

Appendix A

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

Product Name: HyFlip
Trade Mark: Hyundai
Test Model: HTLF14INC4Z1SSG

Environmental Conditions

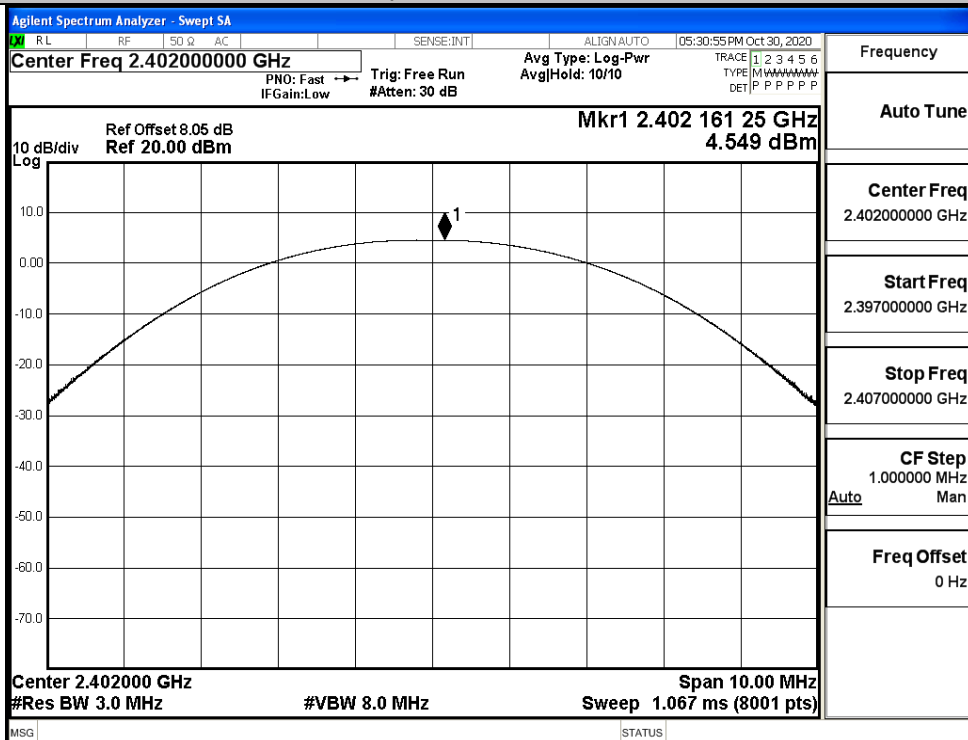
Temperature:	24.2 ° C
Relative Humidity:	53.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Jenny Wu
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

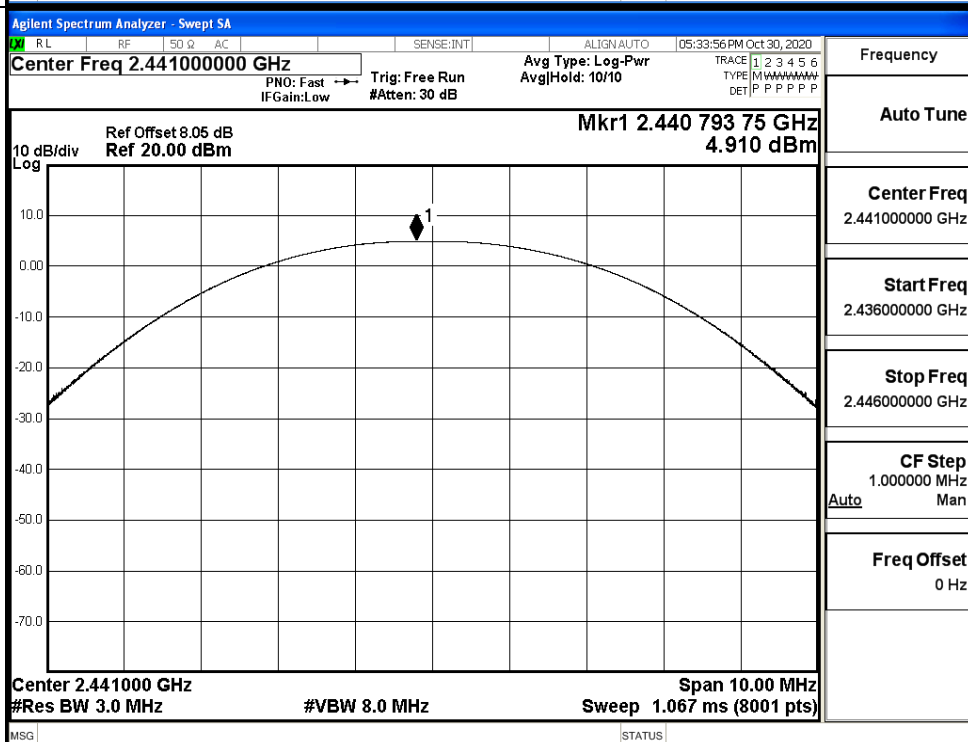
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.549	30	PASS
	MCH	4.910	30	PASS
	HCH	4.347	30	PASS
$\pi/4$ DQPSK	LCH	1.014	21	PASS
	MCH	1.472	21	PASS
	HCH	0.931	21	PASS
8DPSK	LCH	1.263	21	PASS
	MCH	1.748	21	PASS
	HCH	1.190	21	PASS

Test Graphs

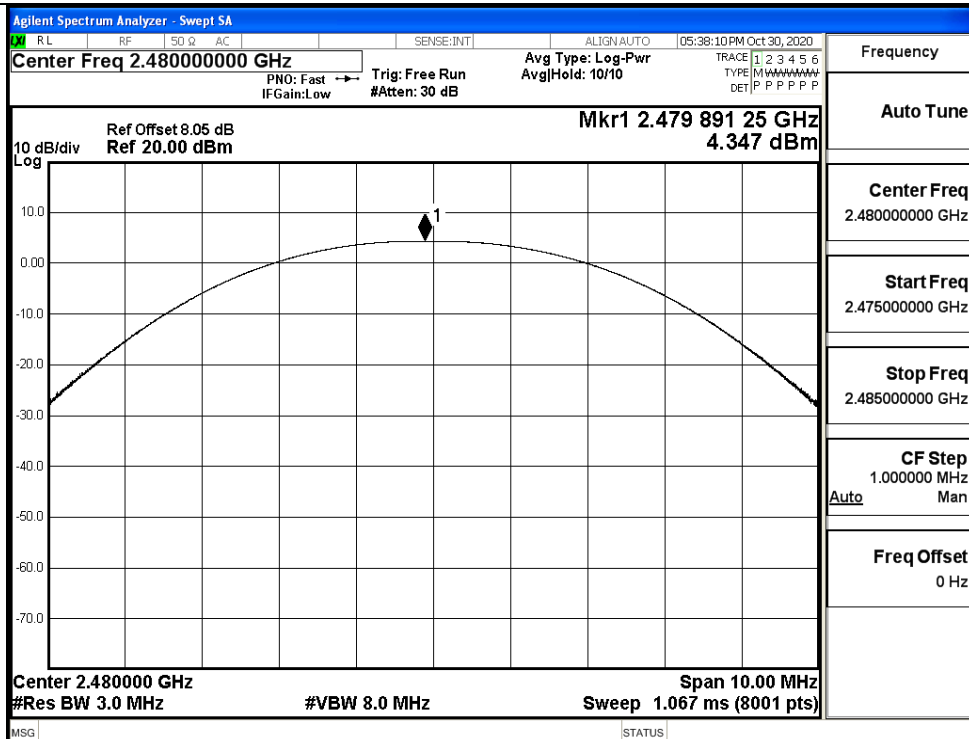
GFSK/LCH



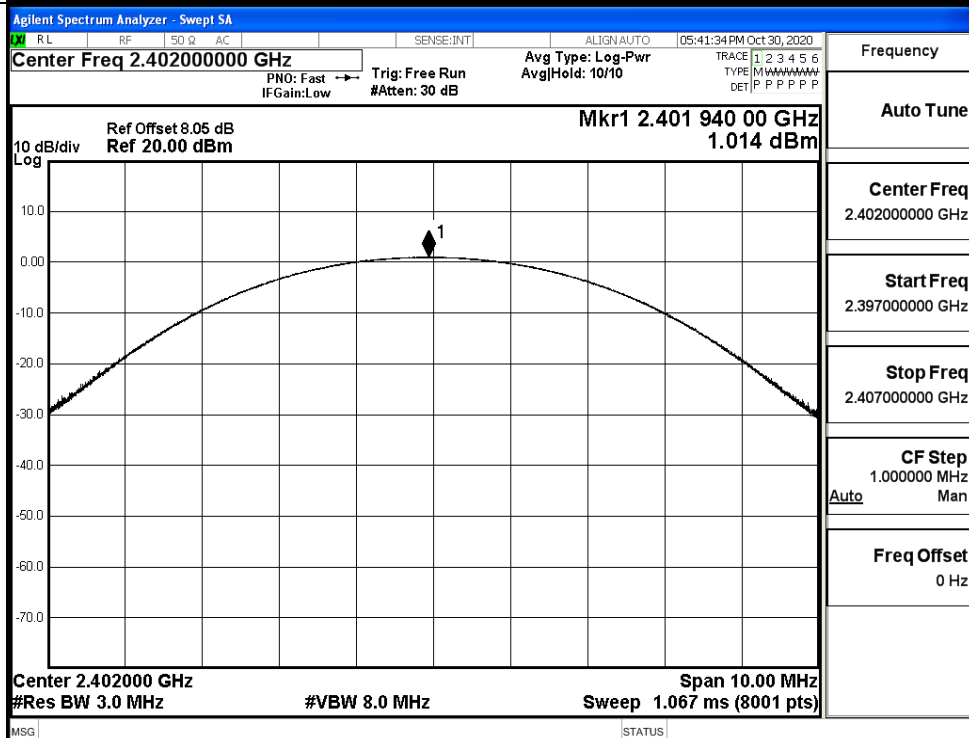
GFSK/MCH

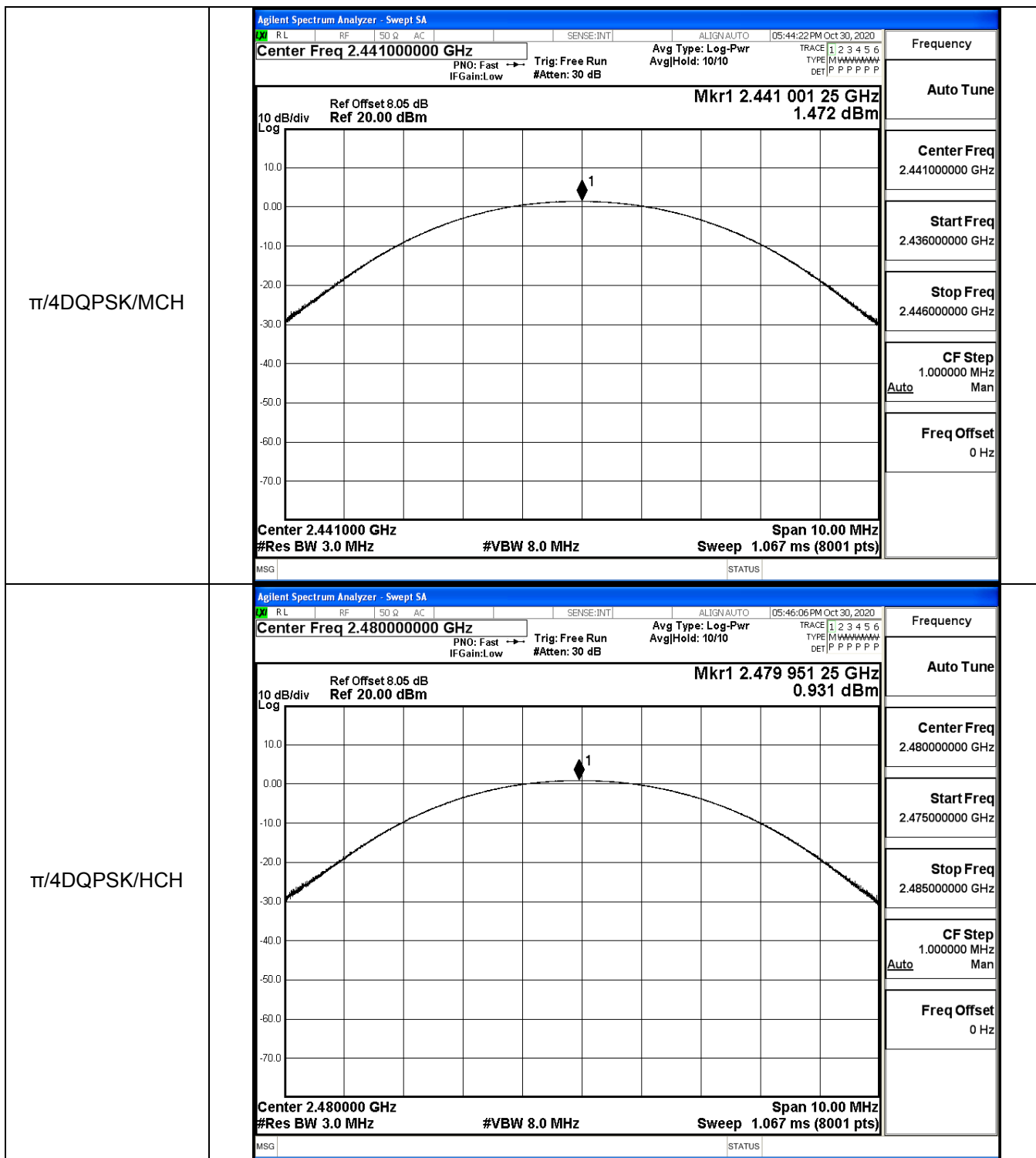


GFSK/HCH

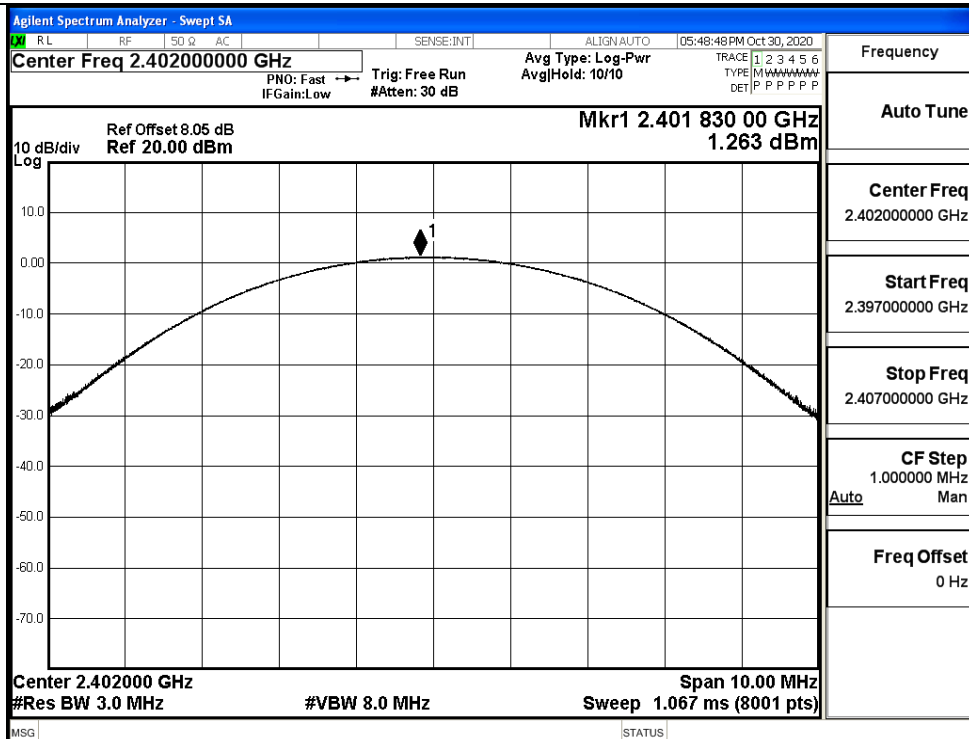


$\pi/4$ DQPSK/LCH

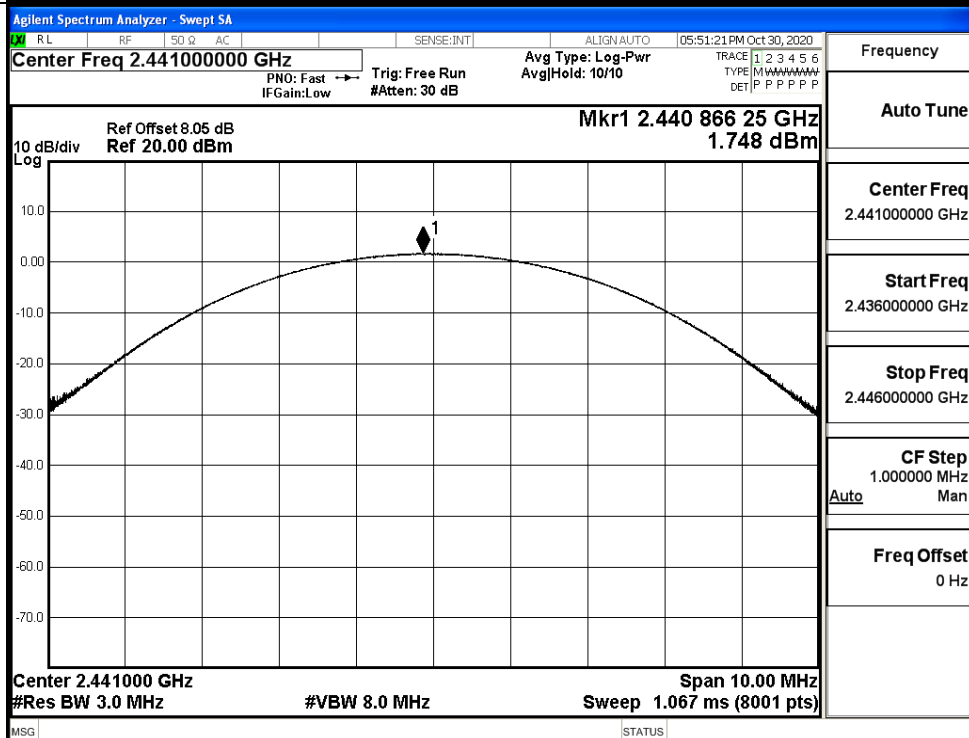




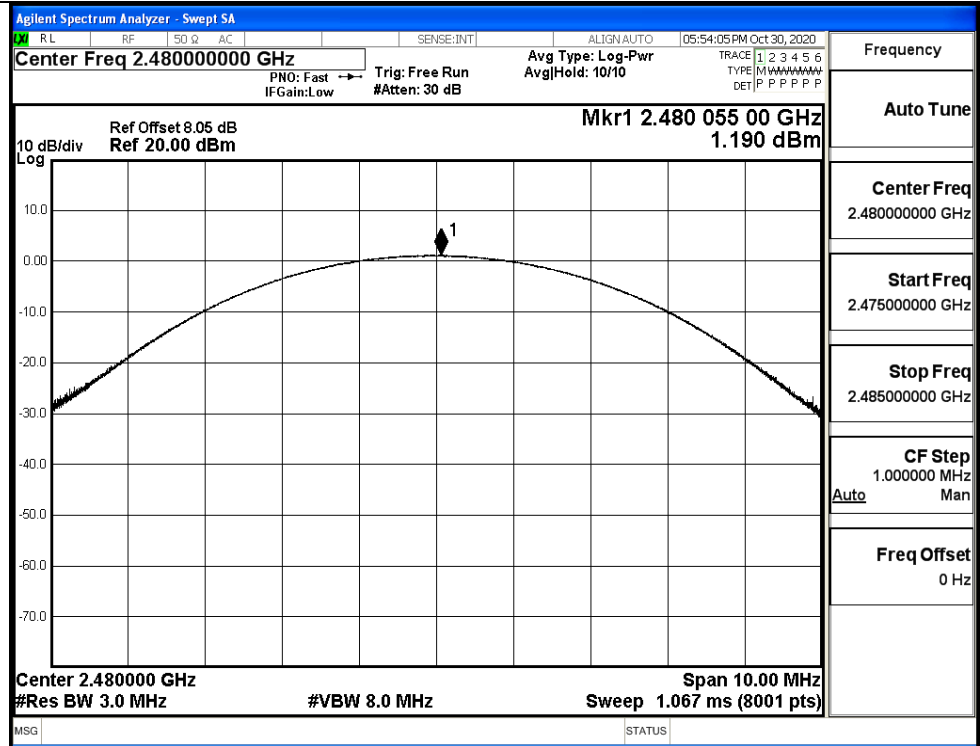
8DPSK/LCH



8DPSK/MCH



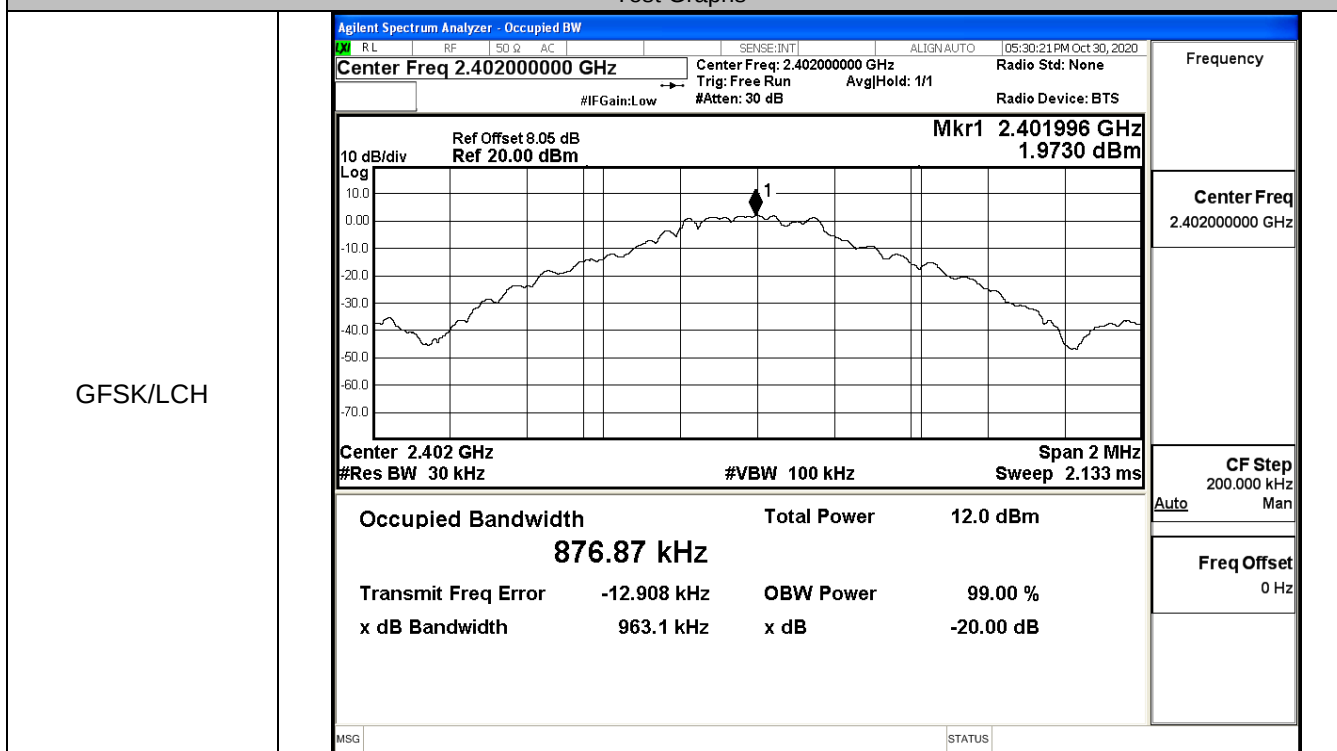
8DPSK/HCH



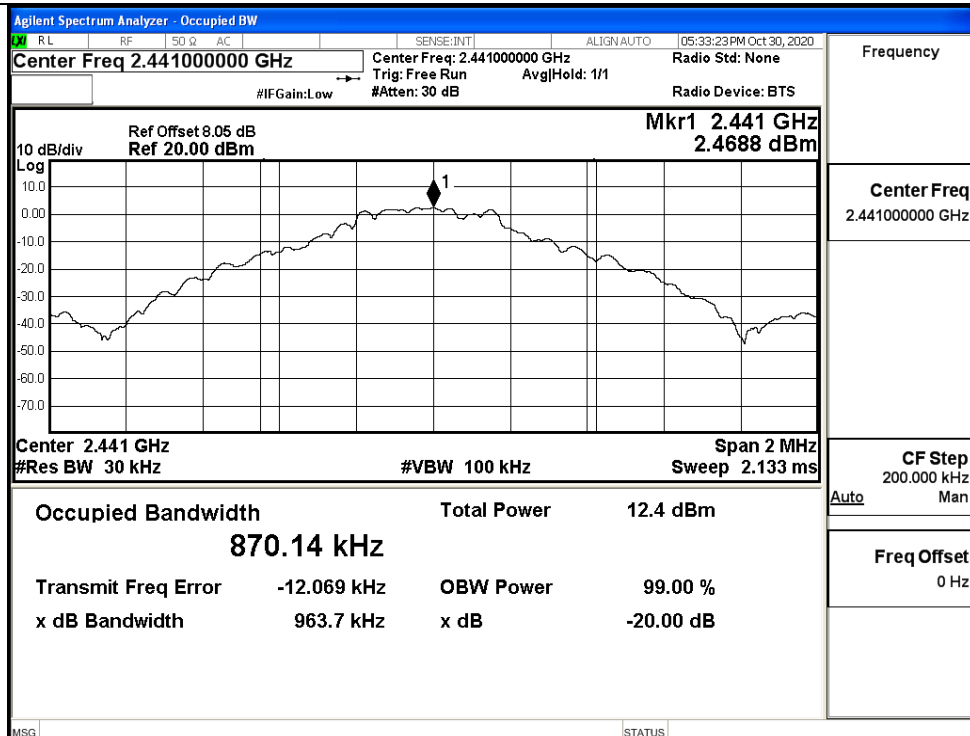
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9631	Not Specified	PASS
	MCH	0.9637	Not Specified	PASS
	HCH	0.9643	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.520	Not Specified	PASS
	MCH	1.520	Not Specified	PASS
	HCH	1.521	Not Specified	PASS
8DPSK	LCH	1.513	Not Specified	PASS
	MCH	1.508	Not Specified	PASS
	HCH	1.501	Not Specified	PASS

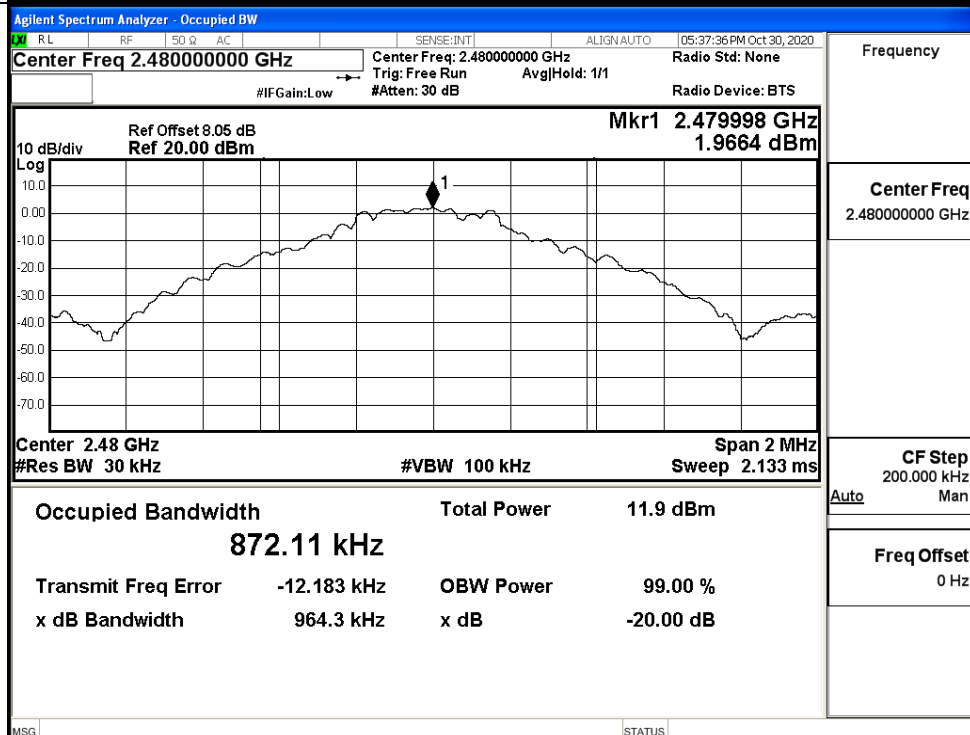
Test Graphs



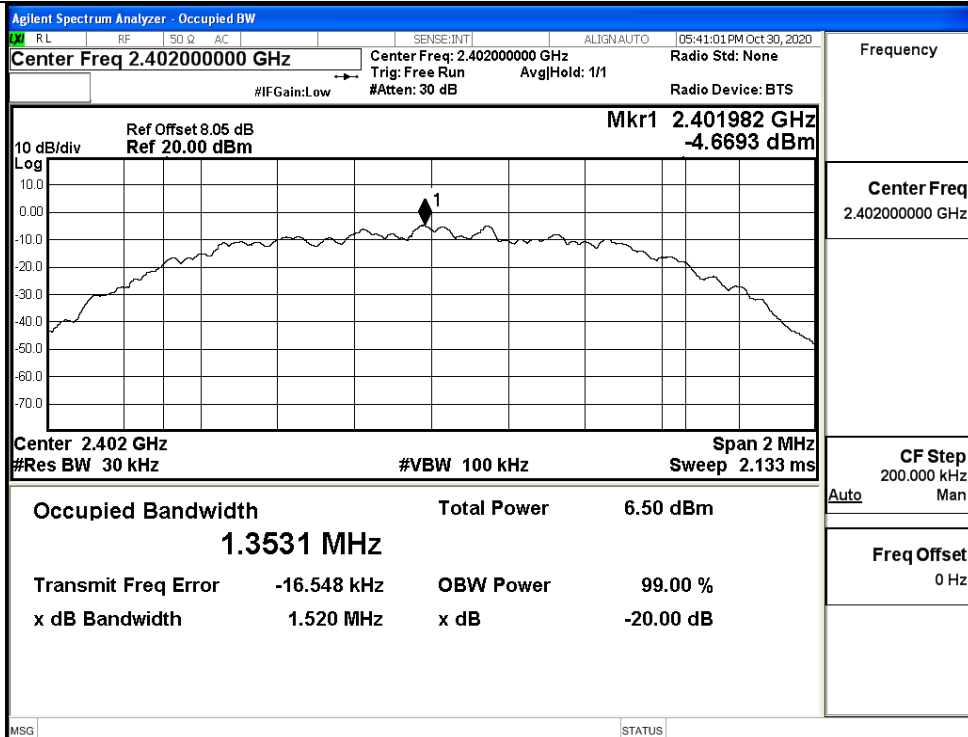
GFSK/MCH



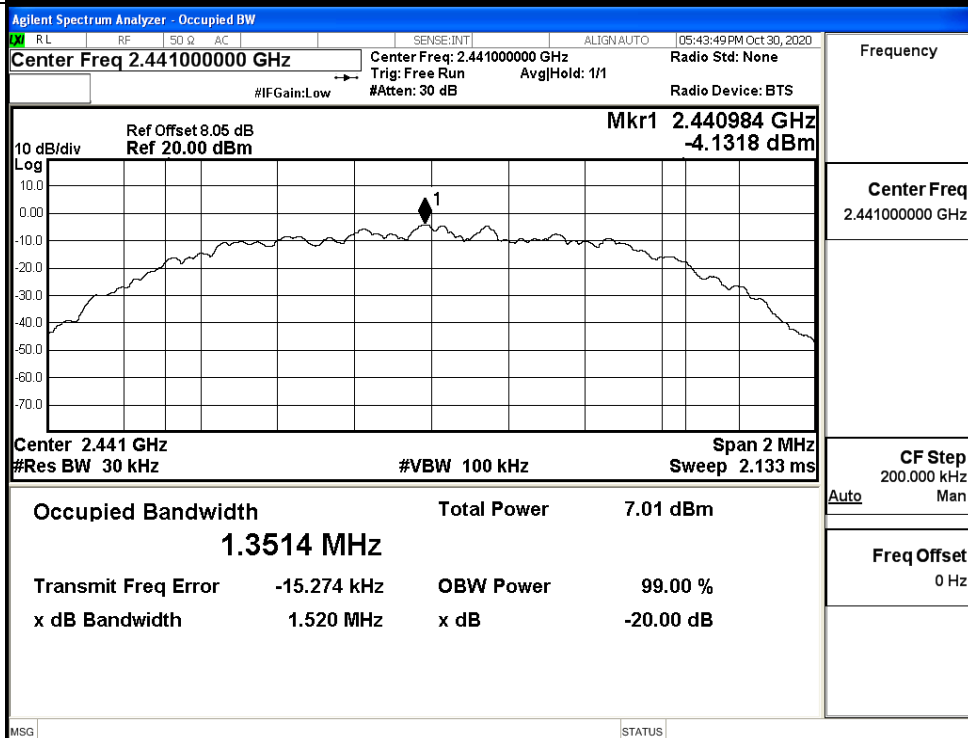
GFSK/HCH



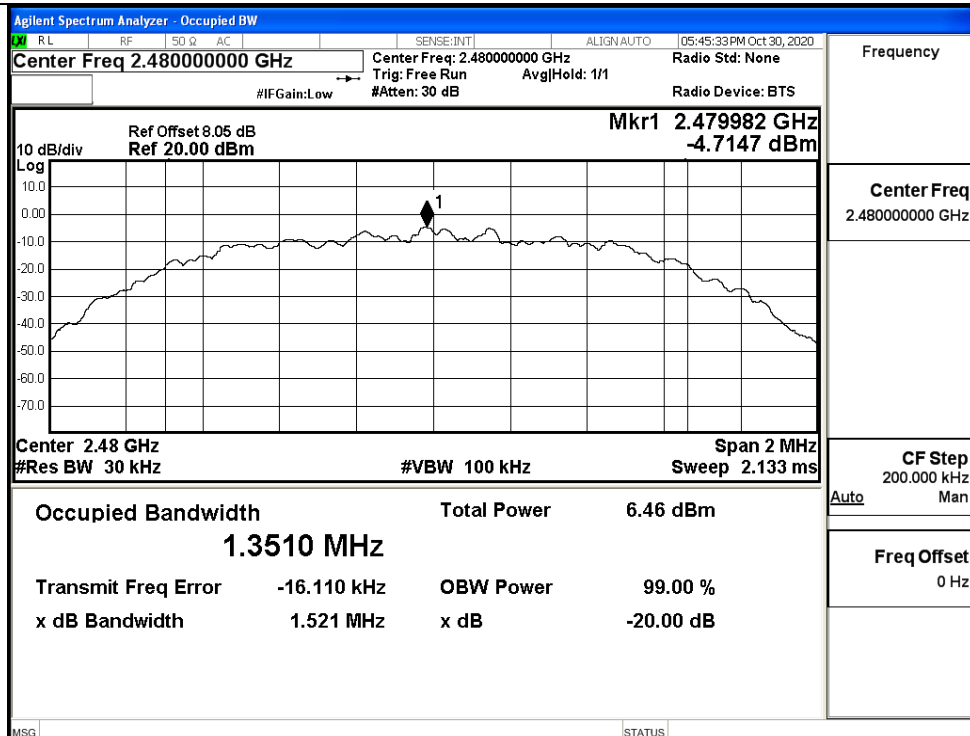
$\pi/4$ DQPSK/LCH



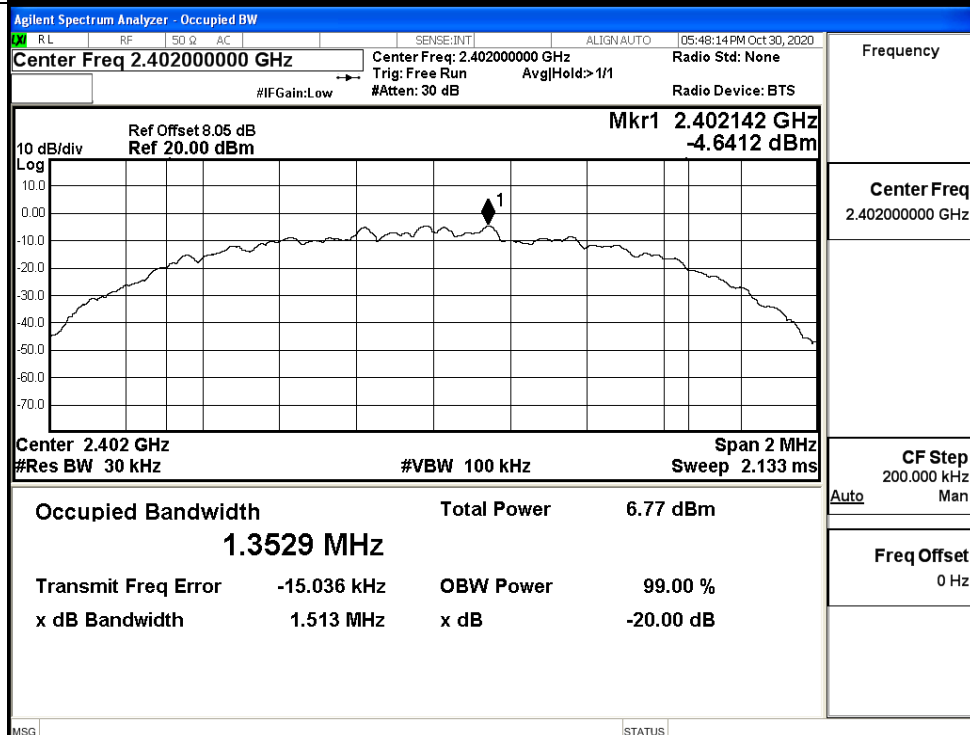
$\pi/4$ DQPSK/MCH



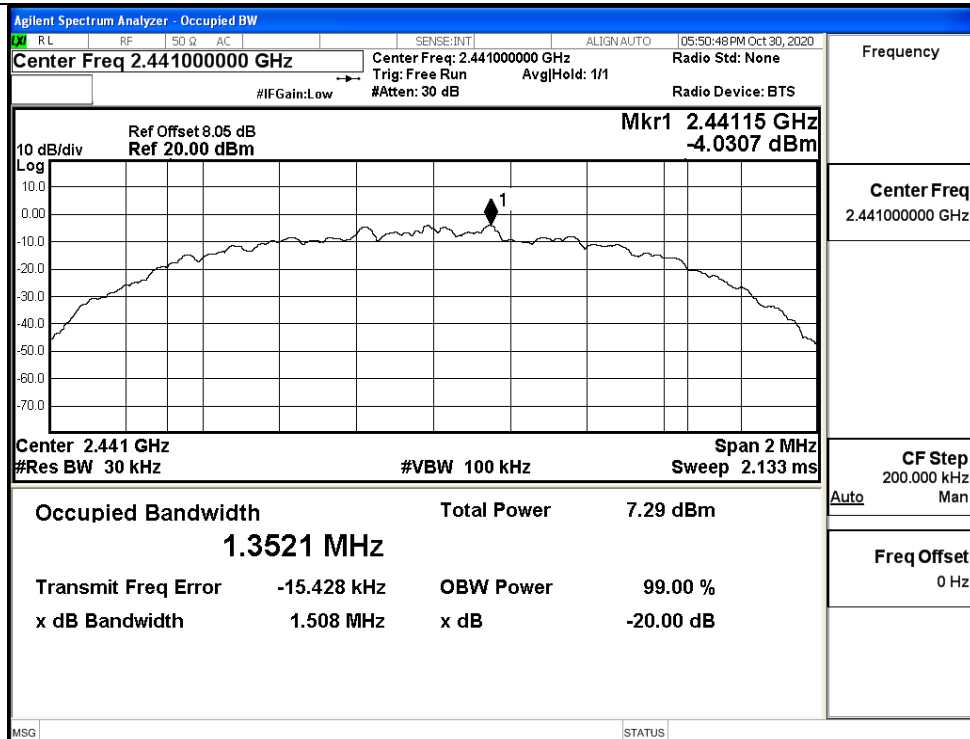
$\pi/4$ DQPSK/HCH



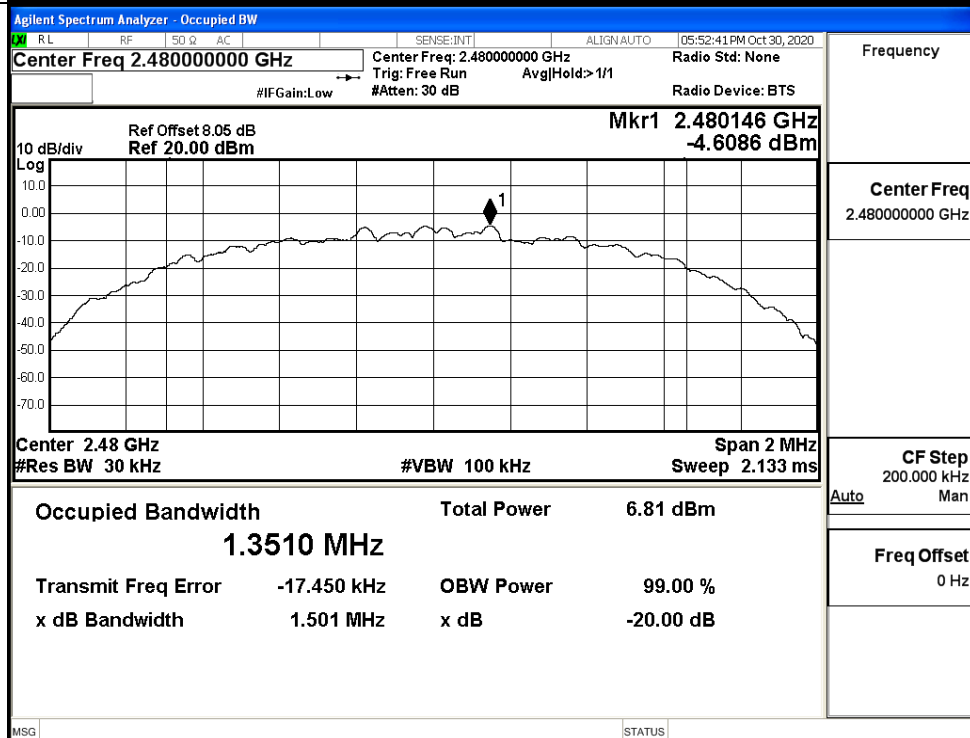
8DPSK/LCH



8DPSK/MCH



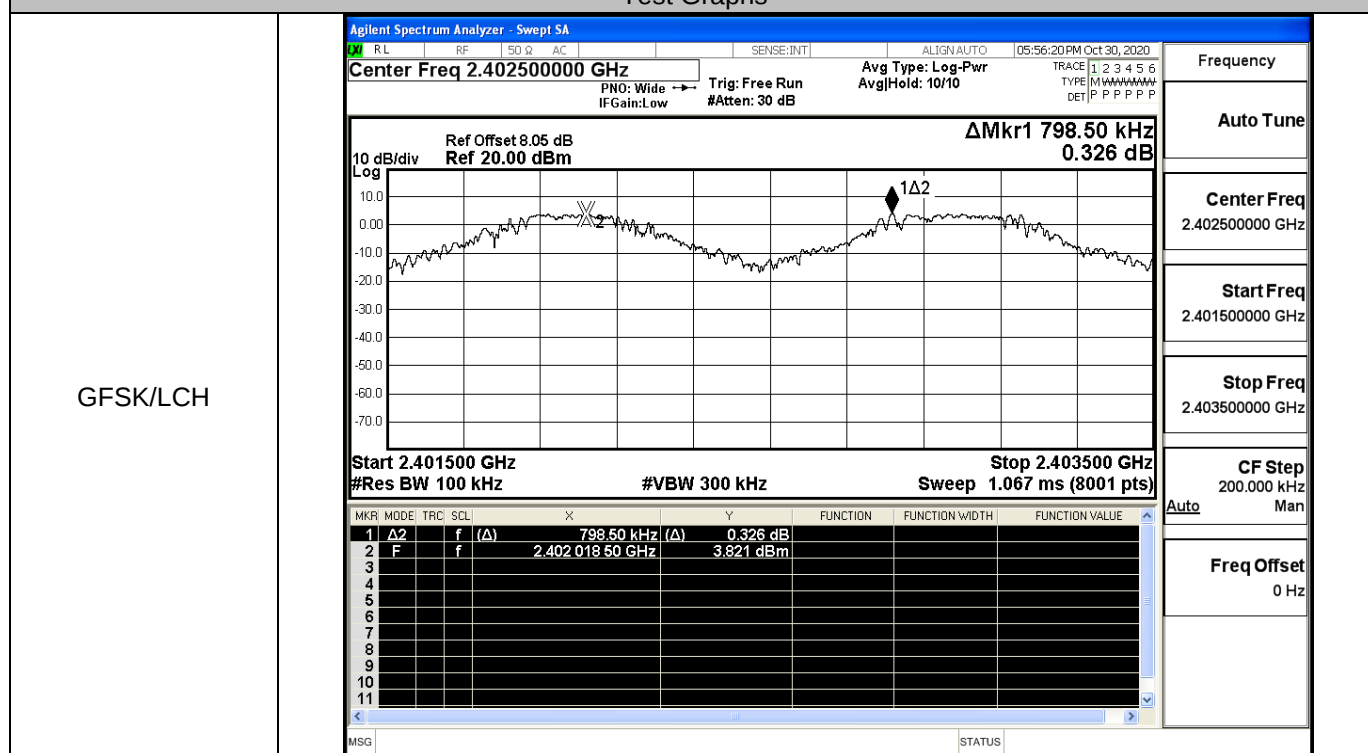
8DPSK/HCH



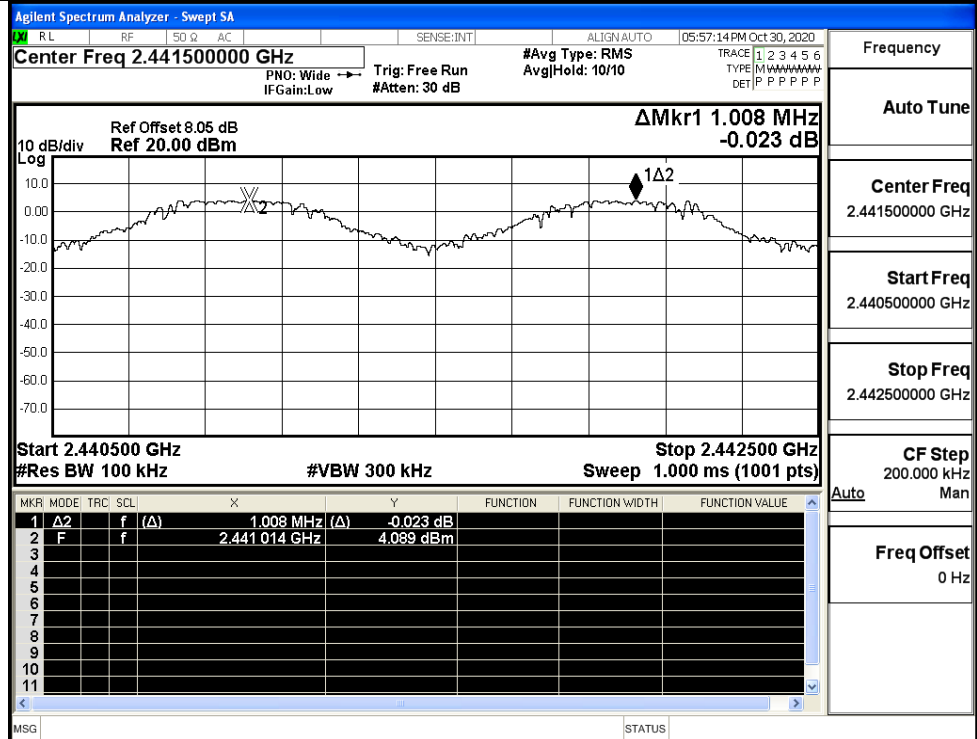
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.798	0.643	PASS
	MCH	1.008	0.643	PASS
	HCH	1.224	0.643	PASS
$\pi/4$ DQPSK	LCH	1.128	1.014	PASS
	MCH	1.070	1.014	PASS
	HCH	1.038	1.014	PASS
8DPSK	LCH	1.254	1.009	PASS
	MCH	1.232	1.009	PASS
	HCH	1.130	1.009	PASS

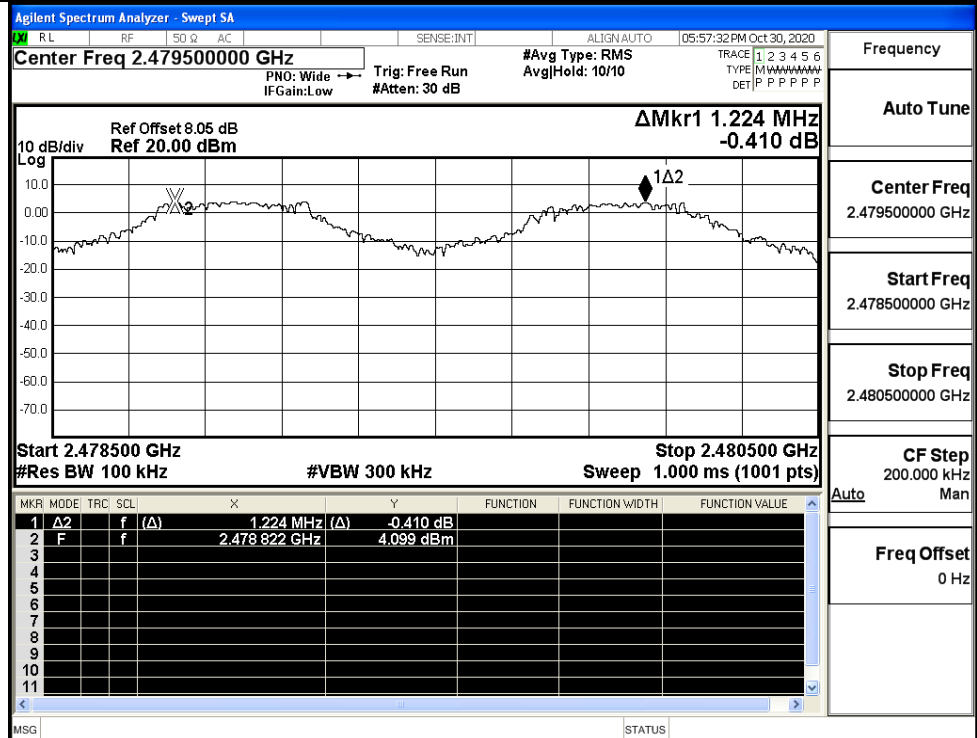
Test Graphs

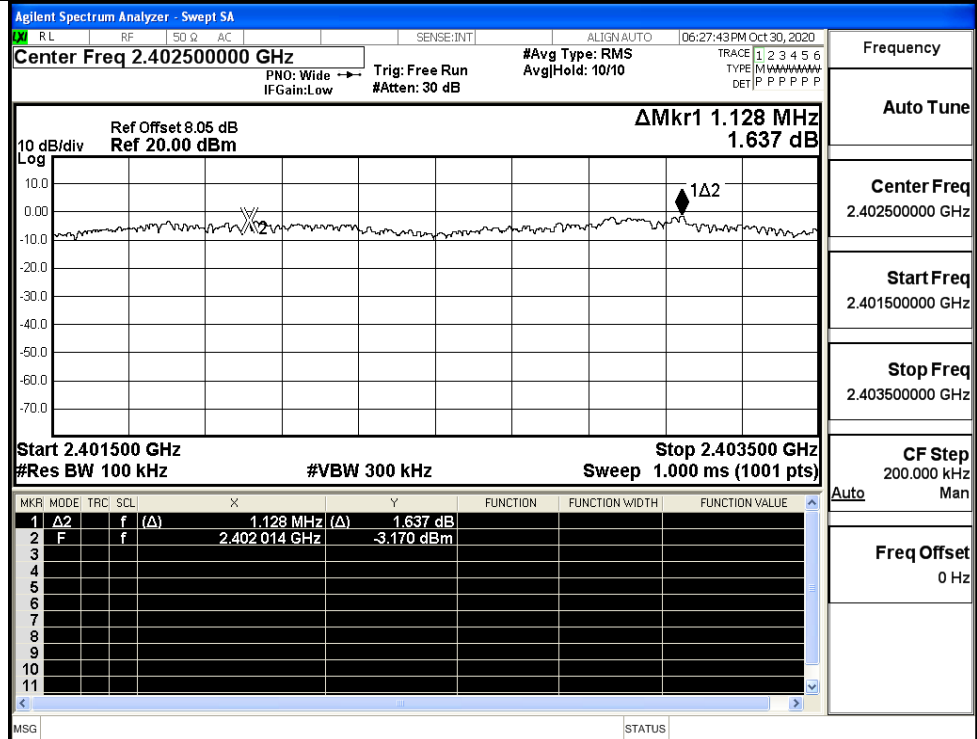
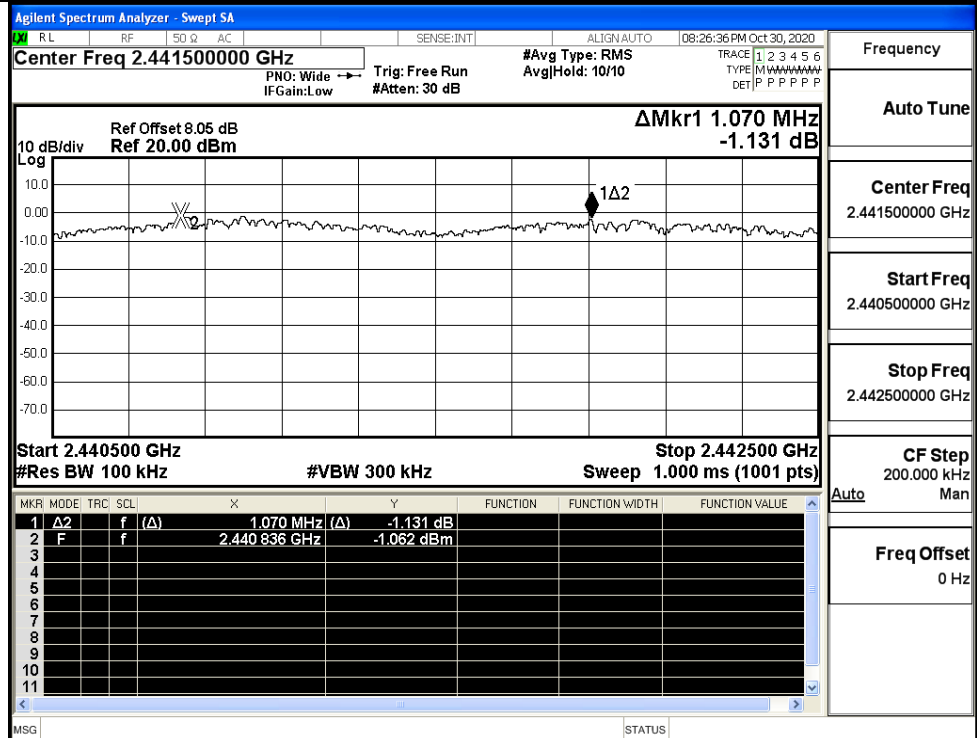


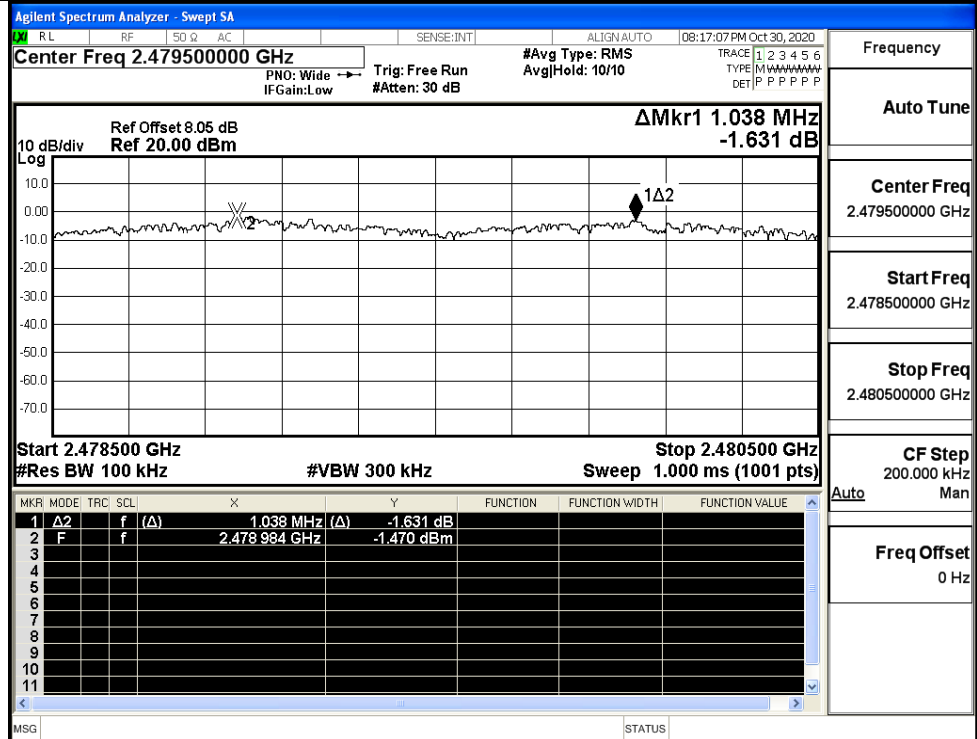
GFSK/MCH



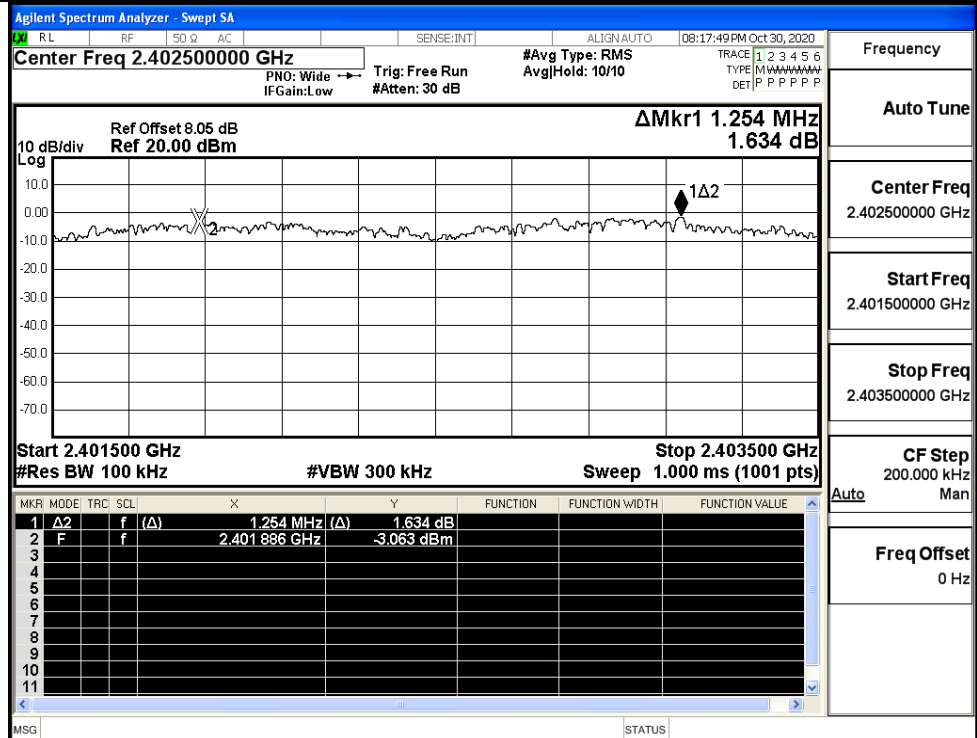
GFSK/HCH

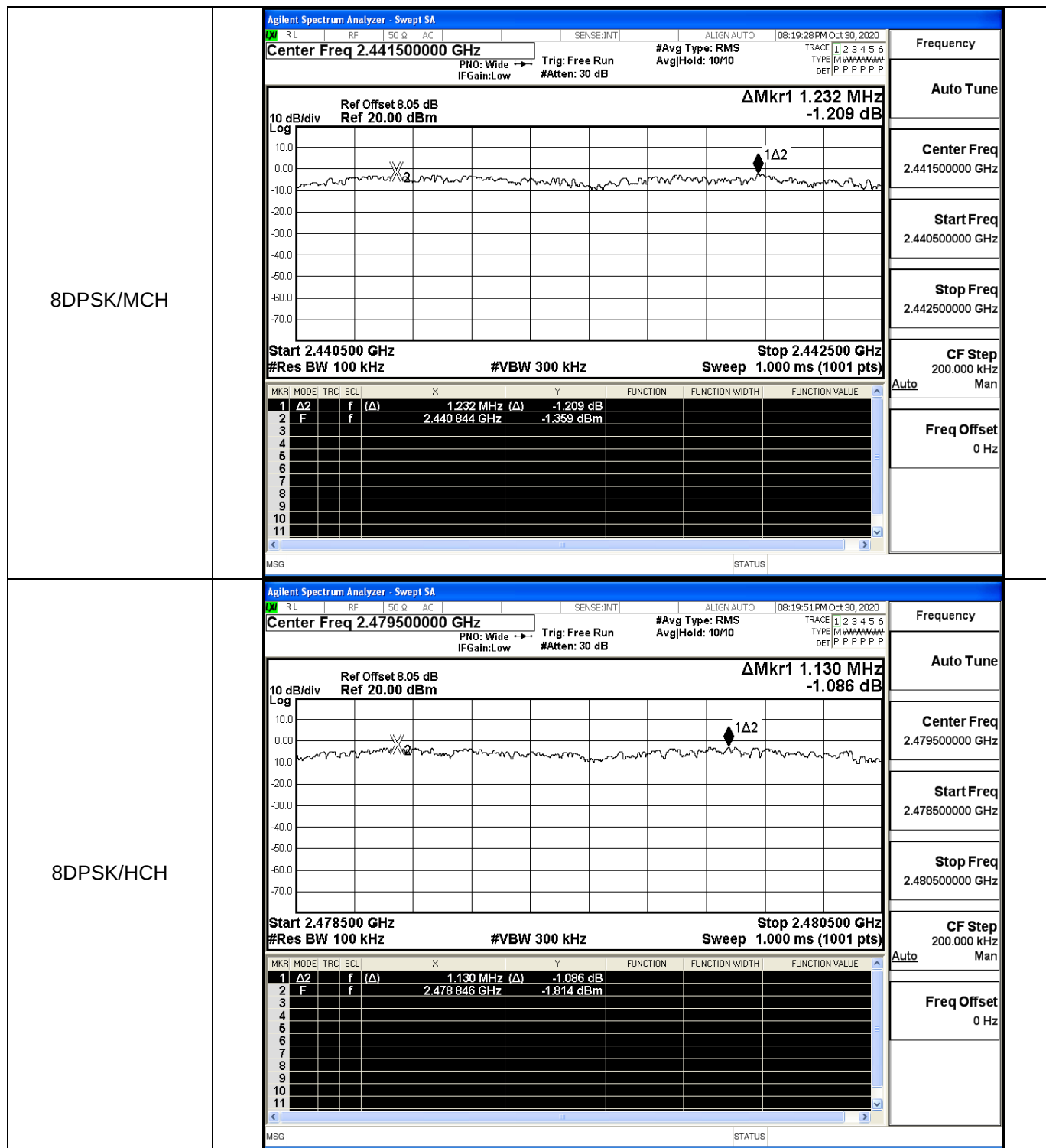


$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

8DPSK/LCH



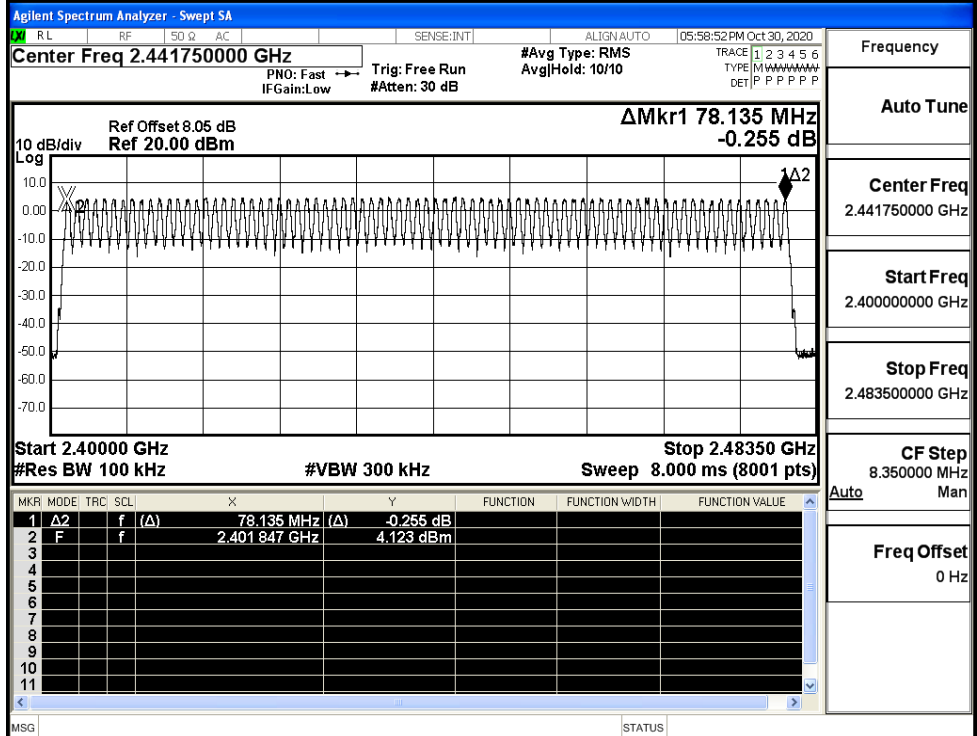
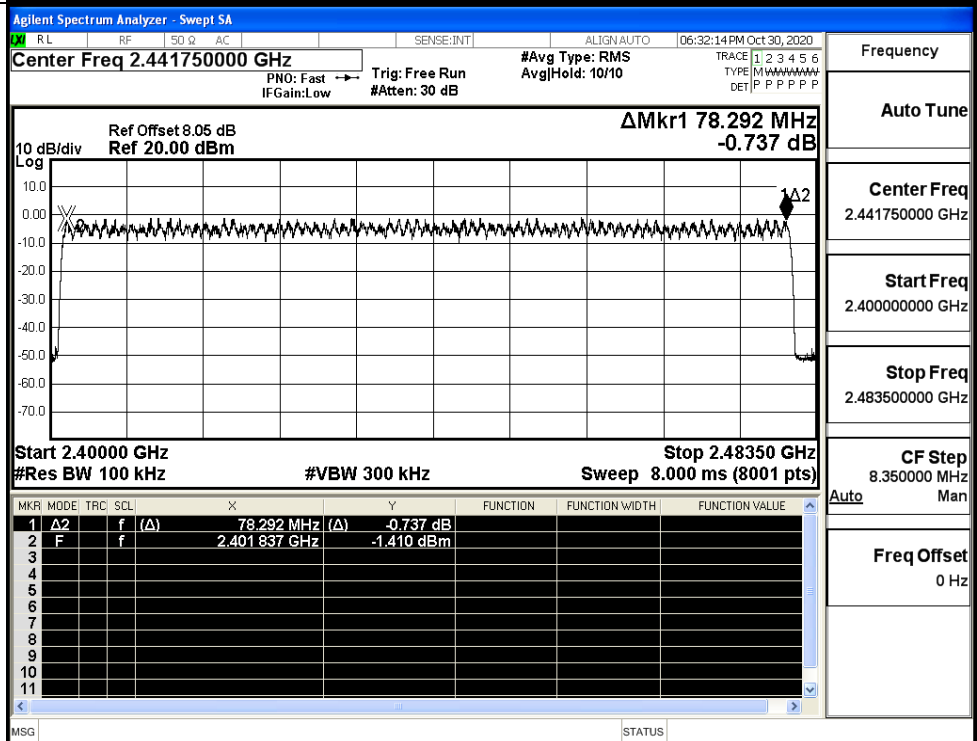


A.4 Hopping Channel Number

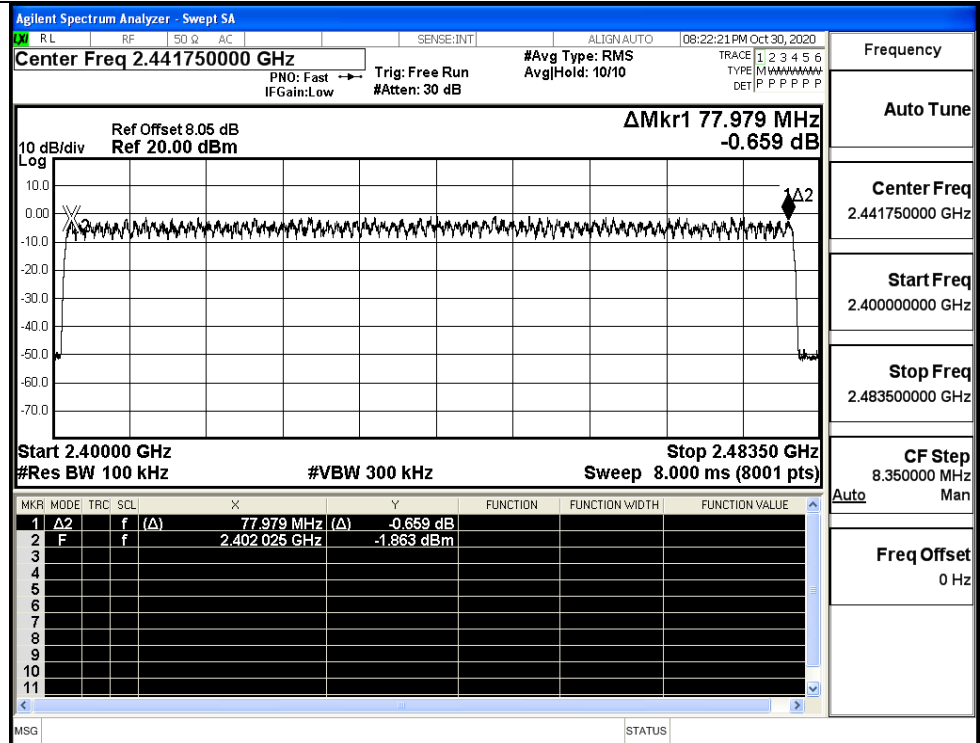
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

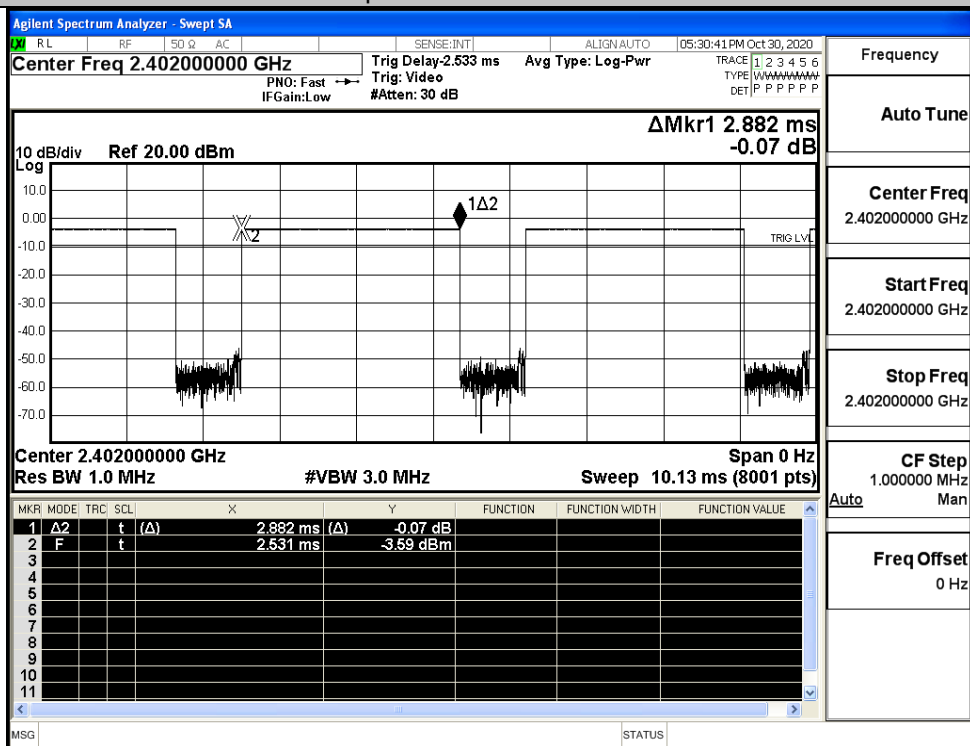


A.5 Dwell Time

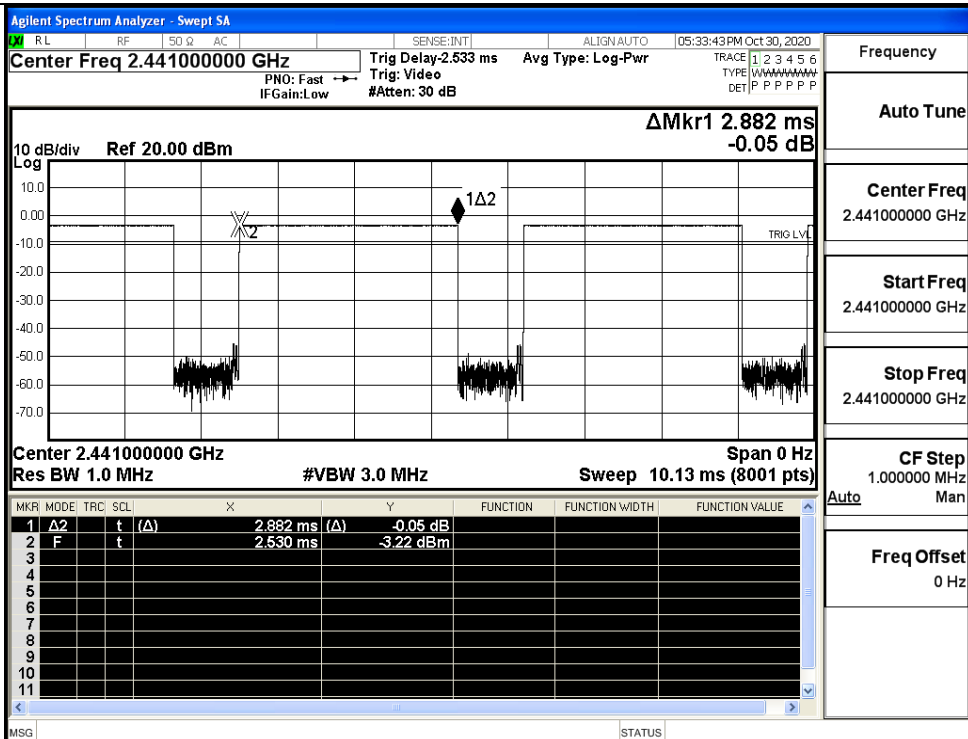
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.015	0.4	PASS
	2DH5	MCH	2.88	106.7	0.015	0.4	PASS
	2DH5	HCH	2.88	106.7	0.015	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.015	0.4	PASS
	3DH5	MCH	2.88	106.7	0.015	0.4	PASS
	3DH5	HCH	2.88	106.7	0.015	0.4	PASS

Test Graphs

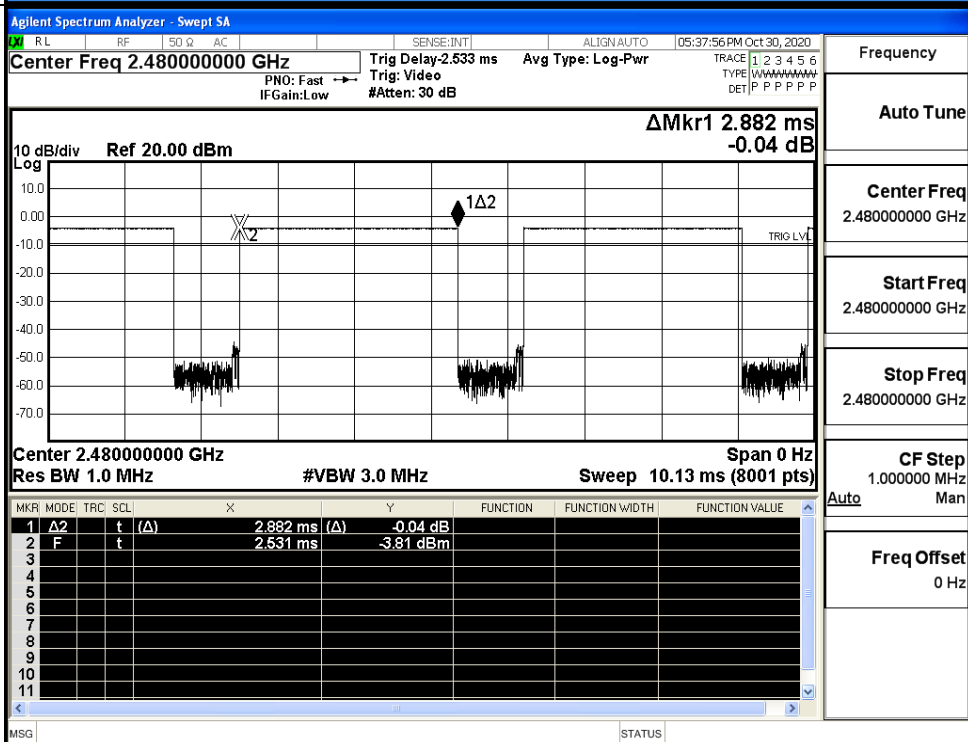
GFSK_DH5/LCH



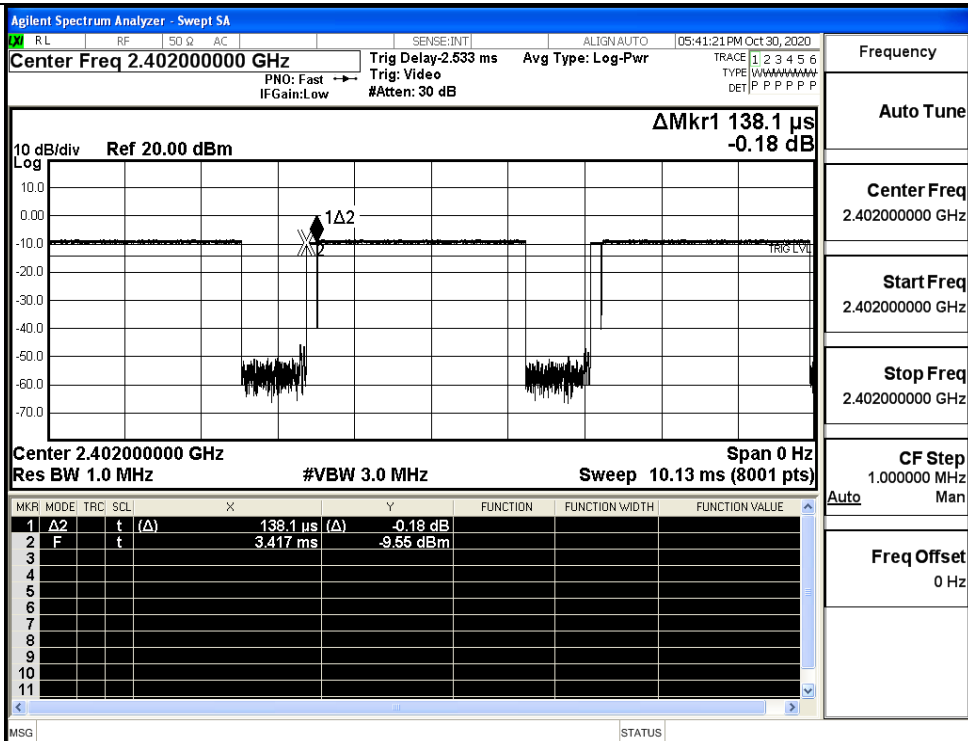
GFSK_DH5/MCH



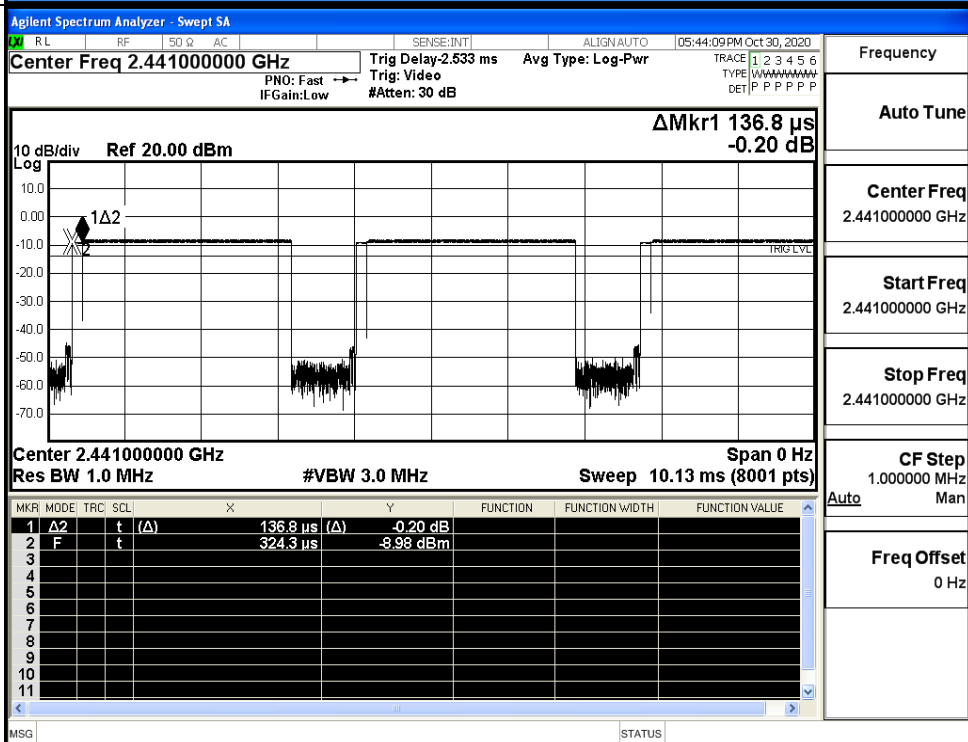
GFSK_DH5/HCH



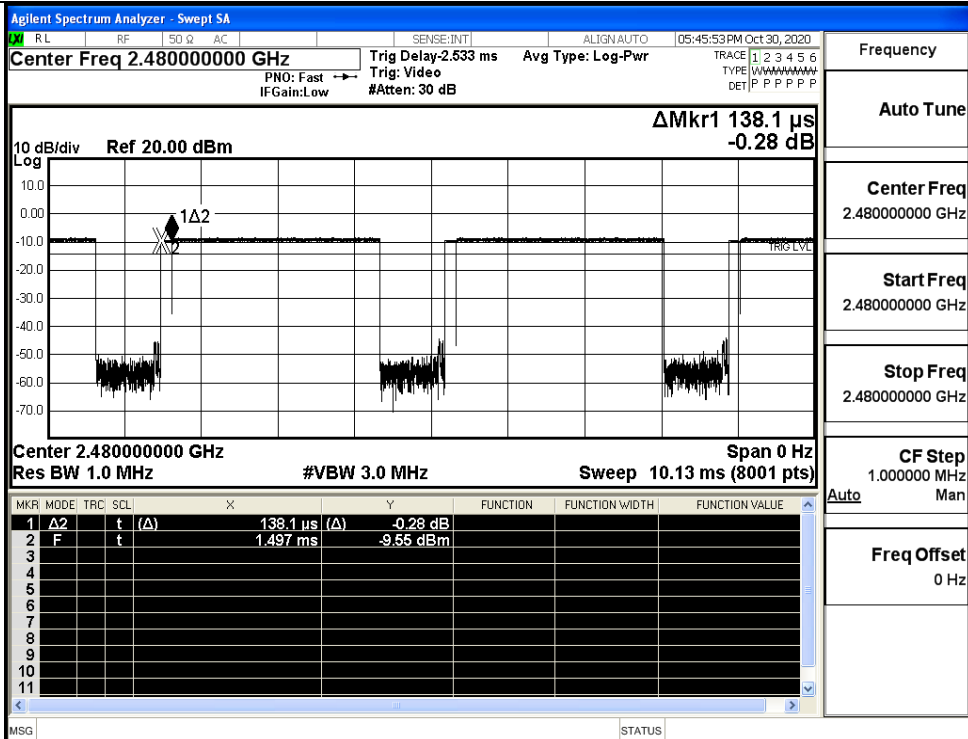
$\pi/4$ DQPSK
_2DH5/LCH



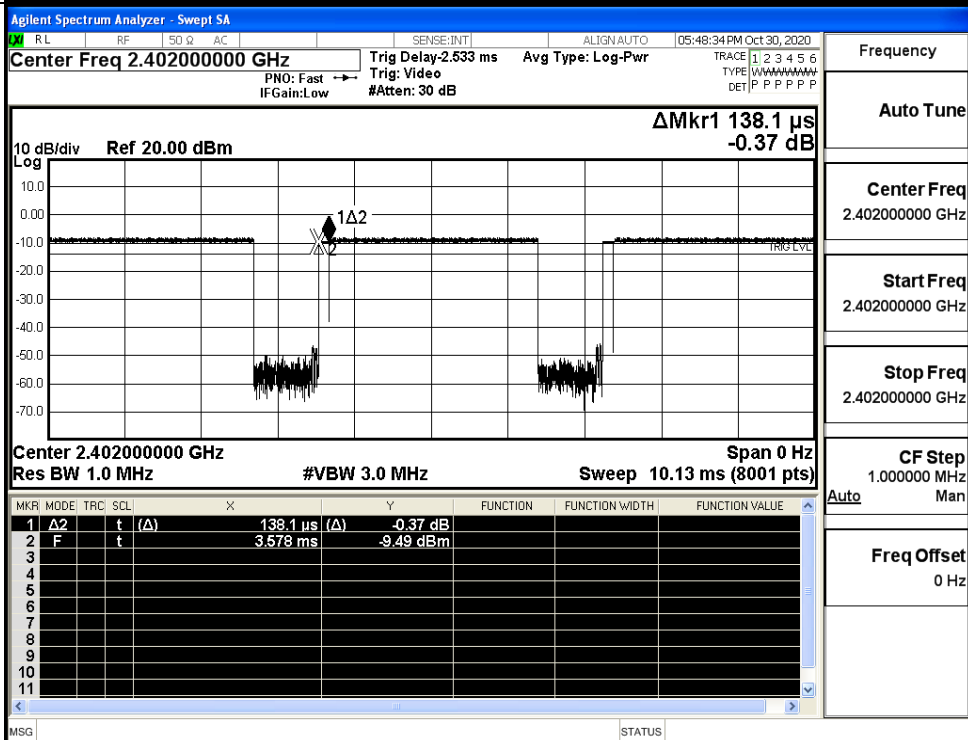
$\pi/4$ DQPSK
_2DH5/MCH



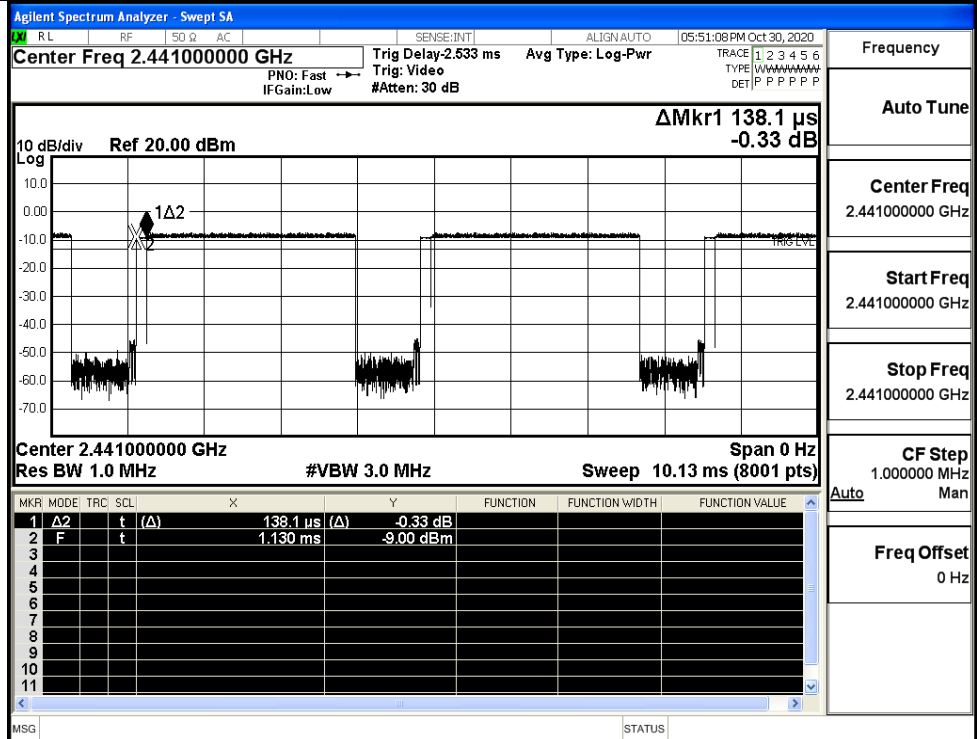
$\pi/4$ DQPSK
_2DH5/HCH



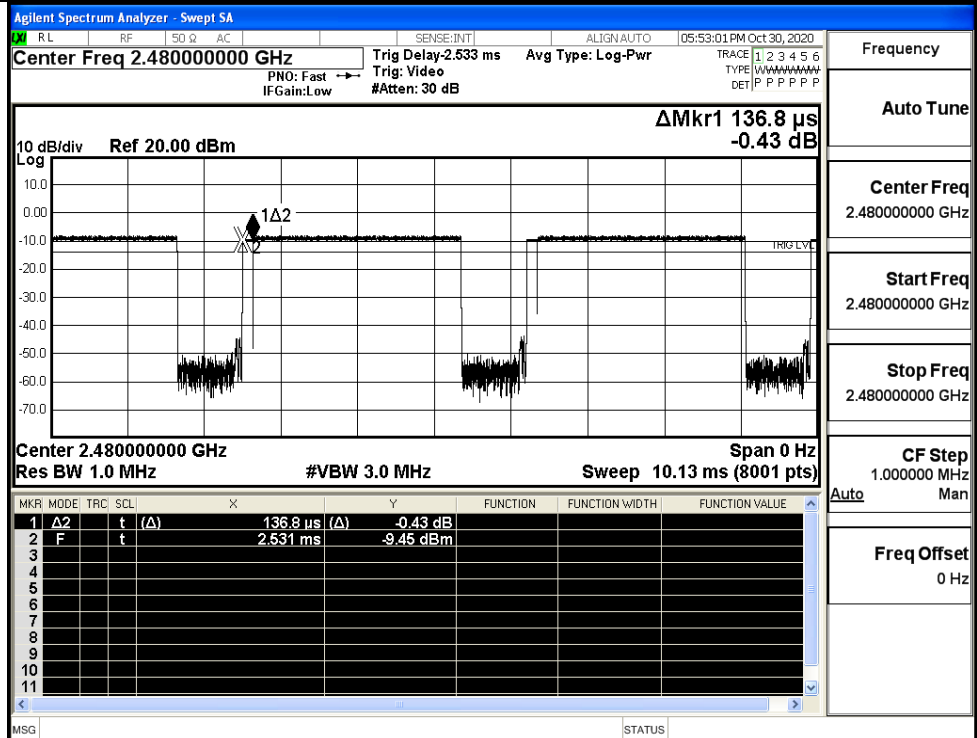
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



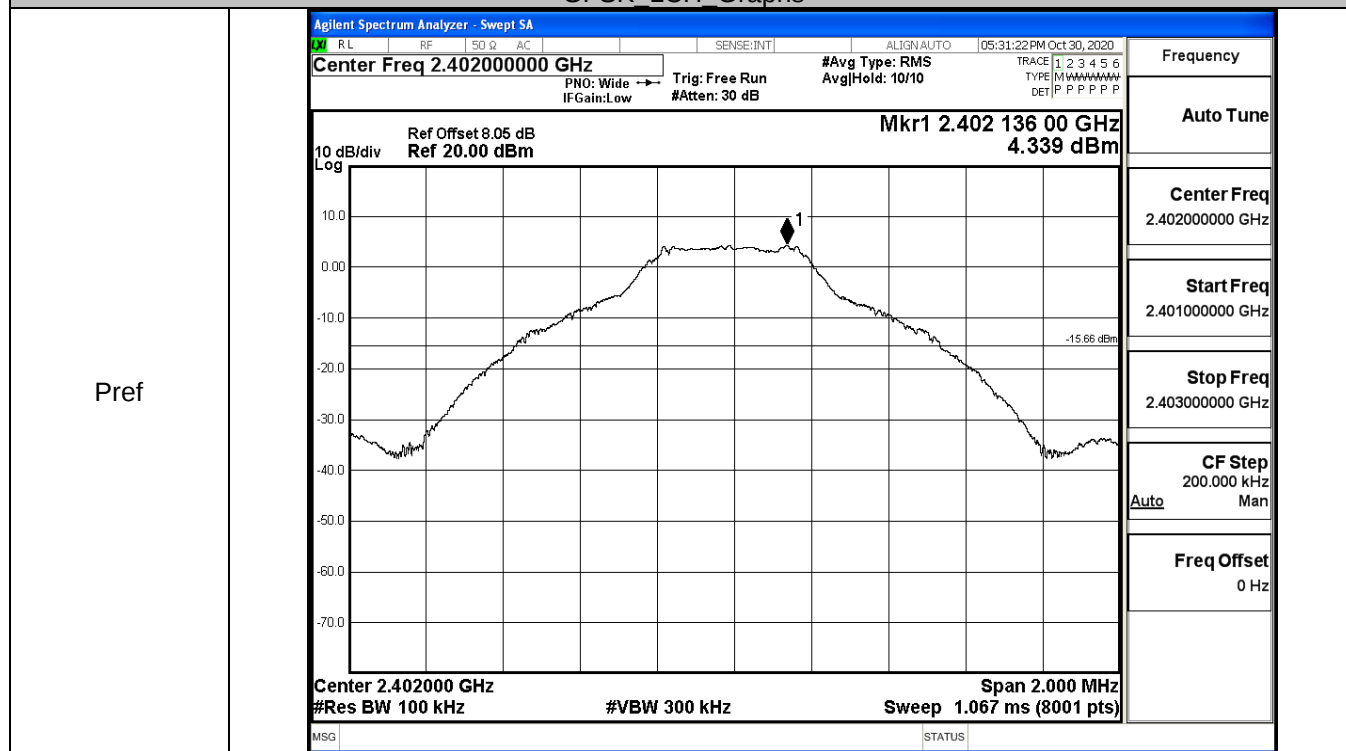
8DPSK_3DH5/HCH



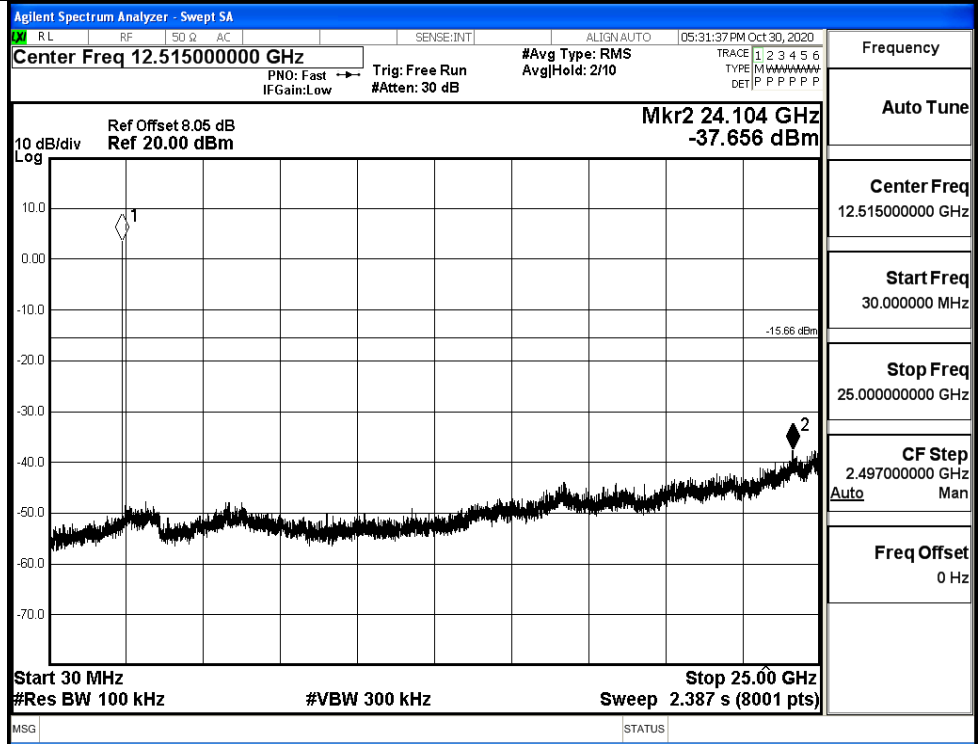
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.339	-37.656	-15.661	PASS
	MCH	4.799	-37.012	-15.201	PASS
	HCH	4.143	-37.094	-15.857	PASS
$\pi/4$ DQPSK	LCH	-1.613	-37.698	-21.613	PASS
	MCH	-1.083	-38.042	-21.083	PASS
	HCH	-1.533	-37.119	-21.533	PASS
8DPSK	LCH	-1.636	-37.424	-21.636	PASS
	MCH	-0.902	-37.847	-20.902	PASS
	HCH	-1.519	-37.383	-21.519	PASS

GFSK LCH Graphs

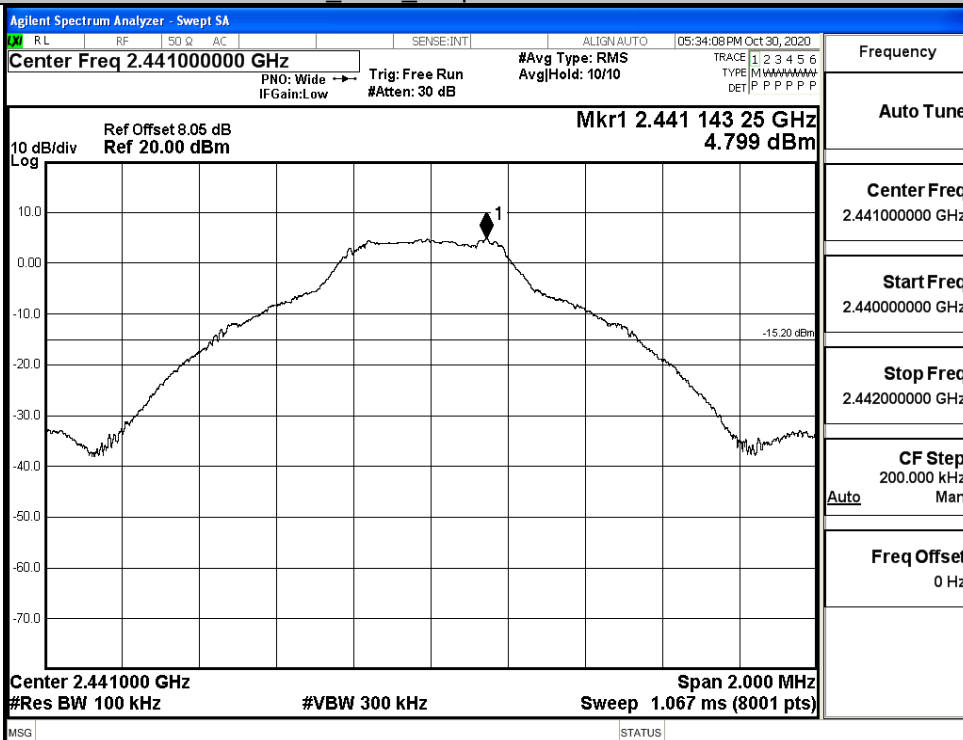


Puw

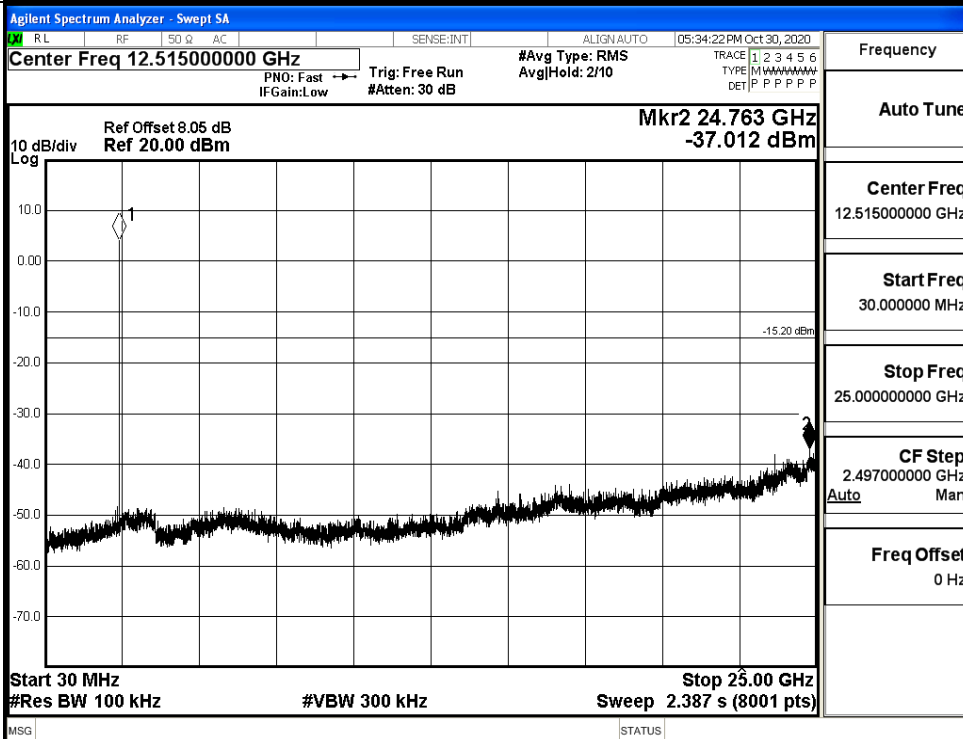


GFSK_MCH_Graphs

Pref

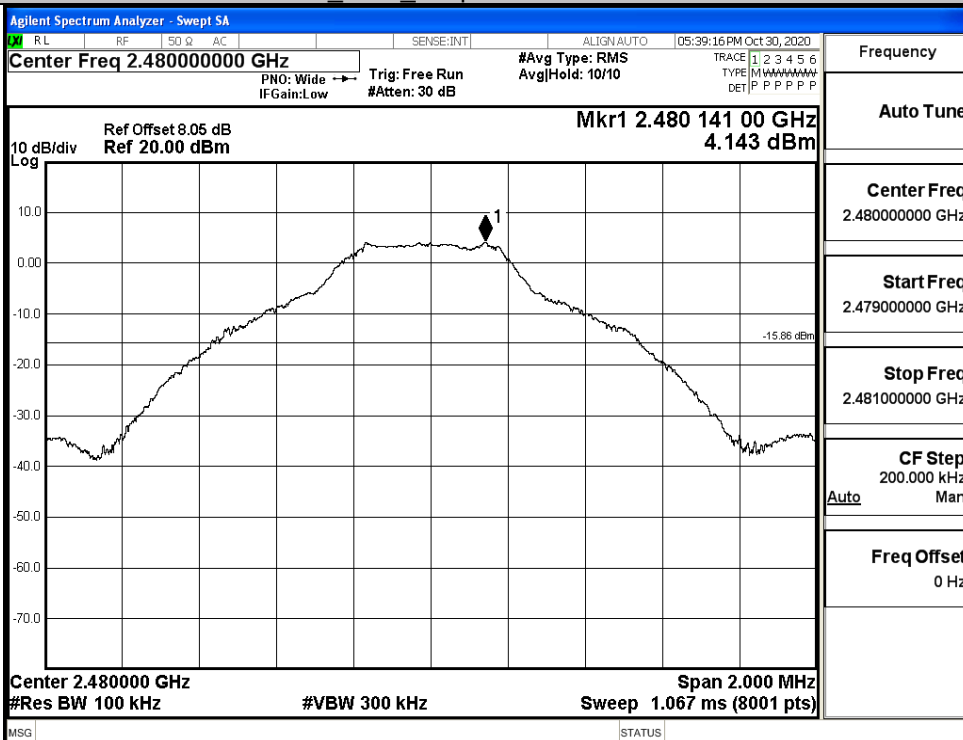


Puw

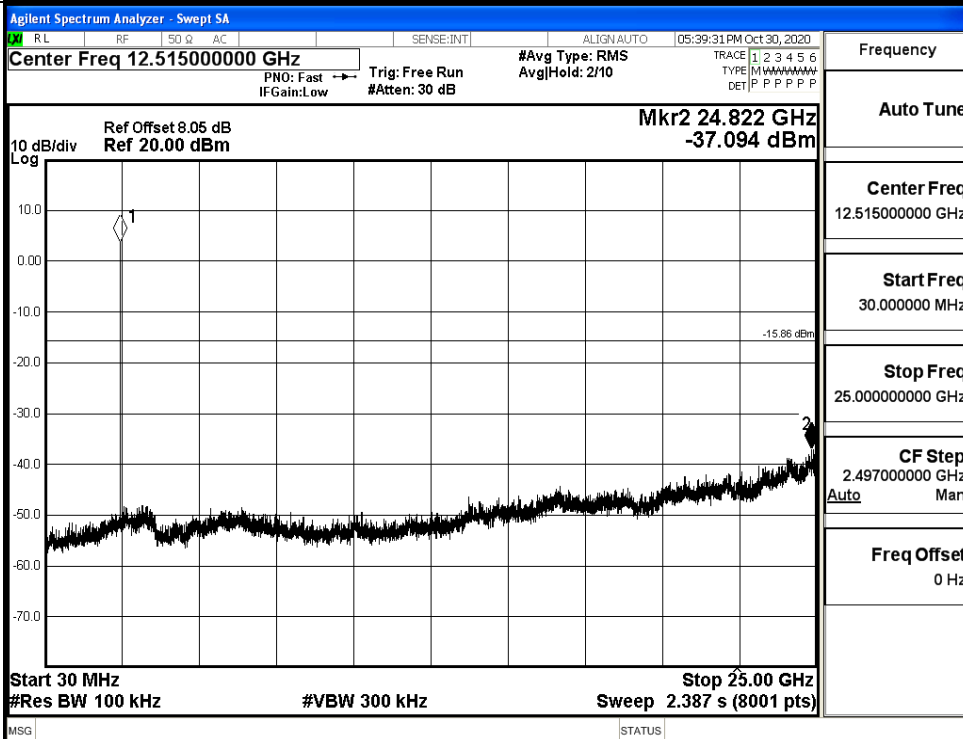


GFSK HCH_Graphs

Pref

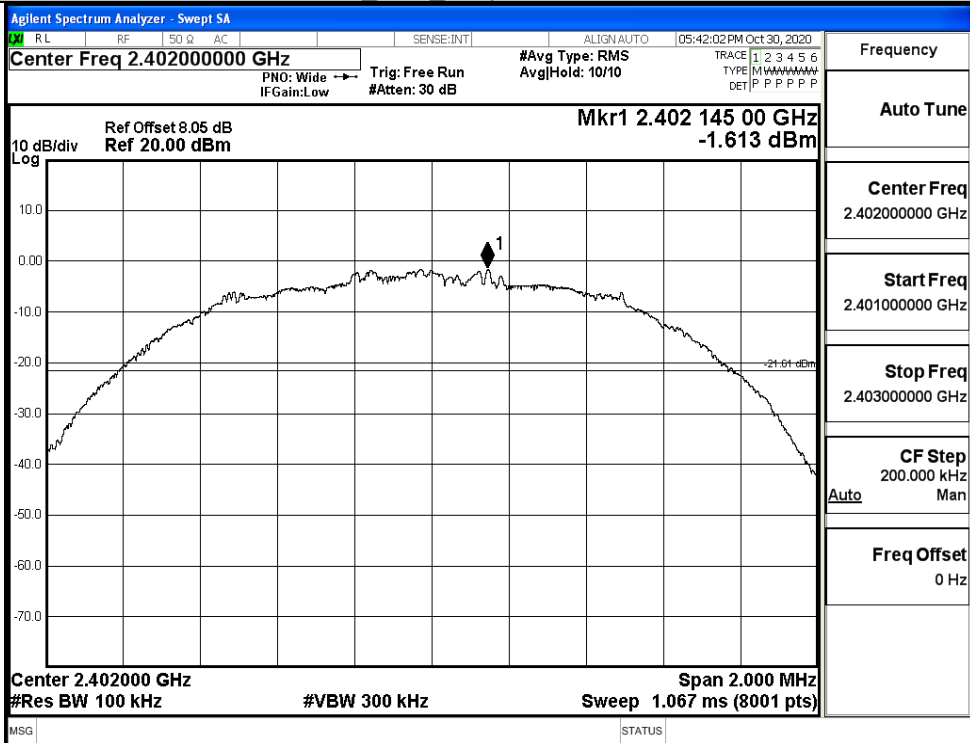


Puw

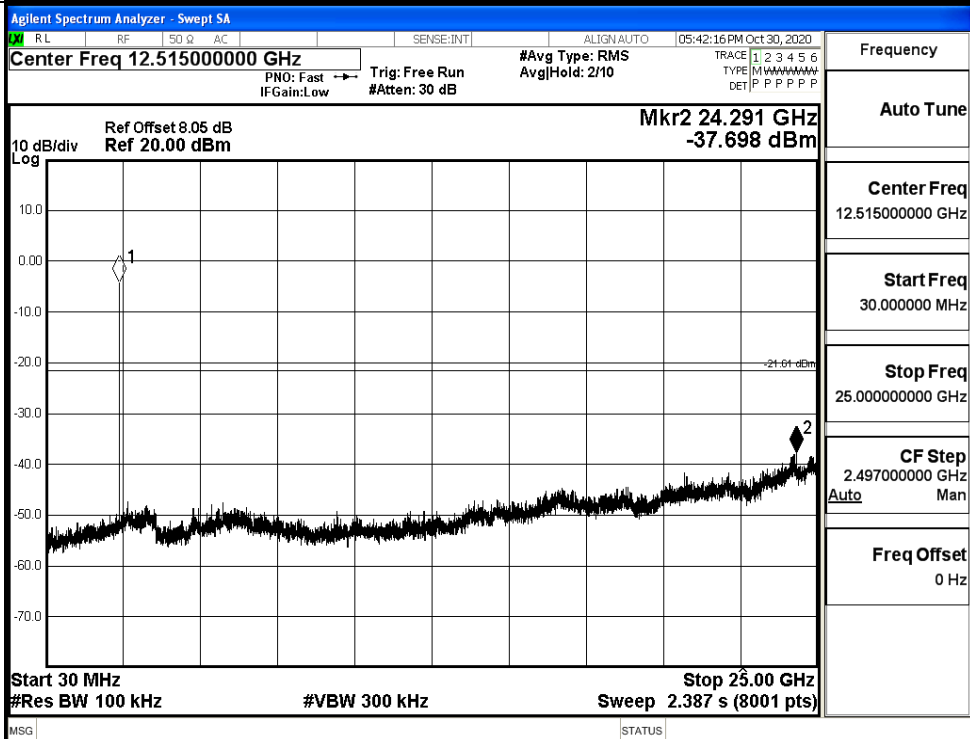


$\pi/4$ DQPSK_LCH_Graphs

Pref

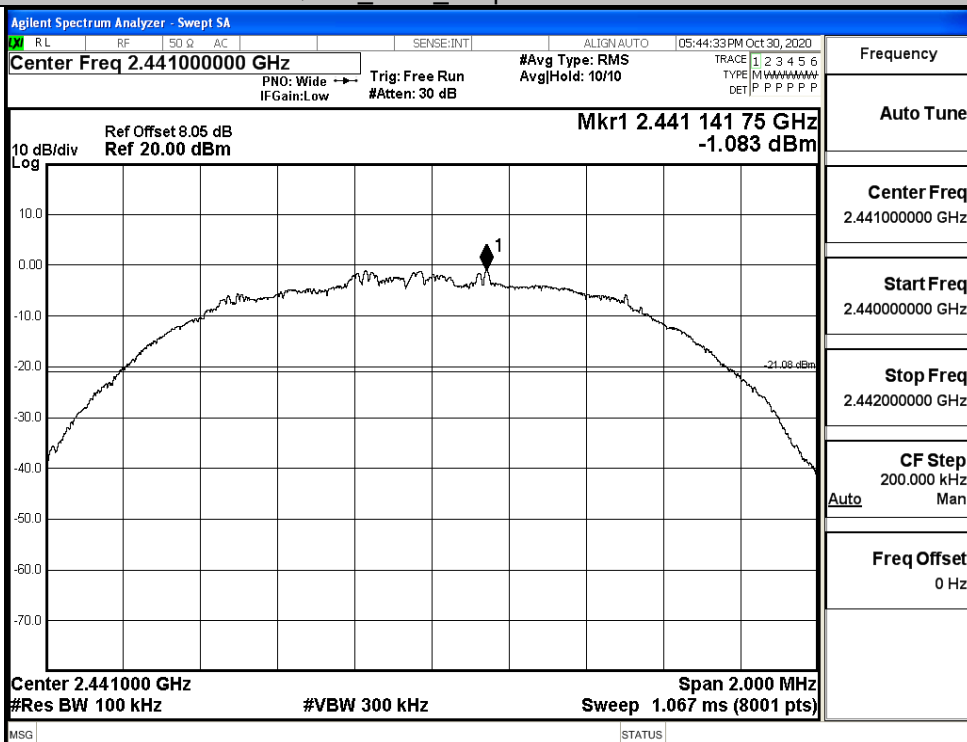


Puw

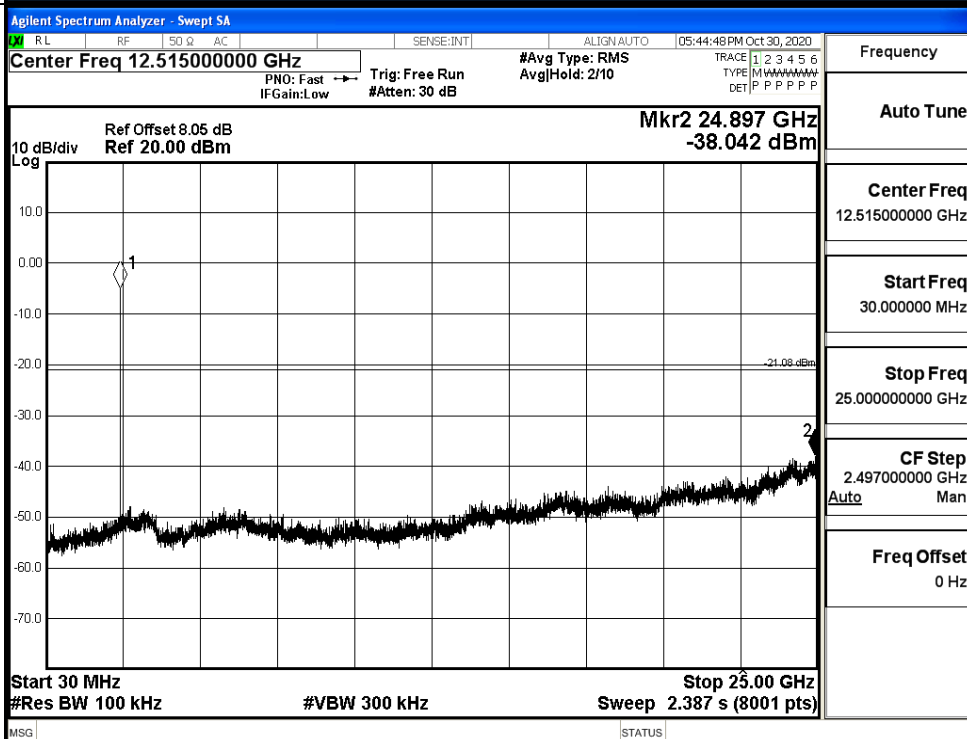


π /4DQPSK_MCH_Graphs

Pref

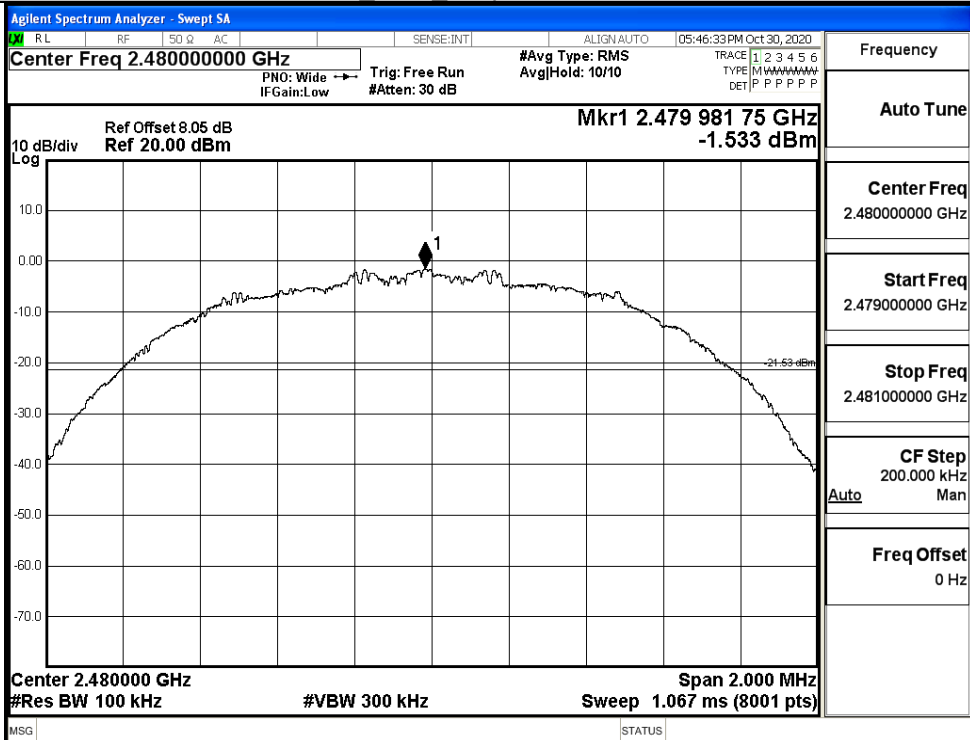


Puw

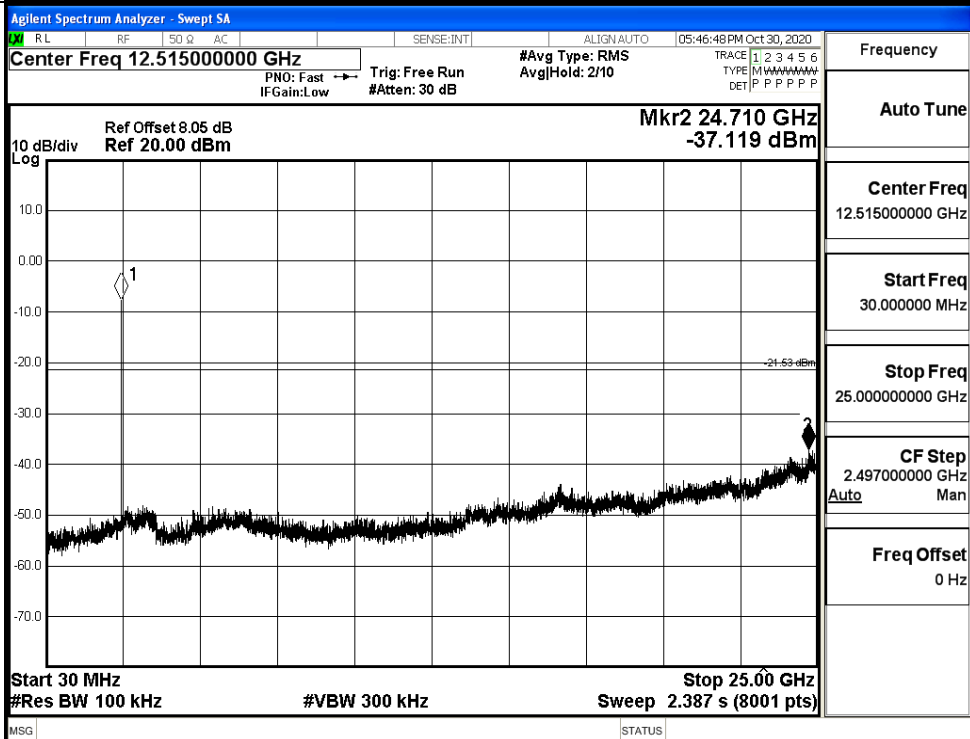


$\pi/4$ DQPSK_HCH_Graphs

Pref

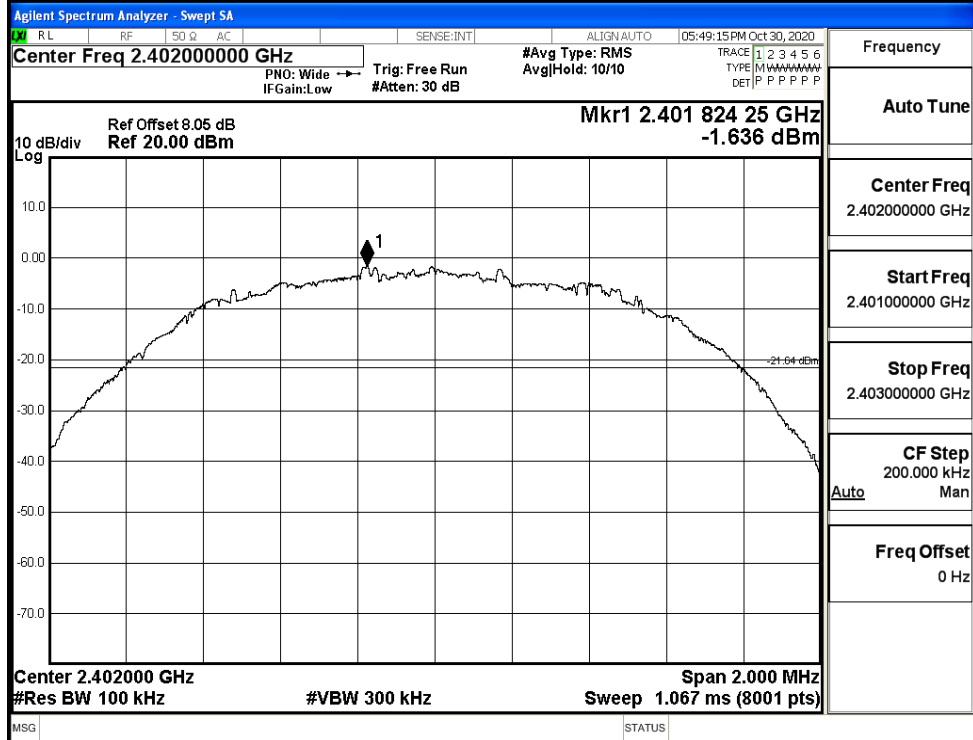


Puw

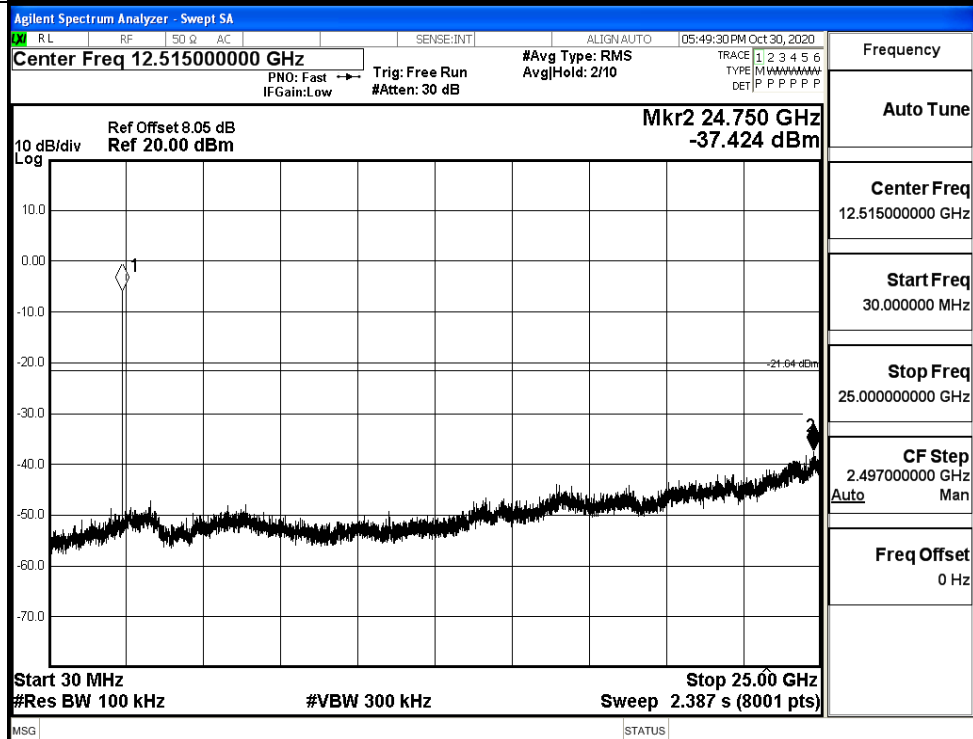


8DPSK_LCH_Graphs

Pref

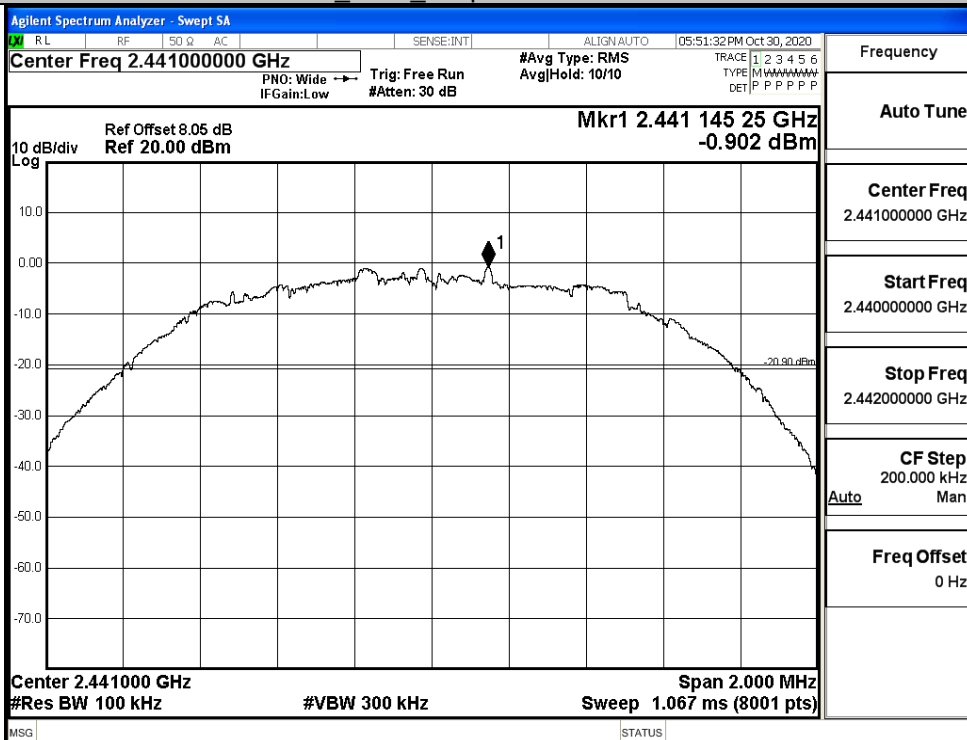


Puw

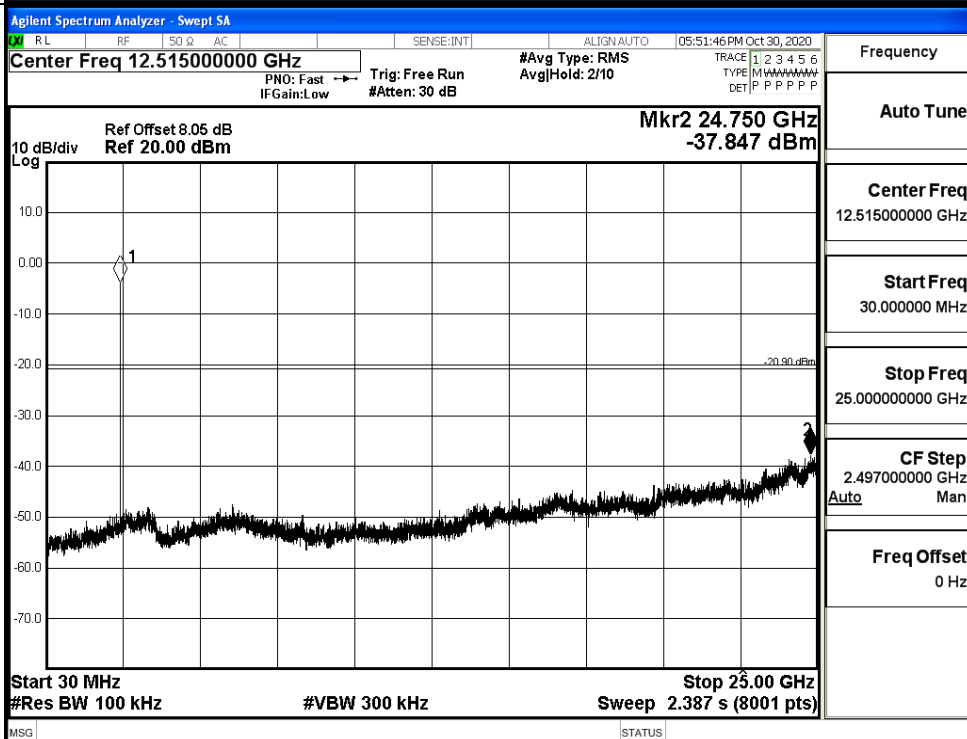


8DPSK_MCH_Graphs

Pref

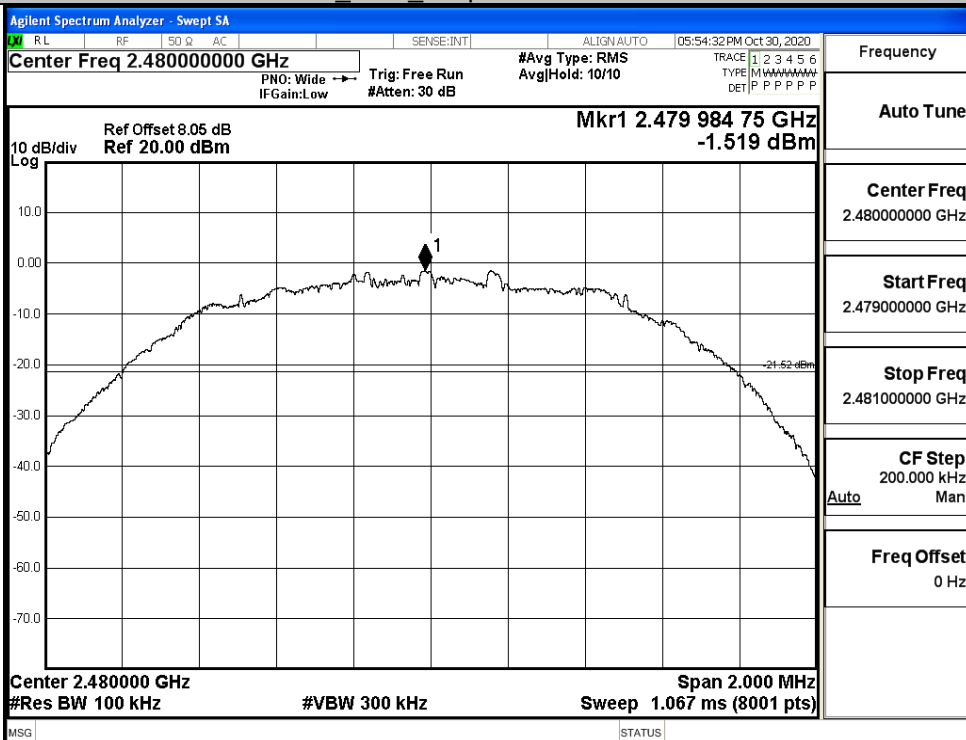


Puw

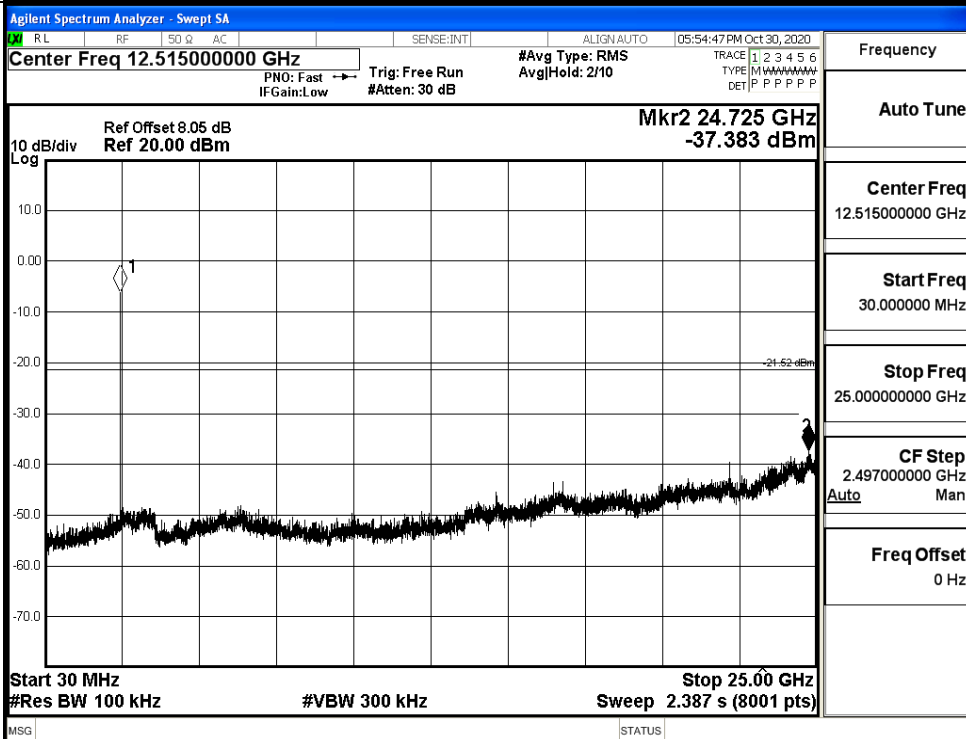


8DPSK_HCH_Graphs

Pref



Puw

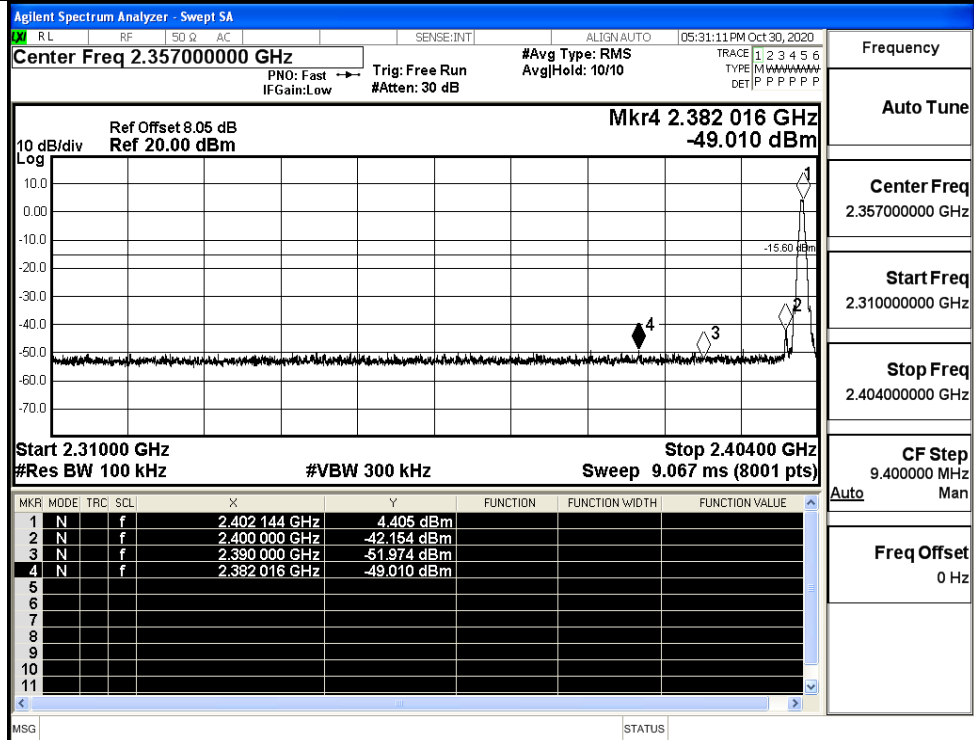


A.7 Band-edge for RF Conducted Emissions

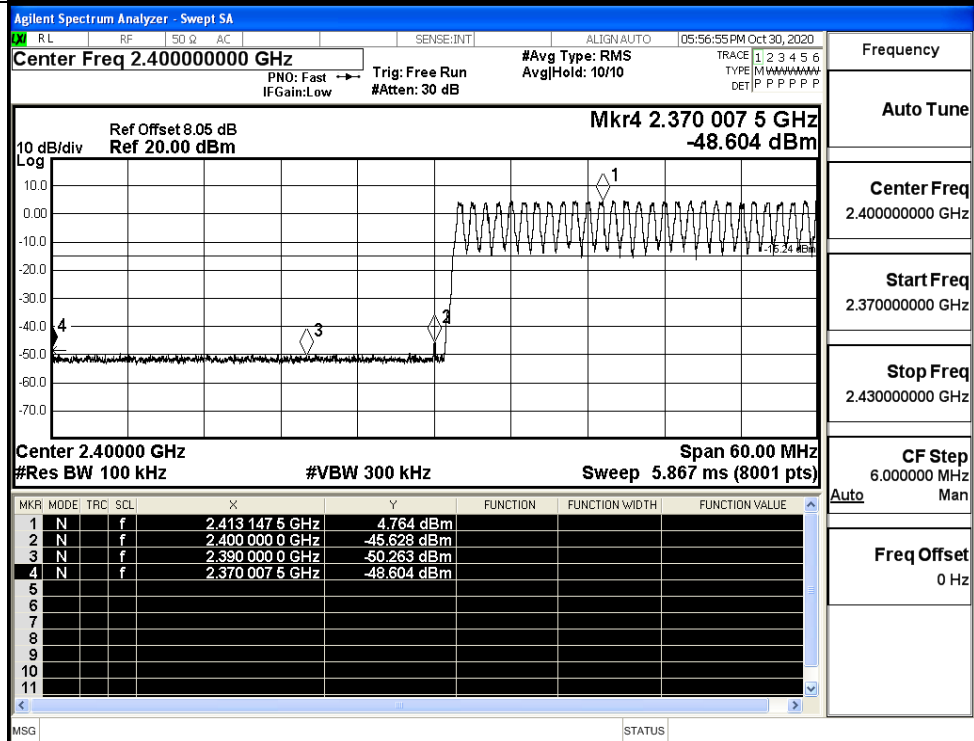
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.405	Off	-49.010	-15.6	PASS
			4.764	On	-48.604	-15.24	PASS
	HCH	2480	4.217	Off	-41.872	-15.78	PASS
			4.481	On	-48.892	-15.52	PASS
$\pi/4$ DQPSK	LCH	2402	-1.477	Off	-49.592	-21.48	PASS
			-1.095	On	-48.509	-21.1	PASS
	HCH	2480	-1.516	Off	-40.472	-21.52	PASS
			-1.168	On	-43.536	-21.17	PASS
8DPSK	LCH	2402	-1.632	Off	-49.618	-21.63	PASS
			-0.833	On	-48.540	-20.83	PASS
	HCH	2480	-1.715	Off	-39.935	-21.72	PASS
			-0.949	On	-39.738	-20.95	PASS

Test Graphs

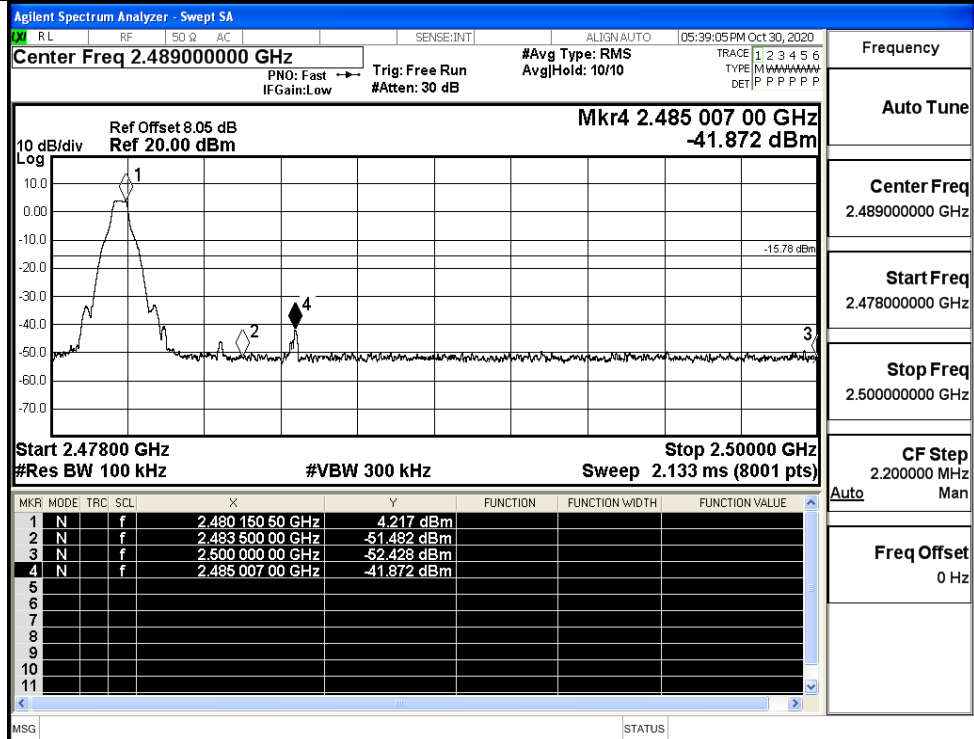
GFSK/LCH/No Hop



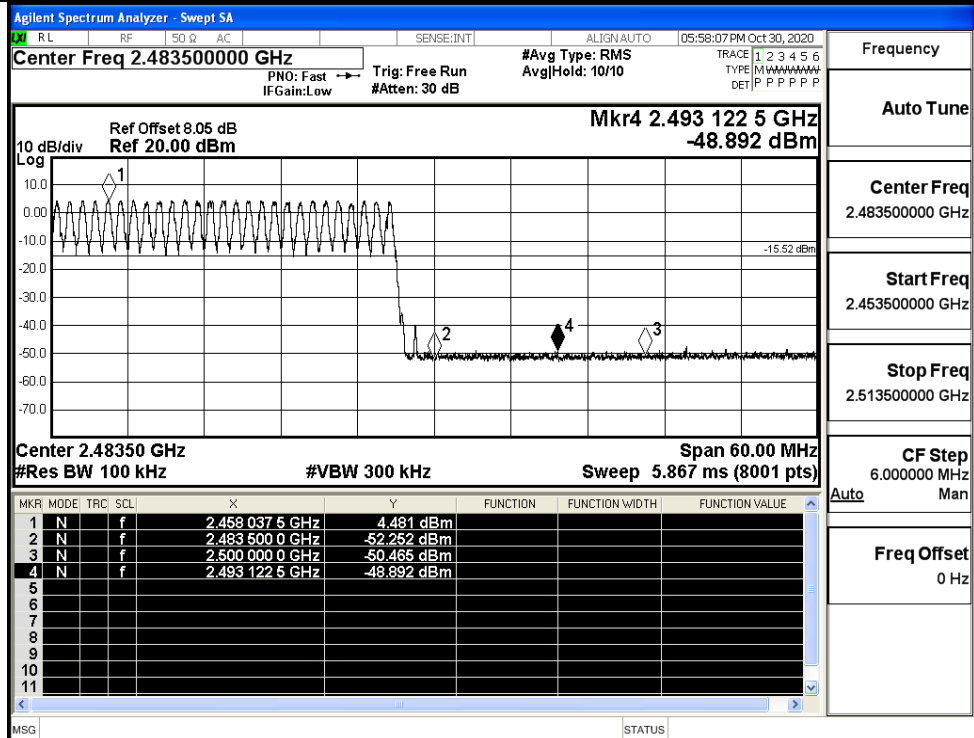
GFSK/LCH/Hop



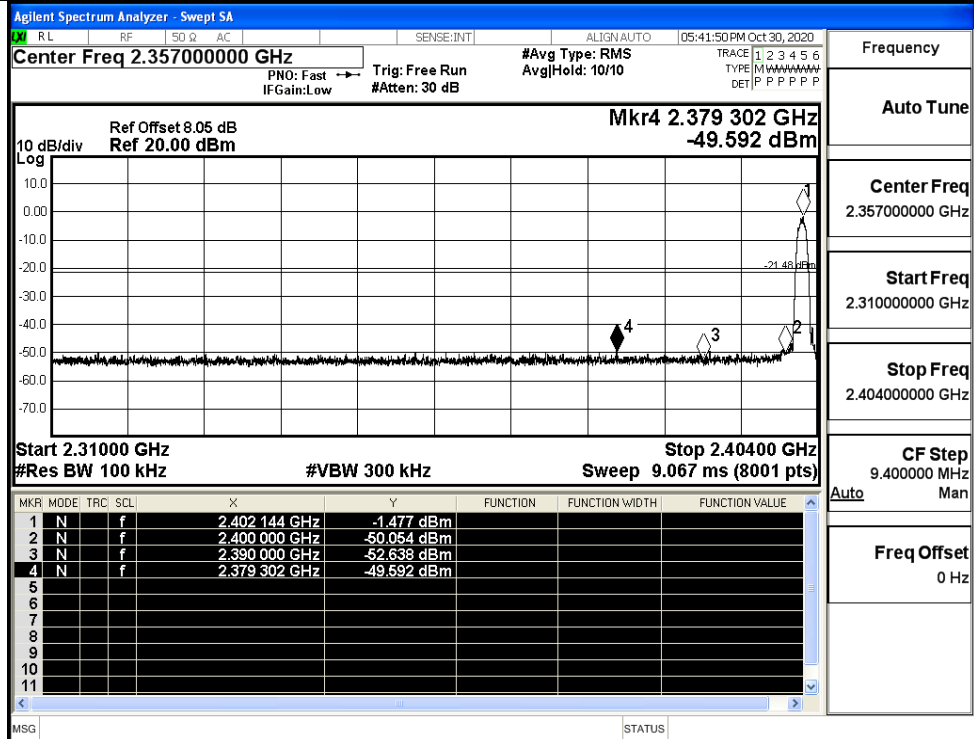
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

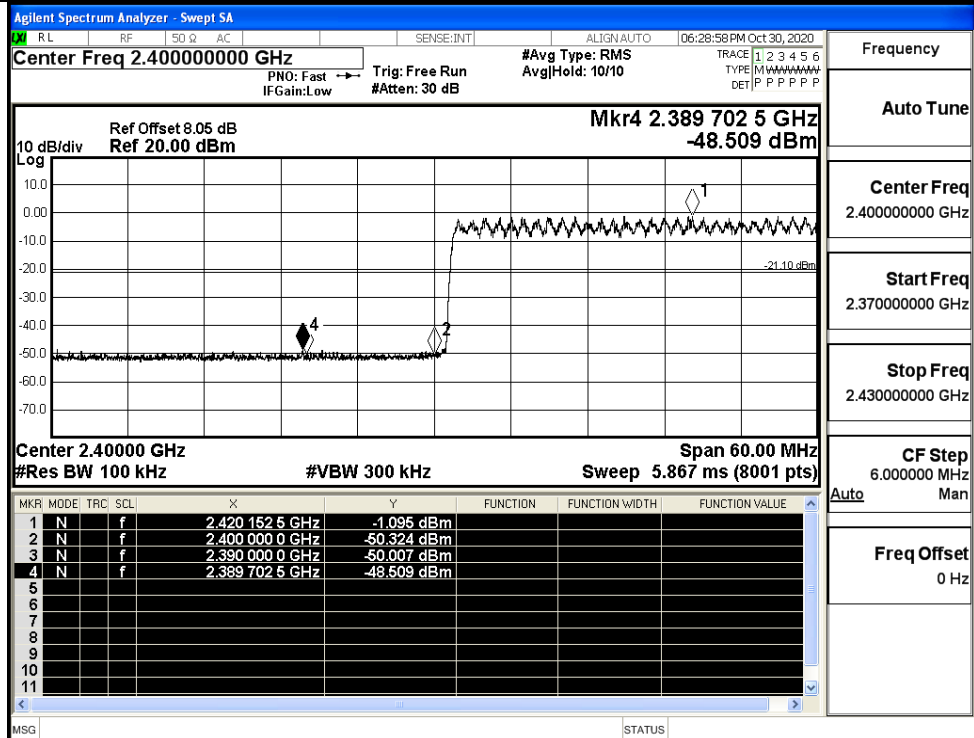
Start Freq
2.310000000 GHz

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

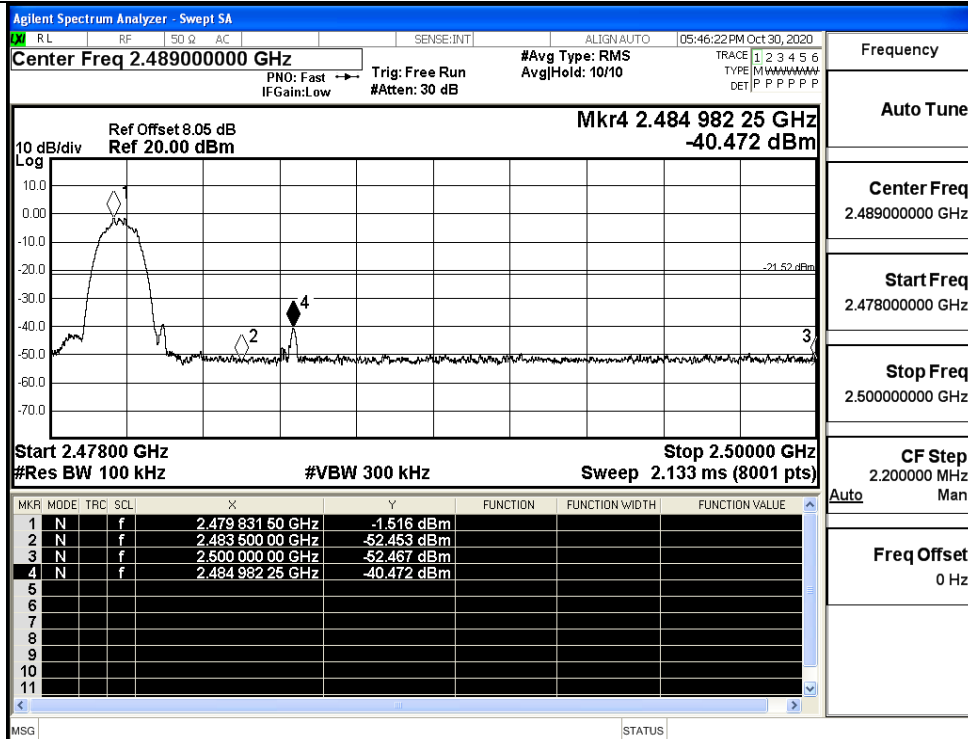
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

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

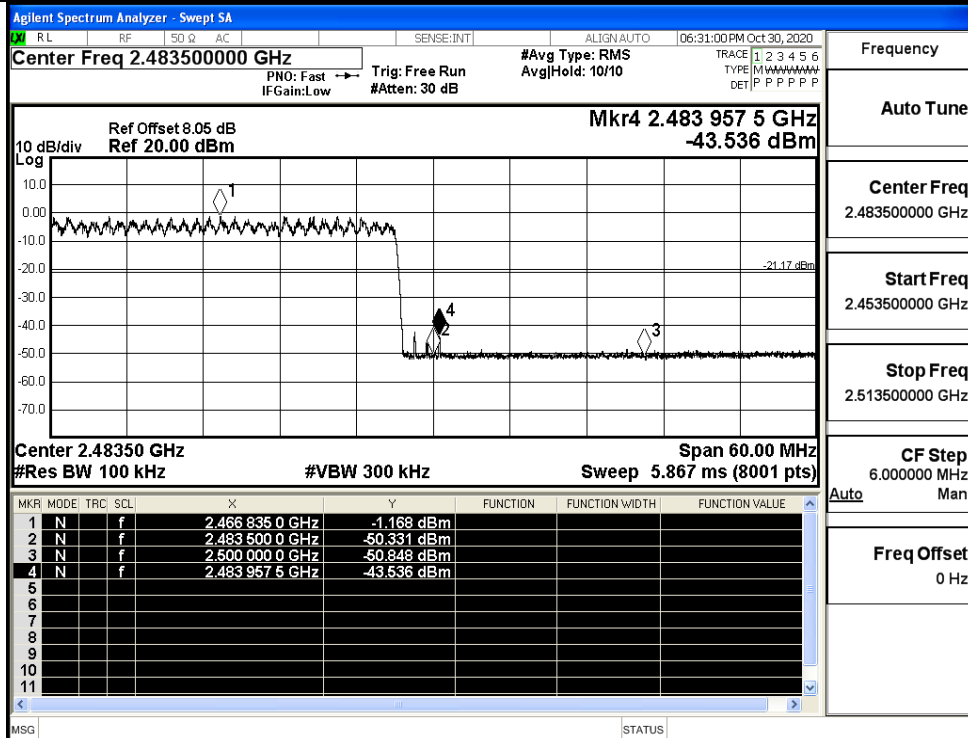


Frequency

Auto Tune

Center Freq
2.489000000 GHzStart Freq
2.478000000 GHzStop Freq
2.500000000 GHzCF Step
2.200000 MHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop

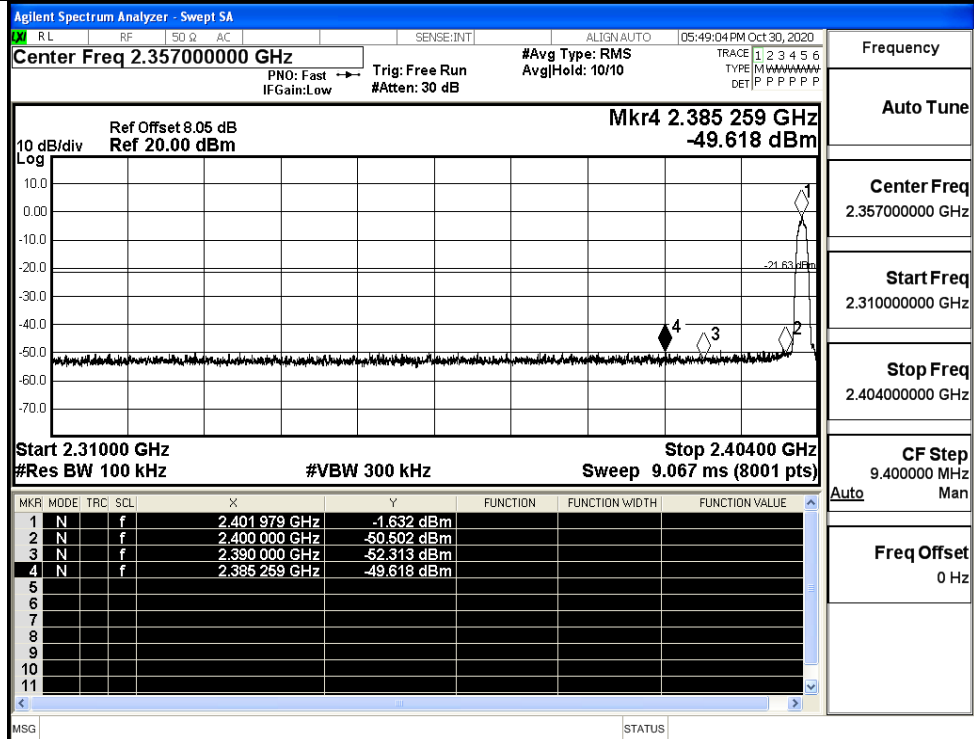


Frequency

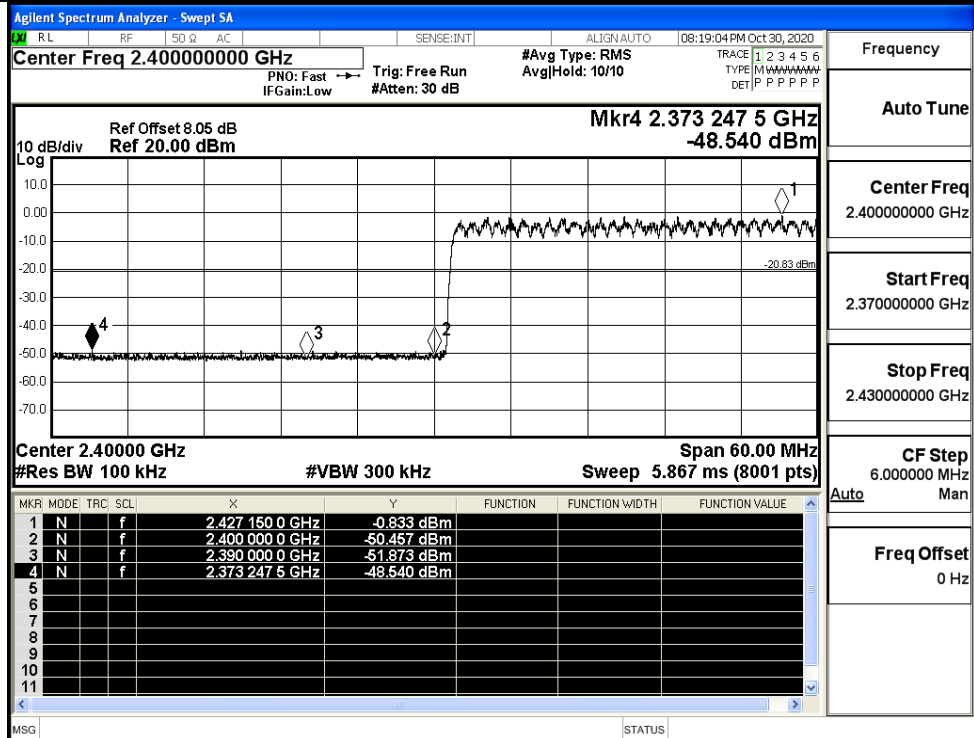
Auto Tune

Center Freq
2.483500000 GHzStart Freq
2.453500000 GHzStop Freq
2.513500000 GHzCF Step
6.000000 MHz
Auto ManFreq Offset
0 Hz

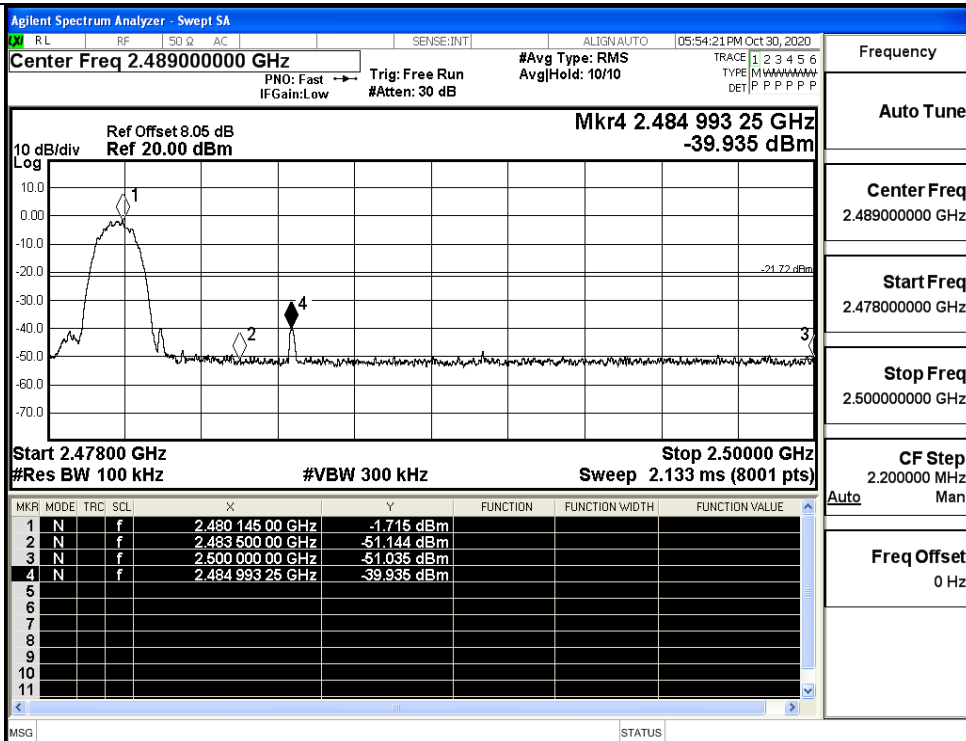
8DPSK/LCH/No Hop



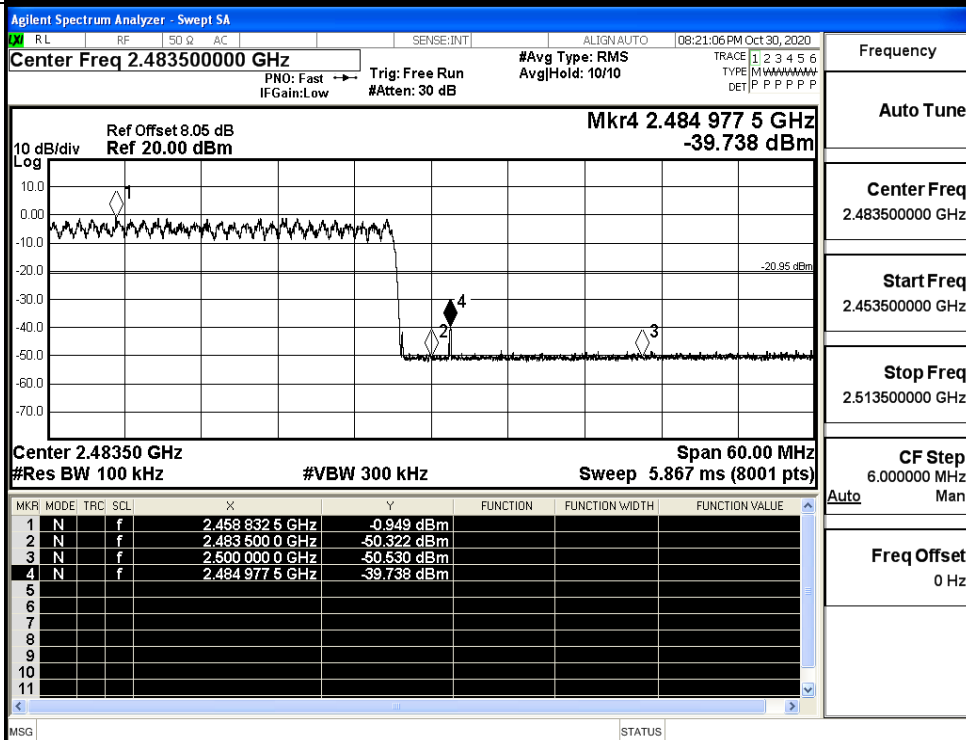
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



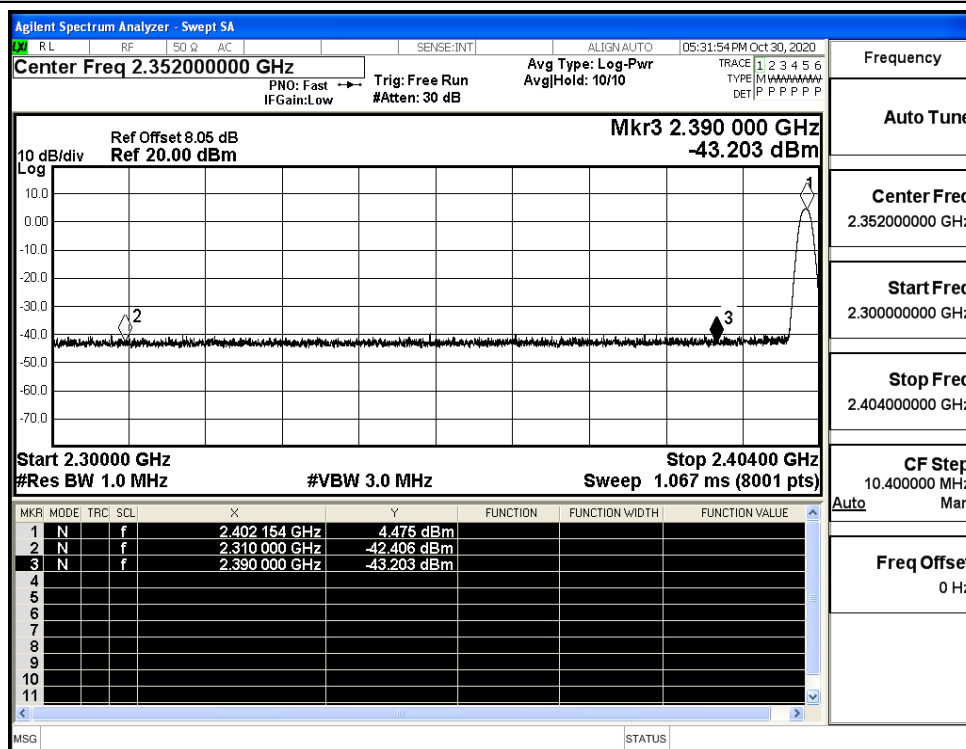
8DPSK/HCH/Hop



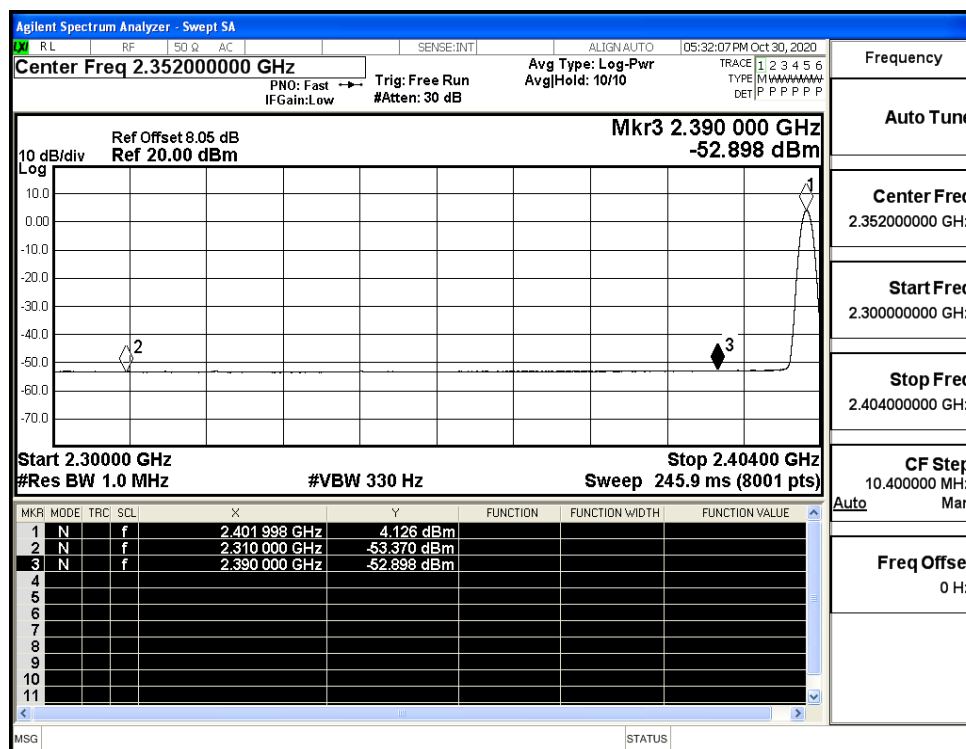
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.41	2.05	0	54.9	PEAK	74	PASS
	Off	2310.0	-53.37	2.05	0	43.94	AV	54	PASS
	Off	2390.0	-43.20	2.05	0	54.11	PEAK	74	PASS
	Off	2390.0	-52.90	2.05	0	44.41	AV	54	PASS
	Off	2483.5	-41.71	2.05	0	55.6	PEAK	74	PASS
	Off	2483.5	-52.28	2.05	0	45.03	AV	54	PASS
	Off	2500.0	-42.18	2.05	0	55.13	PEAK	74	PASS
	Off	2500.0	-52.32	2.05	0	44.99	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.60	2.05	0	54.71	PEAK	74	PASS
	Off	2310.0	-53.28	2.05	0	44.03	AV	54	PASS
	Off	2390.0	-41.56	2.05	0	55.75	PEAK	74	PASS
	Off	2390.0	-52.95	2.05	0	44.36	AV	54	PASS
	Off	2483.5	-42.30	2.05	0	55.01	PEAK	74	PASS
	Off	2483.5	-52.24	2.05	0	45.07	AV	54	PASS
	Off	2500.0	-42.38	2.05	0	54.93	PEAK	74	PASS
	Off	2500.0	-52.28	2.05	0	45.03	AV	54	PASS
8DPSK	Off	2310.0	-43.81	2.05	0	53.5	PEAK	74	PASS
	Off	2310.0	-53.31	2.05	0	44	AV	54	PASS
	Off	2390.0	-43.32	2.05	0	53.99	PEAK	74	PASS
	Off	2390.0	-52.96	2.05	0	44.35	AV	54	PASS
	Off	2483.5	-40.99	2.05	0	56.32	PEAK	74	PASS
	Off	2483.5	-52.01	2.05	0	45.3	AV	54	PASS
	Off	2500.0	-43.00	2.05	0	54.31	PEAK	74	PASS
	Off	2500.0	-52.25	2.05	0	45.06	AV	54	PASS

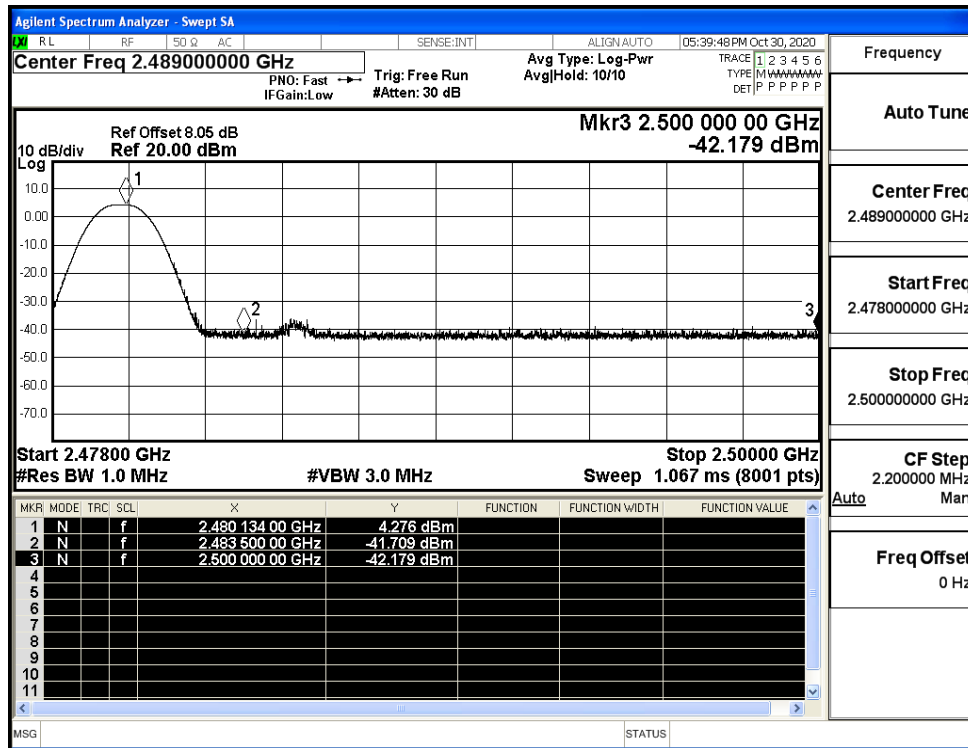
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



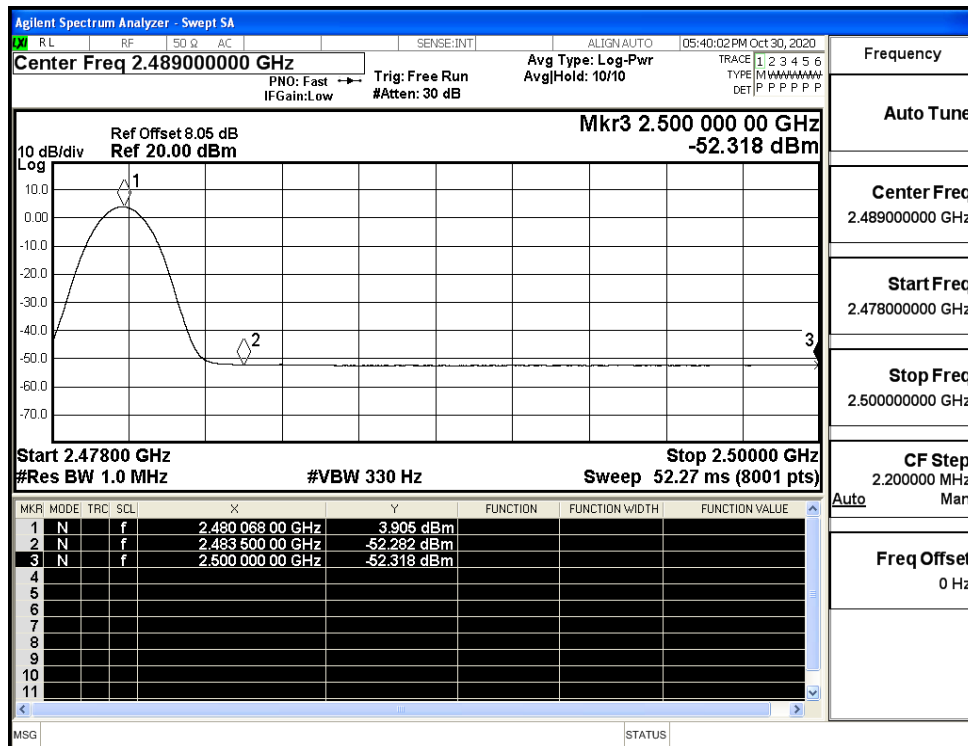
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



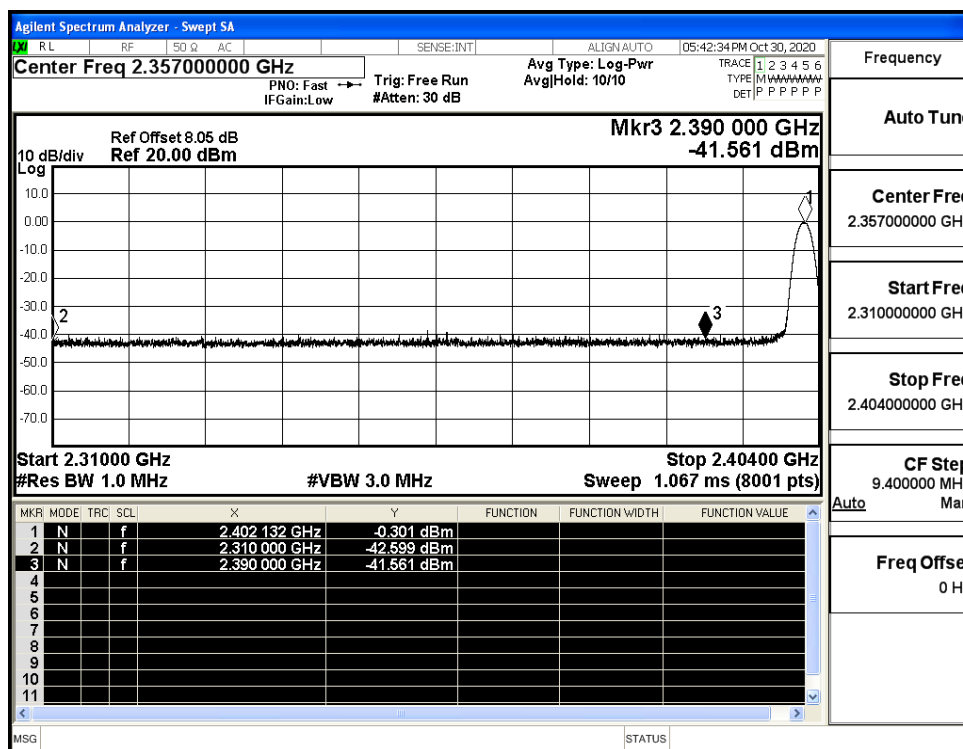
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



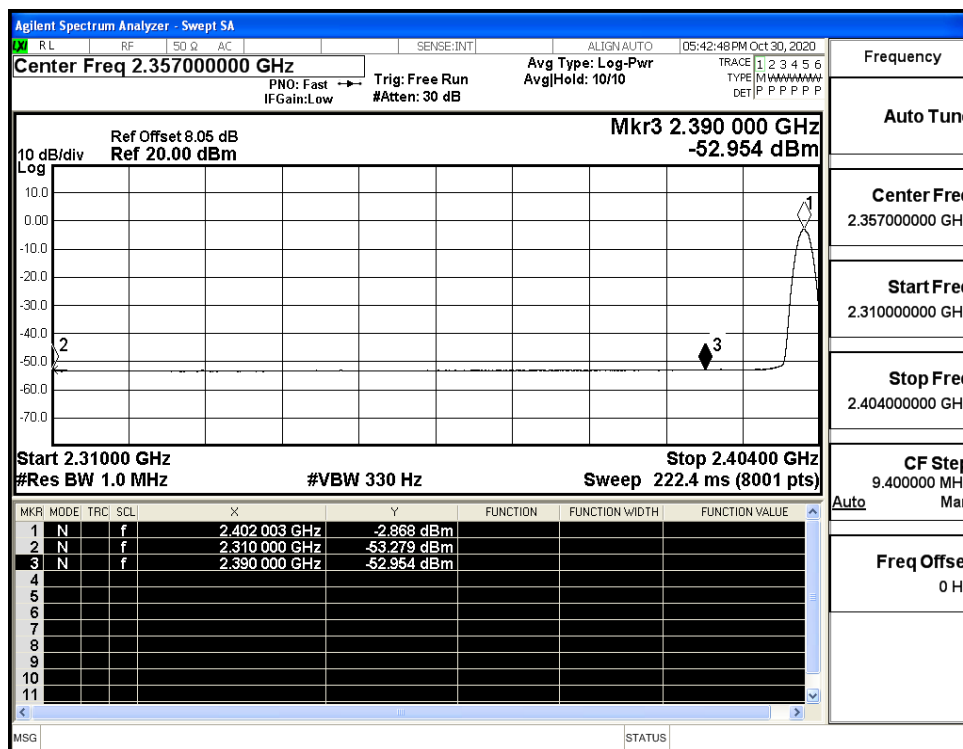
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



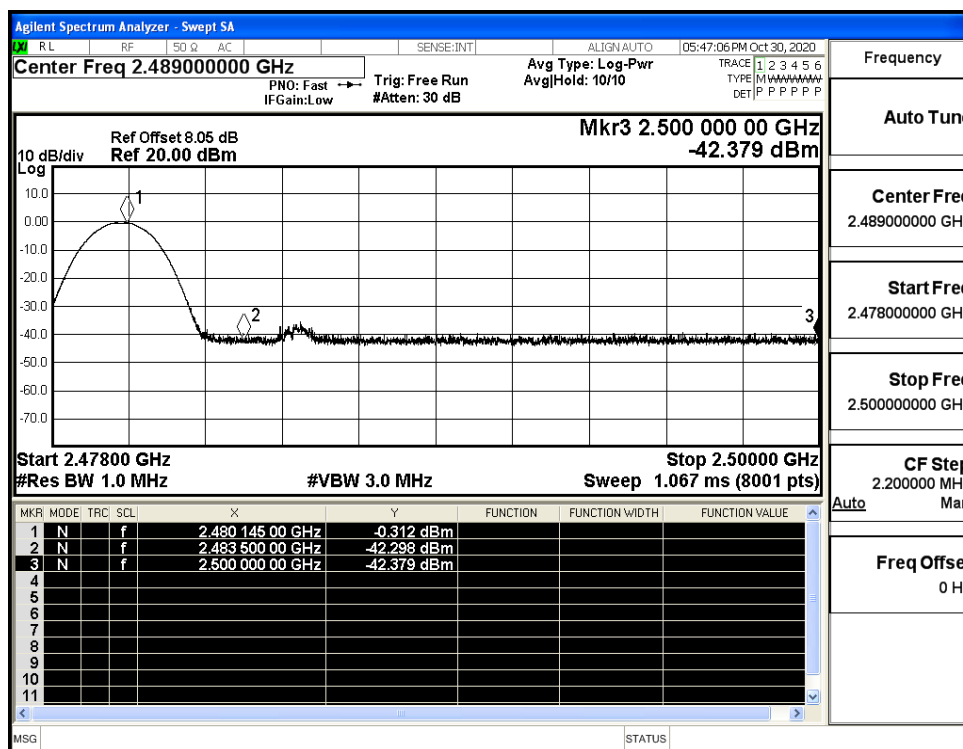
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



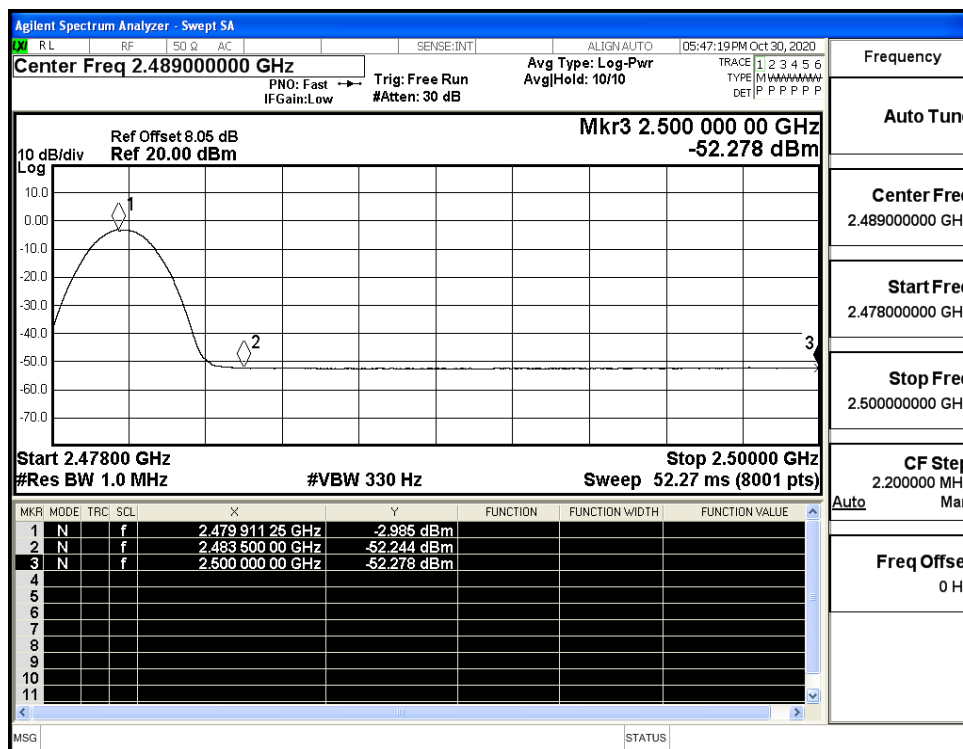
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



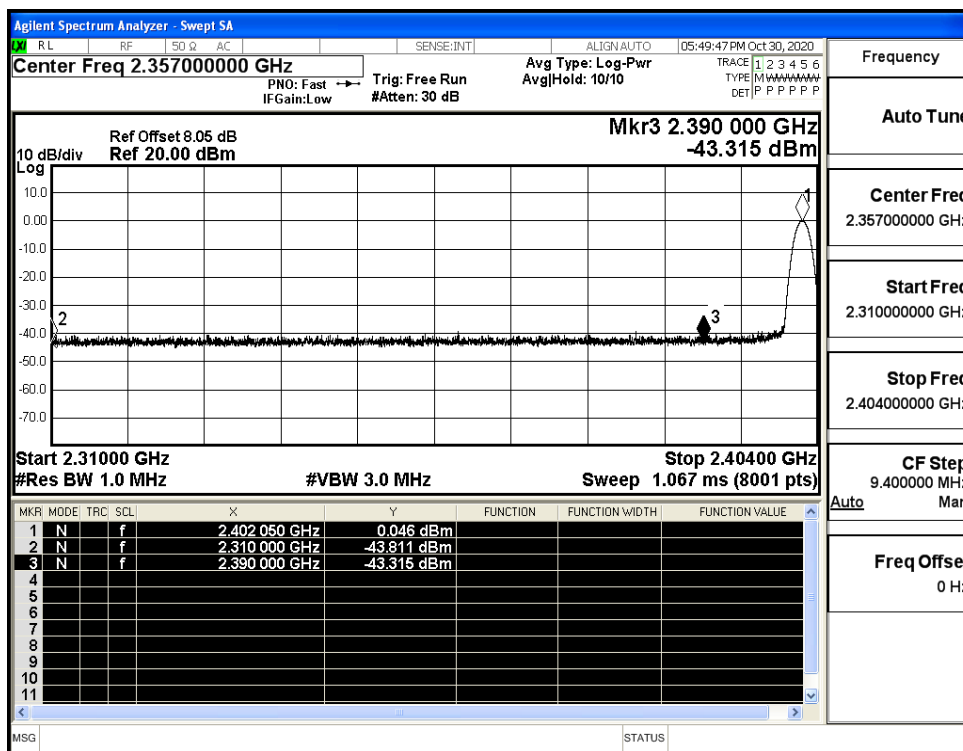
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



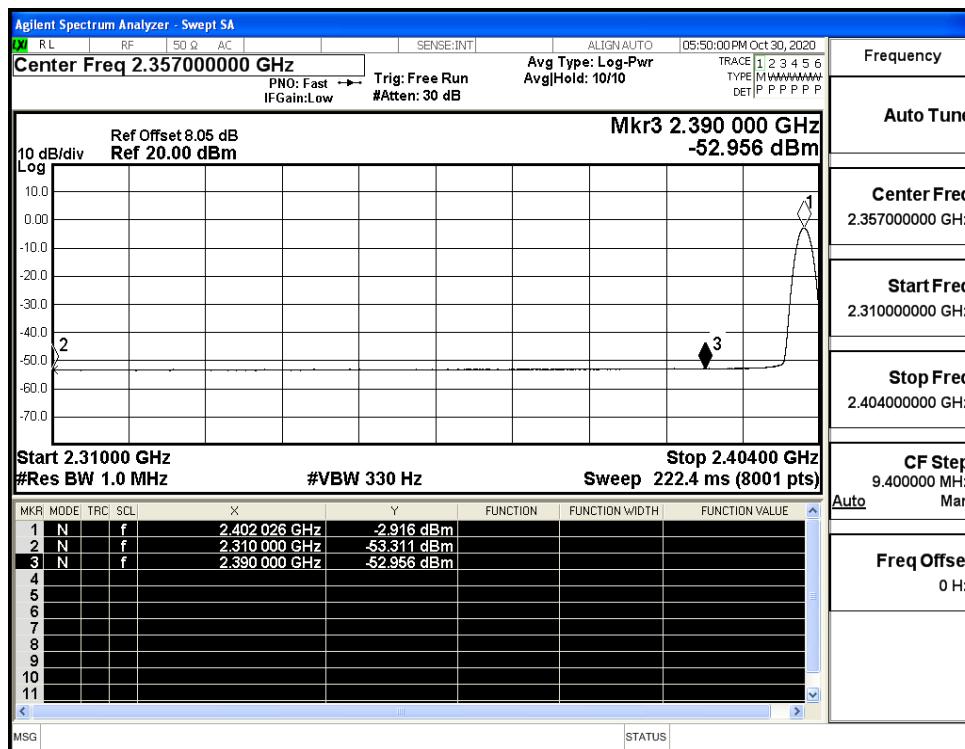
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



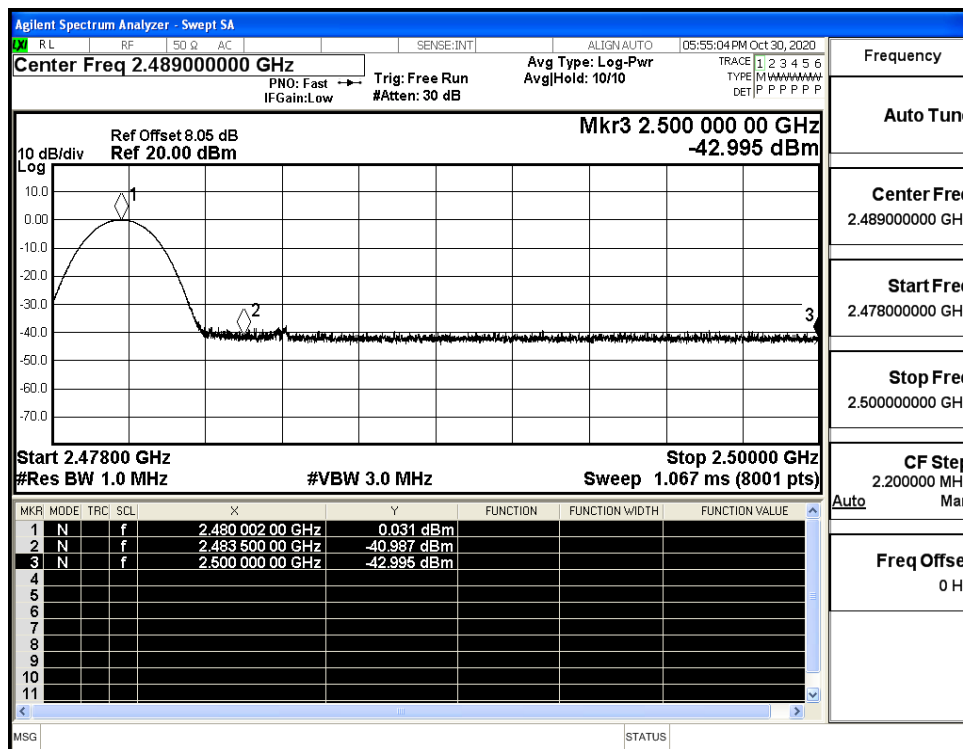
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

