Environmental Conditions

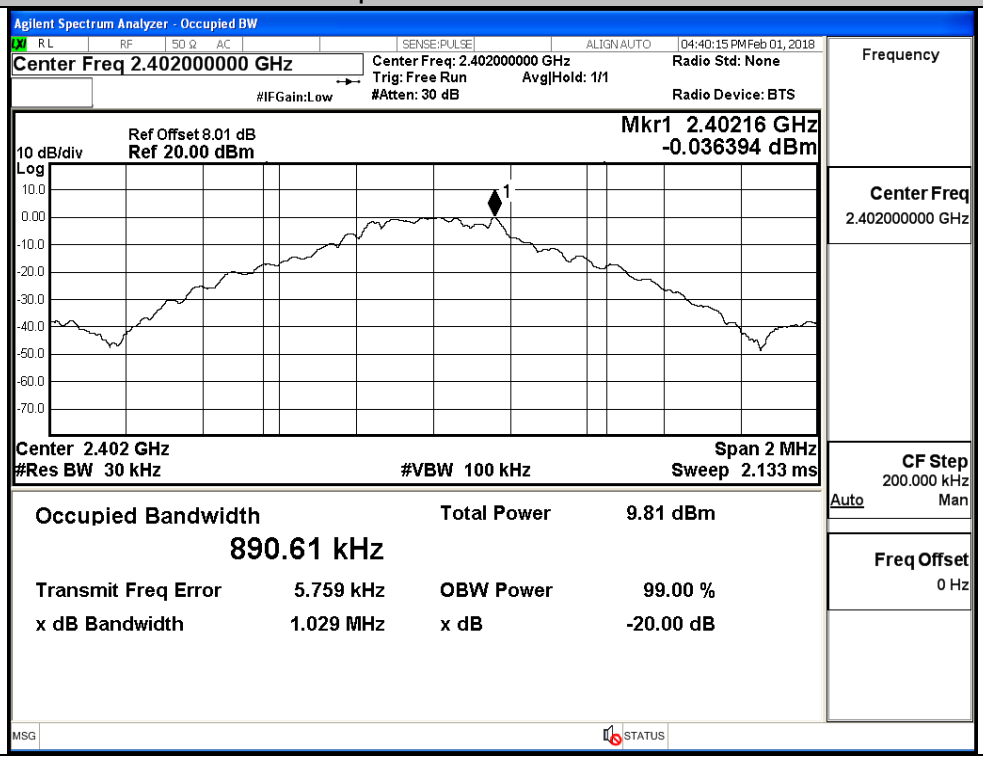
Temperature:	23.1 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.xu
Supervised by:	Tom Liu

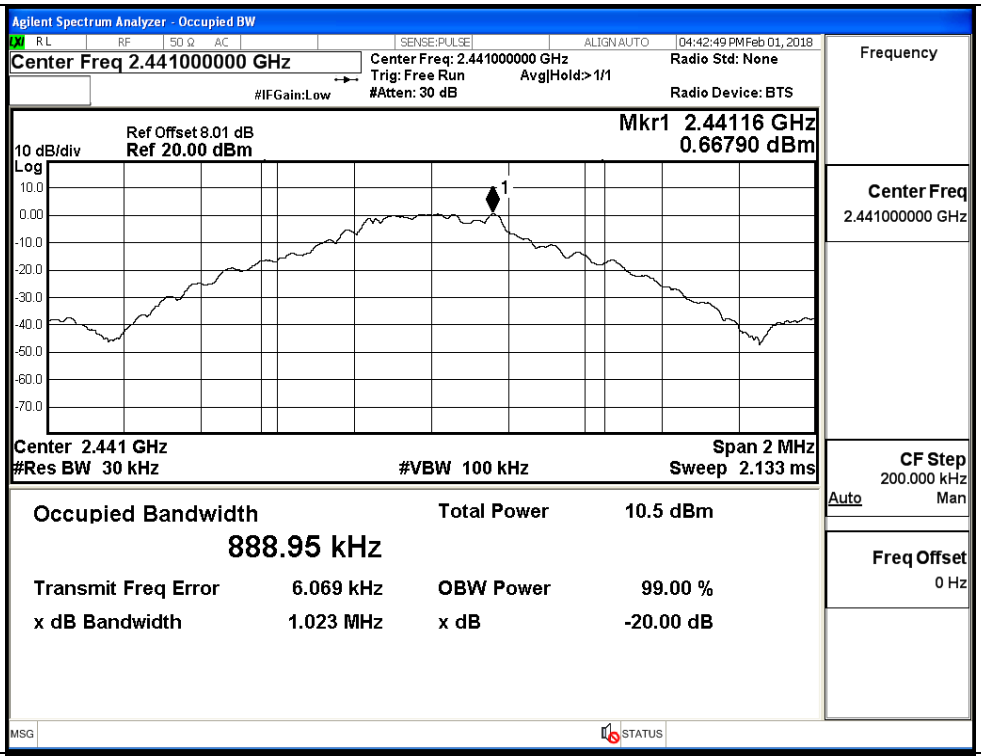
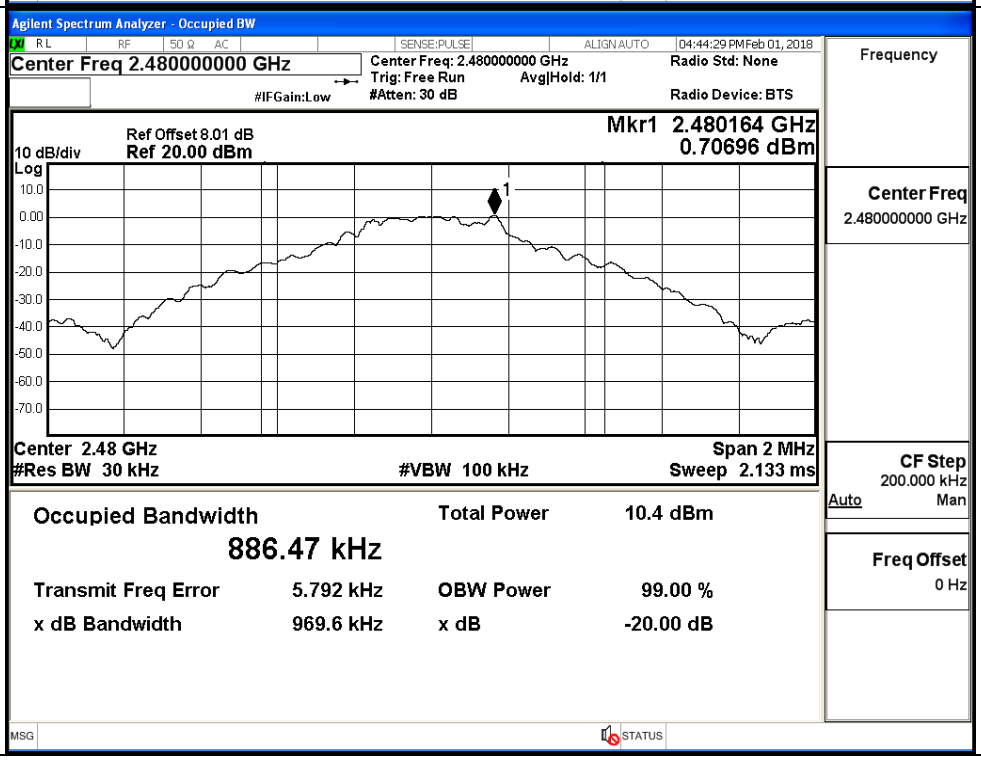
Appendix A): 20dB Bandwidth

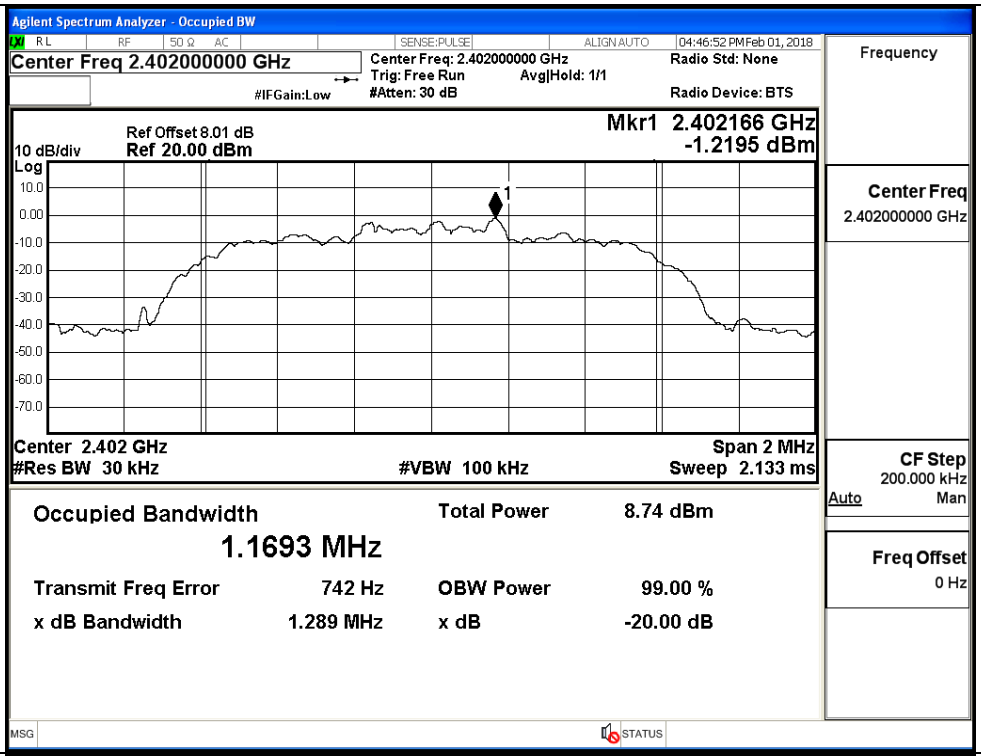
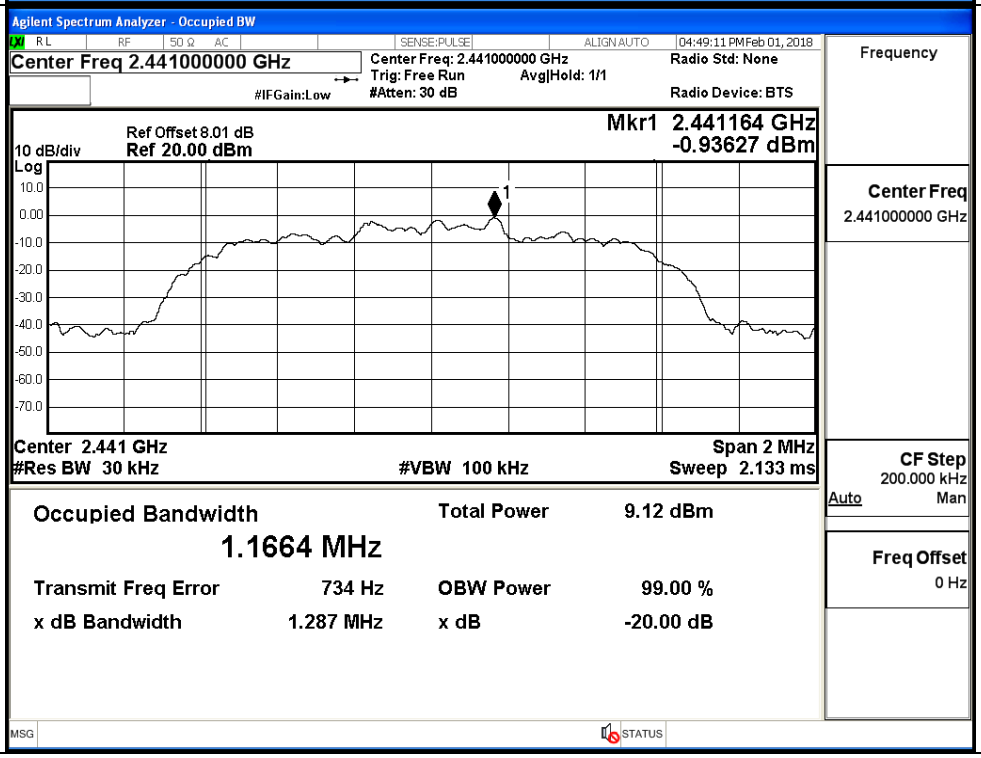
Test Result

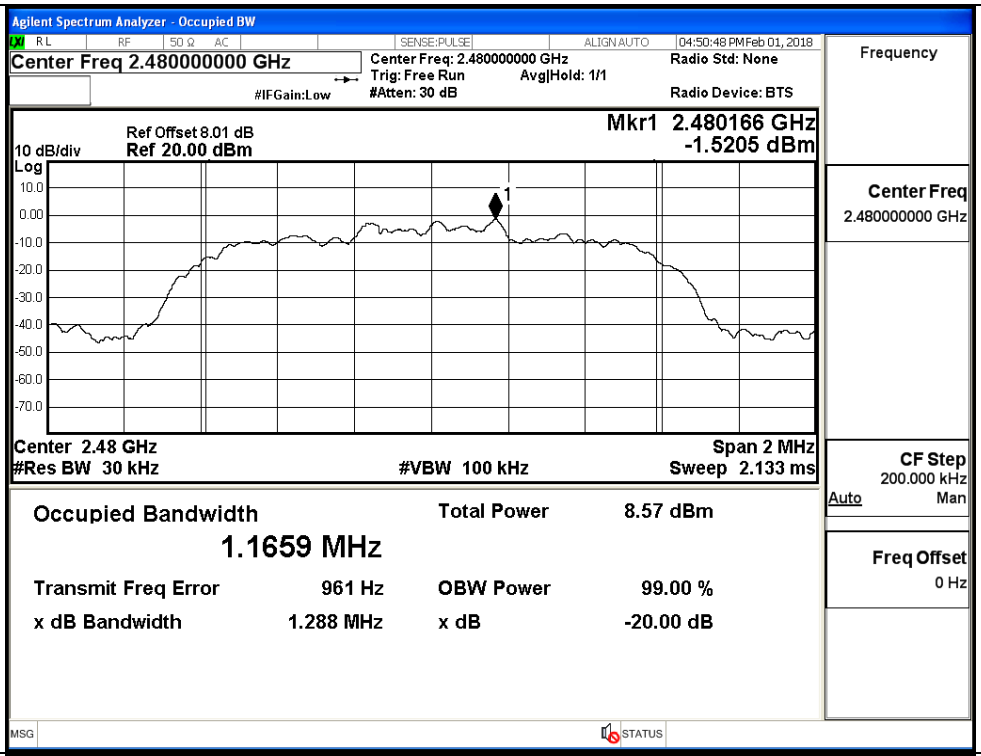
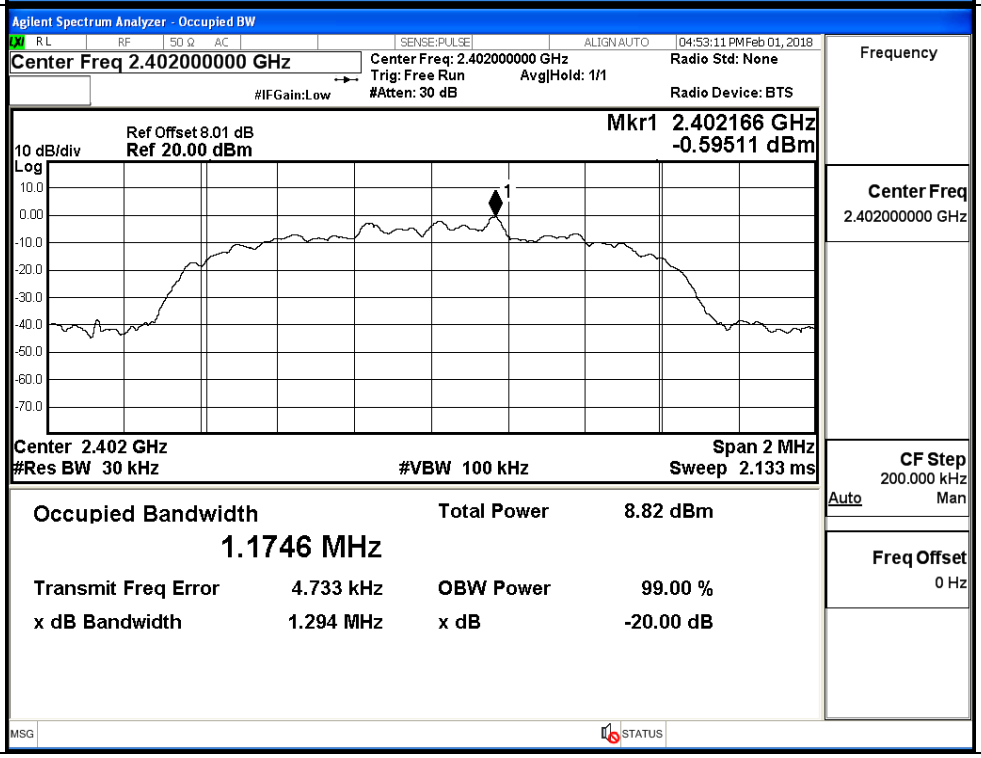
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.029	/	PASS
GFSK	MCH	1.023	/	PASS
GFSK	HCH	0.9696	/	PASS
π/4DQPSK	LCH	1.289	/	PASS
π/4DQPSK	MCH	1.287	/	PASS
π/4DQPSK	HCH	1.288	/	PASS
8DPSK	LCH	1.294	/	PASS
8DPSK	MCH	1.291	/	PASS
8DPSK	HCH	1.294	/	PASS

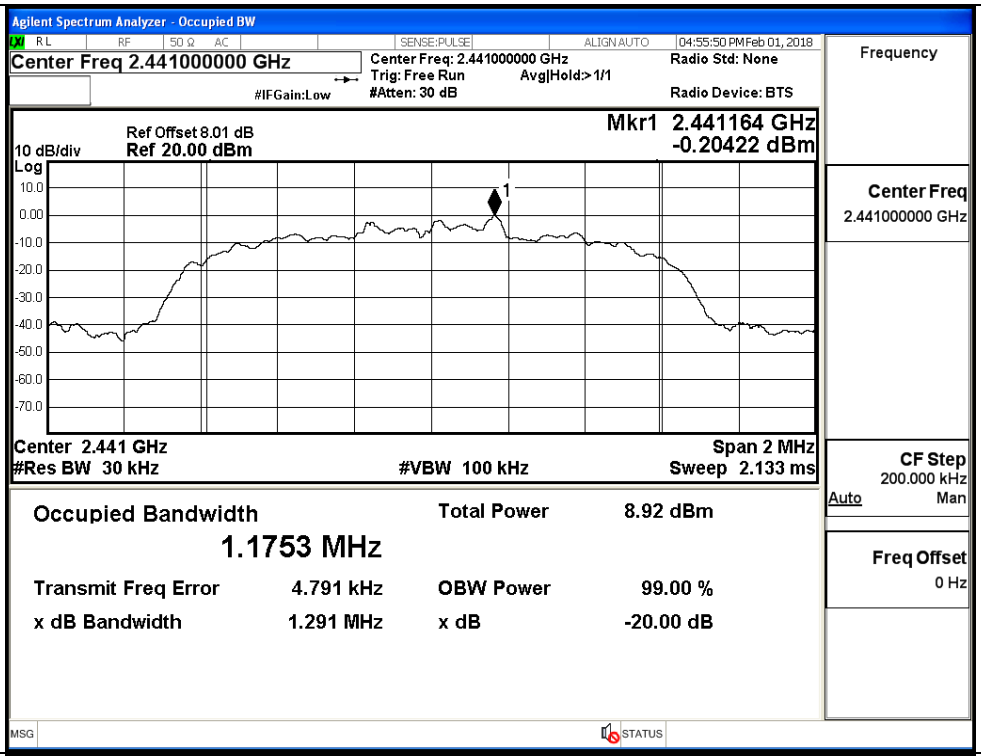
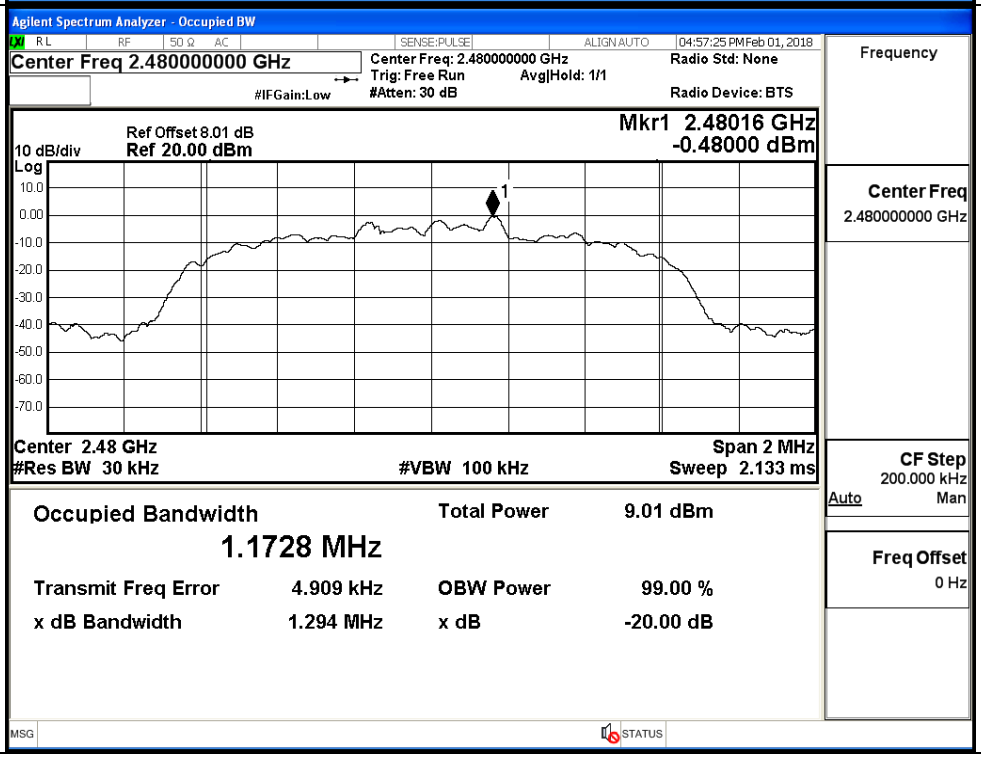
Test Graph

Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

π/4DQPSK/LCH		
π/4DQPSK/MCH		

π/4DQPSK/HCH		
8DPSK/LCH		

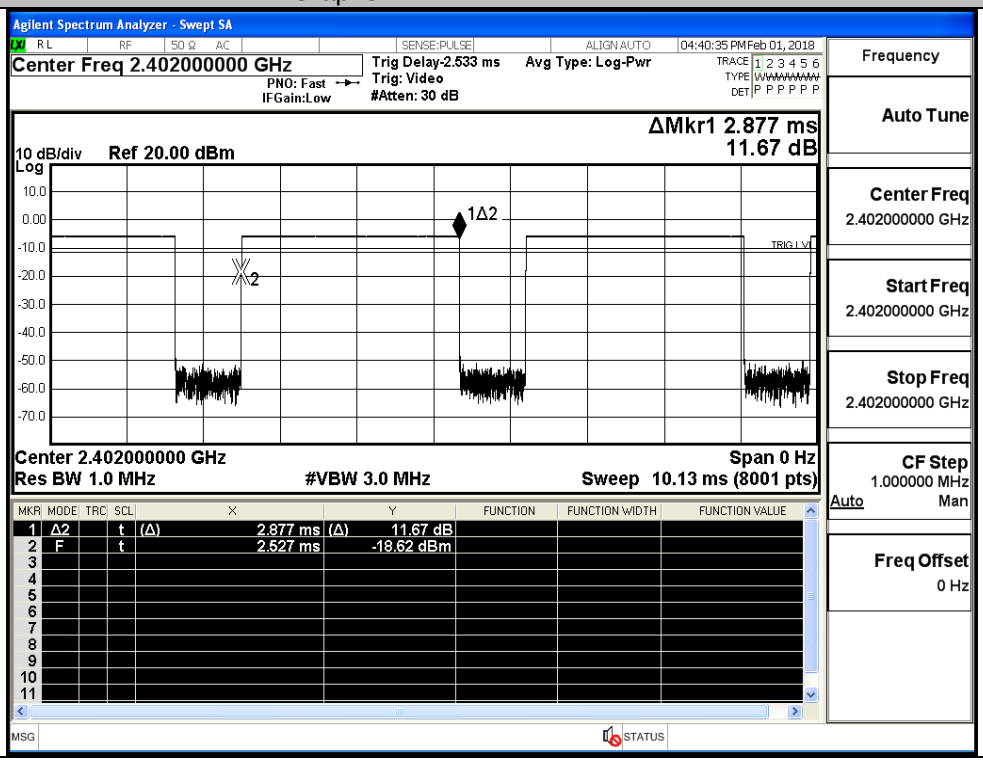
8DPSK/MCH		
8DPSK/HCH		

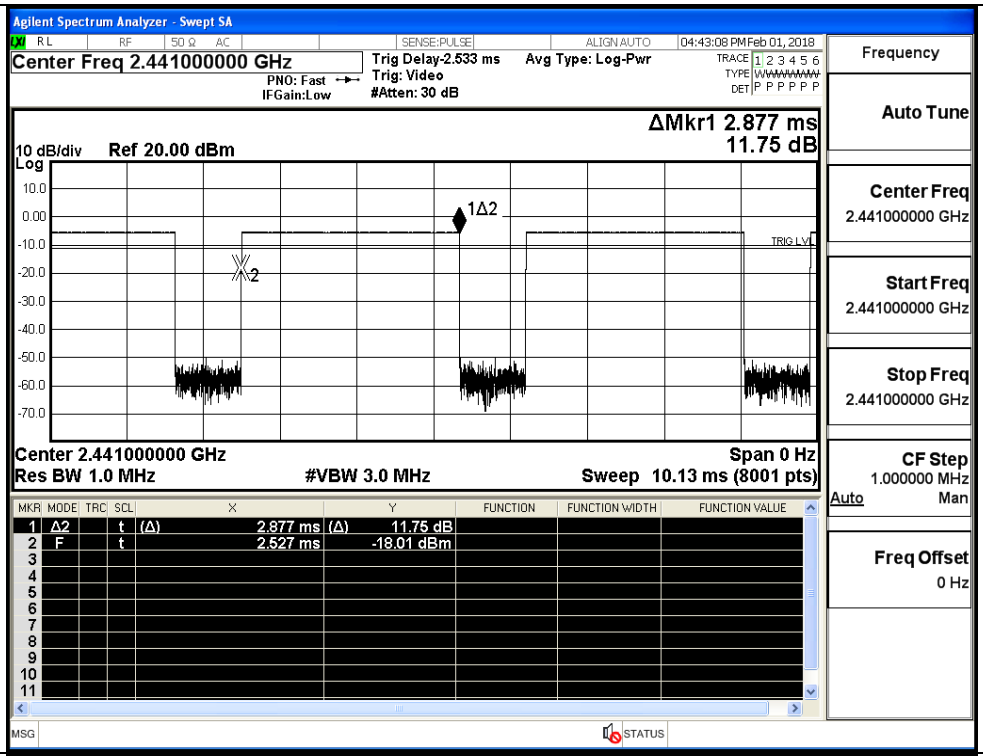
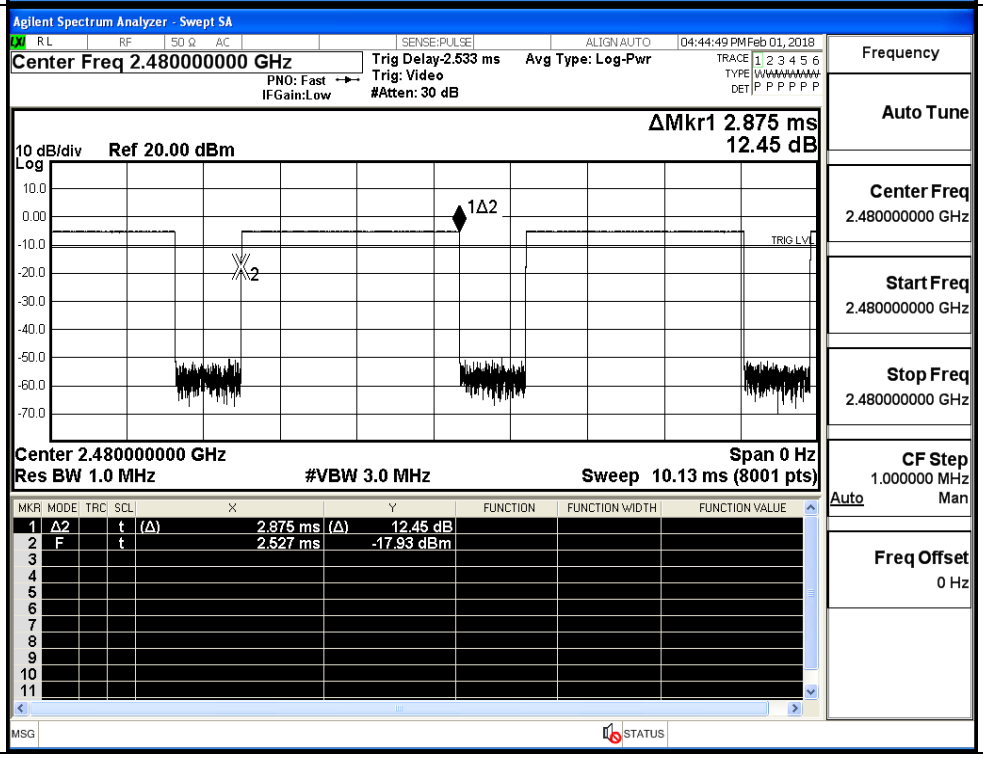
Appendix B): Dwell Time

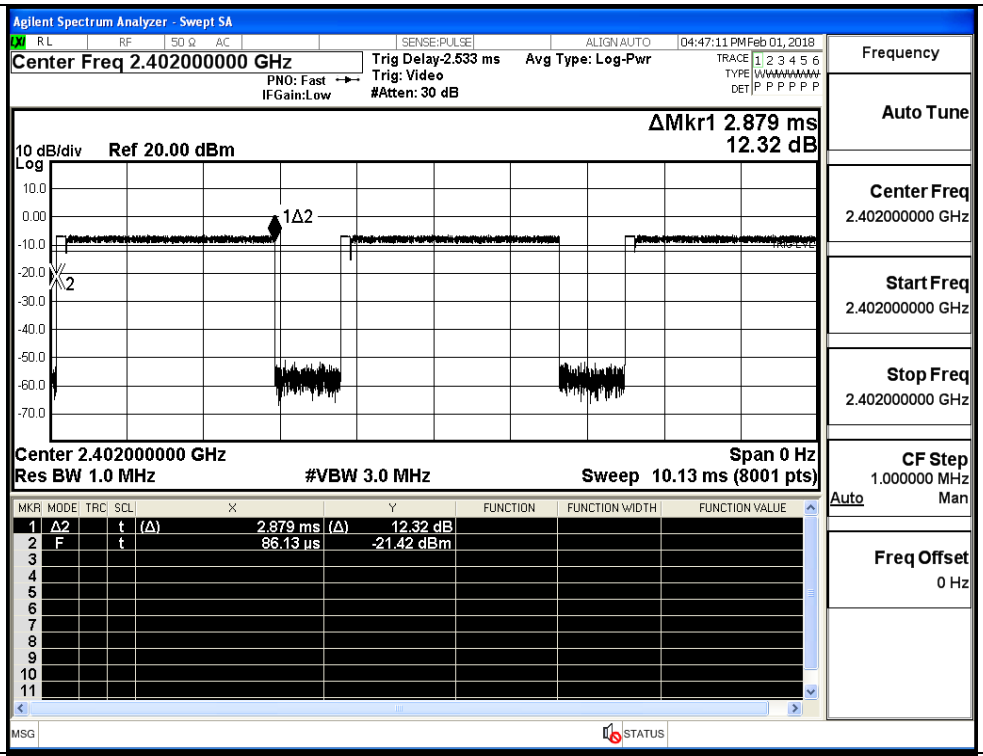
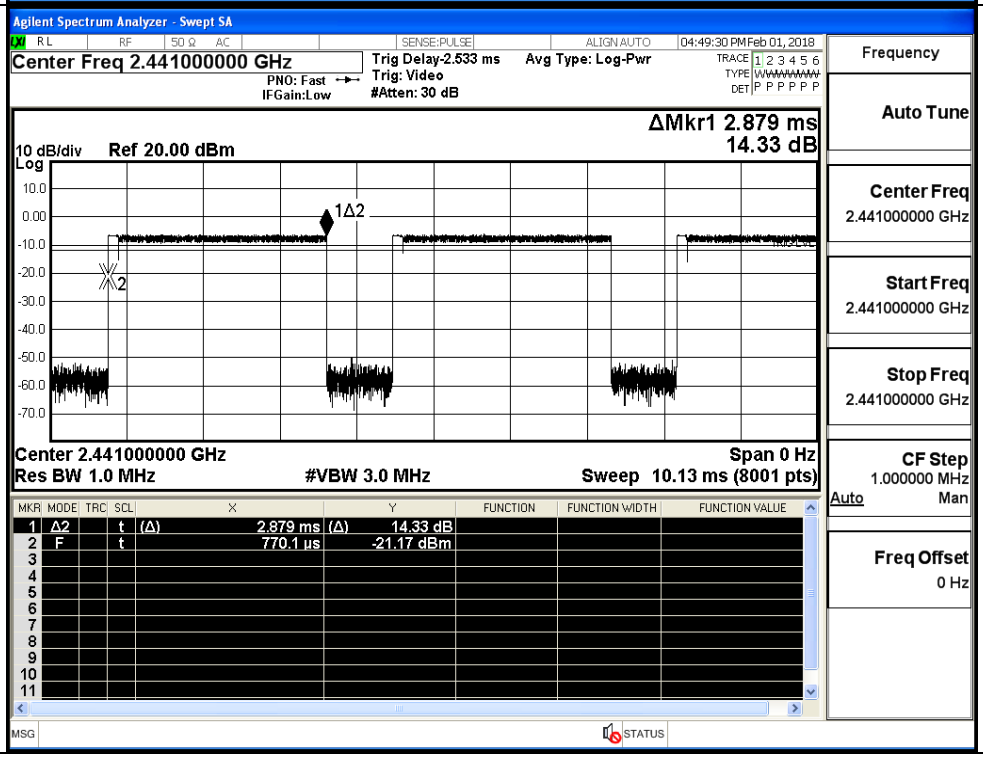
Result Table

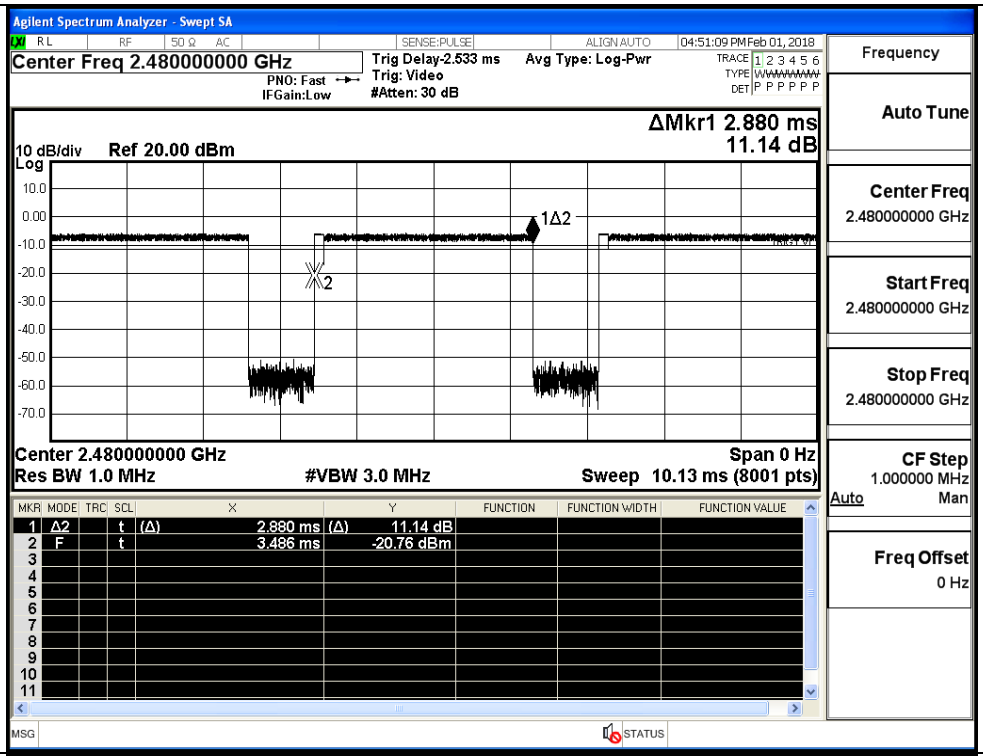
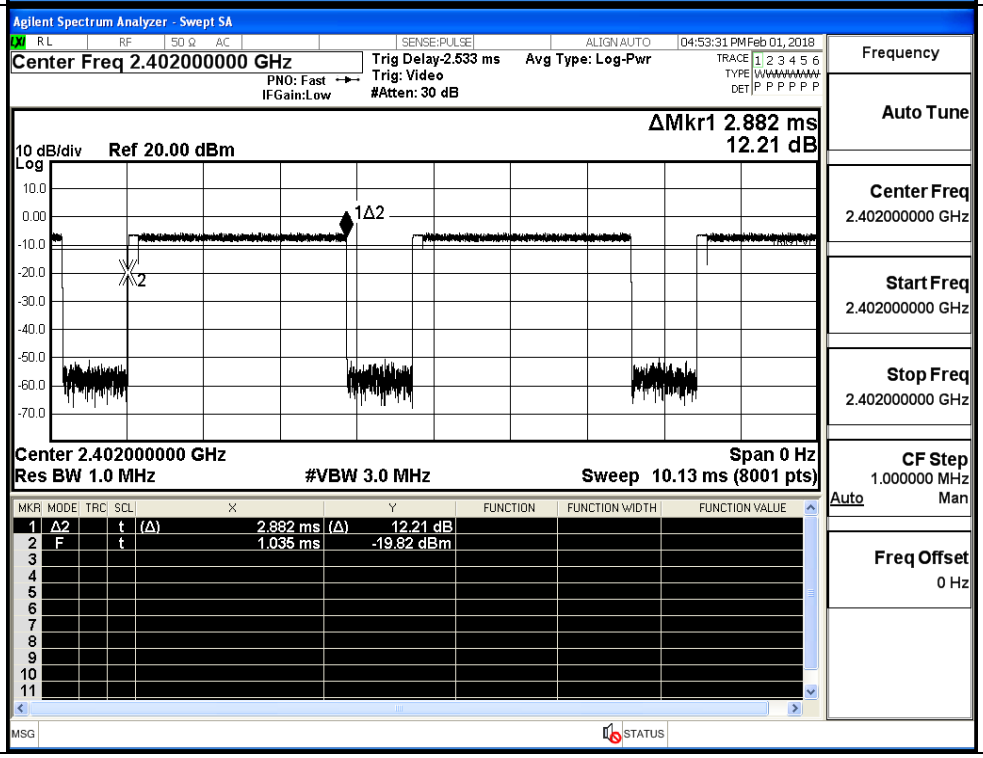
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
GFSK	DH5	MCH	2.88	106.7	0.307	0.4	PASS
GFSK	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK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

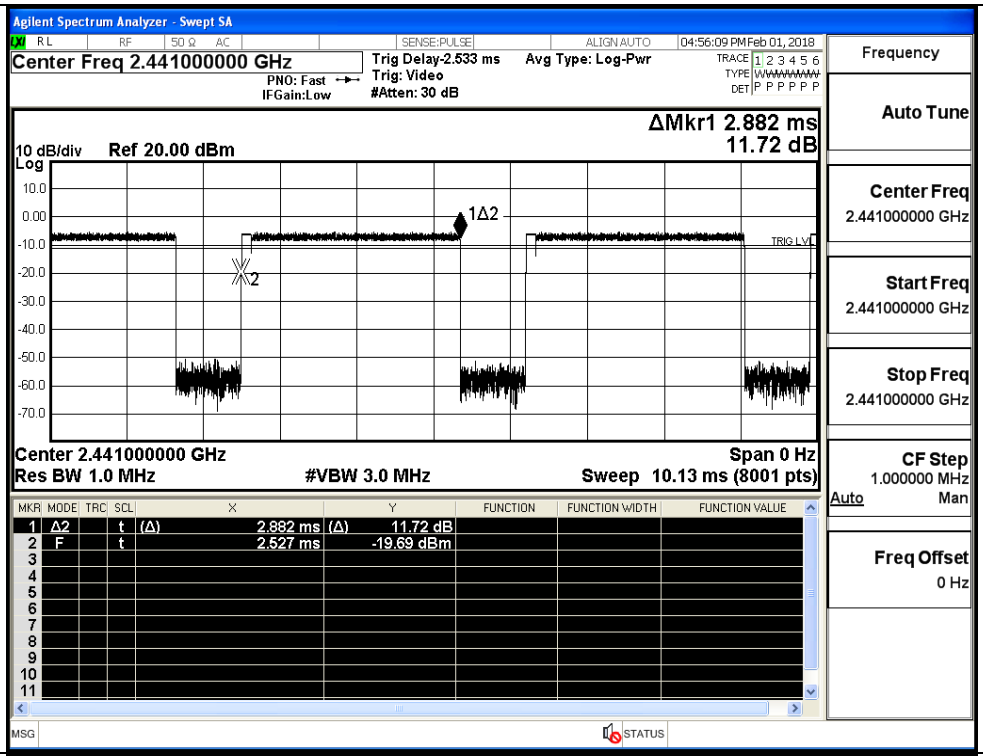
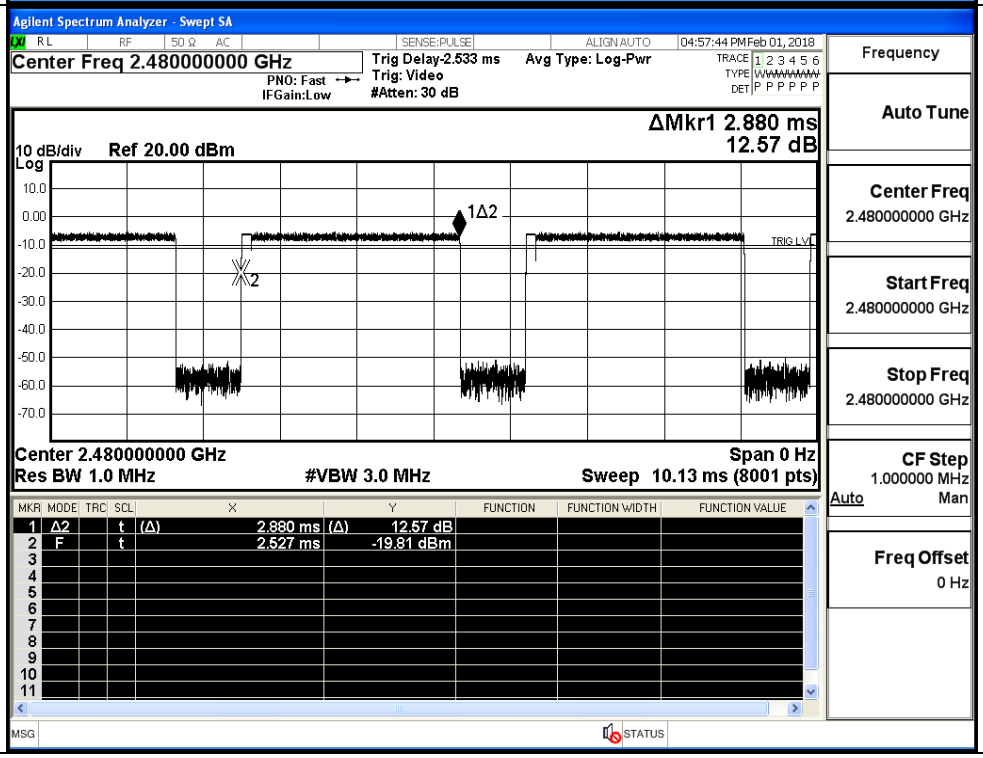
Test Graph

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	

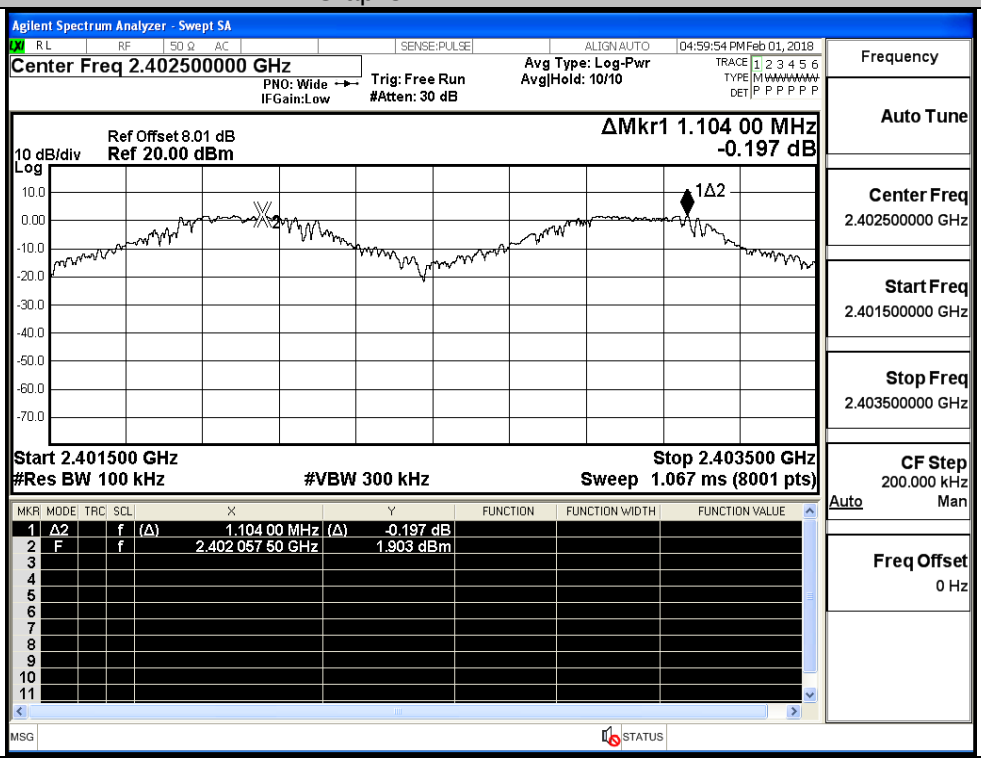
8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

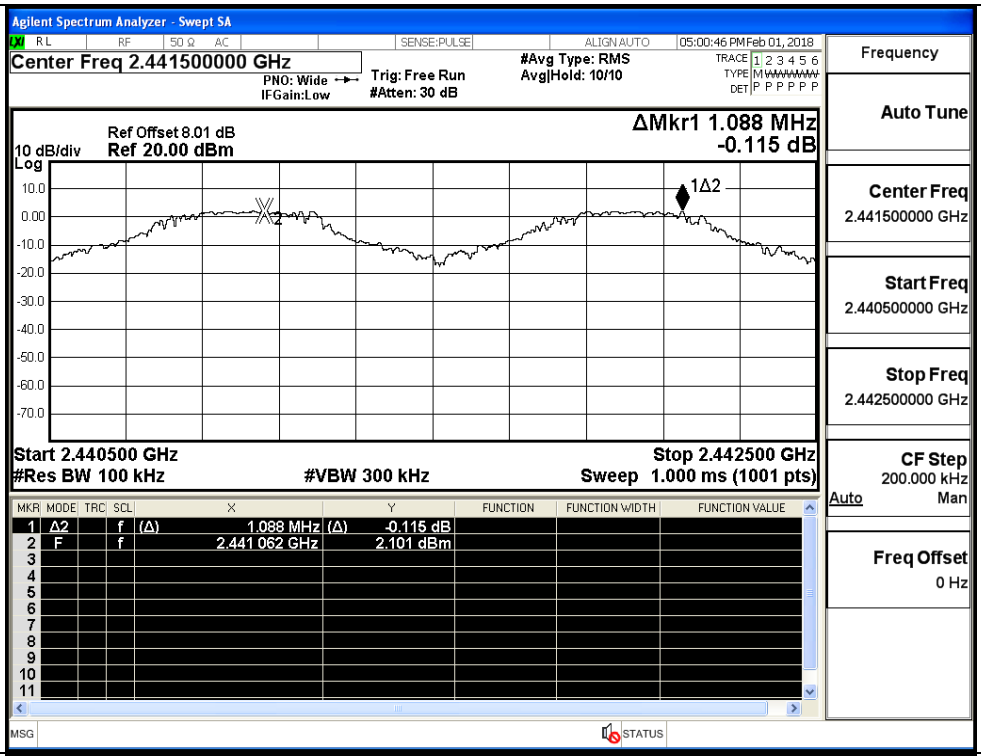
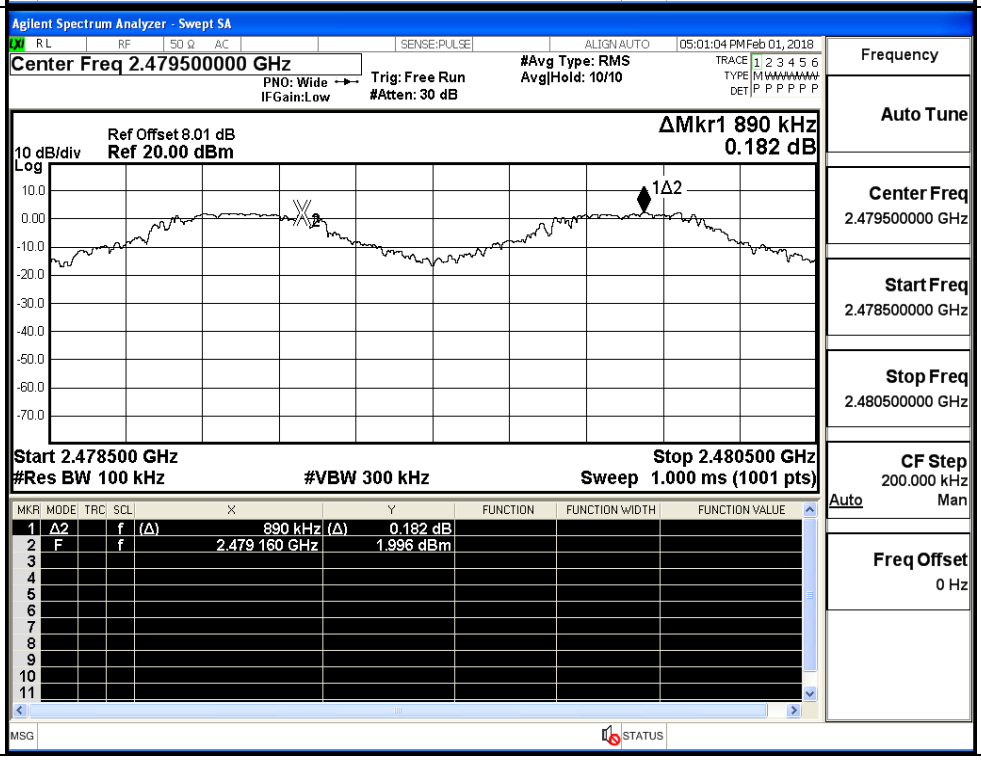
Appendix C): Carrier Frequency Separation

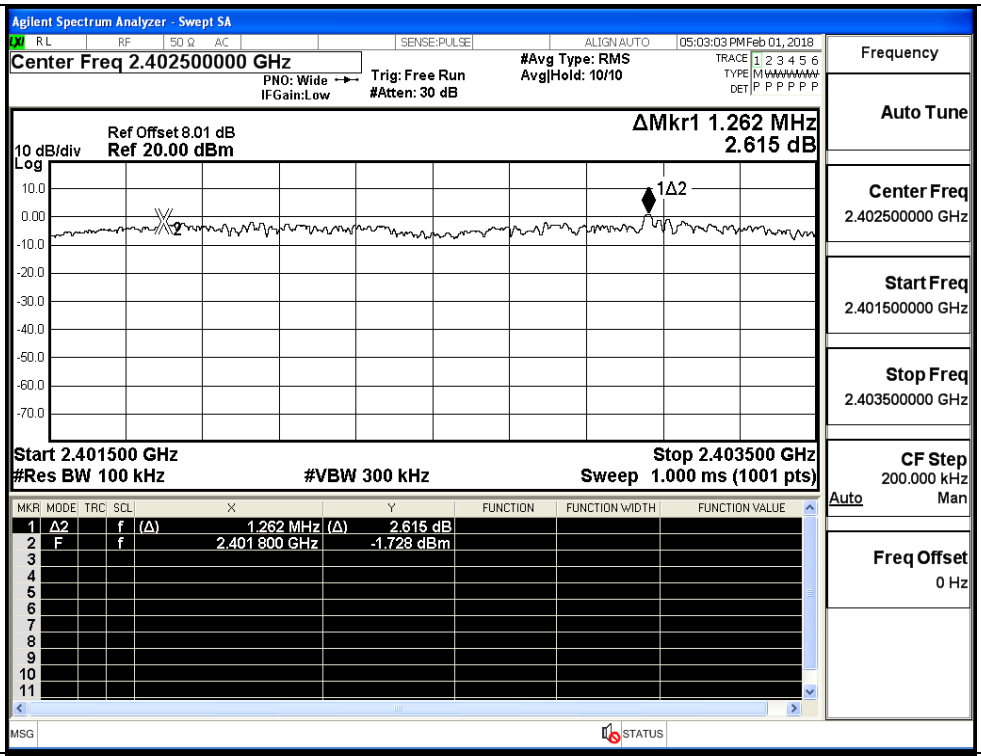
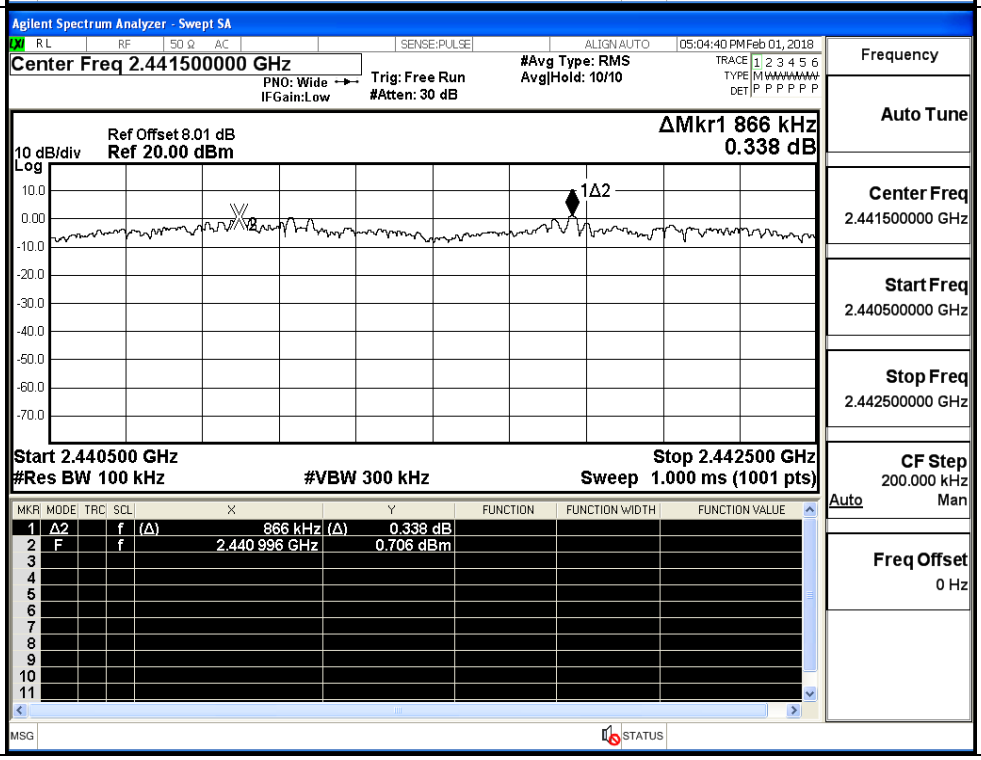
Result Table

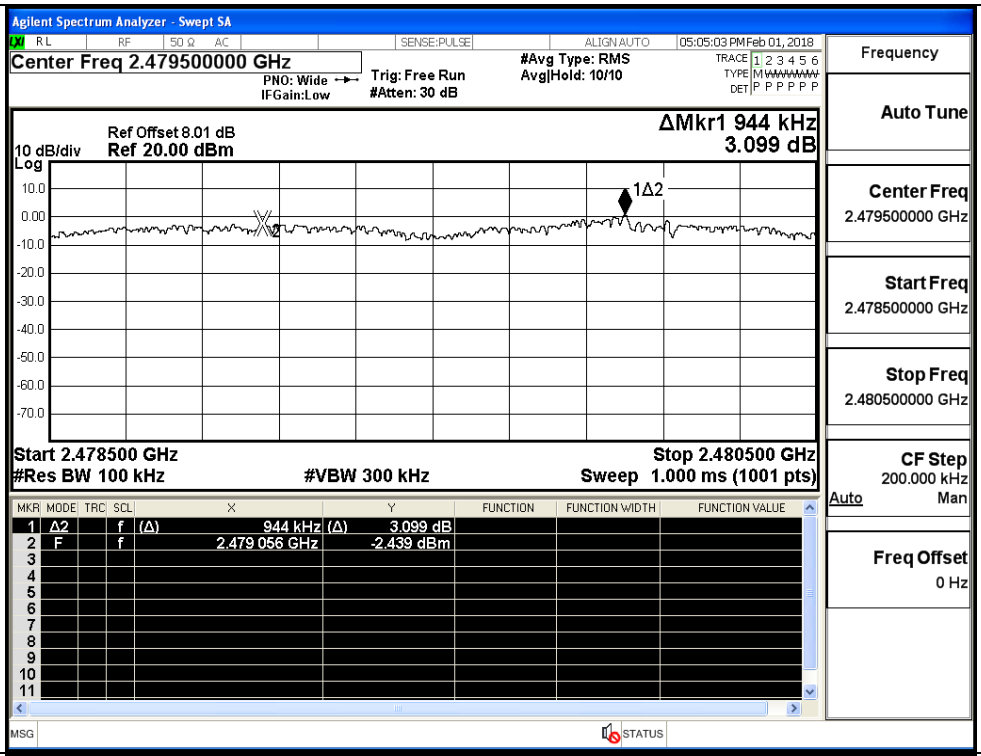
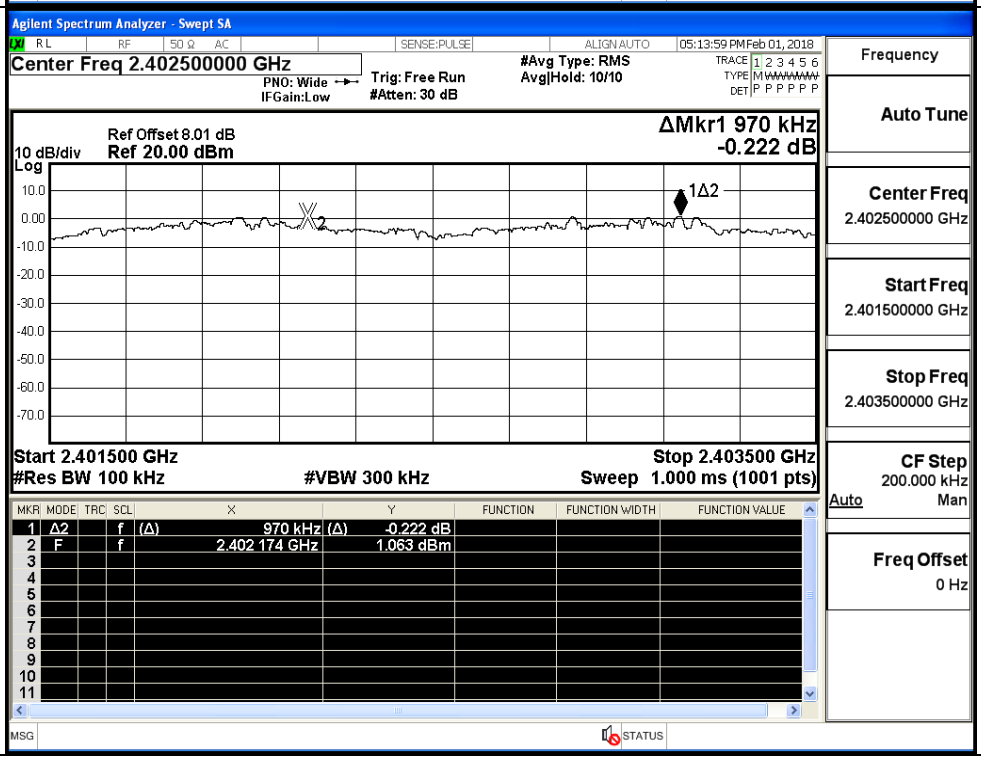
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit[MHz]	Verdict
GFSK	LCH	1.104	0.686	PASS
GFSK	MCH	1.088	0.682	PASS
GFSK	HCH	0.890	0.646	PASS
π/4DQPSK	LCH	1.262	0.859	PASS
π/4DQPSK	MCH	0.866	0.858	PASS
π/4DQPSK	HCH	0.944	0.859	PASS
8DPSK	LCH	0.970	0.863	PASS
8DPSK	MCH	1.050	0.861	PASS
8DPSK	HCH	1.296	0.863	PASS

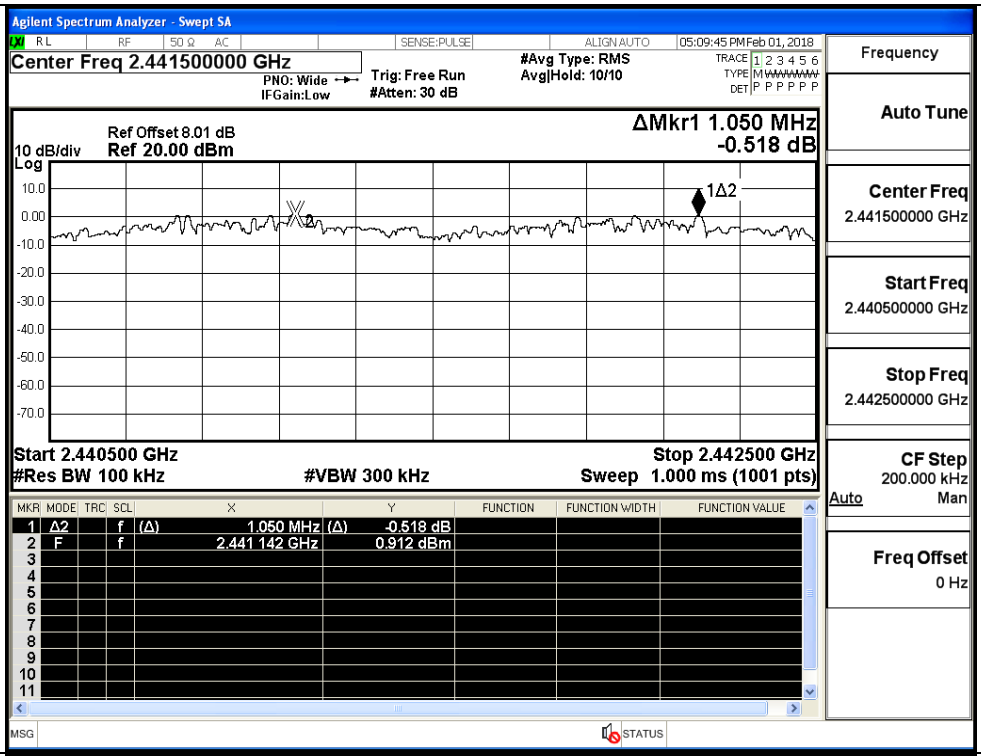
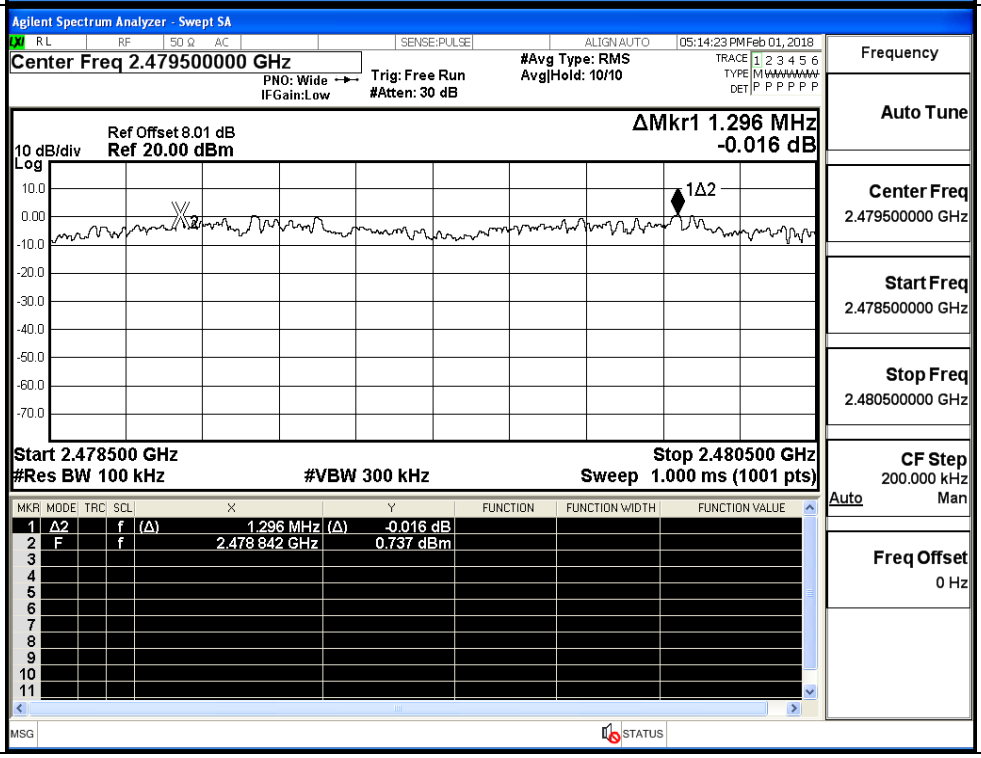
Test Graph

Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

π/4DQPSK/LCH		
π/4DQPSK/MCH		

π/4DQPSK/HCH		
8DPSK/LCH		

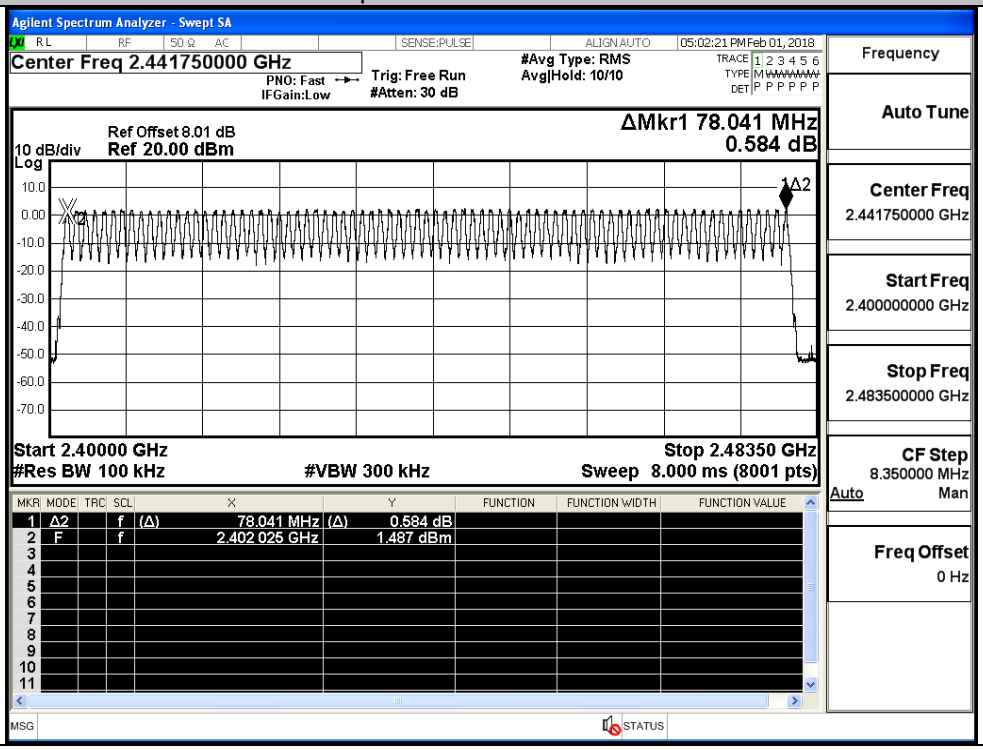
8DPSK/MCH		
8DPSK/HCH		

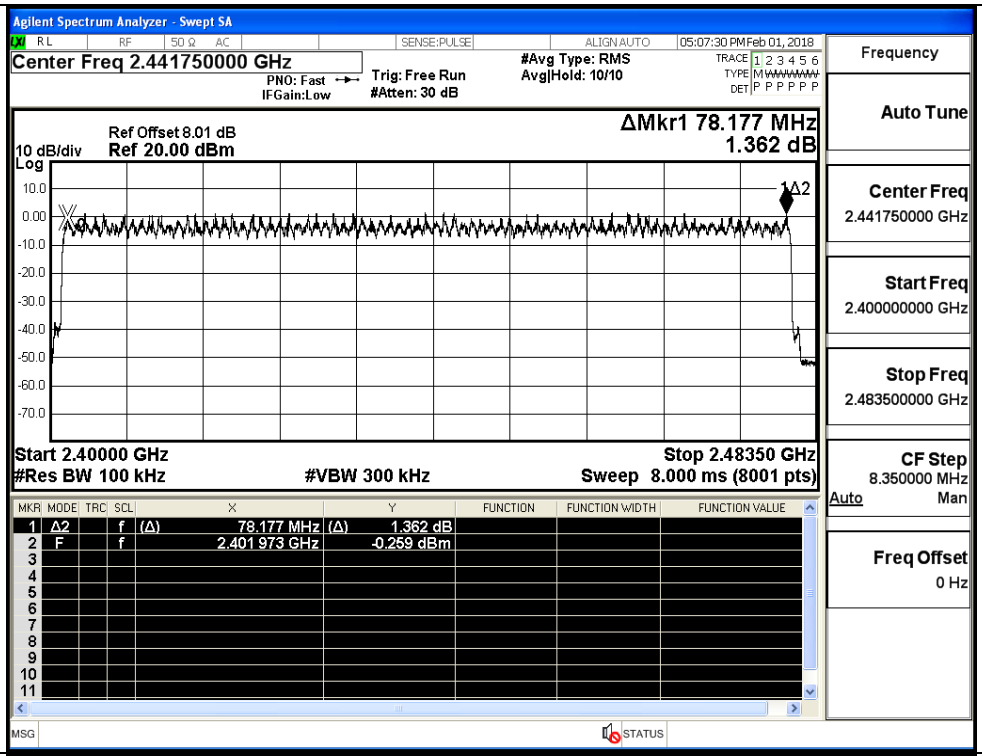
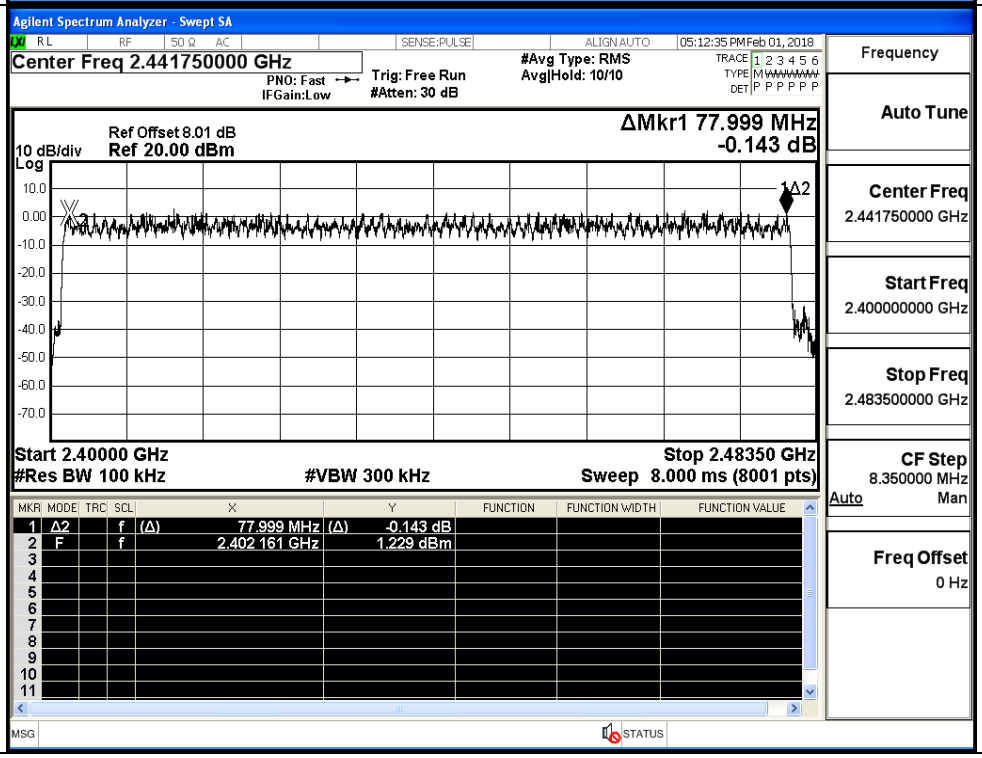
Appendix D): Hopping Channel Number

Result Table

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 Graph

Graphs	
GFSK/Hop	

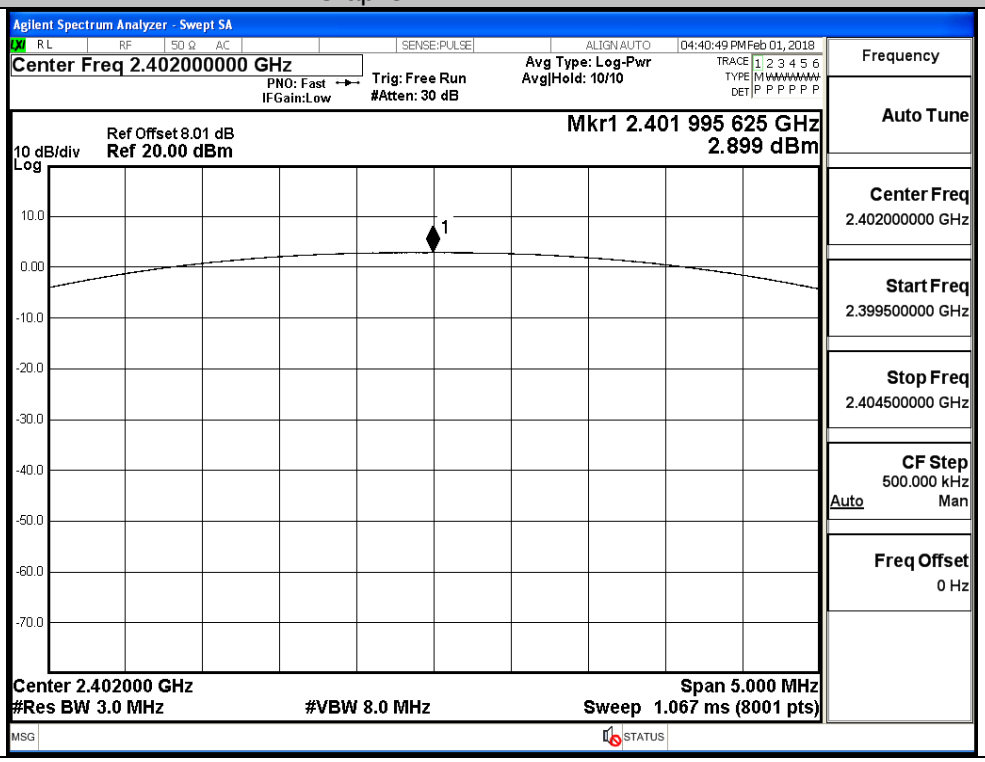
π/4DQPSK/Hop		
8DPSK/Hop		

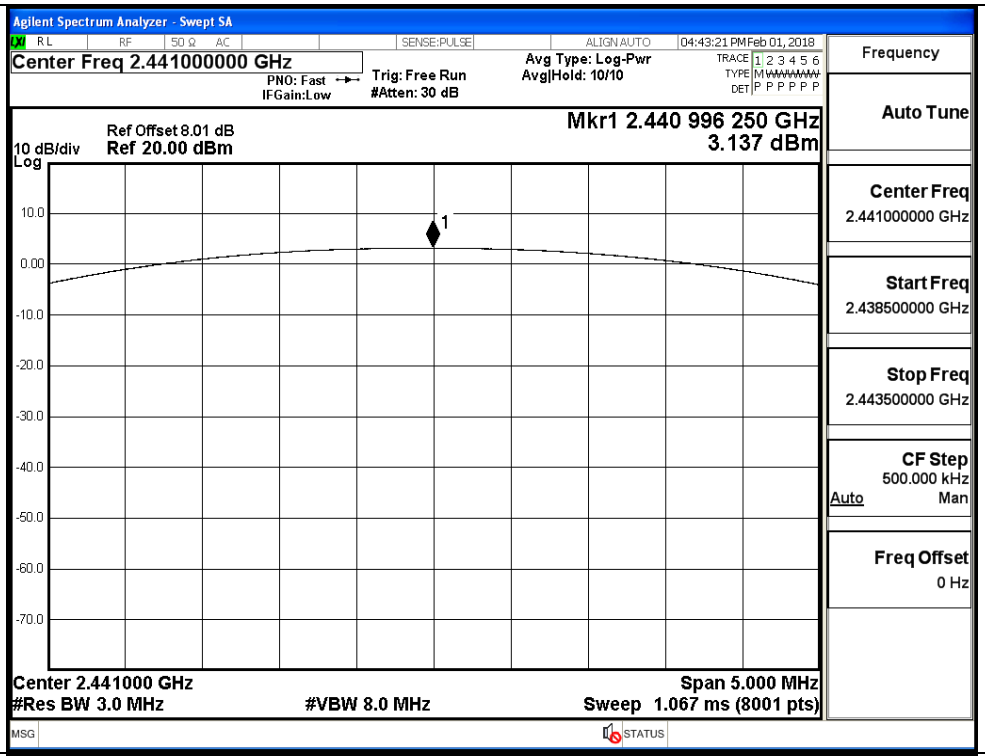
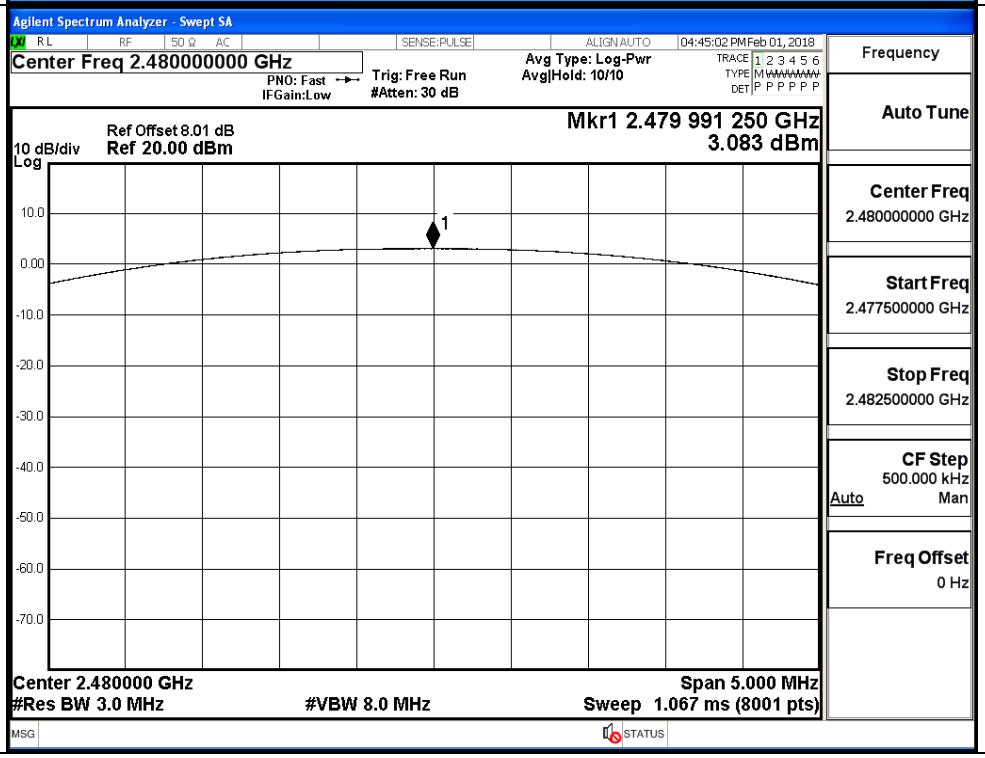
Appendix E): Conducted Peak Output Power

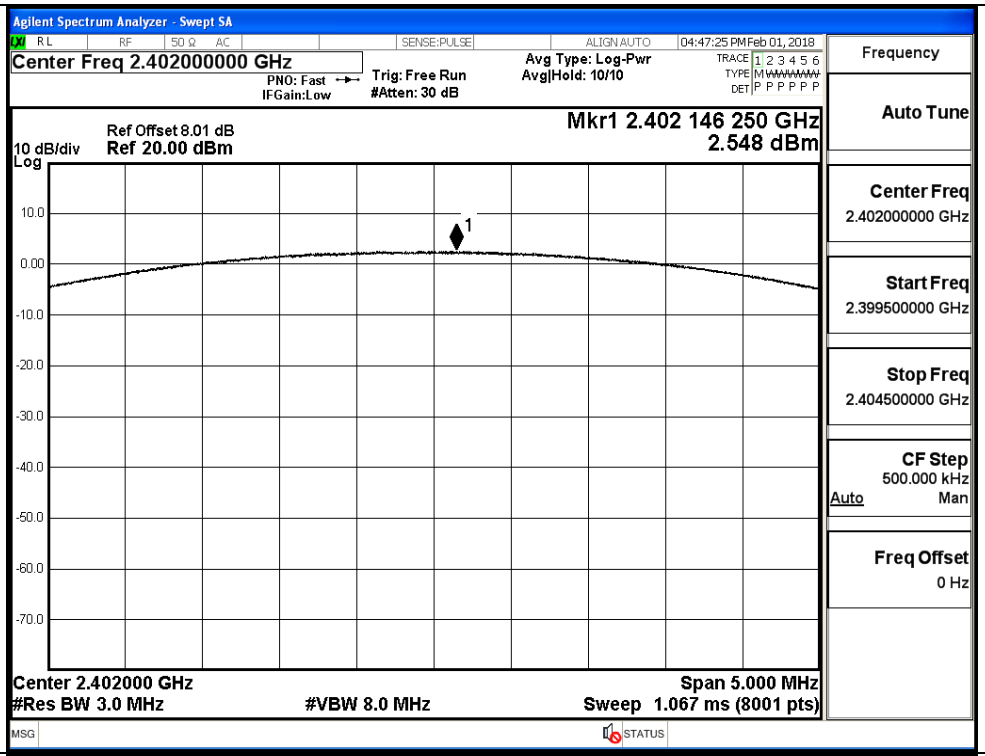
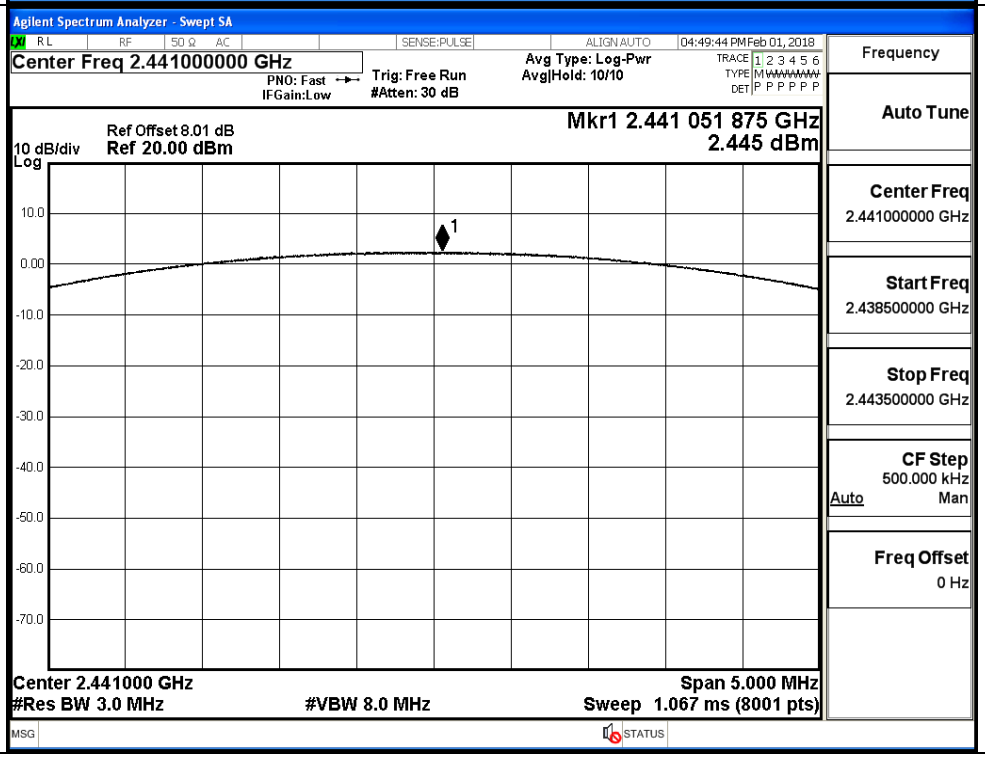
Result Table

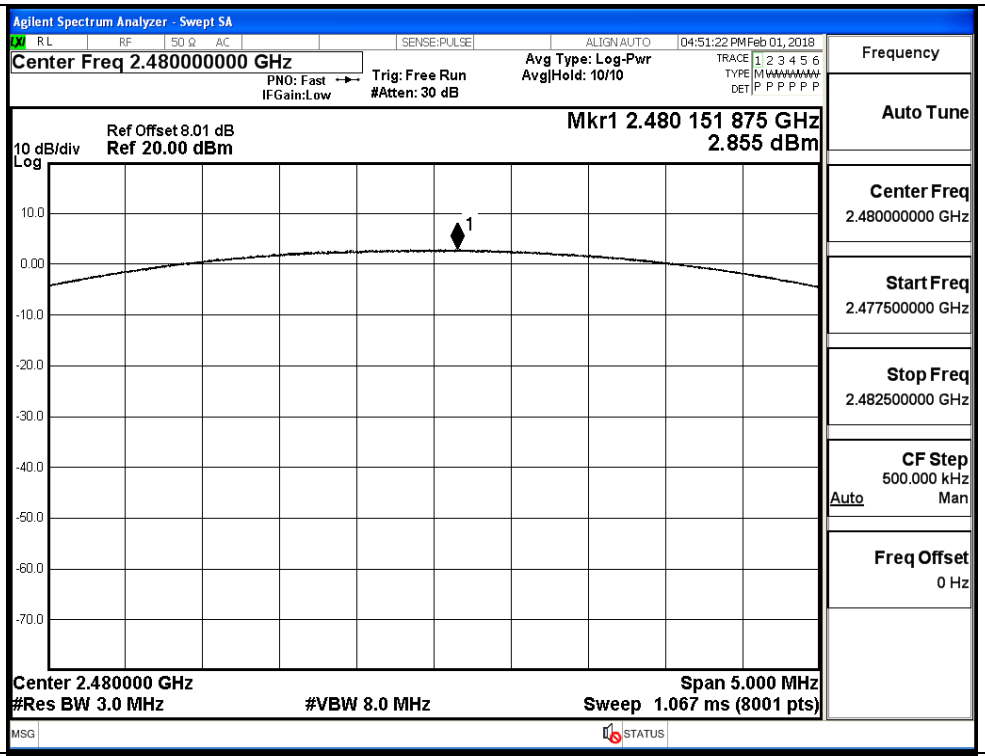
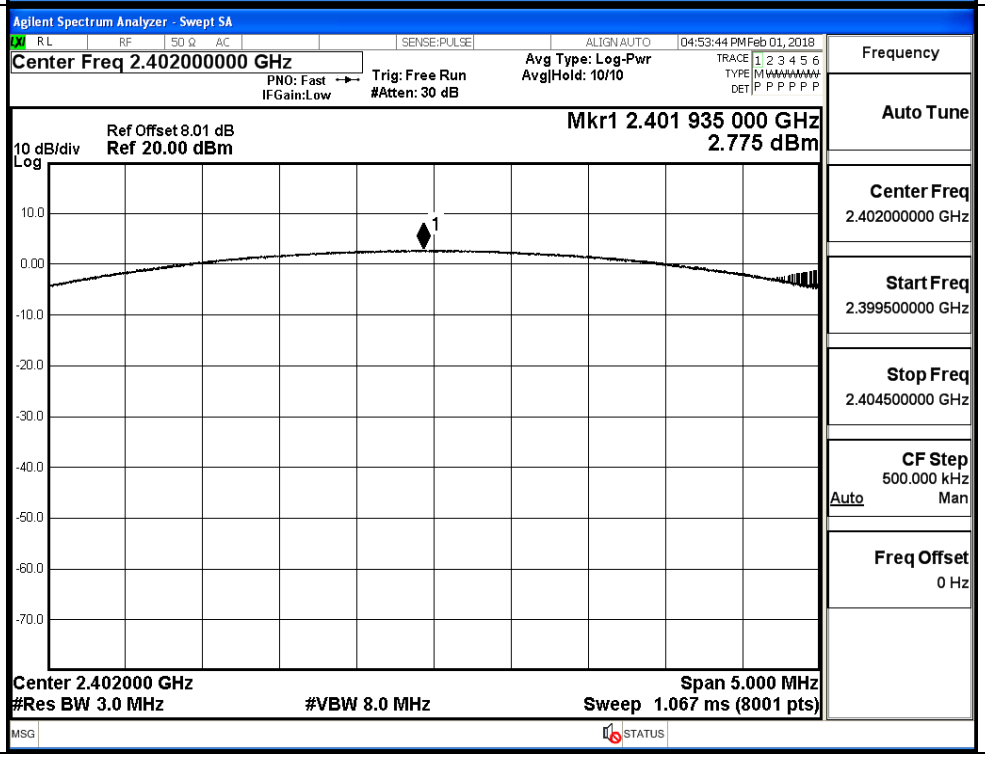
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit[dBm]	Verdict
GFSK	LCH	2.899	21	PASS
GFSK	MCH	3.137	21	PASS
GFSK	HCH	3.083	21	PASS
π/4DQPSK	LCH	2.548	21	PASS
π/4DQPSK	MCH	2.445	21	PASS
π/4DQPSK	HCH	2.855	21	PASS
8DPSK	LCH	2.775	21	PASS
8DPSK	MCH	3.042	21	PASS
8DPSK	HCH	3.037	21	PASS

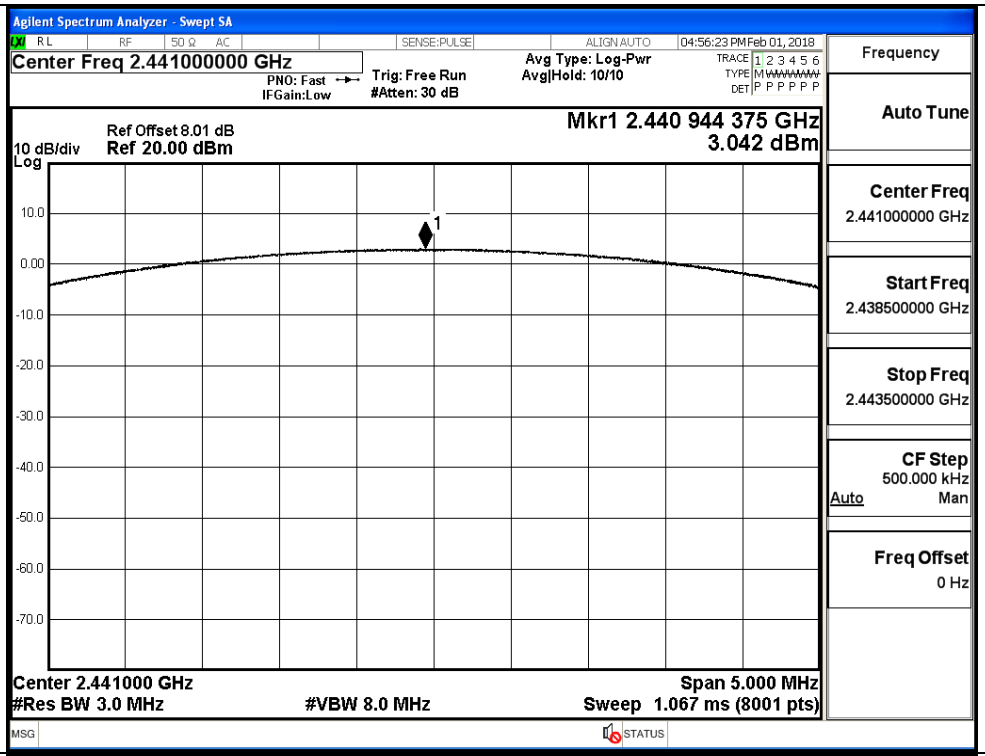
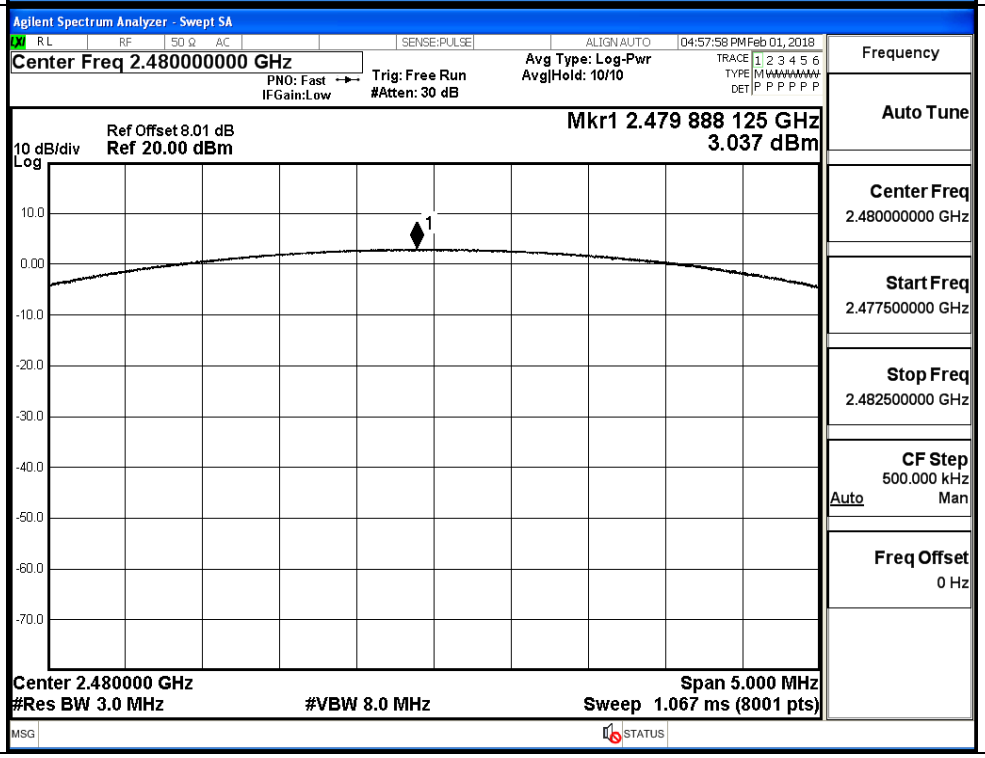
Test Graph

Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

π/4DQPSK/LCH		
π/4DQPSK/MCH		

π/4DQPSK/HCH		
8DPSK/LCH		

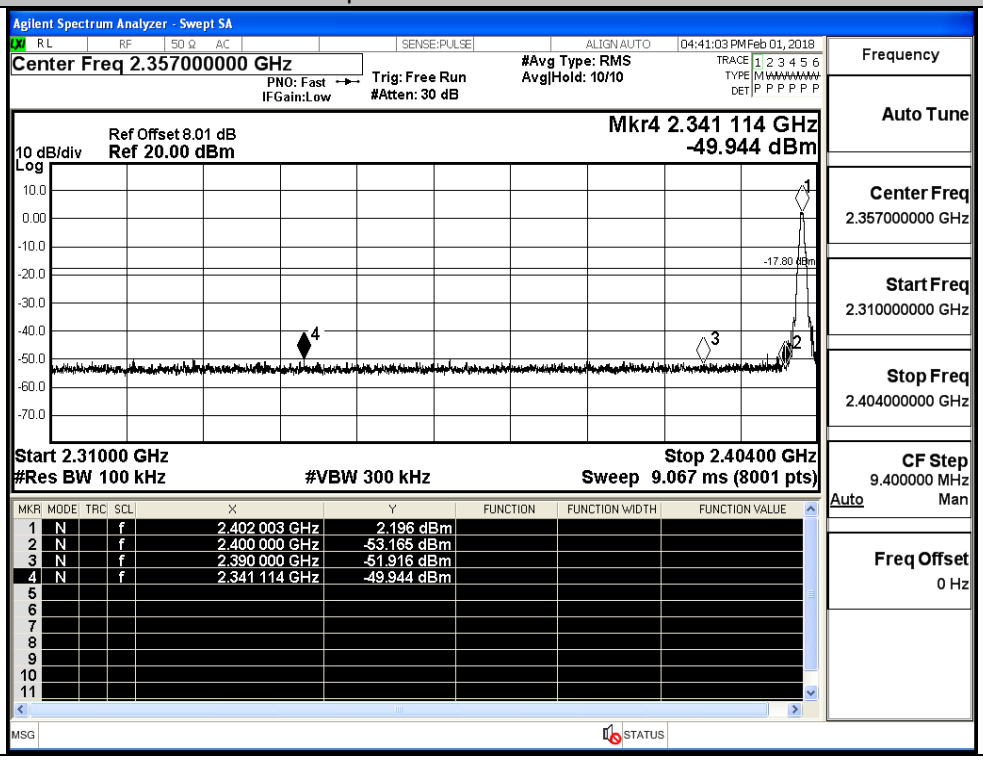
8DPSK/MCH		
8DPSK/HCH		

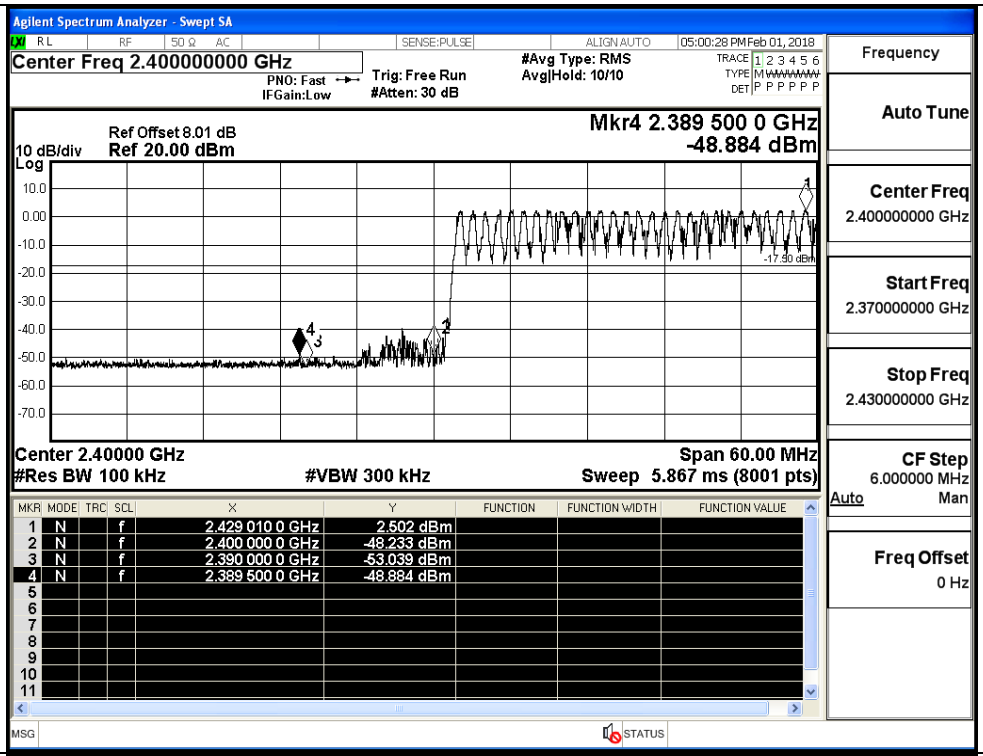
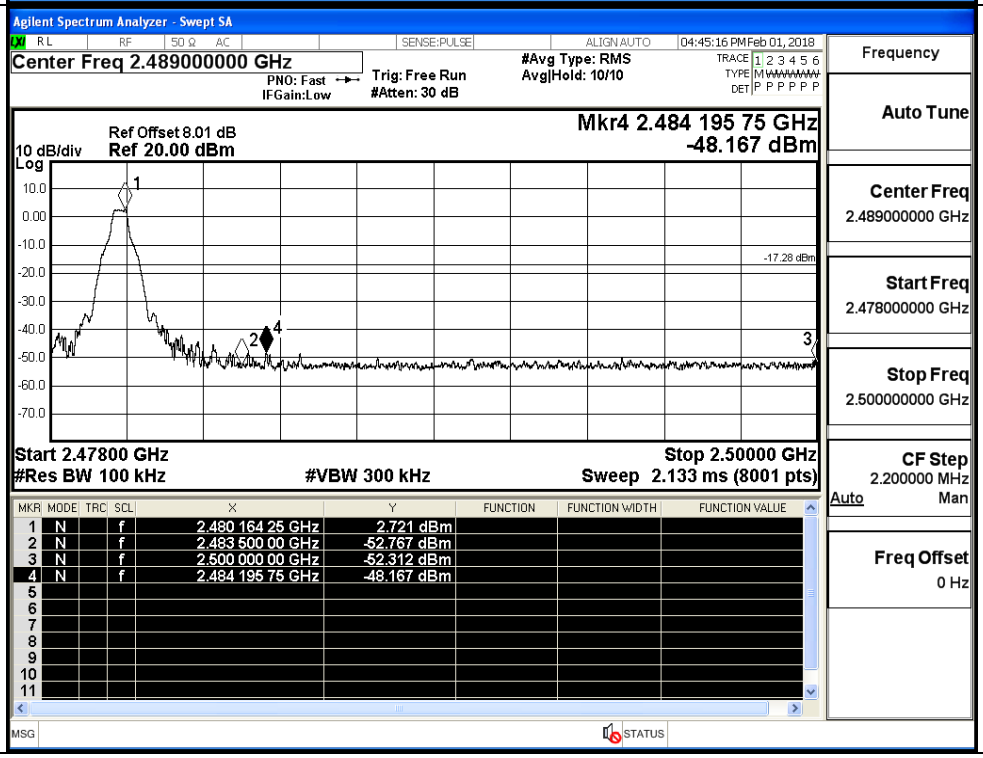
Appendix F): Band-edge for RF Conducted Emissions

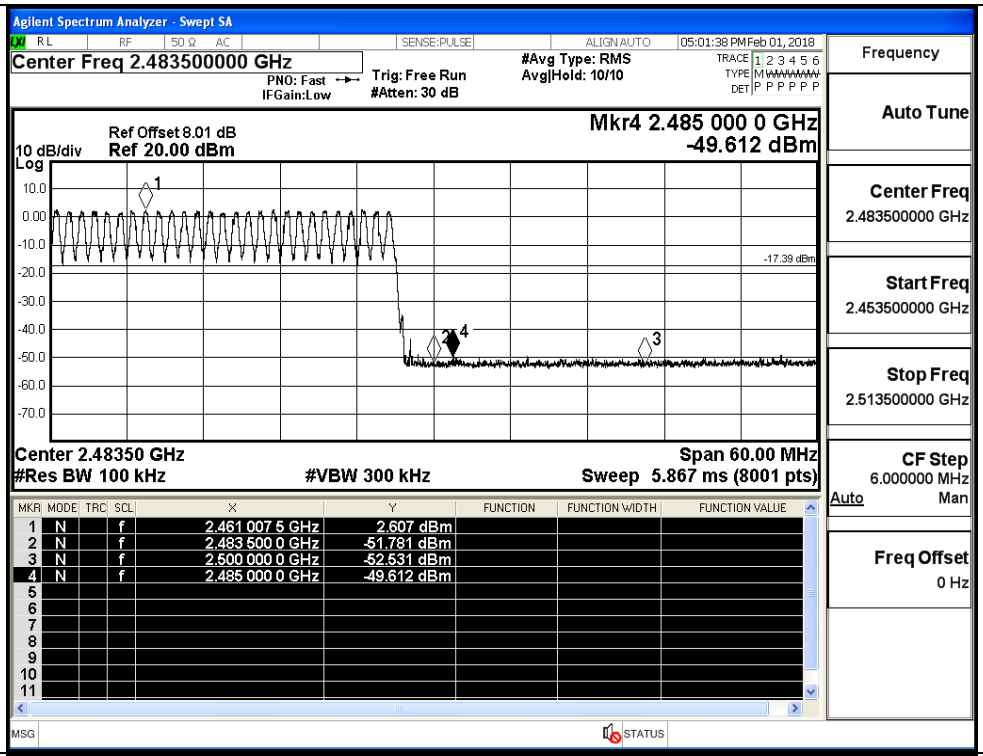
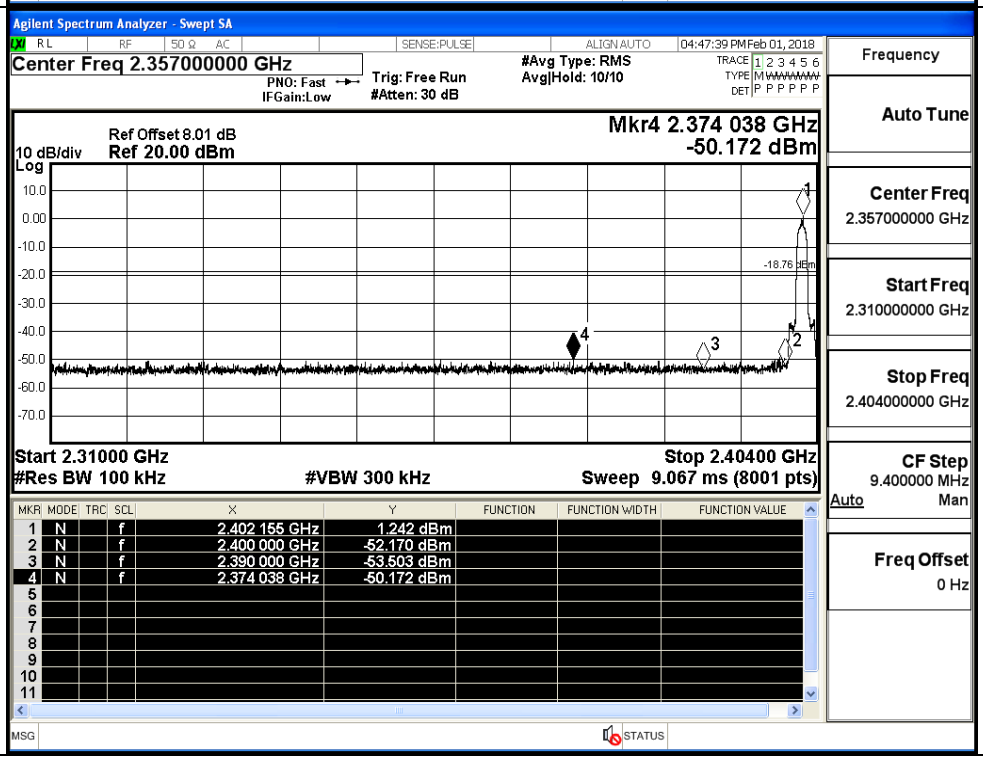
Result Table

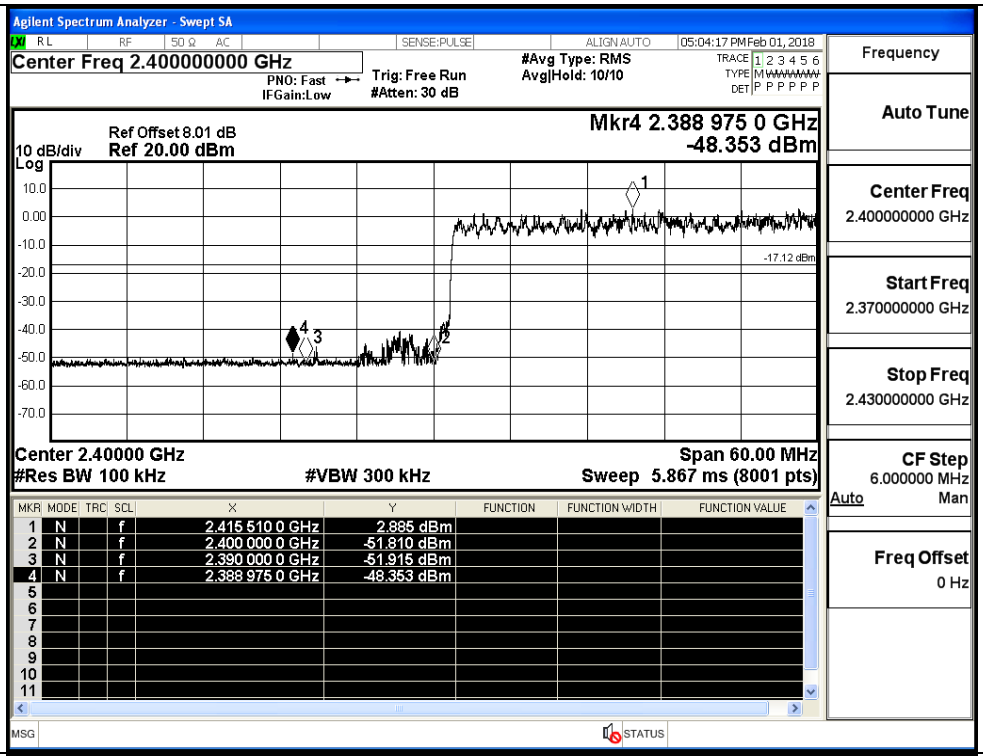
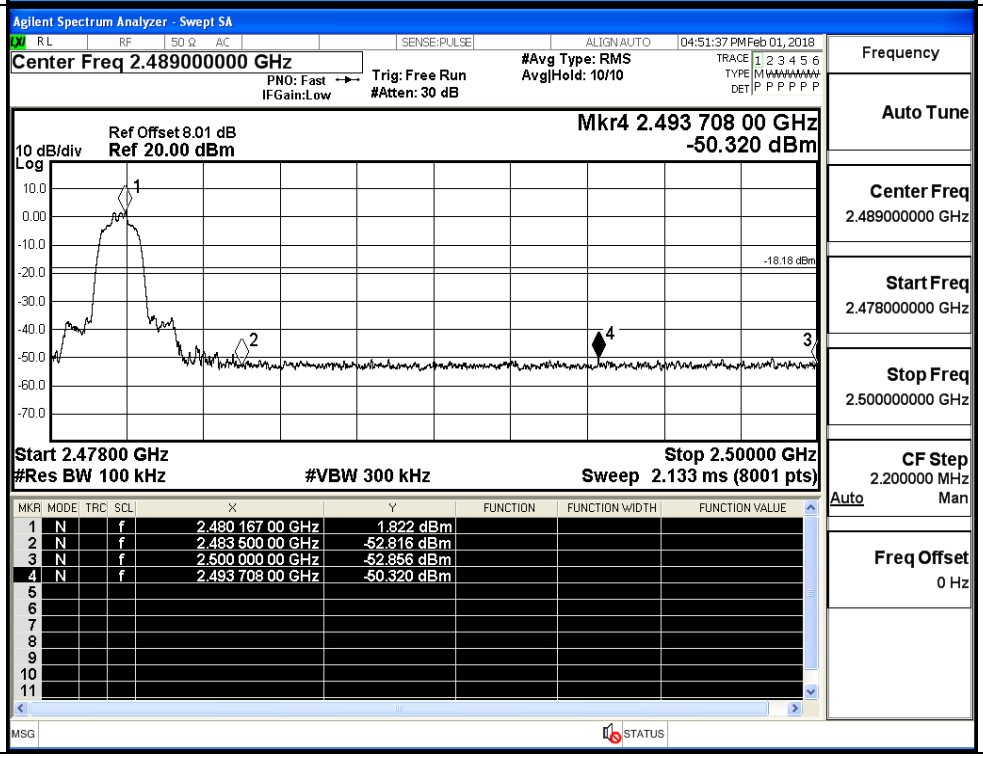
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	2.196	Off	-49.944	-17.8	PASS
			2.502	On	-48.884	-17.5	PASS
GFSK	HCH	2480	2.721	Off	-48.167	-17.28	PASS
			2.607	On	-49.612	-17.39	PASS
π/4DQPSK	LCH	2402	1.242	Off	-50.172	-18.76	PASS
			2.885	On	-48.353	-17.12	PASS
π/4DQPSK	HCH	2480	1.822	Off	-50.320	-18.18	PASS
			1.526	On	-48.621	-18.47	PASS
8DPSK	LCH	2402	1.539	Off	-50.288	-18.46	PASS
			2.070	On	-45.313	-17.93	PASS
8DPSK	HCH	2480	1.910	Off	-50.077	-18.09	PASS
			1.503	On	-49.617	-18.5	PASS

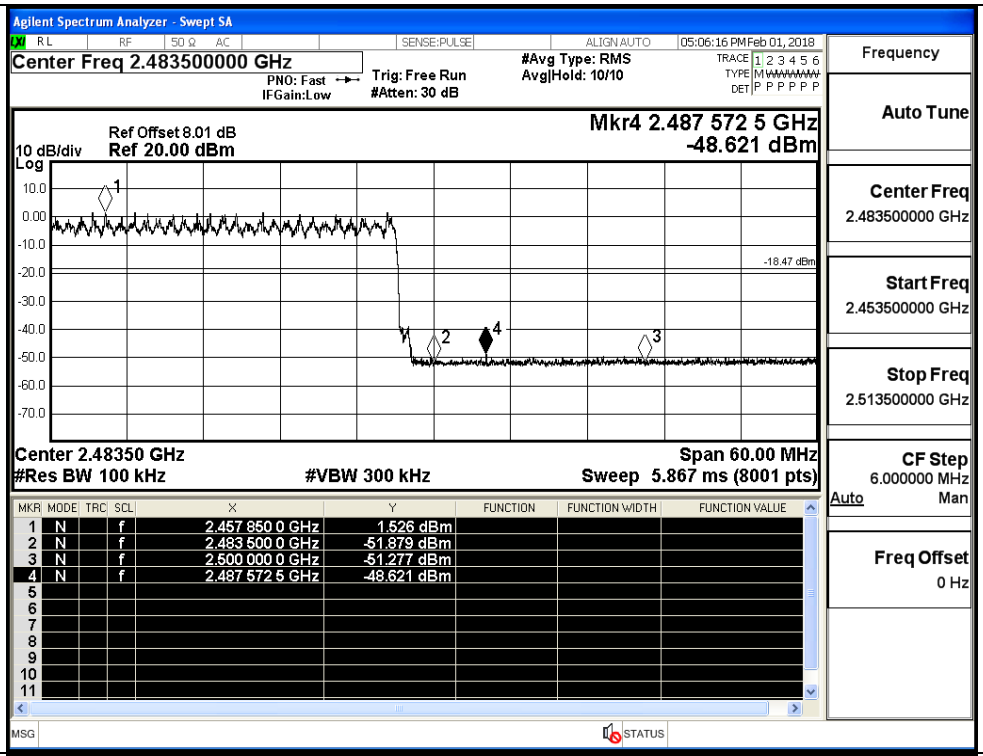
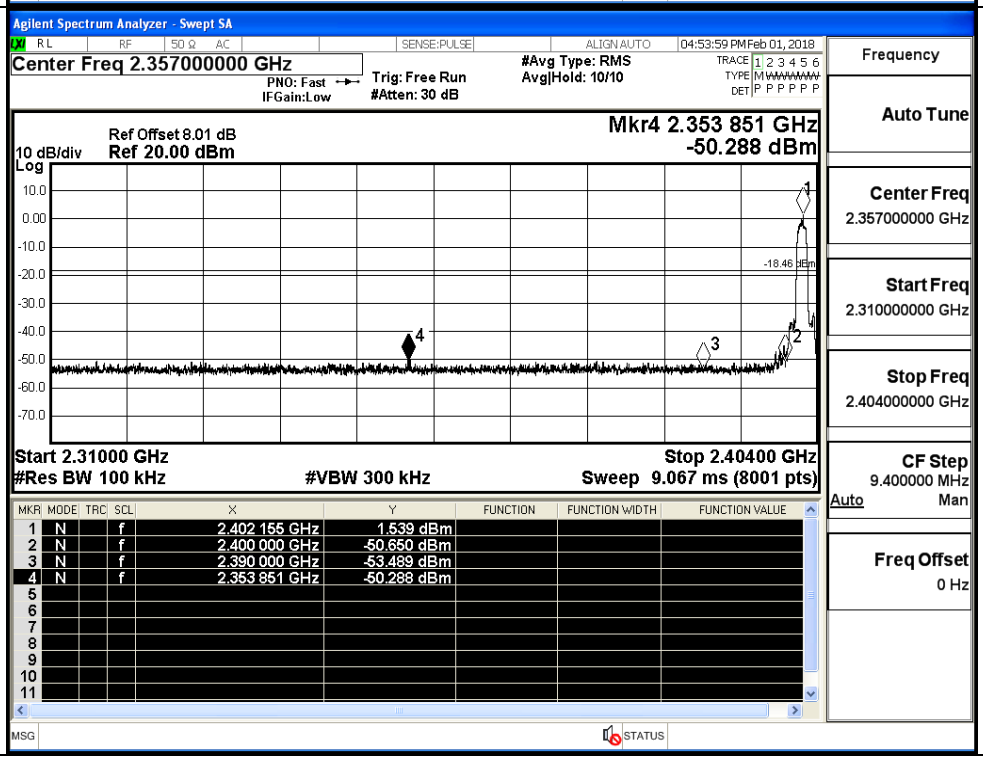
Test Graph

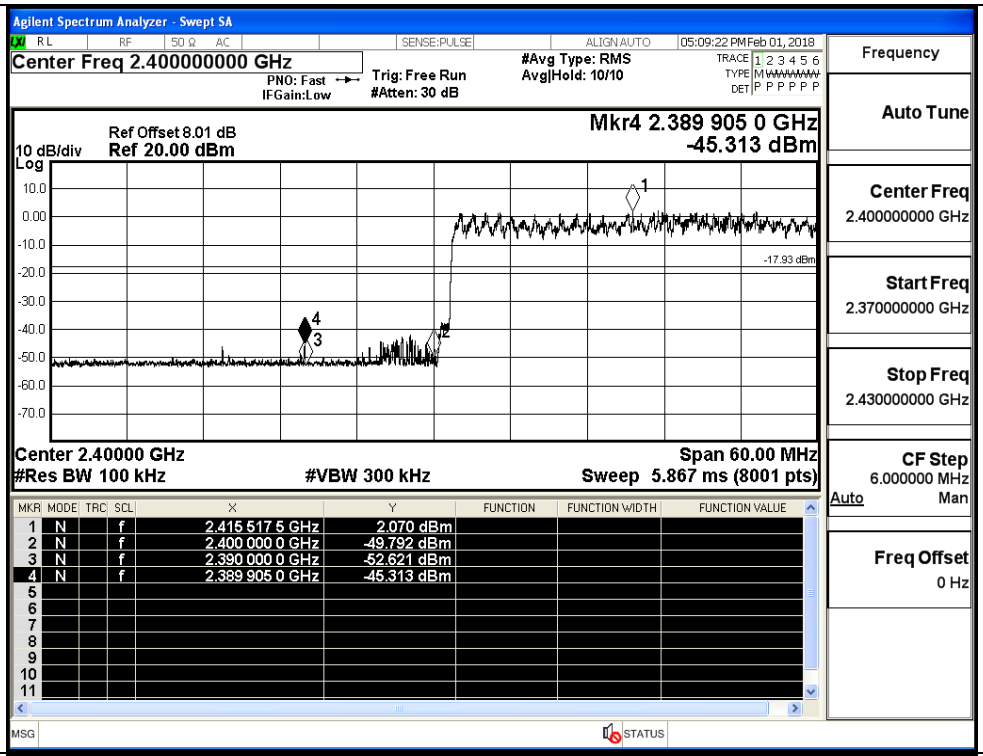
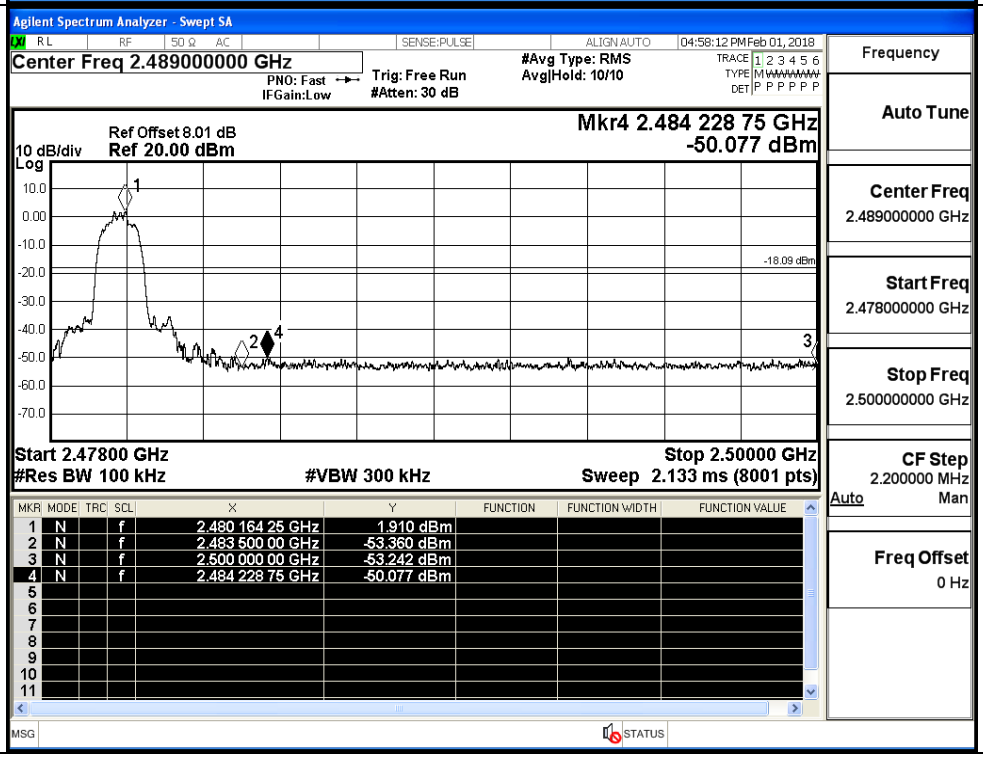
Graphs	
GFSK/LCH/No Hop	

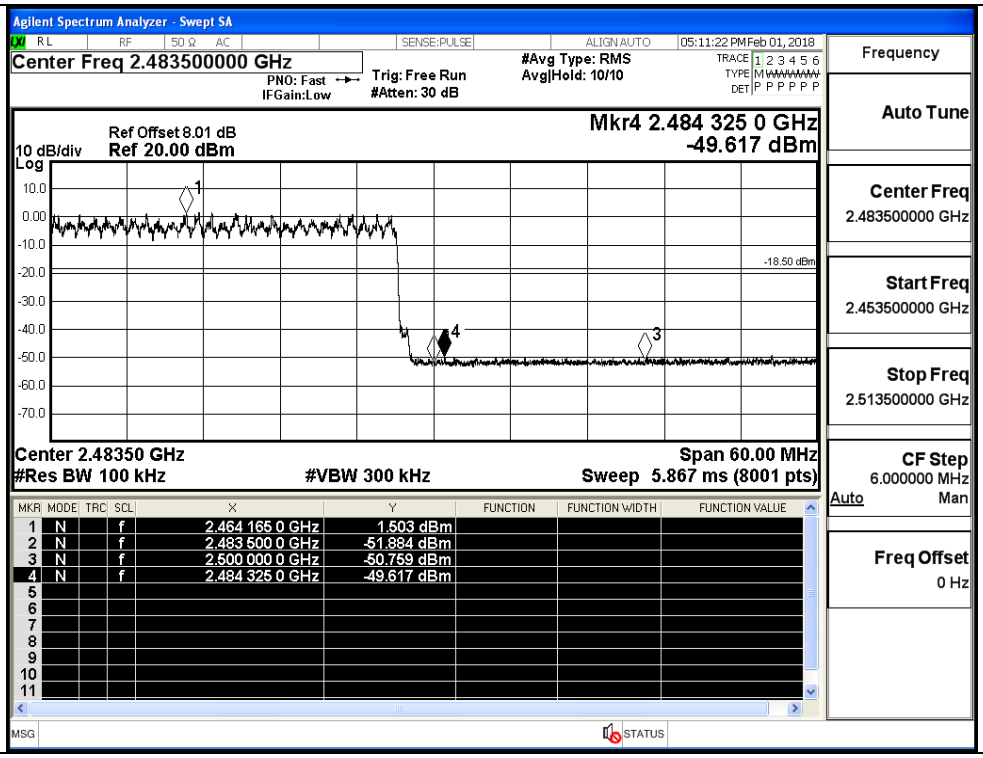
GFSK/LCH/Hop	
GFSK/HCH/No Hop	

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	

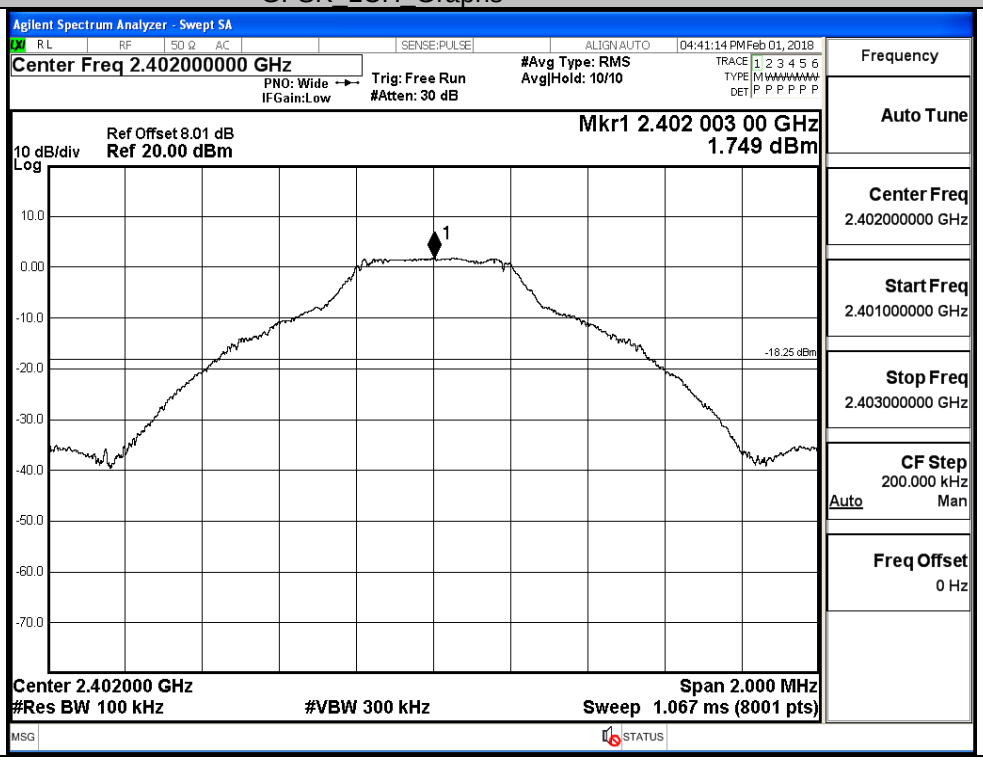
8DPSK/HCH/Hop		

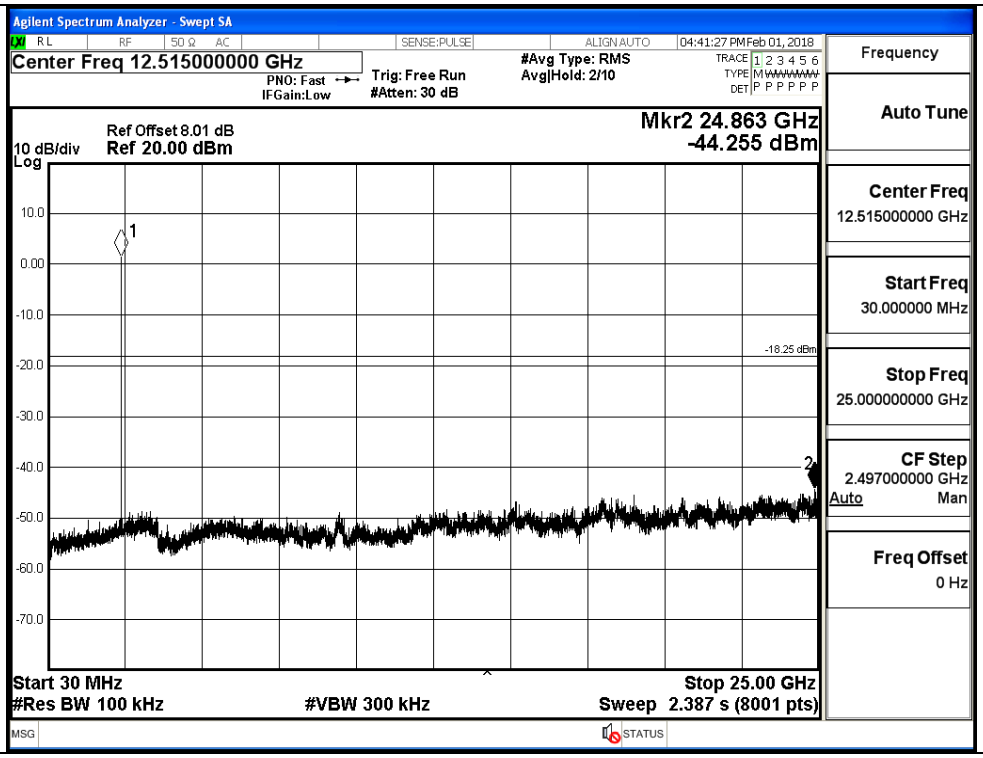
Appendix G): RF Conducted Spurious Emissions

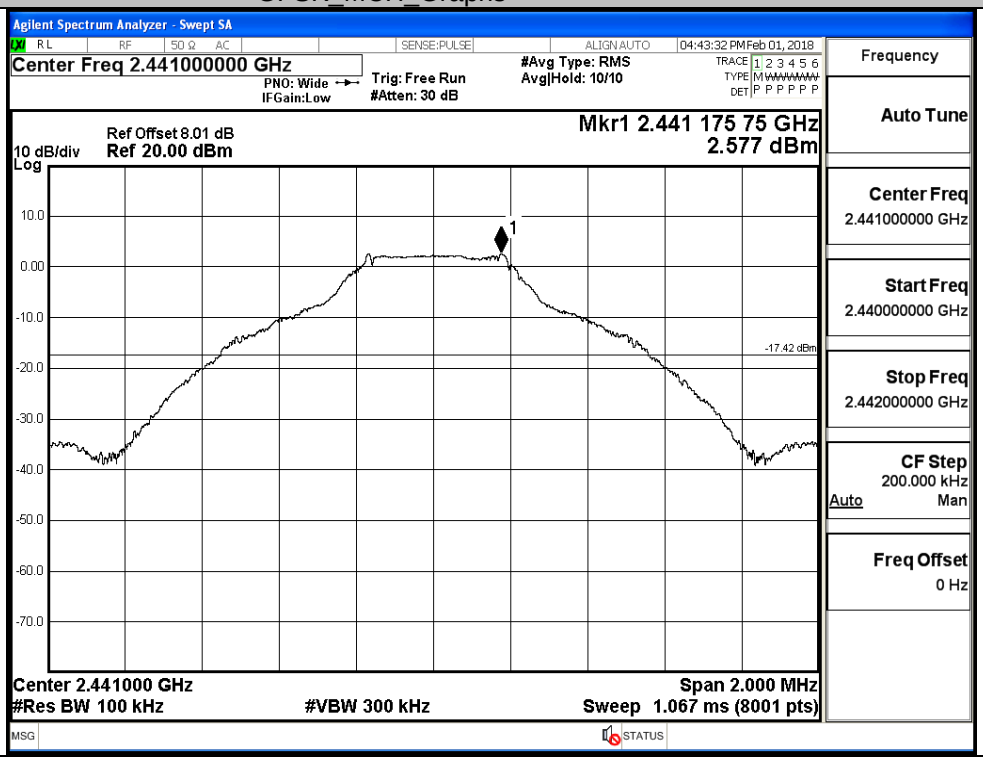
Result Table

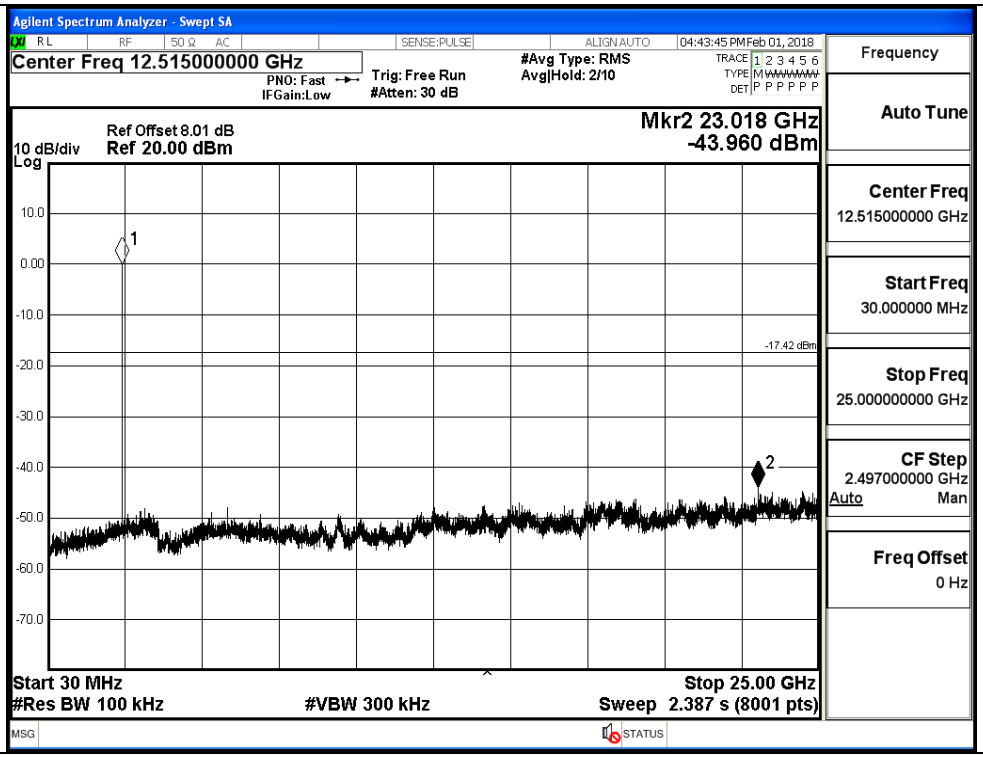
Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
GFSK	LCH	1.749	<-18.25	PASS
GFSK	MCH	2.577	<-17.42	PASS
GFSK	HCH	2.287	<-17.71	PASS
π/4DQPSK	LCH	0.555	<-19.45	PASS
π/4DQPSK	MCH	1.499	<-18.50	PASS
π/4DQPSK	HCH	1.175	<-18.83	PASS
8DPSK	LCH	1.251	<-18.75	PASS
8DPSK	MCH	1.858	<-18.14	PASS
8DPSK	HCH	1.189	<-18.81	PASS

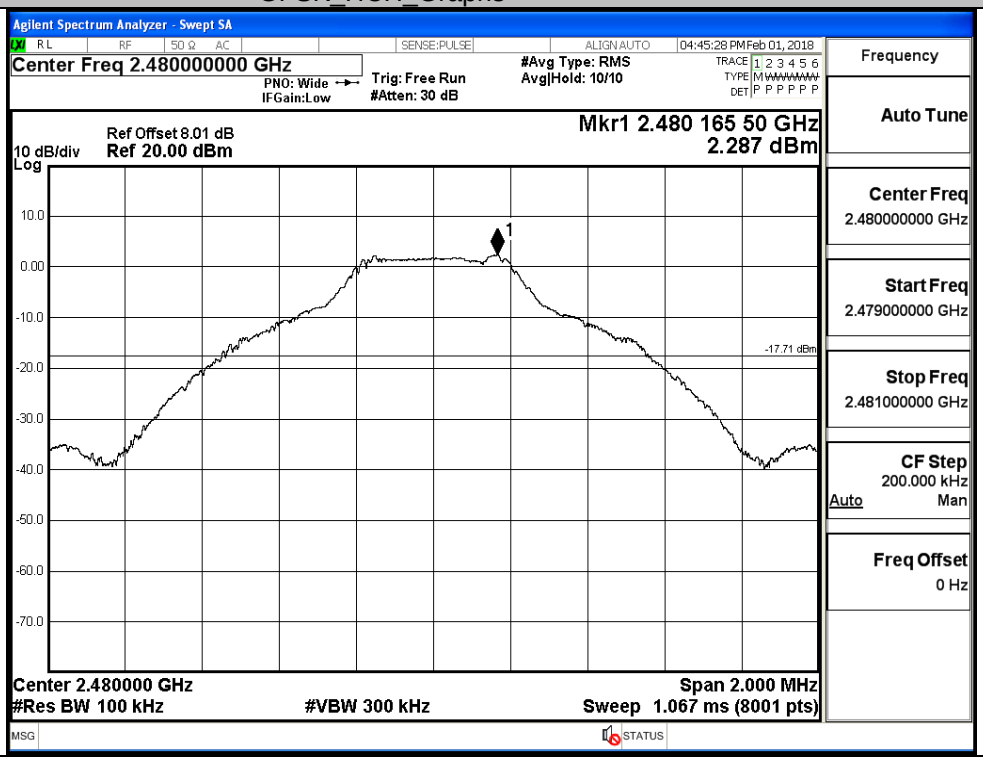
Test Graph

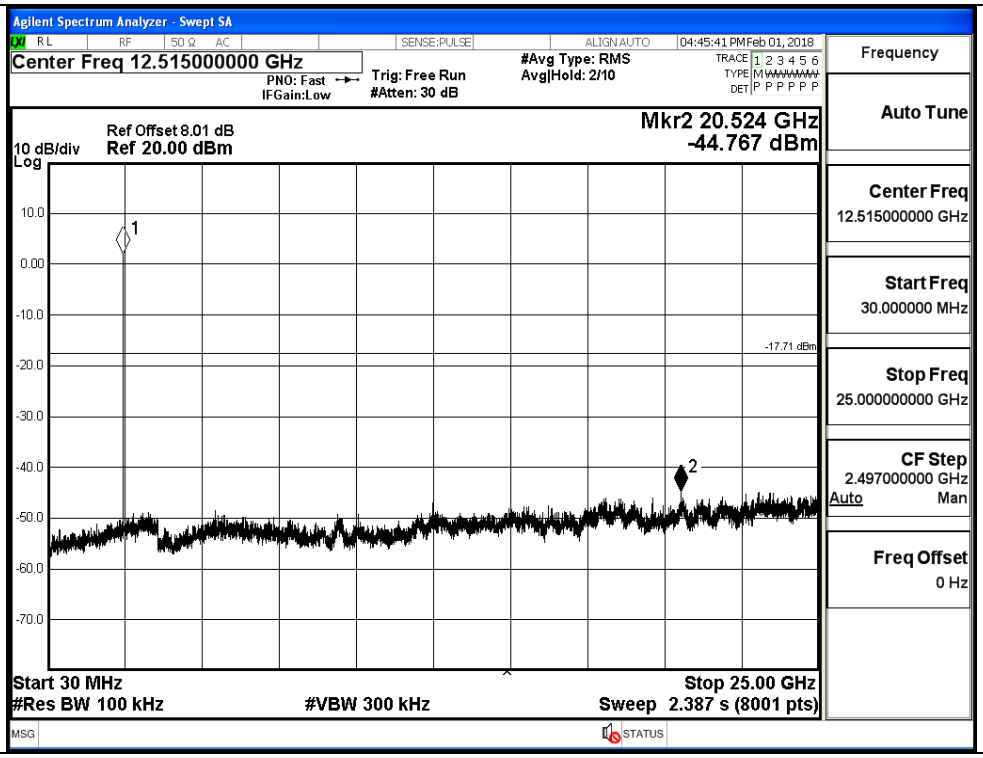
GFSK_LCH_Graphs	
Pref	

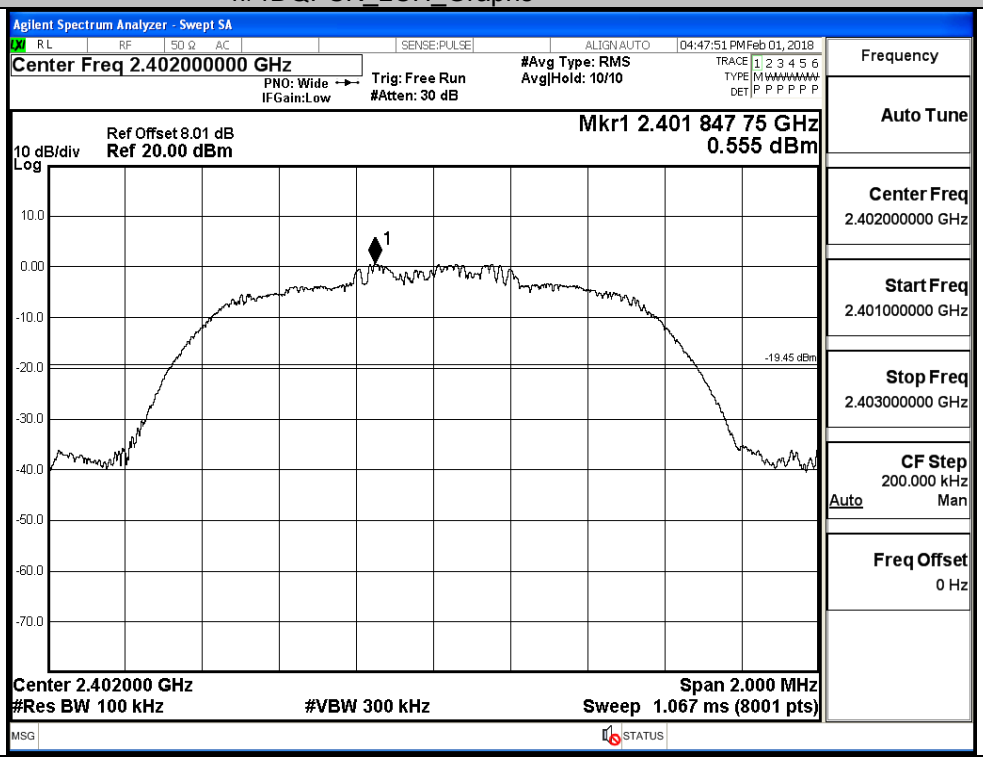
Puw		

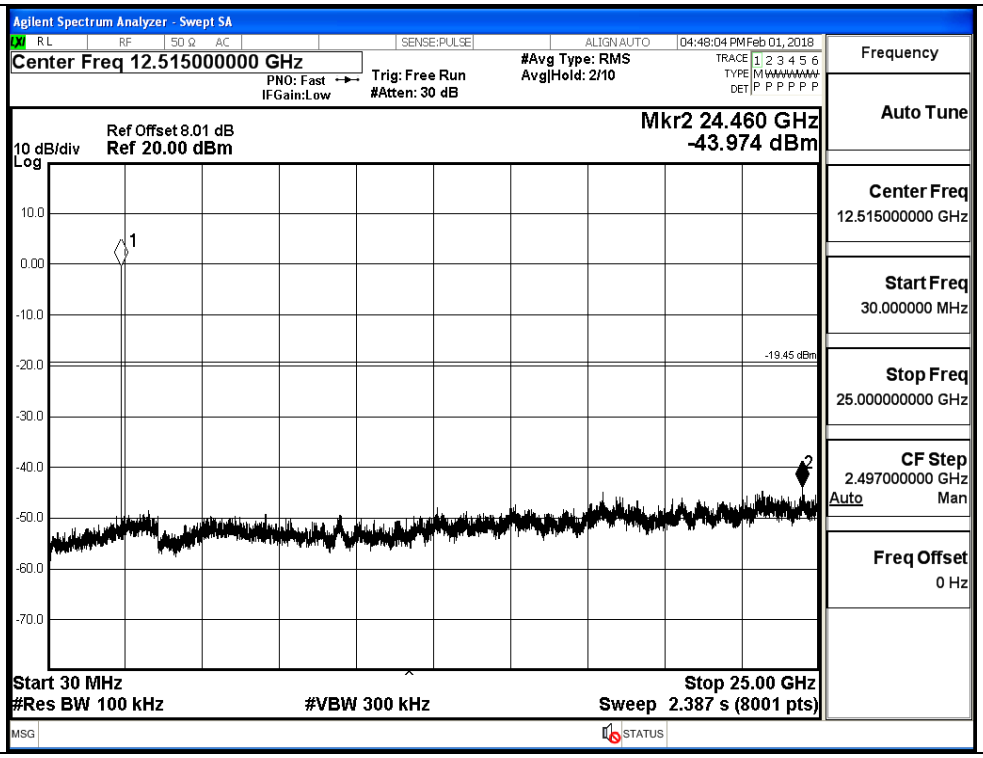
GFSK_MCH_Graphs		
Pref		

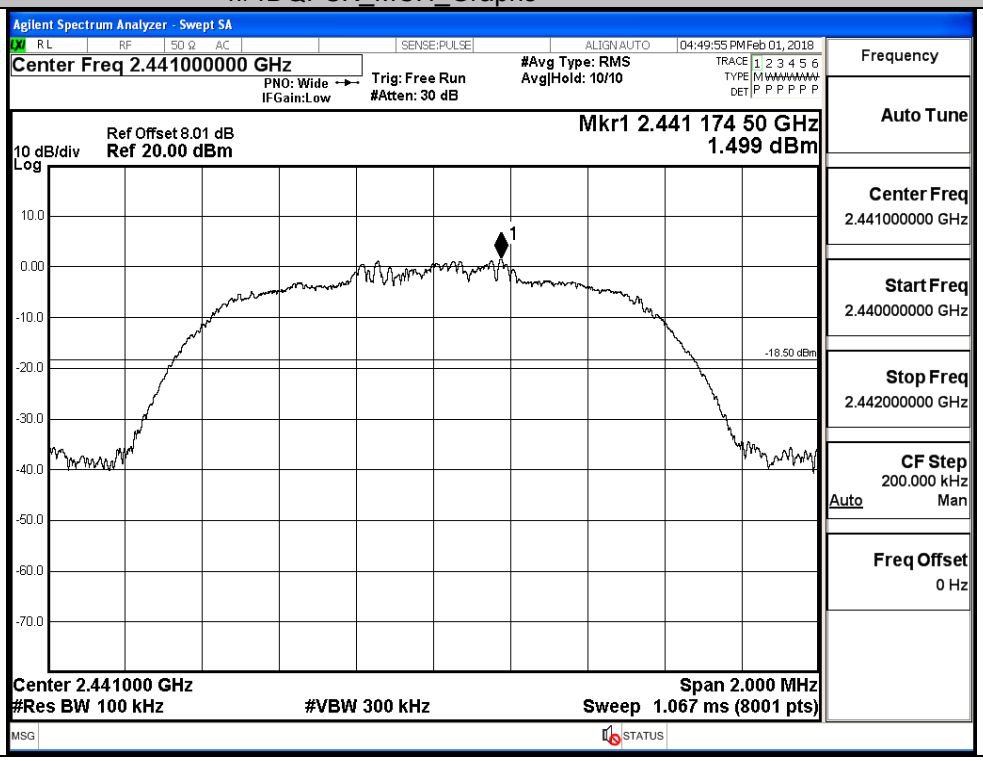
Puw		

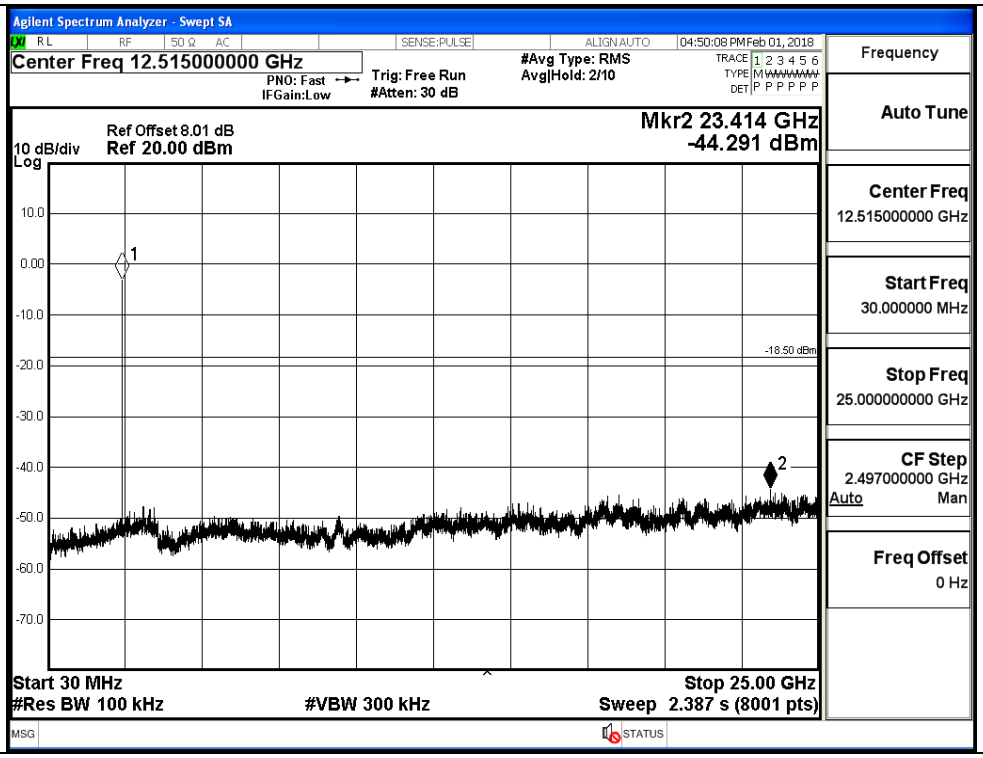
GFSK_HCH_Graphs		
Pref		

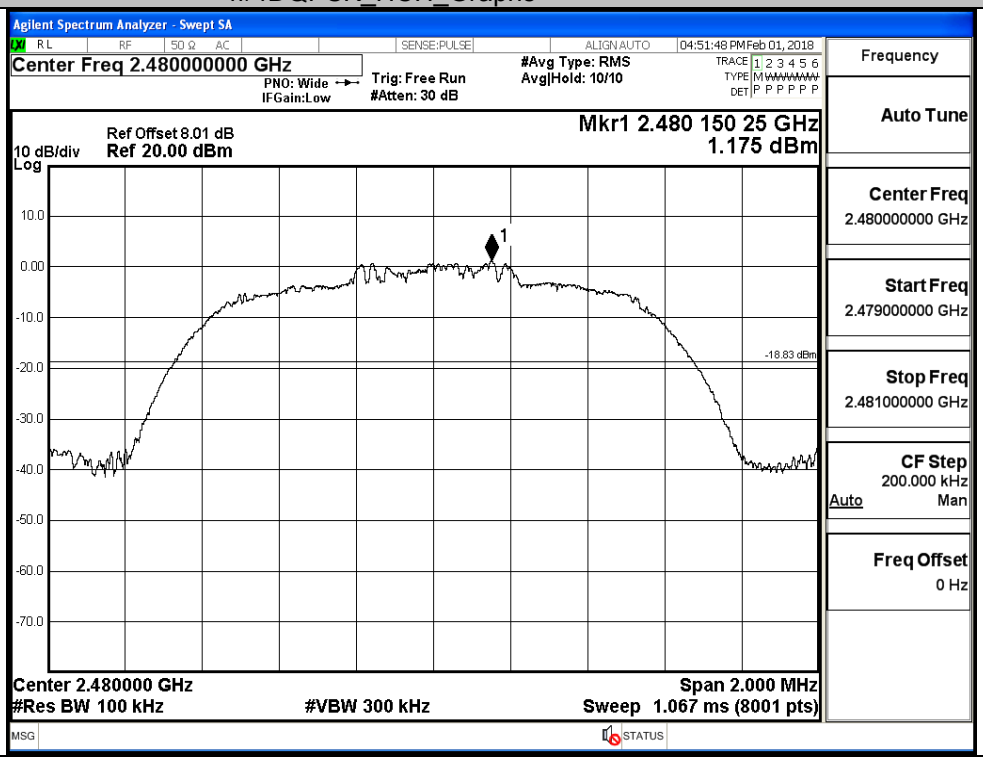
Puw		

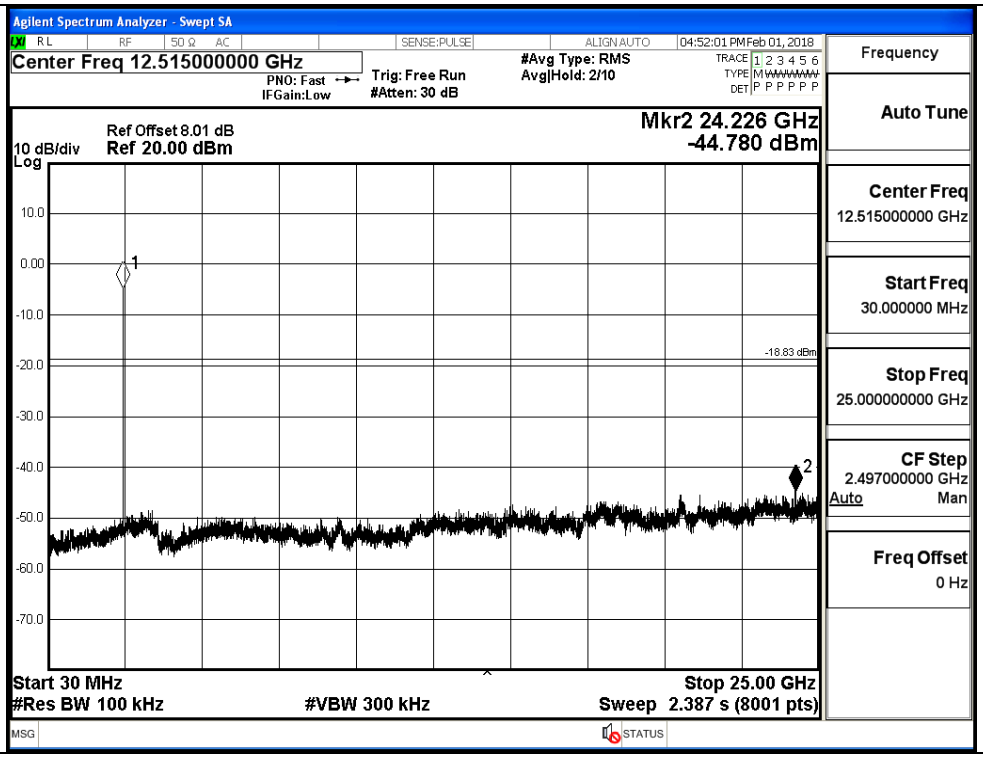
π/4DQPSK_LCH_Graphs		
Pref		

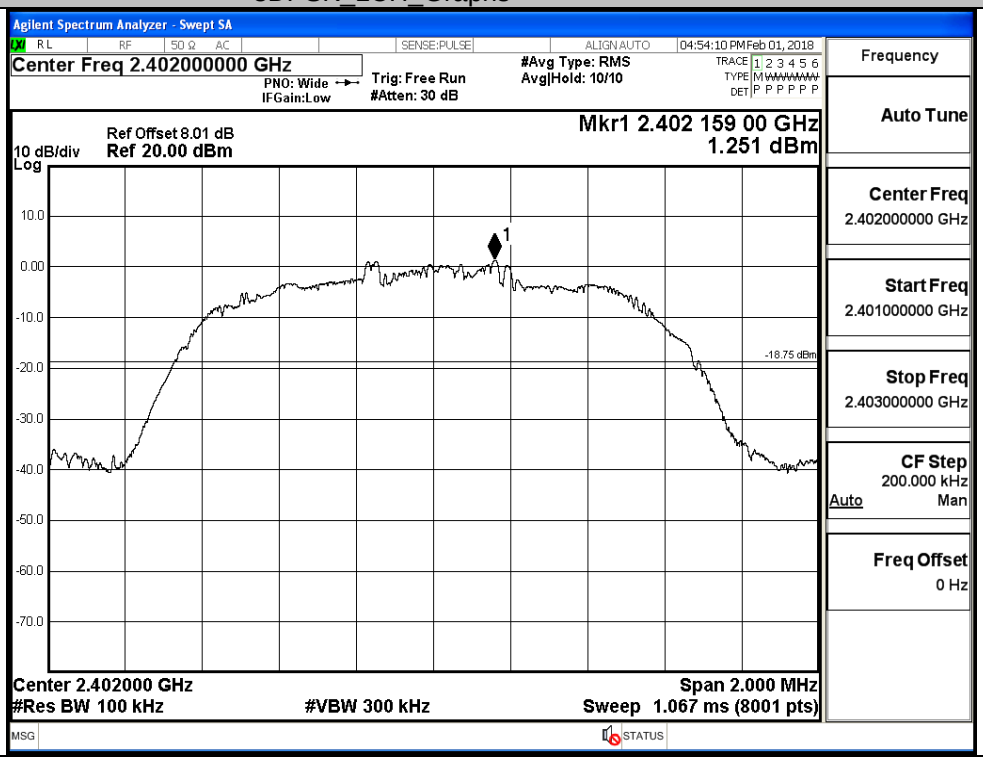
Puw		

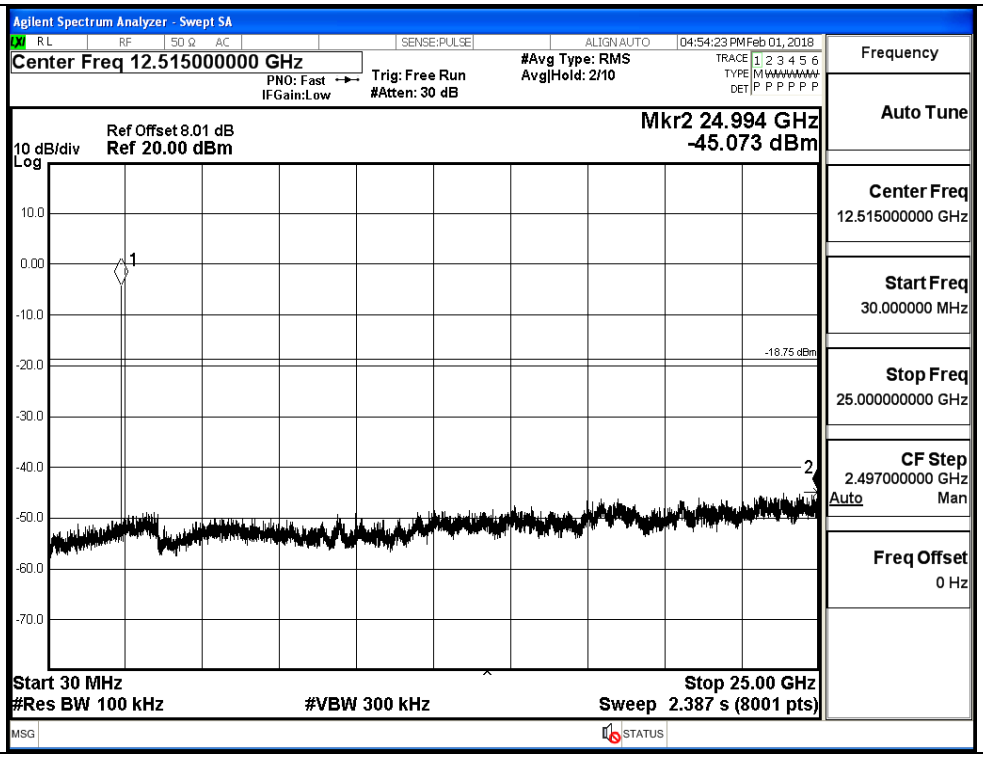
π/4DQPSK_MCH_Graphs		
Pref		

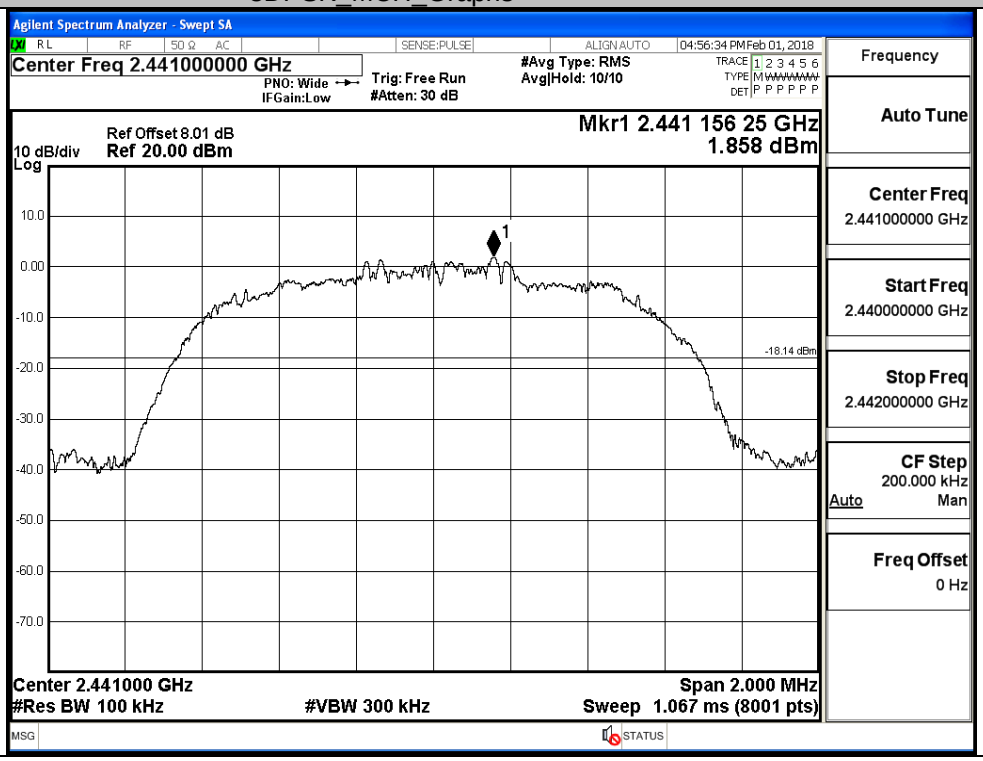
Puw		

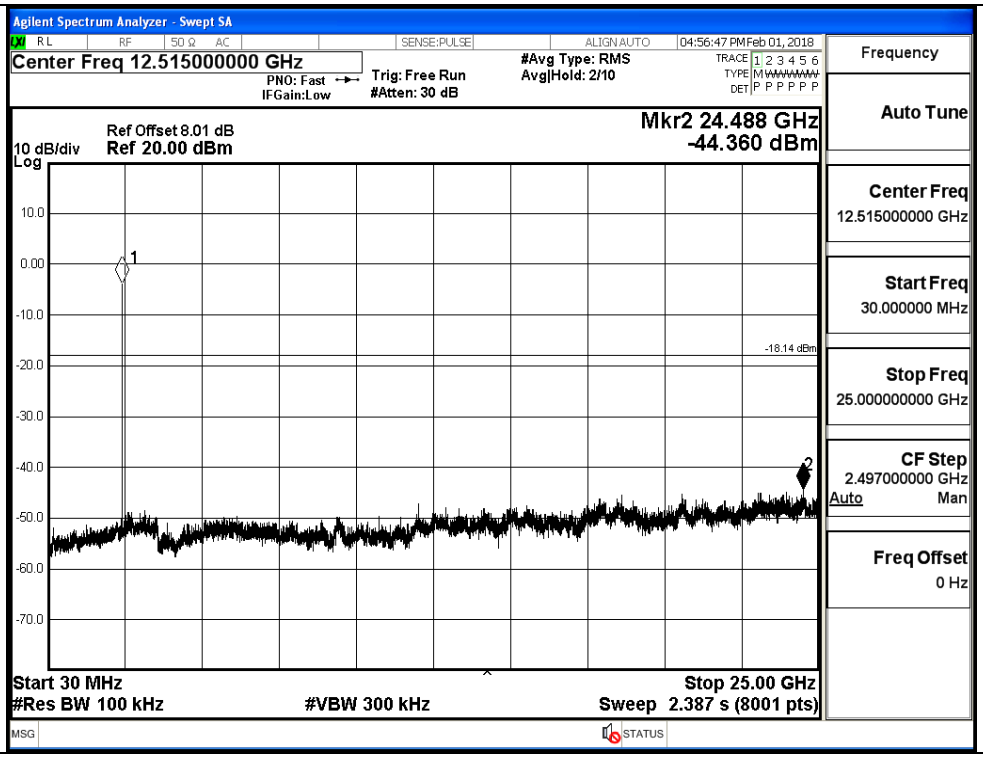
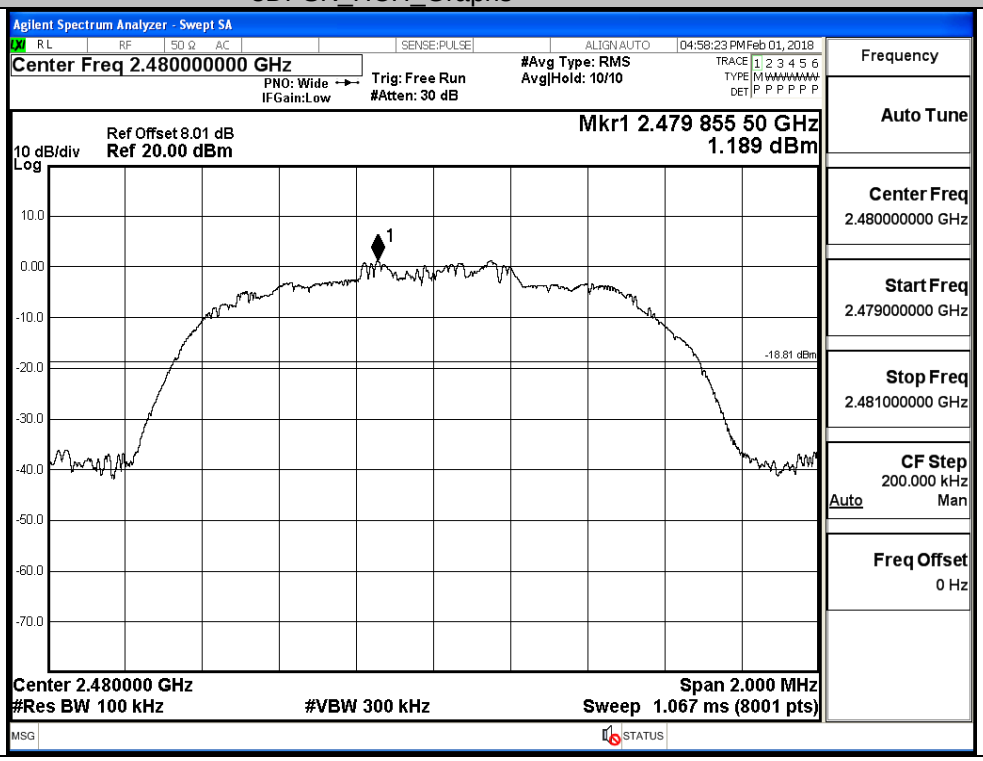
π/4DQPSK_HCH_Graphs		
Pref		

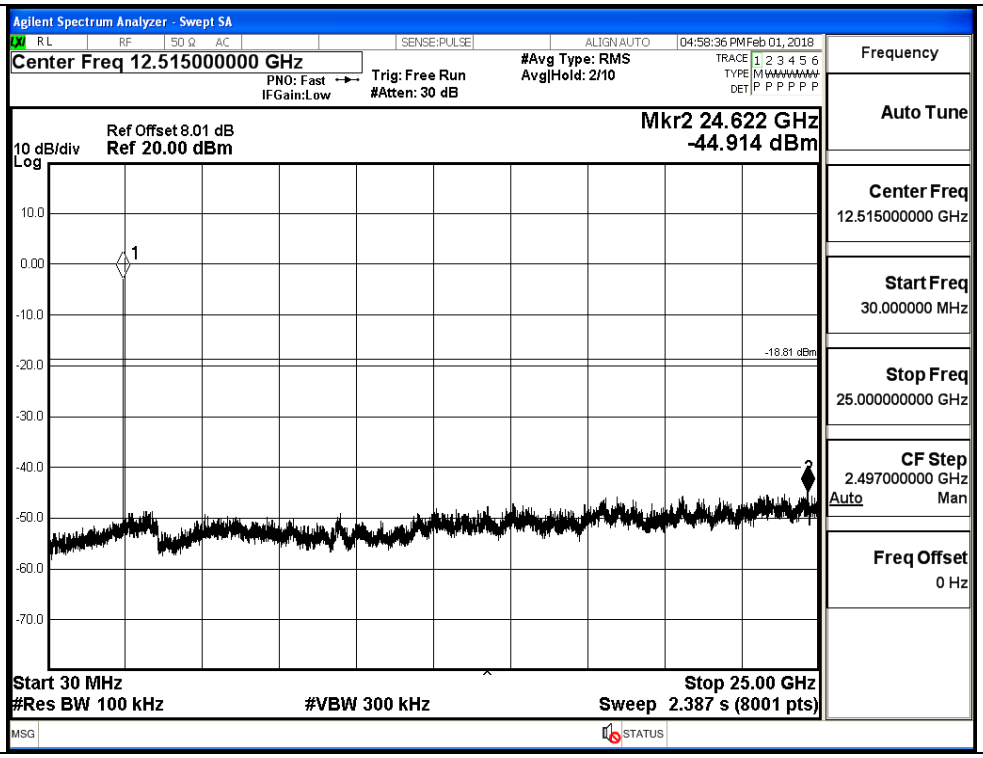
Puw		

8DPSK_LCH_Graphs		
Pref		

Puw		

8DPSK_MCH_Graphs		
Pref		

Puw		
8DPSK_HCH_Graphs		
Pref		

Puw		

Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
04:58:36 PM Feb 01, 2018
Ref Offset 8.01 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 24.622 GHz
-44.914 dBm
-18.81 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

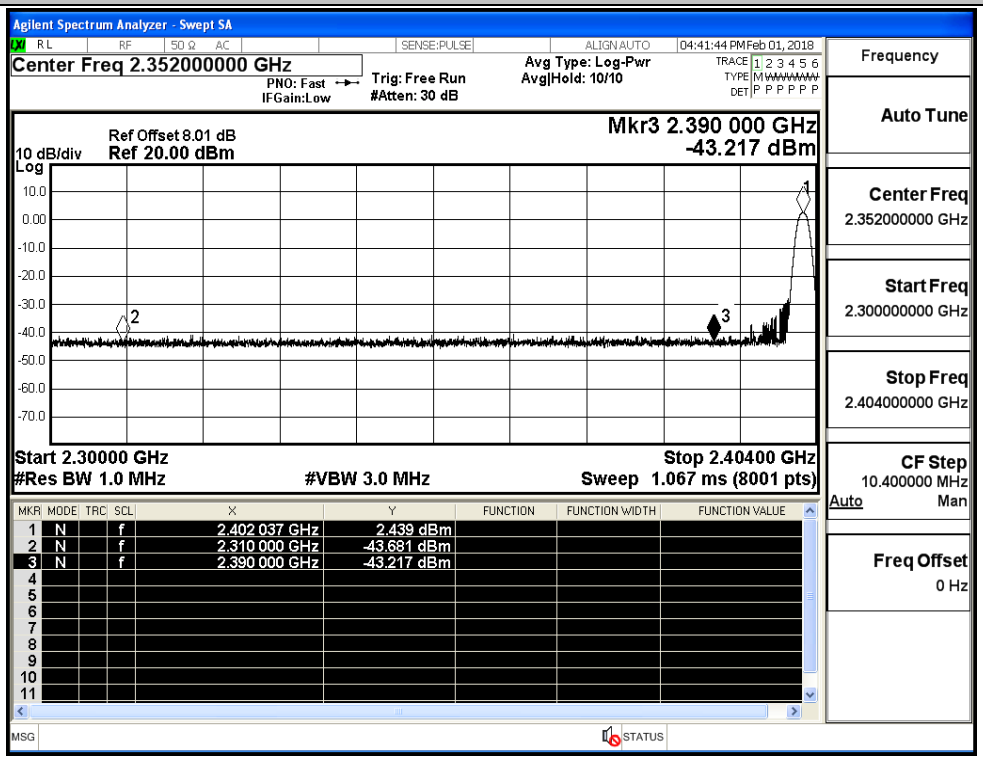
. Appendix H):Restrict-band band-edge measurements

Result Table

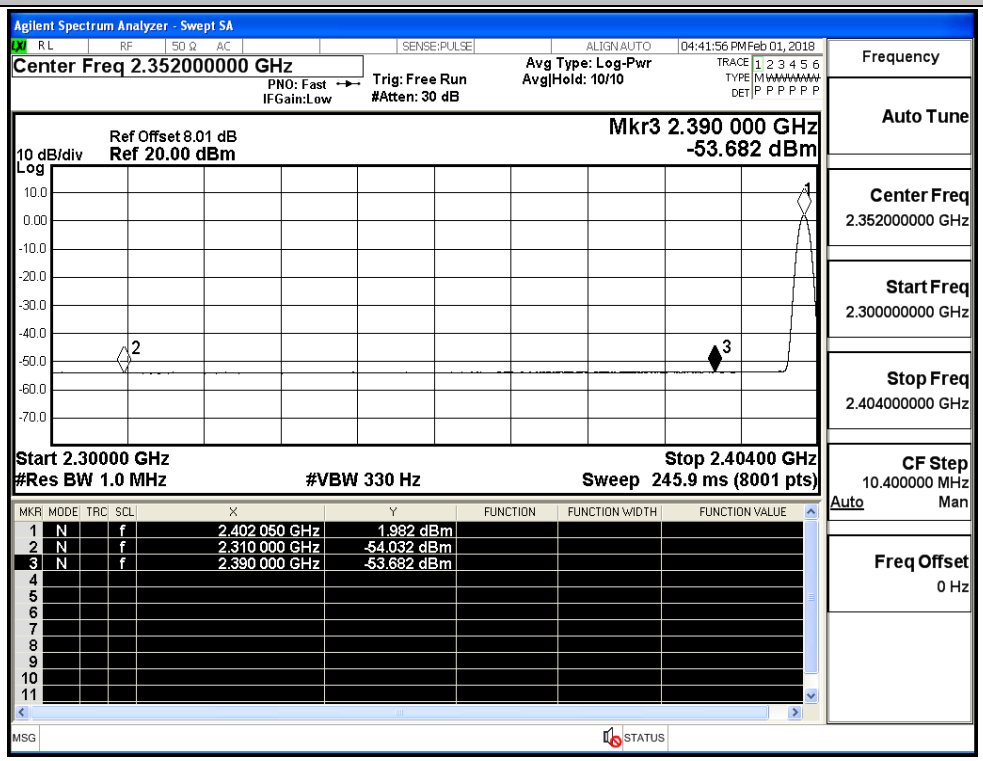
Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdi
GFSK_DH5	On	2310.0	-43.68	2	0	51.58	PEAK	74	PASS
GFSK_DH5	On	2310.0	-54.03	2	0	41.23	AV	54	PASS
GFSK_DH5	On	2390.0	-43.22	2	0	52.04	PEAK	74	PASS
GFSK_DH5	On	2390.0	-53.68	2	0	41.58	AV	54	PASS
GFSK_DH5	On	2483.5	-44.08	2	0	51.18	PEAK	74	PASS
GFSK_DH5	On	2483.5	-53.38	2	0	41.87	AV	54	PASS
GFSK_DH5	On	2500.0	-43.16	2	0	52.10	PEAK	74	PASS
GFSK_DH5	On	2500.0	-53.35	2	0	41.91	AV	54	PASS
π/4DQPSK _2DH5	On	2310.0	-44.44	2	0	50.81	PEAK	74	PASS
π/4DQPSK_ 2DH5	On	2310.0	-54.00	2	0	41.26	AV	54	PASS
π/4DQPSK_ 2DH5	On	2390.0	-43.92	2	0	51.34	PEAK	74	PASS
π/4DQPSK _2DH5	On	2390.0	-53.82	2	0	41.44	AV	54	PASS
π/4DQPSK _2DH5	On	2483.5	-43.26	2	0	52.00	PEAK	74	PASS
π/4DQPSK _2DH5	On	2483.5	-53.36	2	0	41.90	AV	54	PASS
π/4DQPSK _2DH5	On	2500.0	-44.00	2	0	51.26	PEAK	74	PASS
π/4DQPSK_ 2DH5	On	2500.0	-53.34	2	0	41.92	AV	54	PASS
8DPSK _3DH5	On	2310.0	-43.34	2	0	51.91	PEAK	74	PASS
8DPSK _3DH5	On	2310.0	-54.02	2	0	41.24	AV	54	PASS
8DPSK _3DH5	On	2390.0	-43.05	2	0	52.21	PEAK	74	PASS
8DPSK _3DH5	On	2390.0	-53.62	2	0	41.63	AV	54	PASS
8DPSK _3DH5	On	2483.5	-43.09	2	0	52.16	PEAK	74	PASS
8DPSK _3DH5	On	2483.5	-53.35	2	0	41.91	AV	54	PASS
8DPSK _3DH5	On	2500.0	-43.51	2	0	51.75	PEAK	74	PASS
8DPSK _3DH5	On	2500.0	-53.38	2	0	41.88	AV	54	PASS

Test Graph

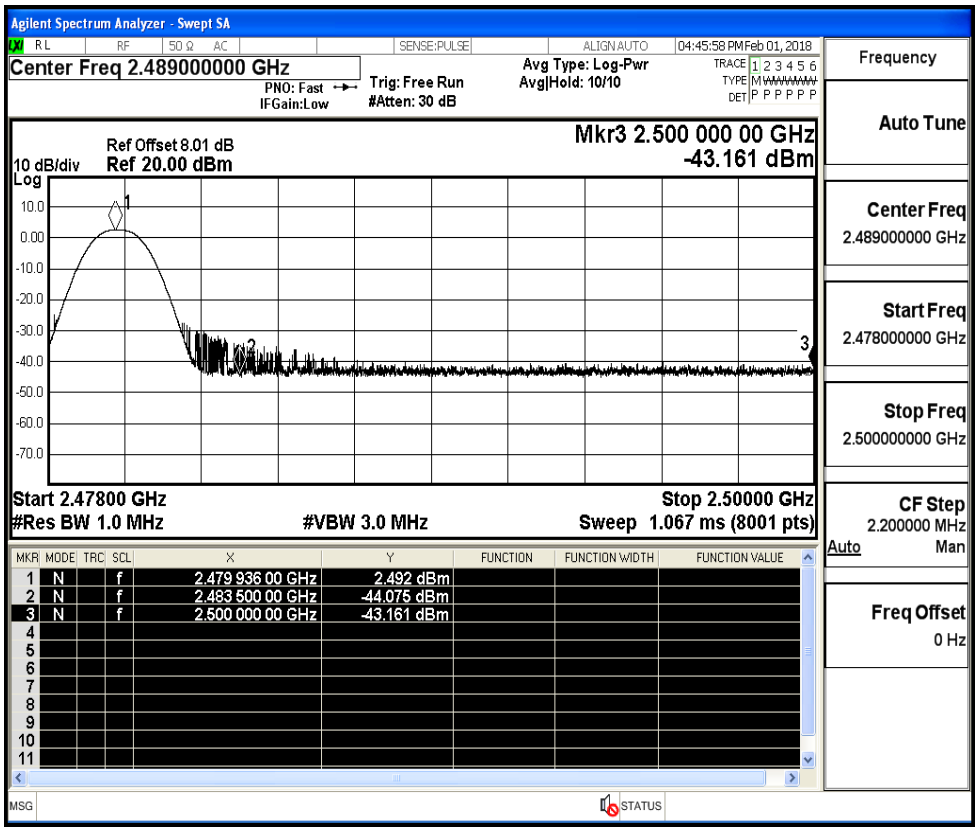
Restrict-band band-edge measurements_2402_PEAK_DH5



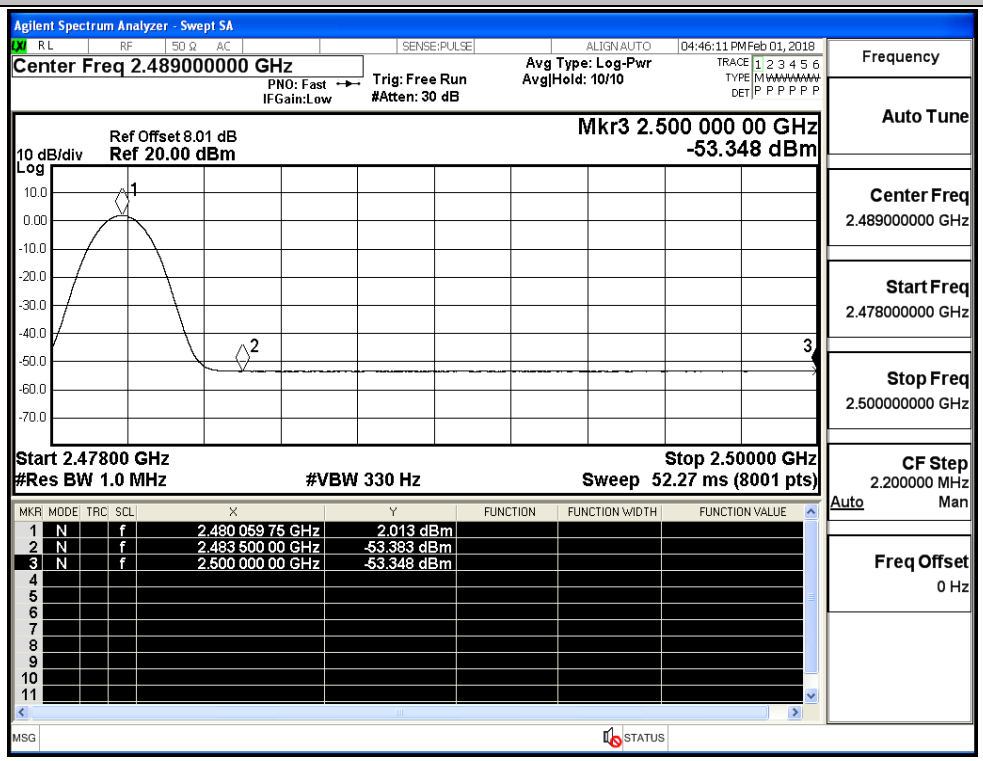
Restrict-band band-edge measurements_2402_AV_DH5



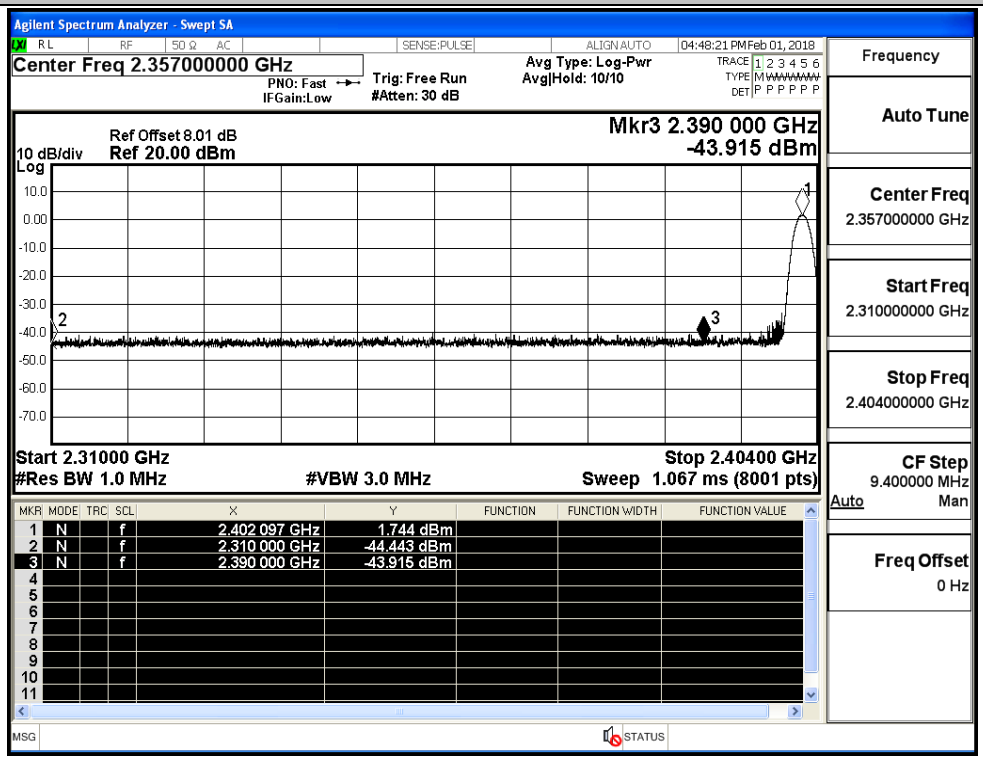
Restrict-band band-edge measurements_2480_PEAK_DH5



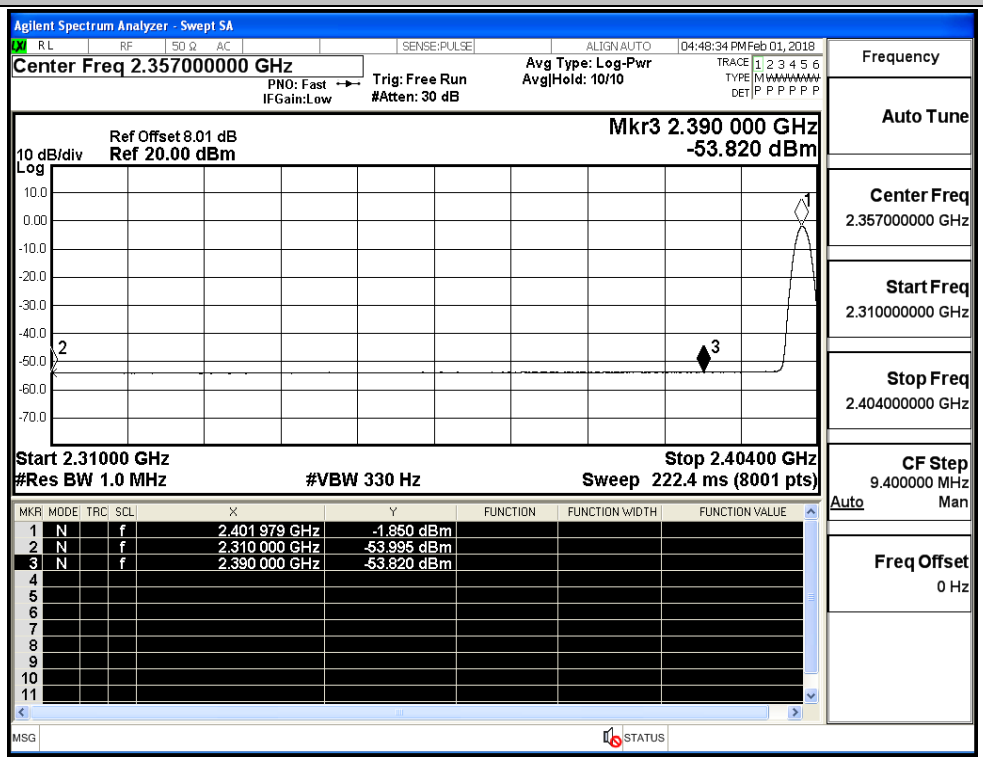
Restrict-band band-edge measurements_2480_AV_DH5



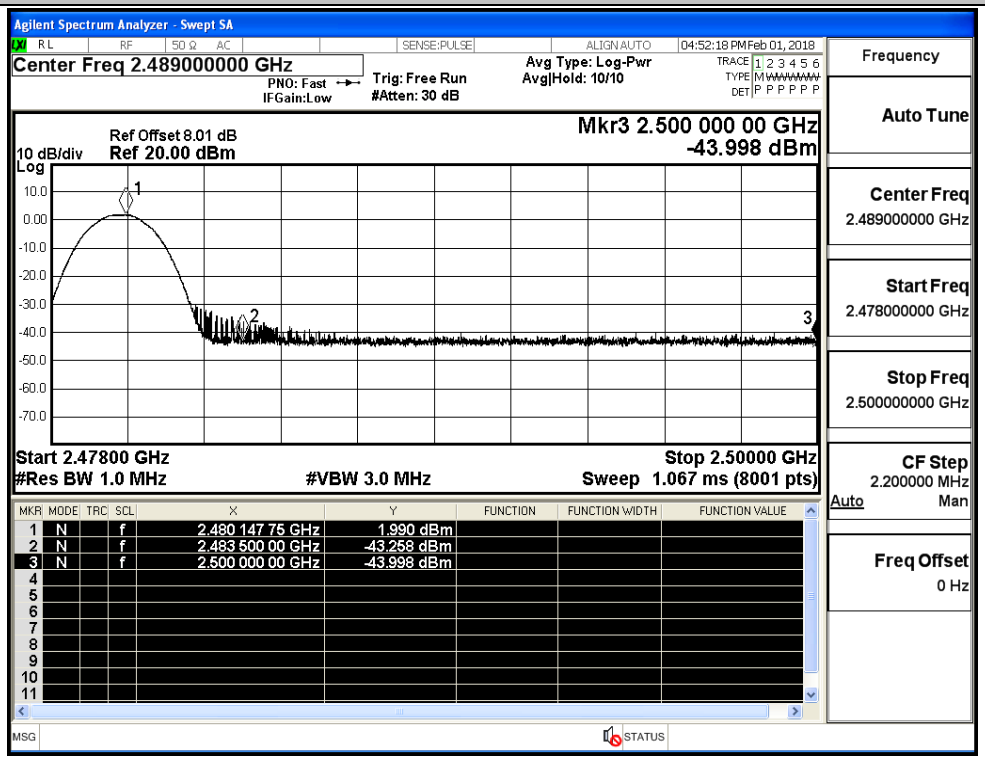
Restrict-band band-edge measurements_2402_PEAK_2DH5



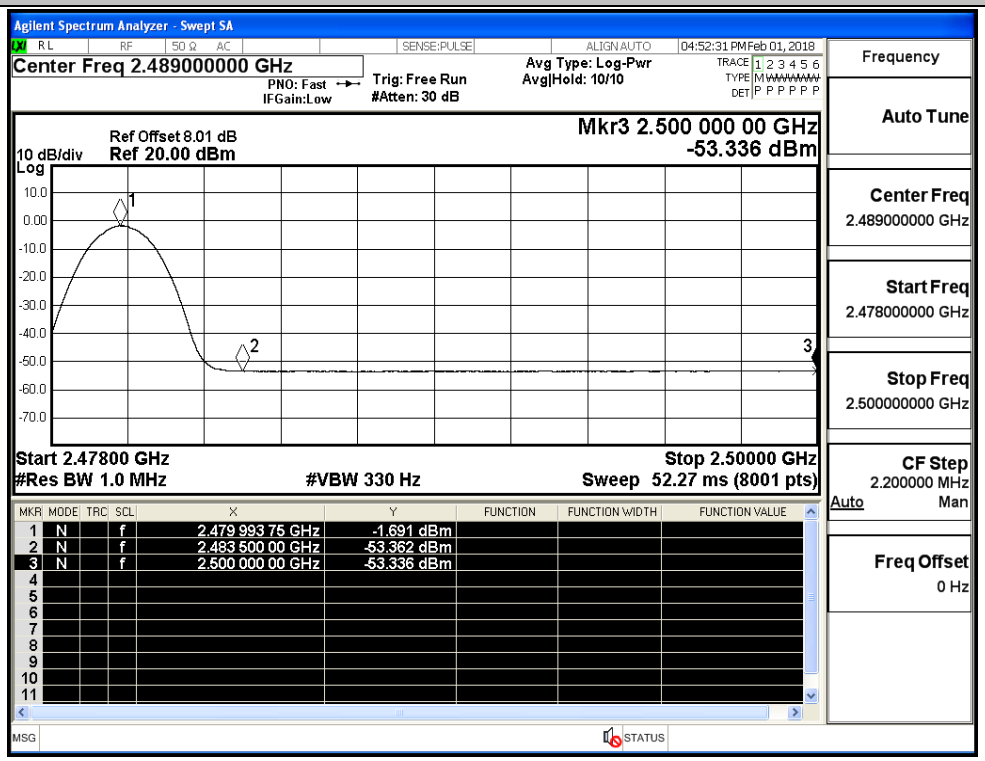
Restrict-band band-edge measurements_2402_AV_2DH5



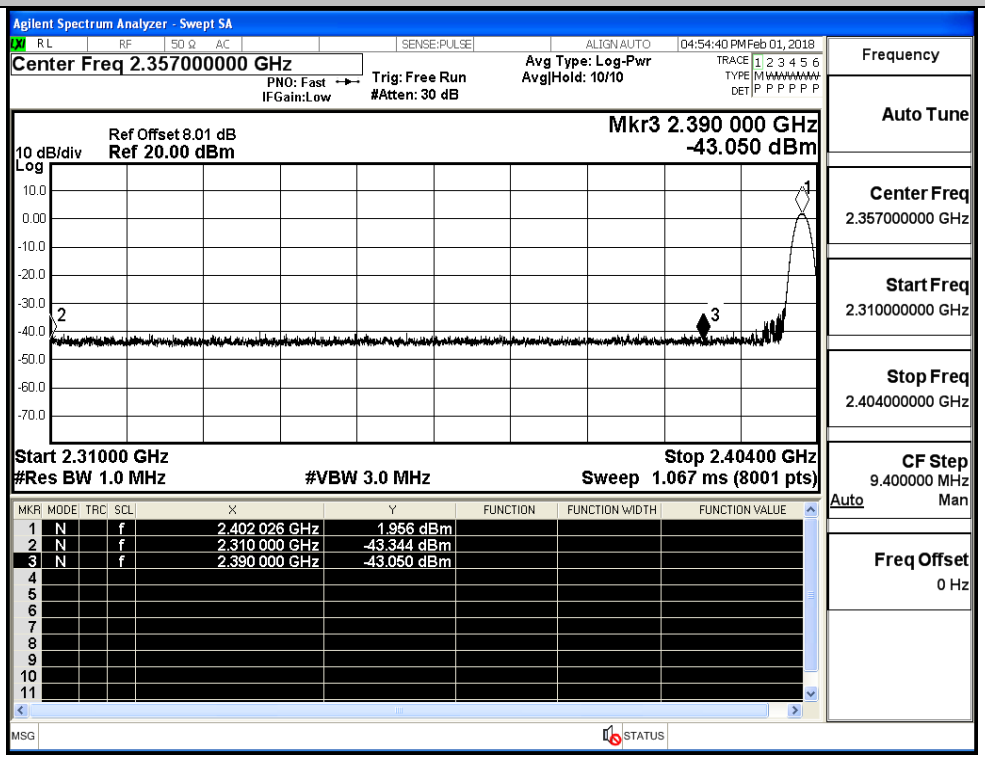
Restrict-band band-edge measurements_2480_PEAK_2DH5



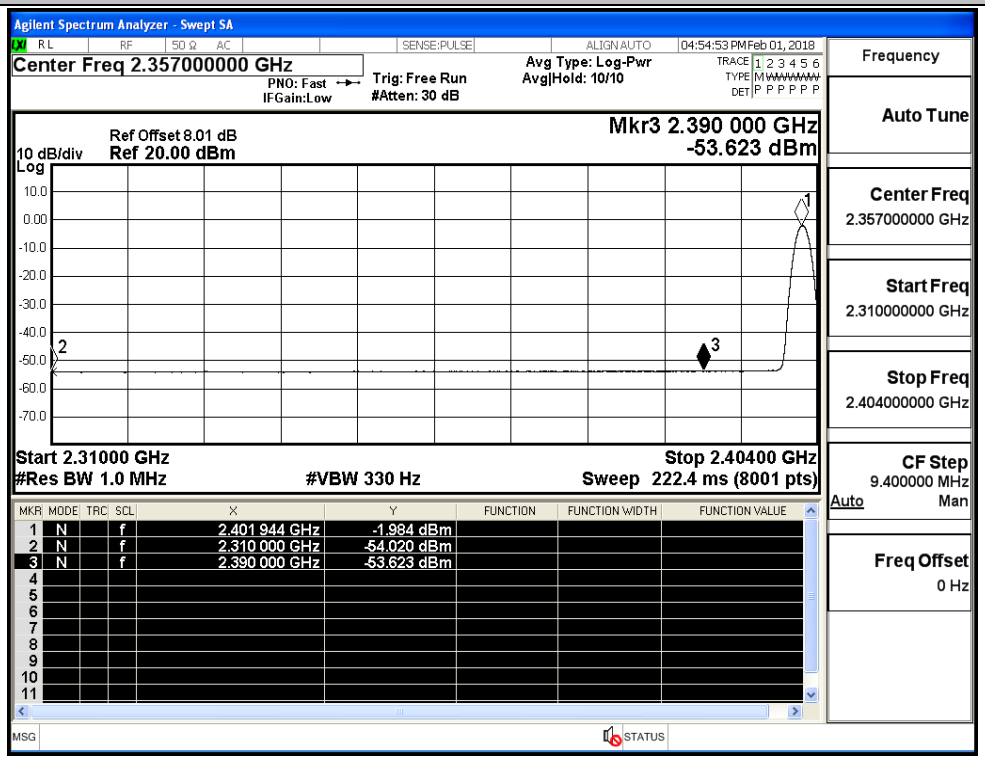
Restrict-band band-edge measurements_2480_AV_2DH5



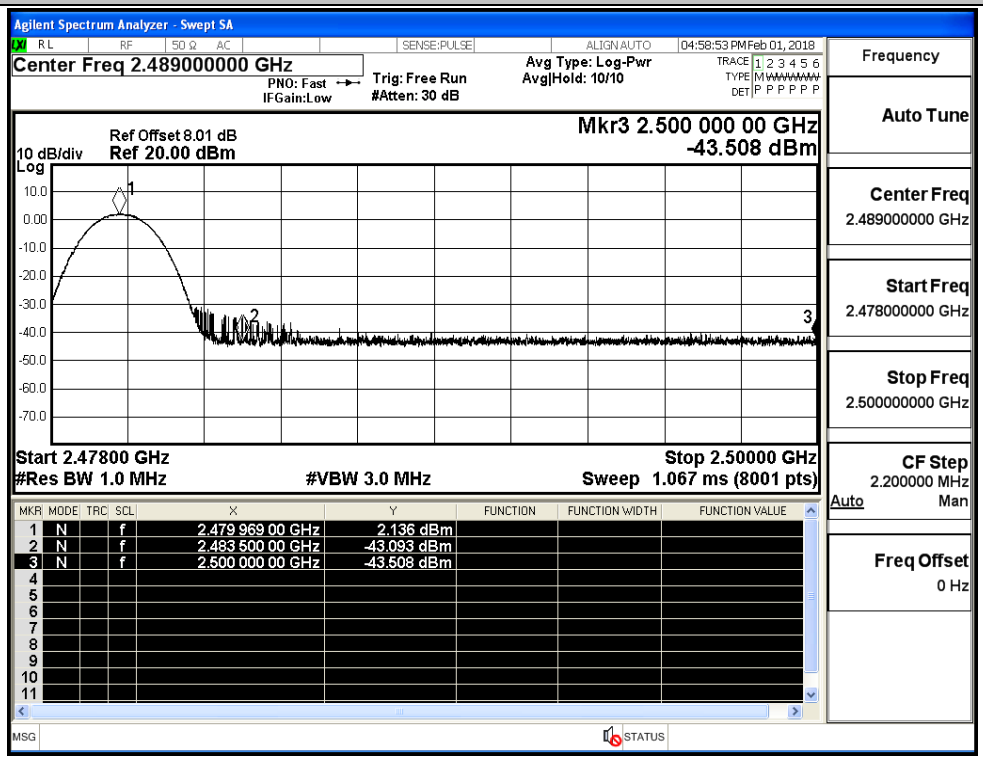
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5