Appendix A

RF Test Data for BT V5.0 (BDR/EDR) (Conducted Measurement)

Product Name: Kai Bluetooth® Earbuds

Trade Mark: Gemline

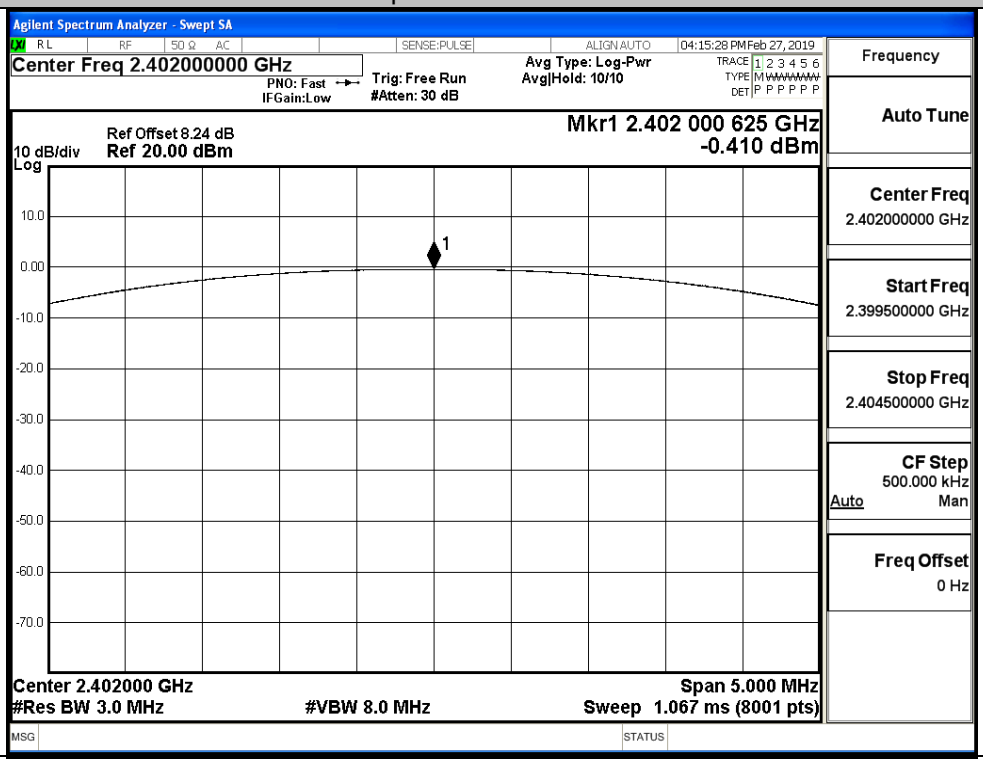
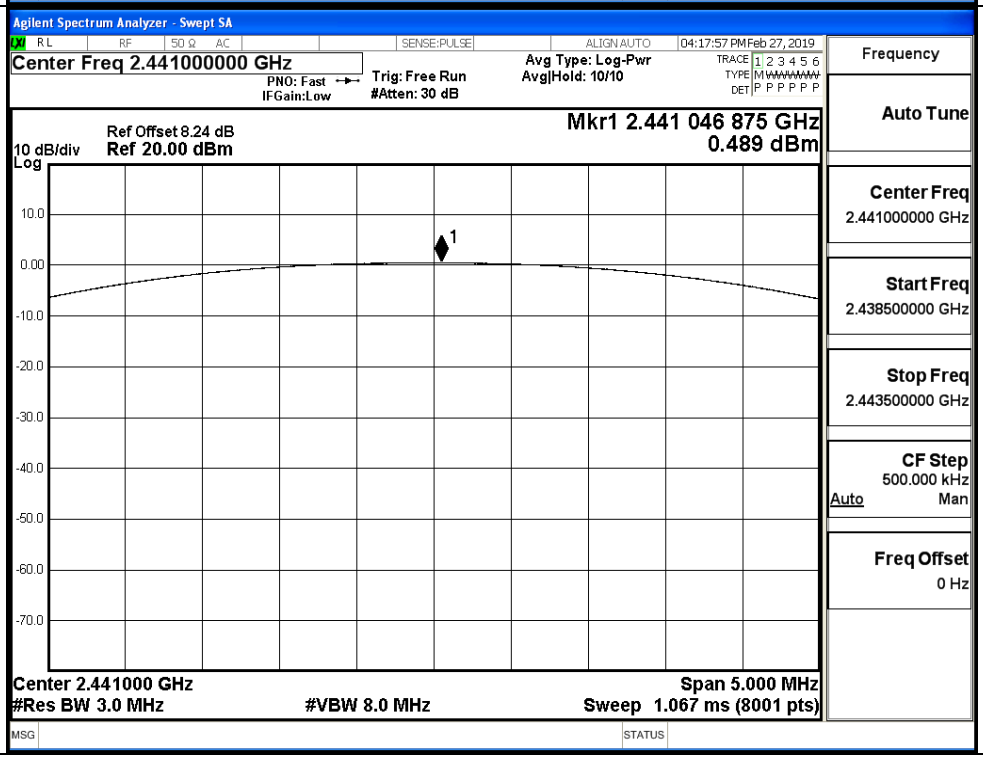
Test Model: 100253-001B

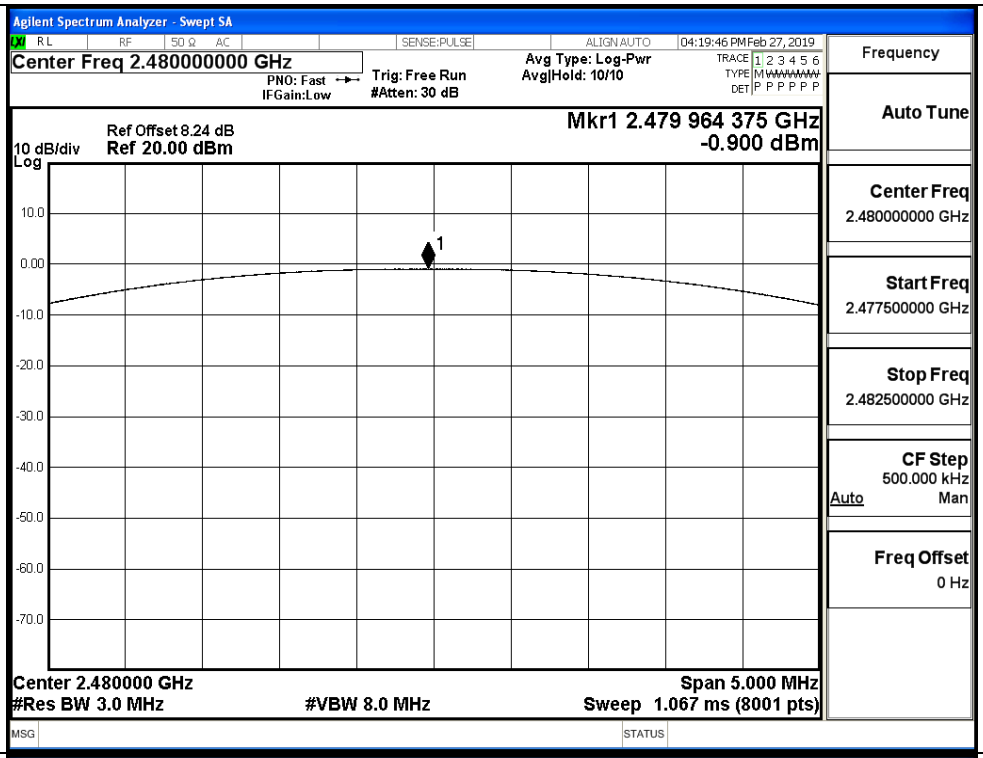
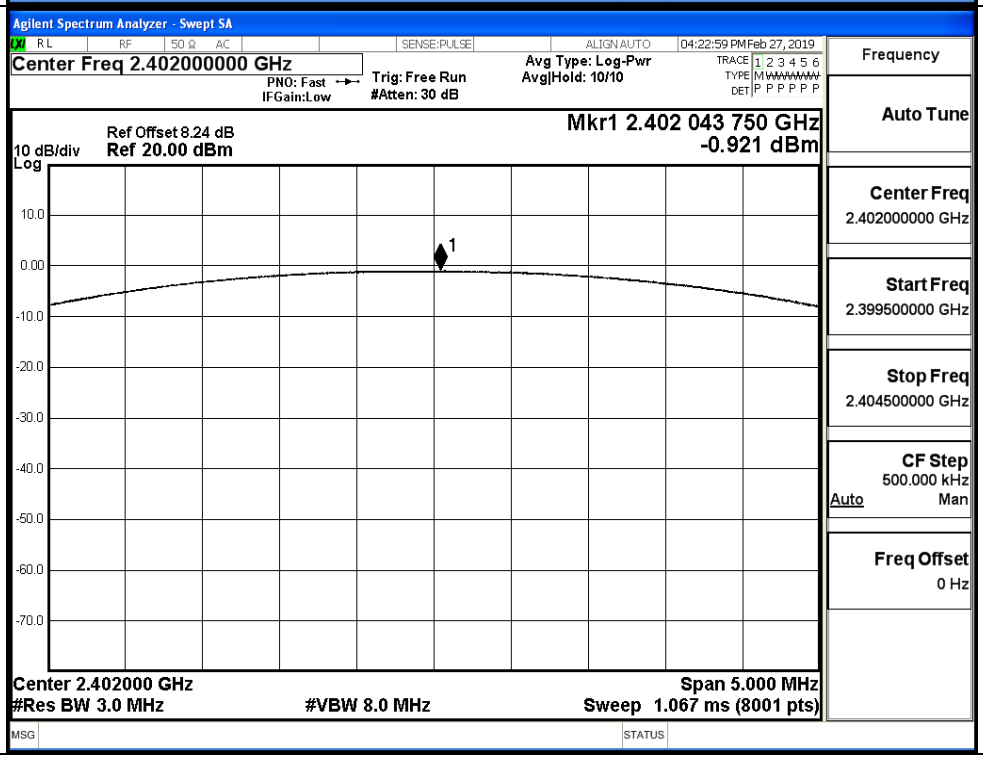
Environmental Conditions

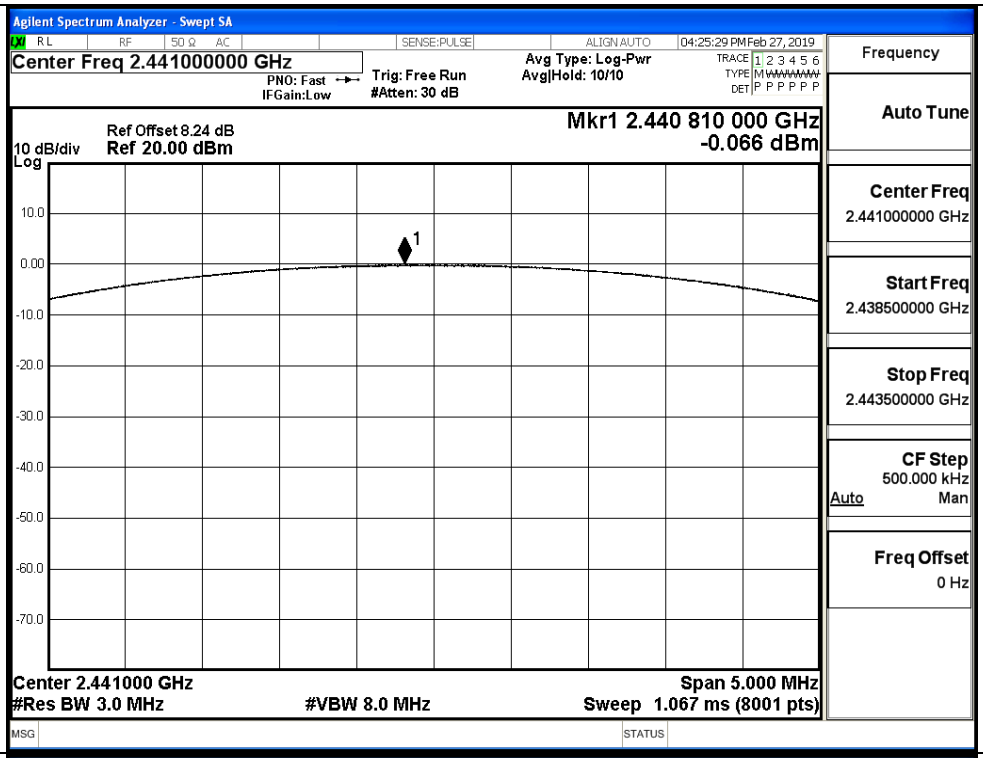
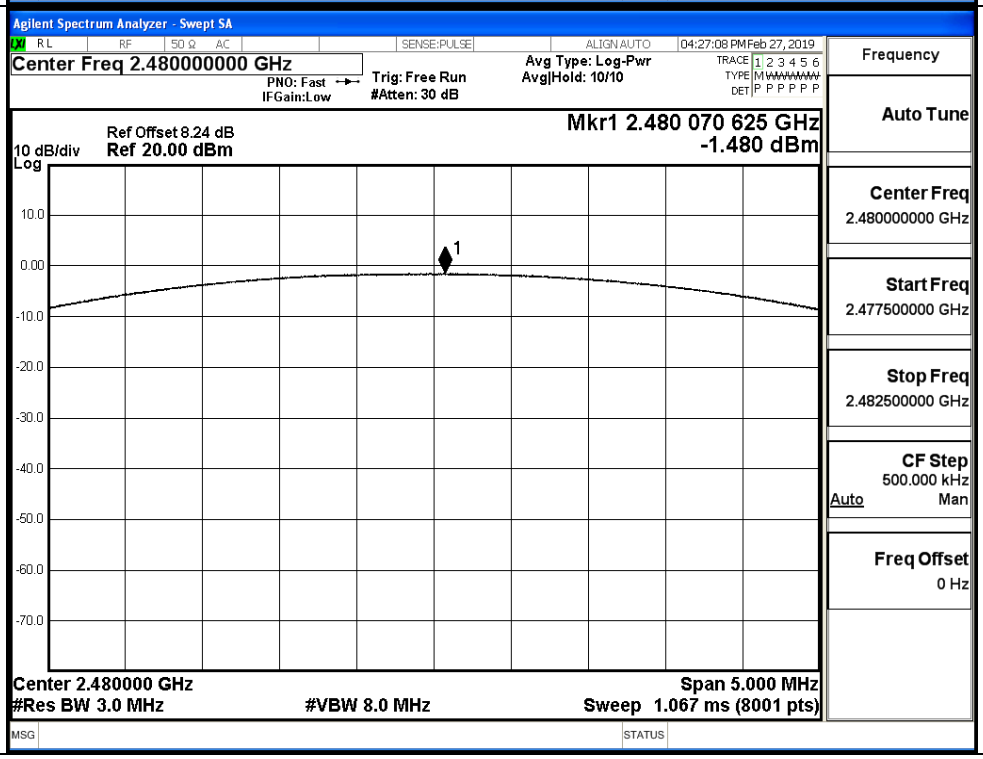
Temperature:	22.8 ° C
Relative Humidity:	53.3%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.Zeng
Supervised by:	Jayden.Zhuo

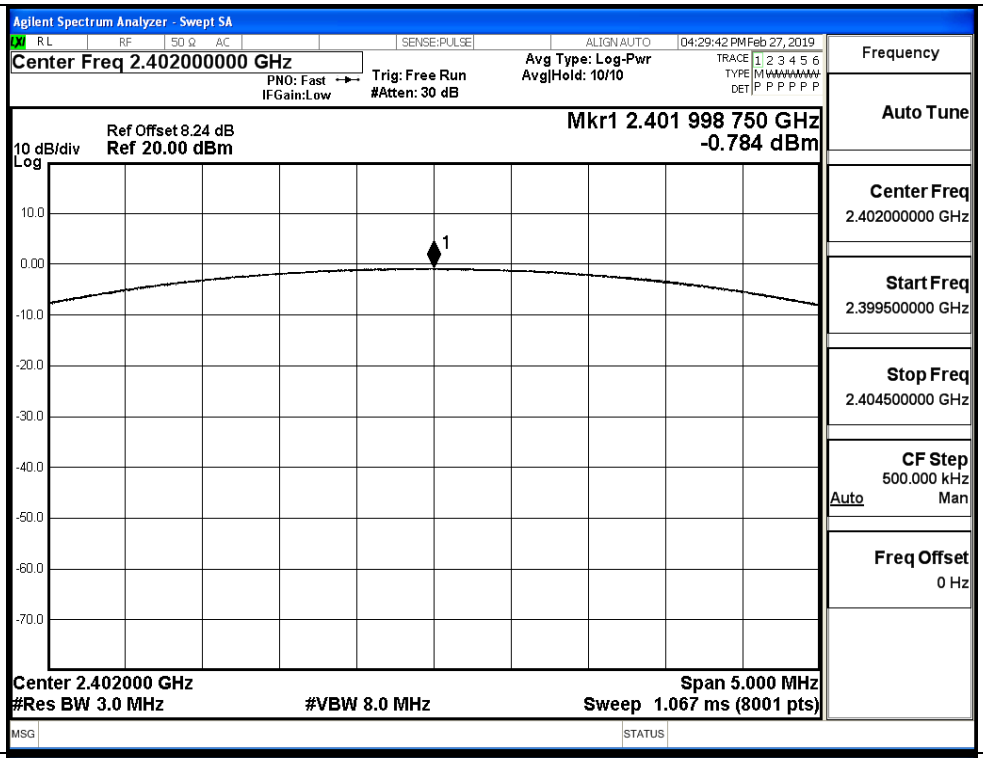
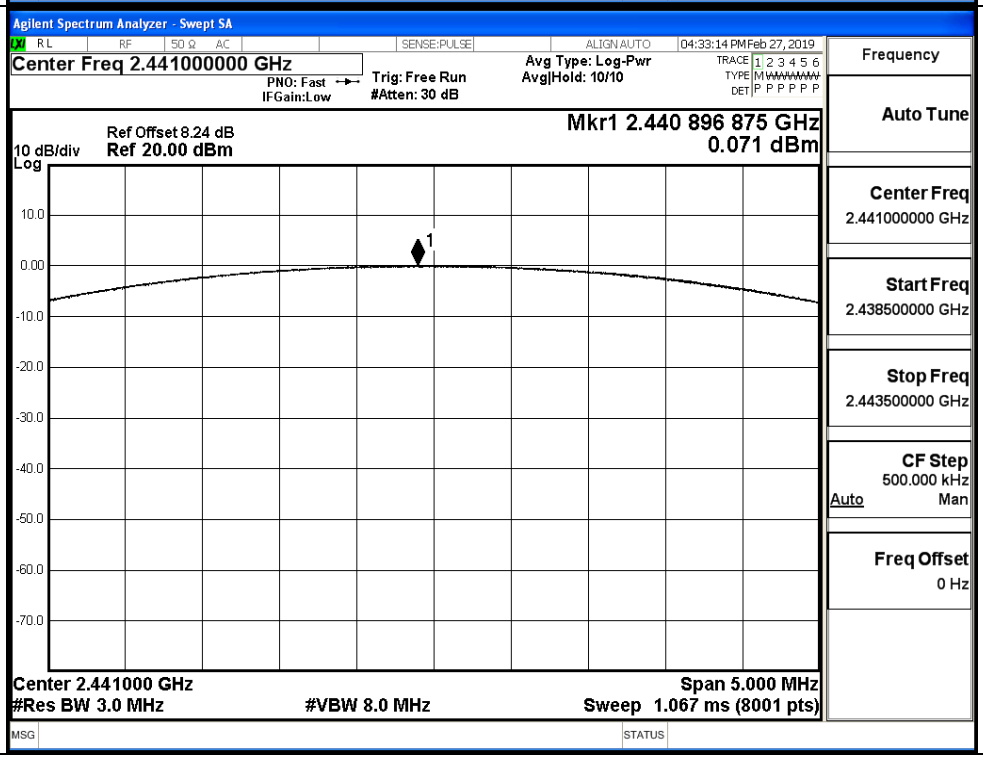
A.1 Maximum Conducted Peak Output Power

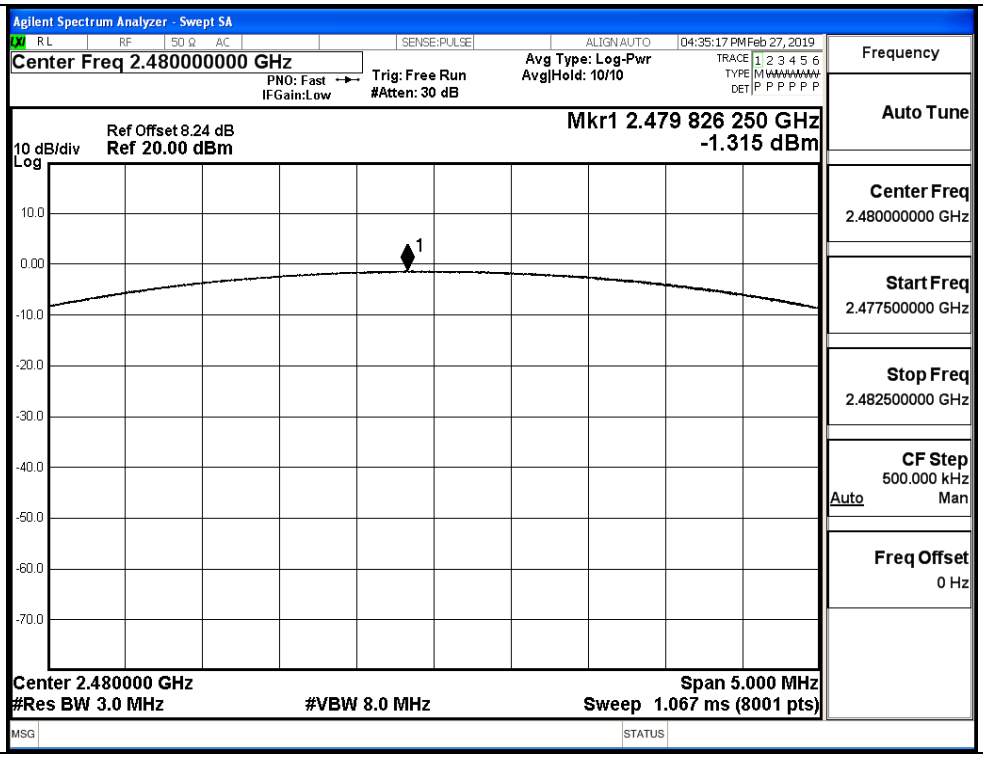
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.410	21	PASS
	MCH	0.489	21	PASS
	HCH	-0.900	21	PASS
π/4DQPSK	LCH	-0.921	21	PASS
	MCH	-0.066	21	PASS
	HCH	-1.480	21	PASS
8DPSK	LCH	-0.784	21	PASS
	MCH	0.071	21	PASS
	HCH	-1.315	21	PASS

Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH		
π/4DQPSK/HCH		

8DPSK/LCH		
8DPSK/MCH		

8DPSK/HCH	

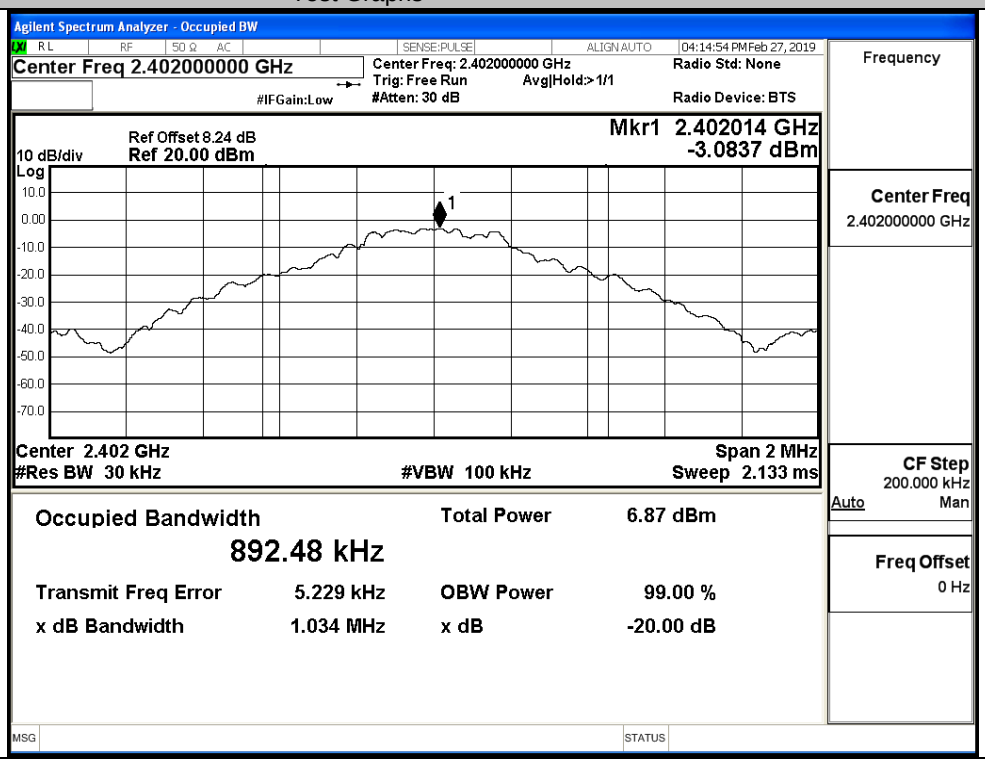
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
04:35:17 PM Feb 27, 2019
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 826 250 GHz
-1.315 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 5.000 MHz
Sweep 1.067 ms (8001 pts)
MSG
STATUS
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

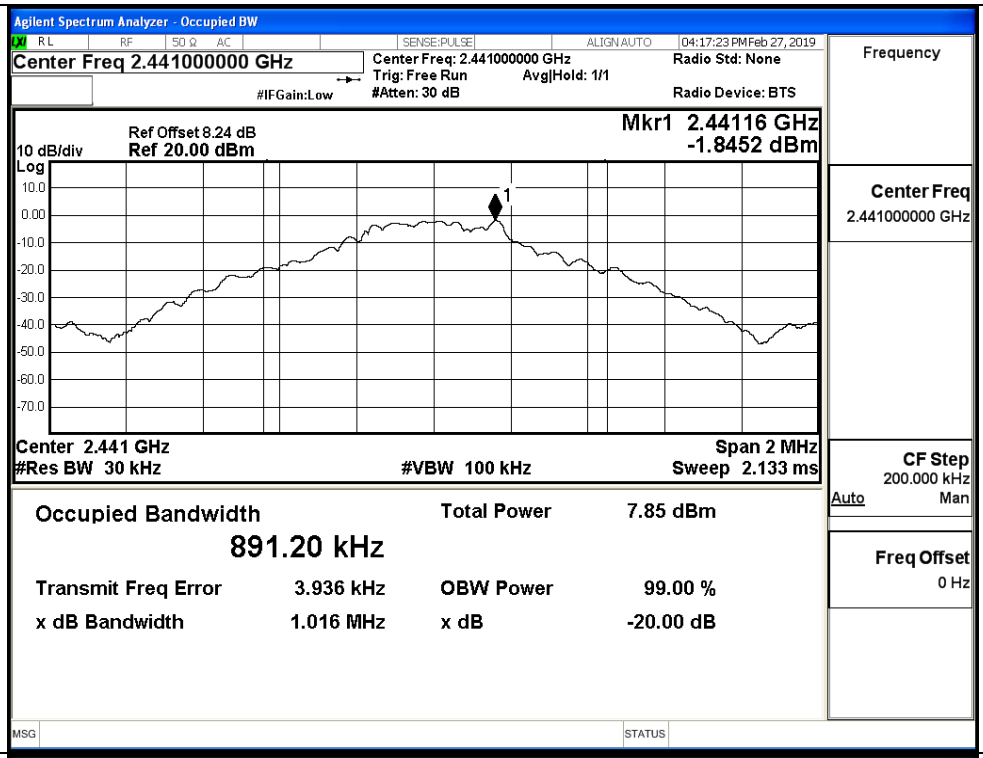
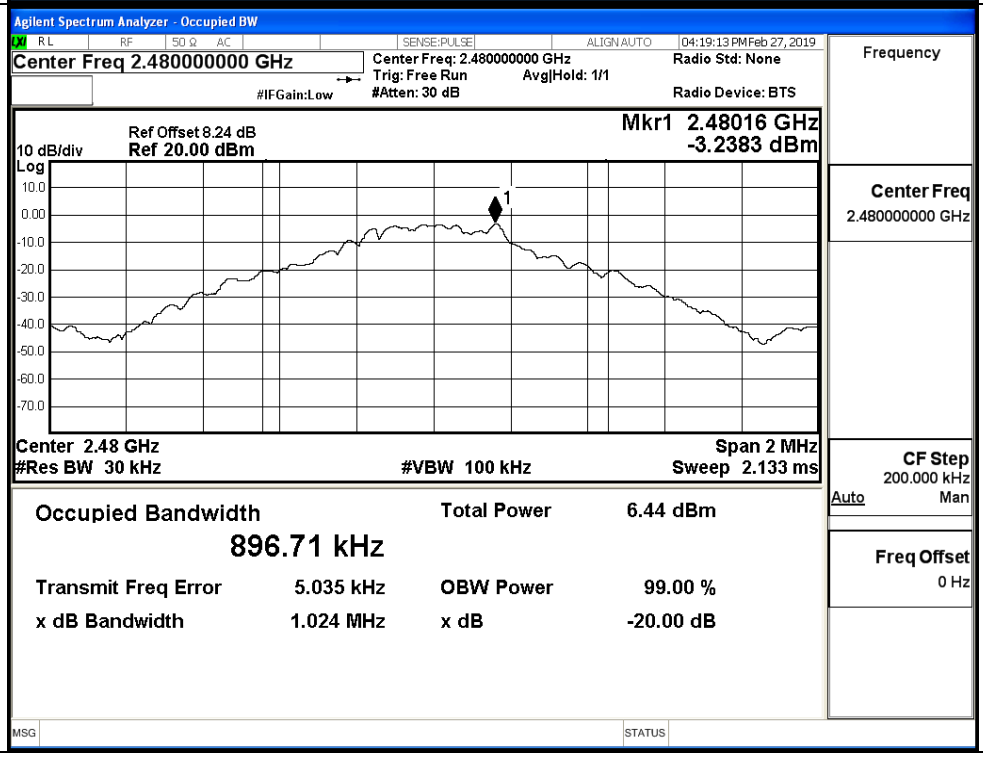
A.2 99% and 20dB Bandwidth

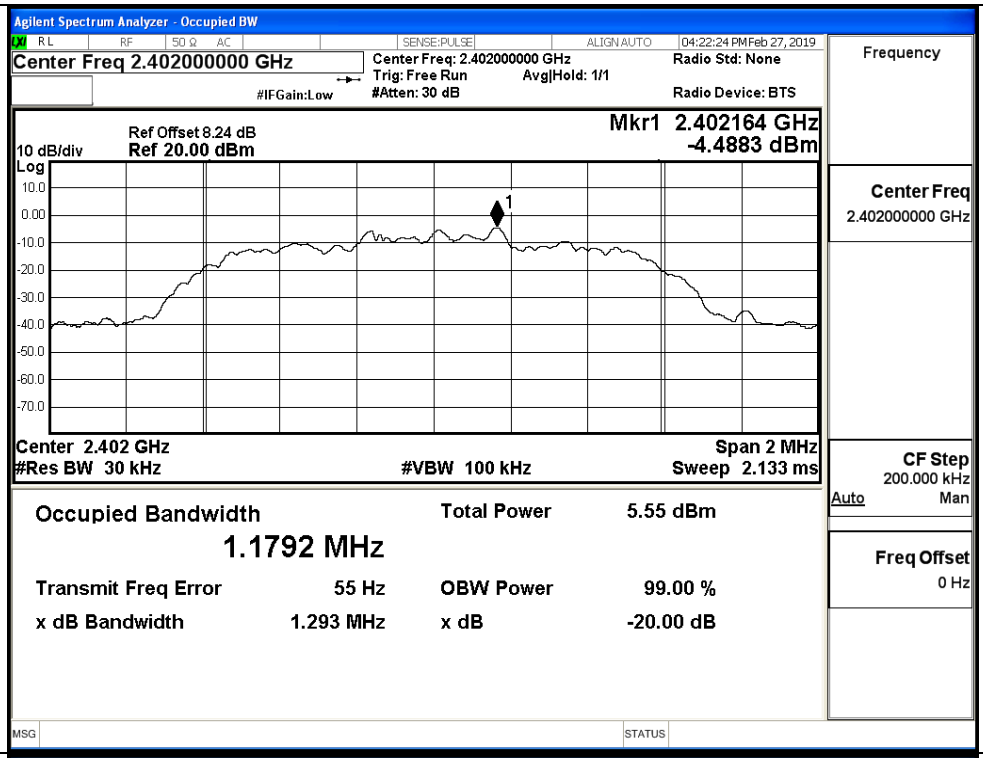
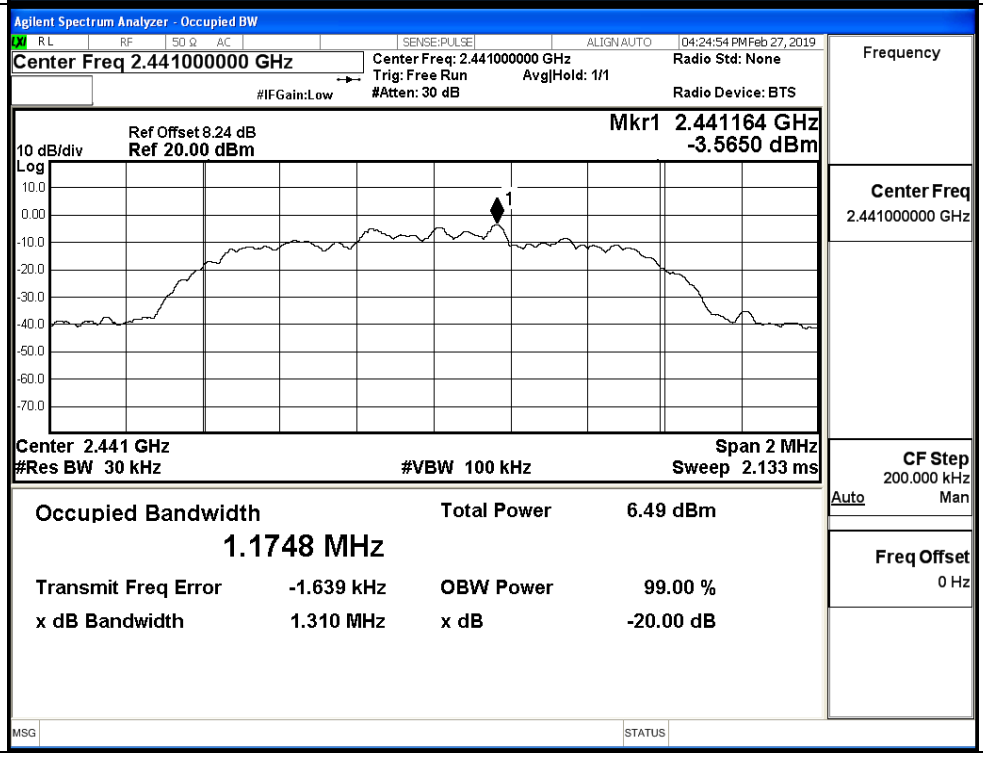
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89248	1.034	Not Specified	PASS
	MCH	0.89120	1.016	Not Specified	PASS
	HCH	0.89671	1.024	Not Specified	PASS
π/4DQPSK	LCH	1.1792	1.293	Not Specified	PASS
	MCH	1.1748	1.310	Not Specified	PASS
	HCH	1.1734	1.306	Not Specified	PASS
8DPSK	LCH	1.1922	1.296	Not Specified	PASS
	MCH	1.1933	1.304	Not Specified	PASS
	HCH	1.1879	1.302	Not Specified	PASS

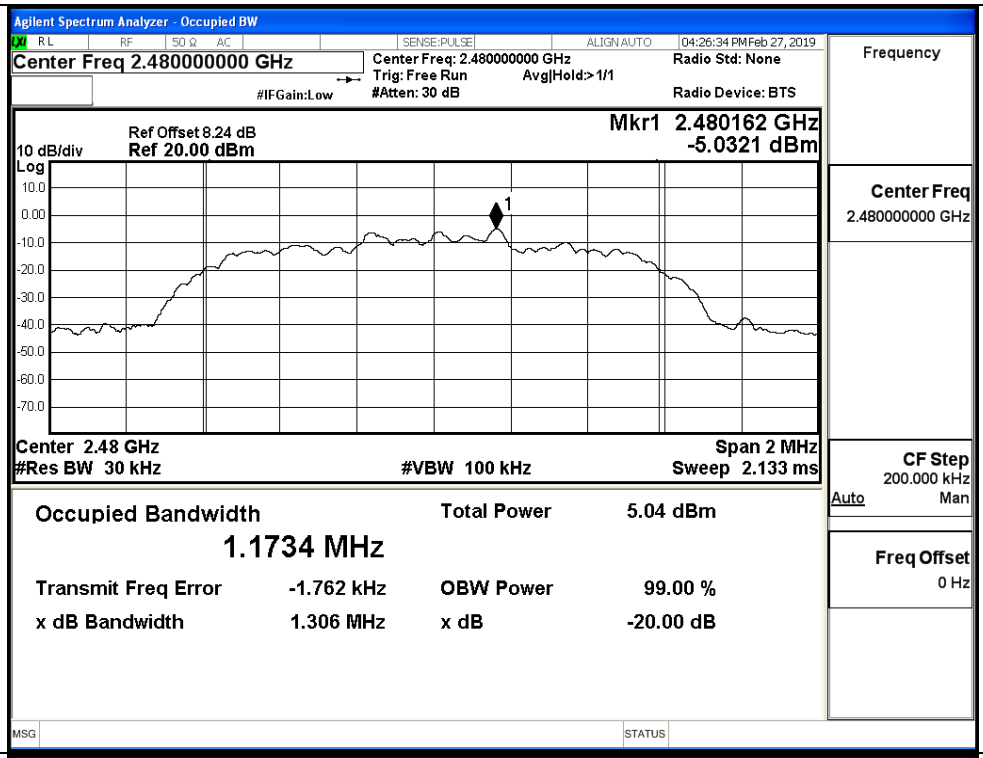
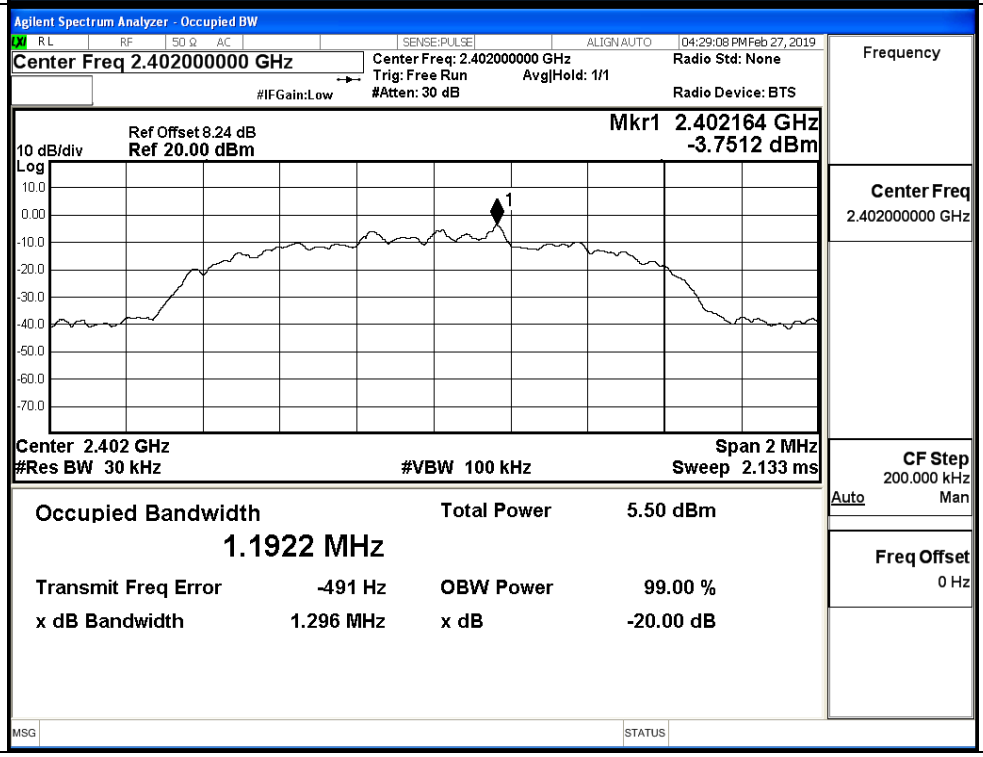
Test Graphs

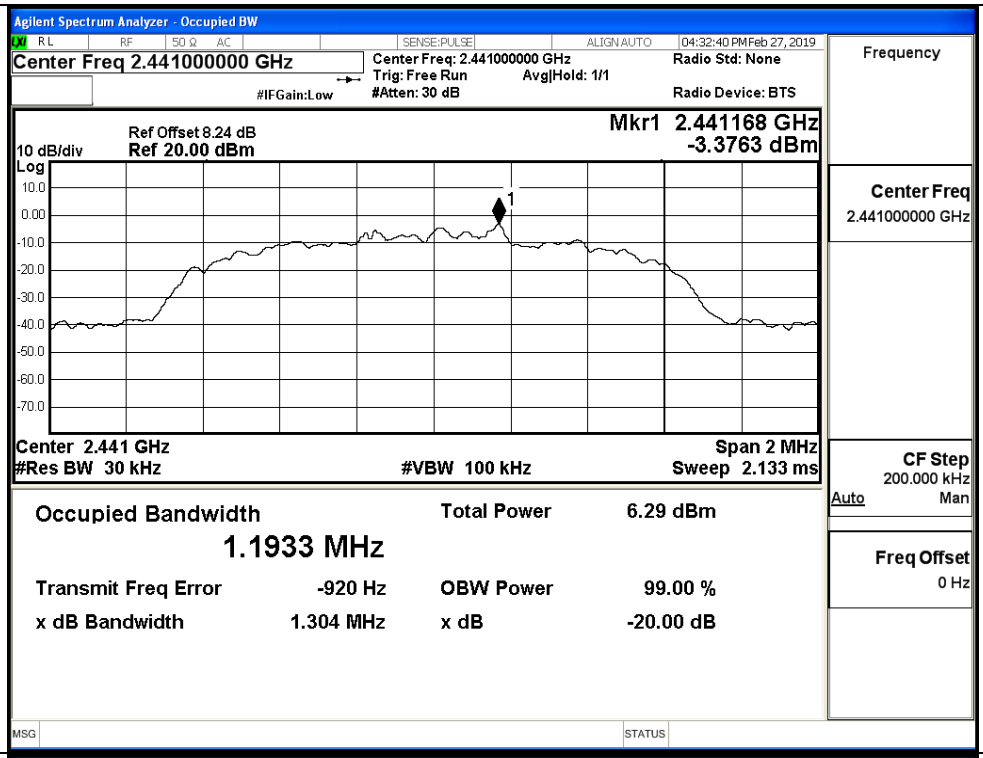
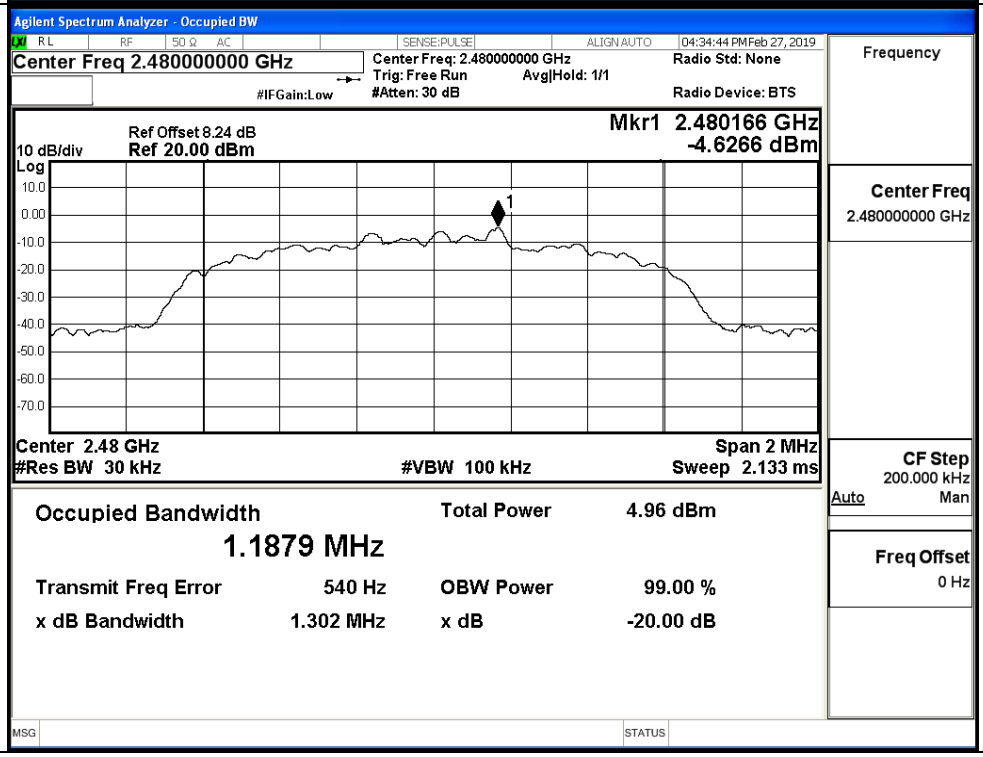
GFSK/LCH



GFSK/MCH	
GFSK/HCH	

π/4DQPSK/LCH	
π/4DQPSK/MCH	

π/4DQPSK/HCH	
8DPSK/LCH	

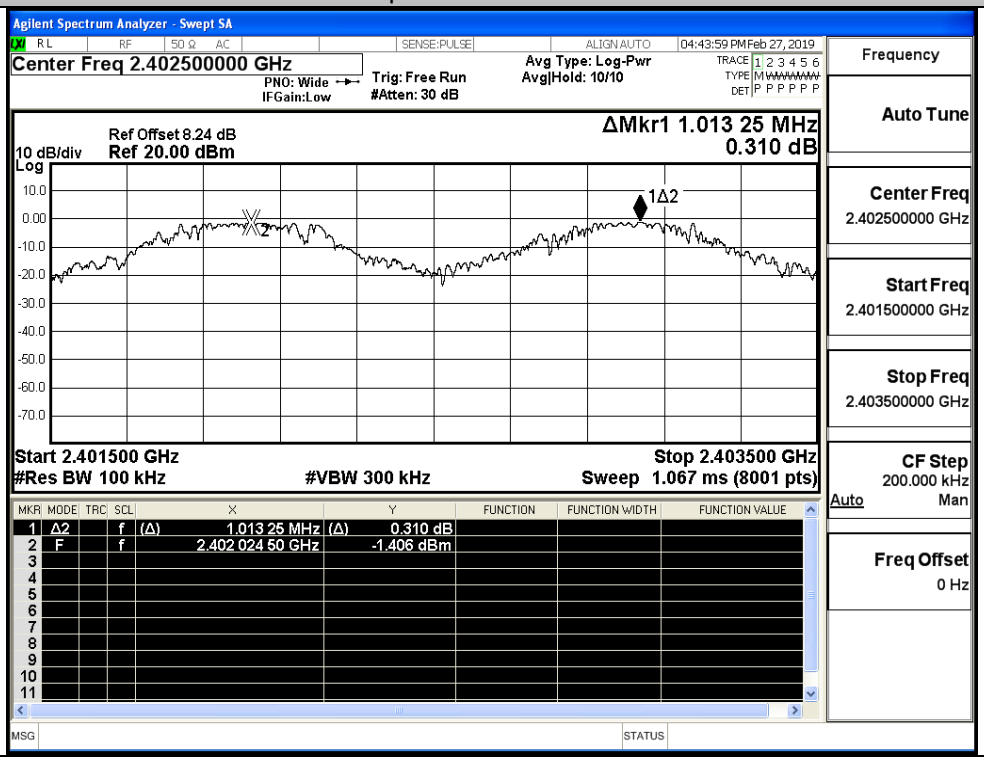
8DPSK/MCH	
8DPSK/HCH	

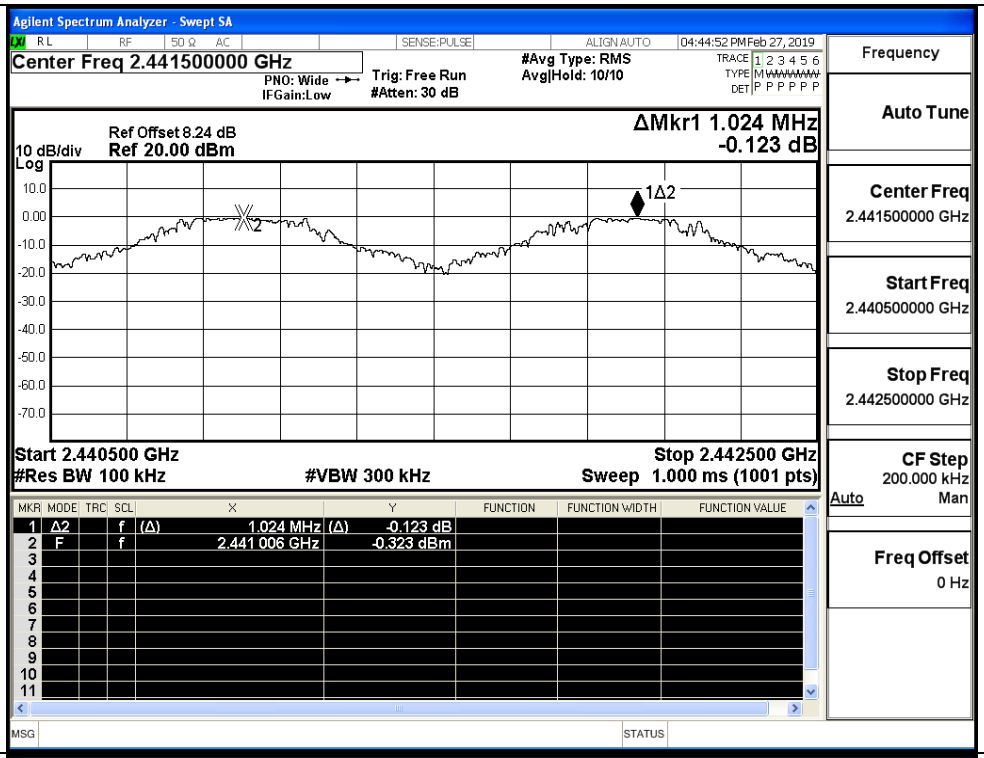
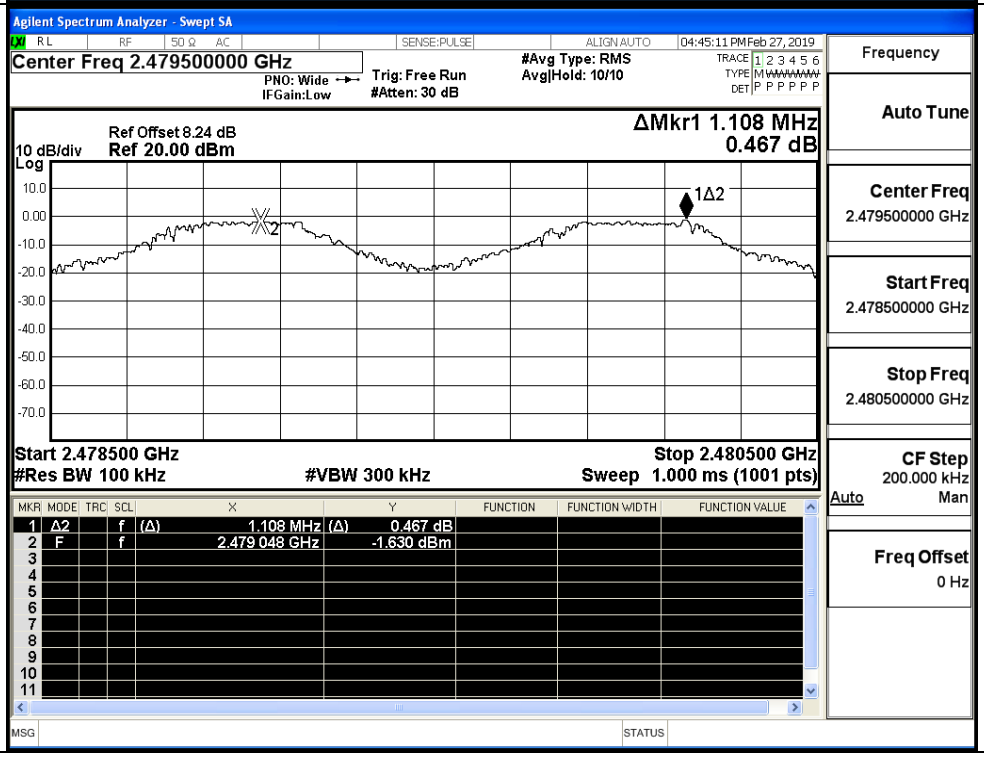
A.3 Carrier Frequency Separation

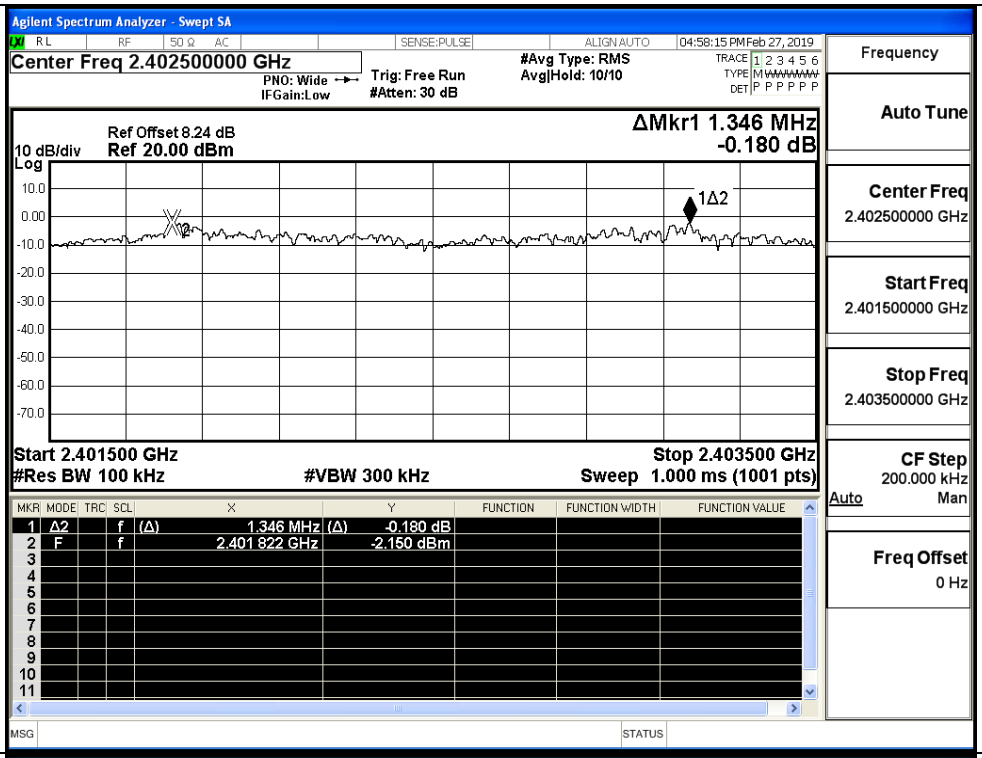
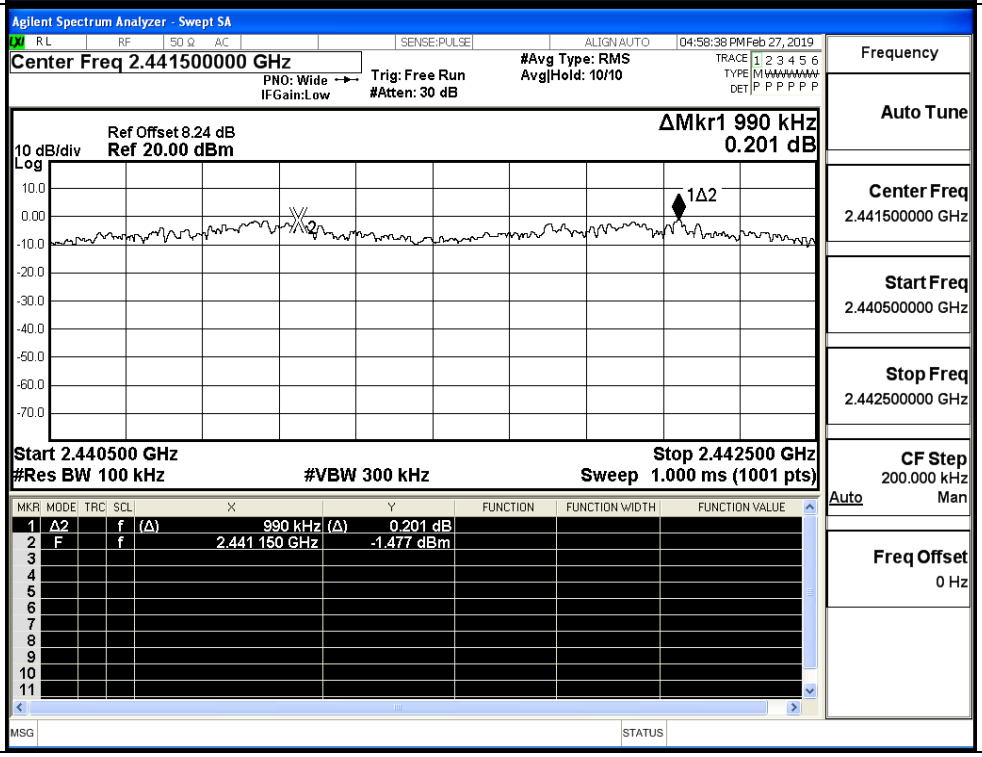
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.013	0.689	PASS
	MCH	1.024	0.689	PASS
	HCH	1.108	0.689	PASS
π/4DQPSK	LCH	1.346	0.873	PASS
	MCH	0.990	0.873	PASS
	HCH	1.320	0.873	PASS
8DPSK	LCH	1.010	0.869	PASS
	MCH	1.346	0.869	PASS
	HCH	1.222	0.869	PASS

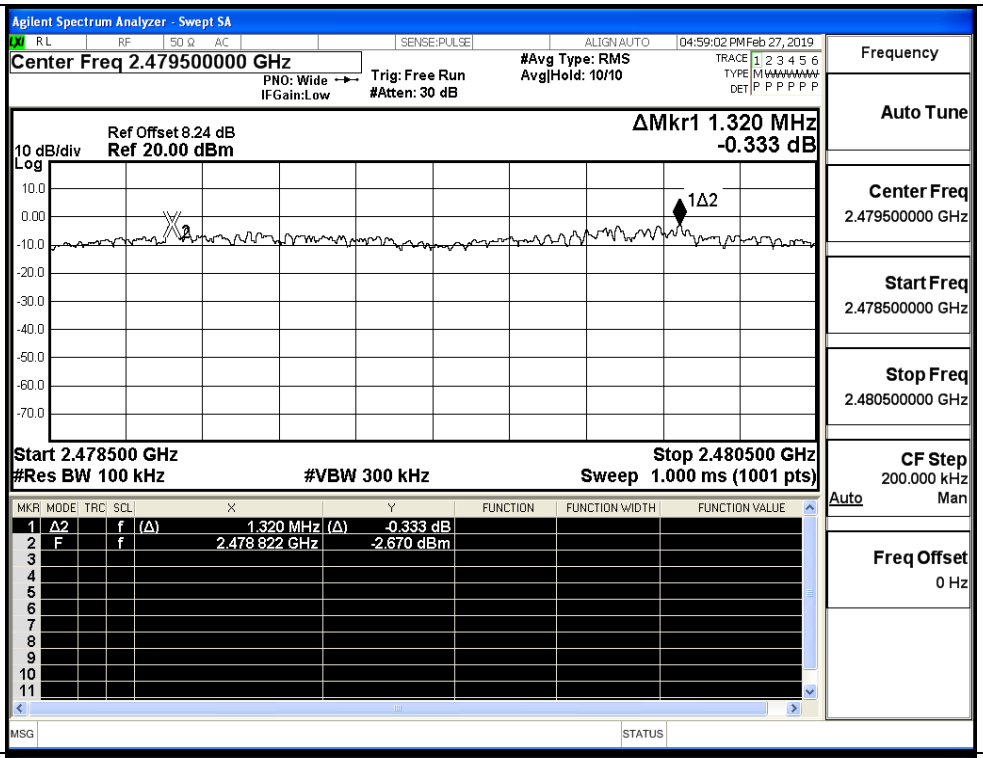
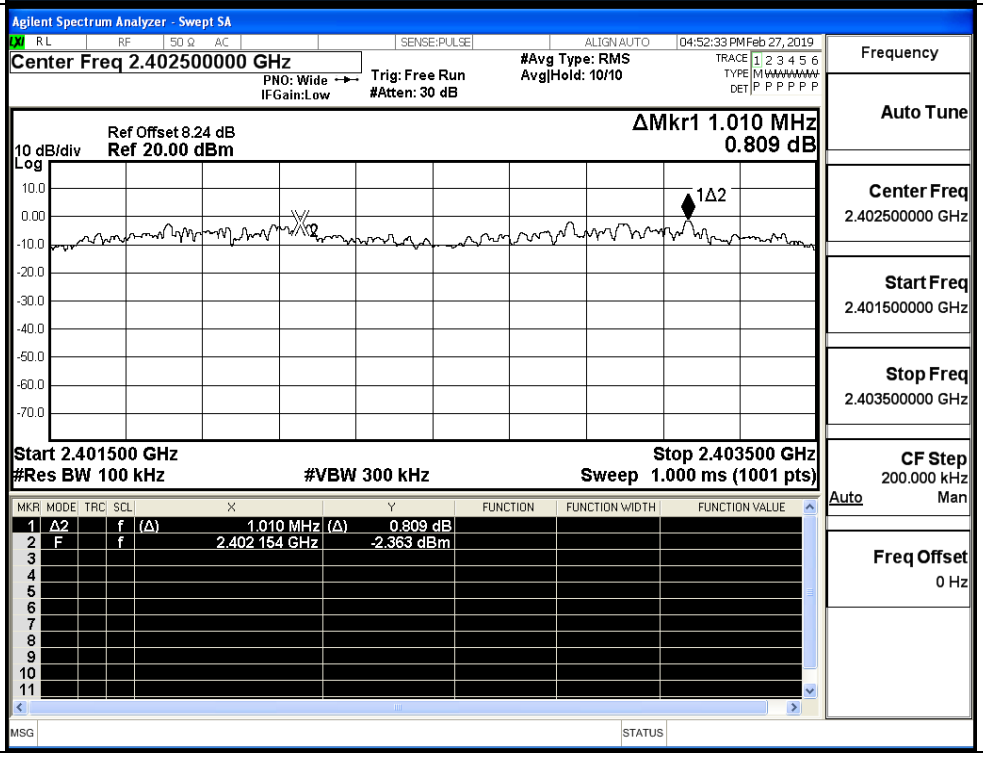
Test Graphs

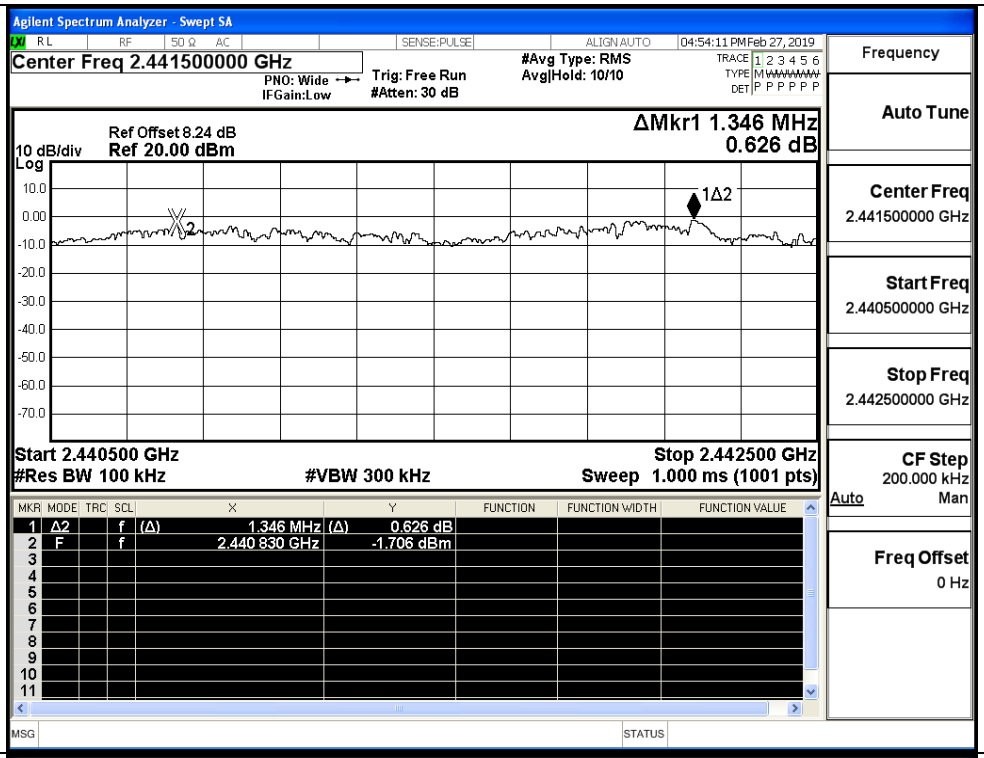
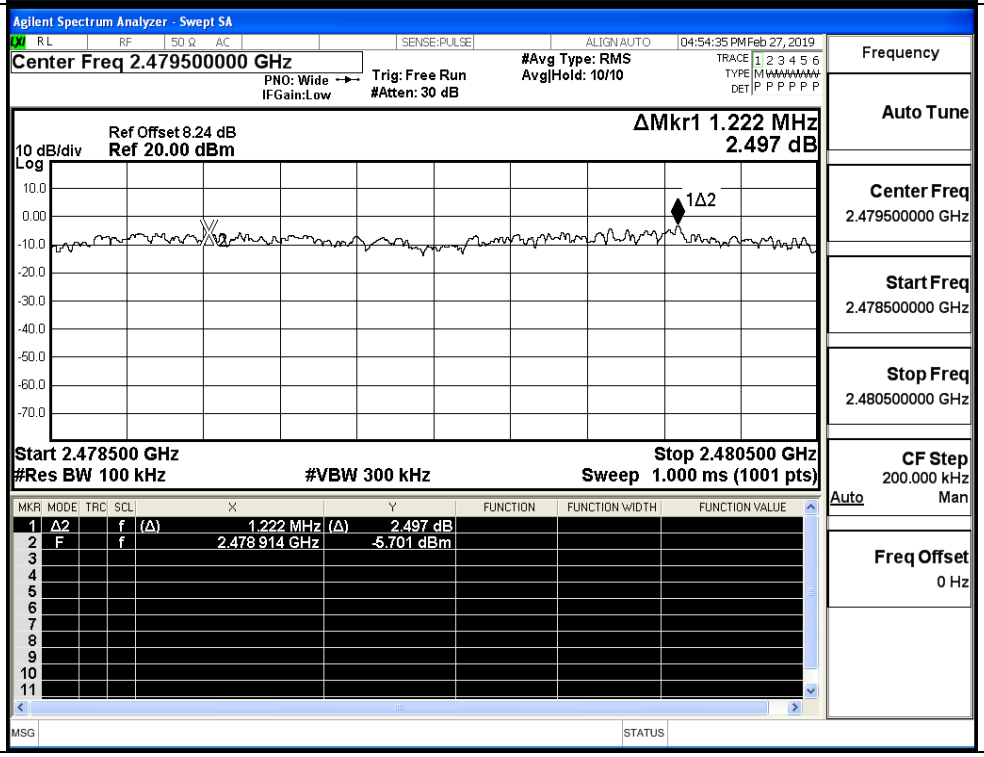
GFSK/LCH



GFSK/MCH	
GFSK/HCH	

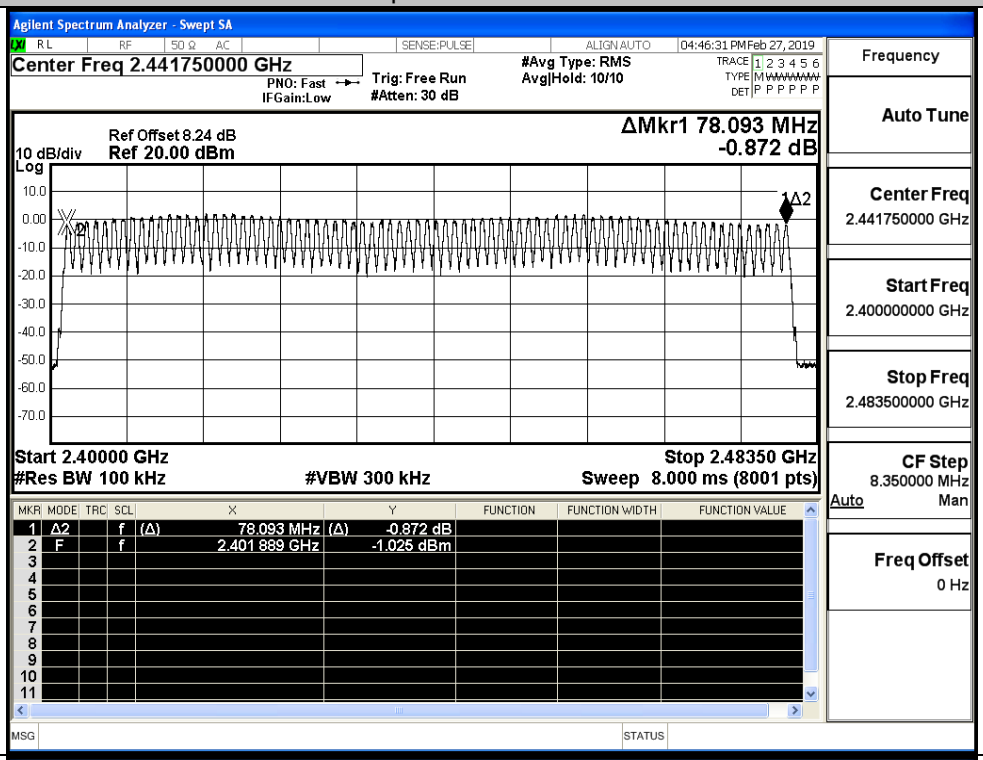
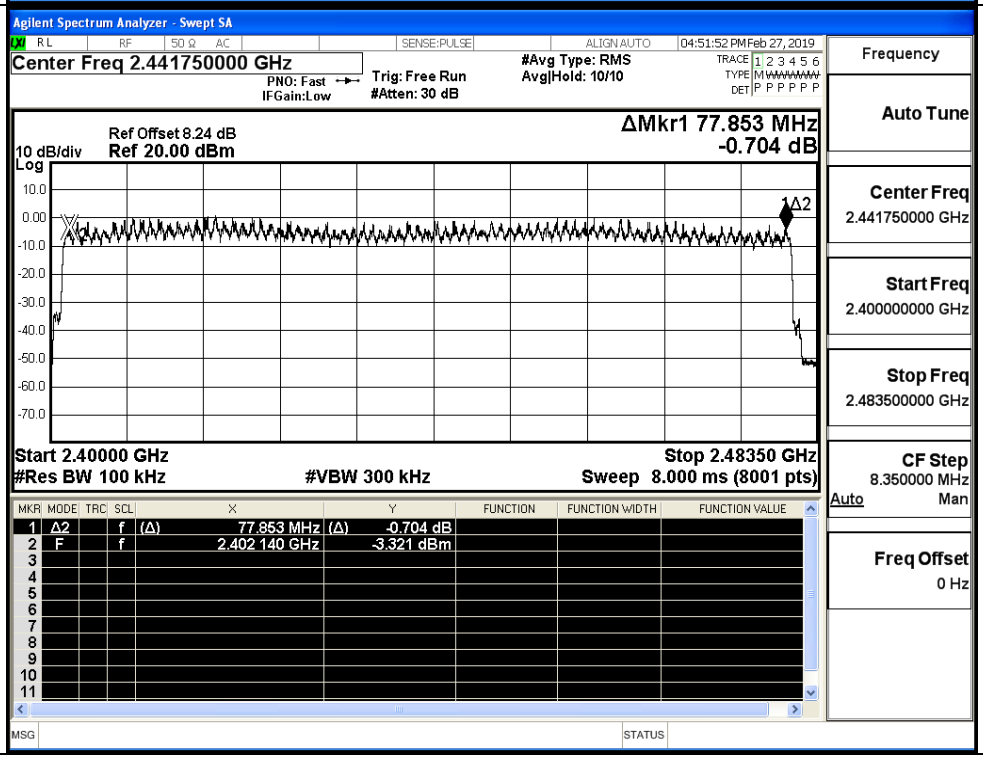
π/4DQPSK/LCH	
π/4DQPSK/MCH	

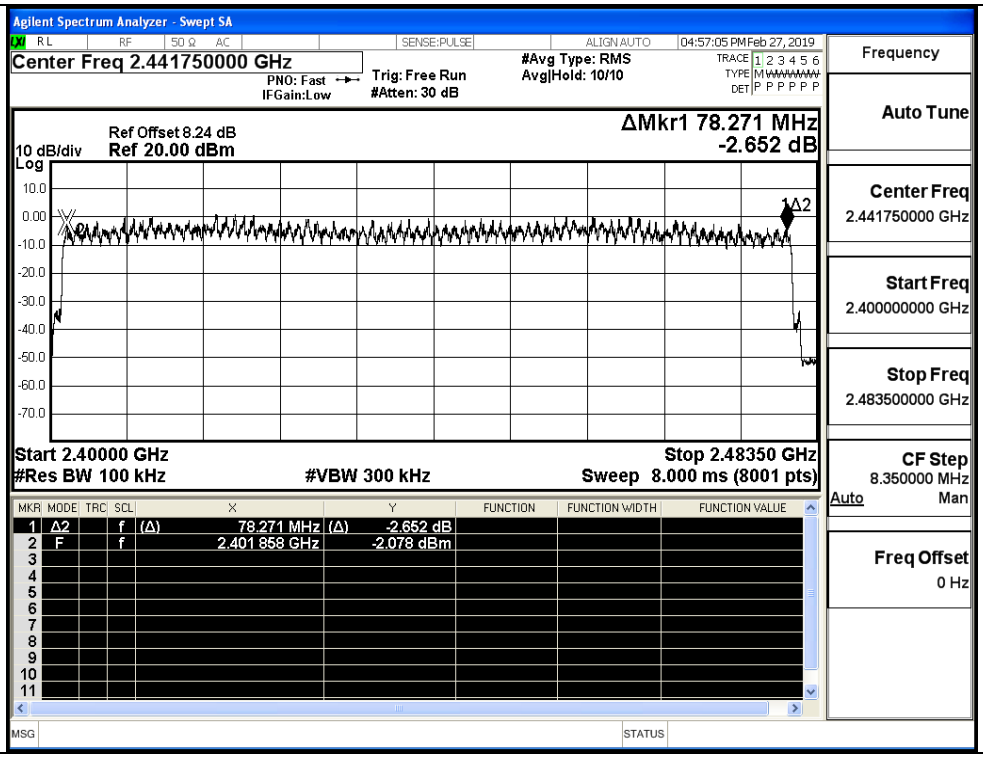
π/4DQPSK/HCH	
8DPSK/LCH	

8DPSK/MCH	
8DPSK/HCH	

A.4 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	

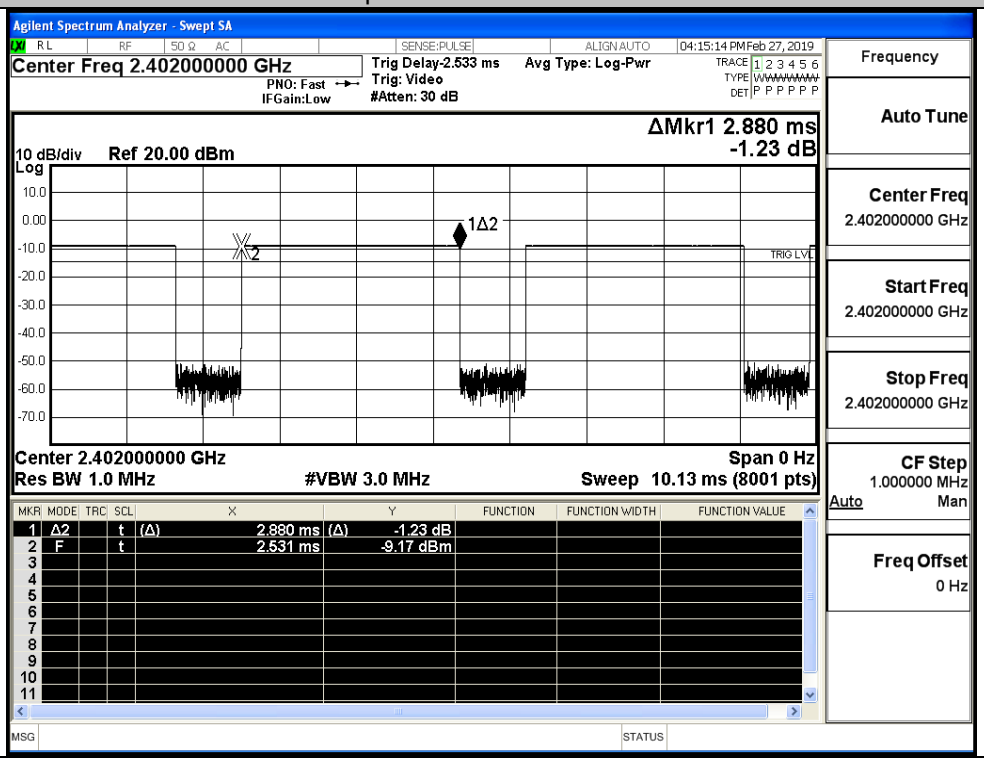
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
04:57:05 PM Feb 27, 2019
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr1 78.271 MHz
-2.652 dB
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (8001 pts)
1 Δ2 f (Δ) 78.271 MHz (Δ) -2.652 dB
2 F f 2.401 858 GHz -2.078 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

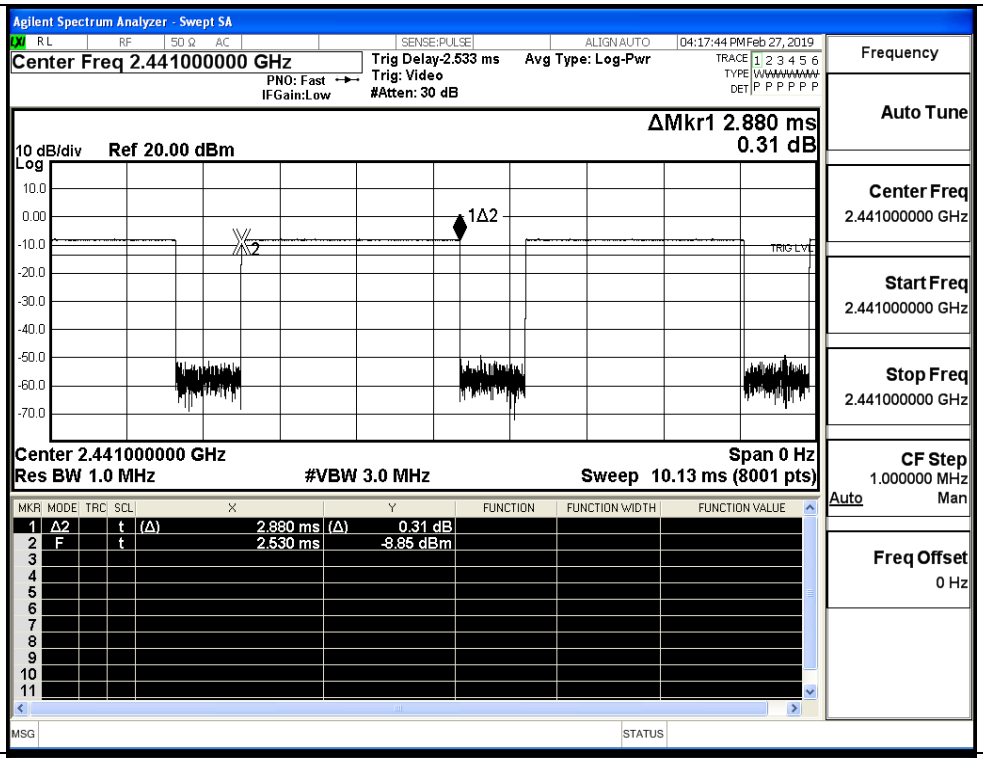
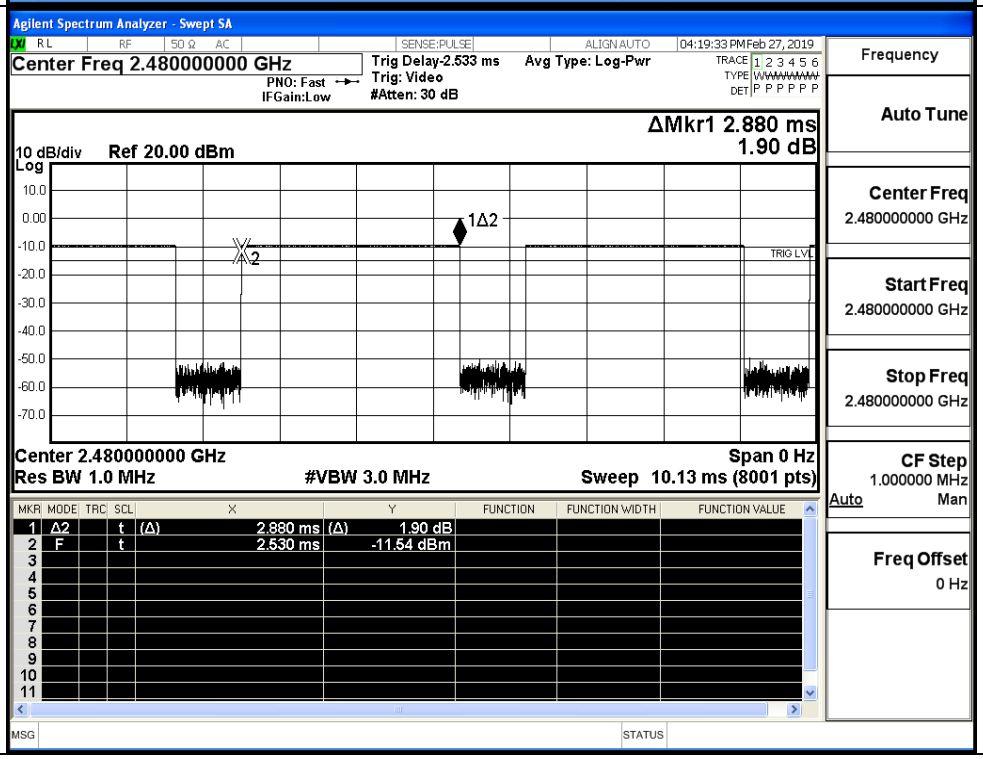
A.5 Dwell Time

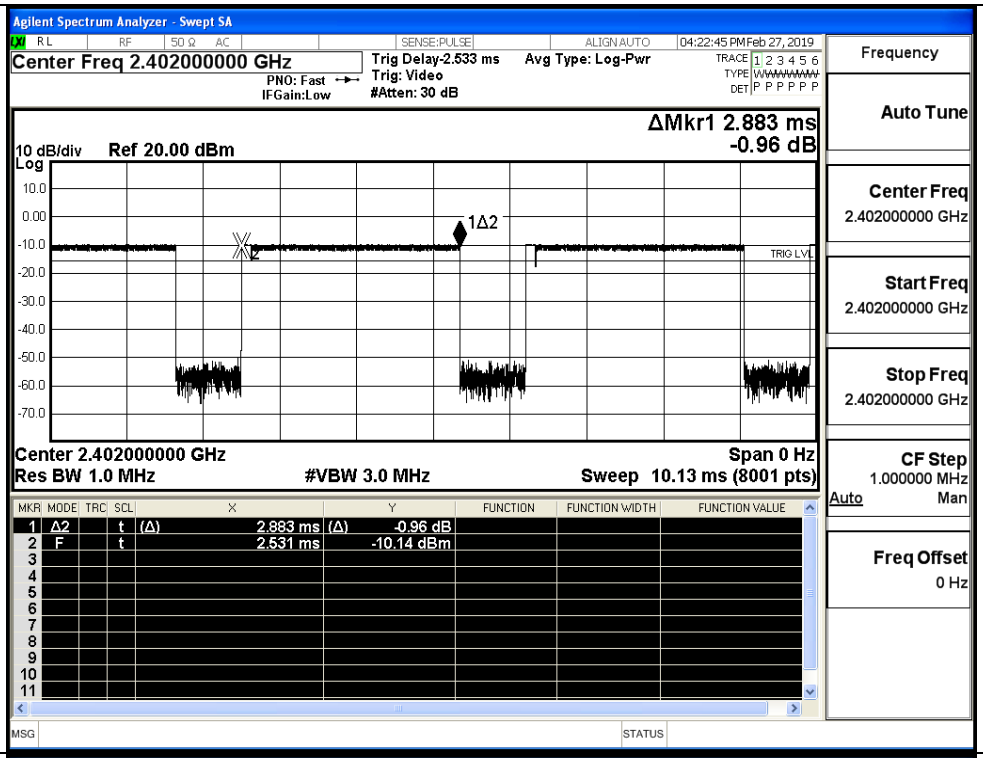
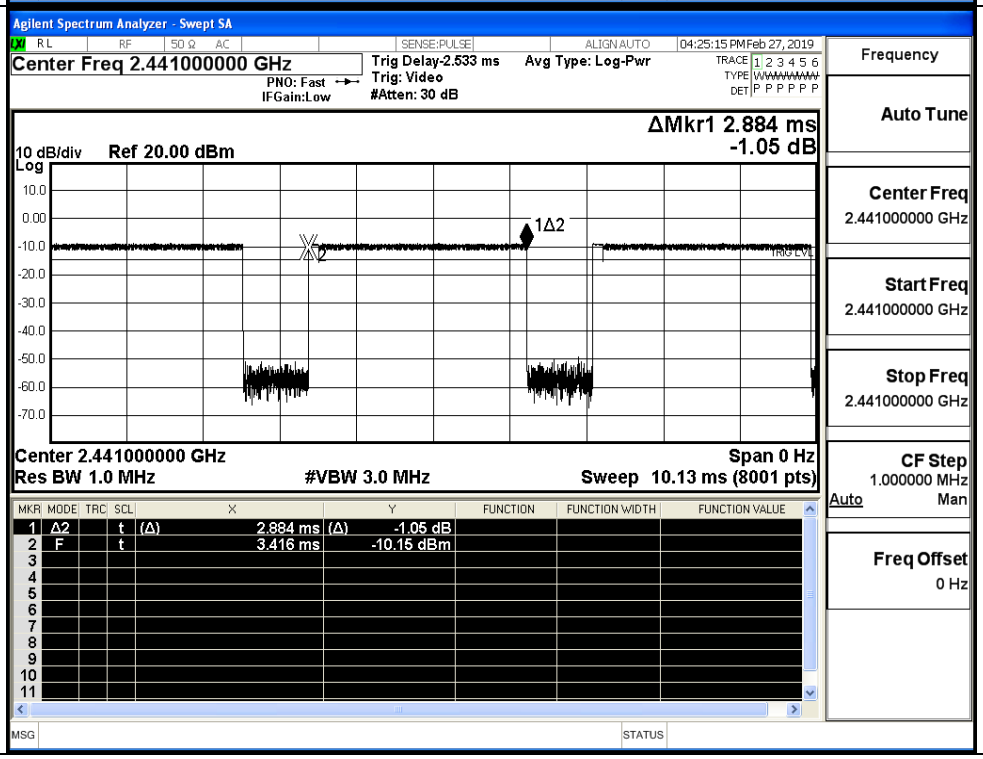
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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

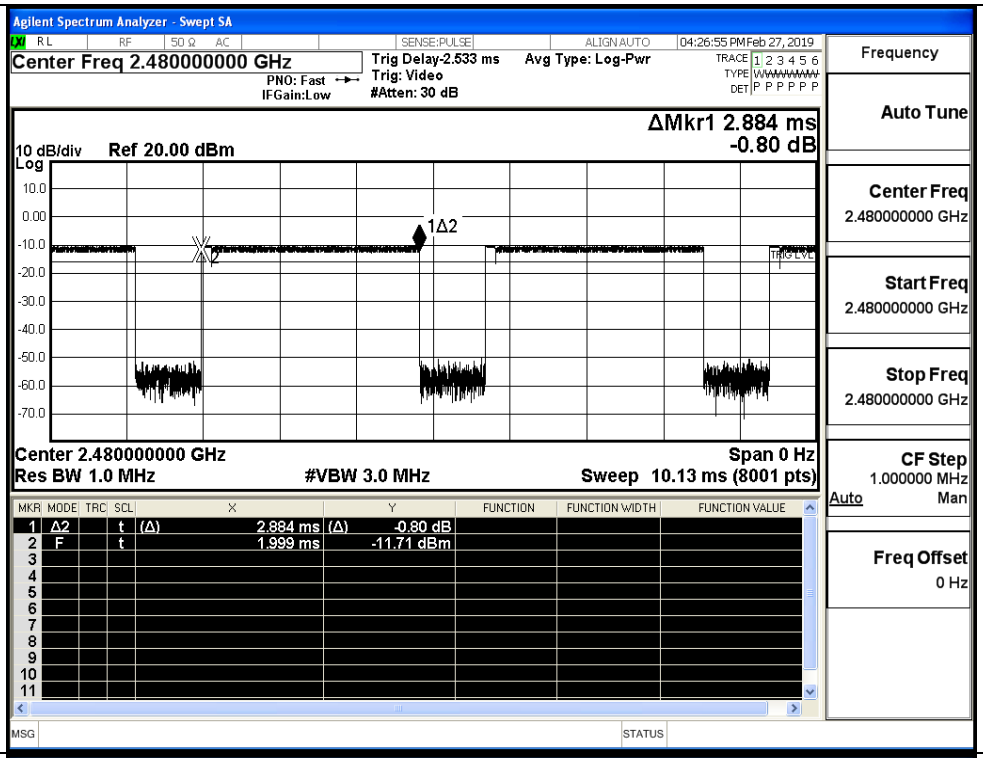
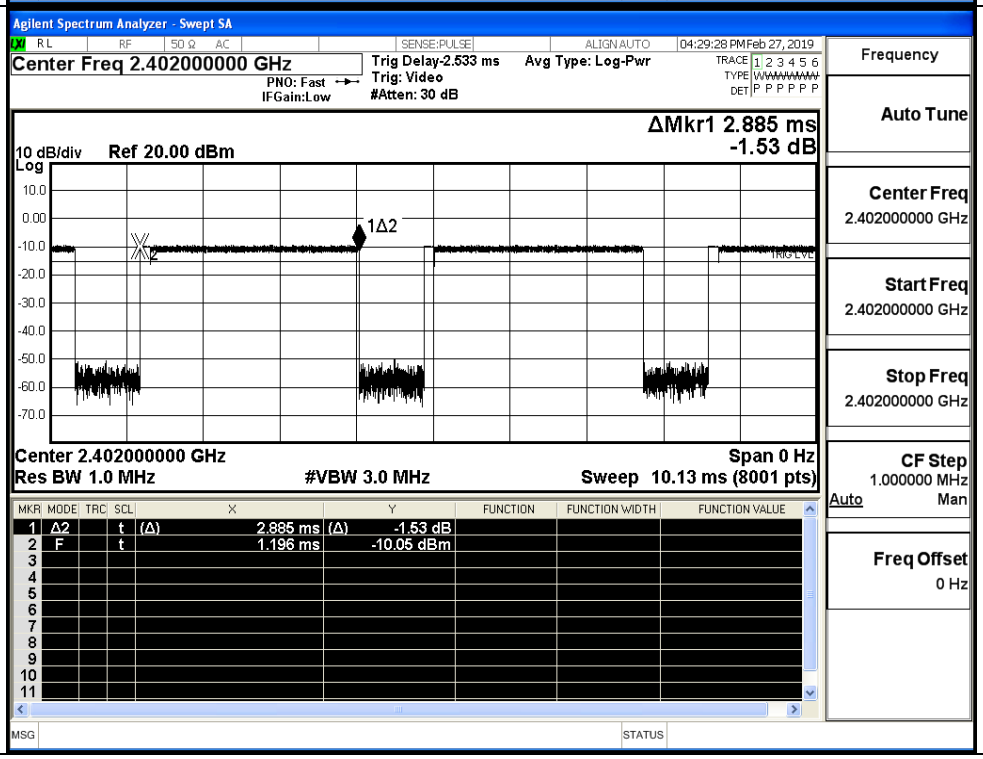
Test Graphs

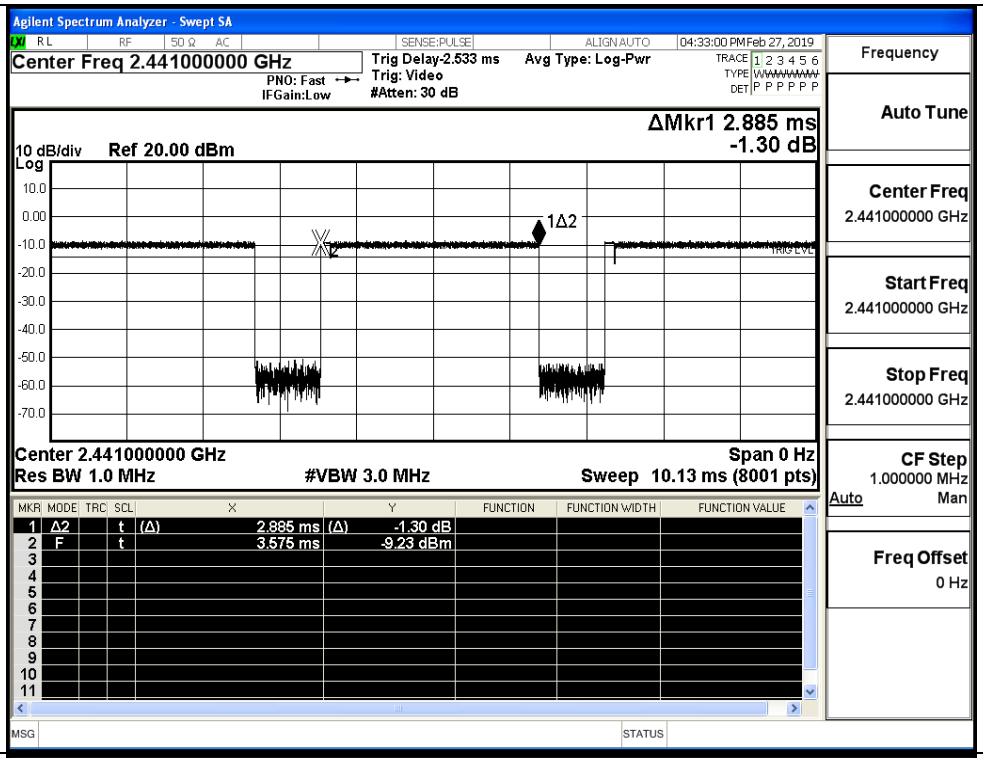
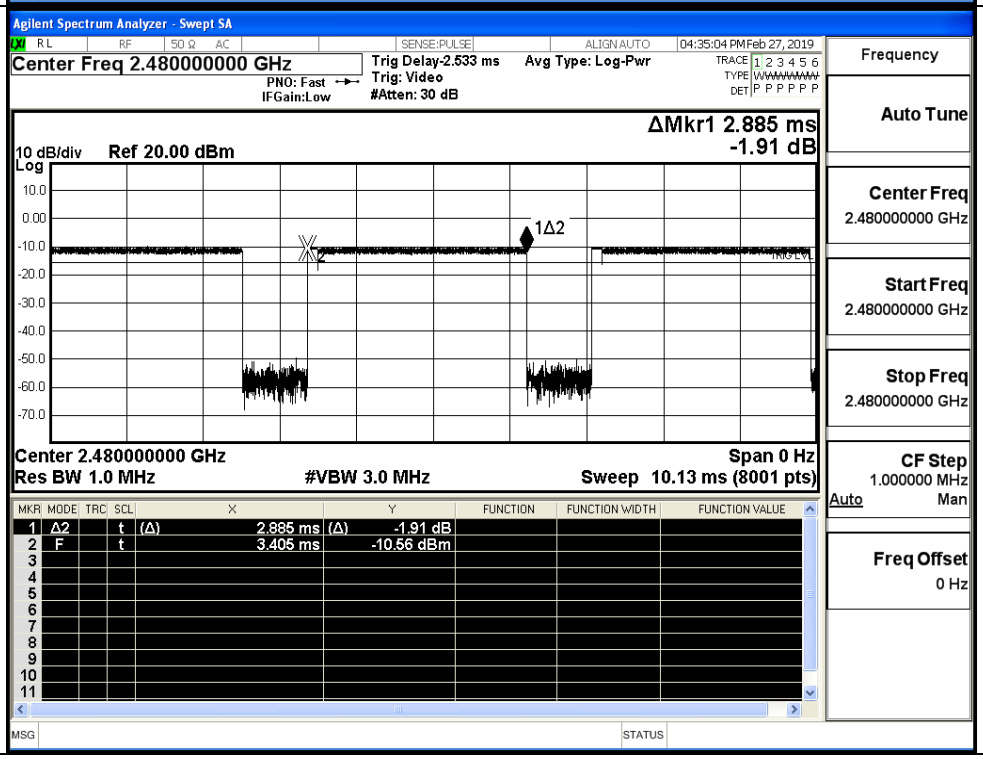
GFSK_DH5/LCH



GFSK_DH5/MCH	
GFSK_DH5/HCH	

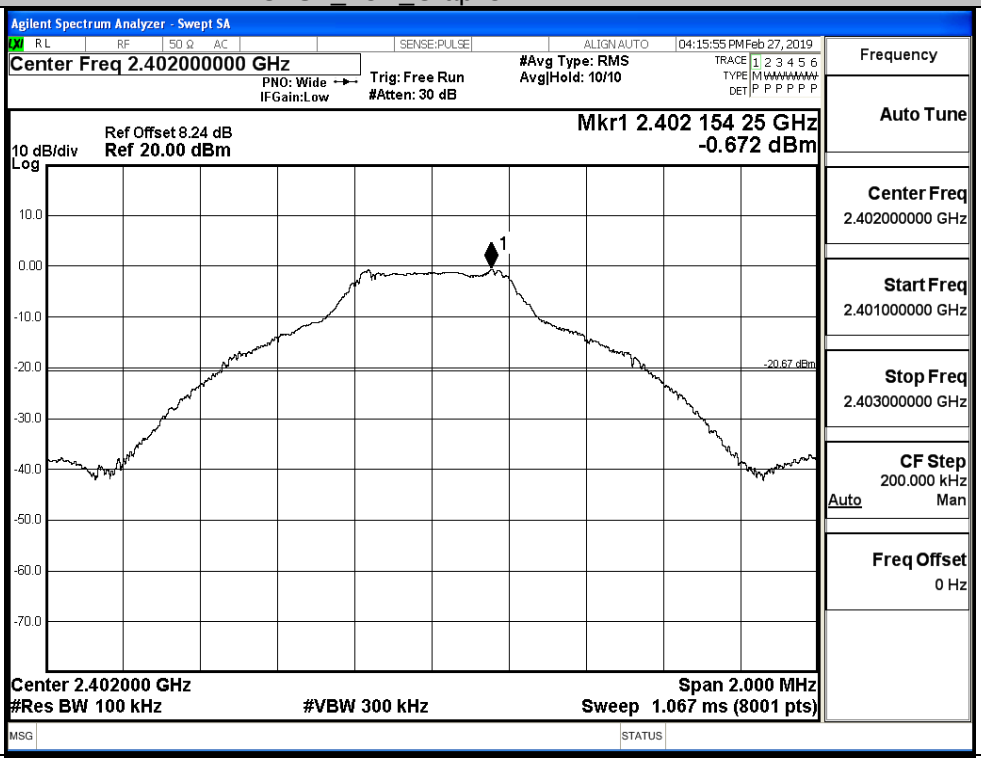
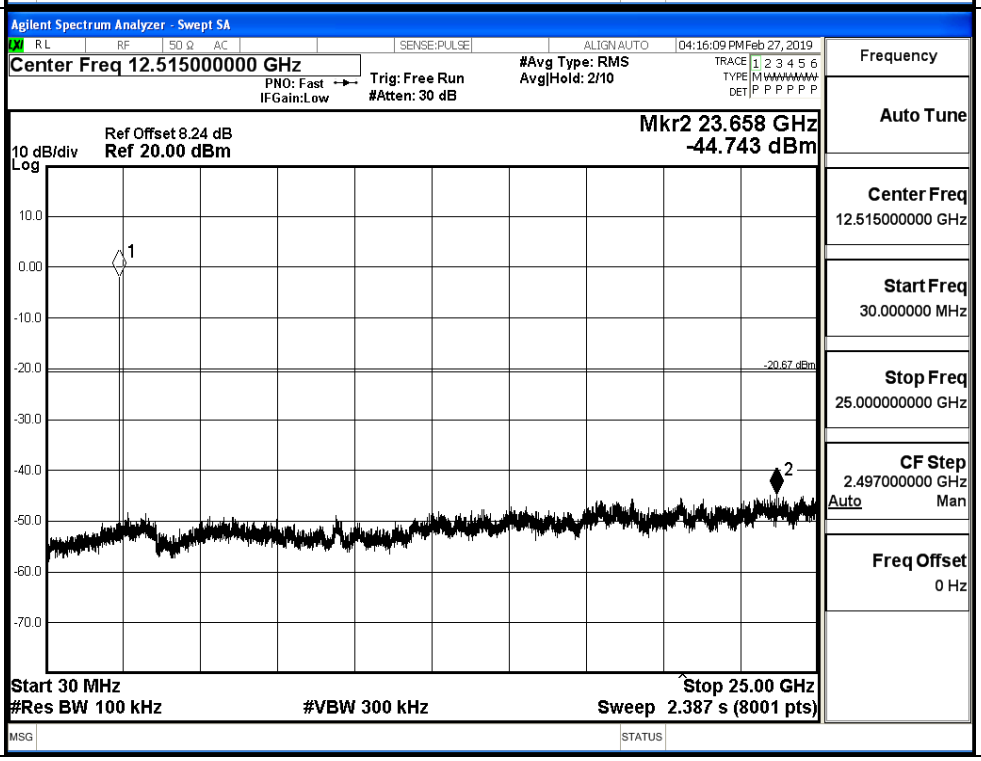
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

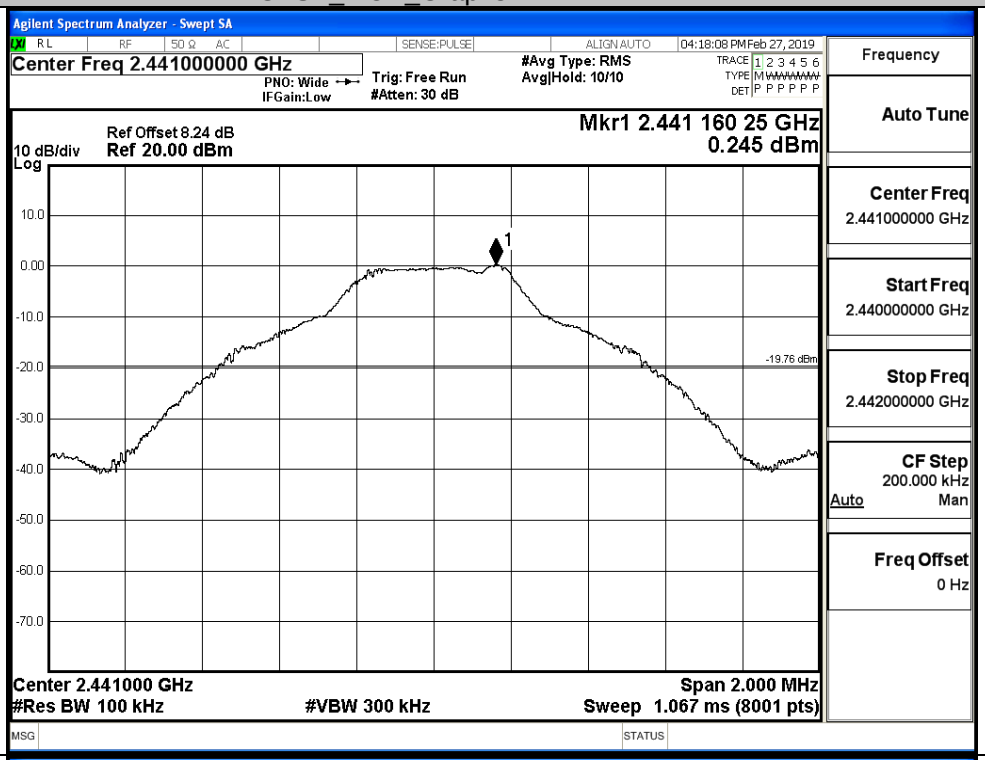
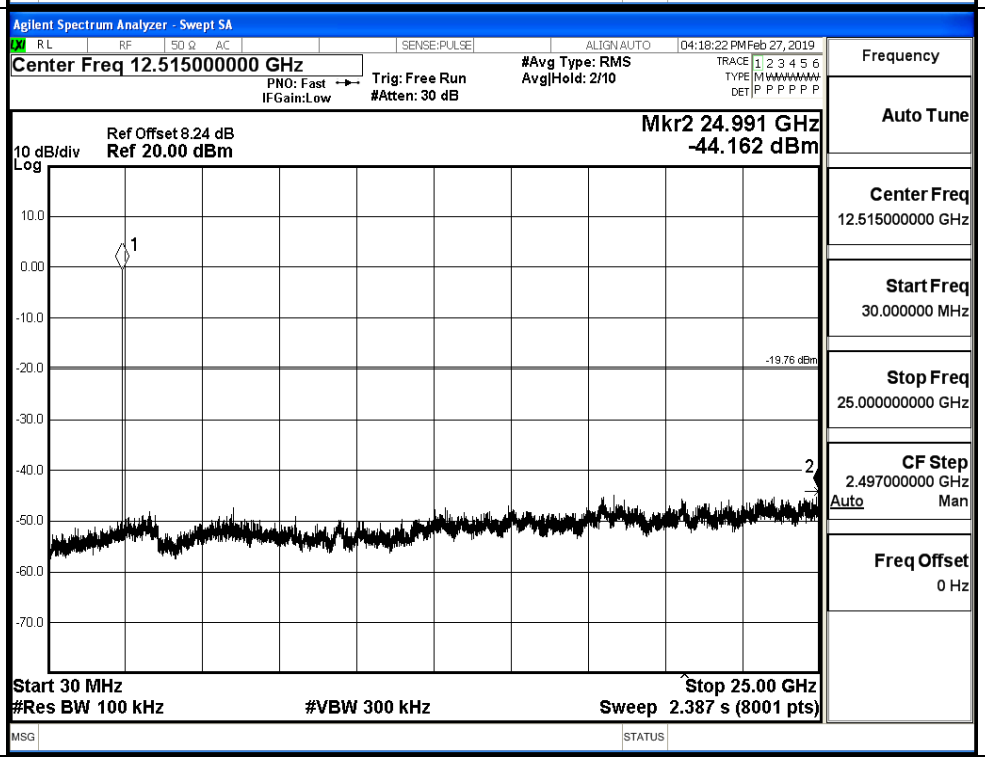
π/4DQPSK _2DH5/HCH	
8DPSK _3DH5/LCH	

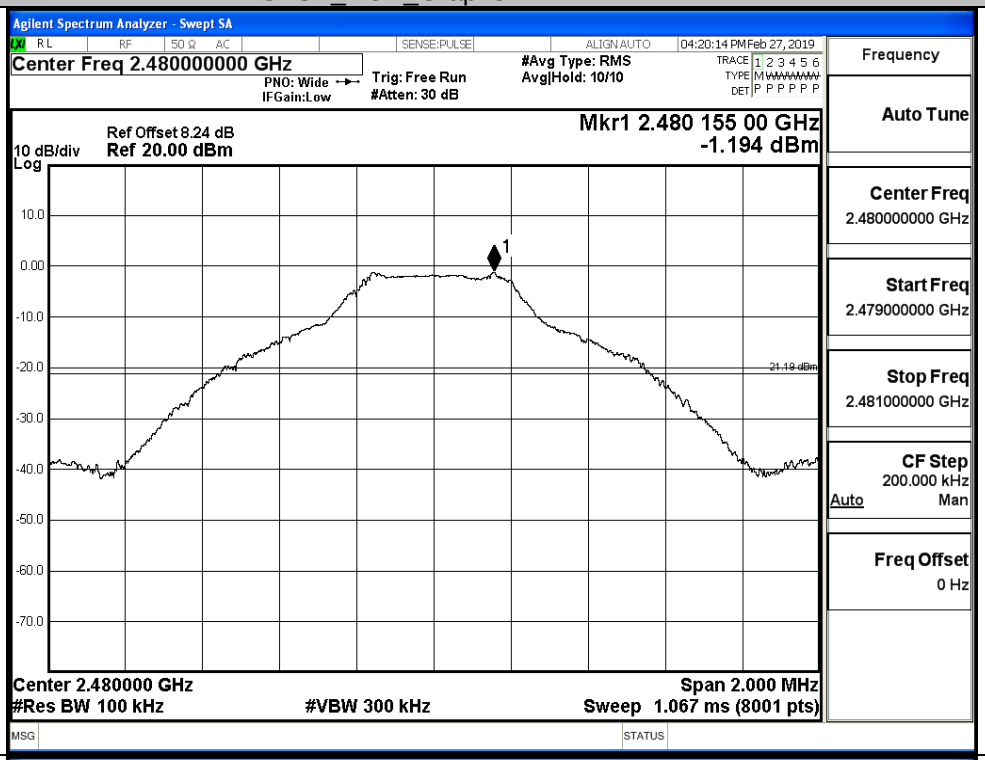
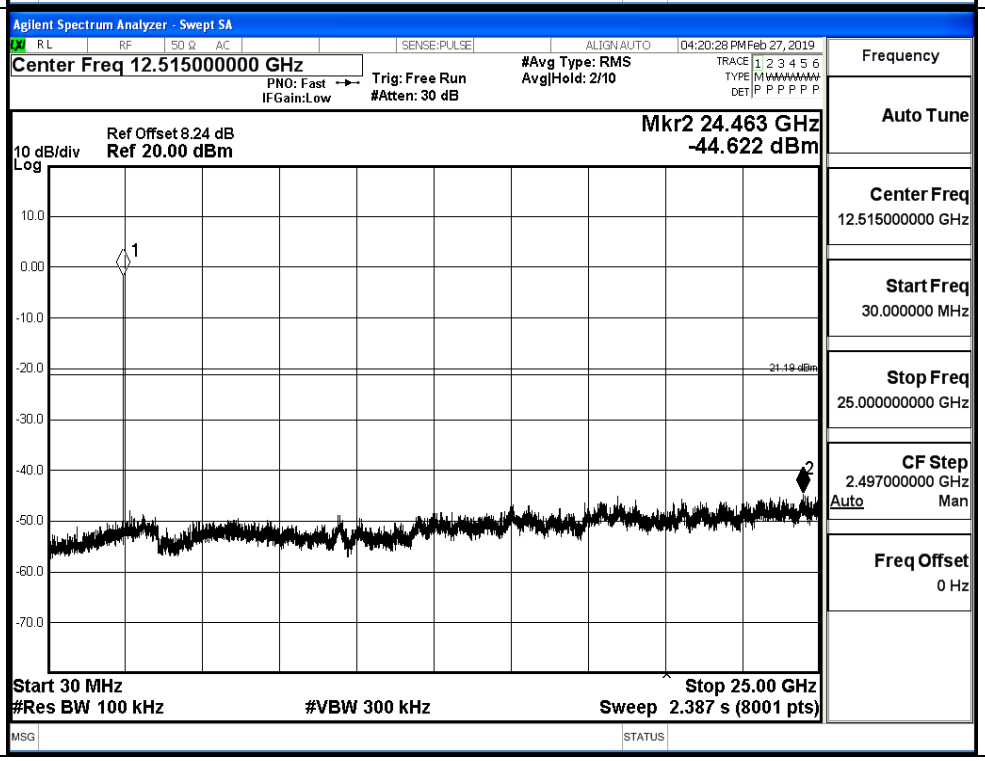
8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

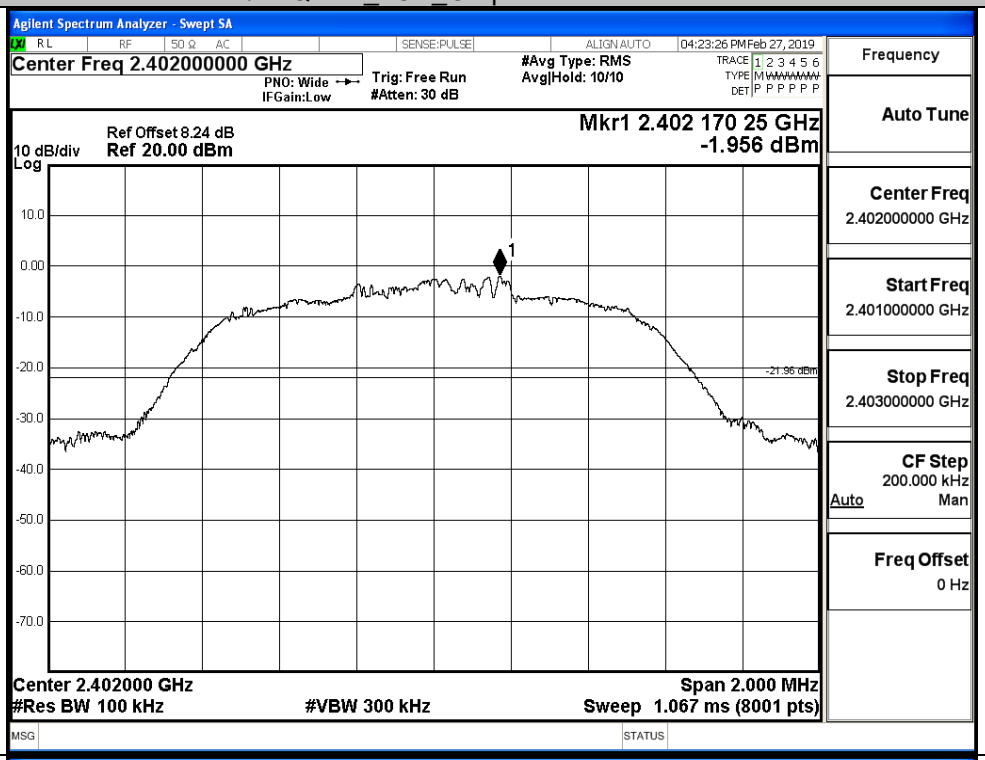
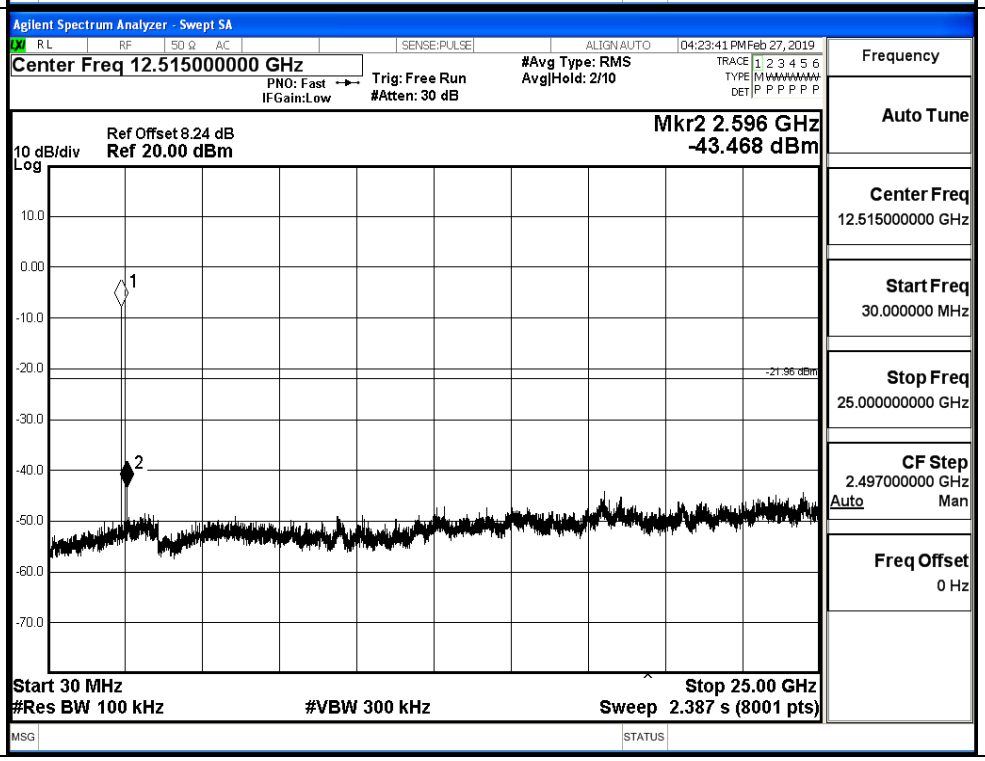
A.6 RF Conducted Spurious Emissions

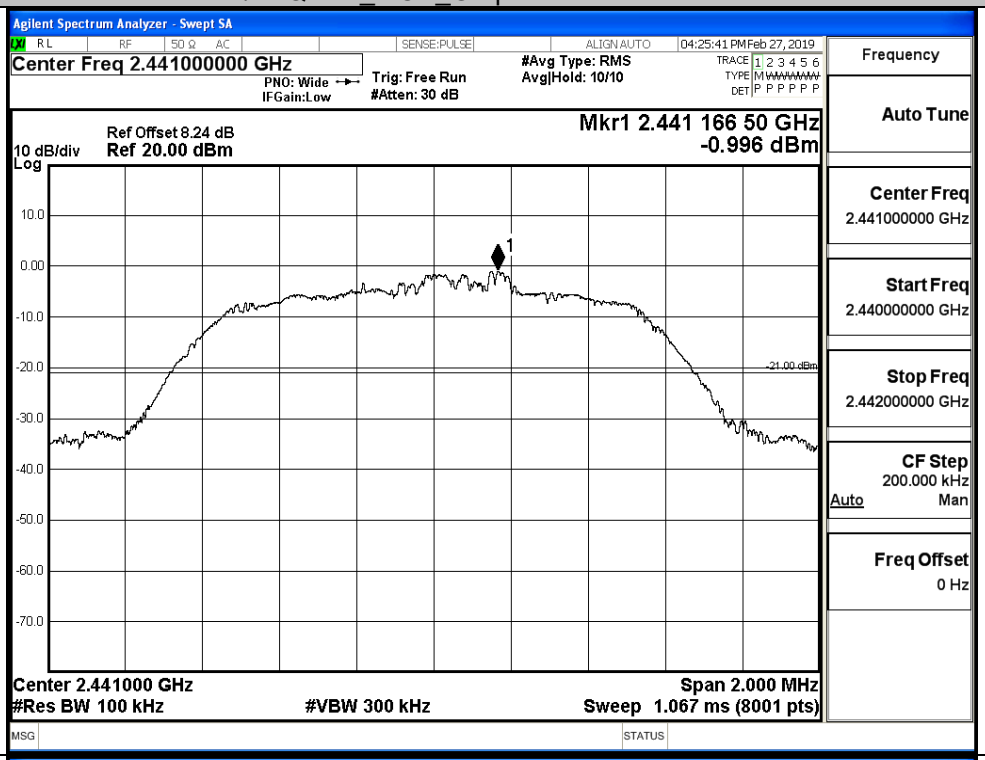
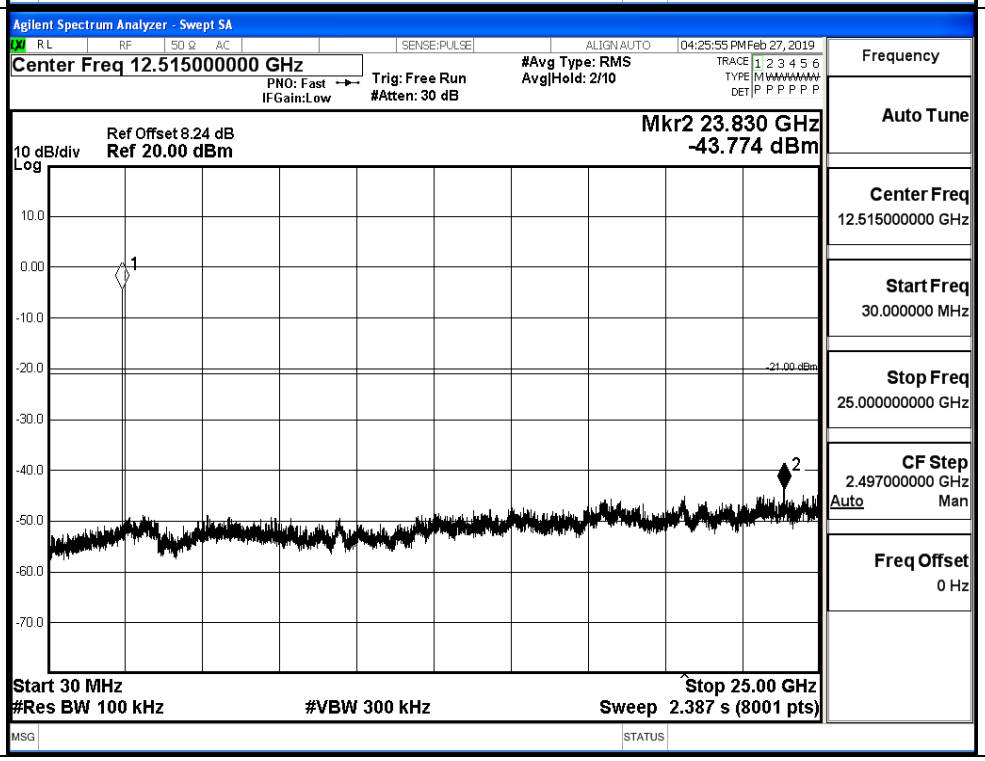
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.672	-44.743	-20.672	PASS
	MCH	0.245	-44.162	-19.755	PASS
	HCH	-1.194	-44.622	-21.194	PASS
π/4DQPSK	LCH	-1.956	-43.468	-21.956	PASS
	MCH	-0.996	-43.774	-20.996	PASS
	HCH	-2.952	-44.251	-22.952	PASS
8DPSK	LCH	-1.618	-44.112	-21.618	PASS
	MCH	-1.531	-44.296	-21.531	PASS
	HCH	-2.48	-44.387	-22.480	PASS

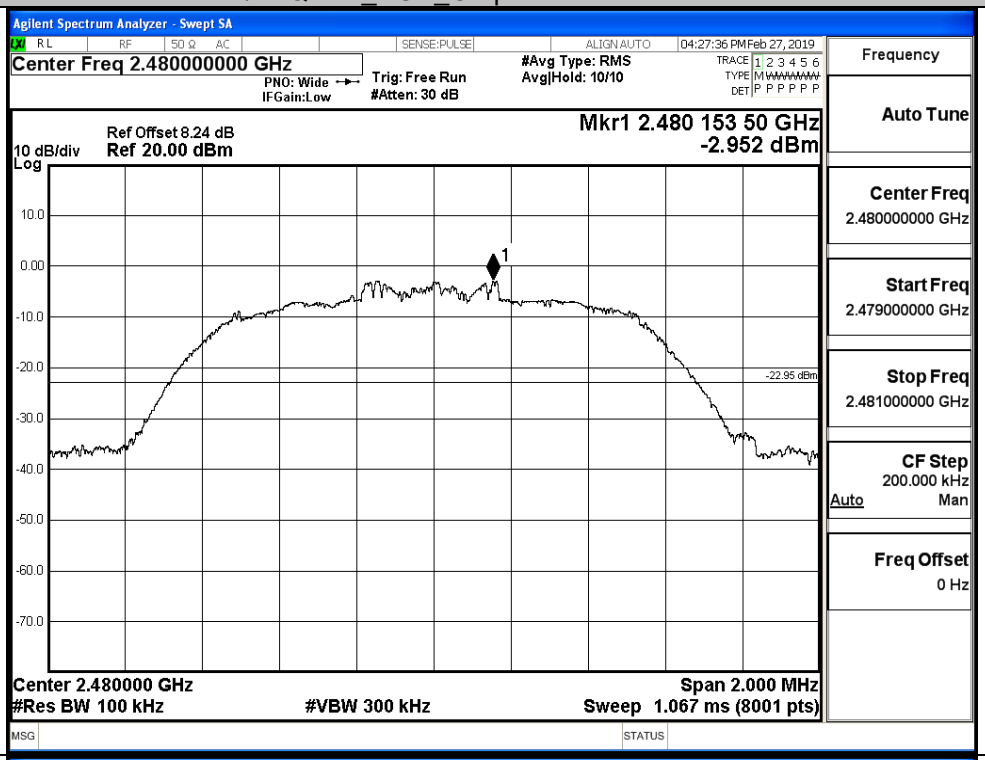
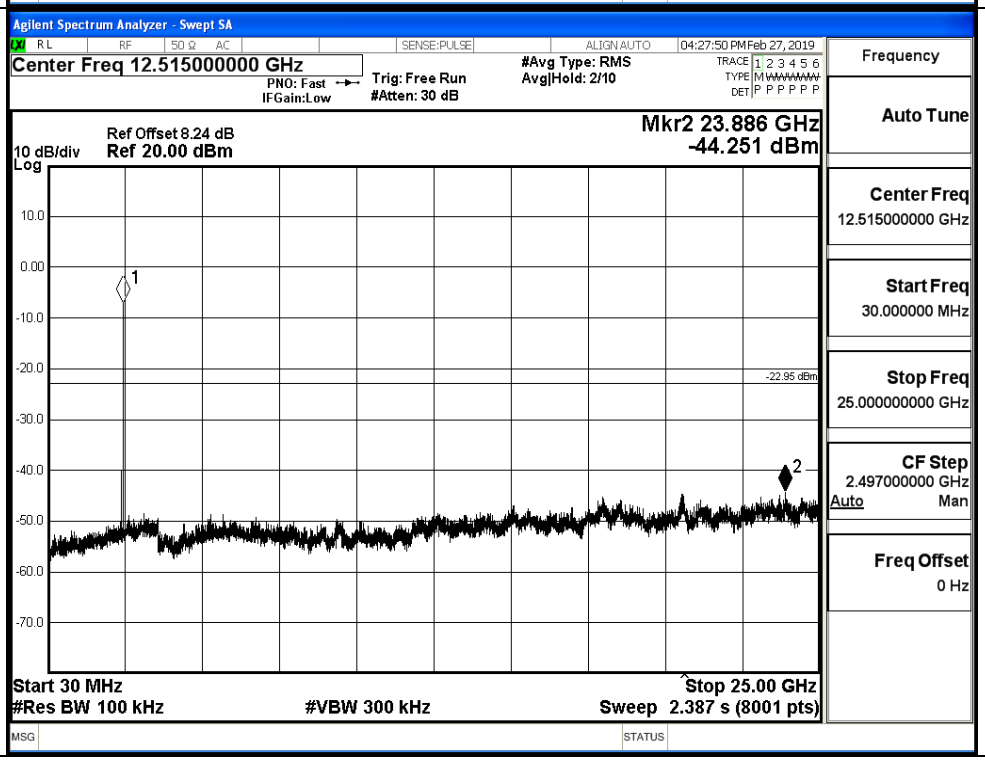
GFSK_LCH_Graphs		
Pref		
Puw		

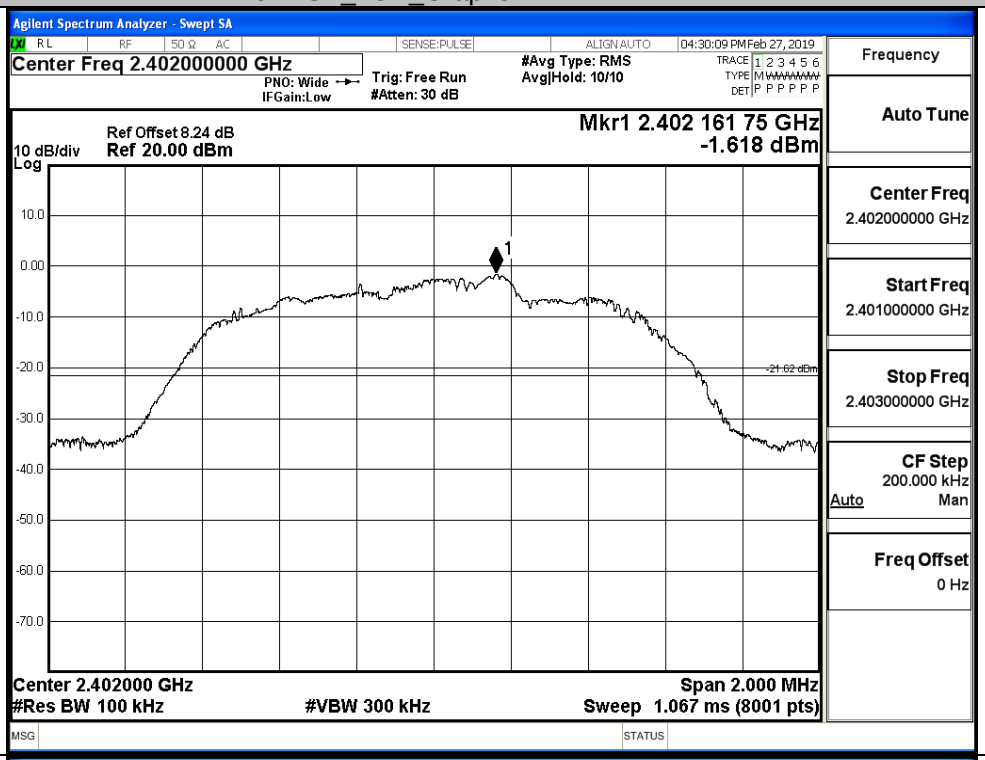
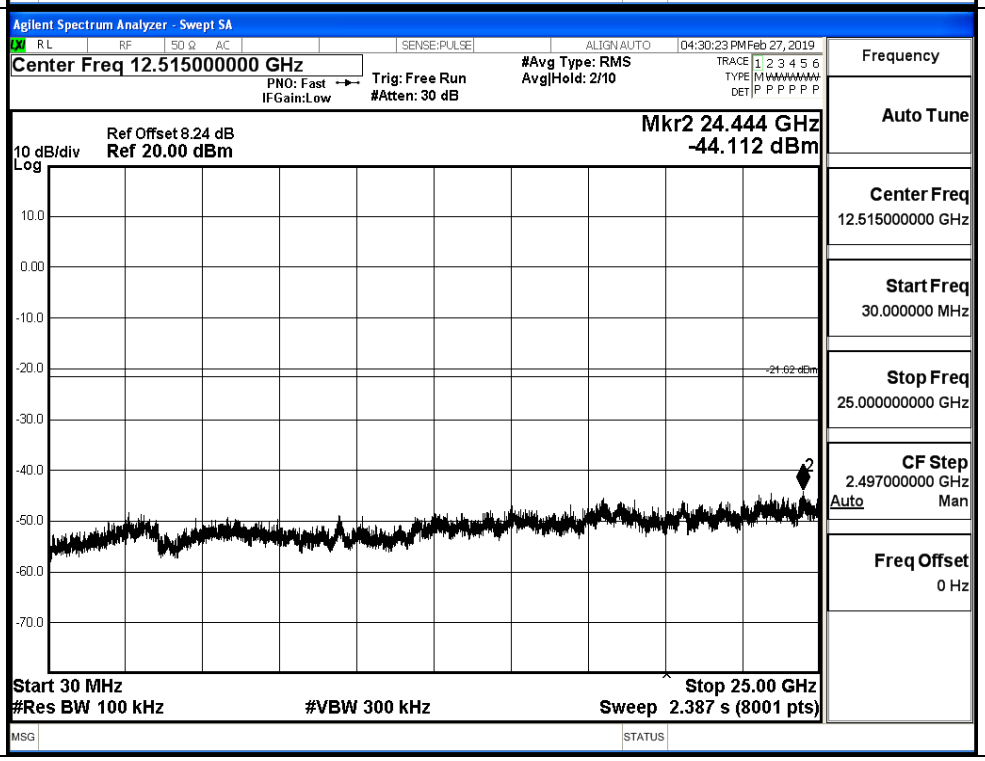
GFSK_MCH_Graphs			
Pref			
Puw			

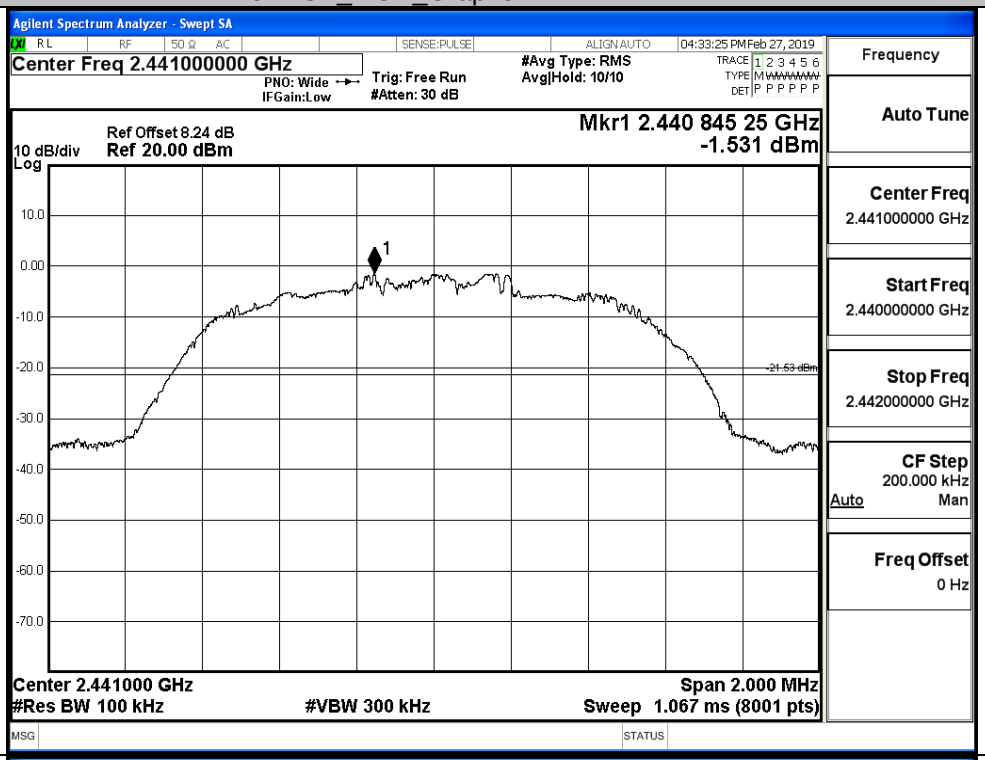
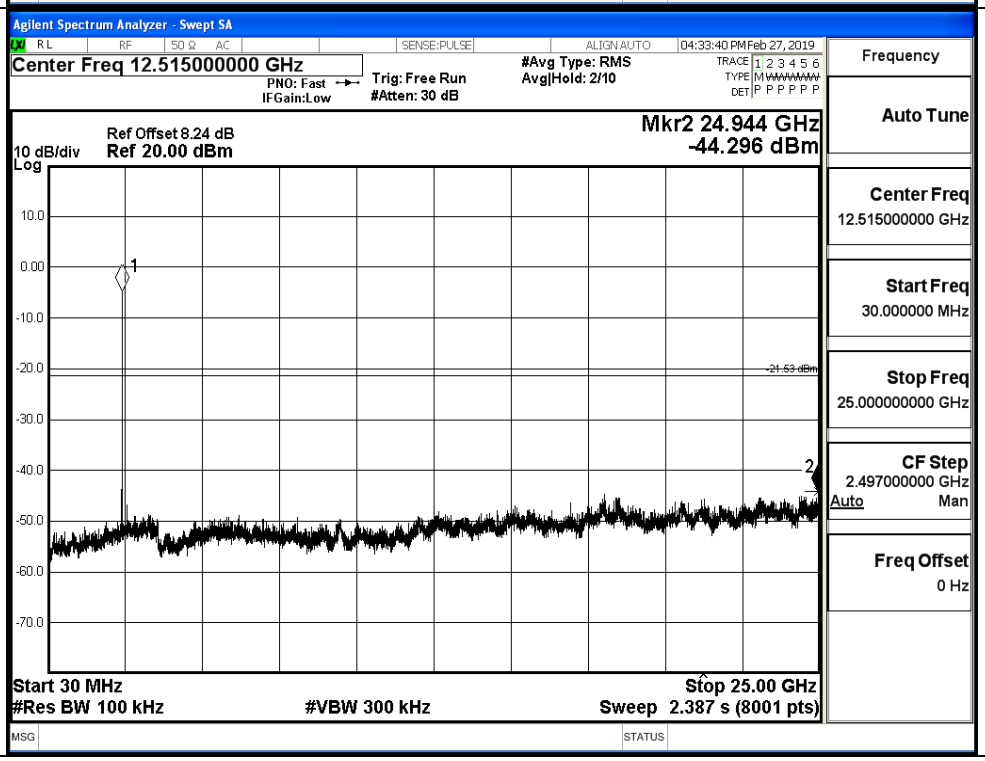
GFSK_HCH_Graphs			
Pref			
Puw			

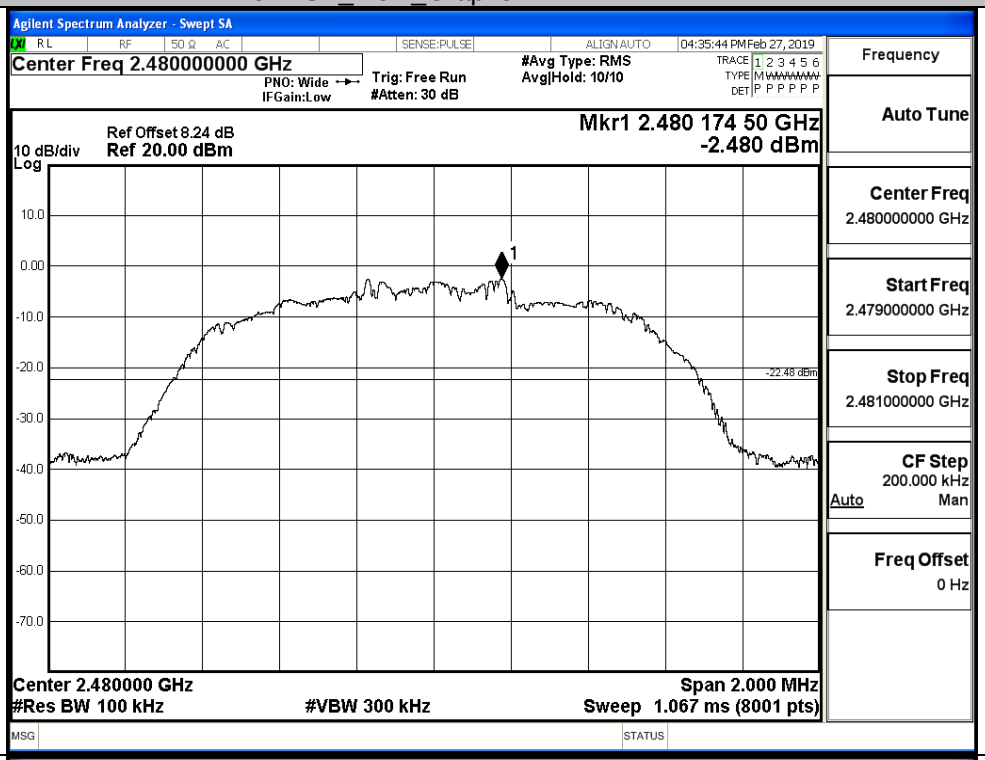
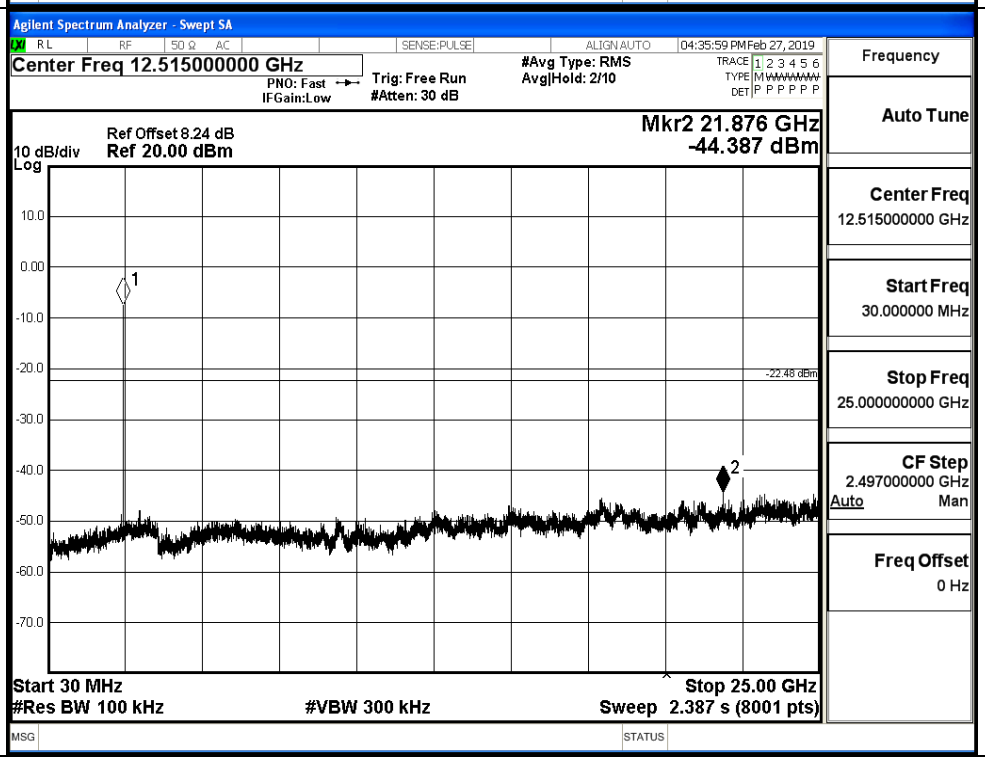
π/4DQPSK_LCH_Graphs			
Pref			
Puw			

π/4DQPSK_MCH_Graphs		
Pref		
Puw		

π/4DQPSK_HCH_Graphs			
Pref			
Puw			

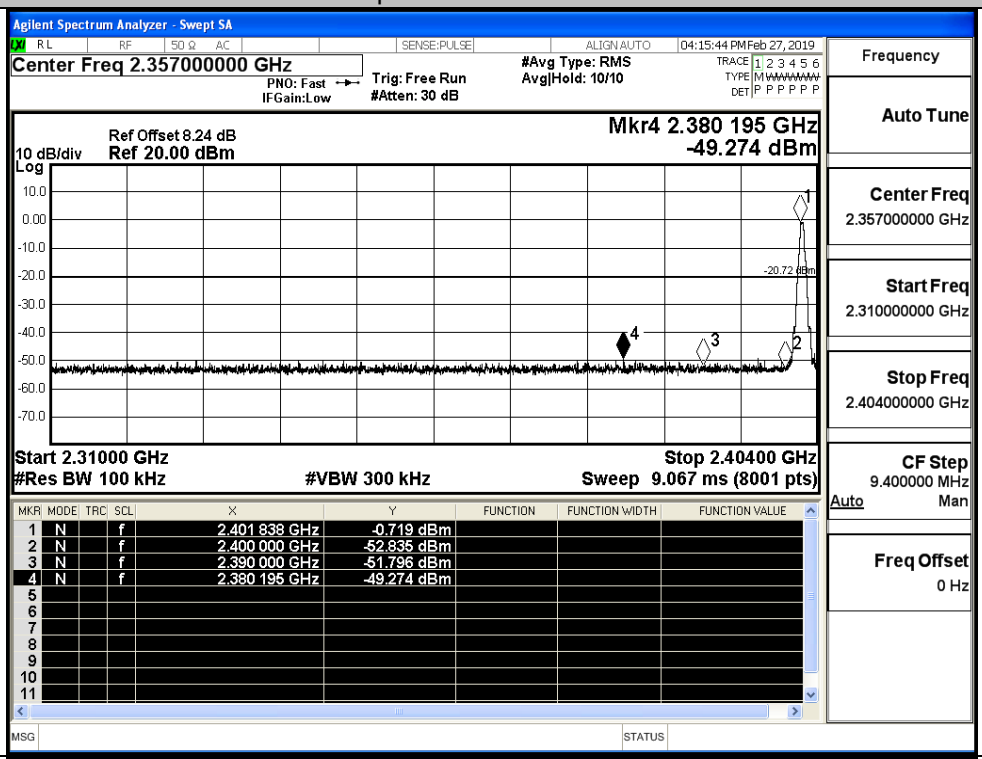
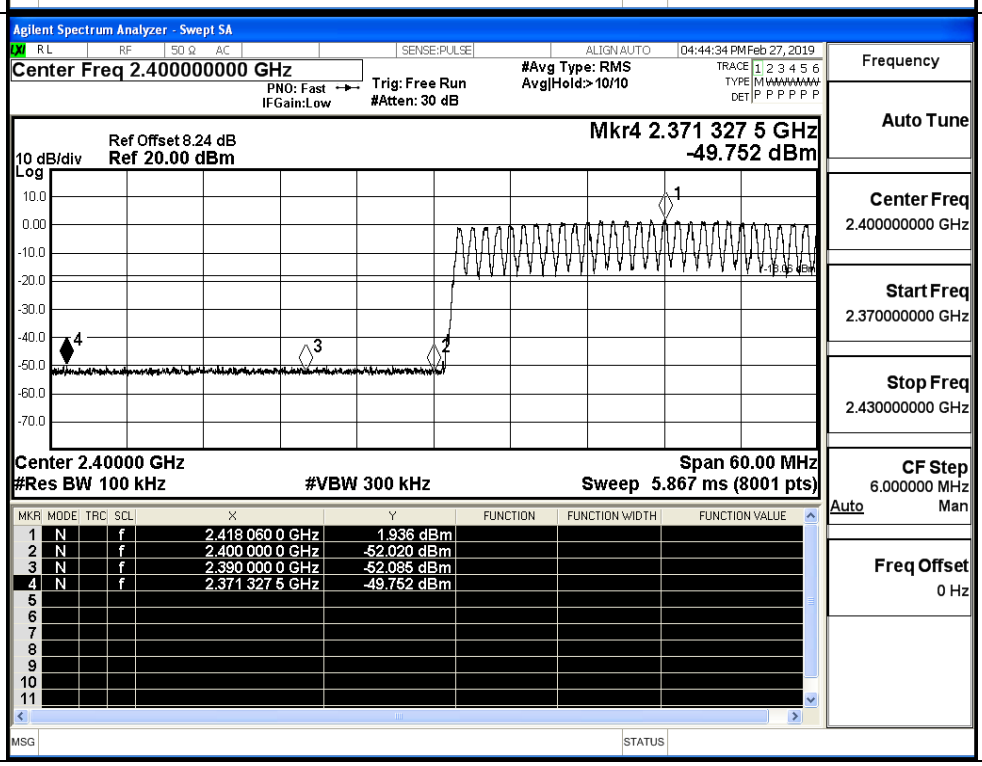
8DPSK_LCH_Graphs			
Pref			
Puw			

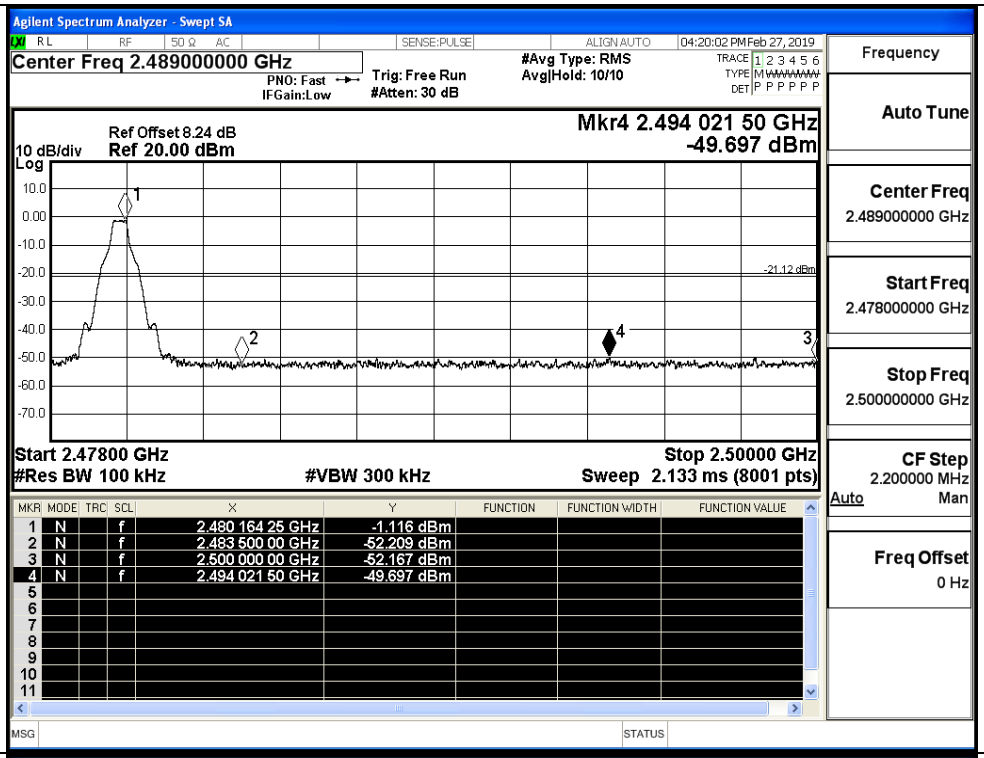
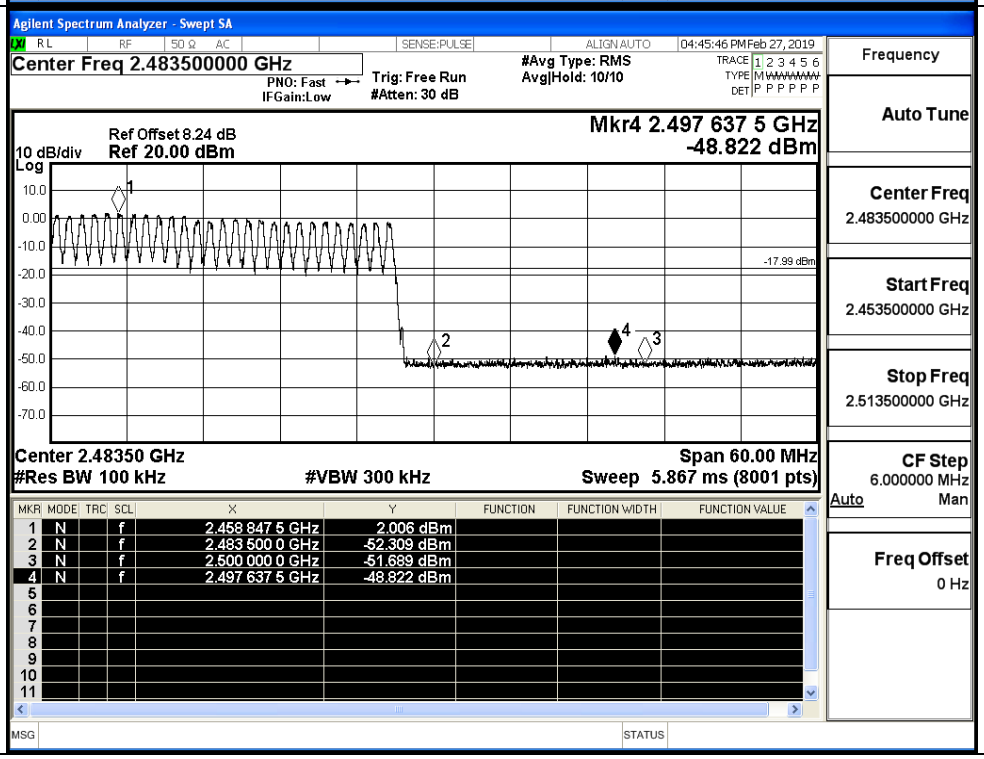
8DPSK_MCH_Graphs			
Pref			
Puw			

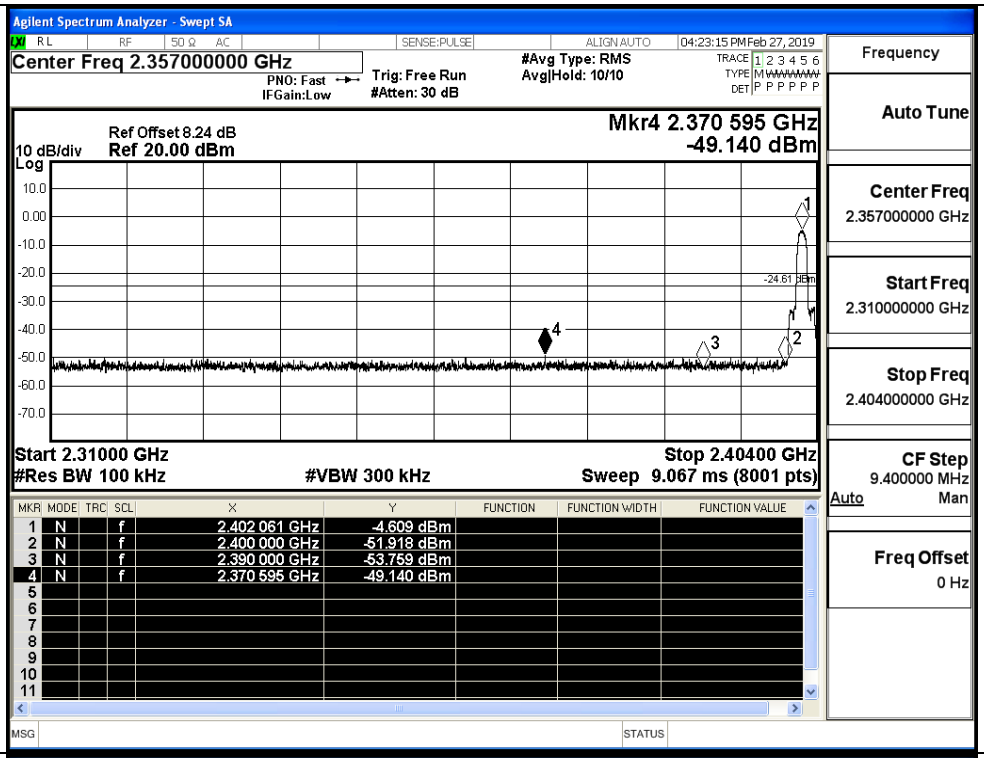
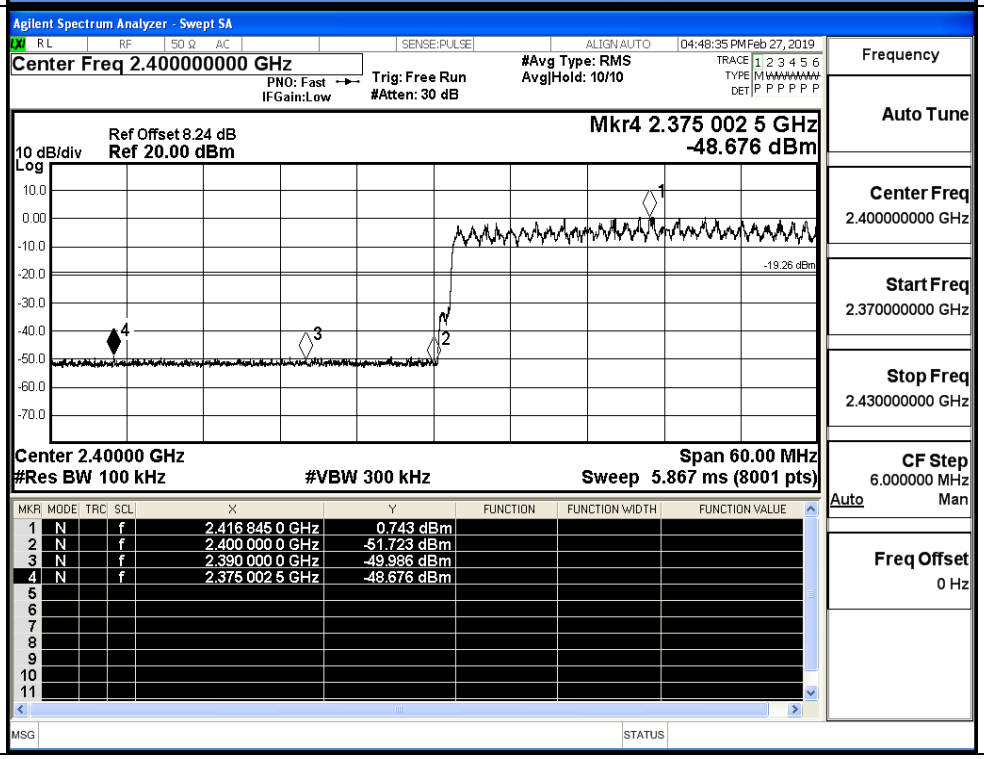
8DPSK_HCH_Graphs			
Pref			
Puw			

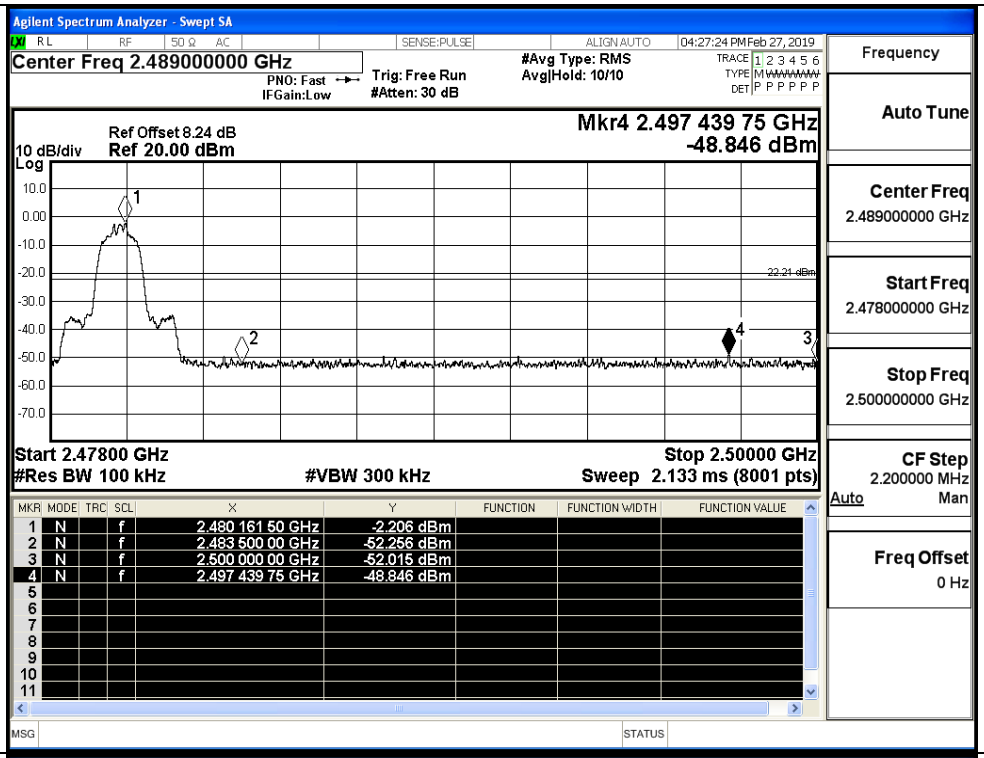
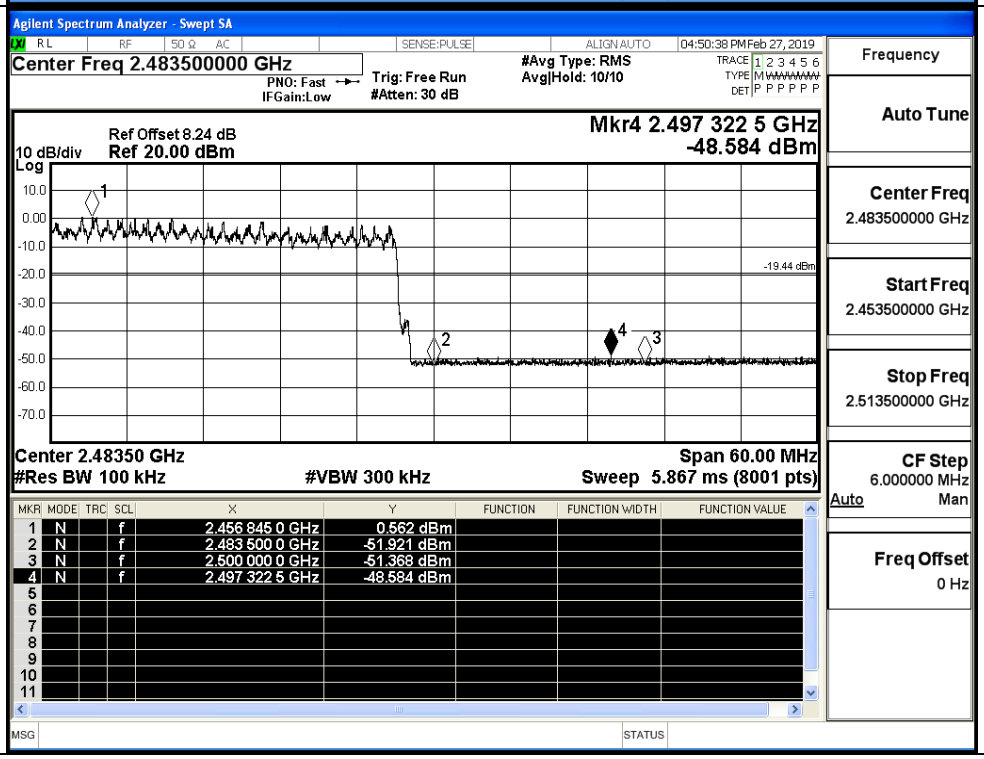
A.7 Band-edge for RF Conducted Emissions

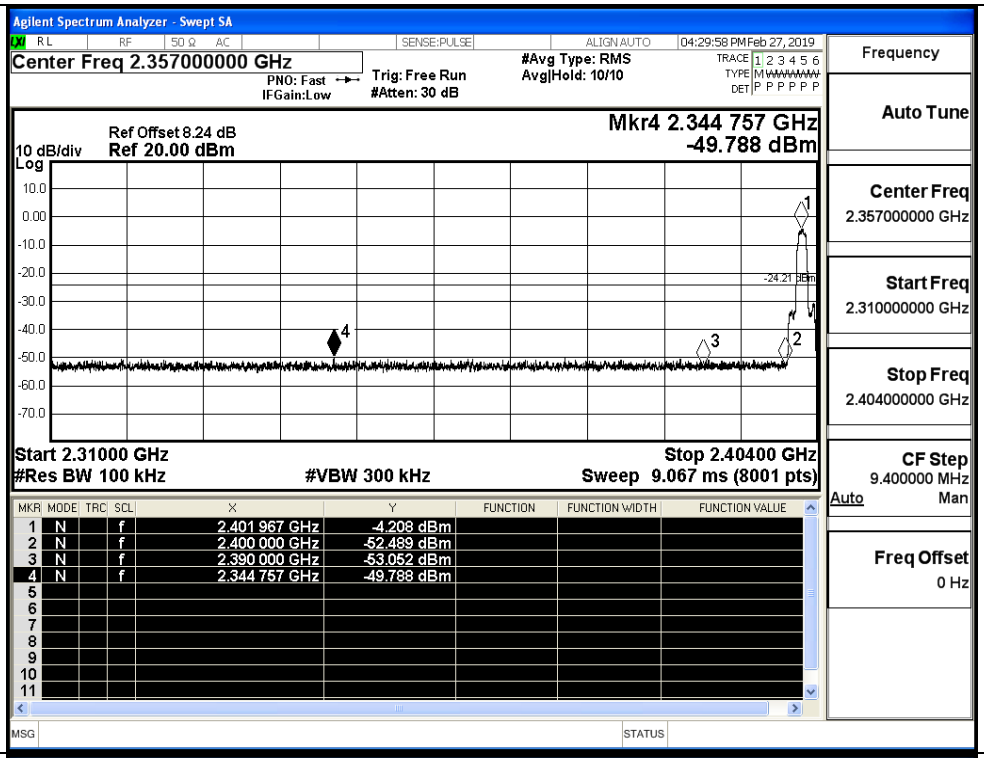
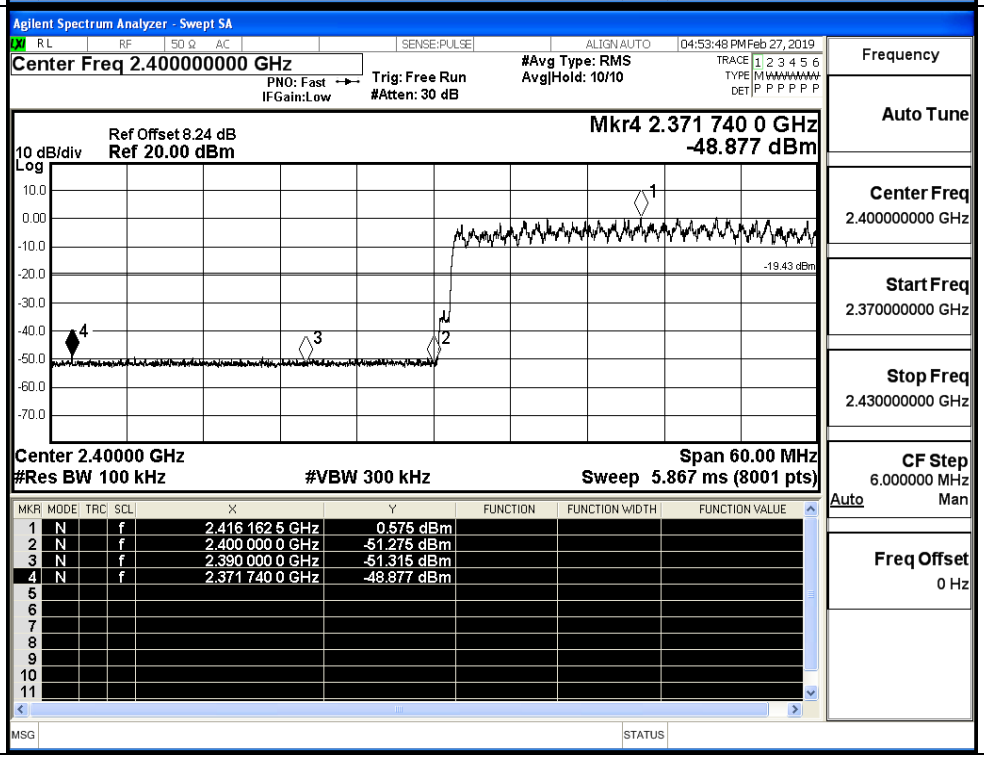
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.719	Off	-49.274	-20.72	PASS
			1.936	On	-49.752	-18.06	PASS
	HCH	2480	-1.116	Off	-49.697	-21.12	PASS
			2.006	On	-48.822	-17.99	PASS
π/4DQPSK	LCH	2402	-4.609	Off	-49.140	-24.61	PASS
			0.743	On	-48.676	-19.26	PASS
	HCH	2480	-2.206	Off	-48.846	-22.21	PASS
			0.562	On	-48.584	-19.44	PASS
8DPSK	LCH	2402	-4.208	Off	-49.788	-24.21	PASS
			0.575	On	-48.877	-19.43	PASS
	HCH	2480	-2.262	Off	-49.598	-22.26	PASS
			0.551	On	-49.492	-19.45	PASS

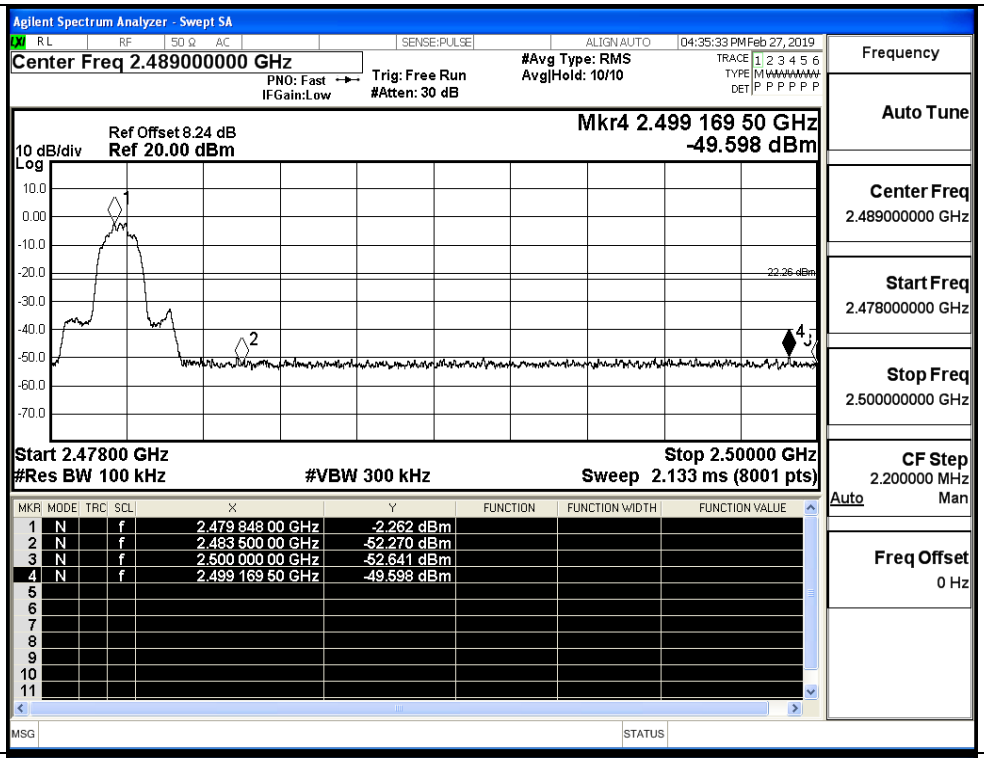
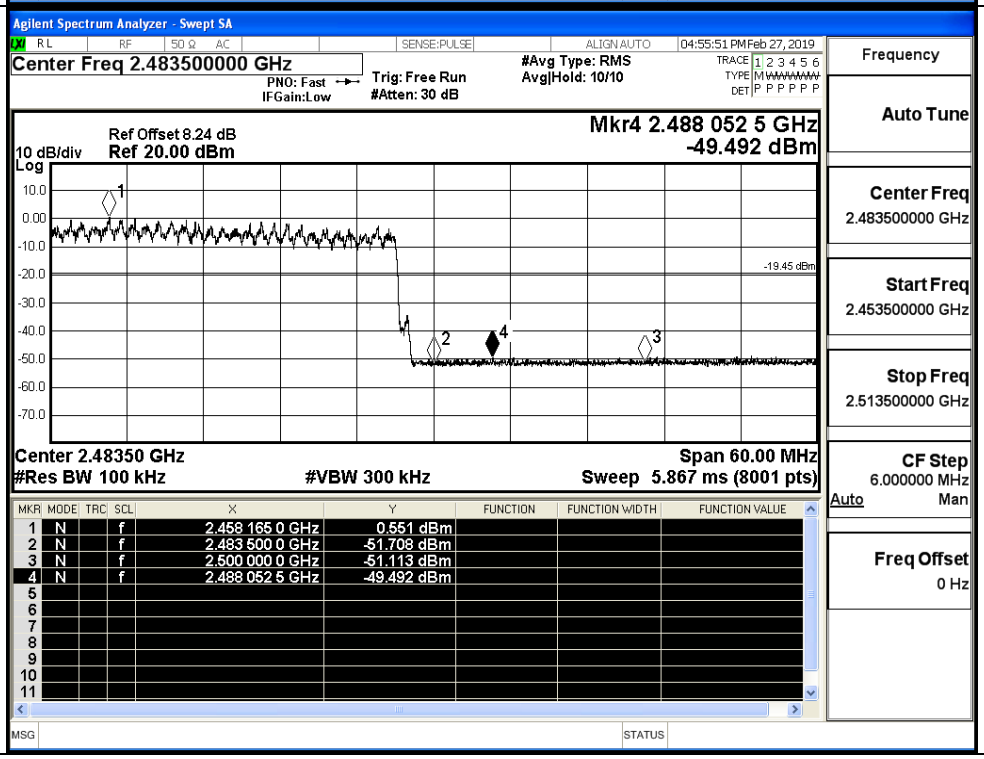
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

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	

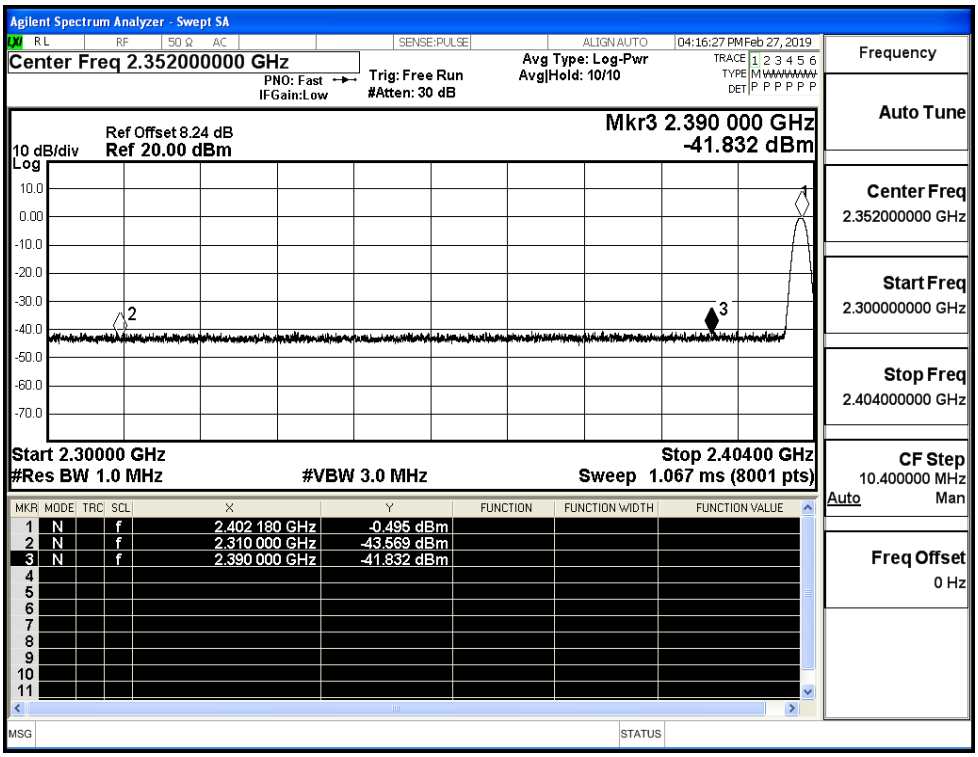
8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

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

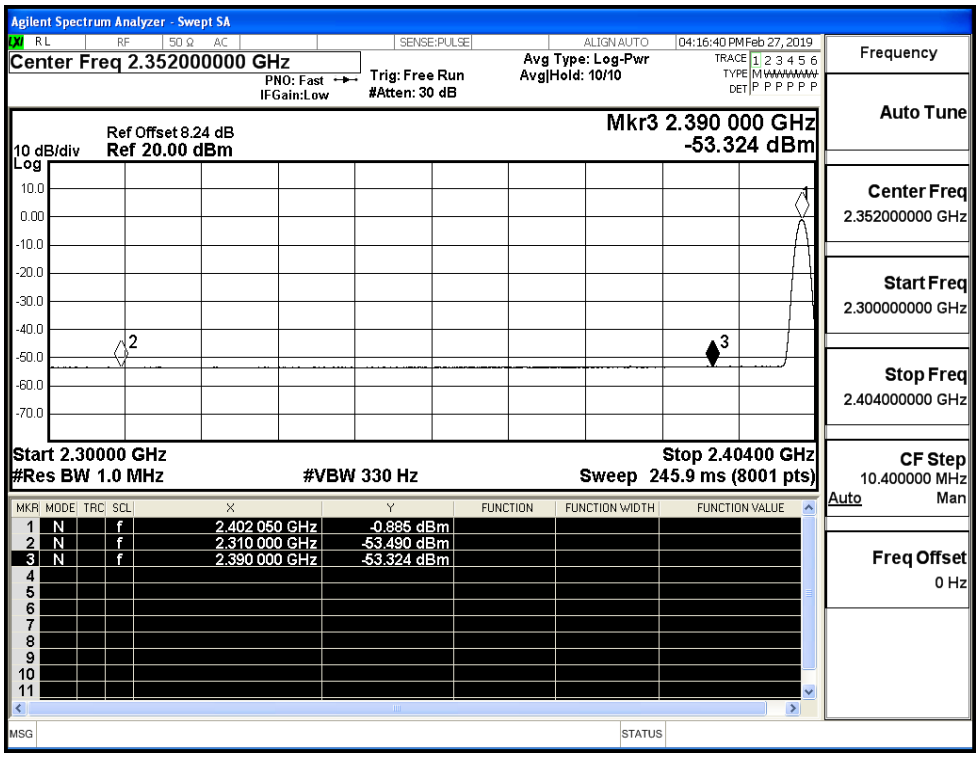
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.57	2.0	0	53.69	PEAK	74	PASS
	Off	2310.0	-53.49	2.0	0	43.77	AV	54	PASS
	Off	2390.0	-41.83	2.0	0	55.43	PEAK	74	PASS
	Off	2390.0	-53.32	2.0	0	43.93	AV	54	PASS
	Off	2483.5	-43.44	2.0	0	53.82	PEAK	74	PASS
	Off	2483.5	-52.99	2.0	0	44.27	AV	54	PASS
	Off	2500.0	-43.28	2.0	0	53.98	PEAK	74	PASS
	Off	2500.0	-52.95	2.0	0	44.31	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.54	2.0	0	54.72	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	43.76	AV	54	PASS
	Off	2390.0	-43.15	2.0	0	54.11	PEAK	74	PASS
	Off	2390.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2483.5	-42.71	2.0	0	54.55	PEAK	74	PASS
	Off	2483.5	-53.05	2.0	0	44.20	AV	54	PASS
	Off	2500.0	-42.44	2.0	0	54.82	PEAK	74	PASS
	Off	2500.0	-52.75	2.0	0	44.50	AV	54	PASS
8DPSK	Off	2310.0	-43.21	2.0	0	54.05	PEAK	74	PASS
	Off	2310.0	-53.58	2.0	0	43.68	AV	54	PASS
	Off	2390.0	-42.96	2.0	0	54.30	PEAK	74	PASS
	Off	2390.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2483.5	-42.42	2.0	0	54.84	PEAK	74	PASS
	Off	2483.5	-52.96	2.0	0	44.30	AV	54	PASS
	Off	2500.0	-43.01	2.0	0	54.25	PEAK	74	PASS
	Off	2500.0	-52.84	2.0	0	44.42	AV	54	PASS

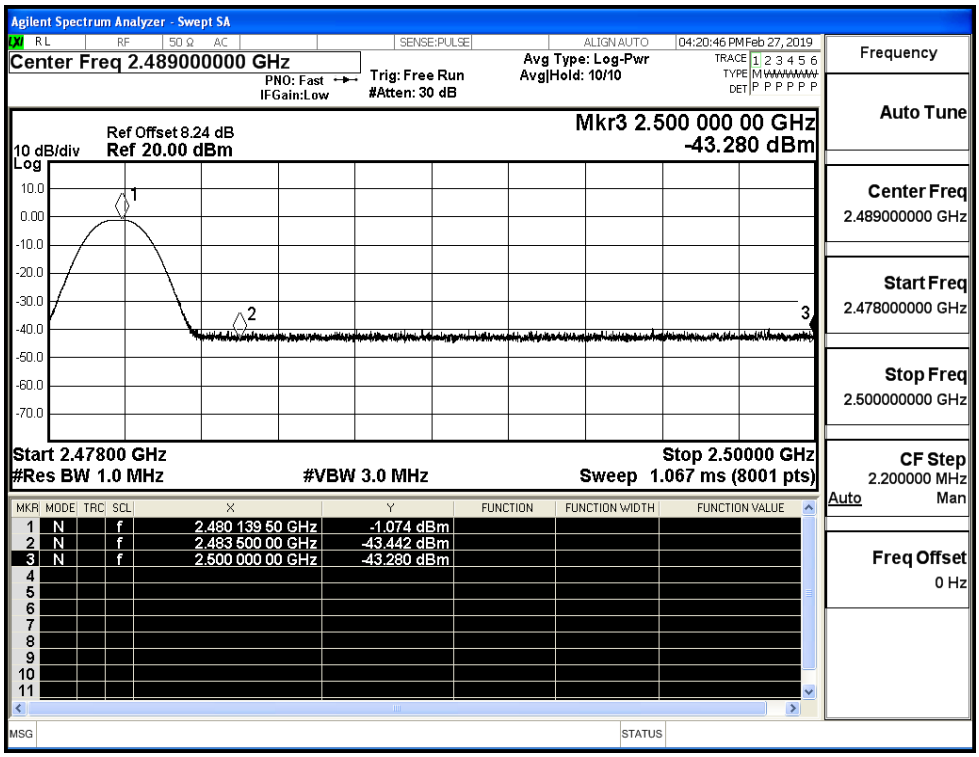
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



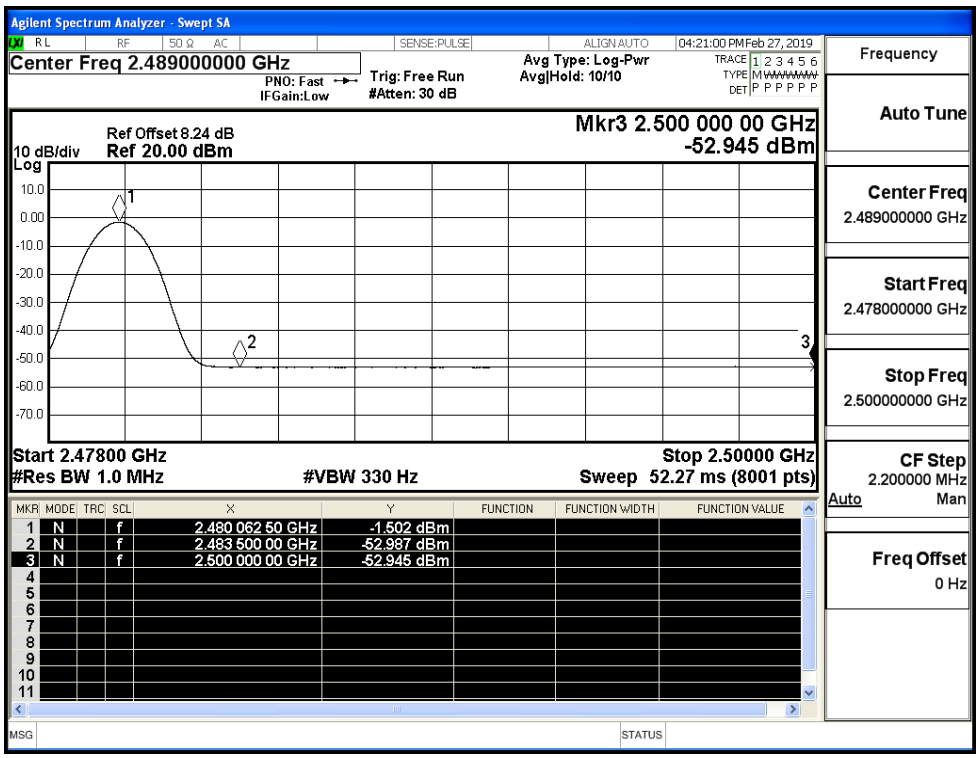
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



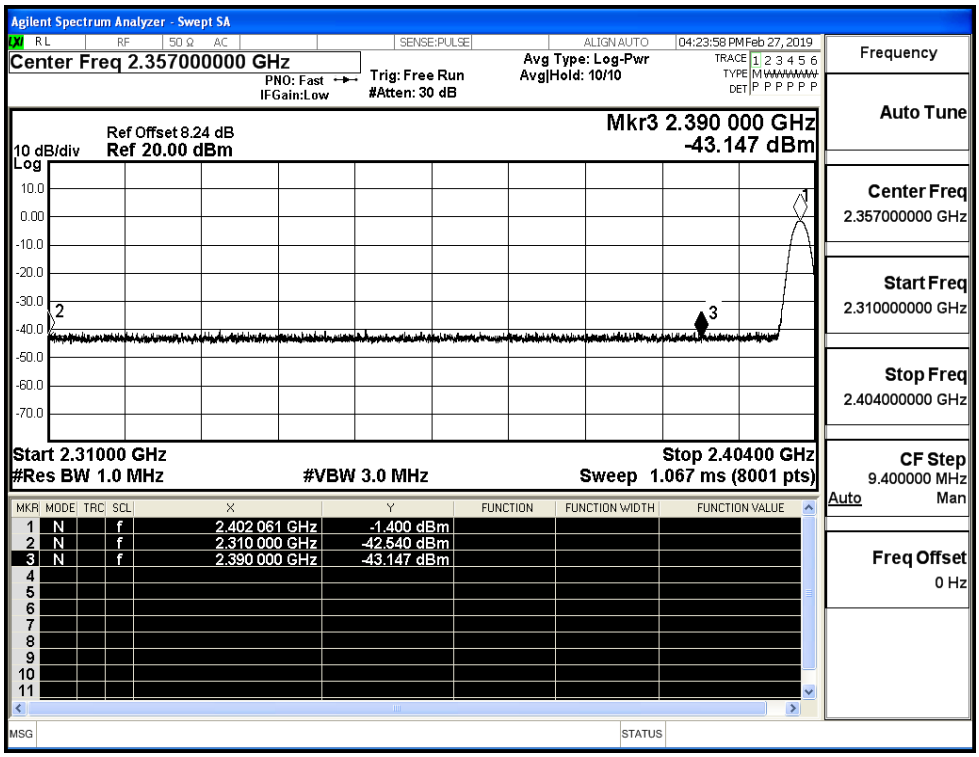
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



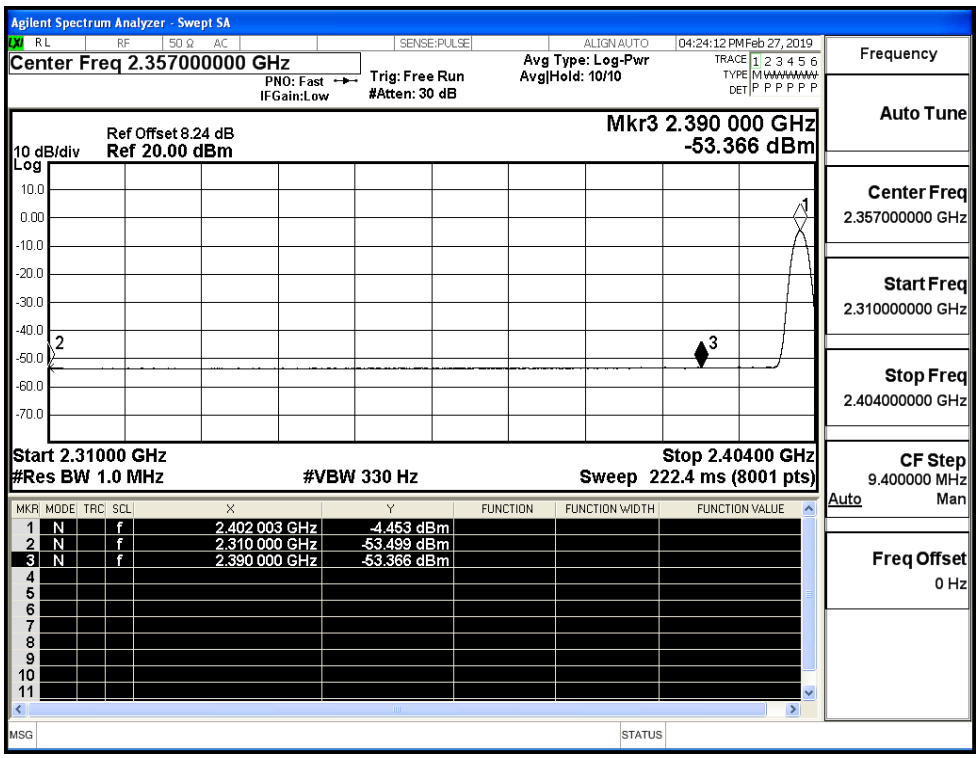
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



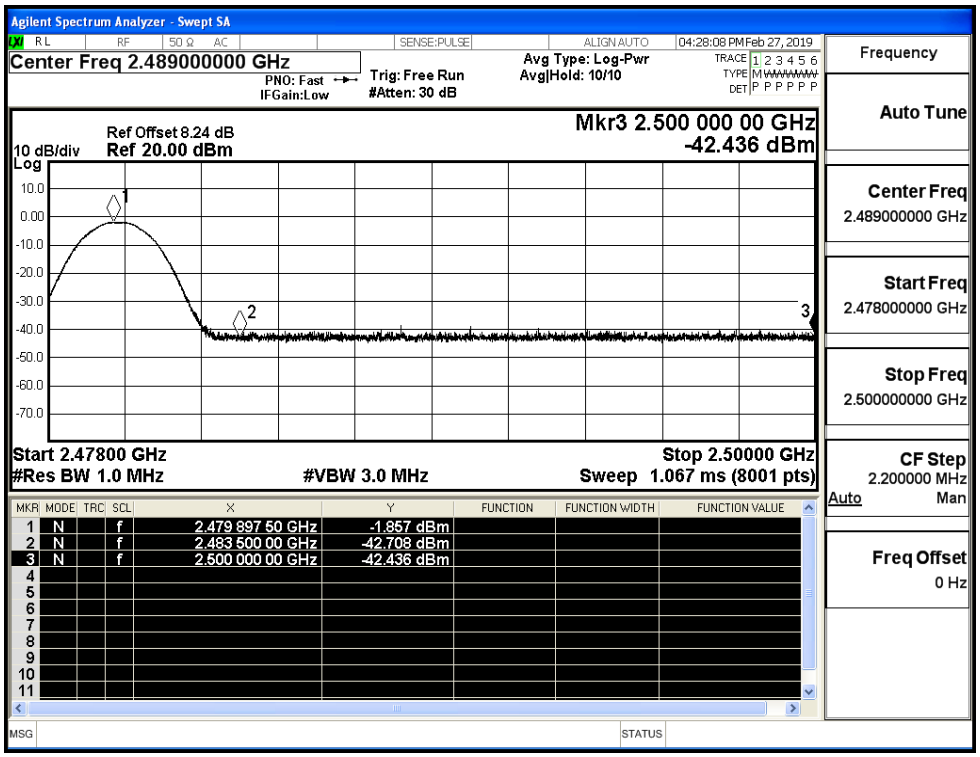
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



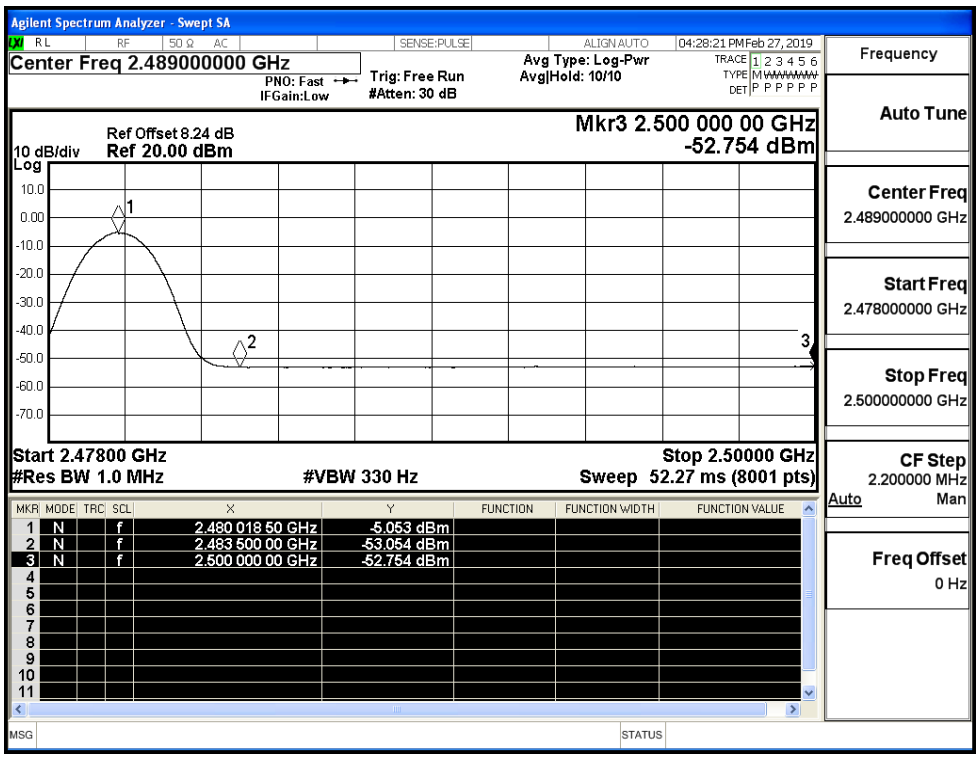
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



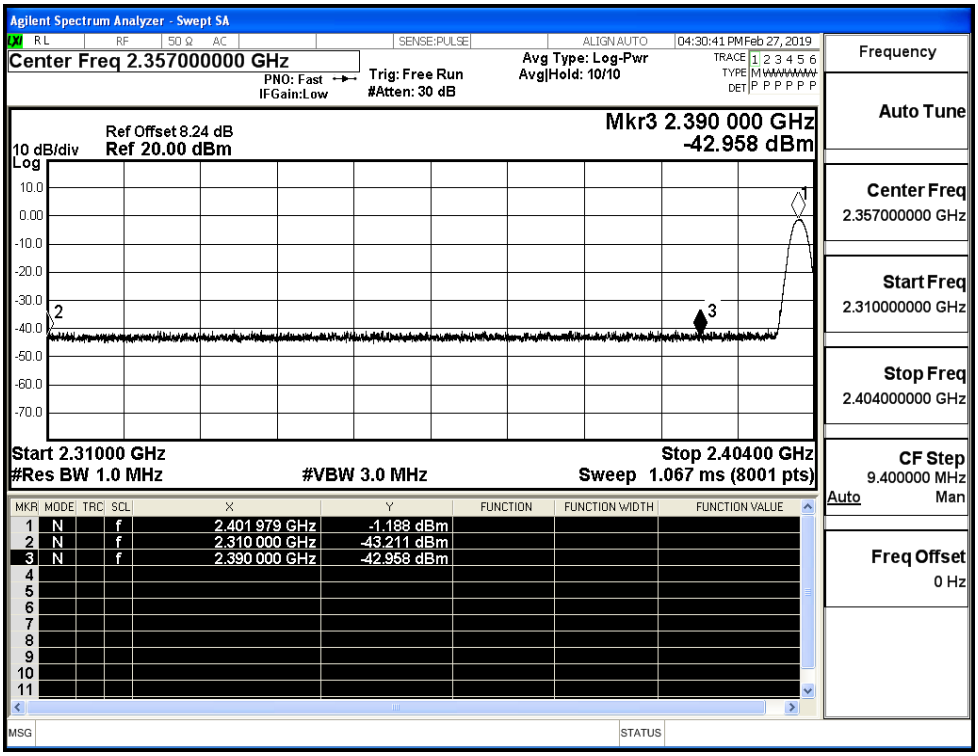
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



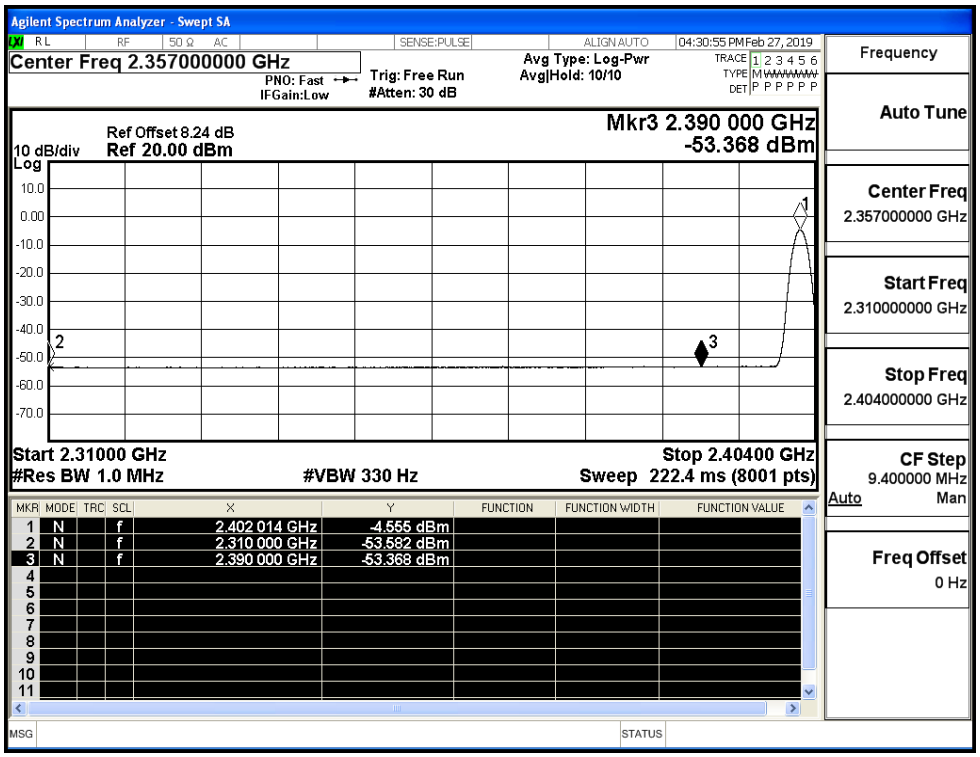
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



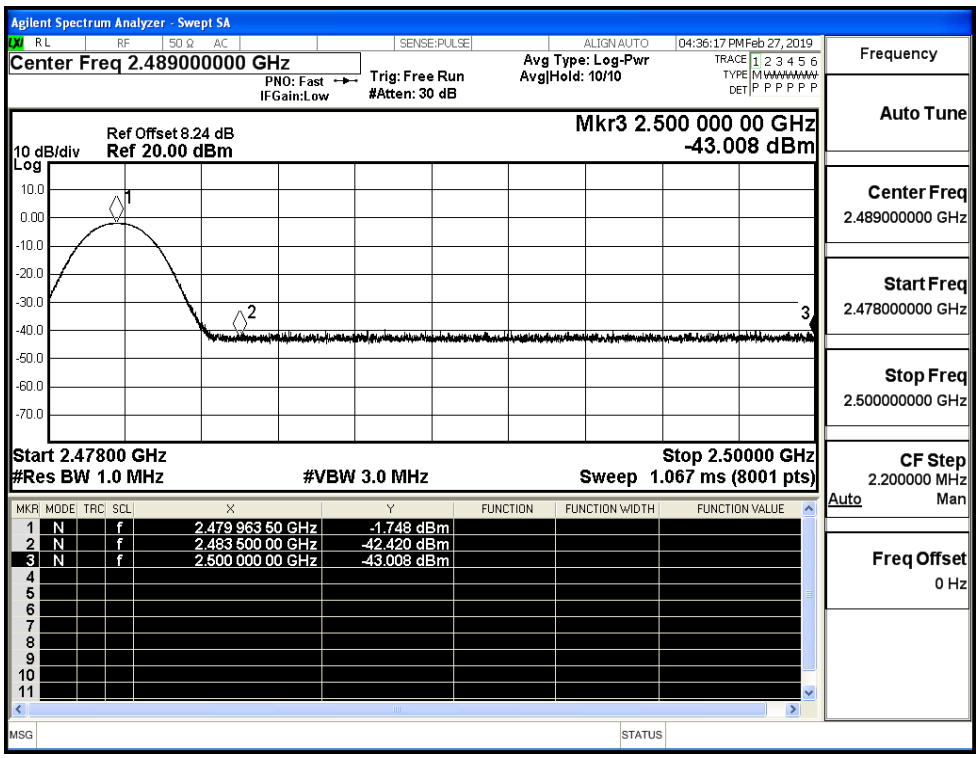
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)