

Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: Kids wireless Bluetooth headphone

Trade Mark: Twists by TickTalk

Test Model: Twists 1

Environmental Conditions

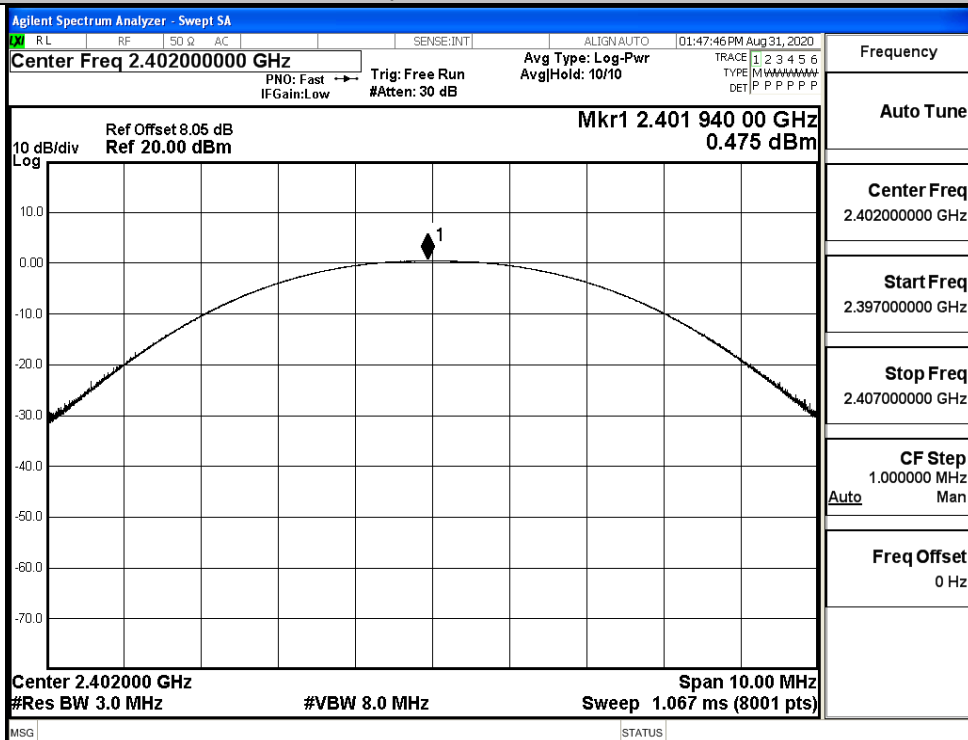
Temperature:	23.1° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

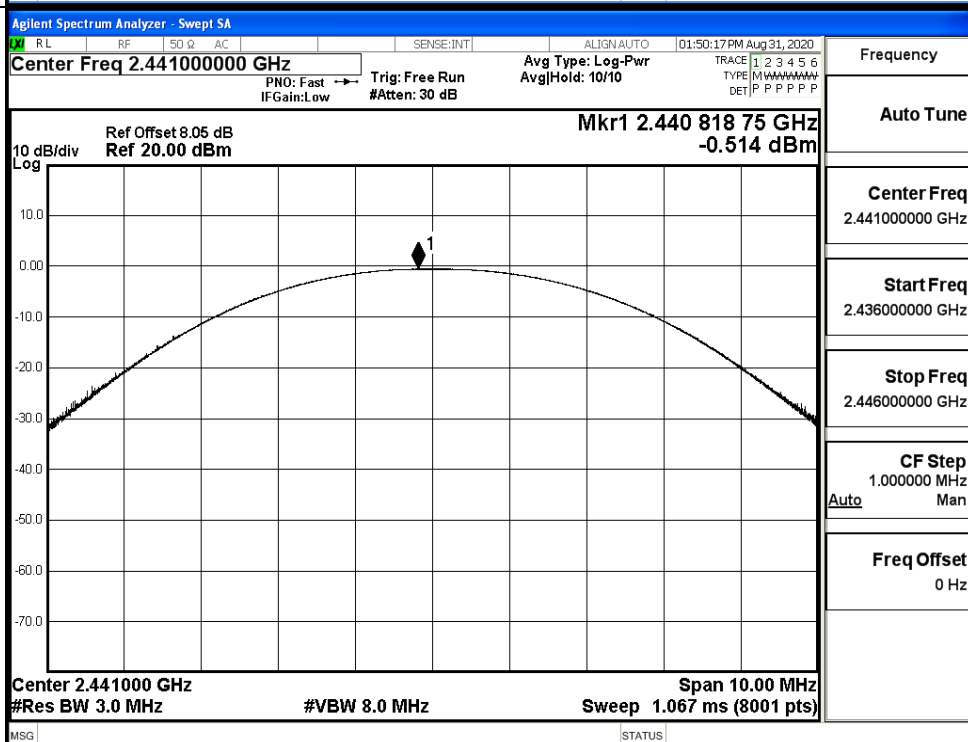
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.475	30	PASS
	MCH	-0.514	30	PASS
	HCH	-1.585	30	PASS
$\pi/4$ DQPSK	LCH	2.845	30	PASS
	MCH	1.789	30	PASS
	HCH	0.719	30	PASS
8DPSK	LCH	3.341	30	PASS
	MCH	2.396	30	PASS
	HCH	1.315	30	PASS

Test Graphs

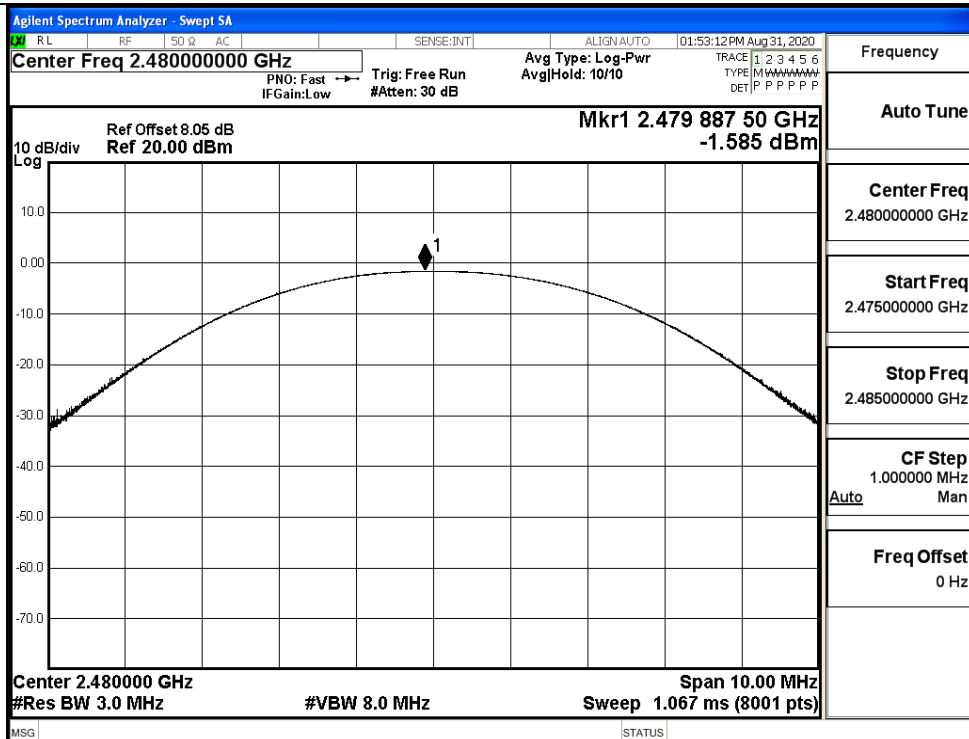
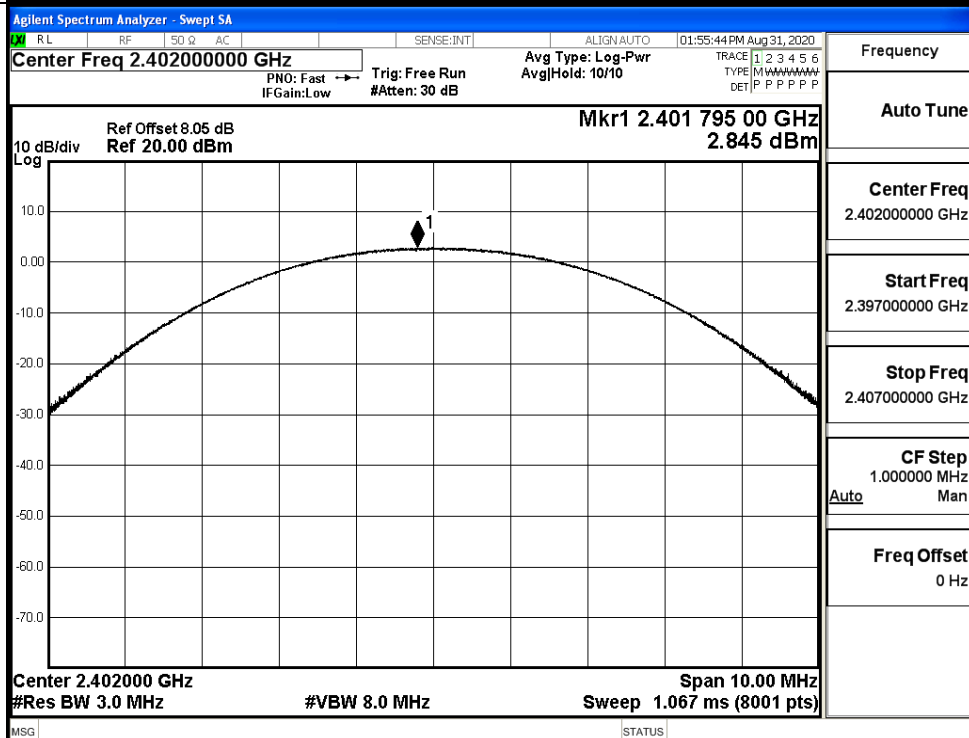
GFSK/LCH

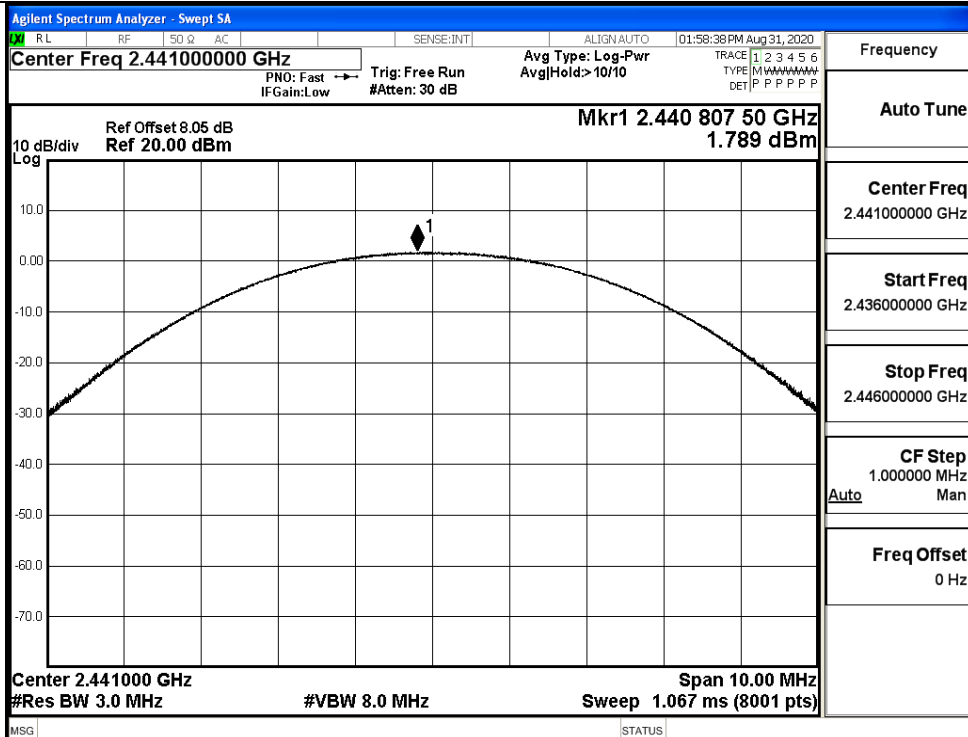
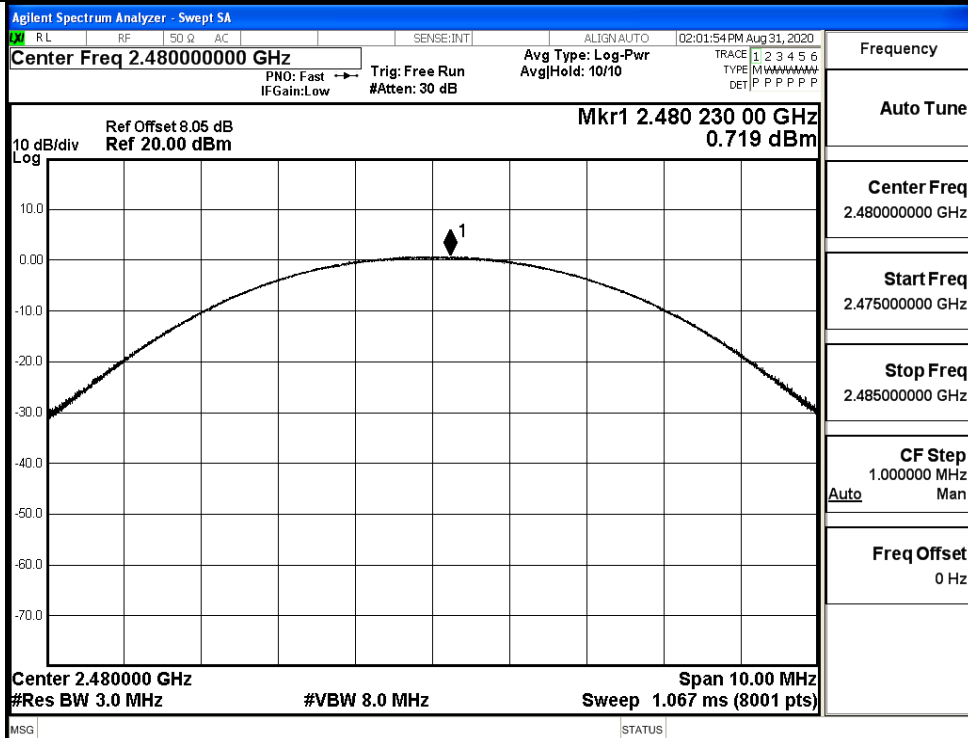


GFSK/MCH

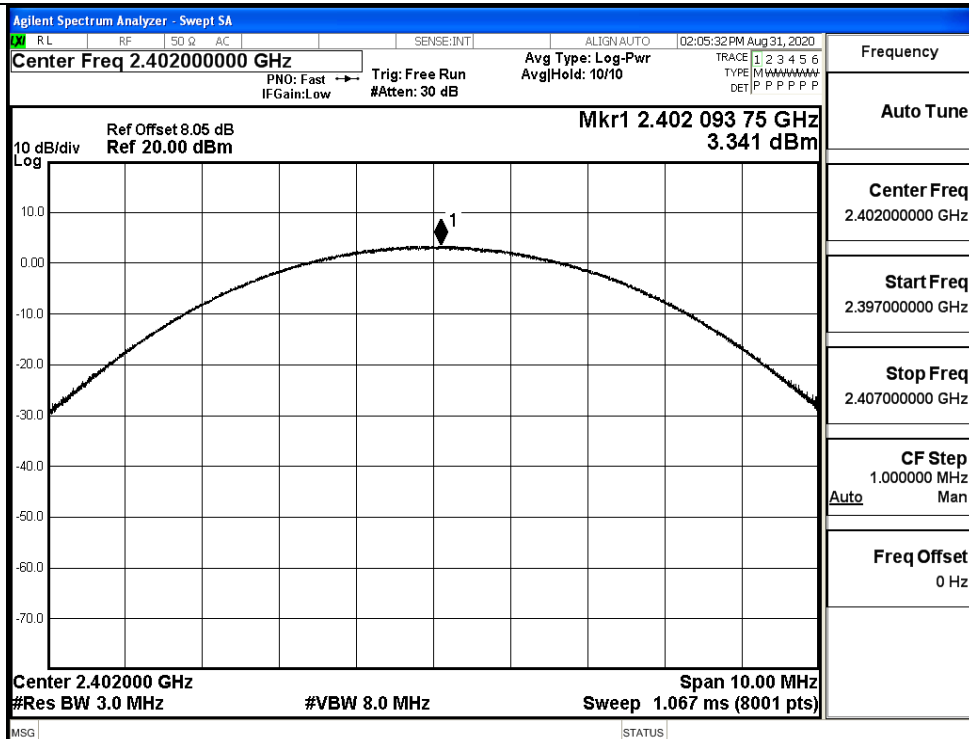


GFSK/HCH

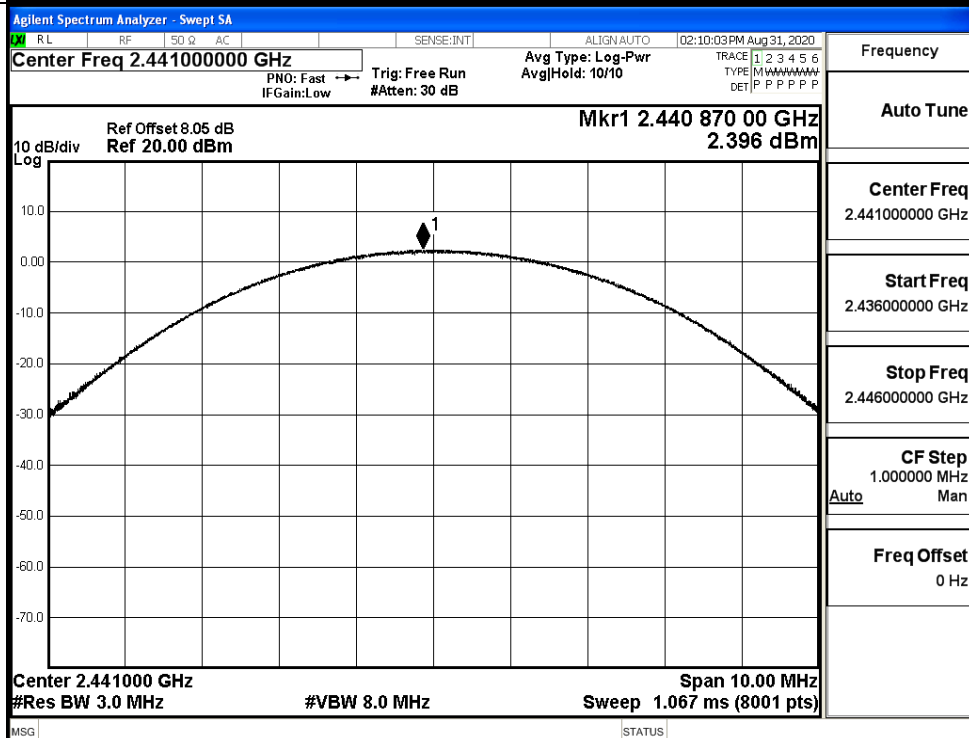
 $\pi/4$ DQPSK/LCH

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

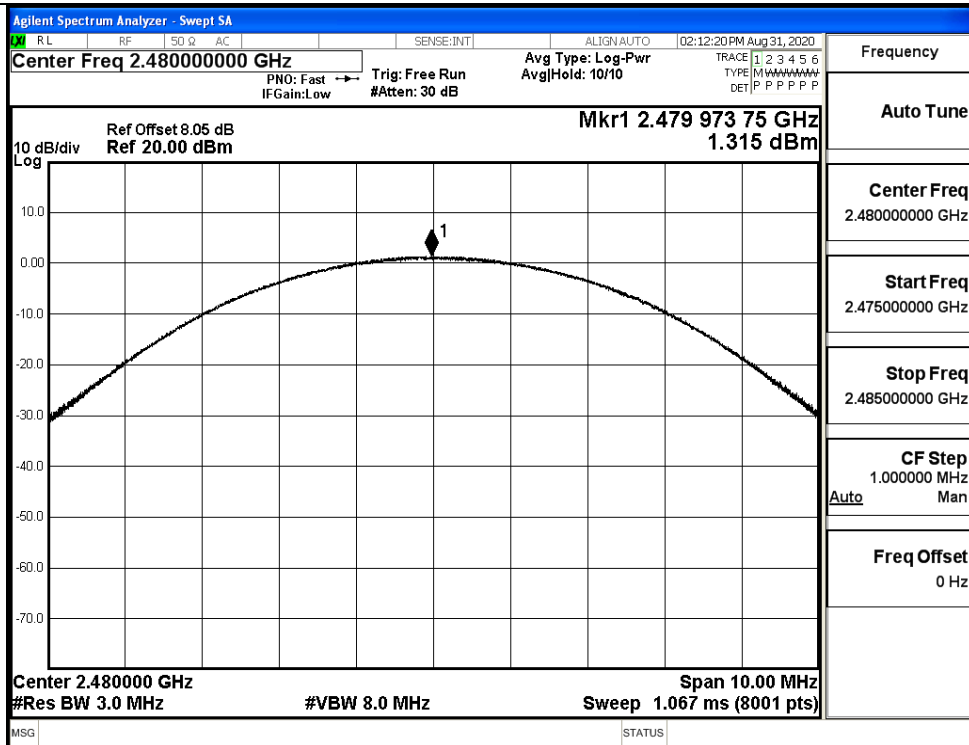
8DPSK/LCH



8DPSK/MCH



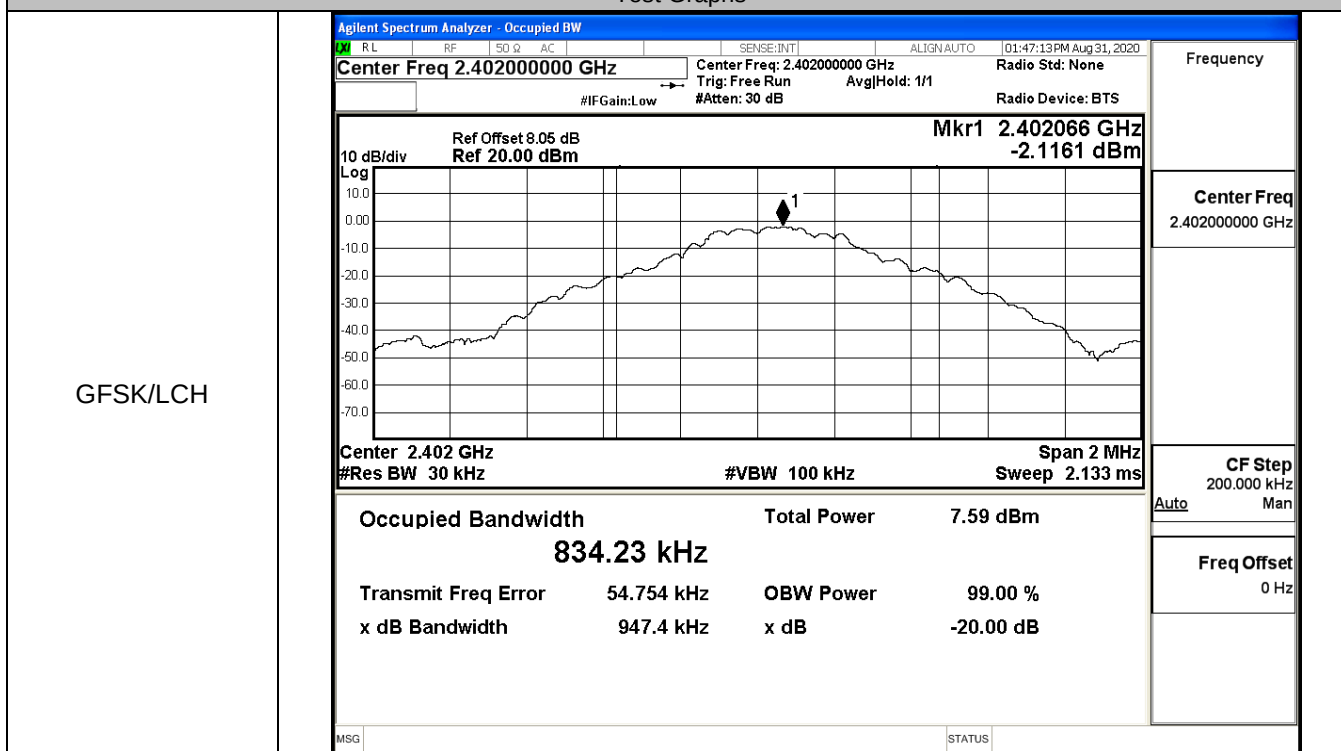
8DPSK/HCH



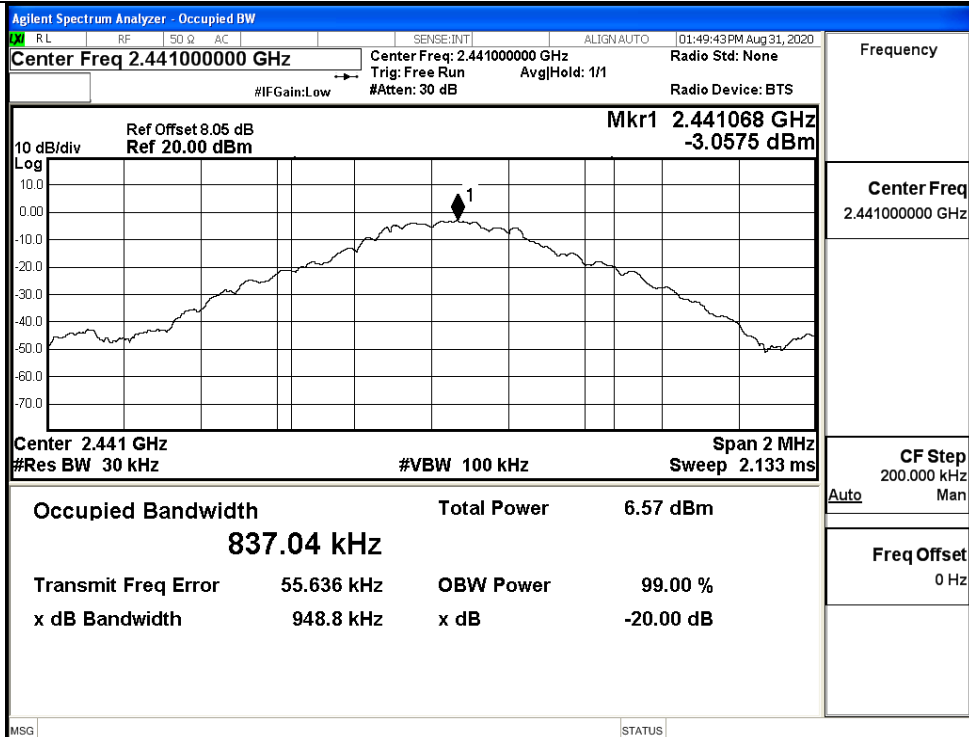
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9474	Not Specified	PASS
	MCH	0.9488	Not Specified	PASS
	HCH	0.9487	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.317	Not Specified	PASS
	MCH	1.319	Not Specified	PASS
	HCH	1.318	Not Specified	PASS
8DPSK	LCH	1.302	Not Specified	PASS
	MCH	1.302	Not Specified	PASS
	HCH	1.301	Not Specified	PASS

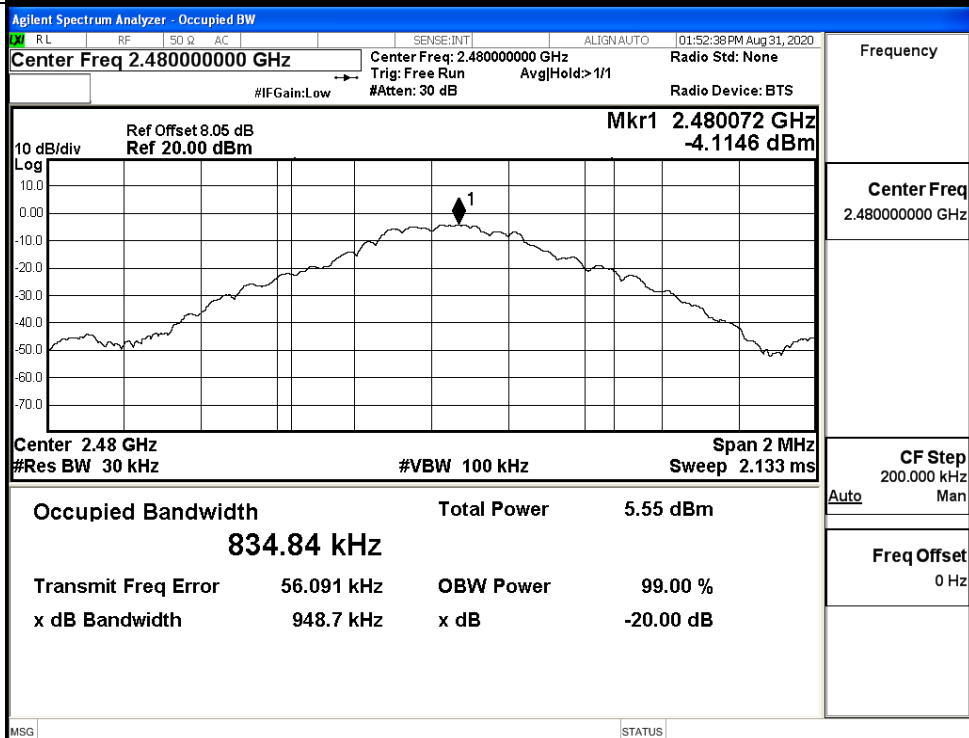
Test Graphs

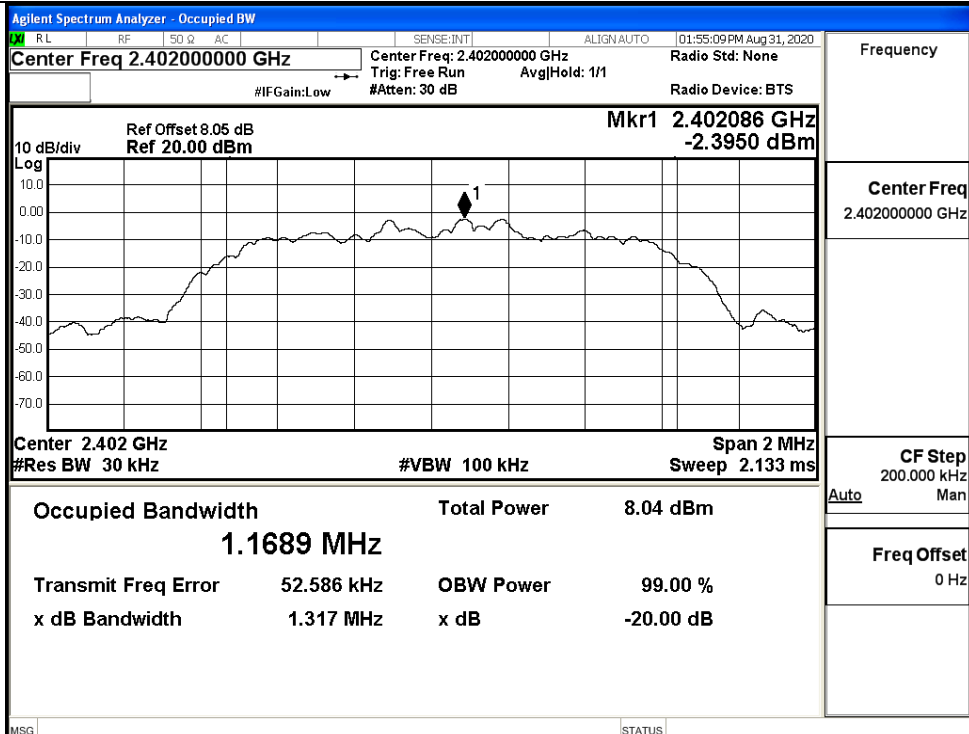
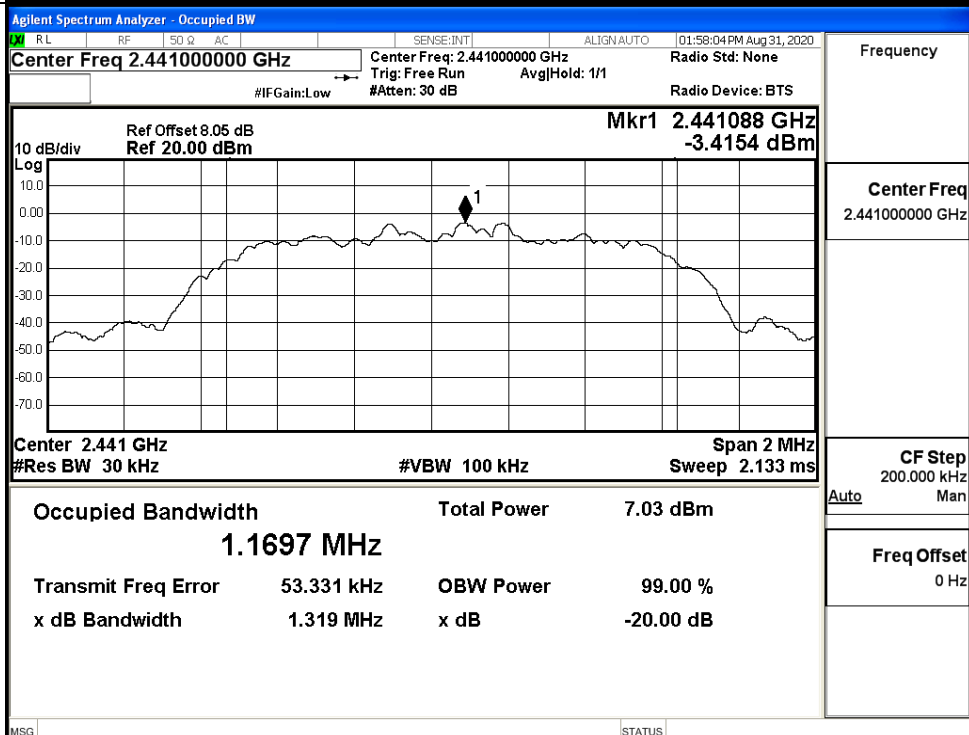


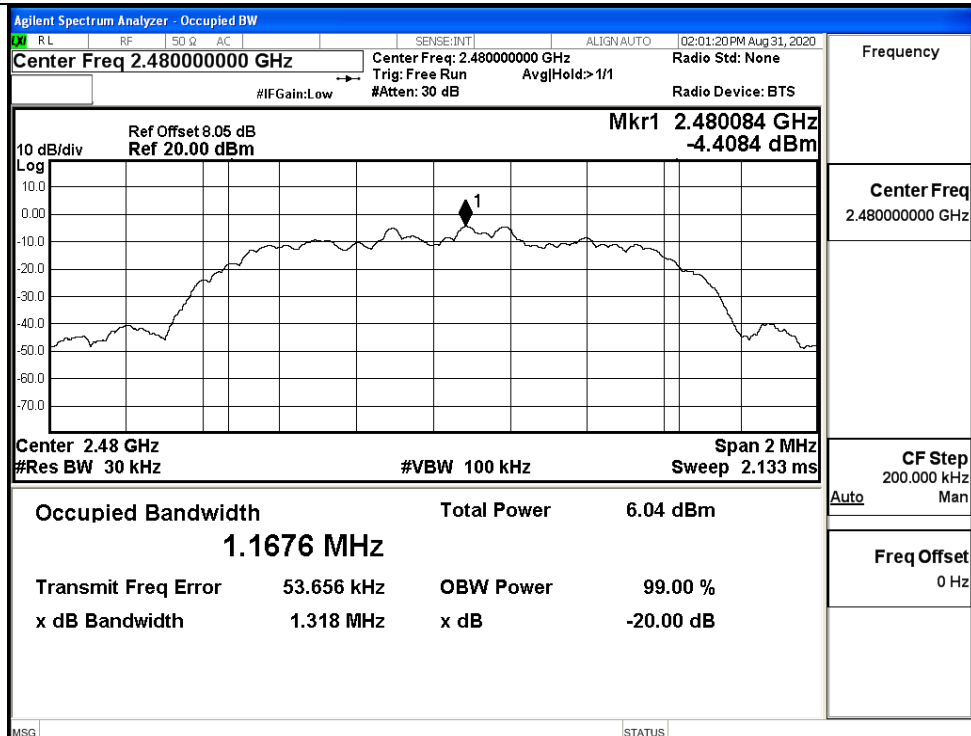
GFSK/MCH



GFSK/HCH



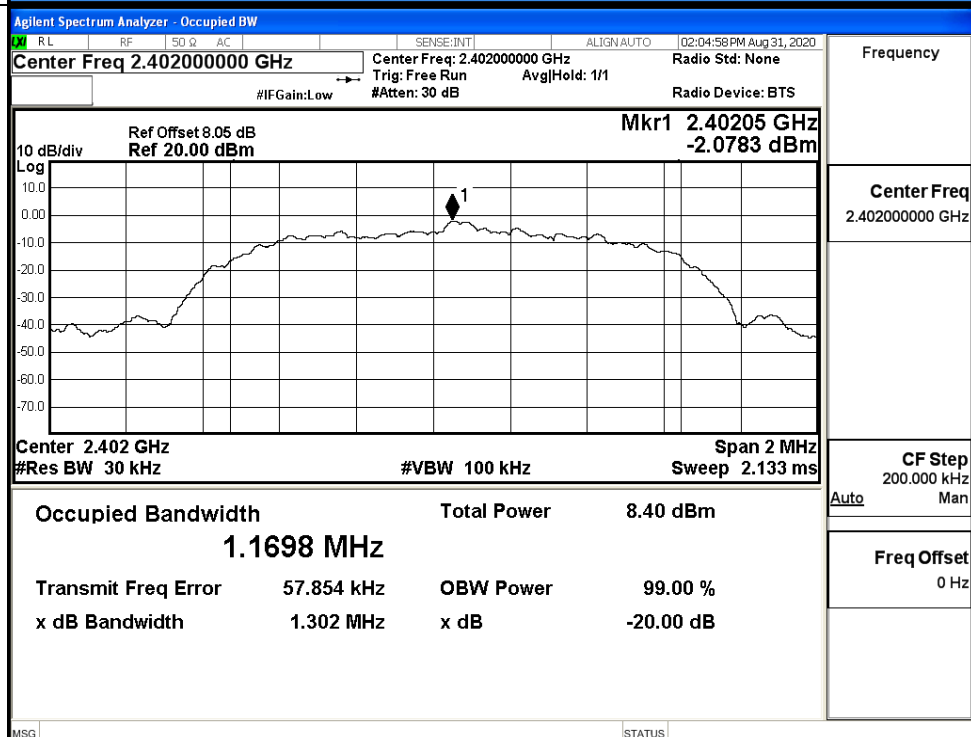
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

Frequency

Center Freq
2.48000000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

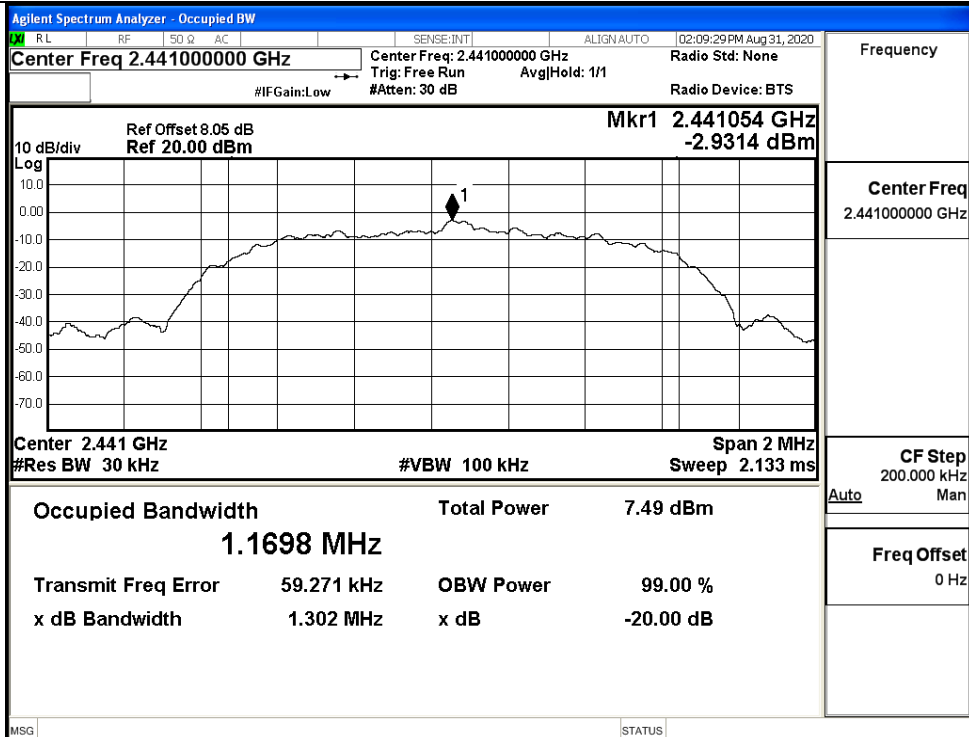
8DPSK/LCH



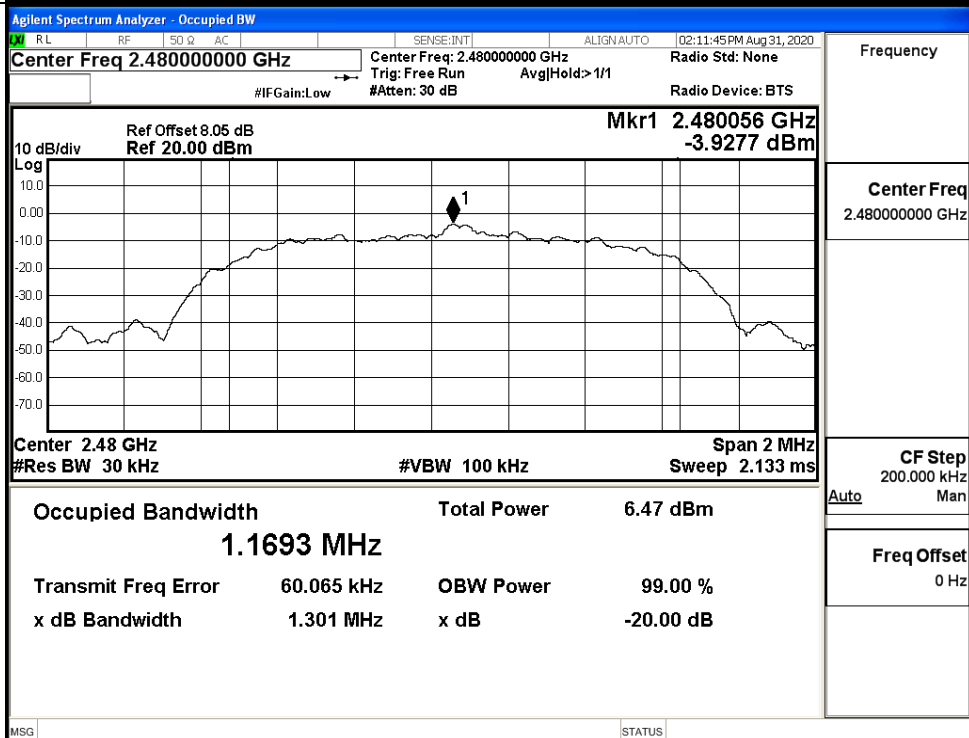
Frequency

Center Freq
2.40200000 GHzCF Step
200.000 kHz
Auto ManFreq Offset
0 Hz

8DPSK/MCH



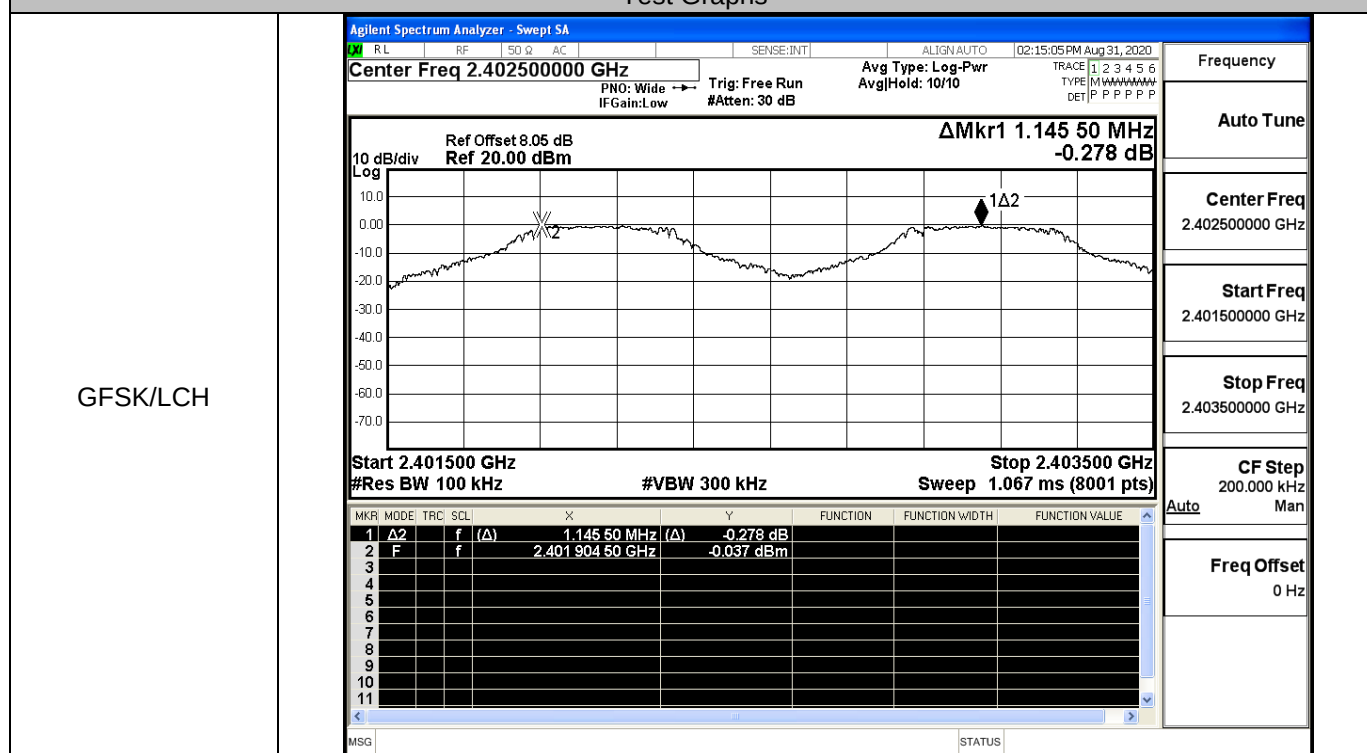
8DPSK/HCH



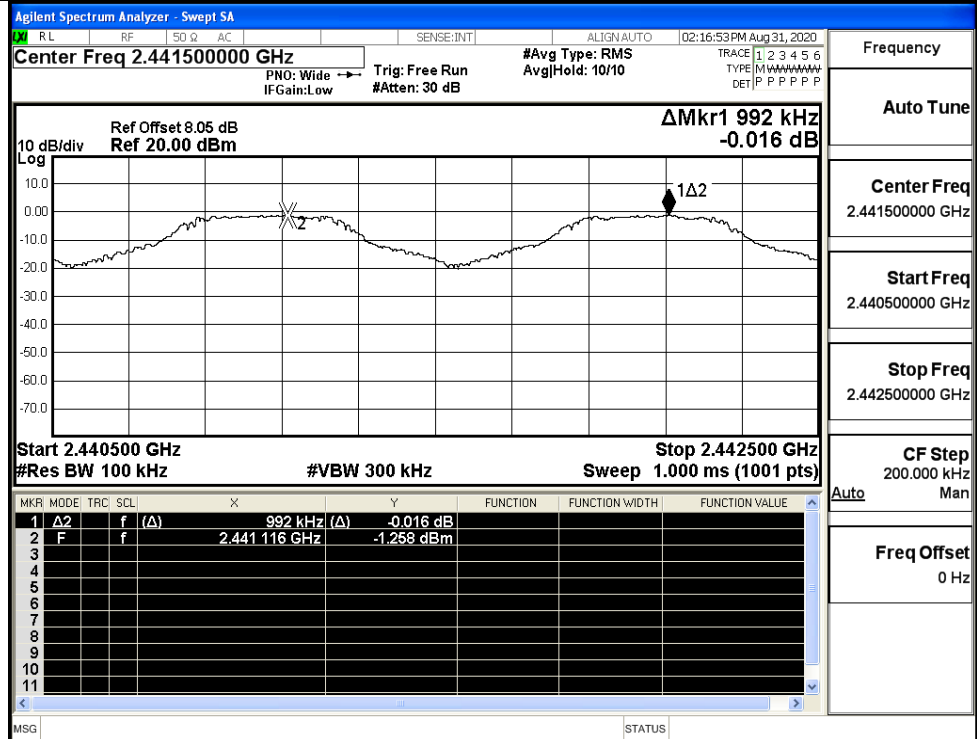
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.146	0.633	PASS
	MCH	0.992	0.633	PASS
	HCH	1.168	0.633	PASS
$\pi/4$ DQPSK	LCH	0.990	0.879	PASS
	MCH	1.098	0.879	PASS
	HCH	0.914	0.879	PASS
8DPSK	LCH	0.998	0.868	PASS
	MCH	0.996	0.868	PASS
	HCH	1.158	0.868	PASS

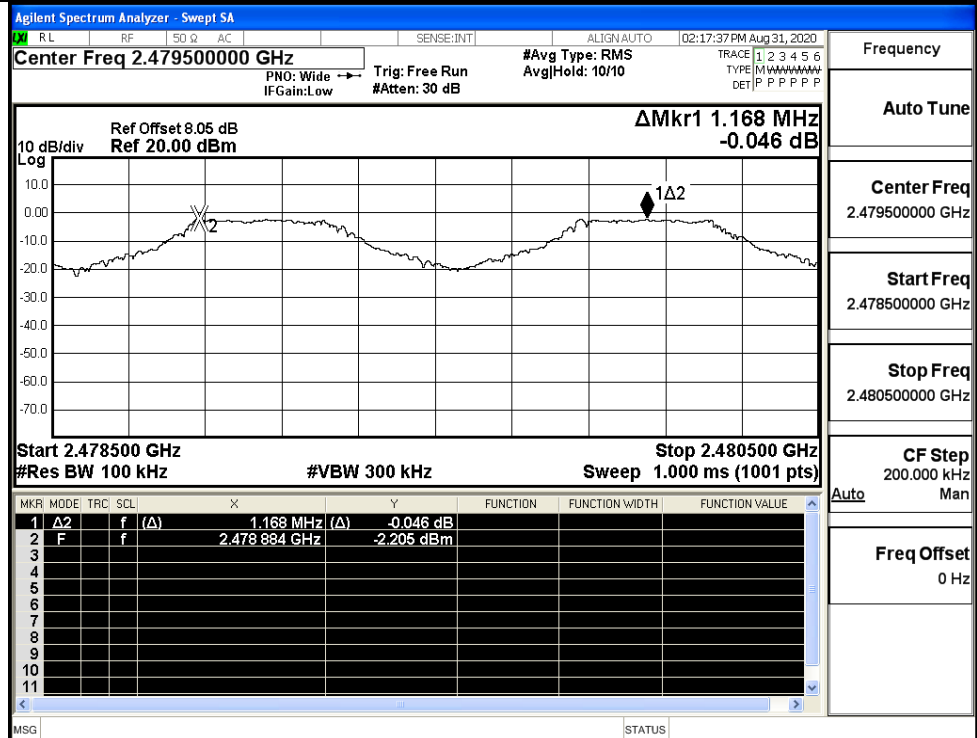
Test Graphs

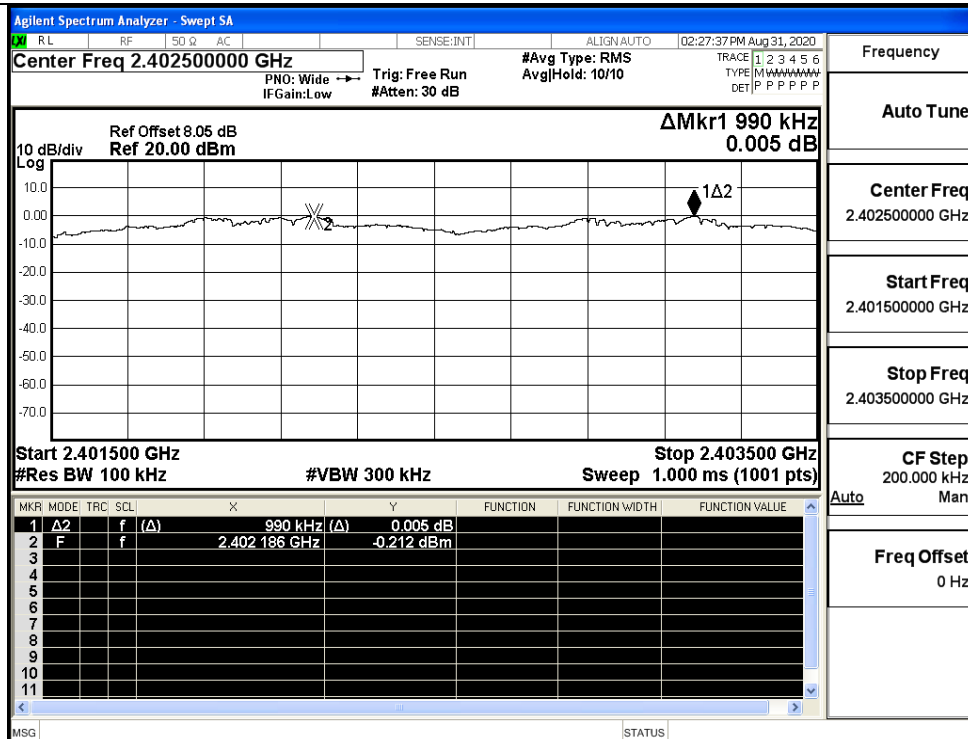
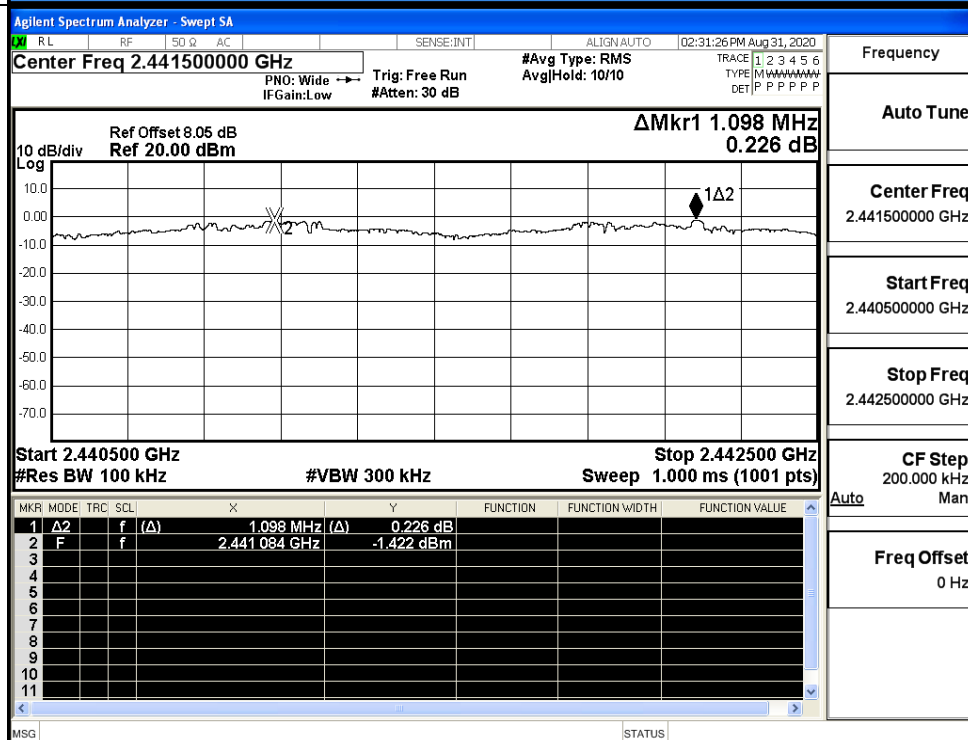


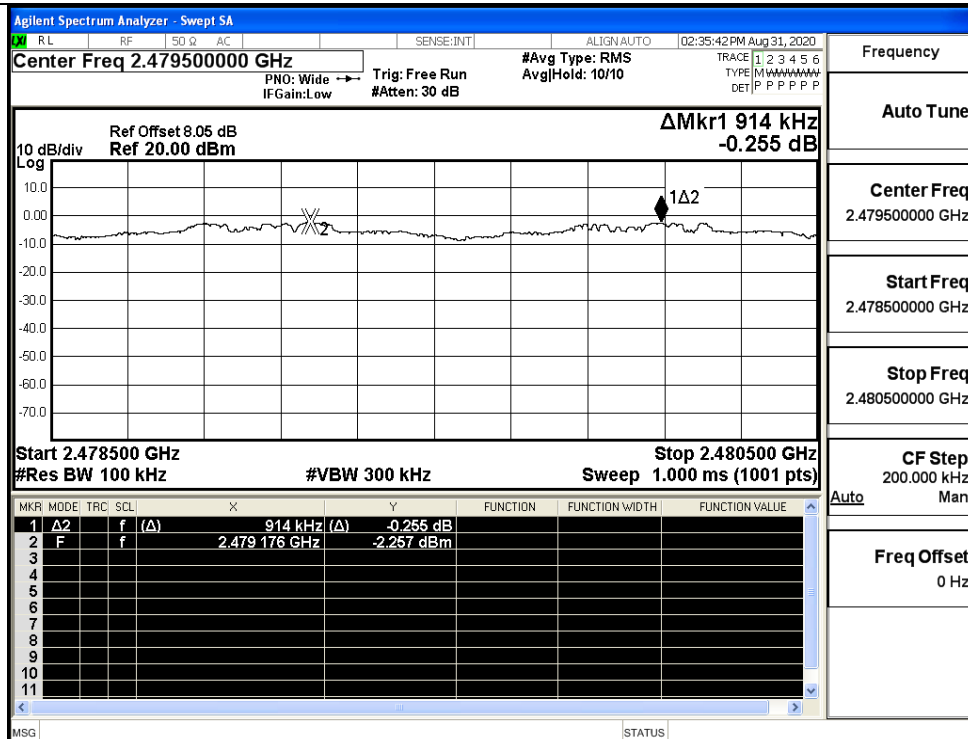
GFSK/MCH



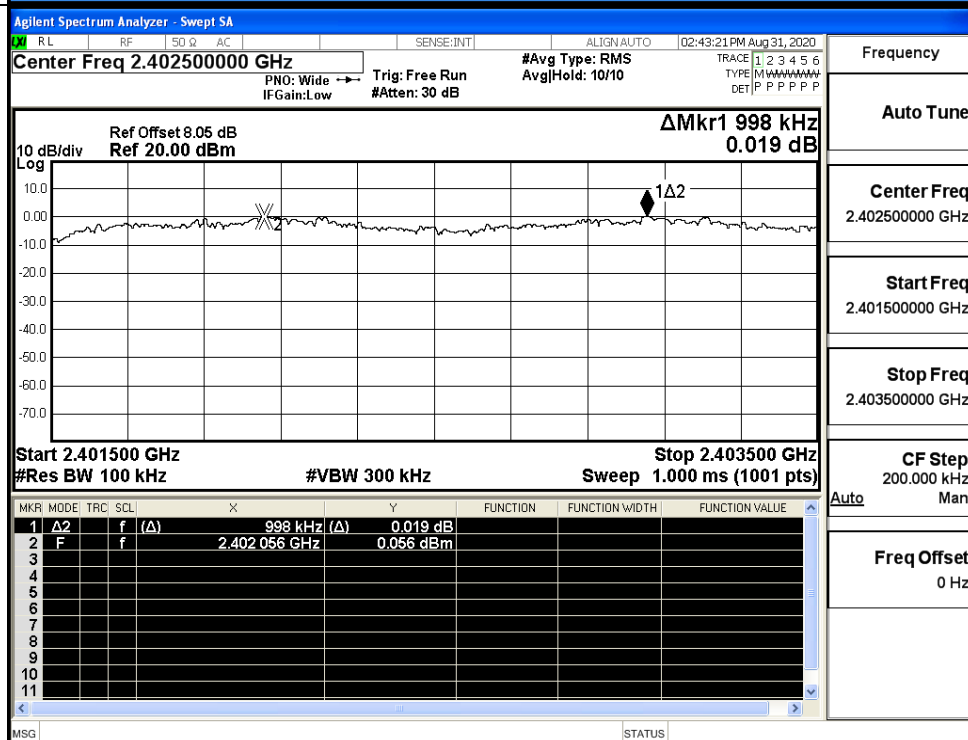
GFSK/HCH



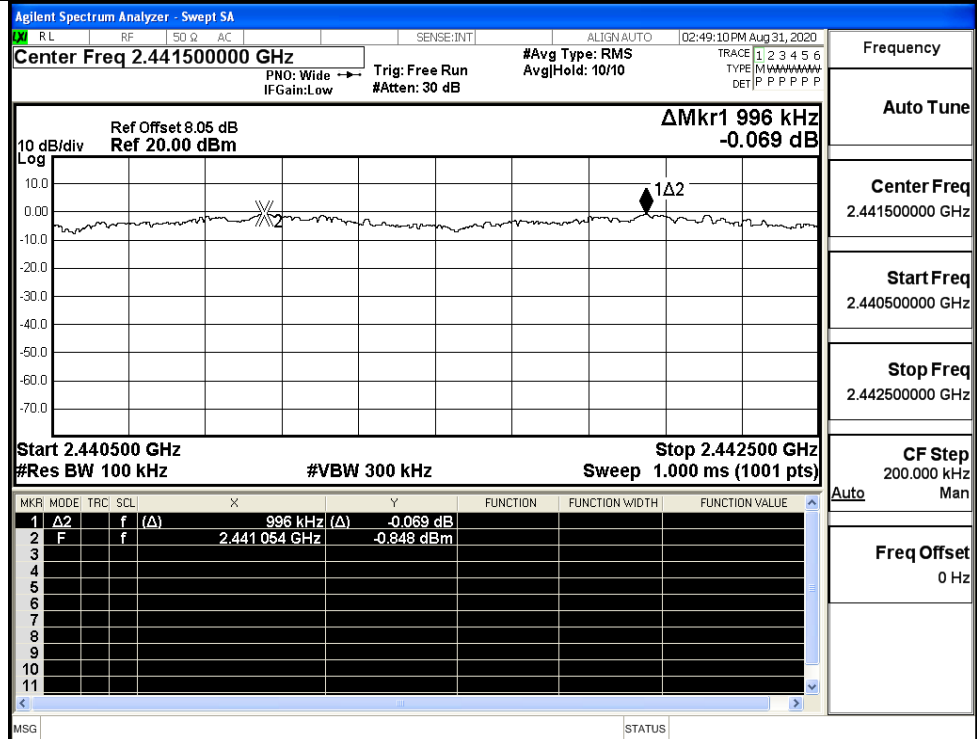
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

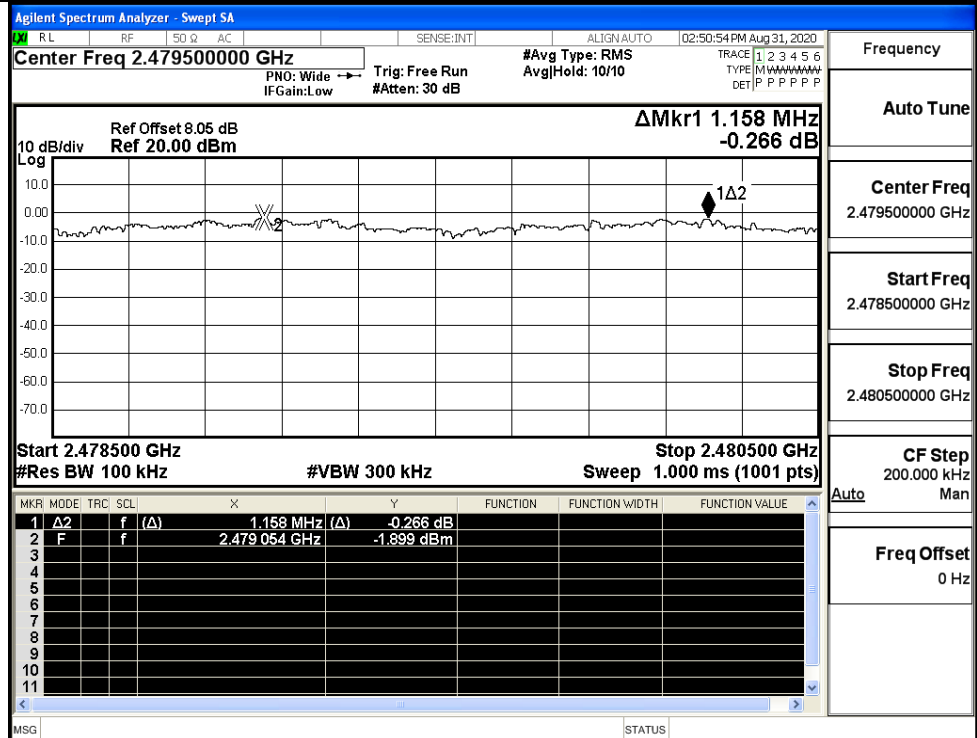
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

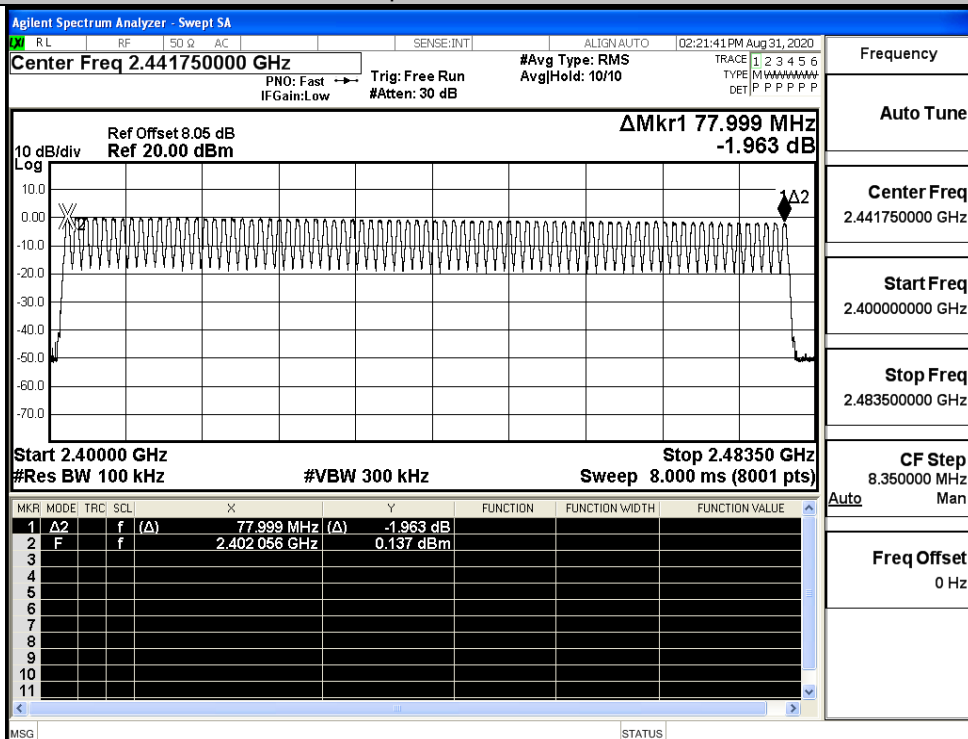


A.4 Hopping Channel Number

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

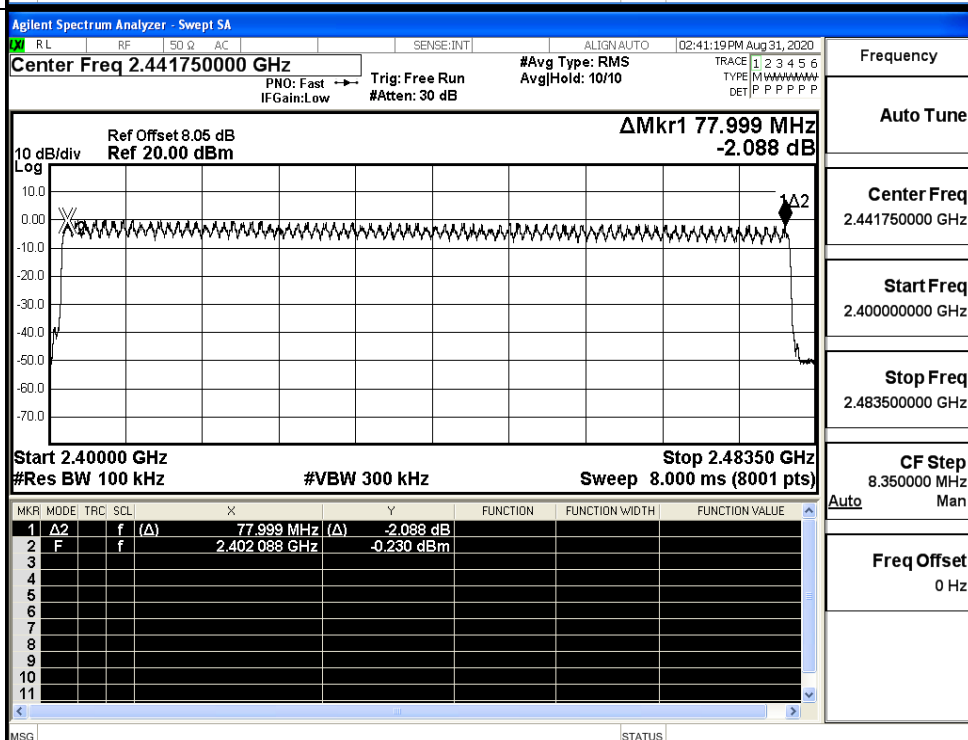
Test Graphs

GFSK/Hop



Frequency

Auto Tune

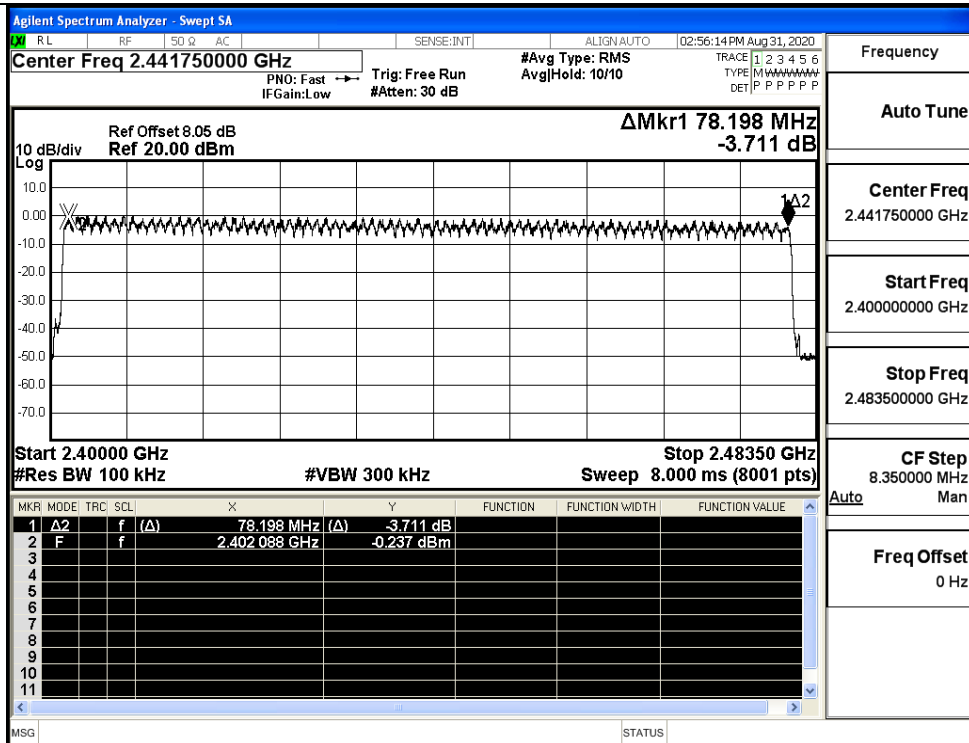
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
Auto ManFreq Offset
0 Hz $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
Auto ManFreq Offset
0 Hz

8DPSK/Hop

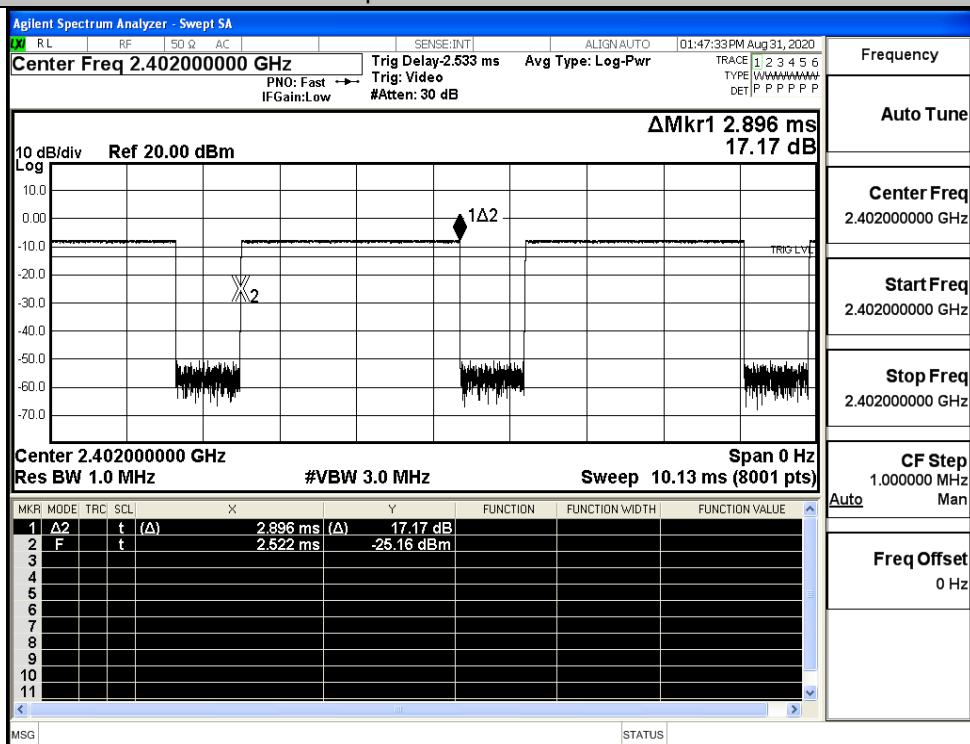


A.5 Dwell Time

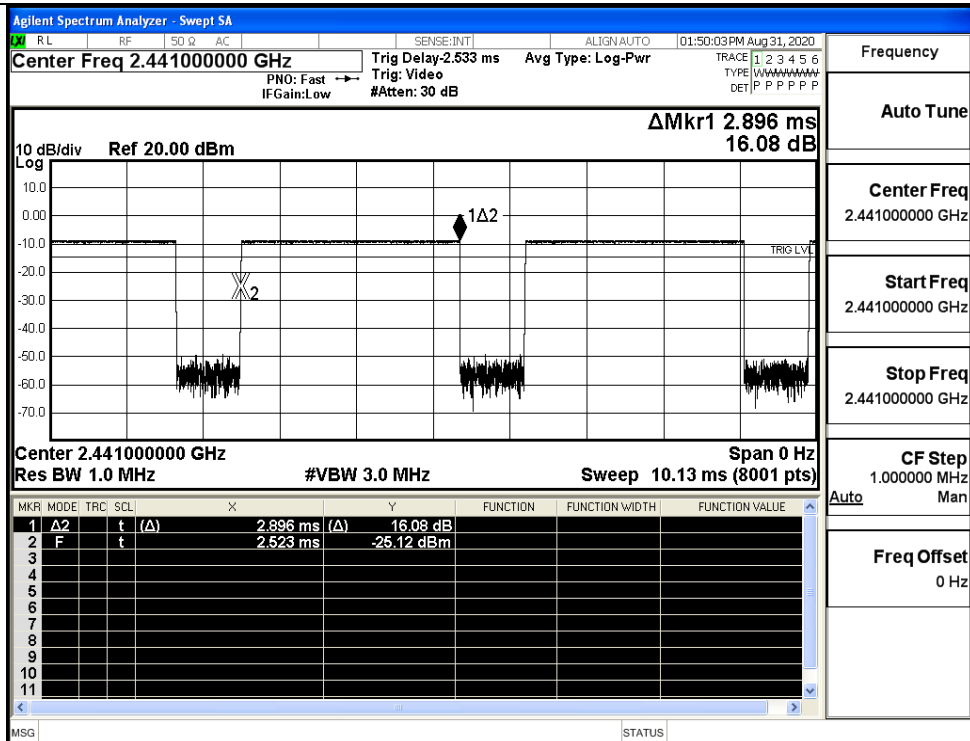
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS

Test Graphs

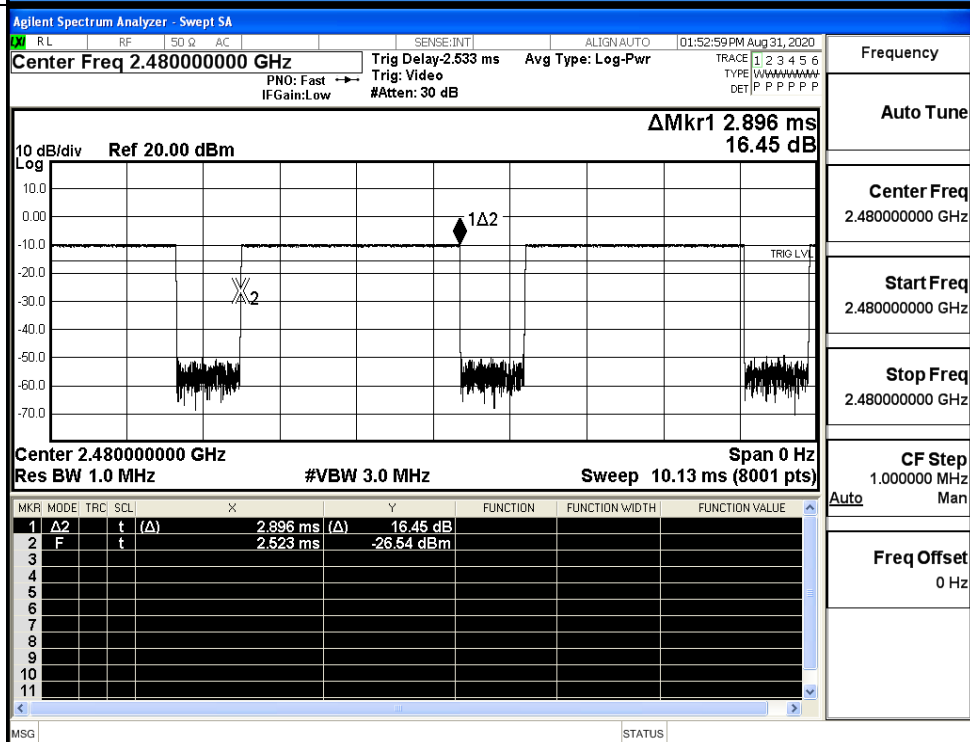
GFSK_DH5/LCH



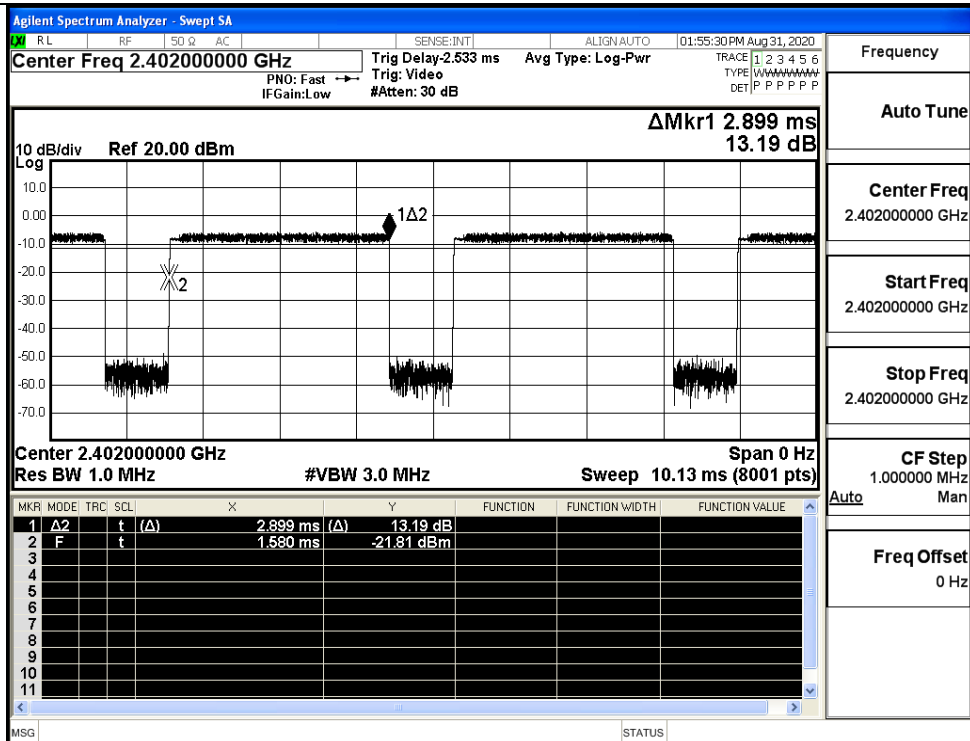
GFSK_DH5/MCH



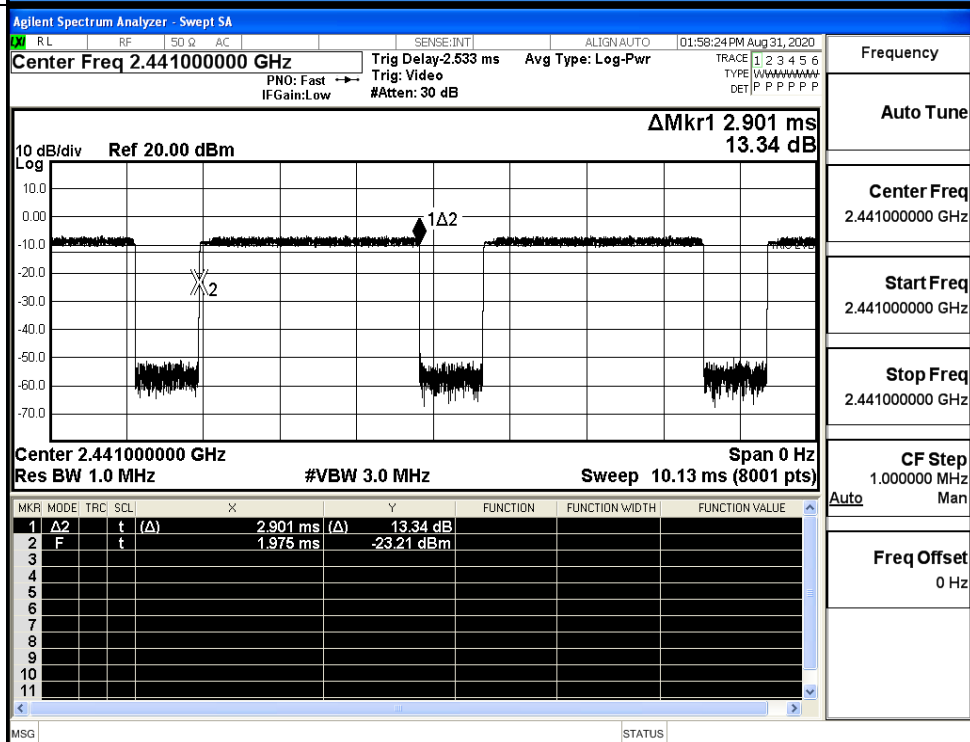
GFSK_DH5/HCH



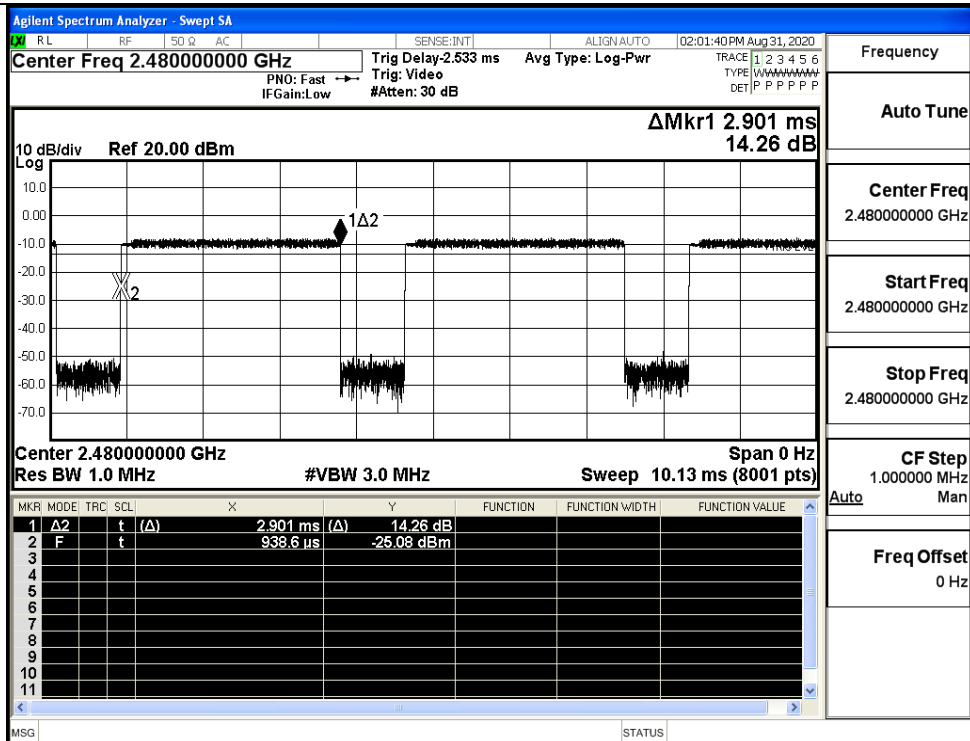
$\pi/4$ DQPSK
_2DH5/LCH



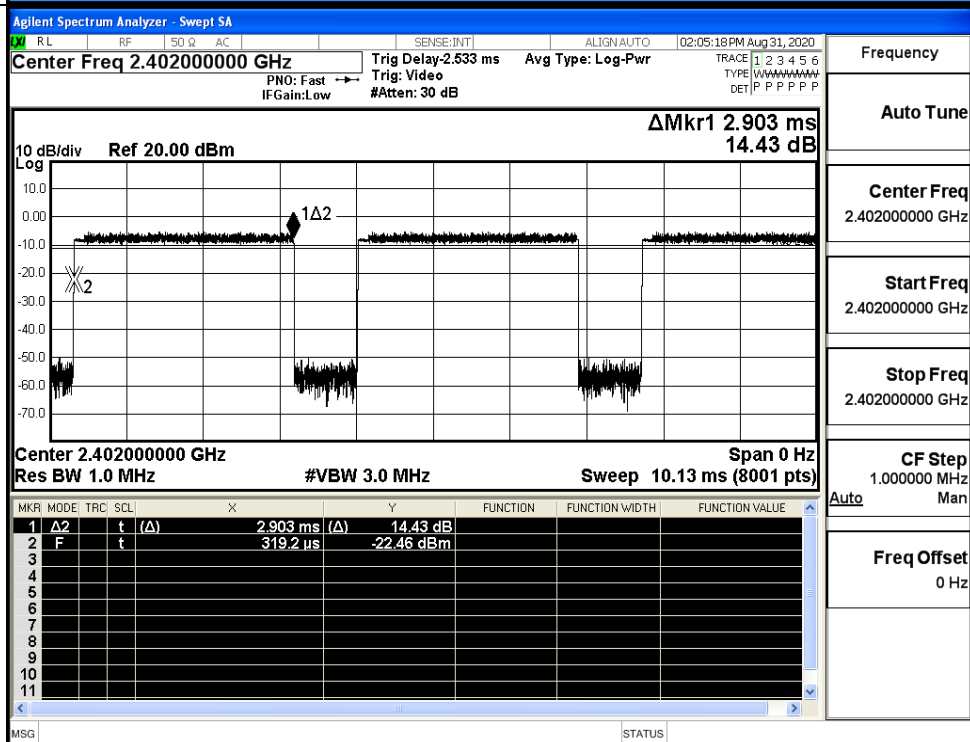
$\pi/4$ DQPSK
_2DH5/MCH



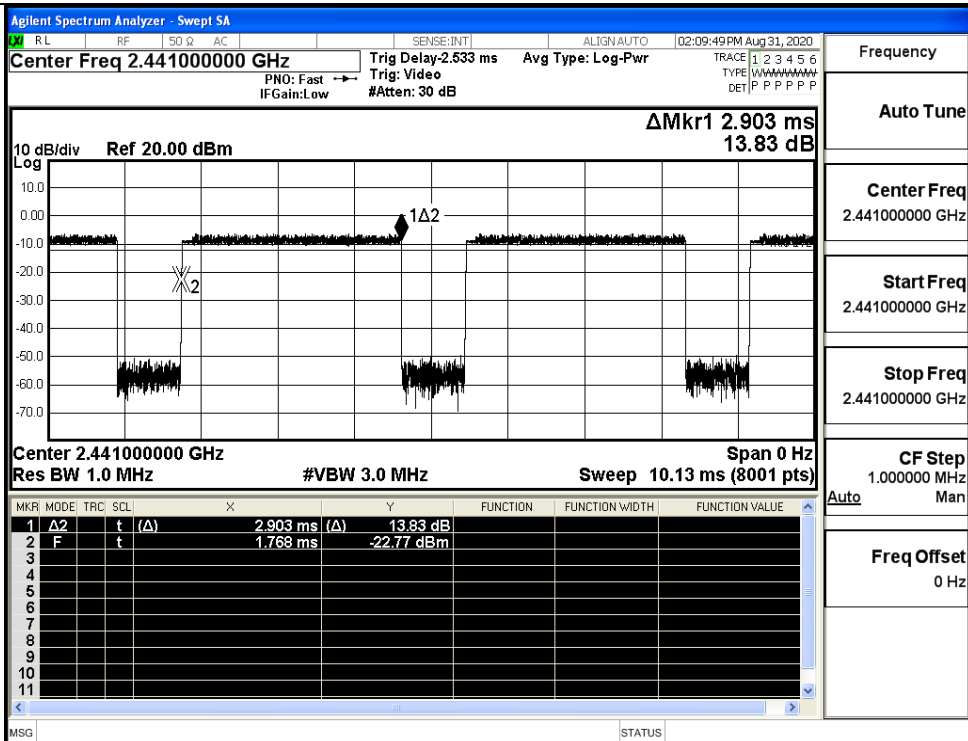
$\pi/4$ DQPSK
_2DH5/HCH



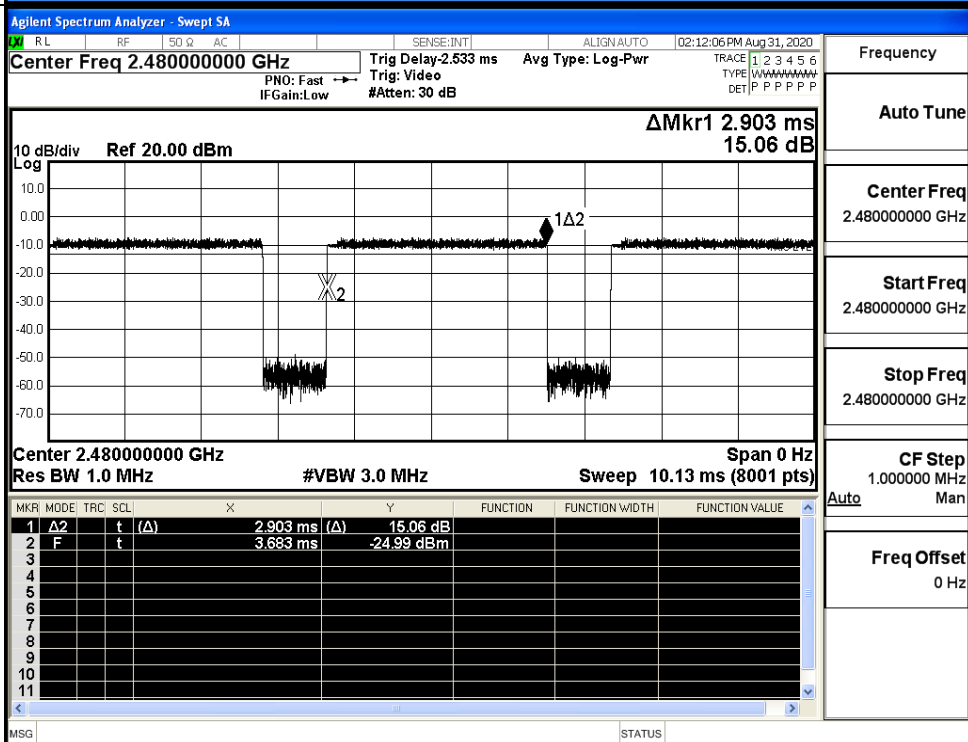
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



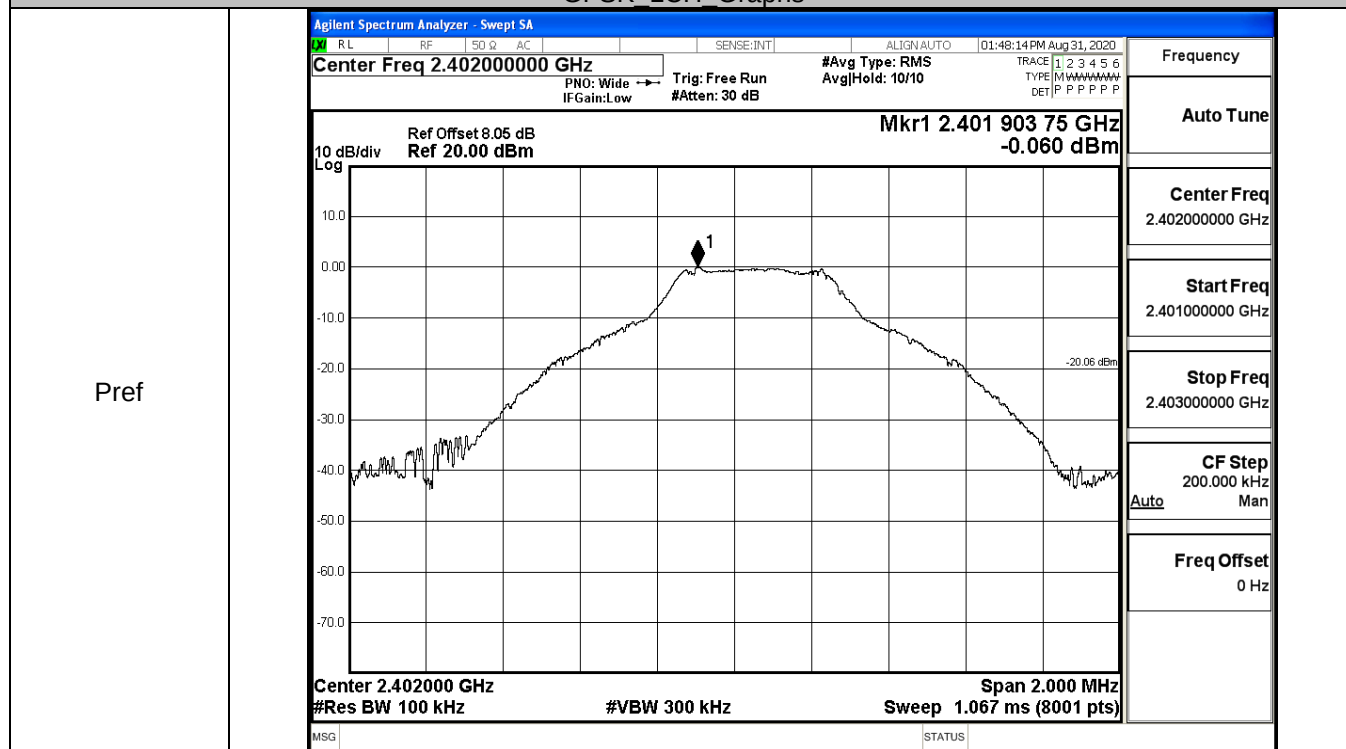
8DPSK_3DH5/HCH



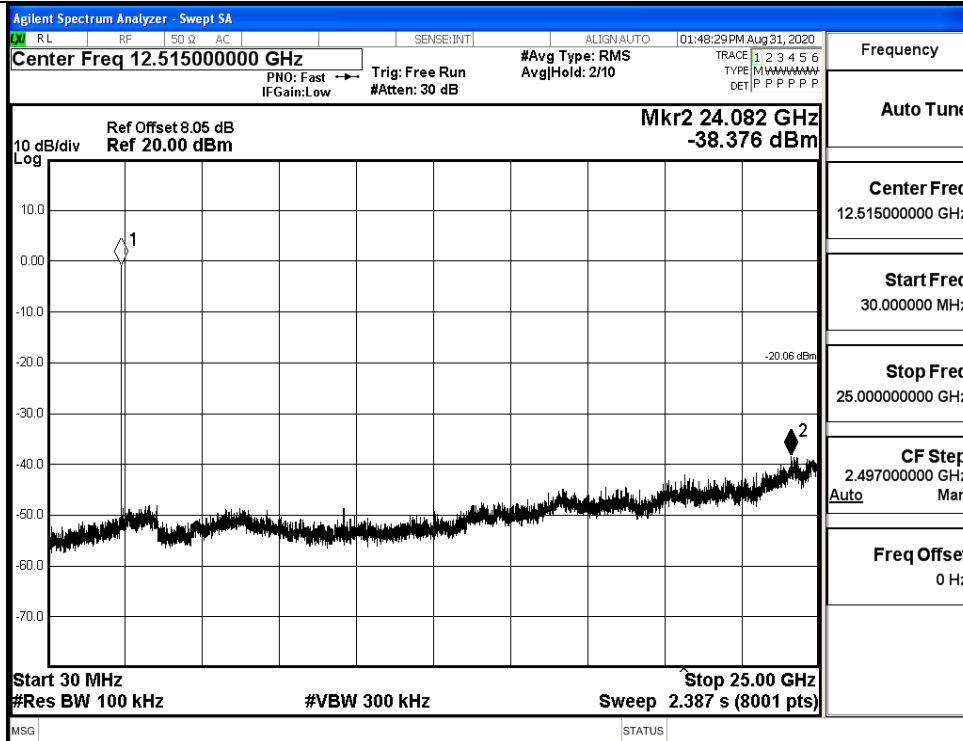
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.06	-38.376	-20.060	PASS
	MCH	-0.947	-36.884	-20.947	PASS
	HCH	-2.026	-37.693	-22.026	PASS
$\pi/4$ DQPSK	LCH	-0.779	-37.657	-20.779	PASS
	MCH	-1.291	-37.289	-21.291	PASS
	HCH	-2.456	-38.188	-22.456	PASS
8DPSK	LCH	0.025	-35.975	-19.975	PASS
	MCH	-0.888	-37.675	-20.888	PASS
	HCH	-1.904	-38.301	-21.904	PASS

GFSK LCH Graphs

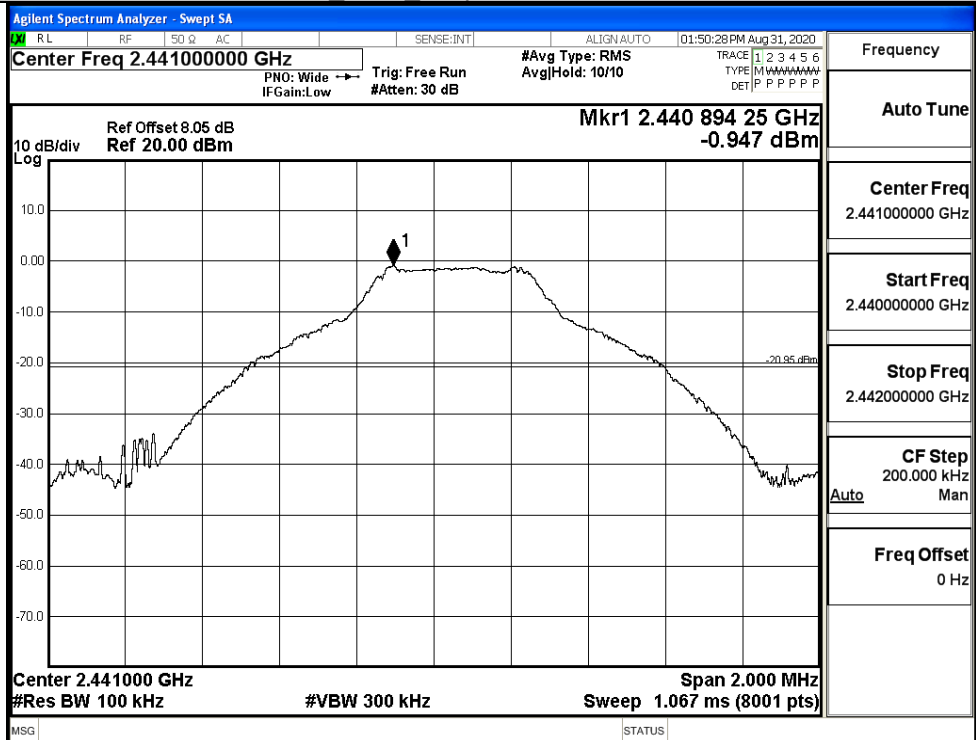


Puw

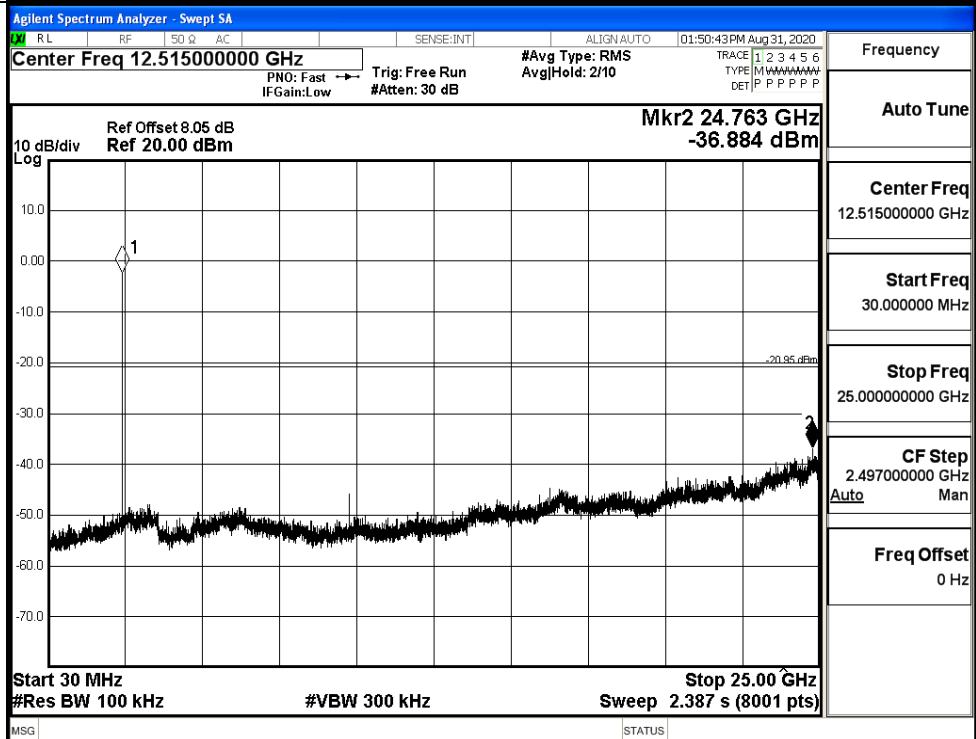


GFSK_MCH_Graphs

Pref

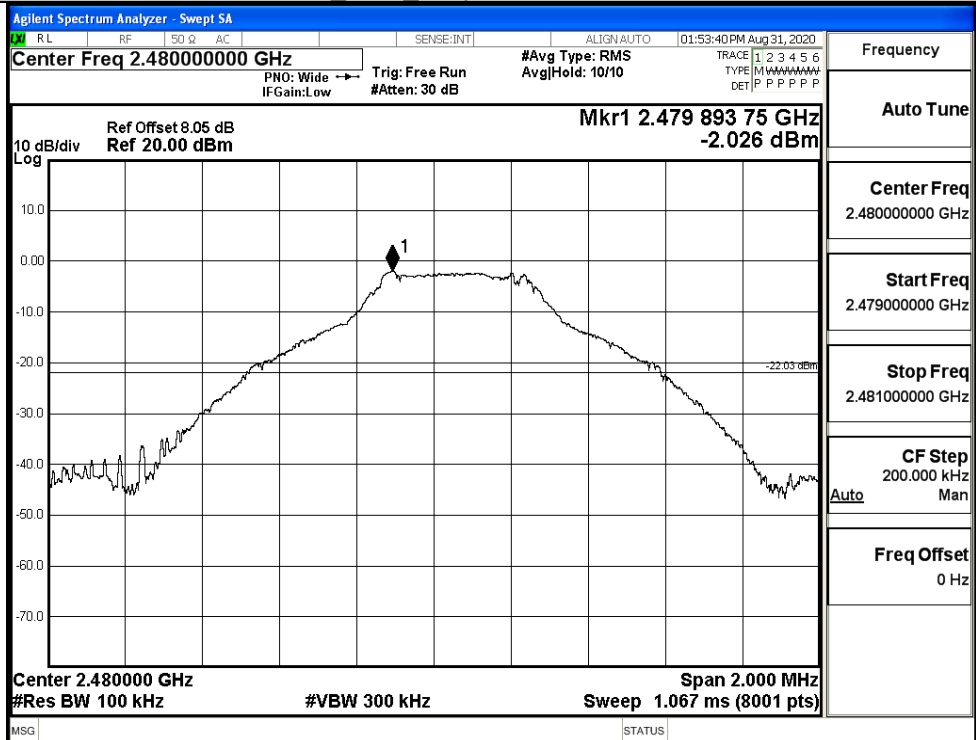


Puw

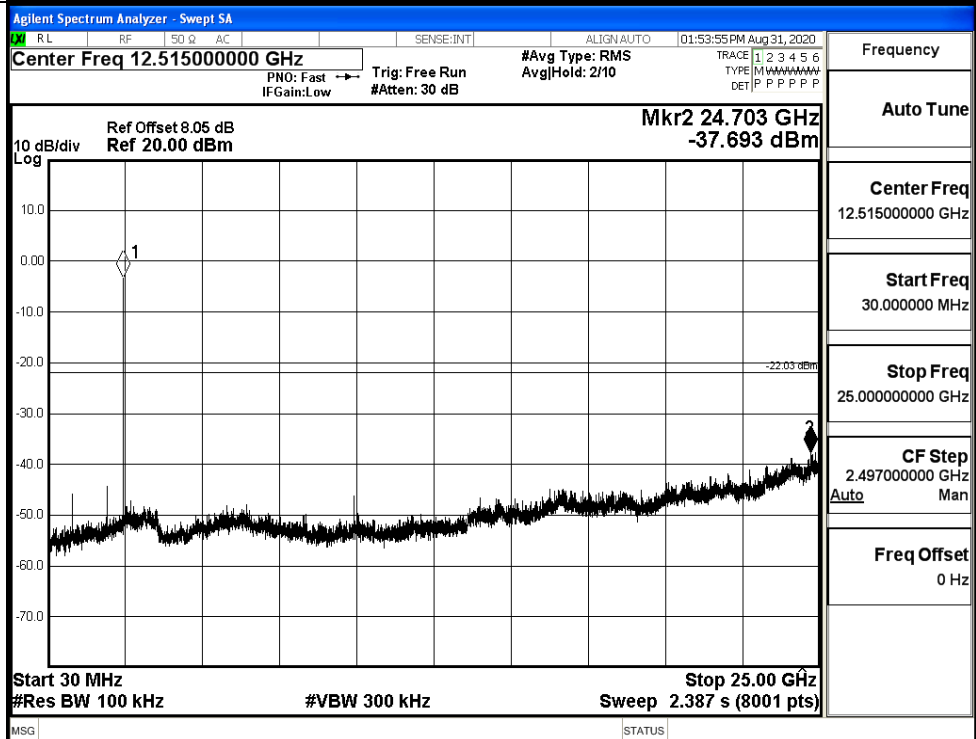


GFSK HCH Graphs

Pref

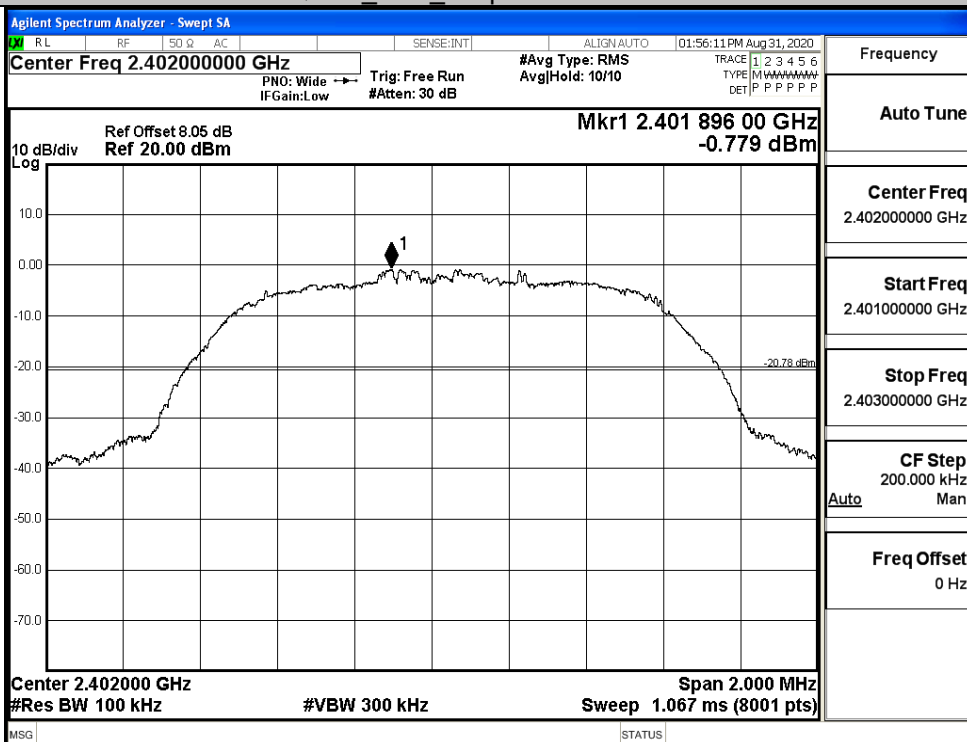


Puw

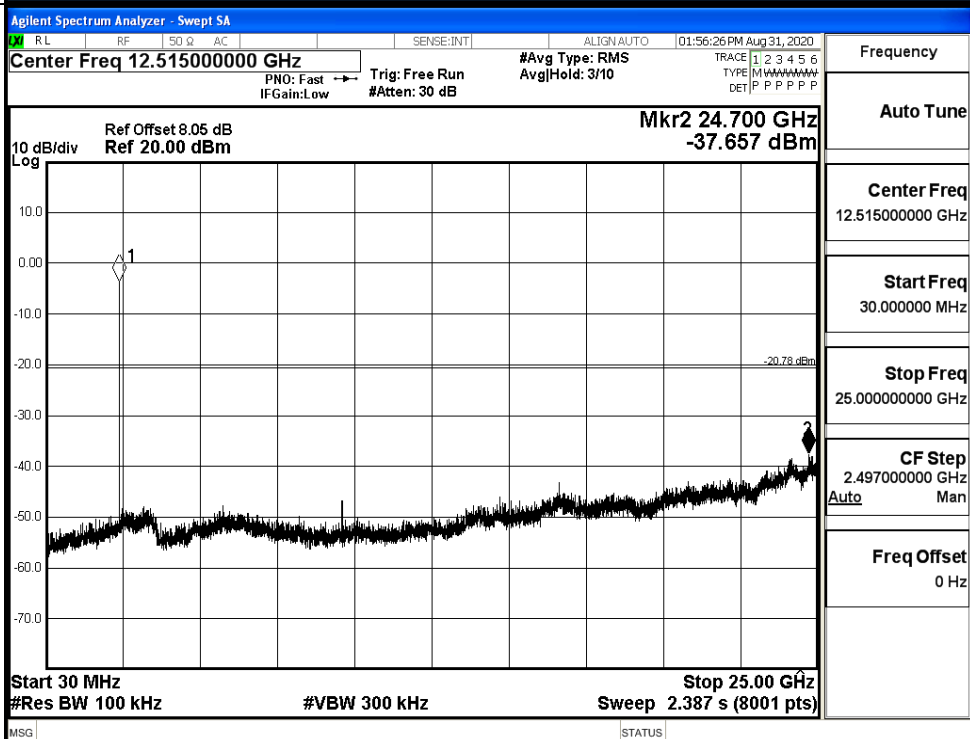


$\pi/4$ DQPSK_LCH_Graphs

Pref

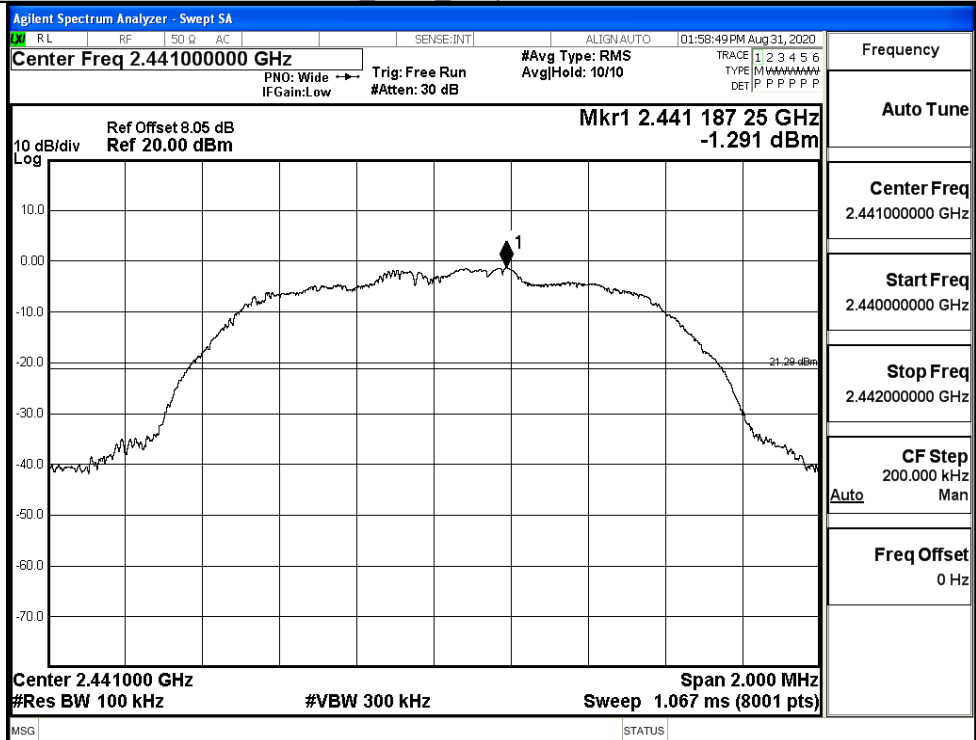


Puw

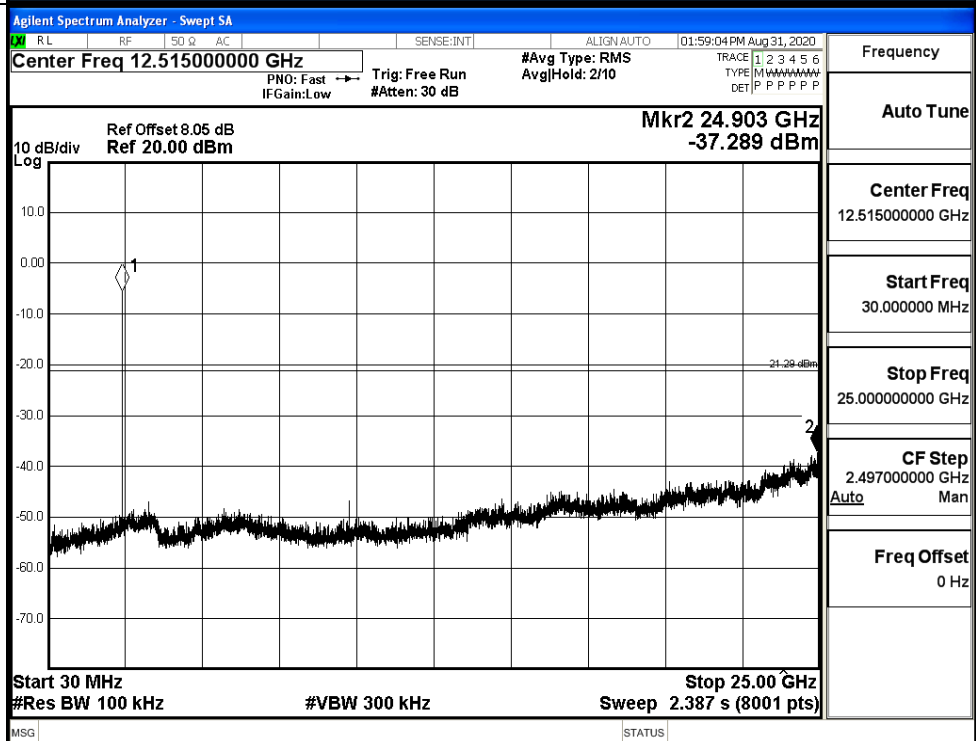


π /4DQPSK_MCH_Graphs

Pref

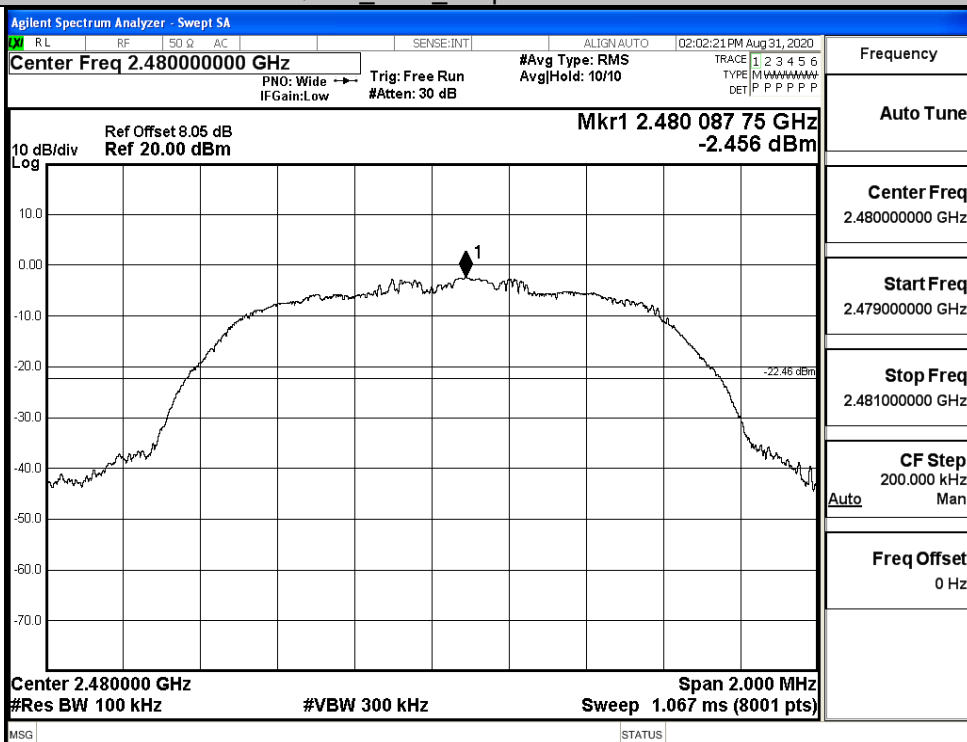


Puw

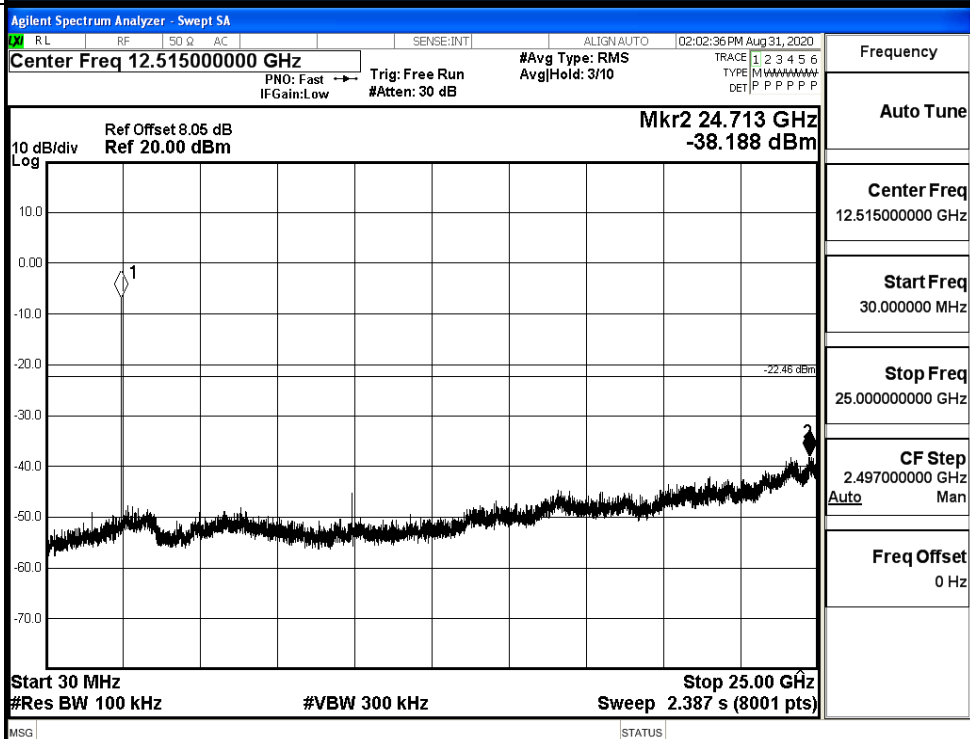


$\pi/4$ DQPSK_HCH_Graphs

Pref

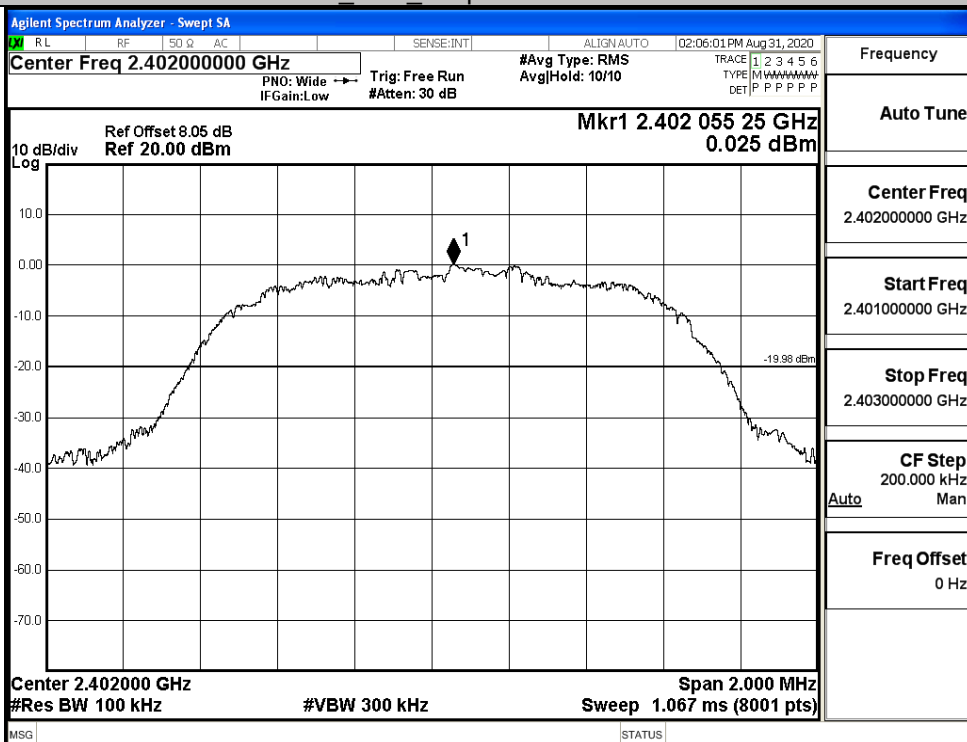


Puw

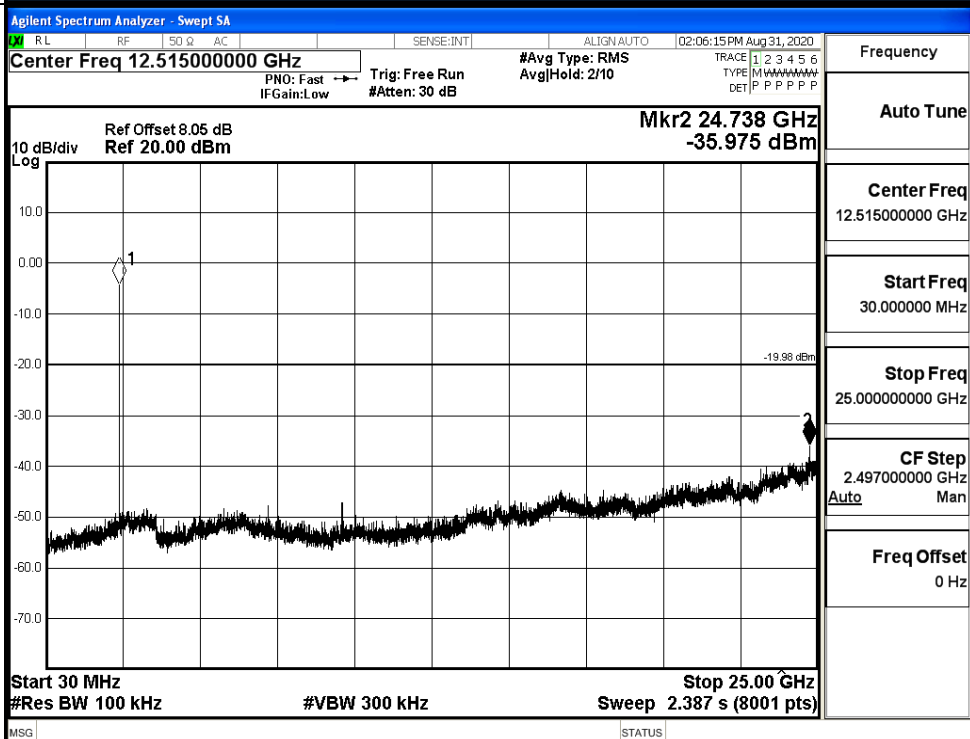


8DPSK_LCH_Graphs

Pref

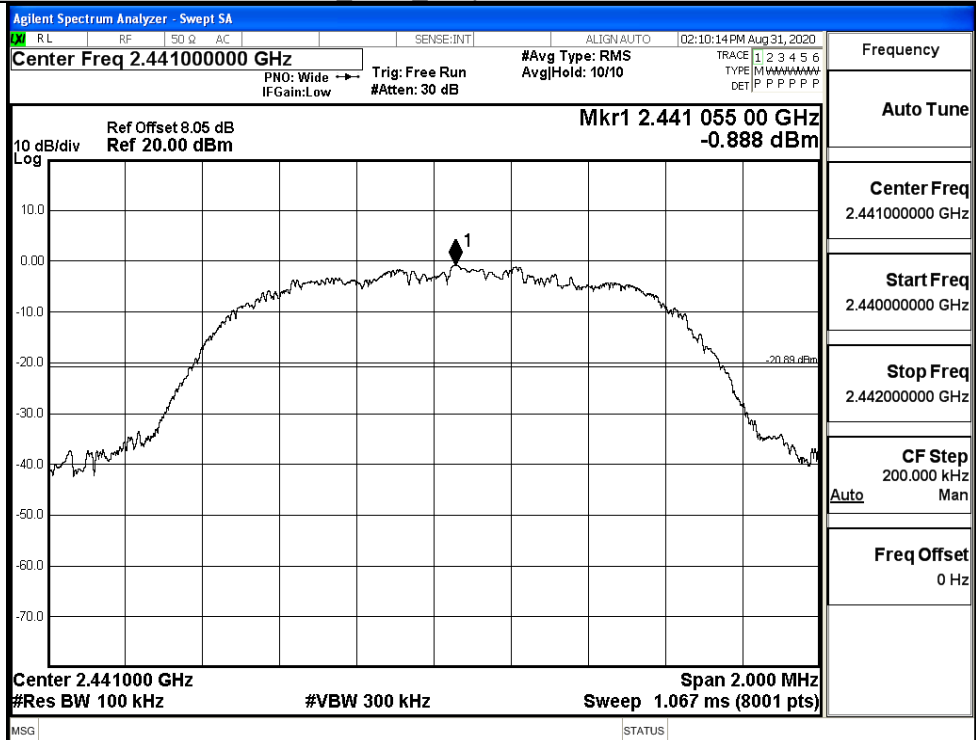


Puw

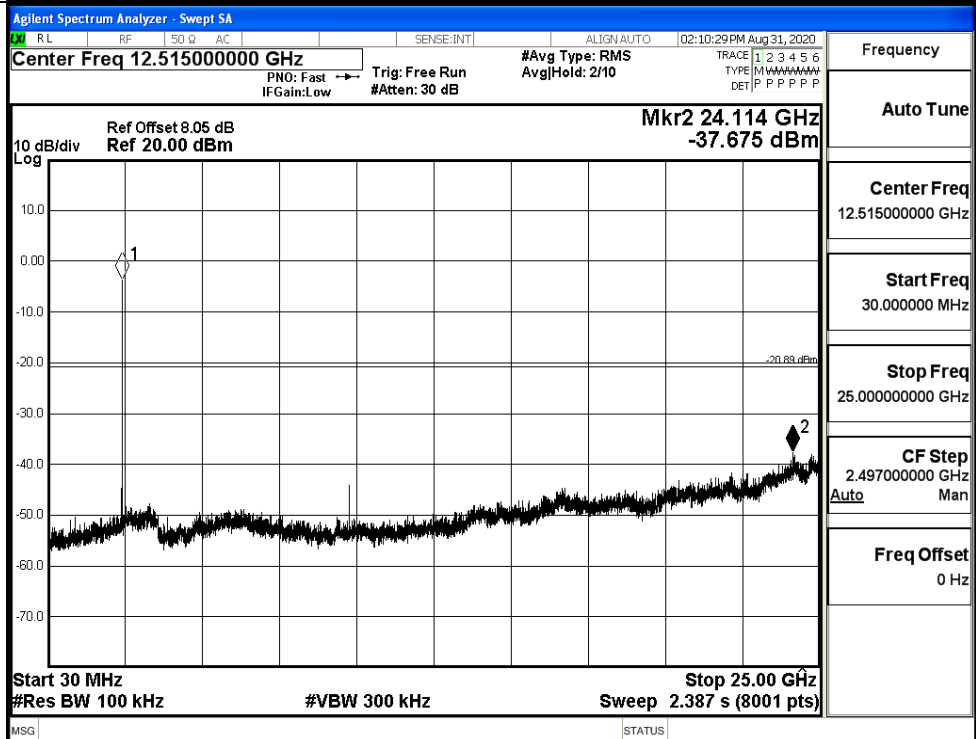


8DPSK_MCH_Graphs

Pref

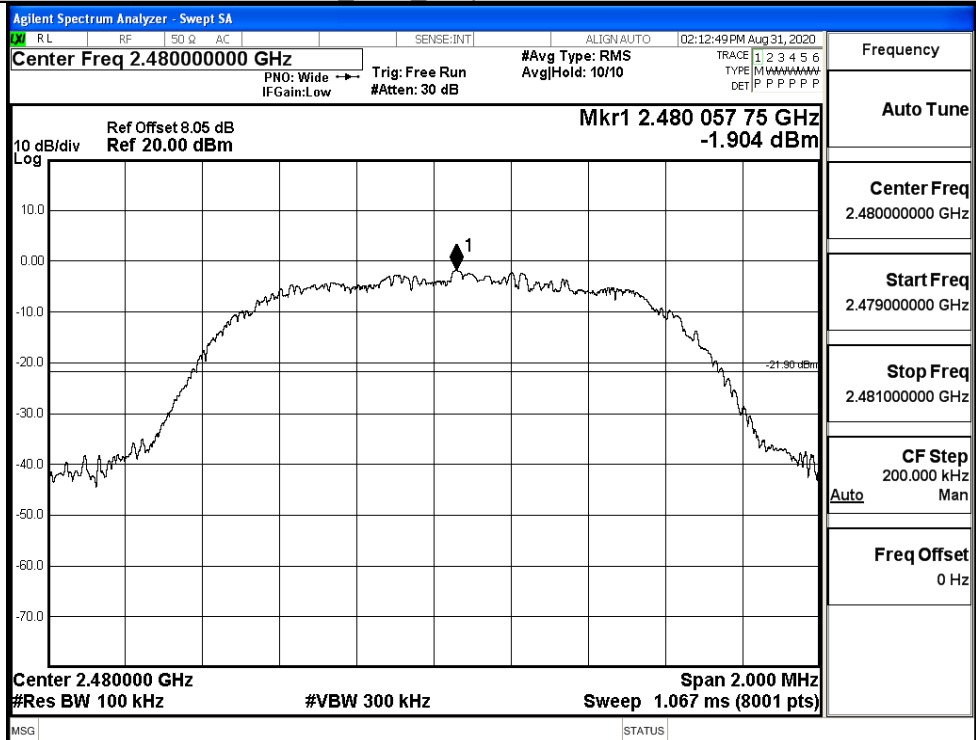


Puw

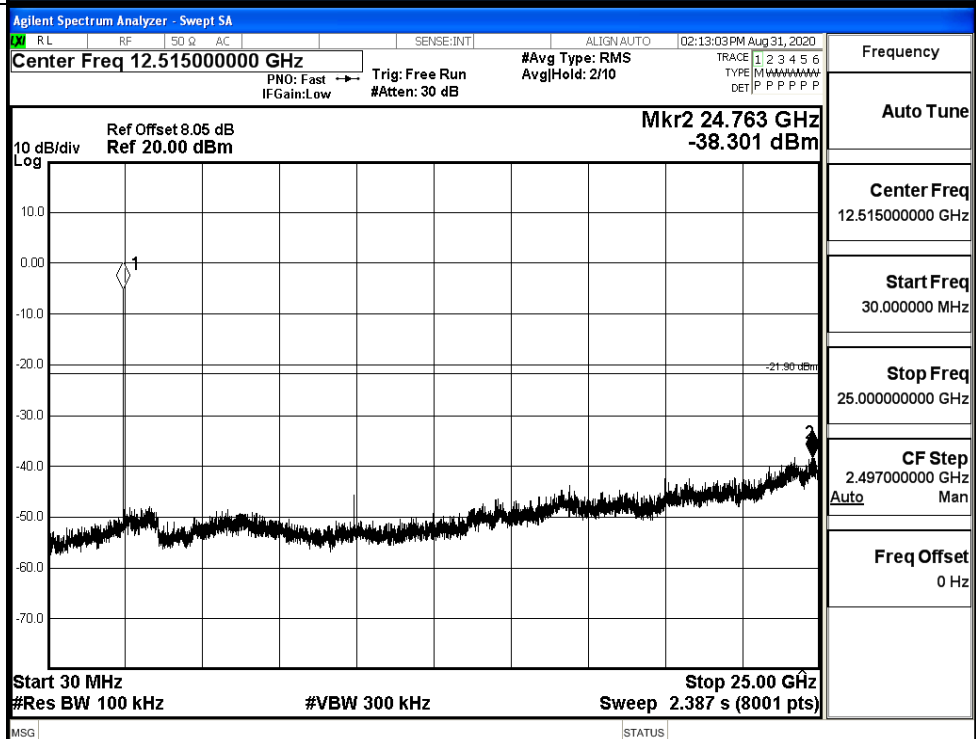


8DPSK_HCH_Graphs

Pref



Puw

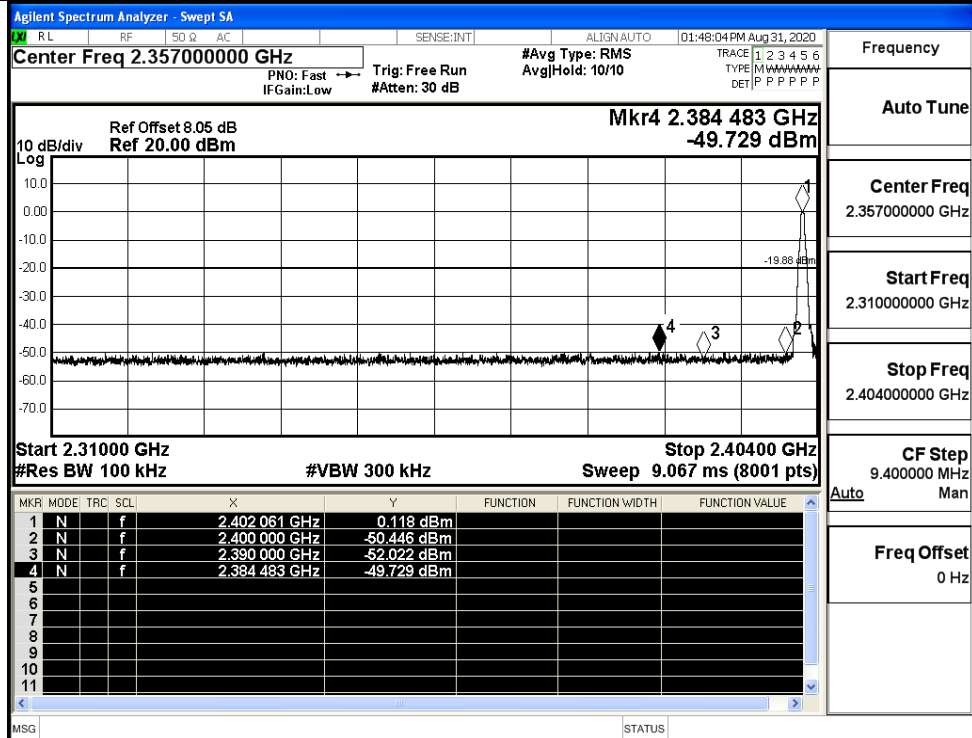


A.7 Band-edge for RF Conducted Emissions

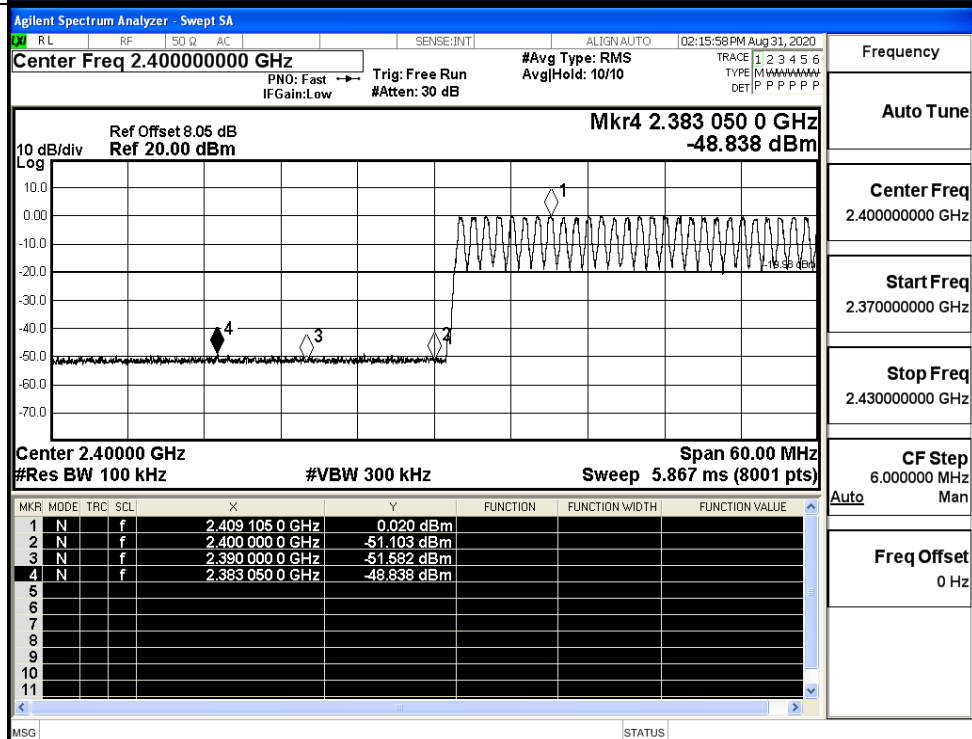
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.118	Off	-49.729	-19.88	PASS
			0.020	On	-48.838	-19.98	PASS
	HCH	2480	-1.957	Off	-48.521	-21.96	PASS
			-1.177	On	-48.343	-21.18	PASS
$\pi/4$ DQPSK	LCH	2402	-0.172	Off	-49.623	-20.17	PASS
			-0.202	On	-48.229	-20.2	PASS
	HCH	2480	-2.200	Off	-49.469	-22.2	PASS
			-1.521	On	-47.956	-21.52	PASS
8DPSK	LCH	2402	-0.245	Off	-49.420	-20.25	PASS
			0.095	On	-48.907	-19.91	PASS
	HCH	2480	-1.878	Off	-48.967	-21.88	PASS
			-1.311	On	-48.475	-21.31	PASS

Test Graphs

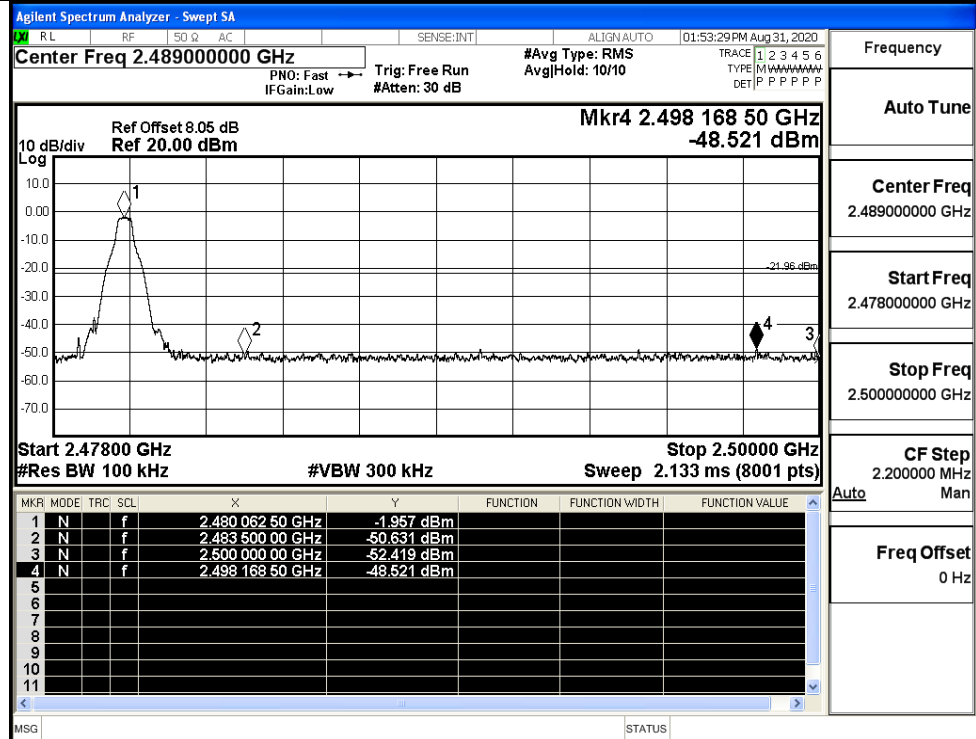
GFSK/LCH/No Hop



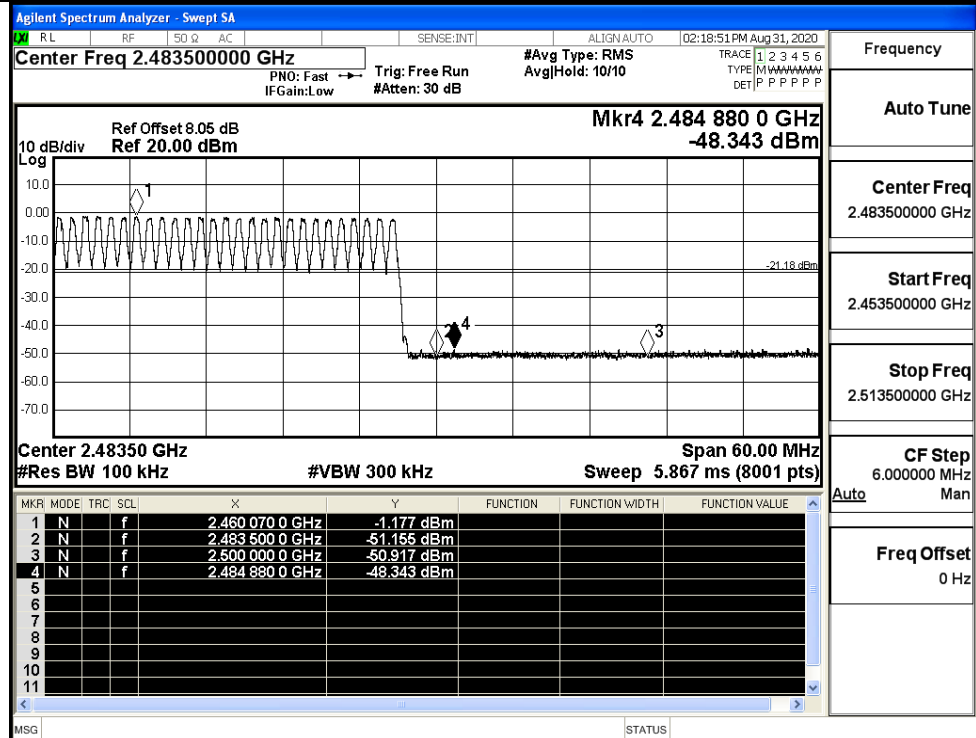
GFSK/LCH/Hop



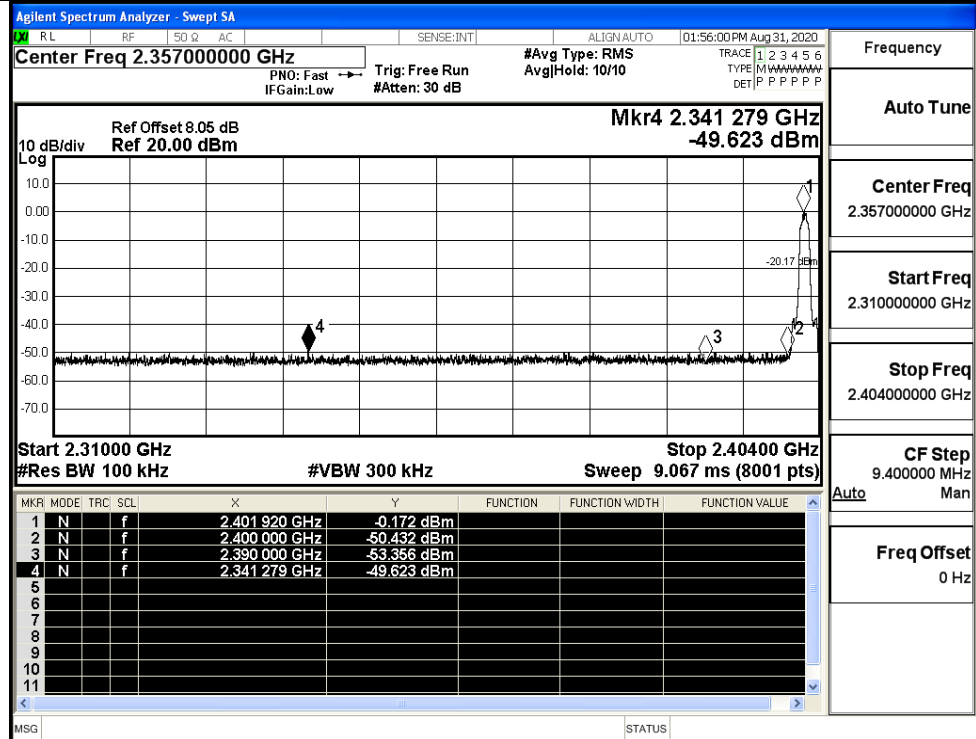
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

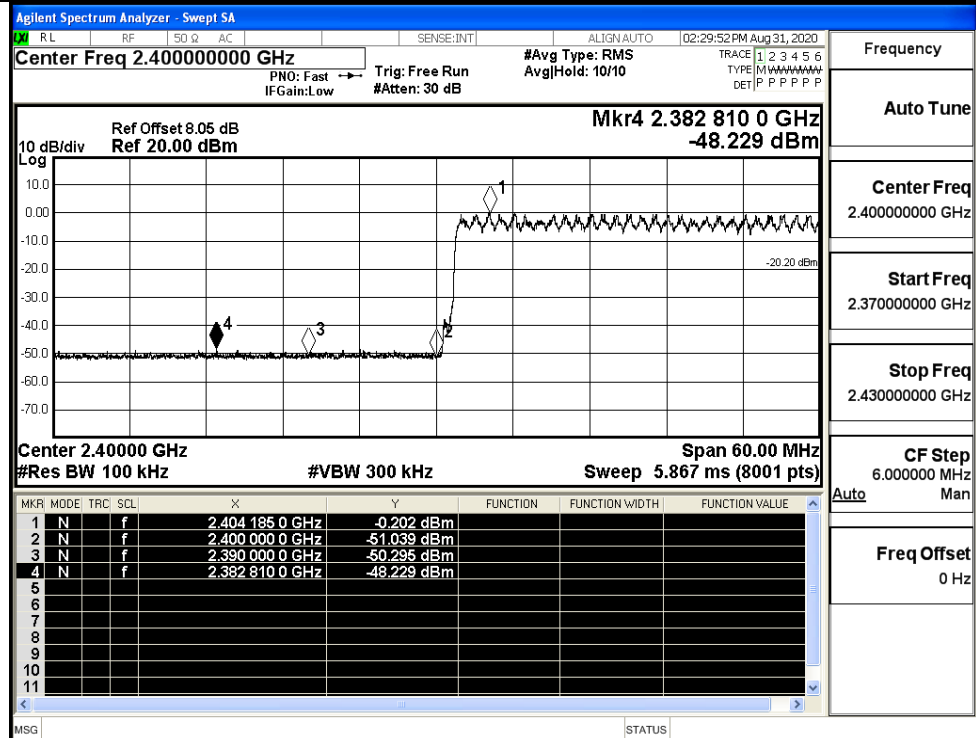
Start Freq
2.310000000 GHz

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

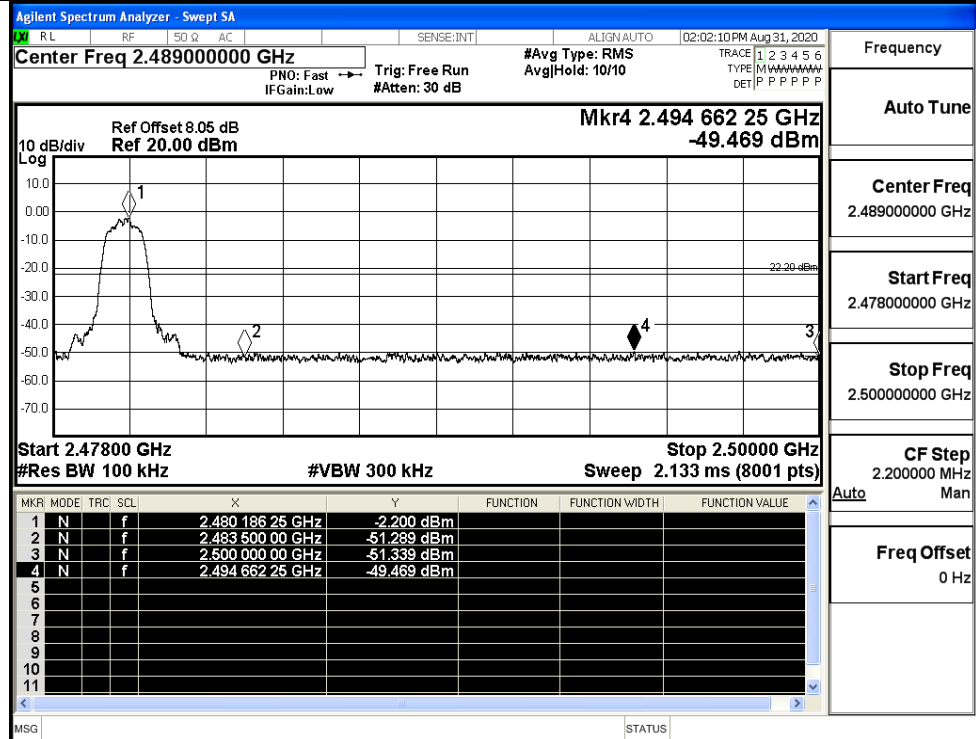
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

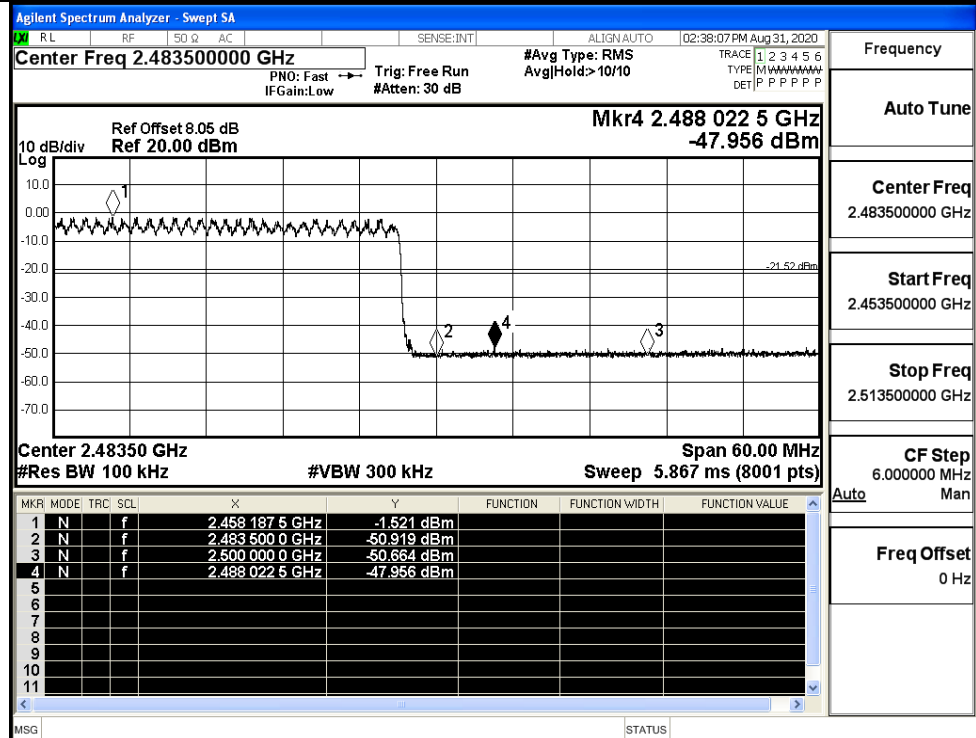
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

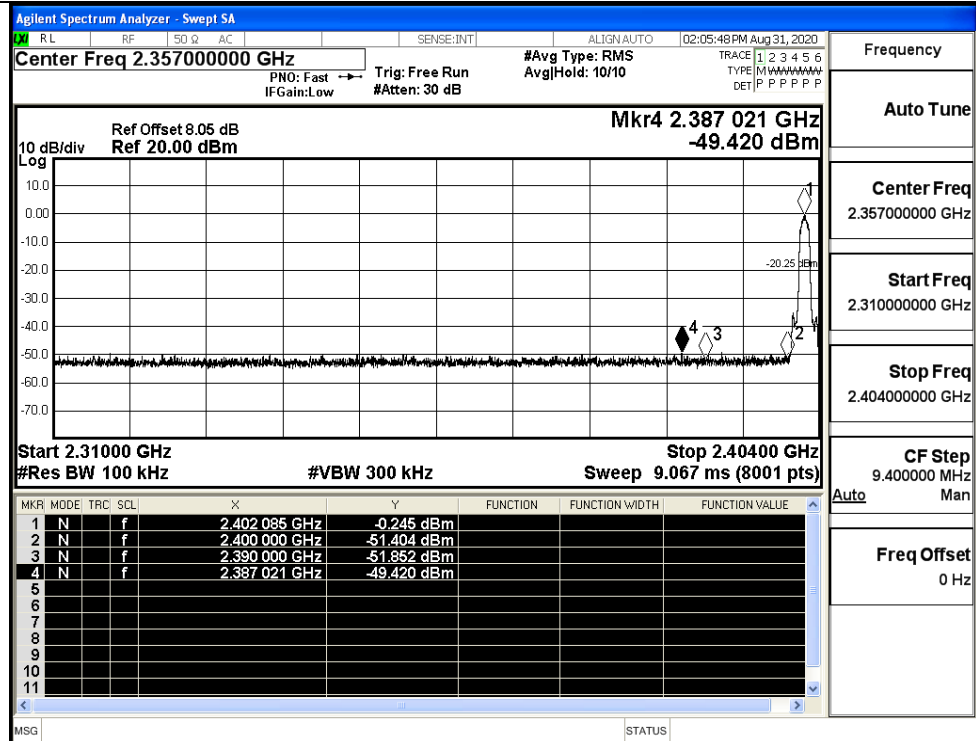
$\pi/4$ DQPSK/HCH/No
Hop



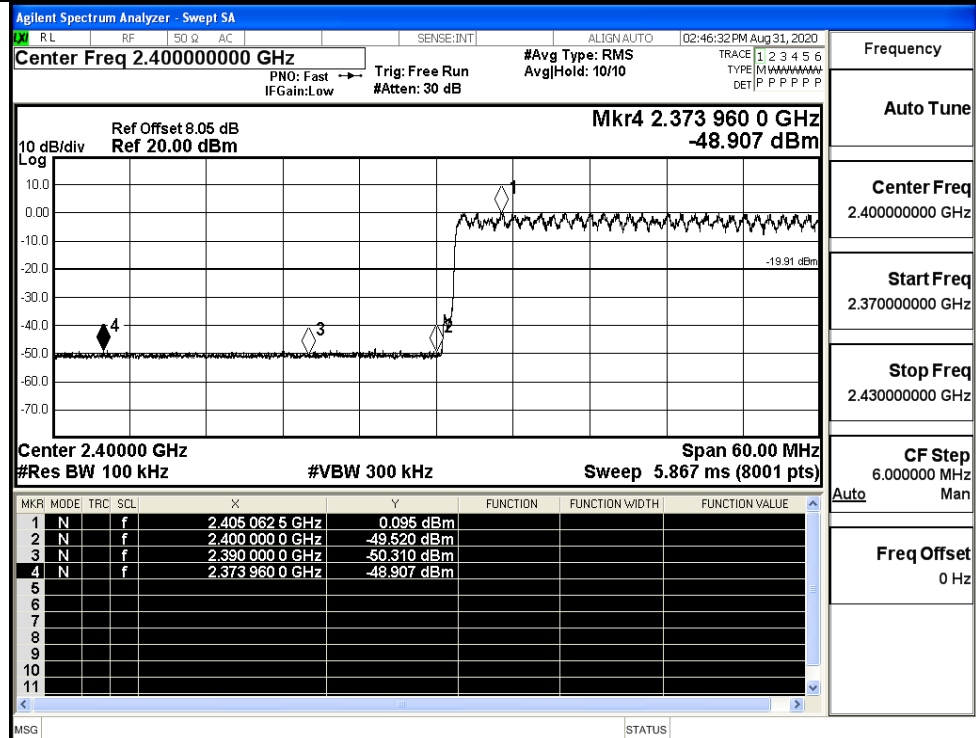
$\pi/4$ DQPSK/HCH/Hop



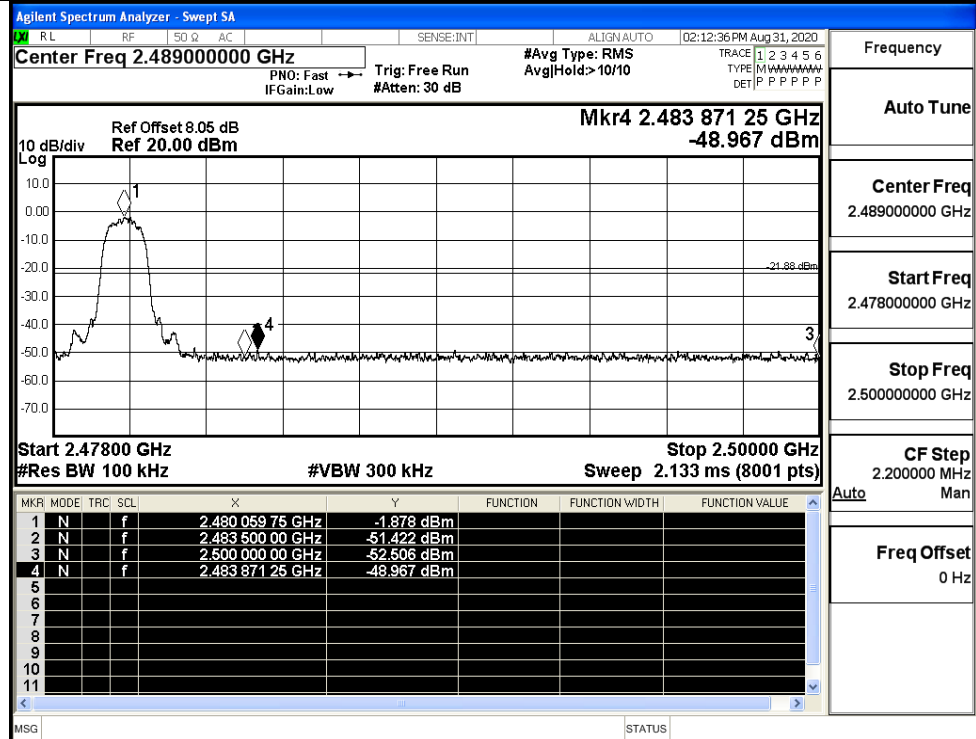
8DPSK/LCH/No Hop



8DPSK/LCH/Hop



8DPSK/HCH/No Hop



Frequency

Auto Tune

Center Freq

2.489000000 GHz

Start Freq

2.478000000 GHz

Stop Freq

2.500000000 GHz

CF Step

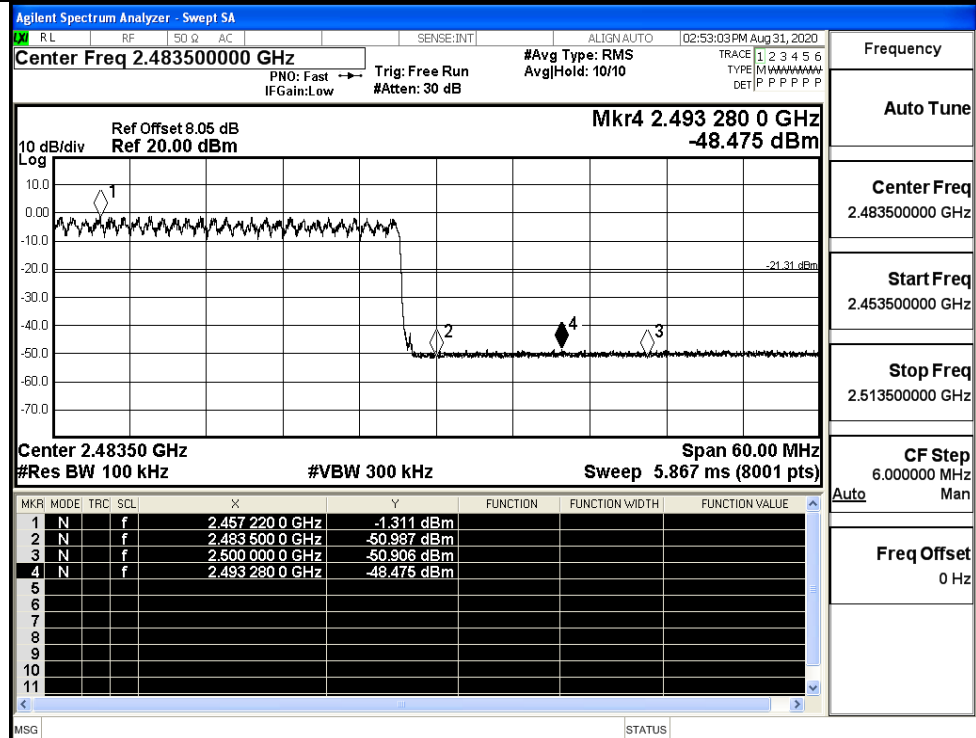
2.200000 MHz

Auto Man

Freq Offset

0 Hz

8DPSK/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

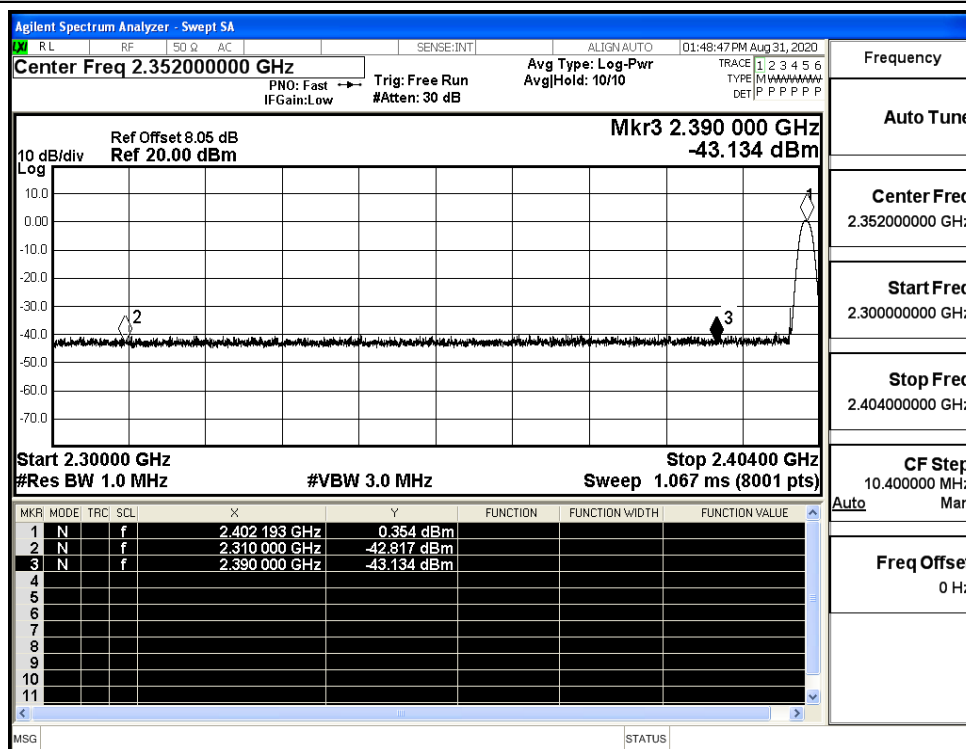
Freq Offset

0 Hz

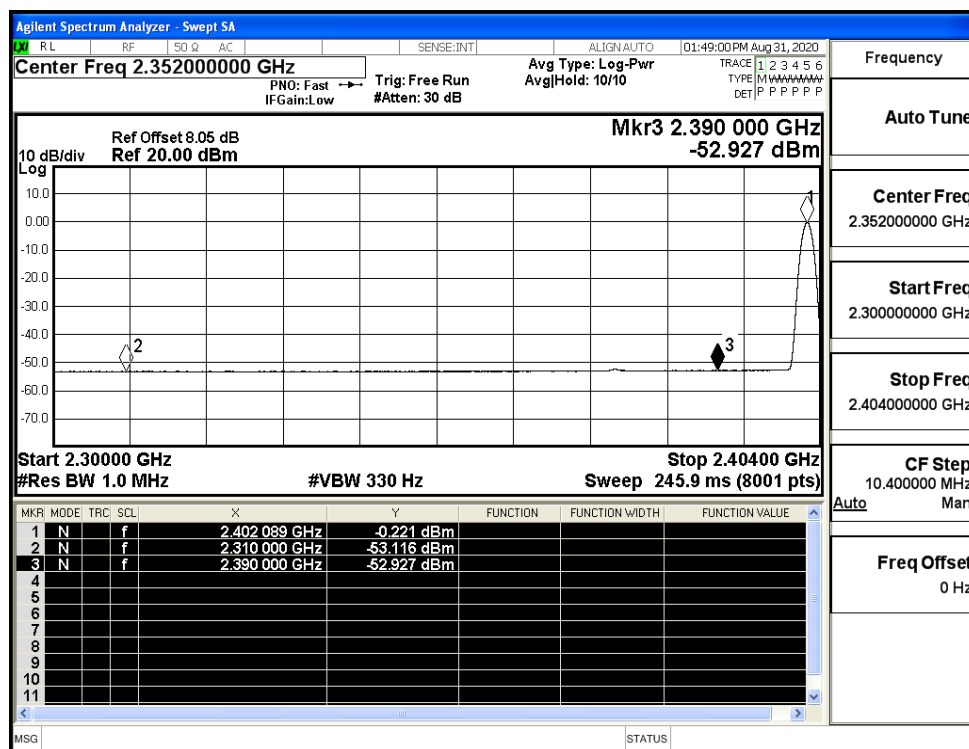
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.82	2.0	0	52.44	PEAK	74	PASS
	Off	2310.0	-53.12	2.0	0	42.14	AV	54	PASS
	Off	2390.0	-43.13	2.0	0	52.12	PEAK	74	PASS
	Off	2390.0	-52.93	2.0	0	42.33	AV	54	PASS
	Off	2483.5	-41.60	2.0	0	53.66	PEAK	74	PASS
	Off	2483.5	-52.36	2.0	0	42.90	AV	54	PASS
	Off	2500.0	-40.93	2.0	0	54.33	PEAK	74	PASS
	Off	2500.0	-52.18	2.0	0	43.08	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.65	2.0	0	51.60	PEAK	74	PASS
	Off	2310.0	-53.18	2.0	0	42.08	AV	54	PASS
	Off	2390.0	-42.30	2.0	0	52.96	PEAK	74	PASS
	Off	2390.0	-52.95	2.0	0	42.31	AV	54	PASS
	Off	2483.5	-42.26	2.0	0	52.99	PEAK	74	PASS
	Off	2483.5	-52.34	2.0	0	42.92	AV	54	PASS
	Off	2500.0	-43.33	2.0	0	51.92	PEAK	74	PASS
	Off	2500.0	-52.21	2.0	0	43.05	AV	54	PASS
8DPSK	Off	2310.0	-43.18	2.0	0	52.07	PEAK	74	PASS
	Off	2310.0	-53.22	2.0	0	42.04	AV	54	PASS
	Off	2390.0	-42.83	2.0	0	52.42	PEAK	74	PASS
	Off	2390.0	-52.80	2.0	0	42.45	AV	54	PASS
	Off	2483.5	-42.36	2.0	0	52.90	PEAK	74	PASS
	Off	2483.5	-52.39	2.0	0	42.87	AV	54	PASS
	Off	2500.0	-41.57	2.0	0	53.68	PEAK	74	PASS
	Off	2500.0	-52.13	2.0	0	43.13	AV	54	PASS

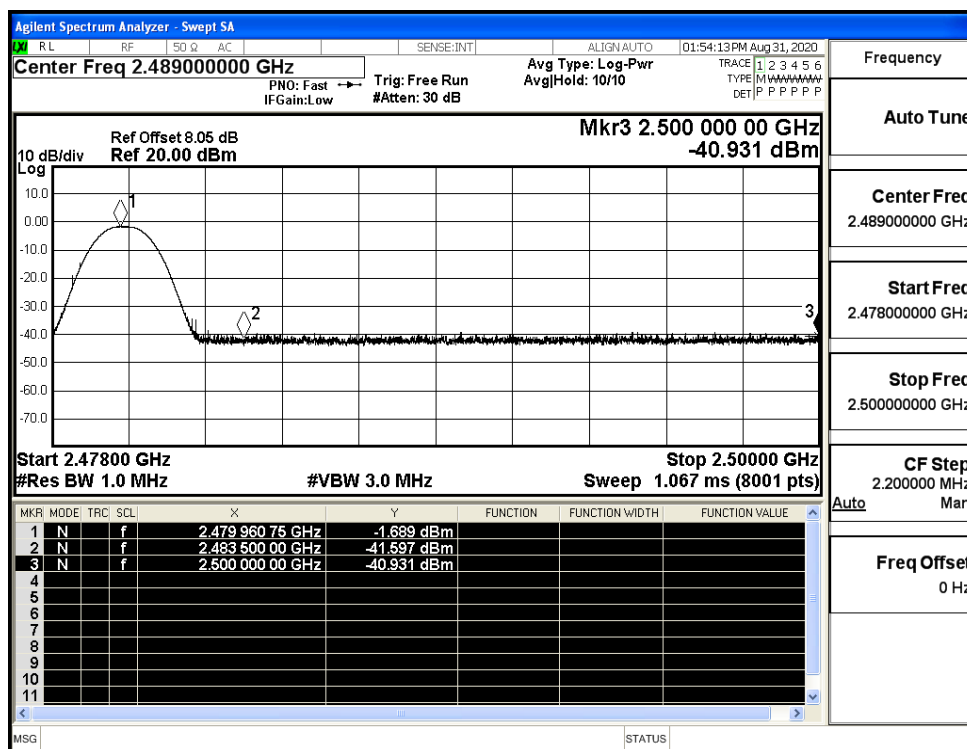
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



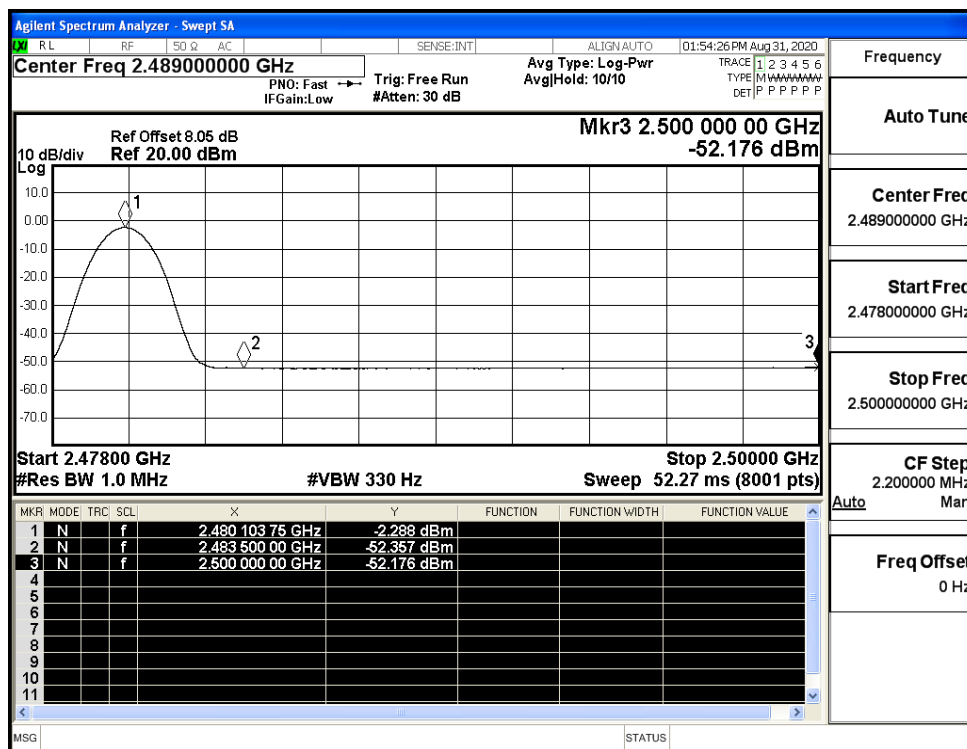
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

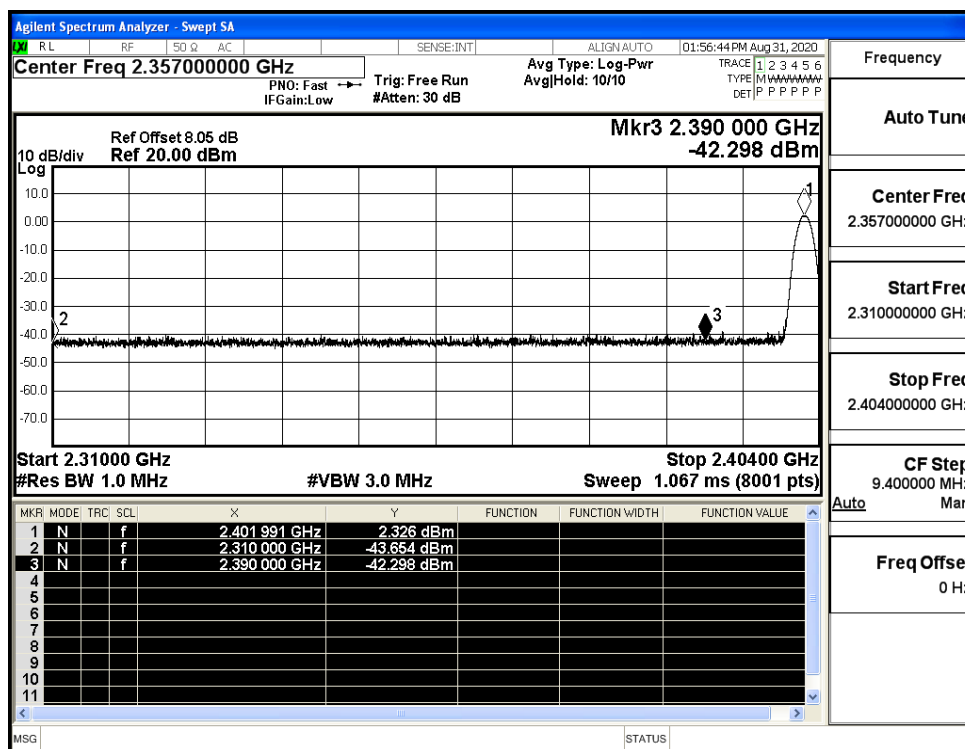
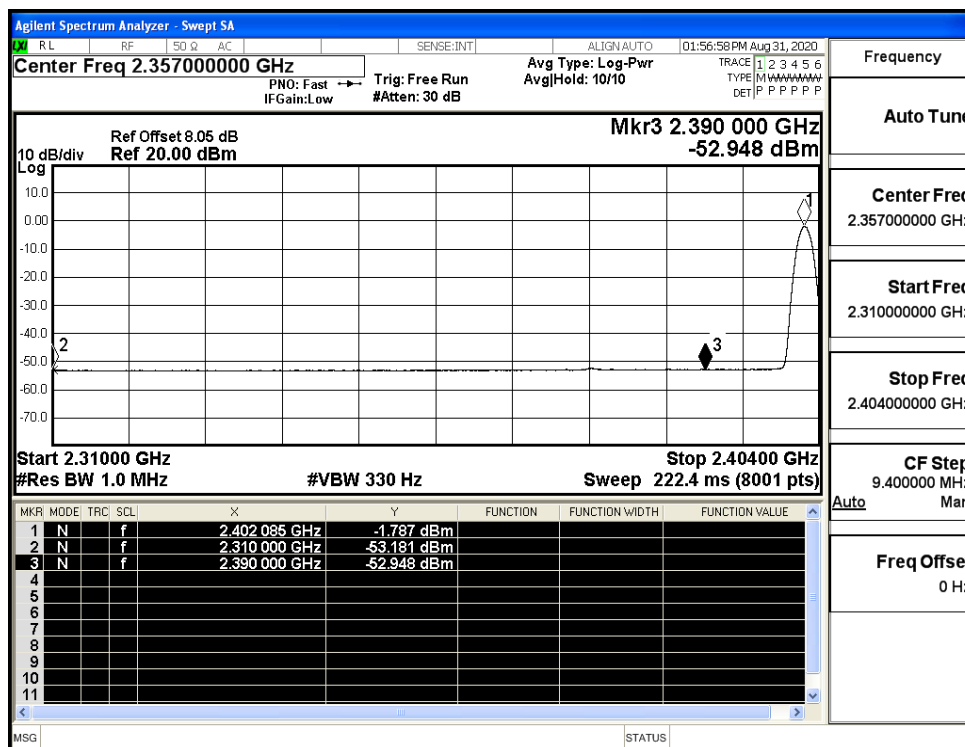


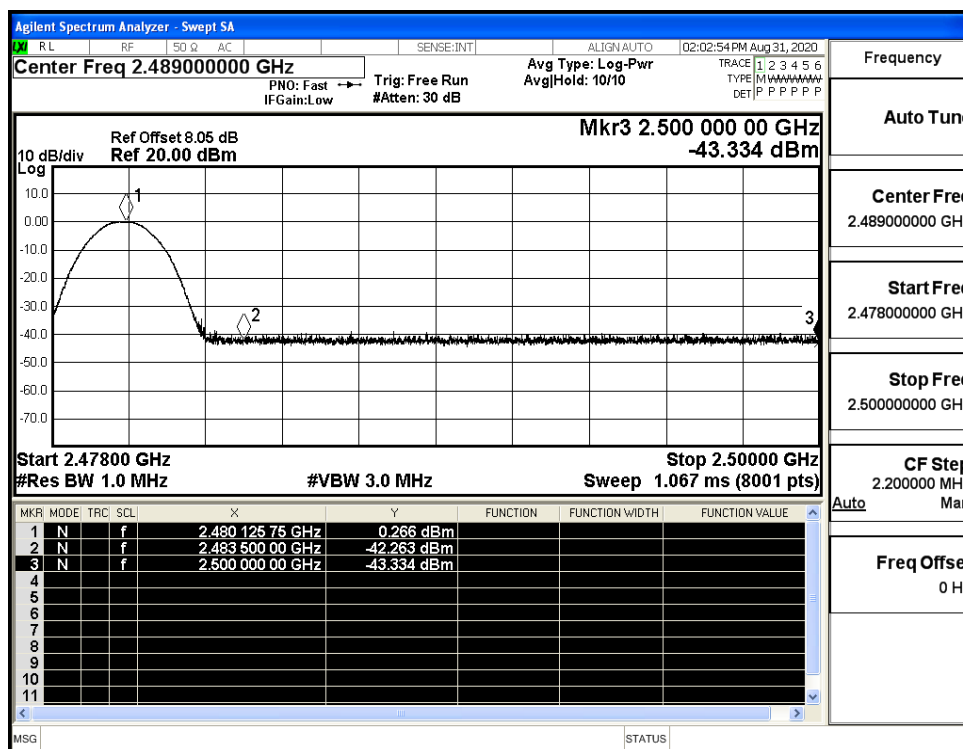
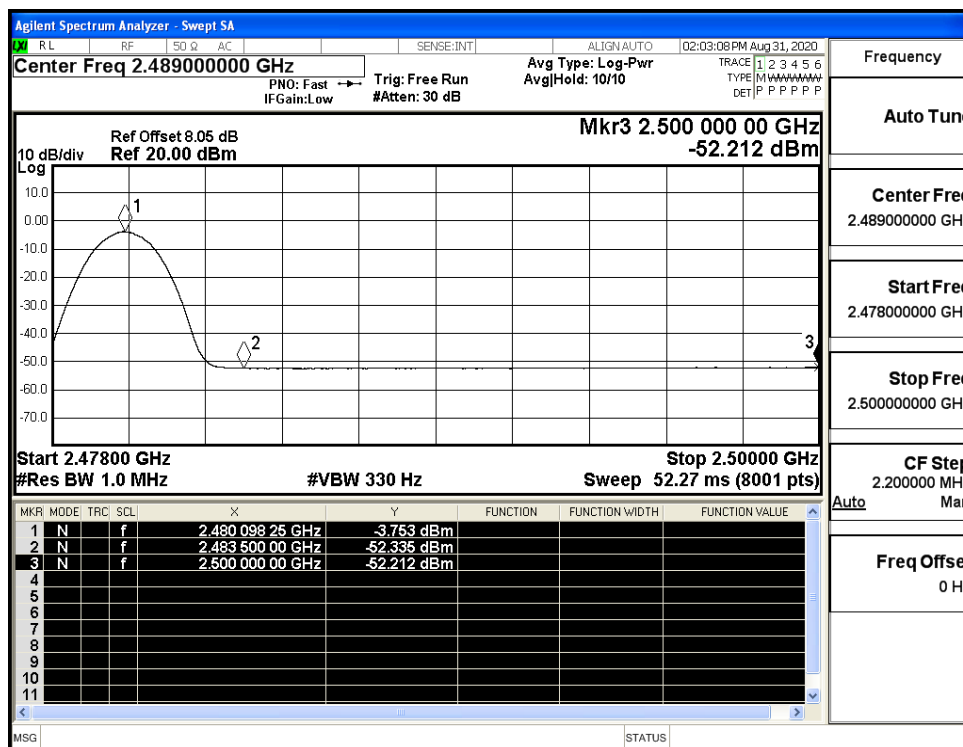
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



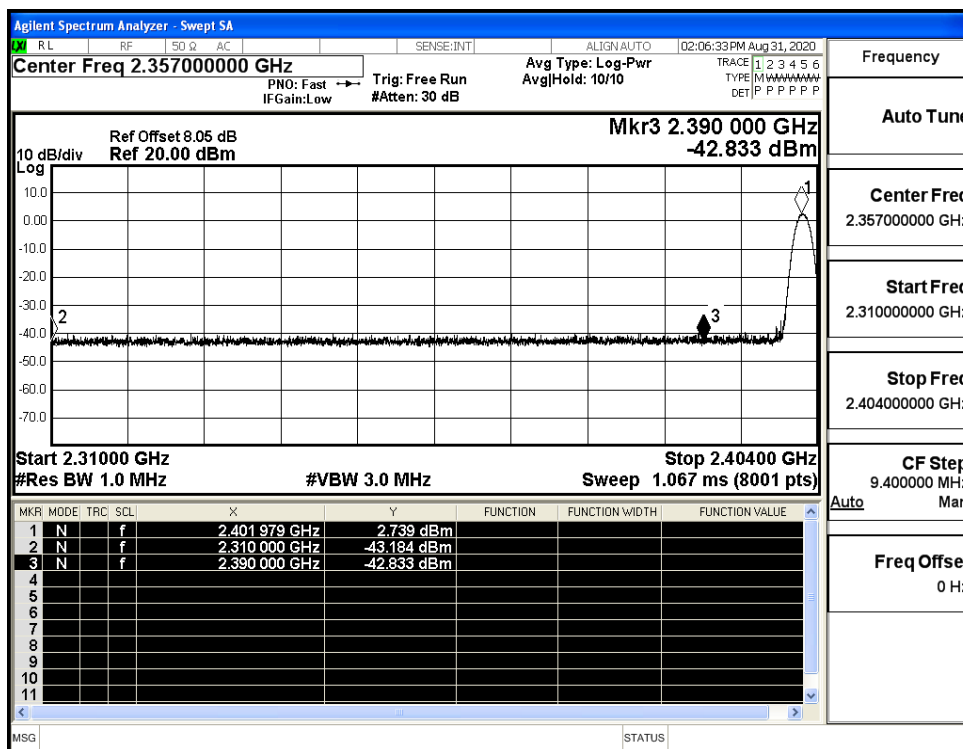
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



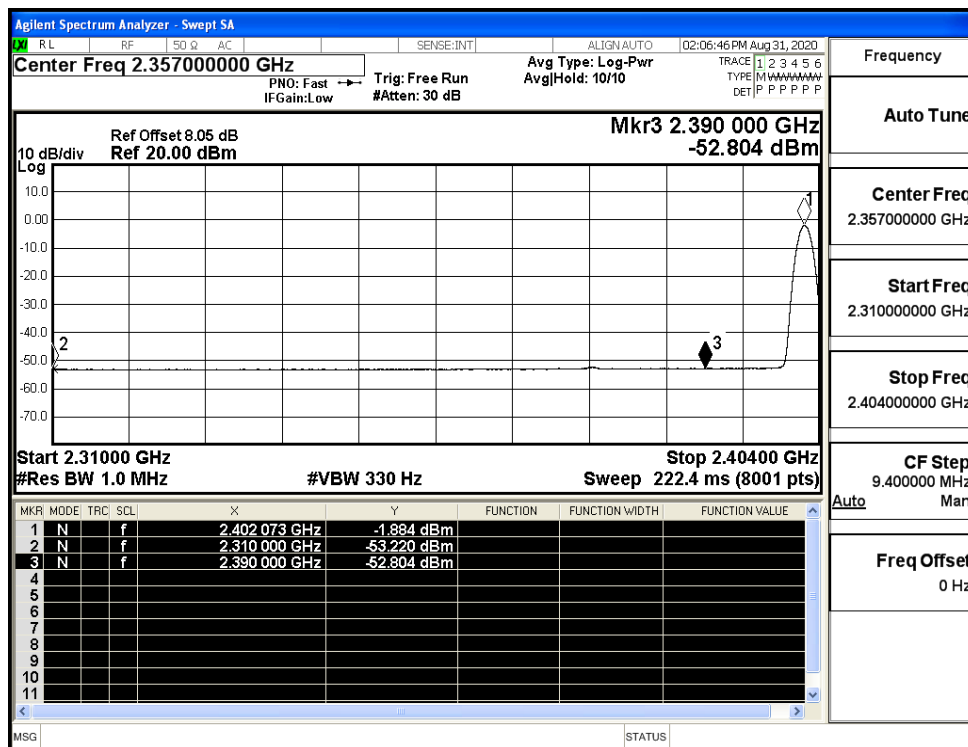
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

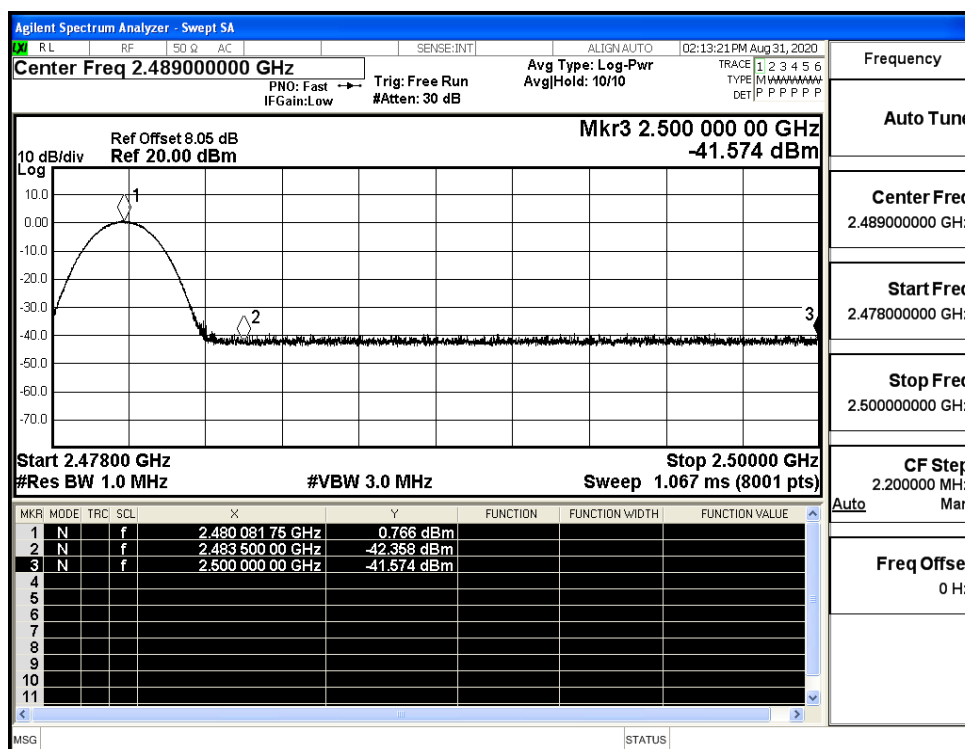
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

