

Appendix A

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

Product Name: Kraydel Hub

Trade Mark: Kraydel

Test Model: Konnect

Environmental Conditions

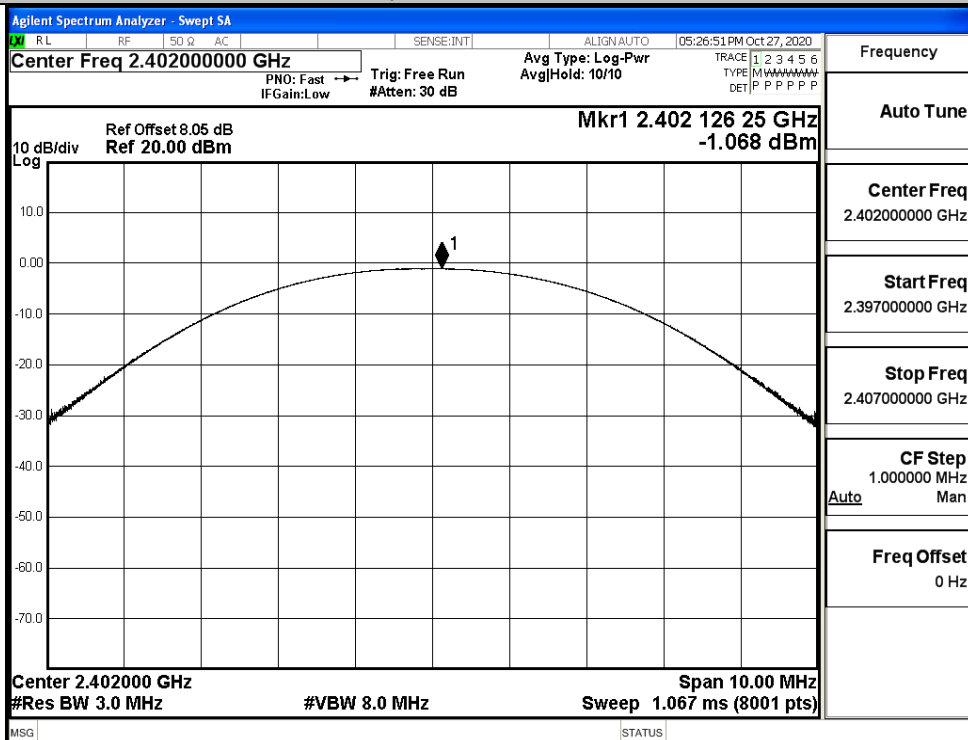
Temperature:	25.5 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.5 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

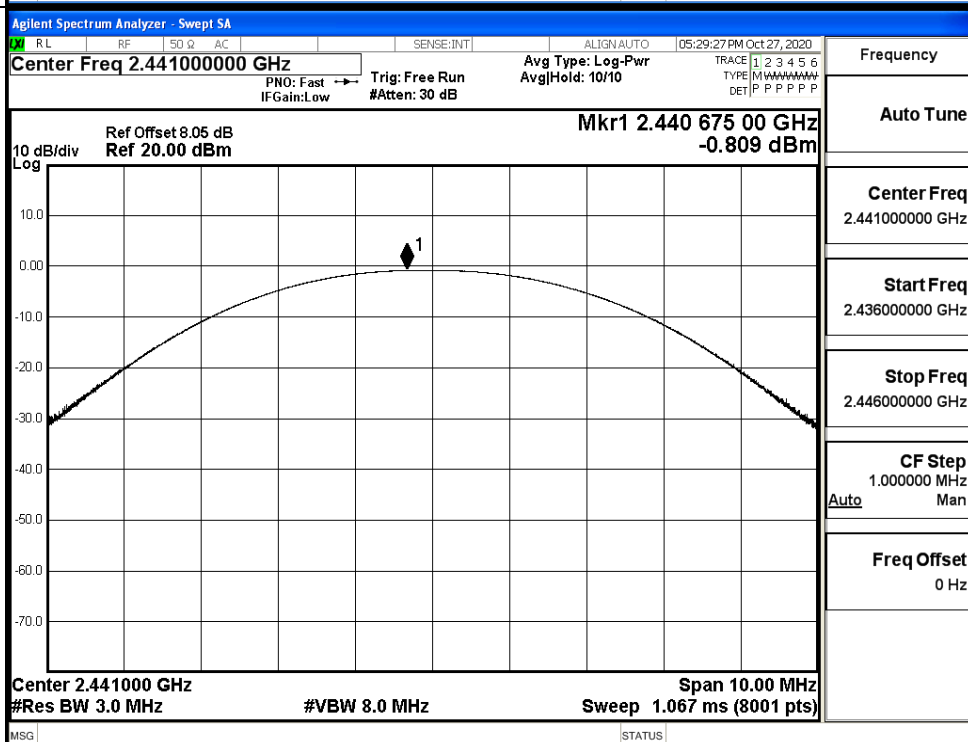
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.068	21	PASS
	MCH	-0.809	21	PASS
	HCH	-1.148	21	PASS
$\pi/4$ DQPSK	LCH	1.222	21	PASS
	MCH	1.452	21	PASS
	HCH	1.096	21	PASS
8DPSK	LCH	1.452	21	PASS
	MCH	1.713	21	PASS
	HCH	1.318	21	PASS

Test Graphs

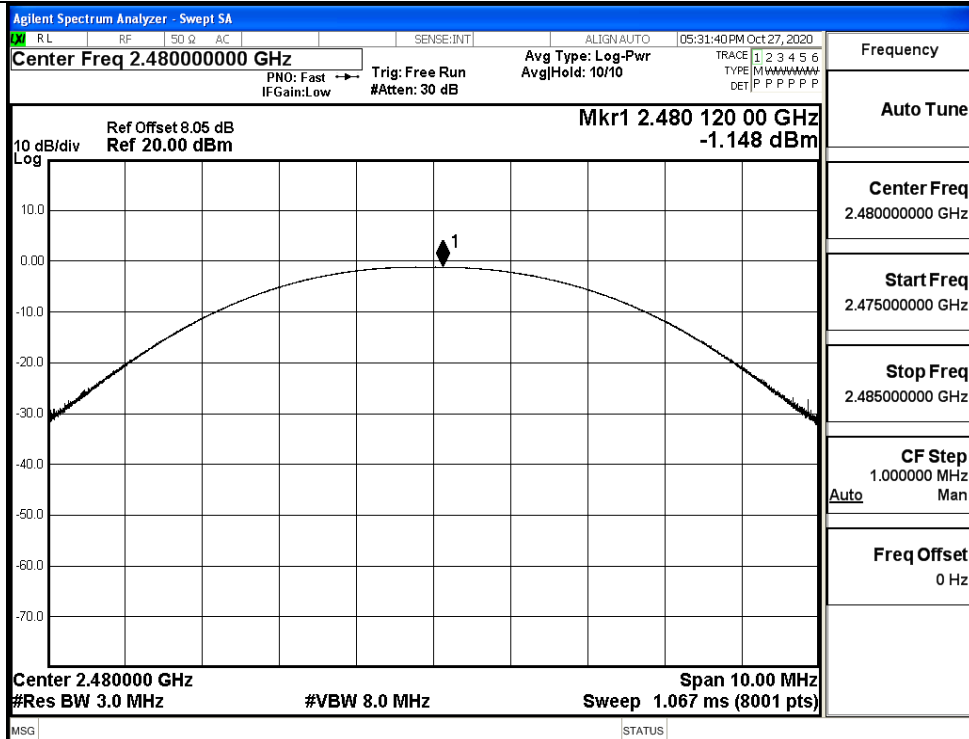
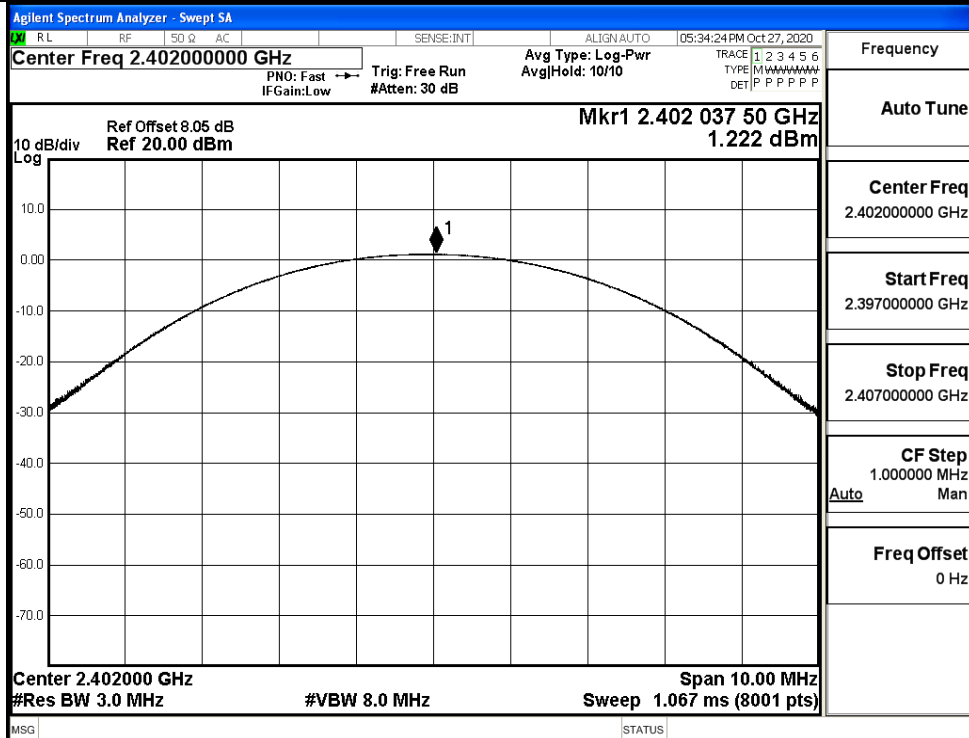
GFSK/LCH

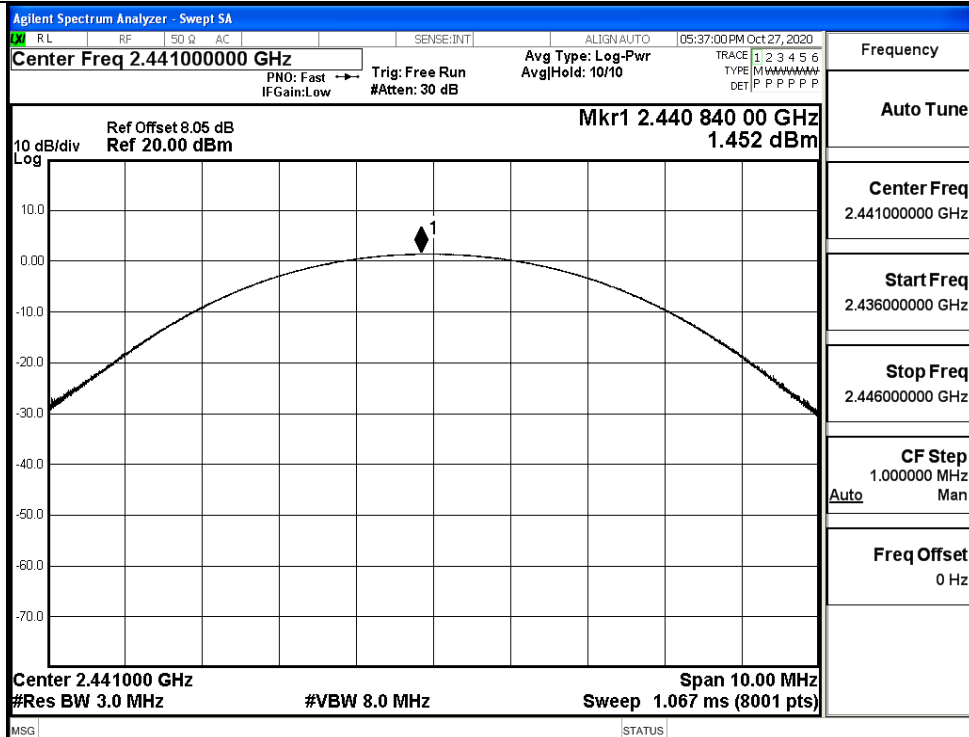
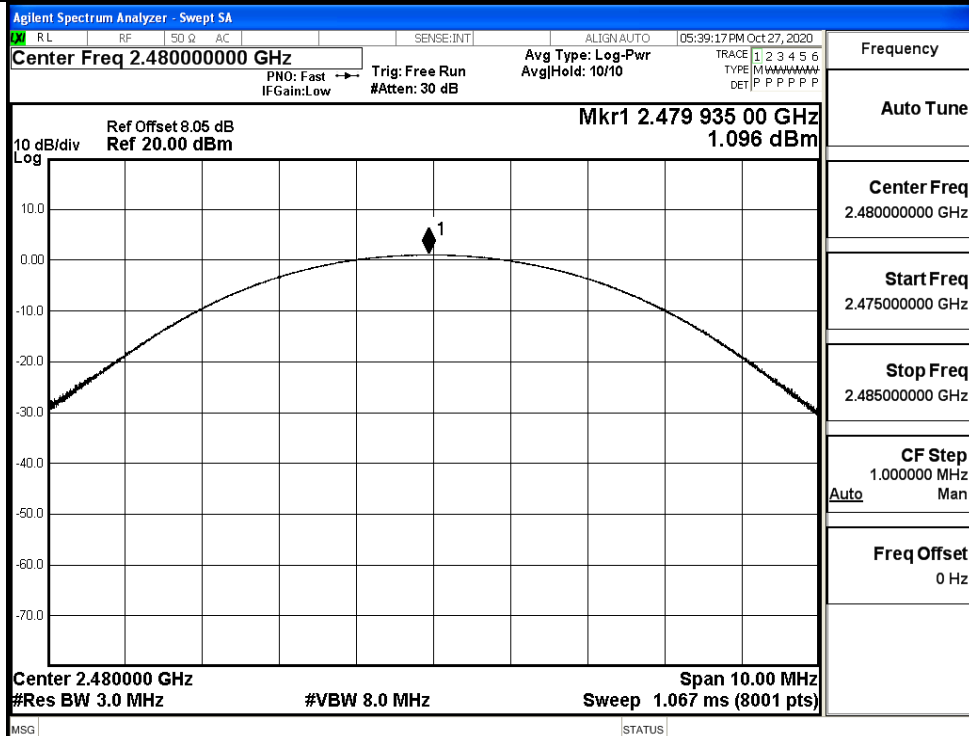


GFSK/MCH

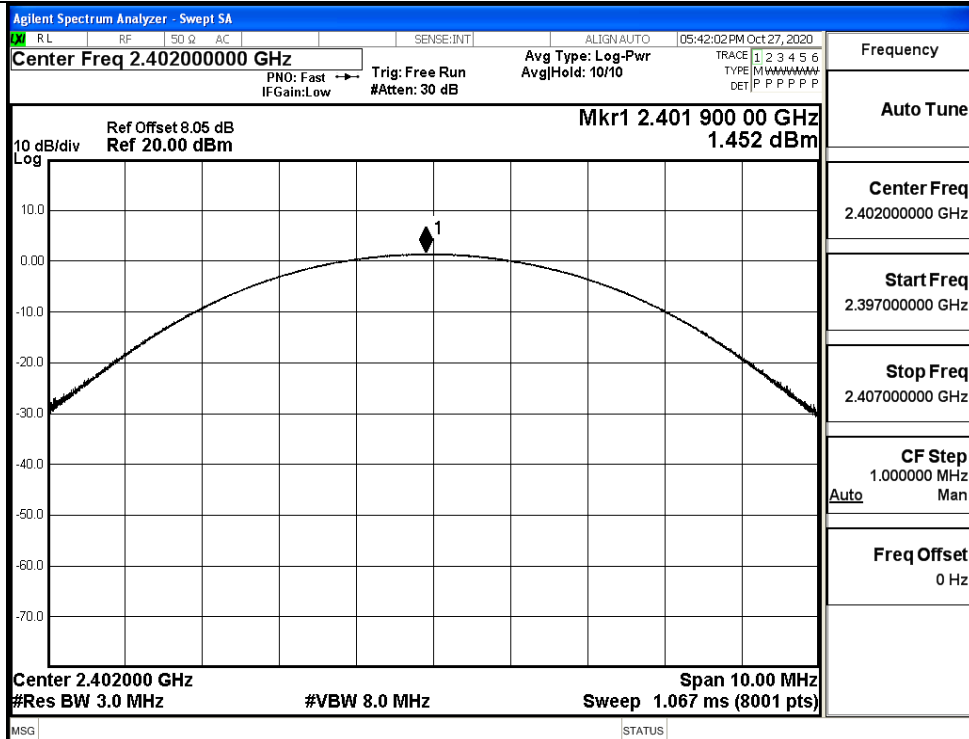


GFSK/HCH

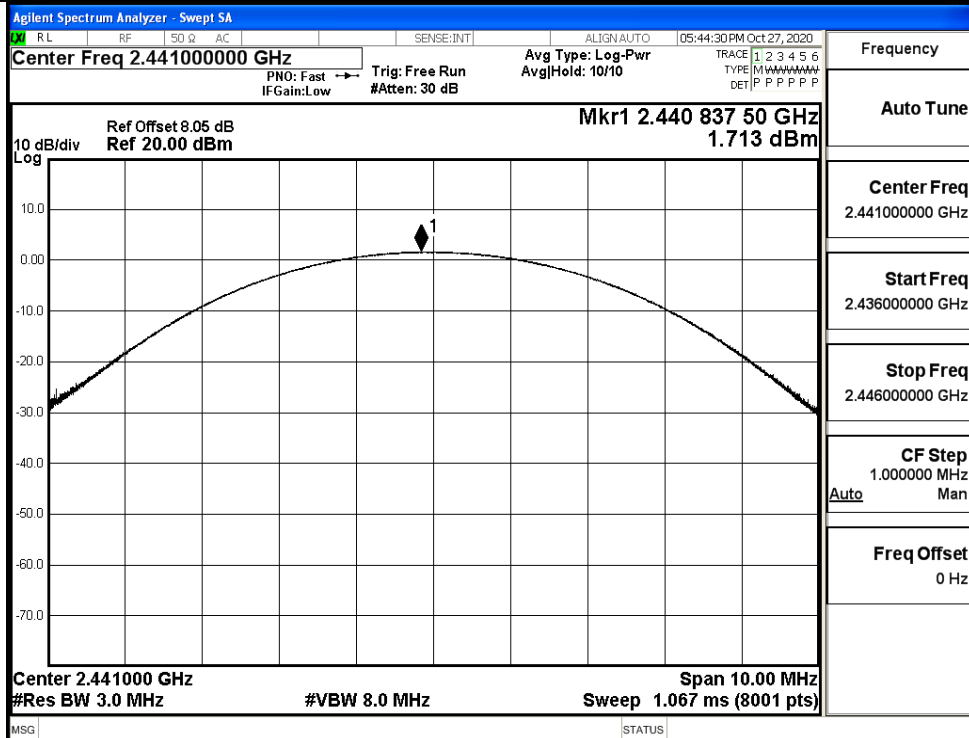
 $\pi/4$ DQPSK/LCH

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

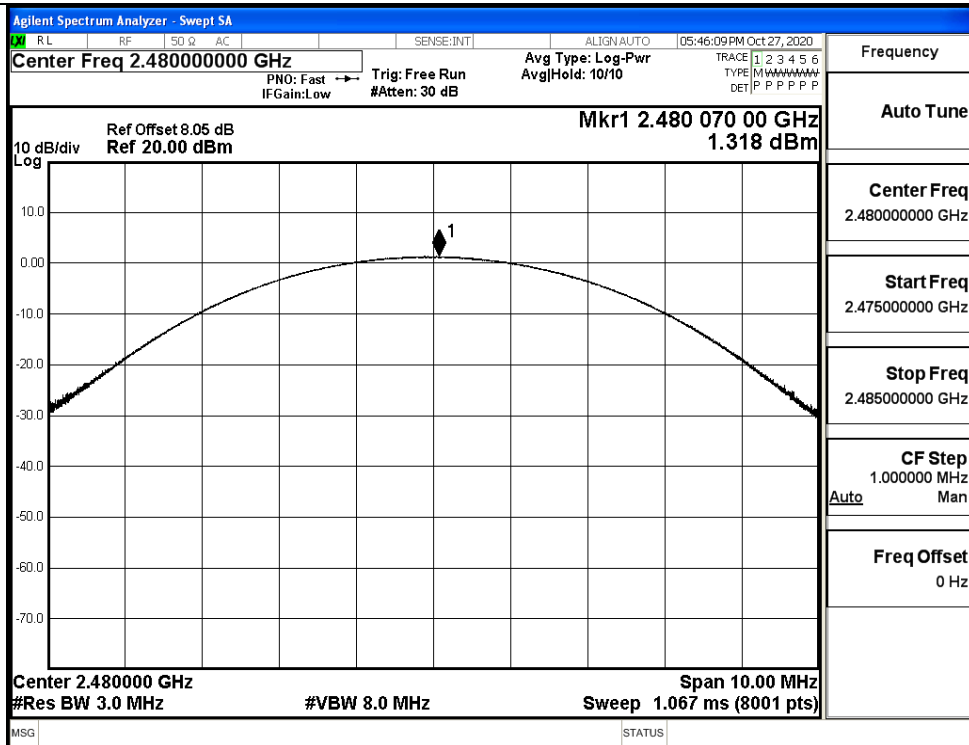
8DPSK/LCH



8DPSK/MCH



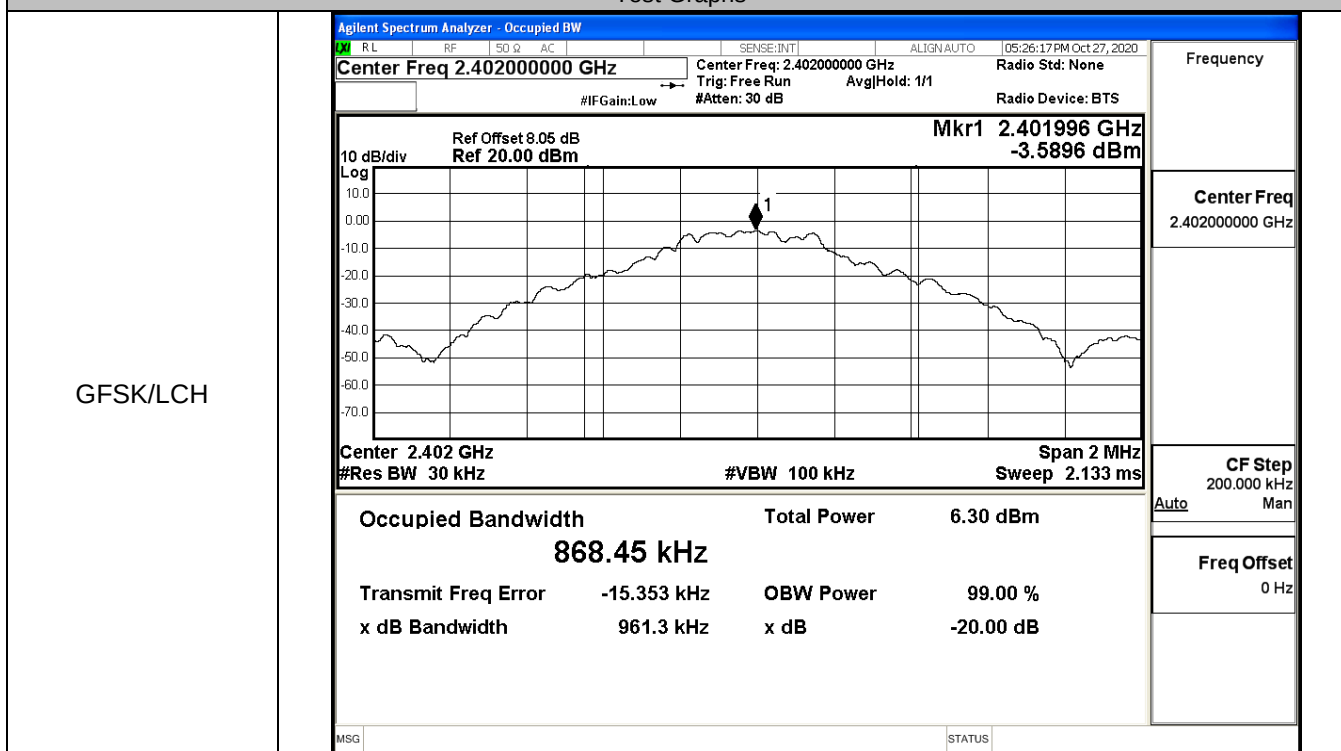
8DPSK/HCH



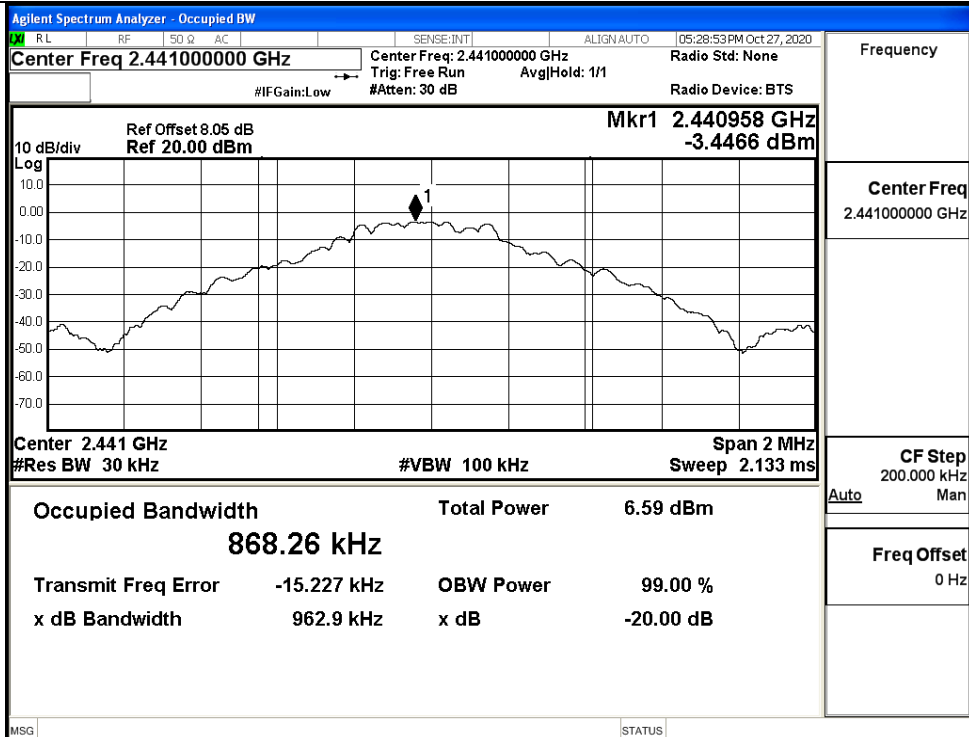
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9613	Not Specified	PASS
	MCH	0.9629	Not Specified	PASS
	HCH	0.9641	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.520	Not Specified	PASS
	MCH	1.522	Not Specified	PASS
	HCH	1.524	Not Specified	PASS
8DPSK	LCH	1.517	Not Specified	PASS
	MCH	1.510	Not Specified	PASS
	HCH	1.508	Not Specified	PASS

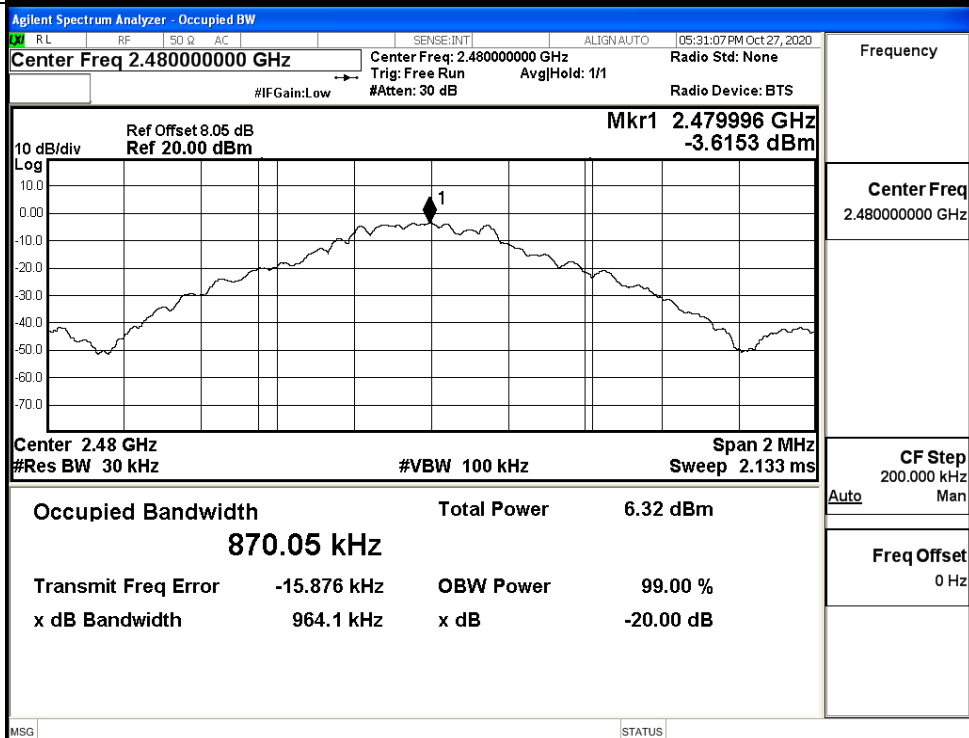
Test Graphs

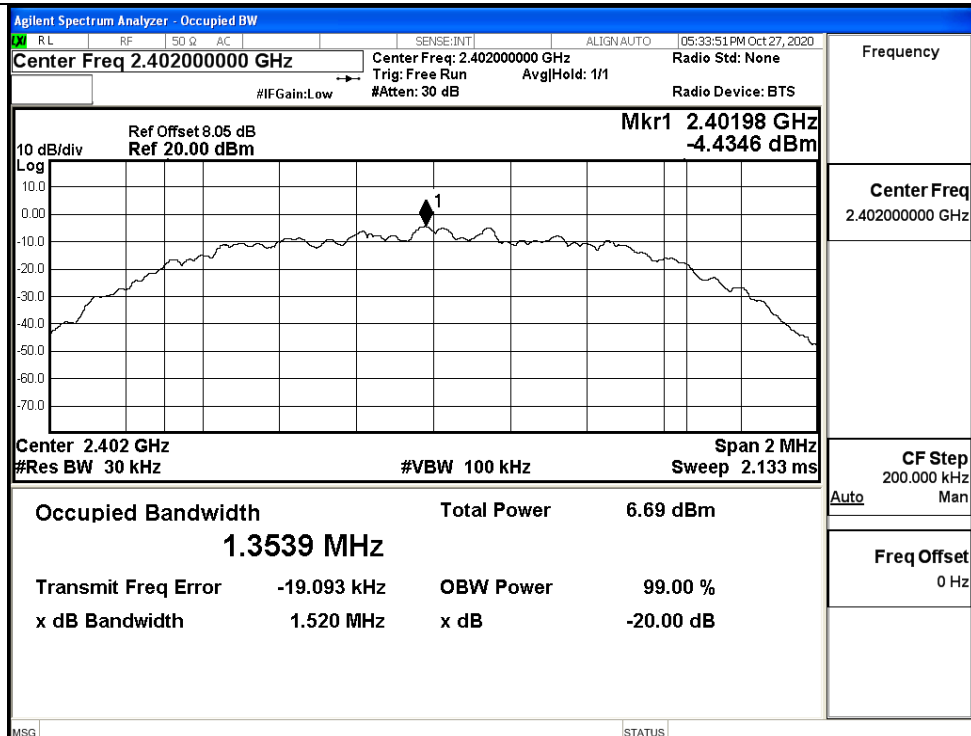


GFSK/MCH



GFSK/HCH

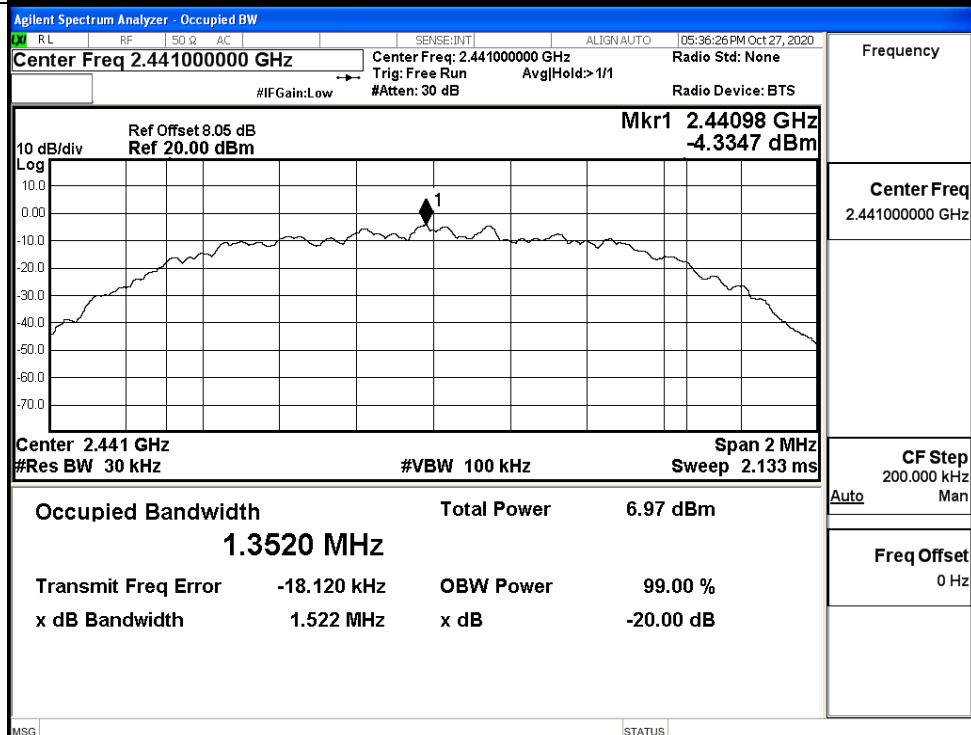


$\pi/4$ DQPSK/LCH

Frequency

Center Freq
2.40200000 GHzCF Step
200.000 kHz
Man

Auto

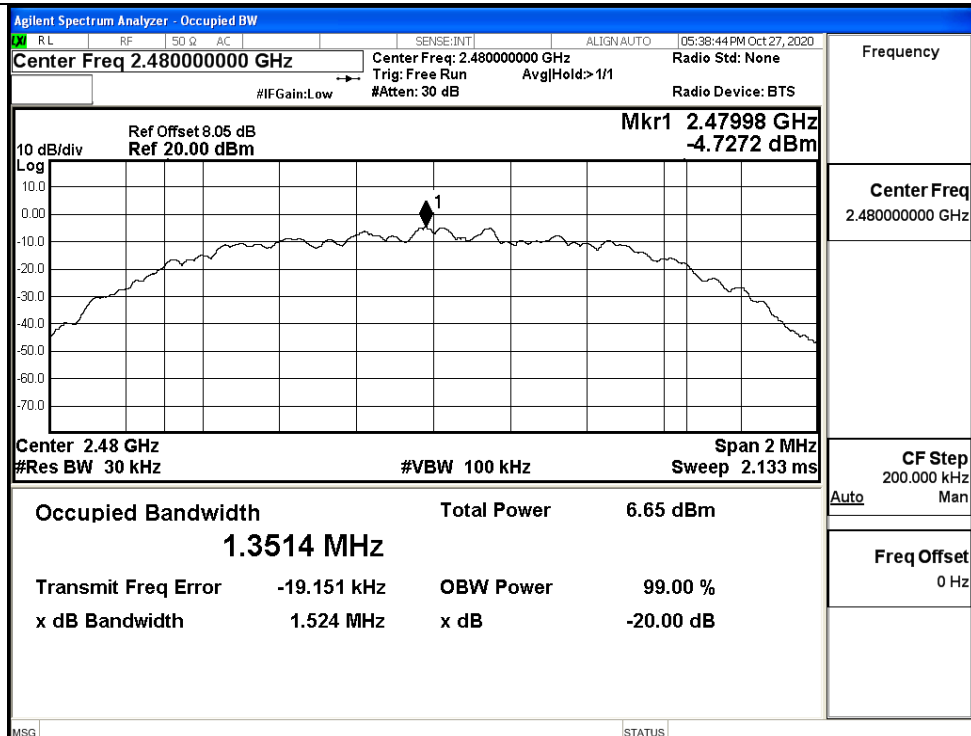
Freq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

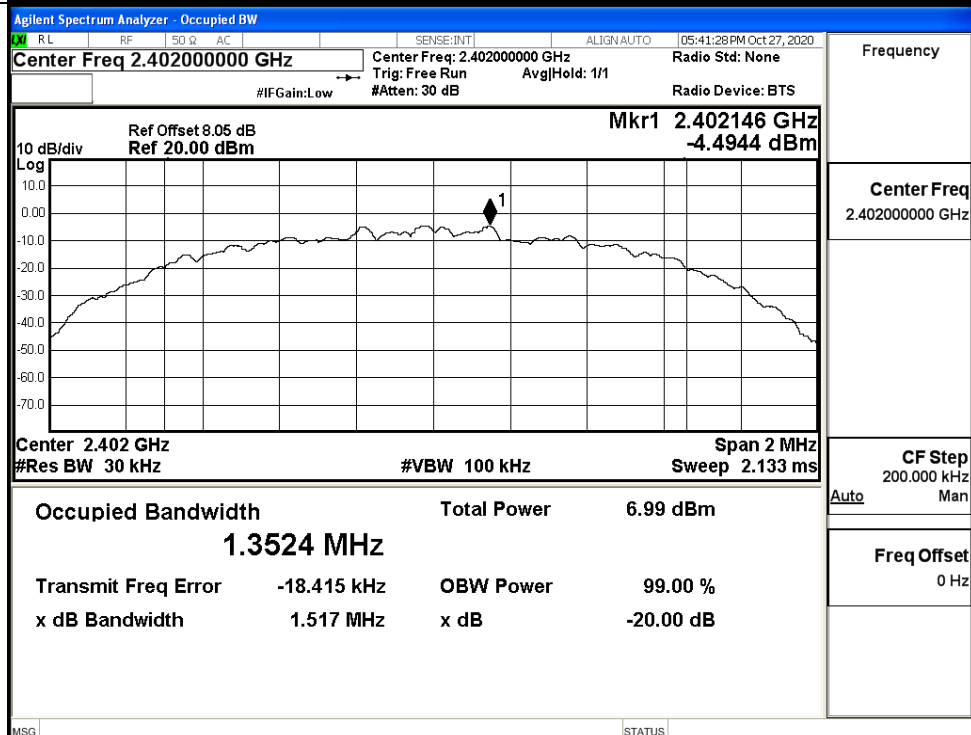
Center Freq
2.44100000 GHzCF Step
200.000 kHz
Man

Auto

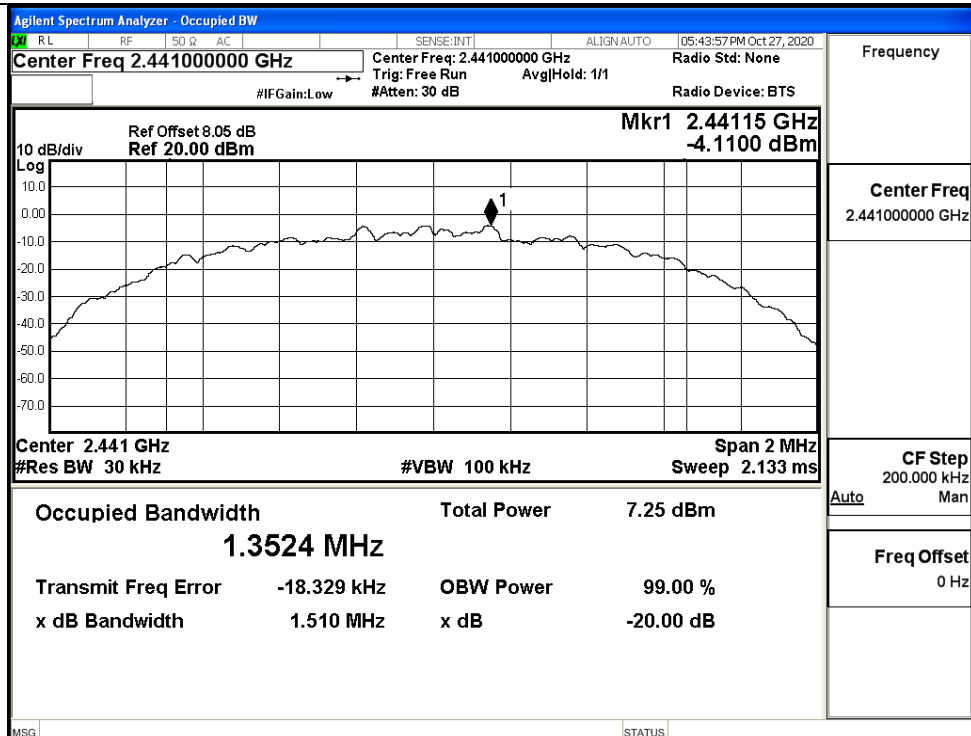
Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH

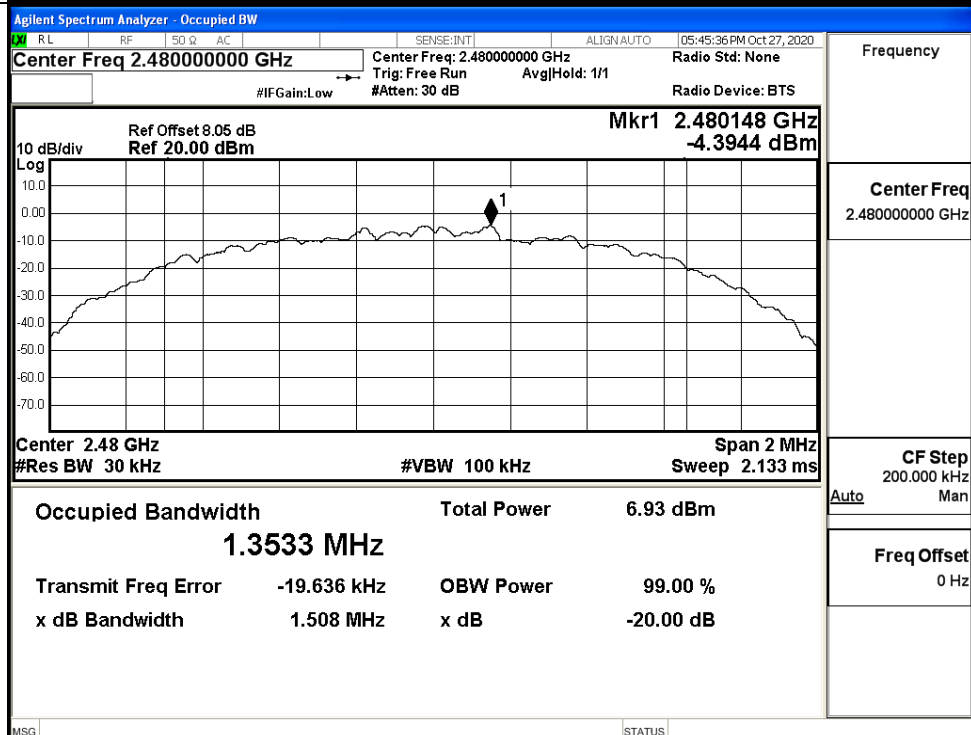
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

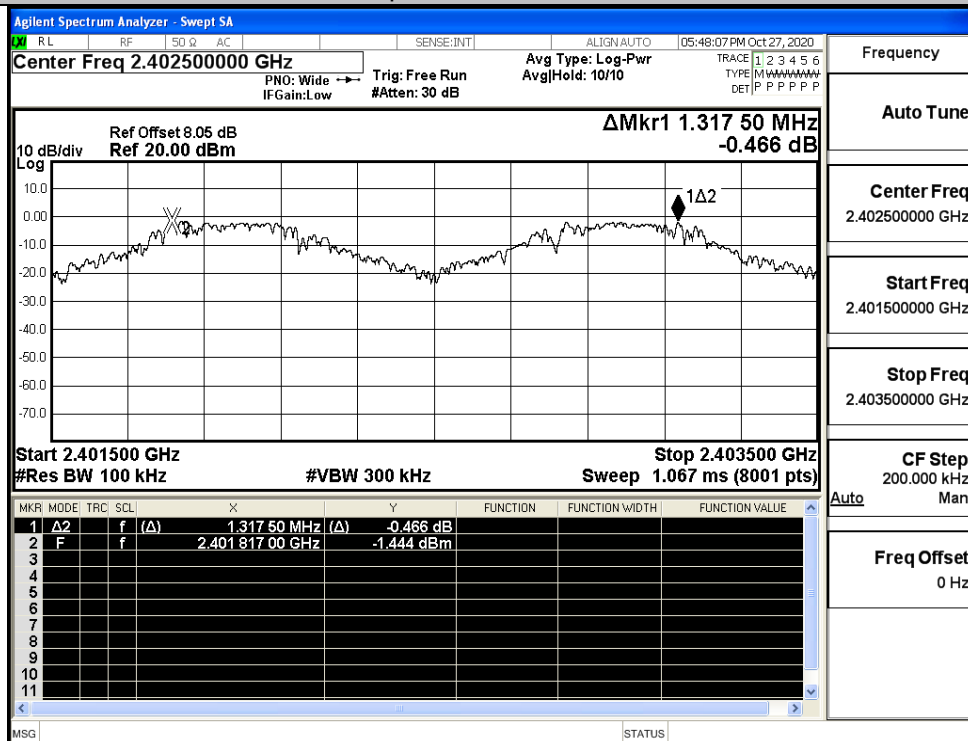


A.3 Carrier Frequency Separation

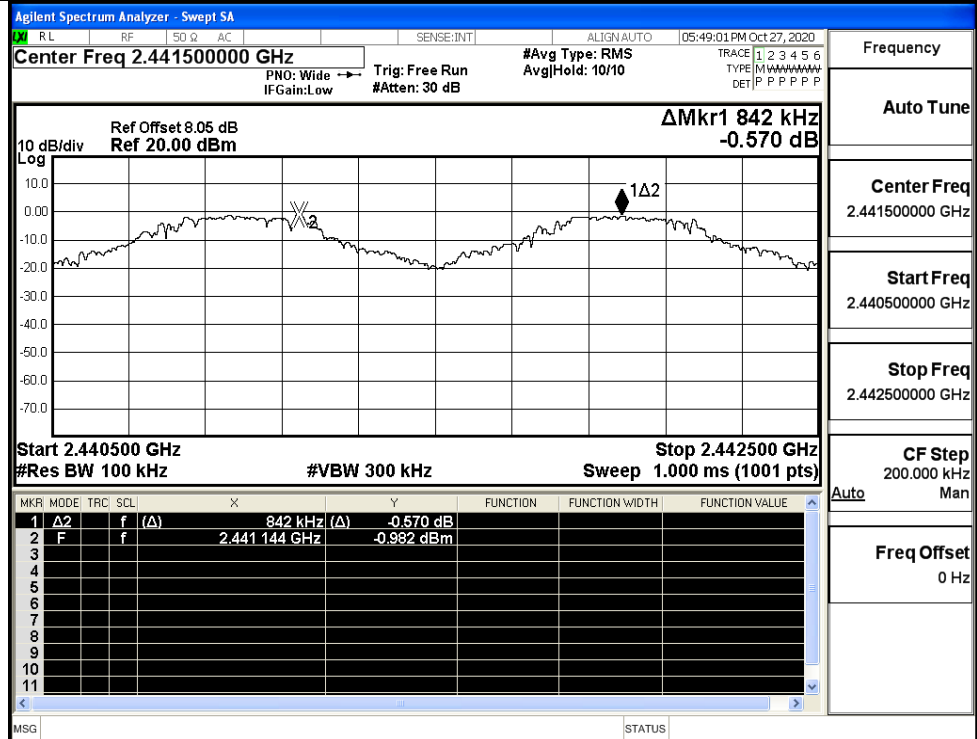
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.318	0.643	PASS
	MCH	0.842	0.643	PASS
	HCH	0.864	0.643	PASS
$\pi/4$ DQPSK	LCH	1.074	1.016	PASS
	MCH	1.024	1.016	PASS
	HCH	1.218	1.016	PASS
8DPSK	LCH	1.058	1.011	PASS
	MCH	1.016	1.011	PASS
	HCH	1.126	1.011	PASS

Test Graphs

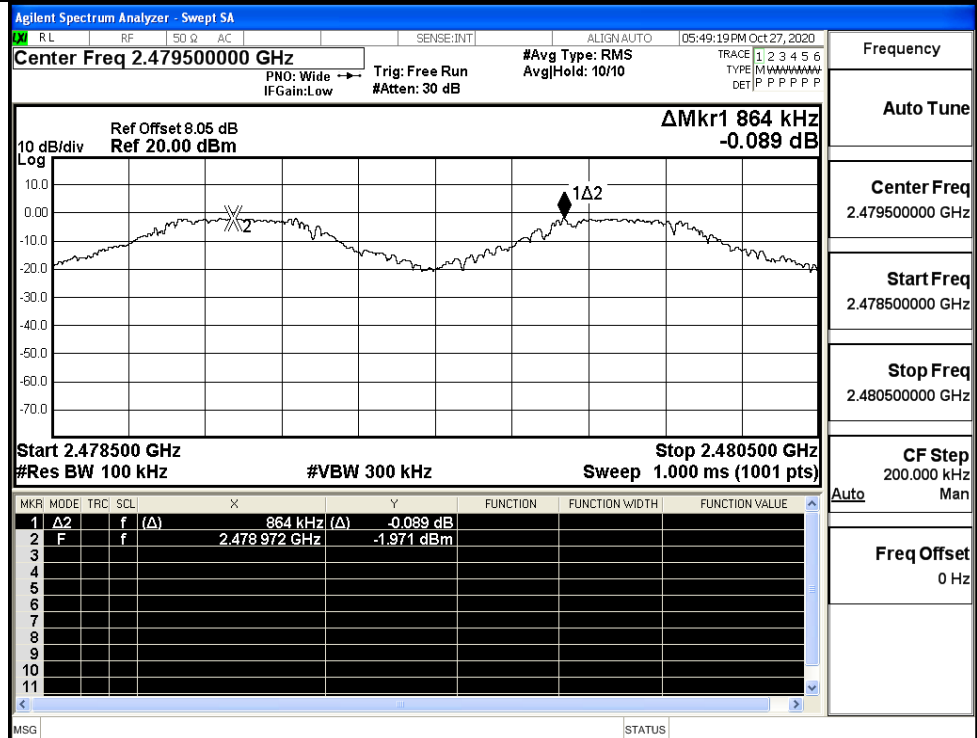
GFSK/LCH

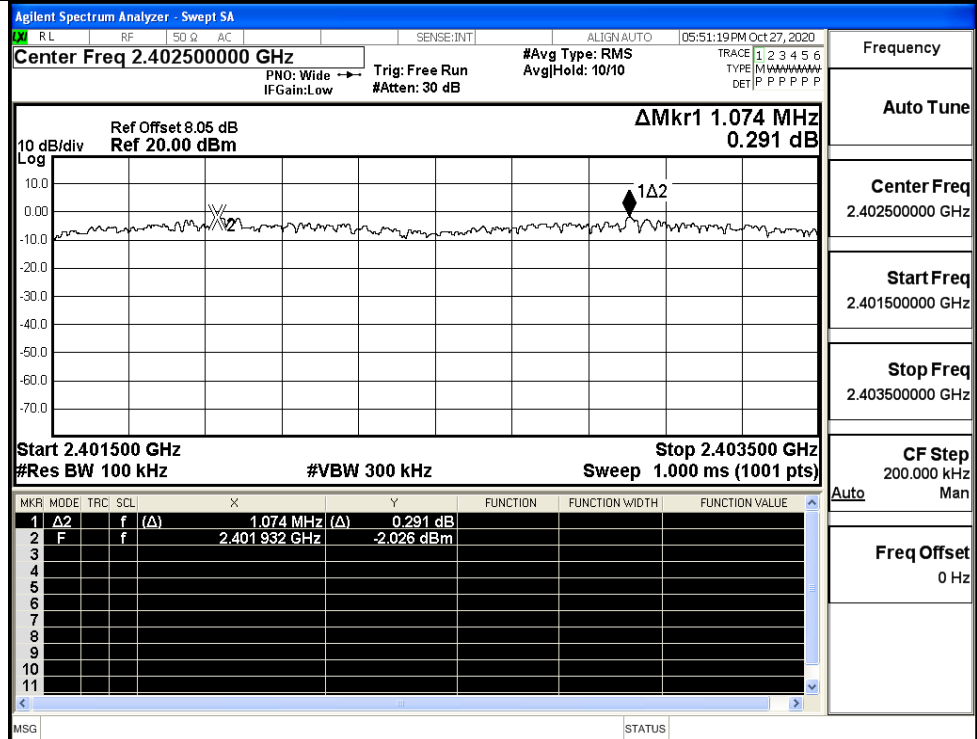
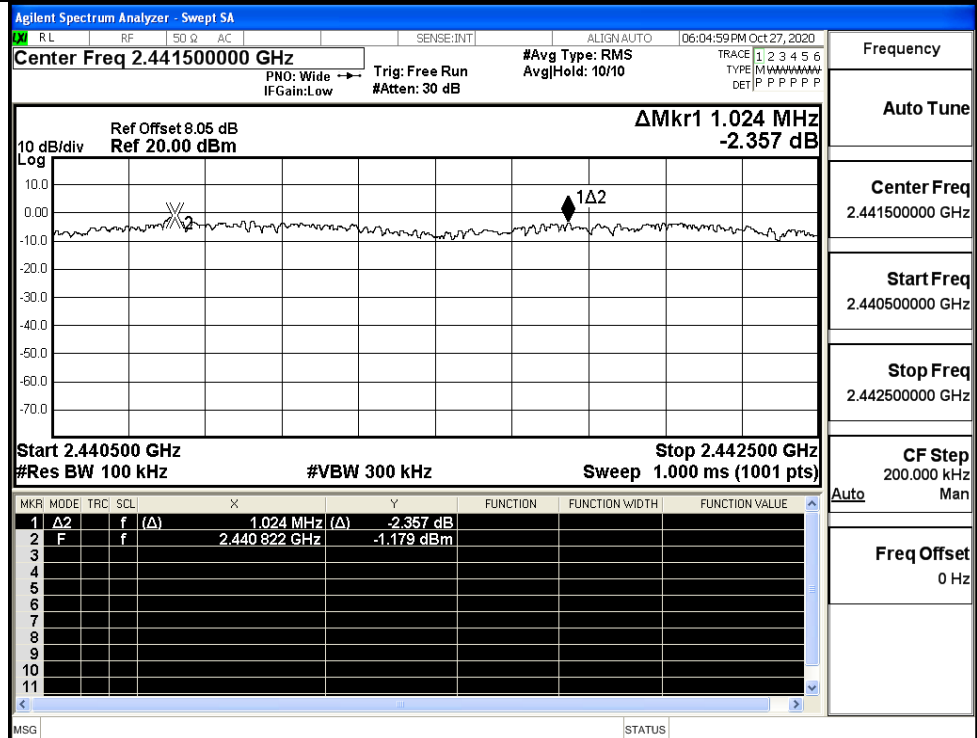


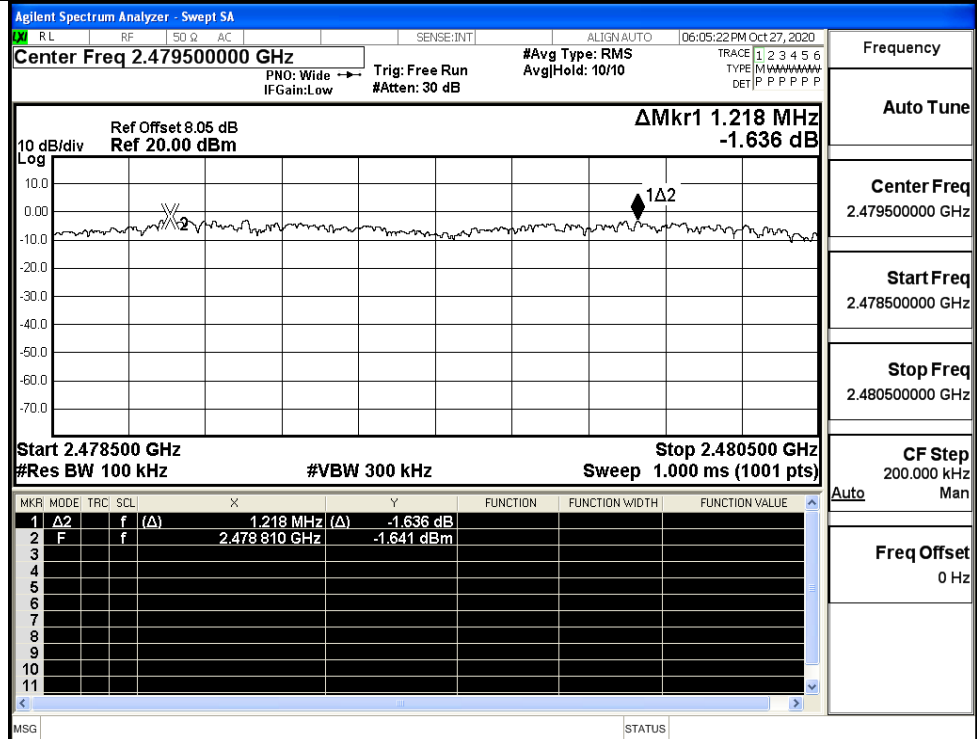
GFSK/MCH



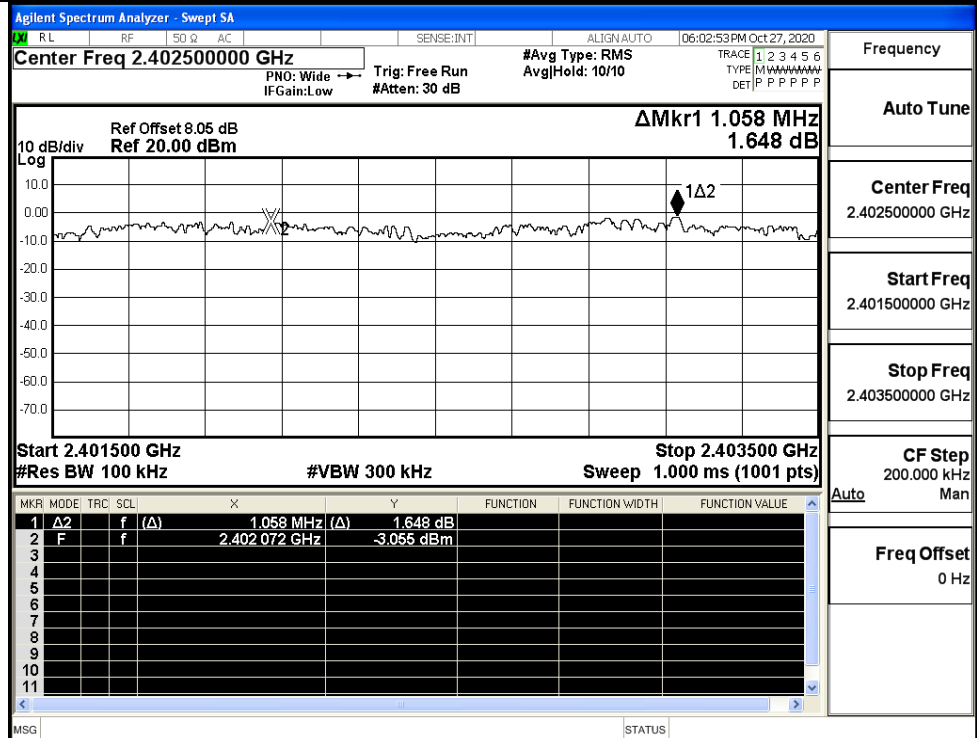
GFSK/HCH



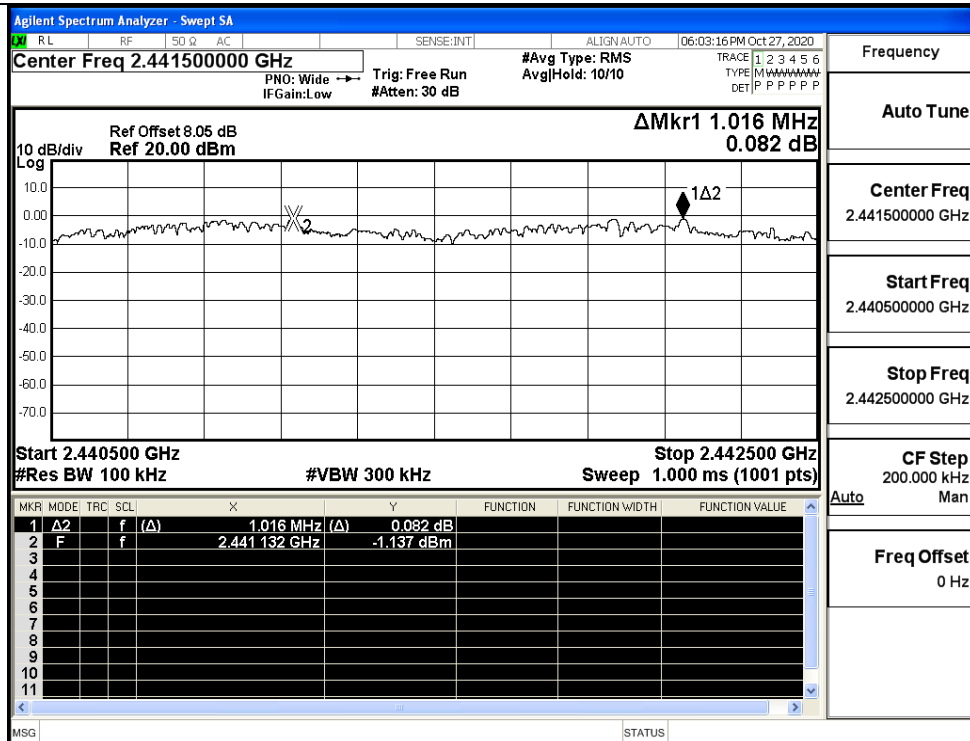
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

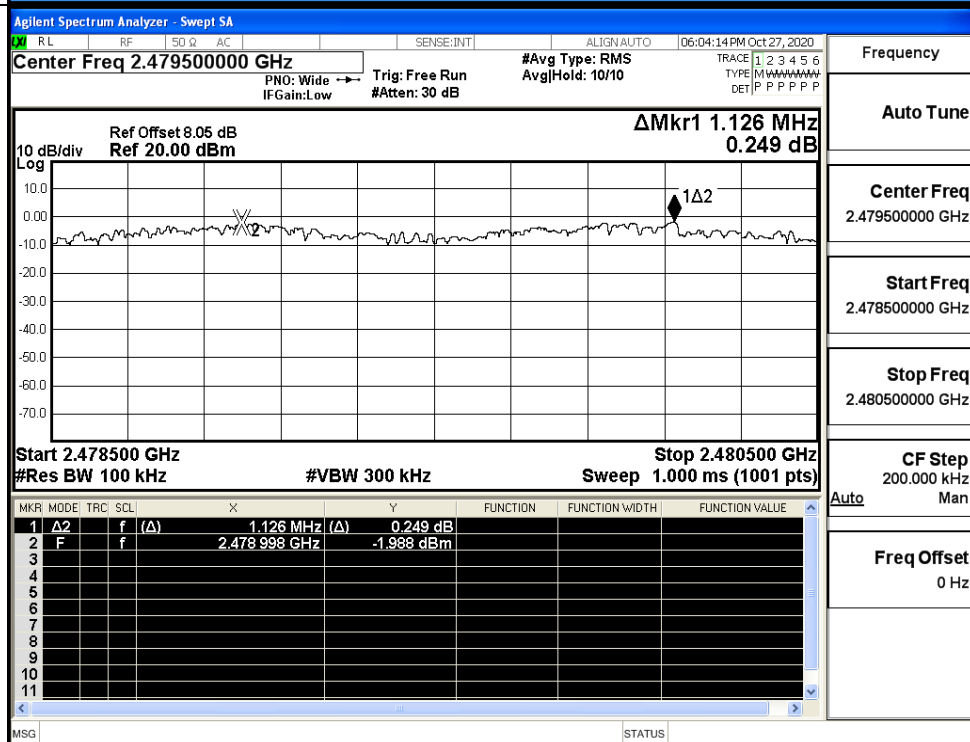
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

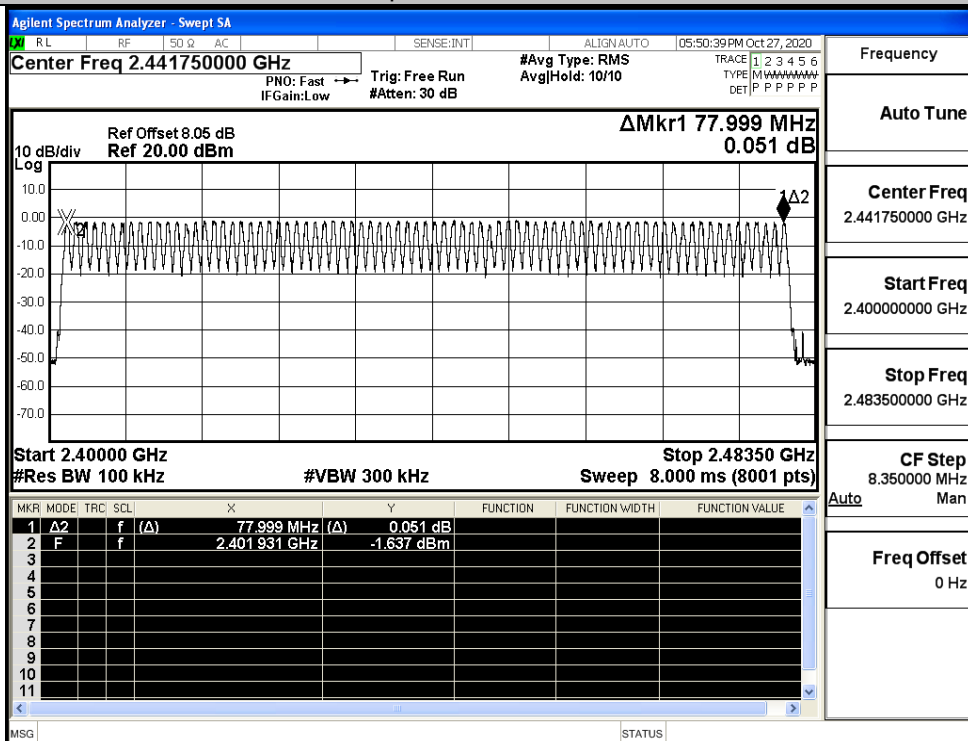
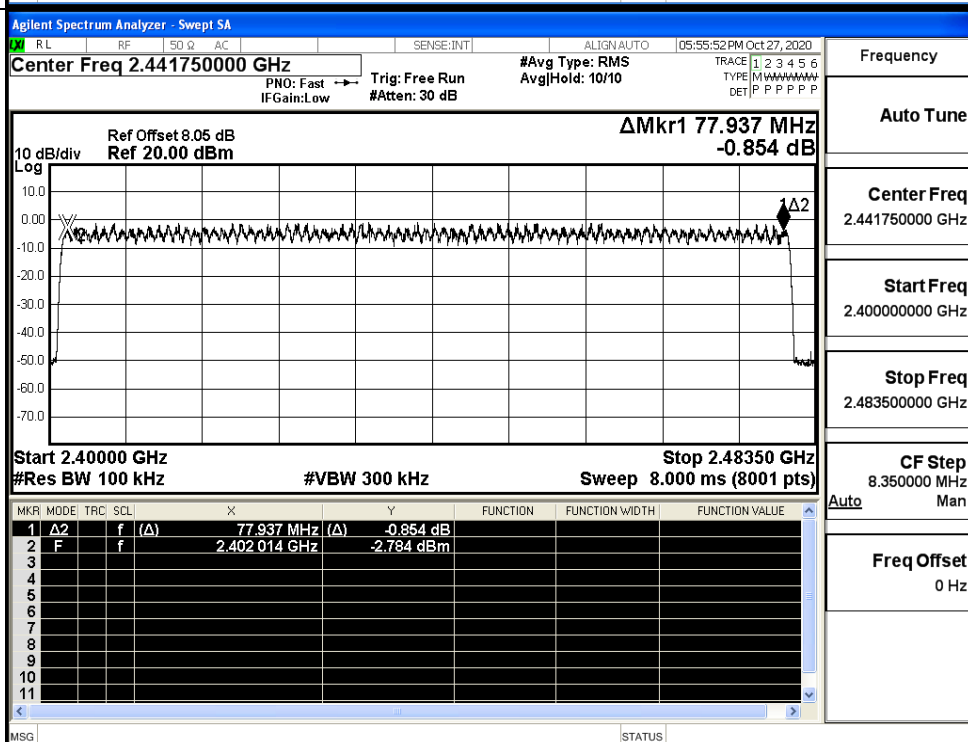


A.4 Hopping Channel Number

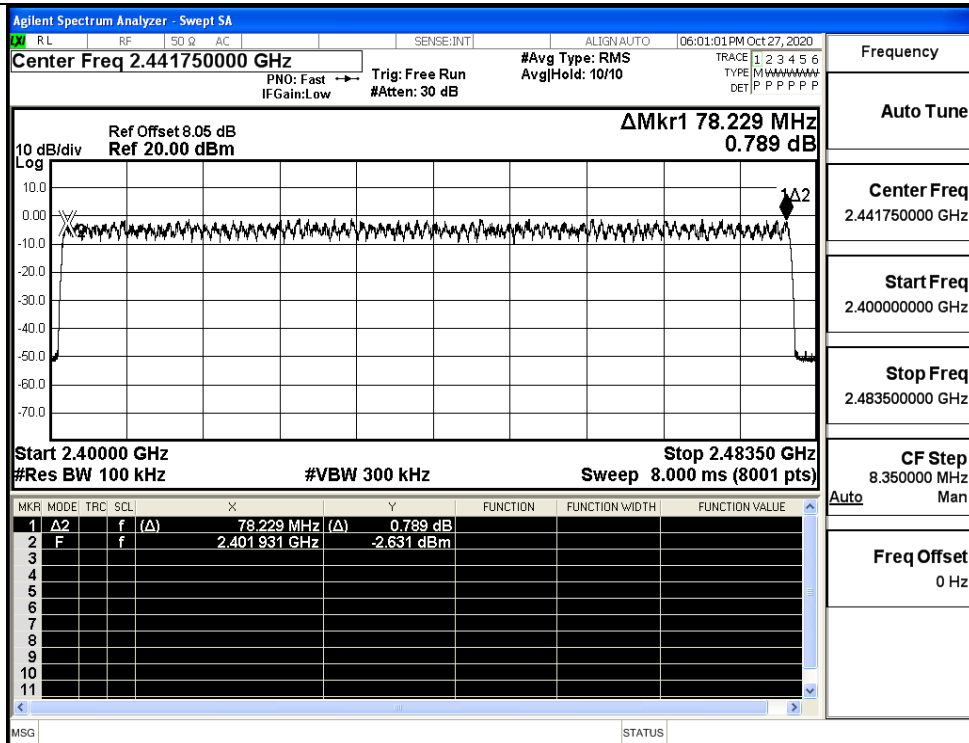
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

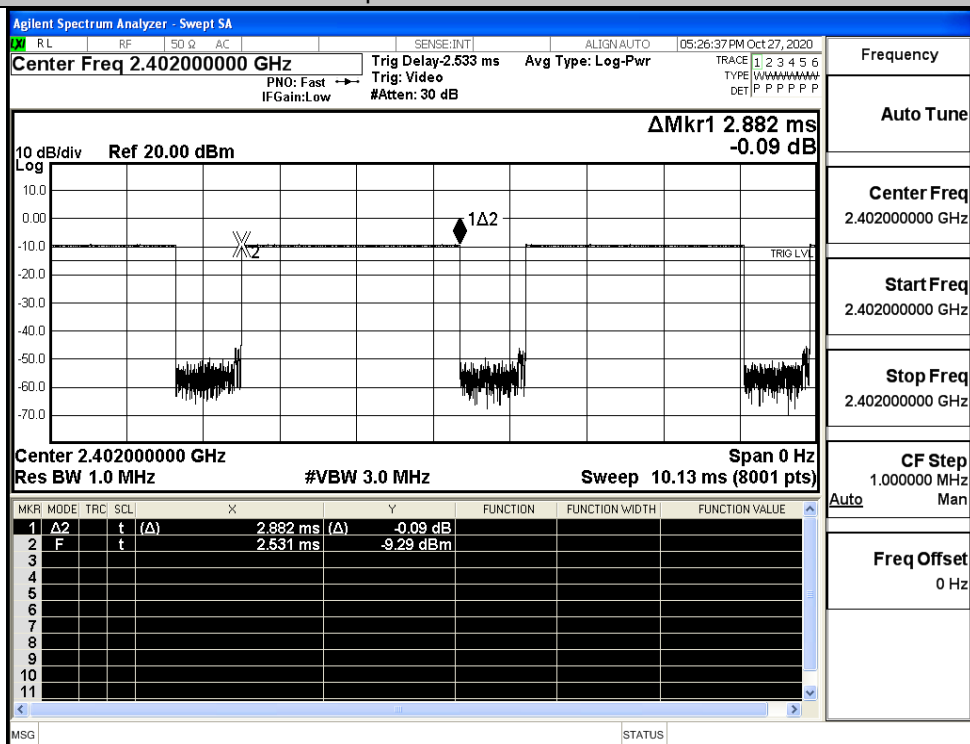


A.5 Dwell Time

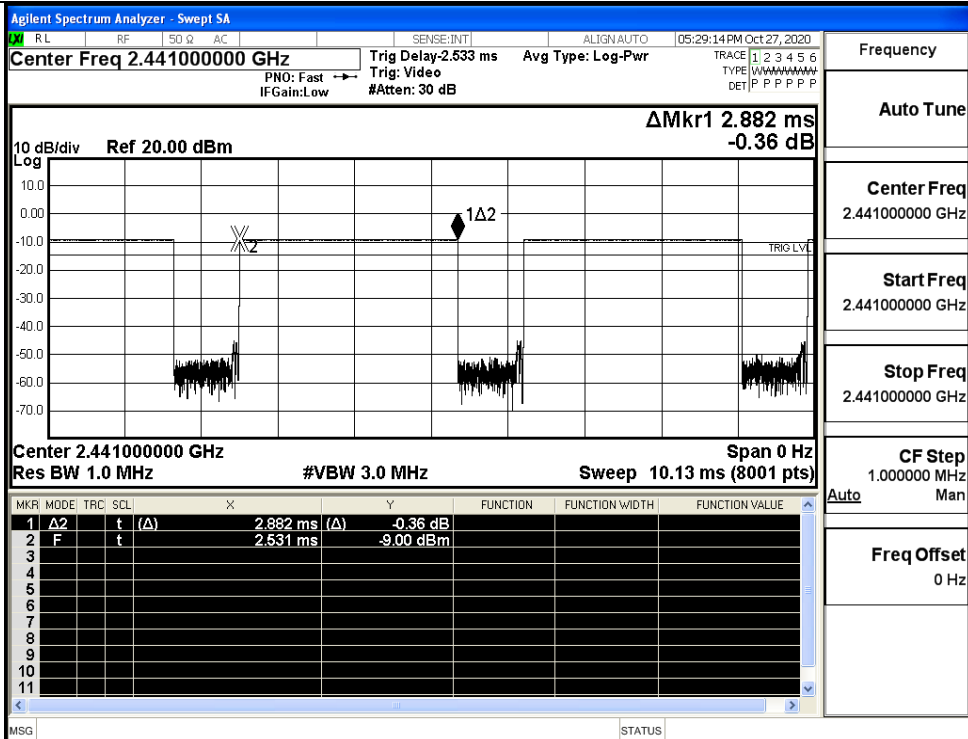
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

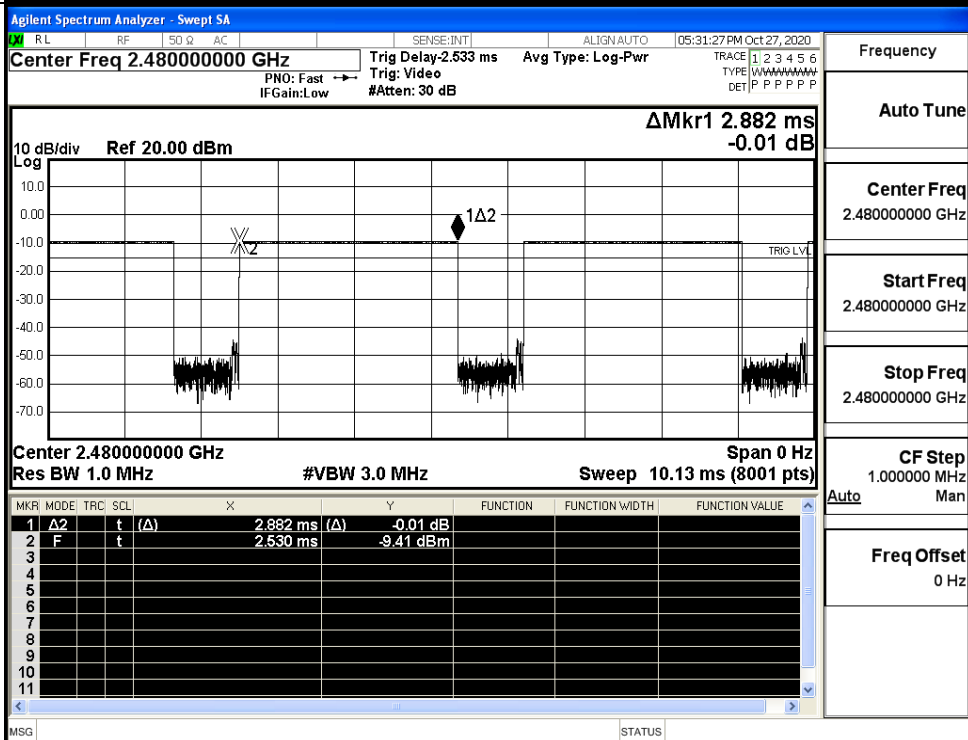
GFSK_DH5/LCH



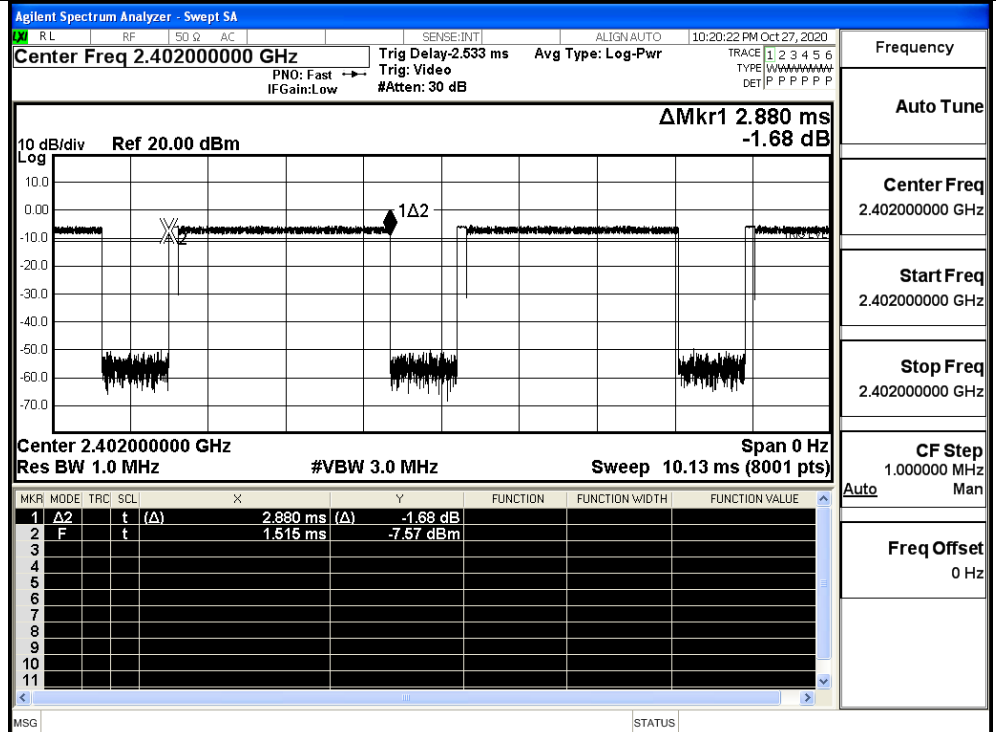
GFSK_DH5/MCH



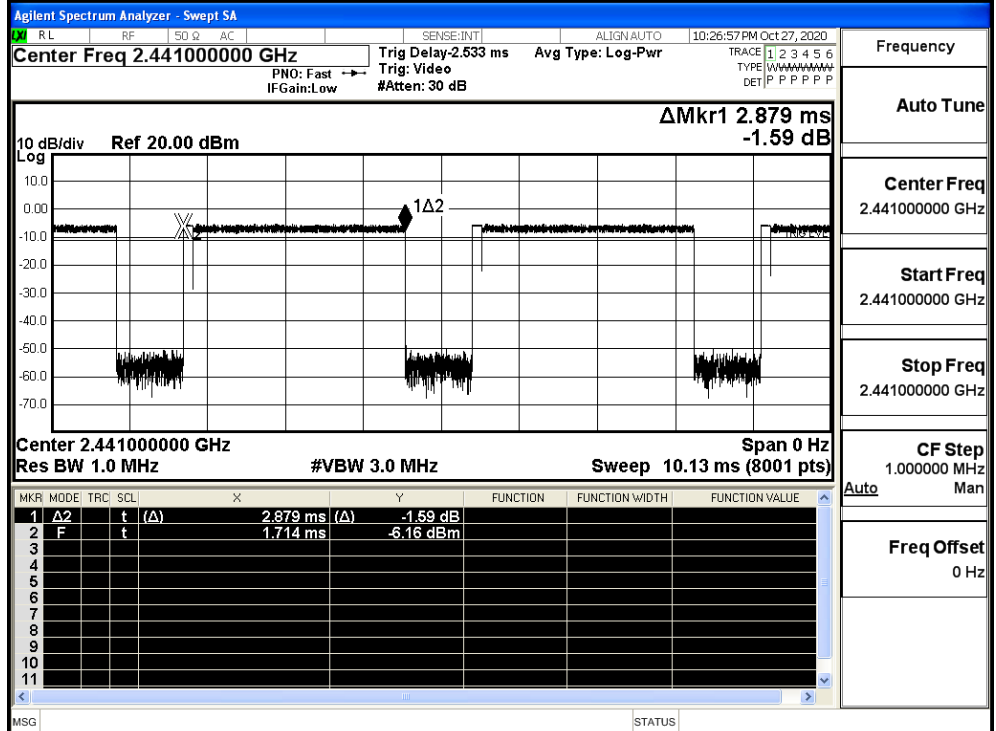
GFSK_DH5/HCH



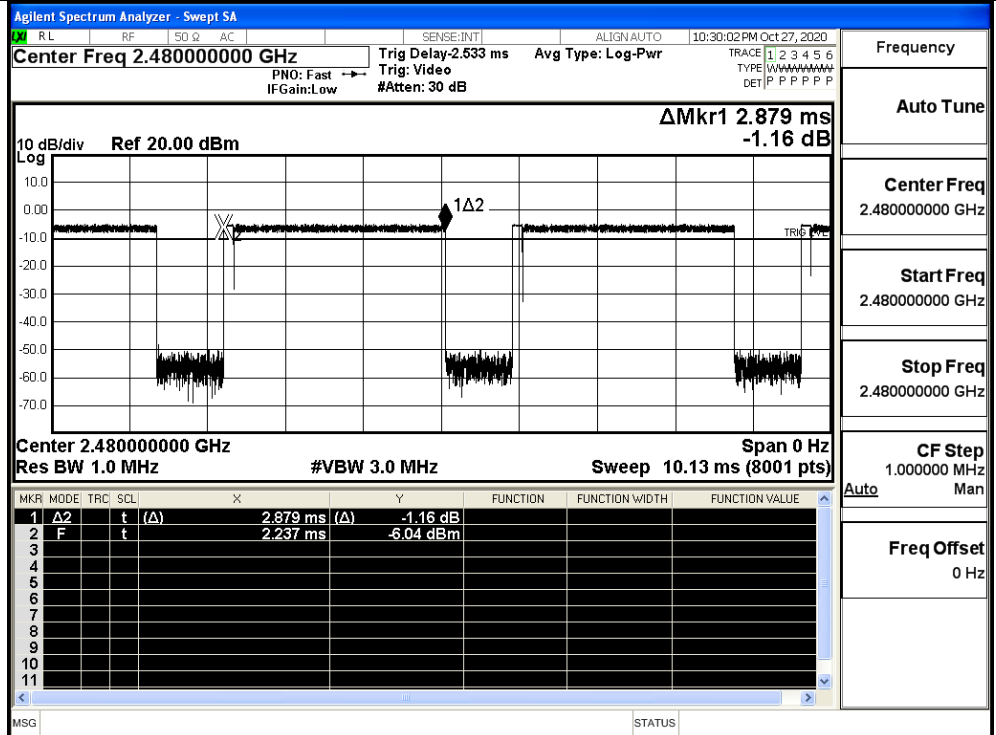
$\pi/4$ DQPSK
_2DH5/LCH



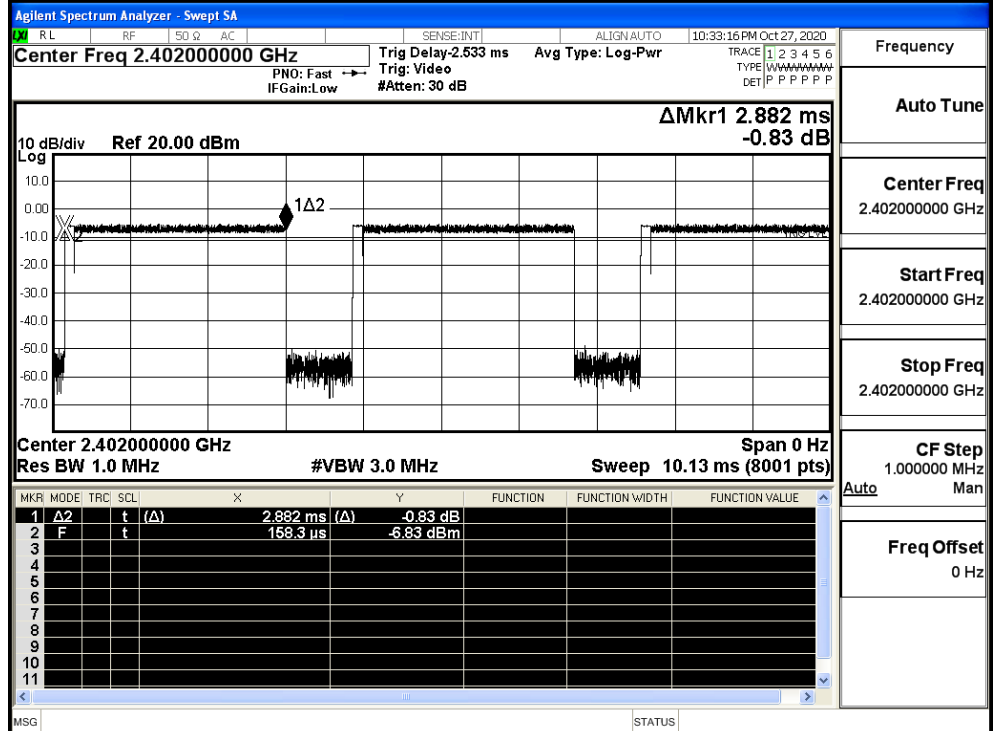
$\pi/4$ DQPSK
_2DH5/MCH



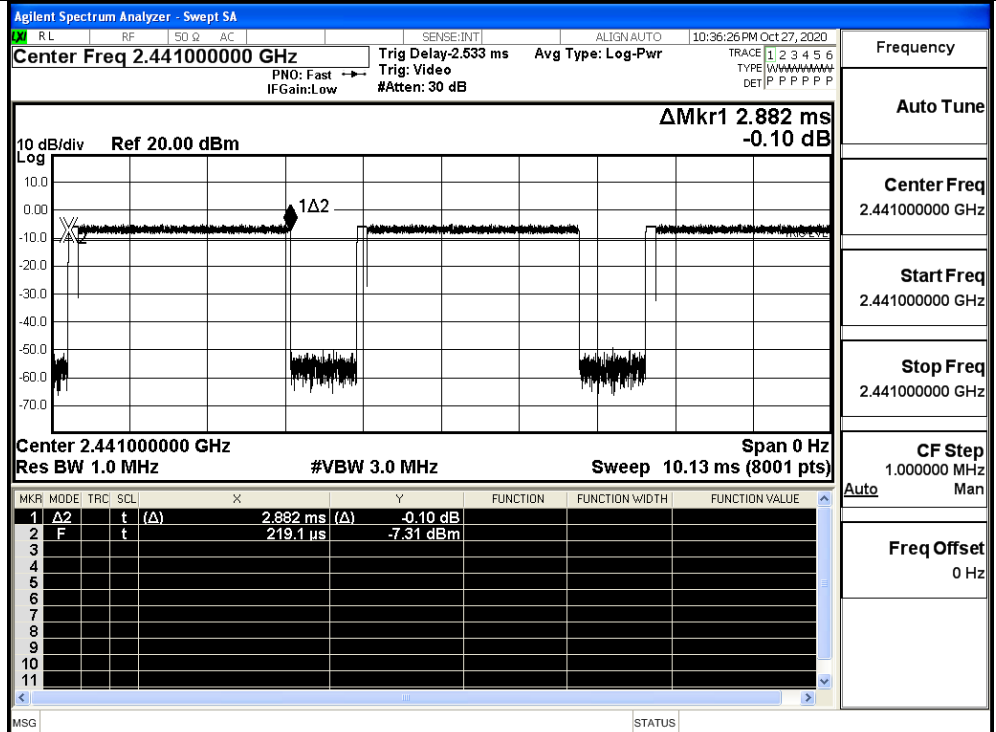
$\pi/4$ DQPSK
_2DH5/HCH



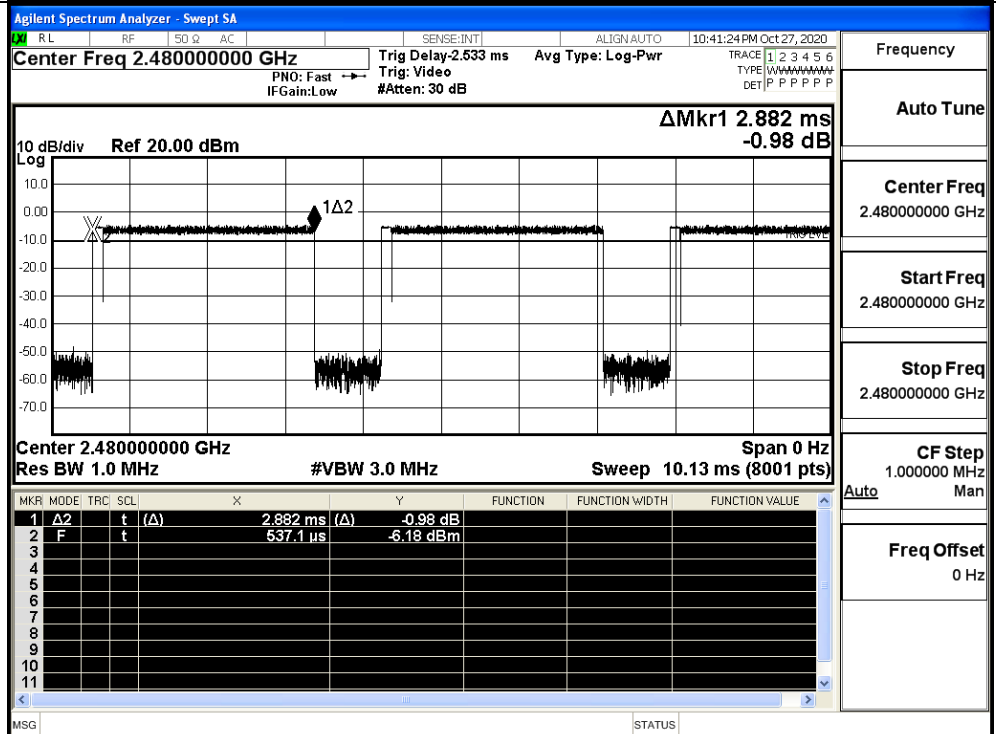
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



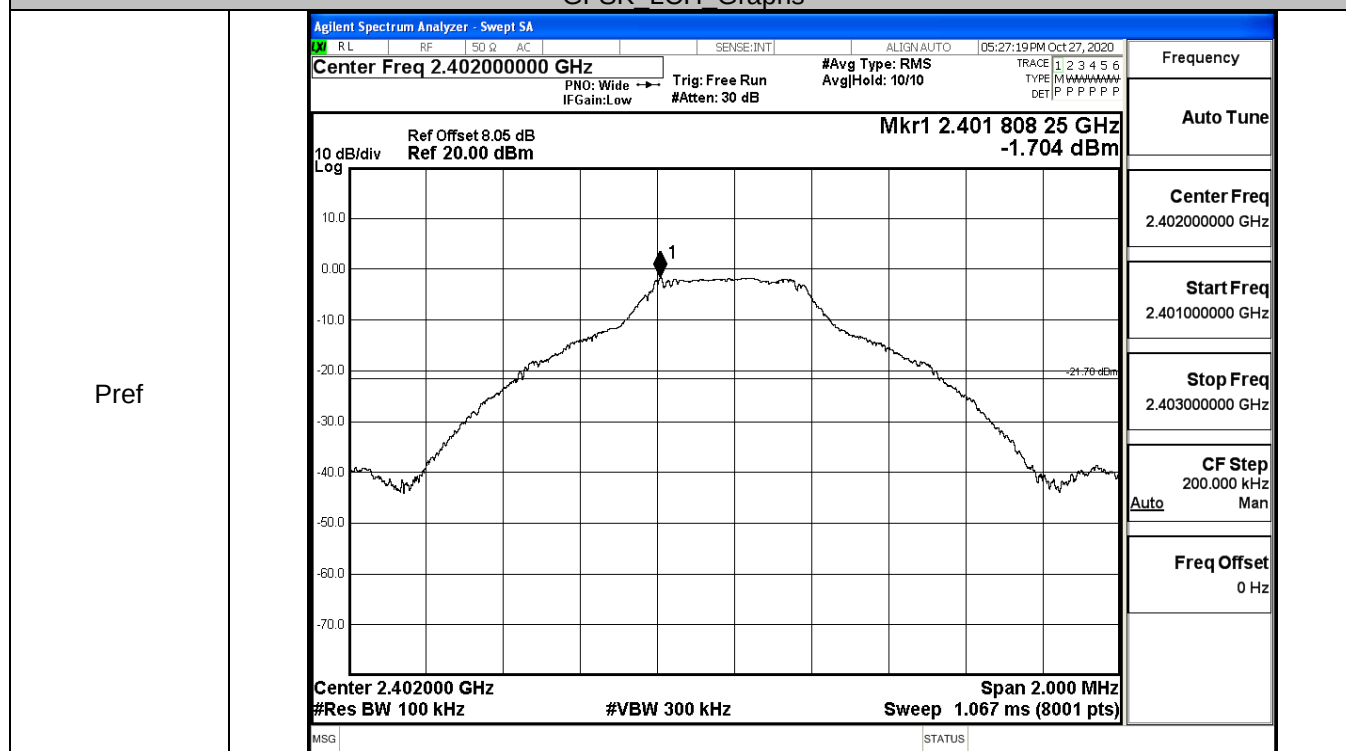
8DPSK_3DH5/HCH



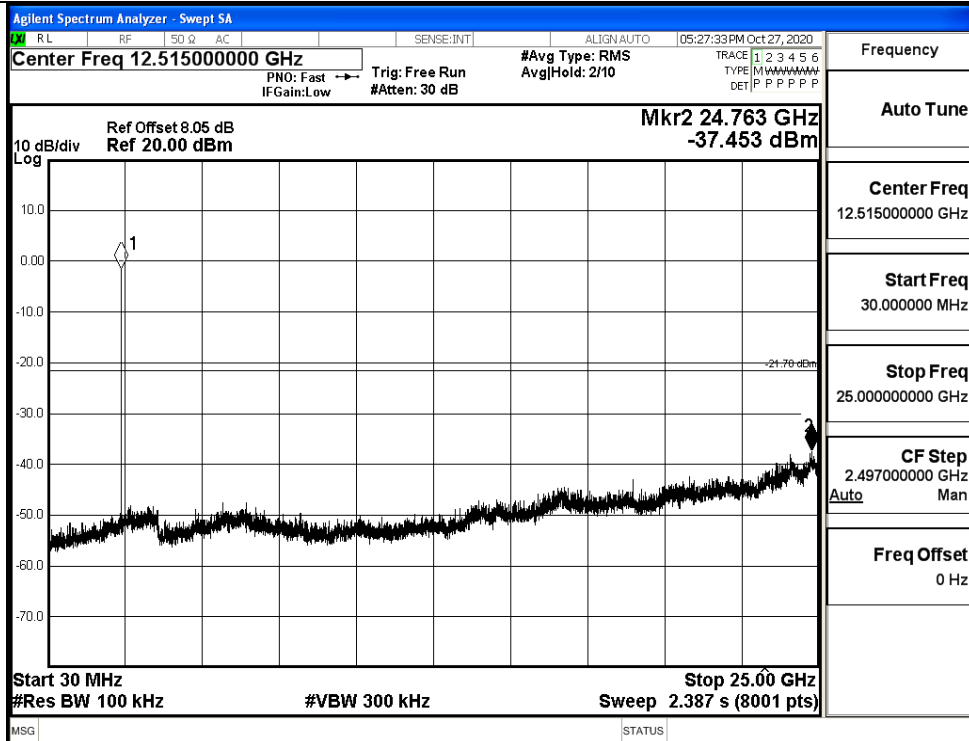
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.704	-37.453	-21.704	PASS
	MCH	-1.003	-37.567	-21.003	PASS
	HCH	-1.322	-36.773	-21.322	PASS
$\pi/4$ DQPSK	LCH	-1.305	-37.378	-21.305	PASS
	MCH	-1.106	-37.547	-21.106	PASS
	HCH	-1.454	-36.128	-21.454	PASS
8DPSK	LCH	-1.313	-37.699	-21.313	PASS
	MCH	-0.981	-37.888	-20.981	PASS
	HCH	-1.346	-37.918	-21.346	PASS

GFSK LCH Graphs

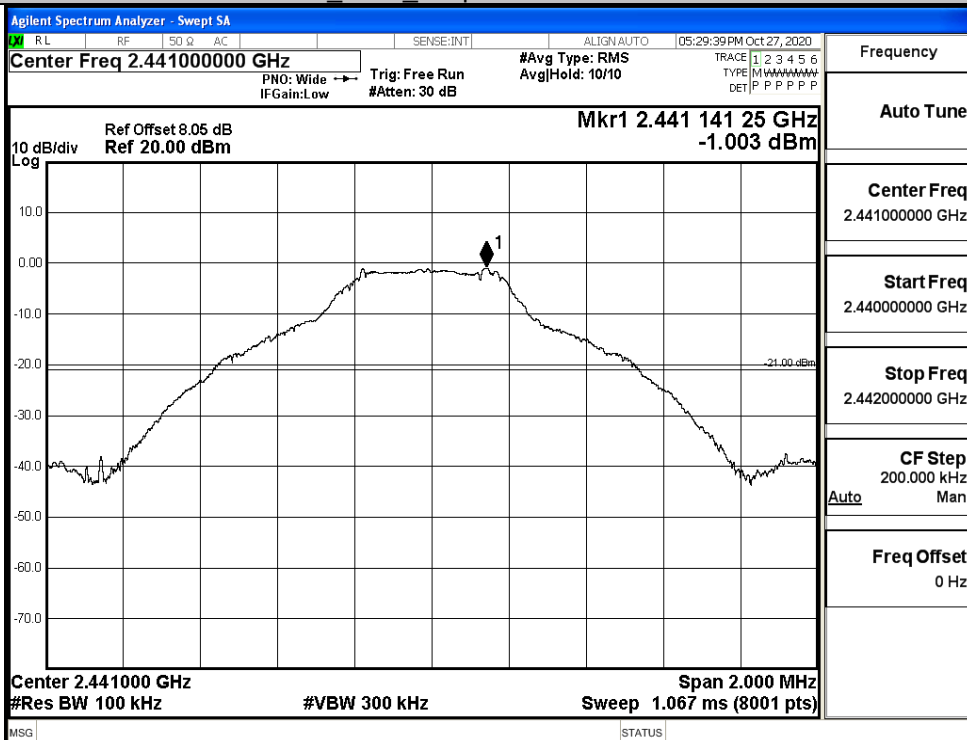


Puw

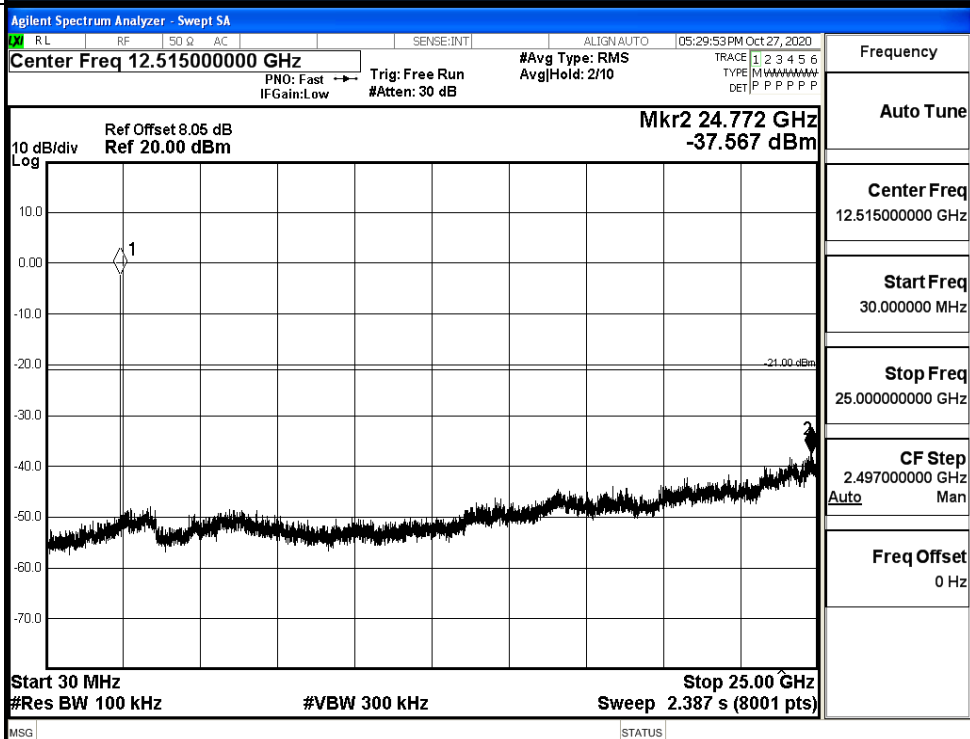


GFSK_MCH_Graphs

Pref

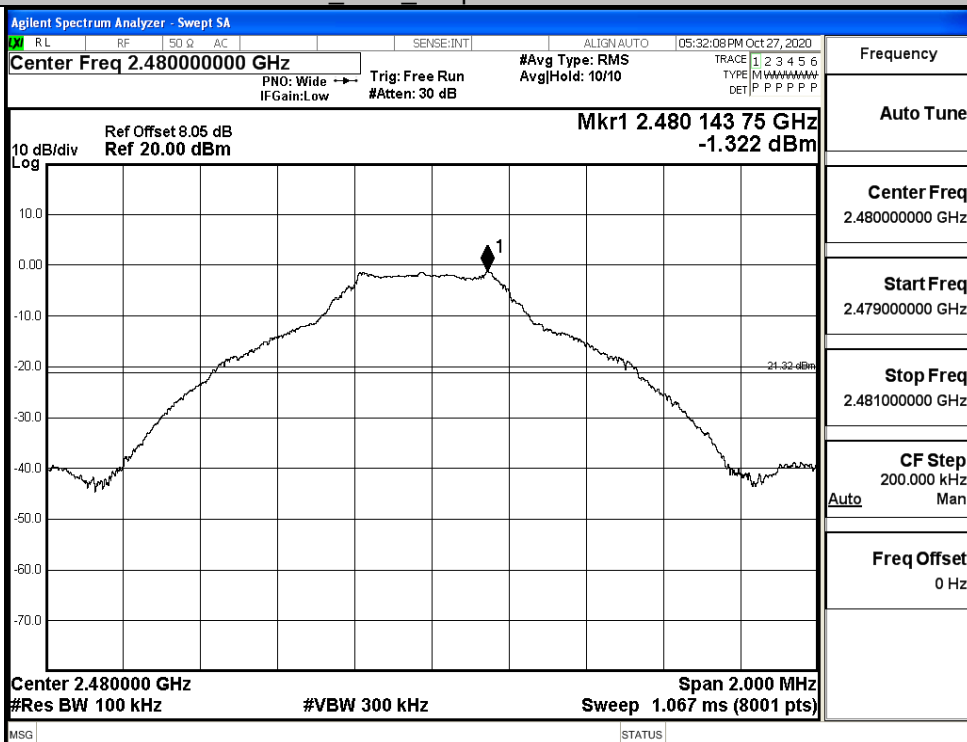


Puw

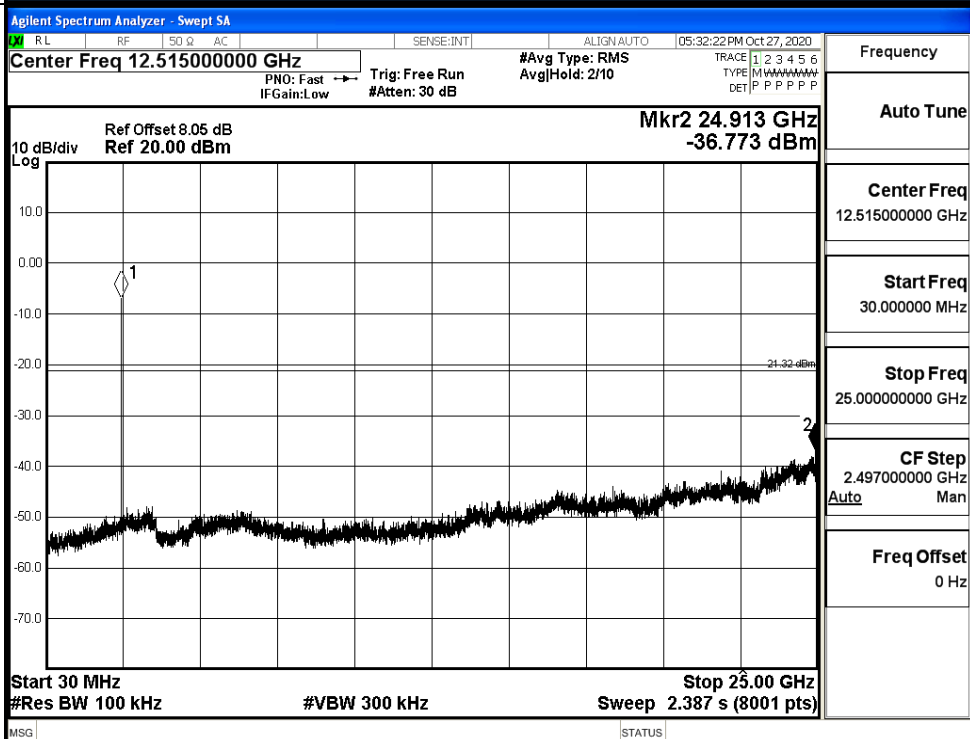


GFSK HCH Graphs

Pref

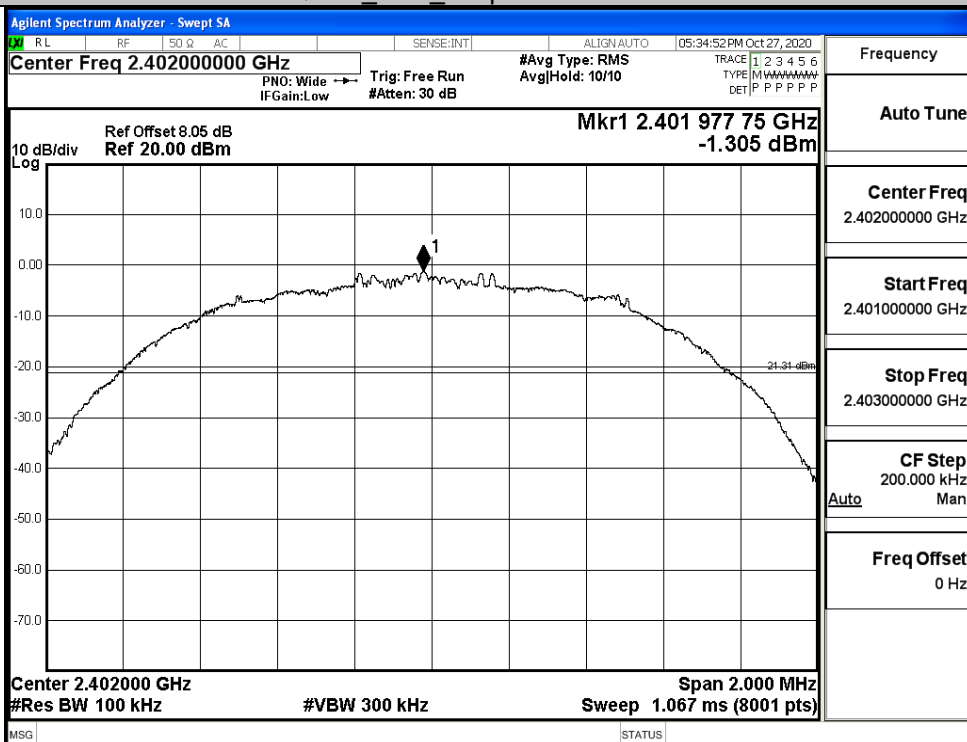


Puw

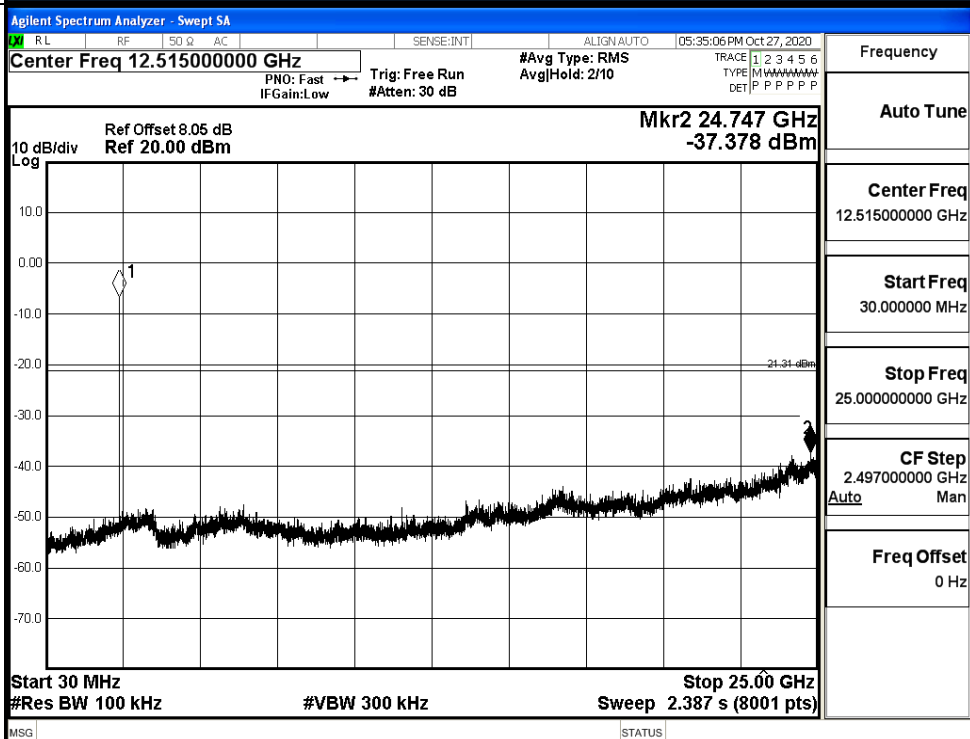


$\pi/4$ DQPSK_LCH_Graphs

Pref

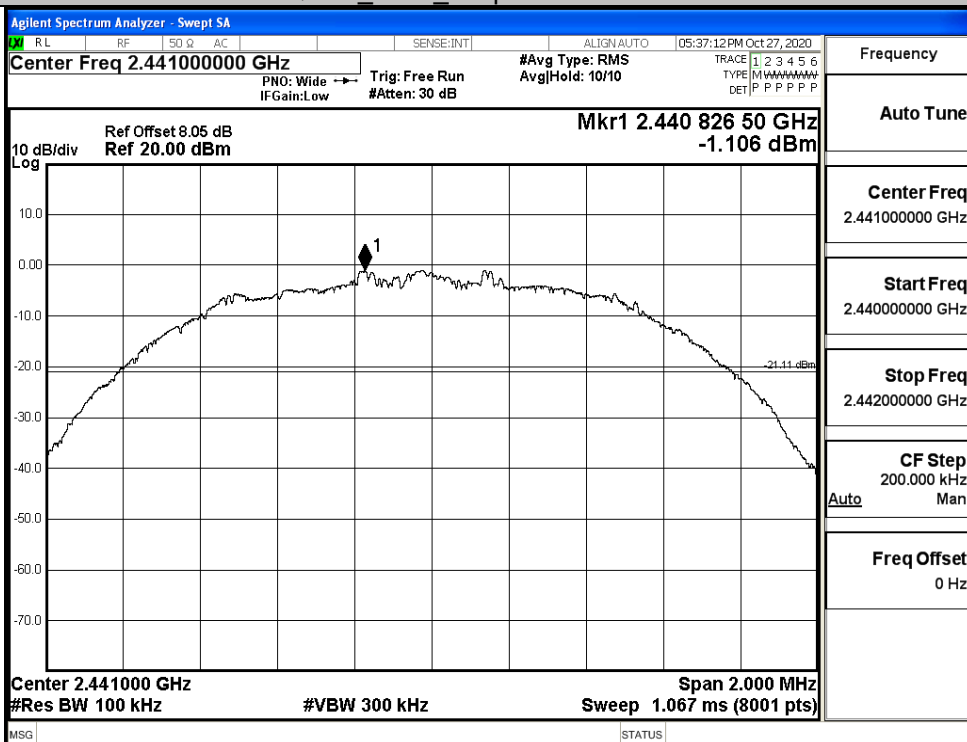


Puw

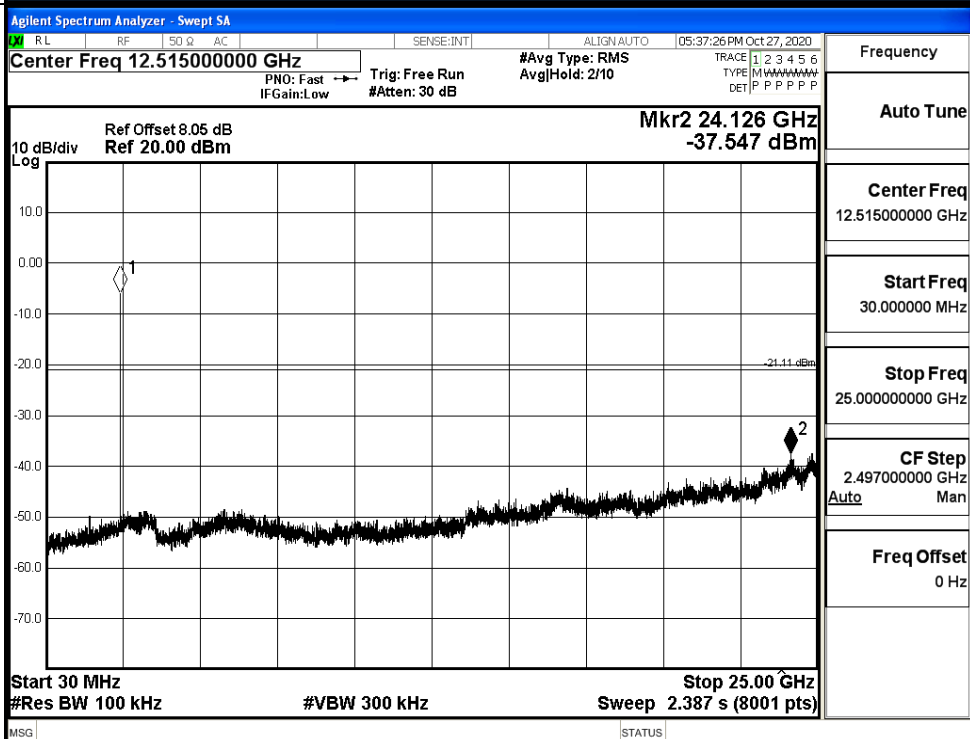


π /4DQPSK_MCH_Graphs

Pref

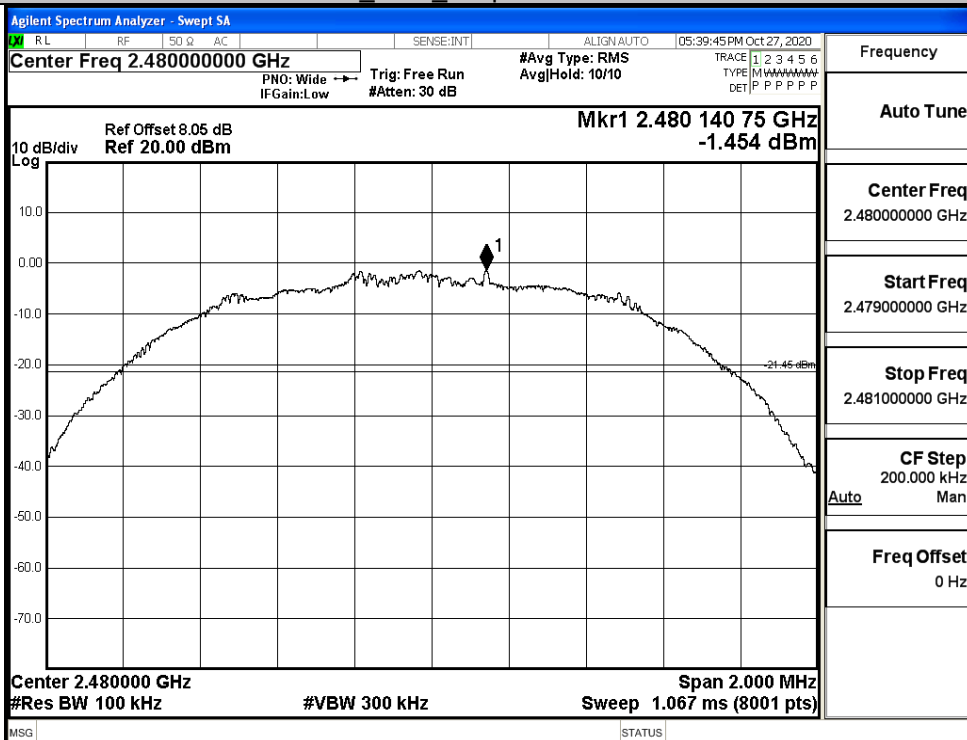


Puw

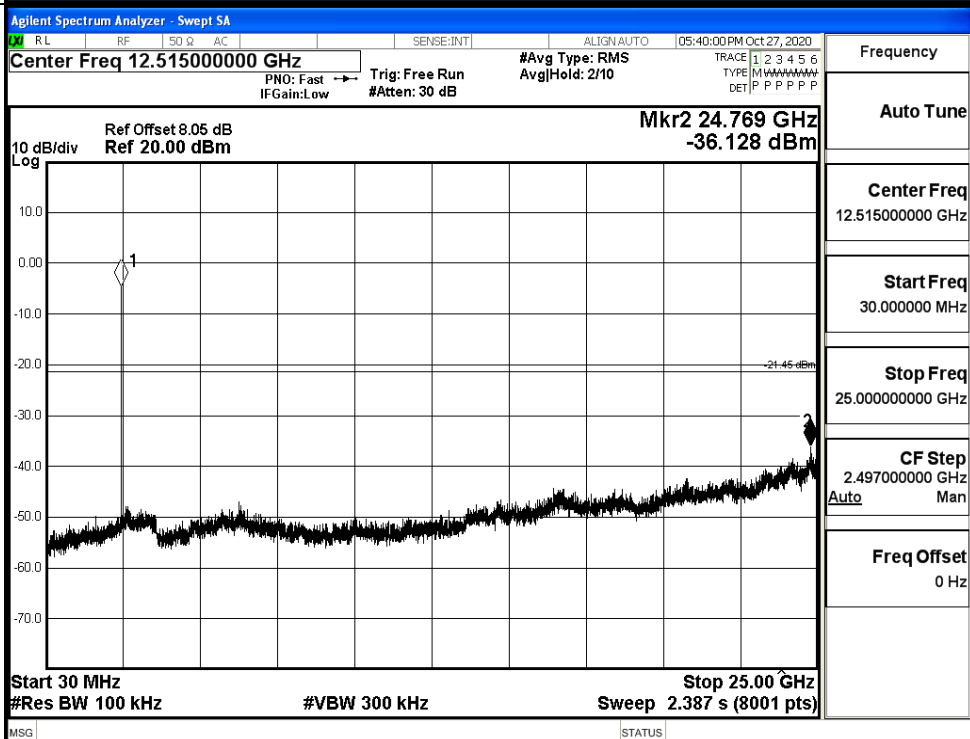


π /4DQPSK_HCH_Graphs

Pref

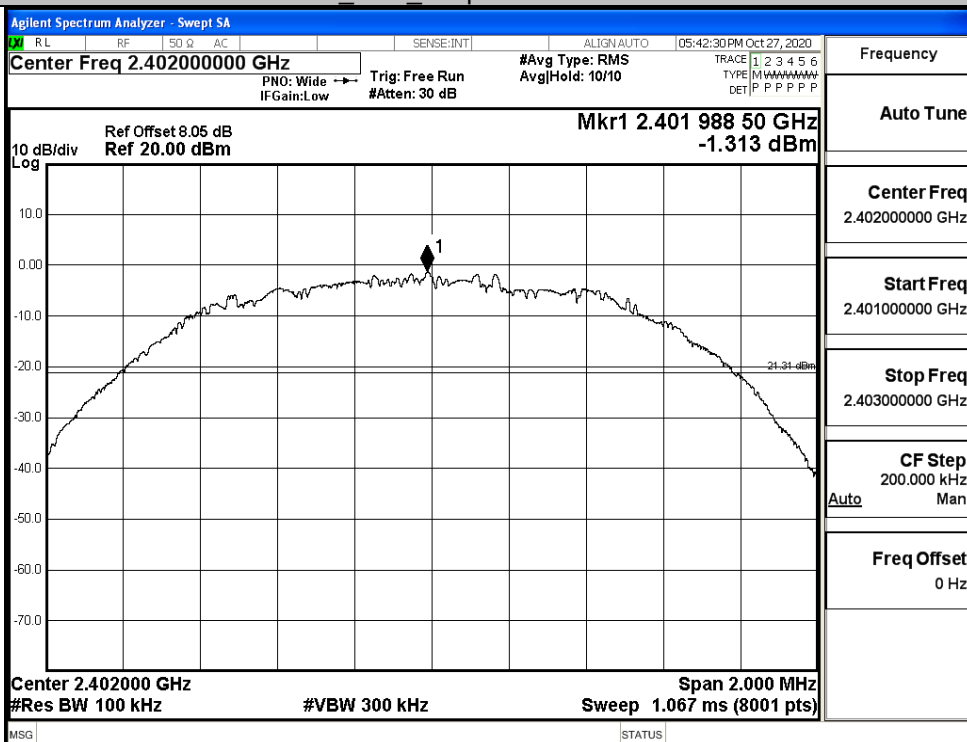


Puw

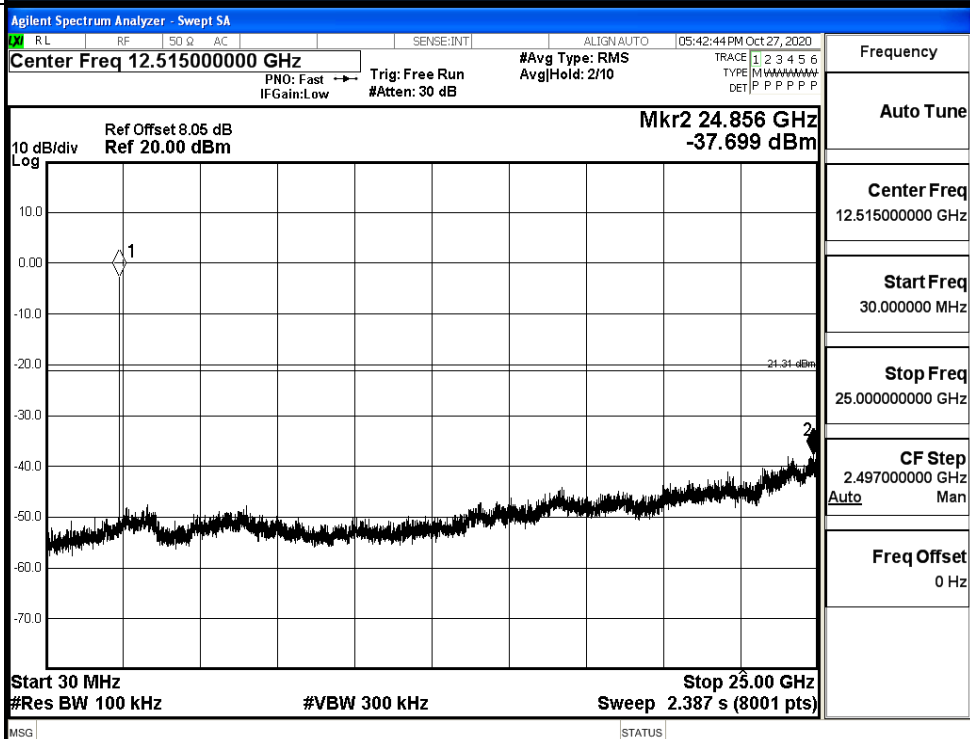


8DPSK_LCH_Graphs

Pref

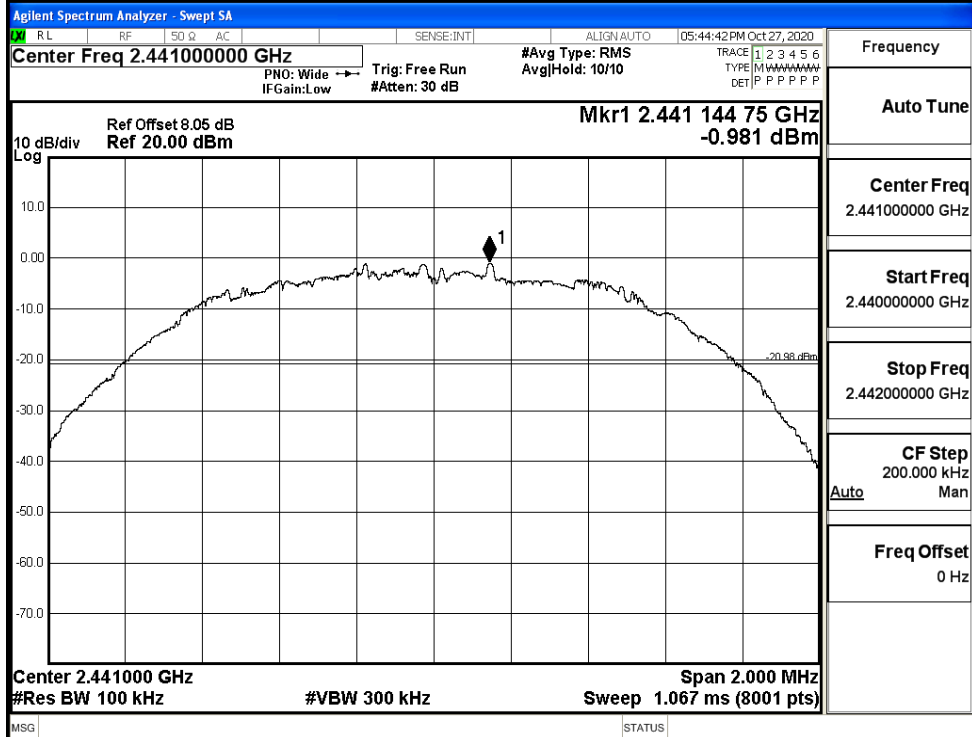


Puw

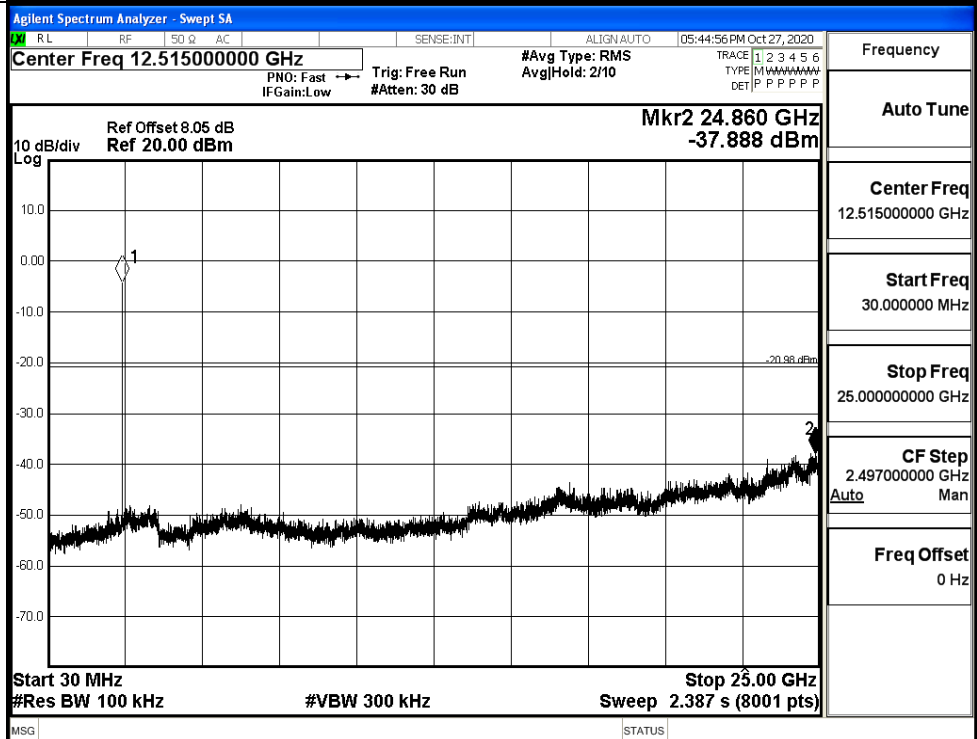


8DPSK_MCH_Graphs

Pref

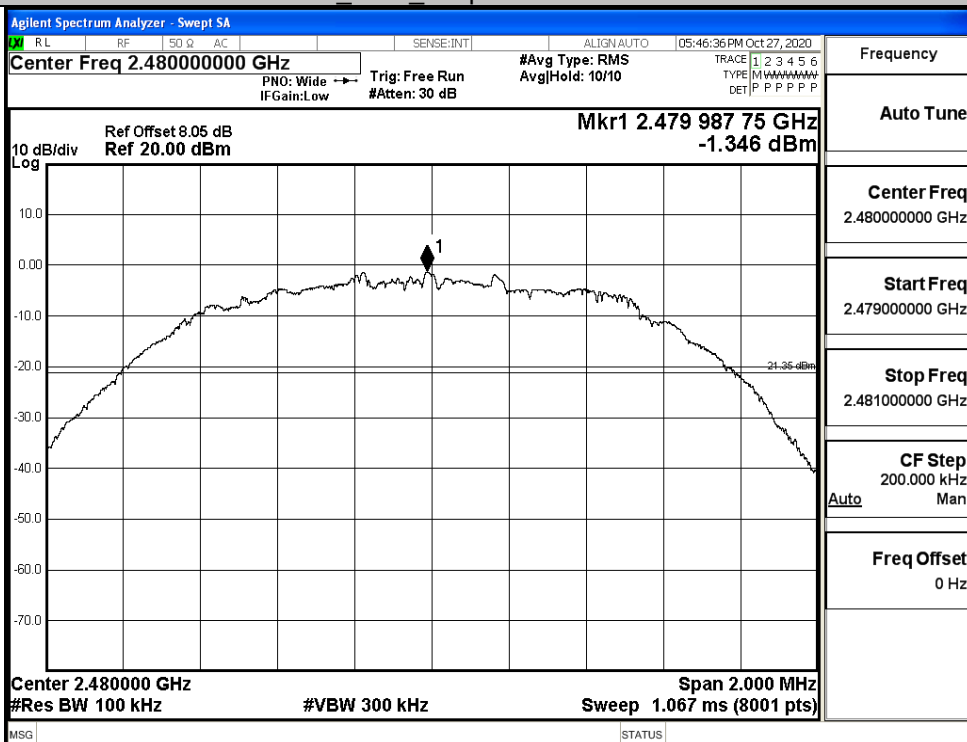


Puw

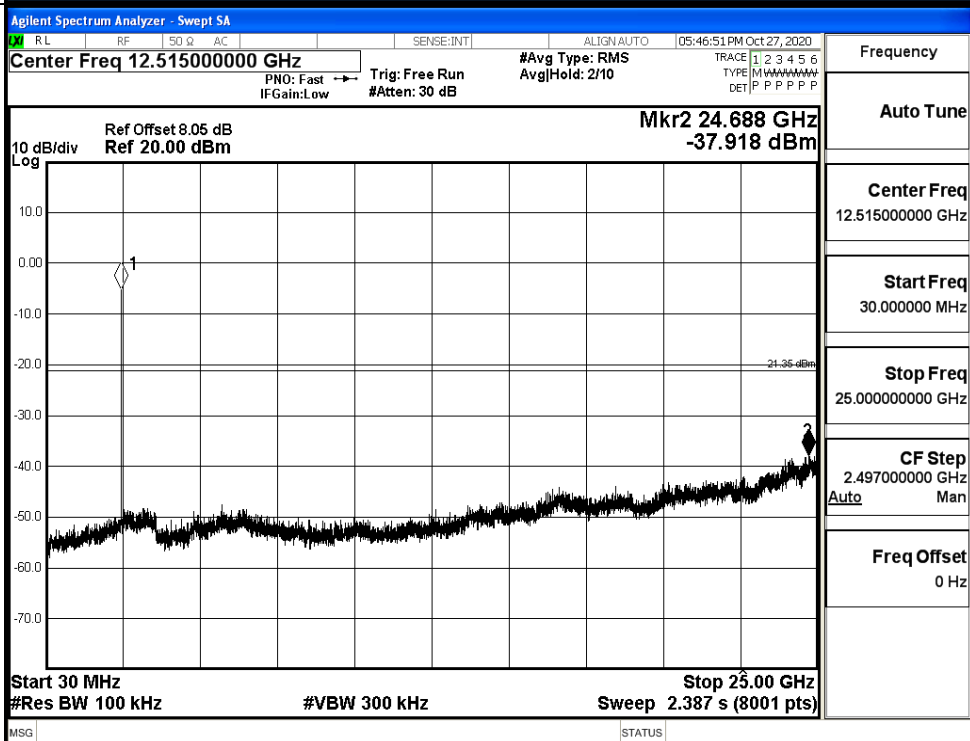


8DPSK_HCH_Graphs

Pref



Puw

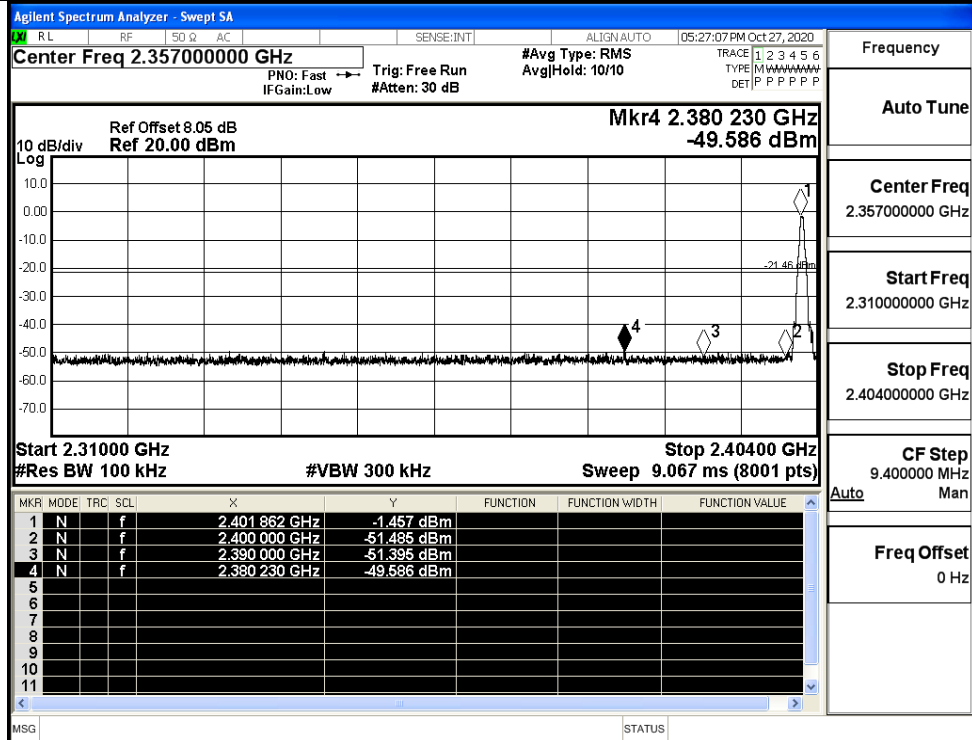


A.7 Band-edge for RF Conducted Emissions

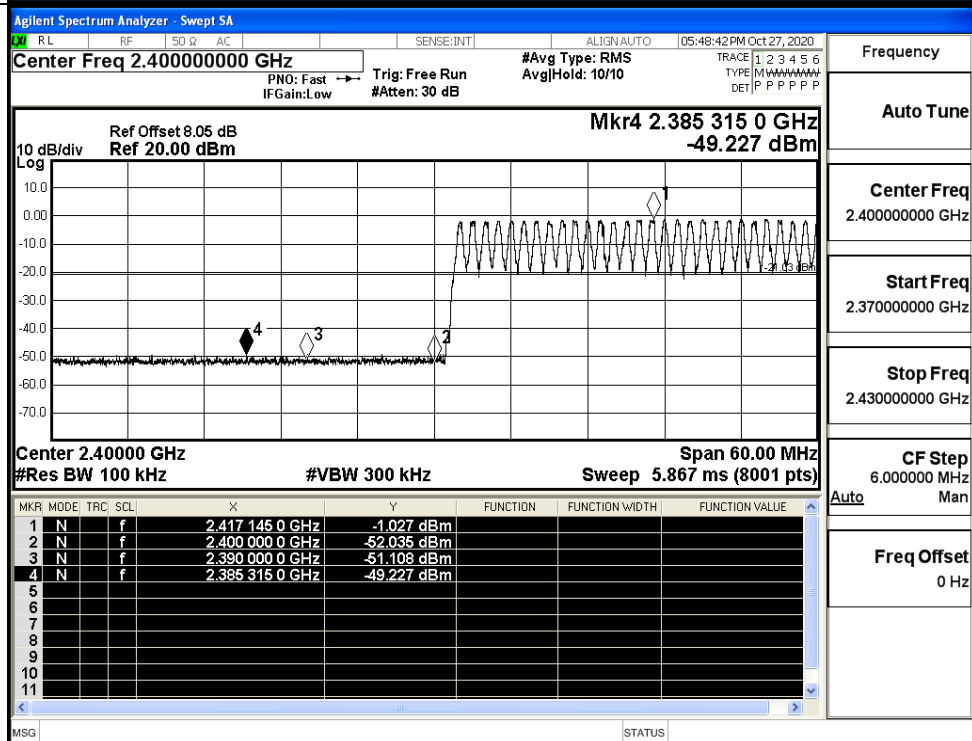
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.457	Off	-49.586	-21.46	PASS
			-1.027	On	-49.227	-21.03	PASS
	HCH	2480	-1.306	Off	-40.403	-21.31	PASS
			-0.894	On	-48.425	-20.89	PASS
$\pi/4$ DQPSK	LCH	2402	-1.236	Off	-49.309	-21.24	PASS
			-1.240	On	-48.916	-21.24	PASS
	HCH	2480	-1.572	Off	-41.175	-21.57	PASS
			-1.089	On	-38.532	-21.09	PASS
8DPSK	LCH	2402	-1.257	Off	-49.745	-21.26	PASS
			-0.958	On	-48.594	-20.96	PASS
	HCH	2480	-1.301	Off	-40.643	-21.3	PASS
			-0.967	On	-42.251	-20.97	PASS

Test Graphs

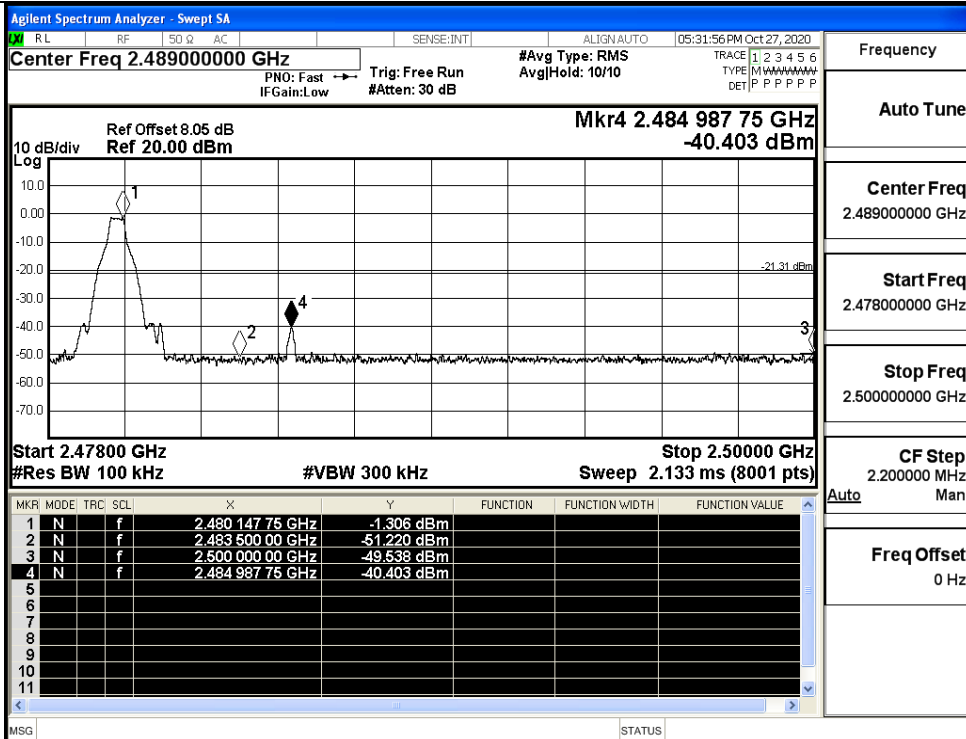
GFSK/LCH/No Hop



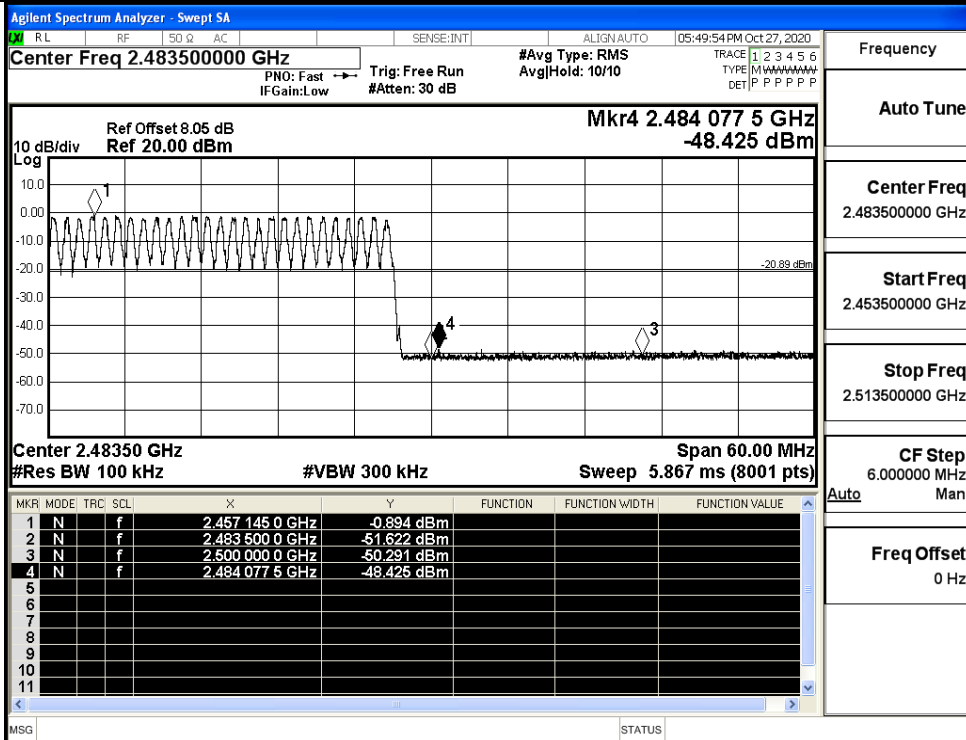
GFSK/LCH/Hop



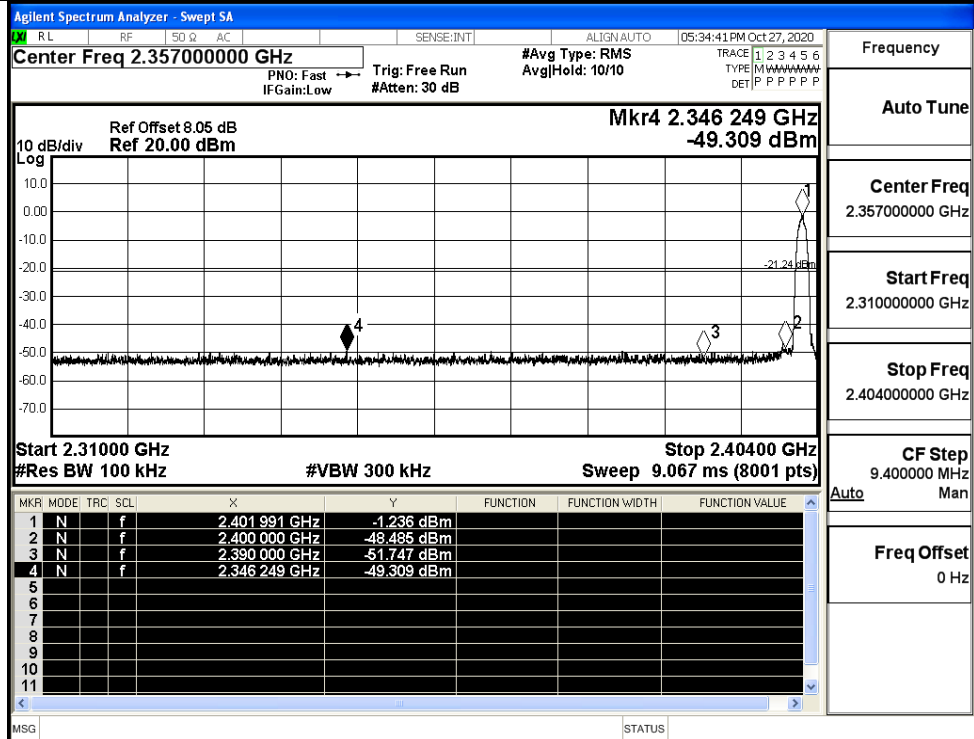
GFSK/HCH/No Hop



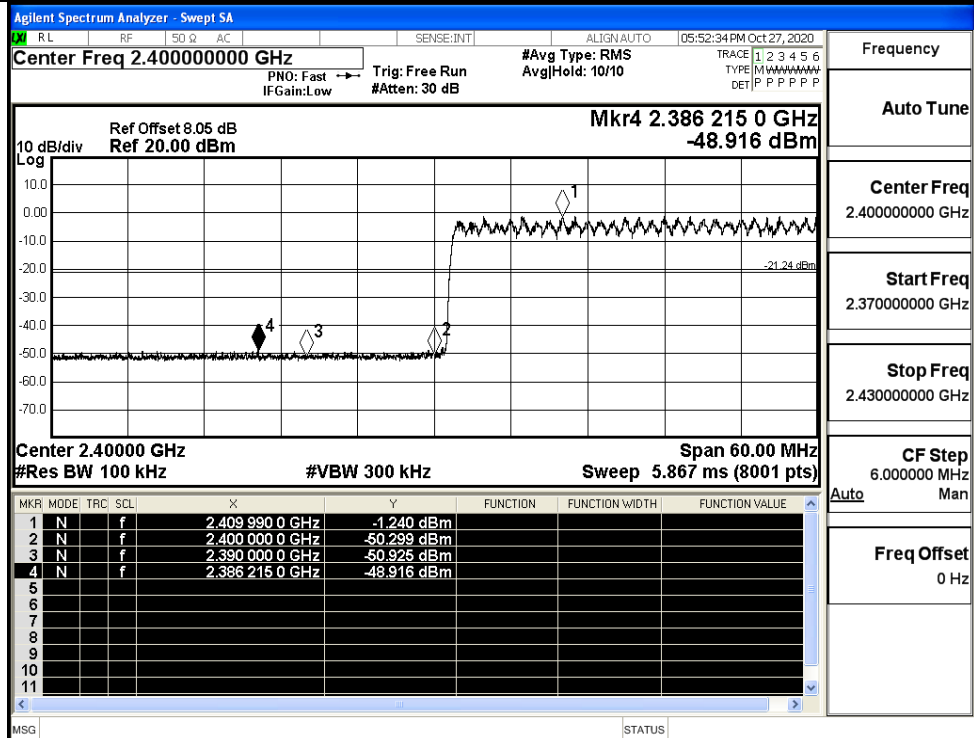
GFSK/HCH/Hop



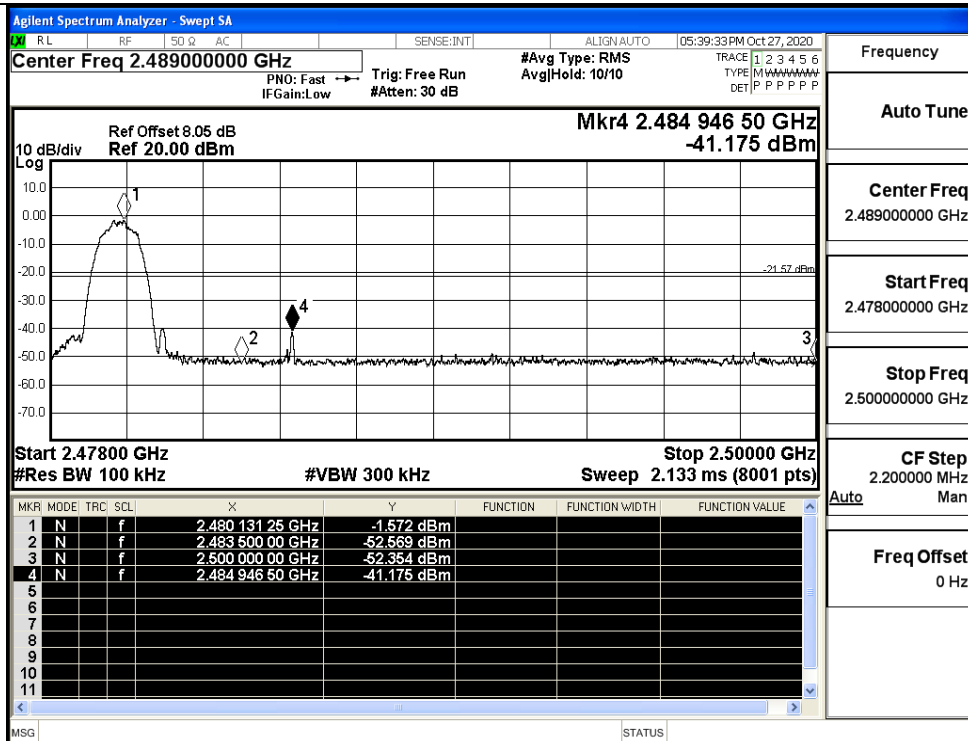
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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



Frequency

Auto Tune

Center Freq
2.489000000 GHz

Start Freq
2.478000000 GHz

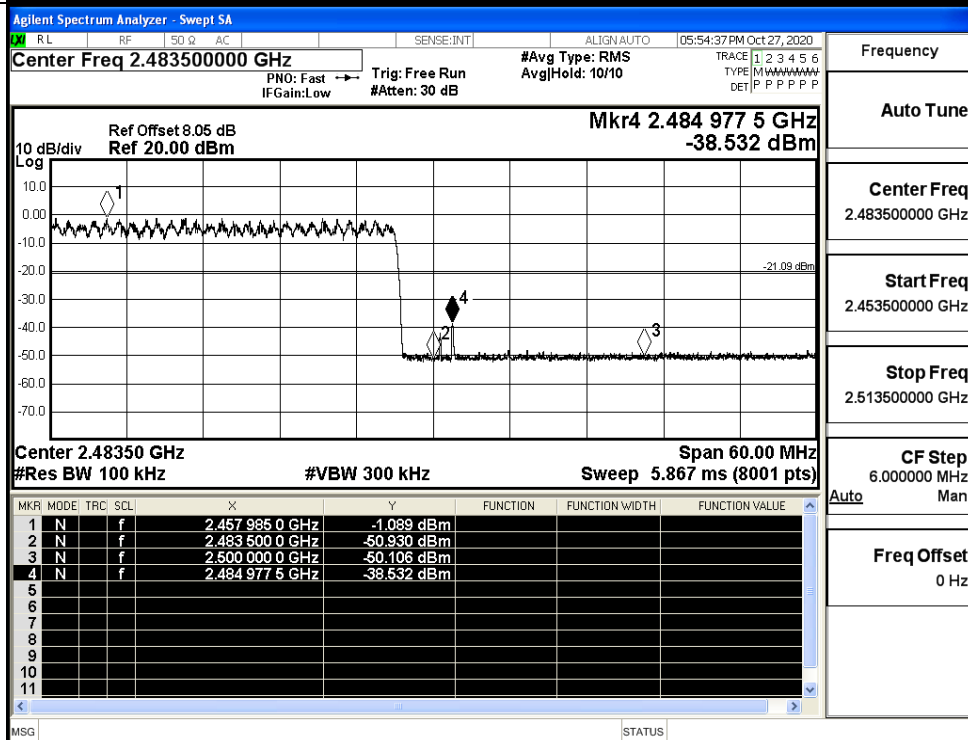
Stop Freq
2.500000000 GHz

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

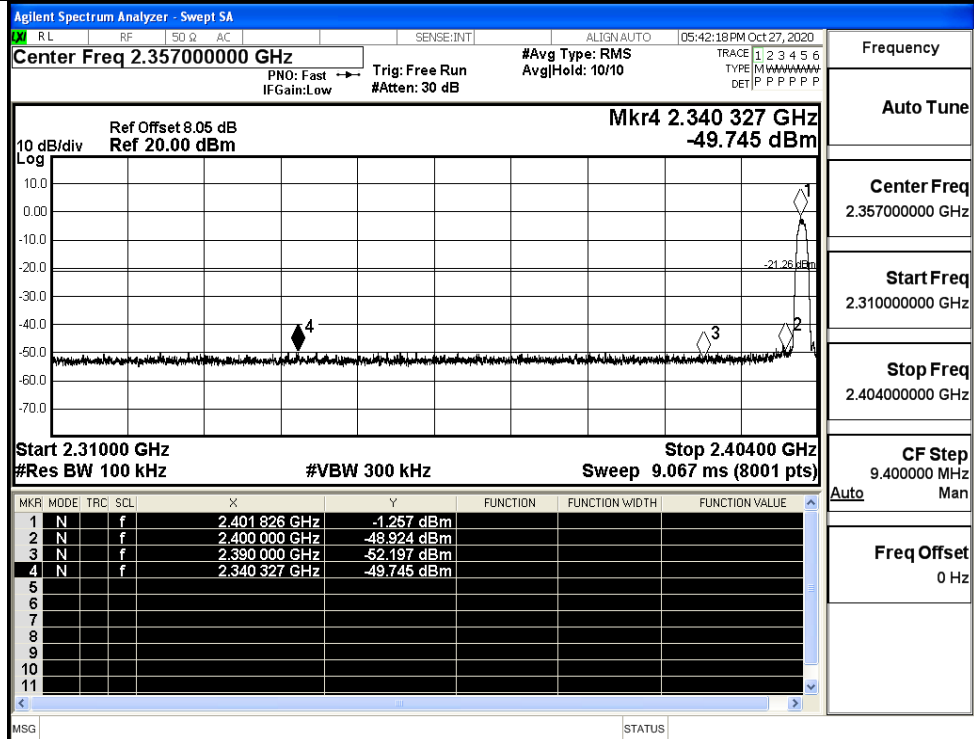
Stop Freq
2.513500000 GHz

CF Step
6.000000 MHz

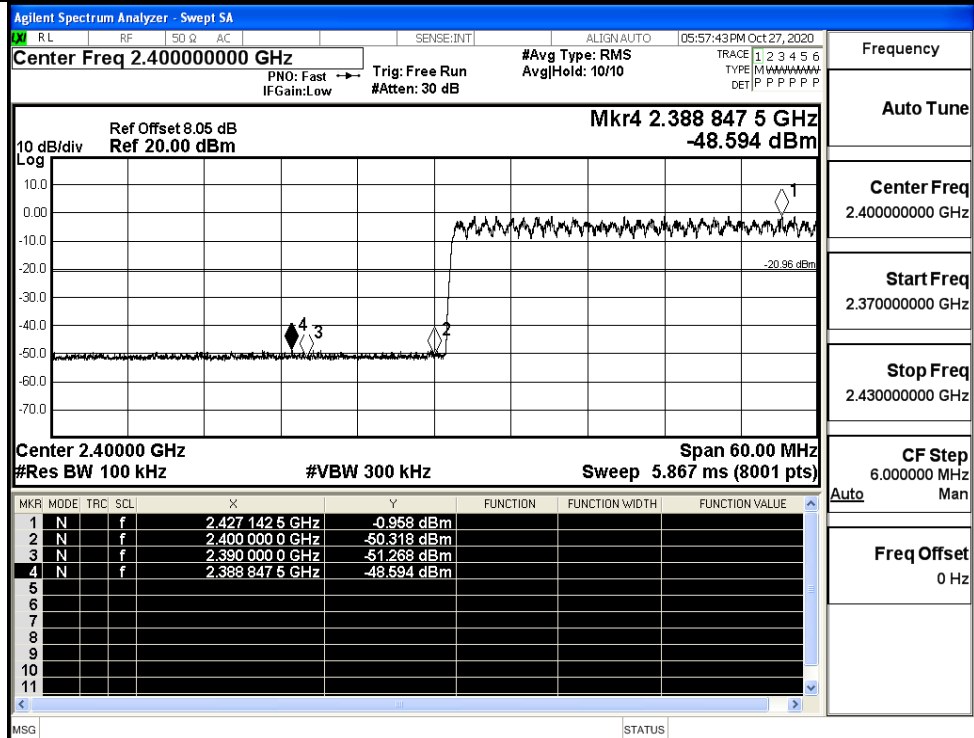
Auto Man

Freq Offset
0 Hz

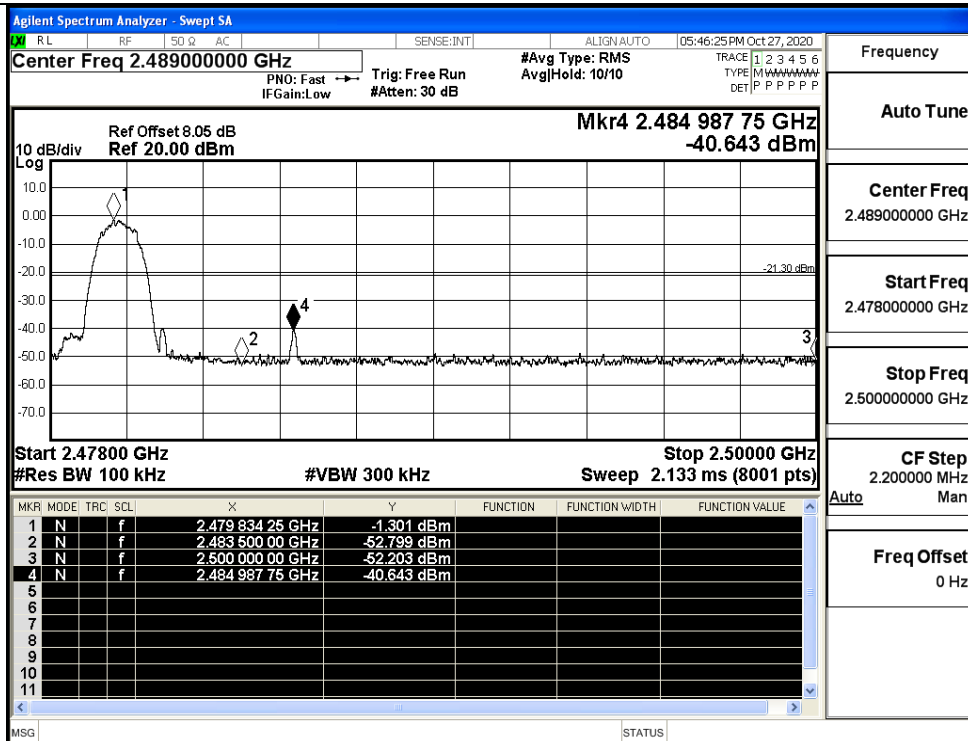
8DPSK/LCH/No Hop



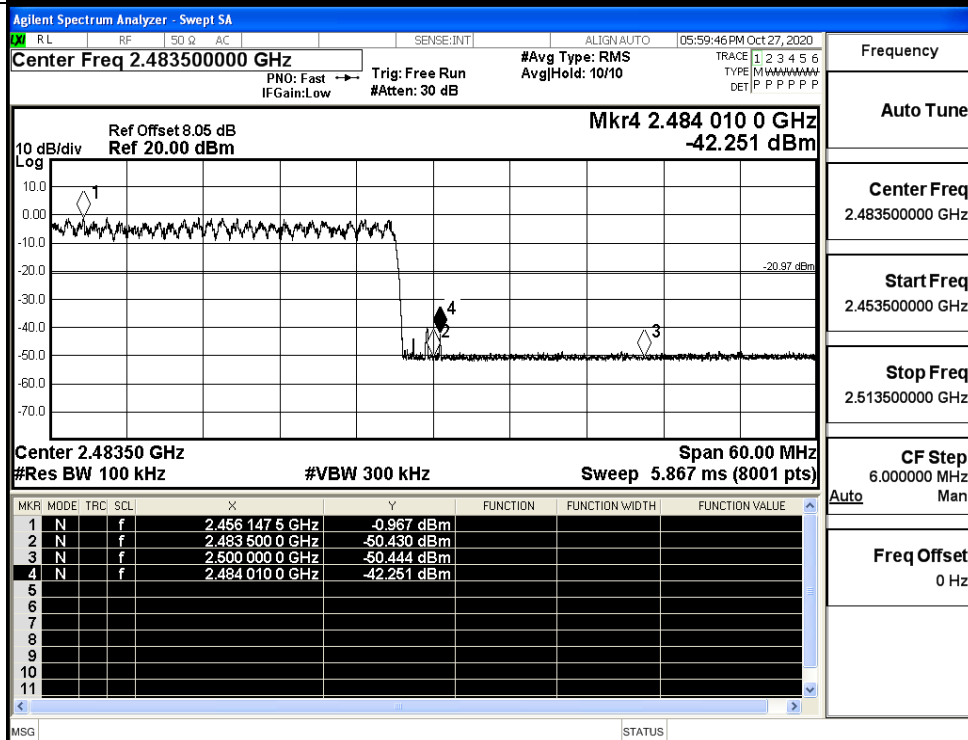
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



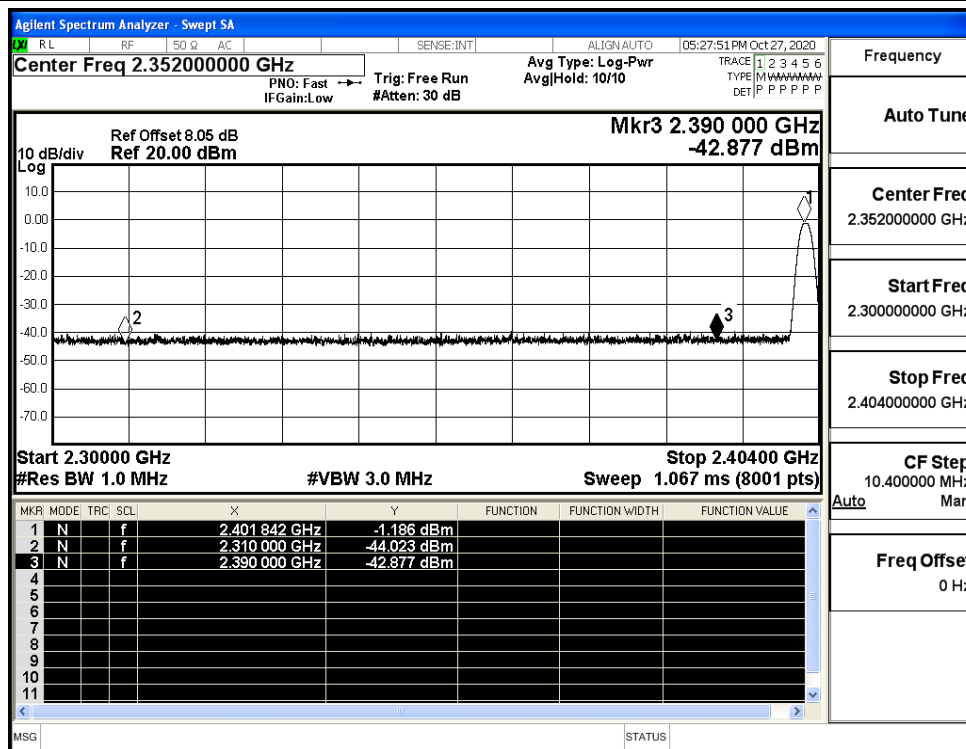
8DPSK/HCH/Hop



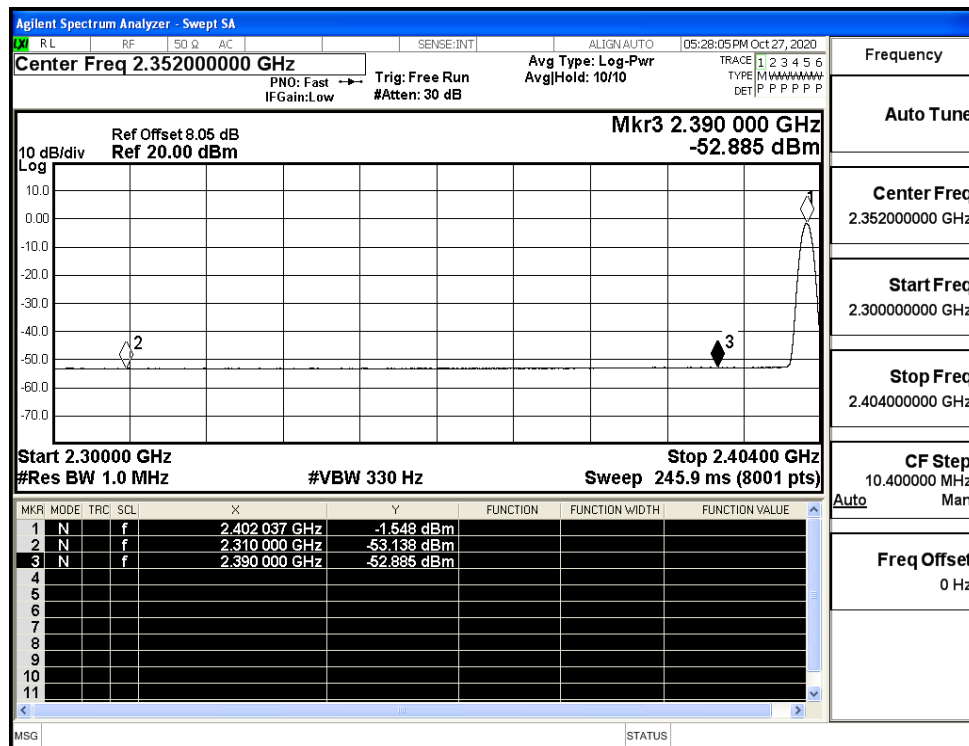
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.02	2.0	0	53.21	PEAK	74	PASS
	Off	2310.0	-53.14	2.0	0	44.09	AV	54	PASS
	Off	2390.0	-42.88	2.0	0	54.35	PEAK	74	PASS
	Off	2390.0	-52.89	2.0	0	44.34	AV	54	PASS
	Off	2483.5	-41.20	2.0	0	56.03	PEAK	74	PASS
	Off	2483.5	-52.32	2.0	0	44.91	AV	54	PASS
	Off	2500.0	-43.24	2.0	0	53.99	PEAK	74	PASS
	Off	2500.0	-52.32	2.0	0	44.91	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.77	2.0	0	53.46	PEAK	74	PASS
	Off	2310.0	-53.23	2.0	0	44.00	AV	54	PASS
	Off	2390.0	-42.45	2.0	0	54.78	PEAK	74	PASS
	Off	2390.0	-52.91	2.0	0	44.32	AV	54	PASS
	Off	2483.5	-42.08	2.0	0	55.15	PEAK	74	PASS
	Off	2483.5	-52.20	2.0	0	45.03	AV	54	PASS
	Off	2500.0	-41.56	2.0	0	55.67	PEAK	74	PASS
	Off	2500.0	-52.25	2.0	0	44.98	AV	54	PASS
8DPSK	Off	2310.0	-43.16	2.0	0	54.07	PEAK	74	PASS
	Off	2310.0	-53.30	2.0	0	43.93	AV	54	PASS
	Off	2390.0	-42.89	2.0	0	54.34	PEAK	74	PASS
	Off	2390.0	-52.80	2.0	0	44.43	AV	54	PASS
	Off	2483.5	-41.88	2.0	0	55.35	PEAK	74	PASS
	Off	2483.5	-52.04	2.0	0	45.19	AV	54	PASS
	Off	2500.0	-41.33	2.0	0	55.90	PEAK	74	PASS
	Off	2500.0	-52.23	2.0	0	45.00	AV	54	PASS

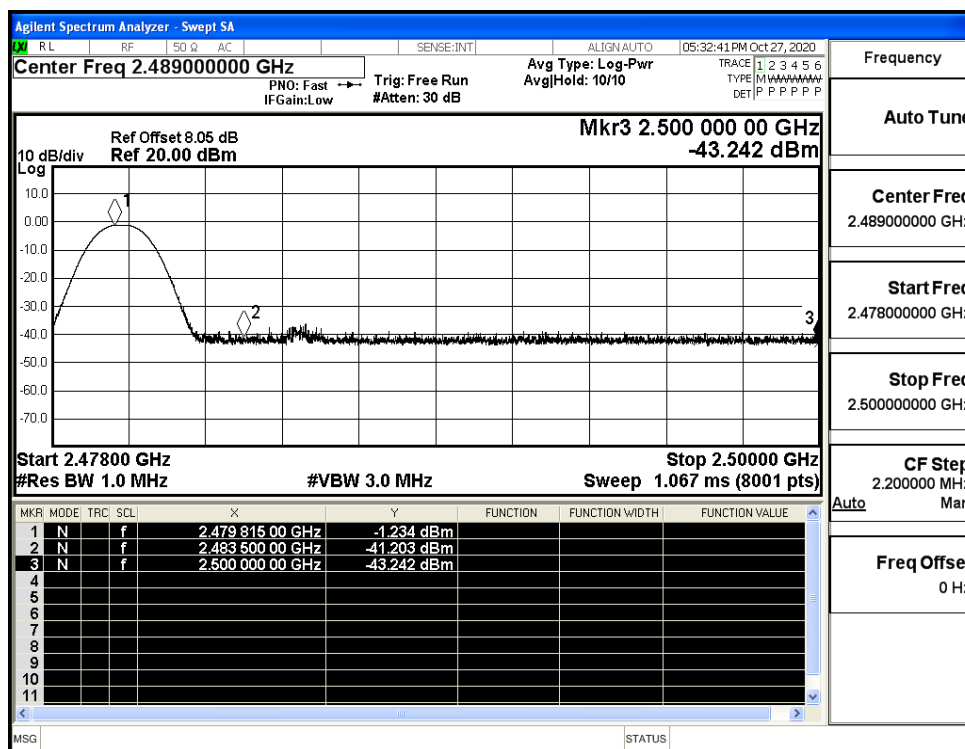
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



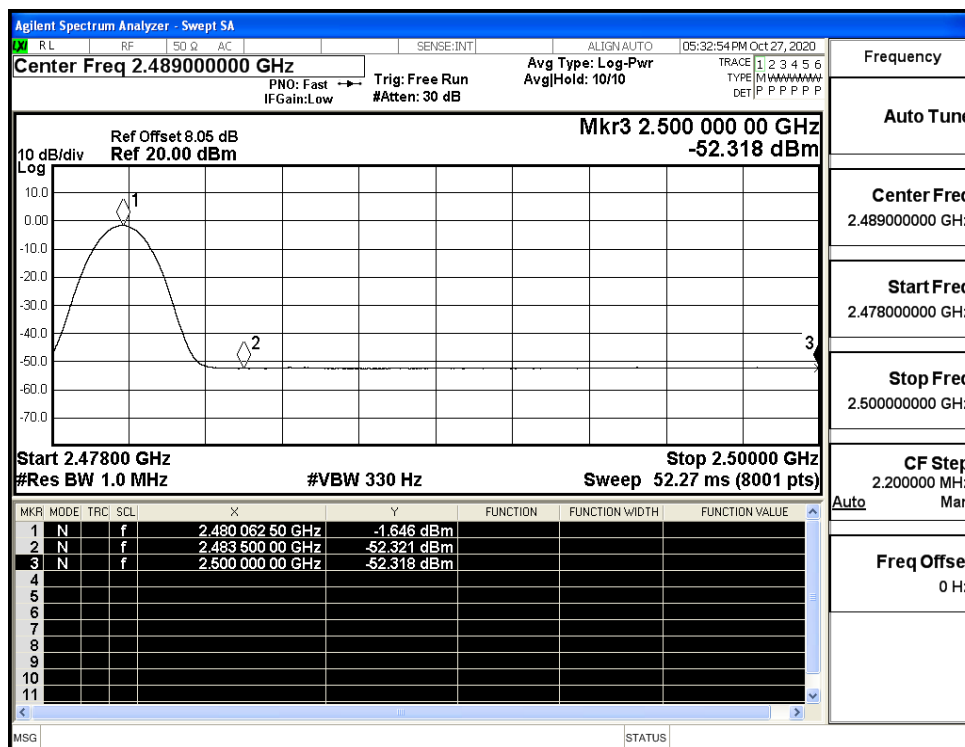
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

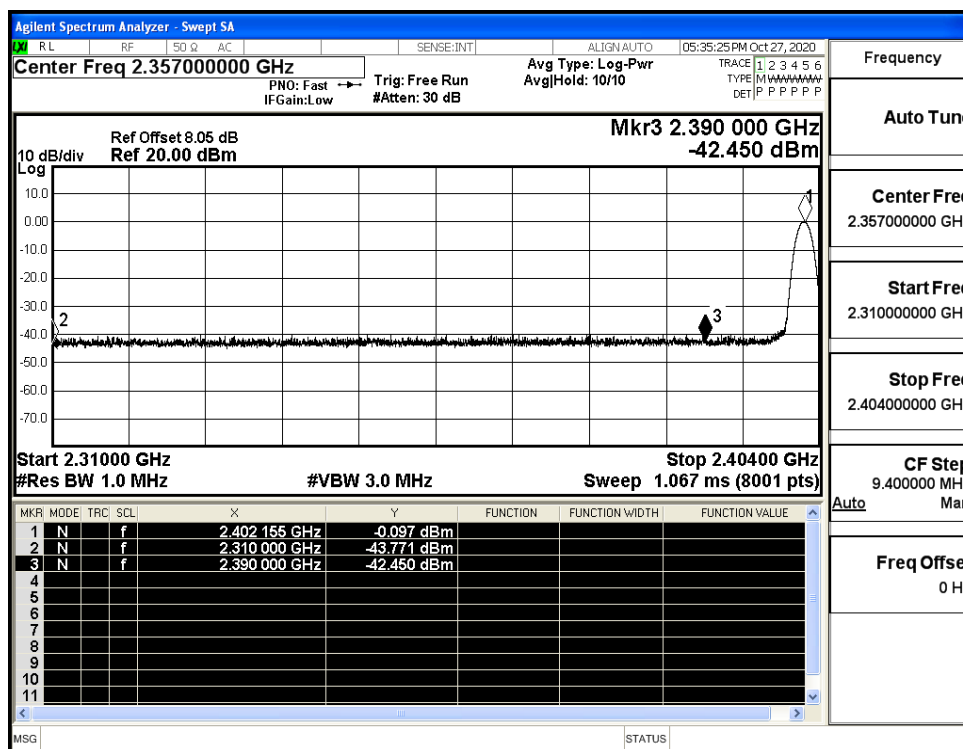
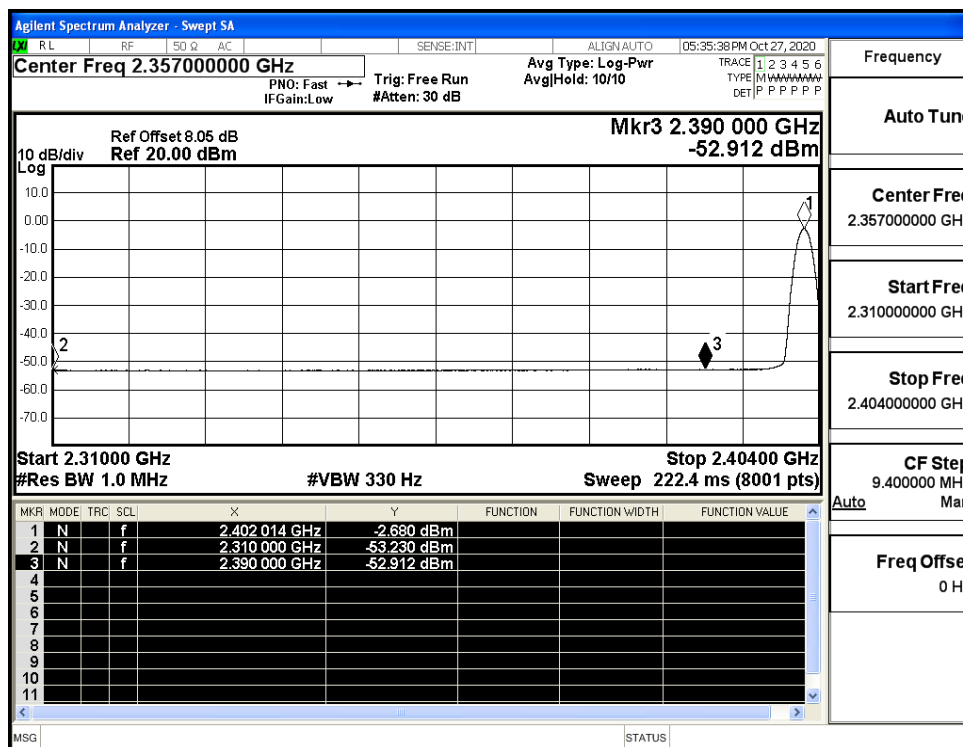


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

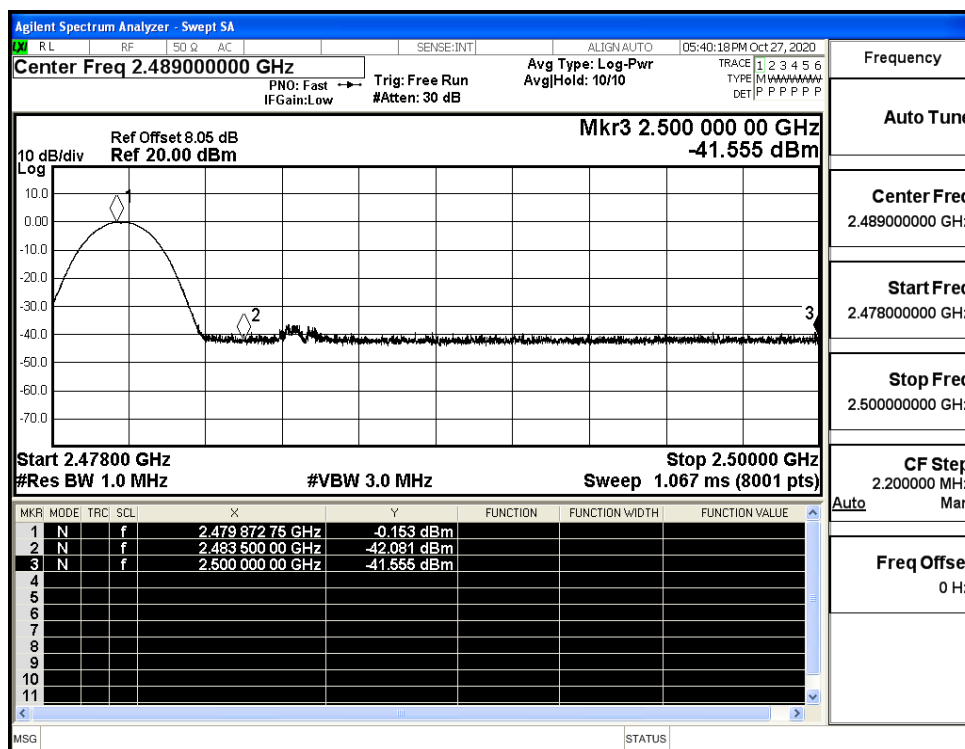


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

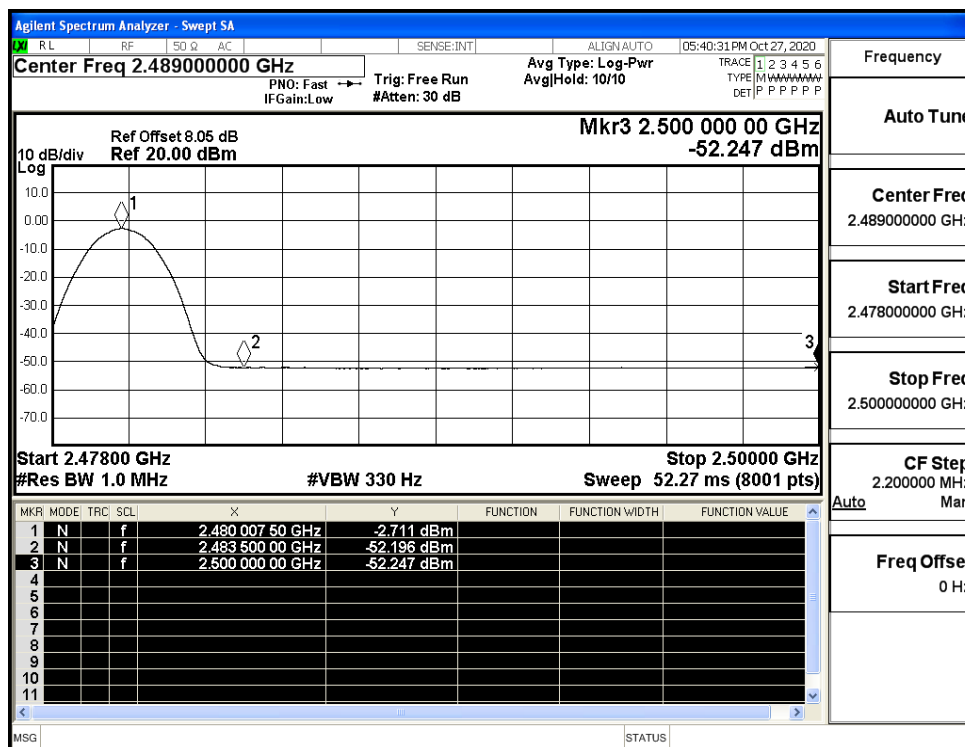


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

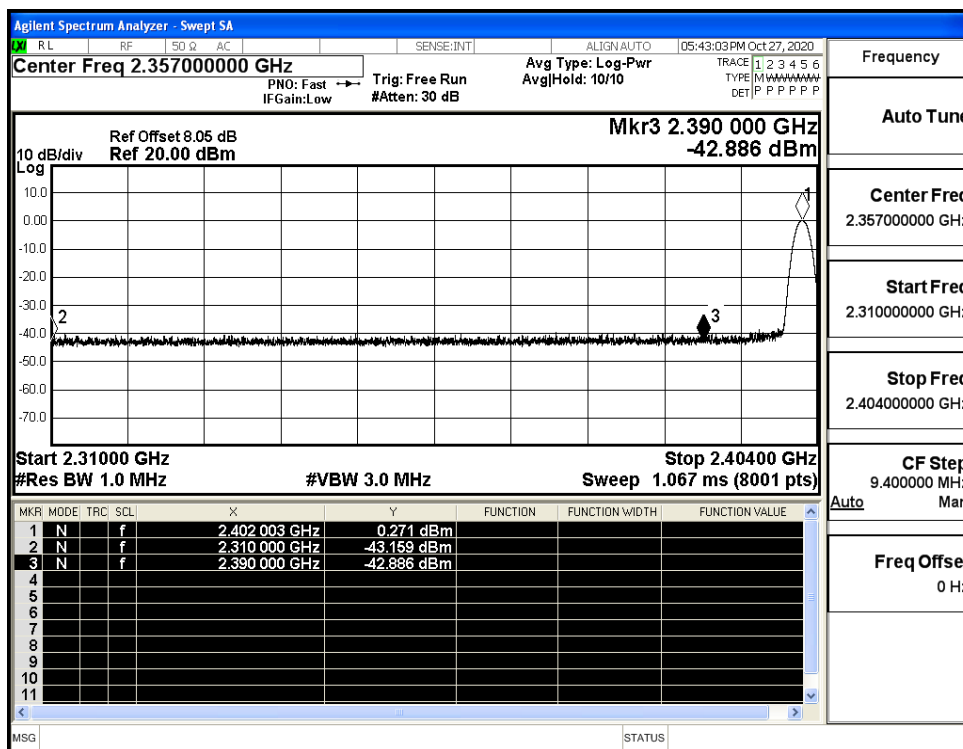
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



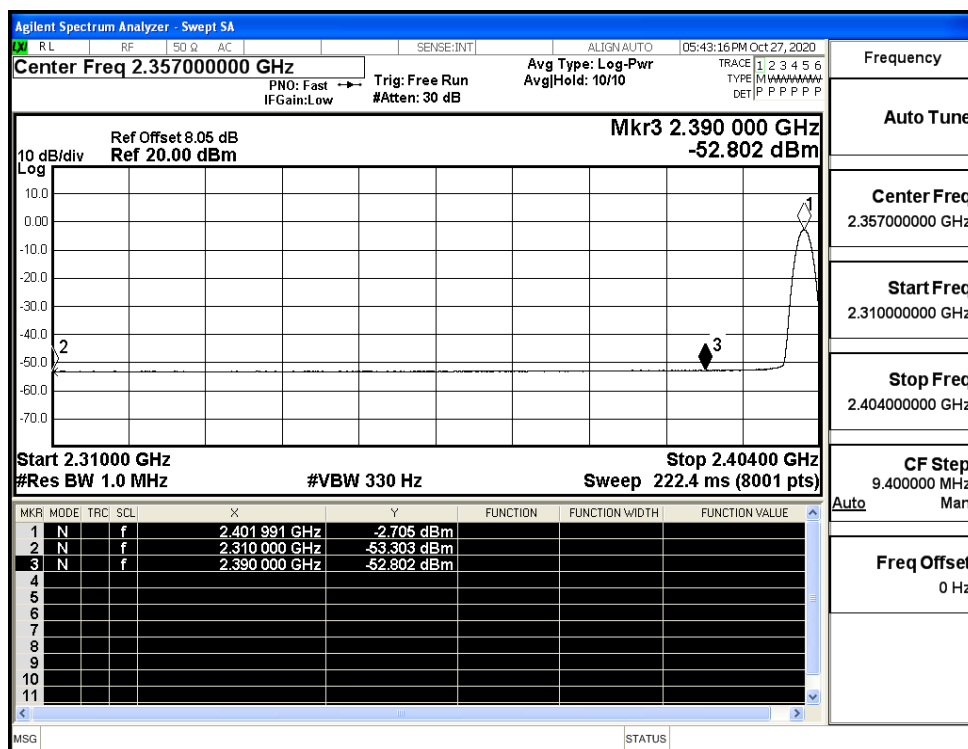
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



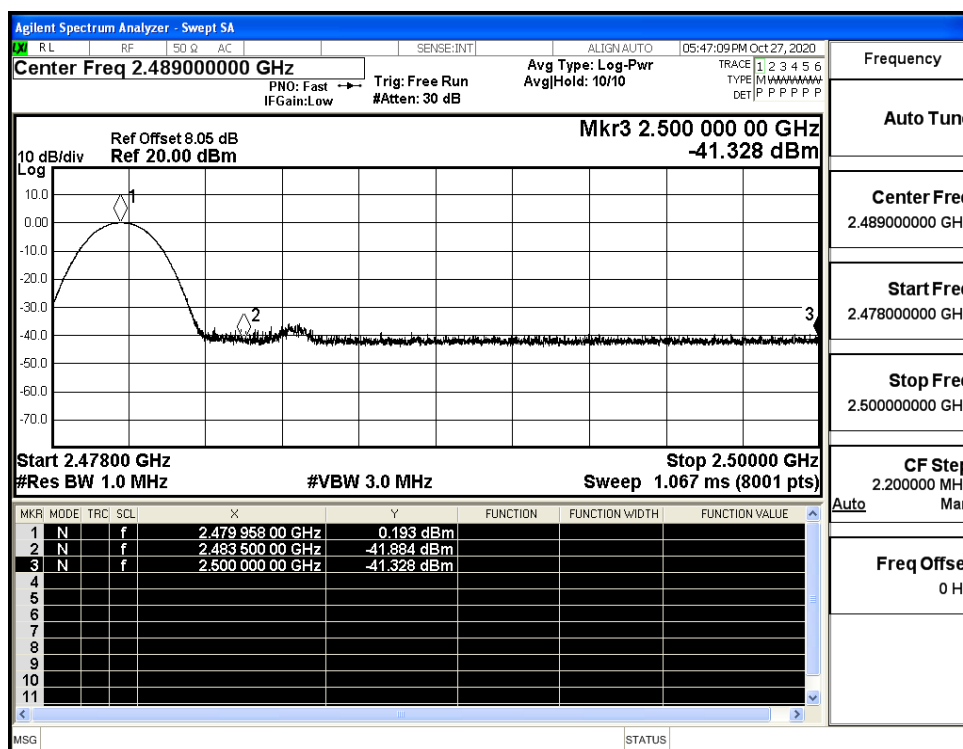
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

