# Appendix A
# RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)
# Product Name: Bluetooth speaker
# Trade Mark: N/A
# Test Model: PM10

**Environmental Conditions**

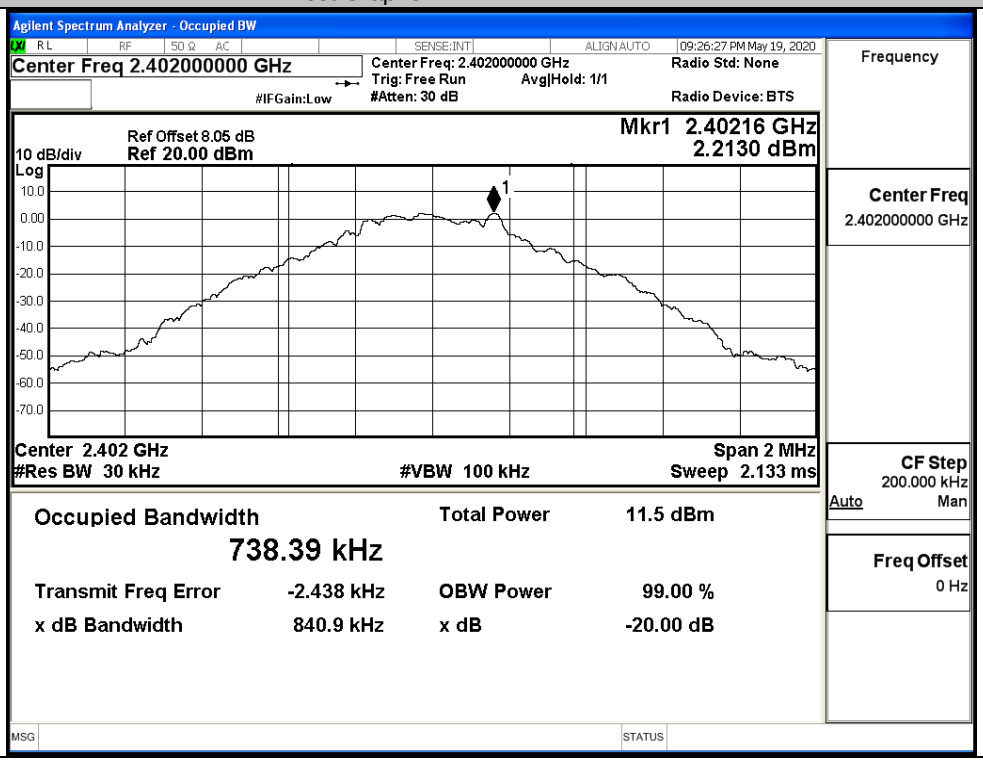
| | |
|---|---|
| Temperature: | 23.5 ° C |
| Relative Humidity: | 54.2% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Li Huan |
| Supervised by: | Tom Liu |

## A.1 Maxmum Conducted Peak Output Power

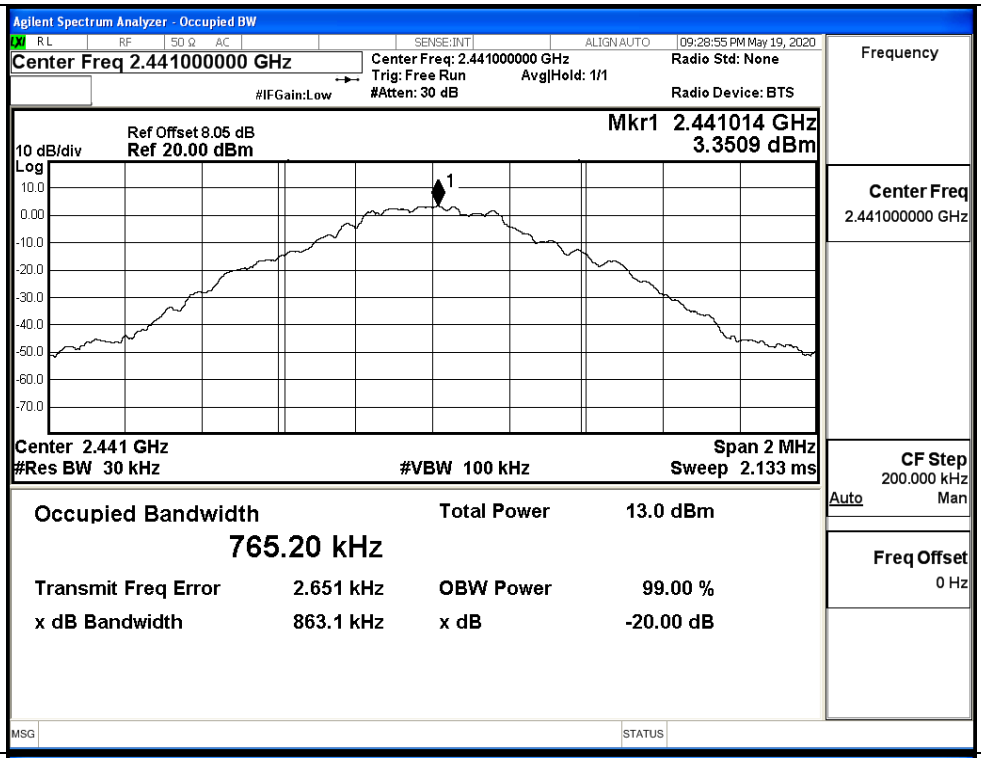
| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|
| GFSK | LCH | 5.836 | 30 | PASS |
| | MCH | 5.364 | 30 | PASS |
| | HCH | 4.832 | 30 | PASS |
| π/4DQPSK | LCH | 4.479 | 30 | PASS |
| | MCH | 5.577 | 30 | PASS |
| | HCH | 4.237 | 30 | PASS |

## A.2 20dB Bandwidth

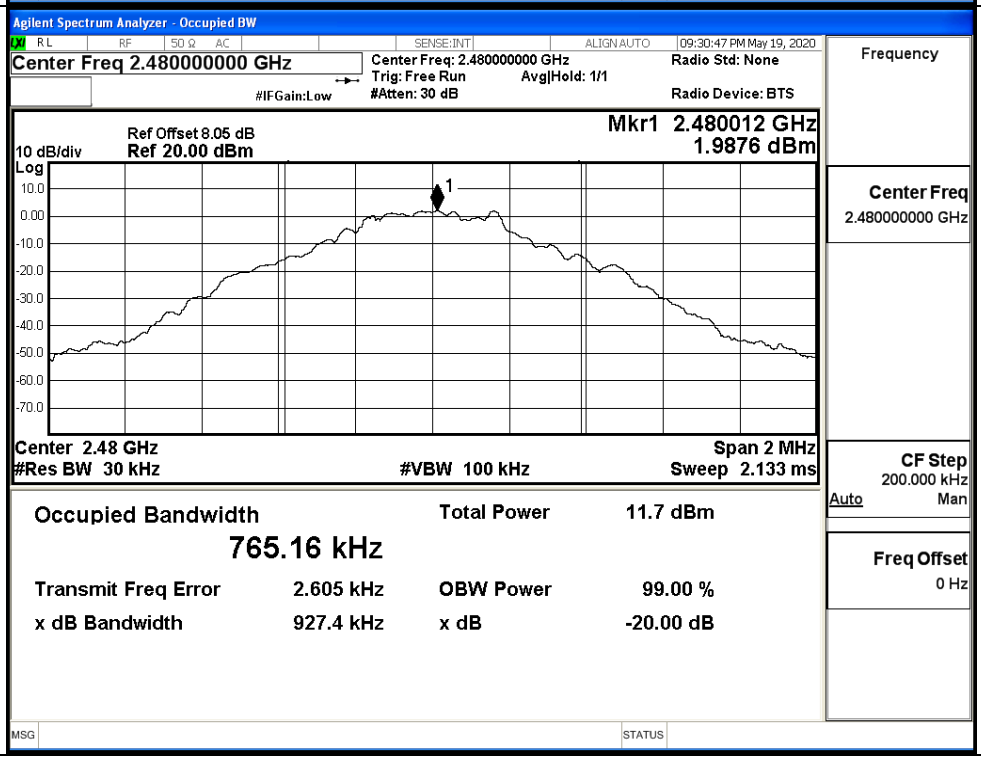
| Mode | Channel. | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|
| GFSK | LCH | 0.8409 | Not Specified | PASS |
| | MCH | 0.8631 | Not Specified | PASS |
| | HCH | 0.9274 | Not Specified | PASS |
| π/4DQPSK | LCH | 1.277 | Not Specified | PASS |
| | MCH | 1.275 | Not Specified | PASS |
| | HCH | 1.278 | Not Specified | PASS |

| Test Graphs | | |
|---|---|---|
| GFSK/LCH | |  |

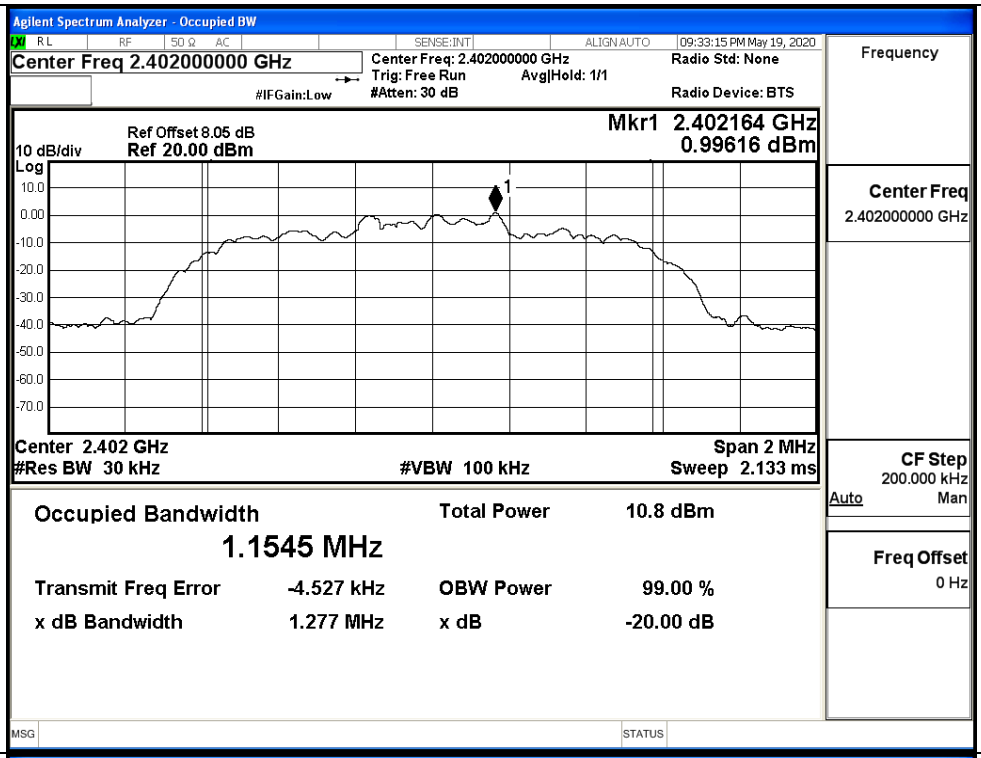
GFSK/MCH



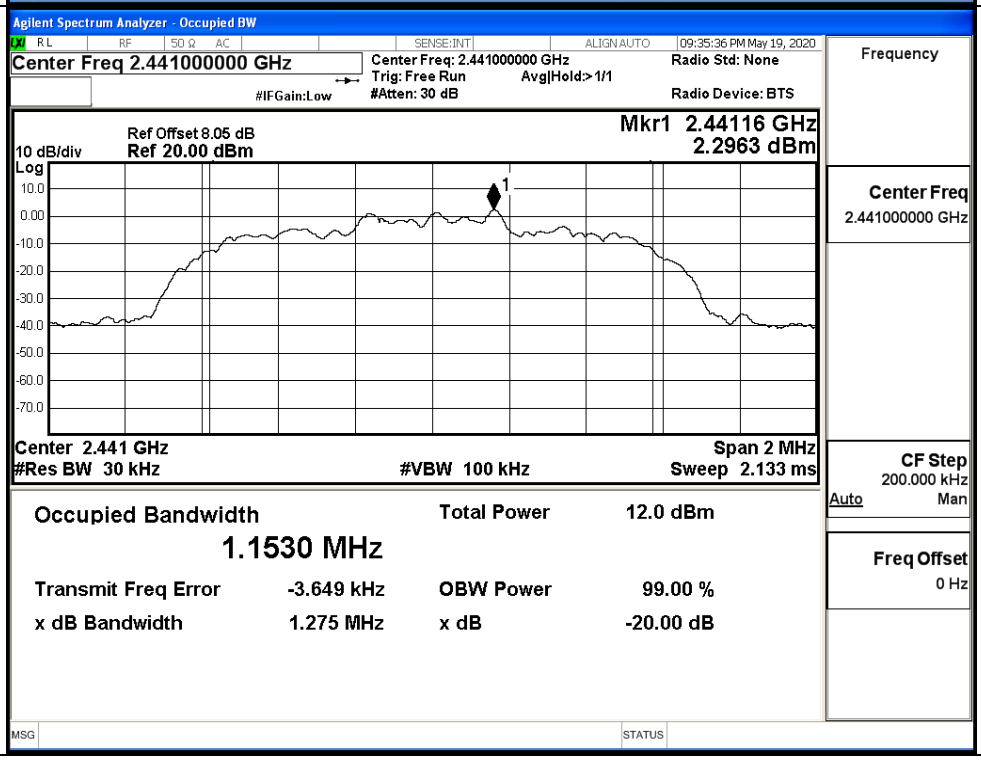

GFSK/HCH



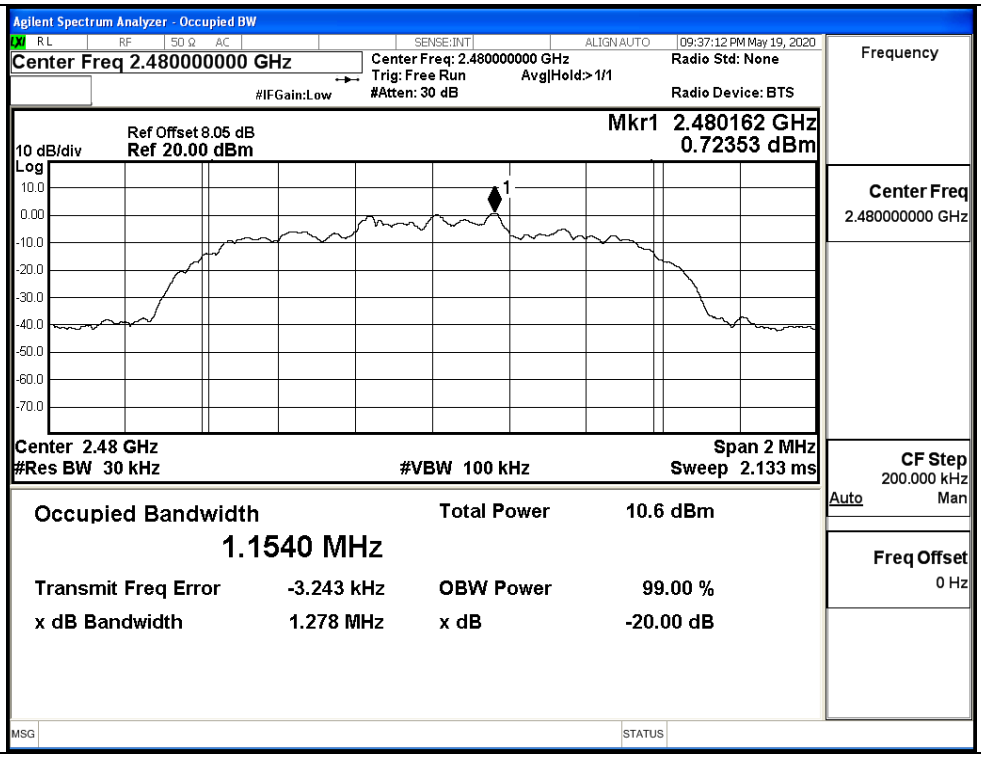
π/4DQPSK/LCH




π/4DQPSK/MCH

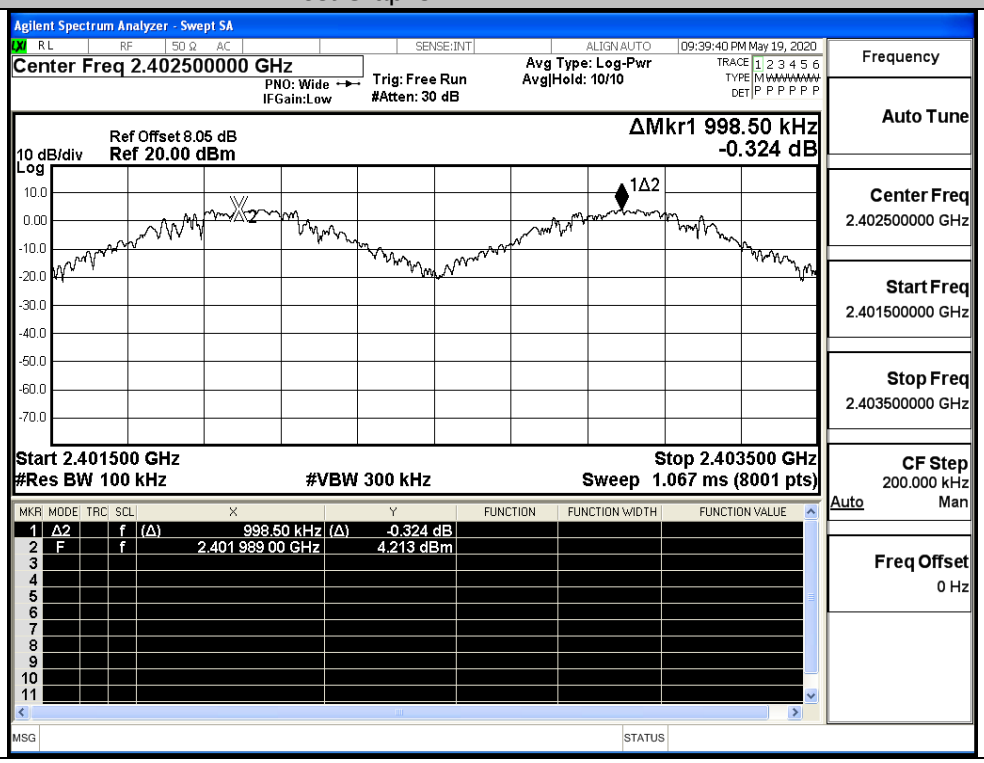


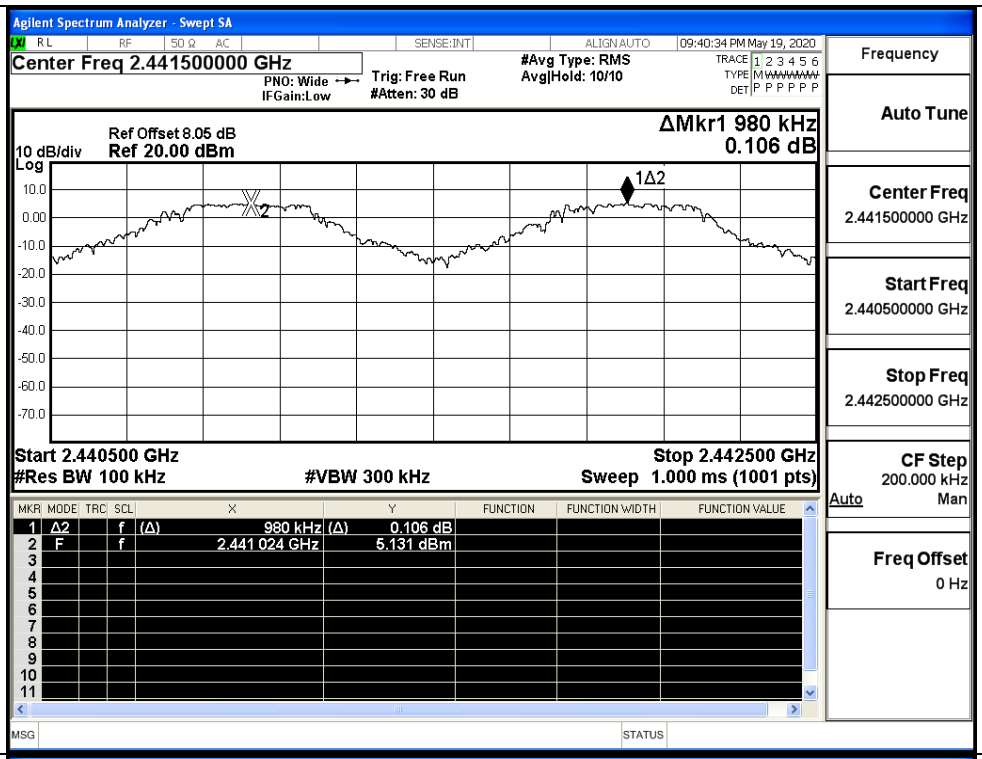
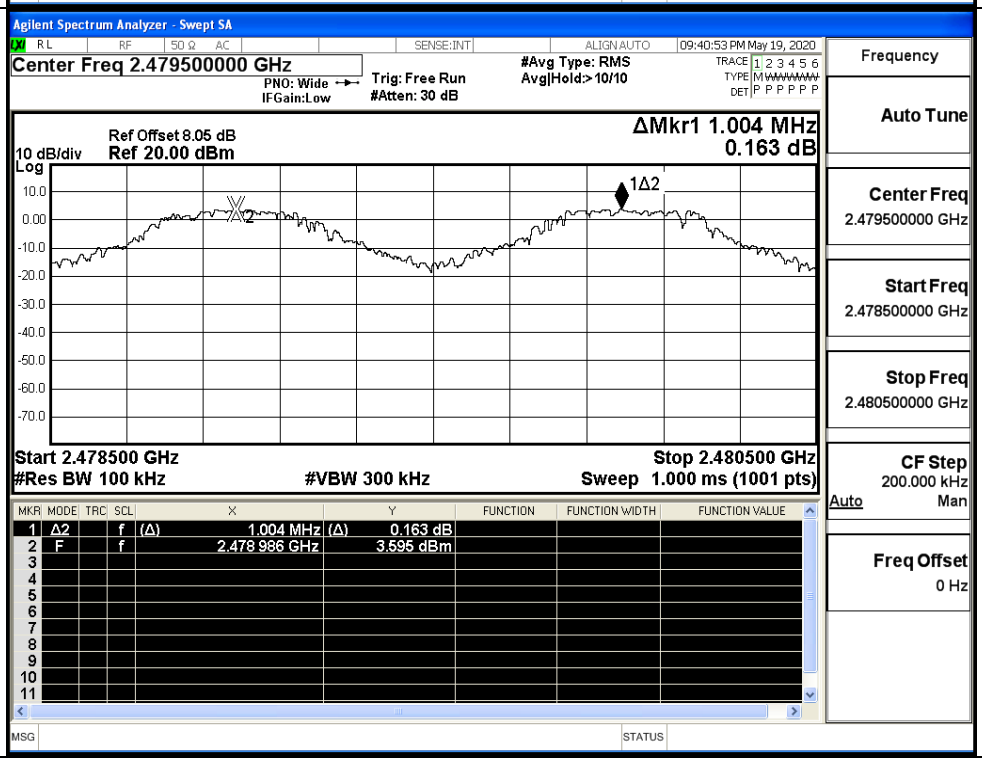
π/4DQPSK/HCH


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
09:37:12 PM May 19, 2020
Frequency
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.480162 GHz
0.72353 dBm
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.133 ms
CF Step
200.000 kHz
Auto
Man
Occupied Bandwidth
1.1540 MHz
Total Power 10.6 dBm
Transmit Freq Error -3.243 kHz
OBW Power 99.00 %
x dB Bandwidth 1.278 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

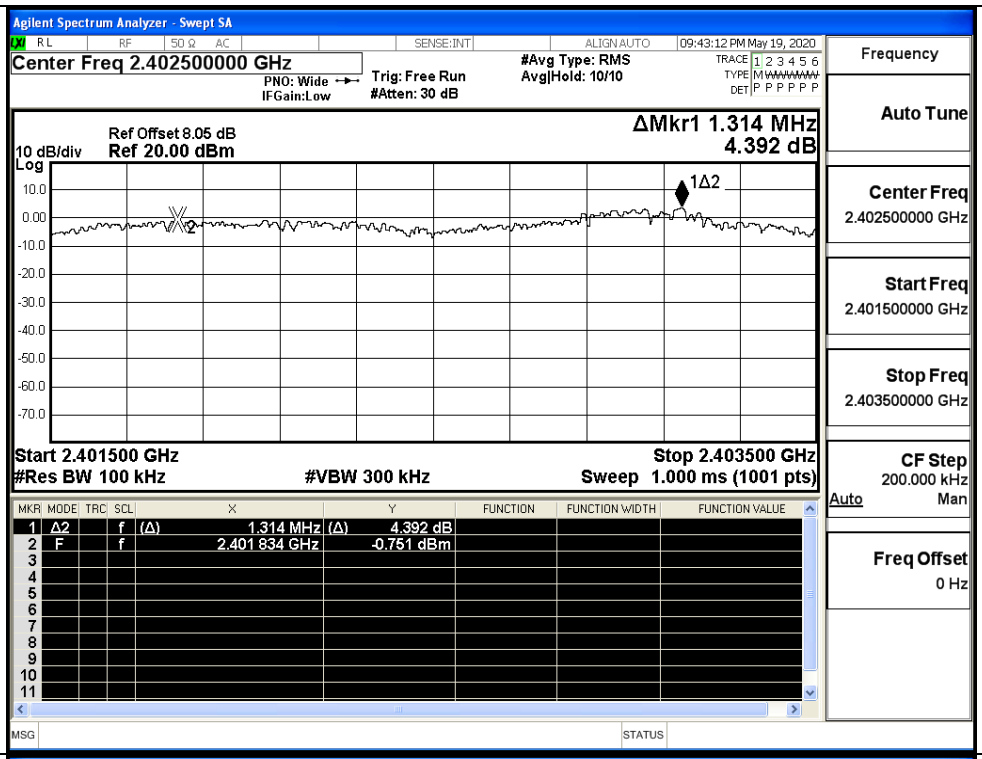
## A.3 Carrier Frequency Separation

| Mode | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|
| GFSK | LCH | 0.999 | 0.618 | PASS |
| | MCH | 0.980 | 0.618 | PASS |
| | HCH | 1.004 | 0.618 | PASS |
| π/4DQPSK | LCH | 1.314 | 0.852 | PASS |
| | MCH | 1.314 | 0.852 | PASS |
| | HCH | 1.302 | 0.852 | PASS |

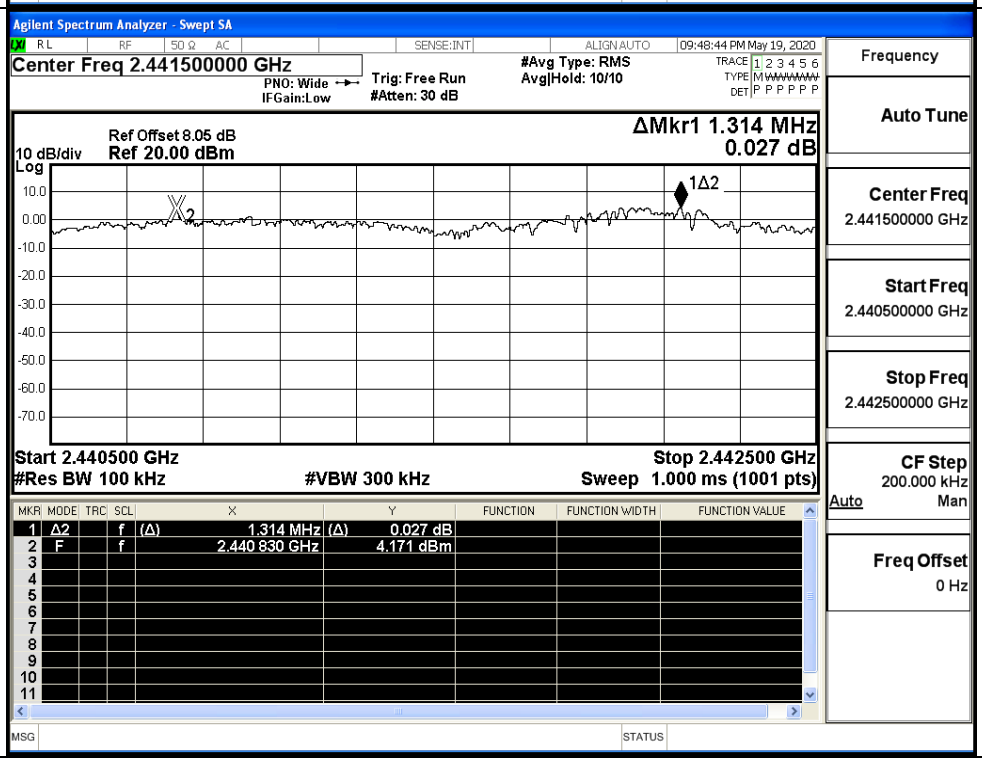
| Test Graphs | |
|---|---|
| GFSK/LCH |  |

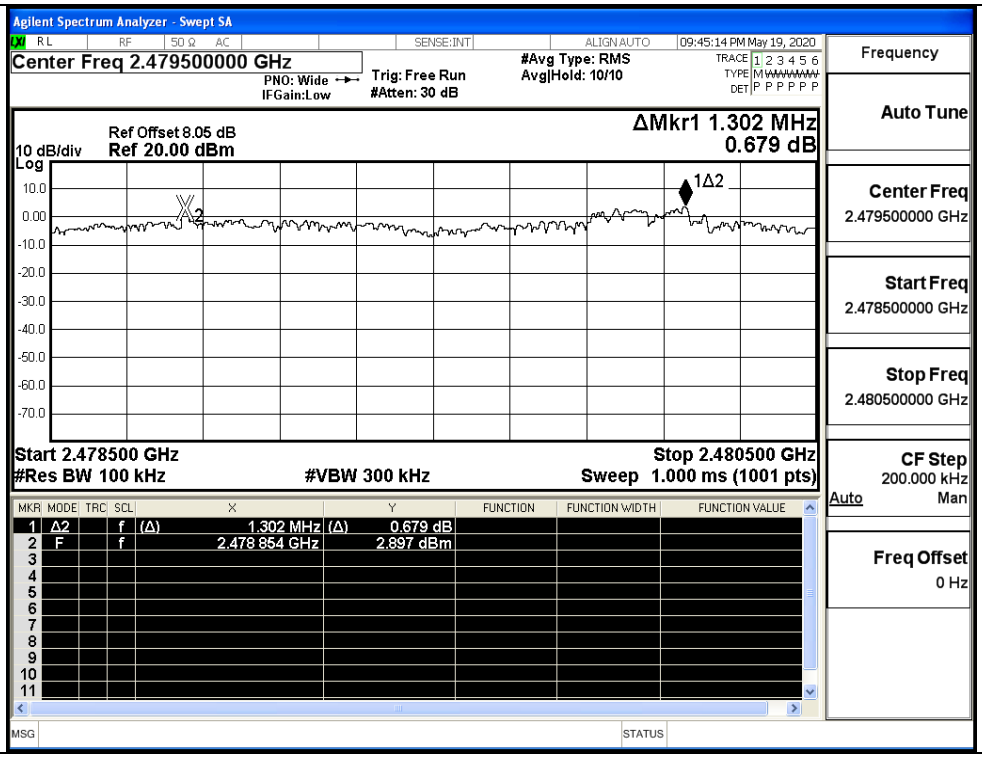
| | | |
|---|---|---|
| GFSK/MCH | |  |
| GFSK/HCH | |  |

π/4DQPSK/LCH




π/4DQPSK/MCH

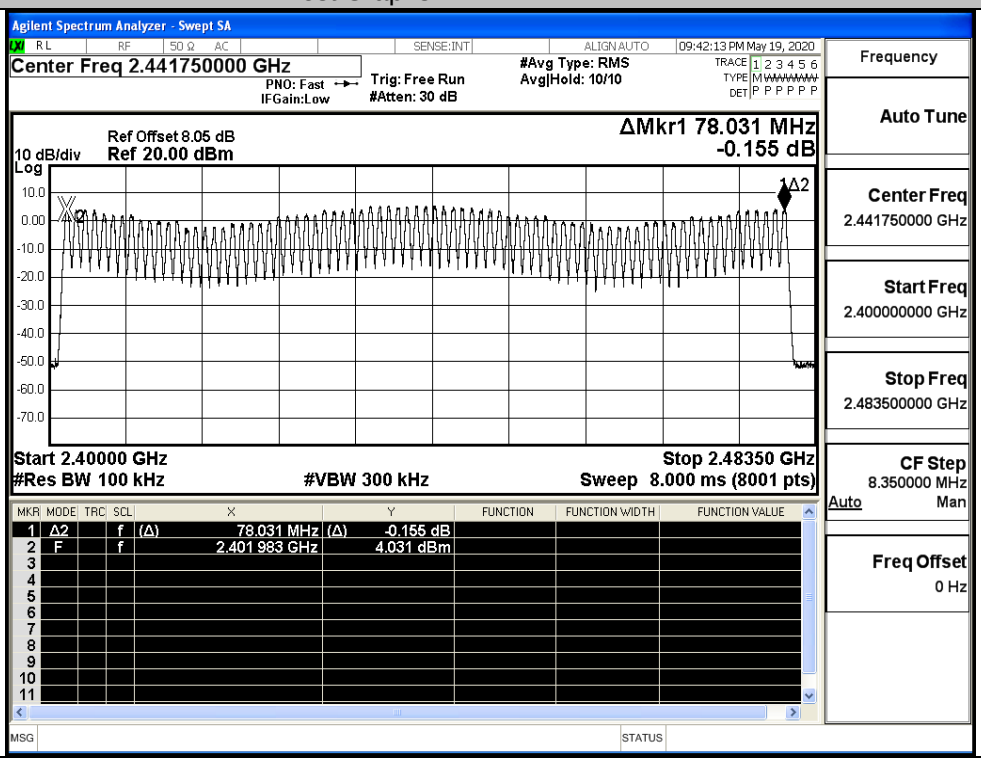
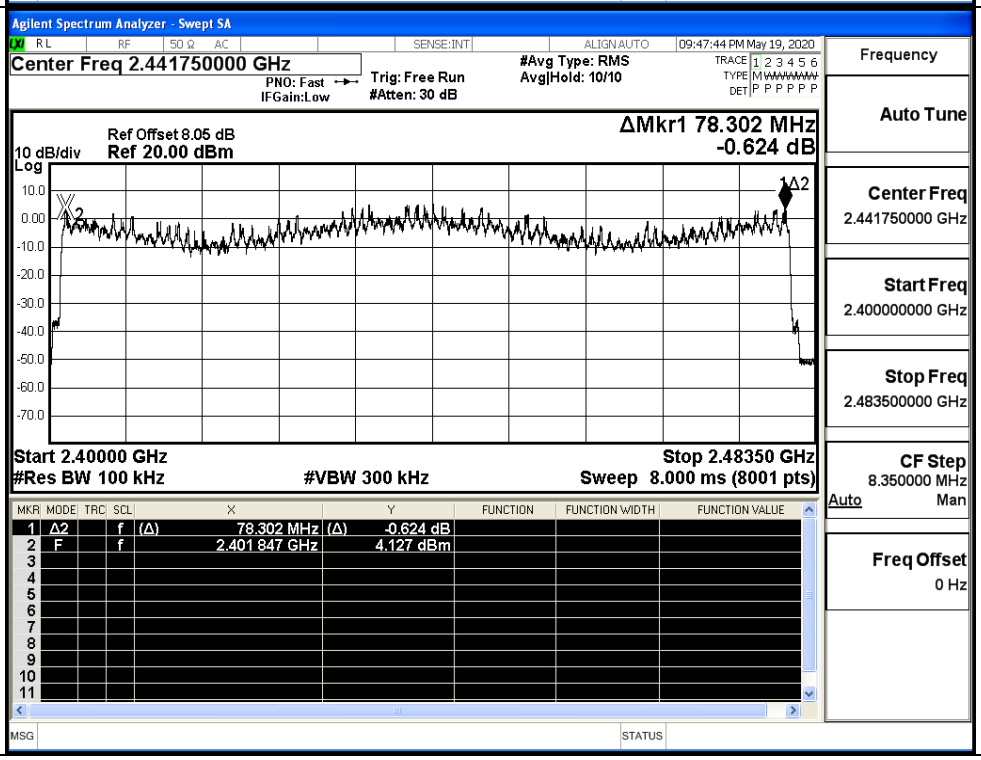


| | | |
|---|---|---|
| π/4DQPSK/HCH | |  |

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.479500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
09:45:14 PM May 19, 2020
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 1.302 MHz
0.679 dB
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.000 ms (1001 pts)
1 Δ2 f (Δ) 1.302 MHz (Δ) 0.679 dB
2 F f 2.478 854 GHz 2.897 dBm
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

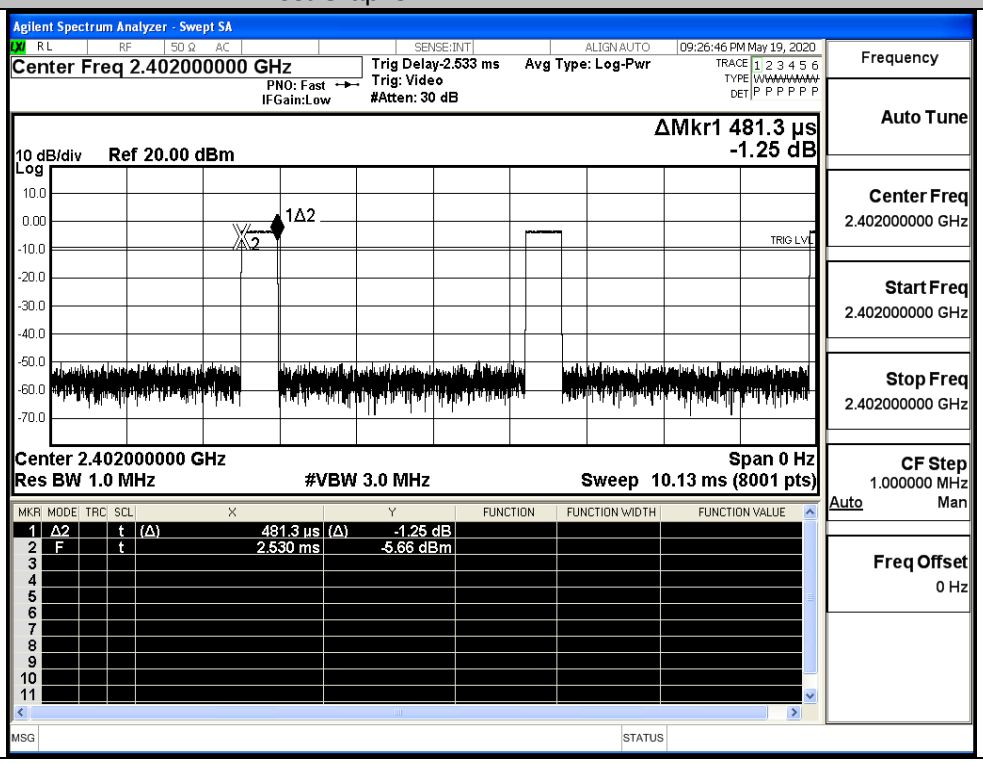
## A.4 Hopping Channel Number

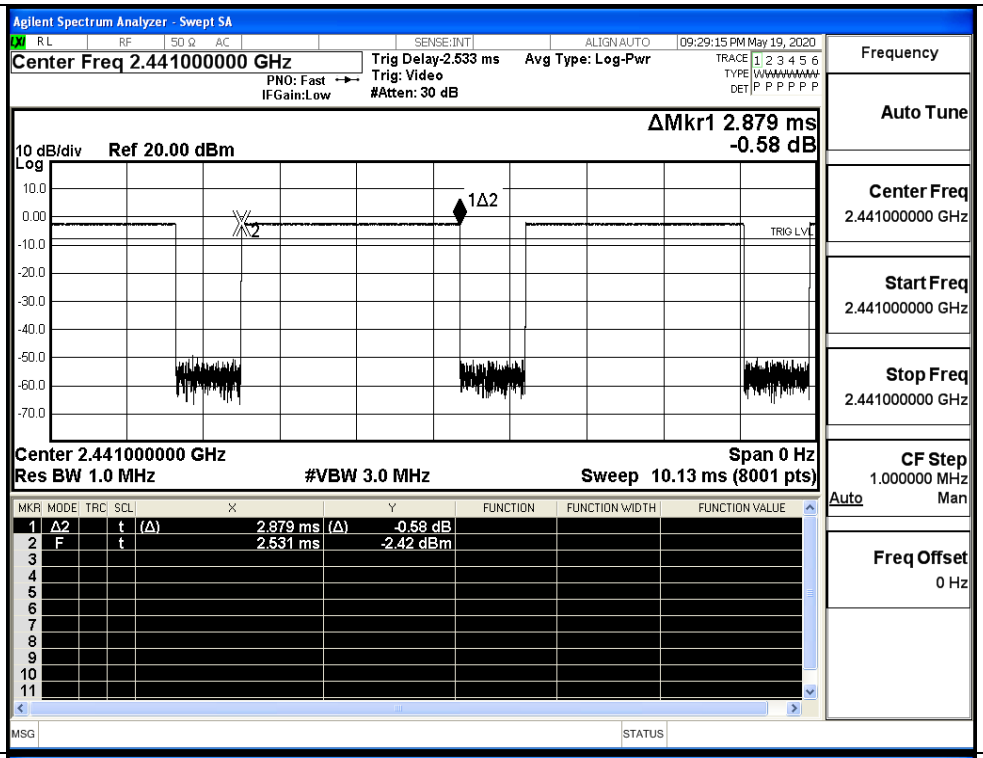
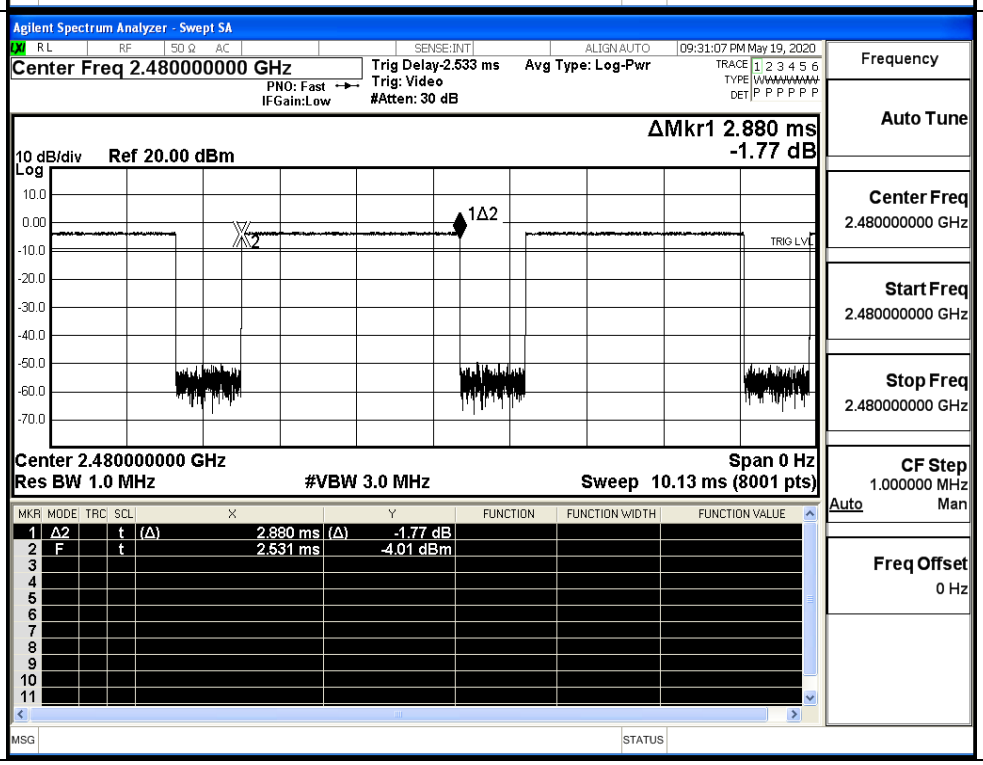
| Mode | Channel. | Number of Hopping Channel [N] | Limit [N] | Verdict |
|---|---|---|---|---|
| GFSK | Hop | 79 | >=15 | PASS |
| π/4DQPSK | Hop | 79 | >=15 | PASS |

| Test Graphs | | |
|---|---|---|
| GFSK/Hop | |  |
| π/4DQPSK/Hop | |  |

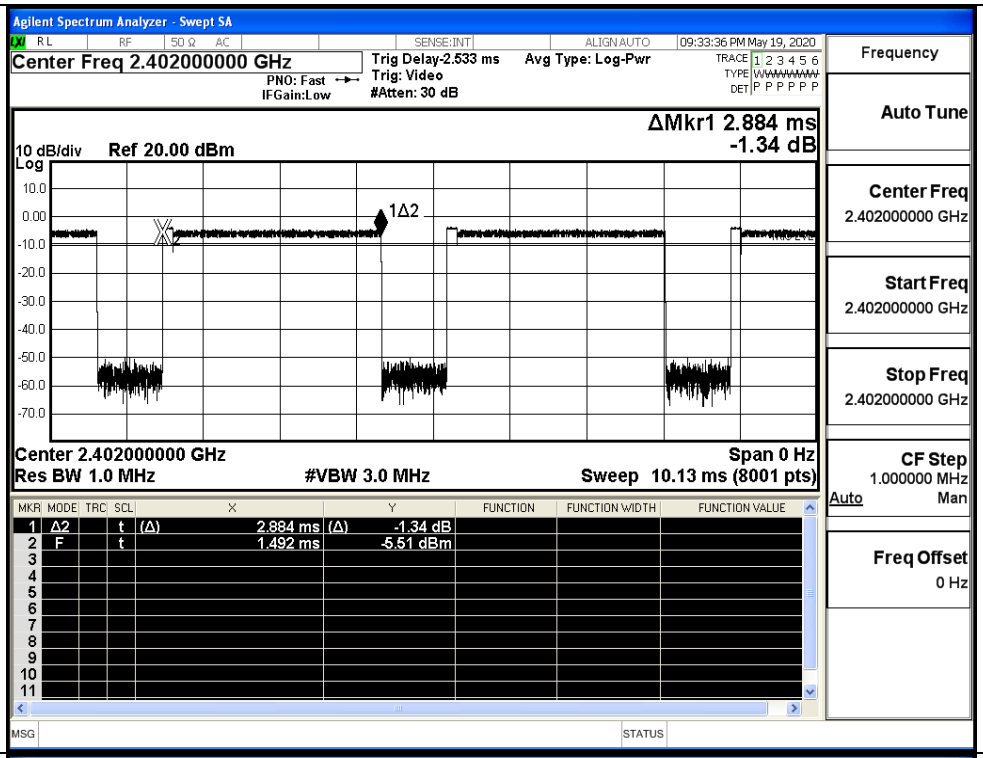
## A.5 Dwell Time

| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---|---|---|---|---|---|---|---|
| GFSK | DH5 | LCH | 0.48 | 106.7 | 0.051 | 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 | 0.48 | 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 |

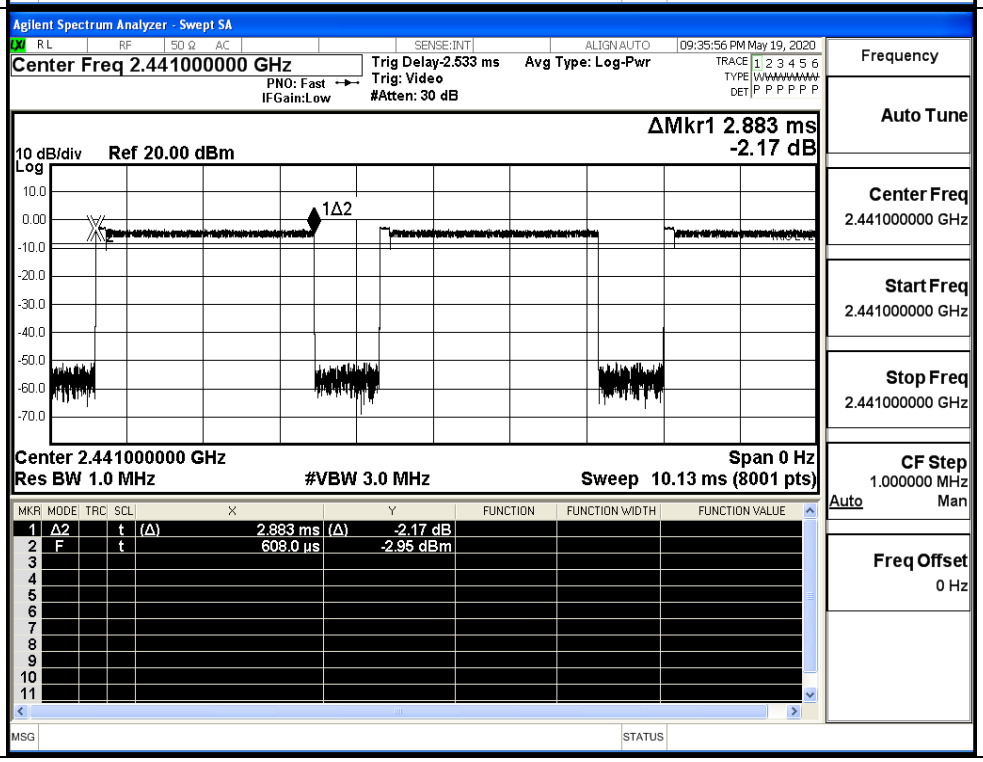
| Test Graphs | |
|---|---|
| GFSK_DH5/LCH |  |

| | |
|---|---|
| GFSK_DH5/MCH |  |
| GFSK_DH5/HCH |  |

π/4DQPSK
_2DH5/LCH

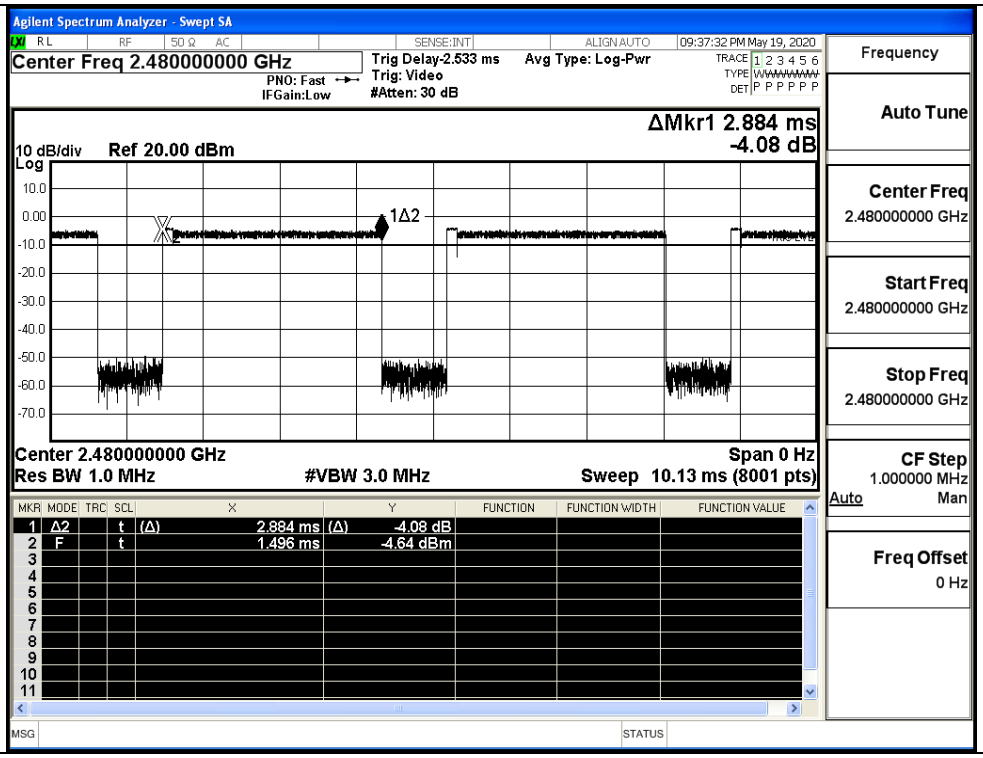



π/4DQPSK
_2DH5/MCH



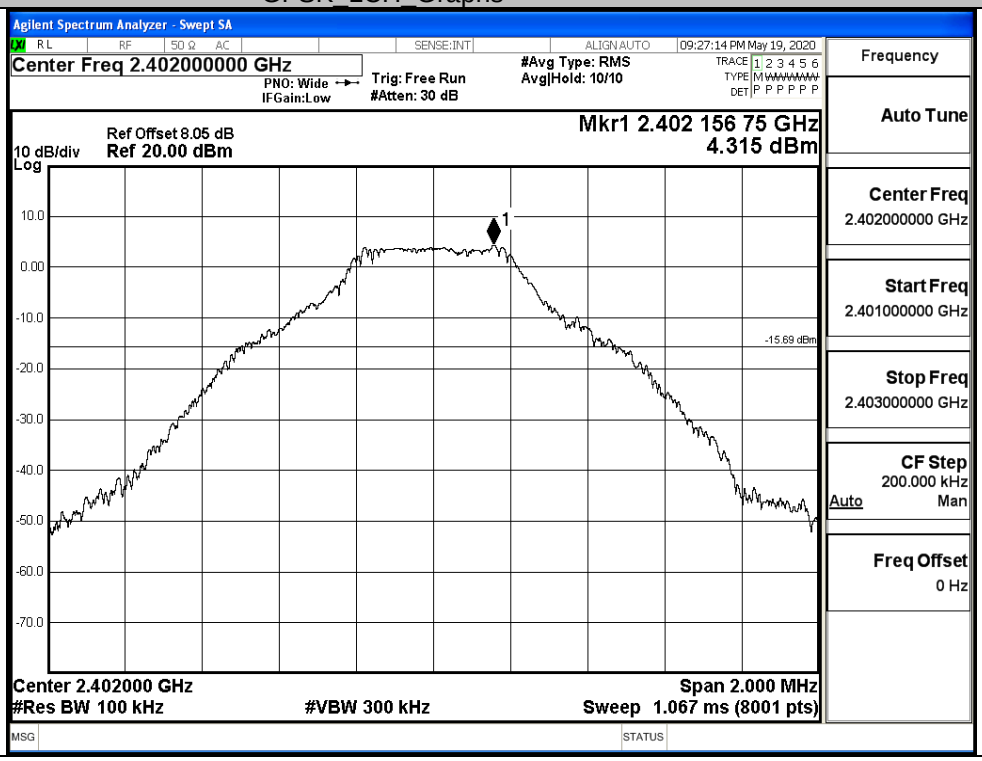
π/4DQPSK

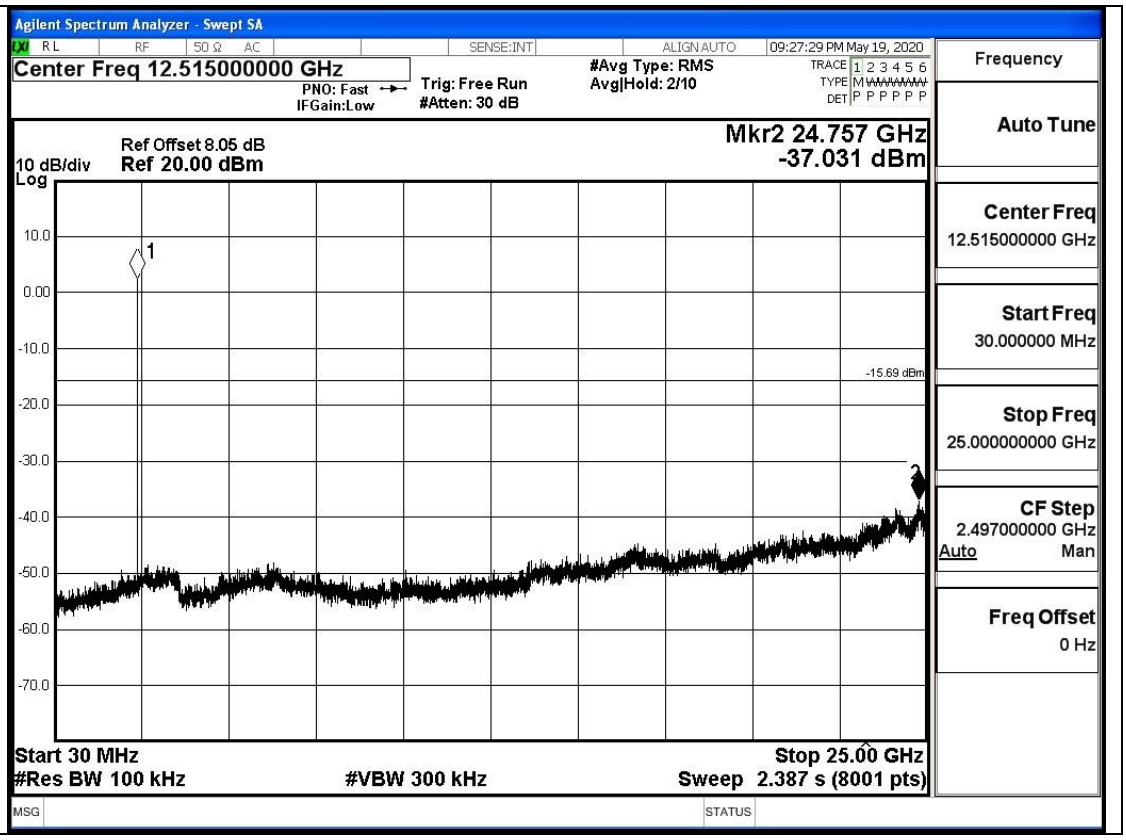
_2DH5/HCH



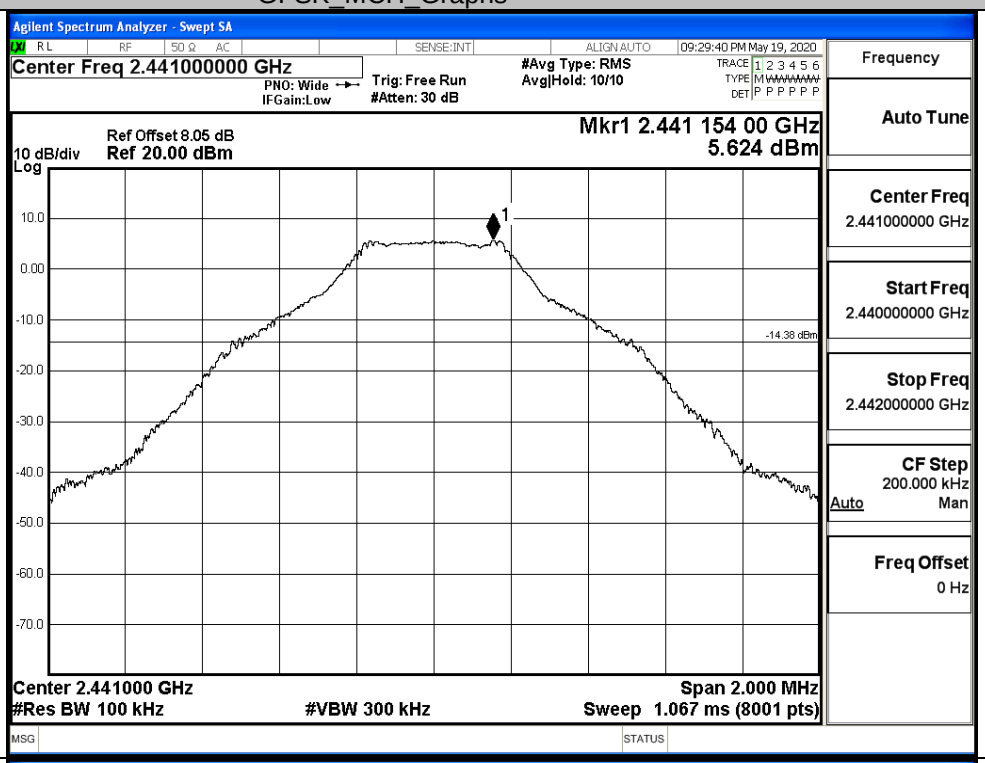
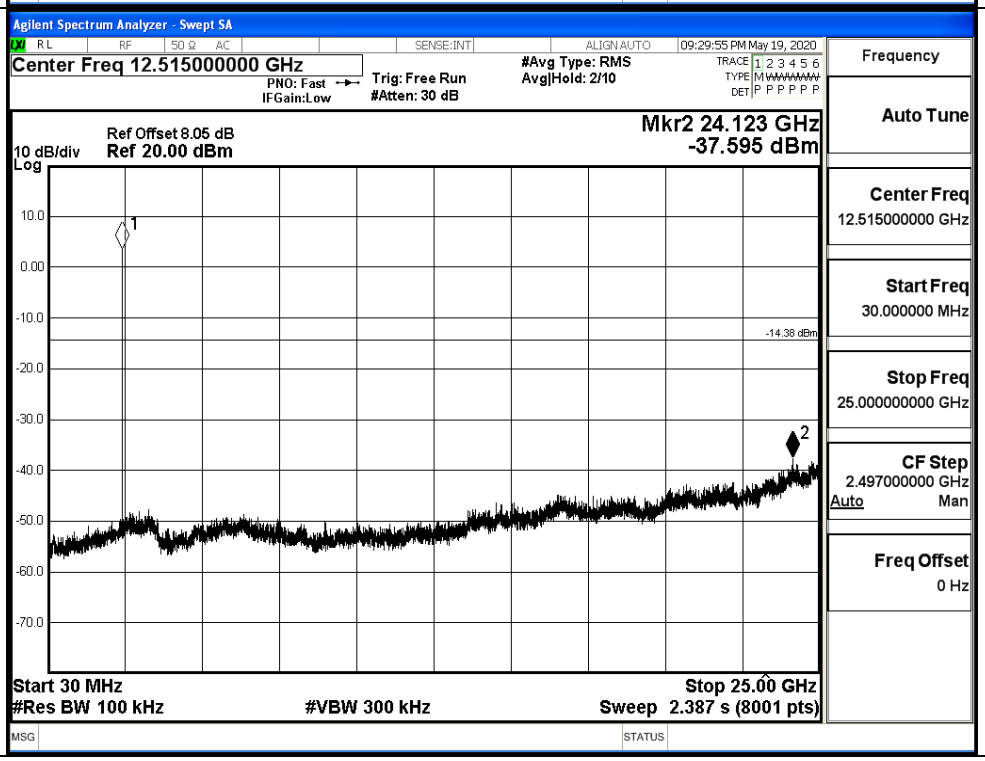
## A.6 RF Conducted Spurious Emissions

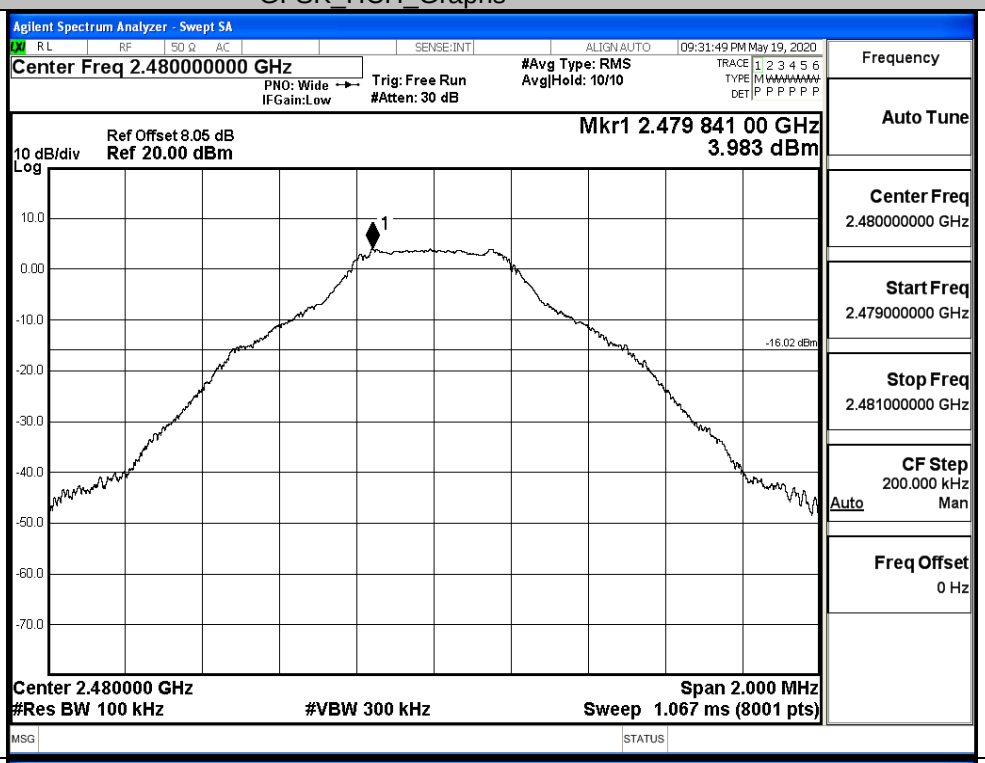
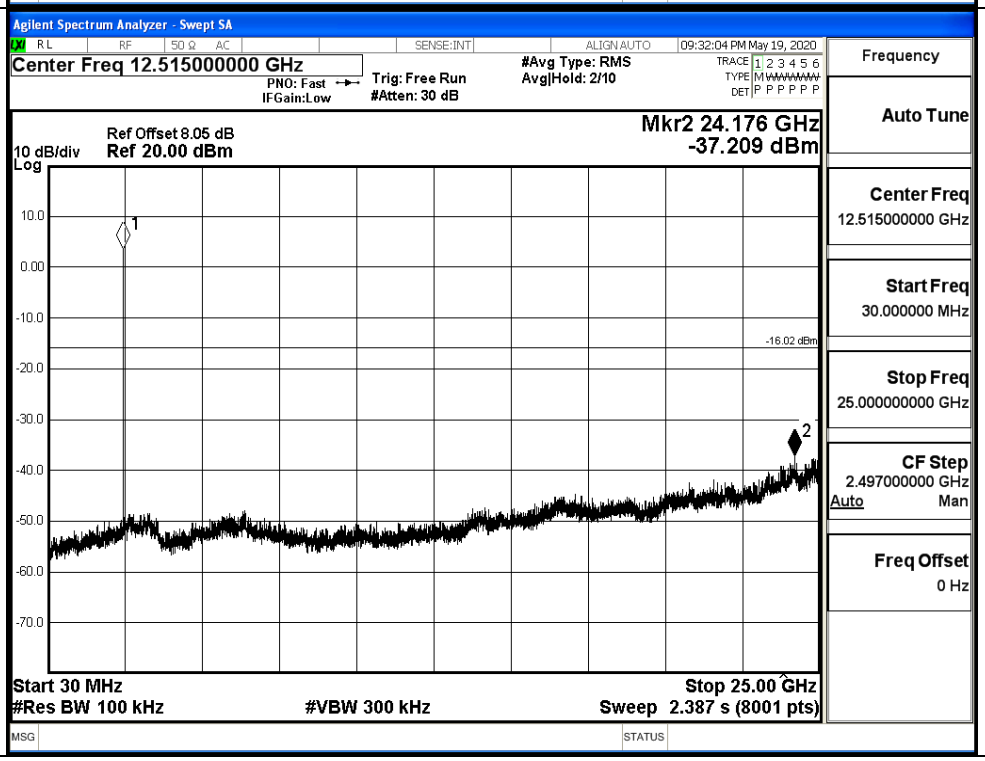
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| GFSK | LCH | 4.315 | -37.031 | -15.685 | PASS |
| | MCH | 5.624 | -37.595 | -14.376 | PASS |
| | HCH | 3.983 | -37.209 | -16.017 | PASS |
| π/4DQPSK | LCH | 3.915 | -38.523 | -16.085 | PASS |
| | MCH | 4.93 | -37.697 | -15.070 | PASS |
| | HCH | 3.482 | -37.851 | -16.518 | PASS |

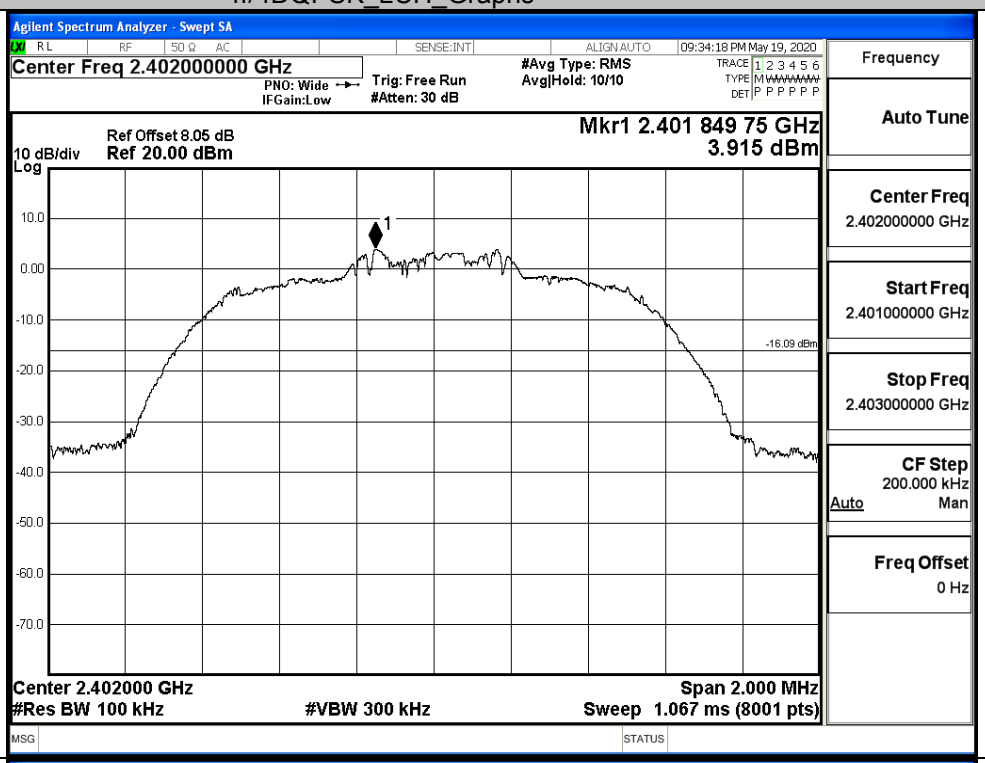
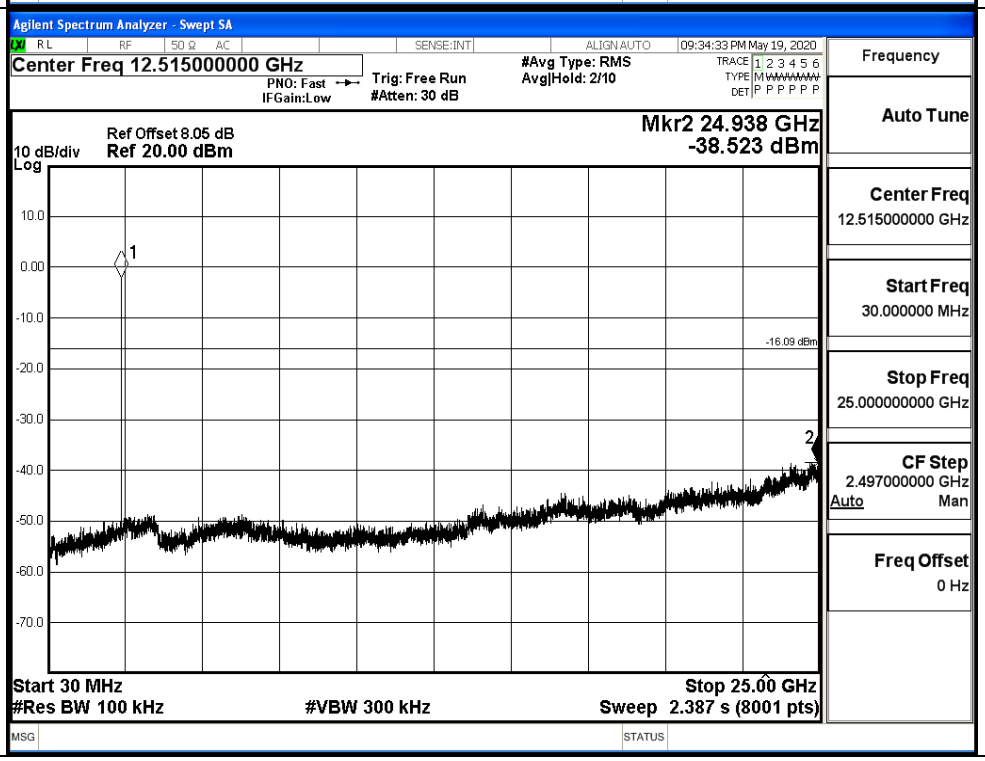
| GFSK_LCH_Graphs | | |
|---|---|---|
| Pref | |  |

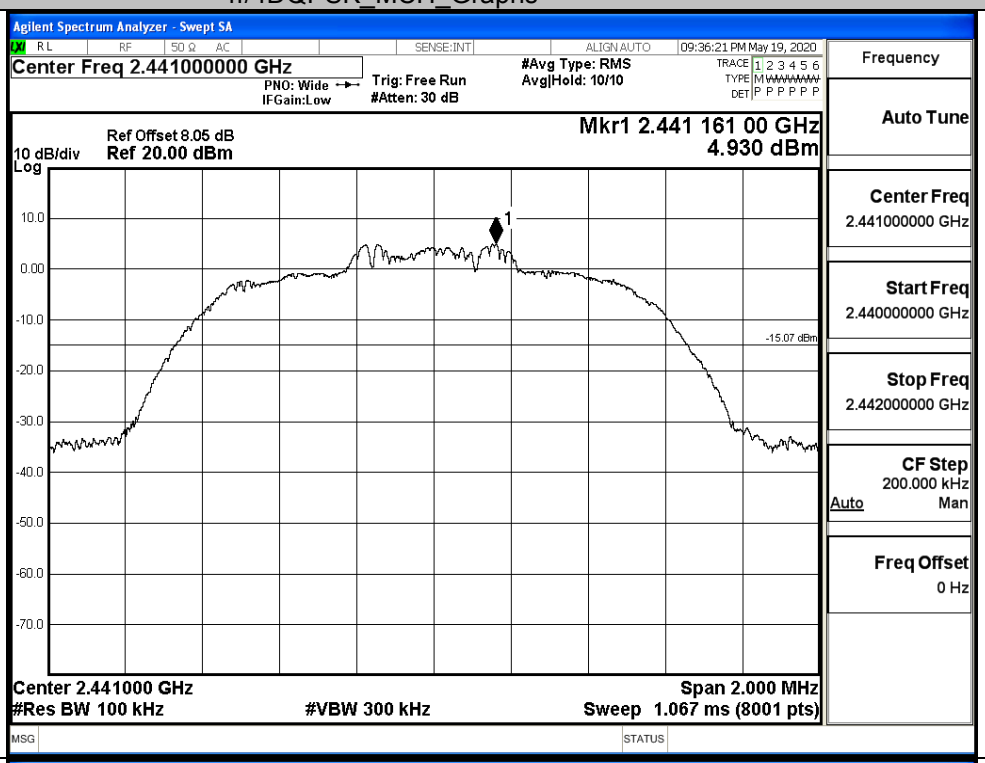
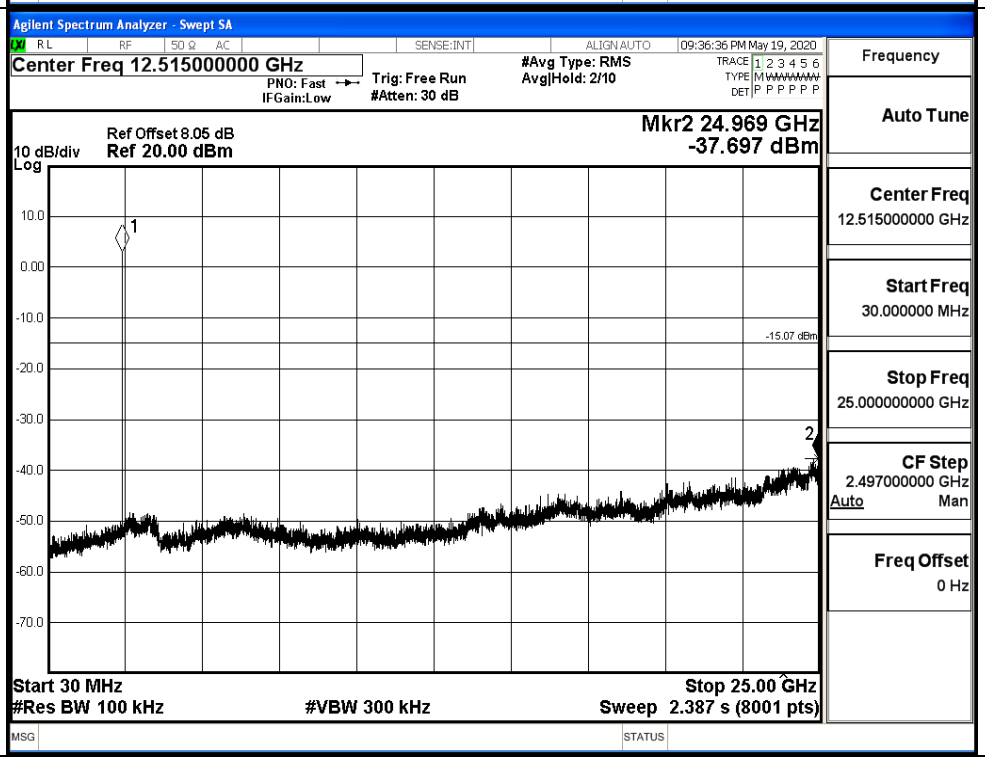
| | |
|---|---|
| Puw |  |

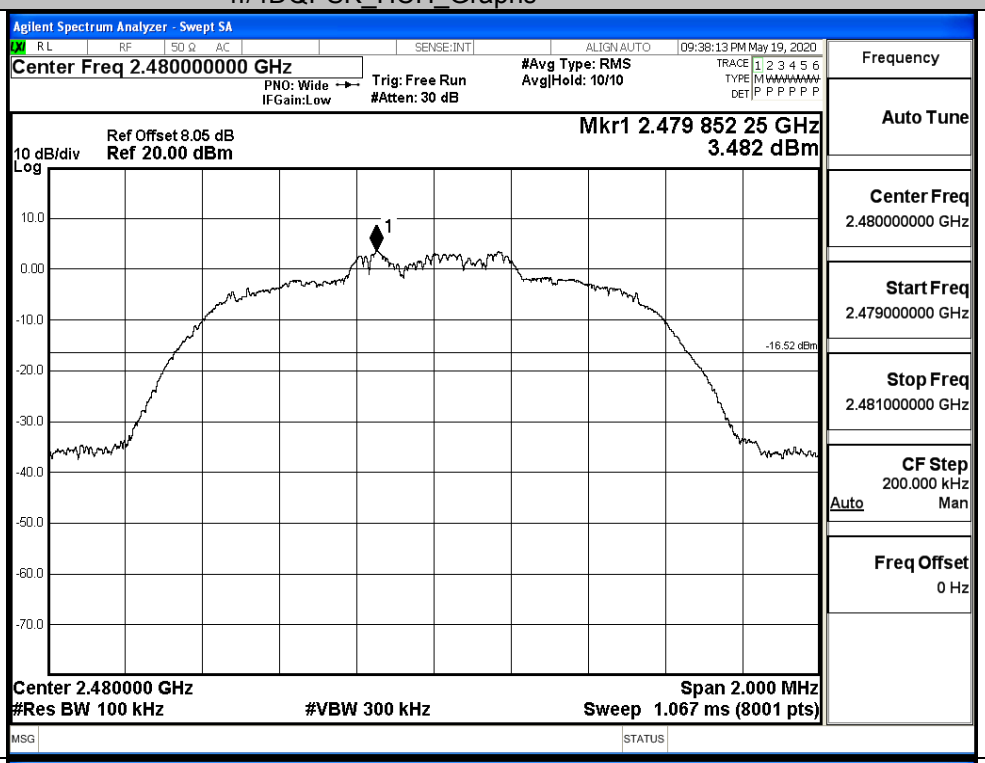
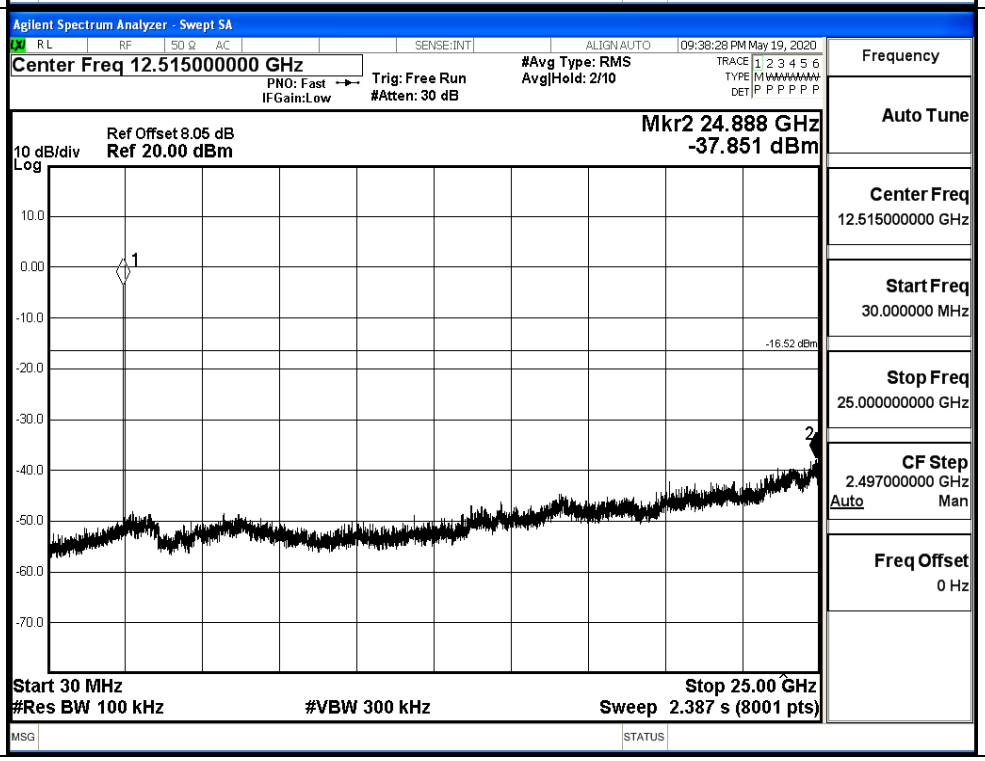
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:27:29 PM May 19, 2020
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr2 24.757 GHz
-37.031 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-15.69 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

| GFSK_MCH_Graphs | | |
|---|---|---|
| Pref | |  |
| Puw | |  |

| GFSK_HCH_Graphs | | | |
|---|---|---|---|
| Pref | |  | |
| Puw | |  | |

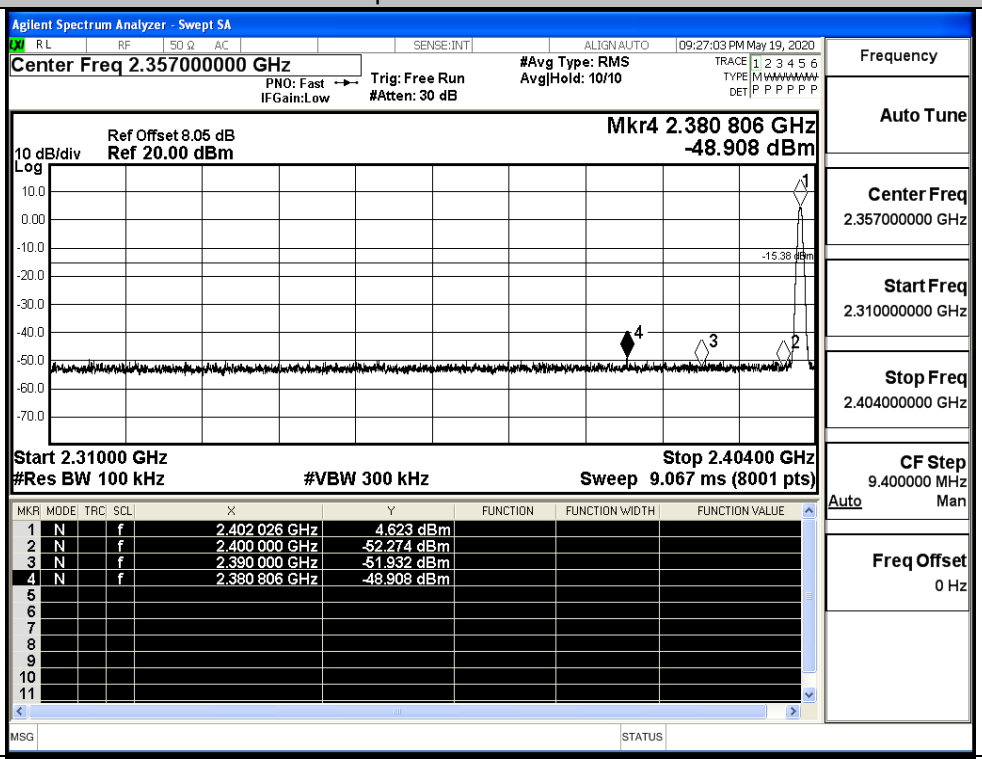
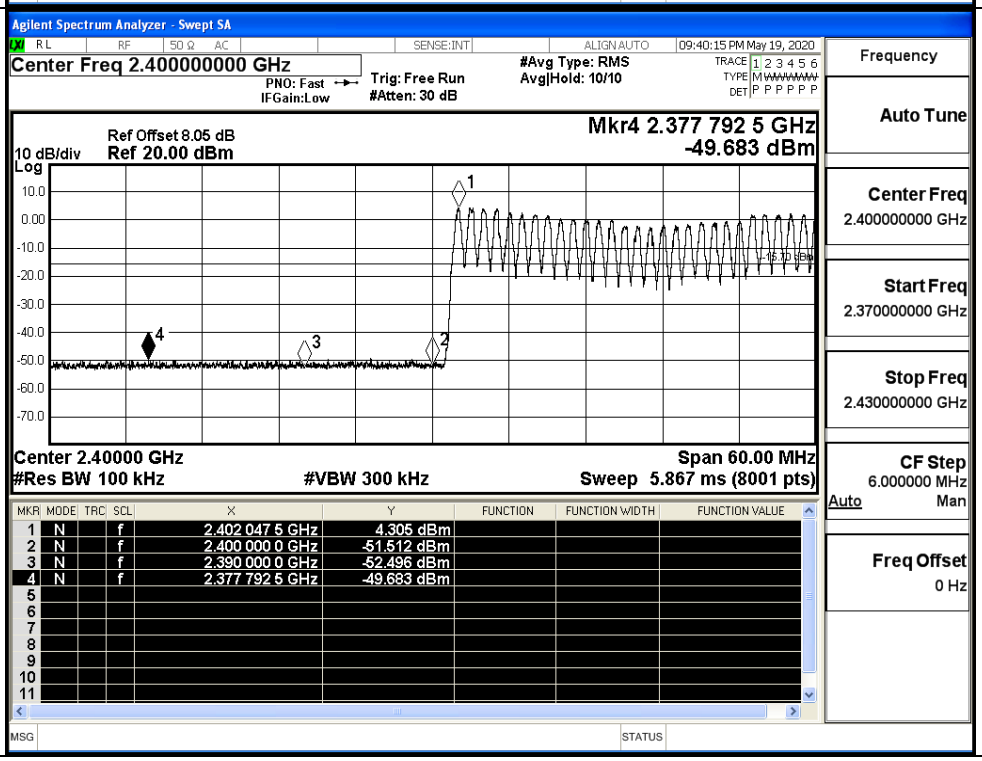
| π/4DQPSK_LCH_Graphs | | |
|---|---|---|
| Pref | |  |
| Puw | |  |

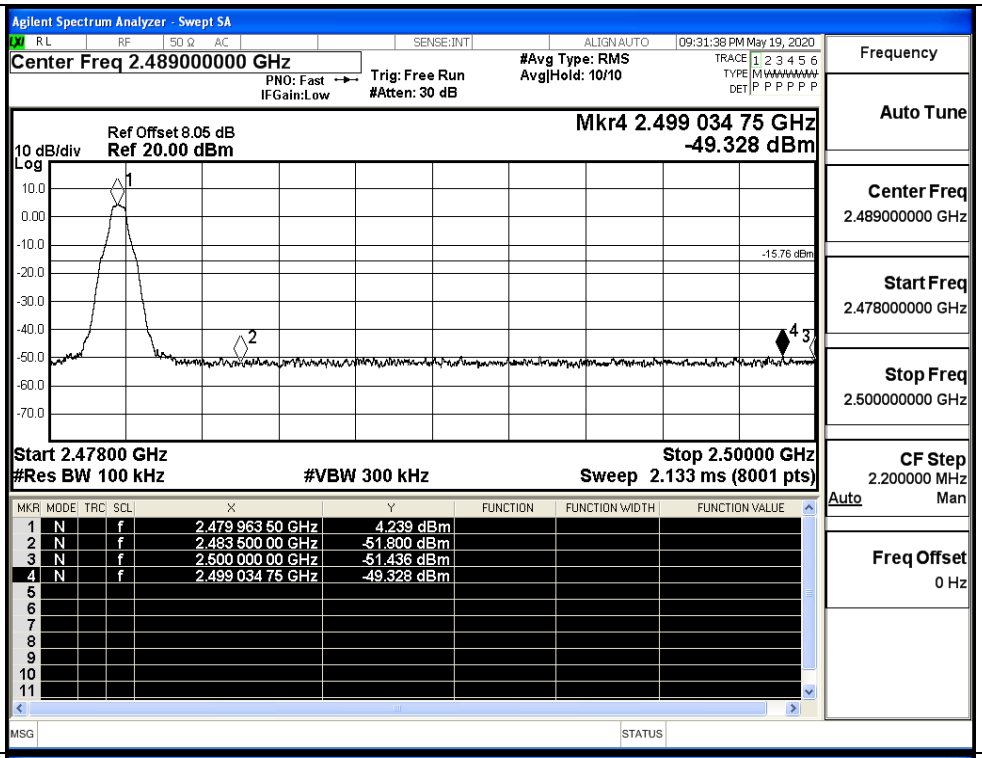
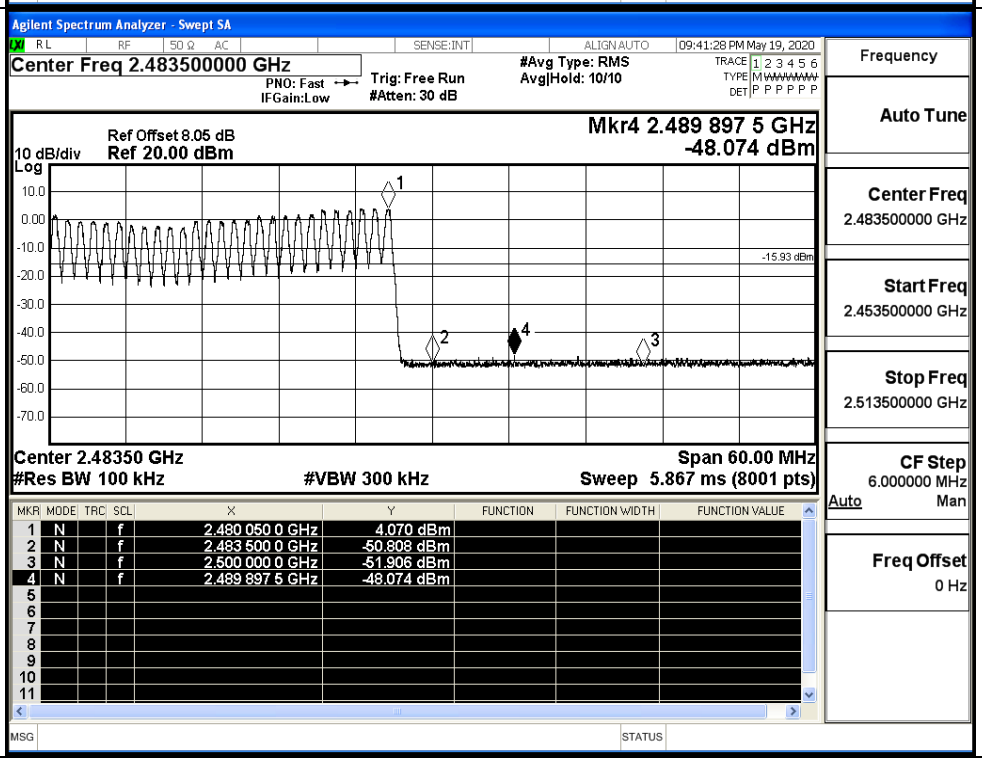
| π/4DQPSK_MCH_Graphs | | | |
|---|---|---|---|
| Pref | |  | |
| Puw | |  | |

| π/4DQPSK_HCH_Graphs | | |
|---|---|---|
| Pref | |  |
| Puw | |  |

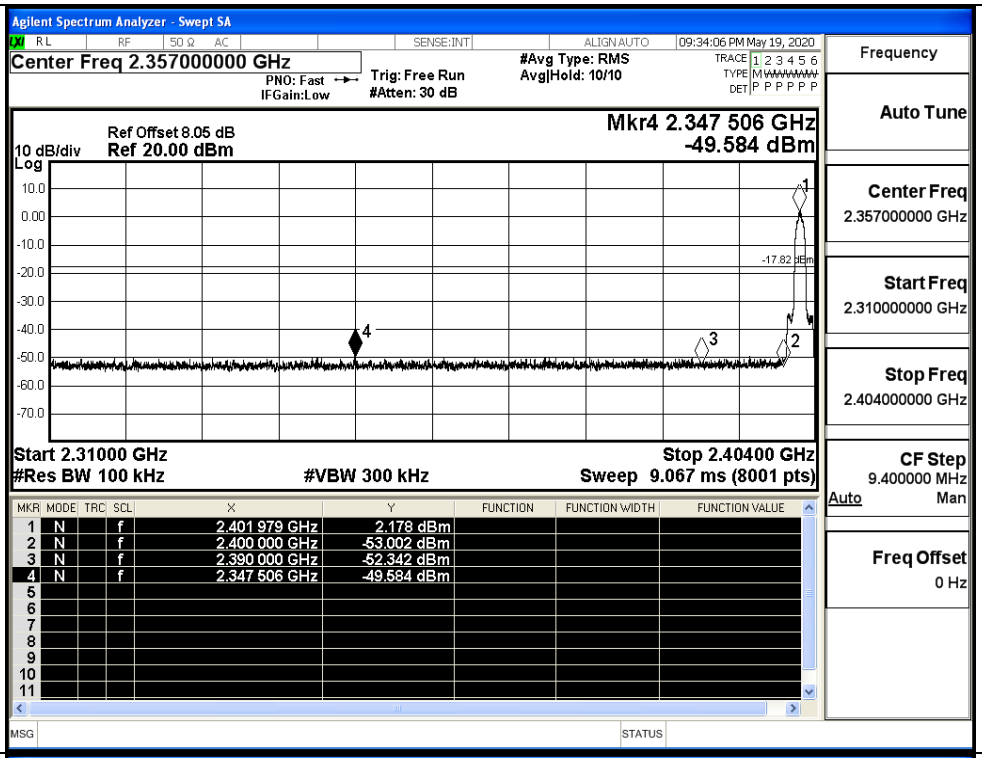
## A.7 Band-edge for RF Conducted Emissions

| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| GFSK | LCH | 2402 | 4.623 | Off | -48.908 | -15.38 | PASS |
| | | | 4.305 | On | -49.683 | -15.7 | PASS |
| | HCH | 2480 | 4.239 | Off | -49.328 | -15.76 | PASS |
| | | | 4.070 | On | -48.074 | -15.93 | PASS |
| π/4DQPSK | LCH | 2402 | 2.178 | Off | -49.584 | -17.82 | PASS |
| | | | 2.498 | On | -49.074 | -17.5 | PASS |
| | HCH | 2480 | 3.608 | Off | -49.249 | -16.39 | PASS |
| | | | 3.102 | On | -48.513 | -16.9 | PASS |

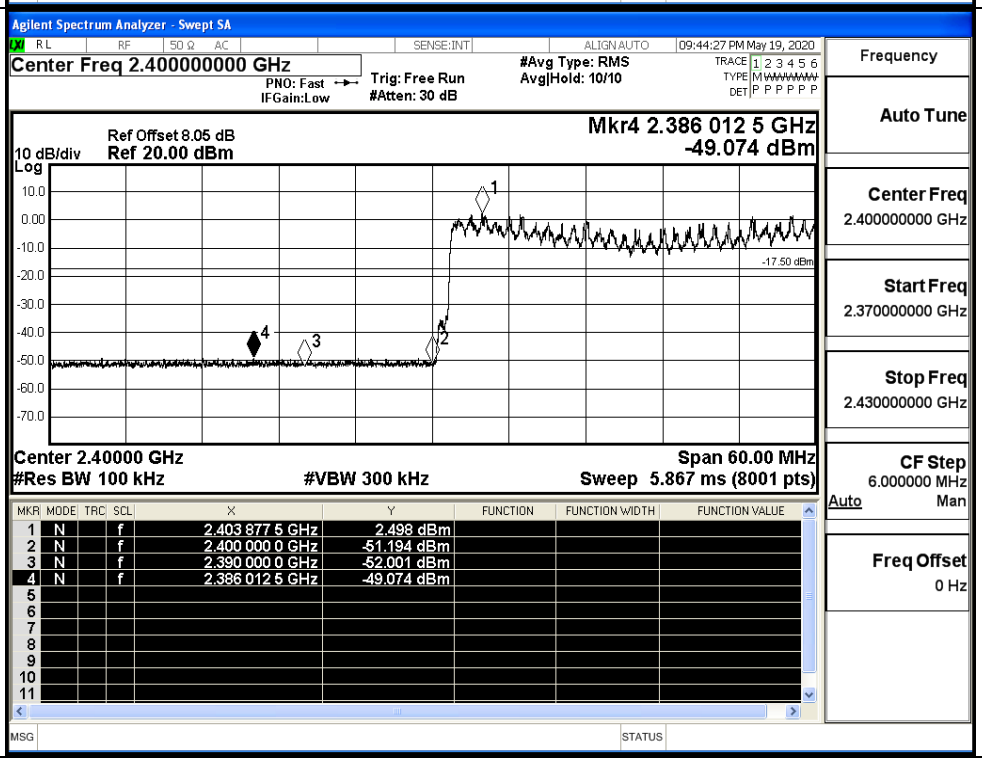
| Test Graphs | |
|---|---|
| GFSK/LCH/No Hop |  |
| GFSK/LCH/Hop |  |

| | |
|---|---|
| GFSK/HCH/No Hop |  |
| GFSK/HCH/Hop |  |

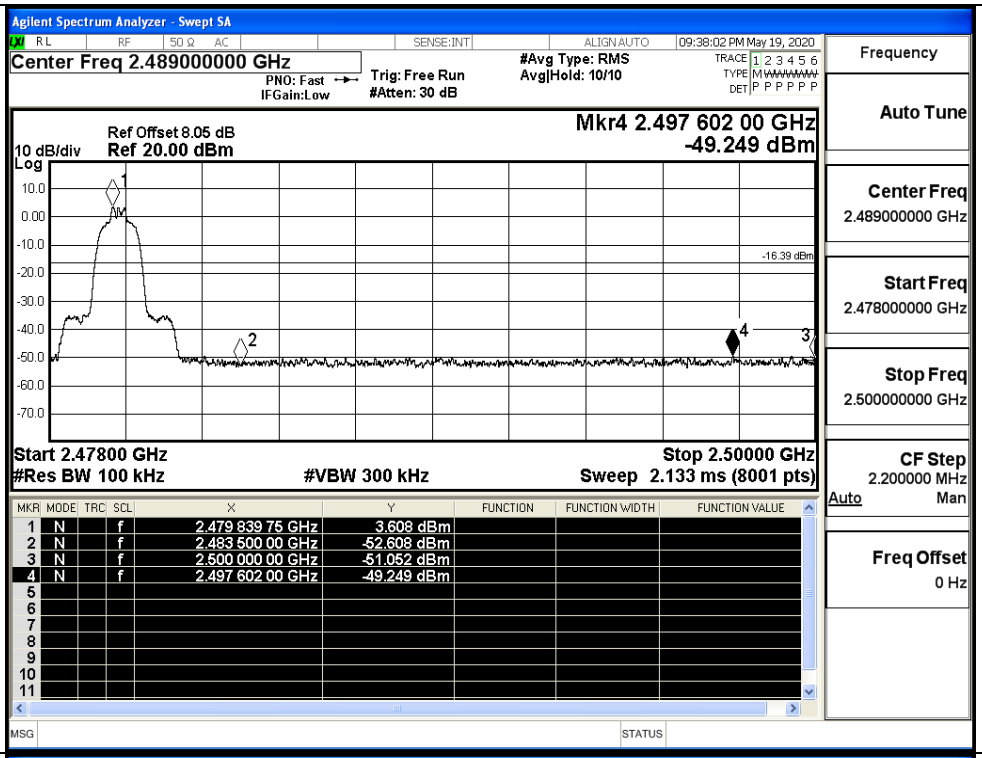
π/4DQPSK/LCH/No Hop



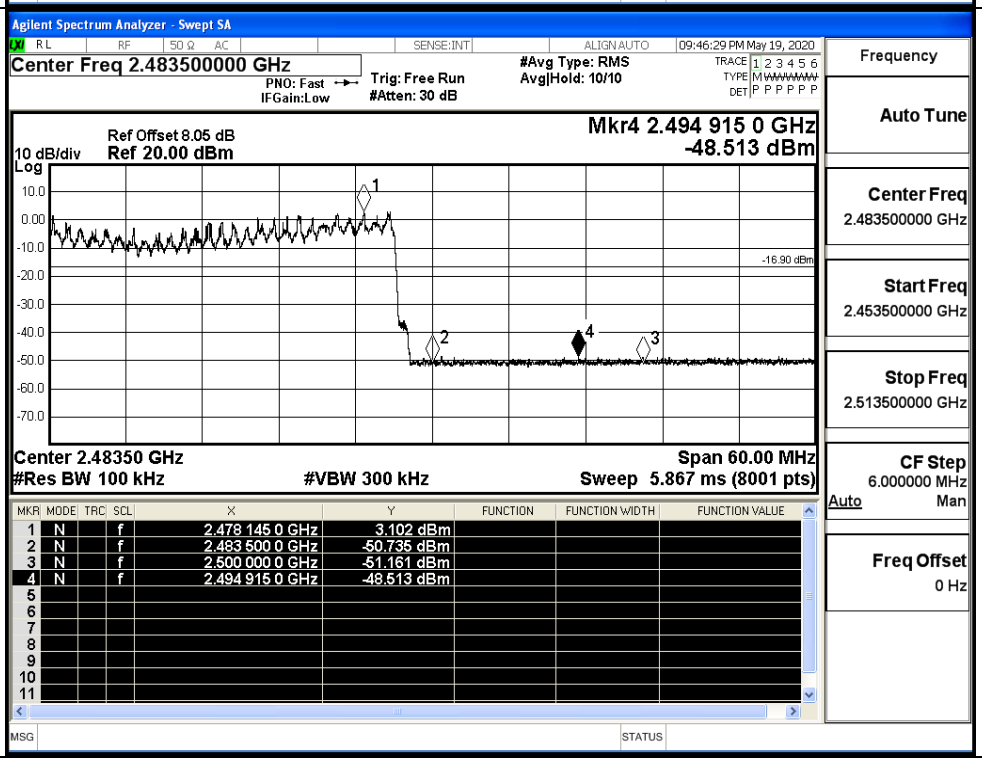

π/4DQPSK/LCH/Hop



π/4DQPSK/HCH/No Hop



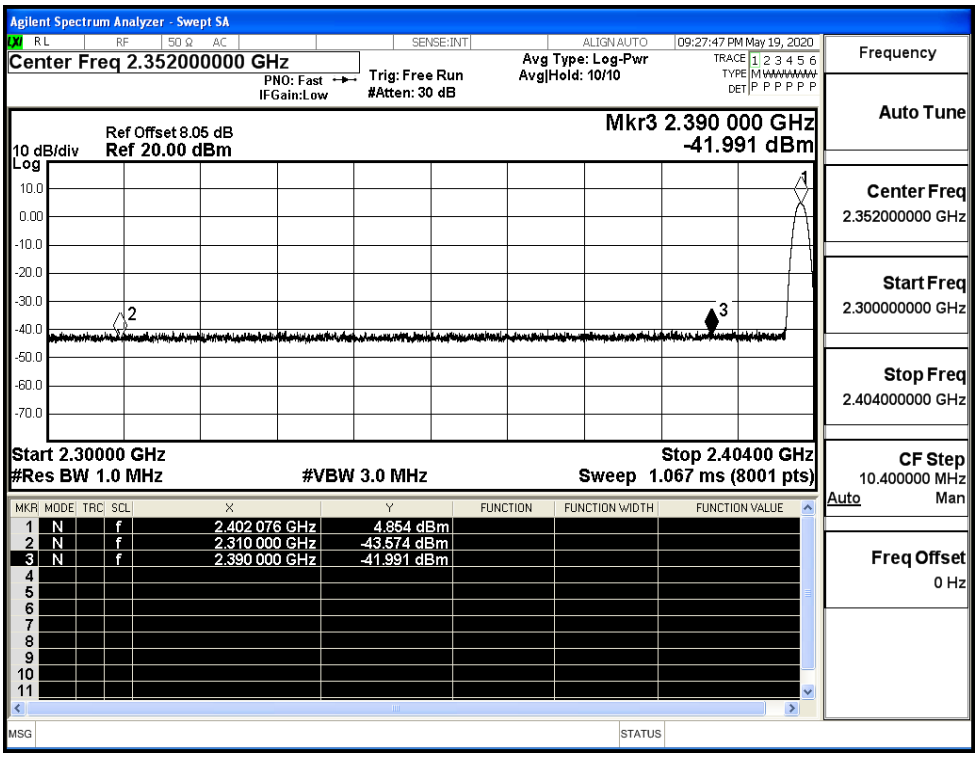

π/4DQPSK/HCH/Hop



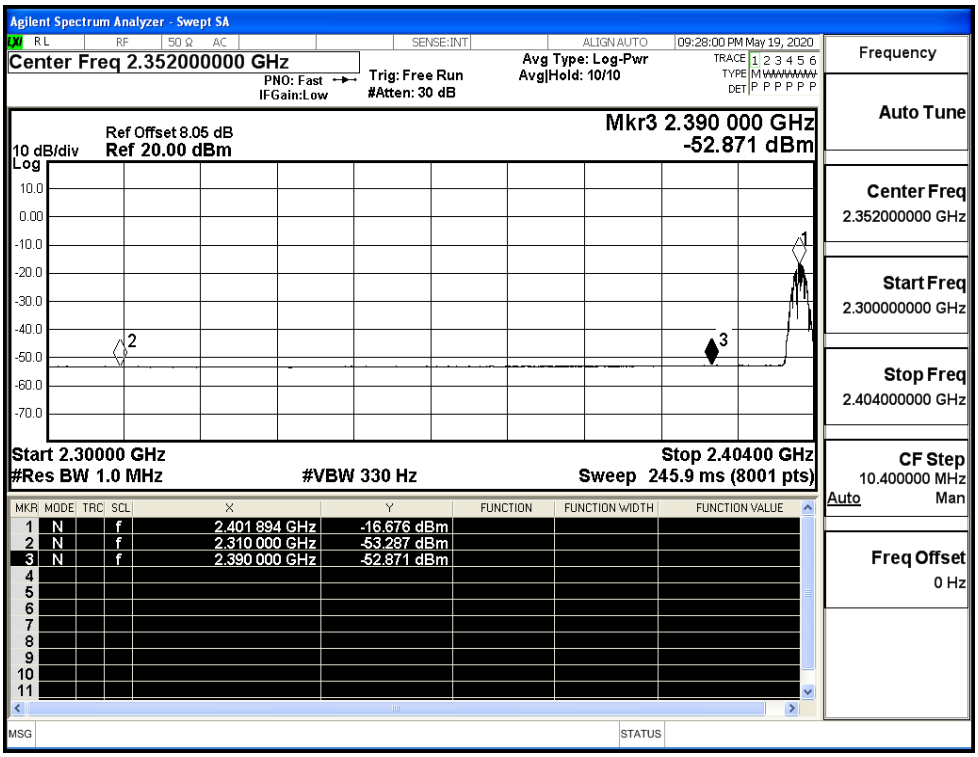
## A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| GFSK | Off | 2310.0 | -43.57 | 2.0 | 0 | 53.66 | PEAK | 74 | PASS |
| | Off | 2310.0 | -53.29 | 2.0 | 0 | 43.94 | AV | 54 | PASS |
| | Off | 2390.0 | -41.99 | 2.0 | 0 | 55.24 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.87 | 2.0 | 0 | 44.36 | AV | 54 | PASS |
| | Off | 2483.5 | -42.05 | 2.0 | 0 | 55.18 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.37 | 2.0 | 0 | 44.86 | AV | 54 | PASS |
| | Off | 2500.0 | -41.30 | 2.0 | 0 | 55.93 | PEAK | 74 | PASS |
| | Off | 2500.0 | -52.29 | 2.0 | 0 | 44.94 | AV | 54 | PASS |
| π/4DQPSK | Off | 2310.0 | -43.21 | 2.0 | 0 | 54.02 | PEAK | 74 | PASS |
| | Off | 2310.0 | -53.27 | 2.0 | 0 | 43.96 | AV | 54 | PASS |
| | Off | 2390.0 | -40.85 | 2.0 | 0 | 56.38 | PEAK | 74 | PASS |
| | Off | 2390.0 | -52.91 | 2.0 | 0 | 44.32 | AV | 54 | PASS |
| | Off | 2483.5 | -41.66 | 2.0 | 0 | 55.57 | PEAK | 74 | PASS |
| | Off | 2483.5 | -52.27 | 2.0 | 0 | 44.96 | AV | 54 | PASS |
| | Off | 2500.0 | -42.32 | 2.0 | 0 | 54.91 | PEAK | 74 | PASS |
| | Off | 2500.0 | -52.29 | 2.0 | 0 | 44.94 | AV | 54 | PASS |

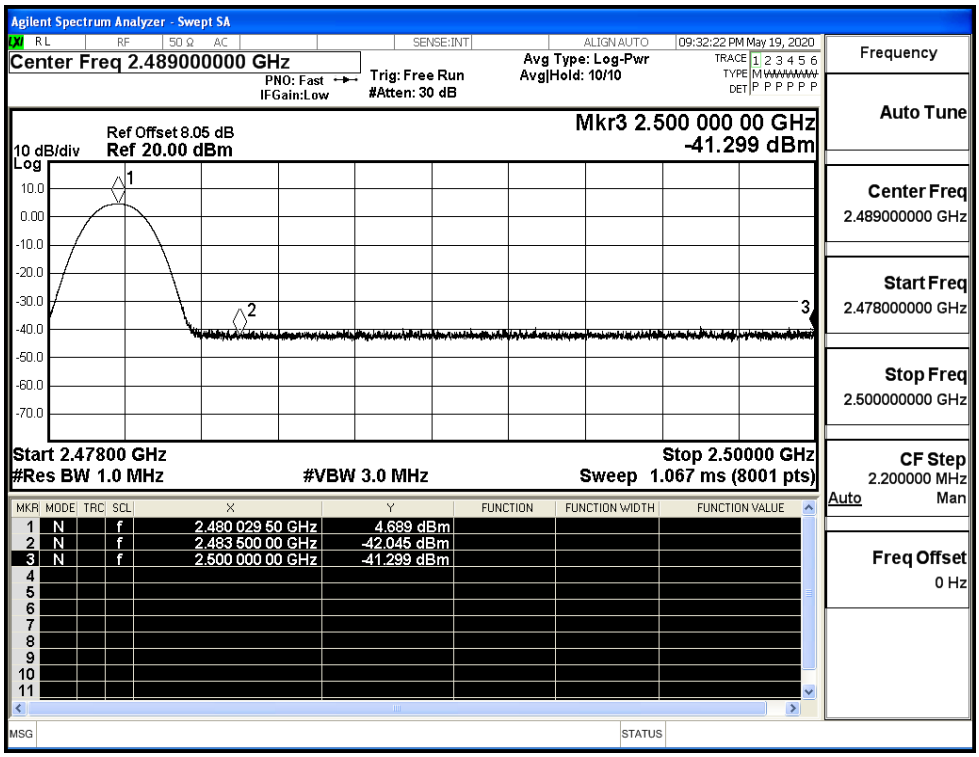
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



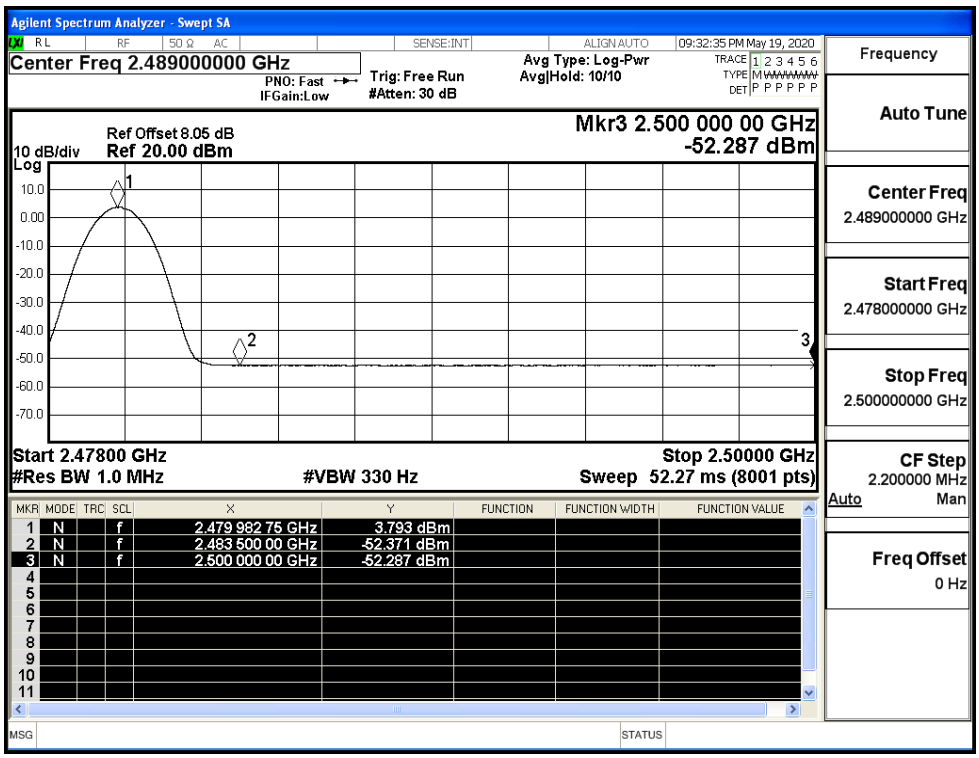

Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



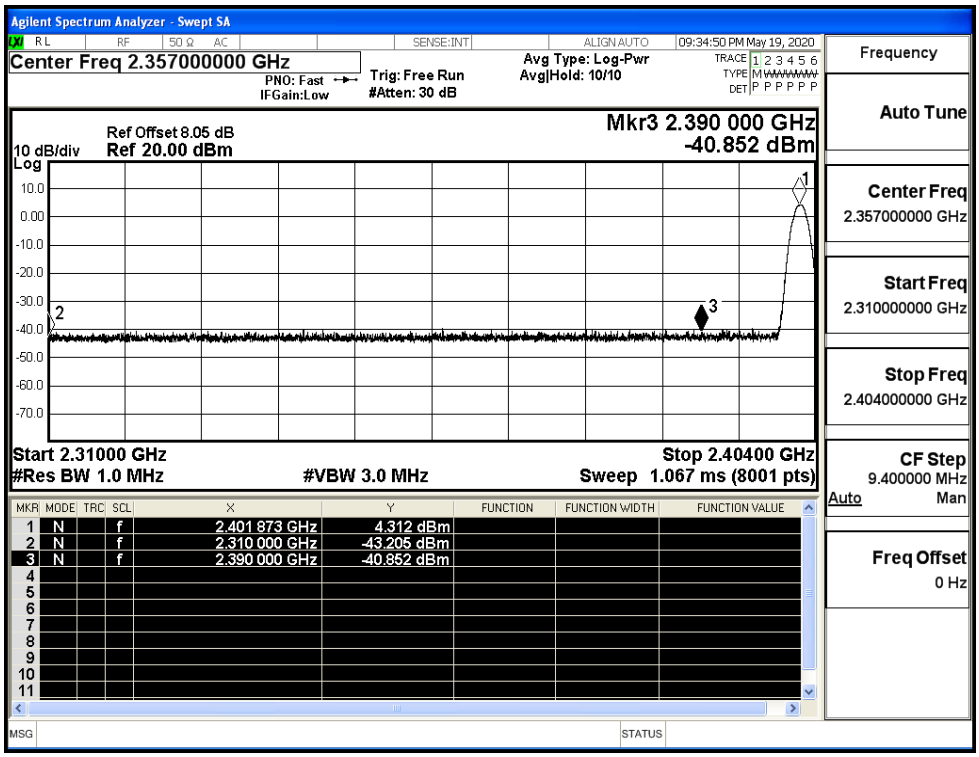
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



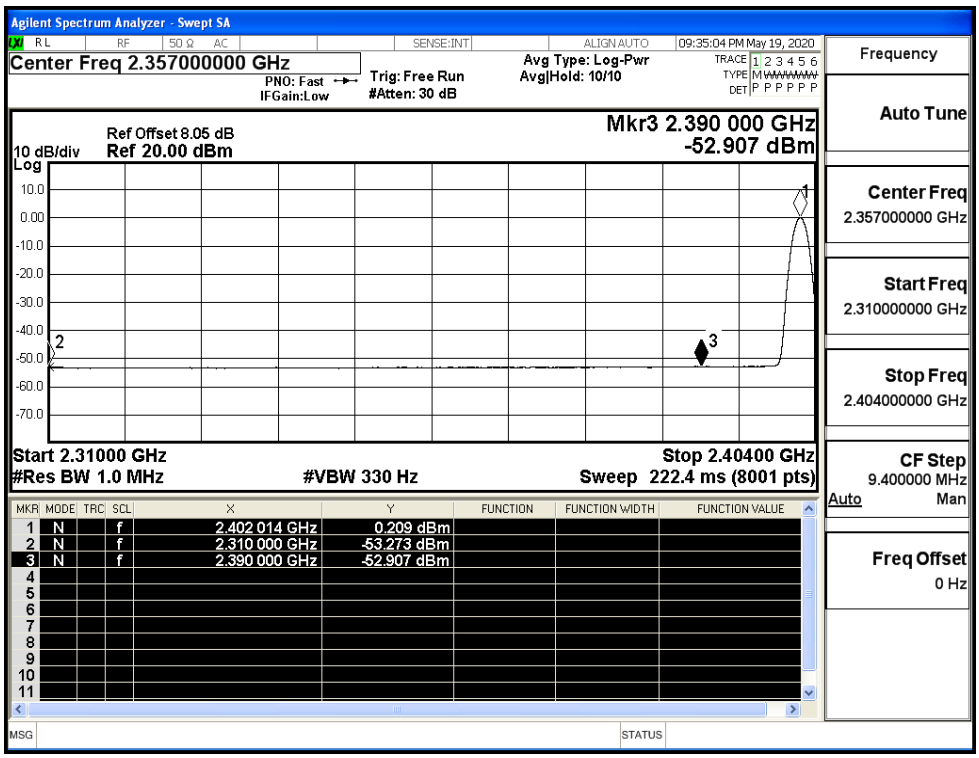

Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



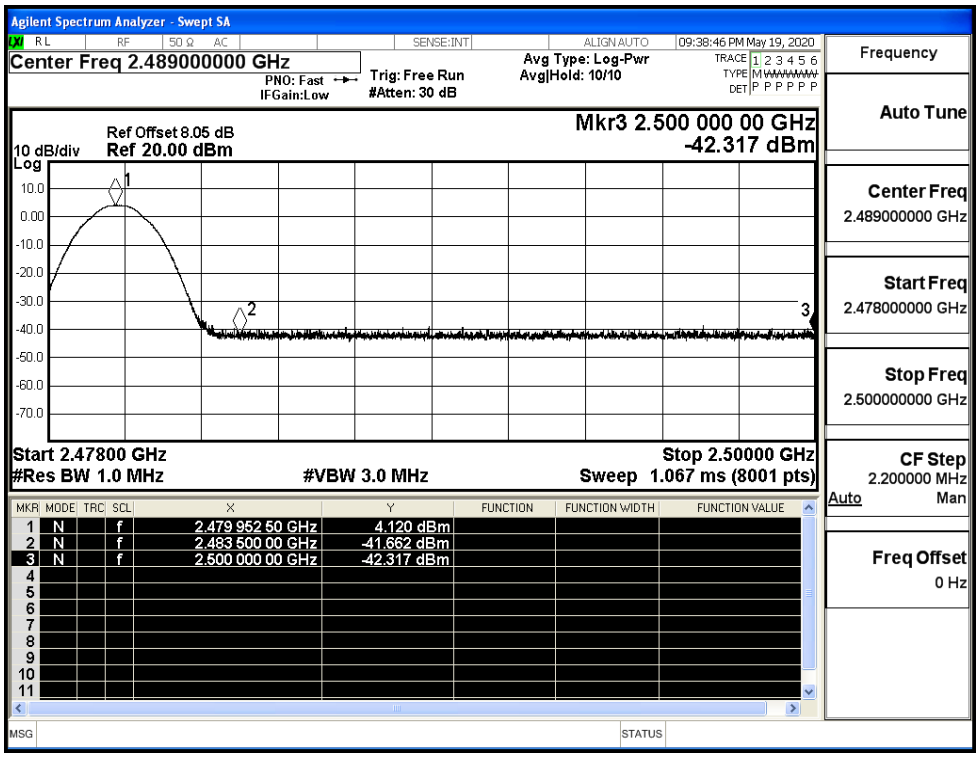
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)

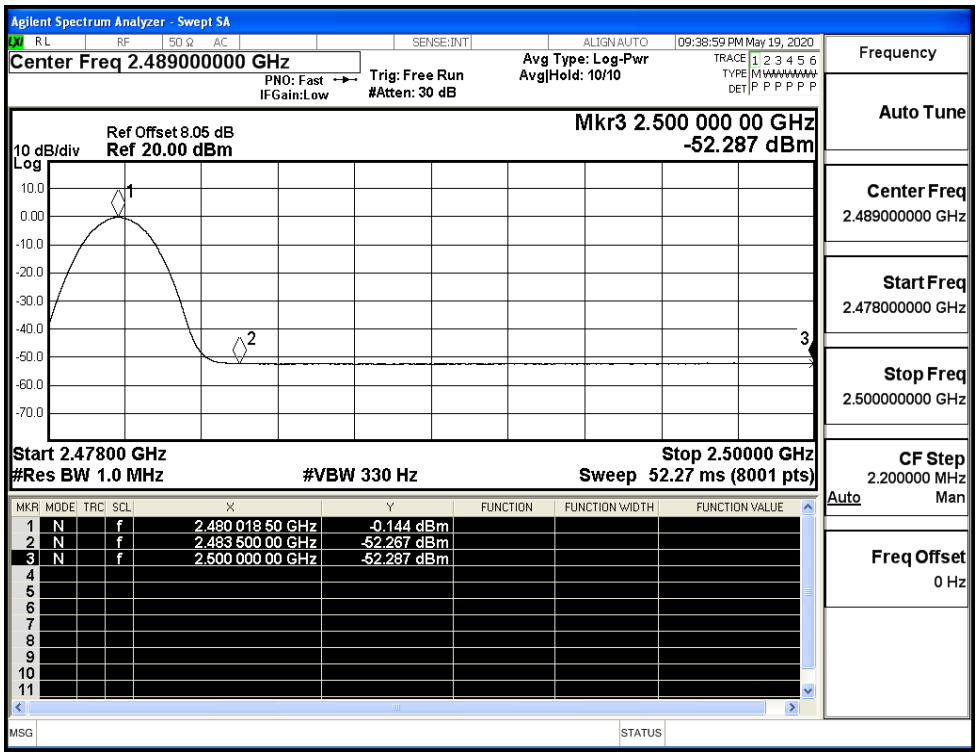



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



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)