# Appendix A

## RF Test Data for BT 2.1+EDR (Conducted Measurement)

**Product Name: Bluetooth FM Transmitter**

**Trade Mark: N/A**

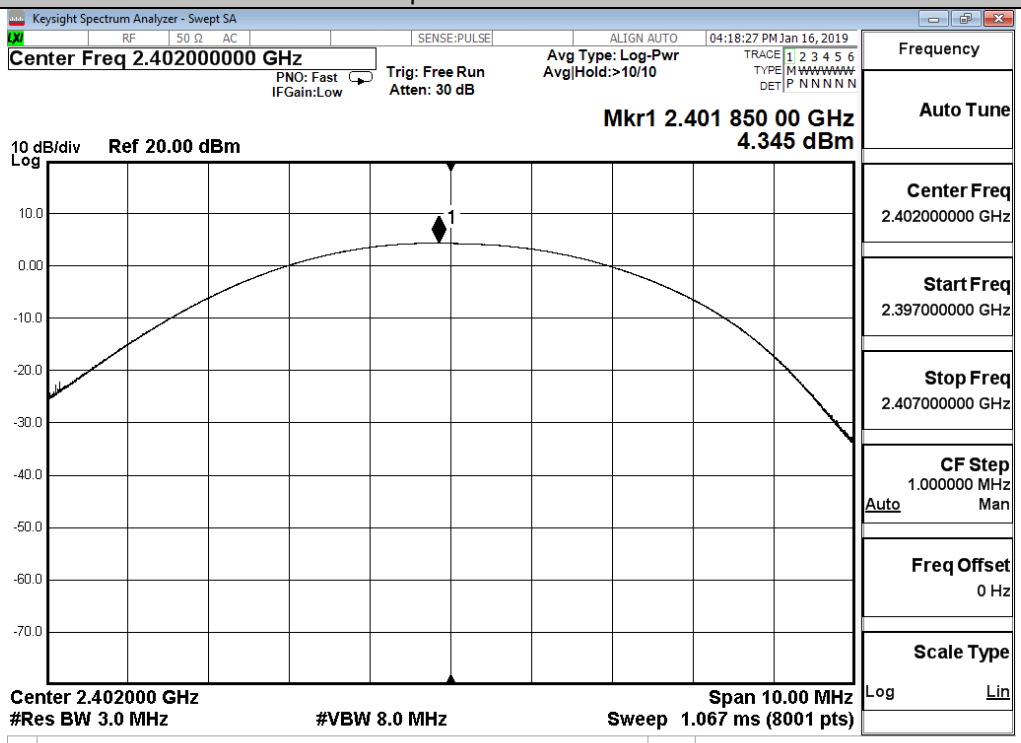
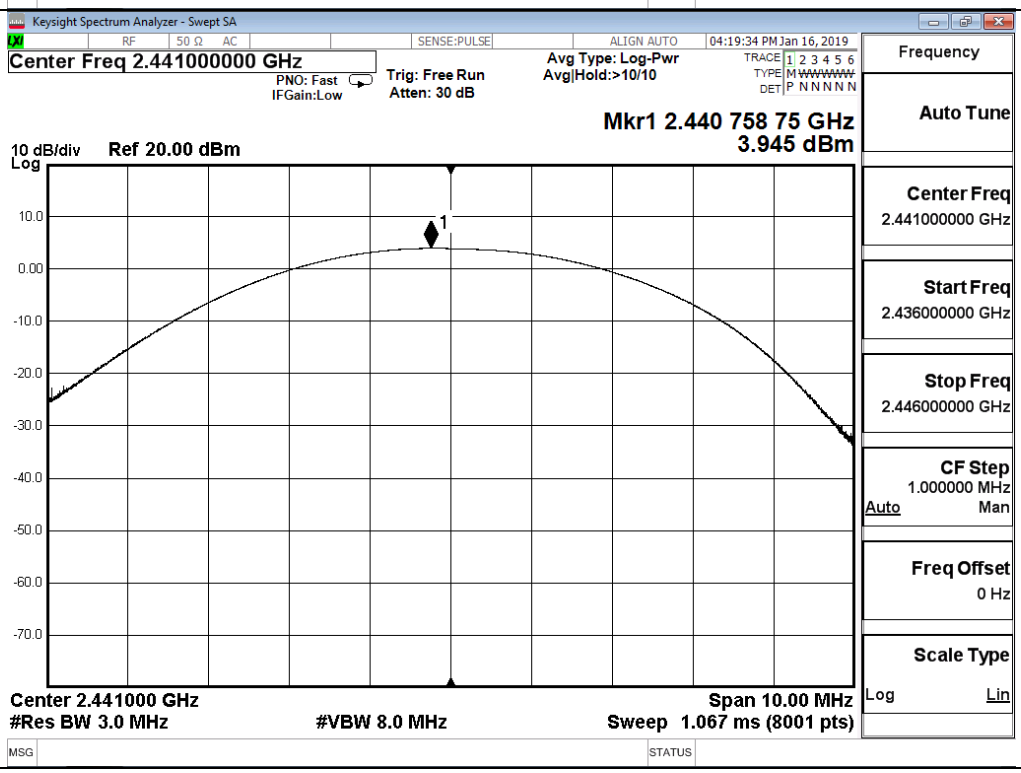
**Test Model: FMT900**

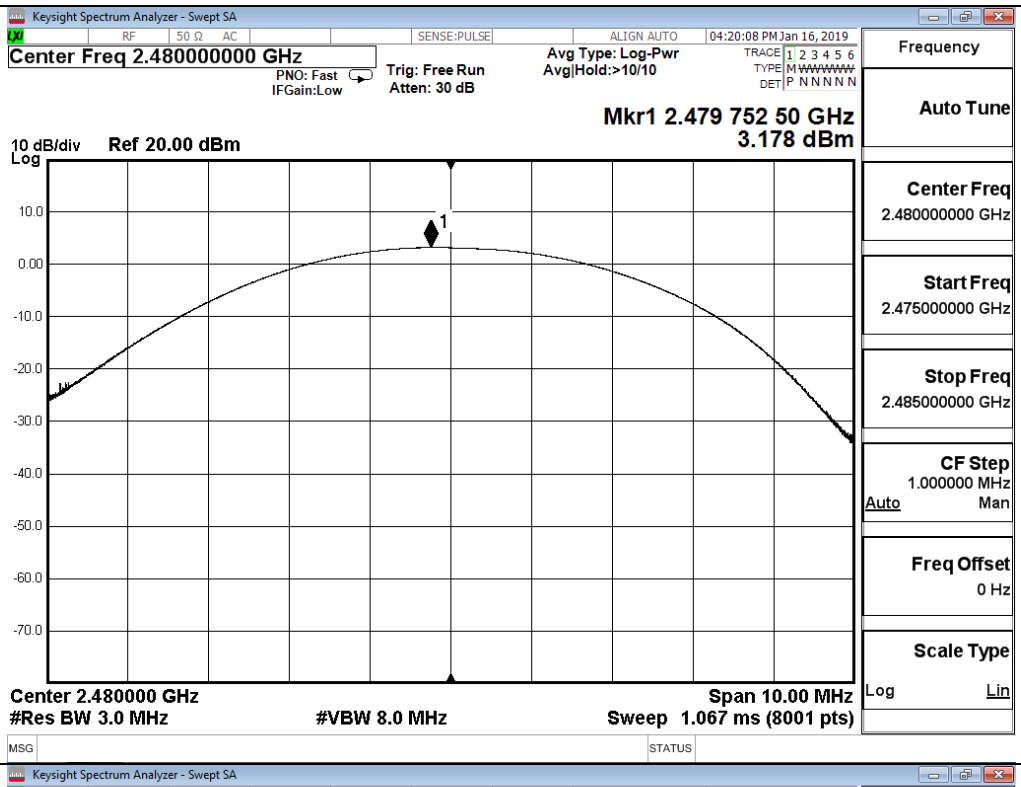
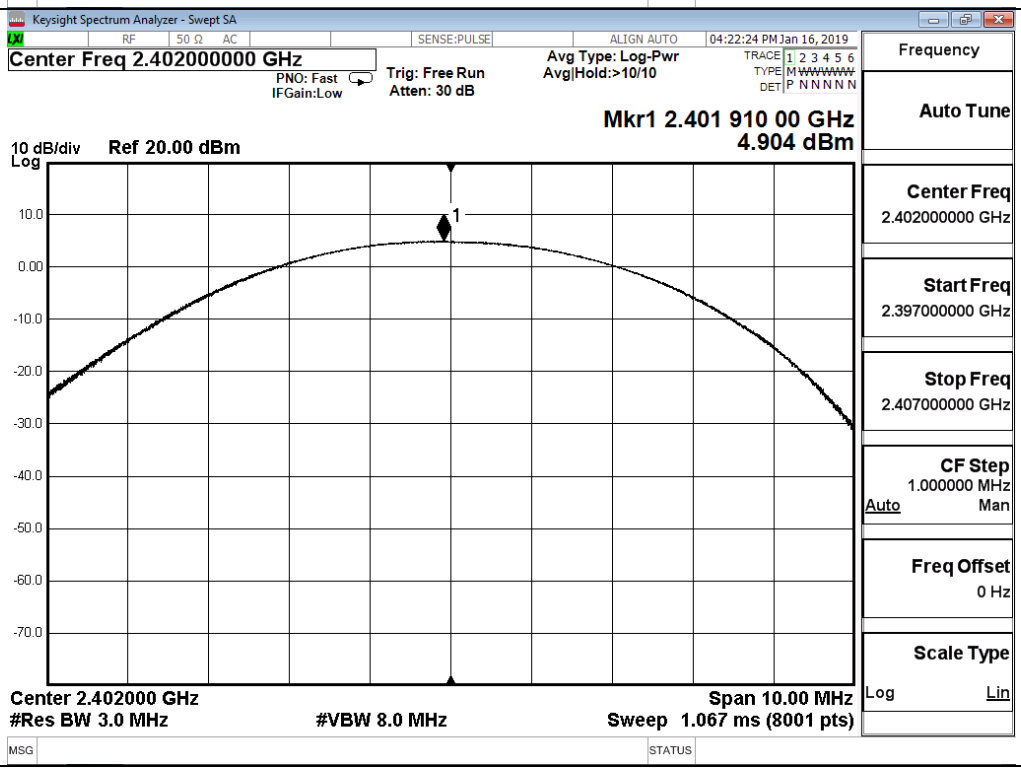
### Environmental Conditions

| | |
|---|---|
| Temperature: | 23.3 ° C |
| Relative Humidity: | 52.5% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Tom Liu |
| Supervised by: | Jayden.Zhuo |

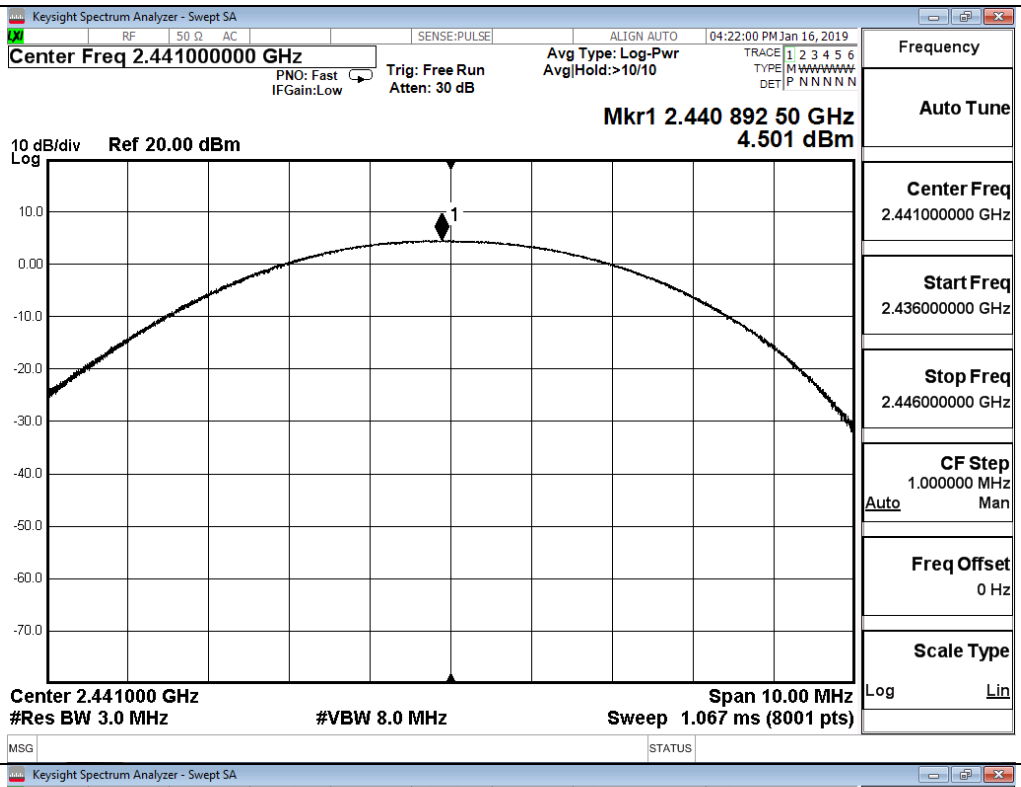
### A.1 Maximum Conducted Peak Output Power

| Mode | Channel. | Maximum Peak Output Power [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|
| GFSK | LCH | 4.345 | 21 | PASS |
| | MCH | 3.945 | 21 | PASS |
| | HCH | 3.178 | 21 | PASS |
| π/4DQPSK | LCH | 4.904 | 21 | PASS |
| | MCH | 4.501 | 21 | PASS |
| | HCH | 3.764 | 21 | PASS |

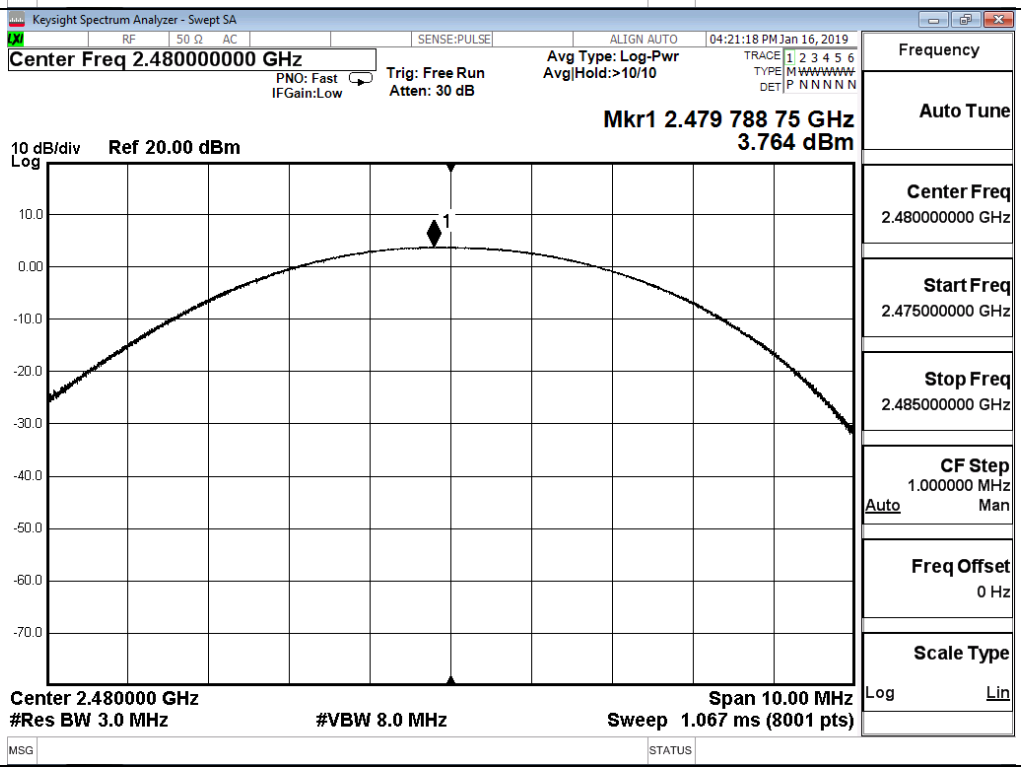
| Test Graphs | |
|---|---|
| GFSK/LCH |  |
| GFSK/MCH |  |

| | |
|---|---|
| GFSK/HCH |  |
| π/4DQPSK/LCH |  |

π/4DQPSK/MCH

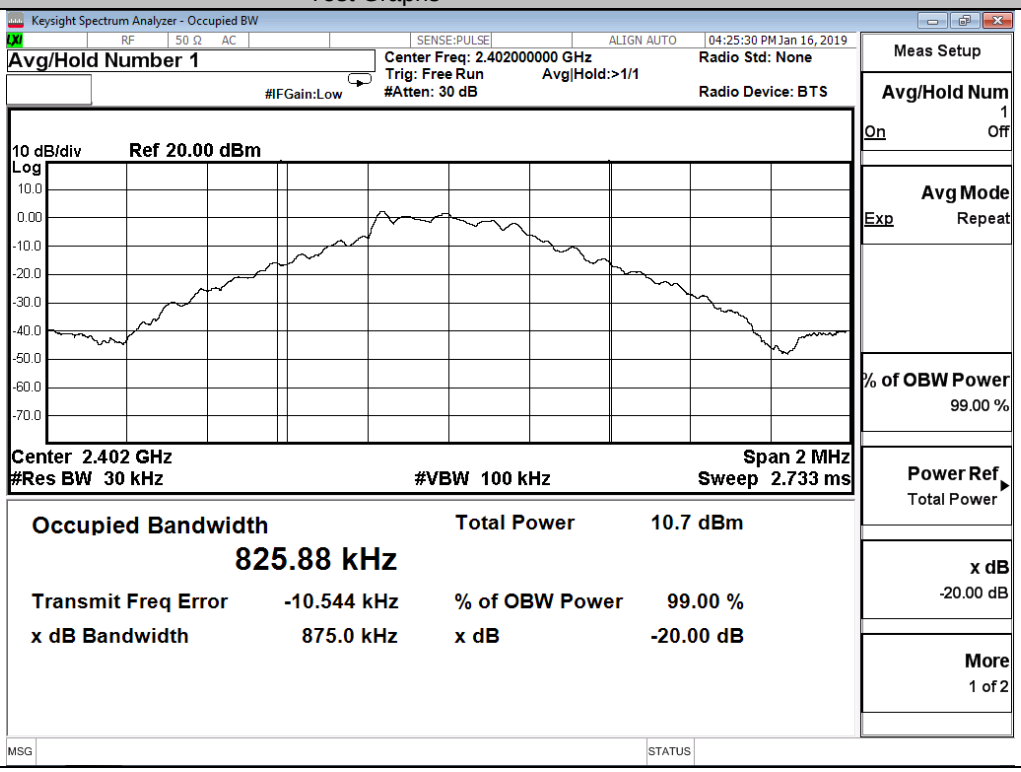



π/4DQPSK/HCH

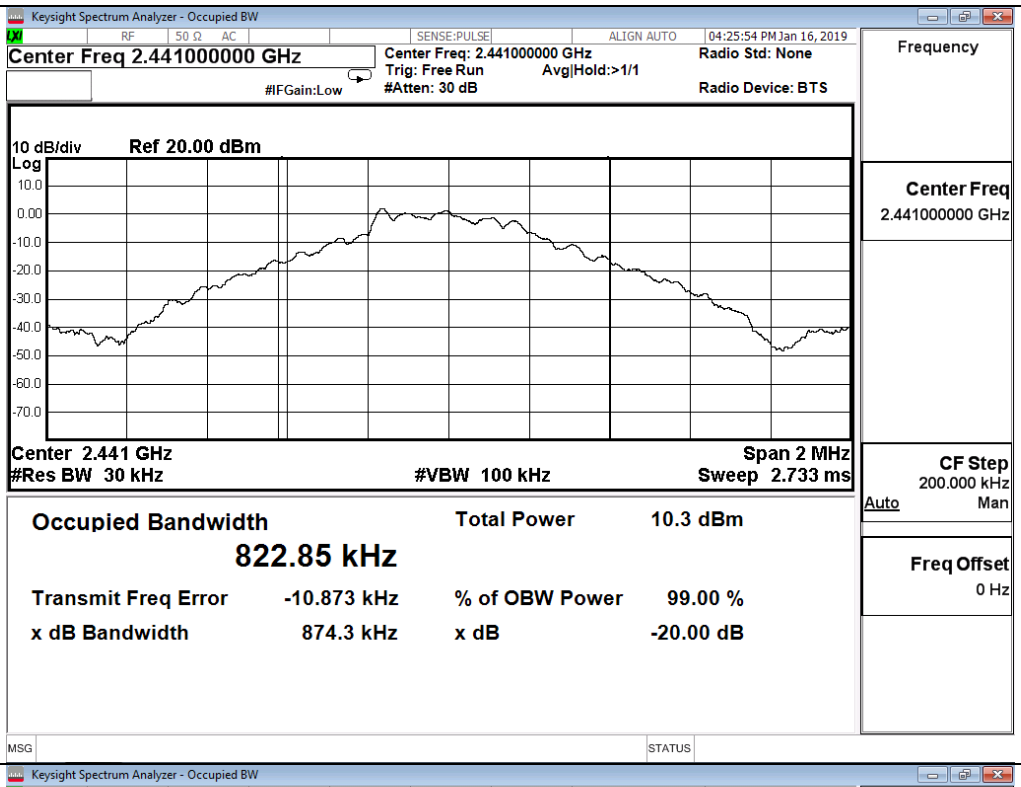


## A.2 99% and 20dB Bandwidth

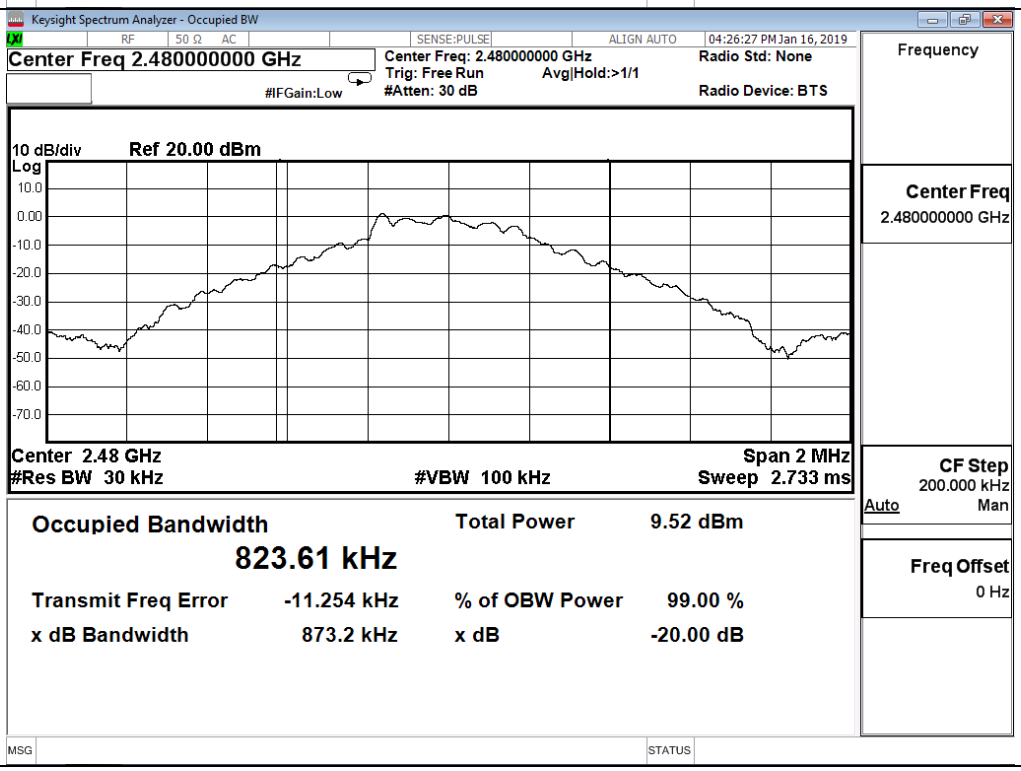
| Mode | Channel. | 99% Bandwidth [MHz] | 20dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|---|
| GFSK | LCH | 0.82588 | 0.8750 | Not Specified | PASS |
| | MCH | 0.82285 | 0.8743 | Not Specified | PASS |
| | HCH | 0.82361 | 0.8732 | Not Specified | PASS |
| π/4DQPSK | LCH | 1.1690 | 1.252 | Not Specified | PASS |
| | MCH | 1.1684 | 1.251 | Not Specified | PASS |
| | HCH | 1.1693 | 1.257 | Not Specified | PASS |

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

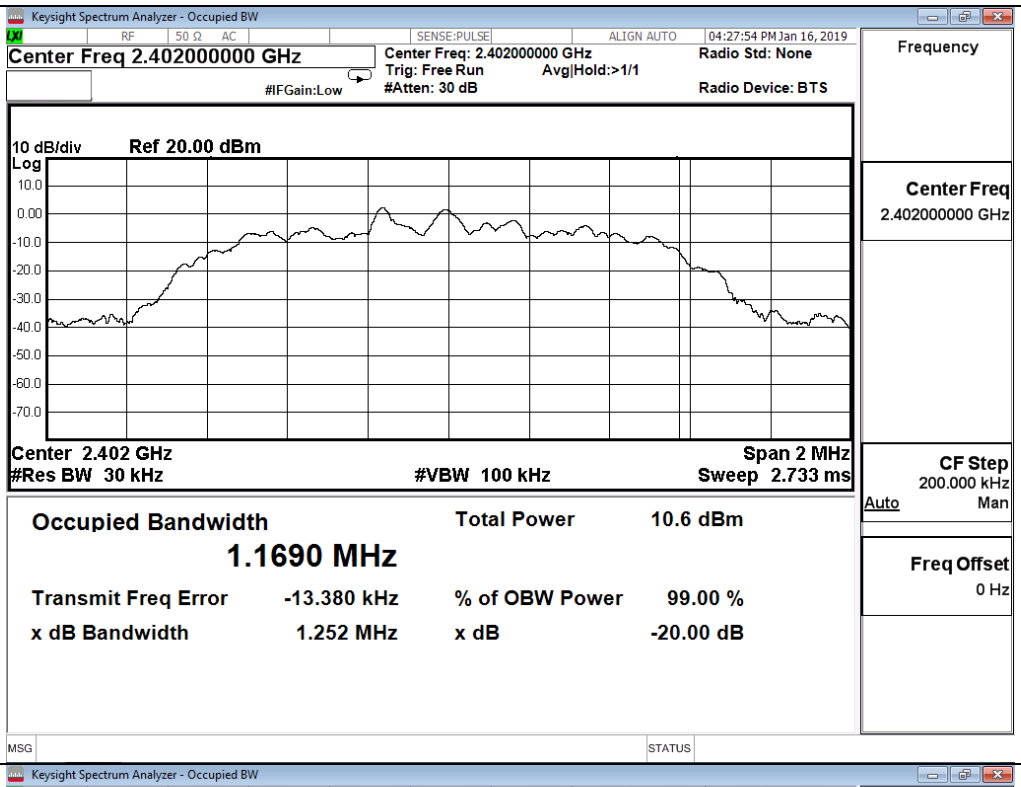
GFSK/MCH



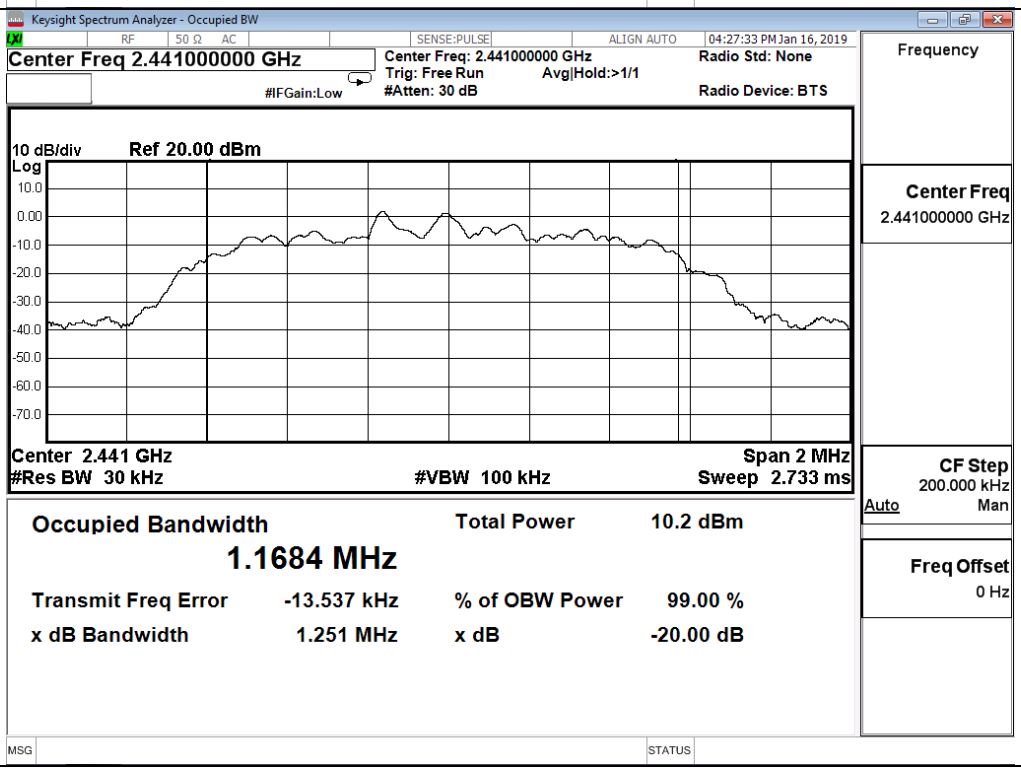

GFSK/HCH



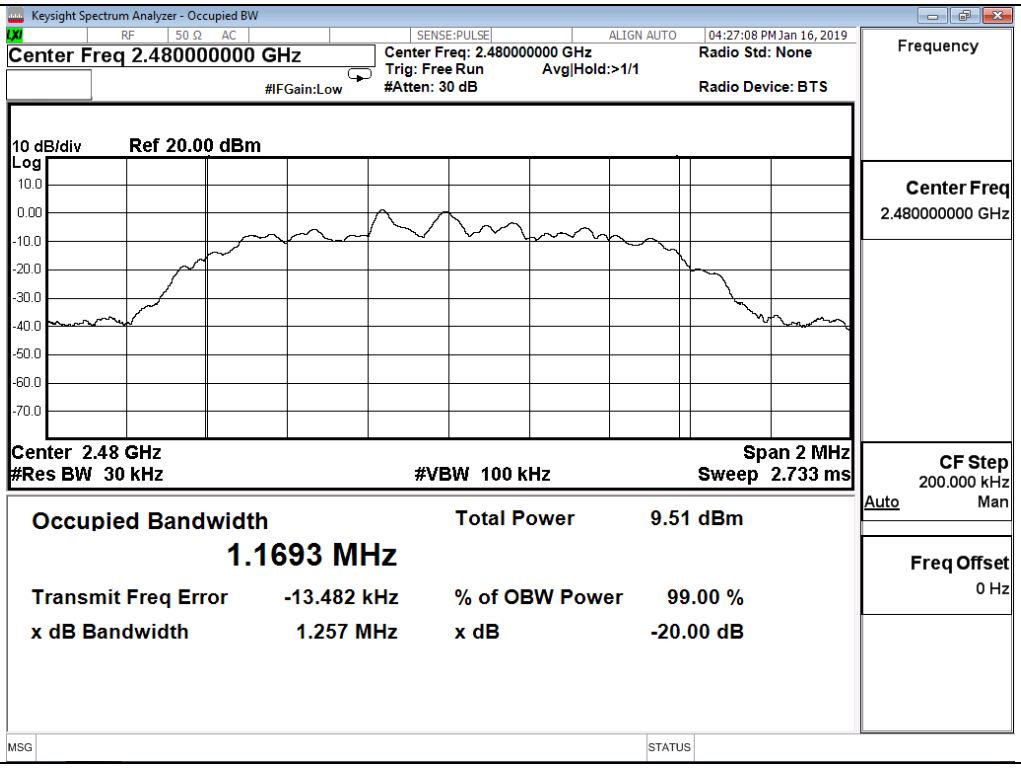
π/4DQPSK/LCH




π/4DQPSK/MCH

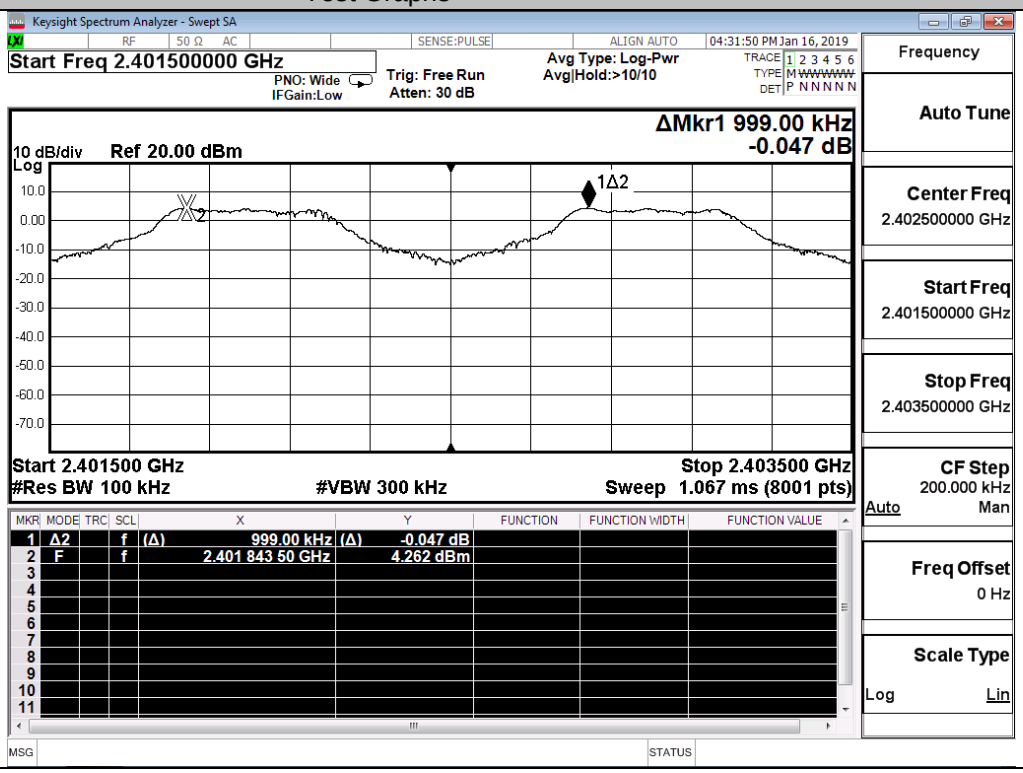


π/4DQPSK/HCH

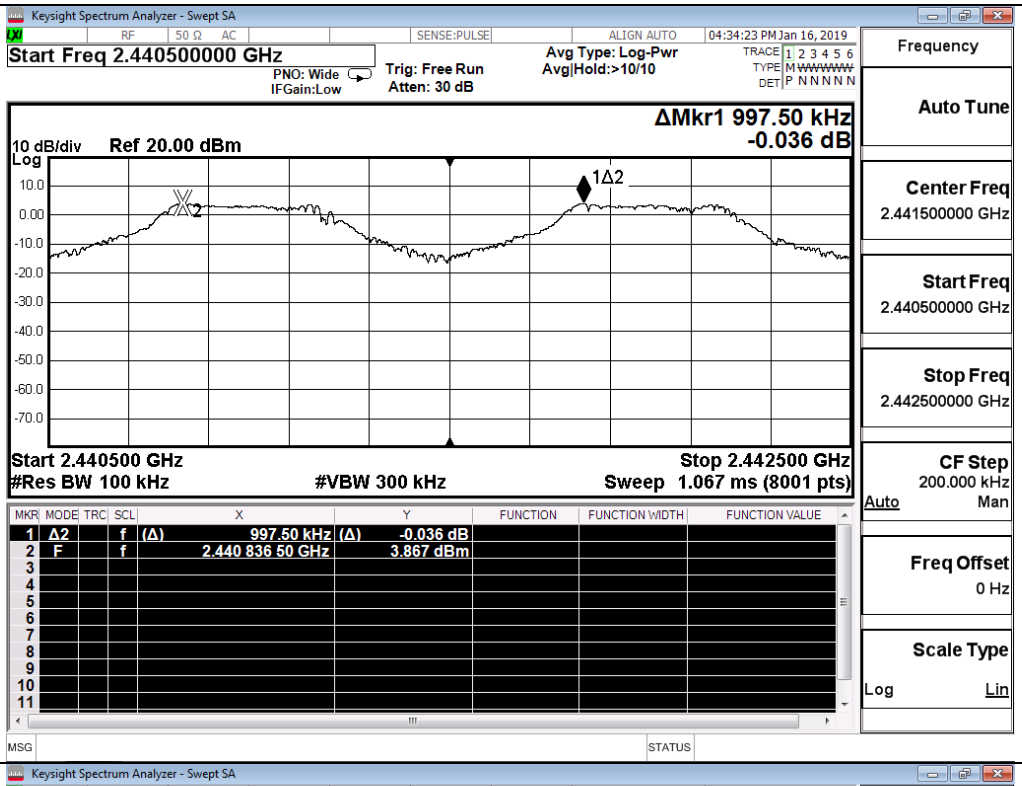

Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:PULSE
ALIGN AUTO
04:27:08 PM Jan 16, 2019
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.733 ms
CF Step
200.000 kHz
Auto
Man
Occupied Bandwidth
1.1693 MHz
Total Power 9.51 dBm
Transmit Freq Error -13.482 kHz
% of OBW Power 99.00 %
x dB Bandwidth 1.257 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

## A.3 Carrier Frequency Separation

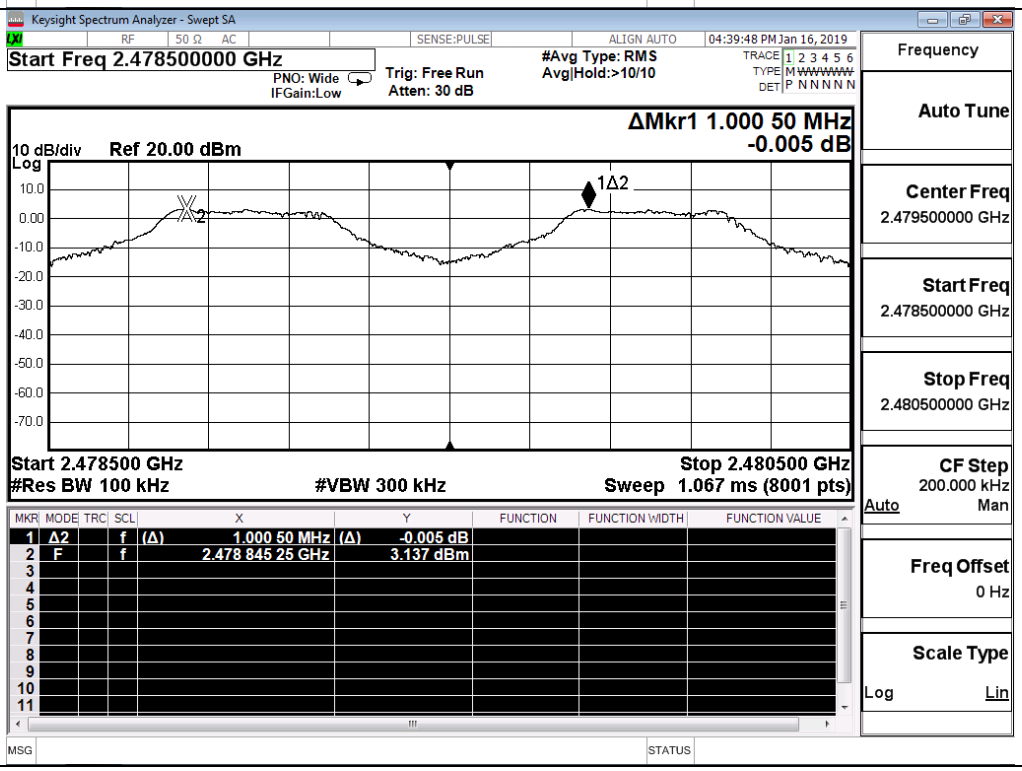
| Mode | Channel. | Carrier Frequency Separation [MHz] | Limit [MHz] | Verdict |
|---|---|---|---|---|
| GFSK | LCH | 0.999 | 0.5833 | PASS |
| | MCH | 0.998 | 0.5829 | PASS |
| | HCH | 1.001 | 0.5821 | PASS |
| π/4DQPSK | LCH | 1.003 | 0.835 | PASS |
| | MCH | 1.000 | 0.834 | PASS |
| | HCH | 1.004 | 0.838 | PASS |

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

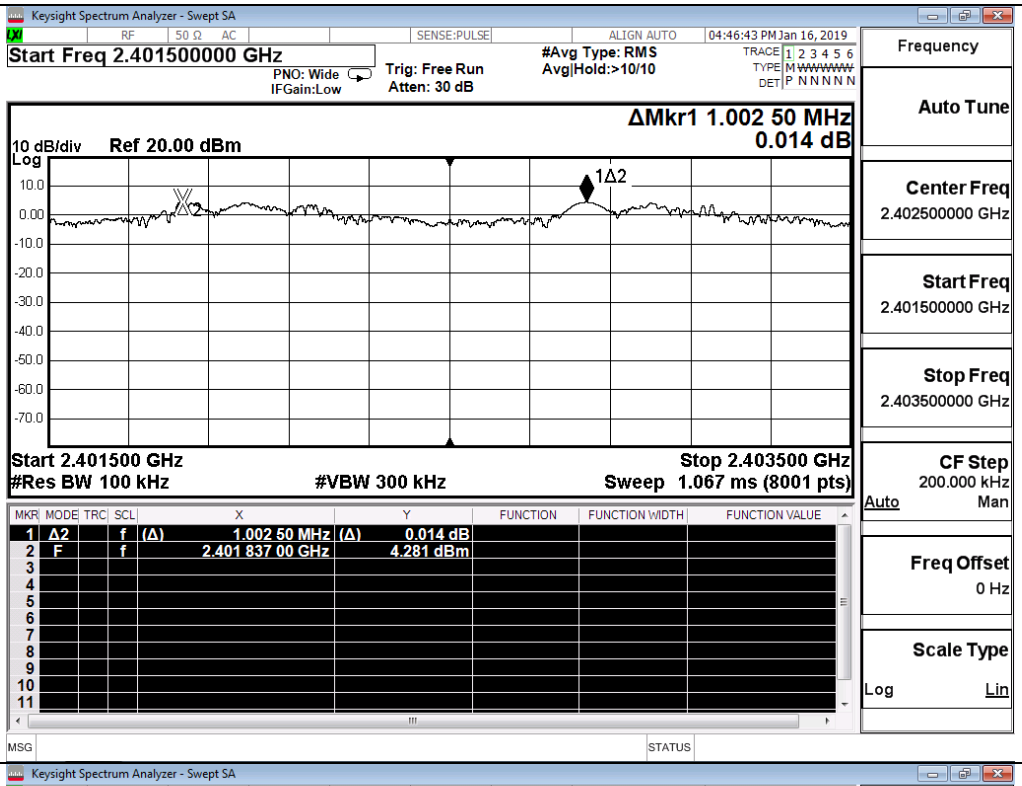
GFSK/MCH



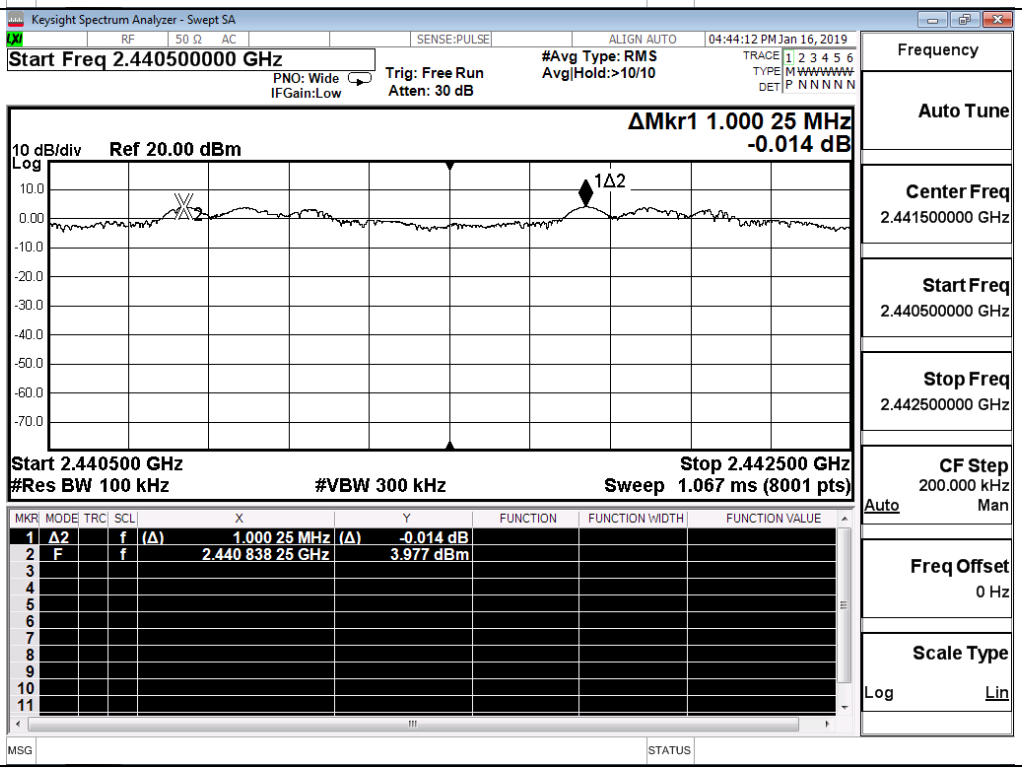

GFSK/HCH



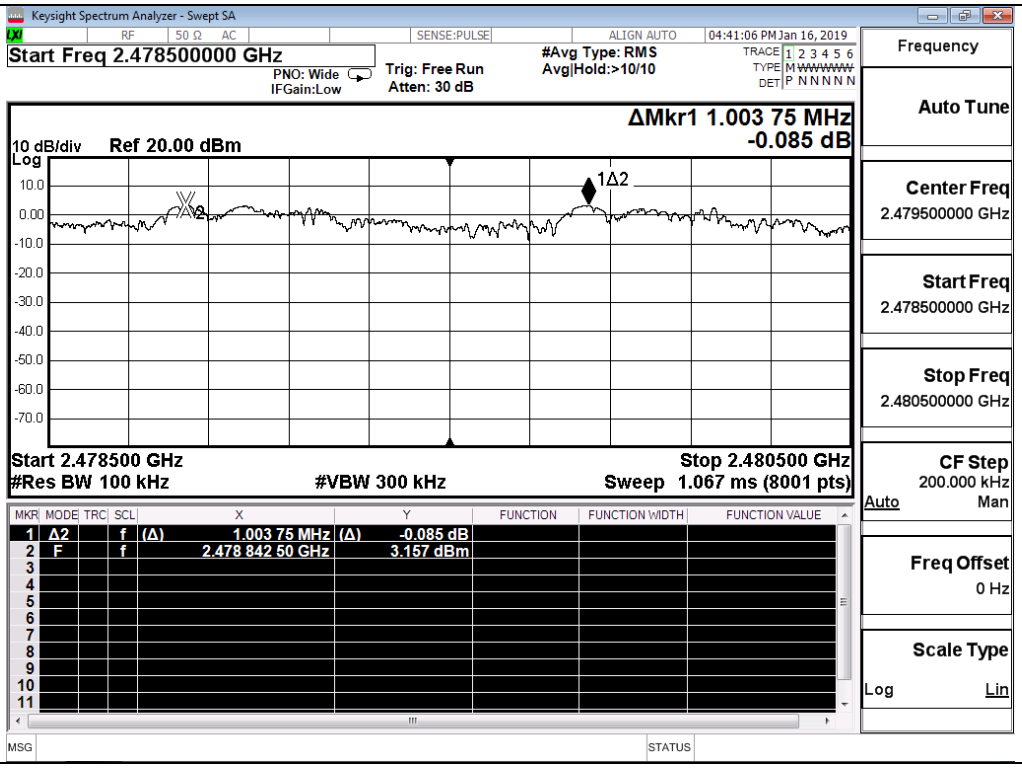
π/4DQPSK/LCH




π/4DQPSK/MCH

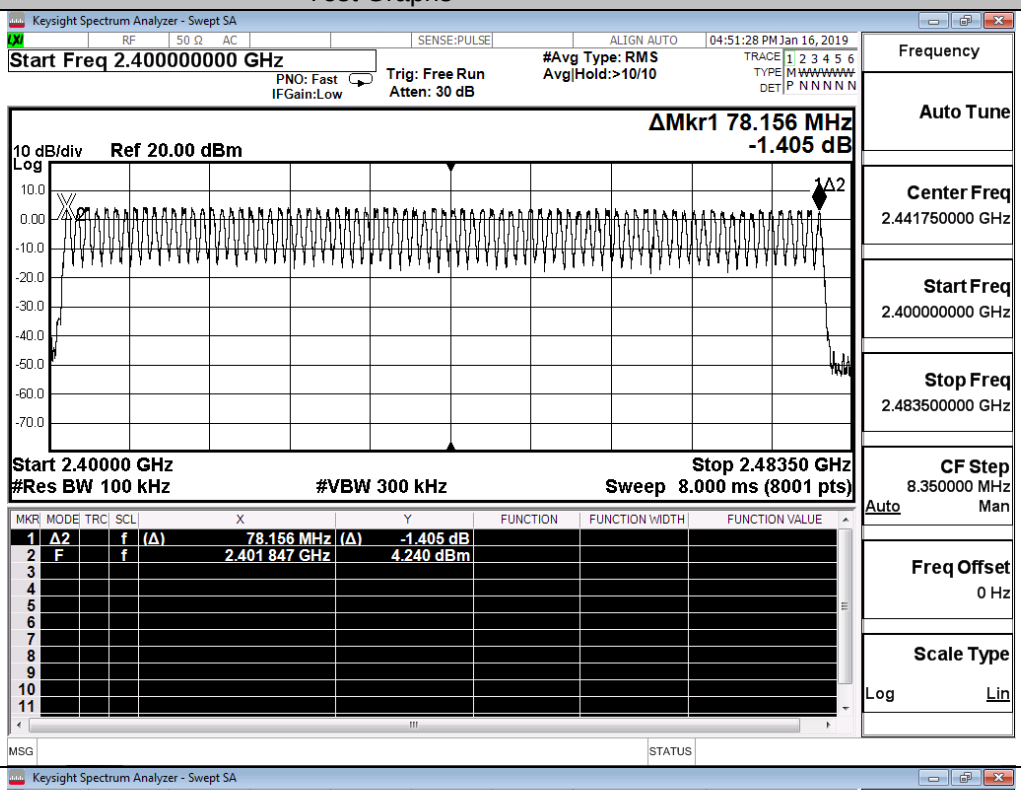
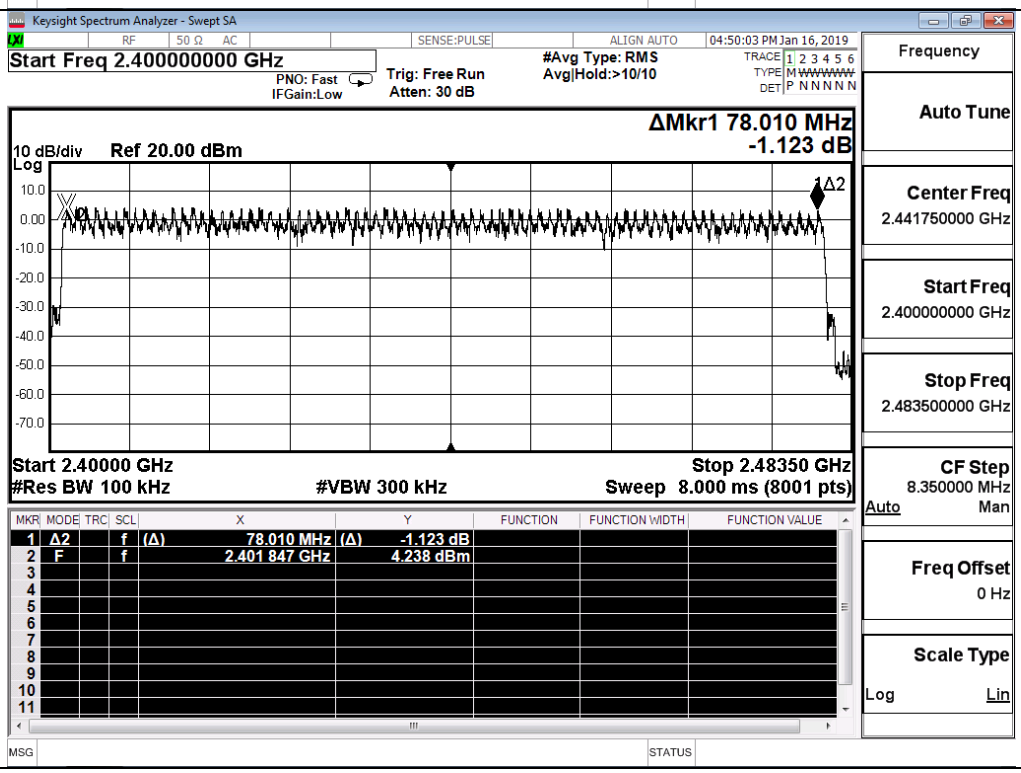


π/4DQPSK/HCH


Keysight Spectrum Analyzer - Swept SA
Start Freq 2.478500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>10/10
04:41:06 PM Jan 16, 2019
ΔMkr1 1.003 75 MHz
-0.085 dB
10 dB/div Ref 20.00 dBm
Log
1Δ2
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.067 ms (8001 pts)
1 Δ2 f (Δ) 1.003 75 MHz (Δ) -0.085 dB
2 F f 2.478 842 50 GHz 3.157 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
Scale Type
Log Lin

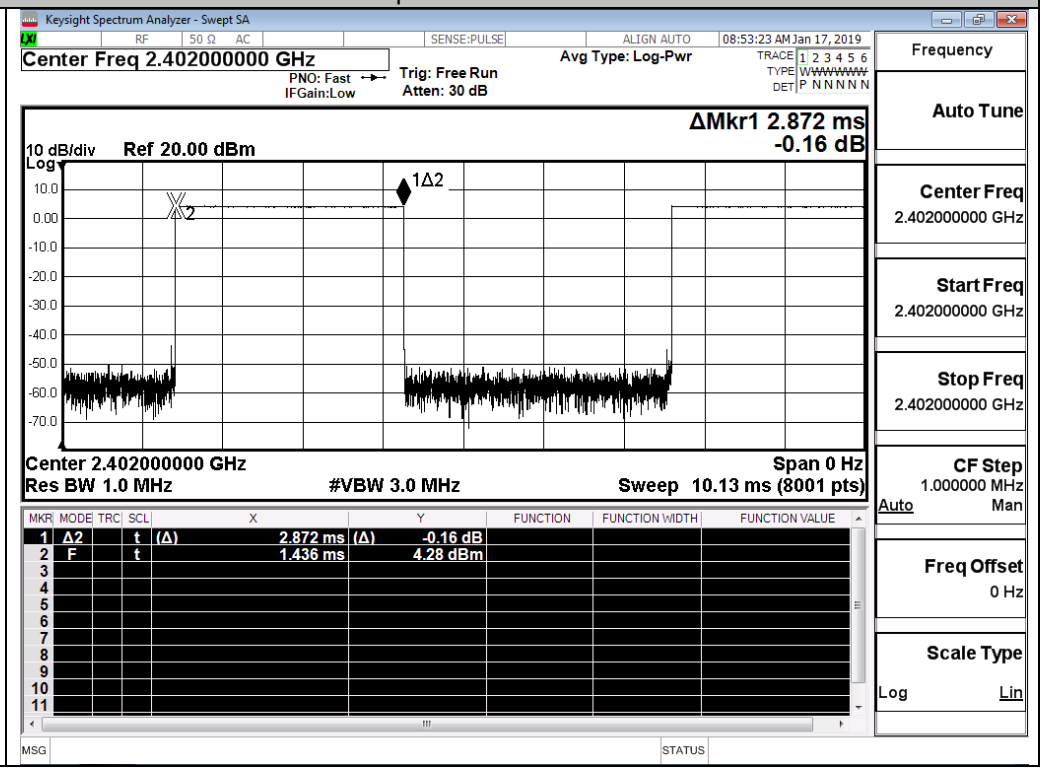
## A.4 Hopping Channel Number

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

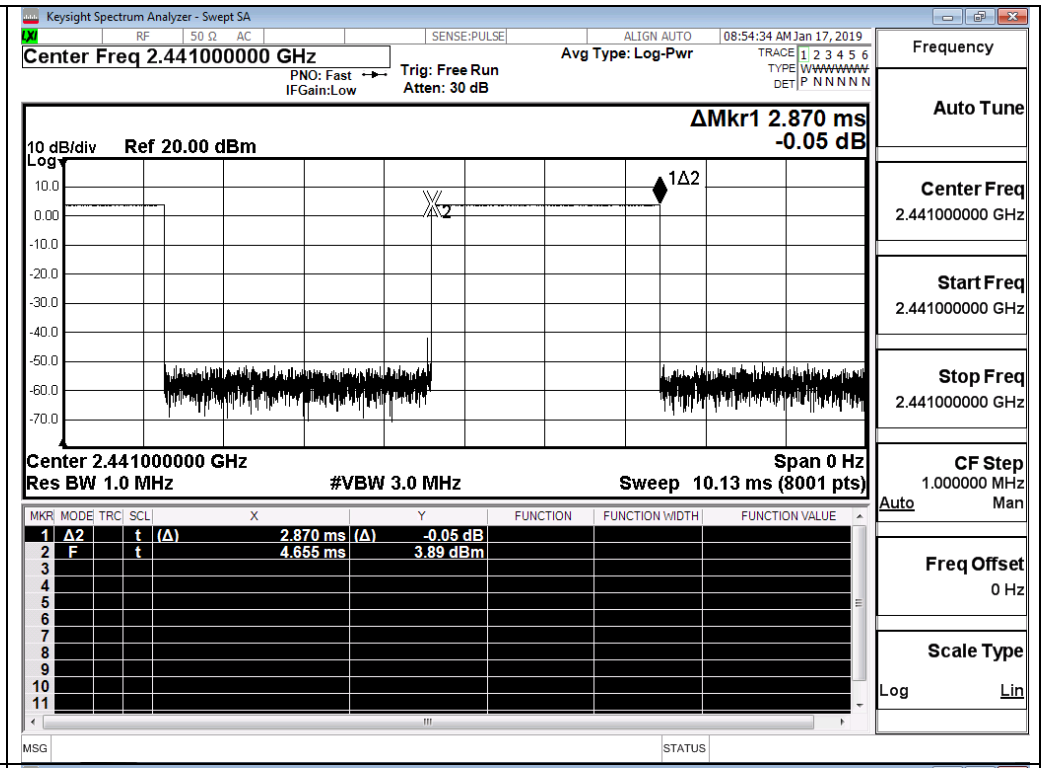
| Test Graphs | |
|---|---|
| GFSK/Hop |  |
| π/4DQPSK/Hop |  |

## A.5 Dwell Time

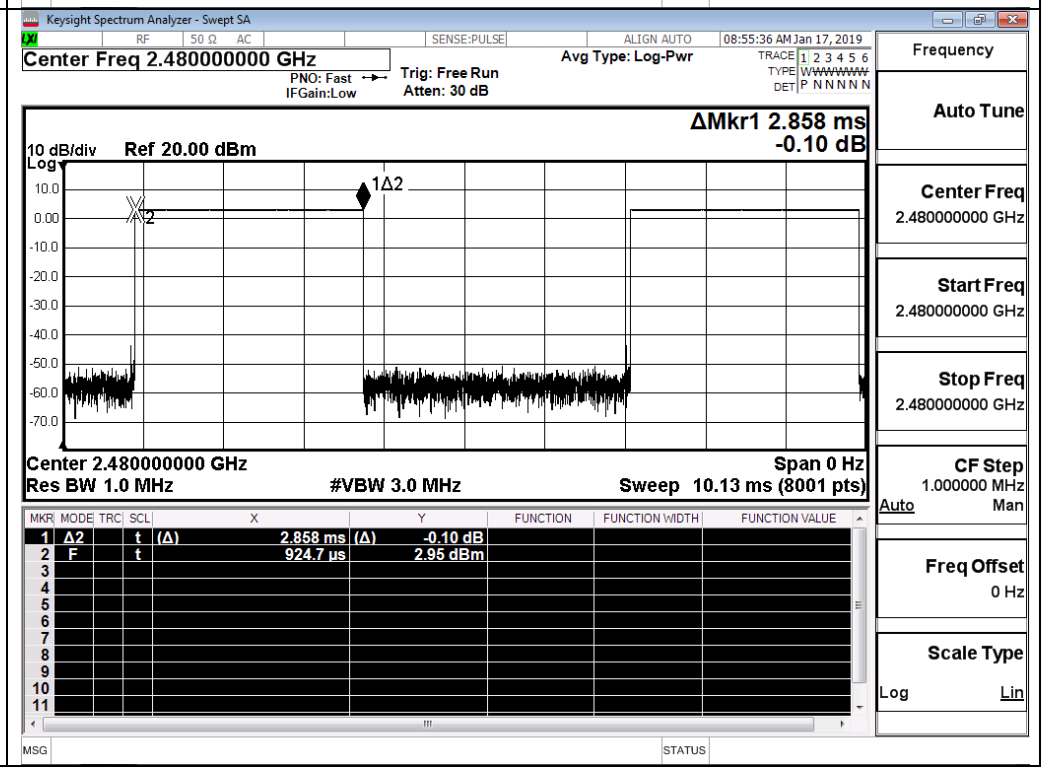
| Mode | Packet | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell Time[s] | Limit [s] | Verdict |
|---|---|---|---|---|---|---|---|
| GFSK | DH5 | LCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |
| | DH5 | MCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |
| | DH5 | HCH | 2.86 | 106.7 | 0.305 | 0.4 | PASS |
| π/4DQPSK | 2DH5 | LCH | 2.85 | 106.7 | 0.304 | 0.4 | PASS |
| | 2DH5 | MCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |
| | 2DH5 | HCH | 2.87 | 106.7 | 0.306 | 0.4 | PASS |

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

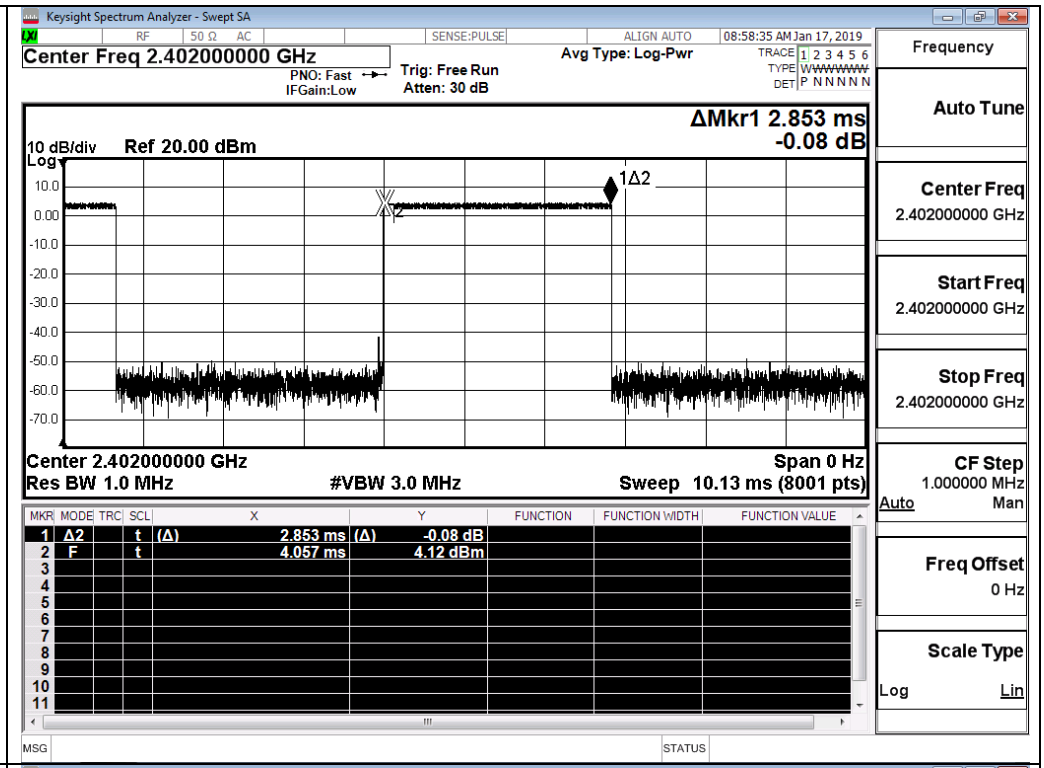
GFSK_DH5/MCH



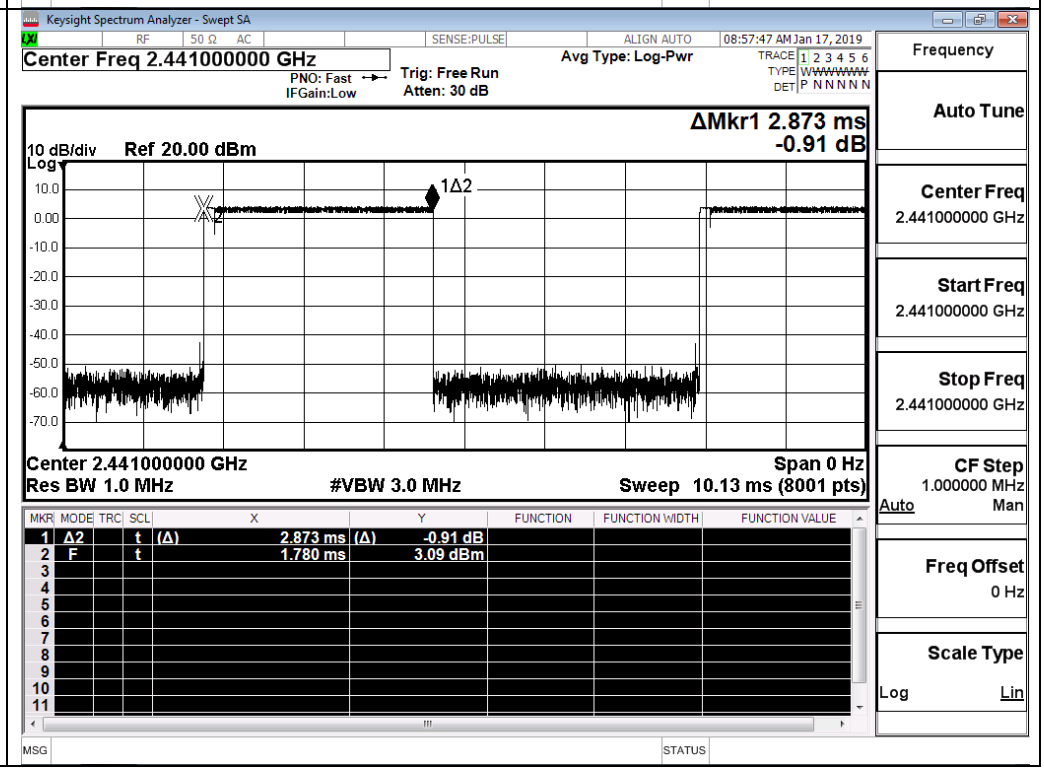

GFSK_DH5/HCH

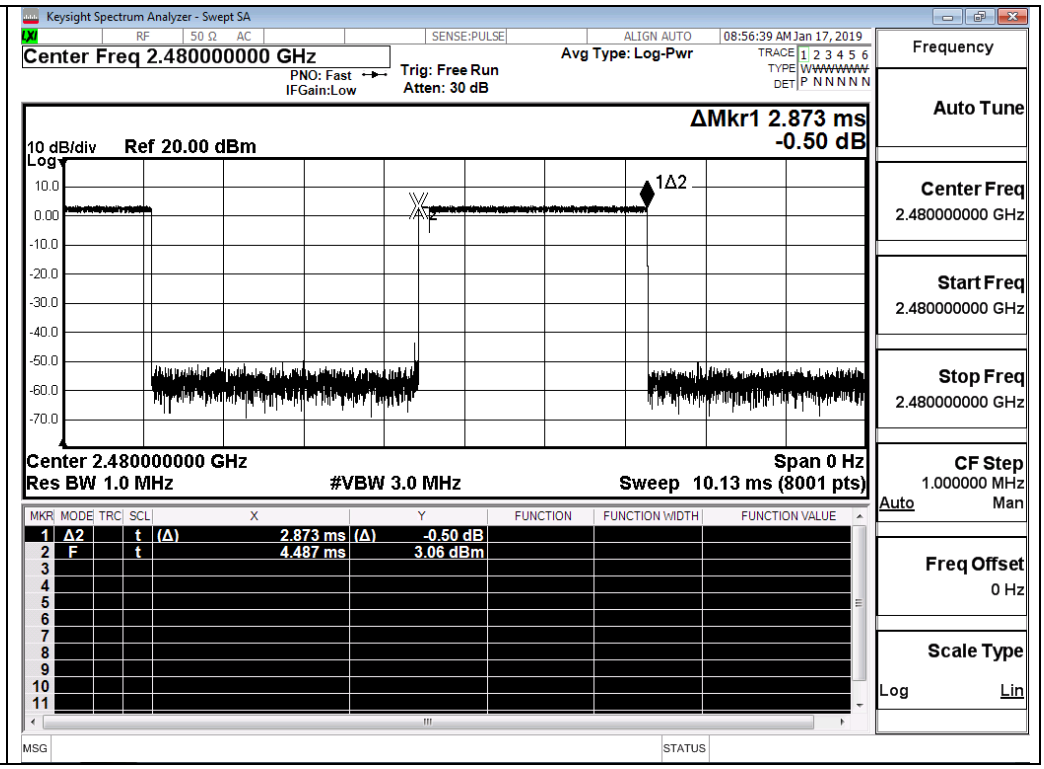


π/4DQPSK
_2DH5/LCH



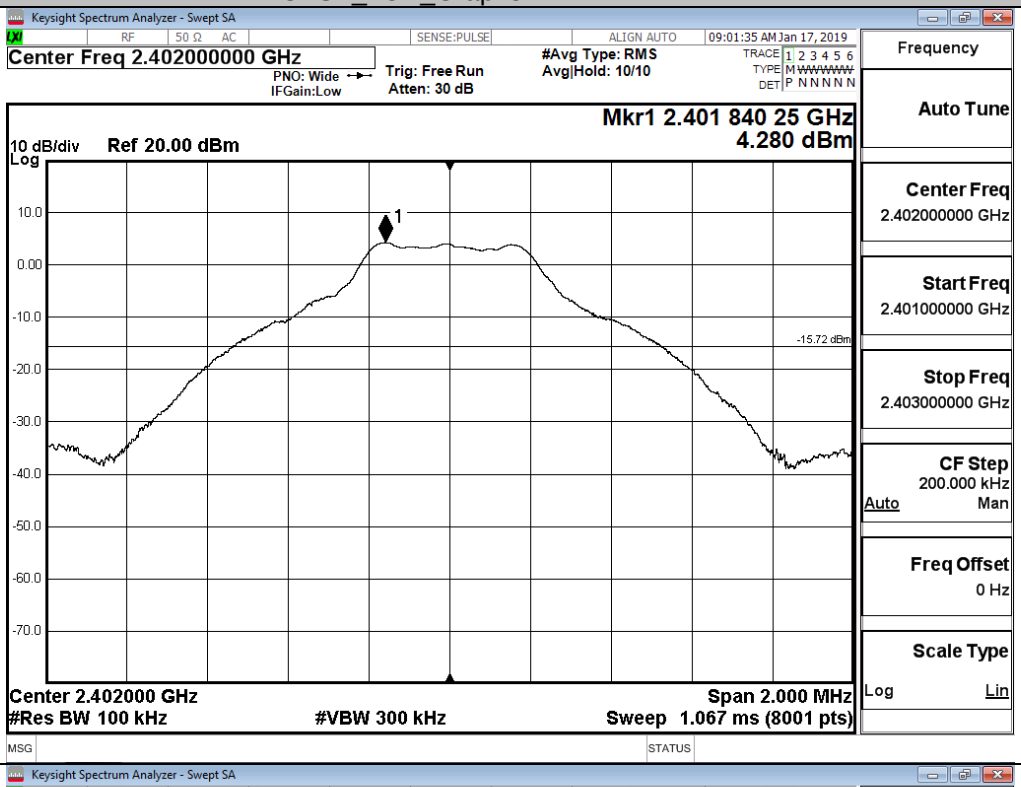
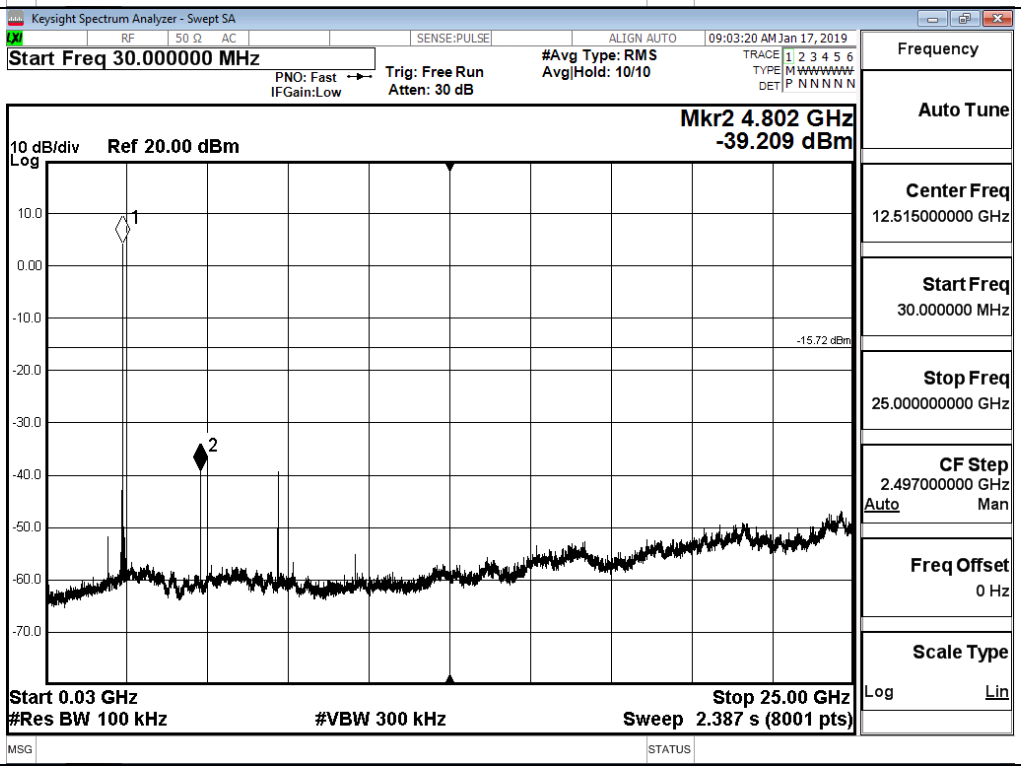

π/4DQPSK
_2DH5/MCH

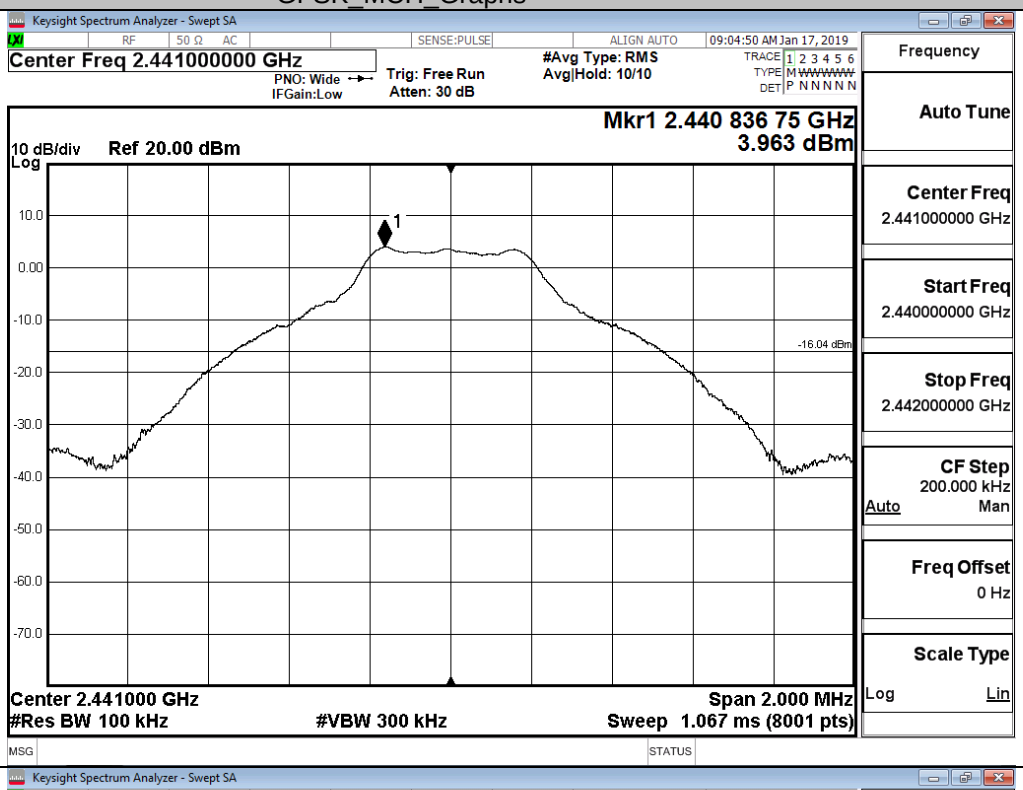
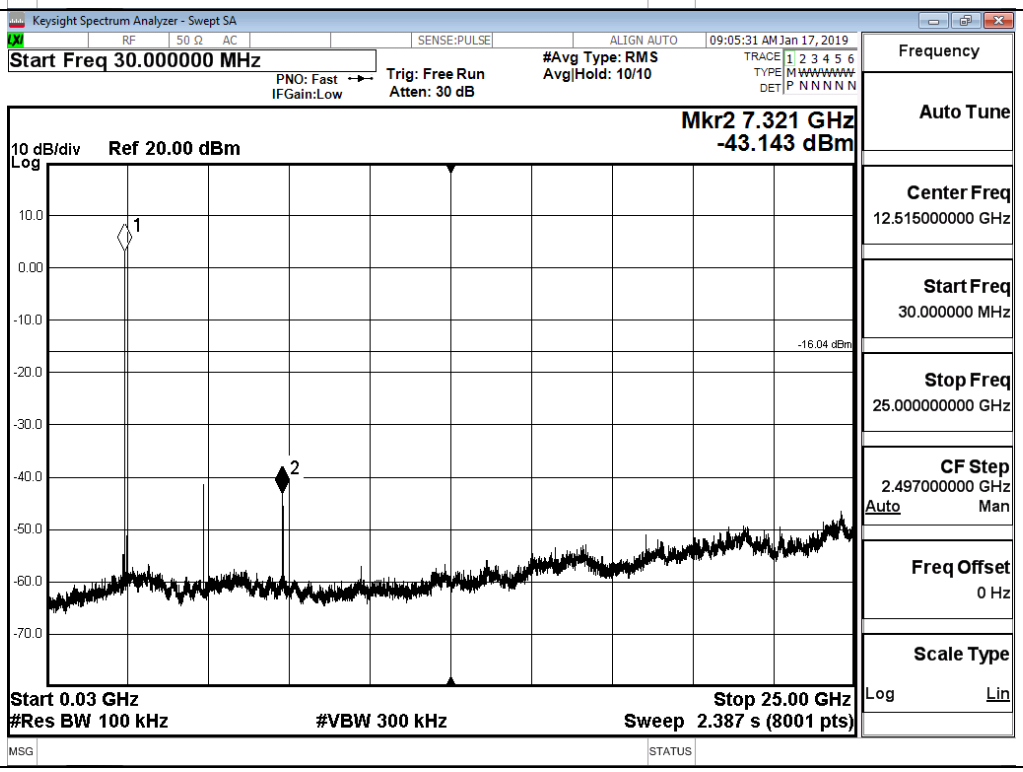


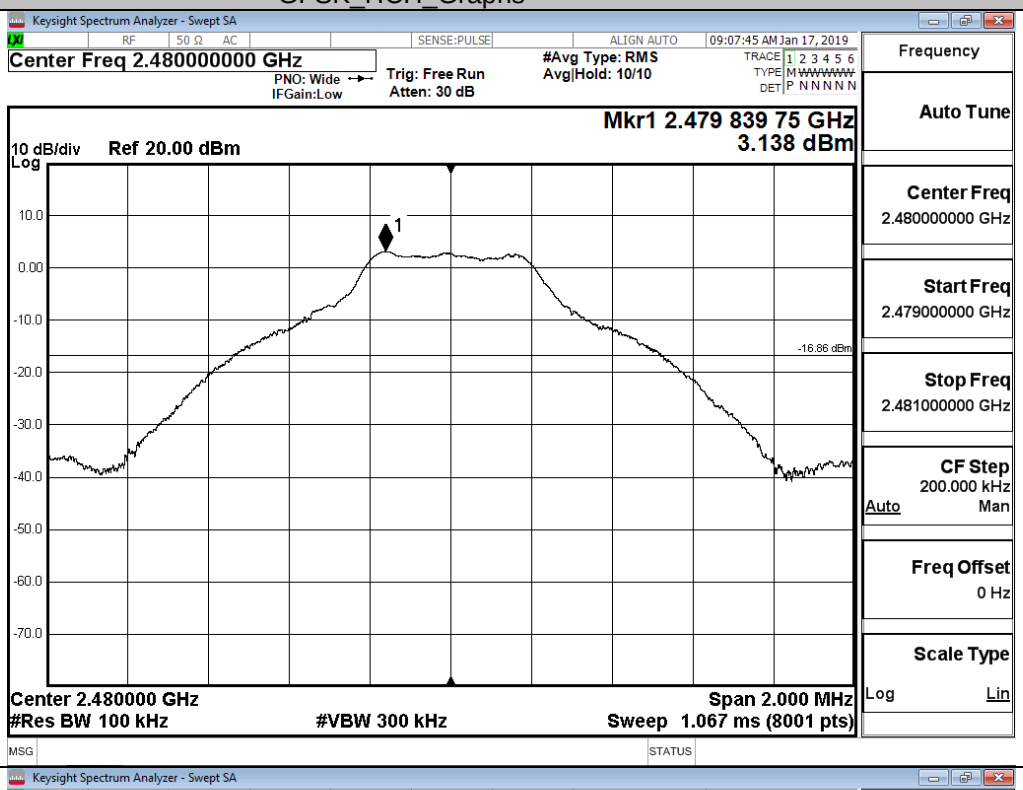
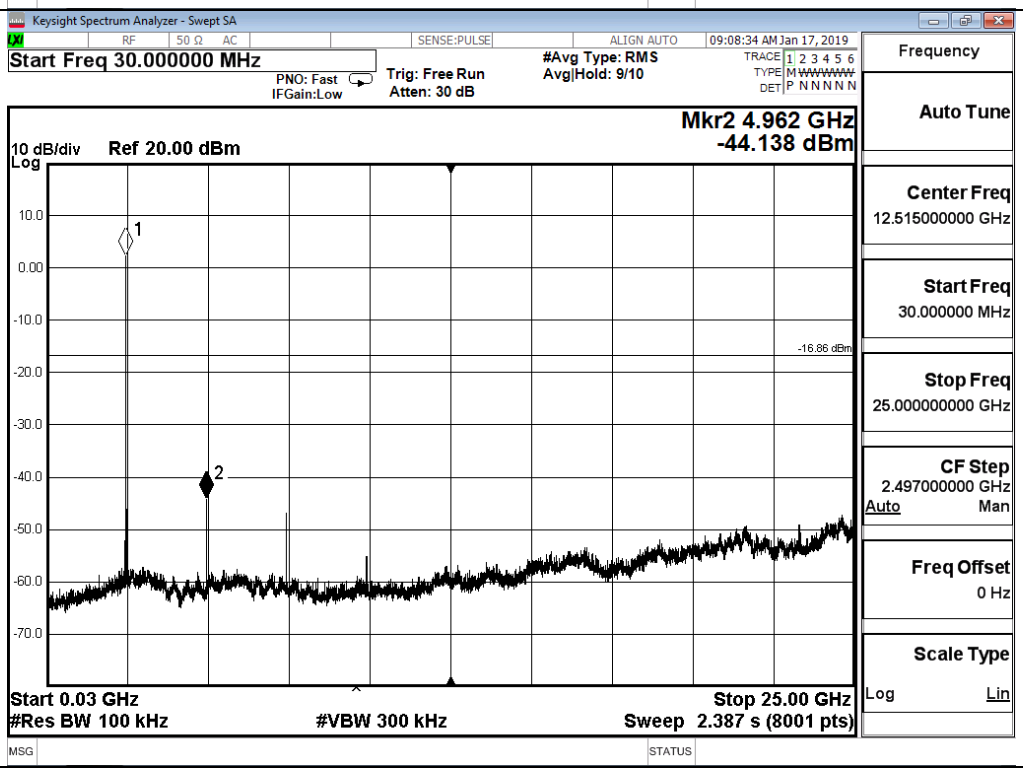
| | |
|---|---|
| π/4DQPSK<br>_2DH5/HCH |  |

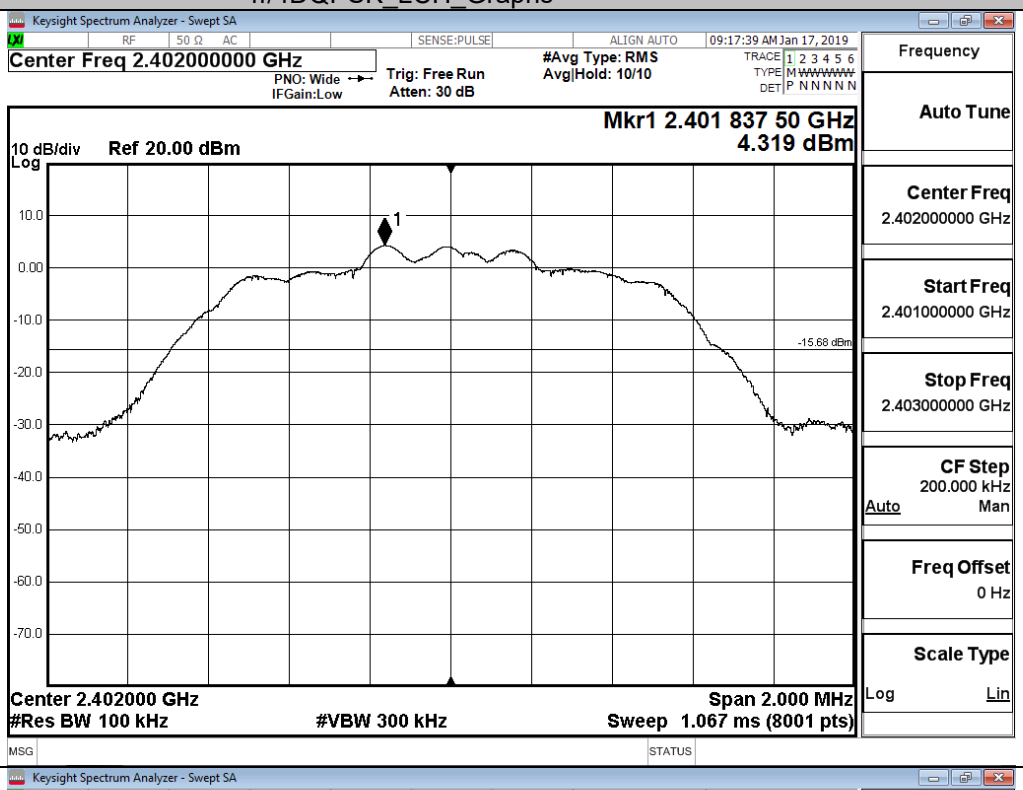
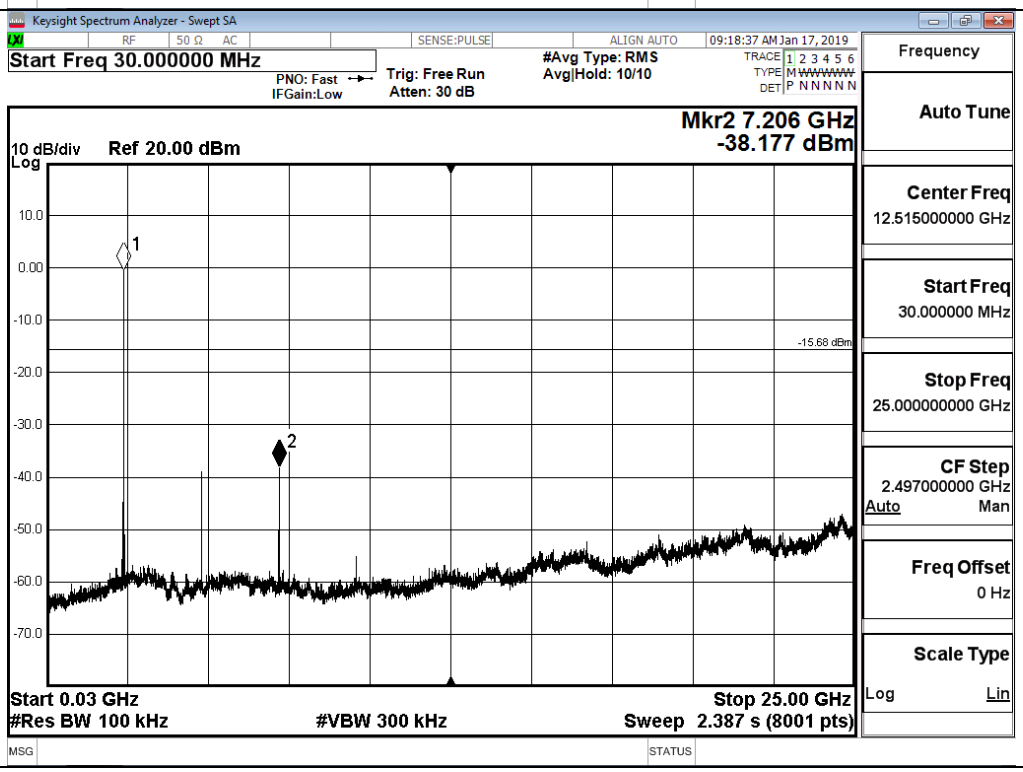
## A.6 RF Conducted Spurious Emissions

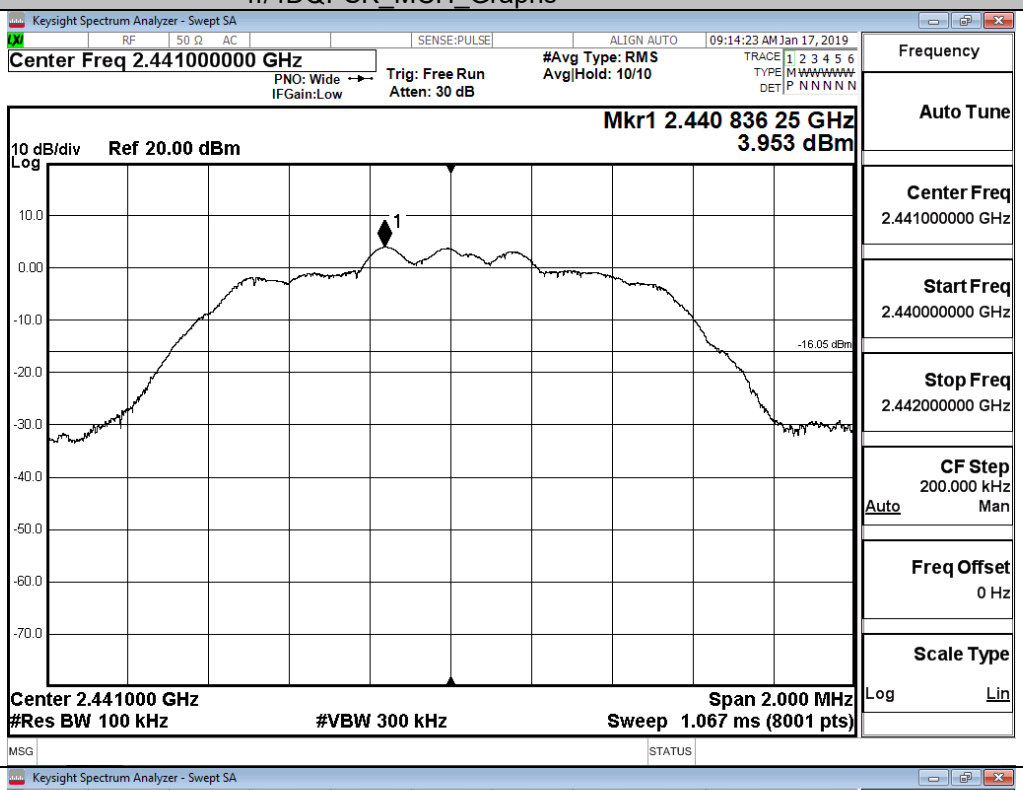
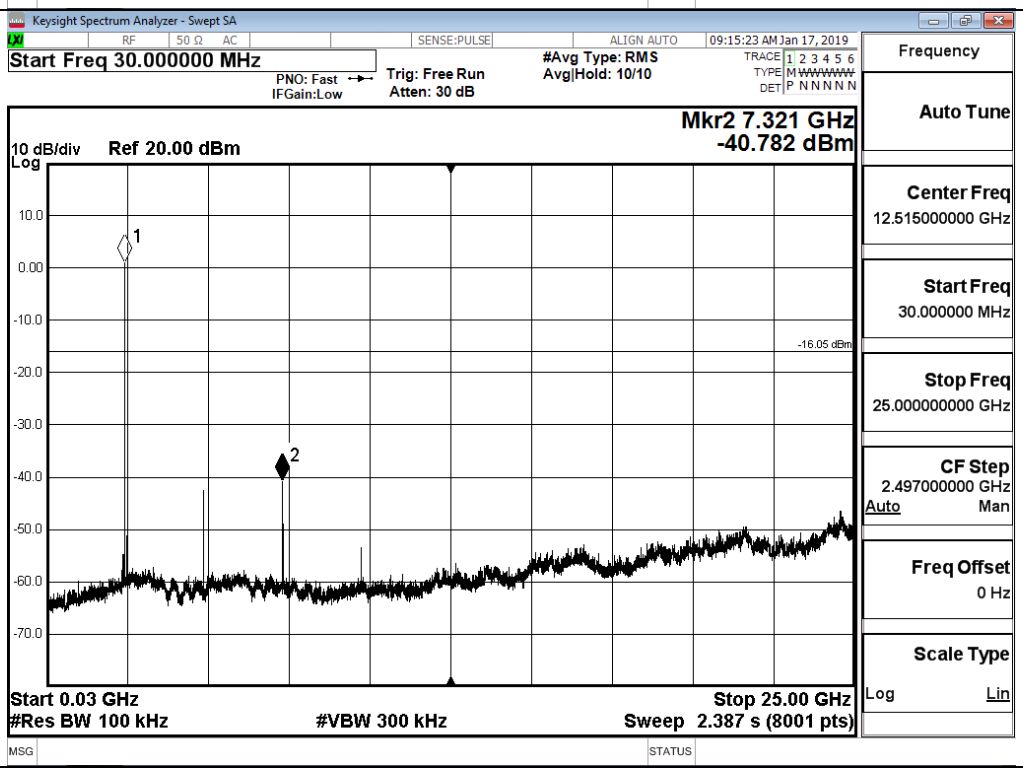
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| GFSK | LCH | 4.280 | -39.209 | -15.72 | PASS |
| | MCH | 3.963 | -43.143 | -16.04 | PASS |
| | HCH | 3.138 | -44.138 | -16.86 | PASS |
| π/4DQPSK | LCH | 4.319 | -38.177 | -15.68 | PASS |
| | MCH | 3.953 | -40.782 | -16.05 | PASS |
| | HCH | 3.088 | -45.443 | -16.91 | PASS |

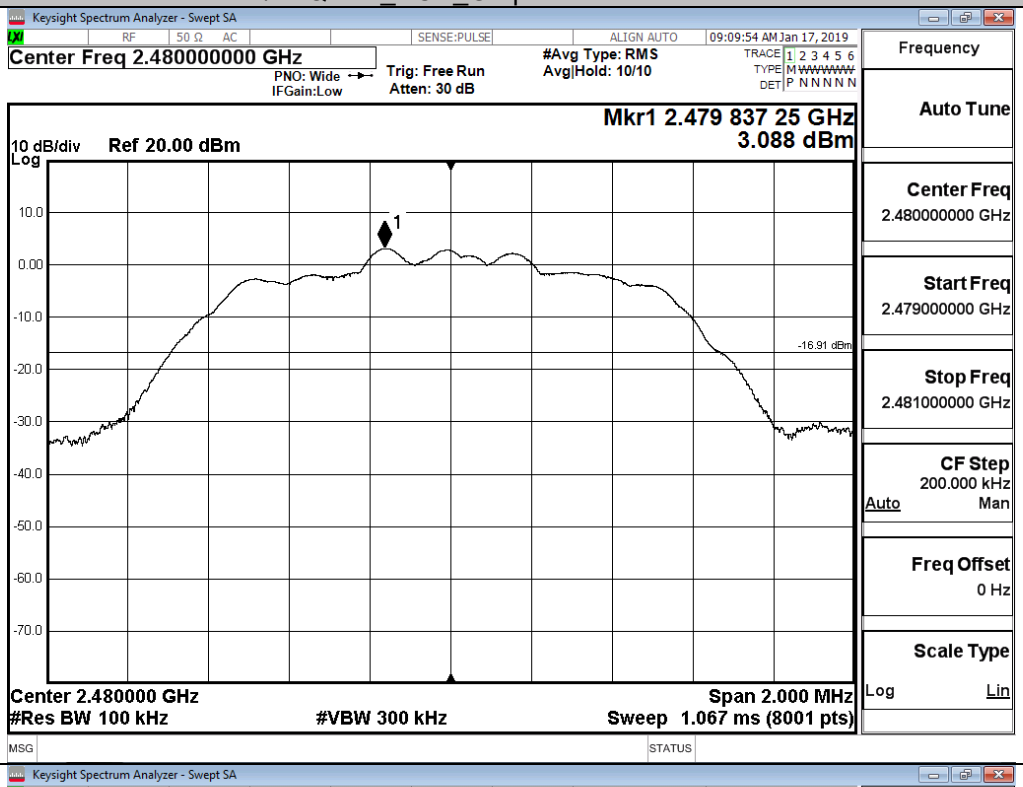
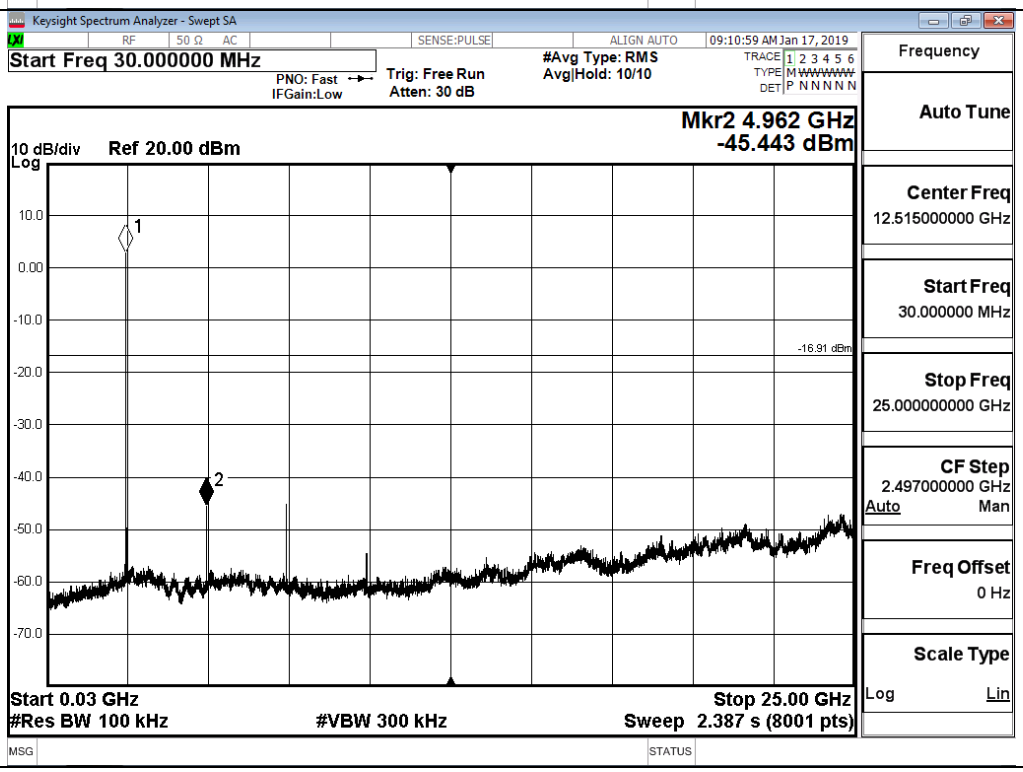
| GFSK_LCH_Graphs | |
|---|---|
| Pref |  |
| Puw |  |

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

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

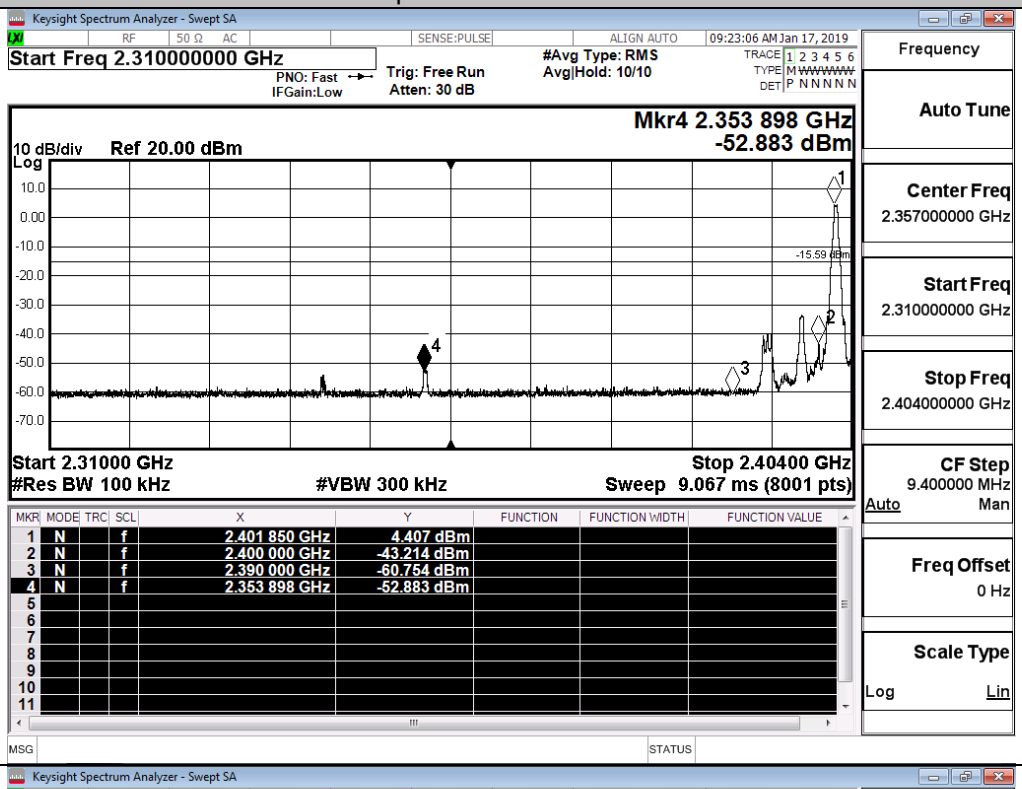
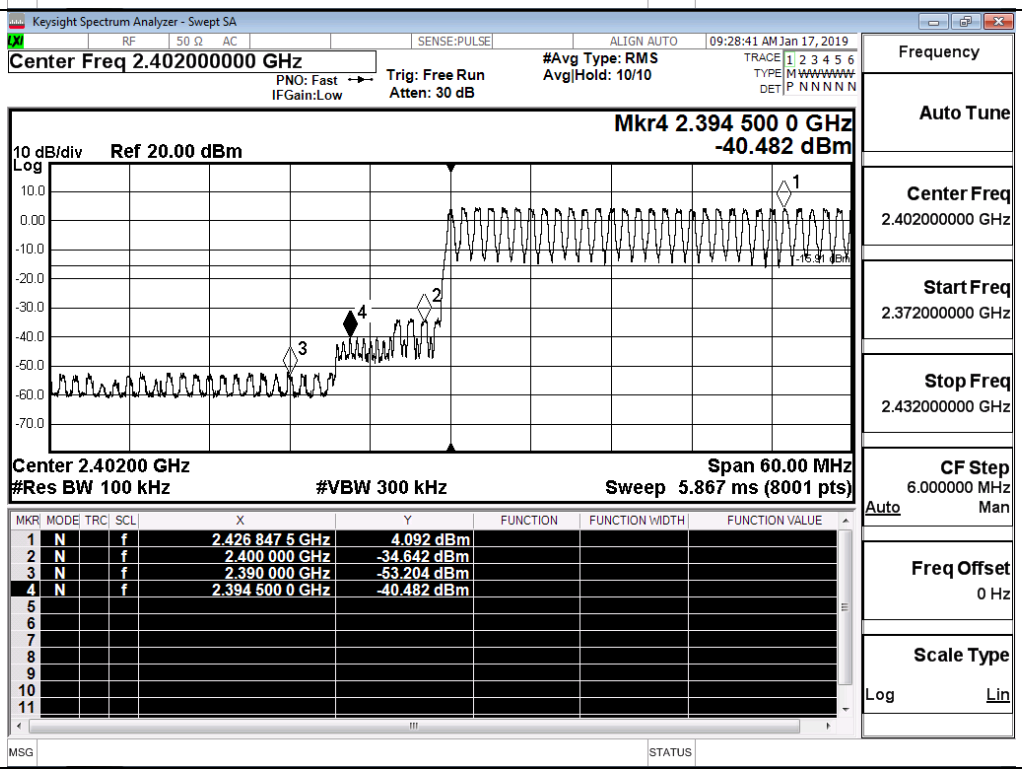
| π/4DQPSK_LCH_Graphs | |
|---|---|
| Pref |  |
| Puw |  |

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

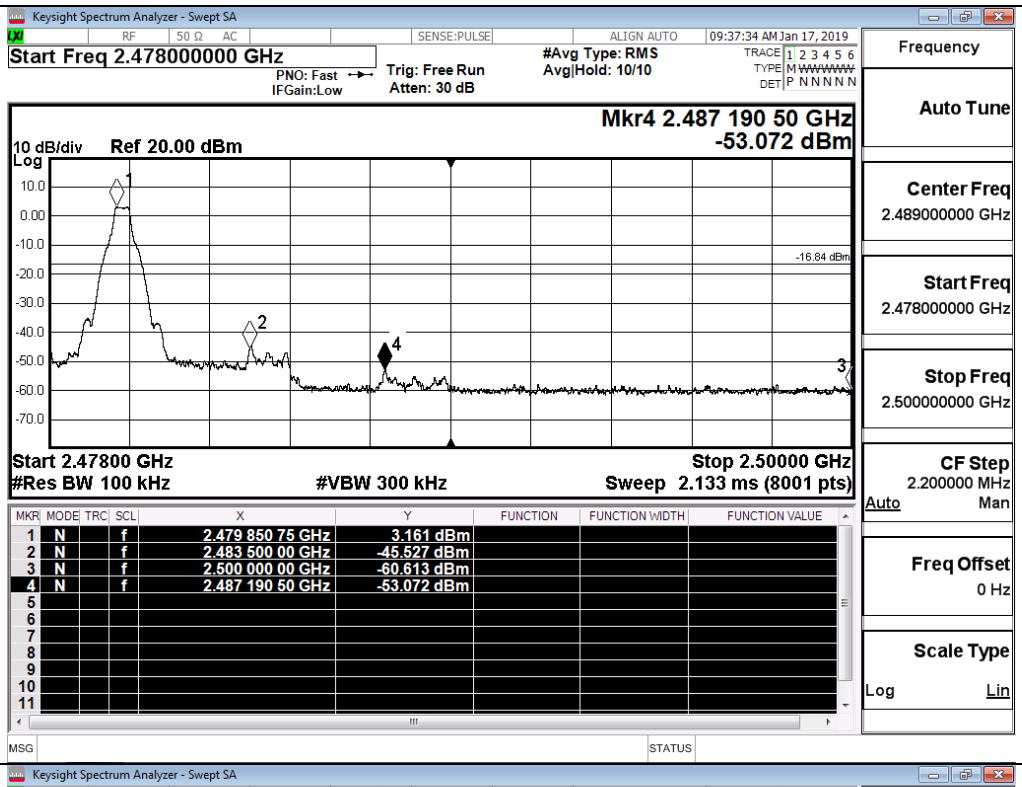
| π/4DQPSK_HCH_Graphs | |
|---|---|
| Pref |  |
| Puw |  |

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

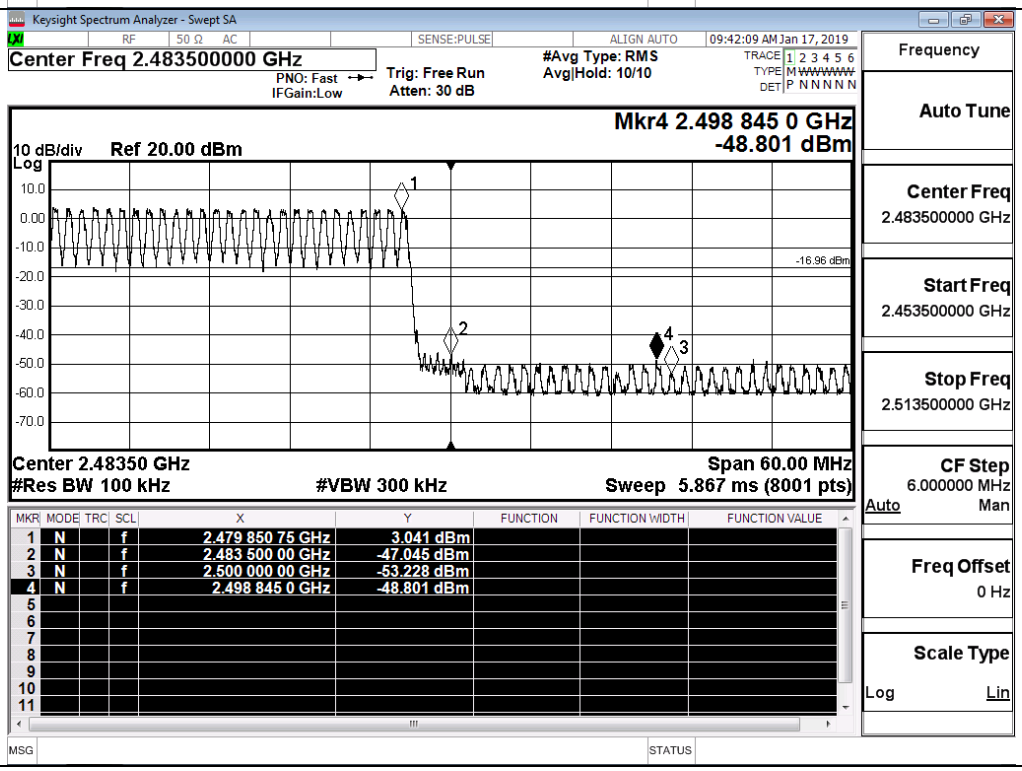
| Mode | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| GFSK | LCH | 2402 | 4.407 | Off | -52.883 | -15.59 | PASS |
| | | | 4.092 | On | -40.482 | -15.91 | PASS |
| | HCH | 2480 | 3.161 | Off | -53.072 | -16.84 | PASS |
| | | | 3.041 | On | -48.801 | -16.96 | PASS |
| π/4DQPSK | LCH | 2402 | 4.331 | Off | -52.581 | -15.67 | PASS |
| | | | 4.257 | On | -45.691 | -15.74 | PASS |
| | HCH | 2480 | 3.133 | Off | -53.231 | -16.87 | PASS |
| | | | 3.634 | On | -50.875 | -16.37 | PASS |

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

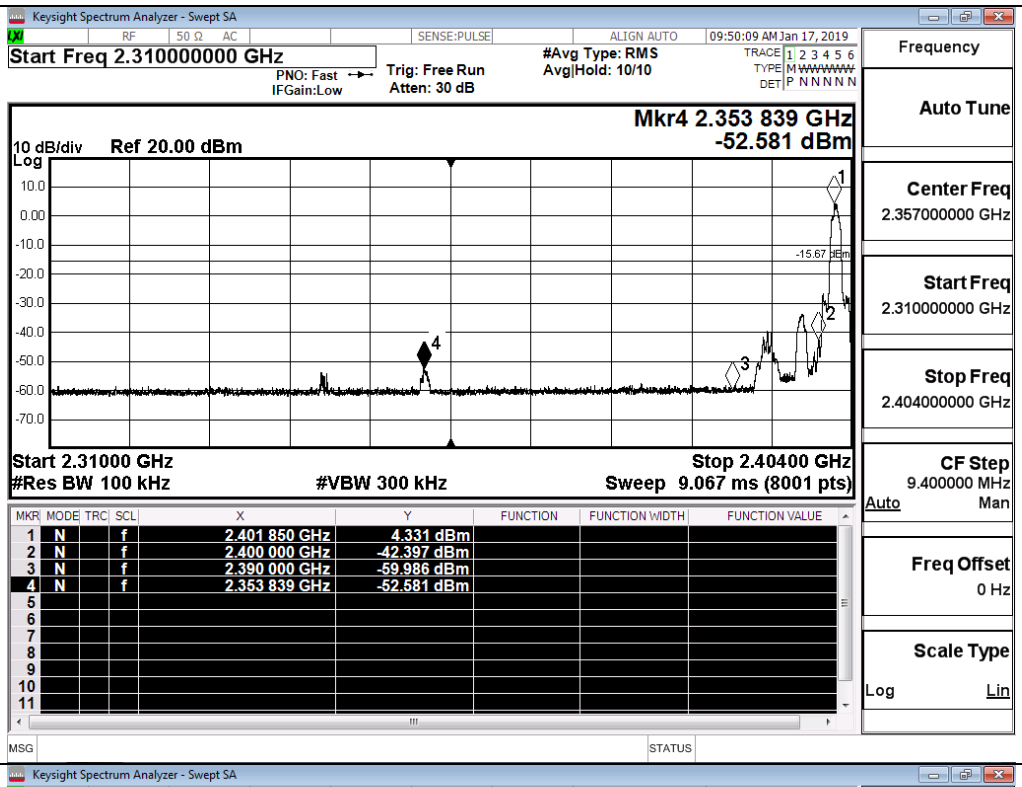
GFSK/HCH/No Hop



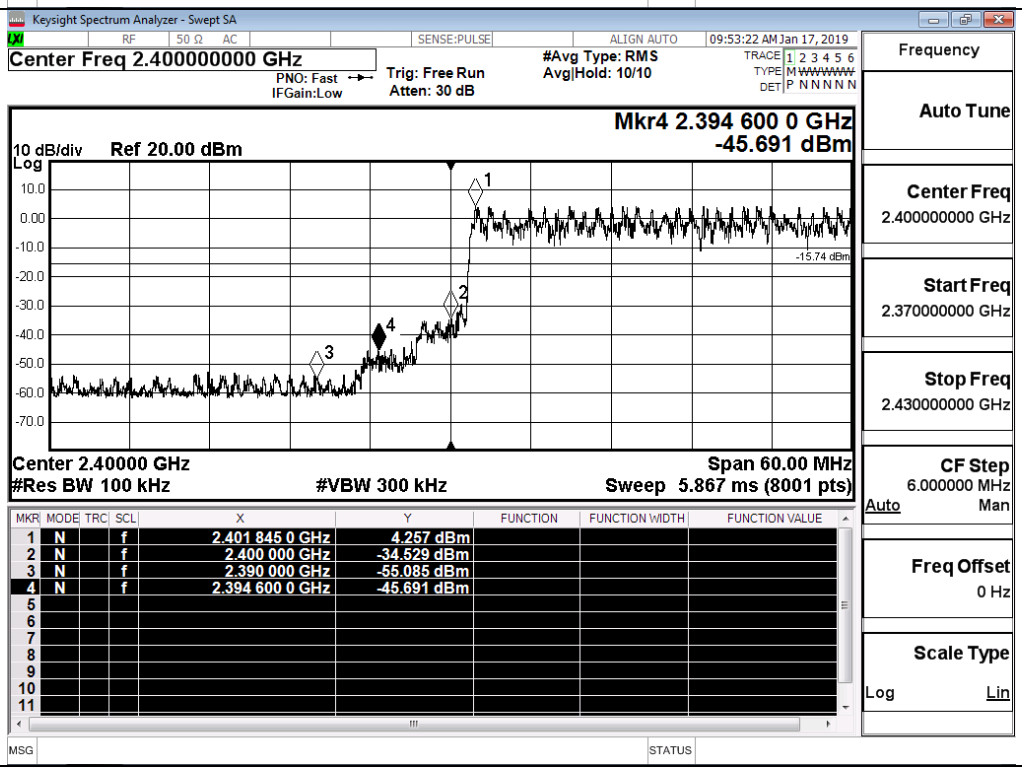

GFSK/HCH/Hop



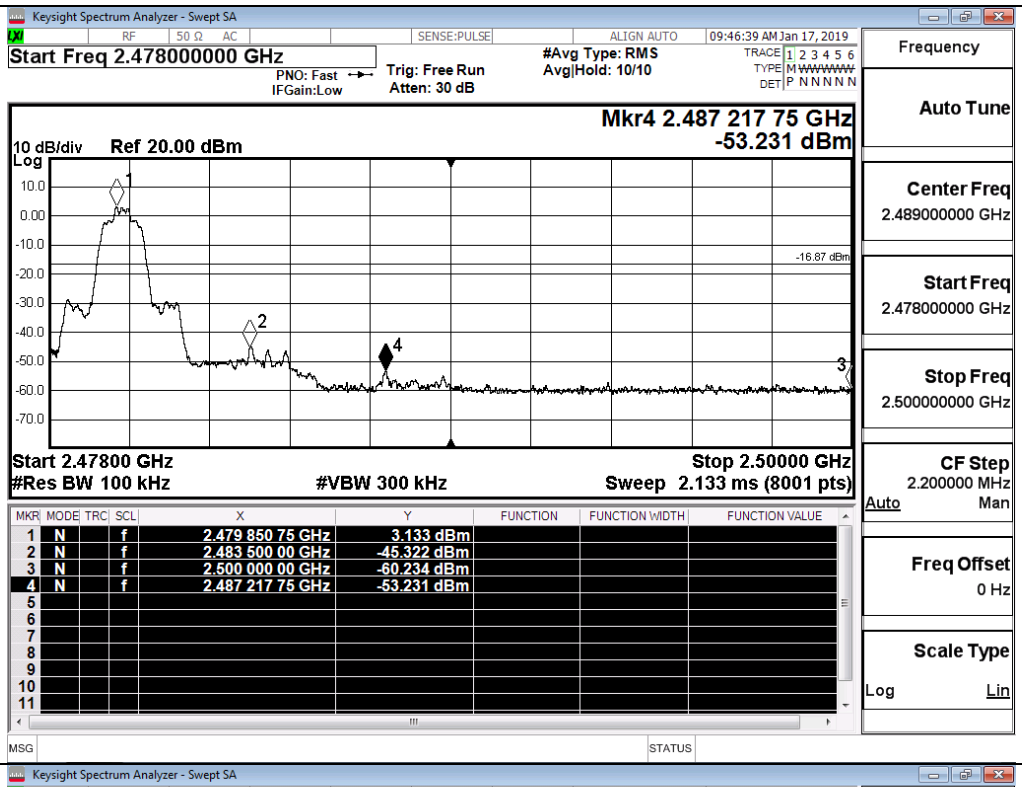
π/4DQPSK/LCH/No Hop



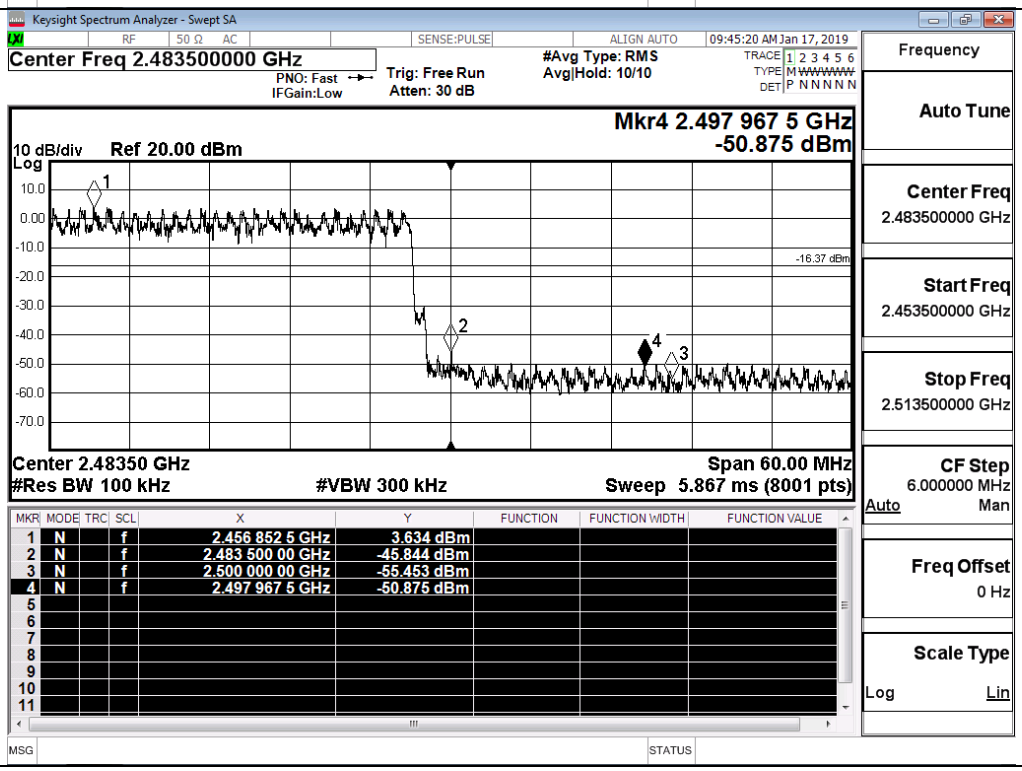

π/4DQPSK/LCH/Hop



π/4DQPSK/HCH/No Hop



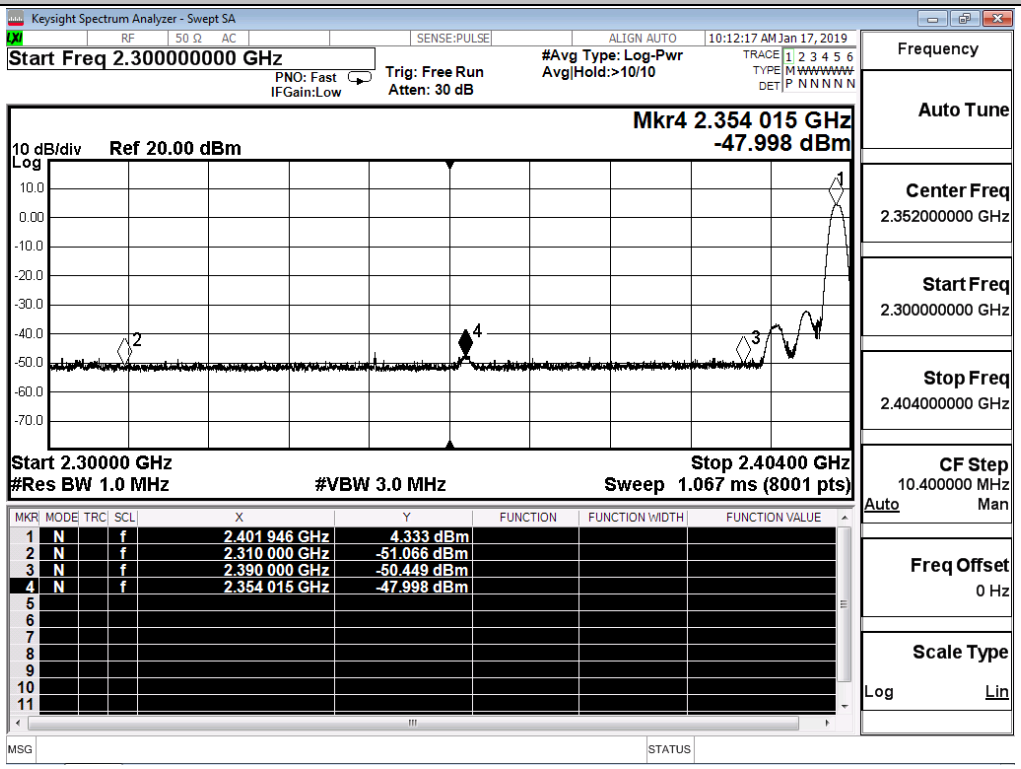

π/4DQPSK/HCH/Hop



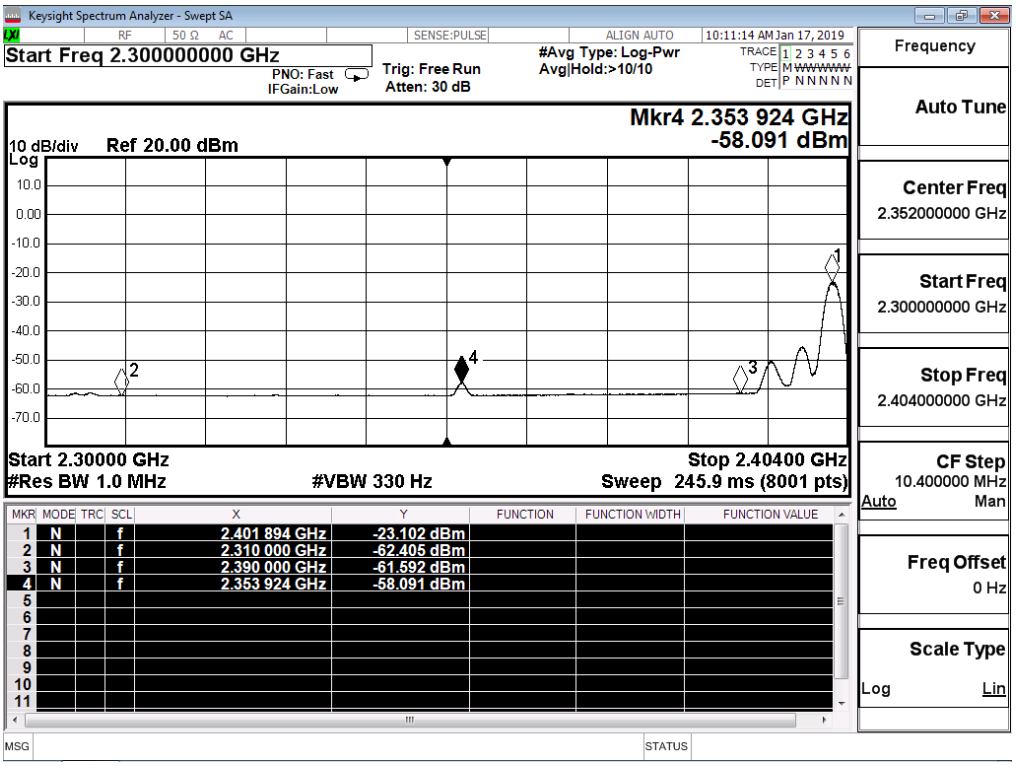
## A.8 Restrict-band band-edge measurements

| Test Mode | Hopping | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdict |
|---|---|---|---|---|---|---|---|---|---|
| GFSK | Off | 2310.0 | -51.066 | 2.0 | 0 | 46.19 | PEAK | 74 | PASS |
| | Off | 2310.0 | -62.405 | 2.0 | 0 | 34.86 | AV | 54 | PASS |
| | Off | 2390.0 | -50.449 | 2.0 | 0 | 46.81 | PEAK | 74 | PASS |
| | Off | 2390.0 | -61.592 | 2.0 | 0 | 35.67 | AV | 54 | PASS |
| | Off | 2483.5 | -40.400 | 2.0 | 0 | 56.86 | PEAK | 74 | PASS |
| | Off | 2483.5 | -53.880 | 2.0 | 0 | 43.38 | AV | 54 | PASS |
| | Off | 2500.0 | -49.685 | 2.0 | 0 | 47.58 | PEAK | 74 | PASS |
| | Off | 2500.0 | -61.502 | 2.0 | 0 | 35.76 | AV | 54 | PASS |
| π/4DQPSK | Off | 2310.0 | -51.473 | 2.0 | 0 | 45.79 | PEAK | 74 | PASS |
| | Off | 2310.0 | -62.420 | 2.0 | 0 | 34.84 | AV | 54 | PASS |
| | Off | 2390.0 | -50.330 | 2.0 | 0 | 46.93 | PEAK | 74 | PASS |
| | Off | 2390.0 | -61.648 | 2.0 | 0 | 35.61 | AV | 54 | PASS |
| | Off | 2483.5 | -39.758 | 2.0 | 0 | 57.50 | PEAK | 74 | PASS |
| | Off | 2483.5 | -55.430 | 2.0 | 0 | 41.83 | AV | 54 | PASS |
| | Off | 2500.0 | -49.918 | 2.0 | 0 | 47.34 | PEAK | 74 | PASS |
| | Off | 2500.0 | -61.402 | 2.0 | 0 | 35.86 | AV | 54 | PASS |

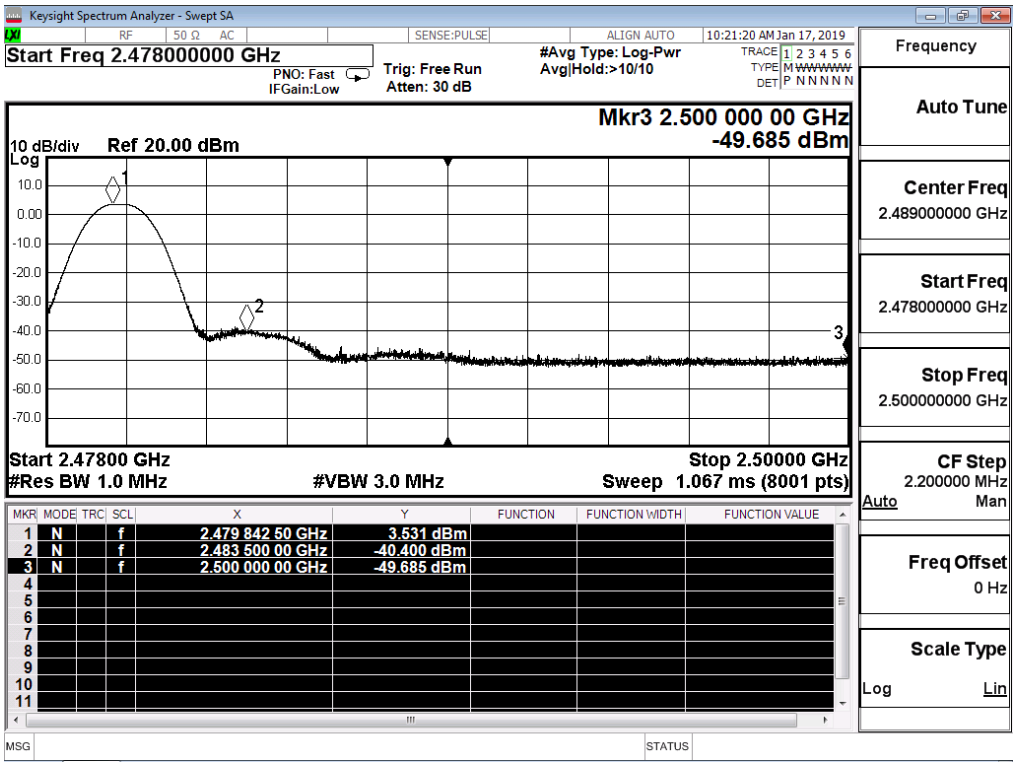
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



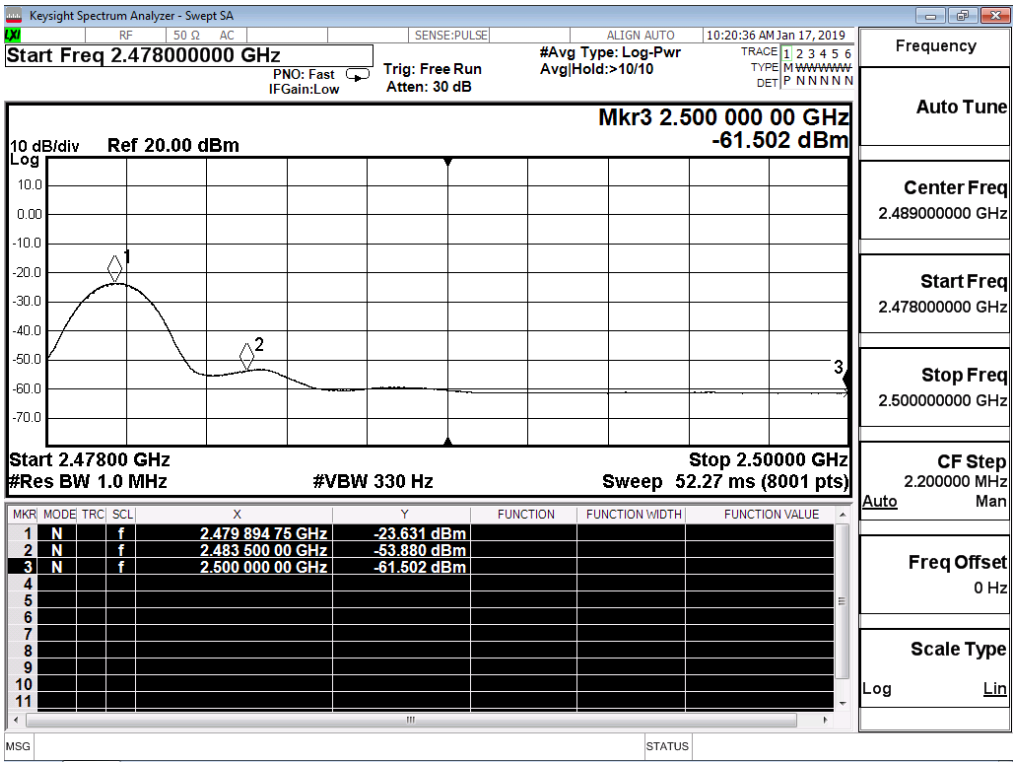

Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



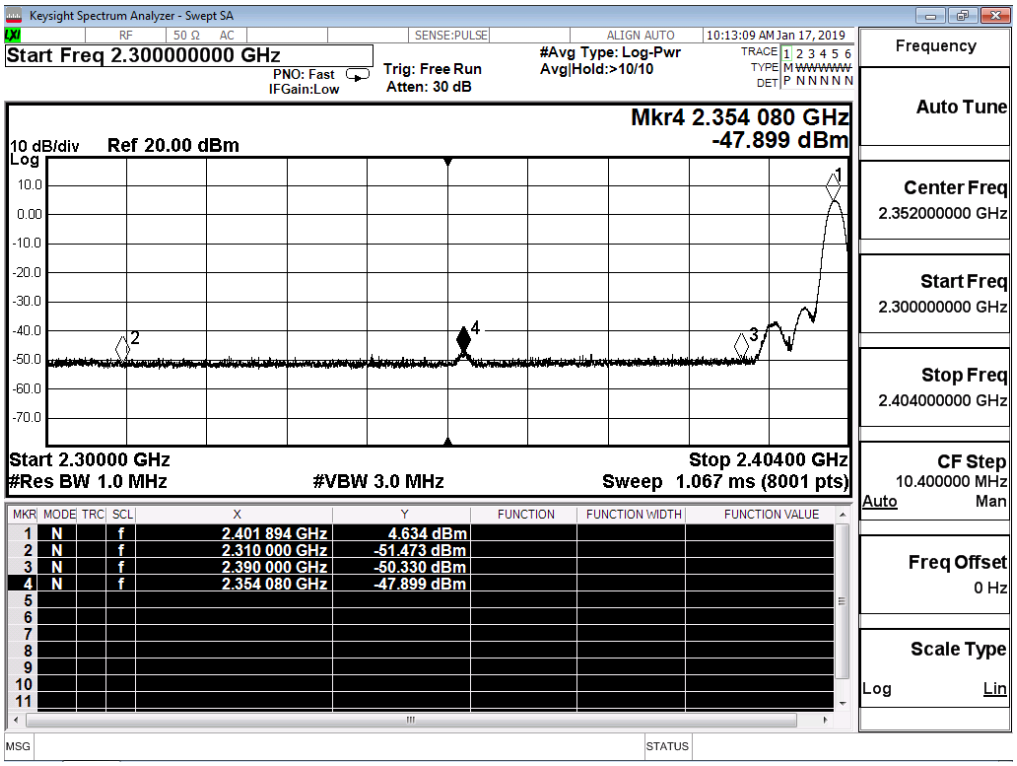
## Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



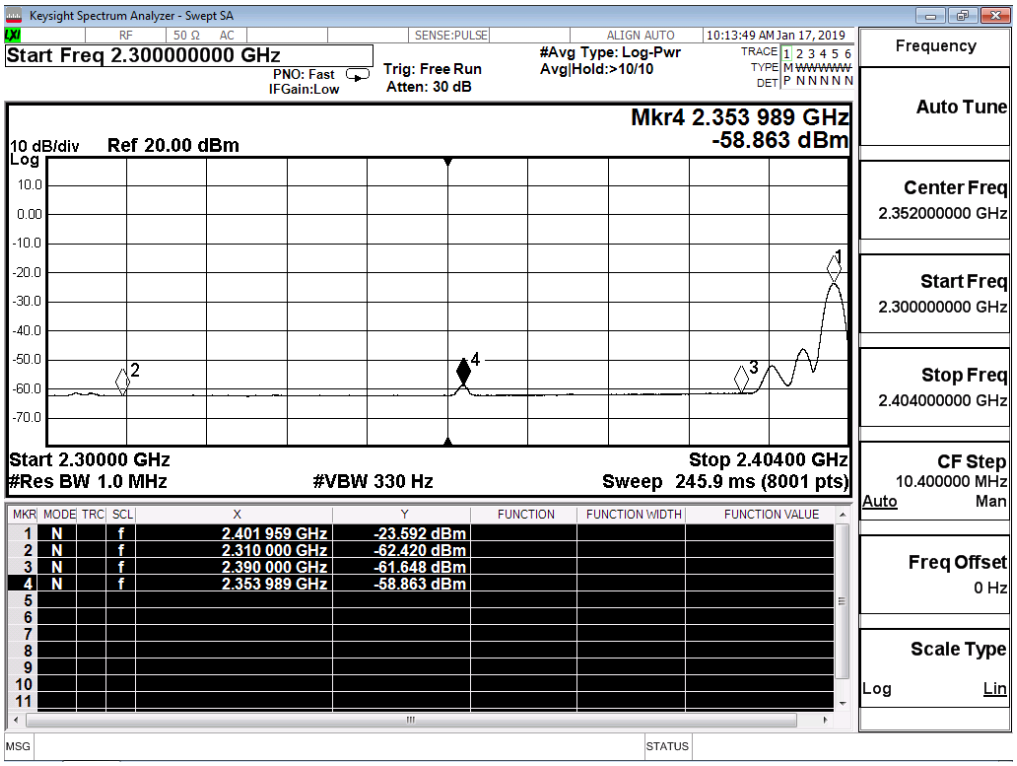

## Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



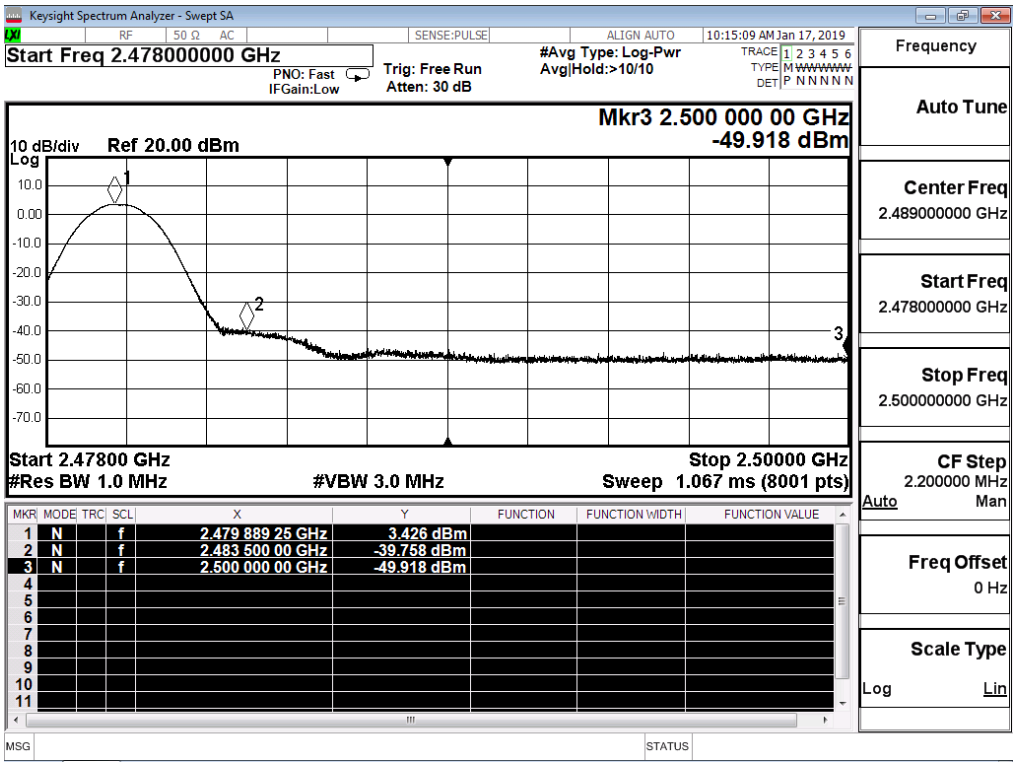
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)

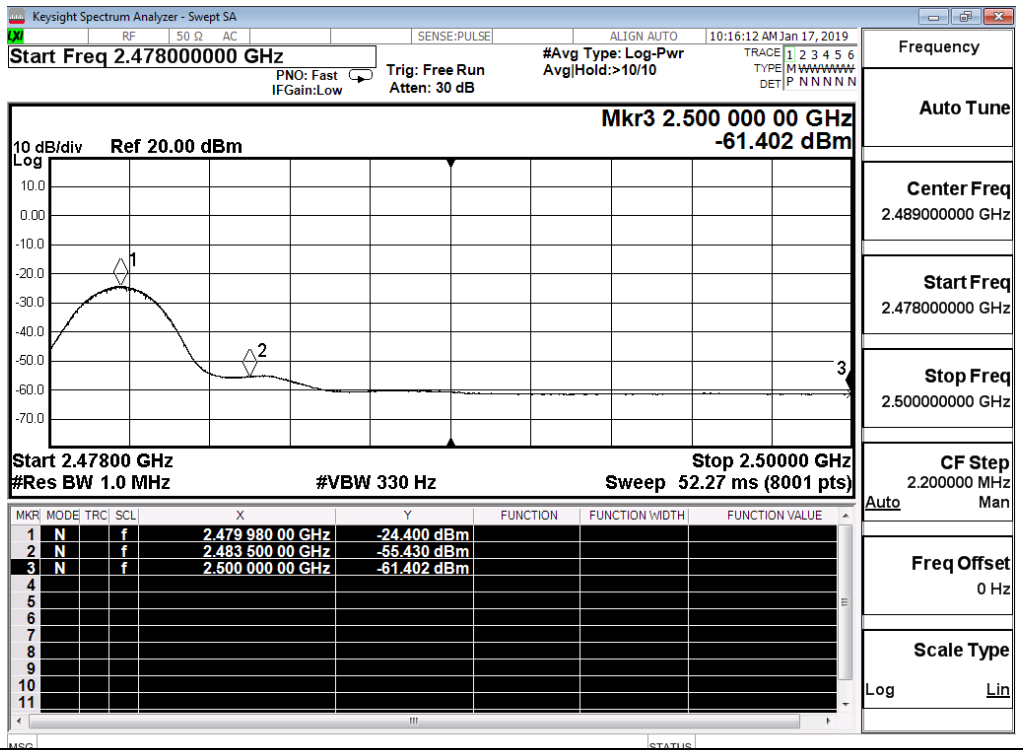



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



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)