Appendix A

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

Product Name: goHeart

Trade Mark: N/A

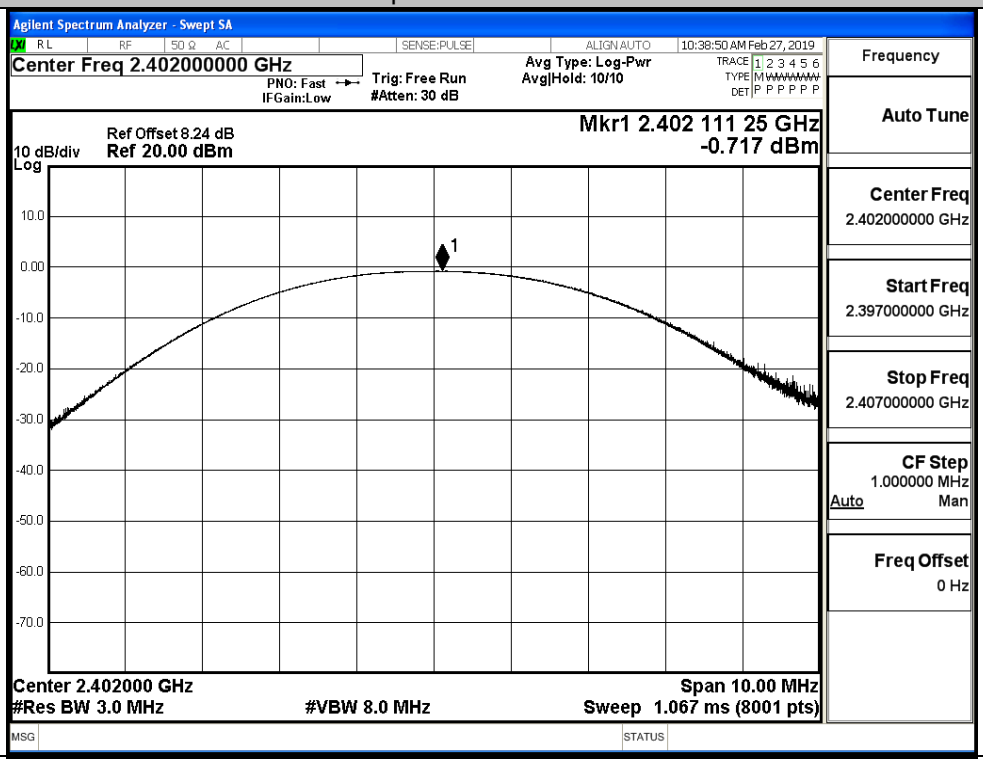
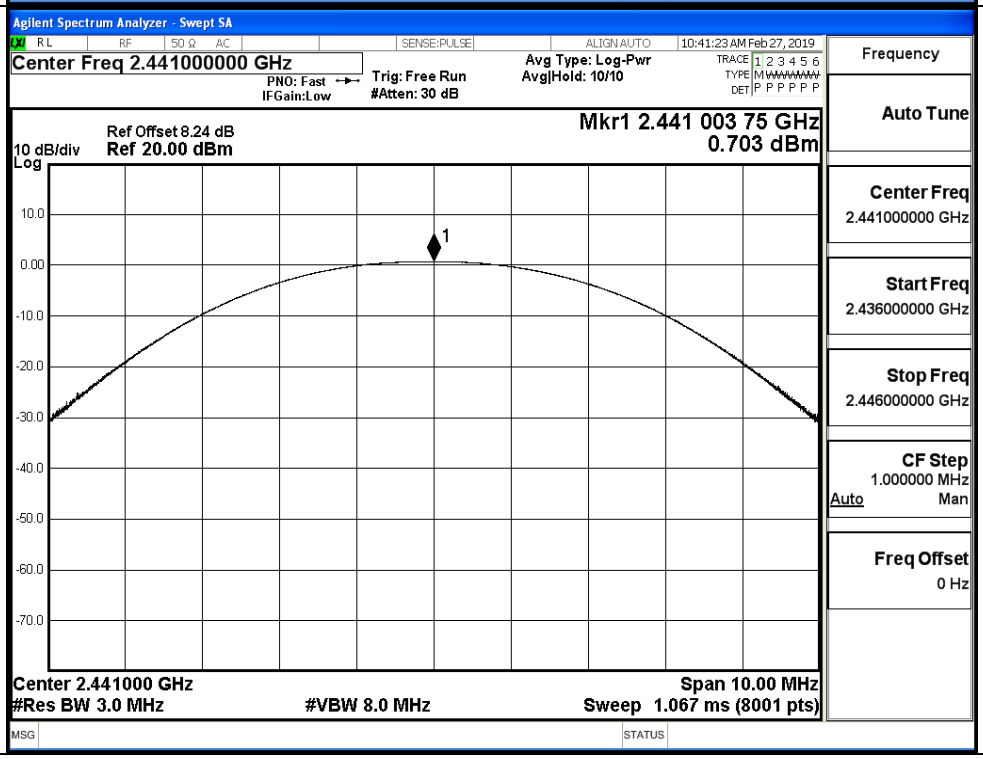
Test Model: XL-02

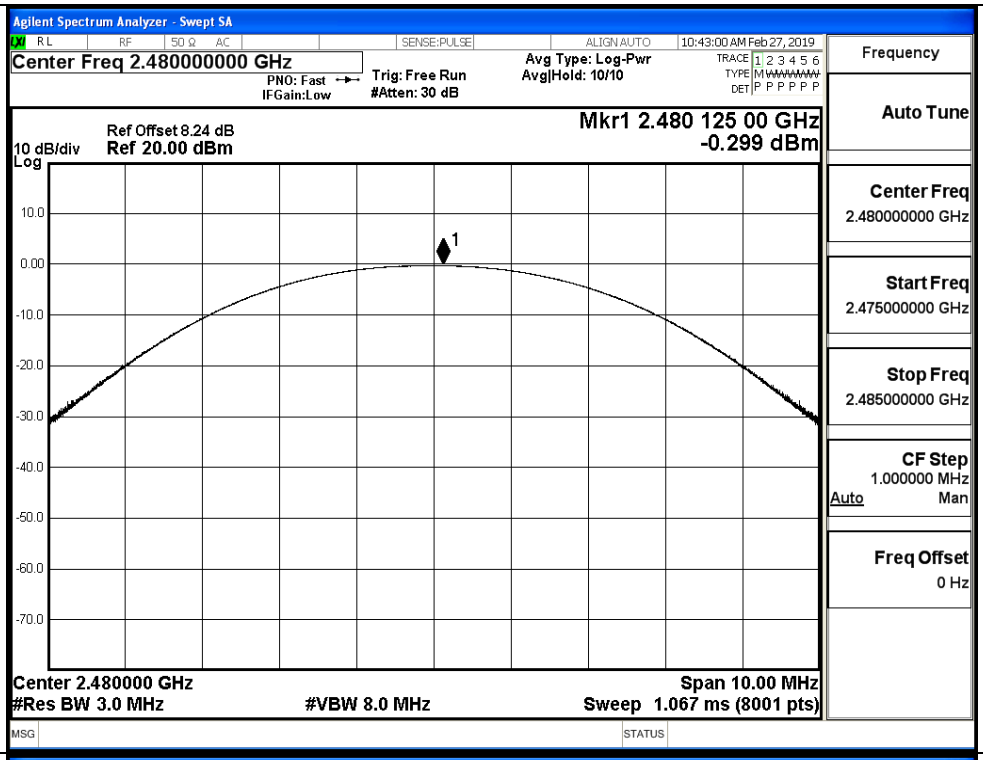
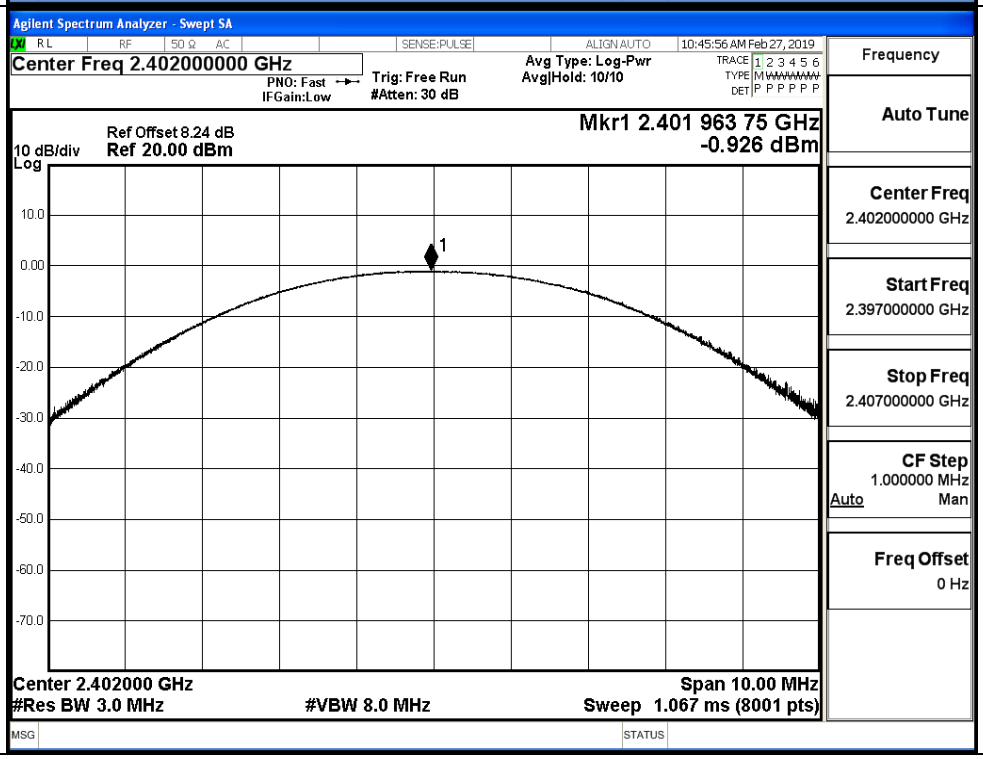
Environmental Conditions

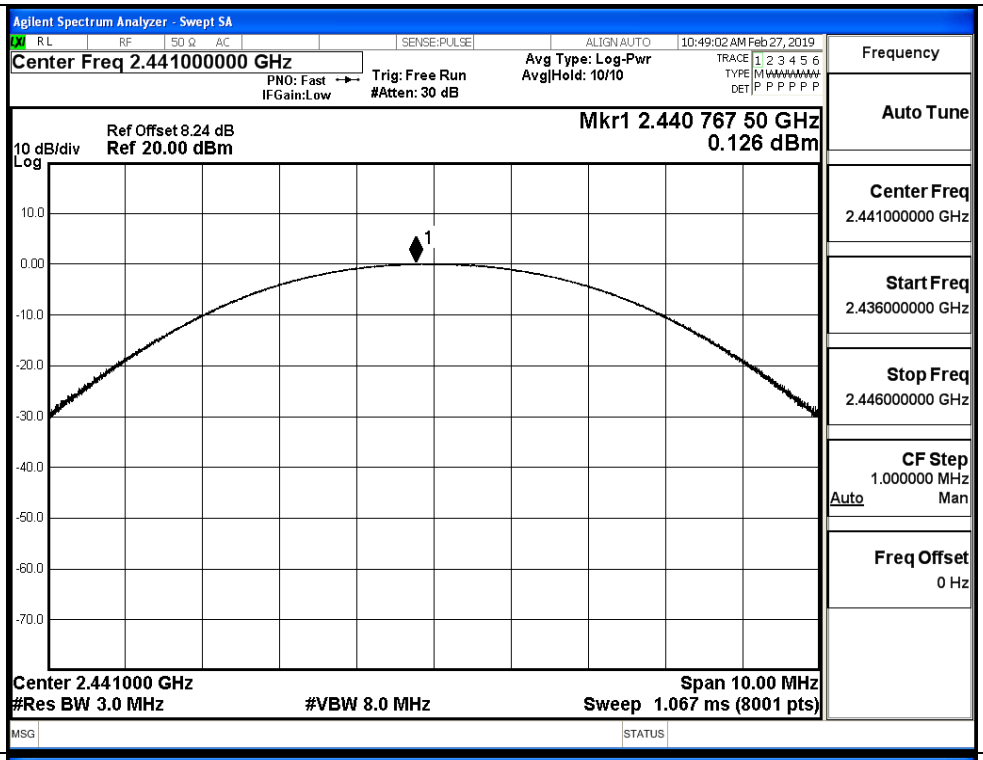
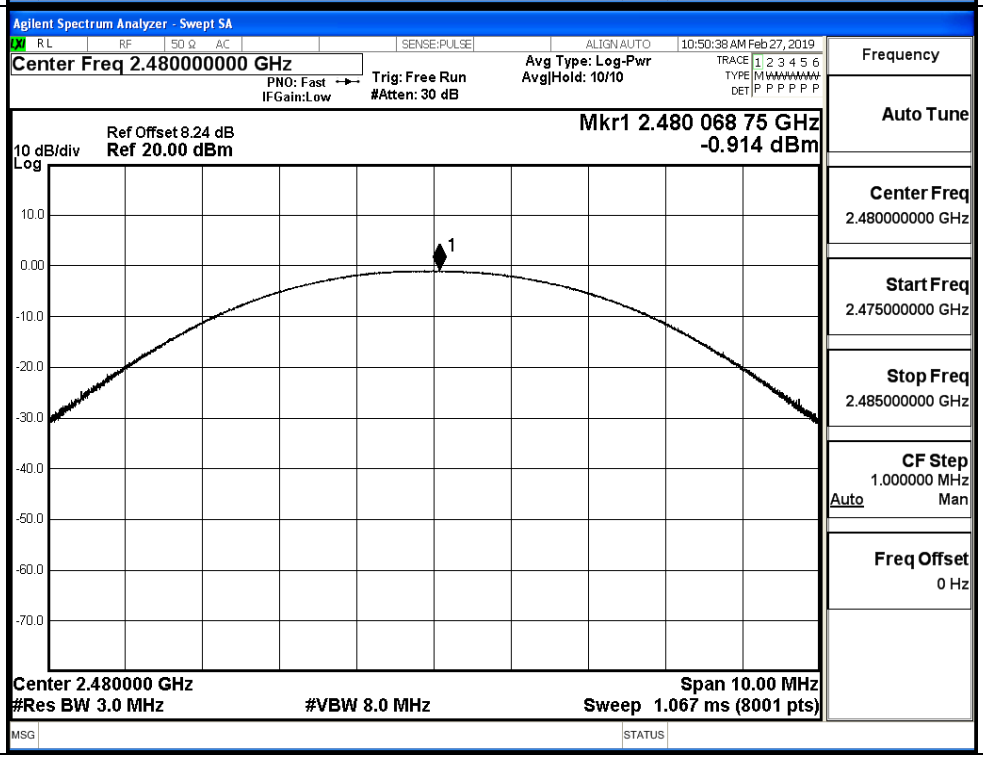
Temperature:	22.8 ° C
Relative Humidity:	53.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Jayden.Zhuo

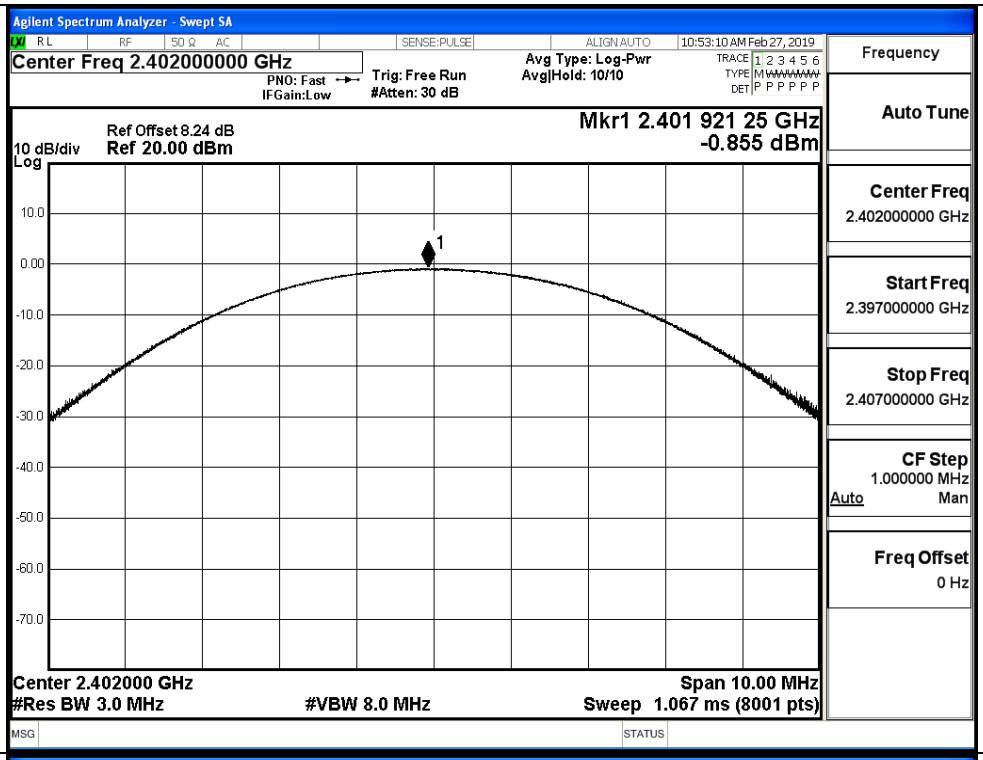
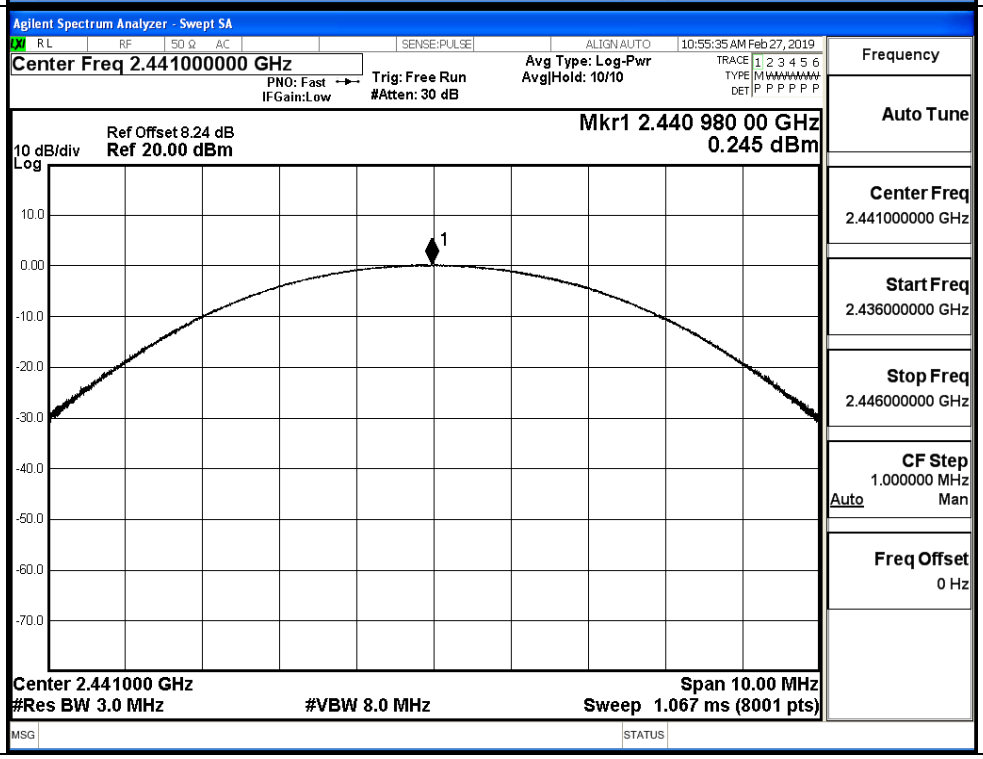
A.1 Maximum Conducted Peak Output Power

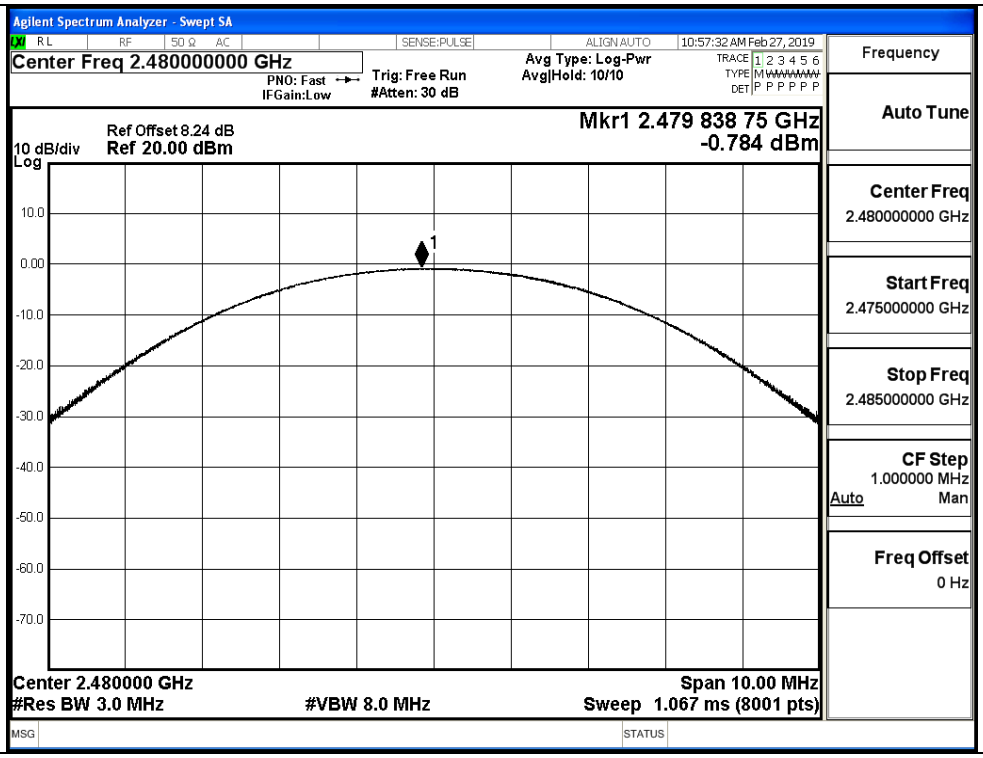
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.717	21	PASS
	MCH	0.703	21	PASS
	HCH	-0.299	21	PASS
π/4DQPSK	LCH	-0.926	21	PASS
	MCH	0.126	21	PASS
	HCH	-0.914	21	PASS
8DPSK	LCH	-0.855	21	PASS
	MCH	0.245	21	PASS
	HCH	-0.784	21	PASS

Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH		
π/4DQPSK/LCH		

π/4DQPSK/MCH		
π/4DQPSK/HCH		

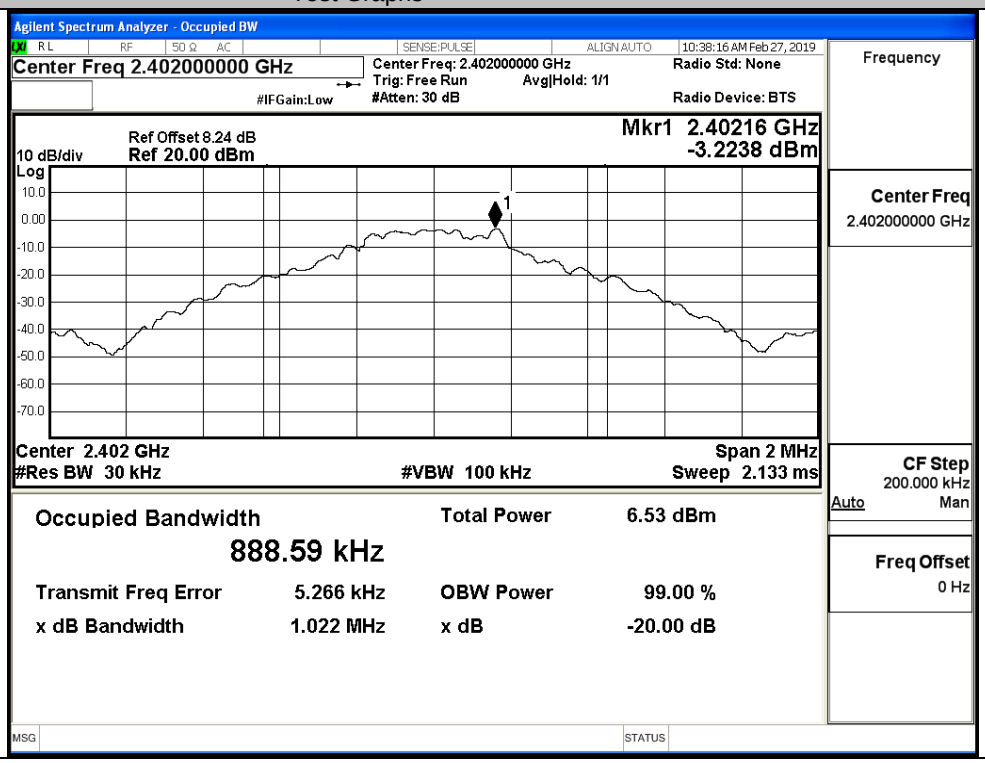
8DPSK/LCH		
8DPSK/MCH		

8DPSK/HCH		

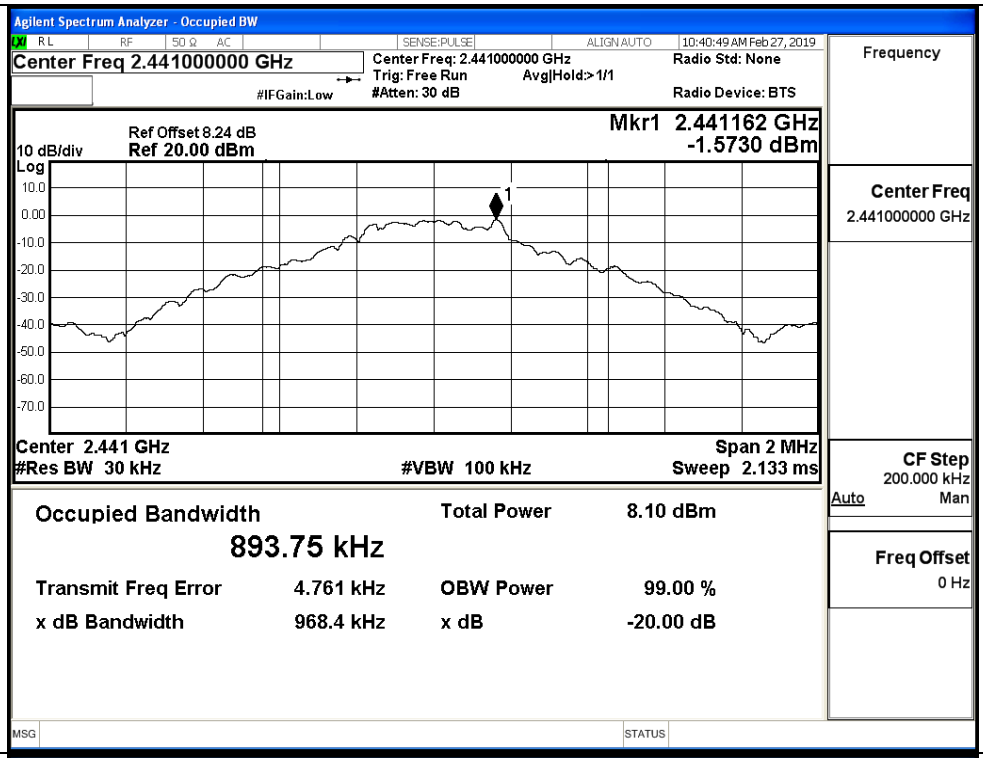
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
10:57:32 AM Feb 27, 2019
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 838 75 GHz
-0.784 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 10.00 MHz
Sweep 1.067 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.475000000 GHz
Stop Freq
2.485000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

A.2 20dB Bandwidth

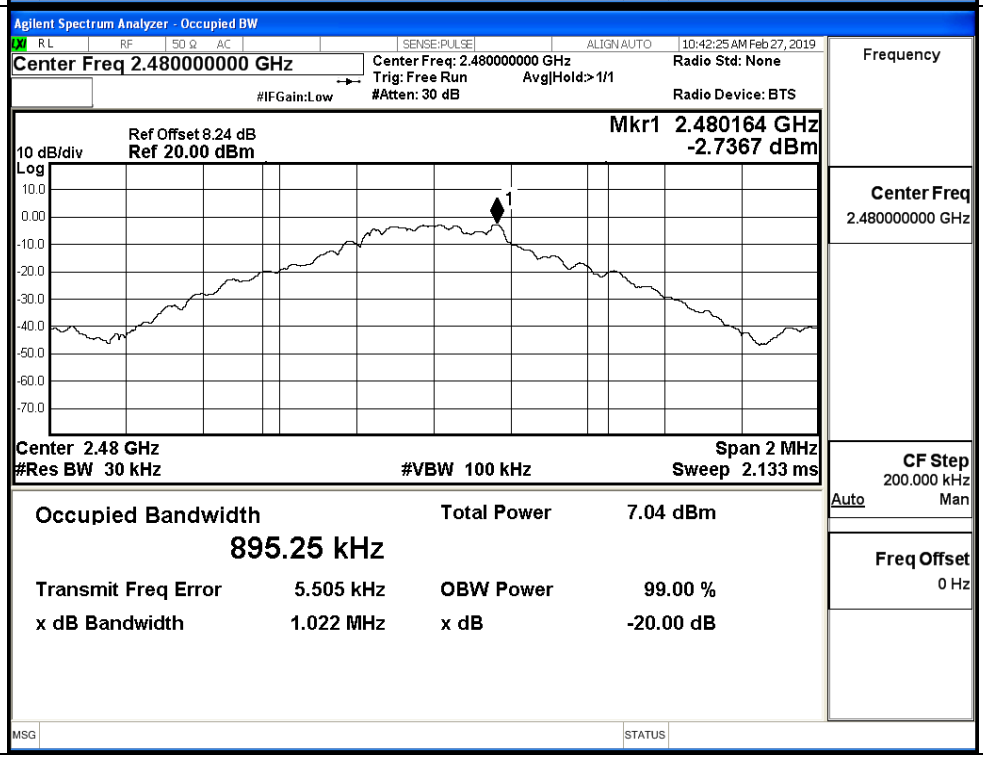
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.88859	1.022	Not Specified	PASS
	MCH	0.89375	0.9684	Not Specified	PASS
	HCH	0.89525	1.022	Not Specified	PASS
π/4DQPSK	LCH	1.1789	1.291	Not Specified	PASS
	MCH	1.1764	1.306	Not Specified	PASS
	HCH	1.1740	1.291	Not Specified	PASS
8DPSK	LCH	1.1903	1.297	Not Specified	PASS
	MCH	1.1890	1.299	Not Specified	PASS
	HCH	1.1875	1.297	Not Specified	PASS

Test Graphs	
GFSK/LCH	

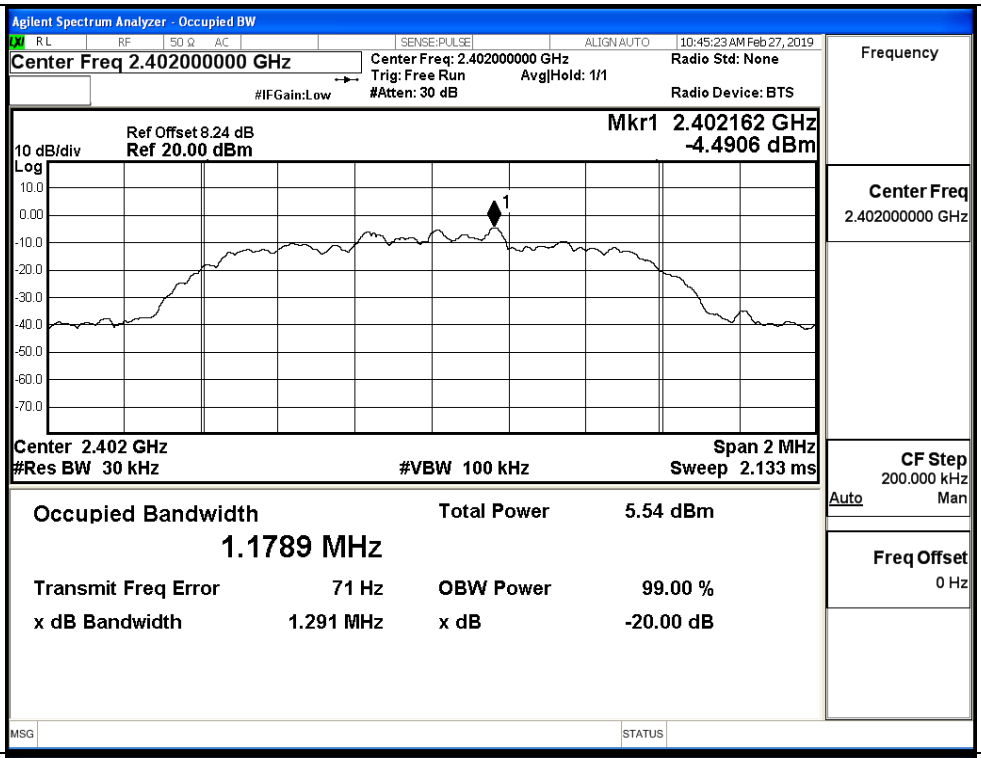
GFSK/MCH



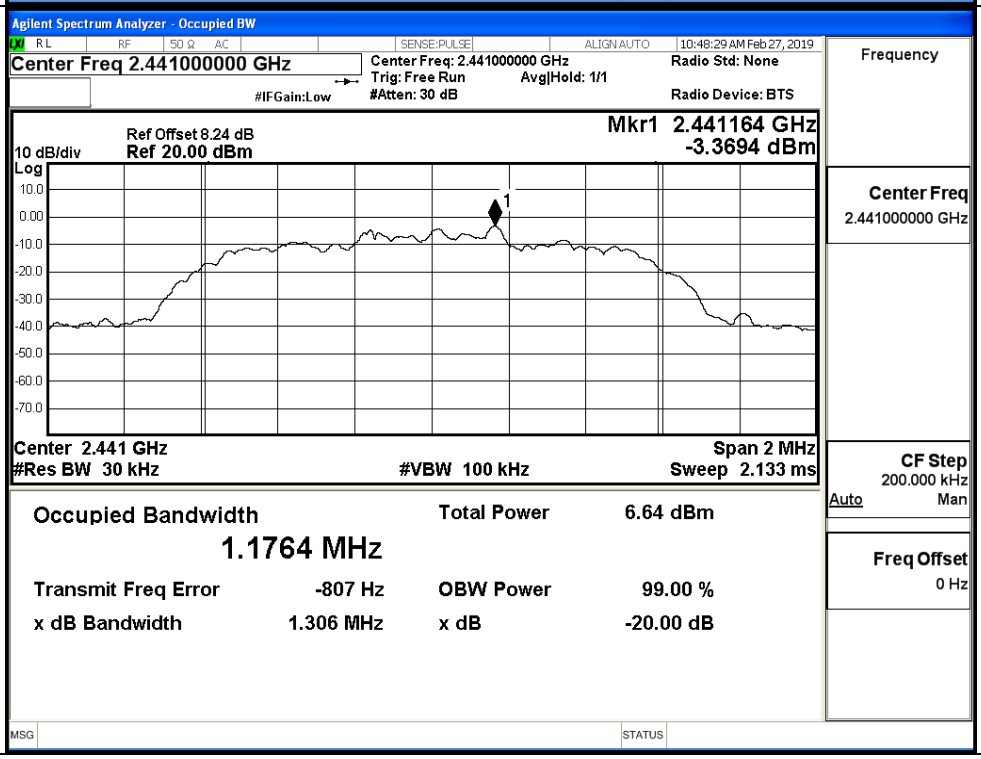
GFSK/HCH



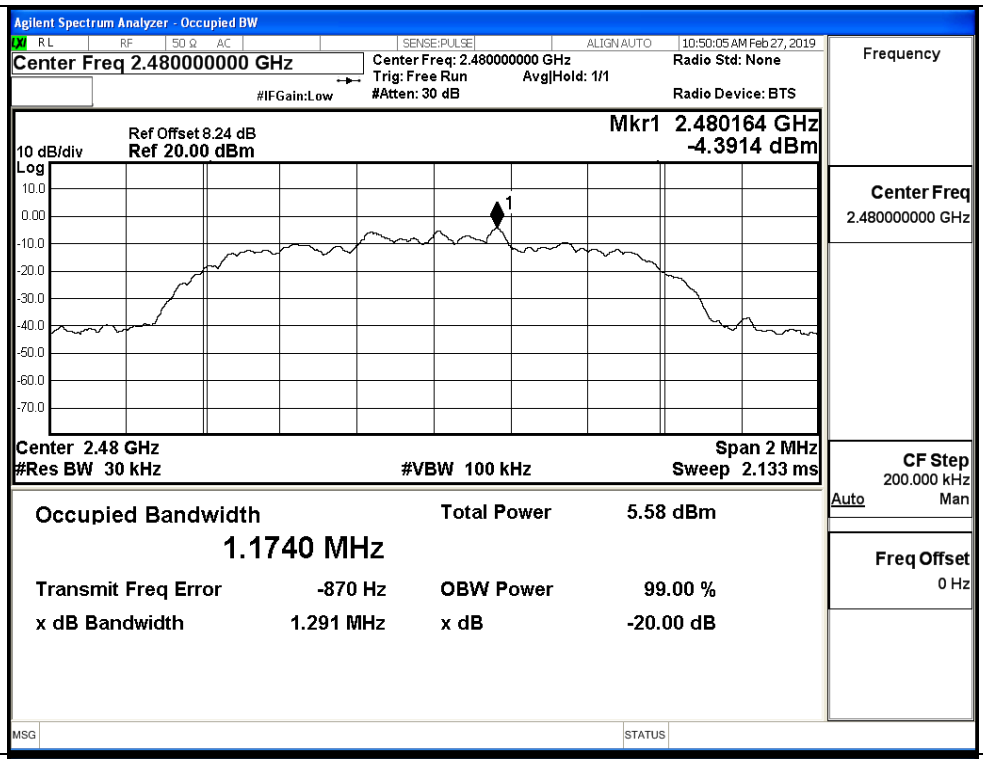
π/4DQPSK/LCH



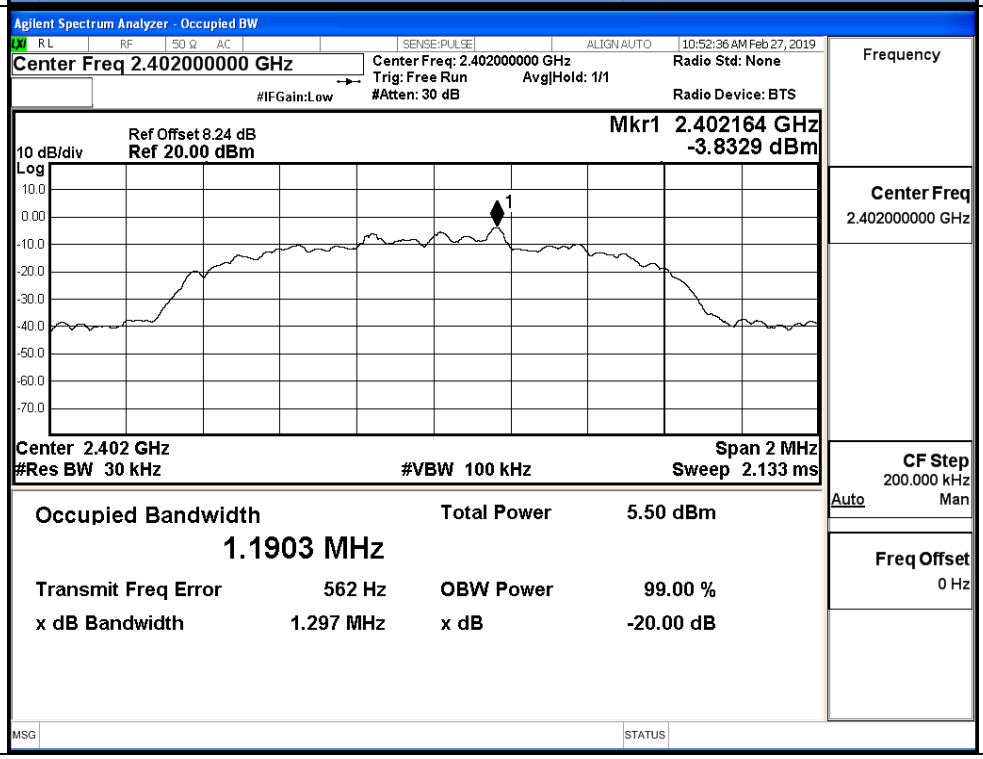
π/4DQPSK/MCH

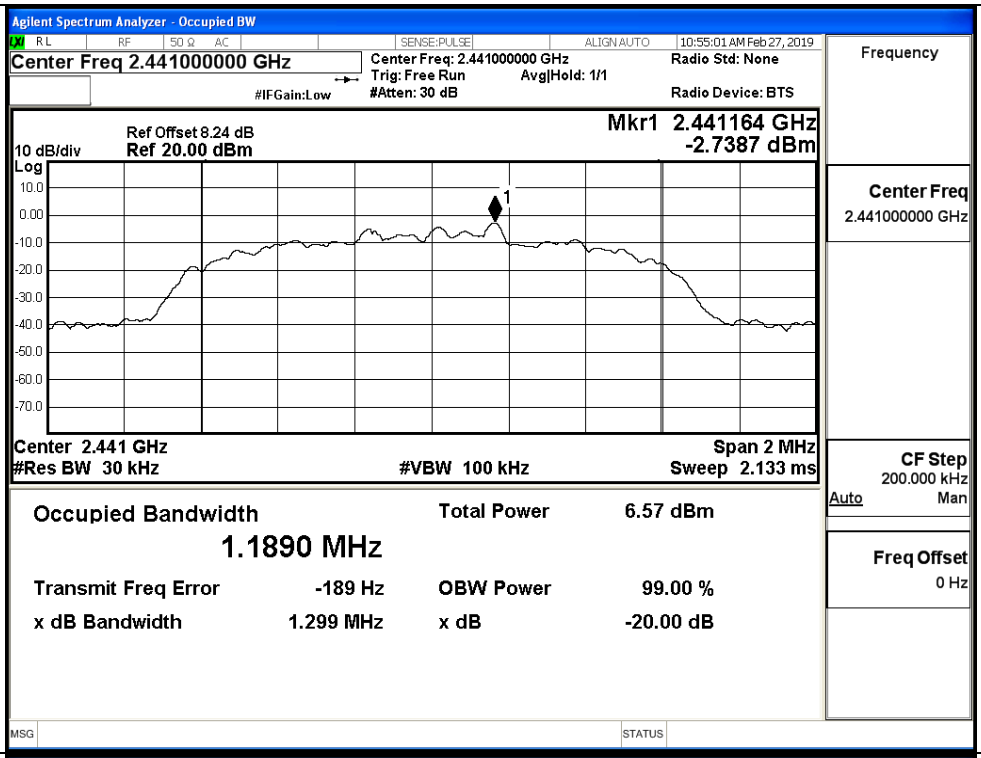
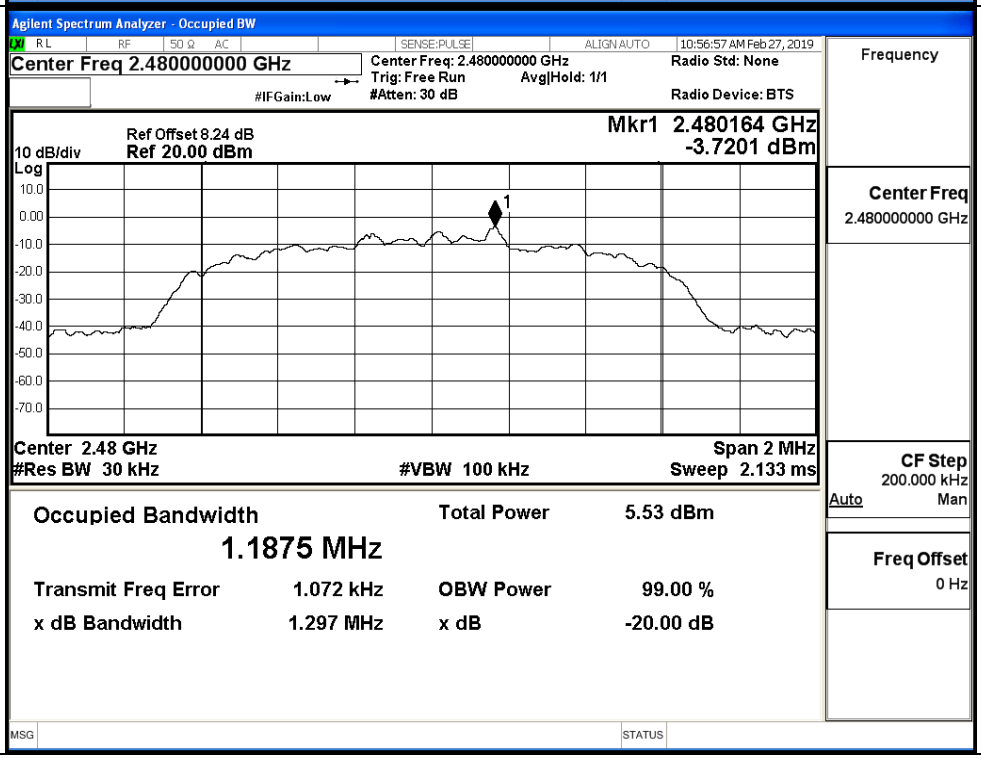


π/4DQPSK/HCH



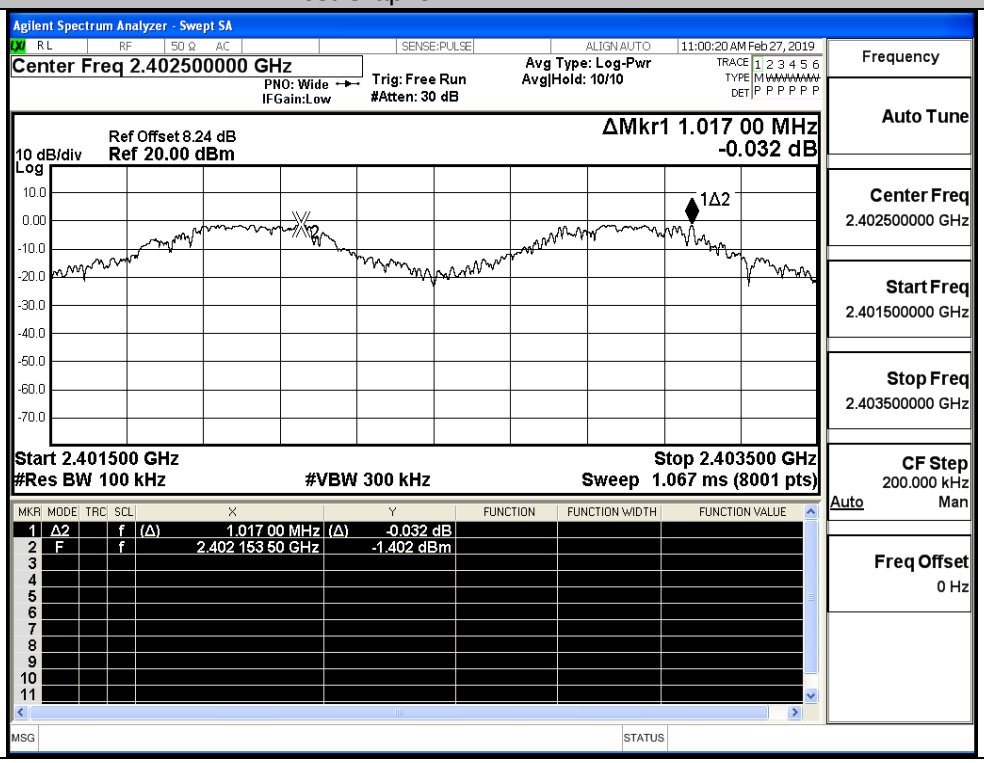
8DPSK/LCH

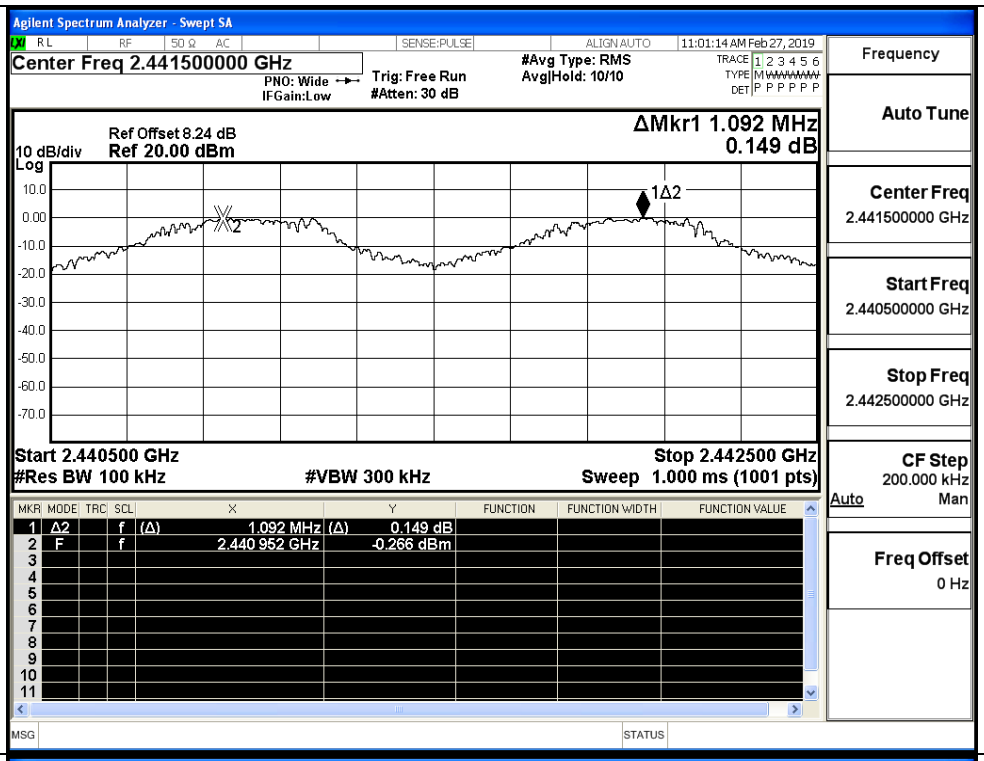
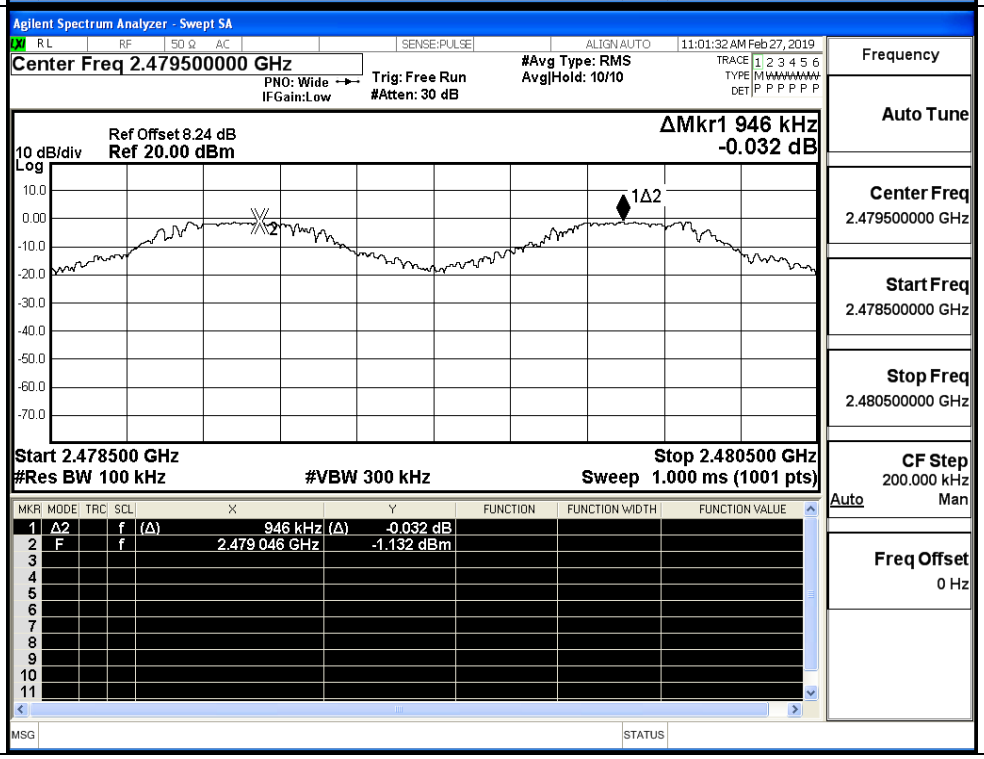


8DPSK/MCH	
8DPSK/HCH	

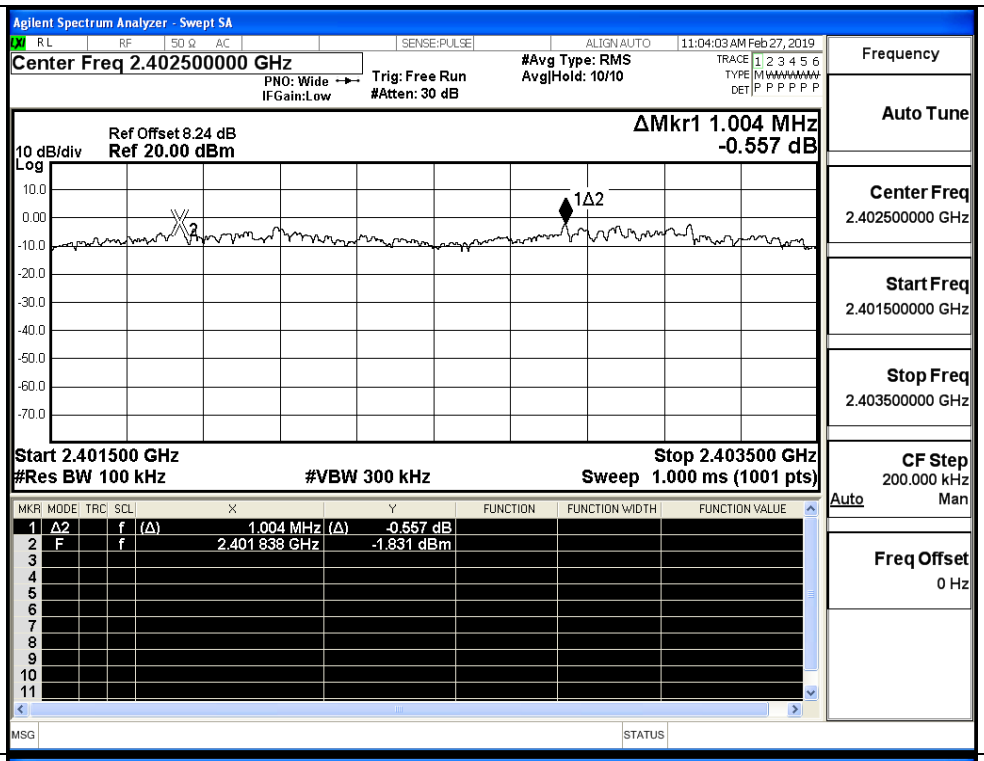
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.017	0.681	PASS
	MCH	1.092	0.681	PASS
	HCH	0.946	0.681	PASS
π/4DQPSK	LCH	1.004	0.871	PASS
	MCH	1.026	0.871	PASS
	HCH	1.200	0.871	PASS
8DPSK	LCH	0.984	0.866	PASS
	MCH	0.910	0.866	PASS
	HCH	0.986	0.866	PASS

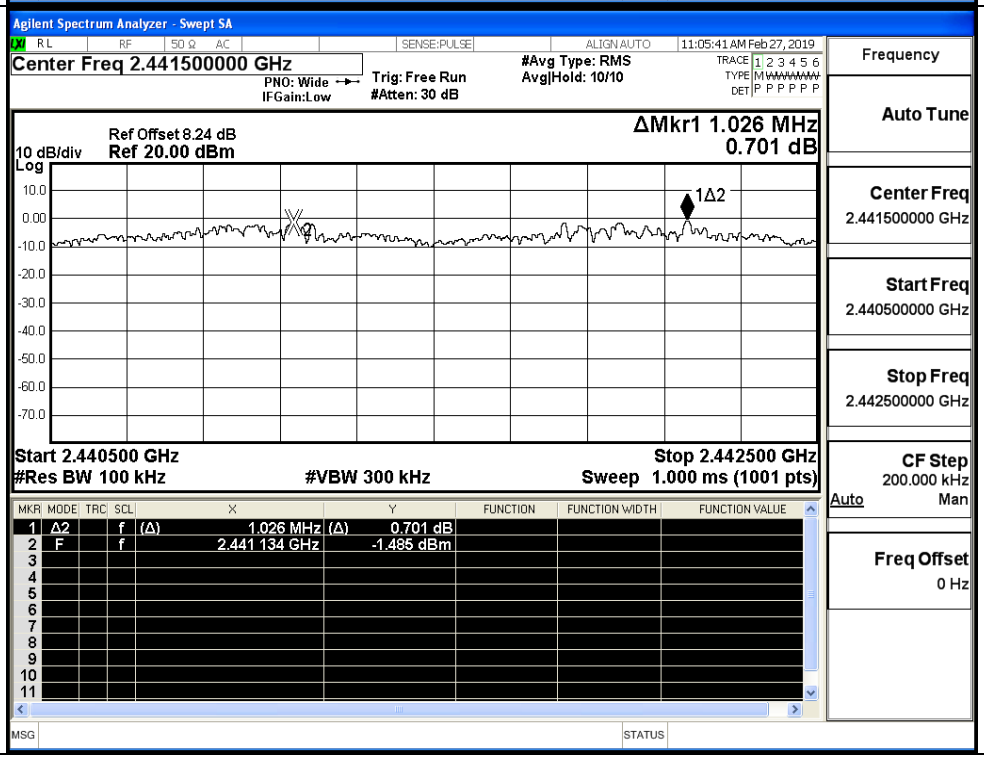
Test Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

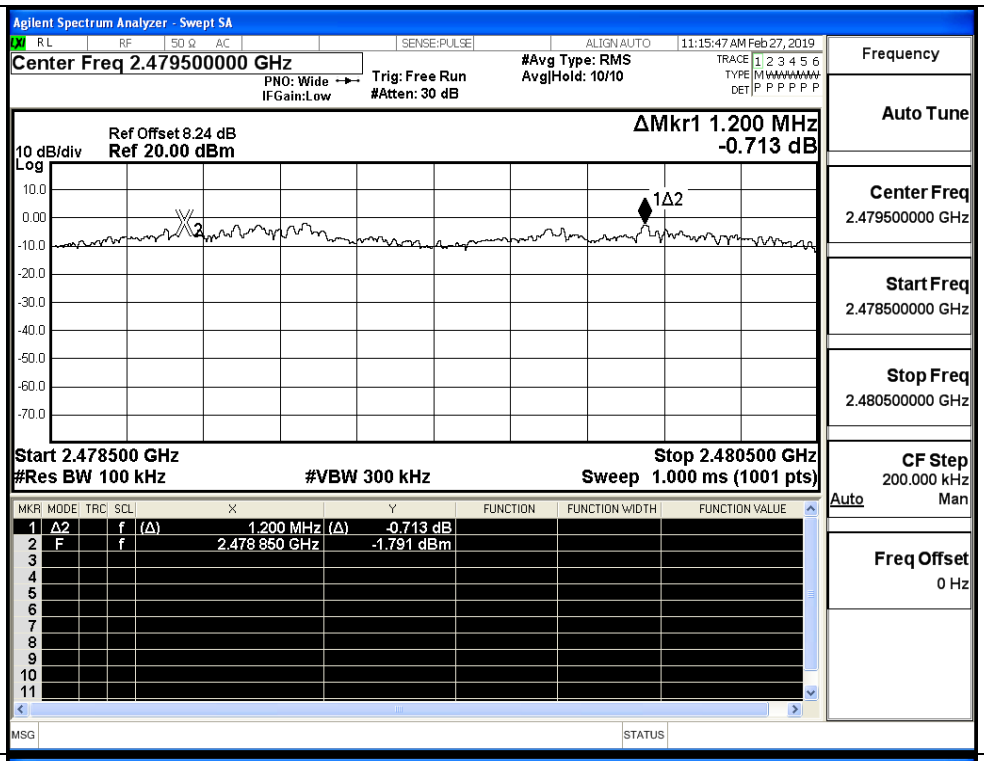
π/4DQPSK/LCH



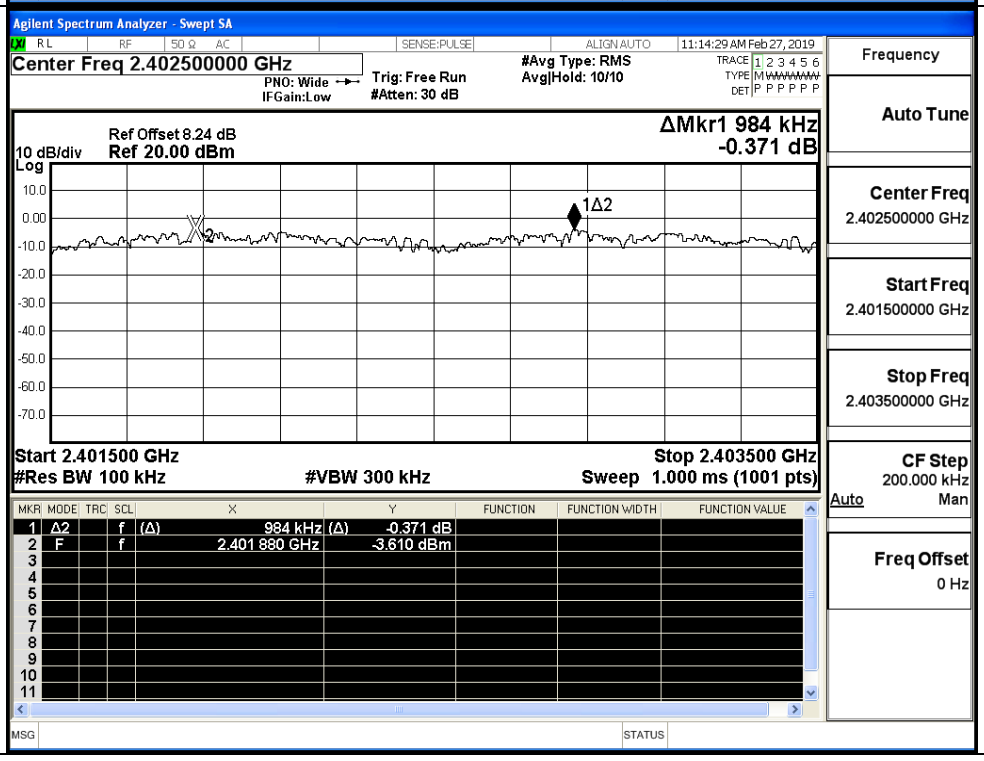
π/4DQPSK/MCH

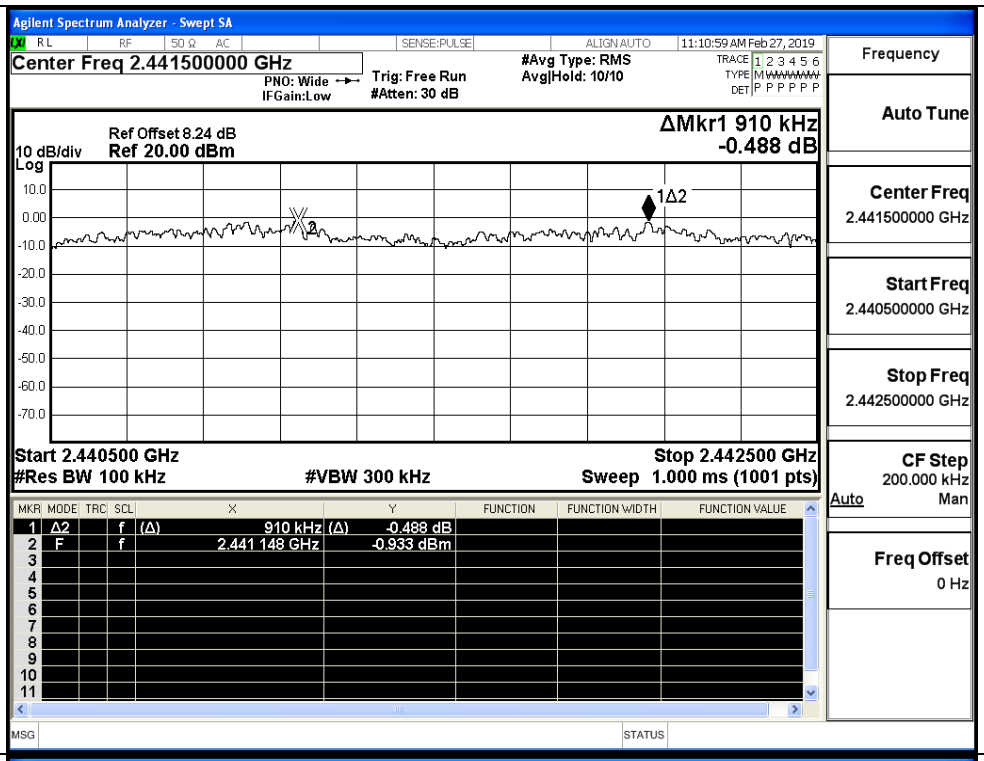
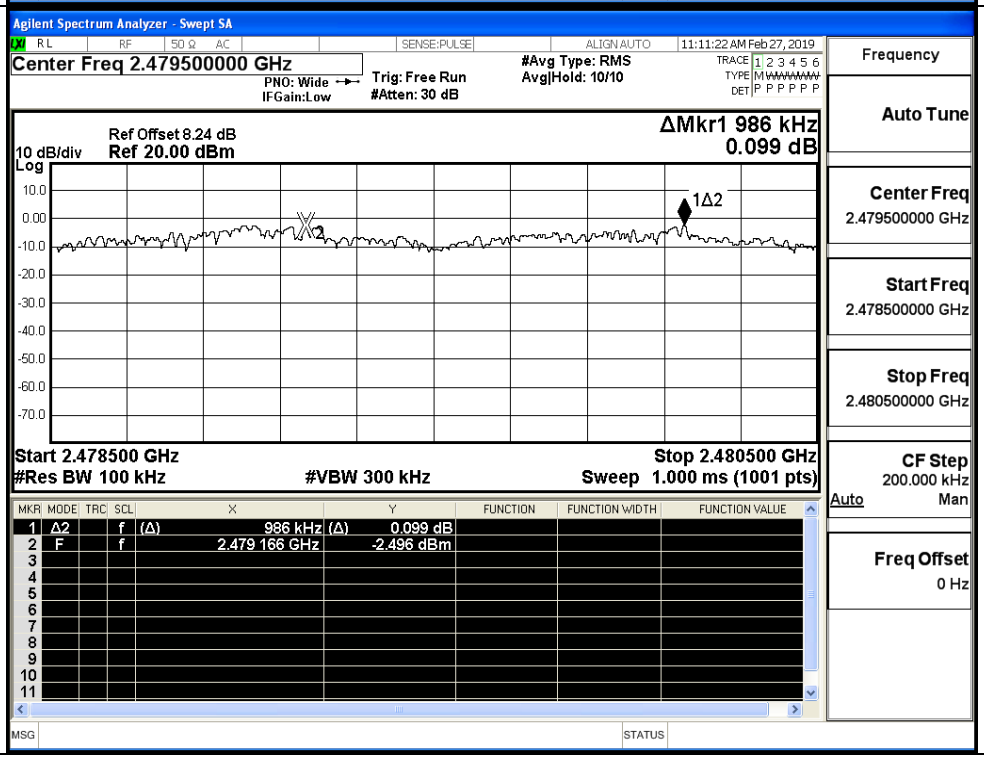


π/4DQPSK/HCH



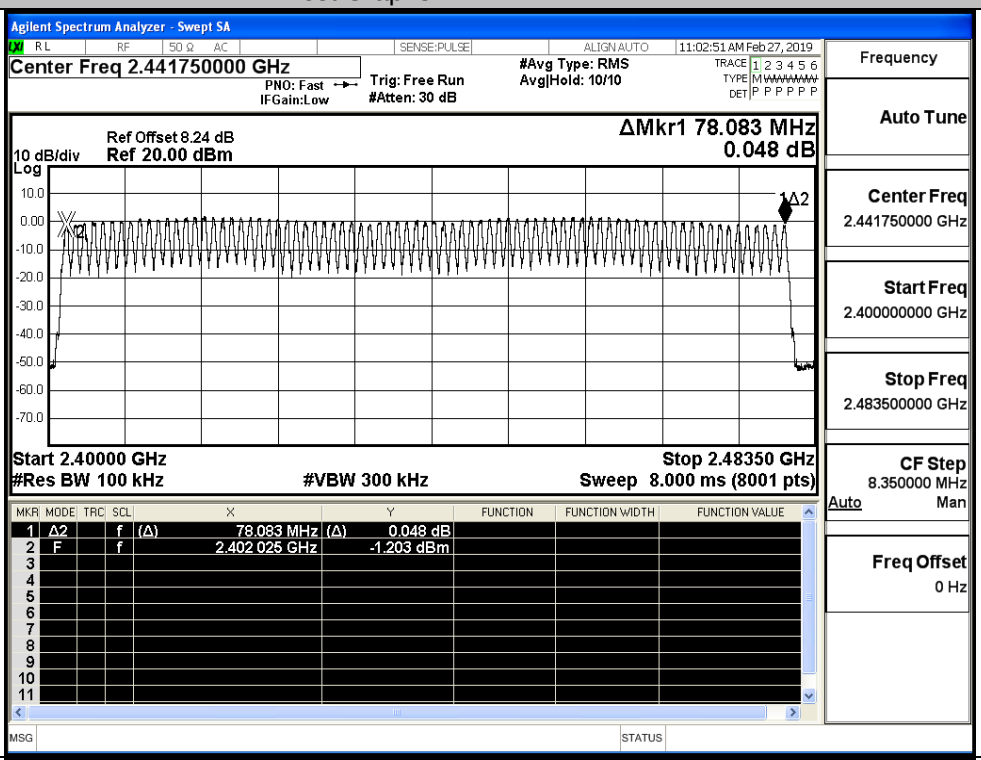
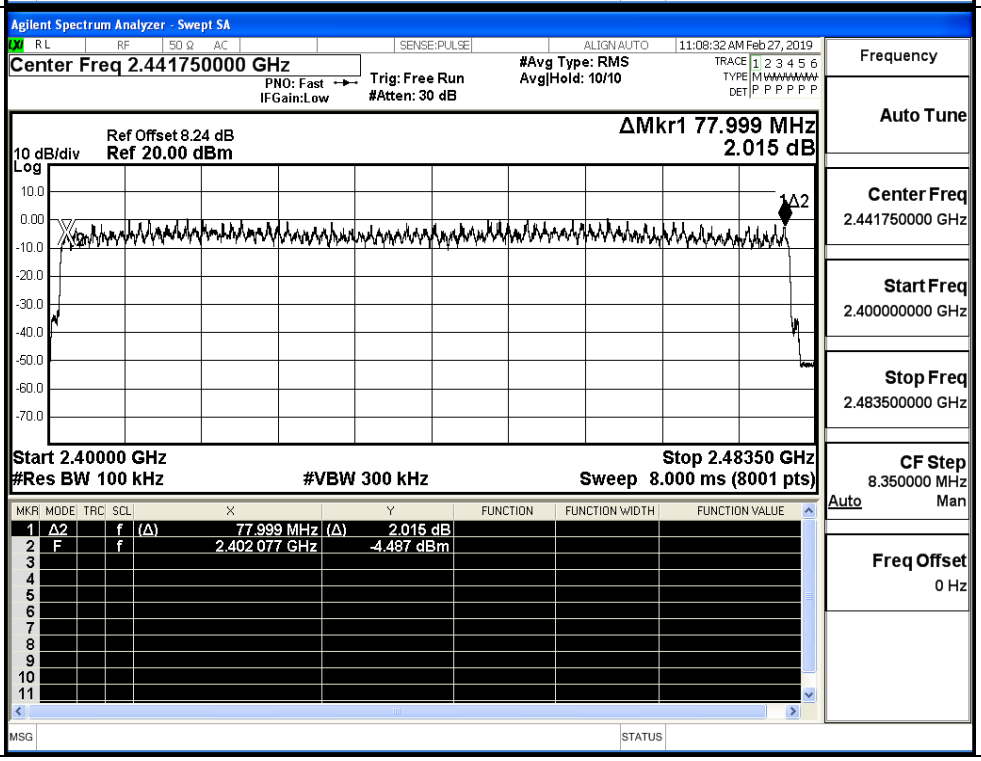
8DPSK/LCH

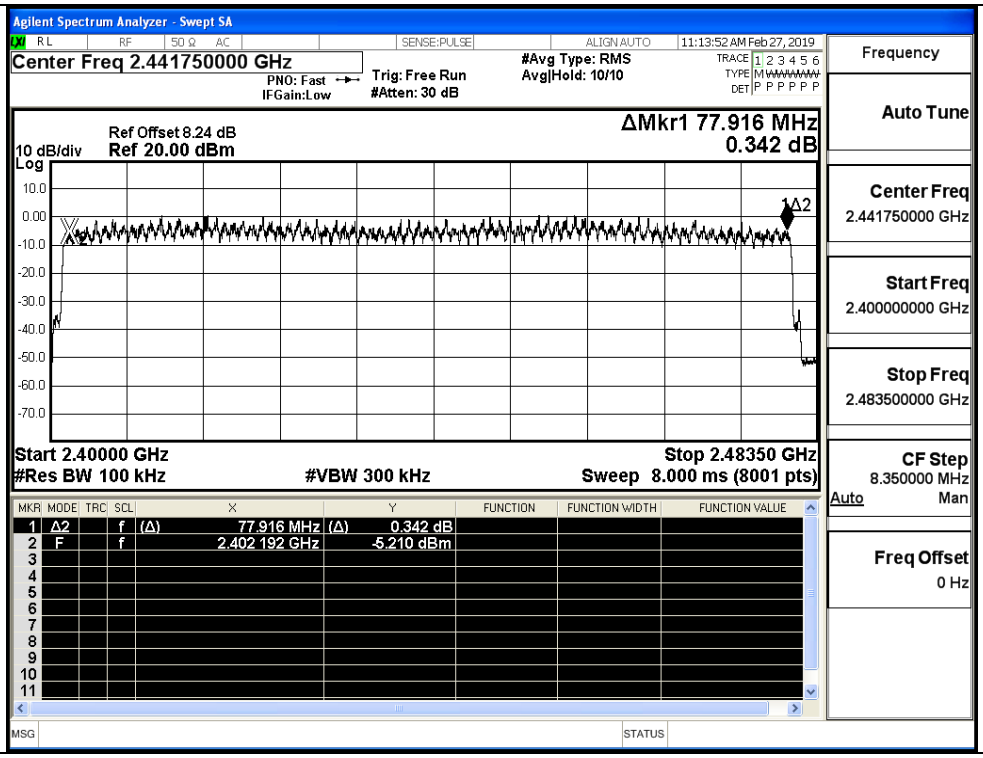


8DPSK/MCH		
8DPSK/HCH		

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

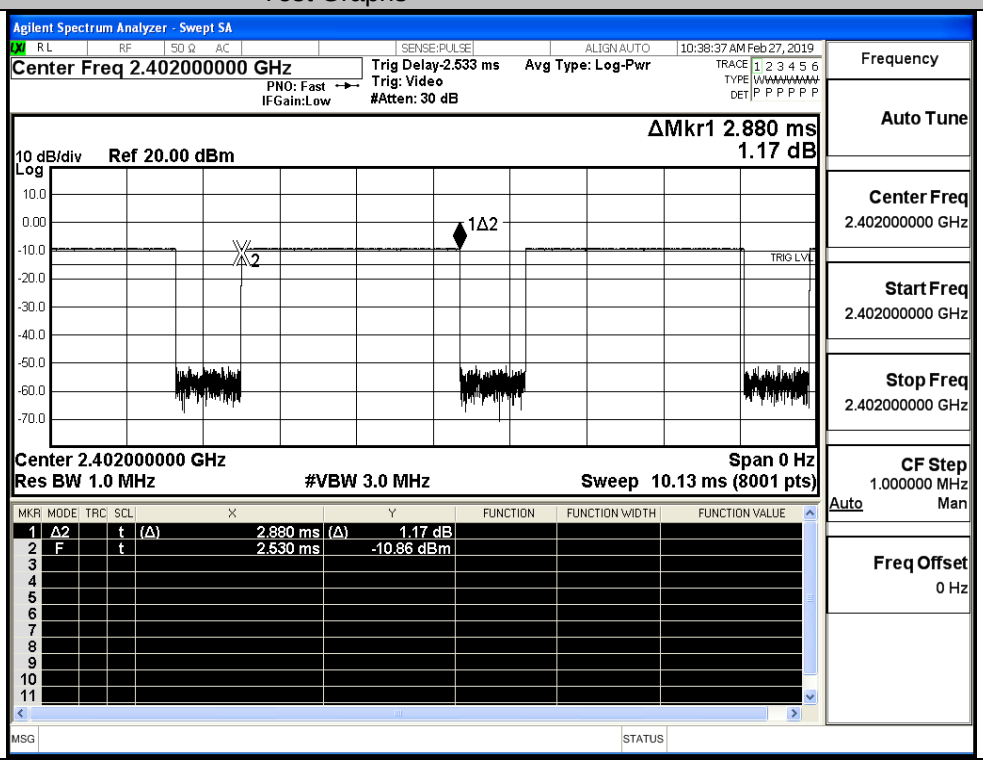
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

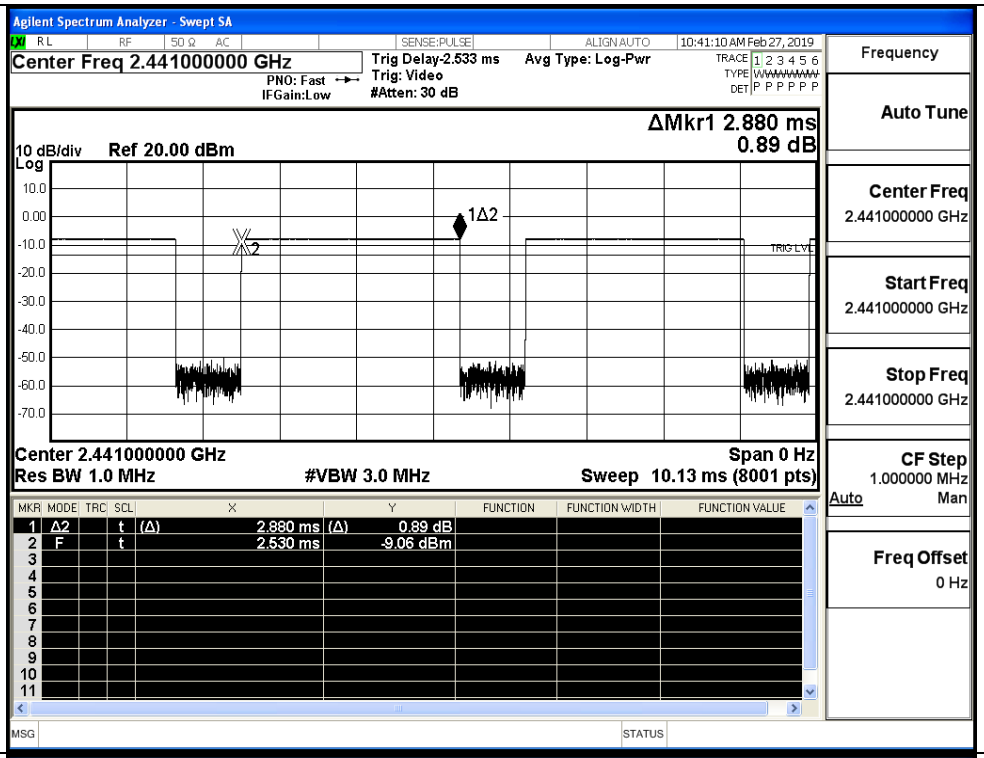
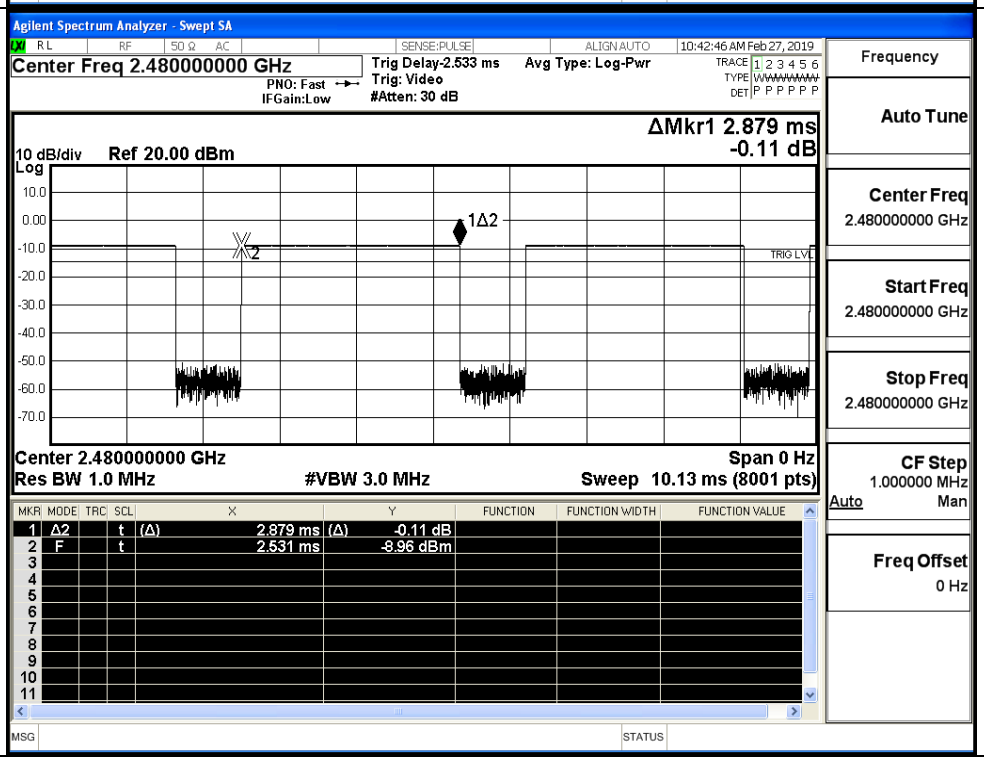
8DPSK/Hop	

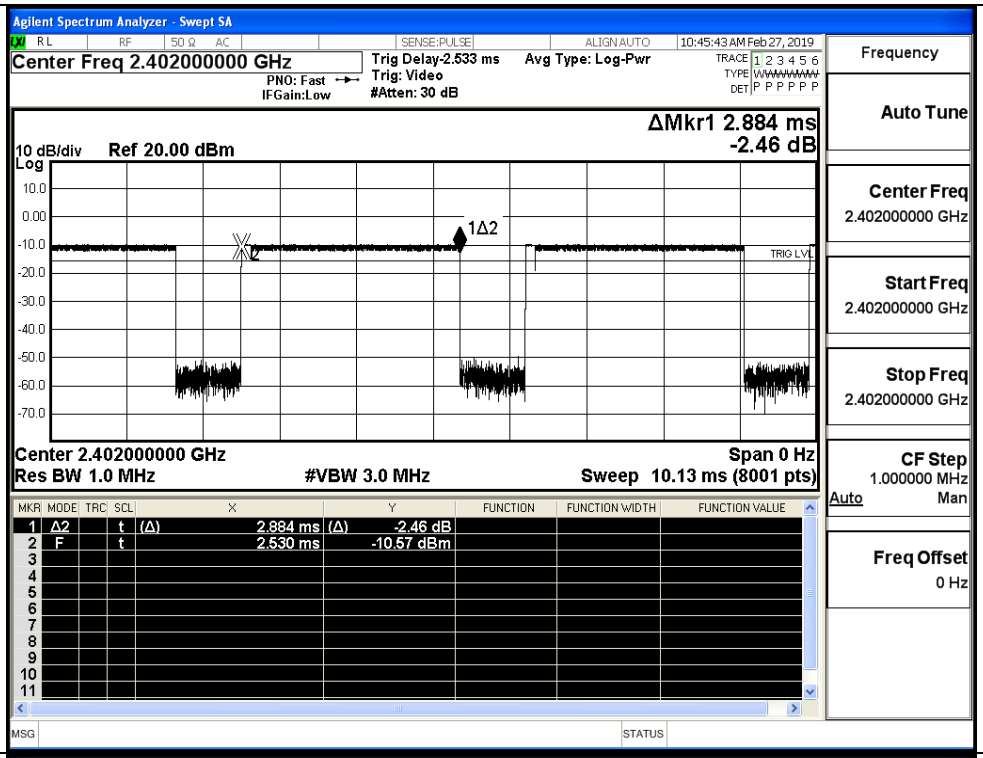
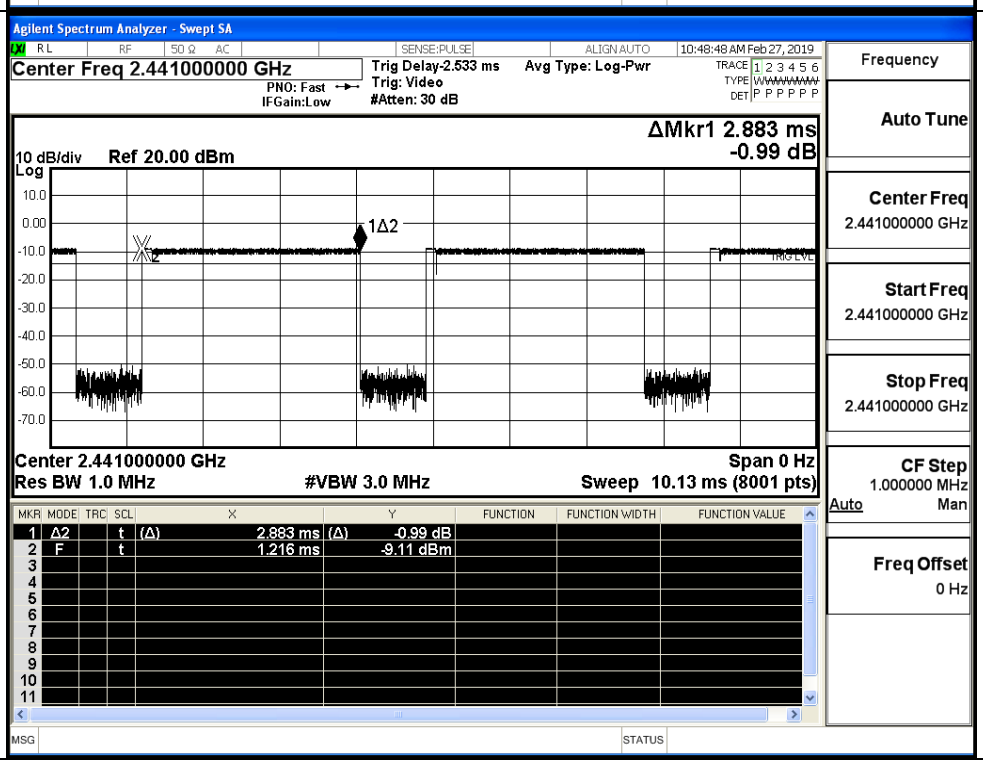
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
11:13:52 AM Feb 27, 2019
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
ΔMkr1 77.916 MHz
0.342 dB
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (8001 pts)
1 Δ2 f (Δ) 77.916 MHz (Δ) 0.342 dB
2 F f 2.402 192 GHz -5.210 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

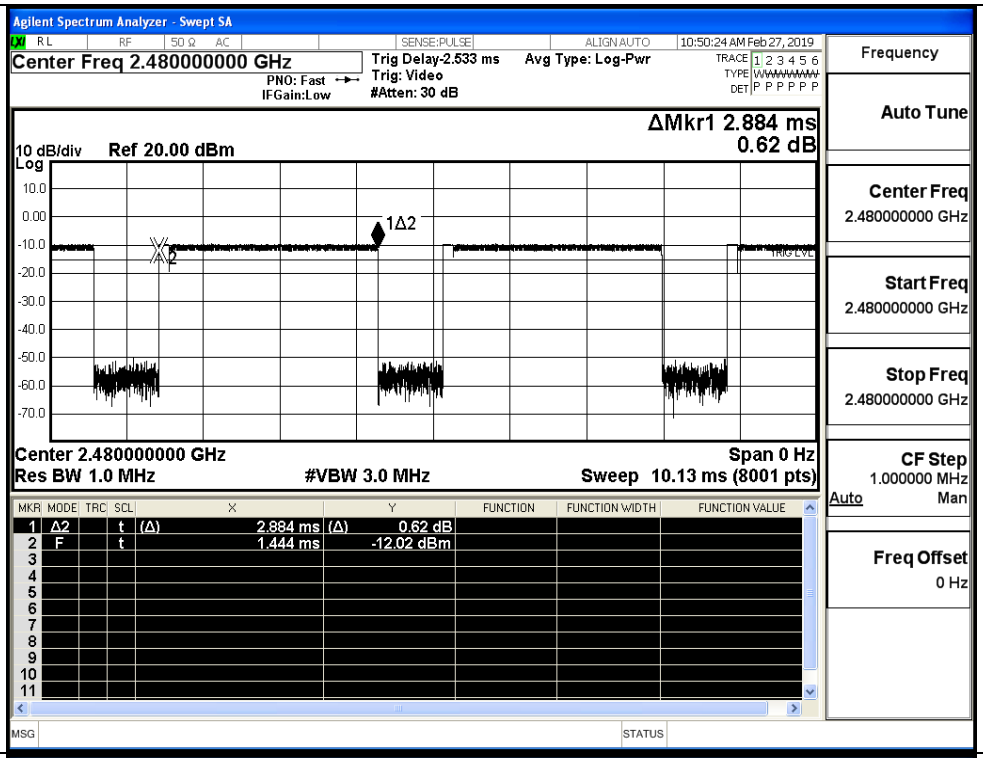
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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

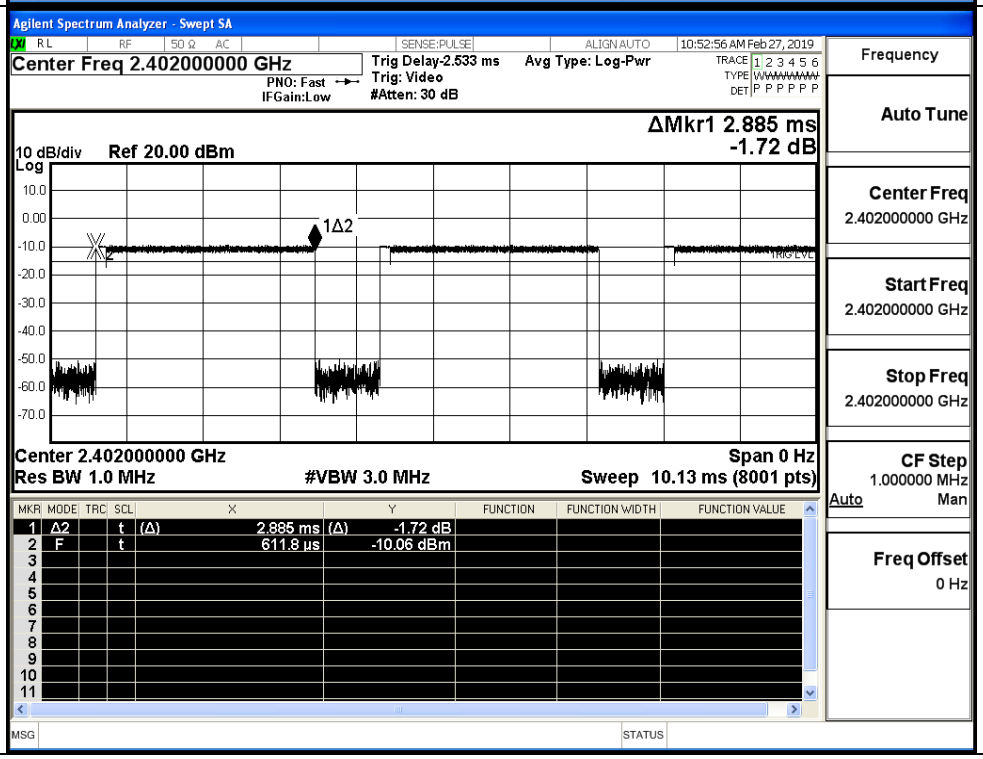
GFSK_DH5/MCH	
GFSK_DH5/HCH	

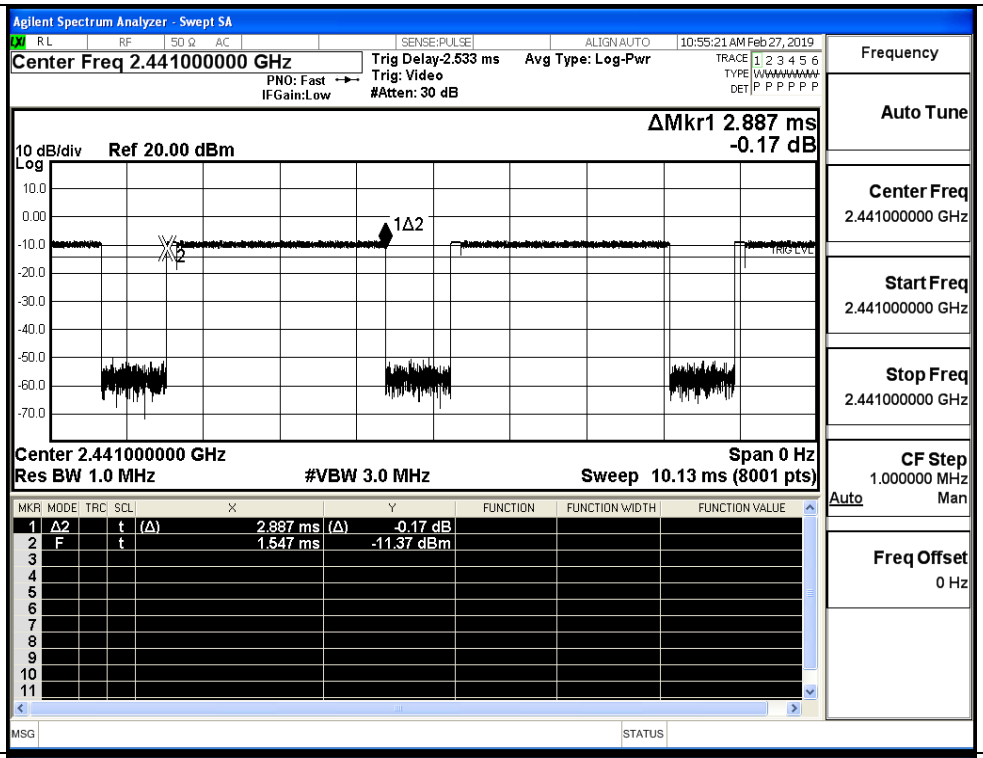
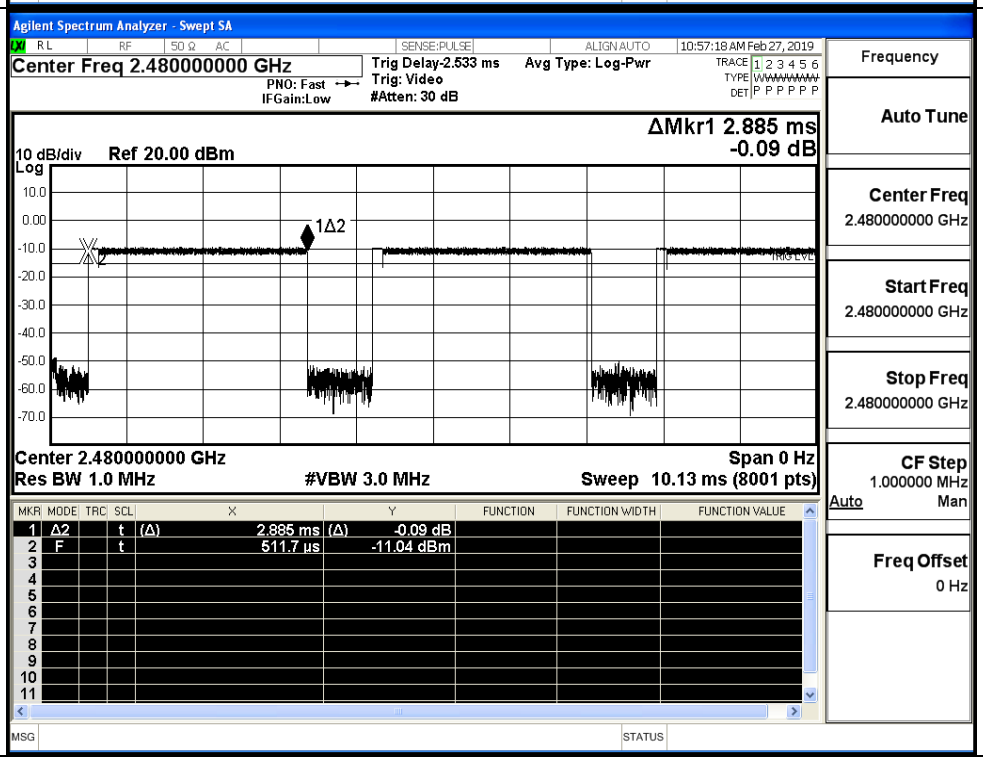
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

π/4DQPSK _2DH5/HCH



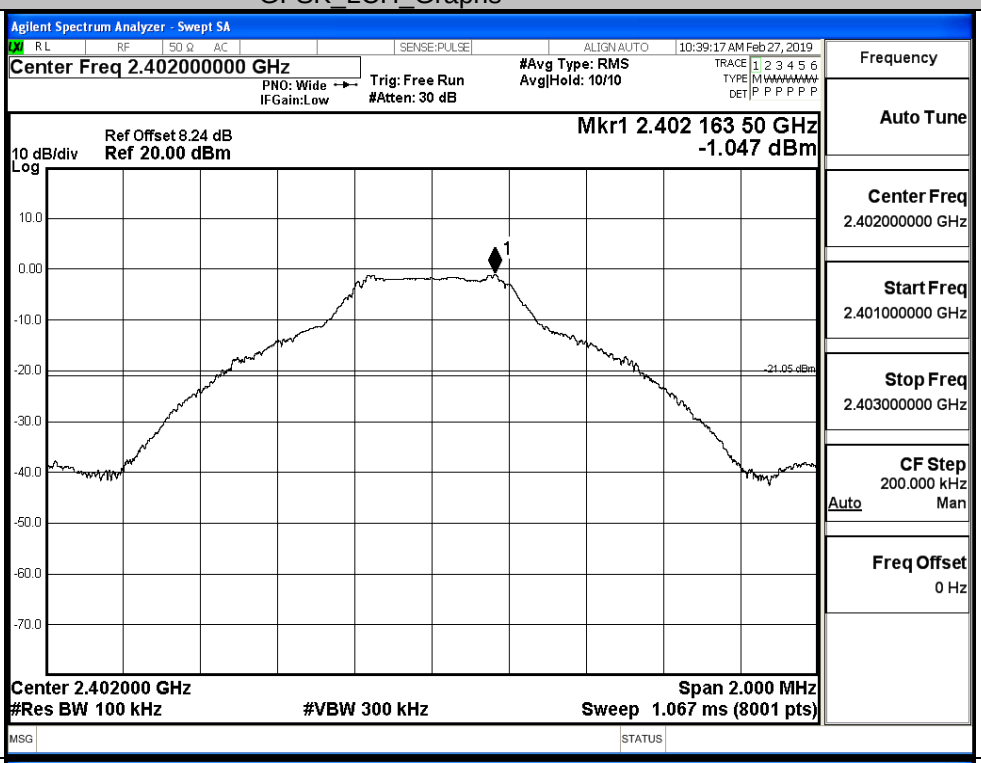
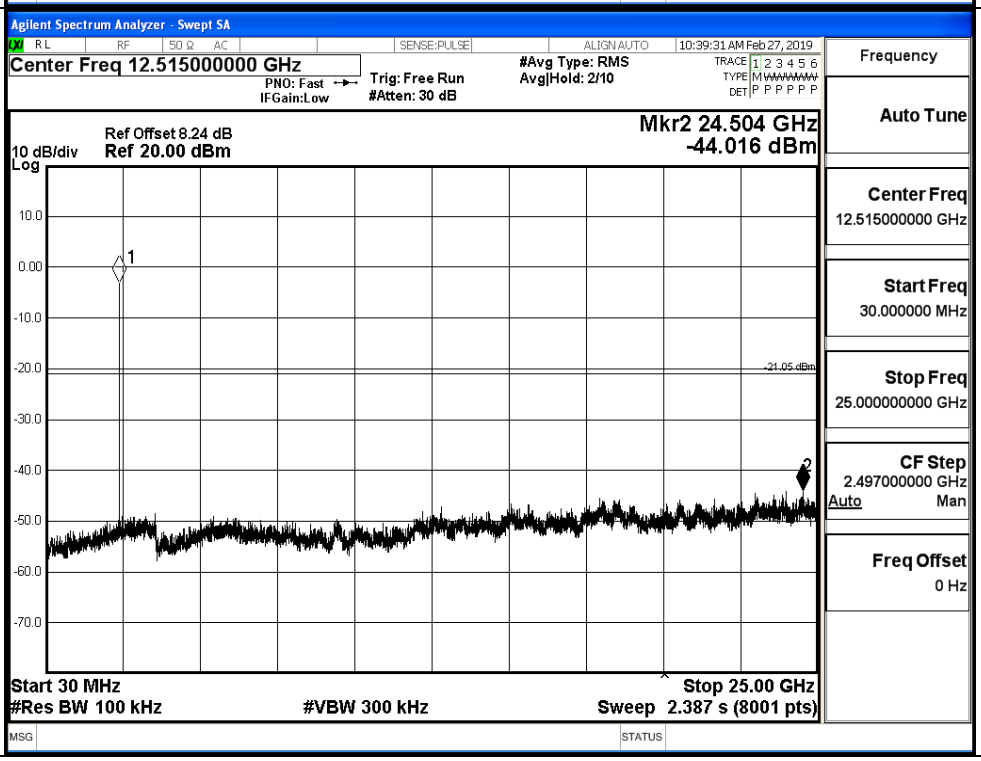
8DPSK _3DH5/LCH

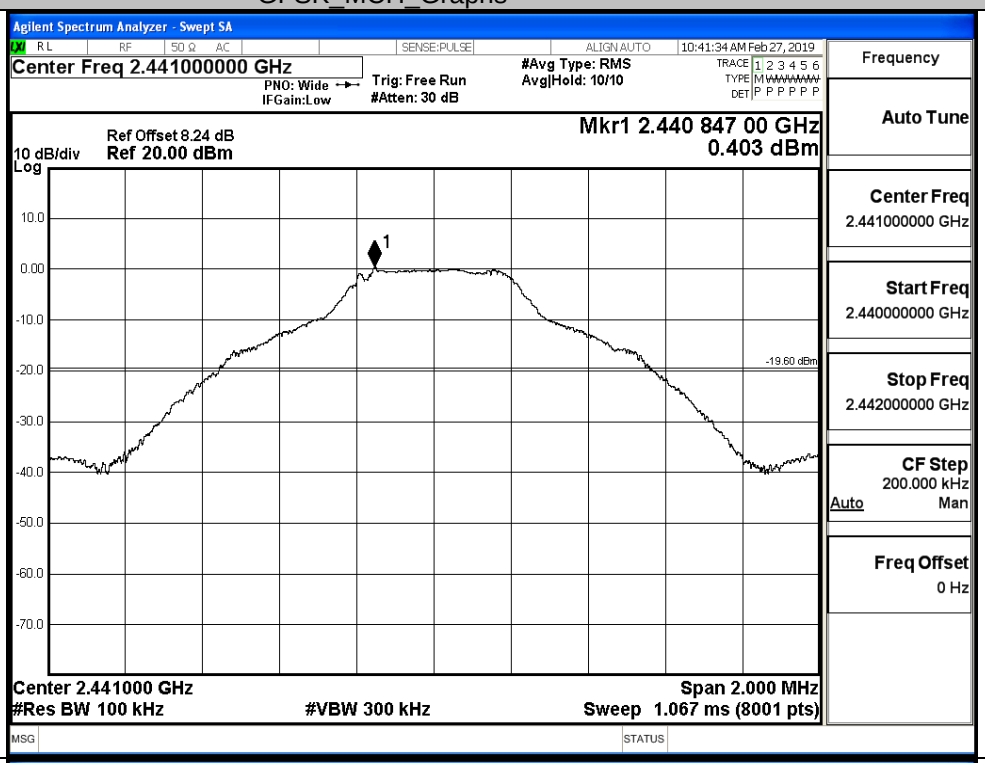
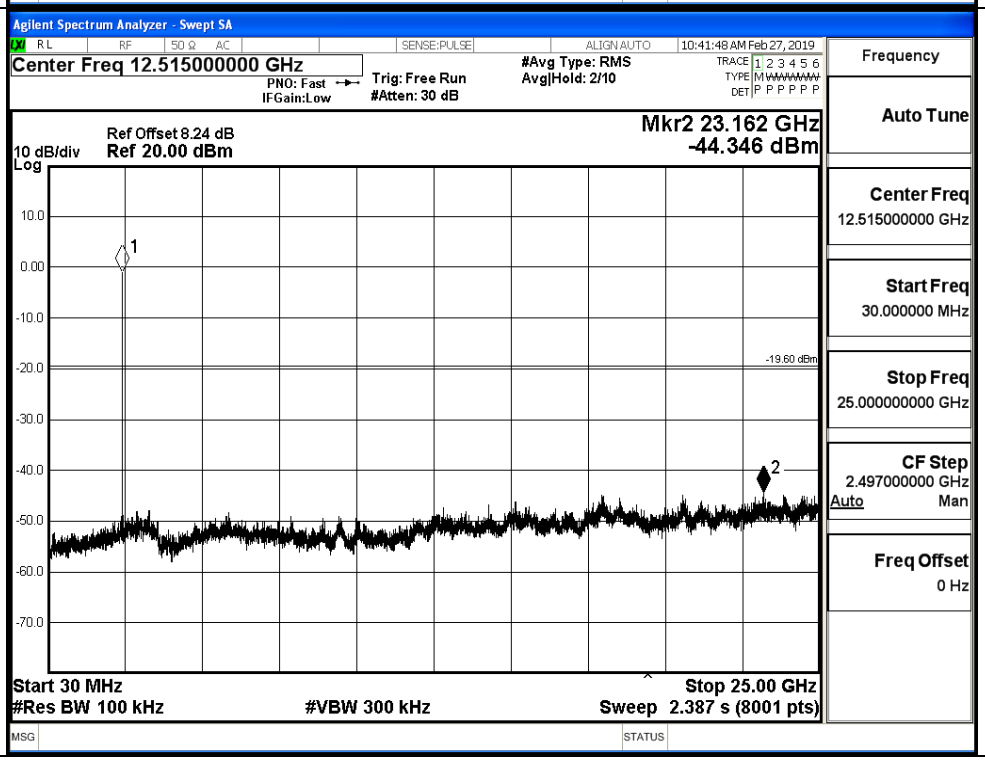


8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.047	-44.016	-21.047	PASS
	MCH	0.403	-44.346	-19.597	PASS
	HCH	-0.619	-44.685	-20.619	PASS
π/4DQPSK	LCH	-1.937	-44.449	-21.937	PASS
	MCH	-0.635	-44.653	-20.635	PASS
	HCH	-1.817	-45.099	-21.817	PASS
8DPSK	LCH	-2.366	-44.327	-22.366	PASS
	MCH	-0.732	-44.772	-20.732	PASS
	HCH	-1.644	-44.225	-21.644	PASS

GFSK_LCH_Graphs		
Pref		
Puw		

GFSK_MCH_Graphs		
Pref		
Puw		

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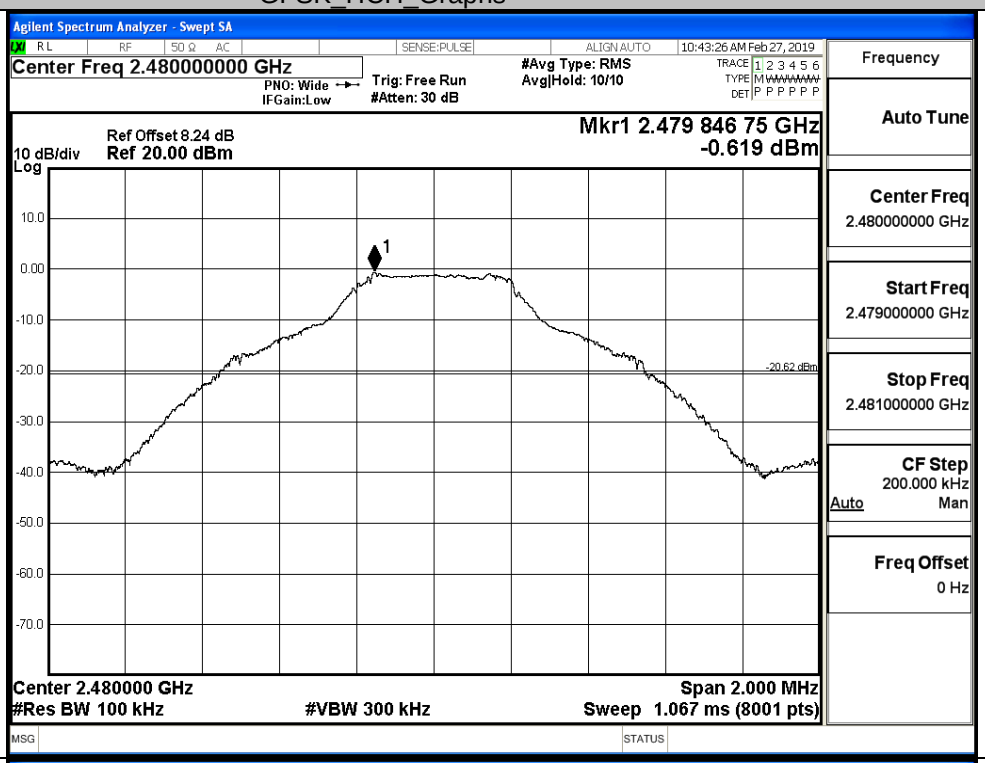
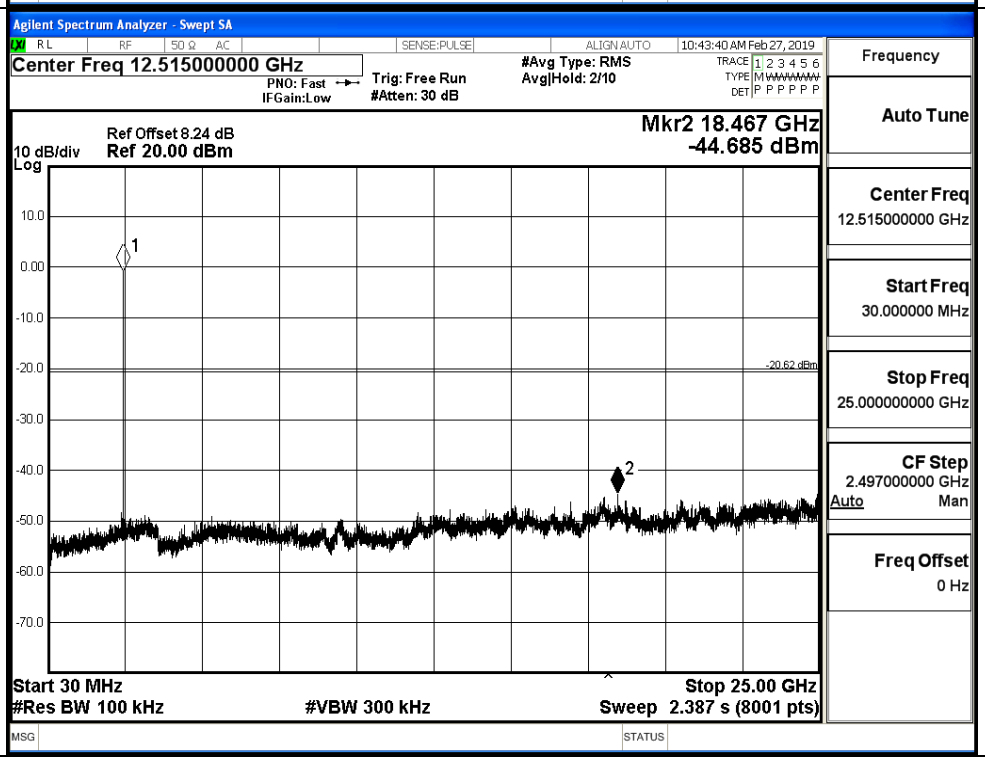
Pref			
Puw			

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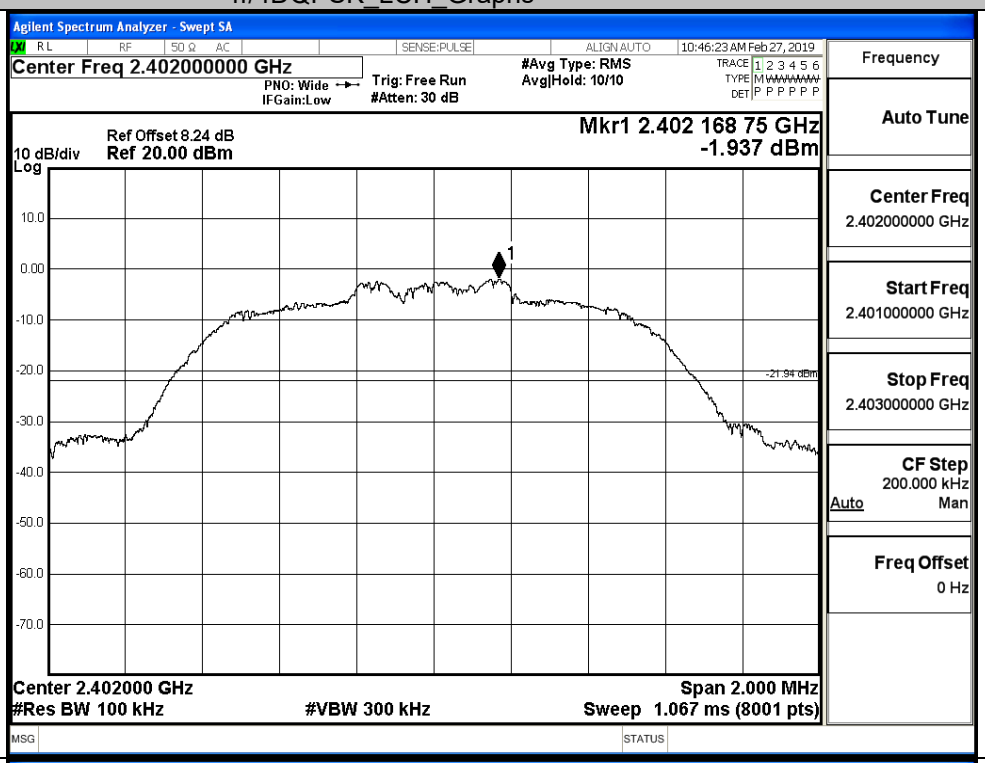
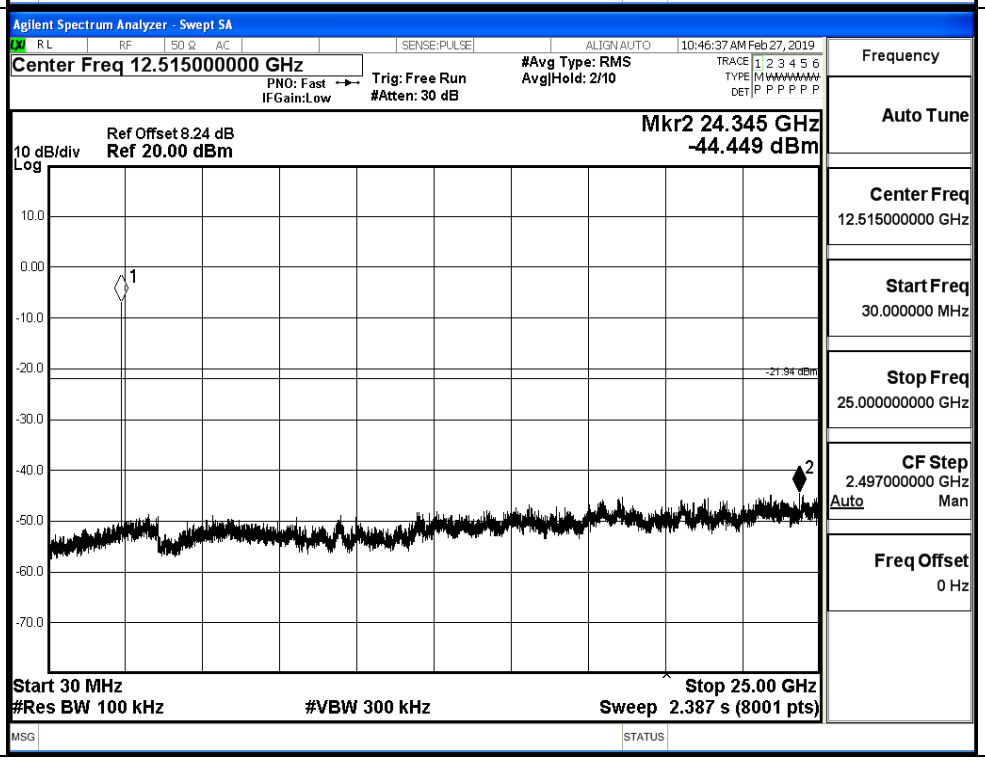
Pref		
Puw		

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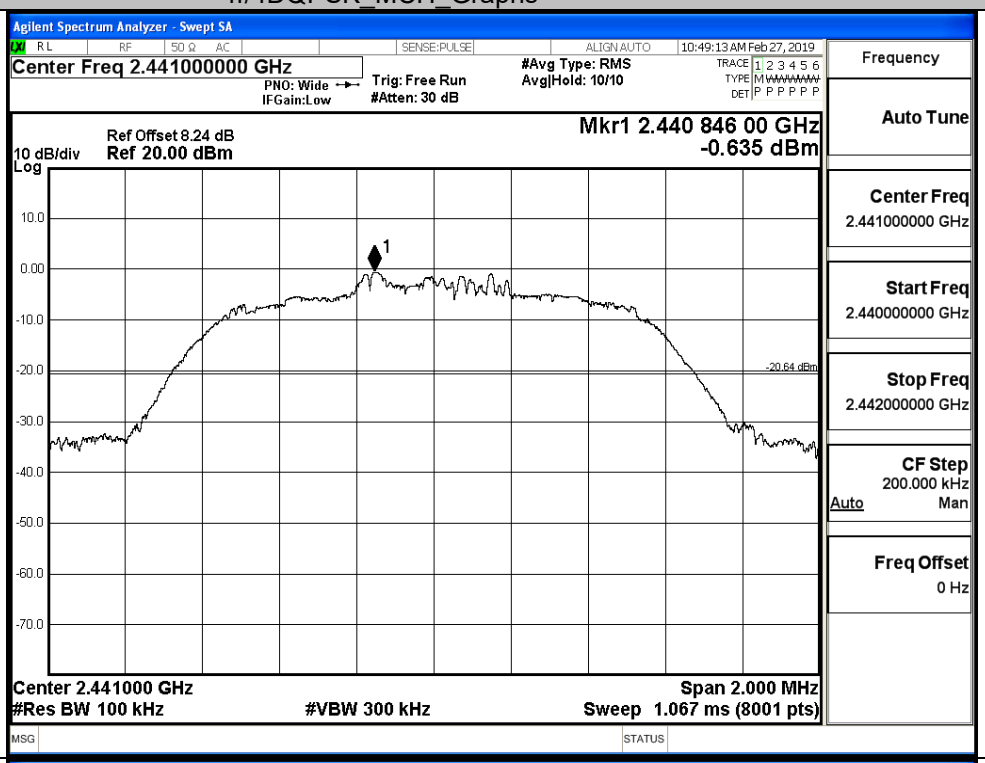
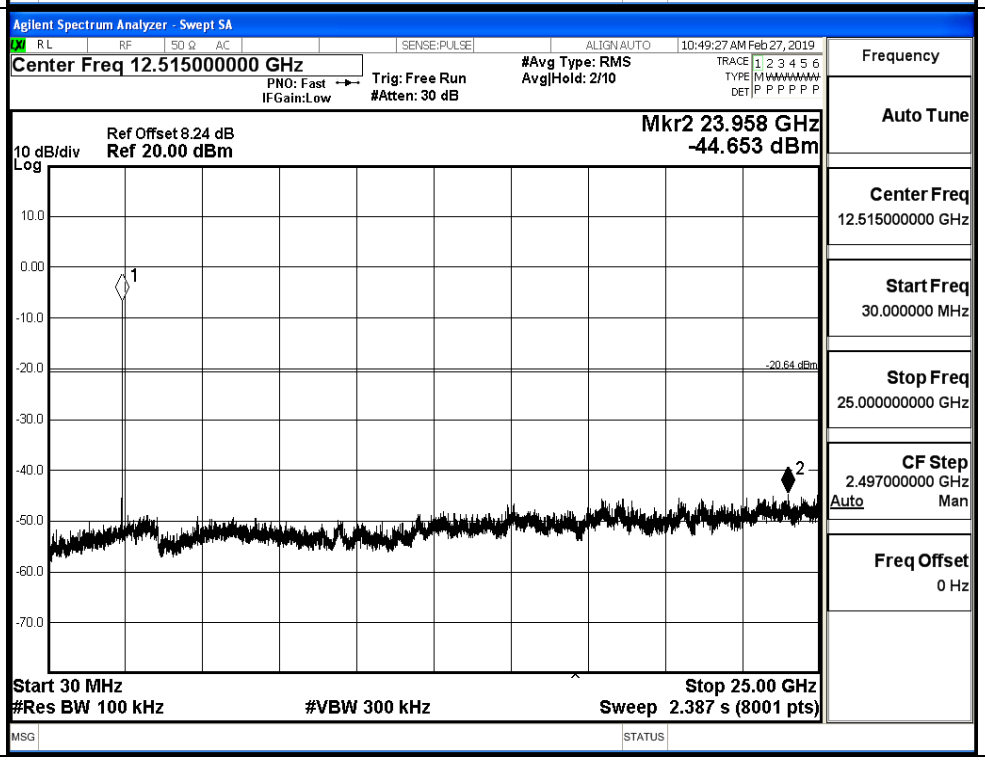
Pref			
Puw			

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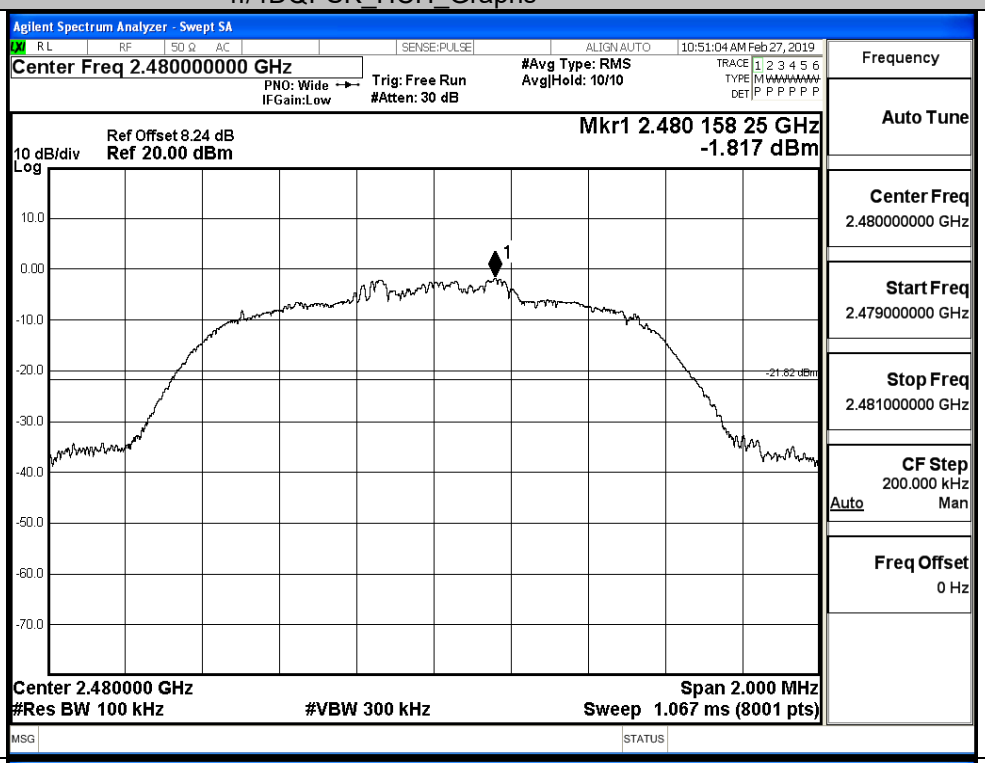
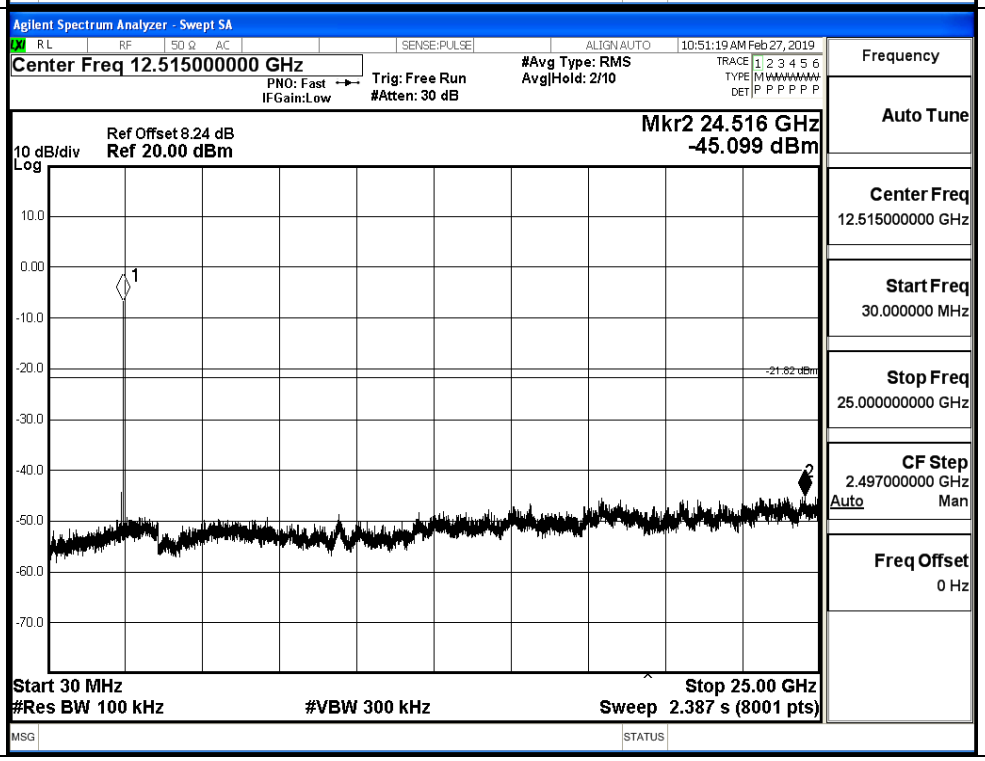
Pref		
Puw		

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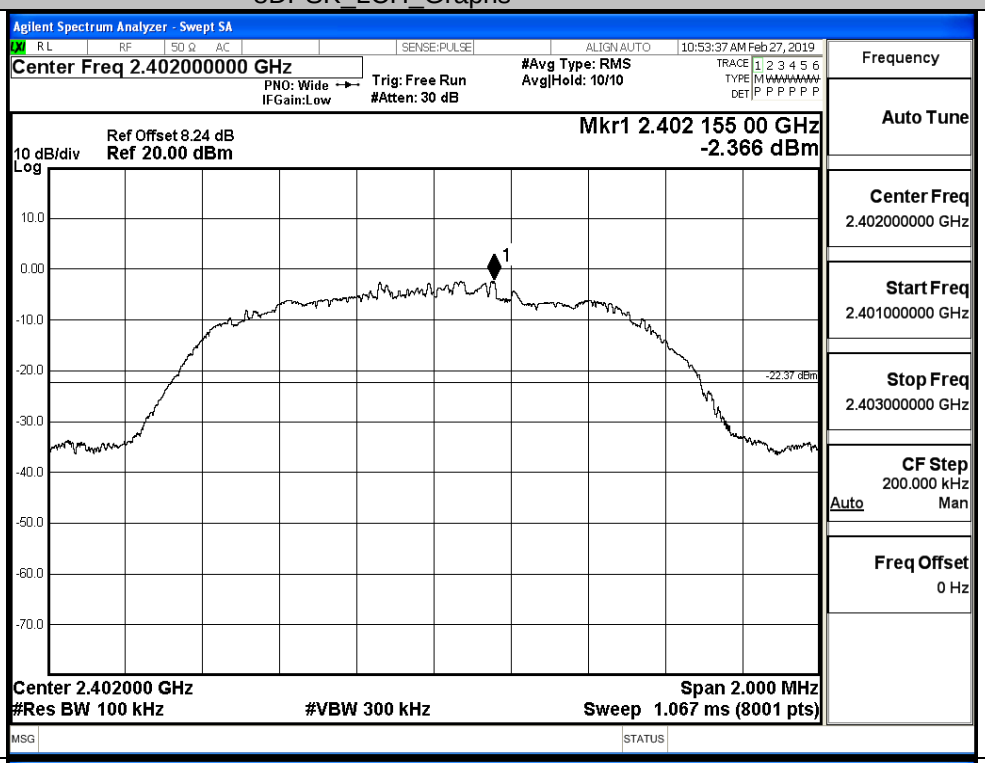
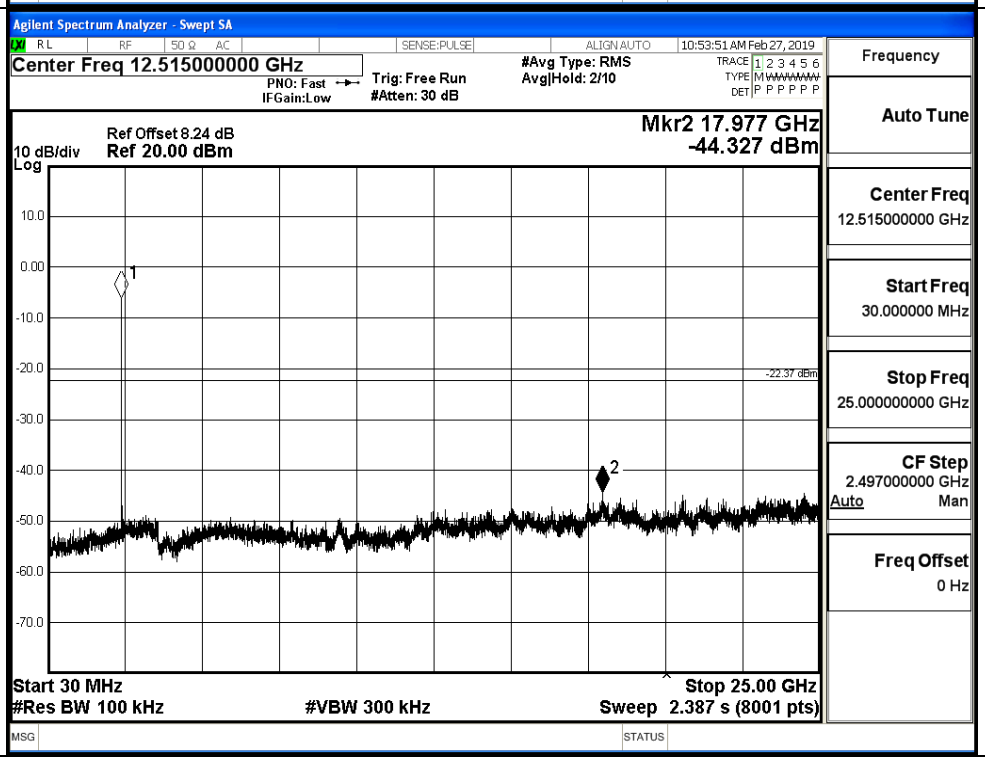
Pref		
Puw		

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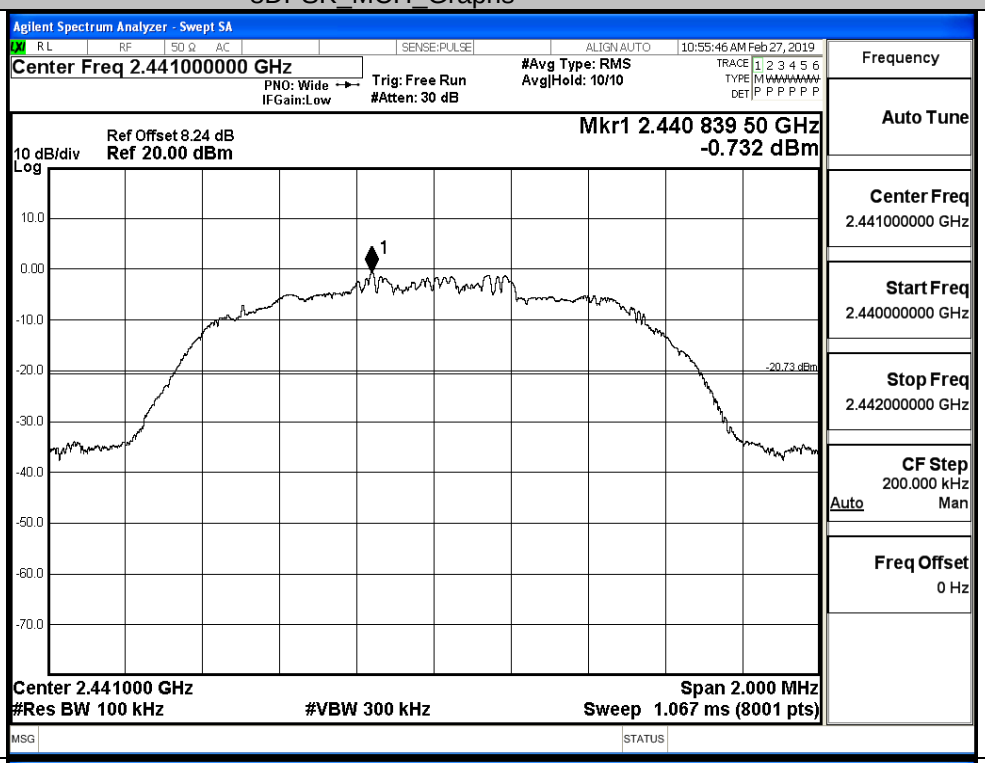
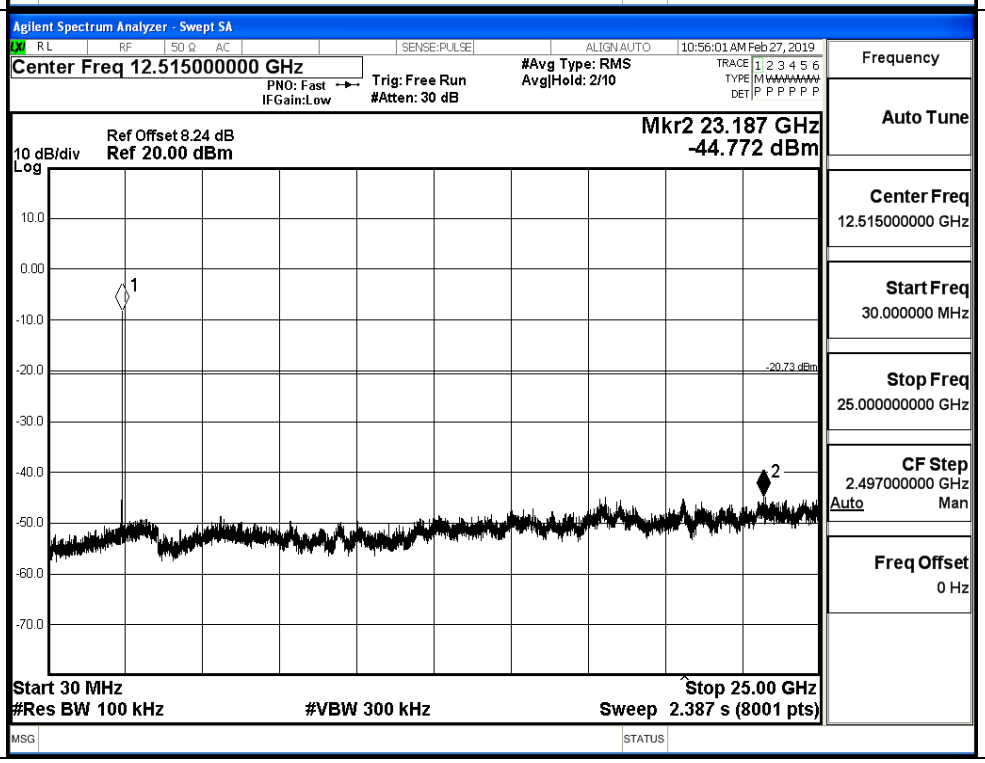
Pref			
Puw			

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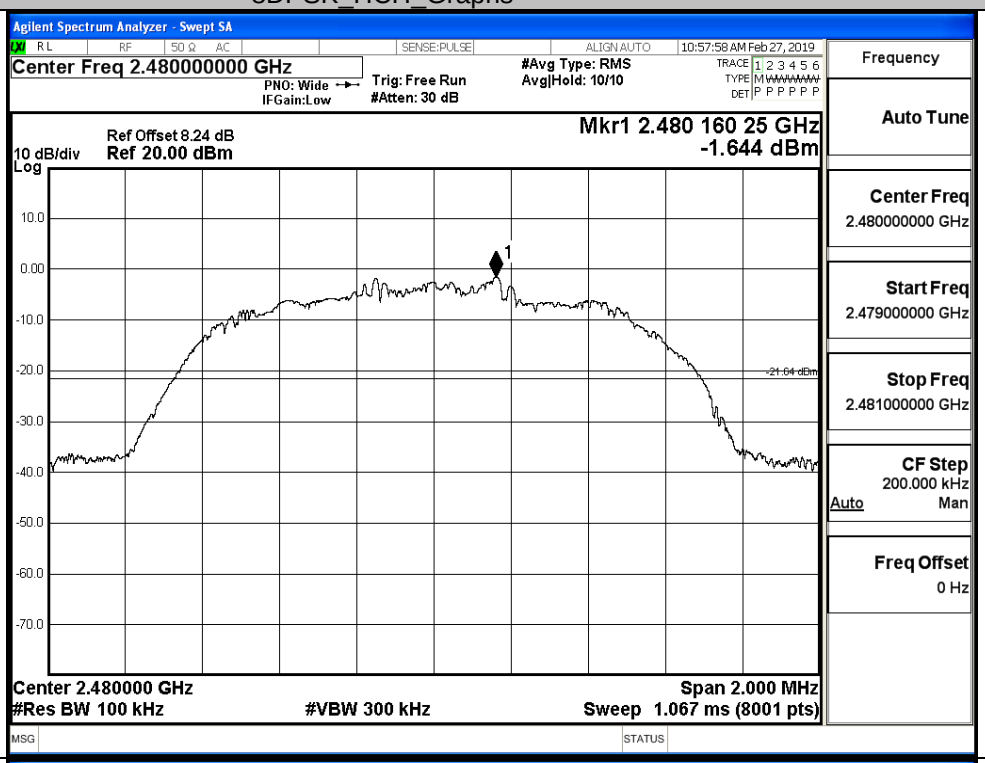
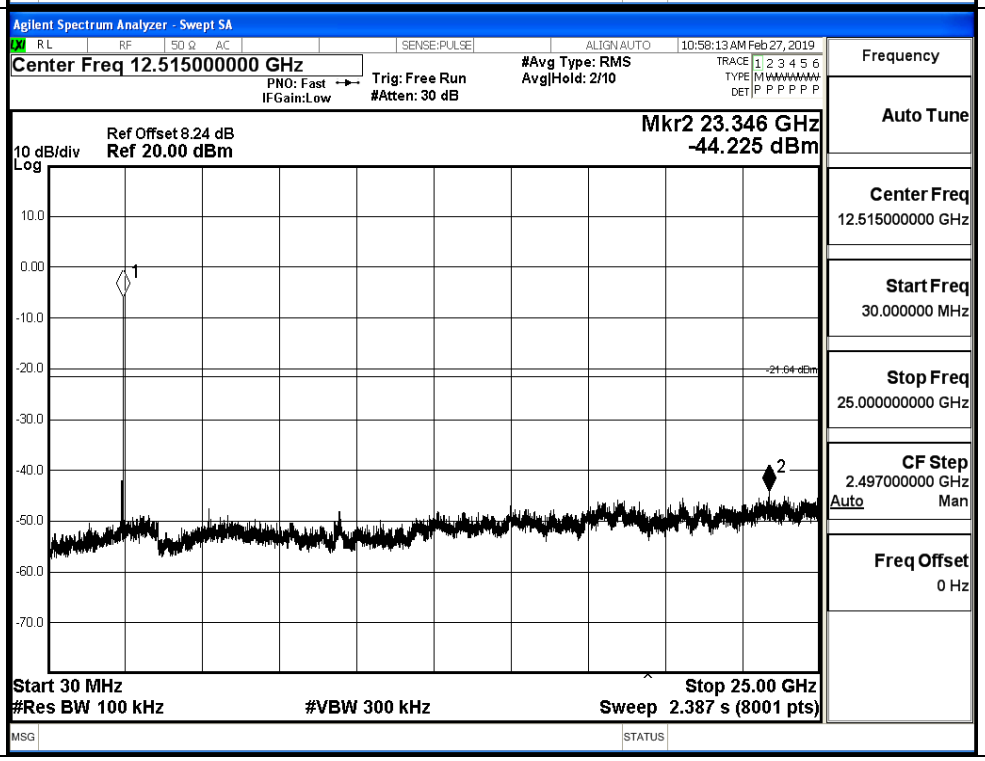
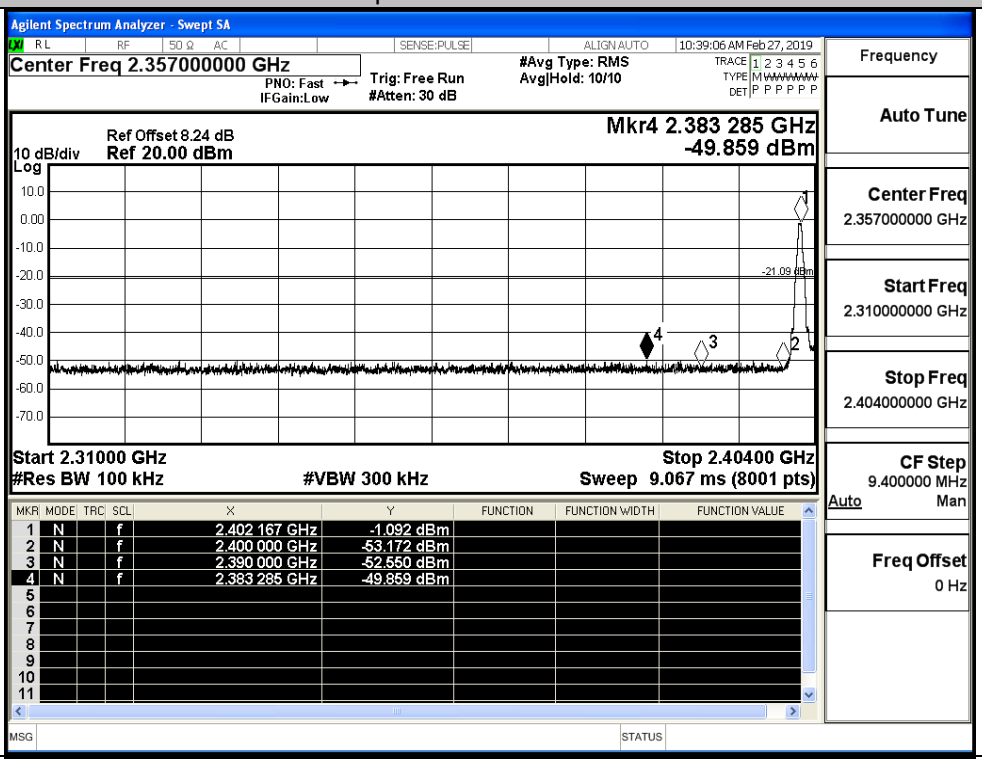
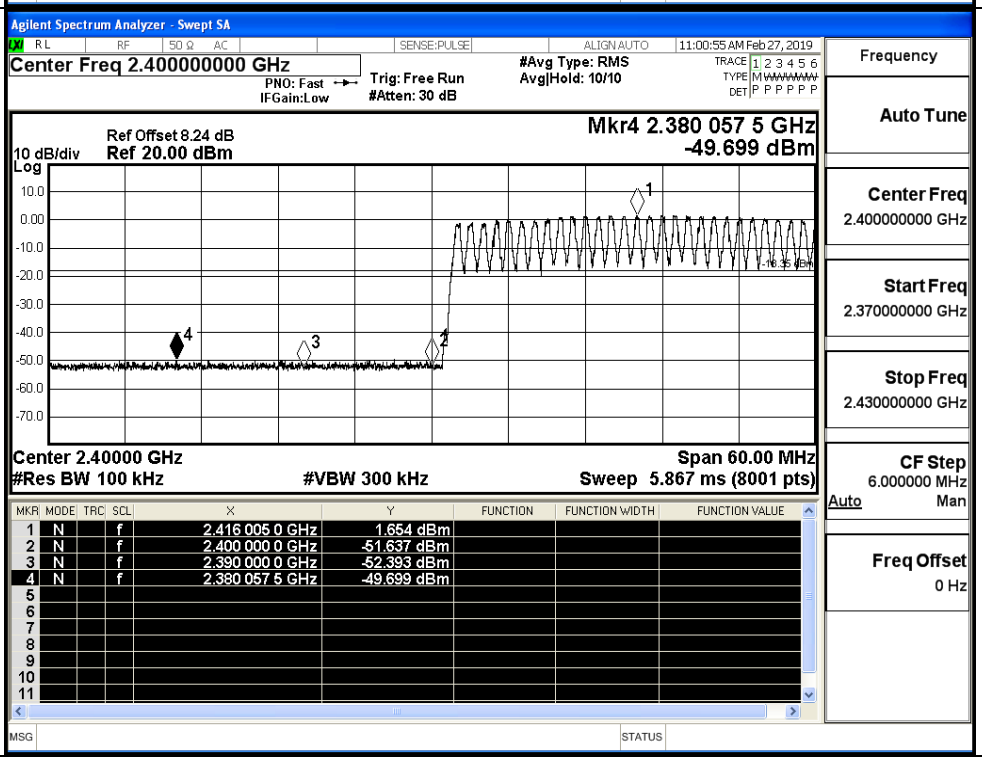
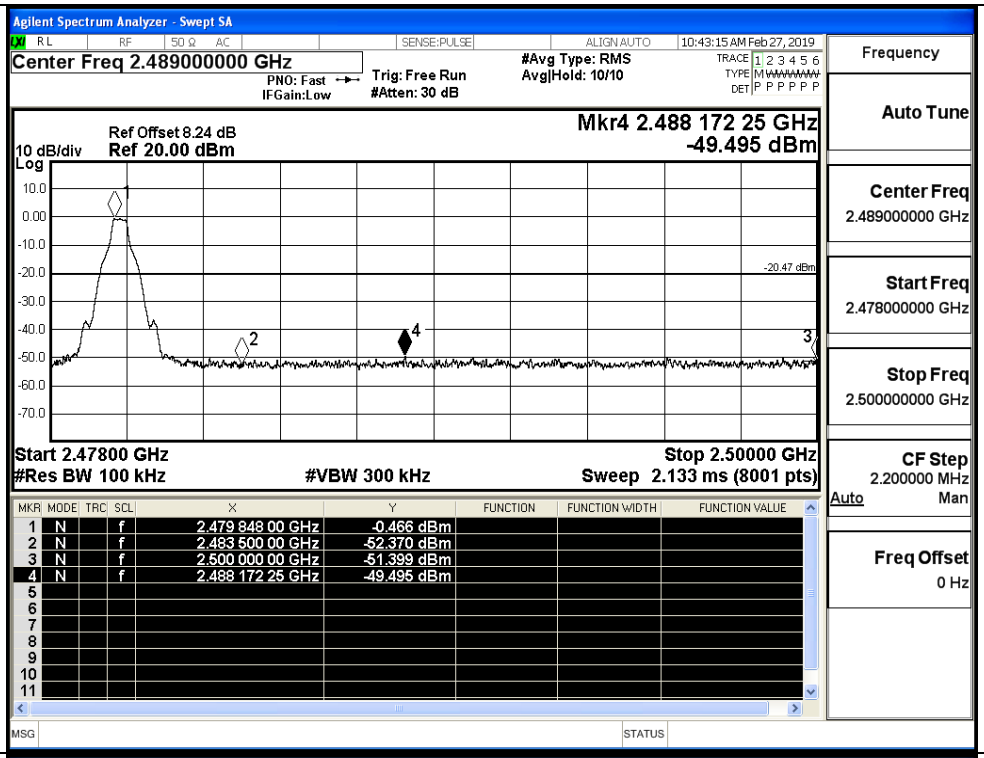
Pref			
Puw			

A.7 Band-edge for RF Conducted Emissions

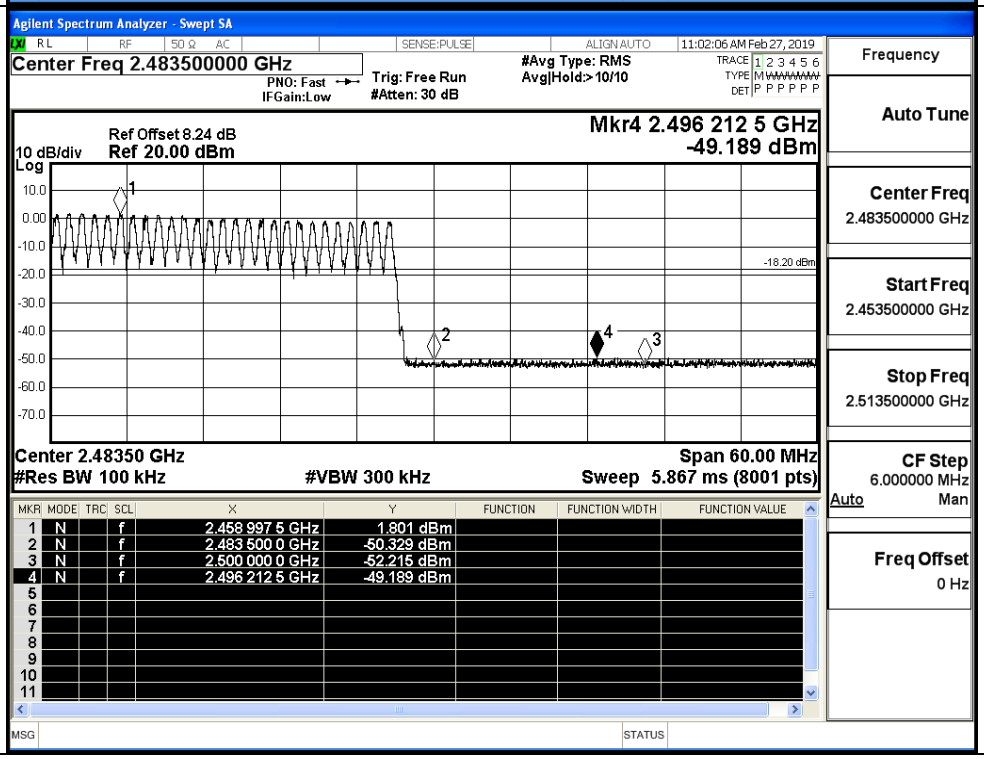
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.092	Off	-49.859	-21.09	PASS
			1.654	On	-49.699	-18.35	PASS
	HCH	2480	-0.466	Off	-49.495	-20.47	PASS
			1.801	On	-49.189	-18.2	PASS
π/4DQPSK	LCH	2402	-1.680	Off	-49.723	-21.68	PASS
			0.428	On	-49.281	-19.57	PASS
	HCH	2480	-2.008	Off	-49.970	-22.01	PASS
			0.153	On	-49.124	-19.85	PASS
8DPSK	LCH	2402	-2.206	Off	-50.137	-22.21	PASS
			0.034	On	-49.144	-19.97	PASS
	HCH	2480	-1.785	Off	-49.029	-21.79	PASS
			0.743	On	-49.171	-19.26	PASS

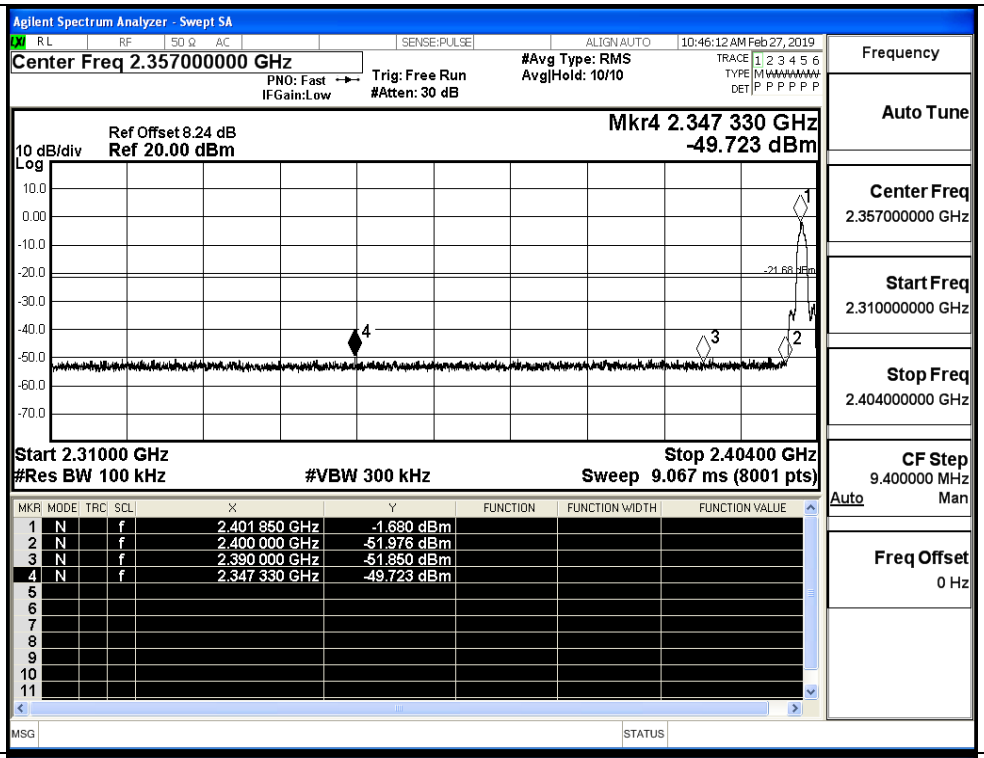
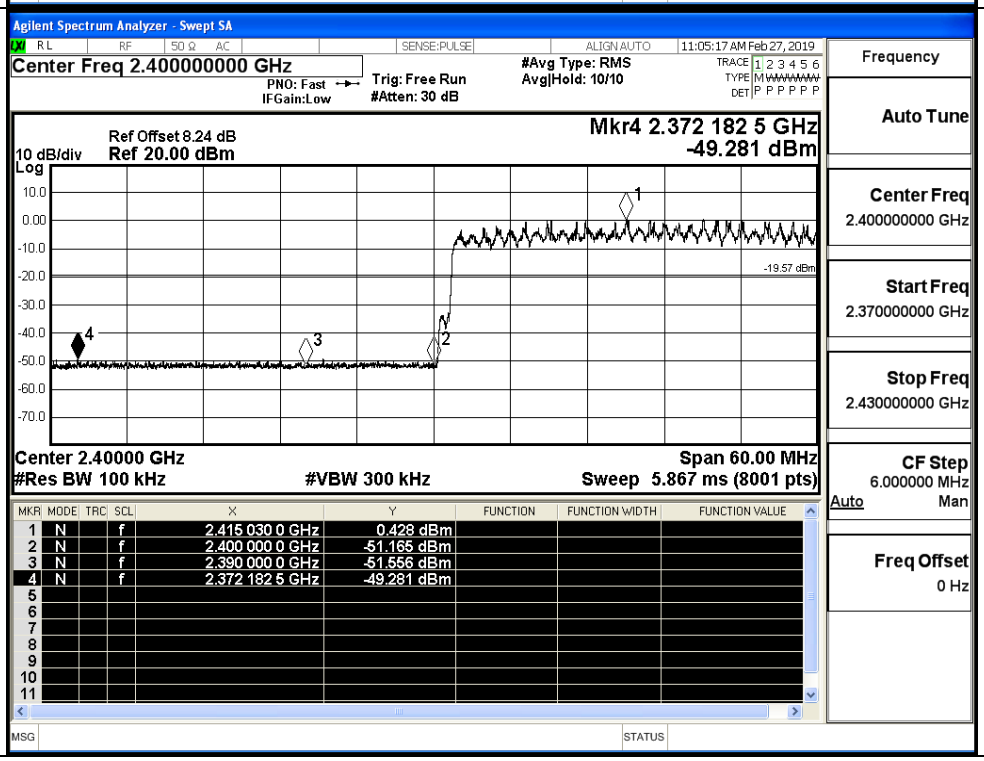
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

GFSK/HCH/No Hop

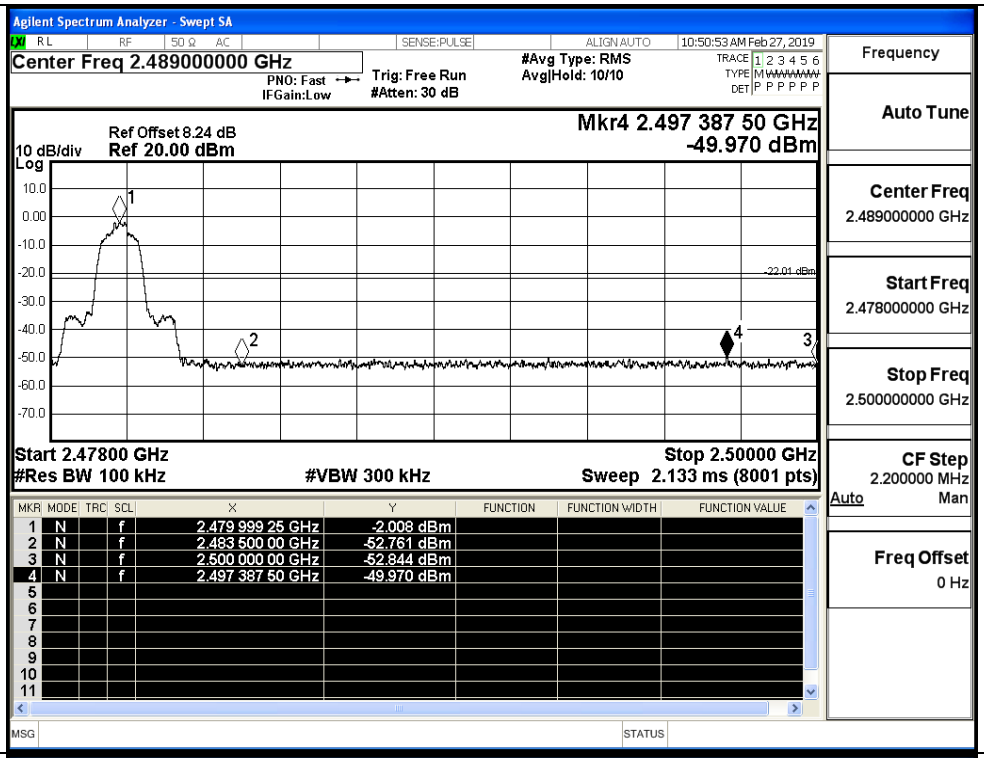


GFSK/HCH/Hop

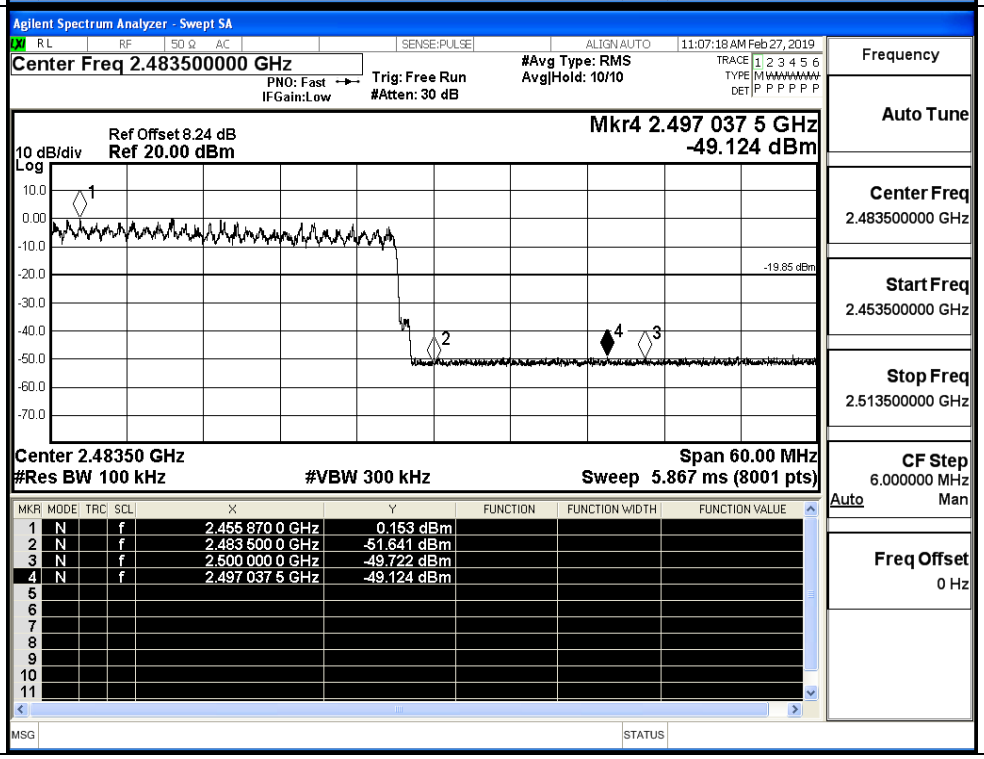


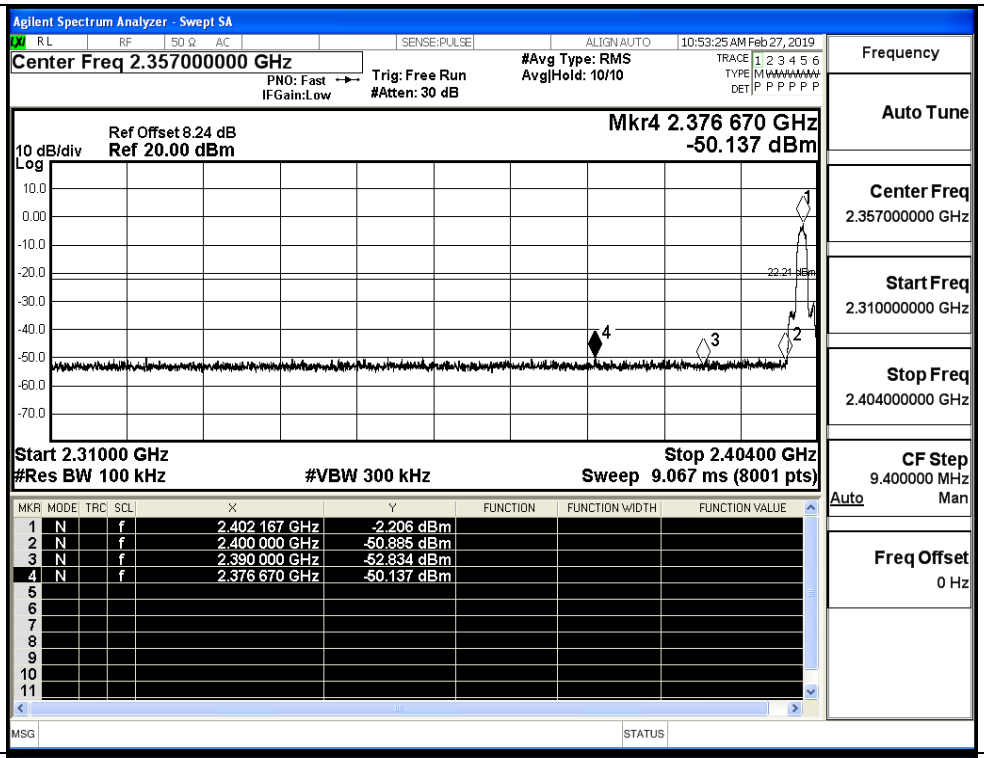
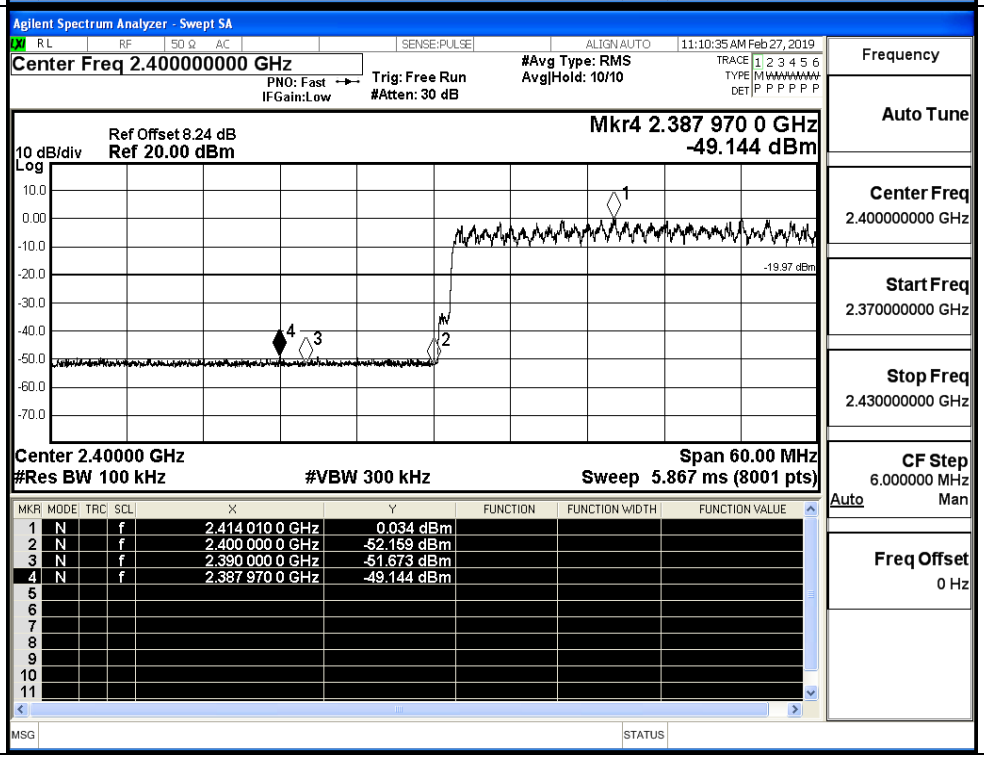
π/4DQPSK/LCH/No Hop	
π/4DQPSK/LCH/Hop	

π/4DQPSK/HCH/No Hop

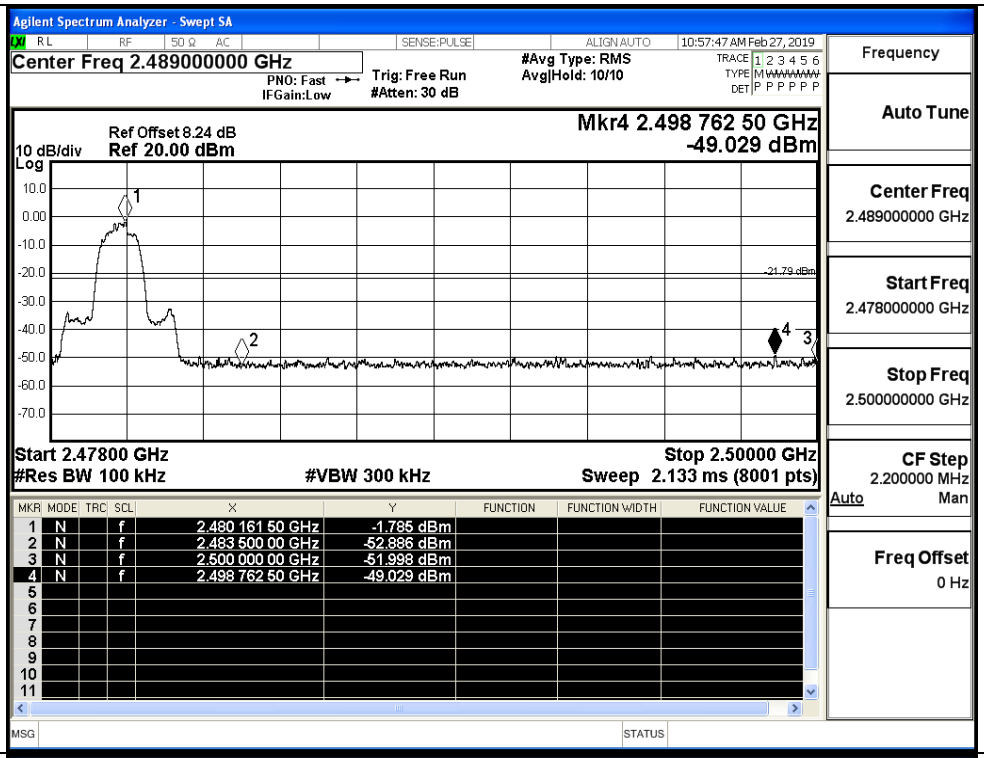


π/4DQPSK/HCH/Hop

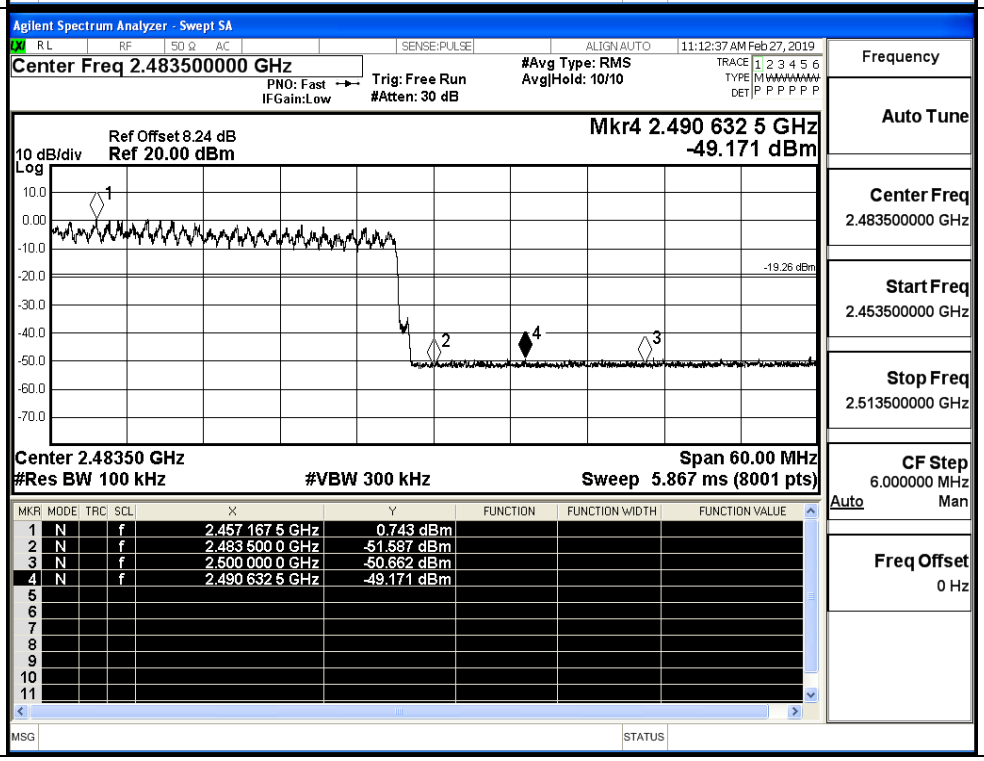


8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

8DPSK/HCH/No Hop



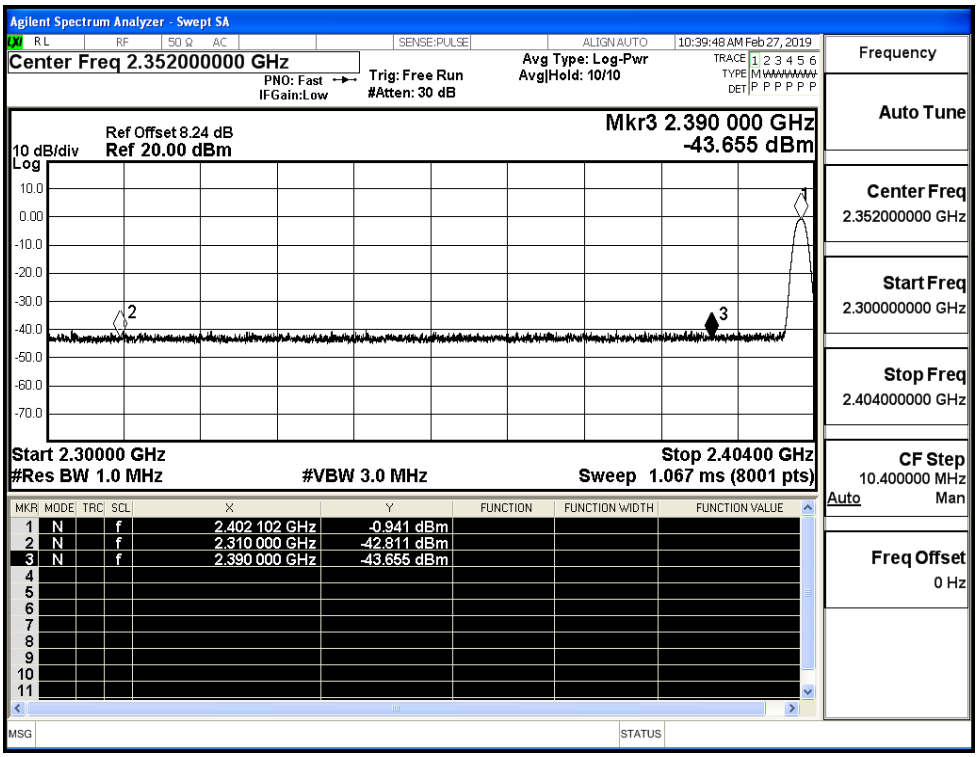
8DPSK/HCH/Hop



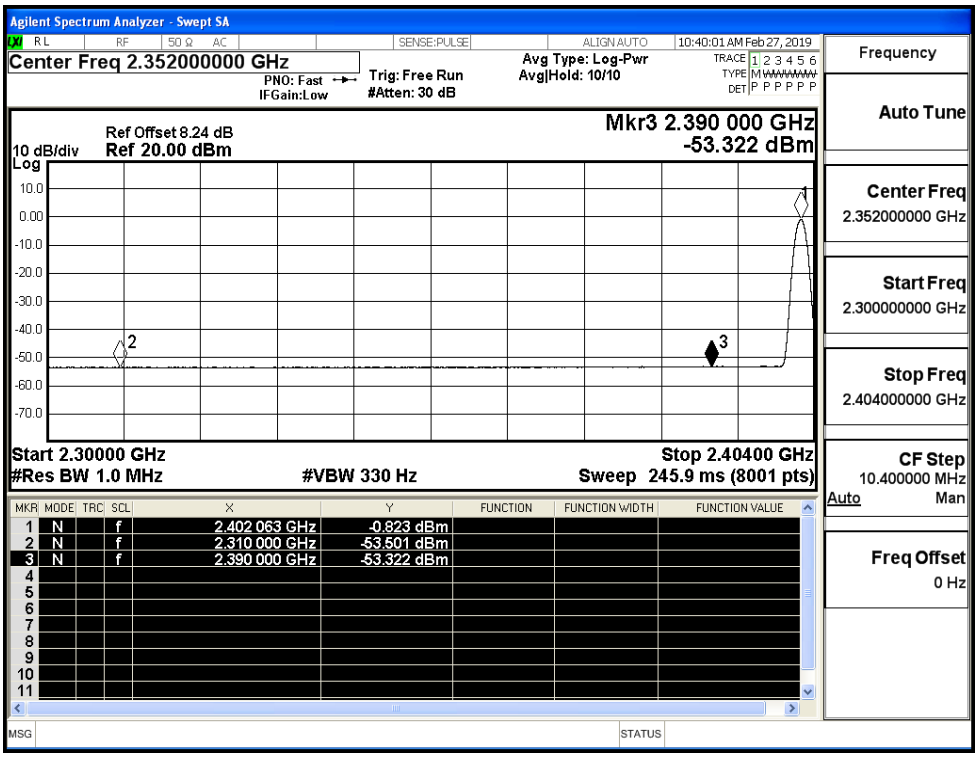
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.81	2.0	0	52.45	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	41.76	AV	54	PASS
	Off	2390.0	-43.66	2.0	0	51.60	PEAK	74	PASS
	Off	2390.0	-53.32	2.0	0	41.94	AV	54	PASS
	Off	2483.5	-43.35	2.0	0	51.91	PEAK	74	PASS
	Off	2483.5	-52.94	2.0	0	42.31	AV	54	PASS
	Off	2500.0	-43.18	2.0	0	52.07	PEAK	74	PASS
	Off	2500.0	-52.94	2.0	0	42.32	AV	54	PASS
π/4DQPSK	Off	2310.0	-43.99	2.0	0	51.27	PEAK	74	PASS
	Off	2310.0	-53.51	2.0	0	41.75	AV	54	PASS
	Off	2390.0	-44.21	2.0	0	51.05	PEAK	74	PASS
	Off	2390.0	-53.16	2.0	0	42.10	AV	54	PASS
	Off	2483.5	-42.08	2.0	0	53.18	PEAK	74	PASS
	Off	2483.5	-52.89	2.0	0	42.37	AV	54	PASS
	Off	2500.0	-41.82	2.0	0	53.44	PEAK	74	PASS
	Off	2500.0	-52.77	2.0	0	42.49	AV	54	PASS
8DPSK	Off	2310.0	-44.40	2.0	0	50.86	PEAK	74	PASS
	Off	2310.0	-53.33	2.0	0	41.93	AV	54	PASS
	Off	2390.0	-41.36	2.0	0	53.90	PEAK	74	PASS
	Off	2390.0	-53.38	2.0	0	41.88	AV	54	PASS
	Off	2483.5	-42.95	2.0	0	52.31	PEAK	74	PASS
	Off	2483.5	-53.00	2.0	0	42.26	AV	54	PASS
	Off	2500.0	-40.75	2.0	0	54.51	PEAK	74	PASS
	Off	2500.0	-52.83	2.0	0	42.43	AV	54	PASS

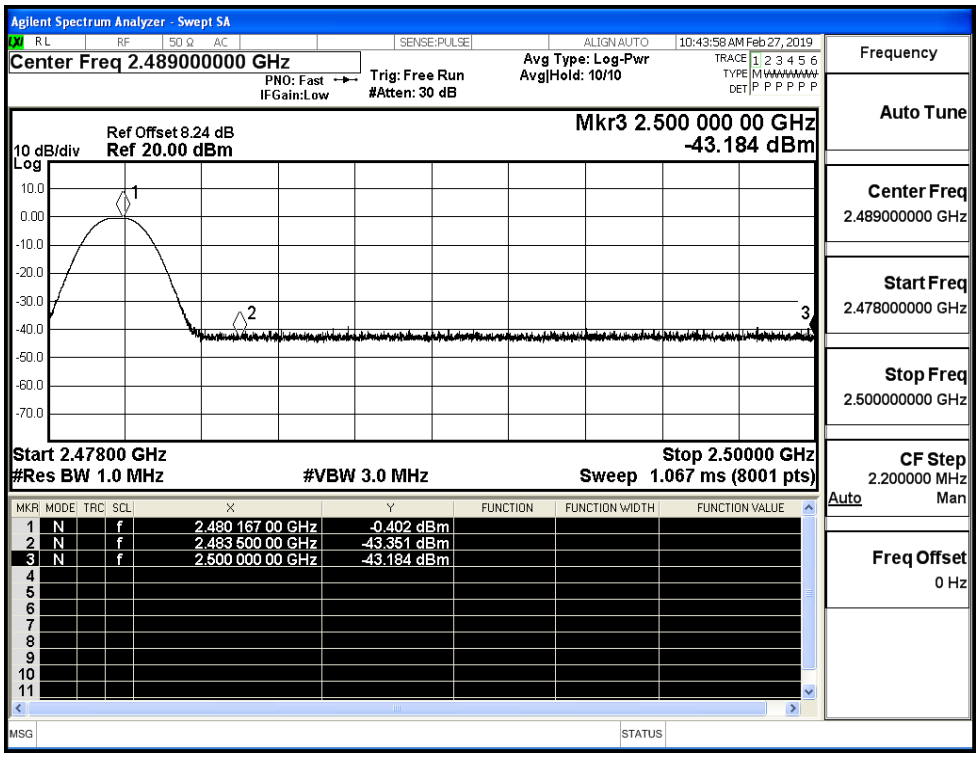
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



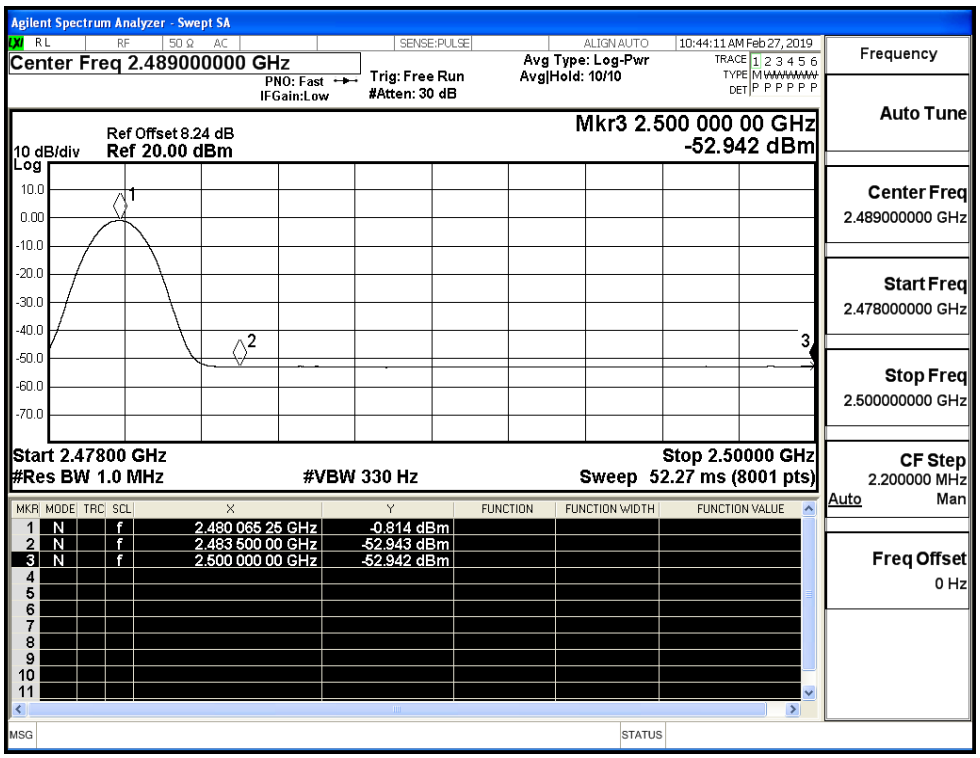
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



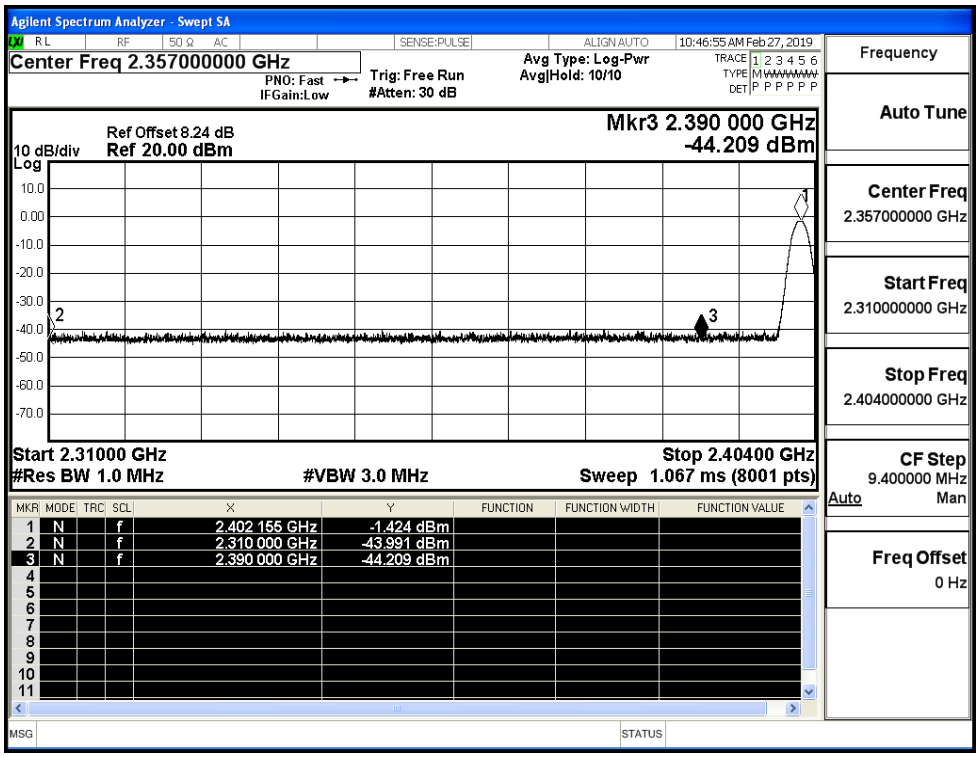
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



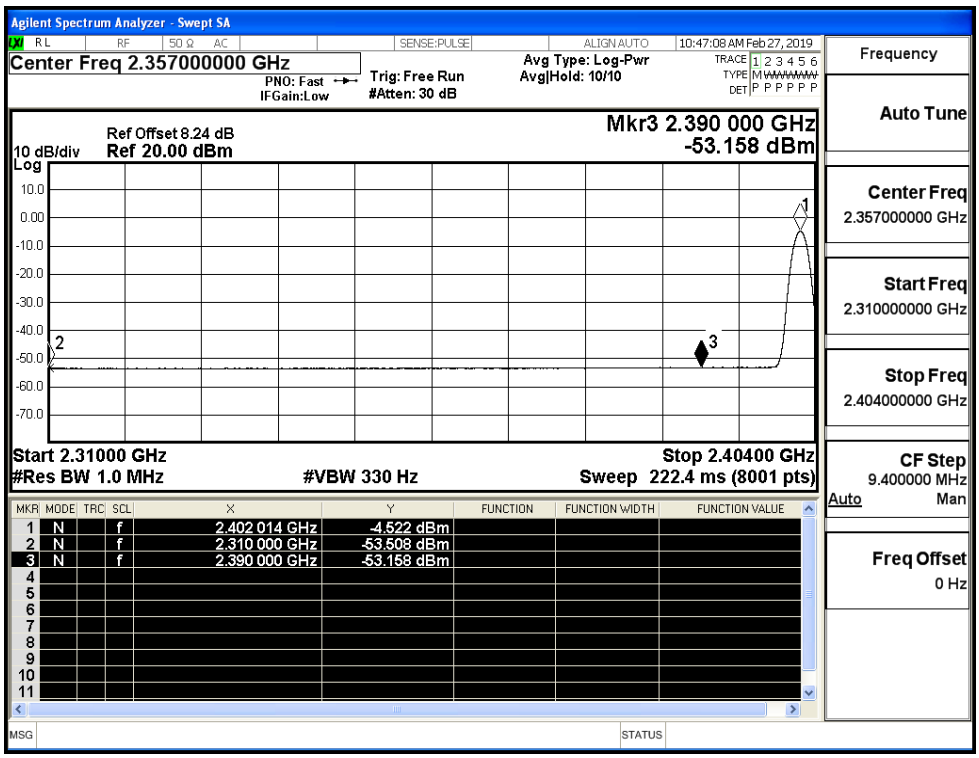
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



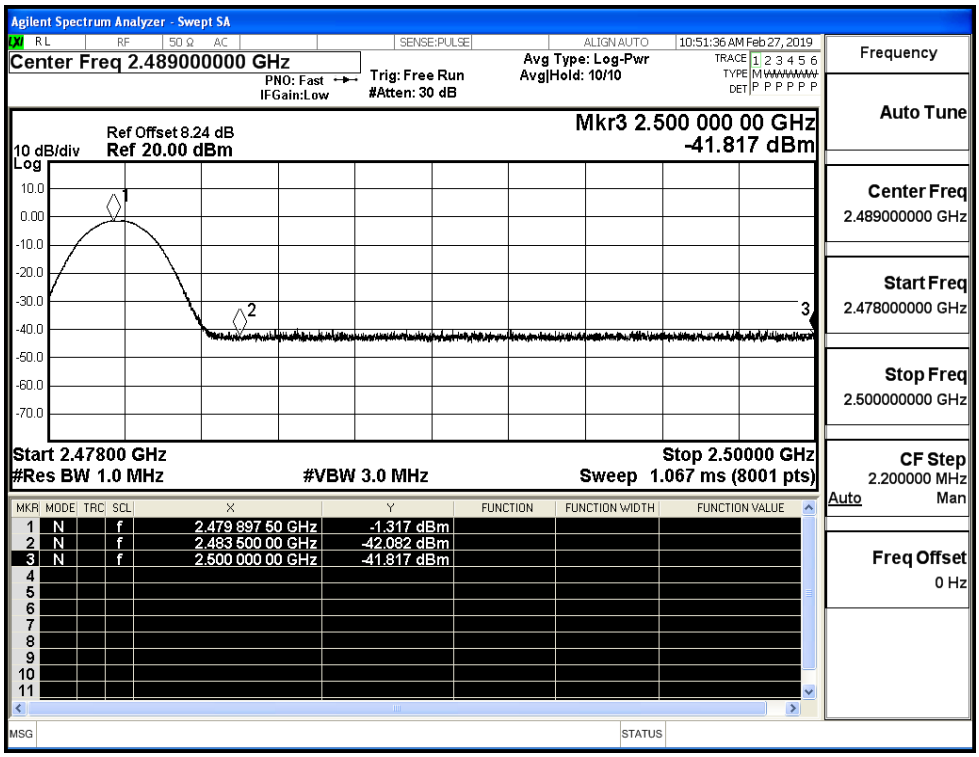
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



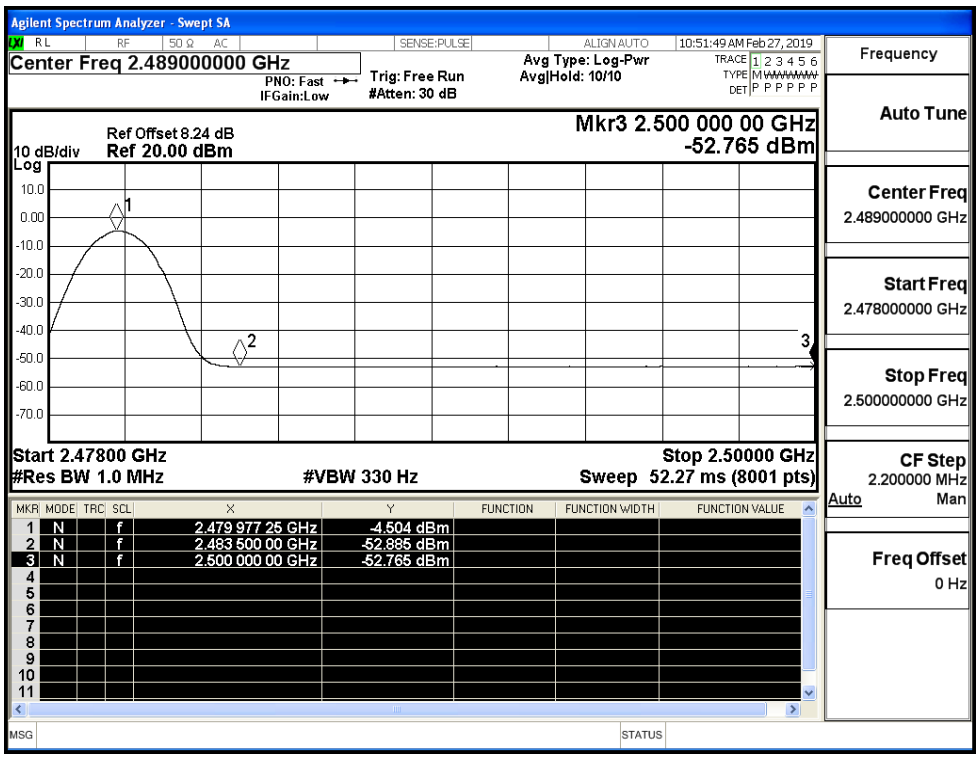
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



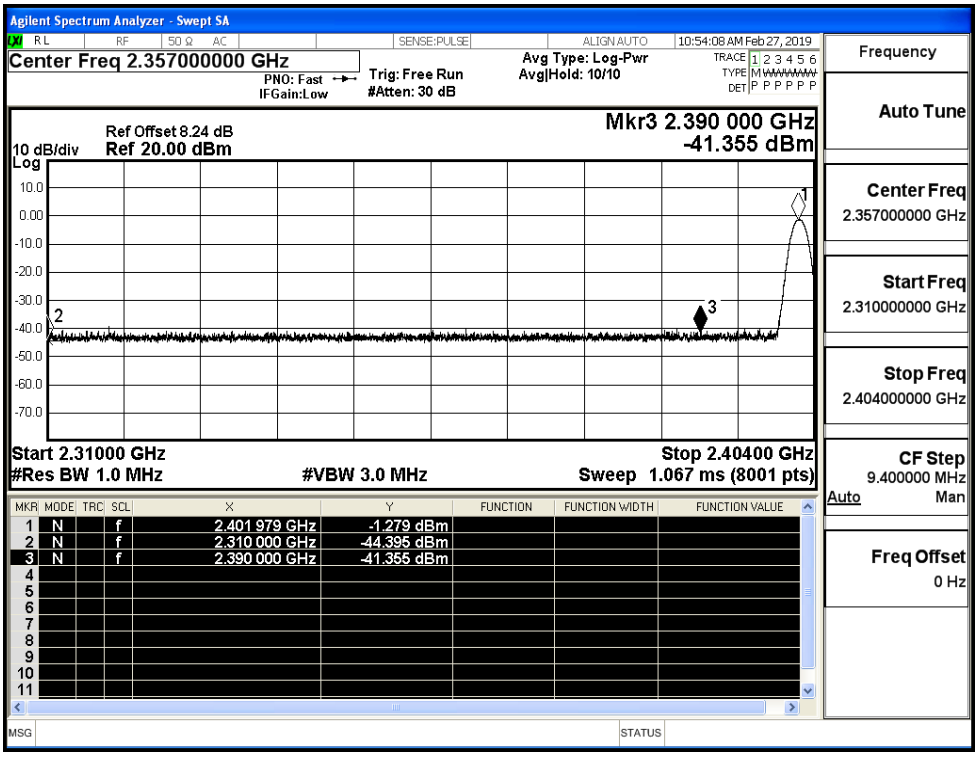
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



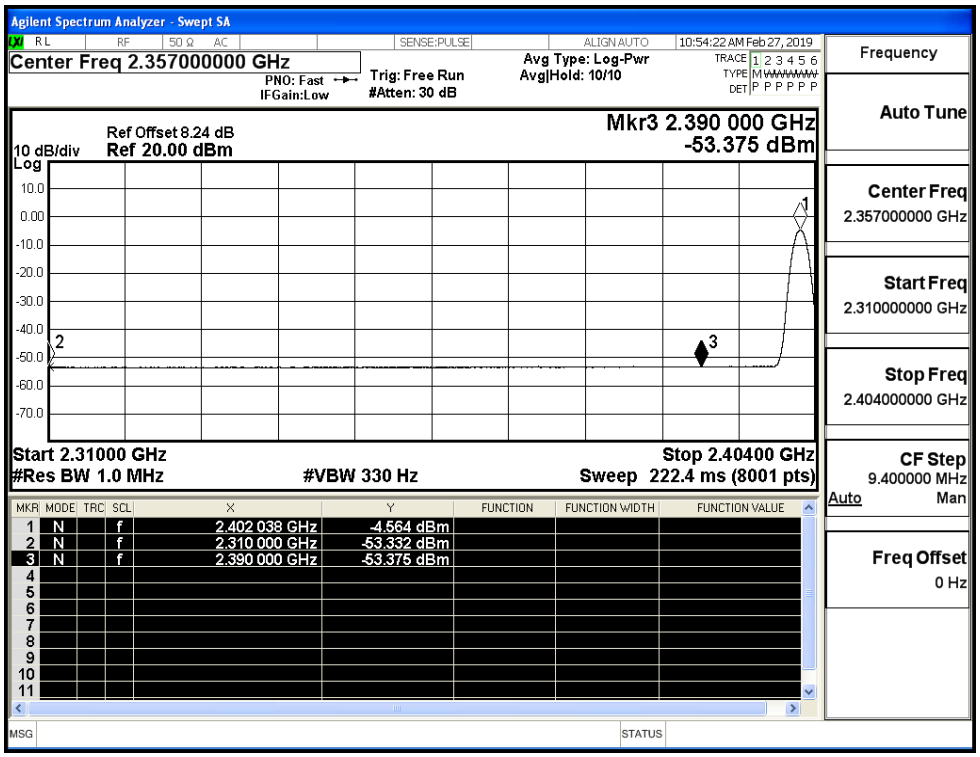
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



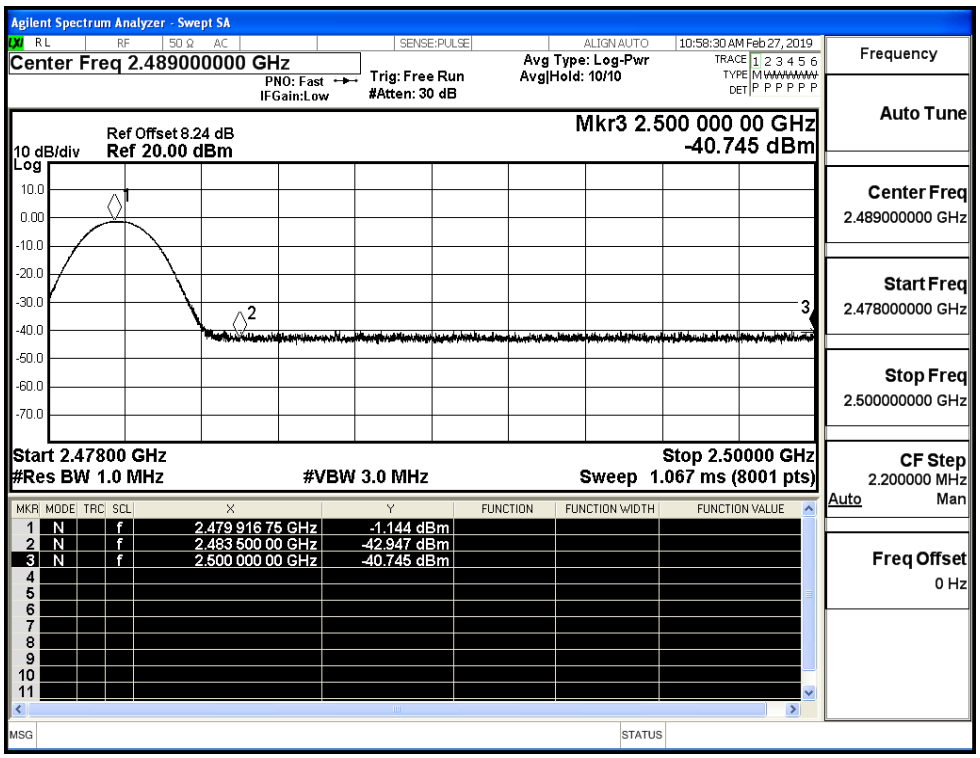
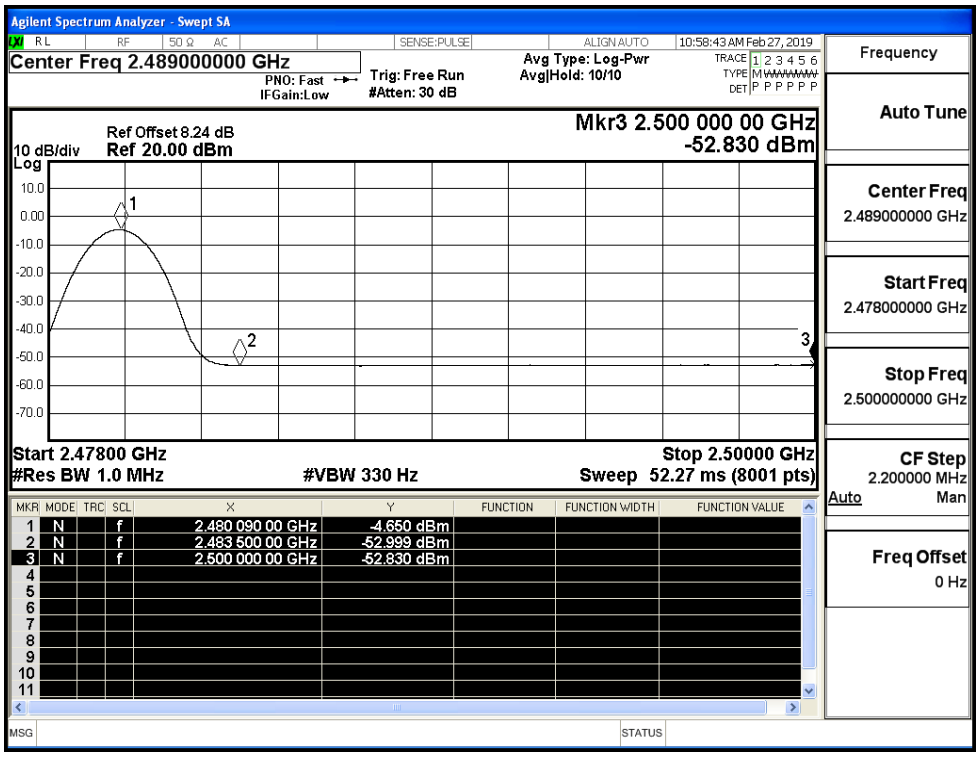
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)