

Appendix A

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

Product Name: 2 x 50 Watt Class D Bluetooth Audio Amplifier Board

Trade Mark: Tinsyne

Test Model: TSA3118B

Environmental Conditions

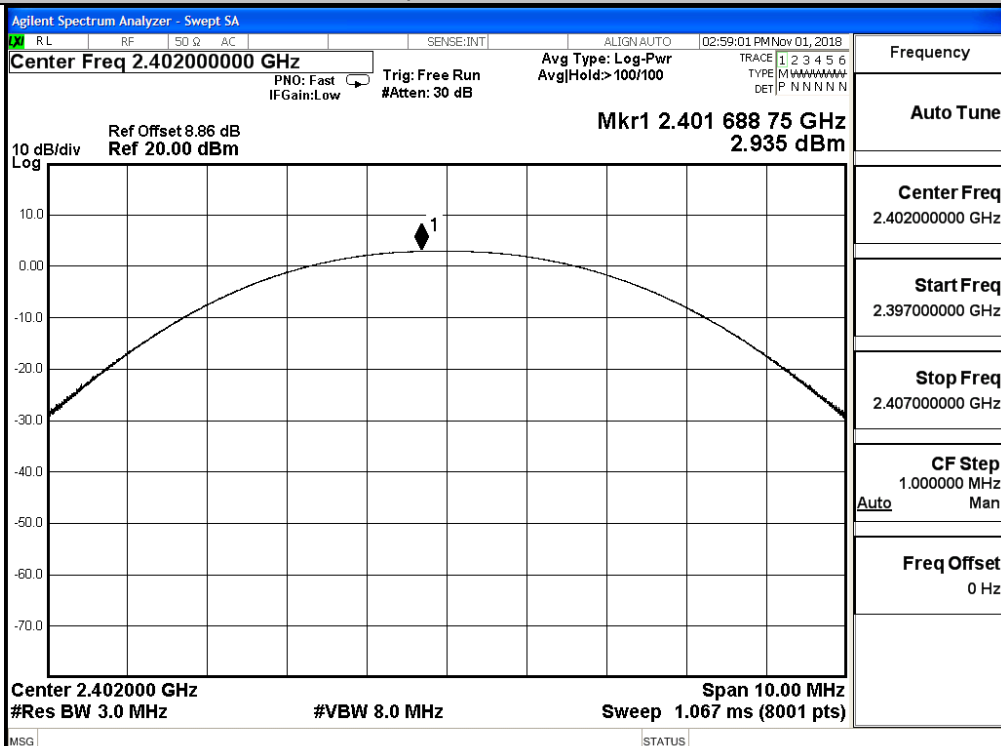
Temperature:	22.7° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina Xu
Supervised by:	Jayden Zhuo

A.1 Maximum Conducted Peak Output Power

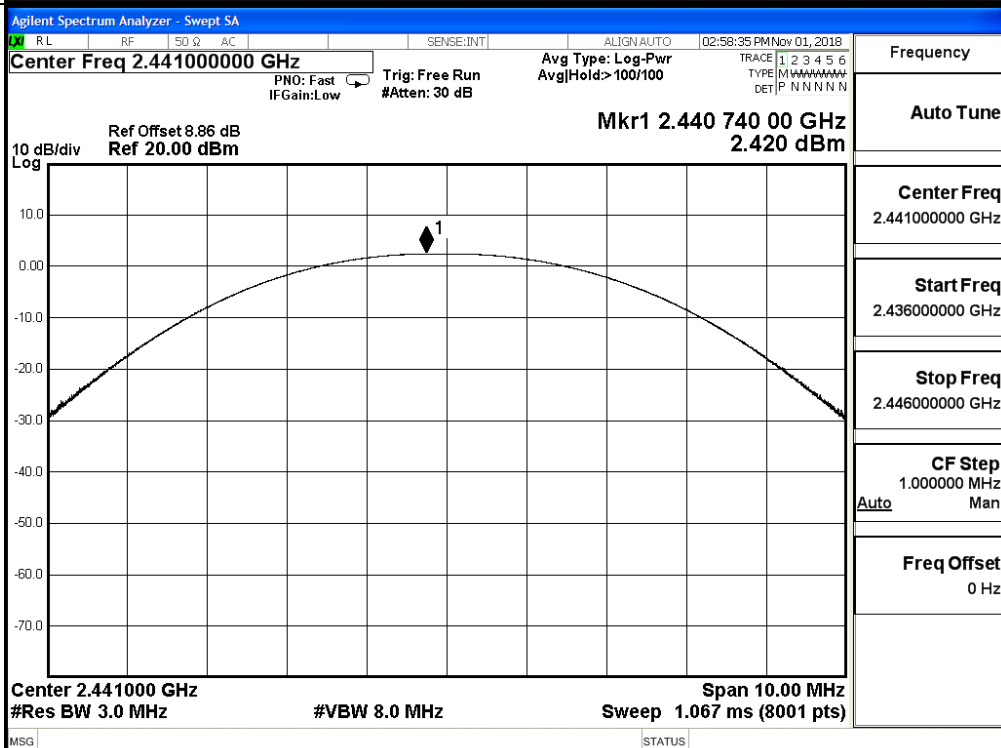
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.935	21	PASS
	MCH	2.420	21	PASS
	HCH	1.240	21	PASS
$\pi/4$ DQPSK	LCH	1.830	21	PASS
	MCH	1.520	21	PASS
	HCH	0.500	21	PASS
8DPSK	LCH	2.082	21	PASS
	MCH	1.788	21	PASS
	HCH	0.758	21	PASS

Test Graphs

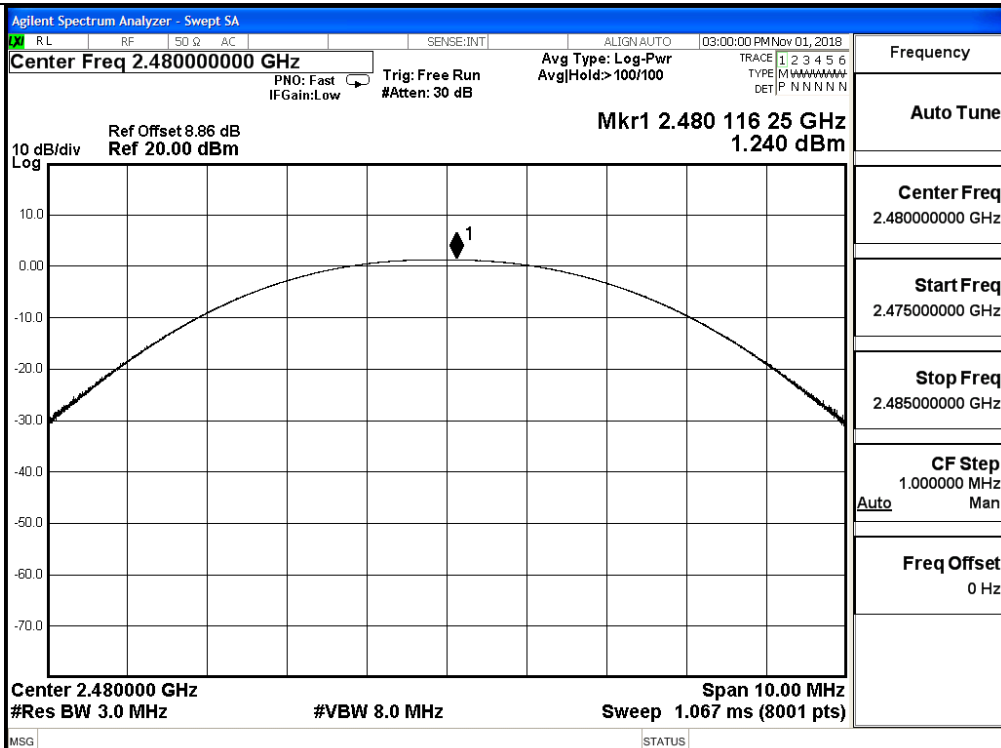
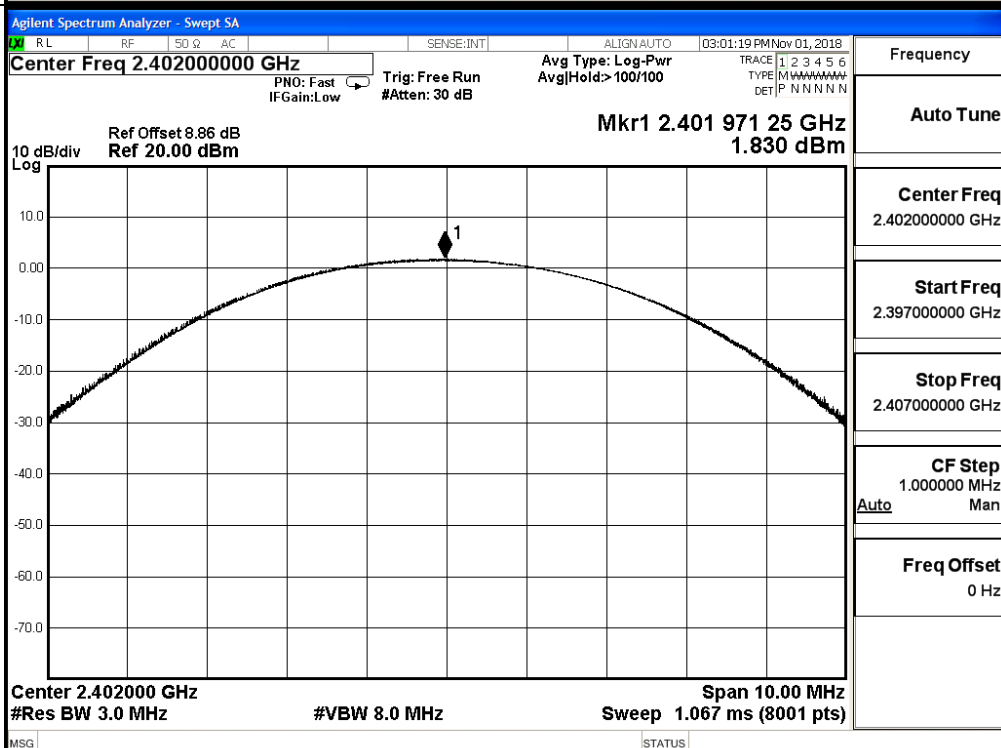
GFSK/LCH

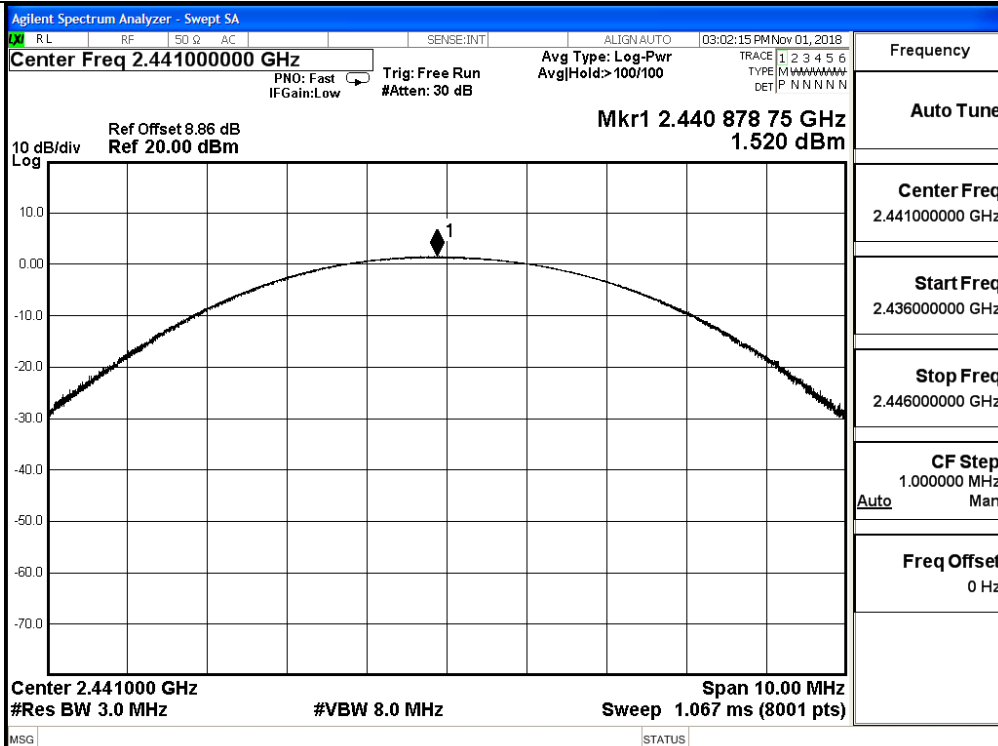
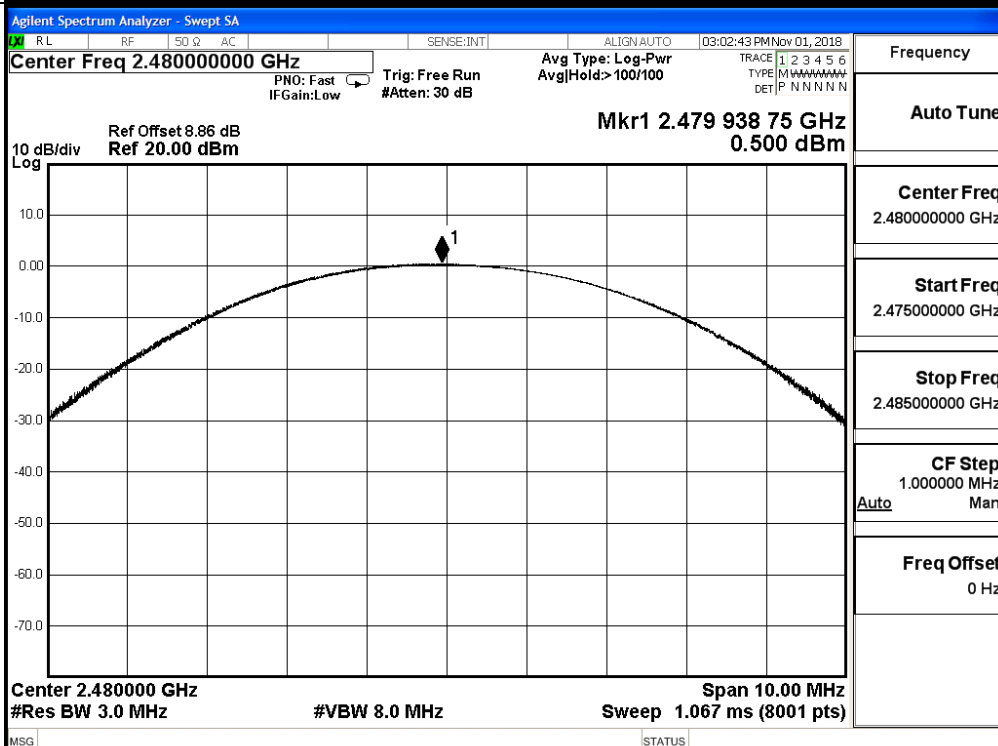


GFSK/MCH

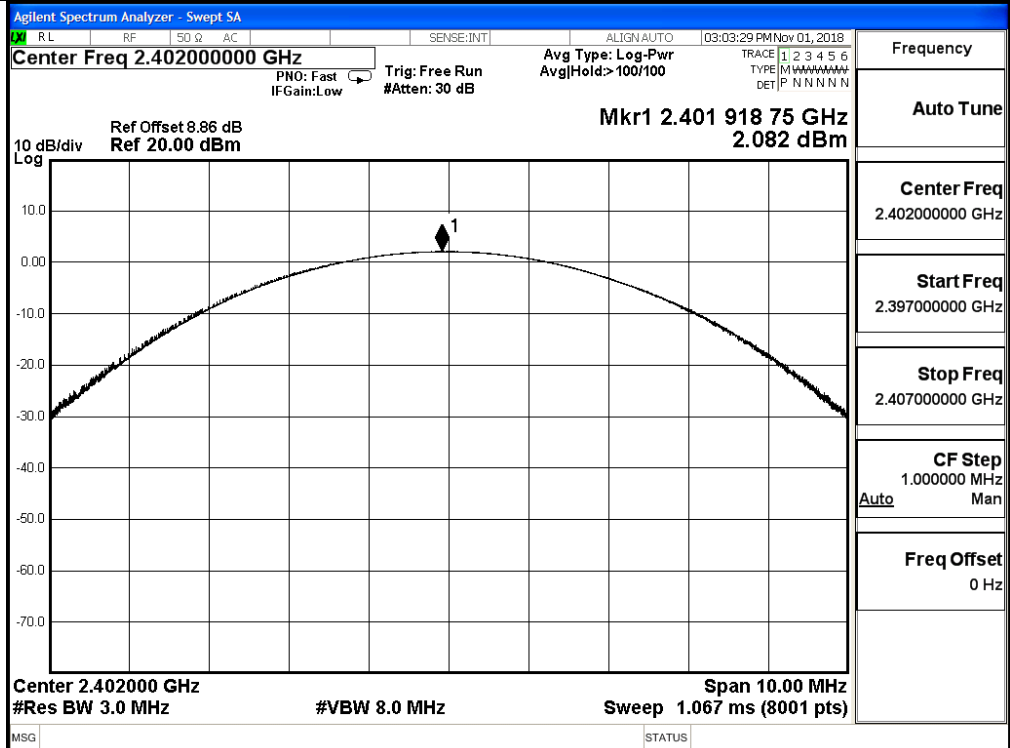


GFSK/HCH

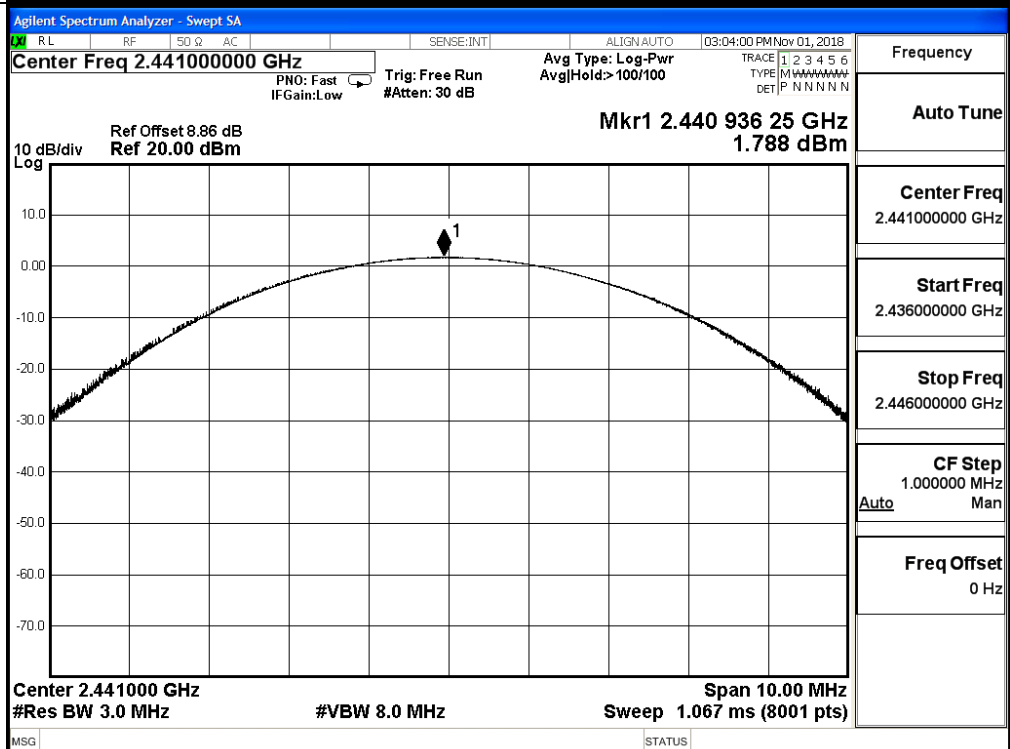
 π /4DQPSK/LCH

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

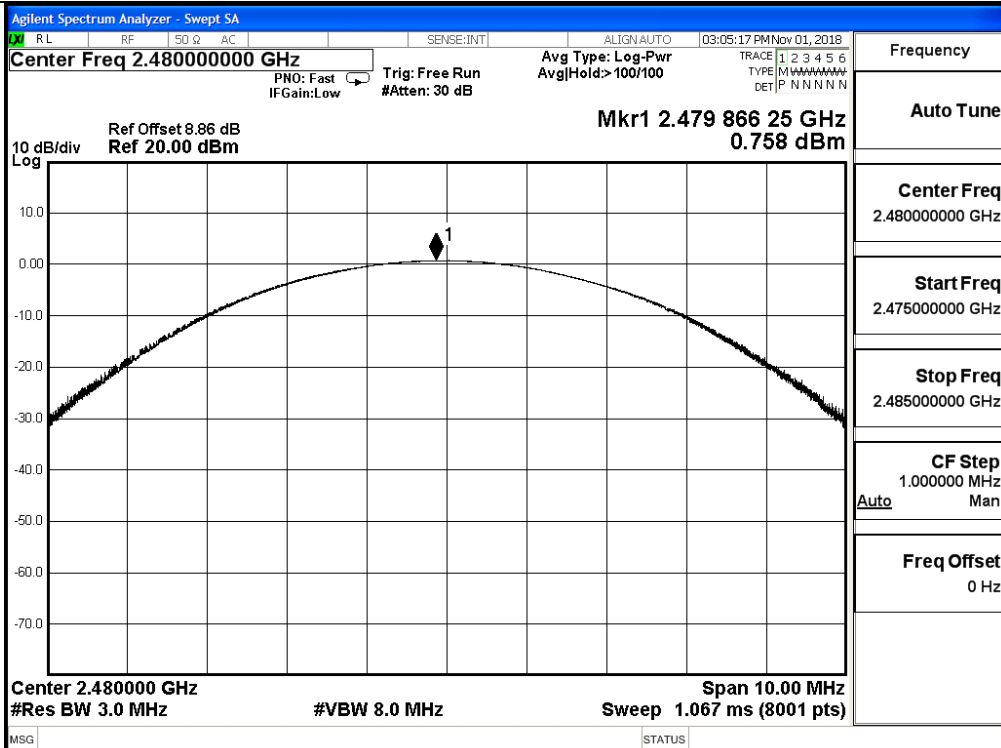
8DPSK/LCH



8DPSK/MCH



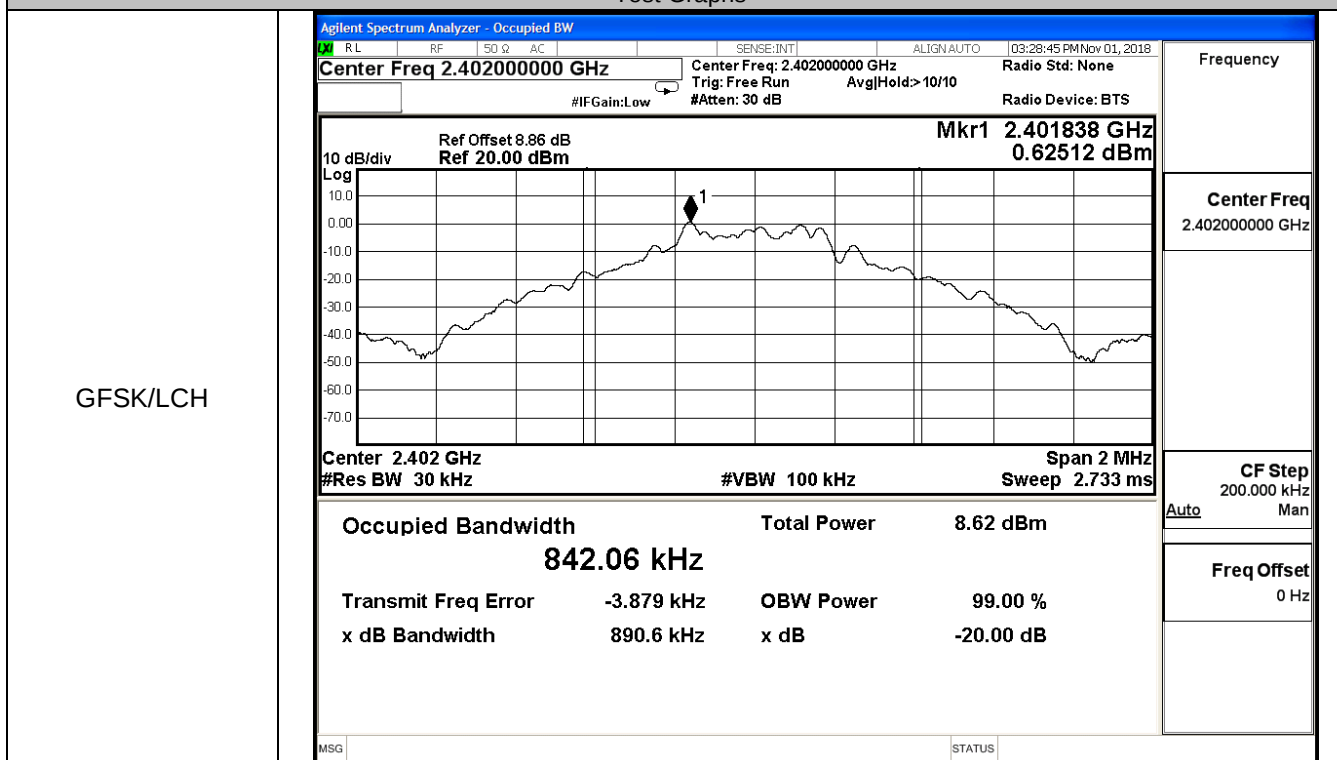
8DPSK/HCH



A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.84206	0.8906	Not Specified	PASS
	MCH	0.84057	0.8909	Not Specified	PASS
	HCH	0.84256	0.8948	Not Specified	PASS
π /4DQPSK	LCH	1.1654	1.287	Not Specified	PASS
	MCH	1.1744	1.288	Not Specified	PASS
	HCH	1.1830	1.289	Not Specified	PASS
8DPSK	LCH	1.1273	1.276	Not Specified	PASS
	MCH	1.1300	1.277	Not Specified	PASS
	HCH	1.1338	1.279	Not Specified	PASS

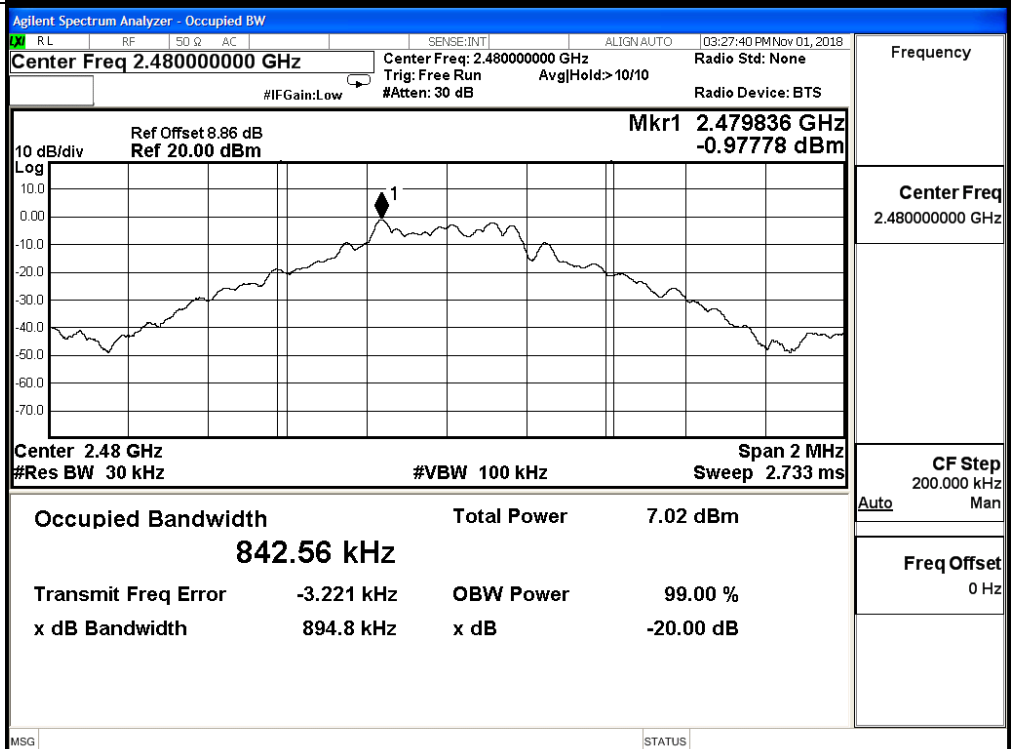
Test Graphs

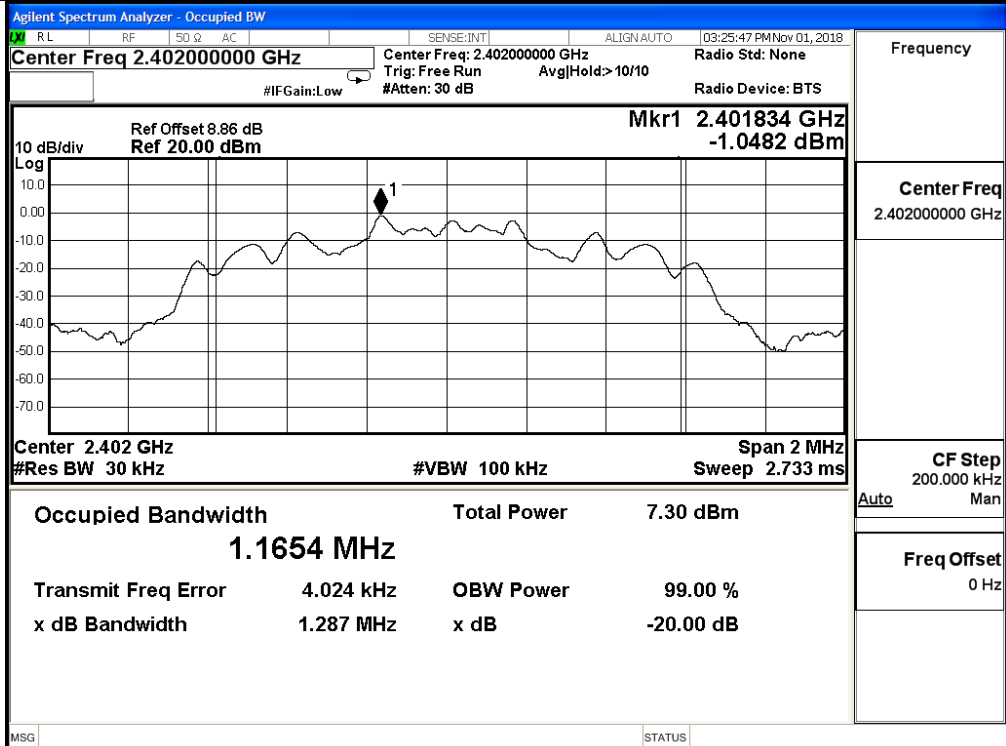
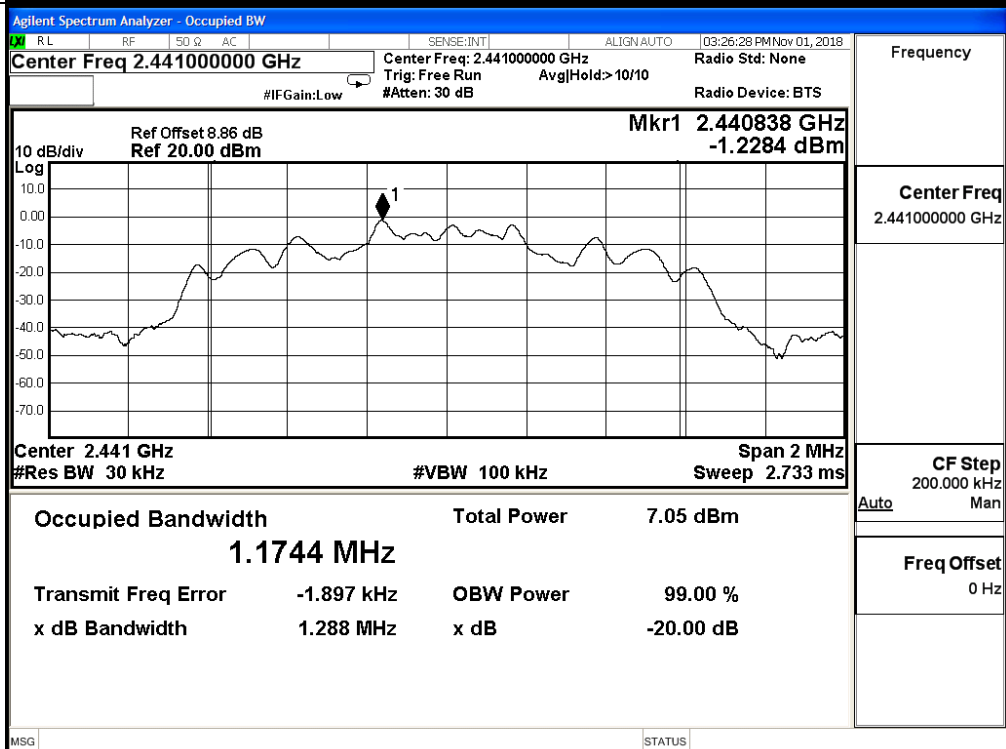


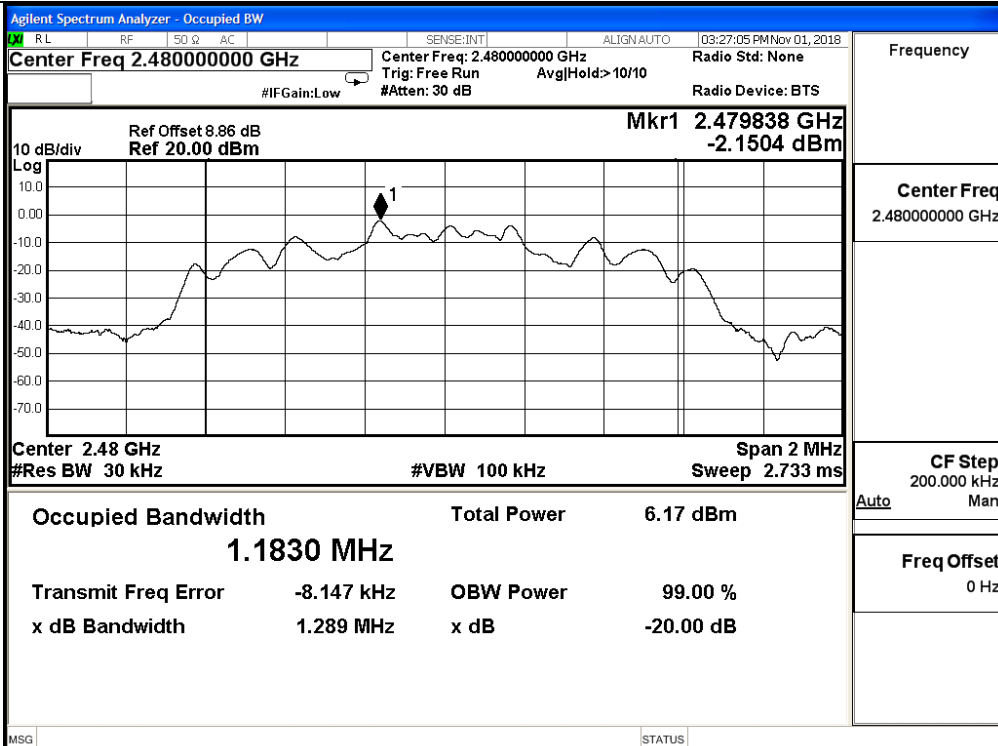
GFSK/MCH



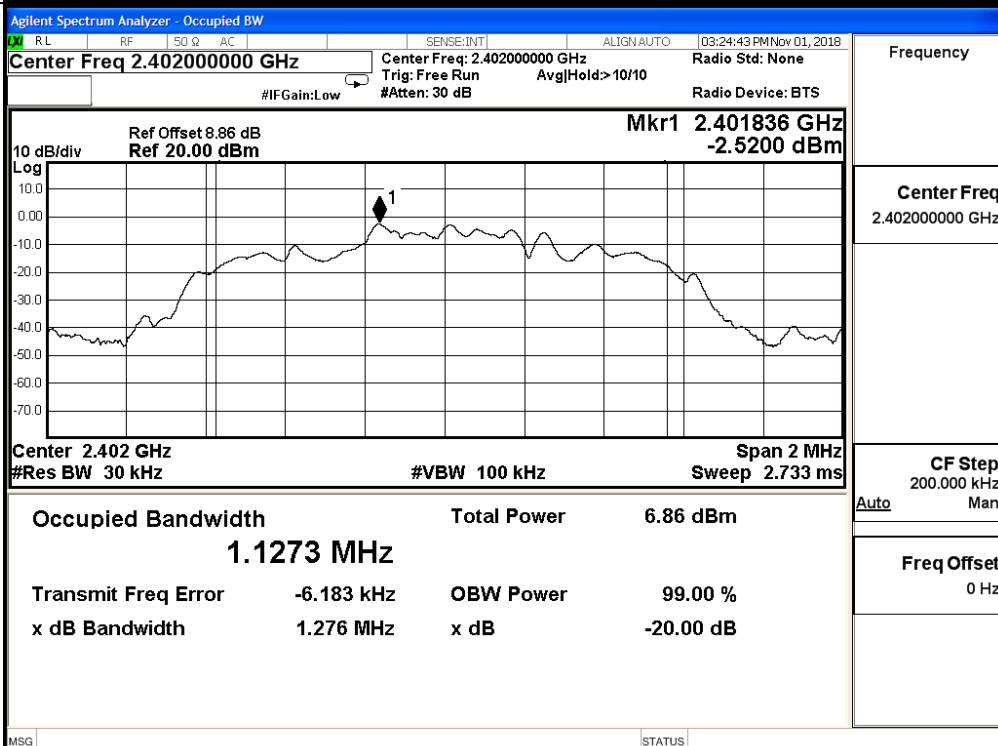
GFSK/HCH



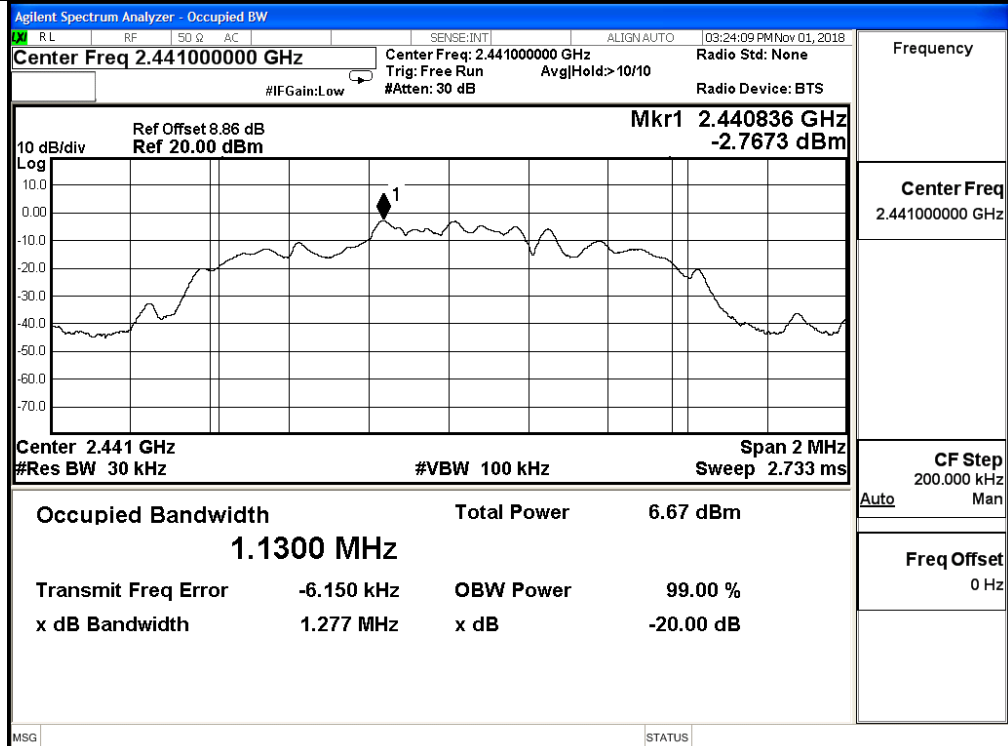
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

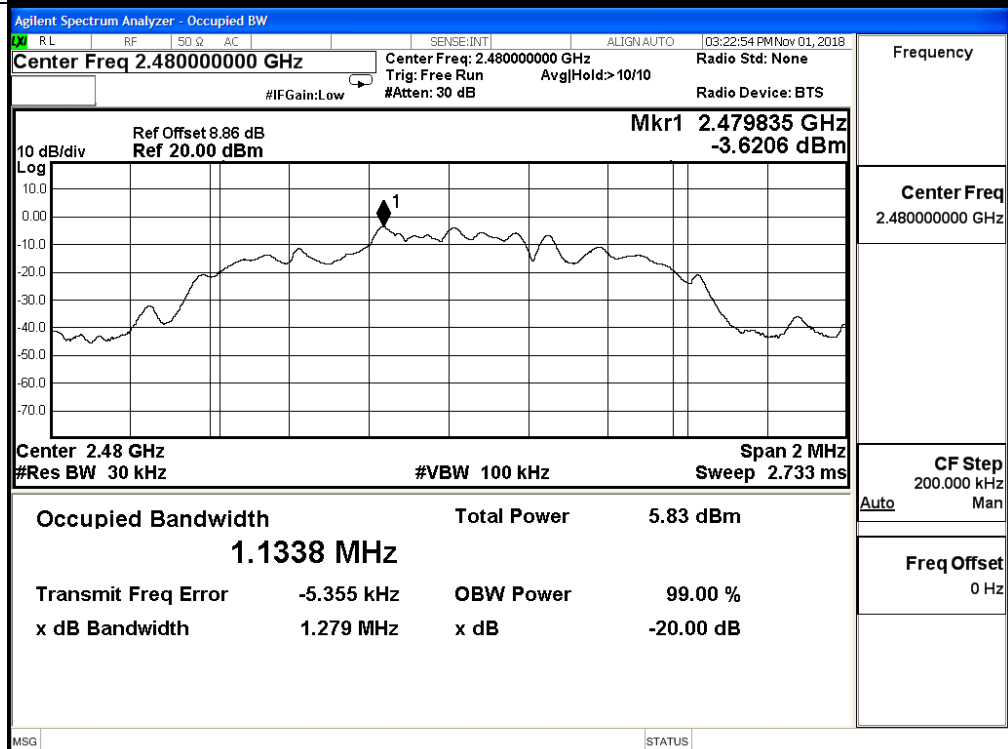
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

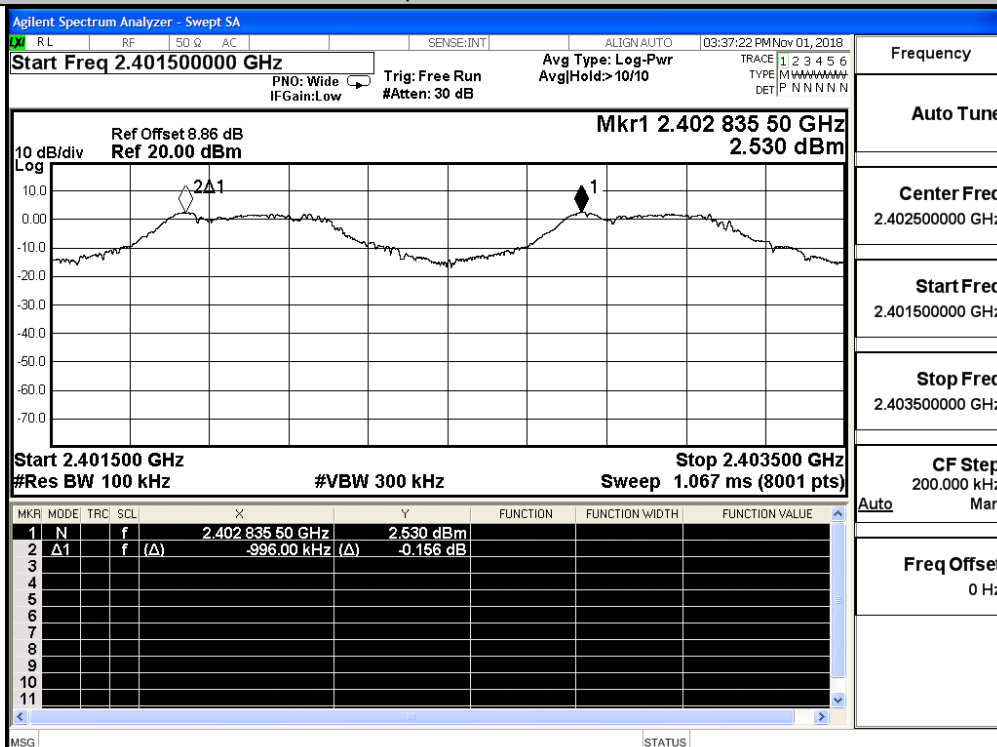


A.3 Carrier Frequency Separation

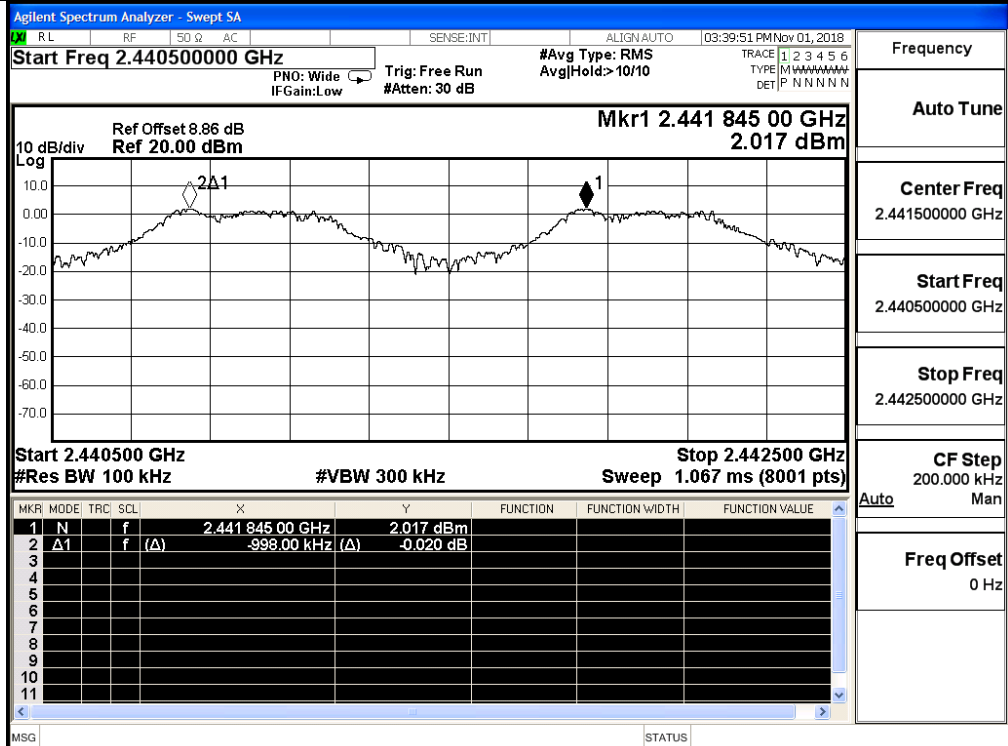
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9960	0.596	PASS
	MCH	0.9980	0.596	PASS
	HCH	1.0095	0.596	PASS
$\pi/4$ DQPSK	LCH	1.0093	0.859	PASS
	MCH	0.9973	0.859	PASS
	HCH	0.9953	0.859	PASS
8DPSK	LCH	1.0045	0.853	PASS
	MCH	0.9990	0.853	PASS
	HCH	0.9880	0.853	PASS

Test Graphs

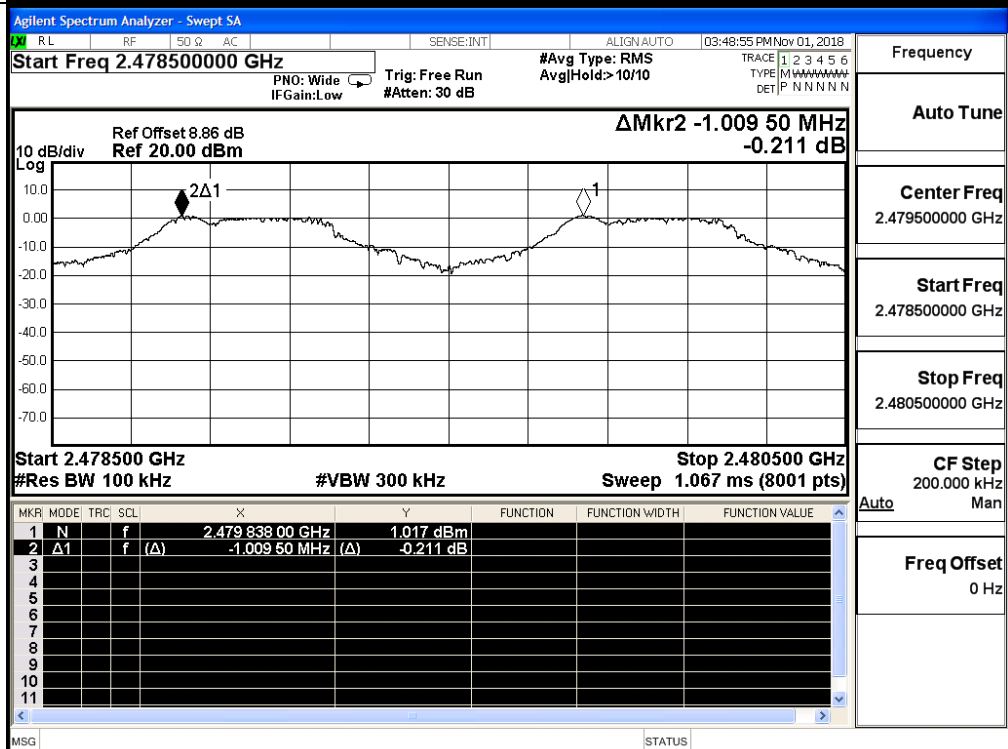
GFSK/LCH

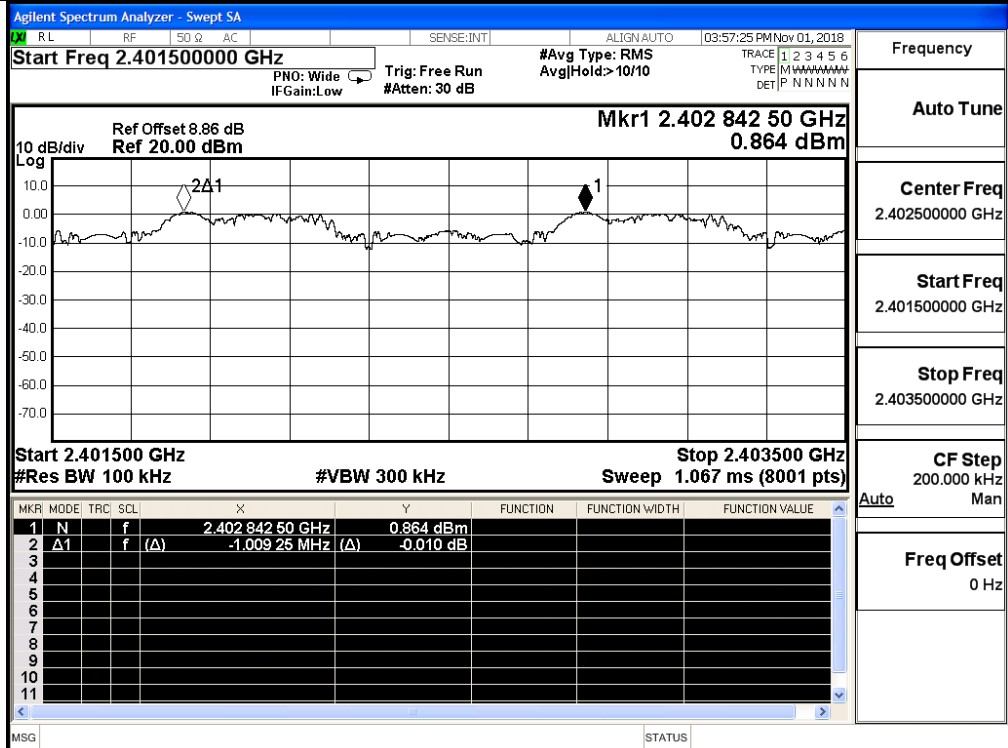


GFSK/MCH



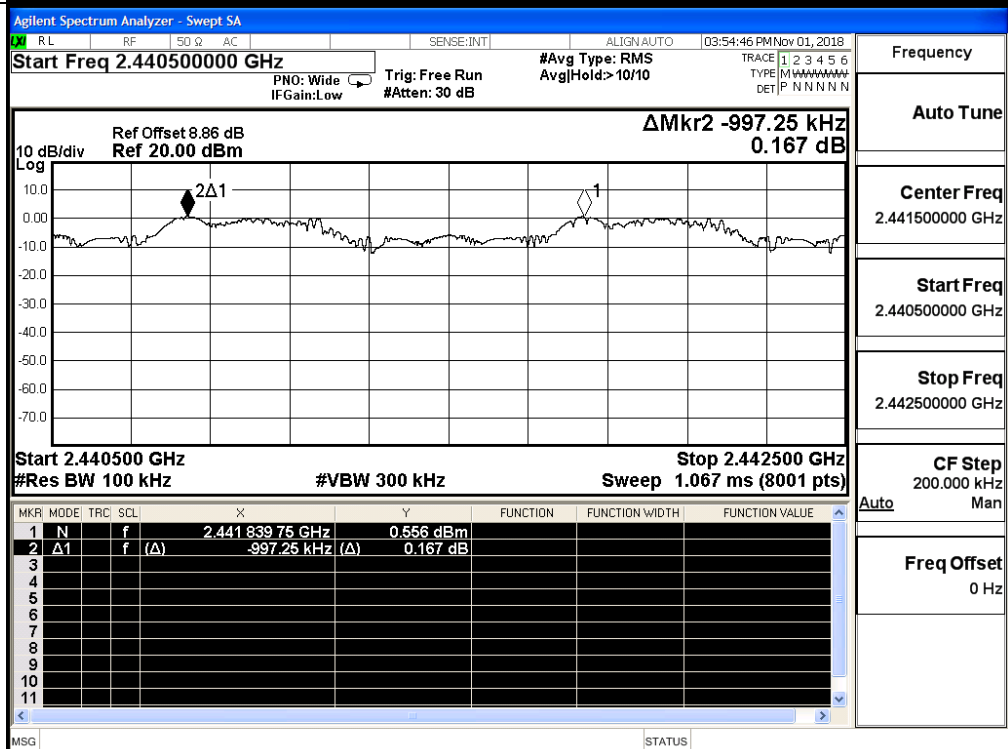
GFSK/HCH



$\pi/4$ DQPSK/LCH

Frequency

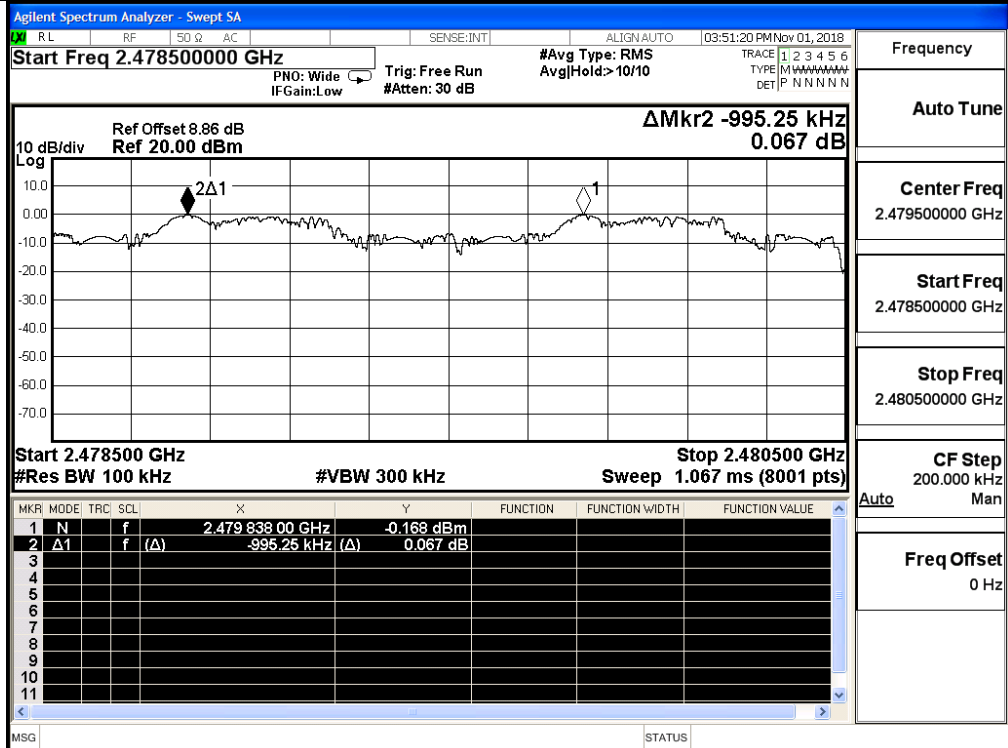
Auto Tune

Center Freq
2.402500000 GHzStart Freq
2.401500000 GHzStop Freq
2.403500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz $\pi/4$ DQPSK/MCH

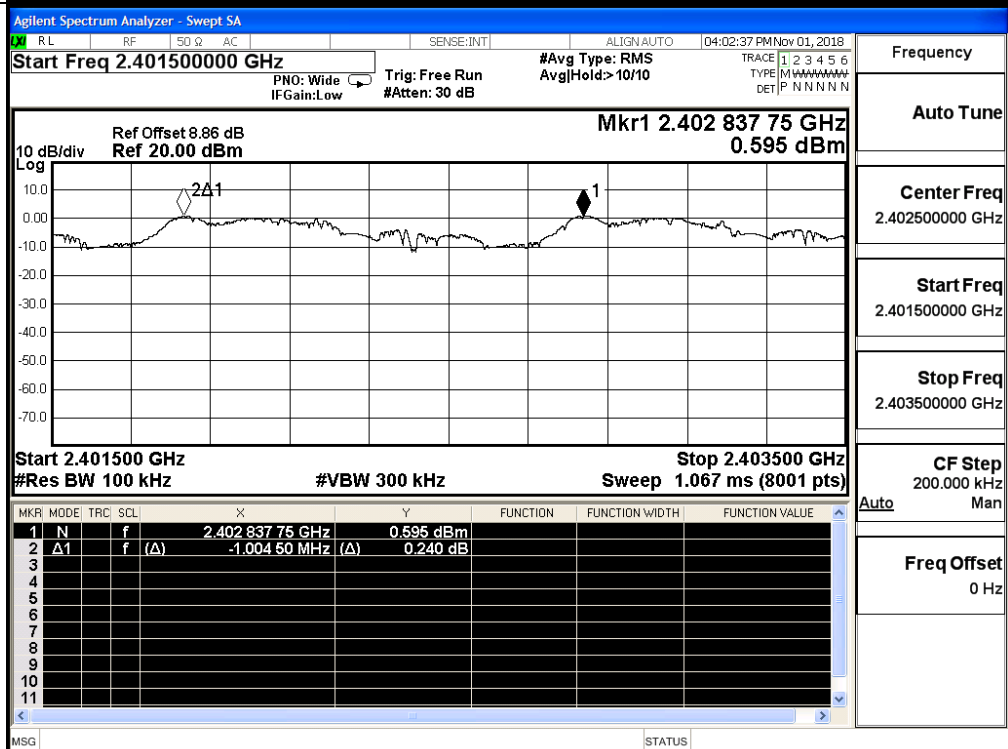
Frequency

Auto Tune

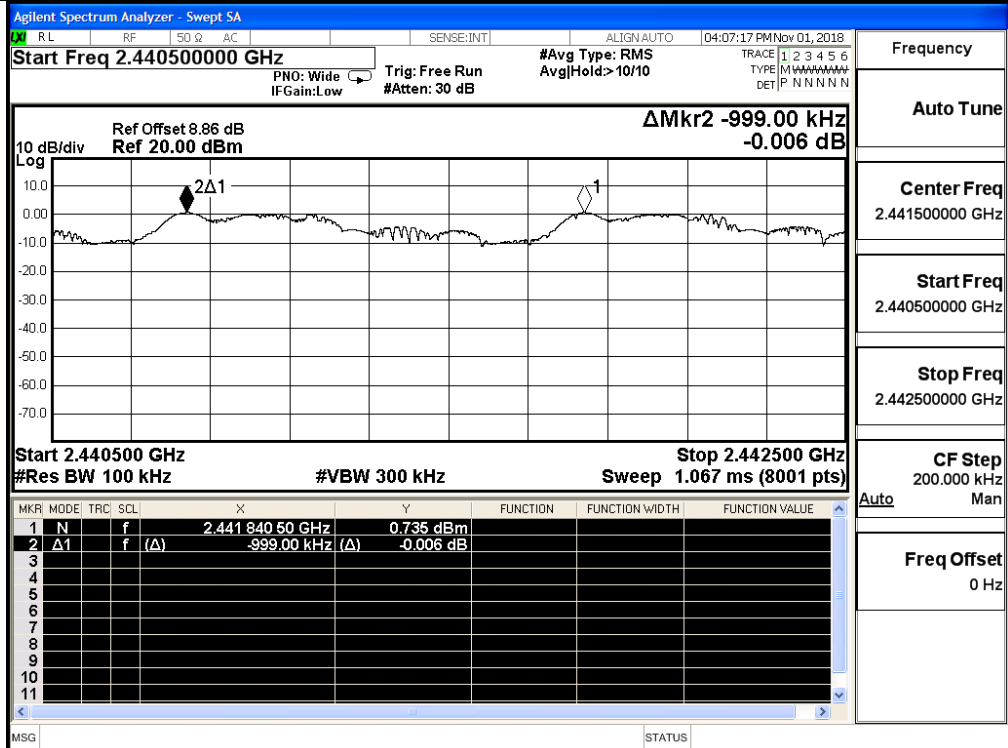
Center Freq
2.441500000 GHzStart Freq
2.440500000 GHzStop Freq
2.442500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH

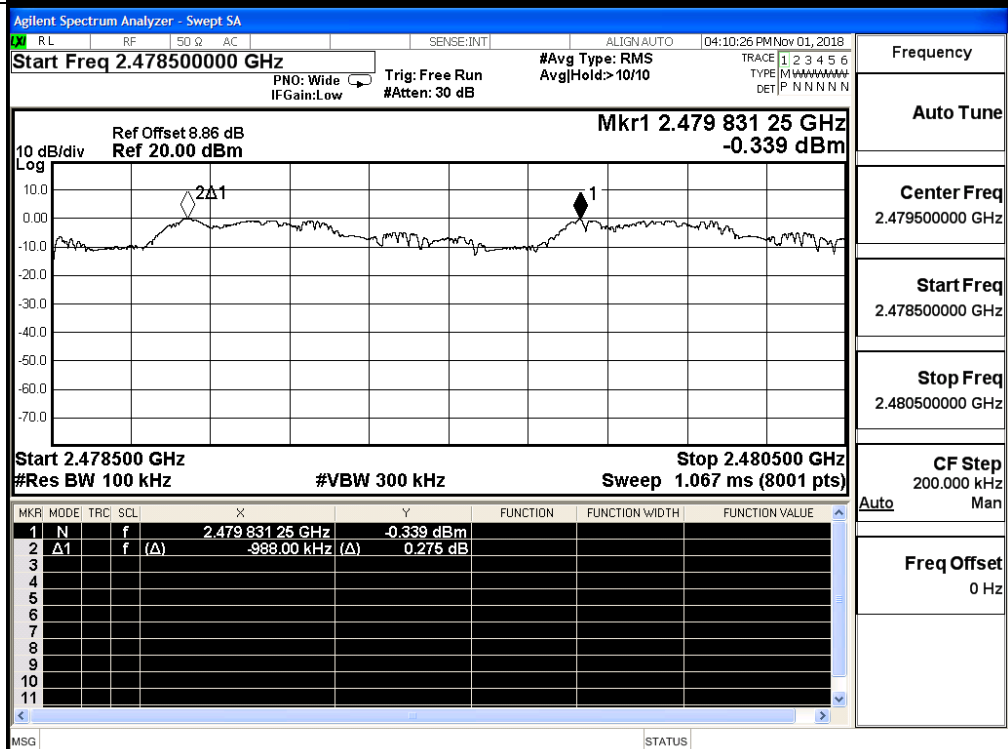
8DPSK/LCH



8DPSK/MCH

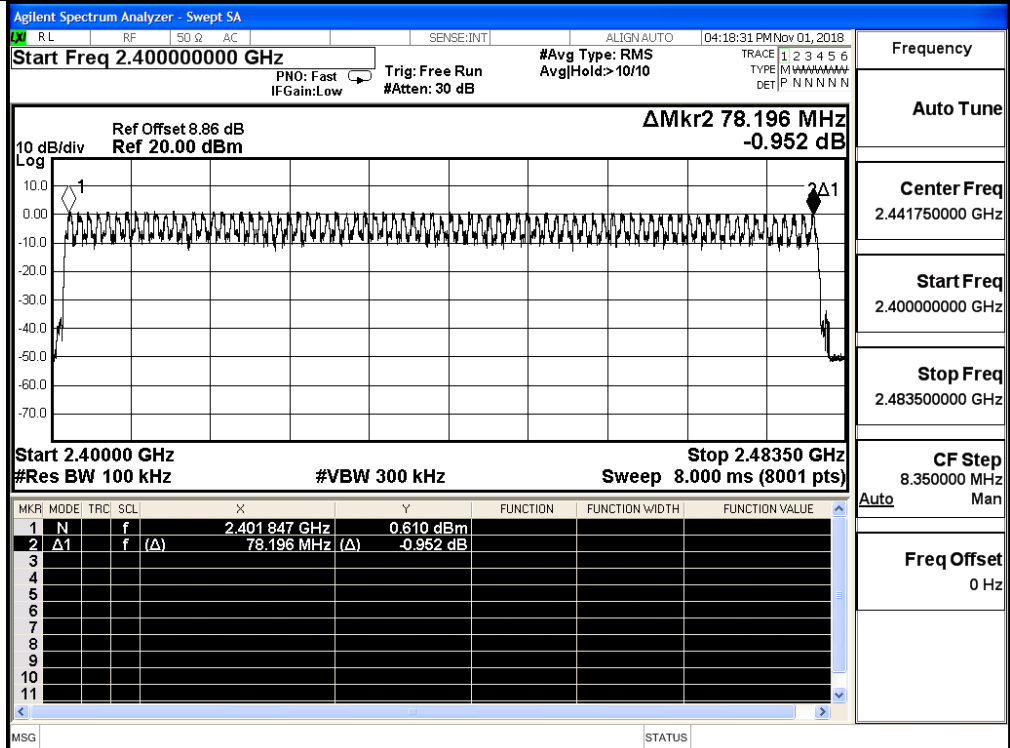


8DPSK/HCH

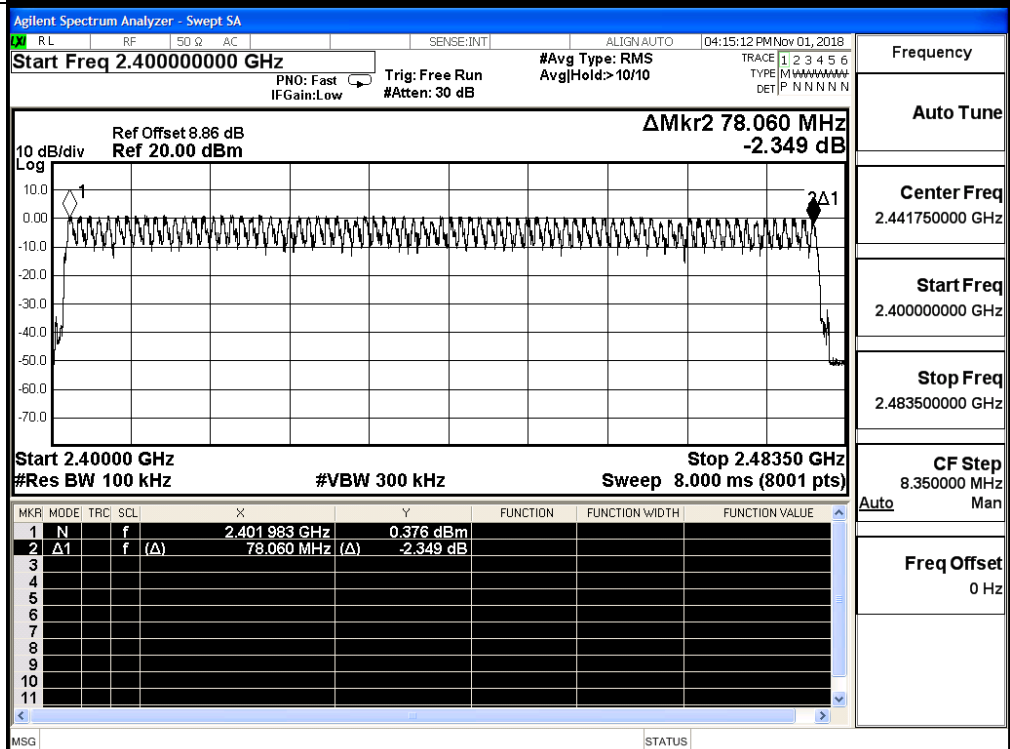


Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS



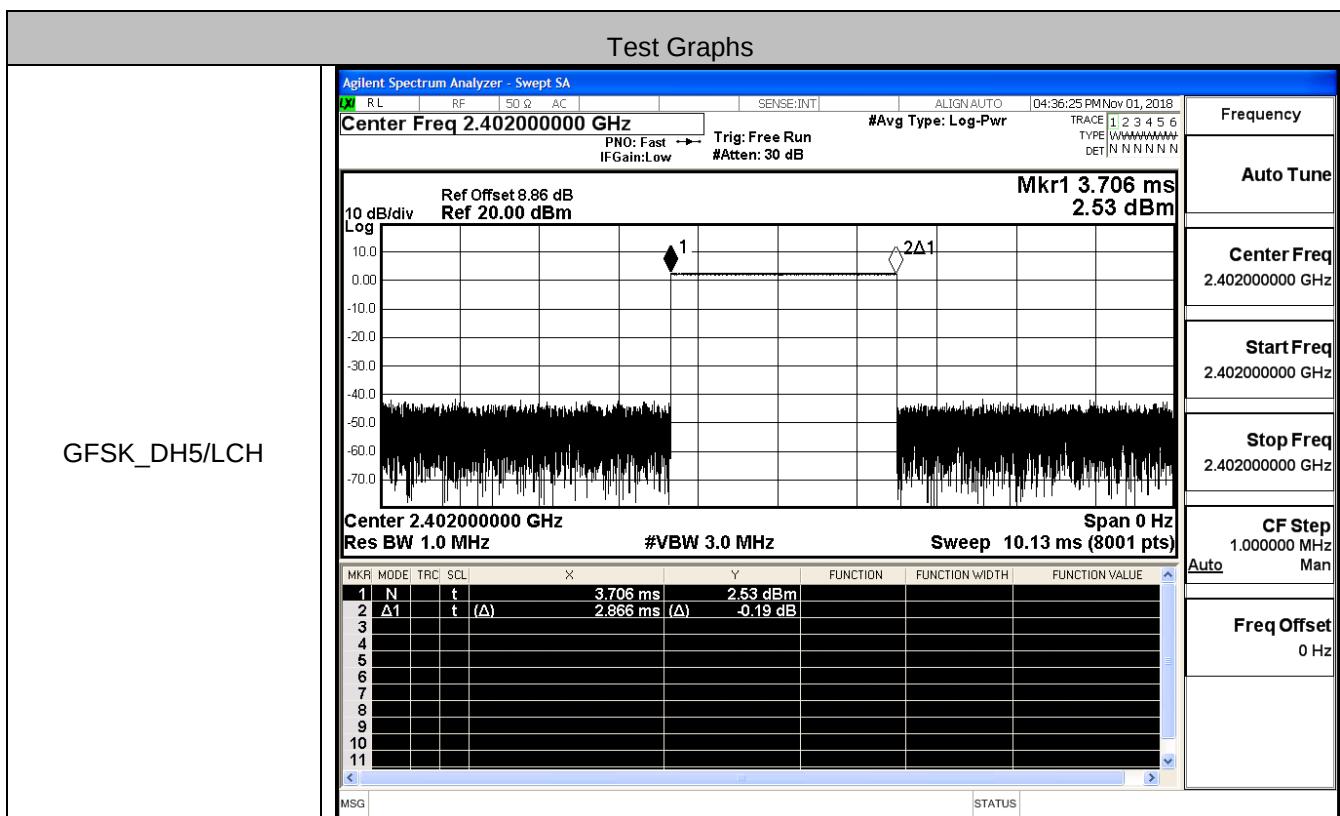
$\pi/4$ DQPSK/Hop

8DPSK/Hop

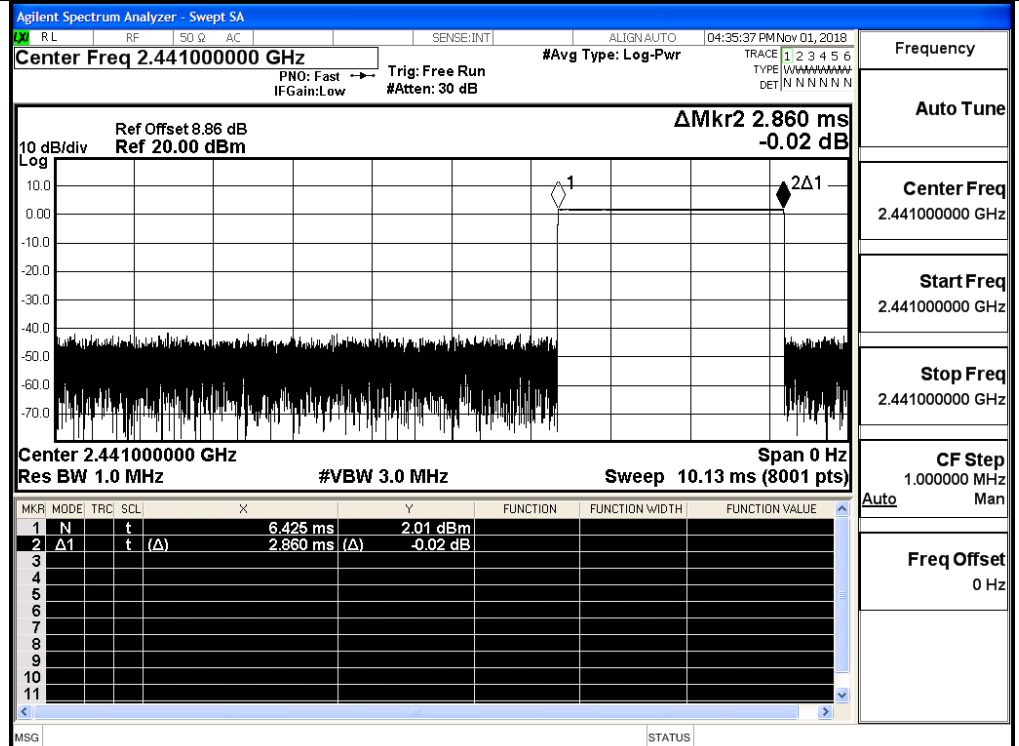


A.5 Dwell Time

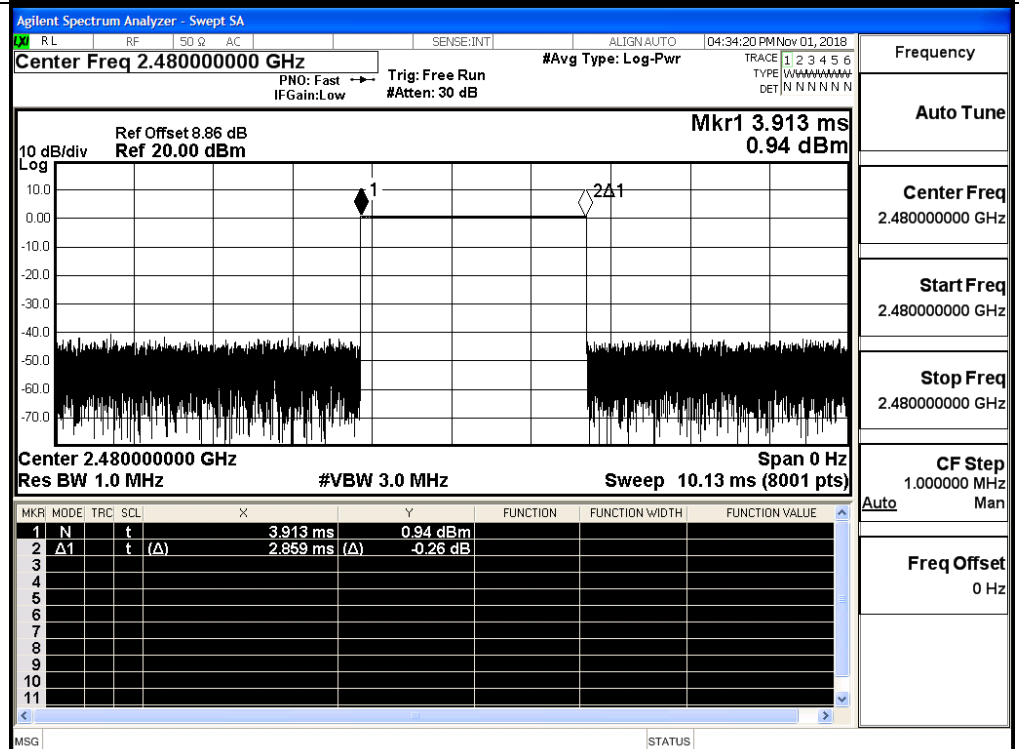
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.866	106.7	0.306	0.4	PASS
	DH5	MCH	2.860	106.7	0.305	0.4	PASS
	DH5	HCH	2.859	106.7	0.305	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.874	106.7	0.307	0.4	PASS
	2DH5	MCH	2.860	106.7	0.305	0.4	PASS
	2DH5	HCH	2.854	106.7	0.304	0.4	PASS
8DPSK	3DH5	LCH	2.850	106.7	0.304	0.4	PASS
	3DH5	MCH	2.854	106.7	0.304	0.4	PASS
	3DH5	HCH	2.841	106.7	0.303	0.4	PASS



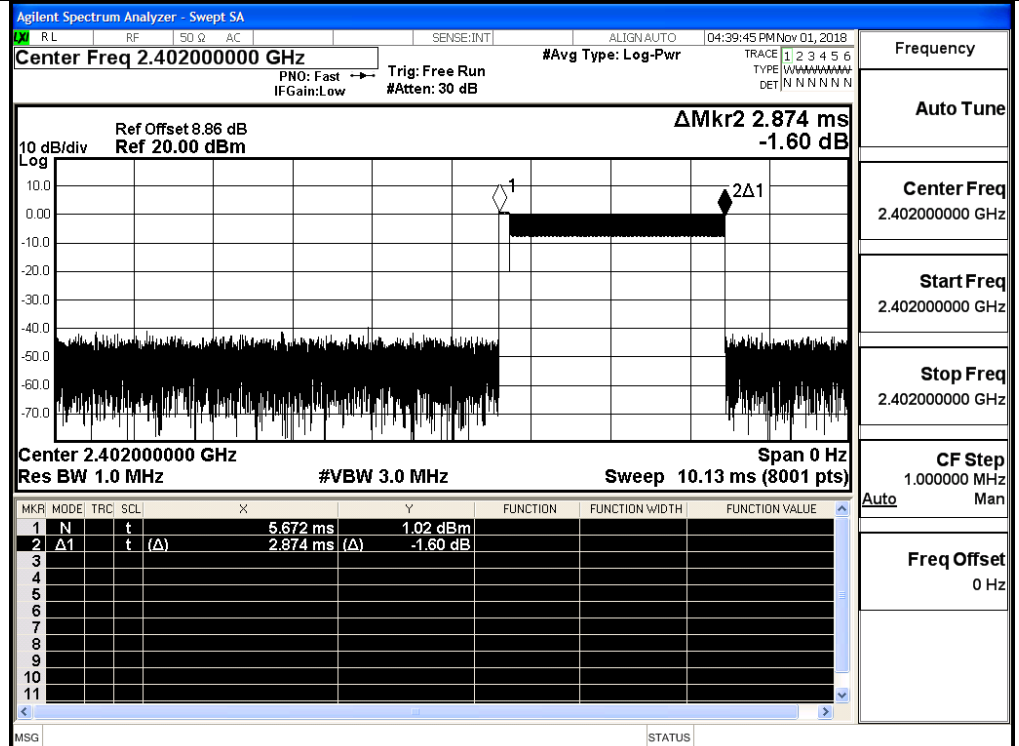
GFSK_DH5/MCH



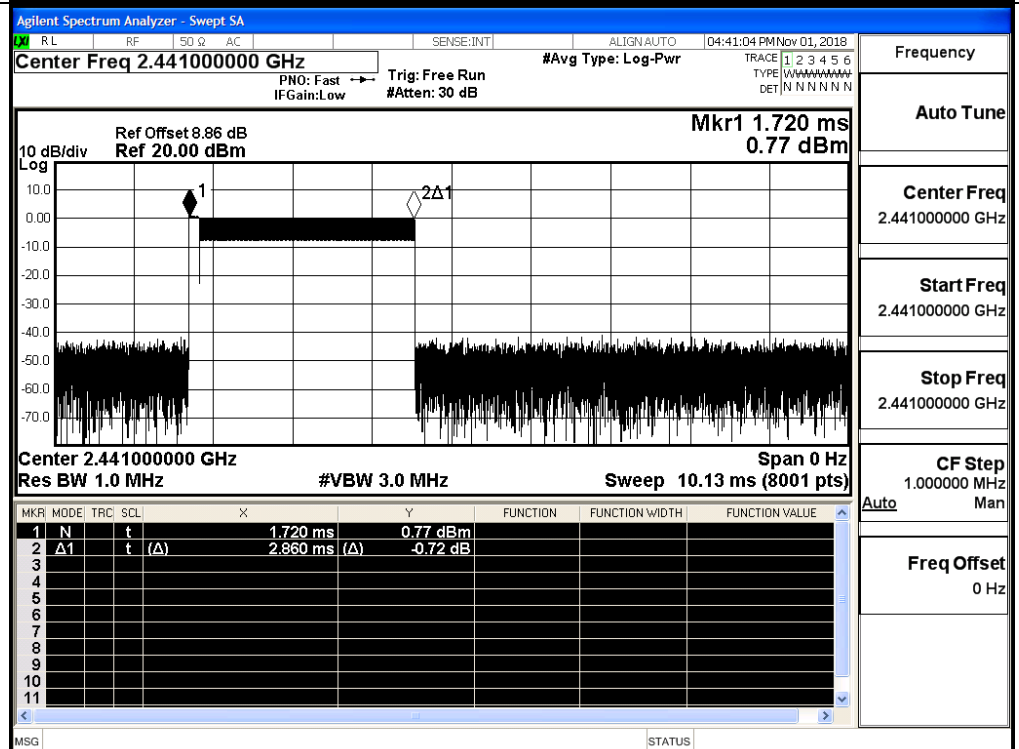
GFSK_DH5/HCH



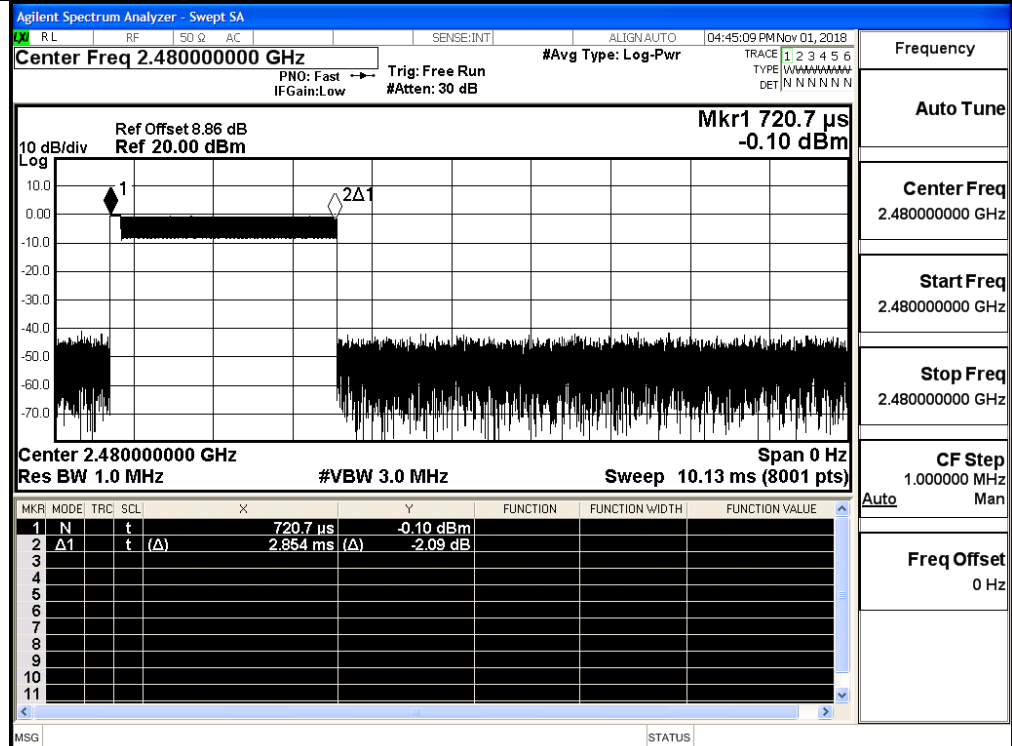
$\pi/4$ DQPSK
_2DH5/LCH



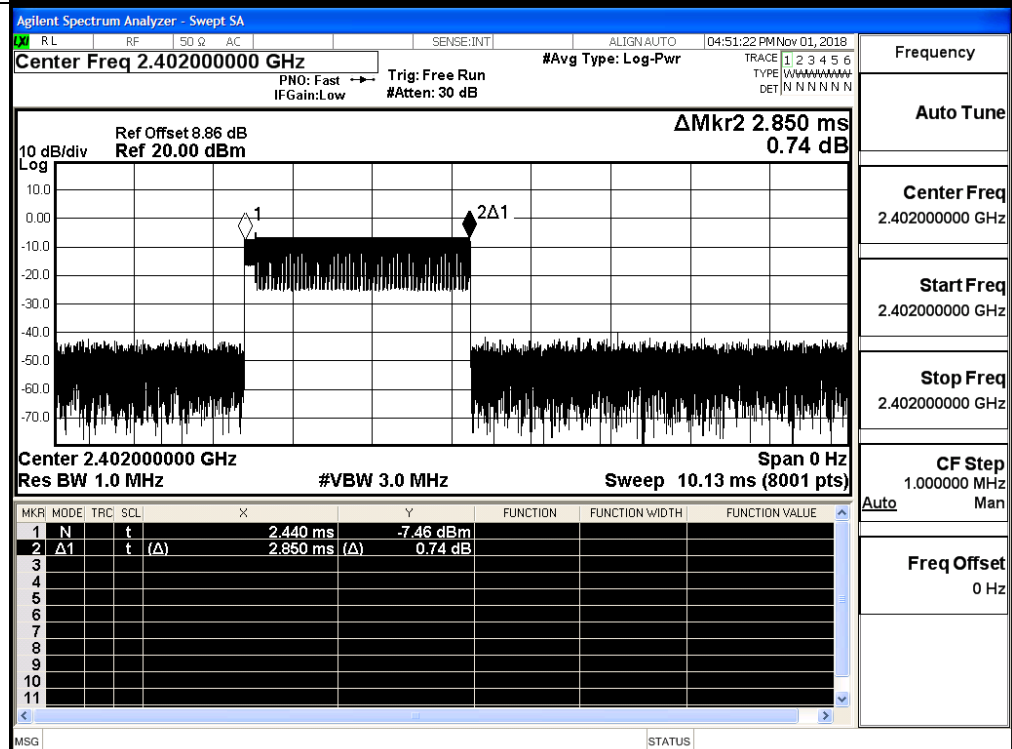
$\pi/4$ DQPSK
_2DH5/MCH



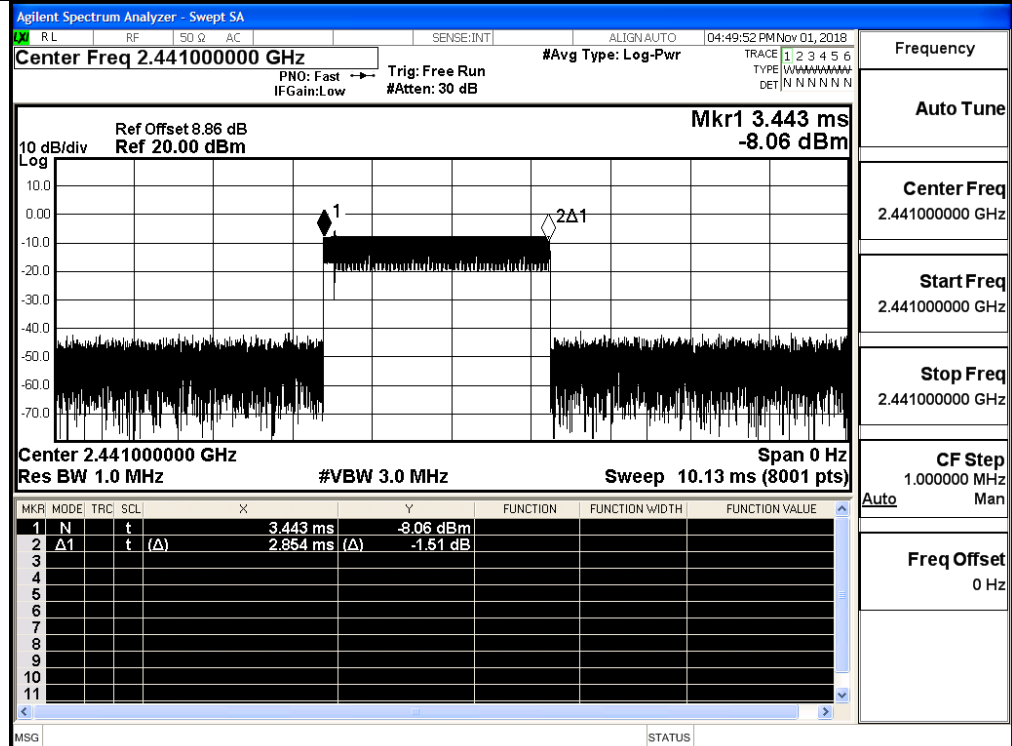
$\pi/4$ DQPSK
_2DH5/HCH



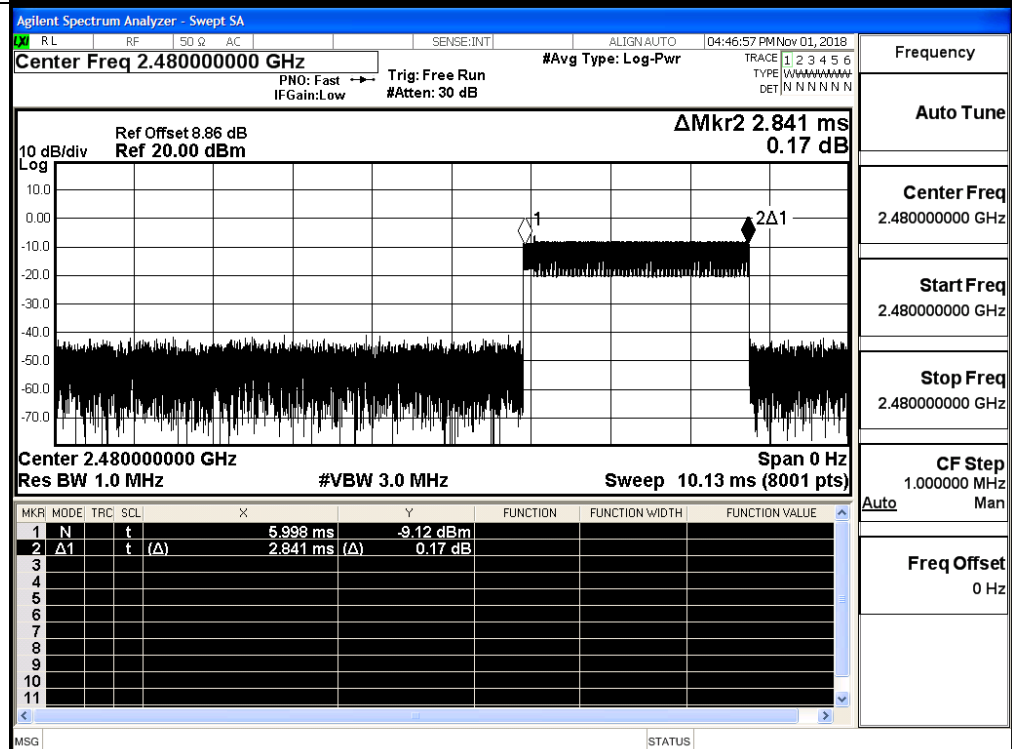
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

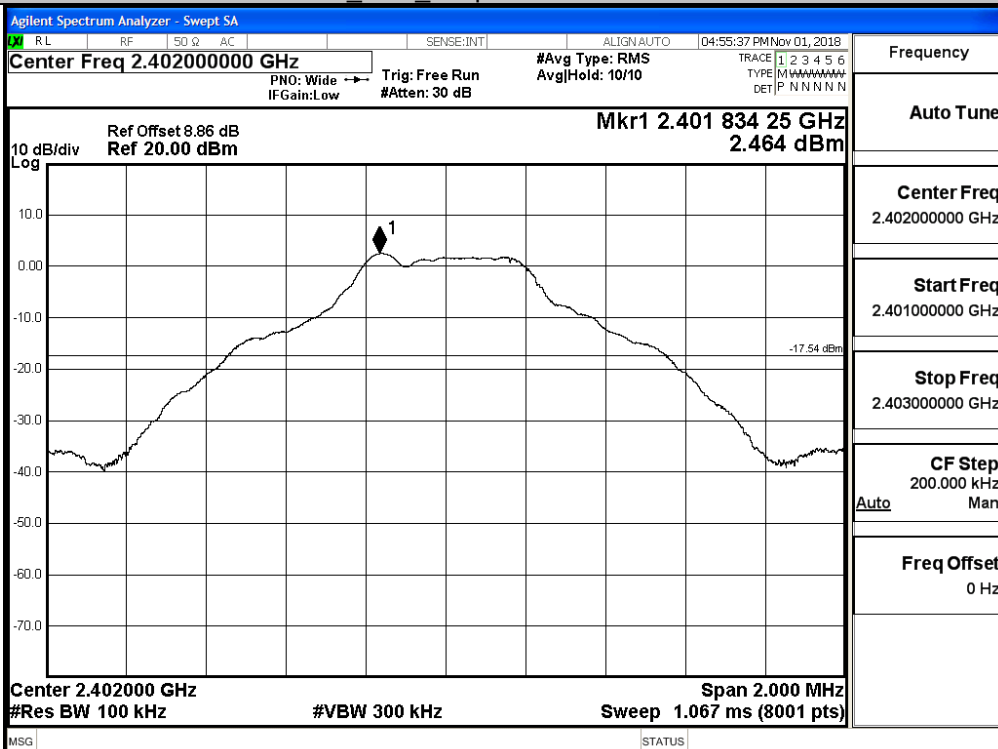


A.6 RF Conducted Spurious Emissions

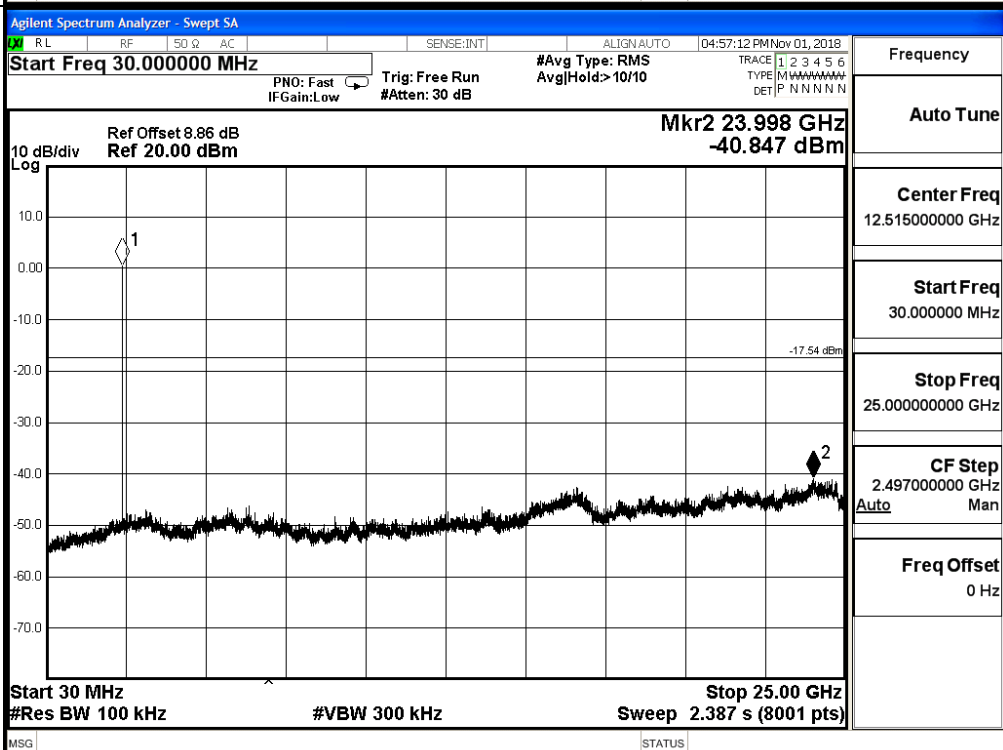
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.464	-40.847	-17.54	PASS
	MCH	2.012	-40.291	-17.99	PASS
	HCH	0.979	-41.190	-19.02	PASS
$\pi/4$ DQPSK	LCH	0.926	-40.538	-19.07	PASS
	MCH	0.711	-40.783	-19.29	PASS
	HCH	-0.164	-41.532	-20.16	PASS
8DPSK	LCH	1.058	-41.358	-18.94	PASS
	MCH	0.847	-40.714	-19.15	PASS
	HCH	-0.069	-41.805	-20.07	PASS

GFSK_LCH_Graphs

Pref

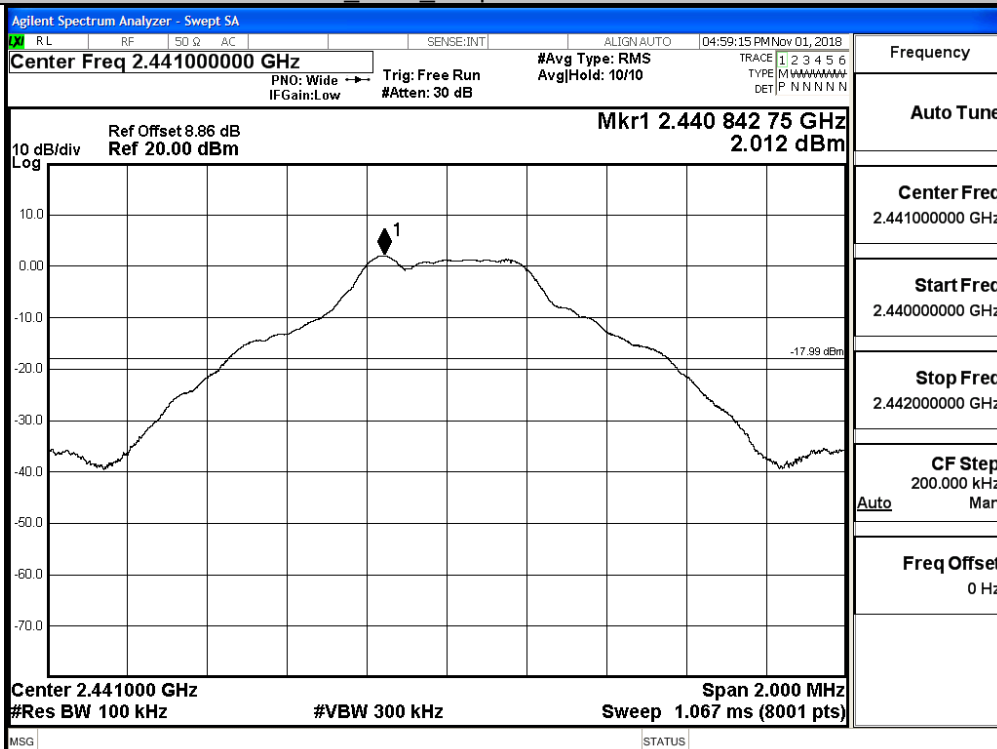


Puw

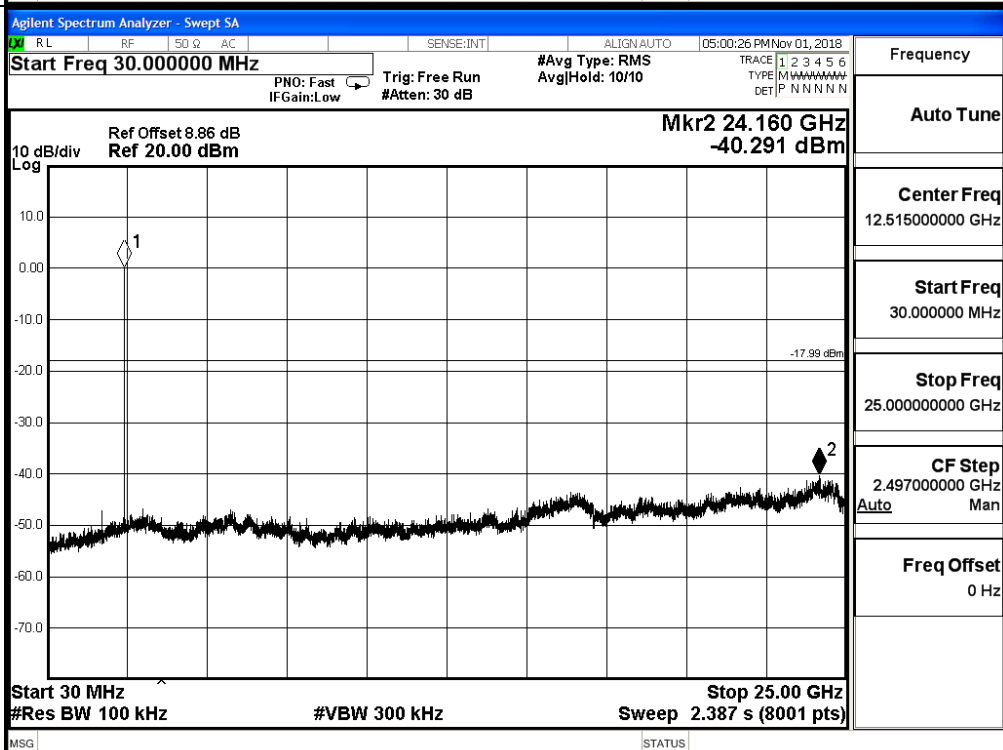


GFSK_MCH_Graphs

Pref

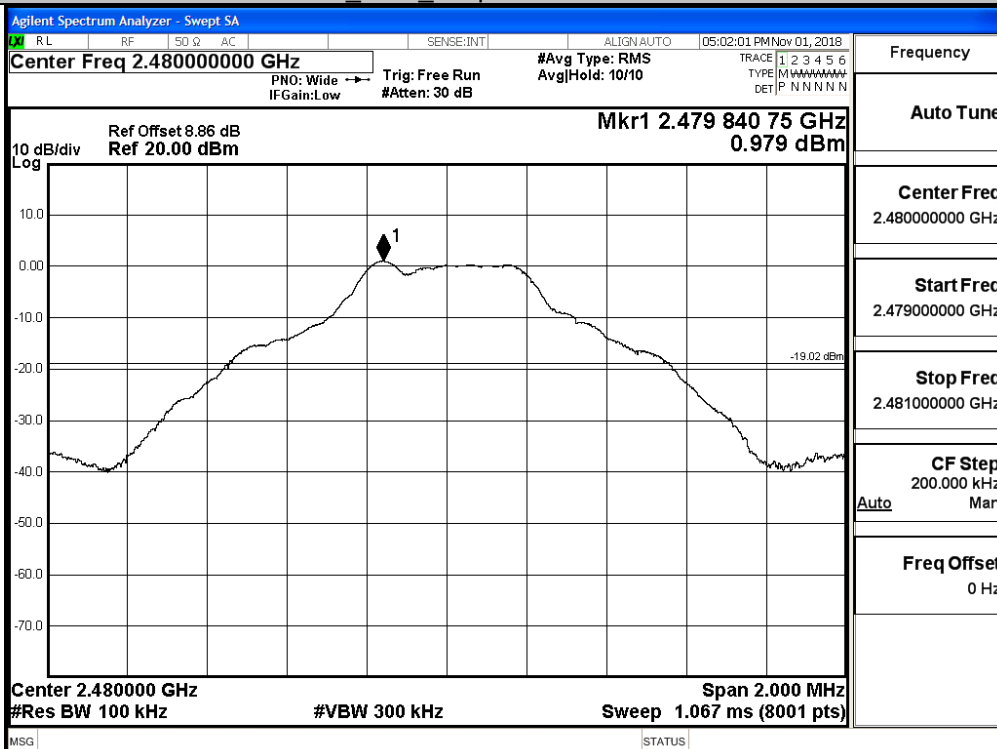


Puw

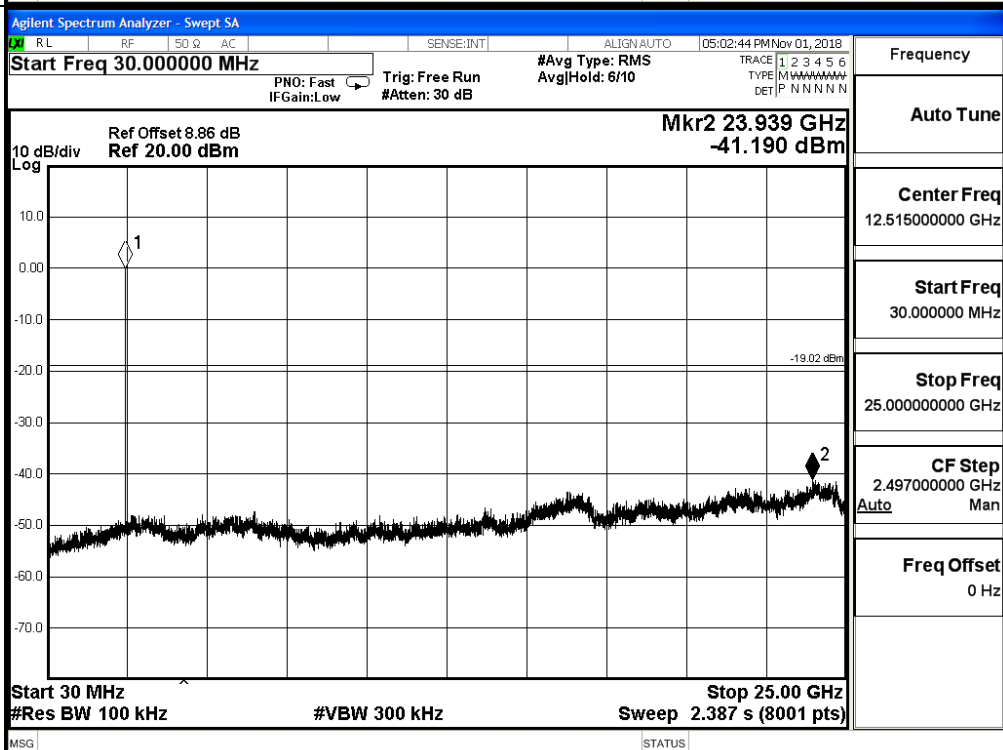


GFSK HCH_Graphs

Pref

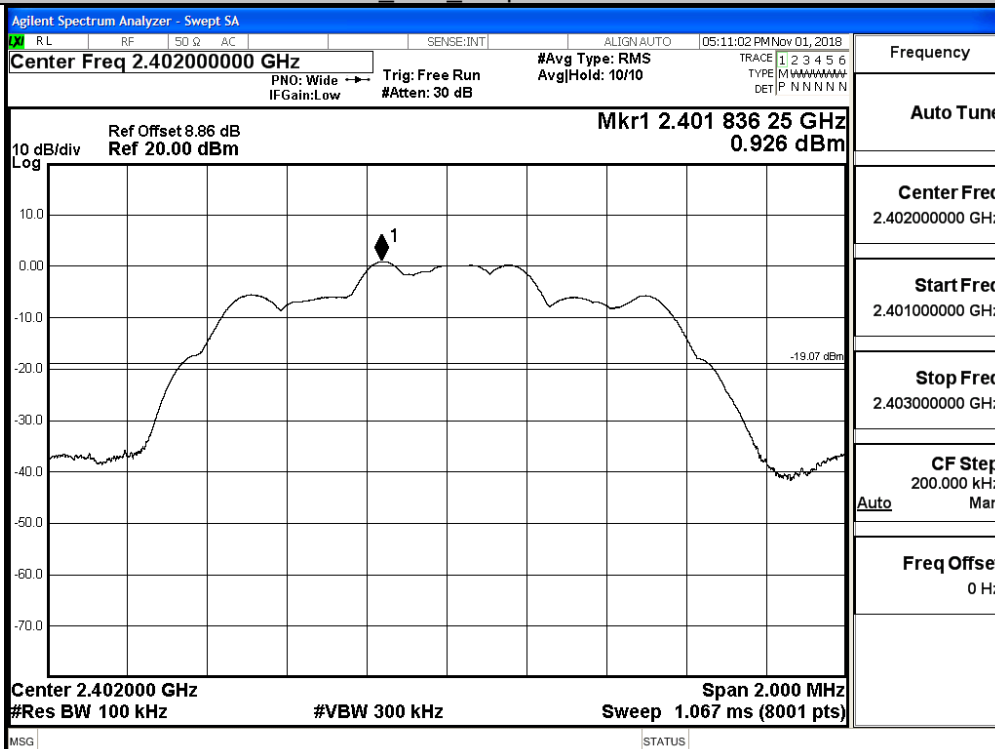


Puw

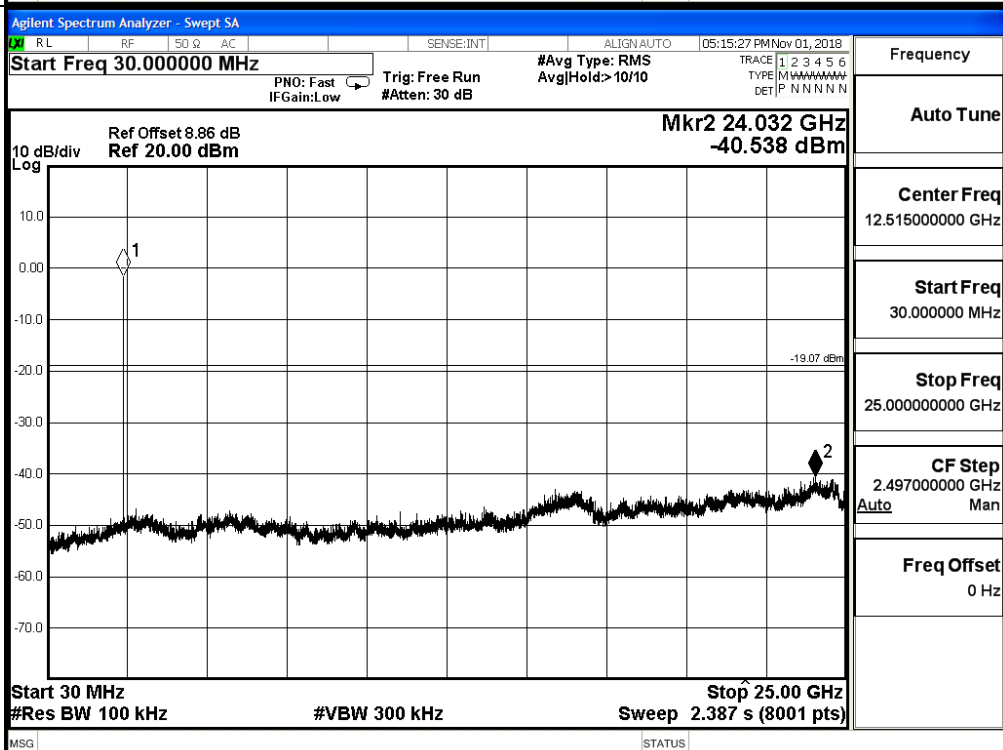


$\pi/4$ DQPSK LCH_Graphs

Pref

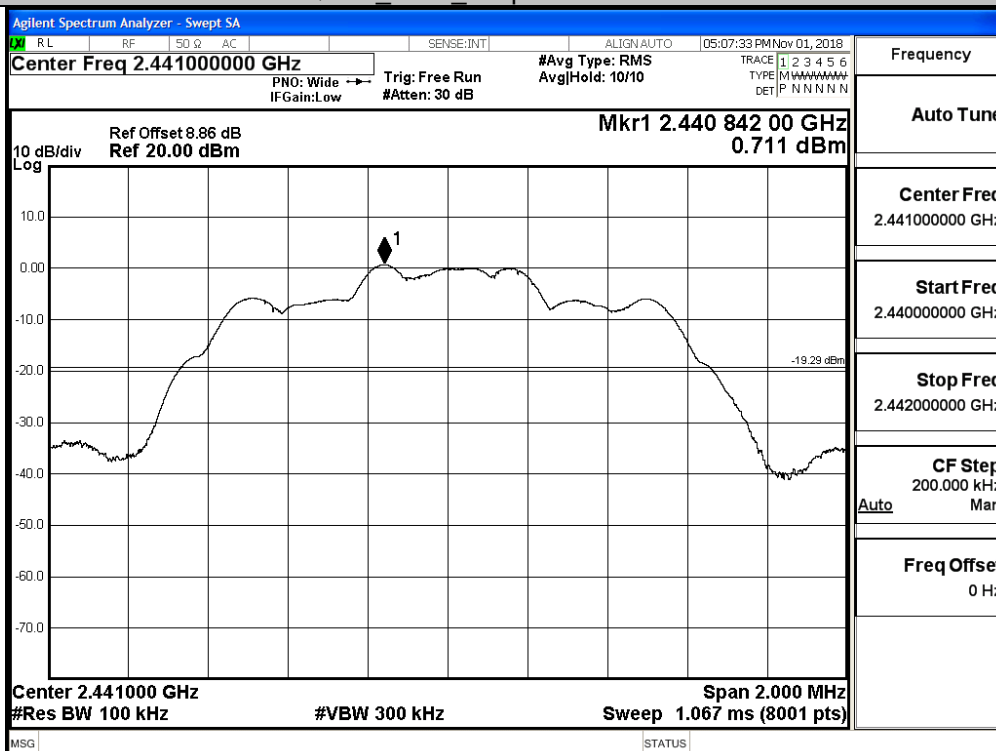


Puw

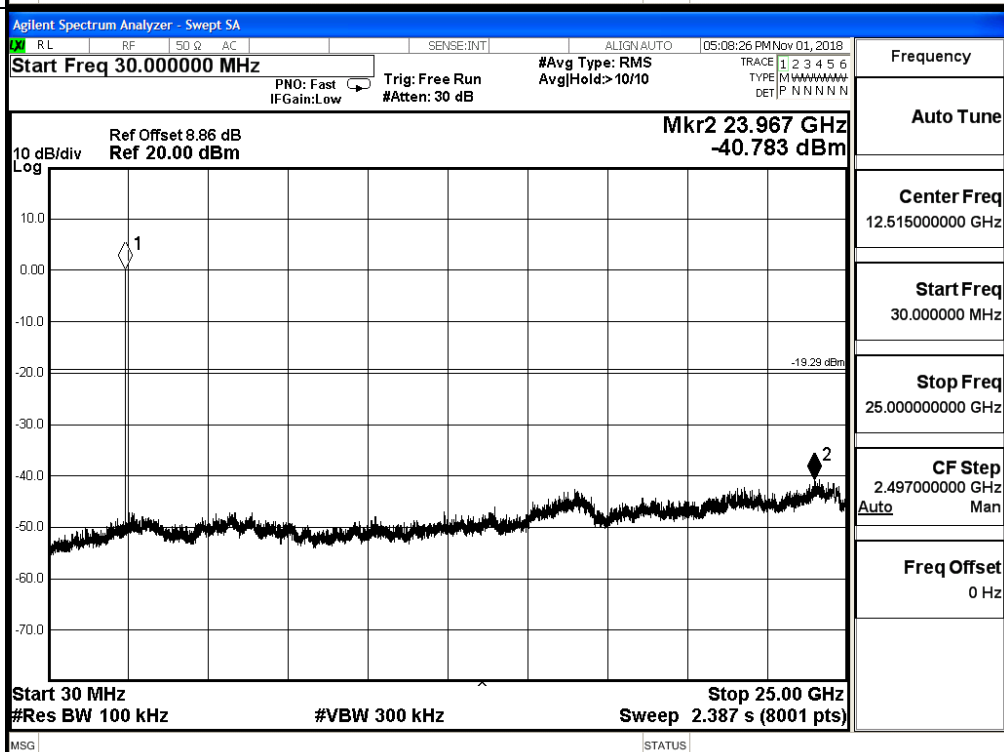


π /4DQPSK_MCH_Graphs

Pref

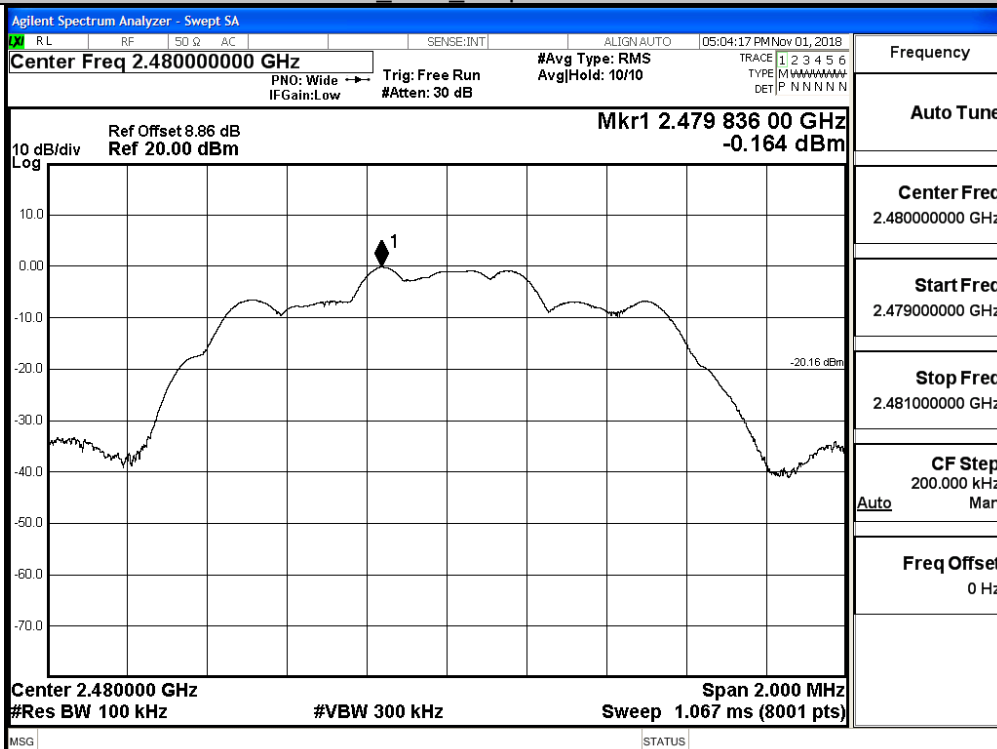


Puw

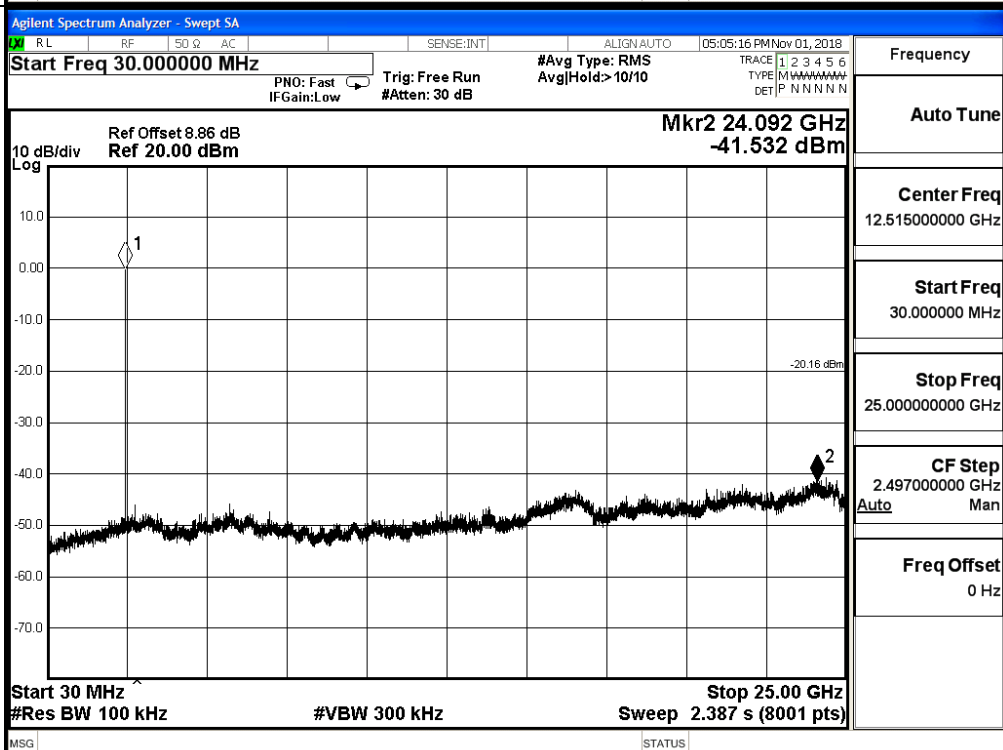


$\pi/4$ DQPSK_HCH_Graphs

Pref

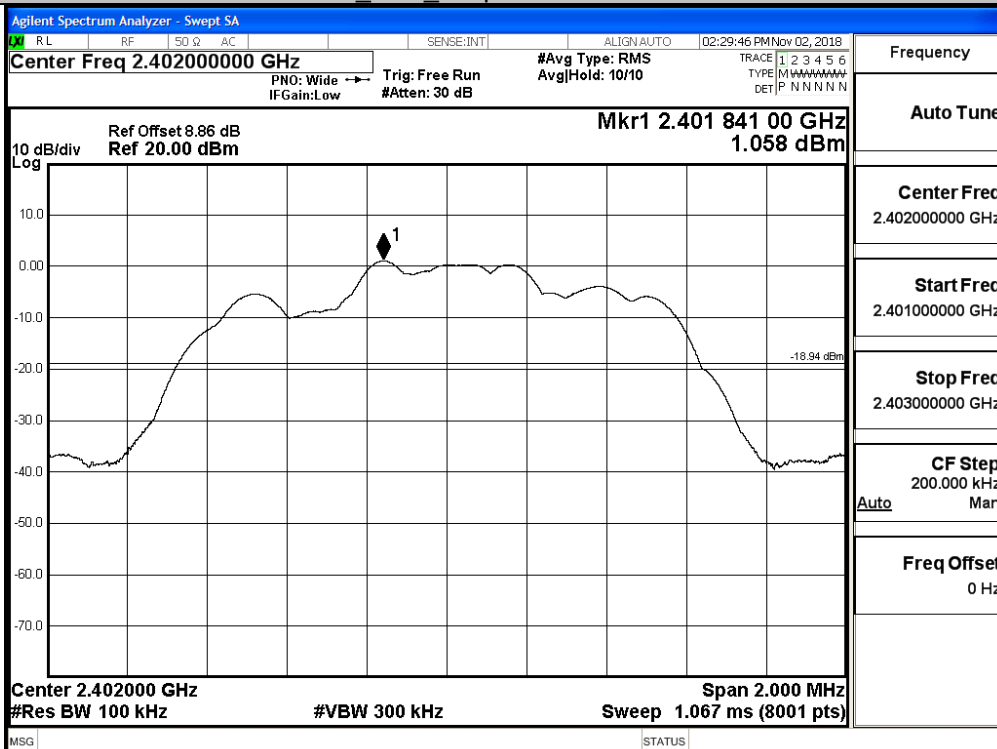


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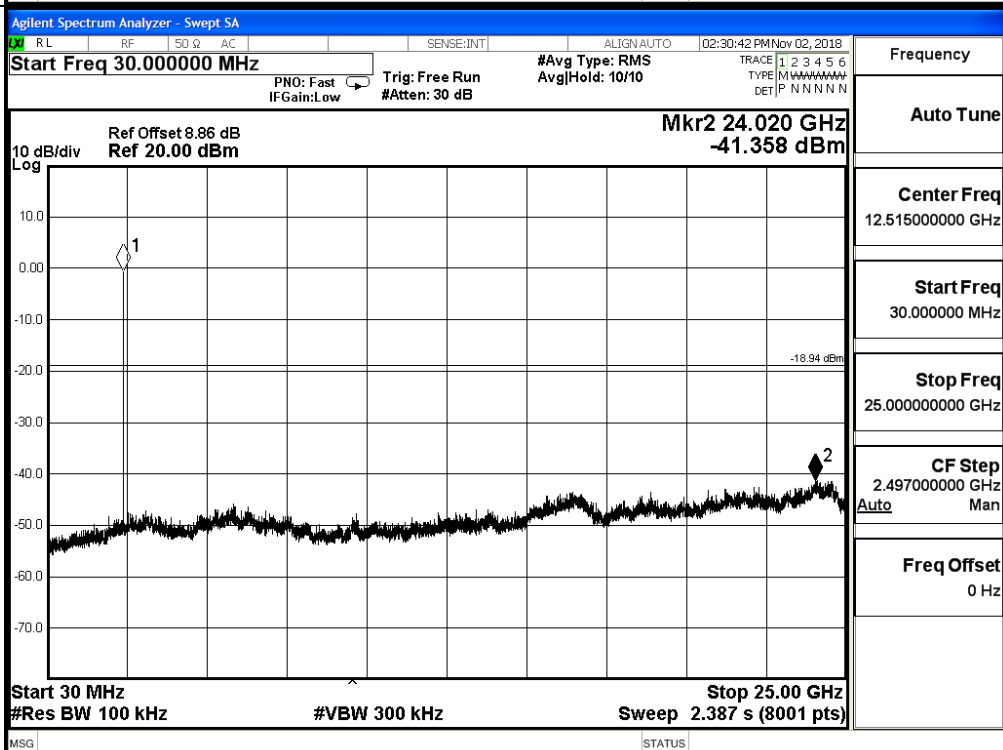


8DPSK_LCH_Graphs

Pref

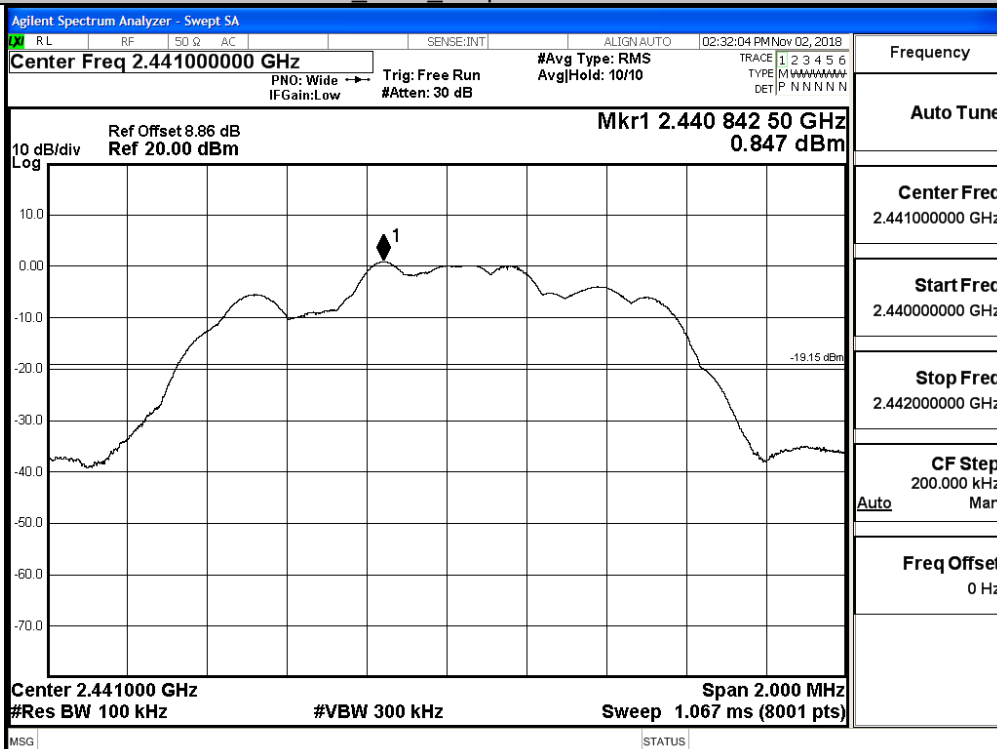


Puw

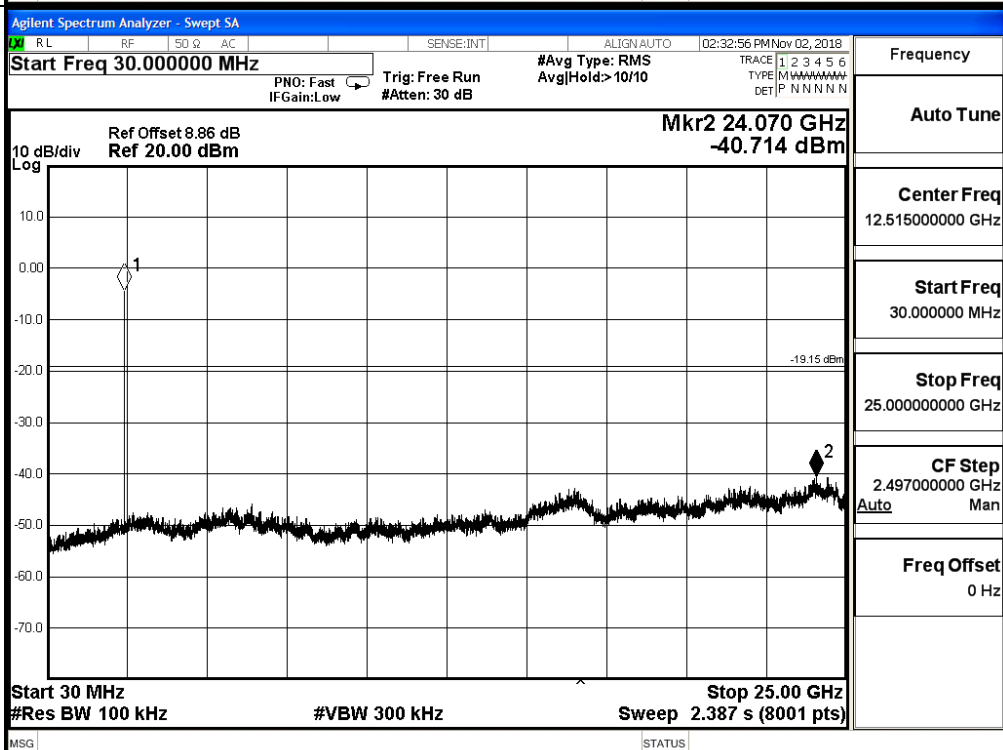


8DPSK_MCH_Graphs

Pref

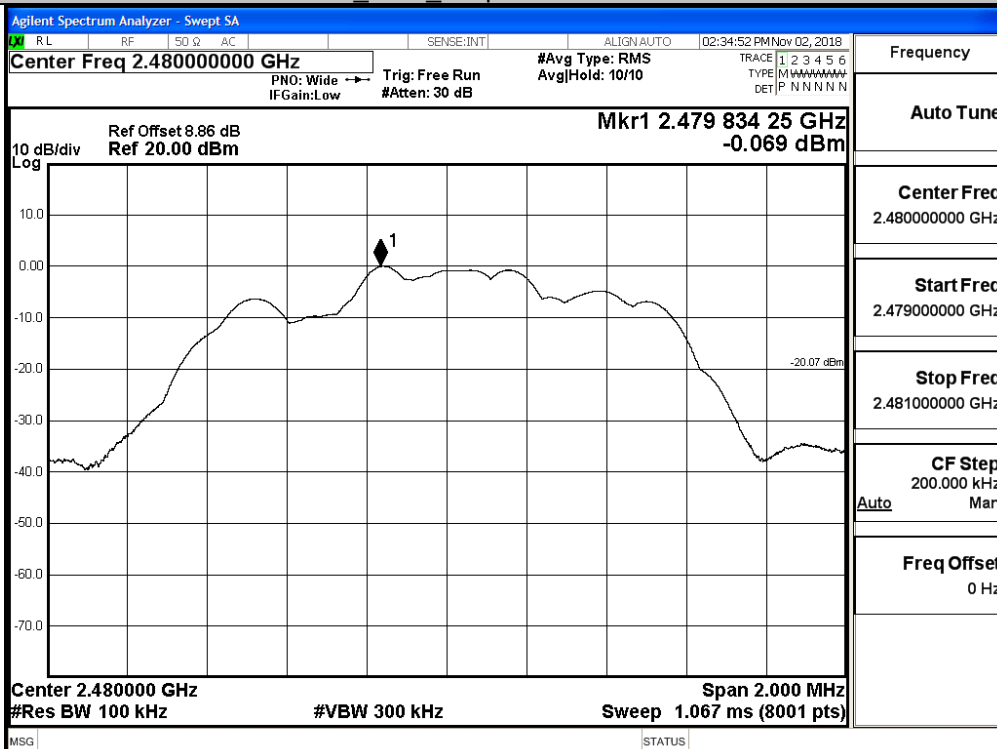


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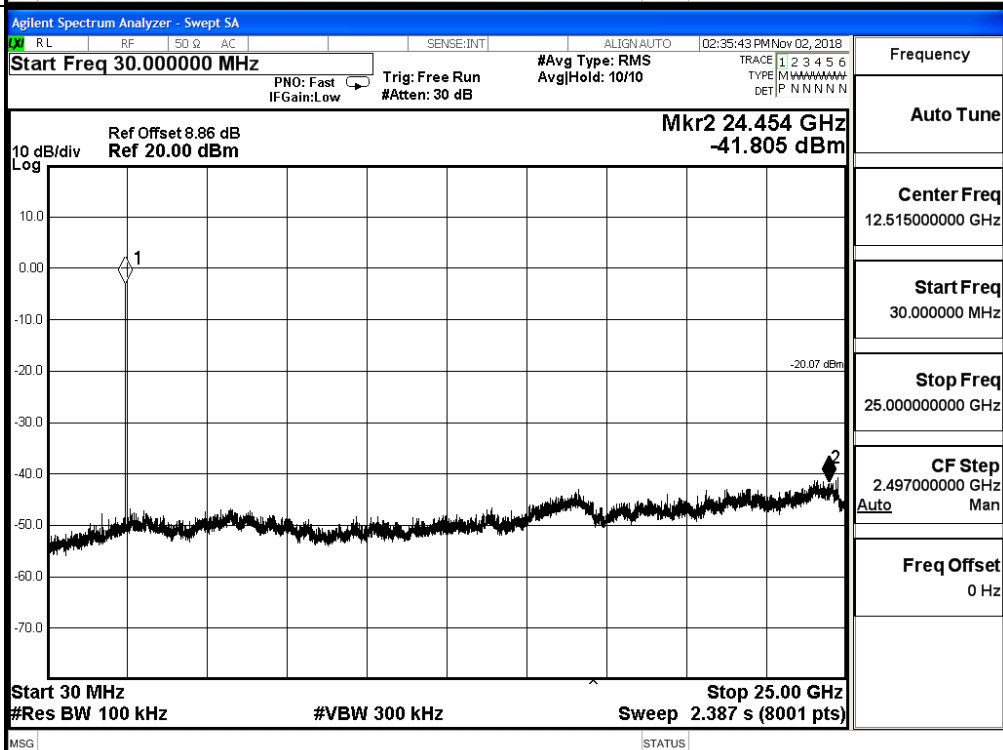


8DPSK_HCH_Graphs

Pref



Puw

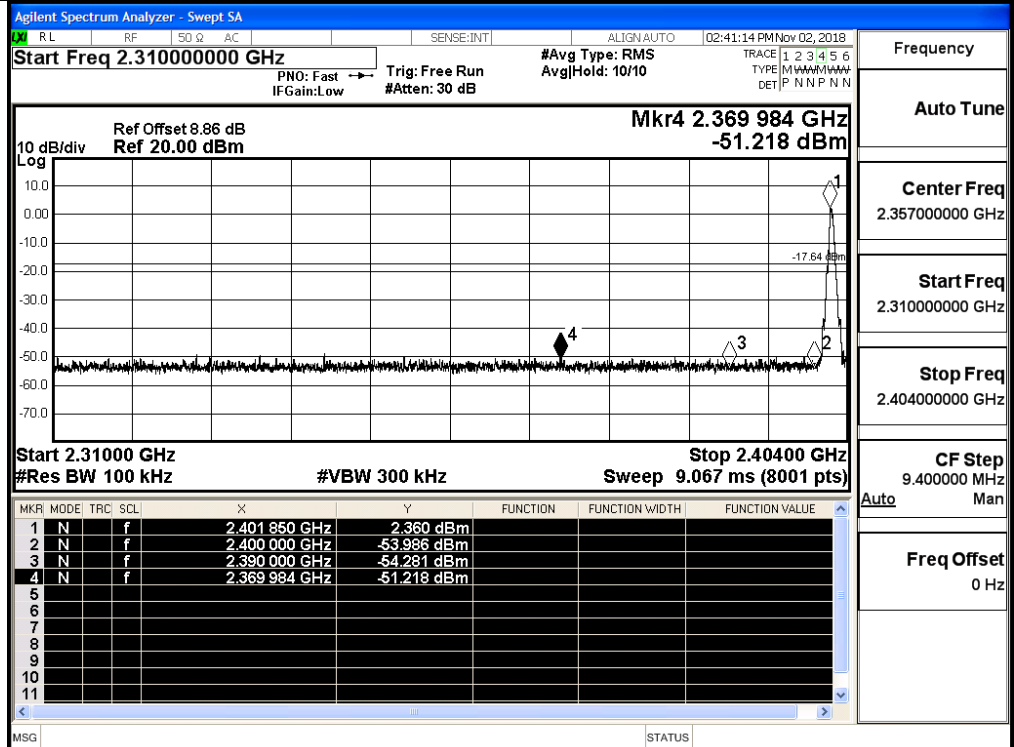


A.7 Band-edge for RF Conducted Emissions

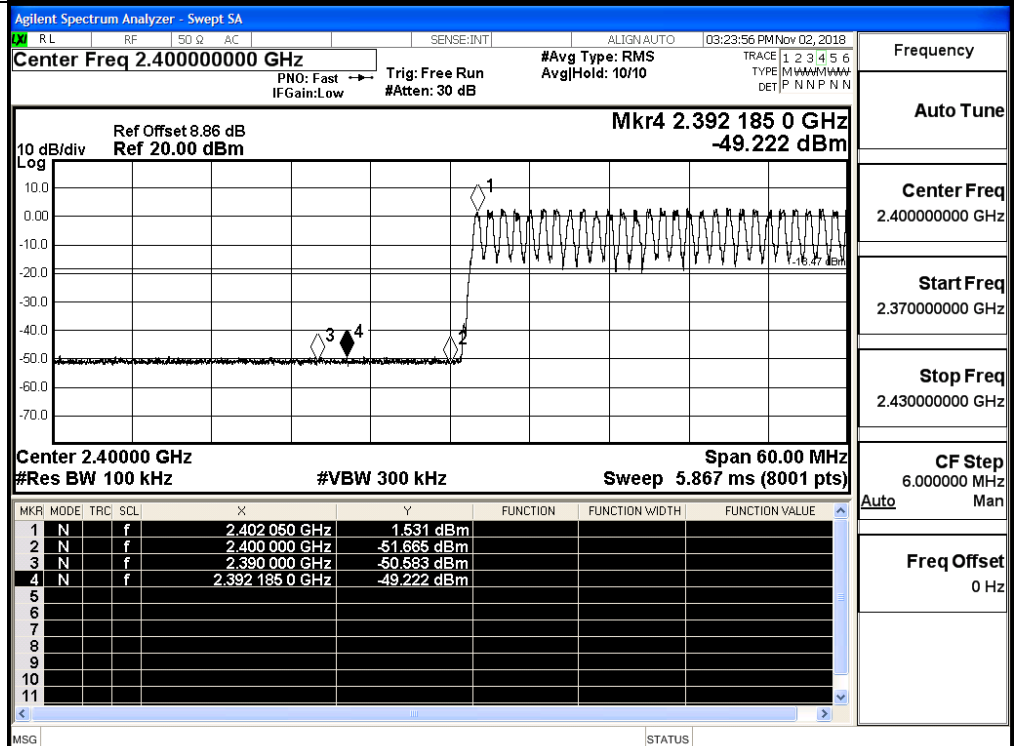
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	2.360	Off	-51.218	-17.64	PASS
			1.531	On	-49.222	-18.47	PASS
	HCH	2480	1.168	Off	-50.567	-18.83	PASS
			0.978	On	-47.710	-19.02	PASS
$\pi/4$ DQPSK	LCH	2402	1.115	Off	-50.531	-18.88	PASS
			1.059	On	-48.830	-18.94	PASS
	HCH	2480	0.073	Off	-49.439	-19.93	PASS
			-0.094	On	-49.469	-20.09	PASS
8DPSK	LCH	2402	1.021	Off	-51.269	-18.98	PASS
			0.453	On	-48.800	-19.55	PASS
	HCH	2480	0.130	Off	-48.465	-19.87	PASS
			-0.156	On	-48.833	-20.16	PASS

Test Graphs

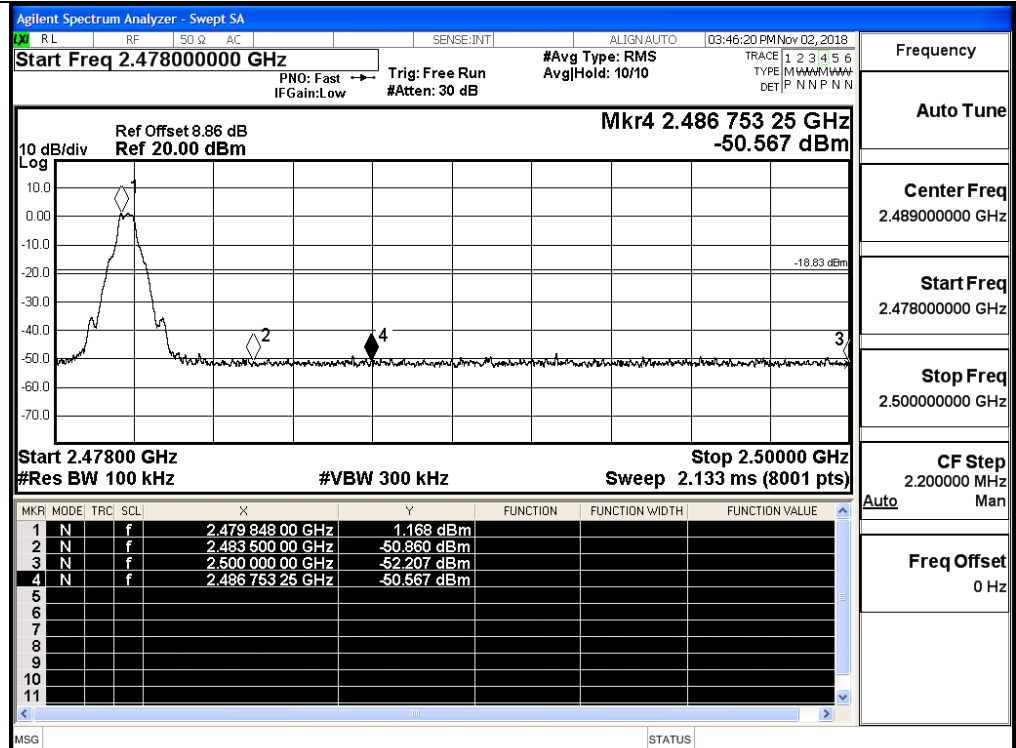
GFSK/LCH/No Hop



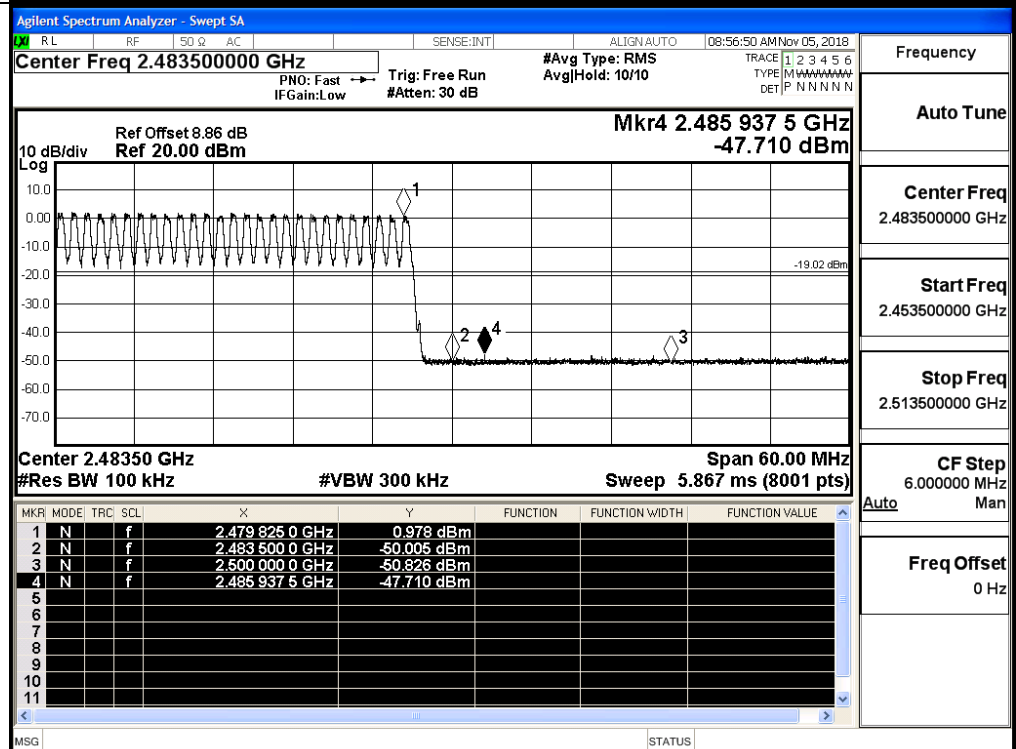
GFSK/LCH/Hop



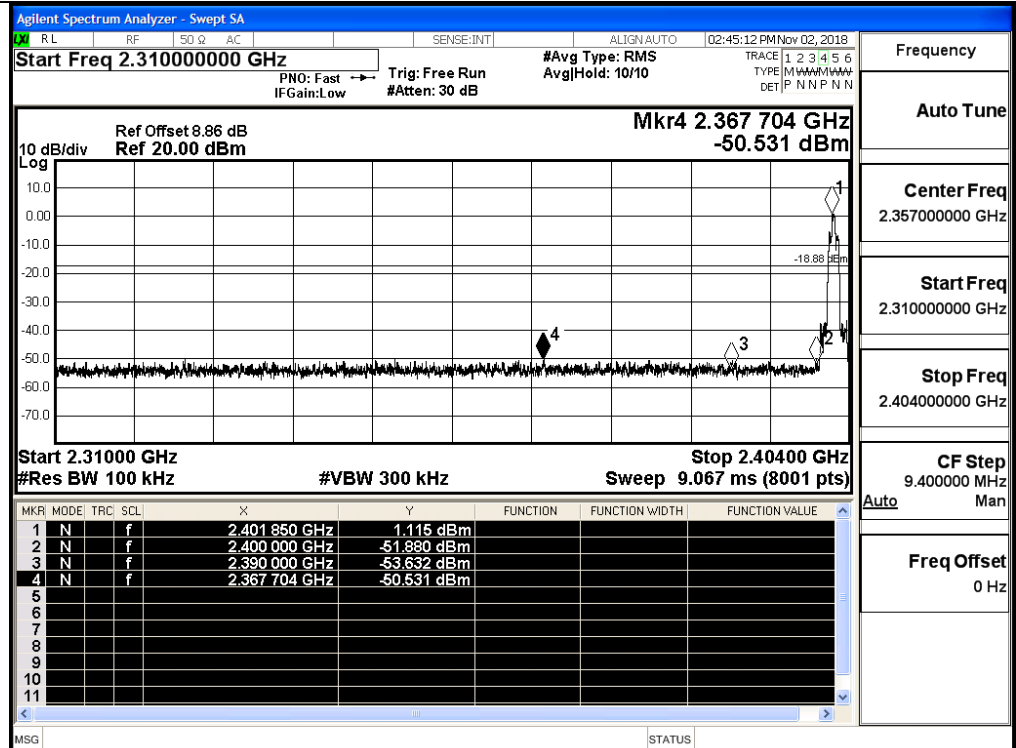
GFSK/HCH/No Hop



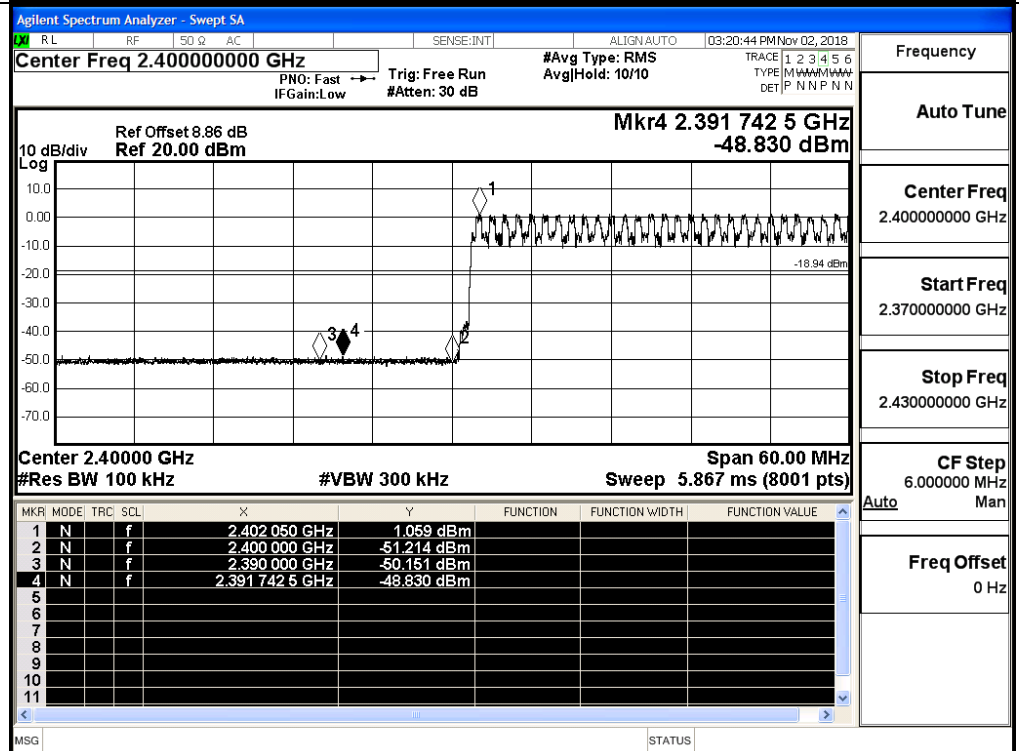
GFSK/HCH/Hop



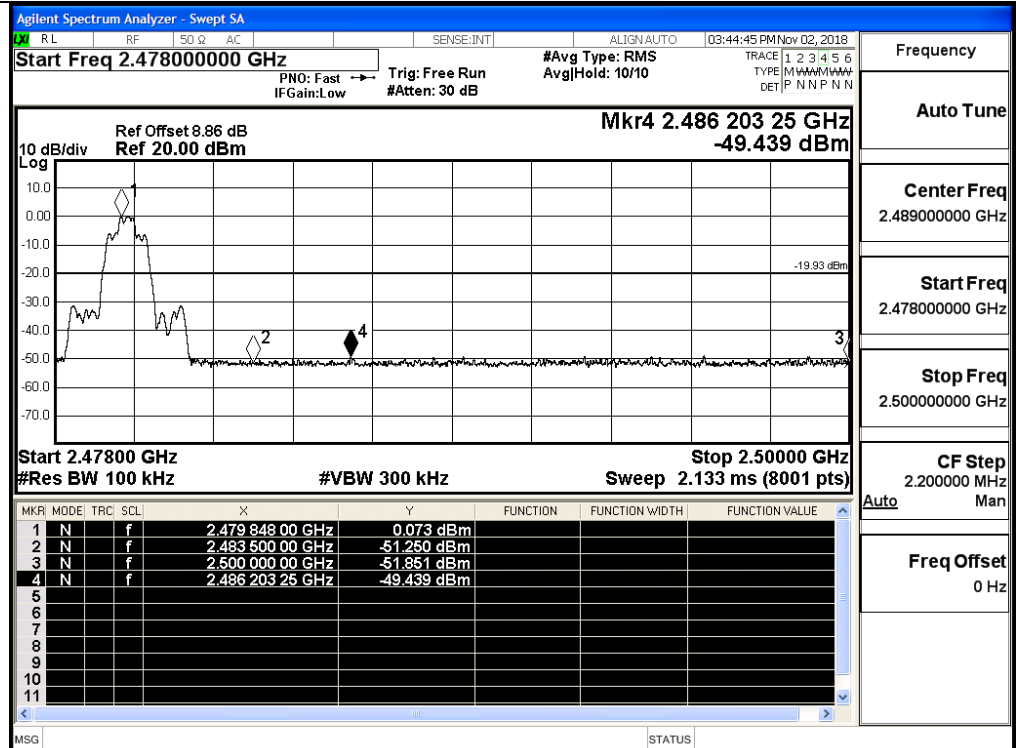
$\pi/4$ DQPSK/LCH/No
Hop



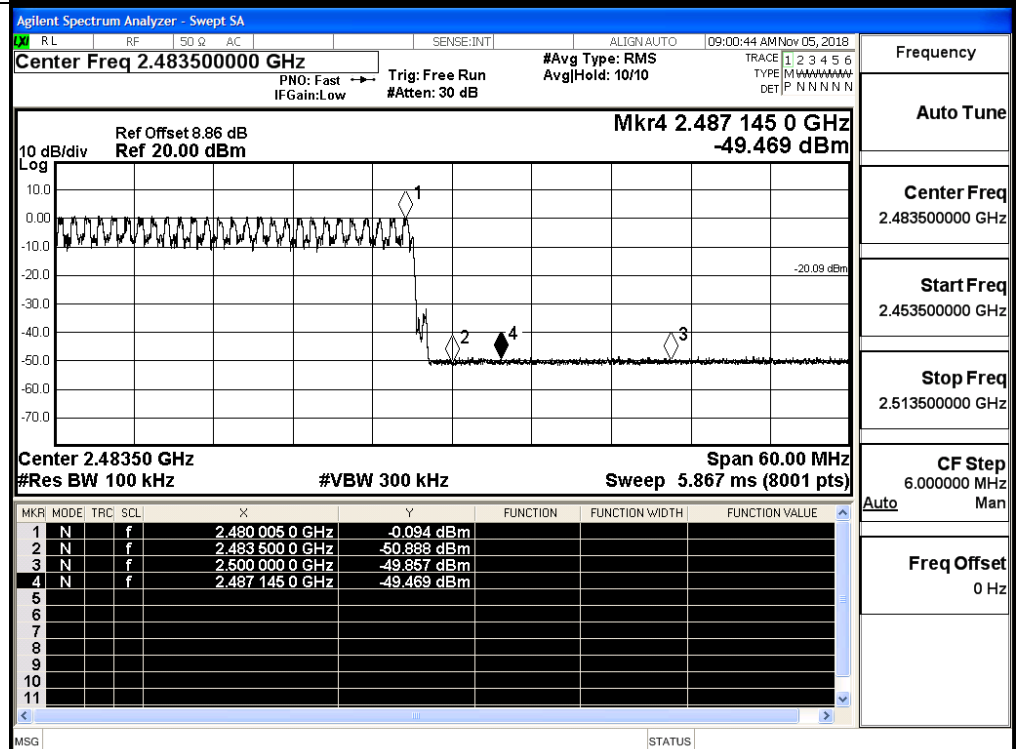
$\pi/4$ DQPSK/LCH/Hop



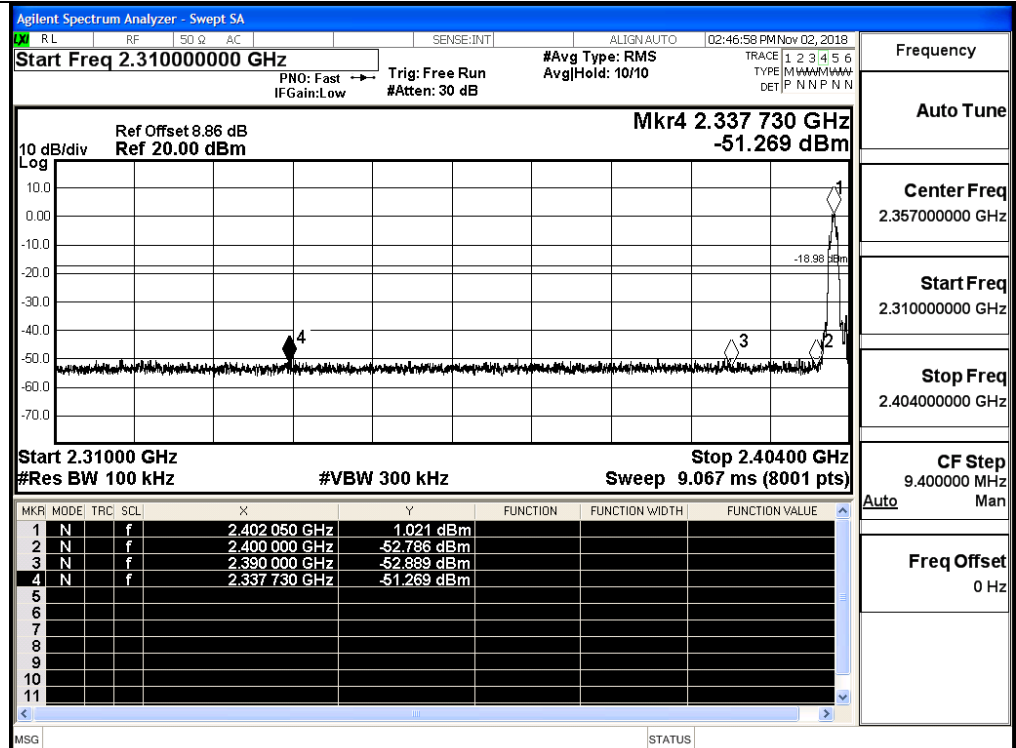
$\pi/4$ DQPSK/HCH/No
Hop



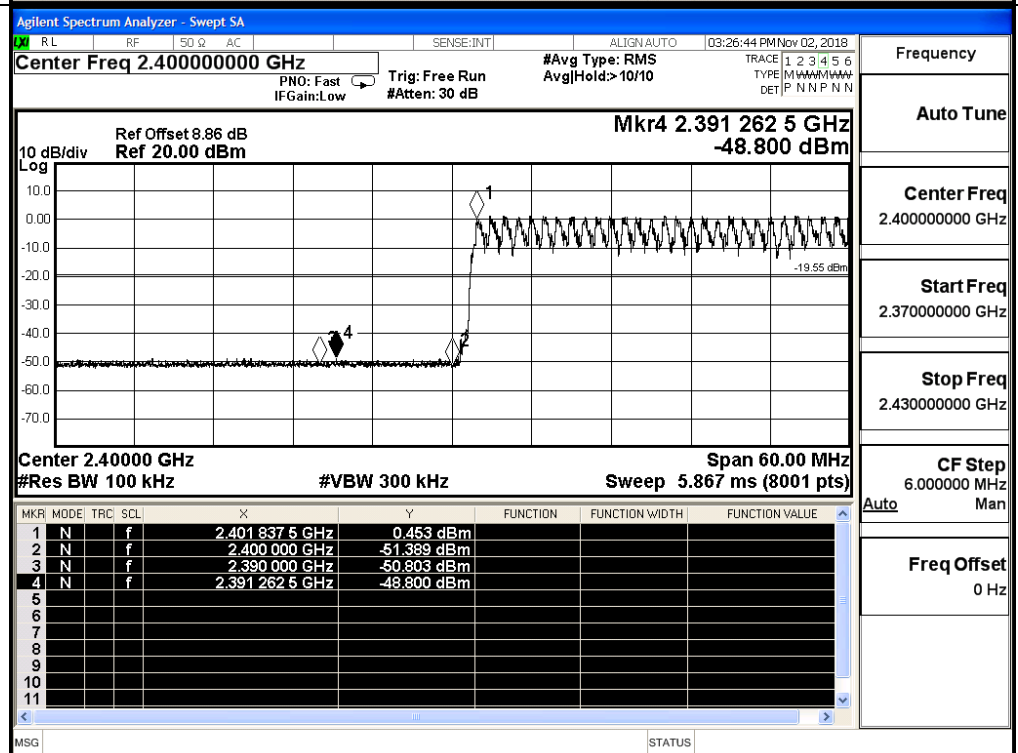
$\pi/4$ DQPSK/HCH/Hop



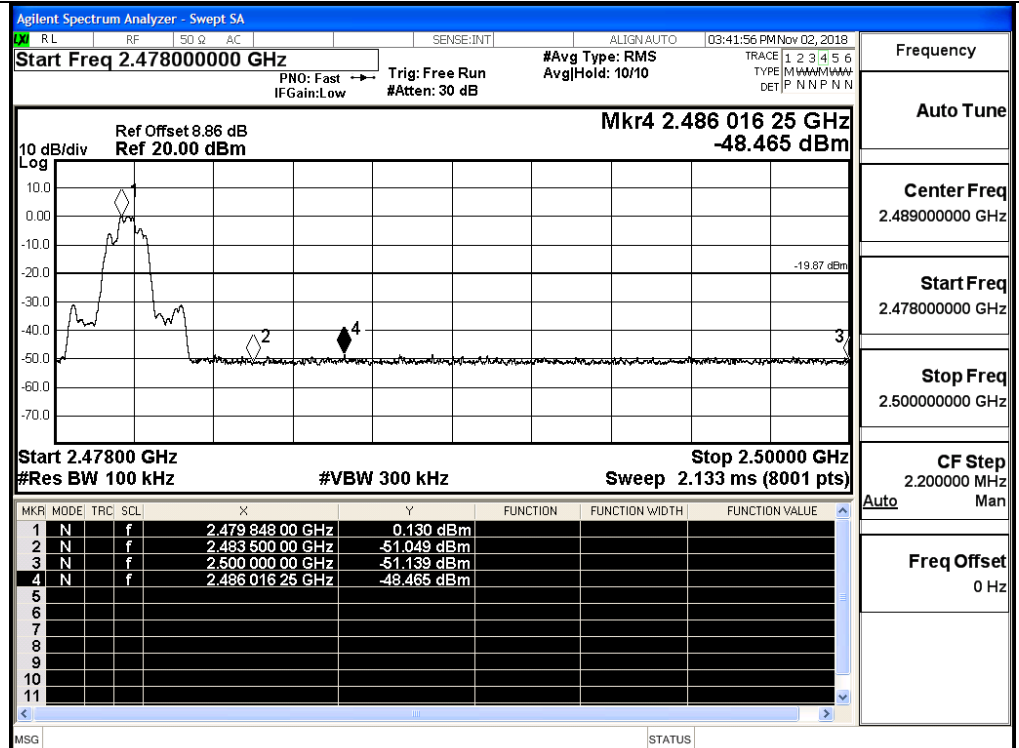
8DPSK/LCH/No Hop



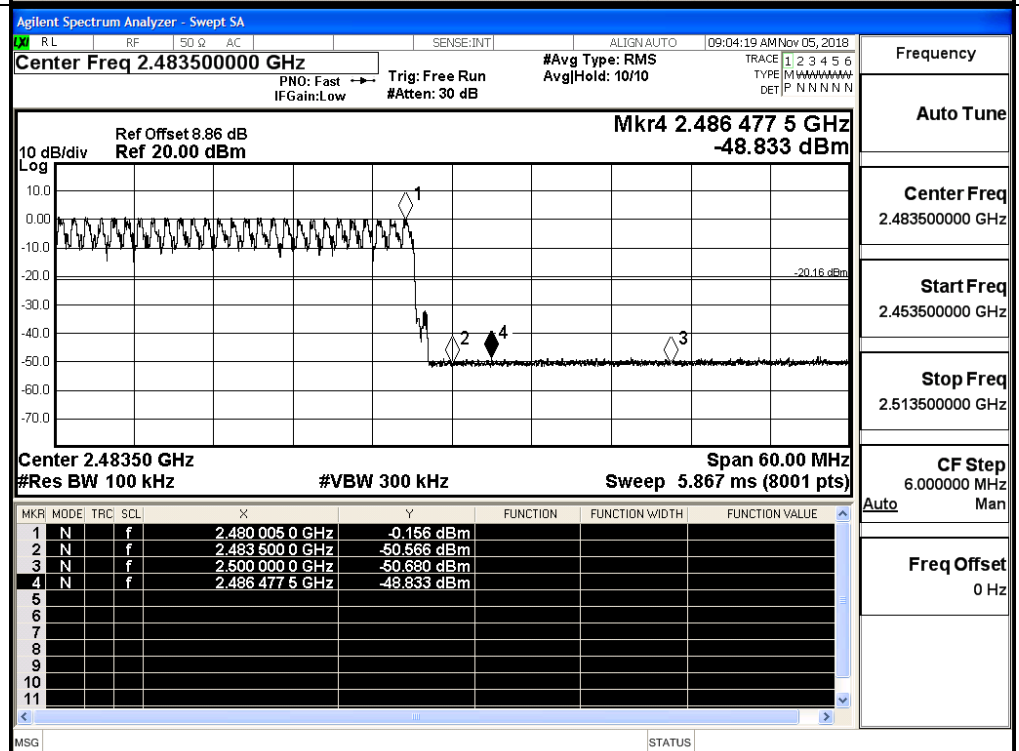
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



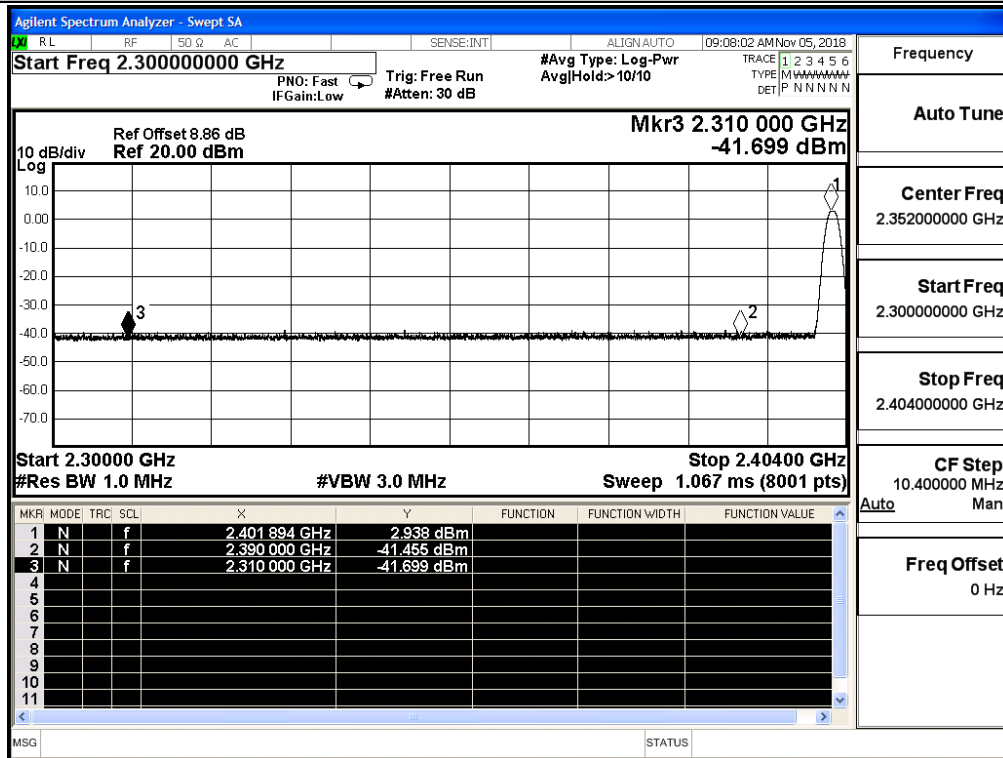
8DPSK/HCH/Hop



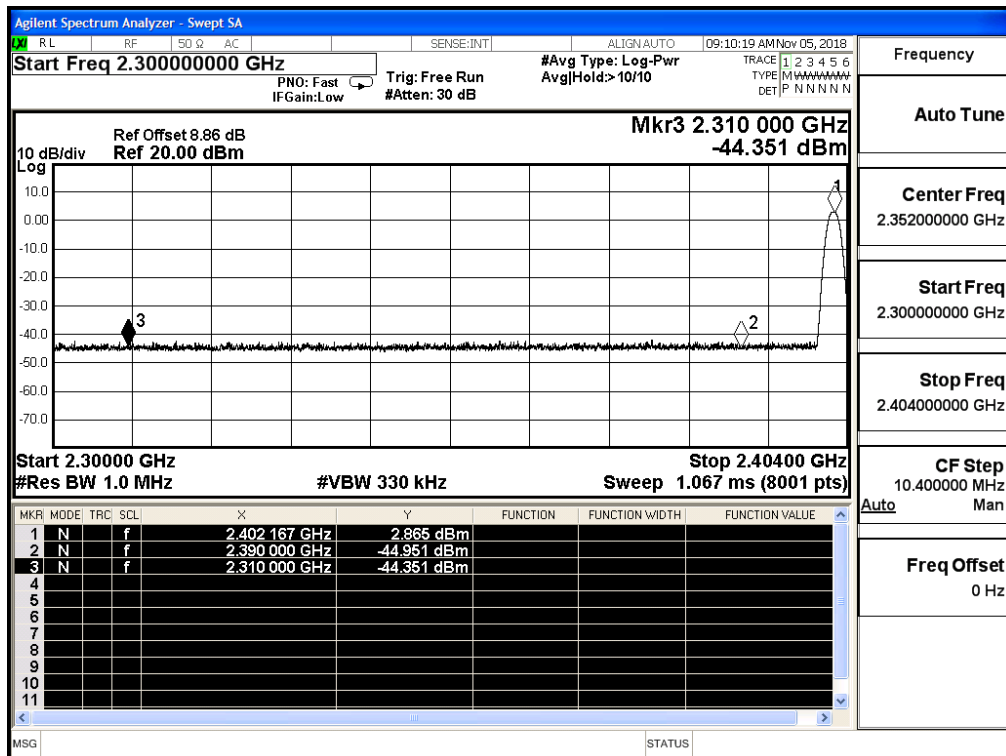
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.699	2.0	0	55.56	PEAK	74	PASS
	Off	2310.0	-44.351	2.0	0	52.91	AV	54	PASS
	Off	2390.0	-41.455	2.0	0	55.81	PEAK	74	PASS
	Off	2390.0	-44.951	2.0	0	52.31	AV	54	PASS
	Off	2483.5	-42.630	2.0	0	54.63	PEAK	74	PASS
	Off	2483.5	-43.611	2.0	0	53.65	AV	54	PASS
	Off	2500.0	-41.956	2.0	0	55.30	PEAK	74	PASS
	Off	2500.0	-44.232	2.0	0	53.03	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.030	2.0	0	54.23	PEAK	74	PASS
	Off	2310.0	-44.703	2.0	0	52.56	AV	54	PASS
	Off	2390.0	-40.525	2.0	0	56.74	PEAK	74	PASS
	Off	2390.0	-43.687	2.0	0	53.57	AV	54	PASS
	Off	2483.5	-40.695	2.0	0	56.57	PEAK	74	PASS
	Off	2483.5	-44.666	2.0	0	52.59	AV	54	PASS
	Off	2500.0	-43.038	2.0	0	54.22	PEAK	74	PASS
	Off	2500.0	-43.649	2.0	0	53.61	AV	54	PASS
8DPSK	Off	2310.0	-42.631	2.0	0	54.63	PEAK	74	PASS
	Off	2310.0	-44.730	2.0	0	52.53	AV	54	PASS
	Off	2390.0	-41.066	2.0	0	56.19	PEAK	74	PASS
	Off	2390.0	-45.271	2.0	0	51.99	AV	54	PASS
	Off	2483.5	-42.518	2.0	0	54.74	PEAK	74	PASS
	Off	2483.5	-43.432	2.0	0	53.83	AV	54	PASS
	Off	2500.0	-42.421	2.0	0	54.84	PEAK	74	PASS
	Off	2500.0	-43.488	2.0	0	53.77	AV	54	PASS

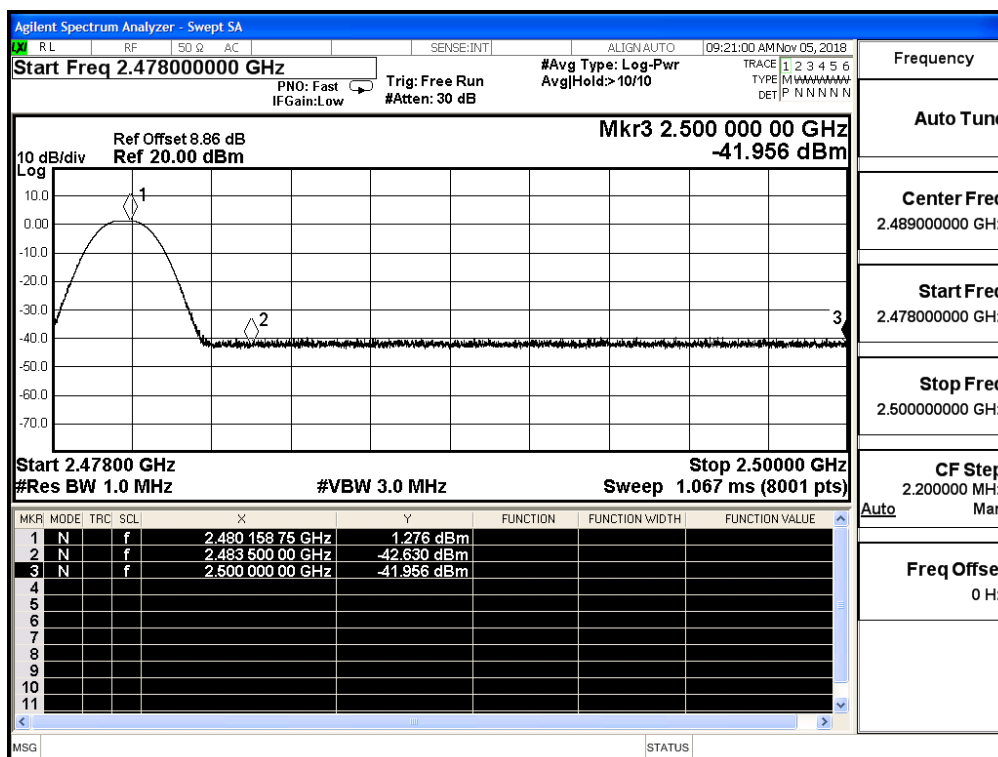
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



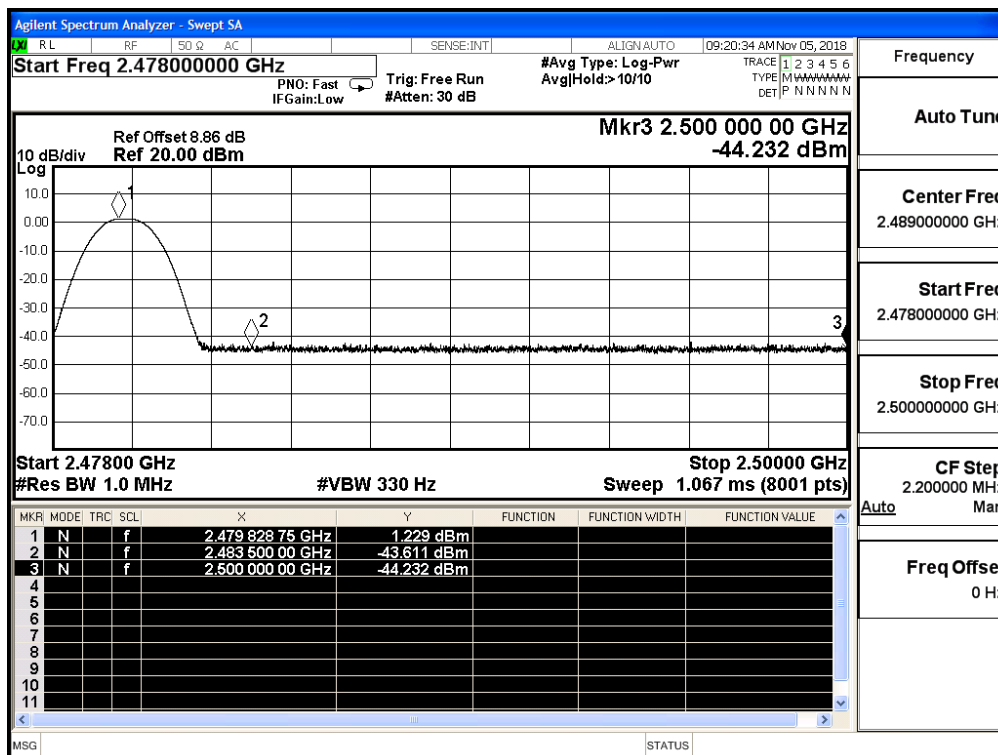
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

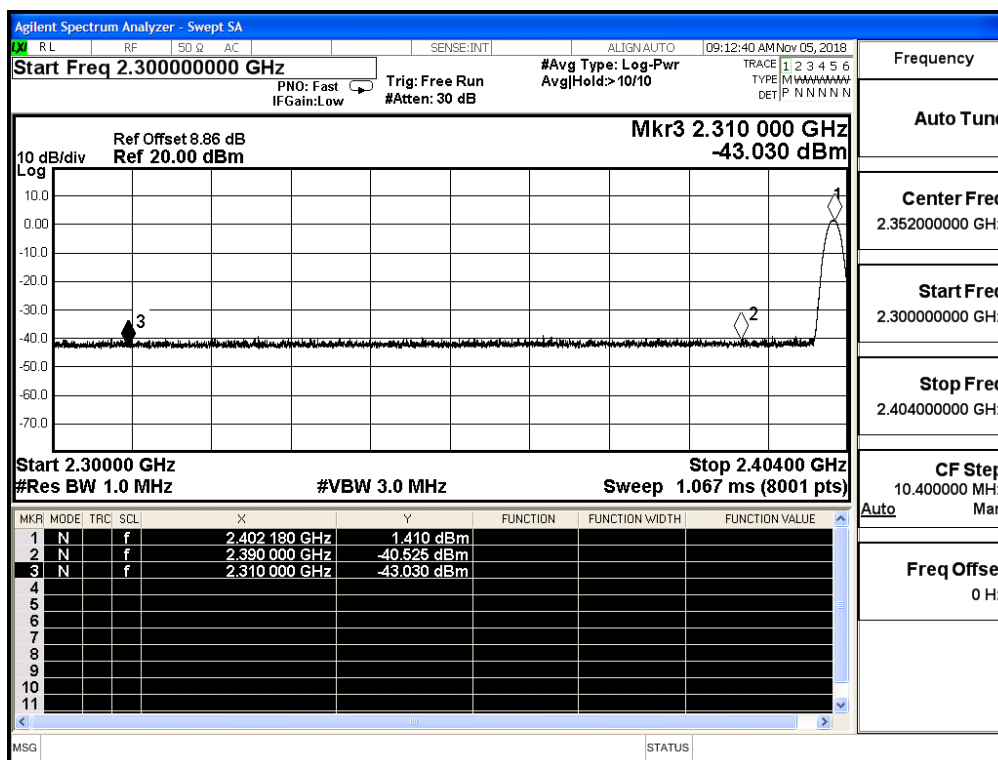
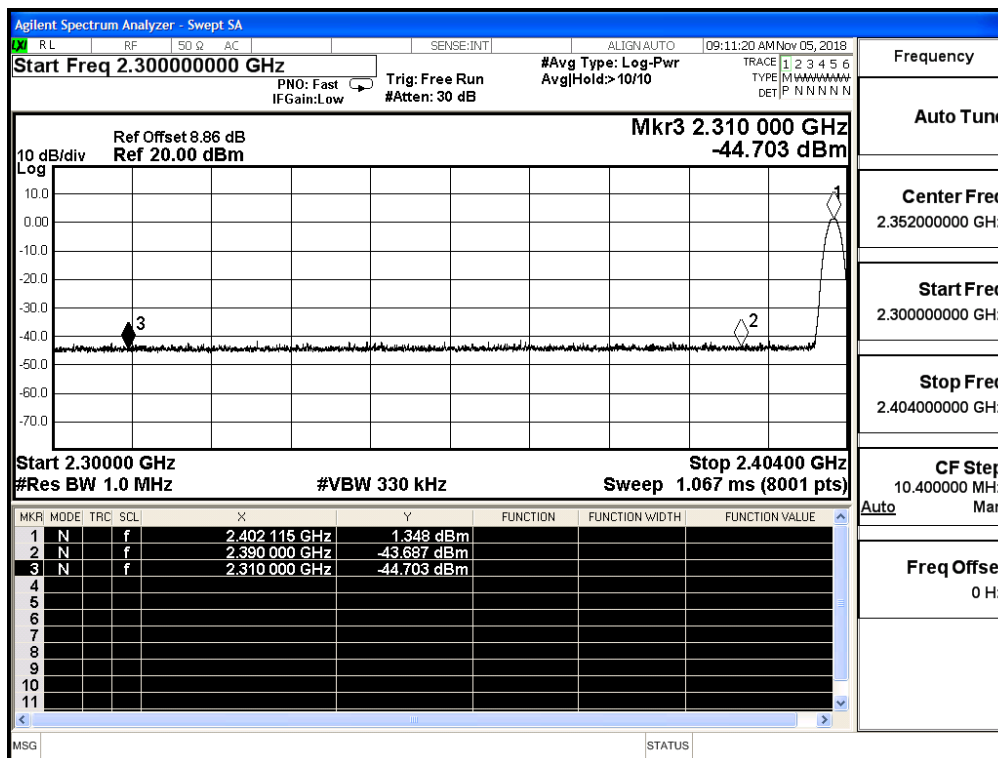


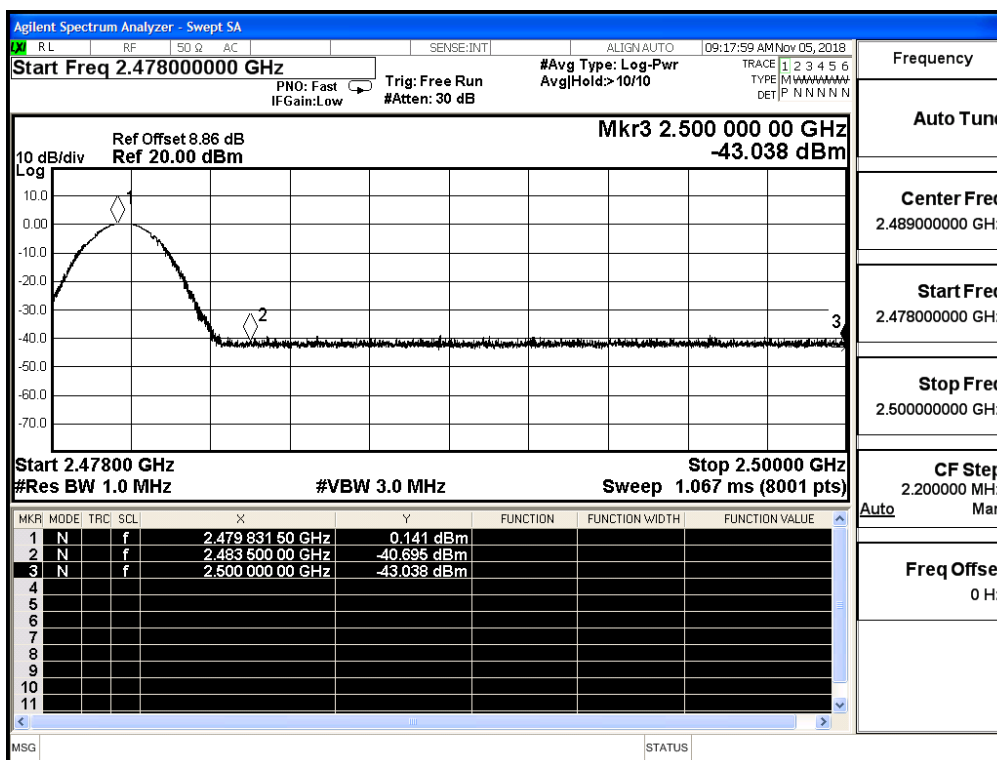
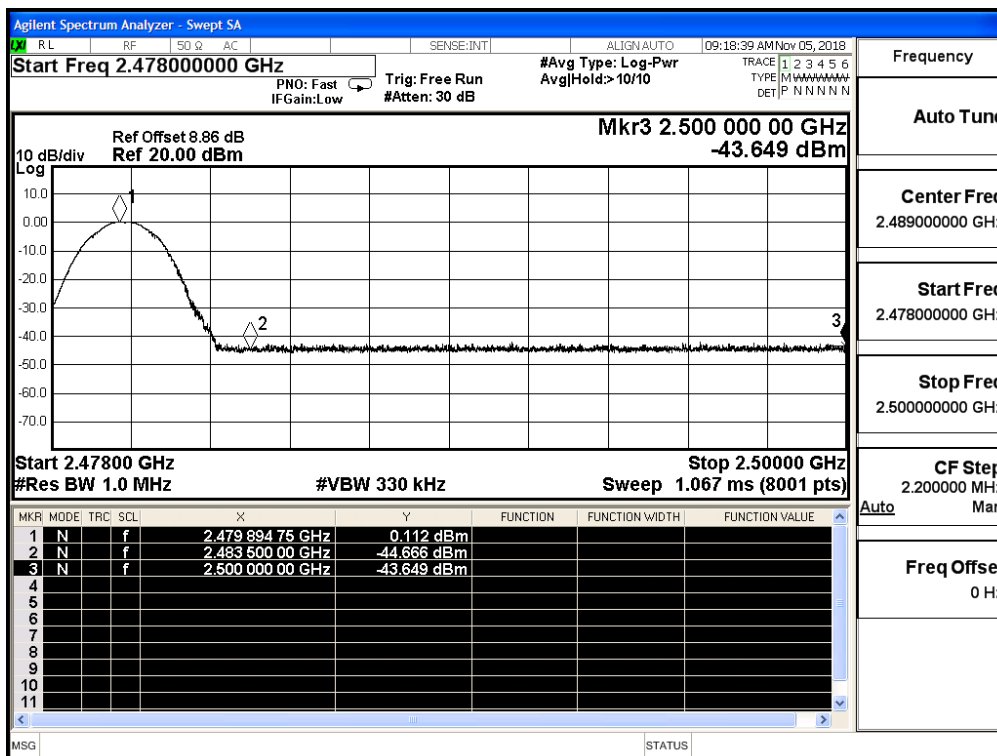
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



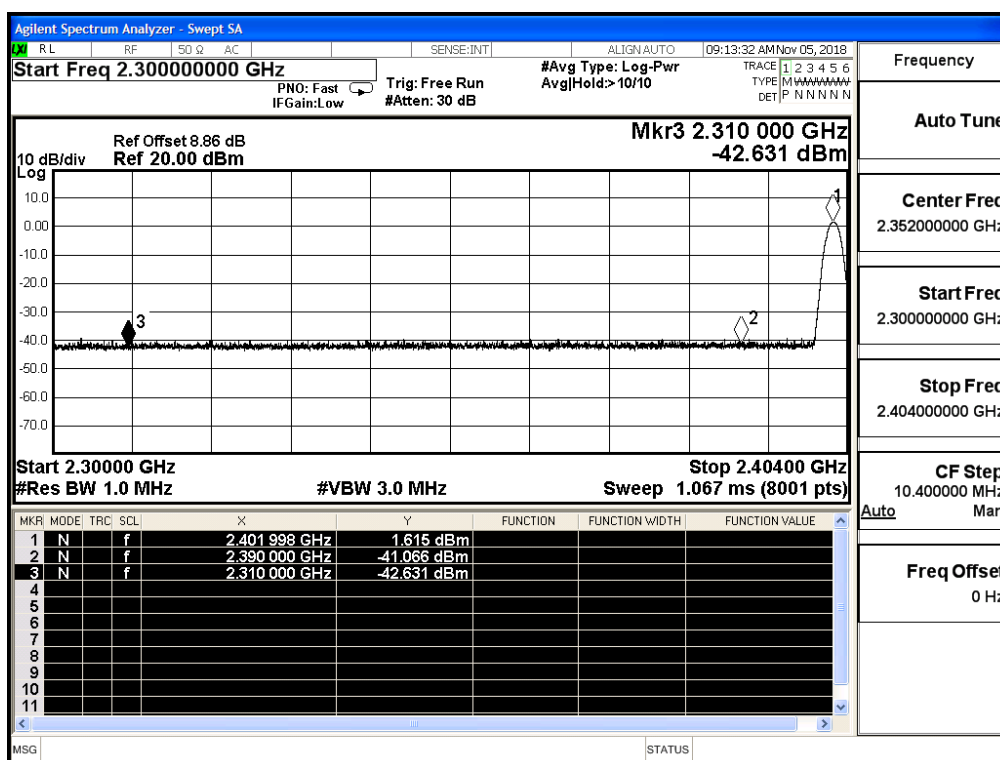
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



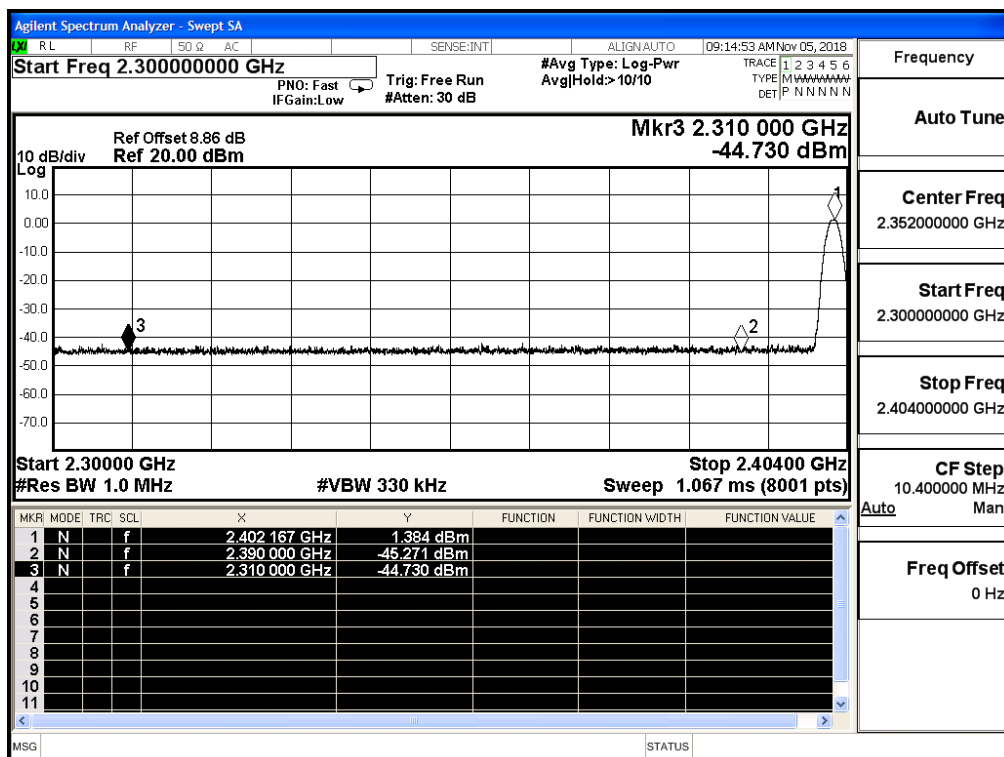
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

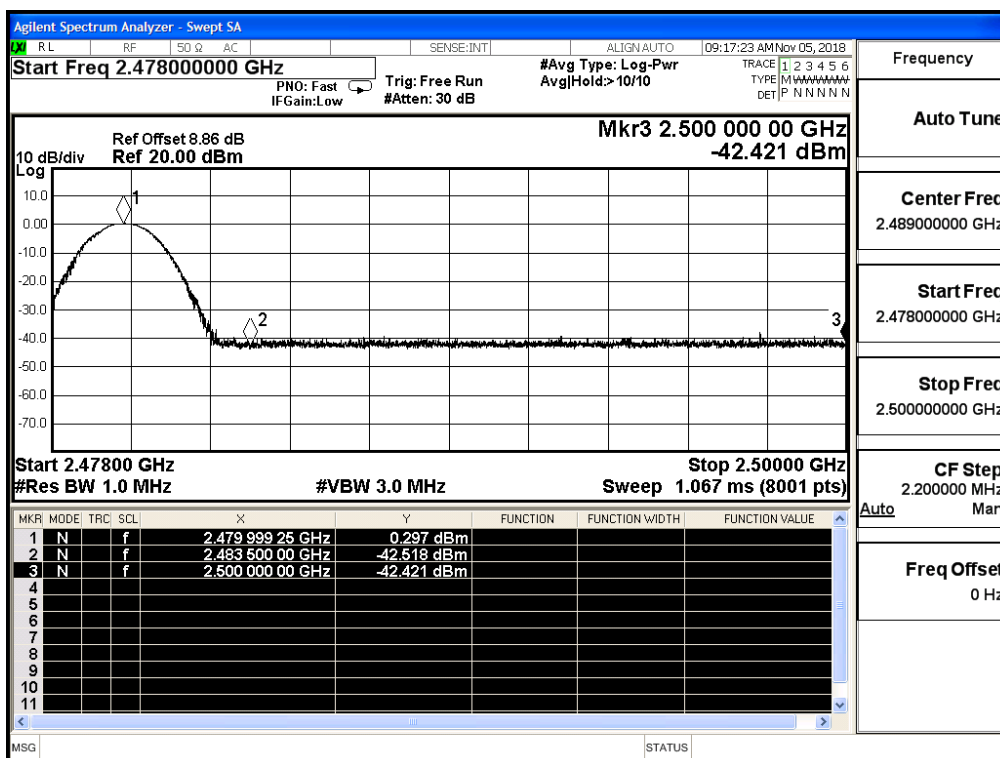
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

