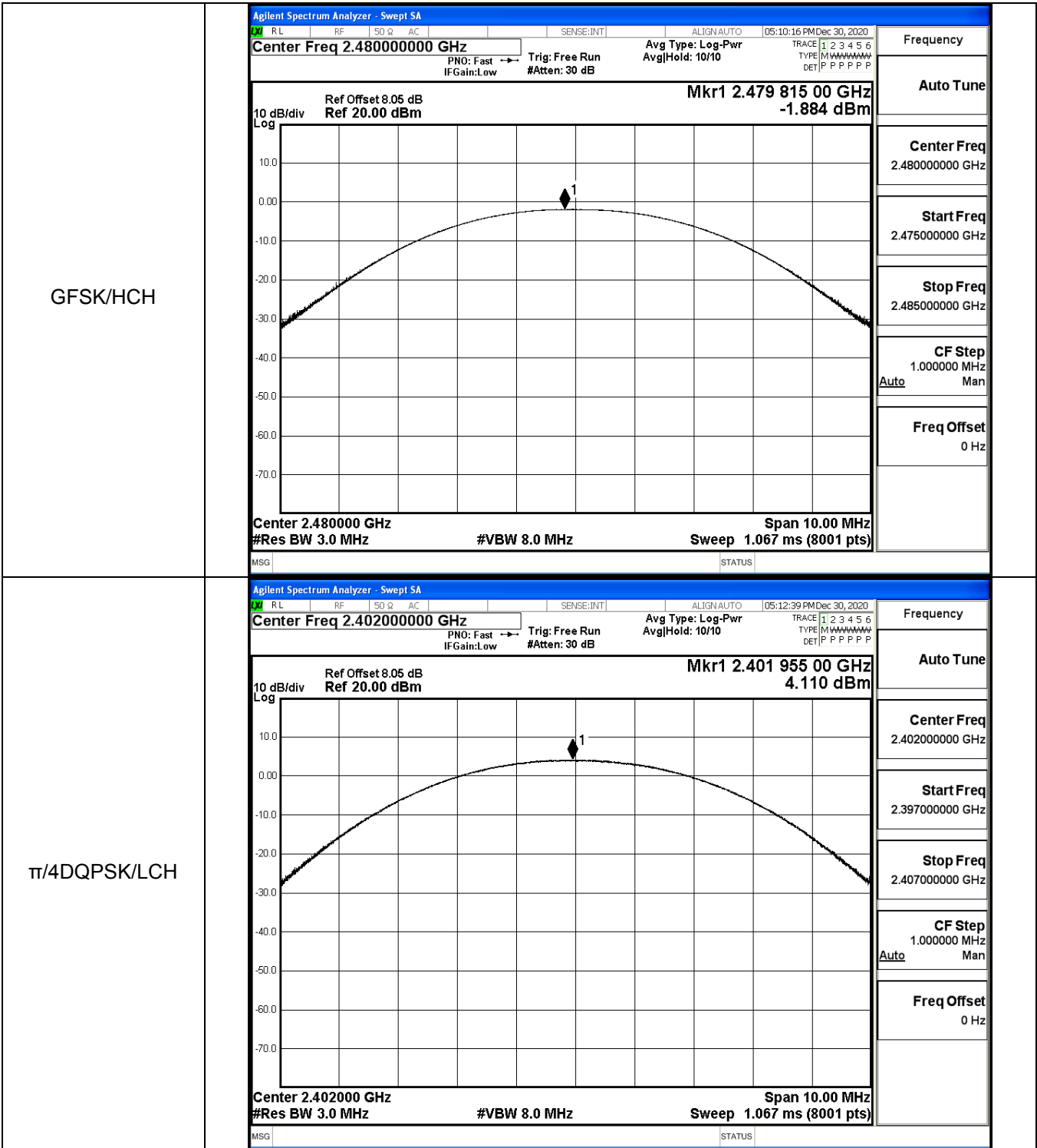
Test Graphs

GFSK/LCH

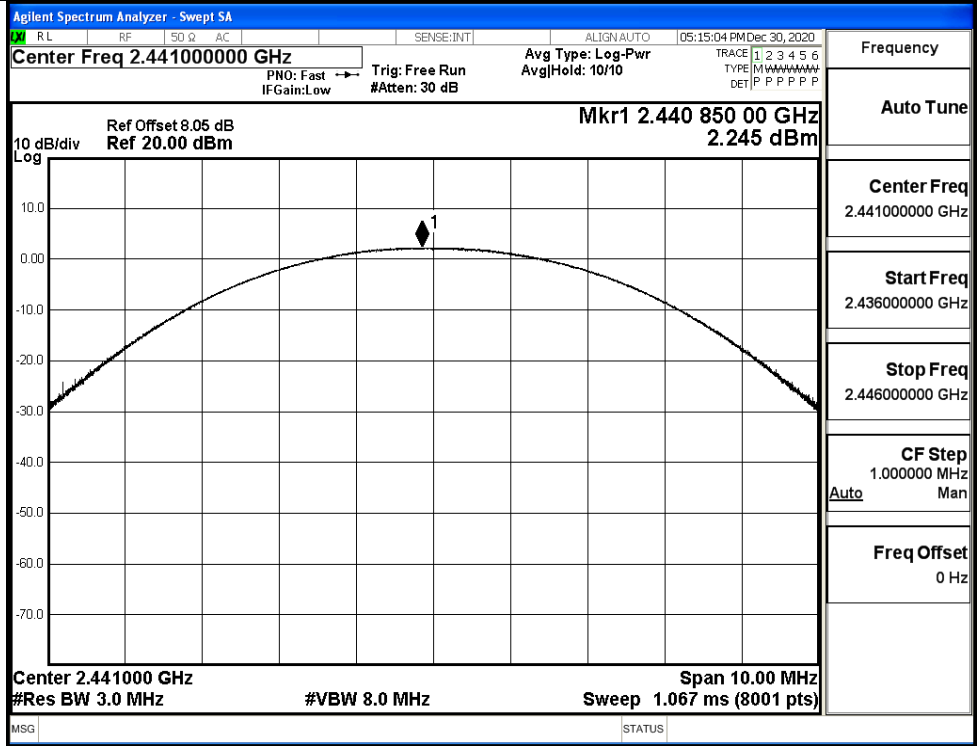


GFSK/MCH

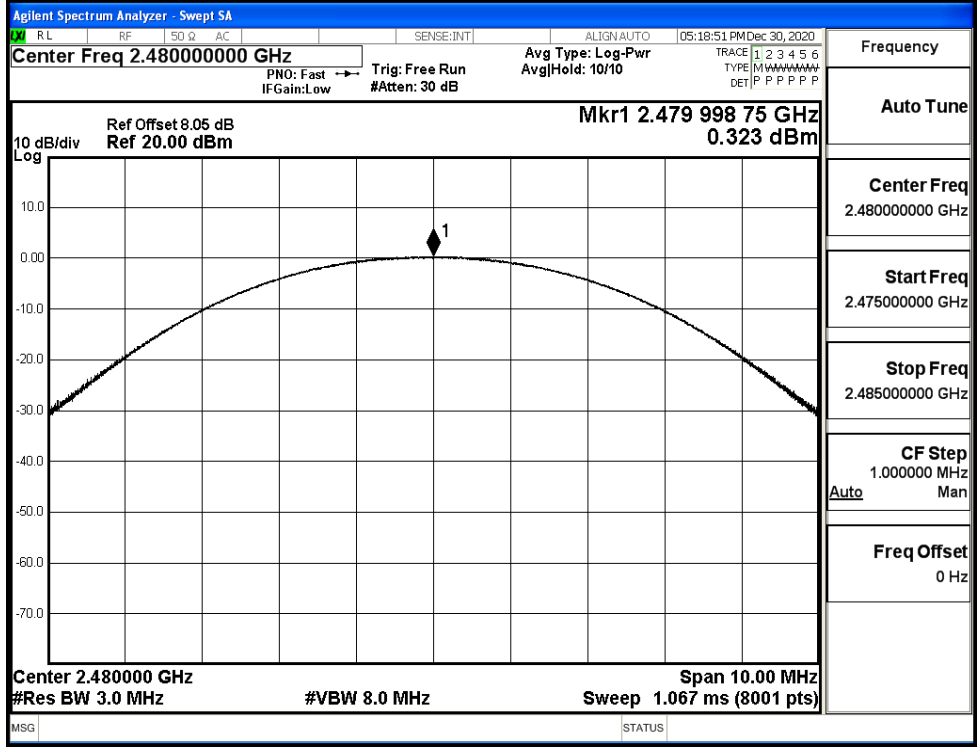




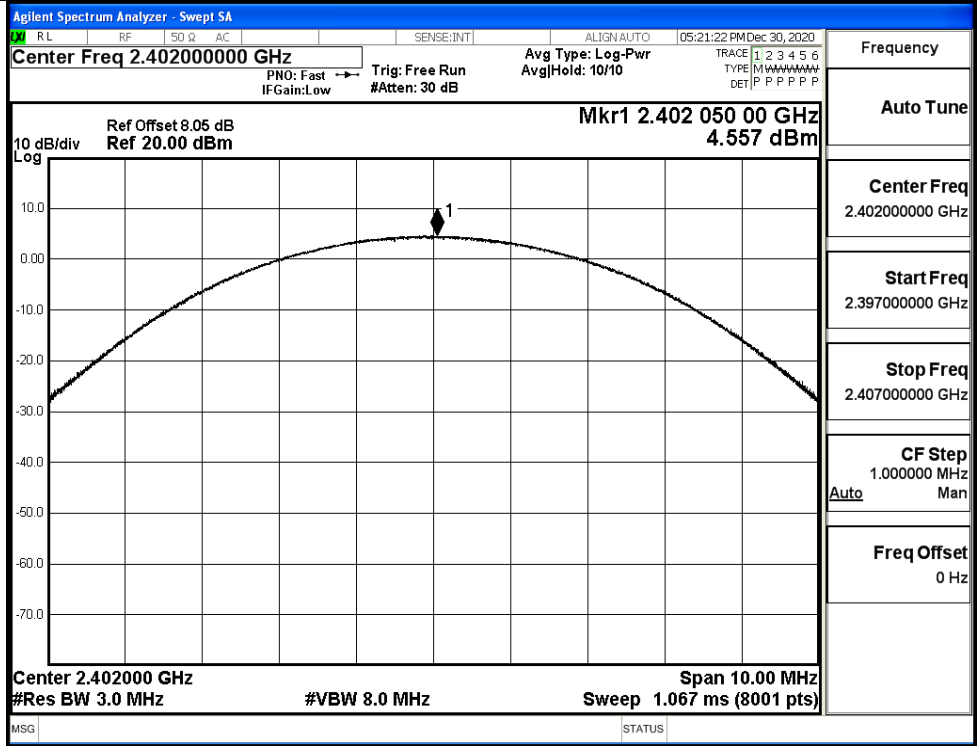
$\pi/4$ DQPSK/MCH



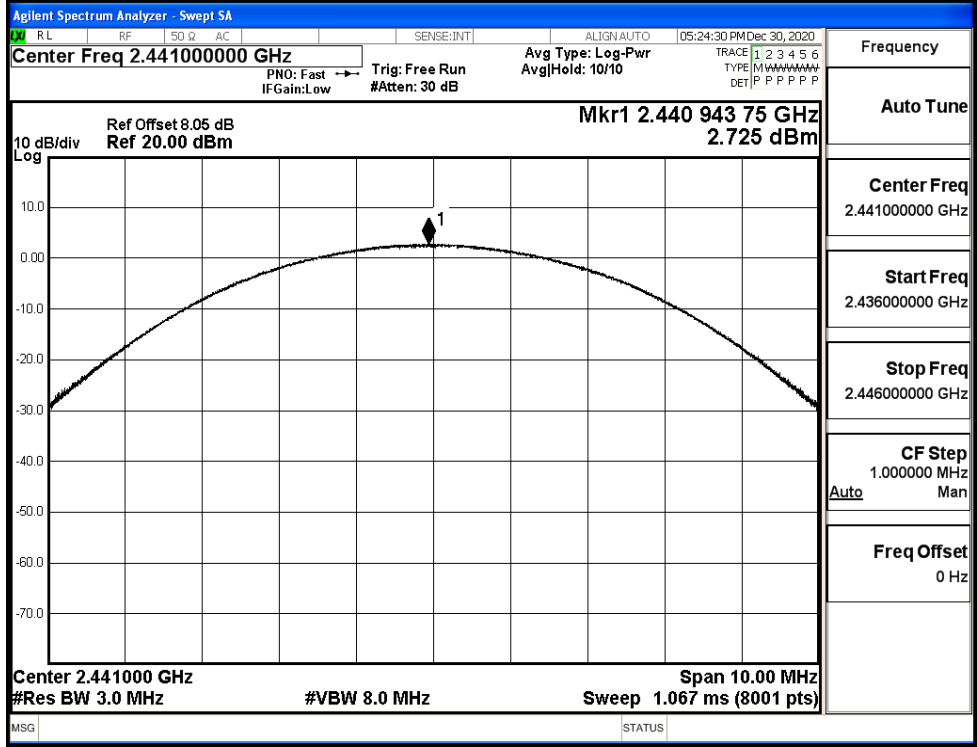
$\pi/4$ DQPSK/HCH



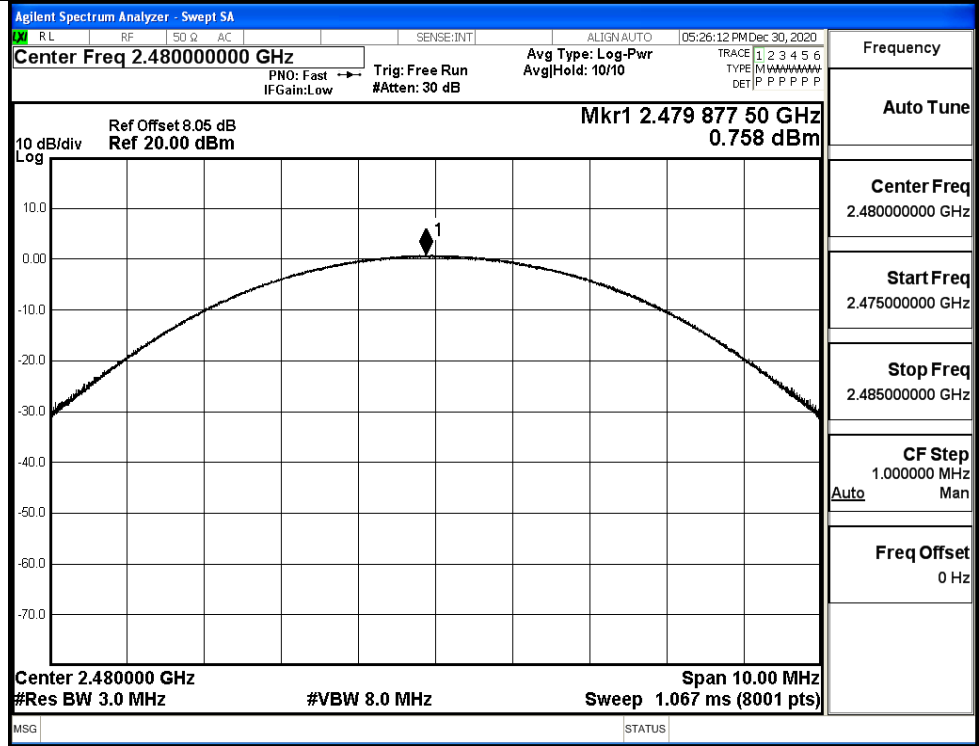
8DPSK/LCH



8DPSK/MCH

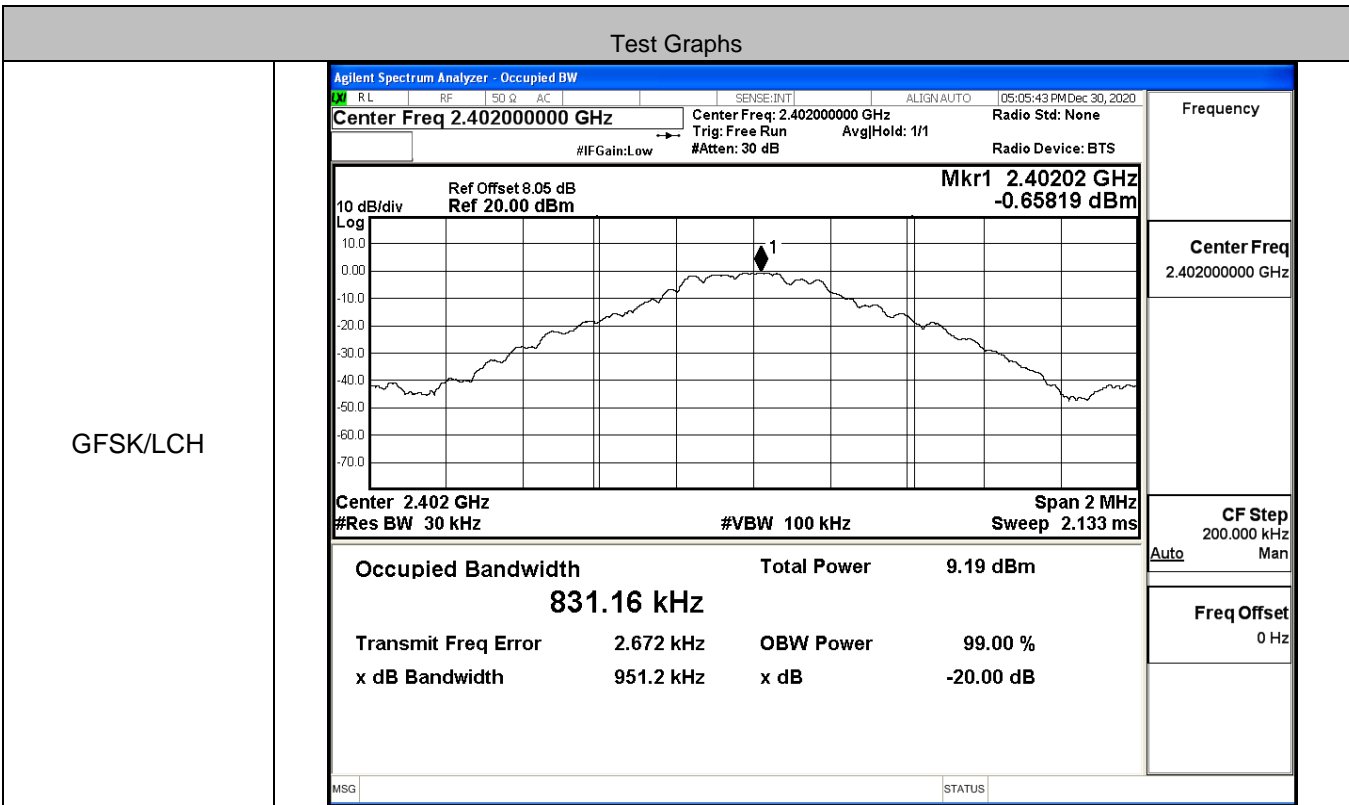


8DPSK/HCH

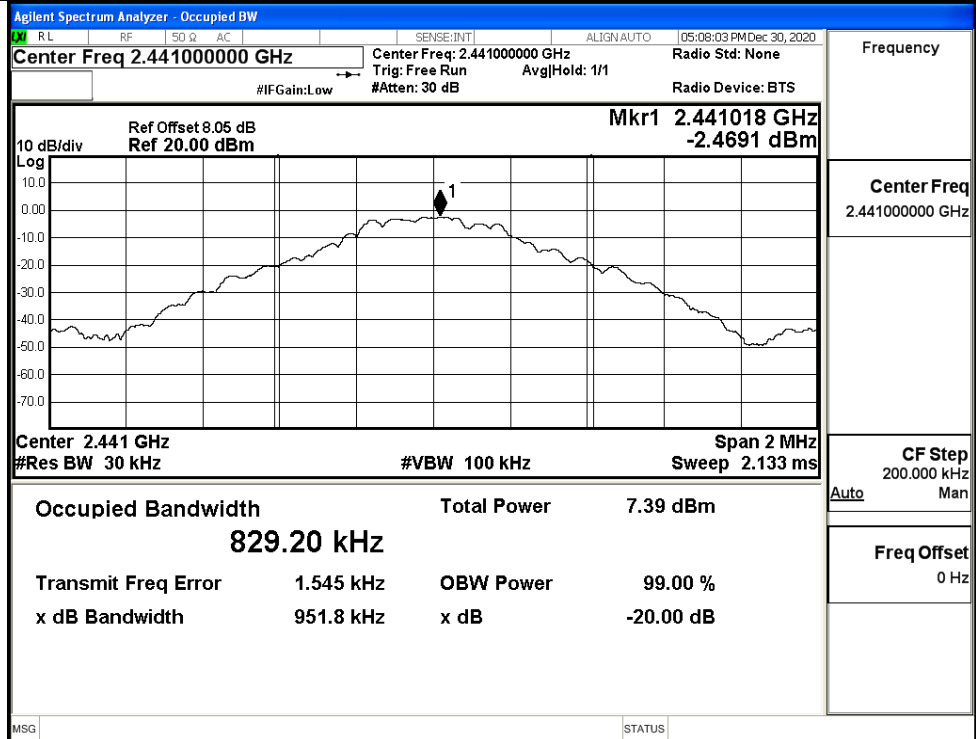


A.2 20dB Bandwidth

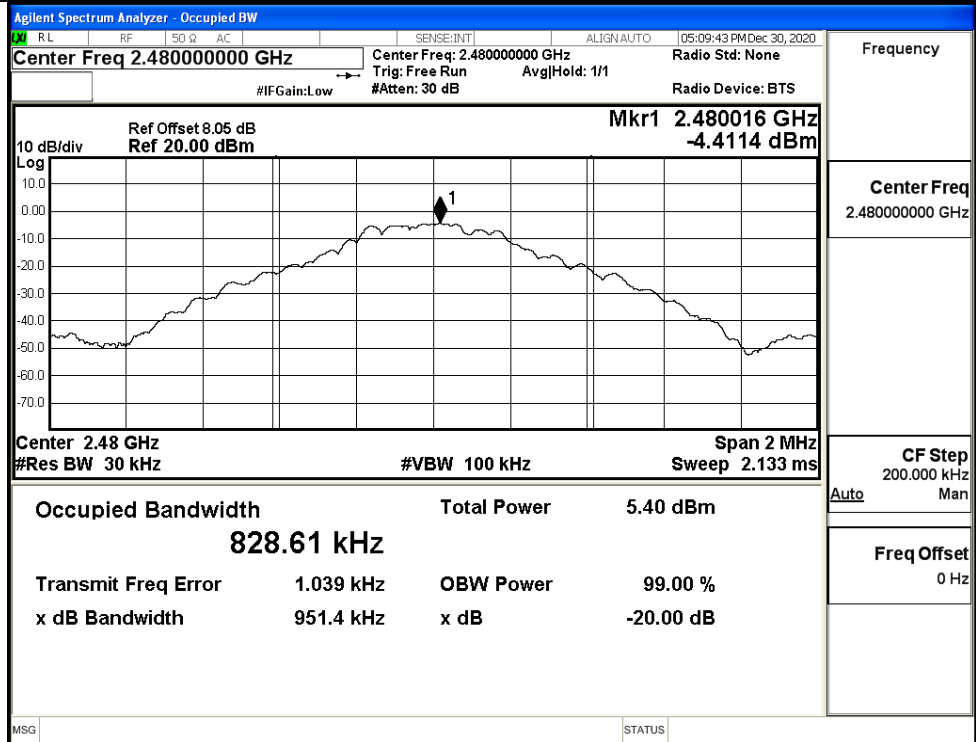
| Mode | Channel. | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK | LCH | 0.9512 | Not Specified | PASS |
| | MCH | 0.9518 | Not Specified | PASS |
| | HCH | 0.9514 | Not Specified | PASS |
| $\pi/4$ DQPSK | LCH | 1.320 | Not Specified | PASS |
| | MCH | 1.318 | Not Specified | PASS |
| | HCH | 1.319 | Not Specified | PASS |
| 8DPSK | LCH | 1.300 | Not Specified | PASS |
| | MCH | 1.302 | Not Specified | PASS |
| | HCH | 1.301 | Not Specified | PASS |



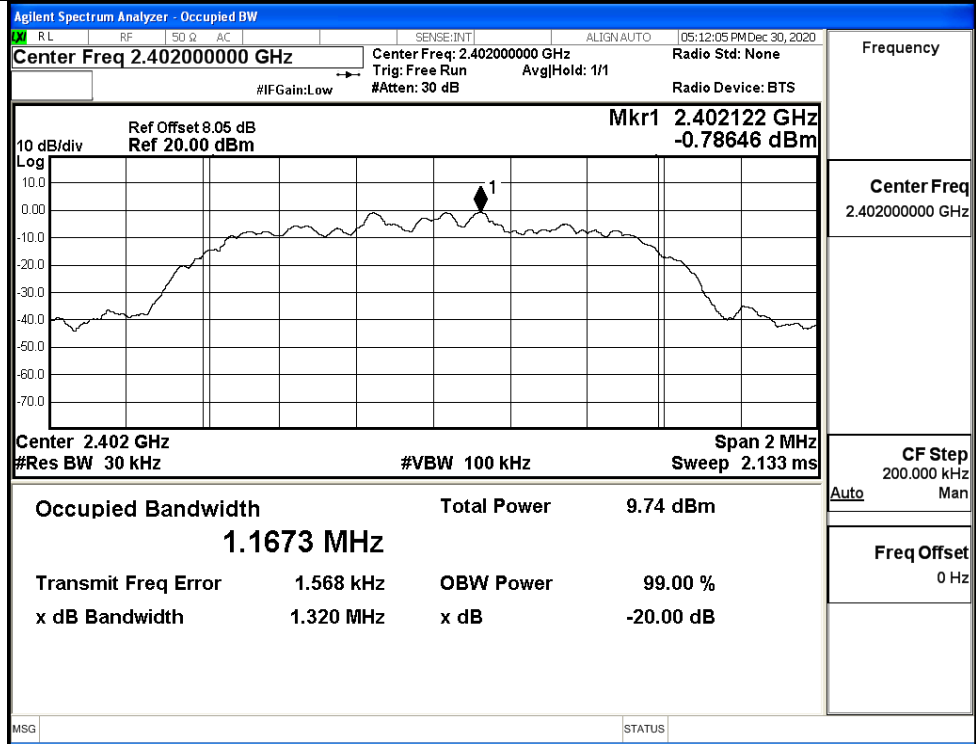
GFSK/MCH



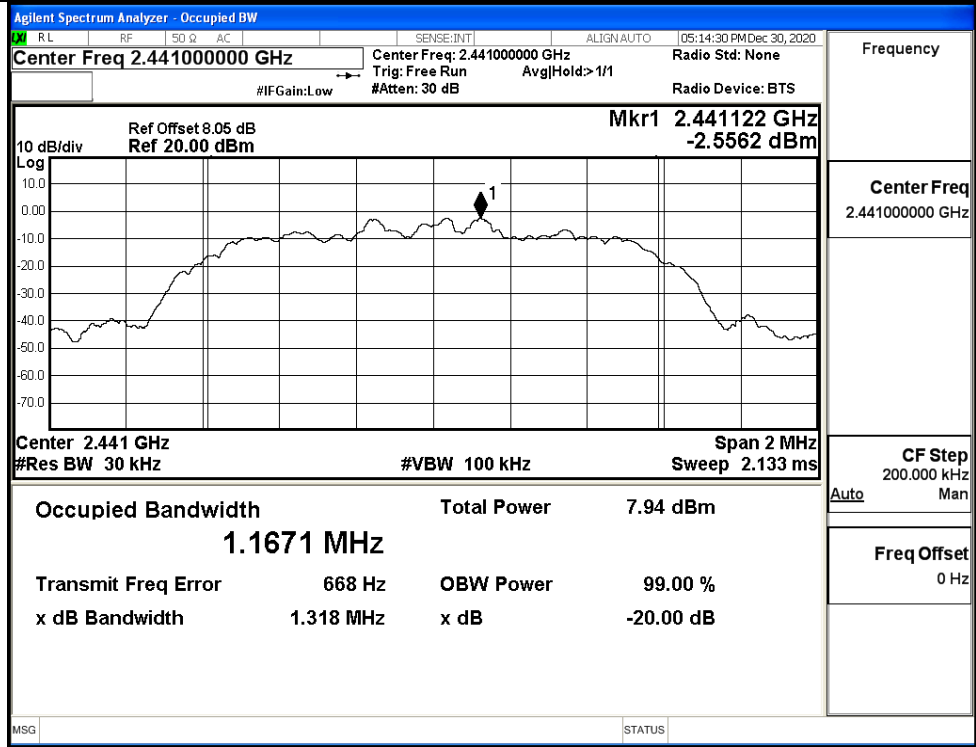
GFSK/HCH



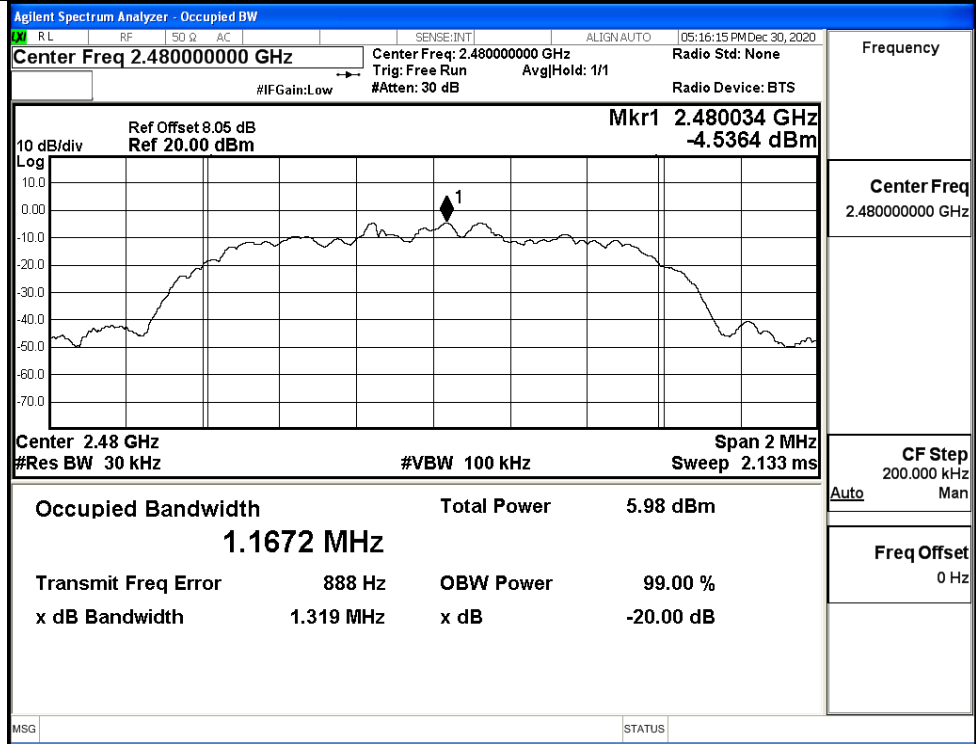
$\pi/4$ DQPSK/LCH



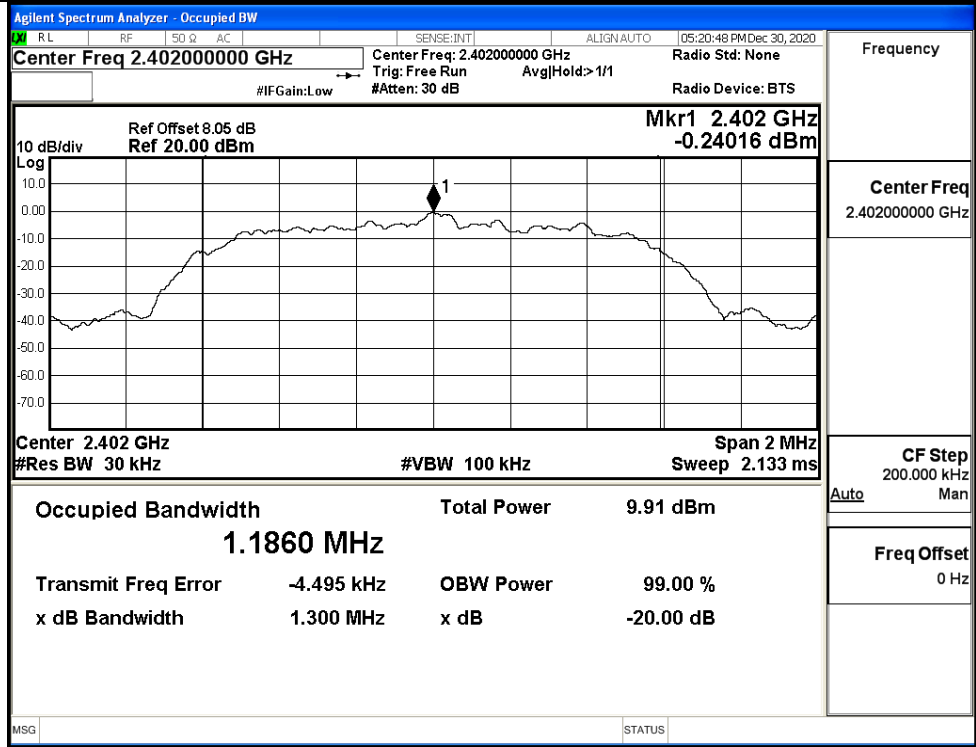
$\pi/4$ DQPSK/MCH



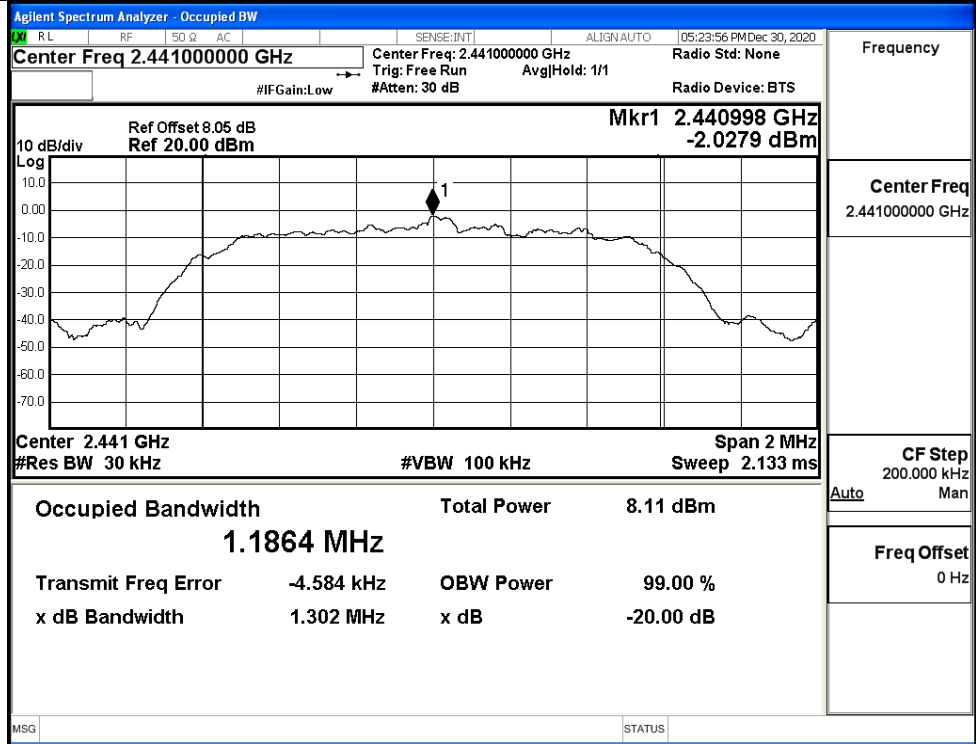
$\pi/4$ DQPSK/HCH



8DPSK/LCH

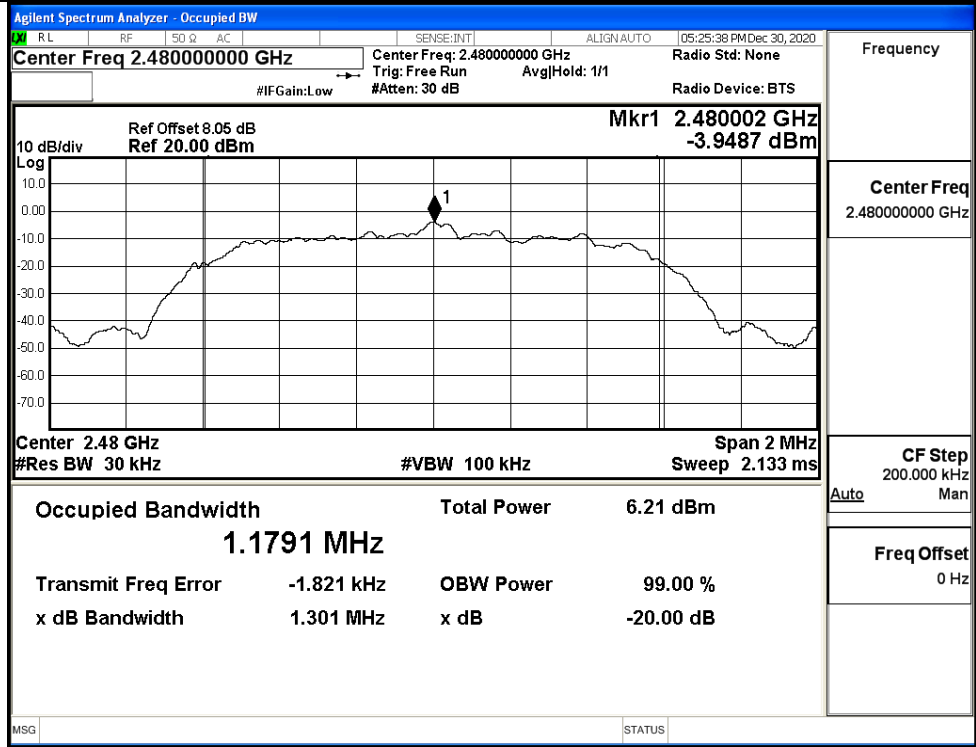


8DPSK/MCH



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

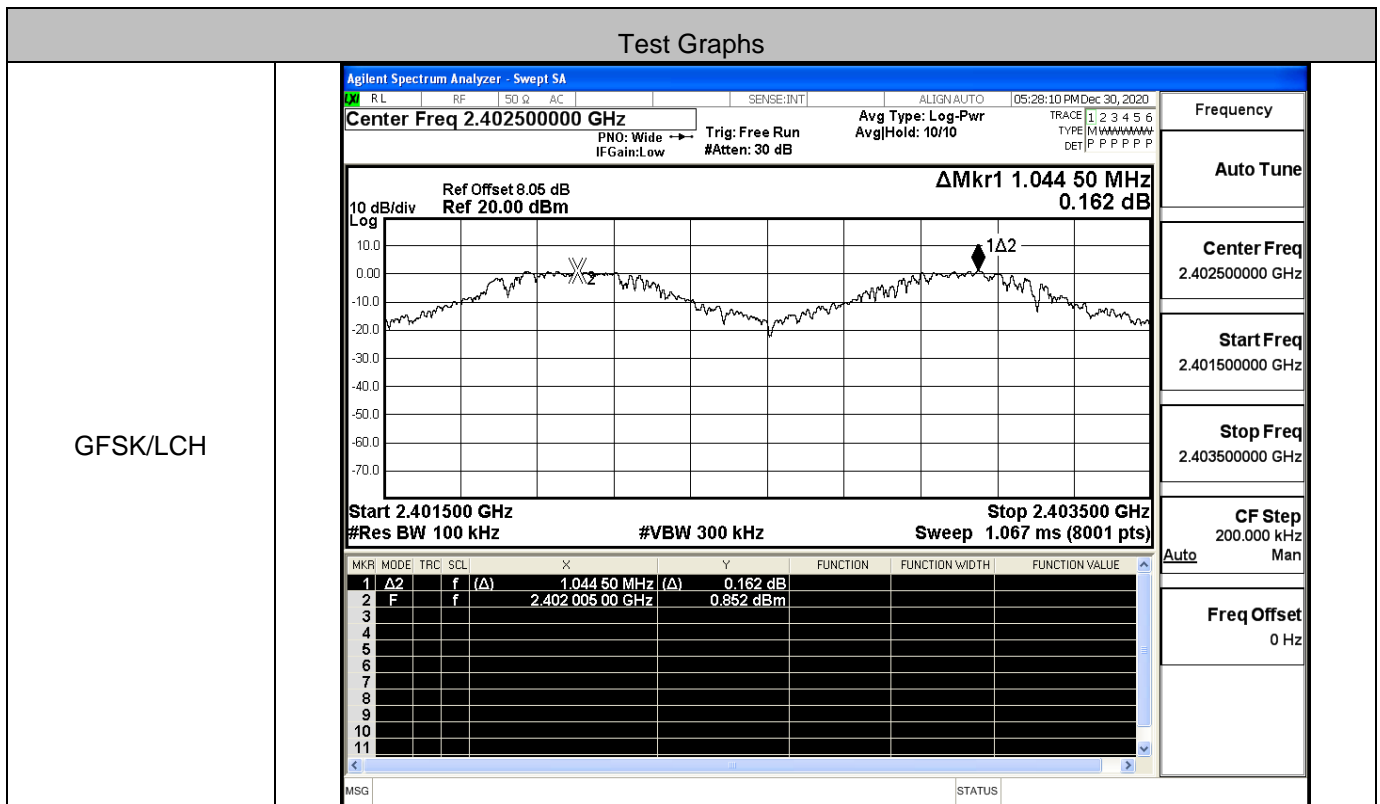
8DPSK/HCH



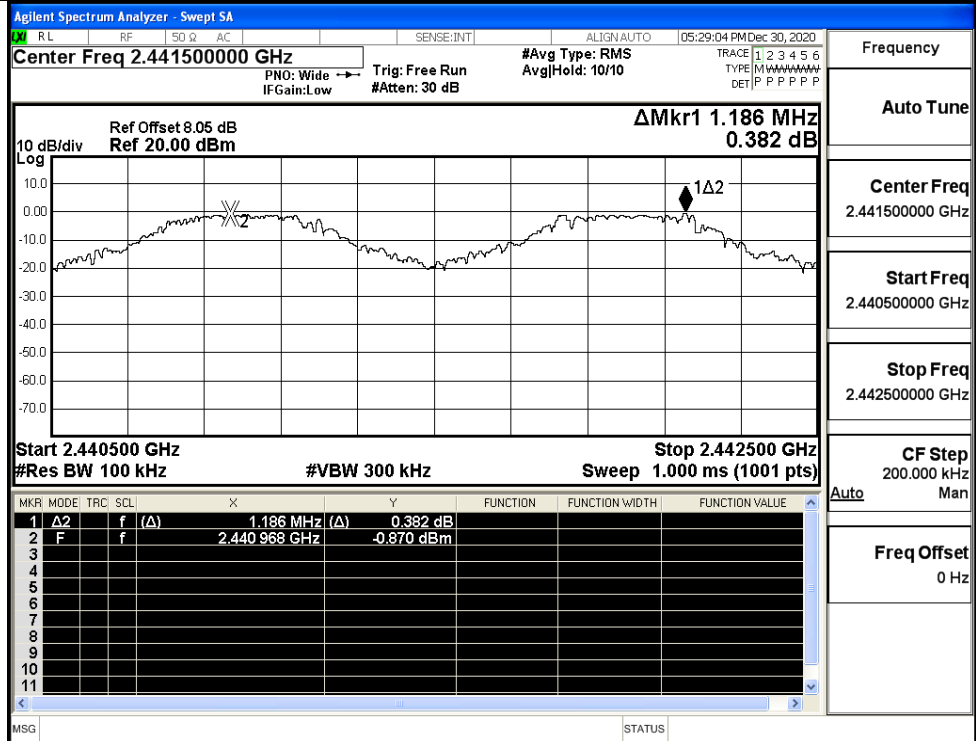
| | |
|-------------|-----------------|
| Frequency | 2.480000000 GHz |
| Center Freq | 2.480000000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

A.3 Carrier Frequency Separation

| Mode | Channel | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|---------|------------------------------------|-------------|---------|
| GFSK | LCH | 1.044 | 0.635 | PASS |
| | MCH | 1.186 | 0.635 | PASS |
| | HCH | 1.064 | 0.635 | PASS |
| π/4DQPSK | LCH | 0.908 | 0.880 | PASS |
| | MCH | 1.186 | 0.880 | PASS |
| | HCH | 1.050 | 0.880 | PASS |
| 8DPSK | LCH | 1.098 | 0.868 | PASS |
| | MCH | 0.910 | 0.868 | PASS |
| | HCH | 1.048 | 0.868 | PASS |



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

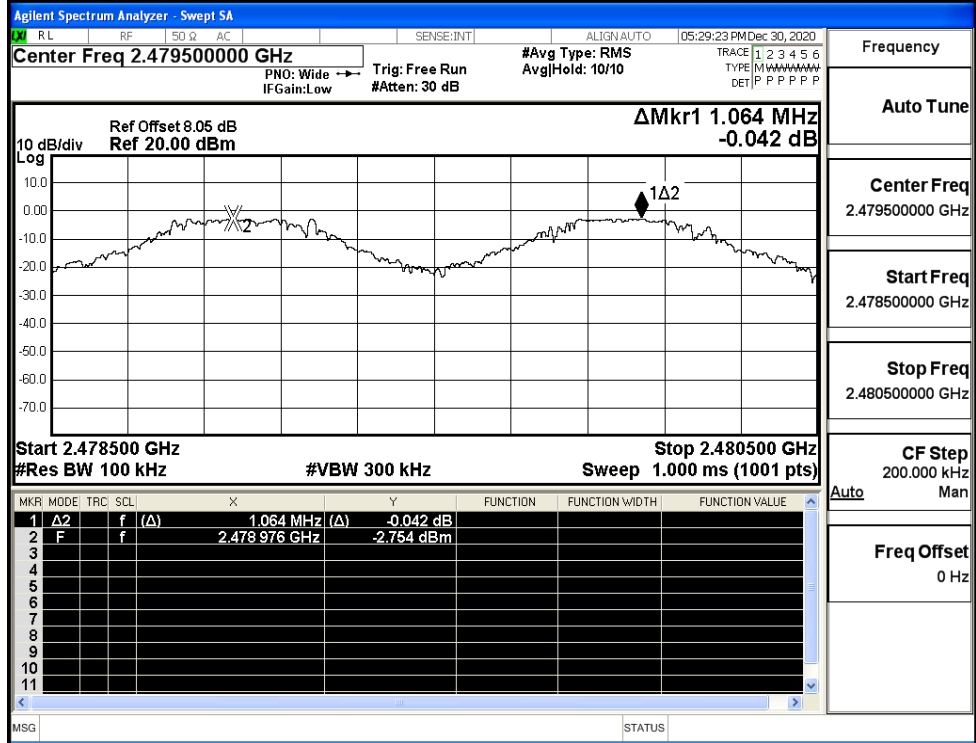
Start Freq
2.440500000 GHz

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

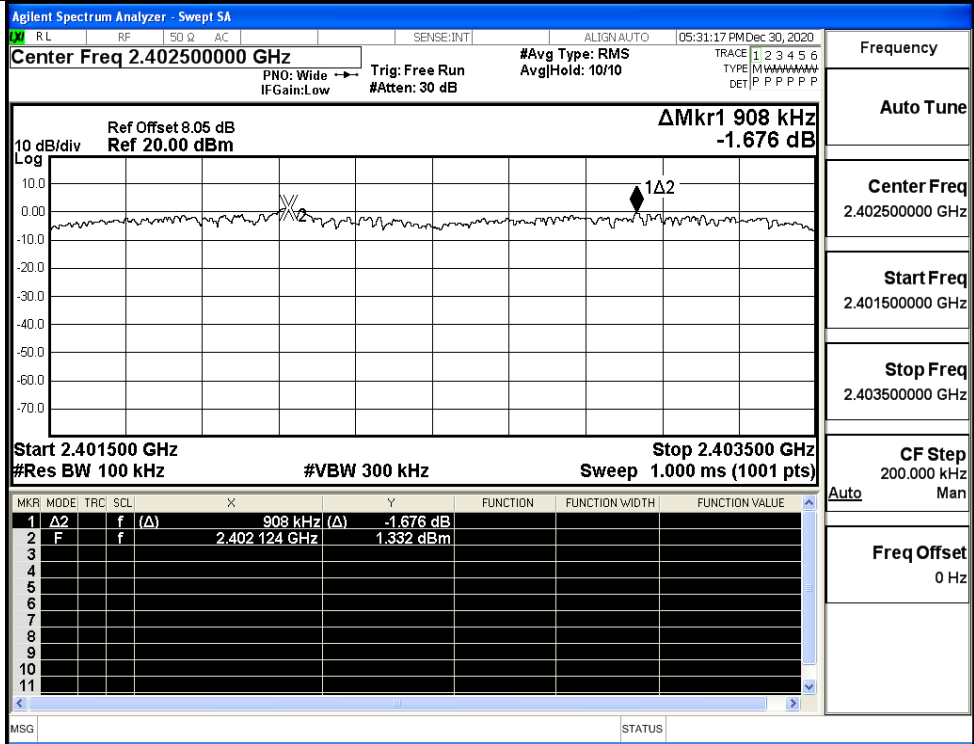
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Auto Man

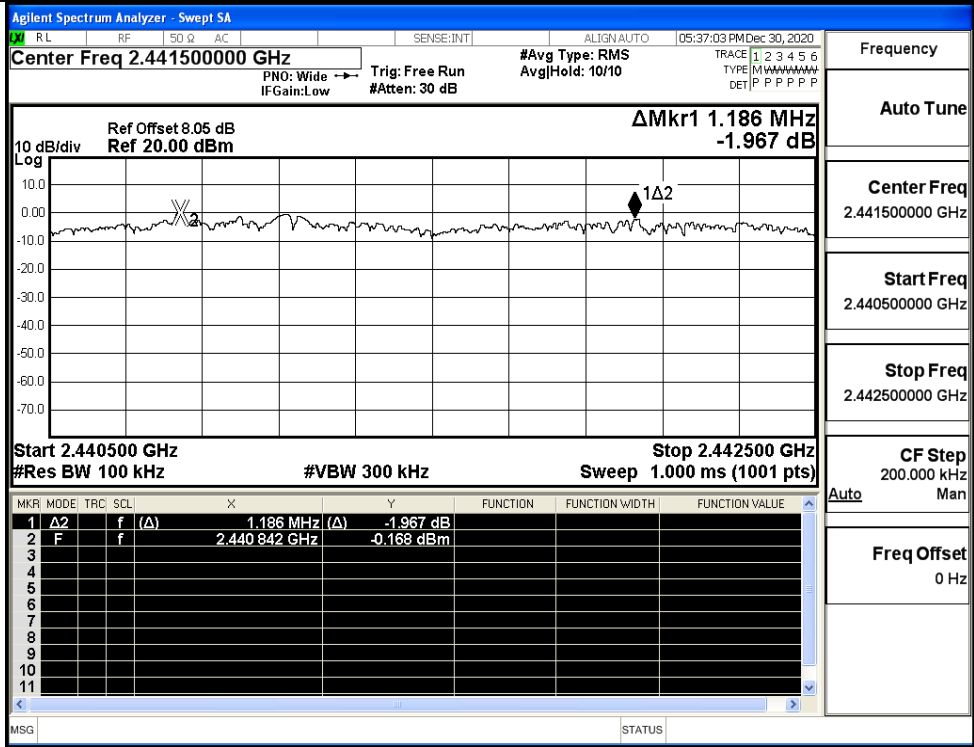
Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH



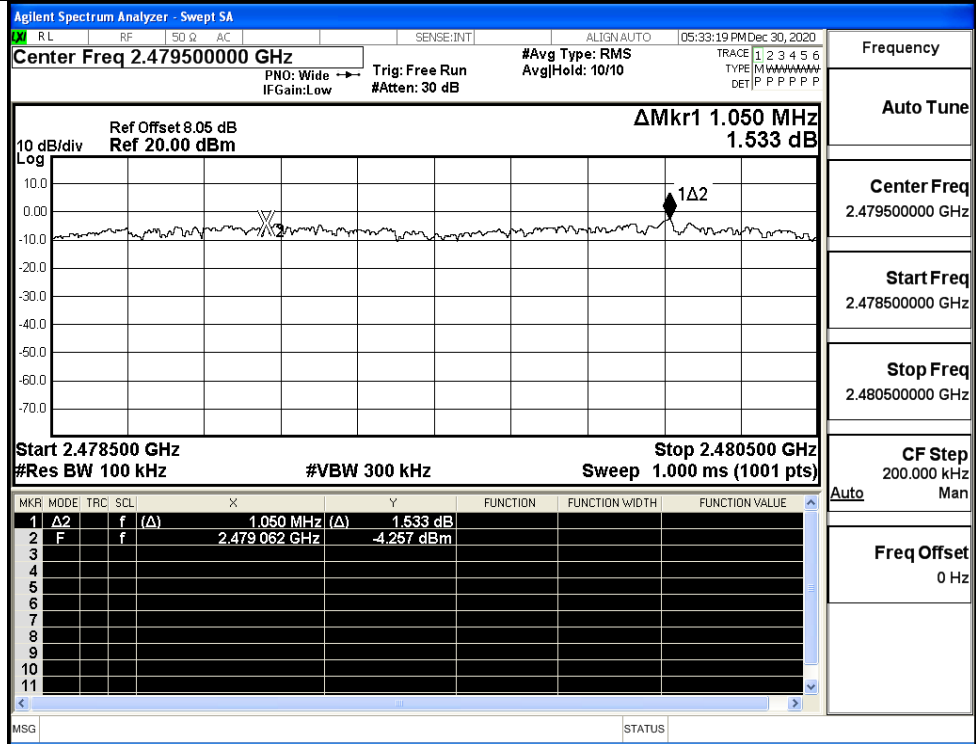
| | |
|-------------|-----------------|
| Frequency | 2.402500000 GHz |
| Auto Tune | |
| Center Freq | 2.402500000 GHz |
| Start Freq | 2.401500000 GHz |
| Stop Freq | 2.403500000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

$\pi/4$ DQPSK/MCH

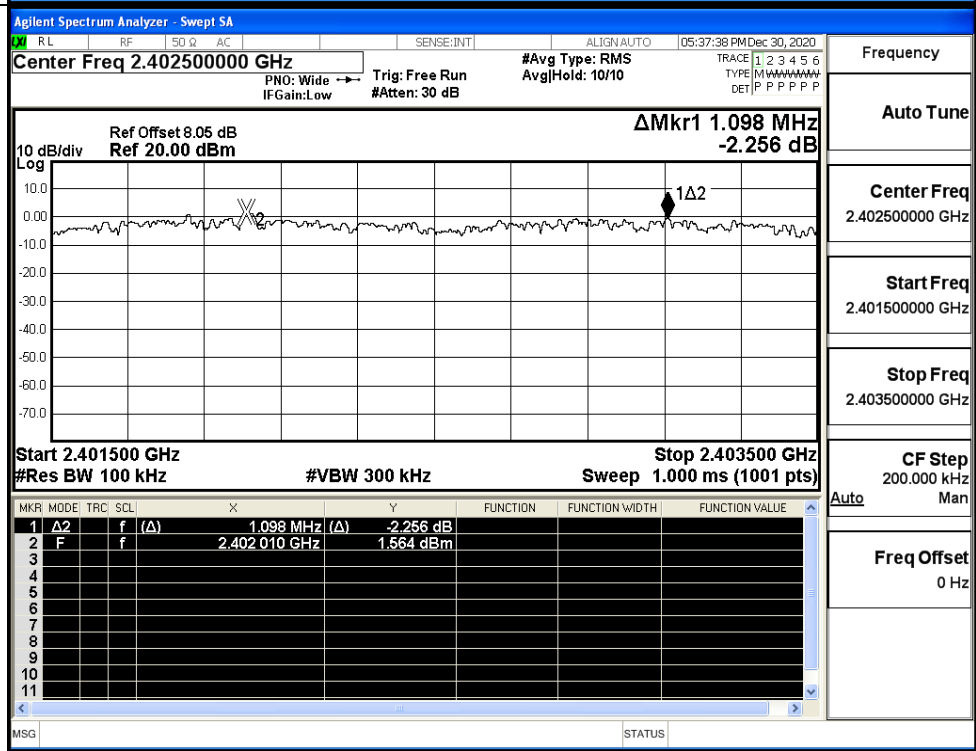


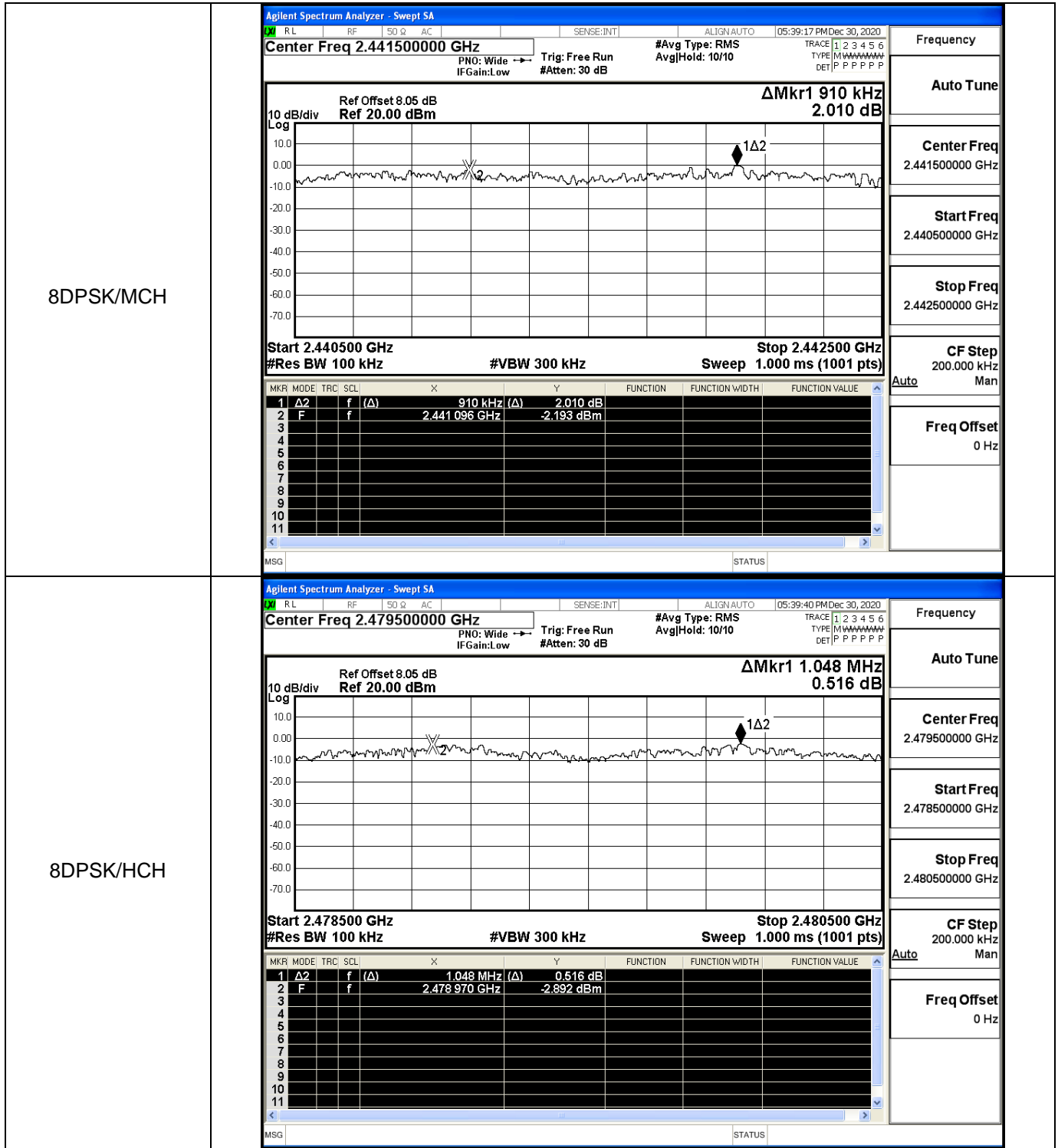
| | |
|-------------|-----------------|
| Frequency | 2.441500000 GHz |
| Auto Tune | |
| Center Freq | 2.441500000 GHz |
| Start Freq | 2.440500000 GHz |
| Stop Freq | 2.442500000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

π/4DQPSK/HCH



8DPSK/LCH



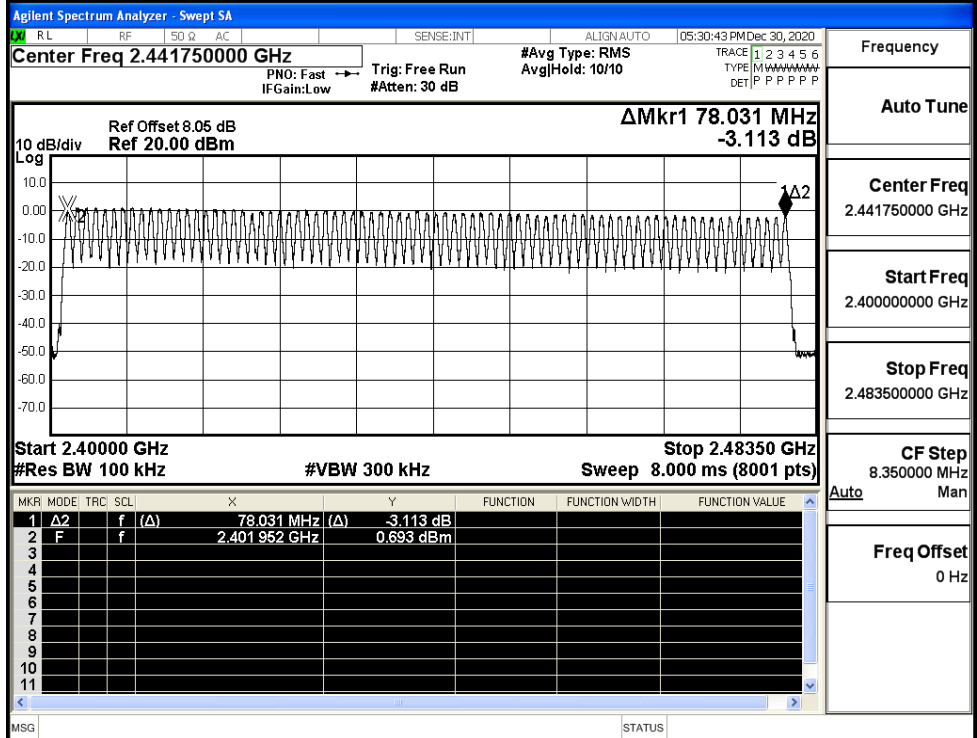


A.4 Hopping Channel Number

| 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 |

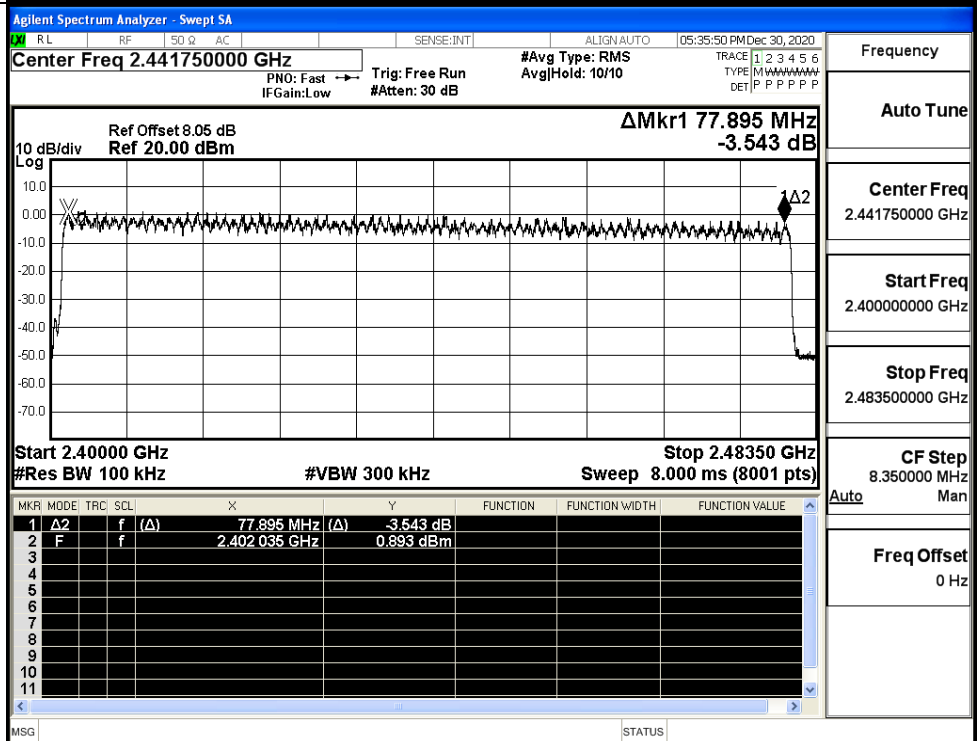
Test Graphs

GFSK/Hop



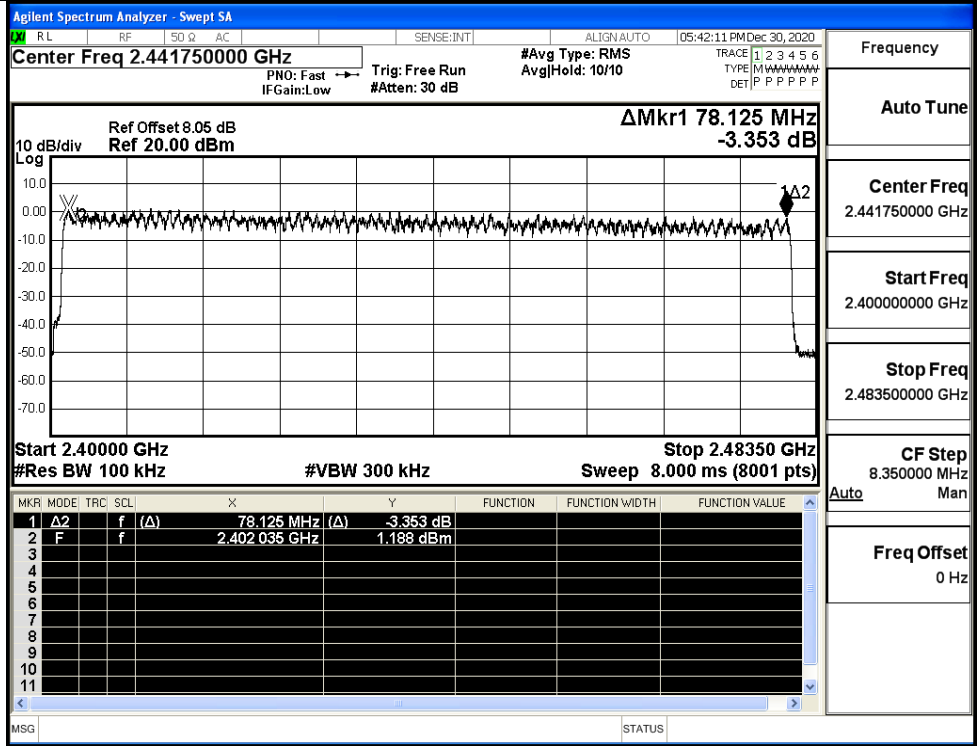
| |
|--------------------------------|
| Frequency |
| Auto Tune |
| Center Freq 2.441750000 GHz |
| Start Freq 2.400000000 GHz |
| Stop Freq 2.483500000 GHz |
| CF Step 8.350000 MHz |
| Auto Man |
| Freq Offset 0 Hz |

$\pi/4$ DQPSK/Hop



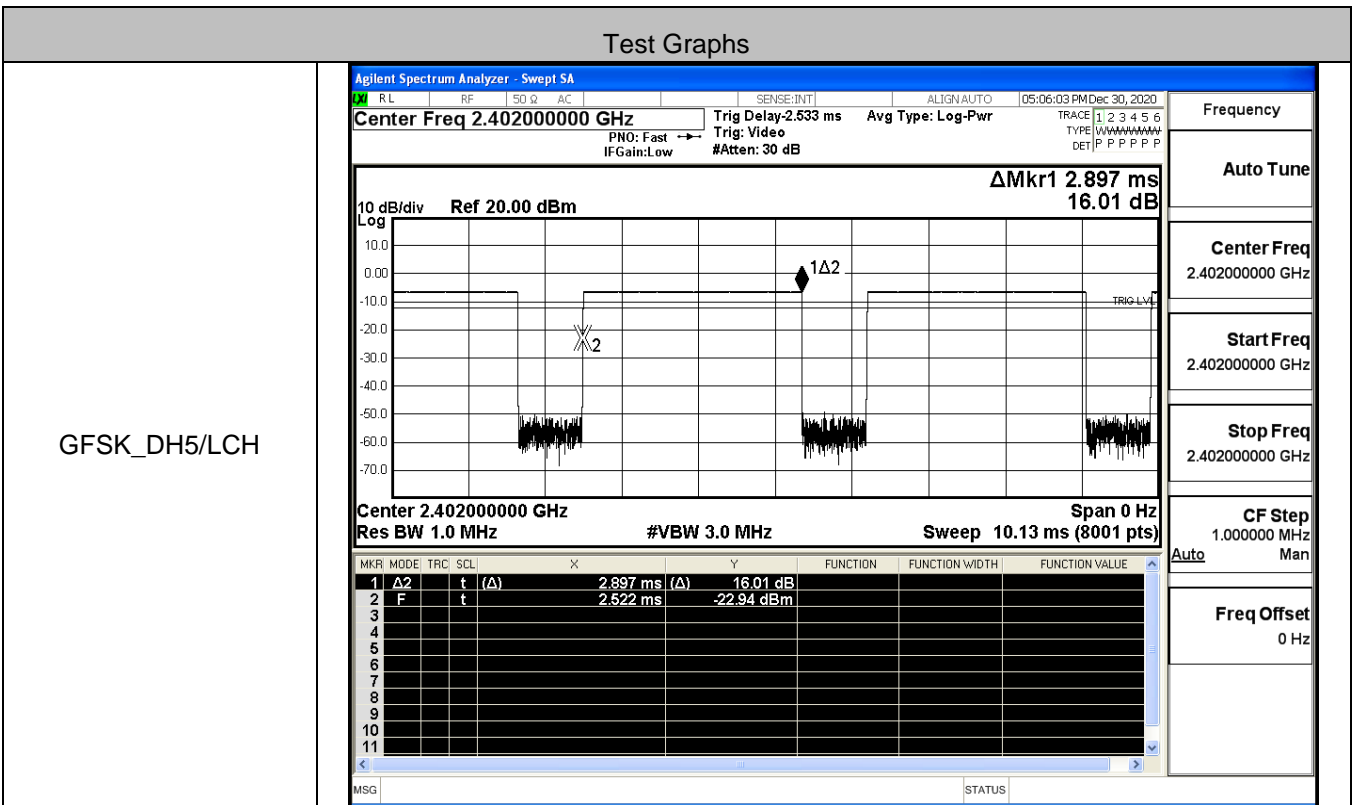
| |
|--------------------------------|
| Frequency |
| Auto Tune |
| Center Freq 2.441750000 GHz |
| Start Freq 2.400000000 GHz |
| Stop Freq 2.483500000 GHz |
| CF Step 8.350000 MHz |
| Auto Man |
| Freq Offset 0 Hz |

8DPSK/Hop

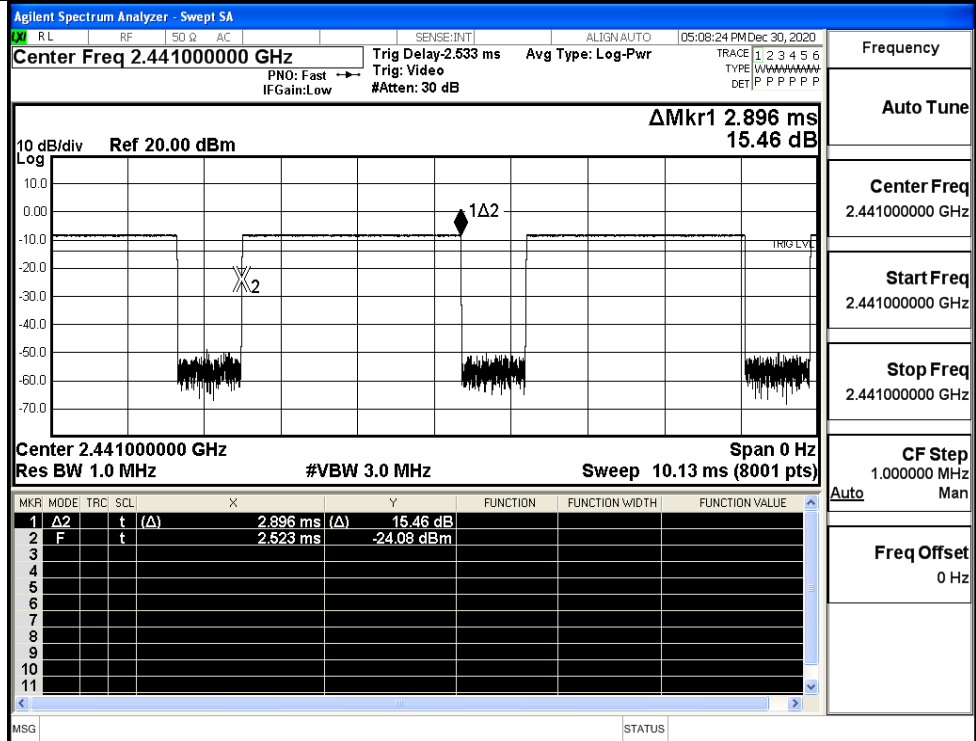


A.5 Dwell Time

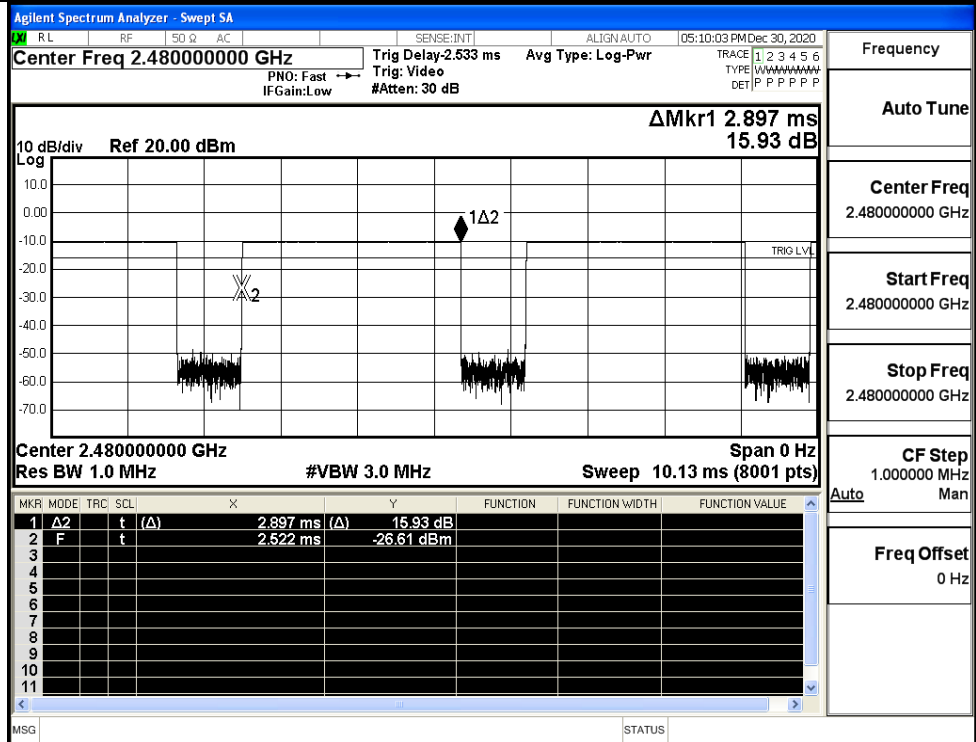
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK | DH5 | LCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| | DH5 | MCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| | DH5 | HCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| π/4DQPSK | 2DH5 | LCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| | 2DH5 | MCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| | 2DH5 | HCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| 8DPSK | 3DH5 | LCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| | 3DH5 | MCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |
| | 3DH5 | HCH | 2.9 | 106.7 | 0.309 | 0.4 | PASS |



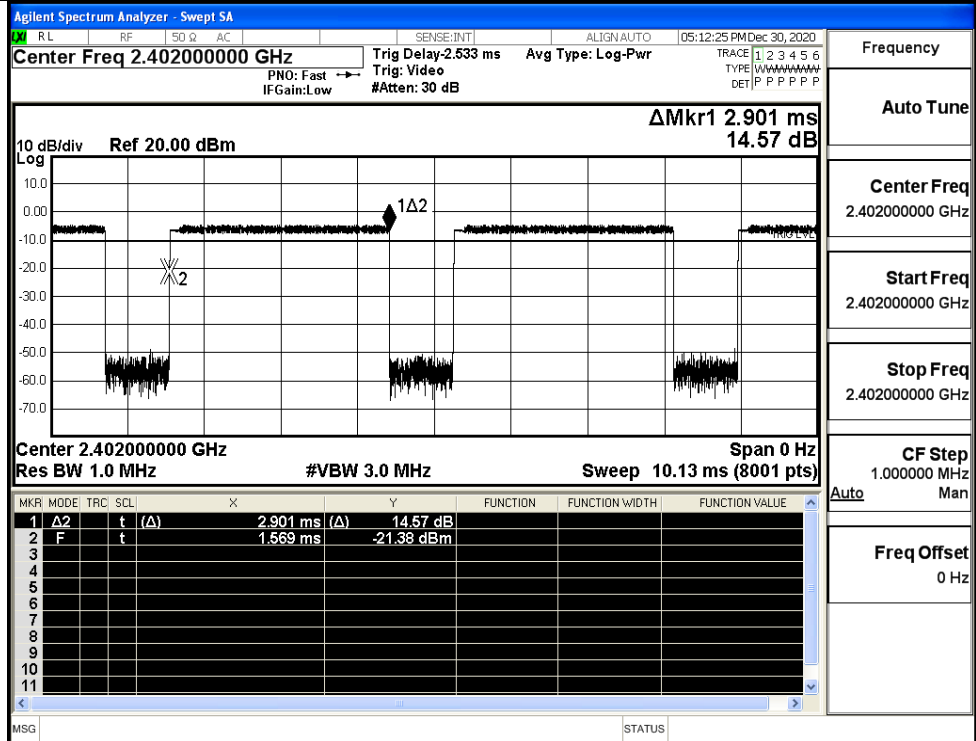
GFSK_DH5/MCH



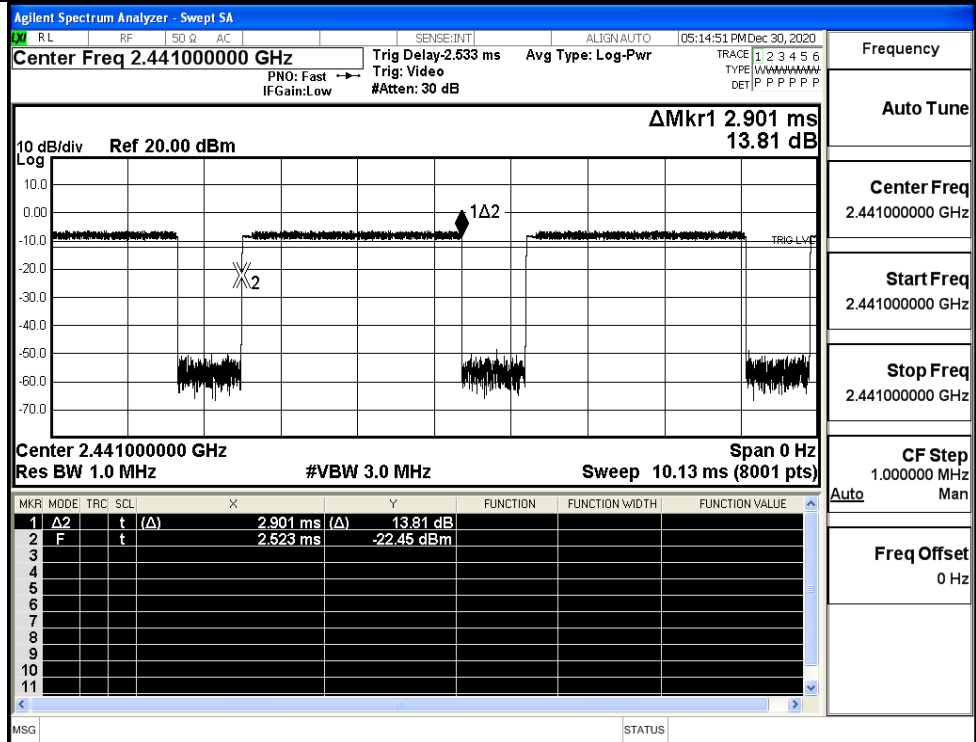
GFSK_DH5/HCH



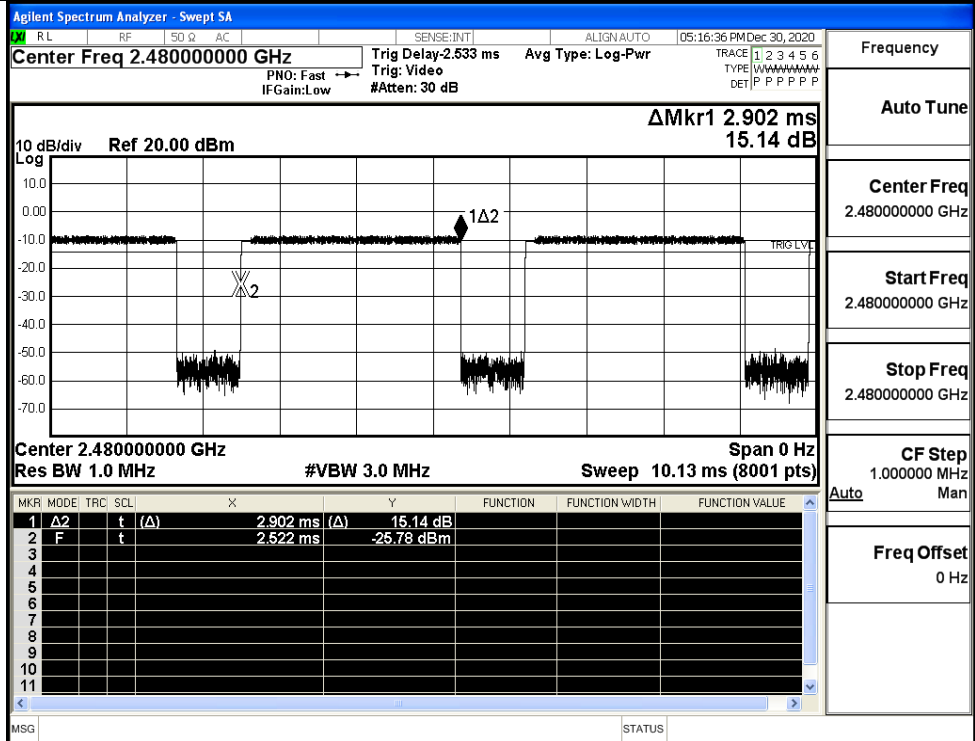
$\pi/4$ DQPSK
_2DH5/LCH



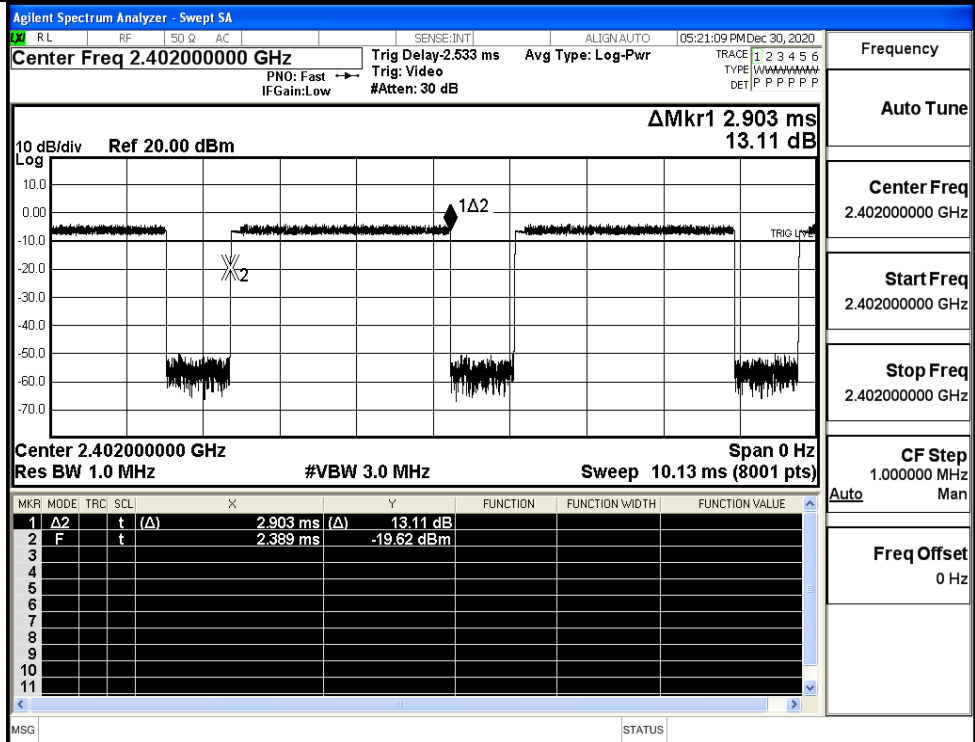
$\pi/4$ DQPSK
_2DH5/MCH



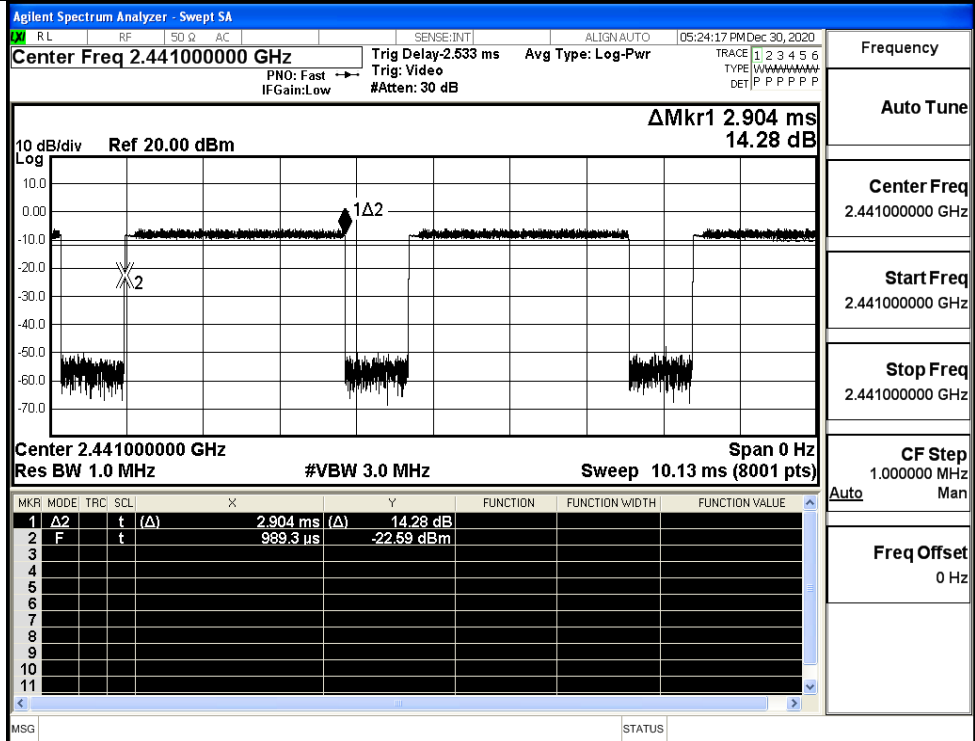
$\pi/4$ DQPSK
_2DH5/HCH



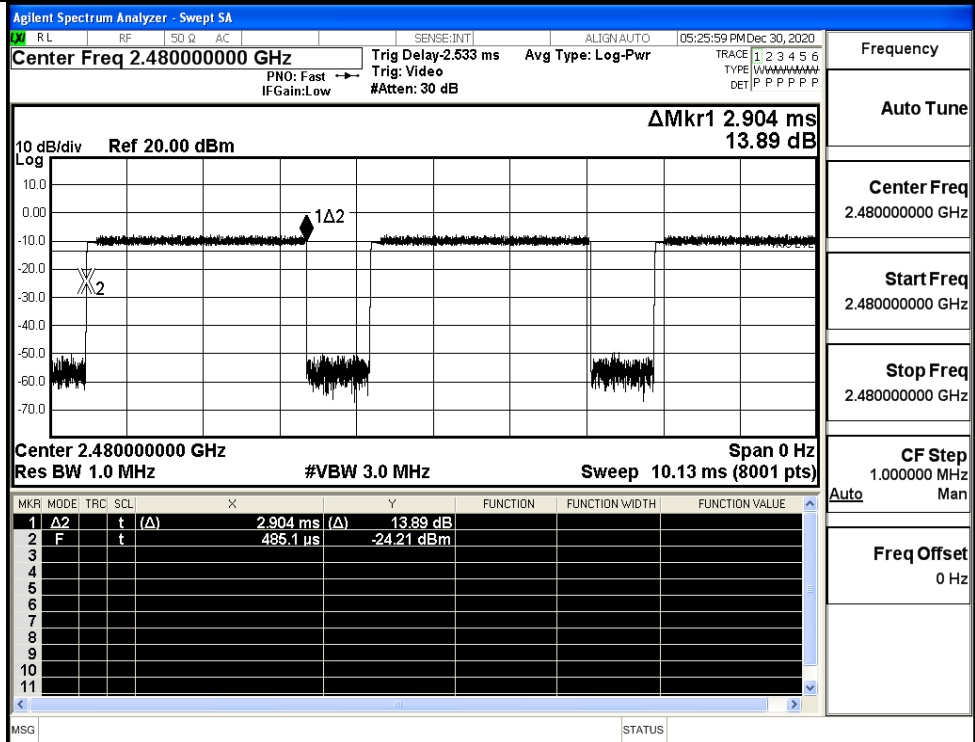
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



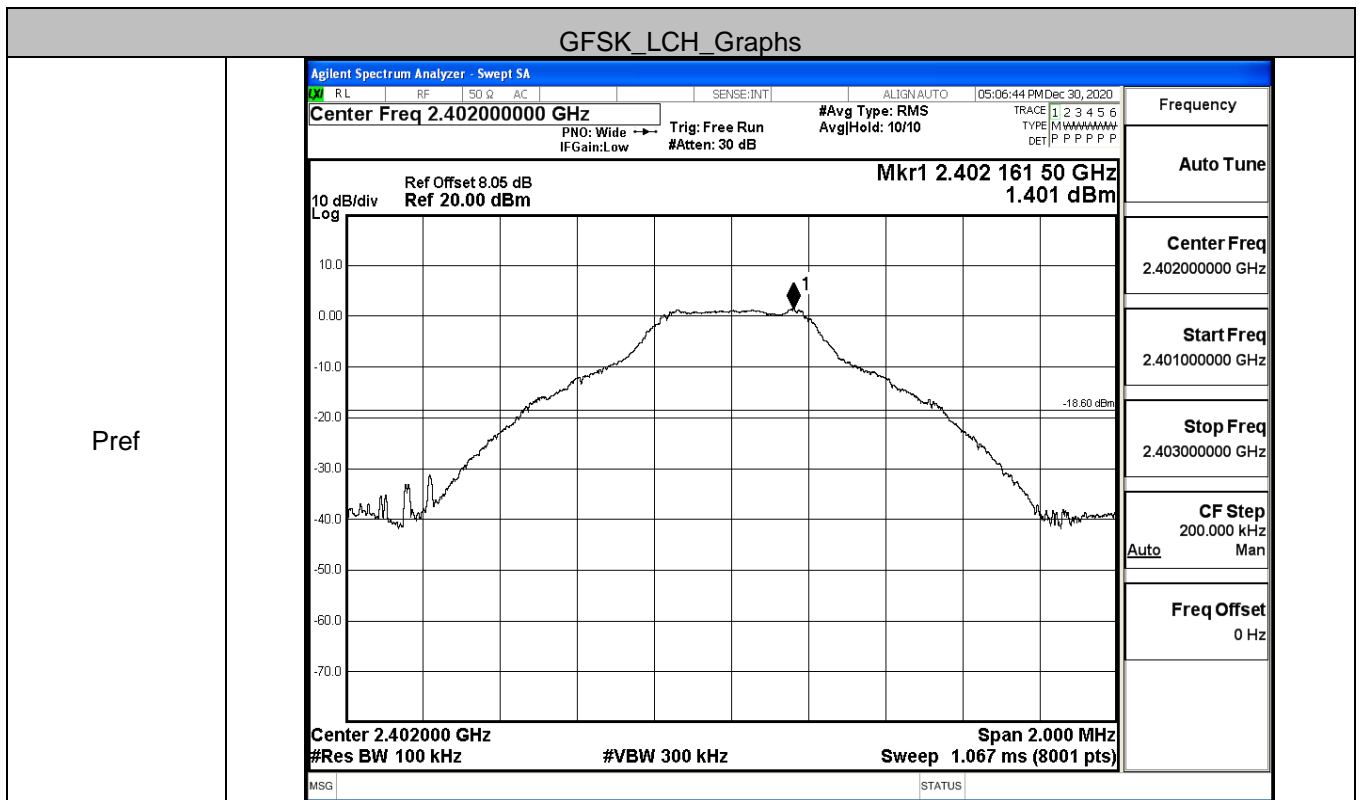
8DPSK_3DH5/HCH

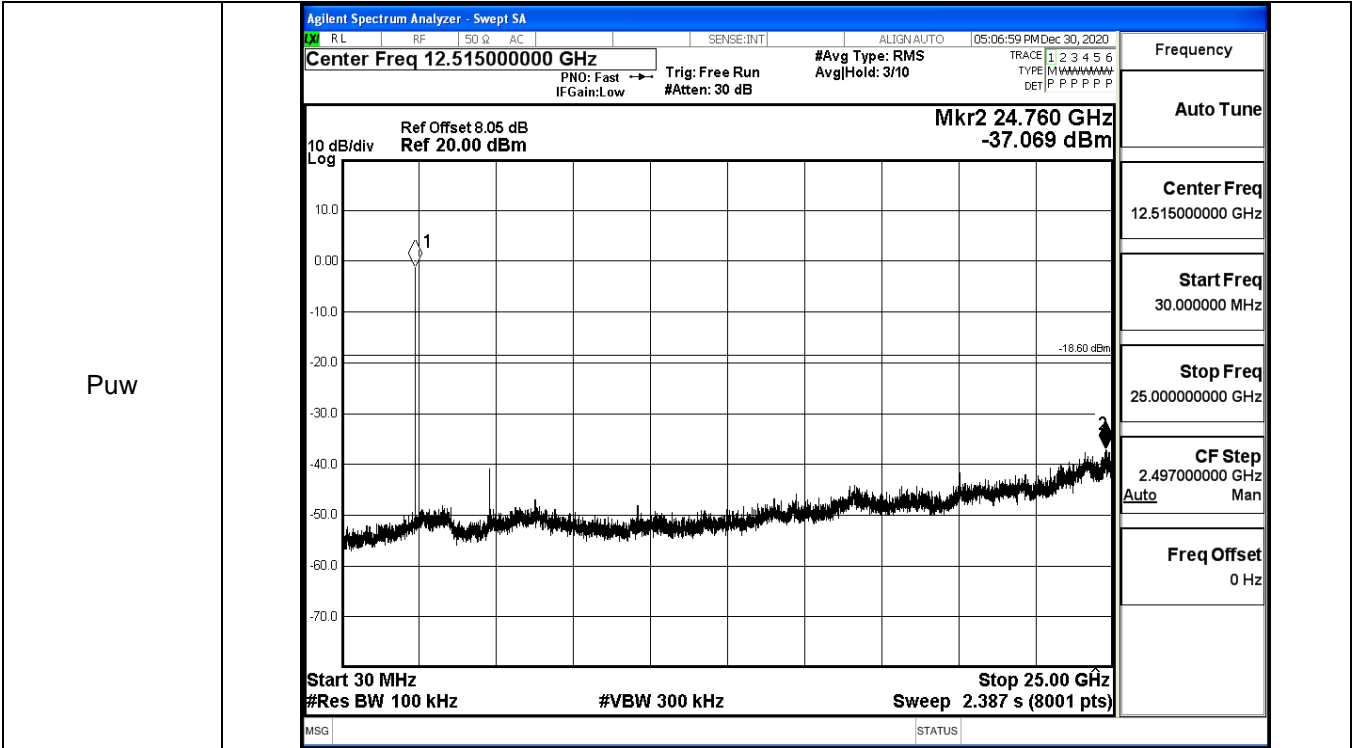


A.6 RF Conducted Spurious Emissions

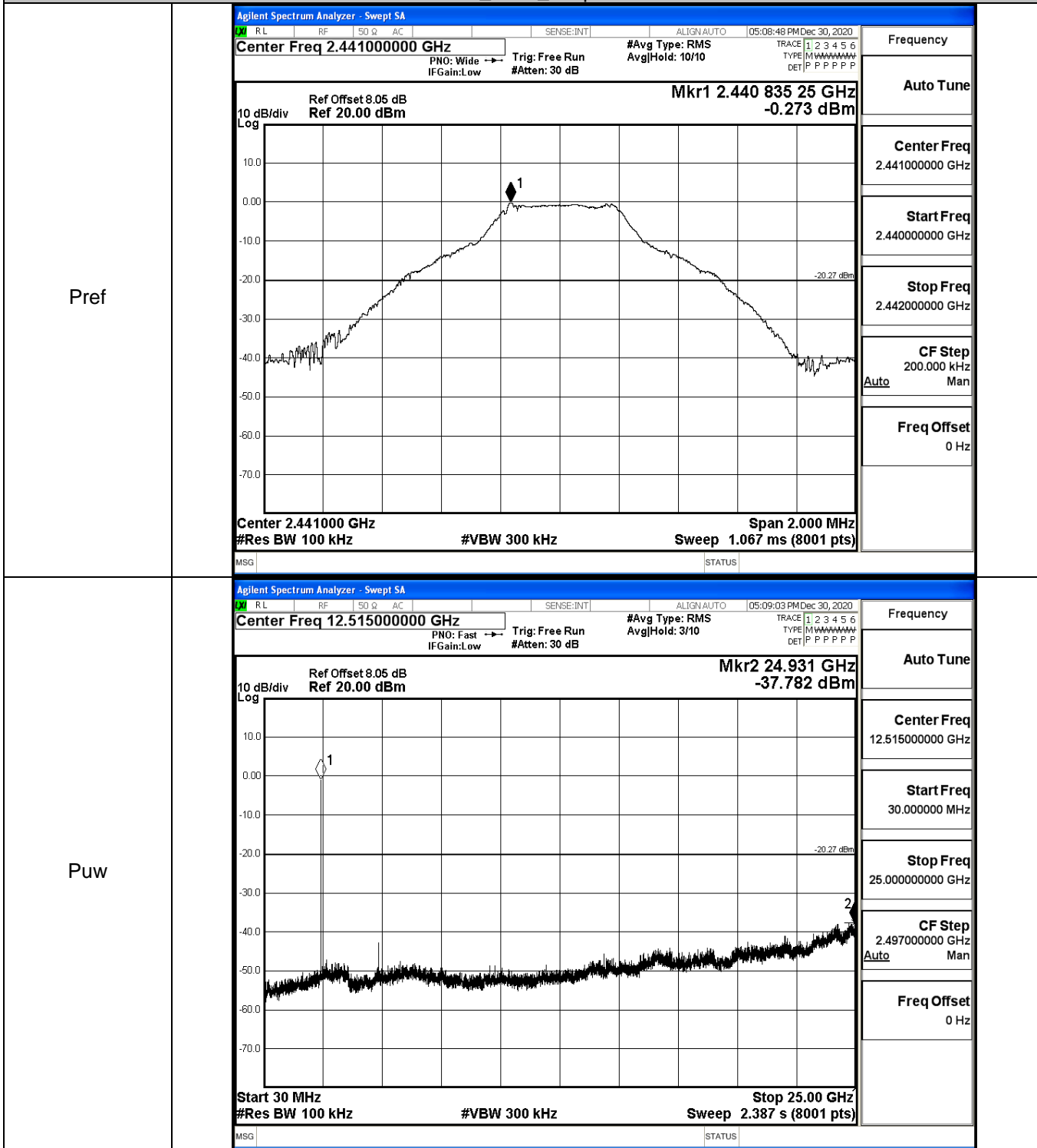
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK | LCH | 1.401 | -37.069 | -18.599 | PASS |
| | MCH | -0.273 | -37.782 | -20.273 | PASS |
| | HCH | -2.202 | -37.704 | -22.202 | PASS |
| π /4DQPSK | LCH | 1.526 | -37.500 | -18.474 | PASS |
| | MCH | -0.291 | -37.599 | -20.291 | PASS |
| | HCH | -2.197 | -37.471 | -22.197 | PASS |
| 8DPSK | LCH | 1.494 | -36.245 | -18.506 | PASS |
| | MCH | -0.25 | -36.541 | -20.250 | PASS |
| | HCH | -2.206 | -37.270 | -22.206 | PASS |

GFSK_LCH_Graphs

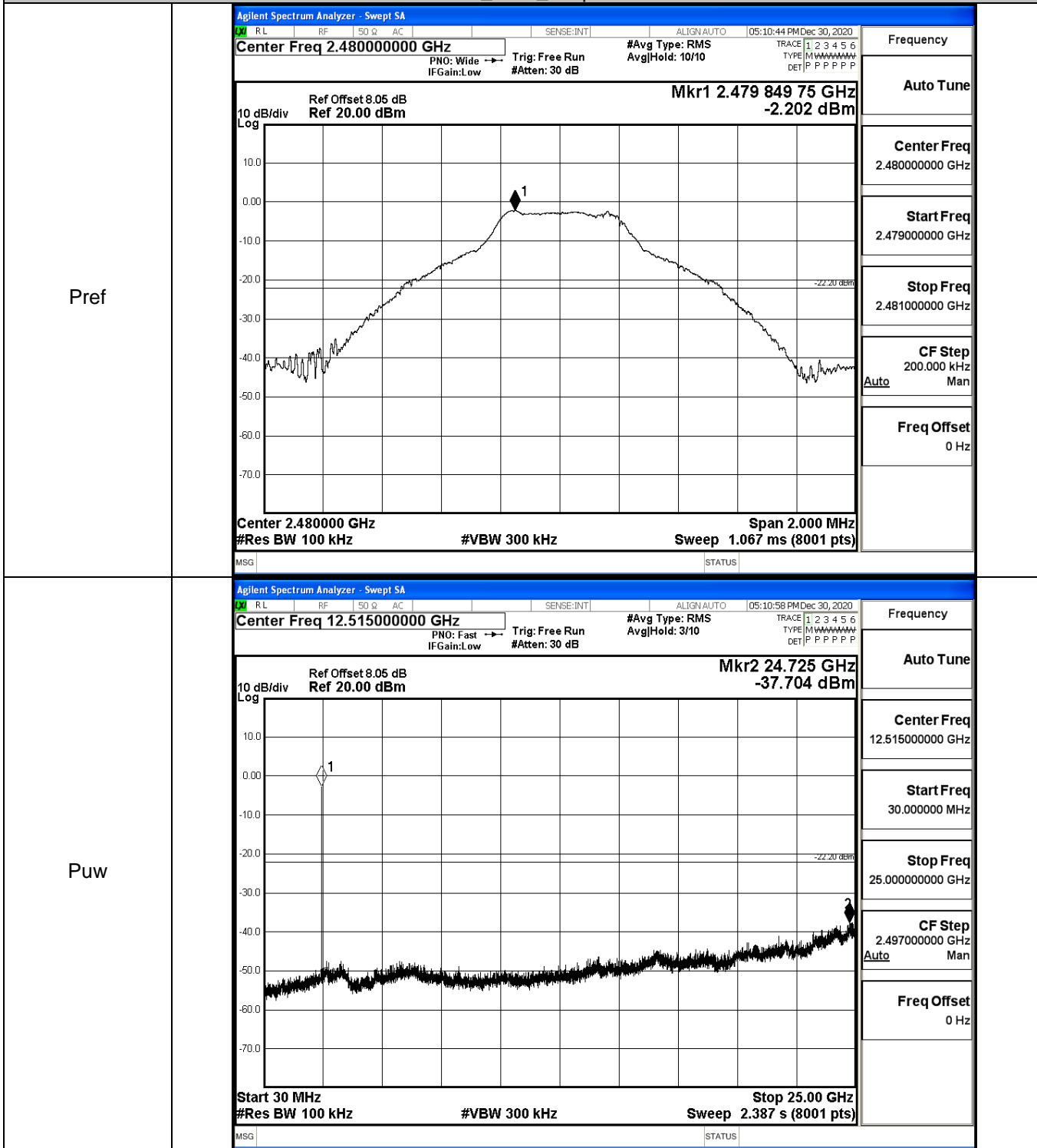




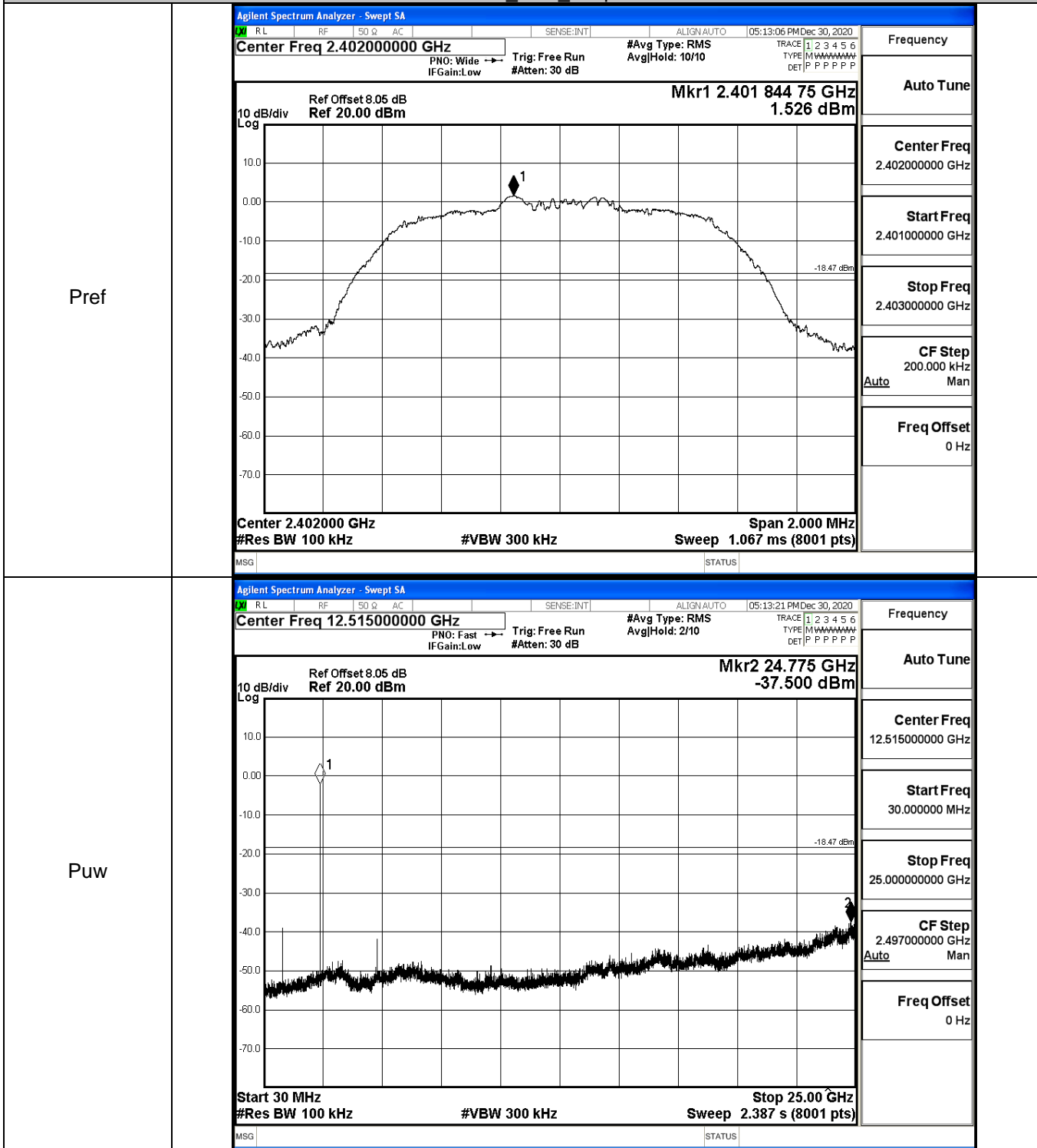
GFSK_MCH_Graphs



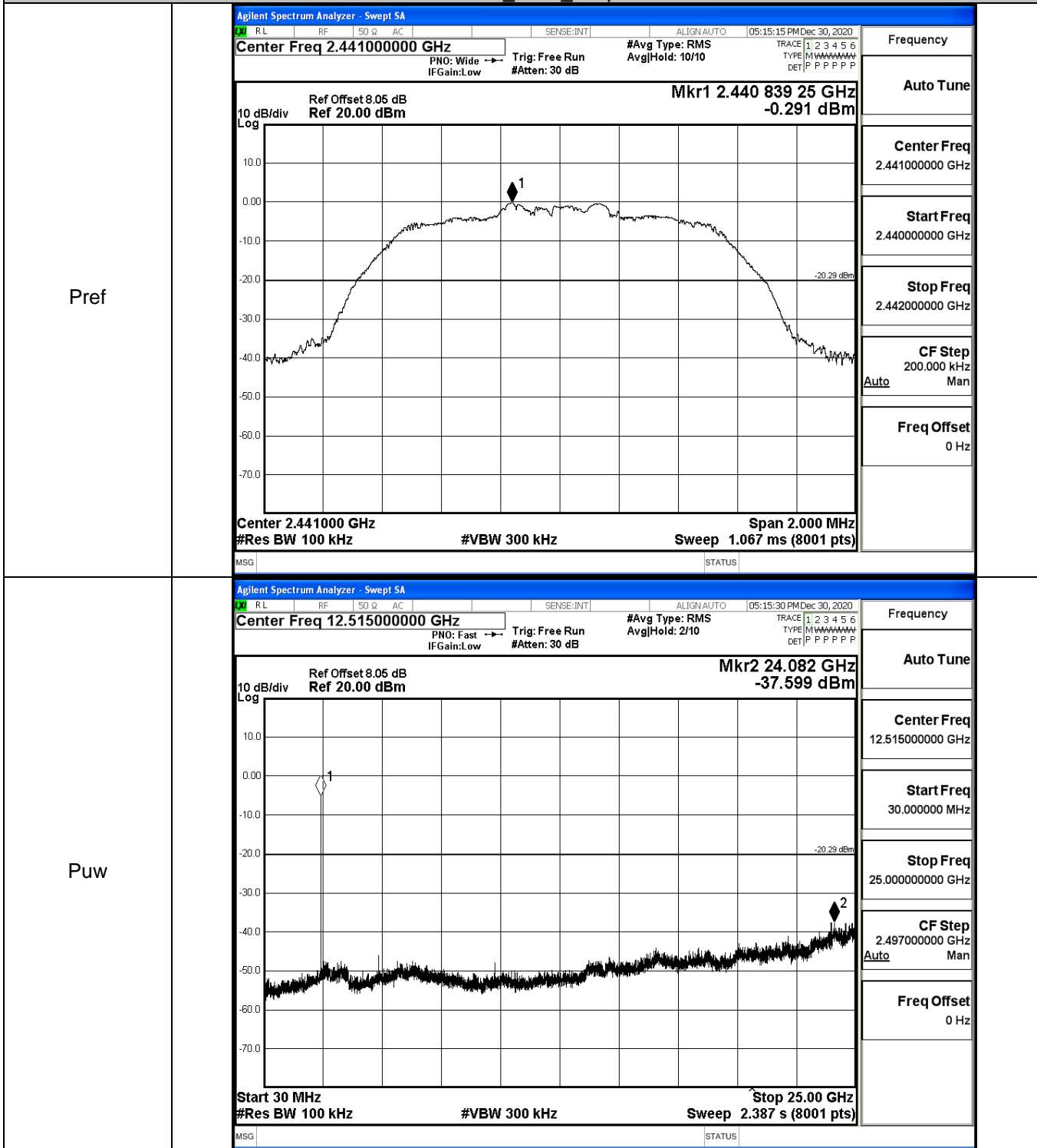
GFSK_HCH_Graphs



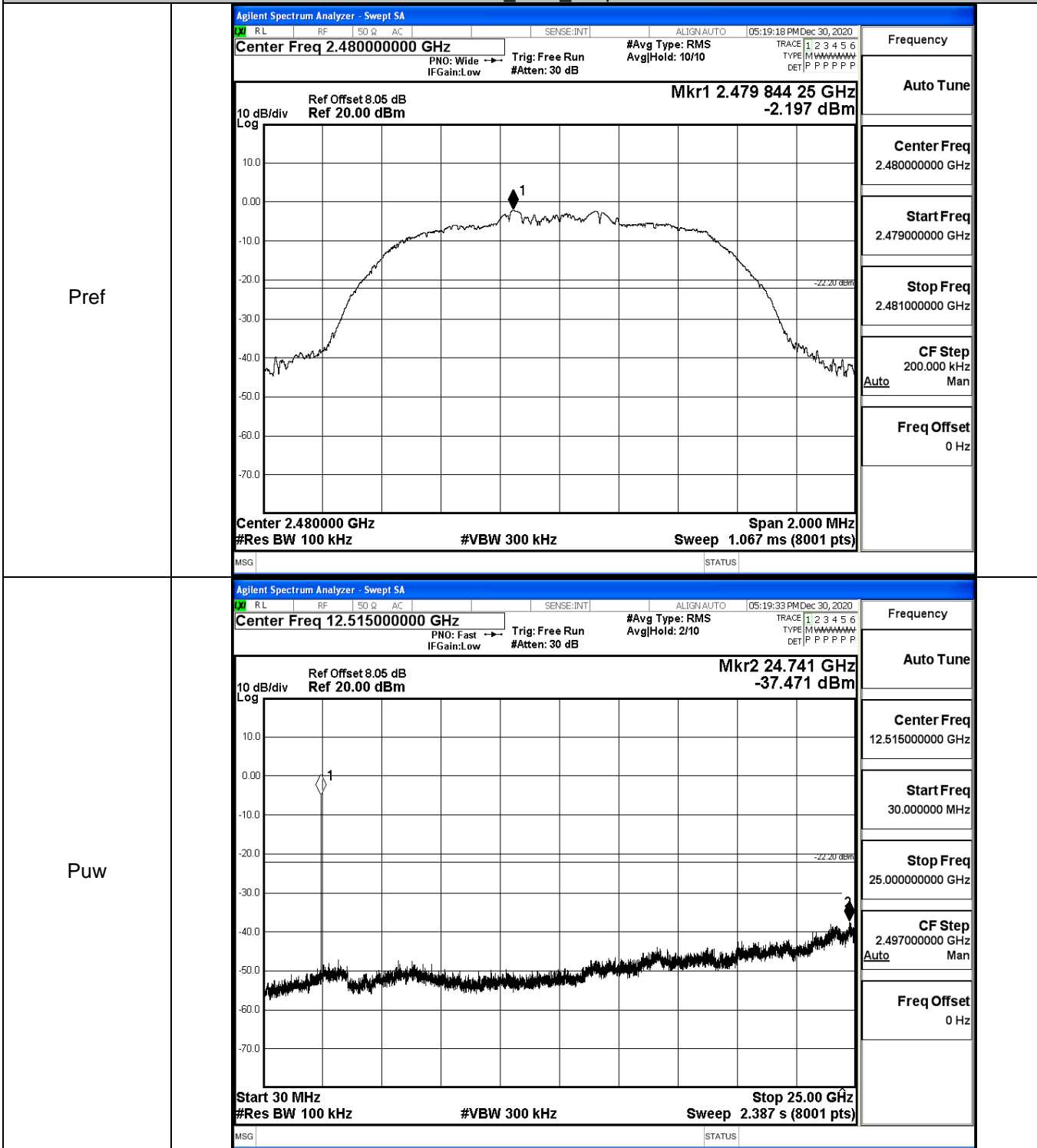
$\pi/4$ DQPSK_LCH_Graphs



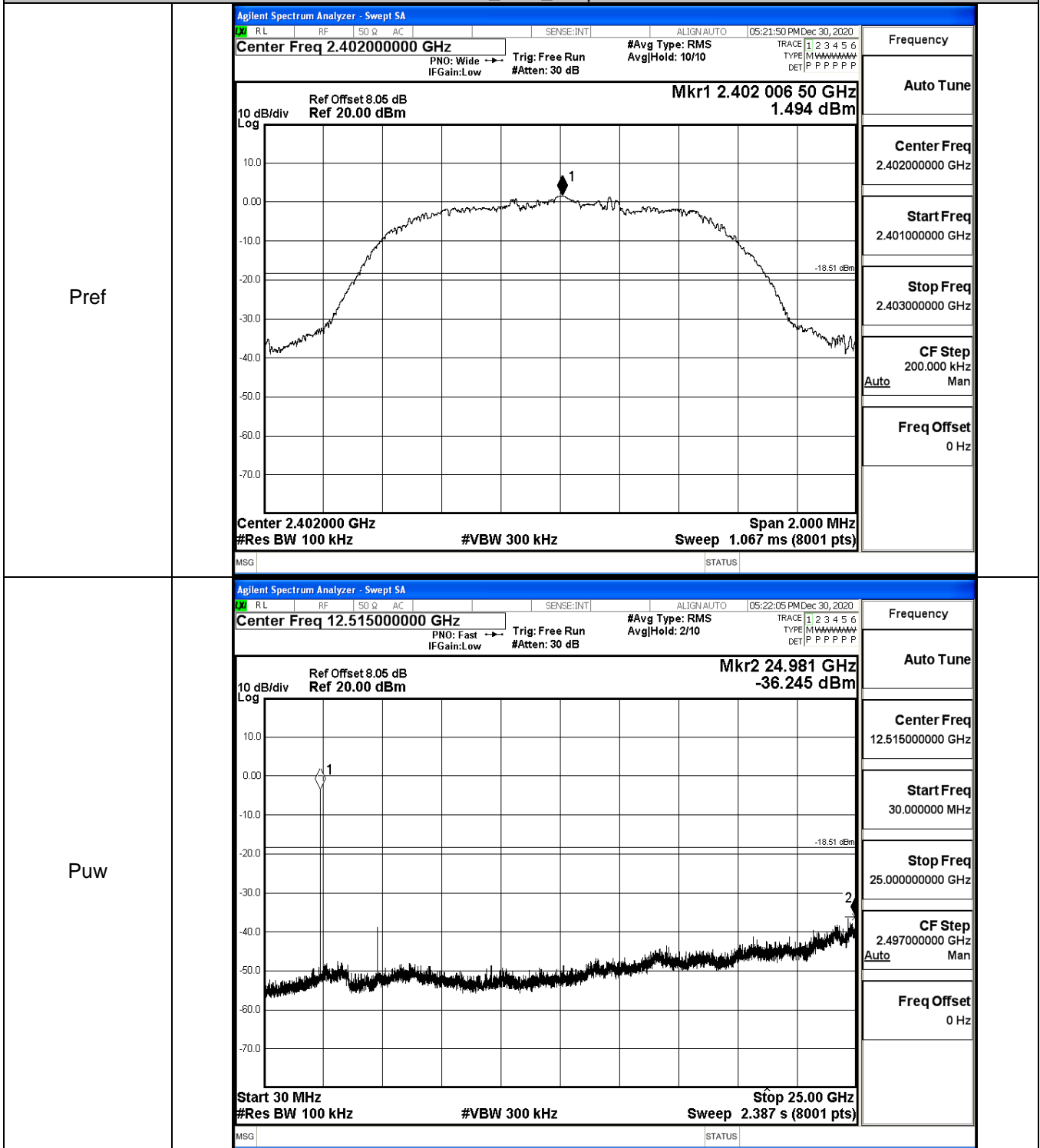
$\pi/4$ DQPSK_MCH_Graphs



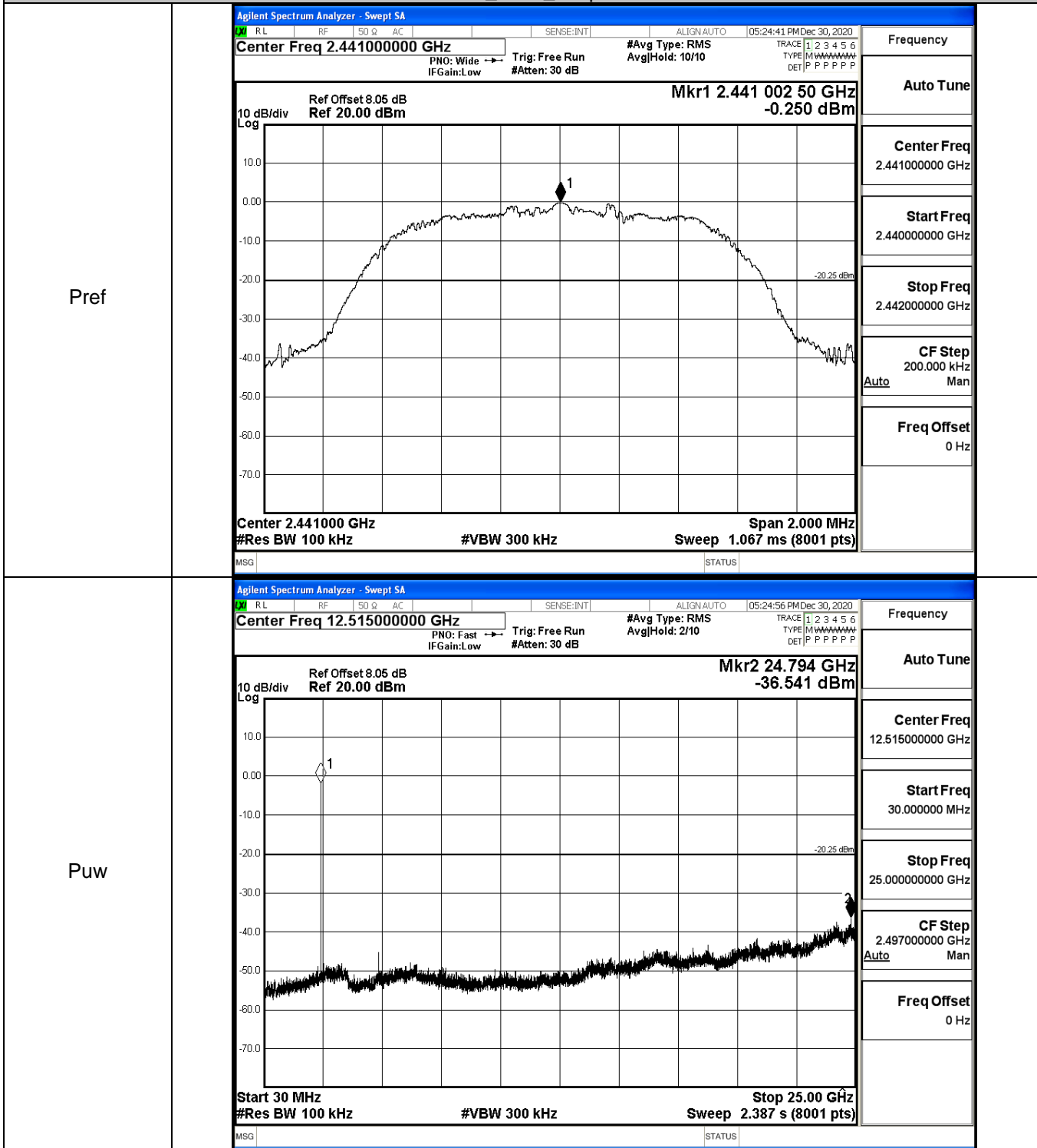
$\pi/4$ DQPSK_HCH_Graphs



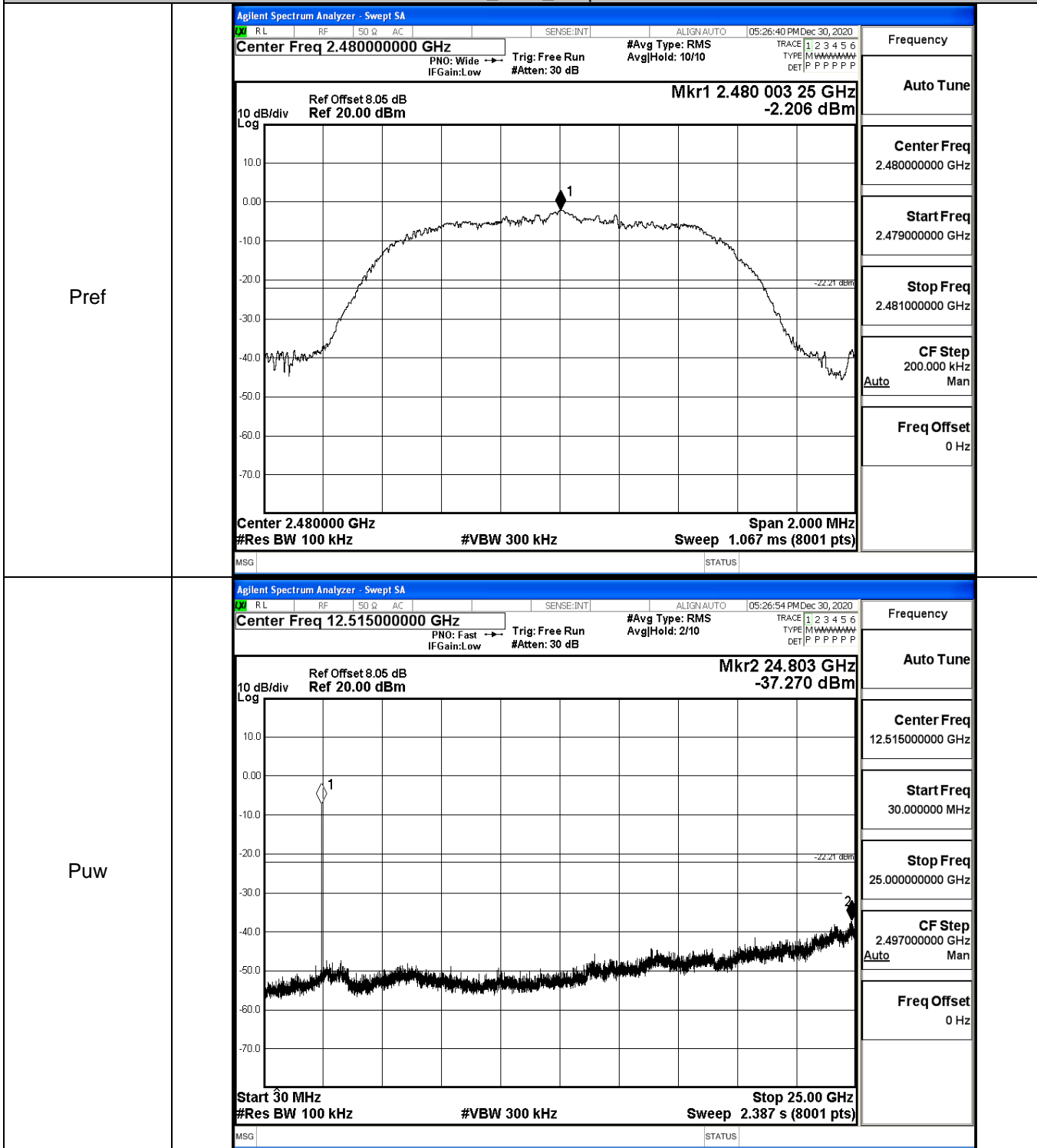
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

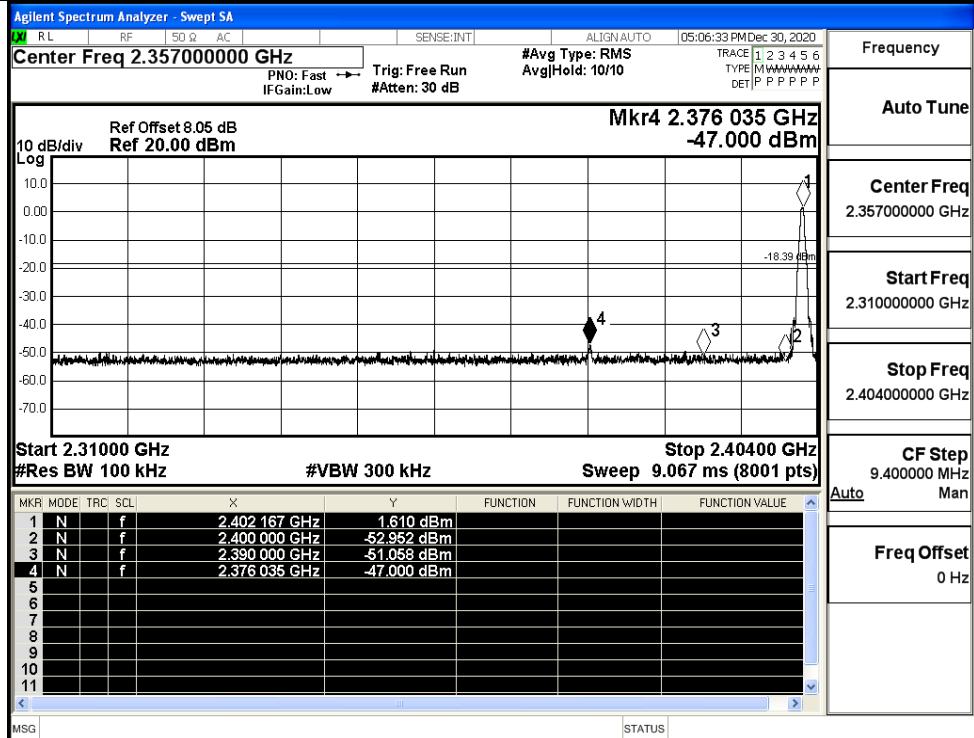


A.7 Band-edge for RF Conducted Emissions

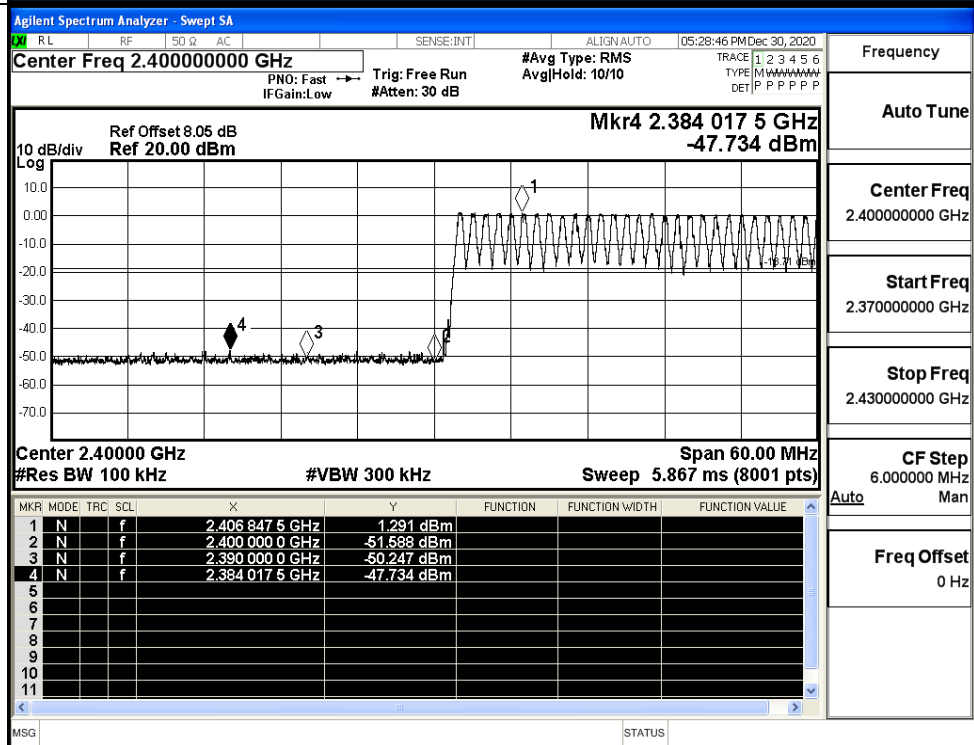
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK | LCH | 2402 | 1.610 | Off | -47.000 | -18.39 | PASS |
| | | | 1.291 | On | -47.734 | -18.71 | PASS |
| | HCH | 2480 | -2.257 | Off | -48.548 | -22.26 | PASS |
| | | | -1.022 | On | -48.677 | -21.02 | PASS |
| $\pi/4$ DQPSK | LCH | 2402 | 0.996 | Off | -48.084 | -19 | PASS |
| | | | 1.240 | On | -47.836 | -18.76 | PASS |
| | HCH | 2480 | -2.185 | Off | -48.901 | -22.19 | PASS |
| | | | -0.865 | On | -48.300 | -20.87 | PASS |
| 8DPSK | LCH | 2402 | 1.525 | Off | -48.671 | -18.48 | PASS |
| | | | 1.582 | On | -47.996 | -18.42 | PASS |
| | HCH | 2480 | -2.119 | Off | -49.409 | -22.12 | PASS |
| | | | -0.814 | On | -47.298 | -20.81 | PASS |

Test Graphs

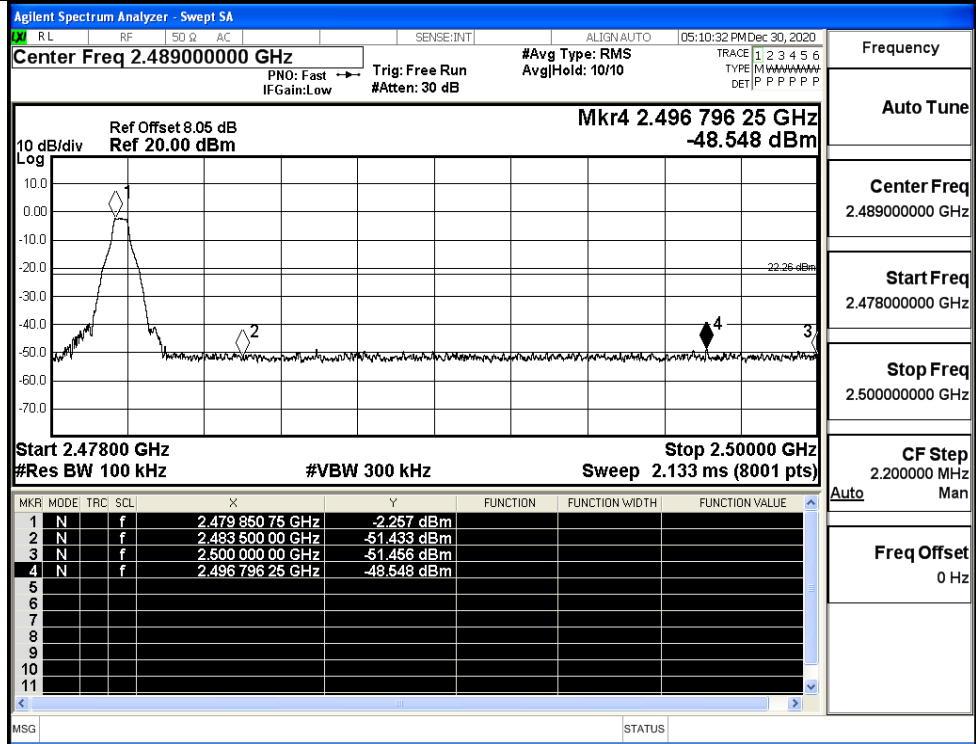
GFSK/LCH/No Hop



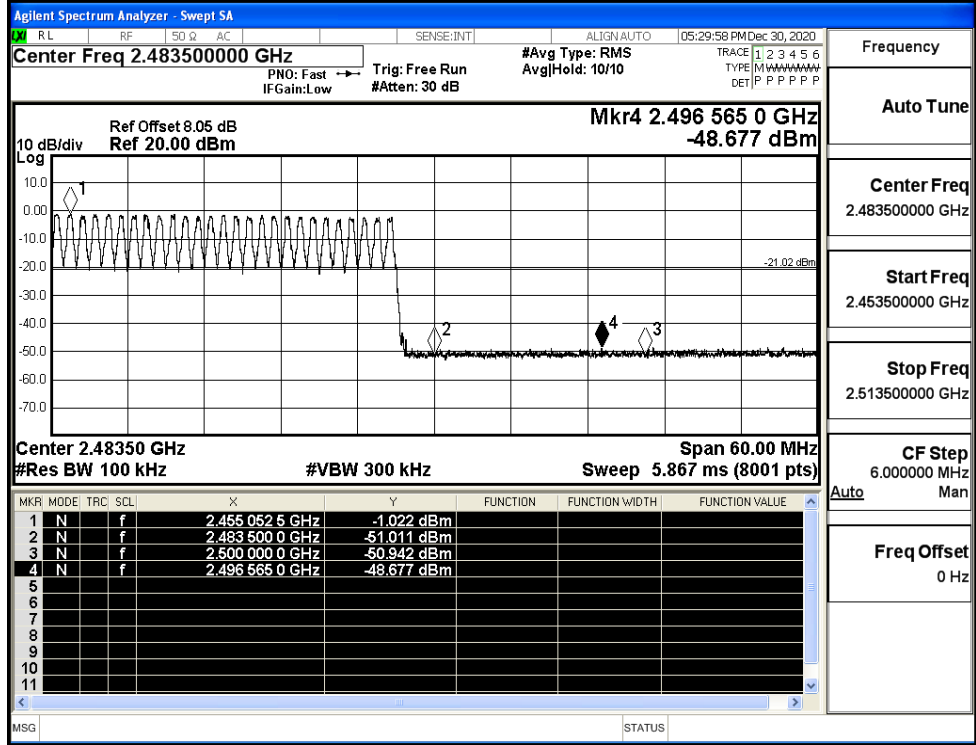
GFSK/LCH/Hop



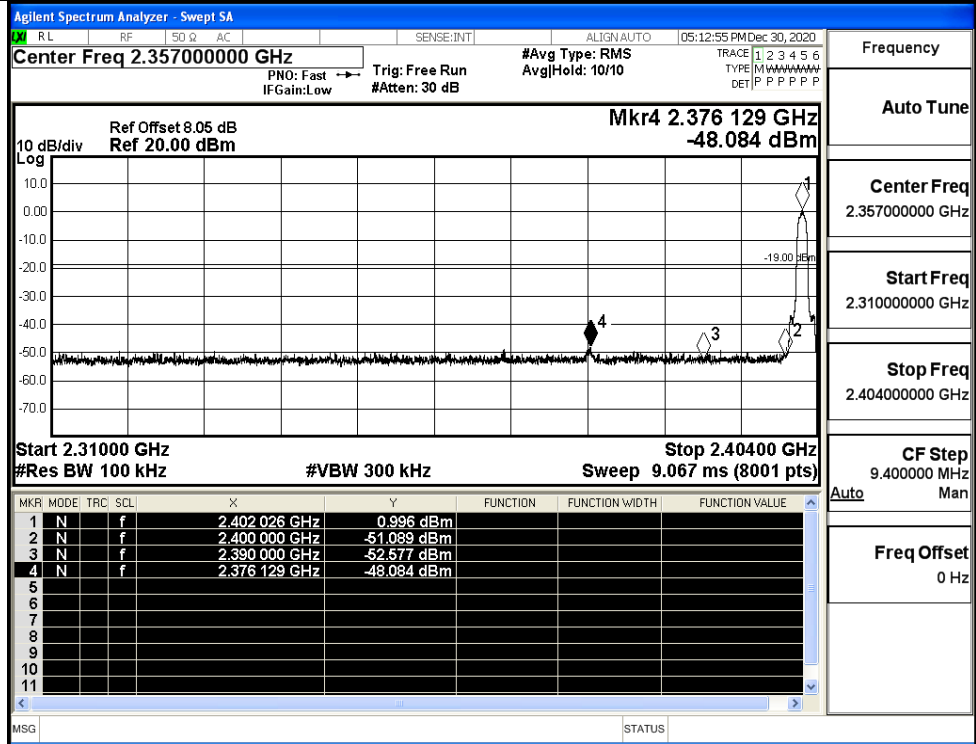
GFSK/HCH/No Hop



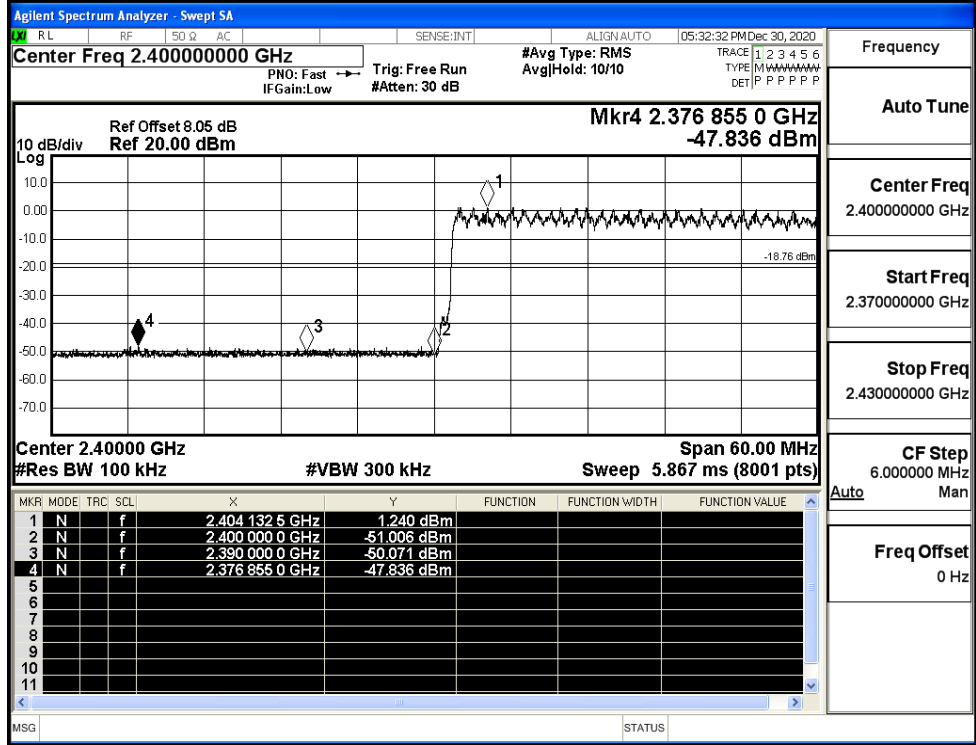
GFSK/HCH/Hop



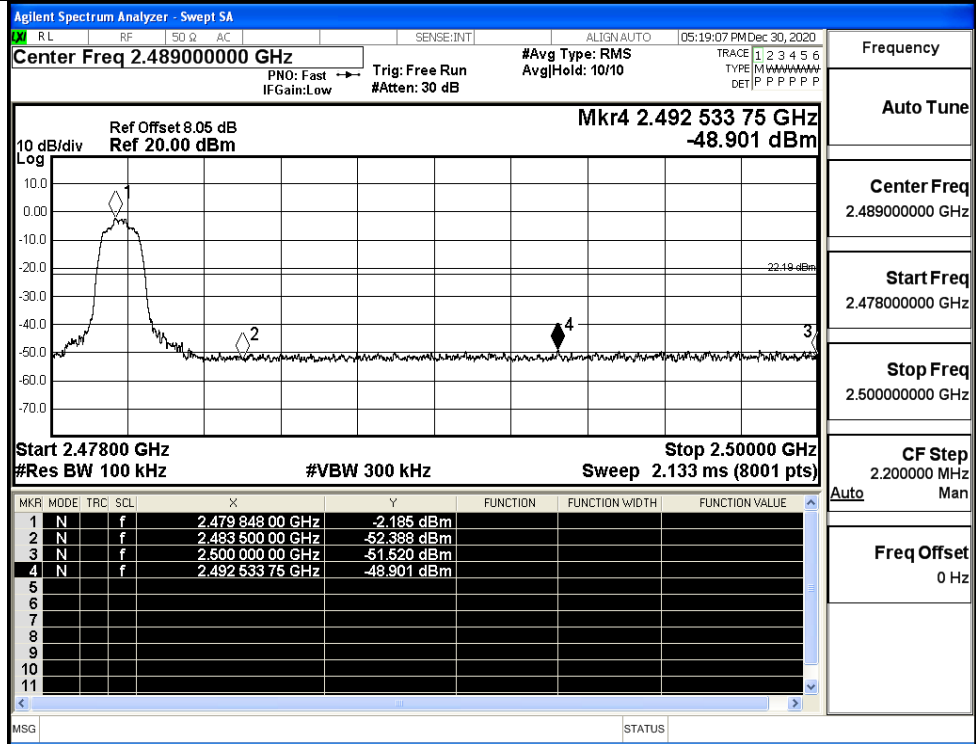
$\pi/4$ DQPSK/LCH/No
Hop



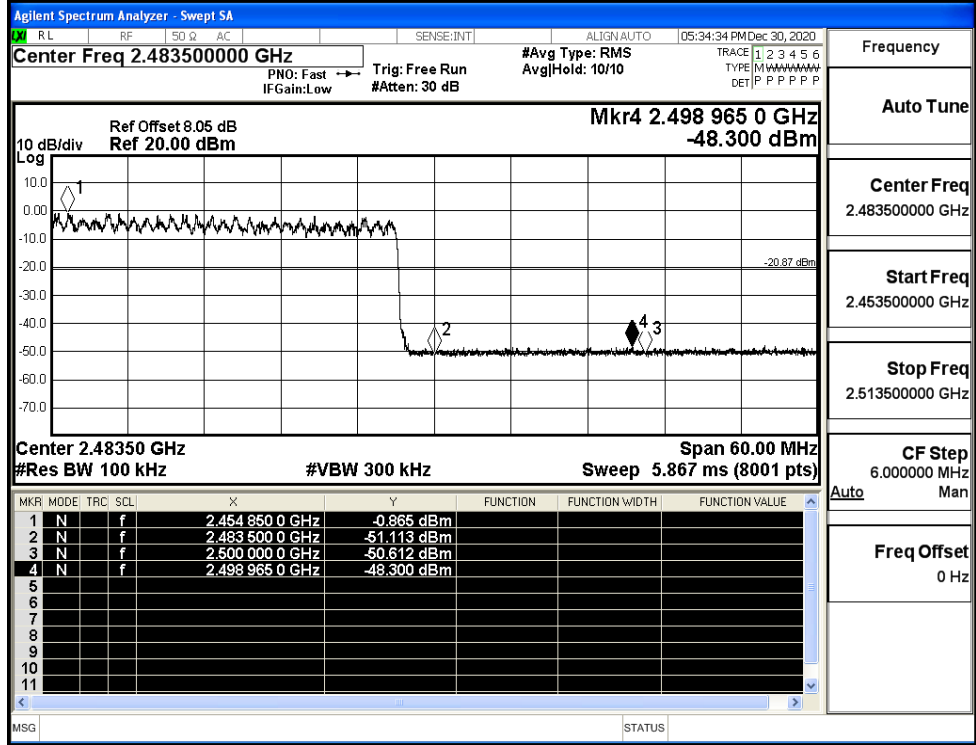
$\pi/4$ DQPSK/LCH/Hop



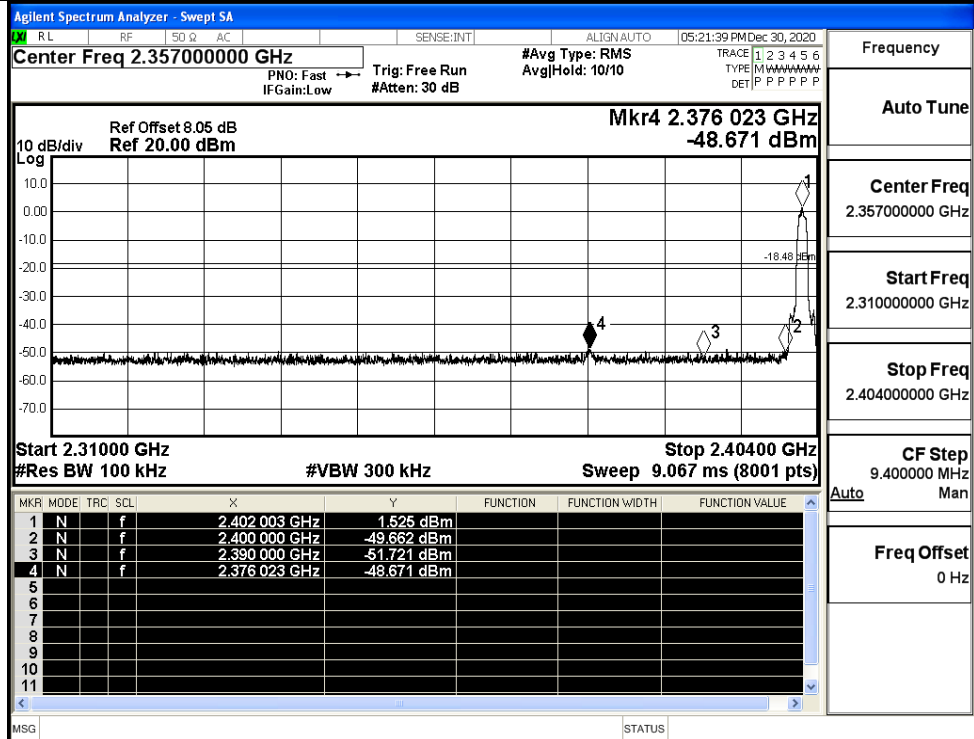
$\pi/4$ DQPSK/HCH/No Hop



$\pi/4$ DQPSK/HCH/Hop

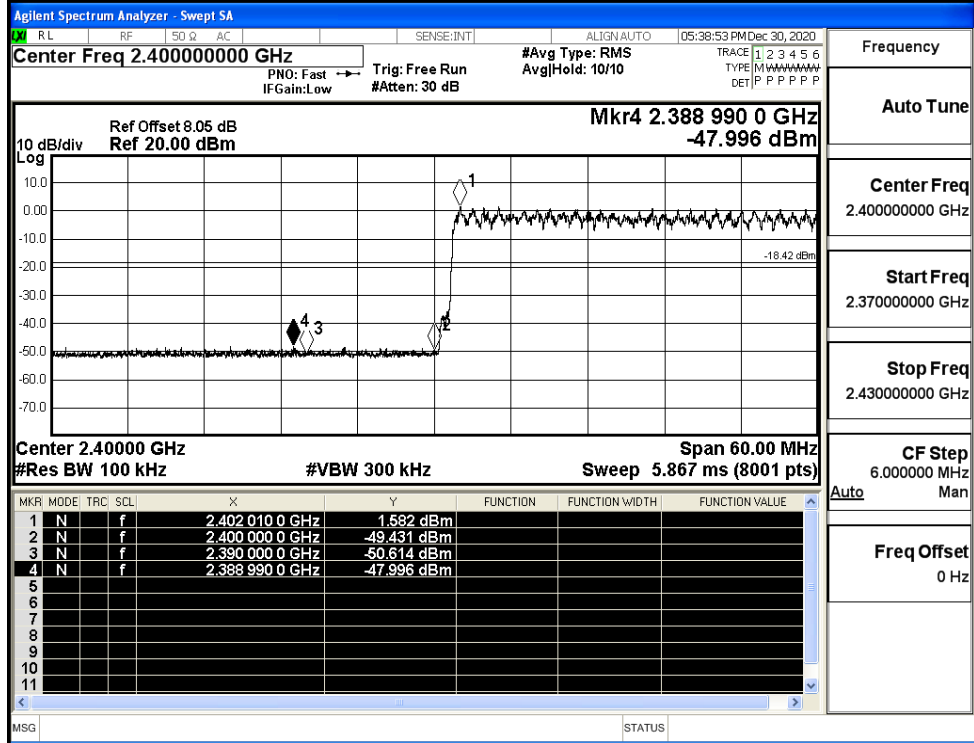


8DPSK/LCH/No Hop



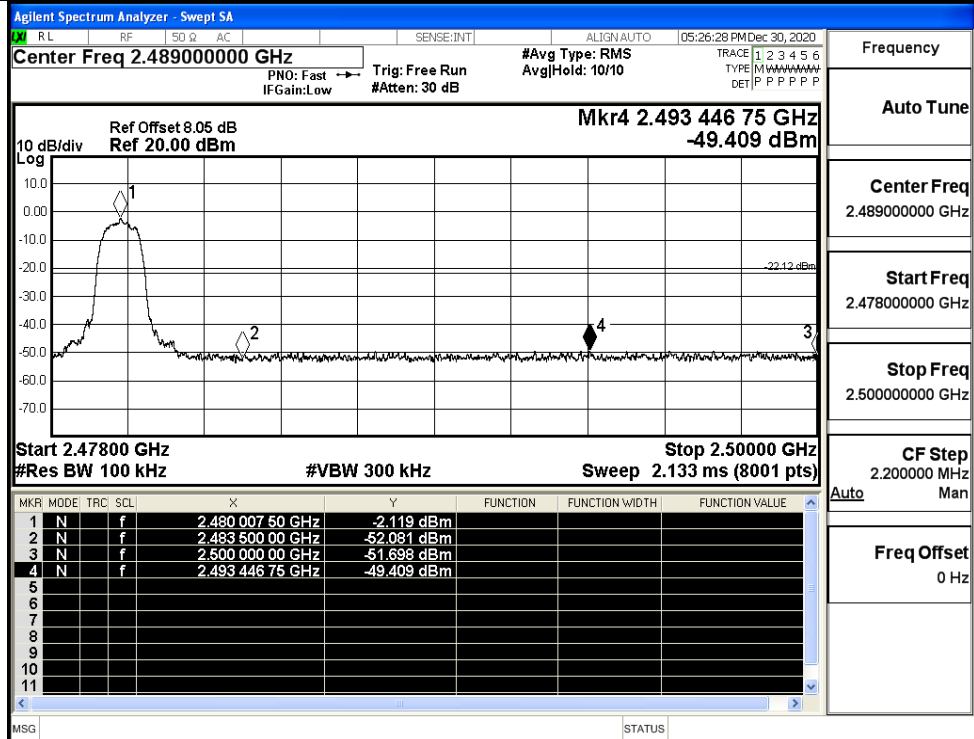
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



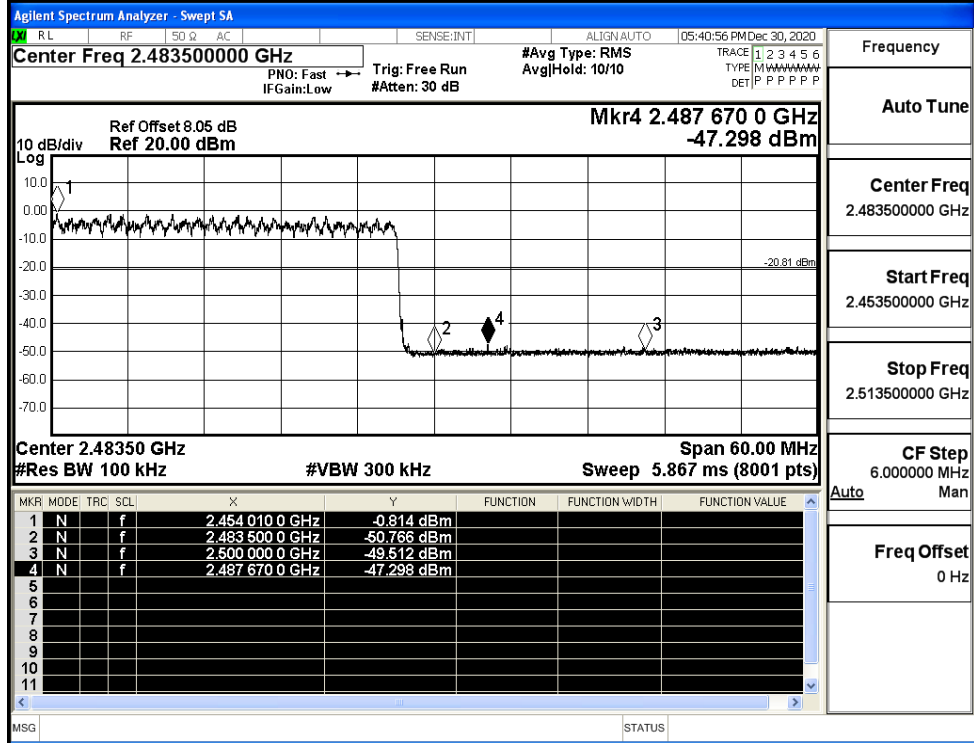
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

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
Auto Man
Freq Offset
0 Hz

8DPSK/HCH/Hop

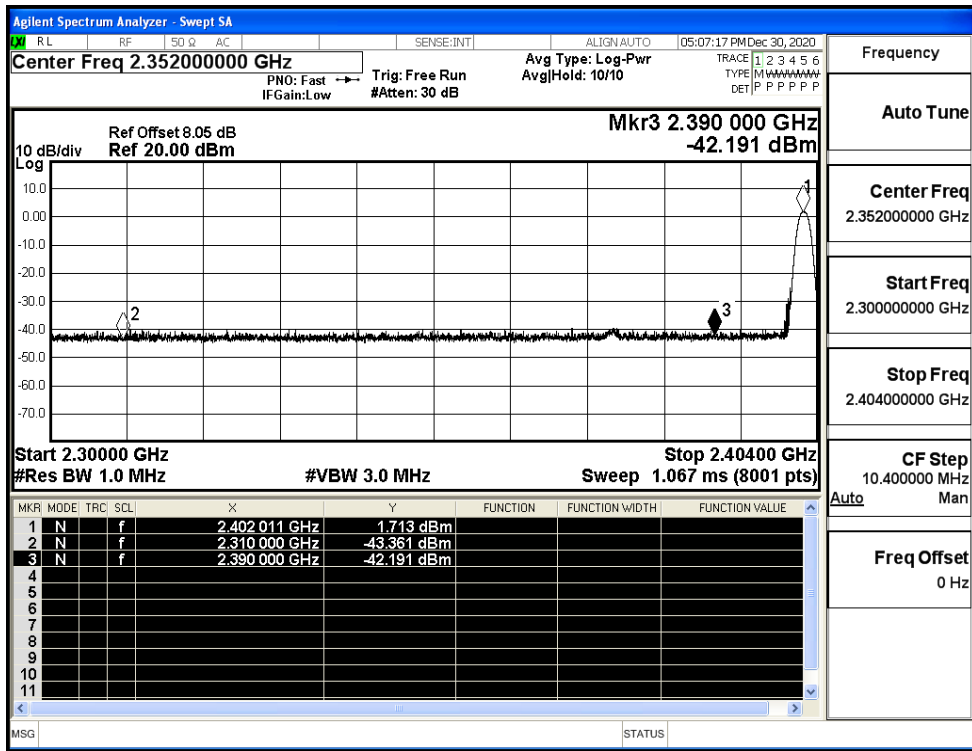


Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.453500000 GHz
Stop Freq
2.513500000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

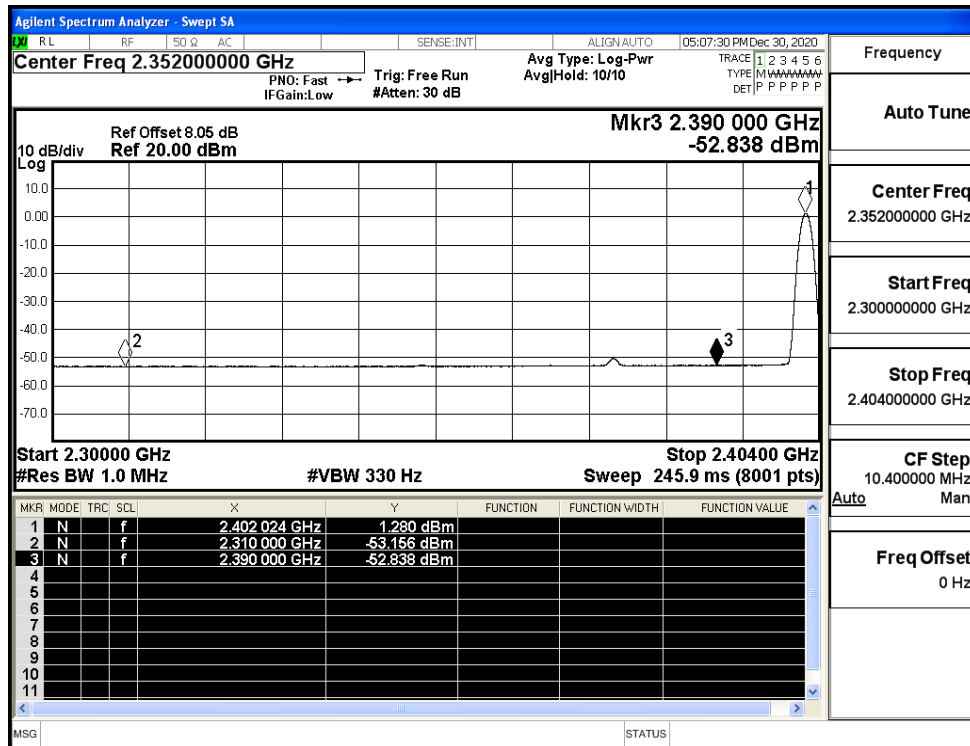
A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK | Off | 2310.0 | -43.36 | 2.0 | 0 | 53.90 | PEAK | 74 | PASS |
| | Off | 2310.0 | -53.16 | 2.0 | 0 | 44.10 | AV | 54 | PASS |
| | Off | 2390.0 | -42.19 | 2.0 | 0 | 55.07 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.84 | 2.0 | 0 | 44.42 | AV | 54 | PASS |
| | Off | 2483.5 | -42.71 | 2.0 | 0 | 54.54 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.33 | 2.0 | 0 | 44.93 | AV | 54 | PASS |
| | Off | 2500.0 | -42.52 | 2.0 | 0 | 54.74 | PEAK | 74 | PASS |
| | Off | 2500.0 | -52.14 | 2.0 | 0 | 45.12 | AV | 54 | PASS |
| $\pi/4$ DQPSK | Off | 2310.0 | -42.63 | 2.0 | 0 | 54.63 | PEAK | 74 | PASS |
| | Off | 2310.0 | -53.21 | 2.0 | 0 | 44.05 | AV | 54 | PASS |
| | Off | 2390.0 | -43.00 | 2.0 | 0 | 54.25 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.72 | 2.0 | 0 | 44.54 | AV | 54 | PASS |
| | Off | 2483.5 | -41.54 | 2.0 | 0 | 55.72 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.11 | 2.0 | 0 | 45.15 | AV | 54 | PASS |
| | Off | 2500.0 | -41.36 | 2.0 | 0 | 55.9 | PEAK | 74 | PASS |
| | Off | 2500.0 | -52.14 | 2.0 | 0 | 45.12 | AV | 54 | PASS |
| 8DPSK | Off | 2310.0 | -41.48 | 2.0 | 0 | 55.78 | PEAK | 74 | PASS |
| | Off | 2310.0 | -53.09 | 2.0 | 0 | 44.17 | AV | 54 | PASS |
| | Off | 2390.0 | -42.75 | 2.0 | 0 | 54.51 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.72 | 2.0 | 0 | 44.53 | AV | 54 | PASS |
| | Off | 2483.5 | -41.87 | 2.0 | 0 | 55.39 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.21 | 2.0 | 0 | 45.05 | AV | 54 | PASS |
| | Off | 2500.0 | -41.65 | 2.0 | 0 | 55.60 | PEAK | 74 | PASS |
| | Off | 2500.0 | -52.07 | 2.0 | 0 | 45.19 | AV | 54 | PASS |

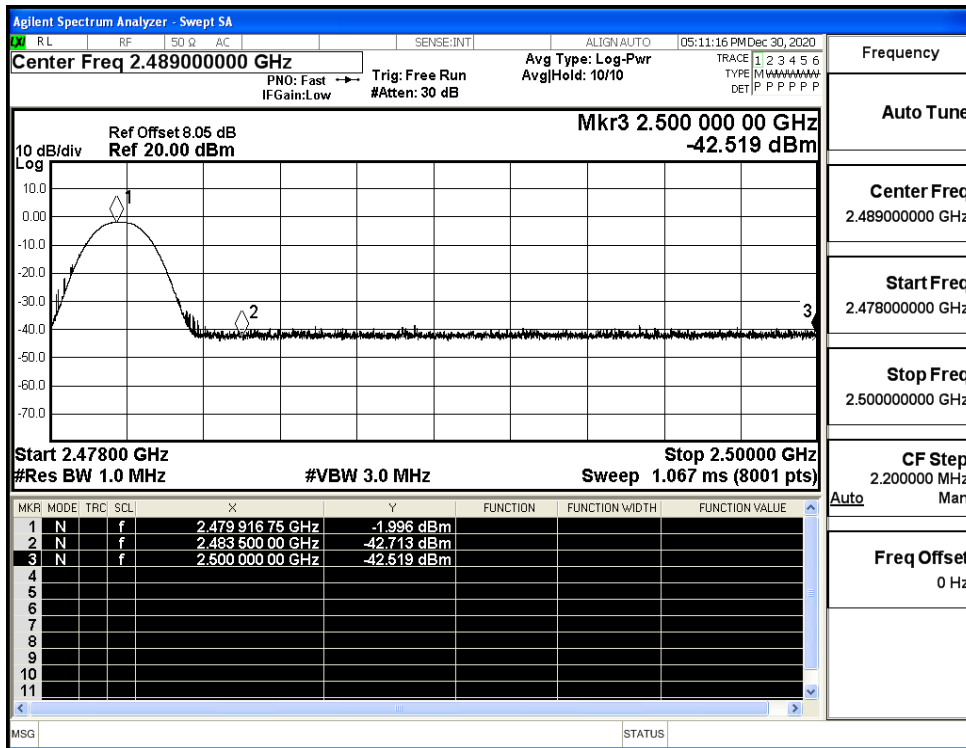
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



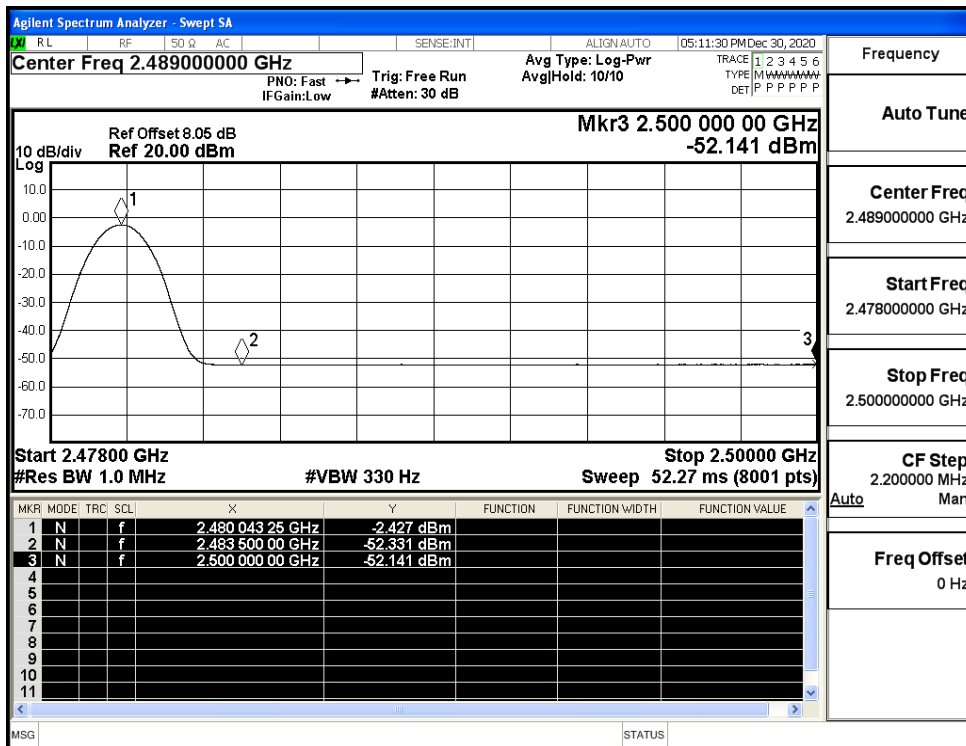
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



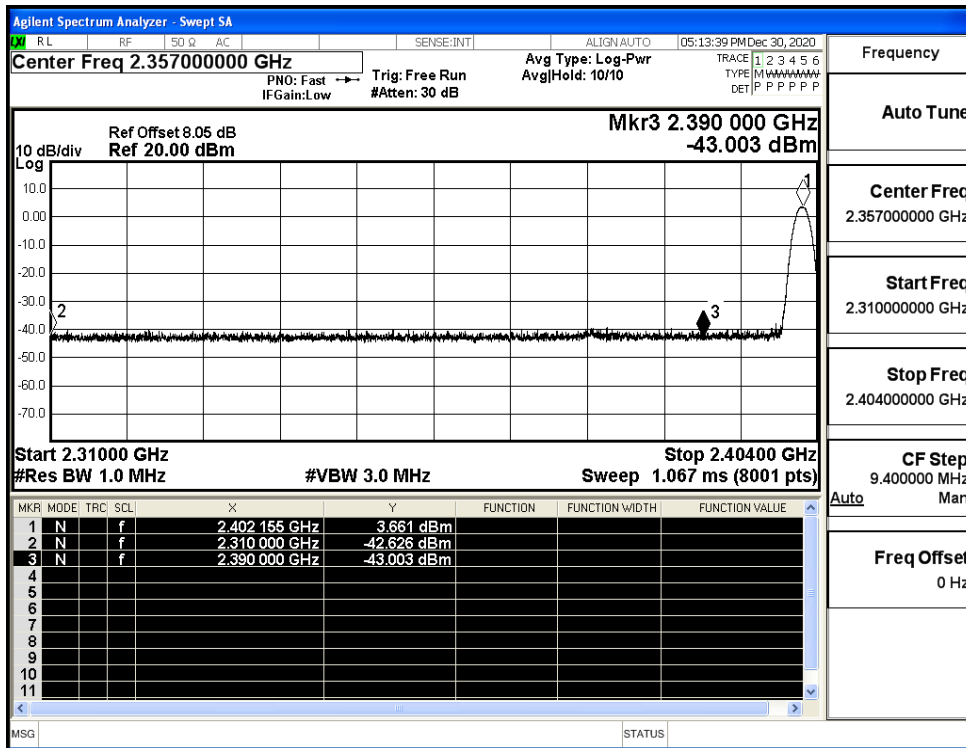
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



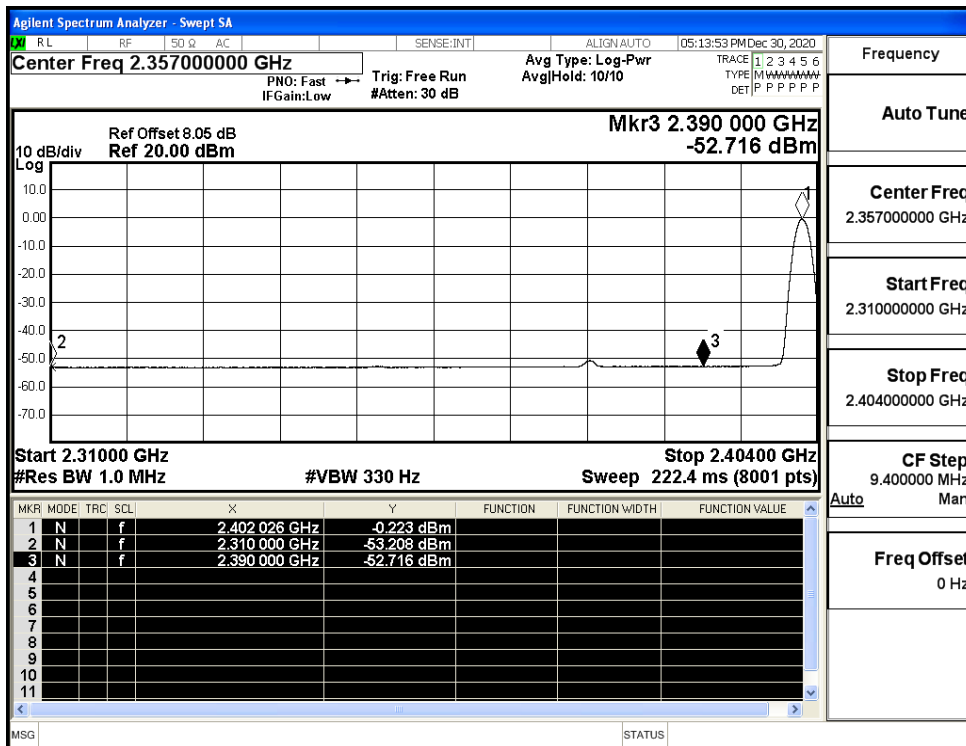
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



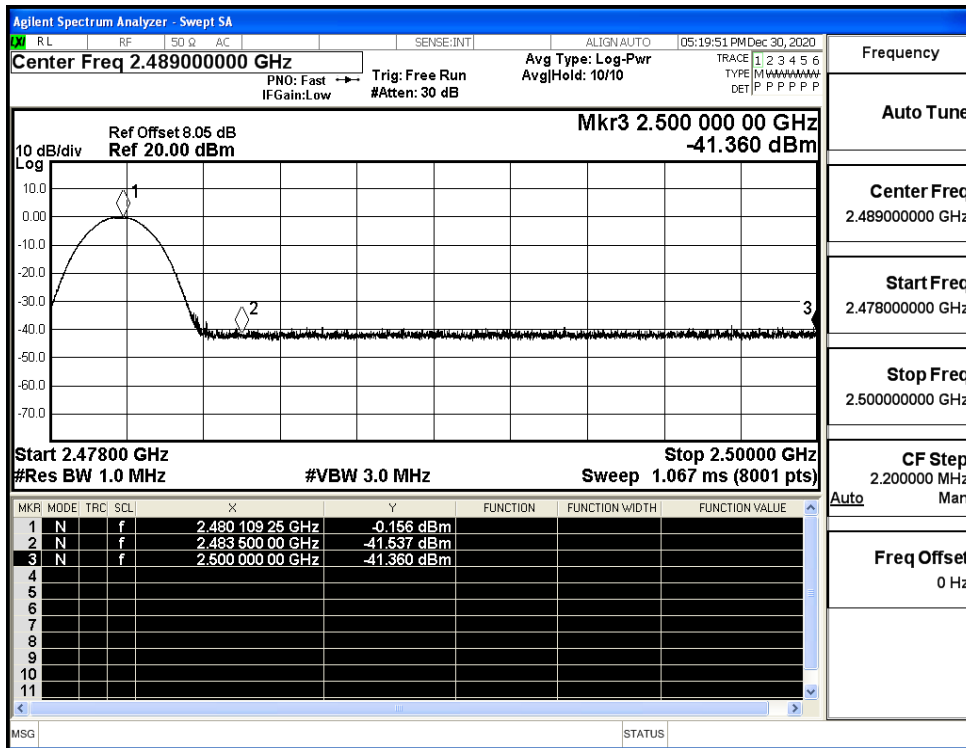
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



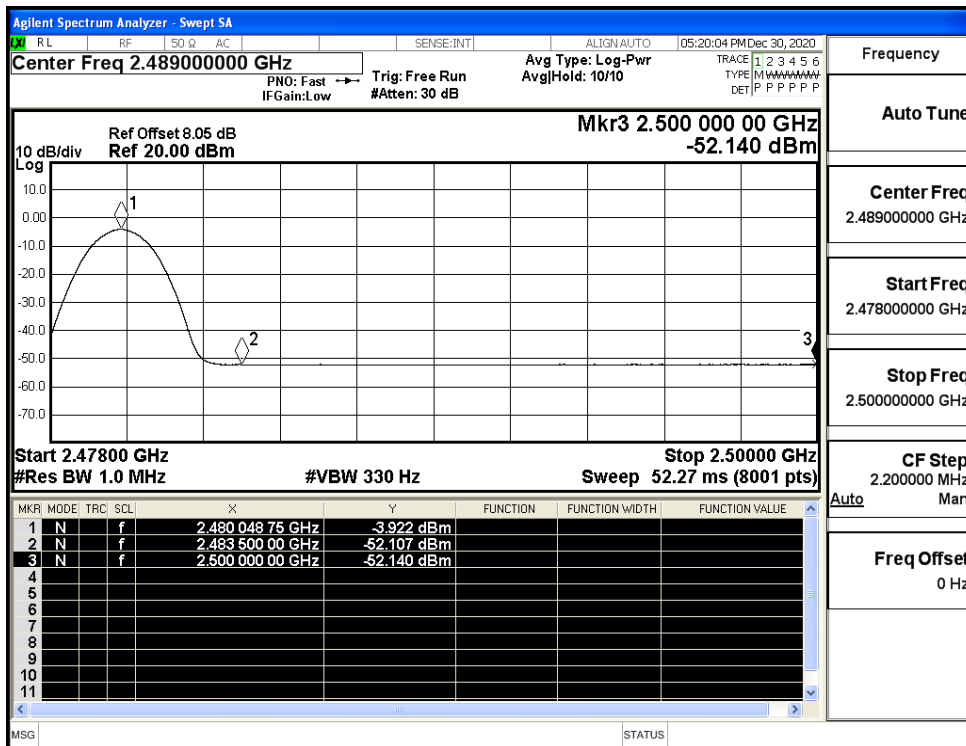
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



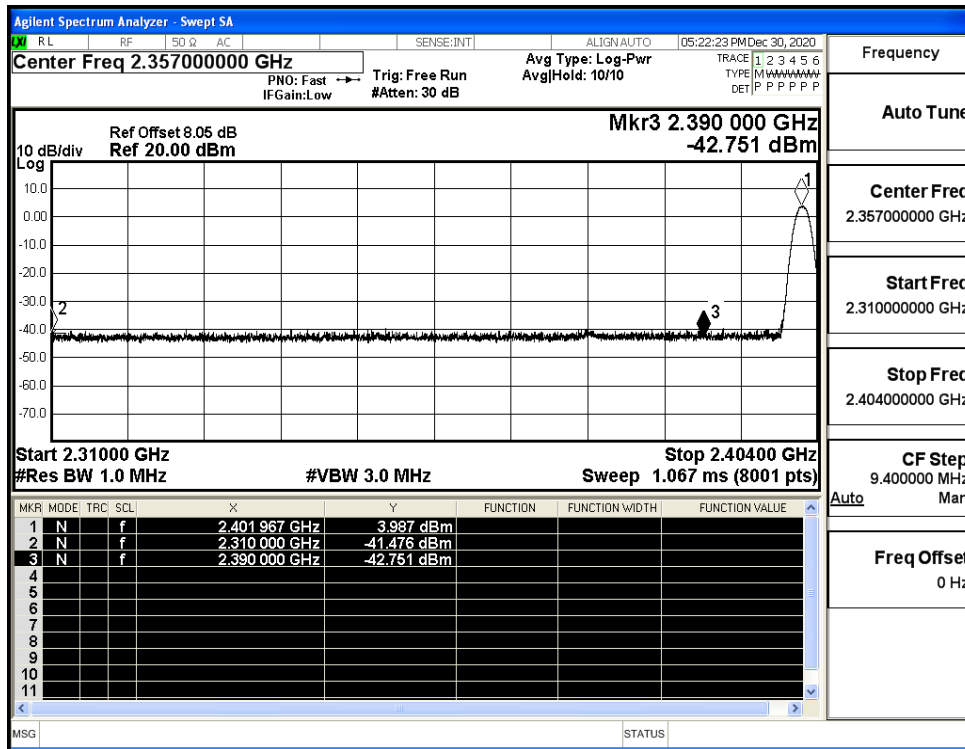
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



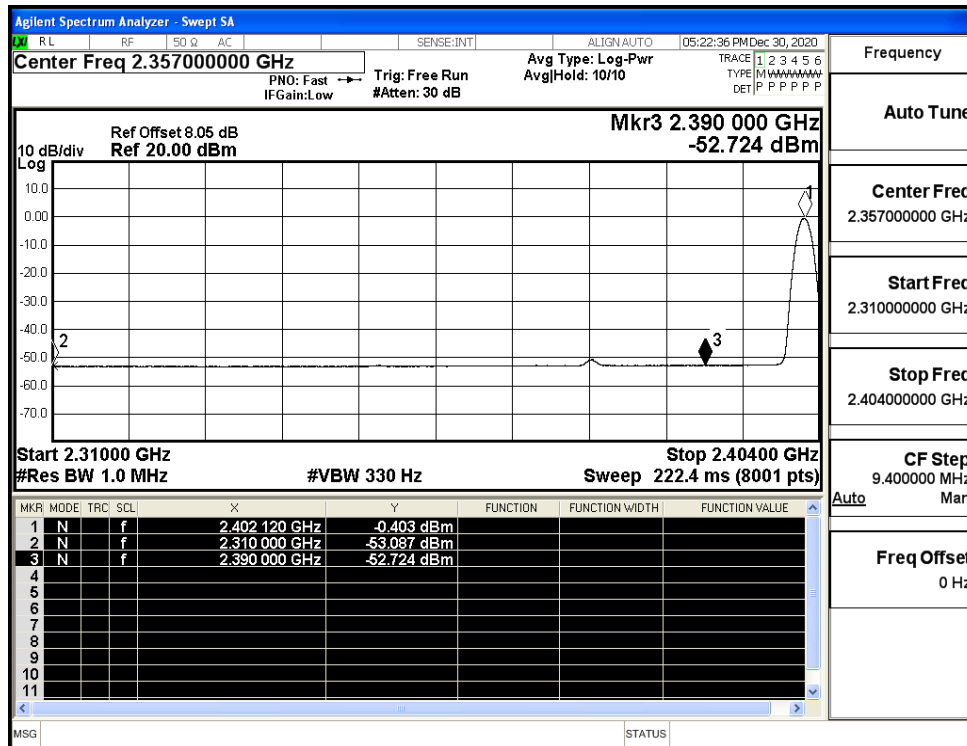
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



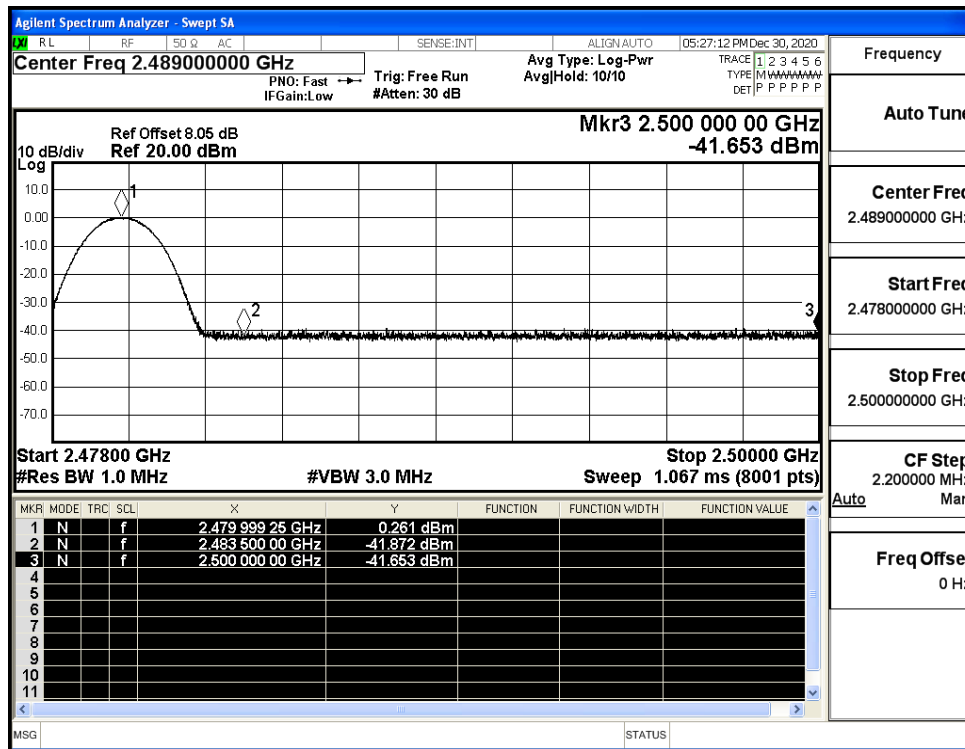
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

