

Appendix A

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

Product Name: BLUETOOTH SPEAKER

Trade Mark: microlab

Test Model: Micmusic

Environmental Conditions

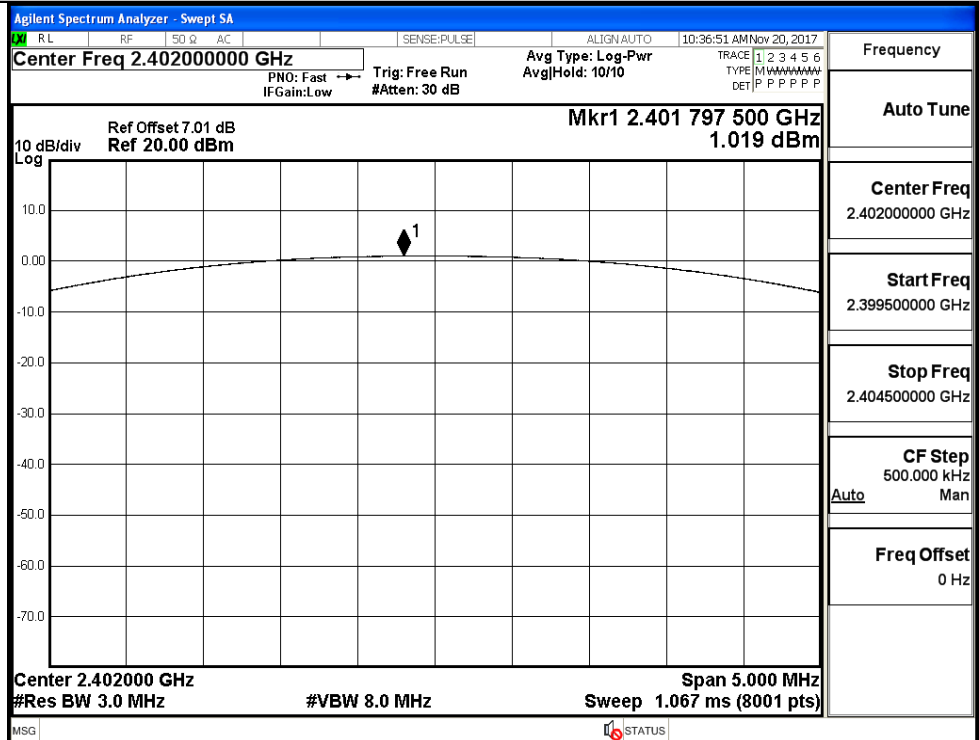
Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Wilson Hong
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

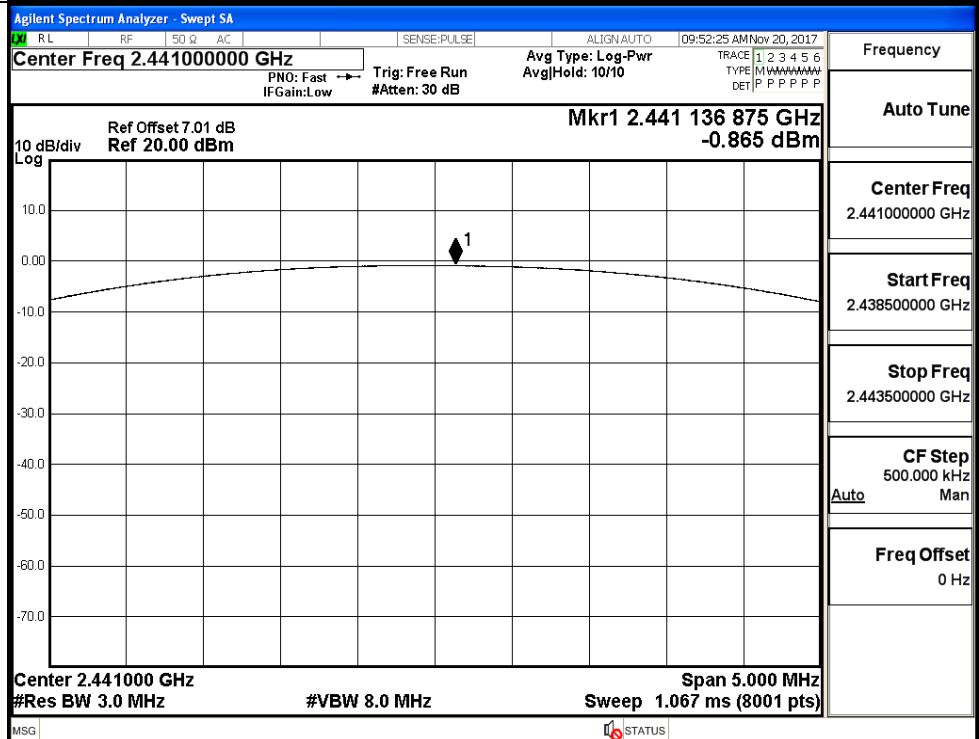
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.019	21	PASS
	MCH	-0.865	21	PASS
	HCH	-0.914	21	PASS
$\pi/4$ DQPSK	LCH	0.265	21	PASS
	MCH	-1.503	21	PASS
	HCH	-1.725	21	PASS
8DPSK	LCH	0.386	21	PASS
	MCH	-1.331	21	PASS
	HCH	-1.637	21	PASS

Test Graphs

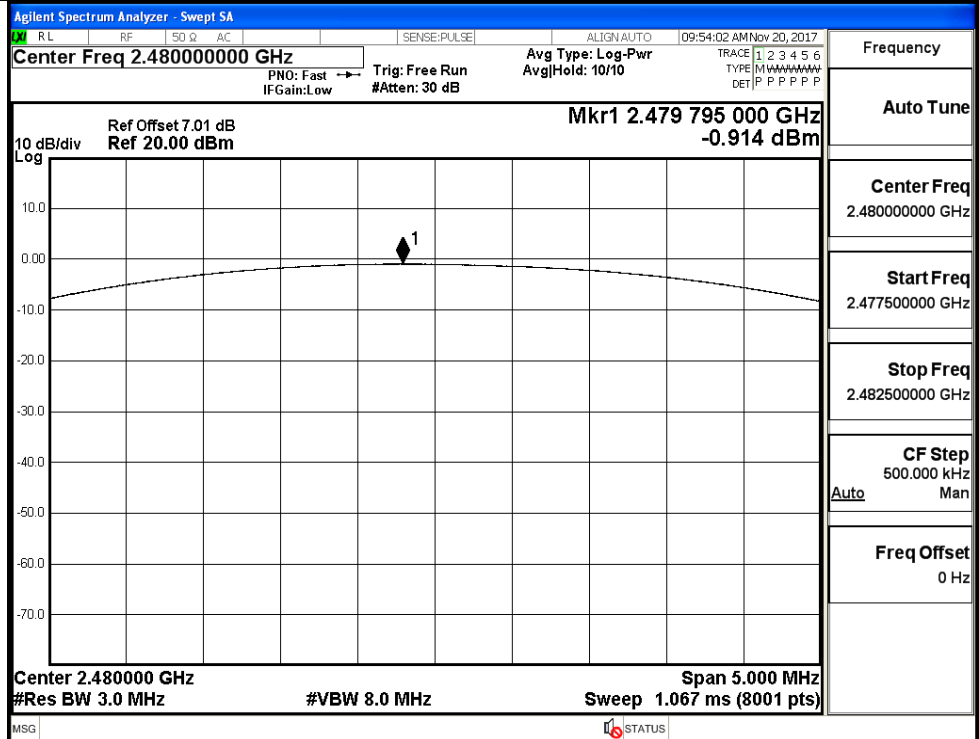
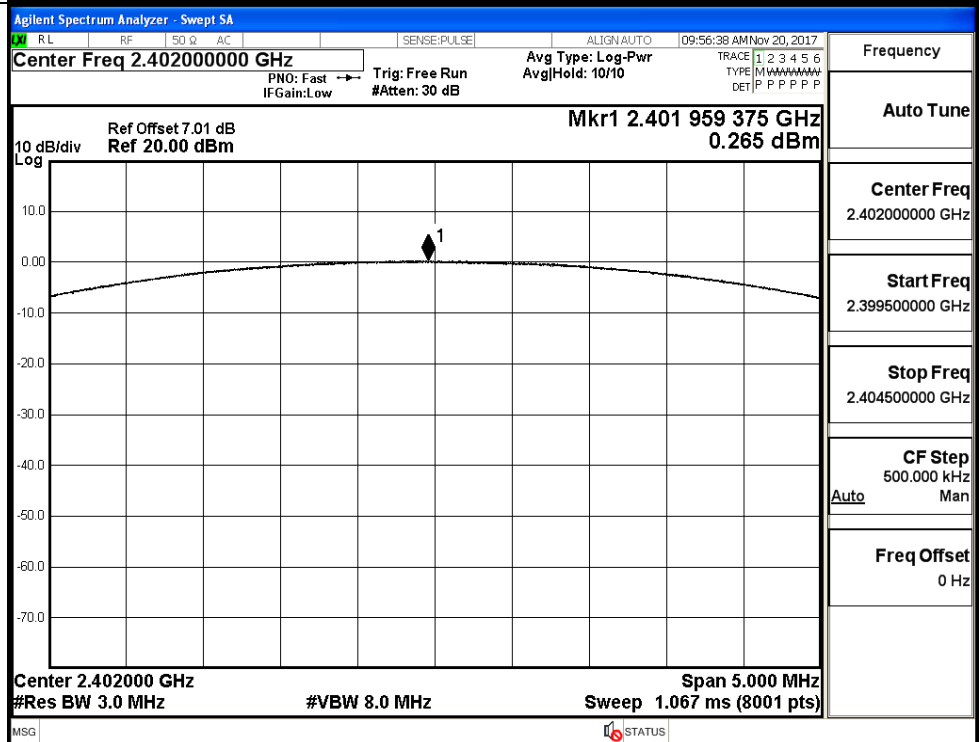
GFSK/LCH

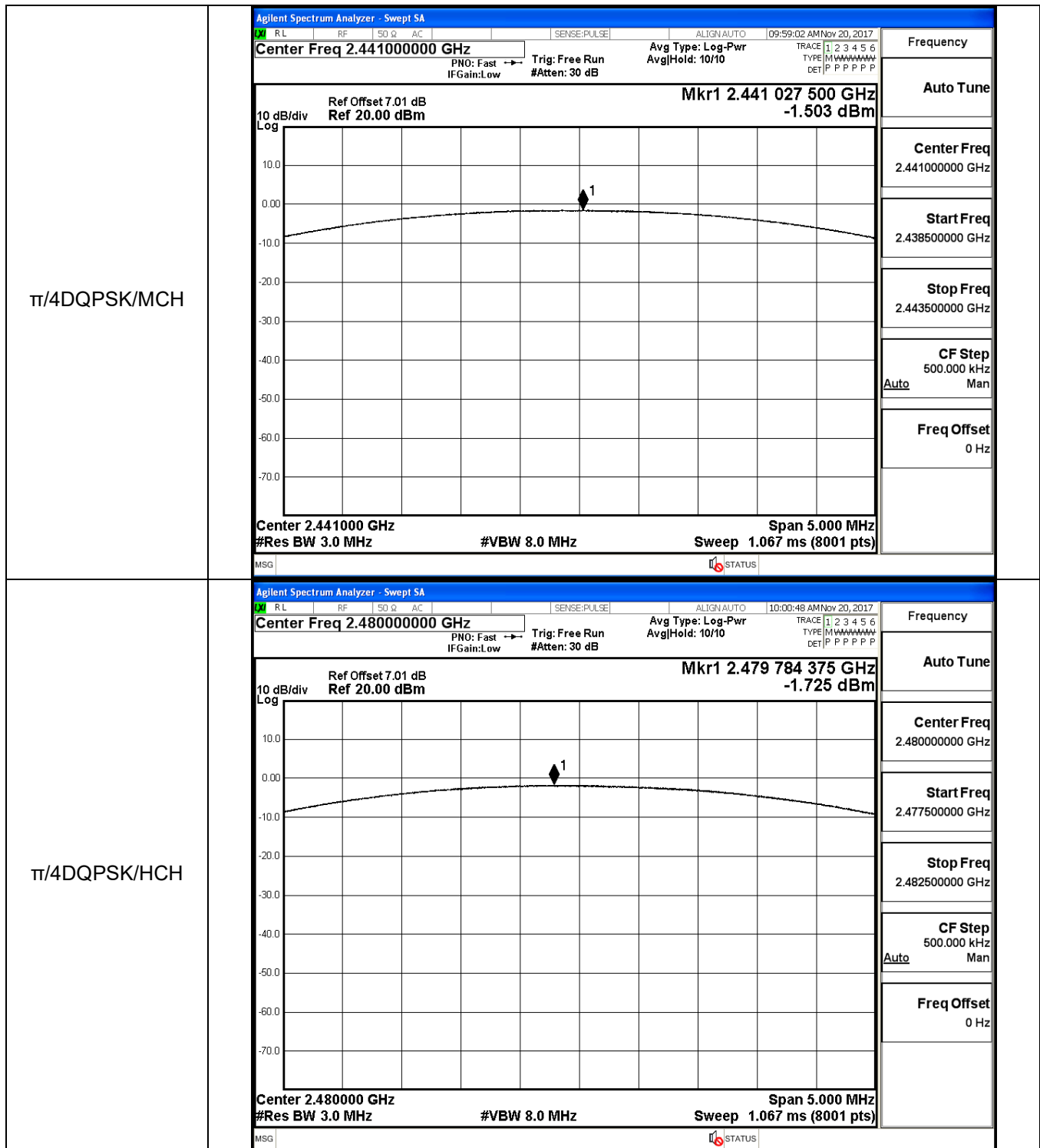


GFSK/MCH

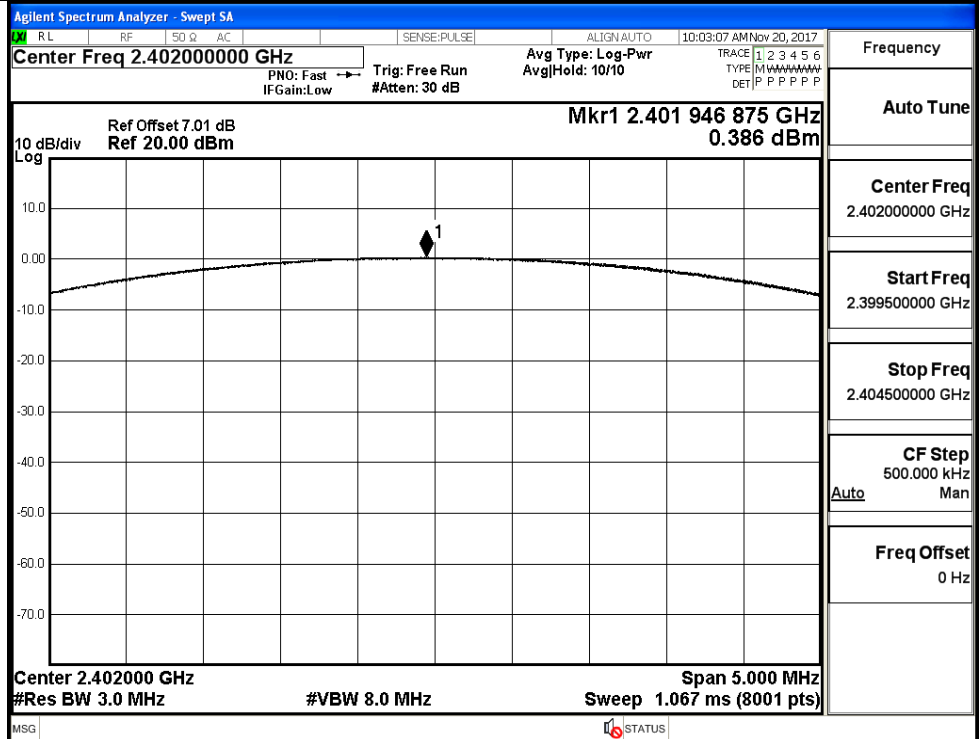


GFSK/HCH

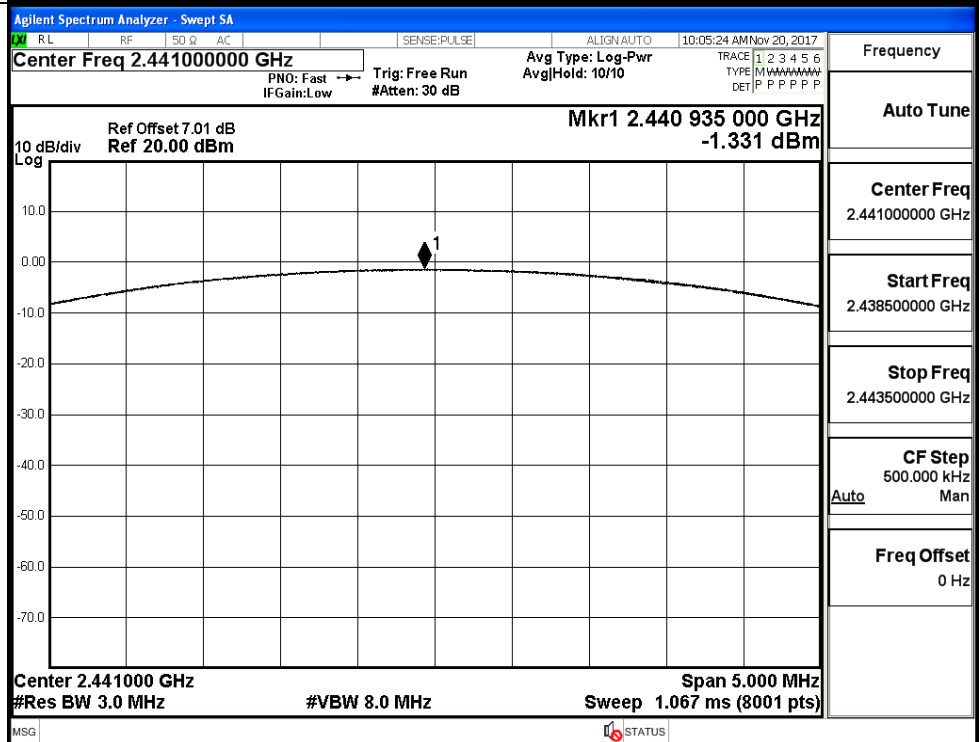
 π /4DQPSK/LCH



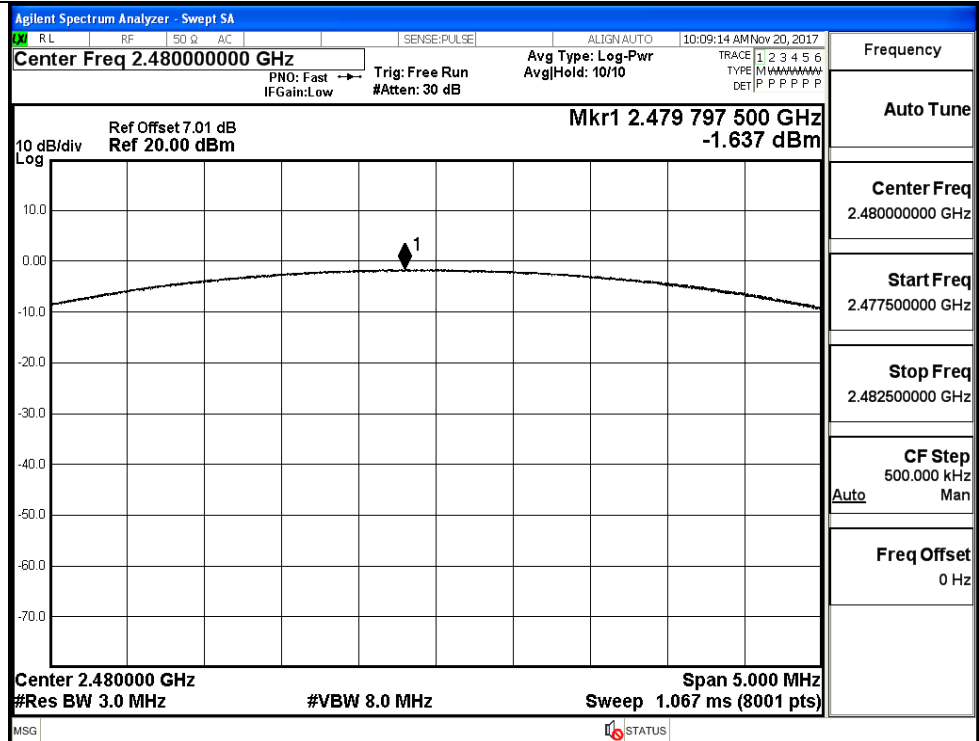
8DPSK/LCH



8DPSK/MCH



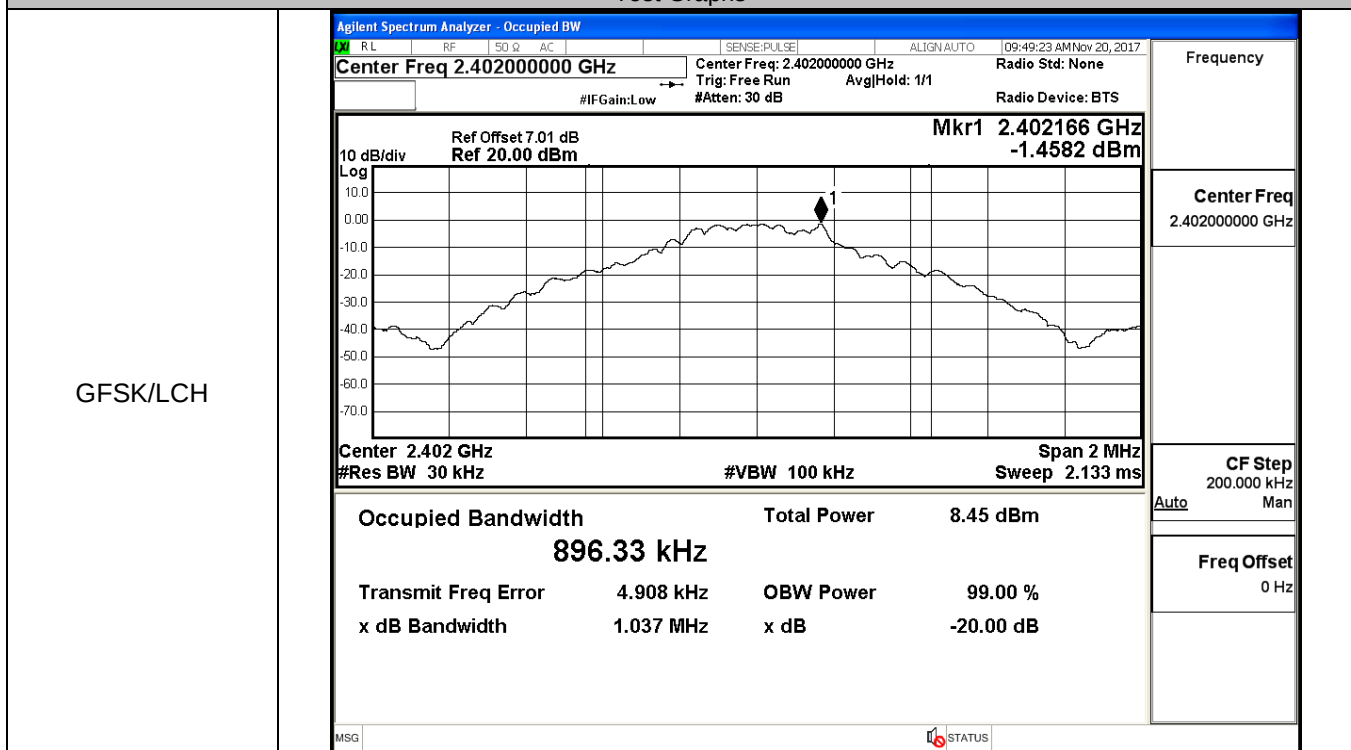
8DPSK/HCH



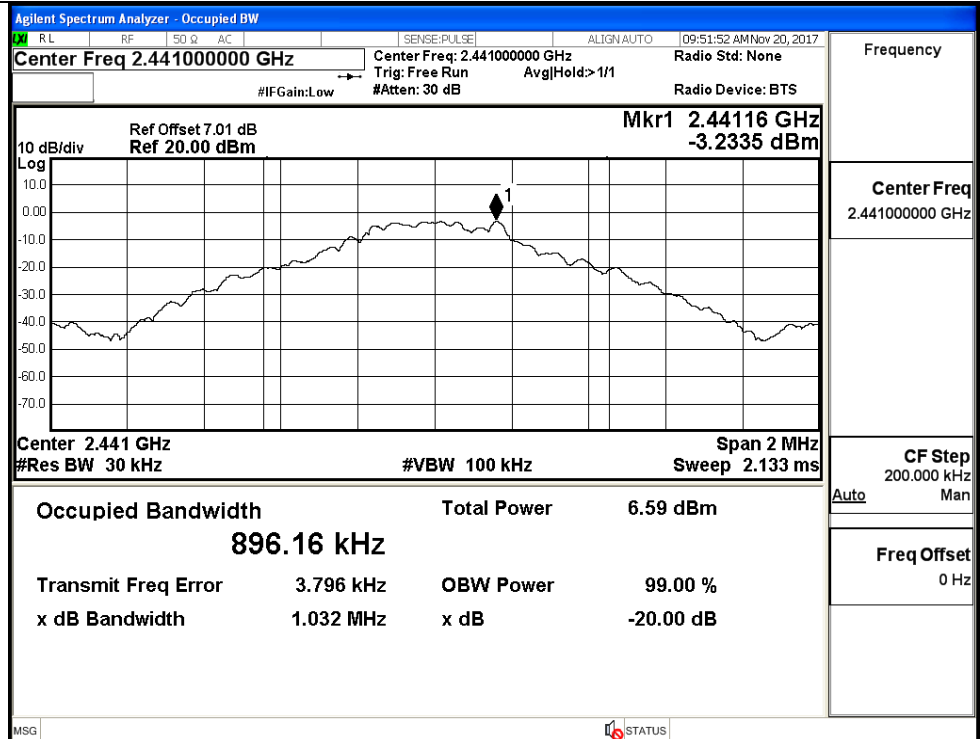
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	99% Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.037	0.89633	Not Specified	PASS
	MCH	1.032	0.86916	Not Specified	PASS
	HCH	1.034	0.89128	Not Specified	PASS
π /4DQPSK	LCH	1.288	1.1713	Not Specified	PASS
	MCH	1.315	1.1780	Not Specified	PASS
	HCH	1.310	1.1714	Not Specified	PASS
8DPSK	LCH	1.292	1.1780	Not Specified	PASS
	MCH	1.299	1.1891	Not Specified	PASS
	HCH	1.294	1.1808	Not Specified	PASS

Test Graphs



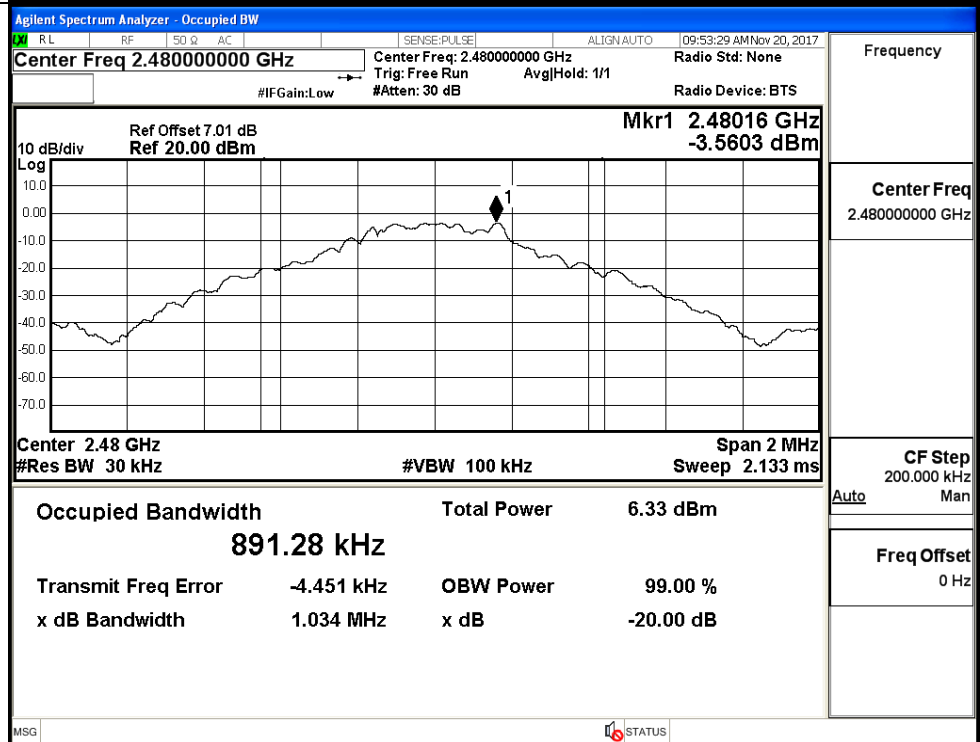
GFSK/MCH



Frequency

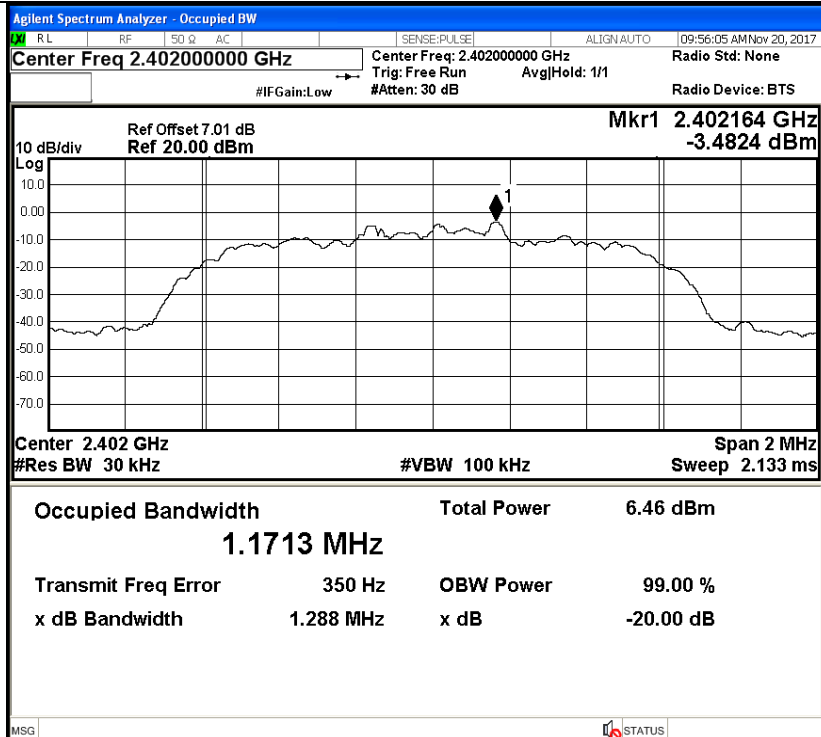
Center Freq
2.441000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

GFSK/HCH



Frequency

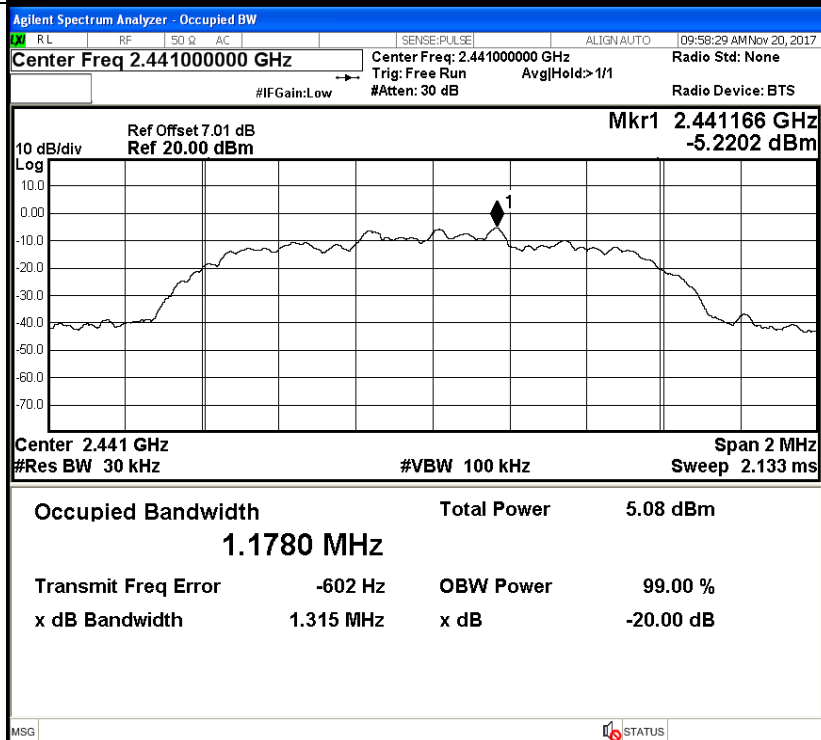
Center Freq
2.480000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/LCH

Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz

Auto

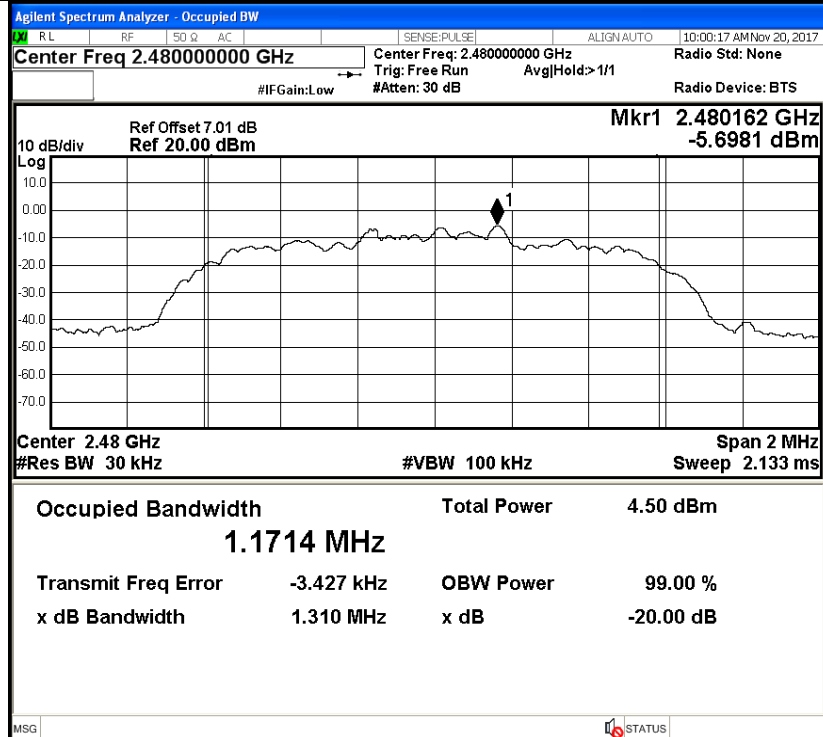
Freq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz

Auto

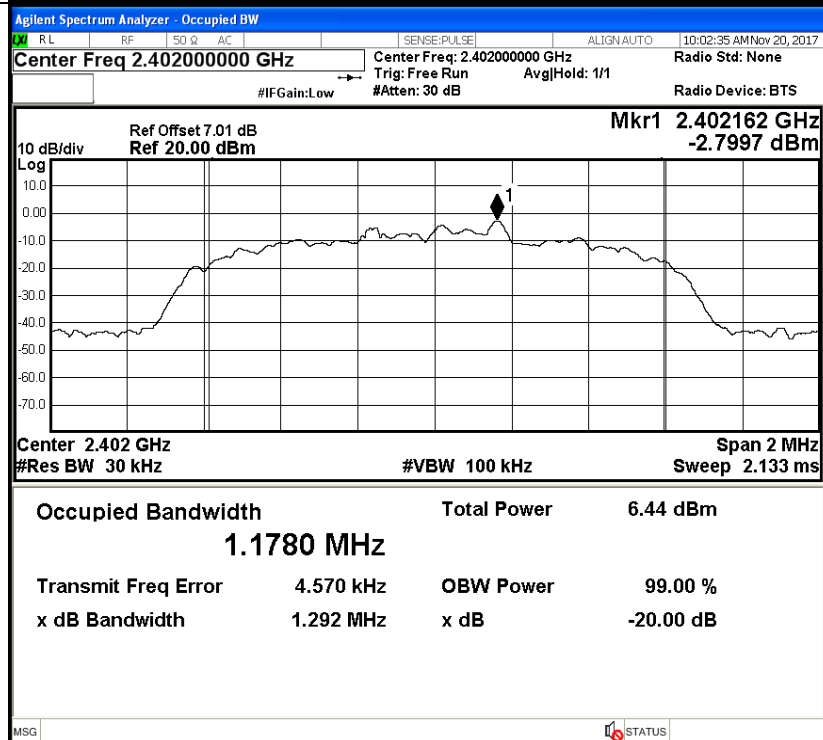
Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH

Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

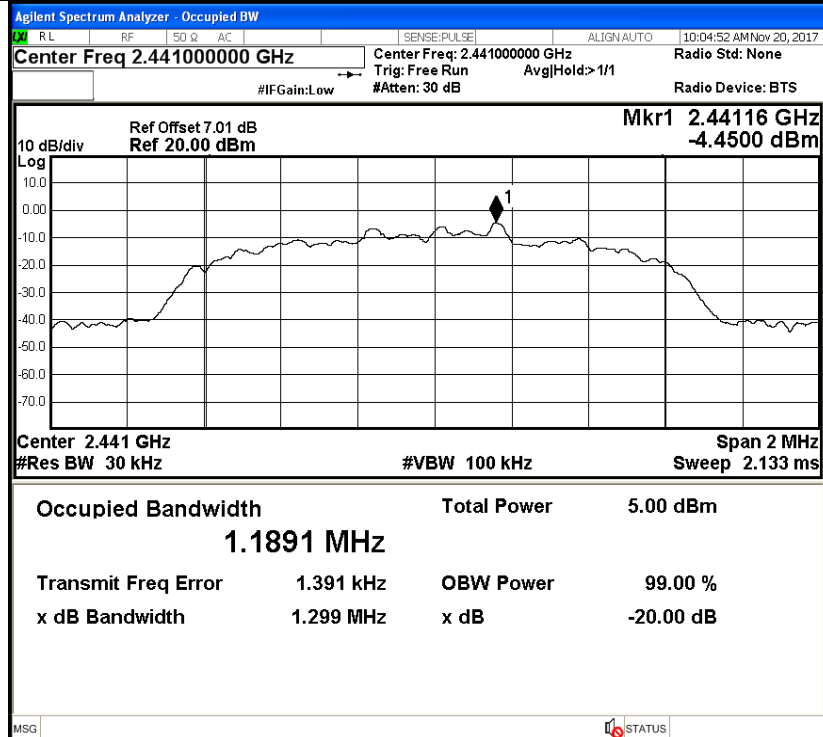
8DPSK/LCH



Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

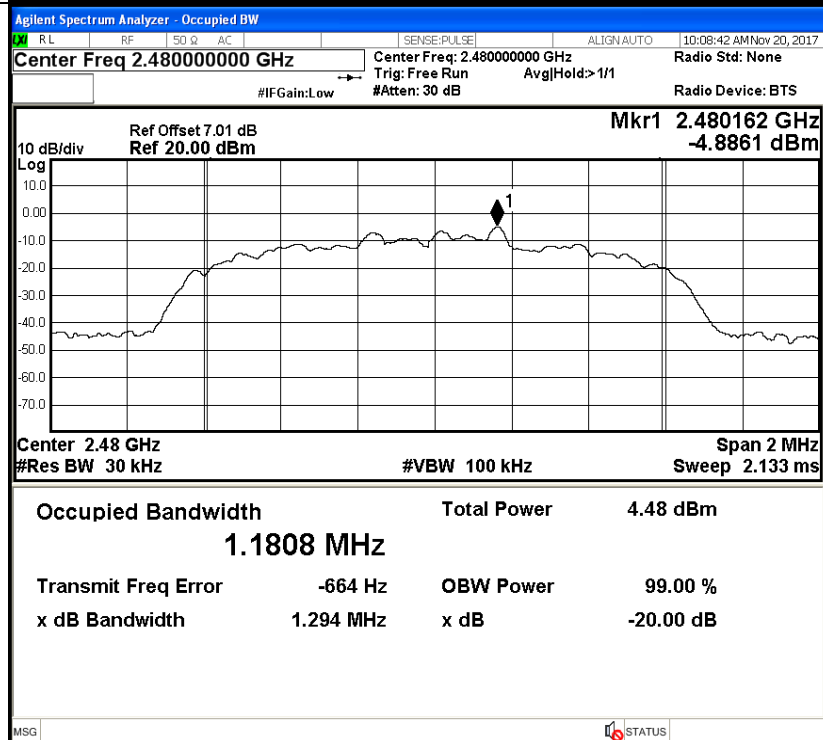
8DPSK/MCH



Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

8DPSK/HCH



Frequency

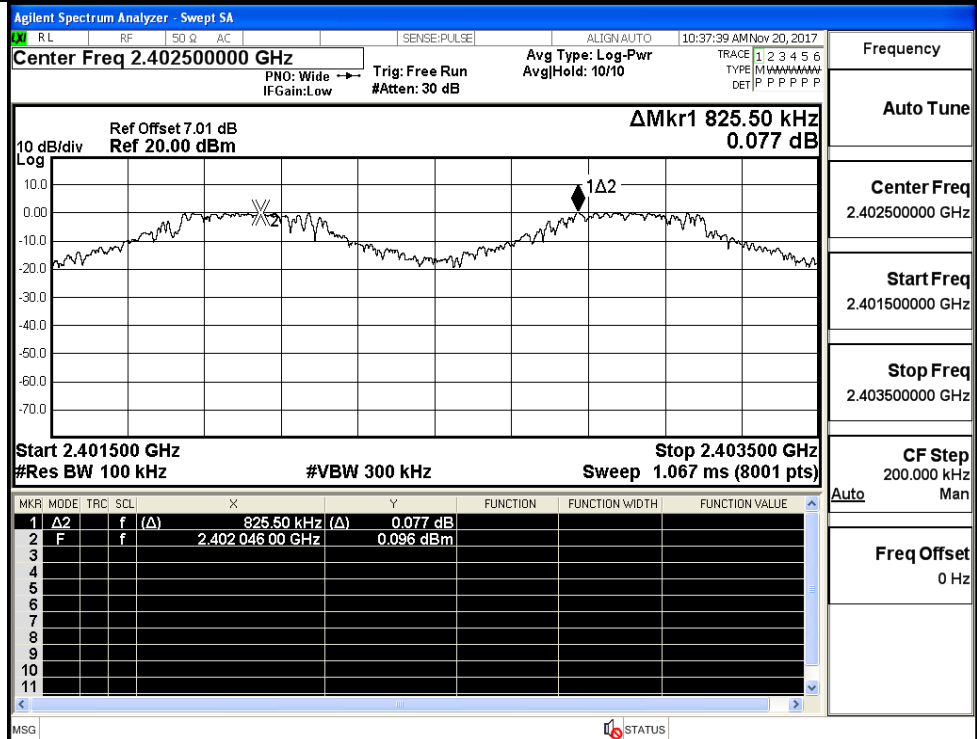
Center Freq
2.480000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

A.3 Carrier Frequency Separation

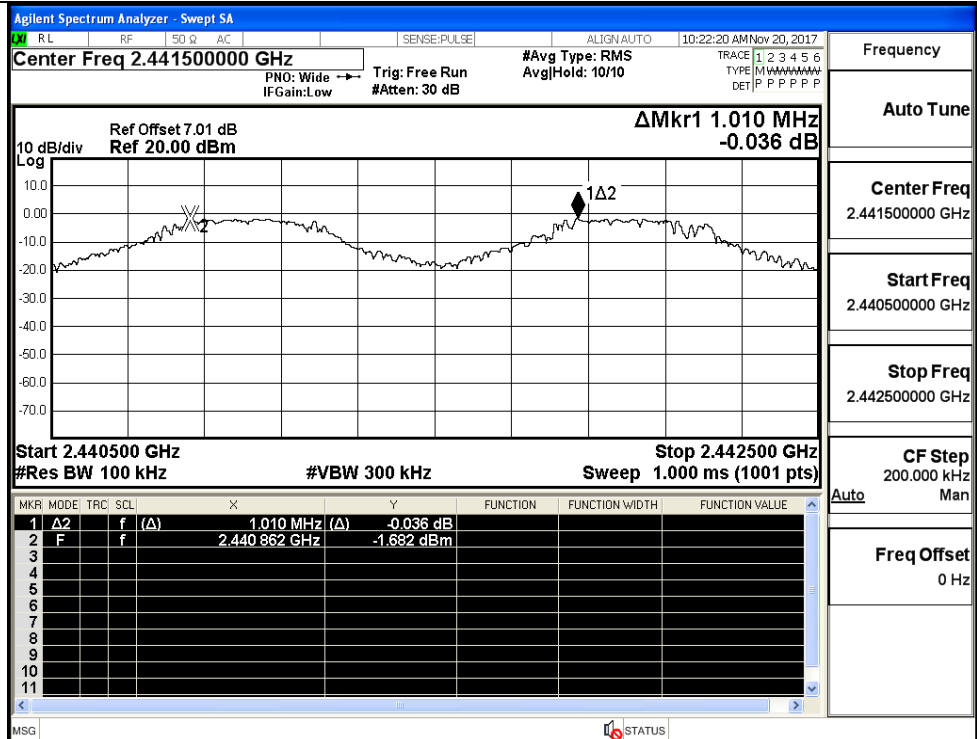
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.826	0.691	PASS
	MCH	1.010	0.691	PASS
	HCH	0.884	0.691	PASS
$\pi/4$ DQPSK	LCH	0.992	0.877	PASS
	MCH	1.240	0.877	PASS
	HCH	0.996	0.877	PASS
8DPSK	LCH	0.930	0.866	PASS
	MCH	1.054	0.866	PASS
	HCH	0.912	0.866	PASS

Test Graphs

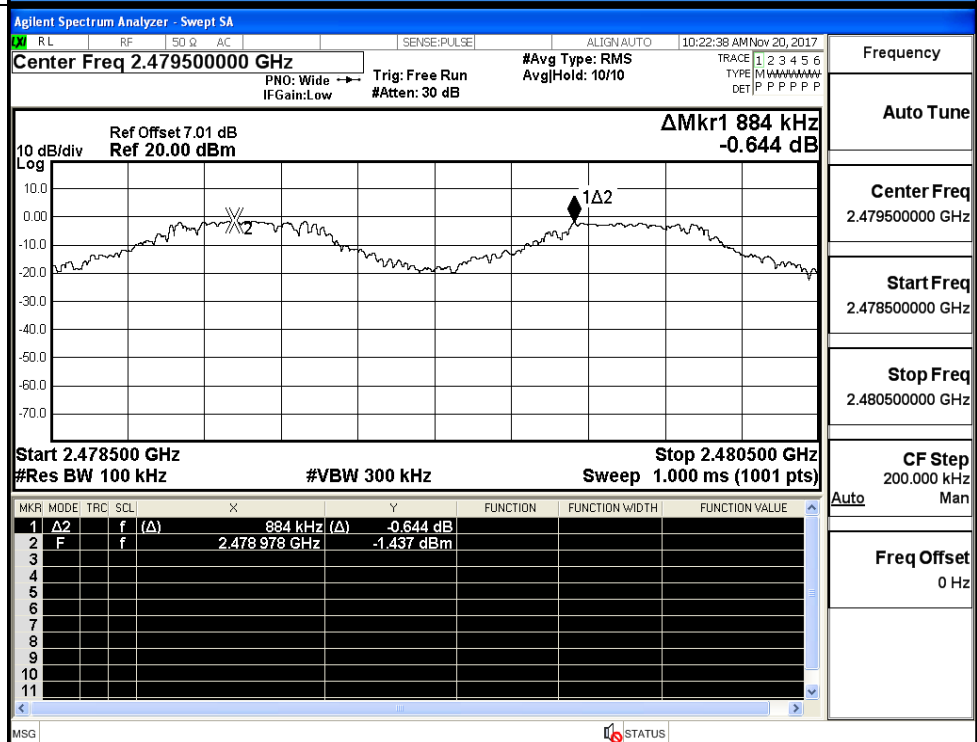
GFSK/LCH



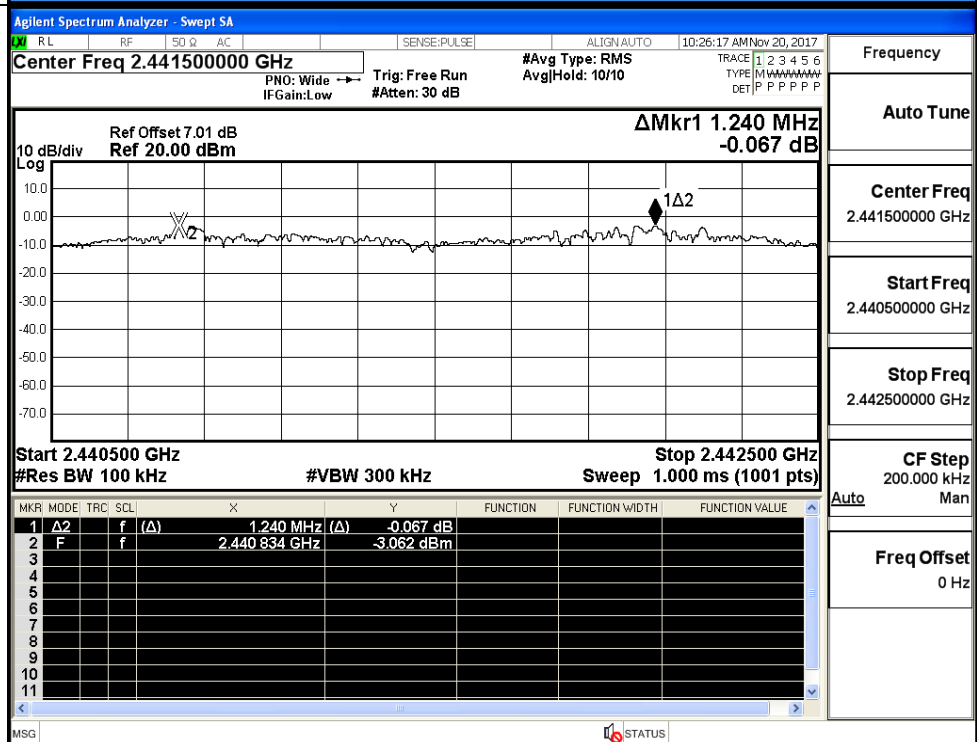
GFSK/MCH

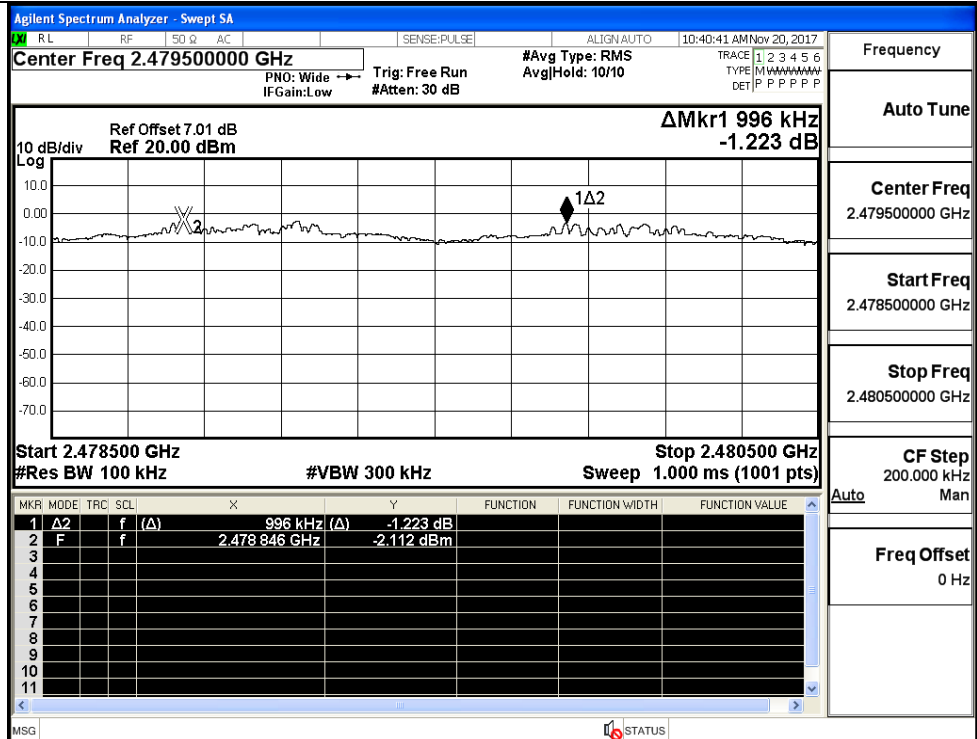


GFSK/HCH

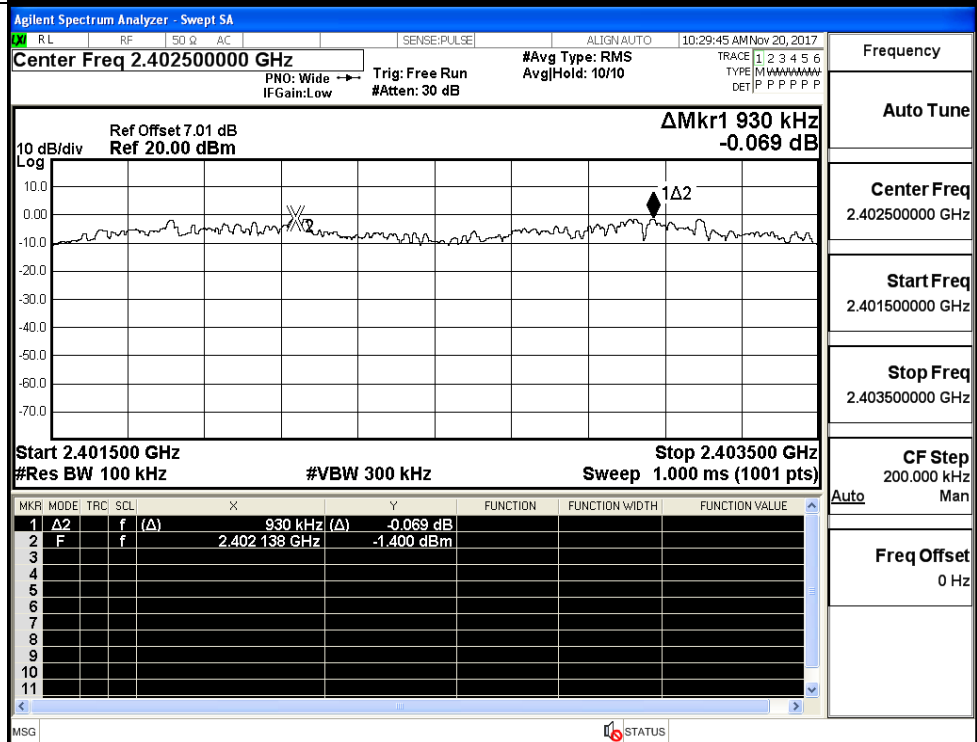


$\pi/4$ DQPSK/MCH

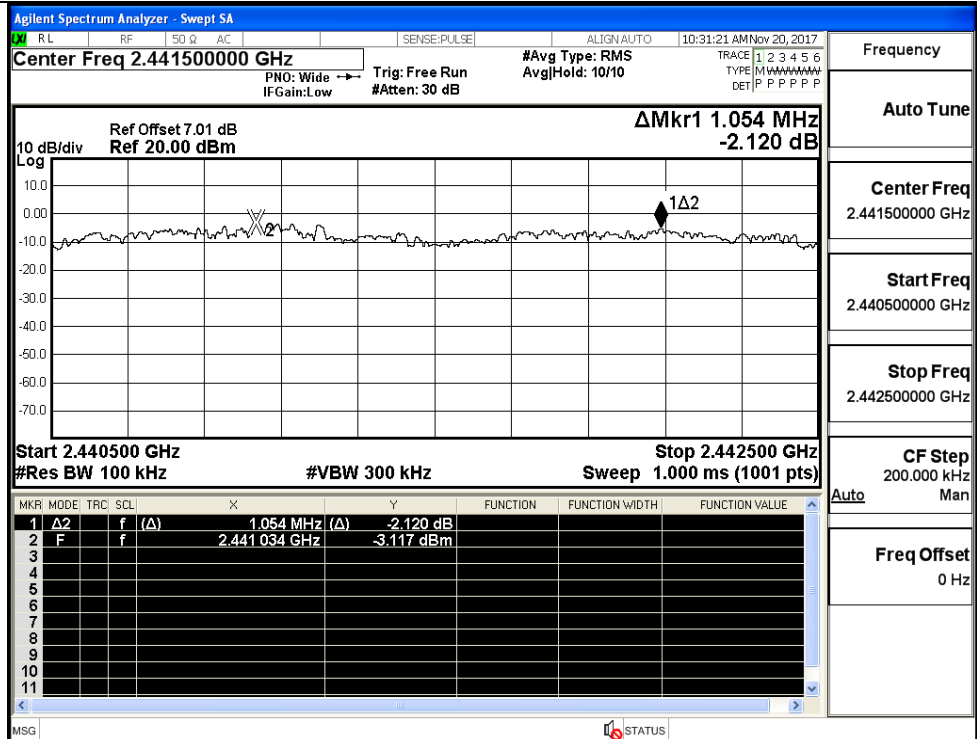


$\pi/4$ DQPSK/HCH

8DPSK/LCH



8DPSK/MCH

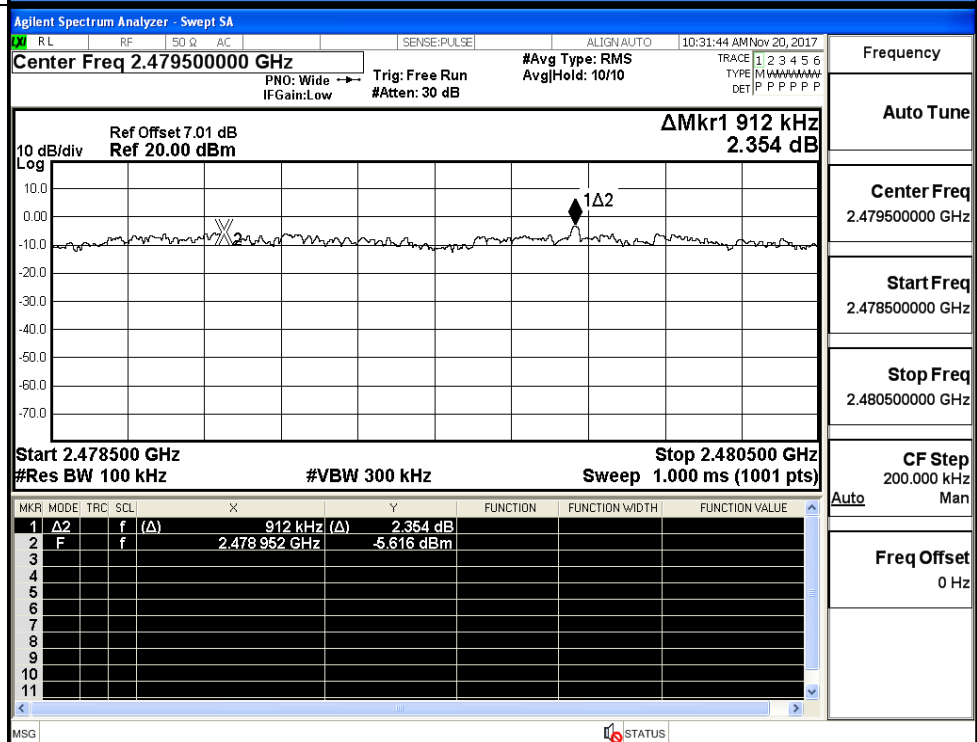


Frequency

Auto Tune

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

8DPSK/HCH



Frequency

Auto Tune

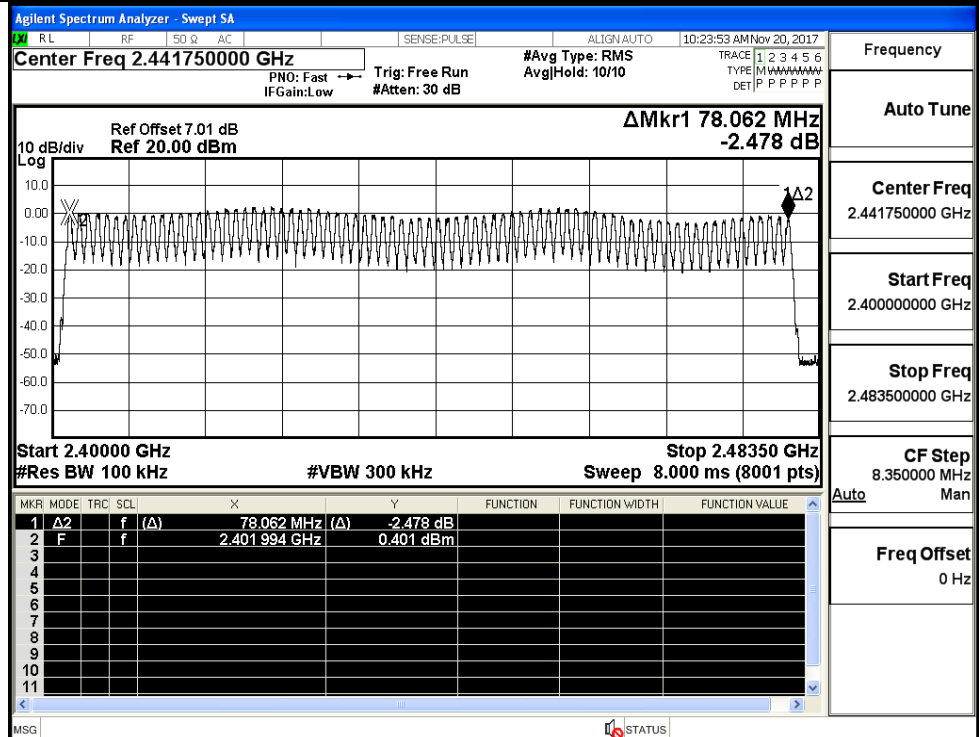
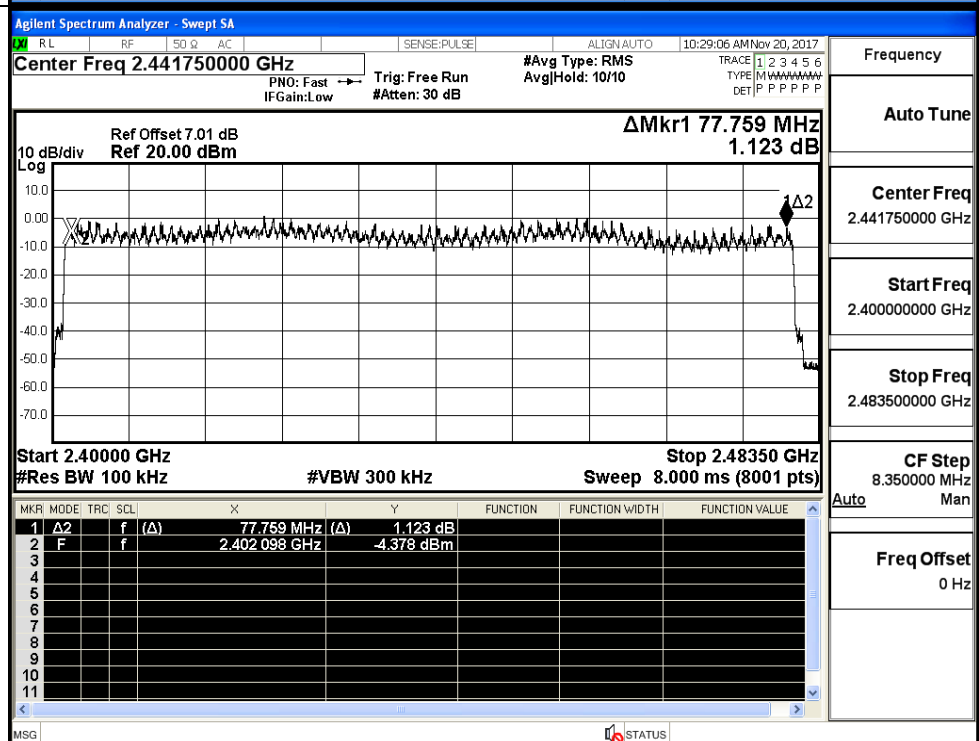
Center Freq
2.479500000 GHzStart Freq
2.478500000 GHzStop Freq
2.480500000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

A.4 Hopping Channel Number

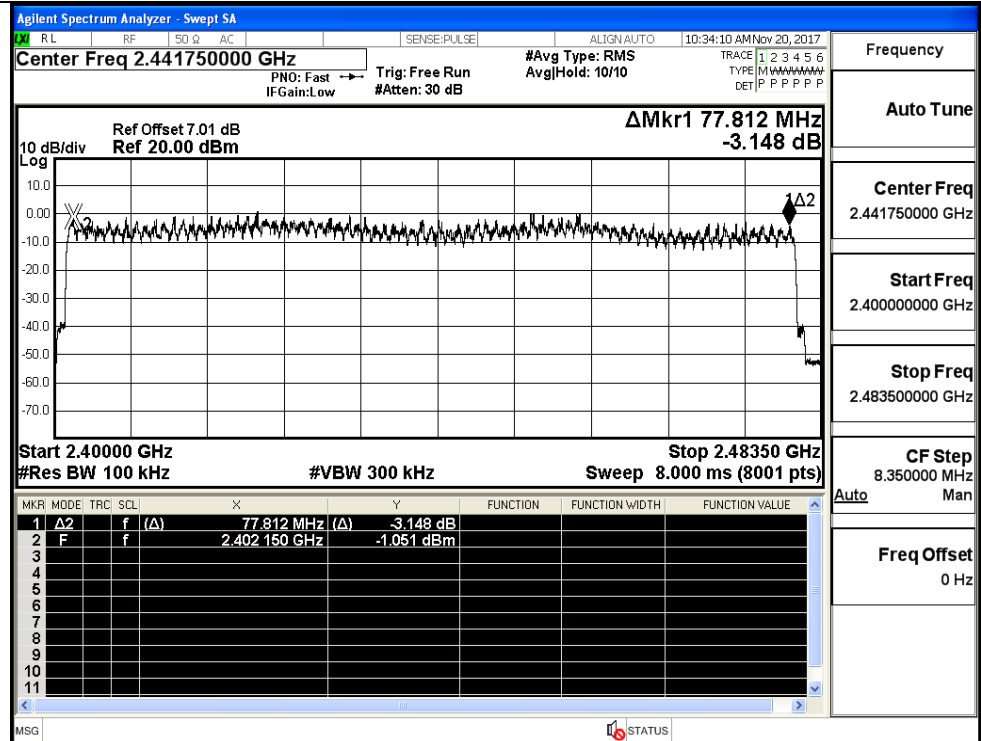
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

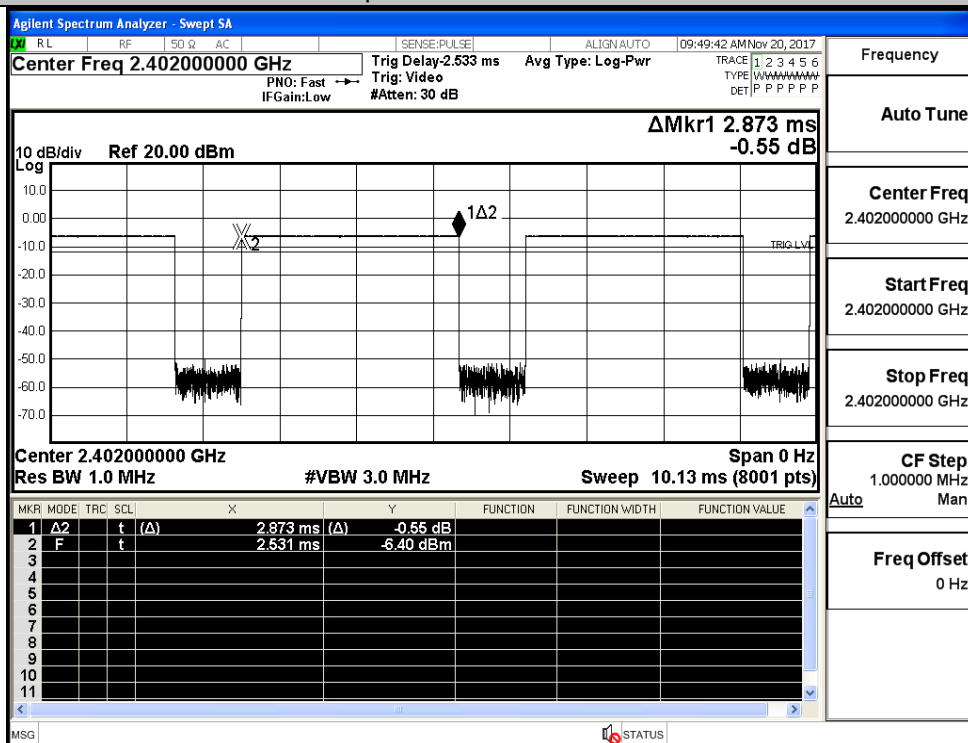


A.5 Dwell Time

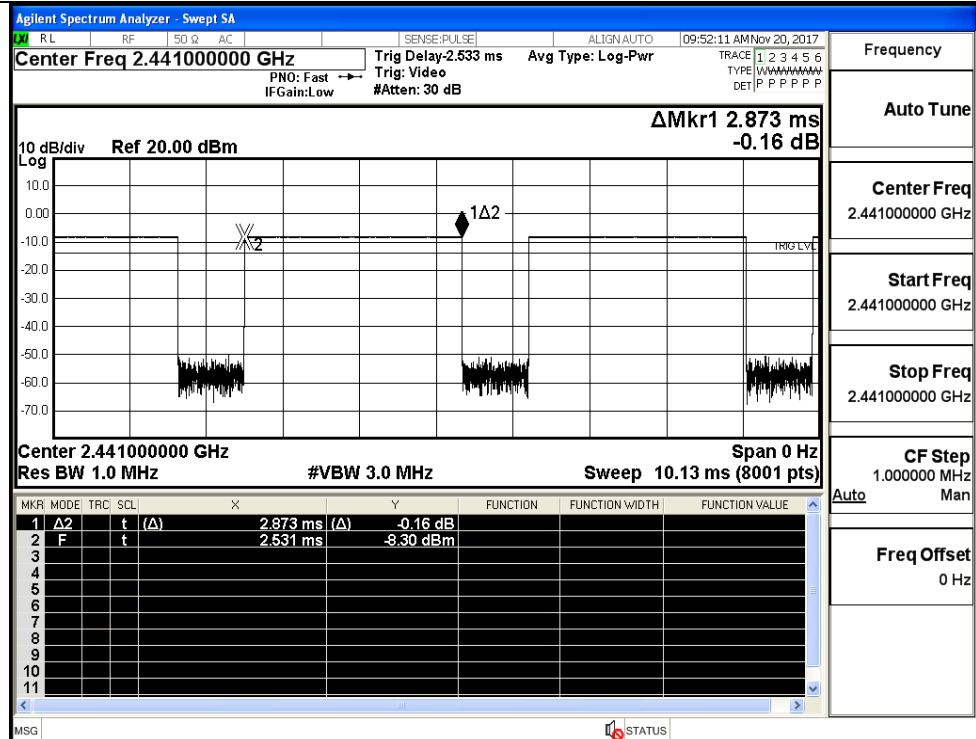
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.873	106.7	0.306	0.4	PASS
	DH5	MCH	2.873	106.7	0.306	0.4	PASS
	DH5	HCH	2.874	106.7	0.306	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.877	106.7	0.307	0.4	PASS
	2DH5	MCH	2.877	106.7	0.307	0.4	PASS
	2DH5	HCH	2.877	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.878	106.7	0.307	0.4	PASS
	3DH5	MCH	2.879	106.7	0.307	0.4	PASS
	3DH5	HCH	2.879	106.7	0.307	0.4	PASS

Test Graphs

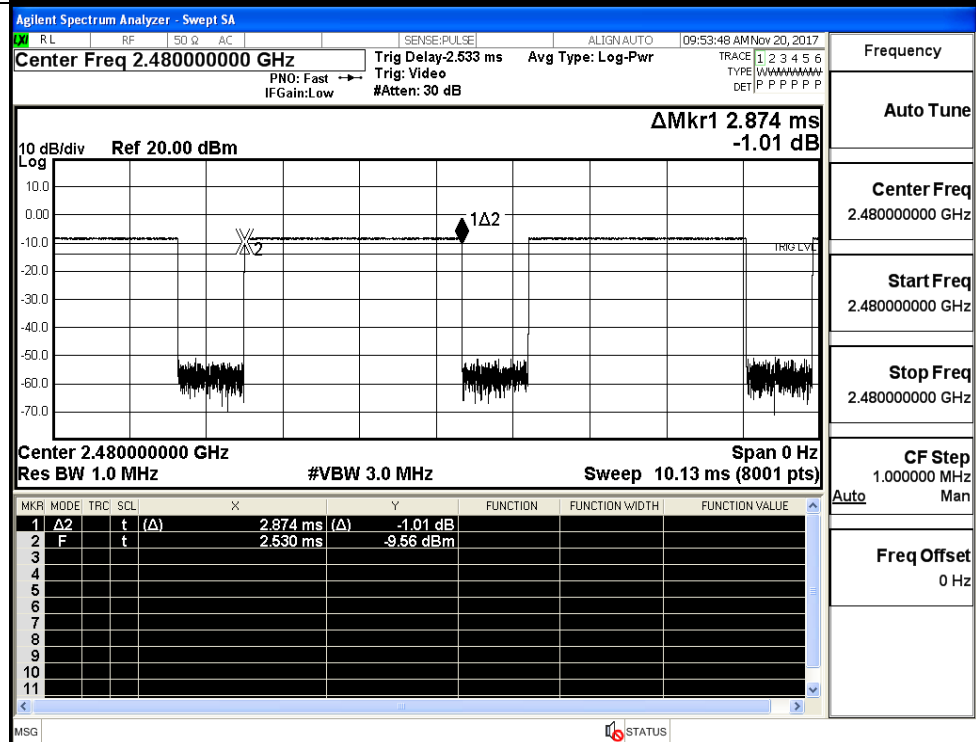
GFSK_DH5/LCH

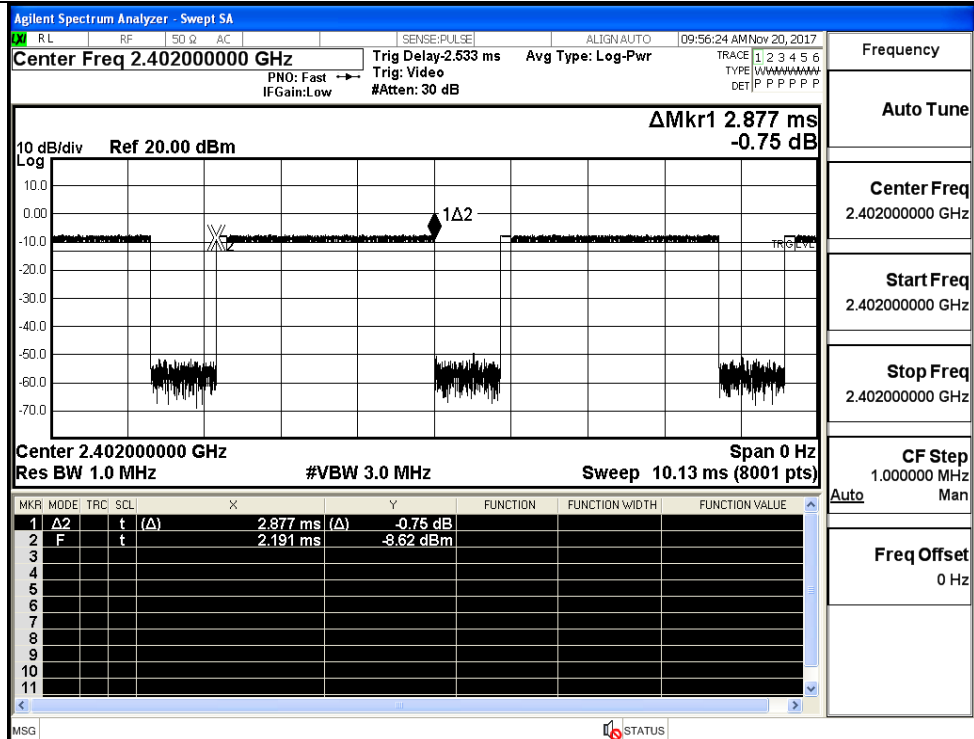
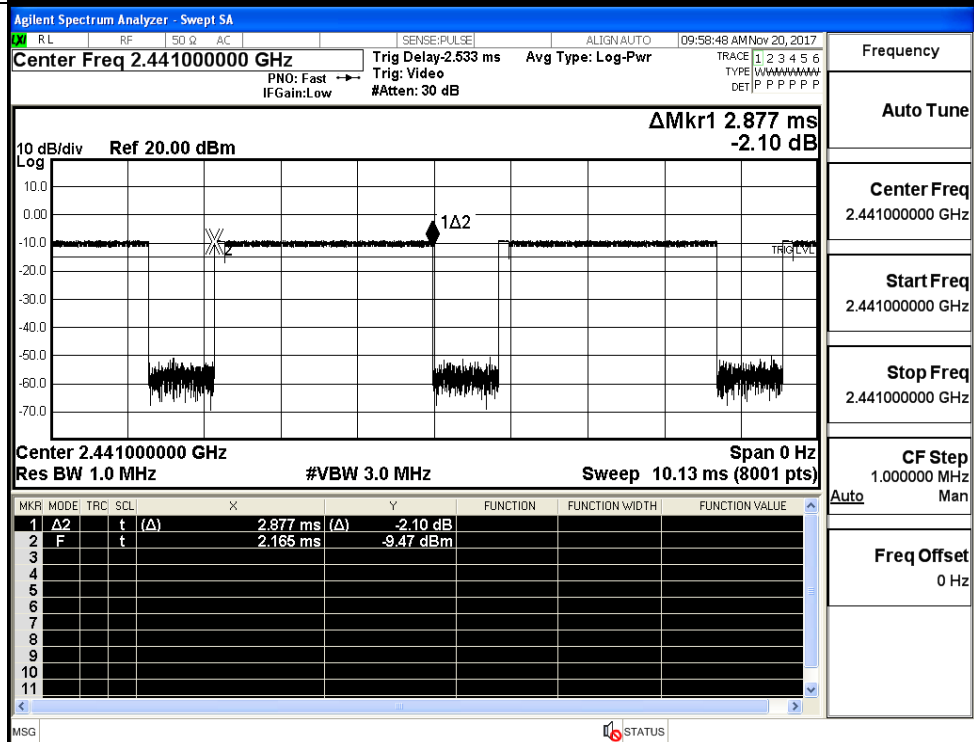


GFSK_DH5/MCH

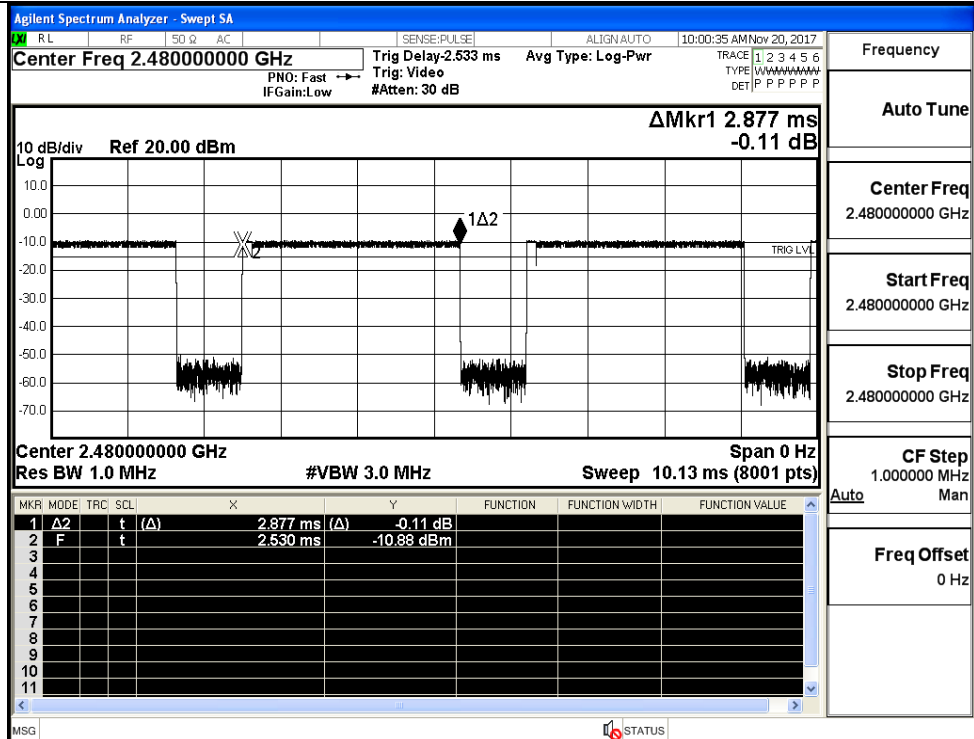


GFSK_DH5/HCH

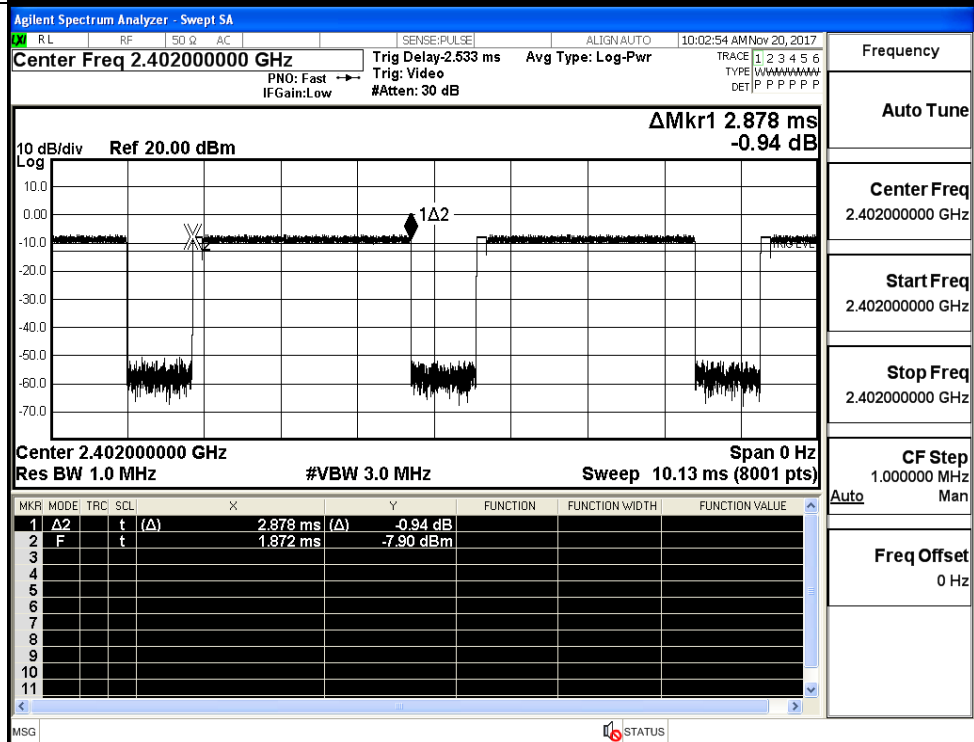


$\pi/4$ DQPSK
_2DH5/LCH $\pi/4$ DQPSK
_2DH5/MCH

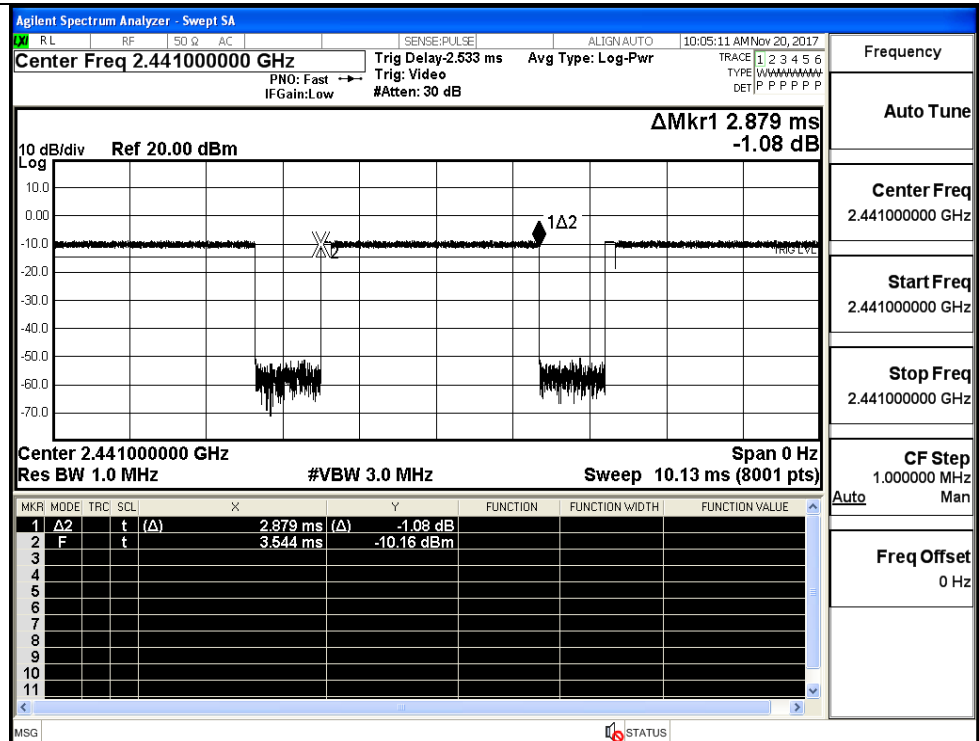
$\pi/4$ DQPSK
_2DH5/HCH



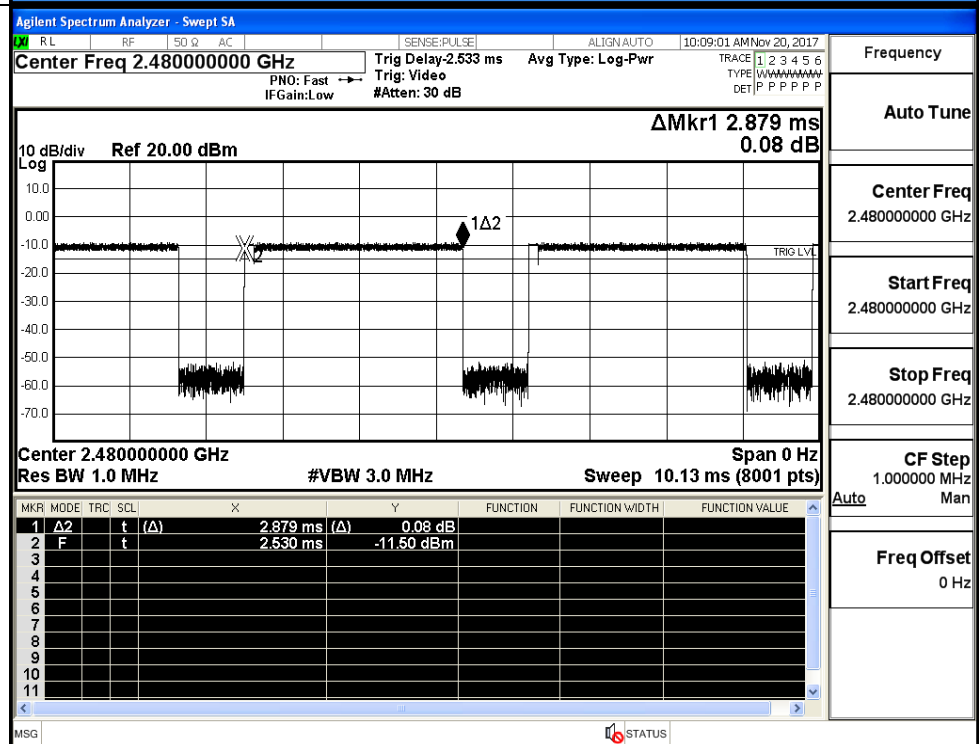
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

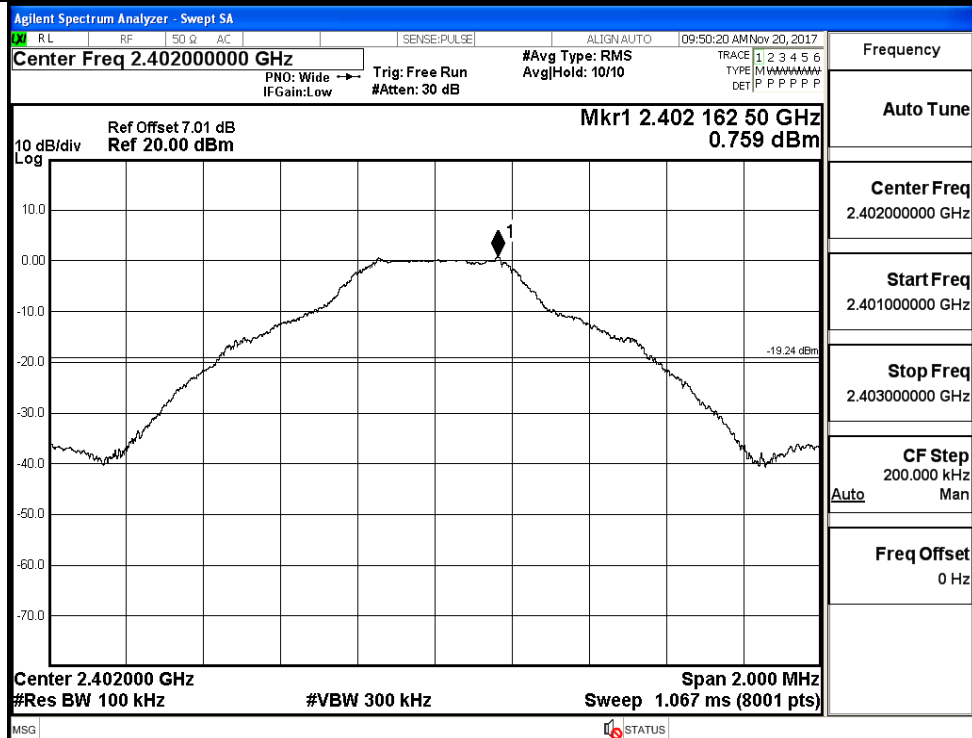


A.6 RF Conducted Spurious Emissions

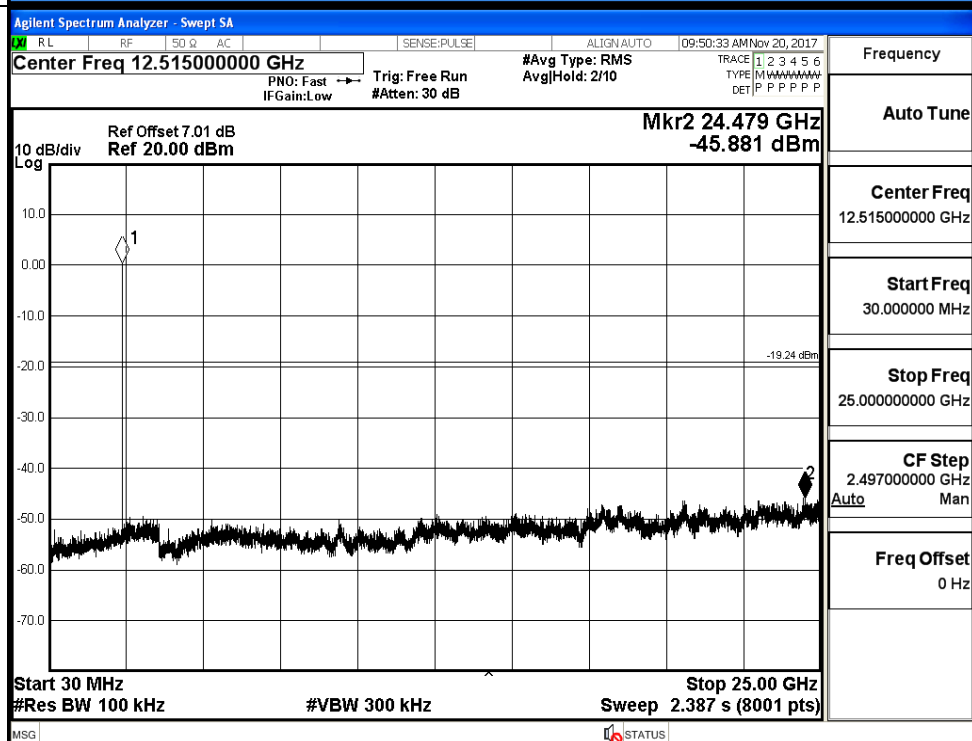
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.759	-45.881	-19.241	PASS
	MCH	-1.107	-45.635	-21.107	PASS
	HCH	-1.473	-45.967	-21.473	PASS
$\pi/4$ DQPSK	LCH	-0.748	-44.787	-20.748	PASS
	MCH	-2.41	-45.148	-22.410	PASS
	HCH	-2.954	-44.889	-22.954	PASS
8DPSK	LCH	-0.842	-45.253	-20.842	PASS
	MCH	-2.305	-45.353	-22.305	PASS
	HCH	-3.002	-45.528	-23.002	PASS

GFSK LCH Graphs

Pref

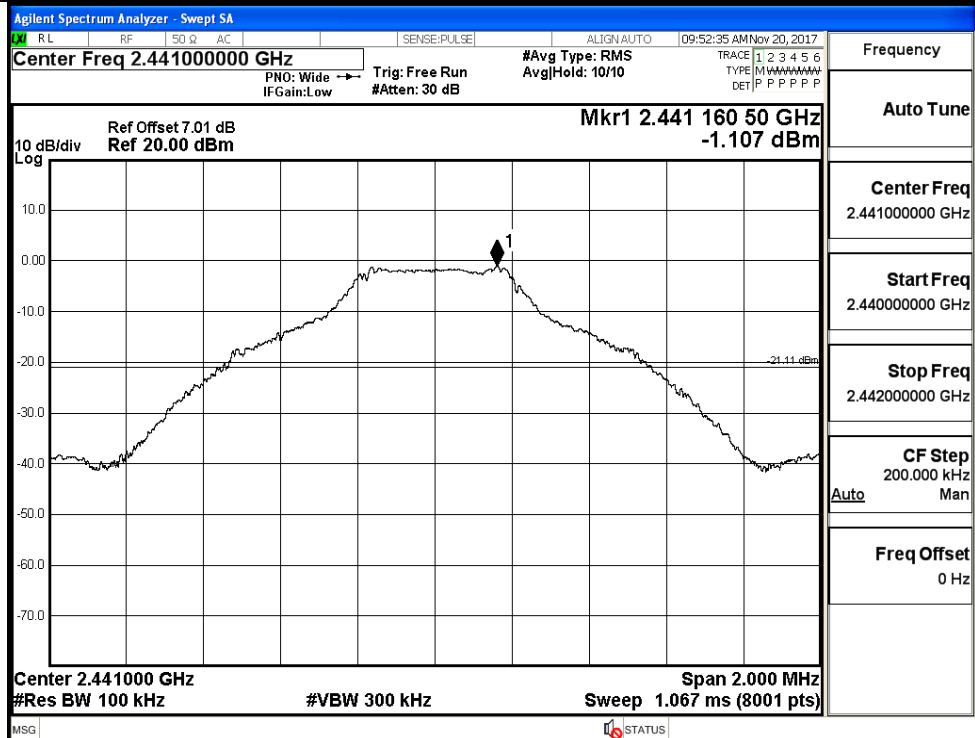


Puw

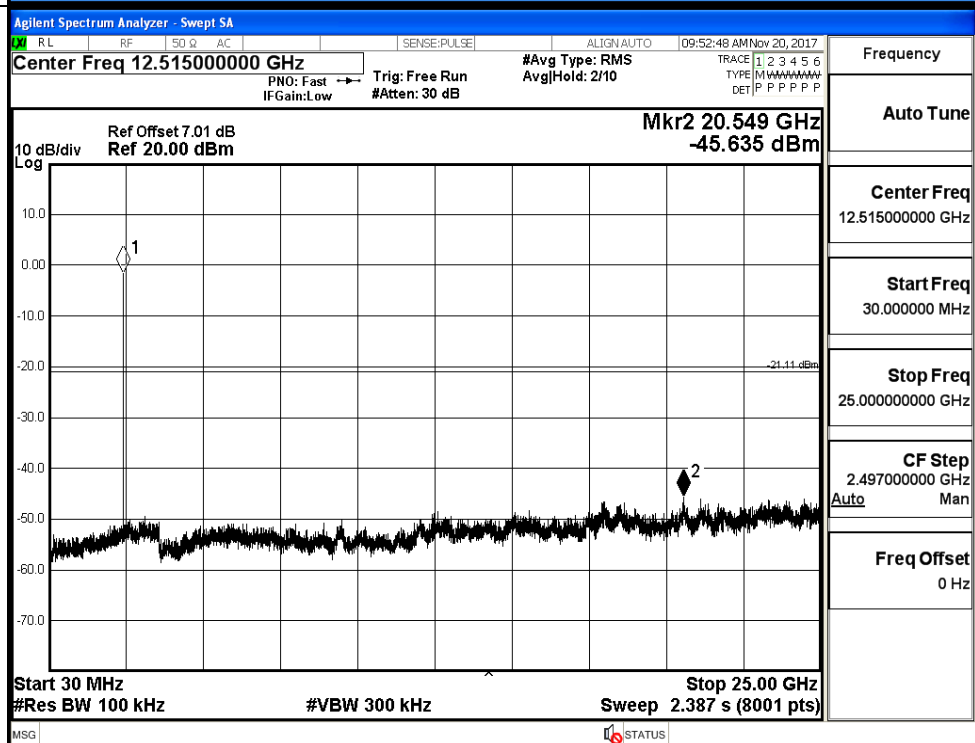


GFSK MCH Graphs

Pref

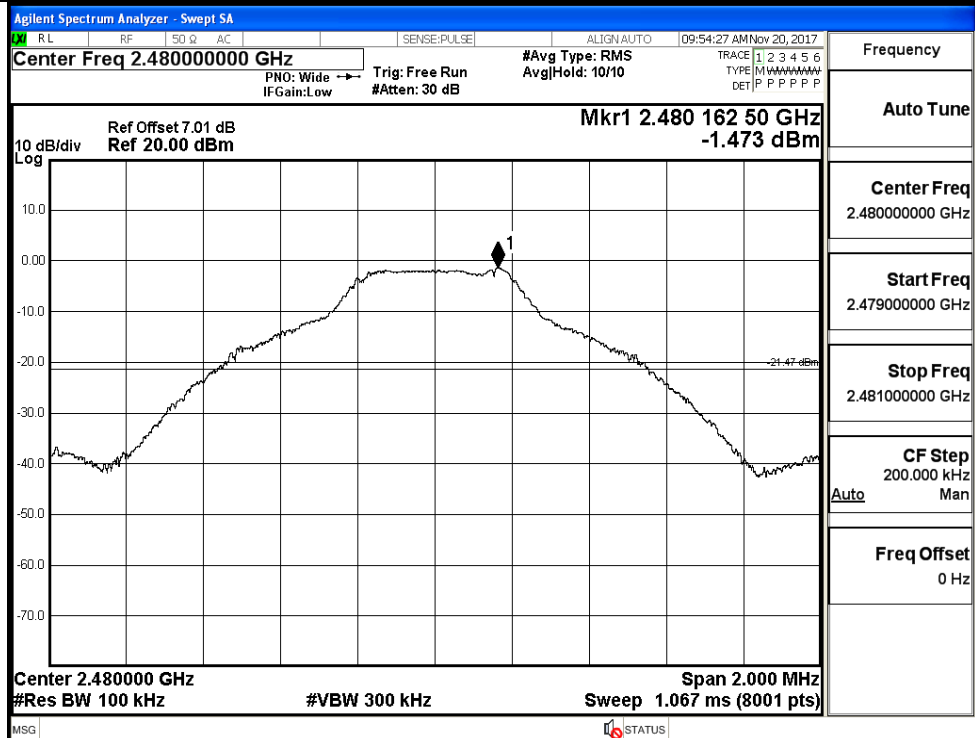


Puw

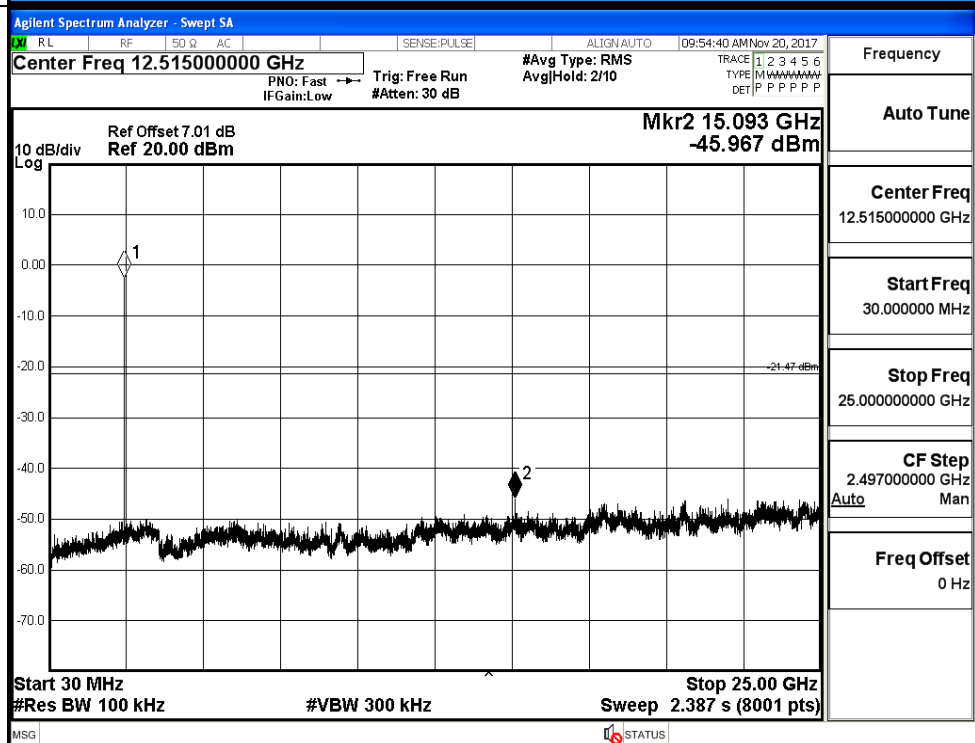


GFSK HCH Graphs

Pref

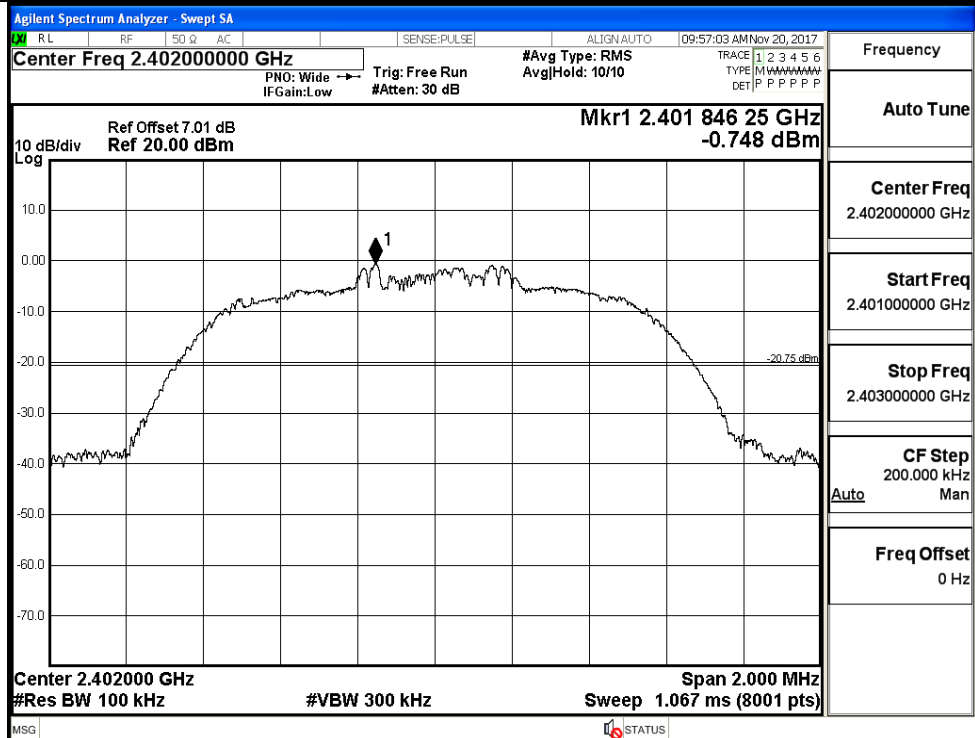


Puw

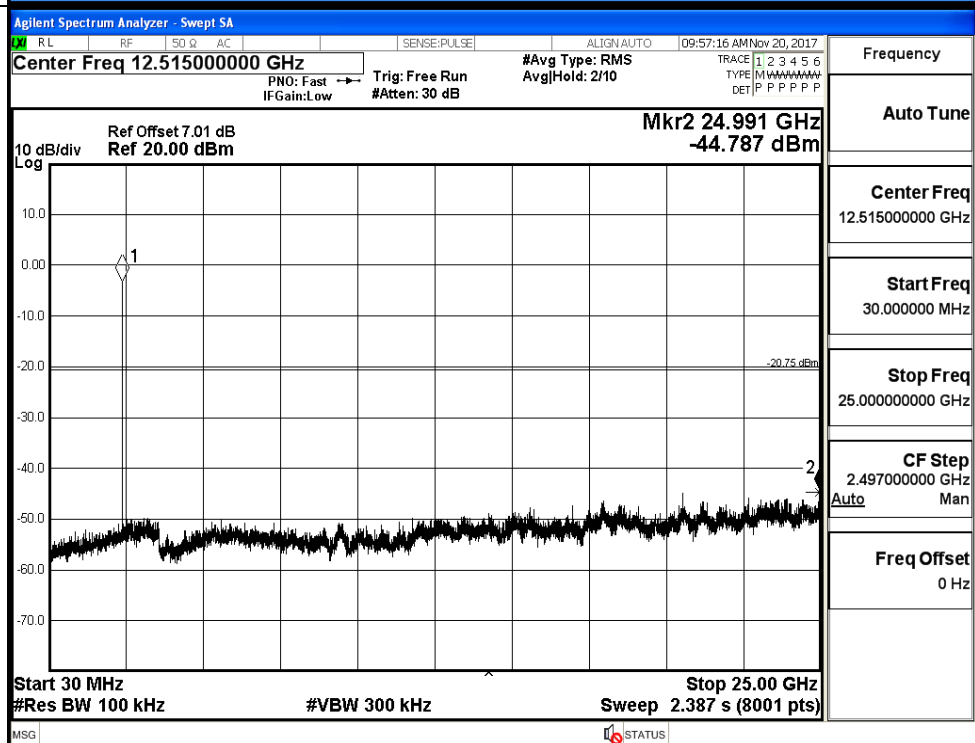


$\pi/4$ DQPSK LCH Graphs

Pref

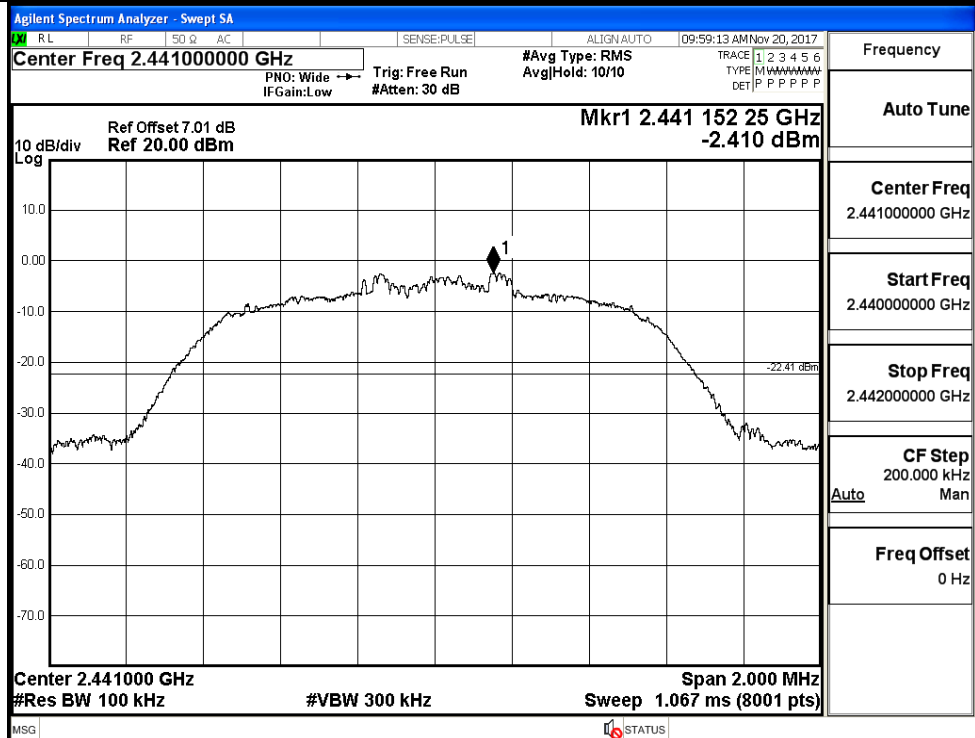


Puw

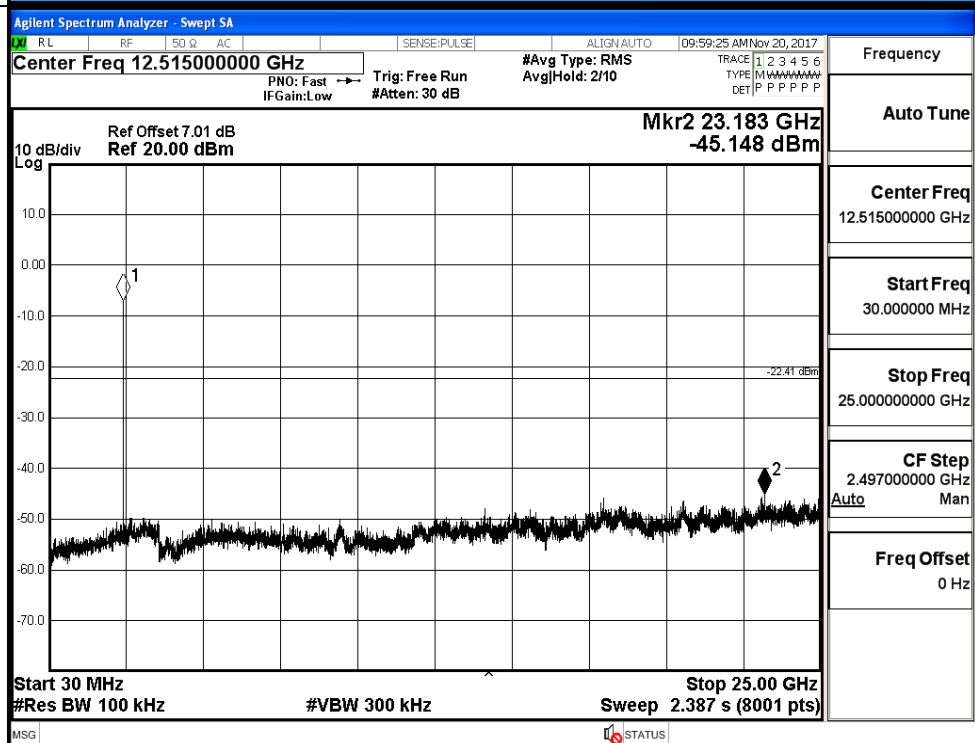


π /4DQPSK MCH Graphs

Pref

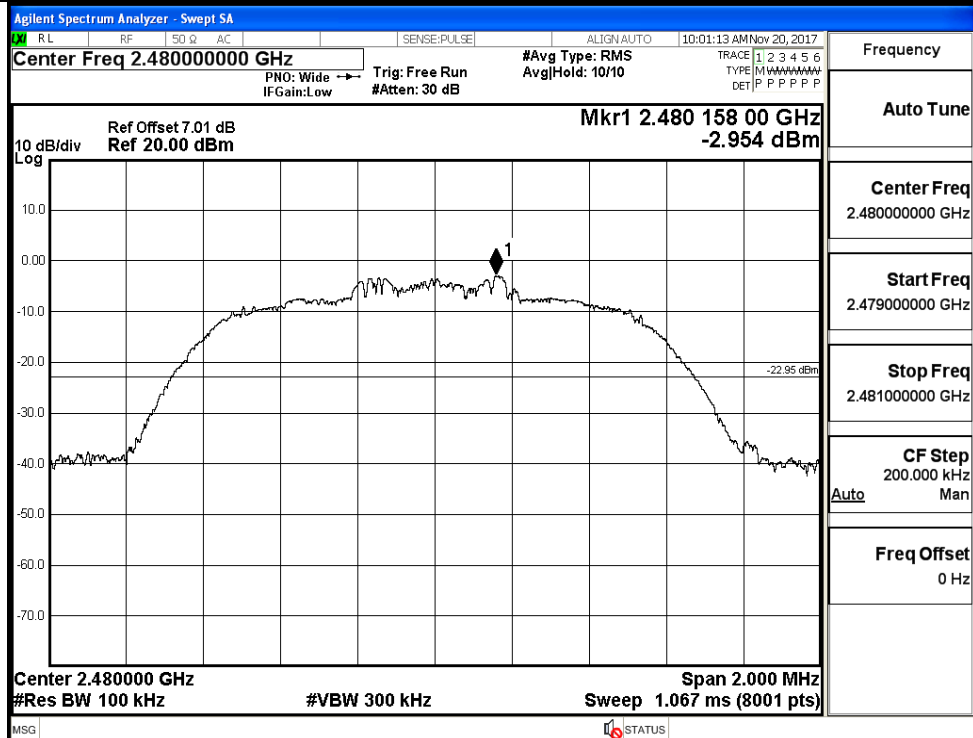


Puw

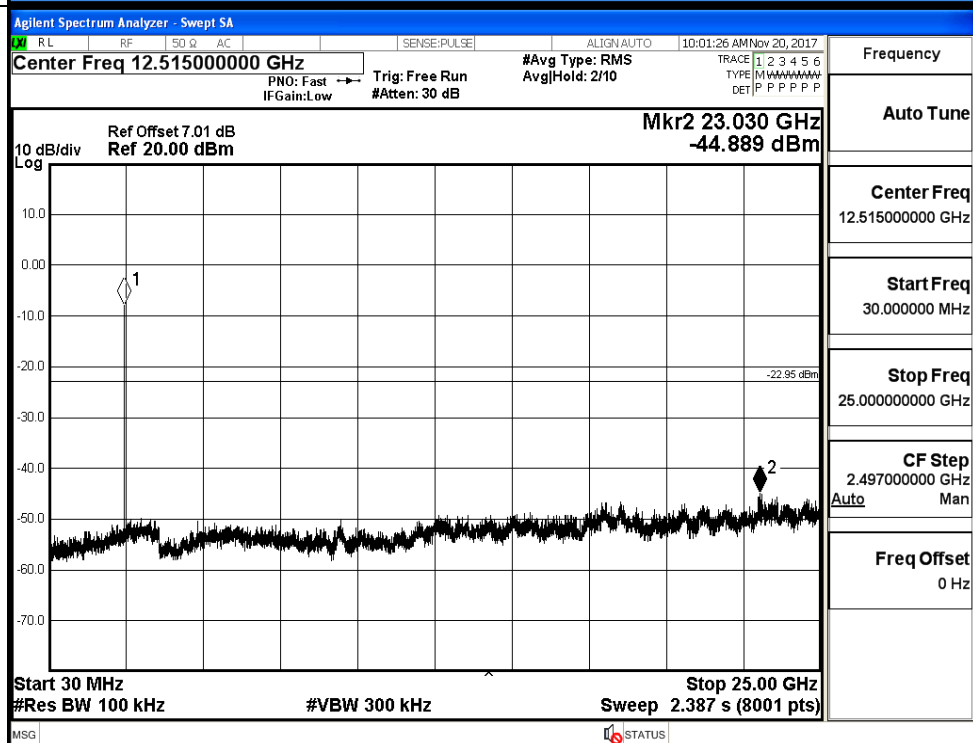


π /4DQPSK HCH Graphs

Pref

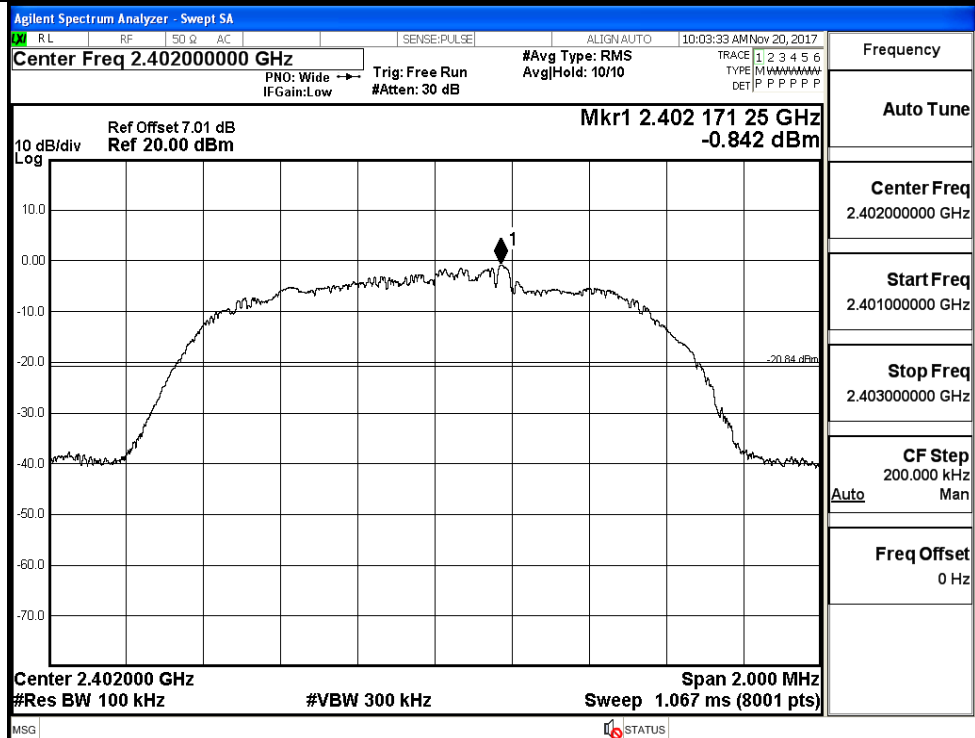


Puw

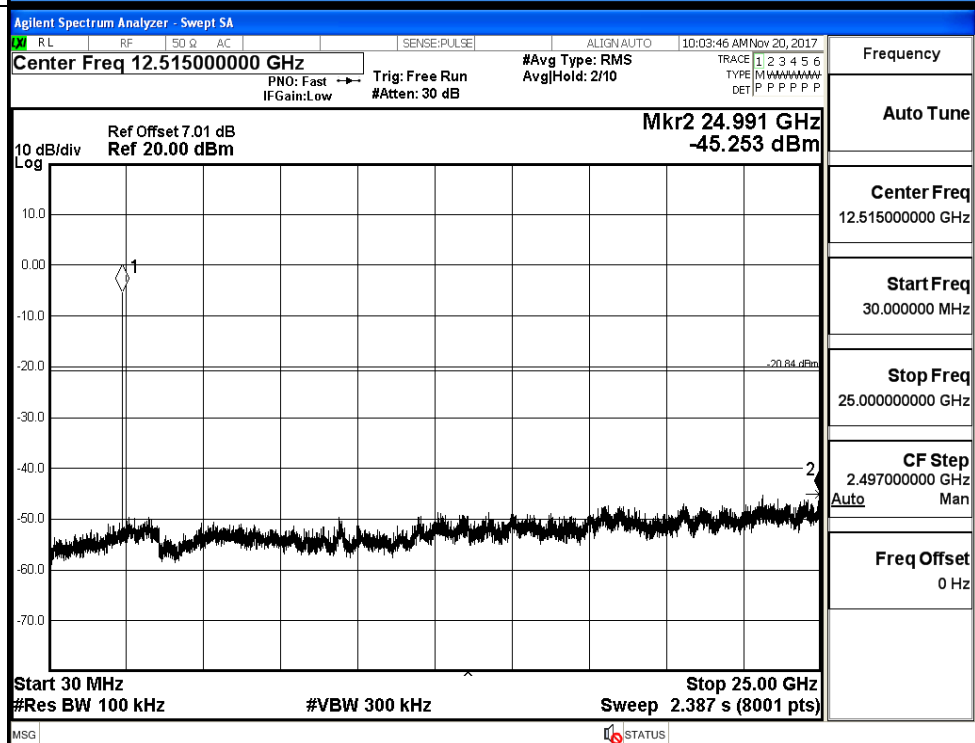


8DPSK LCH Graphs

Pref

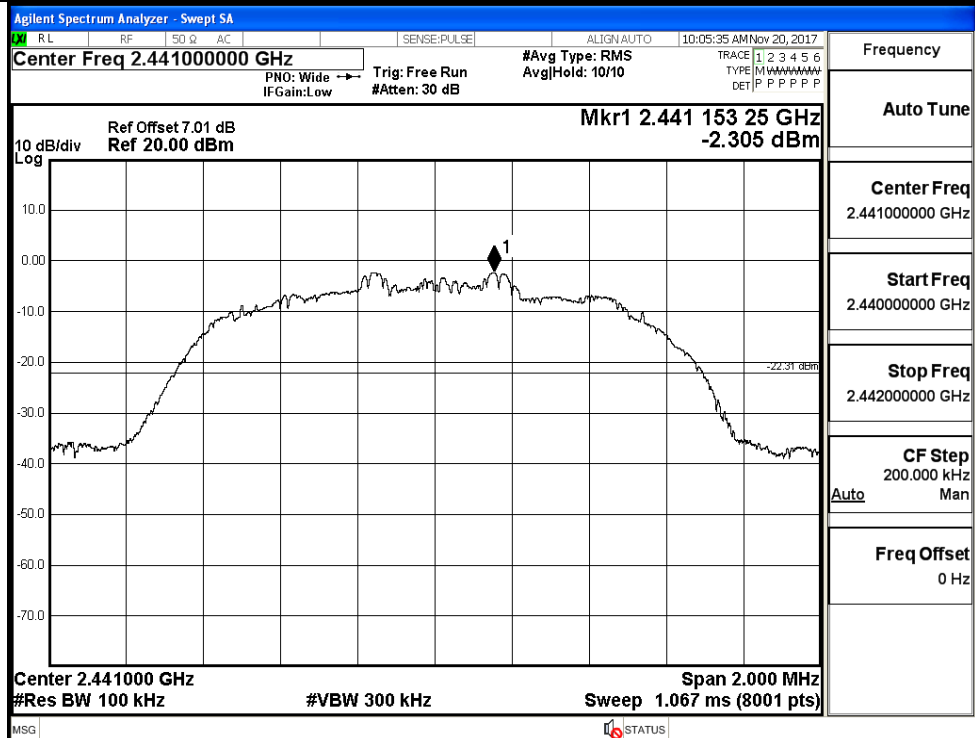


Puw

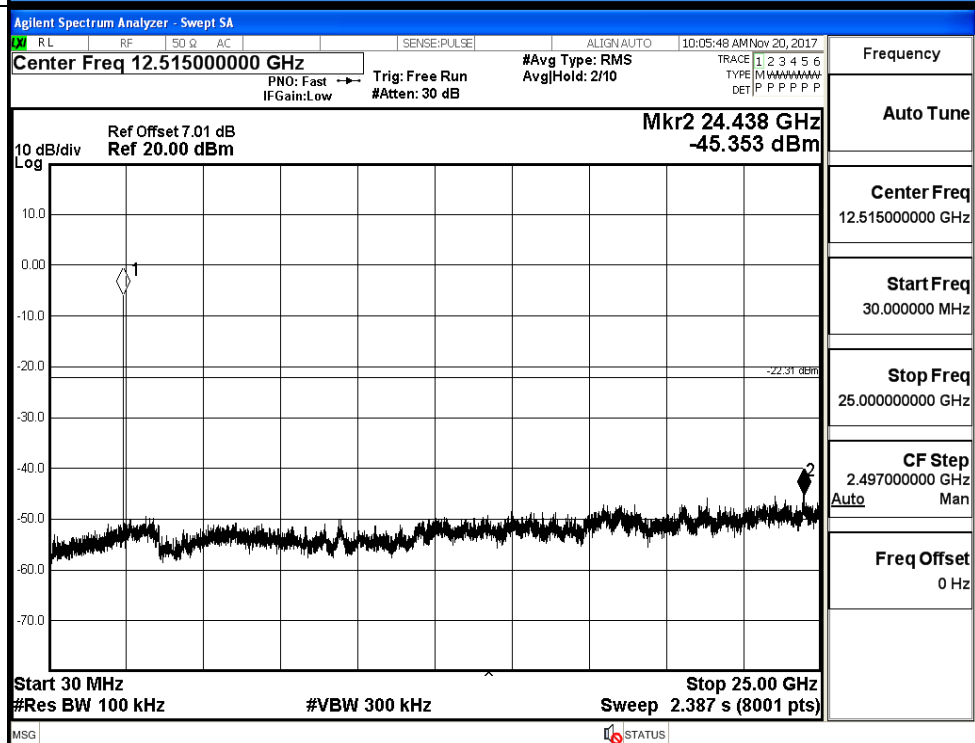


8DPSK MCH Graphs

Pref

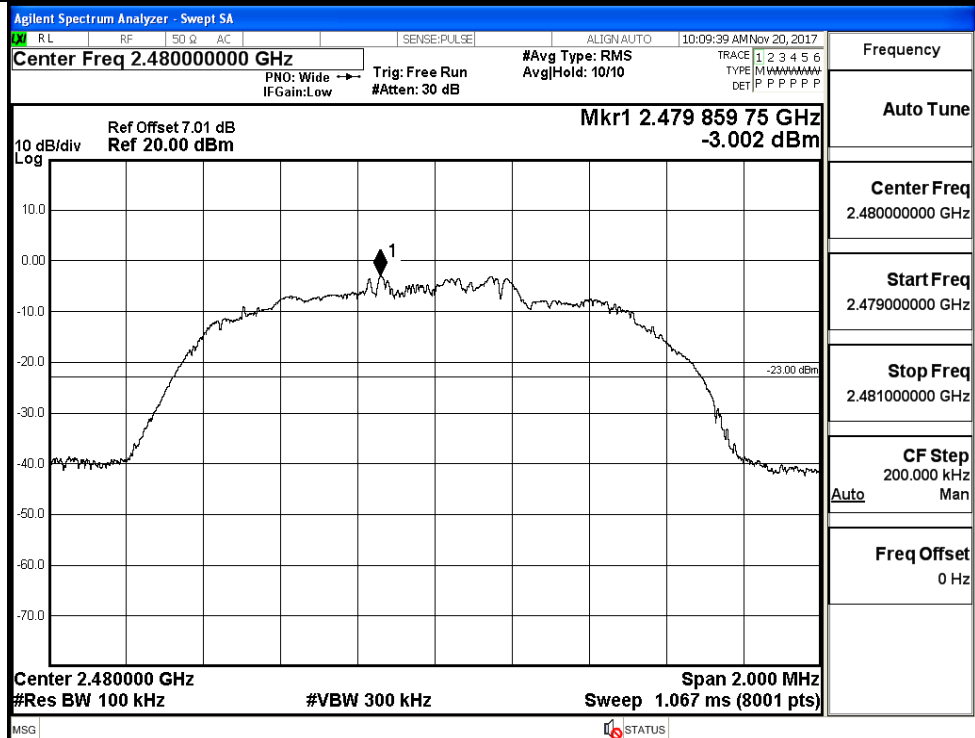


Puw

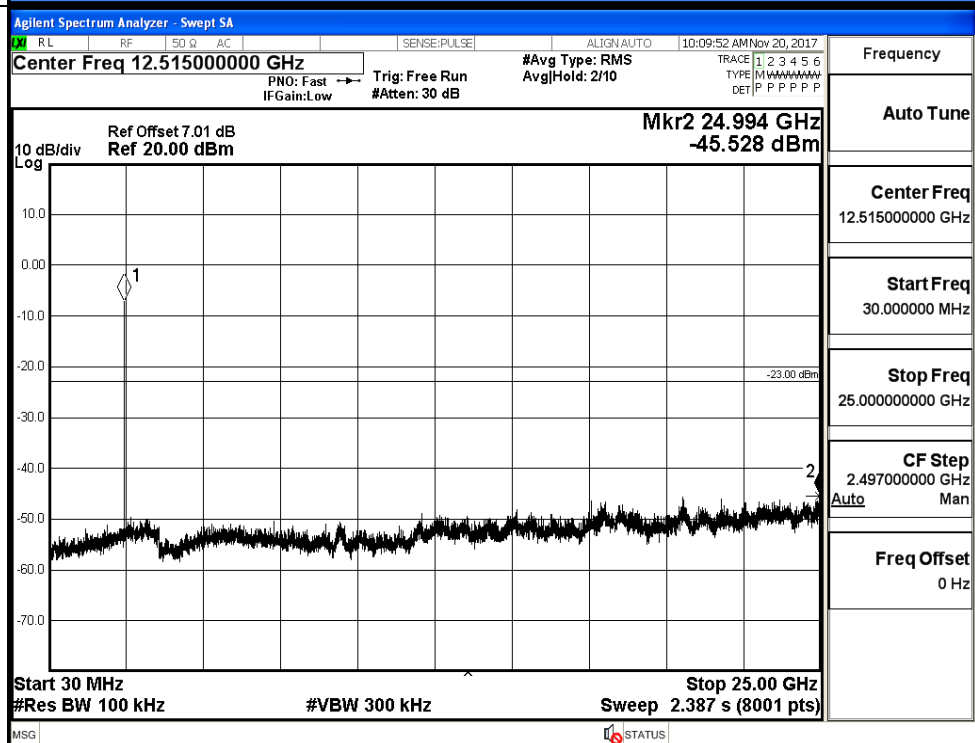


8DPSK_HCH Graphs

Pref



Puw

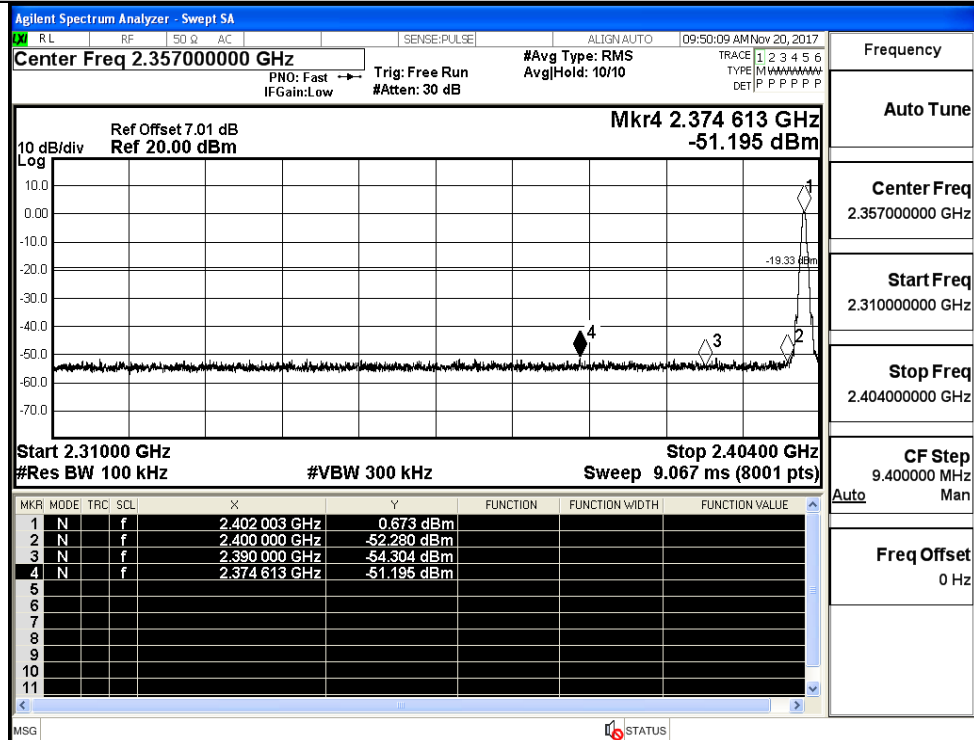


A.7 Band-edge for RF Conducted Emissions

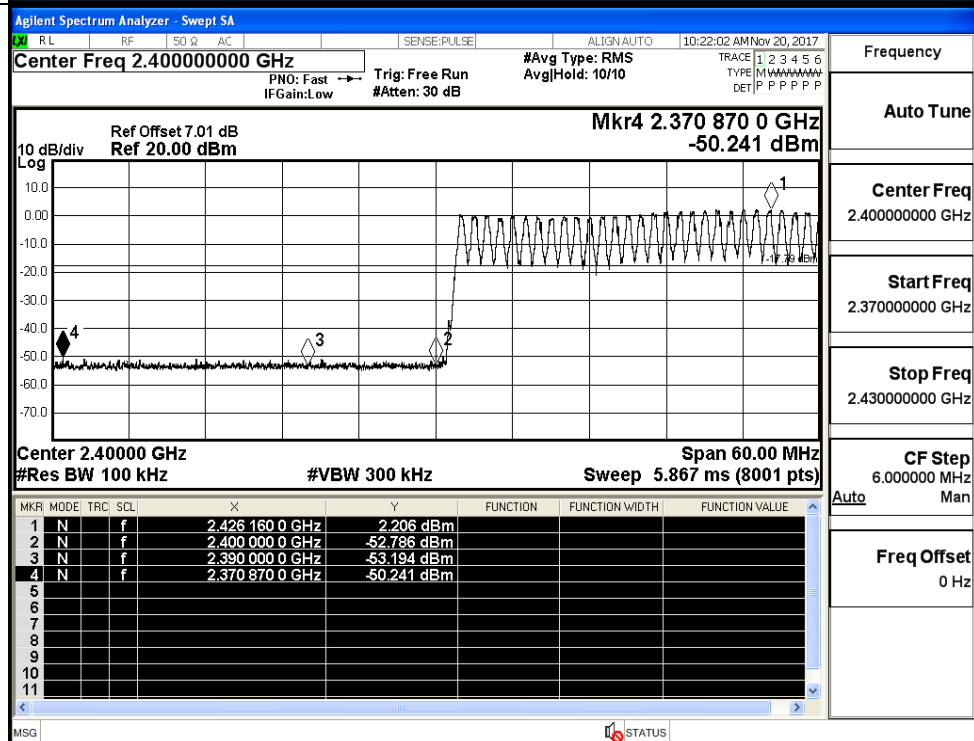
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.673	Off	-51.195	-19.33	PASS
			2.206	On	-50.241	-17.79	PASS
	HCH	2480	-1.412	Off	-51.097	-21.41	PASS
			1.790	On	-50.355	-18.21	PASS
$\pi/4$ DQPSK	LCH	2402	-3.740	Off	-50.474	-23.74	PASS
			0.742	On	-50.031	-19.26	PASS
	HCH	2480	-2.524	Off	-51.056	-22.52	PASS
			0.449	On	-50.100	-19.55	PASS
8DPSK	LCH	2402	-0.788	Off	-51.472	-20.79	PASS
			1.010	On	-50.752	-18.99	PASS
	HCH	2480	-2.978	Off	-50.726	-22.98	PASS
			0.334	On	-50.420	-19.67	PASS

Test Graphs

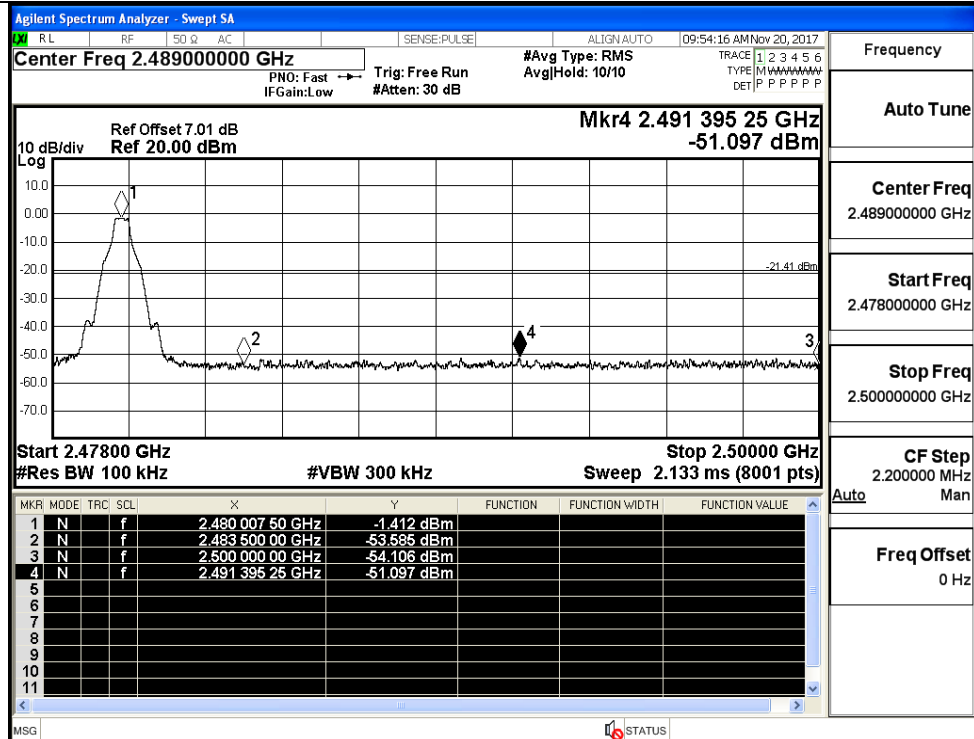
GFSK/LCH/No Hop



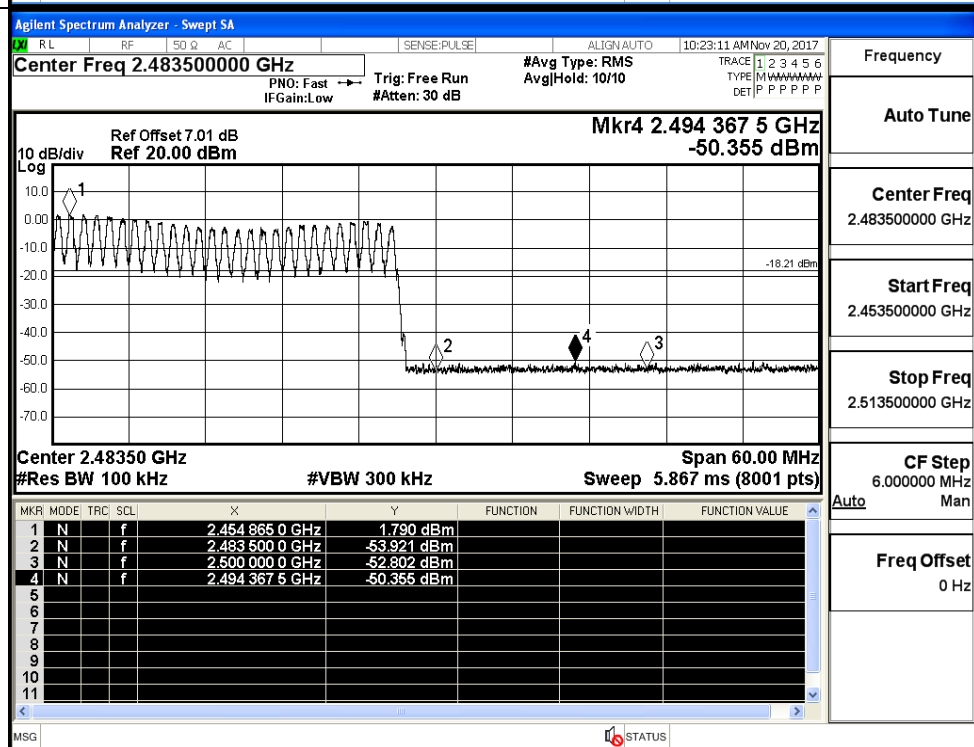
GFSK/LCH/Hop



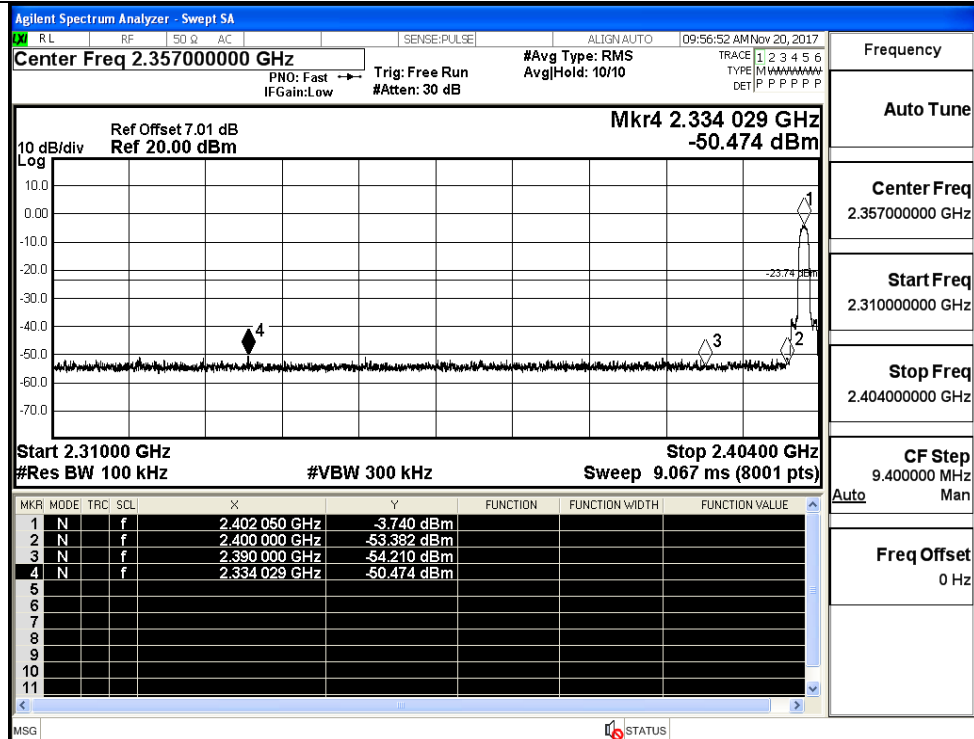
GFSK/HCH/No Hop



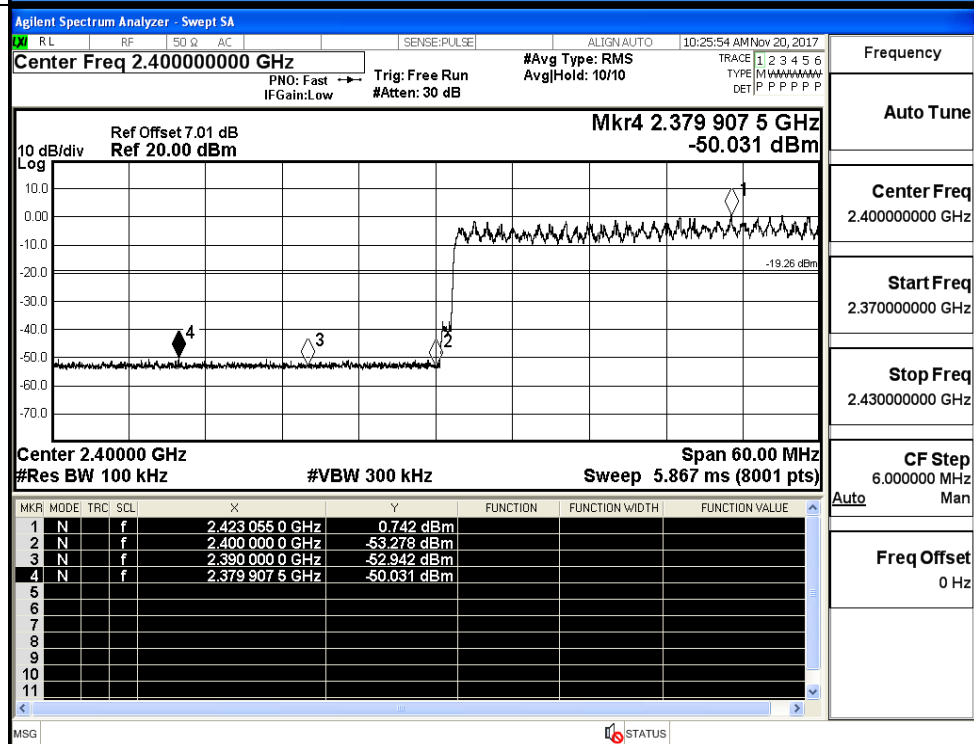
GFSK/HCH/Hop



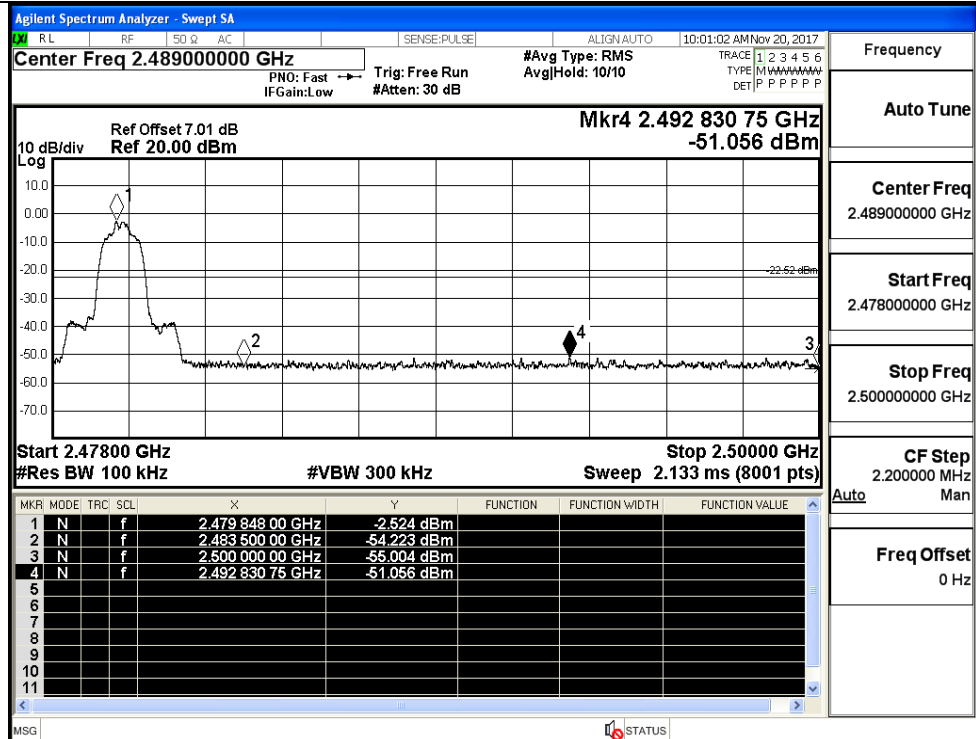
$\pi/4$ DQPSK/LCH/No
Hop



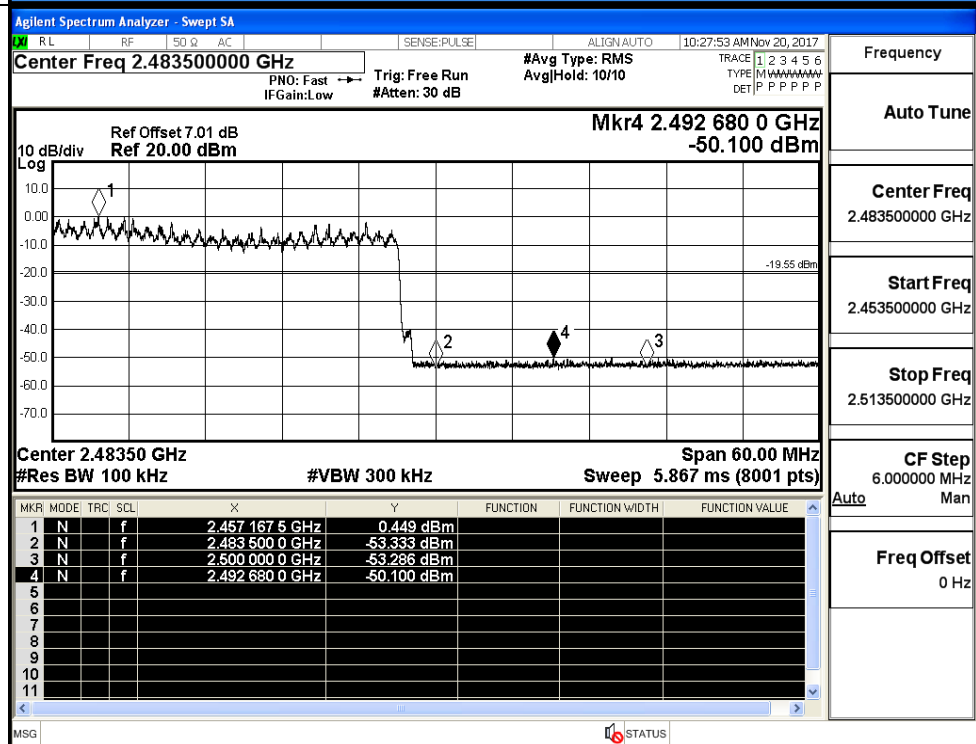
$\pi/4$ DQPSK/LCH/Hop



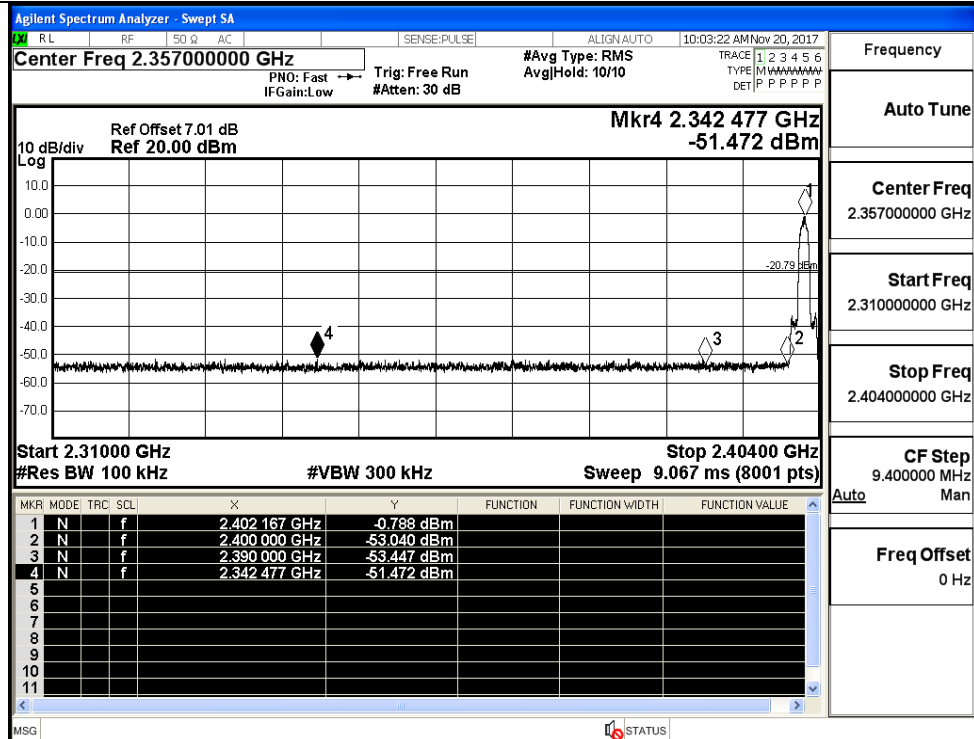
$\pi/4$ DQPSK/HCH/No
Hop



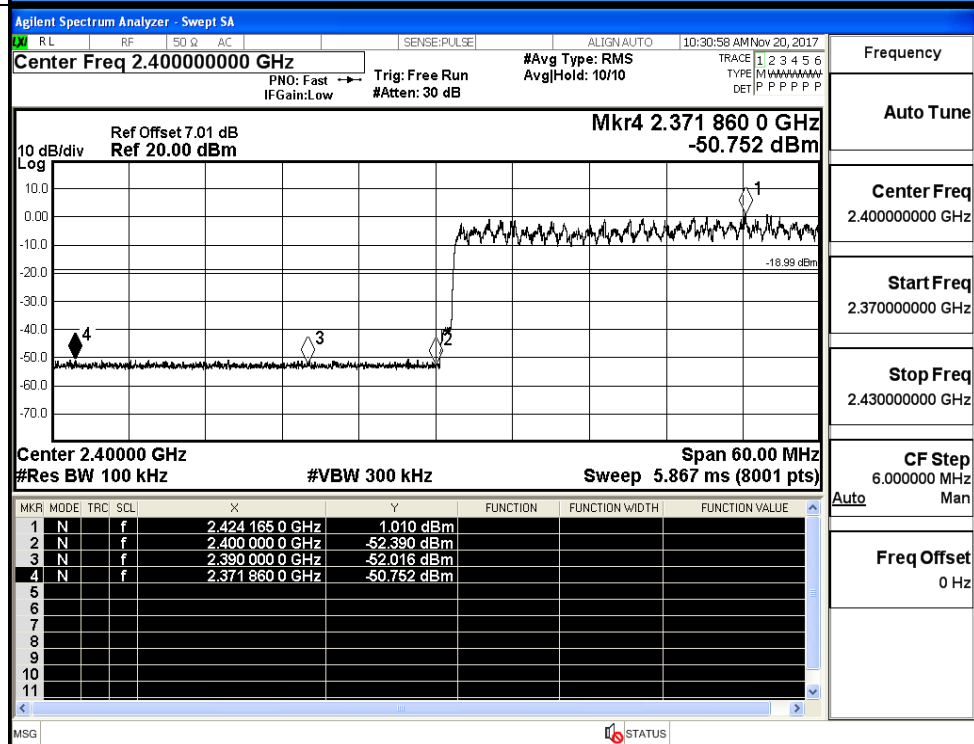
$\pi/4$ DQPSK/HCH/Hop



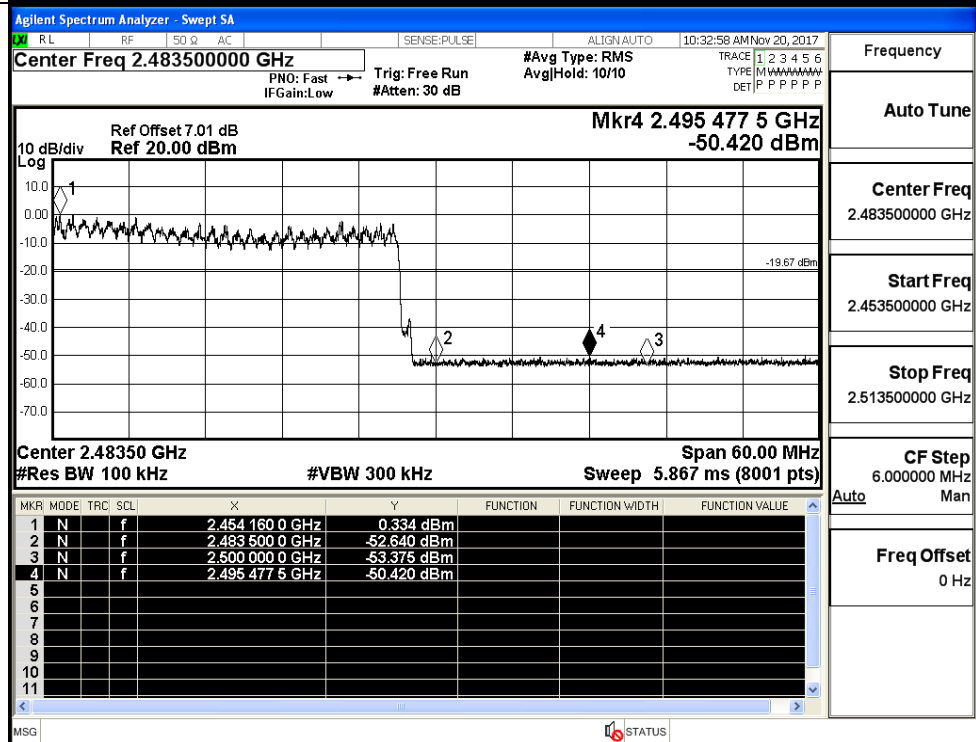
8DPSK/LCH/No Hop



8DPSK/LCH/Hop



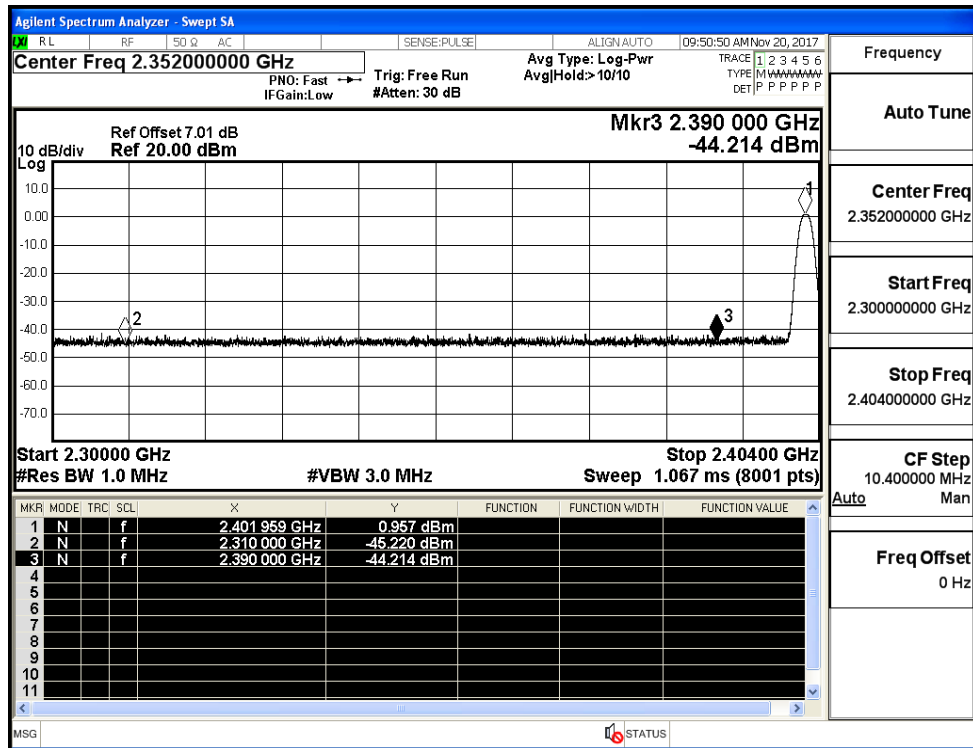
8DPSK/HCH/Hop



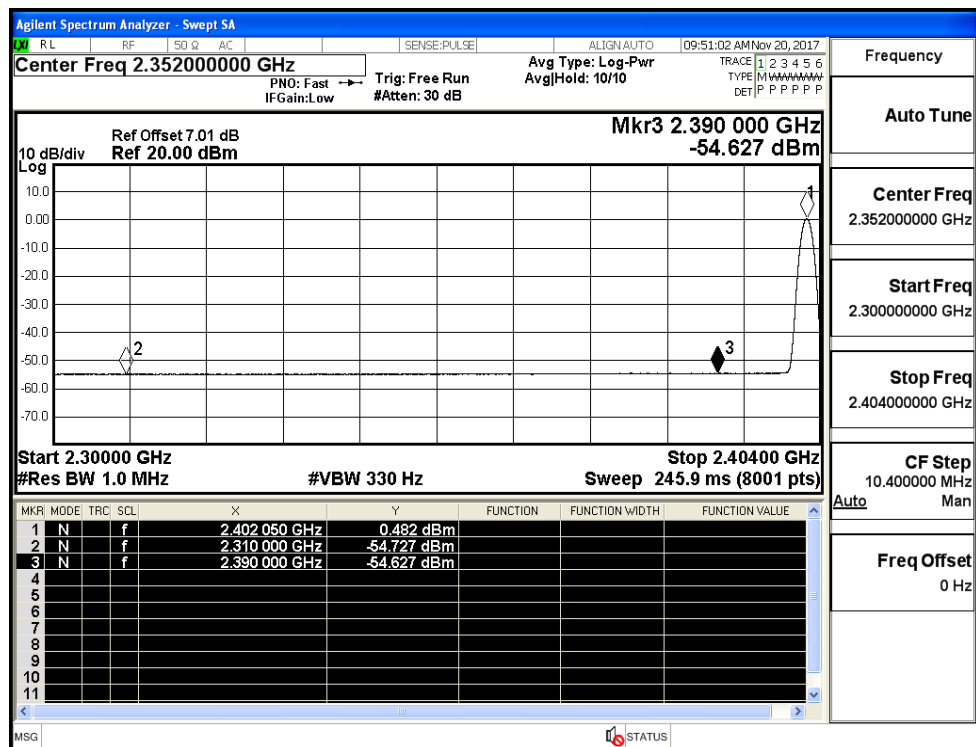
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-45.22	2.0	0	50.04	PEAK	74	PASS
	Off	2310.0	-54.73	2.0	0	40.53	AV	54	PASS
	Off	2390.0	-44.21	2.0	0	51.04	PEAK	74	PASS
	Off	2390.0	-54.63	2.0	0	40.63	AV	54	PASS
	Off	2483.5	-43.22	2.0	0	52.04	PEAK	74	PASS
	Off	2483.5	-54.22	2.0	0	41.04	AV	54	PASS
	Off	2500.0	-44.56	2.0	0	50.70	PEAK	74	PASS
	Off	2500.0	-54.23	2.0	0	41.03	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.33	2.0	0	50.93	PEAK	74	PASS
	Off	2310.0	-54.84	2.0	0	40.41	AV	54	PASS
	Off	2390.0	-45.18	2.0	0	50.08	PEAK	74	PASS
	Off	2390.0	-54.58	2.0	0	40.68	AV	54	PASS
	Off	2483.5	-43.60	2.0	0	51.66	PEAK	74	PASS
	Off	2483.5	-54.26	2.0	0	40.99	AV	54	PASS
	Off	2500.0	-44.08	2.0	0	51.18	PEAK	74	PASS
	Off	2500.0	-54.15	2.0	0	41.10	AV	54	PASS
8DPSK	Off	2310.0	-44.56	2.0	0	50.70	PEAK	74	PASS
	Off	2310.0	-54.86	2.0	0	40.39	AV	54	PASS
	Off	2390.0	-42.07	2.0	0	53.19	PEAK	74	PASS
	Off	2390.0	-54.60	2.0	0	40.66	AV	54	PASS
	Off	2483.5	-43.74	2.0	0	51.52	PEAK	74	PASS
	Off	2483.5	-54.29	2.0	0	40.96	AV	54	PASS
	Off	2500.0	-43.78	2.0	0	51.48	PEAK	74	PASS
	Off	2500.0	-54.20	2.0	0	41.06	AV	54	PASS

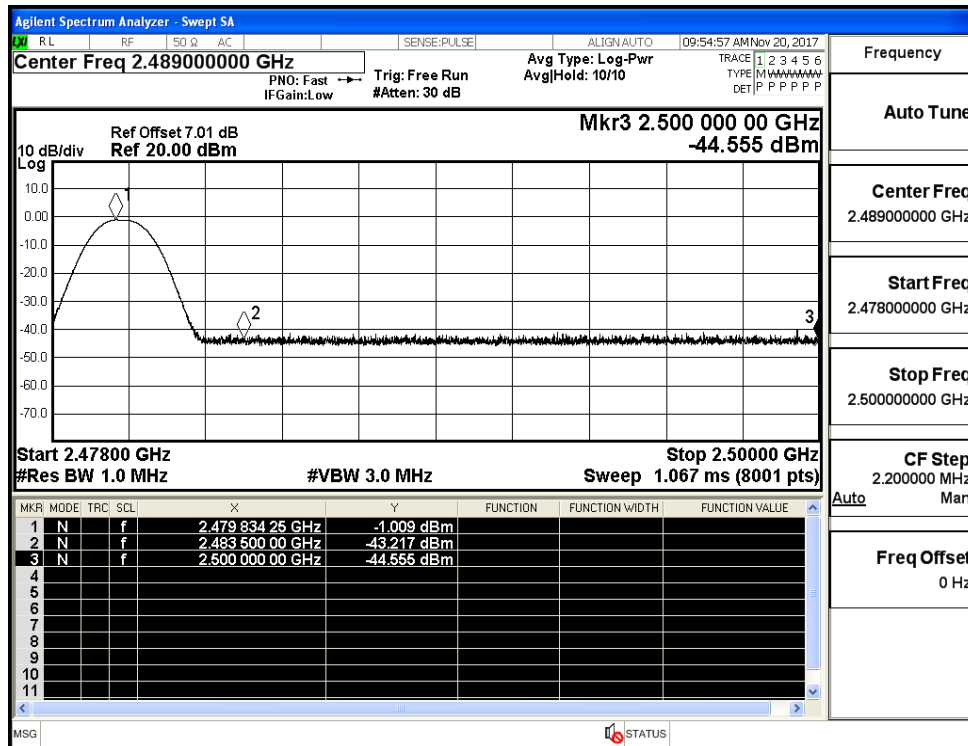
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



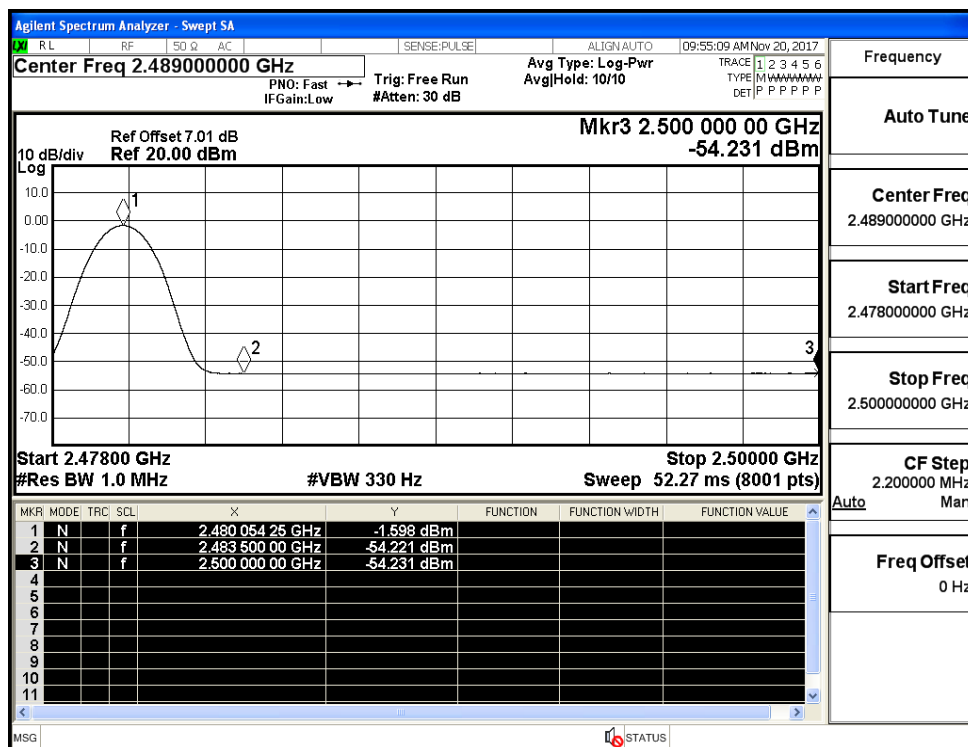
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

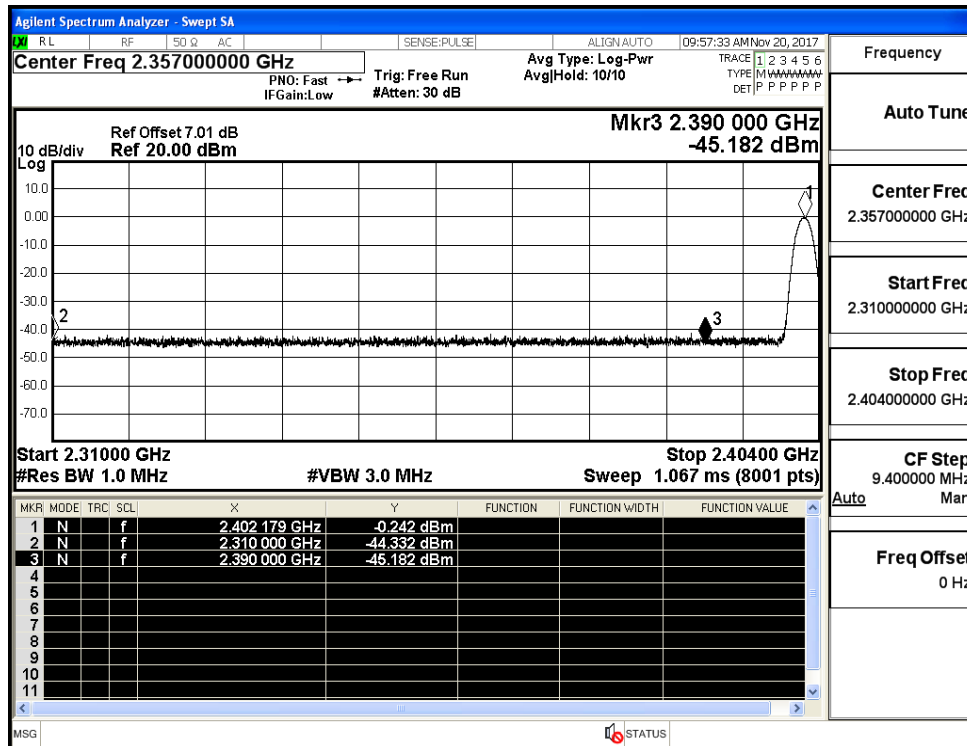
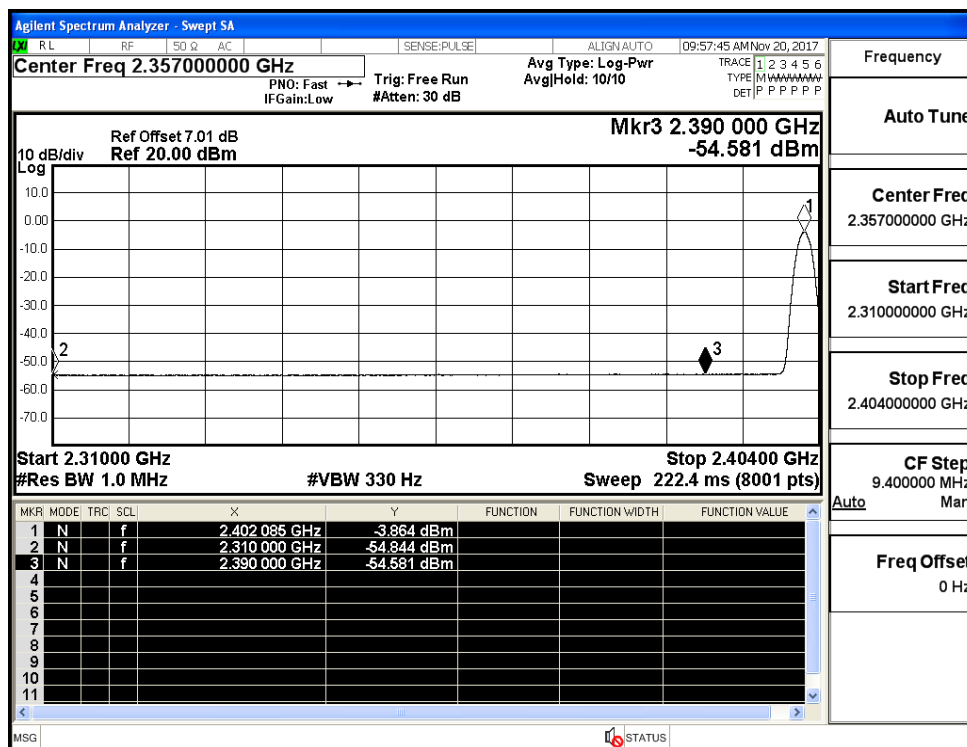


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

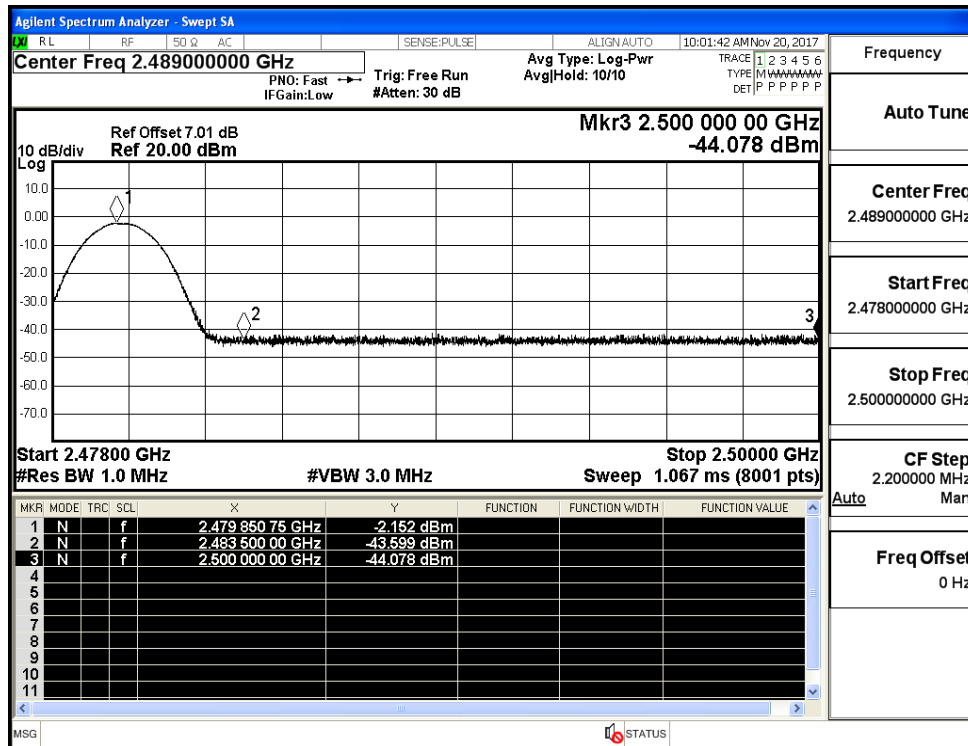


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

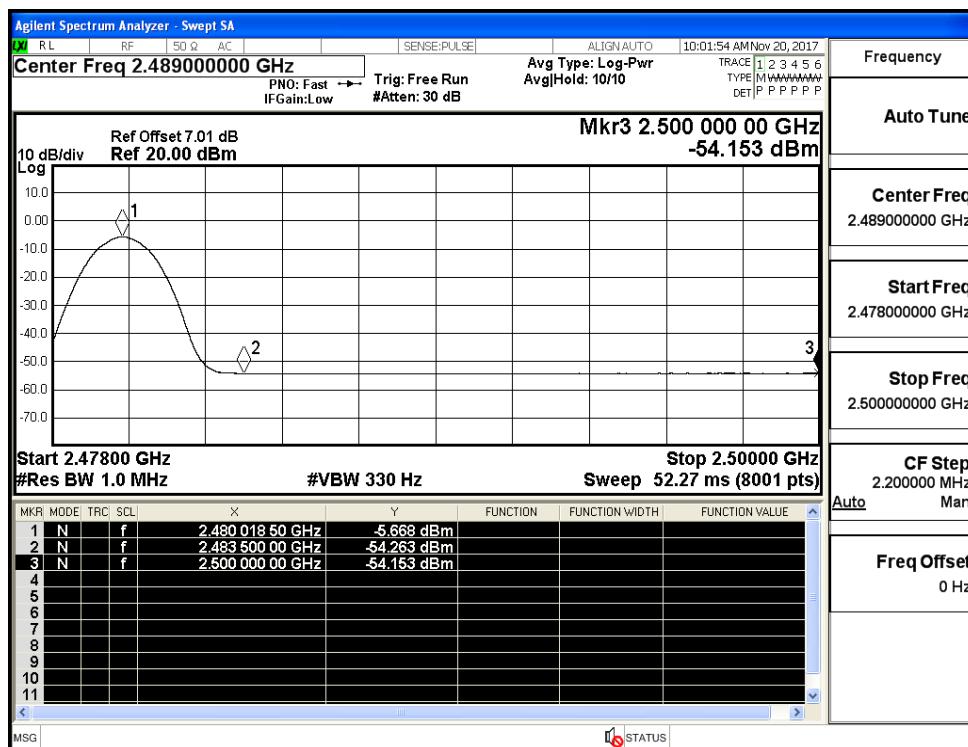


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

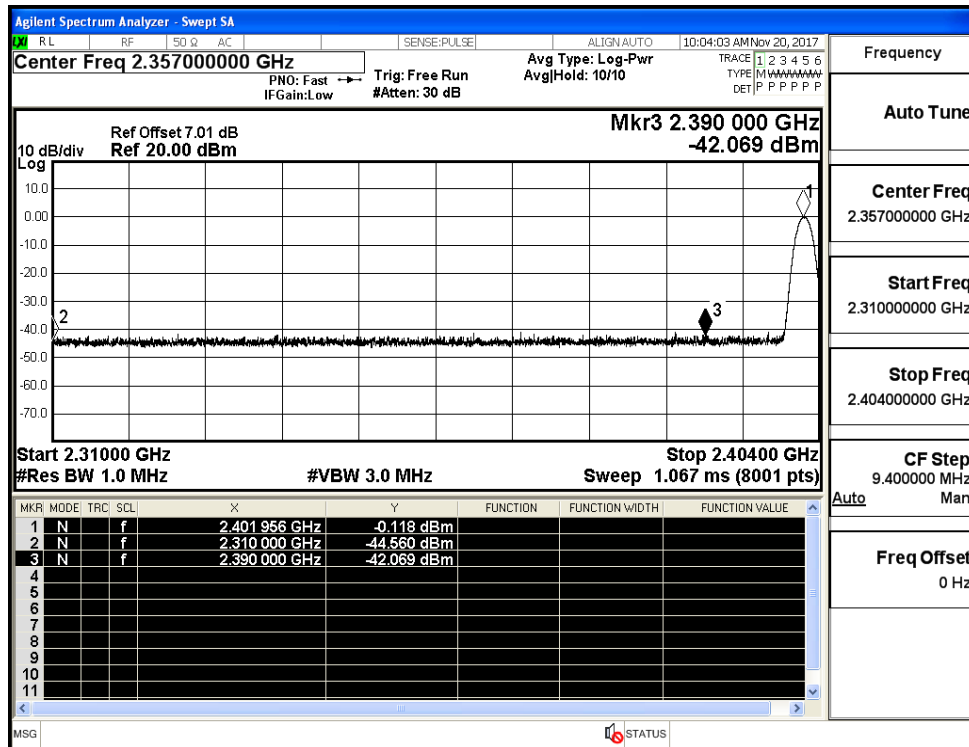
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



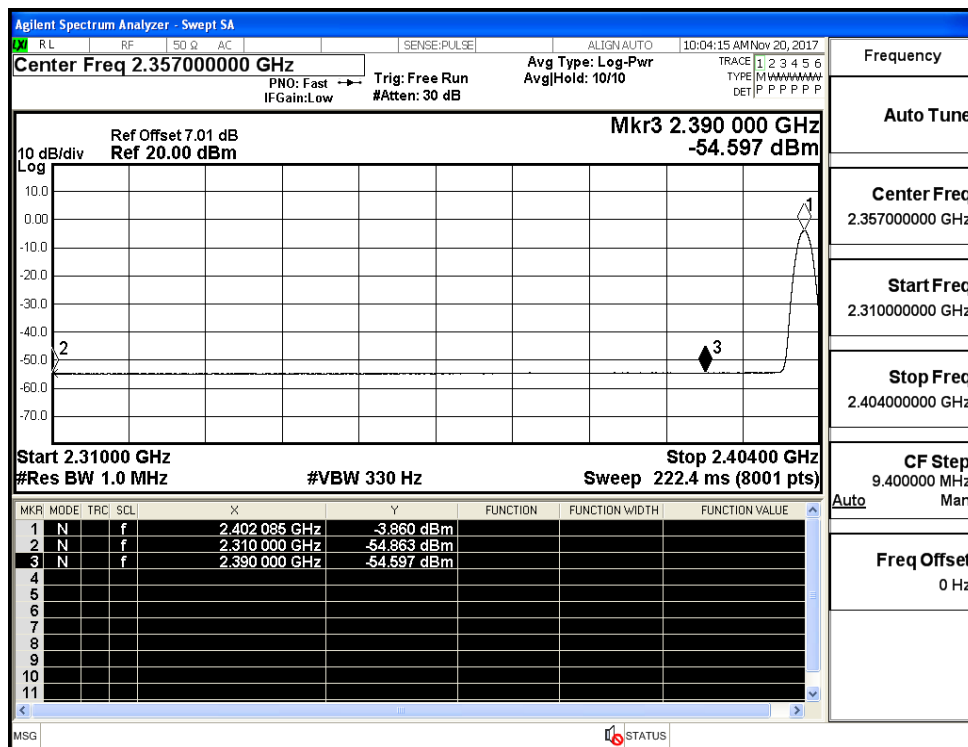
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



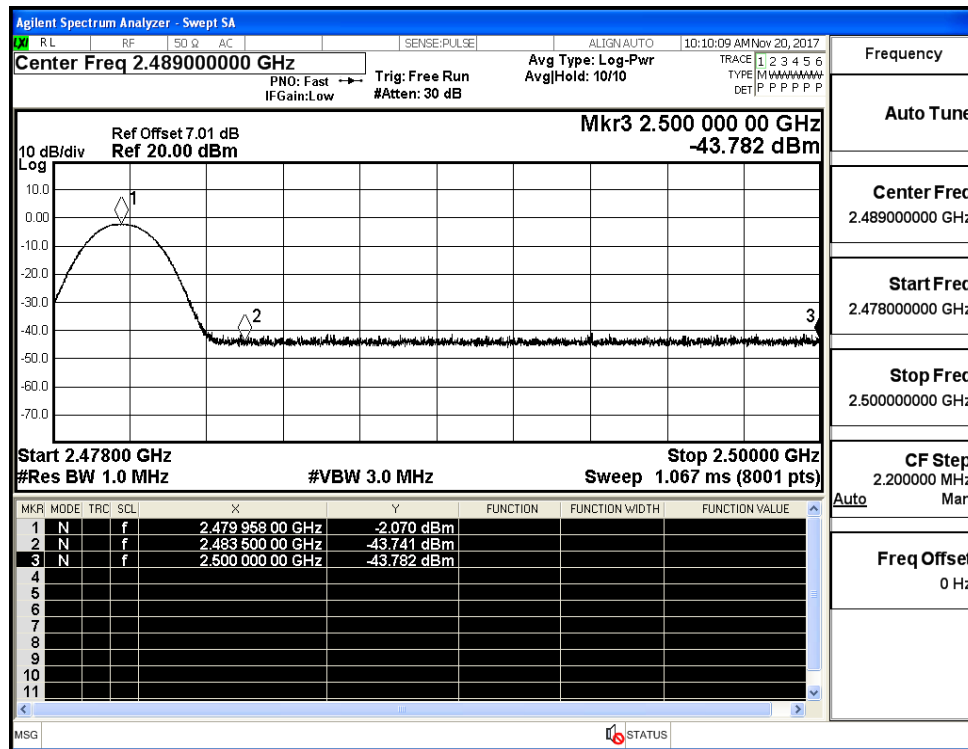
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

