

Appendix A

RF Test Data for BT V4.2(BDR/EDR) (Conducted Measurement)

Product Name: OVMS (Open Vehicle Monitoring System)

Trade Mark: Open Vehicles

Test Model: OVMS-31-5360A

Environmental Conditions

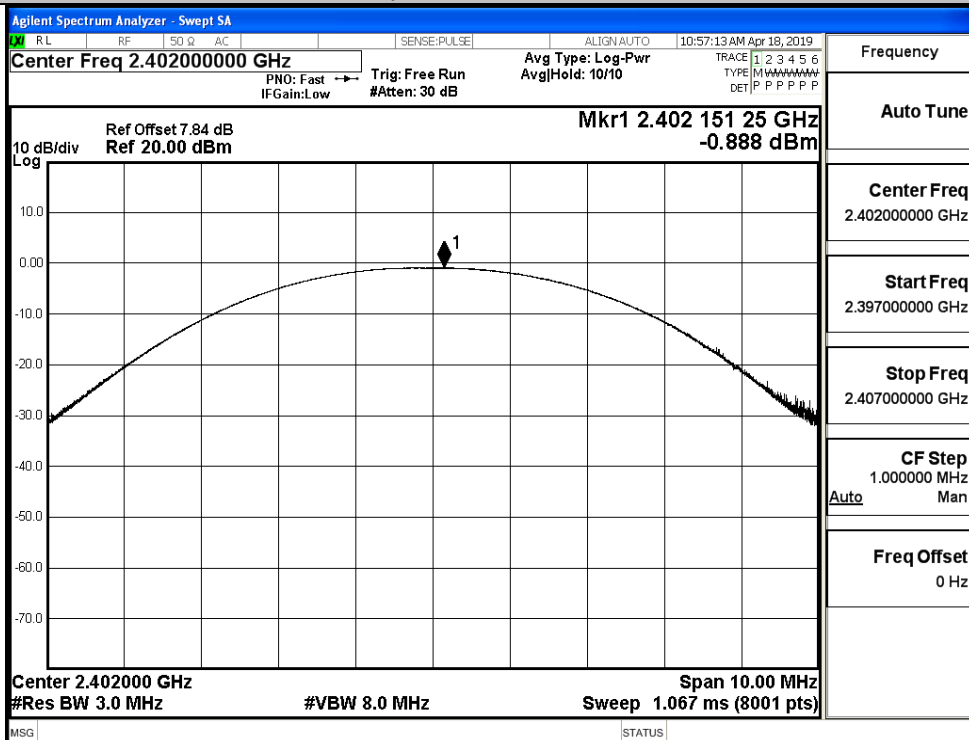
Temperature:	24.1 ° C
Relative Humidity:	52.7%
ATM Pressure:	100.0 kPa
Test Engineer:	Wang Chuang
Supervised by:	Tom Liu

A.1 Maximum Conducted Peak Output Power

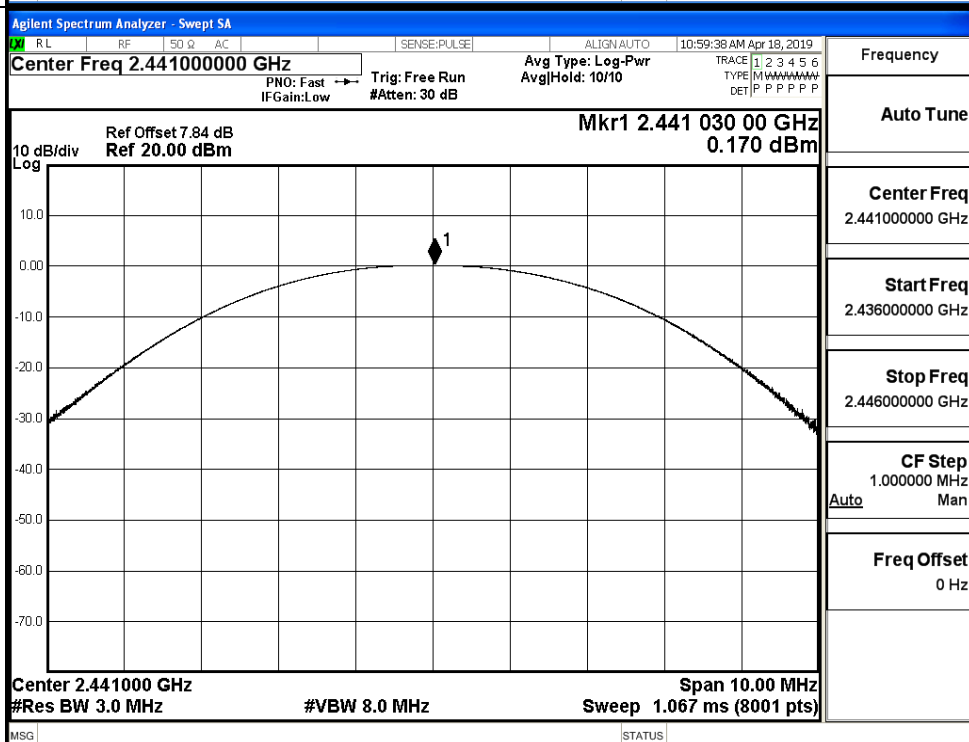
Mode	Channel.	Maximum Peak Output Power [dBm]	Maximum Average Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.888	-1.084	30	PASS
	MCH	0.170	-0.010	30	PASS
	HCH	-1.386	-1.541	30	PASS
$\pi/4$ DQPSK	LCH	-1.611	-1.820	21	PASS
	MCH	-0.638	-0.819	21	PASS
	HCH	-2.232	-2.432	21	PASS
8DPSK	LCH	-1.685	-1.873	21	PASS
	MCH	-0.700	-0.880	21	PASS
	HCH	-2.234	-2.413	21	PASS

Test Graphs

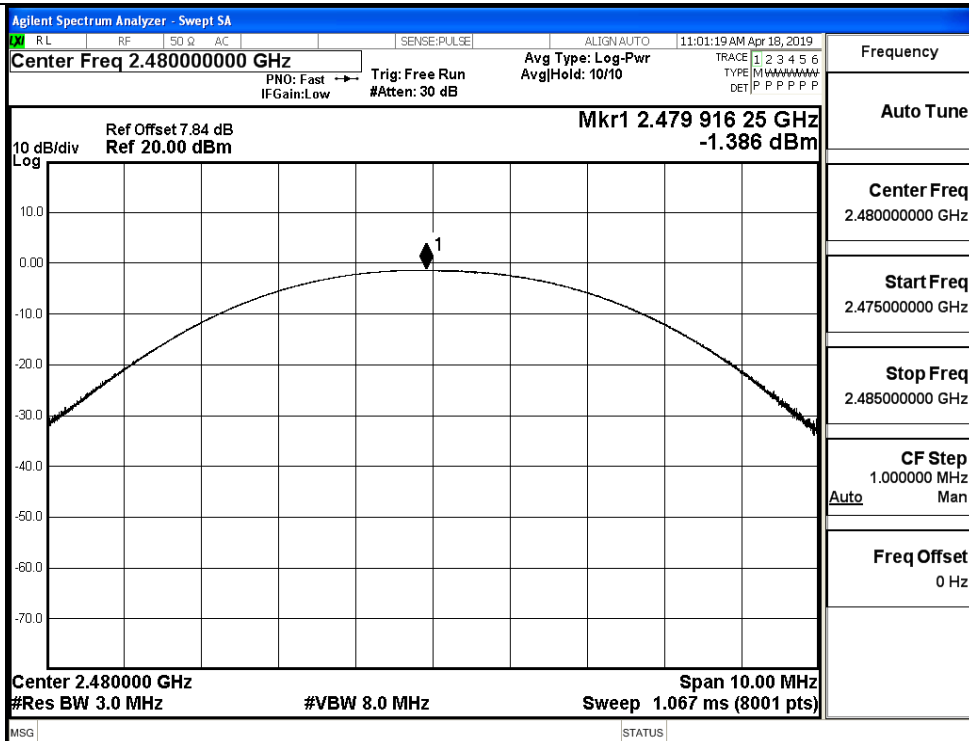
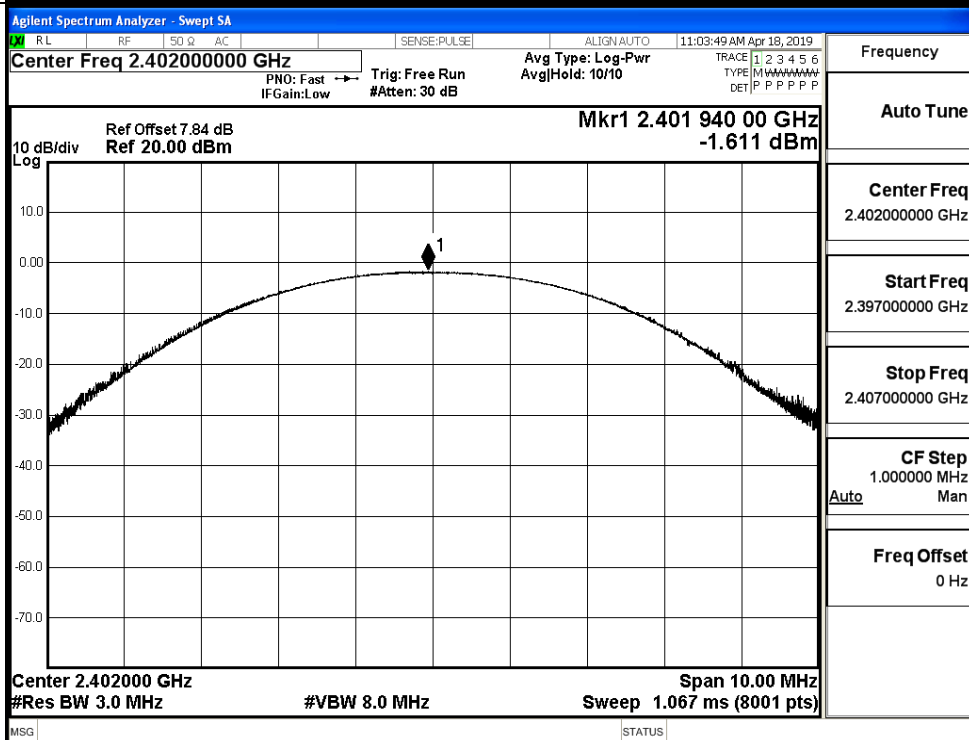
GFSK/LCH

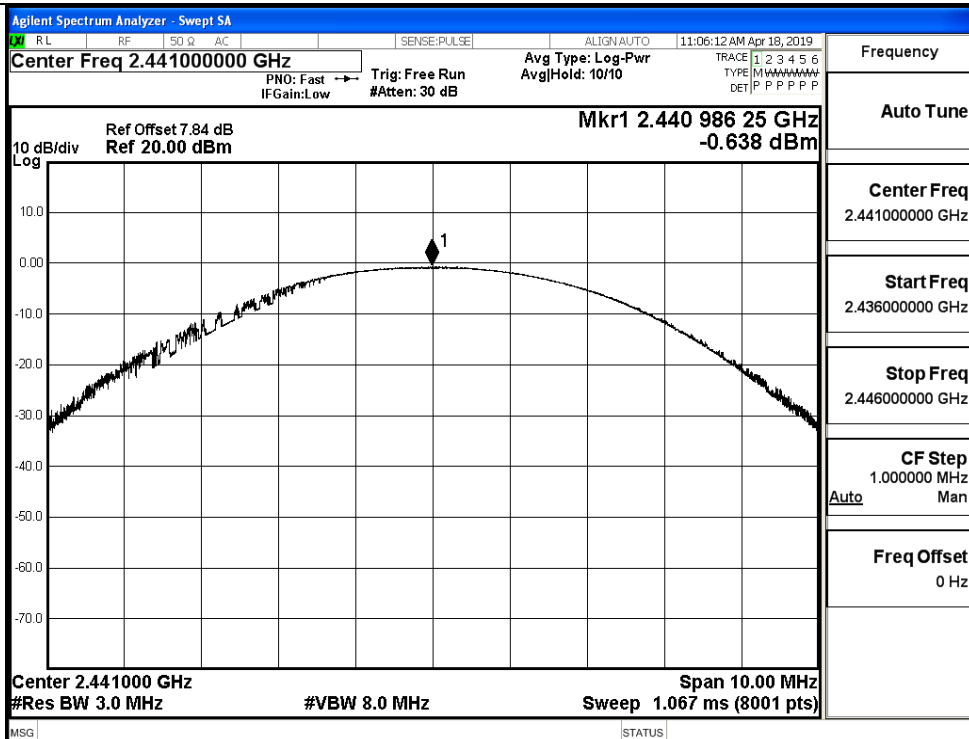
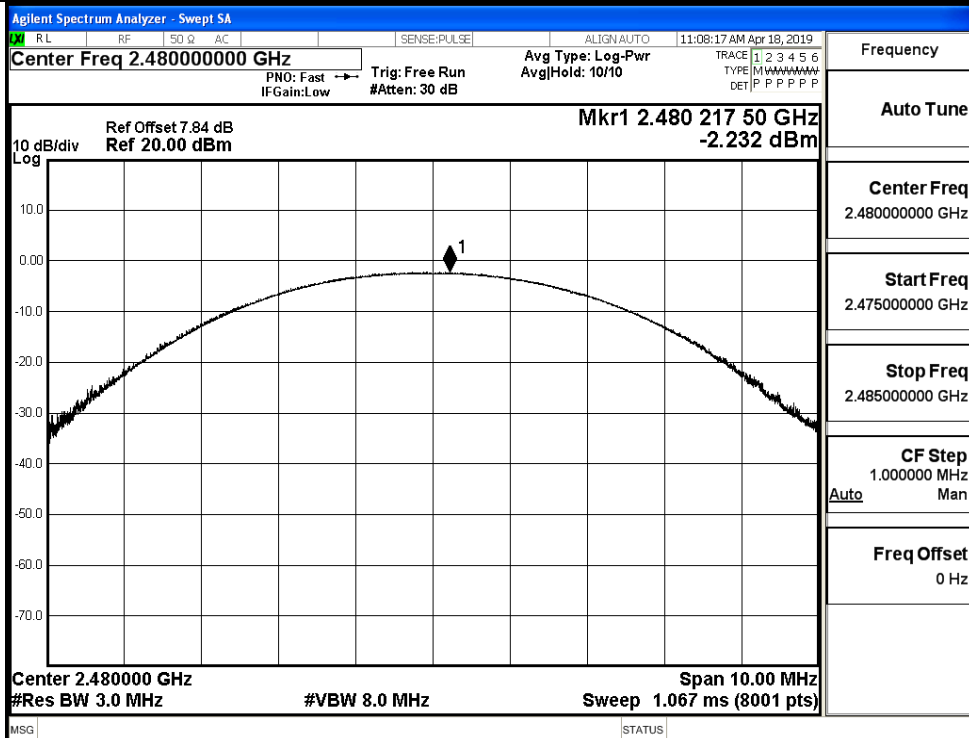


GFSK/MCH

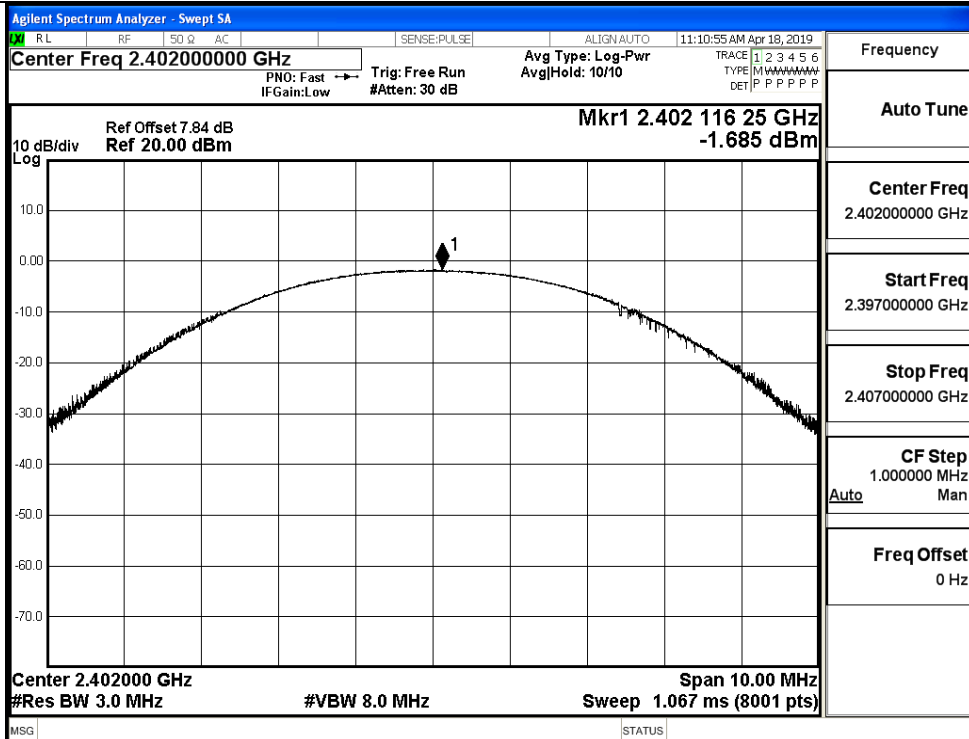


GFSK/HCH

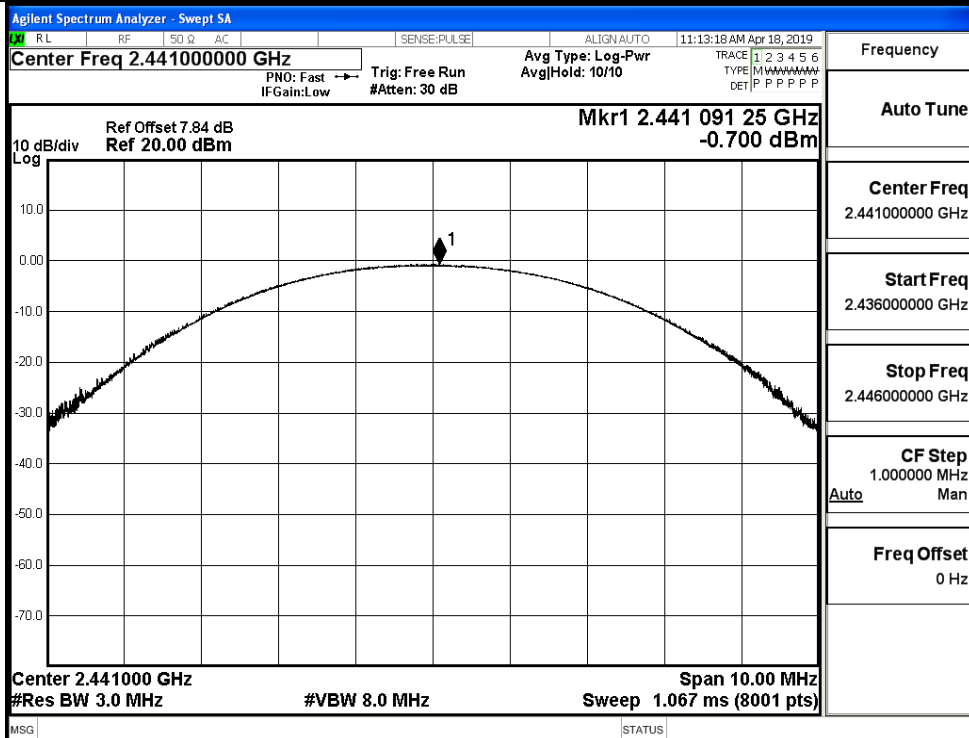
 π /4DQPSK/LCH

$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

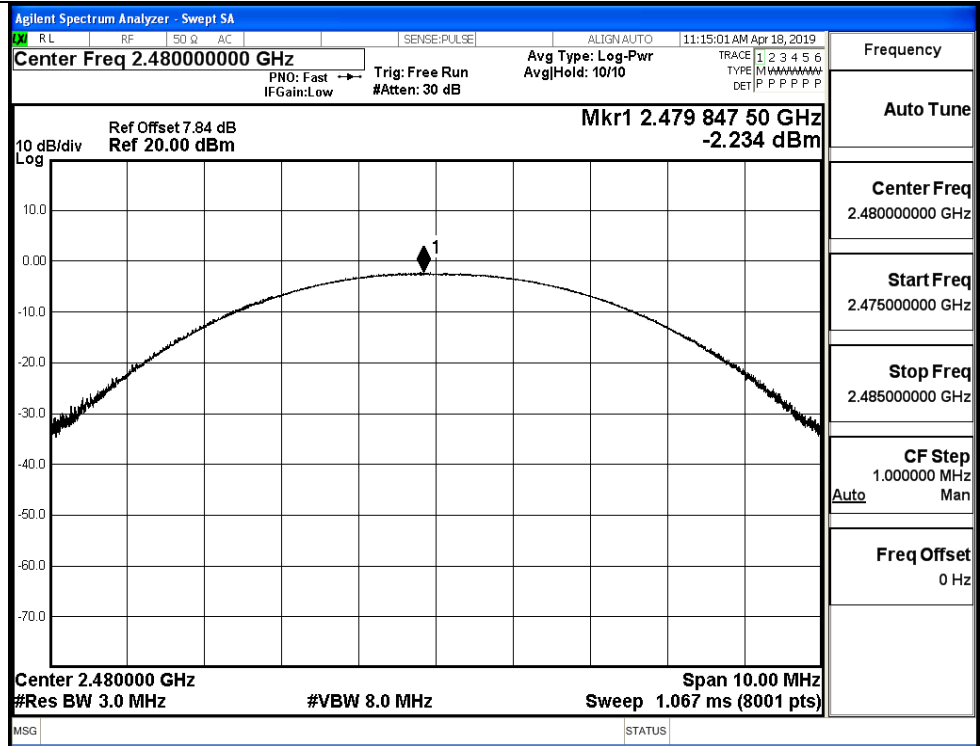
8DPSK/LCH



8DPSK/MCH



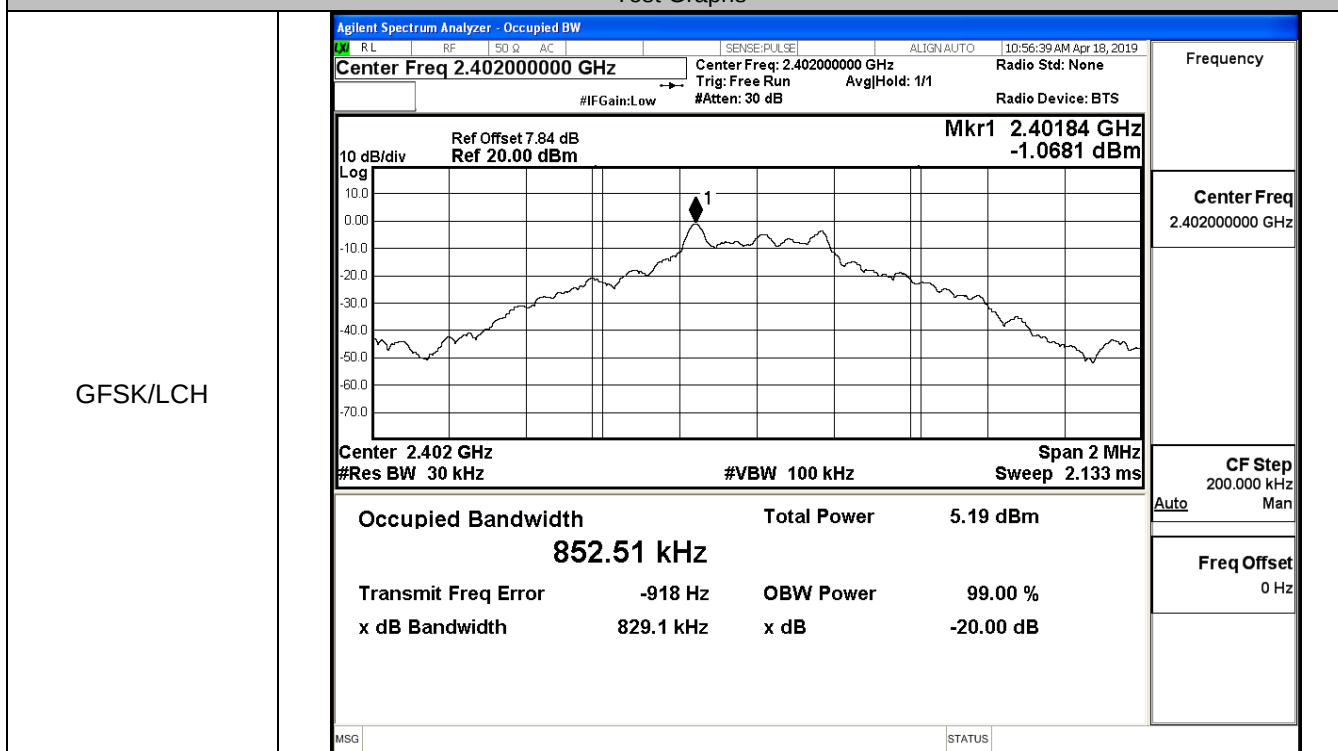
8DPSK/HCH



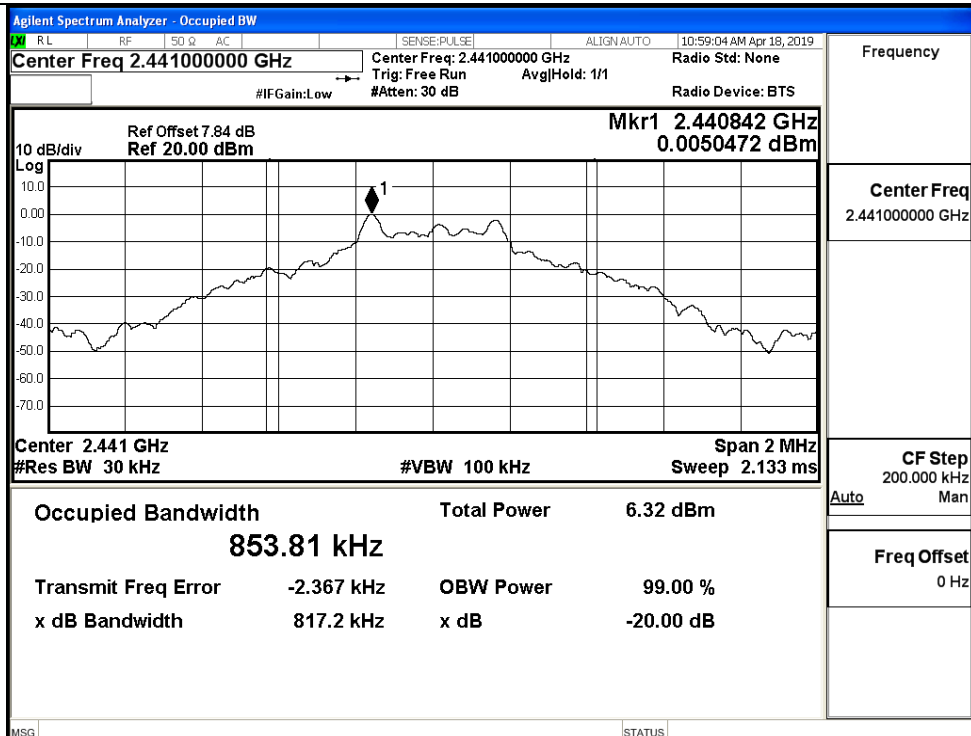
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.8291	Not Specified	PASS
	MCH	0.8172	Not Specified	PASS
	HCH	0.8307	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.116	Not Specified	PASS
	MCH	1.113	Not Specified	PASS
	HCH	1.118	Not Specified	PASS
8DPSK	LCH	1.134	Not Specified	PASS
	MCH	1.113	Not Specified	PASS
	HCH	1.117	Not Specified	PASS

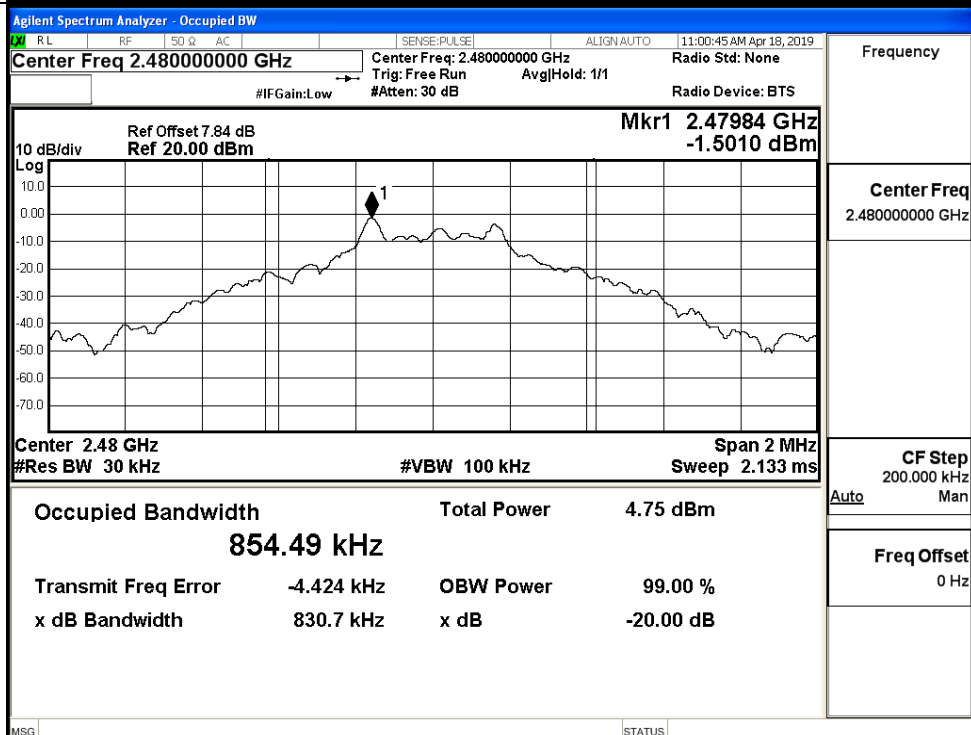
Test Graphs

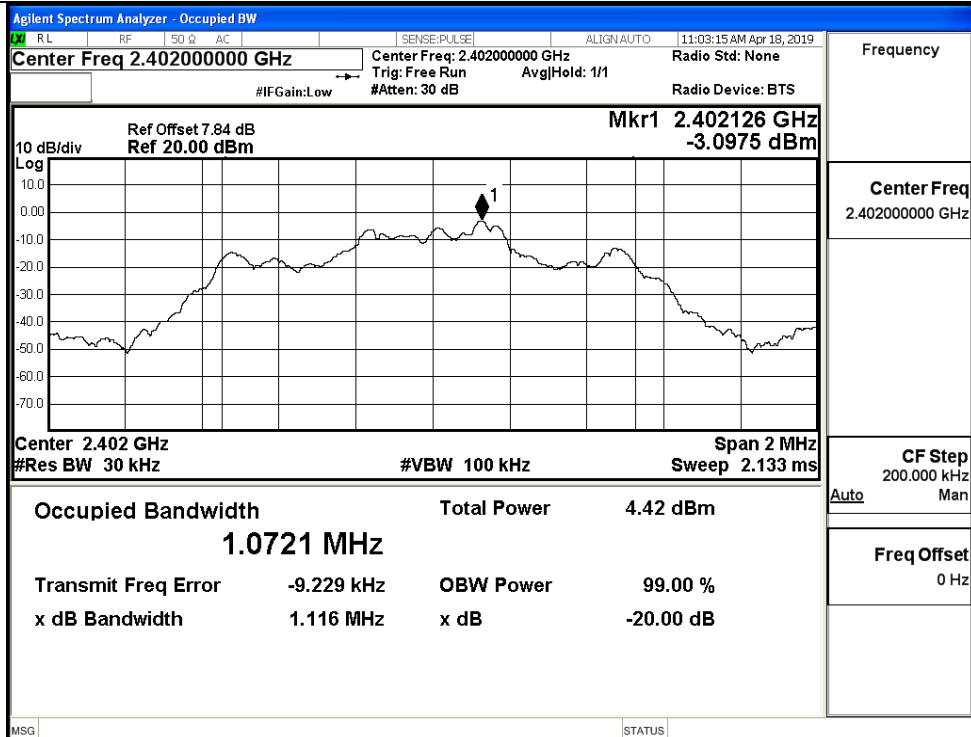
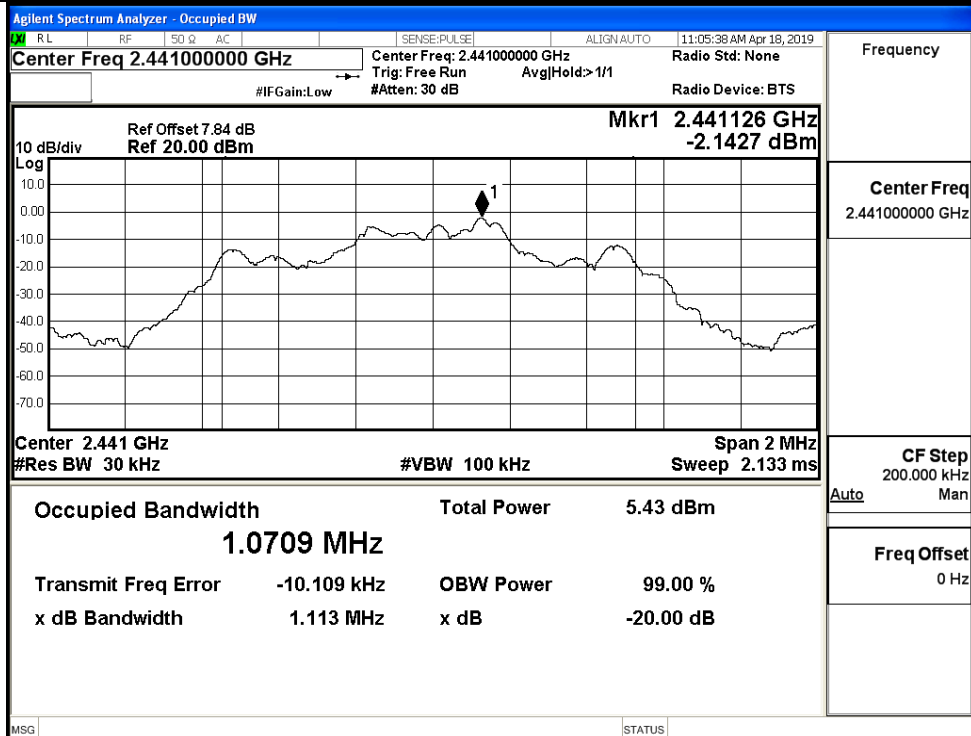


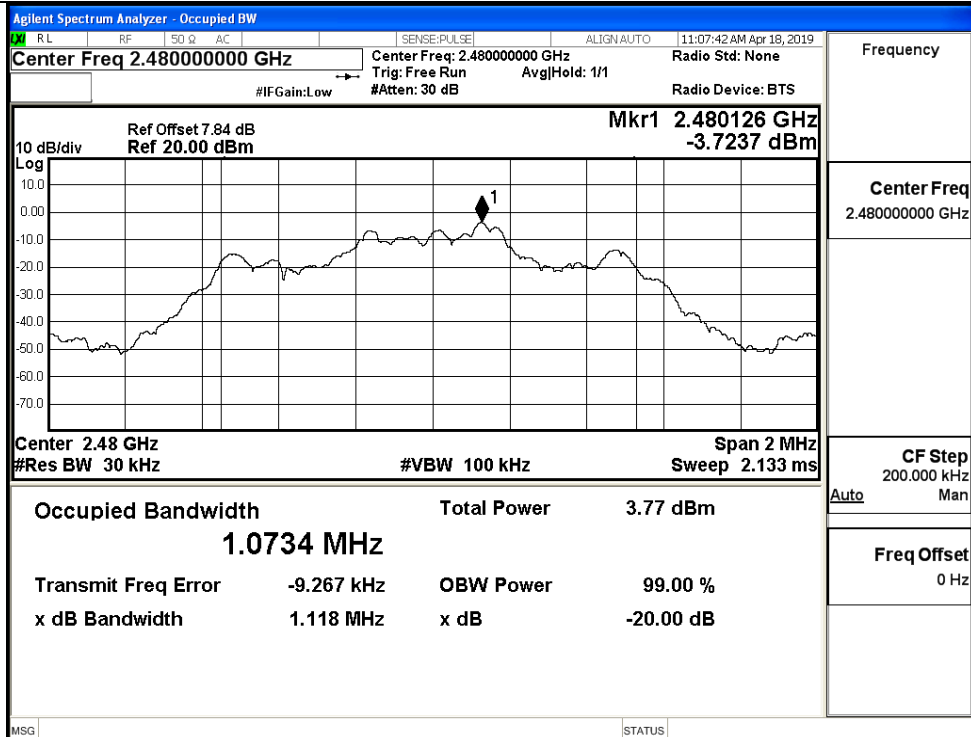
GFSK/MCH



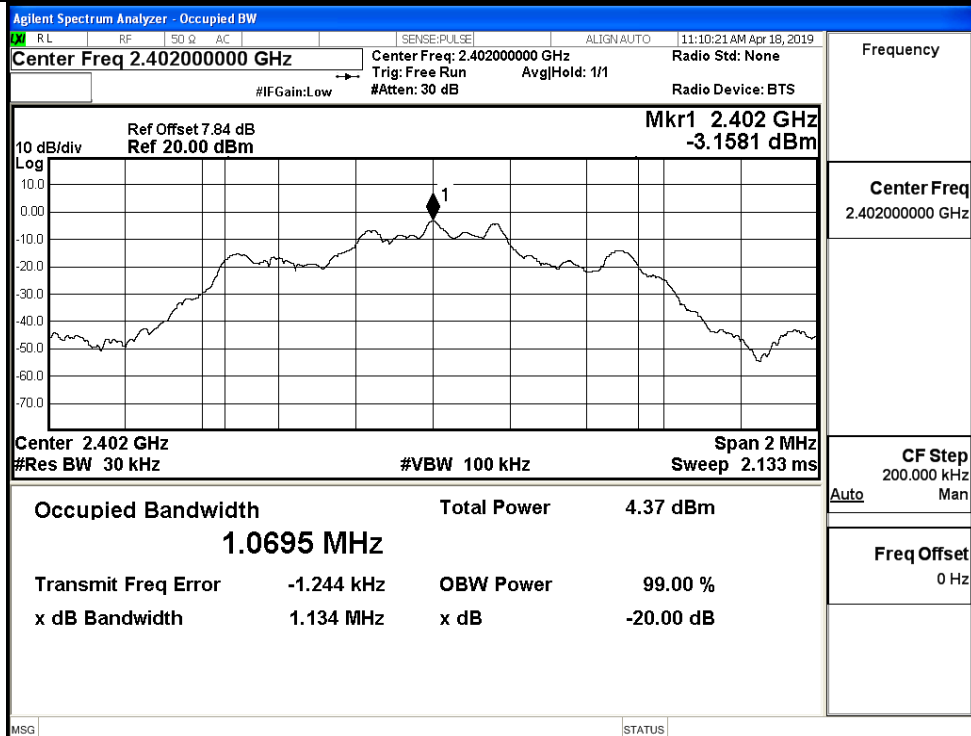
GFSK/HCH



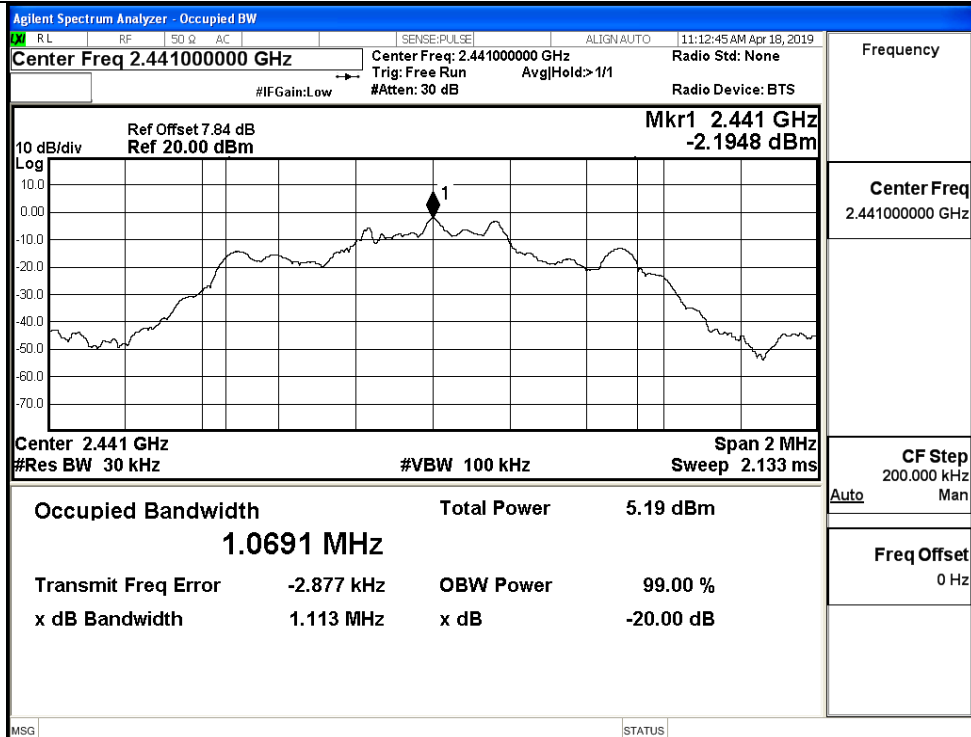
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

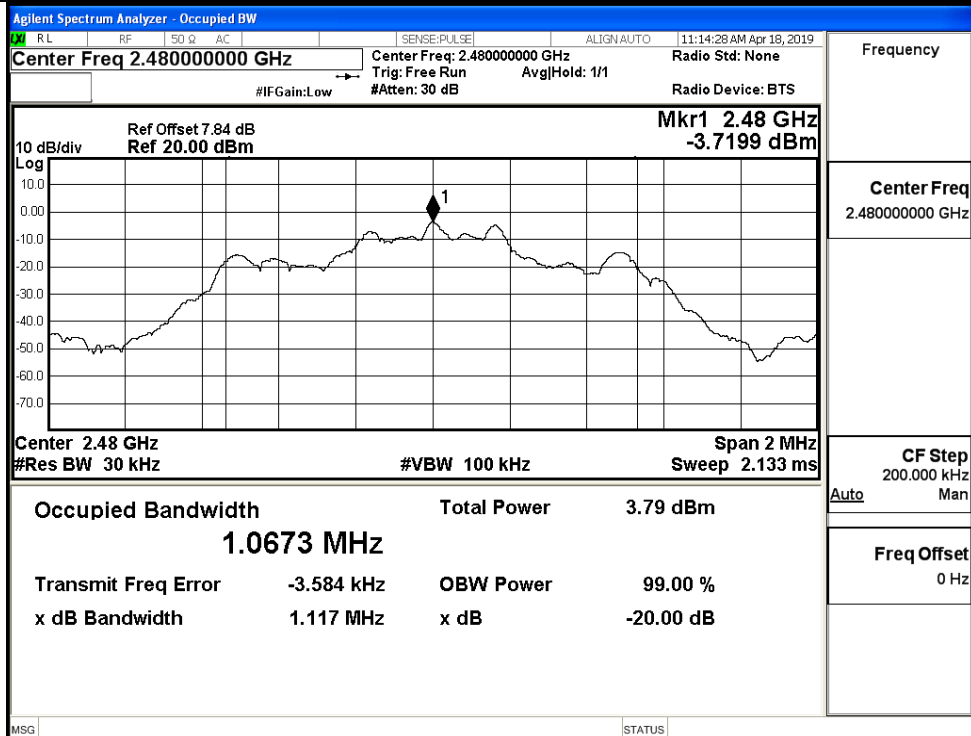
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

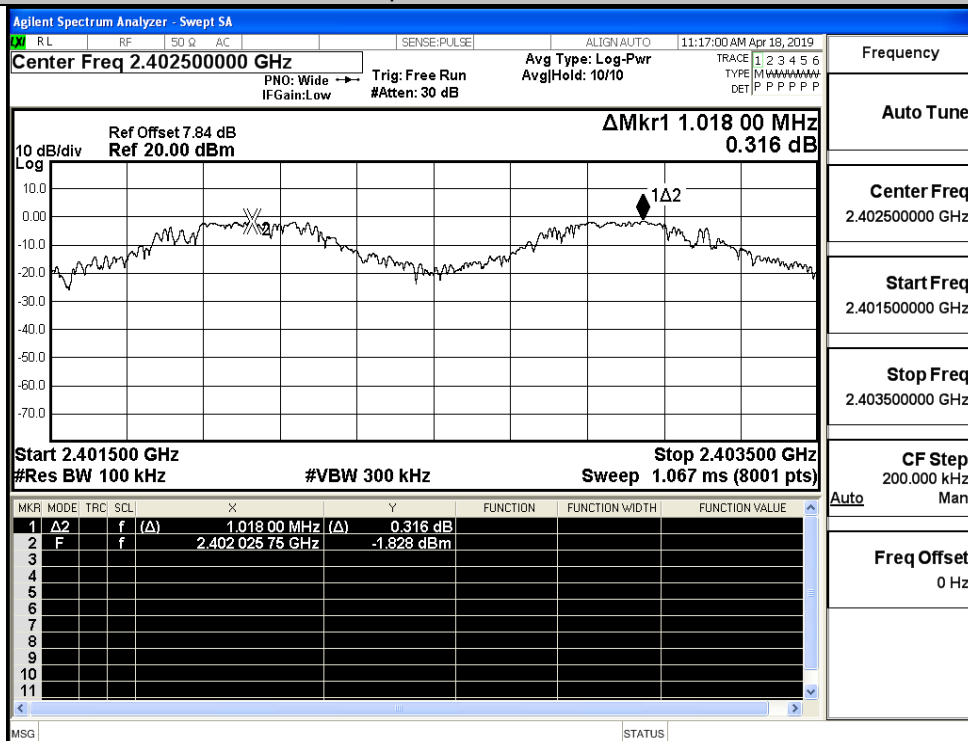


A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.018	0.8291	PASS
	MCH	1.162	0.8172	PASS
	HCH	1.322	0.8307	PASS
$\pi/4$ DQPSK	LCH	0.838	0.745	PASS
	MCH	1.336	0.745	PASS
	HCH	0.890	0.745	PASS
8DPSK	LCH	1.188	0.756	PASS
	MCH	0.836	0.756	PASS
	HCH	1.194	0.756	PASS

Test Graphs

GFSK/LCH

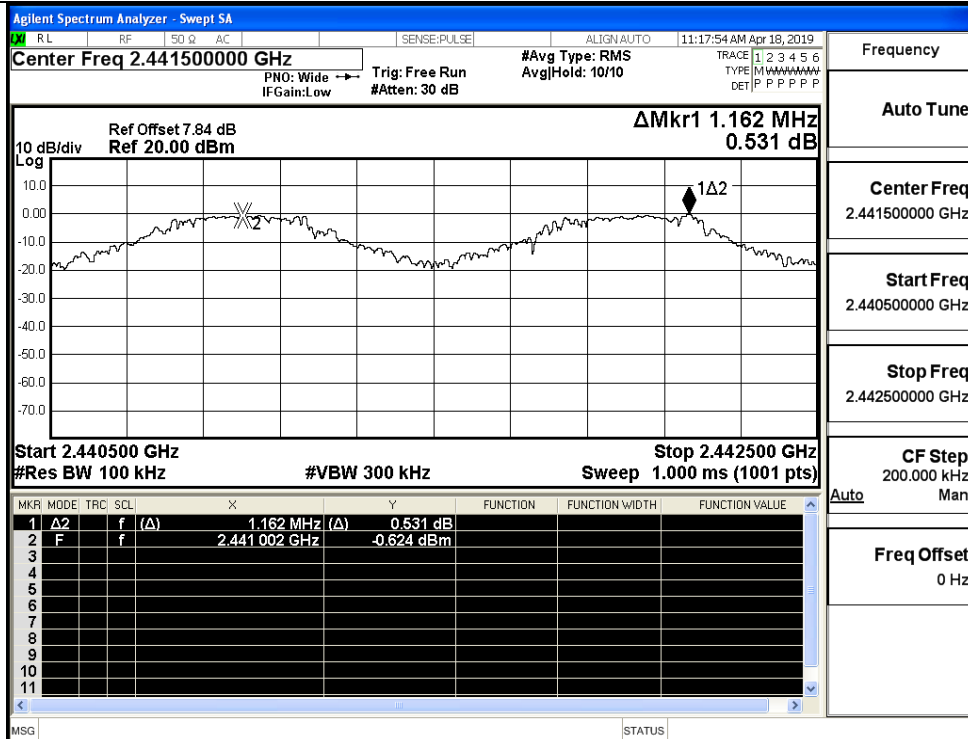


Frequency

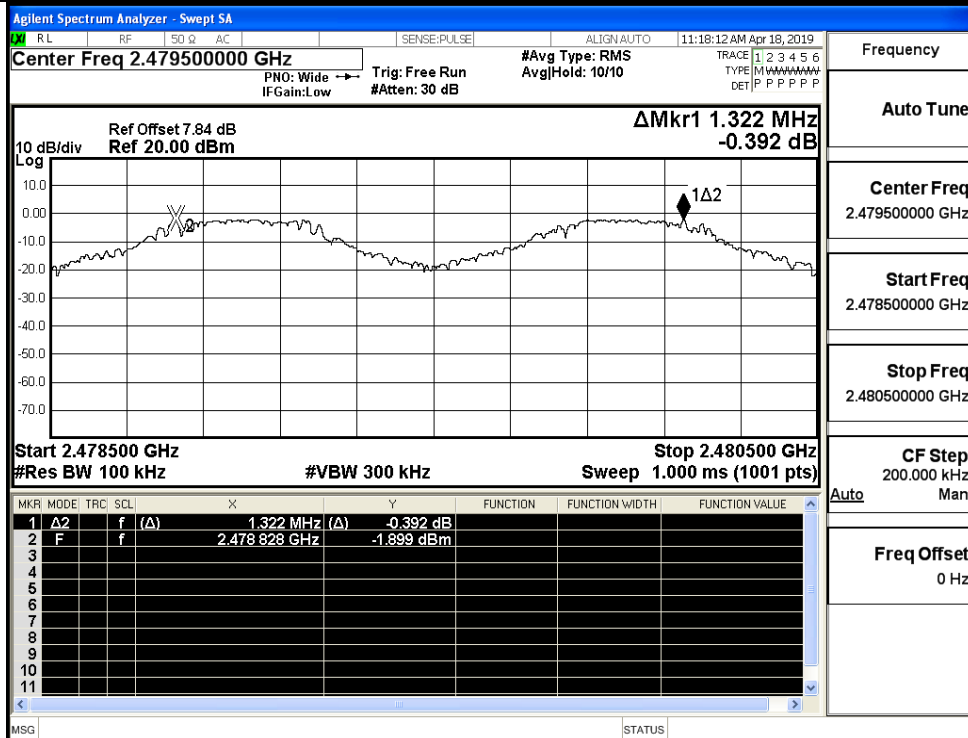
Auto Tune

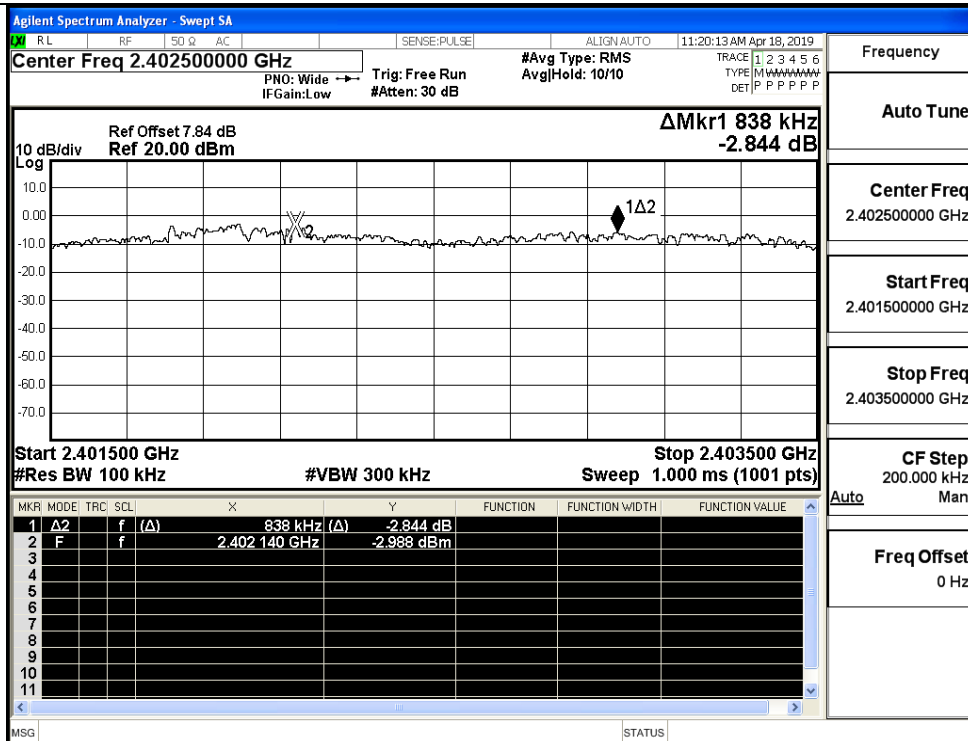
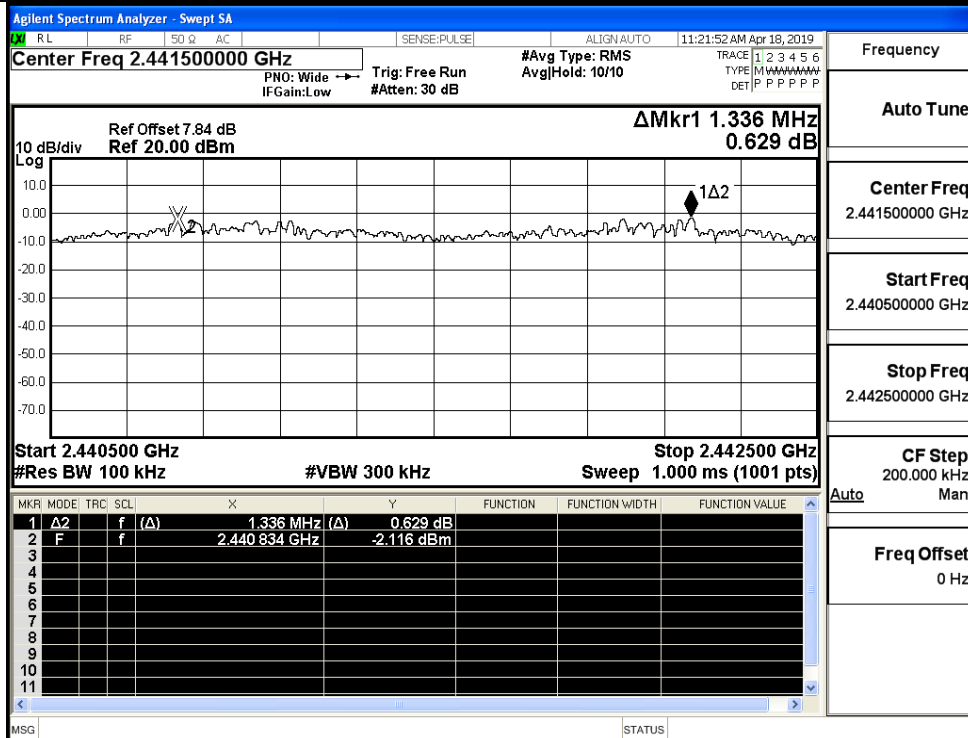
Center Freq
2.402500000 GHzStart Freq
2.401500000 GHzStop Freq
2.403500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

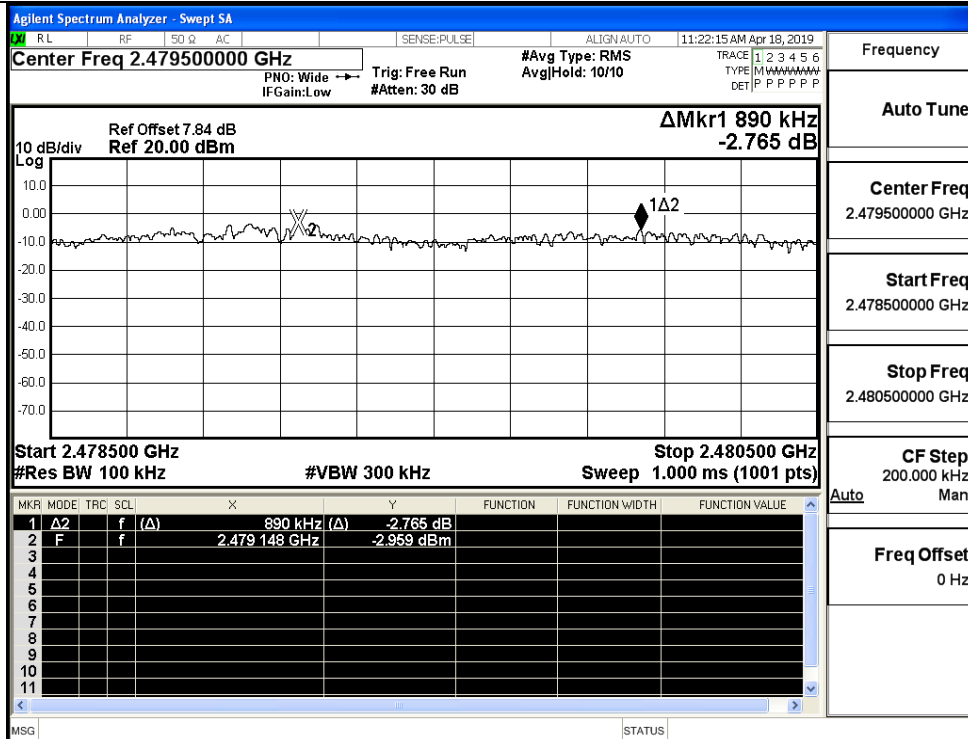
GFSK/MCH



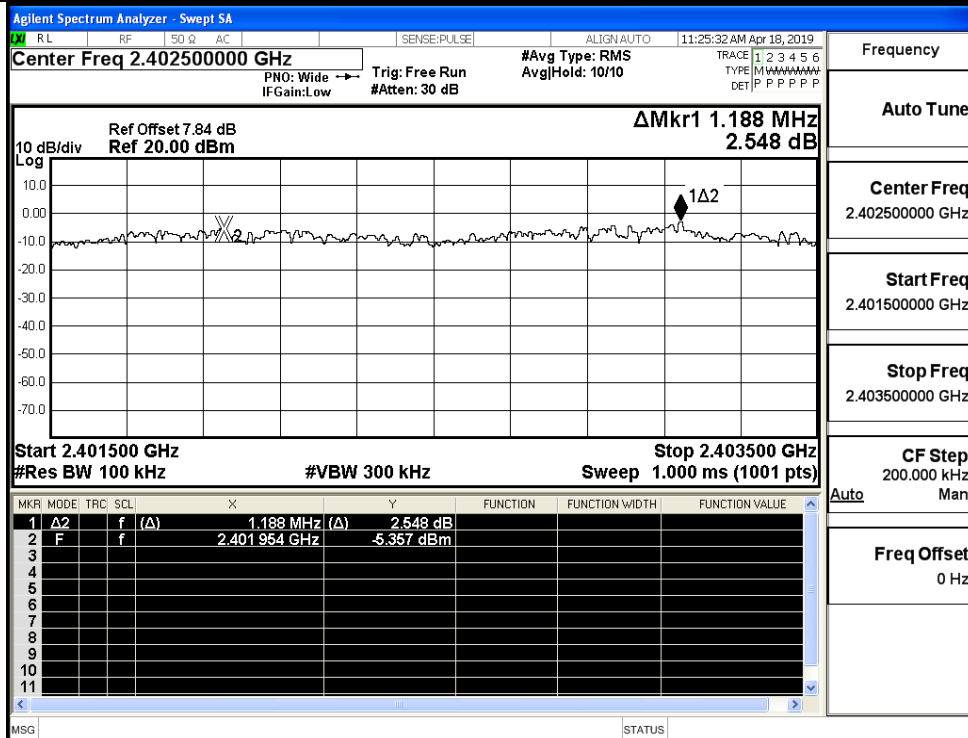
GFSK/HCH



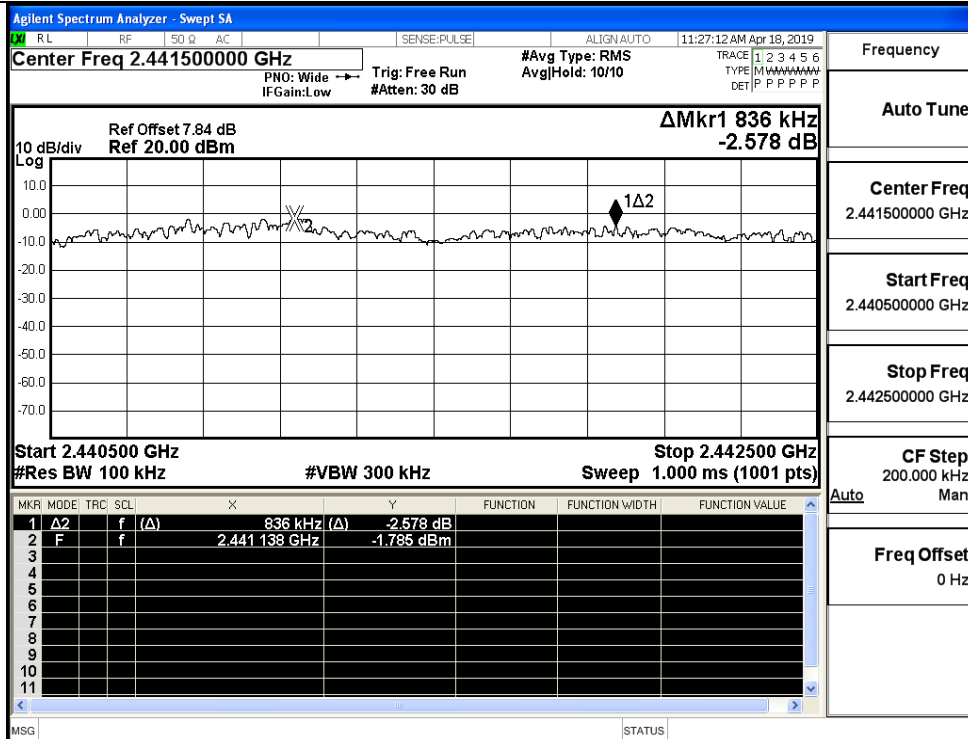
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

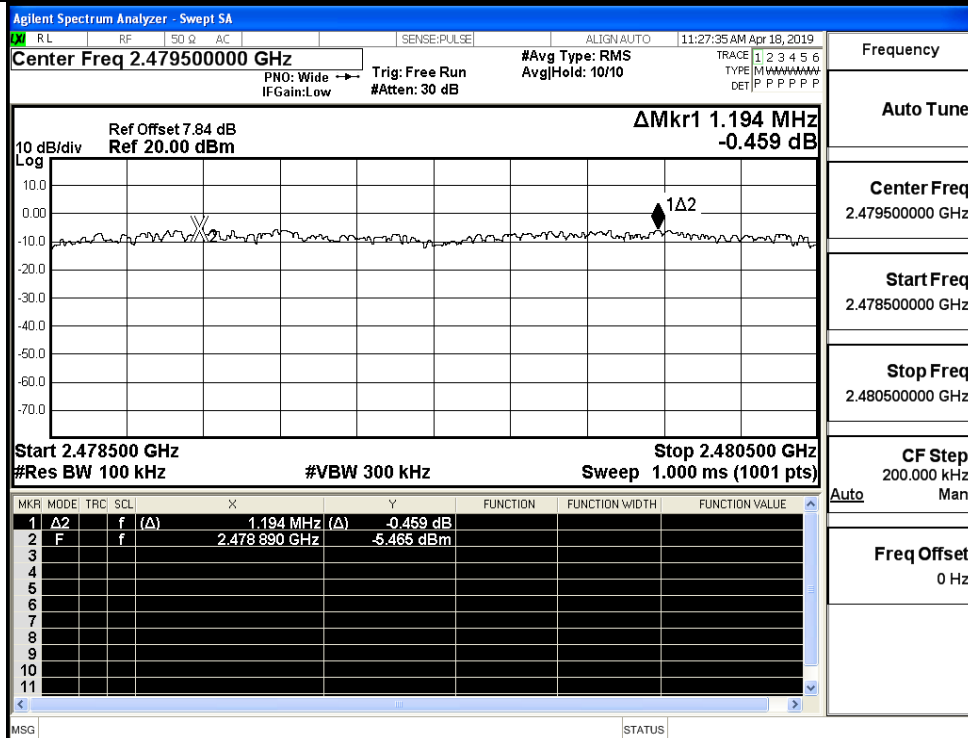
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

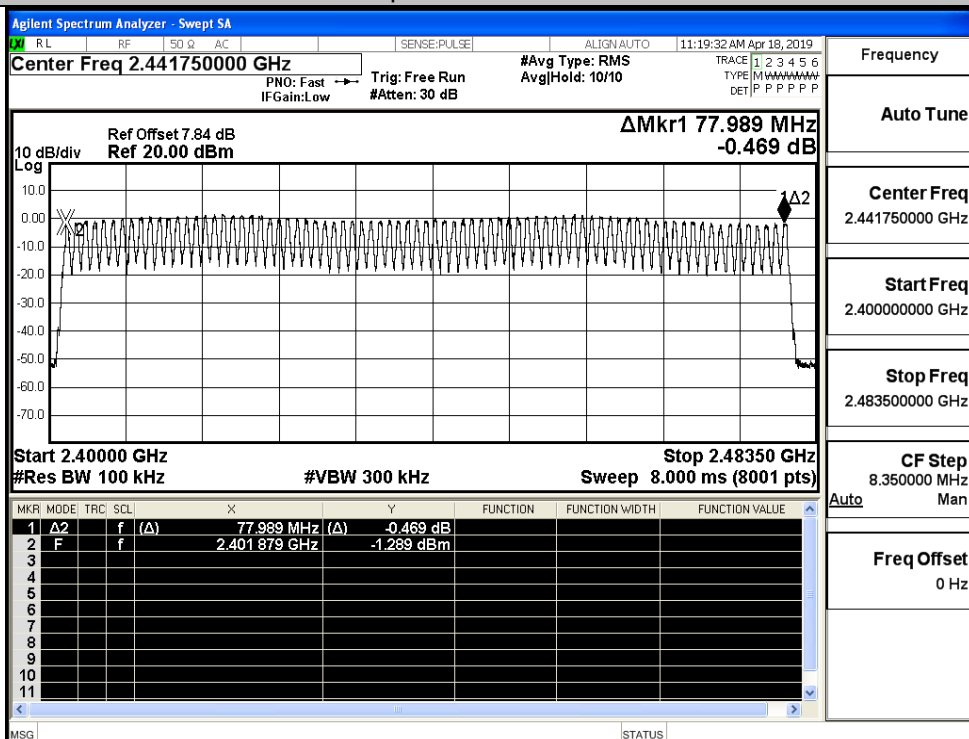
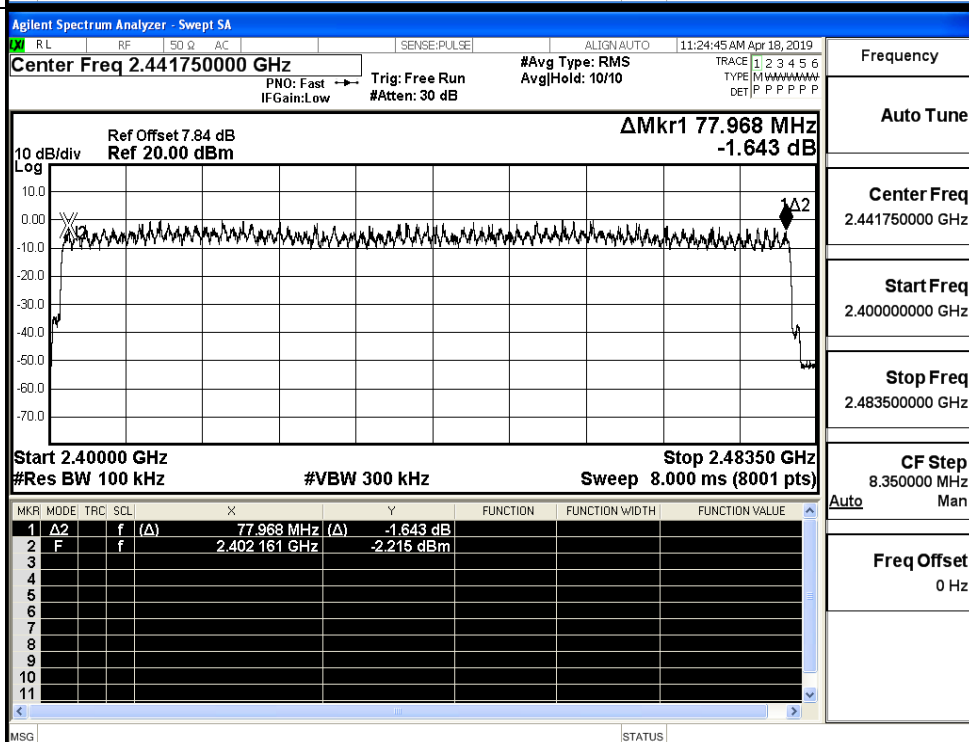


A.4 Hopping Channel Number

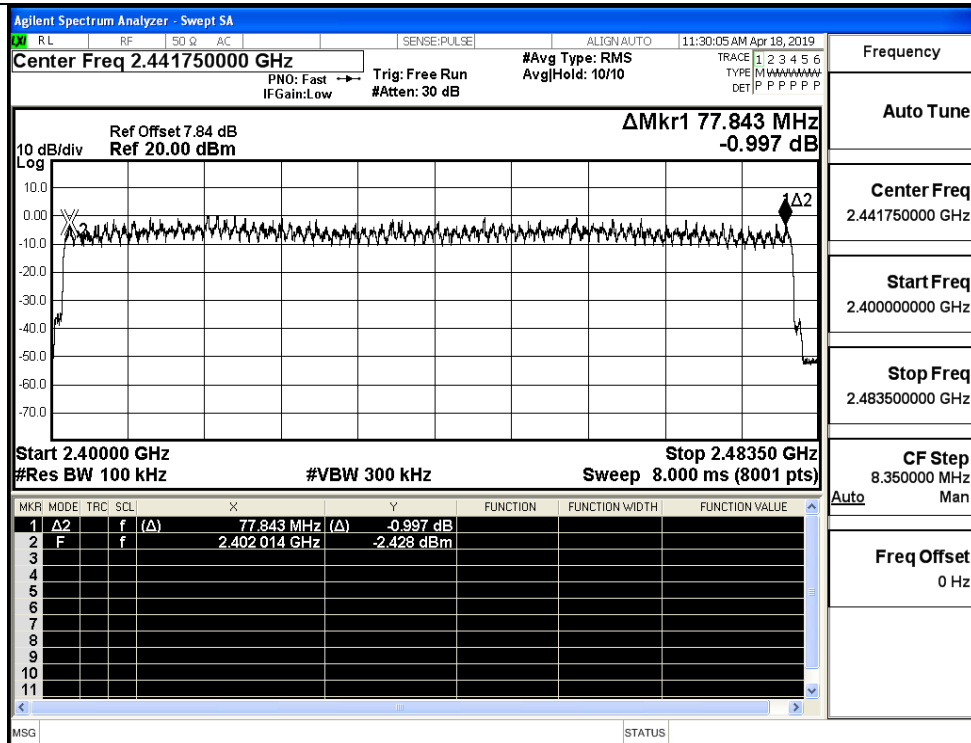
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

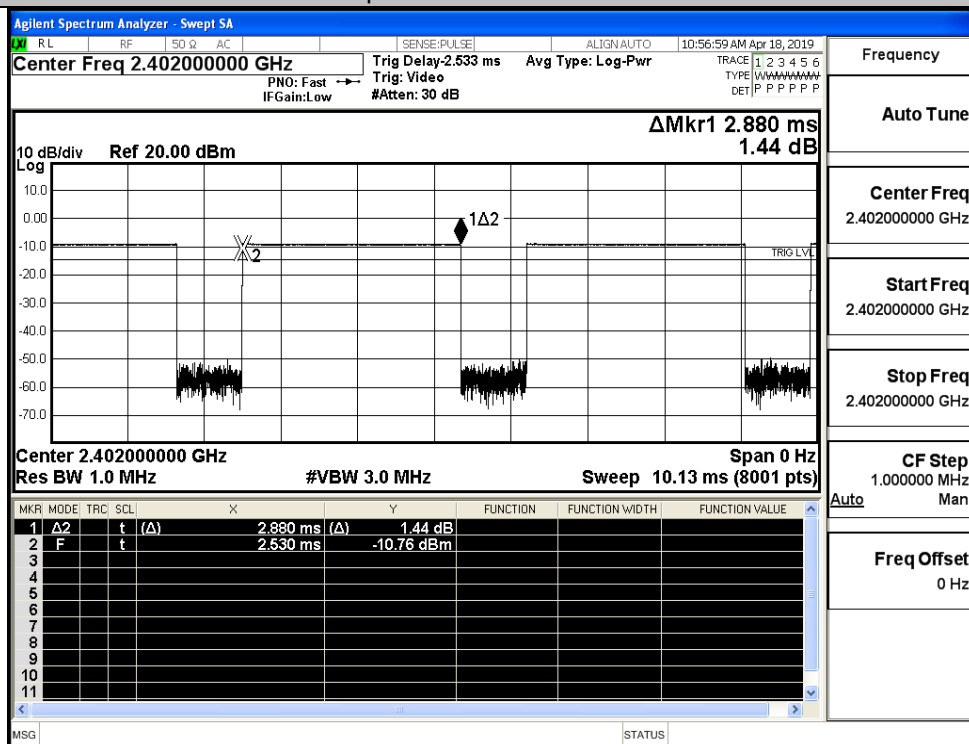


A.5 Dwell Time

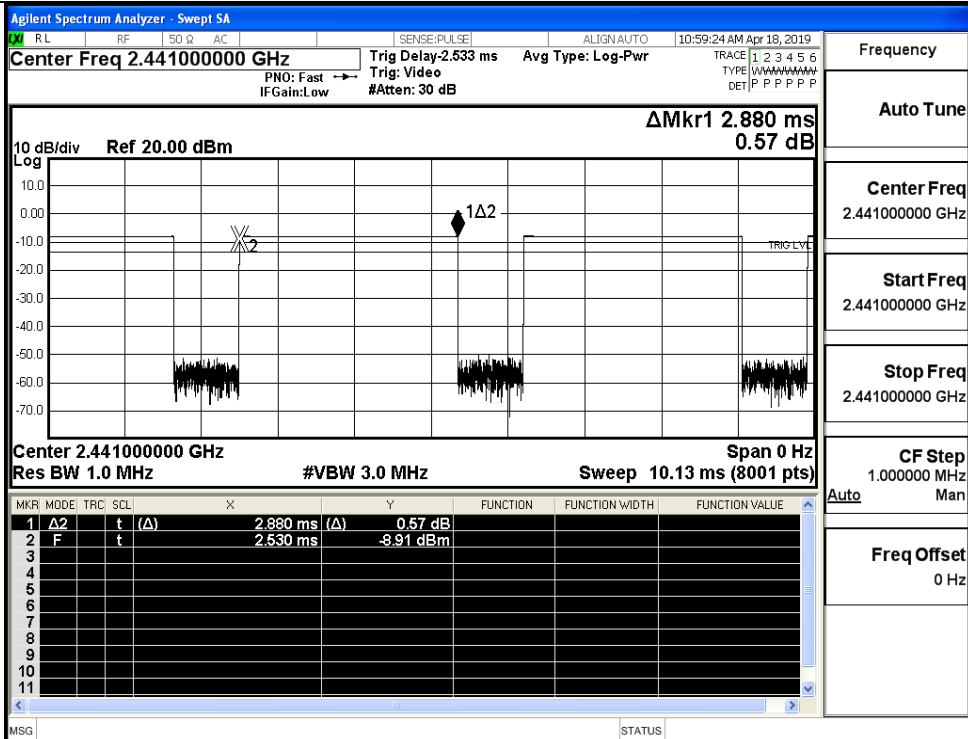
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

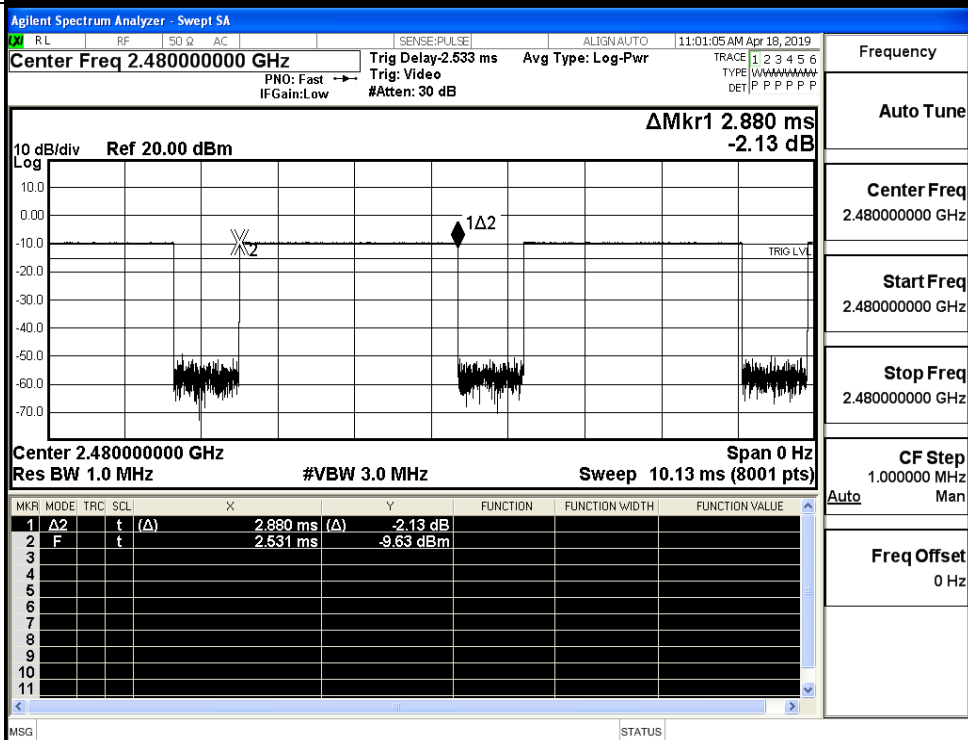
GFSK_DH5/LCH



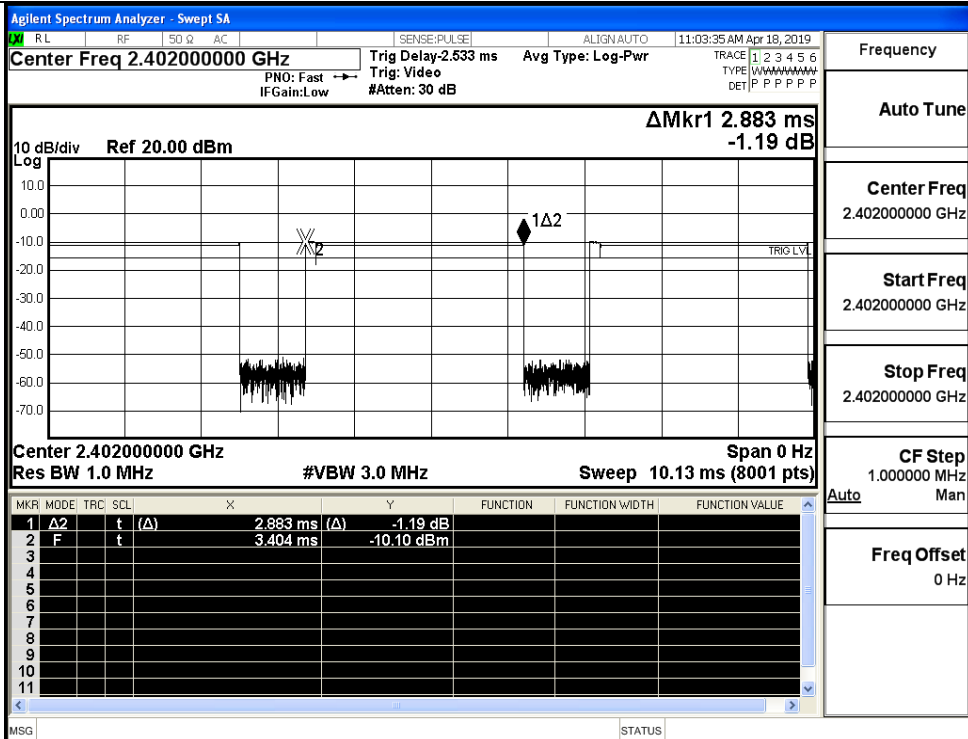
GFSK_DH5/MCH



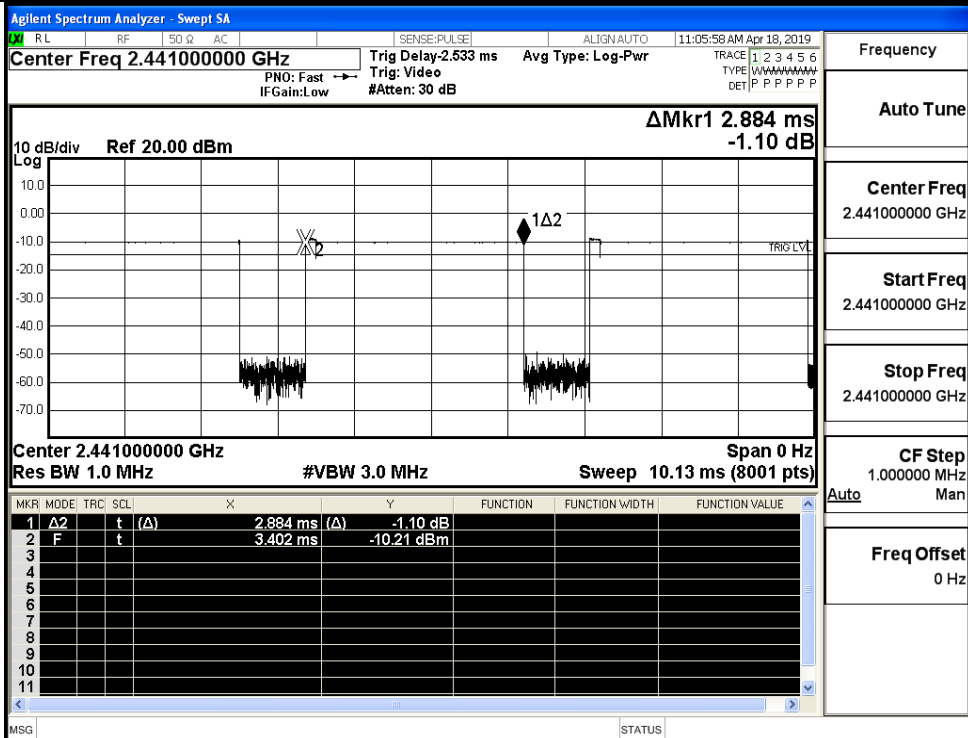
GFSK_DH5/HCH



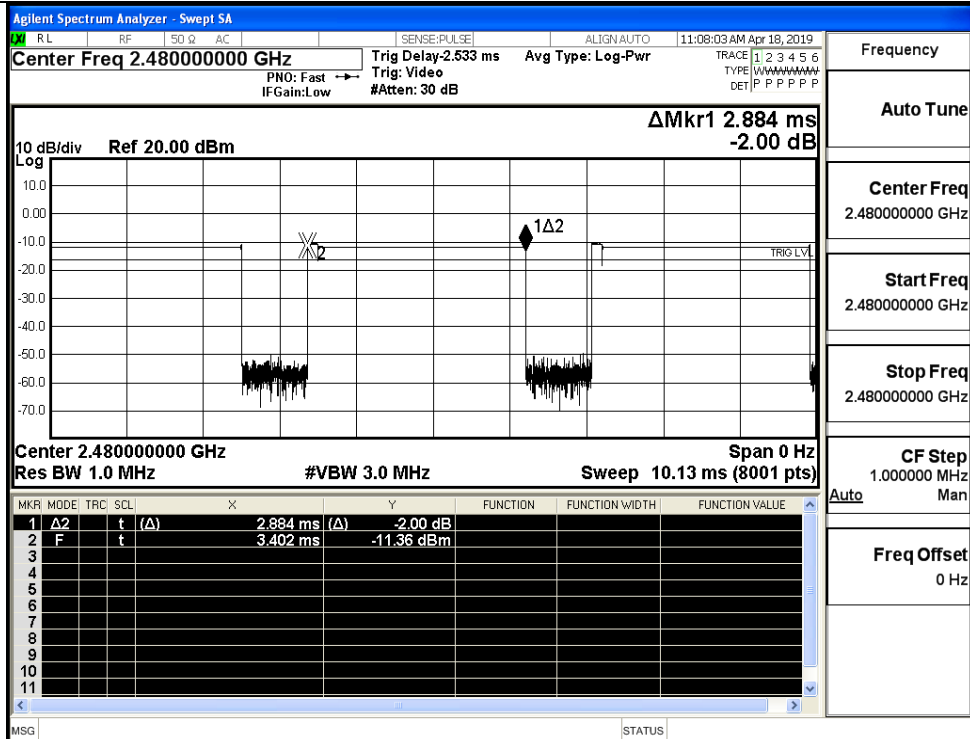
$\pi/4$ DQPSK
_2DH5/LCH



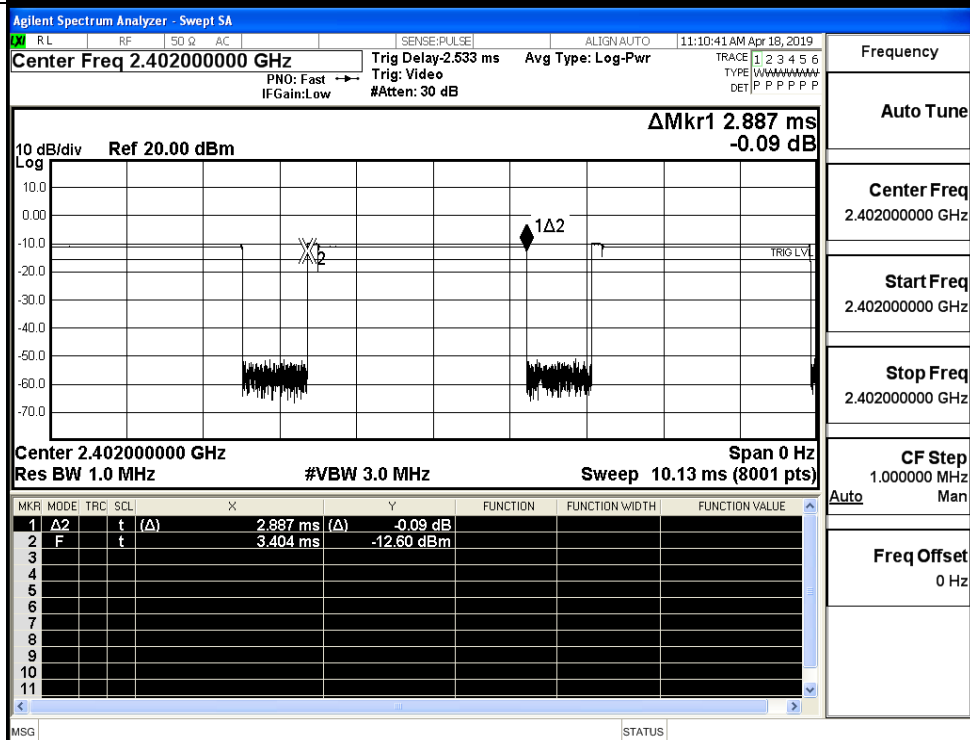
$\pi/4$ DQPSK
_2DH5/MCH



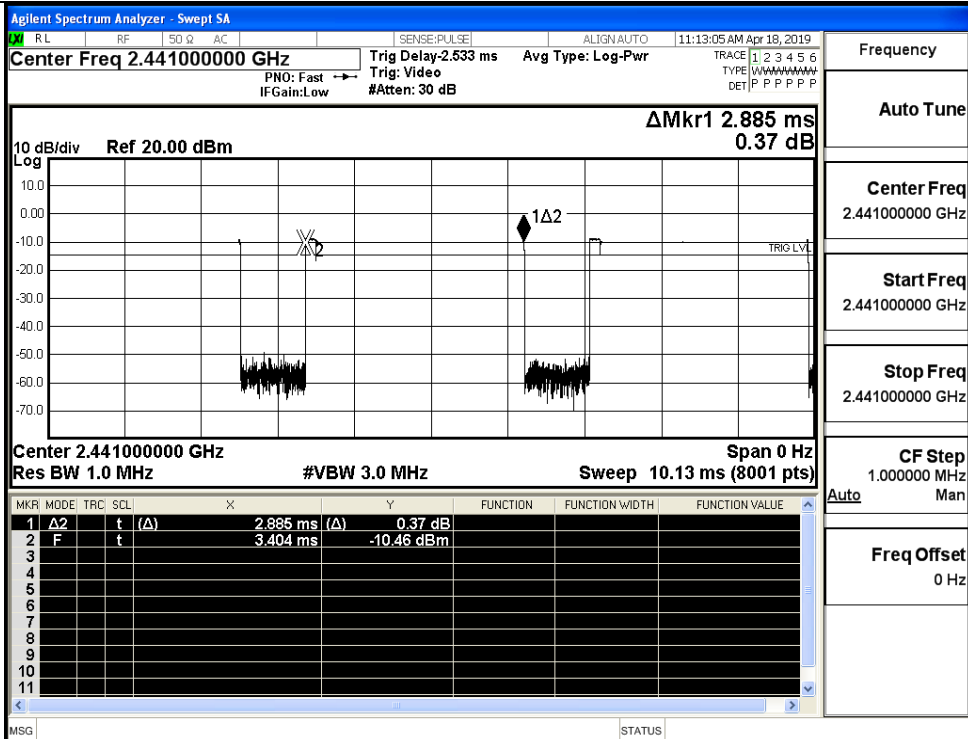
$\pi/4$ DQPSK
_2DH5/HCH



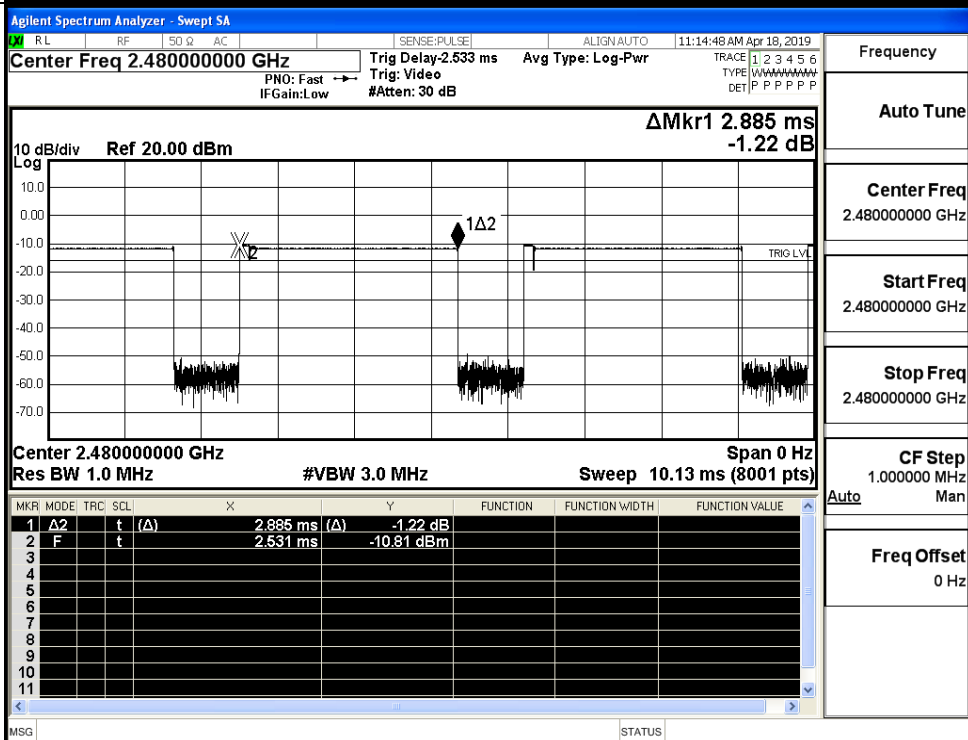
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



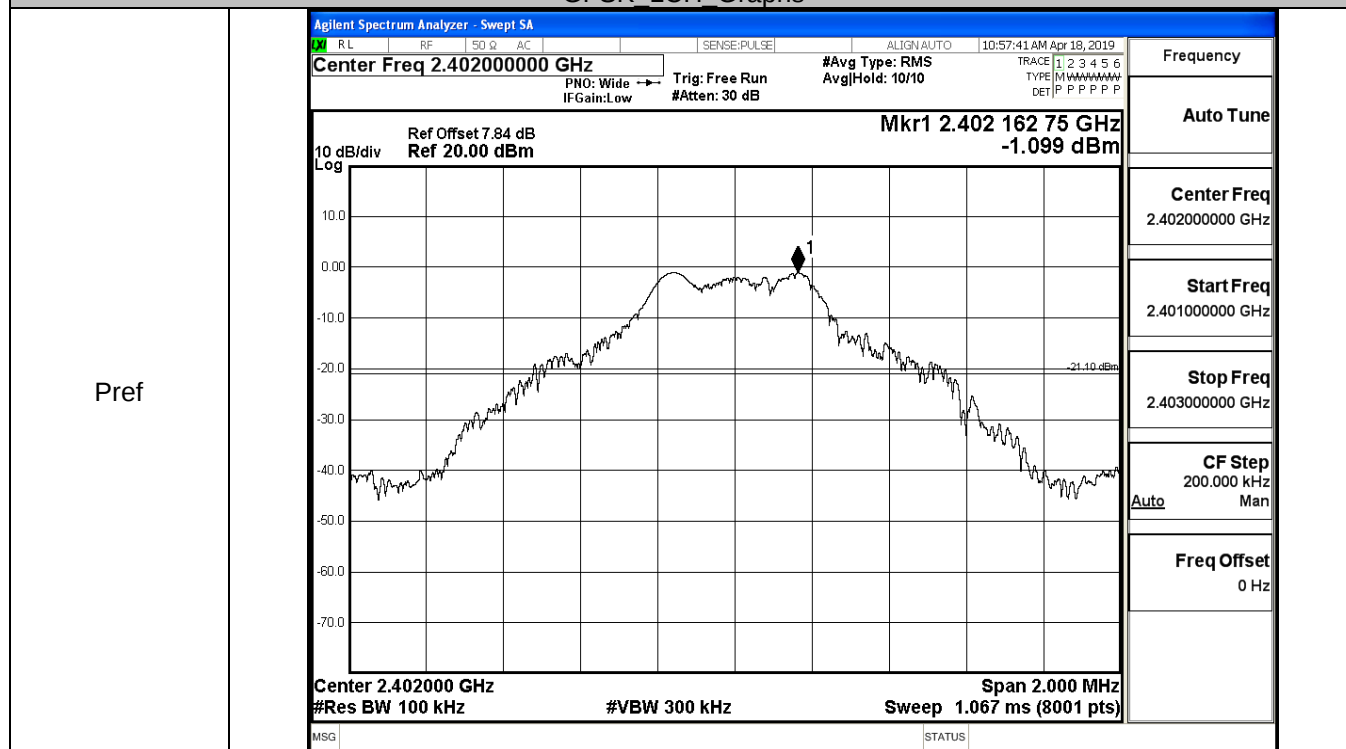
8DPSK_3DH5/HCH

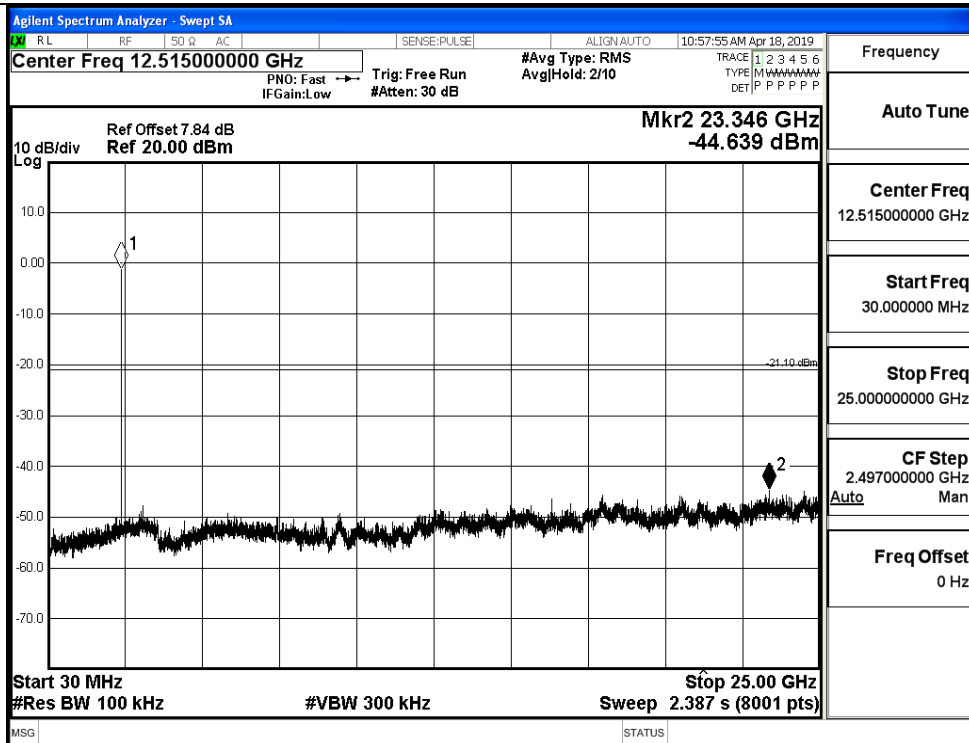


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.099	-44.639	-21.099	PASS
	MCH	-0.025	-44.646	-20.025	PASS
	HCH	-1.598	-45.296	-21.598	PASS
$\pi/4$ DQPSK	LCH	-2.426	-43.654	-22.426	PASS
	MCH	-1.298	-44.737	-21.298	PASS
	HCH	-2.757	-45.037	-22.757	PASS
8DPSK	LCH	-2.234	-44.813	-22.234	PASS
	MCH	-1.257	-45.026	-21.257	PASS
	HCH	-2.743	-44.626	-22.743	PASS

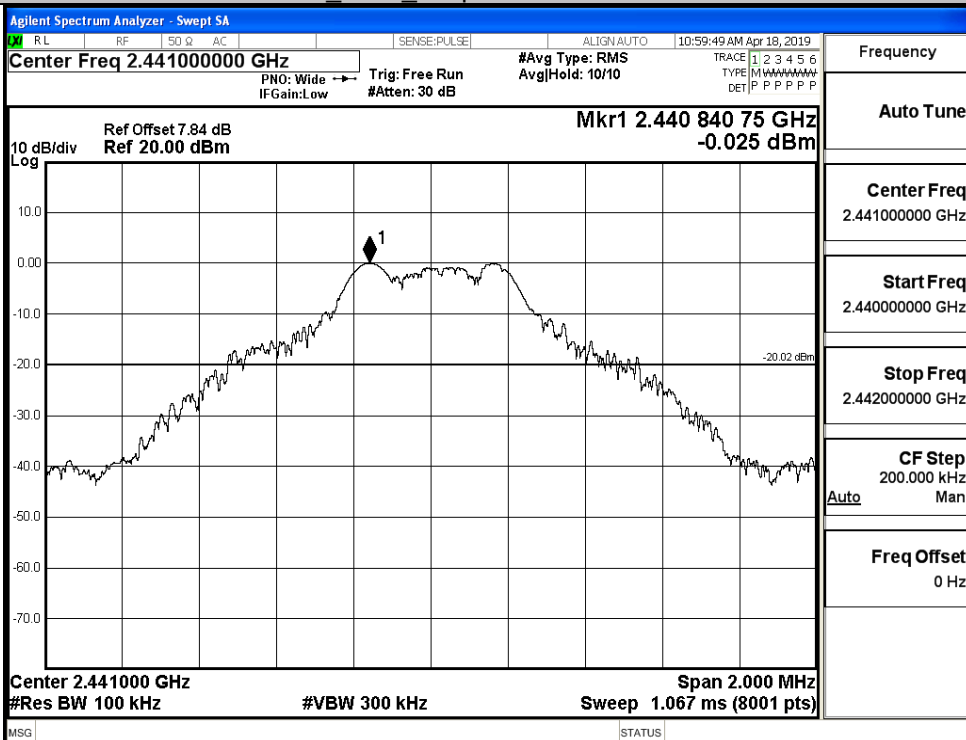
GFSK LCH Graphs



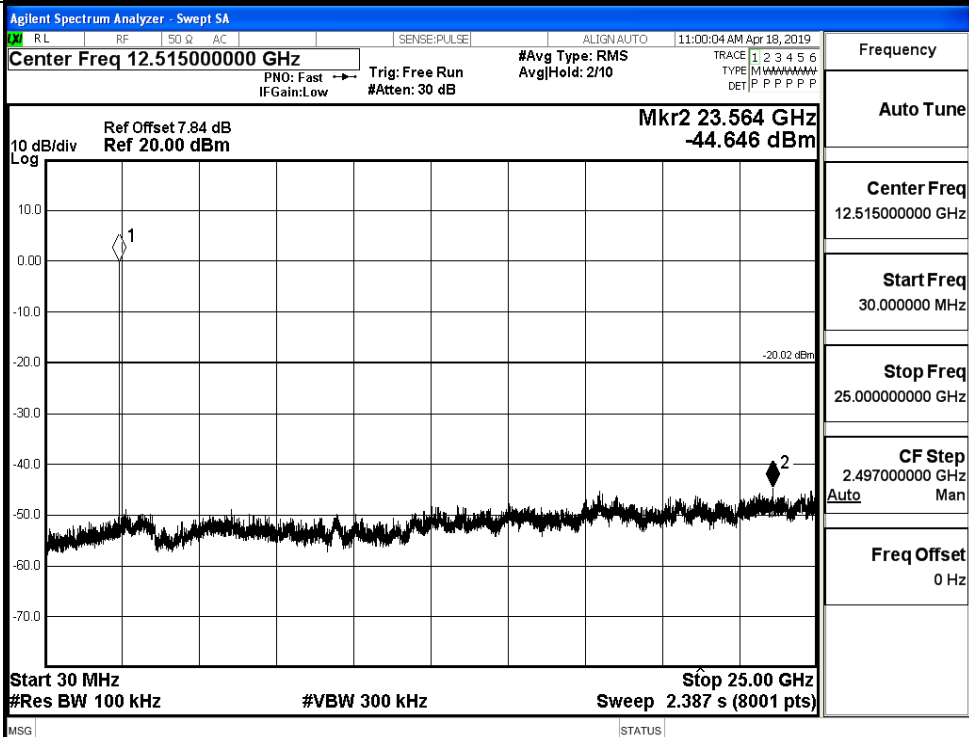


GFSK_MCH_Graphs

Pref

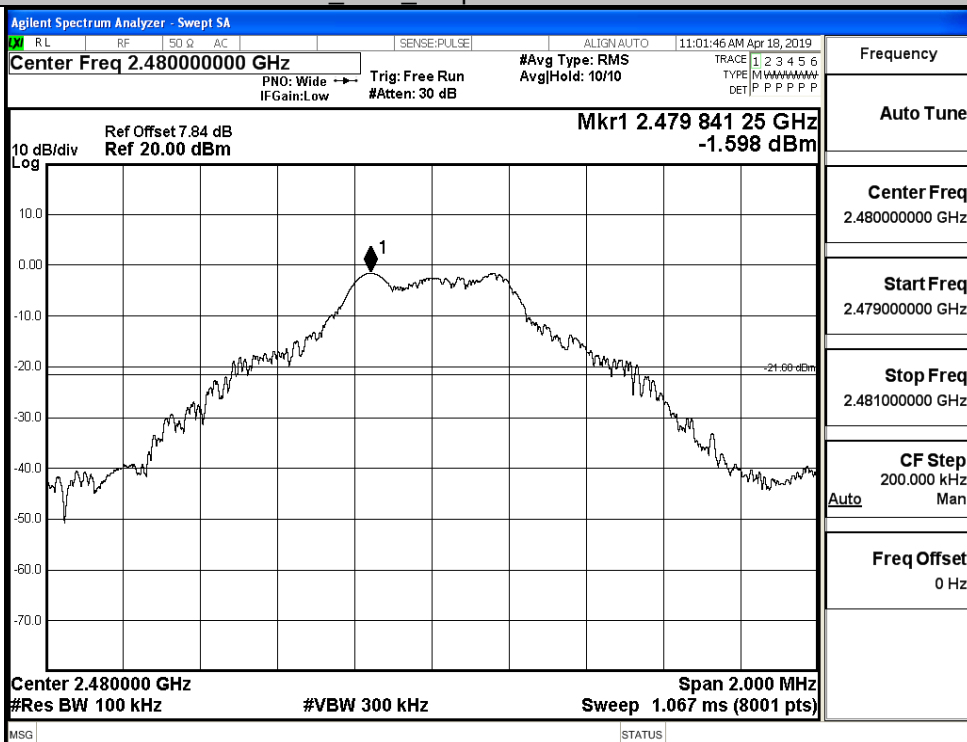


Puw

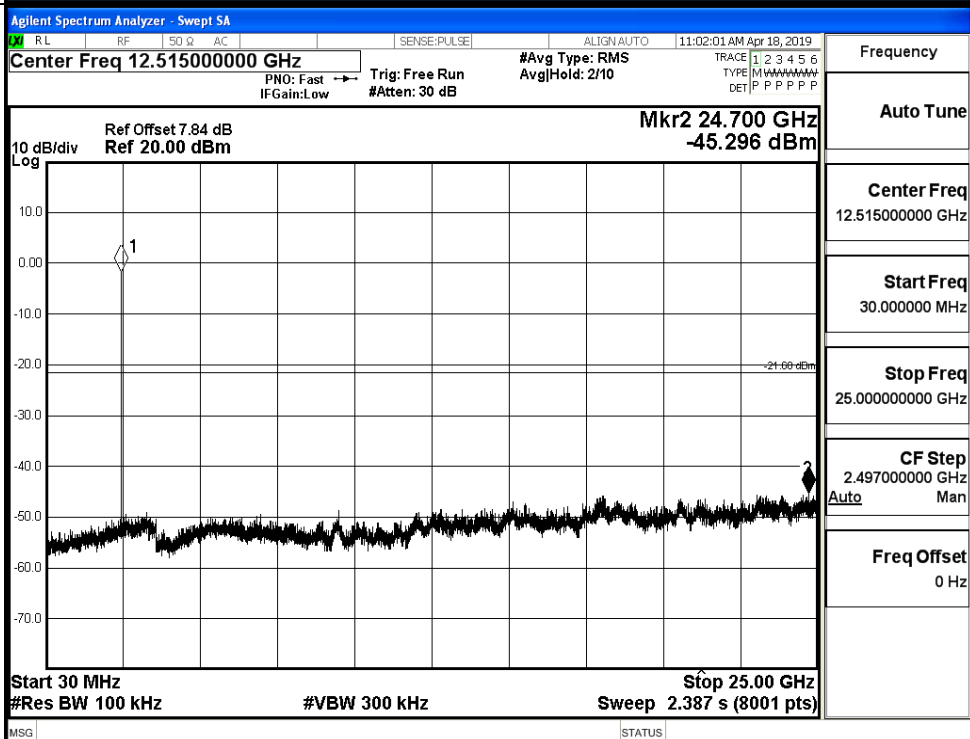


GFSK HCH_Graphs

Pref

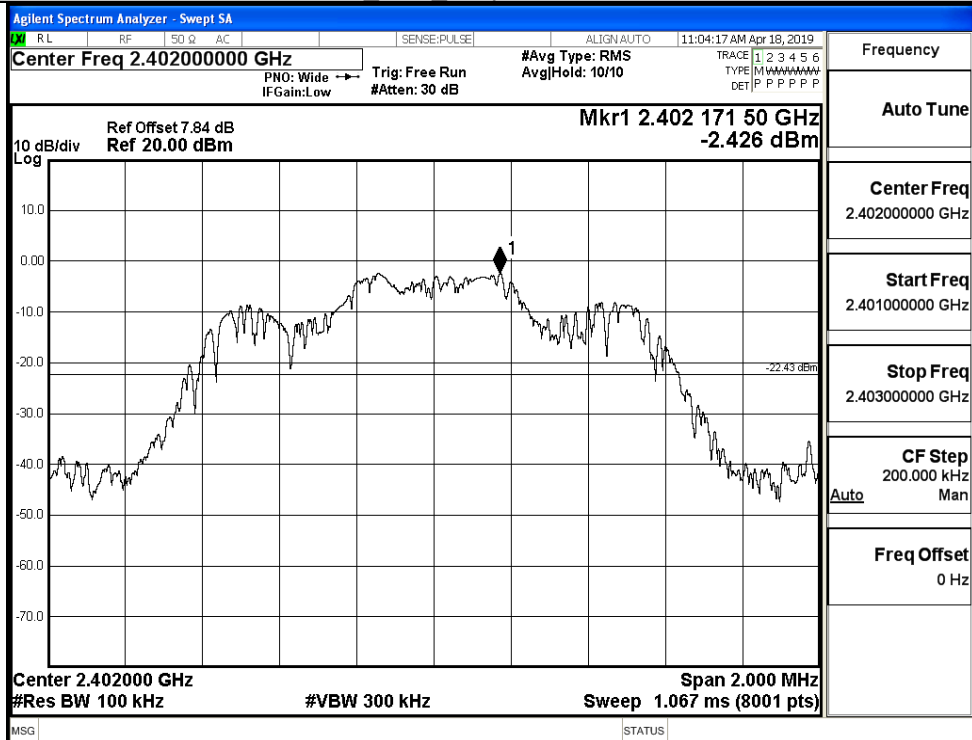


Puw

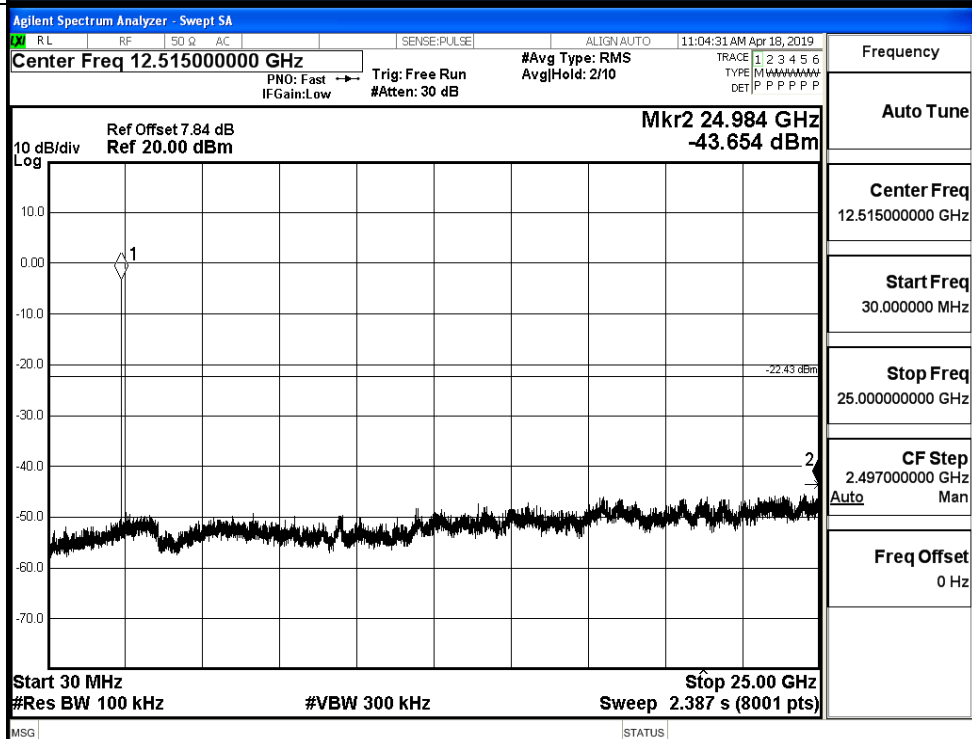


$\pi/4$ DQPSK_LCH_Graphs

Pref

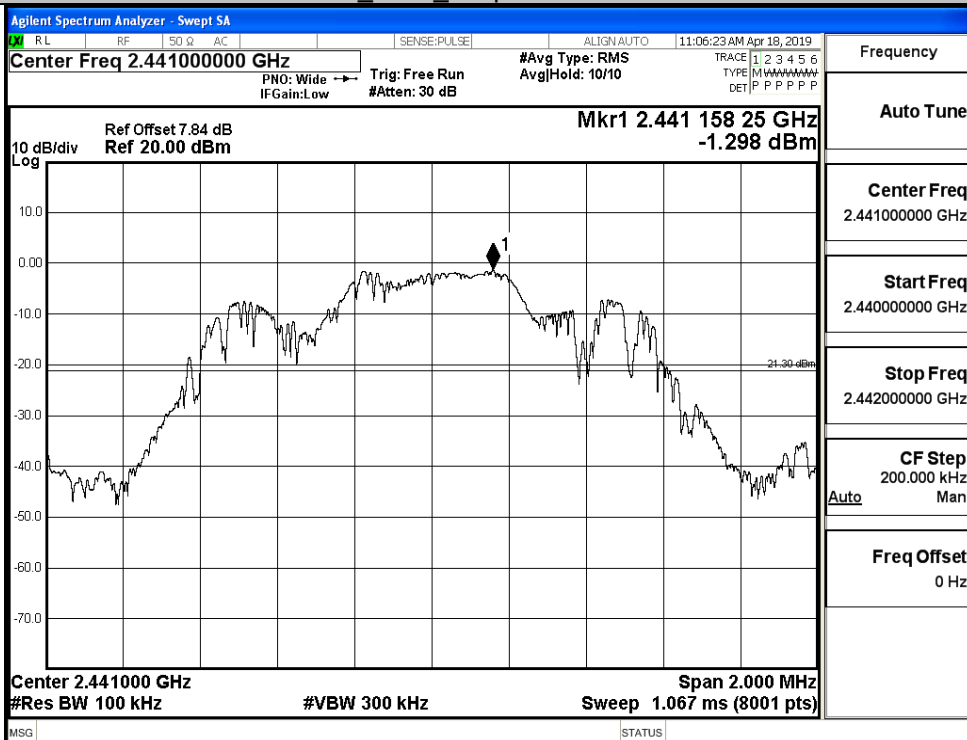


Puw

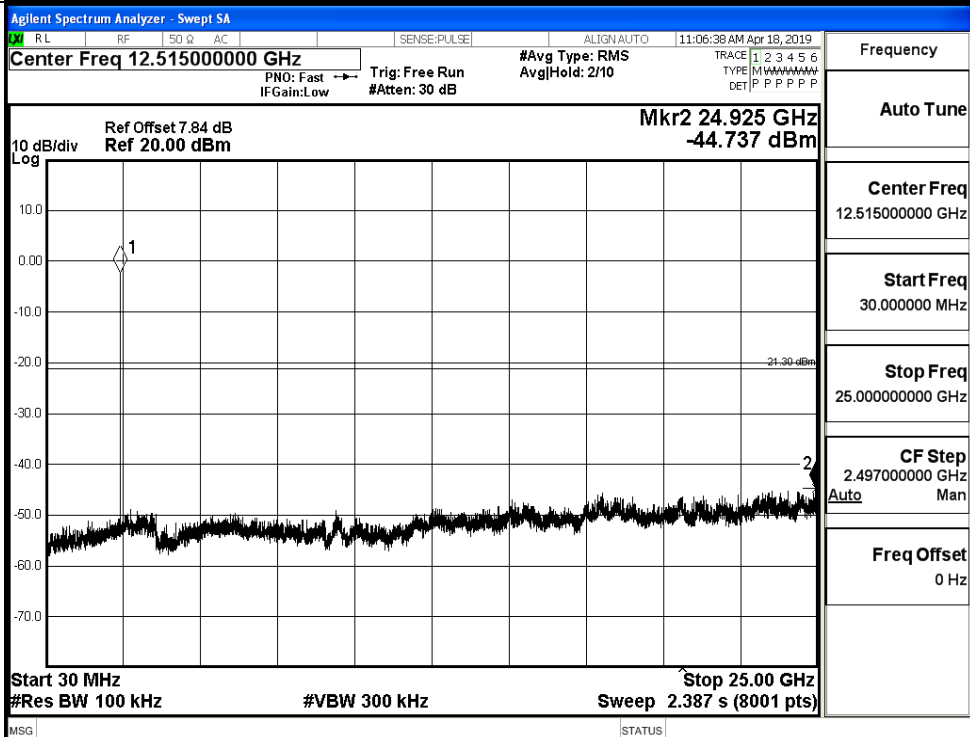


π /4DQPSK_MCH_Graphs

Pref

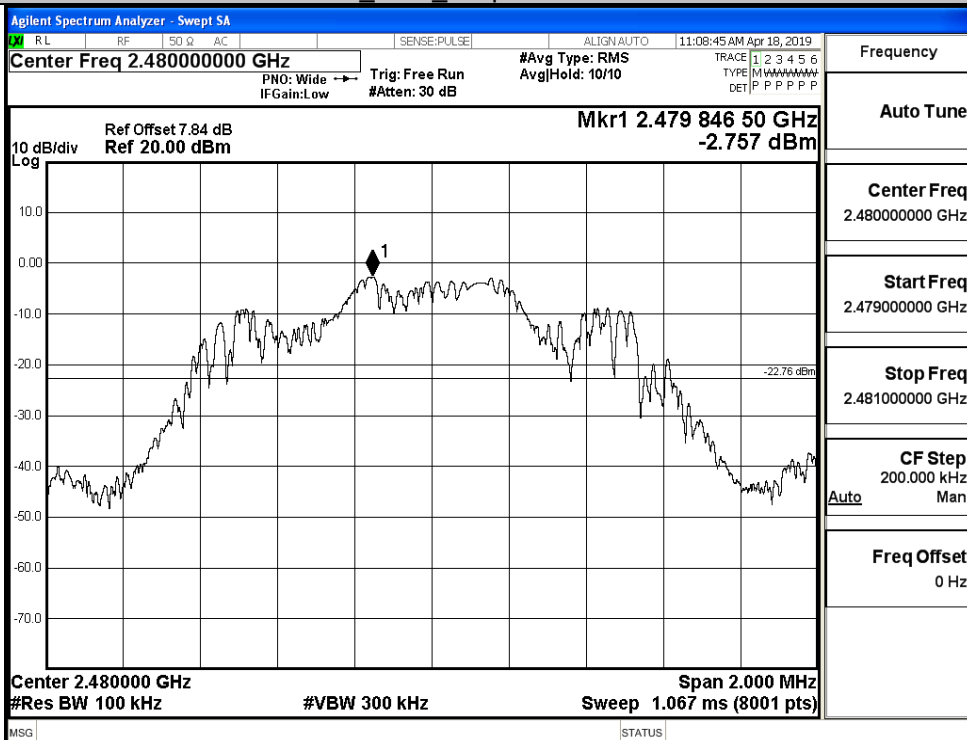


Puw

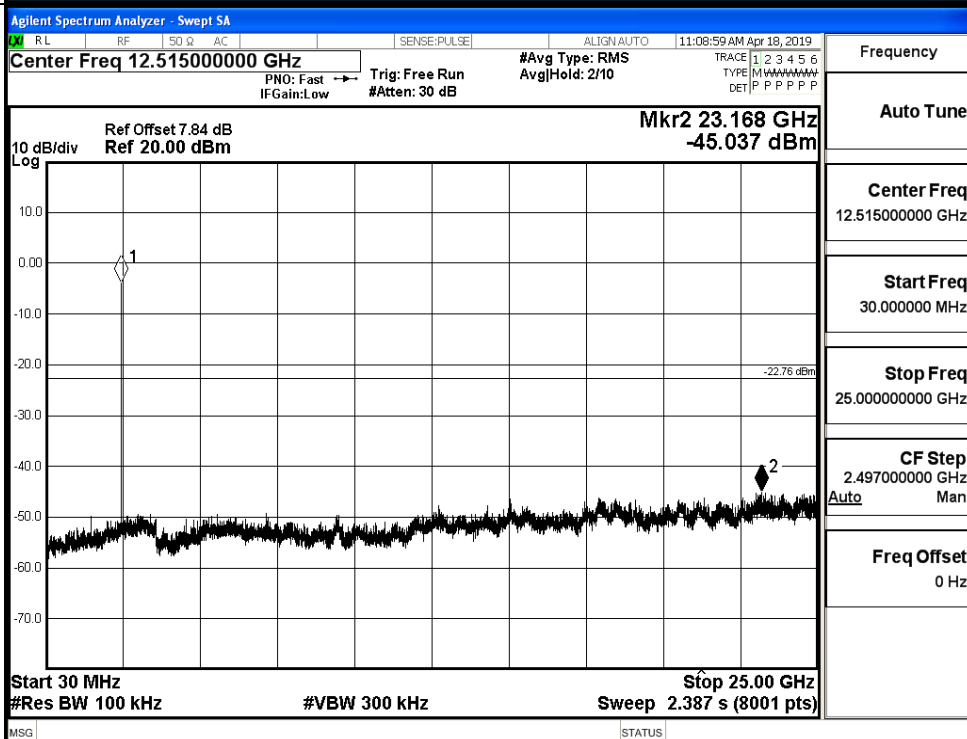


$\pi/4$ DQPSK_HCH_Graphs

Pref

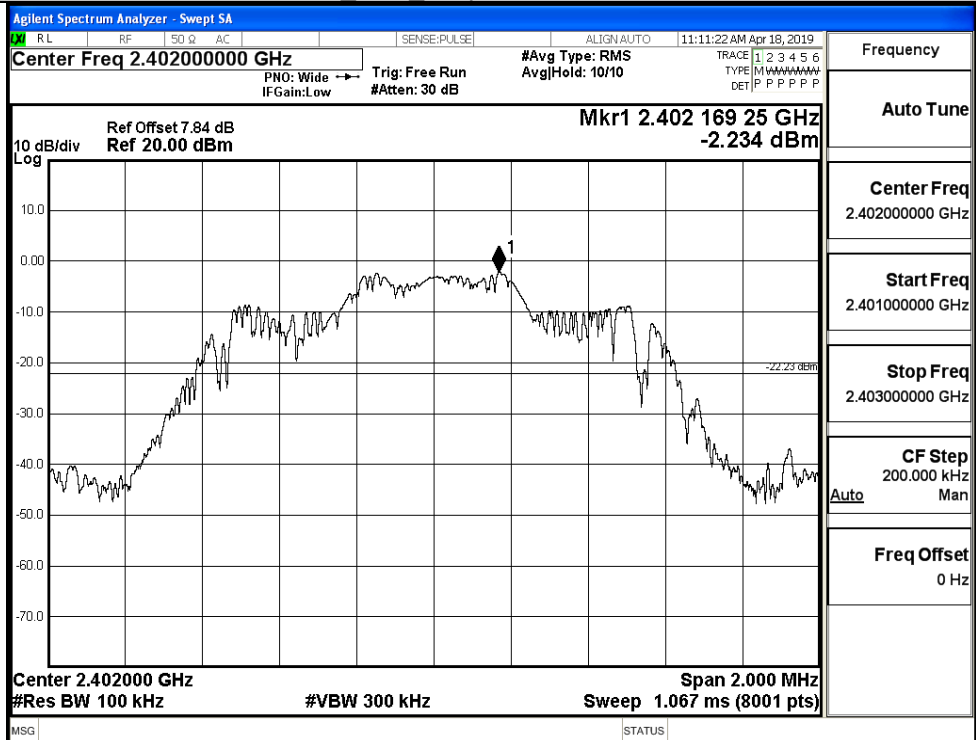


Puw

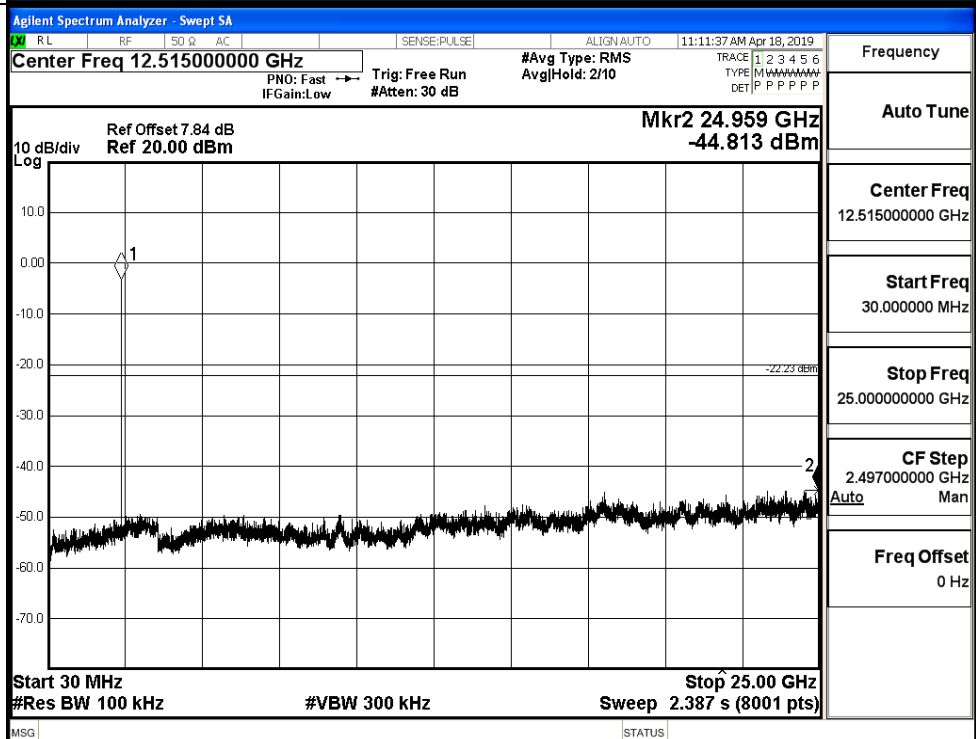


8DPSK_LCH_Graphs

Pref

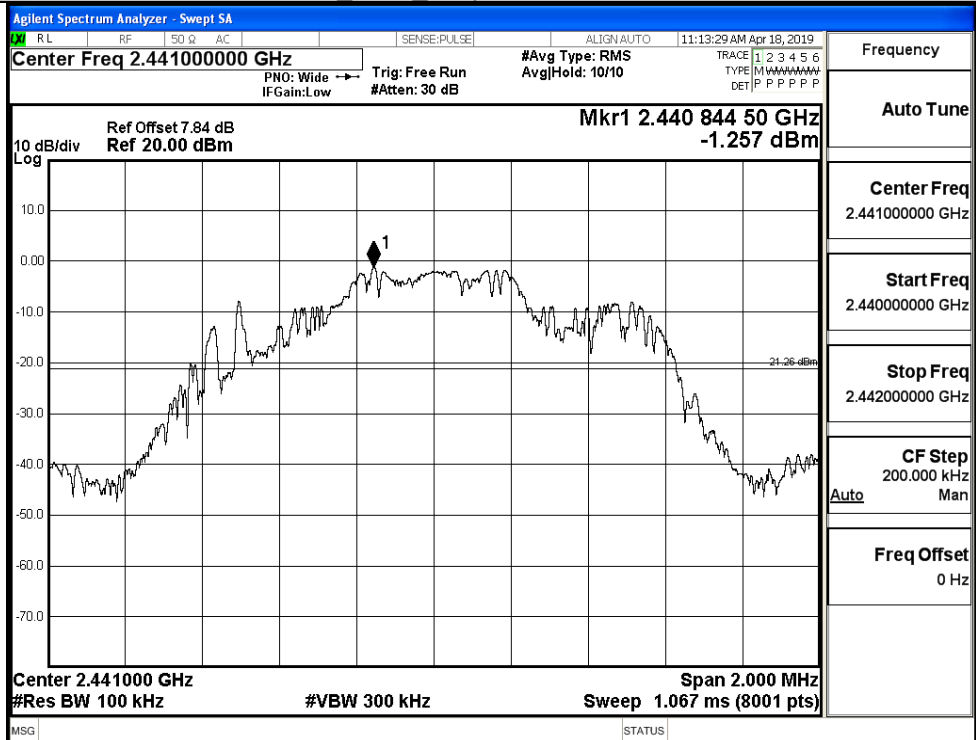


Puw

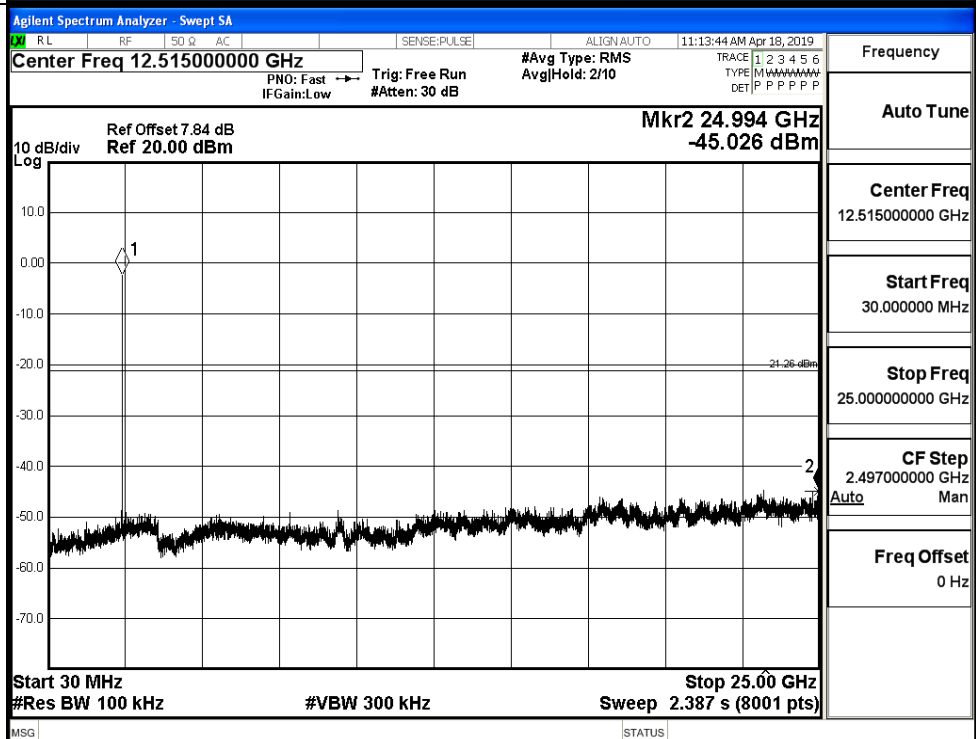


8DPSK_MCH_Graphs

Pref

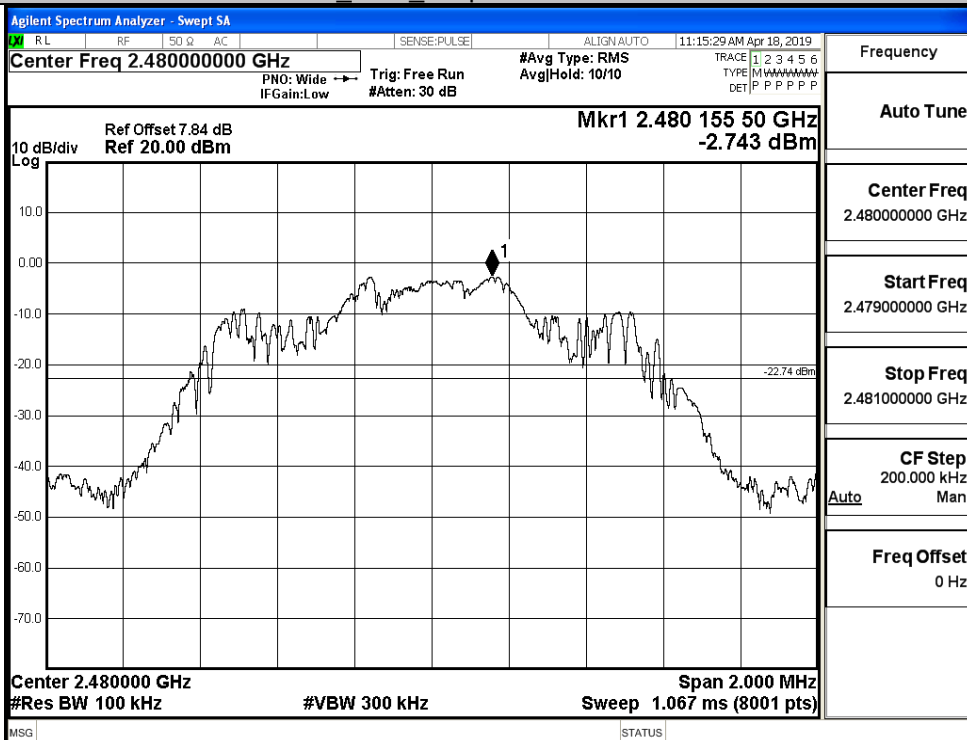


Puw

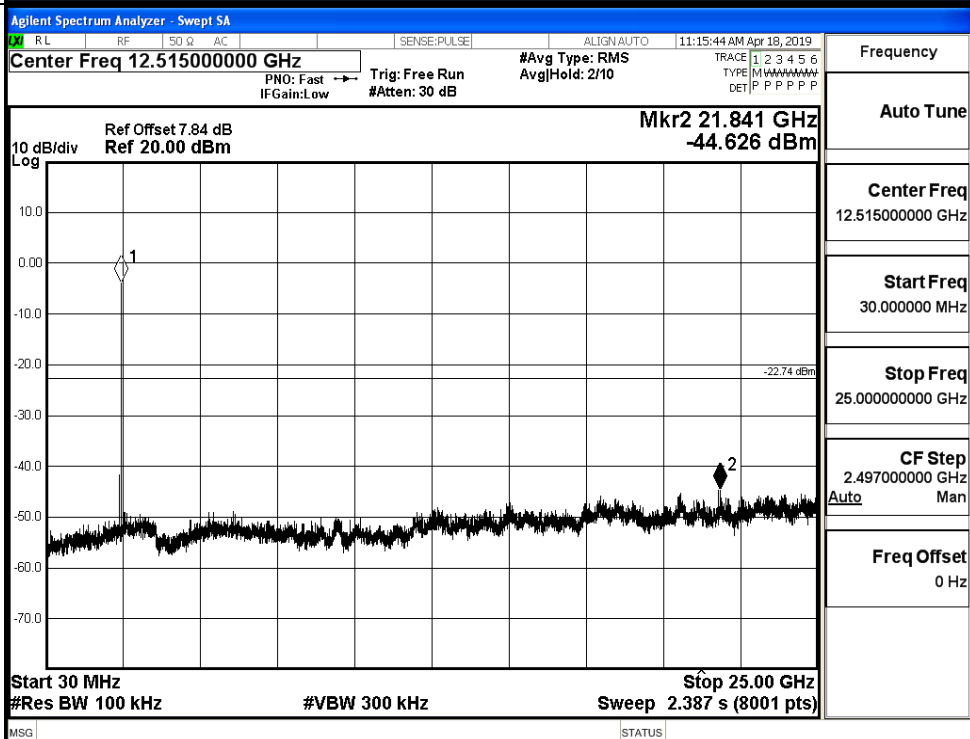


8DPSK_HCH_Graphs

Pref



Puw

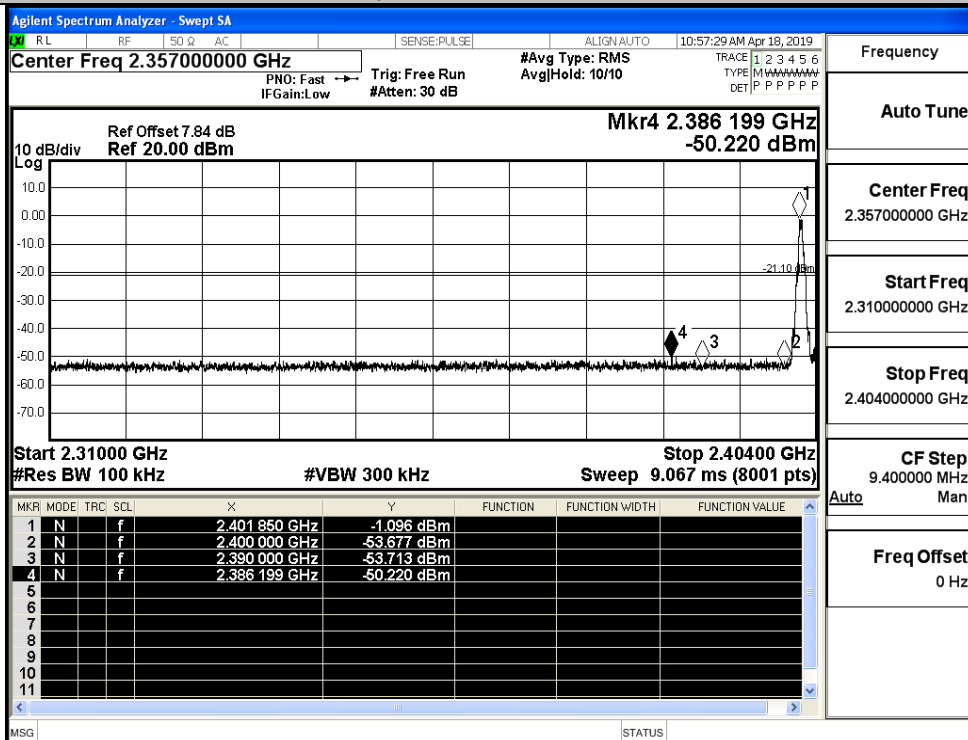


A.7 Band-edge for RF Conducted Emissions

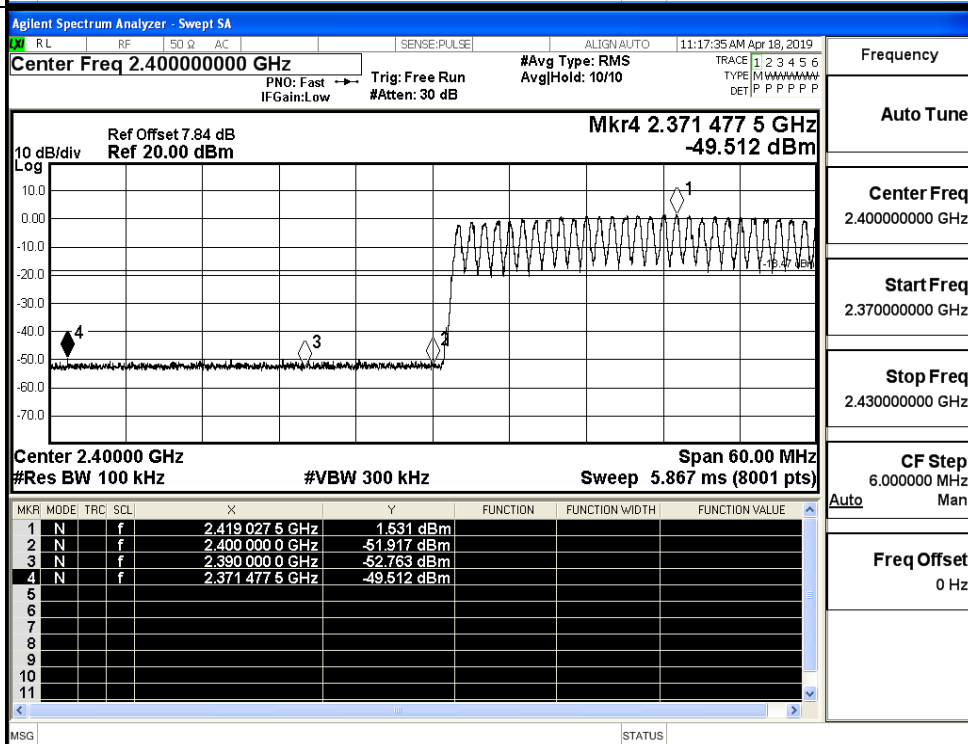
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.096	Off	-50.220	-21.1	PASS
			1.531	On	-49.512	-18.47	PASS
	HCH	2480	-1.565	Off	-49.625	-21.57	PASS
			1.256	On	-49.274	-18.74	PASS
$\pi/4$ DQPSK	LCH	2402	-2.181	Off	-50.482	-22.18	PASS
			-0.186	On	-49.781	-20.19	PASS
	HCH	2480	-2.687	Off	-49.224	-22.69	PASS
			-0.089	On	-49.383	-20.09	PASS
8DPSK	LCH	2402	-2.022	Off	-50.078	-22.02	PASS
			0.250	On	-49.398	-19.75	PASS
	HCH	2480	-2.773	Off	-49.056	-22.77	PASS
			-0.200	On	-49.301	-20.2	PASS

Test Graphs

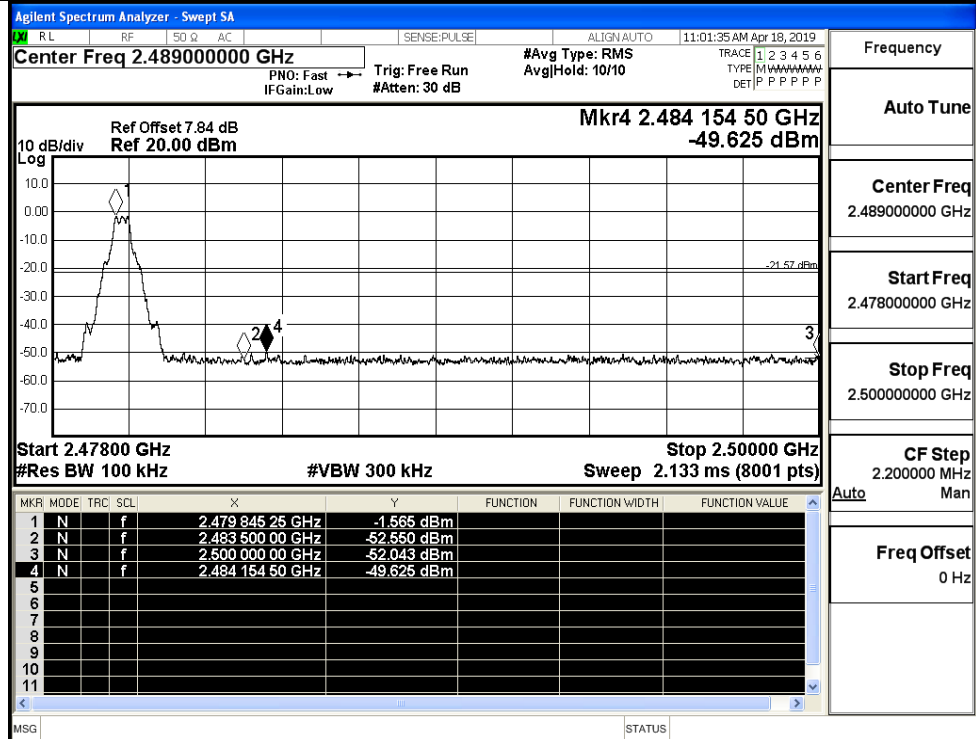
GFSK/LCH/No Hop



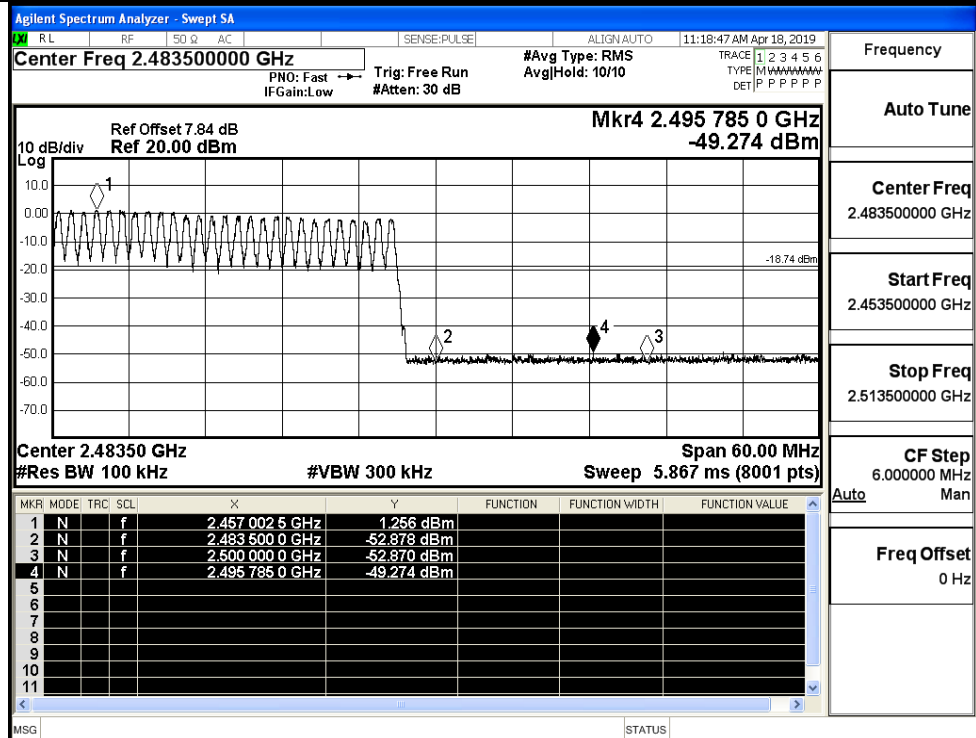
GFSK/LCH/Hop



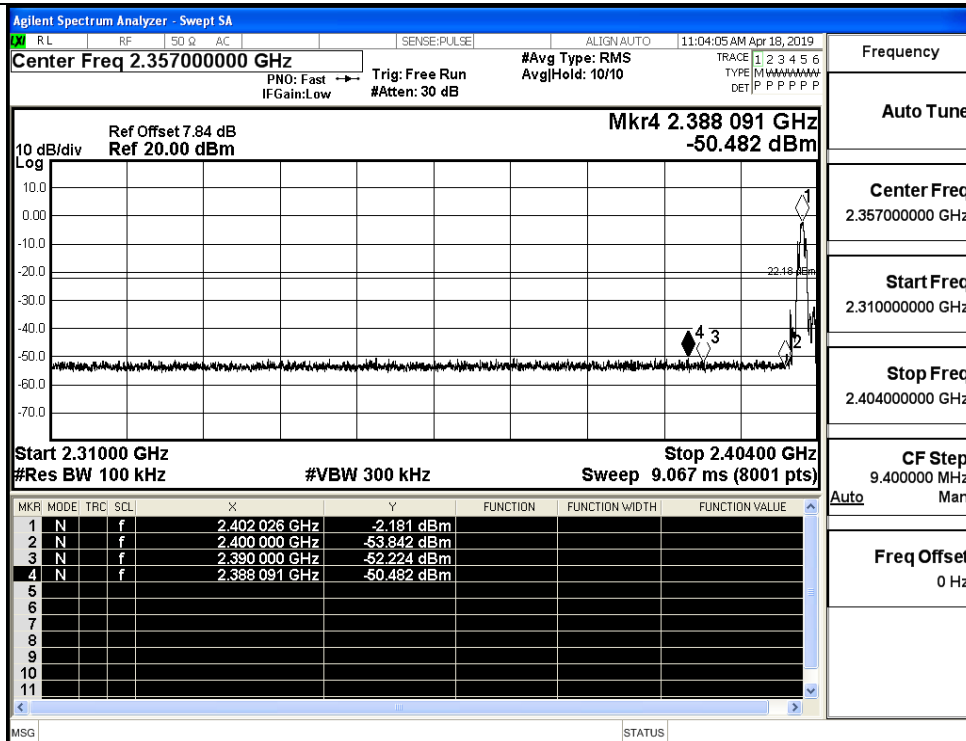
GFSK/HCH/No Hop



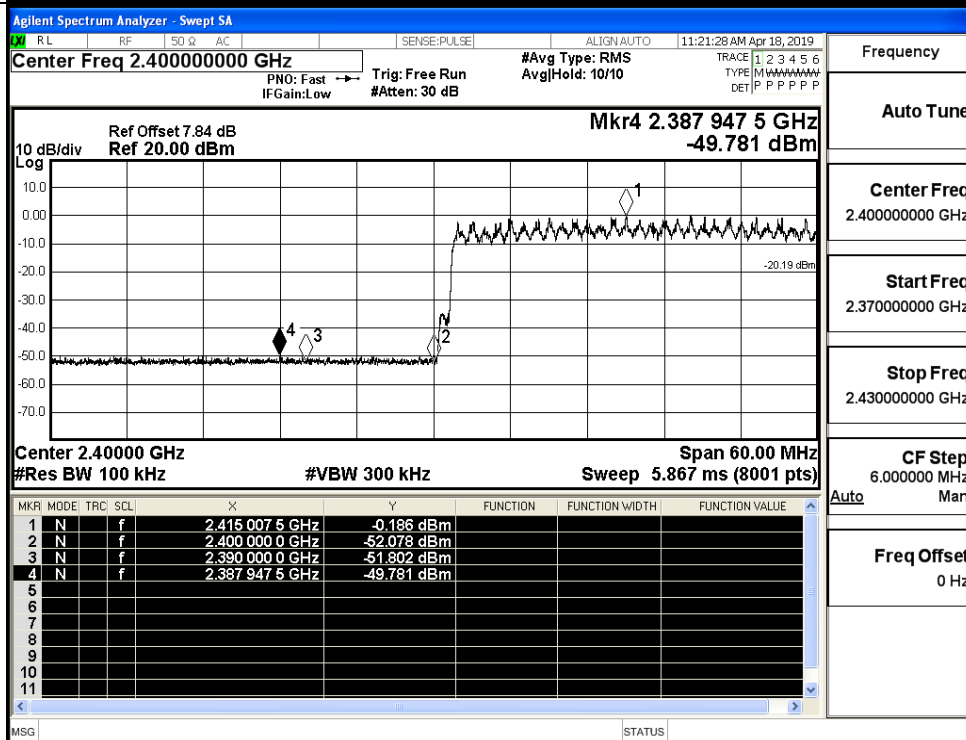
GFSK/HCH/Hop



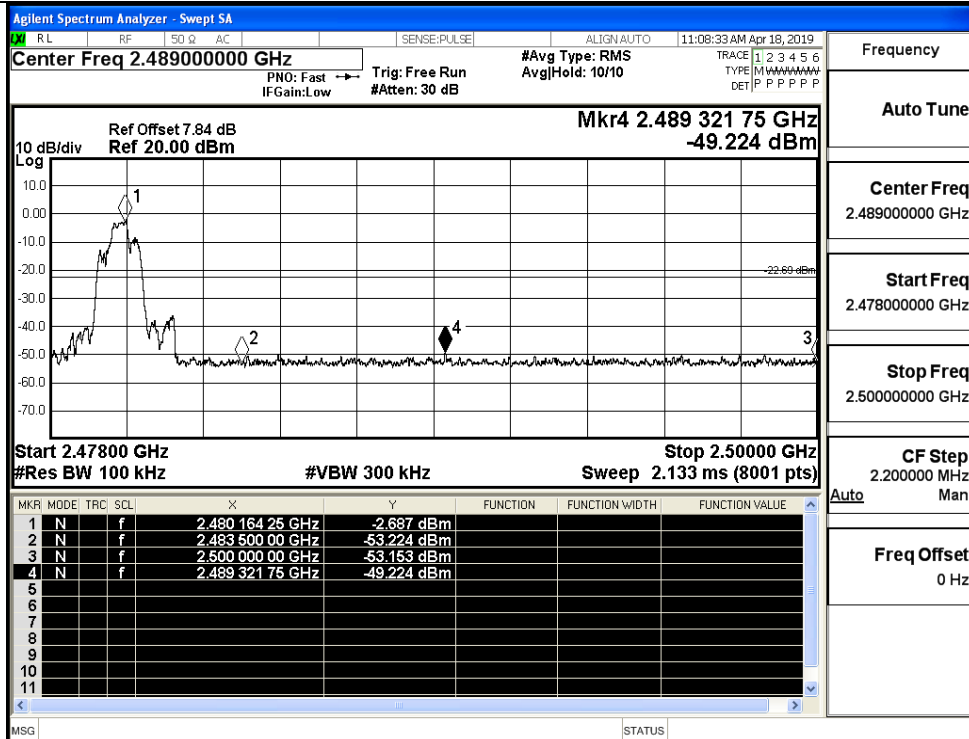
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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

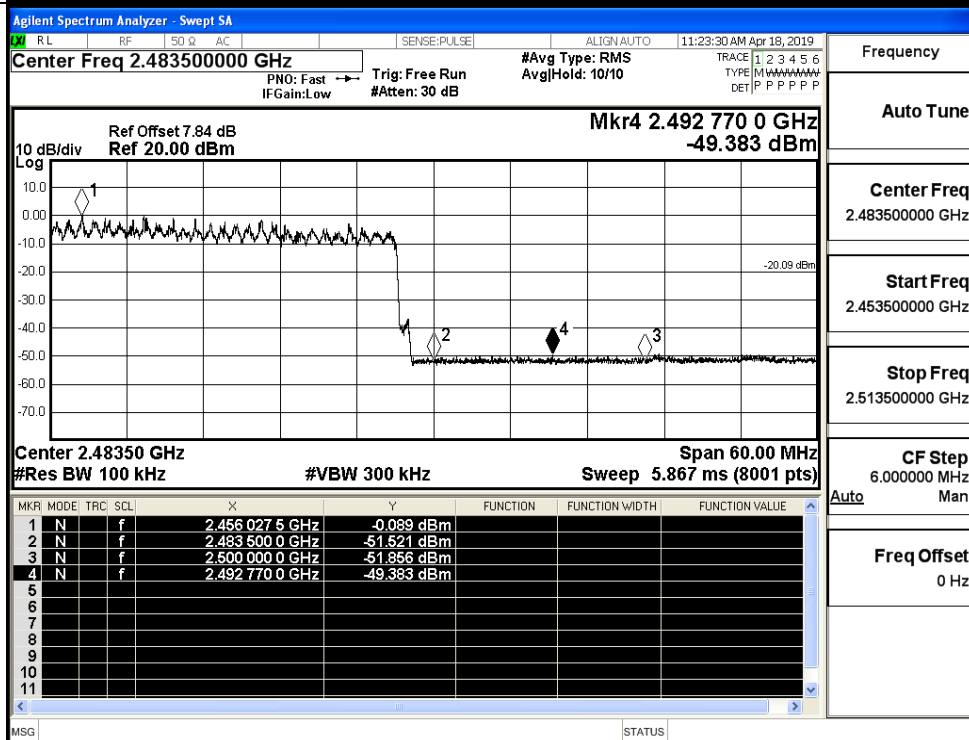


Frequency

Auto Tune

Center Freq
2.489000000 GHzStart Freq
2.478000000 GHzStop Freq
2.500000000 GHzCF Step
2.200000 MHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop

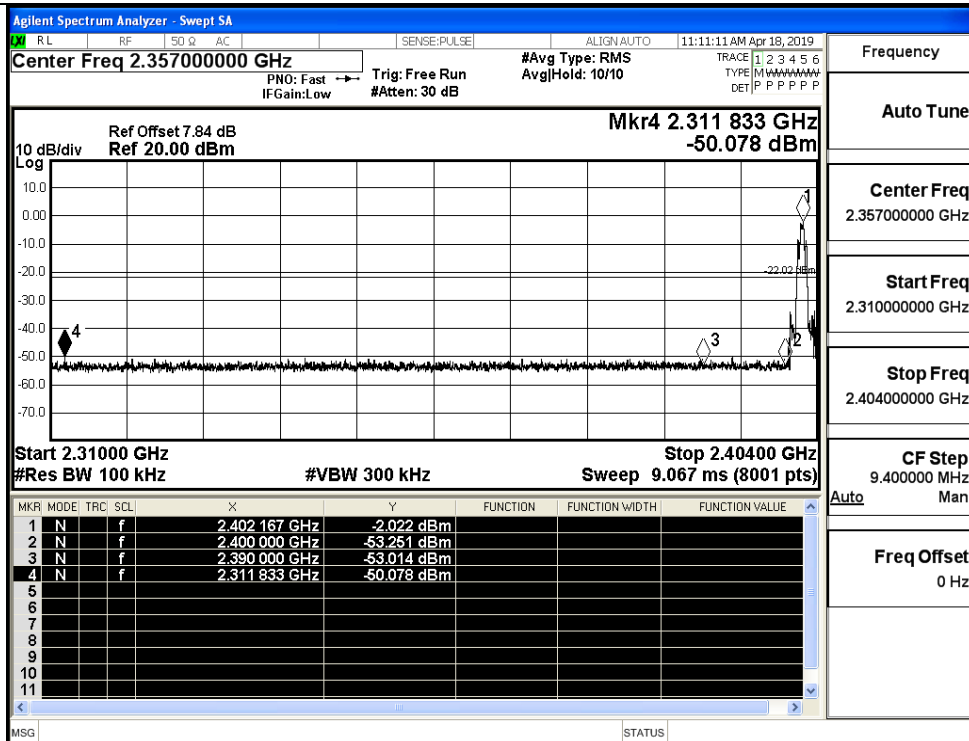


Frequency

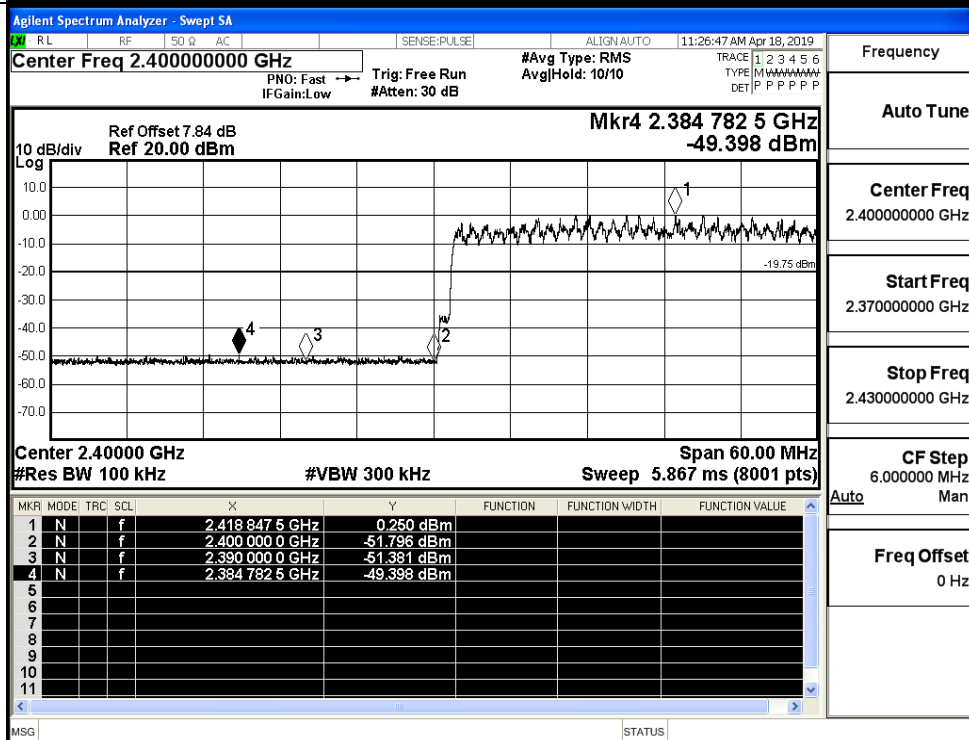
Auto Tune

Center Freq
2.483500000 GHzStart Freq
2.453500000 GHzStop Freq
2.513500000 GHzCF Step
6.000000 MHz
Auto ManFreq Offset
0 Hz

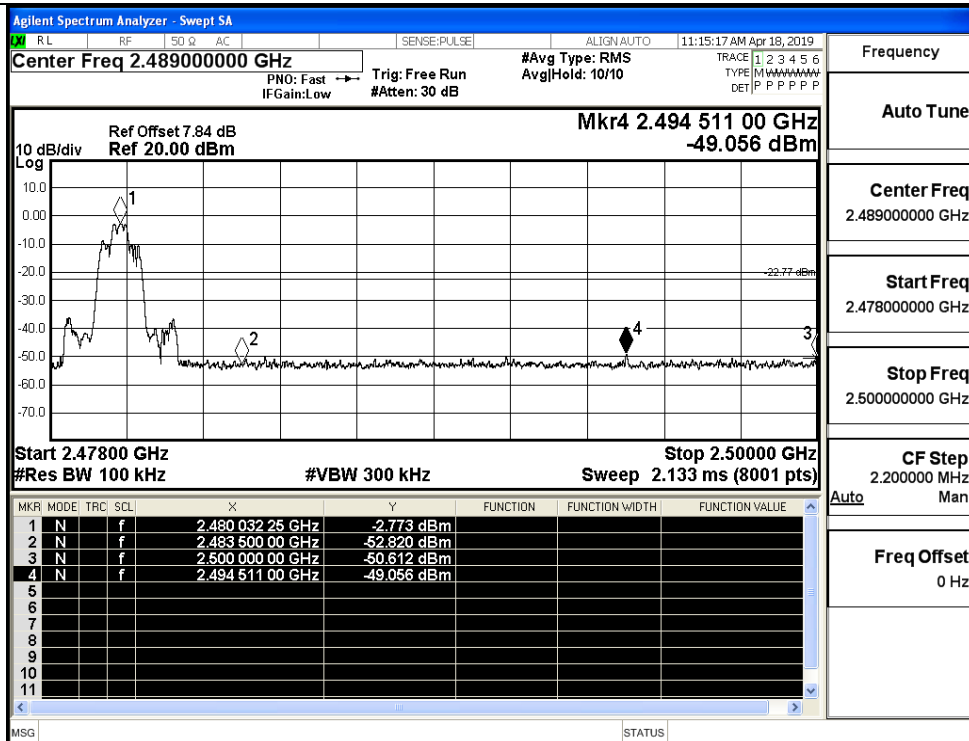
8DPSK/LCH/No Hop



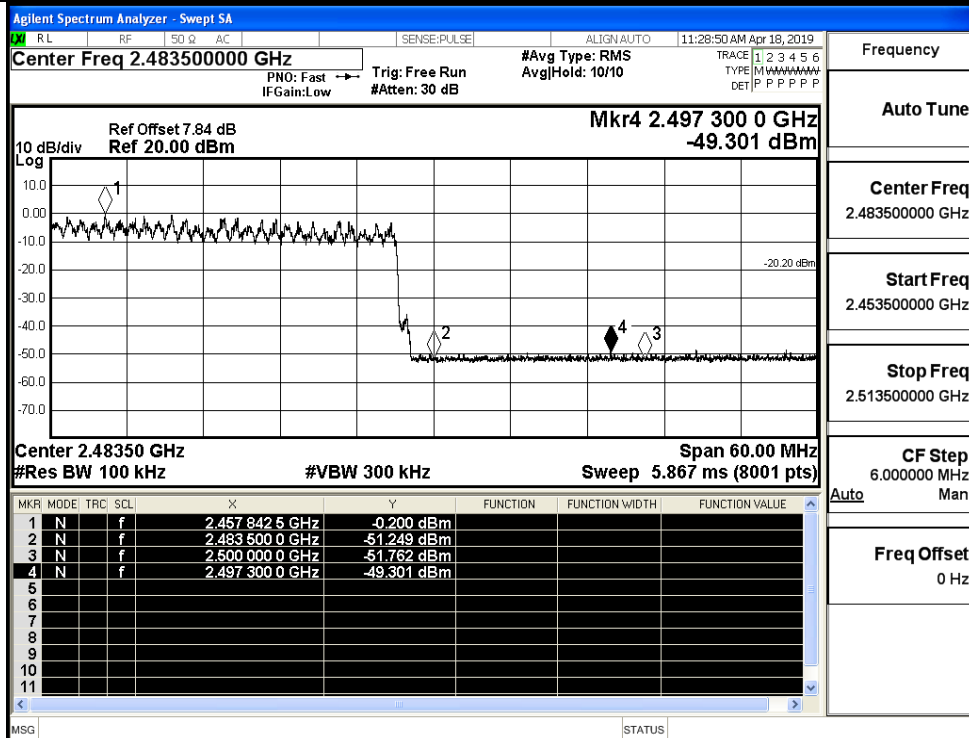
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



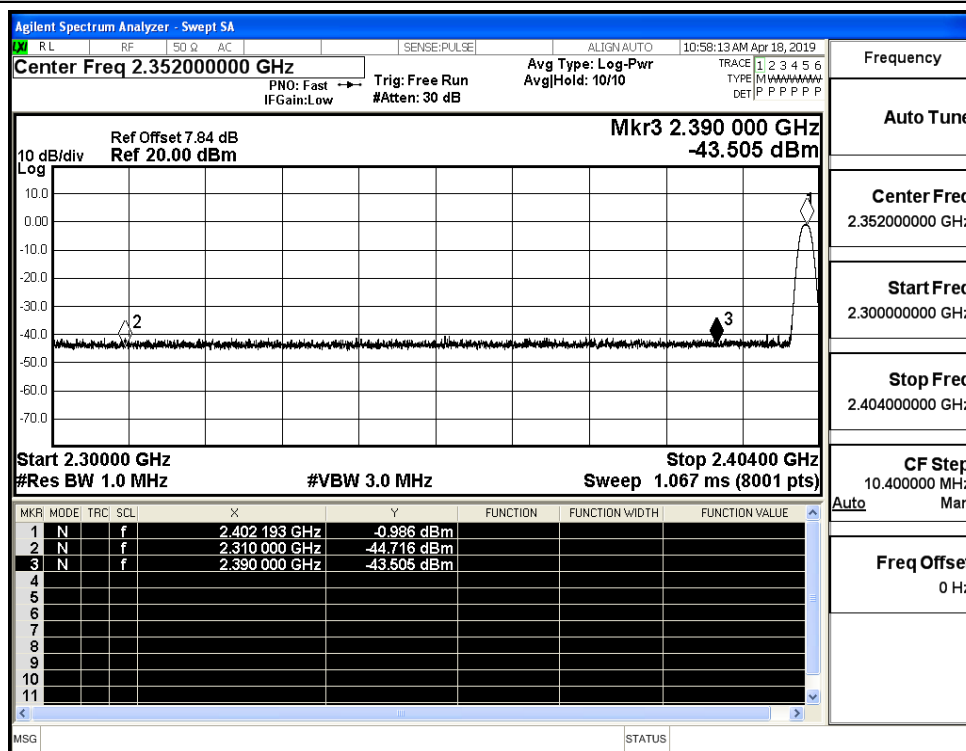
8DPSK/HCH/Hop



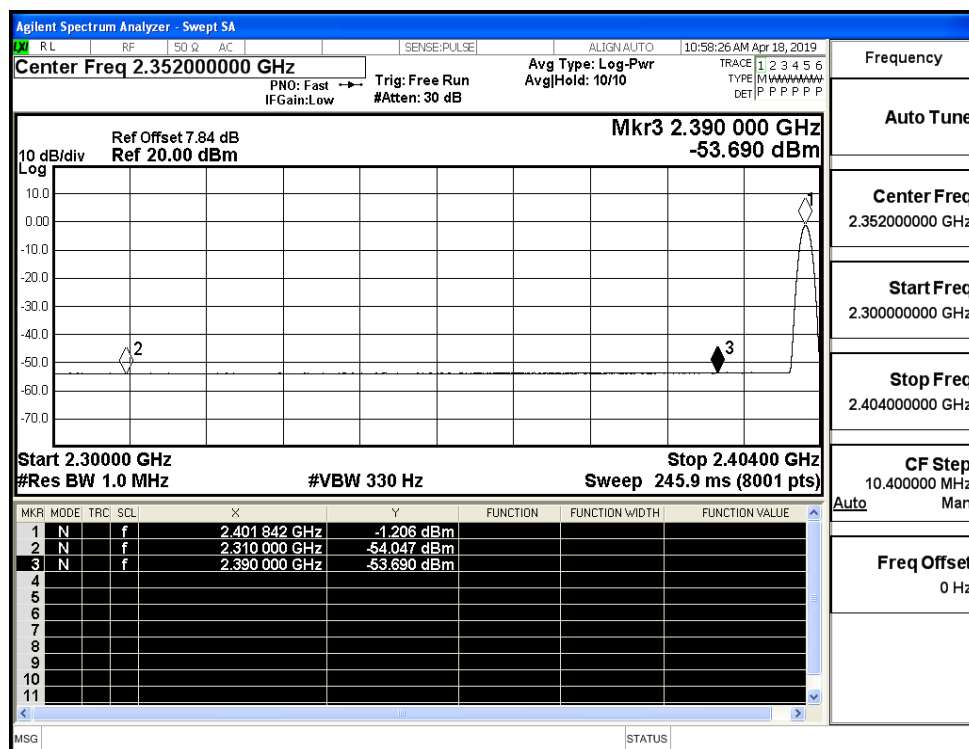
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.72	2.0	0	50.54	PEAK	74	PASS
	Off	2310.0	-54.05	2.0	0	41.21	AV	54	PASS
	Off	2390.0	-43.51	2.0	0	51.75	PEAK	74	PASS
	Off	2390.0	-53.69	2.0	0	41.57	AV	54	PASS
	Off	2483.5	-43.61	2.0	0	51.65	PEAK	74	PASS
	Off	2483.5	-53.45	2.0	0	41.81	AV	54	PASS
	Off	2500.0	-42.34	2.0	0	52.92	PEAK	74	PASS
	Off	2500.0	-53.28	2.0	0	41.98	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.27	2.0	0	50.98	PEAK	74	PASS
	Off	2310.0	-53.86	2.0	0	41.40	AV	54	PASS
	Off	2390.0	-44.46	2.0	0	50.79	PEAK	74	PASS
	Off	2390.0	-53.56	2.0	0	41.69	AV	54	PASS
	Off	2483.5	-42.93	2.0	0	52.33	PEAK	74	PASS
	Off	2483.5	-53.41	2.0	0	41.85	AV	54	PASS
	Off	2500.0	-41.11	2.0	0	54.14	PEAK	74	PASS
	Off	2500.0	-53.29	2.0	0	41.97	AV	54	PASS
8DPSK	Off	2310.0	-44.59	2.0	0	50.66	PEAK	74	PASS
	Off	2310.0	-53.91	2.0	0	41.34	AV	54	PASS
	Off	2390.0	-43.23	2.0	0	52.03	PEAK	74	PASS
	Off	2390.0	-53.67	2.0	0	41.59	AV	54	PASS
	Off	2483.5	-42.34	2.0	0	52.92	PEAK	74	PASS
	Off	2483.5	-53.43	2.0	0	41.83	AV	54	PASS
	Off	2500.0	-43.46	2.0	0	51.79	PEAK	74	PASS
	Off	2500.0	-53.32	2.0	0	41.94	AV	54	PASS

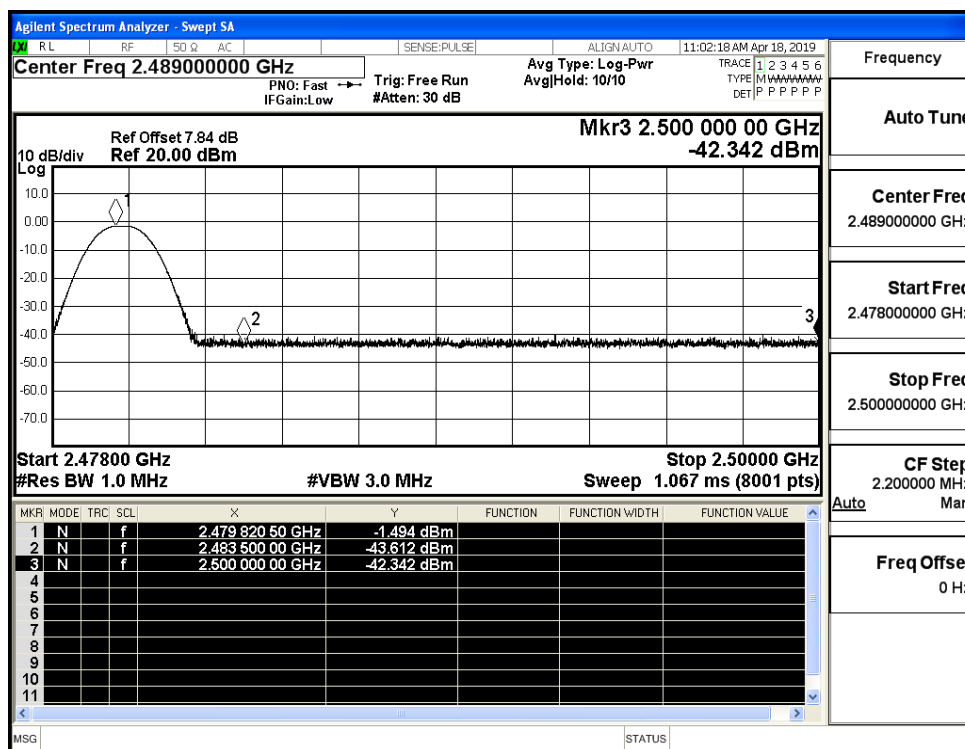
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



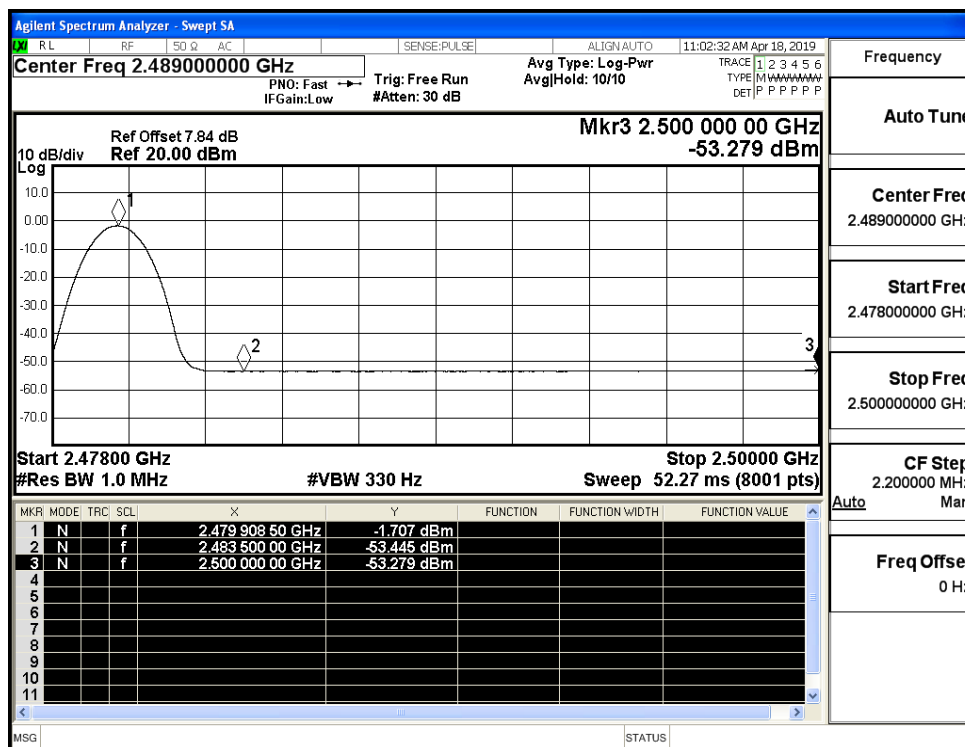
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

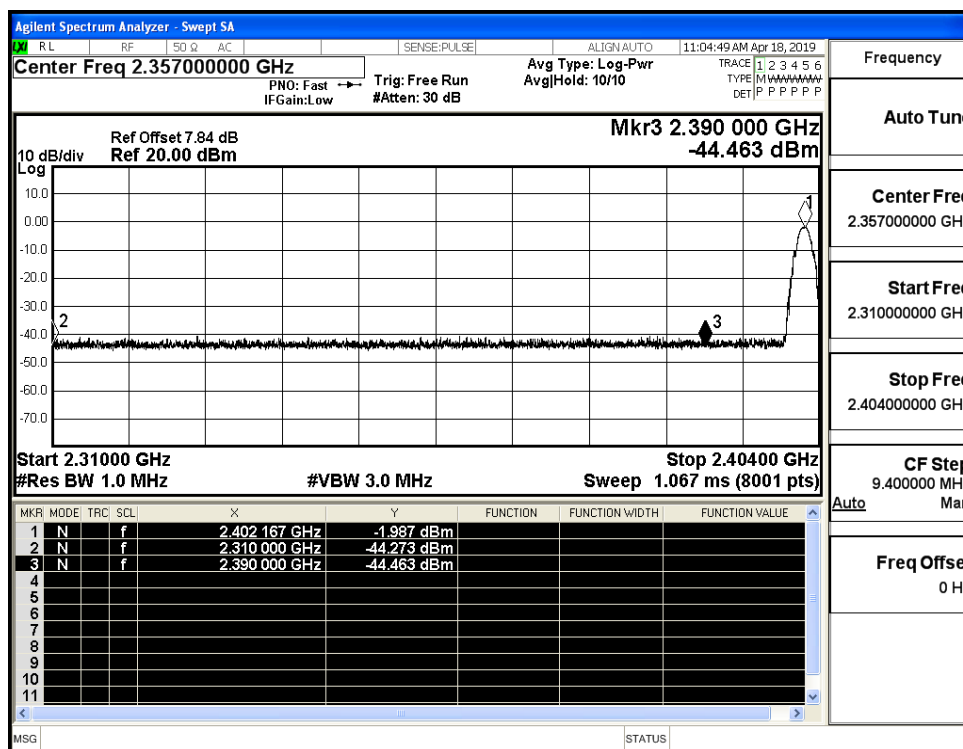
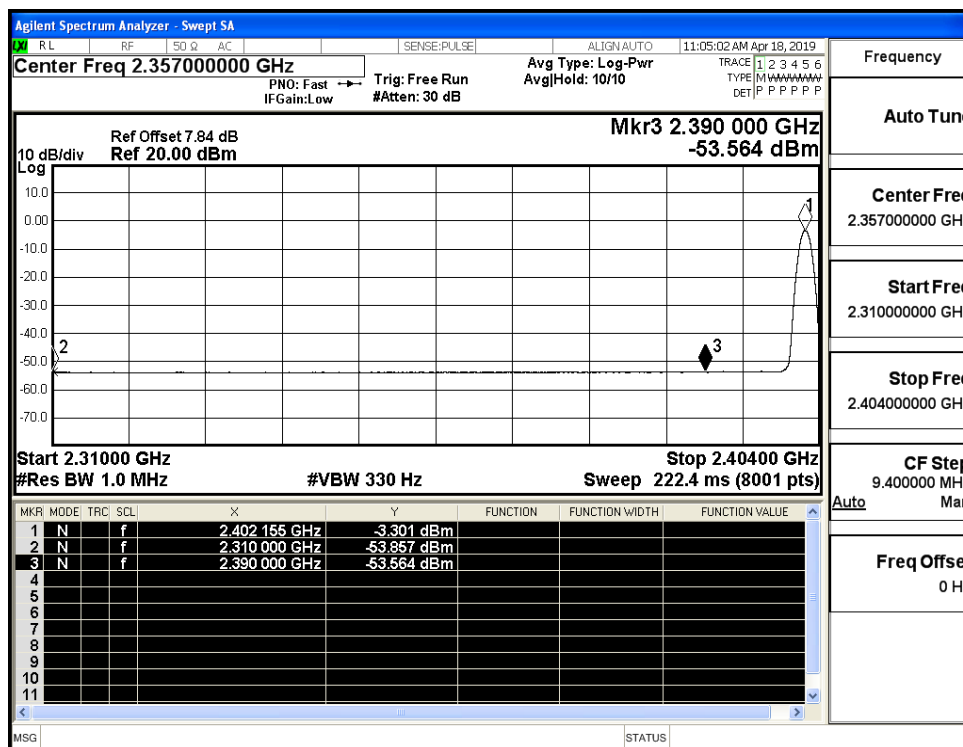


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

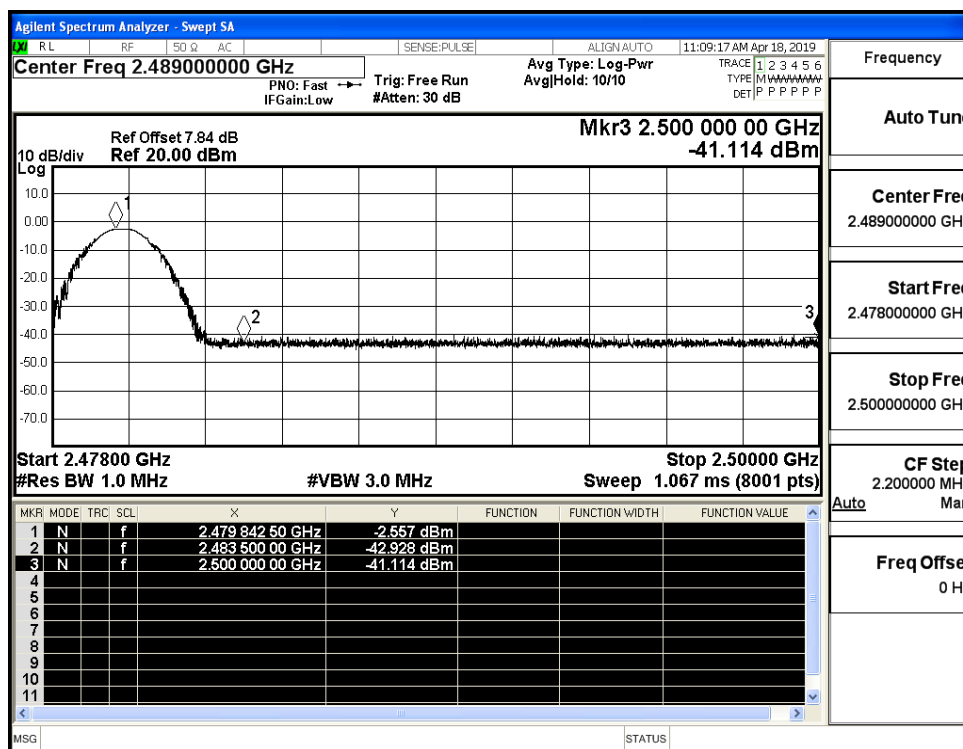


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

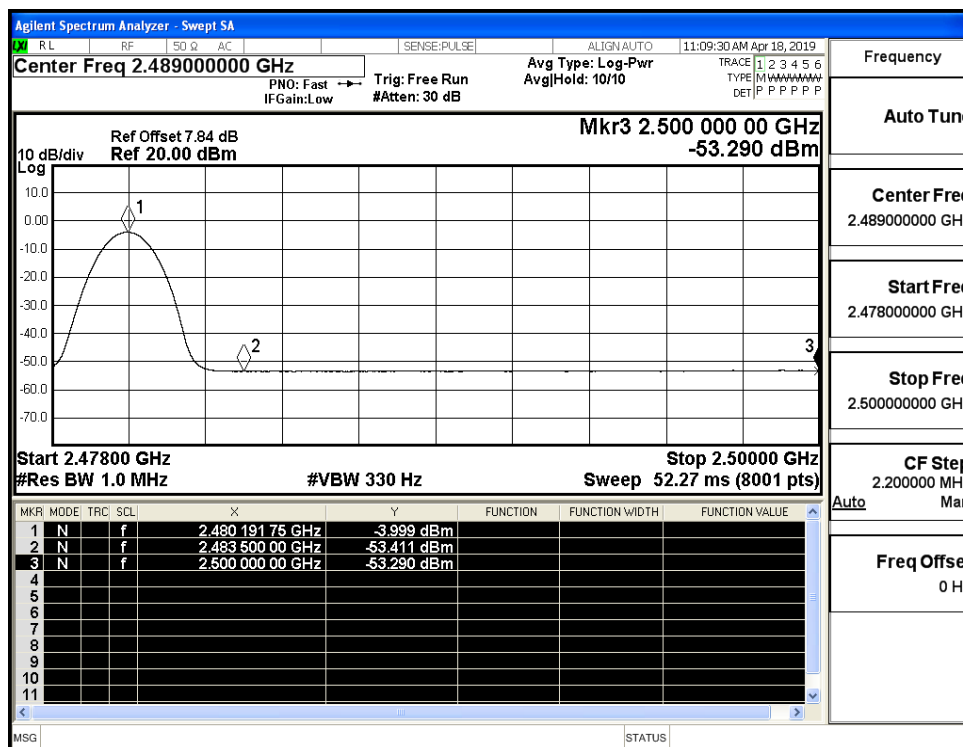


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

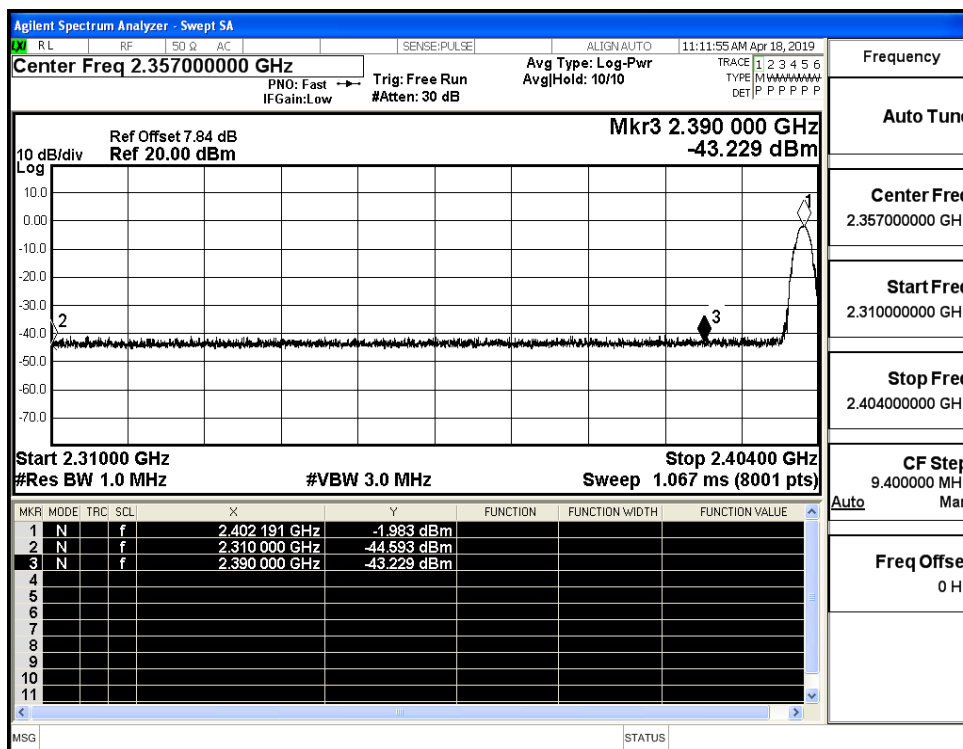
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



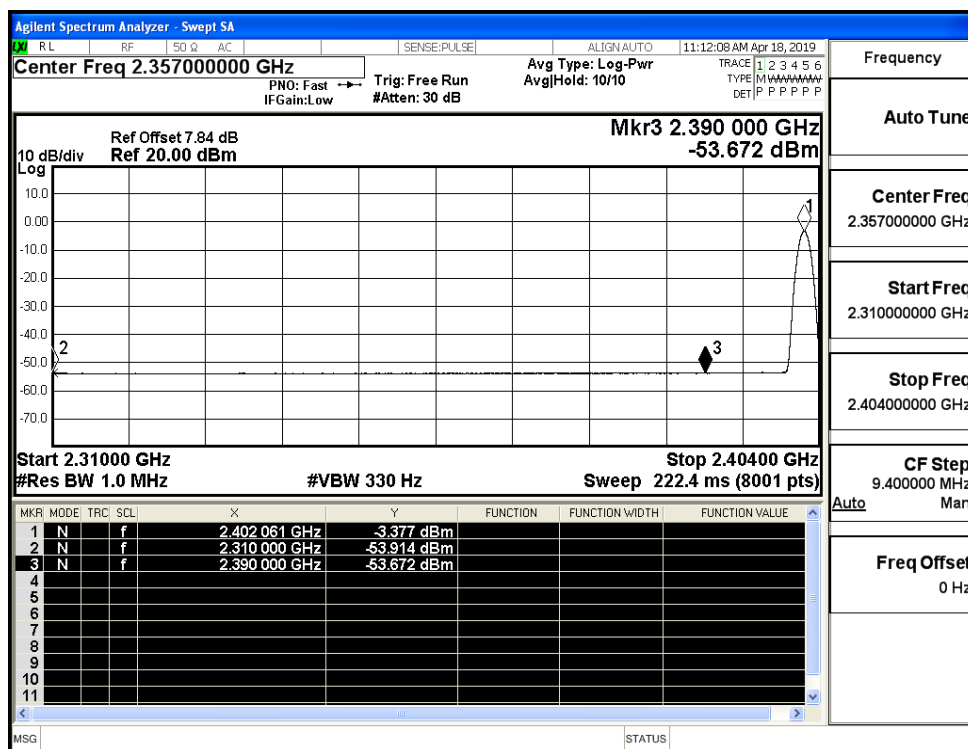
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



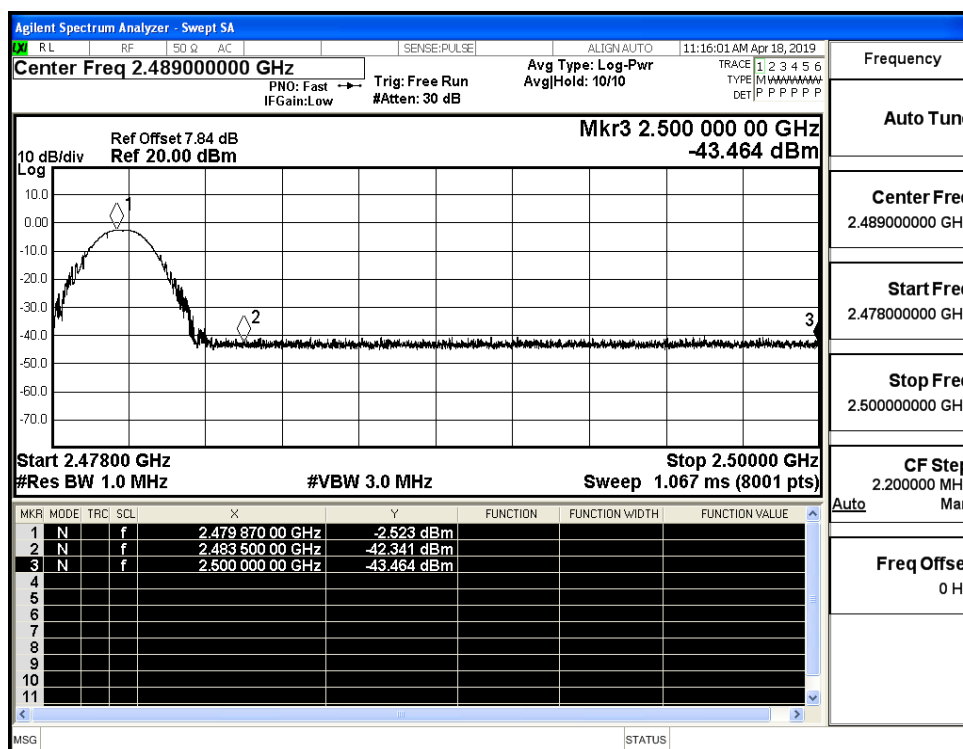
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

