Appendix A

RF Test Data for BT V4.0(BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth FM Transmitter with PD3.0

Trade Mark: Scosche

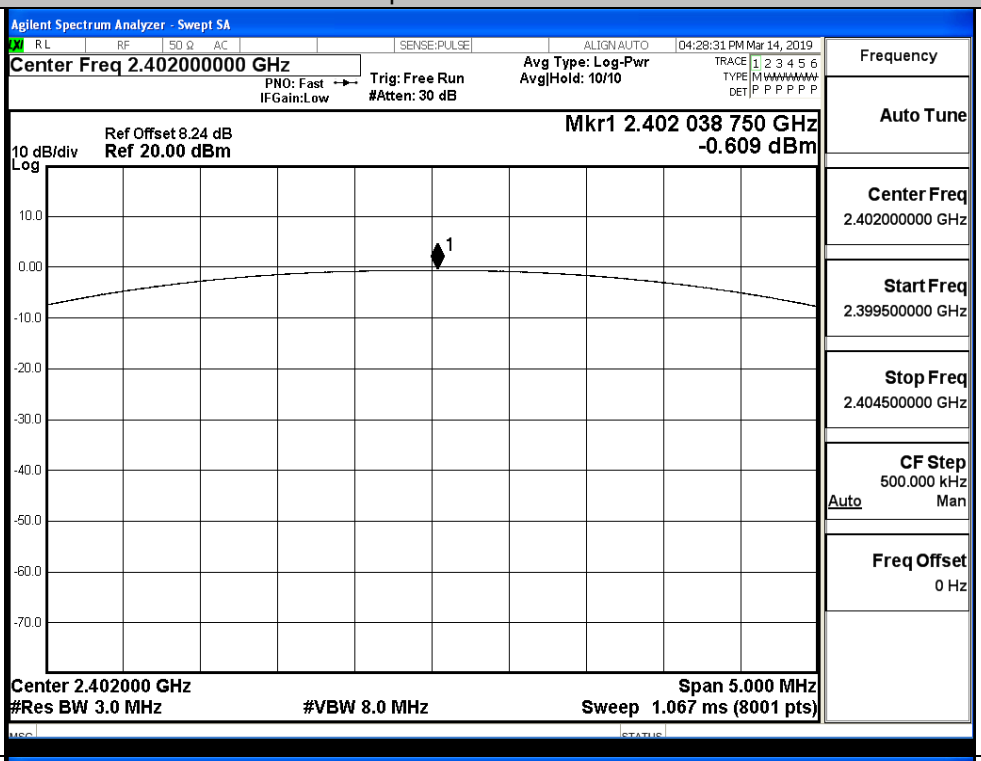
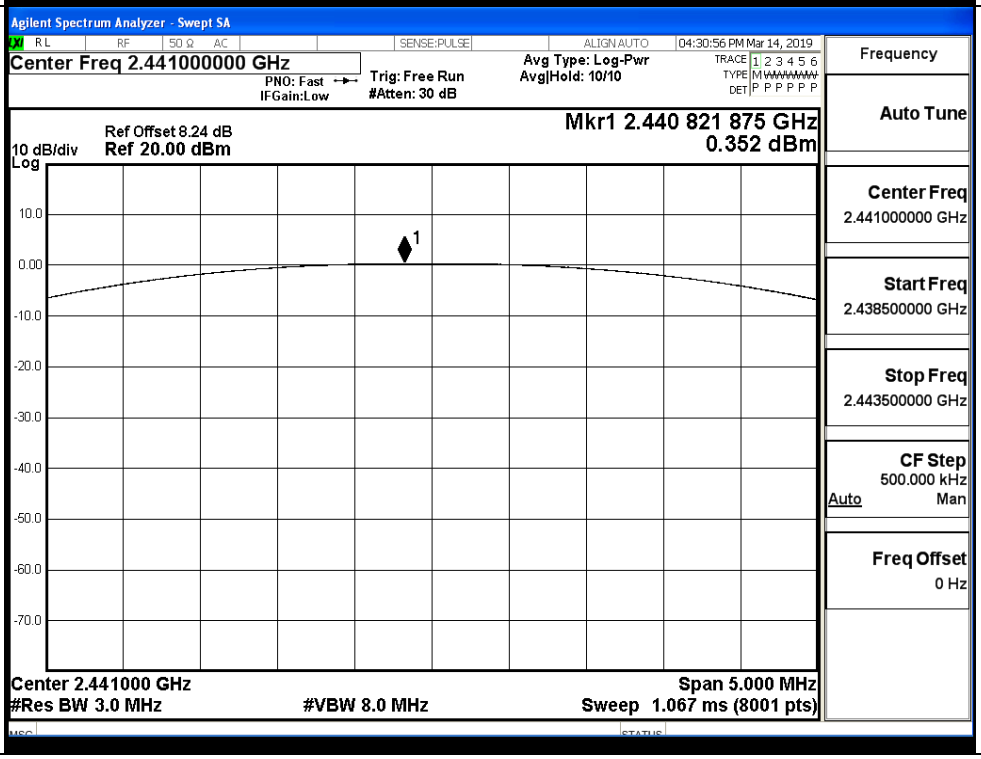
Test Model: BTFMPD

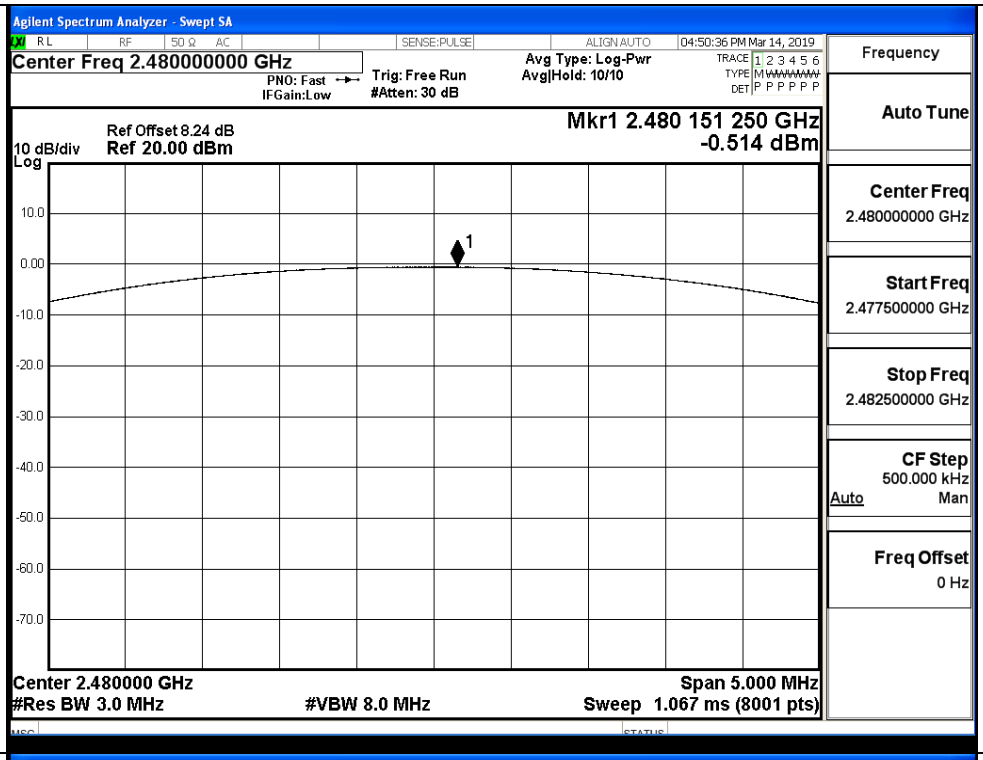
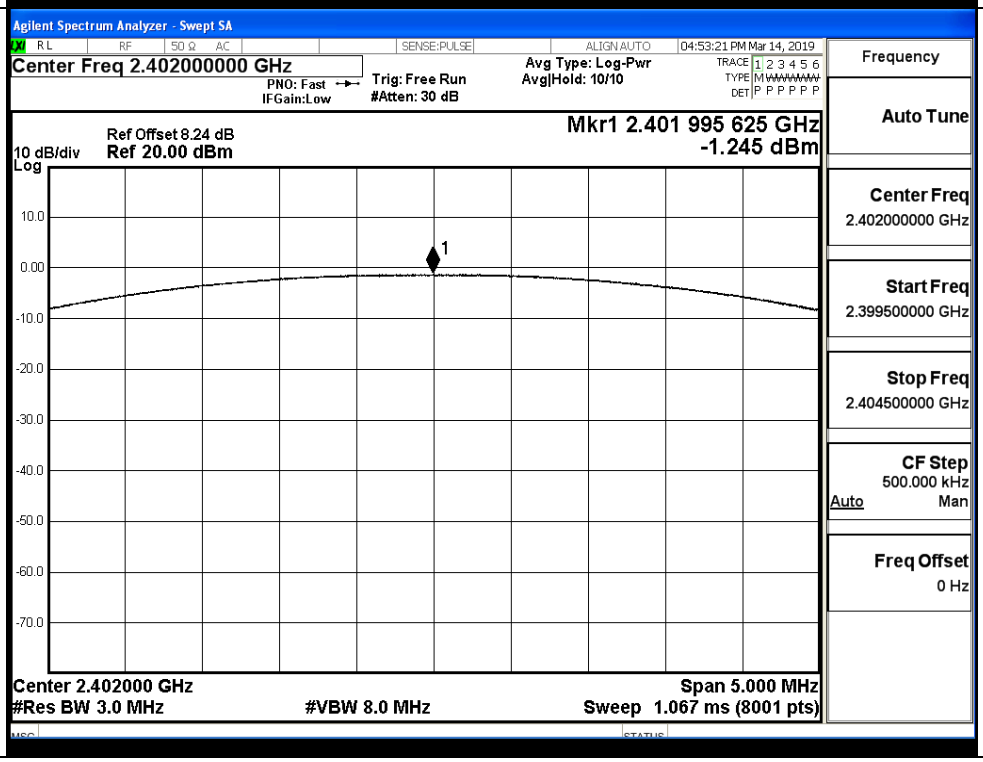
Environmental Conditions

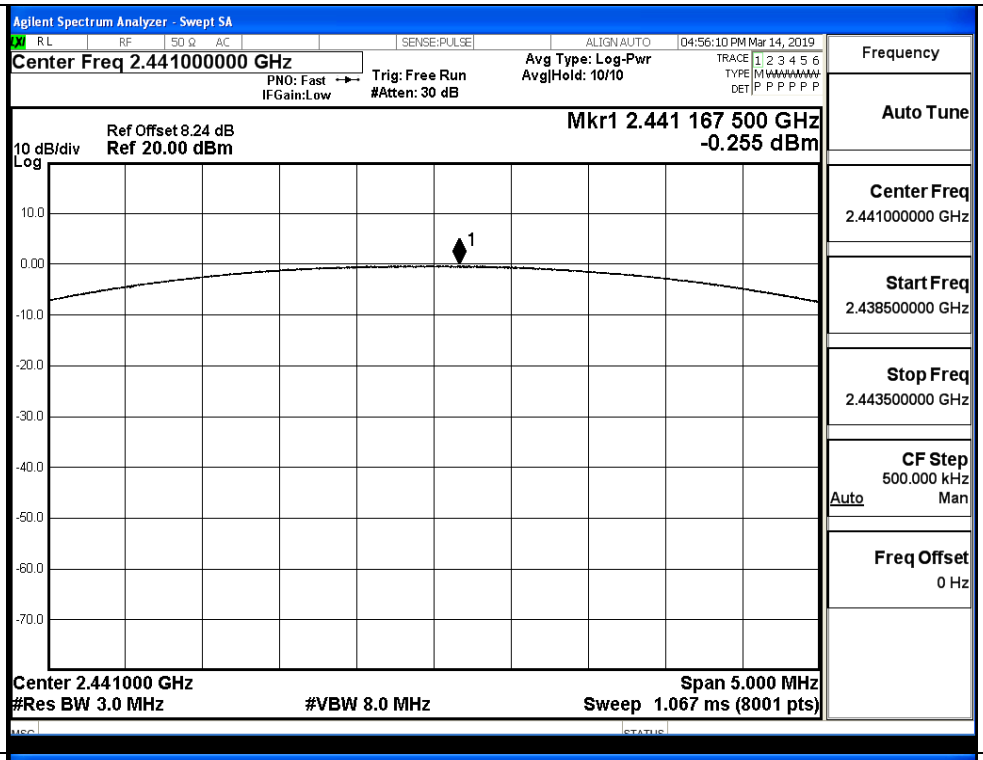
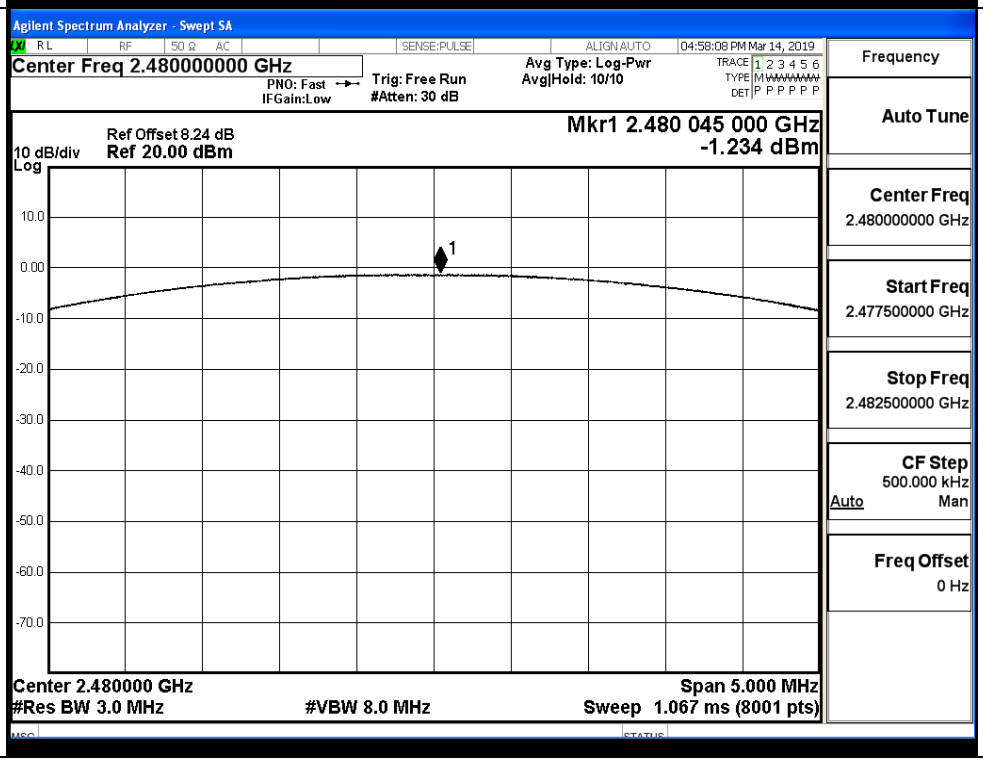
Temperature:	24.5 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.Zeng
Supervised by:	Tom.Liu

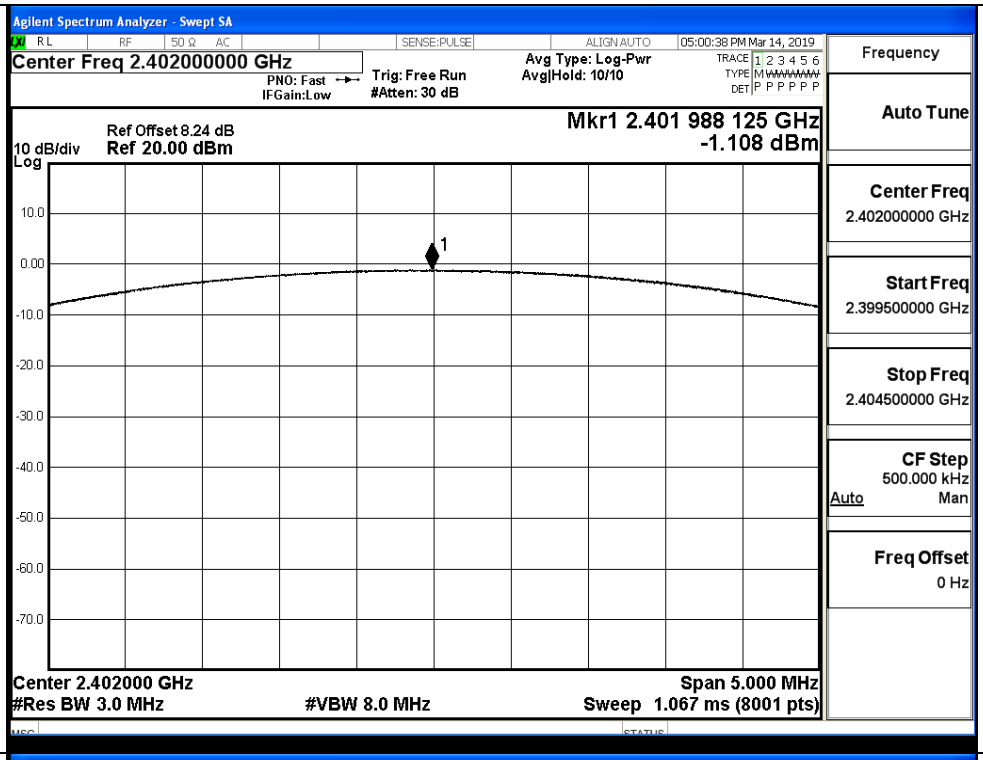
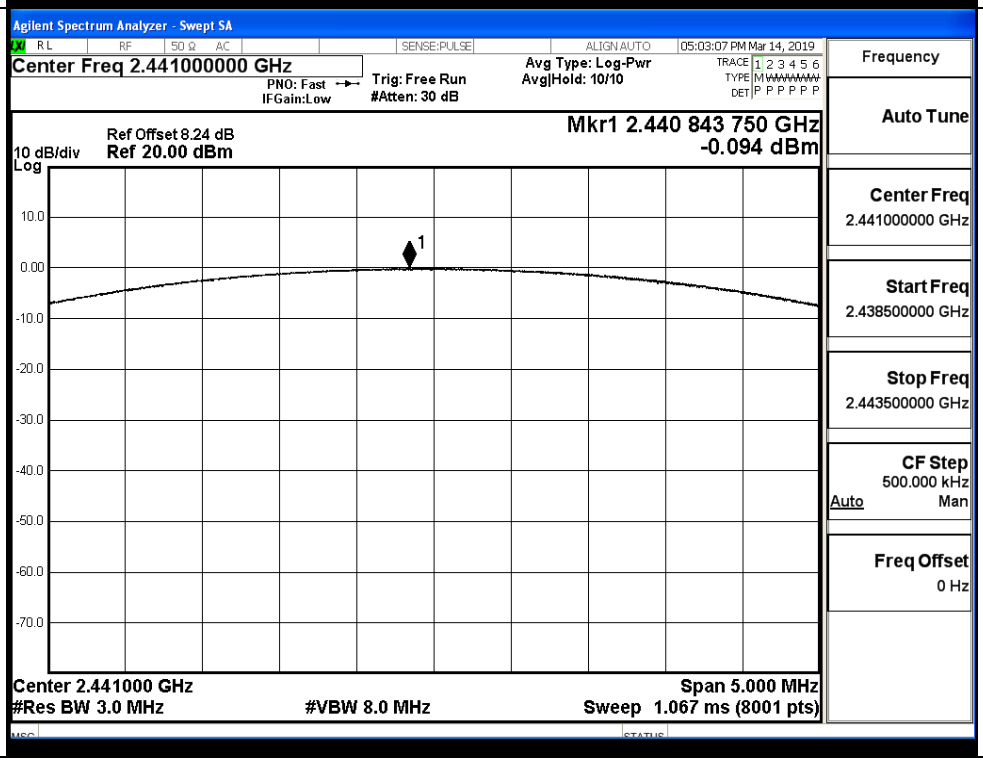
A.1 Maxmum Conducted Peak Output Power

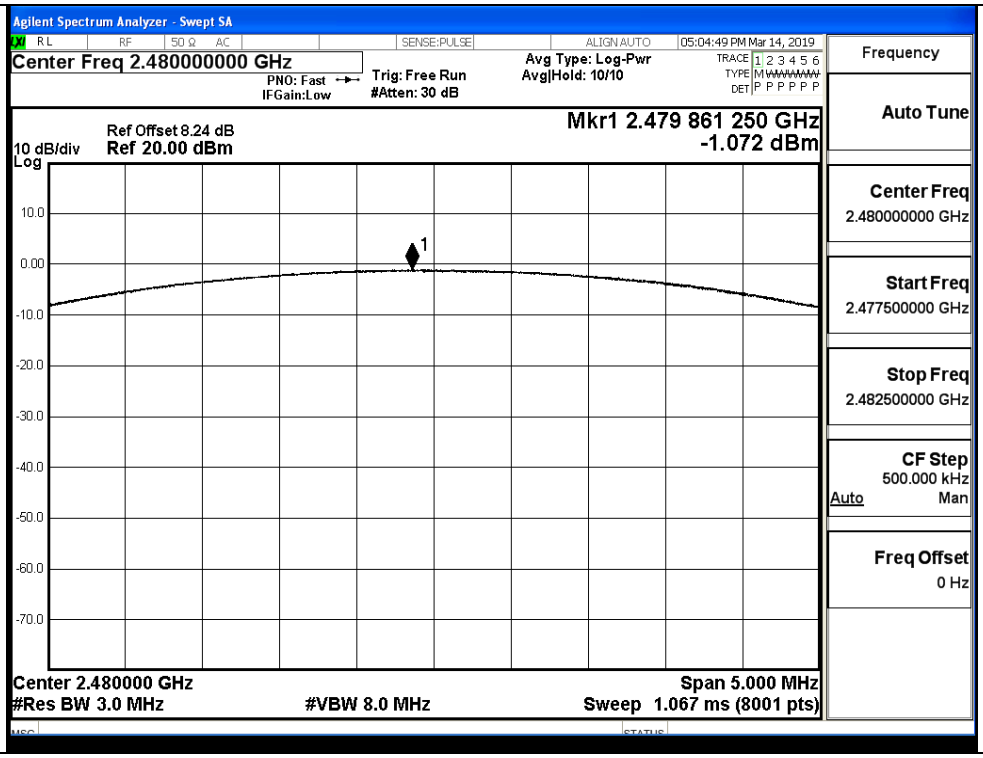
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.609	21	PASS
	MCH	0.352	21	PASS
	HCH	-0.514	21	PASS
π/4DQPSK	LCH	-1.245	21	PASS
	MCH	-0.255	21	PASS
	HCH	-1.234	21	PASS
8DPSK	LCH	-1.108	21	PASS
	MCH	-0.094	21	PASS
	HCH	-1.072	21	PASS

Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH		
π/4DQPSK/HCH		

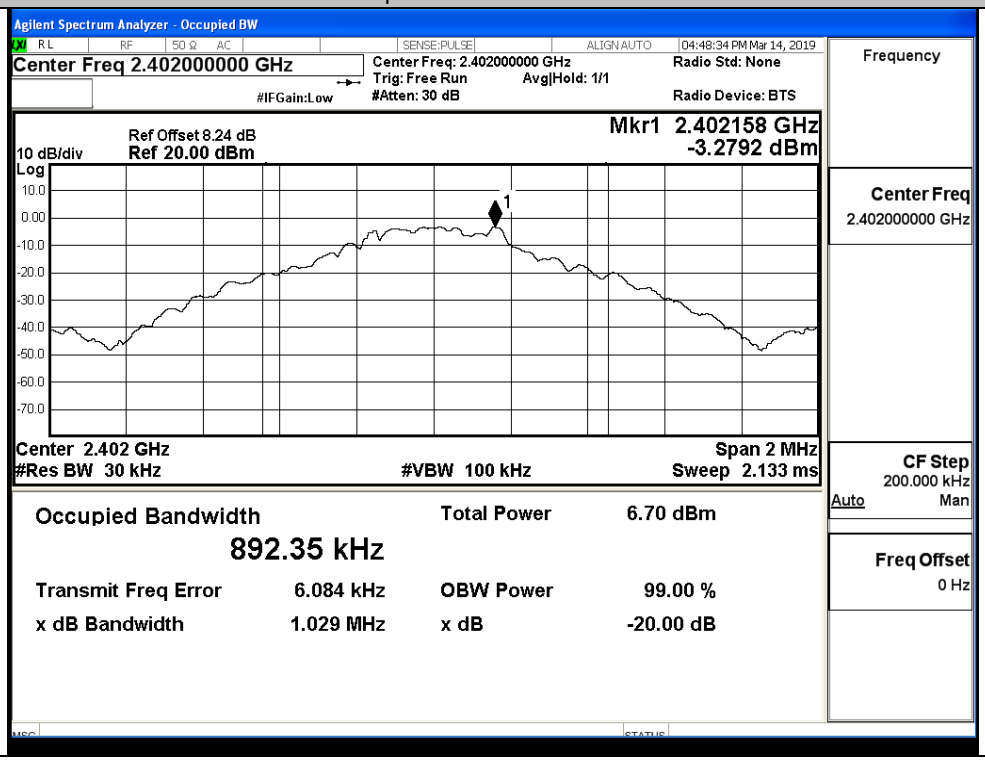
8DPSK/LCH		
8DPSK/MCH		

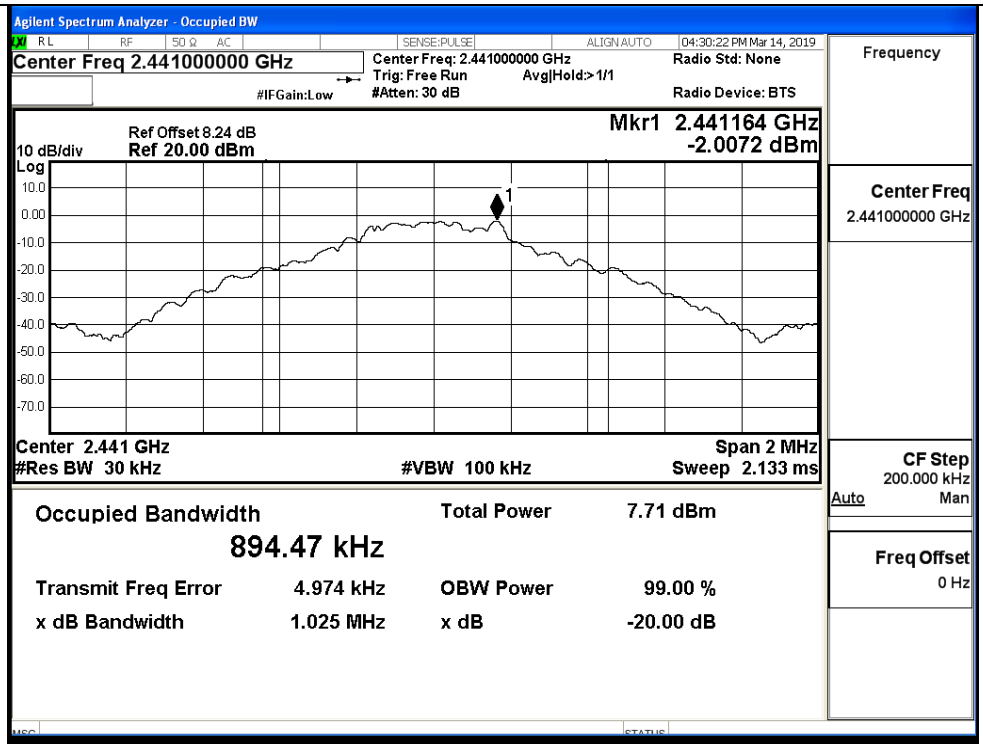
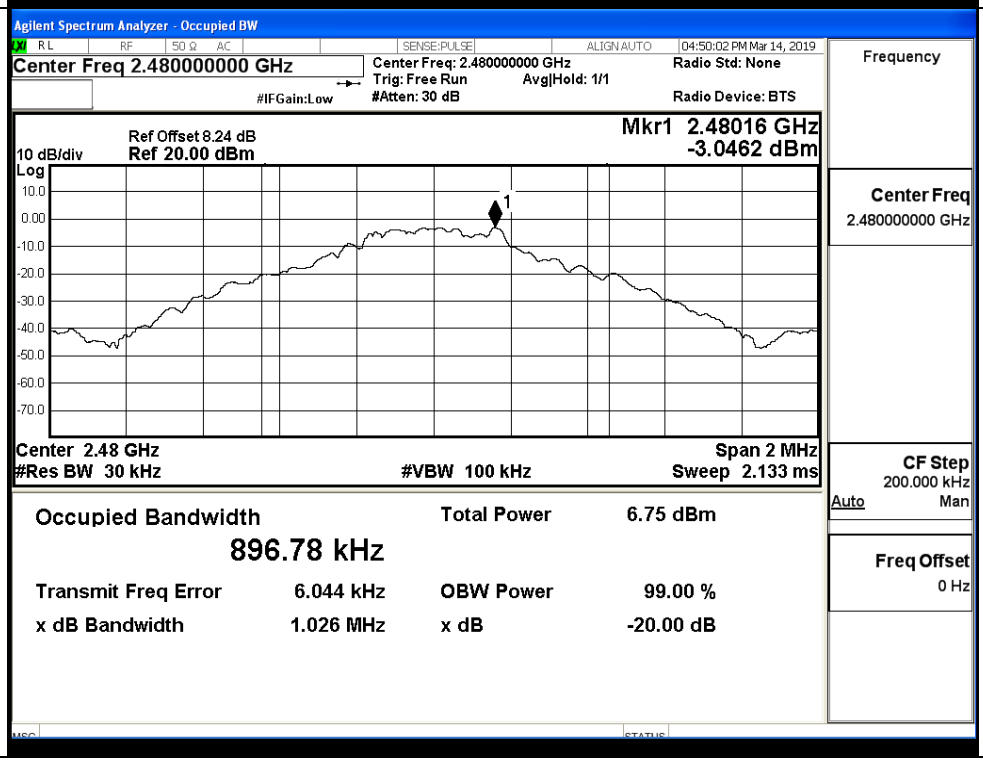
8DPSK/HCH	

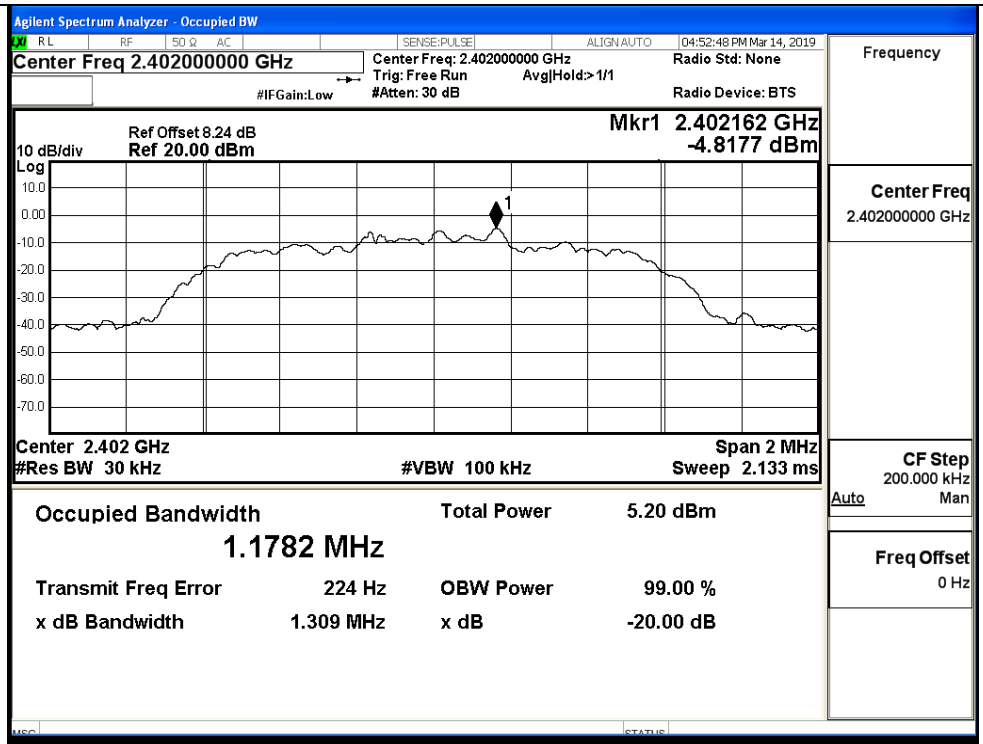
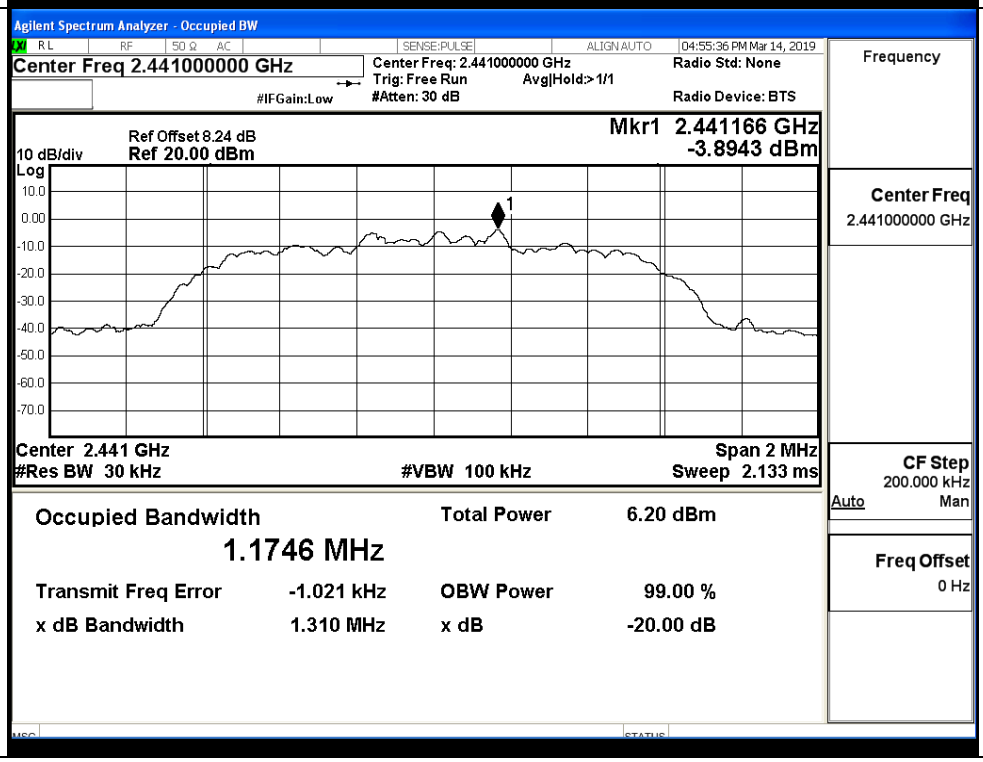
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
05:04:49 PM Mar 14, 2019
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 861 250 GHz
-1.072 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 5.000 MHz
Sweep 1.067 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.477500000 GHz
Stop Freq
2.482500000 GHz
CF Step
500.000 kHz
Auto
Man
Freq Offset
0 Hz

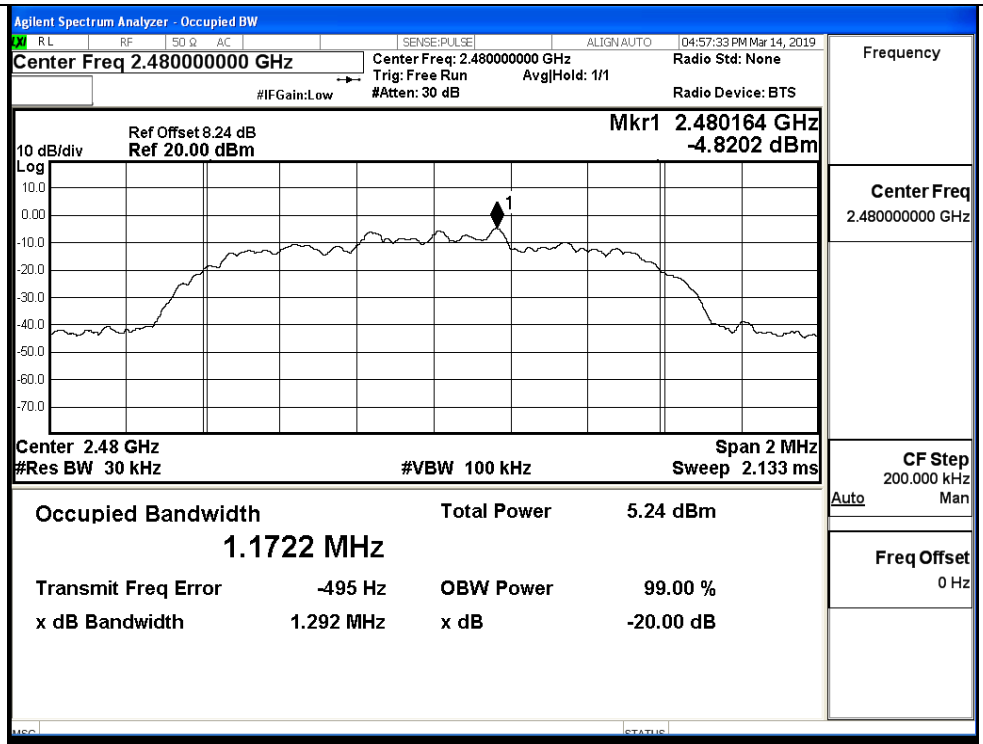
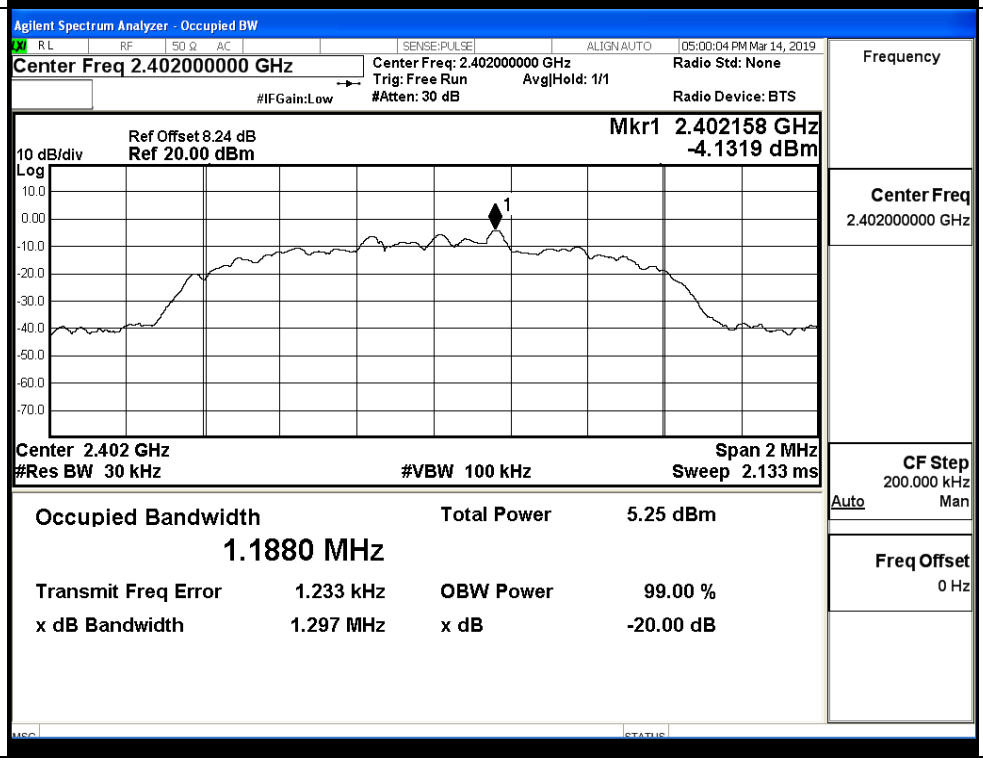
A.2 20dB Bandwidth

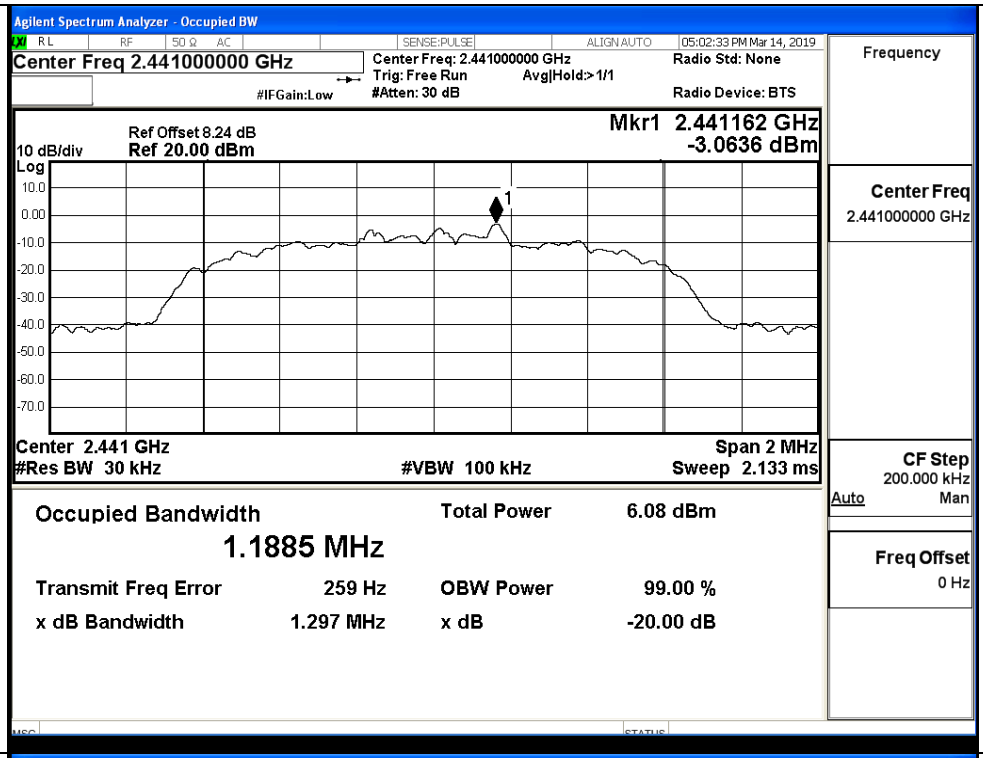
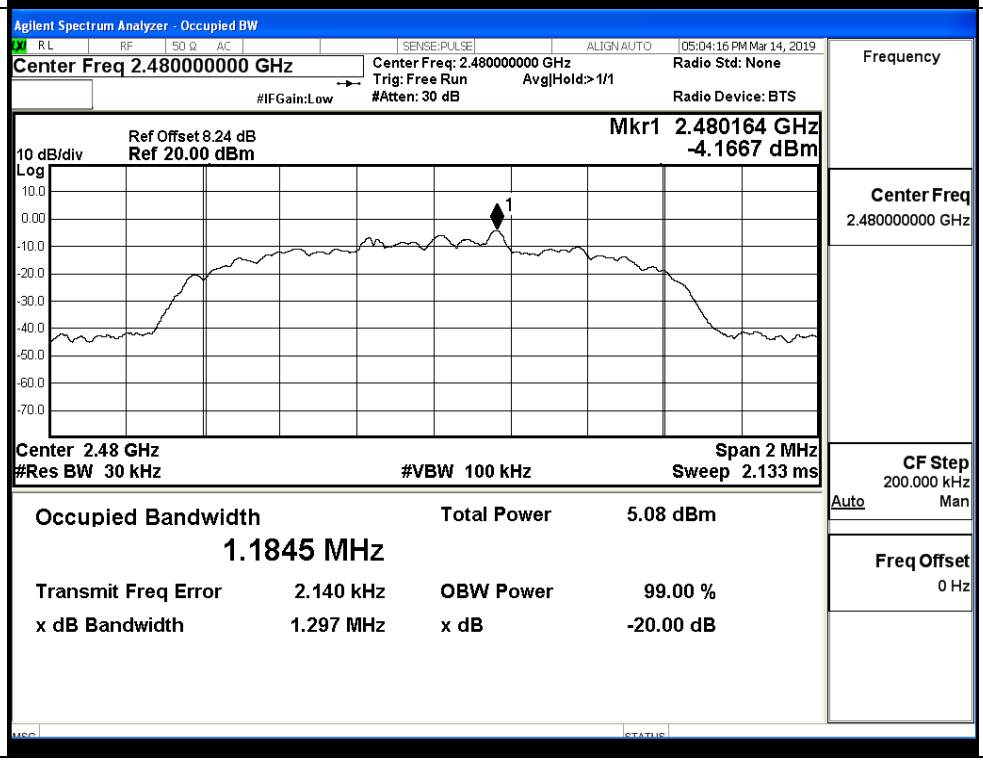
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.029	Not Specified	PASS
	MCH	1.025	Not Specified	PASS
	HCH	1.026	Not Specified	PASS
π/4DQPSK	LCH	1.309	Not Specified	PASS
	MCH	1.310	Not Specified	PASS
	HCH	1.292	Not Specified	PASS
8DPSK	LCH	1.297	Not Specified	PASS
	MCH	1.297	Not Specified	PASS
	HCH	1.297	Not Specified	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

π/4DQPSK/LCH	
π/4DQPSK/MCH	

π/4DQPSK/HCH	
8DPSK/LCH	

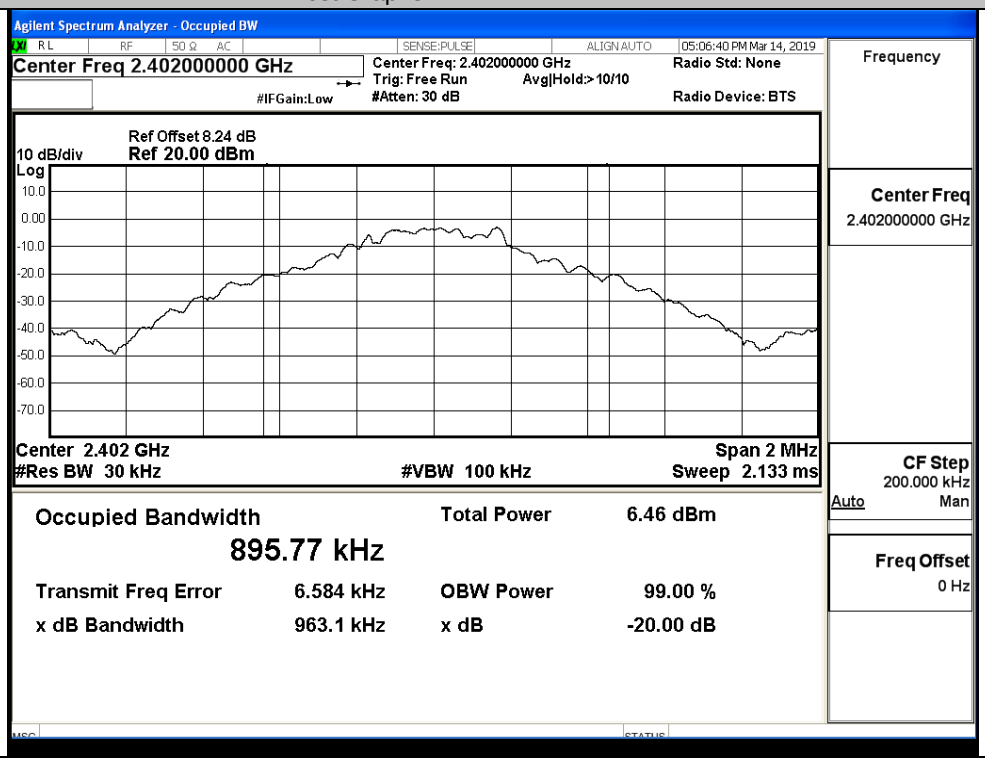
8DPSK/MCH	
8DPSK/HCH	

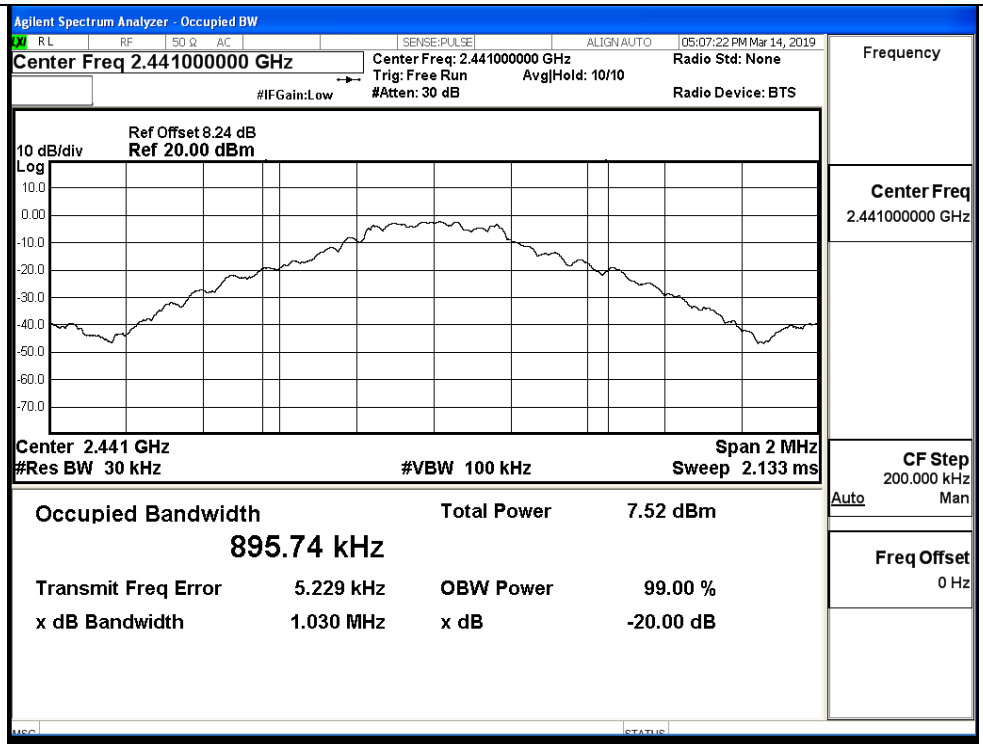
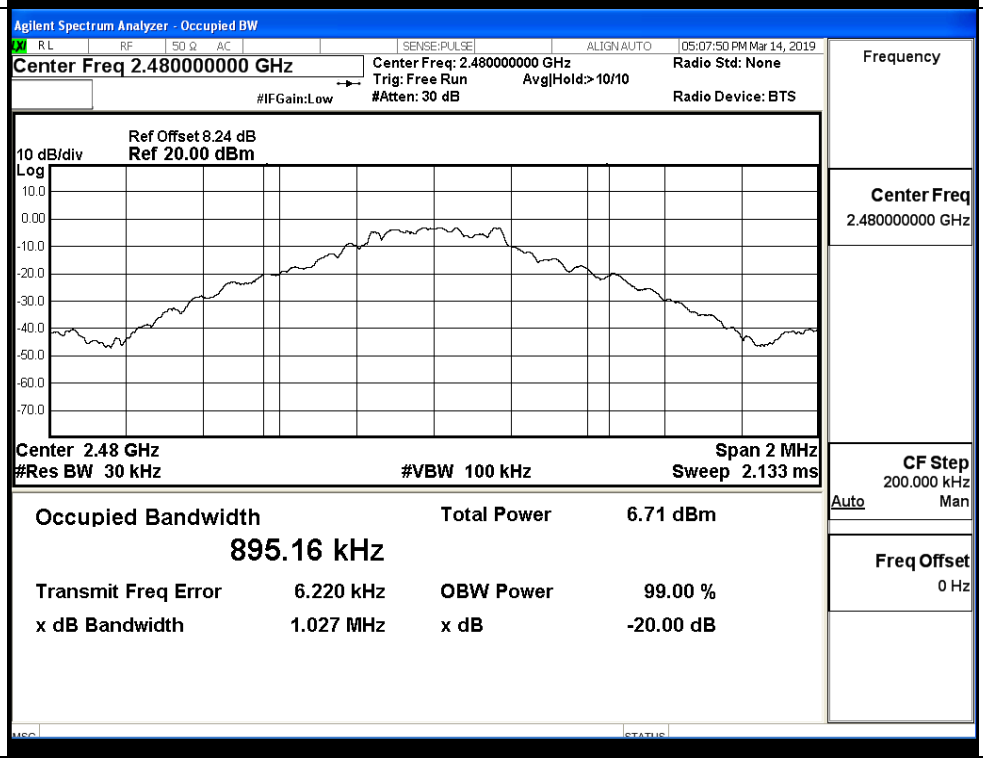
A.3 Occupied Bandwidth

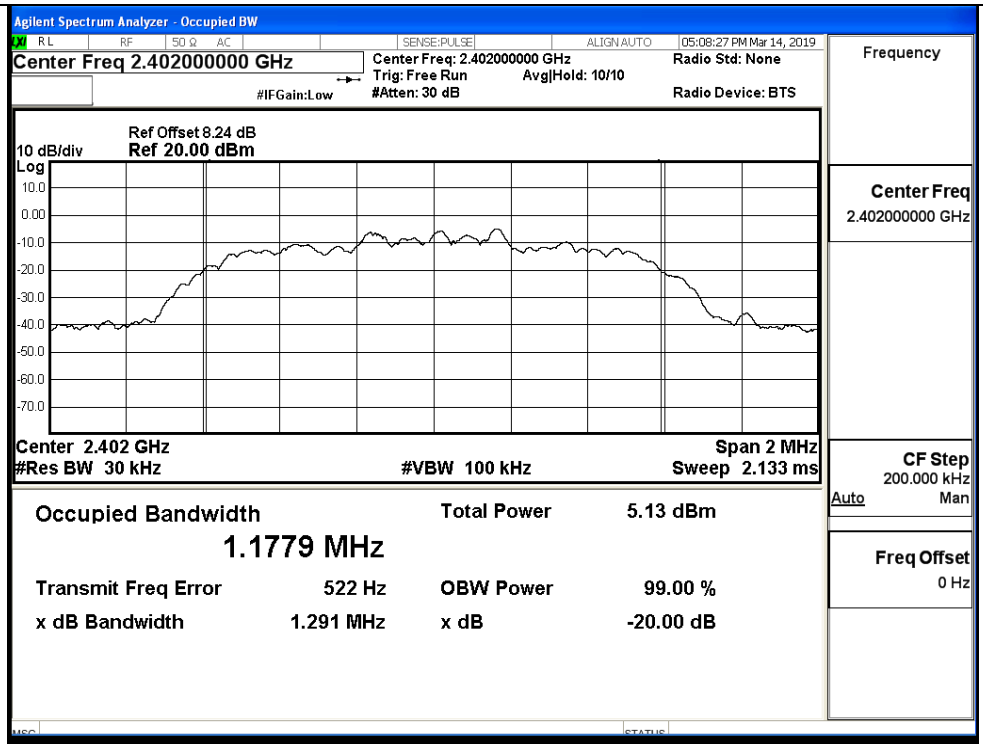
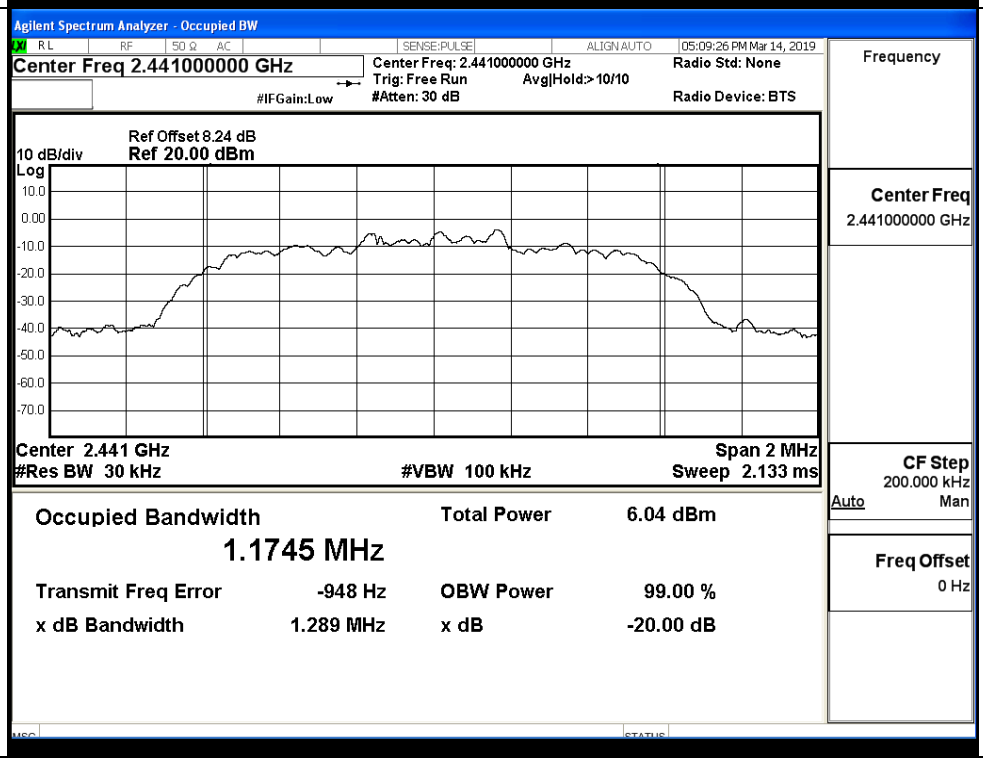
Mode	Channel.	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89577	Not Specified	PASS
	MCH	0.89574	Not Specified	PASS
	HCH	0.89516	Not Specified	PASS
π/4DQPSK	LCH	1.1779	Not Specified	PASS
	MCH	1.1745	Not Specified	PASS
	HCH	1.1747	Not Specified	PASS
8DPSK	LCH	1.1904	Not Specified	PASS
	MCH	1.1858	Not Specified	PASS
	HCH	1.1848	Not Specified	PASS

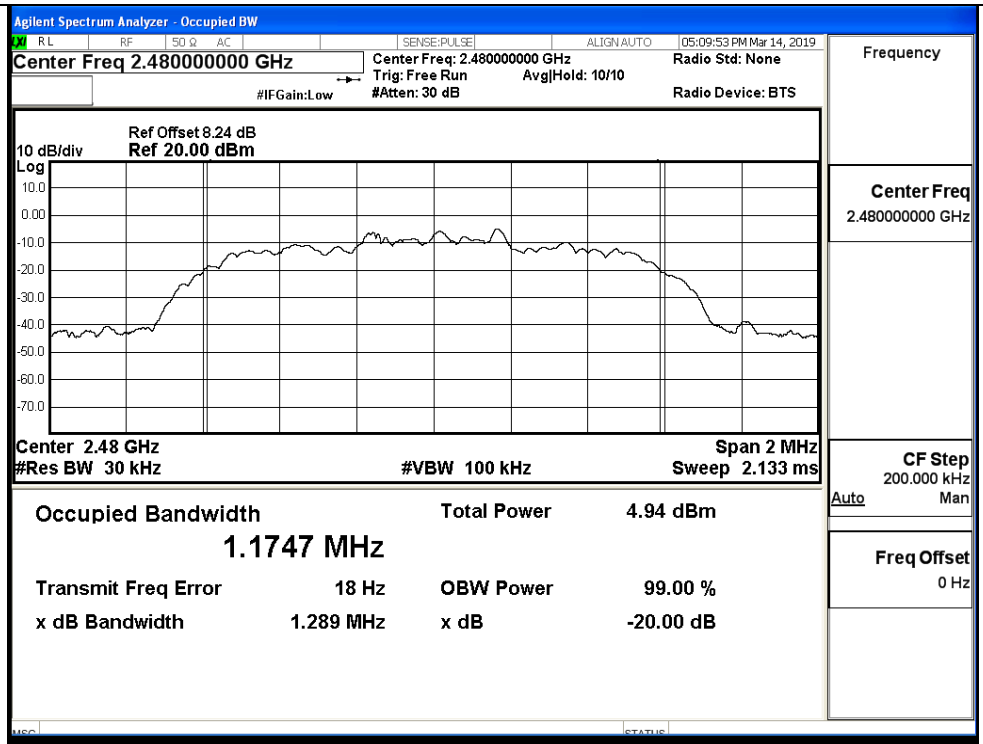
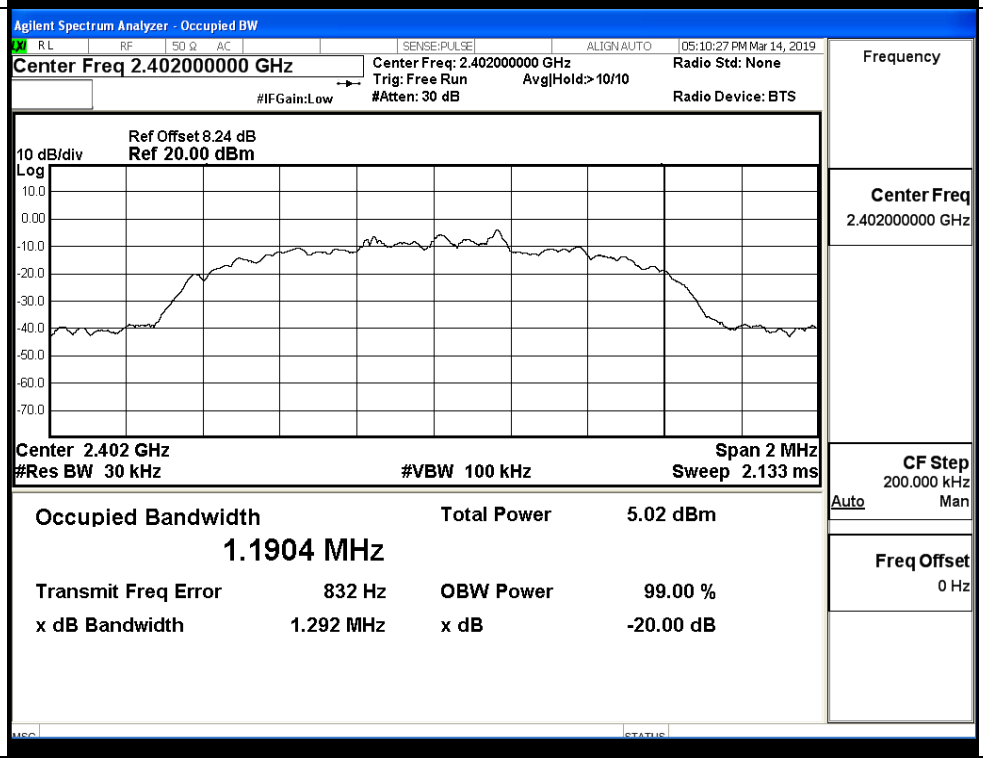
Test Graphs

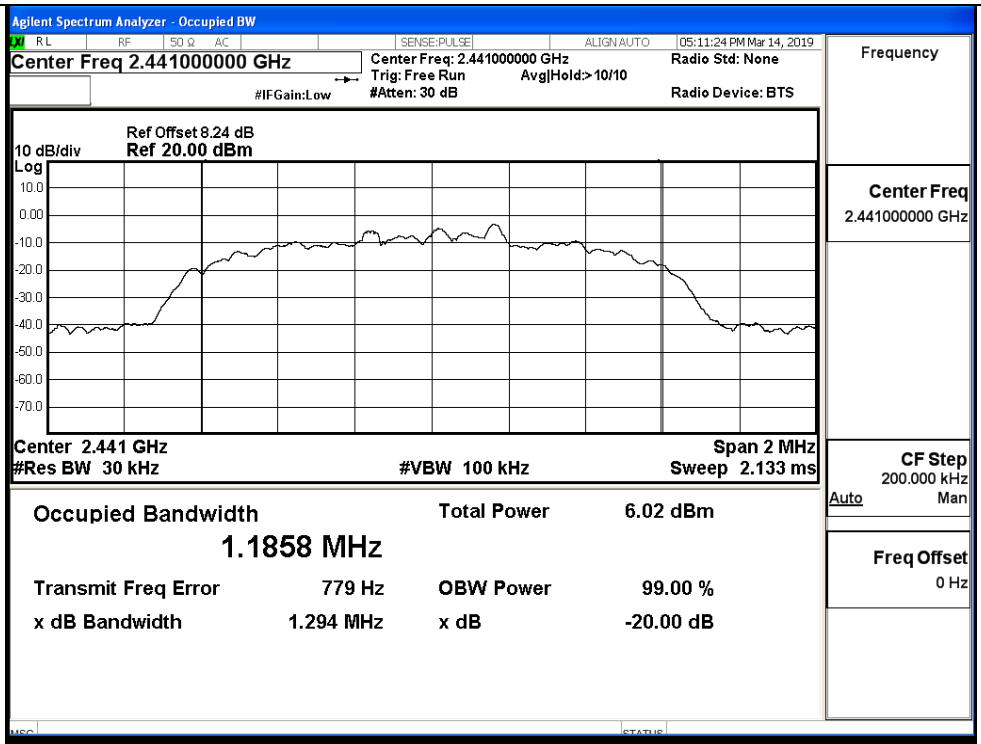
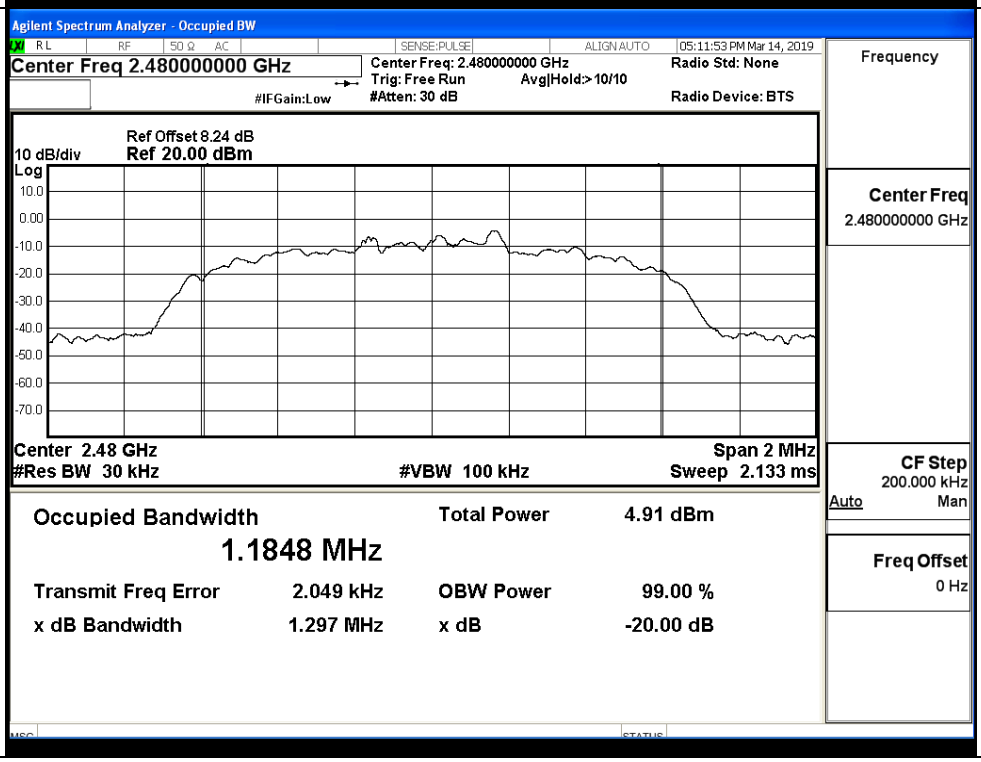
GFSK/LCH



GFSK/MCH	
GFSK/HCH	

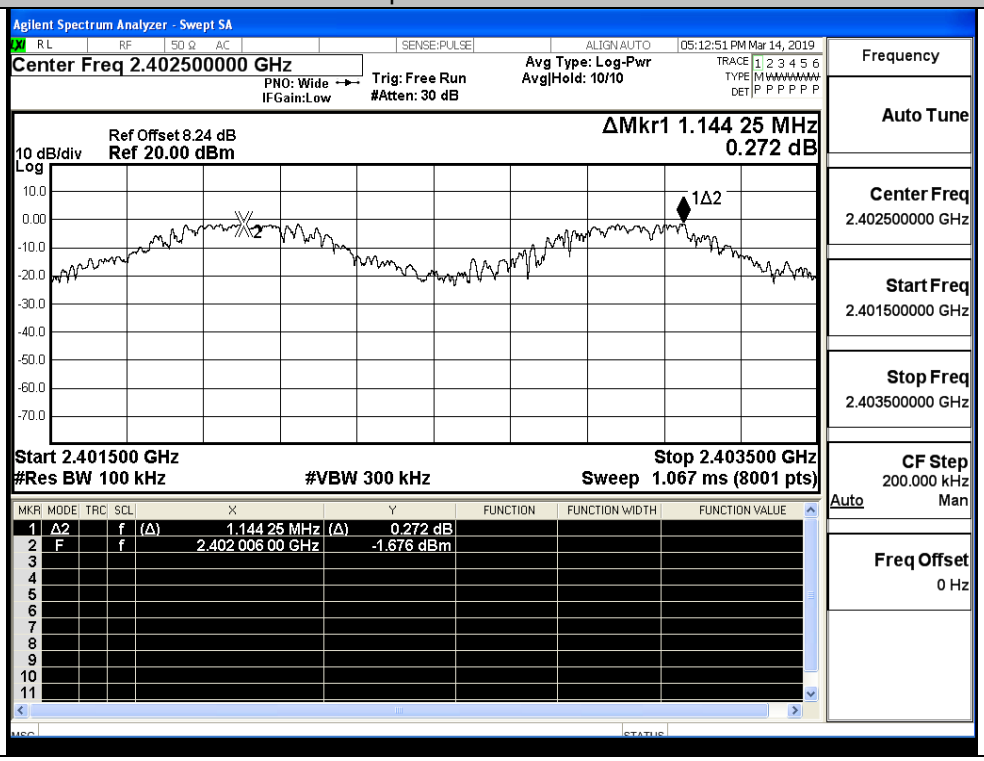
π/4DQPSK/LCH	
π/4DQPSK/MCH	

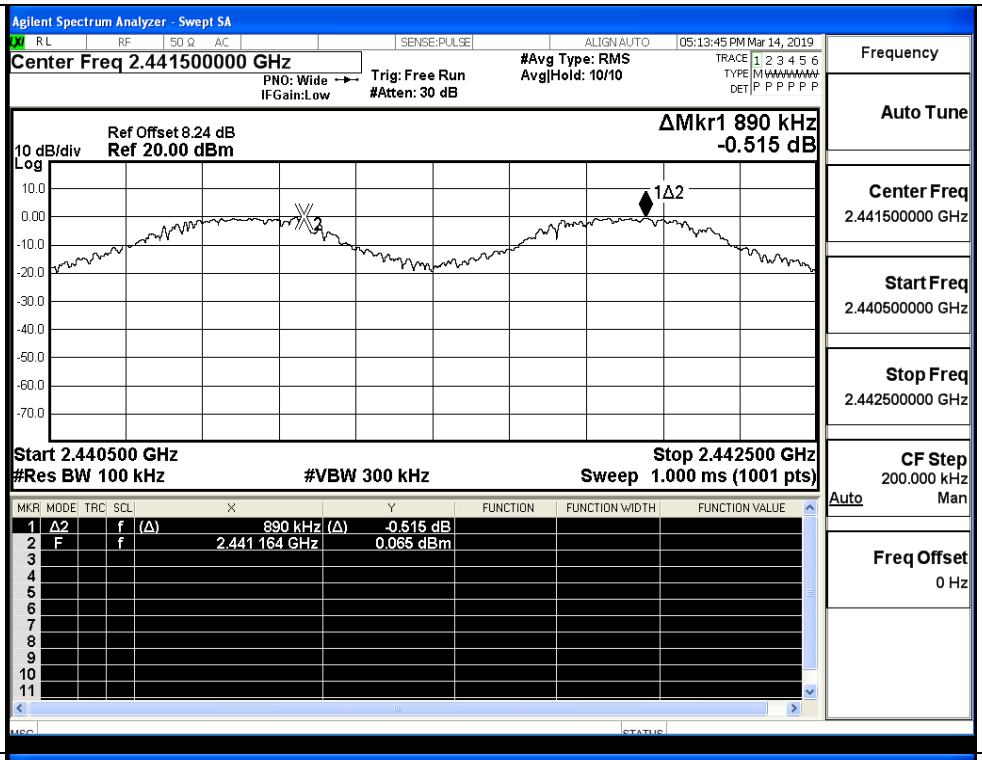
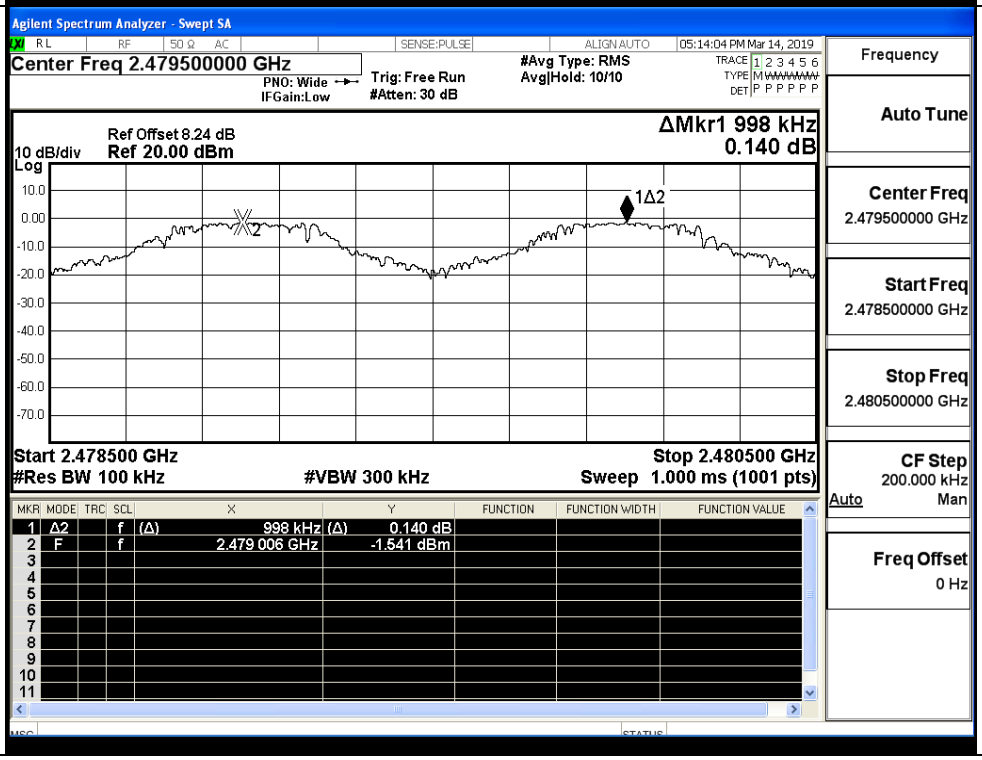
π/4DQPSK/HCH	
8DPSK/LCH	

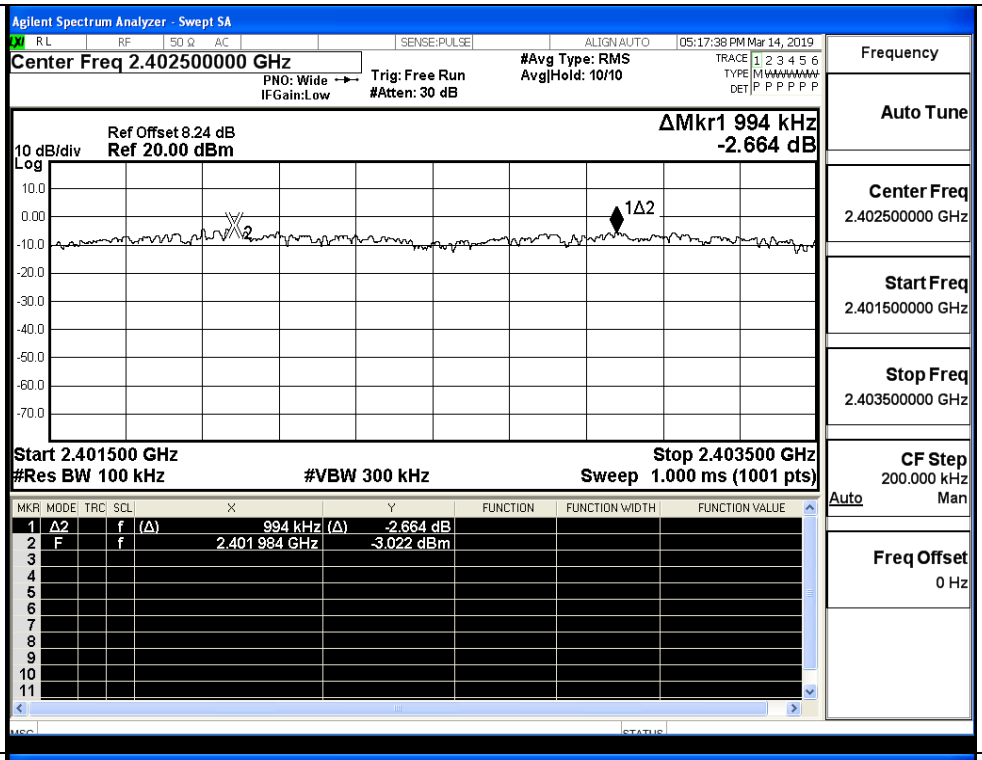
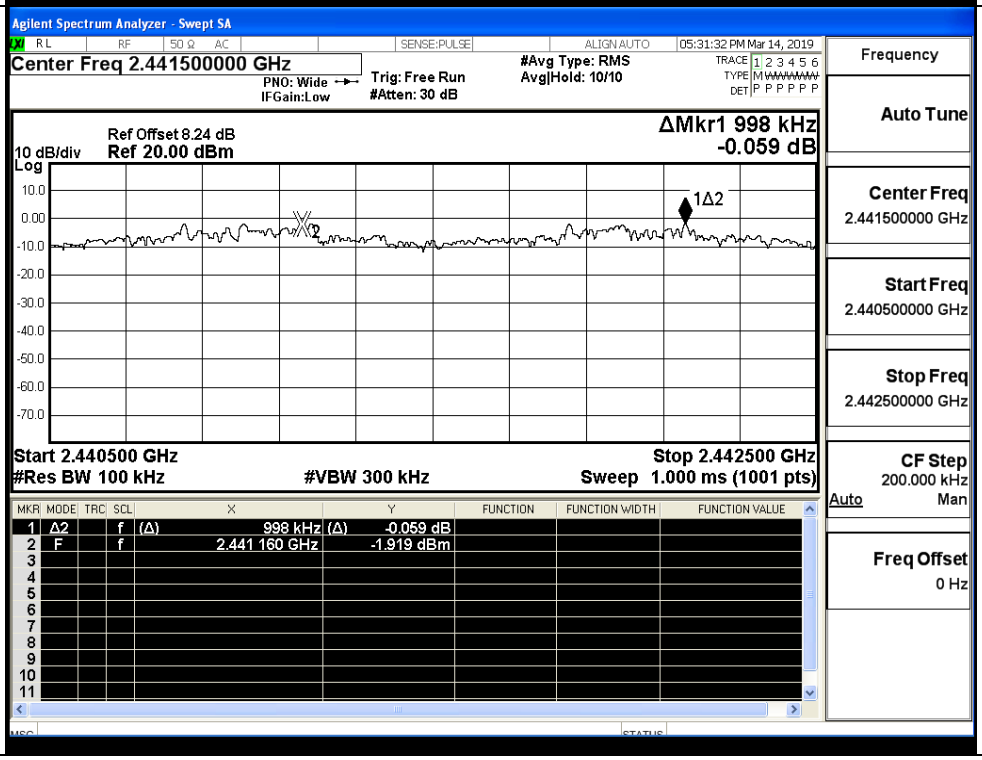
8DPSK/MCH	
8DPSK/HCH	

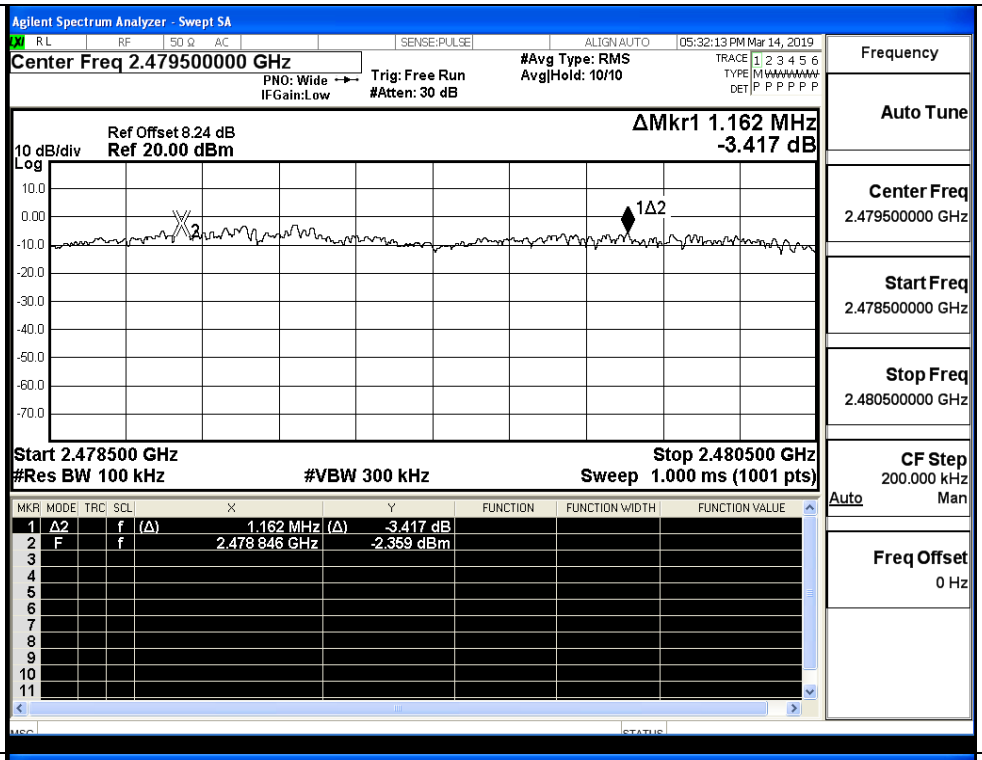
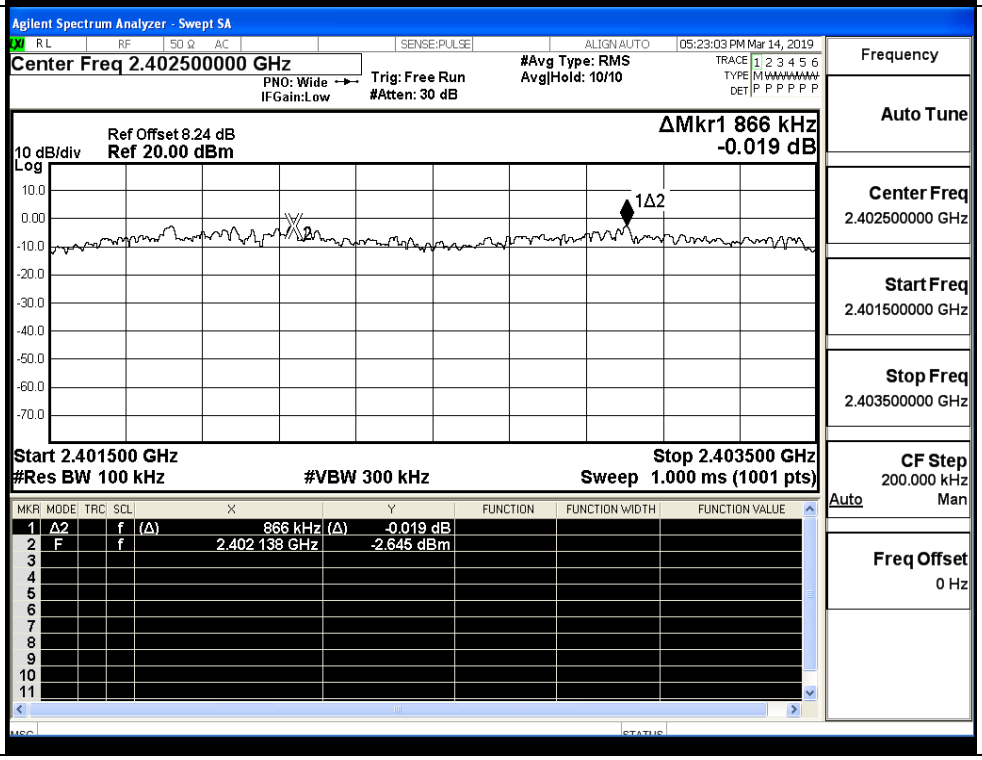
A.4 Carrier Frequency Separation

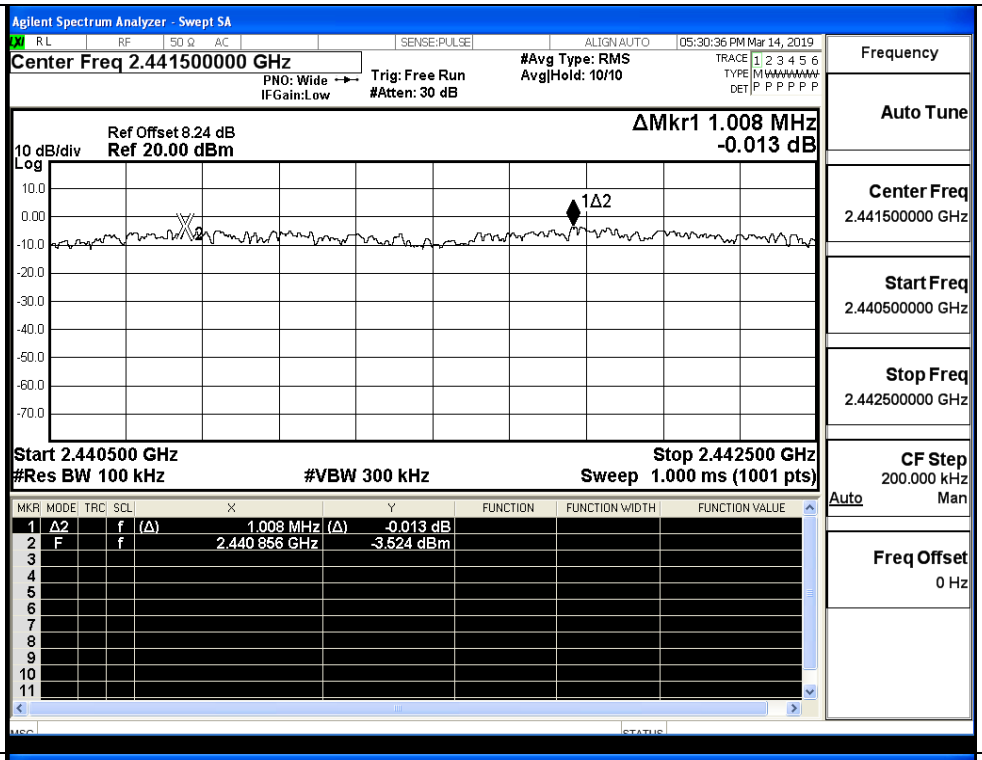
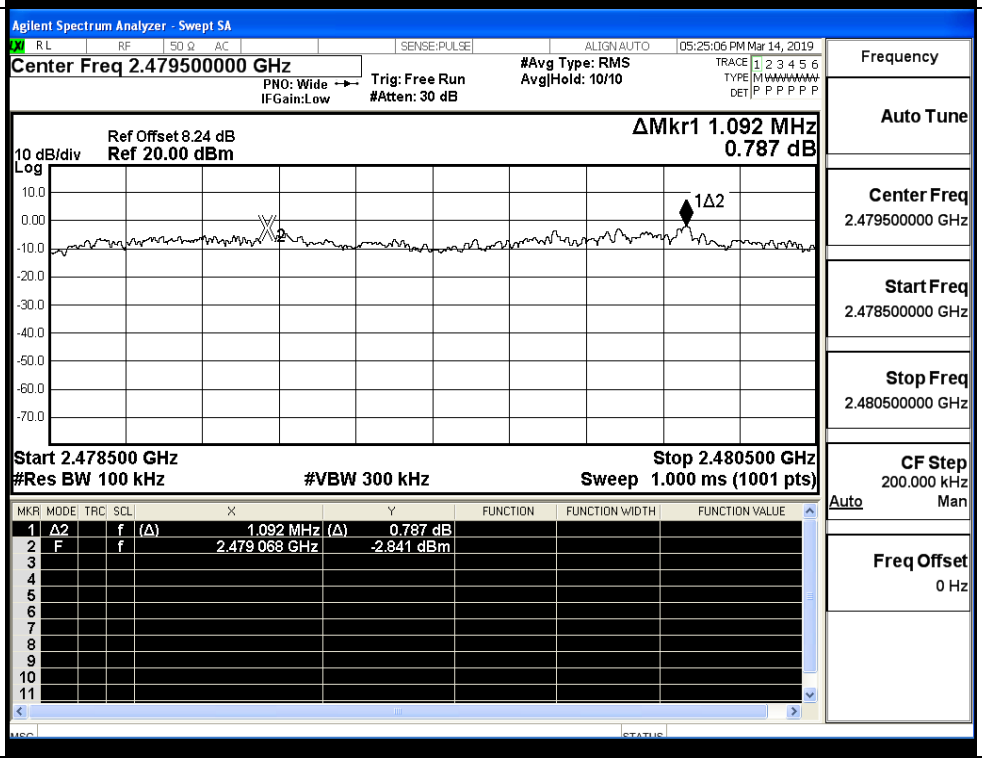
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.144	0.686	PASS
	MCH	0.890	0.686	PASS
	HCH	0.998	0.686	PASS
π/4DQPSK	LCH	0.994	0.873	PASS
	MCH	0.998	0.873	PASS
	HCH	1.162	0.873	PASS
8DPSK	LCH	0.866	0.865	PASS
	MCH	1.008	0.865	PASS
	HCH	1.092	0.865	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

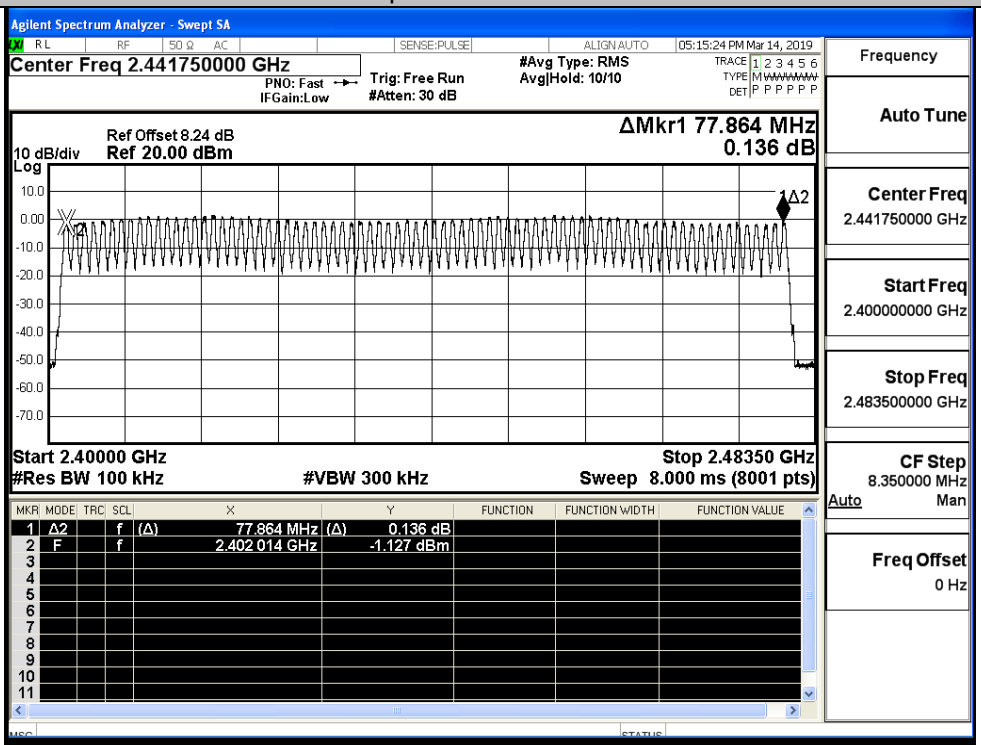
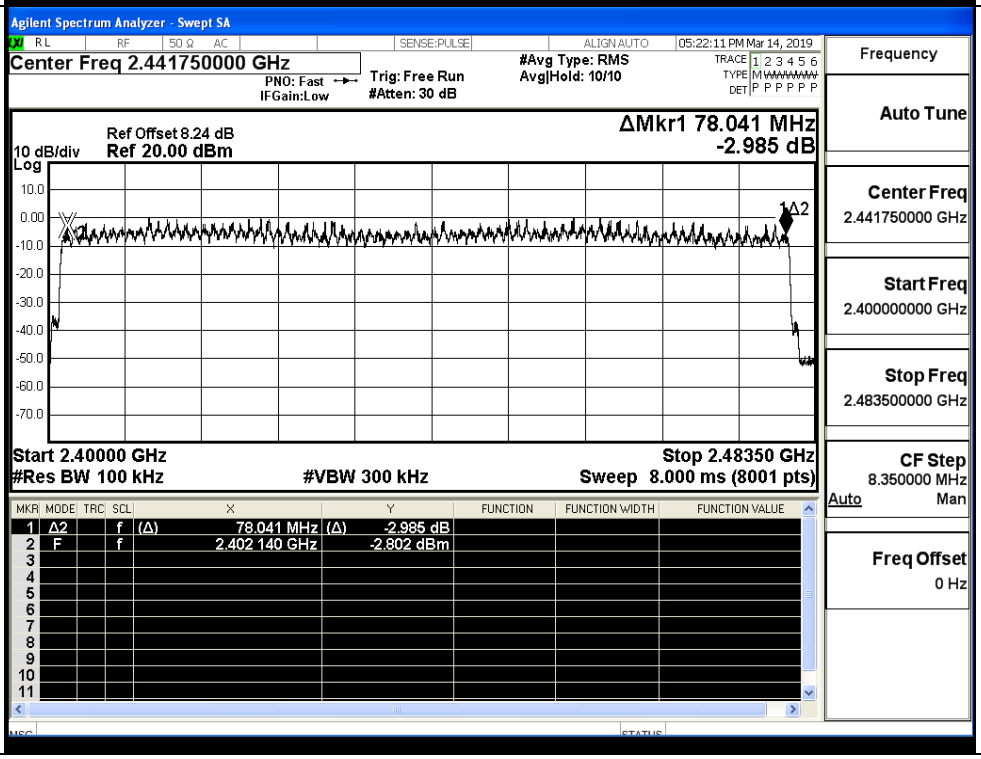
π/4DQPSK/LCH	
π/4DQPSK/MCH	

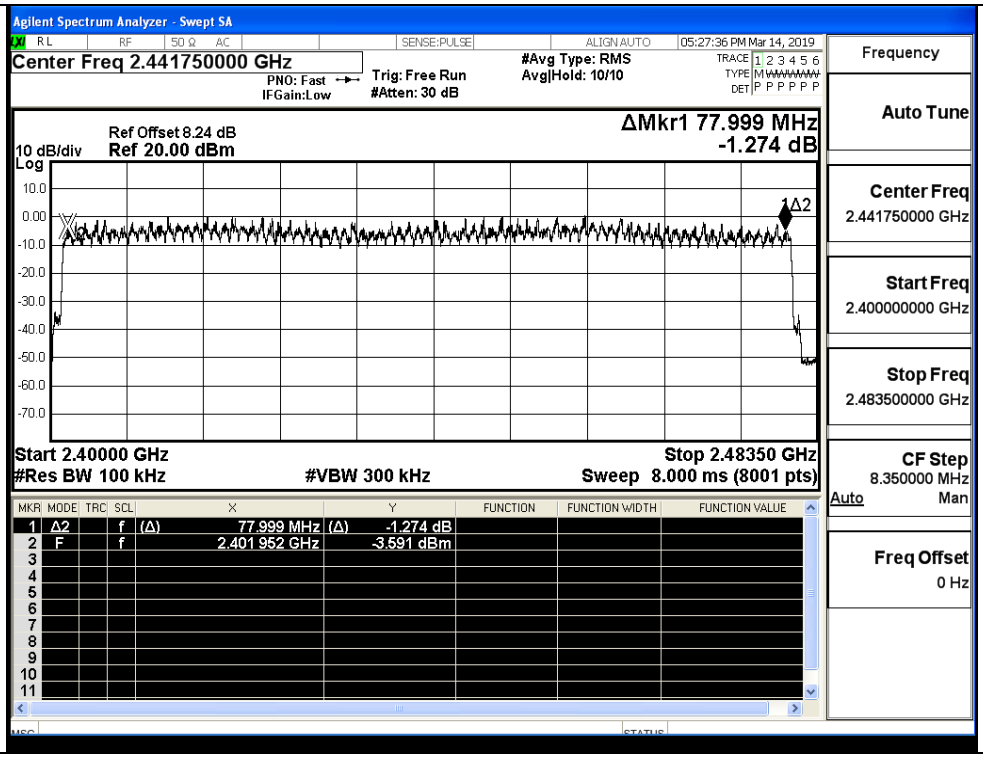
π/4DQPSK/HCH	
8DPSK/LCH	

8DPSK/MCH	
8DPSK/HCH	

A.5 Hopping Channel Number

Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs		
GFSK/Hop		
π/4DQPSK/Hop		

8DPSK/Hop	

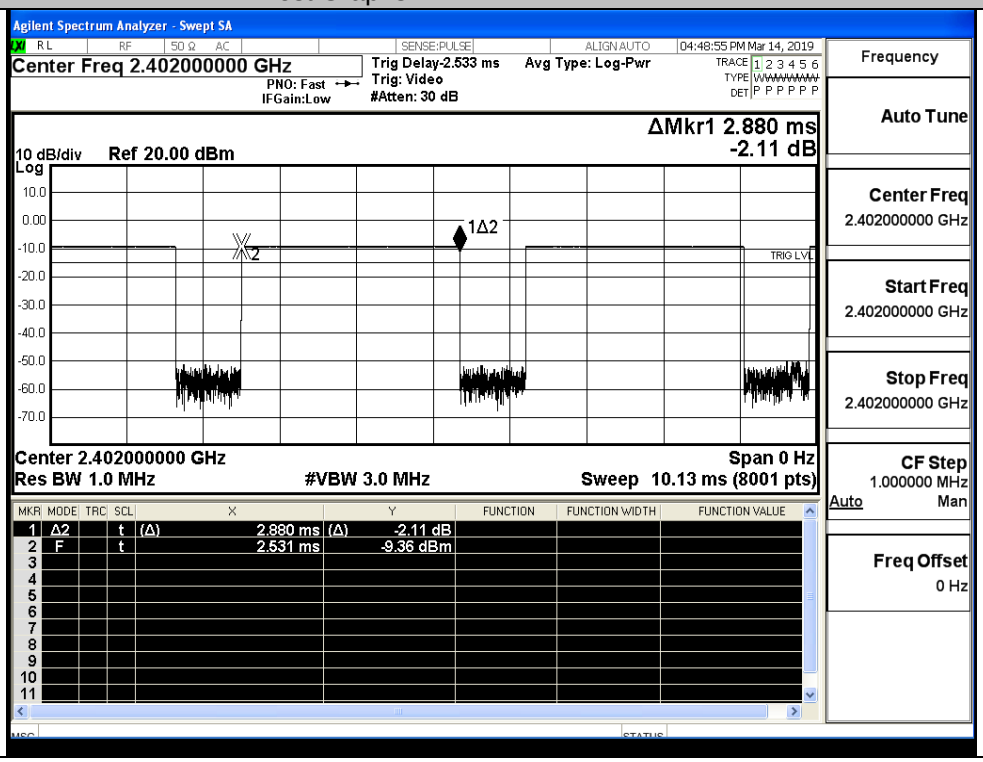
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
05:27:36 PM Mar 14, 2019
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr1 77.999 MHz
-1.274 dB
1Δ2
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (8001 pts)
1 Δ2 f (Δ) 77.999 MHz (Δ) -1.274 dB
2 F f 2.401 952 GHz -3.591 dBm
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz

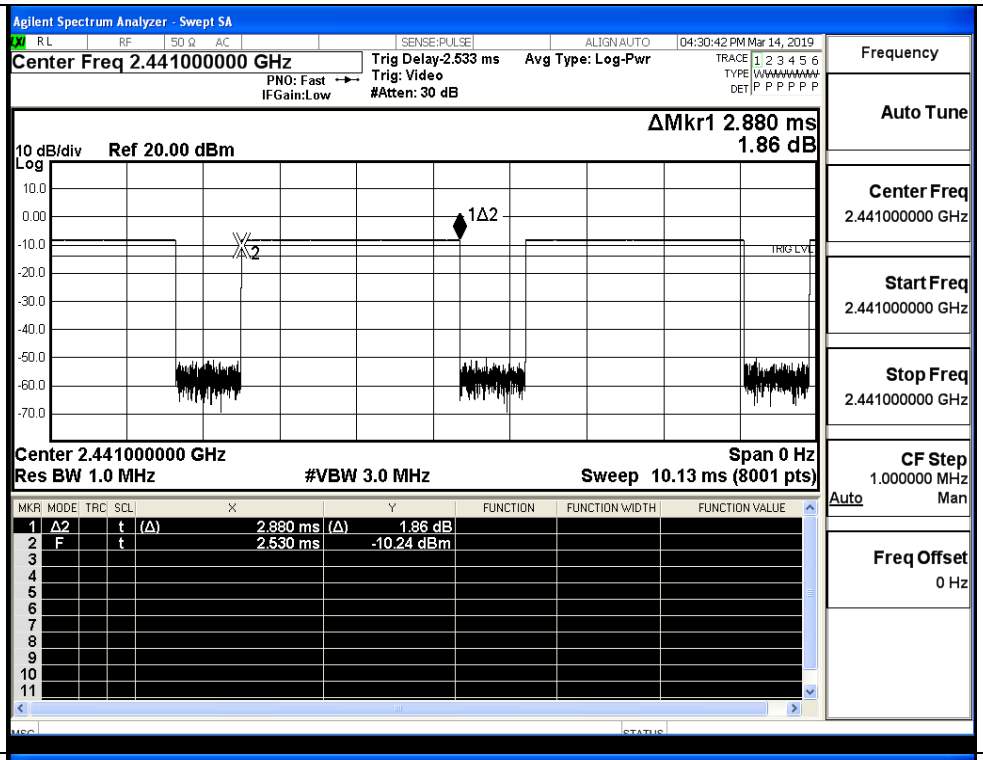
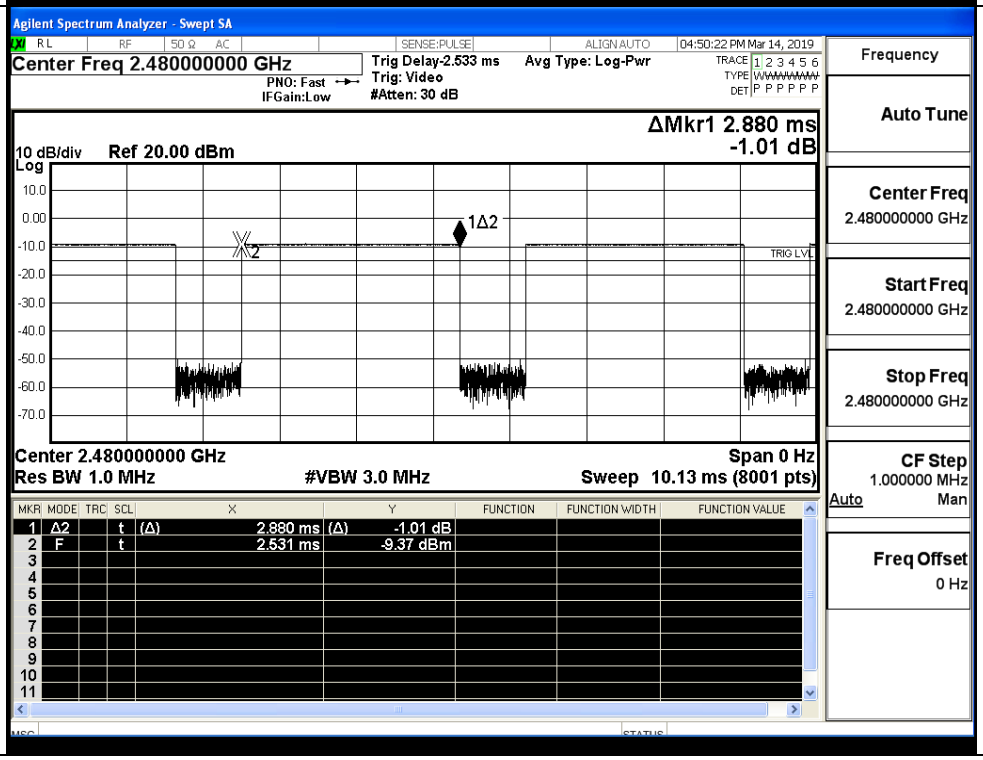
A.6 Dwell Time

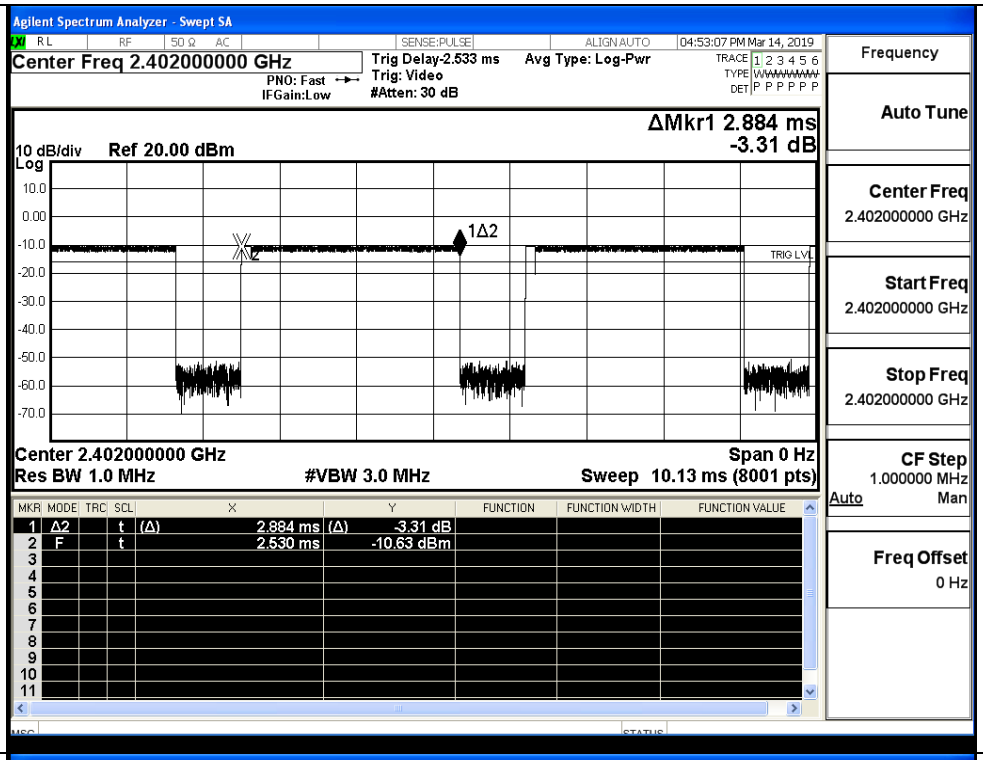
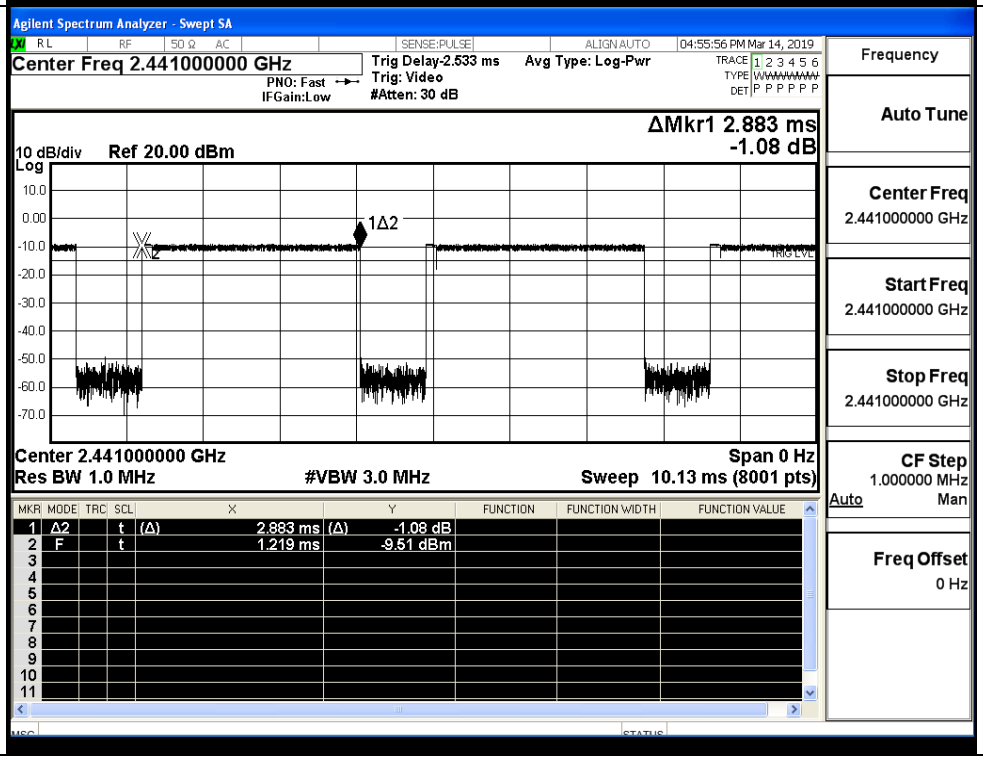
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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

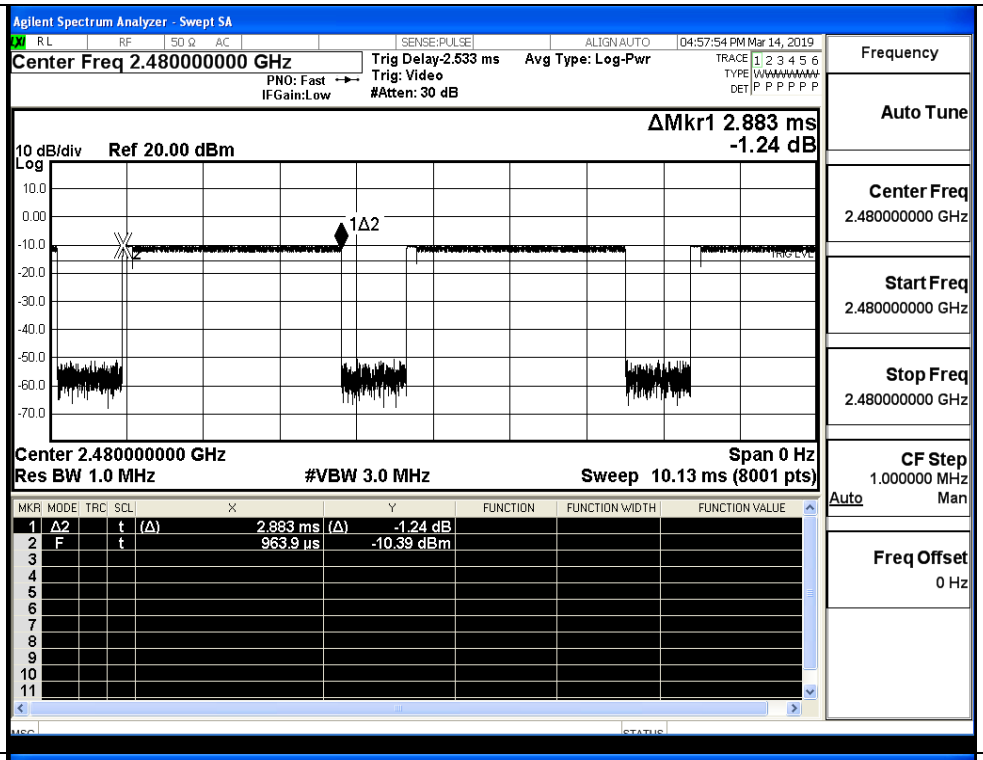
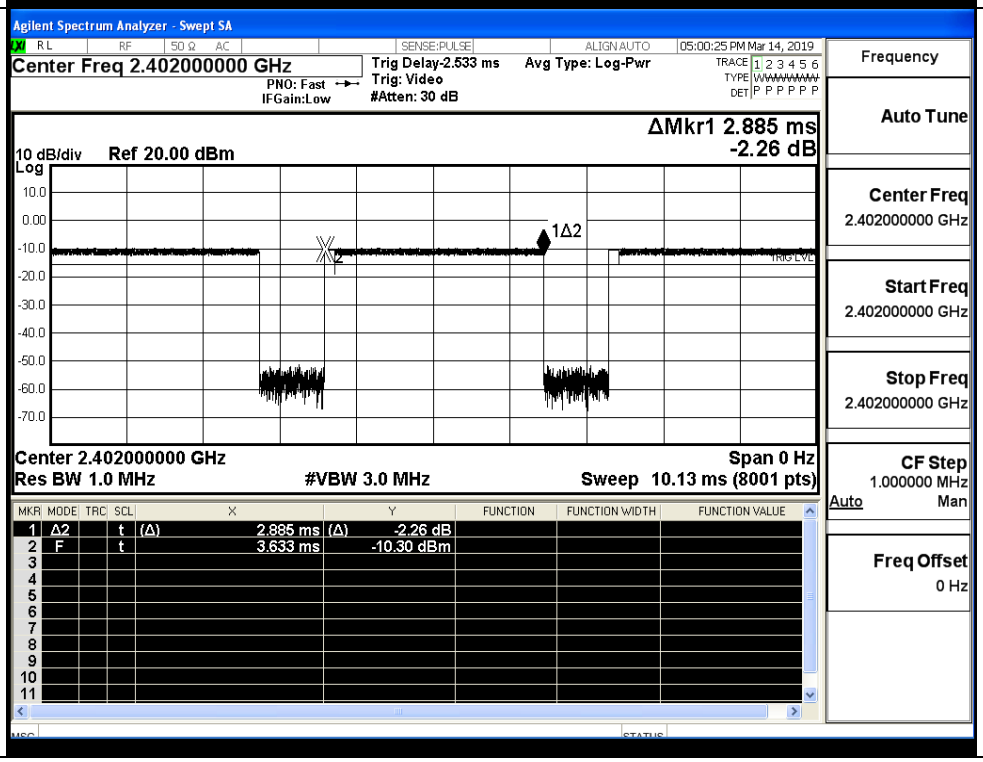
Test Graphs

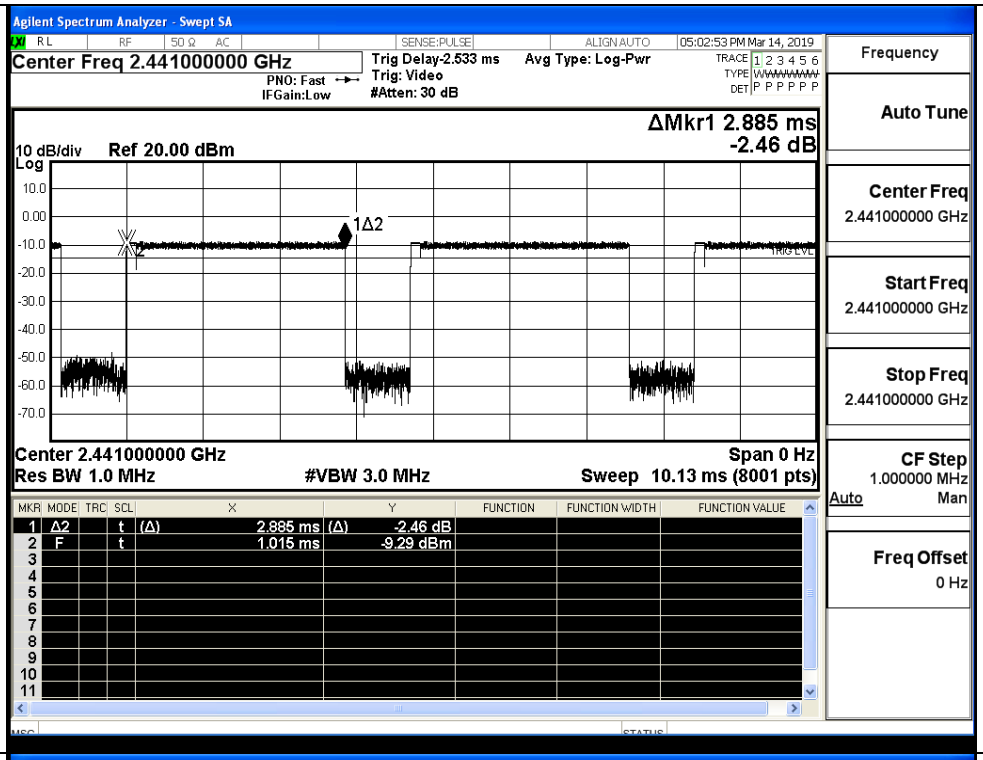
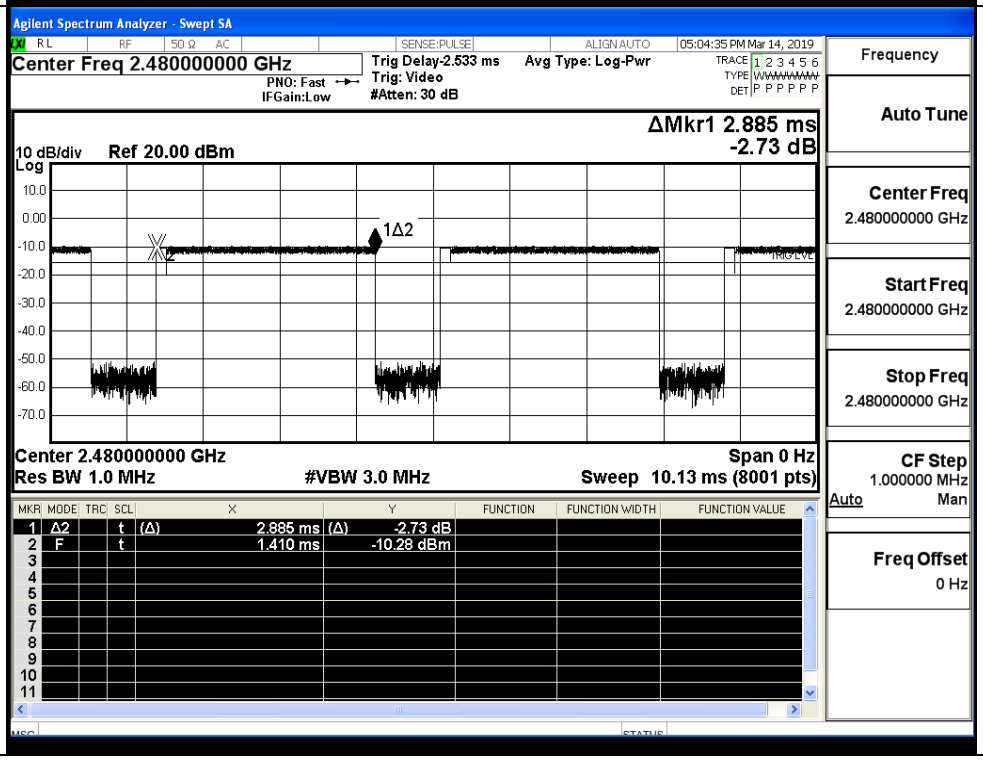
GFSK_DH5/LCH



GFSK_DH5/MCH	
GFSK_DH5/HCH	

π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

π/4DQPSK _2DH5/HCH	
8DPSK _3DH5/LCH	

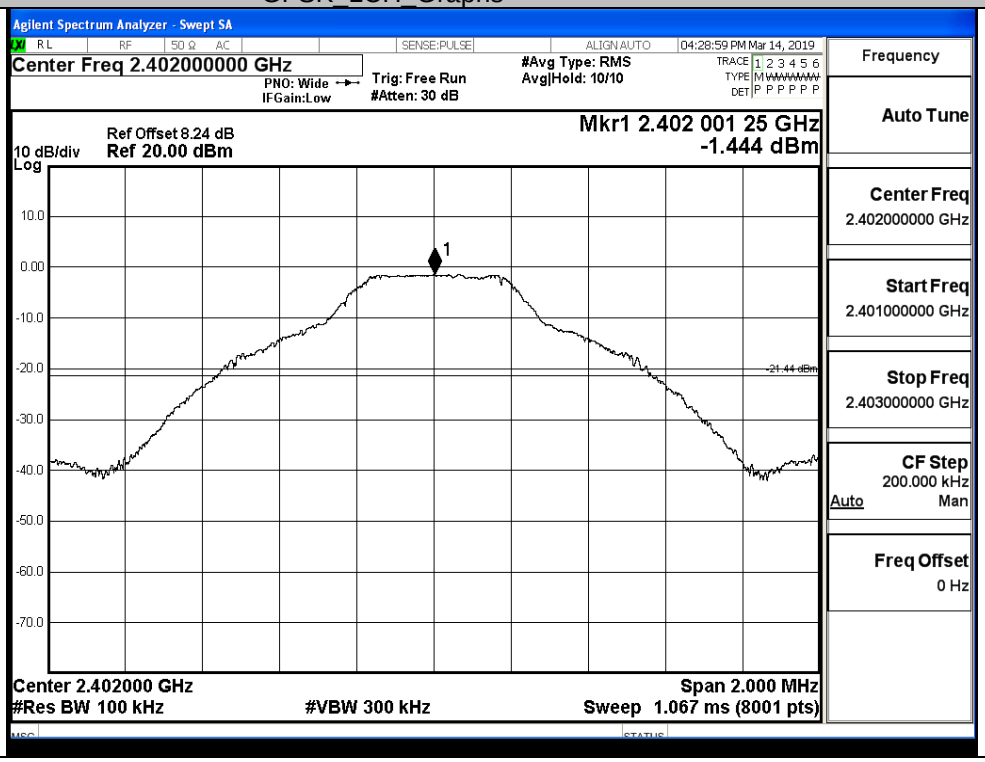
8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

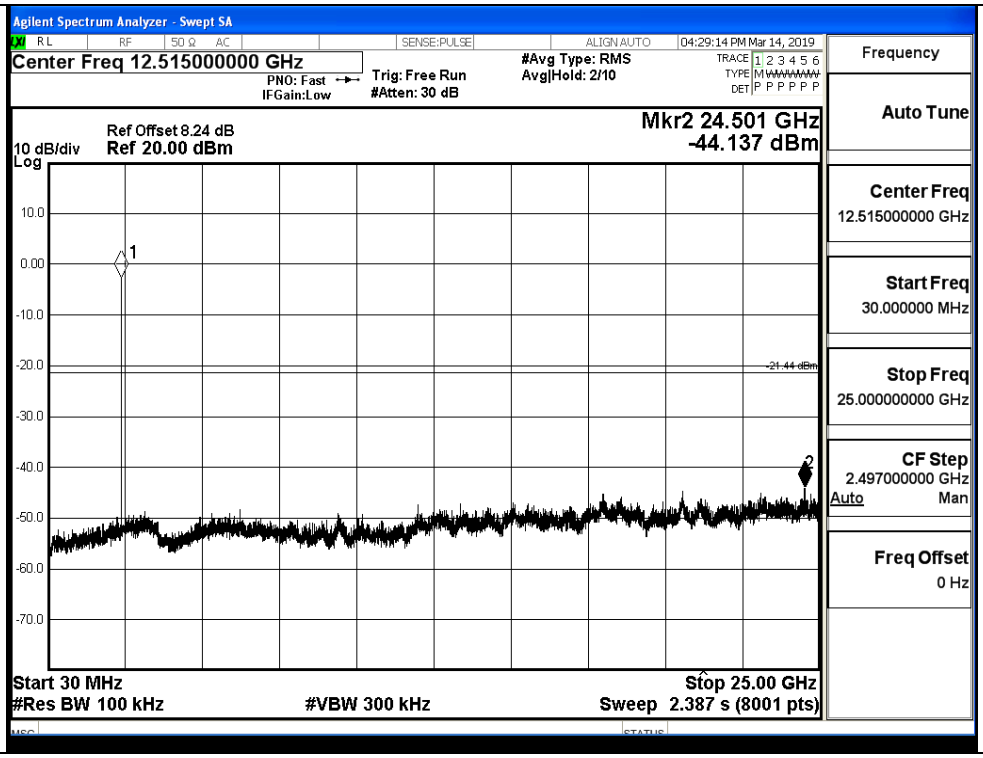
A.7 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.444	-44.137	-21.444	PASS
	MCH	0.018	-44.615	-19.982	PASS
	HCH	-1.105	-44.760	-21.105	PASS
π/4DQPSK	LCH	-2.676	-44.075	-22.676	PASS
	MCH	-1.076	-45.021	-21.076	PASS
	HCH	-2.117	-44.185	-22.117	PASS
8DPSK	LCH	-1.958	-44.401	-21.958	PASS
	MCH	-1.07	-29.181	-21.070	PASS
	HCH	-2.031	-44.687	-22.031	PASS

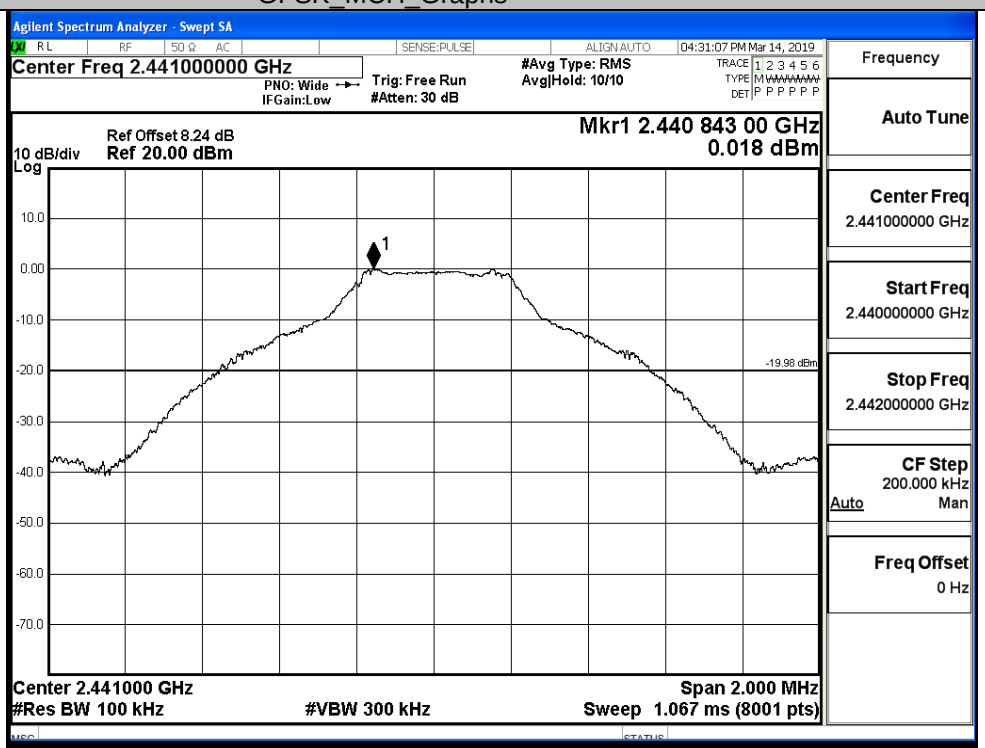
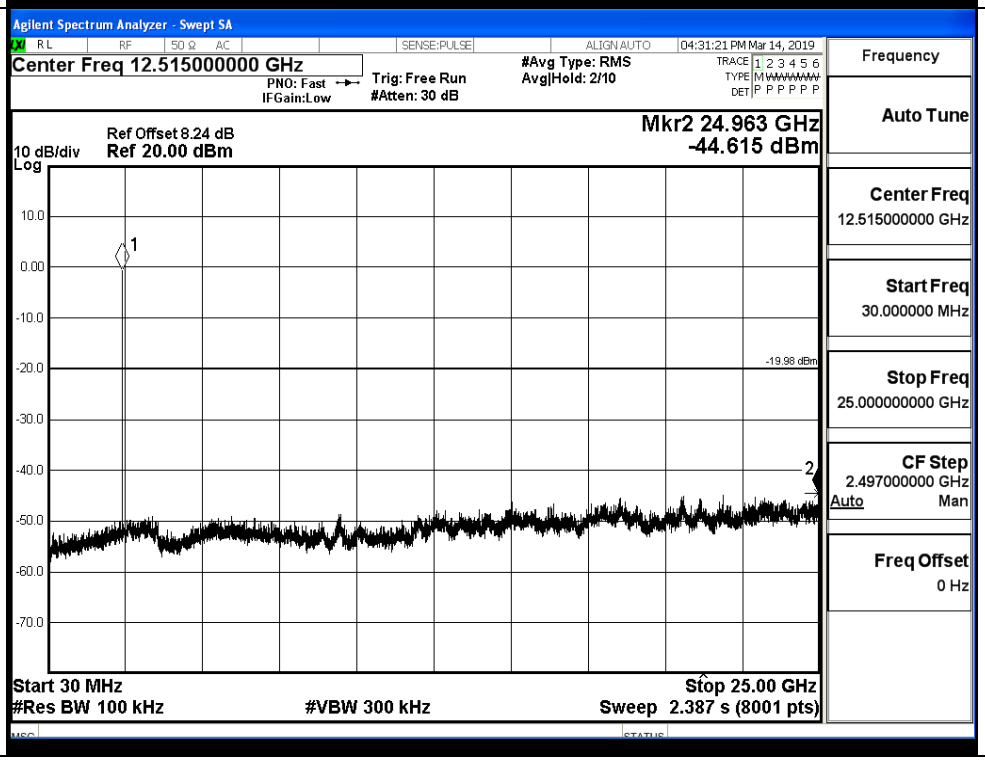
GFSK_LCH_Graphs

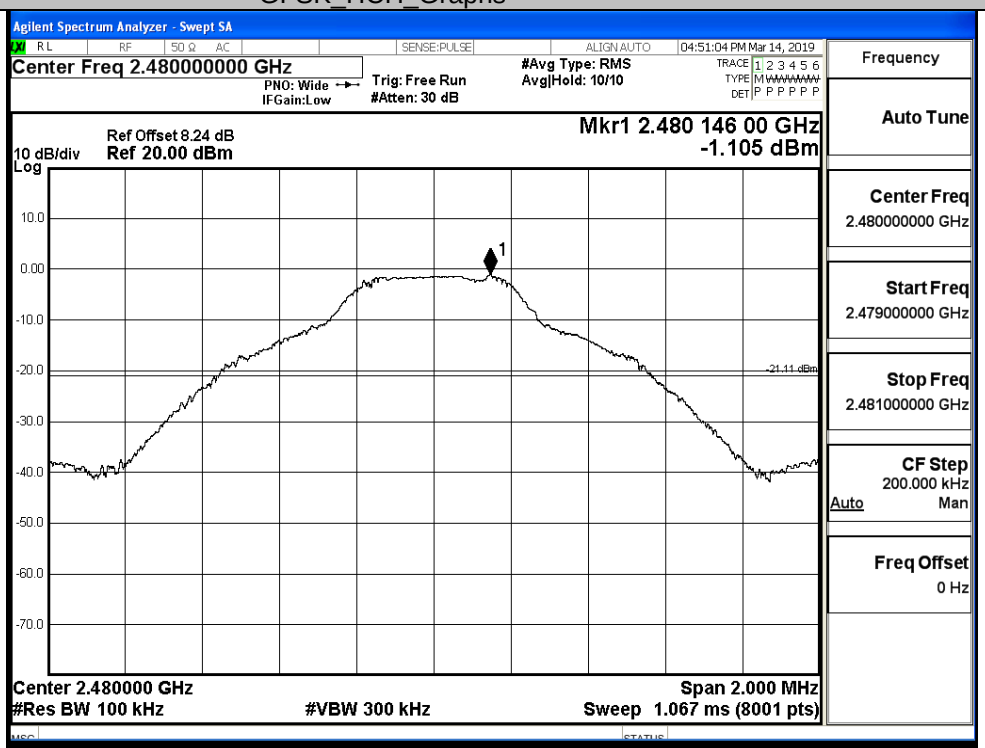
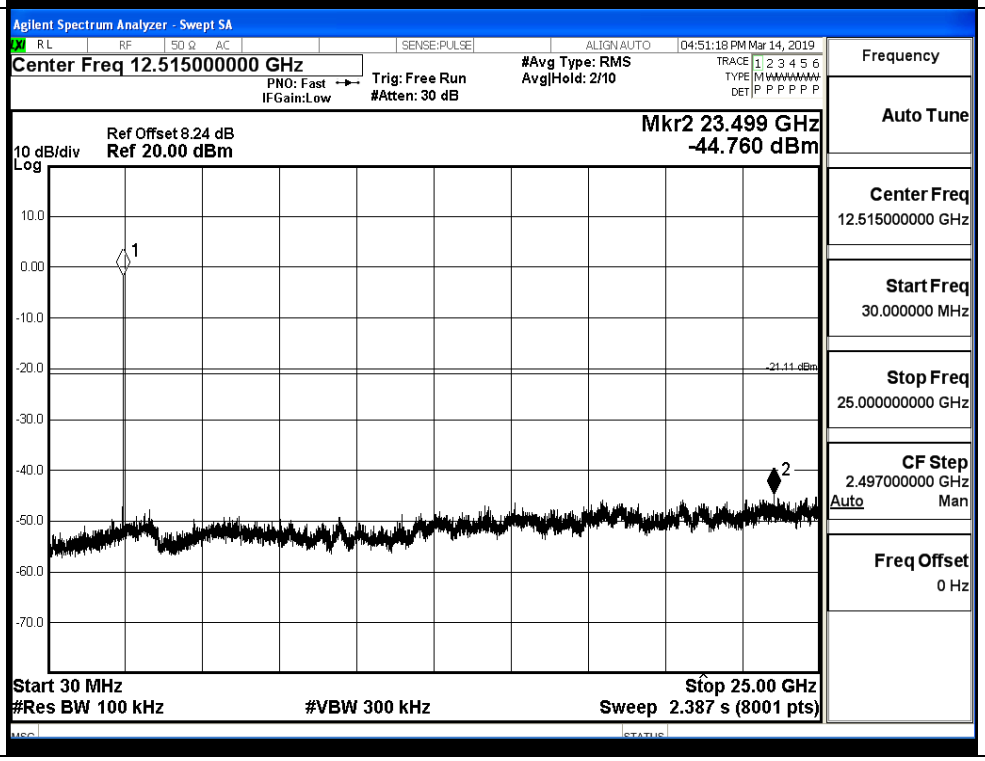
Pref

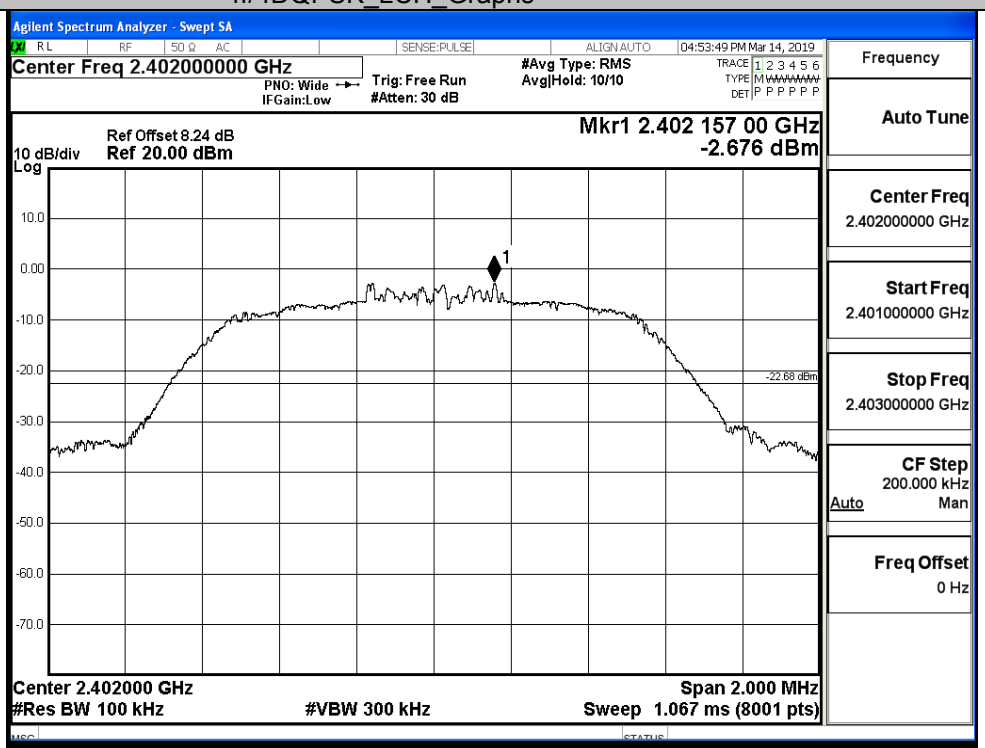
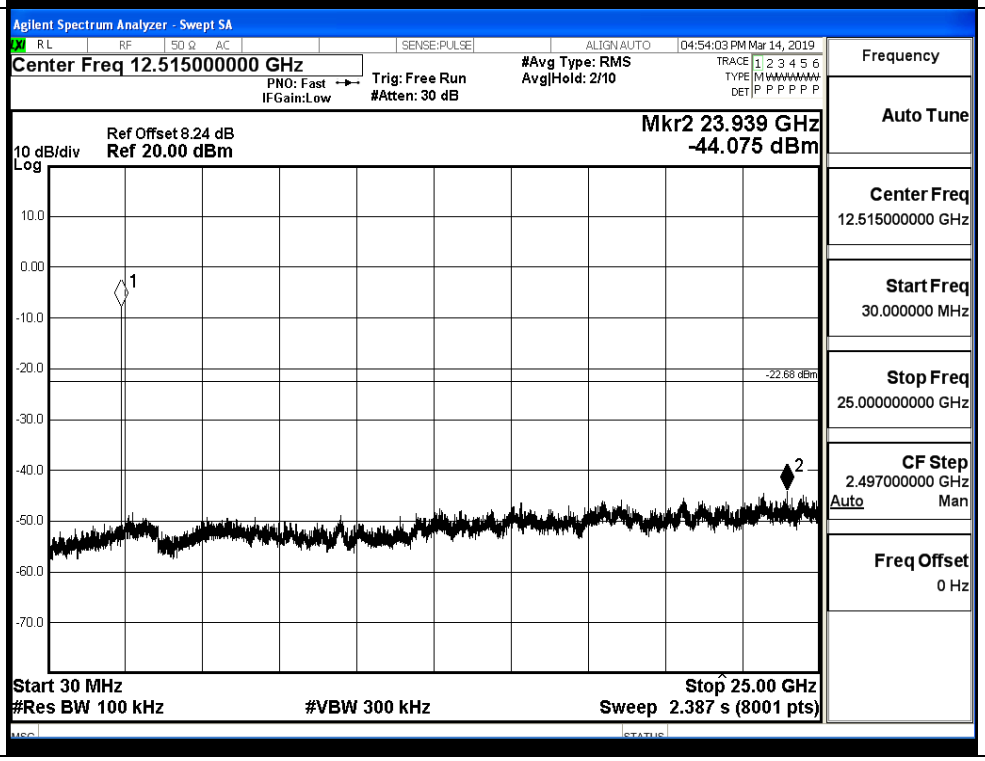


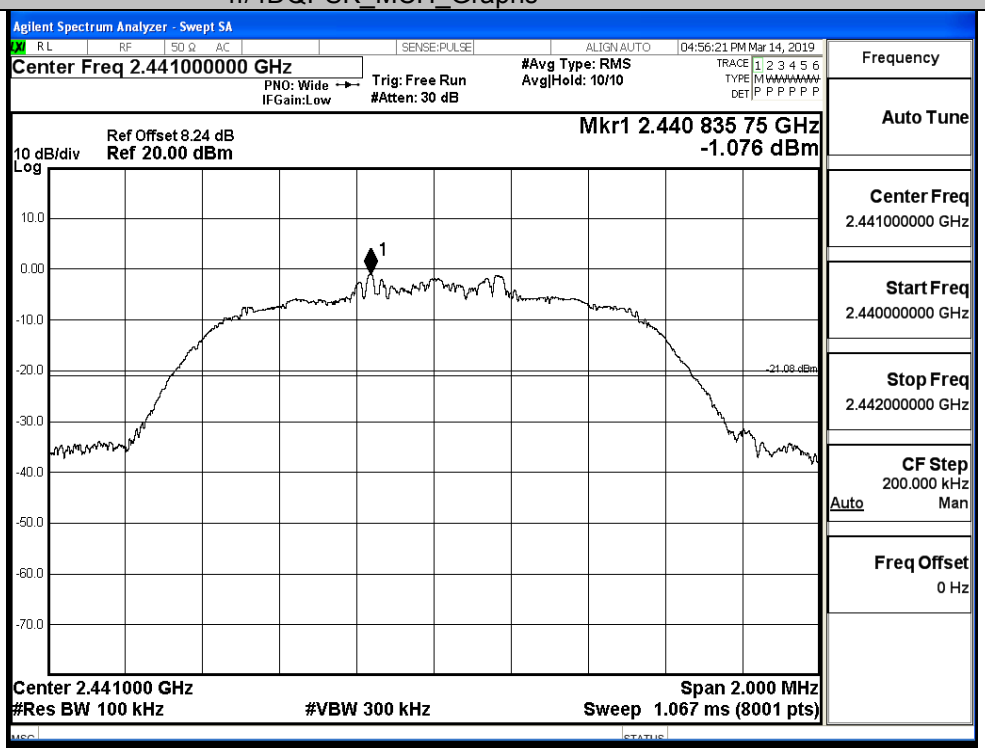
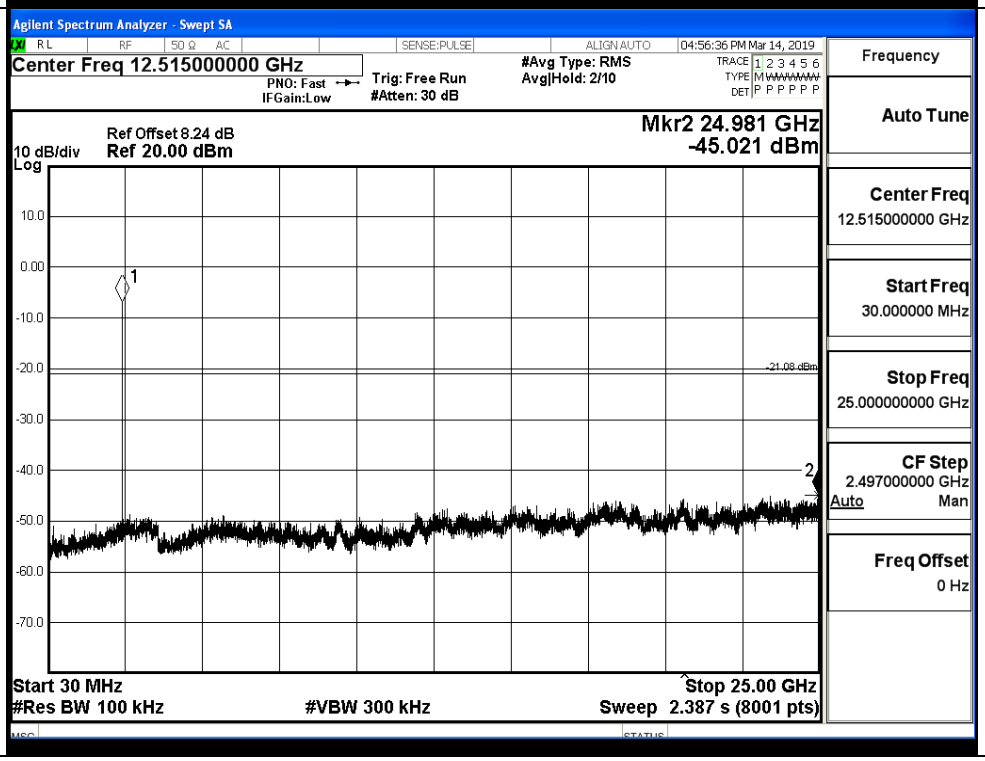
Puw		

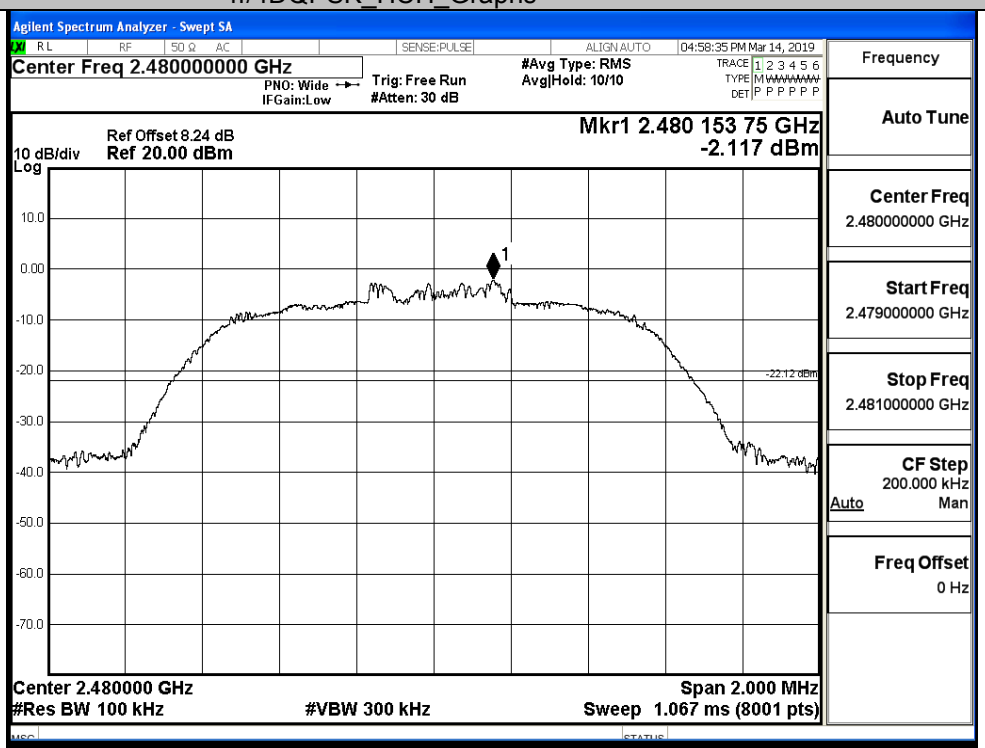
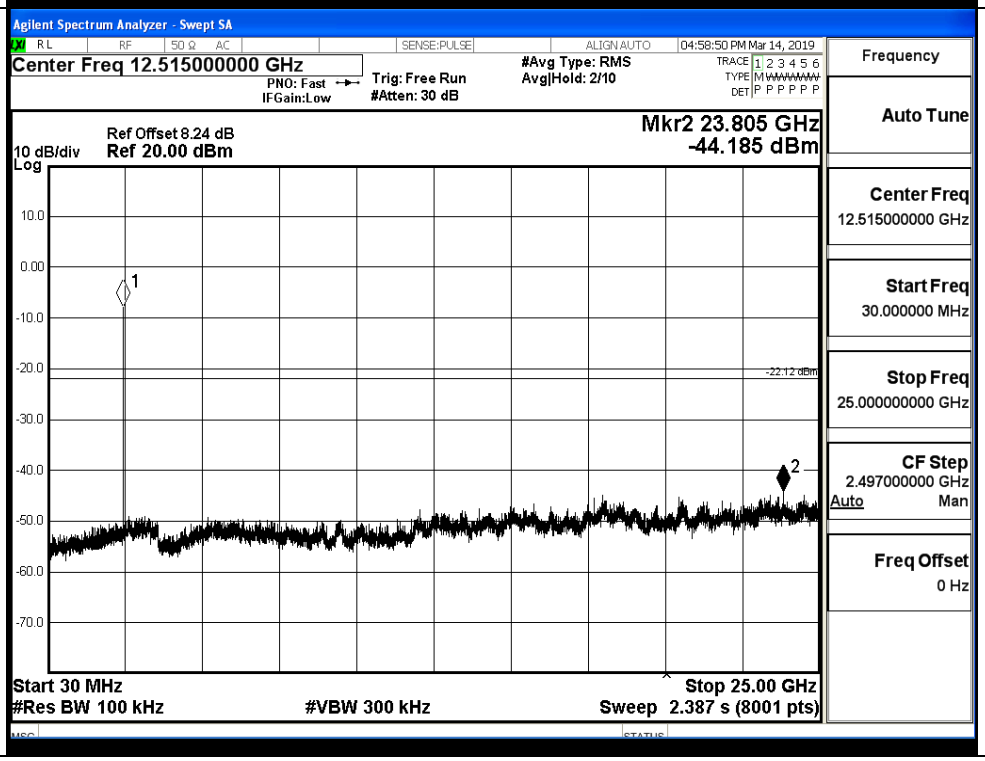
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
04:29:14 PM Mar 14, 2019
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 24.501 GHz
-44.137 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-21.44 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
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

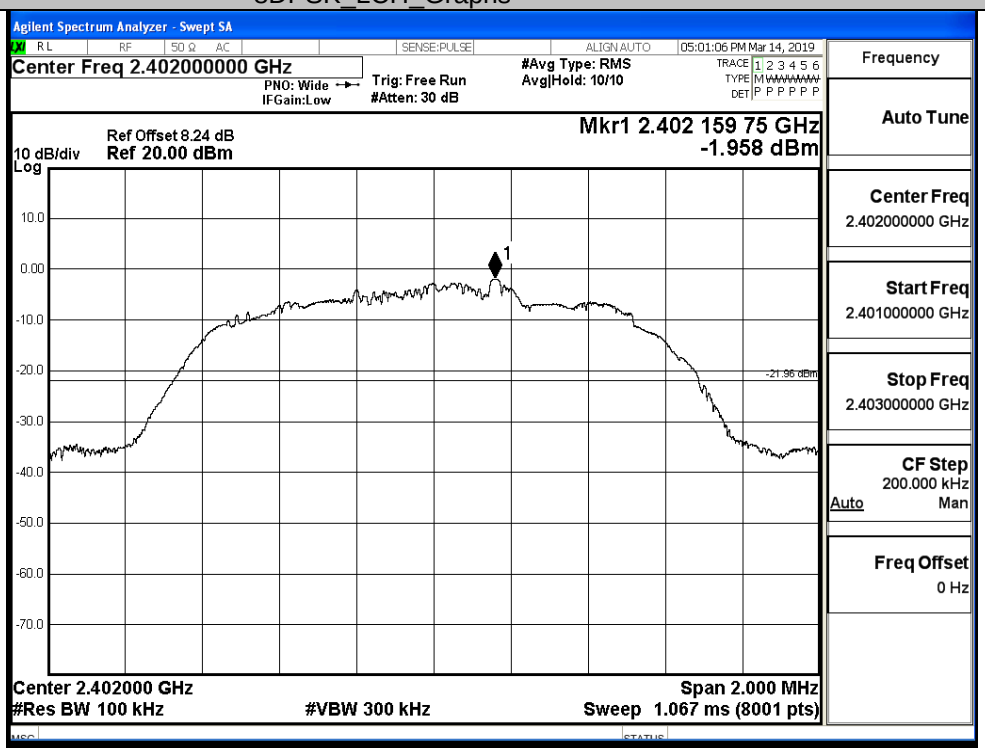
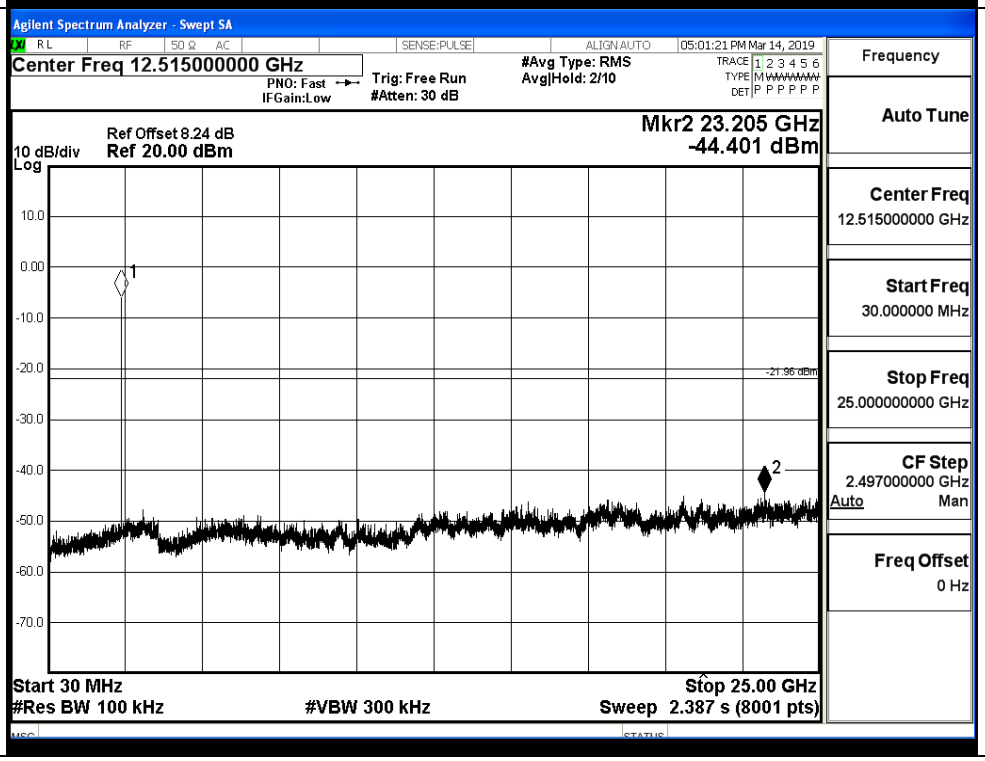
GFSK_MCH_Graphs		
Pref		
Puw		

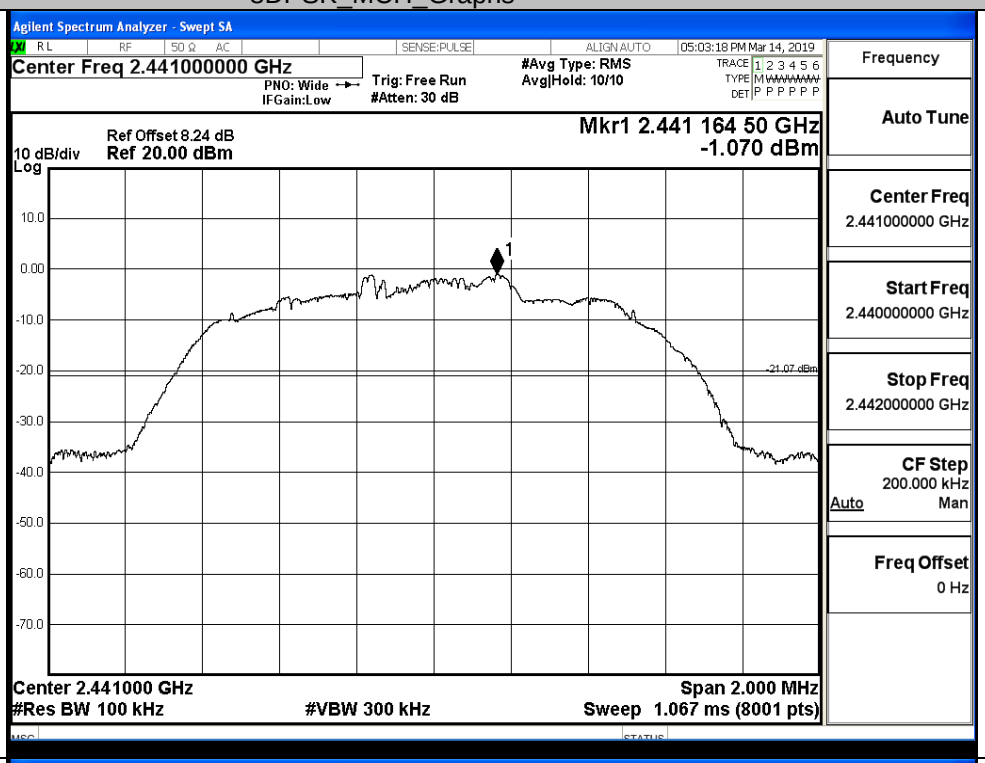
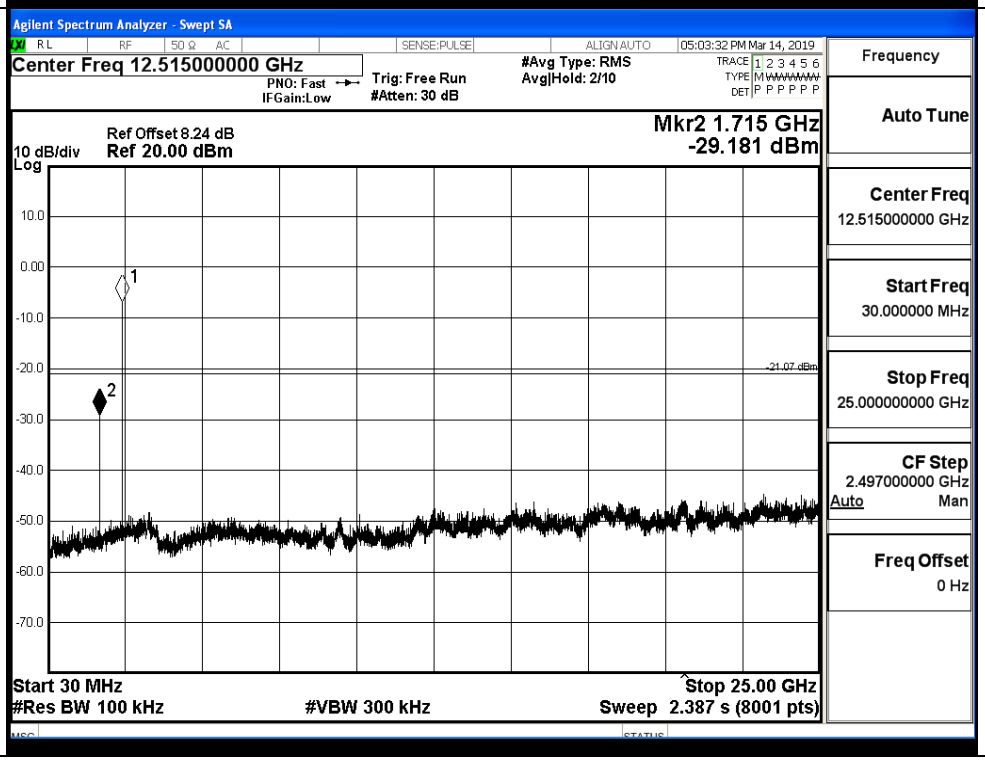
GFSK_HCH_Graphs		
Pref		
Puw		

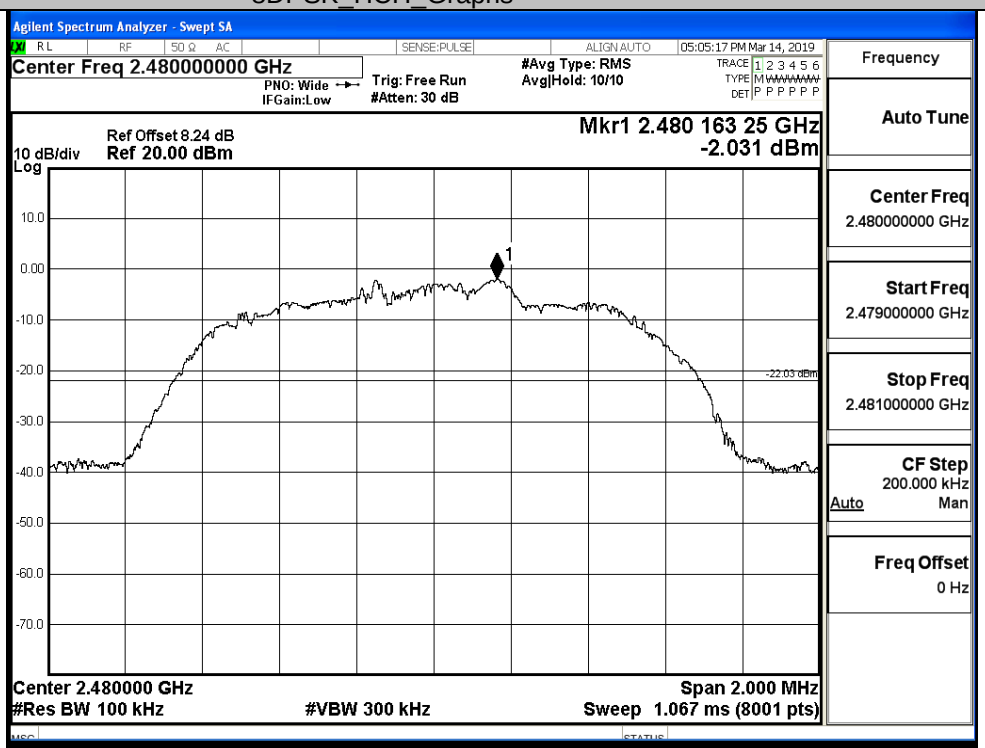
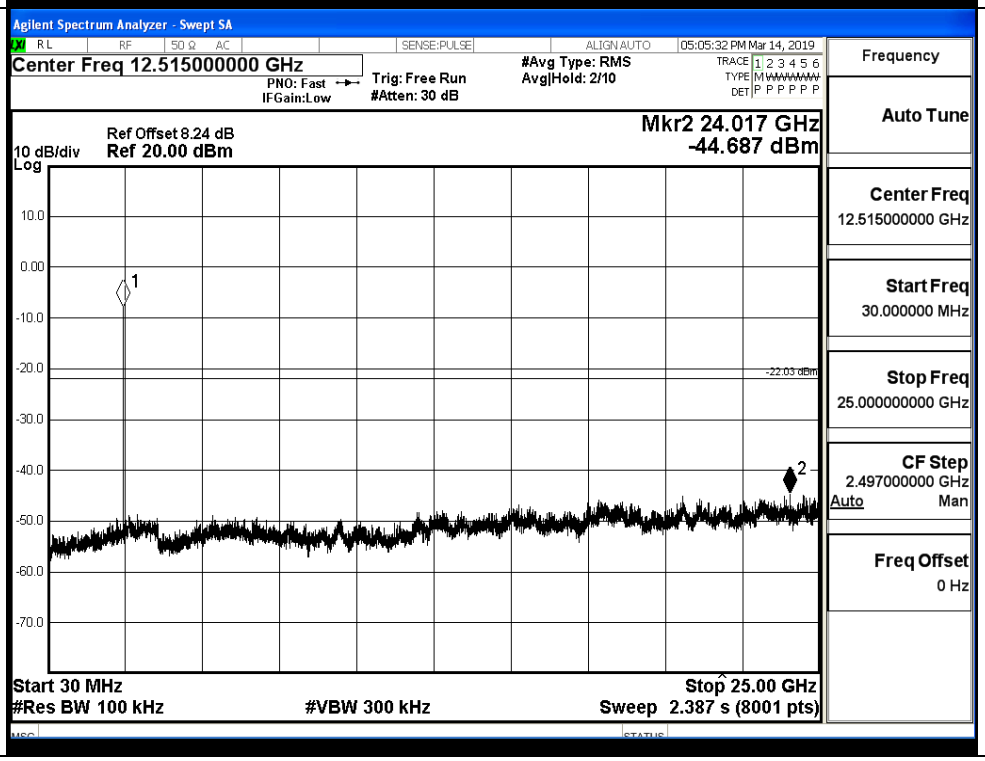
π/4DQPSK_LCH_Graphs		
Pref		
Puw		

π/4DQPSK_MCH_Graphs		
Pref		
Puw		

π/4DQPSK_HCH_Graphs		
Pref		
Puw		

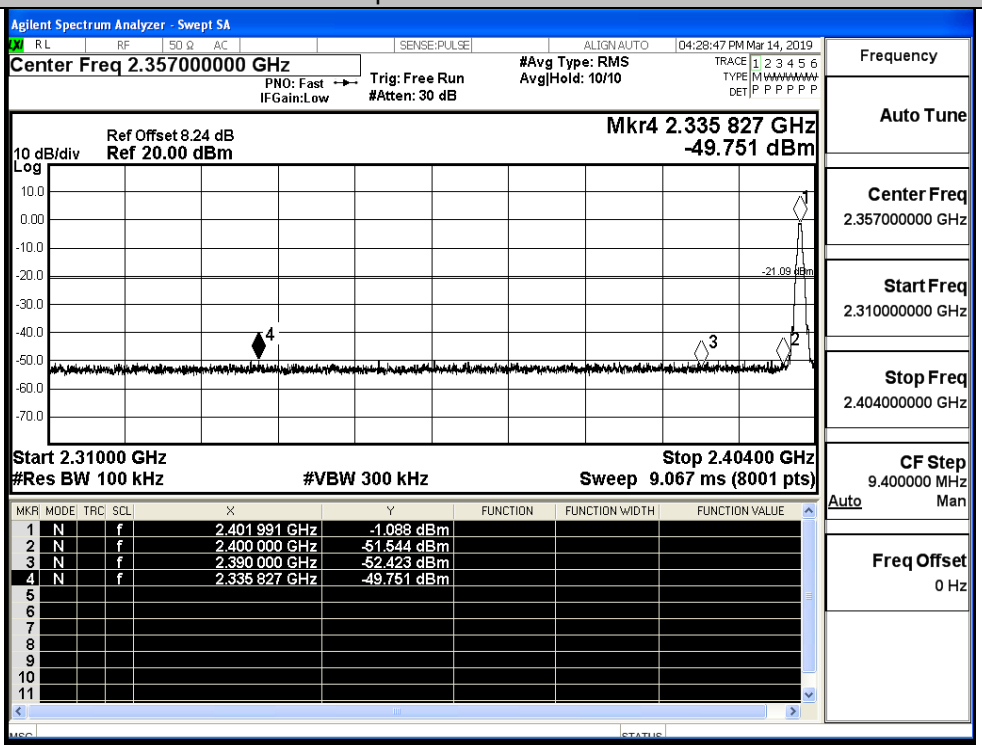
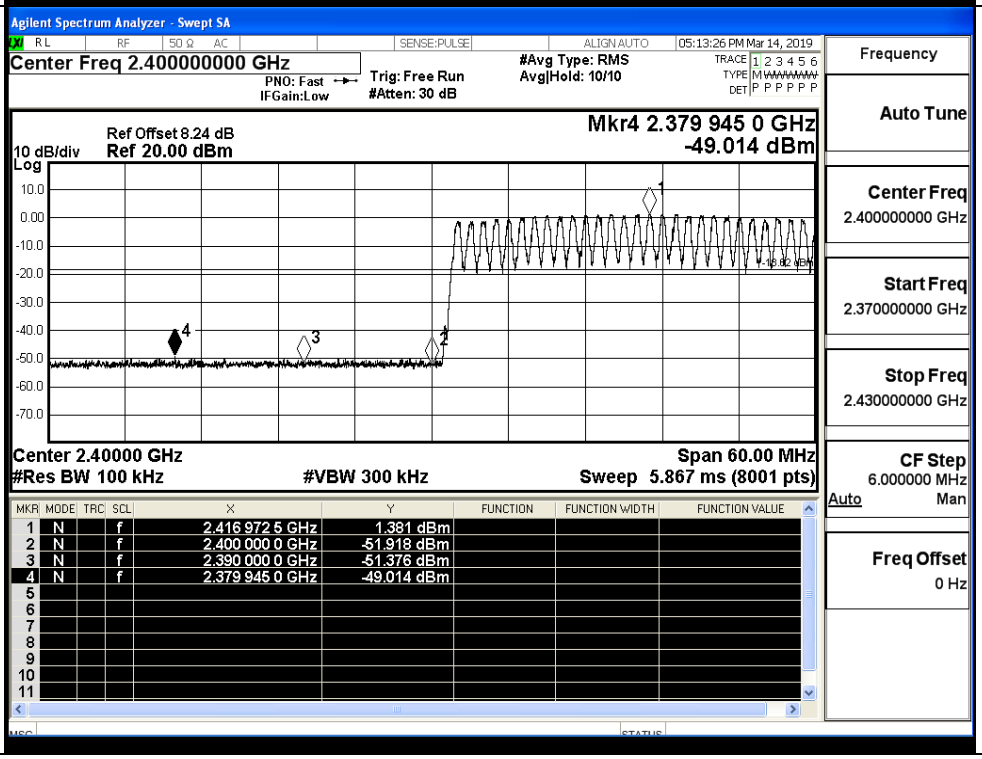
8DPSK_LCH_Graphs		
Pref		
Puw		

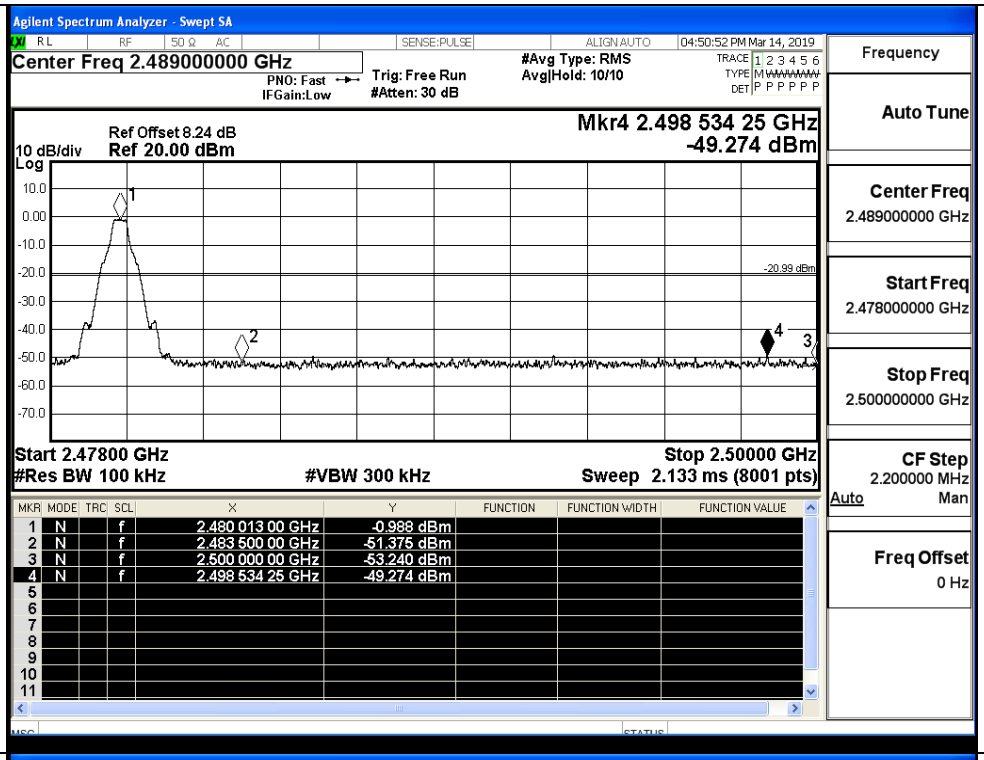
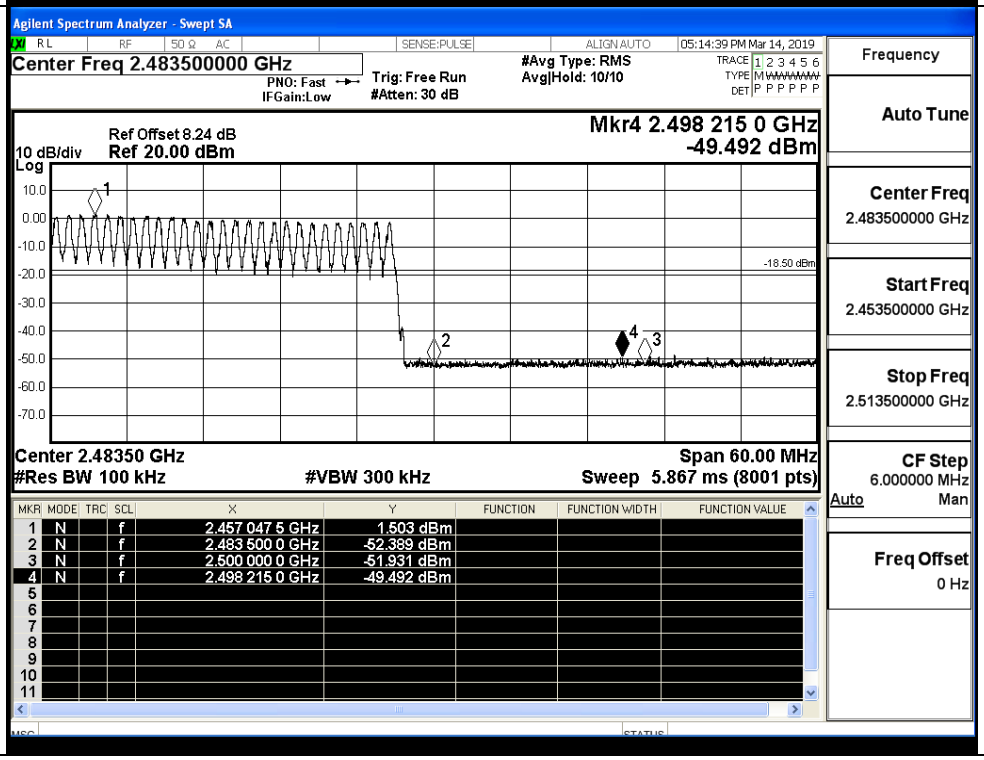
8DPSK_MCH_Graphs		
Pref		
Puw		

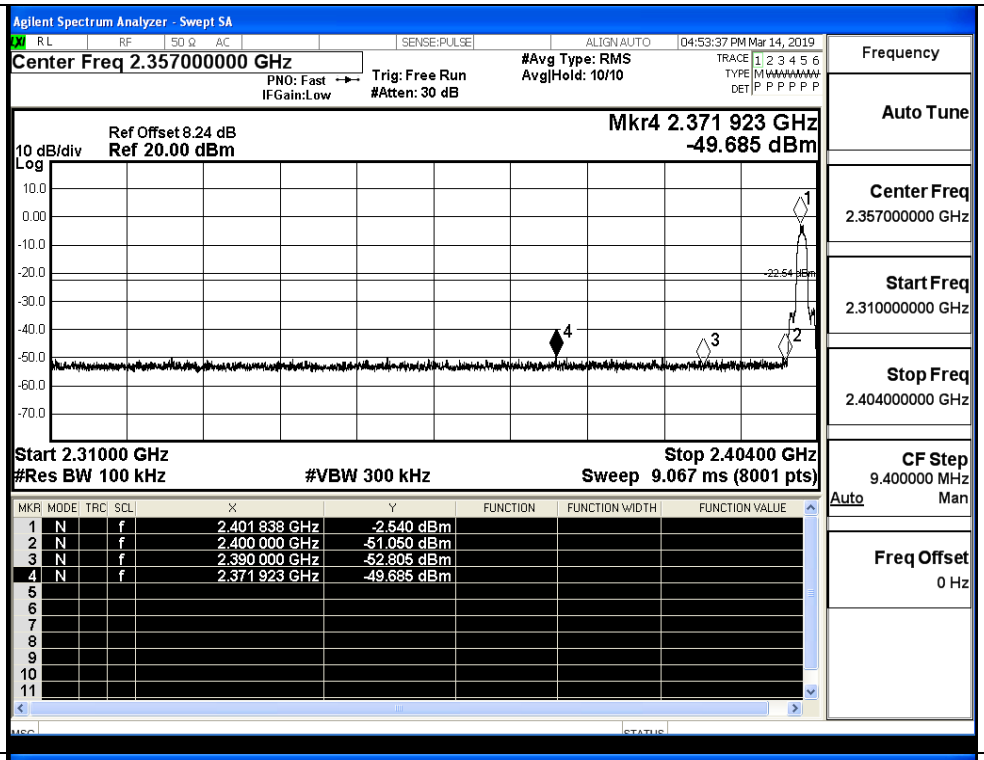
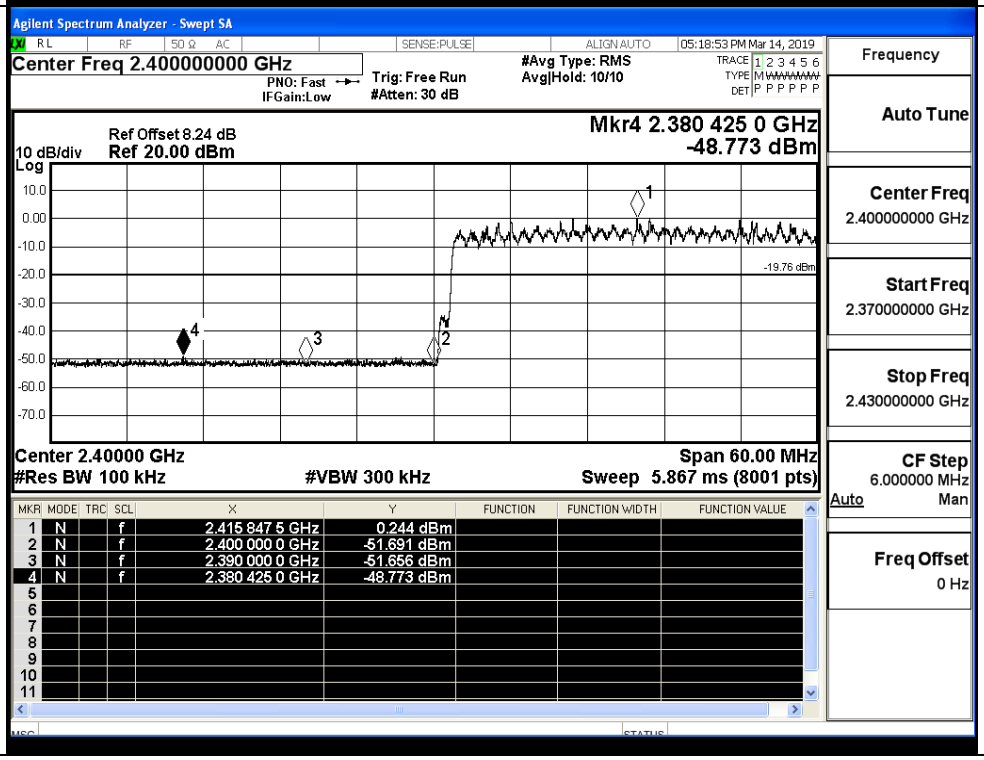
8DPSK_HCH_Graphs			
Pref			
Puw			

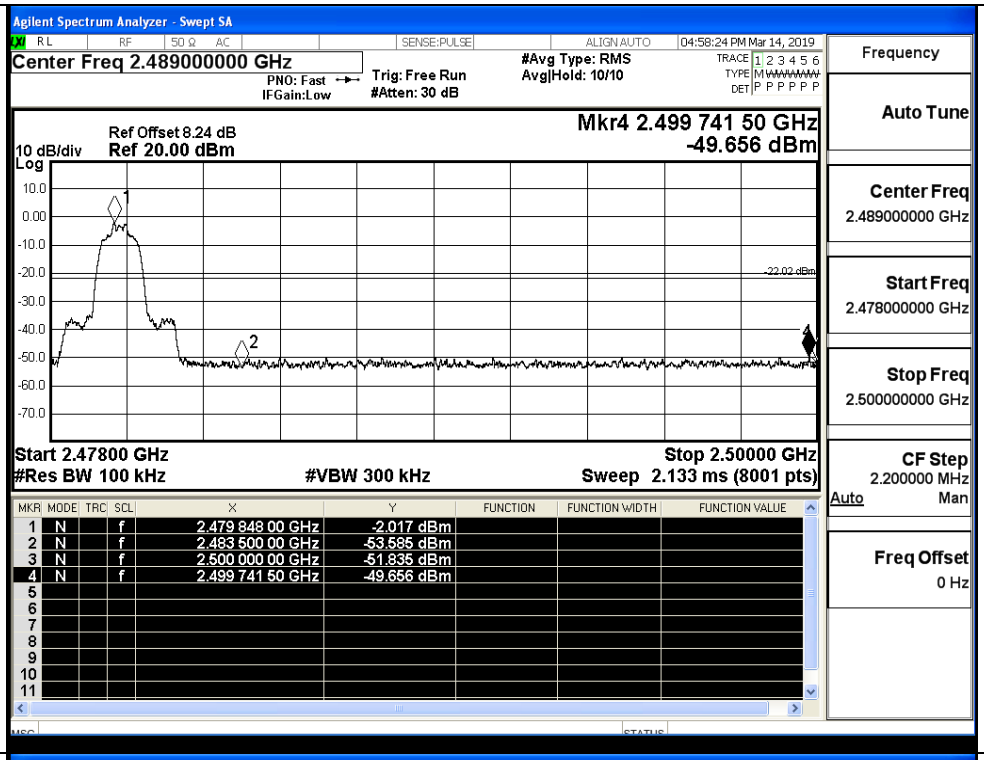
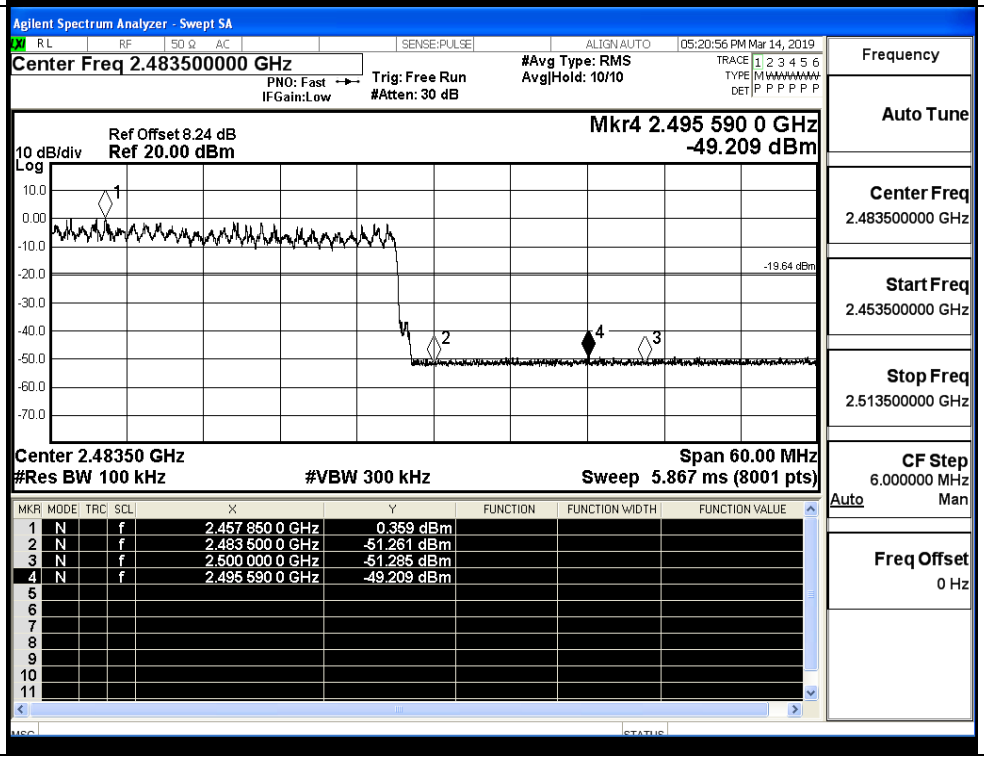
A.8 Band-edge for RF Conducted Emissions

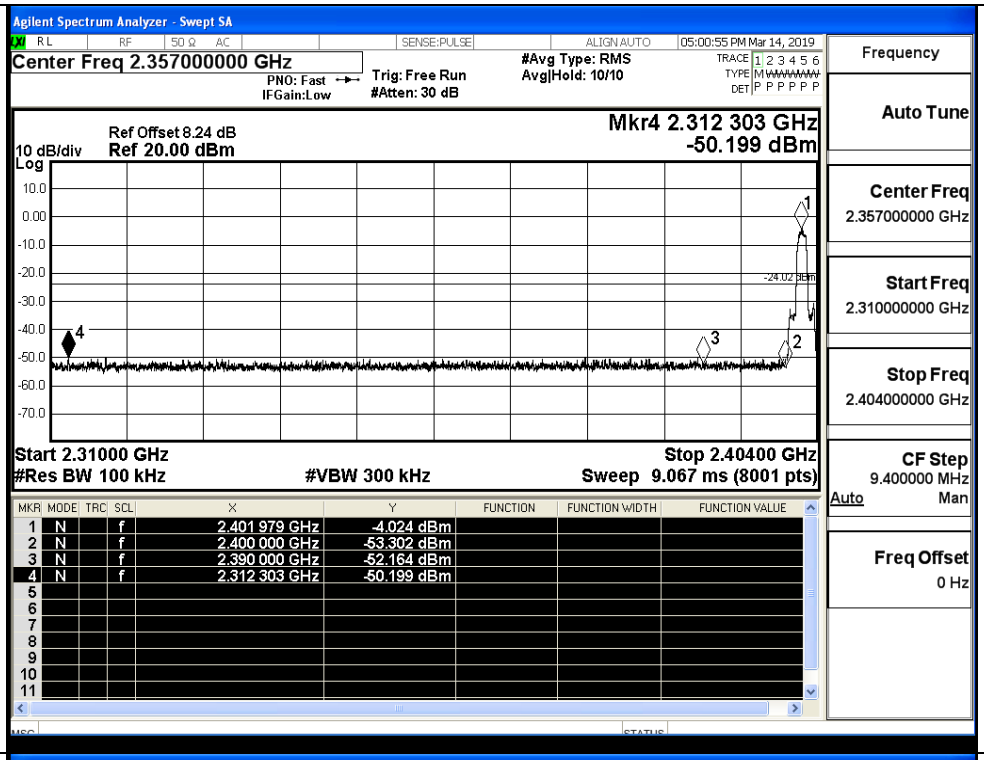
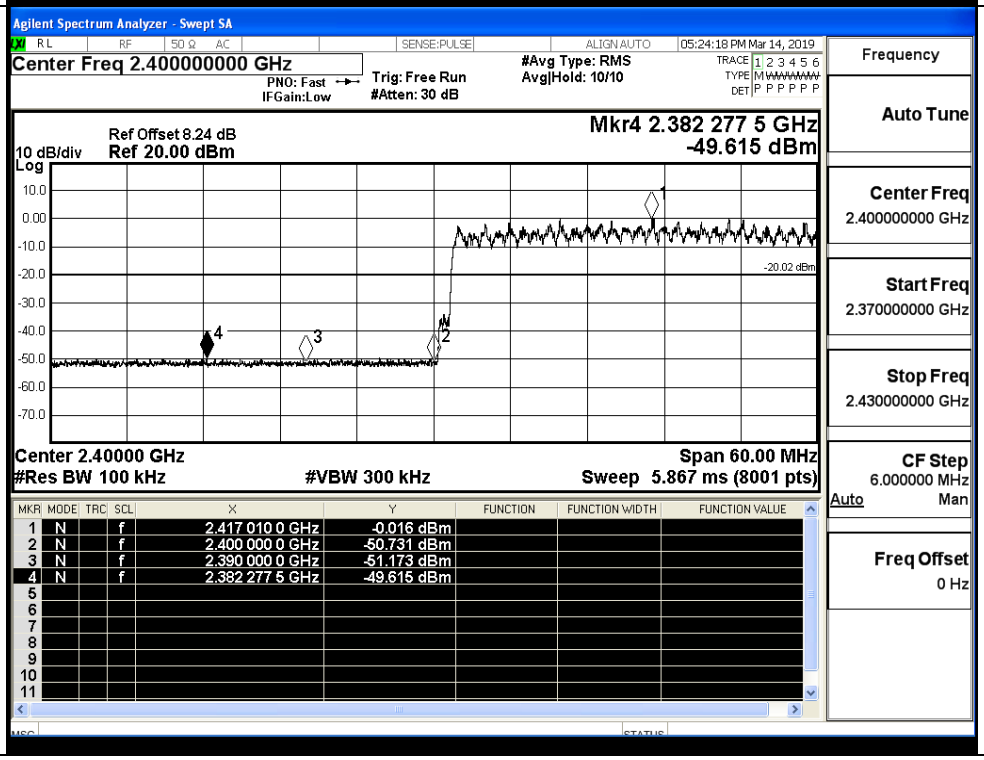
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.088	Off	-49.751	-21.09	PASS
			1.381	On	-49.014	-18.62	PASS
	HCH	2480	-0.988	Off	-49.274	-20.99	PASS
			1.503	On	-49.492	-18.5	PASS
π/4DQPSK	LCH	2402	-2.540	Off	-49.685	-22.54	PASS
			0.244	On	-48.773	-19.76	PASS
	HCH	2480	-2.017	Off	-49.656	-22.02	PASS
			0.359	On	-49.209	-19.64	PASS
8DPSK	LCH	2402	-4.024	Off	-50.199	-24.02	PASS
			-0.016	On	-49.615	-20.02	PASS
	HCH	2480	-2.548	Off	-49.486	-22.55	PASS
			0.077	On	-49.252	-19.92	PASS

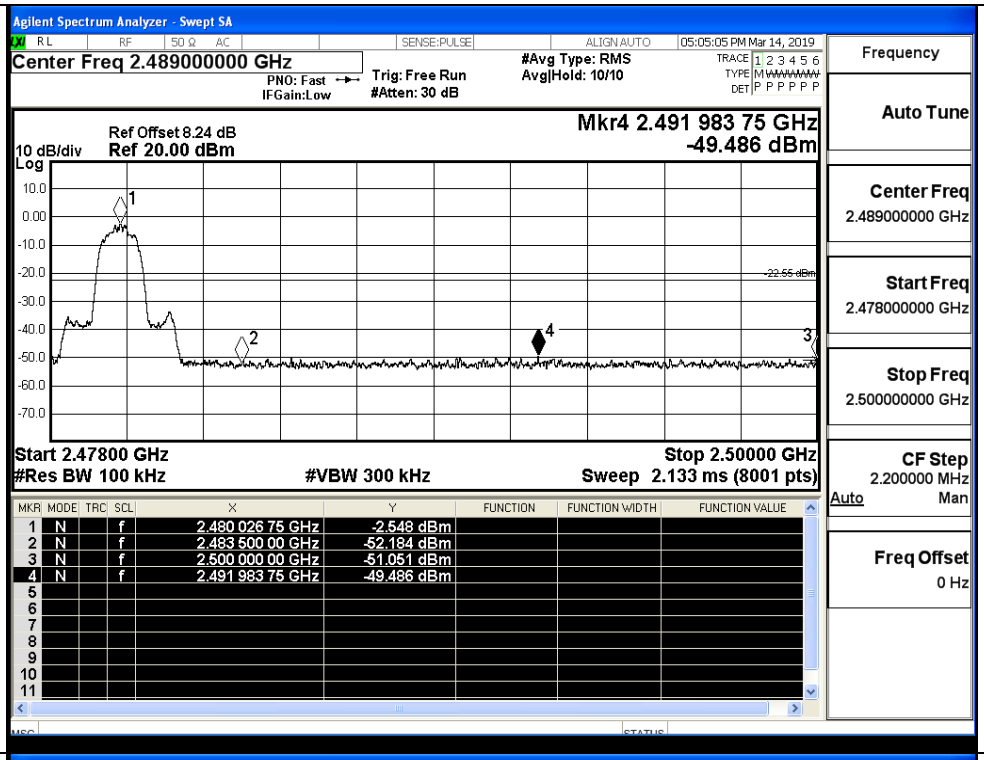
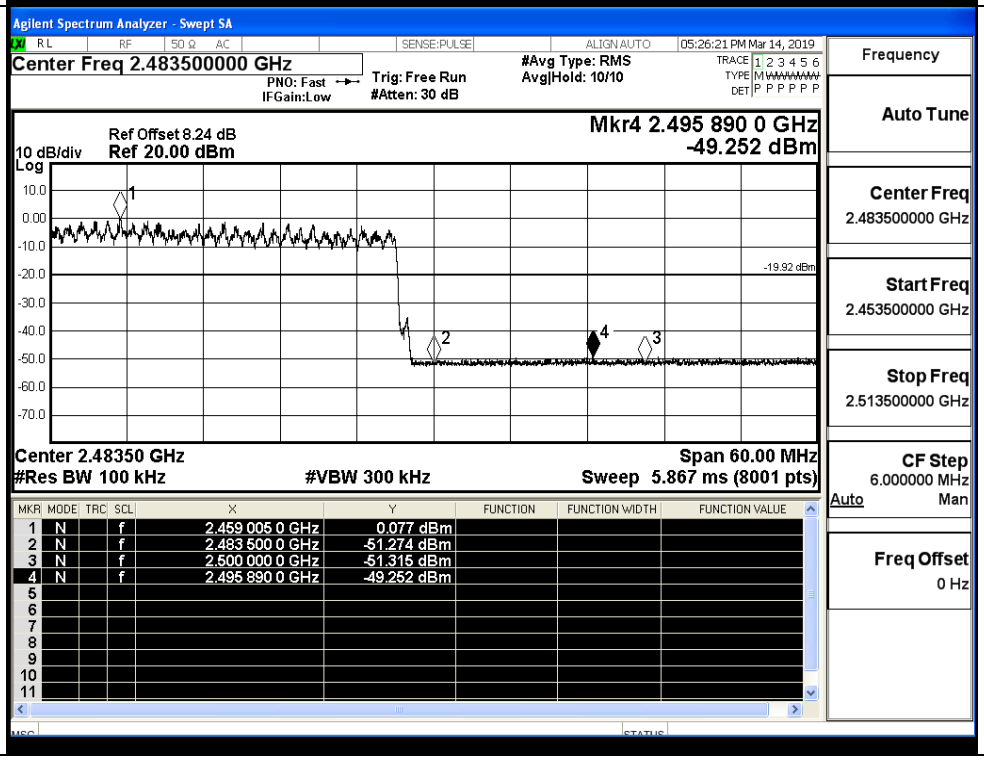
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

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	

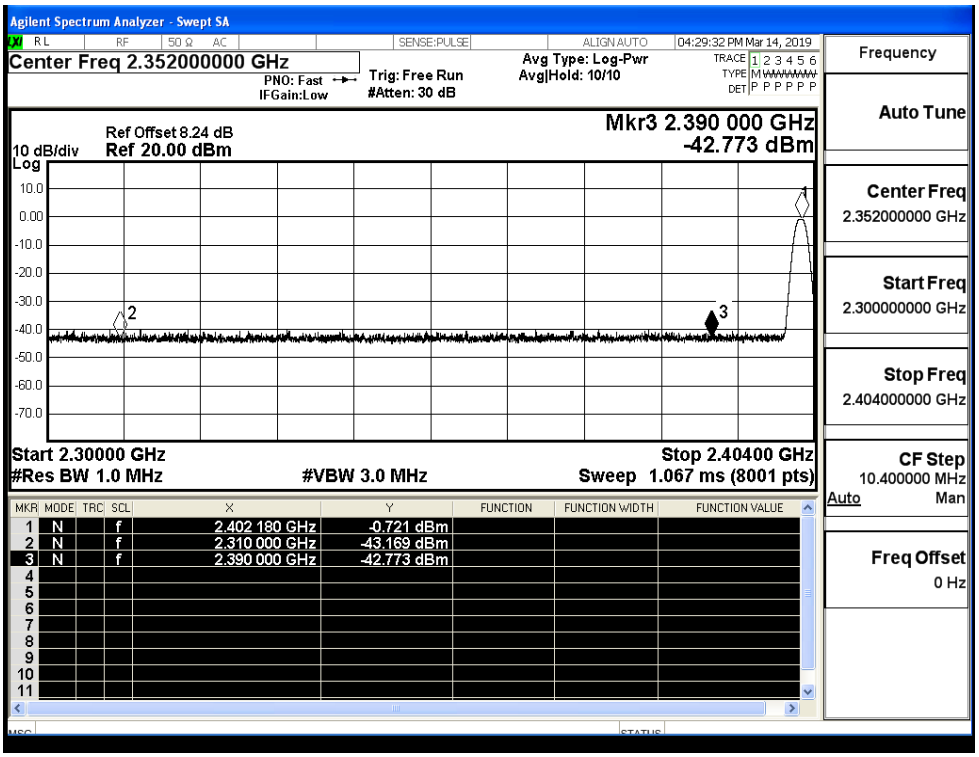
8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

8DPSK/HCH/No Hop	
8DPSK/HCH/Hop	

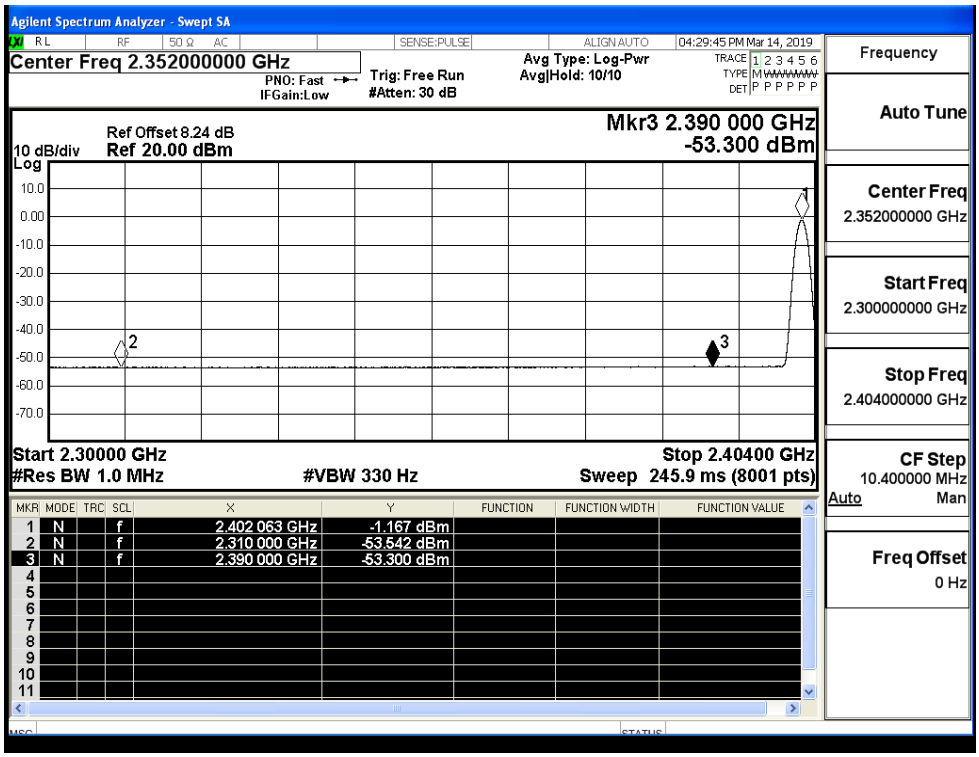
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.17	2.0	0	54.09	PEAK	74	PASS
	Off	2310.0	-53.54	2.0	0	43.72	AV	54	PASS
	Off	2390.0	-42.77	2.0	0	54.48	PEAK	74	PASS
	Off	2390.0	-53.30	2.0	0	43.96	AV	54	PASS
	Off	2483.5	-42.09	2.0	0	55.17	PEAK	74	PASS
	Off	2483.5	-52.92	2.0	0	44.34	AV	54	PASS
	Off	2500.0	-44.06	2.0	0	53.19	PEAK	74	PASS
	Off	2500.0	-52.85	2.0	0	44.41	AV	54	PASS
π/4DQPSK	Off	2310.0	-43.78	2.0	0	53.48	PEAK	74	PASS
	Off	2310.0	-53.58	2.0	0	43.68	AV	54	PASS
	Off	2390.0	-43.98	2.0	0	53.28	PEAK	74	PASS
	Off	2390.0	-53.14	2.0	0	44.12	AV	54	PASS
	Off	2483.5	-43.51	2.0	0	53.74	PEAK	74	PASS
	Off	2483.5	-52.87	2.0	0	44.38	AV	54	PASS
	Off	2500.0	-43.13	2.0	0	54.13	PEAK	74	PASS
	Off	2500.0	-52.85	2.0	0	44.41	AV	54	PASS
8DPSK	Off	2310.0	-42.56	2.0	0	54.70	PEAK	74	PASS
	Off	2310.0	-53.55	2.0	0	43.70	AV	54	PASS
	Off	2390.0	-42.96	2.0	0	54.30	PEAK	74	PASS
	Off	2390.0	-53.18	2.0	0	44.08	AV	54	PASS
	Off	2483.5	-43.77	2.0	0	53.48	PEAK	74	PASS
	Off	2483.5	-53.04	2.0	0	44.22	AV	54	PASS
	Off	2500.0	-43.24	2.0	0	54.01	PEAK	74	PASS
	Off	2500.0	-52.86	2.0	0	44.40	AV	54	PASS

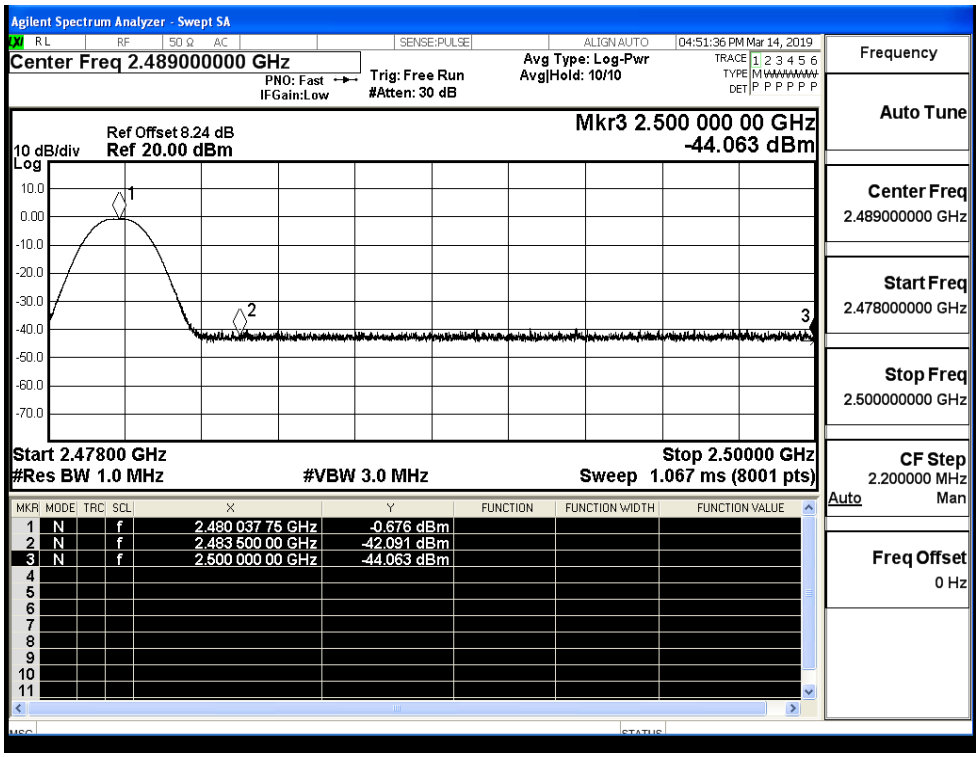
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



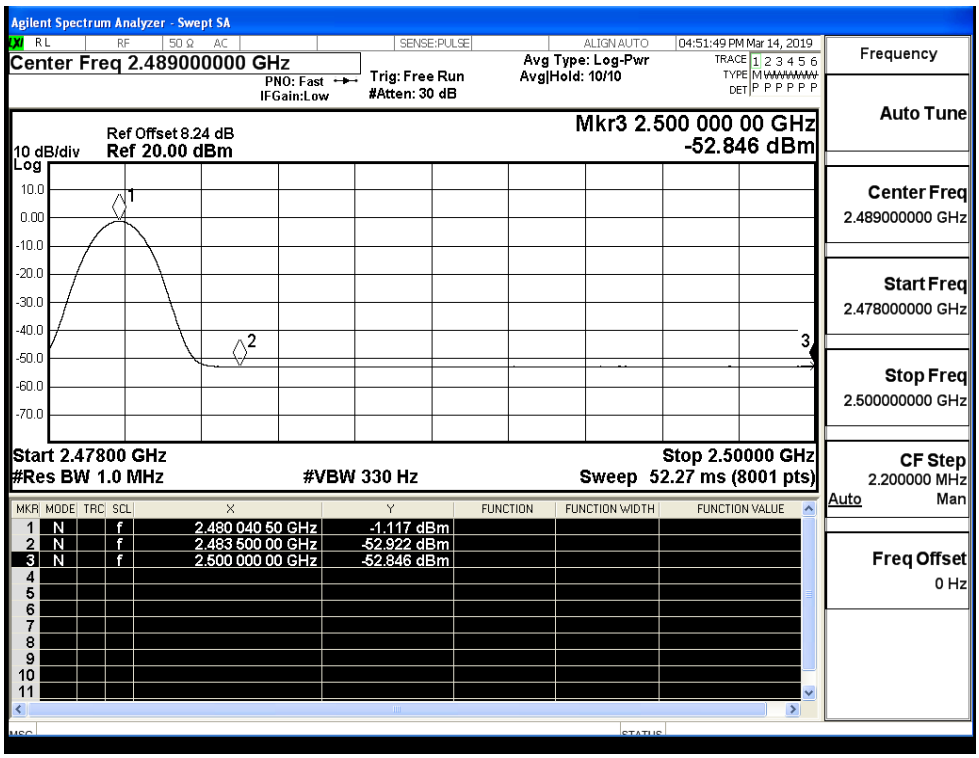
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



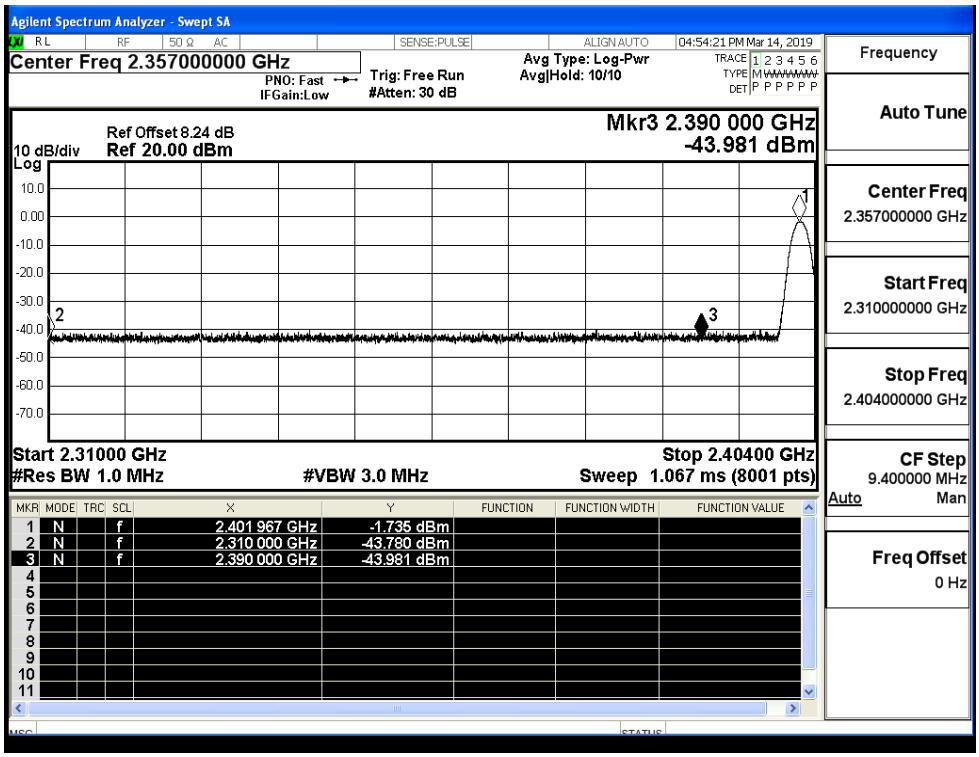
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



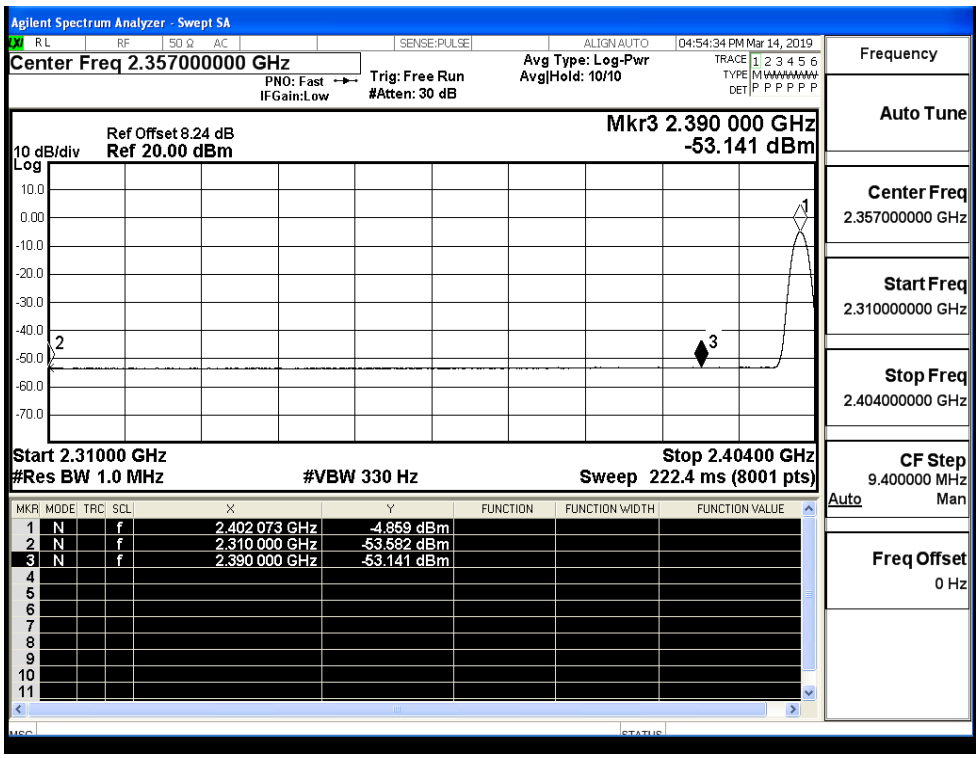
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



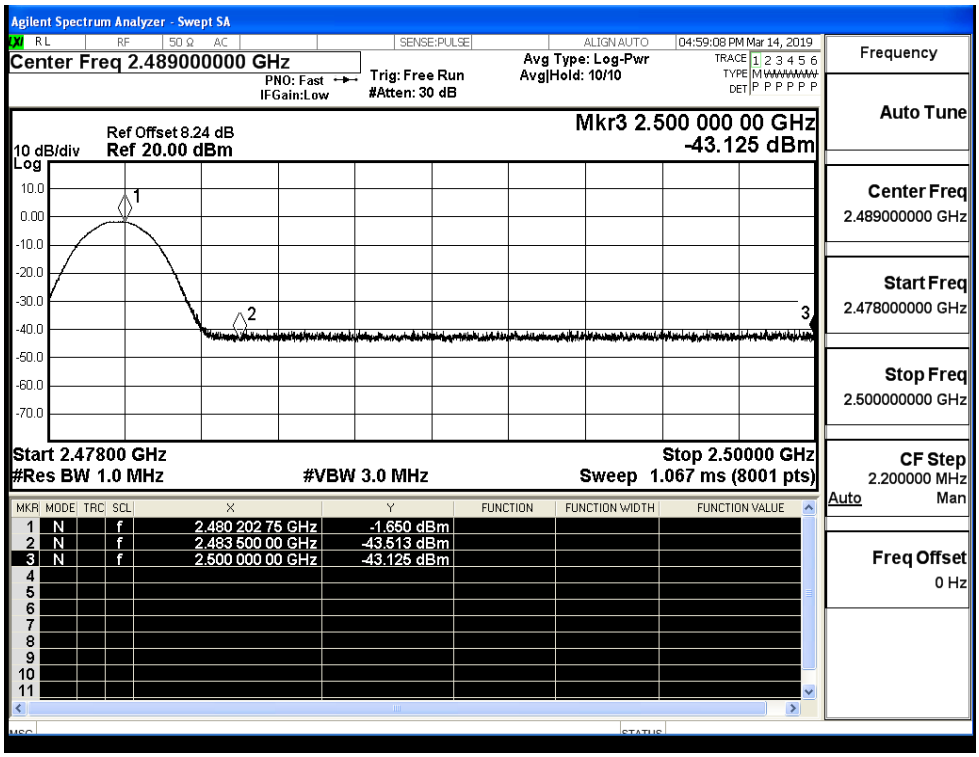
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



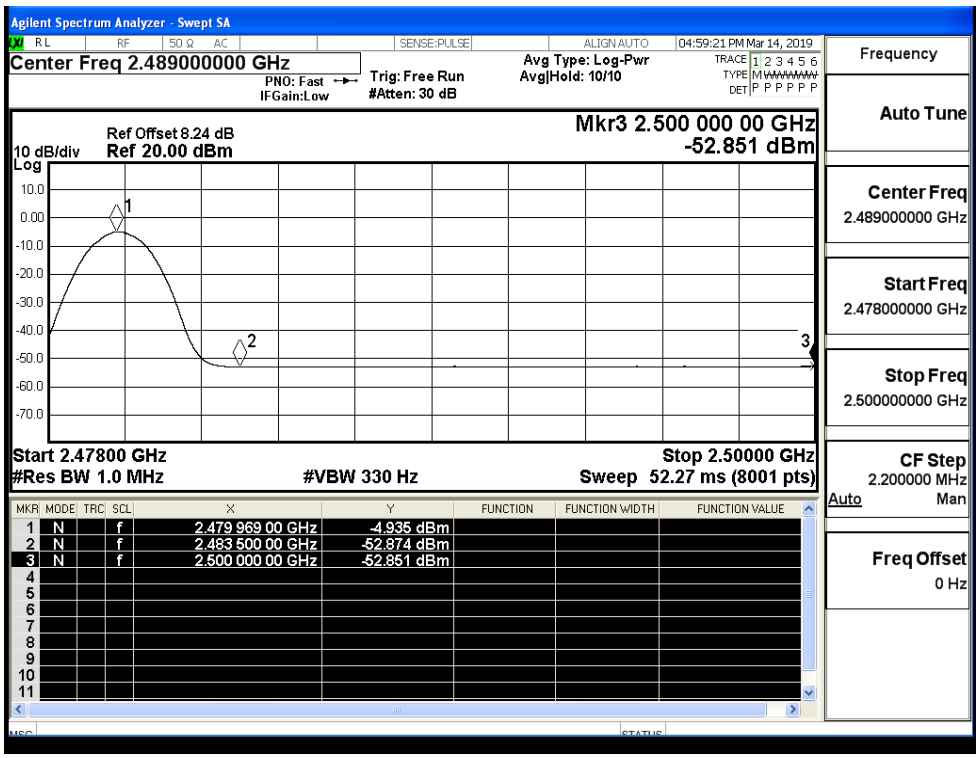
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



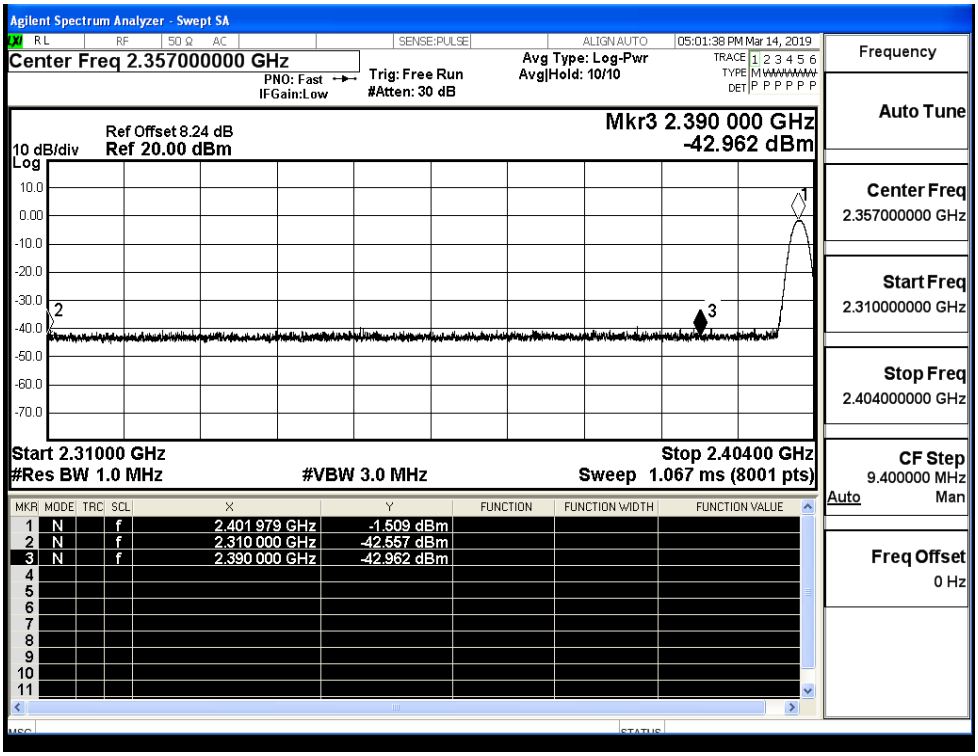
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



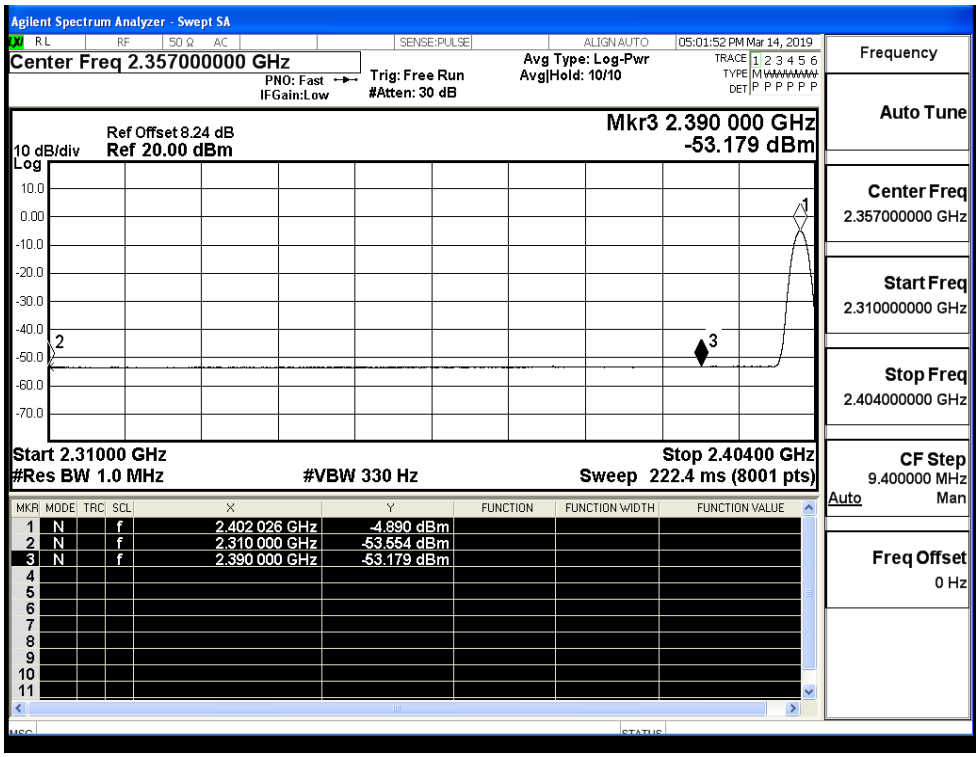
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



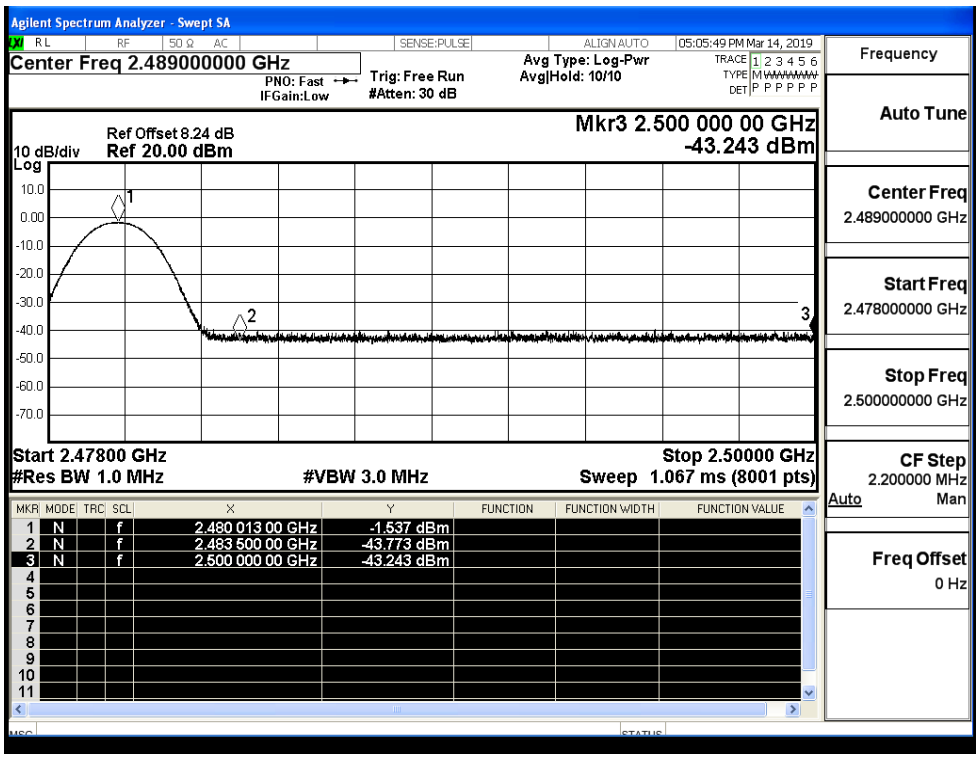
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)