

Appendix A

RF Test Data for BT V3.0(BDR/EDR) (Conducted Measurement)

Product Name: BLUETOOTH SPEAKER

Trade Mark: N/A

Test Model: Q8

Environmental Conditions

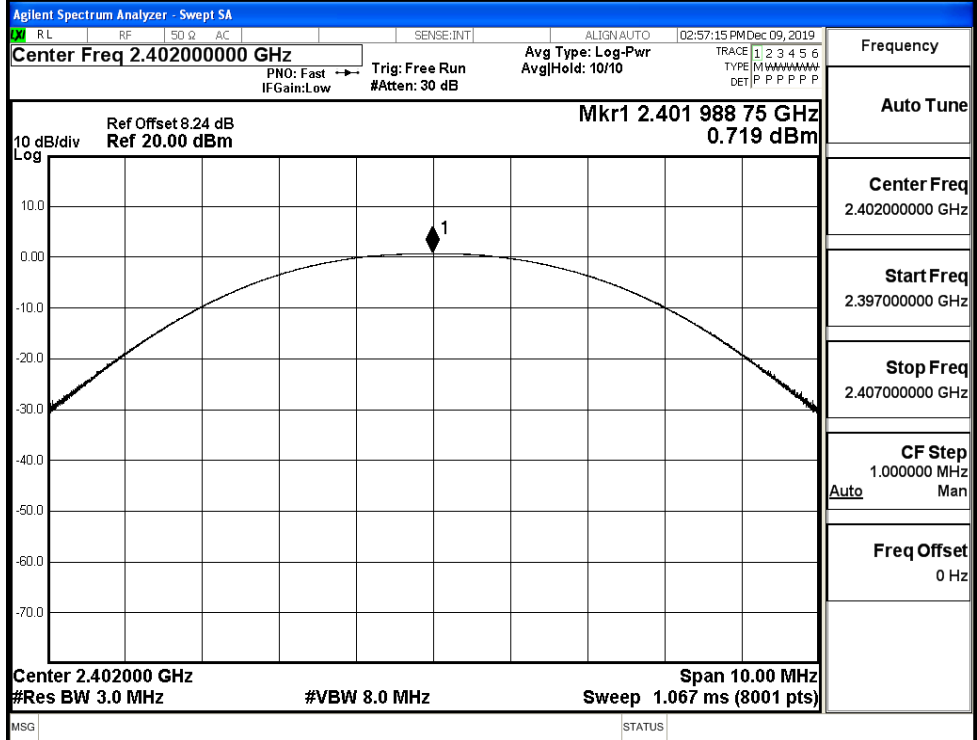
| | |
|--------------------|-------------|
| Temperature: | 23.5° C |
| Relative Humidity: | 53.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Alisa Huang |
| Supervised by: | Wang.Chuang |

A.1 Maximum Conducted Peak Output Power

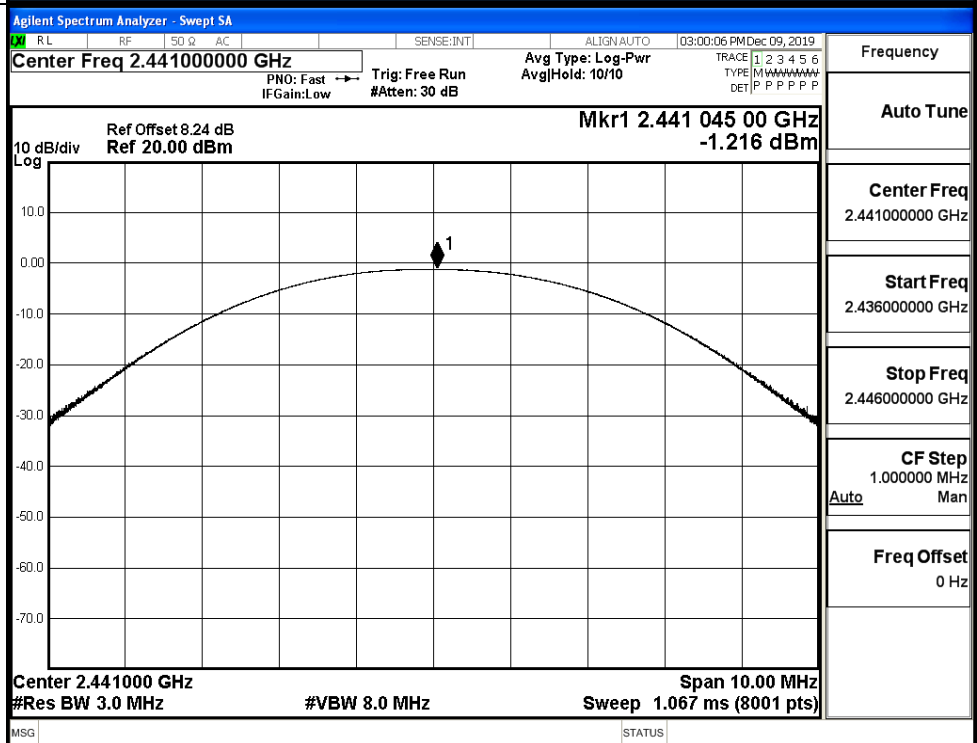
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---------------|----------|---------------------------------|-------------|---------|
| GFSK | LCH | 0.719 | 21 | PASS |
| | MCH | -1.216 | 21 | PASS |
| | HCH | 0.076 | 21 | PASS |
| $\pi/4$ DQPSK | LCH | -0.085 | 21 | PASS |
| | MCH | -1.896 | 21 | PASS |
| | HCH | -0.575 | 21 | PASS |
| 8DPSK | LCH | 0.186 | 21 | PASS |
| | MCH | -1.628 | 21 | PASS |
| | HCH | -0.430 | 21 | PASS |

Test Graphs

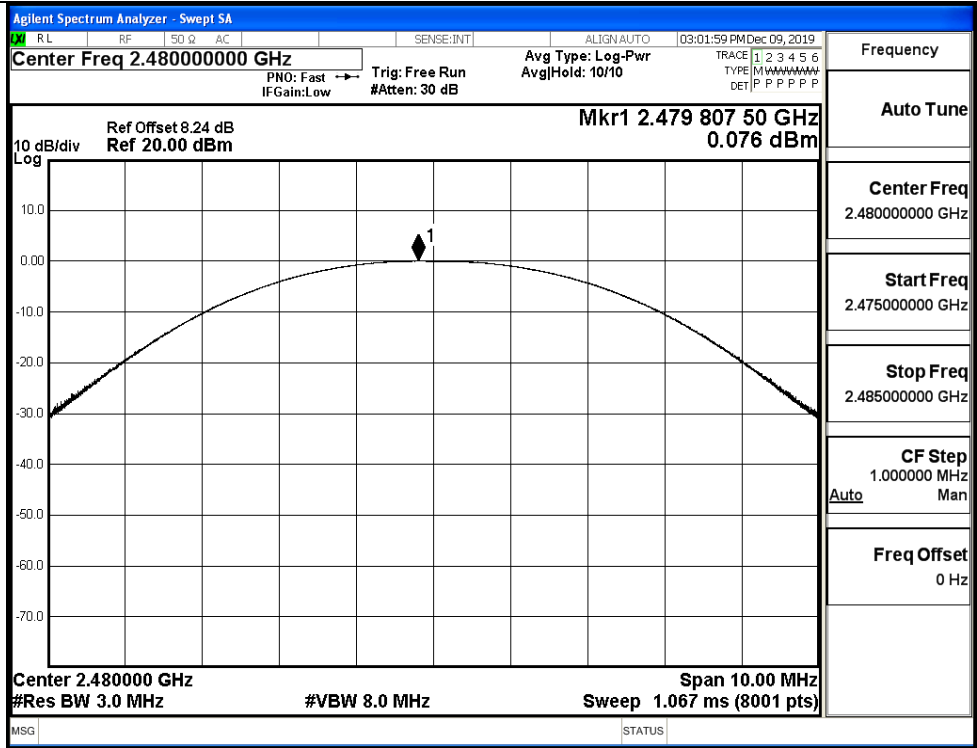
GFSK/LCH



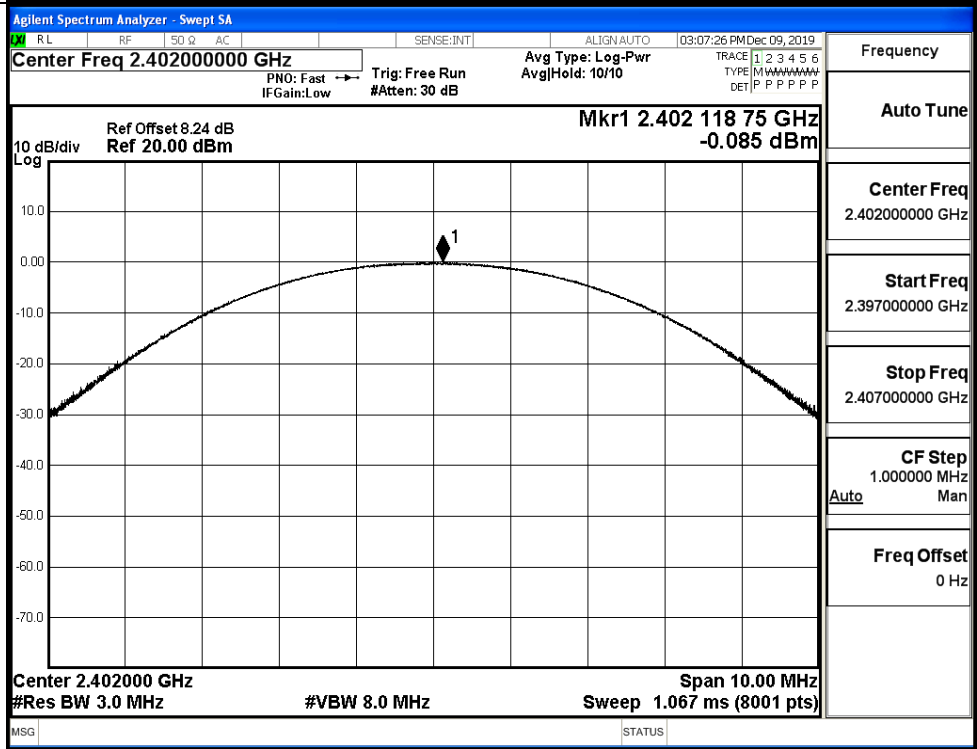
GFSK/MCH



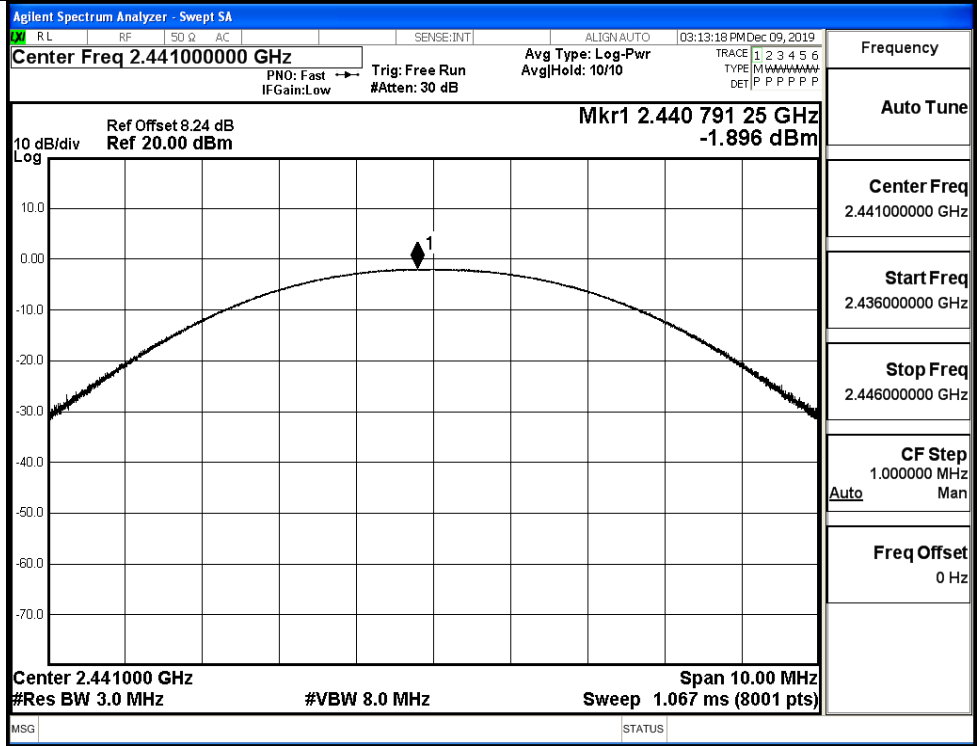
GFSK/HCH



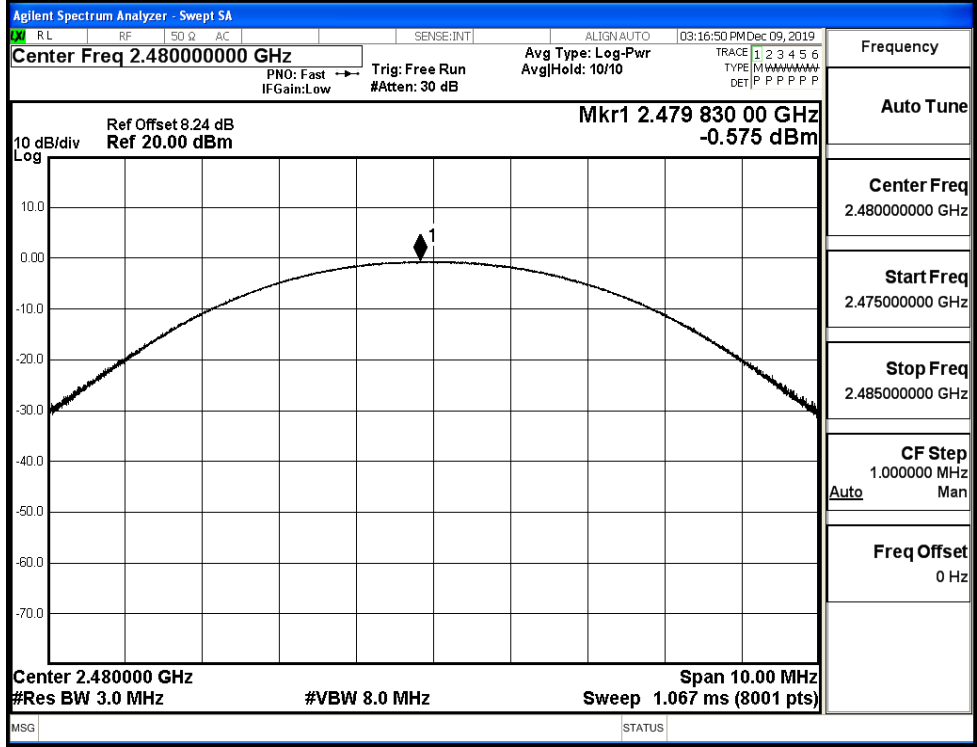
$\pi/4$ DQPSK/LCH



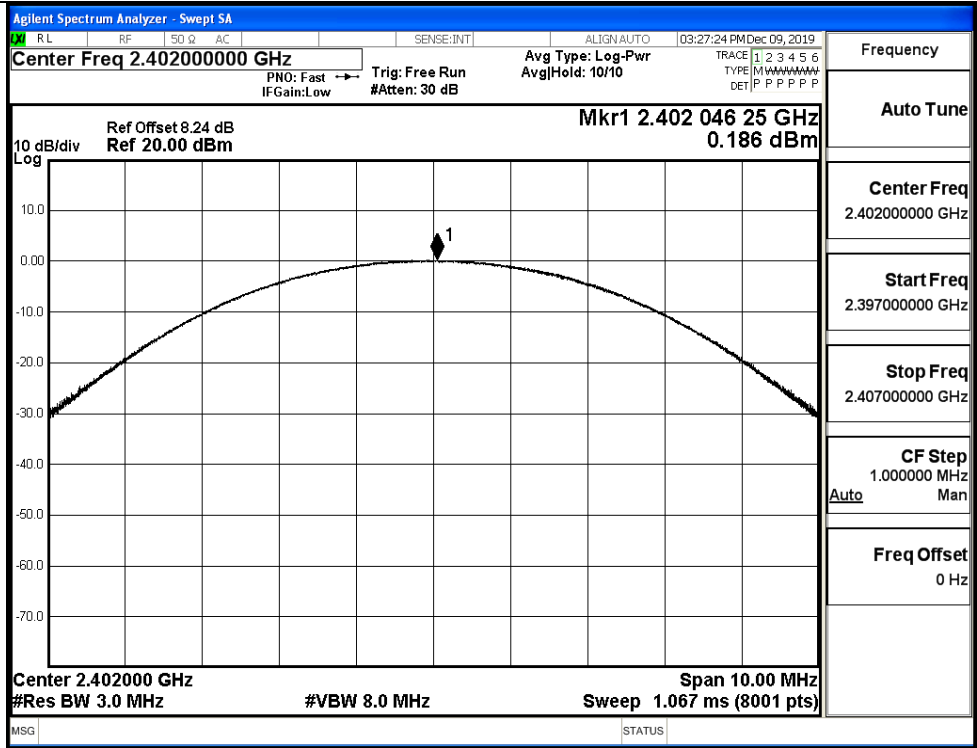
$\pi/4$ DQPSK/MCH



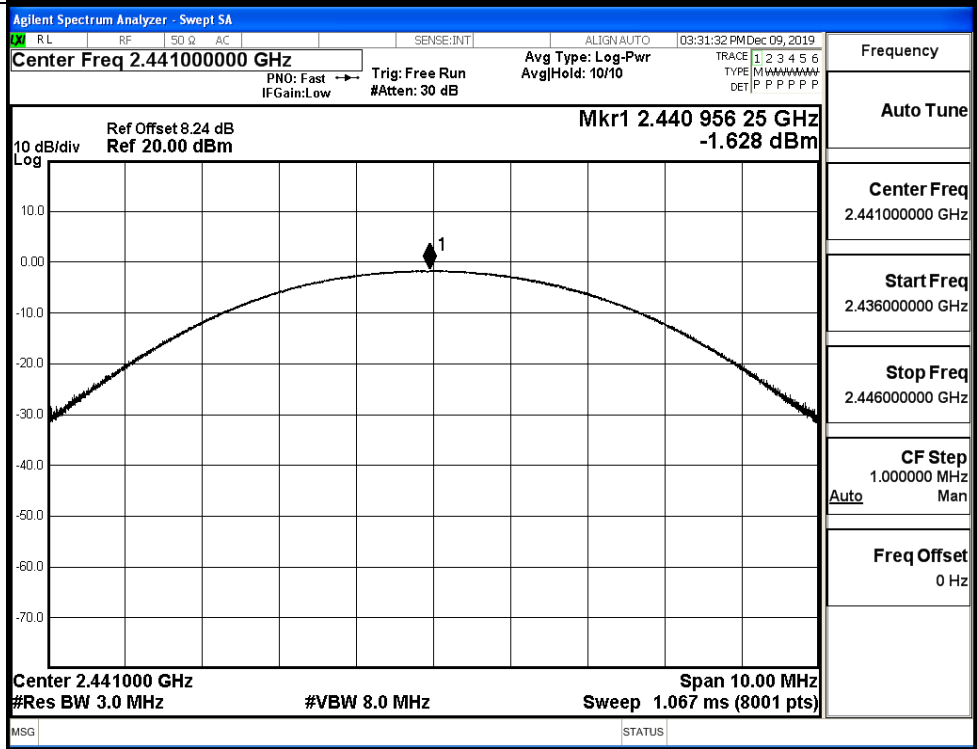
$\pi/4$ DQPSK/HCH



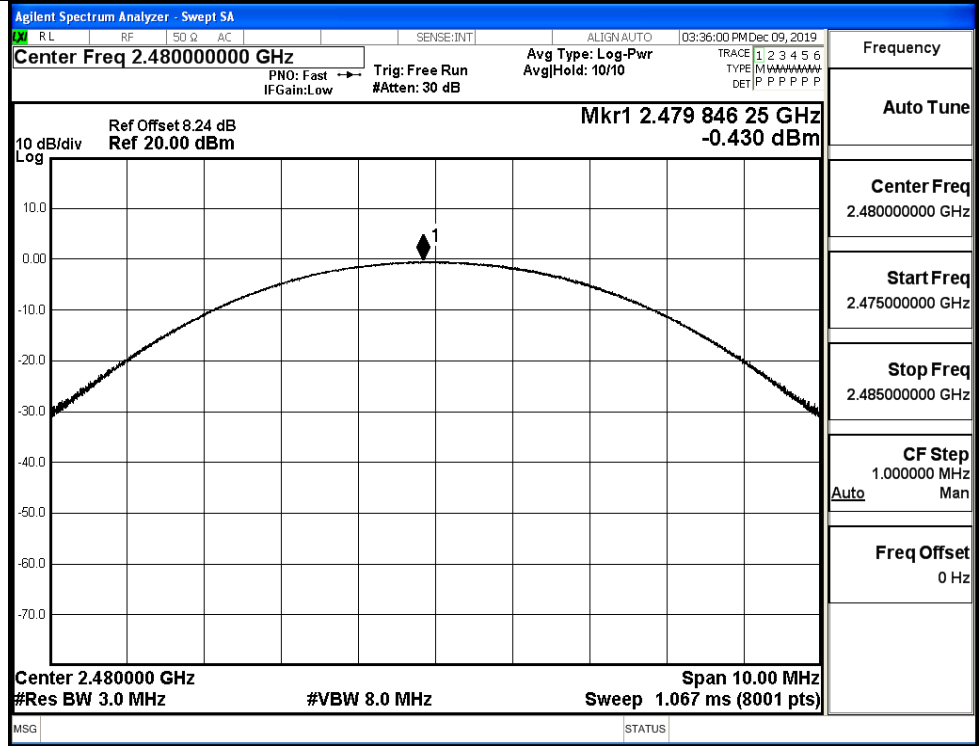
8DPSK/LCH



8DPSK/MCH

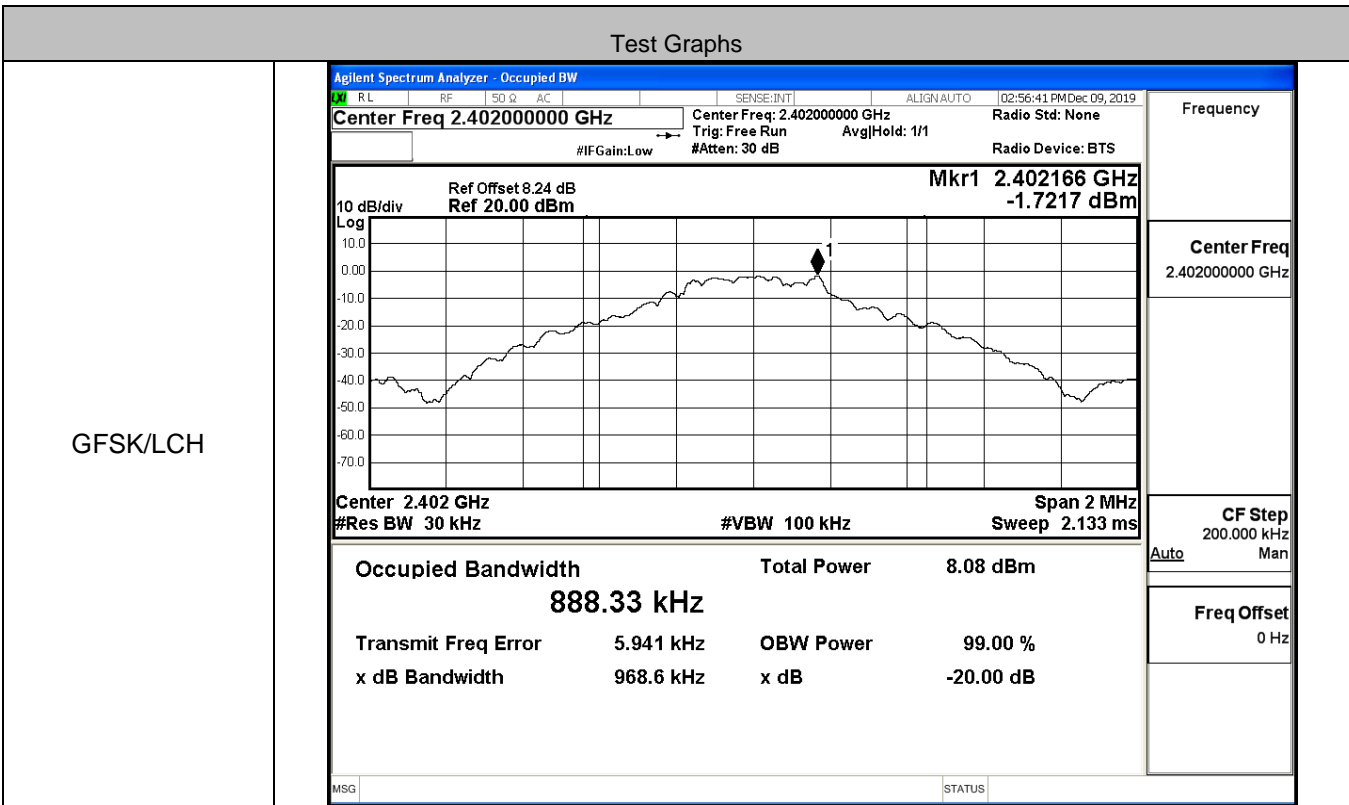


8DPSK/HCH

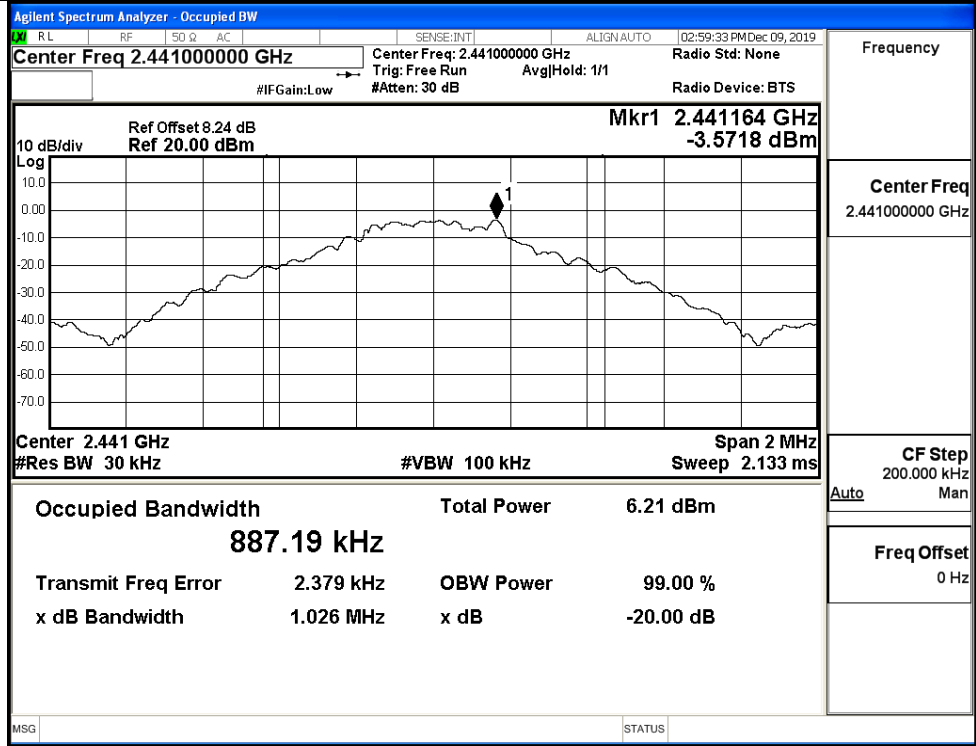


A.2 20dB Bandwidth

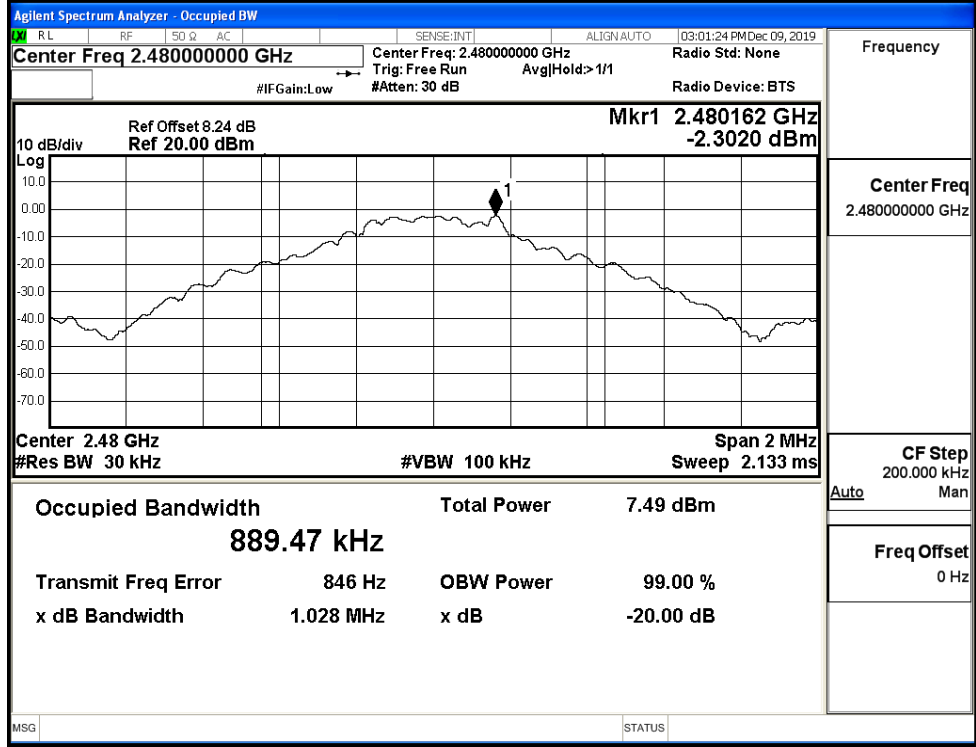
| Mode | Channel. | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK | LCH | 0.9686 | Not Specified | PASS |
| | MCH | 1.026 | Not Specified | PASS |
| | HCH | 1.028 | Not Specified | PASS |
| $\pi/4$ DQPSK | LCH | 1.288 | Not Specified | PASS |
| | MCH | 1.308 | Not Specified | PASS |
| | HCH | 1.290 | Not Specified | PASS |
| 8DPSK | LCH | 1.291 | Not Specified | PASS |
| | MCH | 1.296 | Not Specified | PASS |
| | HCH | 1.294 | Not Specified | PASS |



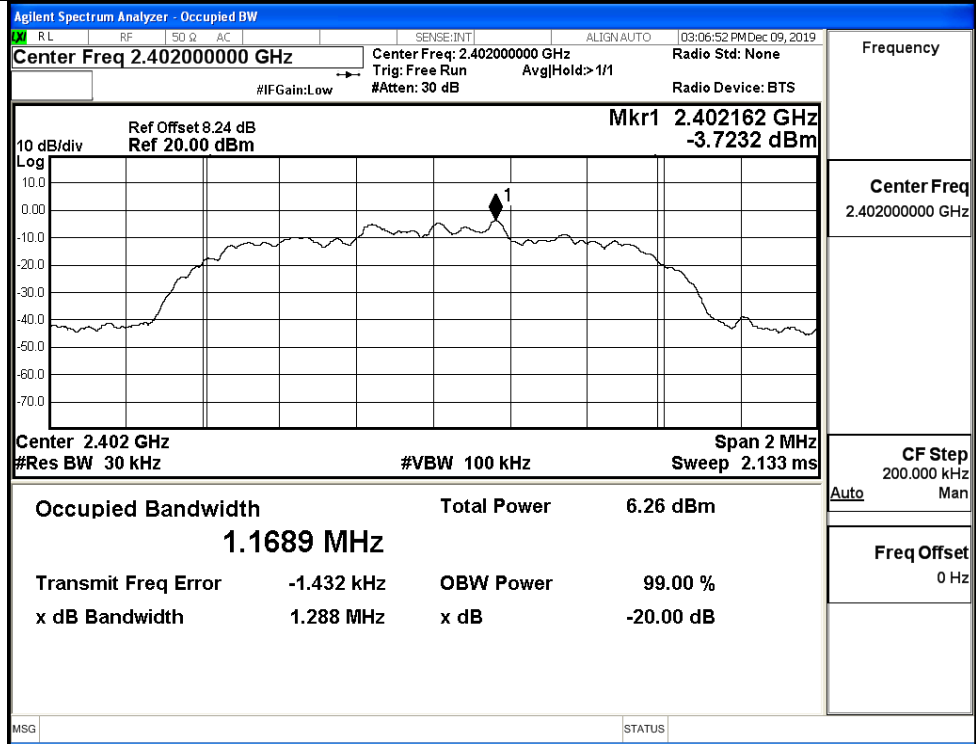
GFSK/MCH



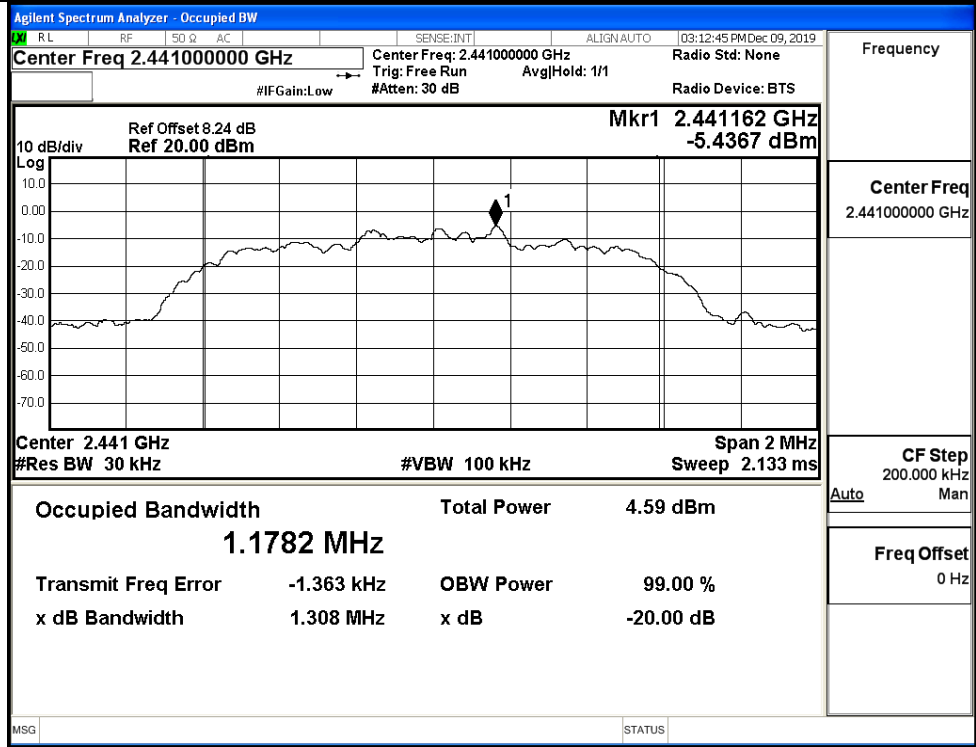
GFSK/HCH



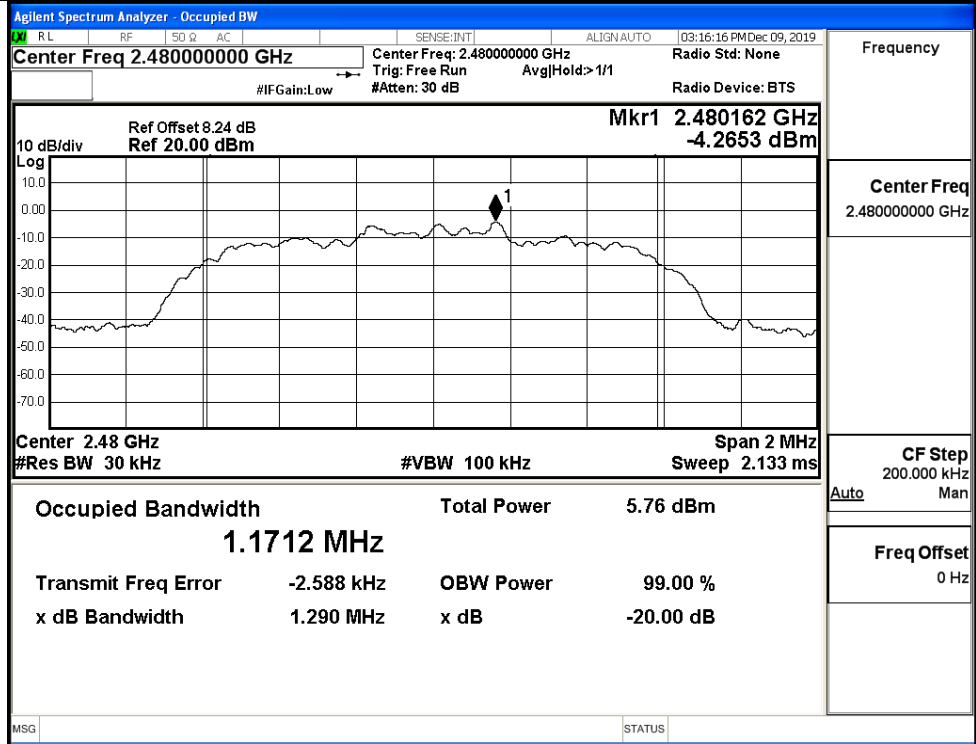
$\pi/4$ DQPSK/LCH



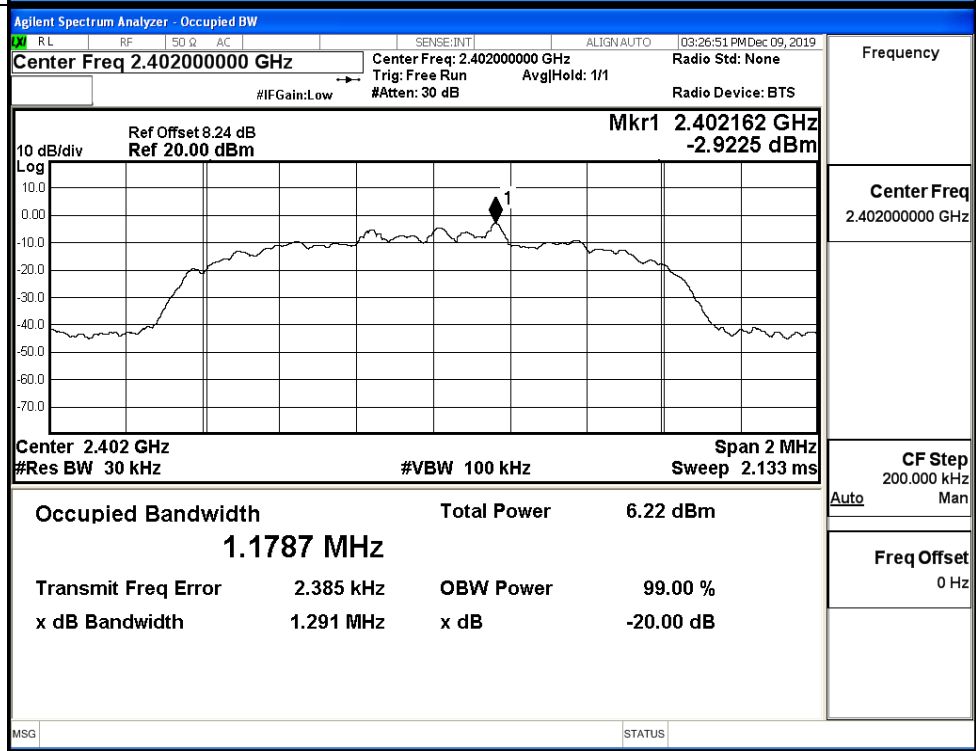
$\pi/4$ DQPSK/MCH



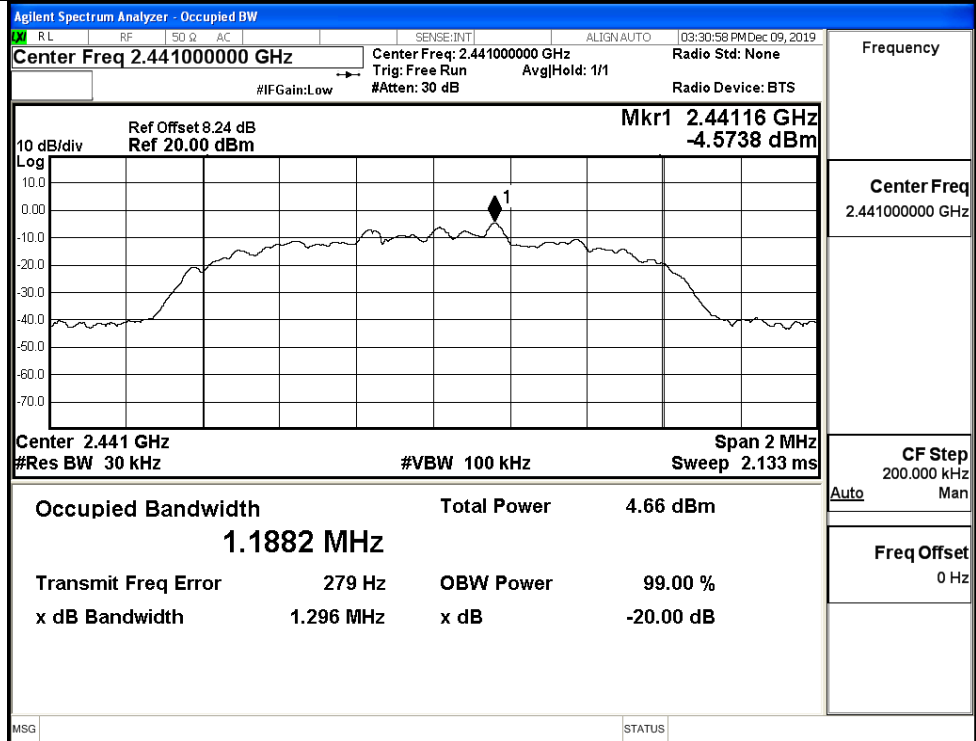
$\pi/4$ DQPSK/HCH



8DPSK/LCH



8DPSK/MCH



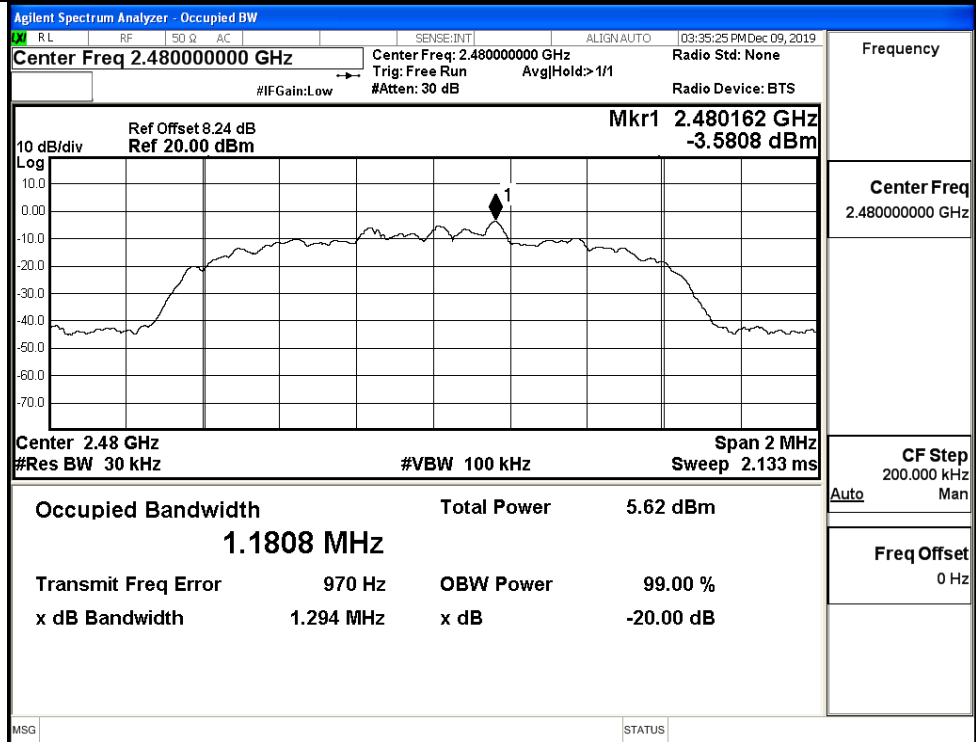
Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

8DPSK/HCH



Frequency

Center Freq
2.480000000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

A.3 Carrier Frequency Separation

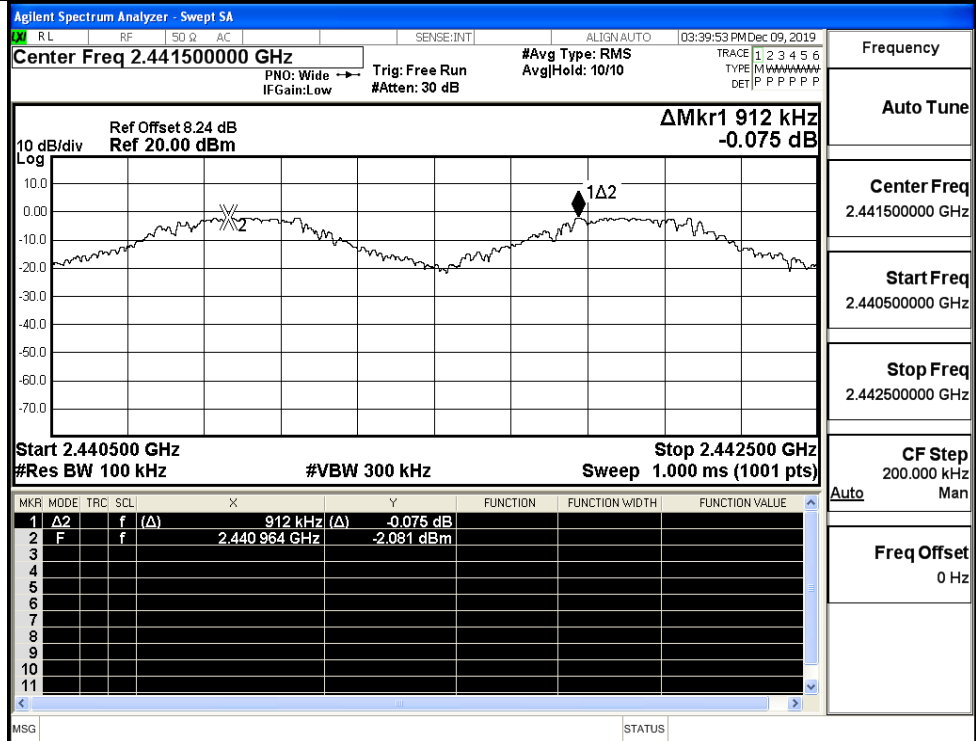
| Mode | Channel | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|----------|---------|------------------------------------|-------------|---------|
| GFSK | LCH | 1.110 | 0.685 | PASS |
| | MCH | 0.912 | 0.685 | PASS |
| | HCH | 0.980 | 0.685 | PASS |
| π/4DQPSK | LCH | 0.880 | 0.872 | PASS |
| | MCH | 1.104 | 0.872 | PASS |
| | HCH | 1.234 | 0.872 | PASS |
| 8DPSK | LCH | 1.160 | 0.864 | PASS |
| | MCH | 1.040 | 0.864 | PASS |
| | HCH | 1.022 | 0.864 | PASS |

Test Graphs

GFSK/LCH

| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|-----|-----|------------------|------------|----------|----------------|----------------|
| 1 | Δ2 | f | (Δ) | 1.110 50 MHz (Δ) | 0.738 dB | | | |
| 2 | F | f | | 2.402 056 00 GHz | -0.104 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

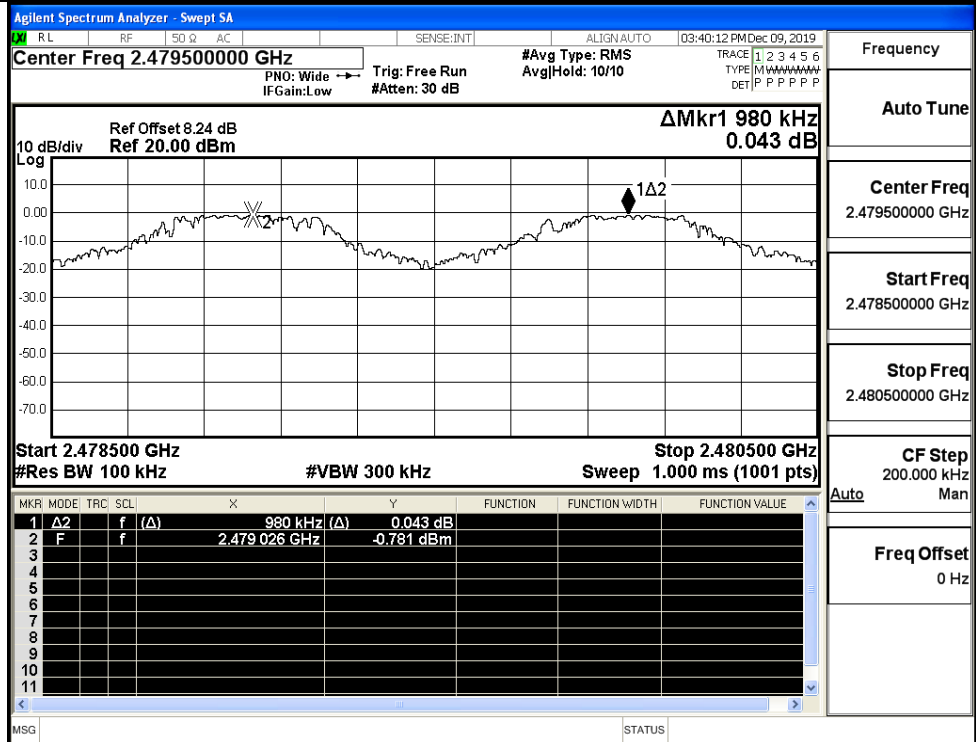
200.000 kHz

Auto

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

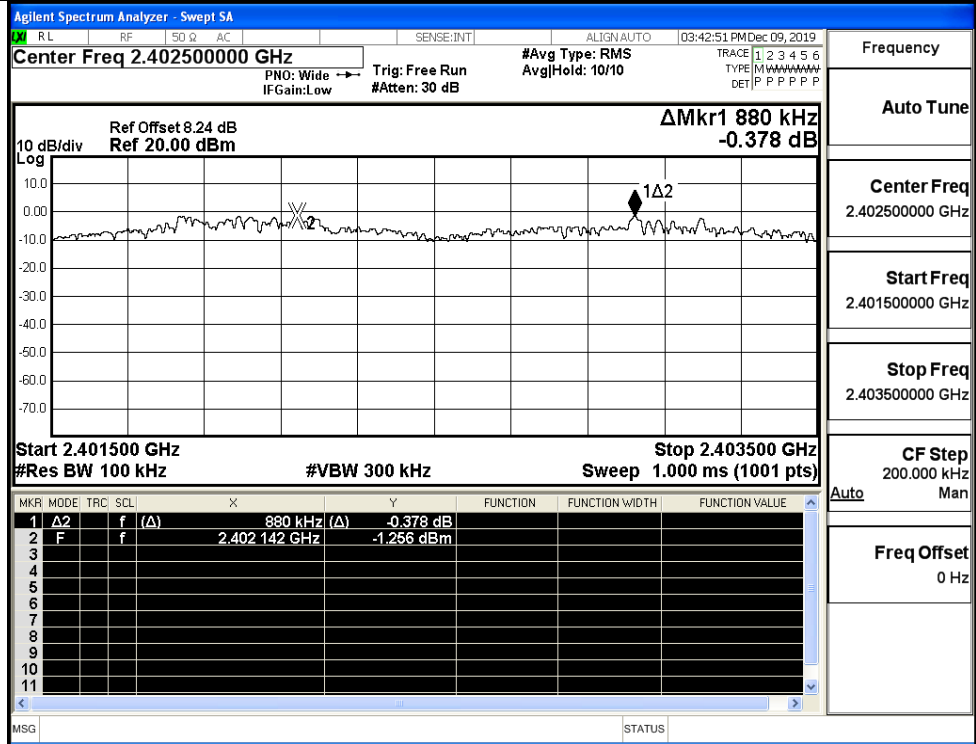
200.000 kHz

Auto

Freq Offset

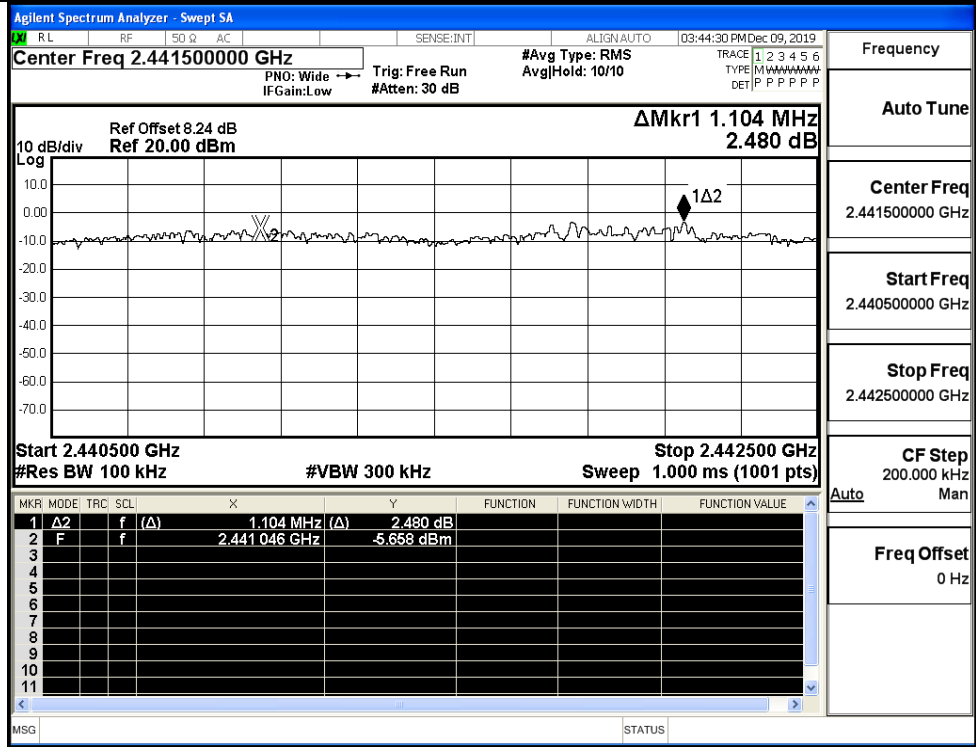
0 Hz

$\pi/4$ DQPSK/LCH



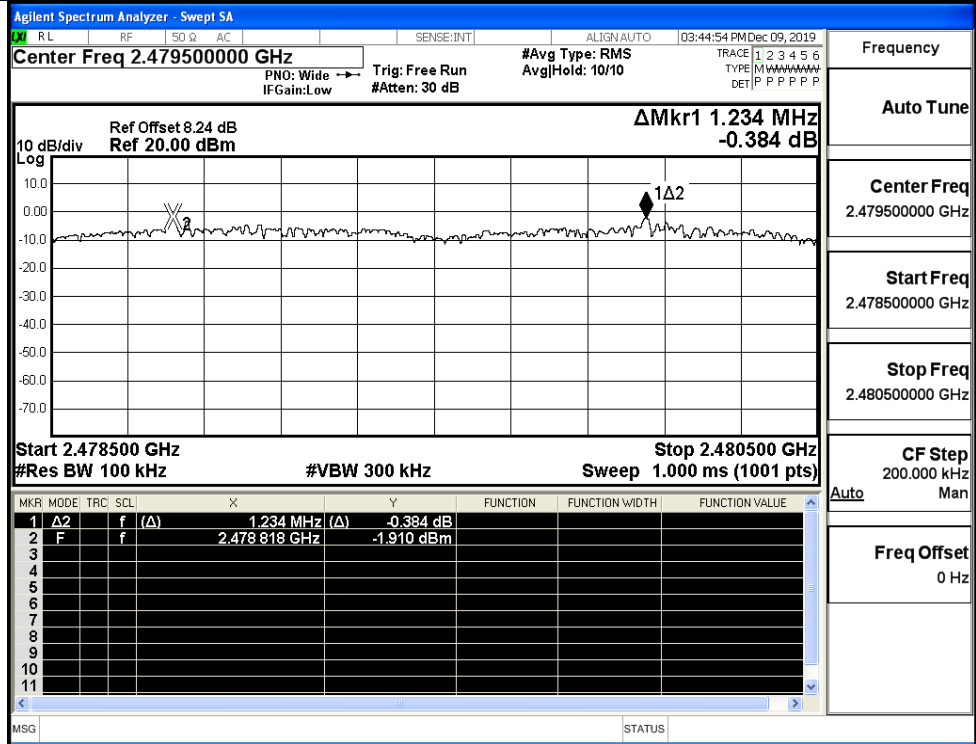
| |
|--------------------------------|
| Frequency |
| Auto Tune |
| Center Freq 2.402500000 GHz |
| Start Freq 2.401500000 GHz |
| Stop Freq 2.403500000 GHz |
| CF Step 200.000 kHz Auto |
| Freq Offset 0 Hz |

$\pi/4$ DQPSK/MCH



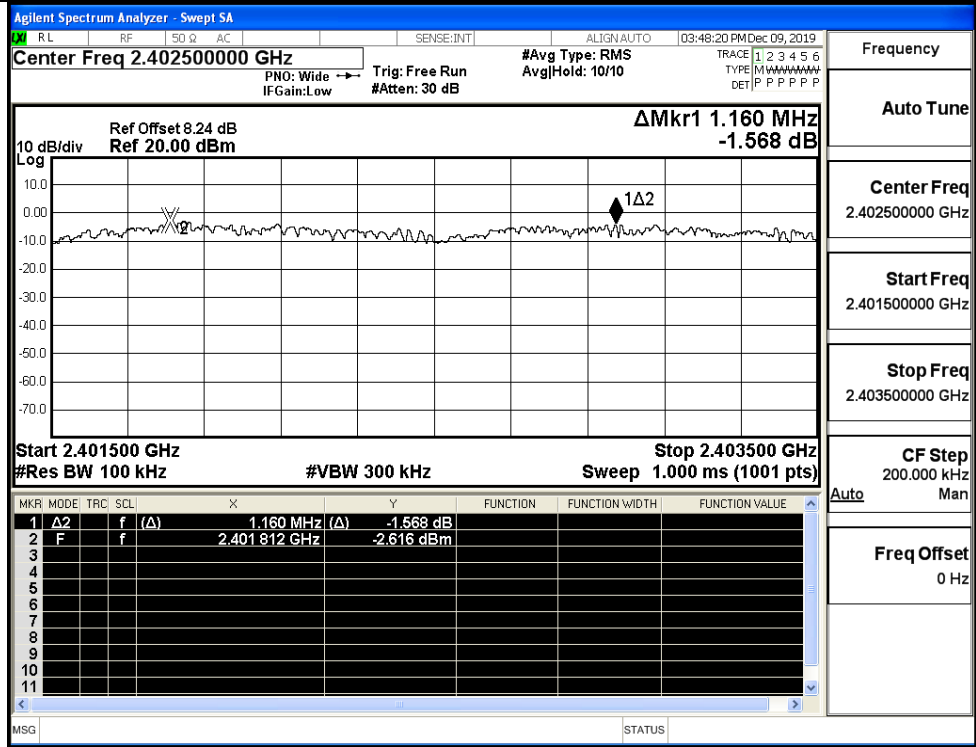
| |
|--------------------------------|
| Frequency |
| Auto Tune |
| Center Freq 2.441500000 GHz |
| Start Freq 2.440500000 GHz |
| Stop Freq 2.442500000 GHz |
| CF Step 200.000 kHz Auto |
| Freq Offset 0 Hz |

π/4DQPSK/HCH



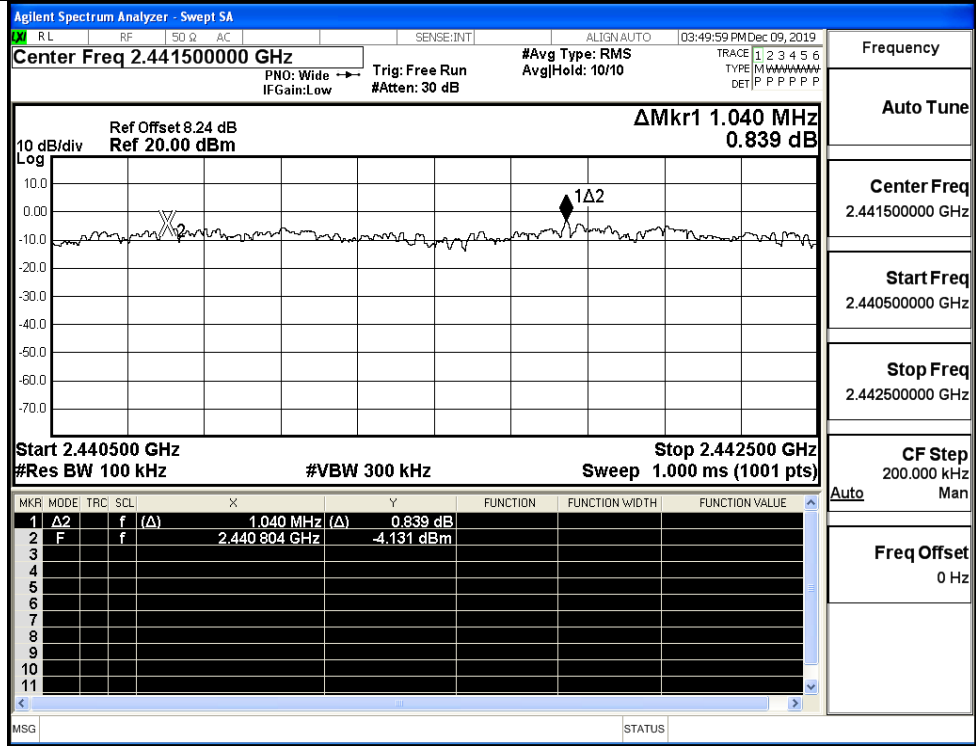
| | |
|-------------|-----------------|
| Frequency | 2.479500000 GHz |
| Auto Tune | |
| Center Freq | 2.479500000 GHz |
| Start Freq | 2.478500000 GHz |
| Stop Freq | 2.480500000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

8DPSK/LCH

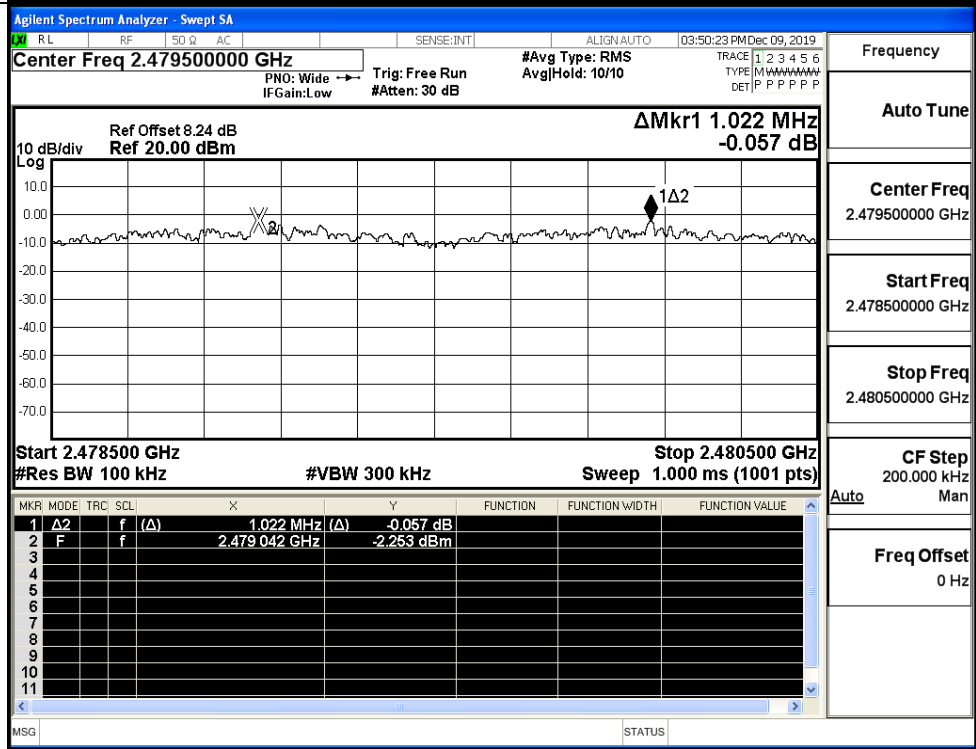


| | |
|-------------|-----------------|
| Frequency | 2.402500000 GHz |
| Auto Tune | |
| Center Freq | 2.402500000 GHz |
| Start Freq | 2.401500000 GHz |
| Stop Freq | 2.403500000 GHz |
| CF Step | 200.000 kHz |
| Auto | Man |
| Freq Offset | 0 Hz |

8DPSK/MCH



8DPSK/HCH



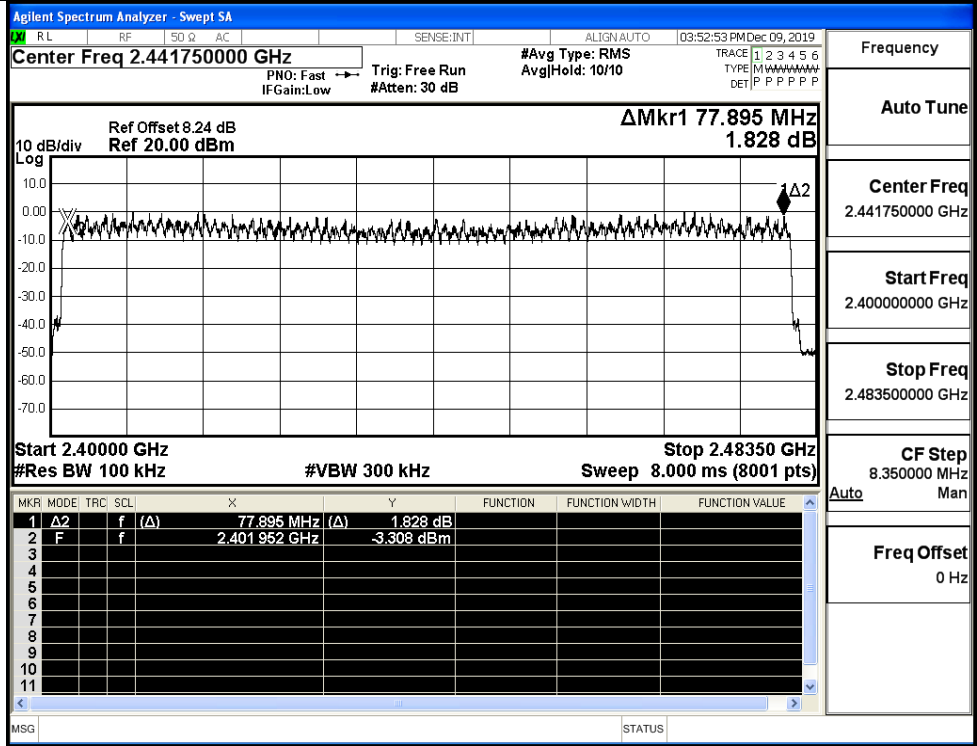
A.4 Hopping Channel Number

| 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

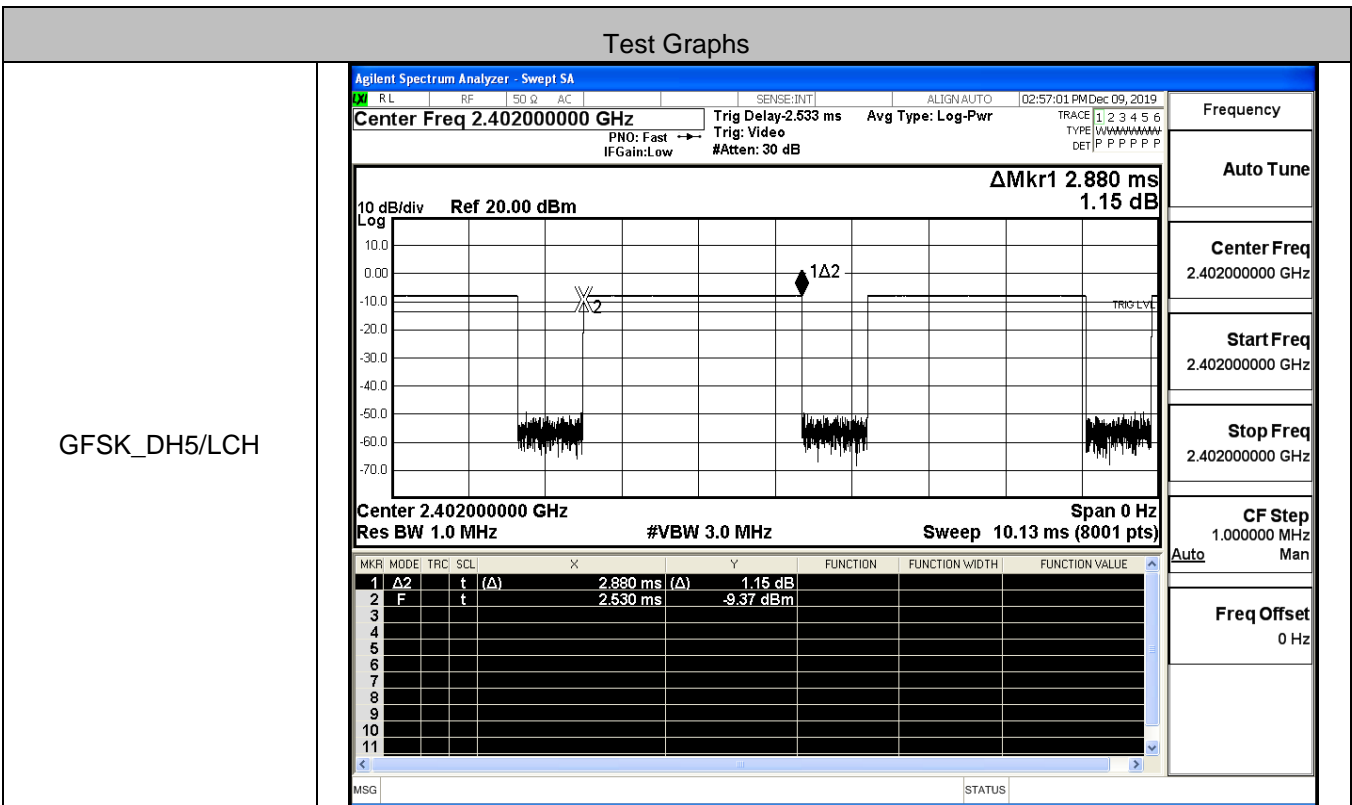
| GFSK/Hop | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 78.073 MHz -0.552 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</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>78.073 MHz (Δ)</td> <td>-0.552 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401973 GHz</td> <td>0.197 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) | 78.073 MHz (Δ) | -0.552 dB | | | | 2 | F | f | | 2.401973 GHz | 0.197 dBm | | | | Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Man Freq Offset 0 Hz |
|-------------------|---|------|--------------|-------------------------|------------|---|----------|----------------|----------------|----------------|---|------------|---|--------------|-------------------------|-----------|--|--|--|---|---|---|--|--------------|------------|--|--|--|--|
| | MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | | | | | | | | | | | | | | | | | | | | |
| 1 | Δ 2 | f | (Δ) | 78.073 MHz (Δ) | -0.552 dB | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | F | f | | 2.401973 GHz | 0.197 dBm | | | | | | | | | | | | | | | | | | | | | | | | |
| $\pi/4$ DQPSK/Hop | <p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 77.979 MHz -2.308 dB Start 2.40000 GHz Stop 2.48350 GHz #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>77.979 MHz (Δ)</td> <td>-2.308 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402077 GHz</td> <td>-1.642 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) | 77.979 MHz (Δ) | -2.308 dB | | | | 2 | F | f | | 2.402077 GHz | -1.642 dBm | | | | Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Man Freq Offset 0 Hz |
| | MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | | | | | | | | | | | | | | | | | | | | |
| 1 | Δ 2 | f | (Δ) | 77.979 MHz (Δ) | -2.308 dB | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | F | f | | 2.402077 GHz | -1.642 dBm | | | | | | | | | | | | | | | | | | | | | | | | |

8DPSK/Hop

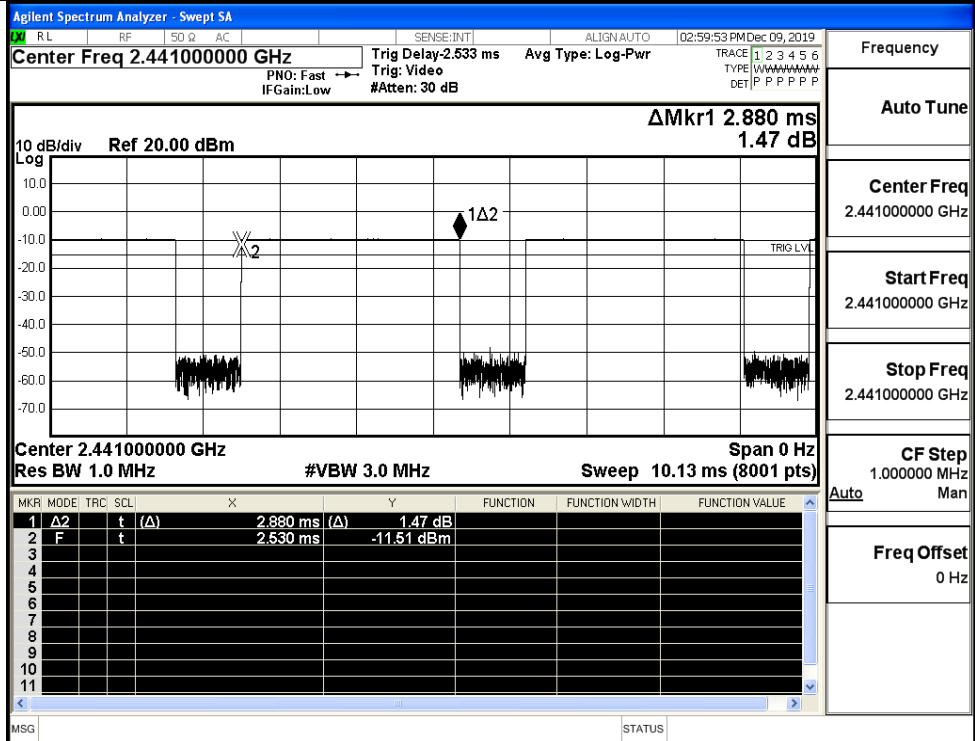


A.5 Dwell Time

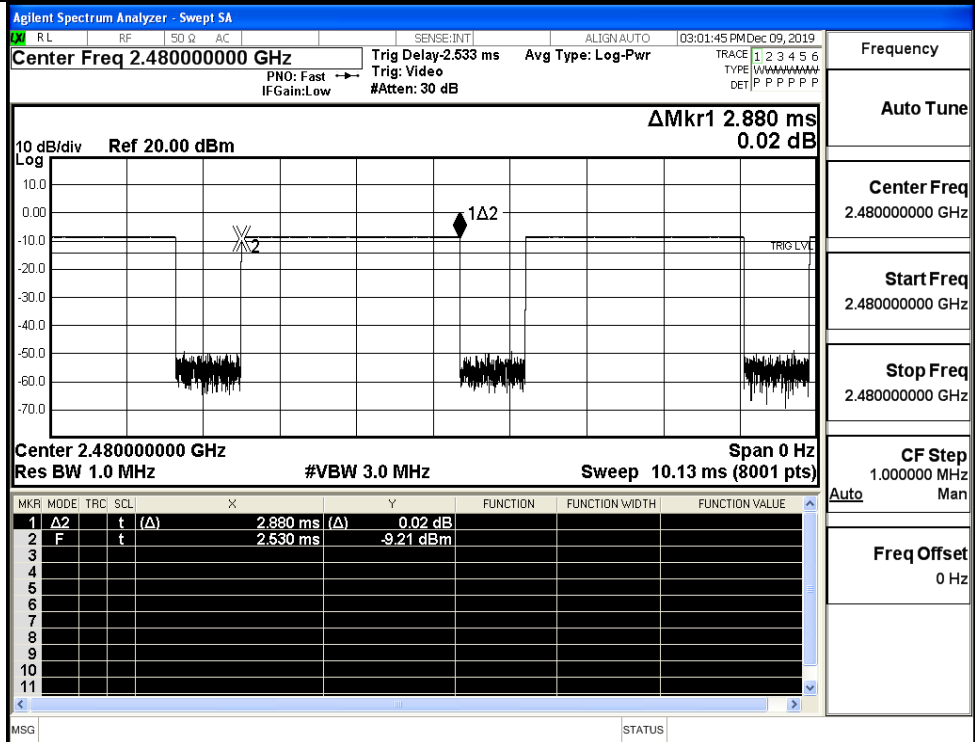
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|----------|--------|---------|-------------------------|--------------------|---------------|-----------|---------|
| GFSK | DH5 | LCH | 2.88 | 106.7 | 0.307 | 0.4 | PASS |
| | DH5 | MCH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



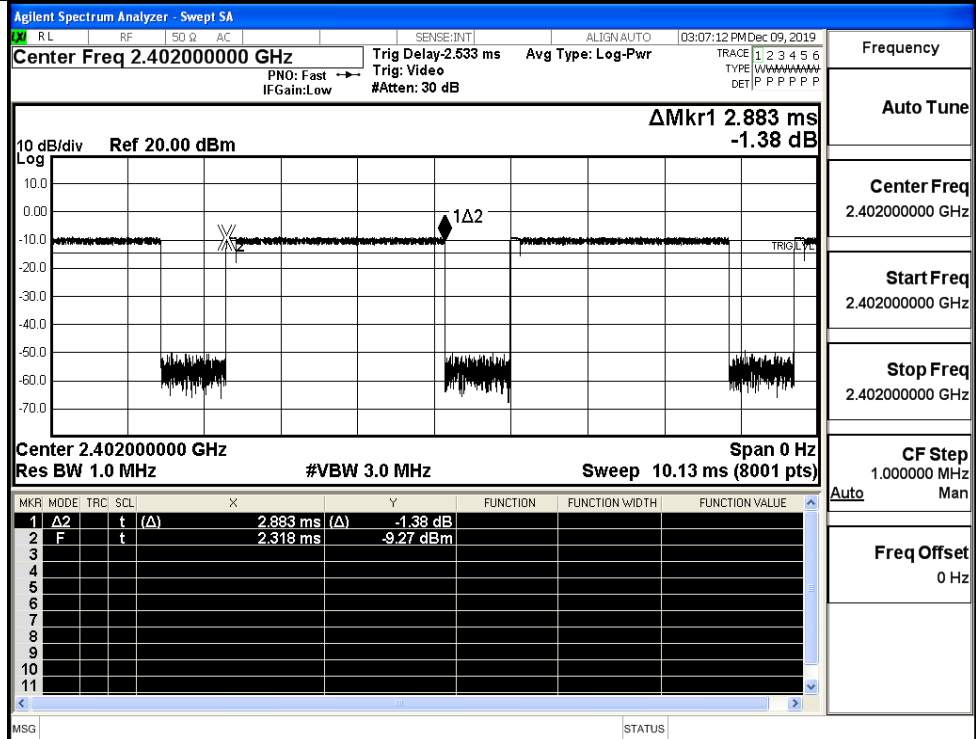
GFSK_DH5/MCH



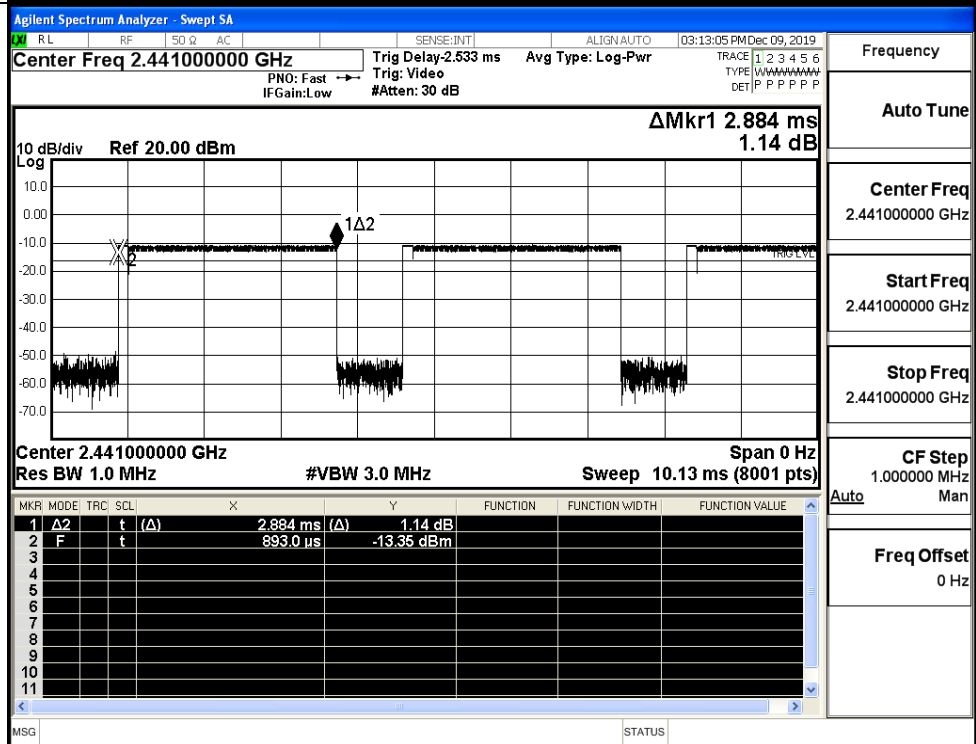
GFSK_DH5/HCH



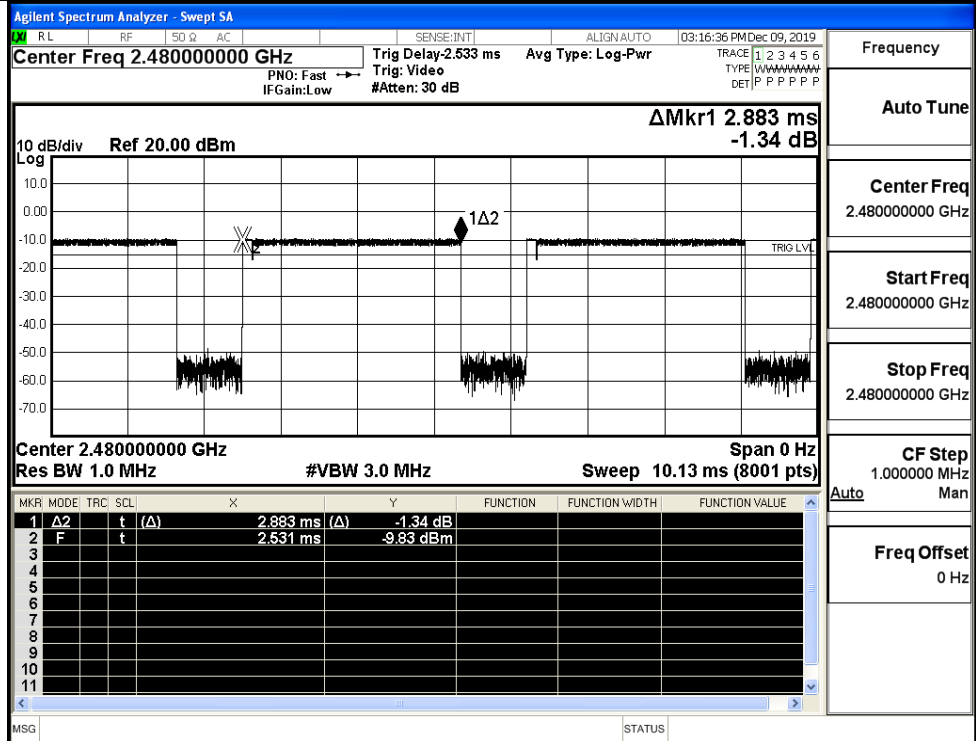
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH

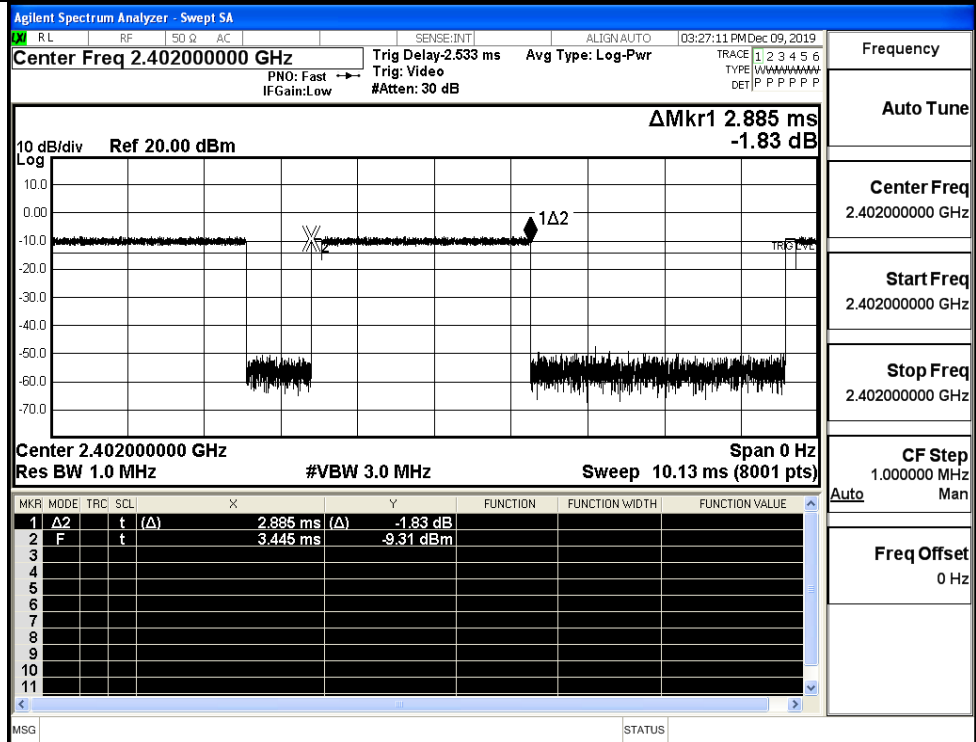


$\pi/4$ DQPSK
_2DH5/HCH



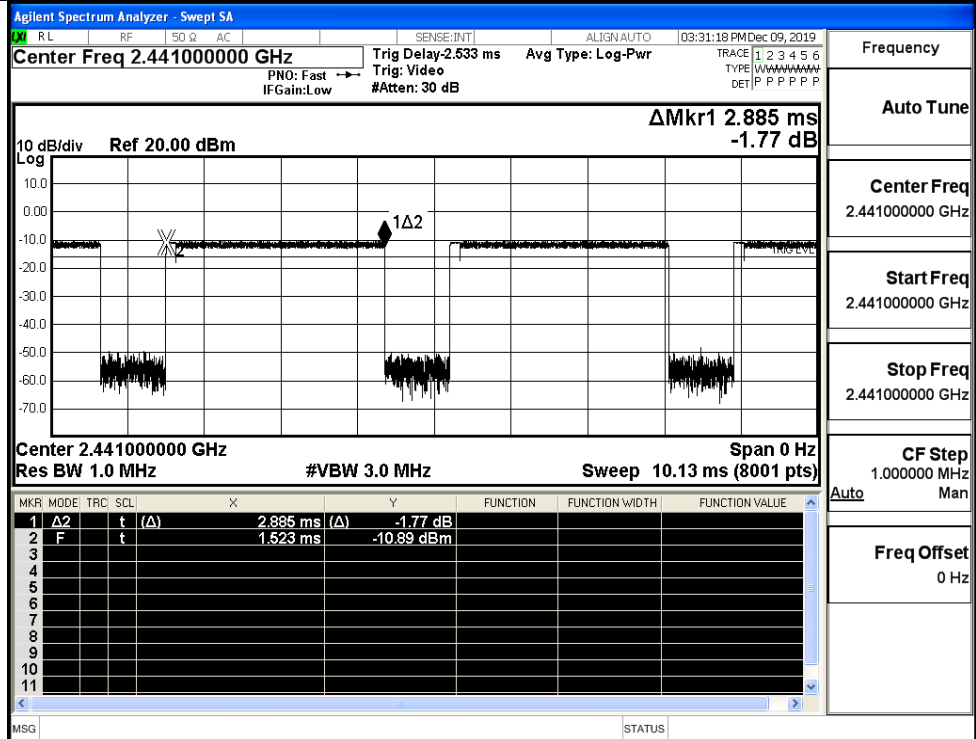
| | |
|-------------|-----------------|
| Frequency | 2.480000000 GHz |
| Auto Tune | |
| Center Freq | 2.480000000 GHz |
| Start Freq | 2.480000000 GHz |
| Stop Freq | 2.480000000 GHz |
| CF Step | 1.000000 MHz |
| Freq Offset | 0 Hz |

8DPSK_3DH5/LCH

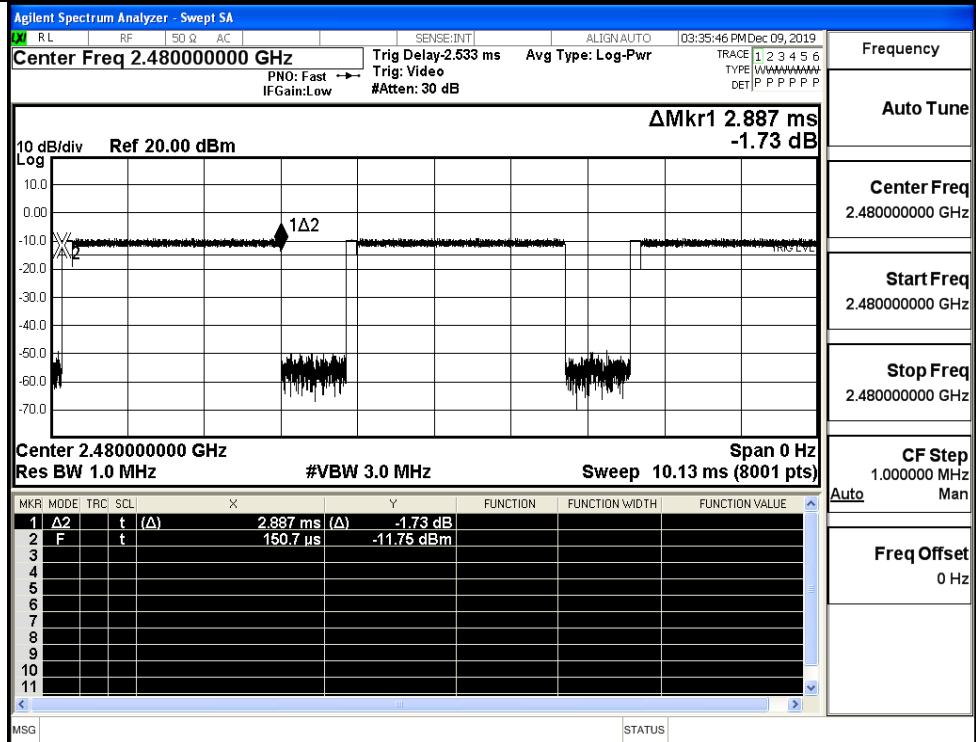


| | |
|-------------|-----------------|
| Frequency | 2.402000000 GHz |
| Auto Tune | |
| Center Freq | 2.402000000 GHz |
| Start Freq | 2.402000000 GHz |
| Stop Freq | 2.402000000 GHz |
| CF Step | 1.000000 MHz |
| Freq Offset | 0 Hz |

8DPSK_3DH5/MCH



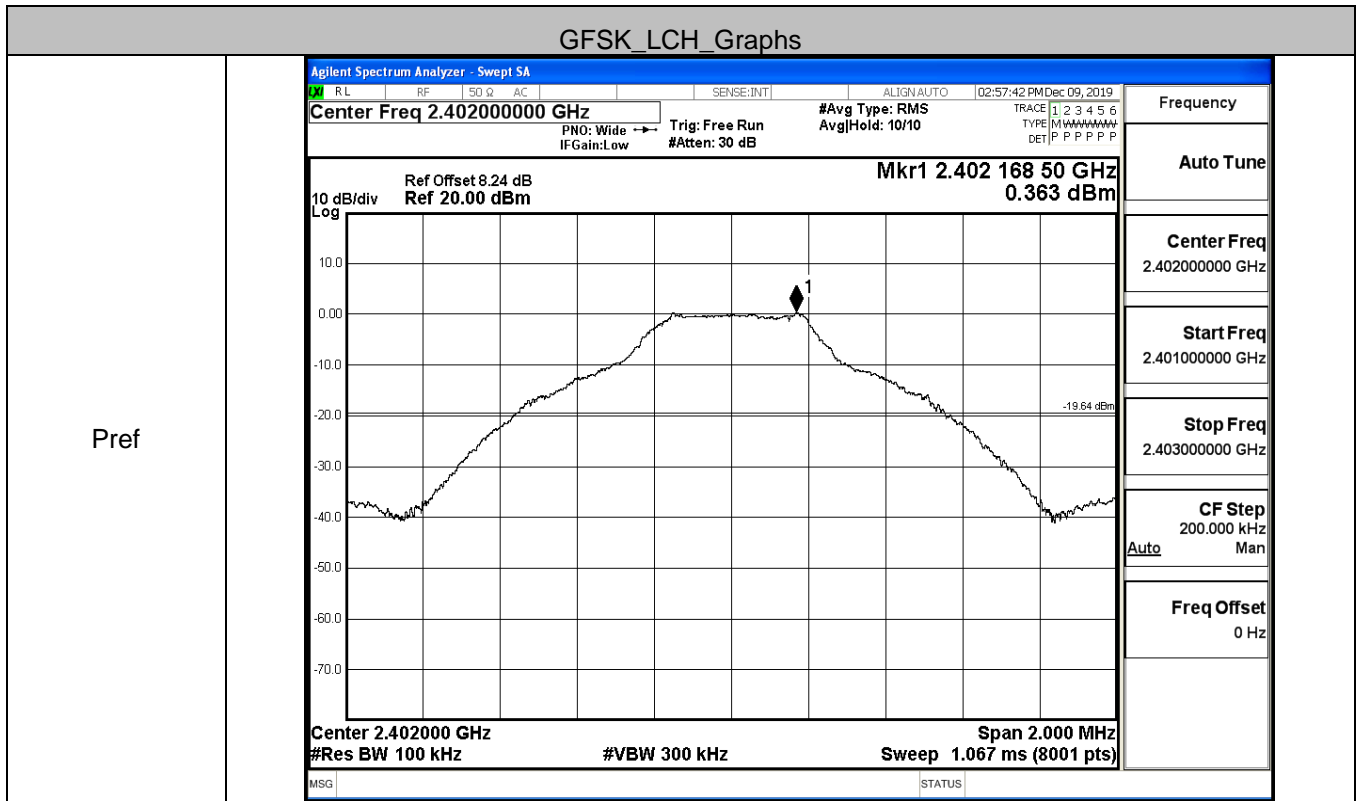
8DPSK_3DH5/HCH

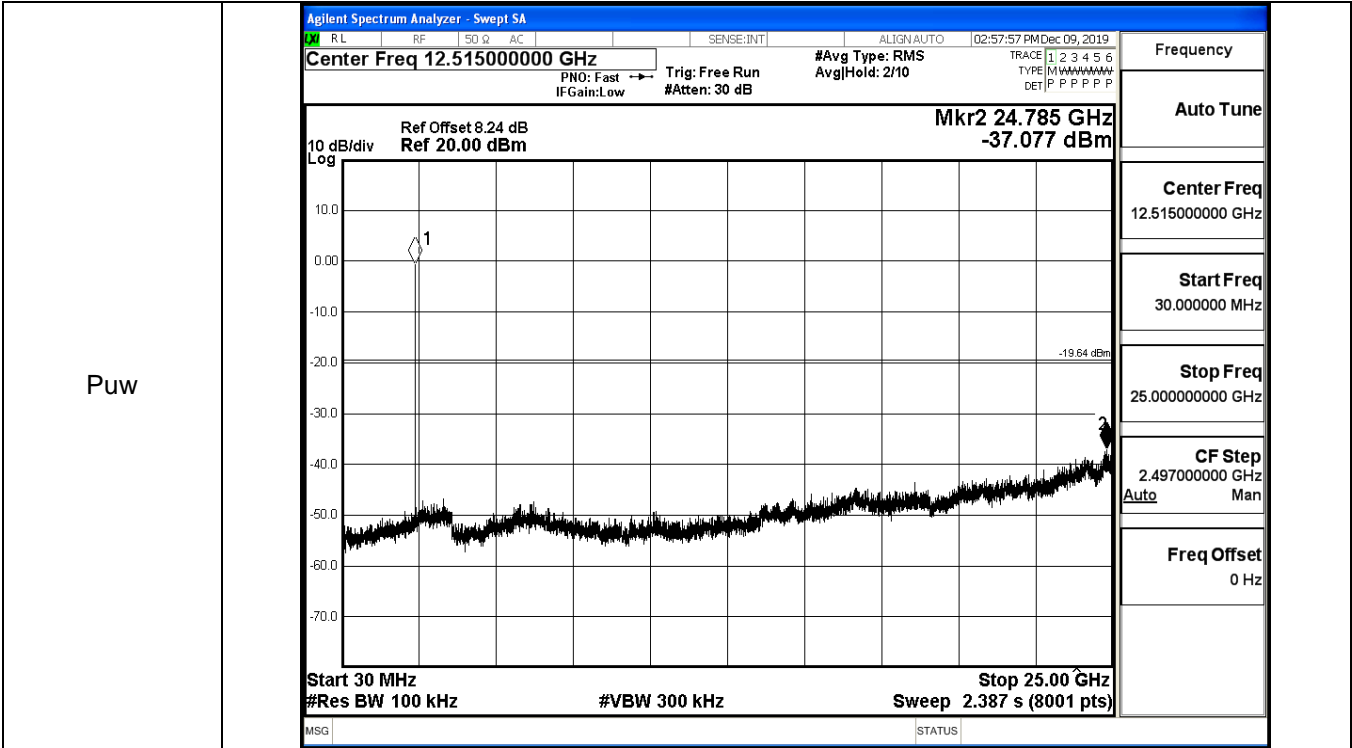


A.6 RF Conducted Spurious Emissions

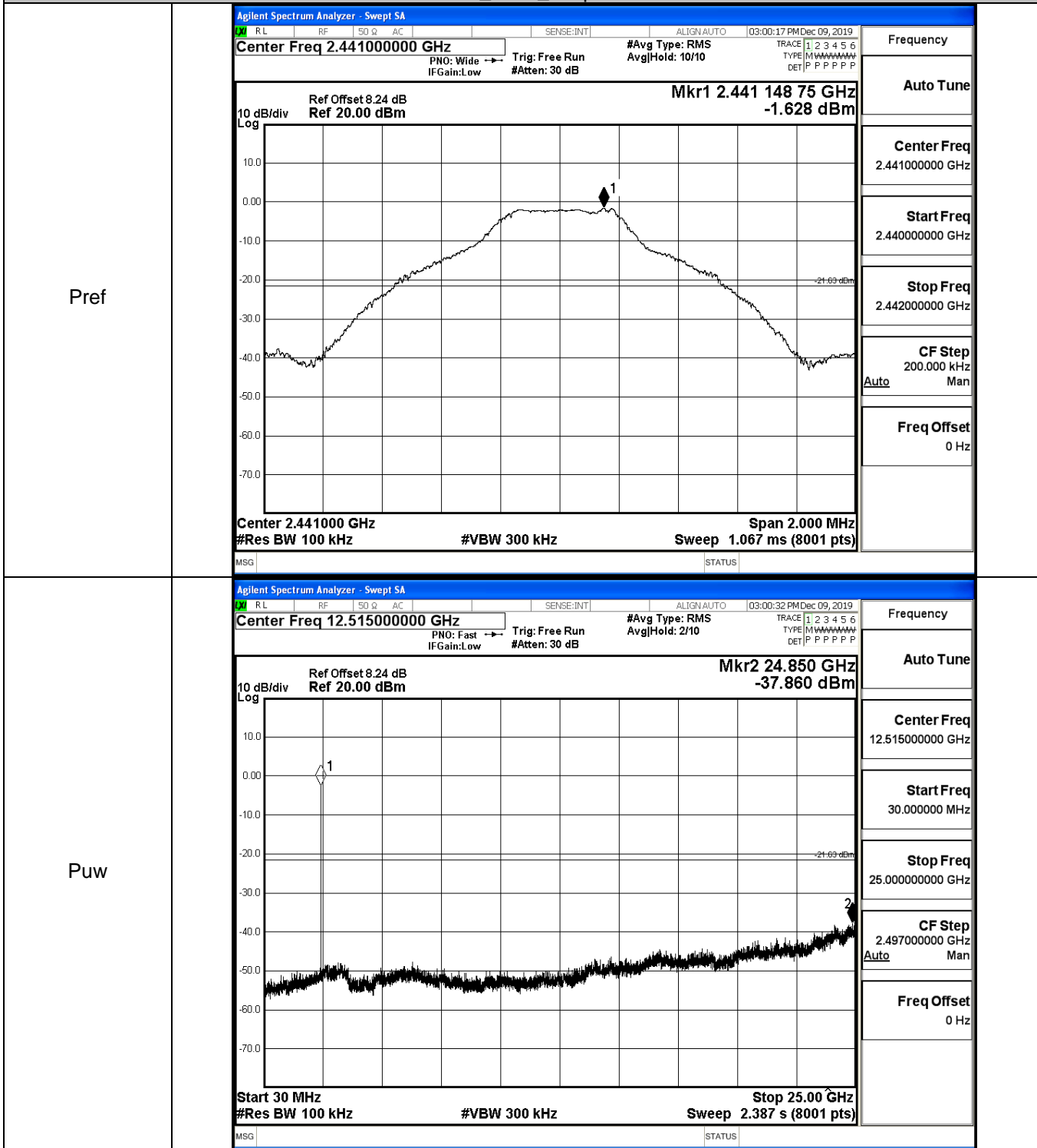
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|------------|------------------|-------------|---------|
| GFSK | LCH | 0.363 | -37.077 | -19.637 | PASS |
| | MCH | -1.628 | -37.860 | -21.628 | PASS |
| | HCH | -0.258 | -37.509 | -20.258 | PASS |
| π /4DQPSK | LCH | -1.063 | -37.550 | -21.063 | PASS |
| | MCH | -3.711 | -37.500 | -23.711 | PASS |
| | HCH | -1.448 | -37.187 | -21.448 | PASS |
| 8DPSK | LCH | -1.033 | -37.547 | -21.033 | PASS |
| | MCH | -2.547 | -36.624 | -22.547 | PASS |
| | HCH | -1.553 | -37.900 | -21.553 | PASS |

GFSK_LCH_Graphs



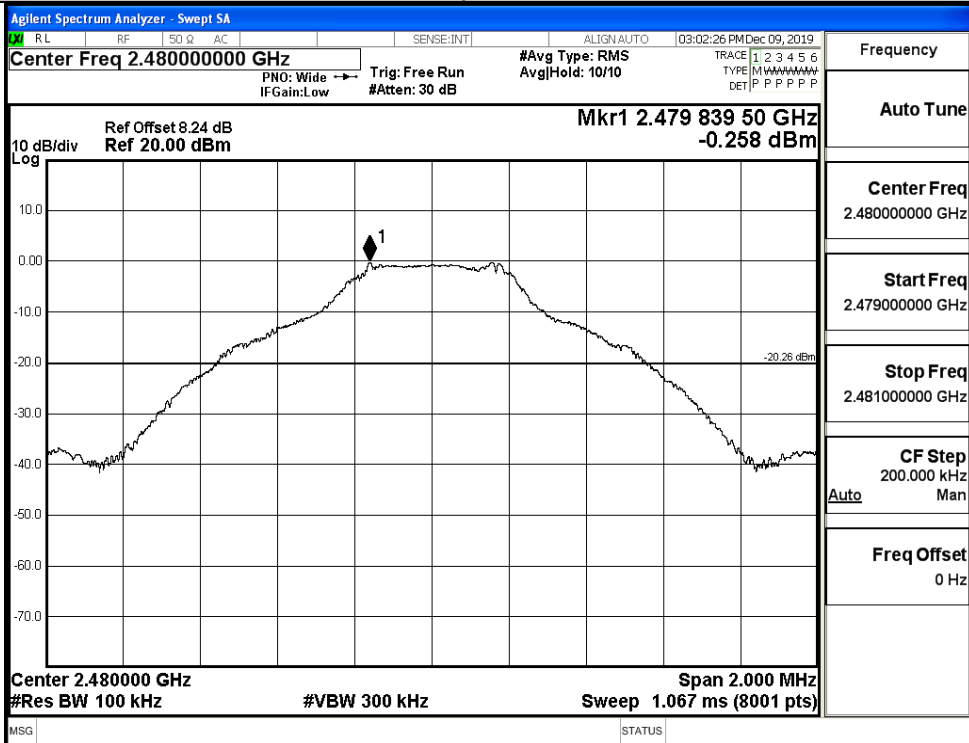


GFSK_MCH_Graphs

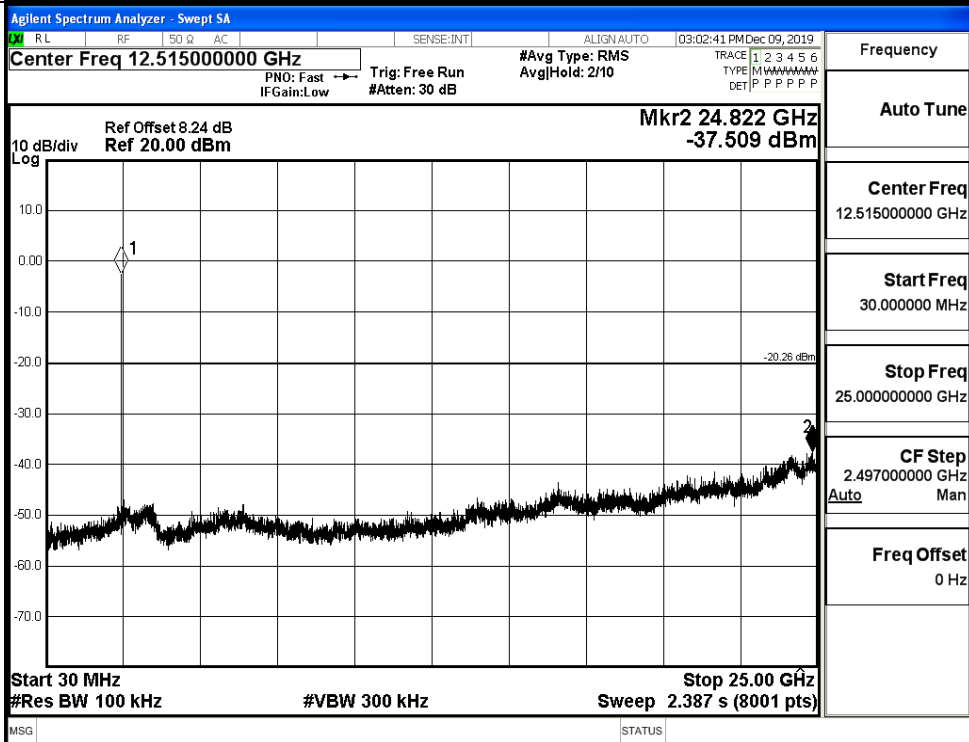


GFSK_HCH_Graphs

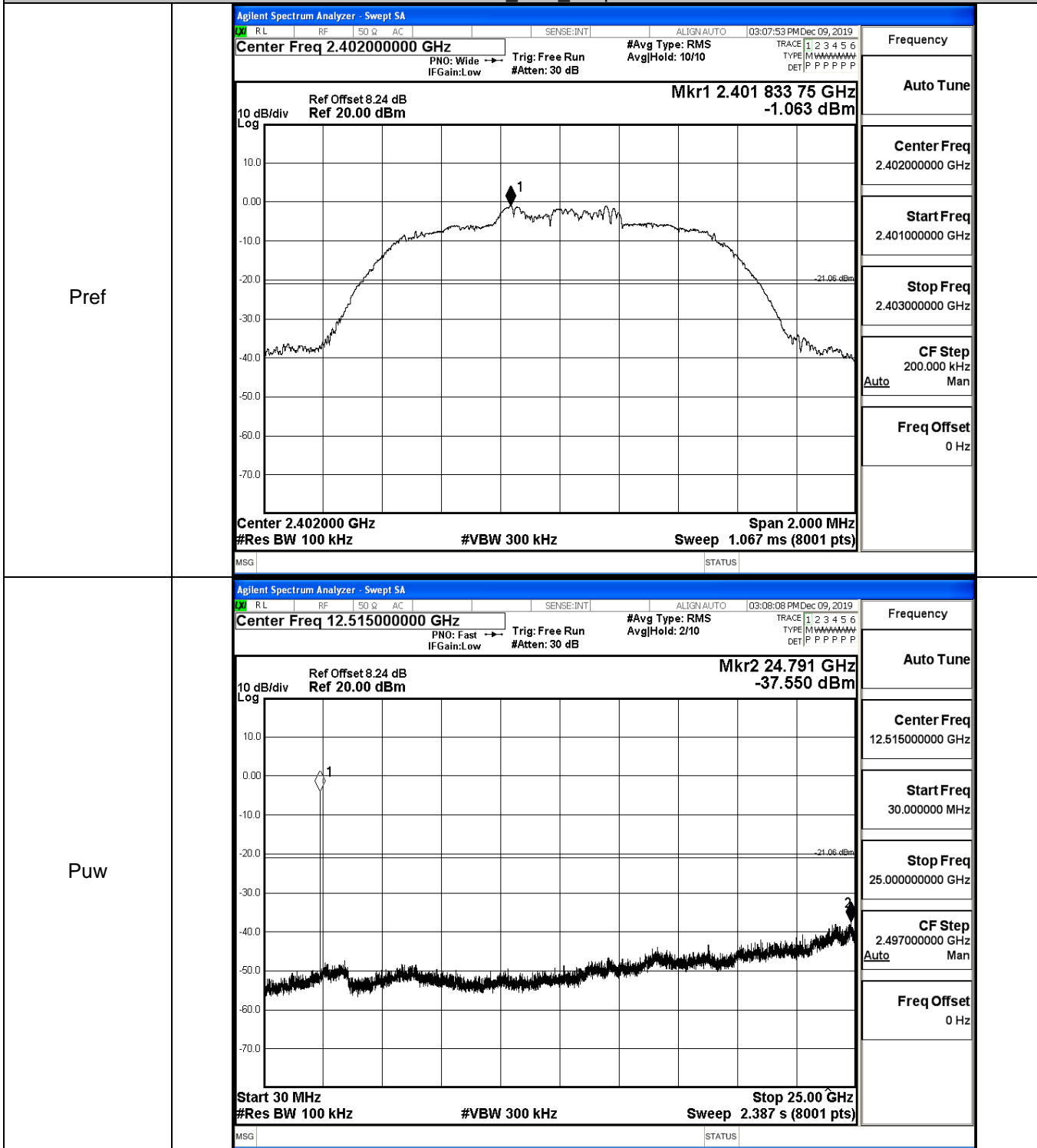
Pref



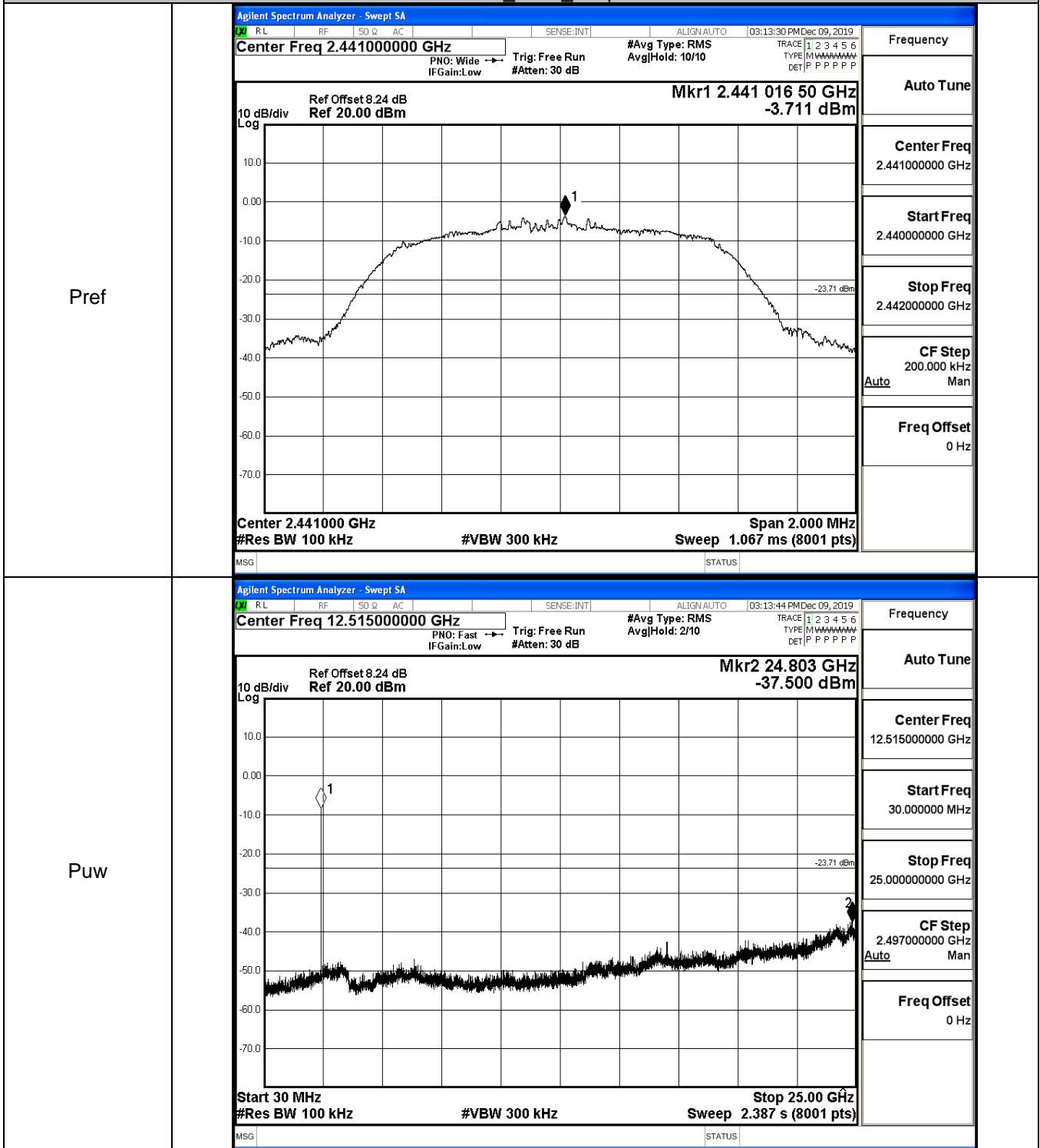
Puw



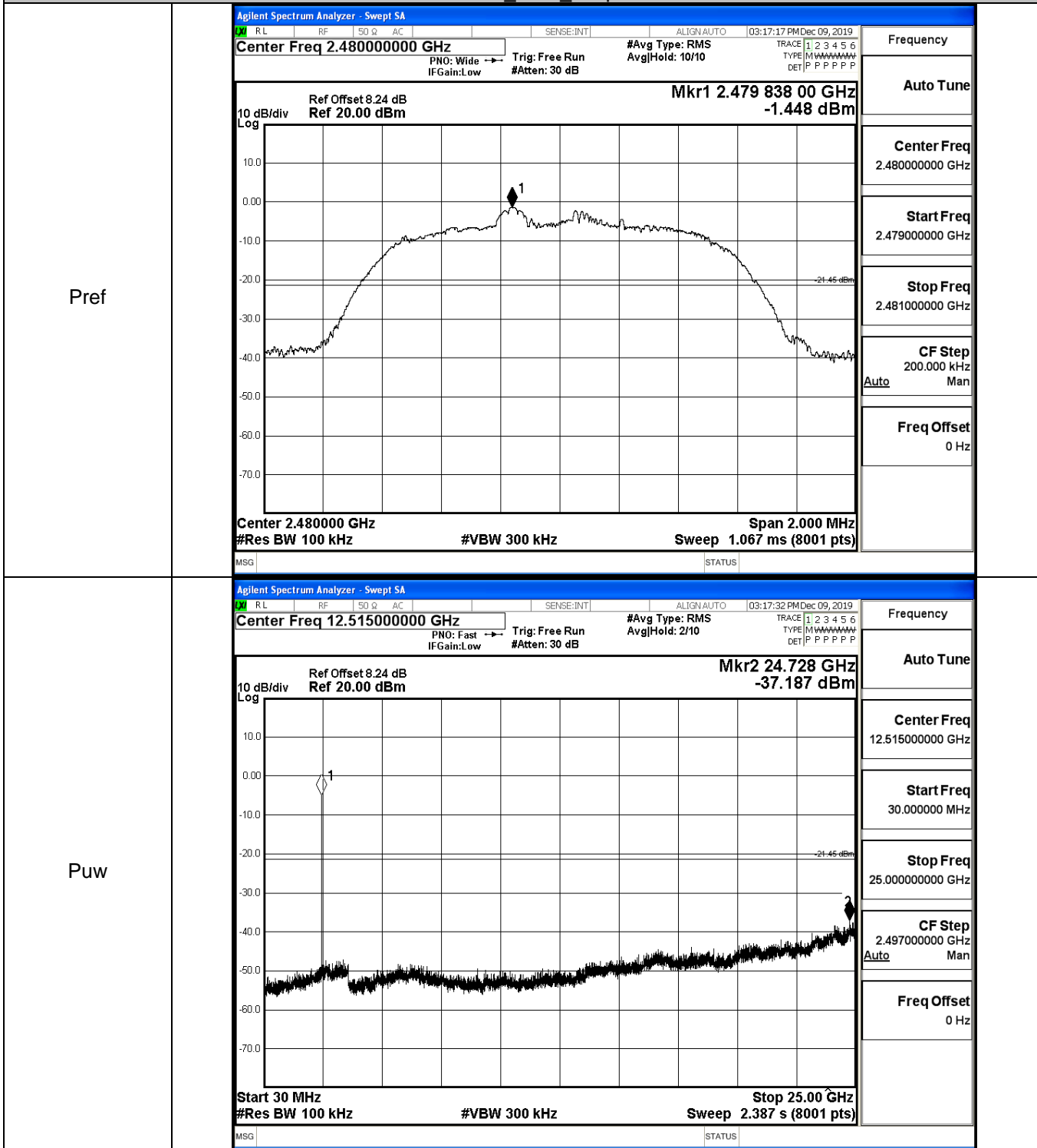
$\pi/4$ DQPSK_LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs

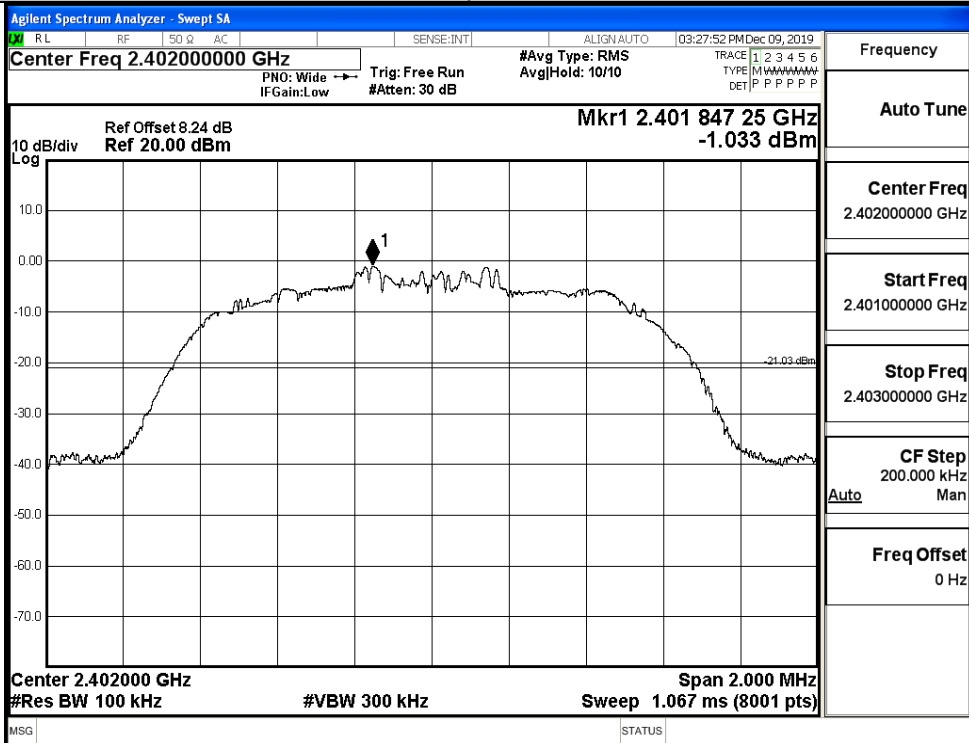


$\pi/4$ DQPSK_HCH_Graphs

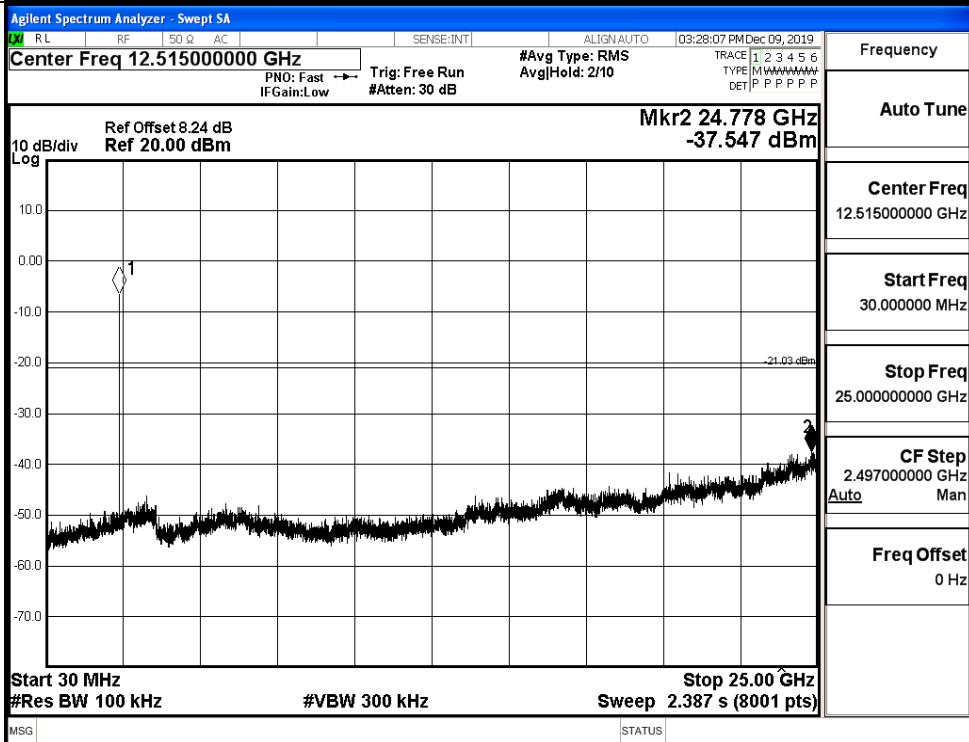


8DPSK_LCH_Graphs

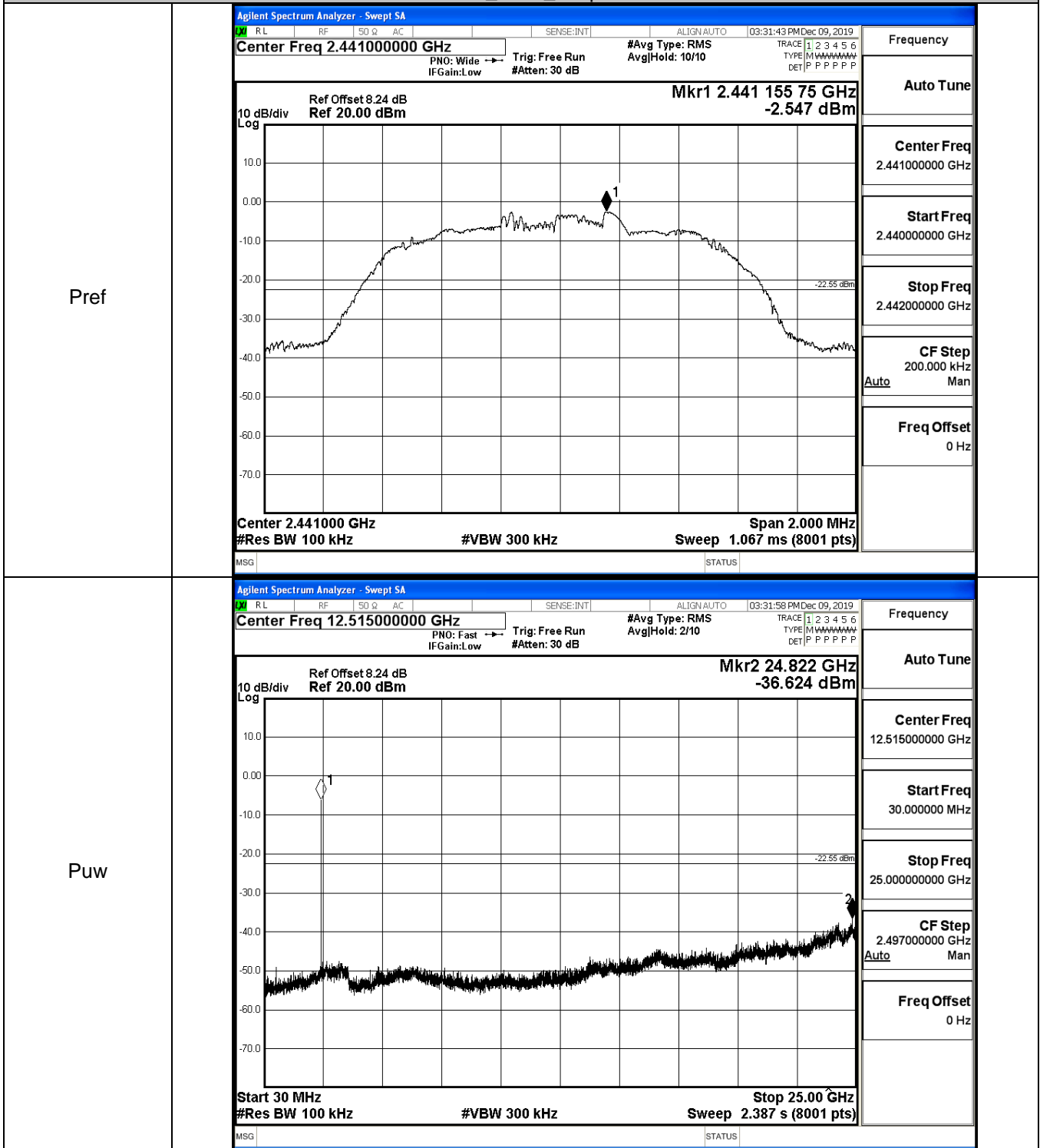
Pref



Puw

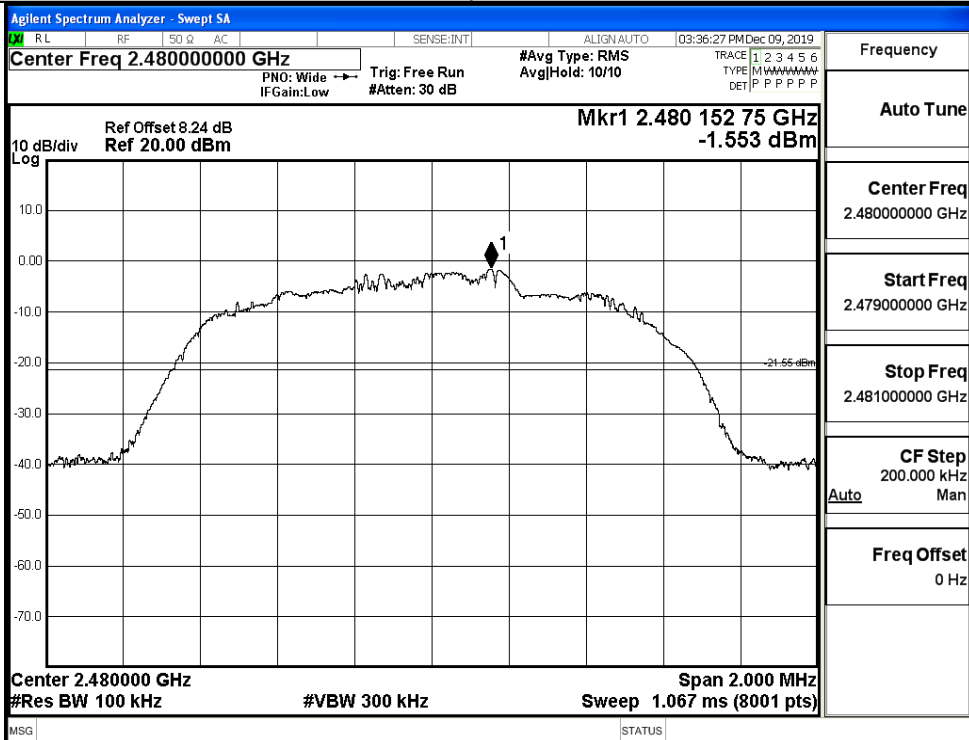


8DPSK_MCH_Graphs

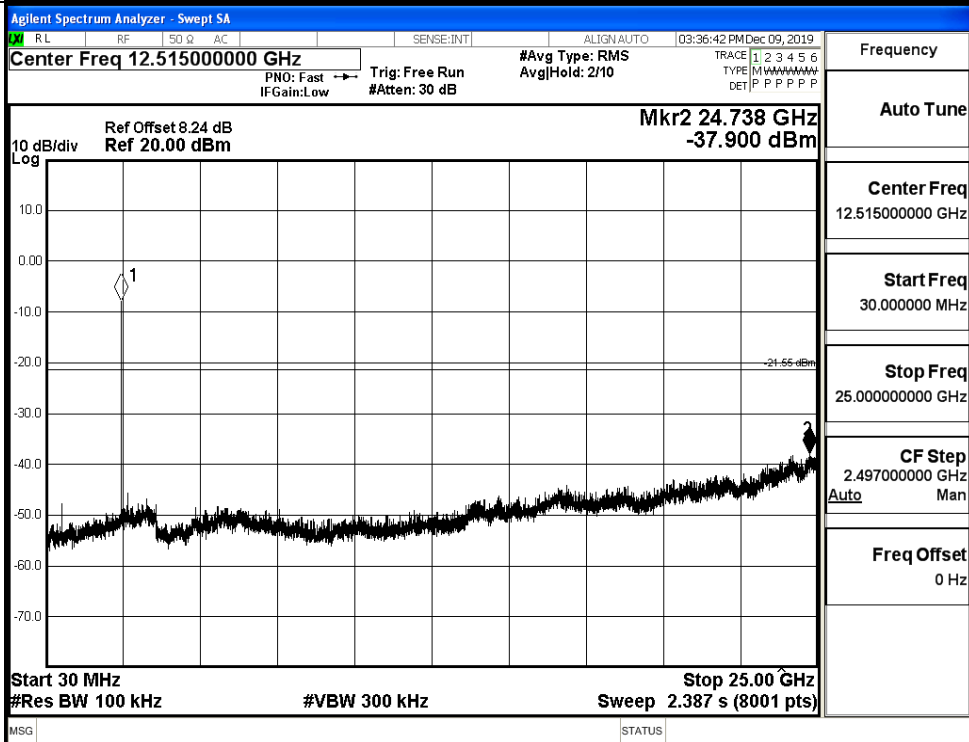


8DPSK_HCH_Graphs

Pref



Puw

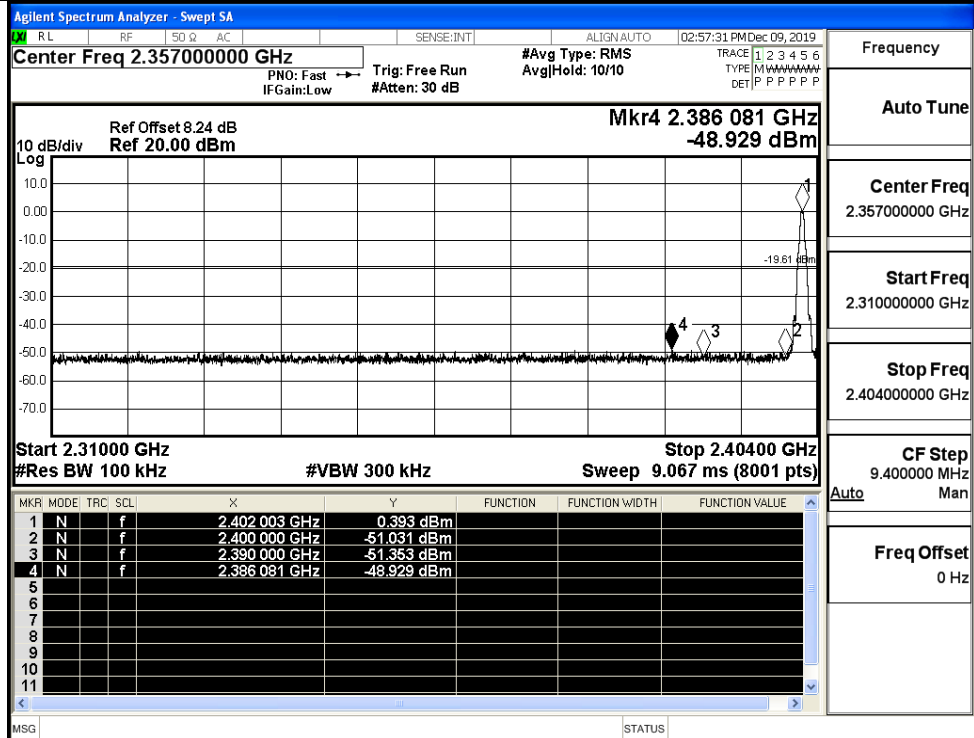


A.7 Band-edge for RF Conducted Emissions

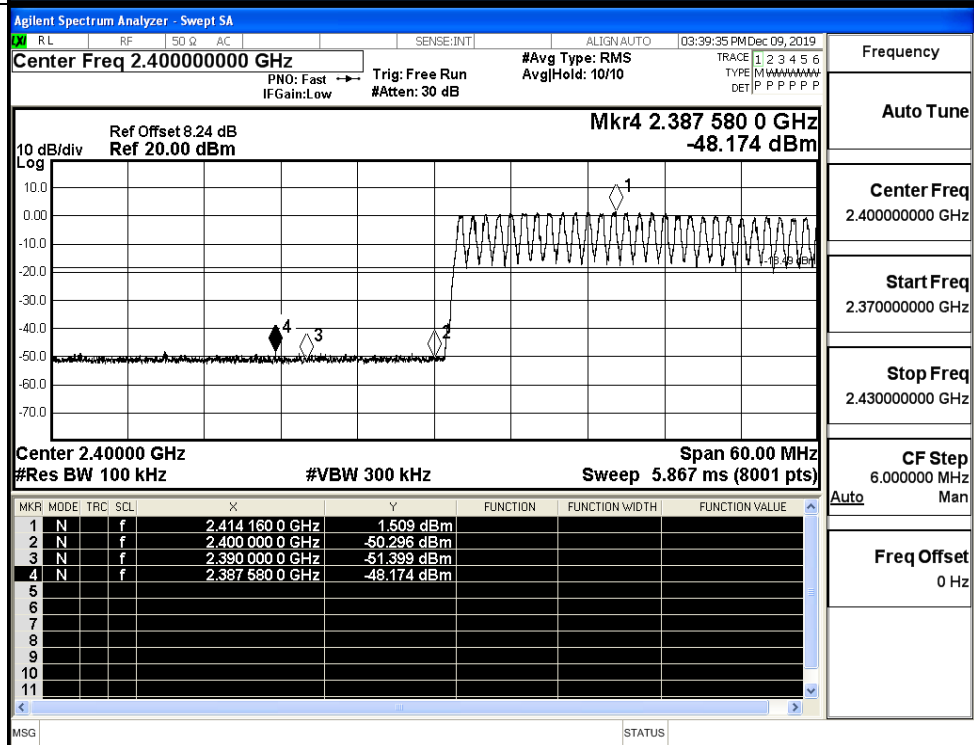
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK | LCH | 2402 | 0.393 | Off | -48.929 | -19.61 | PASS |
| | | | 1.509 | On | -48.174 | -18.49 | PASS |
| | HCH | 2480 | -0.098 | Off | -48.622 | -20.1 | PASS |
| | | | 1.201 | On | -47.335 | -18.8 | PASS |
| $\pi/4$ DQPSK | LCH | 2402 | -1.432 | Off | -48.264 | -21.43 | PASS |
| | | | 0.110 | On | -48.067 | -19.89 | PASS |
| | HCH | 2480 | -1.514 | Off | -48.401 | -21.51 | PASS |
| | | | -0.311 | On | -47.157 | -20.31 | PASS |
| 8DPSK | LCH | 2402 | -0.929 | Off | -49.051 | -20.93 | PASS |
| | | | 0.072 | On | -47.678 | -19.93 | PASS |
| | HCH | 2480 | -1.476 | Off | -48.379 | -21.48 | PASS |
| | | | -0.451 | On | -47.928 | -20.45 | PASS |

Test Graphs

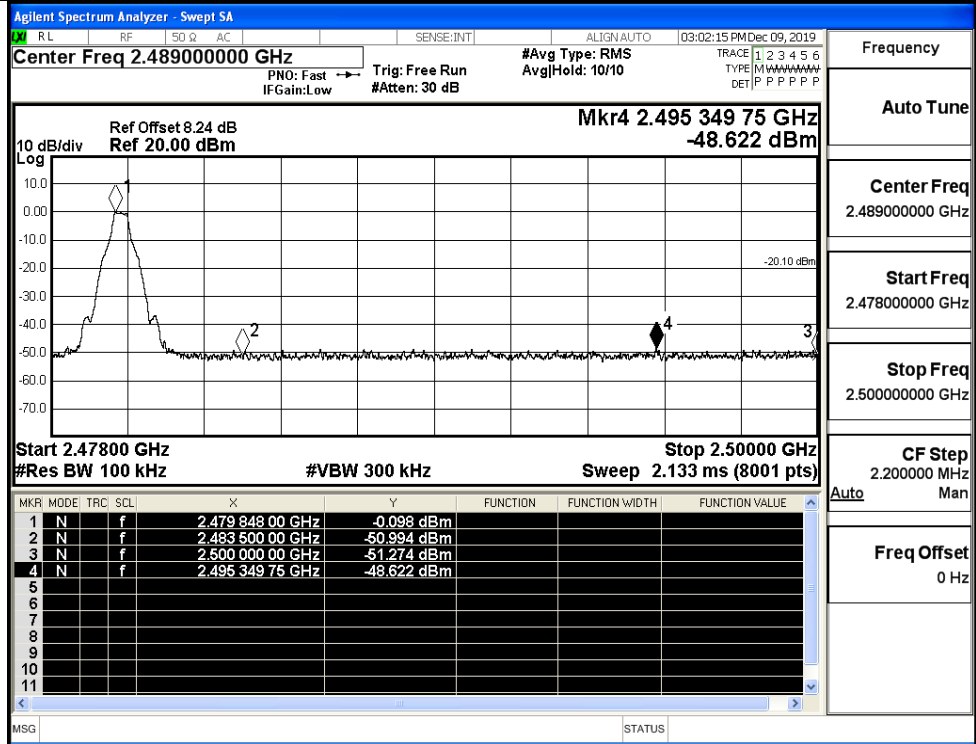
GFSK/LCH/No Hop



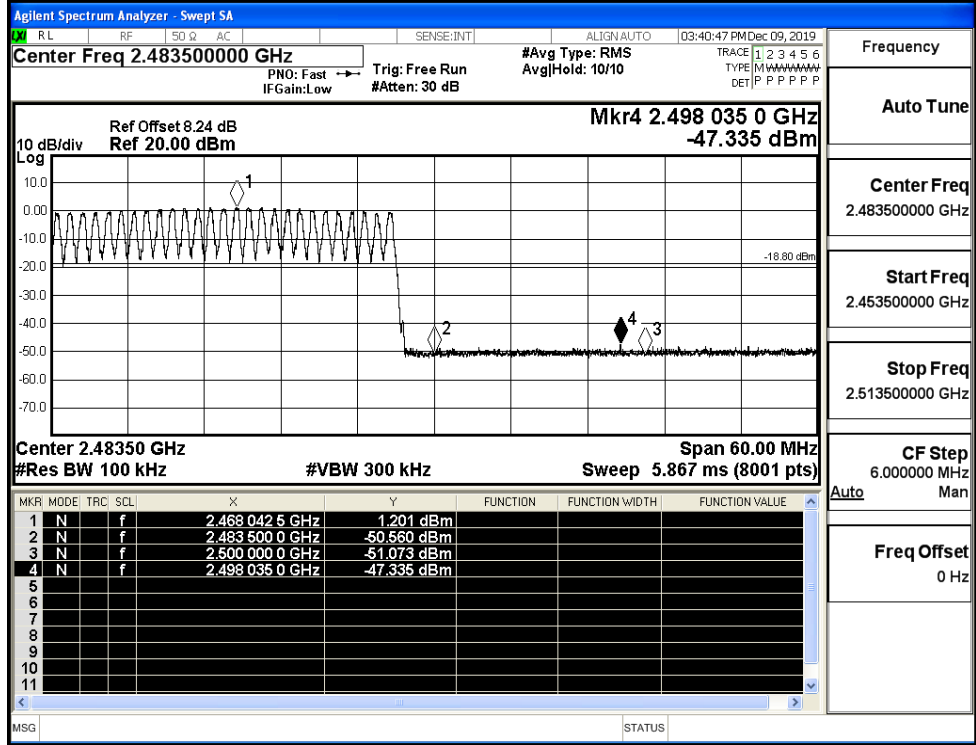
GFSK/LCH/Hop



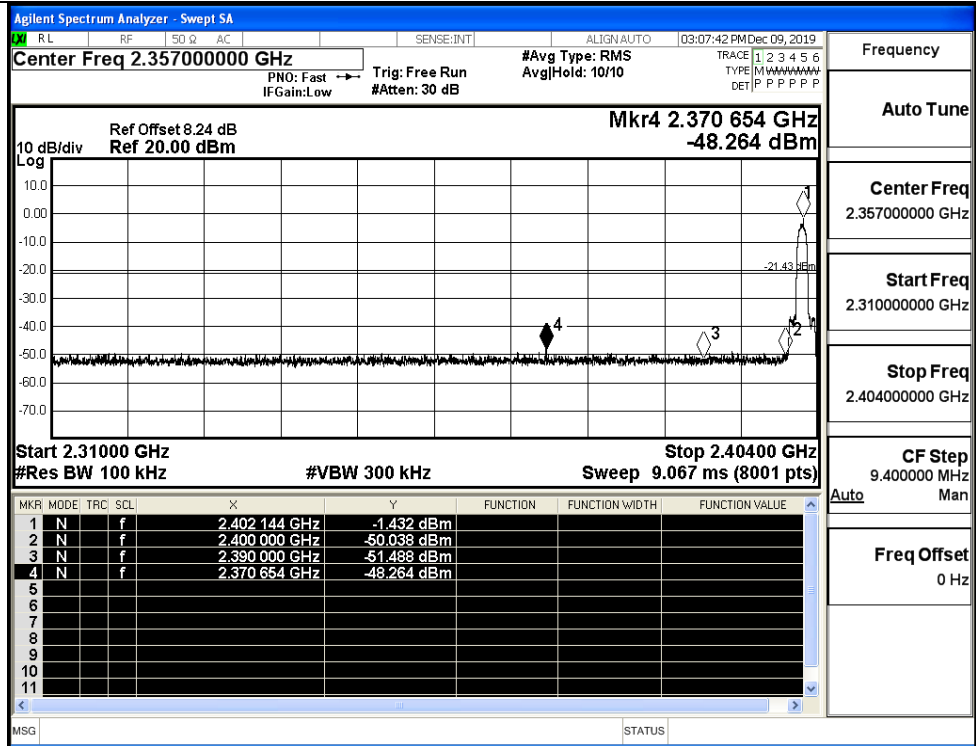
GFSK/HCH/No Hop



GFSK/HCH/Hop

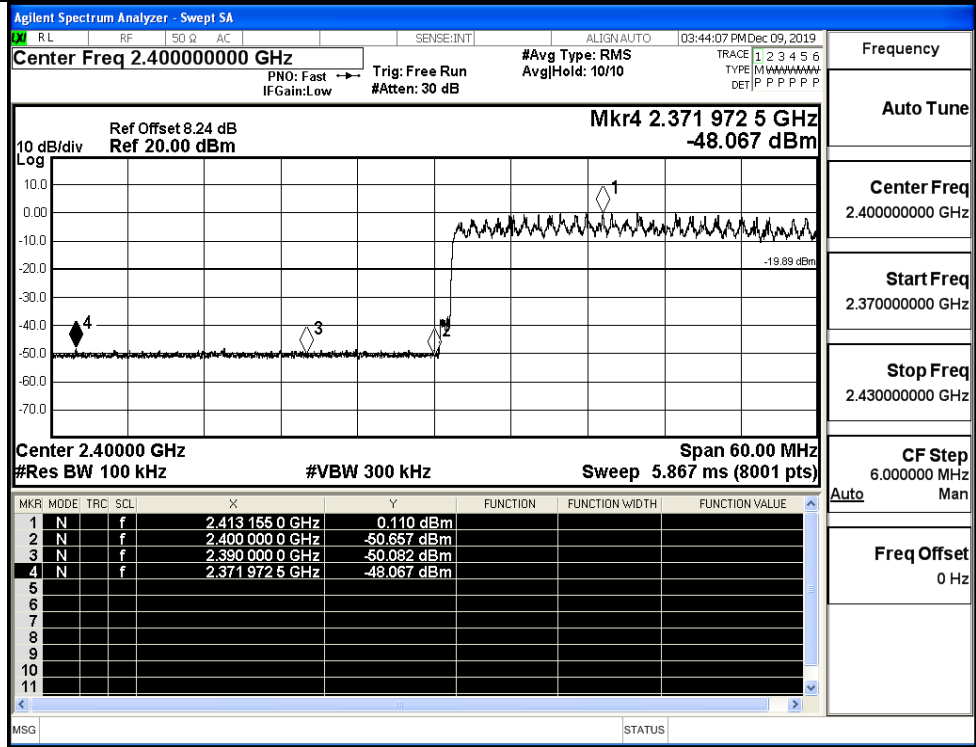


$\pi/4$ DQPSK/LCH/No
Hop



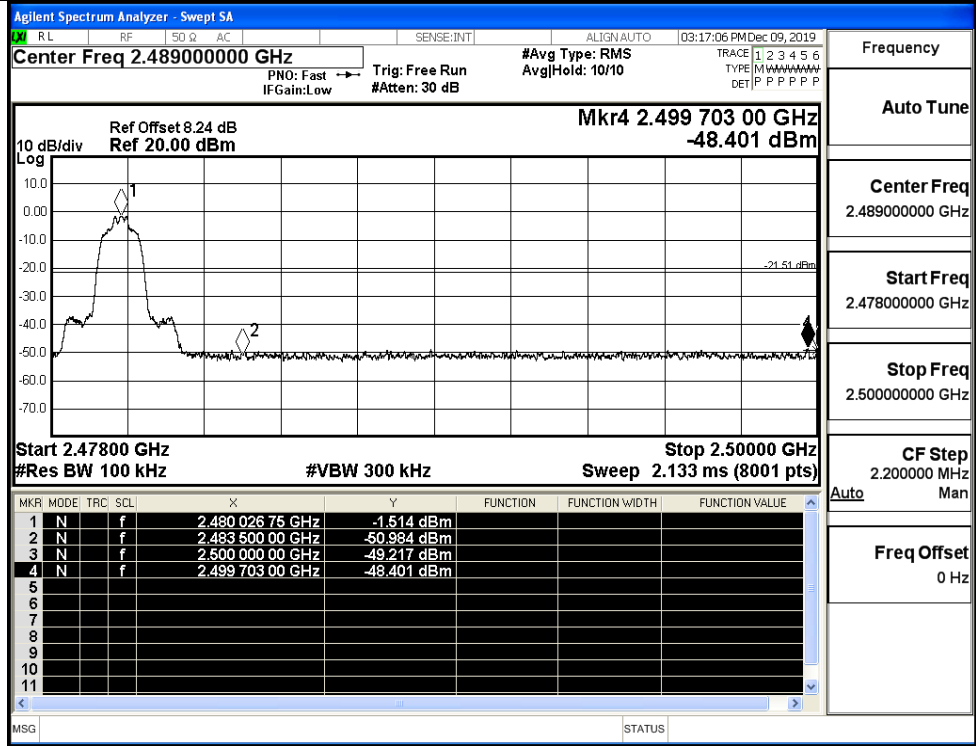
| | |
|-------------|-----------------|
| Frequency | 2.357000000 GHz |
| Auto Tune | |
| Center Freq | 2.357000000 GHz |
| Start Freq | 2.310000000 GHz |
| Stop Freq | 2.404000000 GHz |
| CF Step | 9.400000 MHz |
| Freq Offset | 0 Hz |

$\pi/4$ DQPSK/LCH/Hop

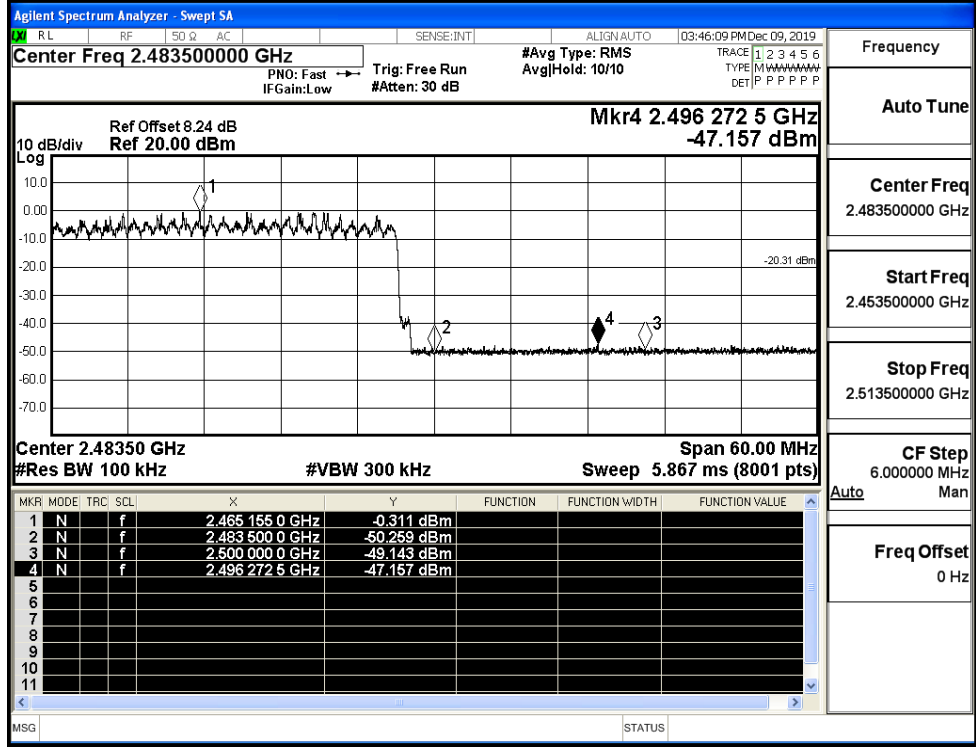


| | |
|-------------|-----------------|
| Frequency | 2.400000000 GHz |
| Auto Tune | |
| Center Freq | 2.400000000 GHz |
| Start Freq | 2.370000000 GHz |
| Stop Freq | 2.430000000 GHz |
| CF Step | 6.000000 MHz |
| Freq Offset | 0 Hz |

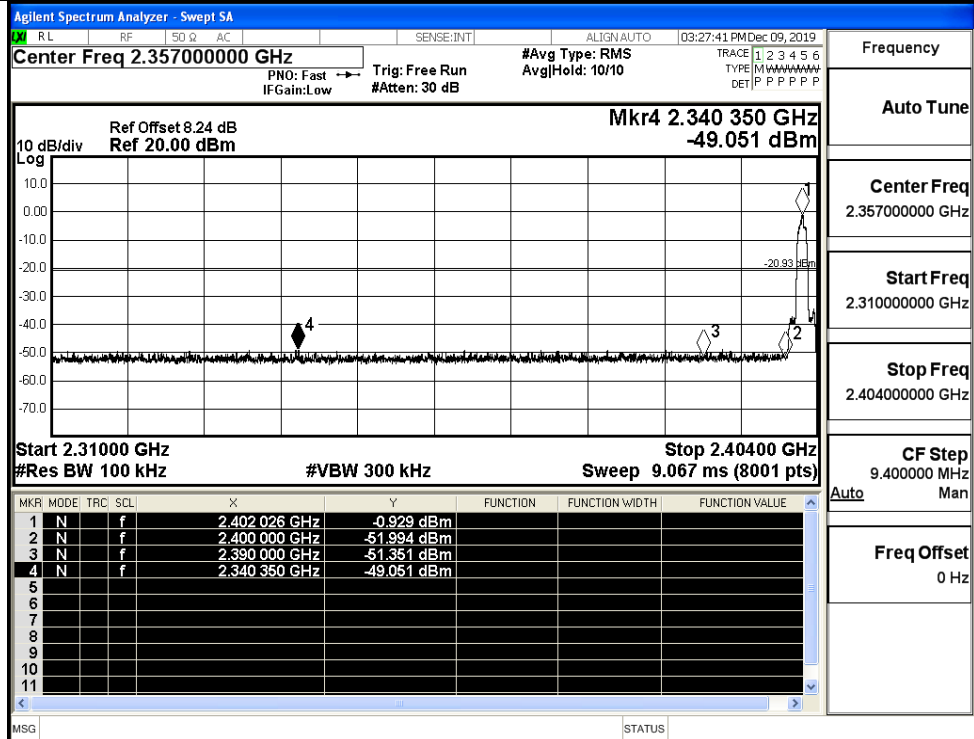
π /4DQPSK/HCH/No
Hop



π /4DQPSK/HCH/Hop

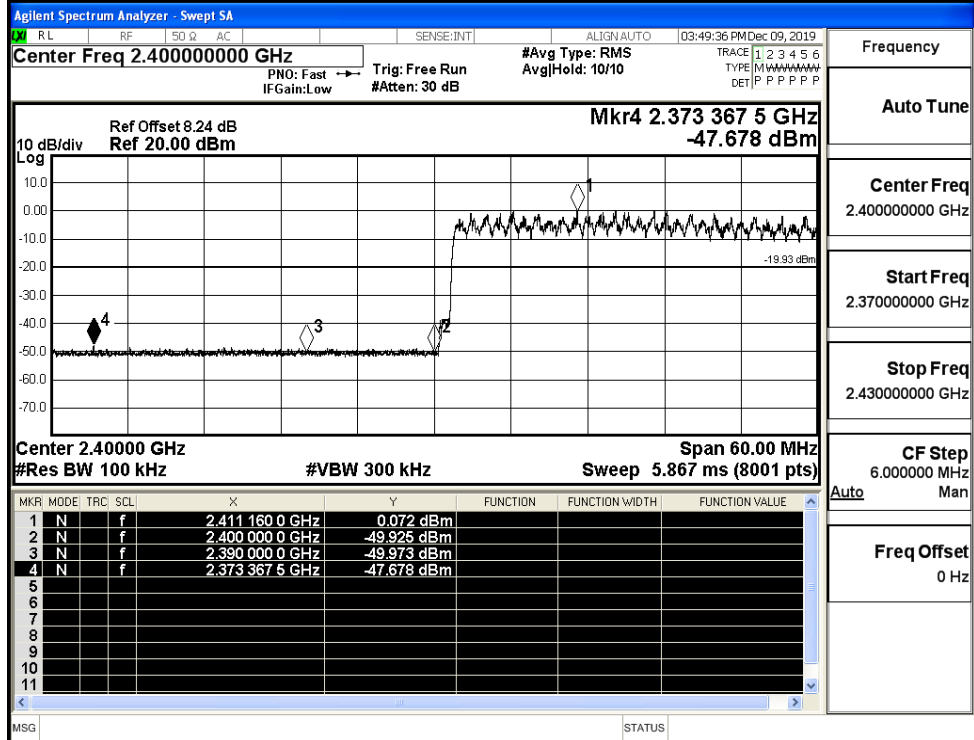


8DPSK/LCH/No Hop



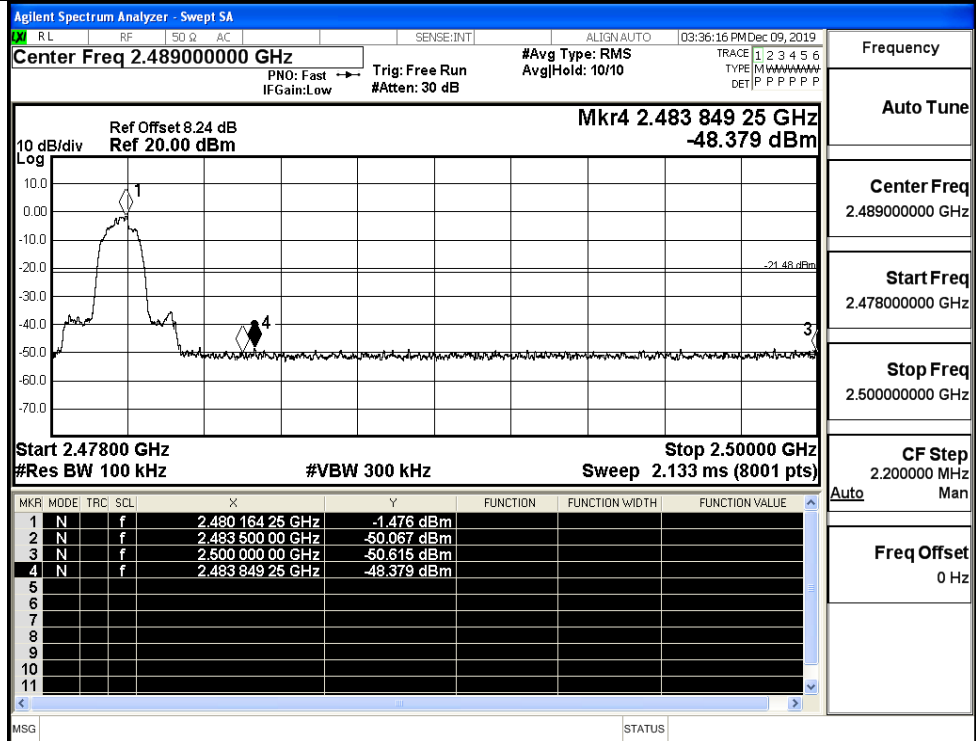
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



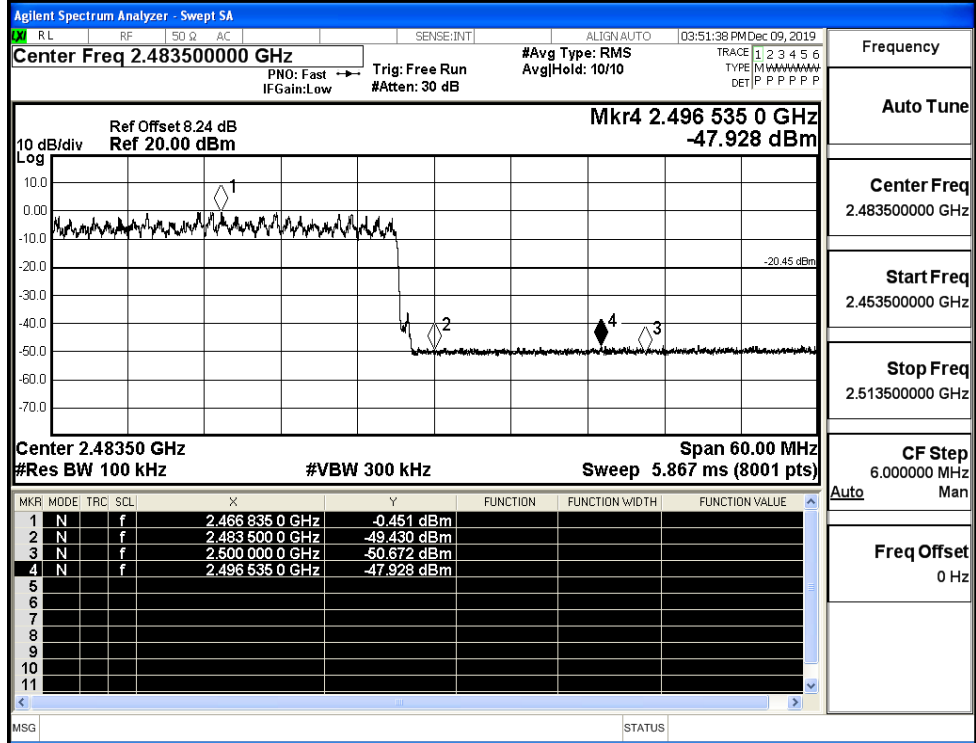
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

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

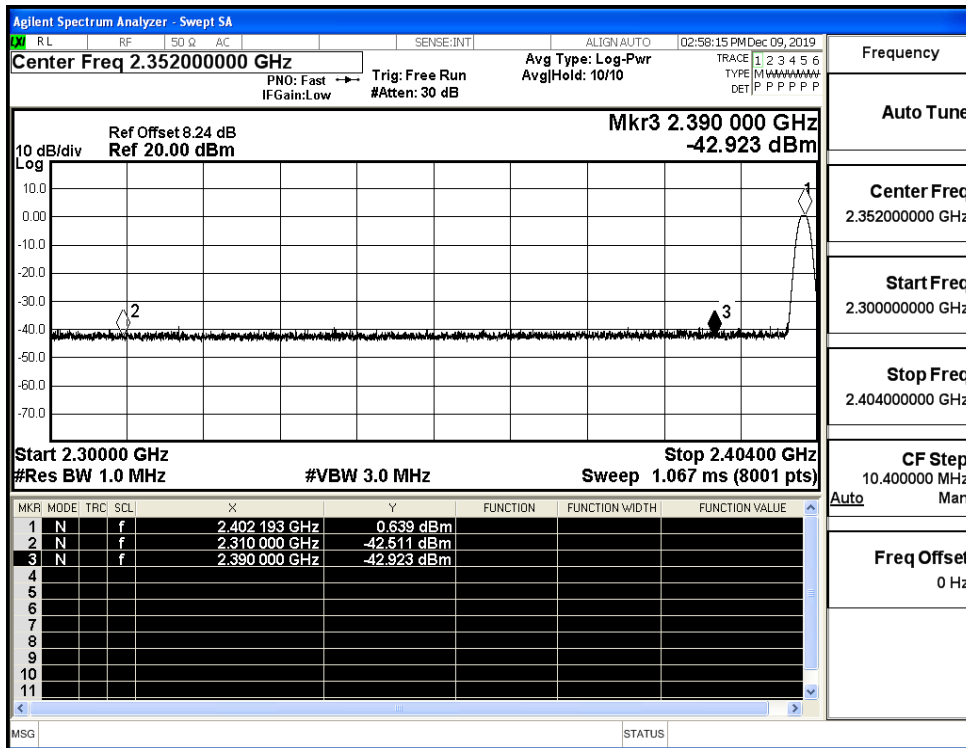


Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.463500000 GHz
Stop Freq
2.513500000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

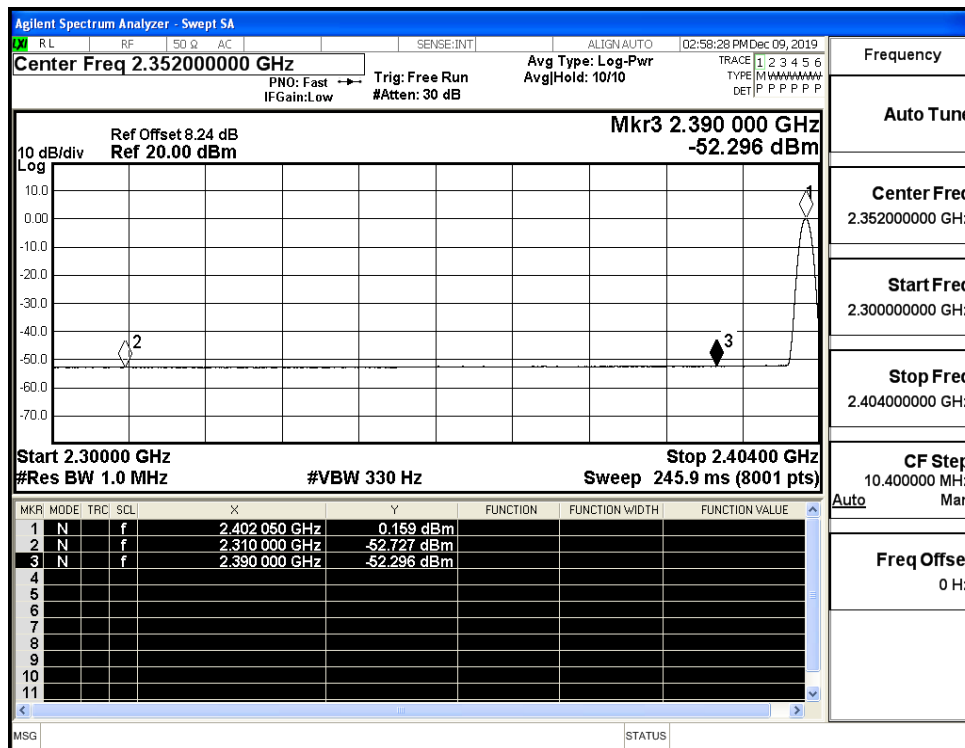
A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---------------|---------|--------|-------------|------|---------------|------------|----------|----------------|---------|
| GFSK | Off | 2310.0 | -42.51 | 2.0 | 0 | 52.75 | PEAK | 74 | PASS |
| | Off | 2310.0 | -52.73 | 2.0 | 0 | 42.53 | AV | 54 | PASS |
| | Off | 2390.0 | -42.92 | 2.0 | 0 | 52.33 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.30 | 2.0 | 0 | 42.96 | AV | 54 | PASS |
| | Off | 2483.5 | -42.96 | 2.0 | 0 | 52.30 | PEAK | 74 | PASS |
| | Off | 2483.5 | -51.89 | 2.0 | 0 | 43.37 | AV | 54 | PASS |
| | Off | 2500.0 | -42.06 | 2.0 | 0 | 53.20 | PEAK | 74 | PASS |
| | Off | 2500.0 | -51.76 | 2.0 | 0 | 43.50 | AV | 54 | PASS |
| $\pi/4$ DQPSK | Off | 2310.0 | -41.95 | 2.0 | 0 | 53.31 | PEAK | 74 | PASS |
| | Off | 2310.0 | -52.71 | 2.0 | 0 | 42.55 | AV | 54 | PASS |
| | Off | 2390.0 | -42.51 | 2.0 | 0 | 52.75 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.44 | 2.0 | 0 | 42.82 | AV | 54 | PASS |
| | Off | 2483.5 | -41.31 | 2.0 | 0 | 53.95 | PEAK | 74 | PASS |
| | Off | 2483.5 | -51.66 | 2.0 | 0 | 43.59 | AV | 54 | PASS |
| | Off | 2500.0 | -42.26 | 2.0 | 0 | 53.00 | PEAK | 74 | PASS |
| | Off | 2500.0 | -51.56 | 2.0 | 0 | 43.70 | AV | 54 | PASS |
| 8DPSK | Off | 2310.0 | -42.24 | 2.0 | 0 | 53.02 | PEAK | 74 | PASS |
| | Off | 2310.0 | -52.63 | 2.0 | 0 | 42.62 | AV | 54 | PASS |
| | Off | 2390.0 | -42.41 | 2.0 | 0 | 52.85 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.21 | 2.0 | 0 | 43.05 | AV | 54 | PASS |
| | Off | 2483.5 | -41.85 | 2.0 | 0 | 53.41 | PEAK | 74 | PASS |
| | Off | 2483.5 | -51.77 | 2.0 | 0 | 43.49 | AV | 54 | PASS |
| | Off | 2500.0 | -42.12 | 2.0 | 0 | 53.14 | PEAK | 74 | PASS |
| | Off | 2500.0 | -51.62 | 2.0 | 0 | 43.64 | AV | 54 | PASS |

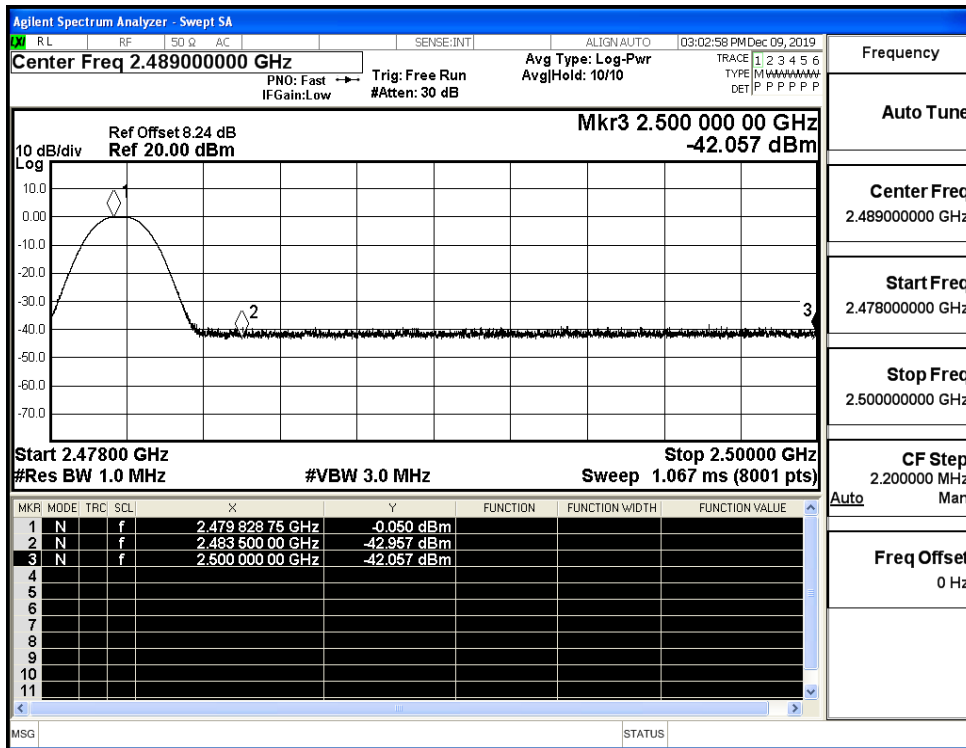
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



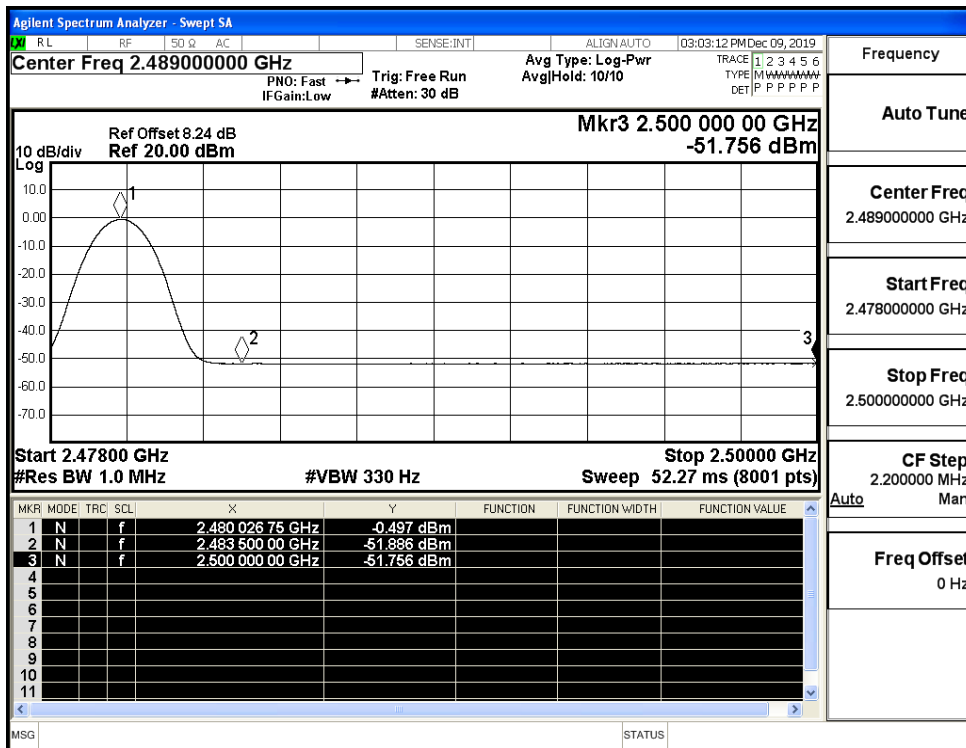
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



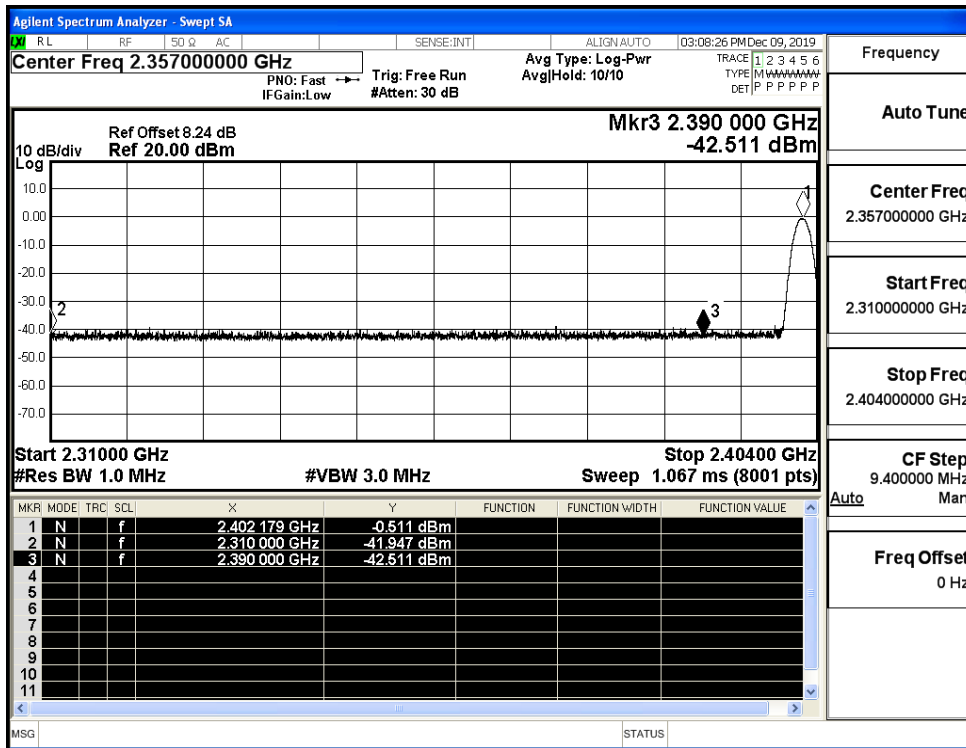
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



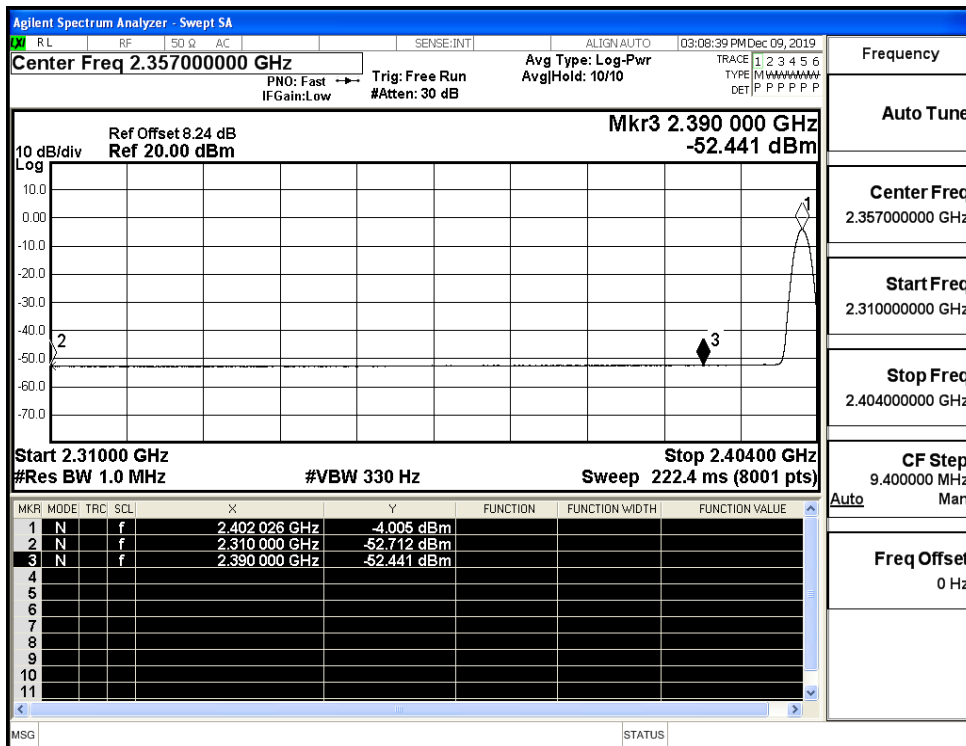
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



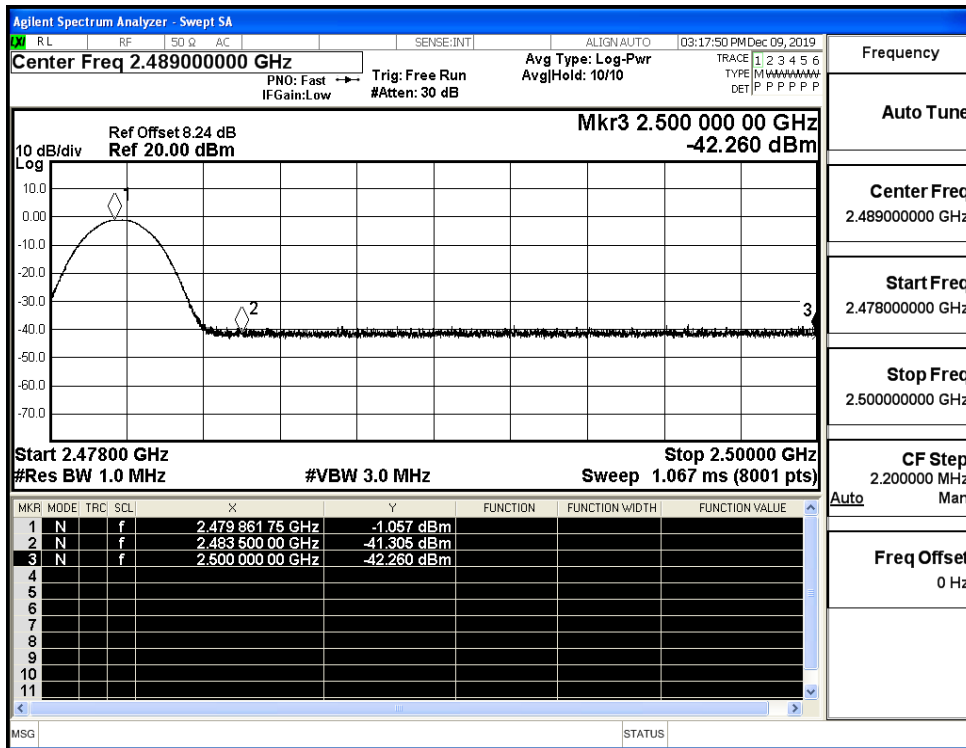
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



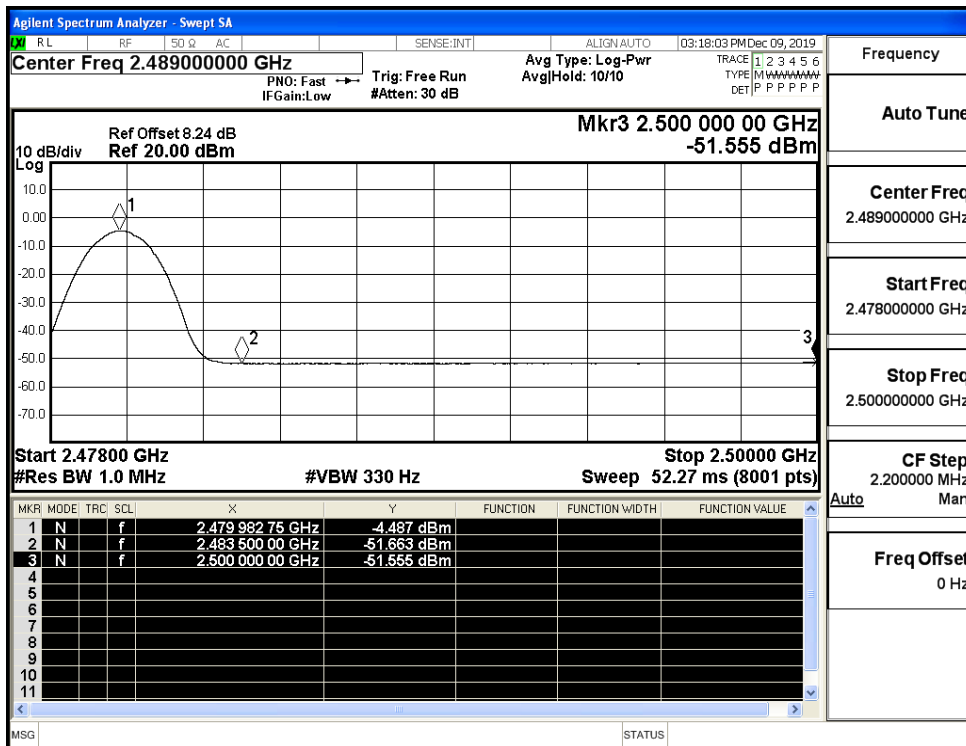
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



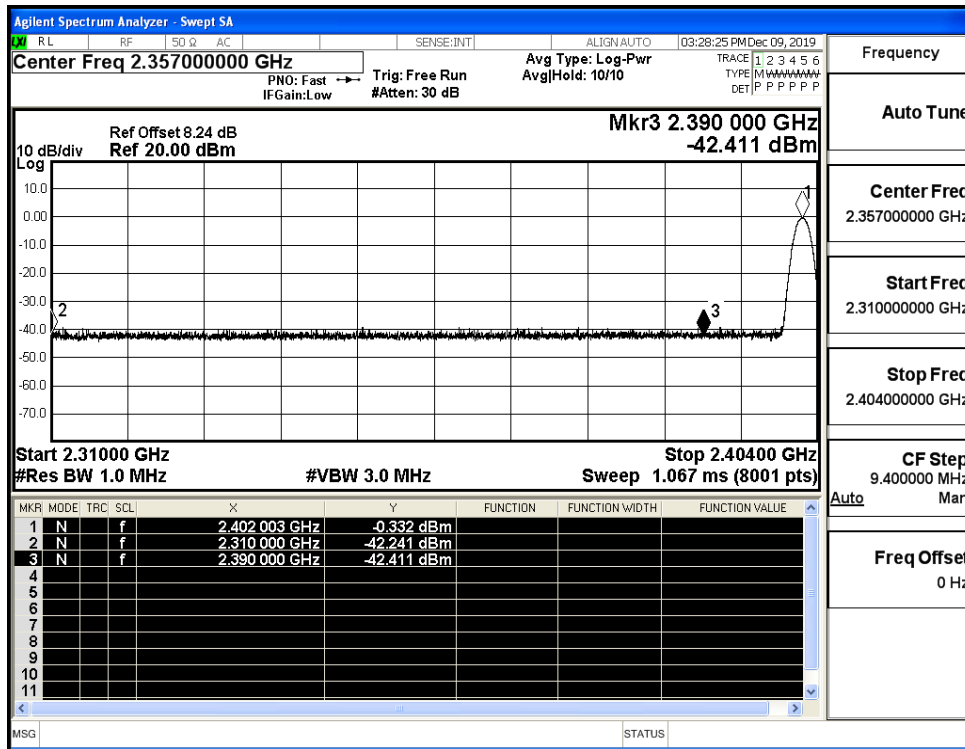
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



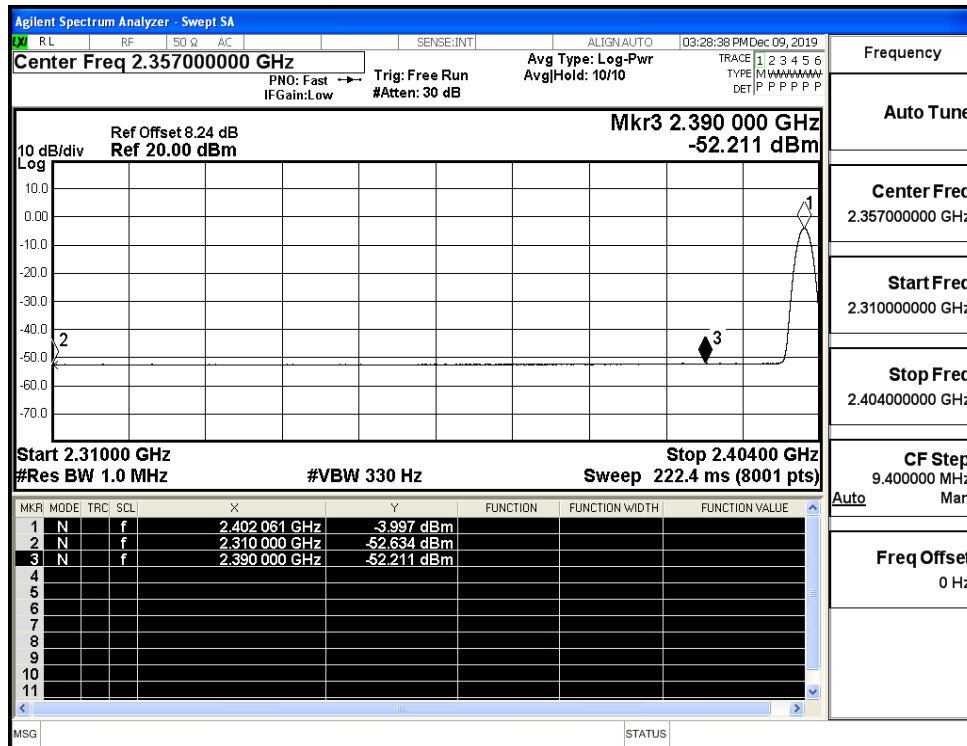
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



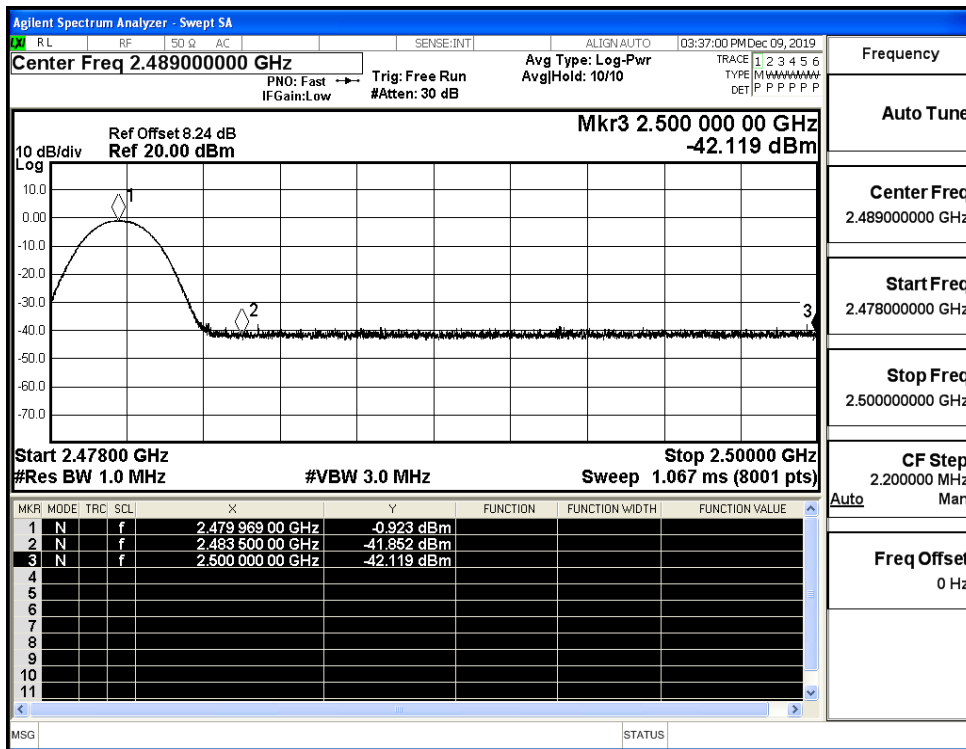
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

