

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

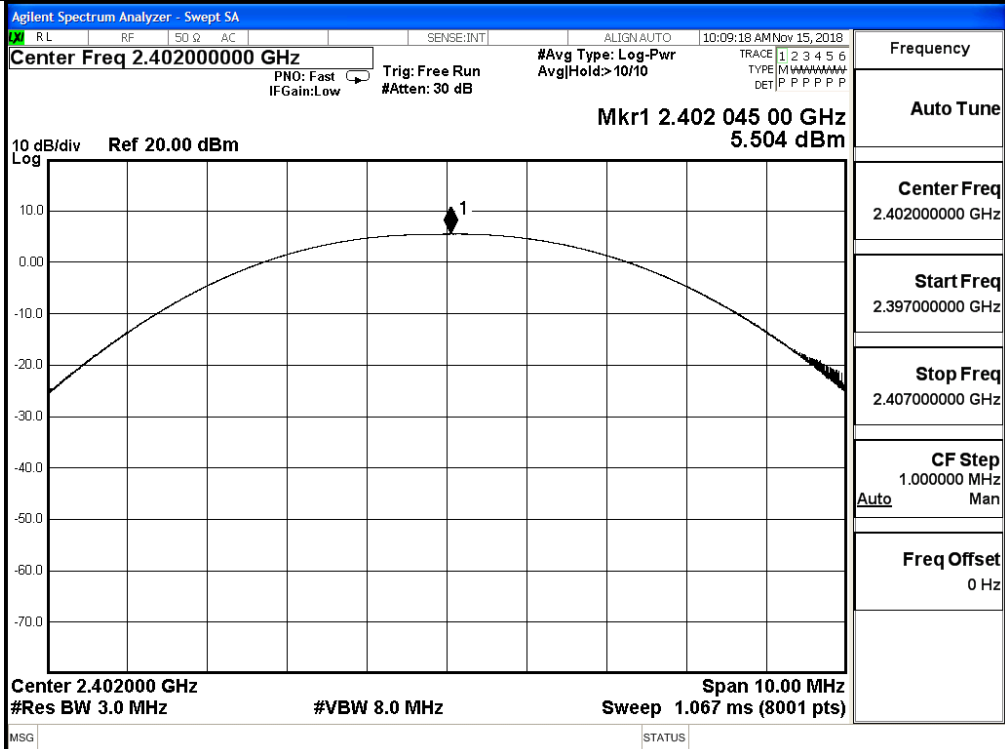
Temperature:	23.5 °C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

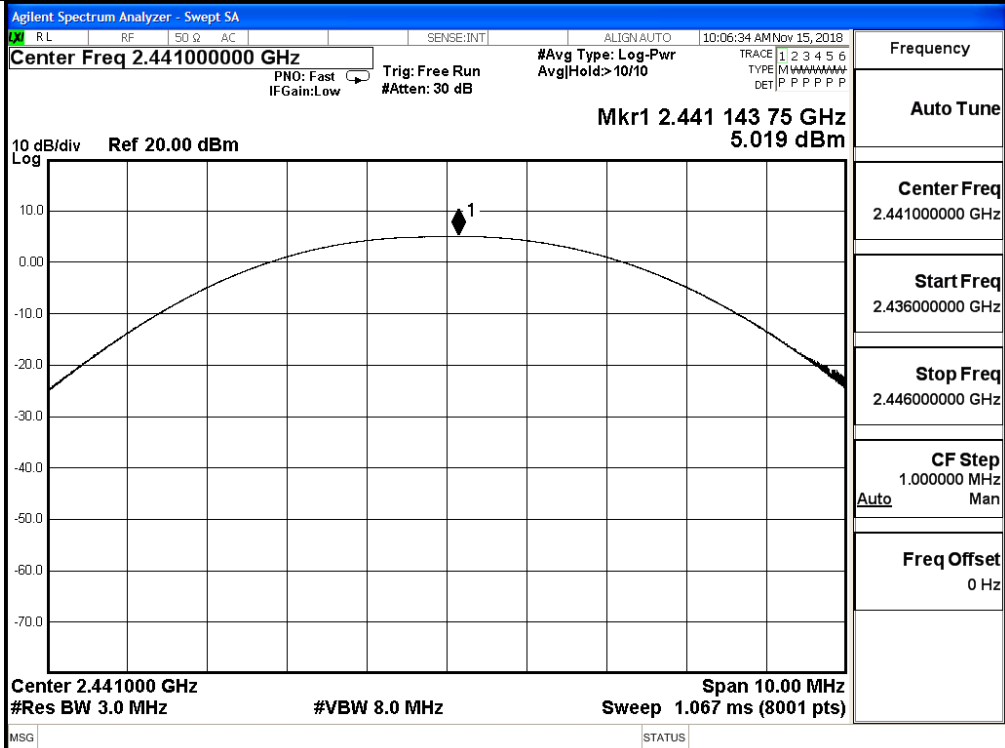
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	5.504	21	PASS
	MCH	5.019	21	PASS
	HCH	4.002	21	PASS
$\pi/4$ DQPSK	LCH	5.170	21	PASS
	MCH	4.817	21	PASS
	HCH	4.004	21	PASS
8DPSK	LCH	5.431	21	PASS
	MCH	5.093	21	PASS
	HCH	4.087	21	PASS

Test Graphs

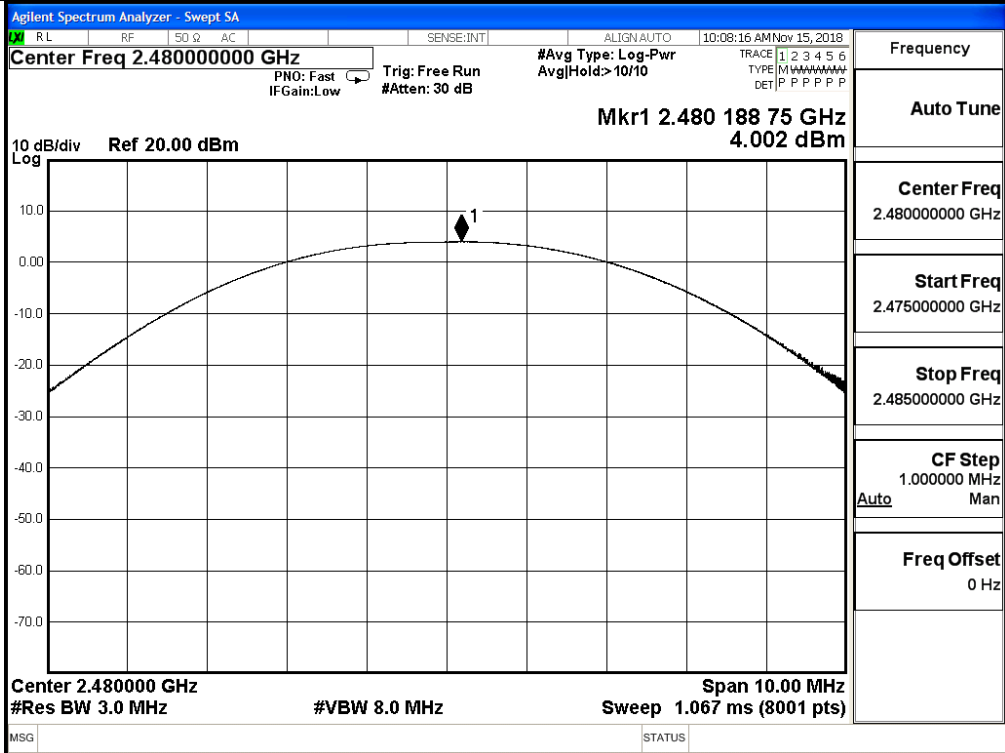
GFSK/LCH



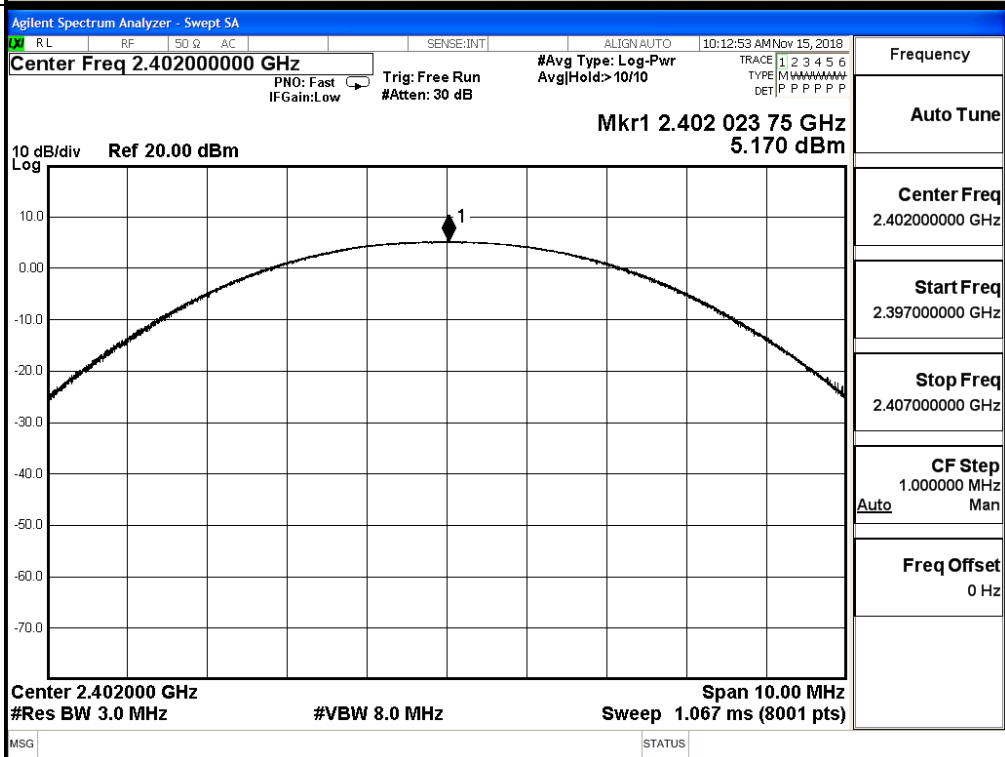
GFSK/MCH



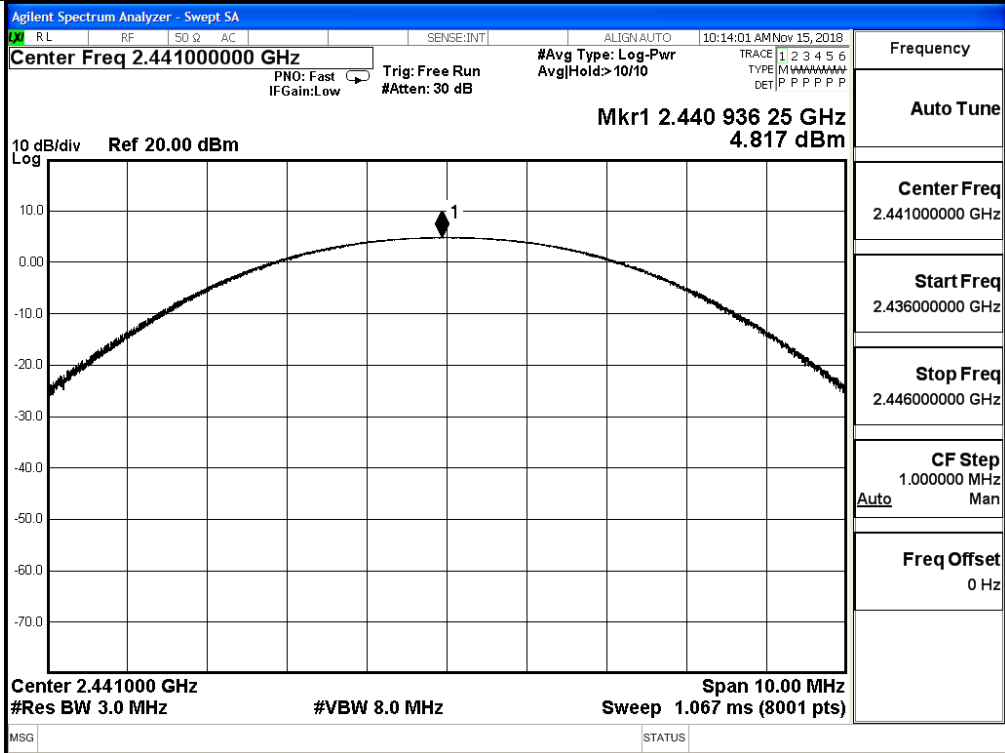
GFSK/HCH



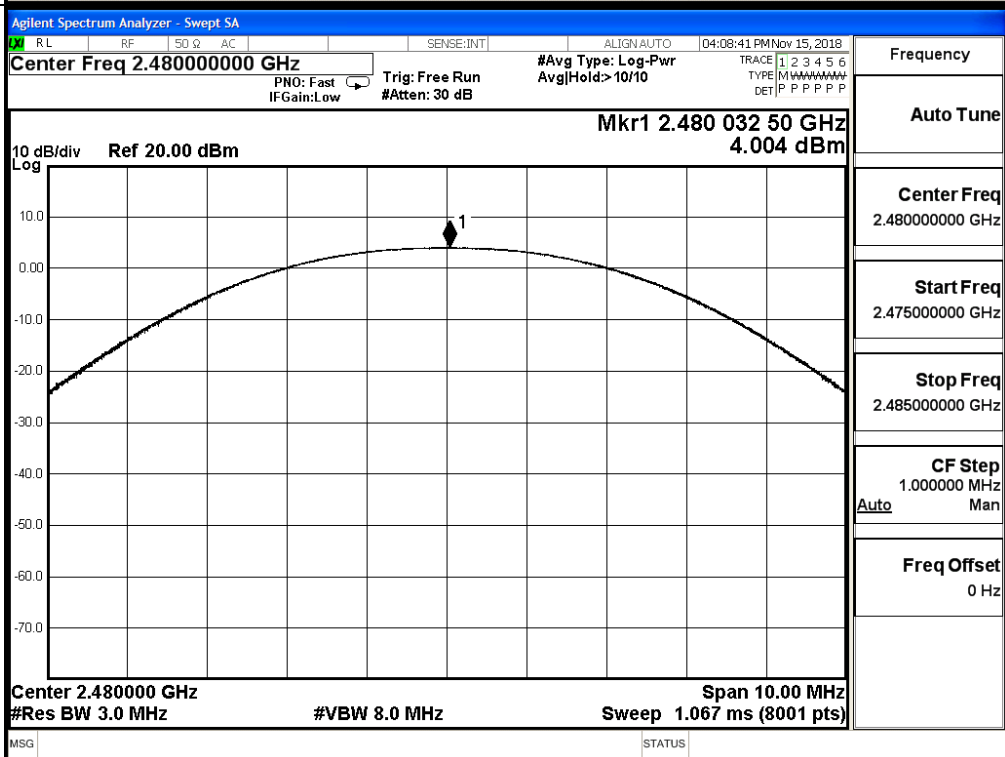
π /4DQPSK/LCH



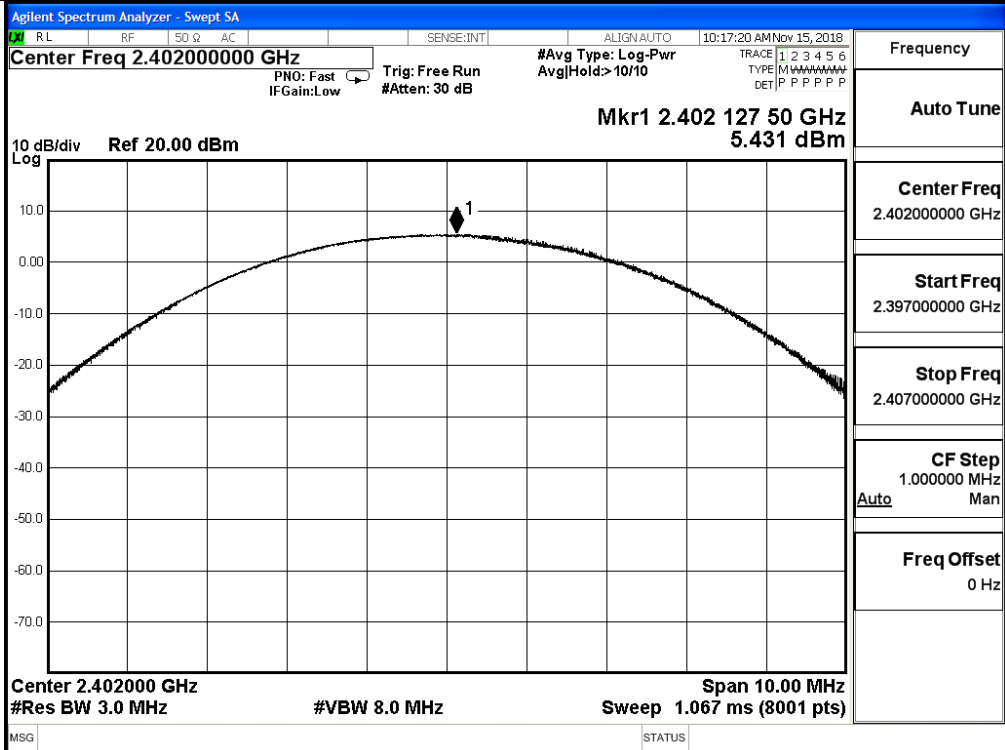
$\pi/4$ DQPSK/MCH



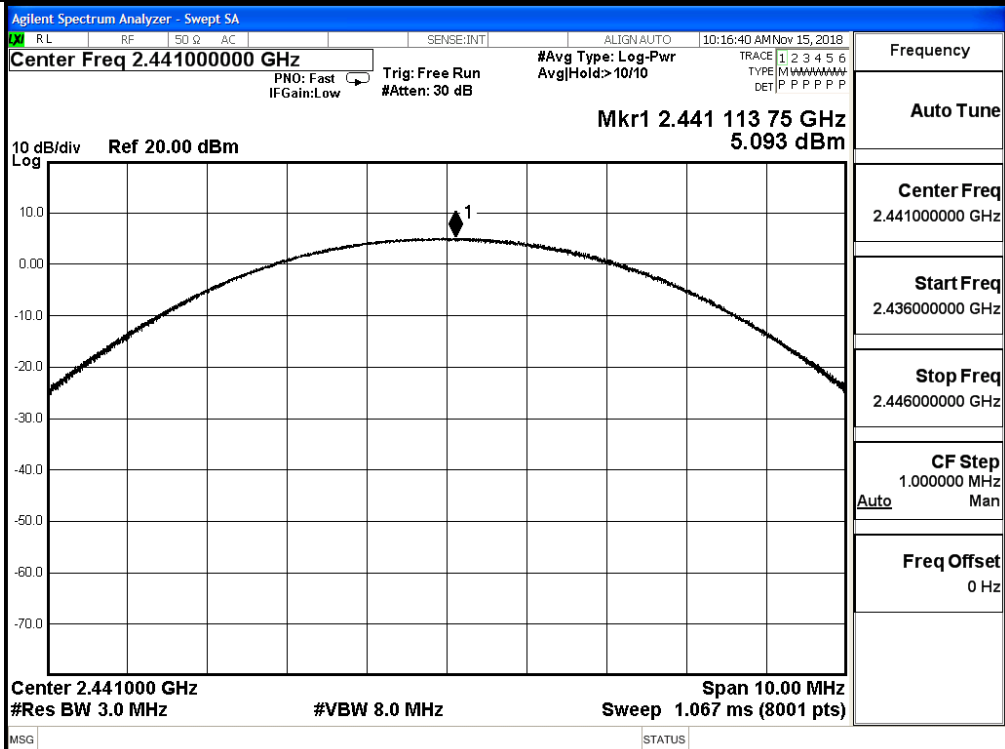
$\pi/4$ DQPSK/HCH

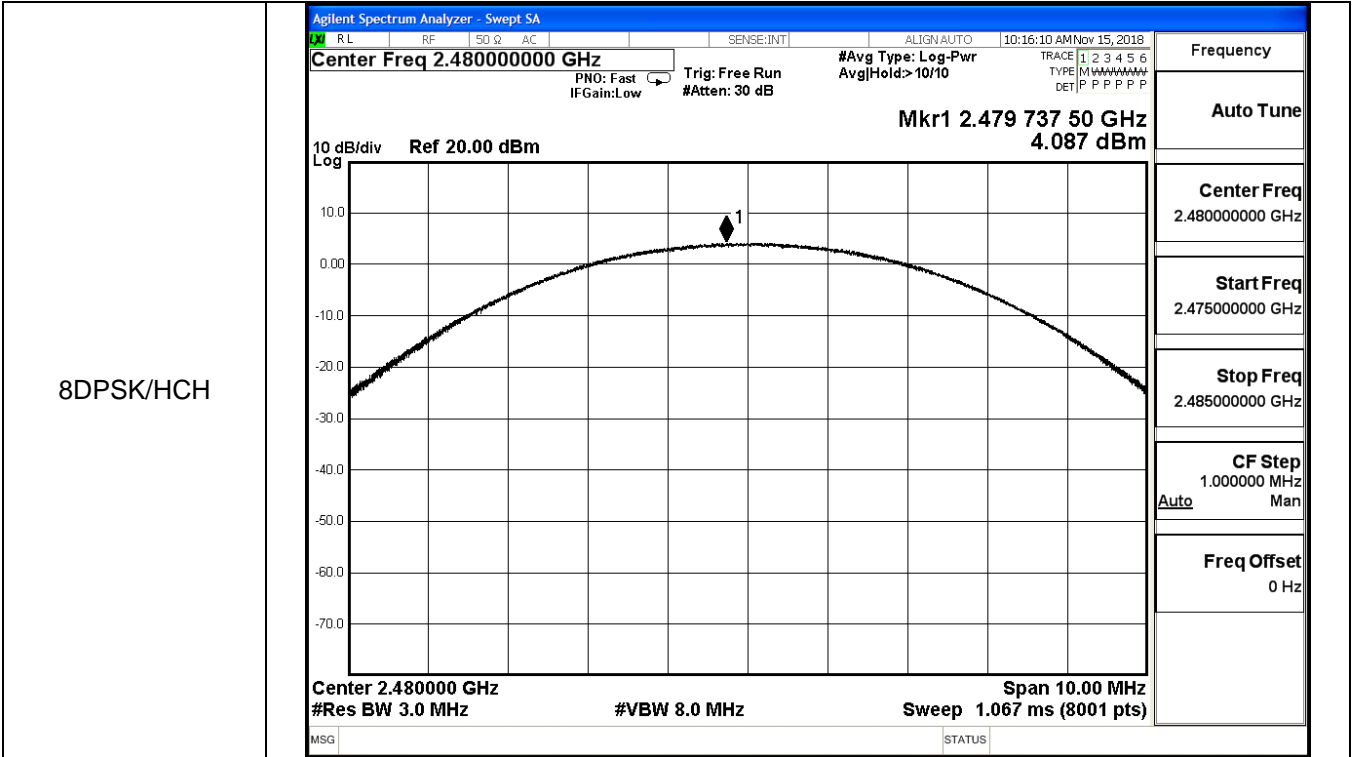


8DPSK/LCH



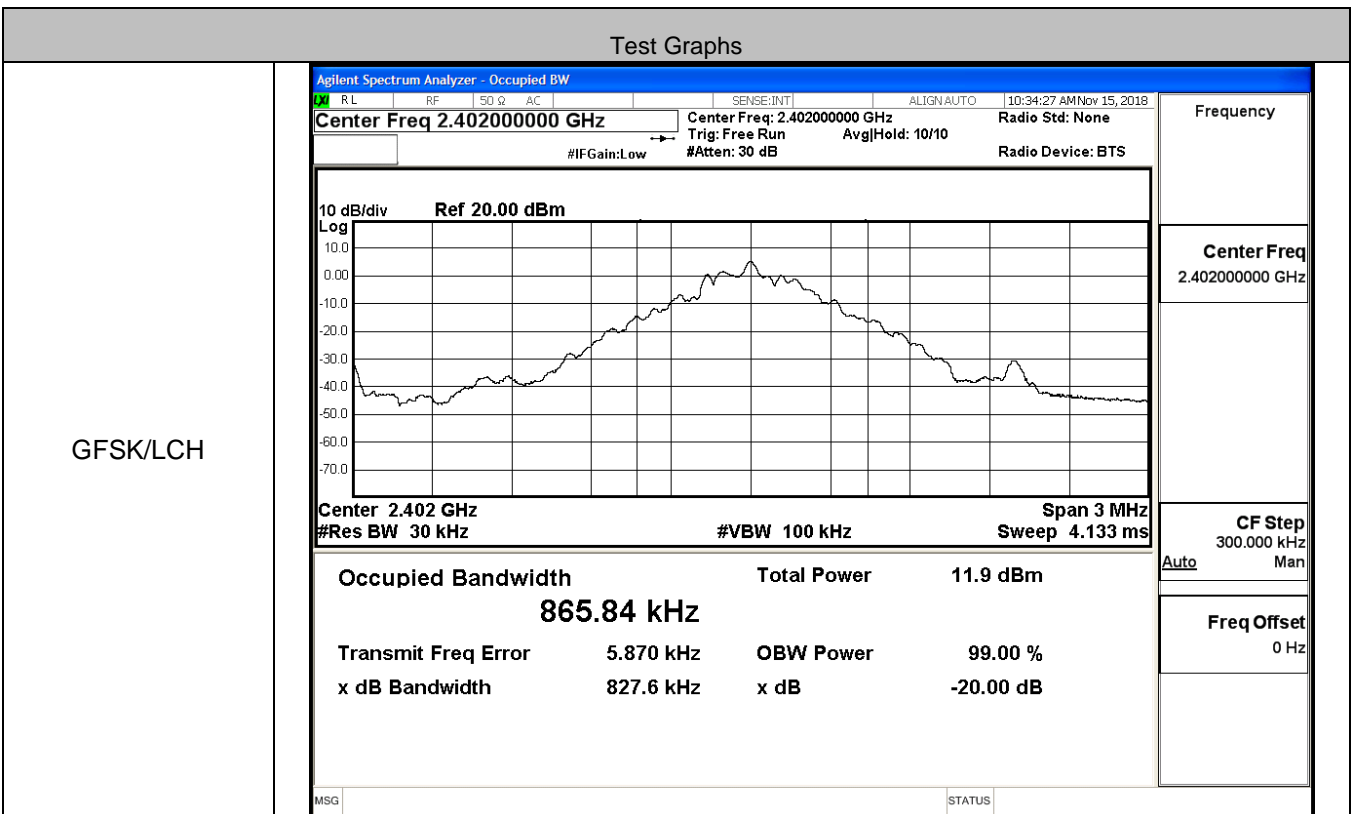
8DPSK/MCH



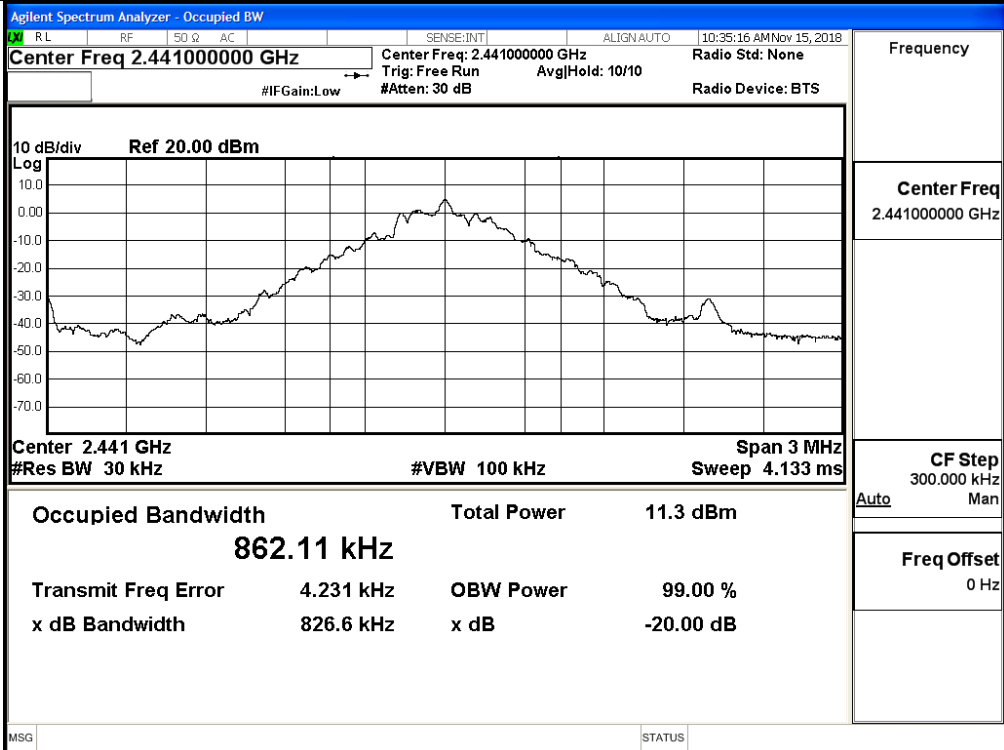


A.2 99% and 20dB Bandwidth

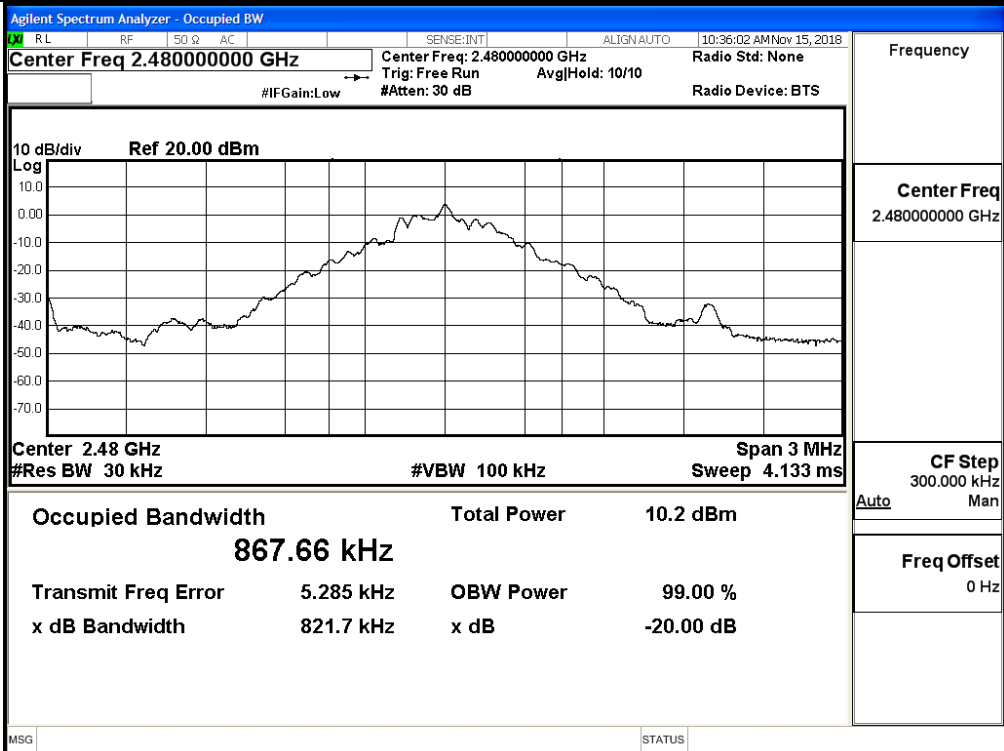
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.86584	0.8276	Not Specified	PASS
	MCH	0.86211	0.8266	Not Specified	PASS
	HCH	0.86766	0.8217	Not Specified	PASS
π/4DQPSK	LCH	1.1745	1.229	Not Specified	PASS
	MCH	1.1763	1.230	Not Specified	PASS
	HCH	1.1791	1.226	Not Specified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



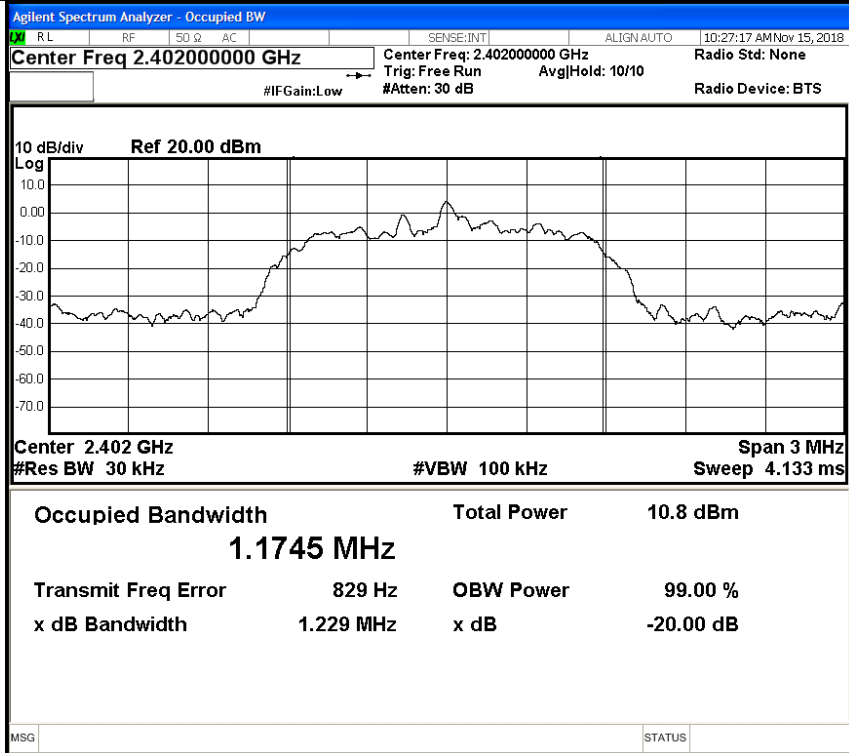
GFSK/MCH



GFSK/HCH

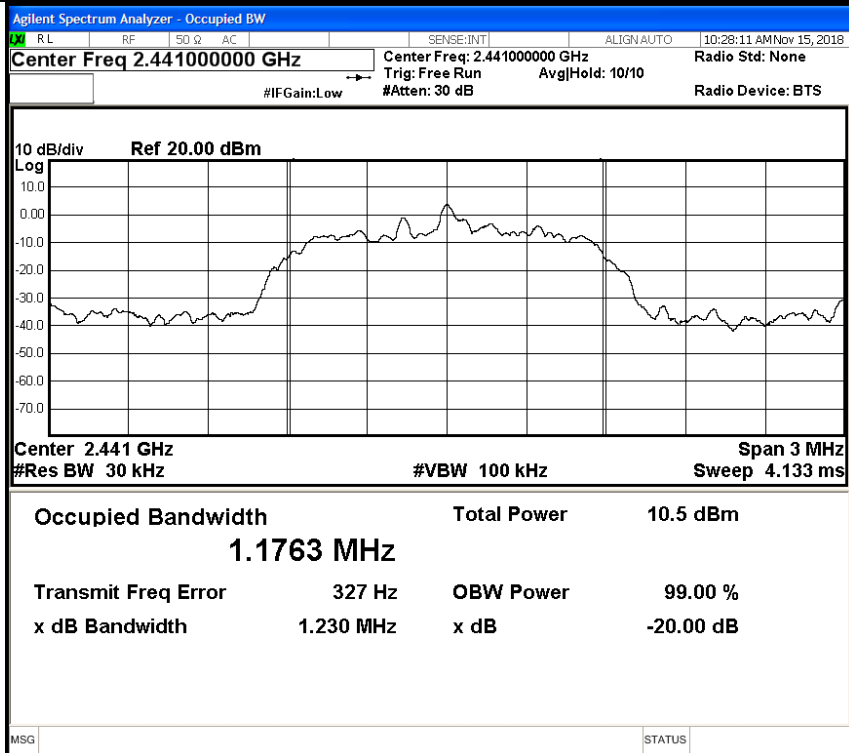


π /4DQPSK/LCH



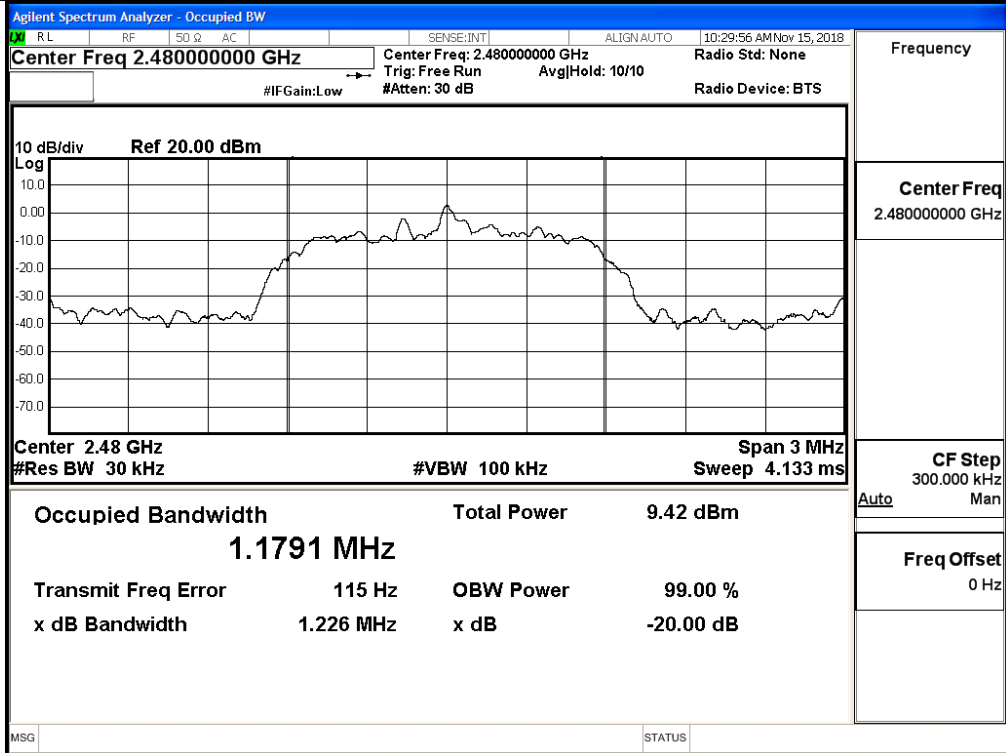
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	300.000 kHz
Auto	Man
Freq Offset	0 Hz

π /4DQPSK/MCH

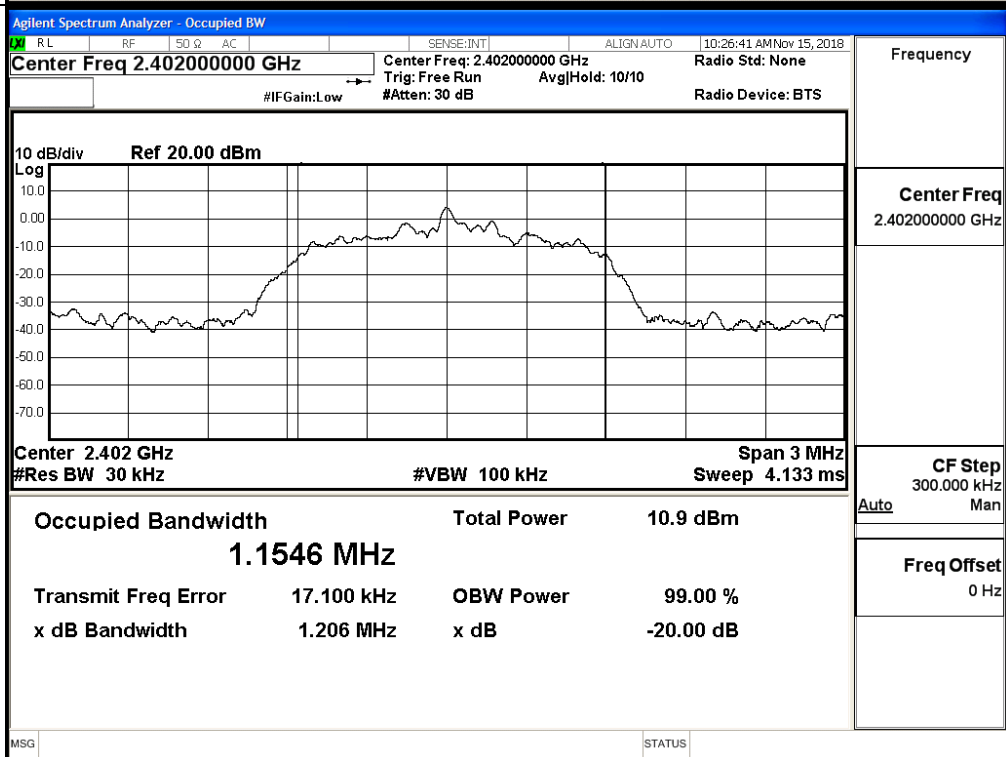


Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	300.000 kHz
Auto	Man
Freq Offset	0 Hz

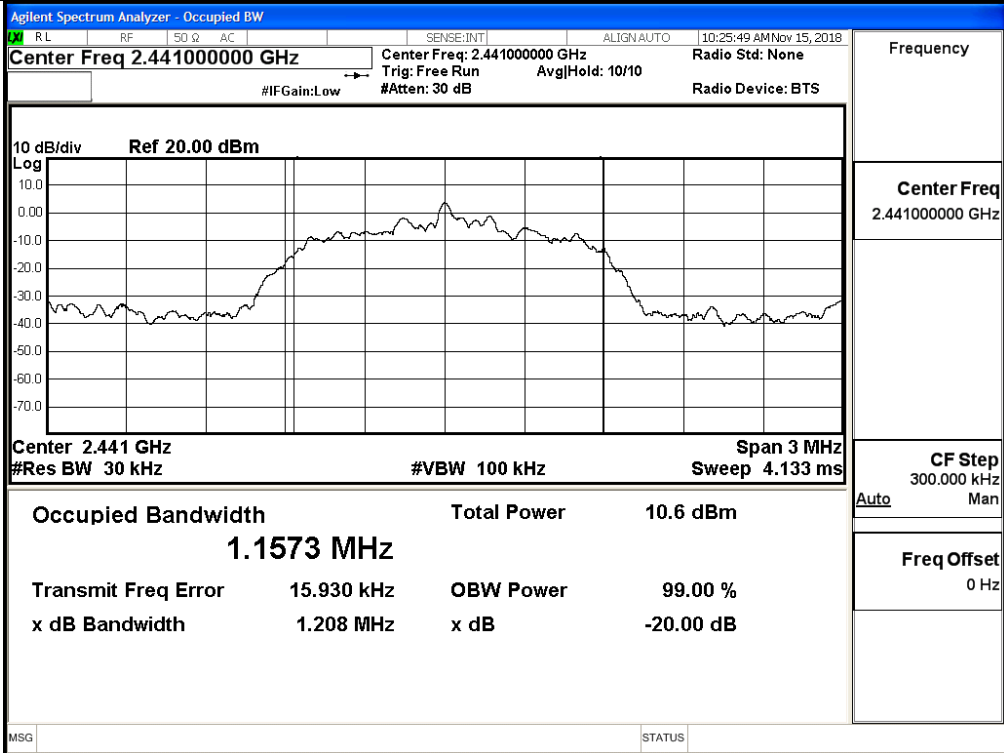
$\pi/4$ DQPSK/HCH



8DPSK/LCH

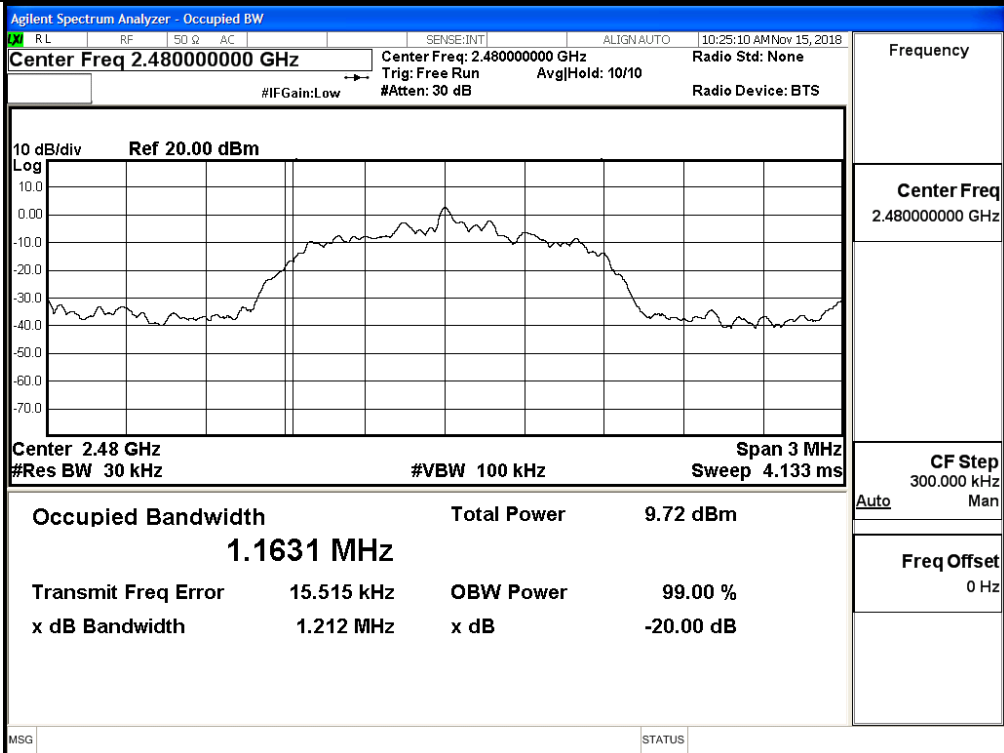


8DPSK/MCH



Frequency	2.441000000 GHz
Center Freq	2.441000000 GHz
CF Step	300.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/HCH

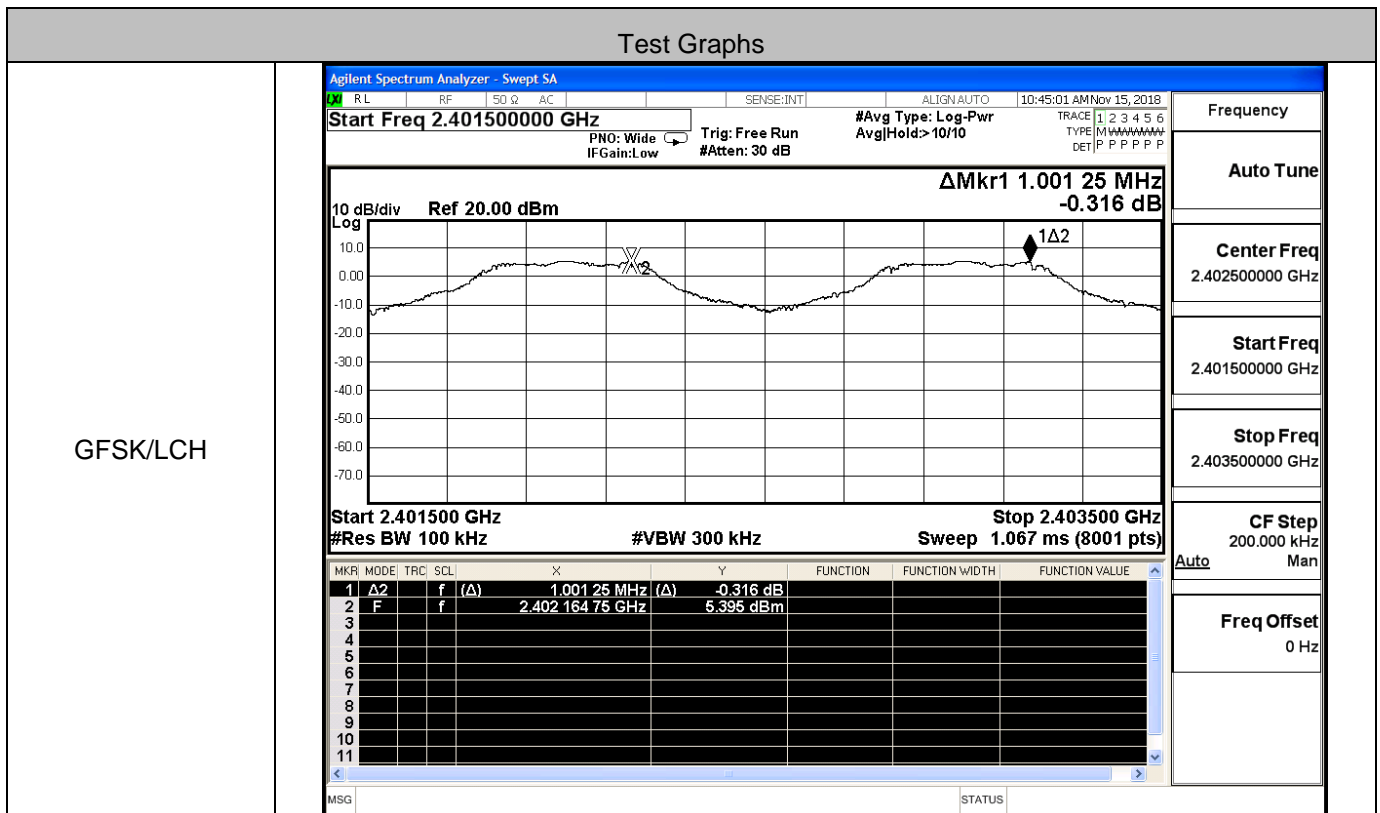


Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	300.000 kHz
Auto	Man
Freq Offset	0 Hz

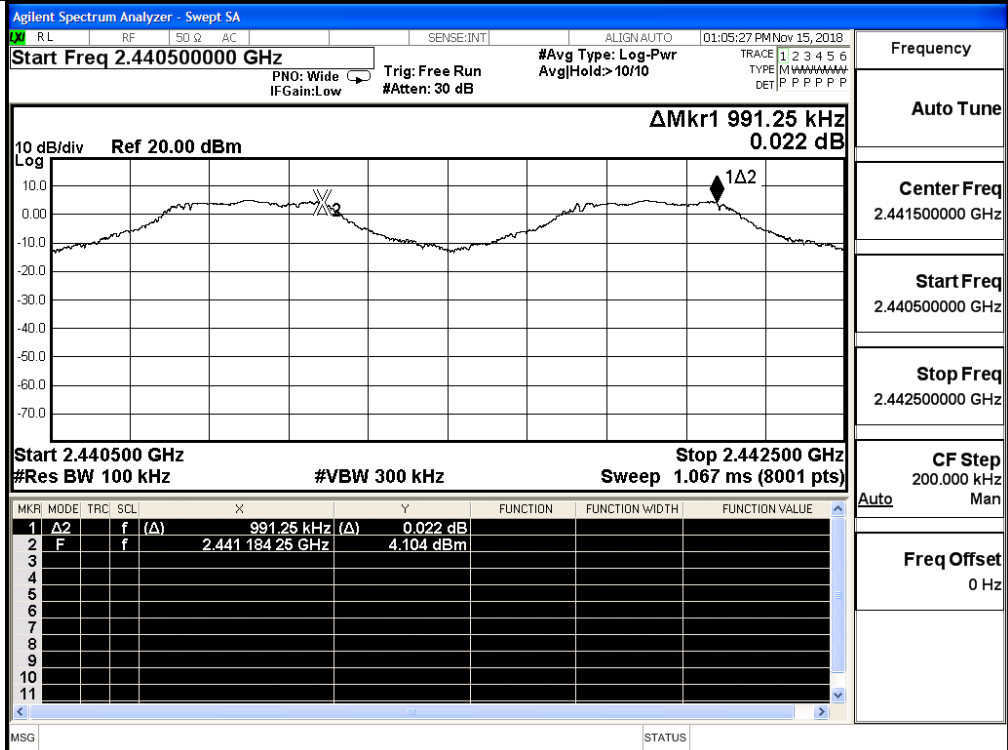
A.3 Carrier Frequency Separation

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

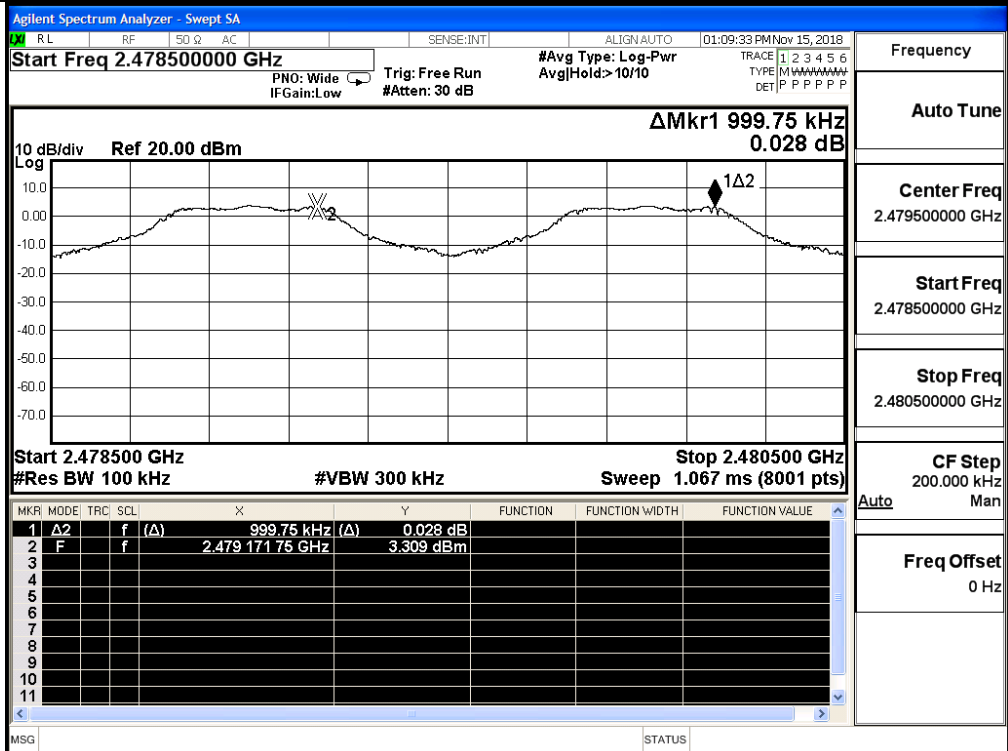


GFSK/MCH



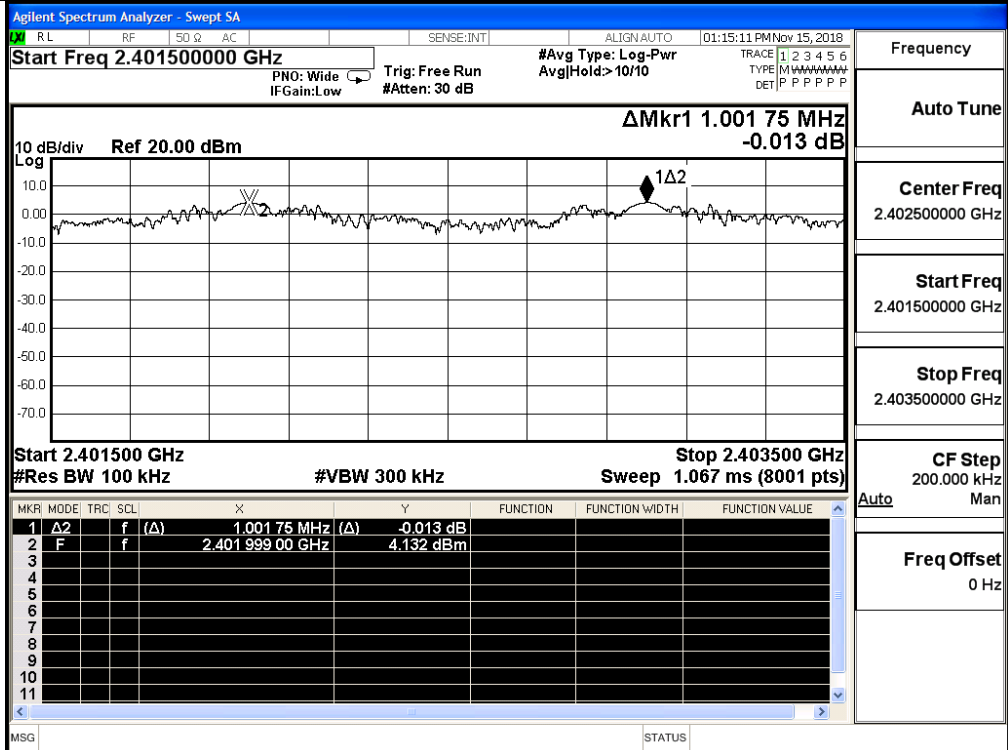
Frequency	
Auto Tune	
Center Freq	2.441500000 GHz
Start Freq	2.440500000 GHz
Stop Freq	2.442500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH



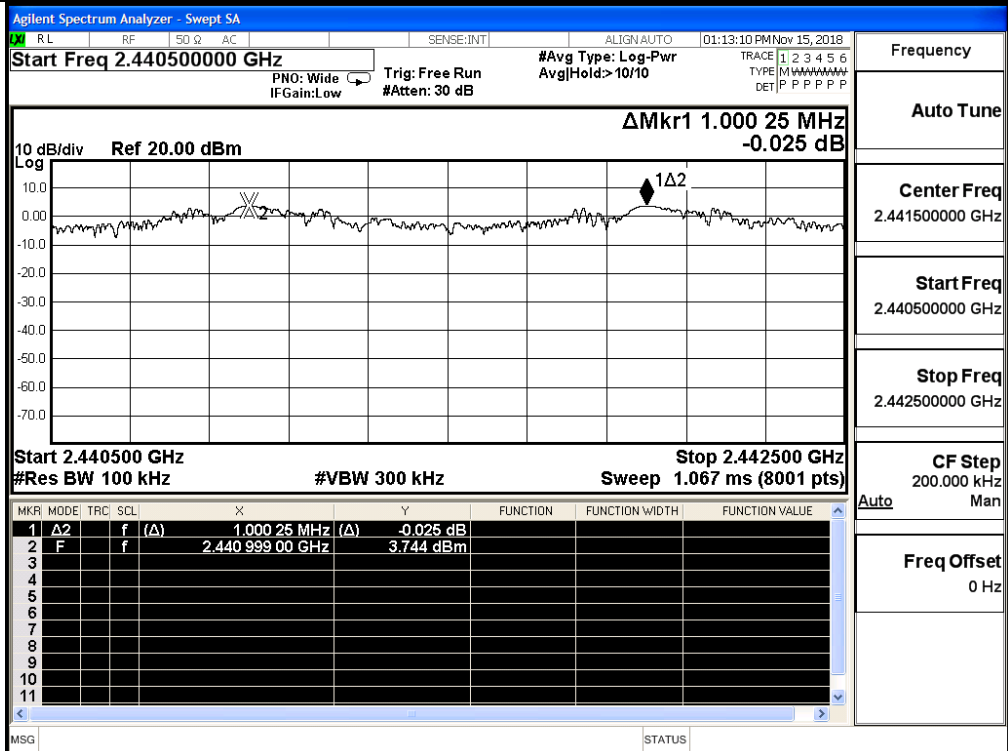
Frequency	
Auto Tune	
Center Freq	2.479500000 GHz
Start Freq	2.478500000 GHz
Stop Freq	2.480500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH



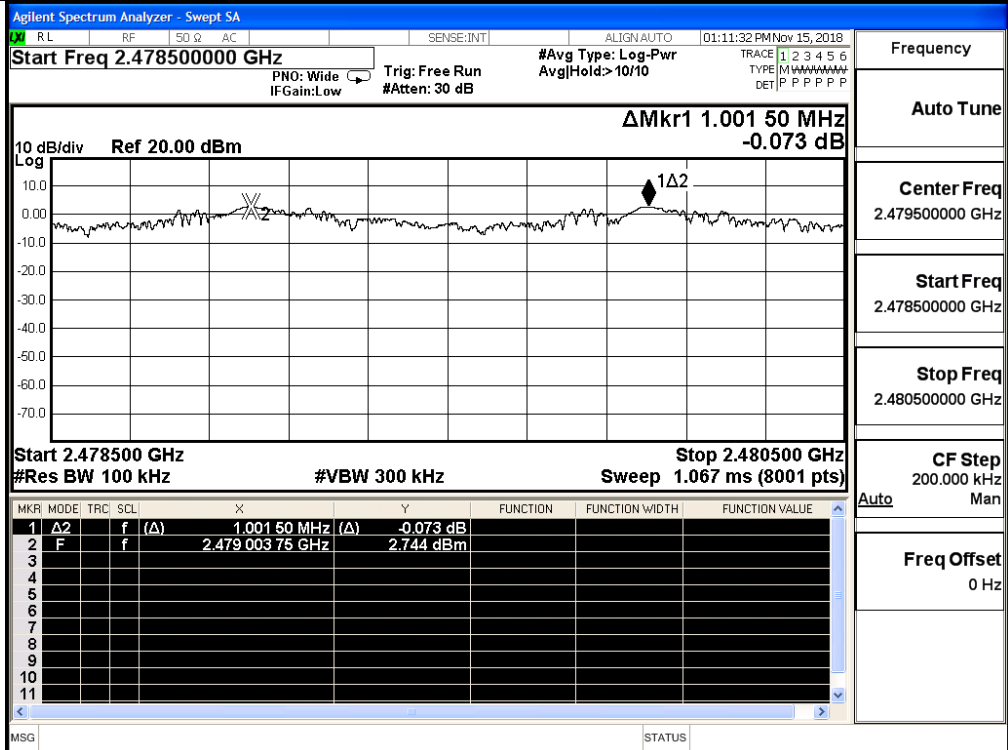
Frequency	
Auto Tune	
Center Freq	2.402500000 GHz
Start Freq	2.401500000 GHz
Stop Freq	2.403500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/MCH

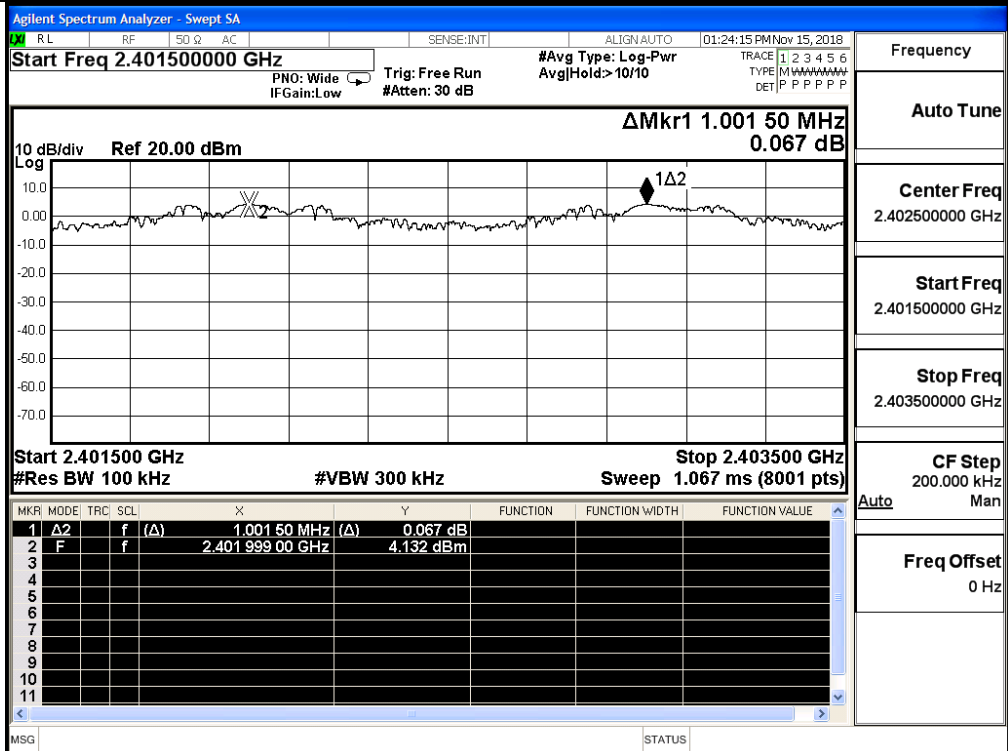


Frequency	
Auto Tune	
Center Freq	2.441500000 GHz
Start Freq	2.440500000 GHz
Stop Freq	2.442500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

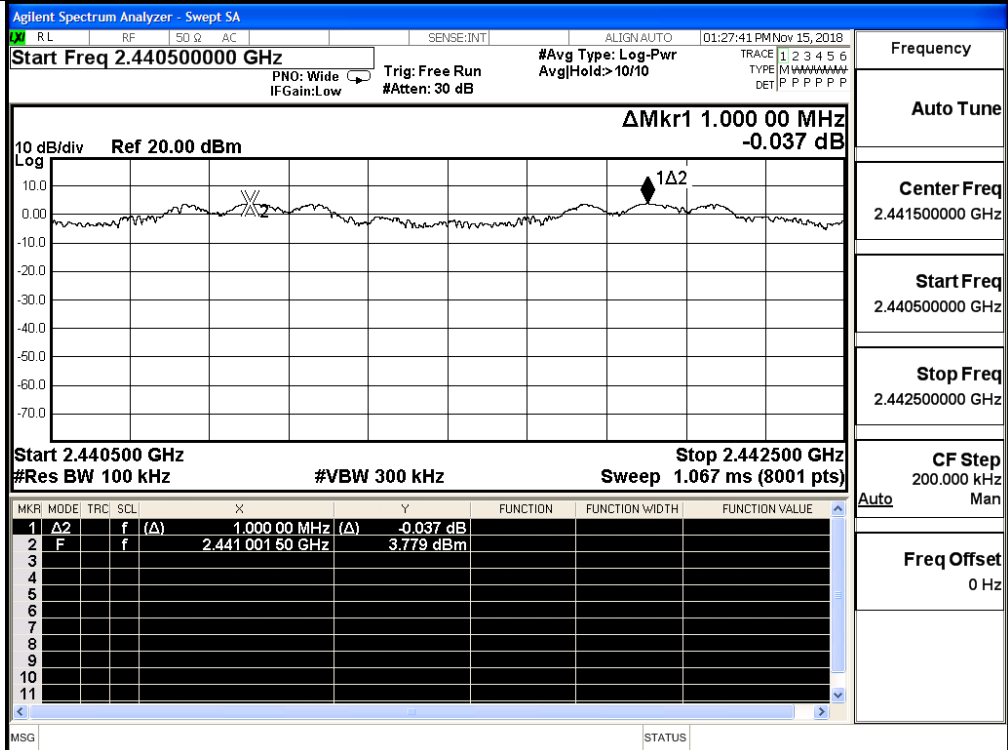
π/4DQPSK/HCH



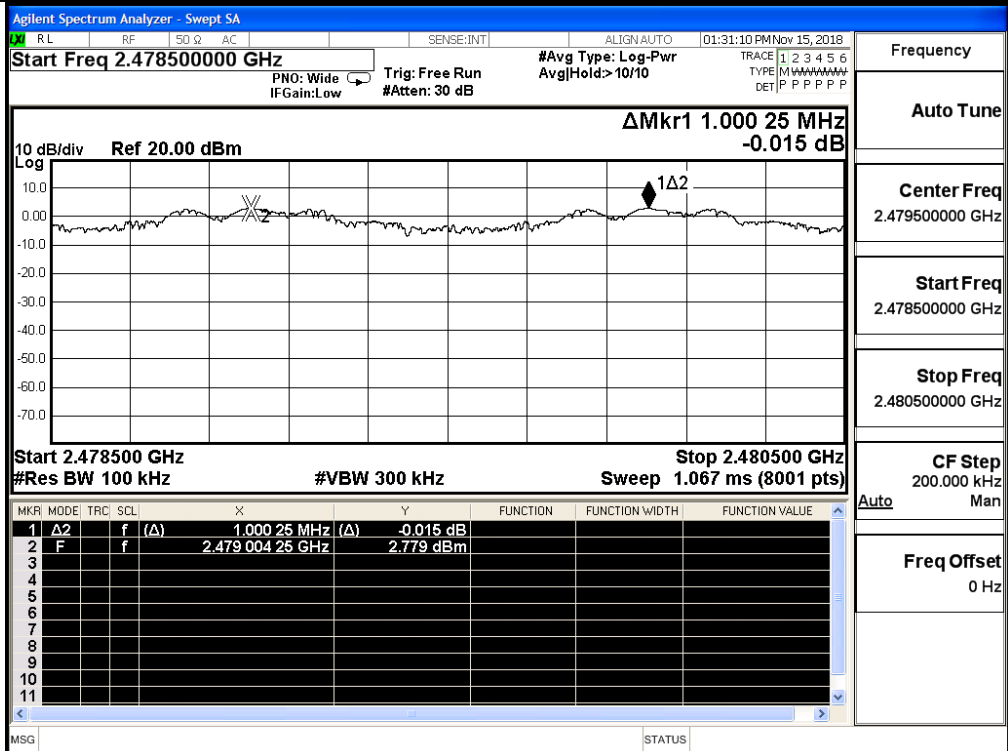
8DPSK/LCH



8DPSK/MCH

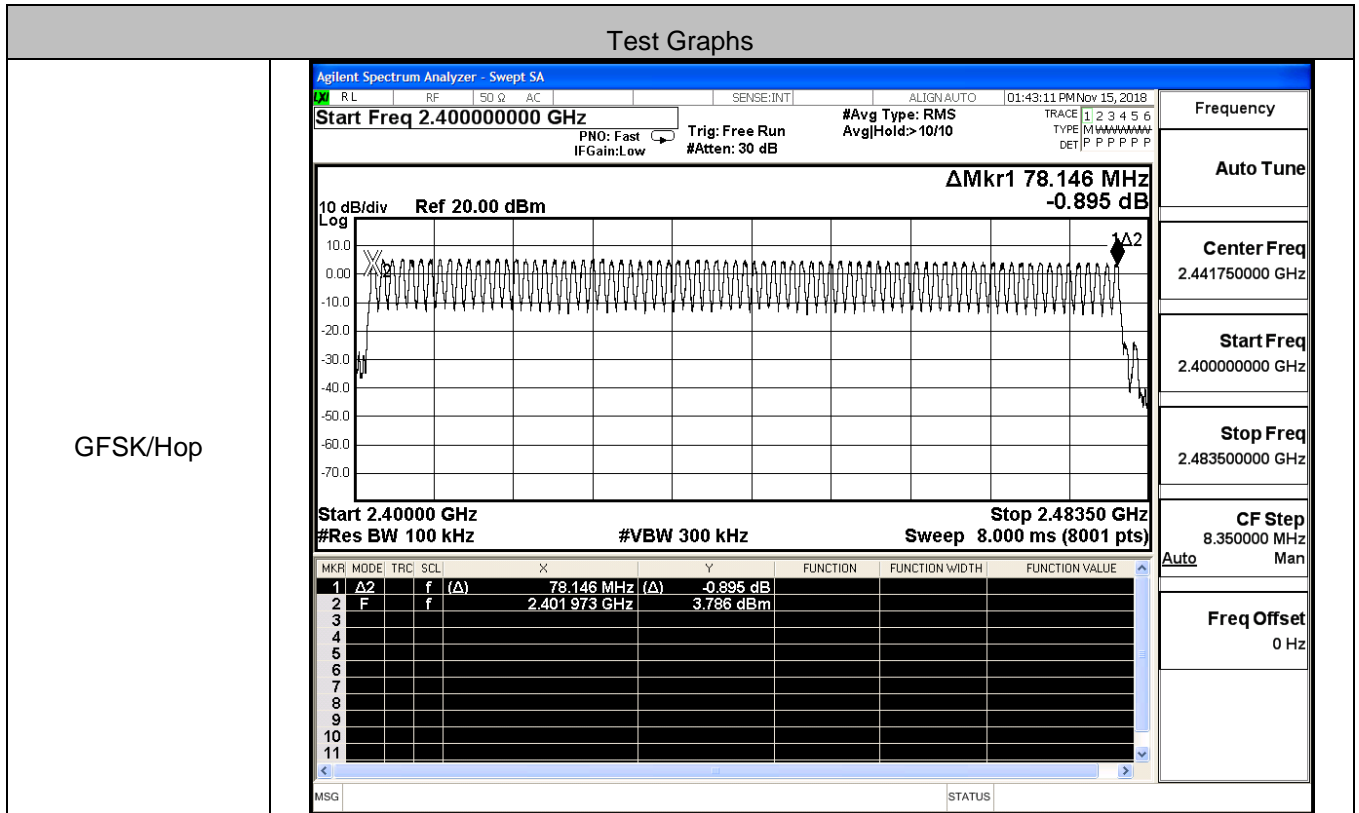


8DPSK/HCH

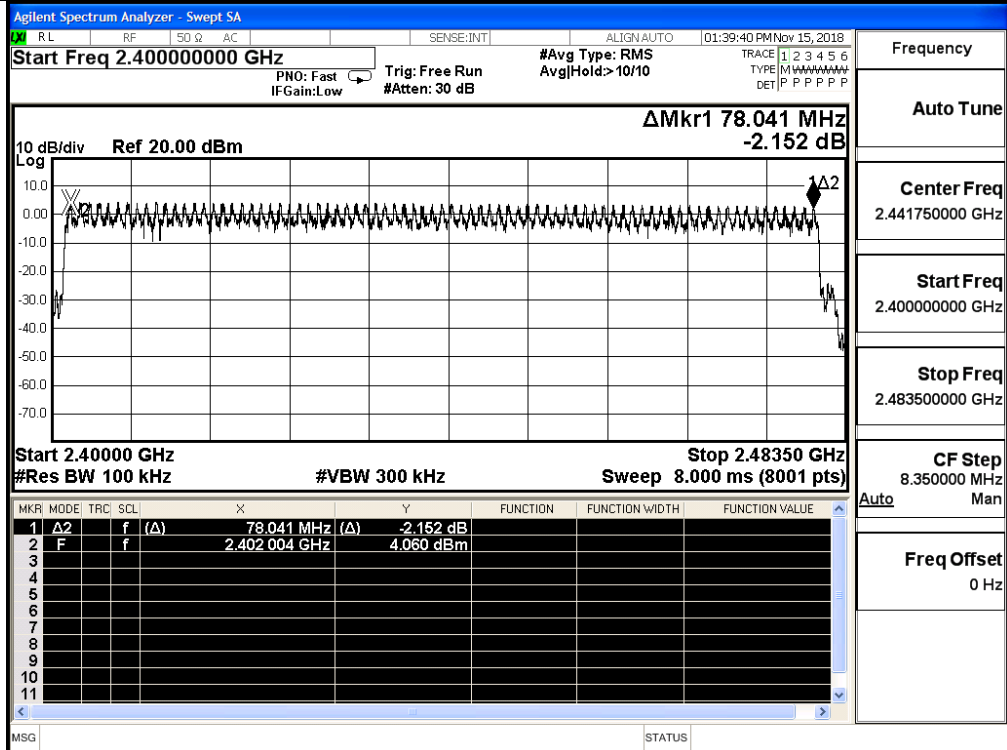


A.4 Hopping Channel Number

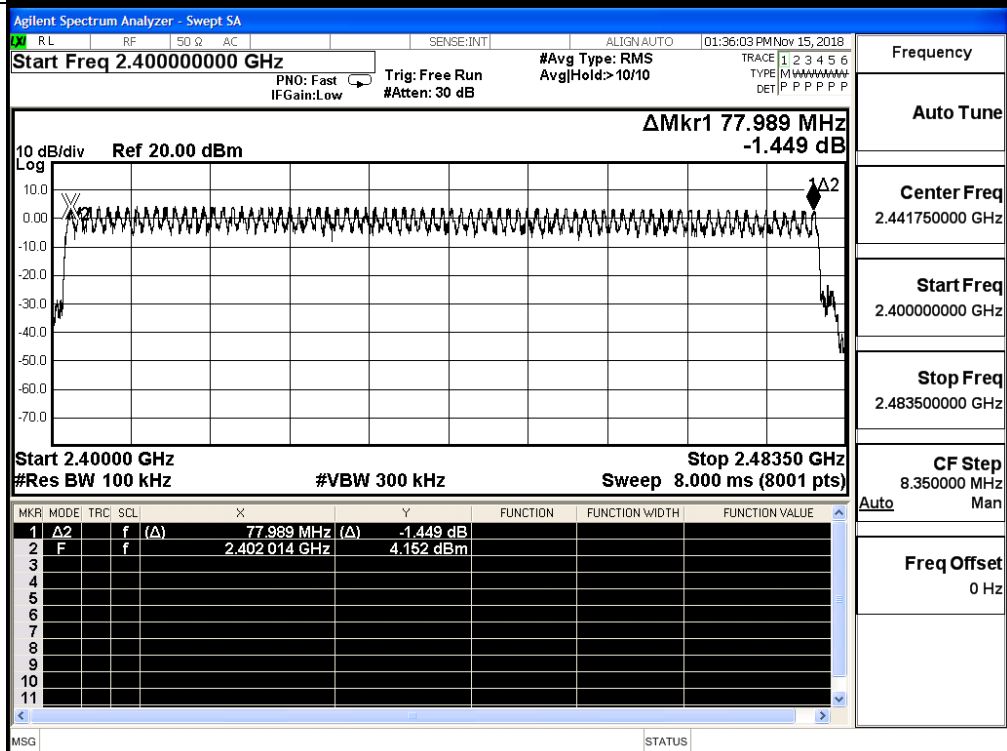
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS



$\pi/4$ DQPSK/Hop

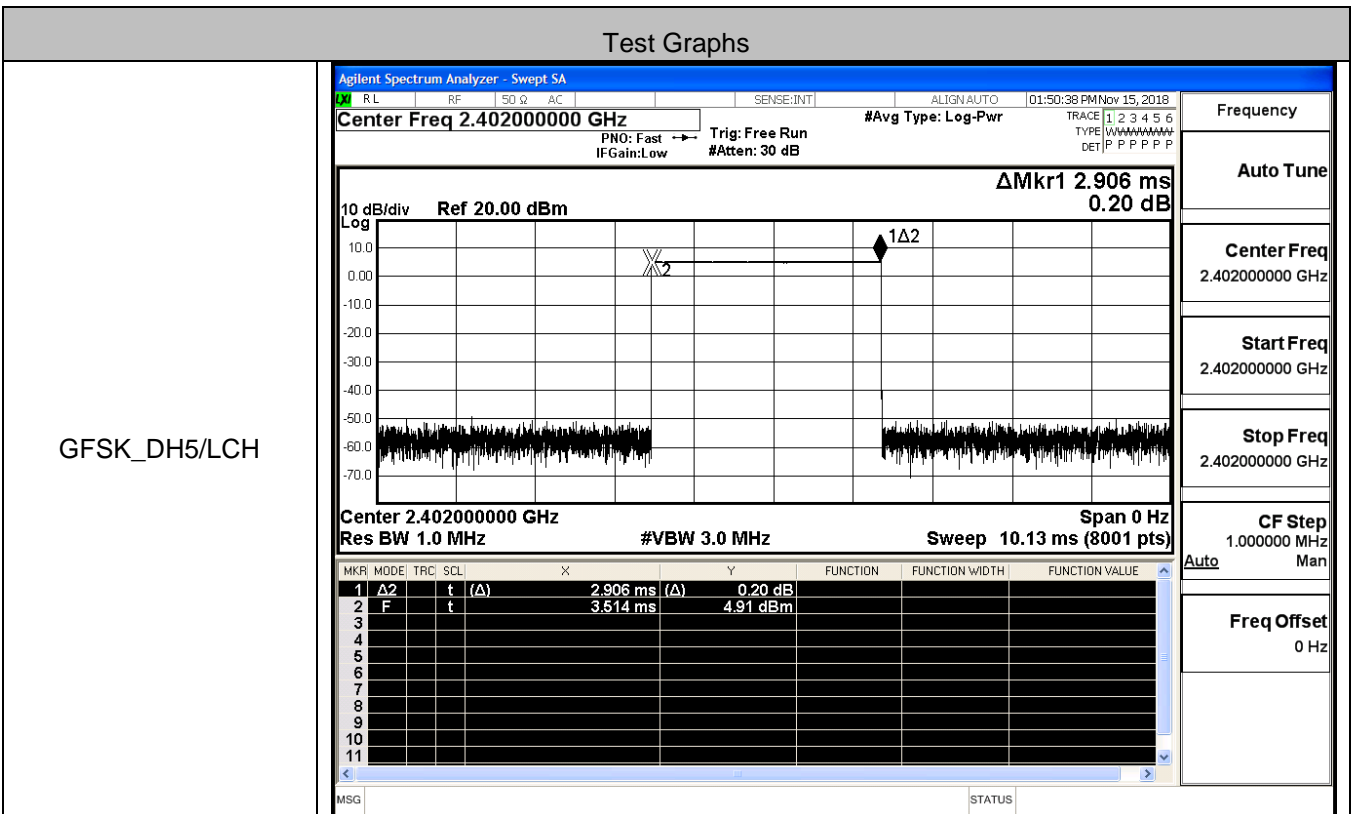


8DPSK/Hop

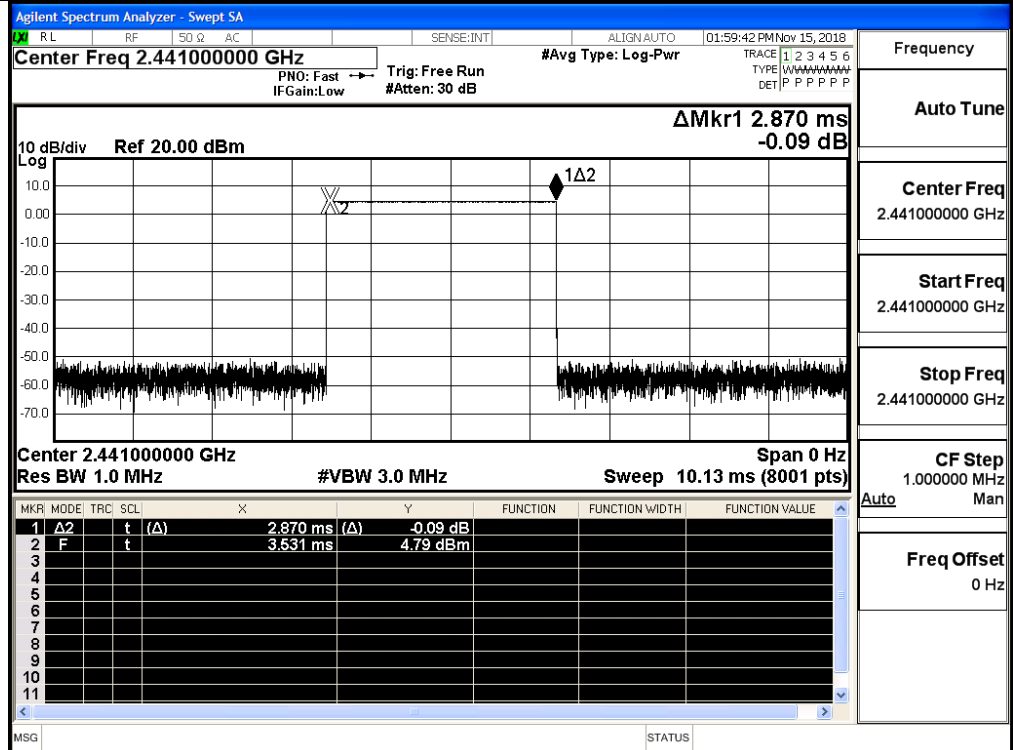


A.5 Dwell Time

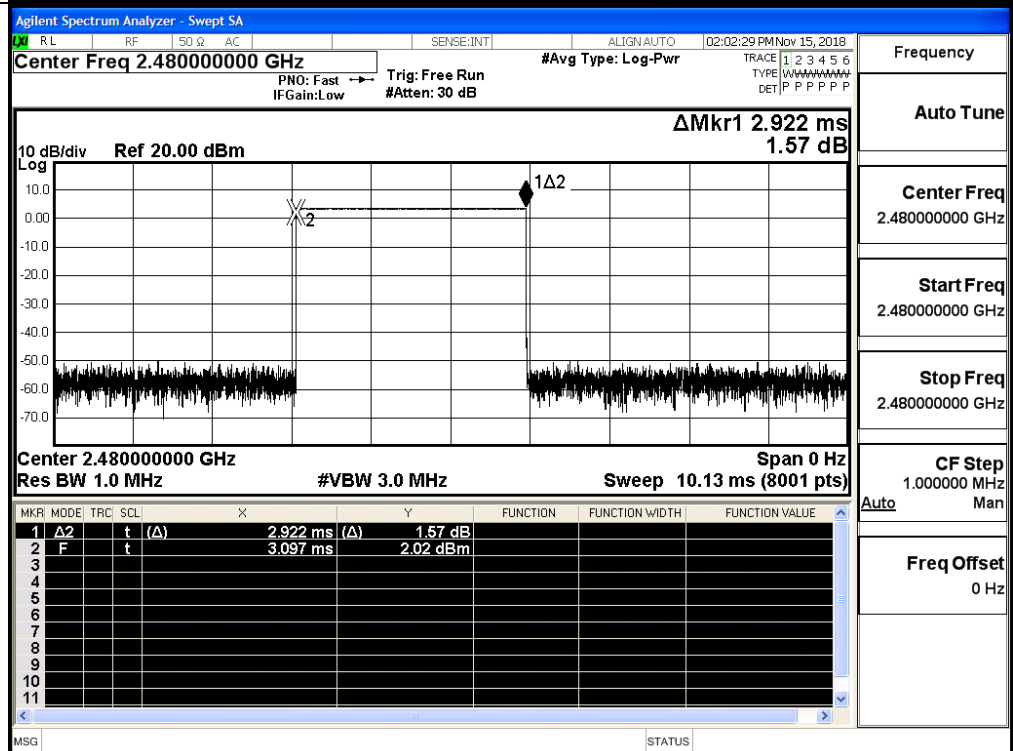
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.906	106.7	0.310	0.4	PASS
	DH5	MCH	2.870	106.7	0.306	0.4	PASS
	DH5	HCH	2.922	106.7	0.312	0.4	PASS
π/4DQPSK	2DH5	LCH	2.927	106.7	0.312	0.4	PASS
	2DH5	MCH	2.930	106.7	0.313	0.4	PASS
	2DH5	HCH	2.923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



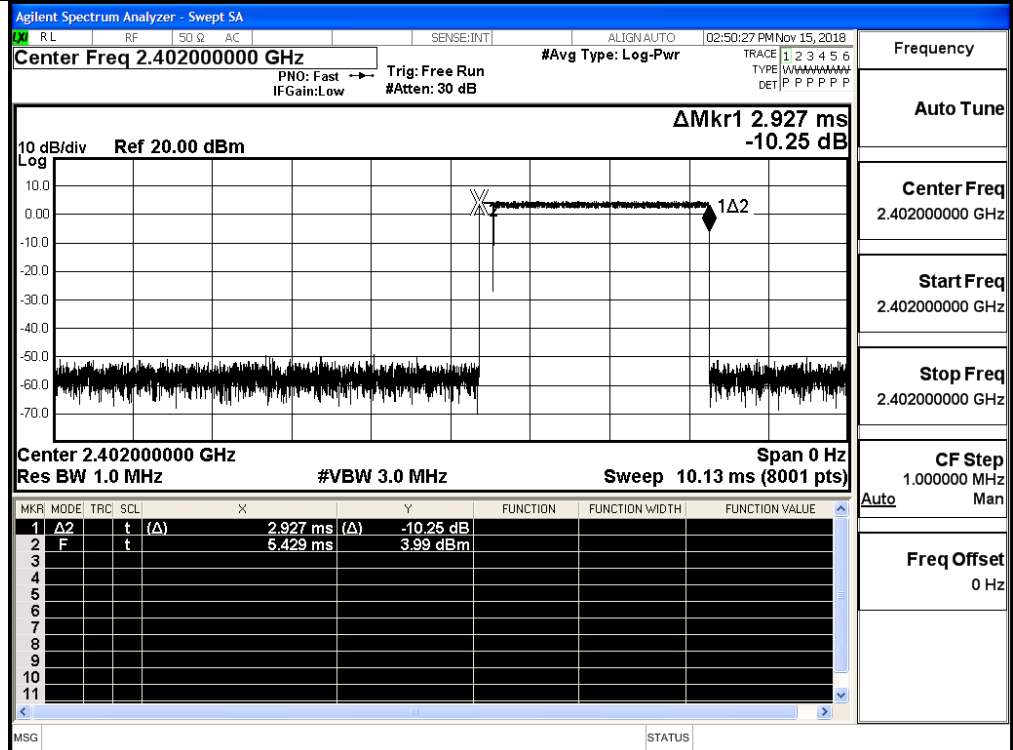
GFSK_DH5/MCH



GFSK_DH5/HCH

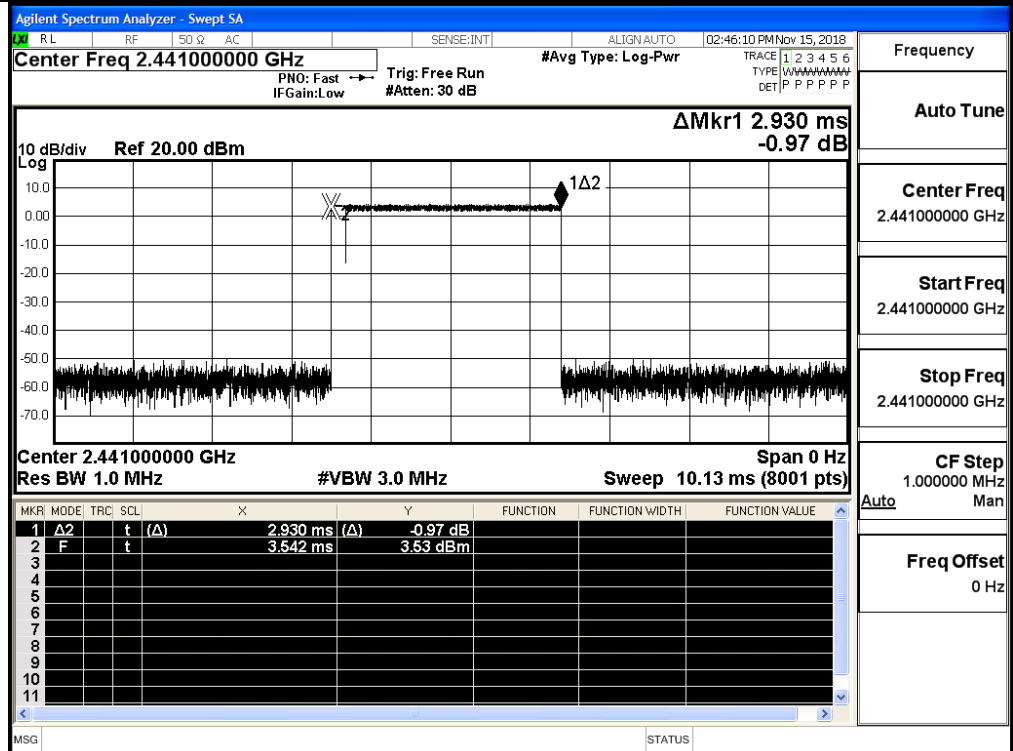


$\pi/4$ DQPSK
_2DH5/LCH



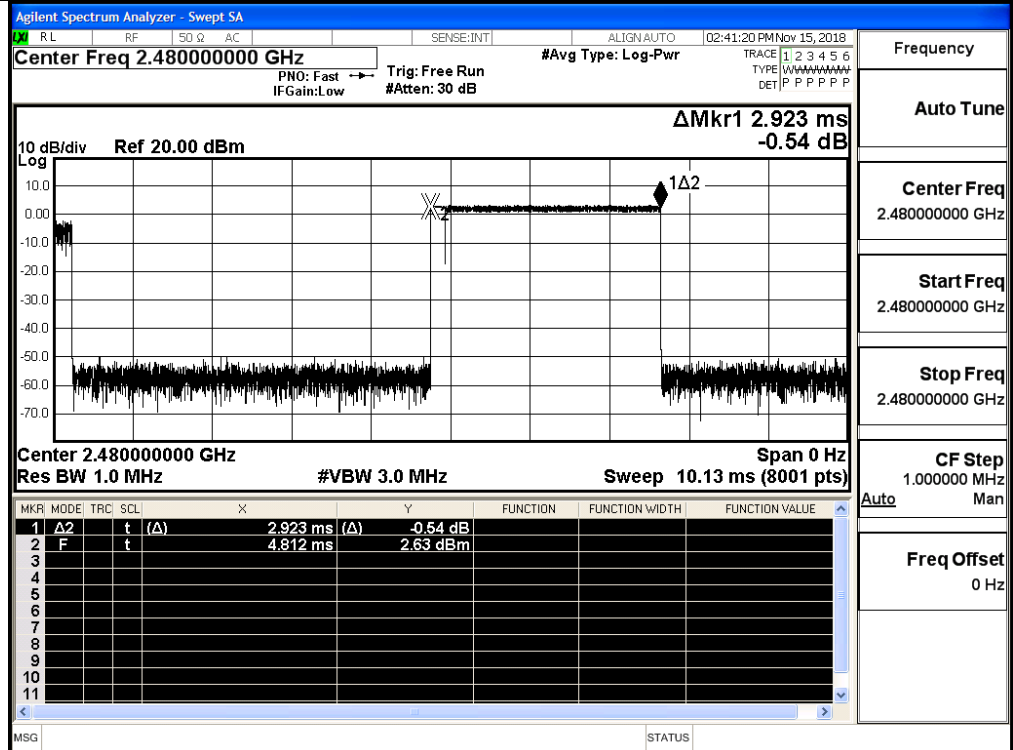
Frequency	
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.402000000 GHz
Stop Freq	2.402000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK
_2DH5/MCH



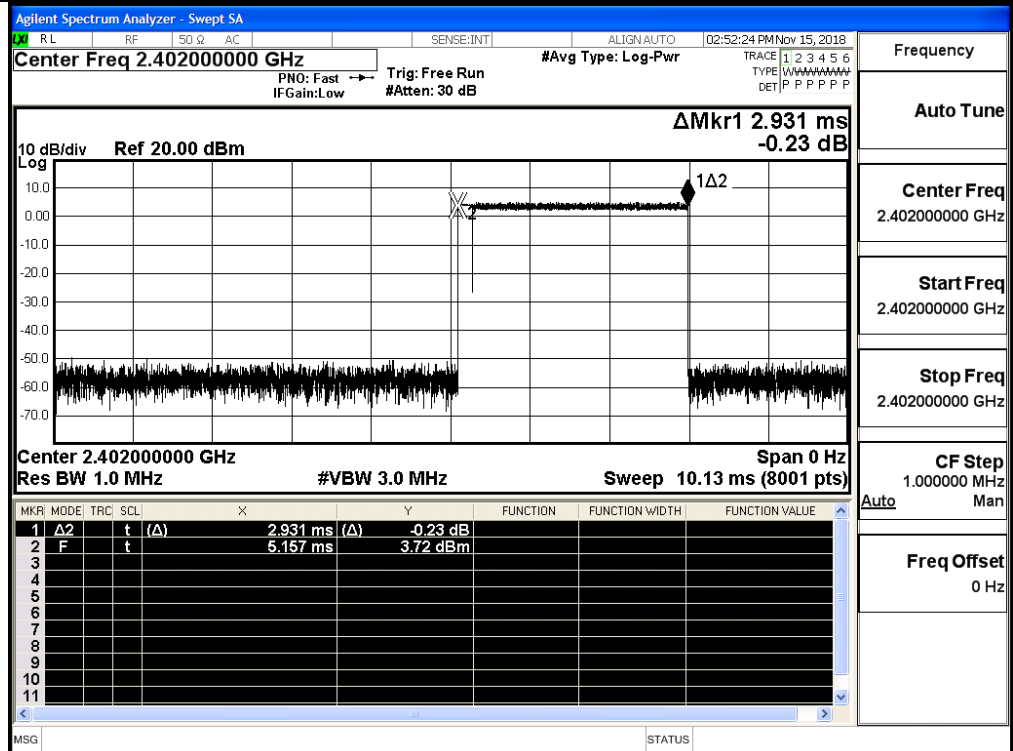
Frequency	
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK
_2DH5/HCH



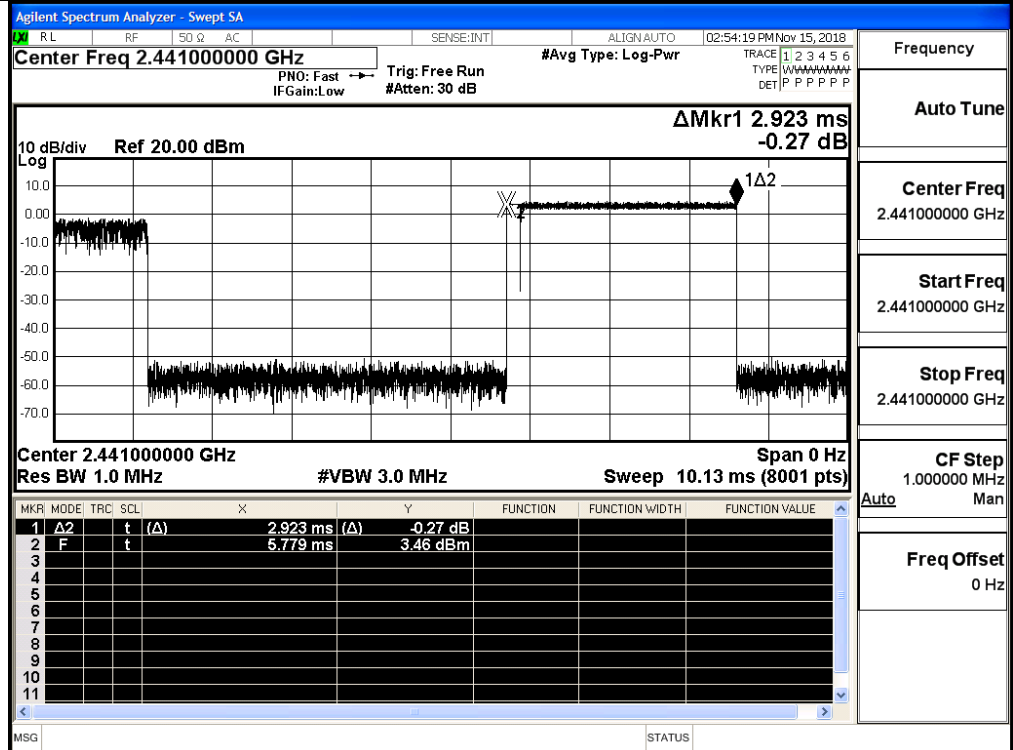
Frequency	
Auto Tune	
Center Freq	2.48000000 GHz
Start Freq	2.48000000 GHz
Stop Freq	2.48000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK_3DH5/LCH

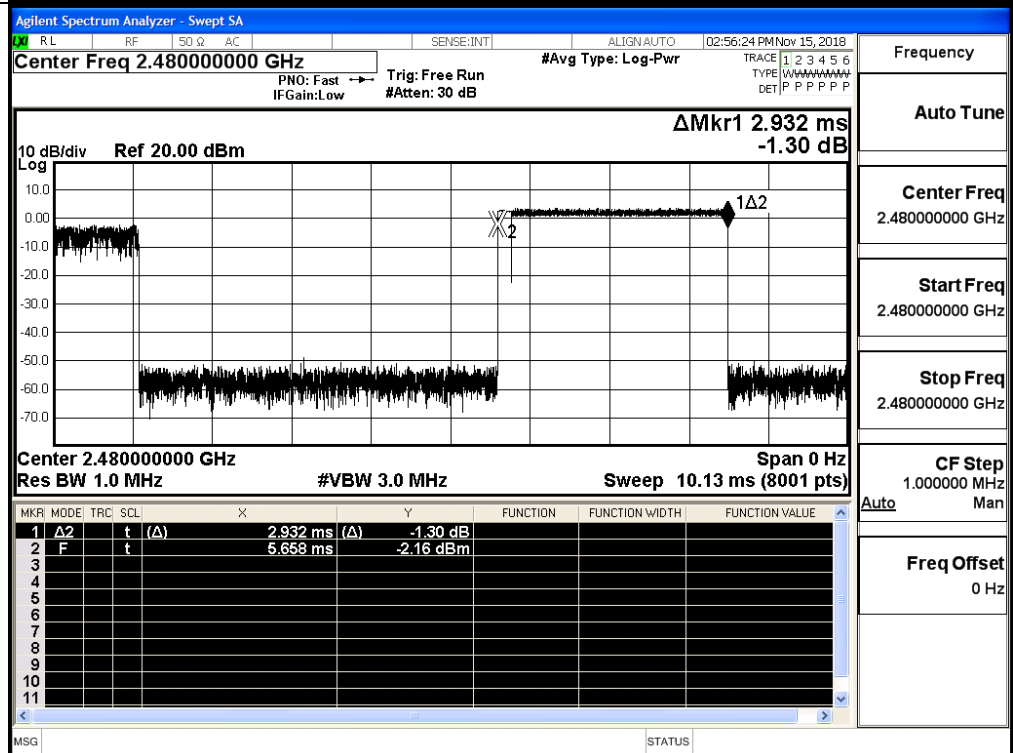


Frequency	
Auto Tune	
Center Freq	2.40200000 GHz
Start Freq	2.40200000 GHz
Stop Freq	2.40200000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

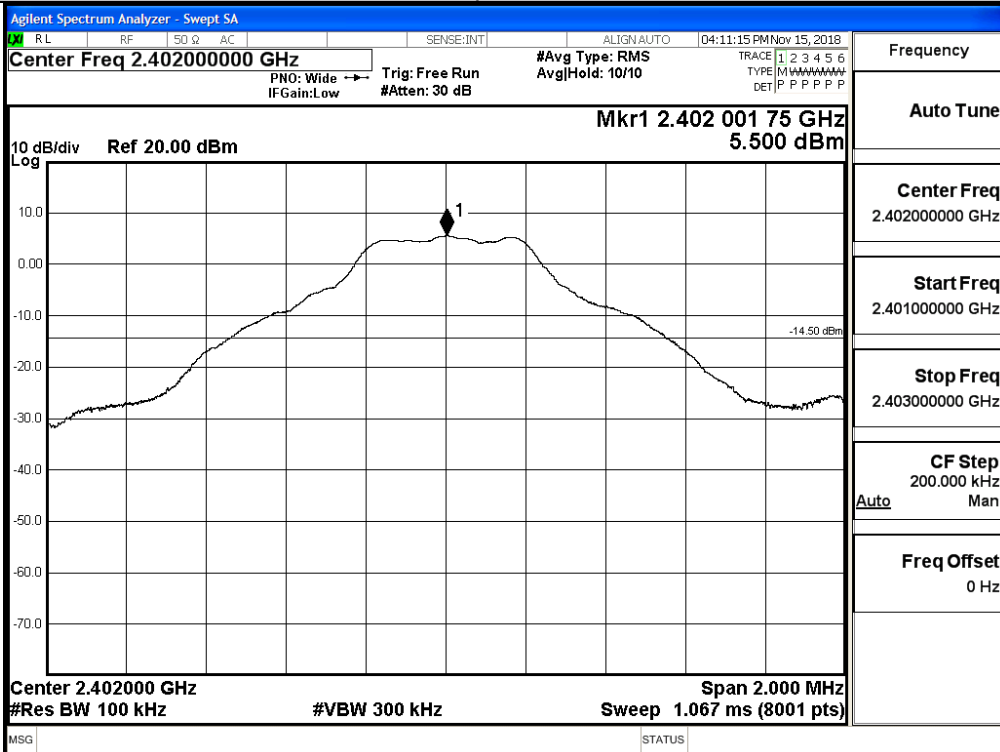


A.6 RF Conducted Spurious Emissions

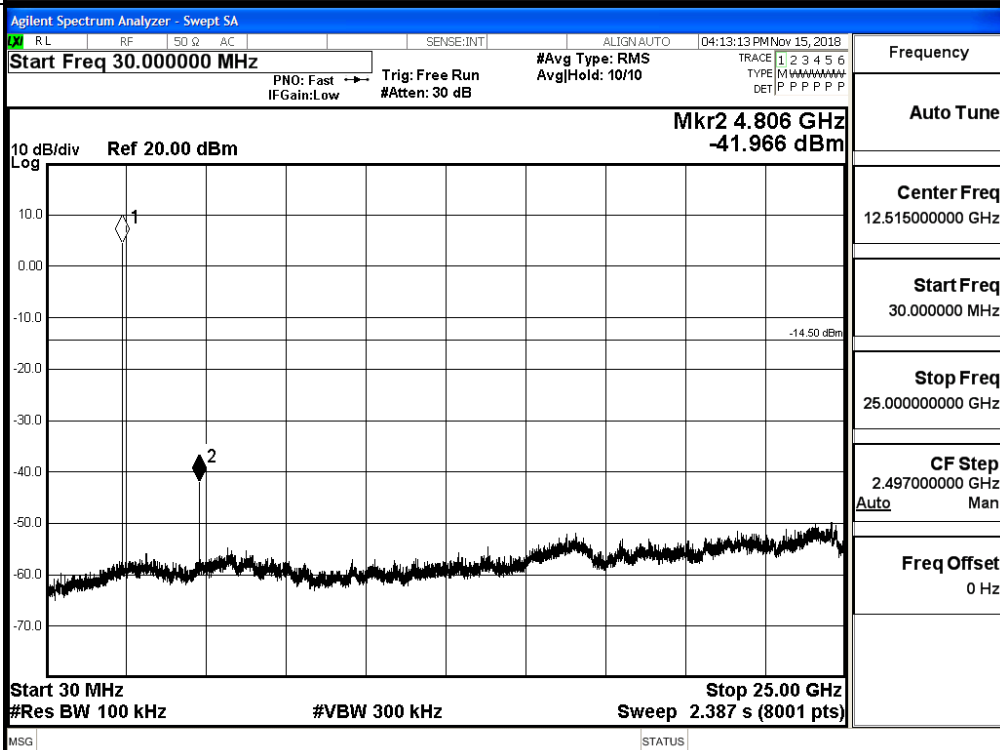
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	5.500	-41.966	-14.50	PASS
	MCH	5.043	-42.938	-14.96	PASS
	HCH	3.901	-38.431	-16.10	PASS
$\pi/4$ DQPSK	LCH	4.291	-44.555	-15.71	PASS
	MCH	3.924	-41.752	-16.08	PASS
	HCH	2.960	-38.092	-17.04	PASS
8DPSK	LCH	4.143	-40.888	-15.86	PASS
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

GFSK_LCH_Graphs

Pref

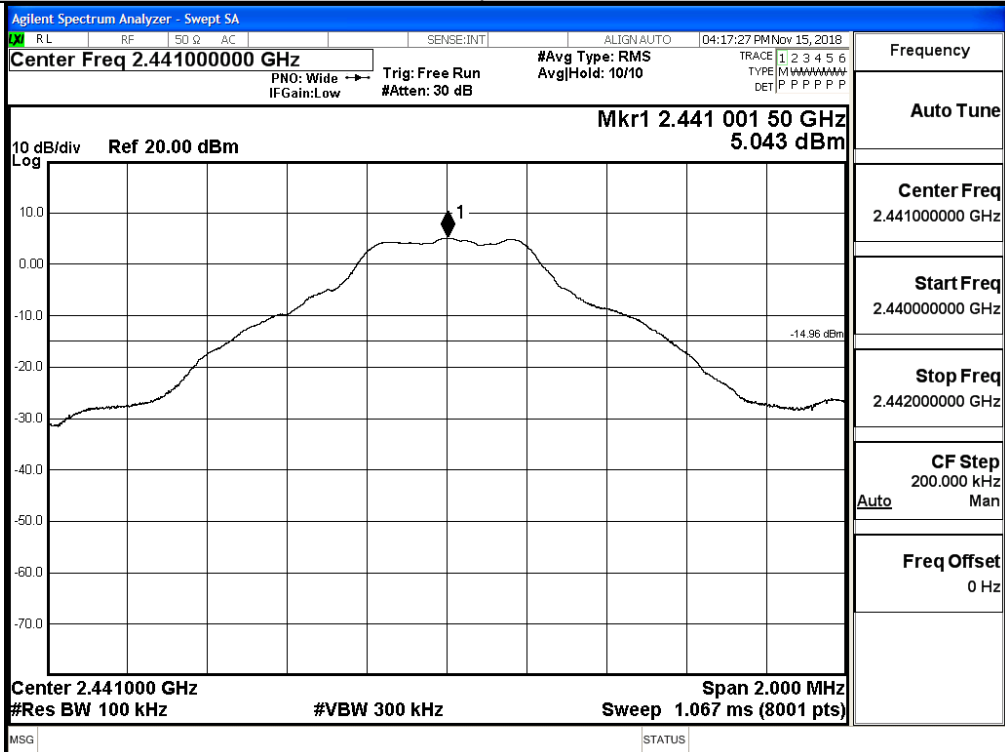


Puw

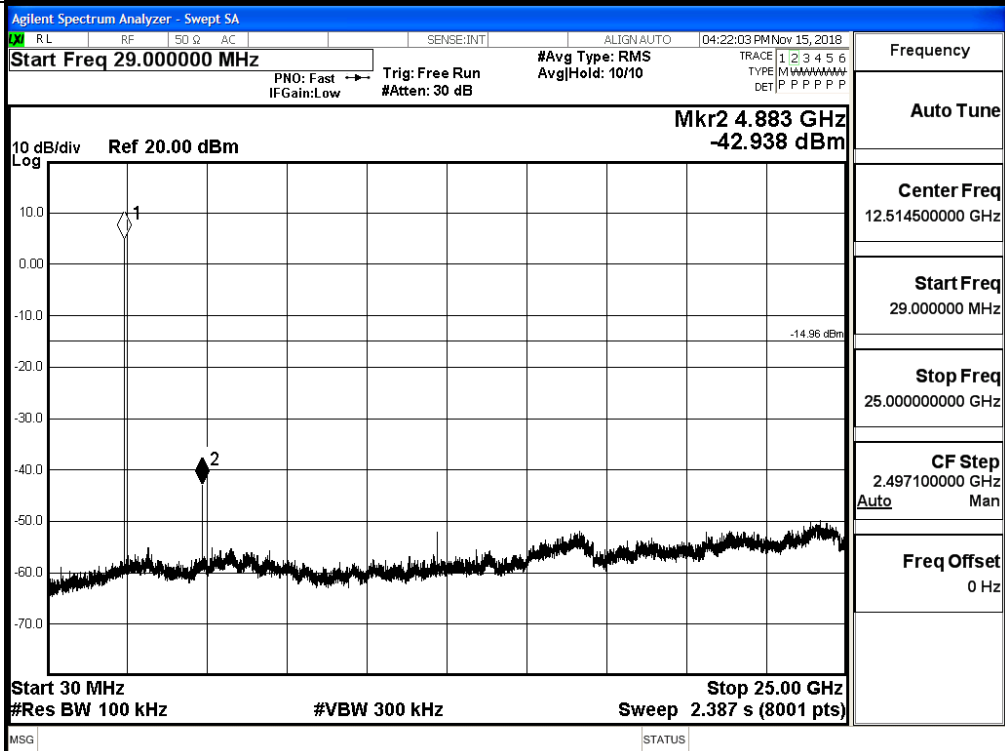


GFSK_MCH_Graphs

Pref

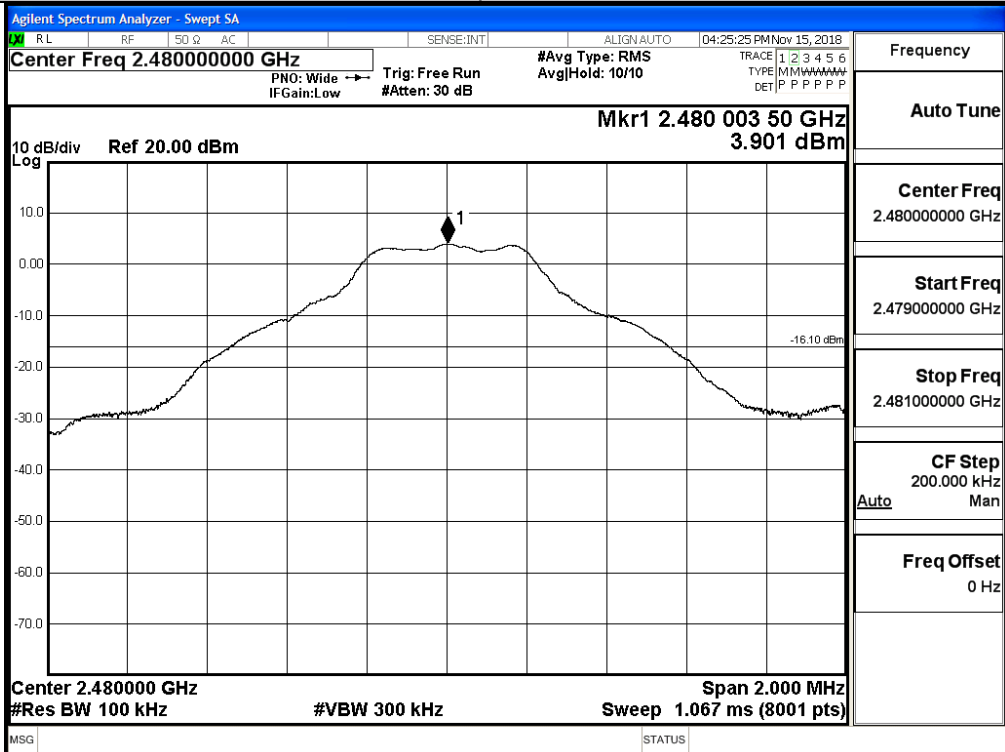


Puw

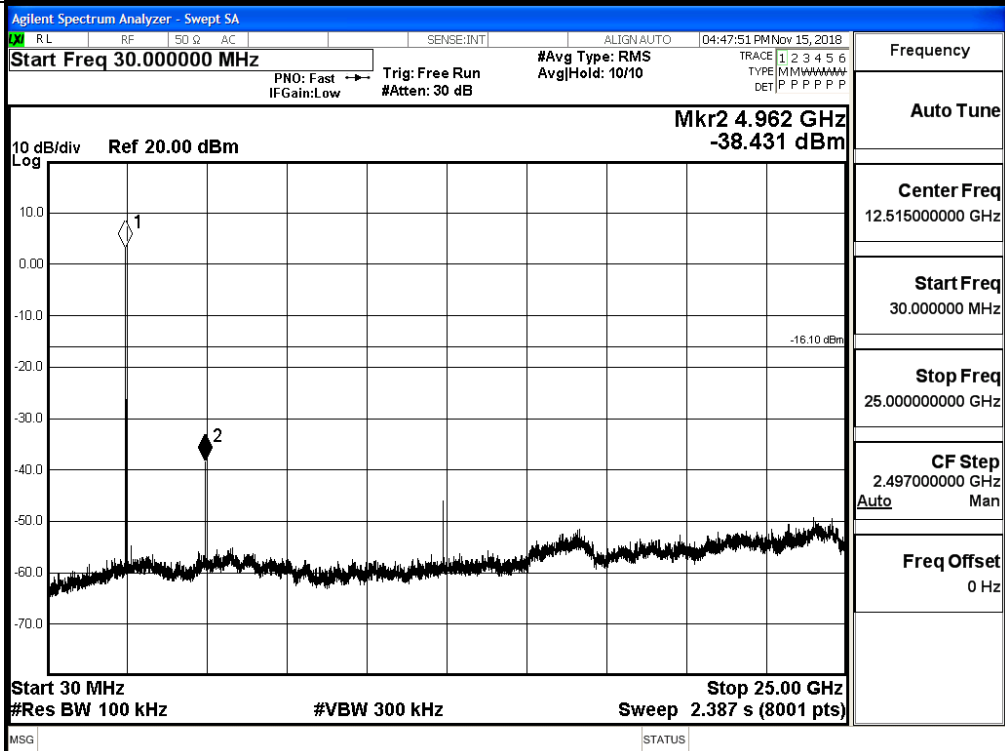


GFSK_HCH_Graphs

Pref

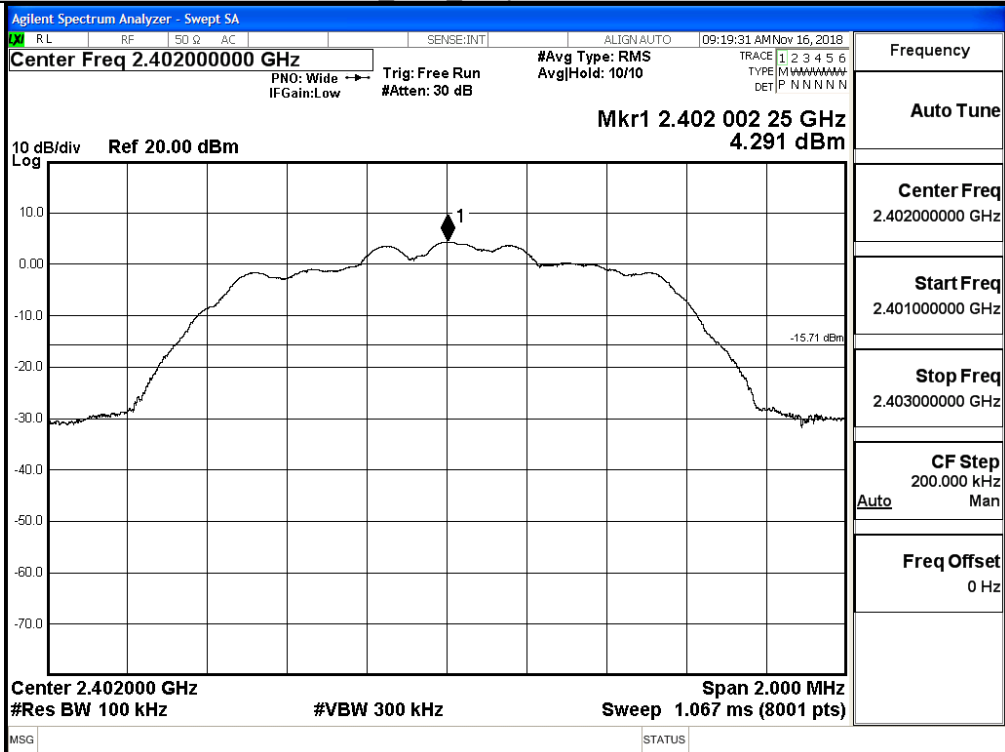


Puw

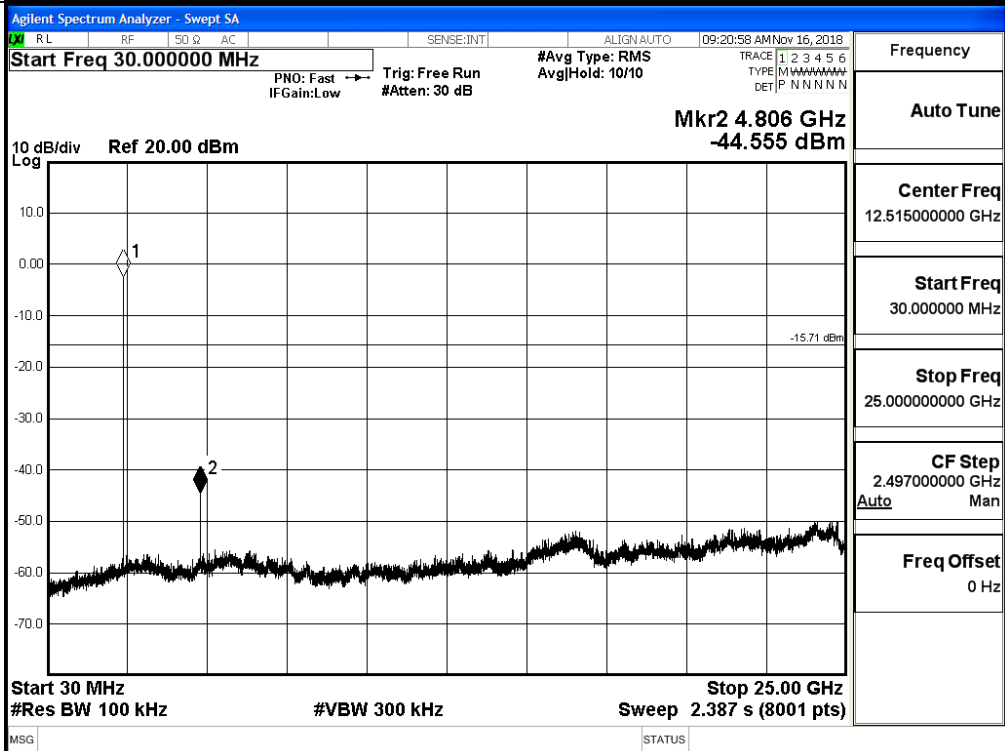


$\pi/4$ DQPSK LCH_Graphs

Pref

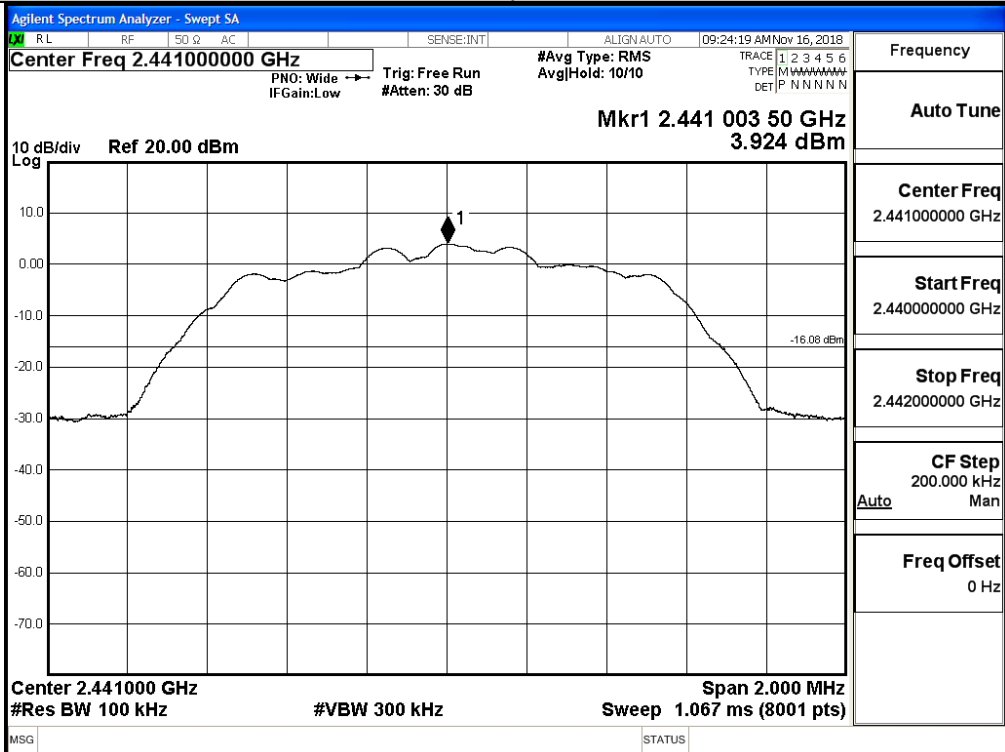


Puw

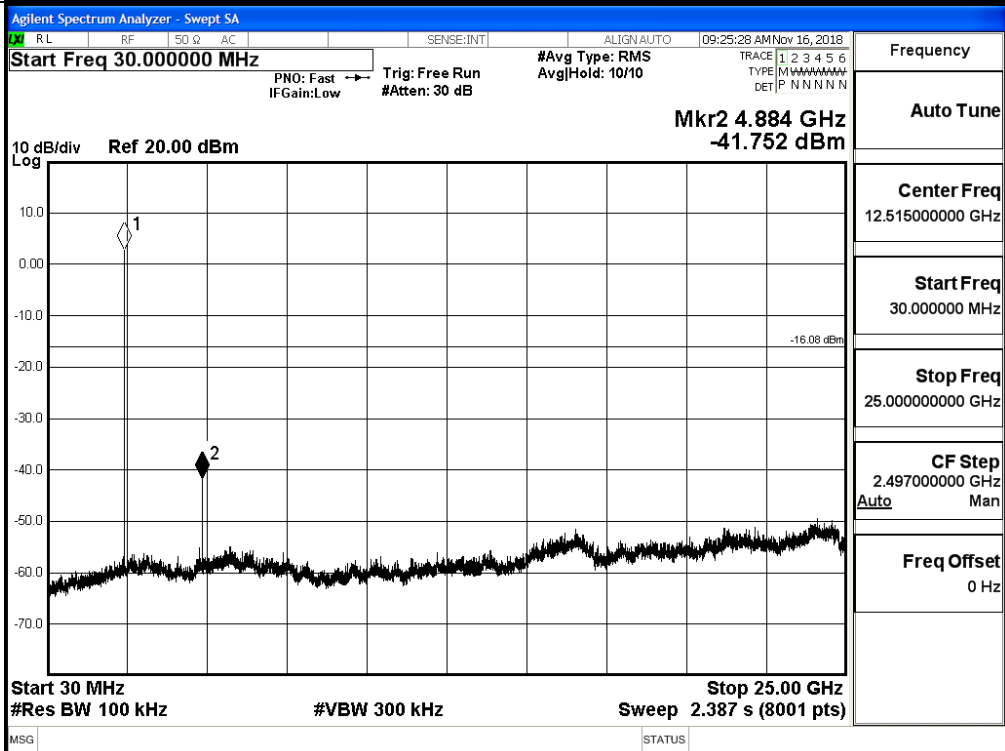


$\pi/4$ DQPSK_MCH_Graphs

Pref

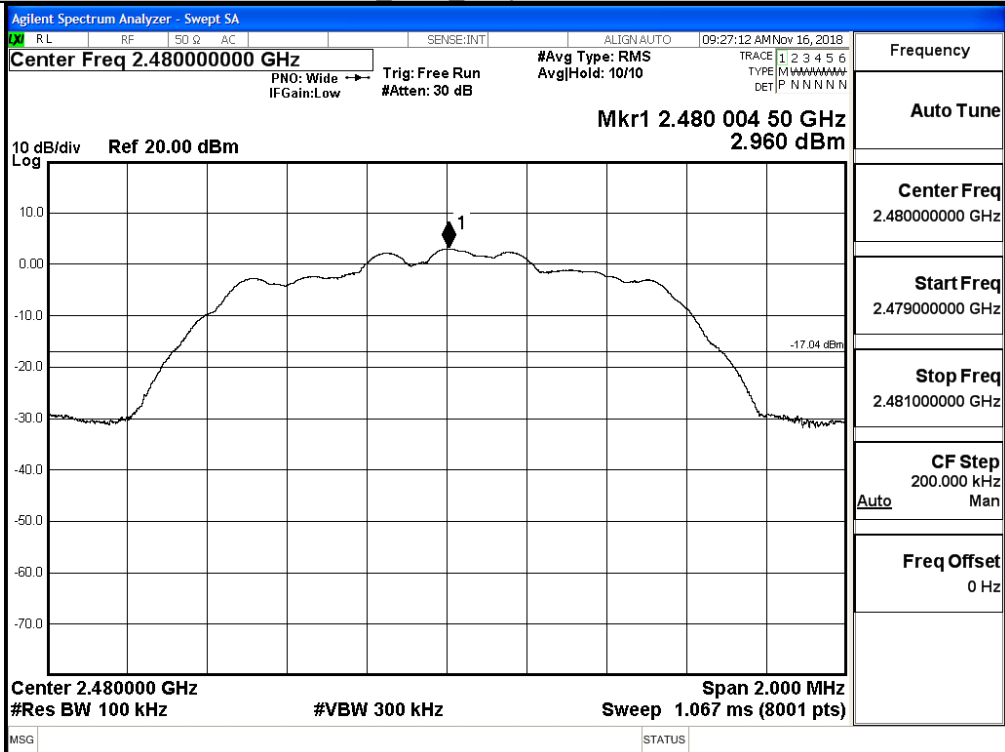


Puw

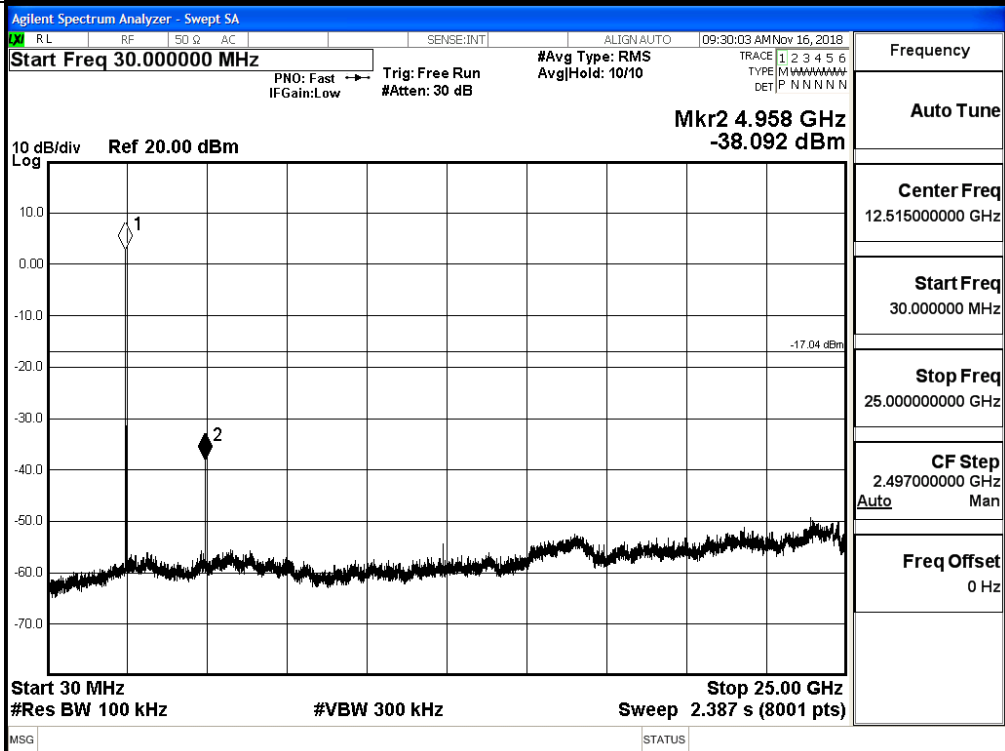


$\pi/4$ DQPSK_HCH_Graphs

Pref

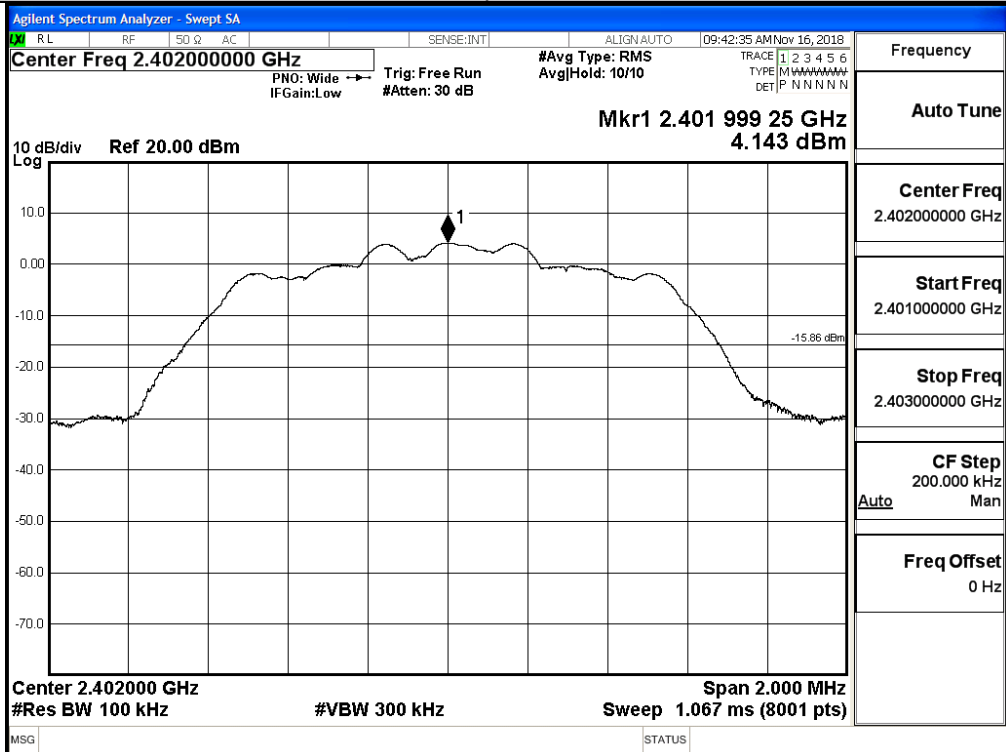


Puw

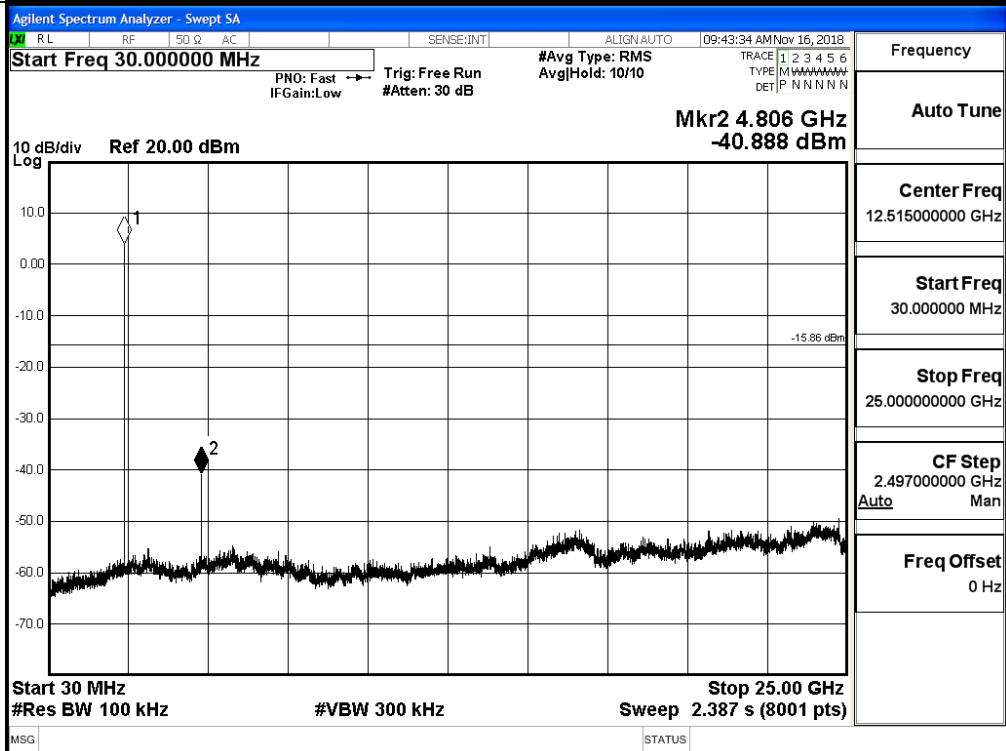


8DPSK_LCH_Graphs

Pref

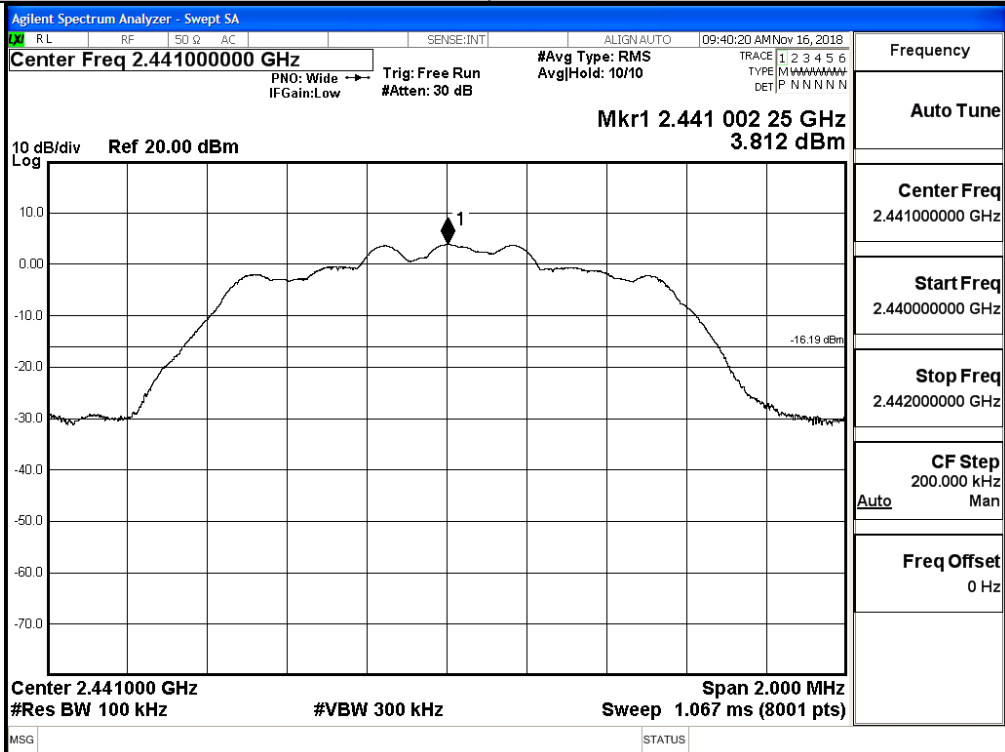


Puw

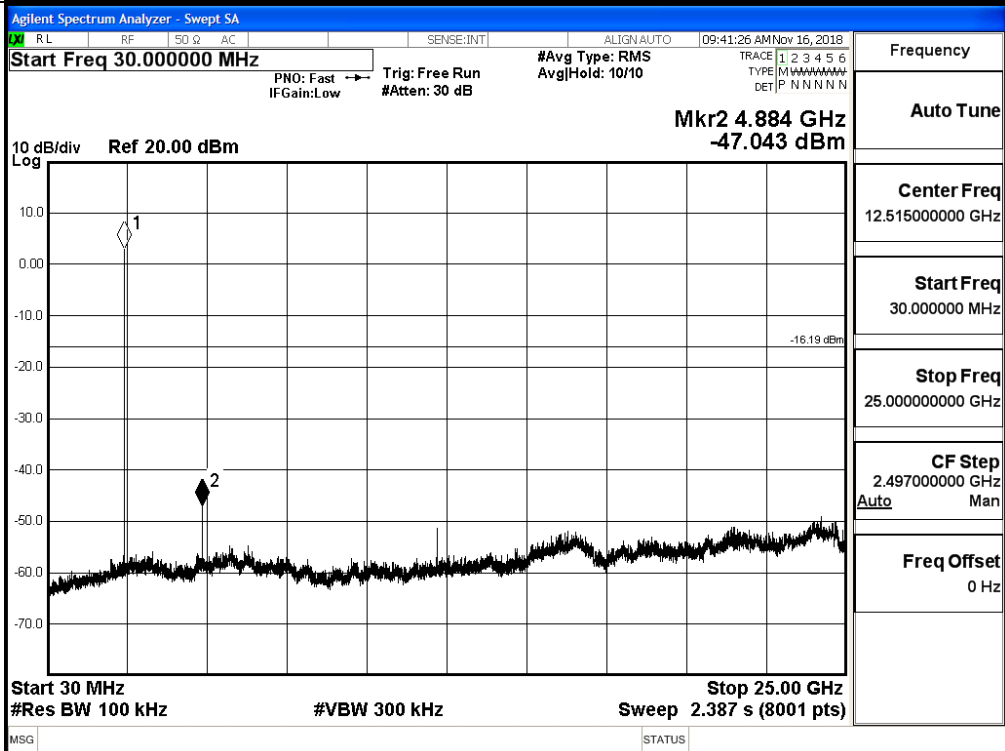


8DPSK_MCH_Graphs

Pref

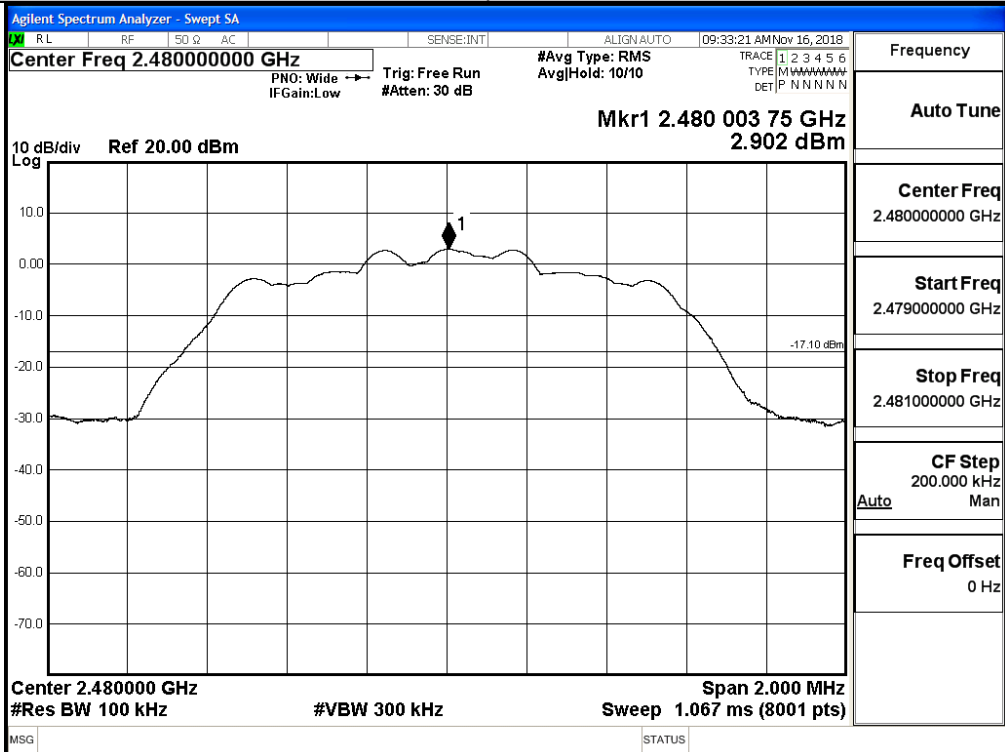


Puw

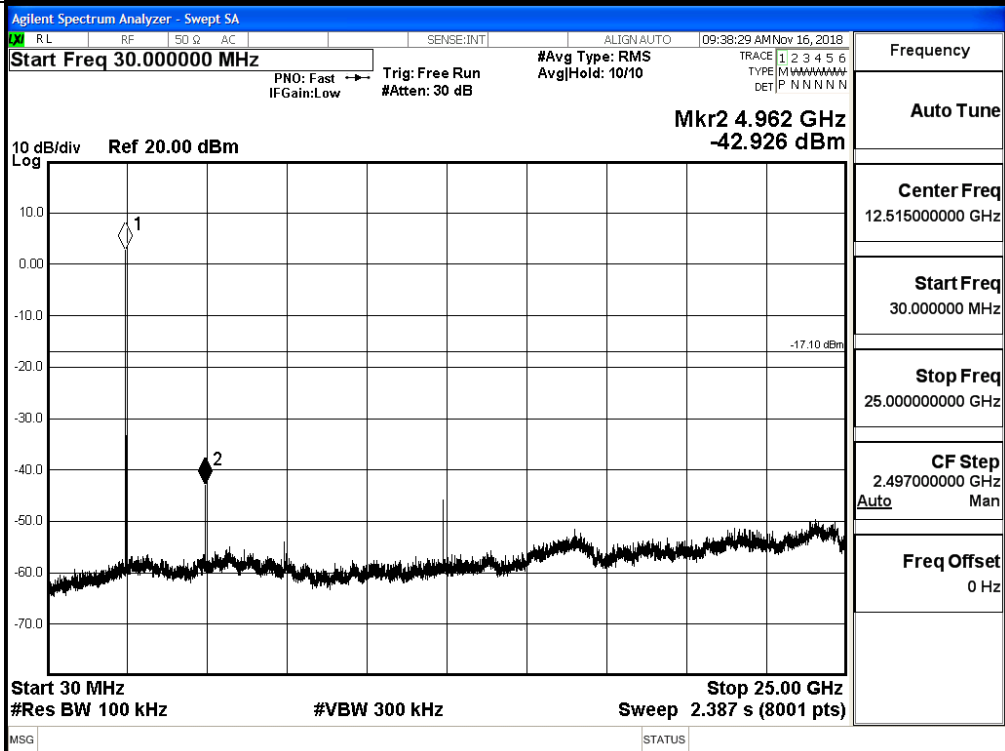


8DPSK_HCH_Graphs

Pref



Puw

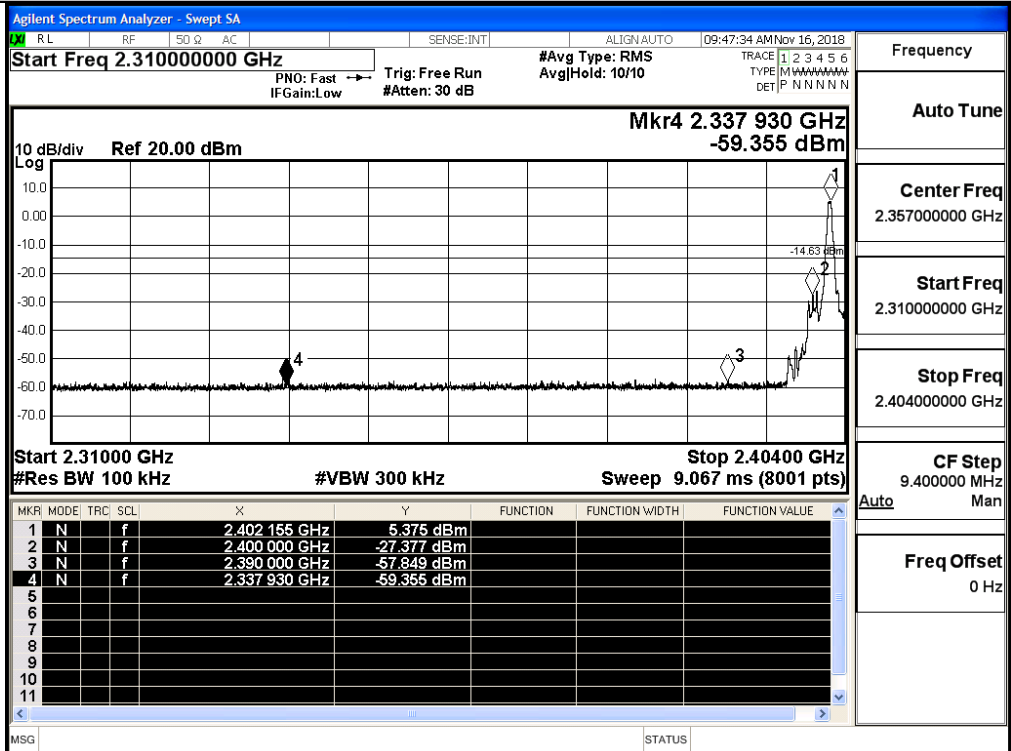


A.7 Band-edge for RF Conducted Emissions

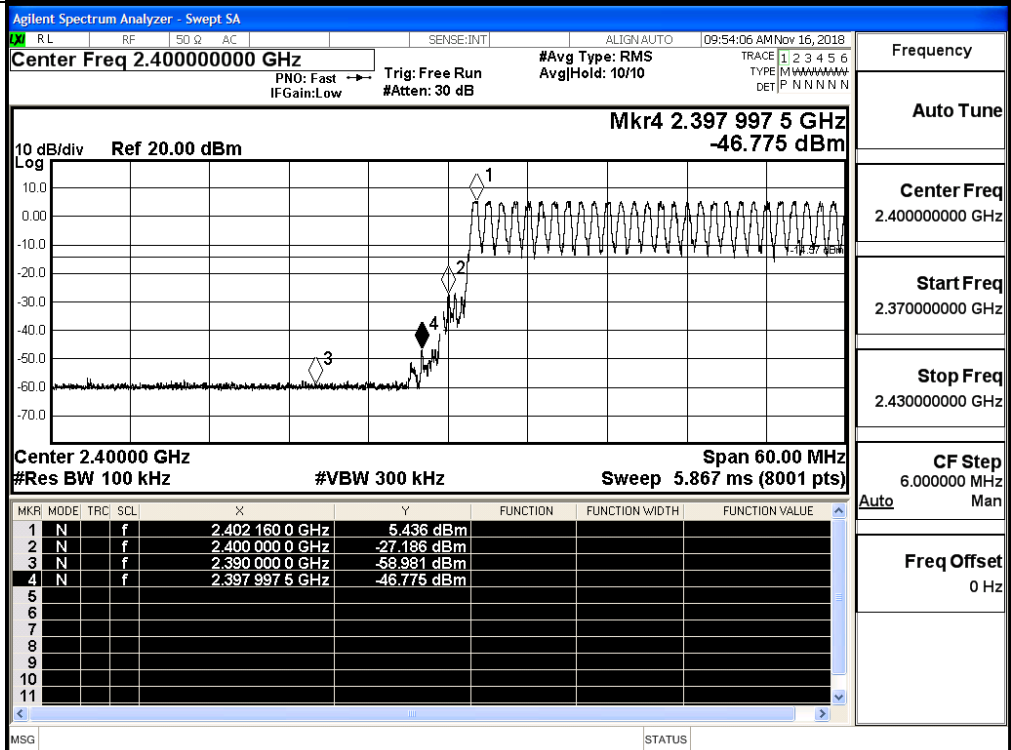
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	5.375	Off	-59.355	-14.63	PASS
			5.436	On	-46.775	-14.57	PASS
	HCH	2480	3.922	Off	-23.063	-16.08	PASS
			3.883	On	-25.528	-16.12	PASS
$\pi/4$ DQPSK	LCH	2402	4.305	Off	-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

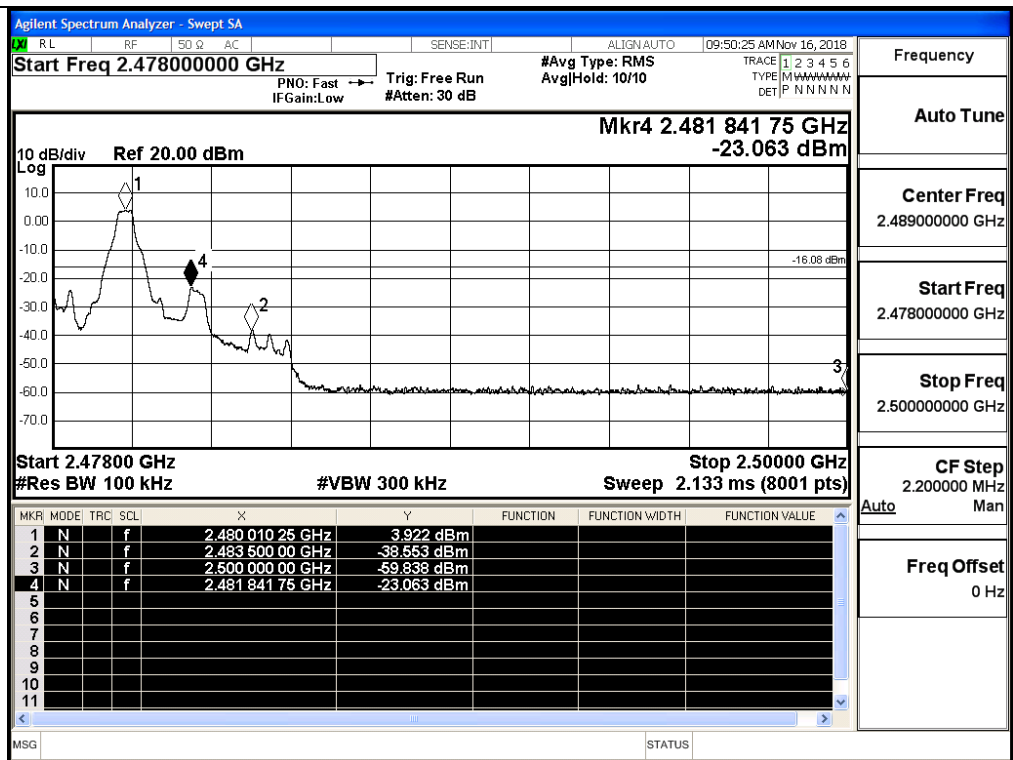
GFSK/LCH/No Hop



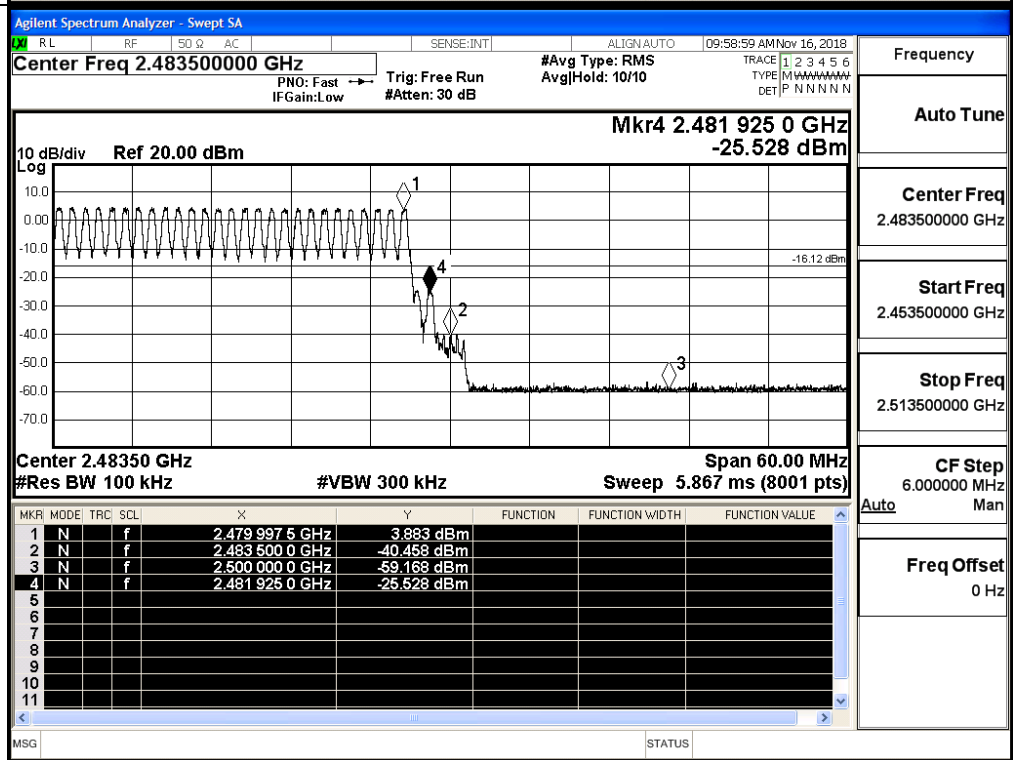
GFSK/LCH/Hop



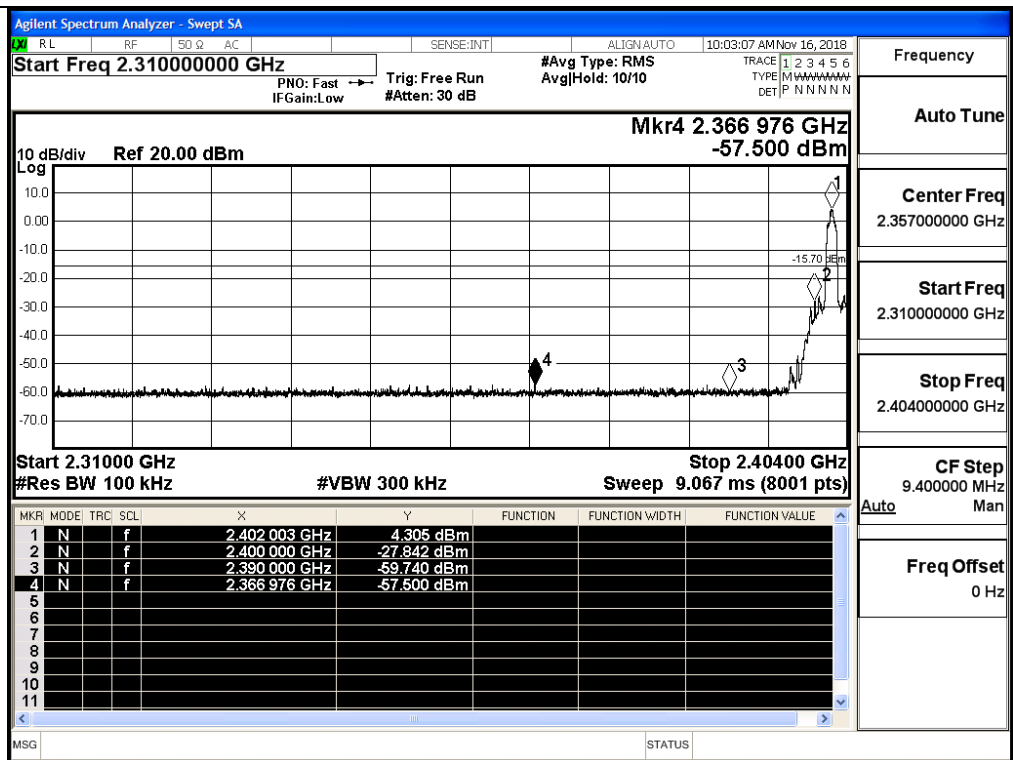
GFSK/HCH/No Hop



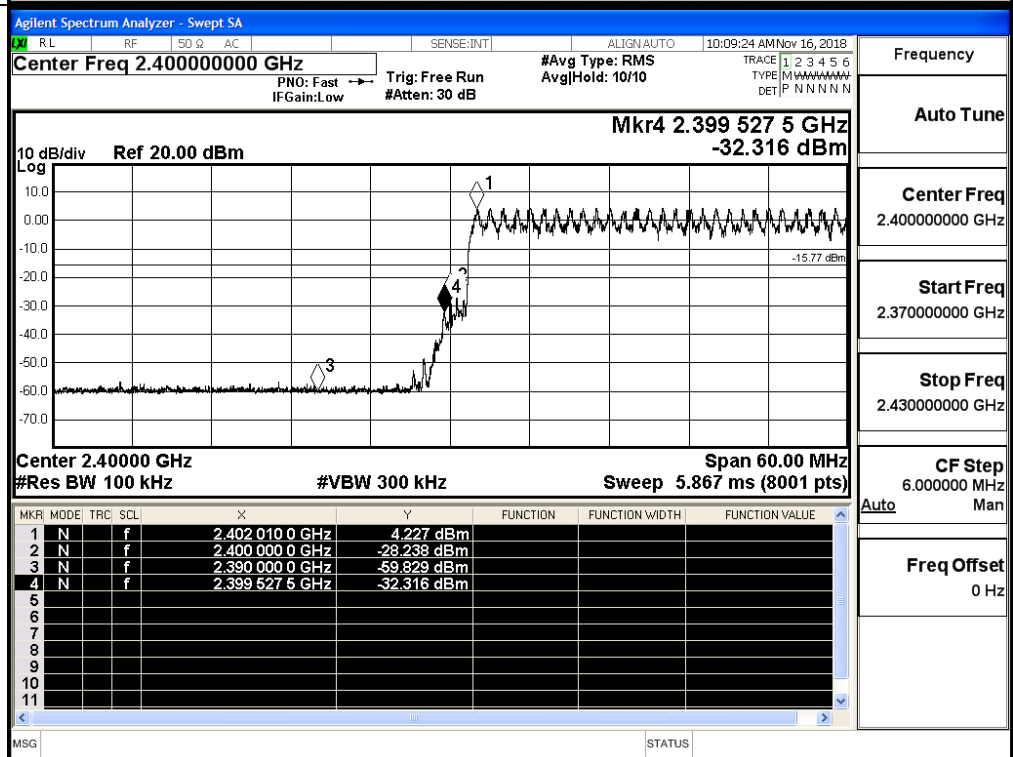
GFSK/HCH/Hop



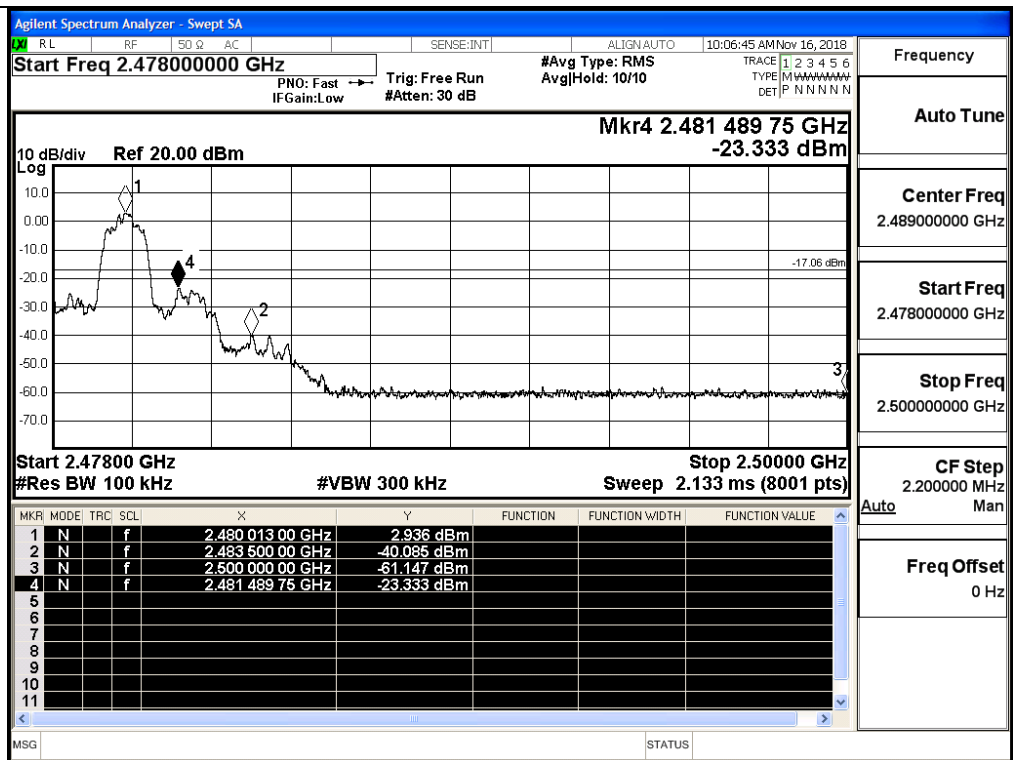
$\pi/4$ DQPSK/LCH/No Hop



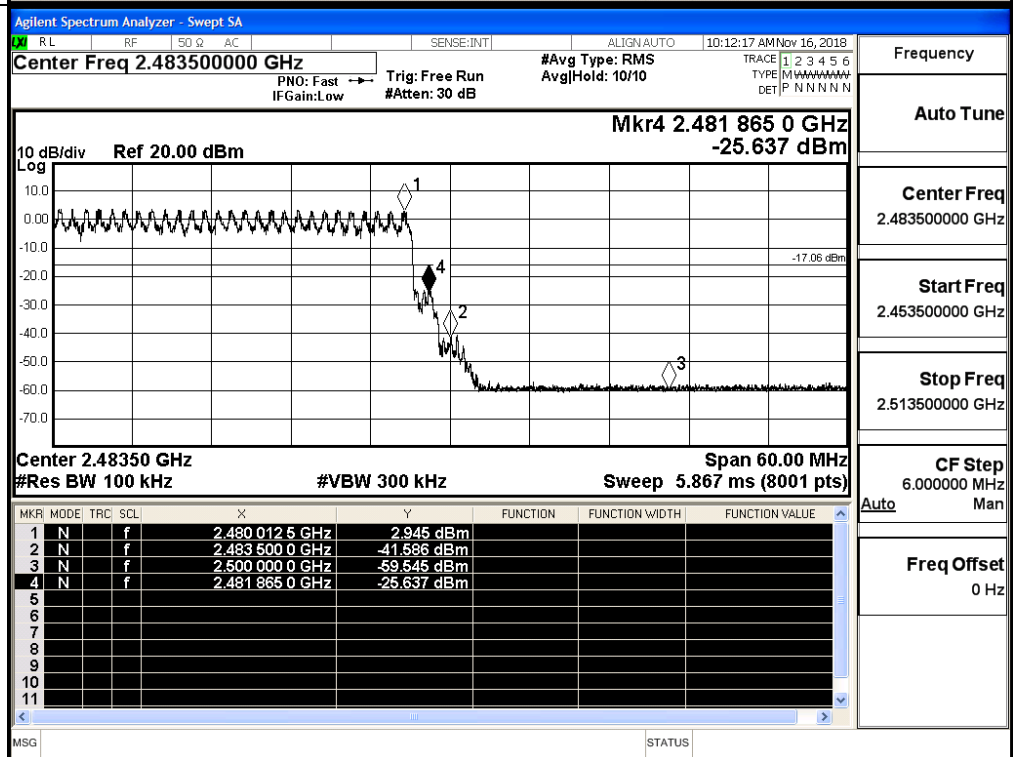
$\pi/4$ DQPSK/LCH/Hop



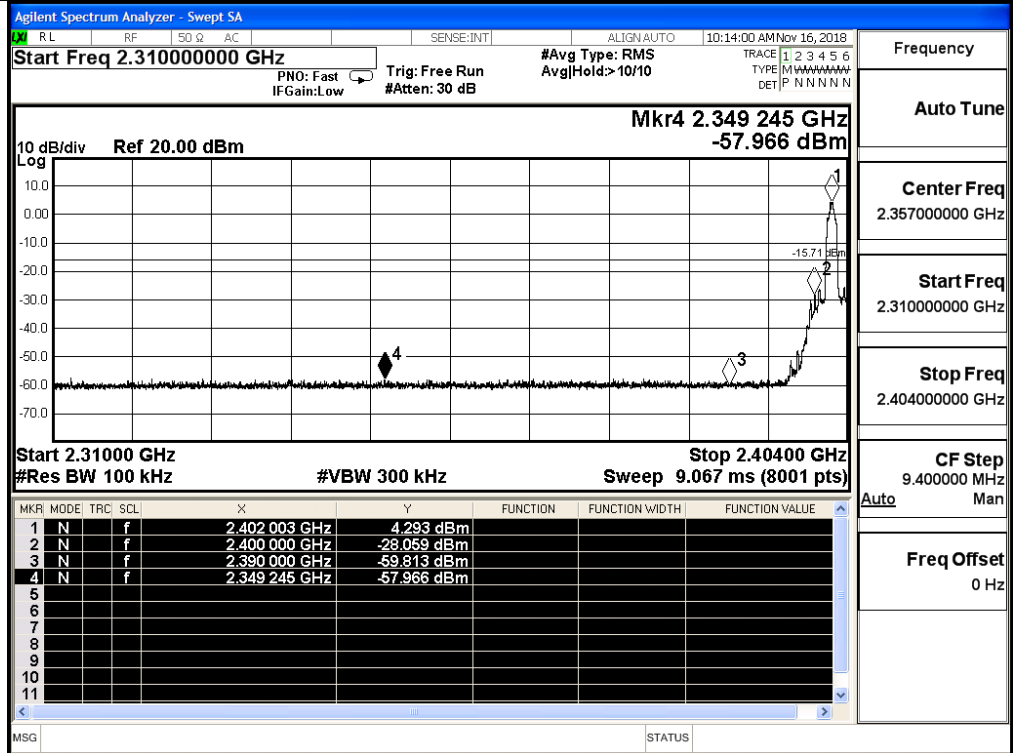
$\pi/4$ DQPSK/HCH/No Hop



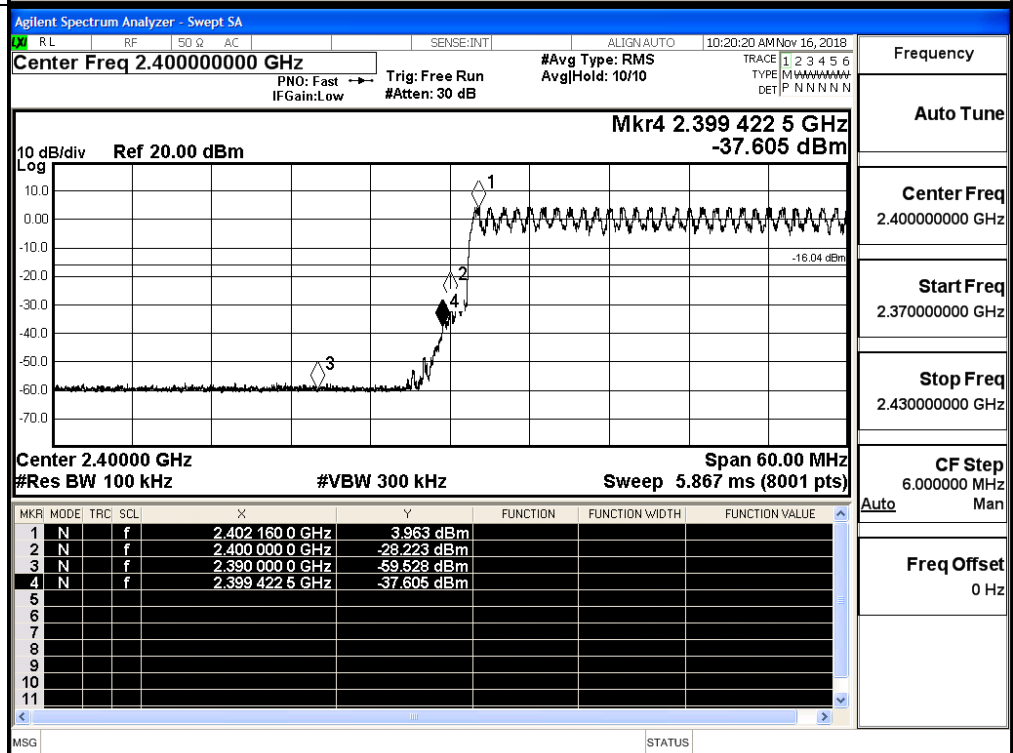
$\pi/4$ DQPSK/HCH/Hop



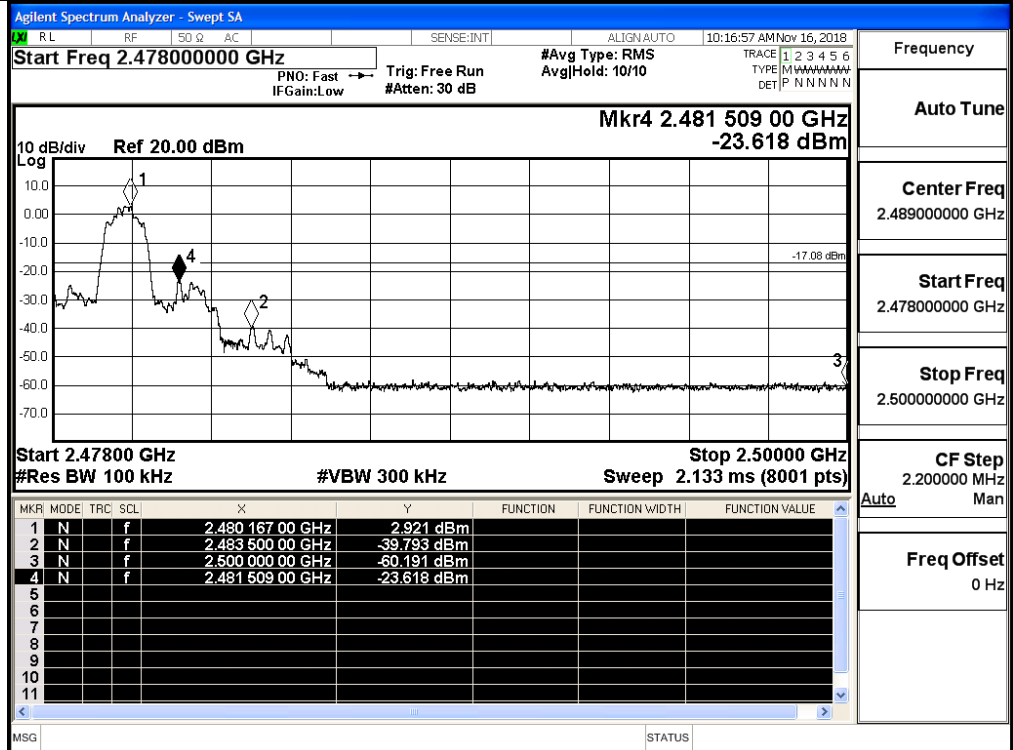
8DPSK/LCH/No Hop



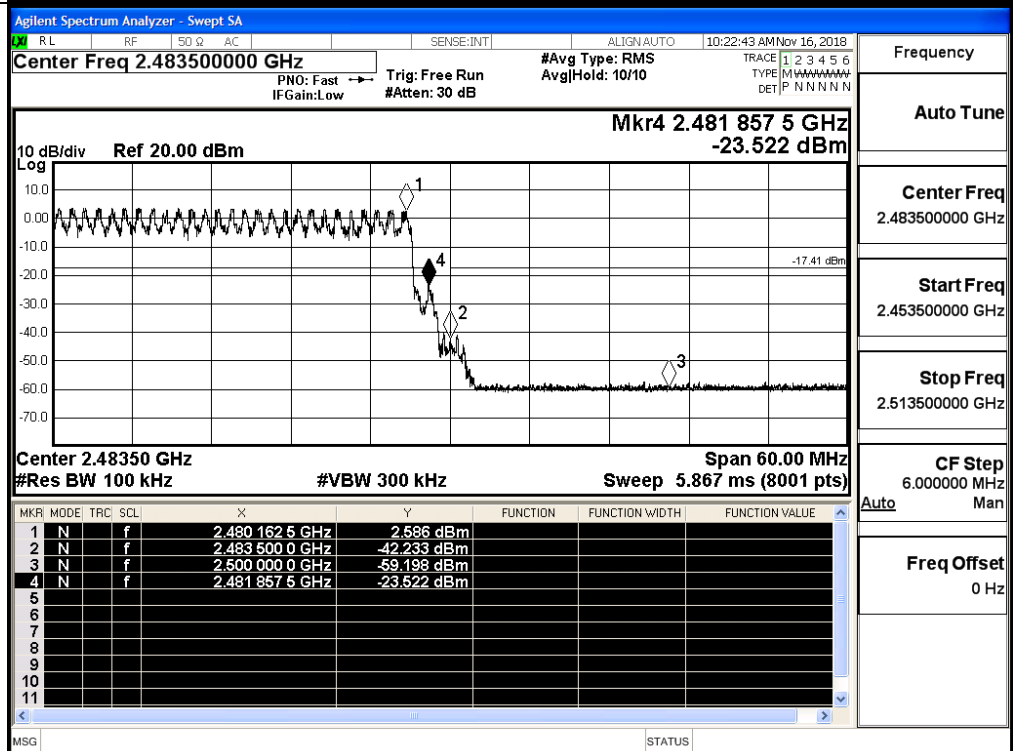
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



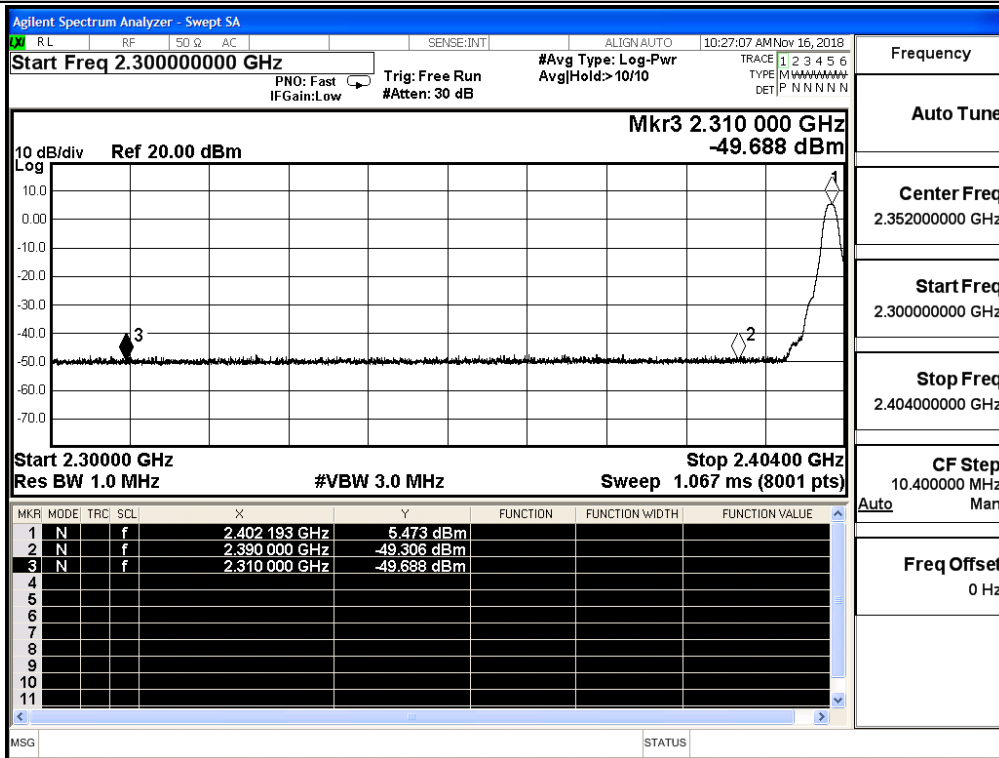
8DPSK/HCH/Hop



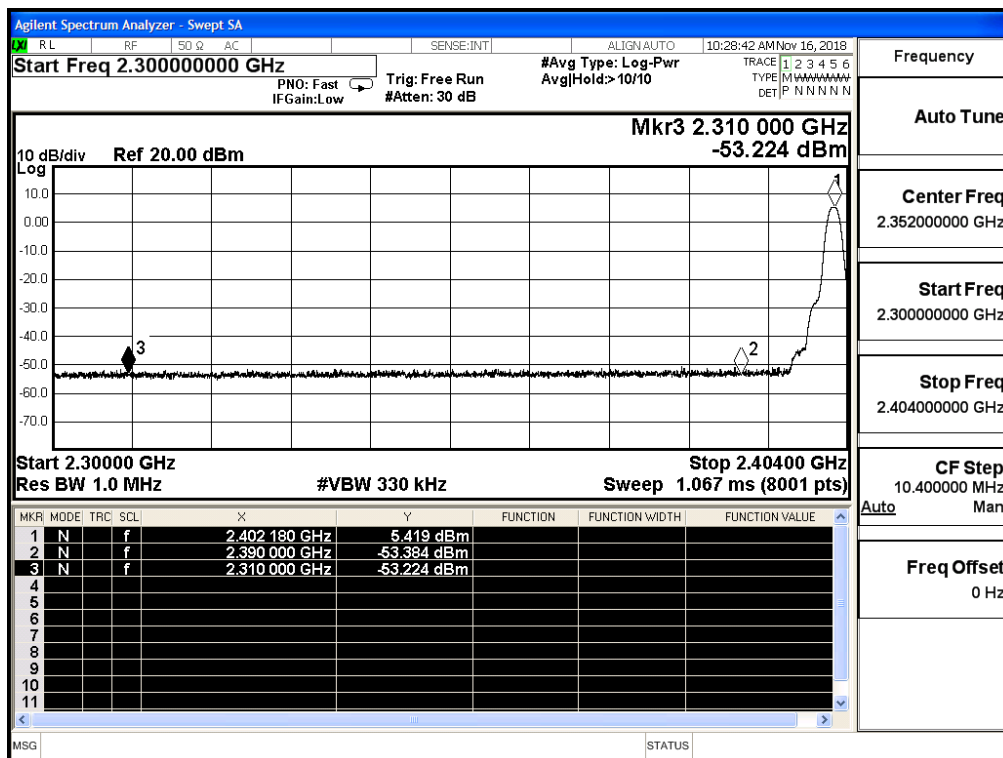
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-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
$\pi/4$ DQPSK	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

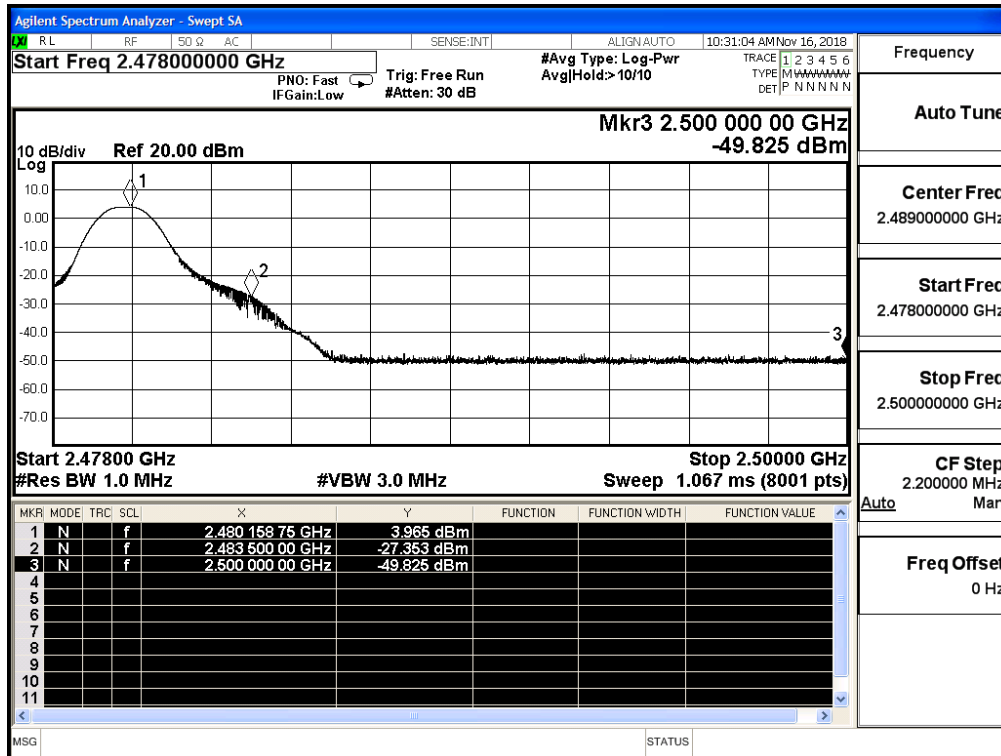
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



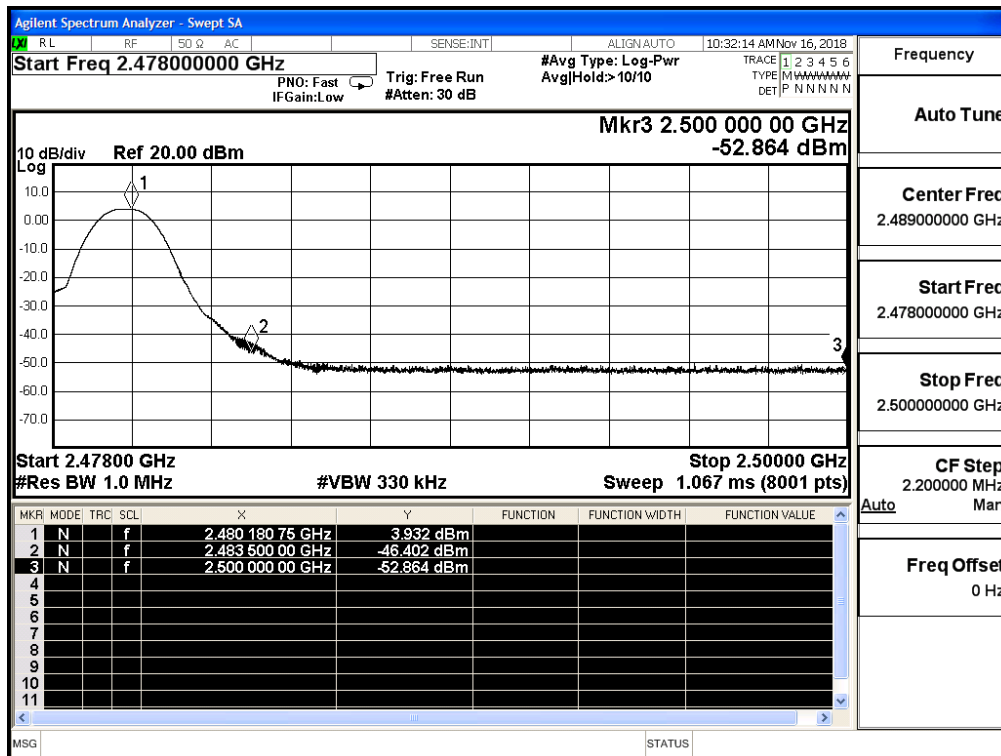
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



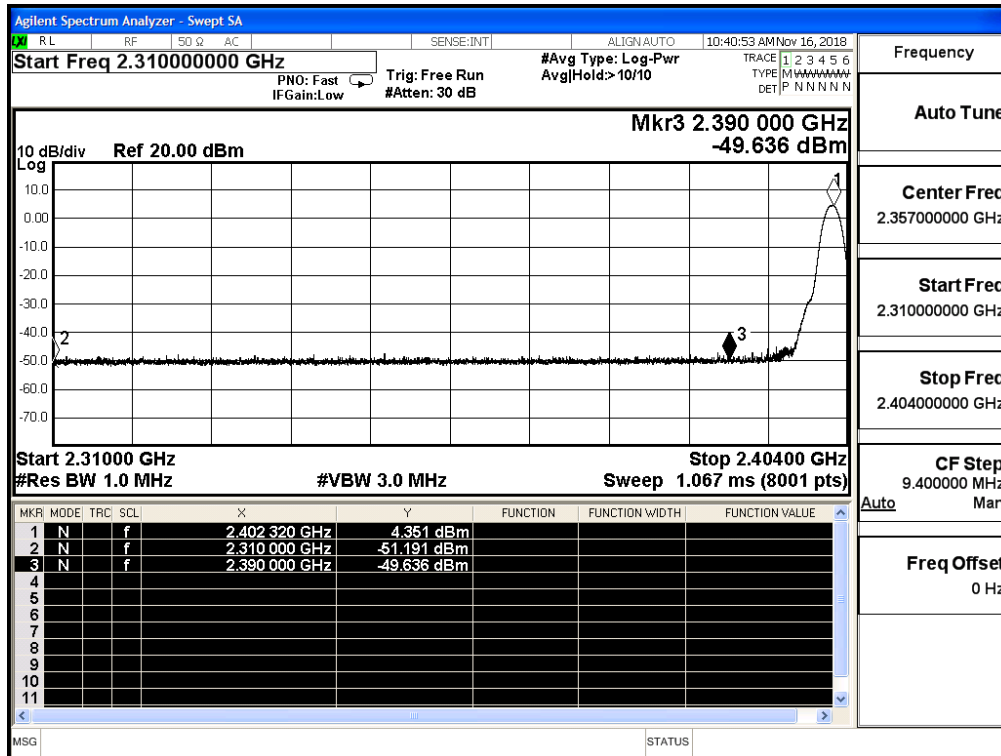
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



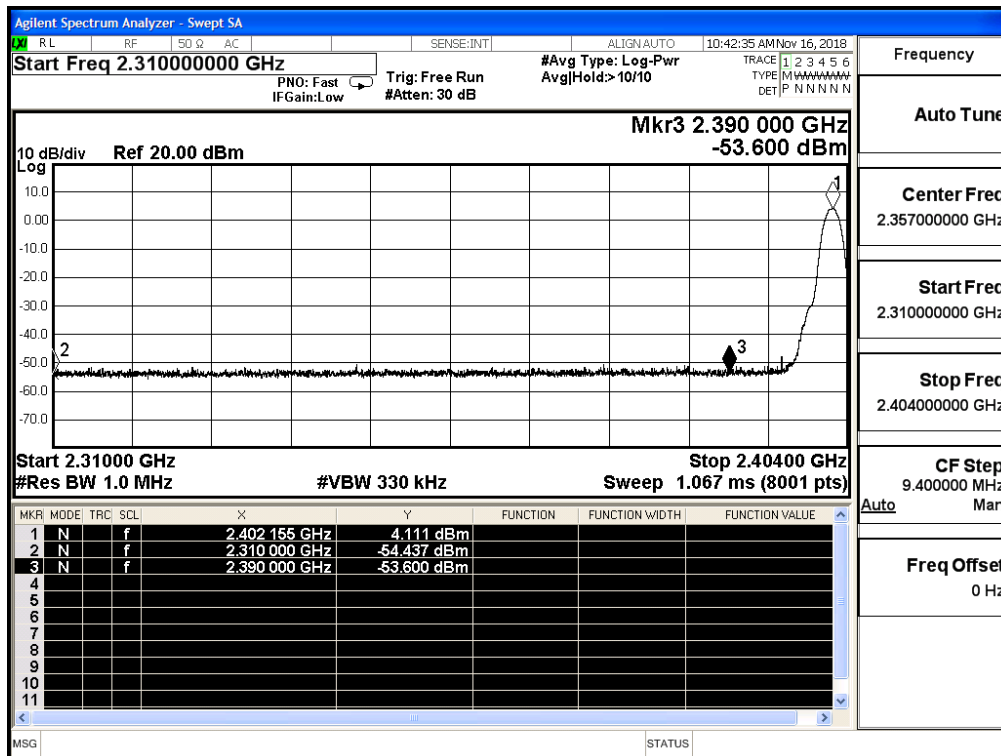
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



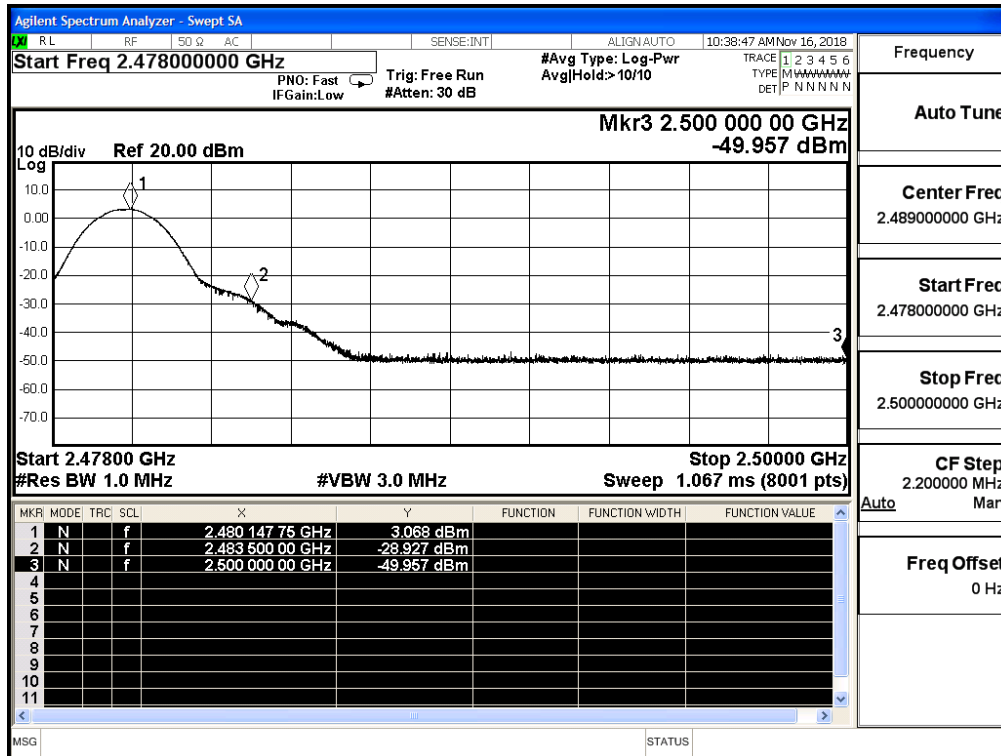
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



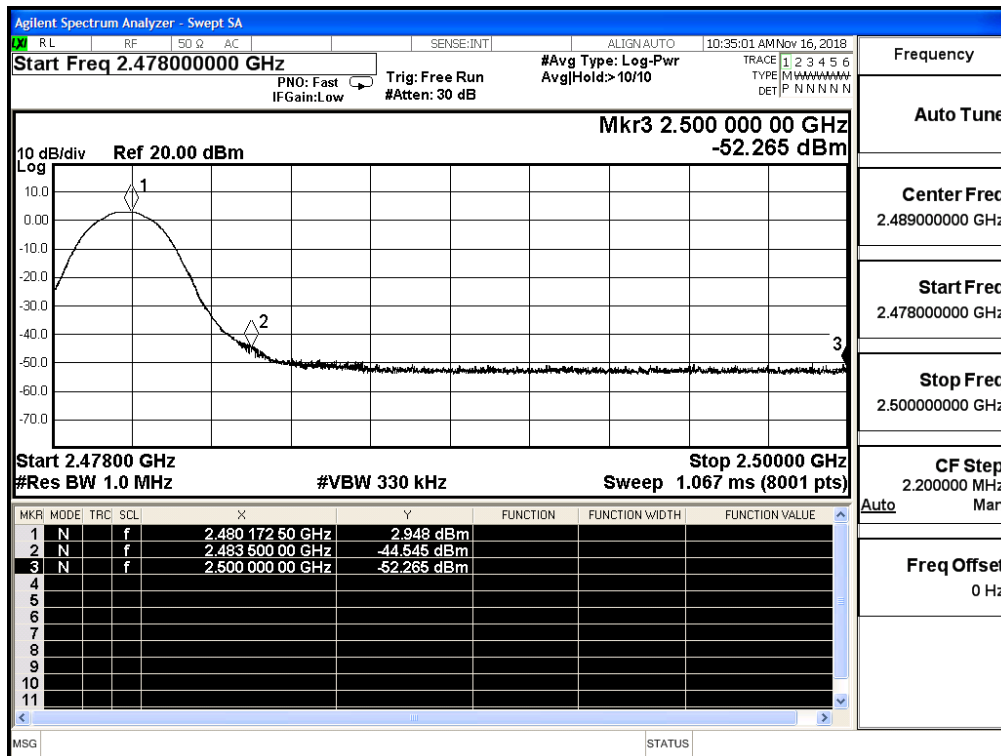
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



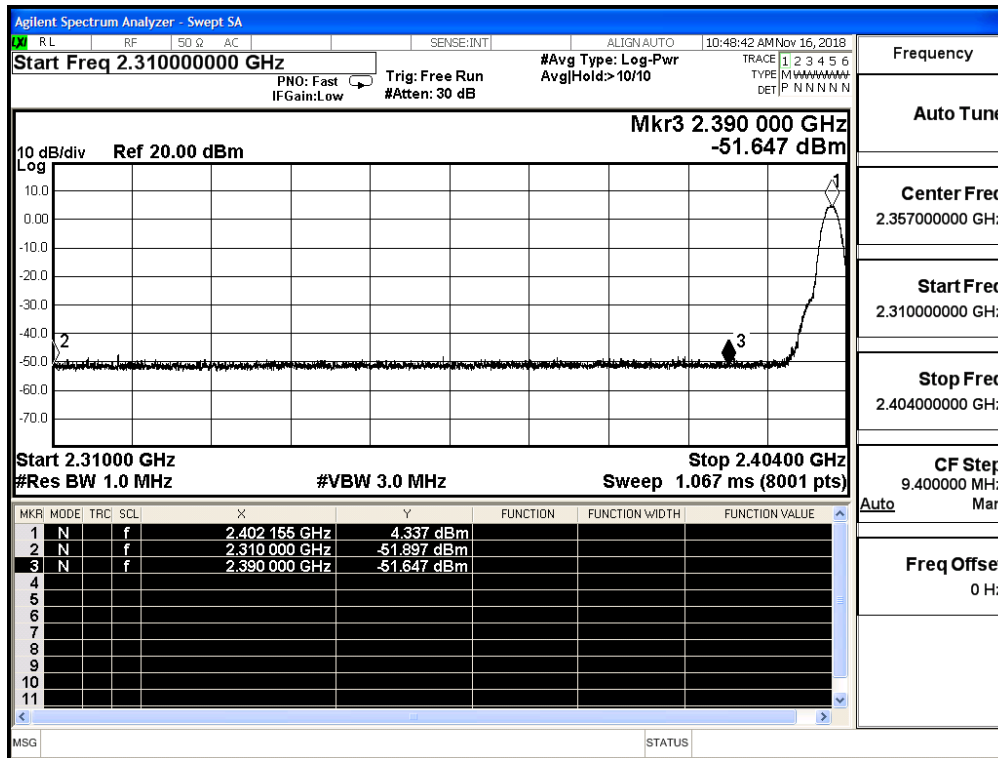
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



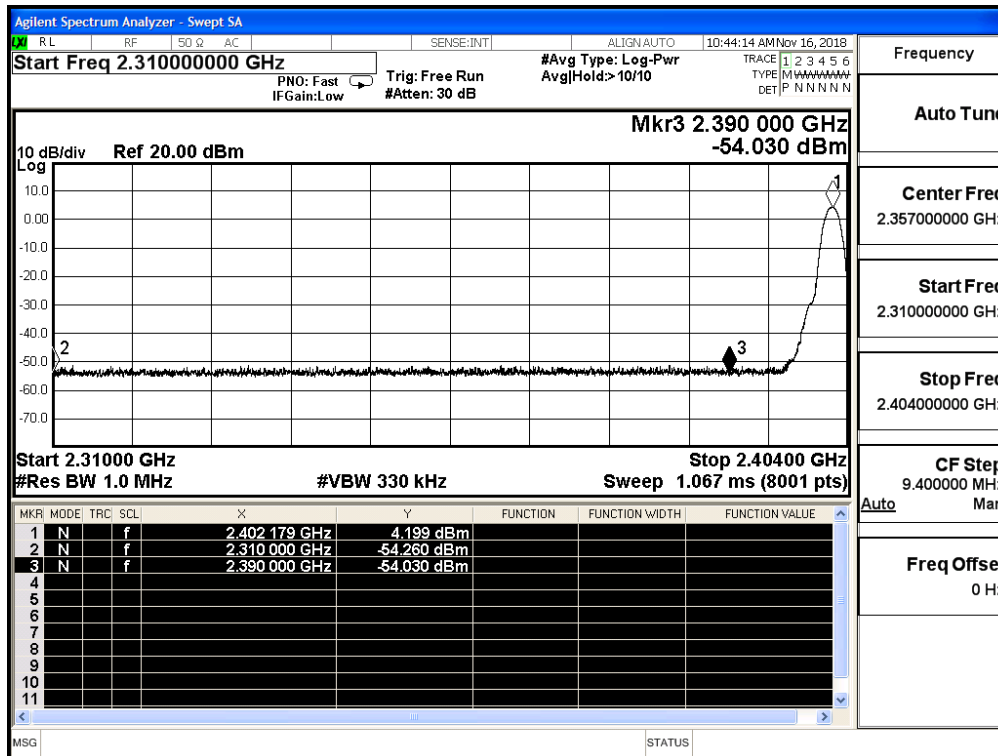
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



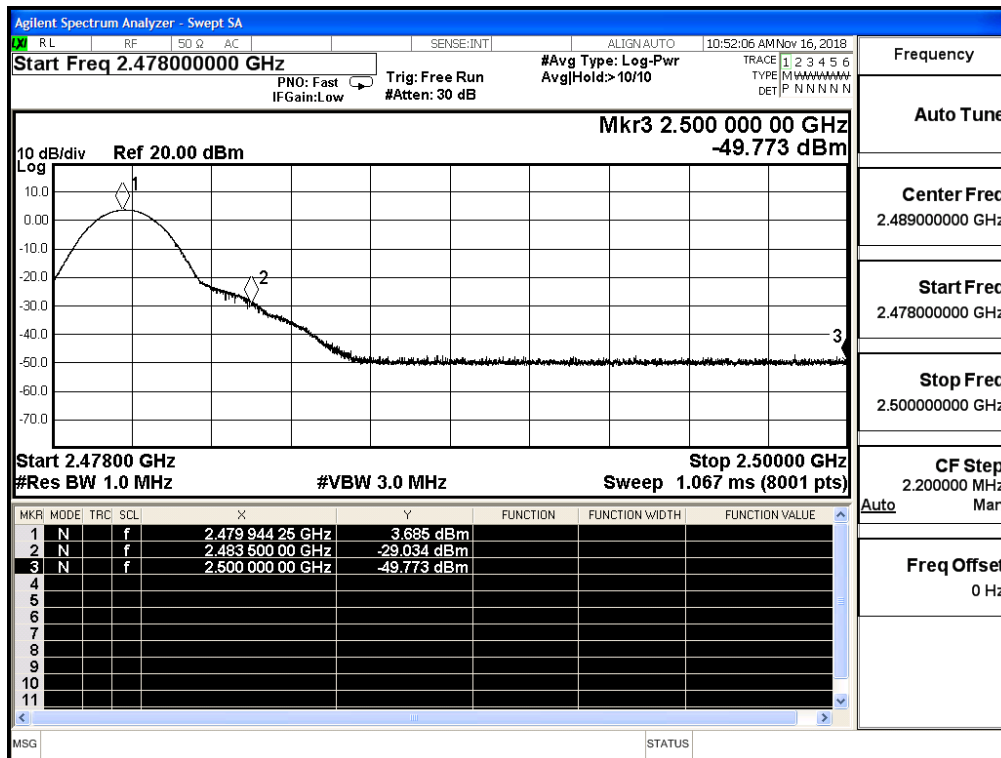
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

