Appendix A

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

Product Name: TWS headphones

Trade Mark: SmartPods

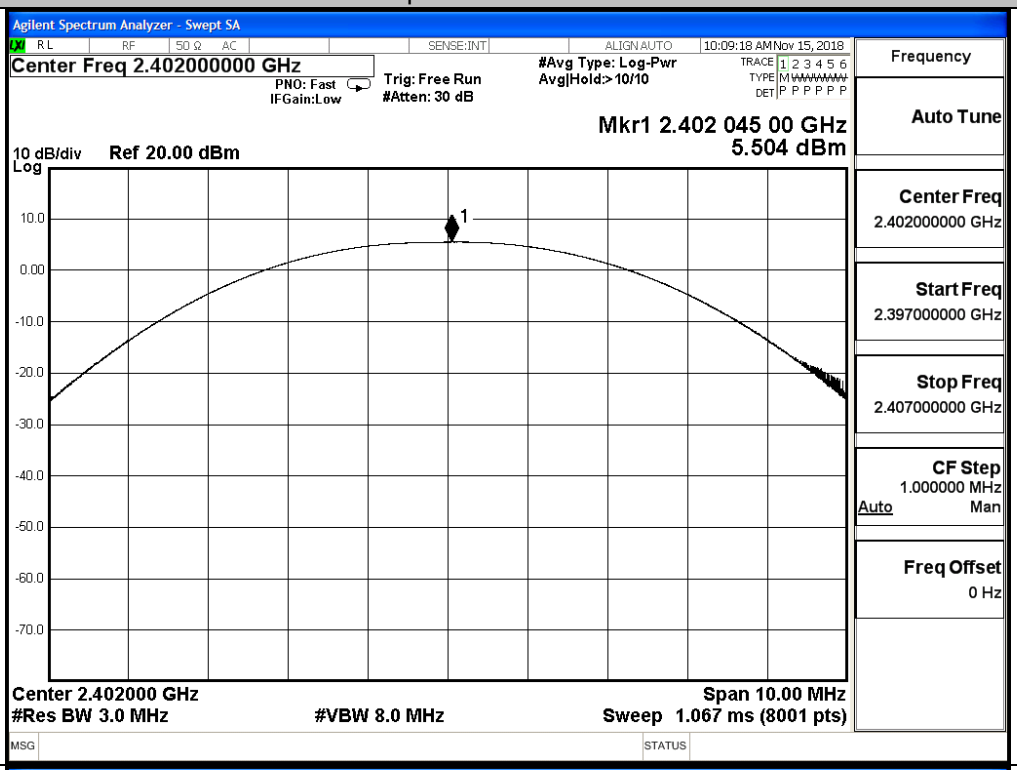
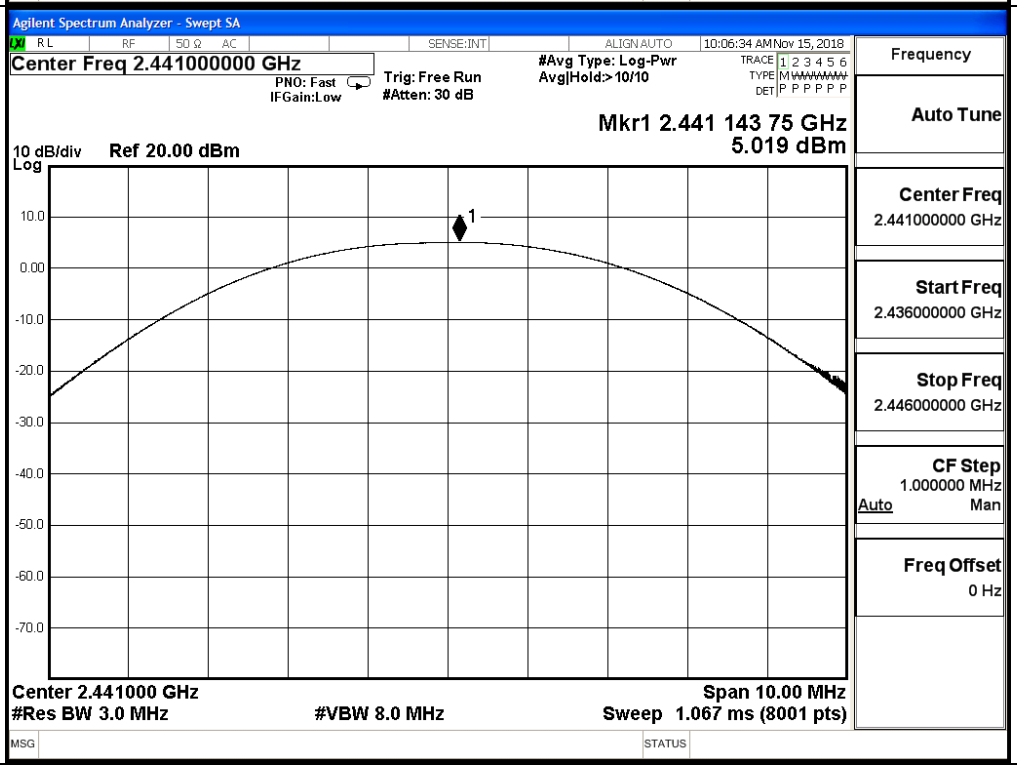
Test Model: SmartPods

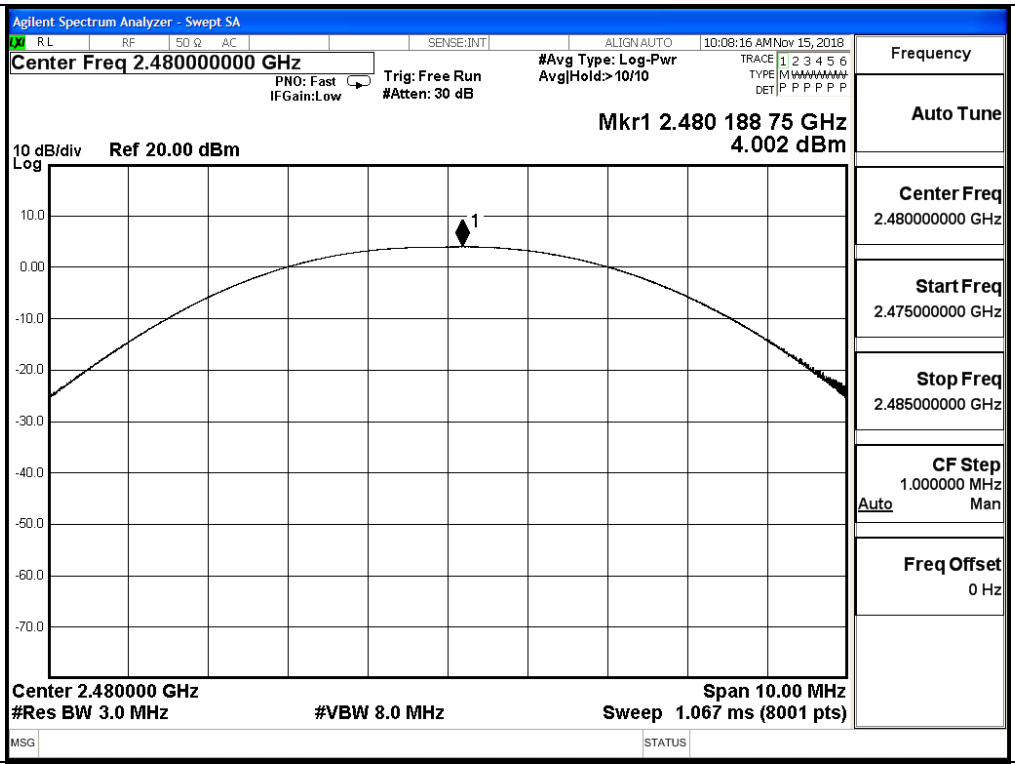
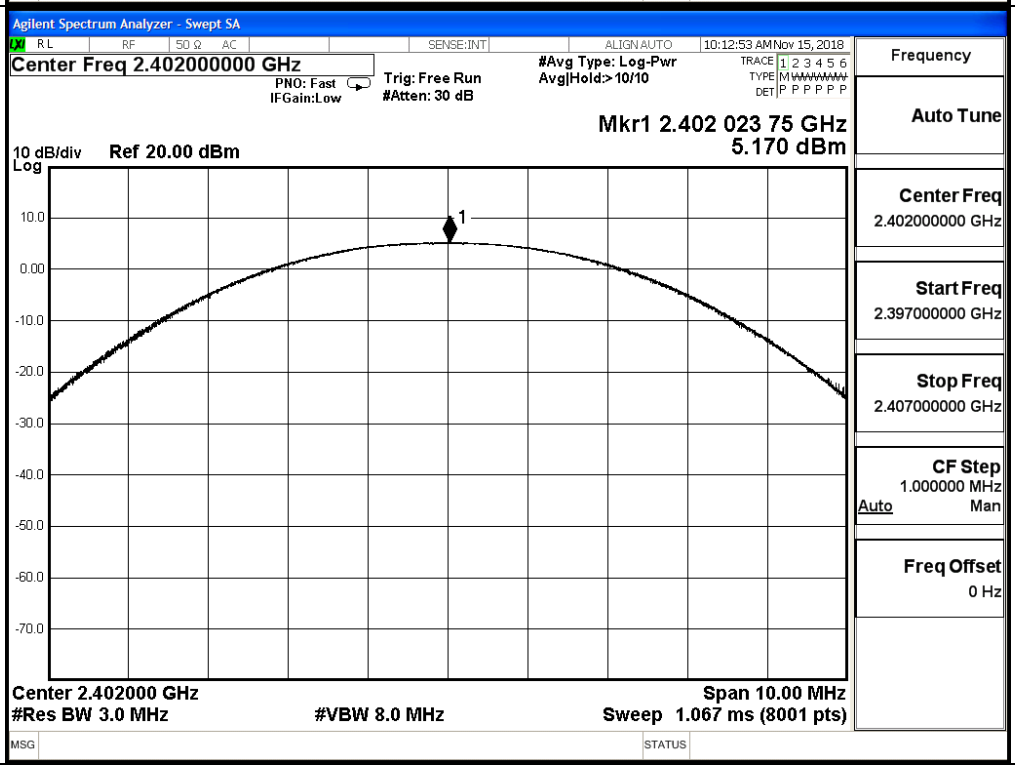
Environmental Conditions

Temperature:	23.5 °C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

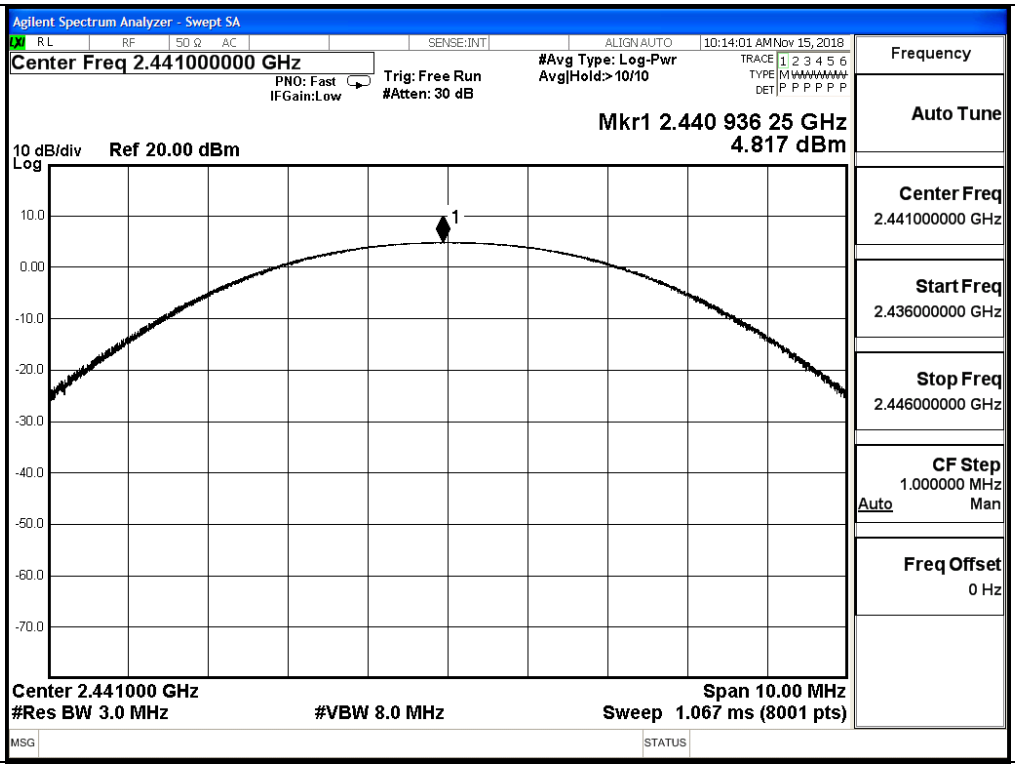
A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	5.504	21	PASS
	MCH	5.019	21	PASS
	HCH	4.002	21	PASS
π/4DQPSK	LCH	5.170	21	PASS
	MCH	4.817	21	PASS
	HCH	4.004	21	PASS
8DPSK	LCH	5.431	21	PASS
	MCH	5.093	21	PASS
	HCH	4.087	21	PASS

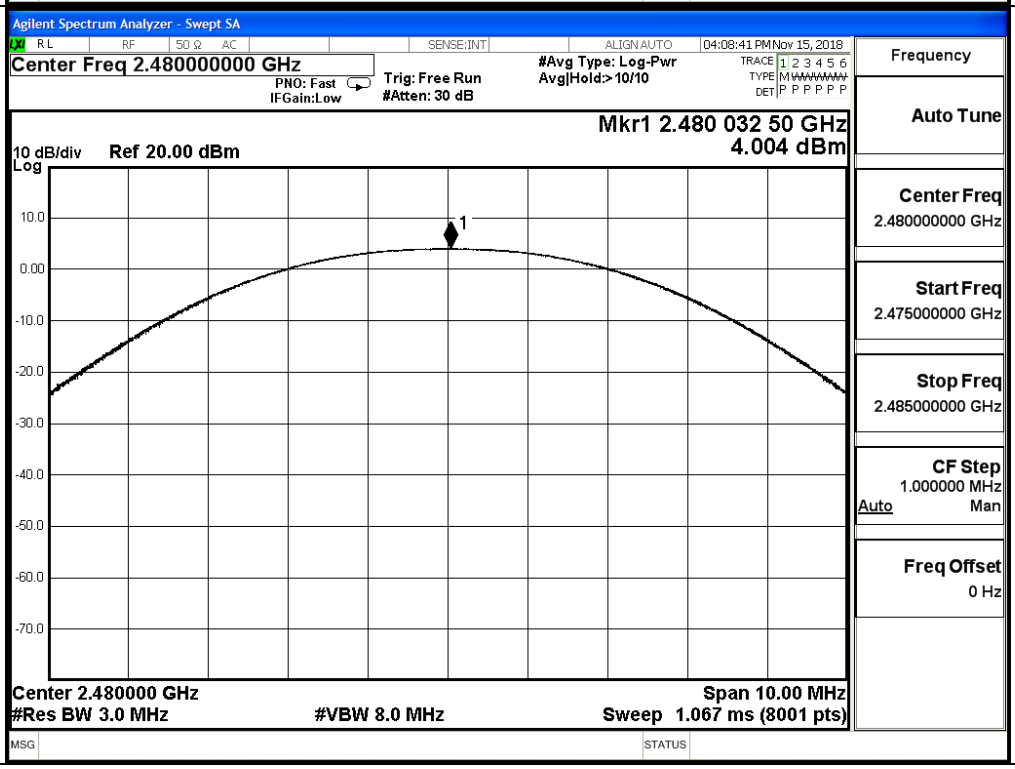
Test Graphs	
GFSK/LCH	
GFSK/MCH	

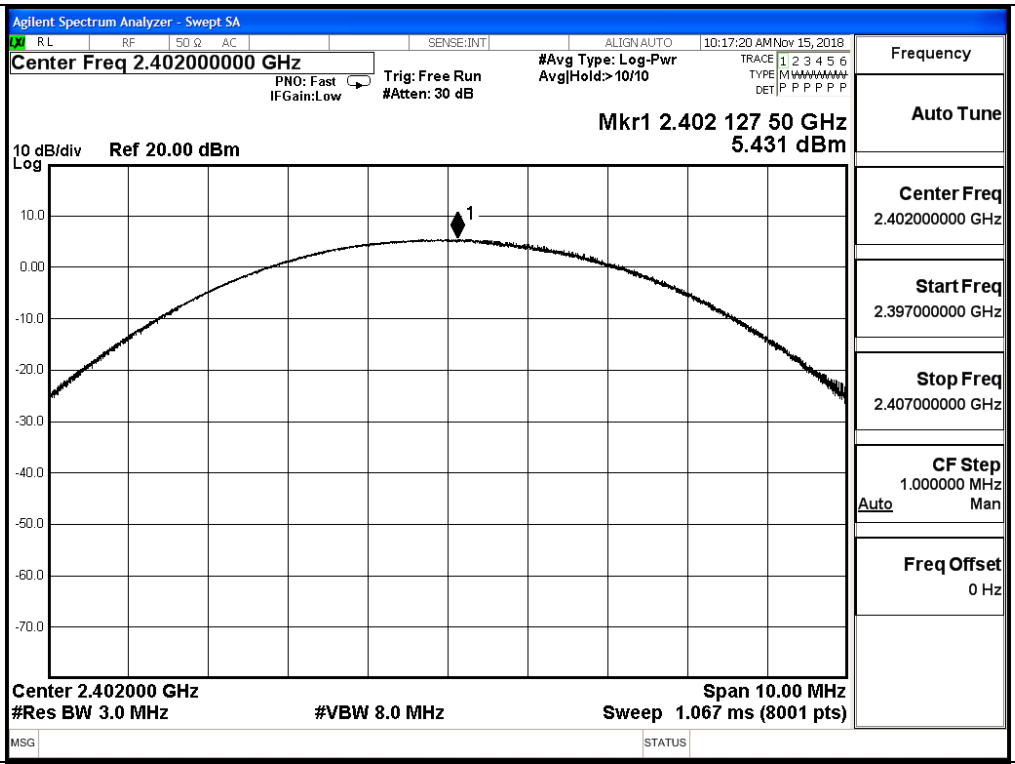
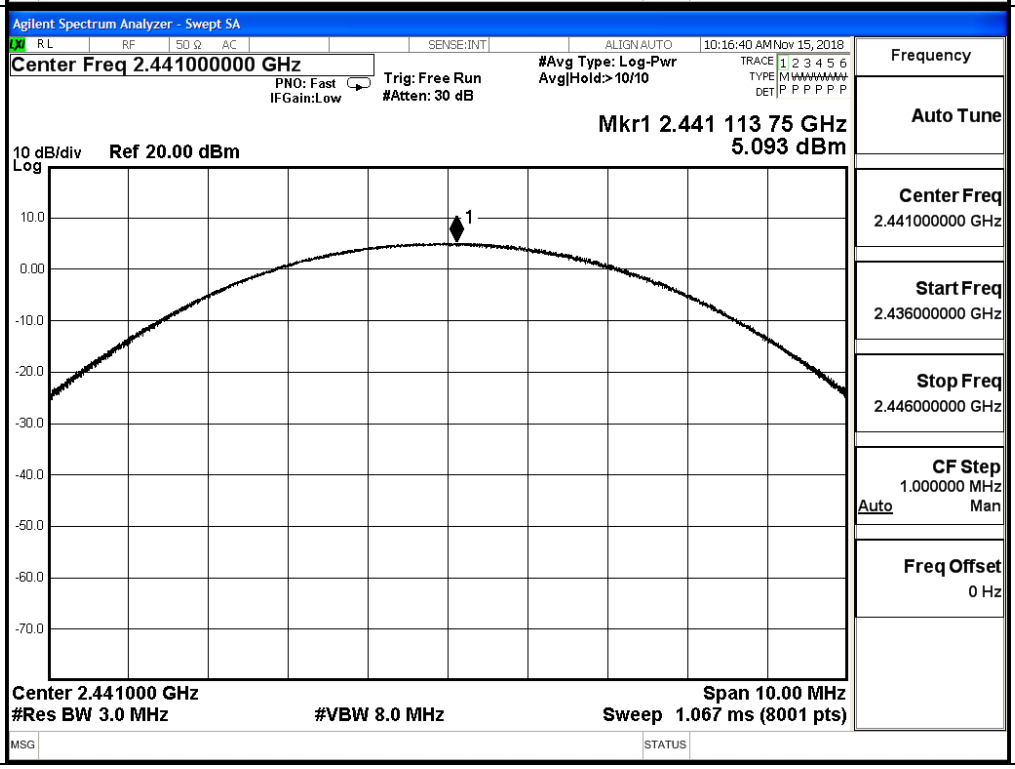
GFSK/HCH	
π/4DQPSK/LCH	

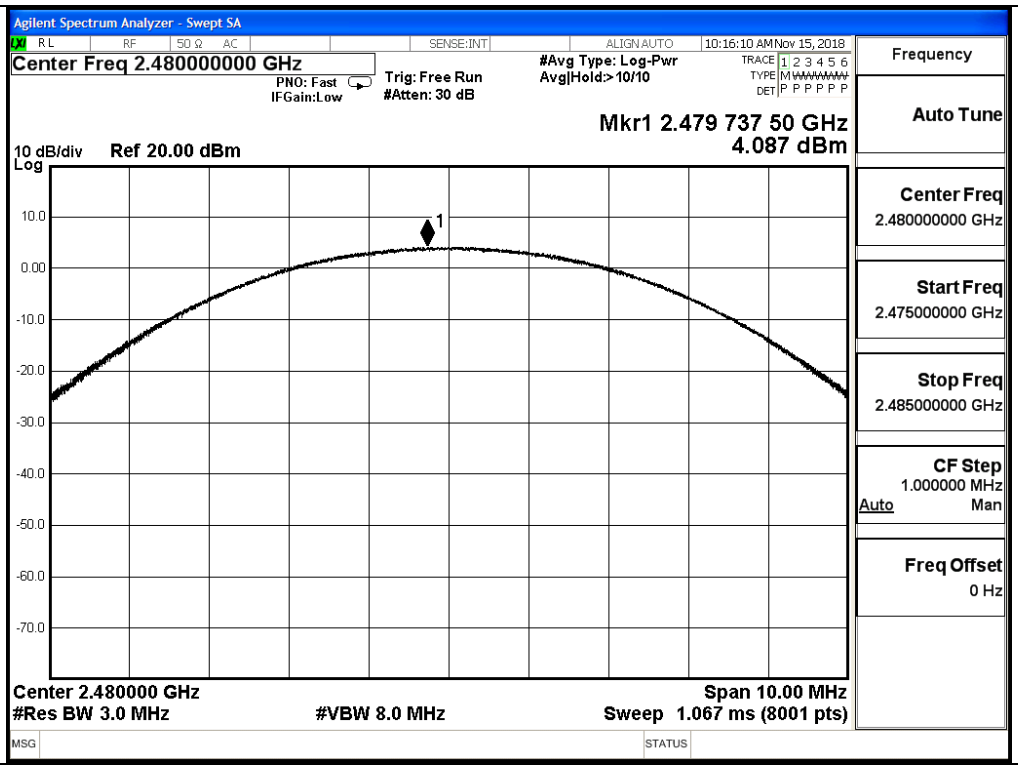
π/4DQPSK/MCH



π/4DQPSK/HCH



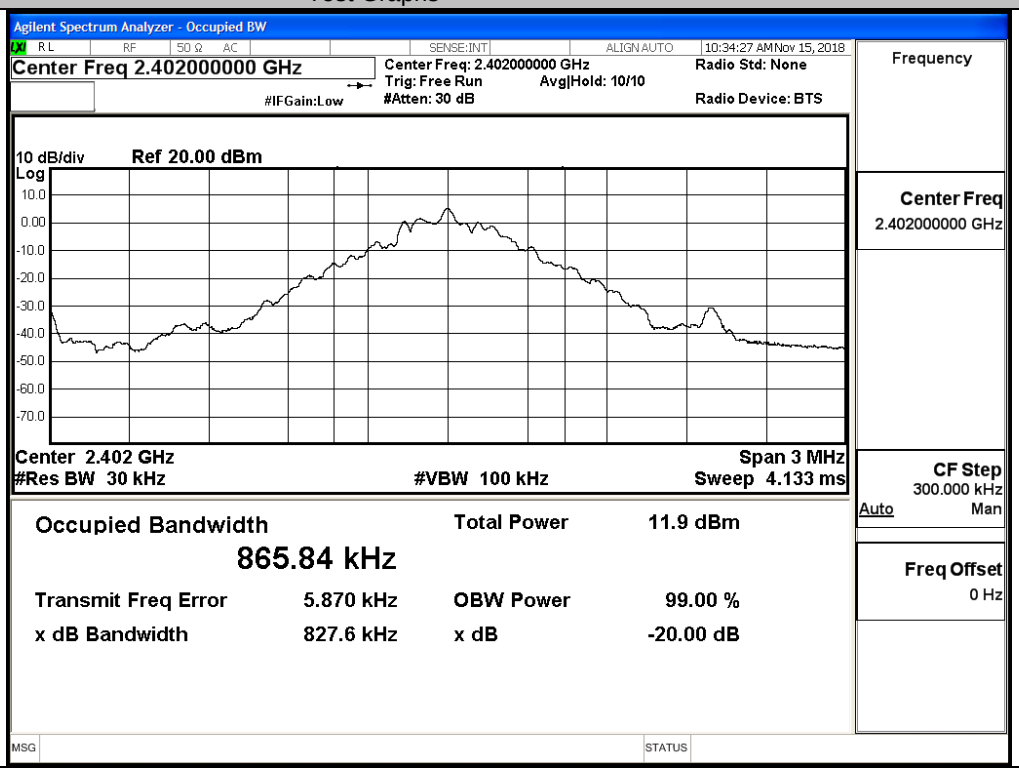
8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH	

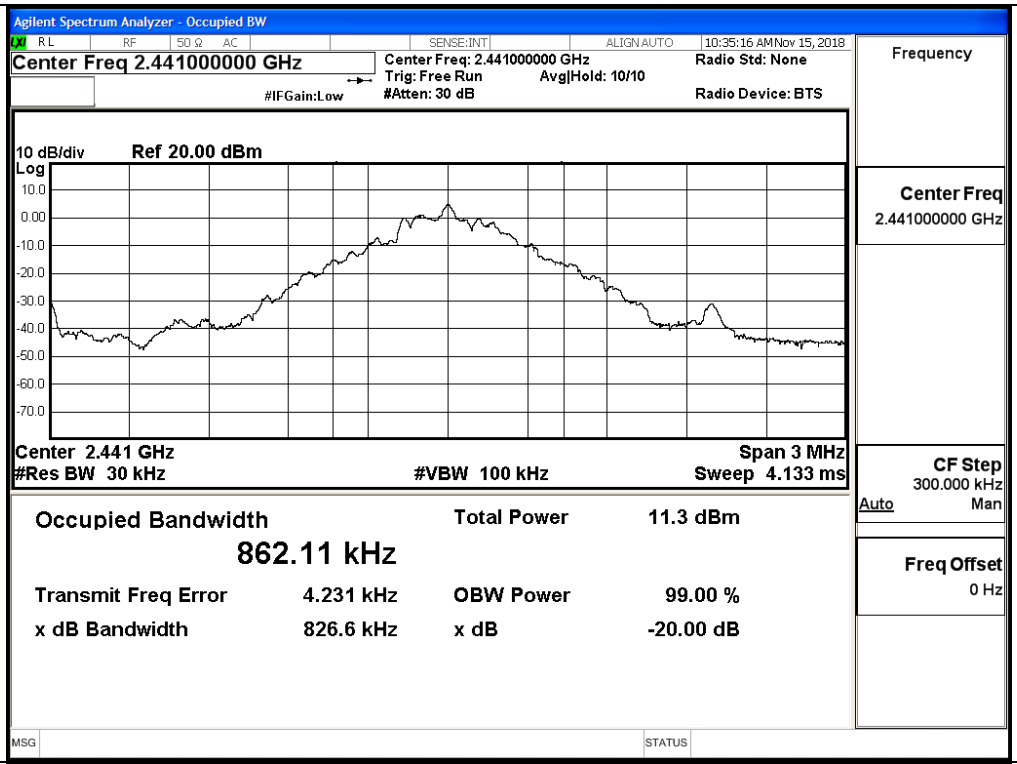
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: Log-Pwr
Avg|Hold:>10/10
10:16:10 AM Nov 15, 2018
Mkr1 2.479 737 50 GHz
4.087 dBm
10 dB/div Ref 20.00 dBm
Log
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 10.00 MHz
Sweep 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 99% and 20dB Bandwidth

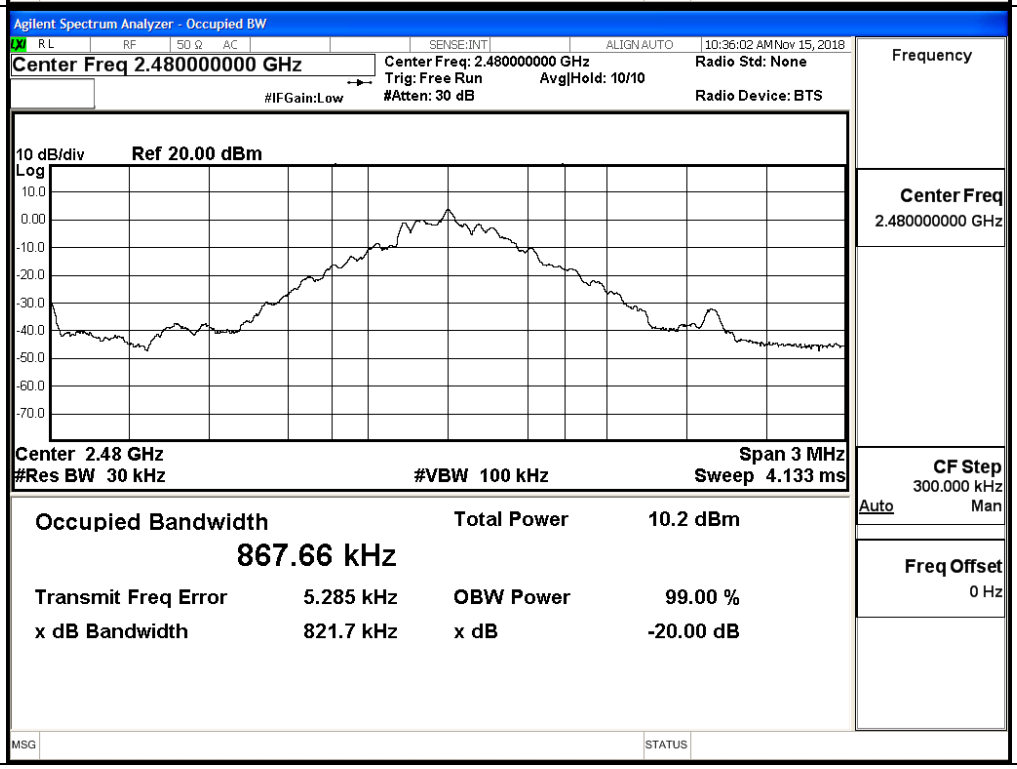
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.86584	0.8276	Not Specified	PASS
	MCH	0.86211	0.8266	Not Specified	PASS
	HCH	0.86766	0.8217	Not Specified	PASS
π/4DQPSK	LCH	1.1745	1.229	Not Specified	PASS
	MCH	1.1763	1.230	Not Specified	PASS
	HCH	1.1791	1.226	Not Specified	PASS
8DPSK	LCH	1.1546	1.206	Not Specified	PASS
	MCH	1.1573	1.208	Not Specified	PASS
	HCH	1.1631	1.212	Not Specified	PASS

Test Graphs	
GFSK/LCH	

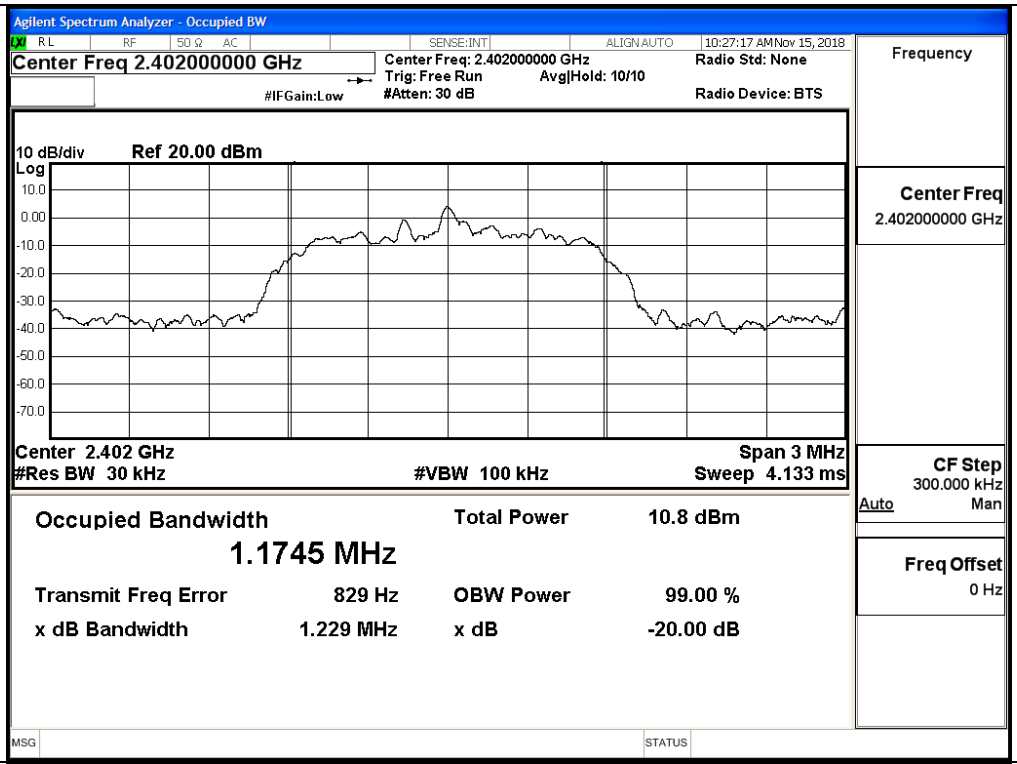
GFSK/MCH



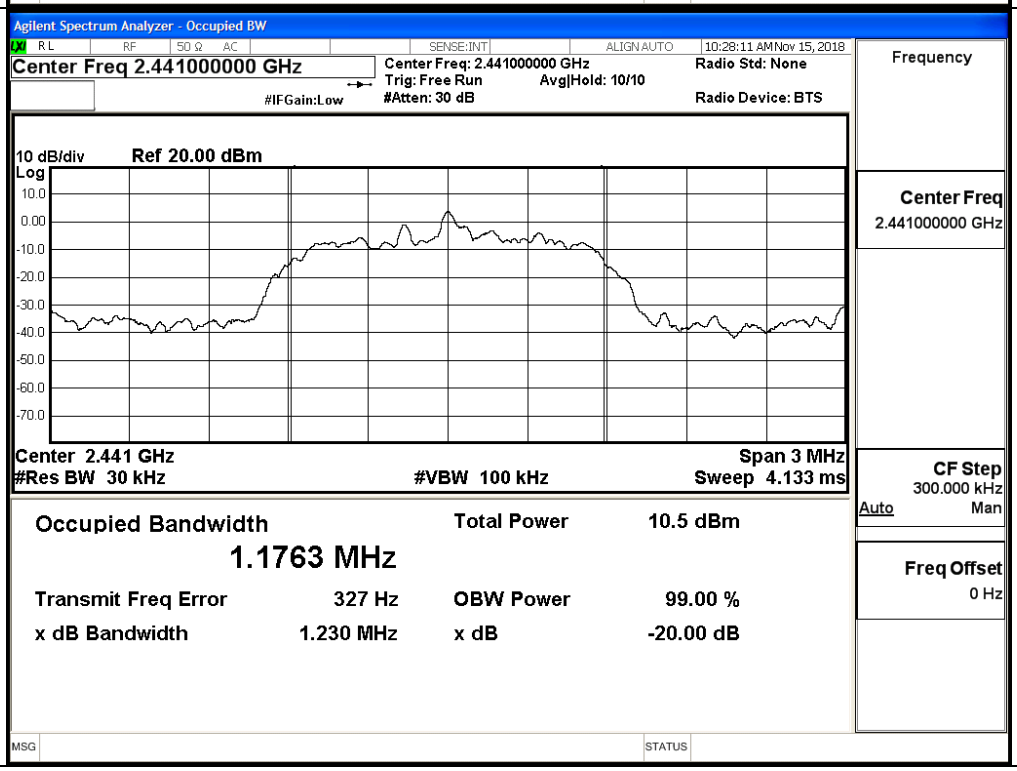
GFSK/HCH



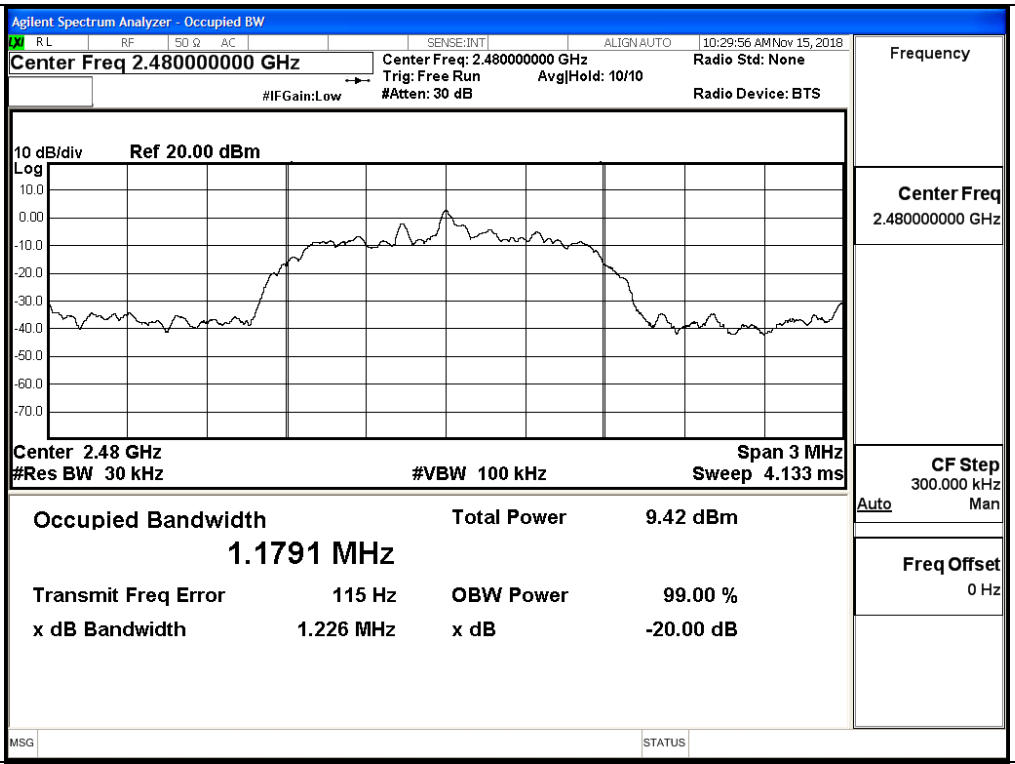
π/4DQPSK/LCH



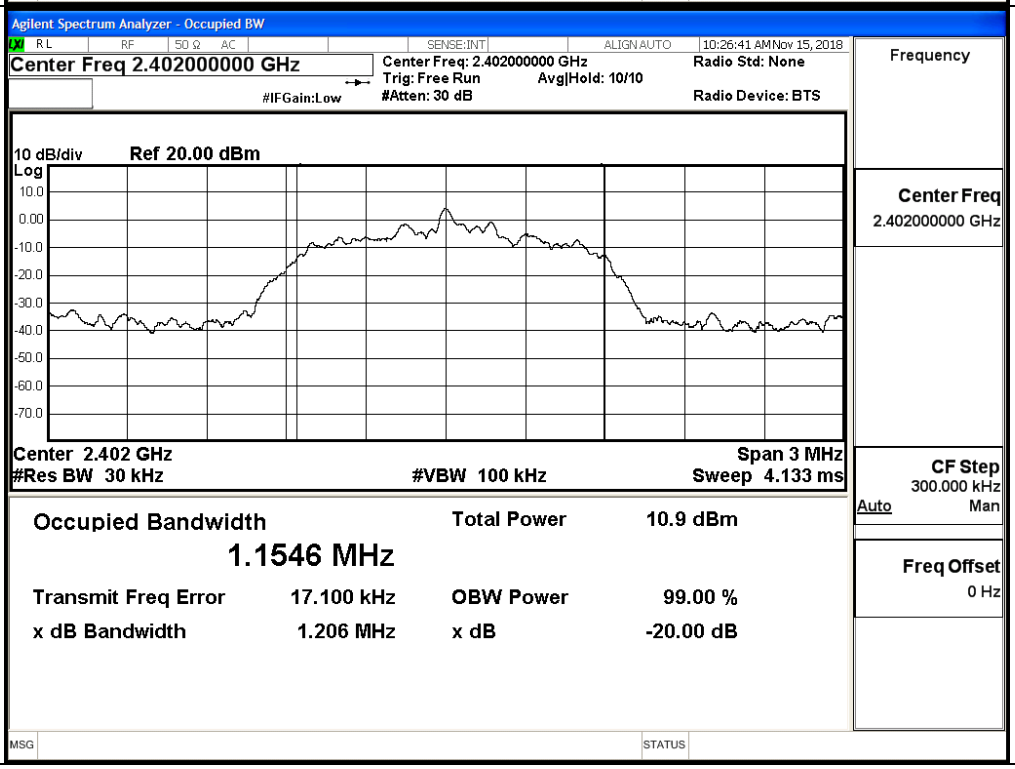
π/4DQPSK/MCH



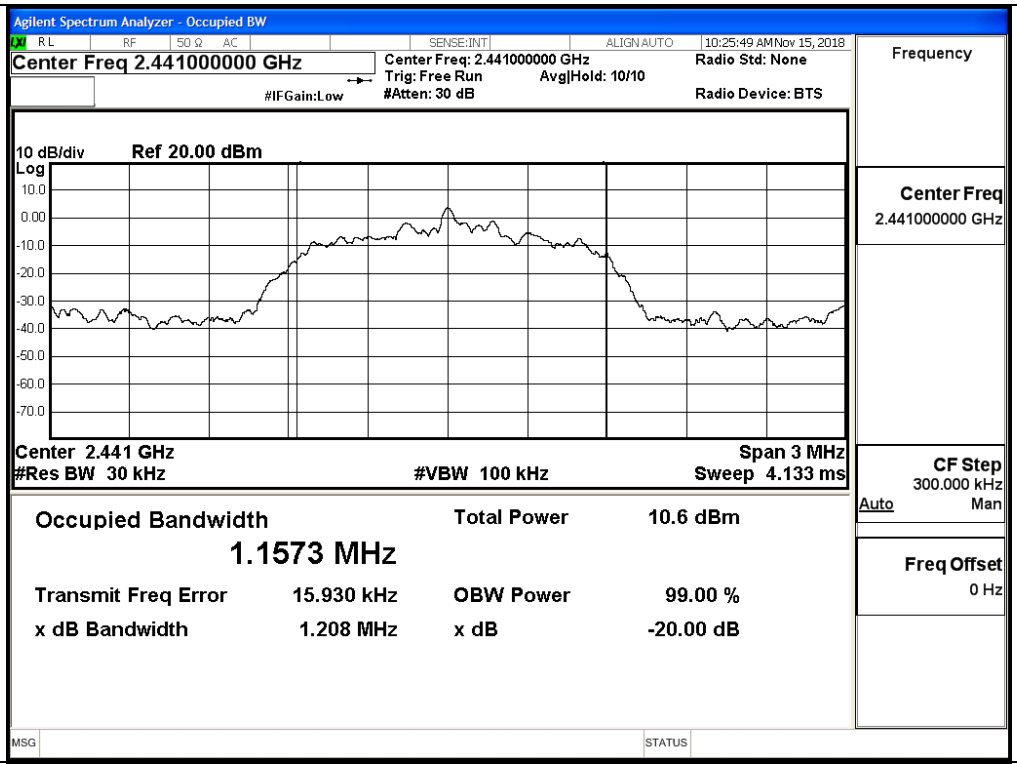
π/4DQPSK/HCH



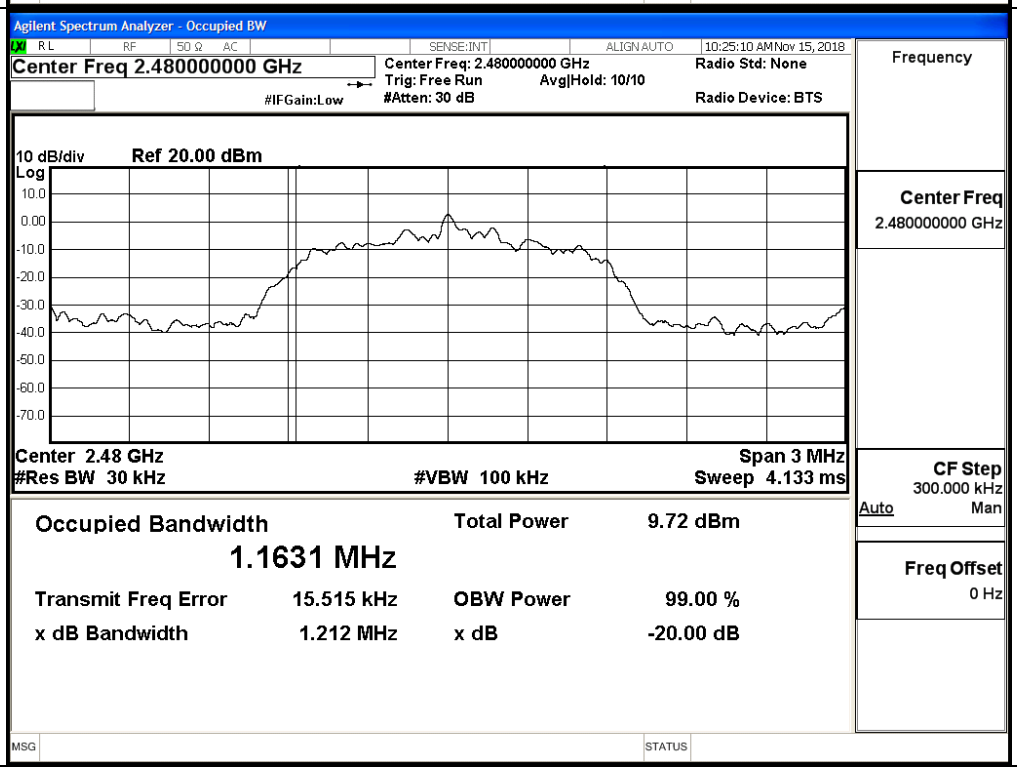
8DPSK/LCH



8DPSK/MCH

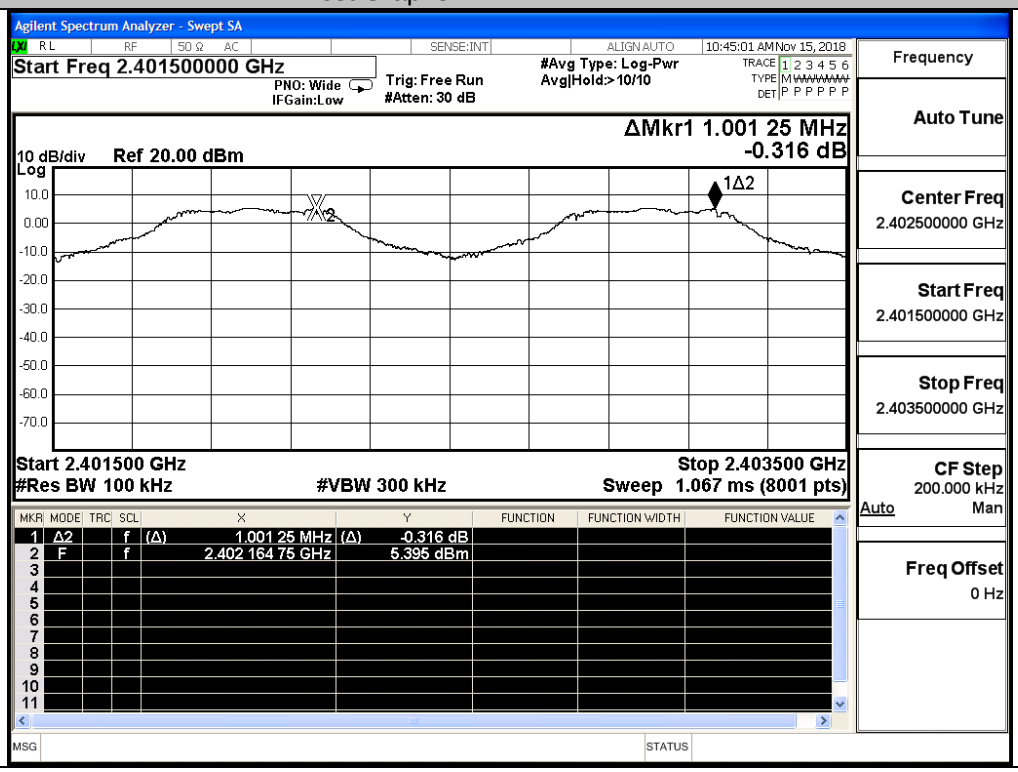


8DPSK/HCH

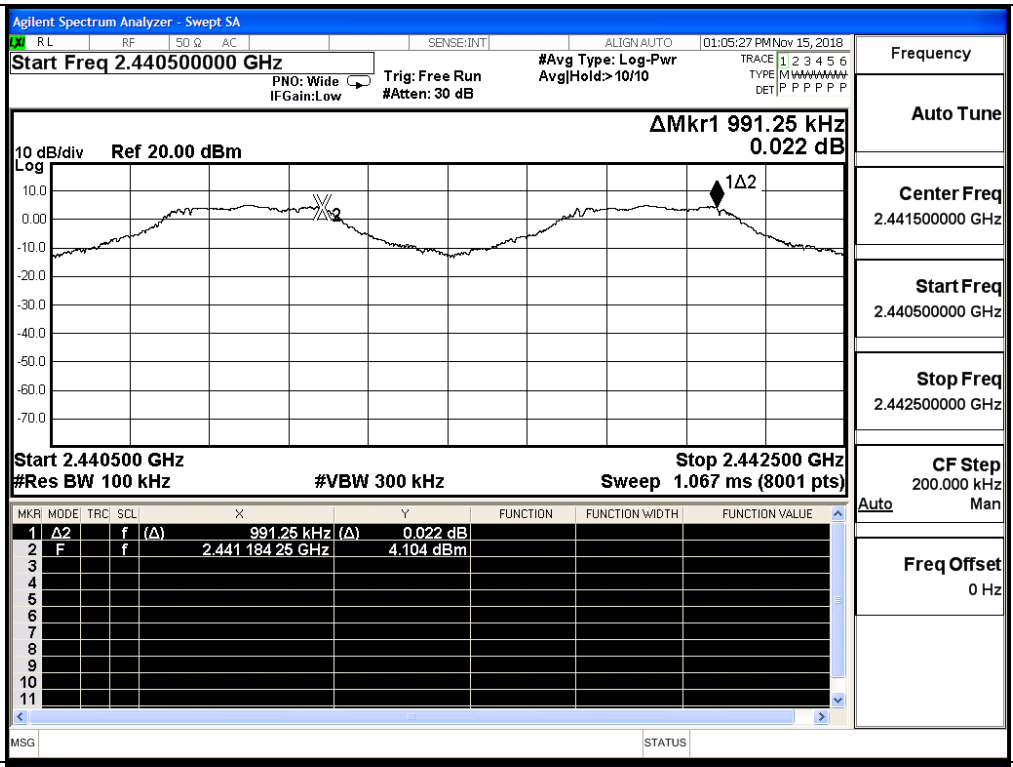


A.3 Carrier Frequency Separation

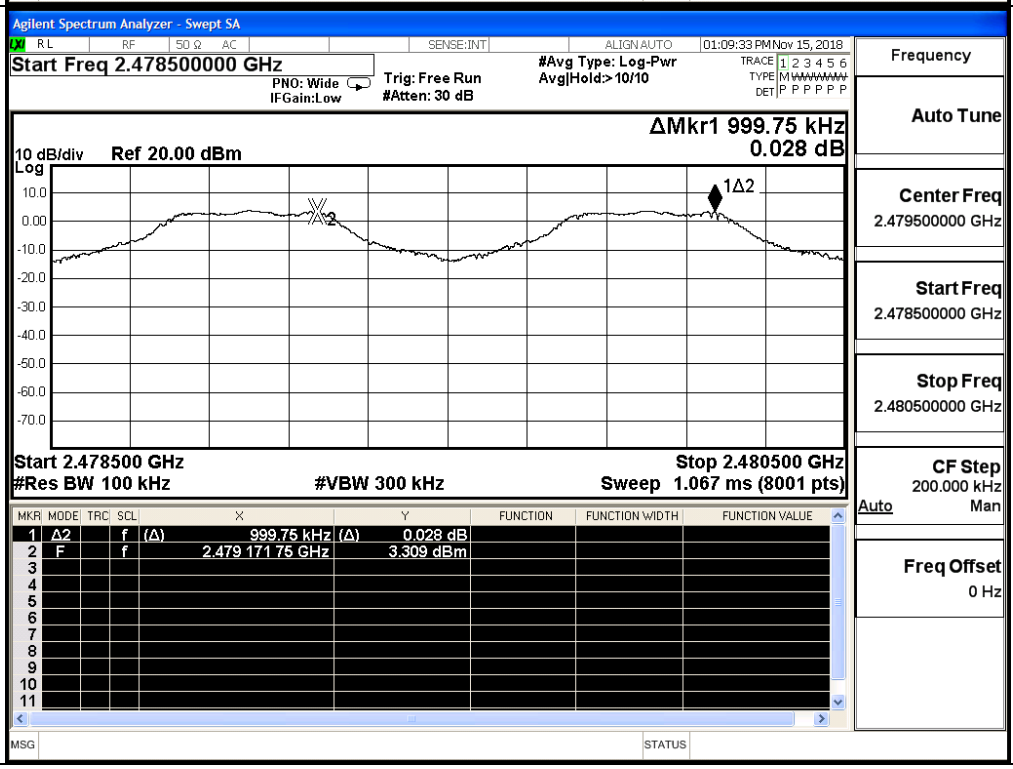
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.001	0.5517	PASS
	MCH	0.991	0.5511	PASS
	HCH	1.000	0.5478	PASS
π/4DQPSK	LCH	1.002	0.819	PASS
	MCH	1.000	0.820	PASS
	HCH	1.002	0.817	PASS
8DPSK	LCH	1.002	0.804	PASS
	MCH	1.000	0.805	PASS
	HCH	1.000	0.808	PASS

Test Graphs	
GFSK/LCH	

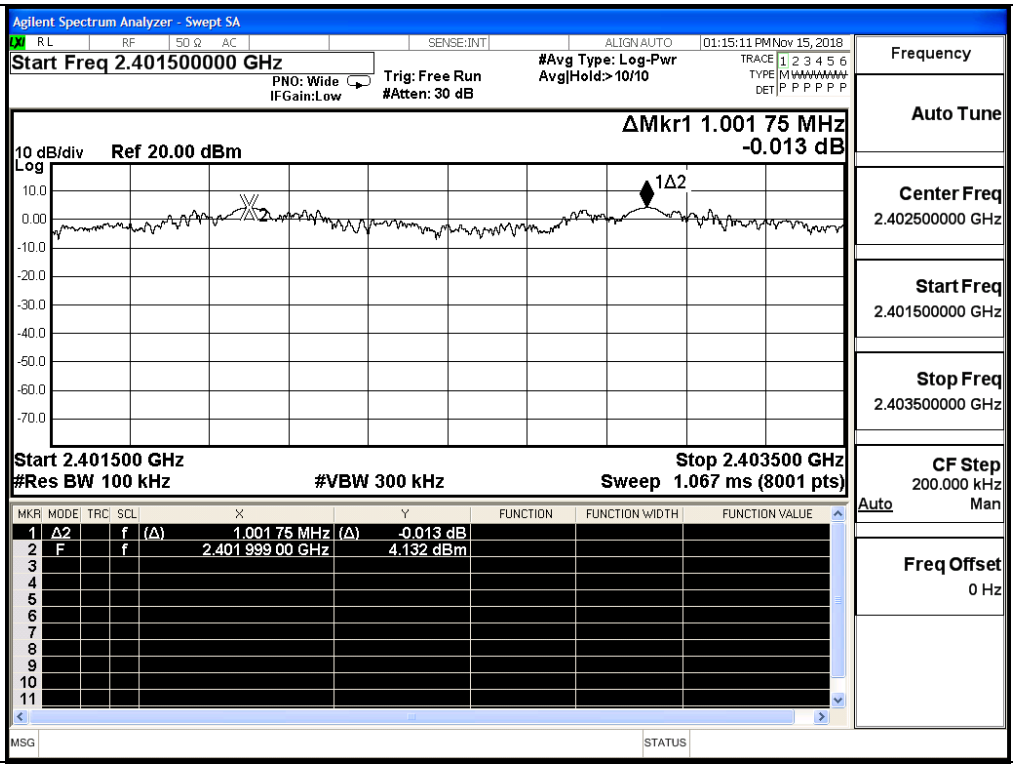
GFSK/MCH



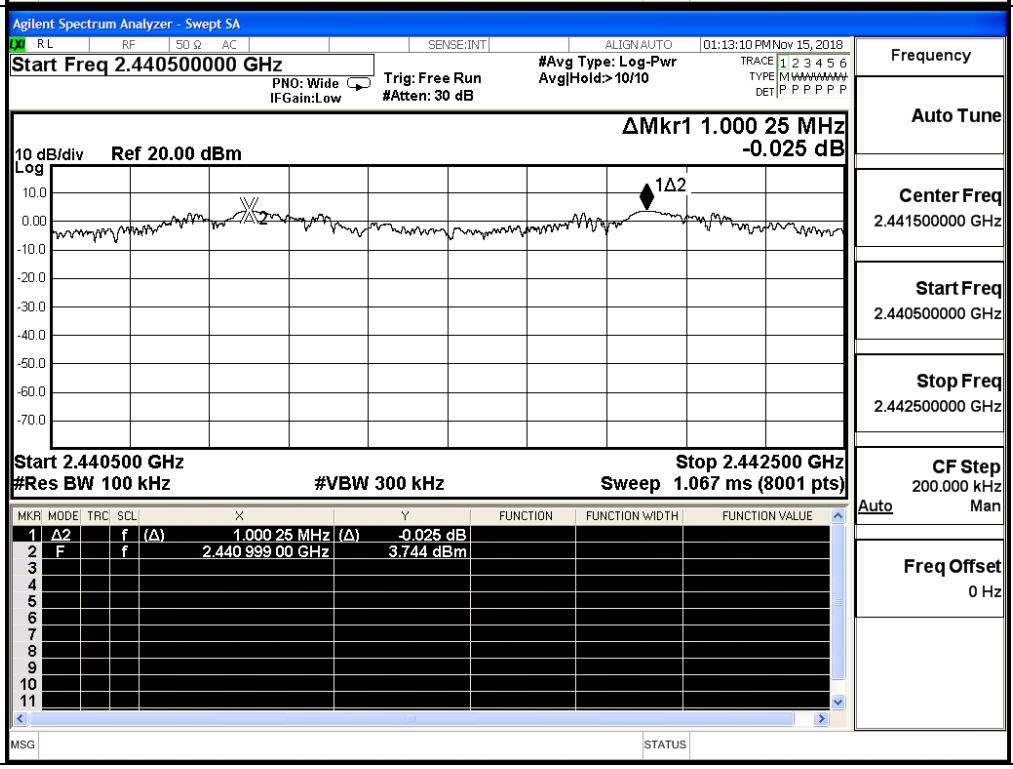
GFSK/HCH



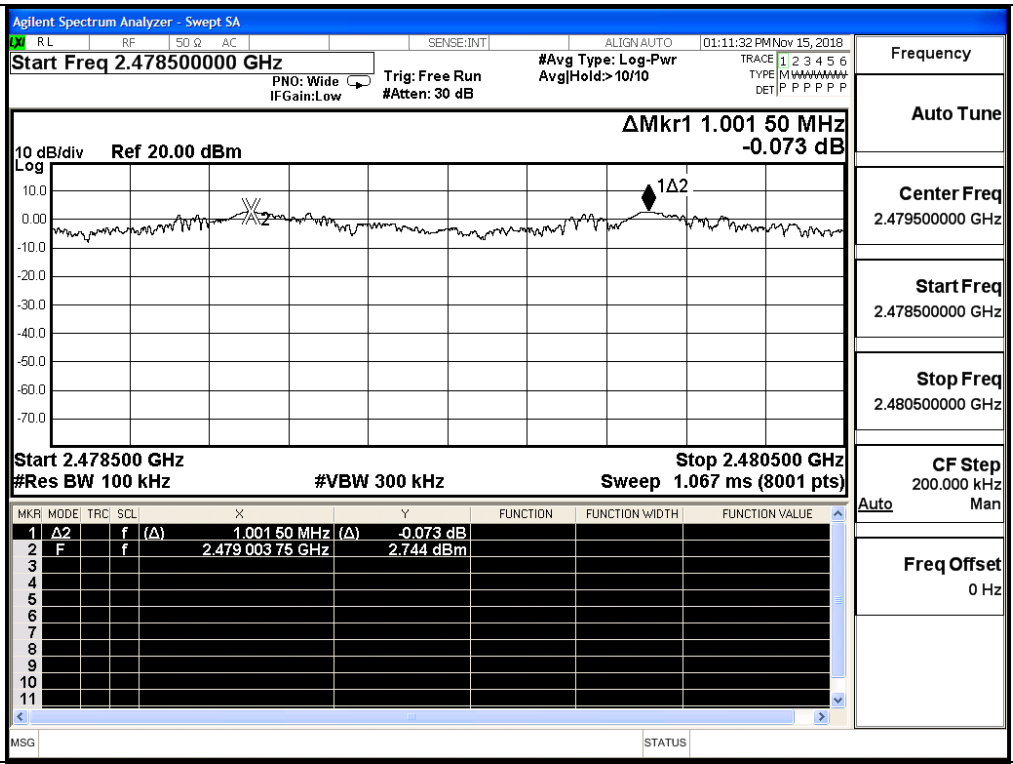
π/4DQPSK/LCH



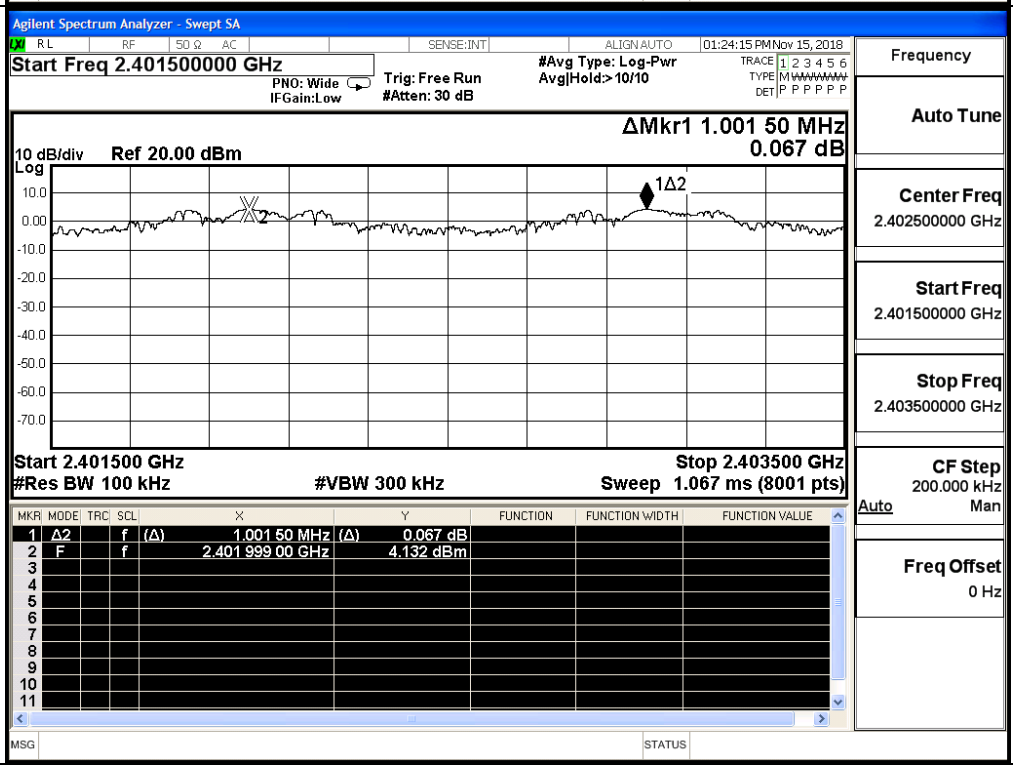
π/4DQPSK/MCH



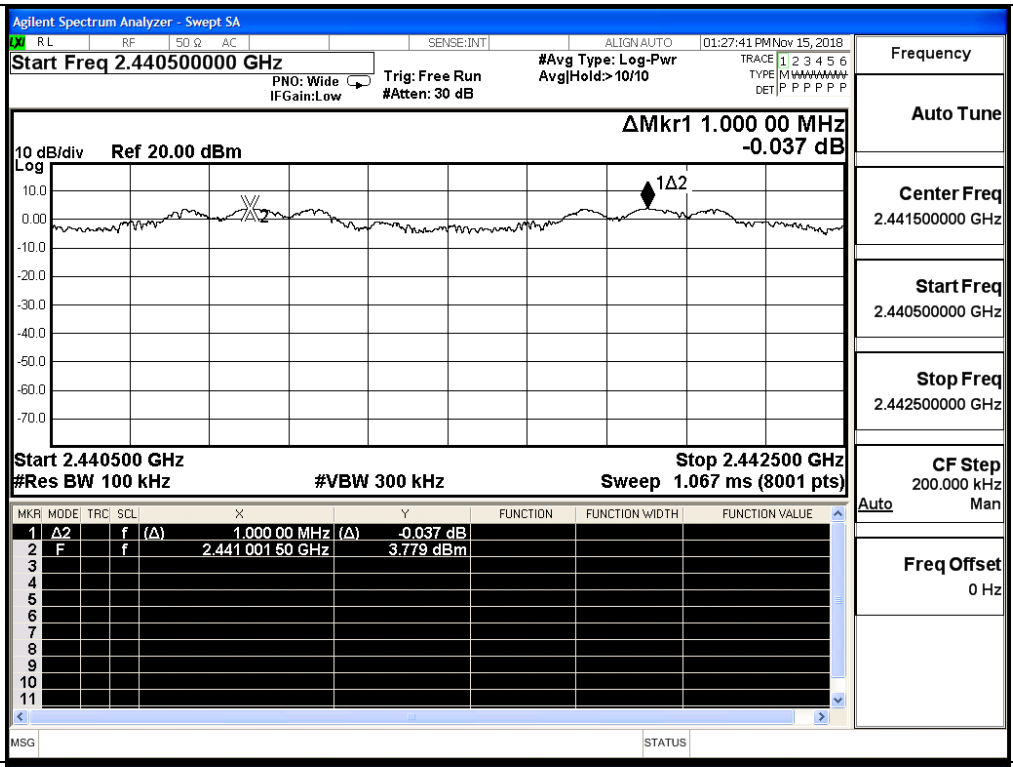
π/4DQPSK/HCH



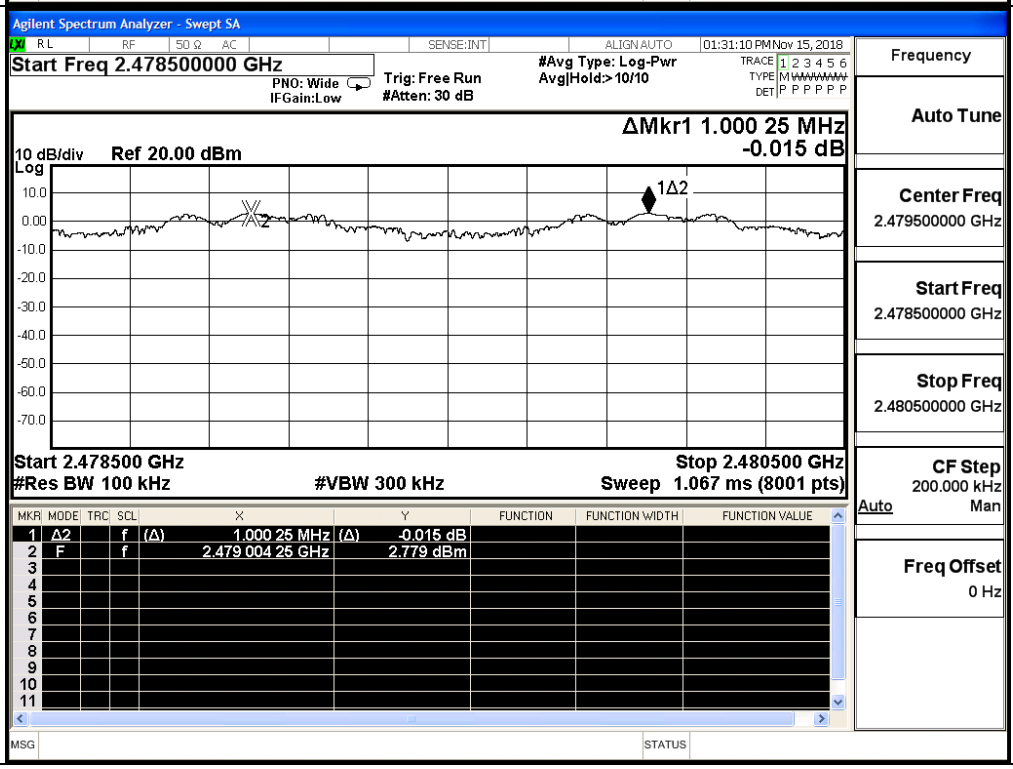
8DPSK/LCH



8DPSK/MCH

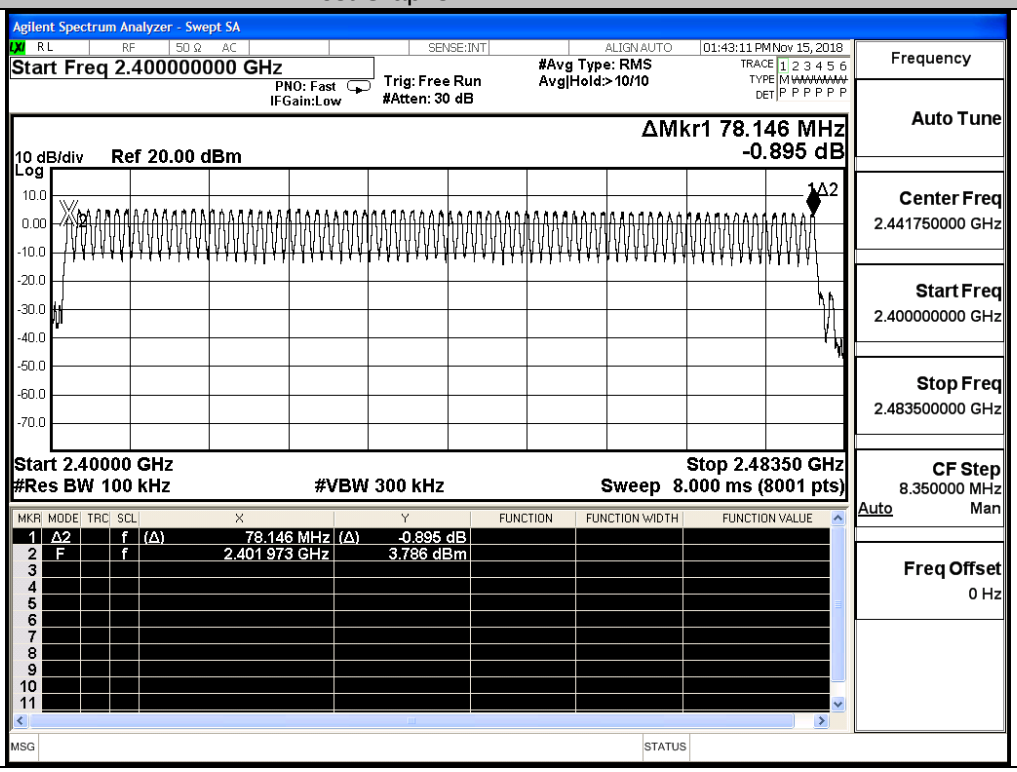


8DPSK/HCH

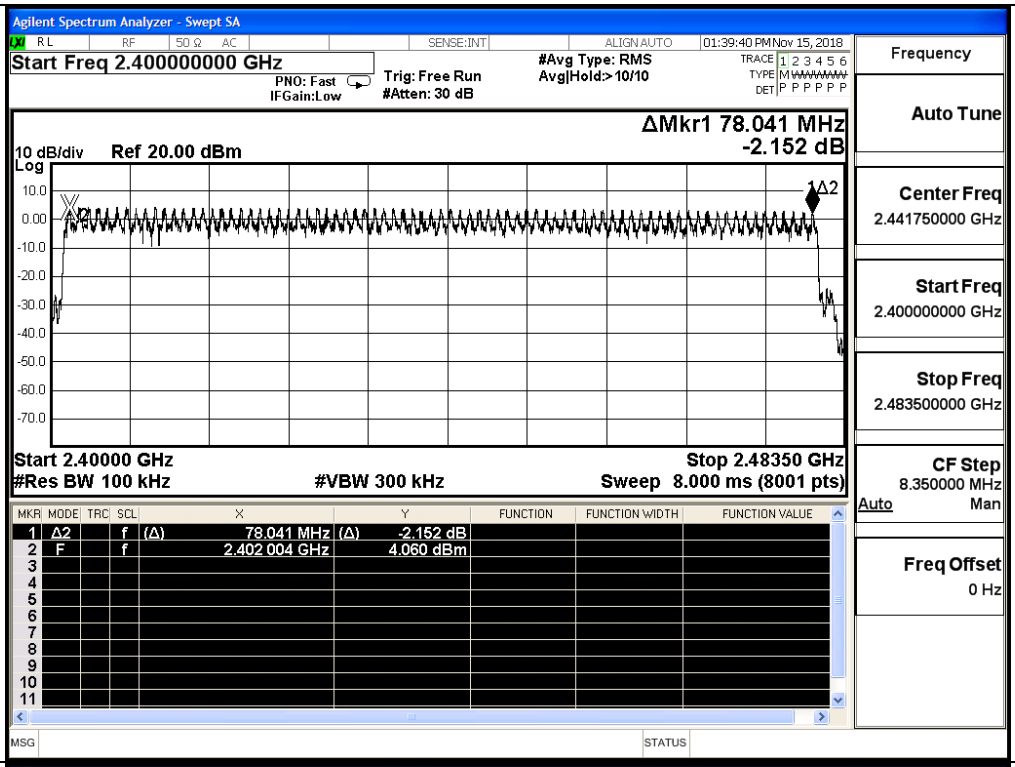


A.4 Hopping Channel Number

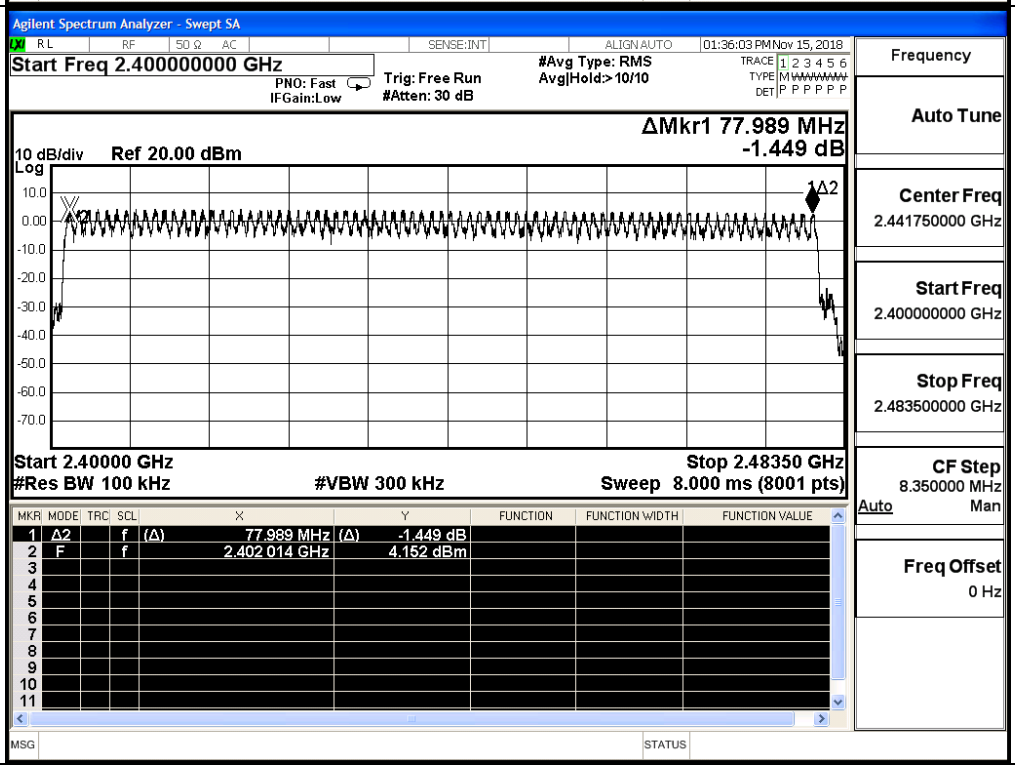
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs	
GFSK/Hop	

π/4DQPSK/Hop

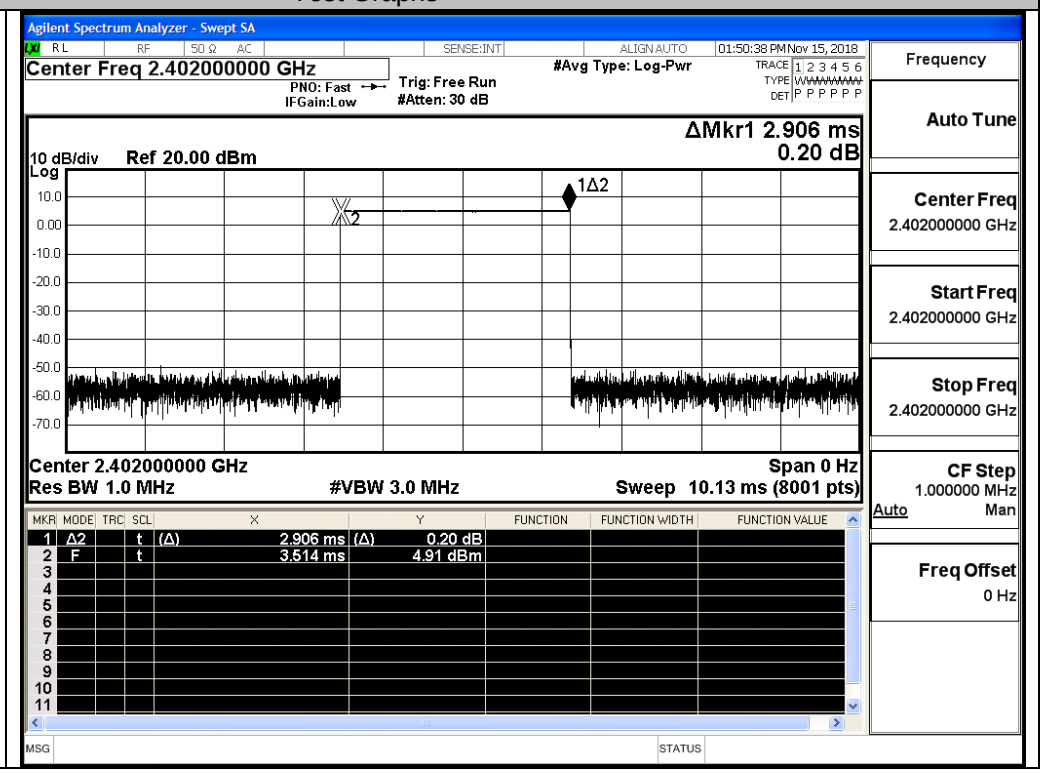


8DPSK/Hop

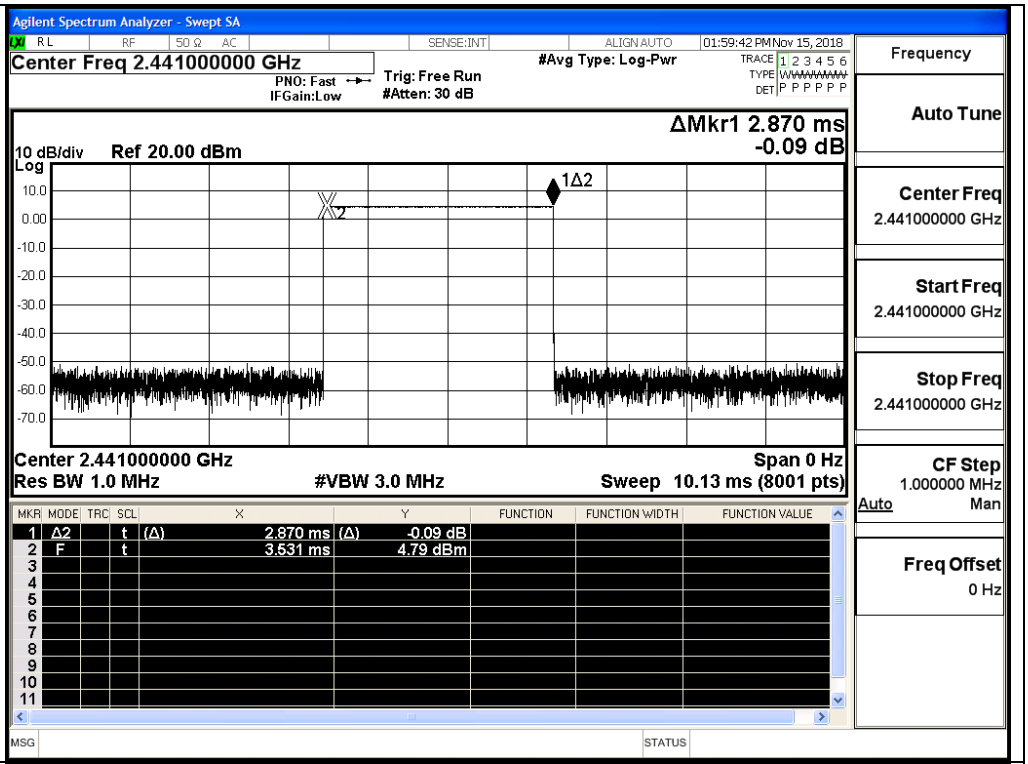


A.5 Dwell Time

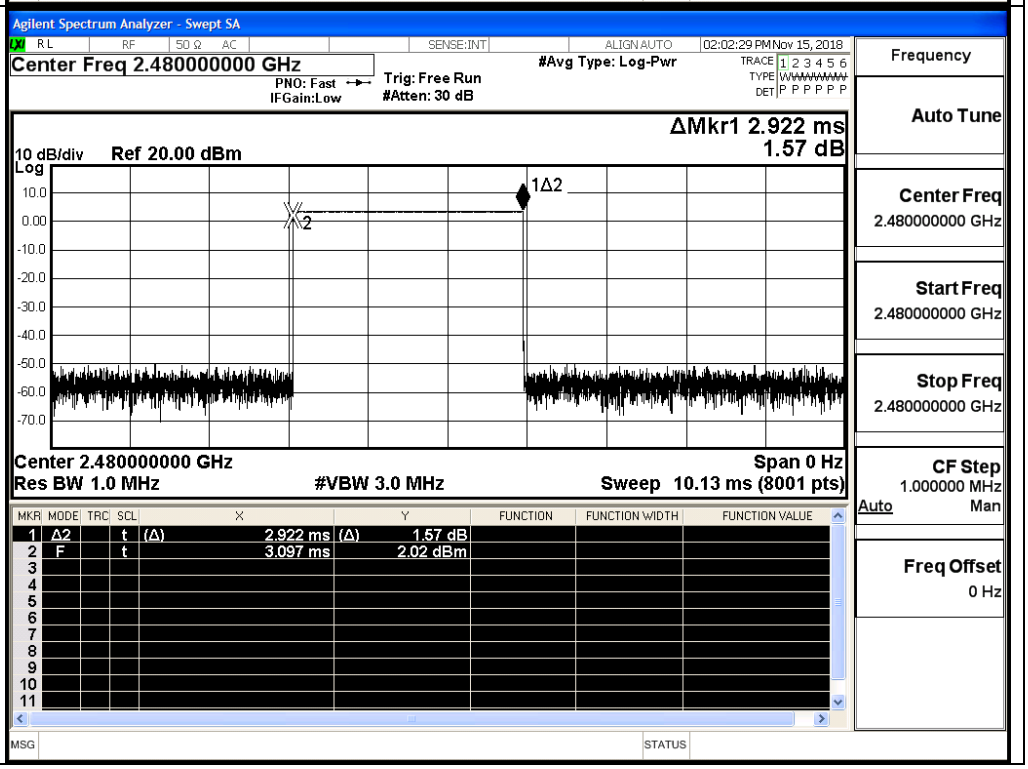
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.906	106.7	0.310	0.4	PASS
	DH5	MCH	2.870	106.7	0.306	0.4	PASS
	DH5	HCH	2.922	106.7	0.312	0.4	PASS
π/4DQPSK	2DH5	LCH	2.927	106.7	0.312	0.4	PASS
	2DH5	MCH	2.930	106.7	0.313	0.4	PASS
	2DH5	HCH	2.923	106.7	0.312	0.4	PASS
8DPSK	3DH5	LCH	2.931	106.7	0.313	0.4	PASS
	3DH5	MCH	2.923	106.7	0.312	0.4	PASS
	3DH5	HCH	2.932	106.7	0.313	0.4	PASS

Test Graphs	
GFSK_DH5/LCH	

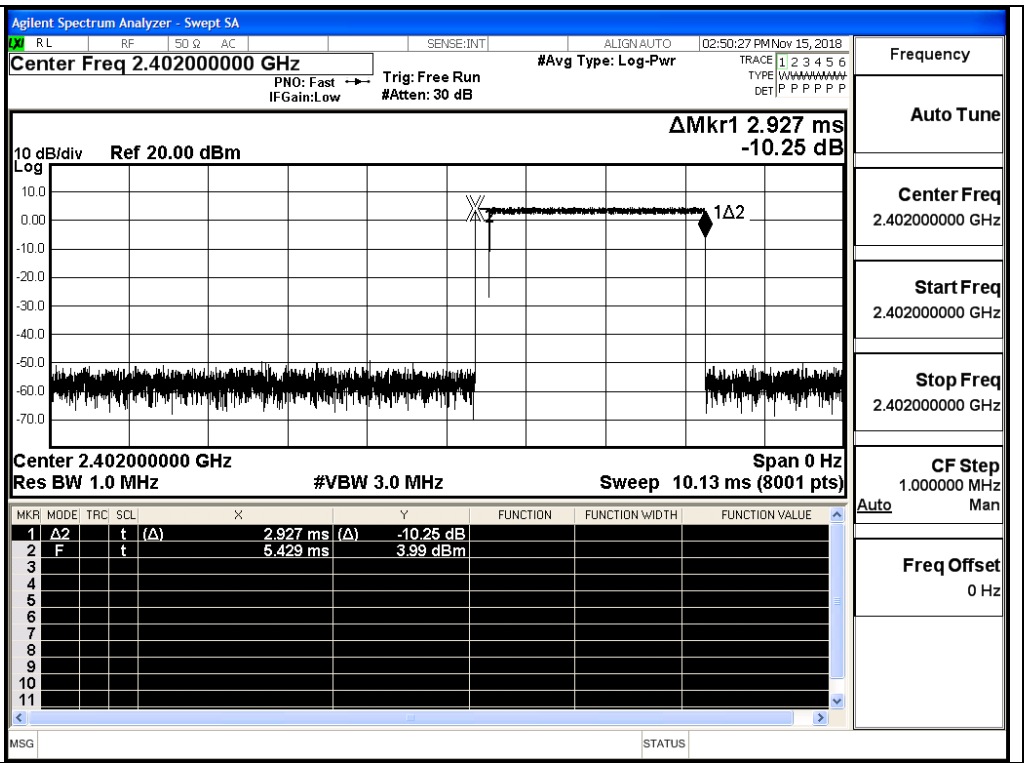
GFSK_DH5/MCH



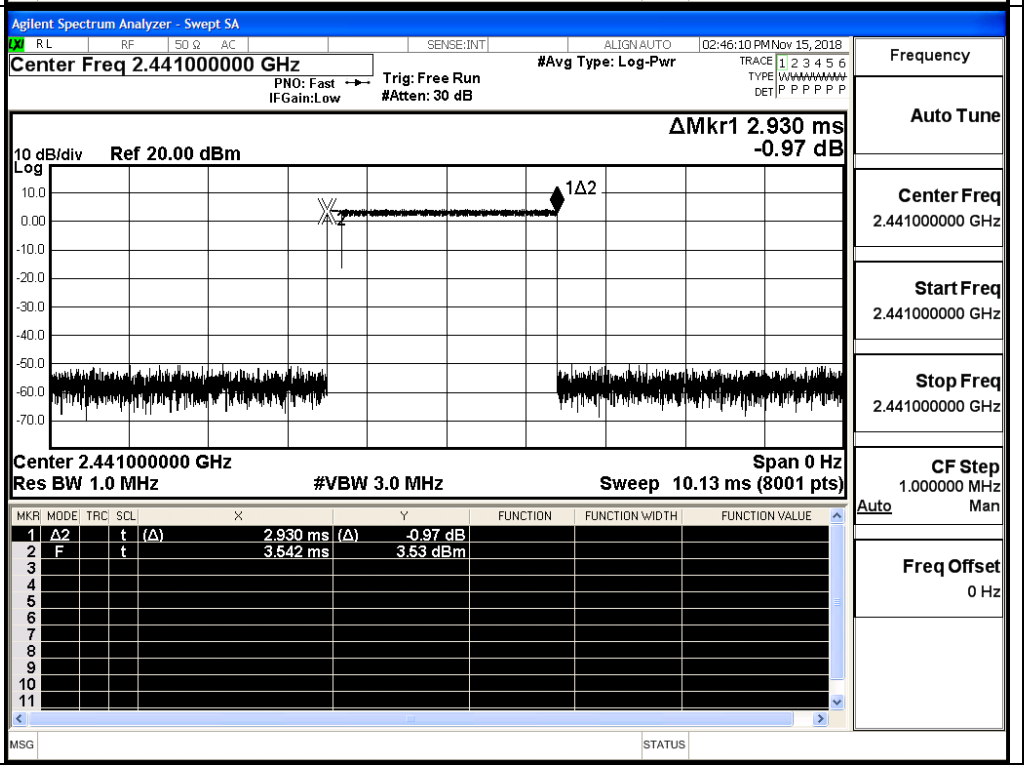
GFSK_DH5/HCH



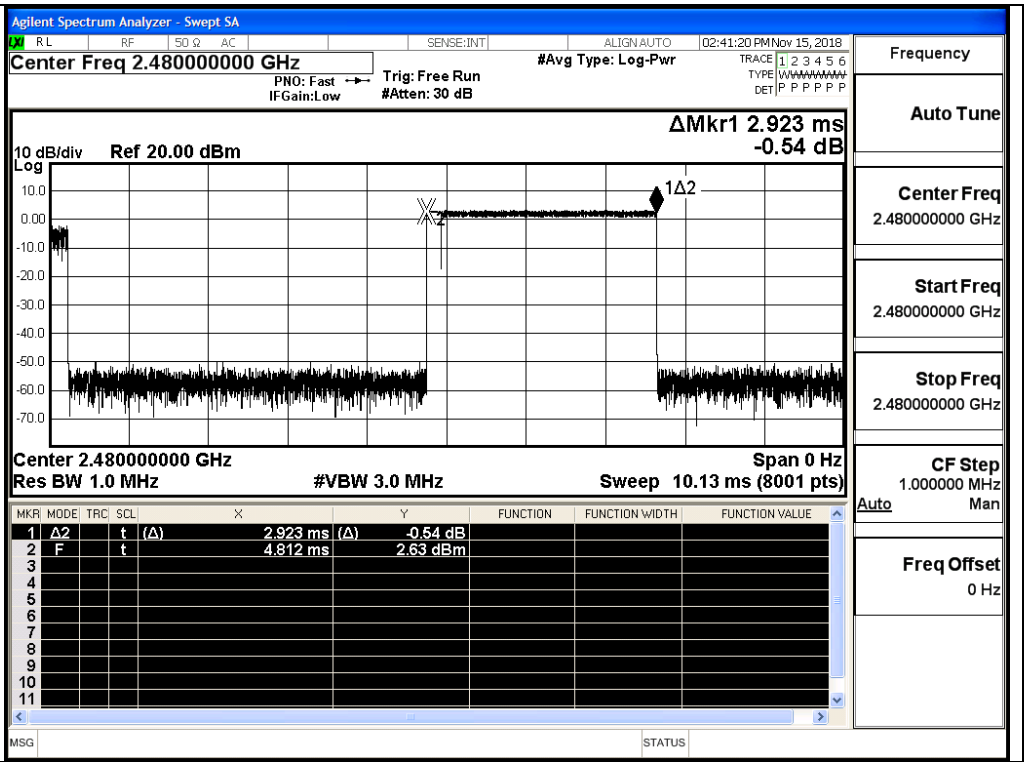
π/4DQPSK
_2DH5/LCH



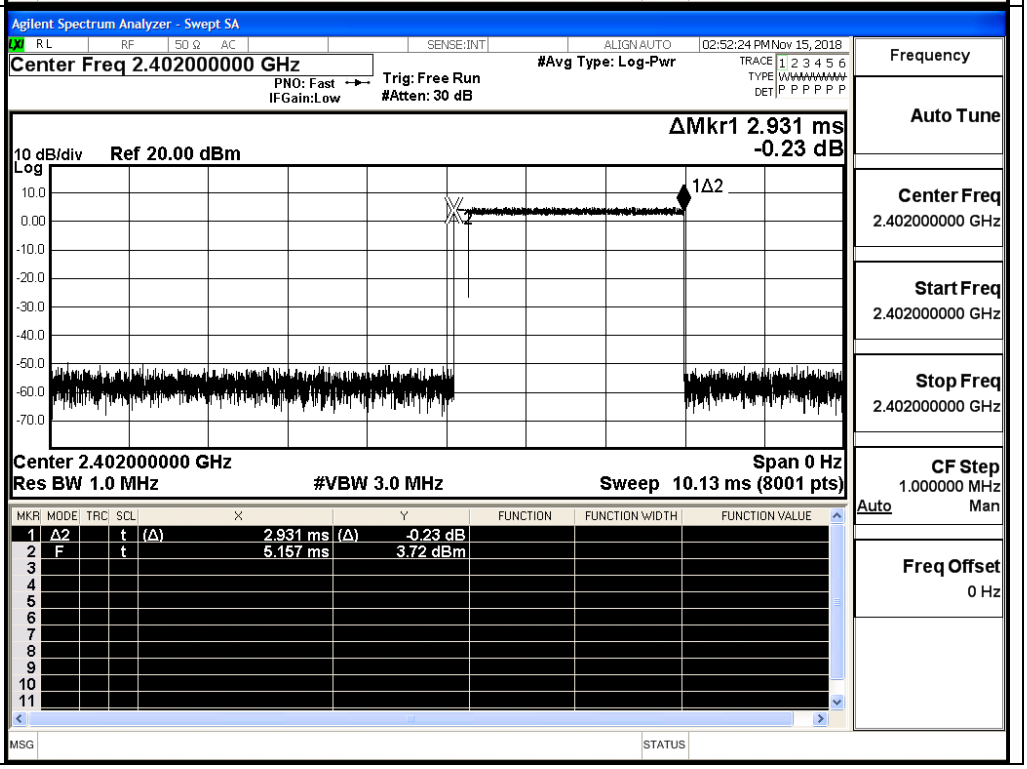
π/4DQPSK
_2DH5/MCH



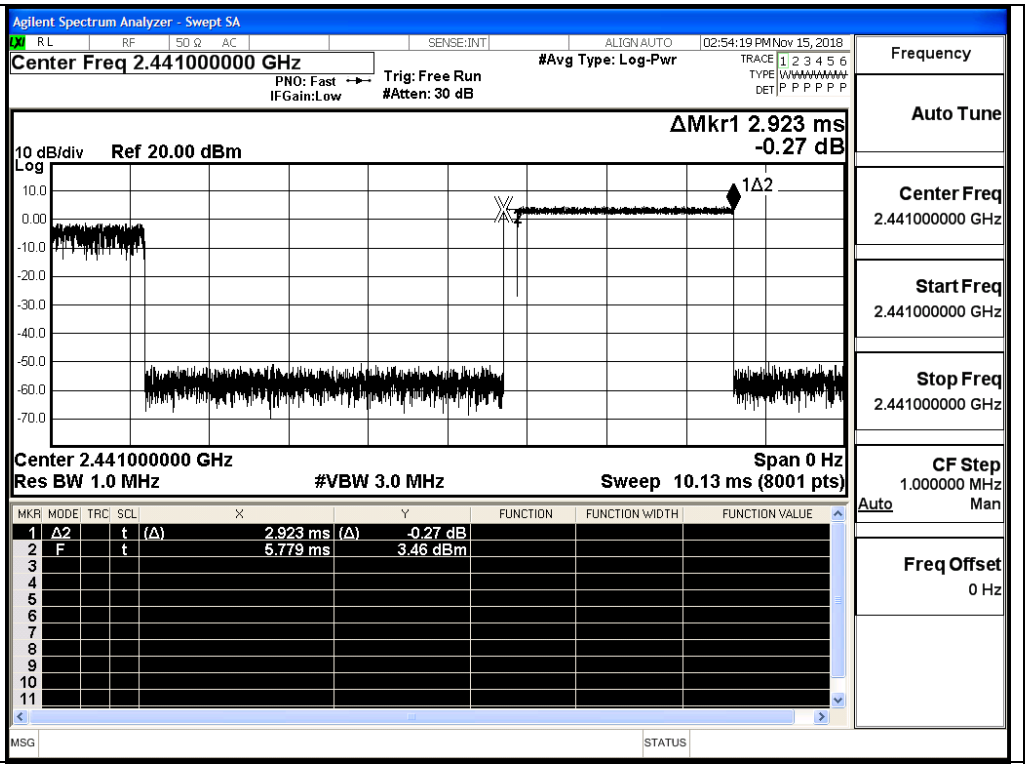
π/4DQPSK _2DH5/HCH



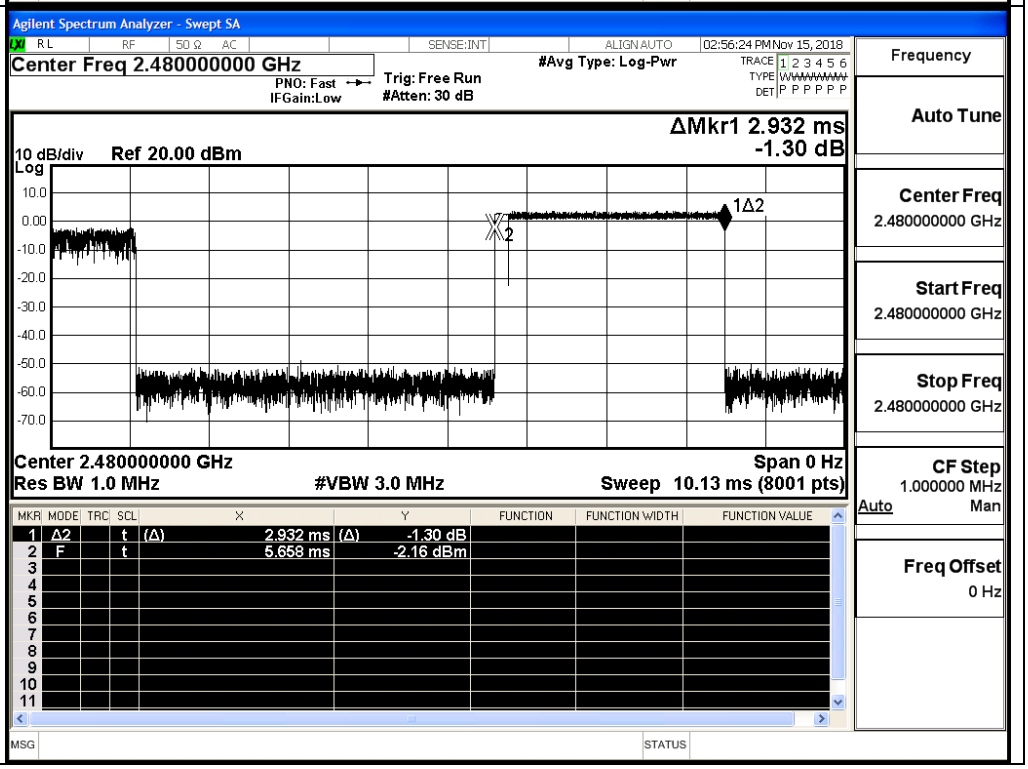
8DPSK _3DH5/LCH



8DPSK _3DH5/MCH

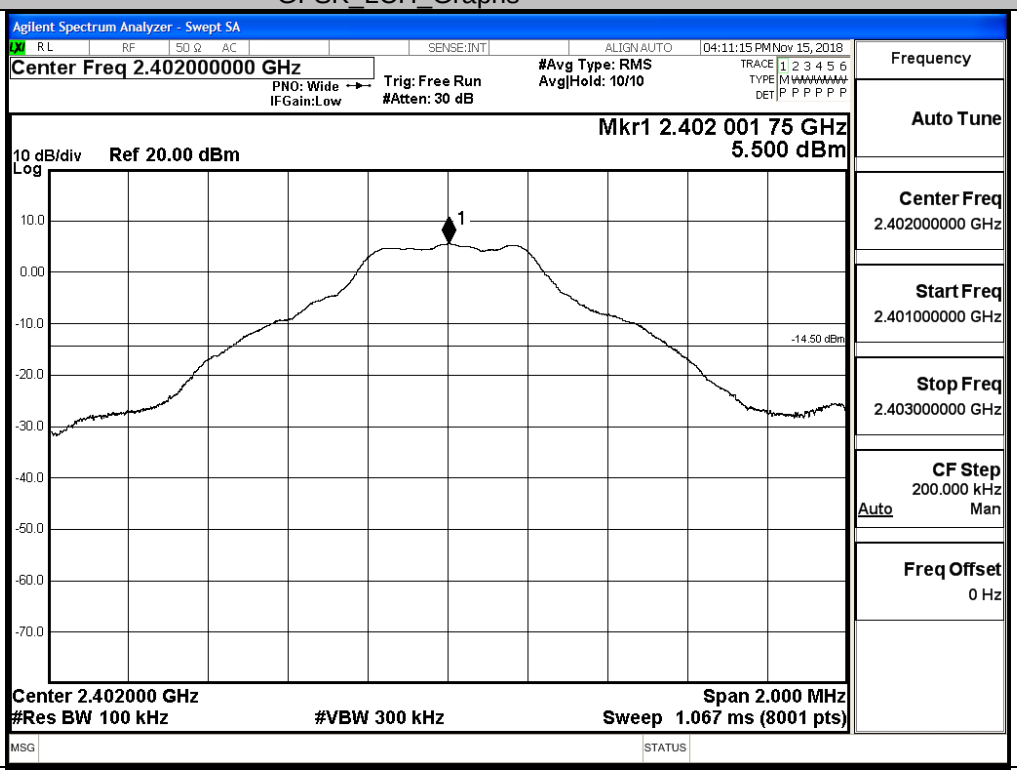
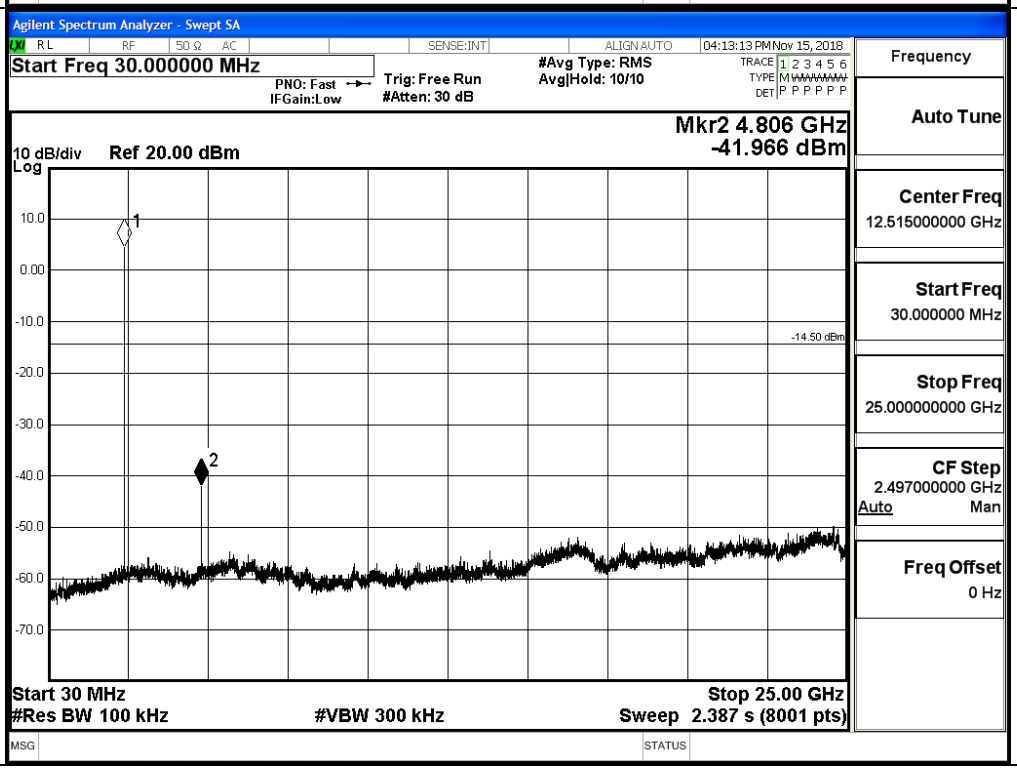


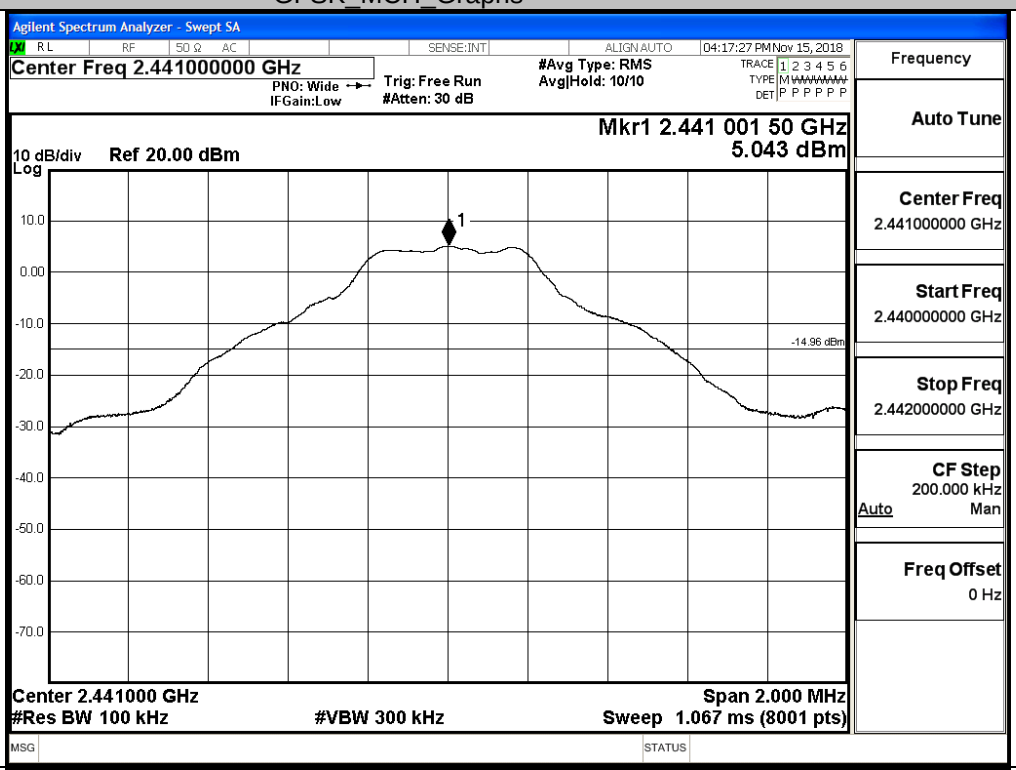
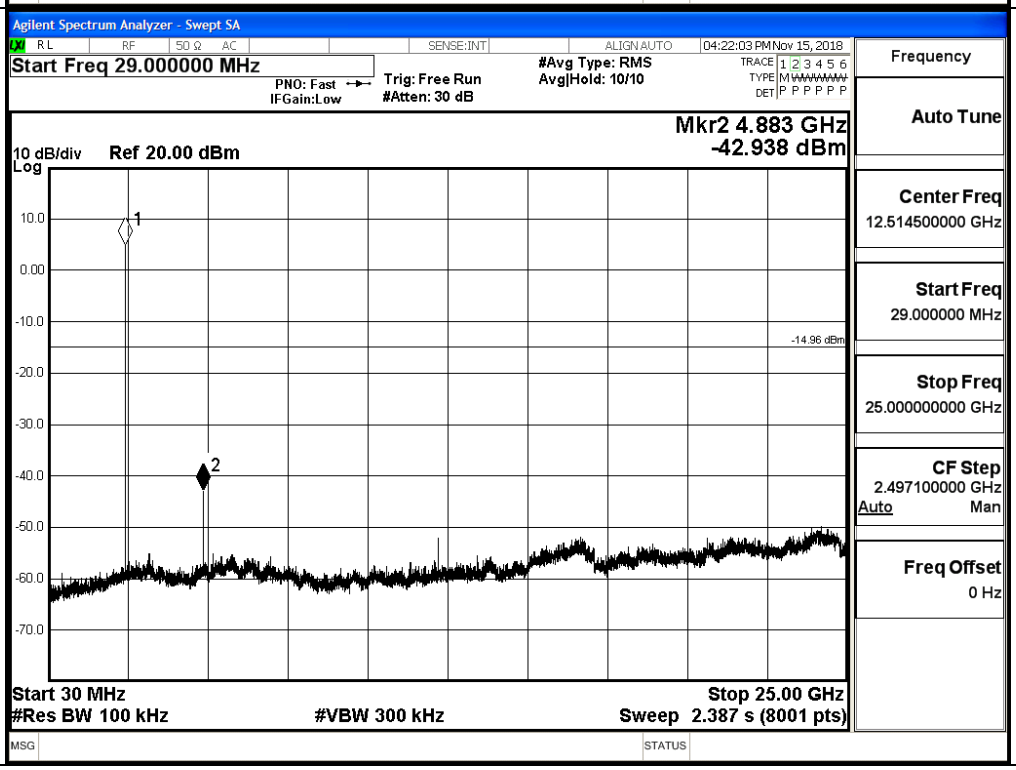
8DPSK _3DH5/HCH

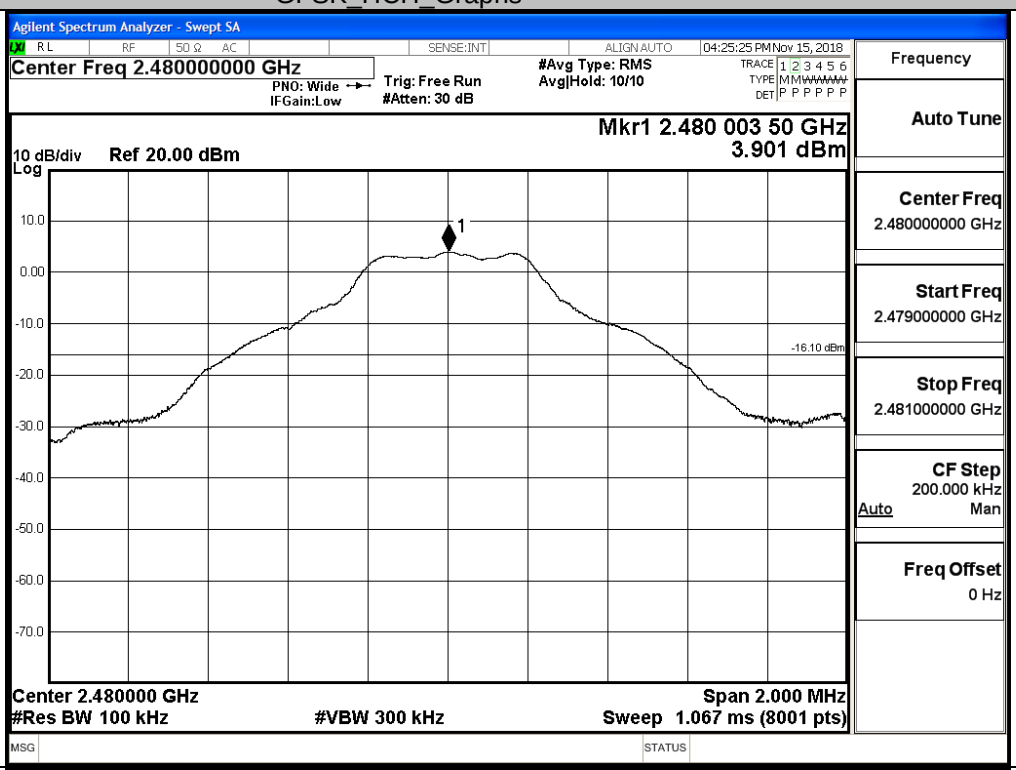
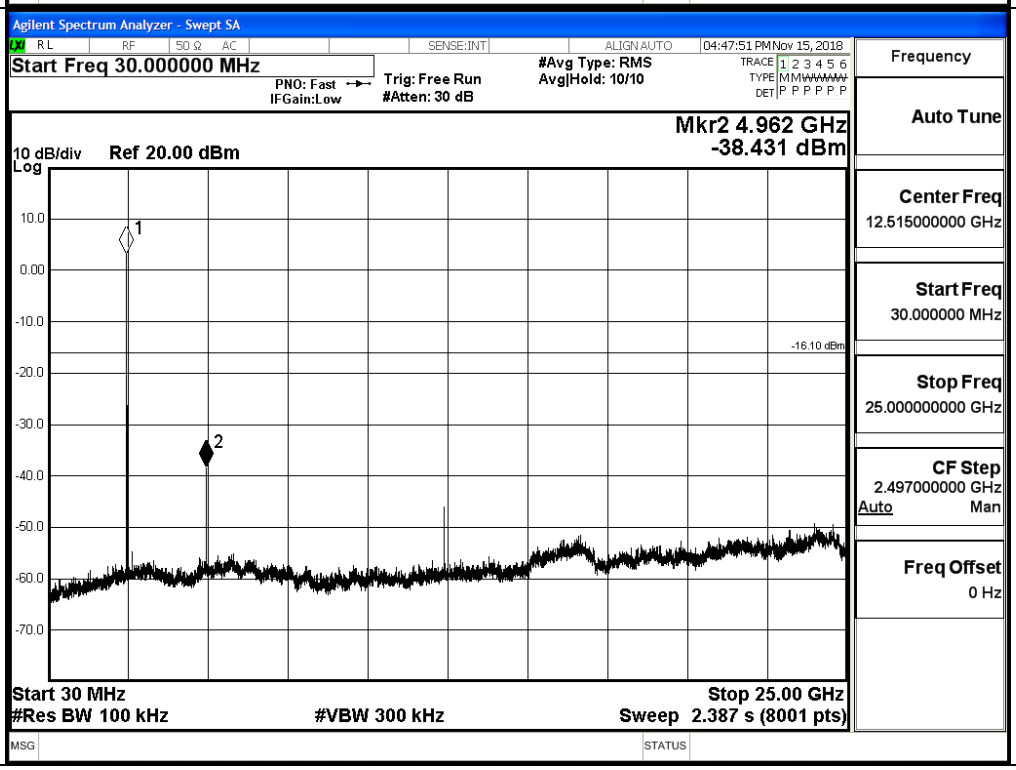


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	5.500	-41.966	-14.50	PASS
	MCH	5.043	-42.938	-14.96	PASS
	HCH	3.901	-38.431	-16.10	PASS
π/4DQPSK	LCH	4.291	-44.555	-15.71	PASS
	MCH	3.924	-41.752	-16.08	PASS
	HCH	2.960	-38.092	-17.04	PASS
8DPSK	LCH	4.143	-40.888	-15.86	PASS
	MCH	3.812	-47.043	-16.19	PASS
	HCH	2.902	-42.926	-17.10	PASS

GFSK_LCH_Graphs		
Pref		
Puw		

GFSK_MCH_Graphs		
Pref		
Puw		

GFSK_HCH_Graphs		
Pref		
Puw		

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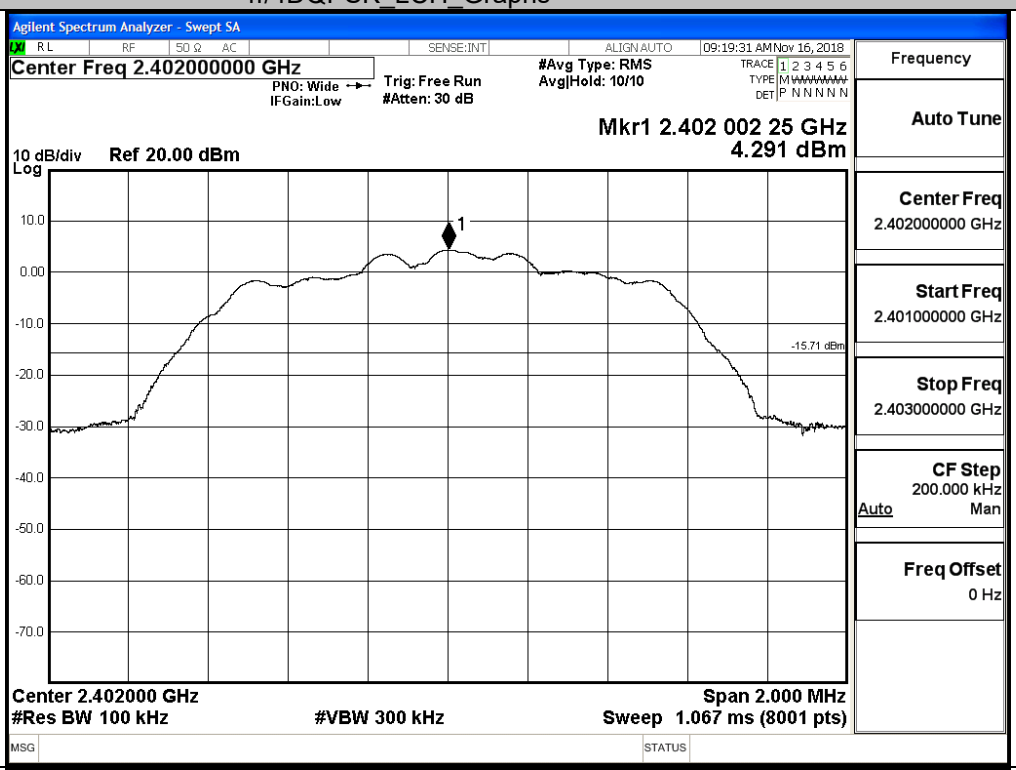
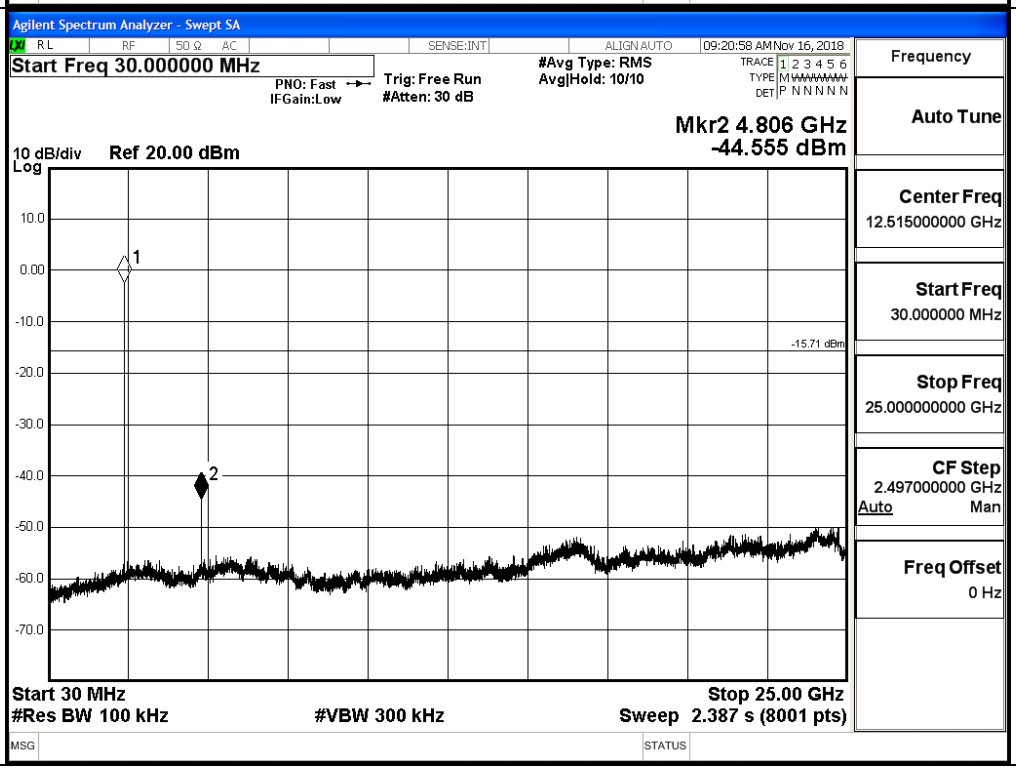
Pref		
Puw		

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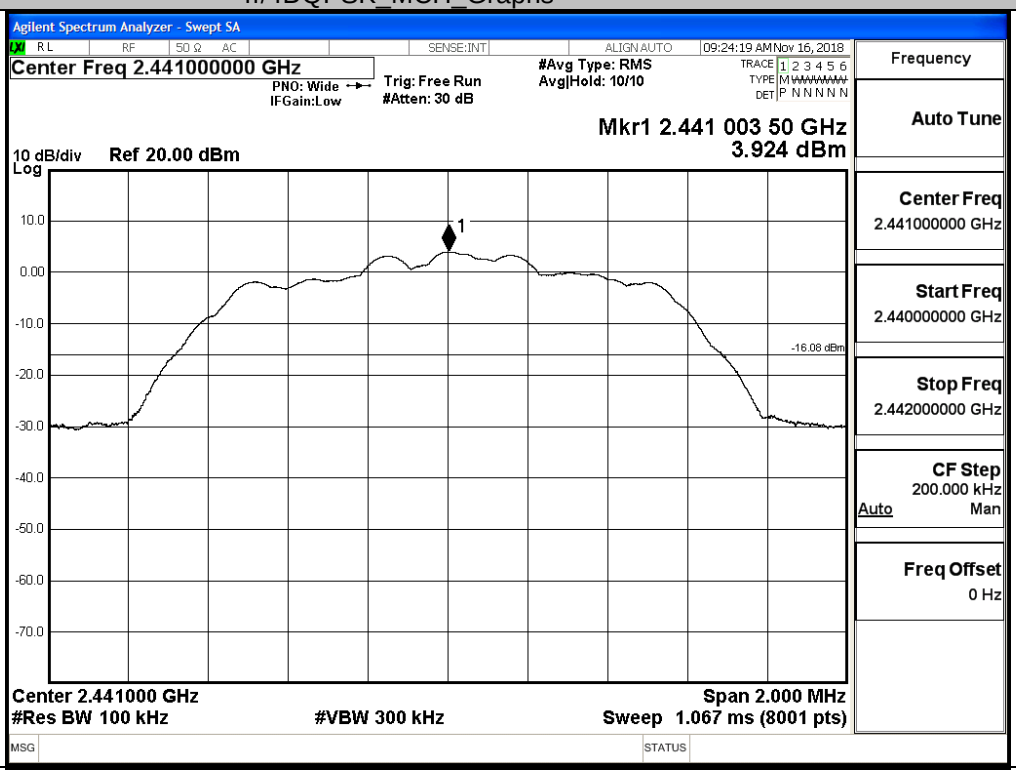
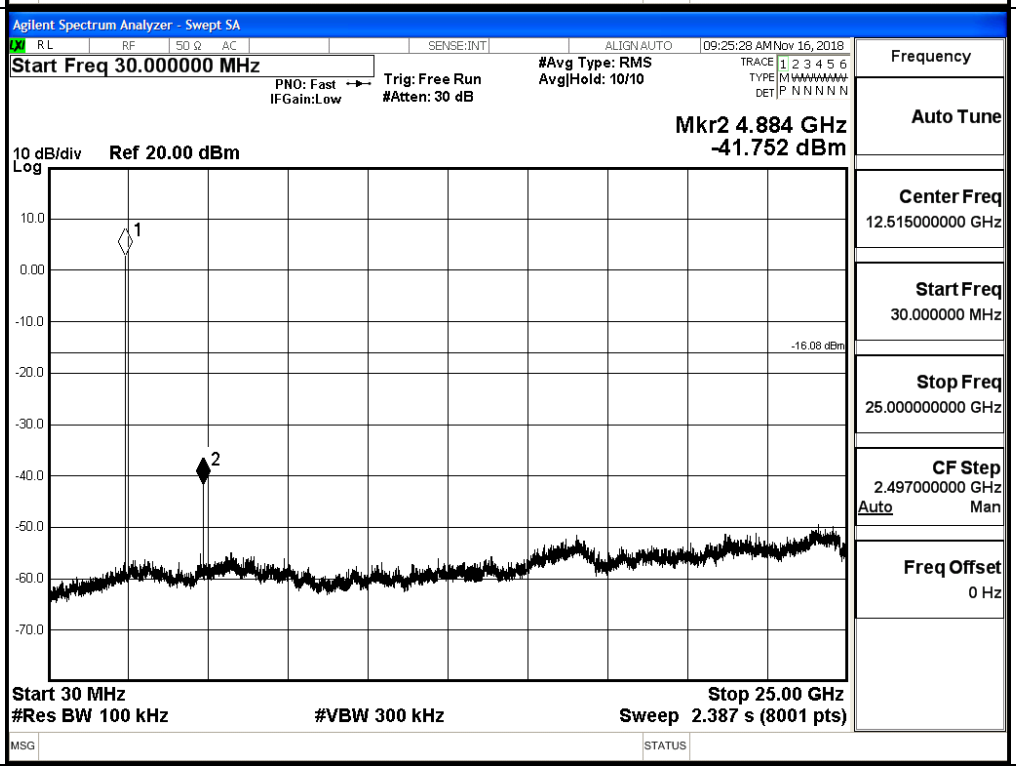
Pref		
Puw		

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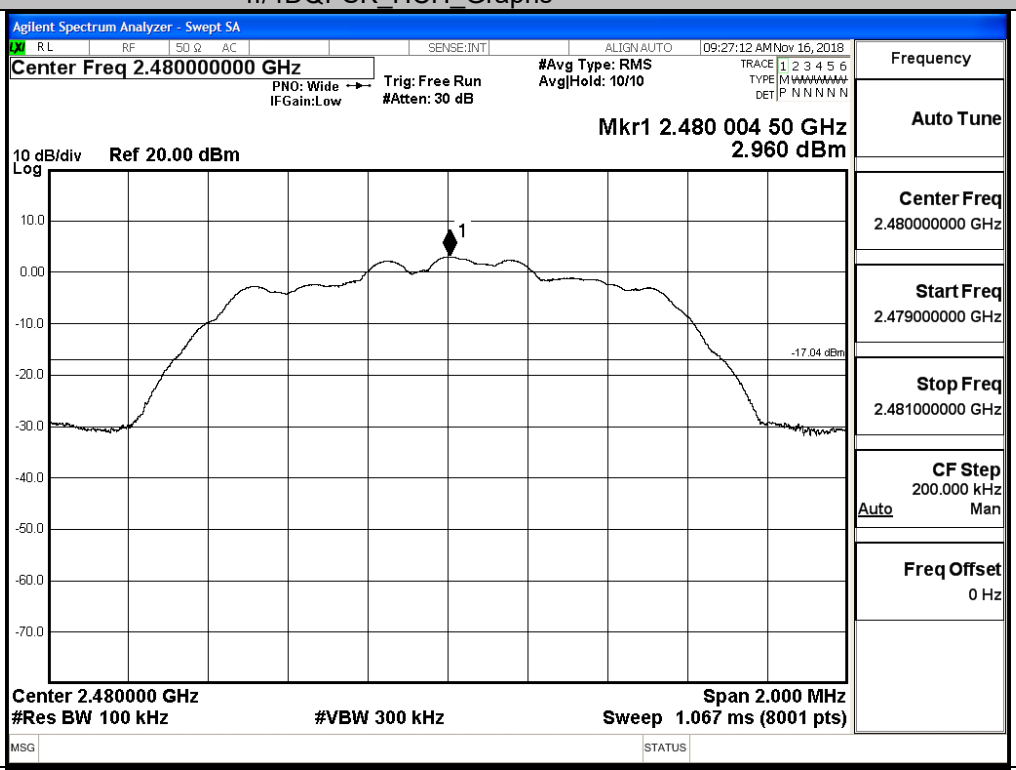
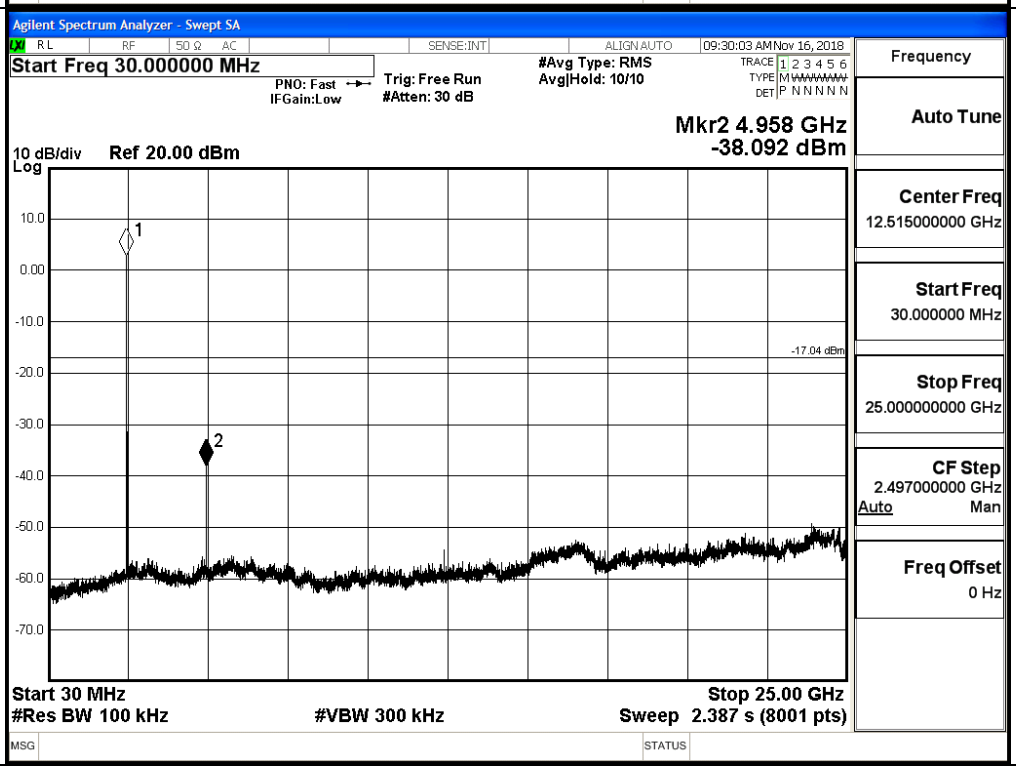
Pref		
Puw		

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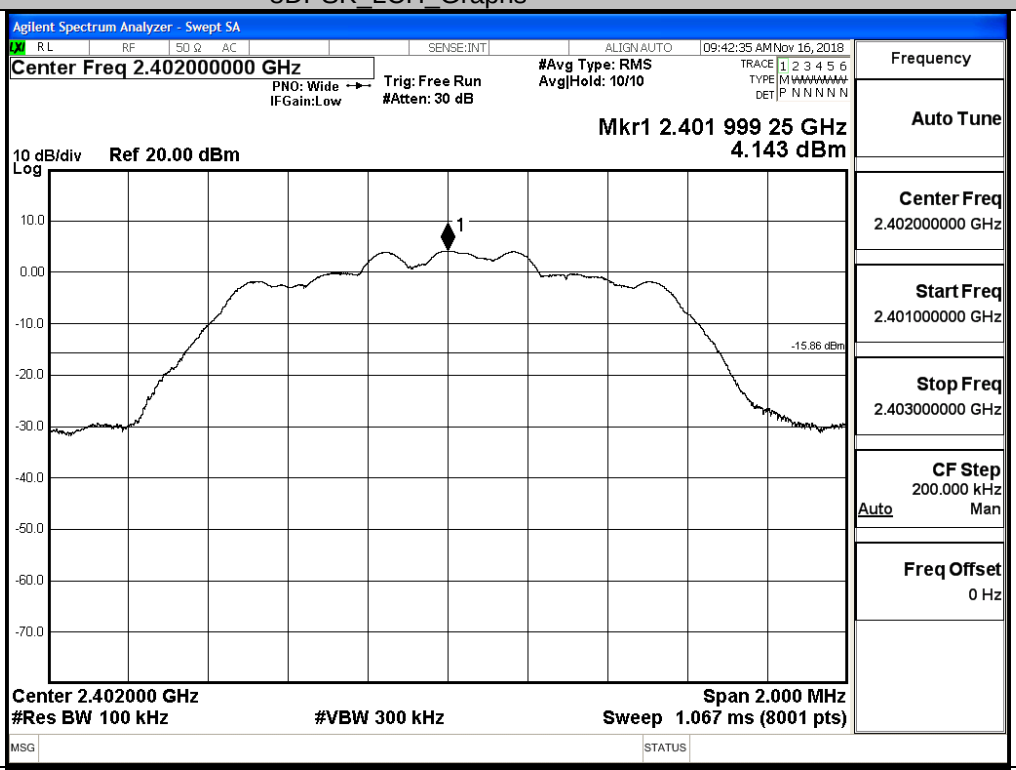
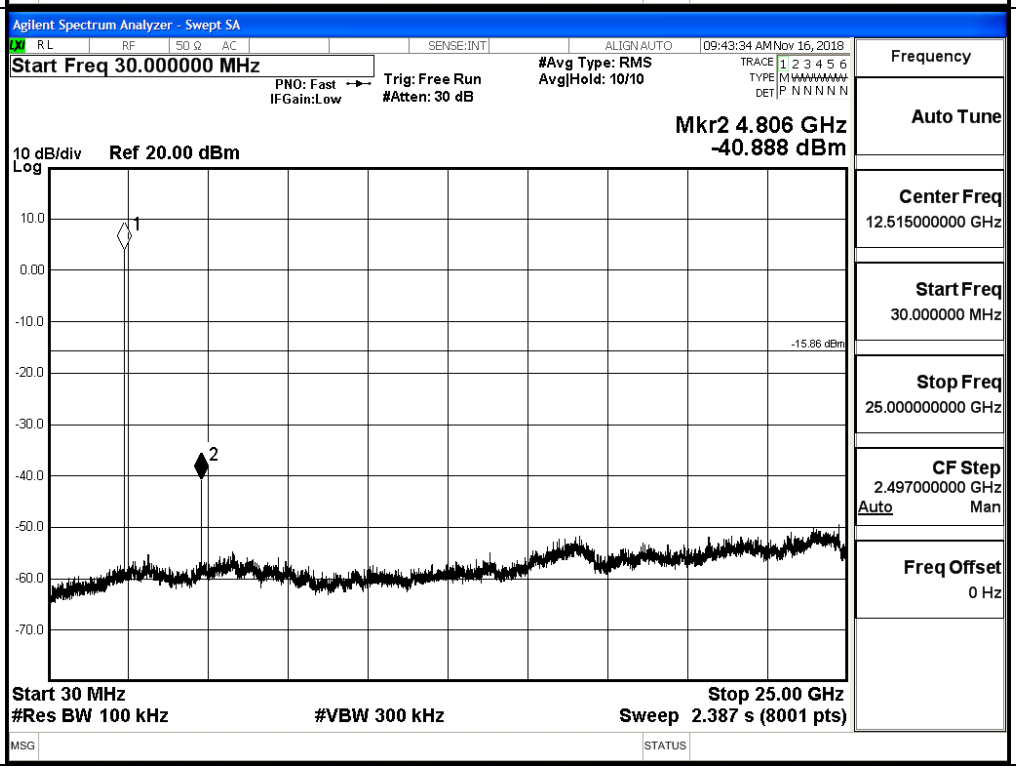
Pref		
Puw		

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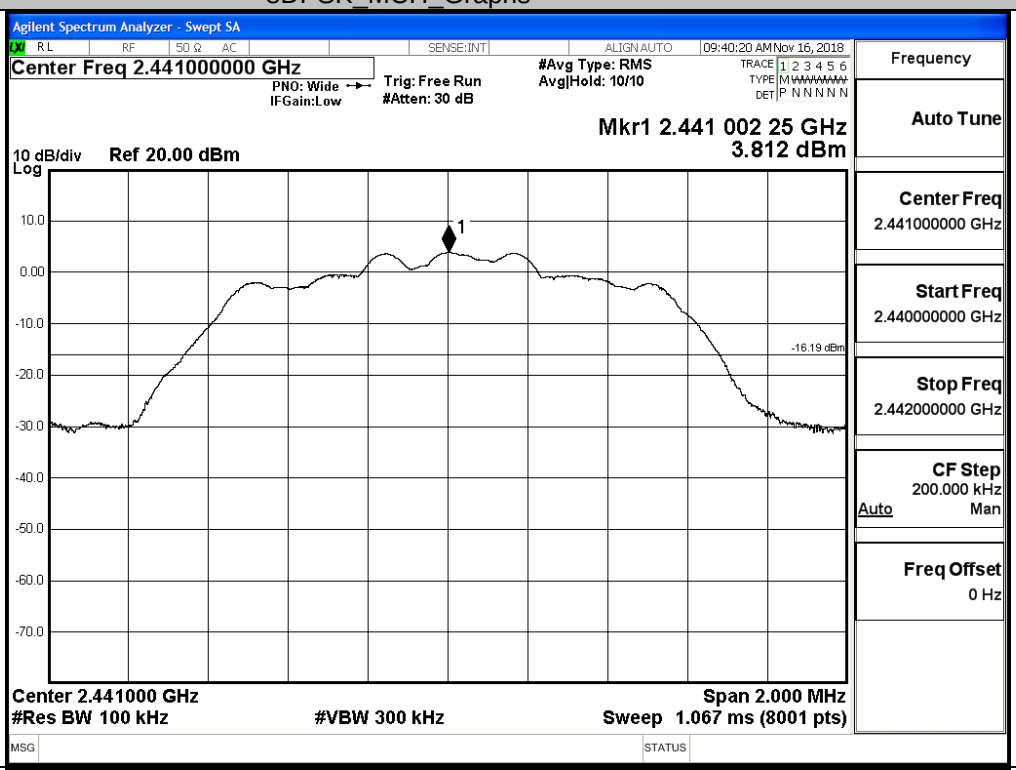
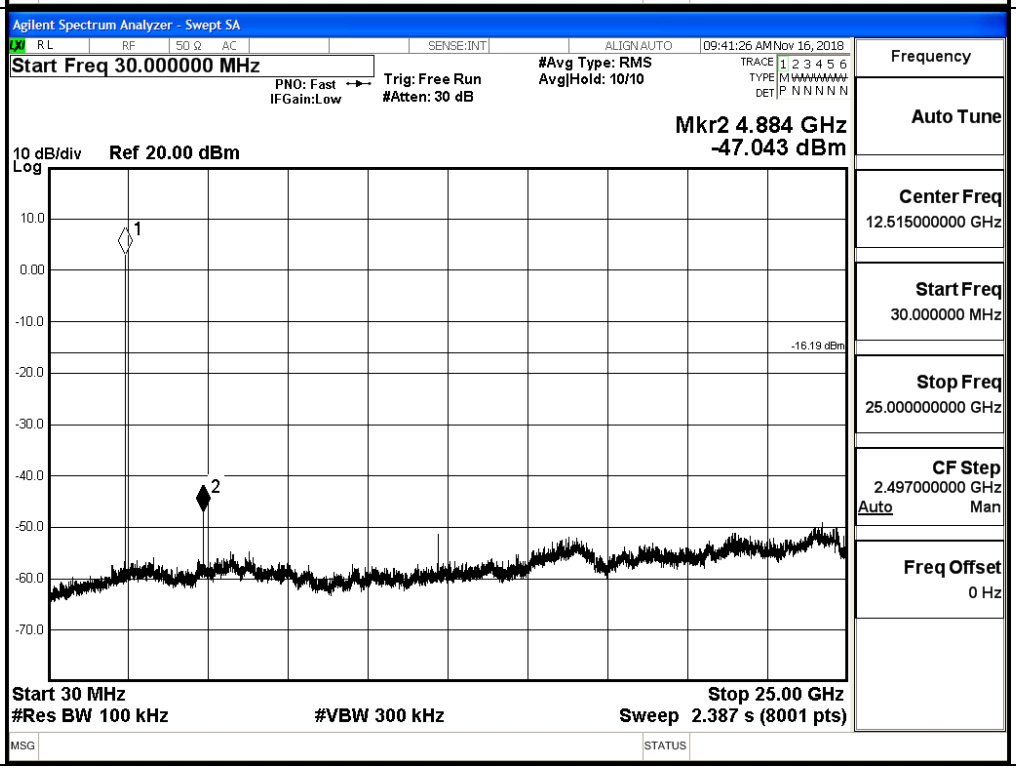
Pref		
Puw		

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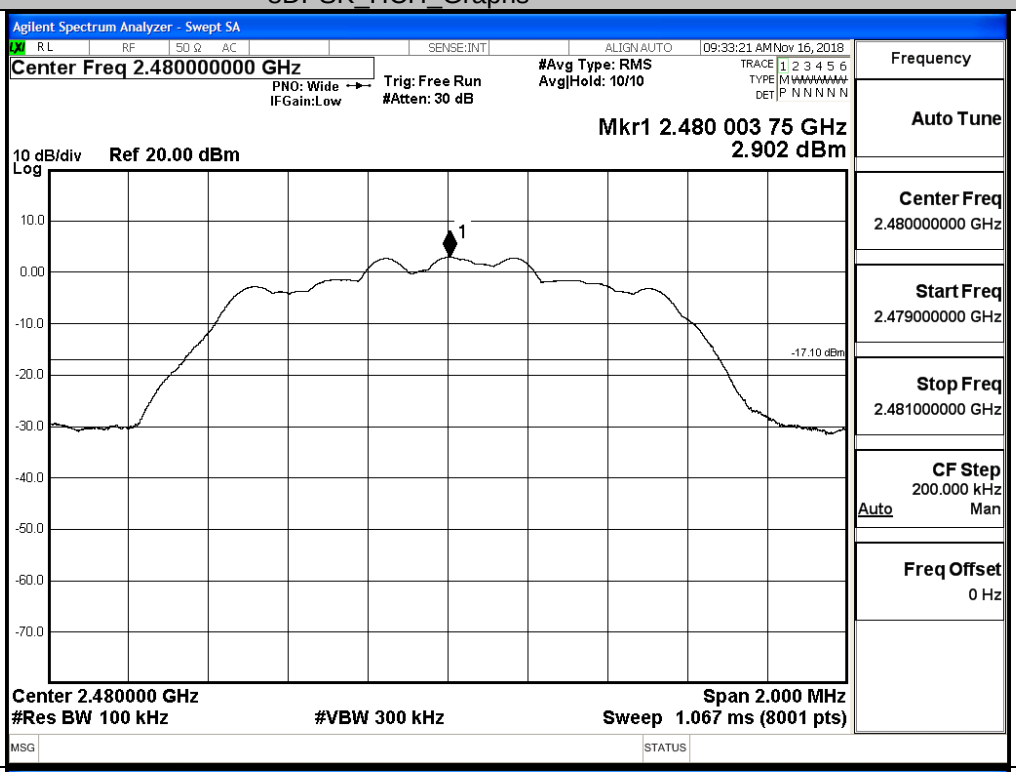
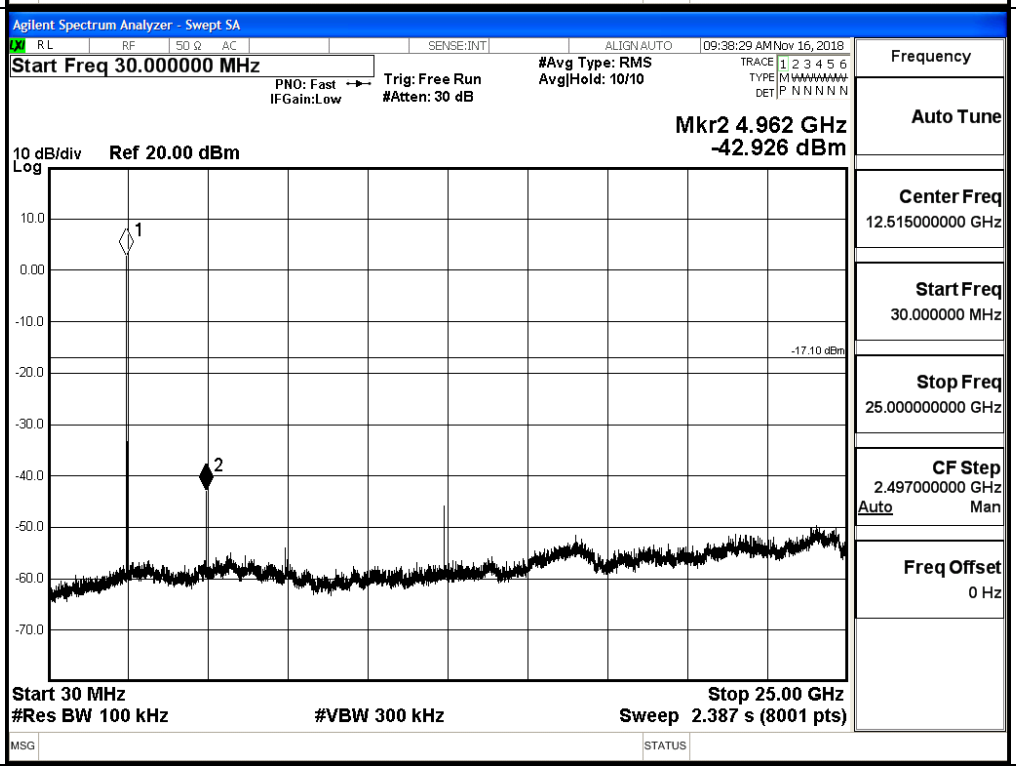
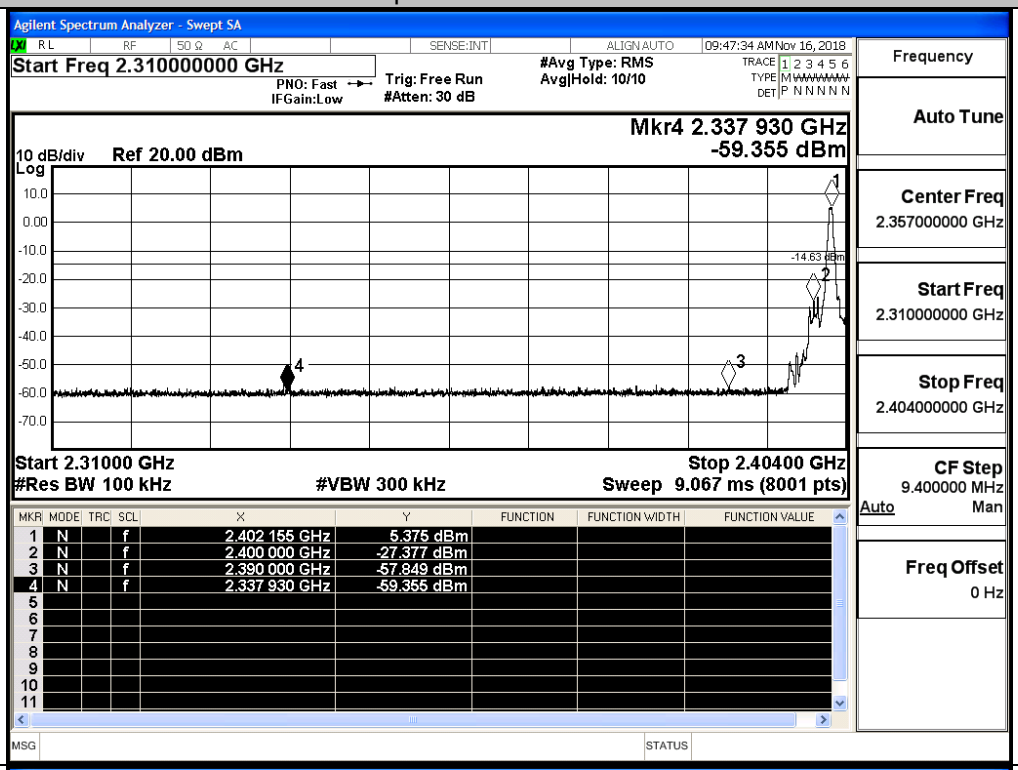
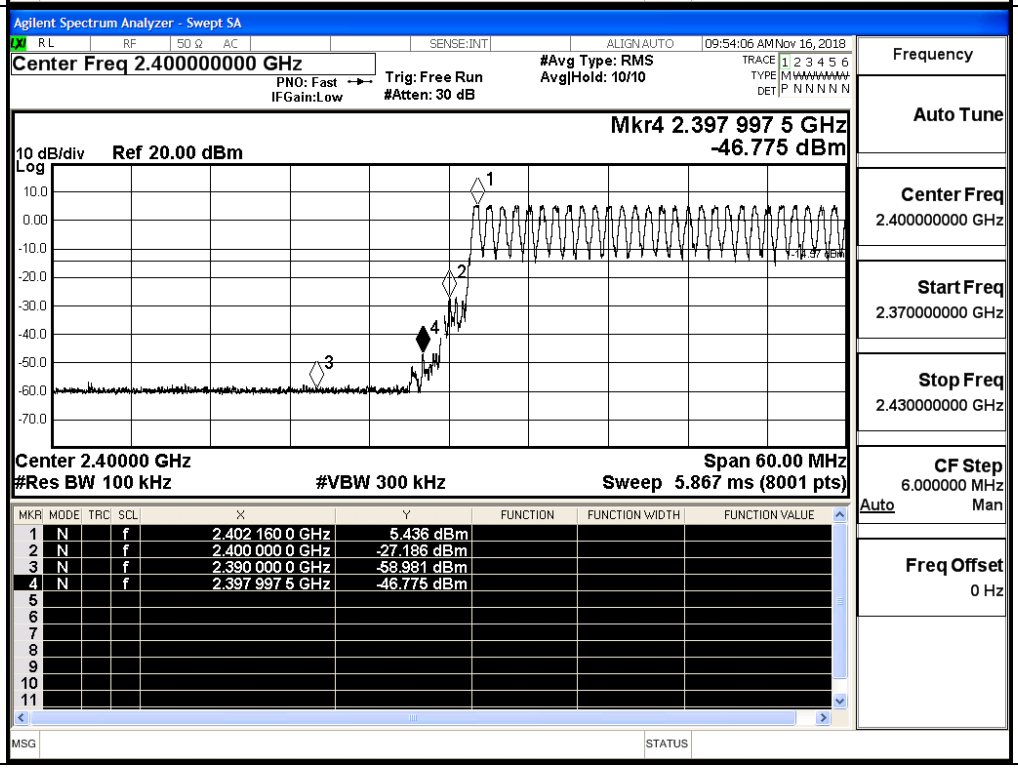
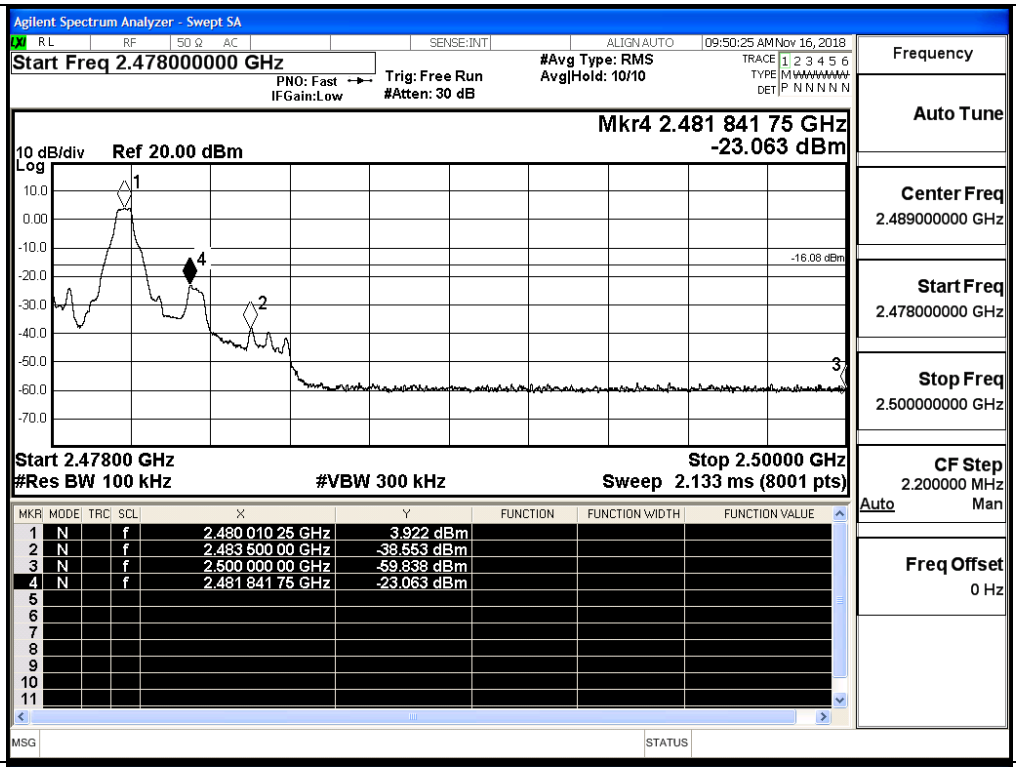
Pref	
Puw	

A.7 Band-edge for RF Conducted Emissions

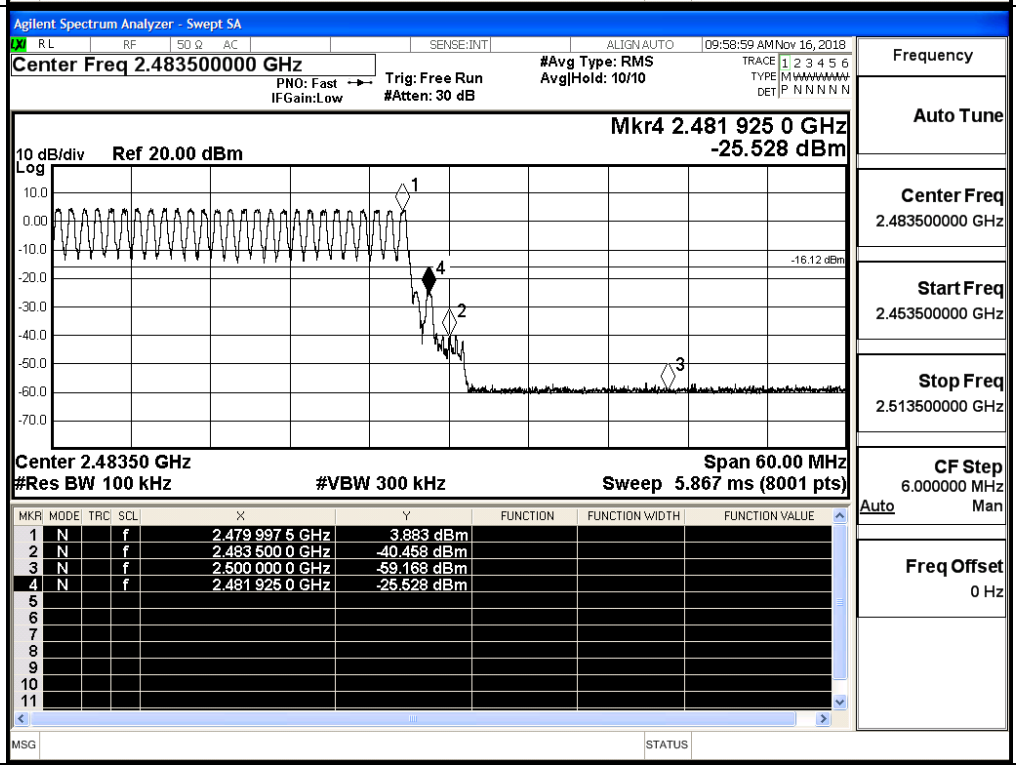
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	5.375	Off	-59.355	-14.63	PASS
			5.436	On	-46.775	-14.57	PASS
	HCH	2480	3.922	Off	-23.063	-16.08	PASS
			3.883	On	-25.528	-16.12	PASS
π/4DQPSK	LCH	2402	4.305	Off	-57.500	-15.70	PASS
			4.227	On	-32.316	-15.77	PASS
	HCH	2480	2.936	Off	-23.333	-17.06	PASS
			2.945	On	-25.637	-17.06	PASS
8DPSK	LCH	2402	4.293	Off	-57.966	-15.71	PASS
			3.963	On	-37.605	-16.04	PASS
	HCH	2480	2.921	Off	-23.618	-17.08	PASS
			2.586	On	-23.522	-17.41	PASS

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

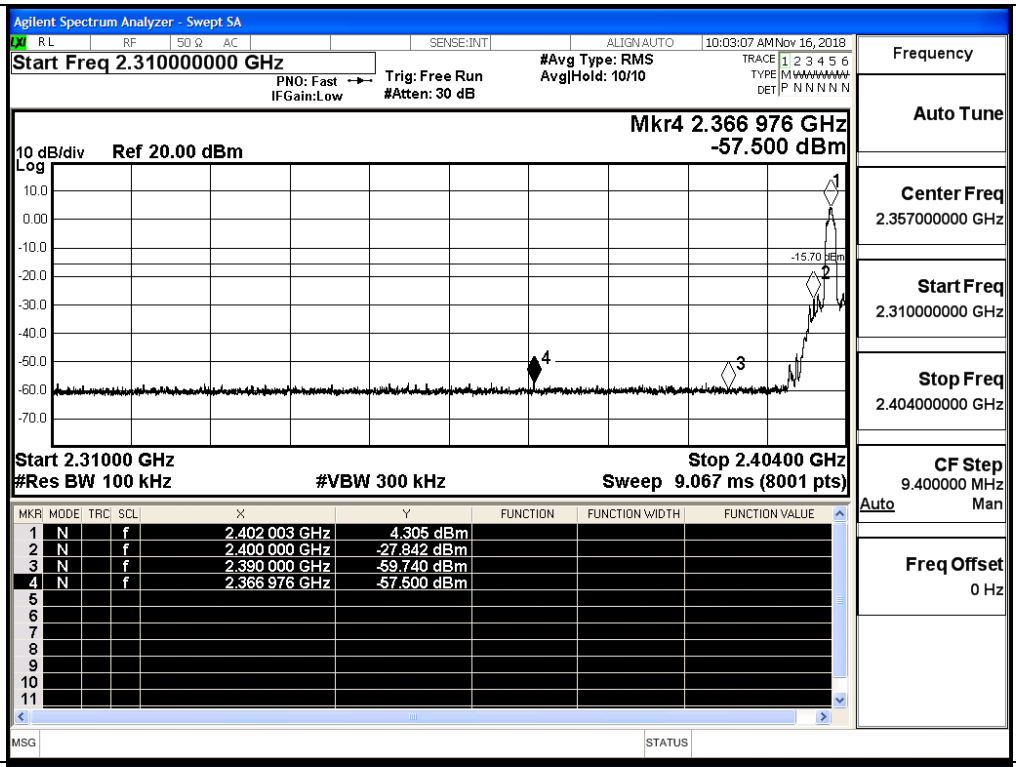
GFSK/HCH/No Hop



GFSK/HCH/Hop



π/4DQPSK/LCH/No Hop



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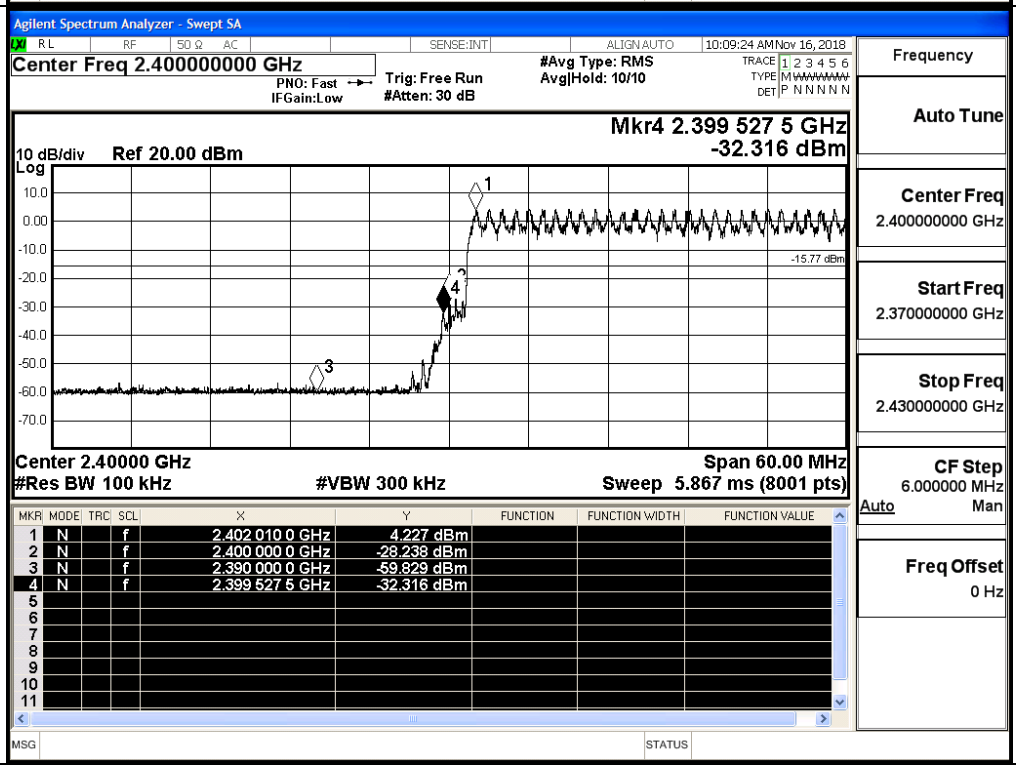

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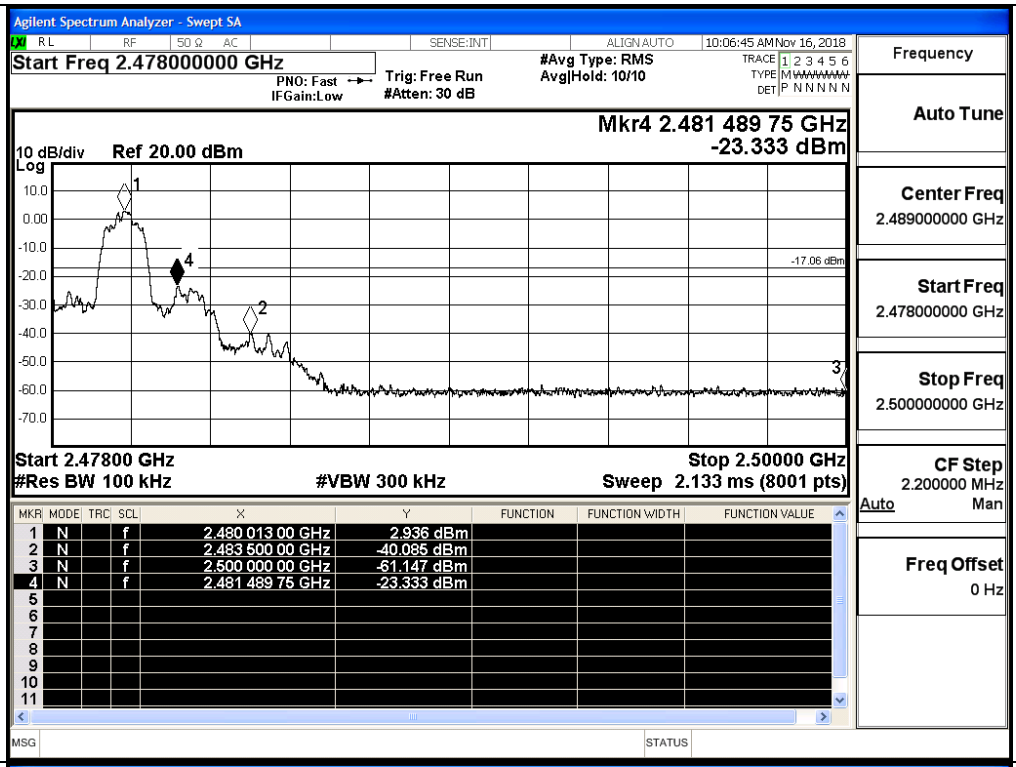

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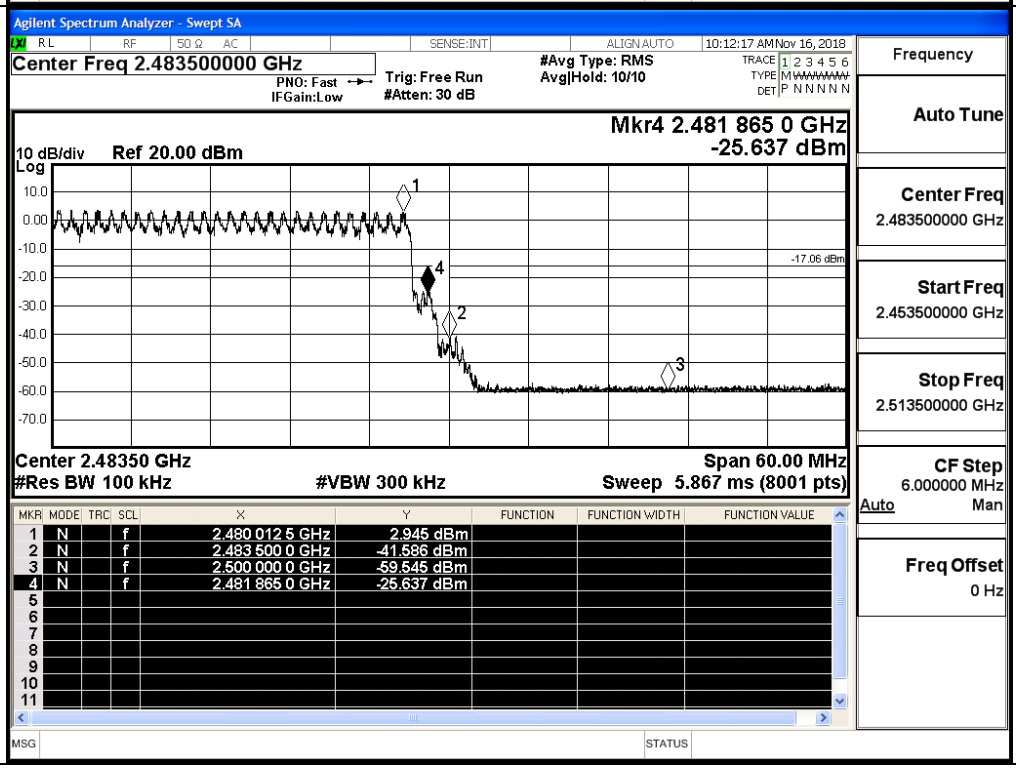
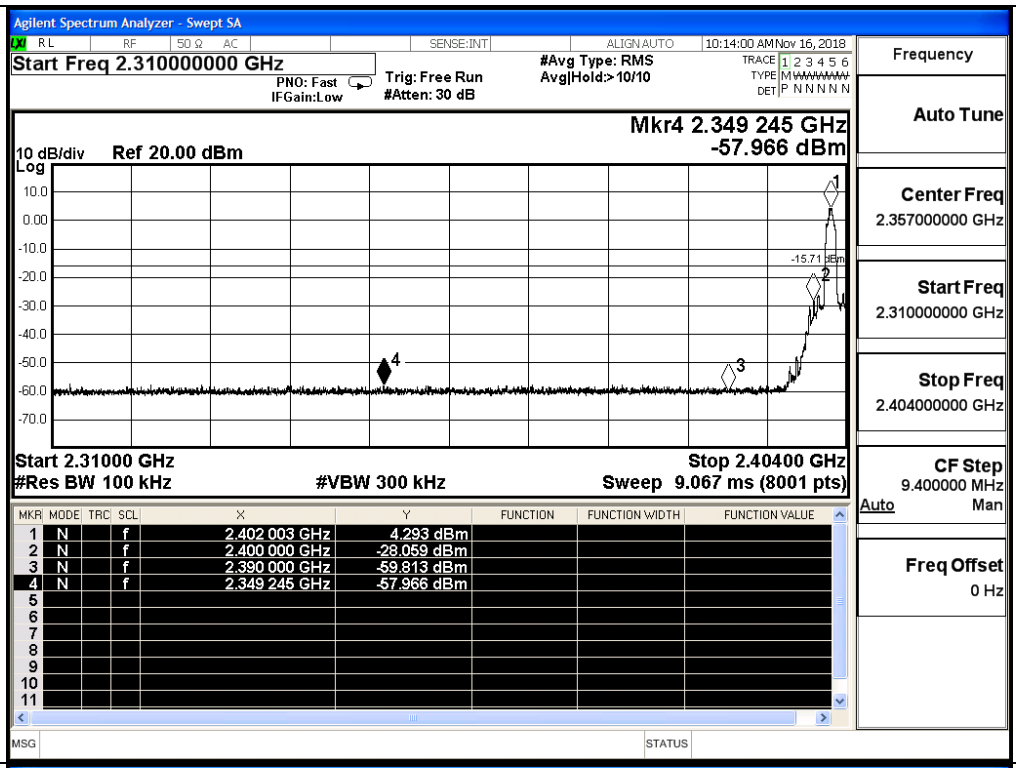
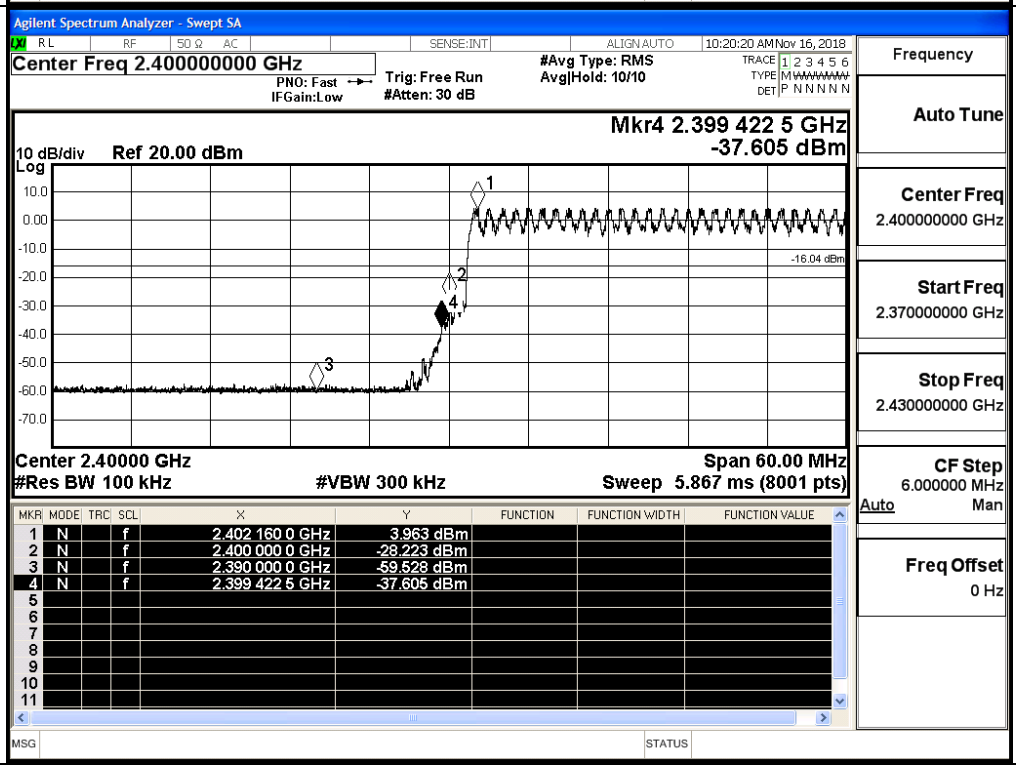


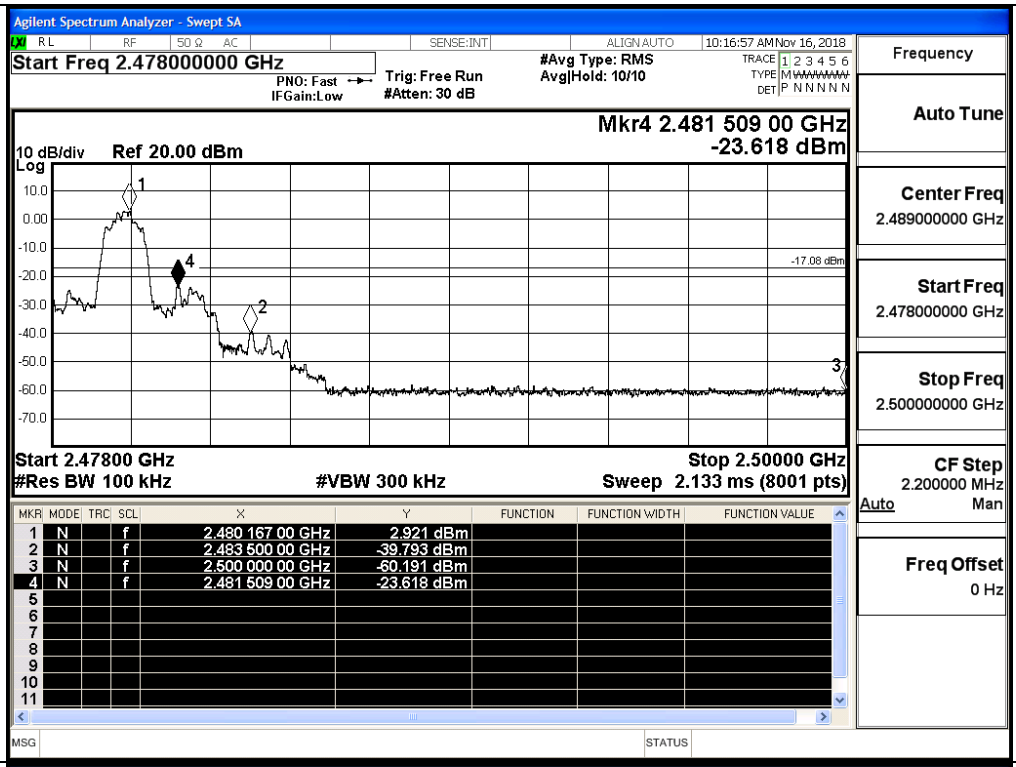
8DPSK/LCH/No Hop



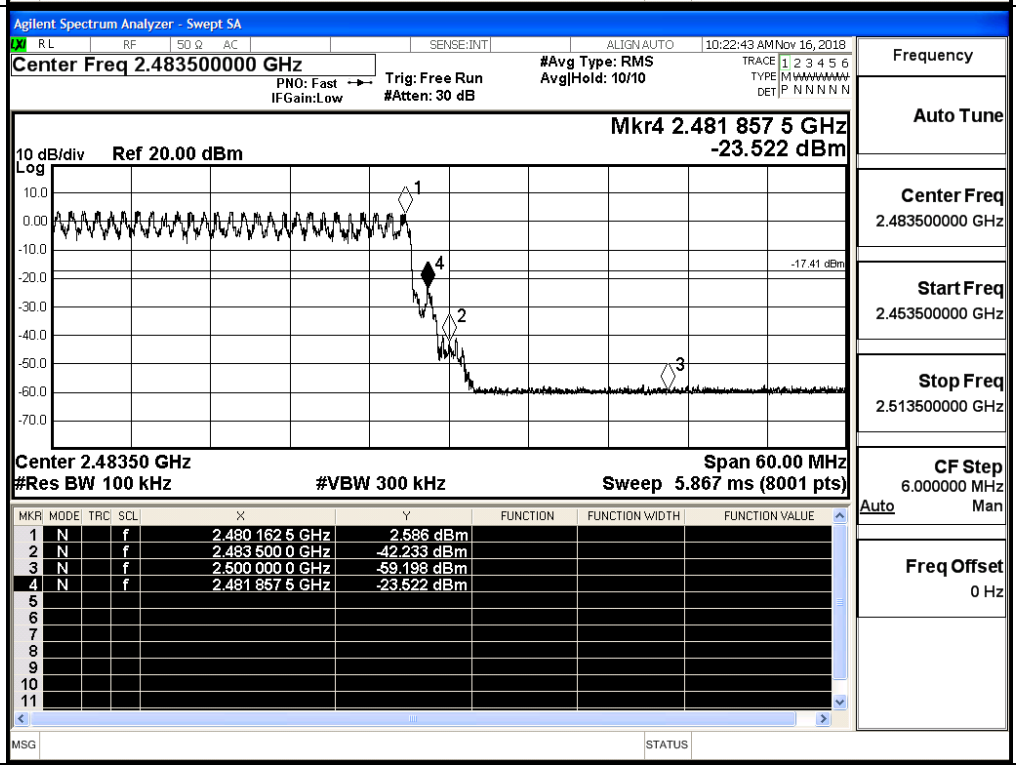
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



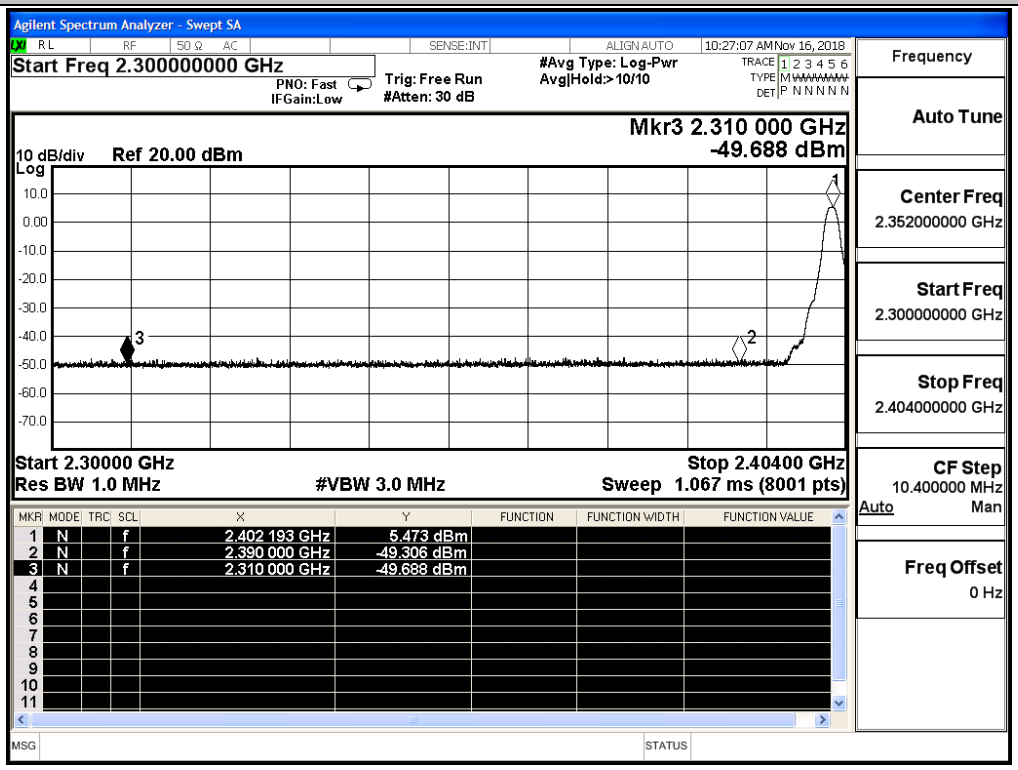
8DPSK/HCH/Hop



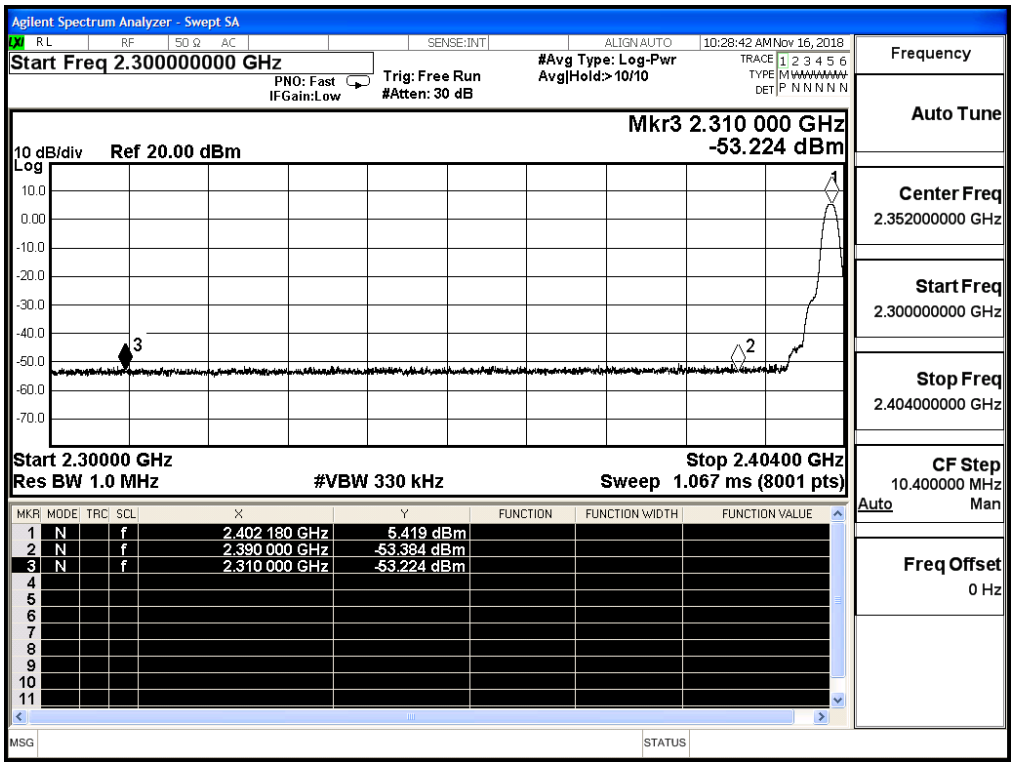
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-49.688	2.0	0	47.57	PEAK	74	PASS
	Off	2310.0	-53.224	2.0	0	44.04	AV	54	PASS
	Off	2390.0	-49.306	2.0	0	47.95	PEAK	74	PASS
	Off	2390.0	-53.384	2.0	0	43.88	AV	54	PASS
	Off	2483.5	-27.353	2.0	0	69.91	PEAK	74	PASS
	Off	2483.5	-46.402	2.0	0	50.86	AV	54	PASS
	Off	2500.0	-49.825	2.0	0	47.44	PEAK	74	PASS
	Off	2500.0	-52.864	2.0	0	44.40	AV	54	PASS
π/4DQPSK	Off	2310.0	-51.191	2.0	0	46.07	PEAK	74	PASS
	Off	2310.0	-54.437	2.0	0	42.82	AV	54	PASS
	Off	2390.0	-49.636	2.0	0	47.62	PEAK	74	PASS
	Off	2390.0	-53.600	2.0	0	43.66	AV	54	PASS
	Off	2483.5	-28.927	2.0	0	68.33	PEAK	74	PASS
	Off	2483.5	-44.545	2.0	0	52.72	AV	54	PASS
	Off	2500.0	-49.957	2.0	0	47.30	PEAK	74	PASS
	Off	2500.0	-52.265	2.0	0	45.00	AV	54	PASS
8DPSK	Off	2310.0	-51.897	2.0	0	45.36	PEAK	74	PASS
	Off	2310.0	-54.260	2.0	0	43.00	AV	54	PASS
	Off	2390.0	-51.647	2.0	0	45.61	PEAK	74	PASS
	Off	2390.0	-54.030	2.0	0	43.23	AV	54	PASS
	Off	2483.5	-29.034	2.0	0	68.23	PEAK	74	PASS
	Off	2483.5	-44.138	2.0	0	53.12	AV	54	PASS
	Off	2500.0	-49.773	2.0	0	47.49	PEAK	74	PASS
	Off	2500.0	-52.890	2.0	0	44.37	AV	54	PASS

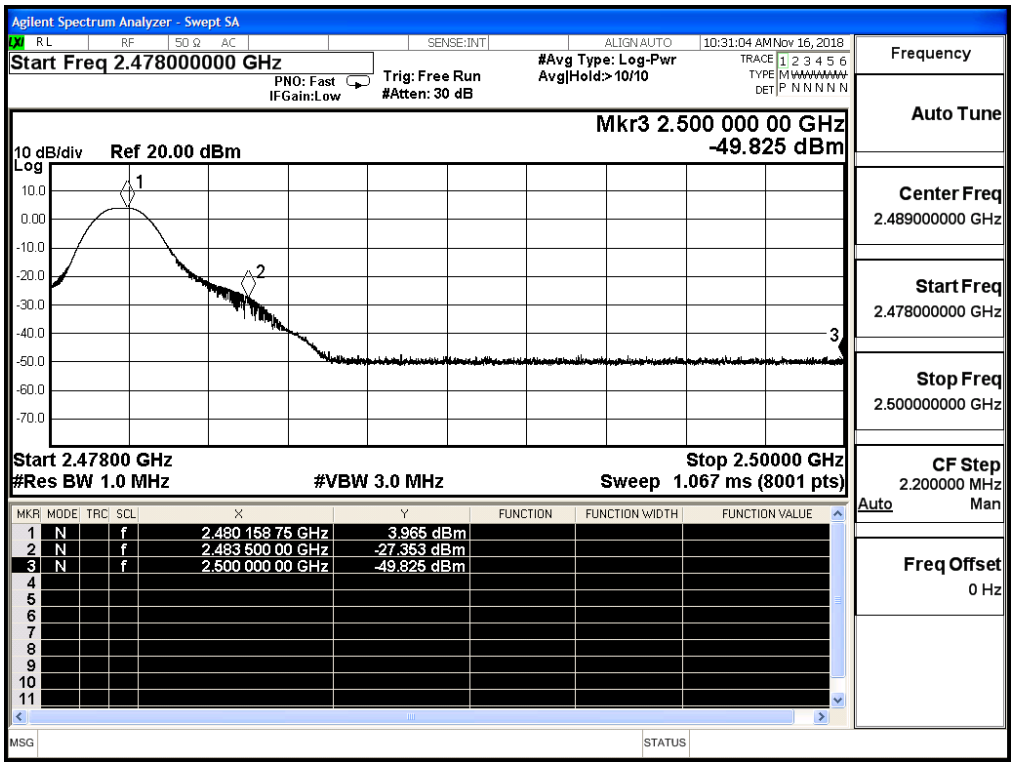
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



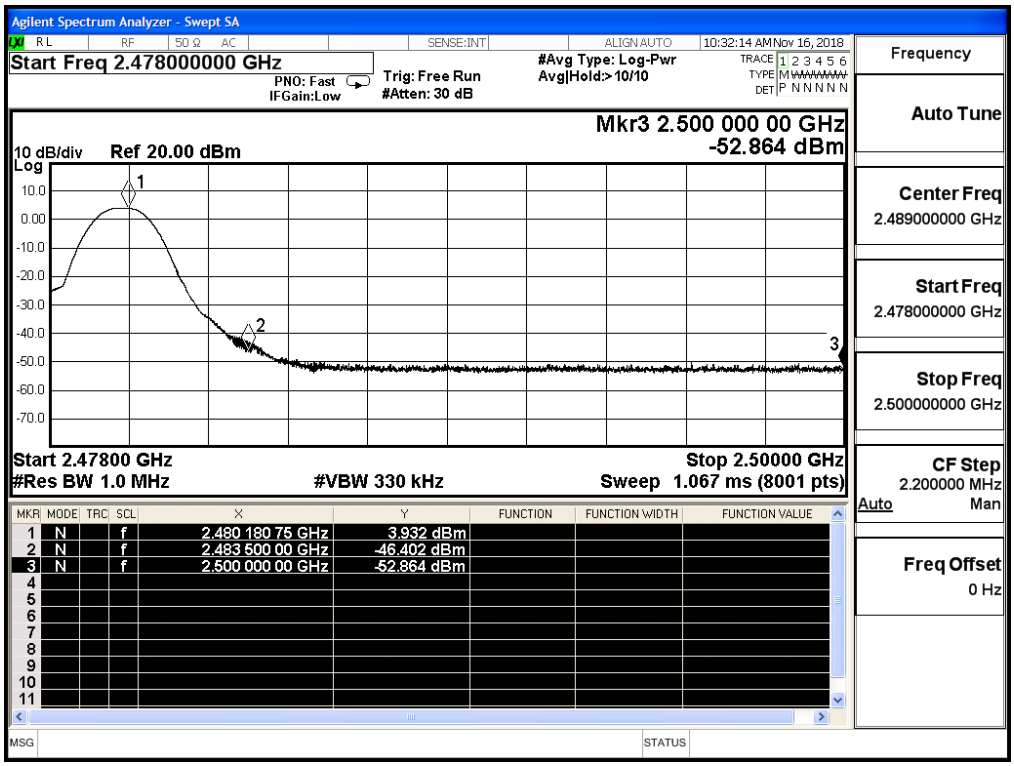
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



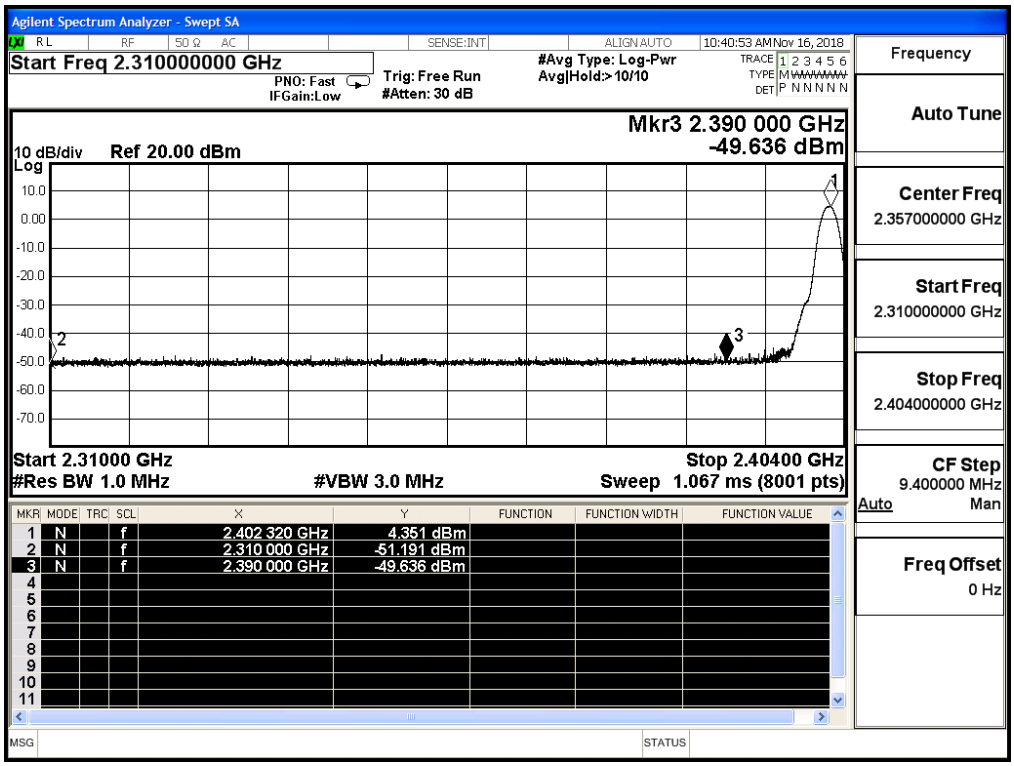
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



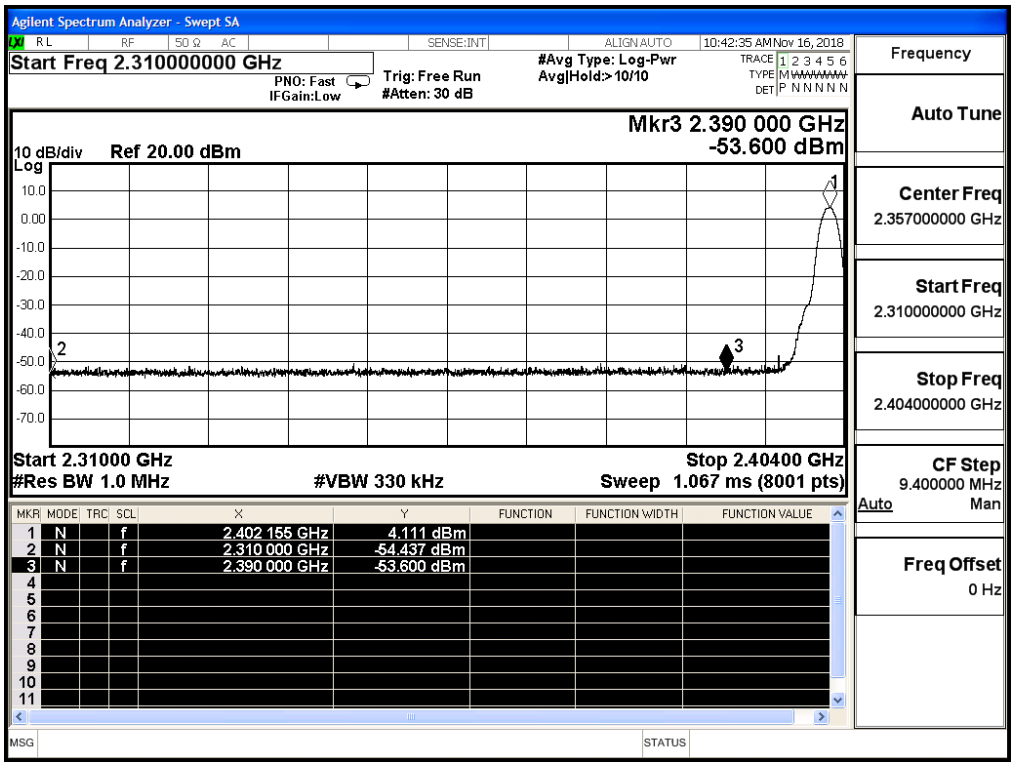
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



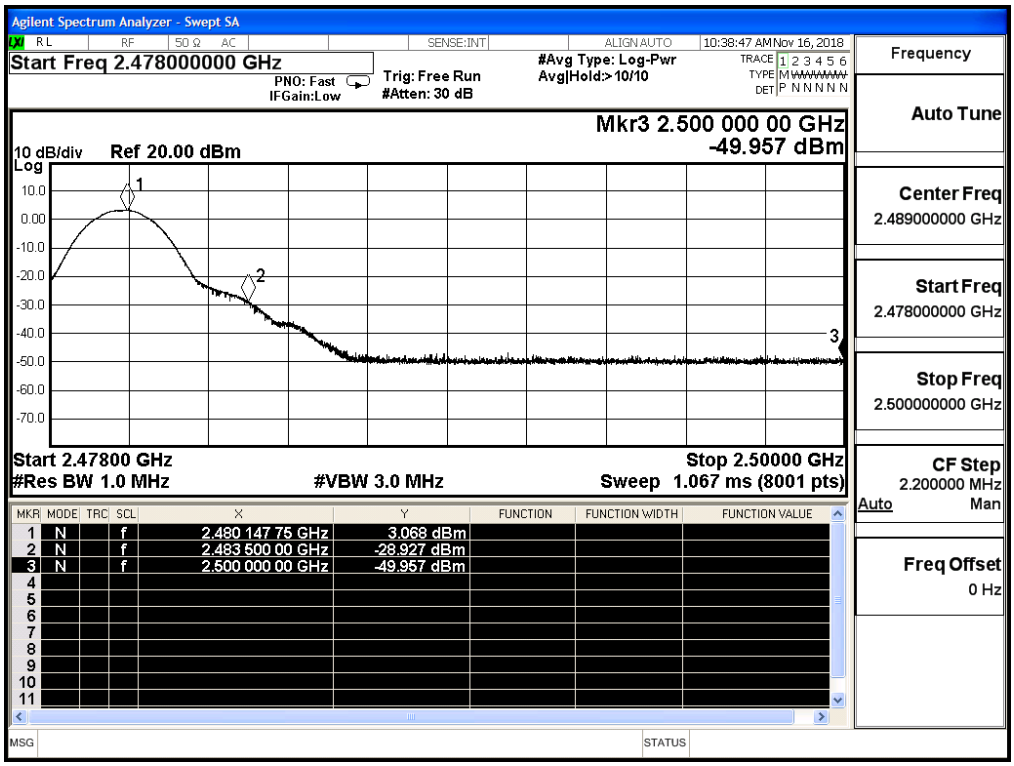
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



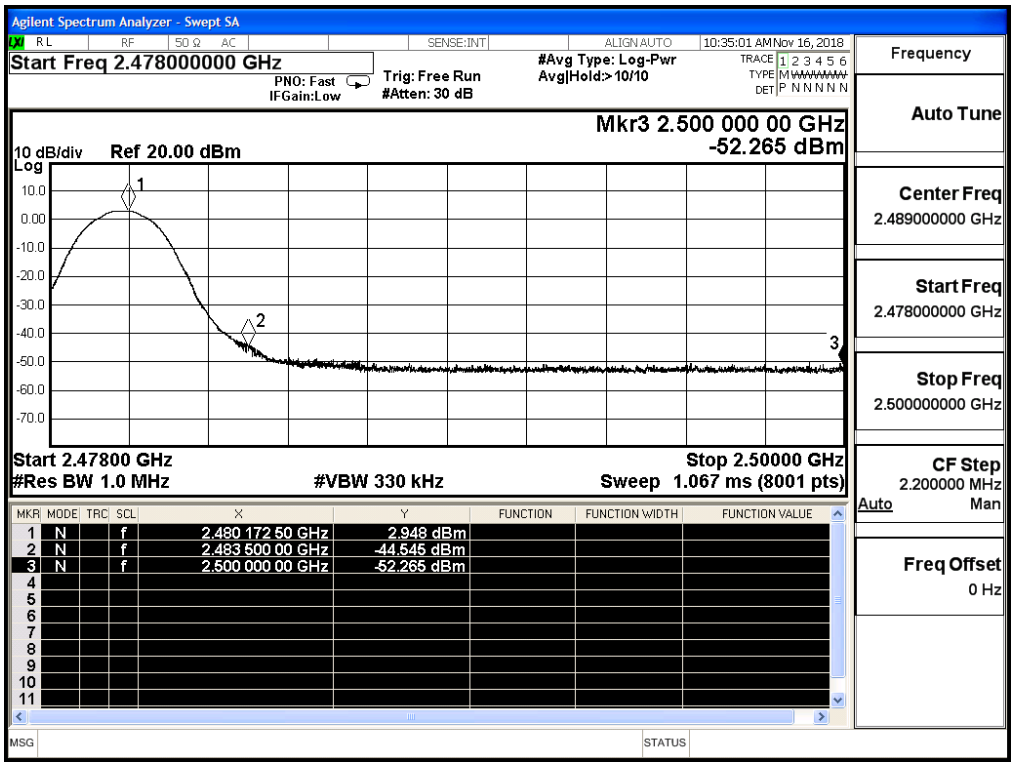
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



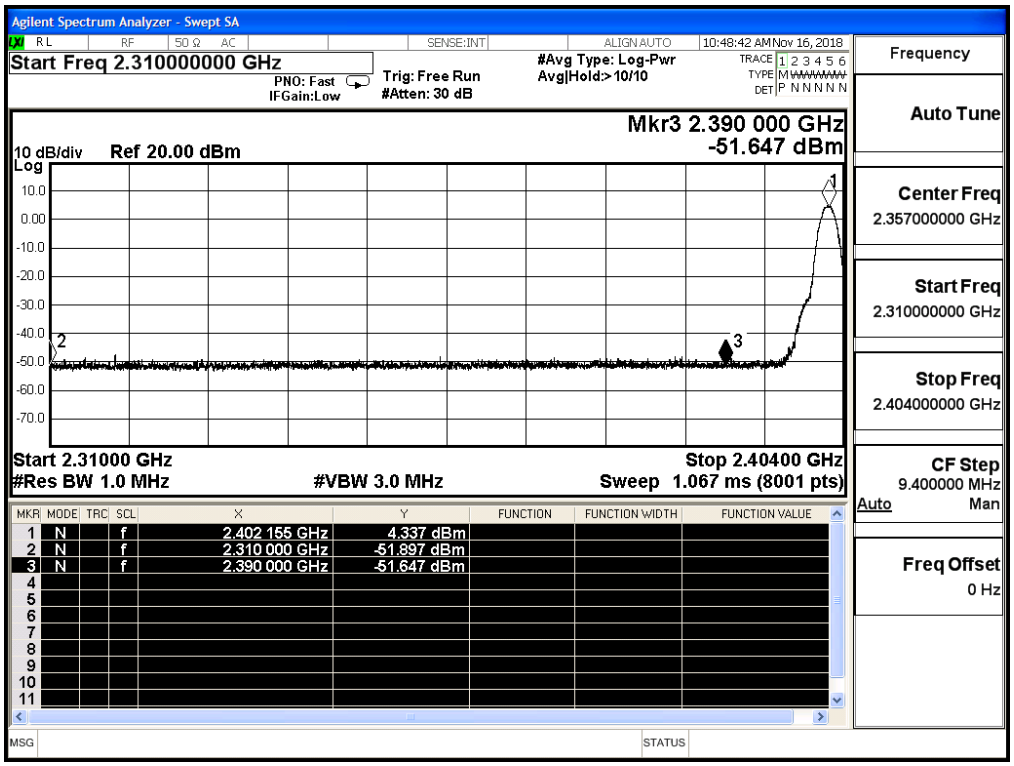
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



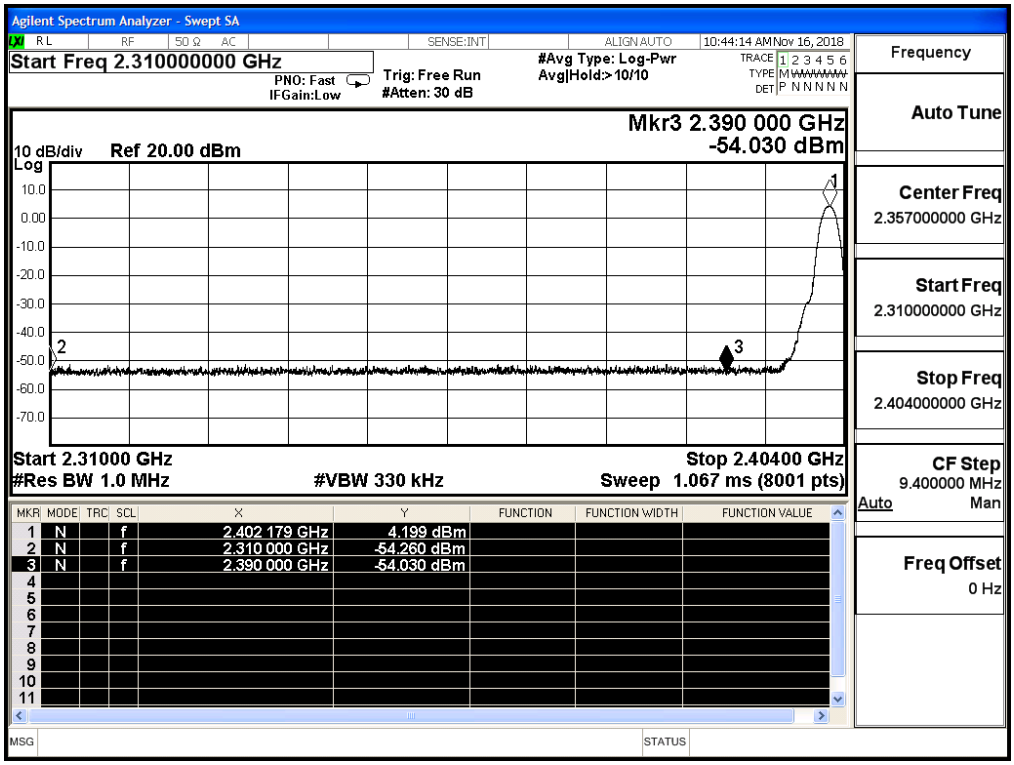
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



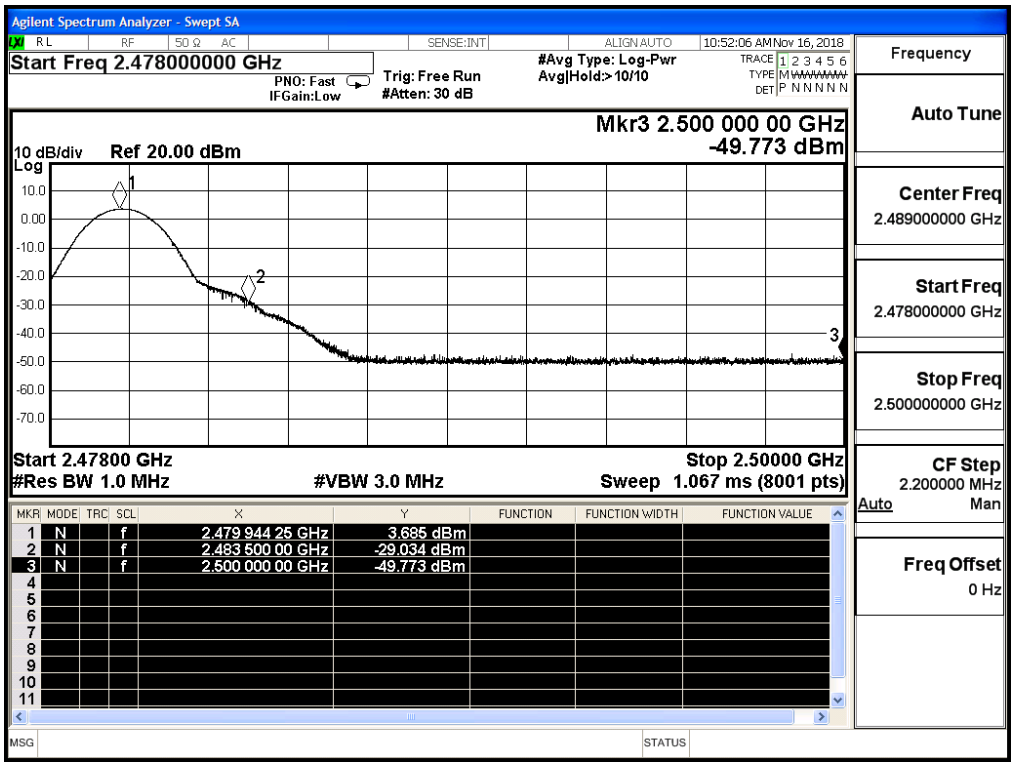
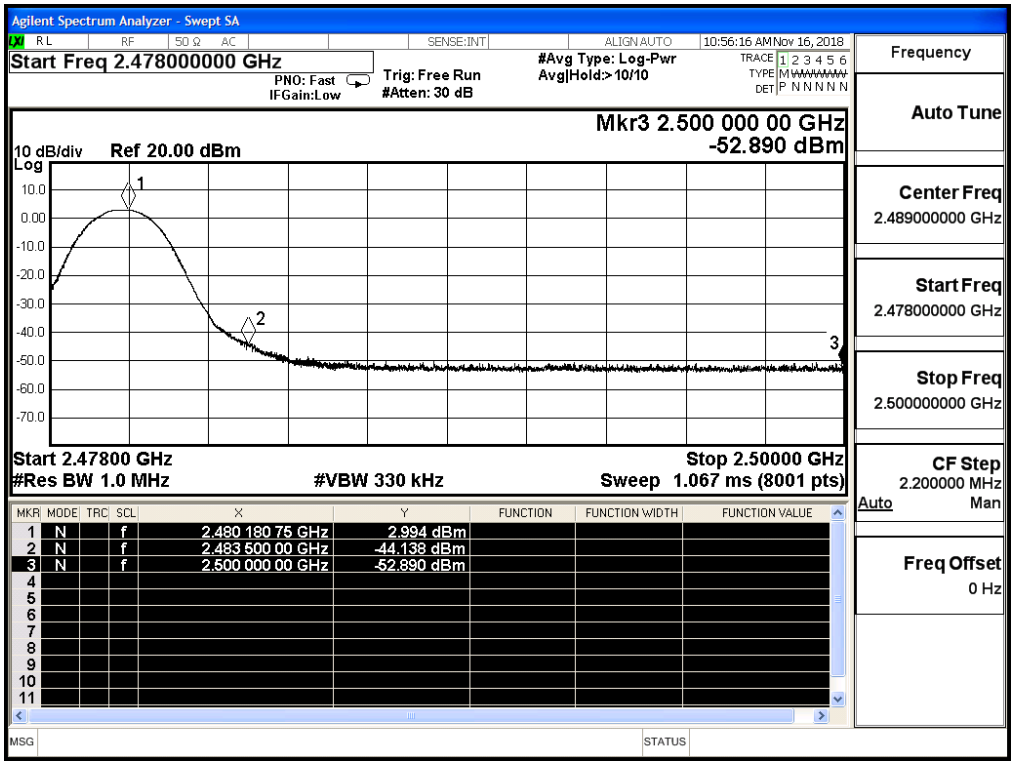
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)