

Appendix A

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

Product Name: Sport Earphone

Trade Mark: Andobil

Test Model: S1

Environmental Conditions

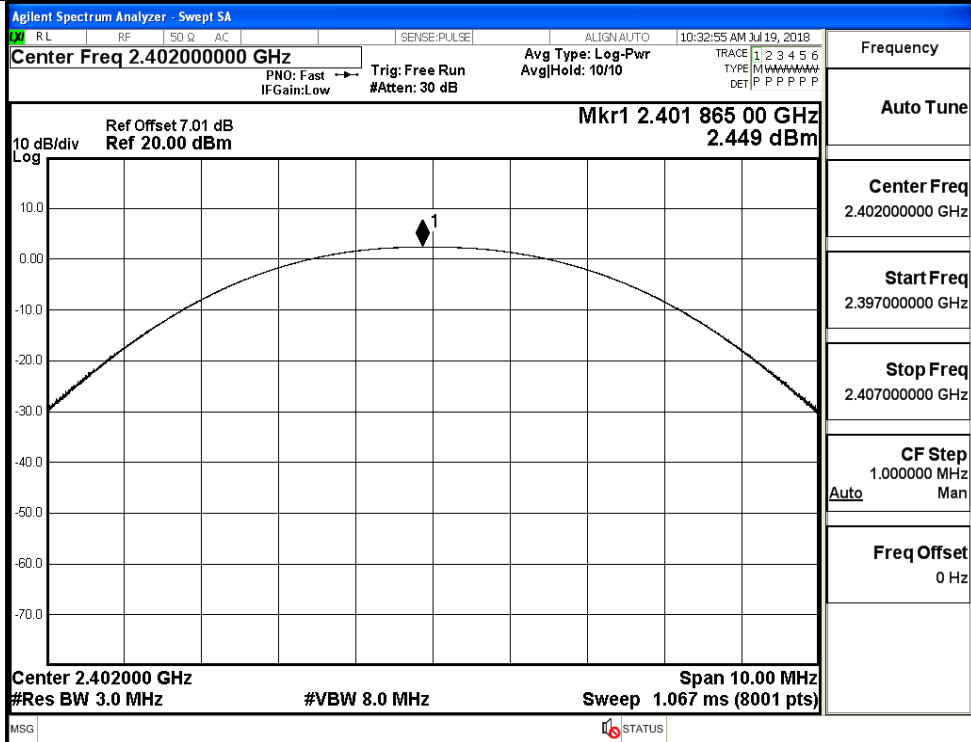
| | |
|--------------------|-------------|
| Temperature: | 23.2° C |
| Relative Humidity: | 53.4% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Tom.Liu |
| Supervised by: | Jayden.Zhuo |

A.1 Maxmum Conducted Peak Output Power

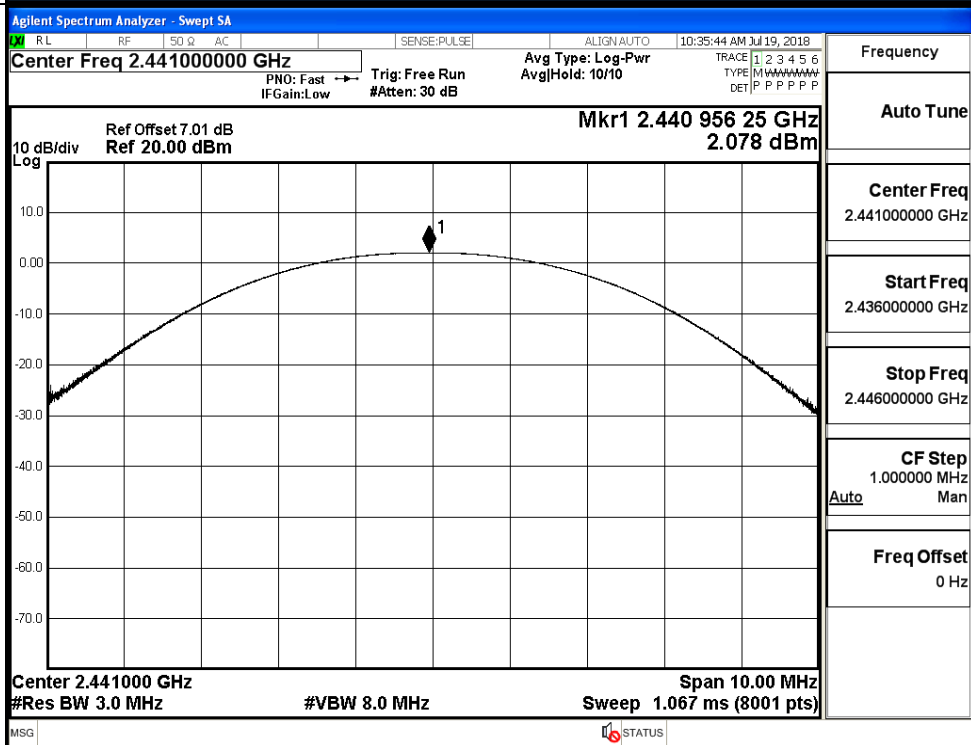
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK | LCH | 2.449 | 21 | PASS |
| | MCH | 2.078 | 21 | PASS |
| | HCH | 1.872 | 21 | PASS |
| $\pi/4$ DQPSK | LCH | 1.554 | 21 | PASS |
| | MCH | 1.198 | 21 | PASS |
| | HCH | 1.003 | 21 | PASS |
| 8DPSK | LCH | 1.659 | 21 | PASS |
| | MCH | 1.260 | 21 | PASS |
| | HCH | 1.060 | 21 | PASS |

Test Graphs

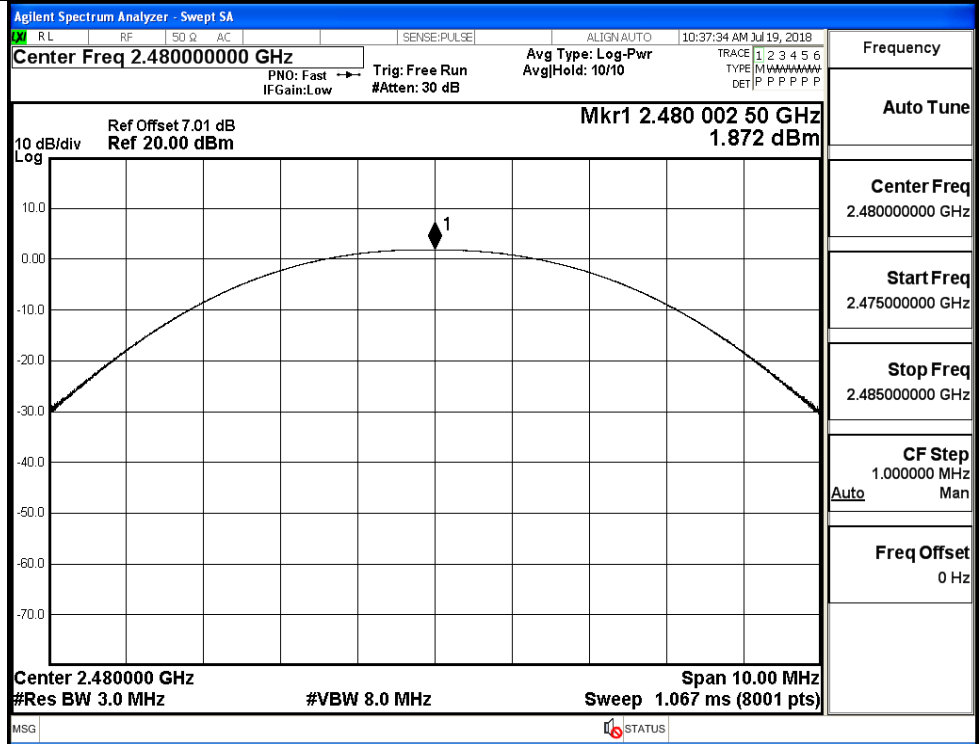
GFSK/LCH



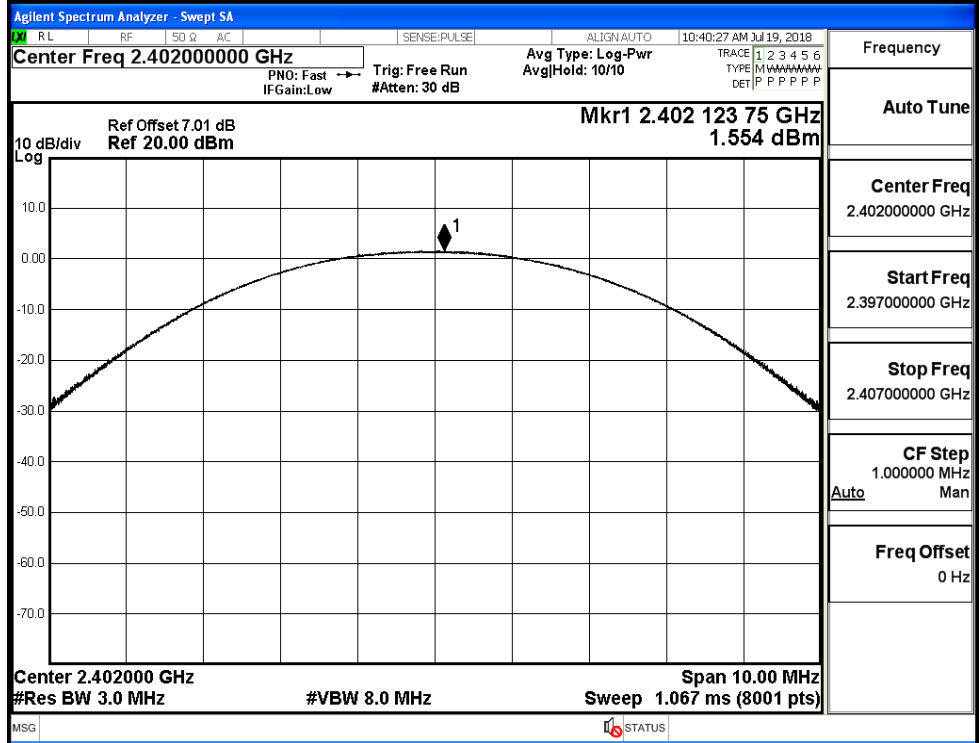
GFSK/MCH



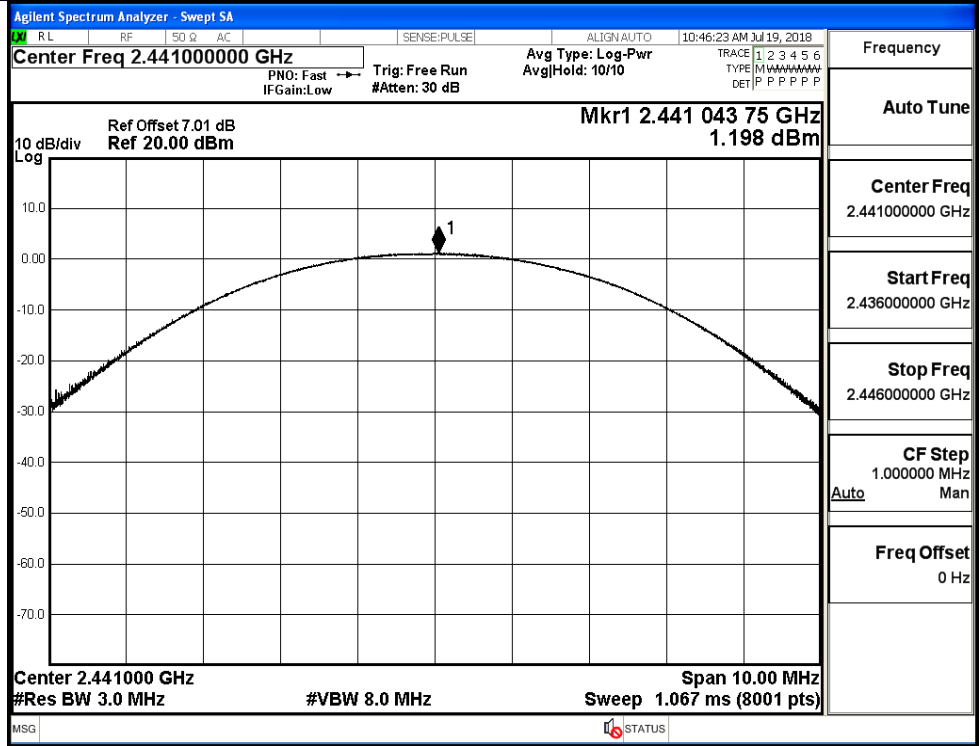
GFSK/HCH



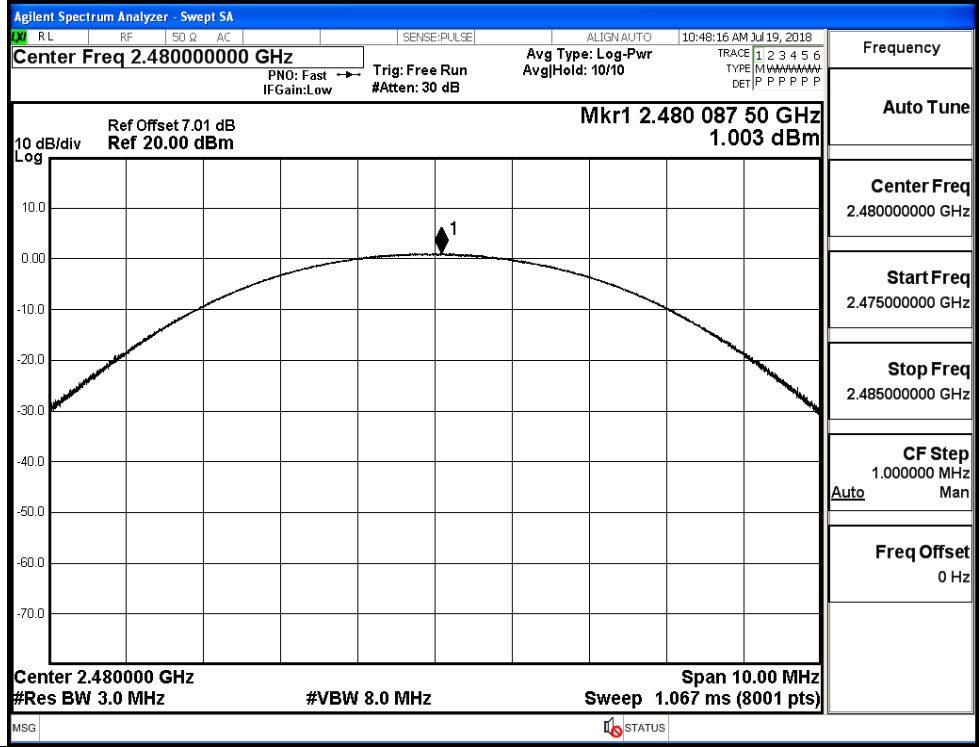
$\pi/4$ DQPSK/LCH



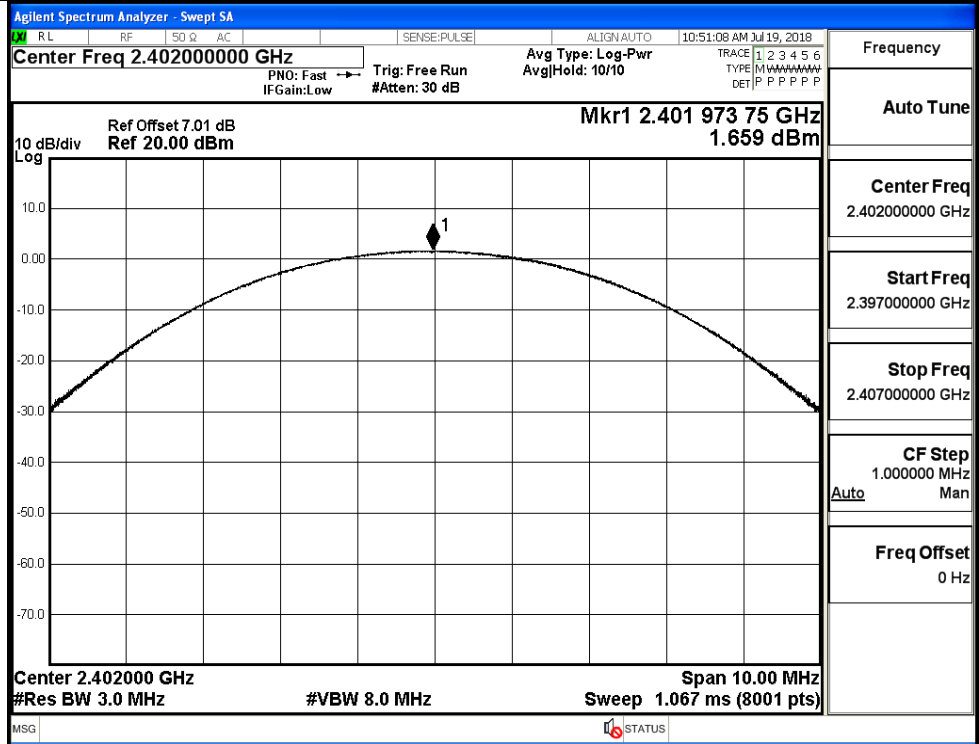
π /4DQPSK/MCH



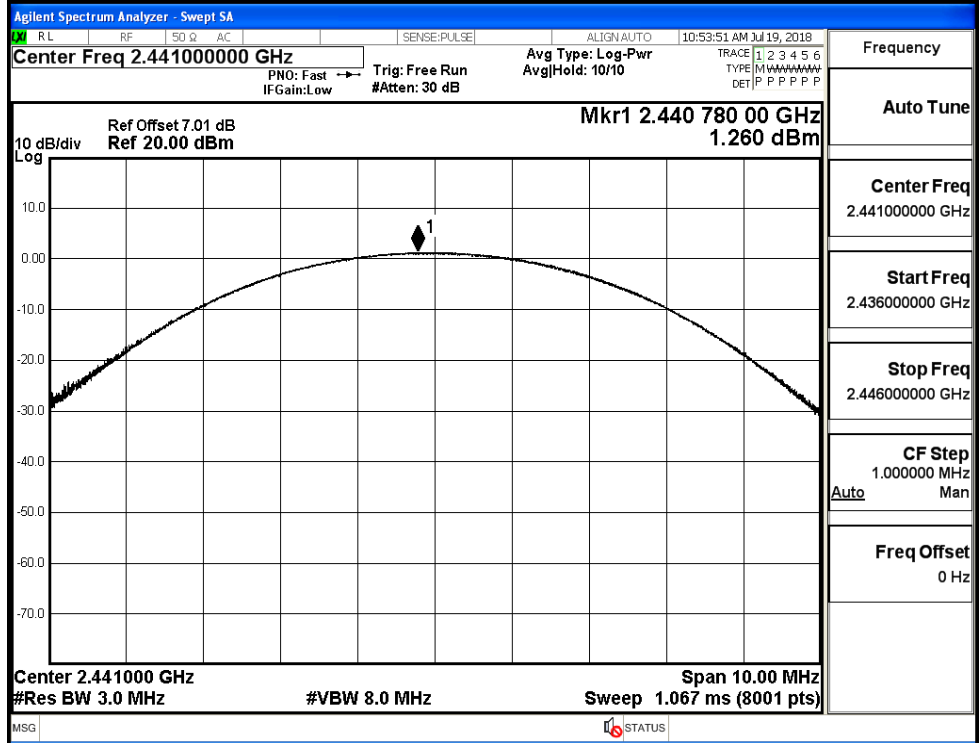
π /4DQPSK/HCH



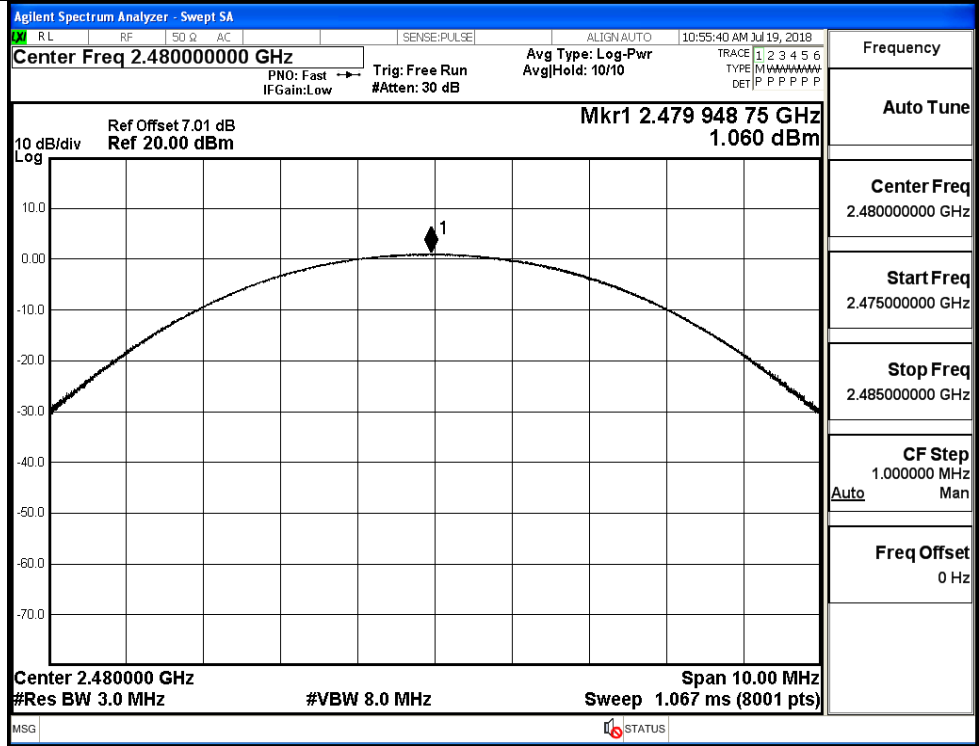
8DPSK/LCH



8DPSK/MCH

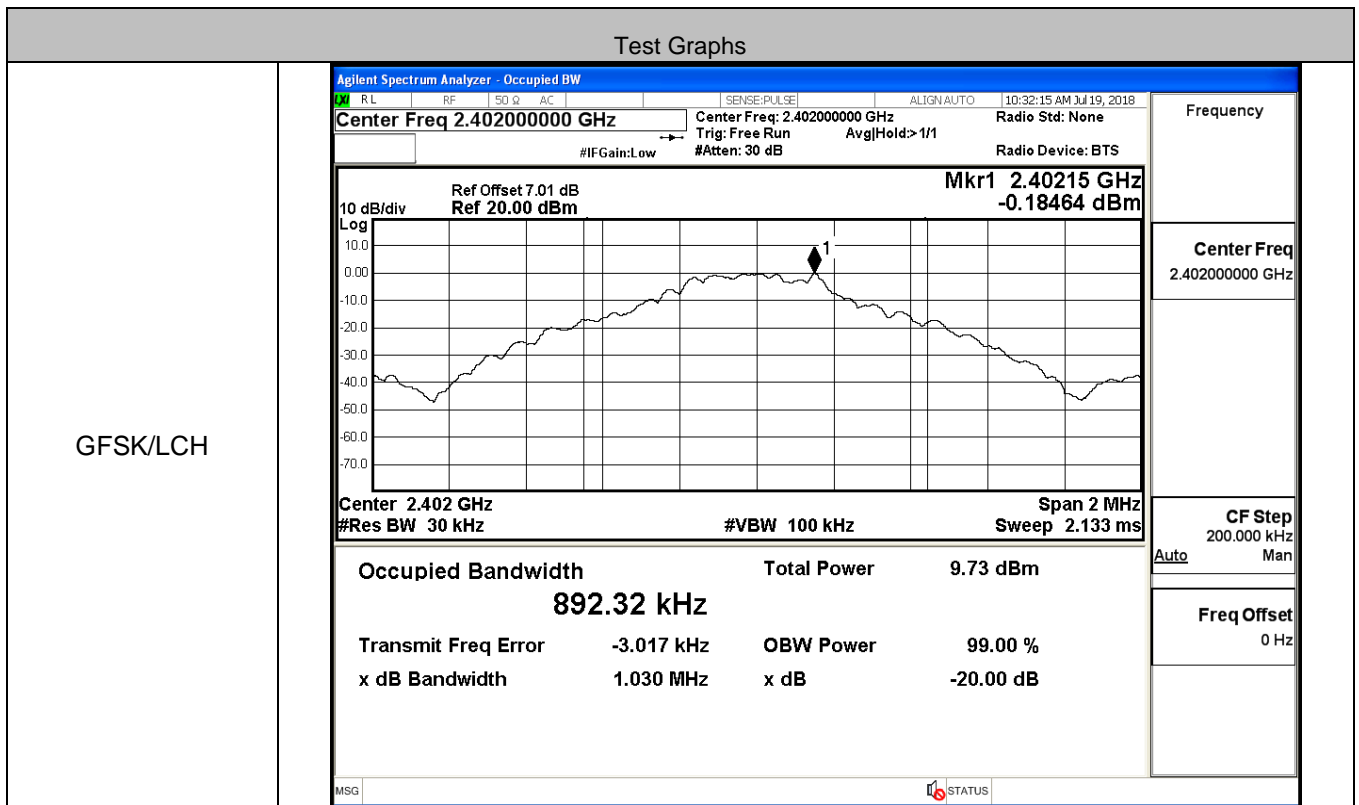


8DPSK/HCH

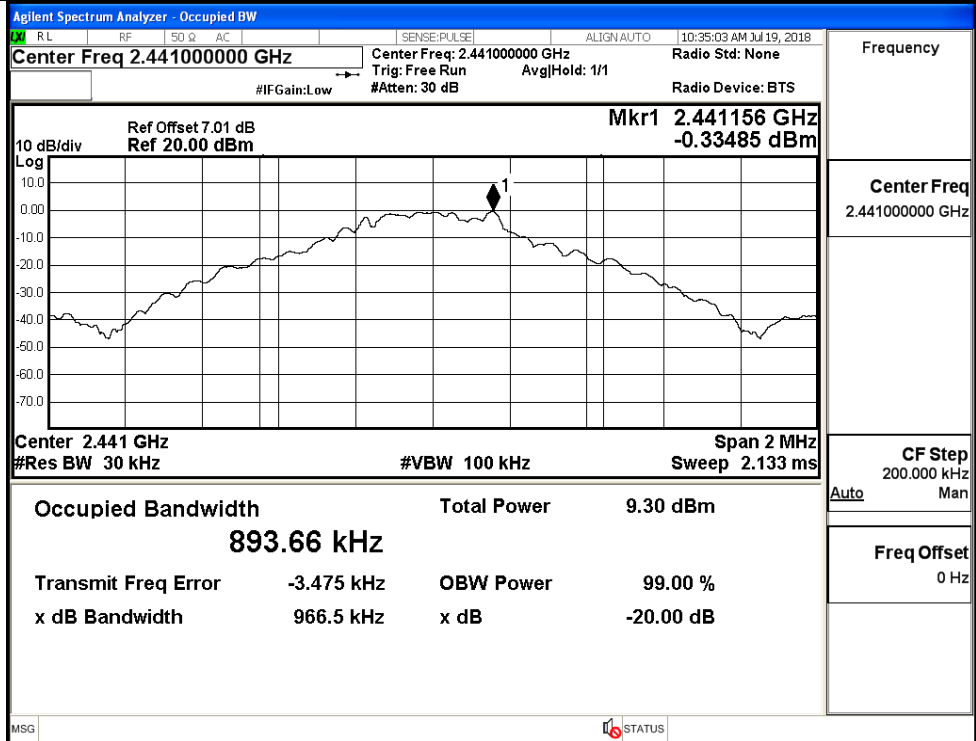


A.2 20dB Bandwidth

| Mode | Channel. | 99% Bandwidth [MHz] | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|----------|----------|---------------------|----------------------|---------------|---------|
| GFSK | LCH | 0.89232 | 1.030 | Not Specified | PASS |
| | MCH | 0.89366 | 0.9665 | Not Specified | PASS |
| | HCH | 0.89057 | 1.020 | Not Specified | PASS |
| π/4DQPSK | LCH | 1.1696 | 1.289 | Not Specified | PASS |
| | MCH | 1.1682 | 1.288 | Not Specified | PASS |
| | HCH | 1.1702 | 1.289 | Not Specified | PASS |
| 8DPSK | LCH | 1.1786 | 1.289 | Not Specified | PASS |
| | MCH | 1.1783 | 1.292 | Not Specified | PASS |
| | HCH | 1.1809 | 1.294 | Not Specified | PASS |



GFSK/MCH



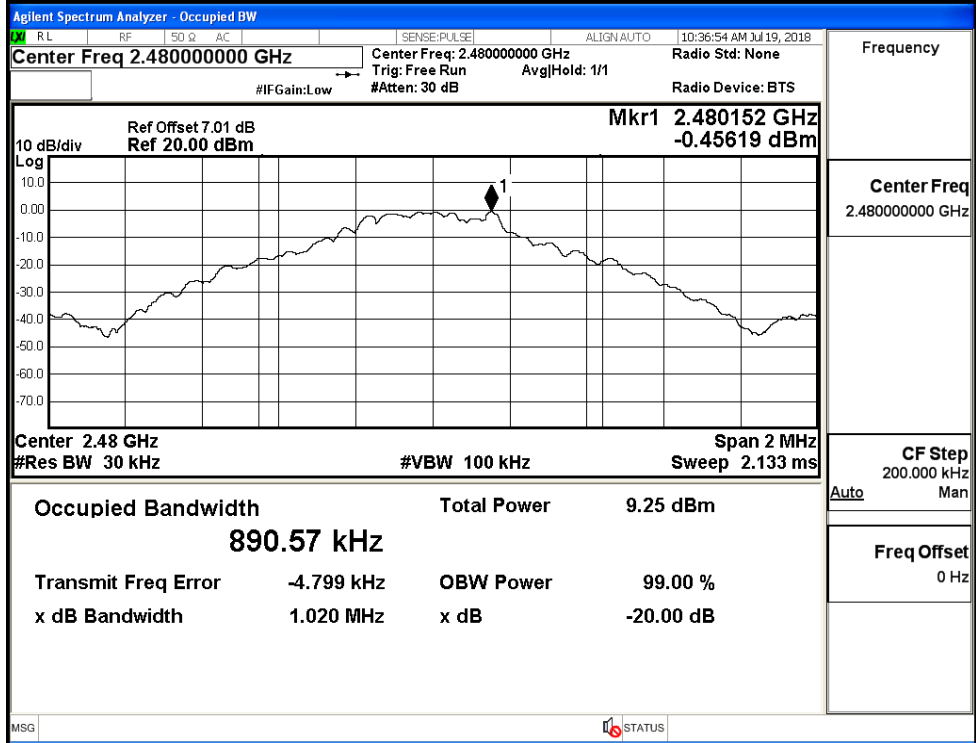
Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH



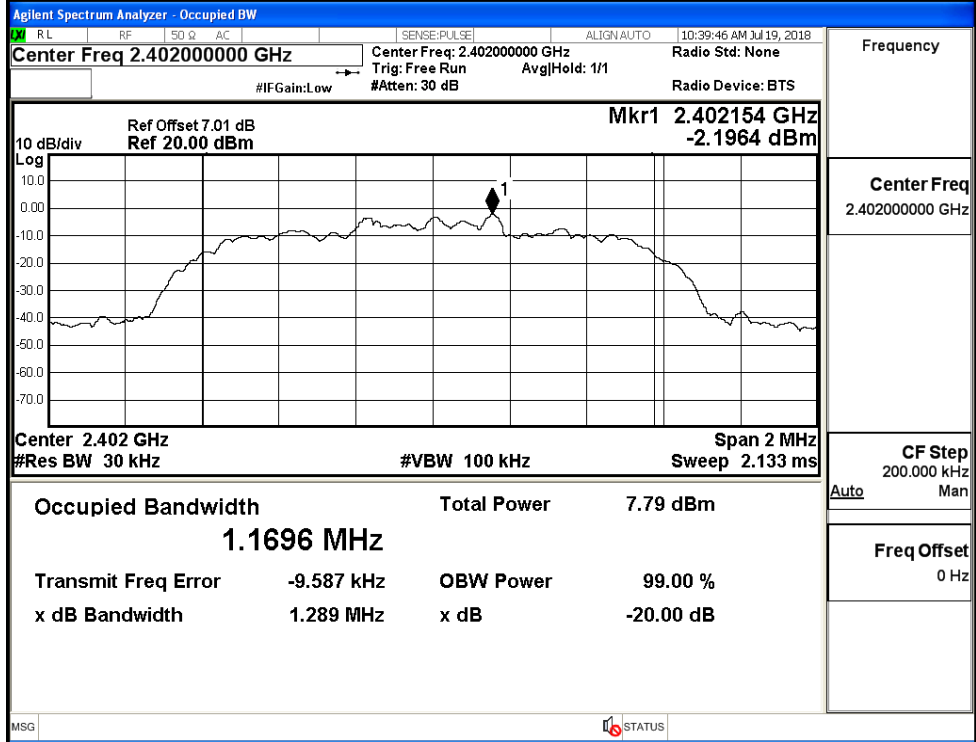
Frequency

Center Freq
2.480000000 GHz

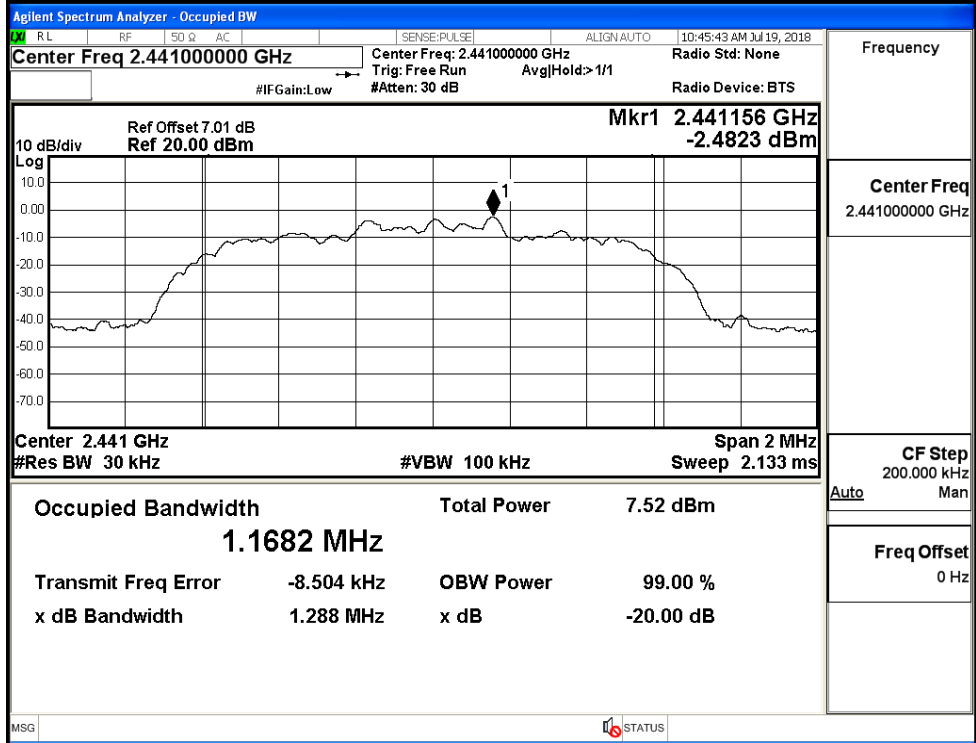
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

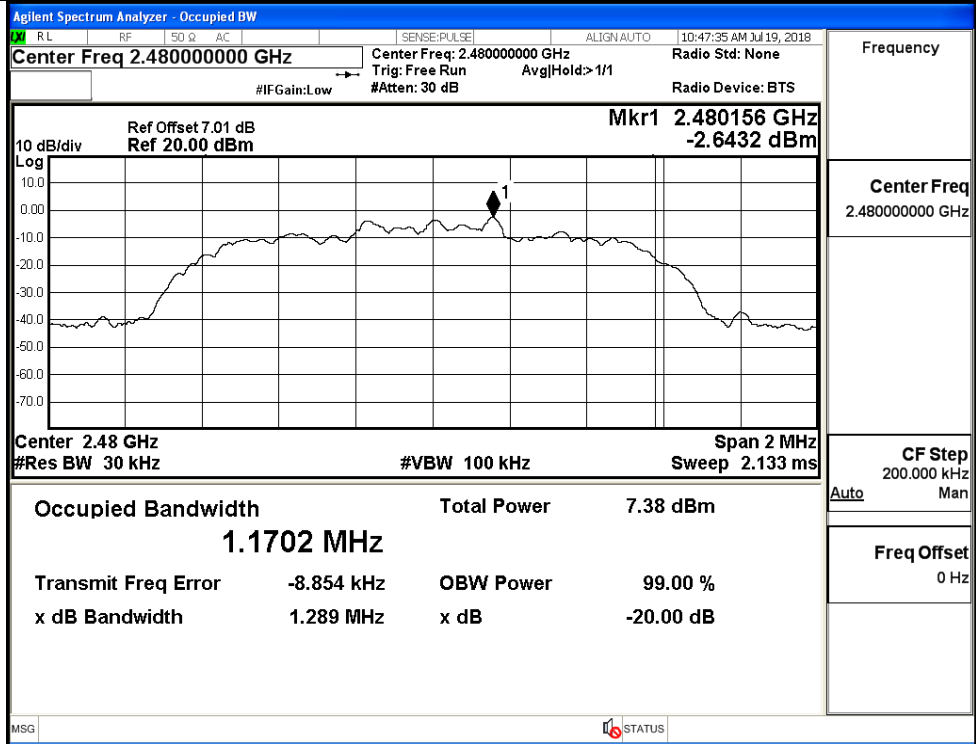
$\pi/4$ DQPSK/LCH



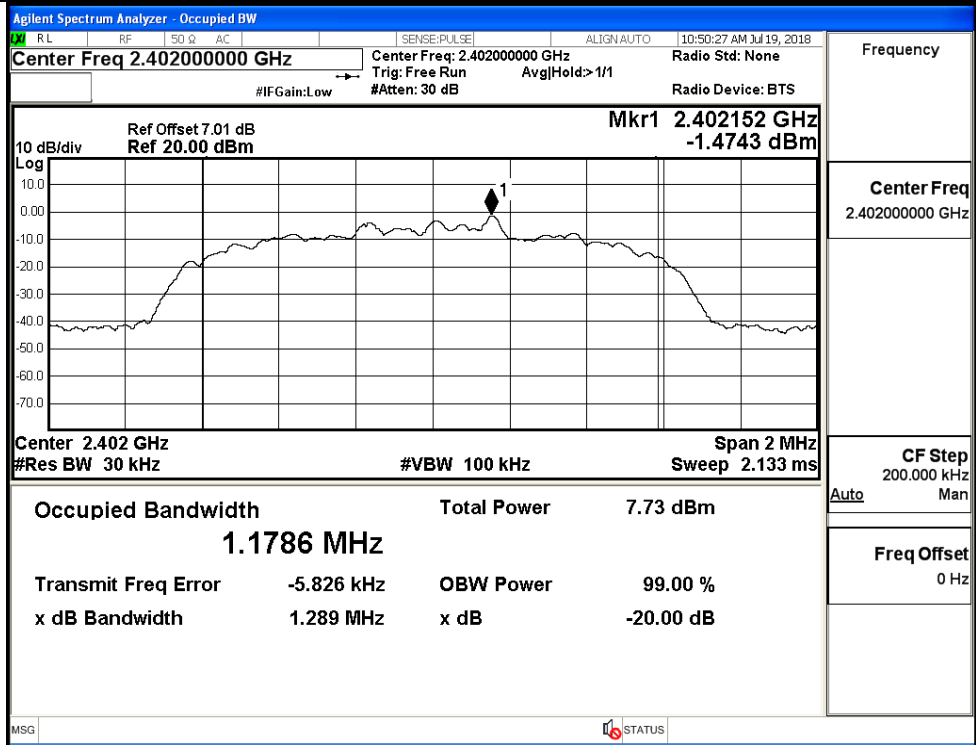
$\pi/4$ DQPSK/MCH



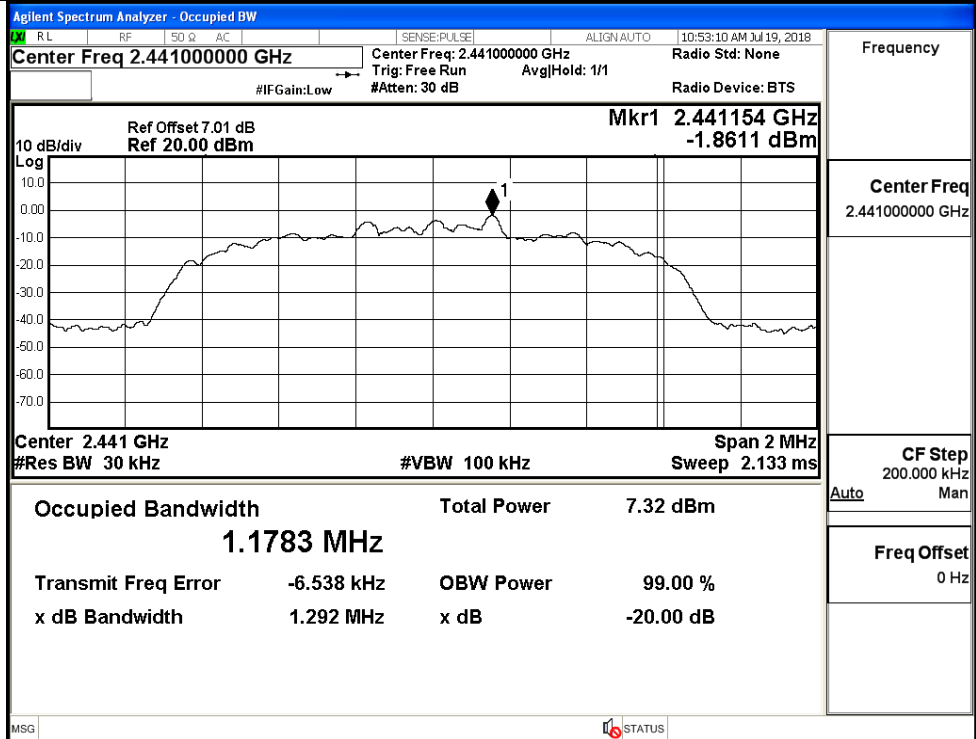
$\pi/4$ DQPSK/HCH



8DPSK/LCH

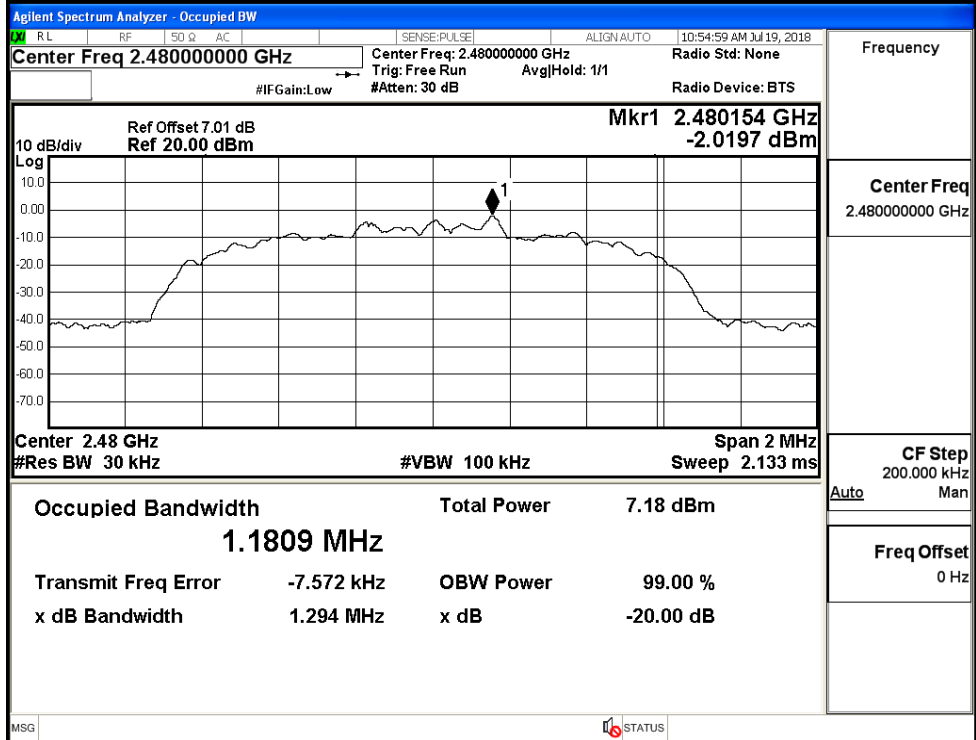


8DPSK/MCH



| | |
|-------------|----------------|
| Frequency | 2.44100000 GHz |
| Center Freq | 2.44100000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

8DPSK/HCH



| | |
|-------------|----------------|
| Frequency | 2.48000000 GHz |
| Center Freq | 2.48000000 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 | 0.957 | 0.687 | PASS |
| | MCH | 0.984 | 0.687 | PASS |
| | HCH | 1.122 | 0.687 | PASS |
| π/4DQPSK | LCH | 1.300 | 0.859 | PASS |
| | MCH | 0.872 | 0.859 | PASS |
| | HCH | 0.876 | 0.859 | PASS |
| 8DPSK | LCH | 0.882 | 0.863 | PASS |
| | MCH | 0.918 | 0.863 | PASS |
| | HCH | 1.172 | 0.863 | PASS |

Test Graphs

GFSK/LCH

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.402500000 GHz

Ref Offset 7.01 dB
Ref 20.00 dBm

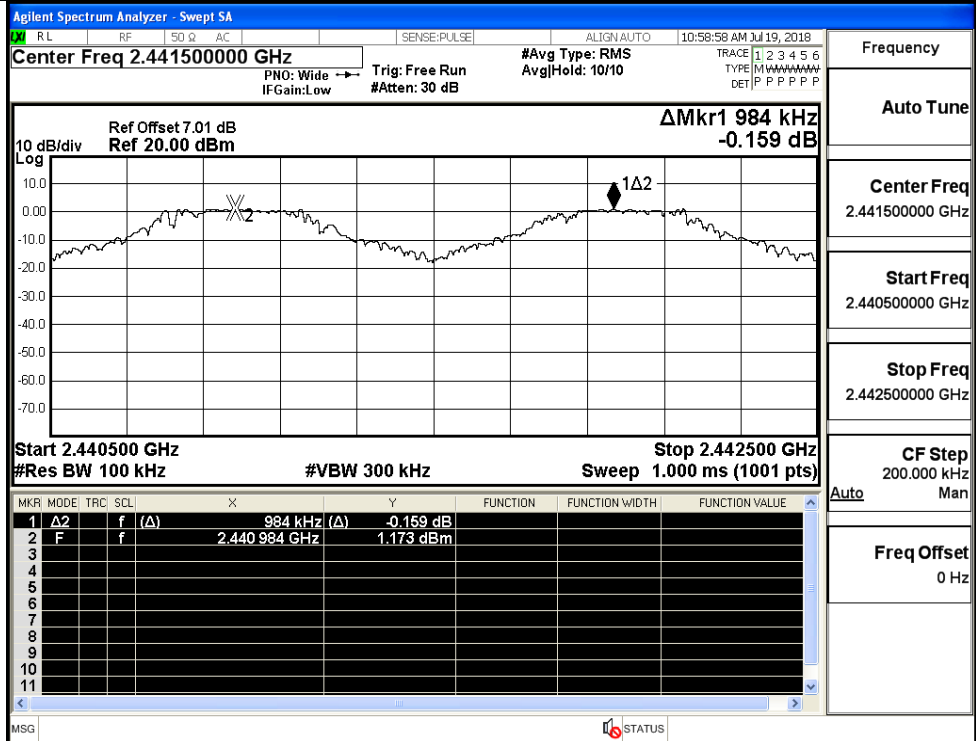
ΔMkr1 957.50 kHz
0.039 dB

Start 2.401500 GHz
#Res BW 100 kHz

Stop 2.403500 GHz
#VBW 300 kHz
Sweep 1.067 ms (8001 pts)

| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|-----|-----|----------------|-----------|----------|----------------|----------------|
| 1 | Δ2 | f | (Δ) | 957.50 kHz (Δ) | 0.039 dB | | | |
| 2 | F | f | | 2.40204075 GHz | 1.489 dBm | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |

GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

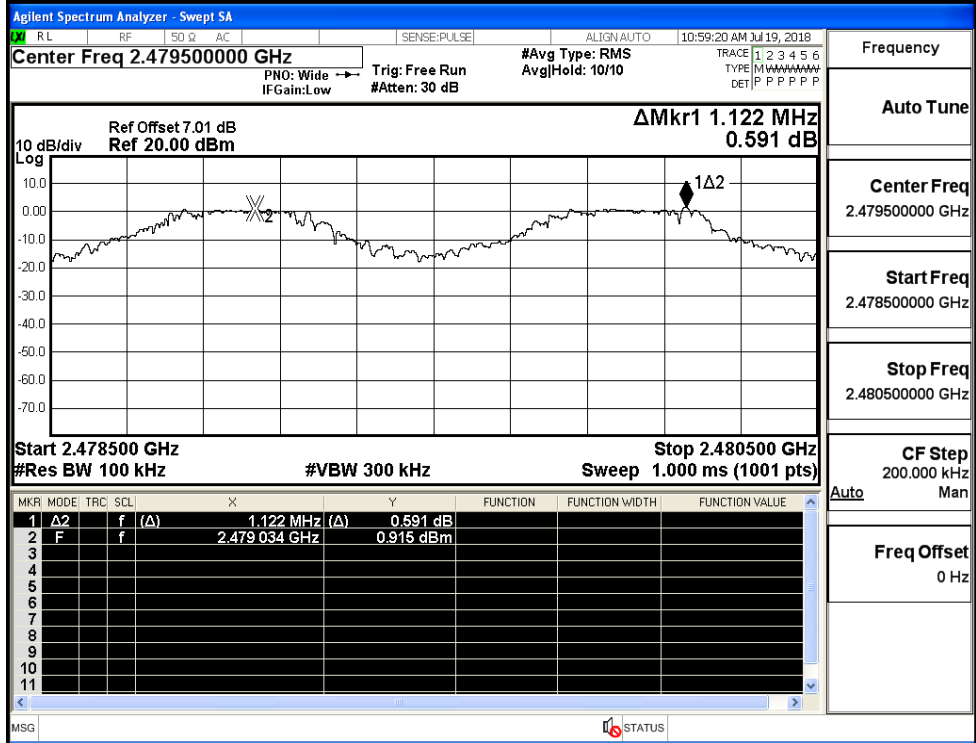
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

GFSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

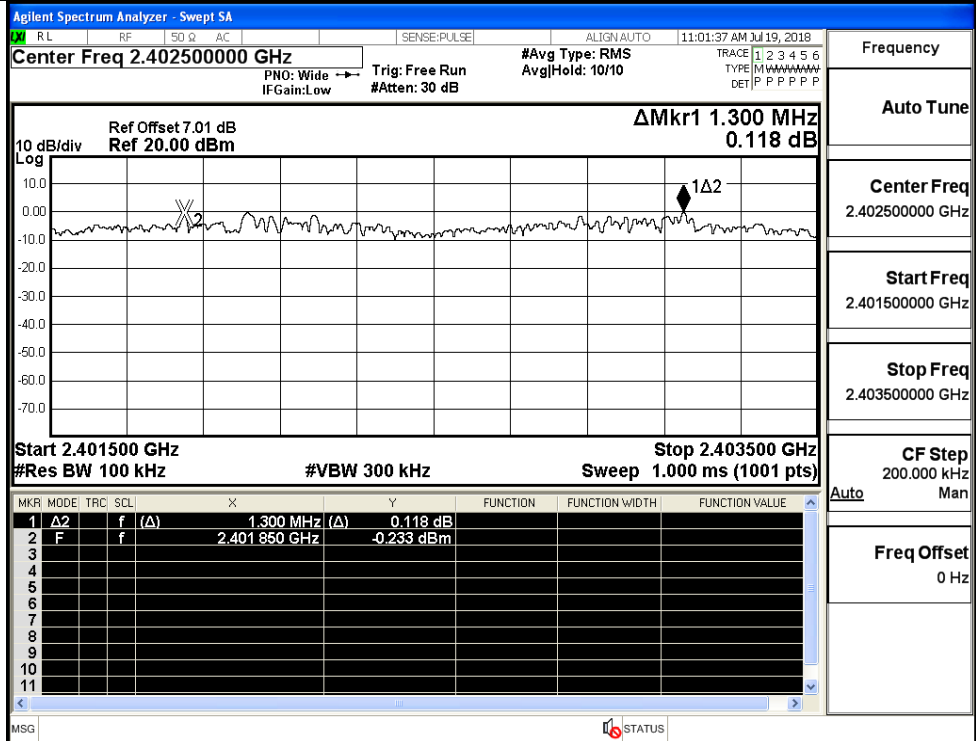
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

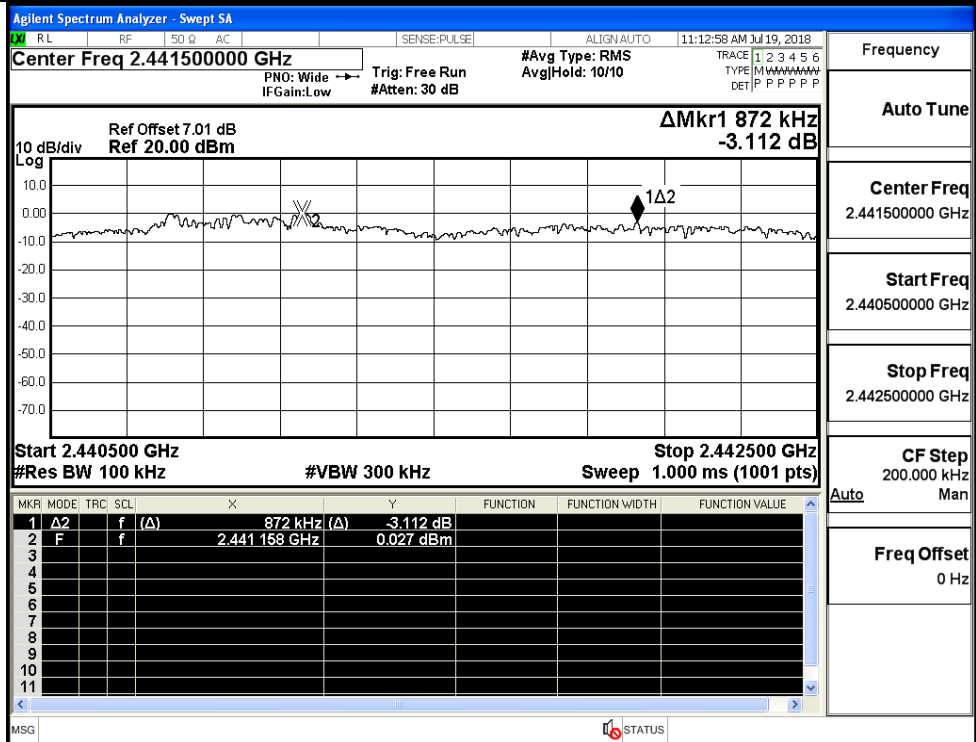
CF Step
200.000 kHz
Man

Freq Offset
0 Hz

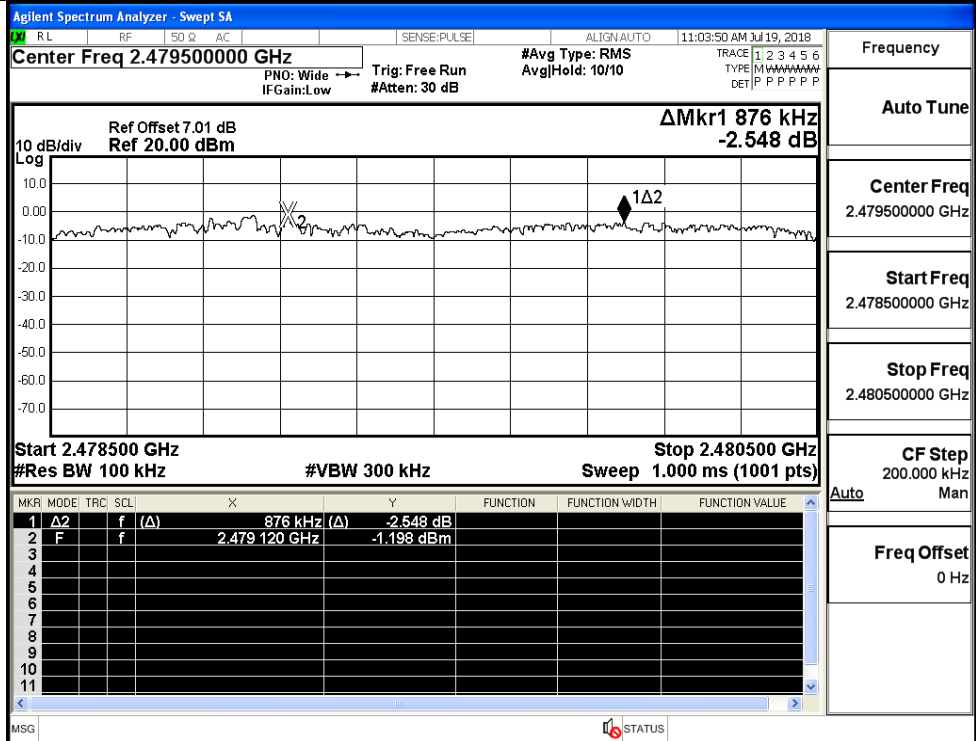
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

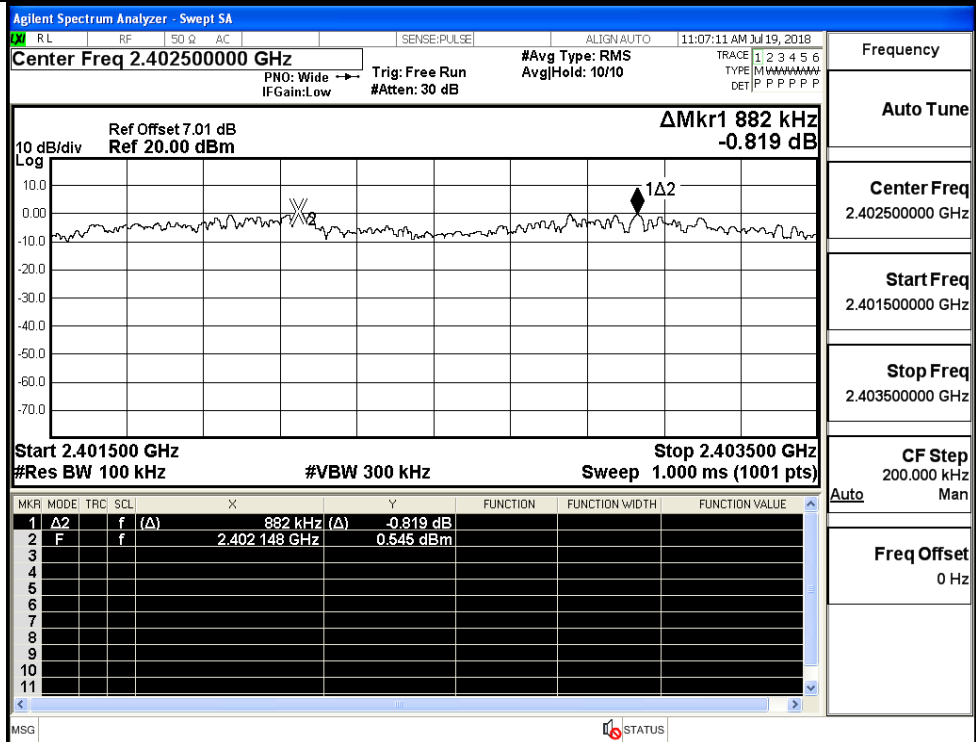
Start Freq
2.478500000 GHz

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

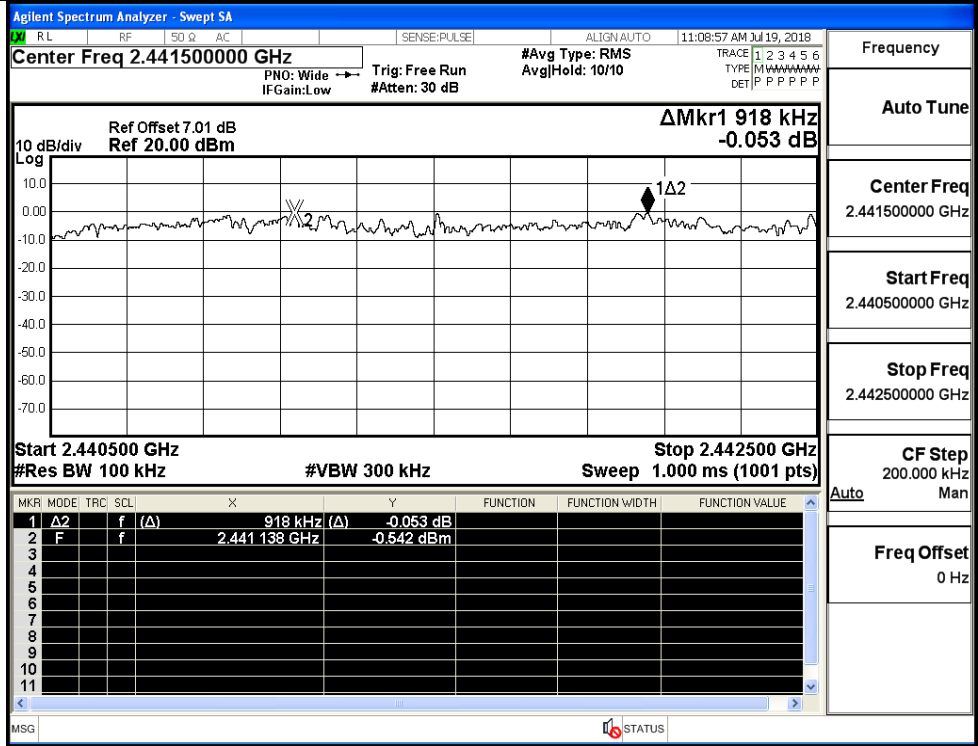
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

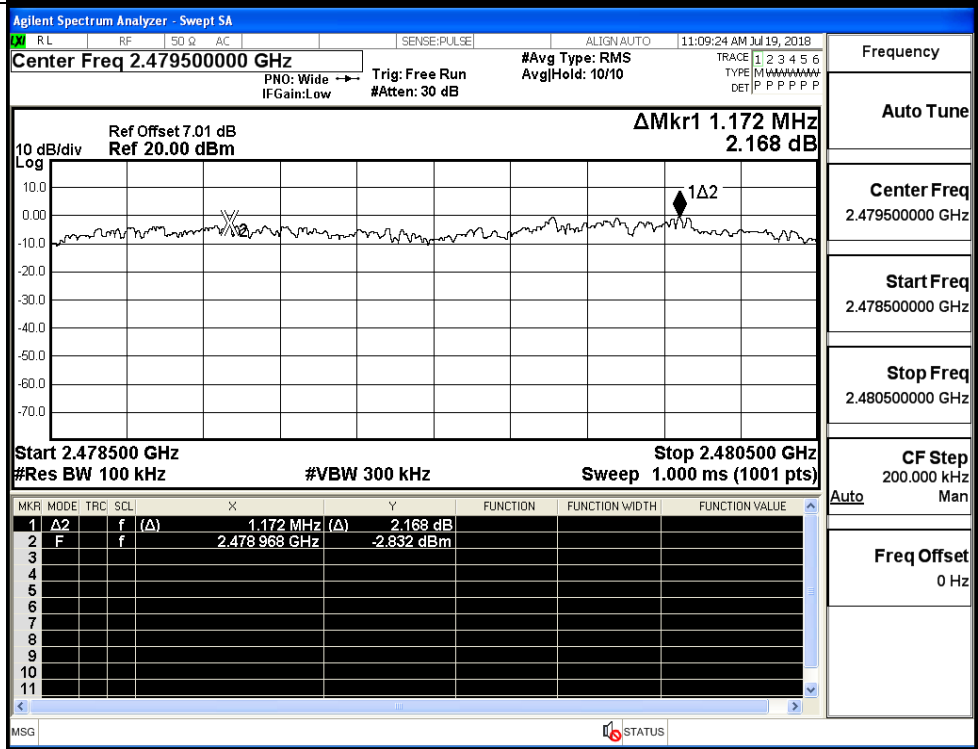
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH



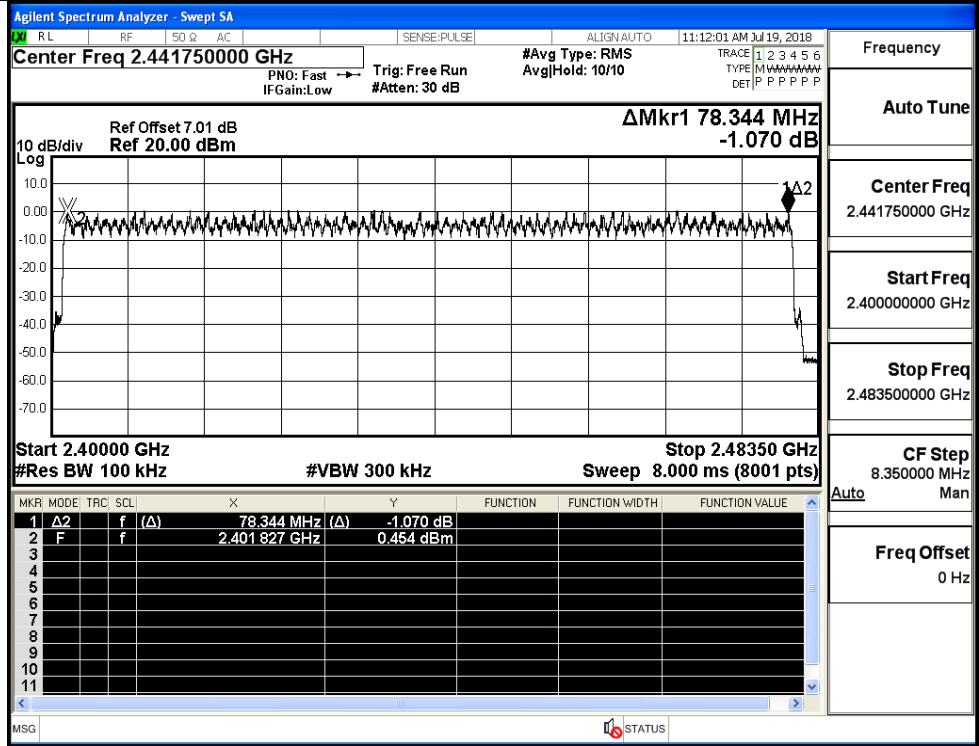
A.4 Hopping Channel Number

| 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

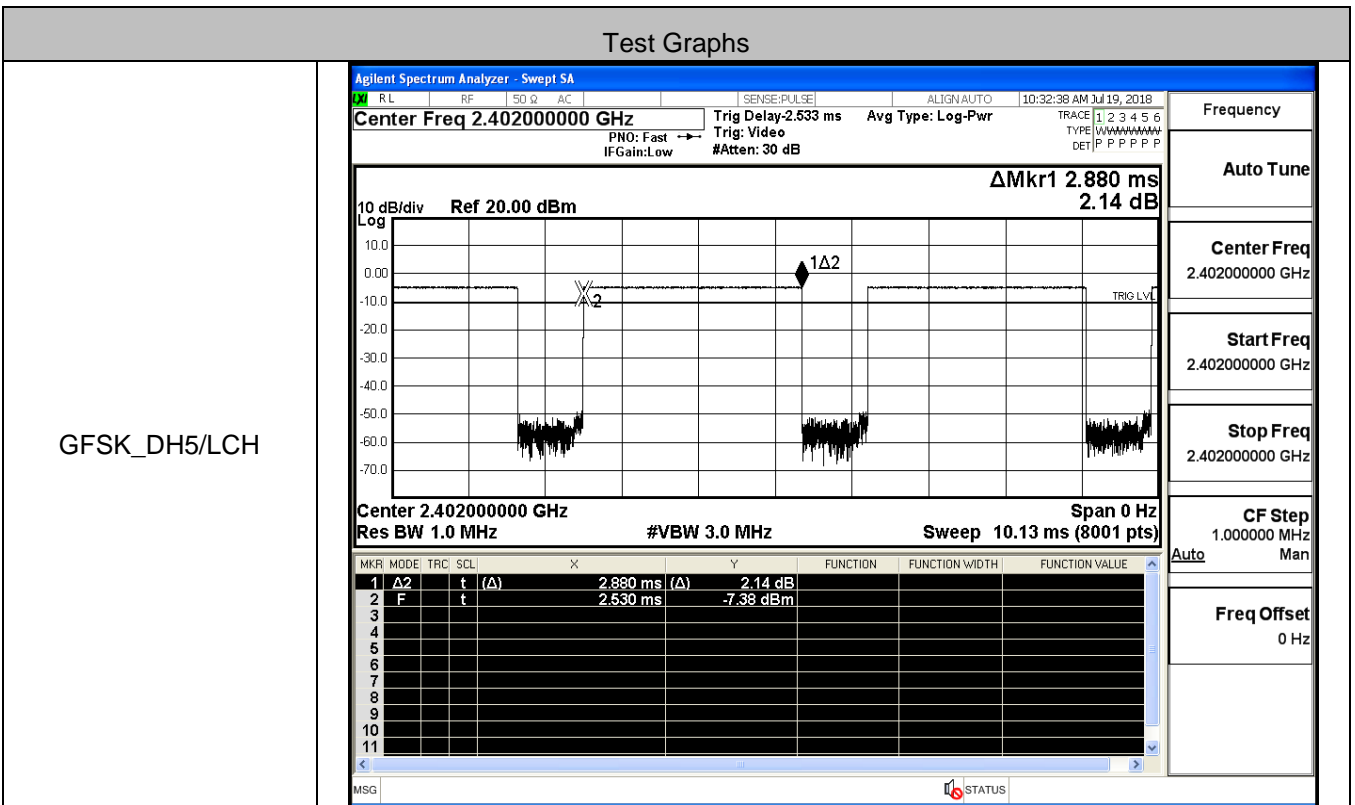
| <p>GFSK/Hop</p> | <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.146 MHz -0.705 dB</p> <p>Start 2.40000 GHz Stop 2.48350 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Δ2</td> <td>f</td> <td>(Δ)</td> <td>78.146 MHz (Δ)</td> <td>-0.705 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402004 GHz</td> <td>1.795 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ 2 | f | (Δ) | 78.146 MHz (Δ) | -0.705 dB | | | | 2 | F | f | | 2.402004 GHz | 1.795 dBm | | | |
|------------------------------------|--|-----|--------------|-------------------------|------------|----------|----------------|----------------|----------------|----------------|---|------------|---|--------------|-------------------------|-----------|--|--|--|---|---|---|--|--------------|------------|--|--|--|
| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | | | | | | | | | | | | | | | | | | | | |
| 1 | Δ 2 | f | (Δ) | 78.146 MHz (Δ) | -0.705 dB | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | F | f | | 2.402004 GHz | 1.795 dBm | | | | | | | | | | | | | | | | | | | | | | | |
| <p>$\pi/4$DQPSK/Hop</p> | <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.083 MHz 1.017 dB</p> <p>Start 2.40000 GHz Stop 2.48350 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Δ2</td> <td>f</td> <td>(Δ)</td> <td>78.083 MHz (Δ)</td> <td>1.017 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402067 GHz</td> <td>-1.355 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | 1 | Δ 2 | f | (Δ) | 78.083 MHz (Δ) | 1.017 dB | | | | 2 | F | f | | 2.402067 GHz | -1.355 dBm | | | |
| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | | | | | | | | | | | | | | | | | | | | |
| 1 | Δ 2 | f | (Δ) | 78.083 MHz (Δ) | 1.017 dB | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | F | f | | 2.402067 GHz | -1.355 dBm | | | | | | | | | | | | | | | | | | | | | | | |

8DPSK/Hop

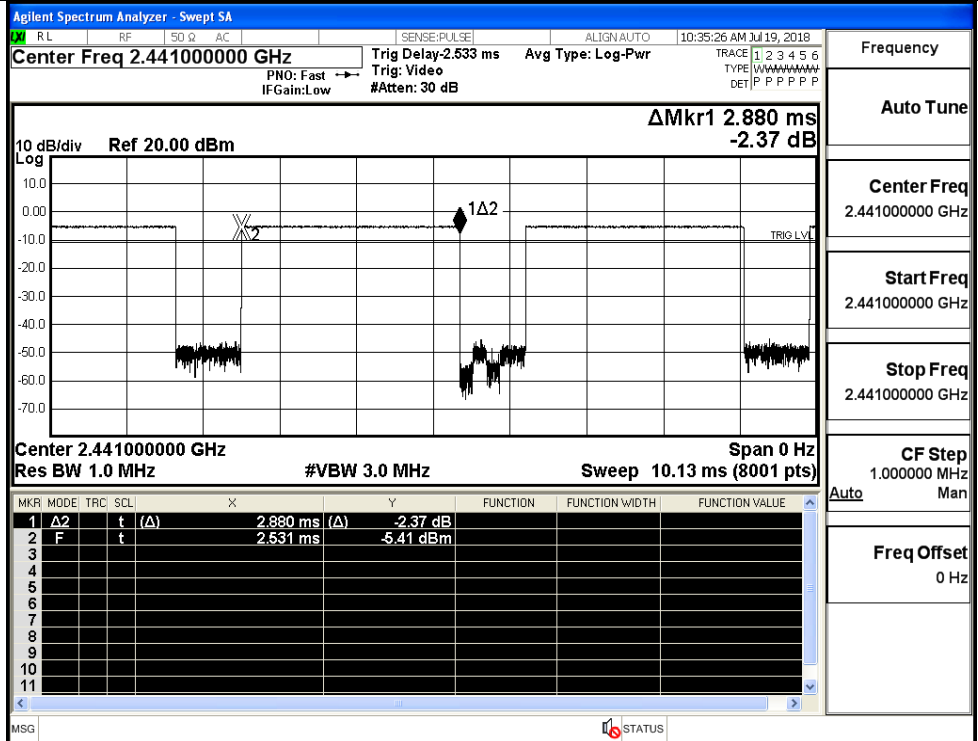


A.5 Dwell Time

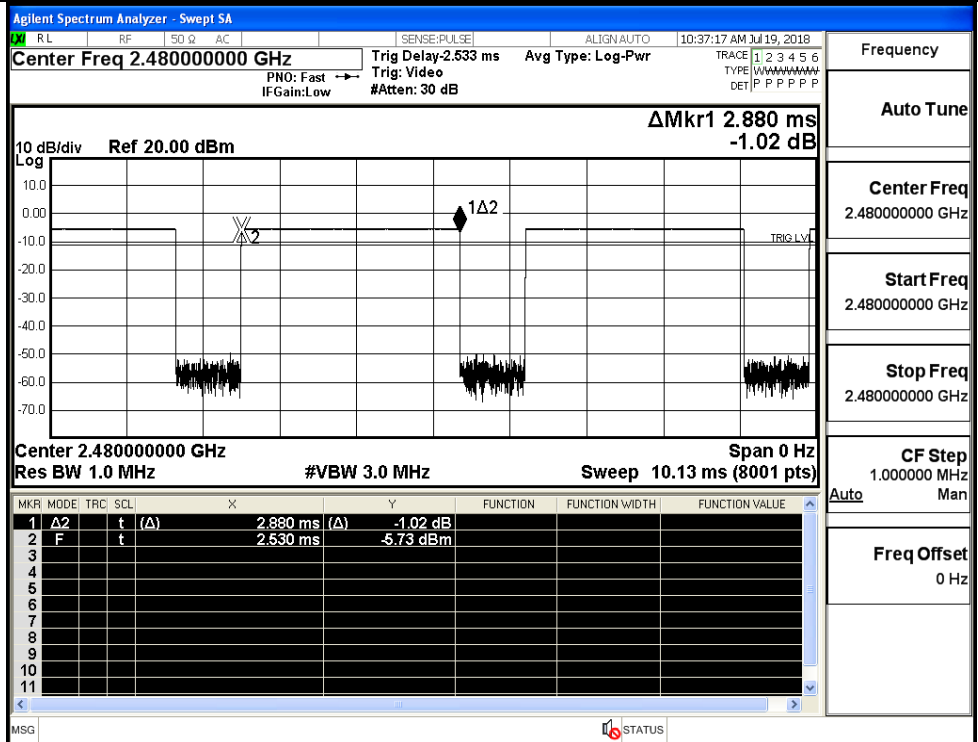
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK | DH5 | LCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| | DH5 | MCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| | DH5 | HCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| π/4DQPSK | 2DH5 | LCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| | 2DH5 | MCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| | 2DH5 | HCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| 8DPSK | 3DH5 | LCH | 2.89 | 106.7 | 0.308 | 0.4 | PASS |
| | 3DH5 | MCH | 2.89 | 106.7 | 0.308 | 0.4 | PASS |
| | 3DH5 | HCH | 2.89 | 106.7 | 0.308 | 0.4 | PASS |



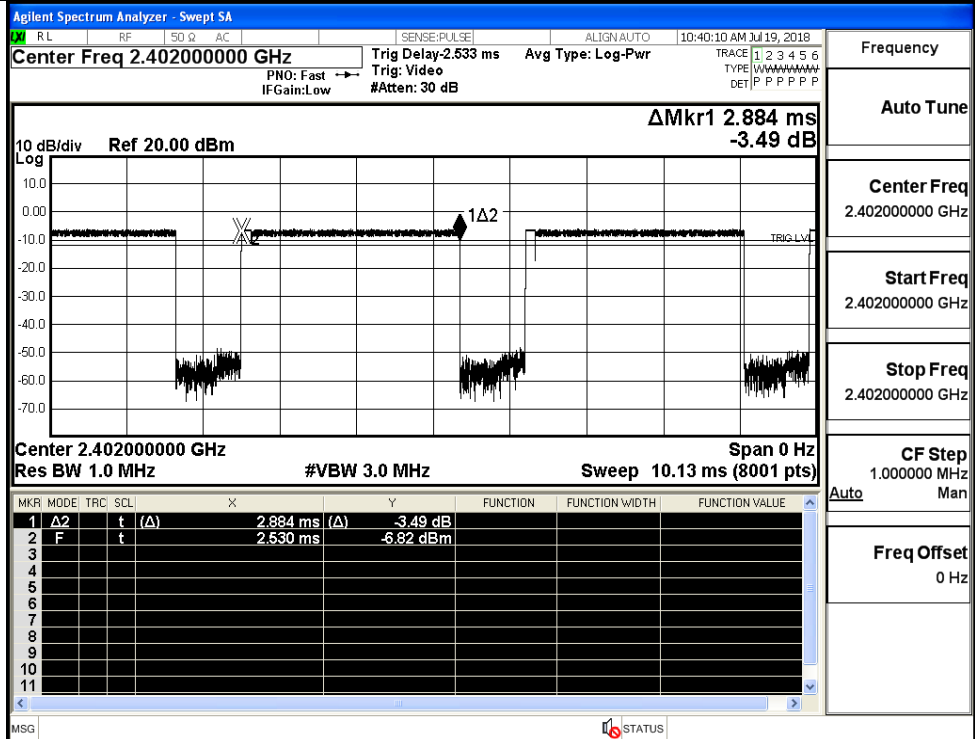
GFSK_DH5/MCH



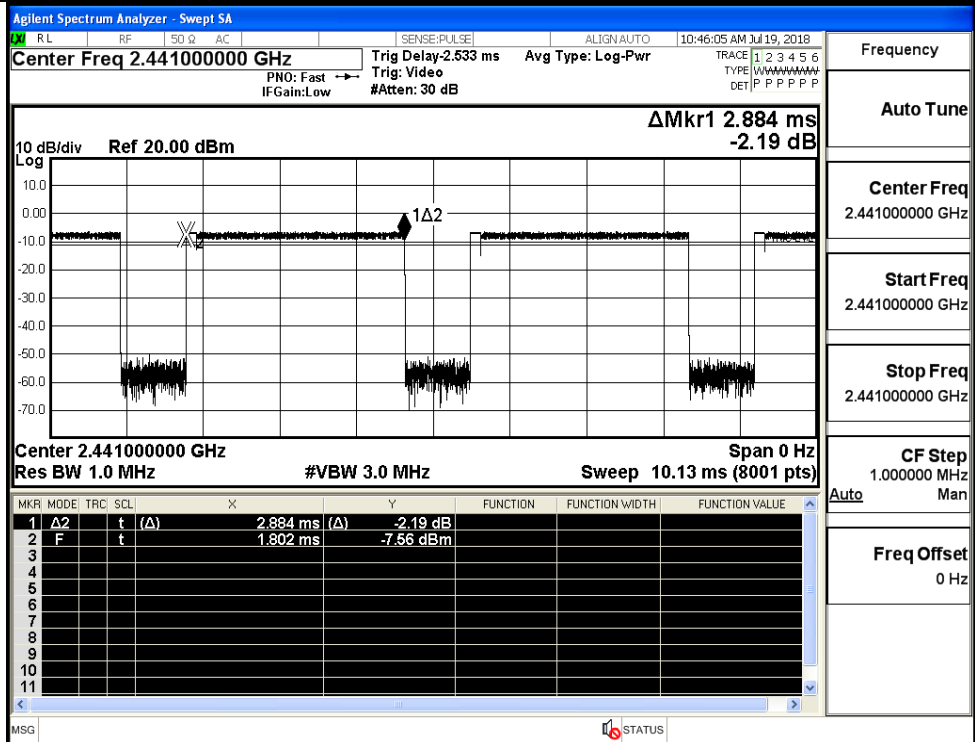
GFSK_DH5/HCH



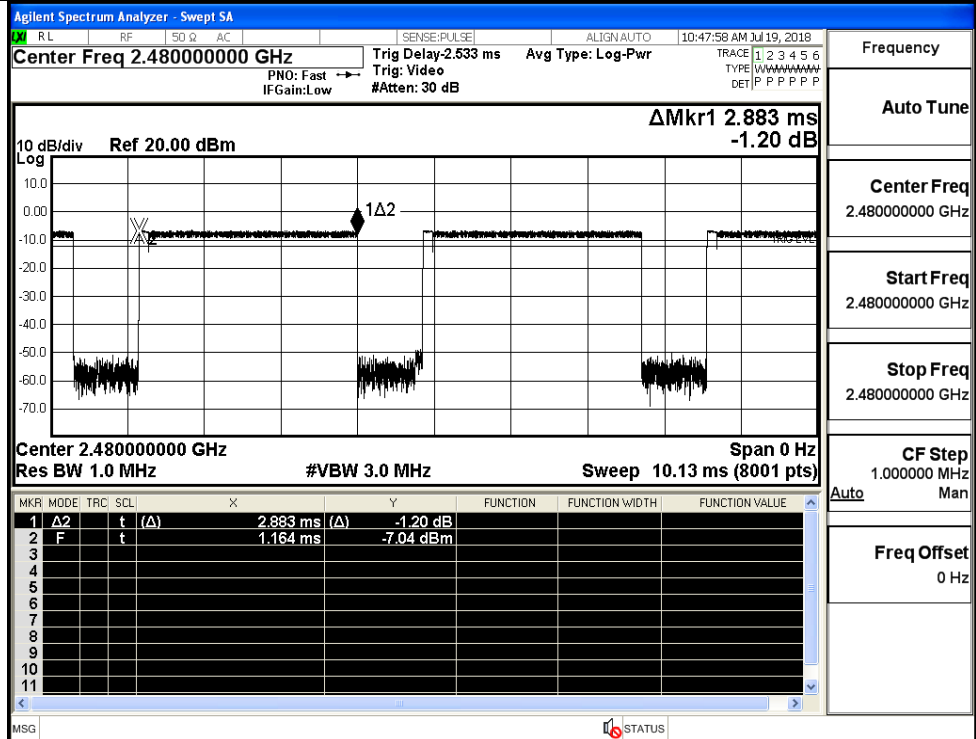
$\pi/4$ DQPSK
_2DH5/LCH



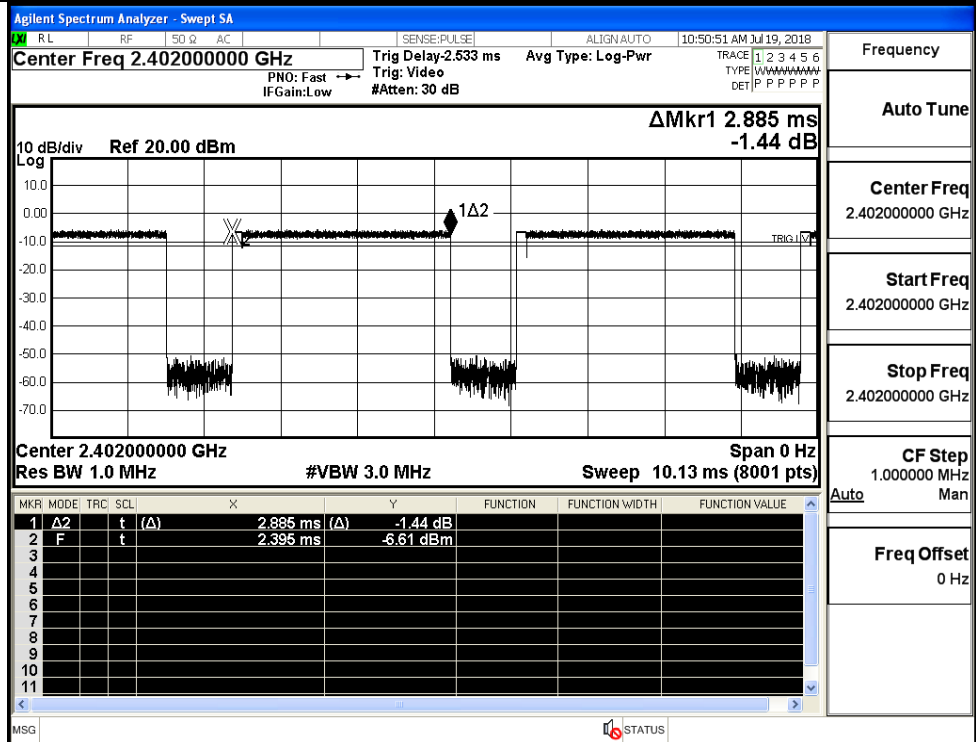
$\pi/4$ DQPSK
_2DH5/MCH



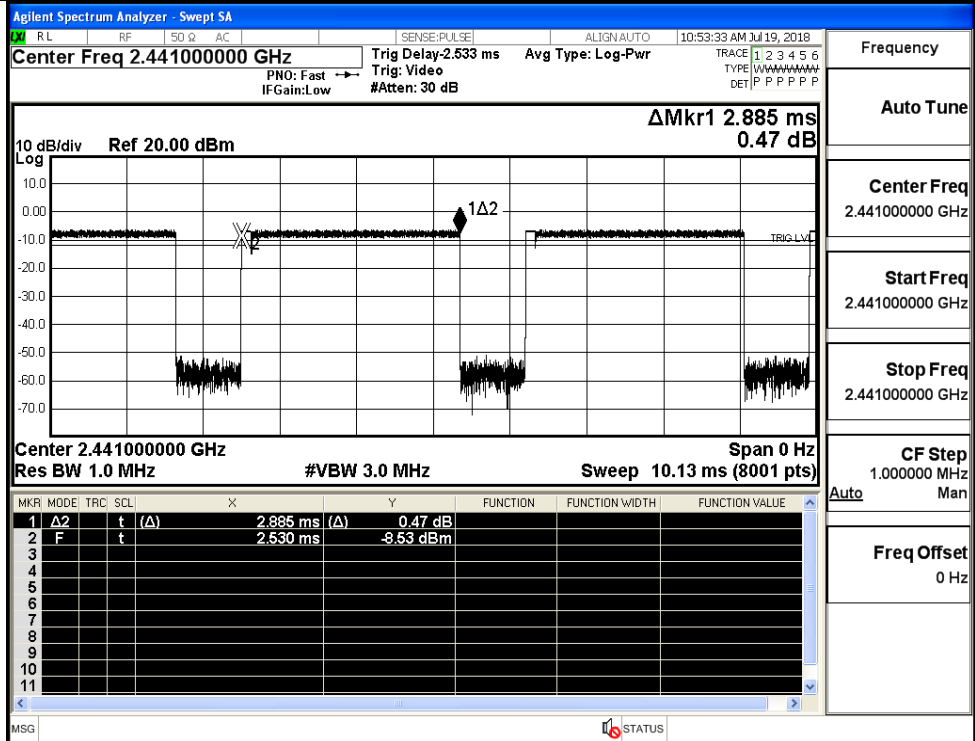
$\pi/4$ DQPSK
_2DH5/HCH



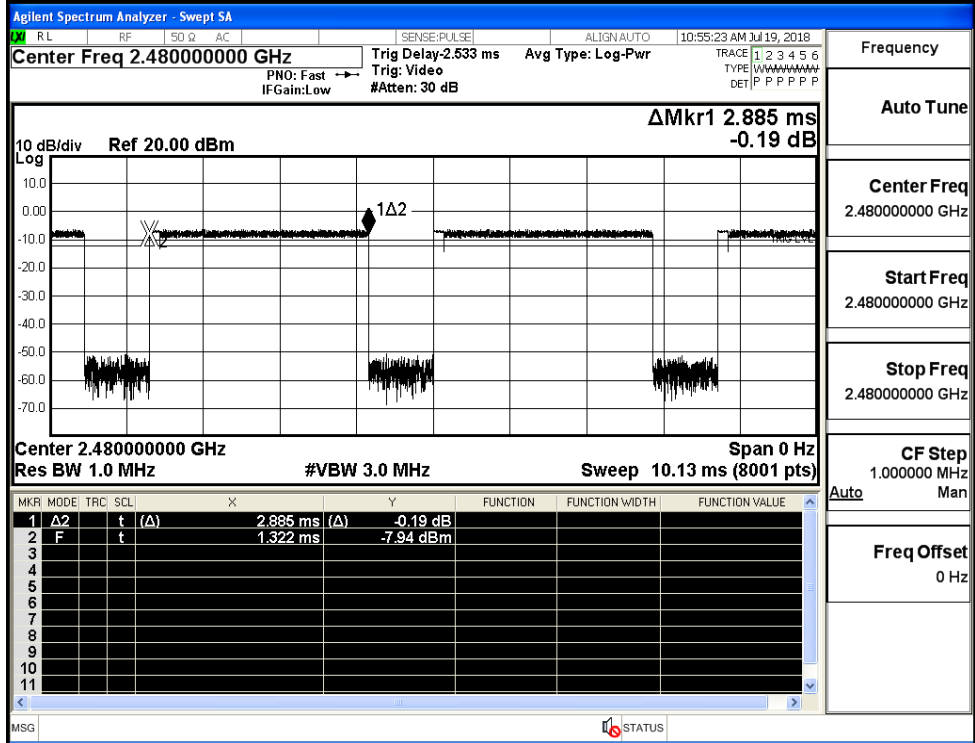
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

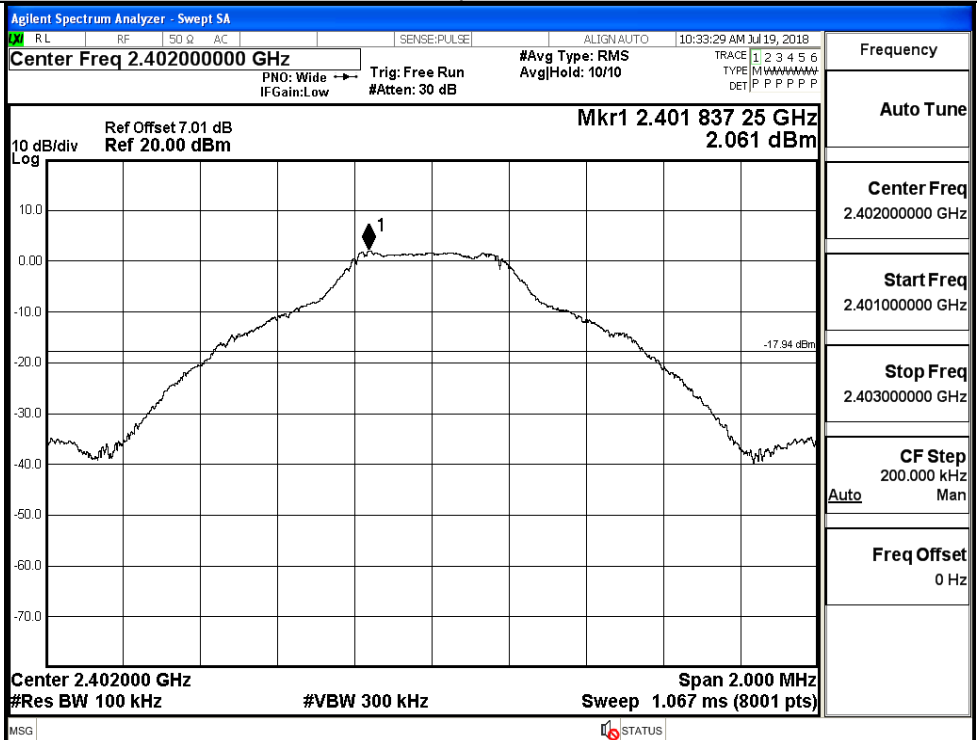


A.6 RF Conducted Spurious Emissions

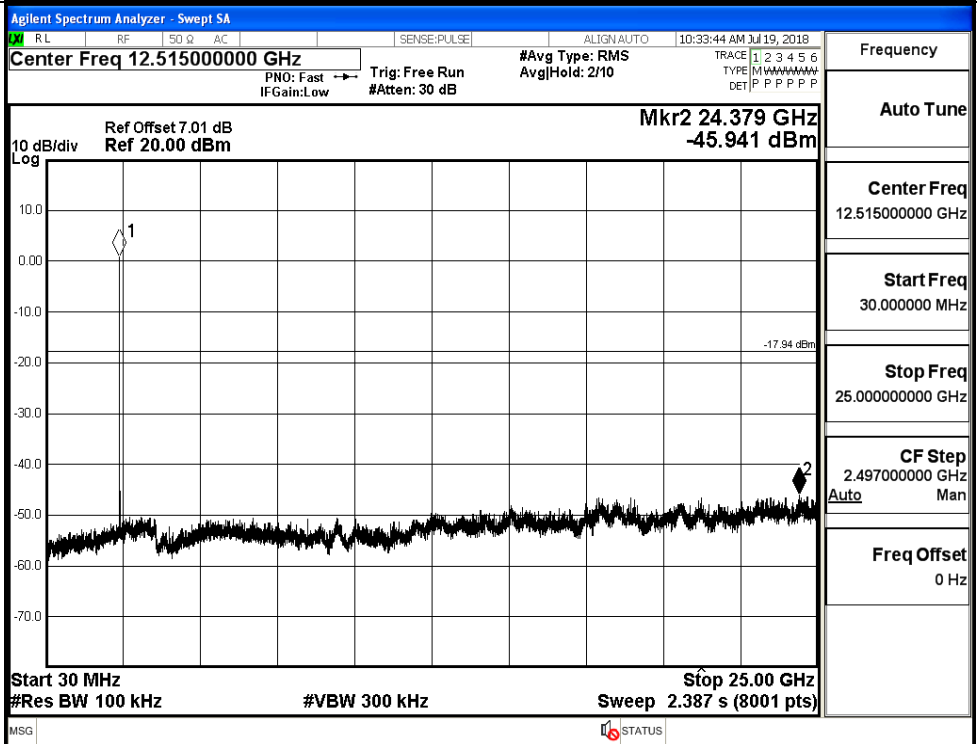
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK | LCH | 2.061 | -45.941 | -17.939 | PASS |
| | MCH | 1.693 | -45.501 | -18.307 | PASS |
| | HCH | 1.097 | -45.493 | -18.903 | PASS |
| $\pi/4$ DQPSK | LCH | 0.528 | -45.605 | -19.472 | PASS |
| | MCH | 0.262 | -45.723 | -19.738 | PASS |
| | HCH | 0.025 | -45.533 | -19.975 | PASS |
| 8DPSK | LCH | 0.569 | -45.582 | -19.431 | PASS |
| | MCH | -0.26 | -45.700 | -20.260 | PASS |
| | HCH | 0.083 | -45.719 | -19.917 | PASS |

GFSK_LCH_Graphs

Pref

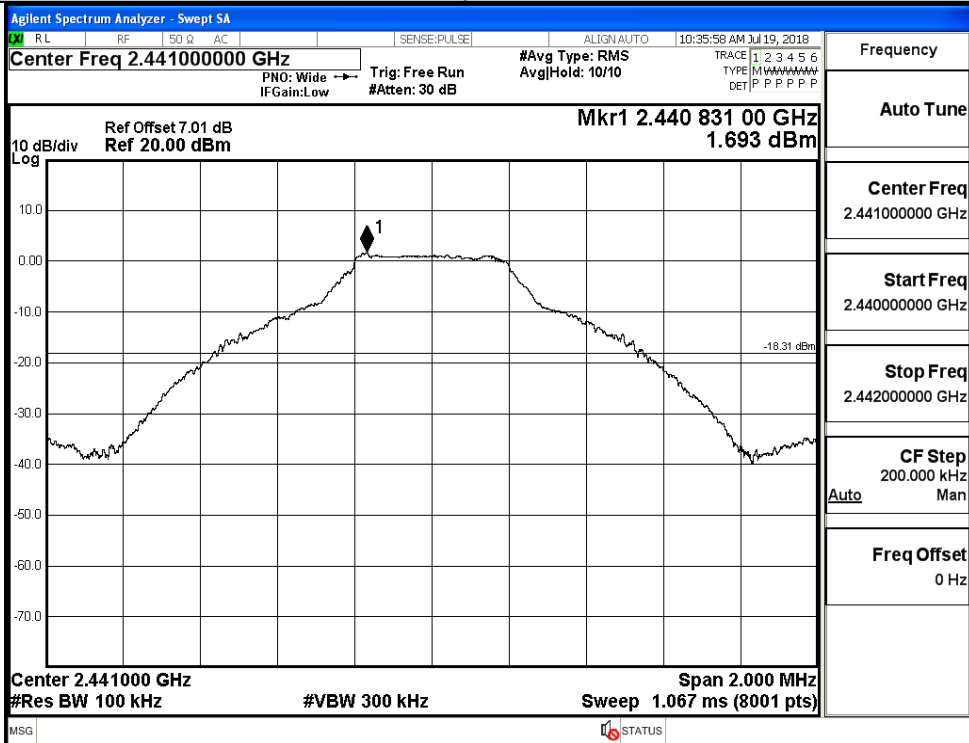


Puw

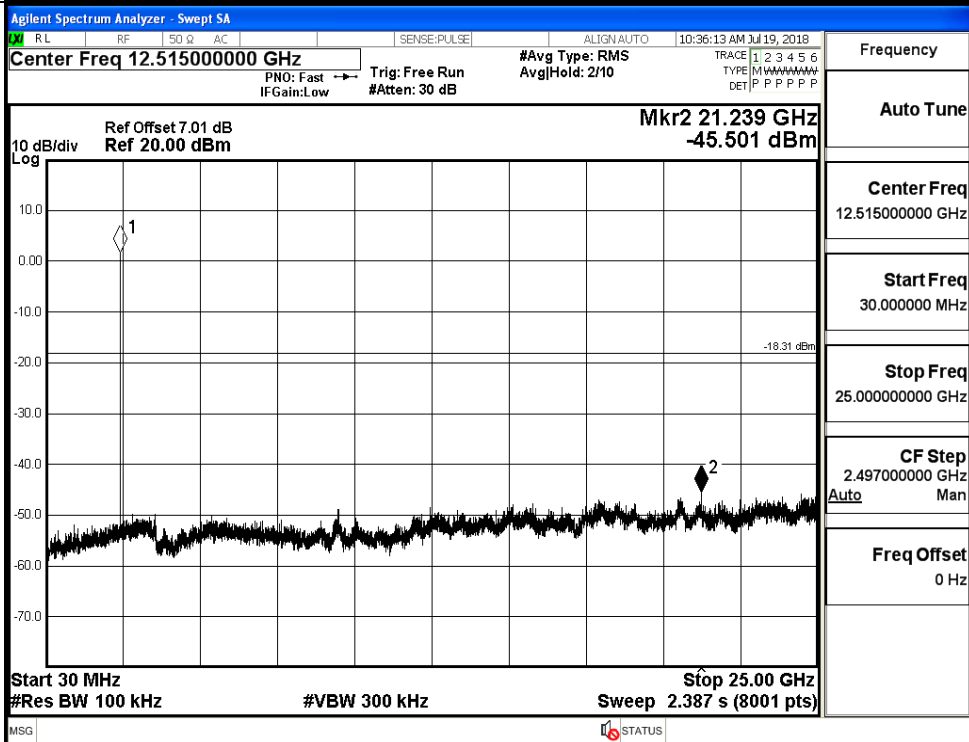


GFSK_MCH_Graphs

Pref

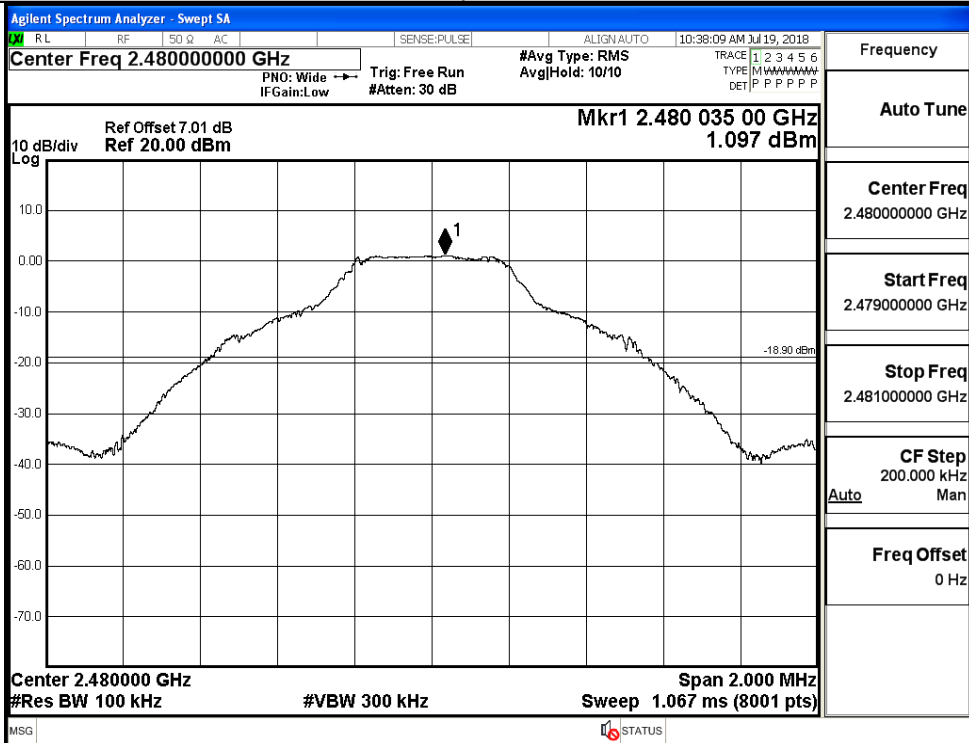


Puw

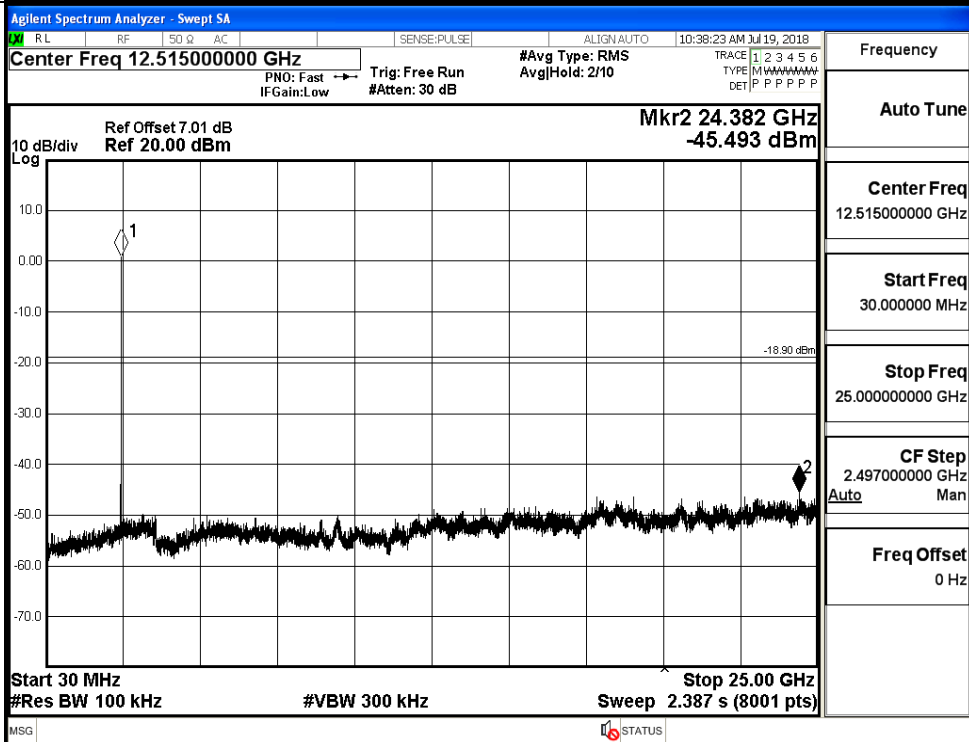


GFSK_HCH_Graphs

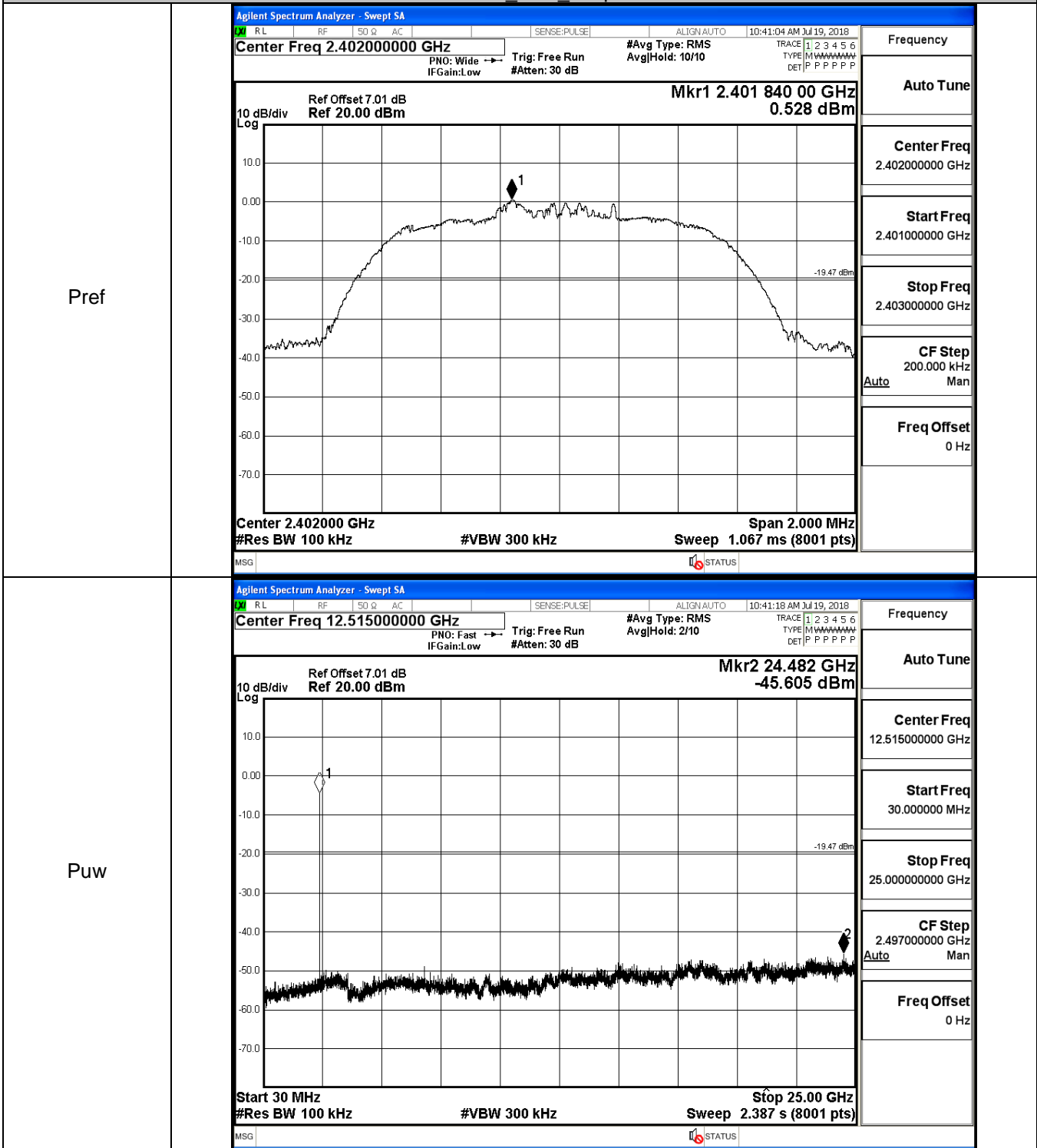
Pref



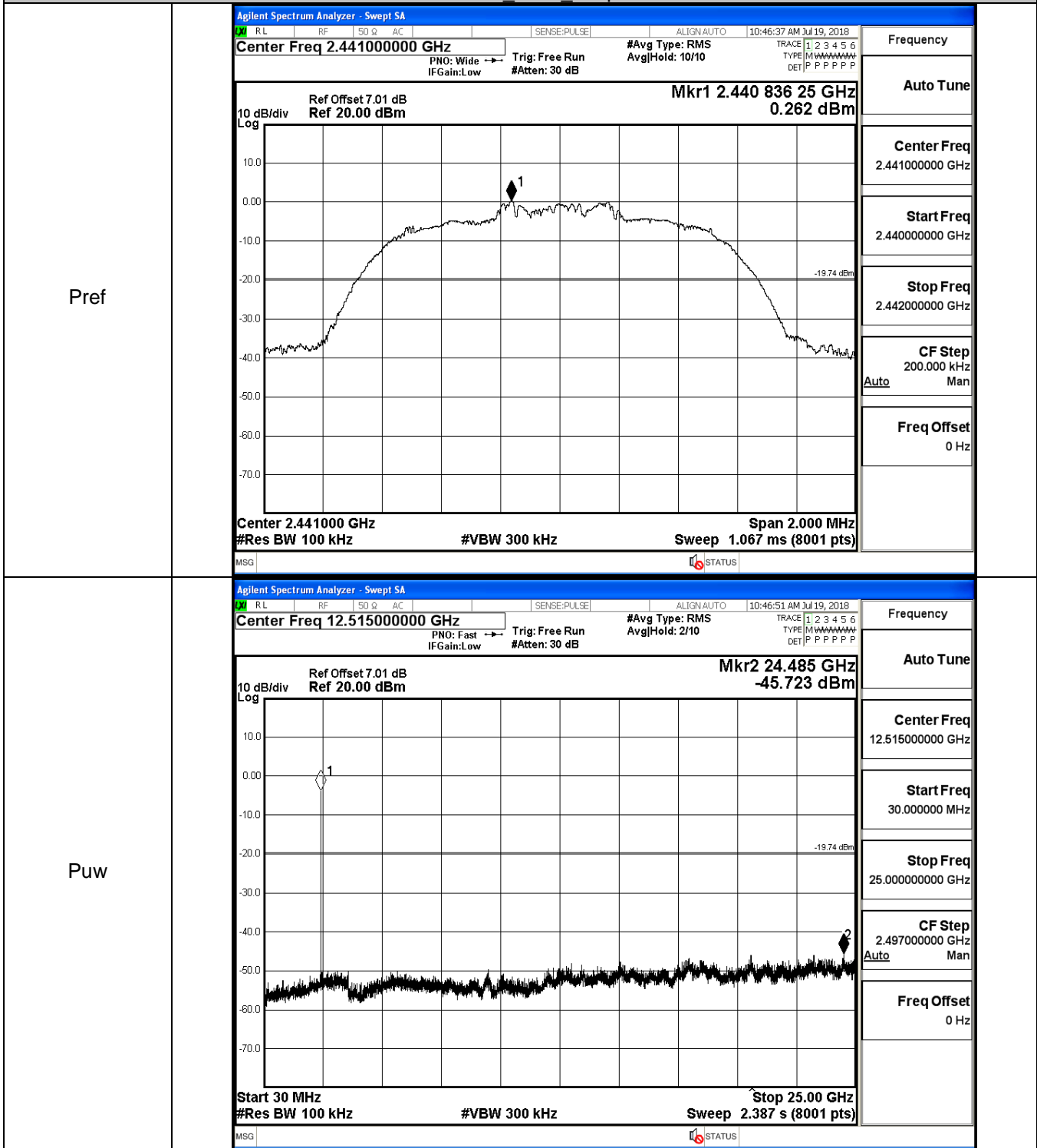
Puw



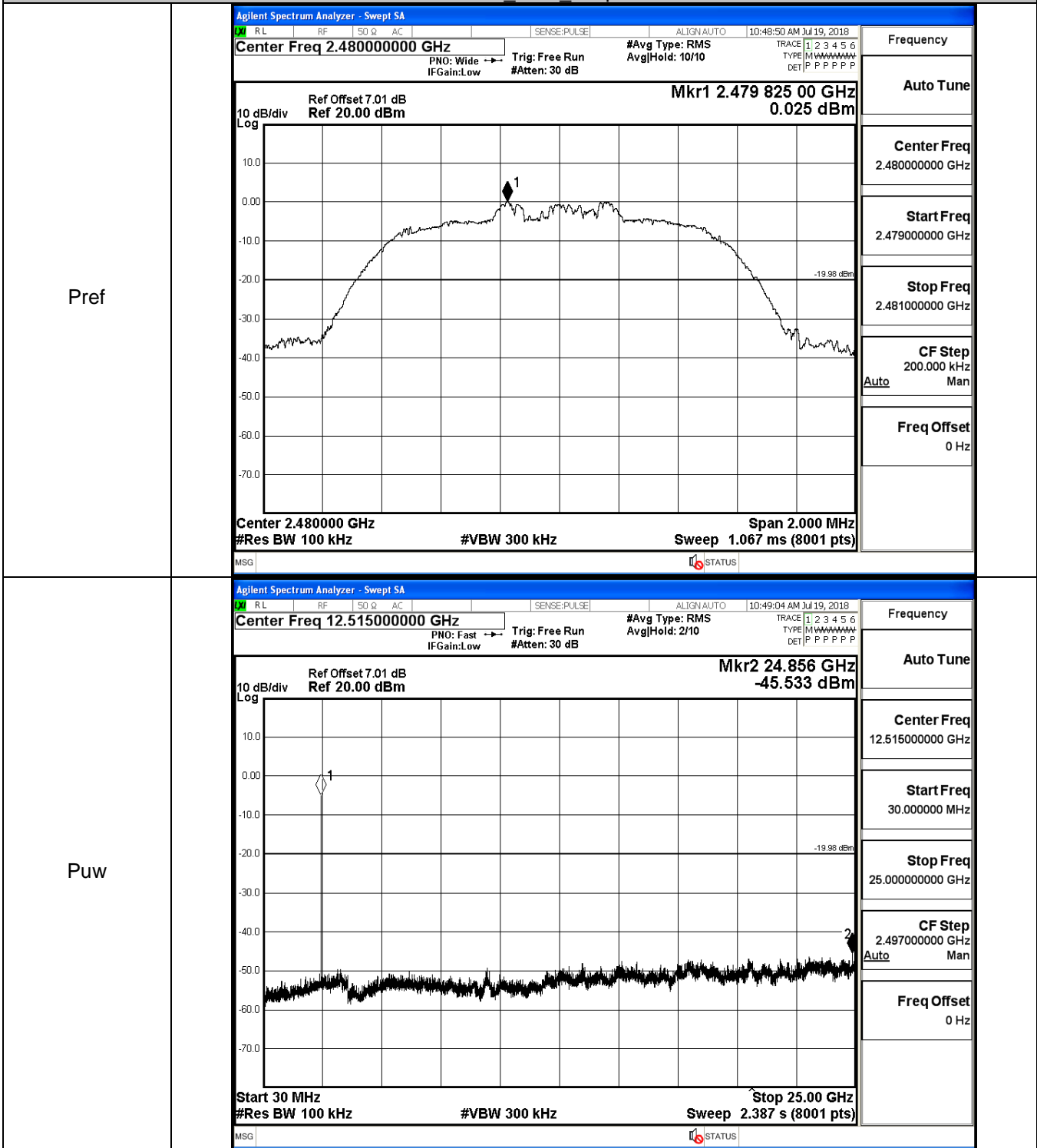
$\pi/4$ DQPSK LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs

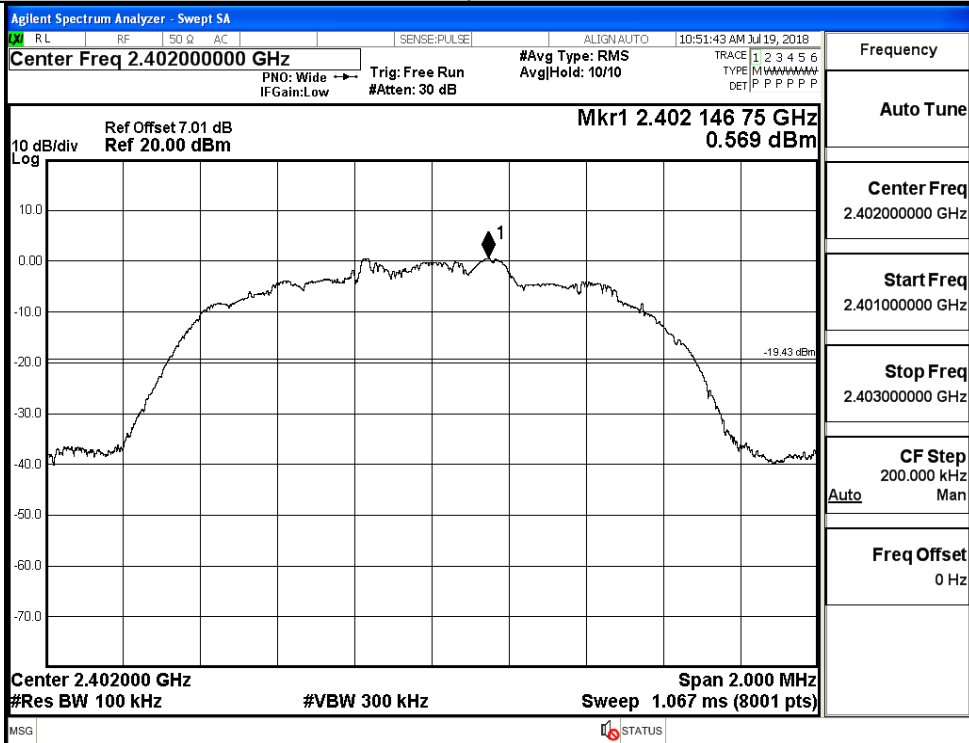


$\pi/4$ DQPSK_HCH_Graphs

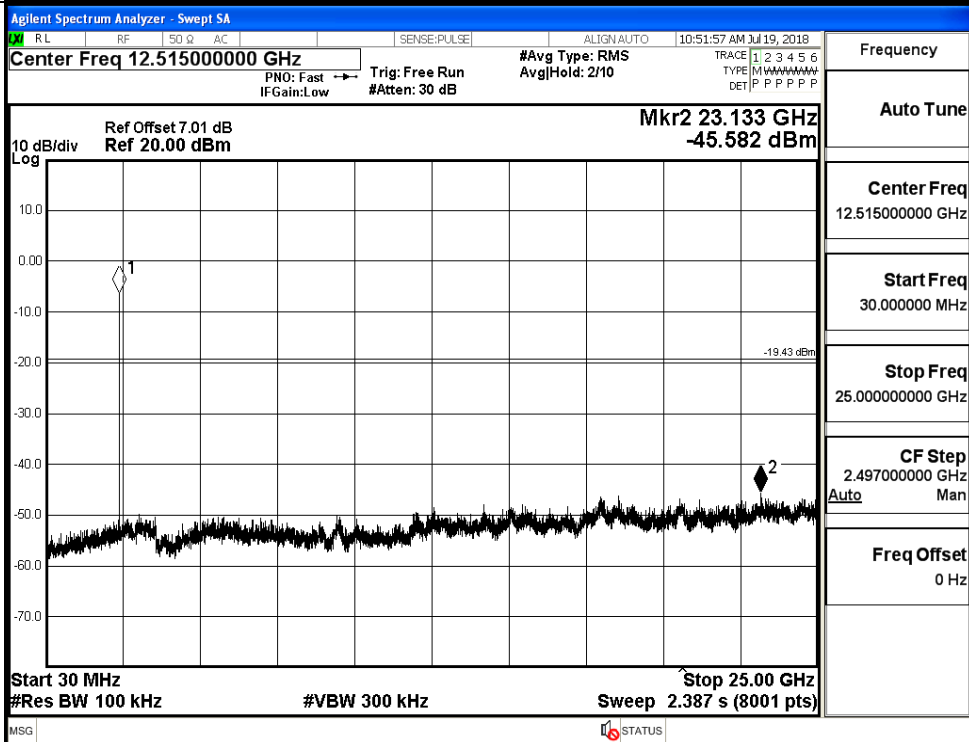


8DPSK_LCH_Graphs

Pref

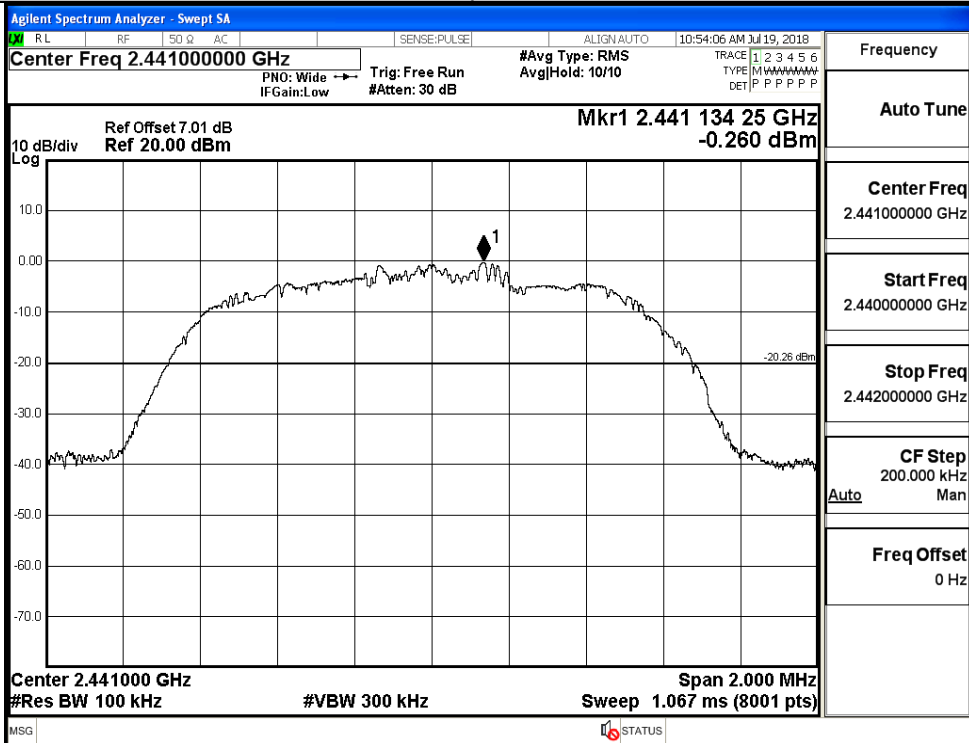


Puw

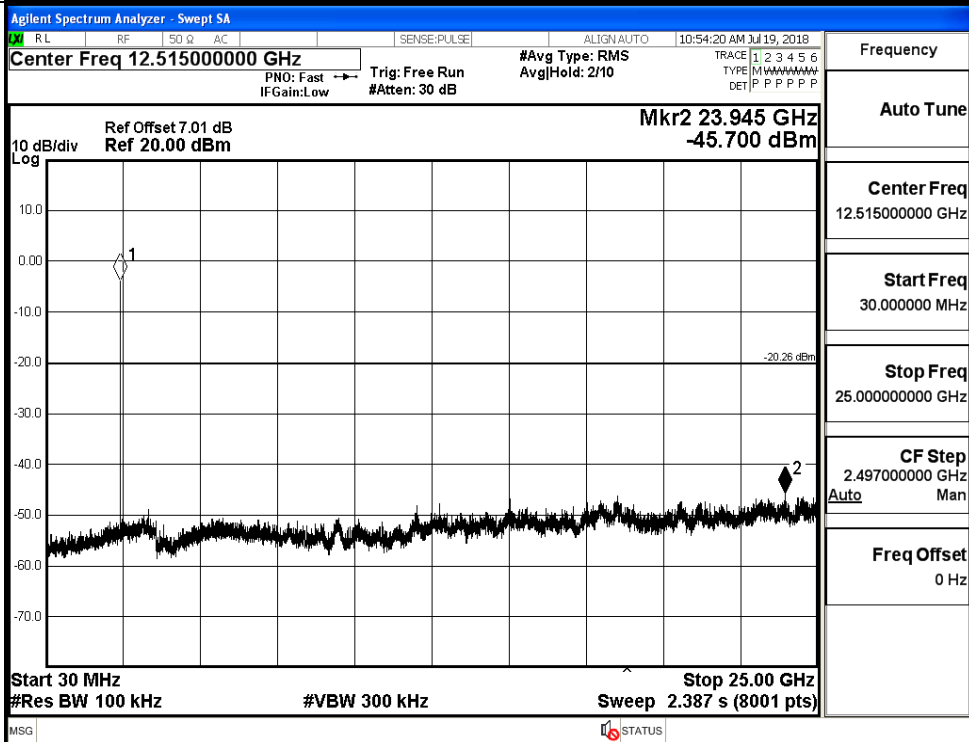


8DPSK_MCH_Graphs

Pref

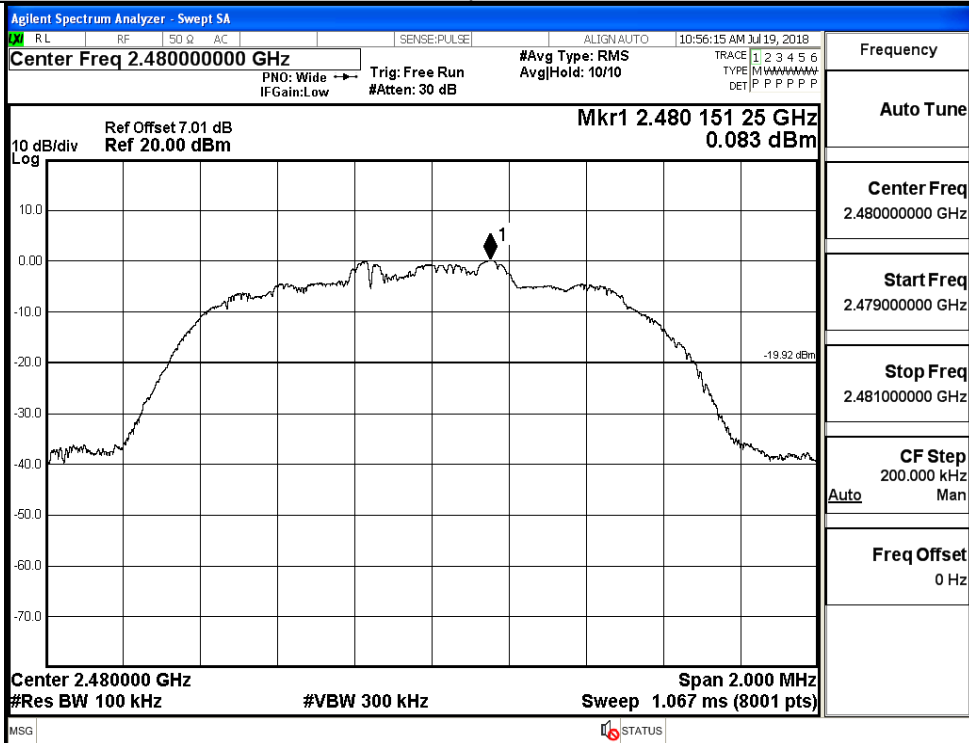


Puw

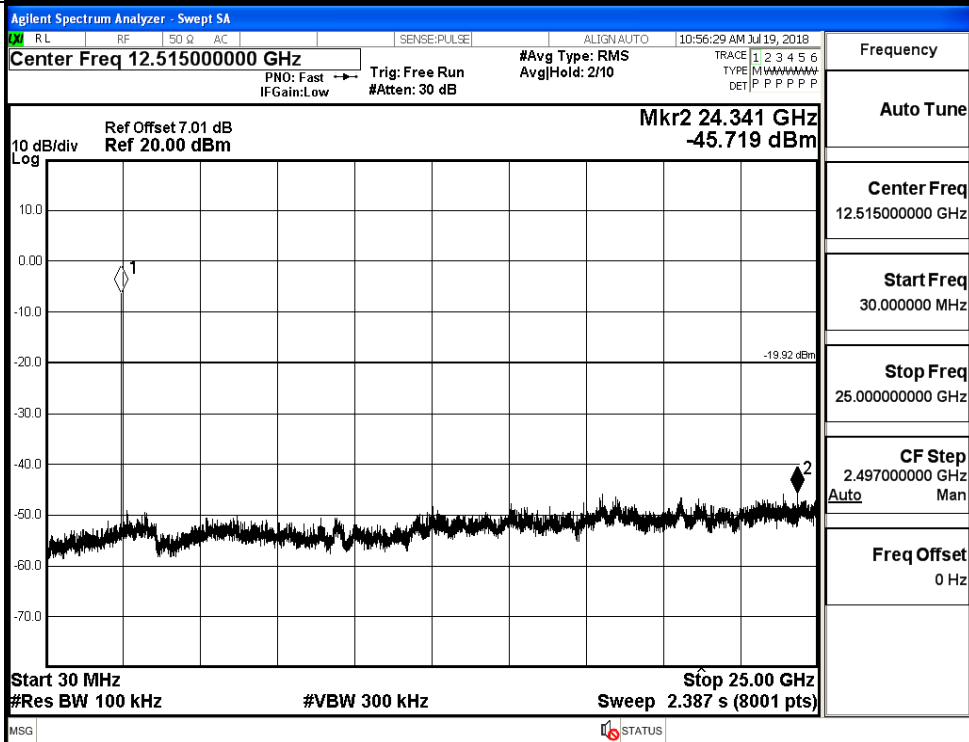


8DPSK_HCH_Graphs

Pref



Puw

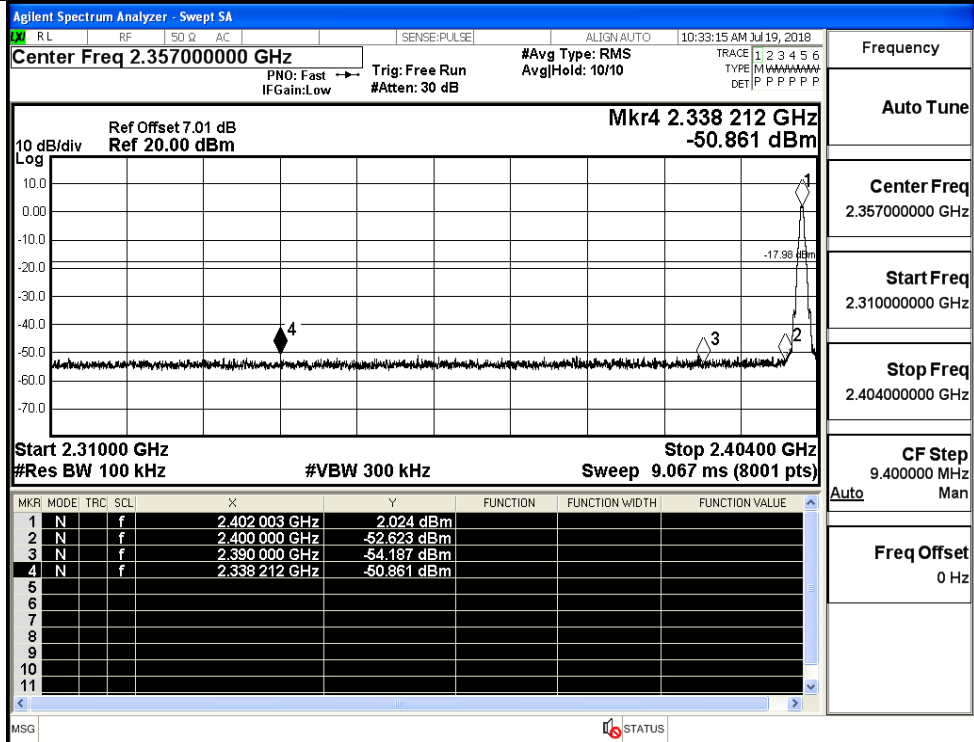


A.7 Band-edge for RF Conducted Emissions

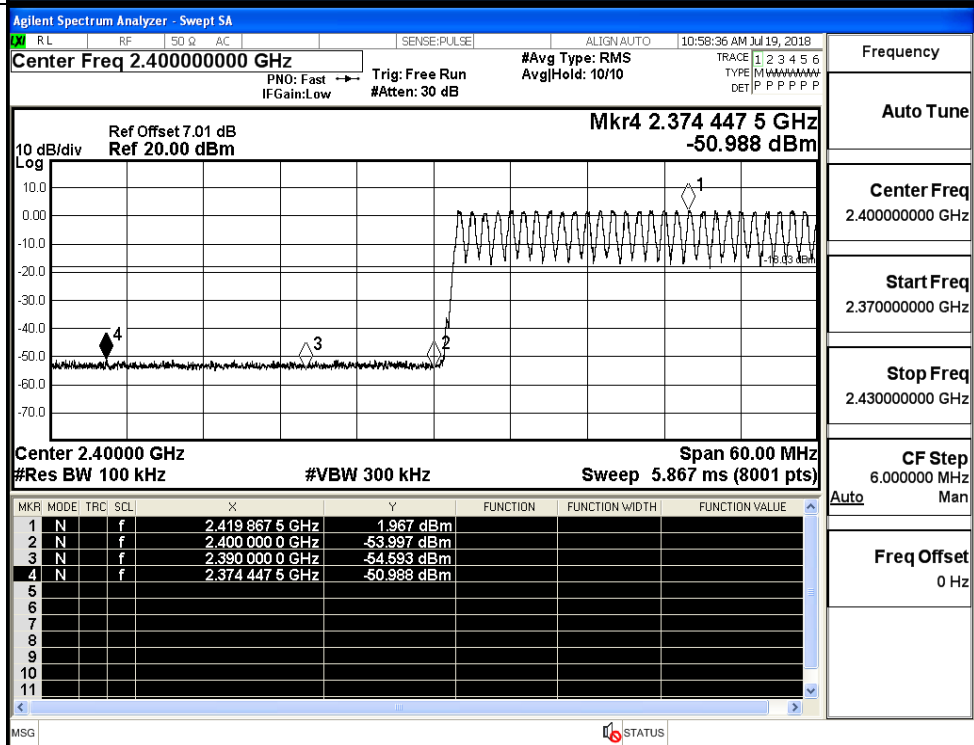
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK | LCH | 2402 | 2.024 | Off | -50.861 | -17.98 | PASS |
| | | | 1.967 | On | -50.988 | -18.03 | PASS |
| | HCH | 2480 | 1.501 | Off | -51.295 | -18.5 | PASS |
| | | | 1.528 | On | -50.402 | -18.47 | PASS |
| $\pi/4$ DQPSK | LCH | 2402 | -1.329 | Off | -50.113 | -21.33 | PASS |
| | | | 0.541 | On | -50.167 | -19.46 | PASS |
| | HCH | 2480 | 0.125 | Off | -50.670 | -19.88 | PASS |
| | | | 0.115 | On | -50.304 | -19.89 | PASS |
| 8DPSK | LCH | 2402 | -2.401 | Off | -50.918 | -22.4 | PASS |
| | | | 0.573 | On | -50.848 | -19.43 | PASS |
| | HCH | 2480 | 0.027 | Off | -50.778 | -19.97 | PASS |
| | | | 0.343 | On | -50.318 | -19.66 | PASS |

Test Graphs

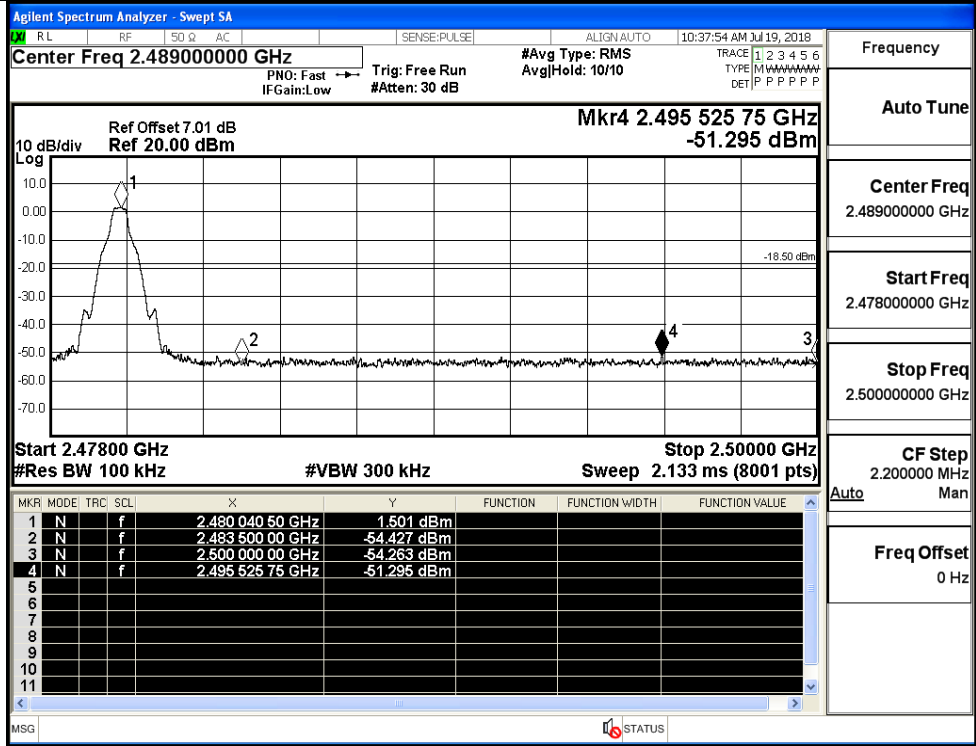
GFSK/LCH/No Hop



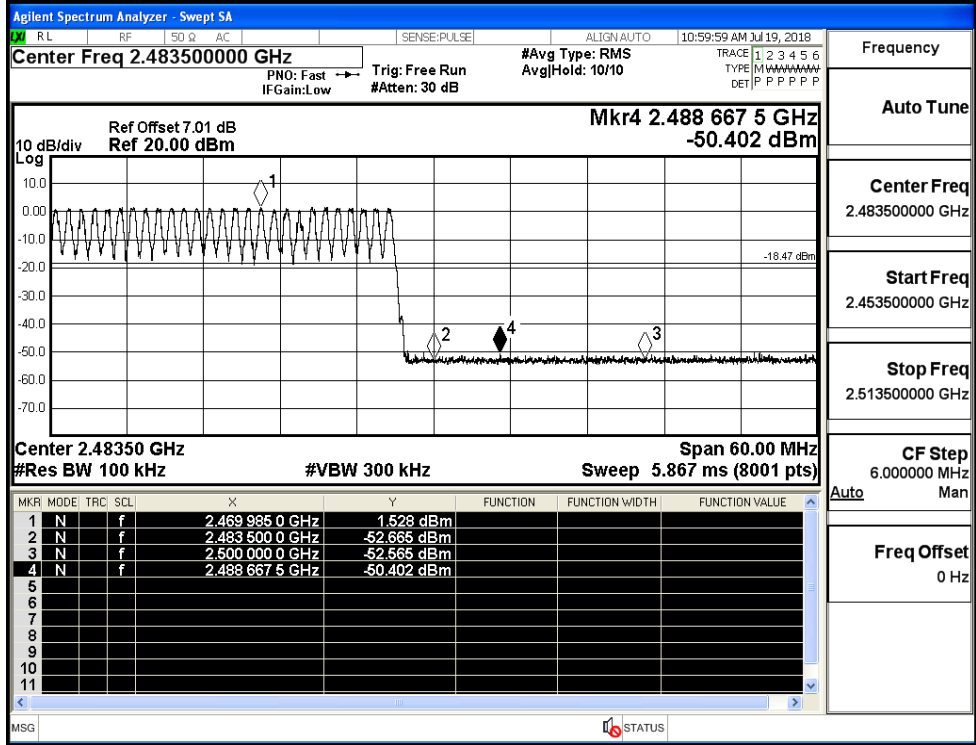
GFSK/LCH/Hop



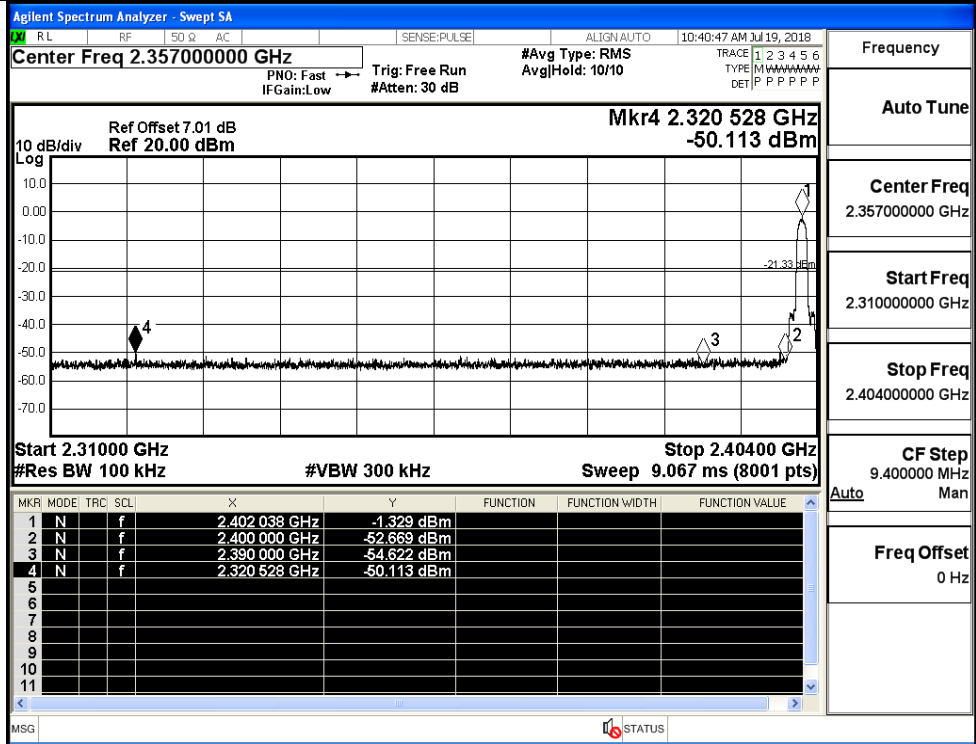
GFSK/HCH/No Hop



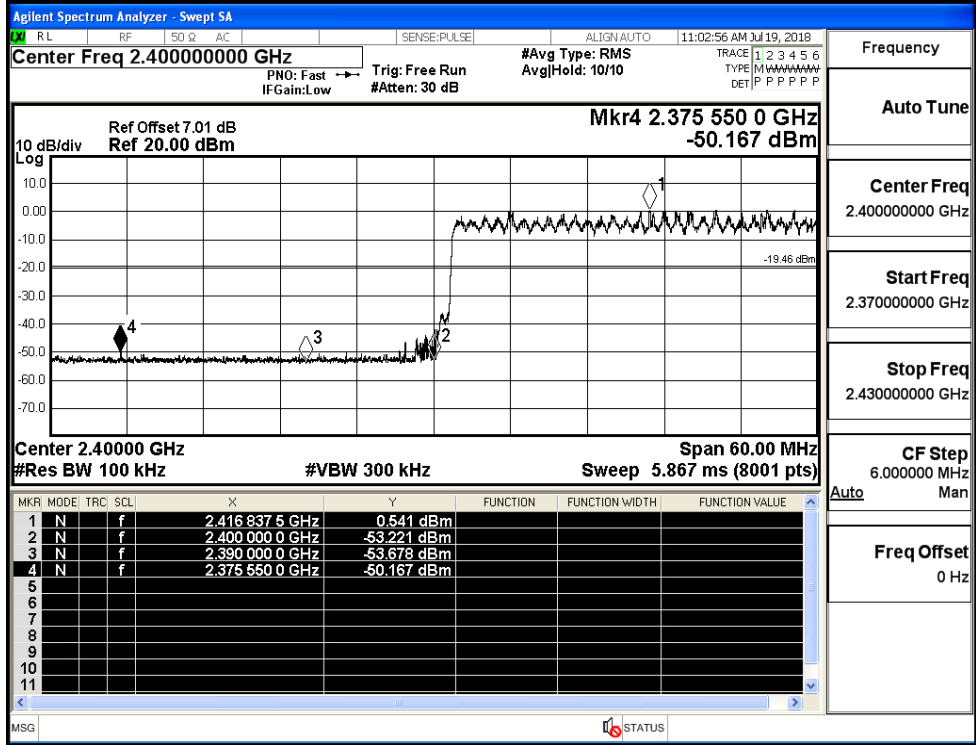
GFSK/HCH/Hop



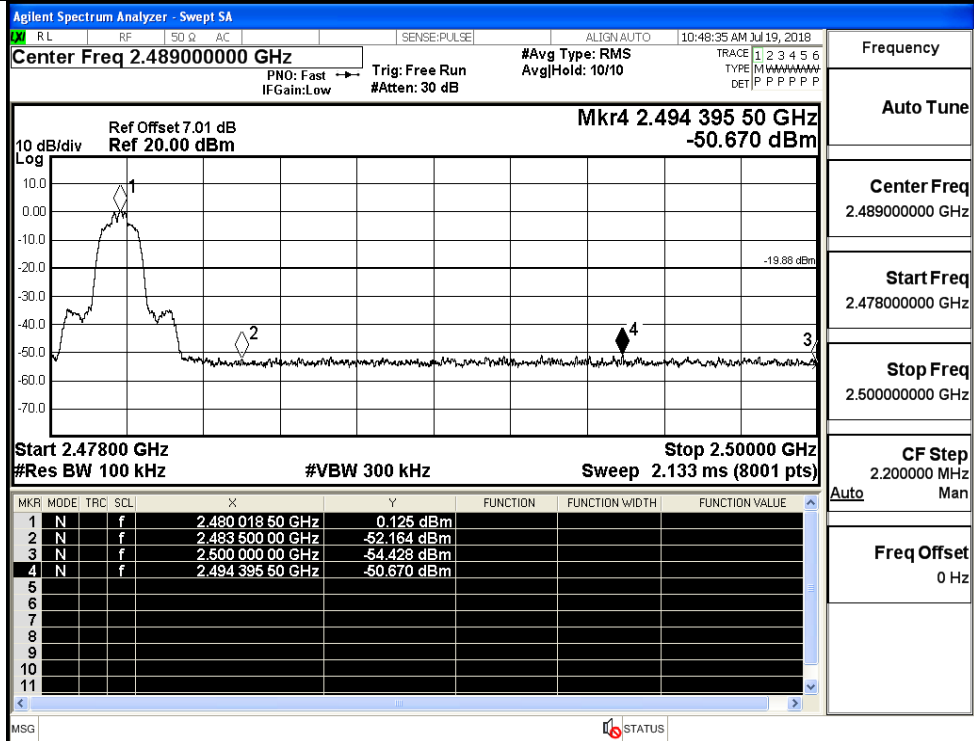
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop

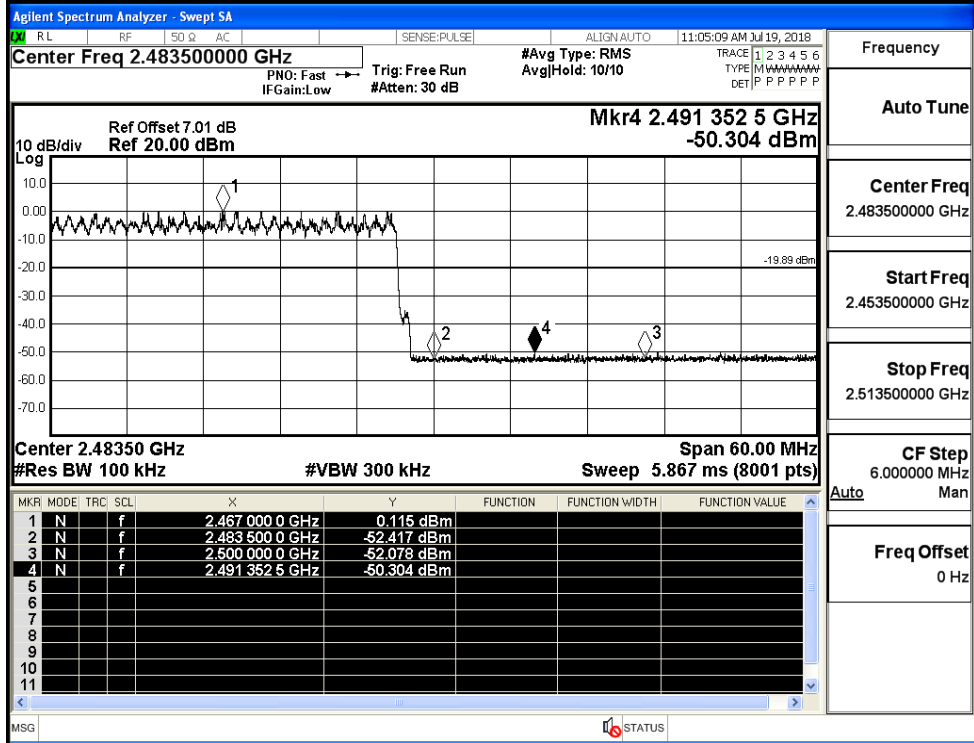


π /4DQPSK/HCH/No
Hop



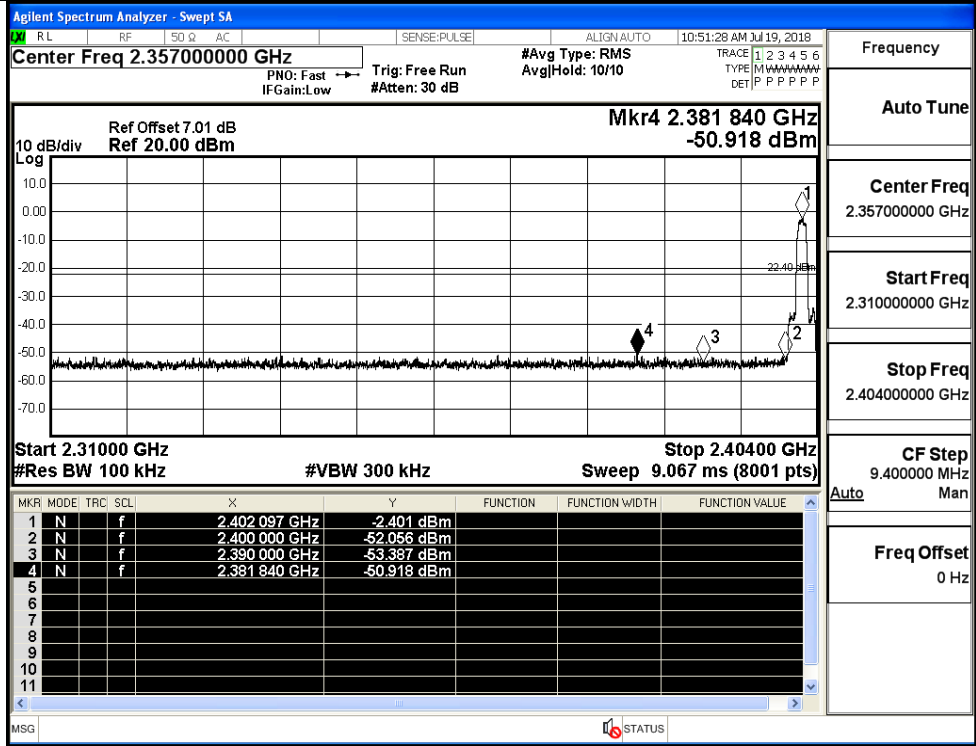
| | |
|-------------|-----------------|
| Frequency | |
| Auto Tune | |
| Center Freq | 2.489000000 GHz |
| Start Freq | 2.478000000 GHz |
| Stop Freq | 2.500000000 GHz |
| CF Step | 2.200000 MHz |
| Freq Offset | 0 Hz |

π /4DQPSK/HCH/Hop



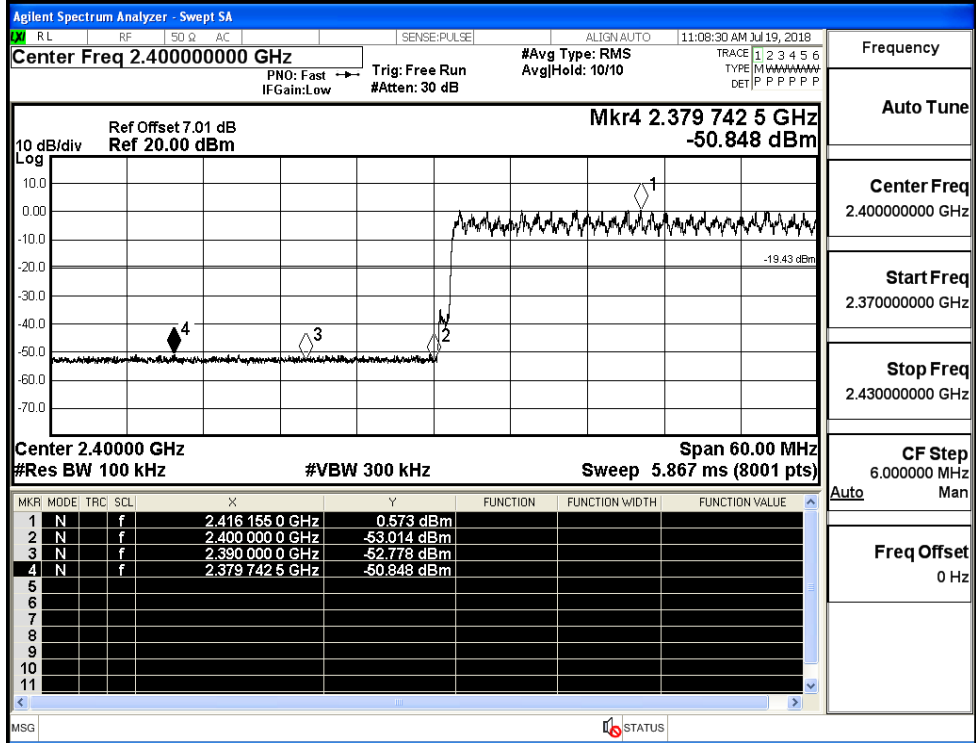
| | |
|-------------|-----------------|
| Frequency | |
| Auto Tune | |
| Center Freq | 2.483500000 GHz |
| Start Freq | 2.453500000 GHz |
| Stop Freq | 2.513500000 GHz |
| CF Step | 6.000000 MHz |
| Freq Offset | 0 Hz |

8DPSK/LCH/No Hop



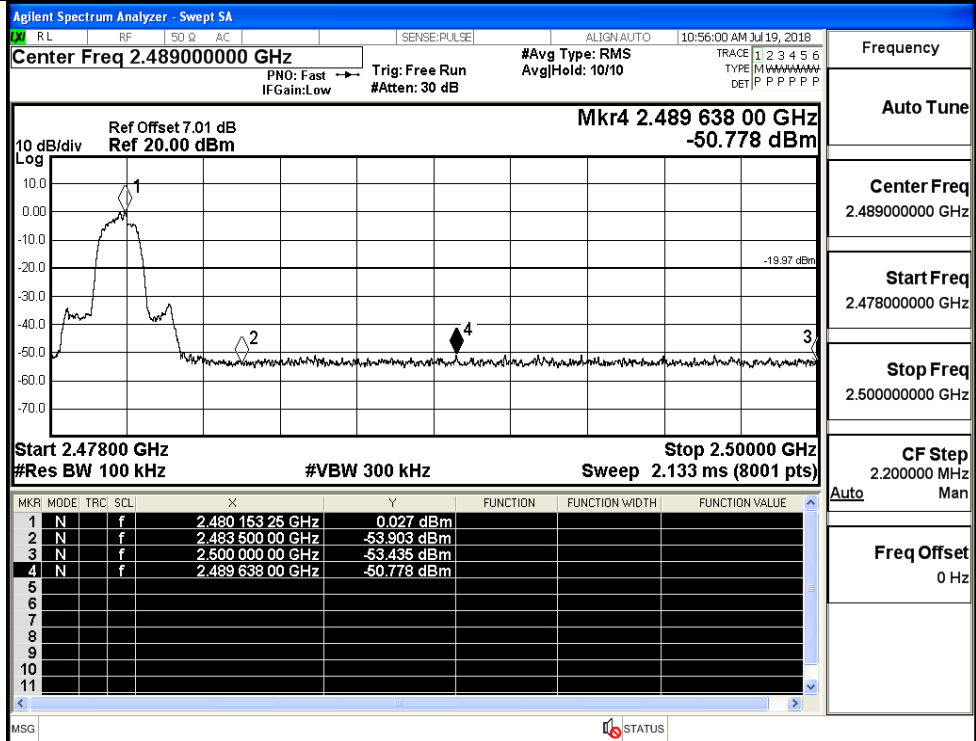
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

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

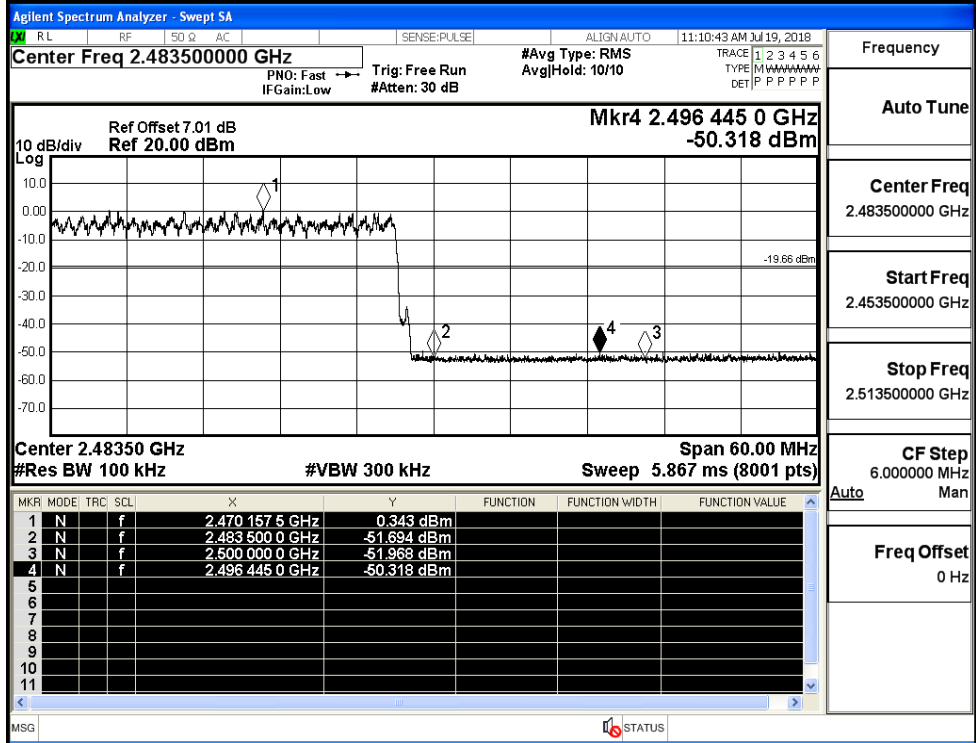
Start Freq
2.478000000 GHz

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

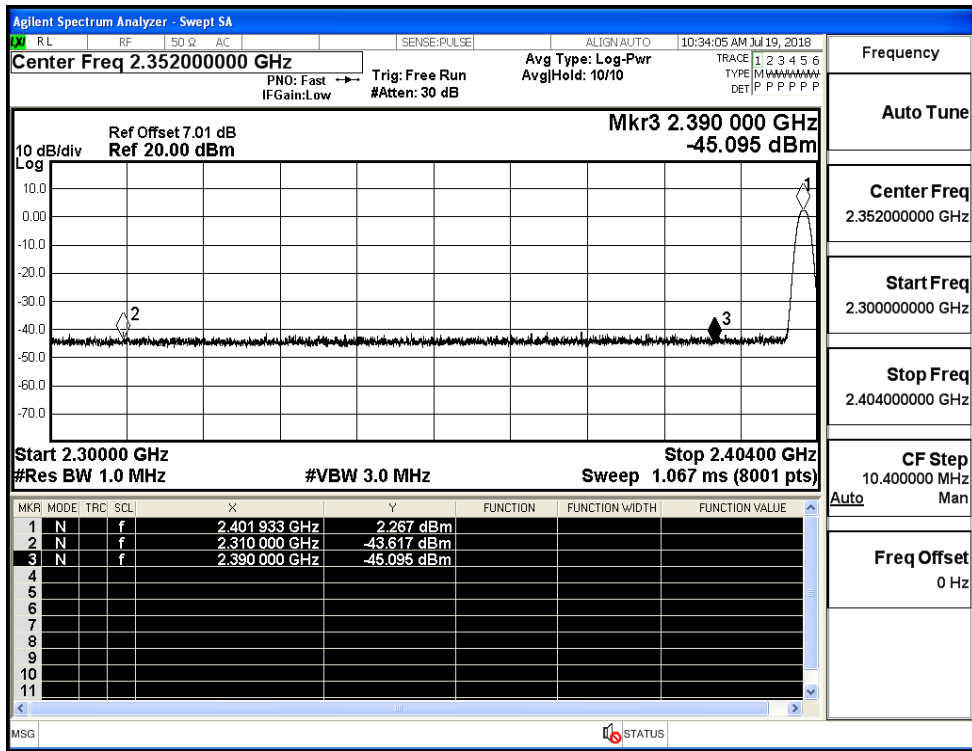
CF Step
6.000000 MHz

Freq Offset
0 Hz

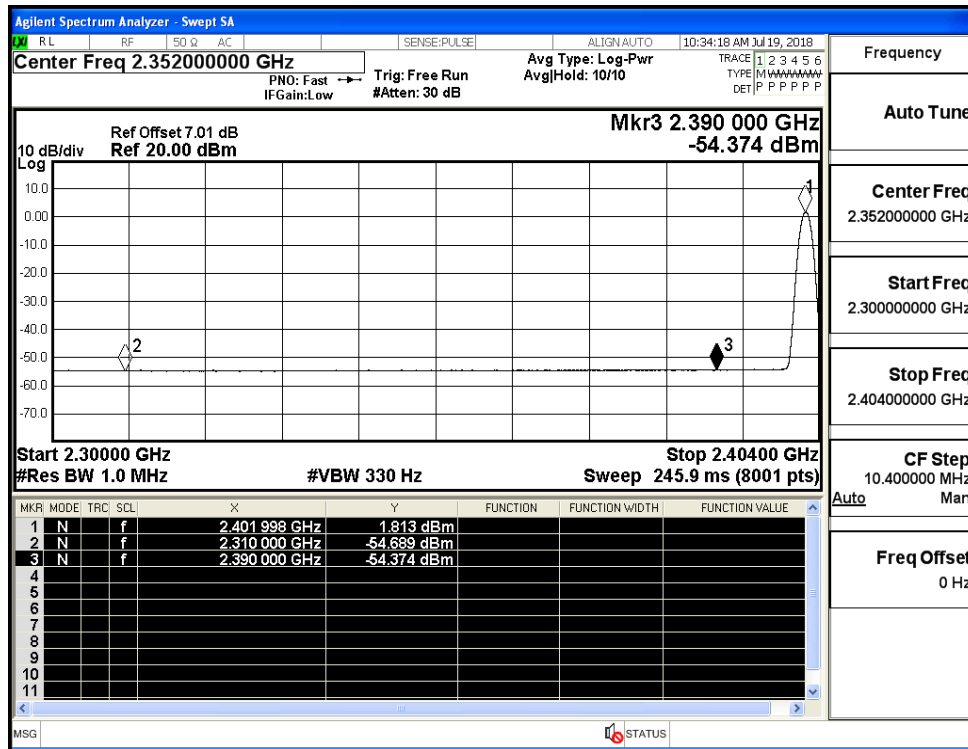
A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK | Off | 2310.0 | -43.62 | 2.0 | 0 | 53.64 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.69 | 2.0 | 0 | 42.57 | AV | 54 | PASS |
| | Off | 2390.0 | -45.10 | 2.0 | 0 | 52.16 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.37 | 2.0 | 0 | 42.88 | AV | 54 | PASS |
| | Off | 2483.5 | -44.83 | 2.0 | 0 | 52.43 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.05 | 2.0 | 0 | 43.21 | AV | 54 | PASS |
| | Off | 2500.0 | -43.91 | 2.0 | 0 | 53.35 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.03 | 2.0 | 0 | 43.23 | AV | 54 | PASS |
| $\pi/4$ DQPSK | Off | 2310.0 | -45.14 | 2.0 | 0 | 52.12 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.72 | 2.0 | 0 | 42.53 | AV | 54 | PASS |
| | Off | 2390.0 | -44.02 | 2.0 | 0 | 53.24 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.41 | 2.0 | 0 | 42.84 | AV | 54 | PASS |
| | Off | 2483.5 | -42.00 | 2.0 | 0 | 55.26 | PEAK | 74 | PASS |
| | Off | 2483.5 | -54.01 | 2.0 | 0 | 43.24 | AV | 54 | PASS |
| | Off | 2500.0 | -44.47 | 2.0 | 0 | 52.79 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.05 | 2.0 | 0 | 43.20 | AV | 54 | PASS |
| 8DPSK | Off | 2310.0 | -44.94 | 2.0 | 0 | 52.32 | PEAK | 74 | PASS |
| | Off | 2310.0 | -54.76 | 2.0 | 0 | 42.50 | AV | 54 | PASS |
| | Off | 2390.0 | -43.97 | 2.0 | 0 | 53.29 | PEAK | 74 | PASS |
| | Off | 2390.0 | -54.47 | 2.0 | 0 | 42.79 | AV | 54 | PASS |
| | Off | 2483.5 | -44.32 | 2.0 | 0 | 52.94 | PEAK | 74 | PASS |
| | Off | 2483.5 | -53.99 | 2.0 | 0 | 43.27 | AV | 54 | PASS |
| | Off | 2500.0 | -43.88 | 2.0 | 0 | 53.38 | PEAK | 74 | PASS |
| | Off | 2500.0 | -54.02 | 2.0 | 0 | 43.24 | AV | 54 | PASS |

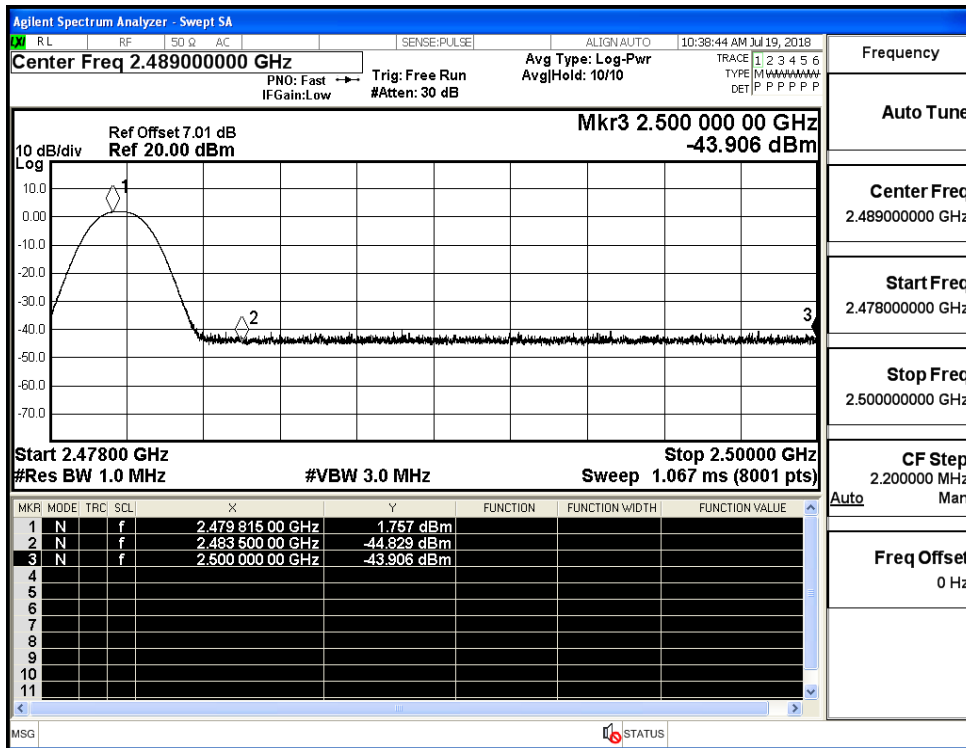
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



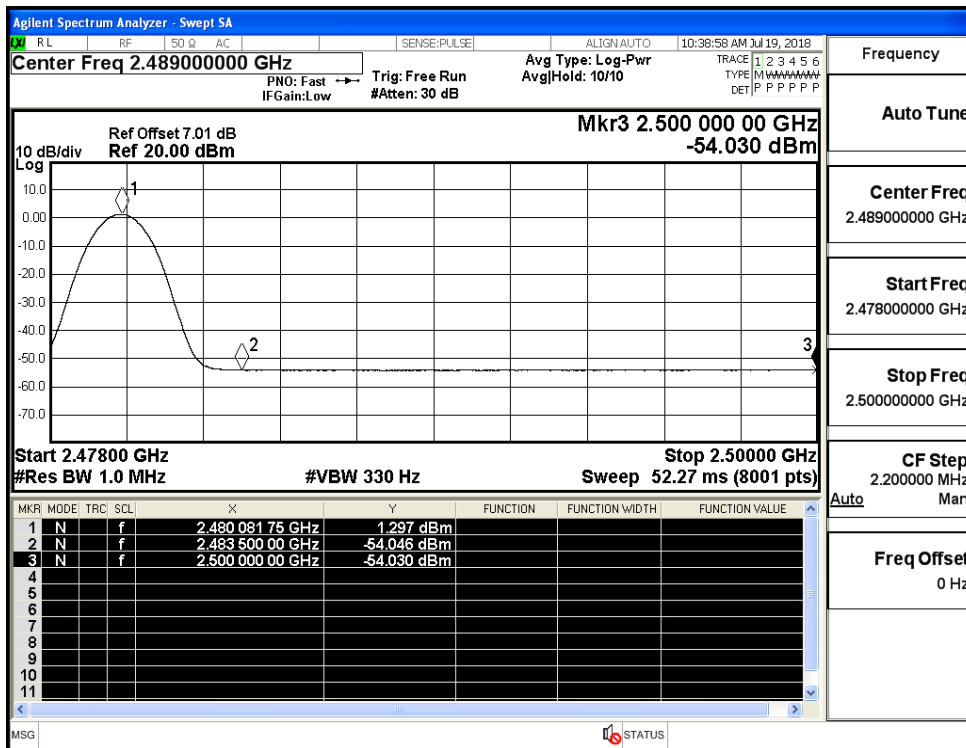
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



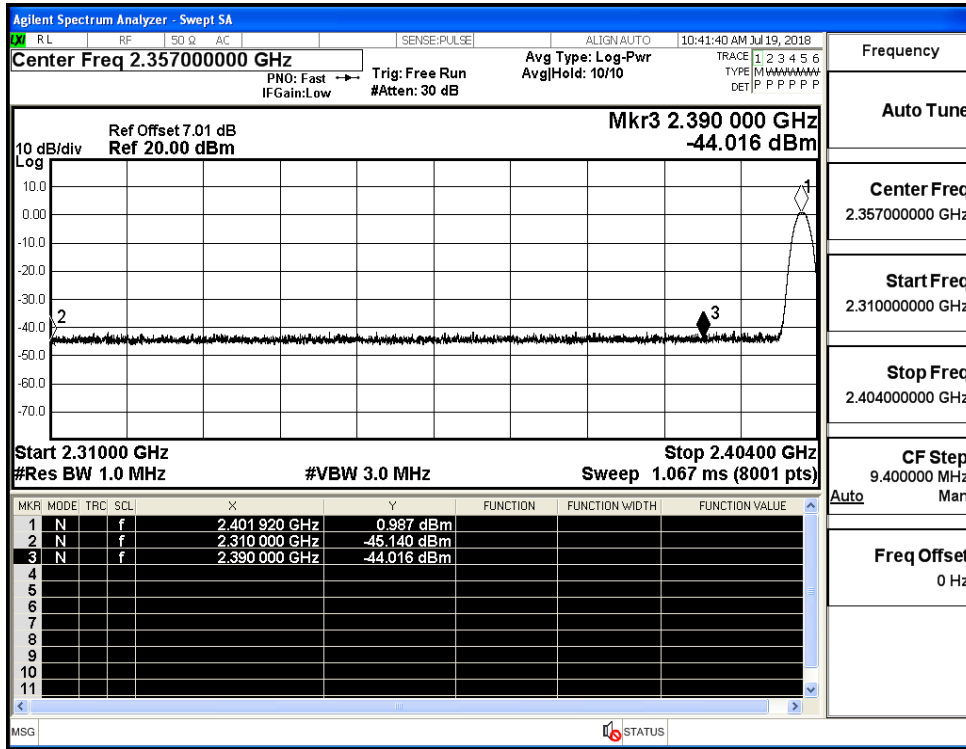
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



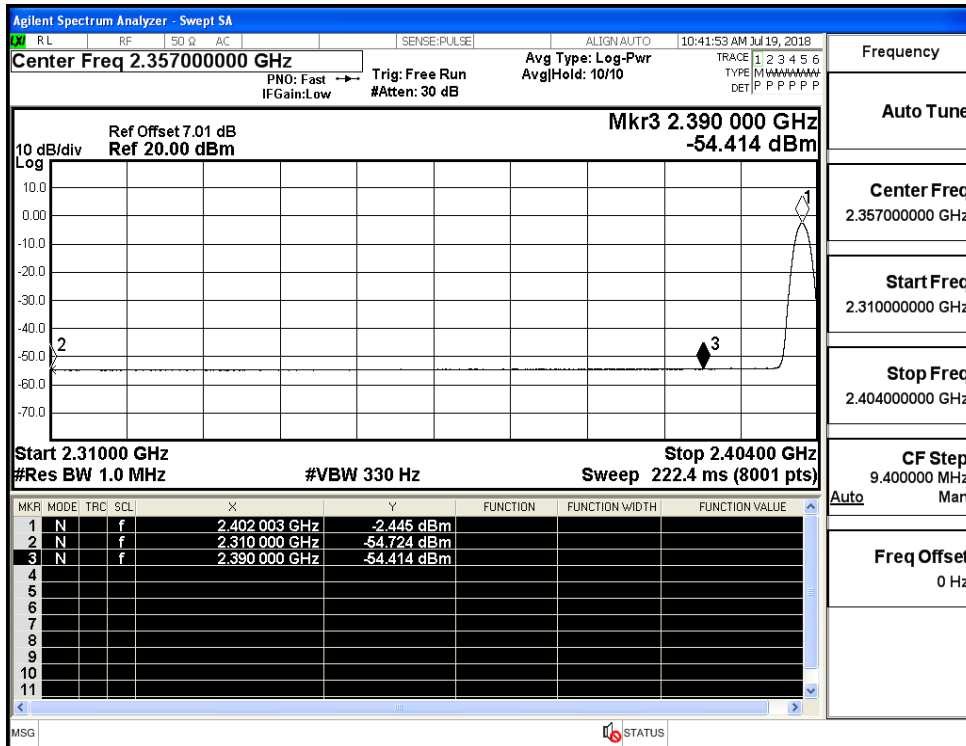
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



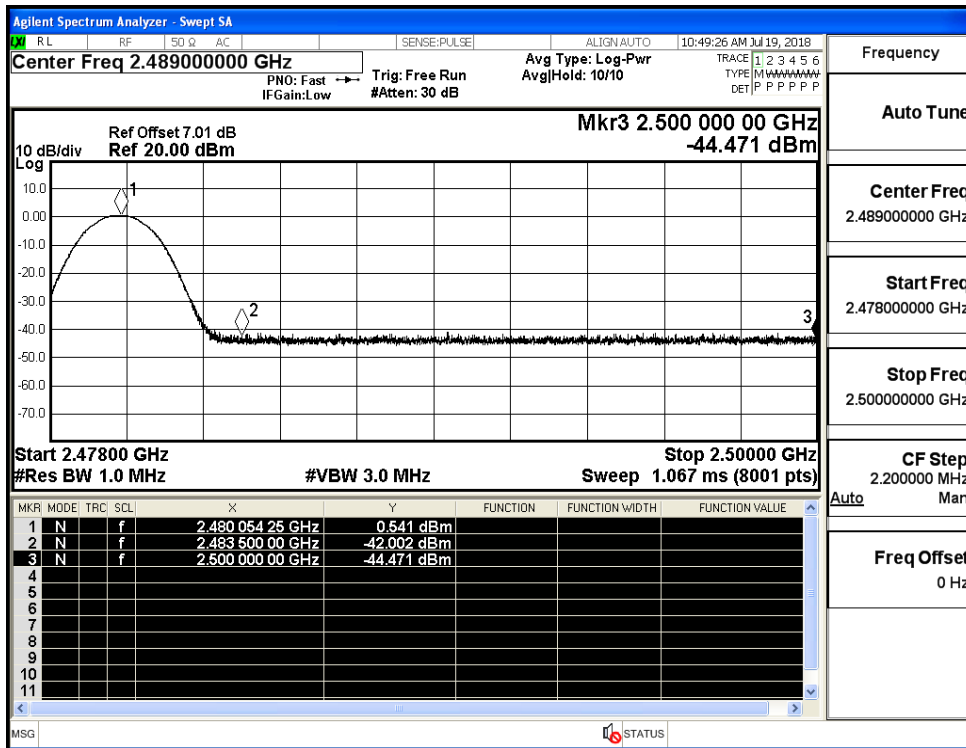
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



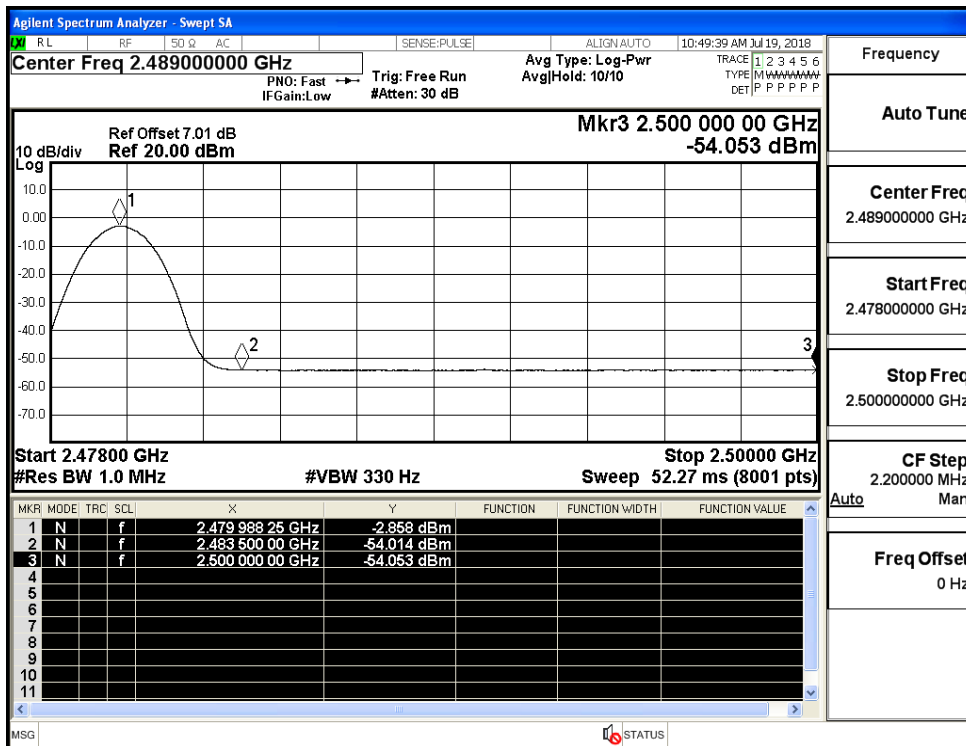
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



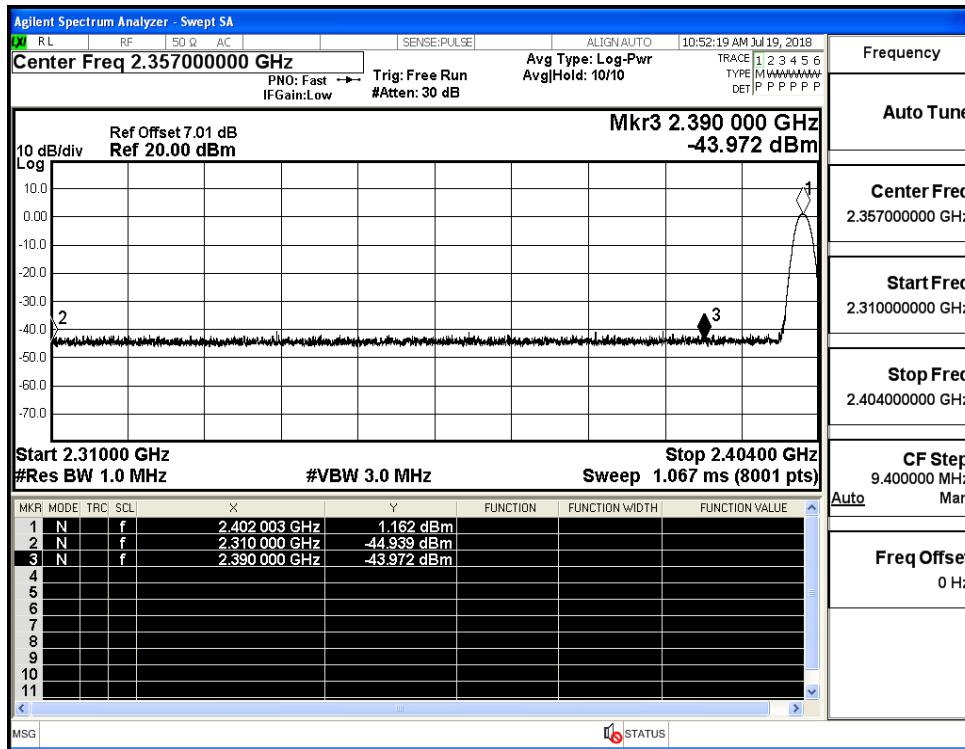
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



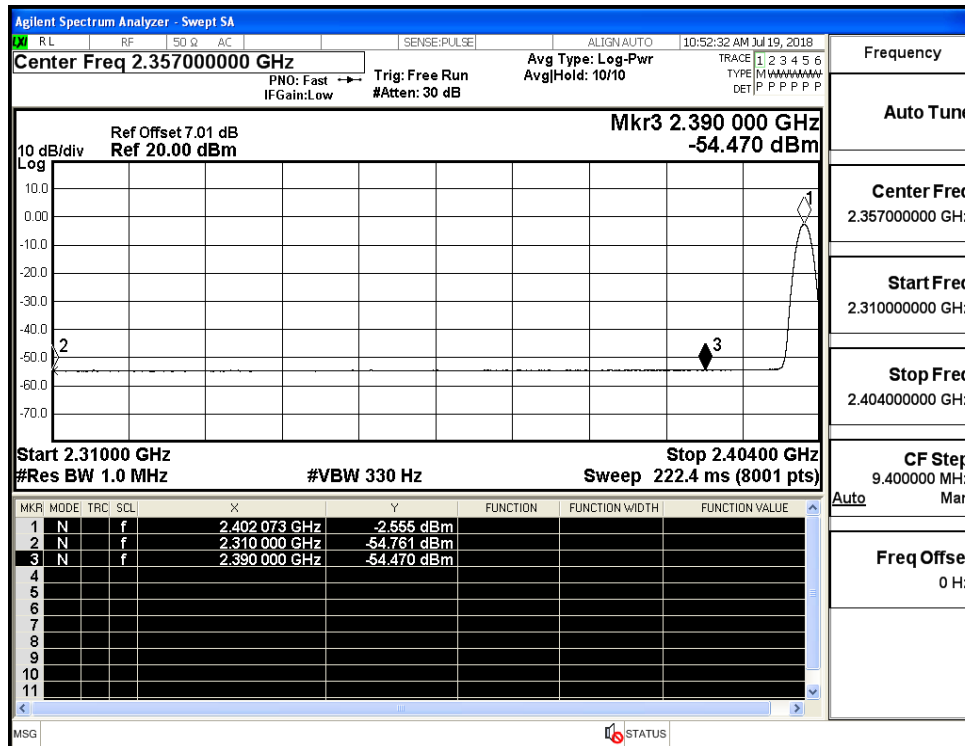
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



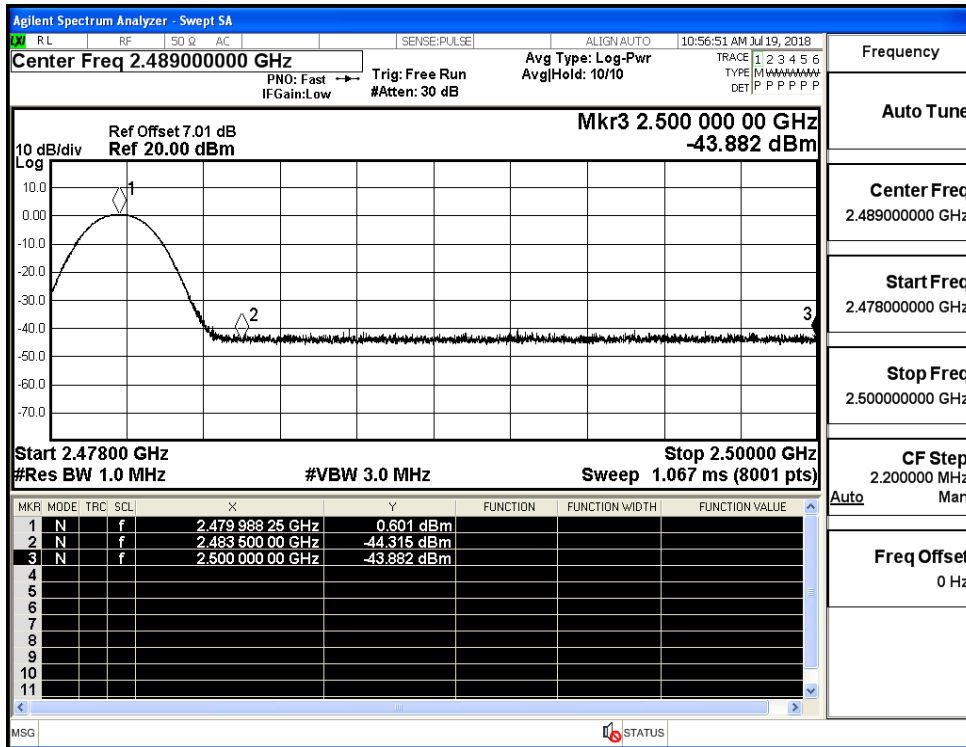
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

