

Appendix A

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

Product Name: BT-510ANC On Ear Bluetooth Headphone with ANC

Trade Mark: Monoprice, IIIP

Test Model: 34439

Environmental Conditions

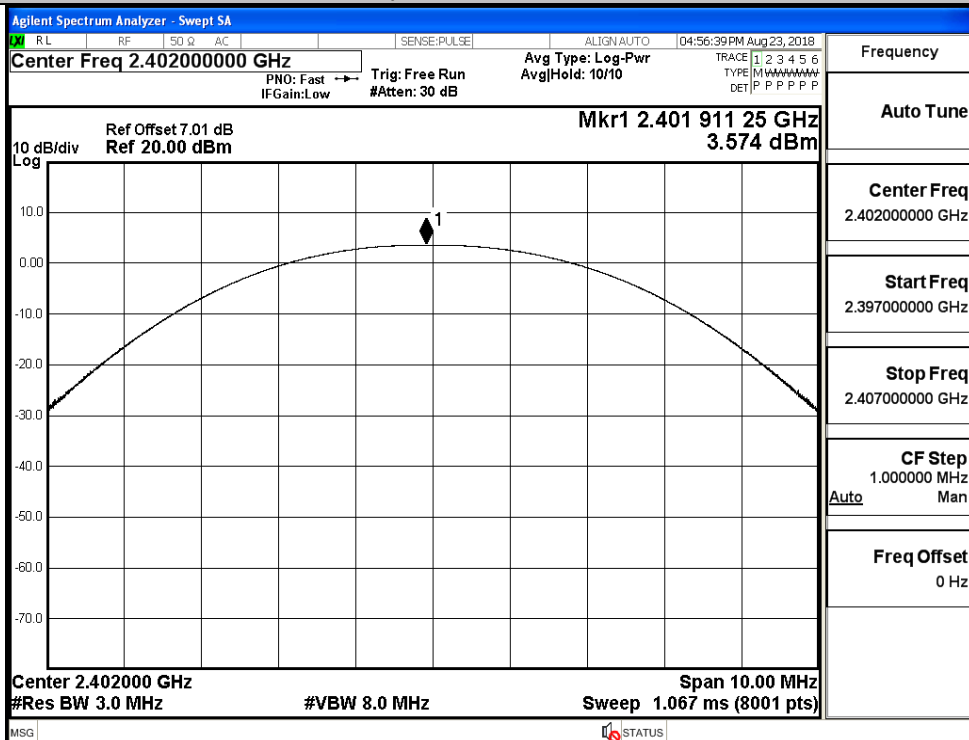
Temperature:	22.6 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Pengyunfei
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

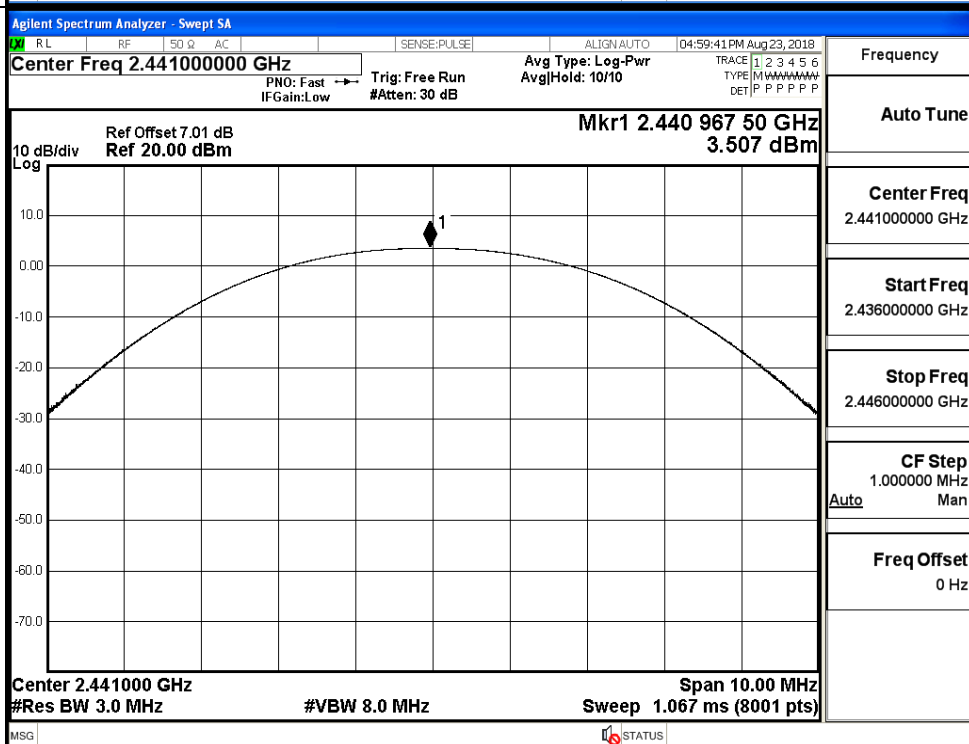
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.574	21	PASS
	MCH	3.507	21	PASS
	HCH	3.355	21	PASS
$\pi/4$ DQPSK	LCH	3.442	21	PASS
	MCH	3.387	21	PASS
	HCH	3.212	21	PASS
8DPSK	LCH	3.632	21	PASS
	MCH	3.567	21	PASS
	HCH	3.402	21	PASS

Test Graphs

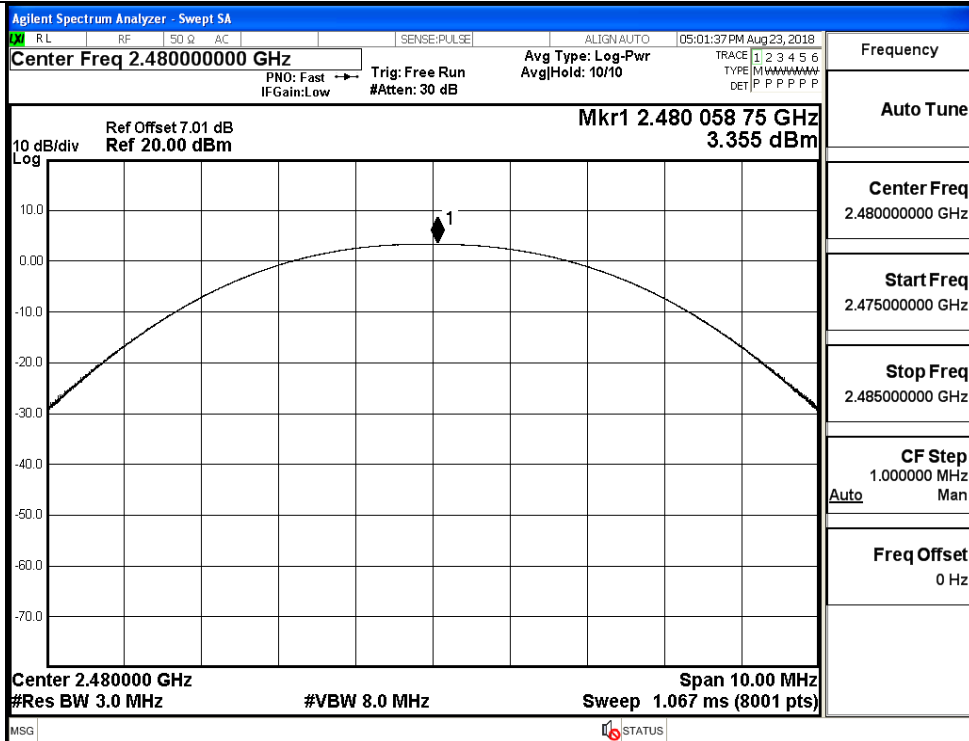
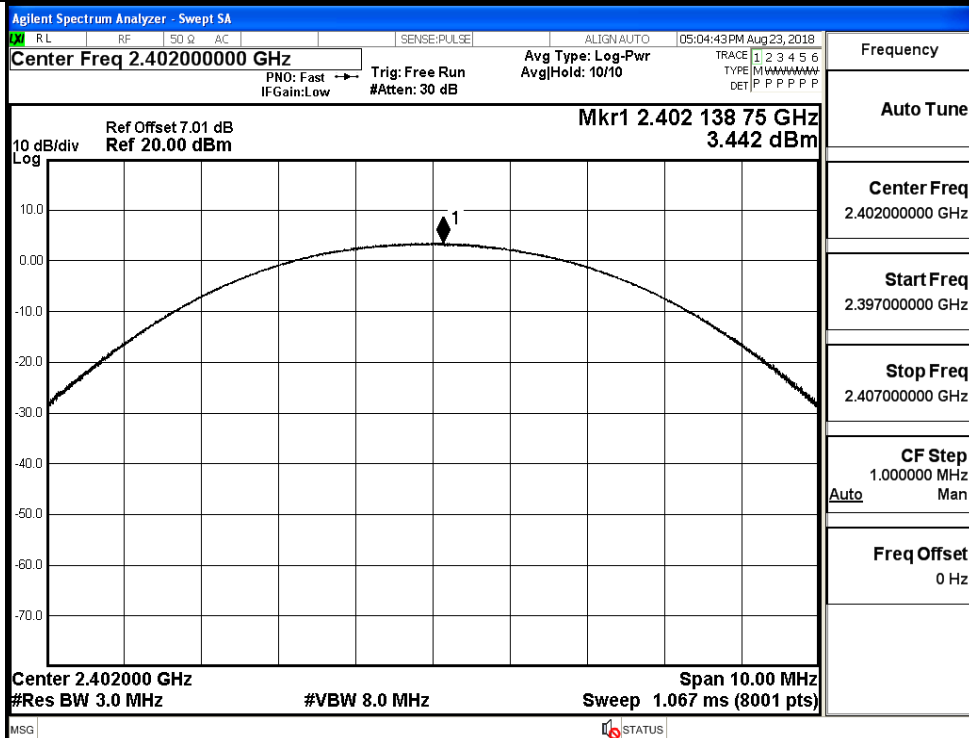
GFSK/LCH

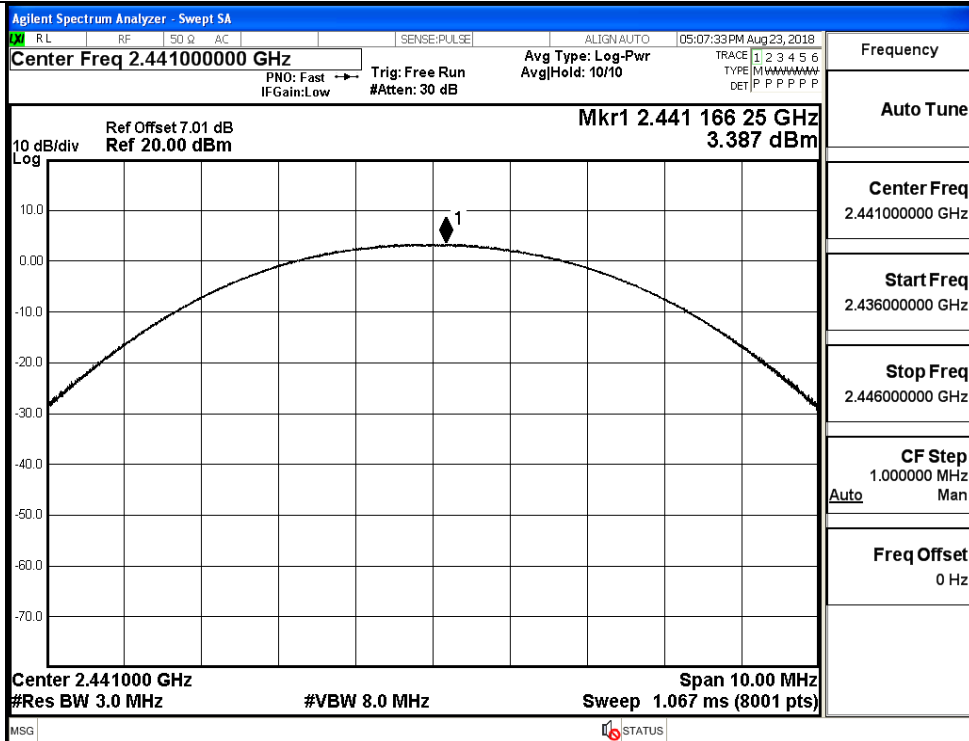
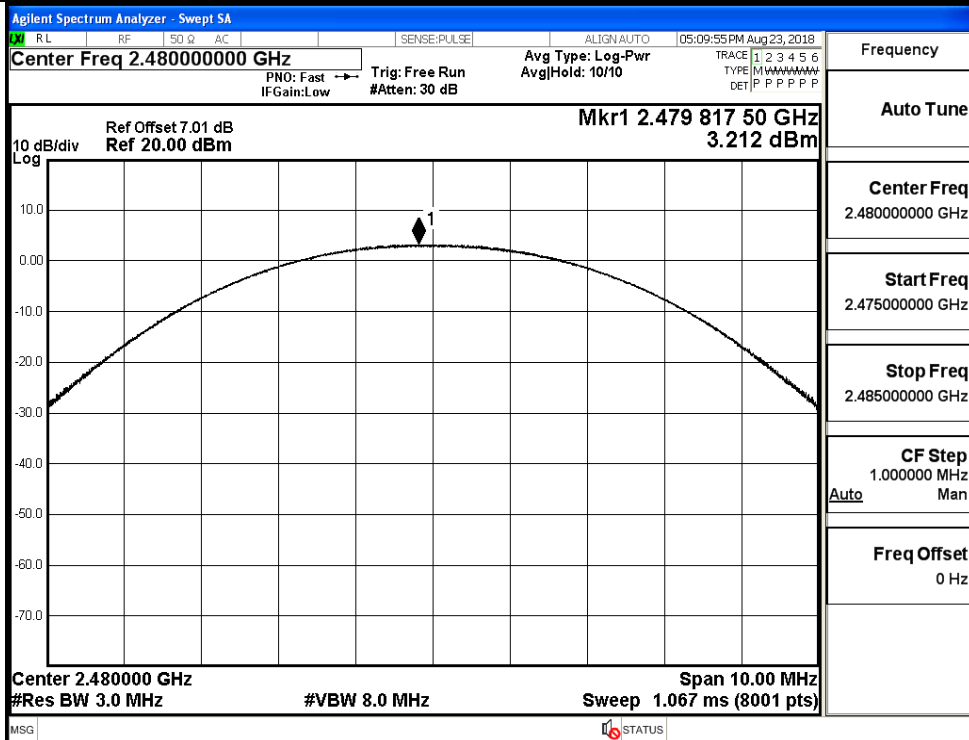


GFSK/MCH

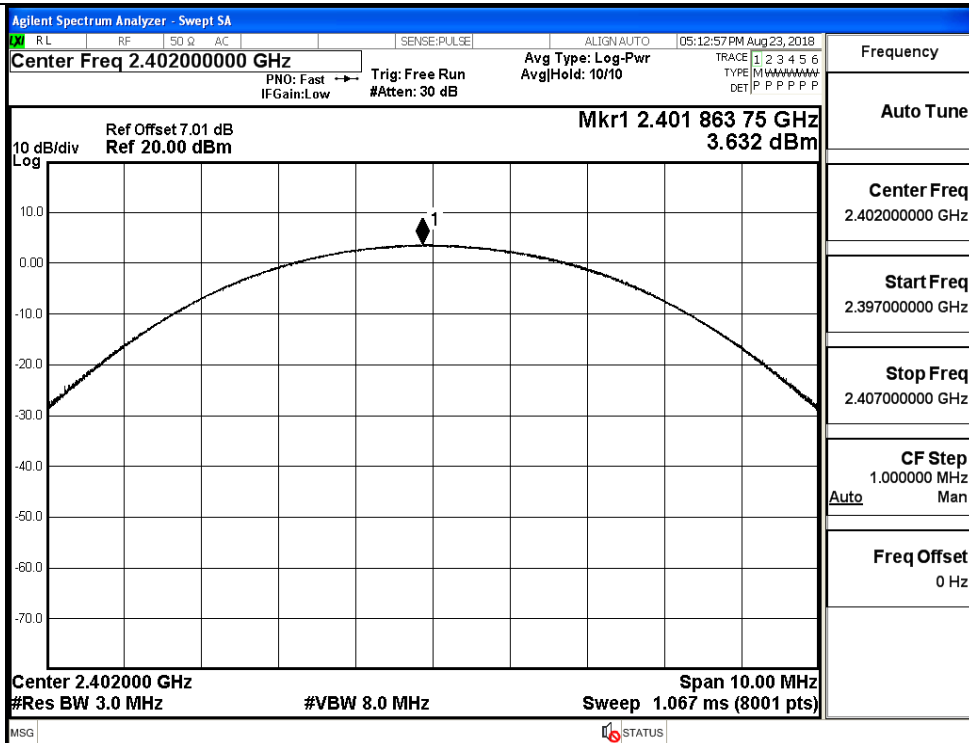


GFSK/HCH

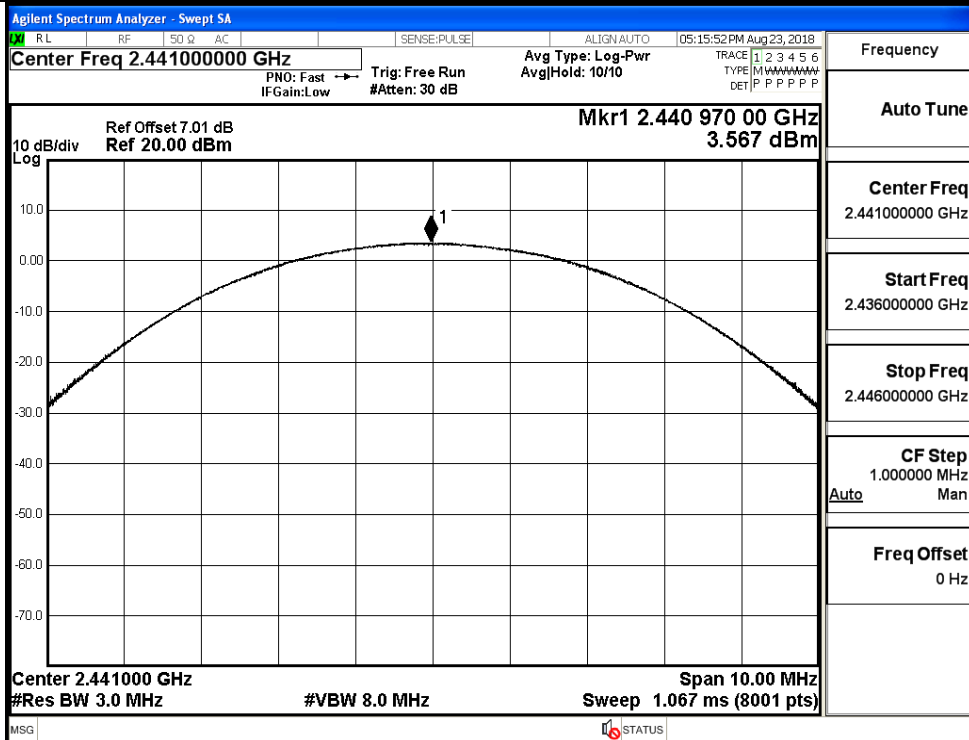
 π /4DQPSK/LCH

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

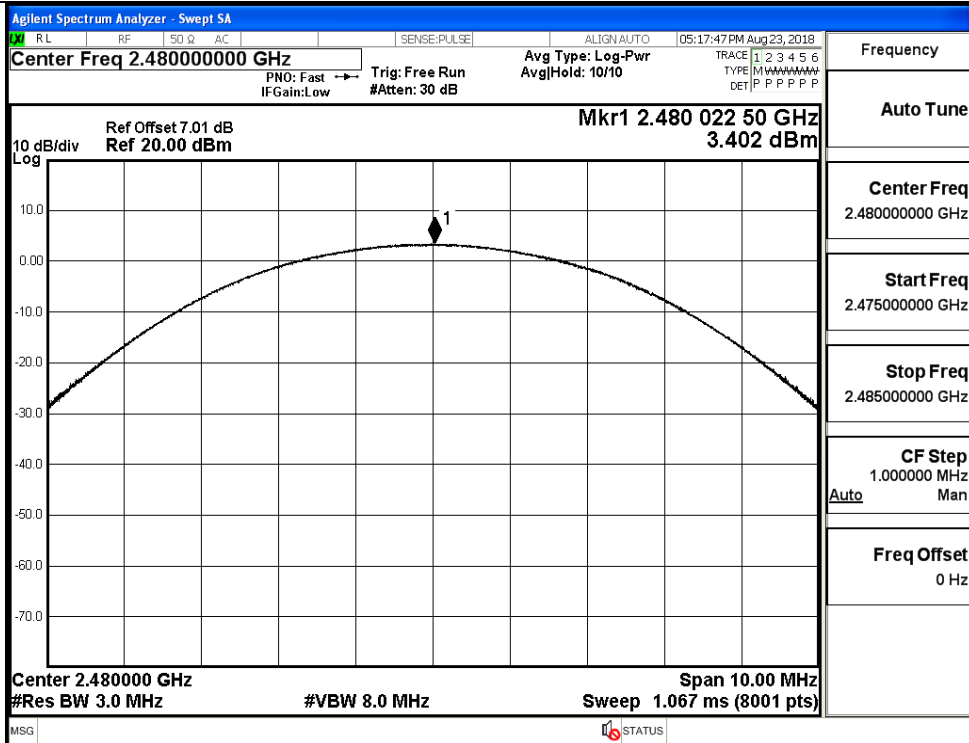
8DPSK/LCH



8DPSK/MCH



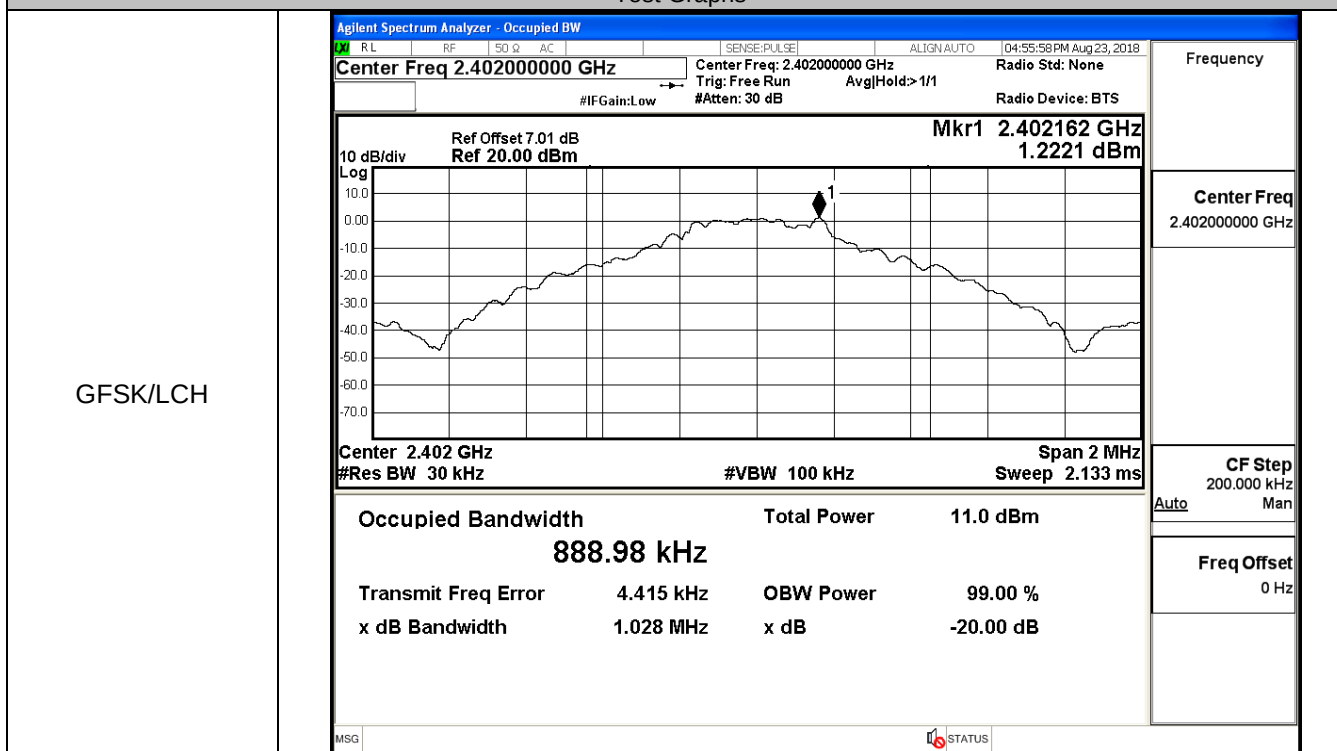
8DPSK/HCH



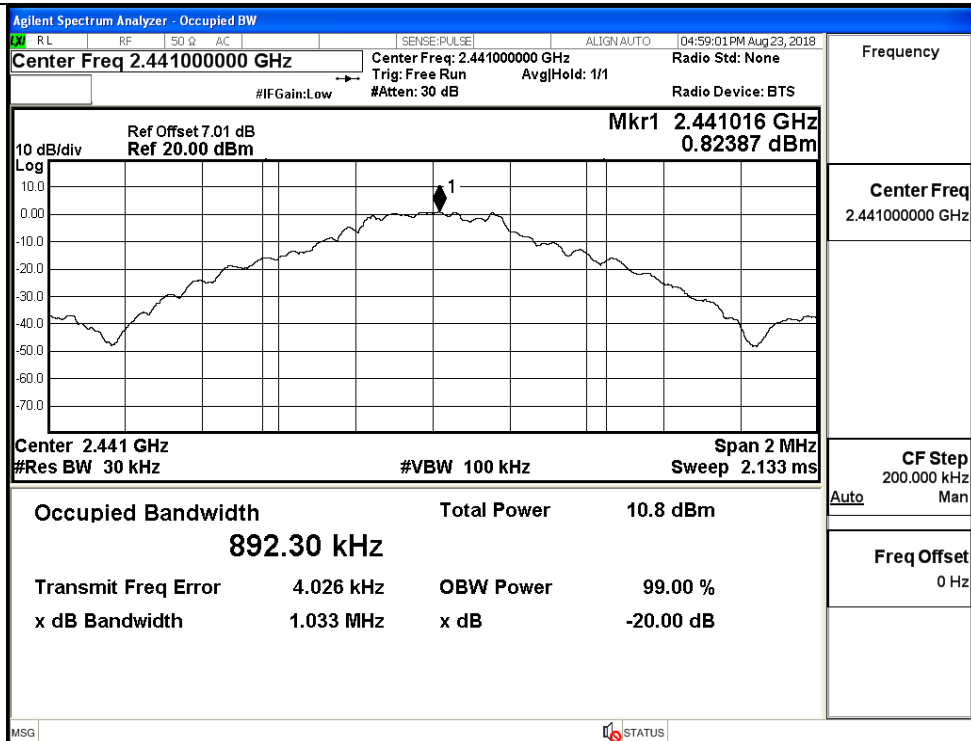
A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.88898	1.028	Not Specified	PASS
	MCH	0.89230	1.033	Not Specified	PASS
	HCH	0.88858	1.027	Not Specified	PASS
π /4DQPSK	LCH	1.1683	1.286	Not Specified	PASS
	MCH	1.1672	1.287	Not Specified	PASS
	HCH	1.1669	1.289	Not Specified	PASS
8DPSK	LCH	1.1729	1.286	Not Specified	PASS
	MCH	1.1709	1.286	Not Specified	PASS
	HCH	1.1705	1.285	Not Specified	PASS

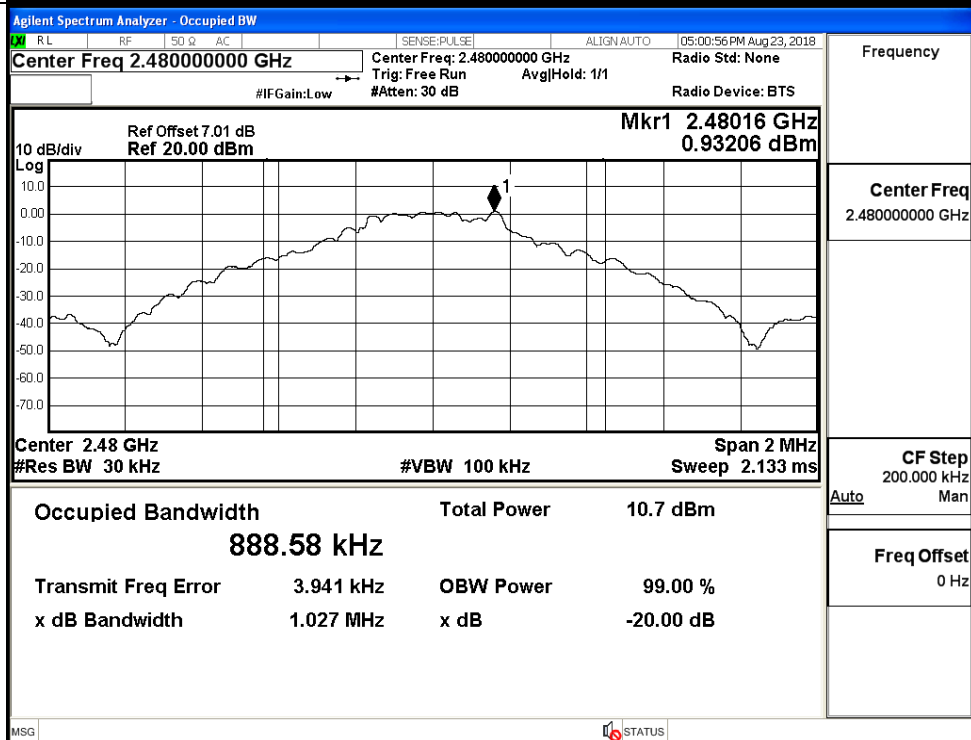
Test Graphs

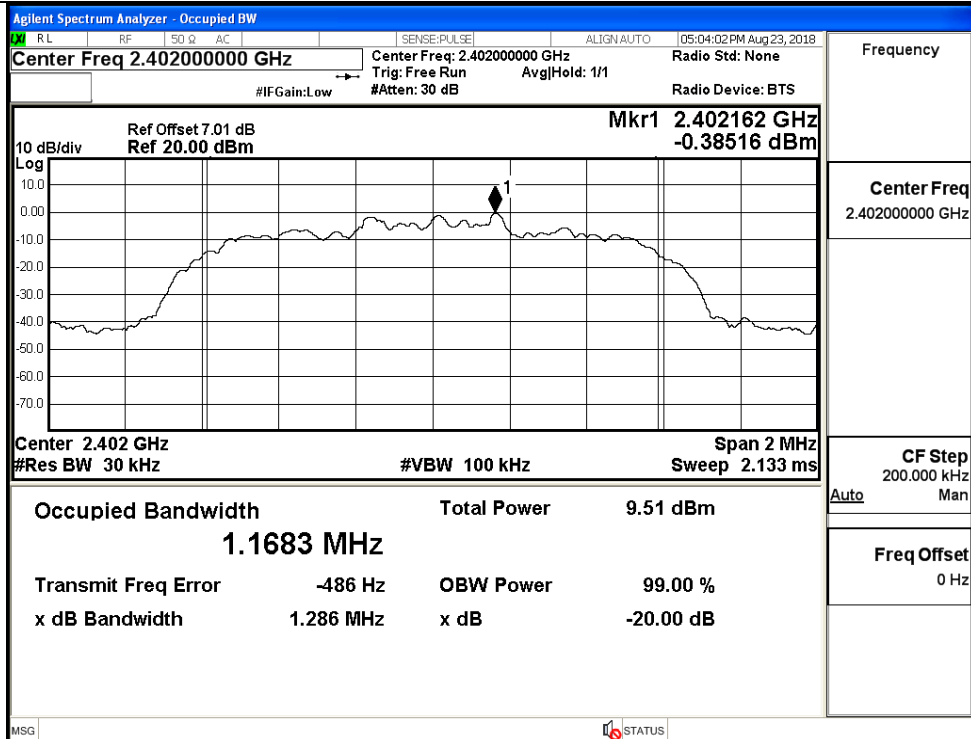
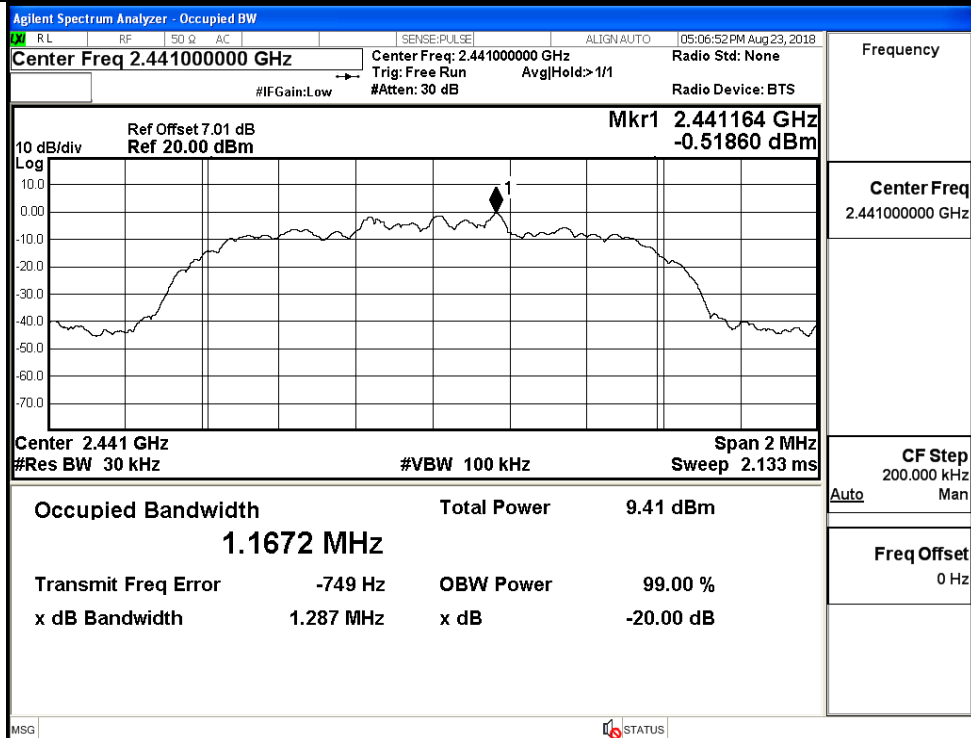


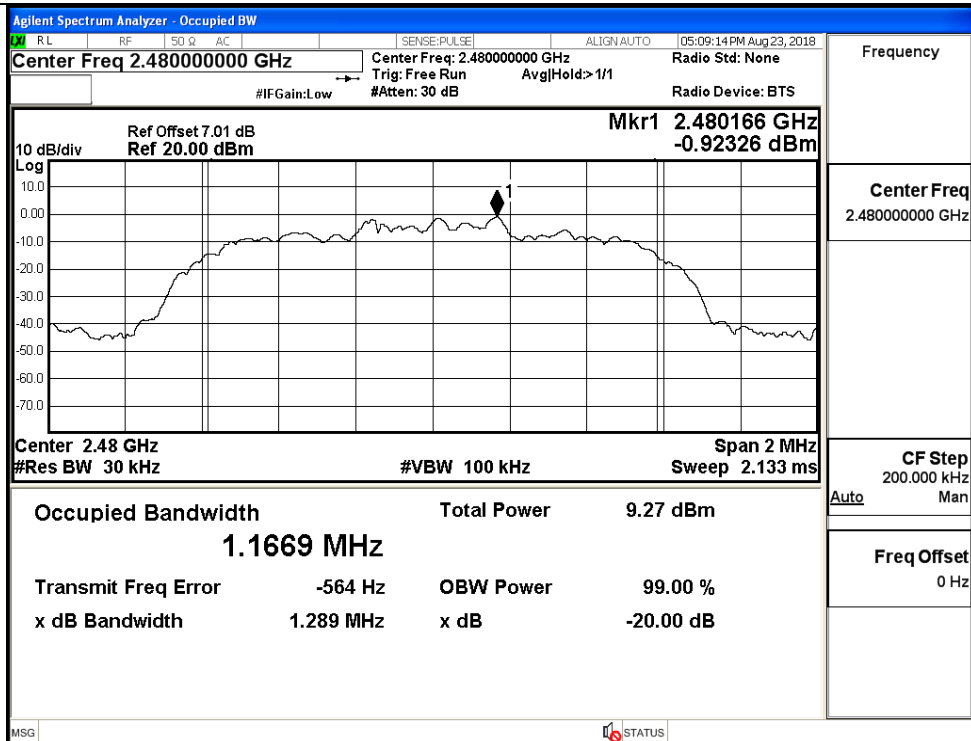
GFSK/MCH



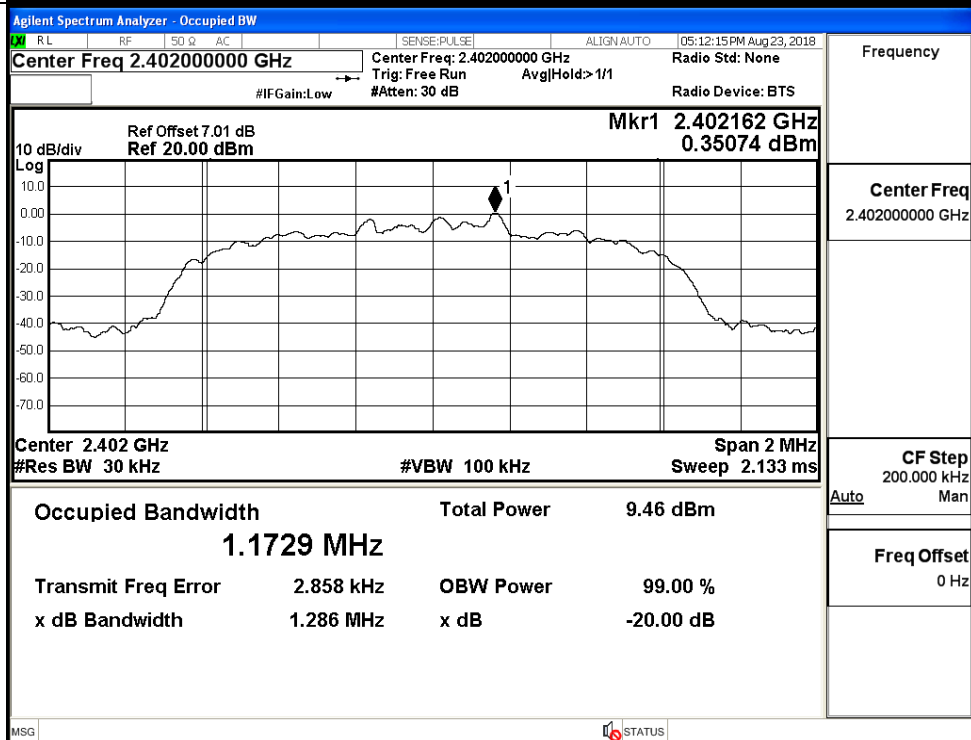
GFSK/HCH



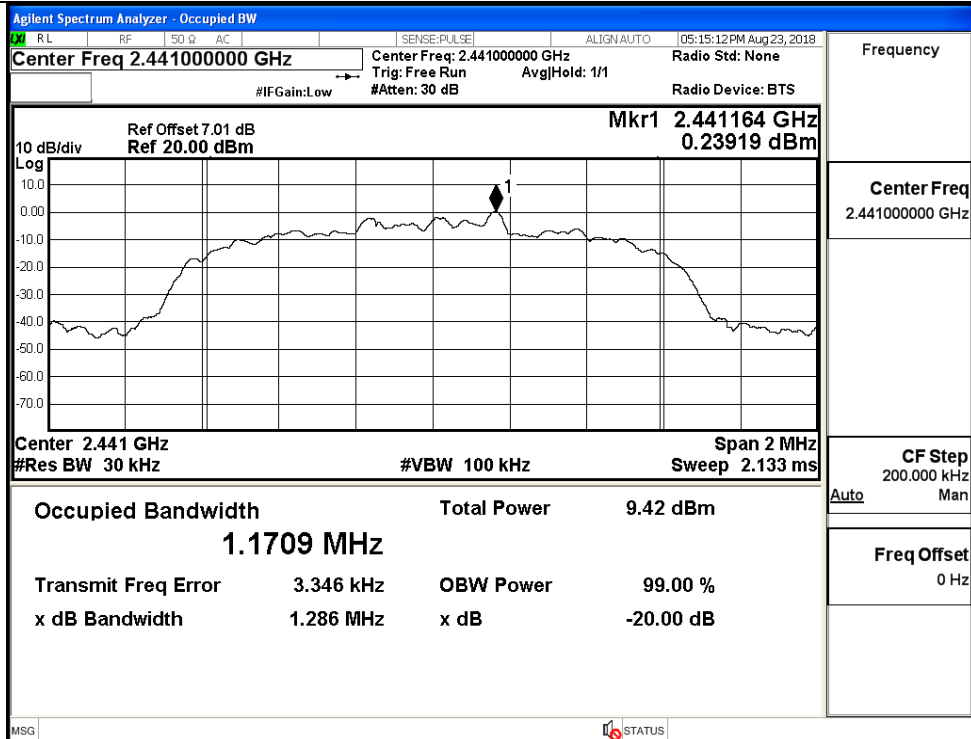
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

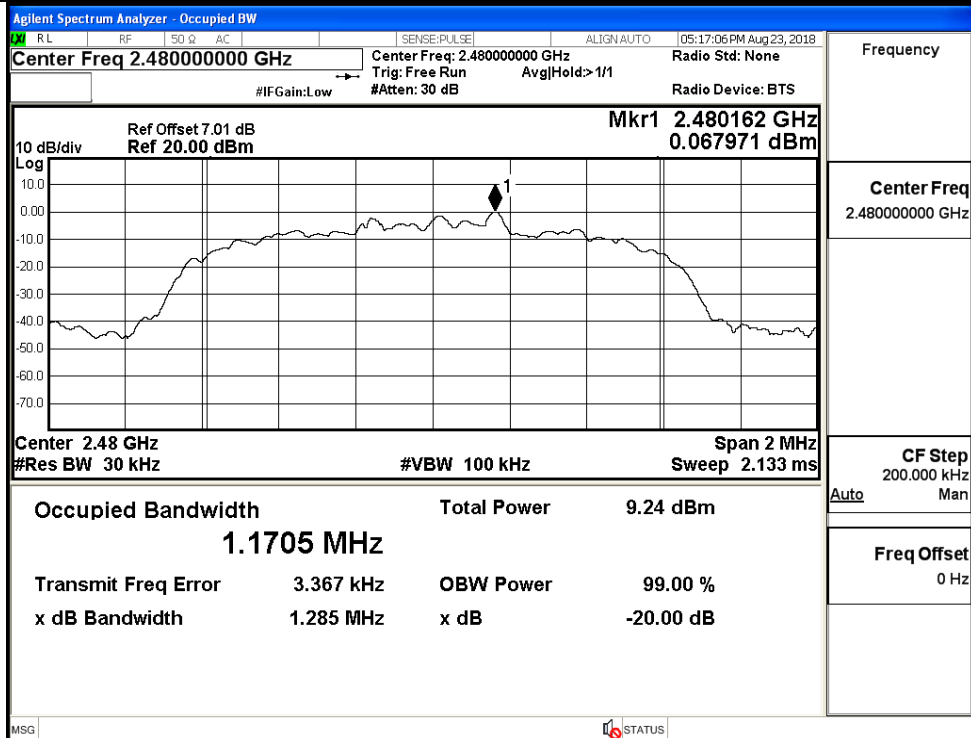
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

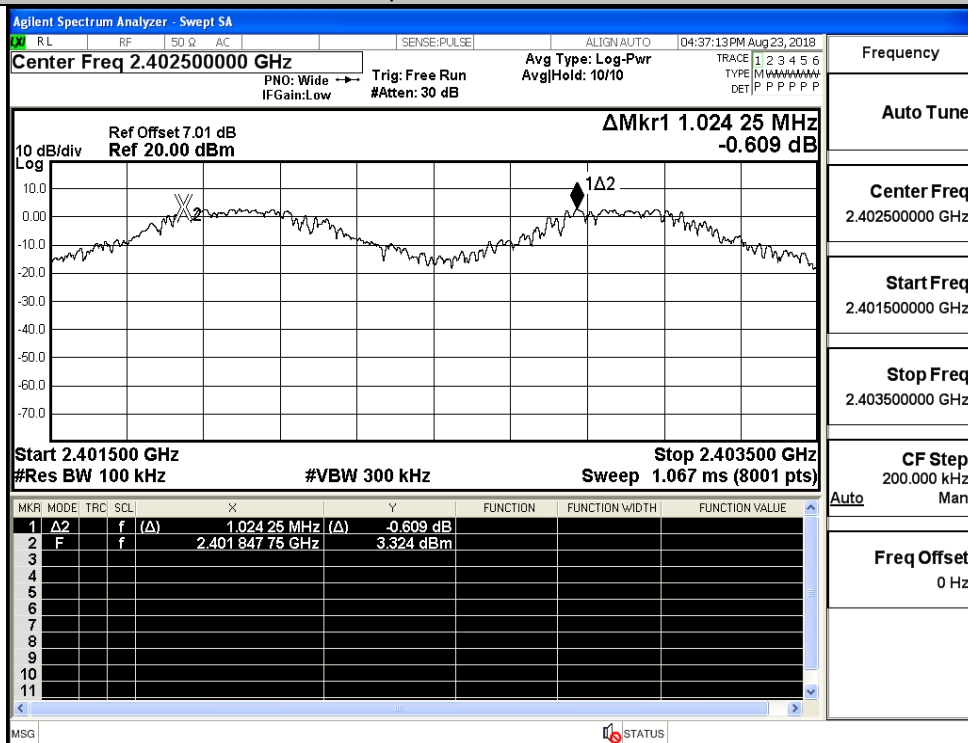


A.3 Carrier Frequency Separation

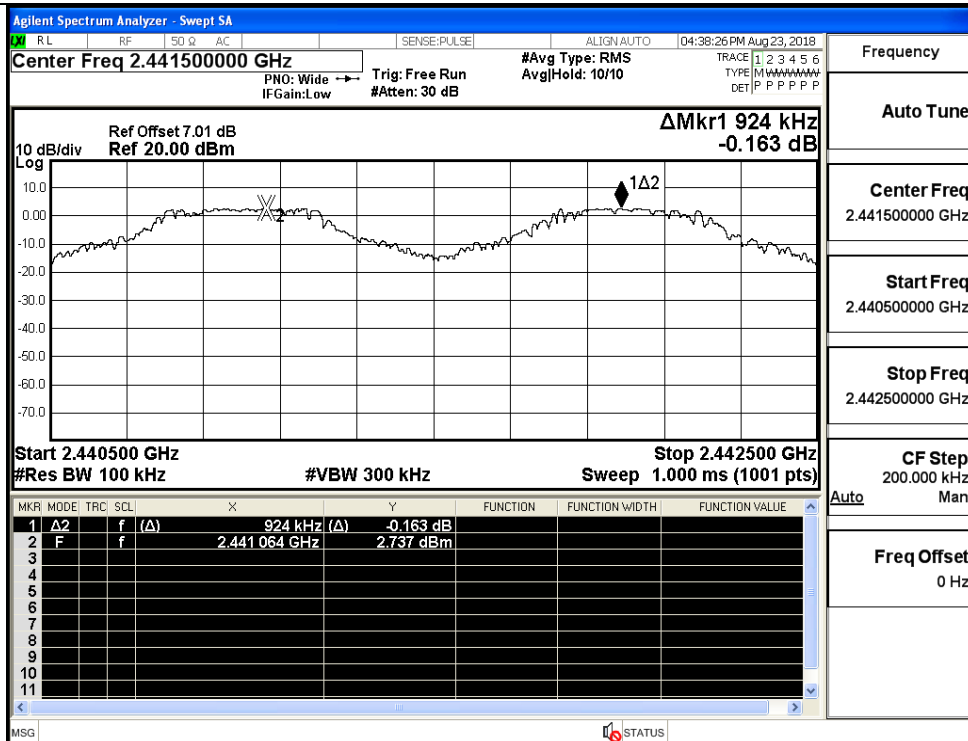
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.024	0.685	PASS
	MCH	0.924	0.689	PASS
	HCH	1.078	0.685	PASS
$\pi/4$ DQPSK	LCH	1.158	0.857	PASS
	MCH	1.236	0.858	PASS
	HCH	0.870	0.859	PASS
8DPSK	LCH	1.074	0.857	PASS
	MCH	0.854	0.857	PASS
	HCH	0.918	0.857	PASS

Test Graphs

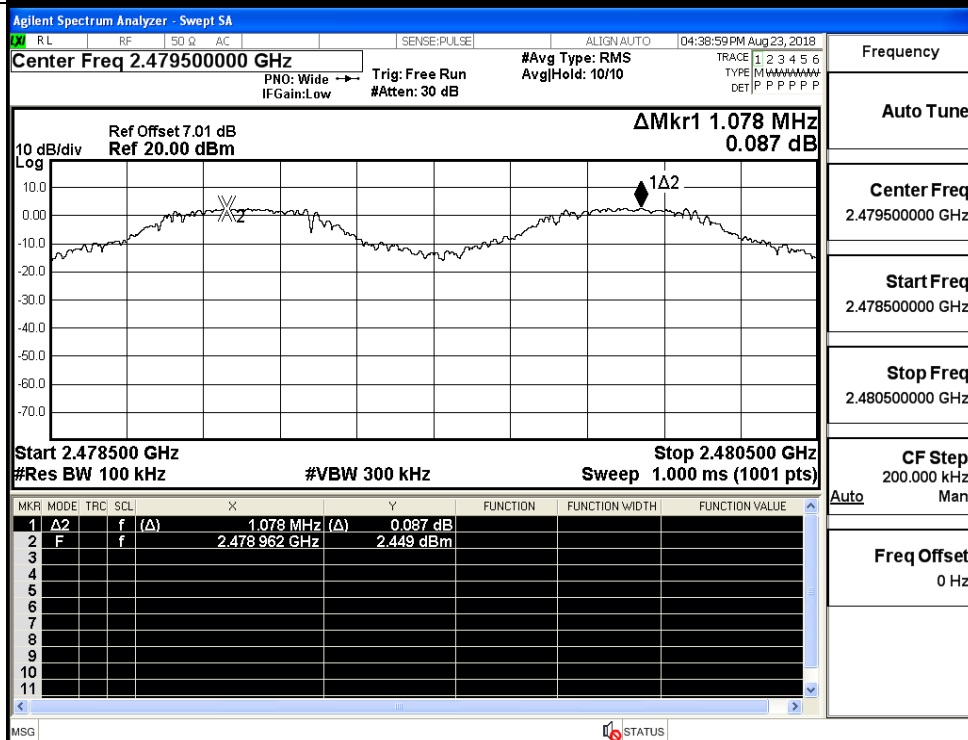
GFSK/LCH

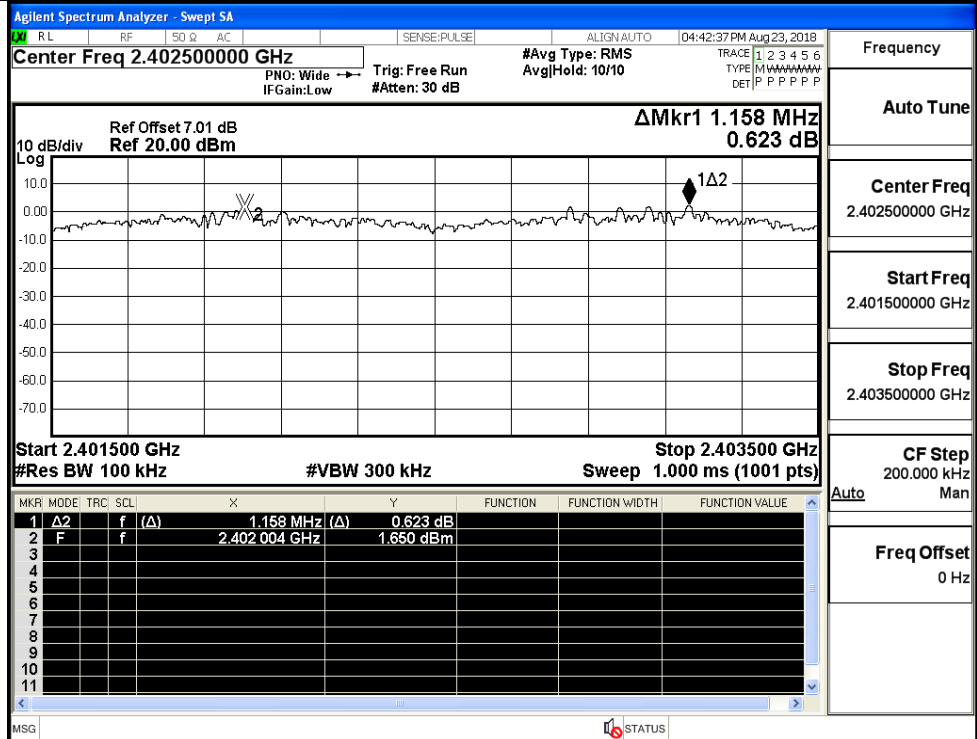
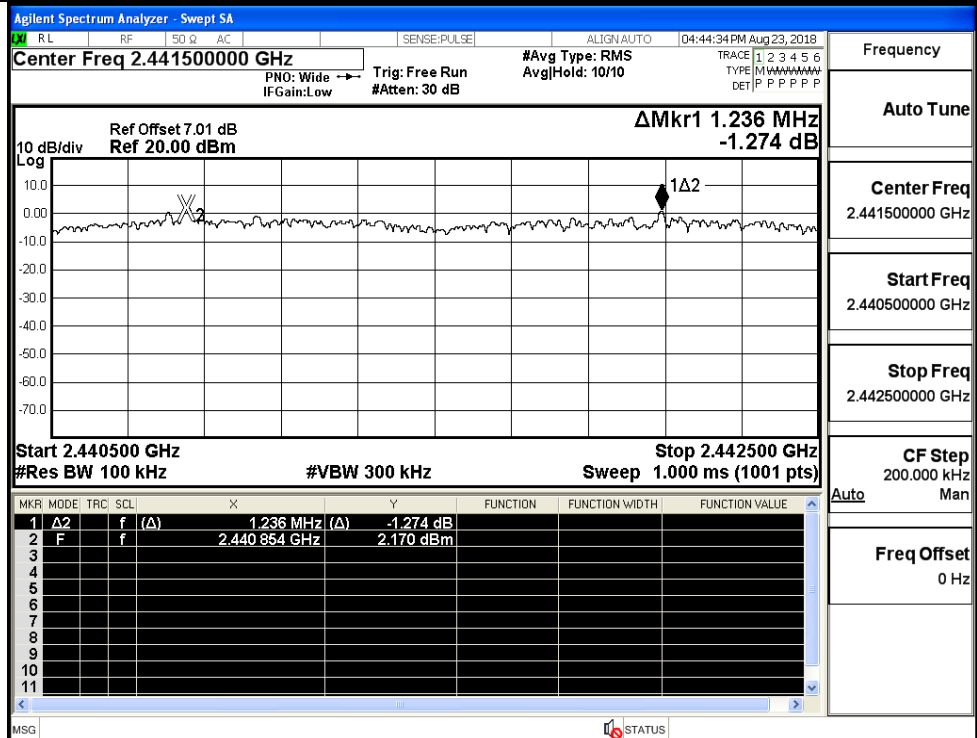


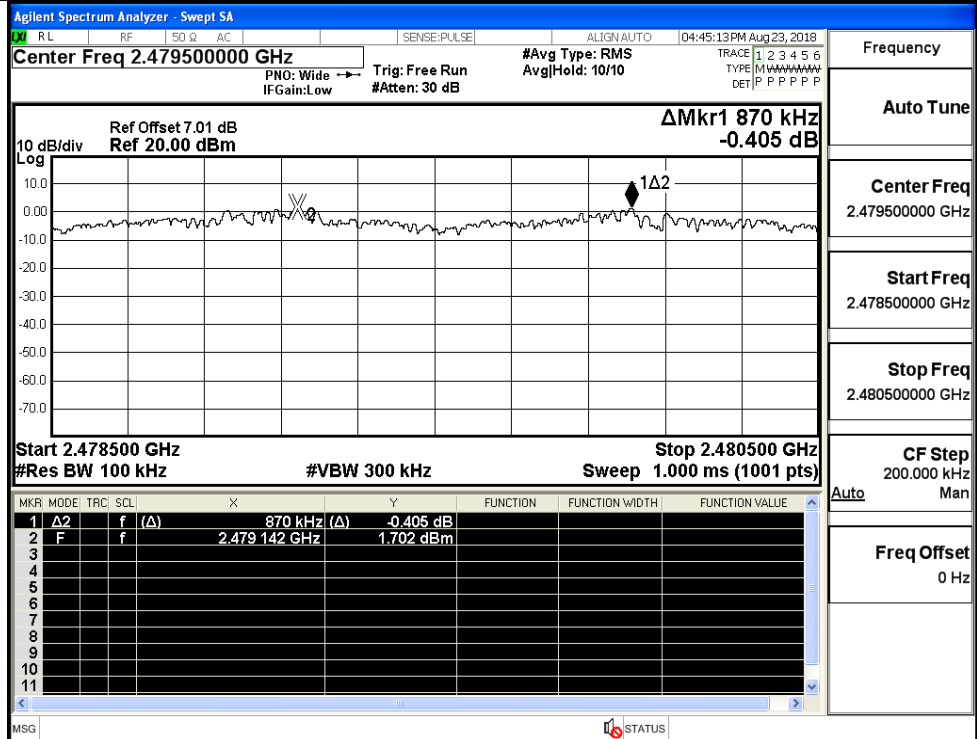
GFSK/MCH



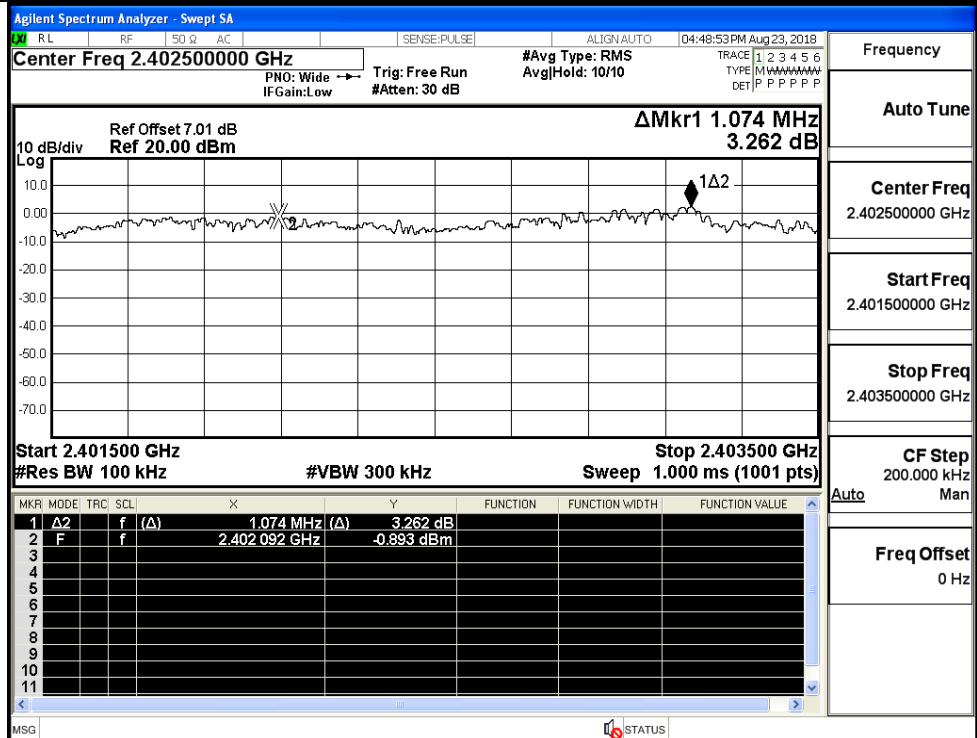
GFSK/HCH



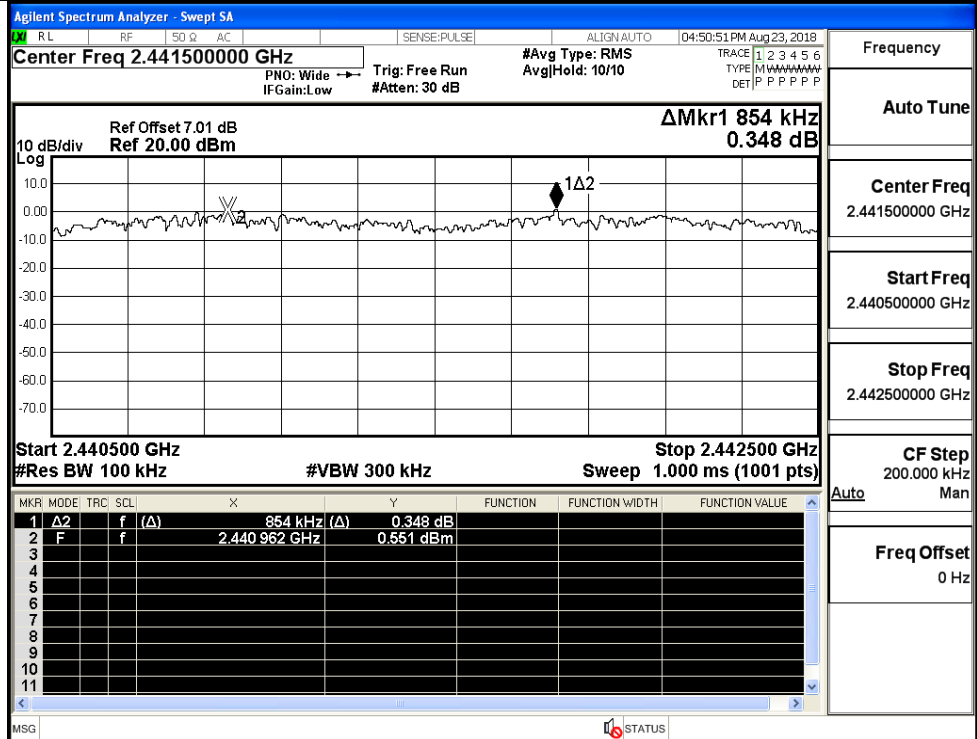
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

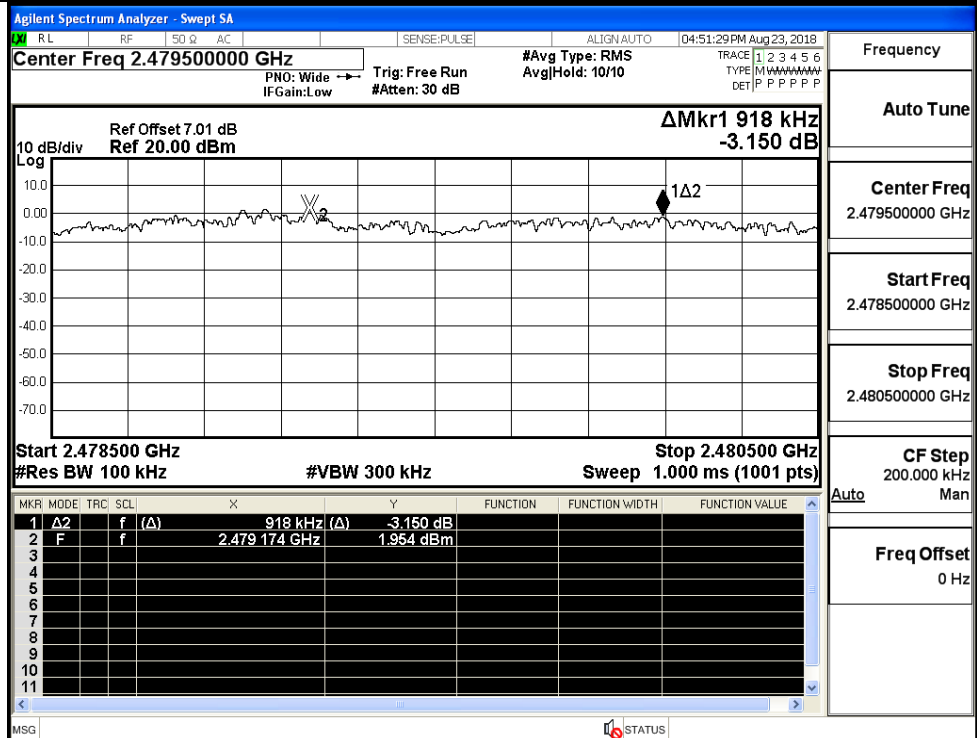
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

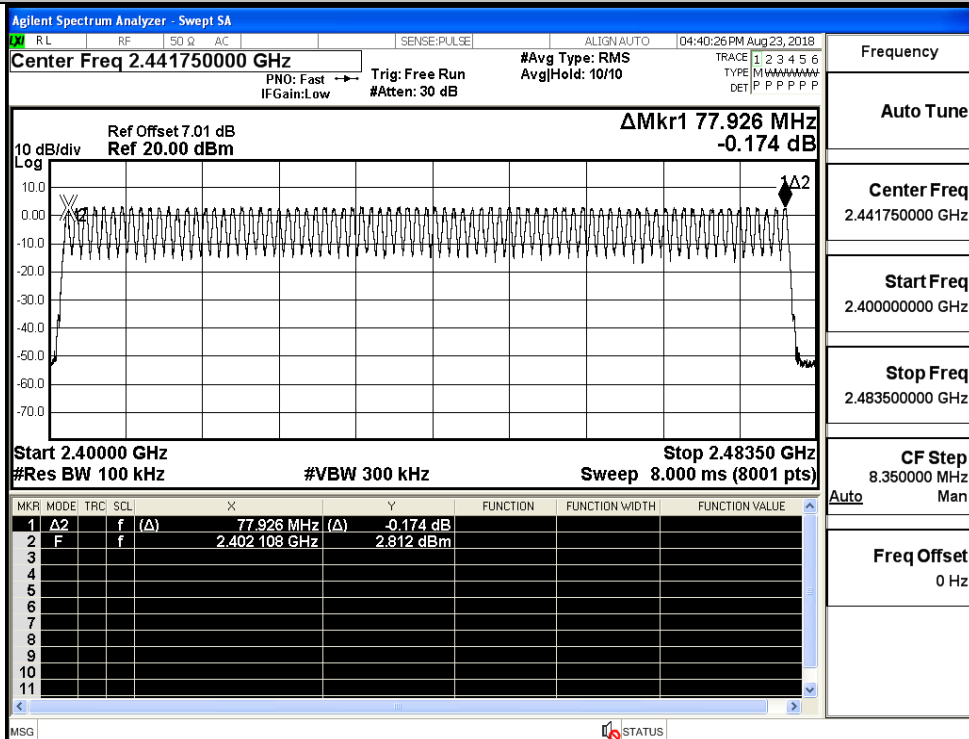
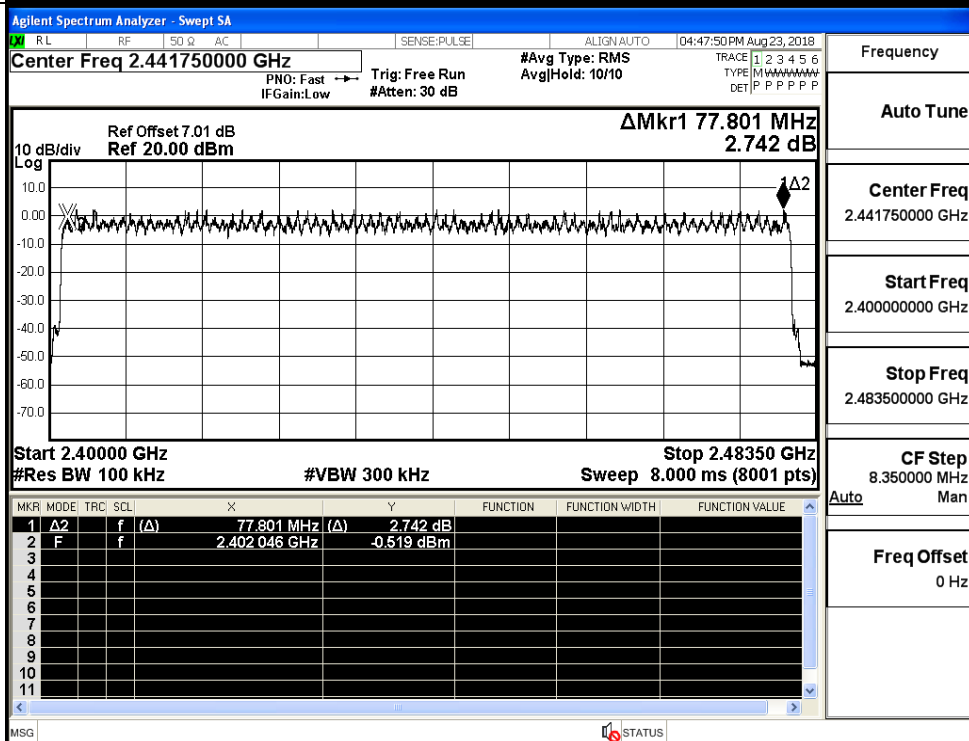


A.4 Hopping Channel Number

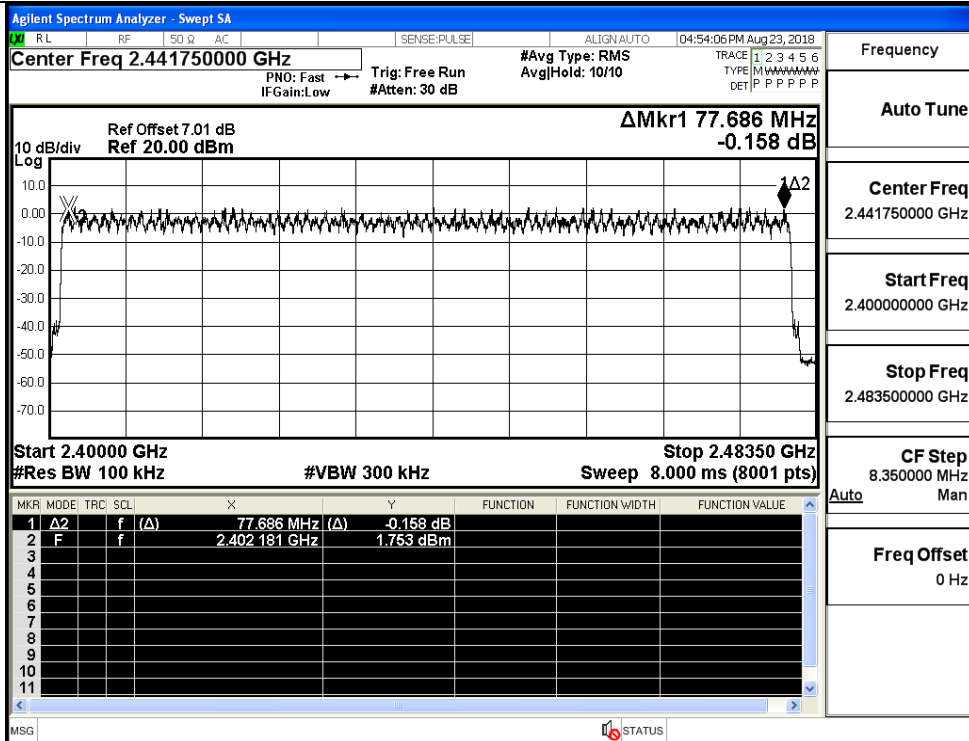
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

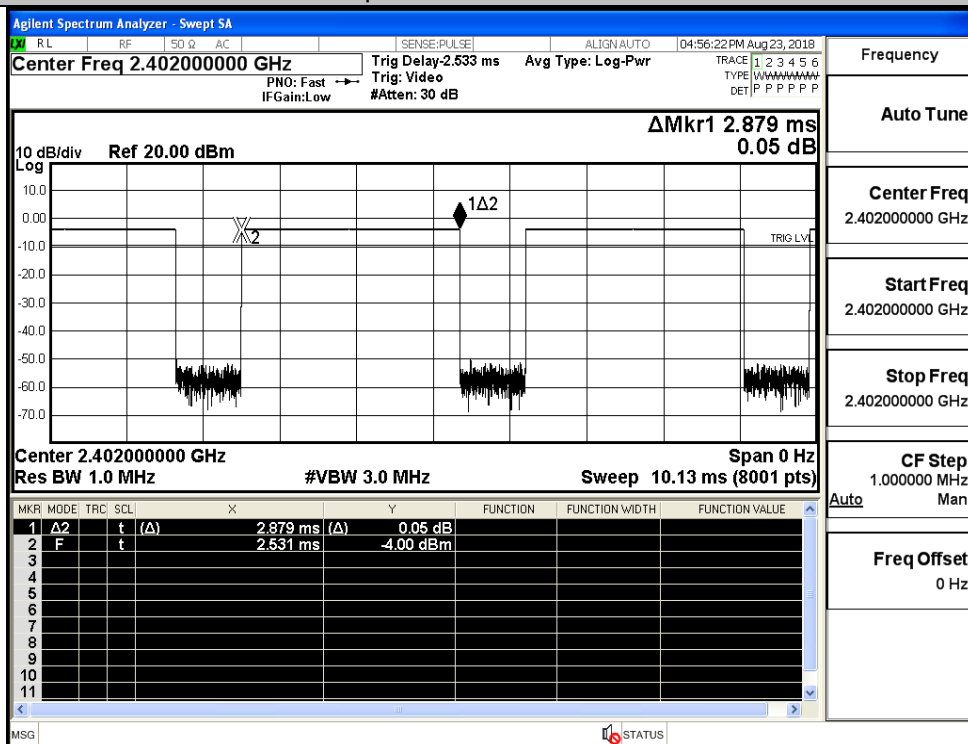


A.5 Dwell Time

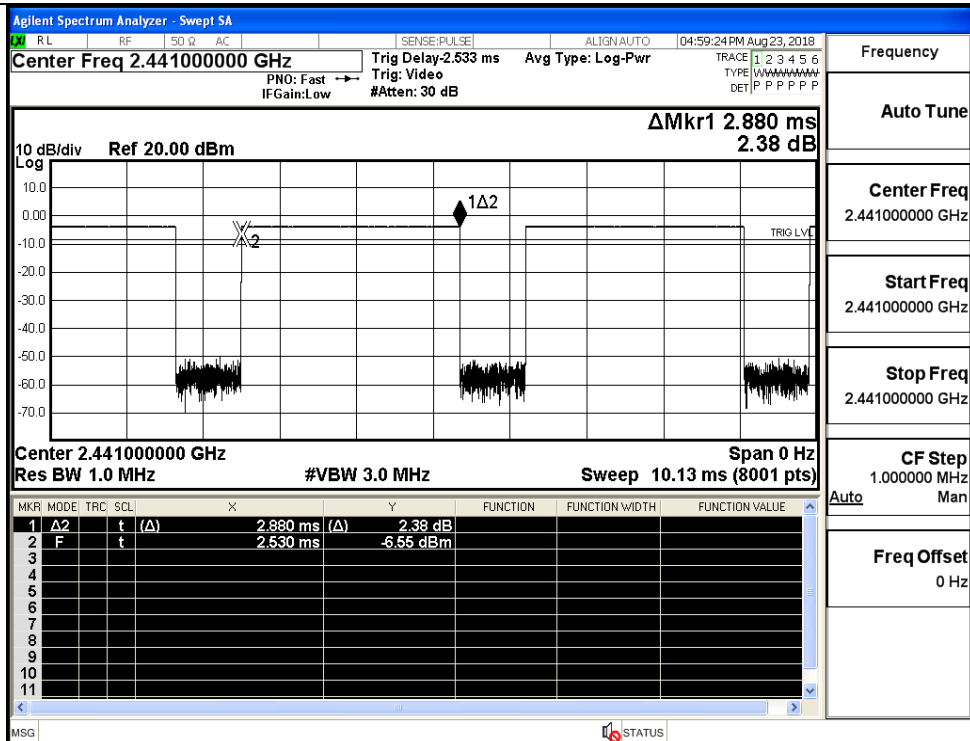
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.308	0.4	PASS
	3DH5	MCH	2.88	106.7	0.308	0.4	PASS
	3DH5	HCH	2.88	106.7	0.308	0.4	PASS

Test Graphs

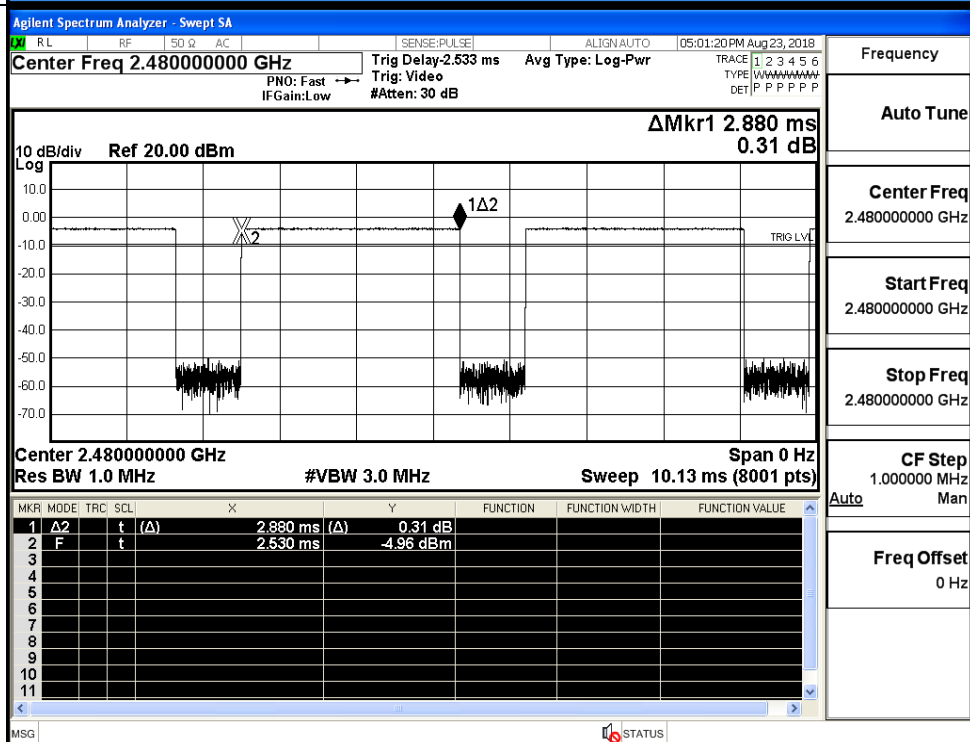
GFSK_DH5/LCH



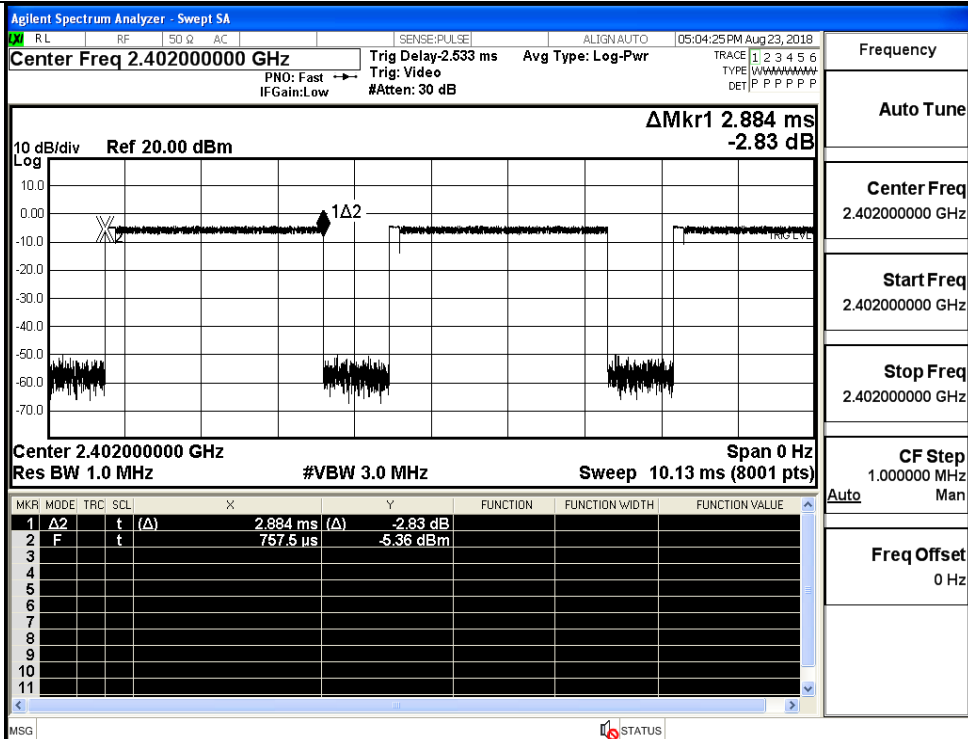
GFSK_DH5/MCH



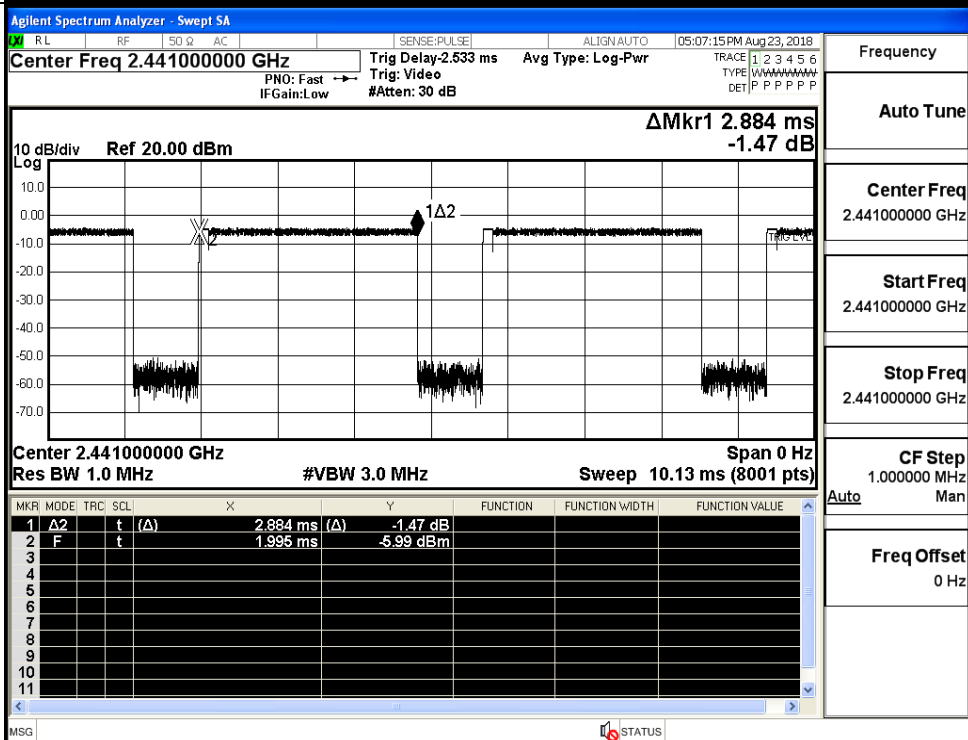
GFSK_DH5/HCH



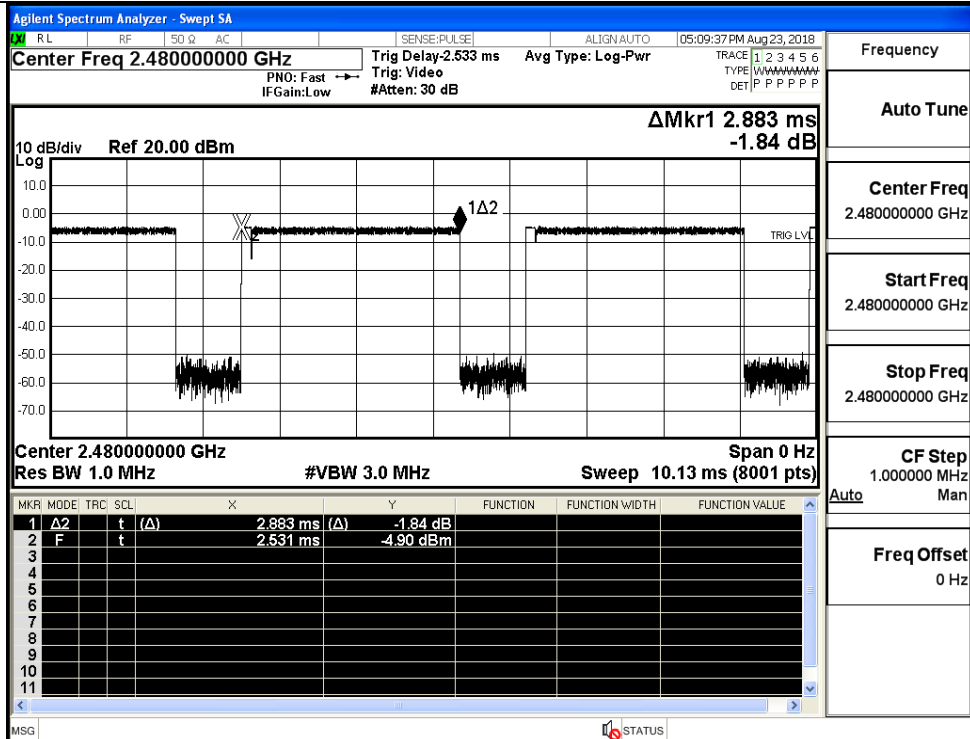
$\pi/4$ DQPSK
_2DH5/LCH



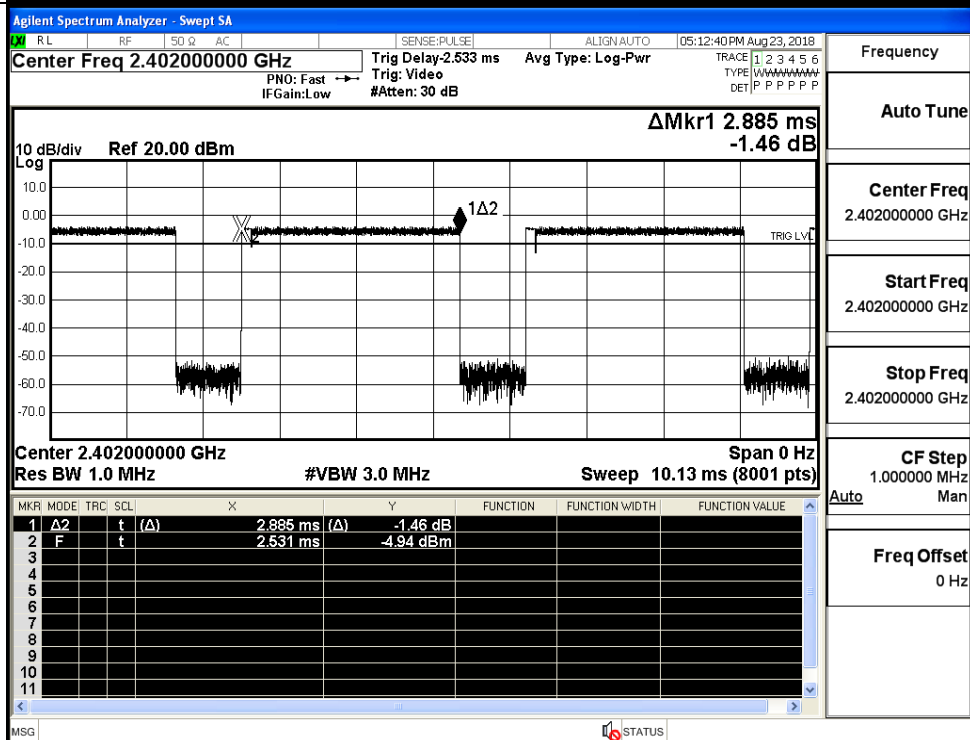
$\pi/4$ DQPSK
_2DH5/MCH



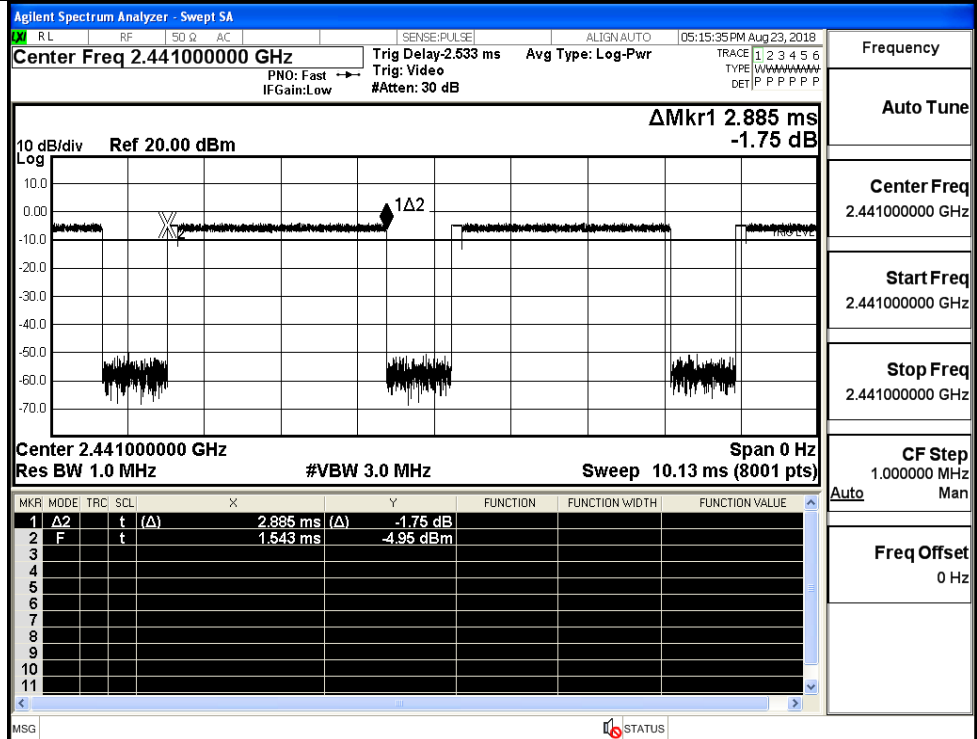
$\pi/4$ DQPSK
_2DH5/HCH



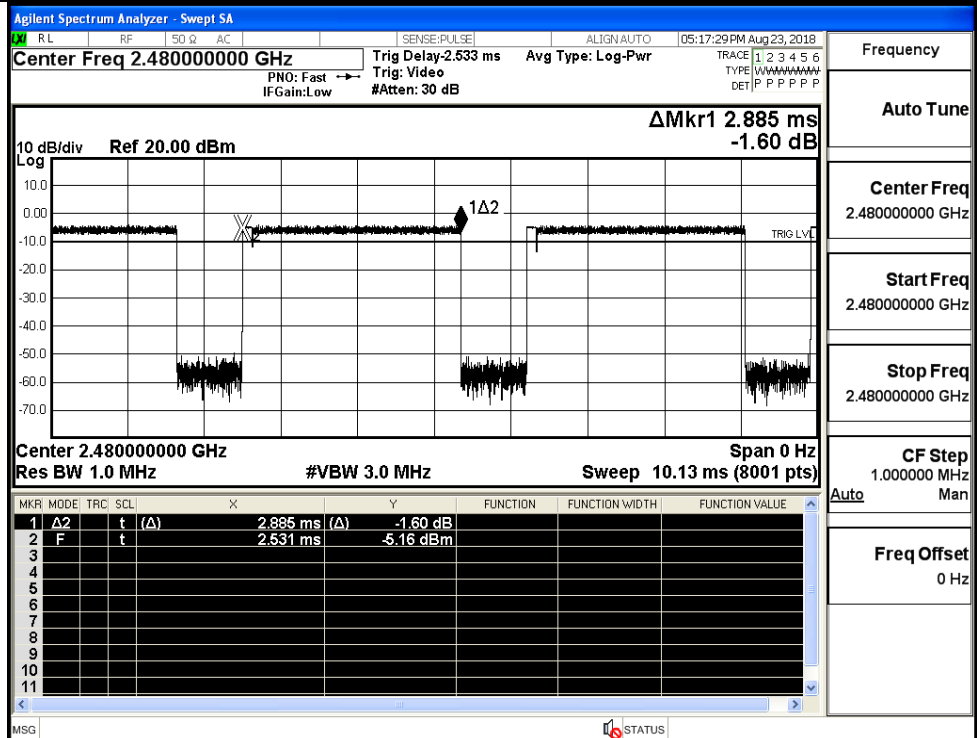
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

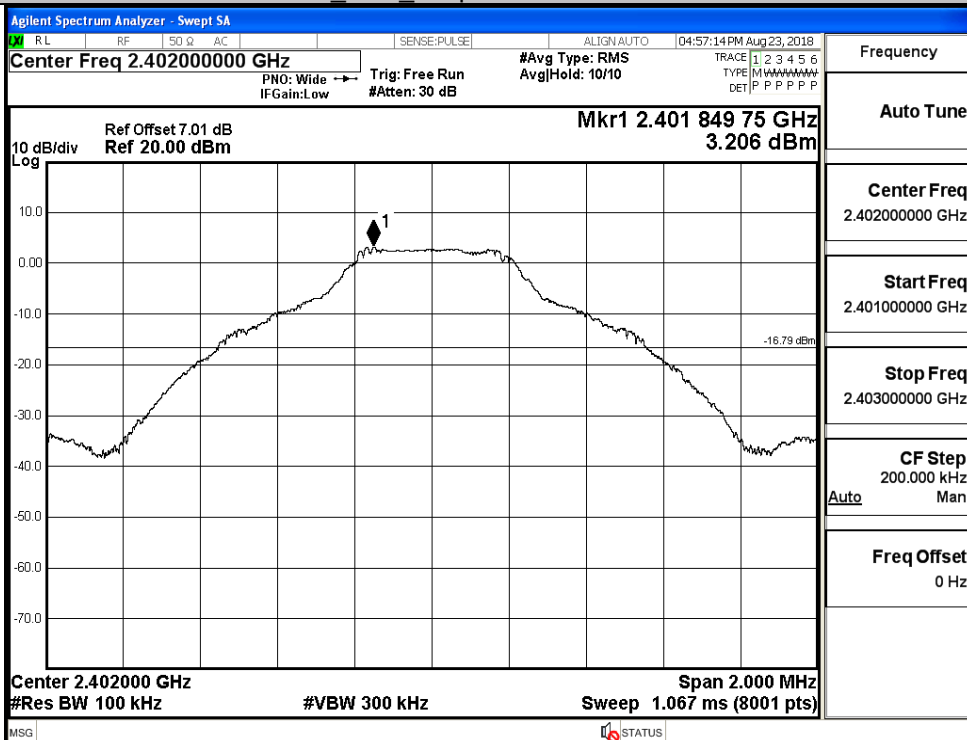


A.6 RF Conducted Spurious Emissions

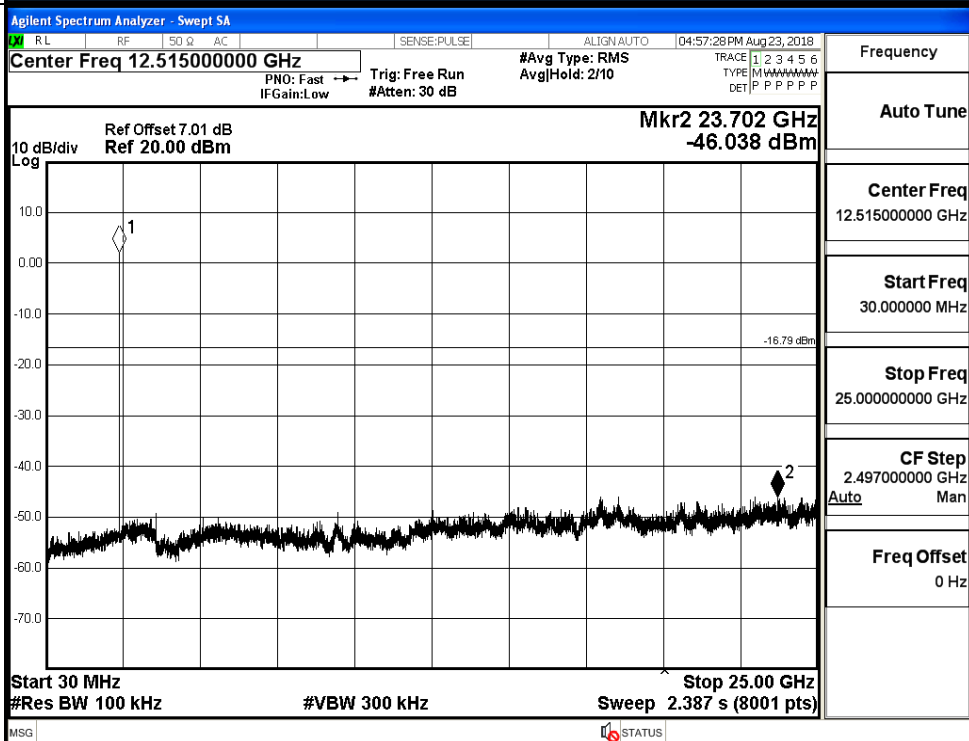
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.206	-46.038	-16.794	PASS
	MCH	3.011	-46.130	-16.989	PASS
	HCH	2.689	-46.224	-17.311	PASS
$\pi/4$ DQPSK	LCH	2.424	-45.911	-17.576	PASS
	MCH	2.216	-45.359	-17.784	PASS
	HCH	2.177	-46.011	-17.823	PASS
8DPSK	LCH	2.445	-46.036	-17.555	PASS
	MCH	1.68	-46.305	-18.320	PASS
	HCH	2.072	-45.236	-17.928	PASS

GFSK LCH Graphs

Pref

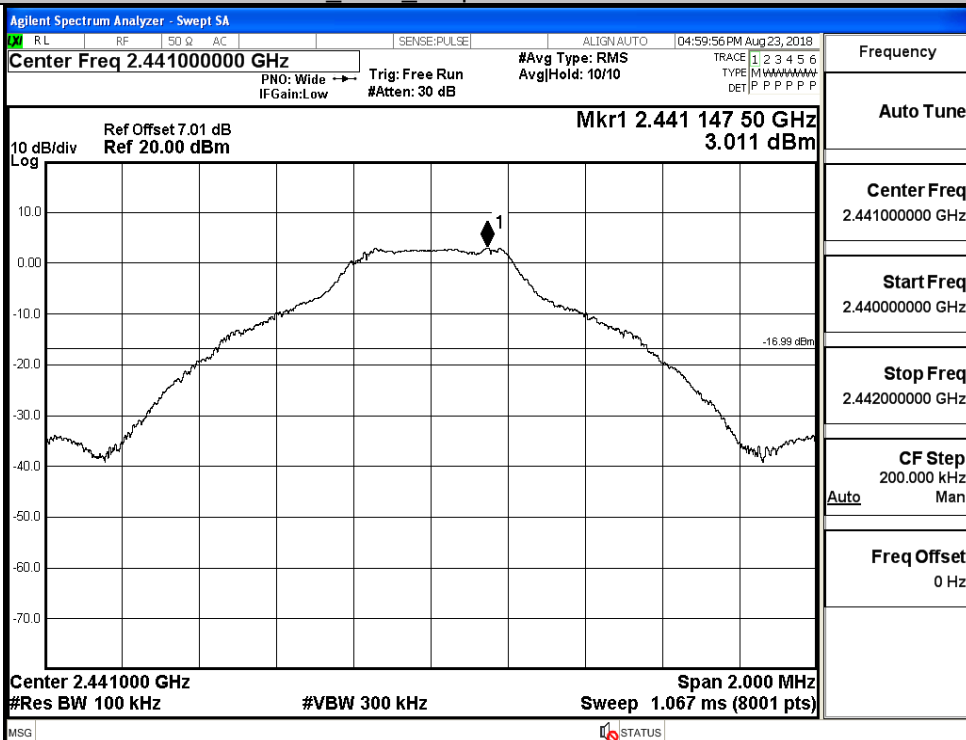


Puw

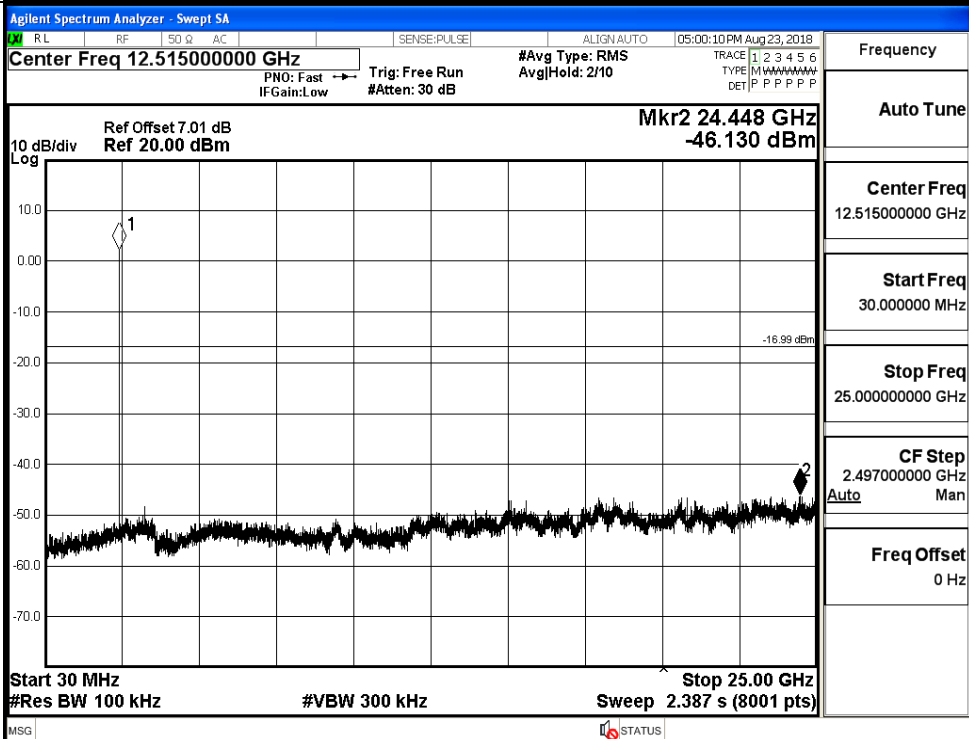


GFSK_MCH_Graphs

Pref

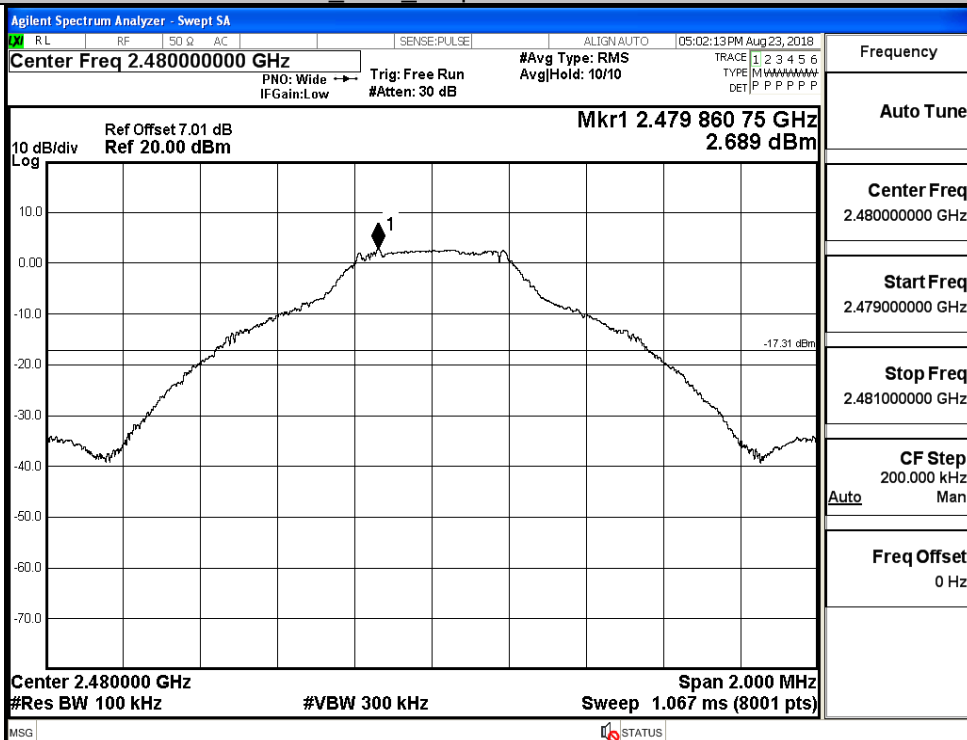


Puw

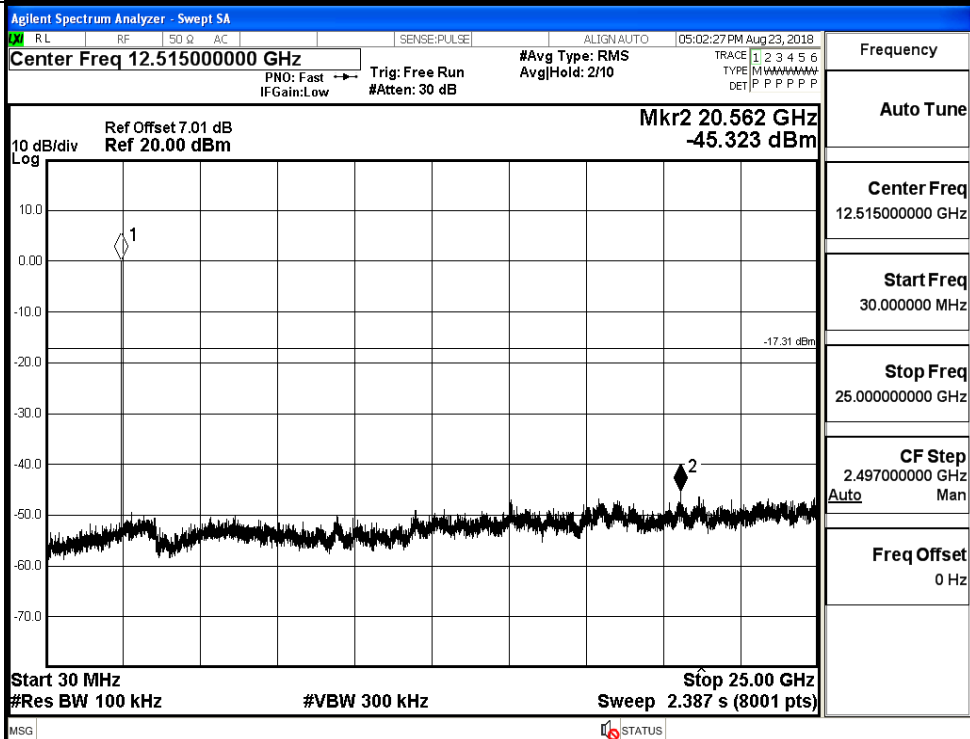


GFSK_HCH_Graphs

Pref

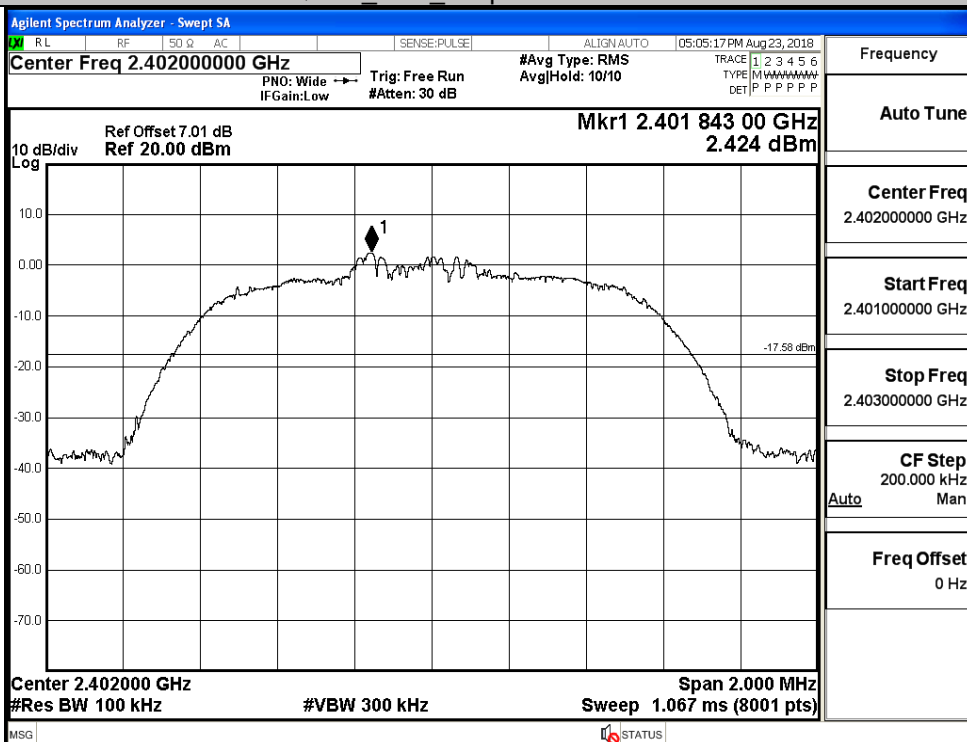


Puw

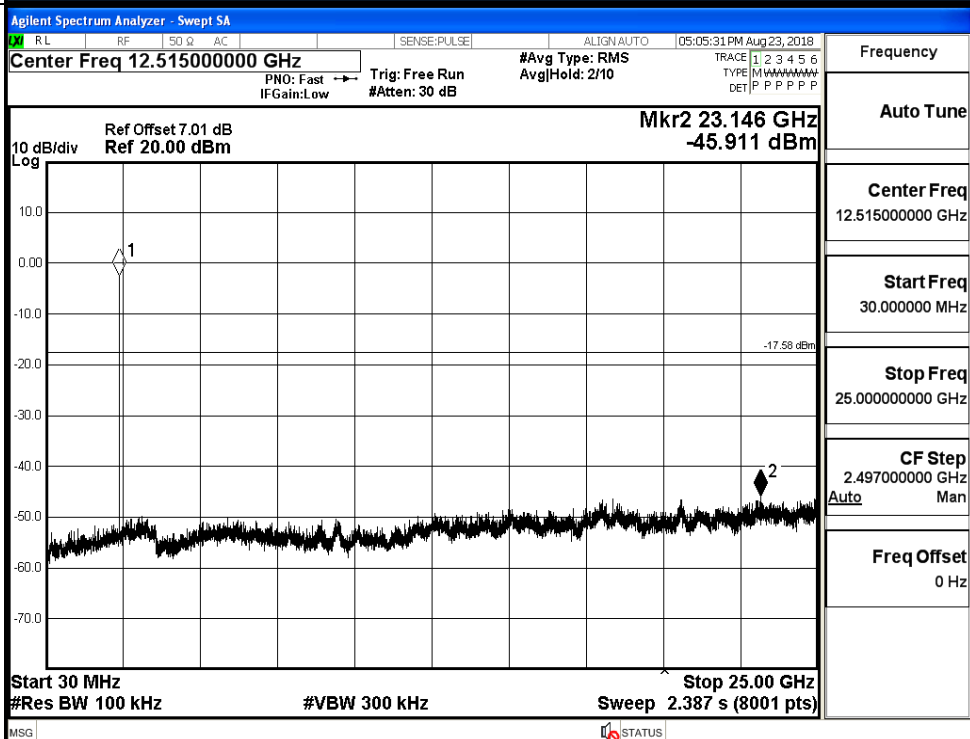


π /4DQPSK LCH_Graphs

Pref

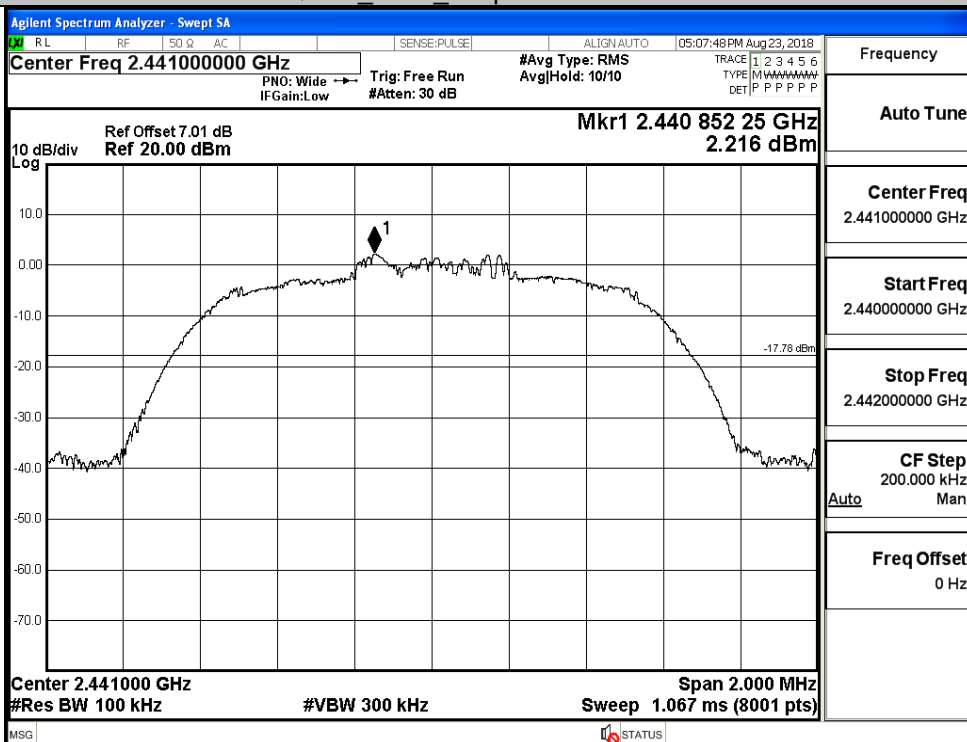


Puw

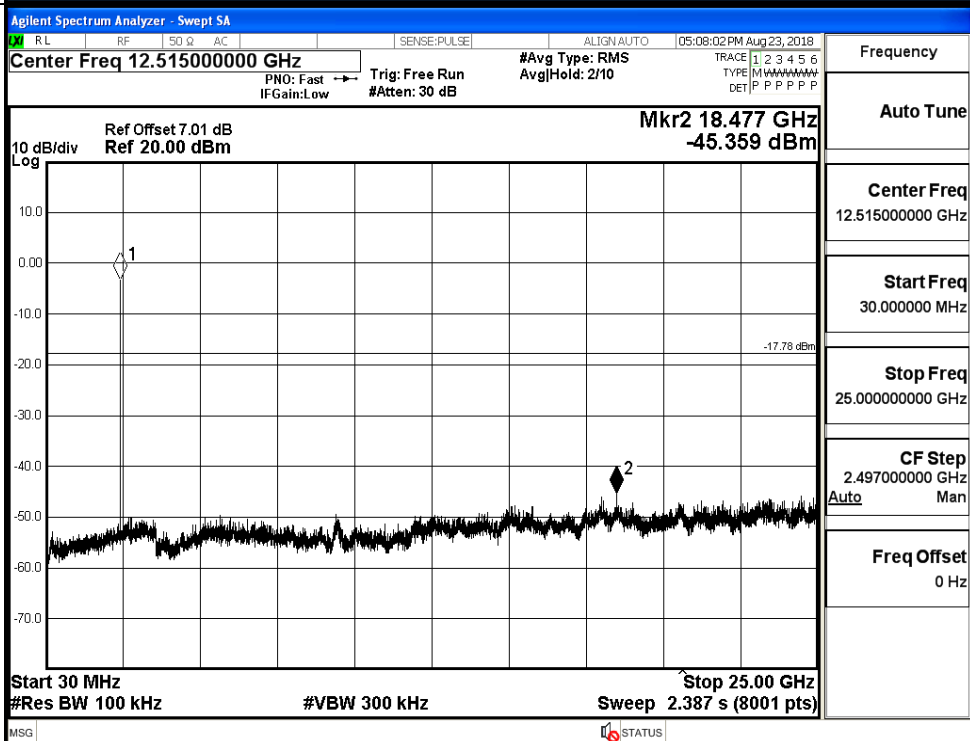


π /4DQPSK_MCH_Graphs

Pref

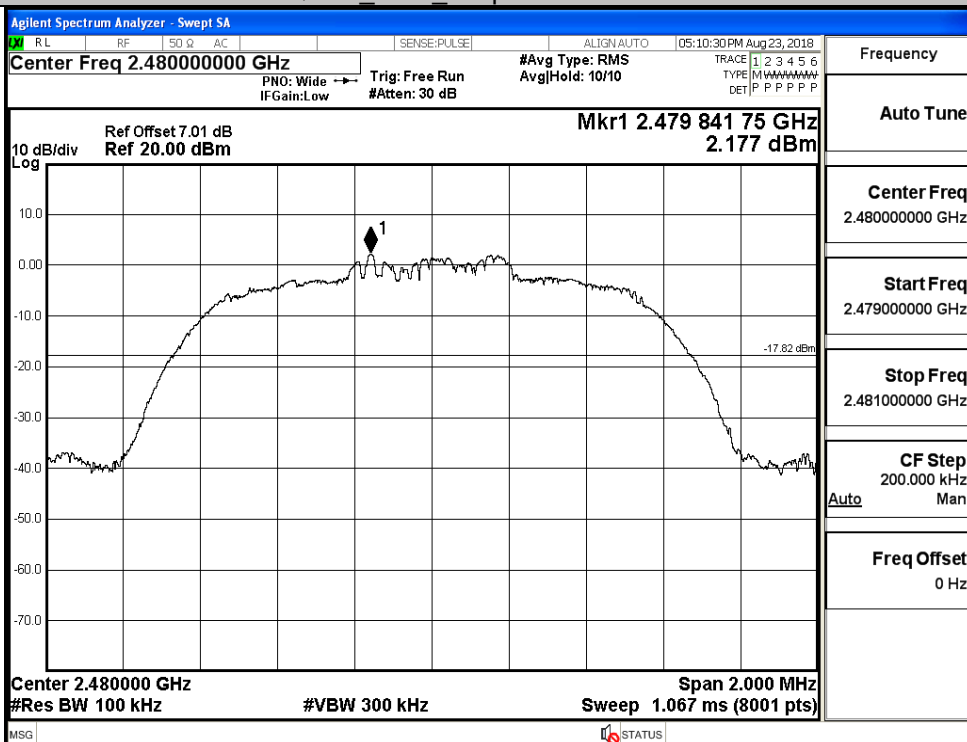


Puw

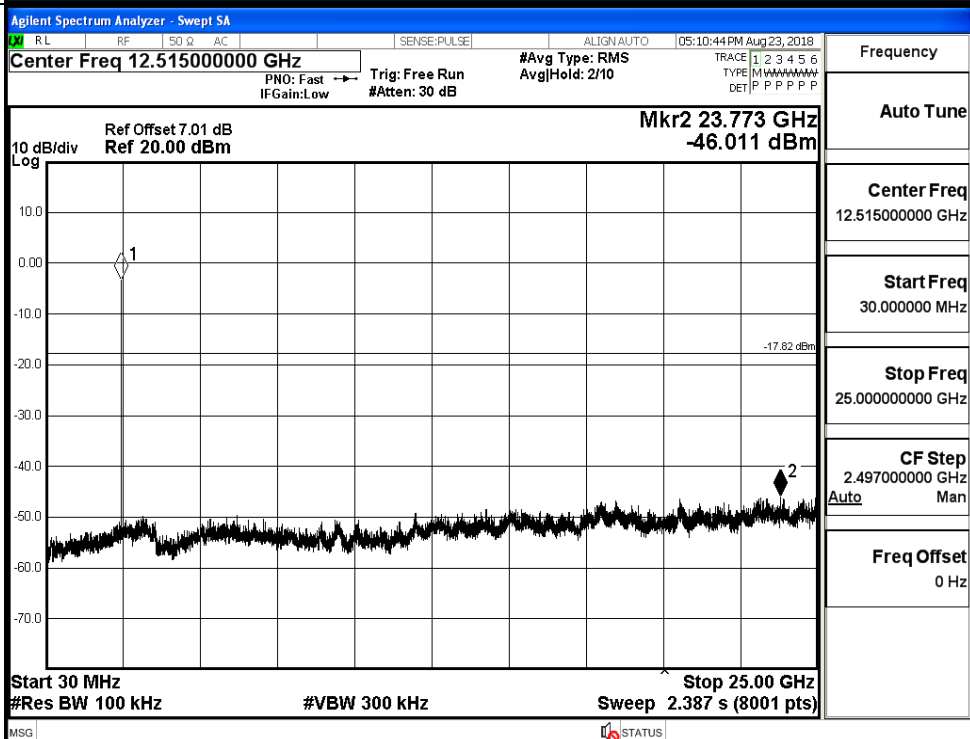


π /4DQPSK_HCH_Graphs

Pref

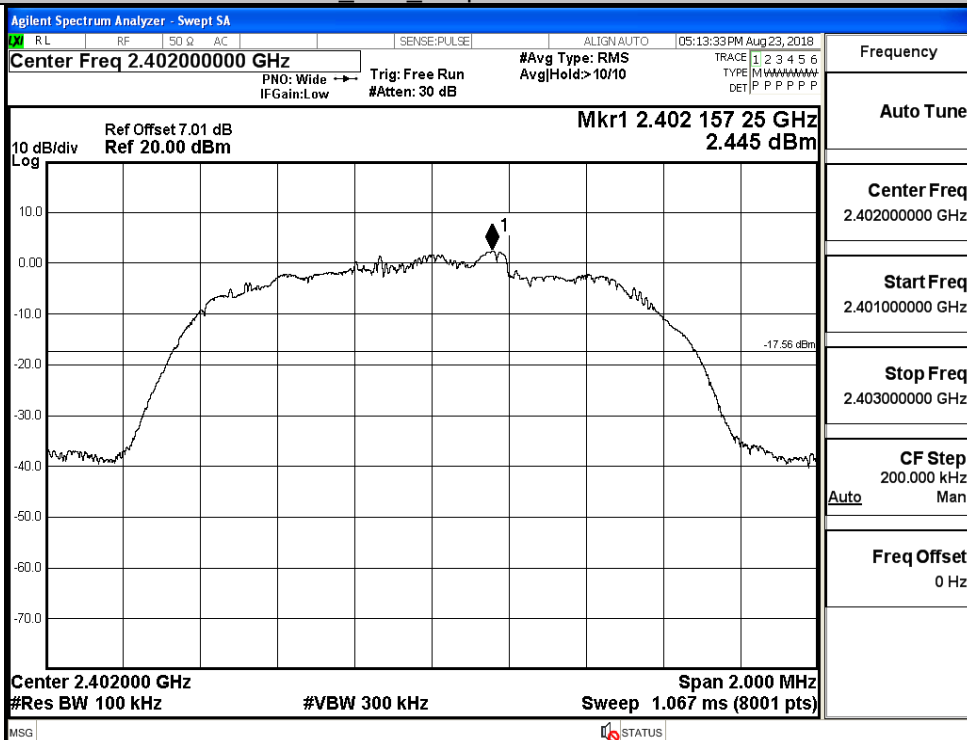


Puw

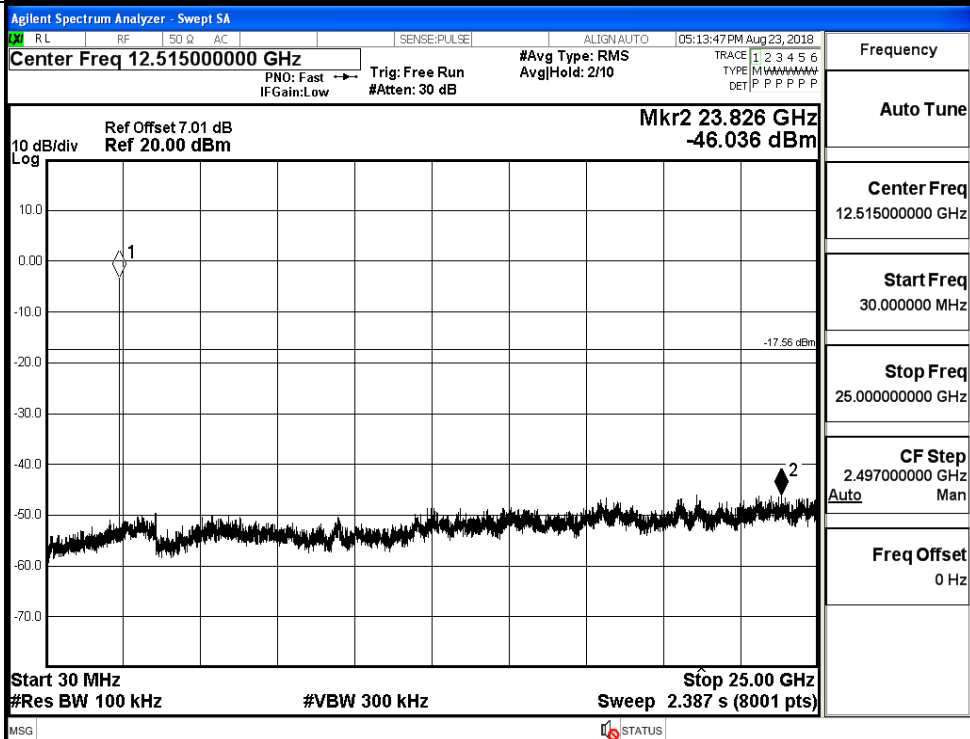


8DPSK_LCH_Graphs

Pref

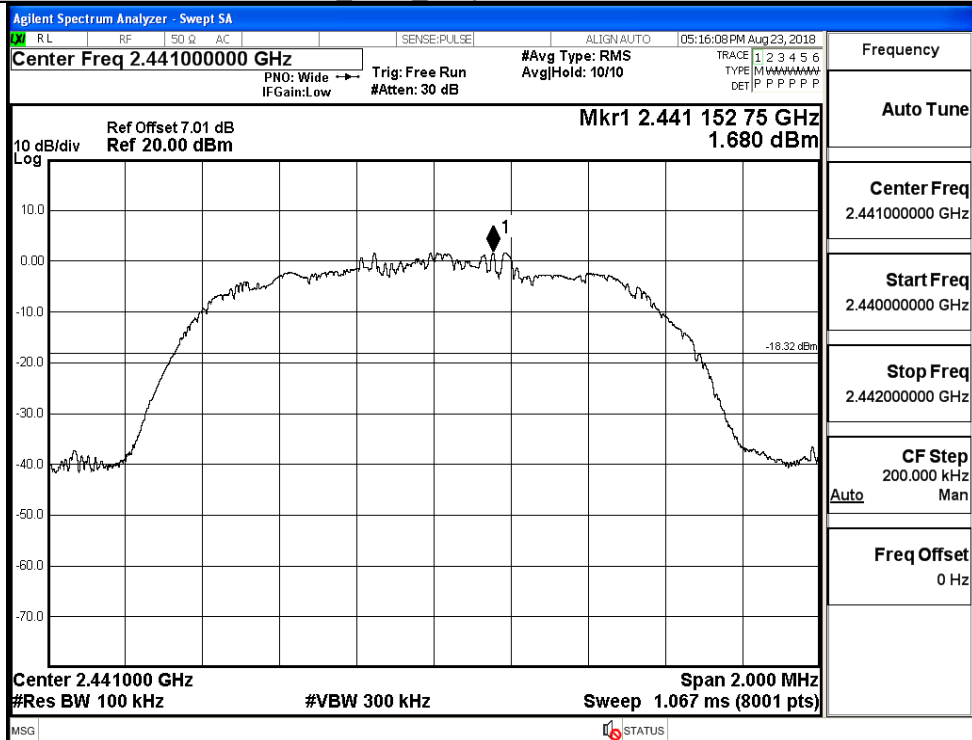


Puw

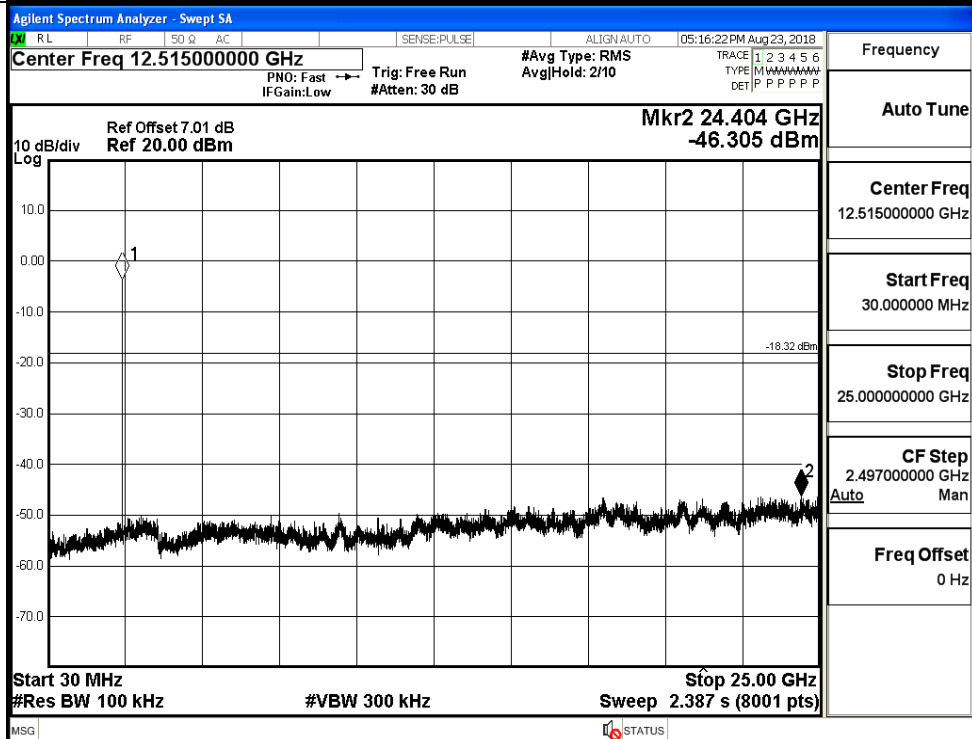


8DPSK_MCH_Graphs

Pref

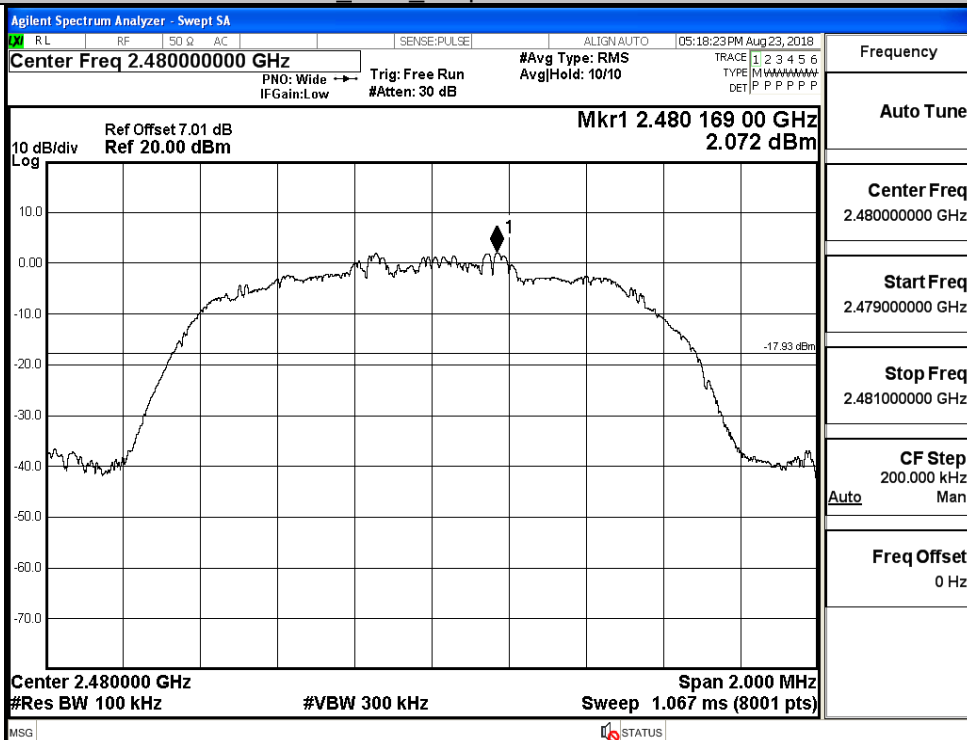


Puw

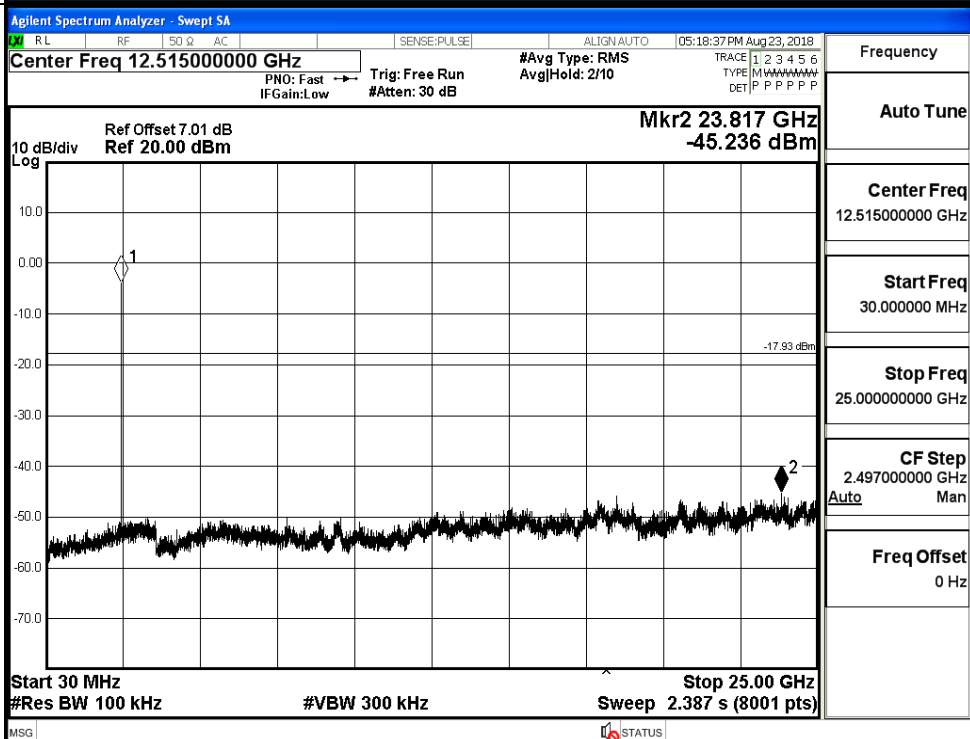


8DPSK_HCH_Graphs

Pref



Puw

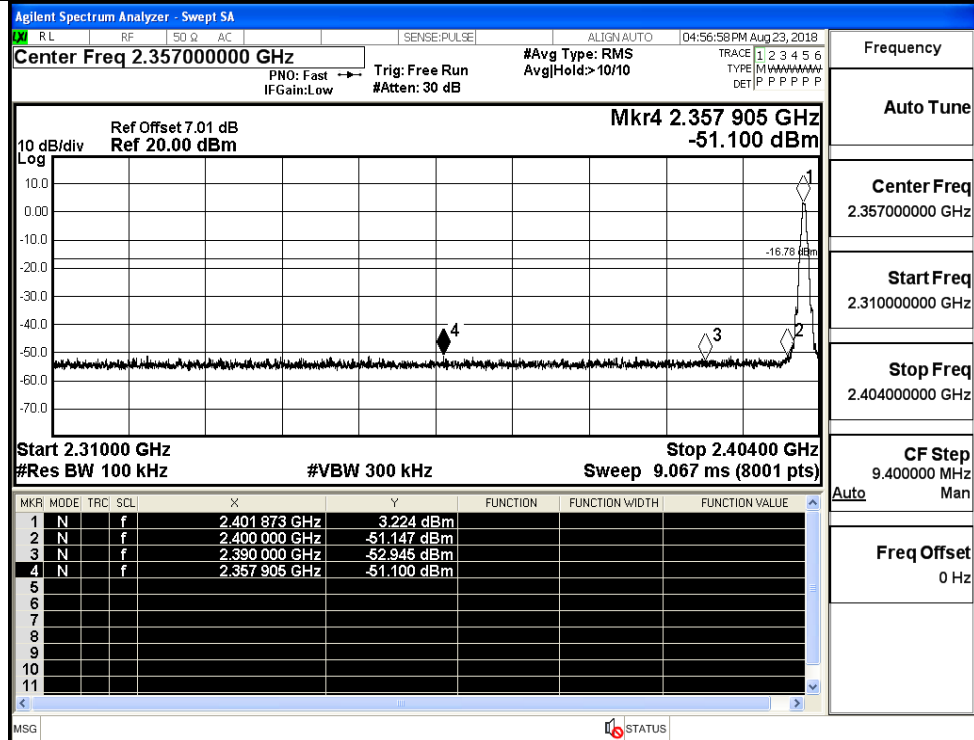


A.7 Band-edge for RF Conducted Emissions

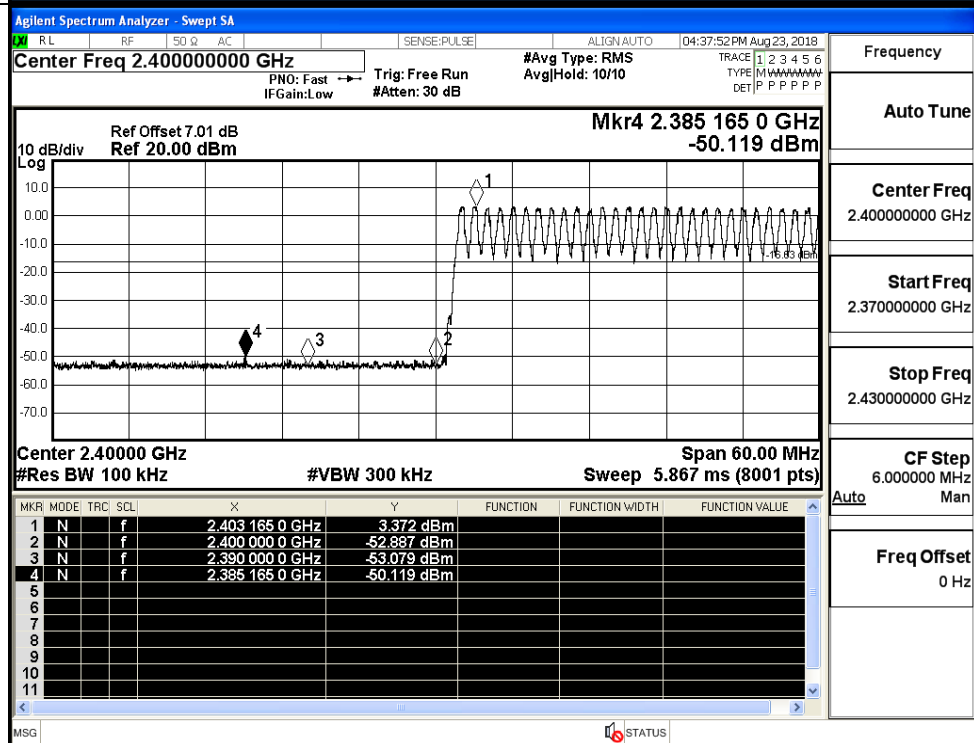
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.224	Off	-51.100	-16.78	PASS
			3.372	On	-50.119	-16.63	PASS
	HCH	2480	2.888	Off	-50.767	-17.11	PASS
			3.239	On	-50.575	-16.76	PASS
$\pi/4$ DQPSK	LCH	2402	2.486	Off	-51.168	-17.51	PASS
			2.331	On	-50.520	-17.67	PASS
	HCH	2480	2.187	Off	-49.937	-17.81	PASS
			2.212	On	-49.825	-17.79	PASS
8DPSK	LCH	2402	2.517	Off	-51.039	-17.48	PASS
			2.460	On	-50.220	-17.54	PASS
	HCH	2480	2.251	Off	-50.617	-17.75	PASS
			2.310	On	-50.380	-17.69	PASS

Test Graphs

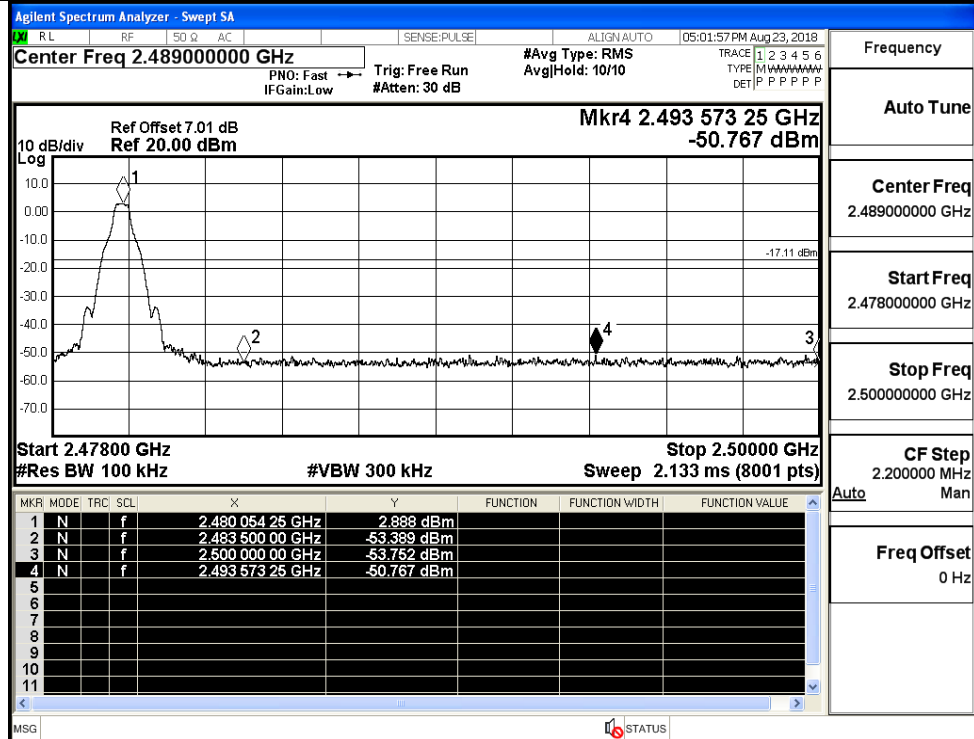
GFSK/LCH/No Hop



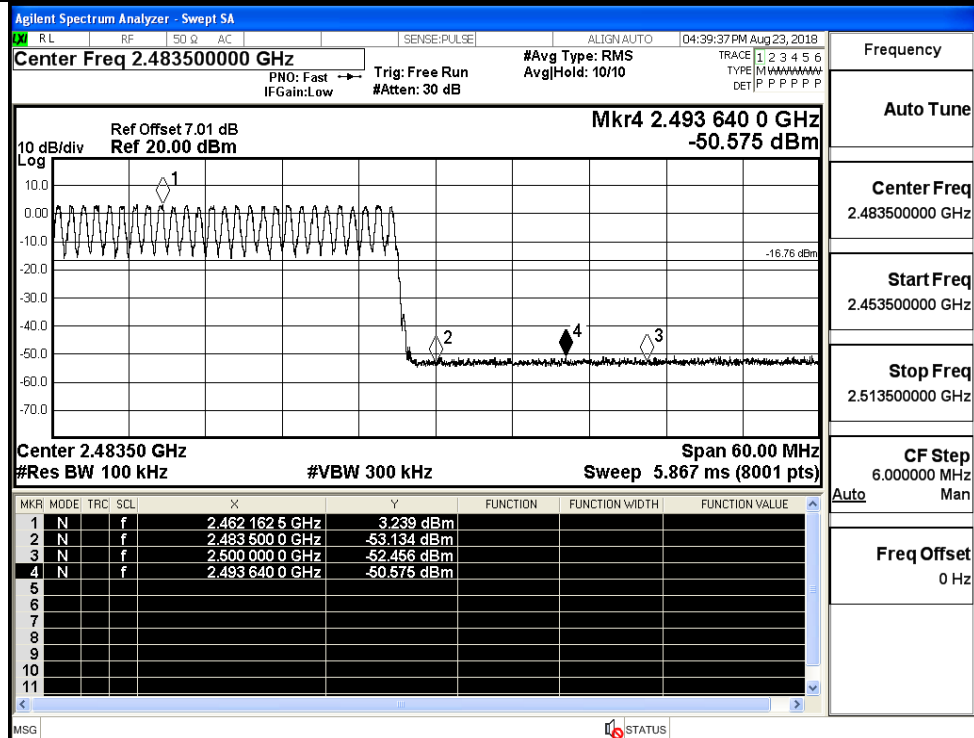
GFSK/LCH/Hop



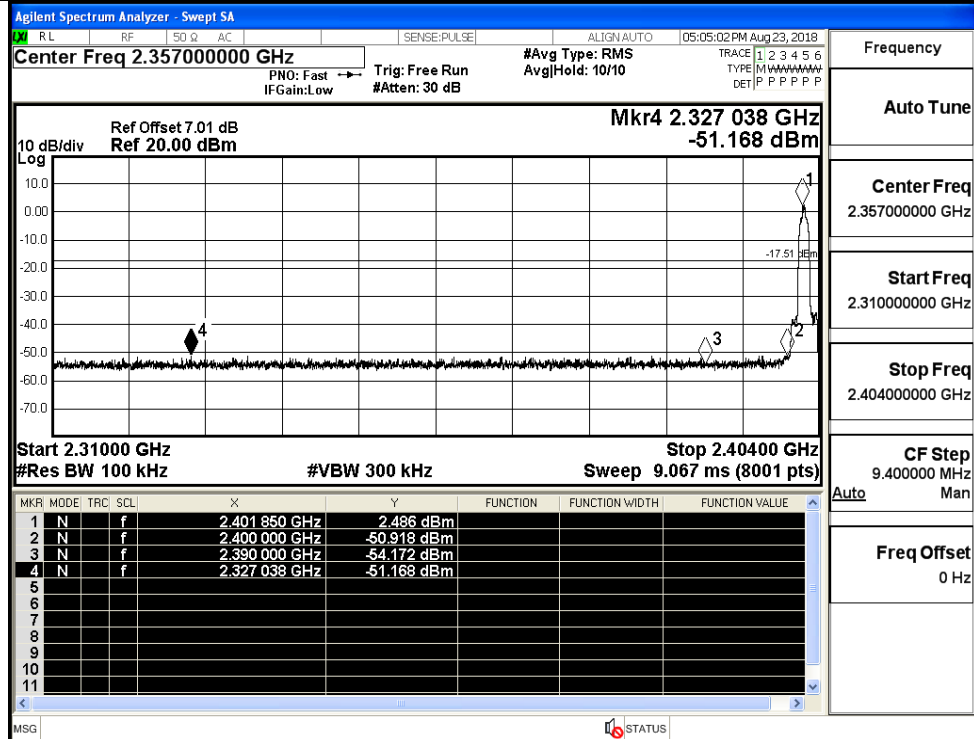
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

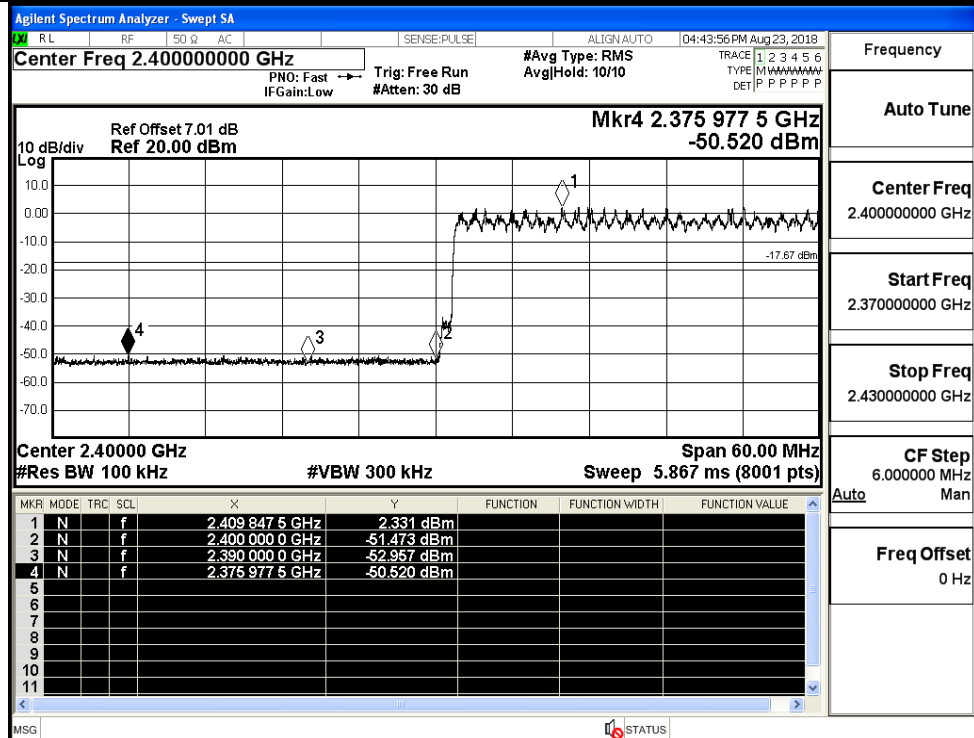
Start Freq
2.310000000 GHz

Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

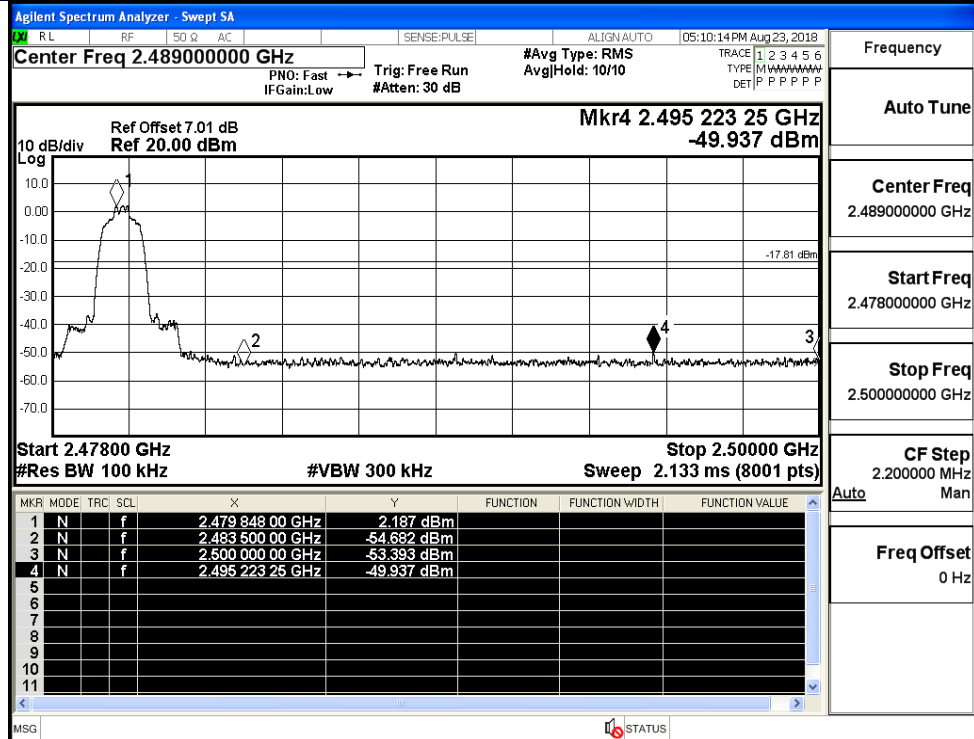
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

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



Frequency

Auto Tune

Center Freq
2.489000000 GHz

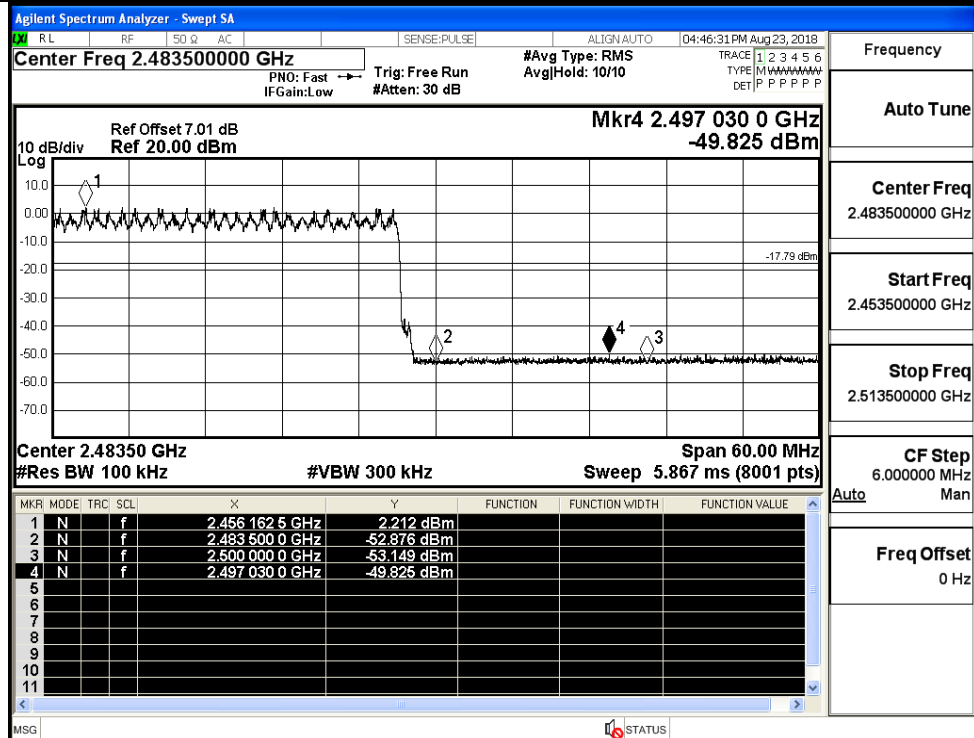
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

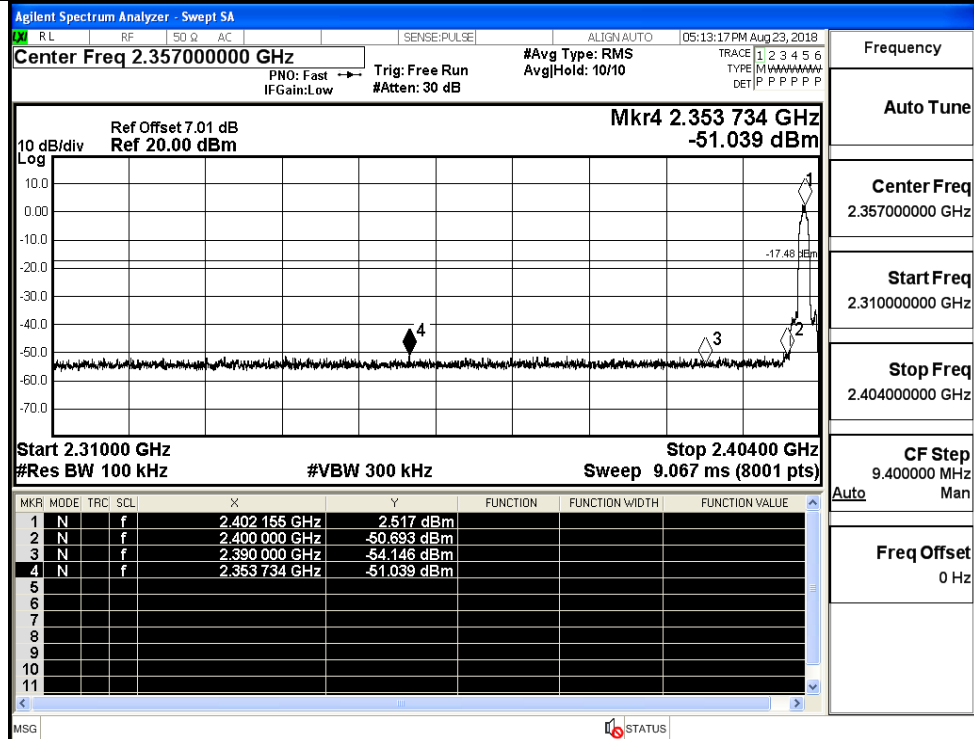
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

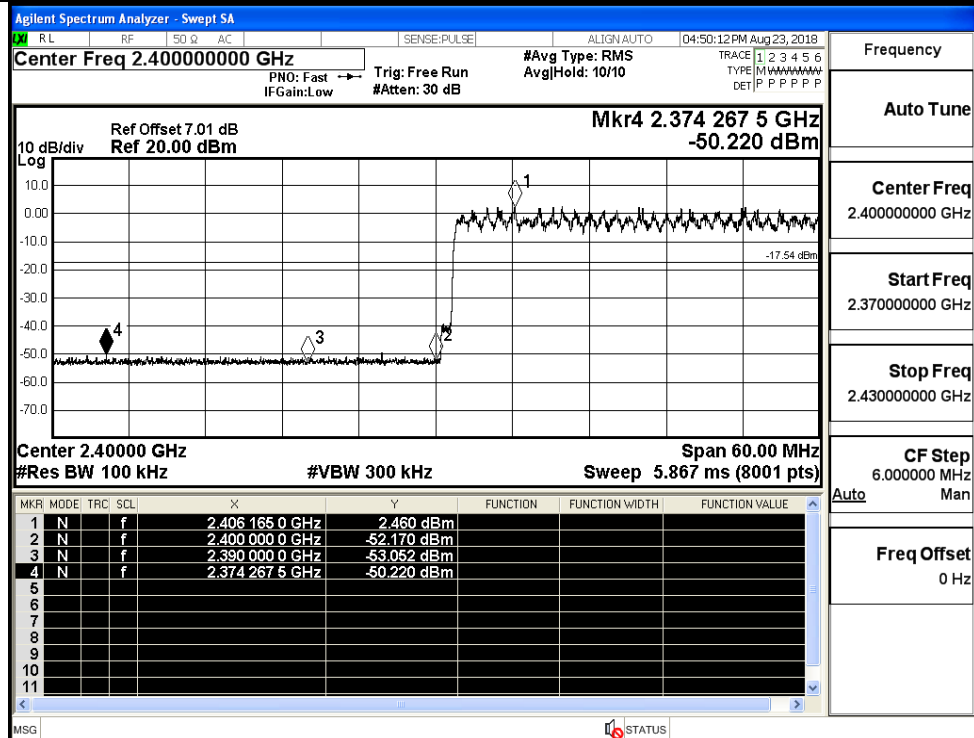
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

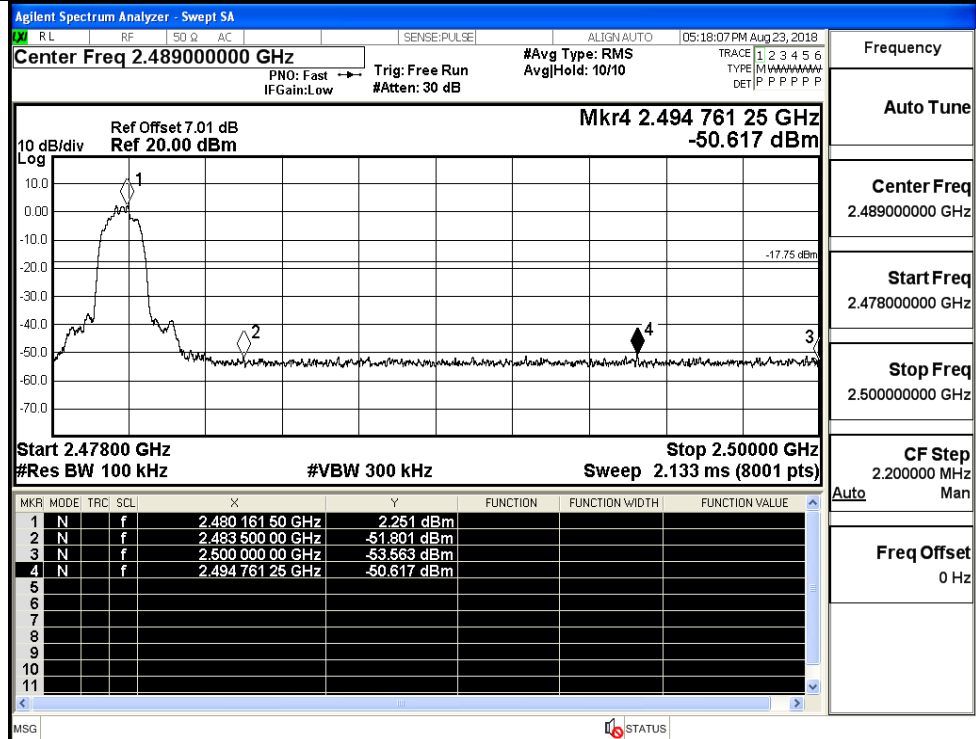
8DPSK/LCH/No Hop



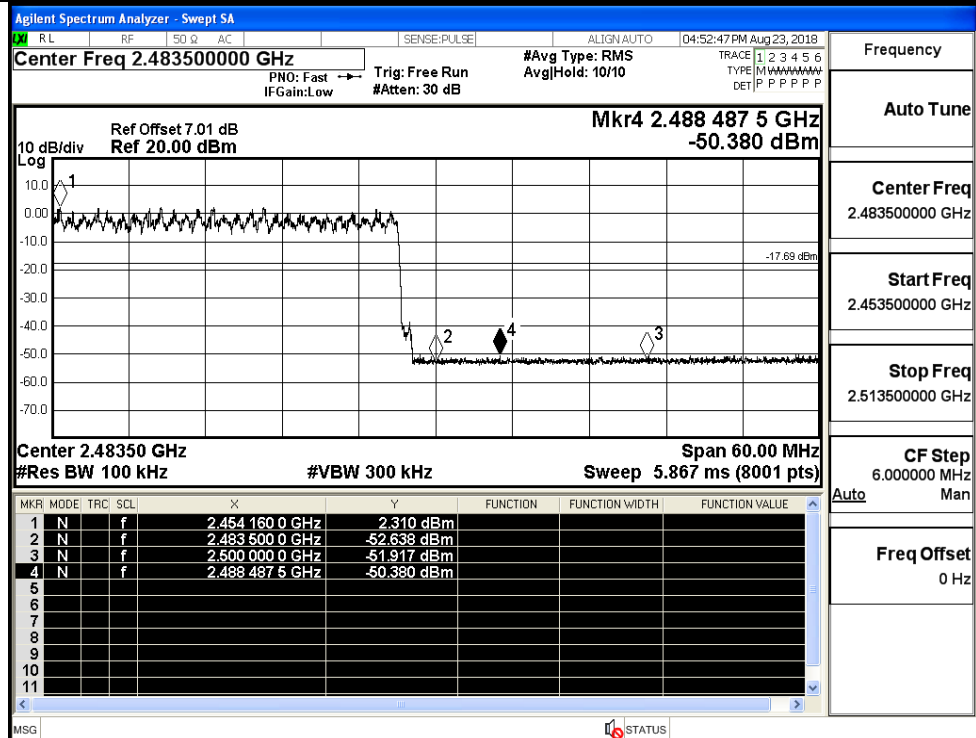
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



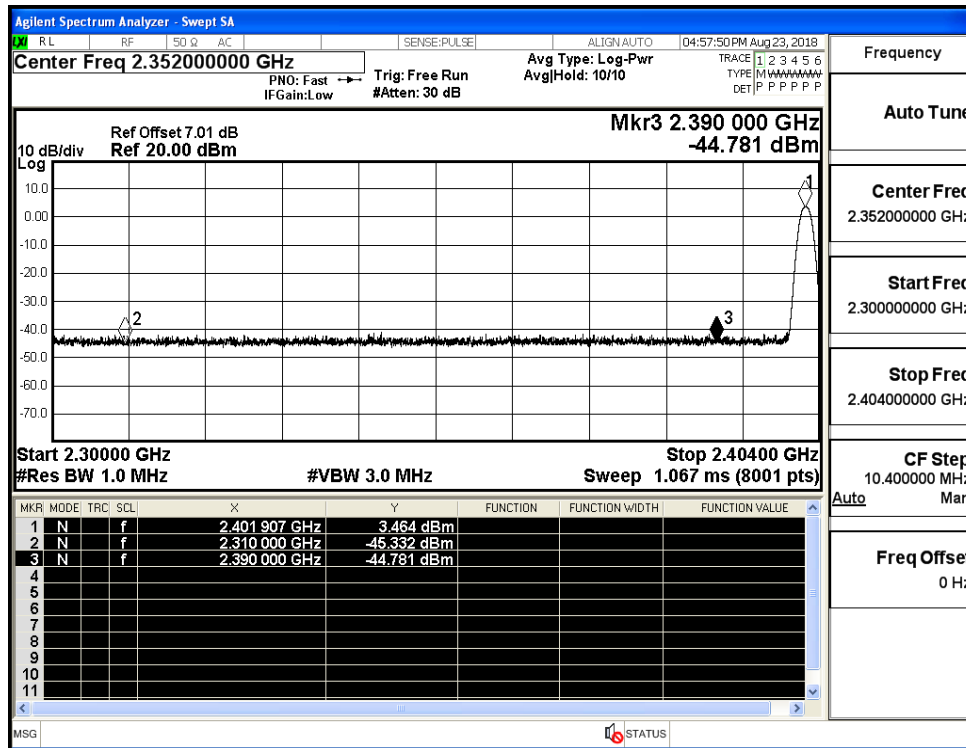
8DPSK/HCH/Hop



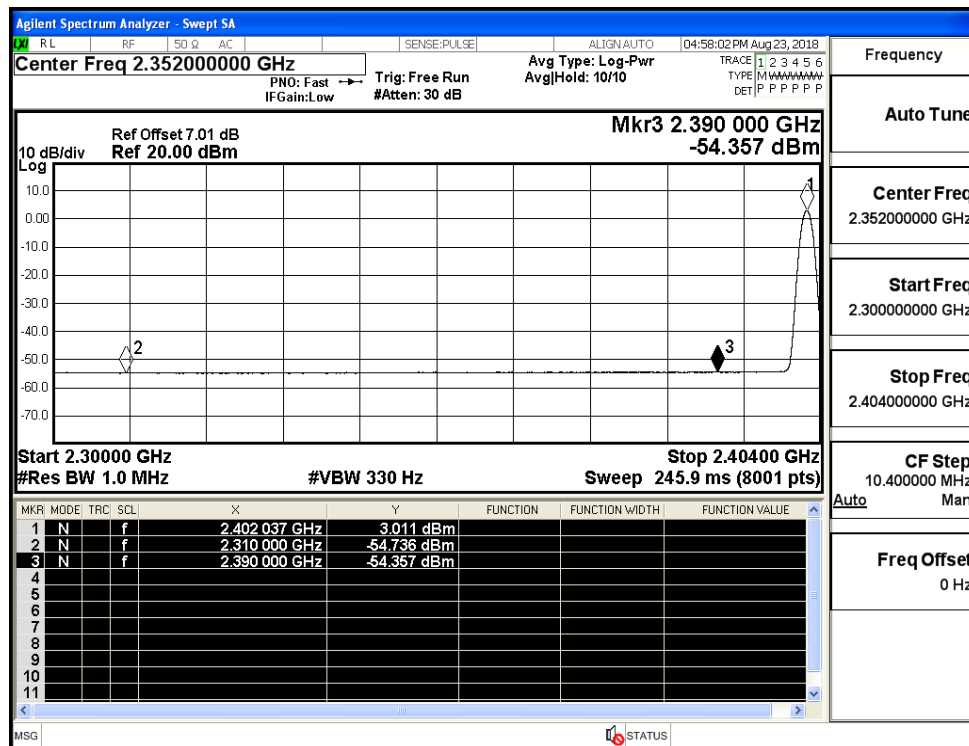
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-45.33	2.0	0	51.93	PEAK	74	PASS
	Off	2310.0	-54.74	2.0	0	42.52	AV	54	PASS
	Off	2390.0	-44.78	2.0	0	52.48	PEAK	74	PASS
	Off	2390.0	-54.36	2.0	0	42.90	AV	54	PASS
	Off	2483.5	-43.81	2.0	0	53.44	PEAK	74	PASS
	Off	2483.5	-53.96	2.0	0	43.29	AV	54	PASS
	Off	2500.0	-42.88	2.0	0	54.38	PEAK	74	PASS
	Off	2500.0	-54.04	2.0	0	43.22	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.39	2.0	0	52.86	PEAK	74	PASS
	Off	2310.0	-54.68	2.0	0	42.57	AV	54	PASS
	Off	2390.0	-44.15	2.0	0	53.11	PEAK	74	PASS
	Off	2390.0	-54.47	2.0	0	42.78	AV	54	PASS
	Off	2483.5	-42.84	2.0	0	54.42	PEAK	74	PASS
	Off	2483.5	-54.04	2.0	0	43.22	AV	54	PASS
	Off	2500.0	-44.42	2.0	0	52.84	PEAK	74	PASS
	Off	2500.0	-53.98	2.0	0	43.28	AV	54	PASS
8DPSK	Off	2310.0	-44.72	2.0	0	52.54	PEAK	74	PASS
	Off	2310.0	-54.68	2.0	0	42.58	AV	54	PASS
	Off	2390.0	-45.09	2.0	0	52.16	PEAK	74	PASS
	Off	2390.0	-54.47	2.0	0	42.79	AV	54	PASS
	Off	2483.5	-44.02	2.0	0	53.24	PEAK	74	PASS
	Off	2483.5	-54.00	2.0	0	43.25	AV	54	PASS
	Off	2500.0	-43.83	2.0	0	53.42	PEAK	74	PASS
	Off	2500.0	-53.96	2.0	0	43.30	AV	54	PASS

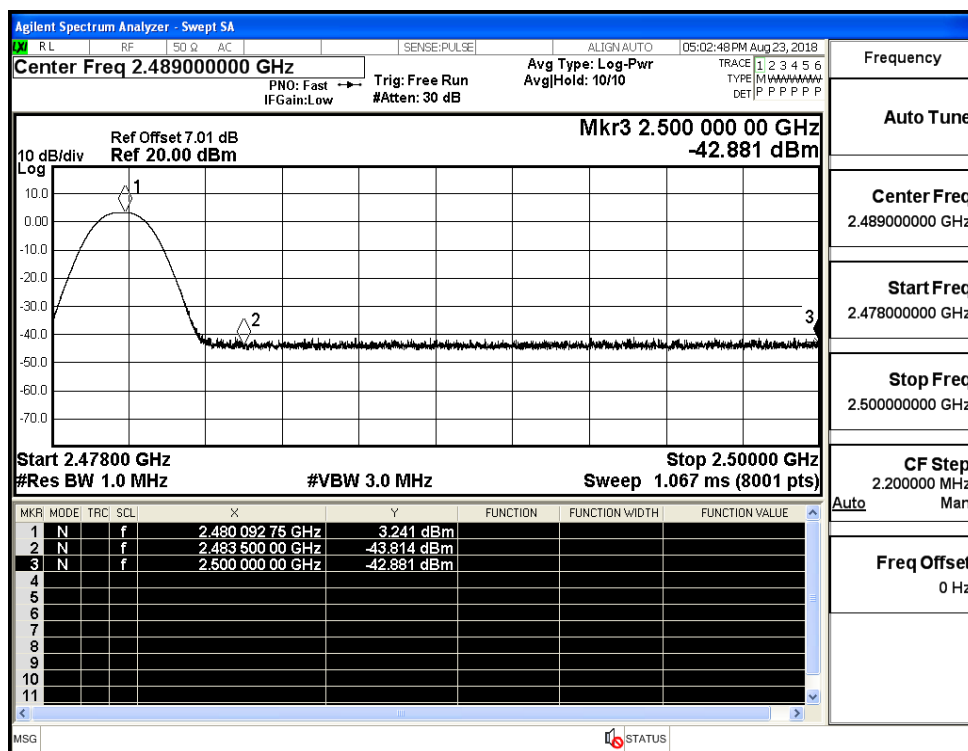
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



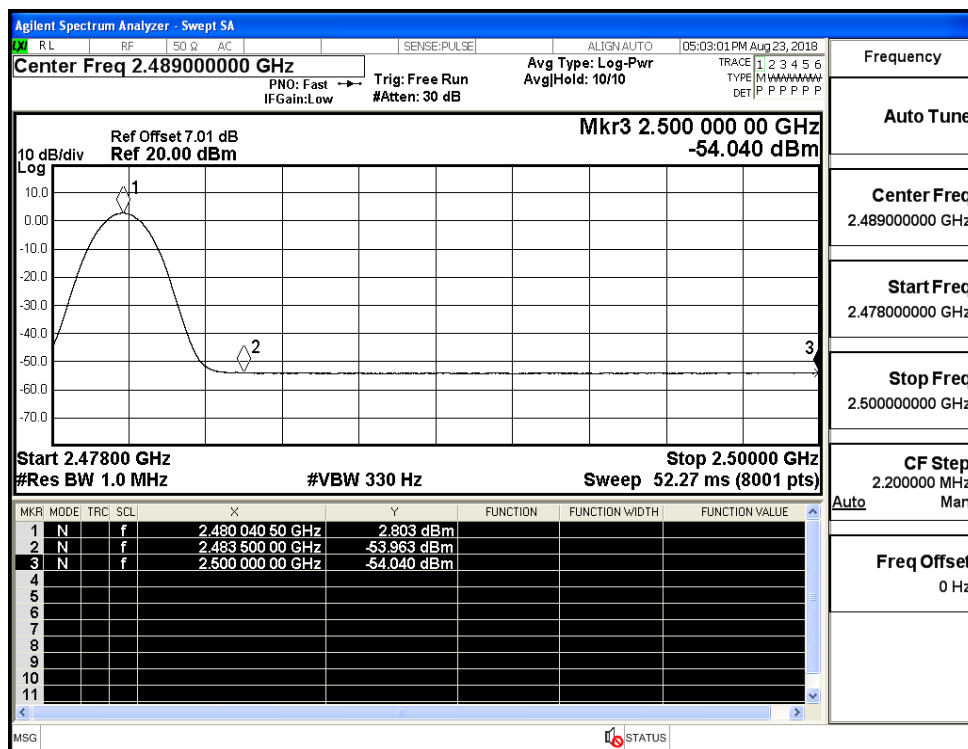
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

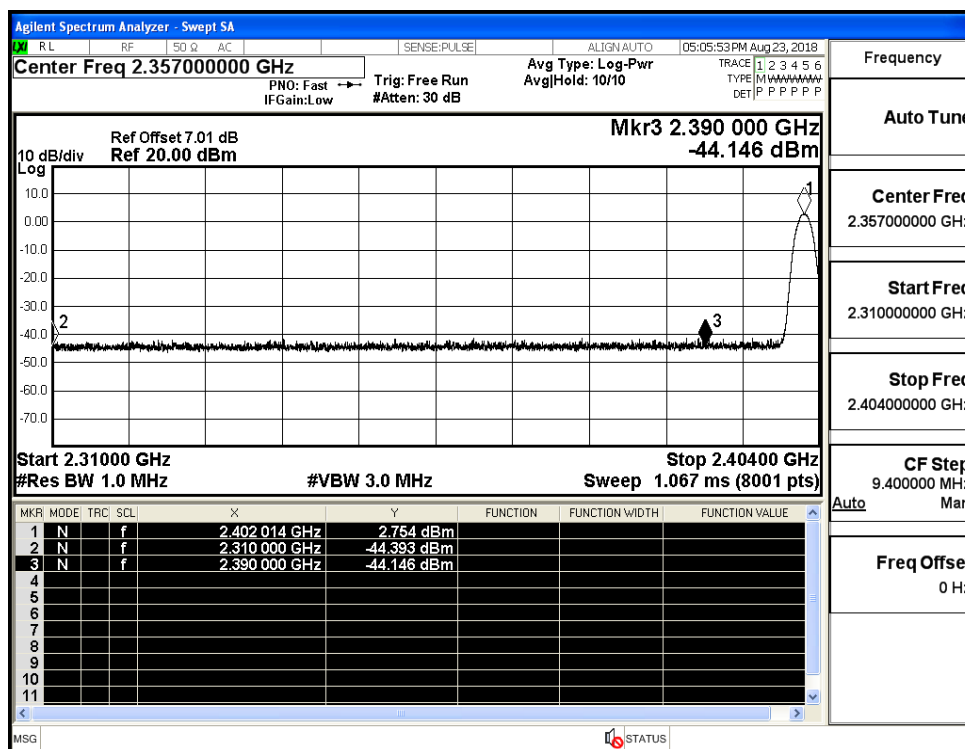
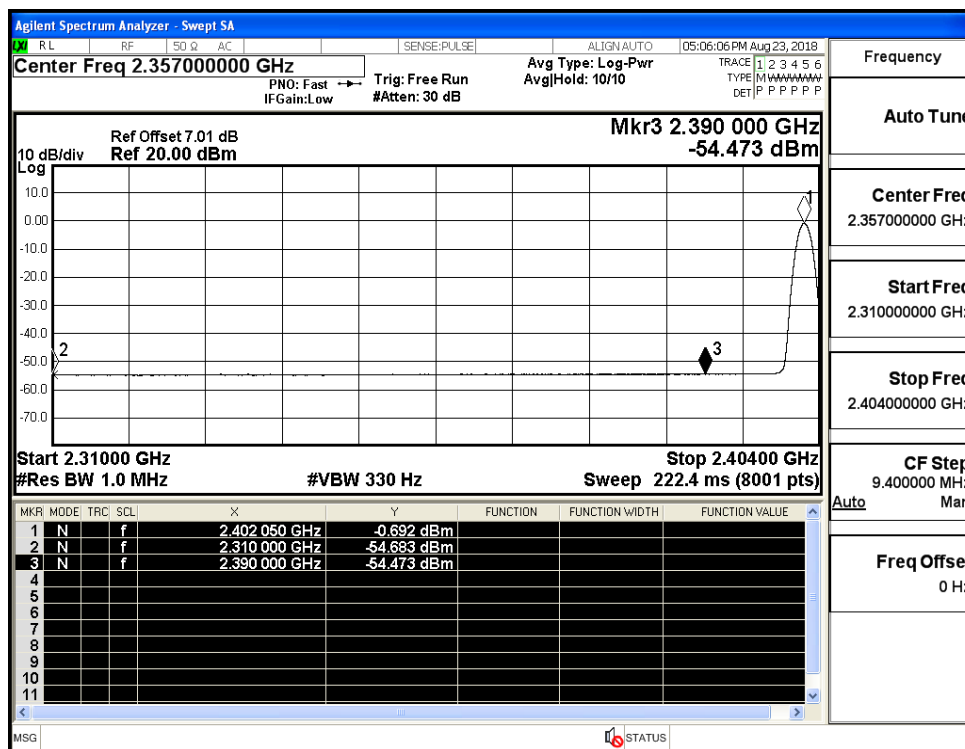


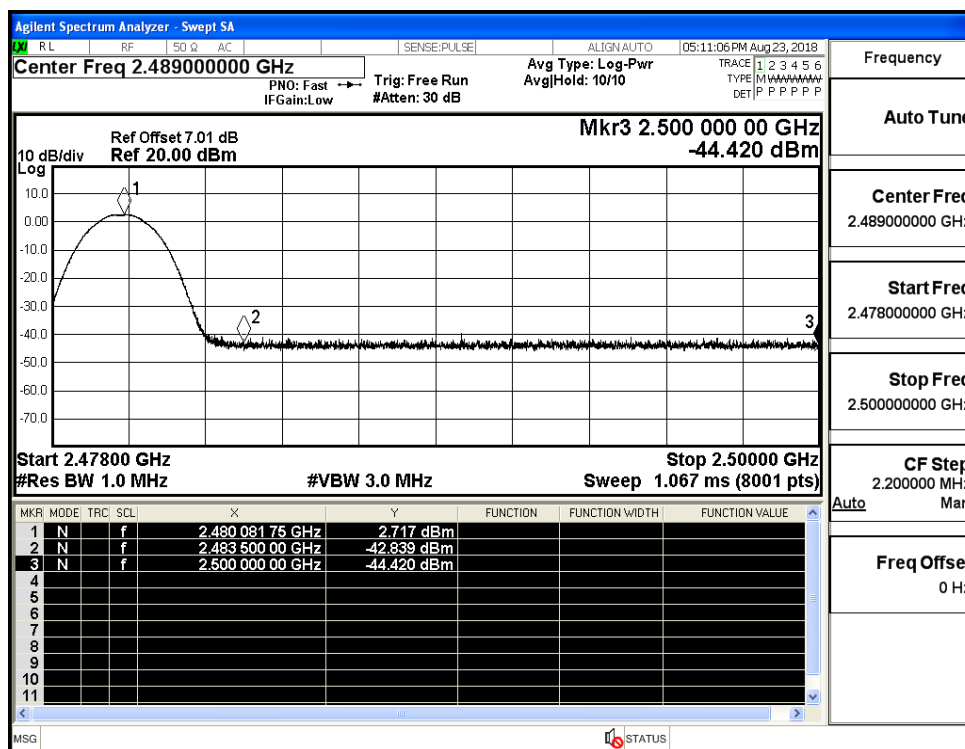
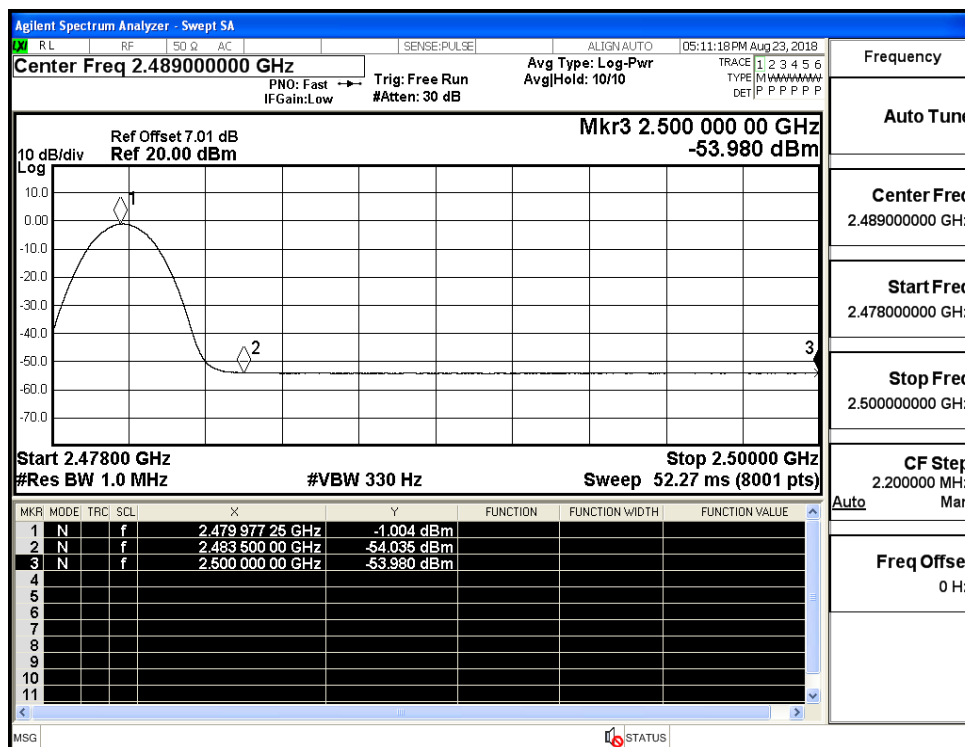
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



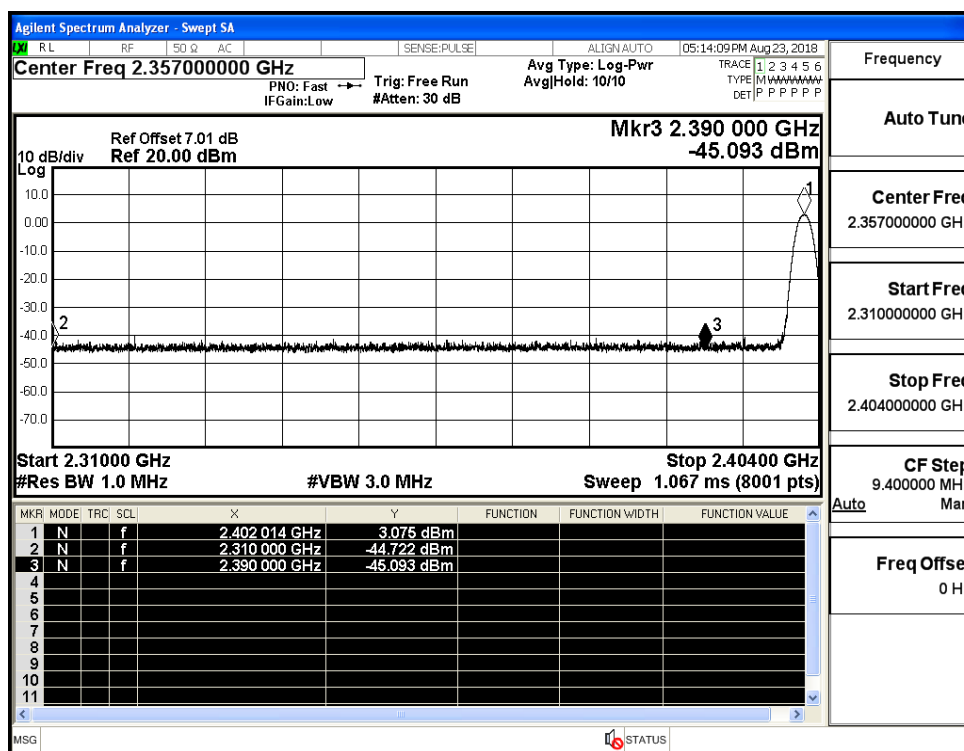
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



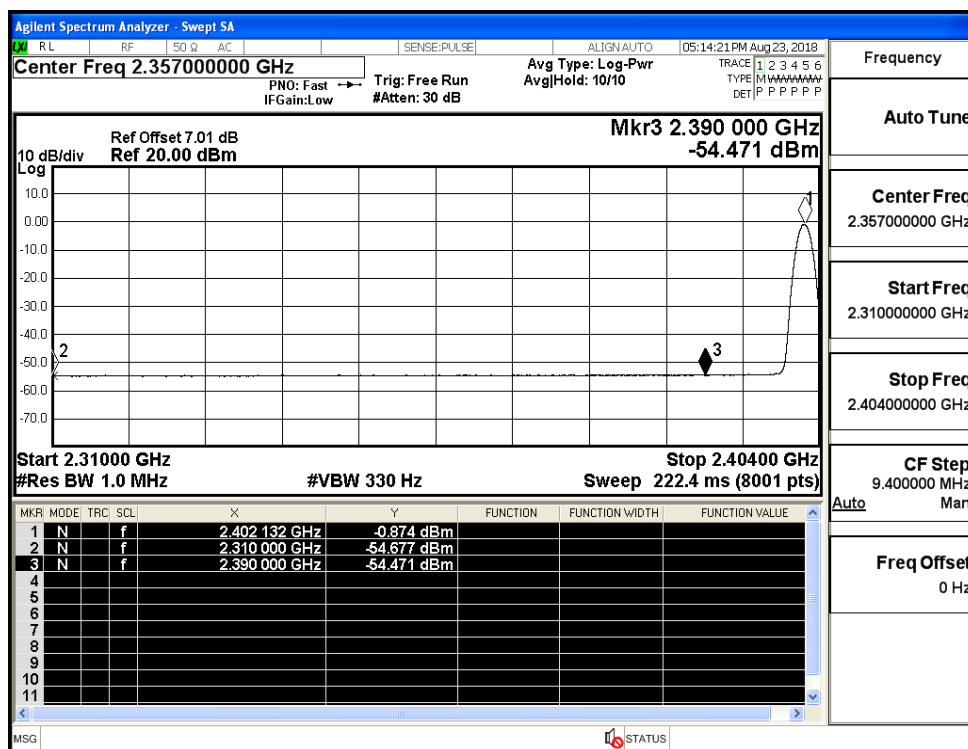
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

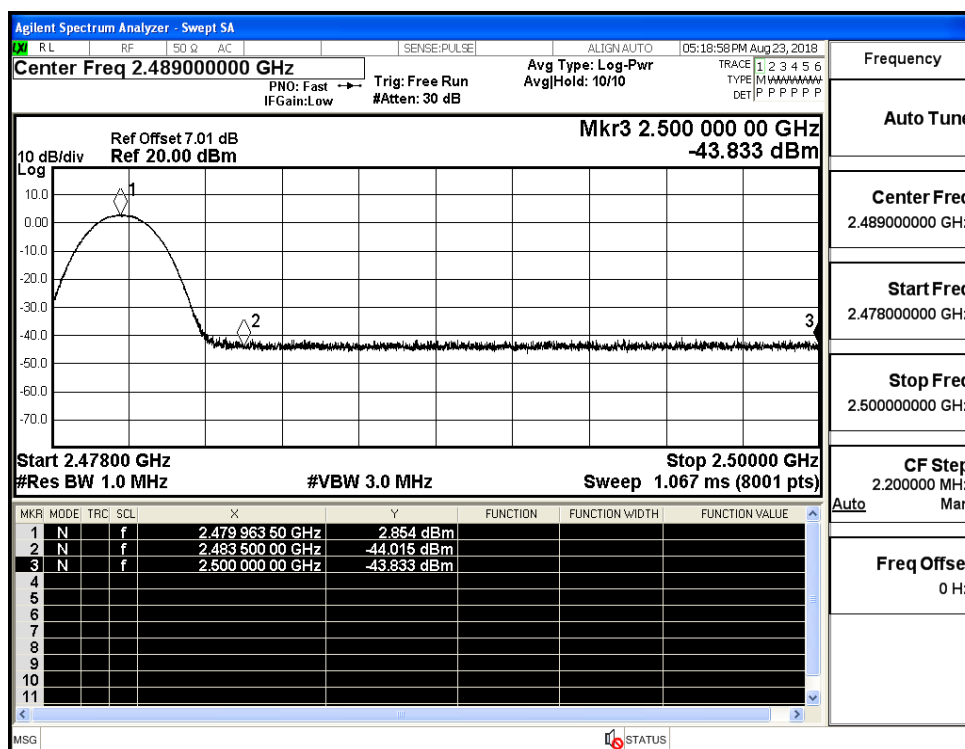
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

