

Appendix A

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

Product Name: TWS ANC Bluetooth Earbuds

Trade Mark: N/A

Test Model: E01_B

Environmental Conditions

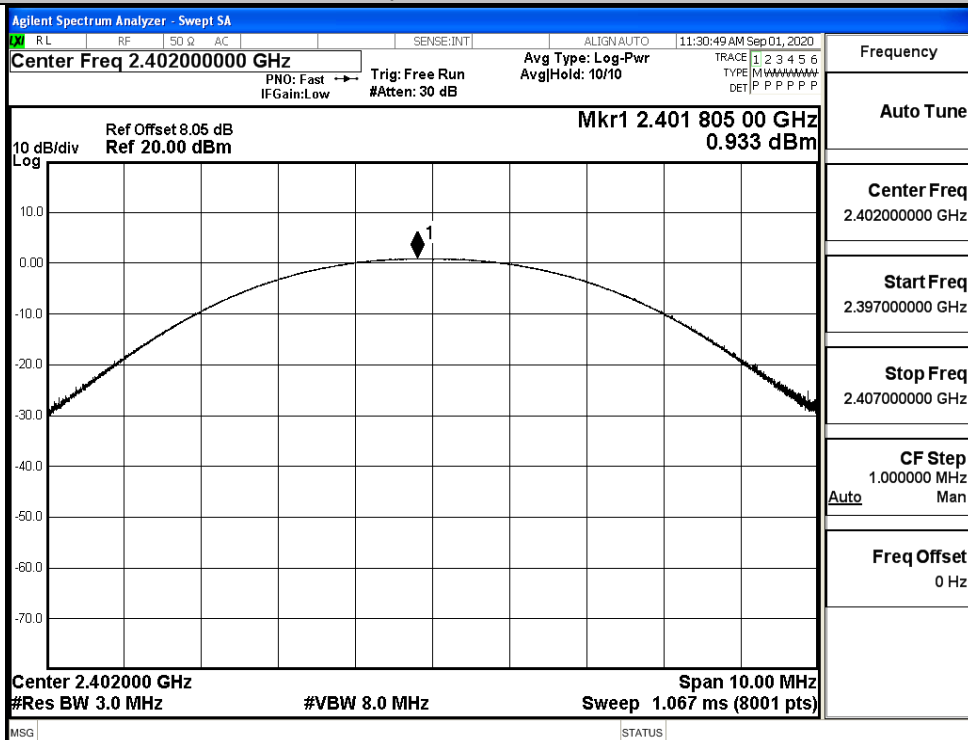
Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

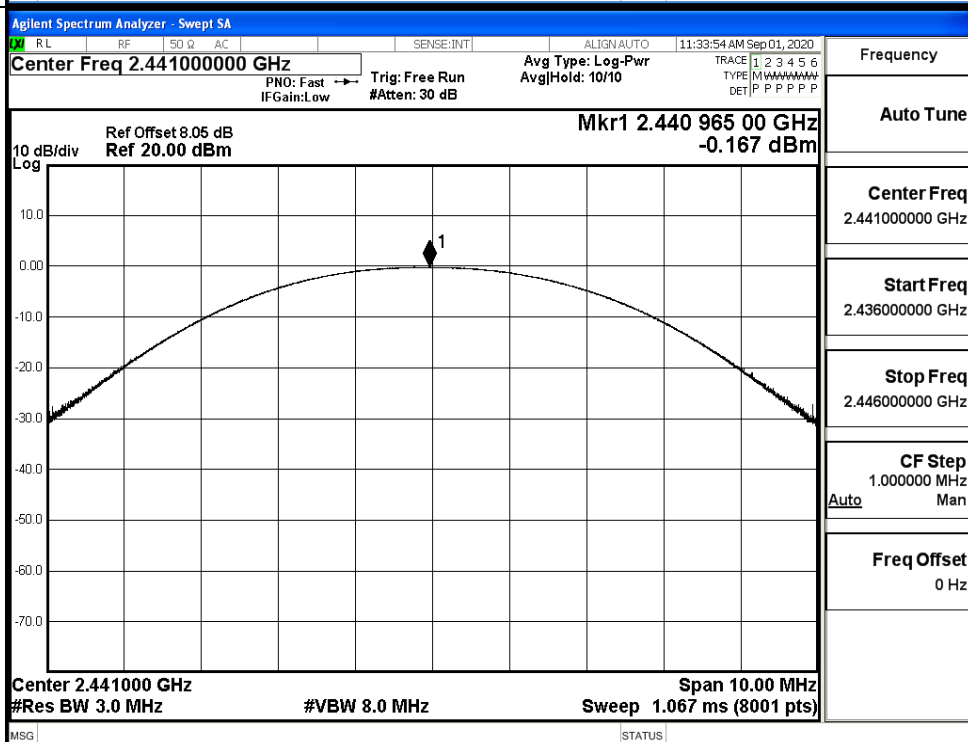
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.933	21	PASS
	MCH	-0.167	21	PASS
	HCH	-1.290	21	PASS
$\pi/4$ DQPSK	LCH	-3.033	21	PASS
	MCH	-0.765	21	PASS
	HCH	-1.468	21	PASS
8DPSK	LCH	0.738	21	PASS
	MCH	0.058	21	PASS
	HCH	-0.861	21	PASS

Test Graphs

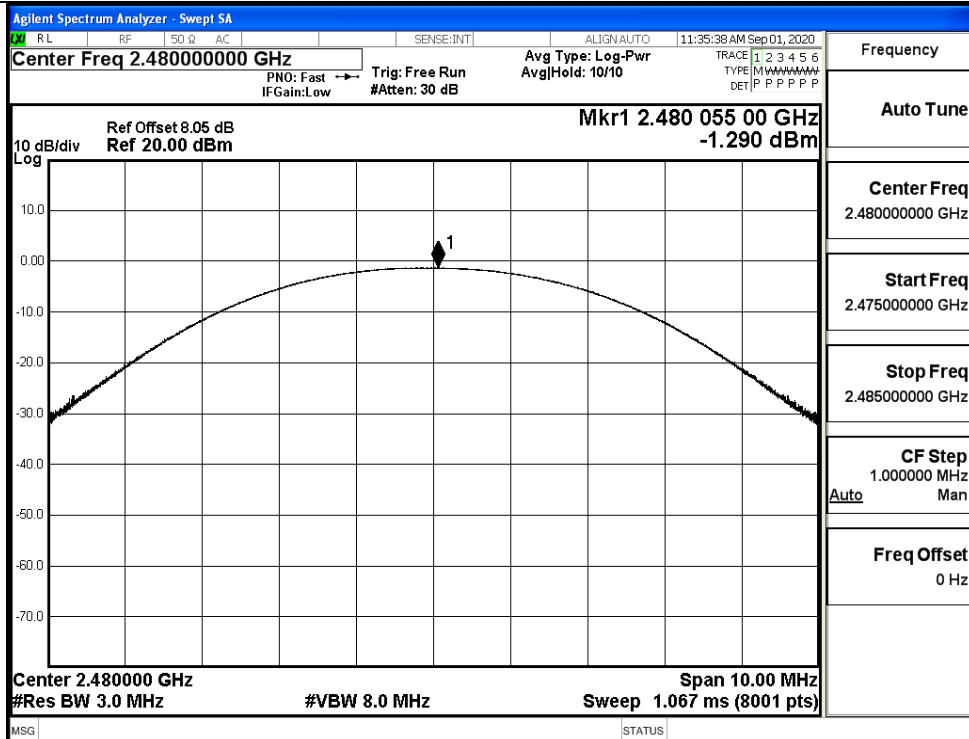
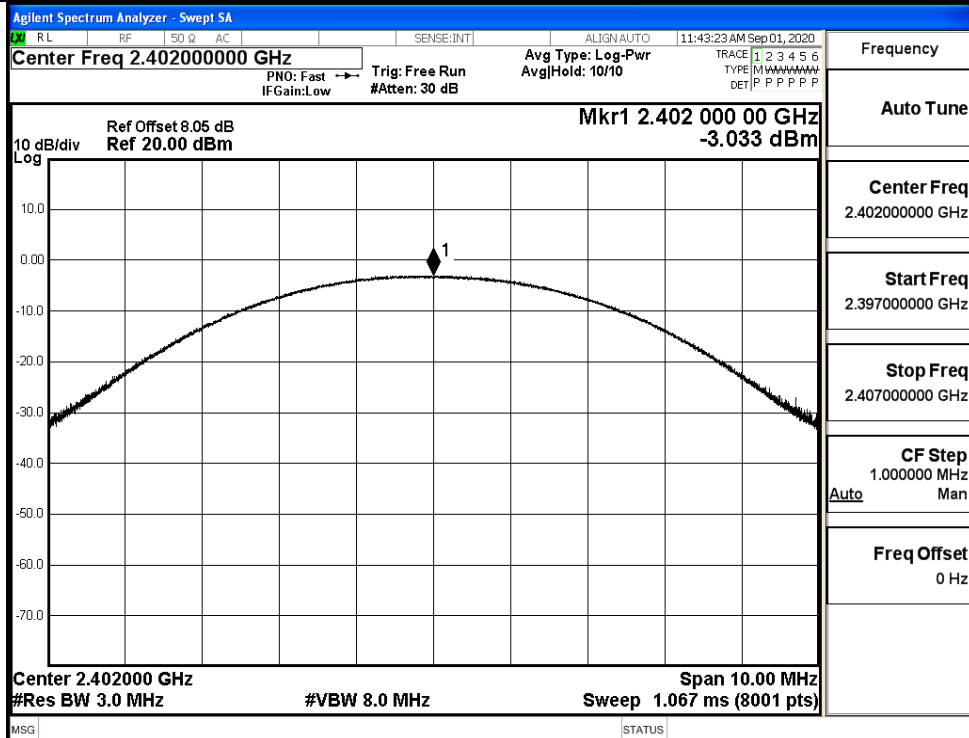
GFSK/LCH

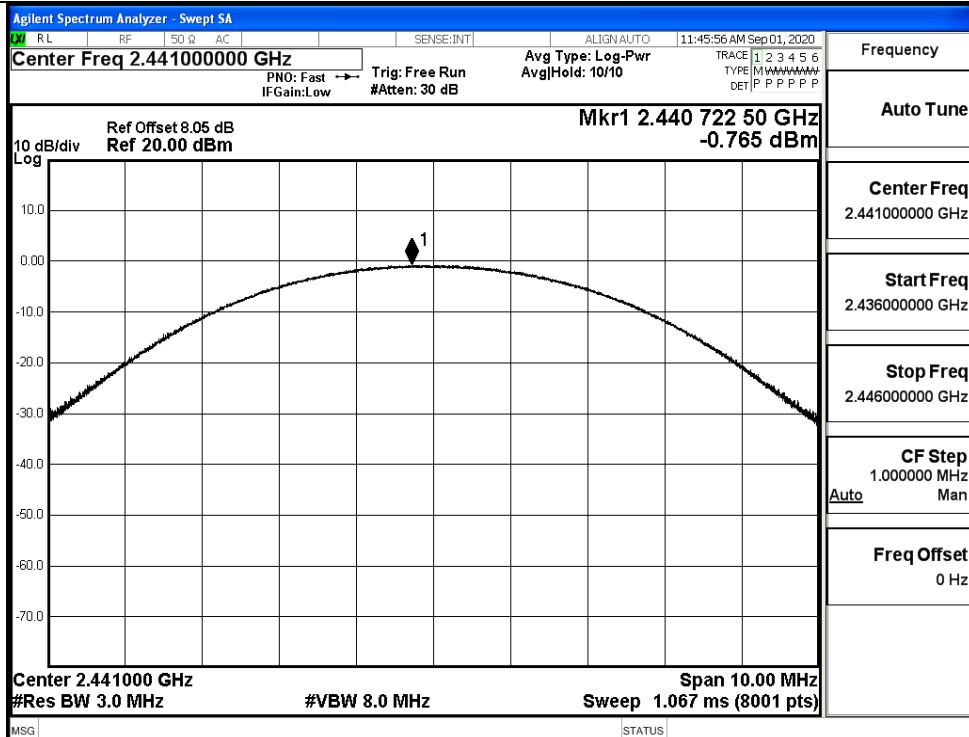
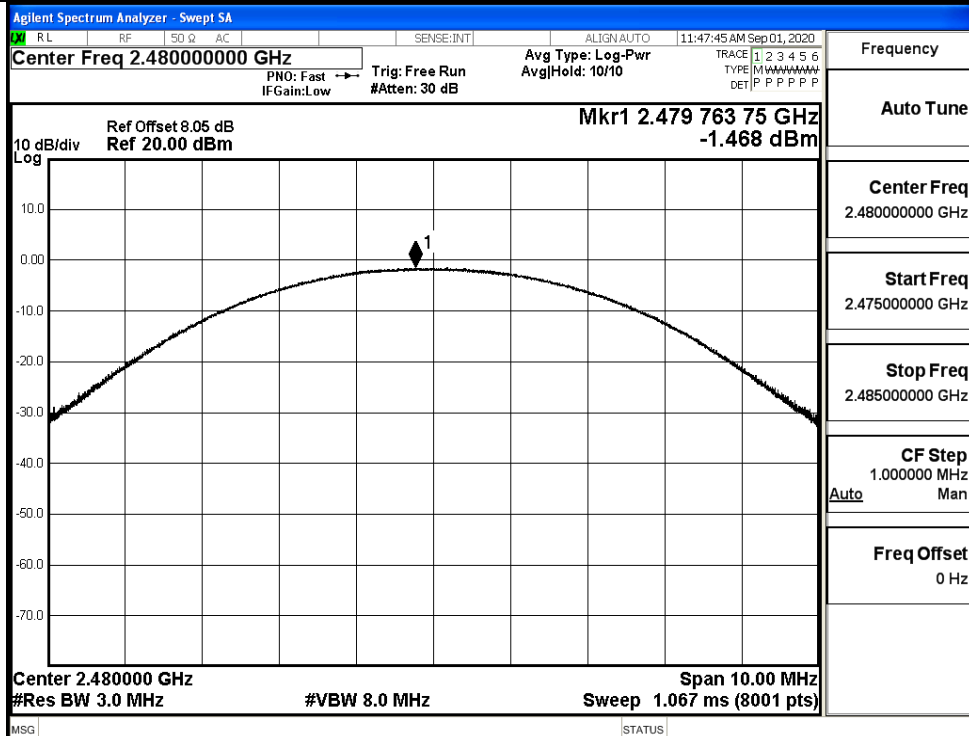


GFSK/MCH

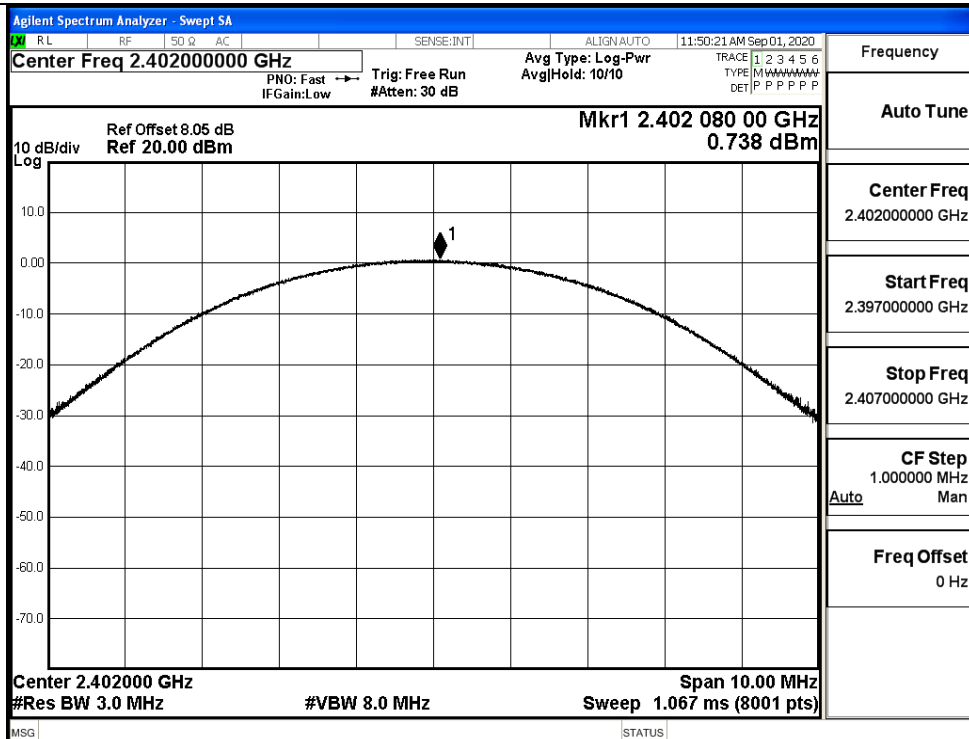


GFSK/HCH

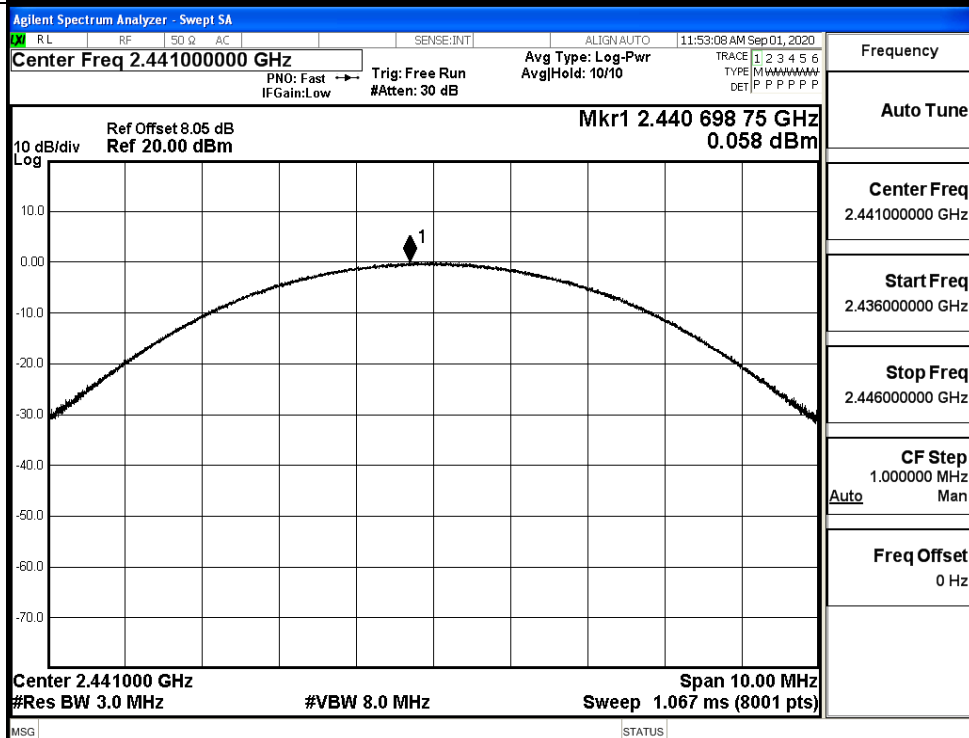
 $\pi/4$ DQPSK/LCH

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

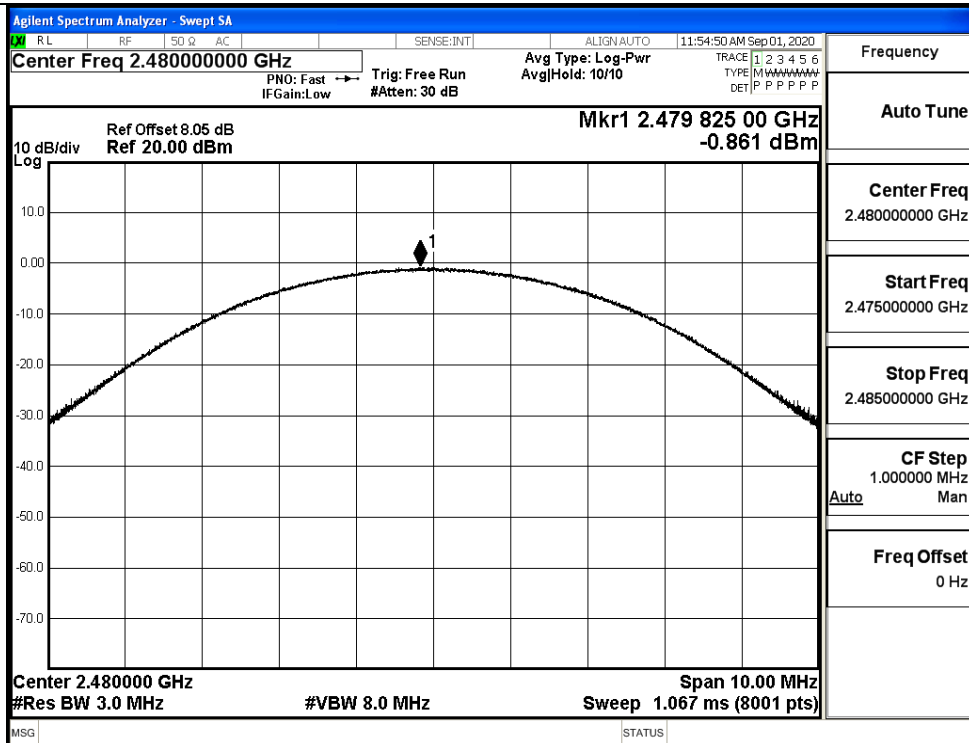
8DPSK/LCH



8DPSK/MCH



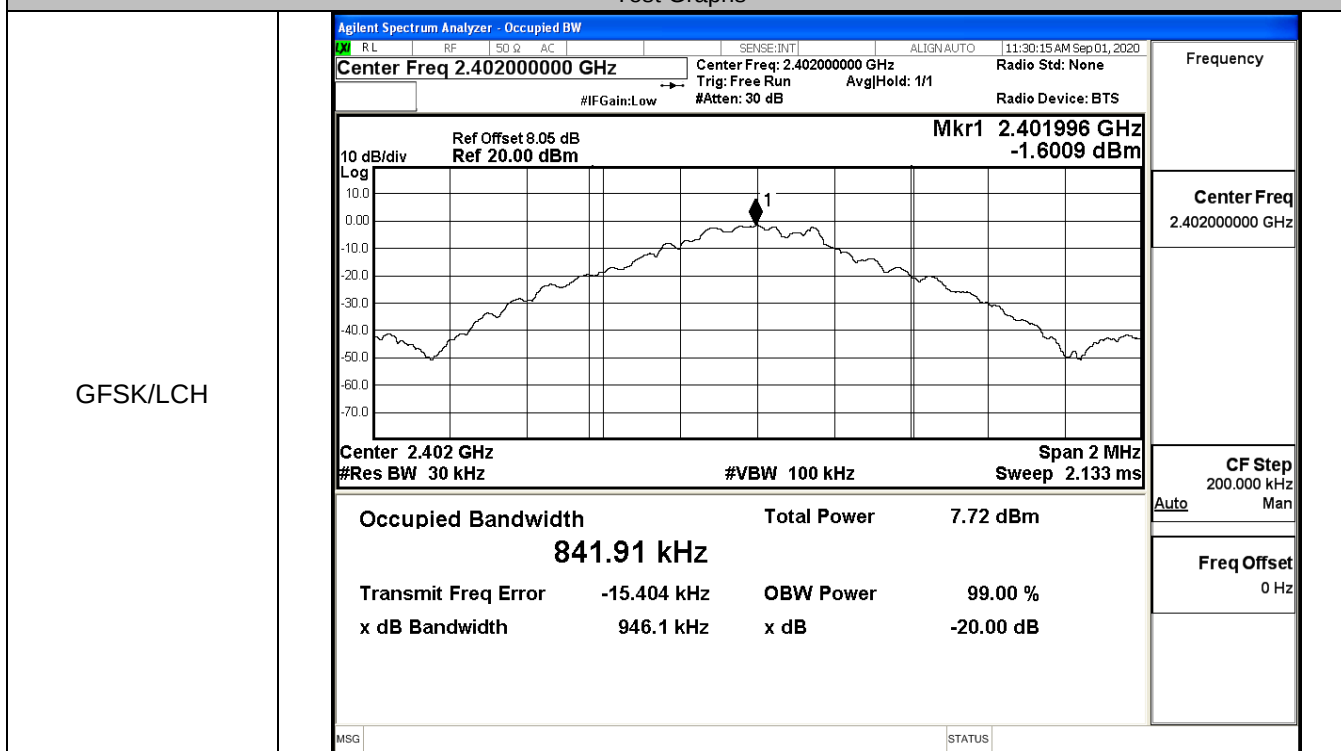
8DPSK/HCH



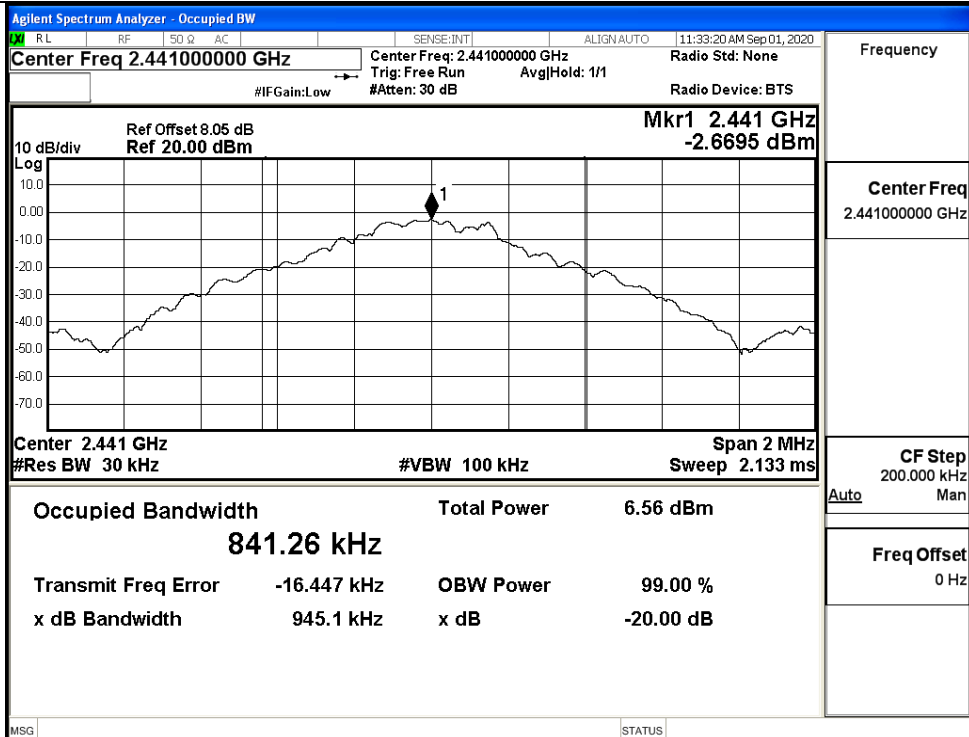
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9461	Not Specified	PASS
	MCH	0.9451	Not Specified	PASS
	HCH	0.9465	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.320	Not Specified	PASS
	MCH	1.317	Not Specified	PASS
	HCH	1.319	Not Specified	PASS
8DPSK	LCH	1.310	Not Specified	PASS
	MCH	1.309	Not Specified	PASS
	HCH	1.312	Not Specified	PASS

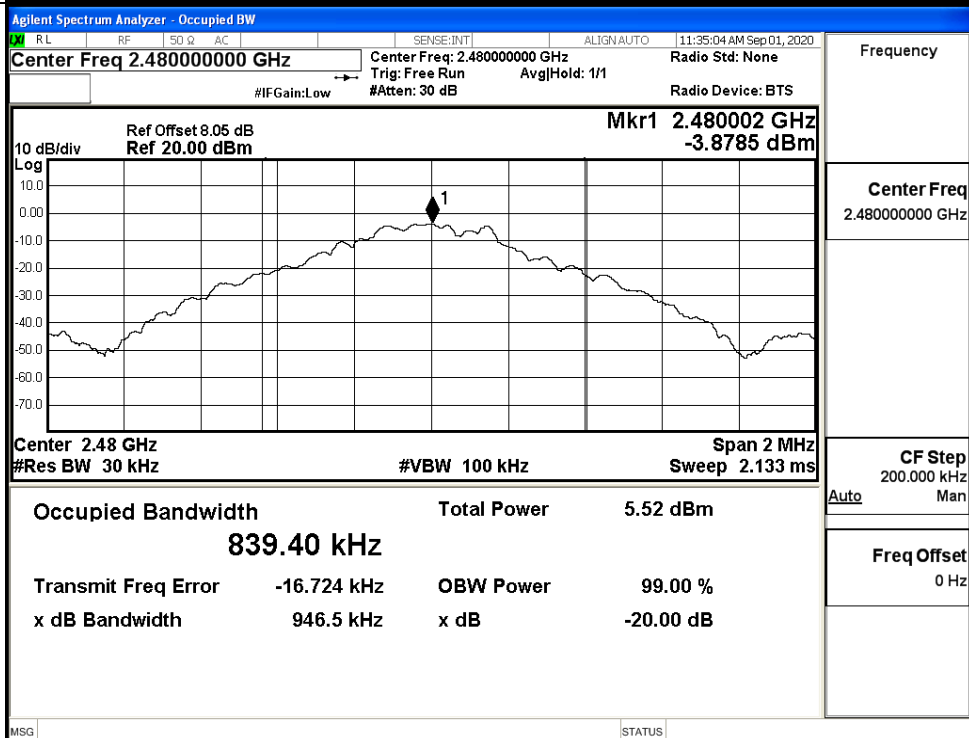
Test Graphs

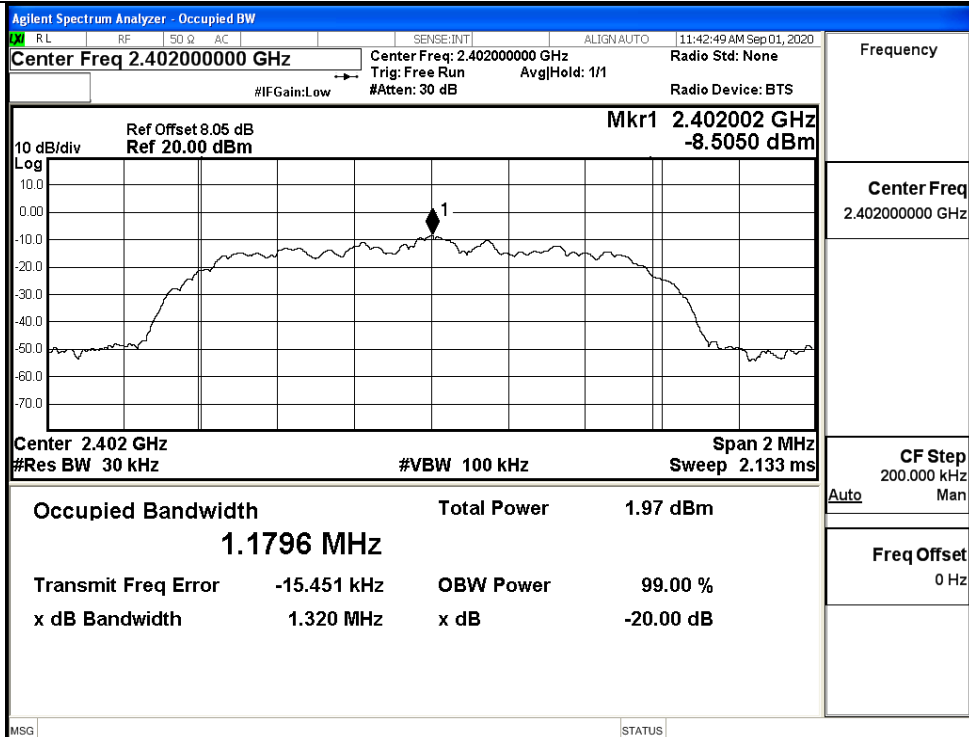
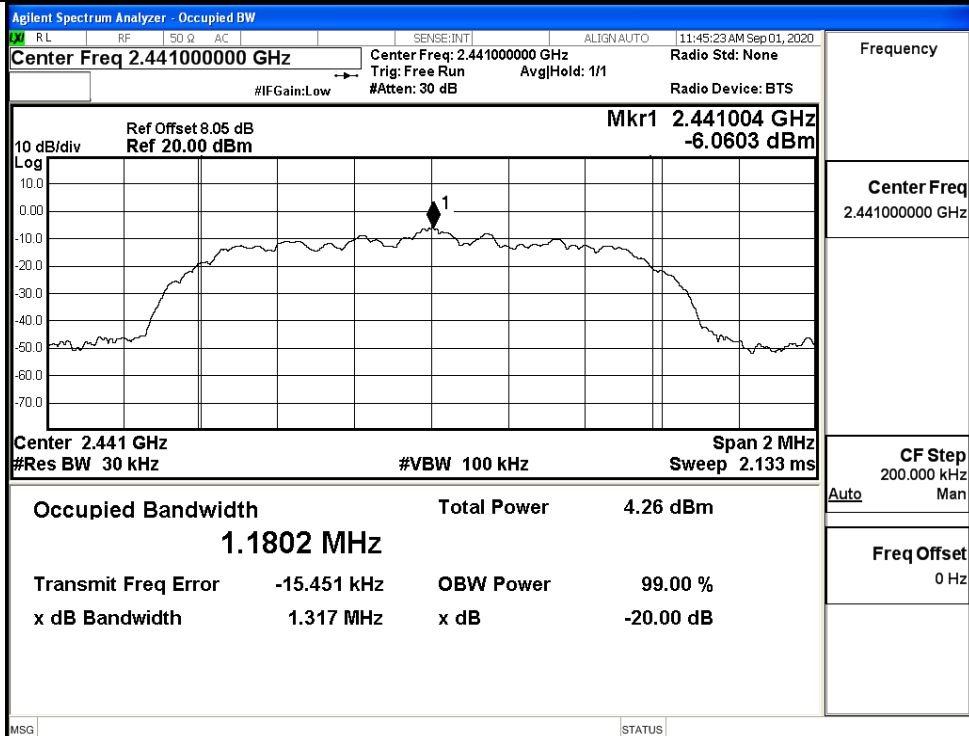


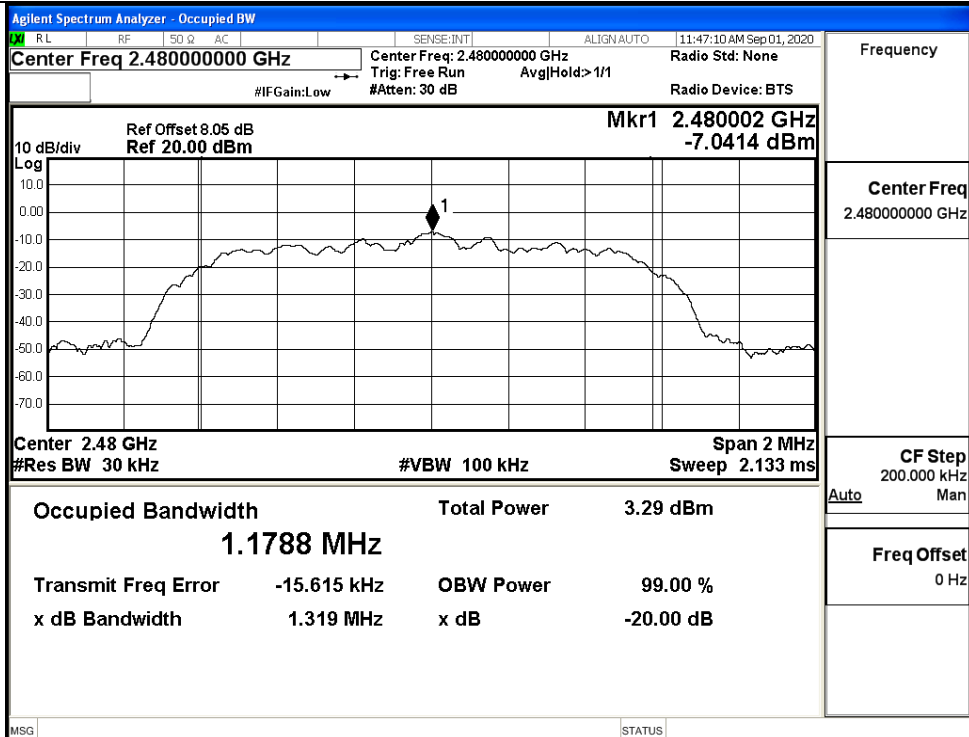
GFSK/MCH



GFSK/HCH



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

$\pi/4$ DQPSK/HCH

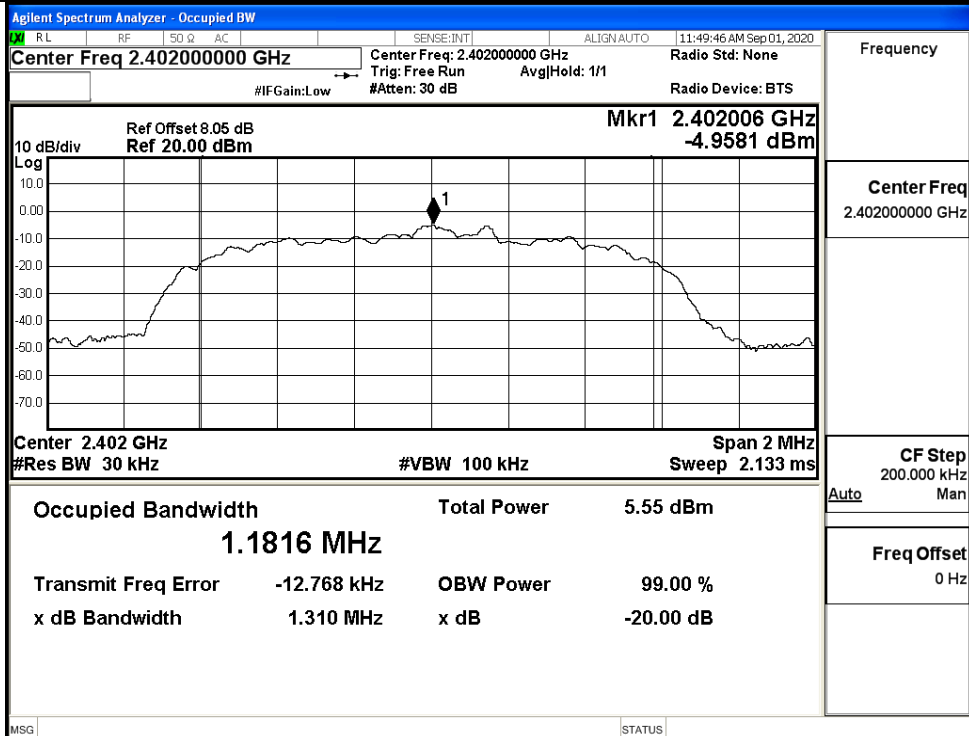
Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

8DPSK/LCH



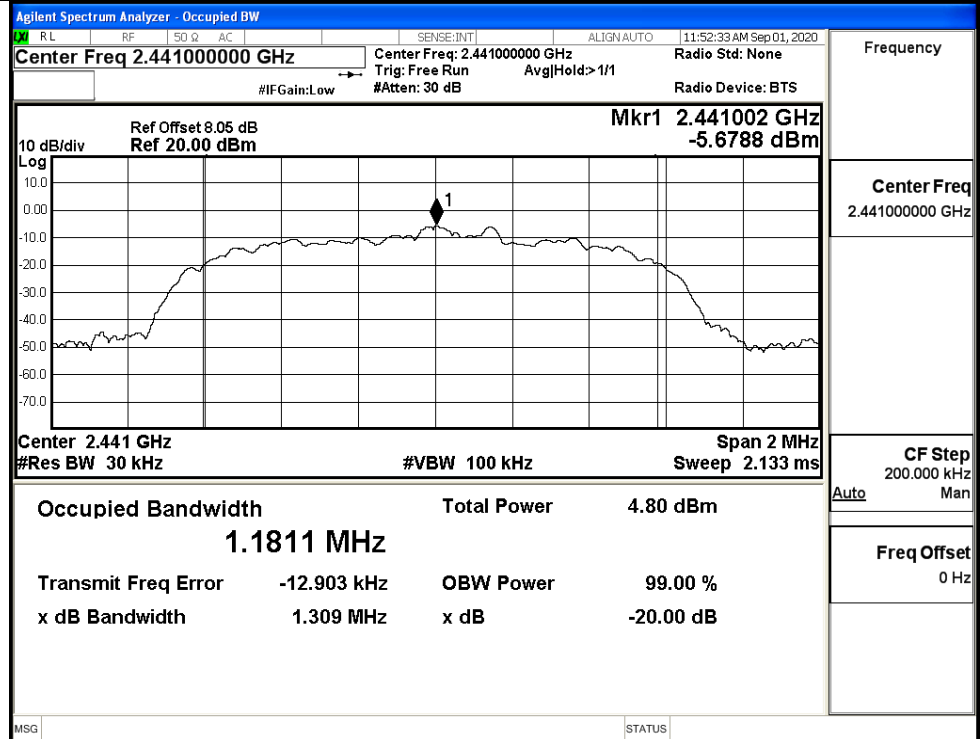
Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
Man

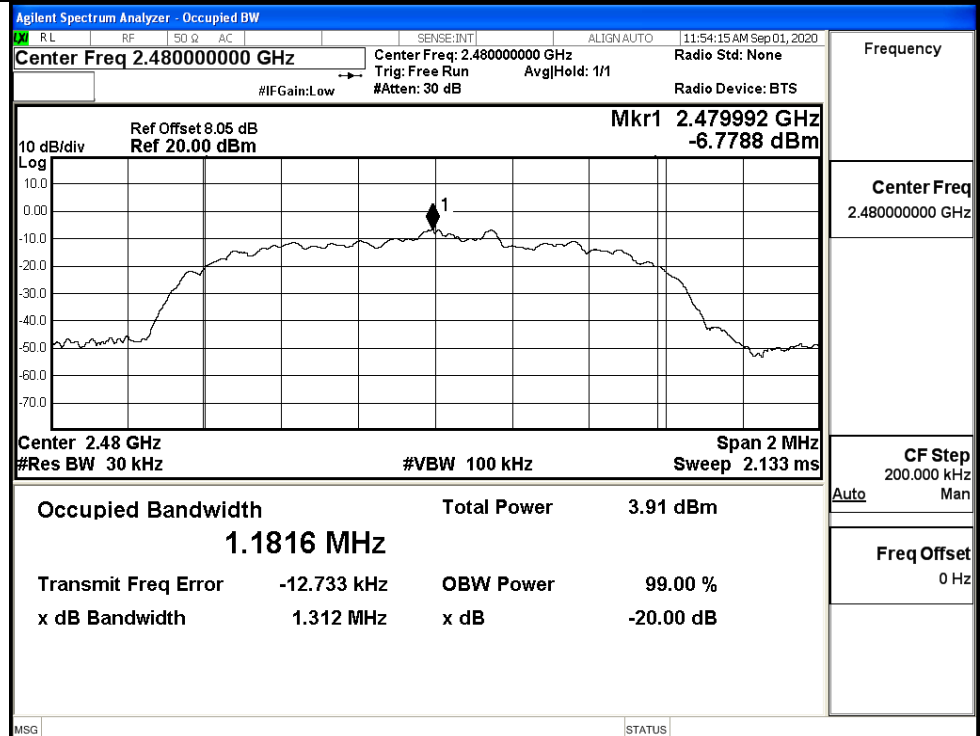
Auto

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH

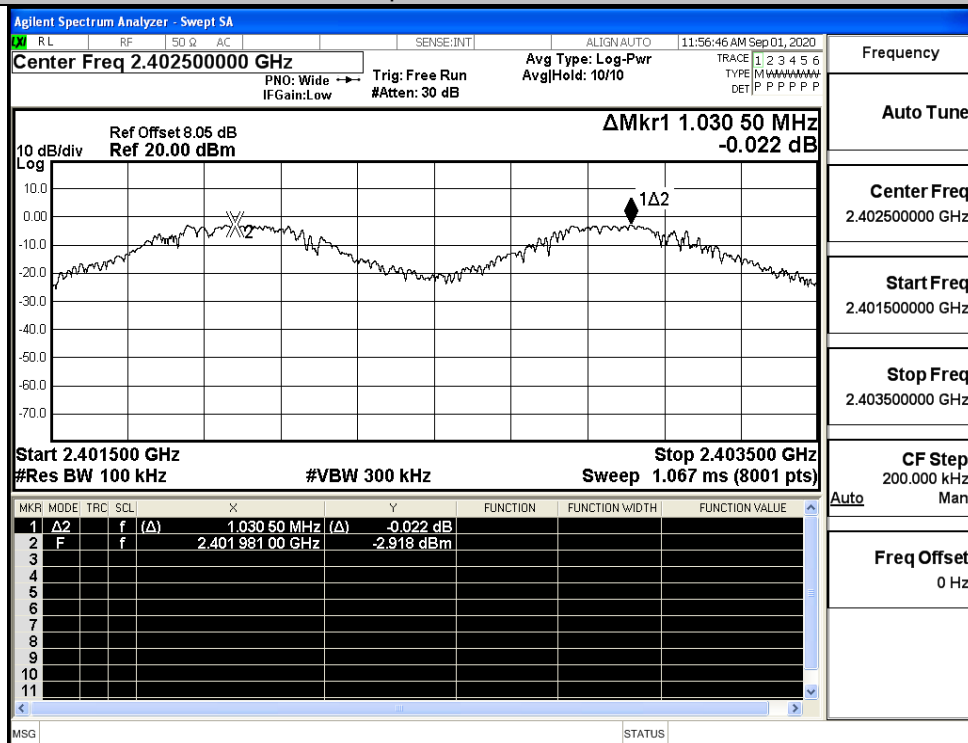


A.3 Carrier Frequency Separation

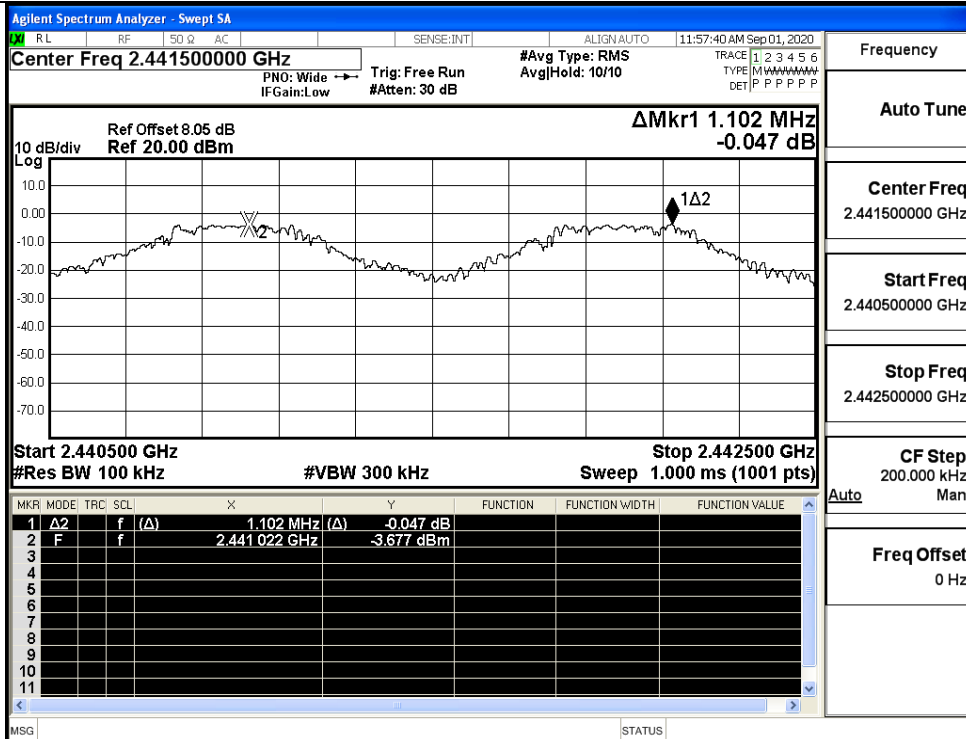
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.030	0.631	PASS
	MCH	1.102	0.631	PASS
	HCH	0.762	0.631	PASS
$\pi/4$ DQPSK	LCH	0.988	0.880	PASS
	MCH	1.136	0.880	PASS
	HCH	1.110	0.880	PASS
8DPSK	LCH	1.026	0.875	PASS
	MCH	0.992	0.875	PASS
	HCH	0.974	0.875	PASS

Test Graphs

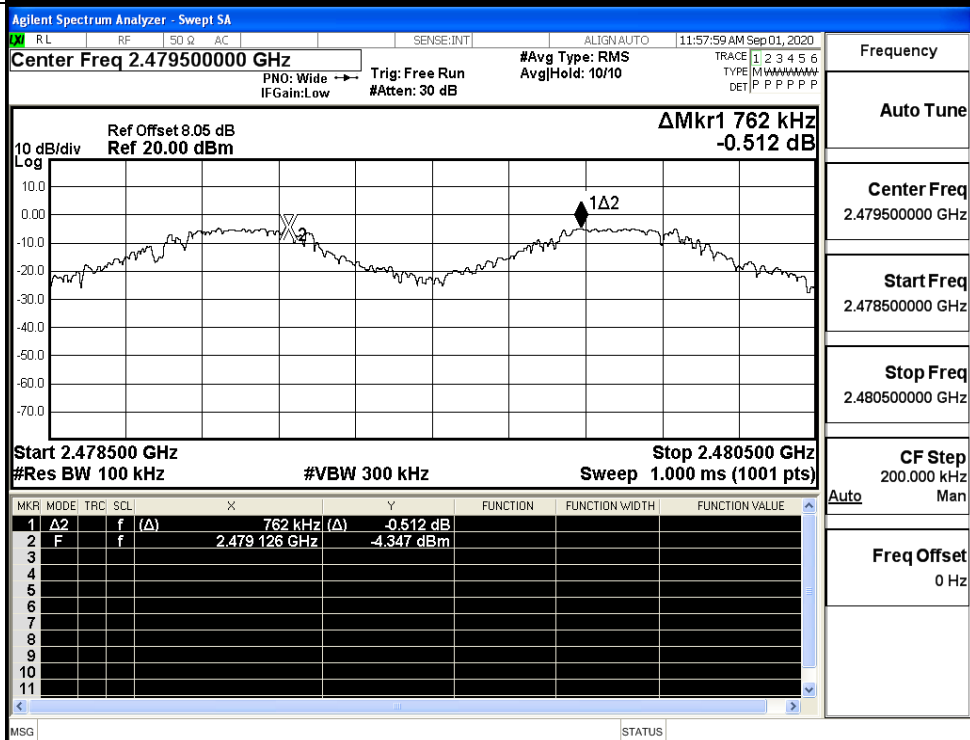
GFSK/LCH

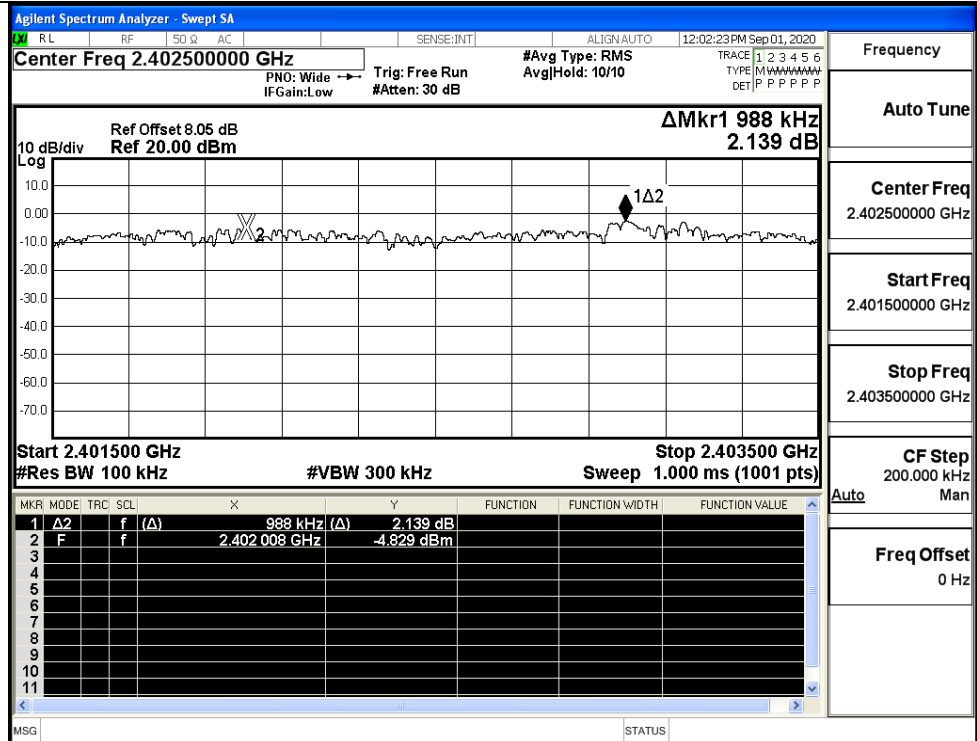
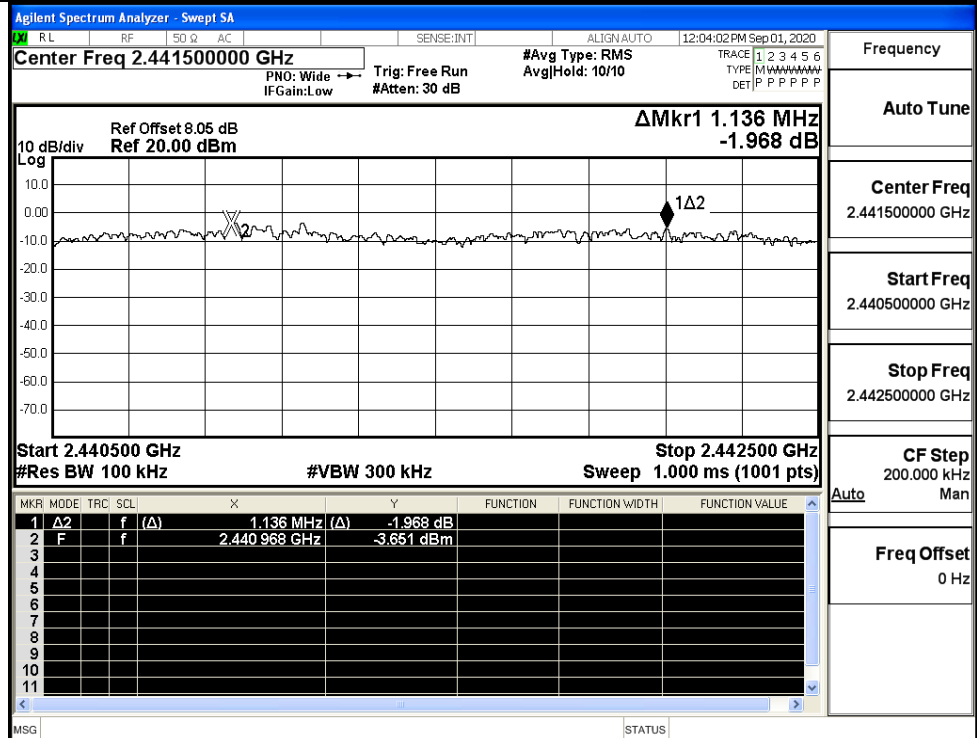


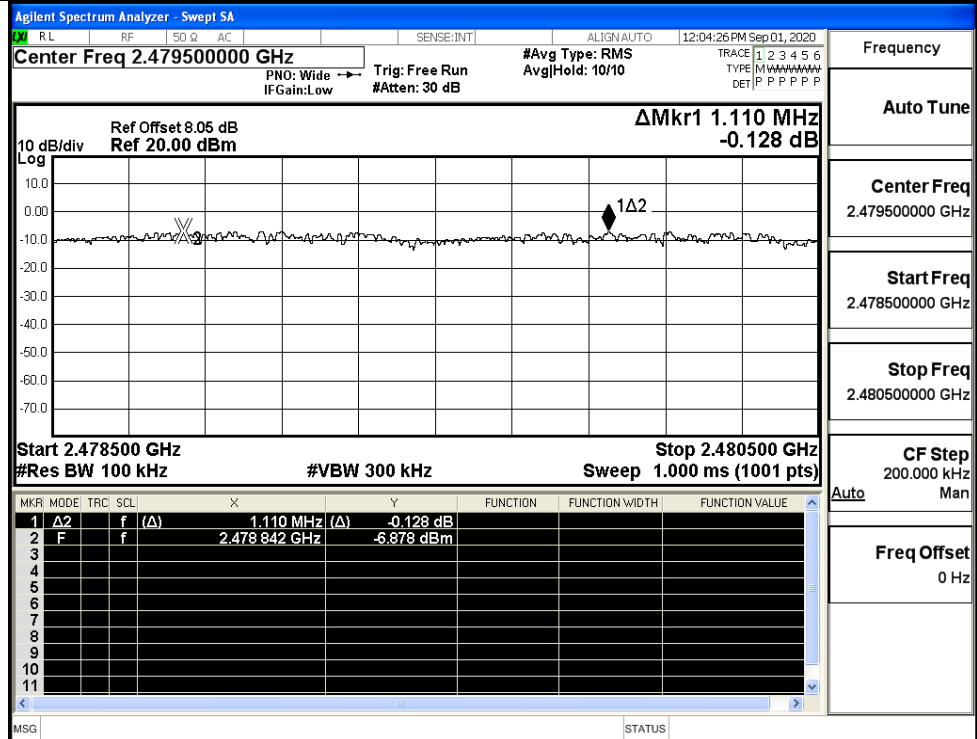
GFSK/MCH



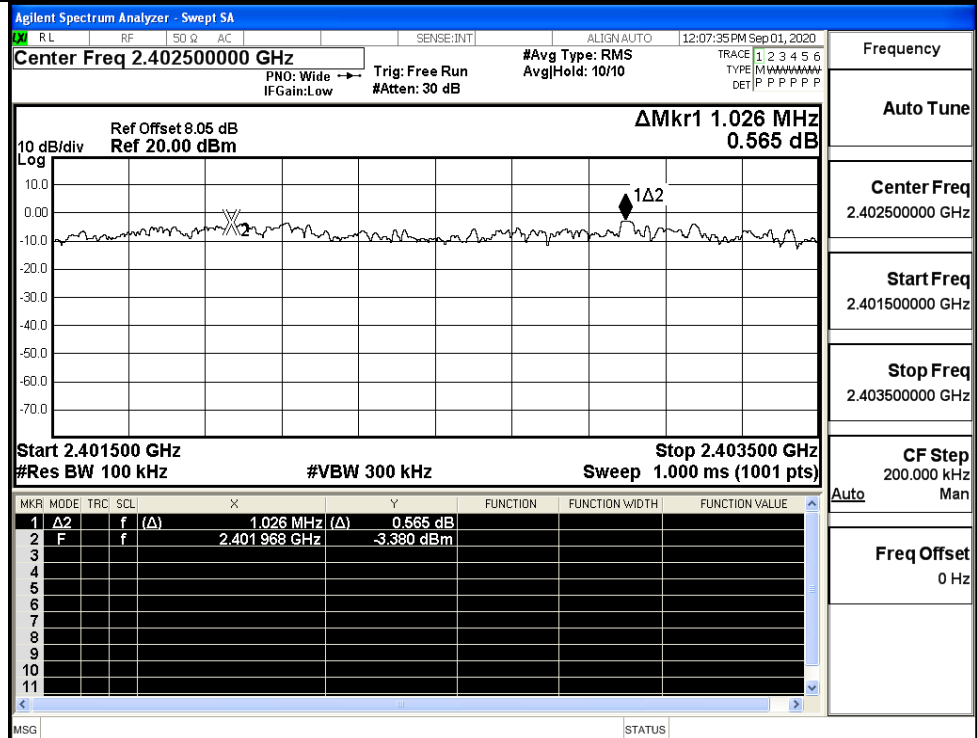
GFSK/HCH



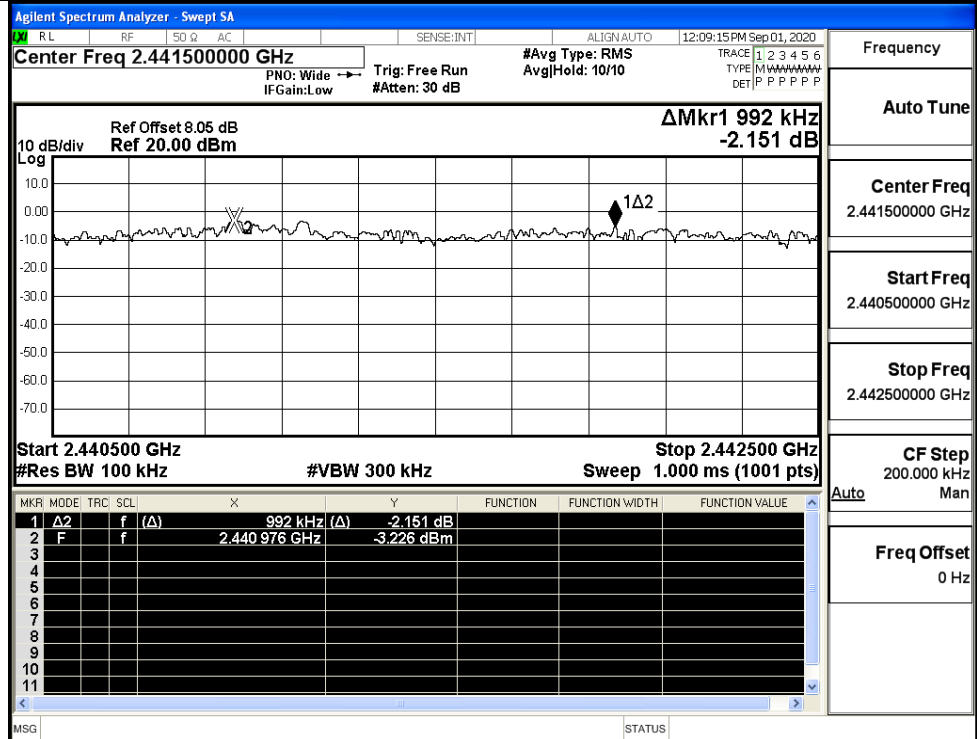
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

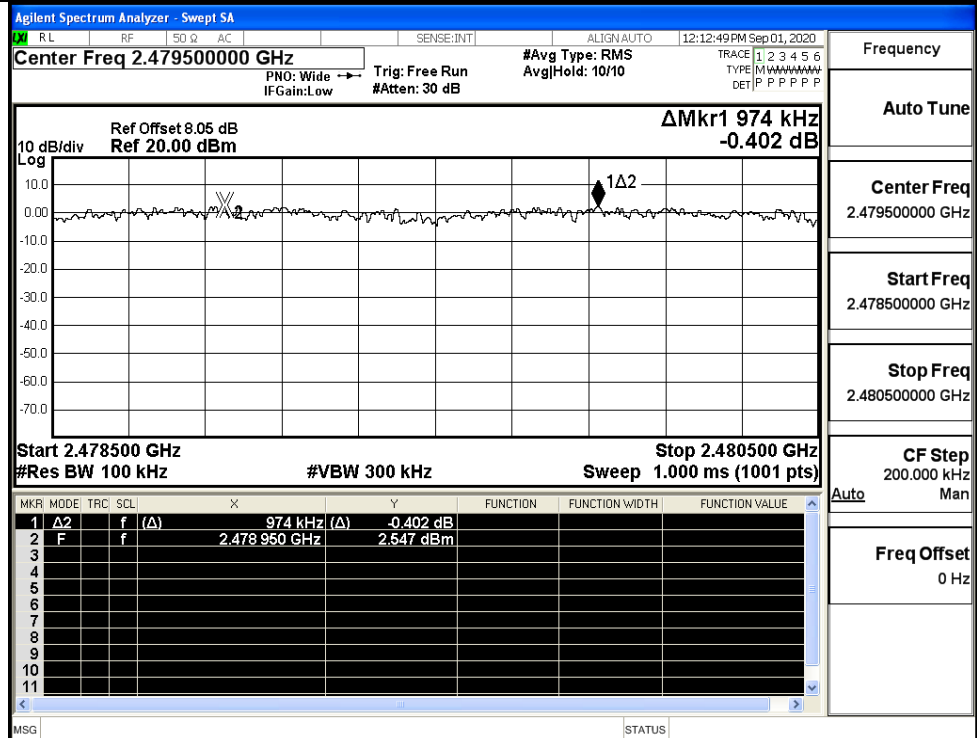
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

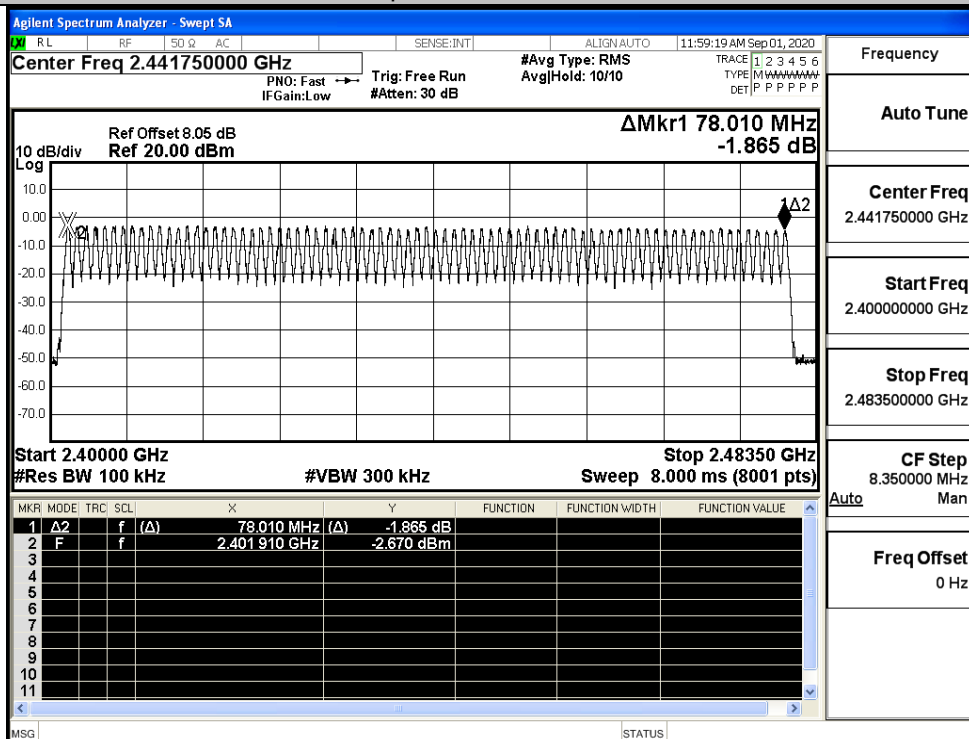


A.4 Hopping Channel Number

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



Frequency

Auto Tune

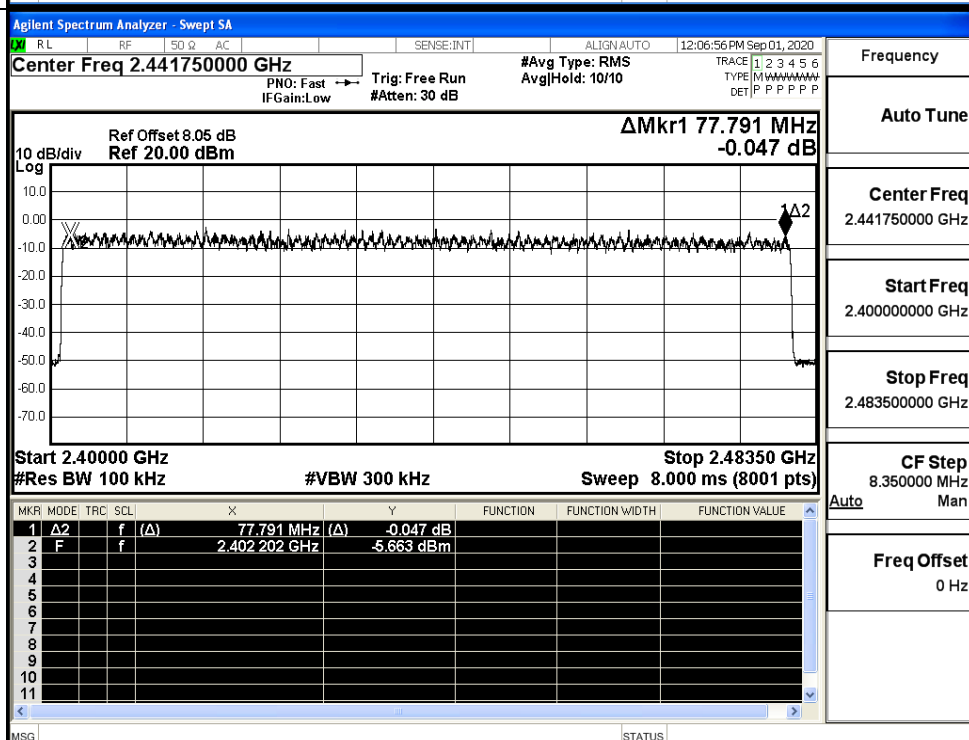
Center Freq
2.441750000 GHz

Start Freq
2.400000000 GHz

Stop Freq
2.483500000 GHz

CF Step
8.350000 MHz
Man

Freq Offset
0 Hz

 $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq
2.441750000 GHz

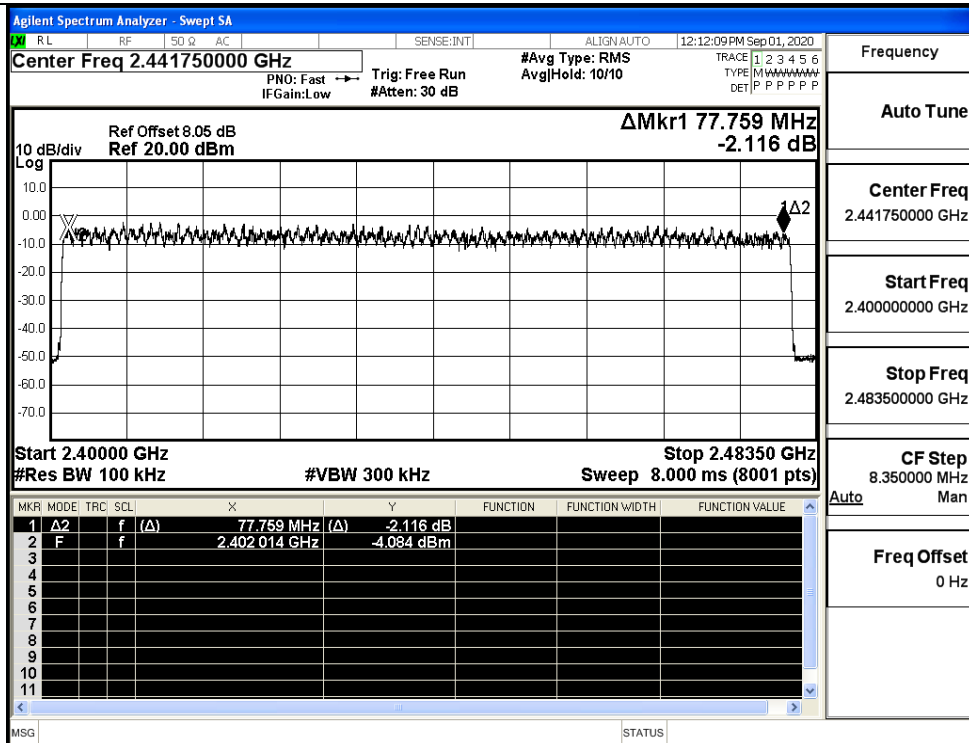
Start Freq
2.400000000 GHz

Stop Freq
2.483500000 GHz

CF Step
8.350000 MHz
Man

Freq Offset
0 Hz

8DPSK/Hop

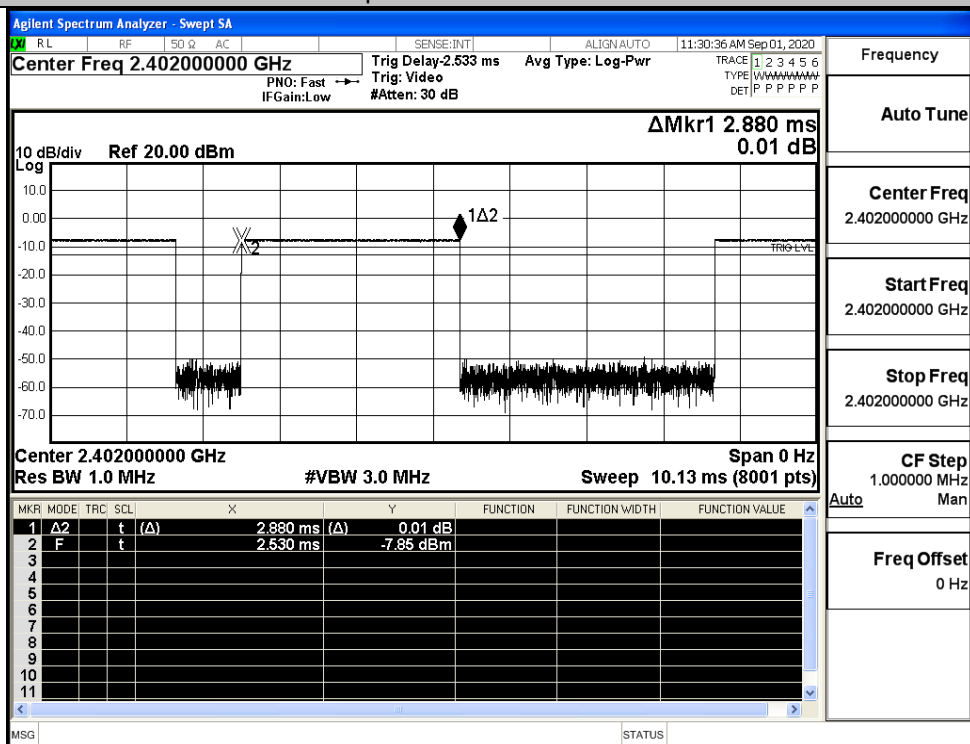


A.5 Dwell Time

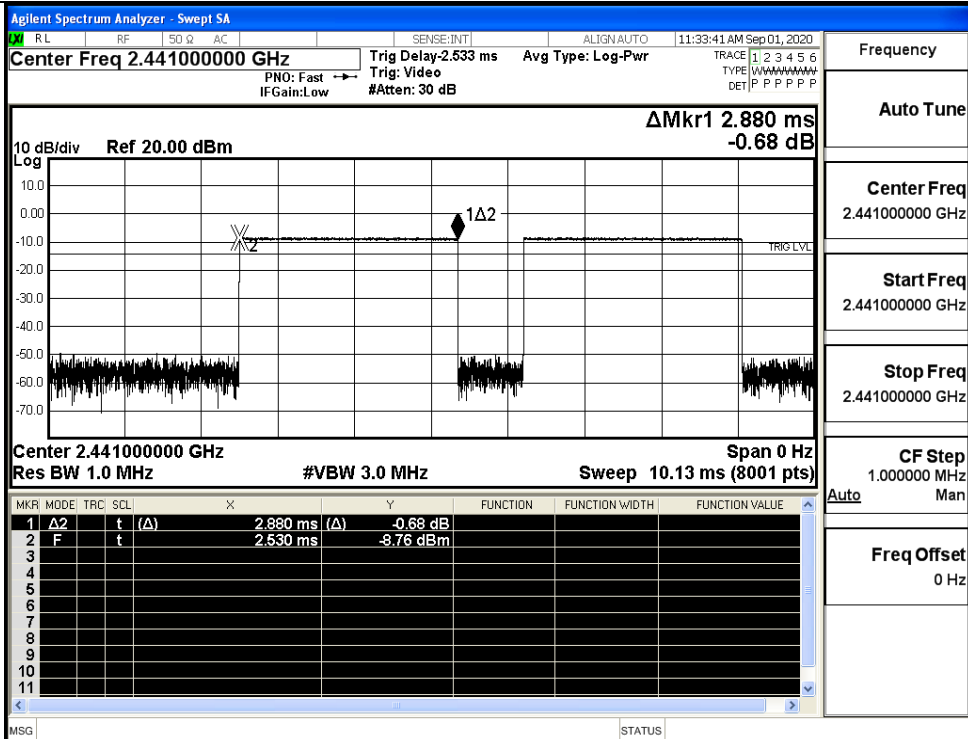
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

Test Graphs

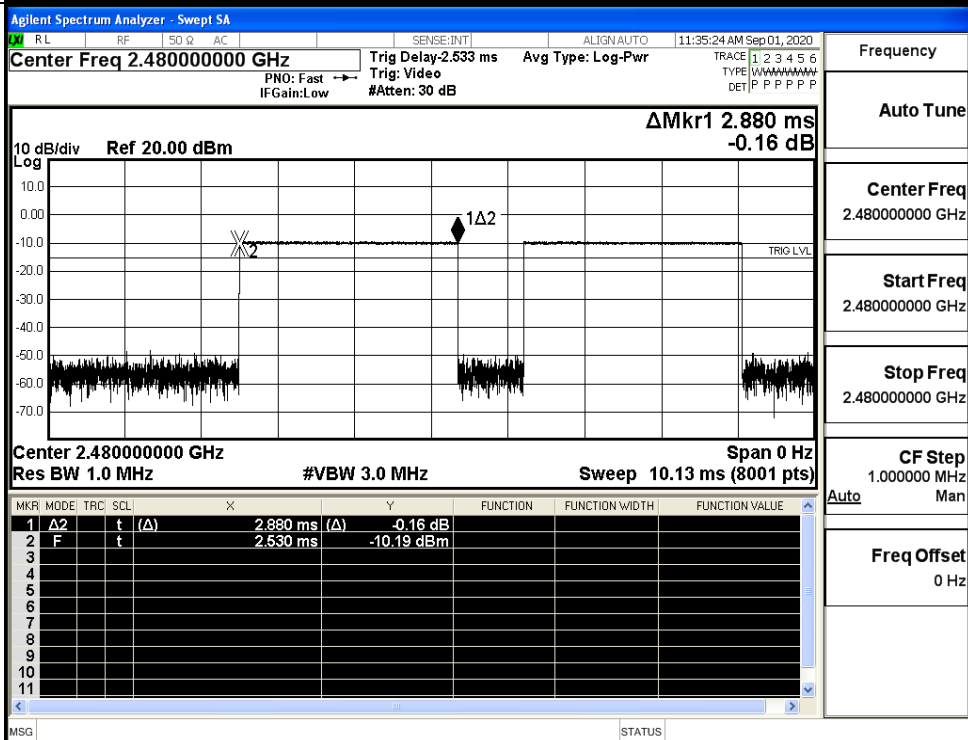
GFSK_DH5/LCH



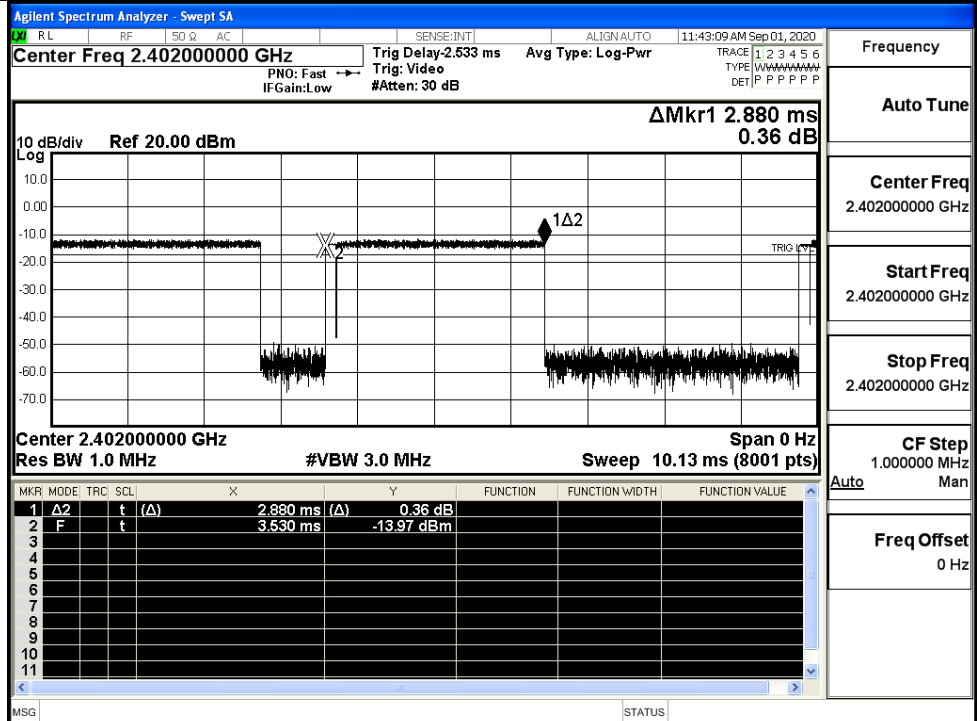
GFSK_DH5/MCH



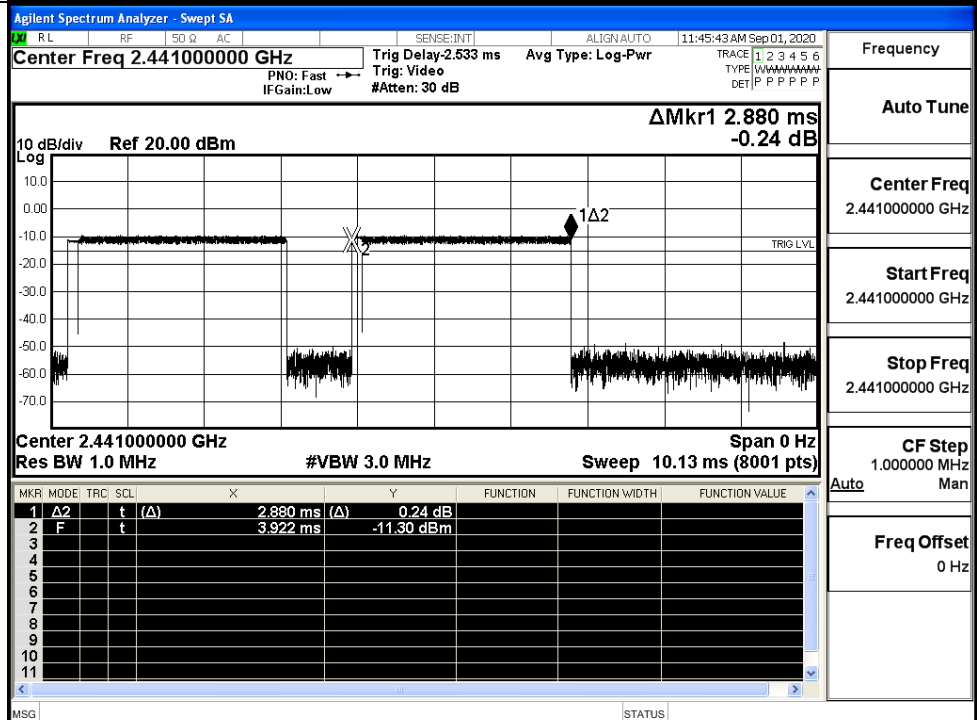
GFSK_DH5/HCH



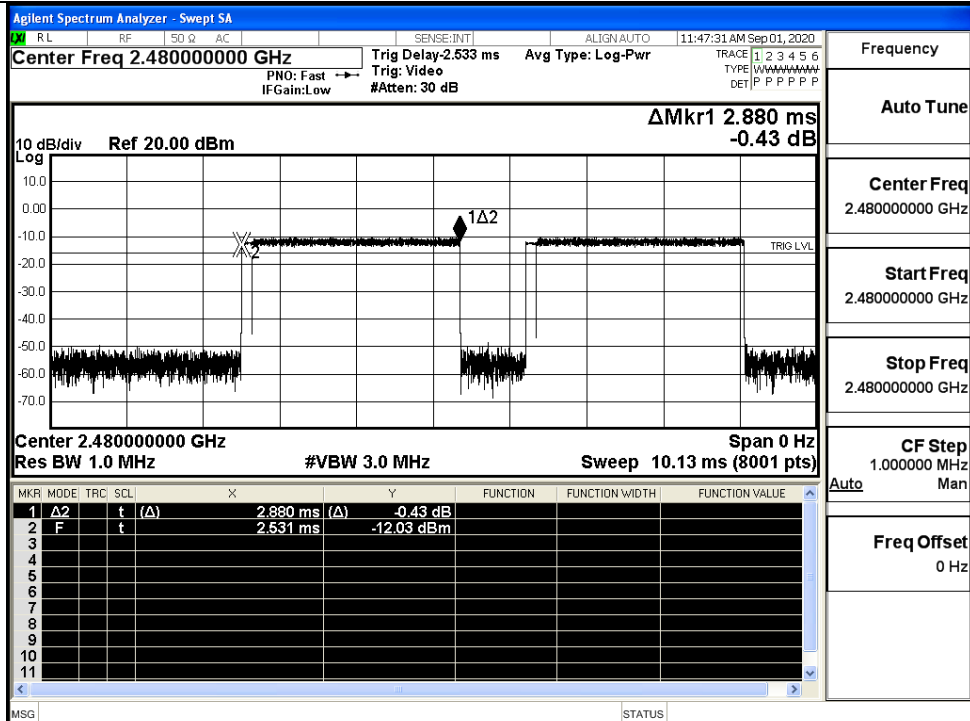
$\pi/4$ DQPSK
_2DH5/LCH



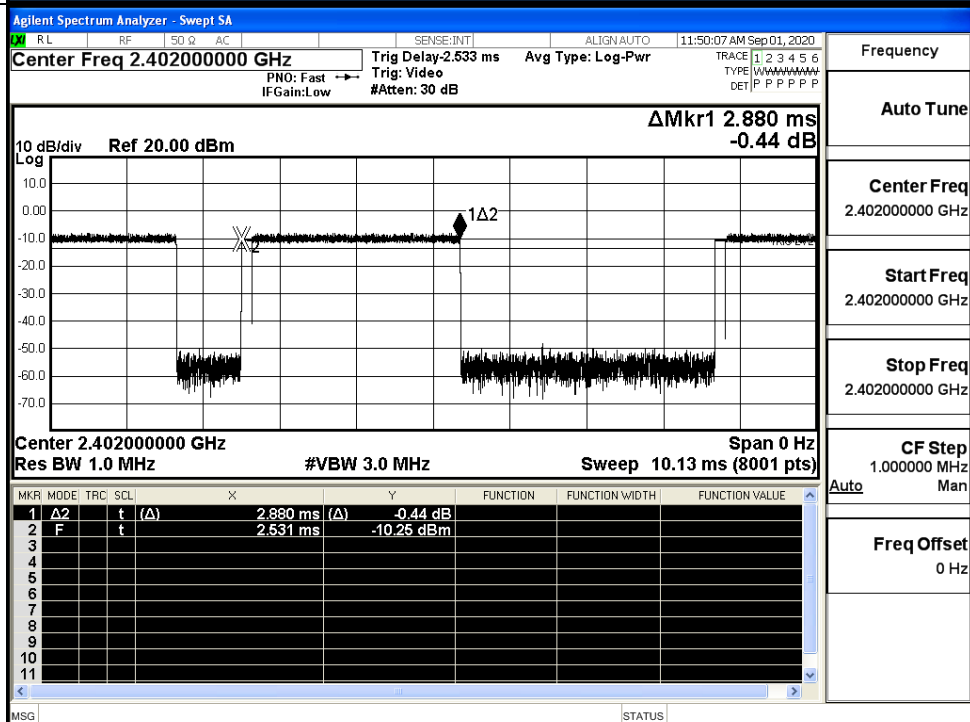
$\pi/4$ DQPSK
_2DH5/MCH



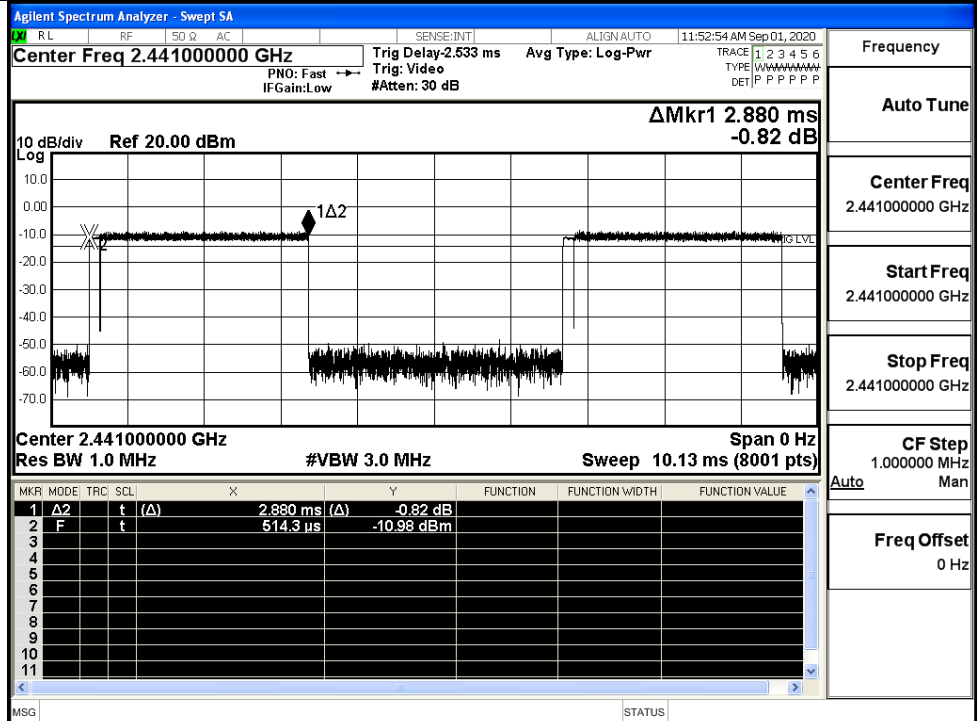
$\pi/4$ DQPSK
_2DH5/HCH



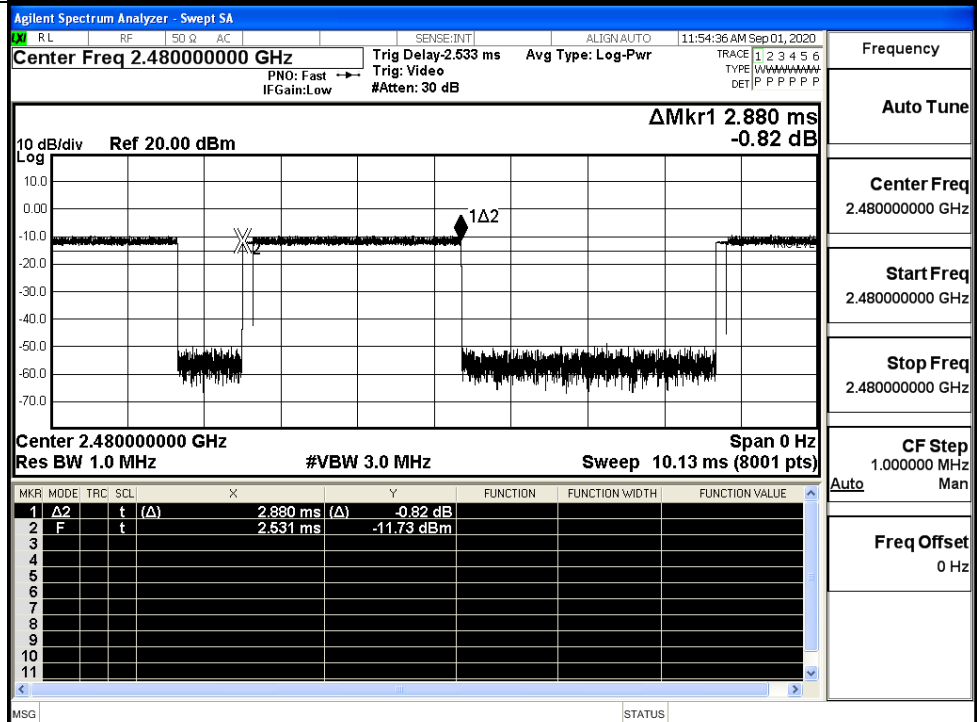
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

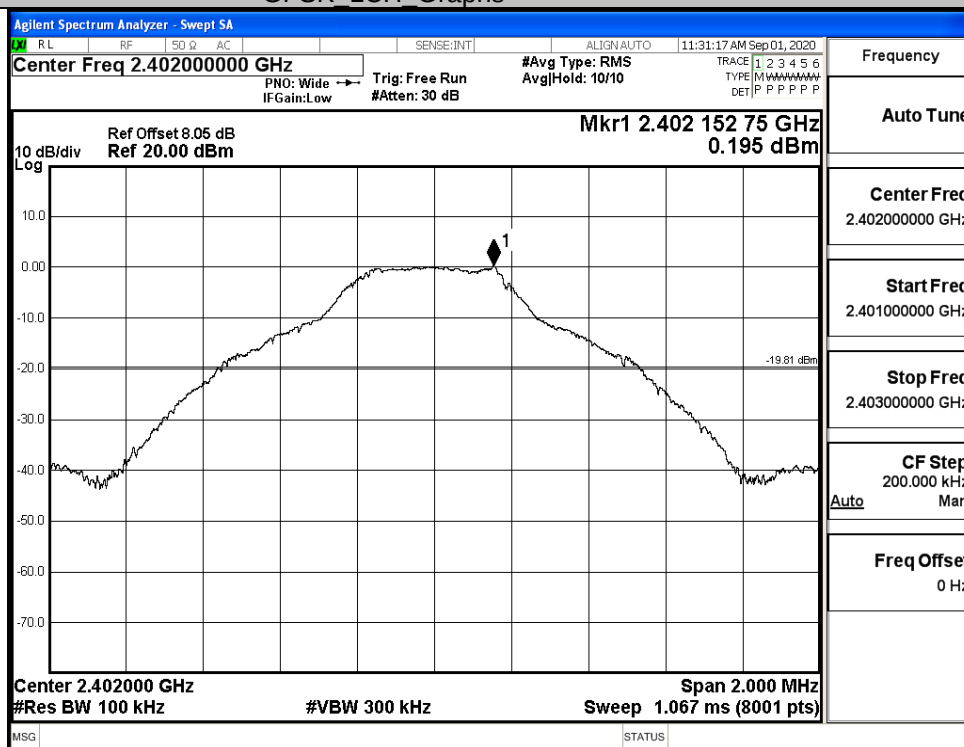


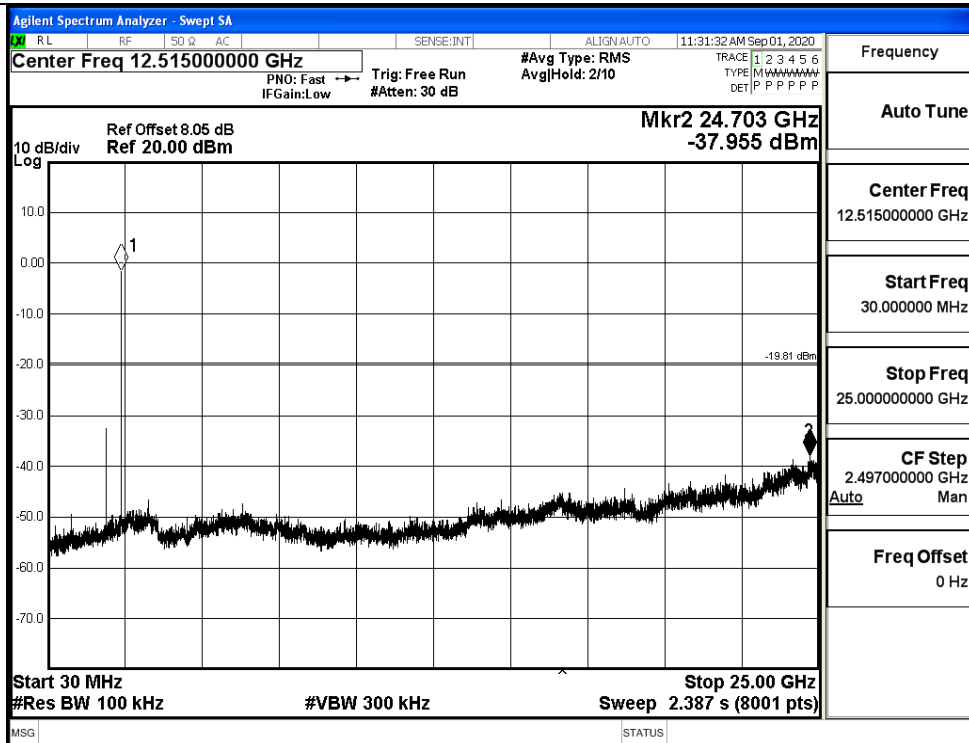
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.195	-37.955	-19.805	PASS
	MCH	-1.004	-35.638	-21.004	PASS
	HCH	-1.804	-36.783	-21.804	PASS
$\pi/4$ DQPSK	LCH	-5.676	-37.563	-25.676	PASS
	MCH	-3.523	-38.316	-23.523	PASS
	HCH	-3.964	-37.891	-23.964	PASS
8DPSK	LCH	-2.457	-38.352	-22.457	PASS
	MCH	-4.031	-37.594	-24.031	PASS
	HCH	-4.88	-38.212	-24.880	PASS

GFSK LCH Graphs

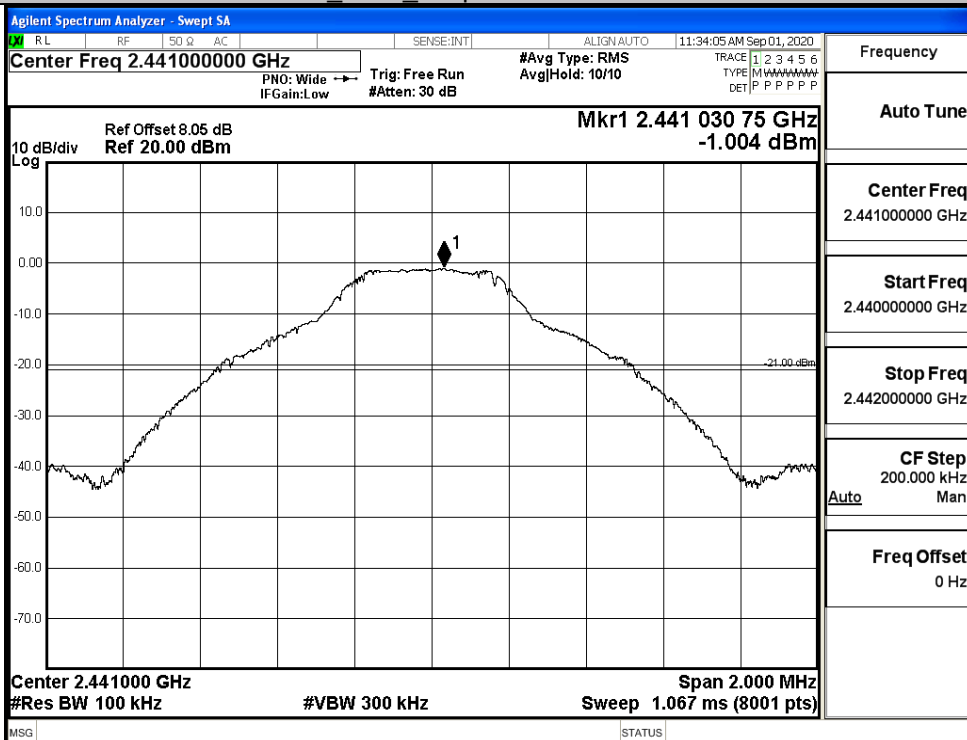
Pref



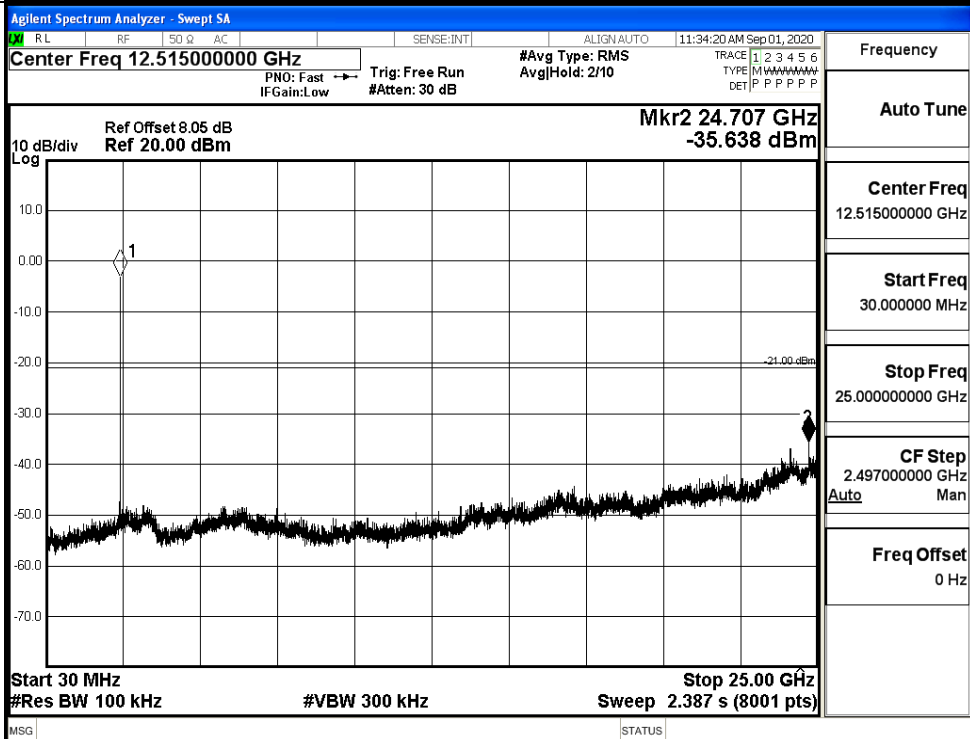


GFSK_MCH_Graphs

Pref

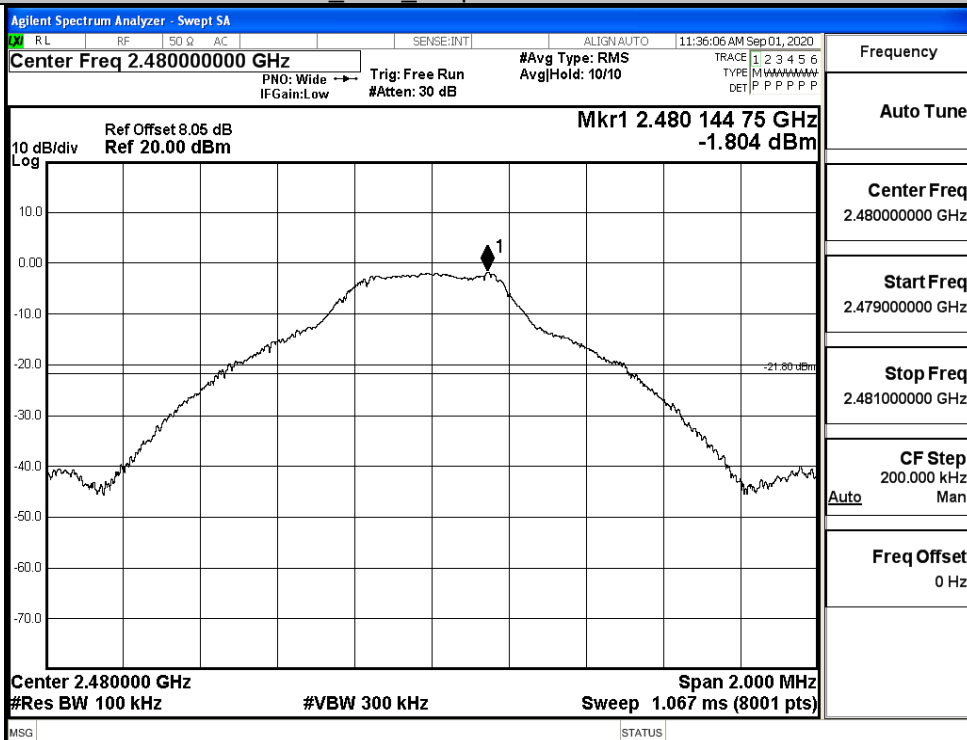


Puw

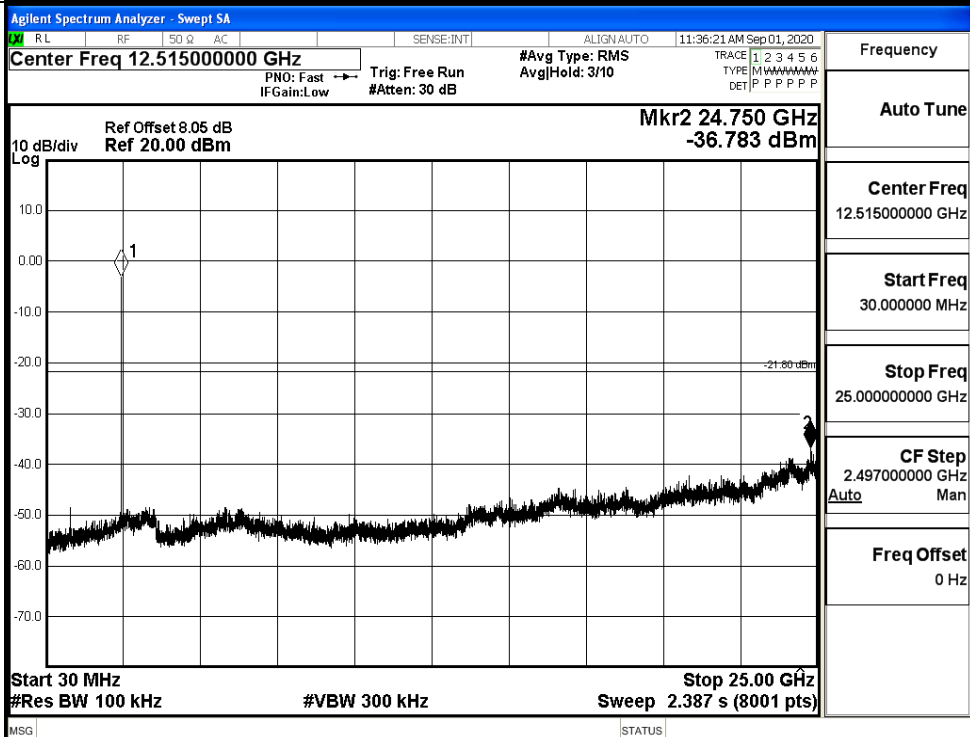


GFSK HCH Graphs

Pref

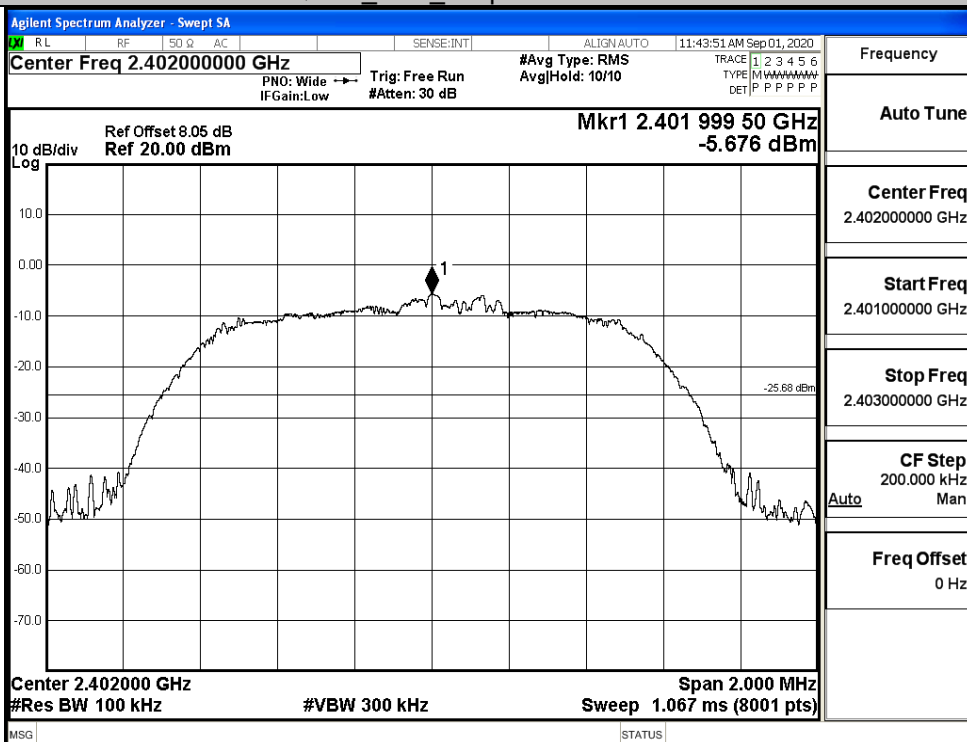


Puw

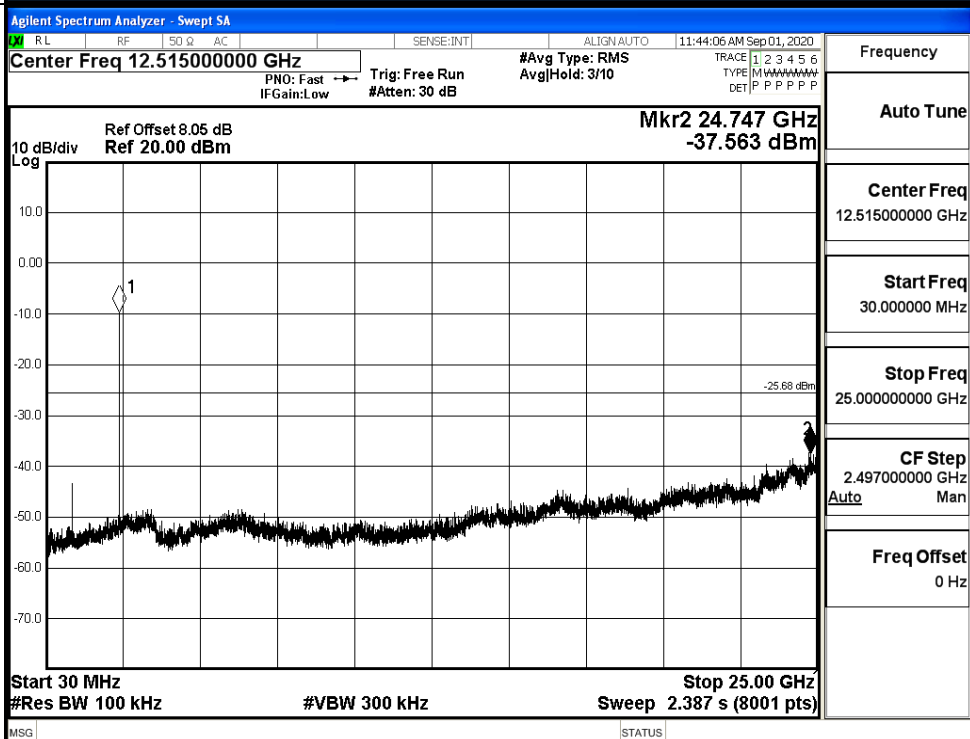


$\pi/4$ DQPSK_LCH_Graphs

Pref

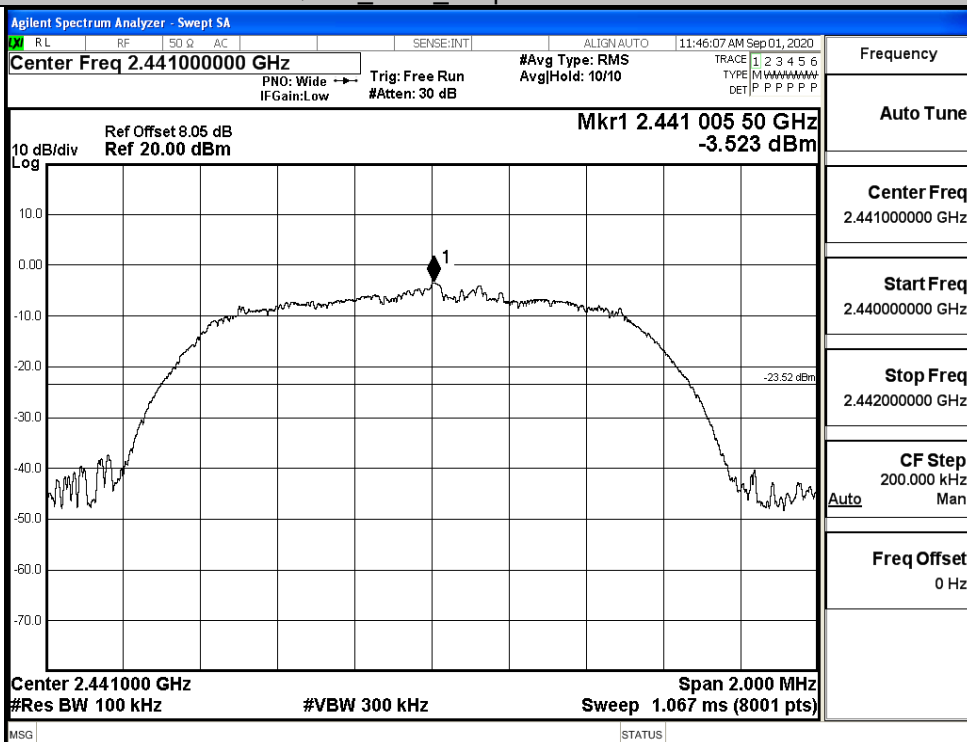


Puw

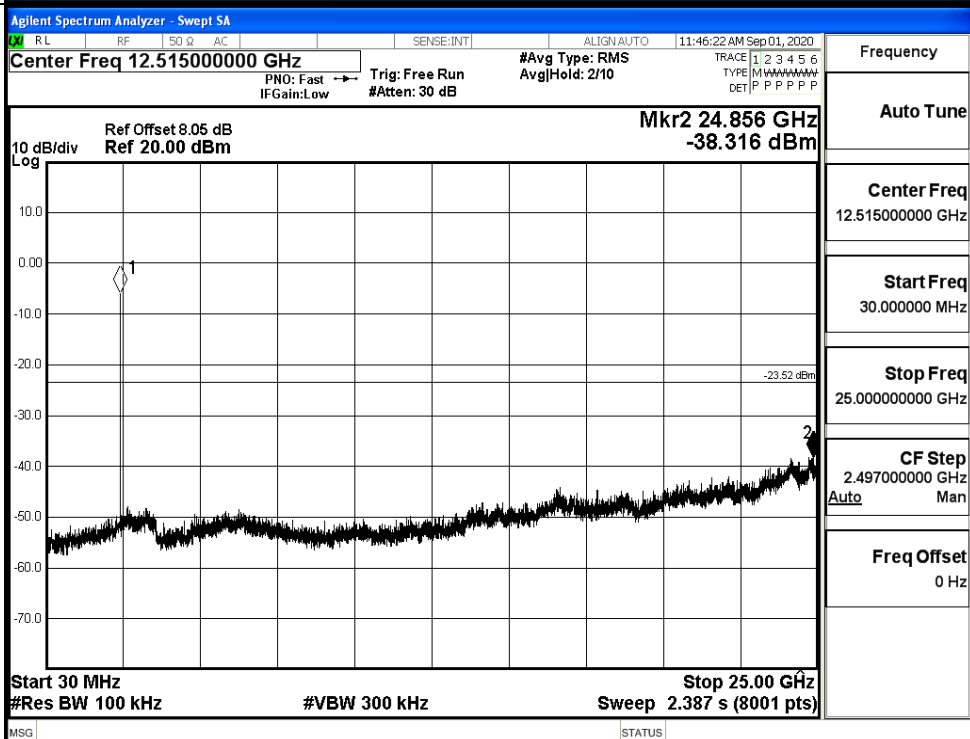


$\pi/4$ DQPSK_MCH_Graphs

Pref

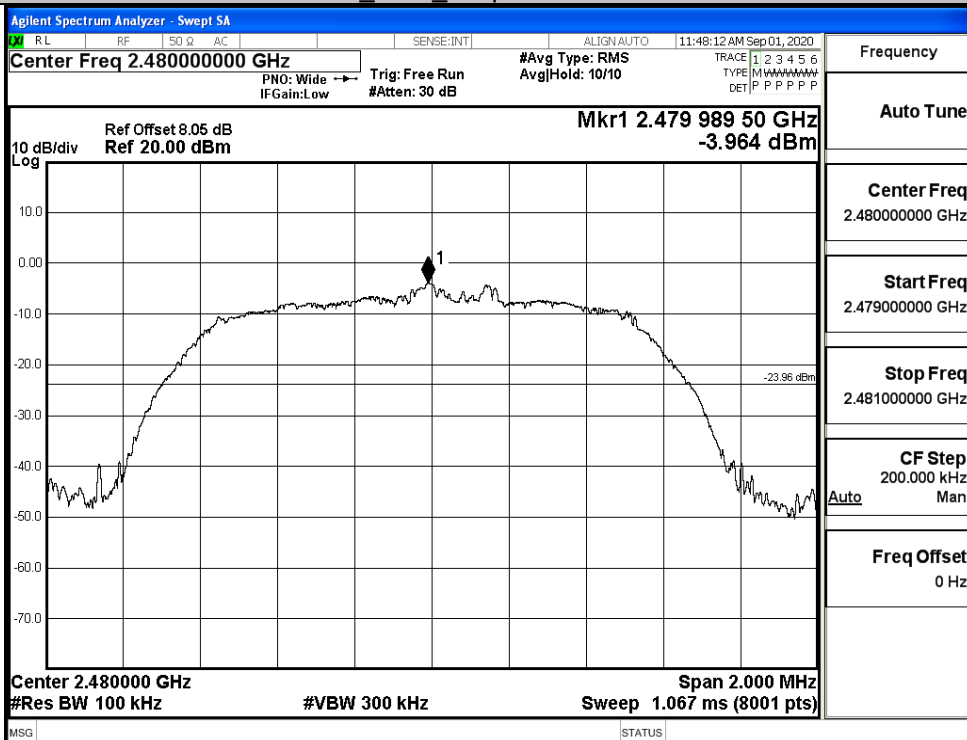


Puw

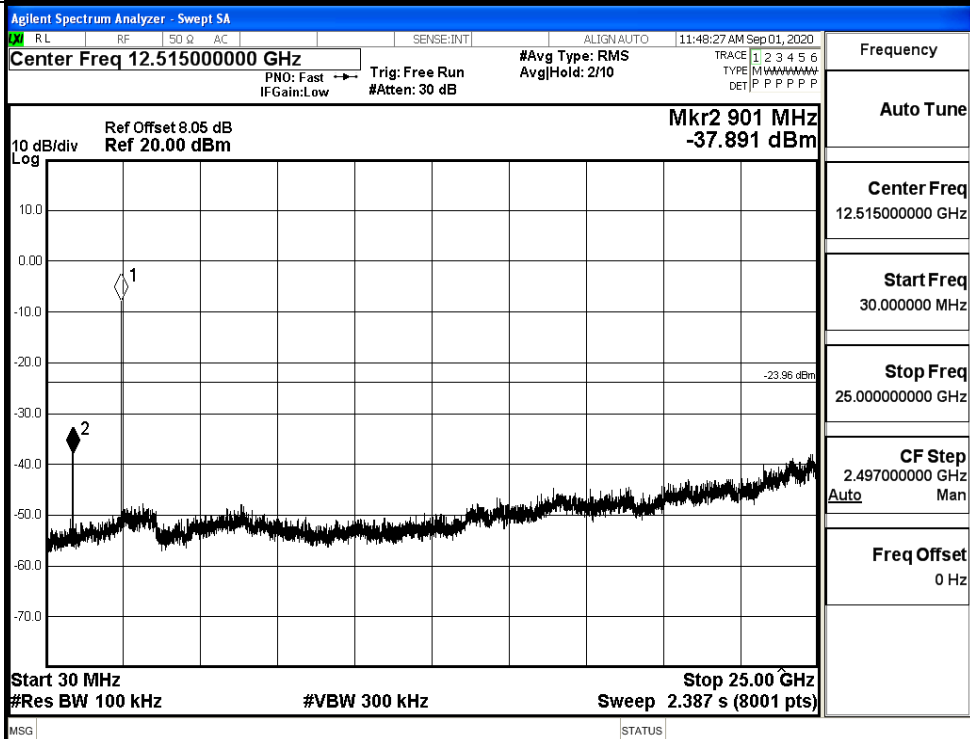


$\pi/4$ DQPSK_HCH_Graphs

Pref

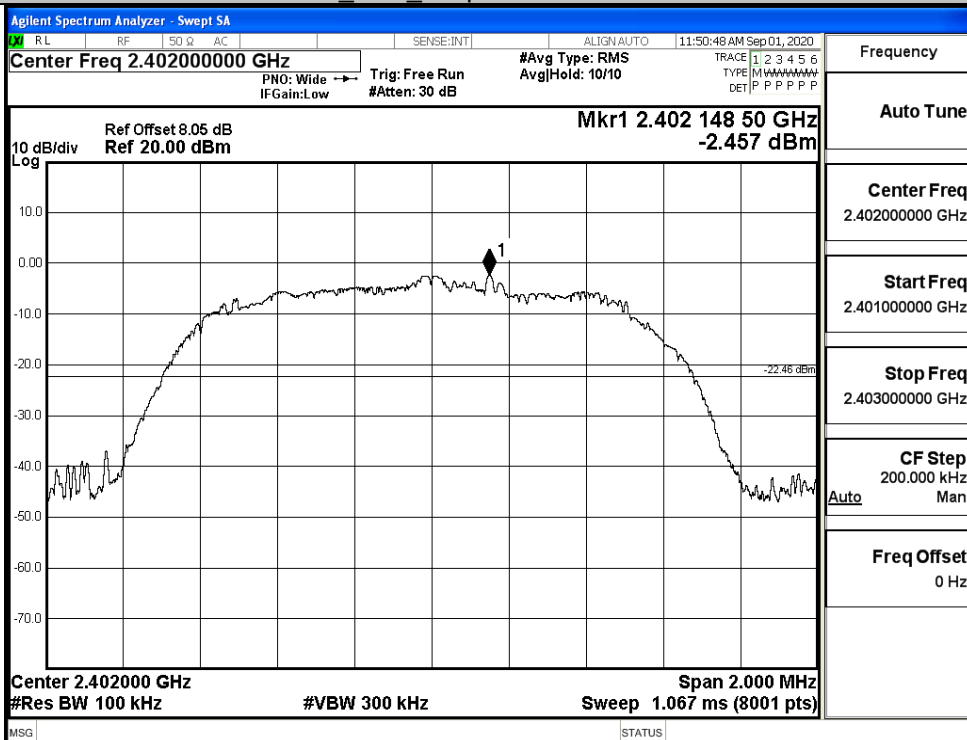


Puw

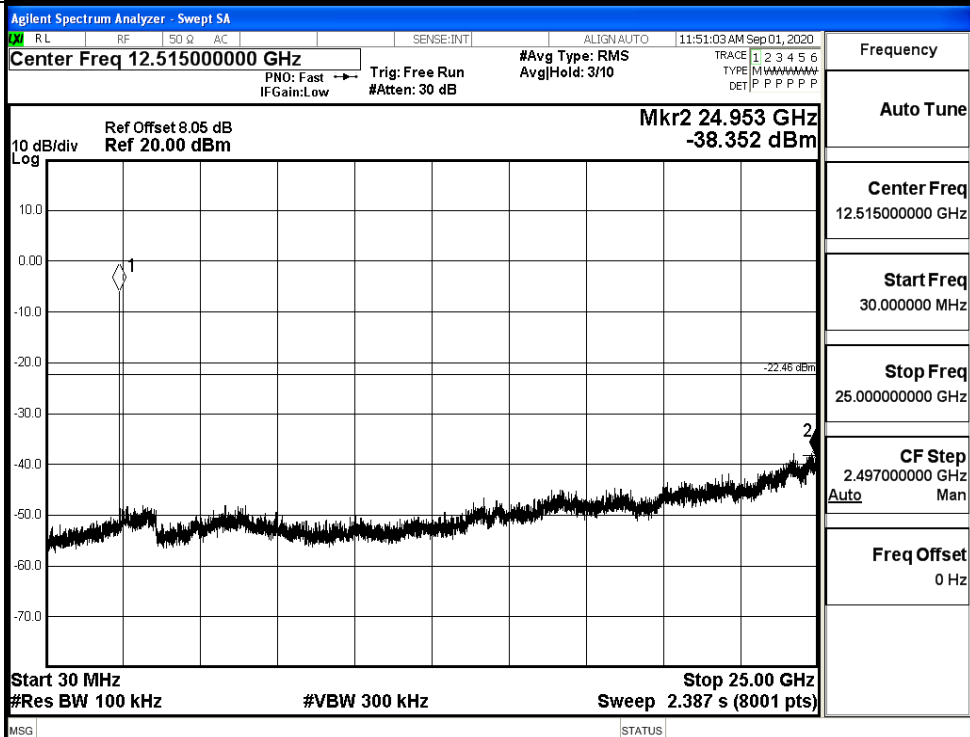


8DPSK_LCH_Graphs

Pref

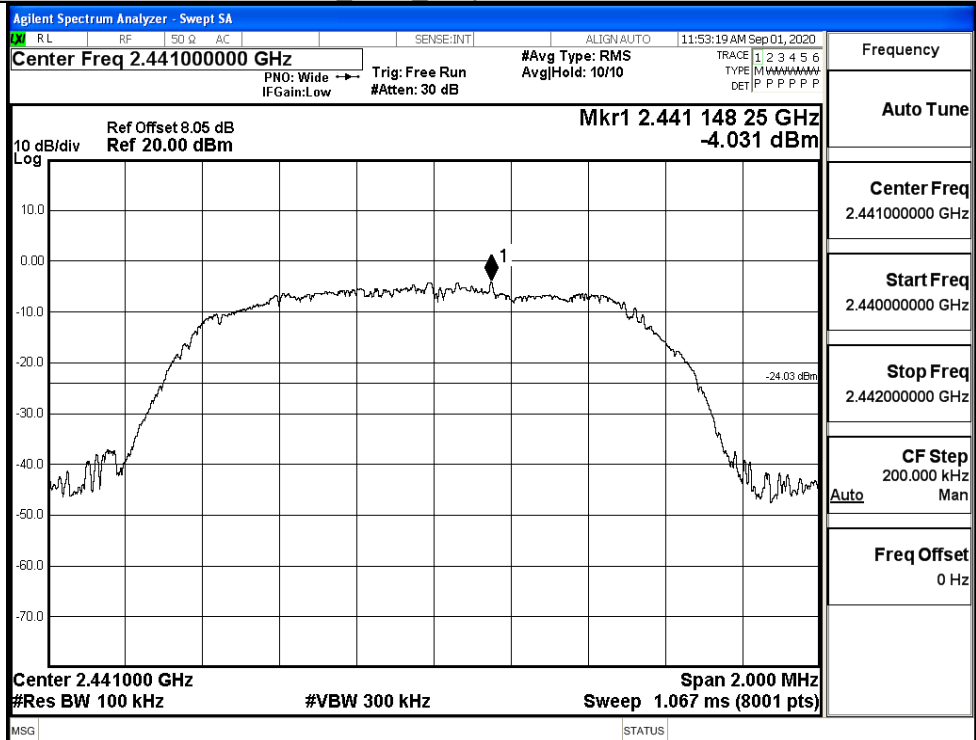


Puw

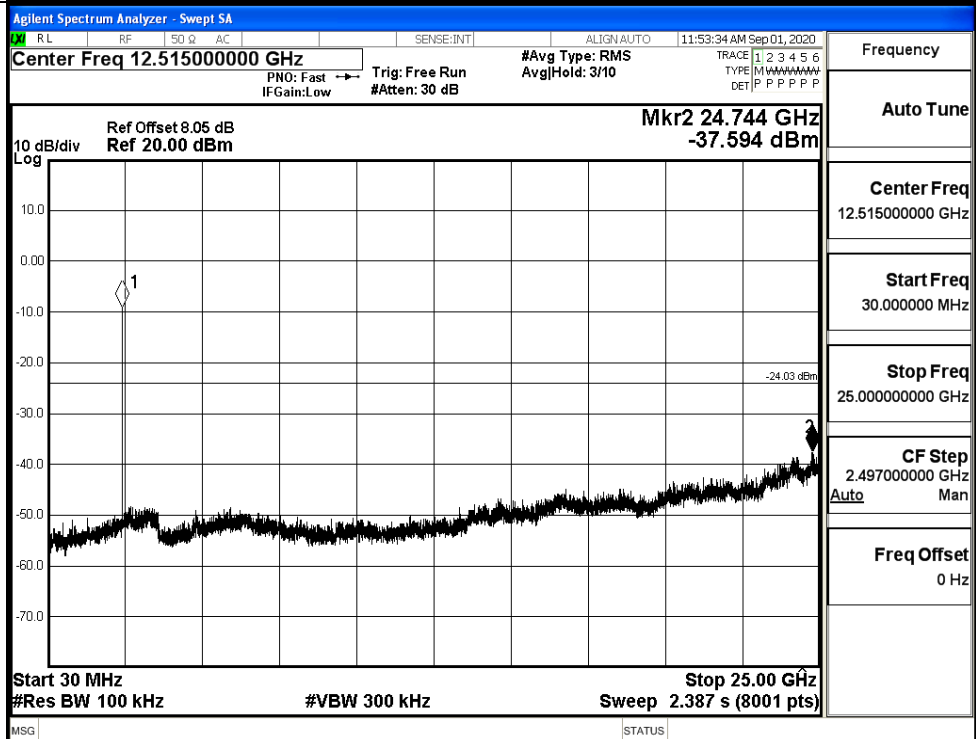


8DPSK_MCH_Graphs

Pref

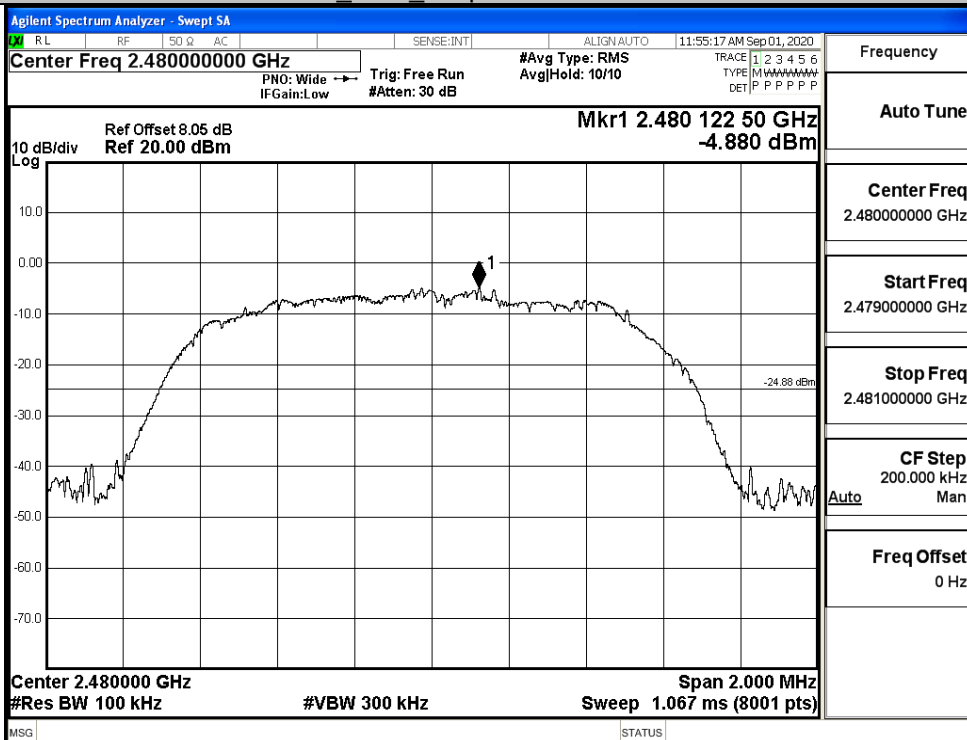


Puw

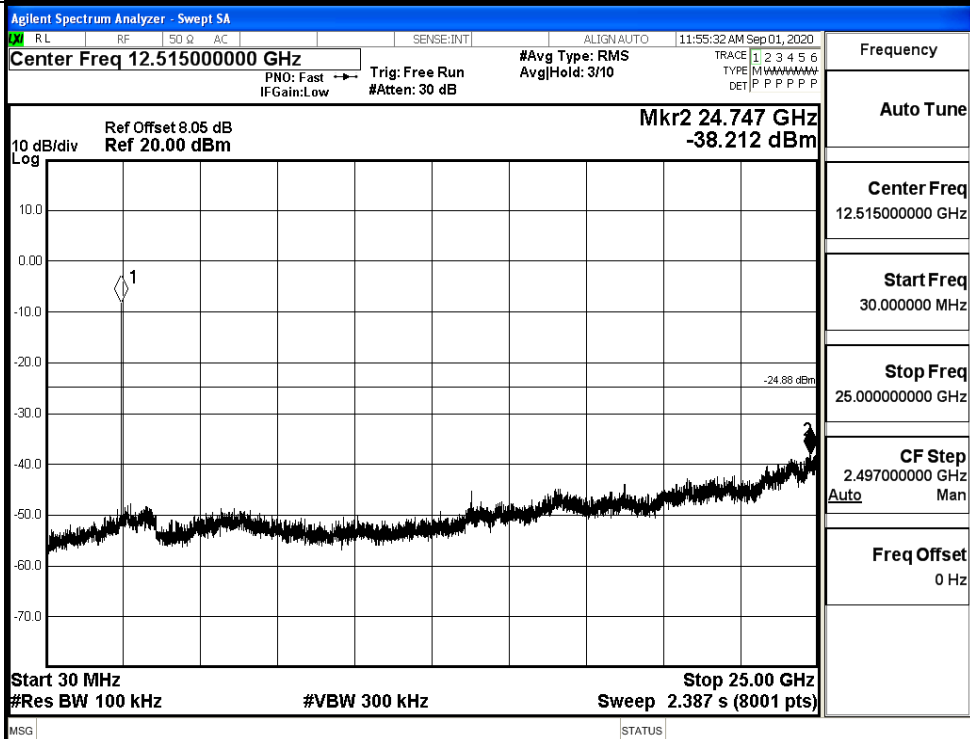


8DPSK_HCH_Graphs

Pref



Puw

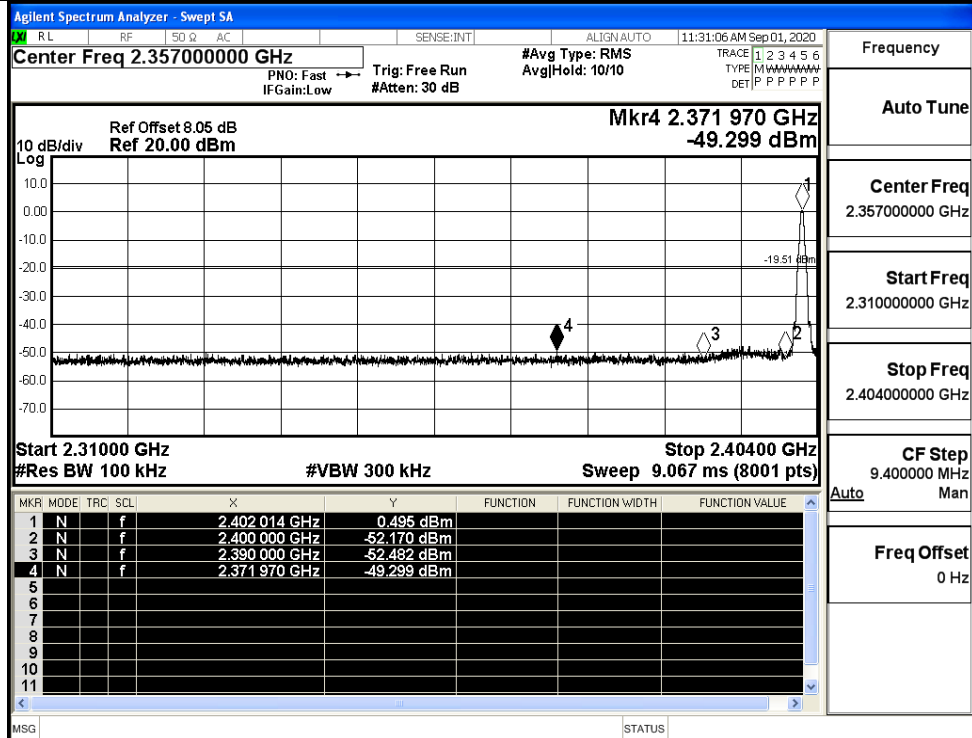


A.7 Band-edge for RF Conducted Emissions

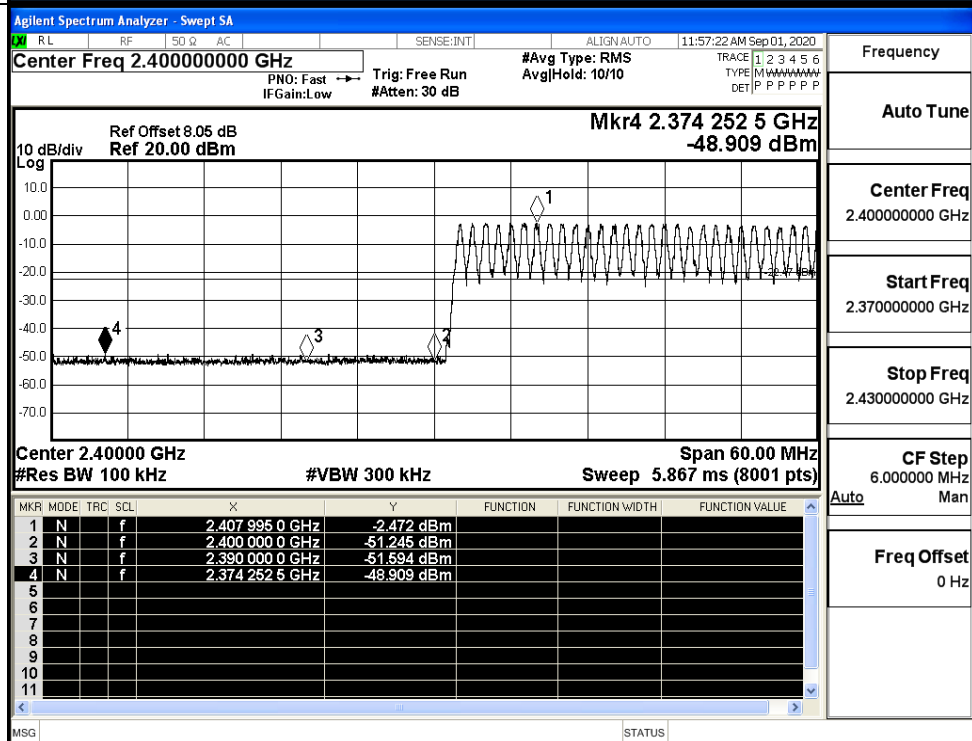
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.495	Off	-49.299	-19.51	PASS
			-2.472	On	-48.909	-22.47	PASS
	HCH	2480	-1.819	Off	-48.415	-21.82	PASS
			-3.523	On	-48.597	-23.52	PASS
$\pi/4$ DQPSK	LCH	2402	-7.582	Off	-49.181	-27.58	PASS
			-2.660	On	-48.280	-22.66	PASS
	HCH	2480	-4.356	Off	-48.759	-24.36	PASS
			-3.912	On	-48.709	-23.91	PASS
8DPSK	LCH	2402	-2.257	Off	-49.608	-22.26	PASS
			-2.436	On	-48.597	-22.44	PASS
	HCH	2480	-3.878	Off	-48.402	-23.88	PASS
			-3.326	On	-48.313	-23.33	PASS

Test Graphs

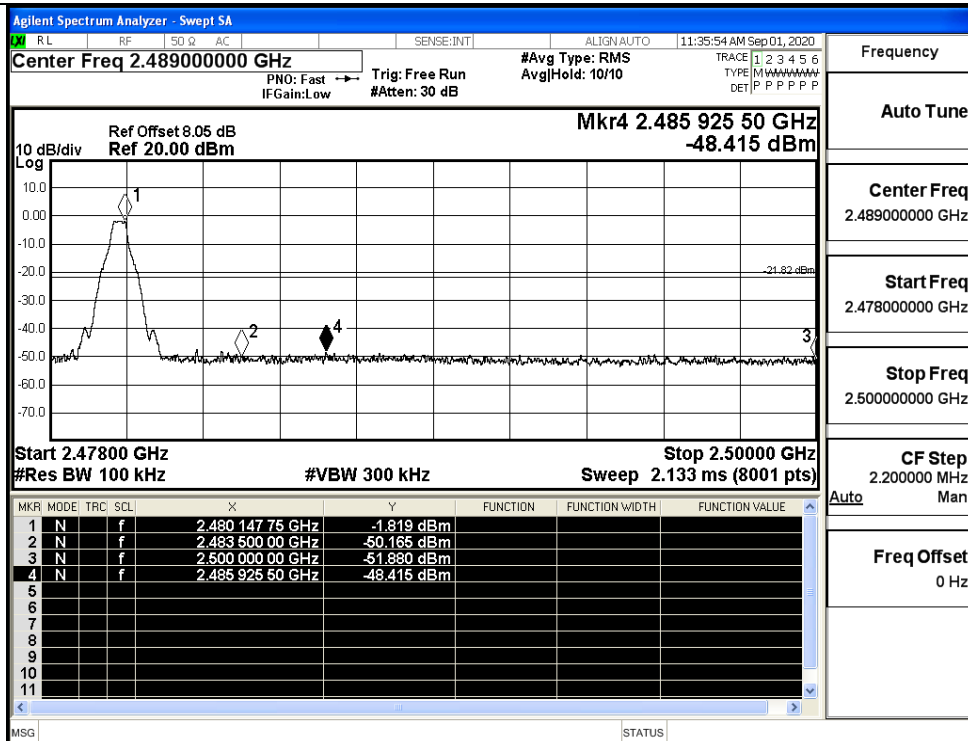
GFSK/LCH/No Hop



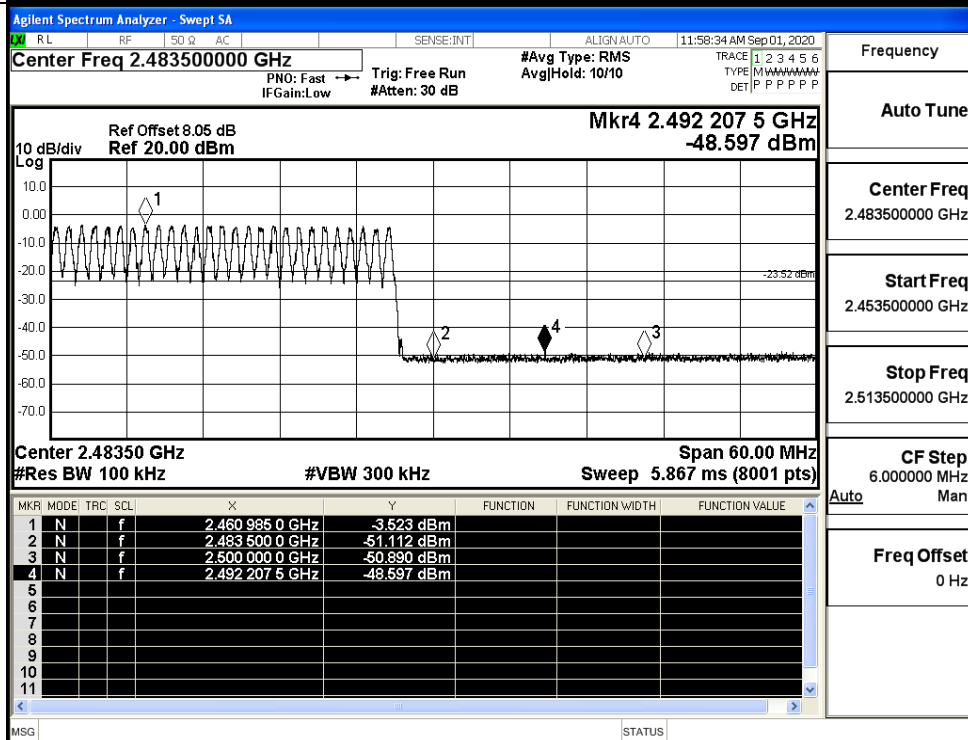
GFSK/LCH/Hop



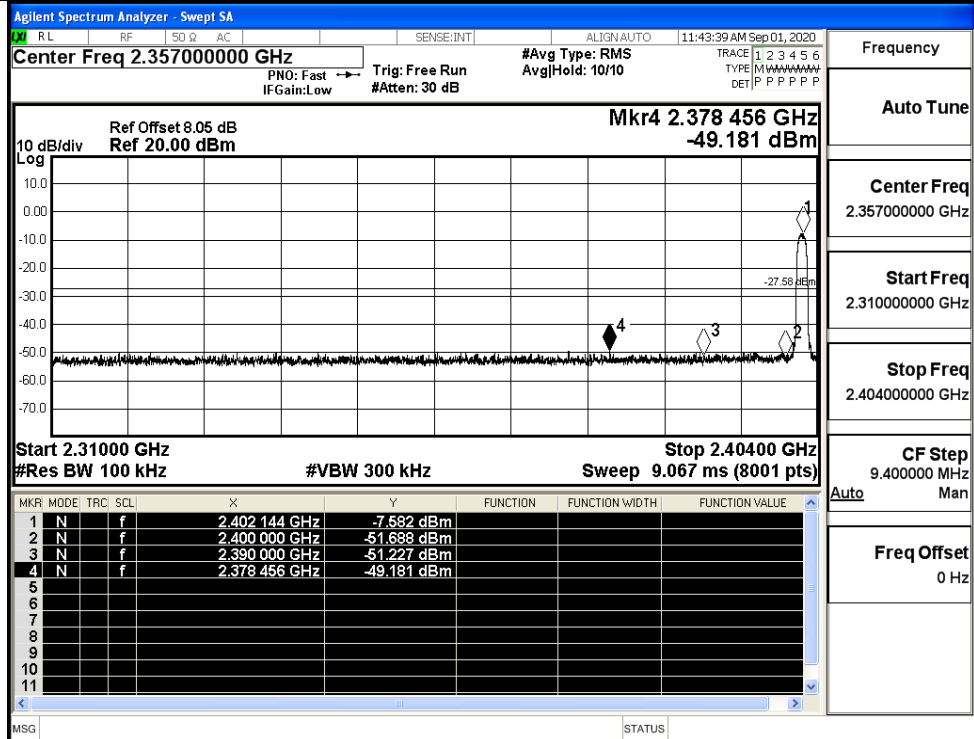
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

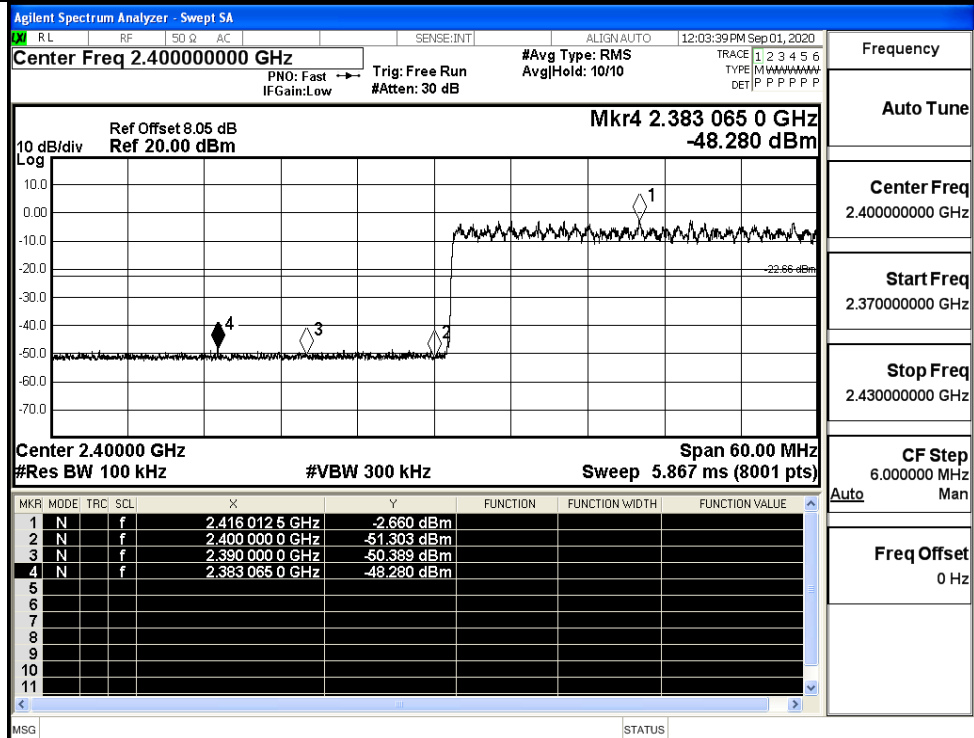
Start Freq
2.310000000 GHz

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

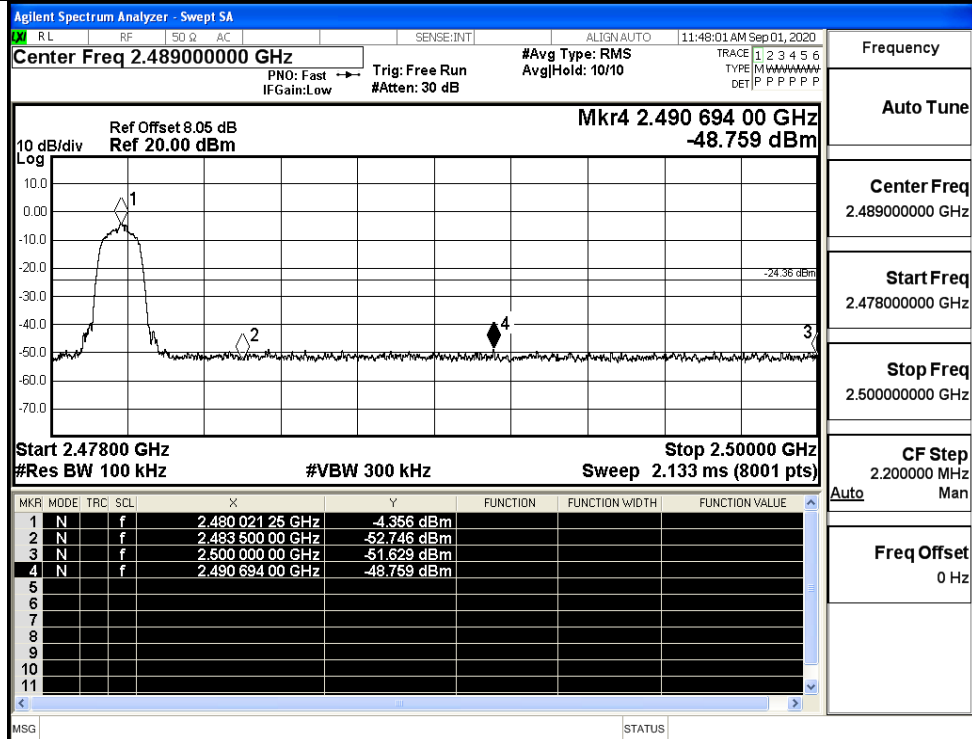
Start Freq
2.370000000 GHz

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

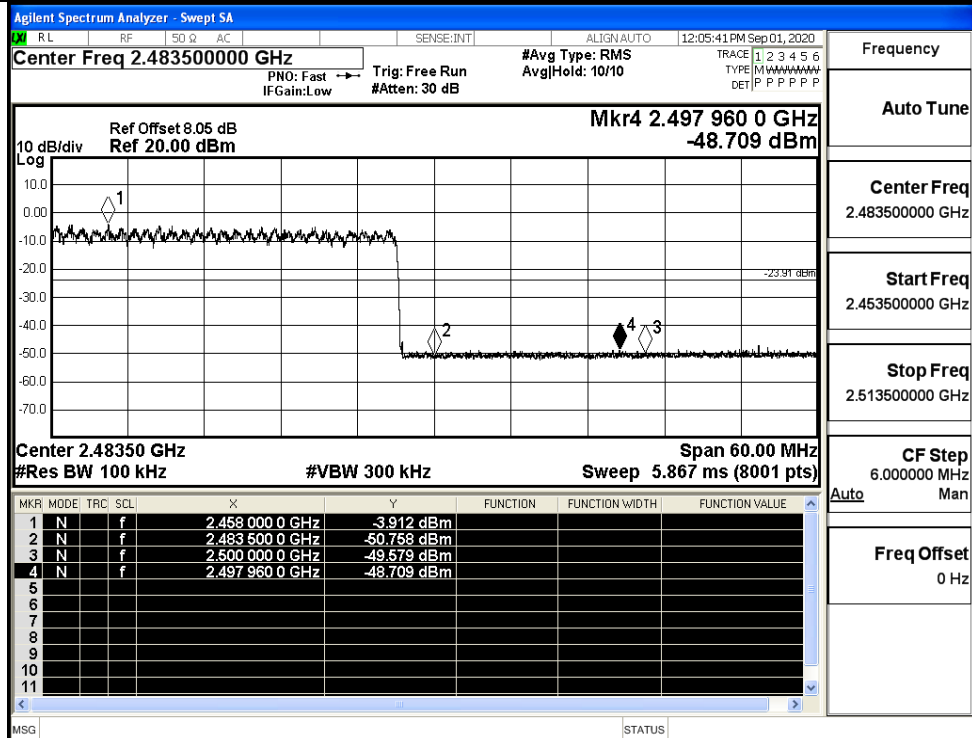
Start Freq
2.478000000 GHz

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

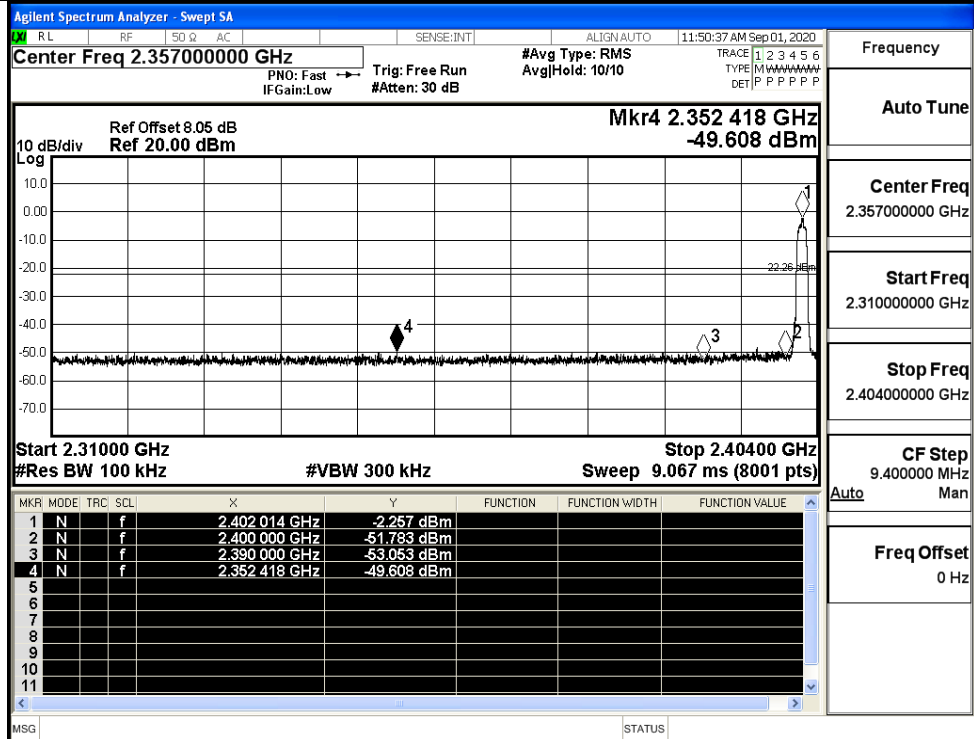
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

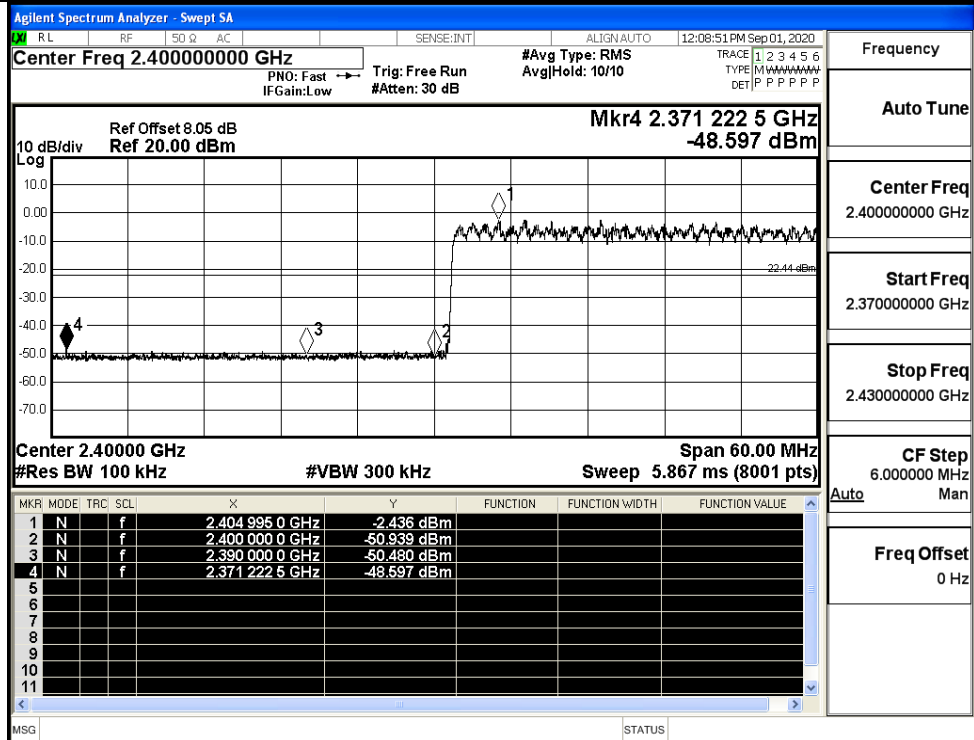
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

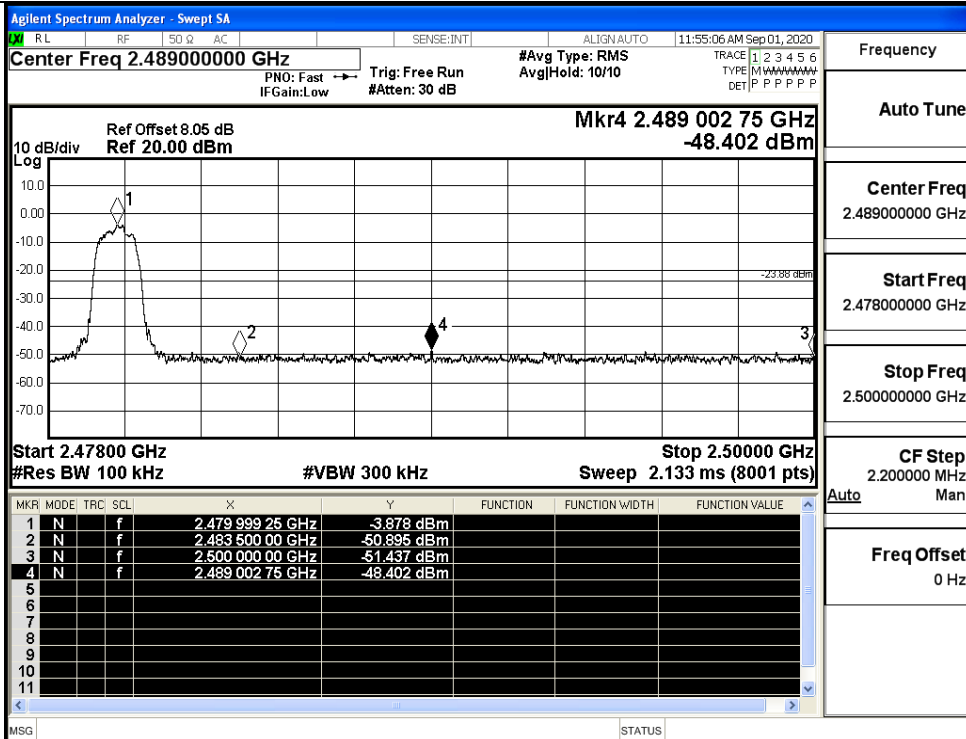
8DPSK/LCH/No Hop



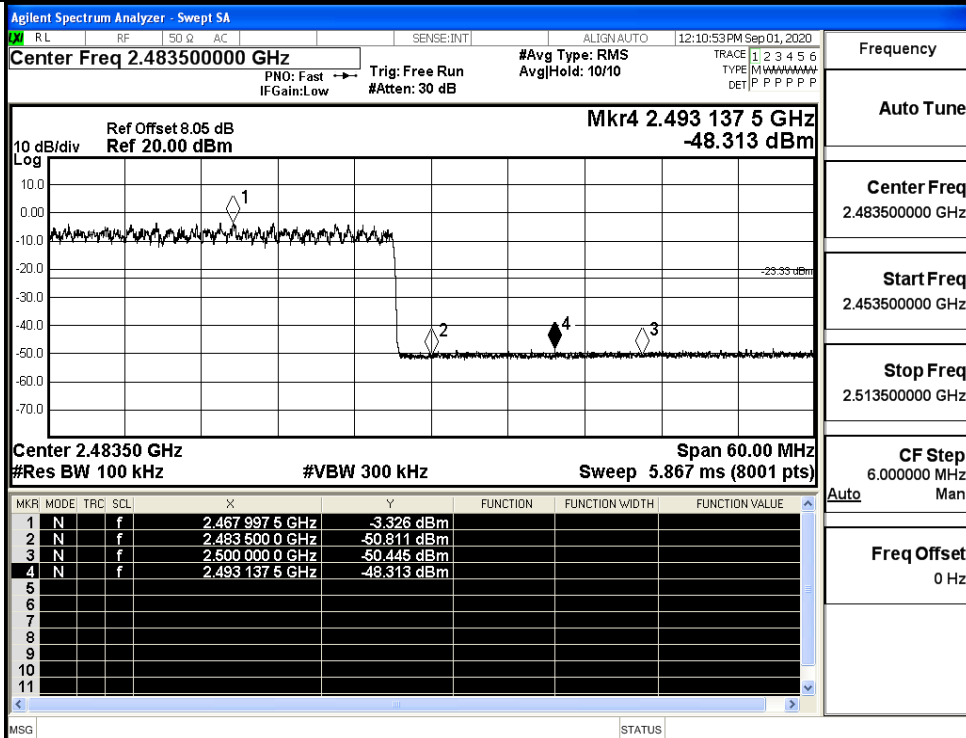
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



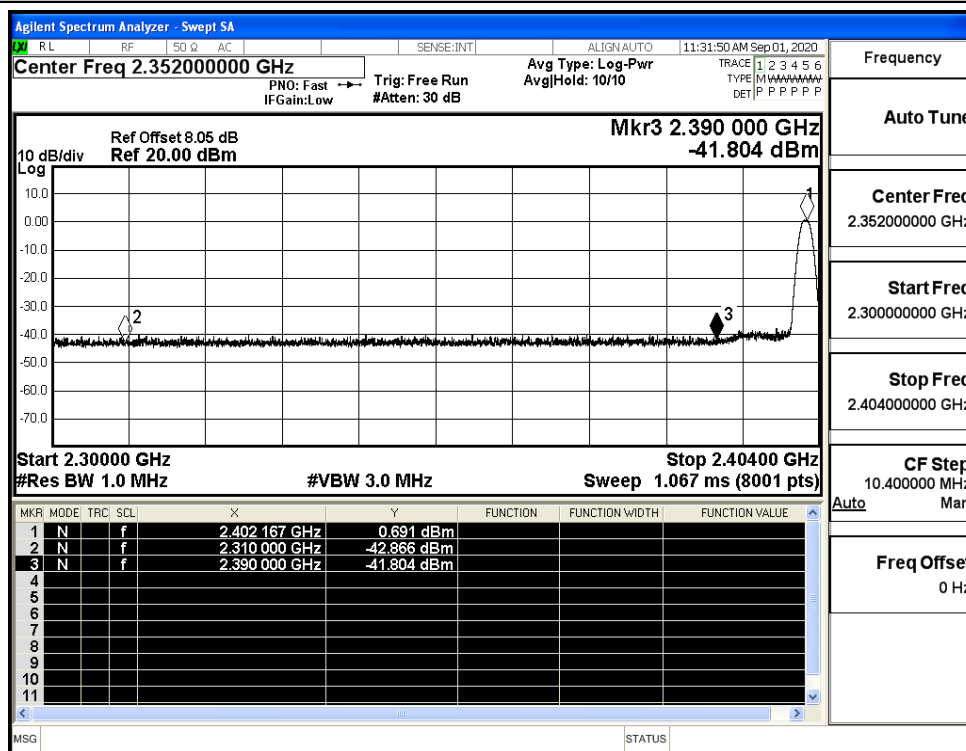
8DPSK/HCH/Hop



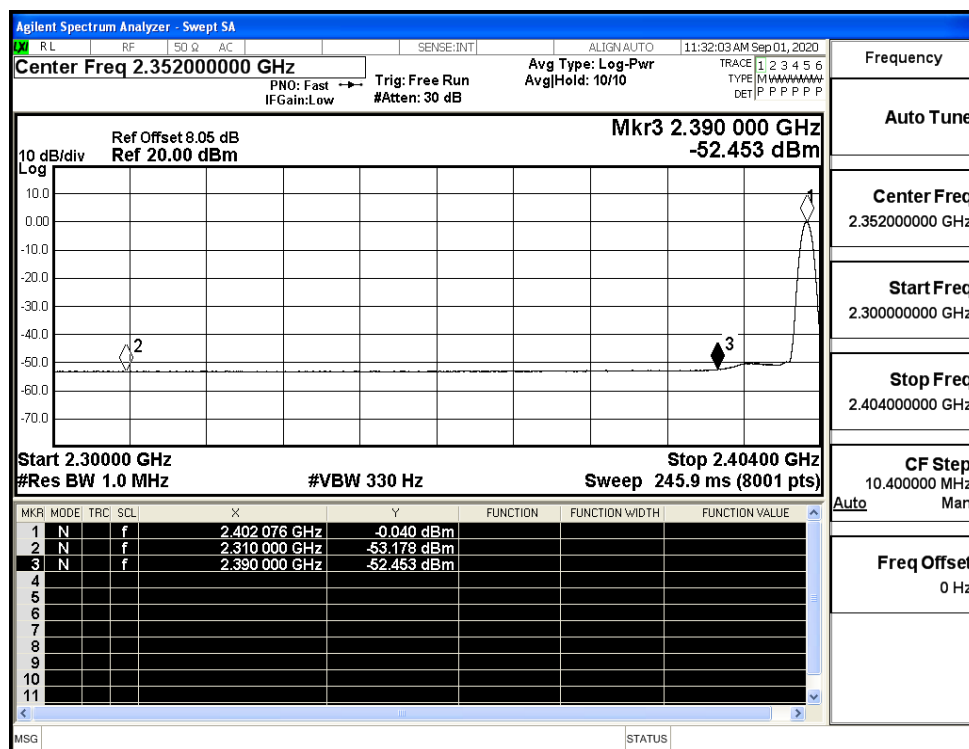
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.87	-0.5	0	51.86	PEAK	74	PASS
	Off	2310.0	-53.18	-0.5	0	41.55	AV	54	PASS
	Off	2390.0	-41.80	-0.5	0	52.93	PEAK	74	PASS
	Off	2390.0	-52.45	-0.5	0	42.28	AV	54	PASS
	Off	2483.5	-40.77	-0.5	0	53.96	PEAK	74	PASS
	Off	2483.5	-51.41	-0.5	0	43.32	AV	54	PASS
	Off	2500.0	-39.25	-0.5	0	55.48	PEAK	74	PASS
	Off	2500.0	-52.23	-0.5	0	42.50	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.07	-0.5	0	51.66	PEAK	74	PASS
	Off	2310.0	-53.22	-0.5	0	41.51	AV	54	PASS
	Off	2390.0	-42.47	-0.5	0	52.26	PEAK	74	PASS
	Off	2390.0	-52.89	-0.5	0	41.84	AV	54	PASS
	Off	2483.5	-42.45	-0.5	0	52.28	PEAK	74	PASS
	Off	2483.5	-52.01	-0.5	0	42.72	AV	54	PASS
	Off	2500.0	-42.08	-0.5	0	52.65	PEAK	74	PASS
	Off	2500.0	-52.21	-0.5	0	42.52	AV	54	PASS
8DPSK	Off	2310.0	-41.52	-0.5	0	53.21	PEAK	74	PASS
	Off	2310.0	-53.17	-0.5	0	41.56	AV	54	PASS
	Off	2390.0	-42.46	-0.5	0	52.27	PEAK	74	PASS
	Off	2390.0	-52.78	-0.5	0	41.95	AV	54	PASS
	Off	2483.5	-40.80	-0.5	0	53.93	PEAK	74	PASS
	Off	2483.5	-51.97	-0.5	0	42.76	AV	54	PASS
	Off	2500.0	-42.63	-0.5	0	52.10	PEAK	74	PASS
	Off	2500.0	-52.12	-0.5	0	42.61	AV	54	PASS

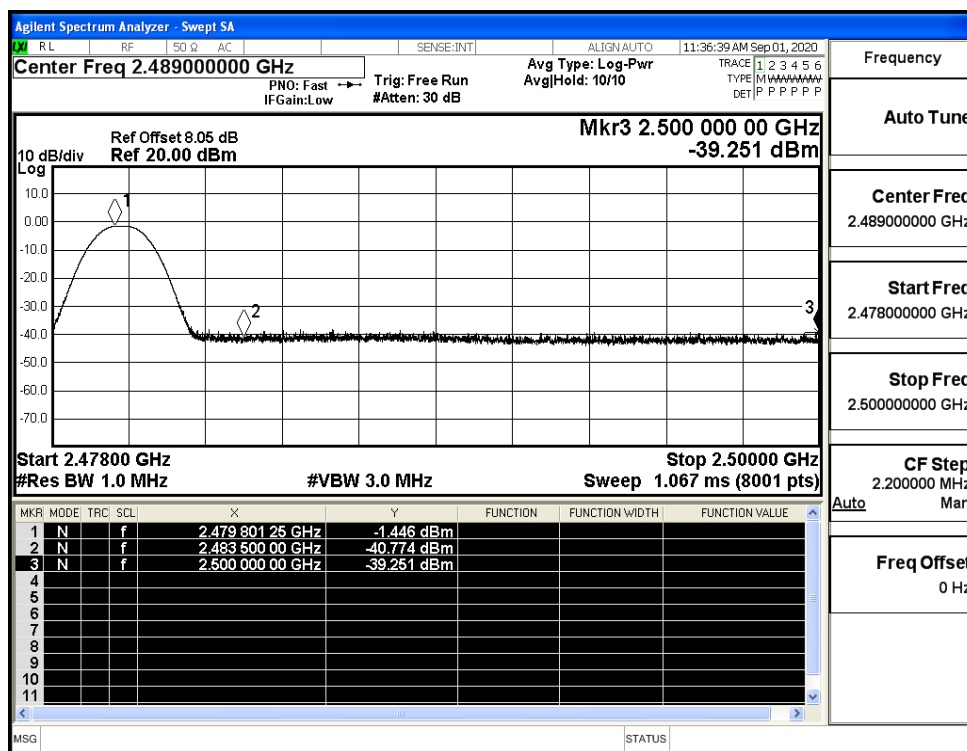
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



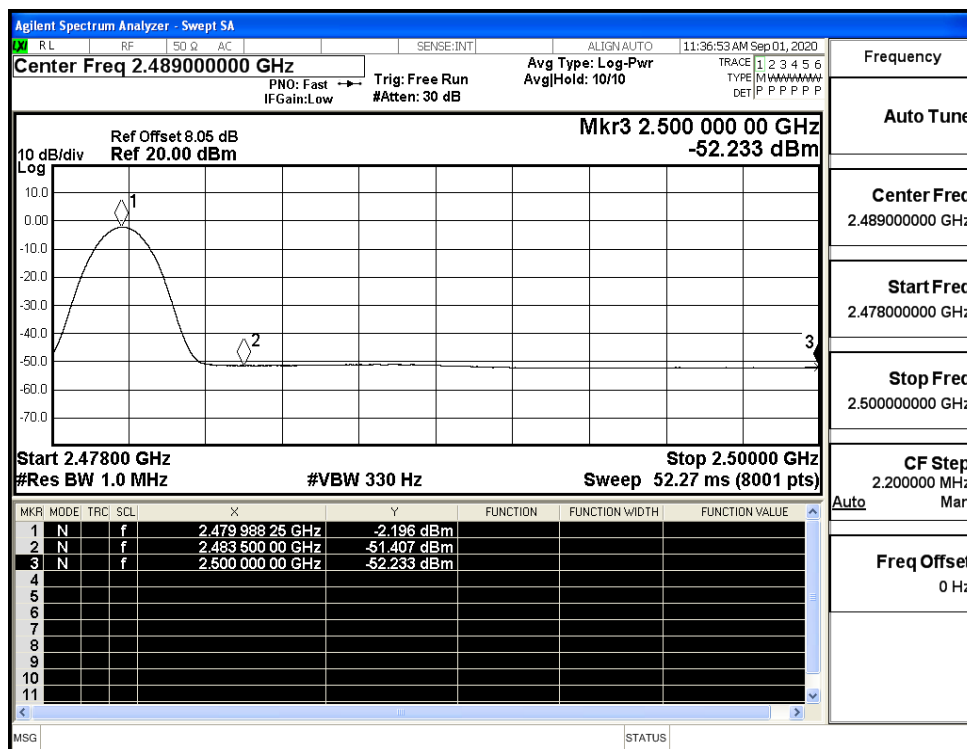
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

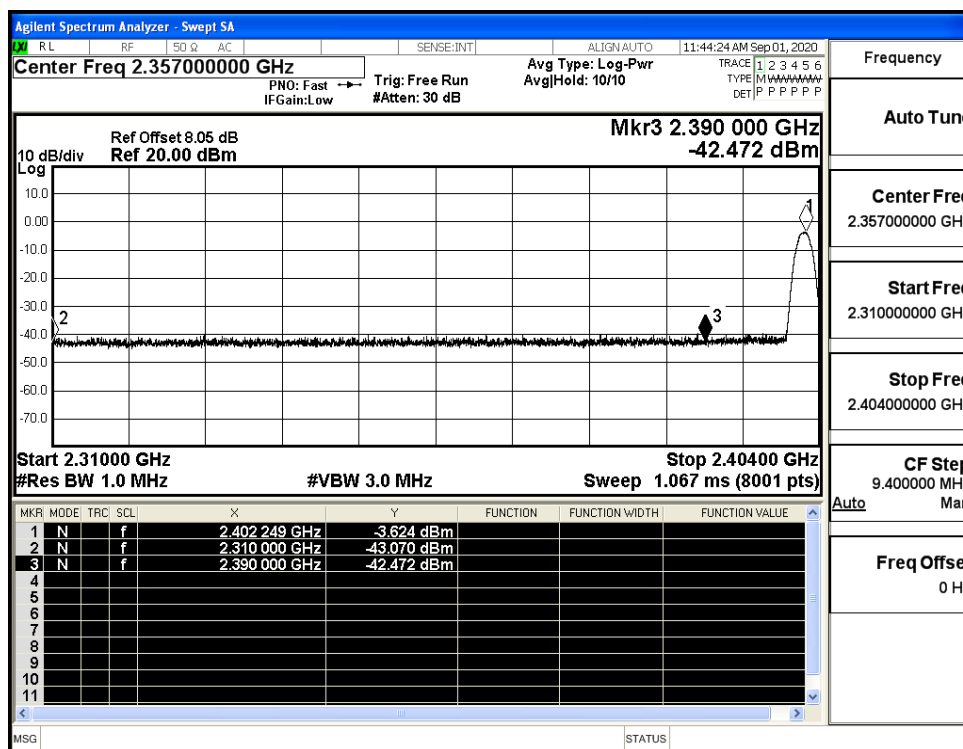
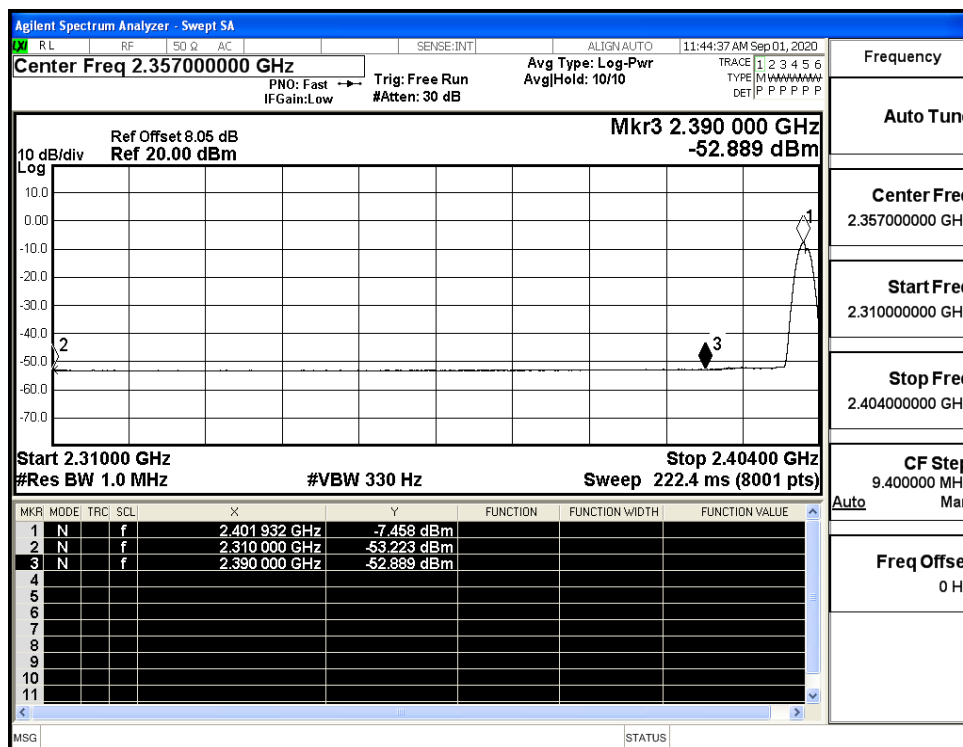


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

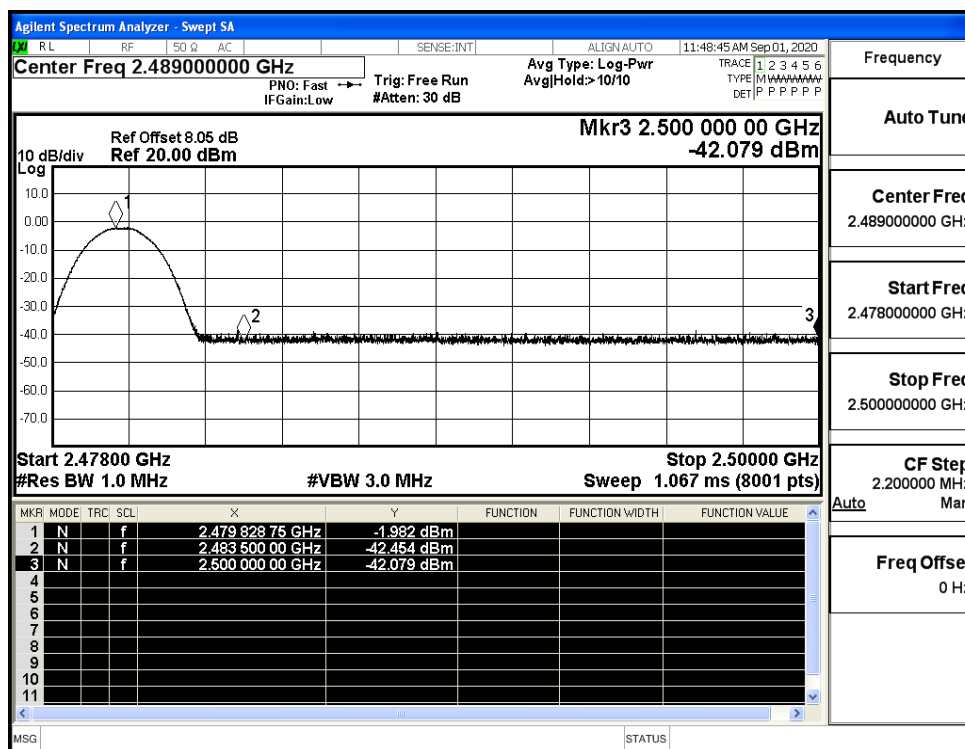


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

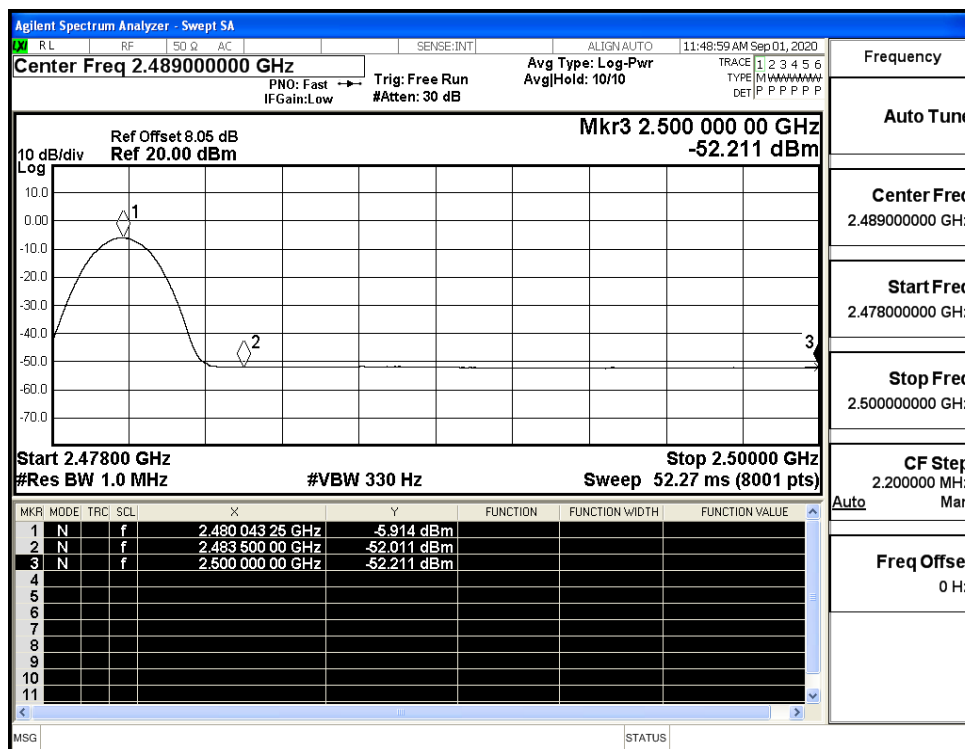


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

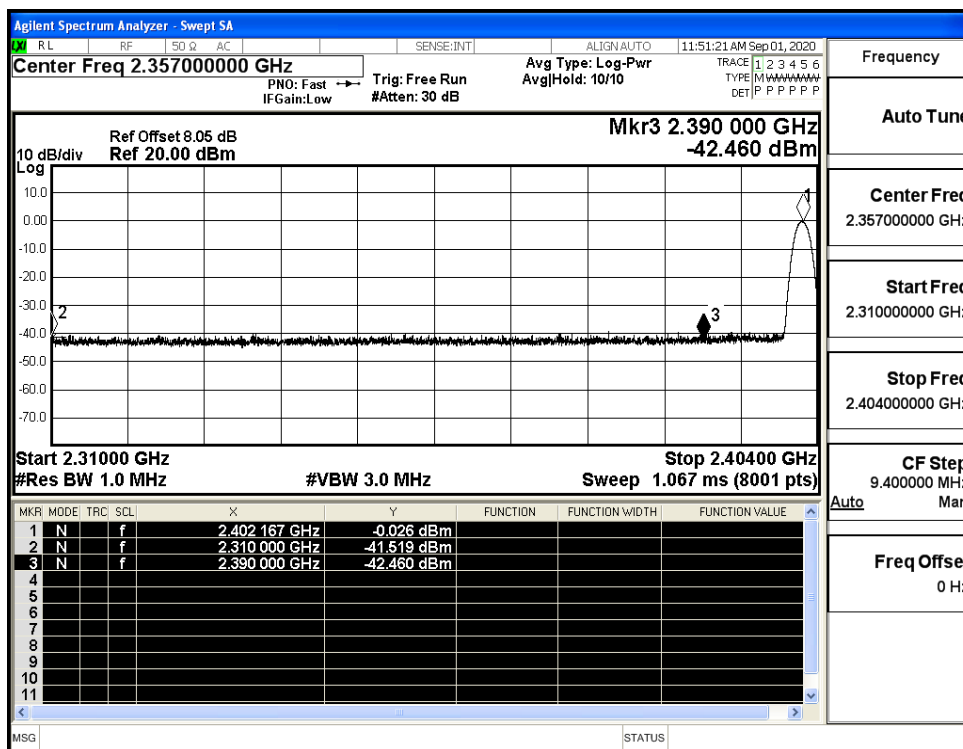
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



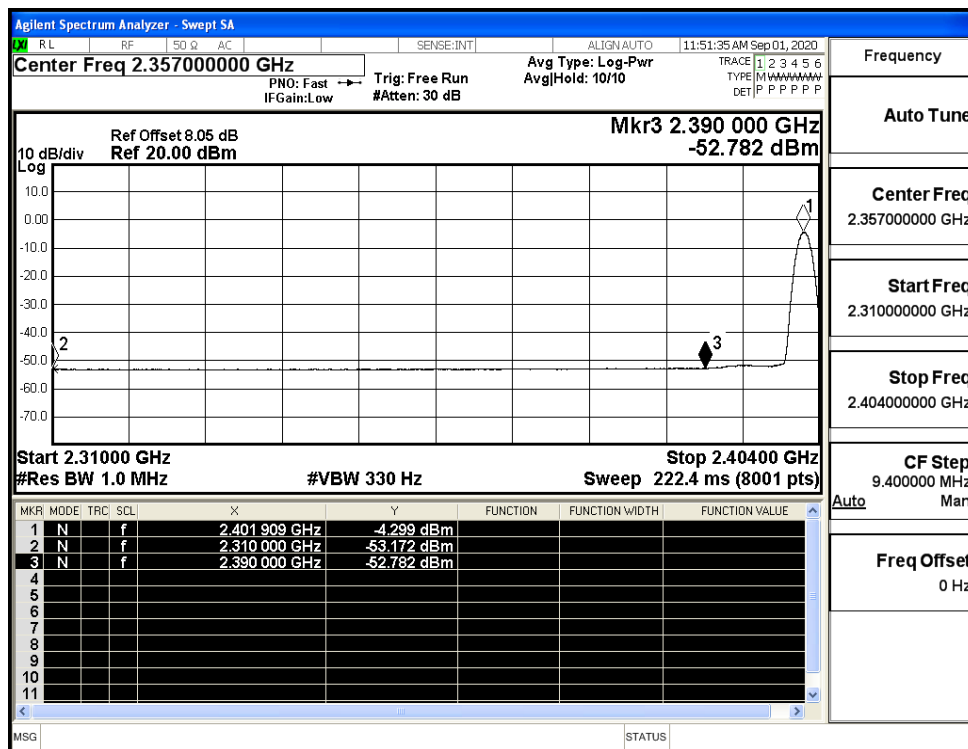
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



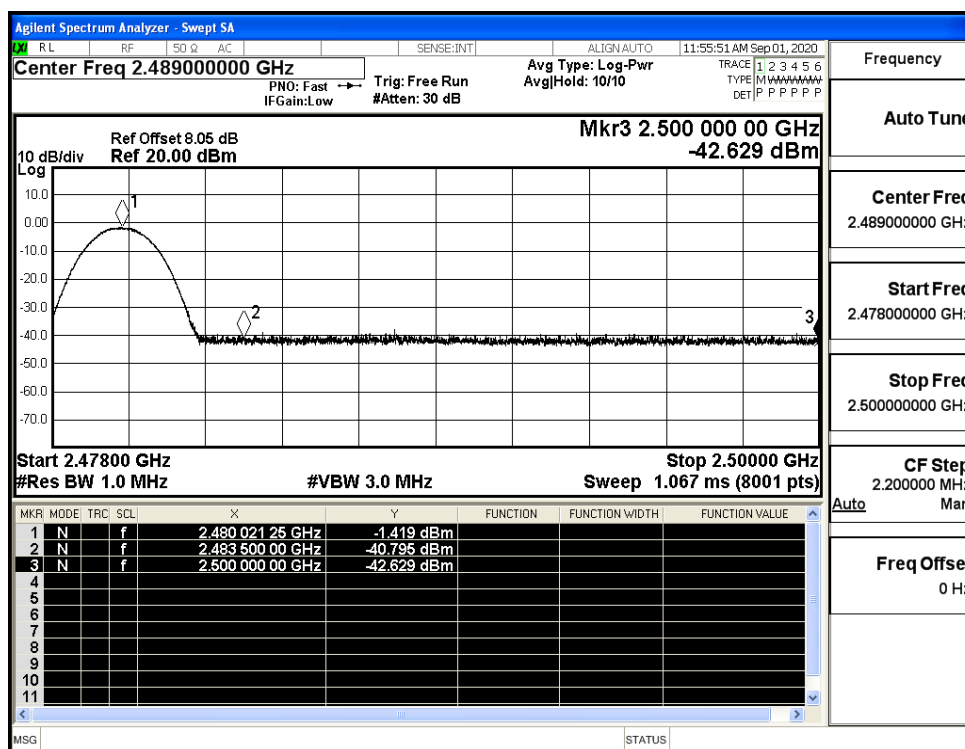
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

