

Appendix A

RF Test Data for BT V5.0 (Classics) (Conducted Measurement)

Product Name: TWS Bluetooth Headset

Trade Mark: Urbanista

Test Model: Urbanista Stockholm

Environmental Conditions

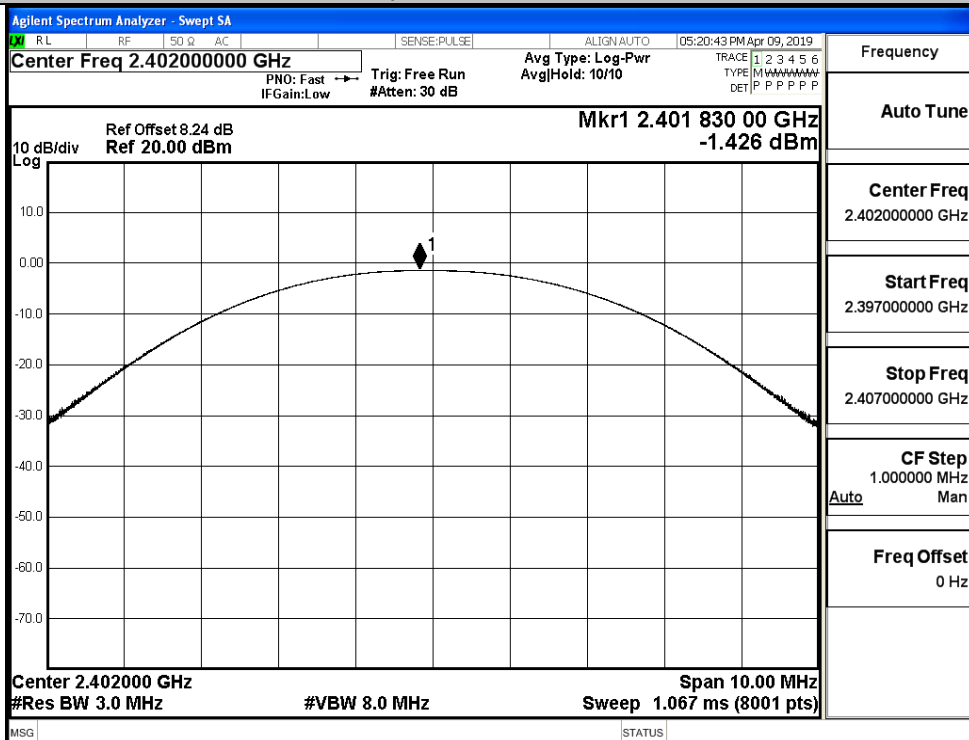
Temperature:	24.5 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Wang Chuang

A.1 Maximum Conducted Peak Output Power

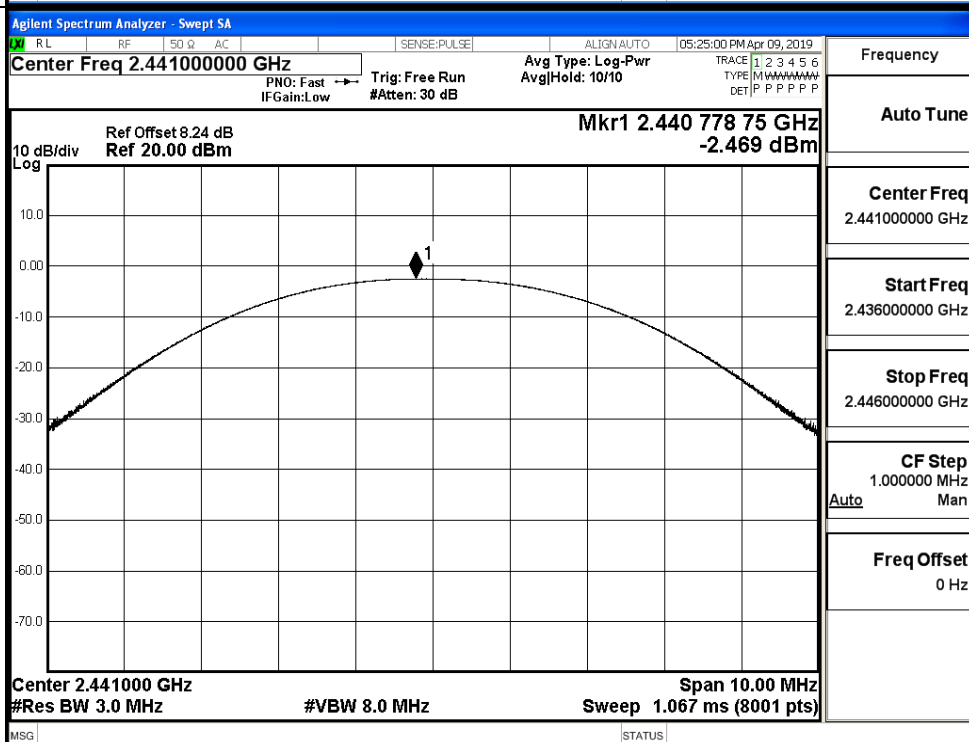
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.426	21	PASS
	MCH	-2.469	21	PASS
	HCH	-3.907	21	PASS
$\pi/4$ DQPSK	LCH	0.844	21	PASS
	MCH	-0.330	21	PASS
	HCH	-1.844	21	PASS
8DPSK	LCH	1.399	21	PASS
	MCH	0.287	21	PASS
	HCH	-1.277	21	PASS

Test Graphs

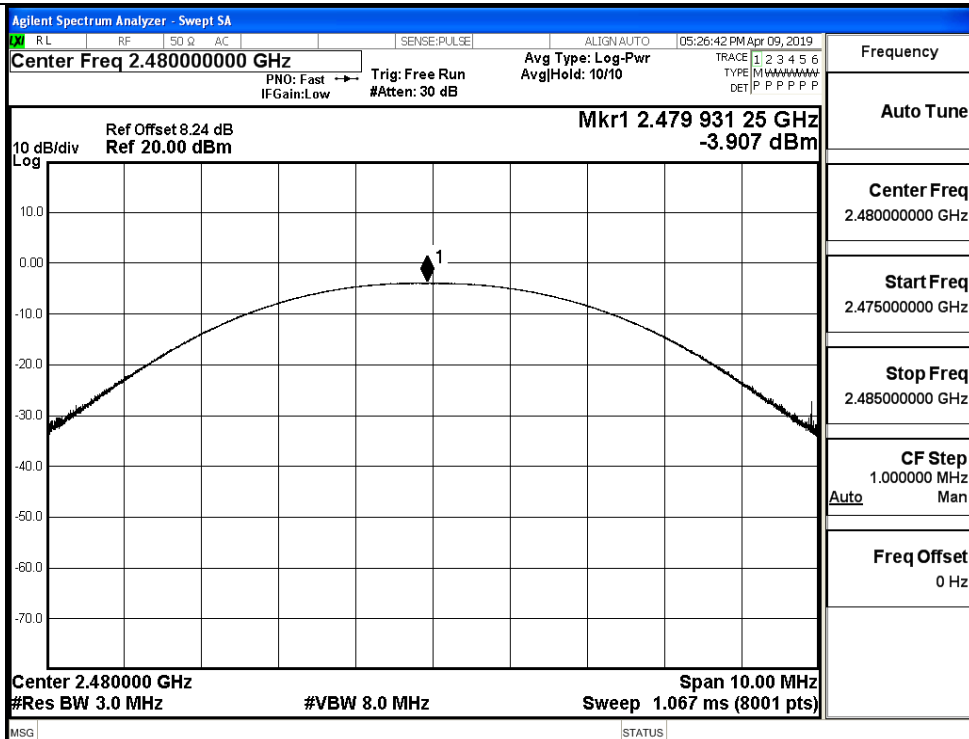
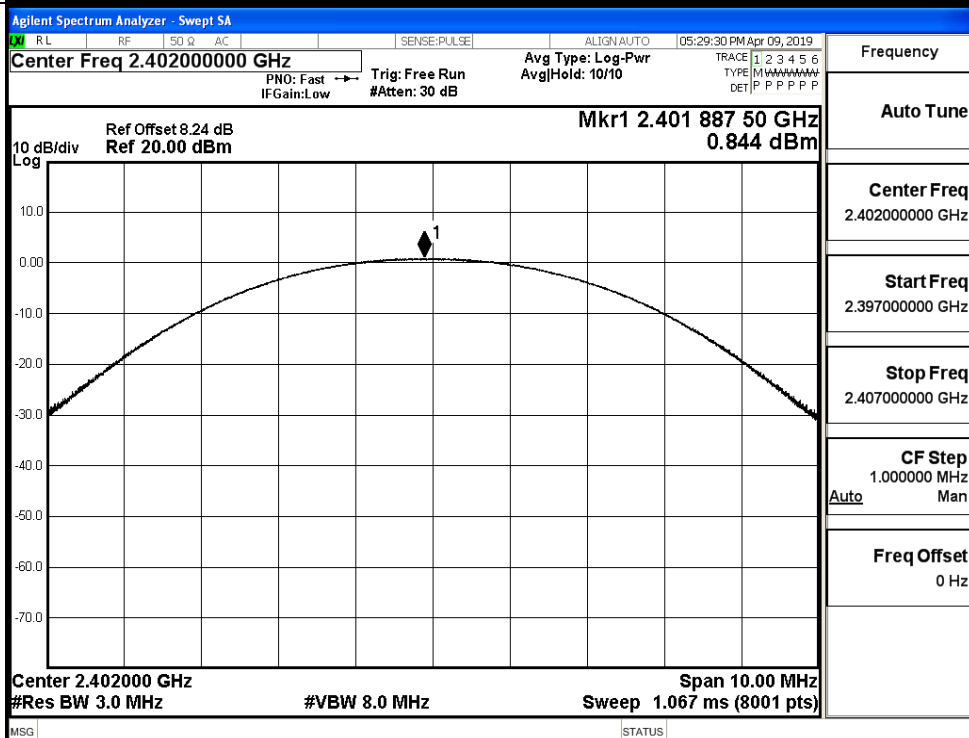
GFSK/LCH

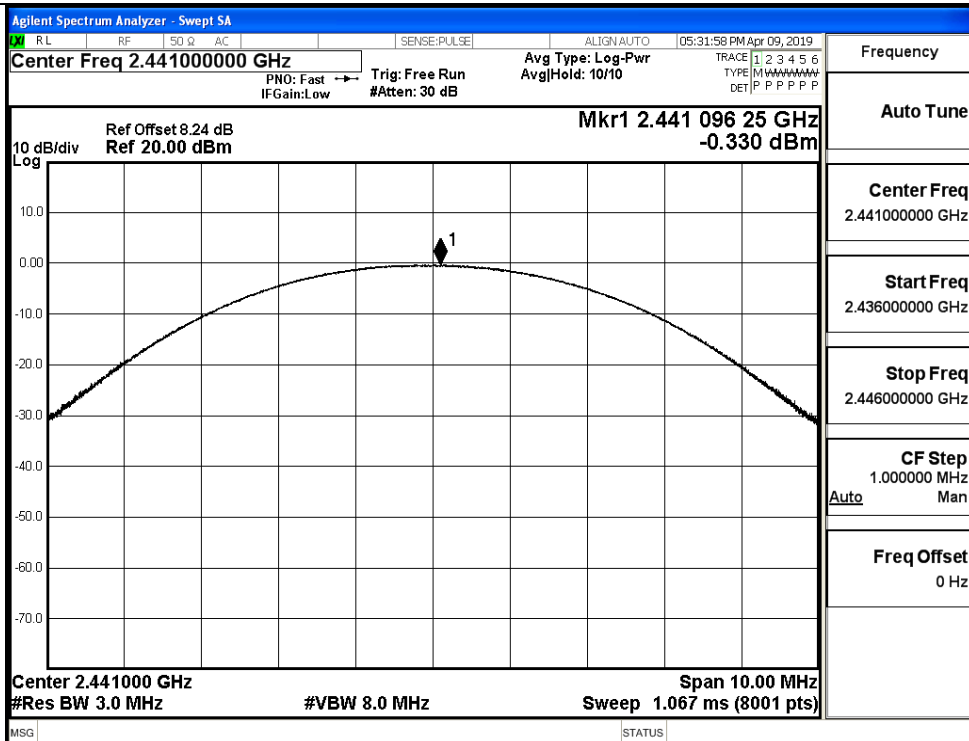
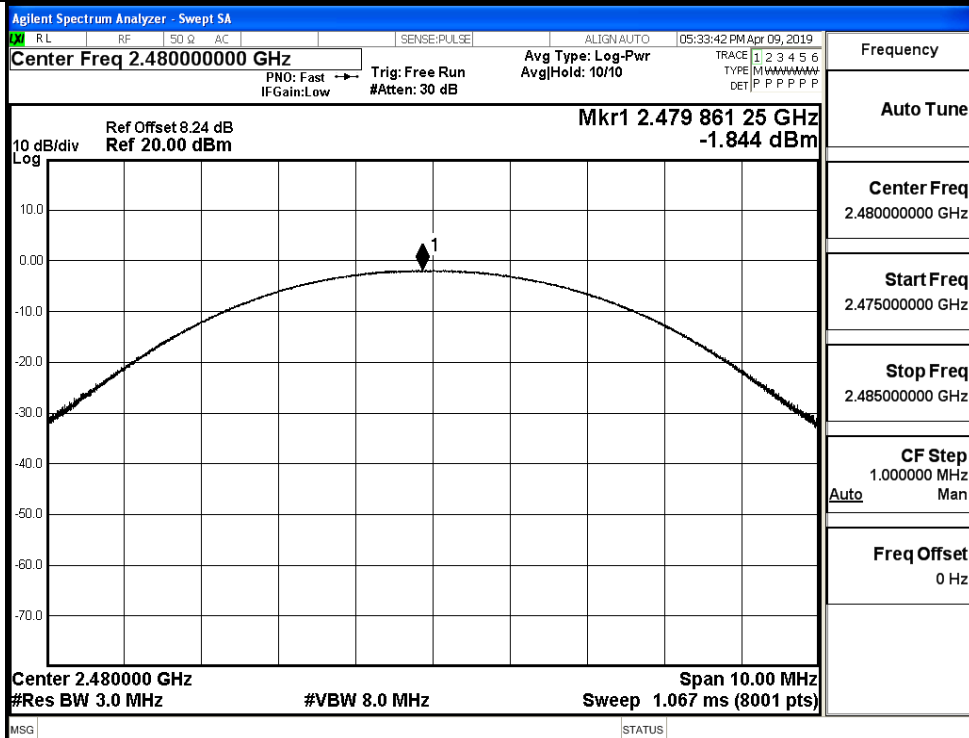


GFSK/MCH

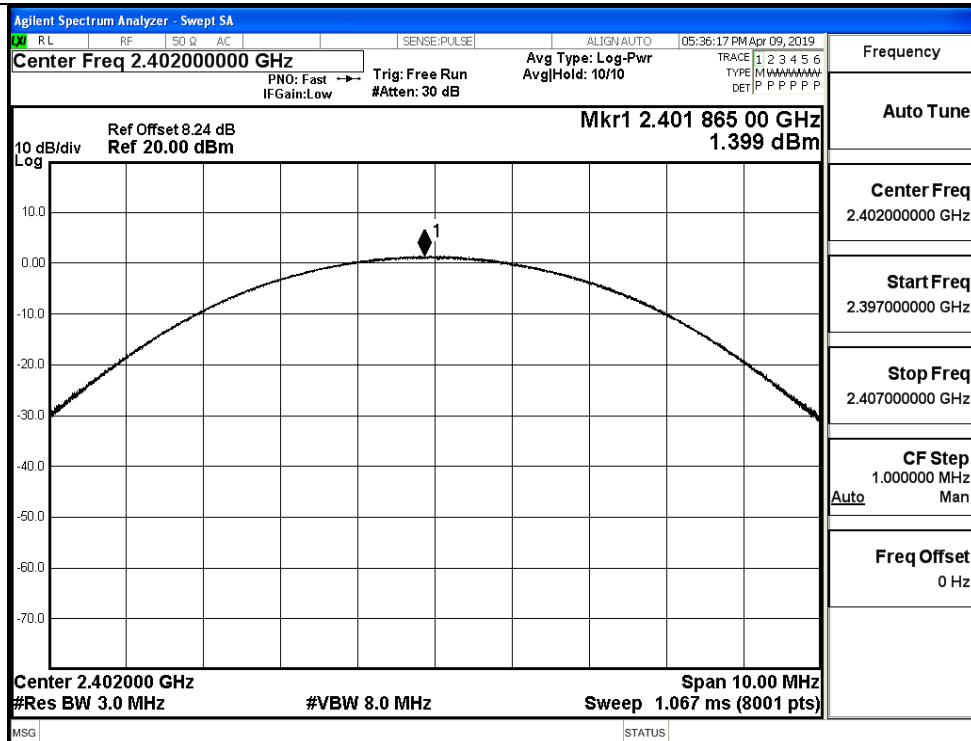


GFSK/HCH

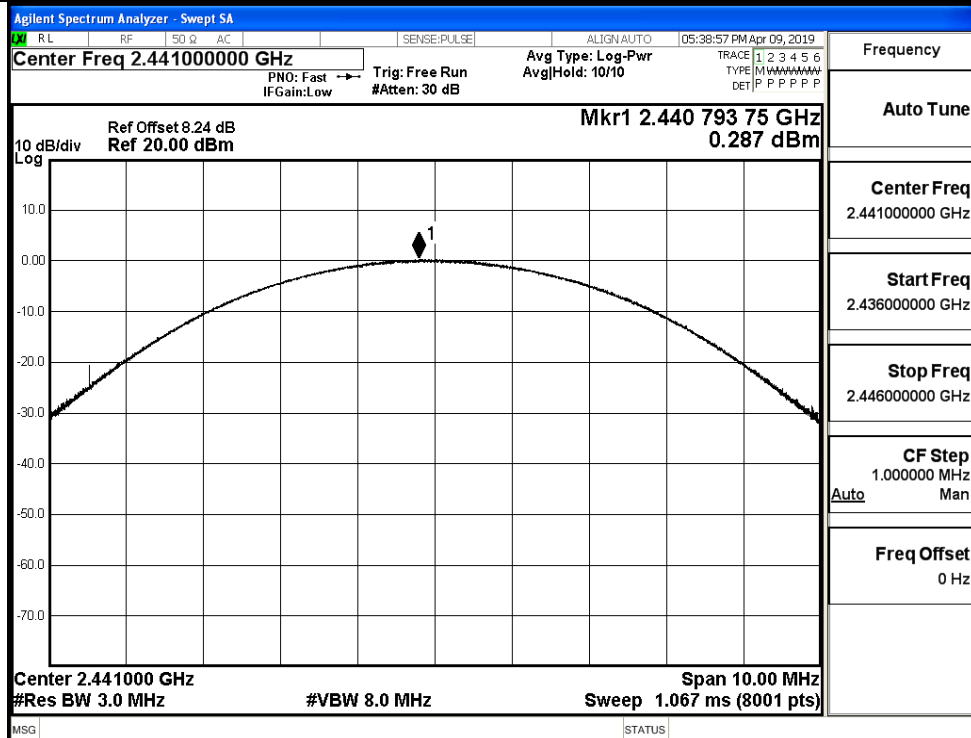
 π /4DQPSK/LCH

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

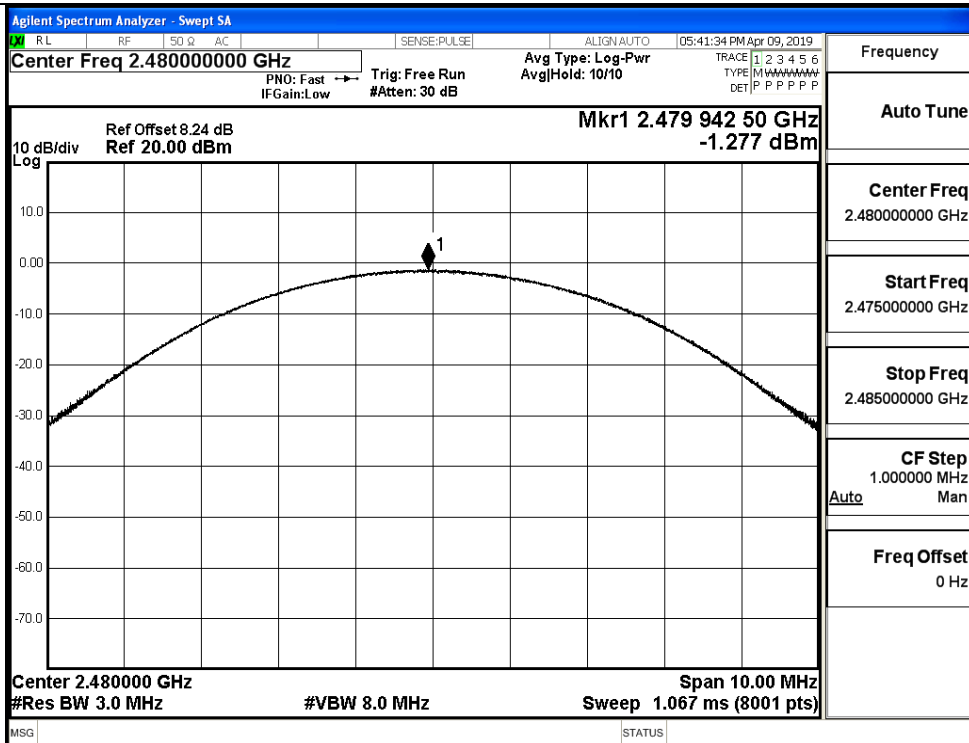
8DPSK/LCH



8DPSK/MCH



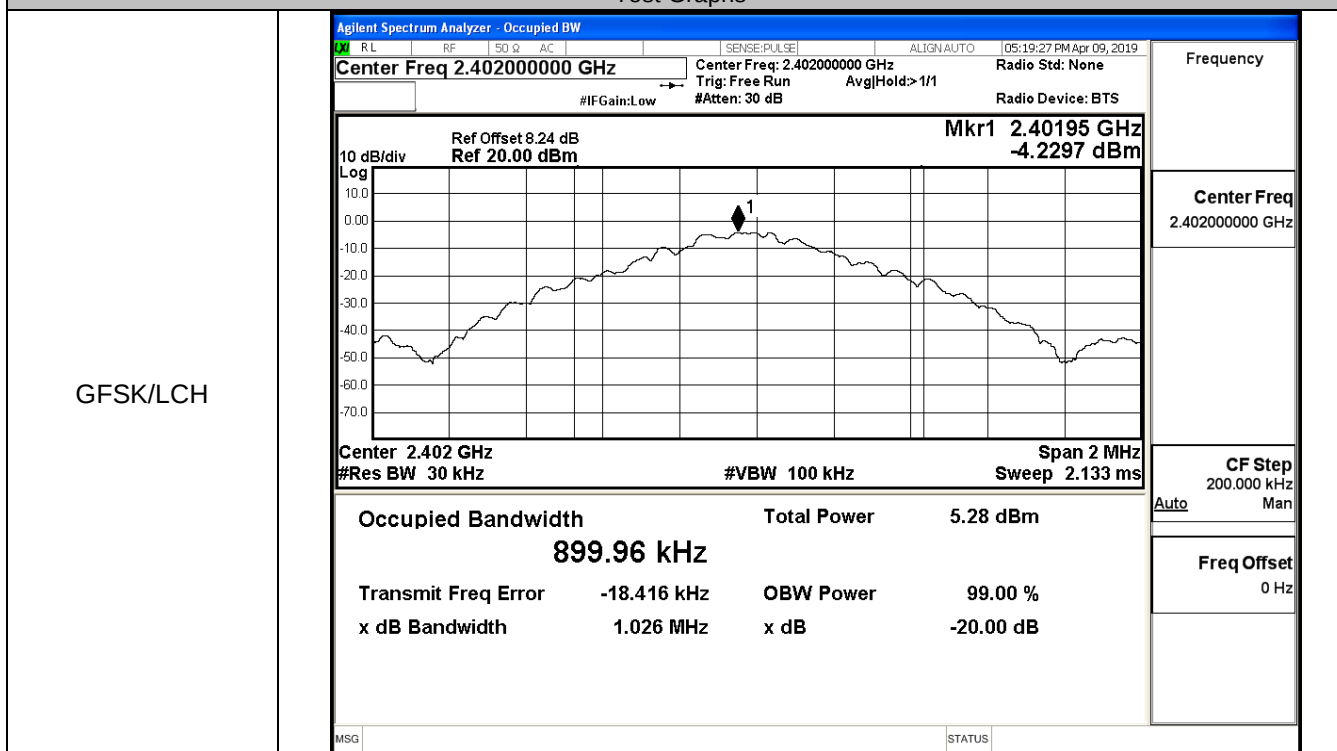
8DPSK/HCH



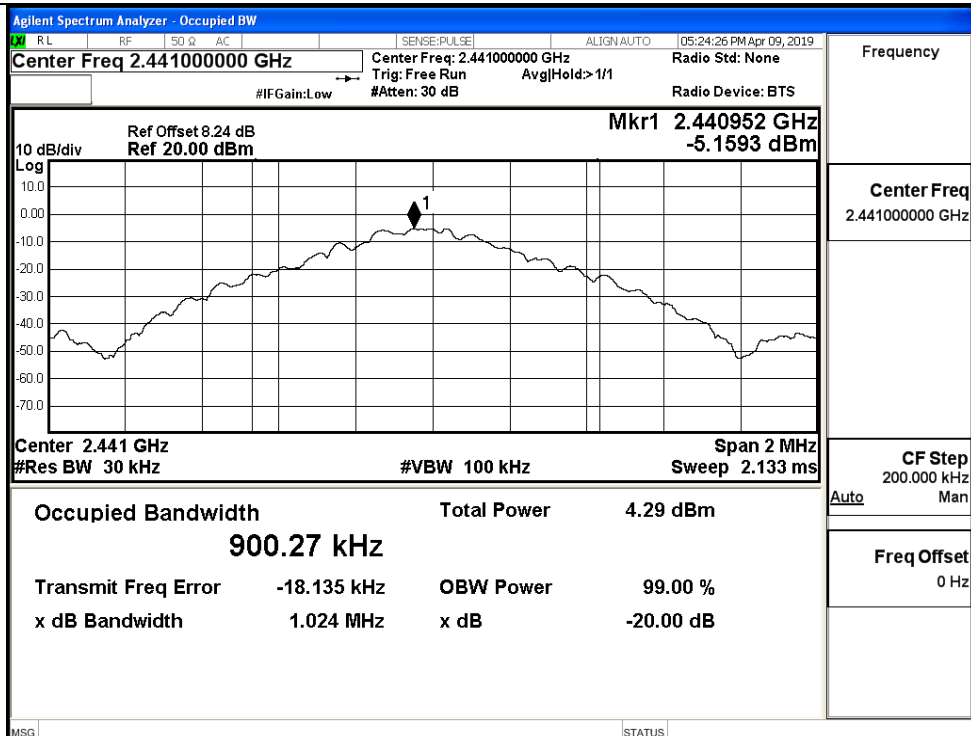
A.2 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89996	1.026	Not Specified	PASS
	MCH	0.90027	1.024	Not Specified	PASS
	HCH	0.87435	0.9625	Not Specified	PASS
π /4DQPSK	LCH	1.1612	1.283	Not Specified	PASS
	MCH	1.1617	1.281	Not Specified	PASS
	HCH	1.1606	1.281	Not Specified	PASS
8DPSK	LCH	1.1688	1.303	Not Specified	PASS
	MCH	1.1696	1.301	Not Specified	PASS
	HCH	1.1687	1.299	Not Specified	PASS

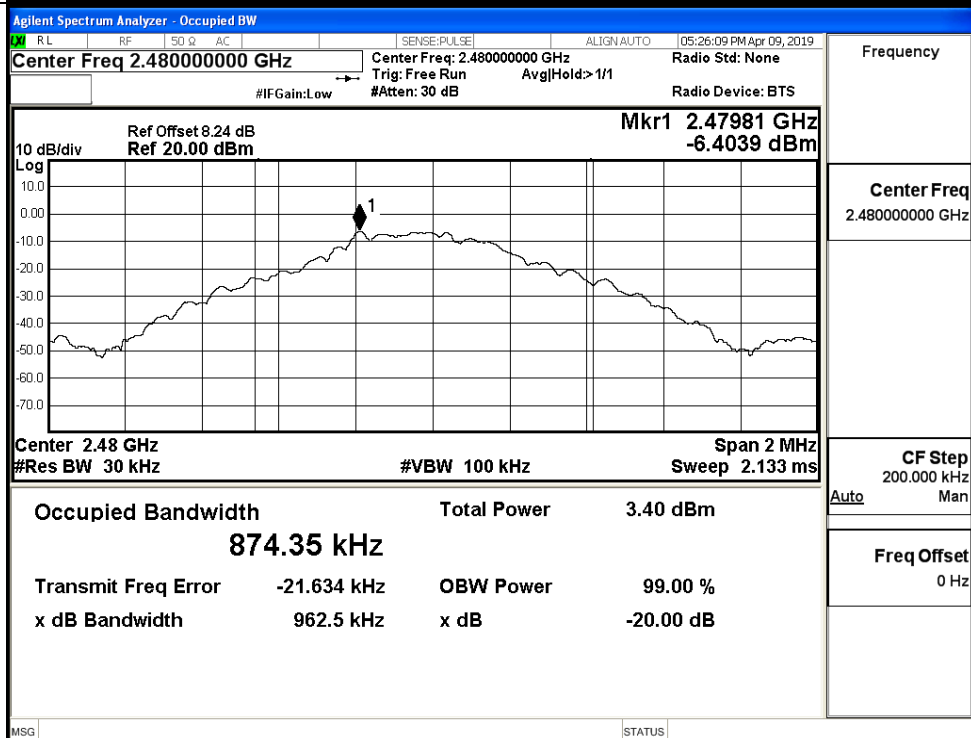
Test Graphs

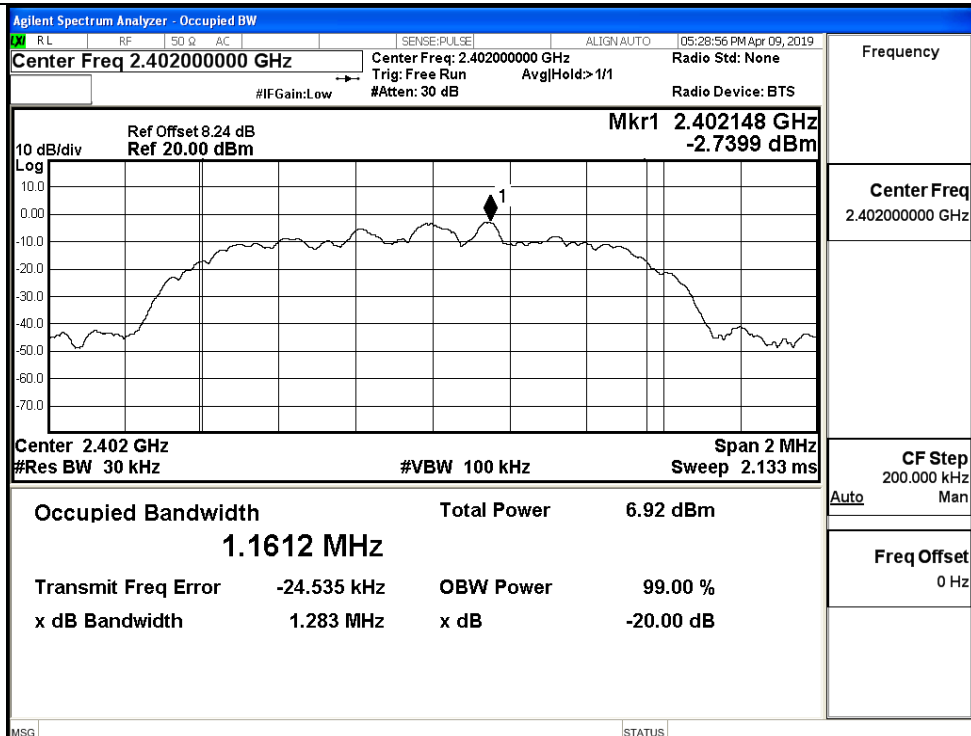
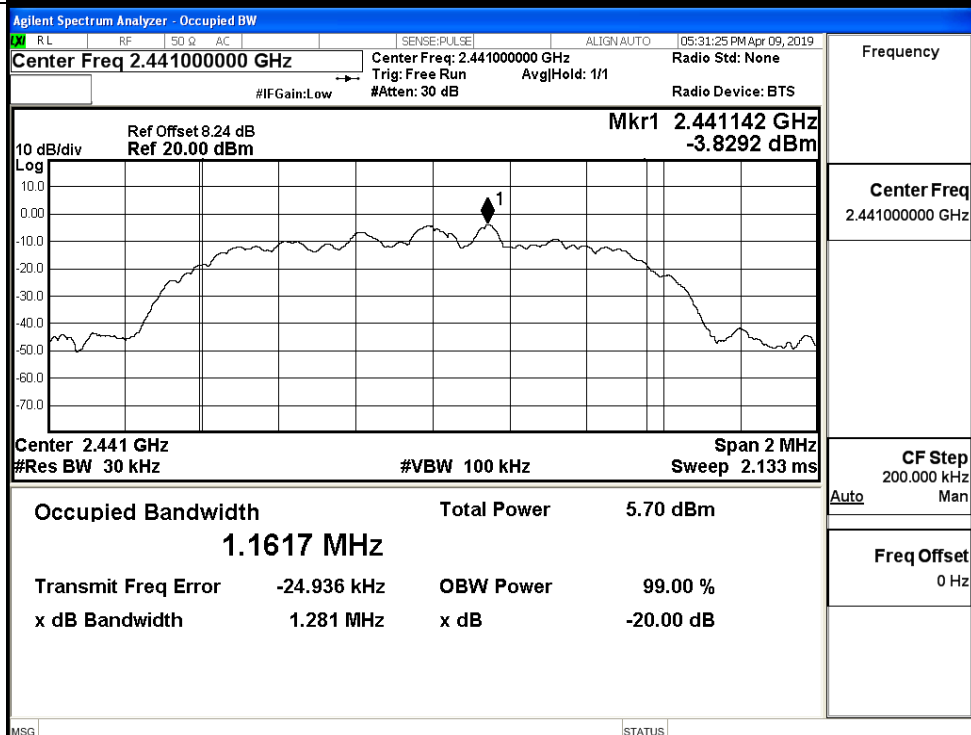


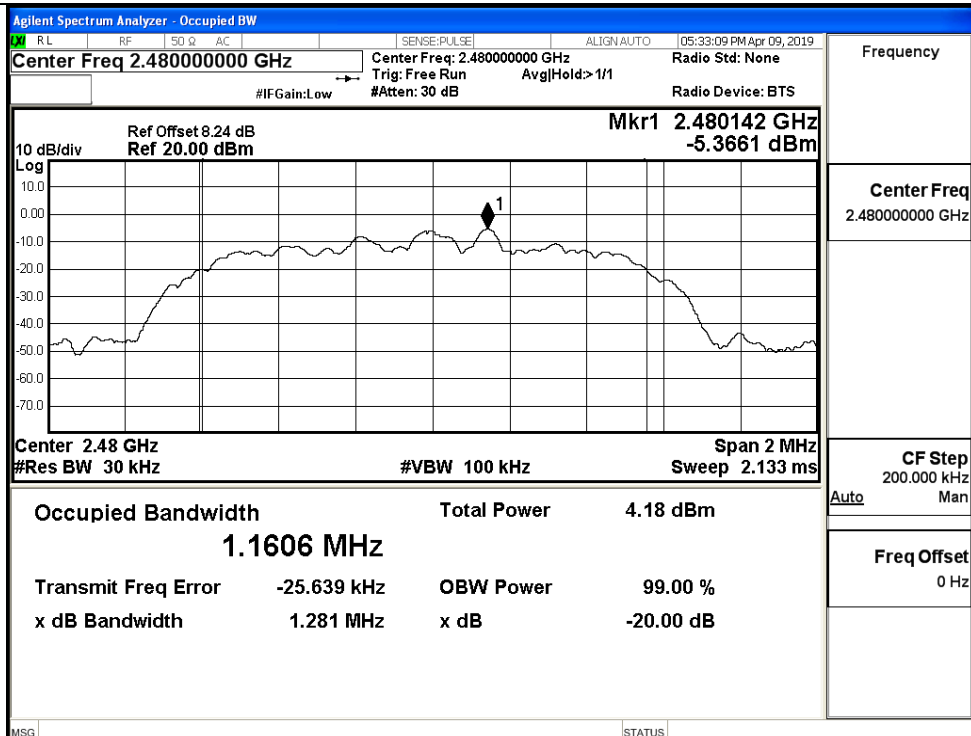
GFSK/MCH



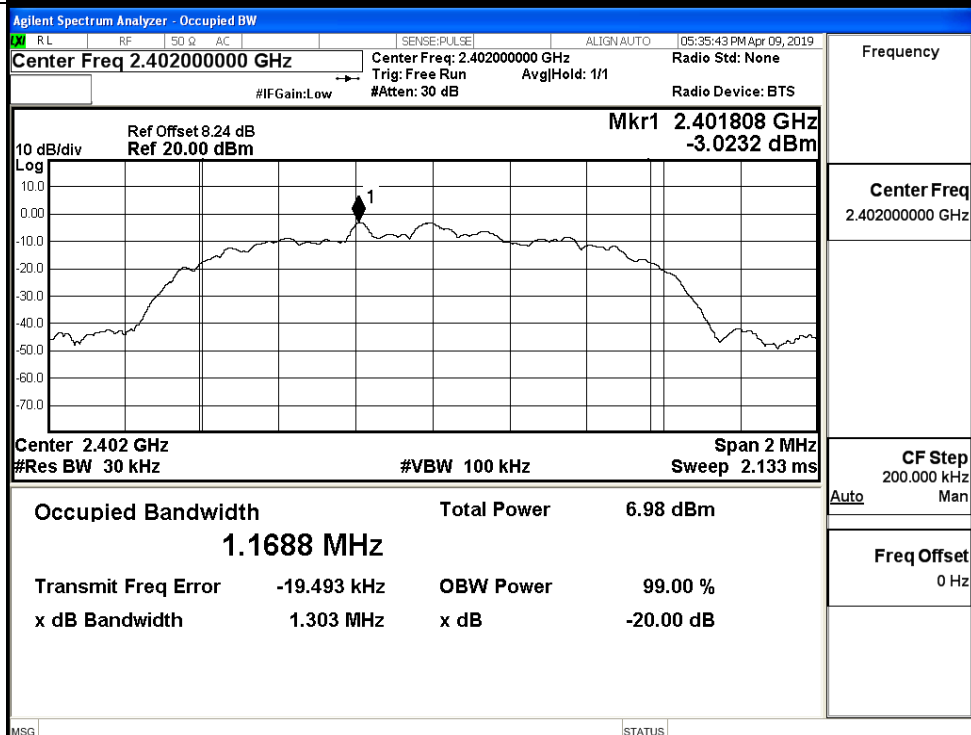
GFSK/HCH



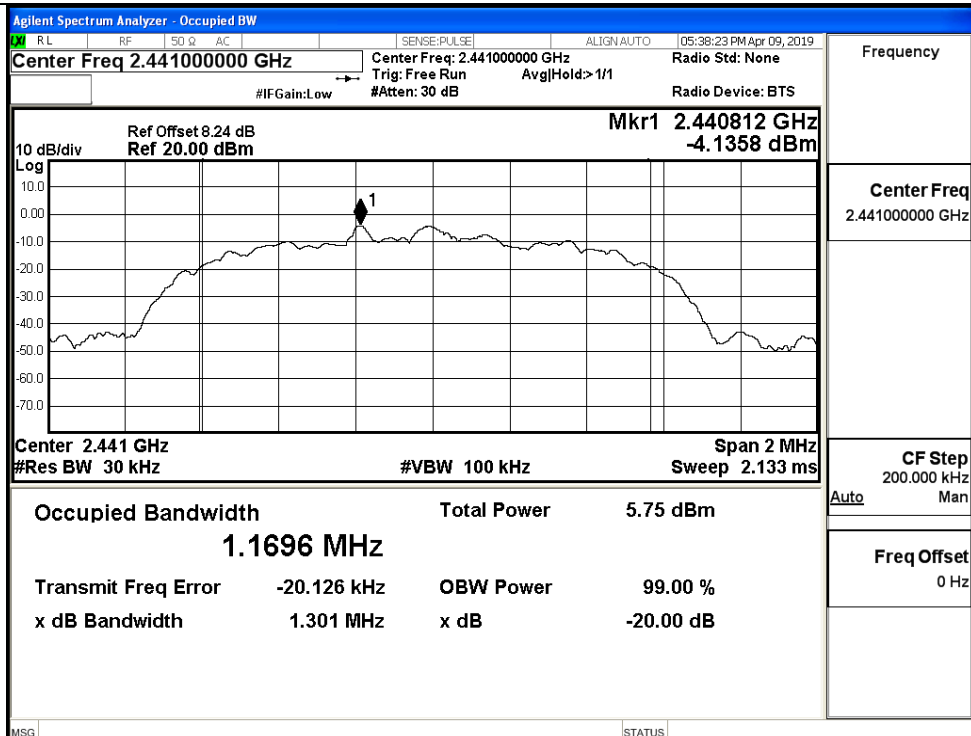
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

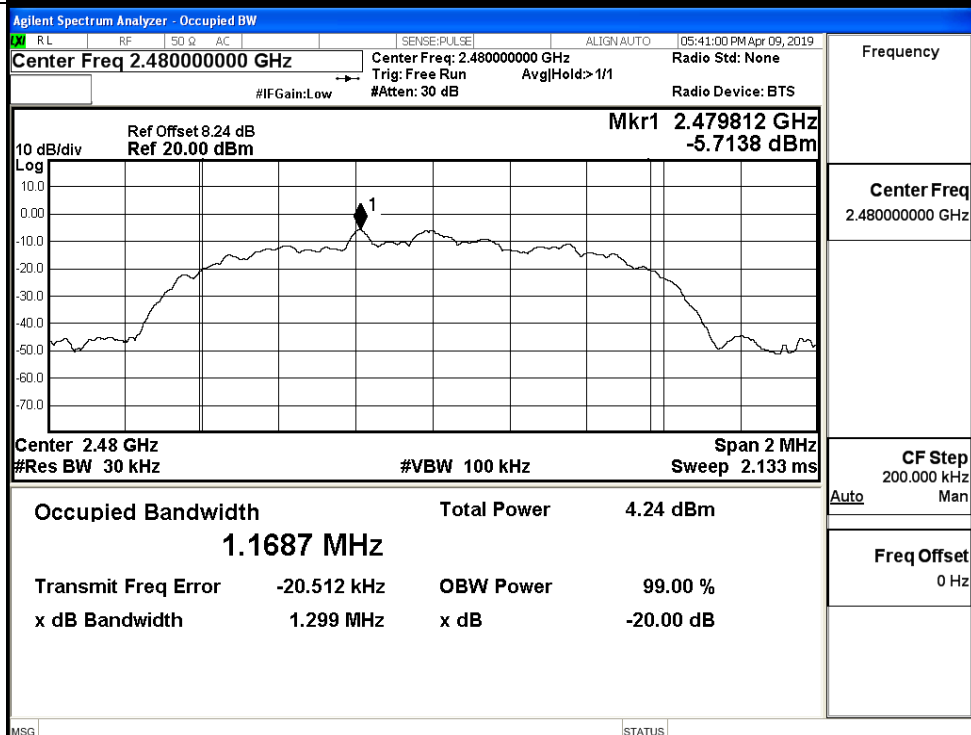
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

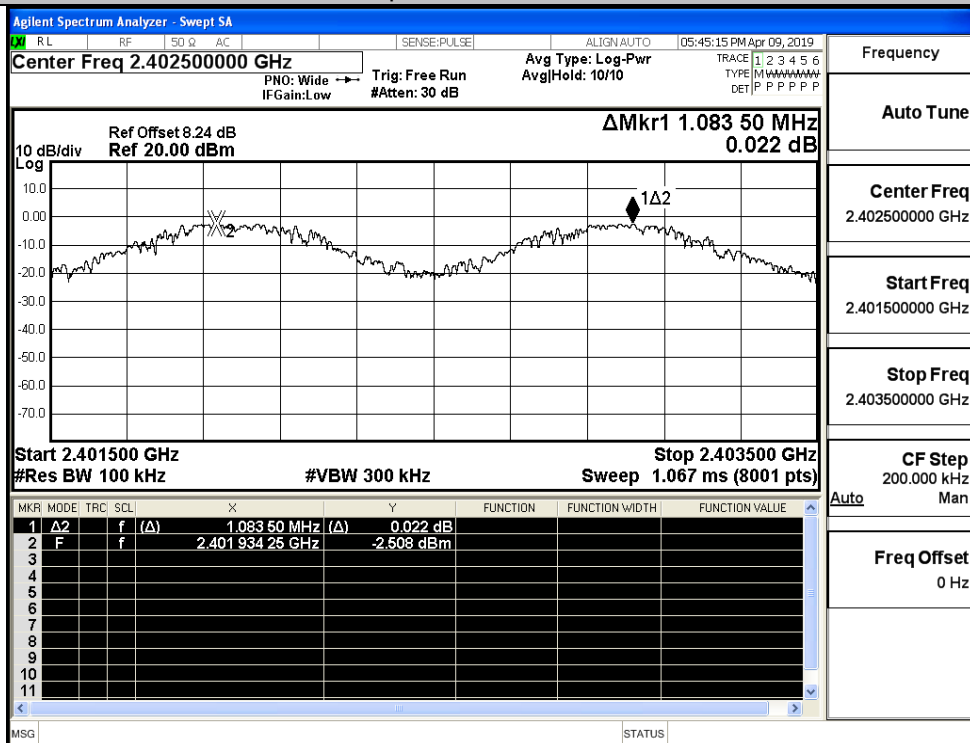


A.3 Carrier Frequency Separation

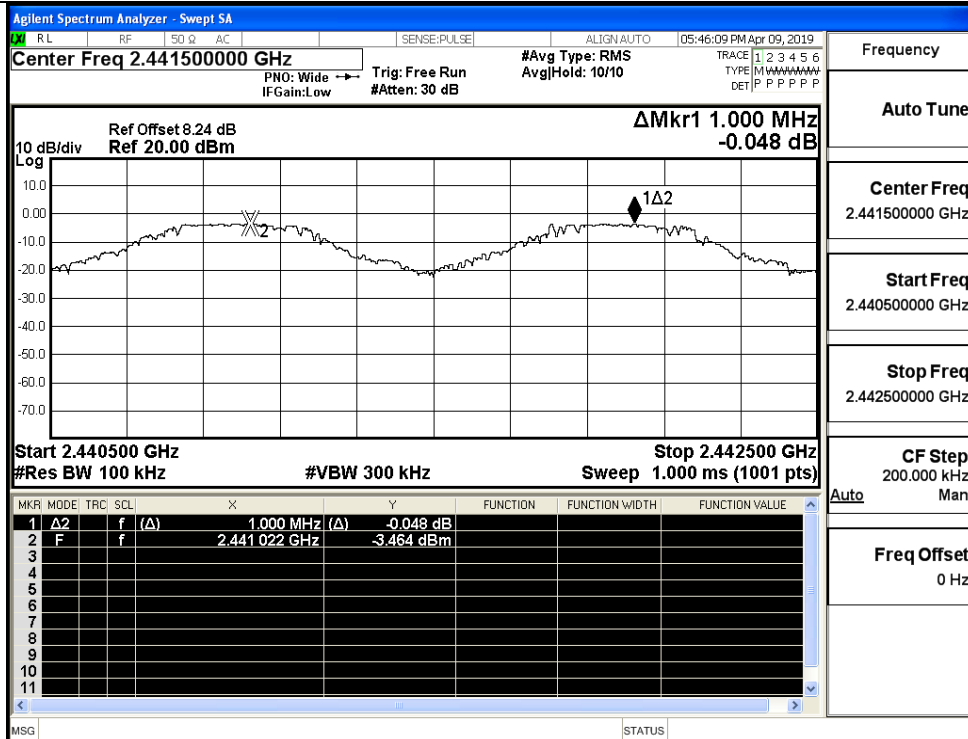
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.084	0.684	PASS
	MCH	1.000	0.684	PASS
	HCH	0.964	0.684	PASS
$\pi/4$ DQPSK	LCH	1.344	0.855	PASS
	MCH	1.034	0.855	PASS
	HCH	1.010	0.855	PASS
8DPSK	LCH	1.036	0.869	PASS
	MCH	0.958	0.869	PASS
	HCH	0.938	0.869	PASS

Test Graphs

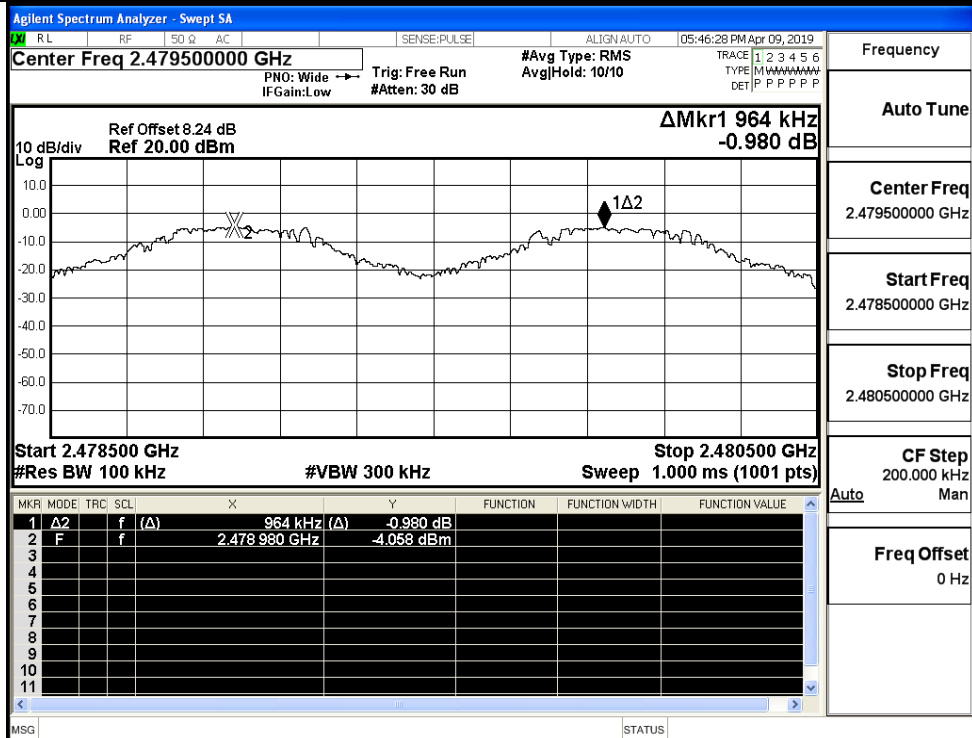
GFSK/LCH

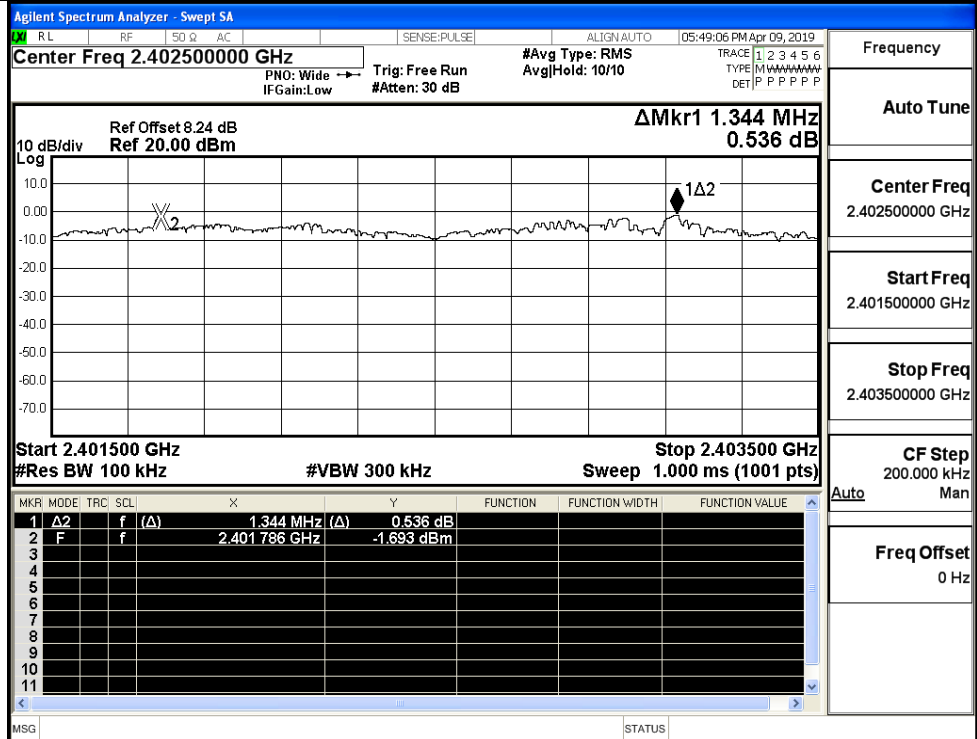
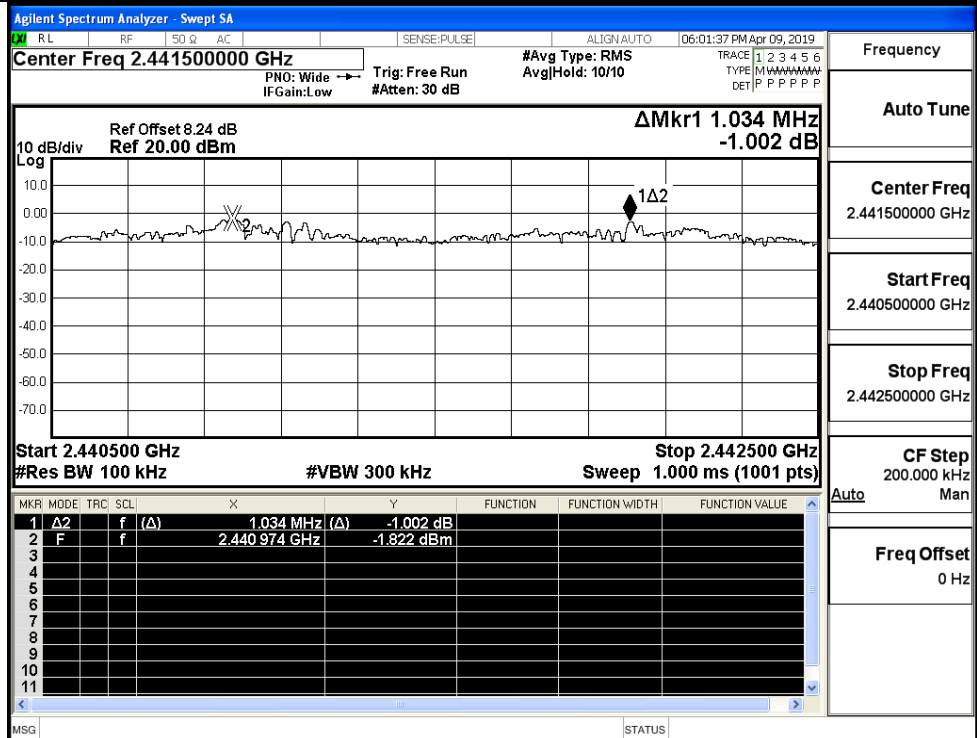


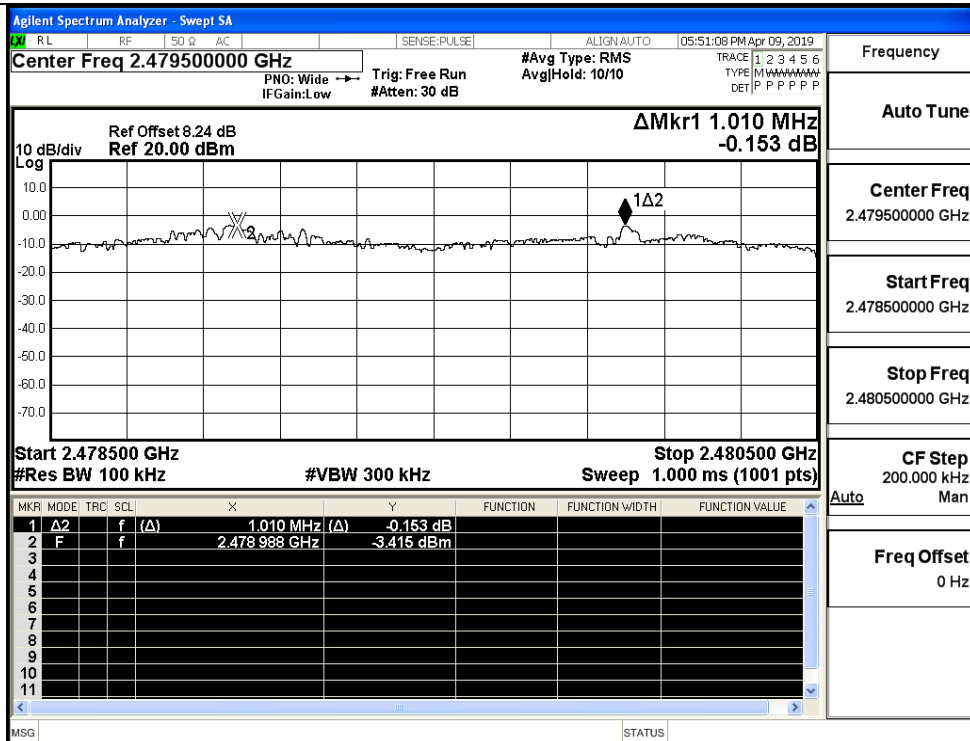
GFSK/MCH



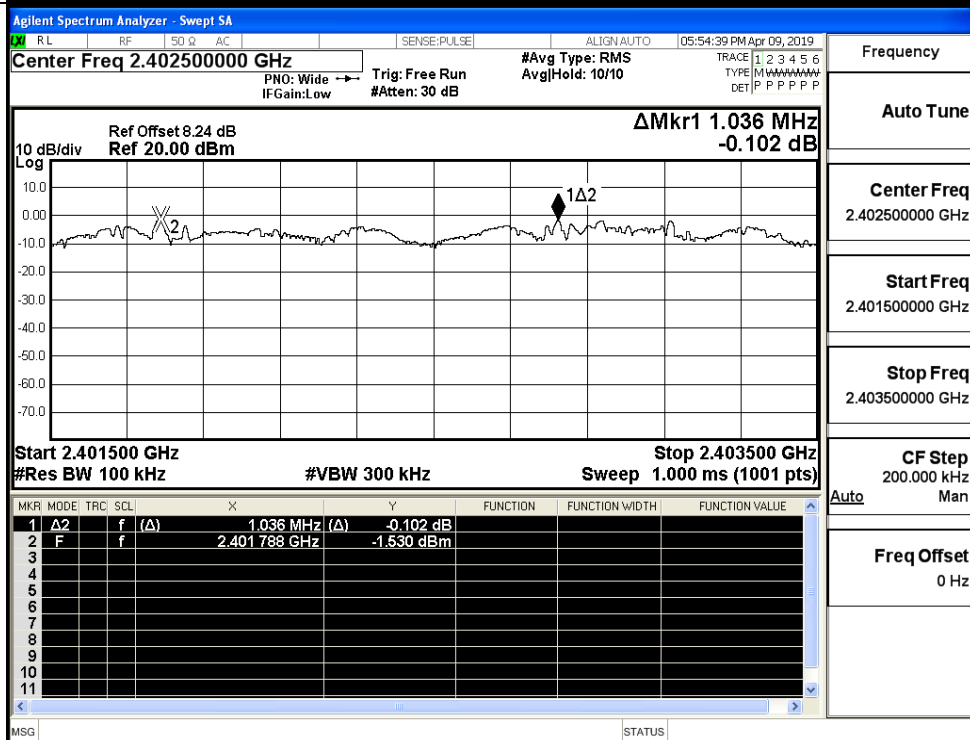
GFSK/HCH



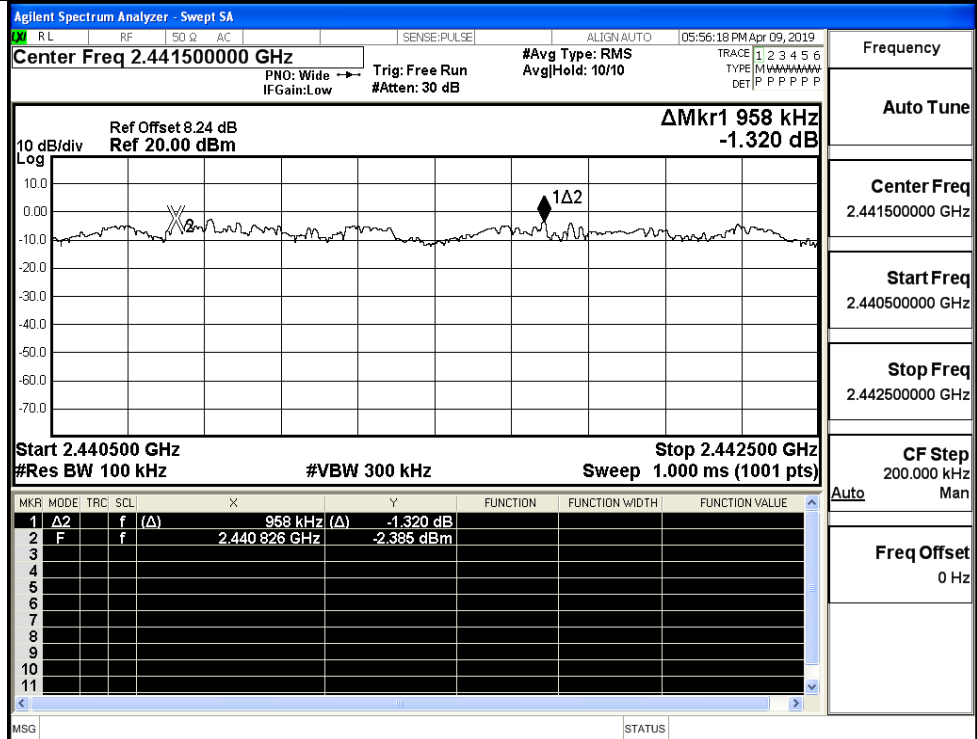
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

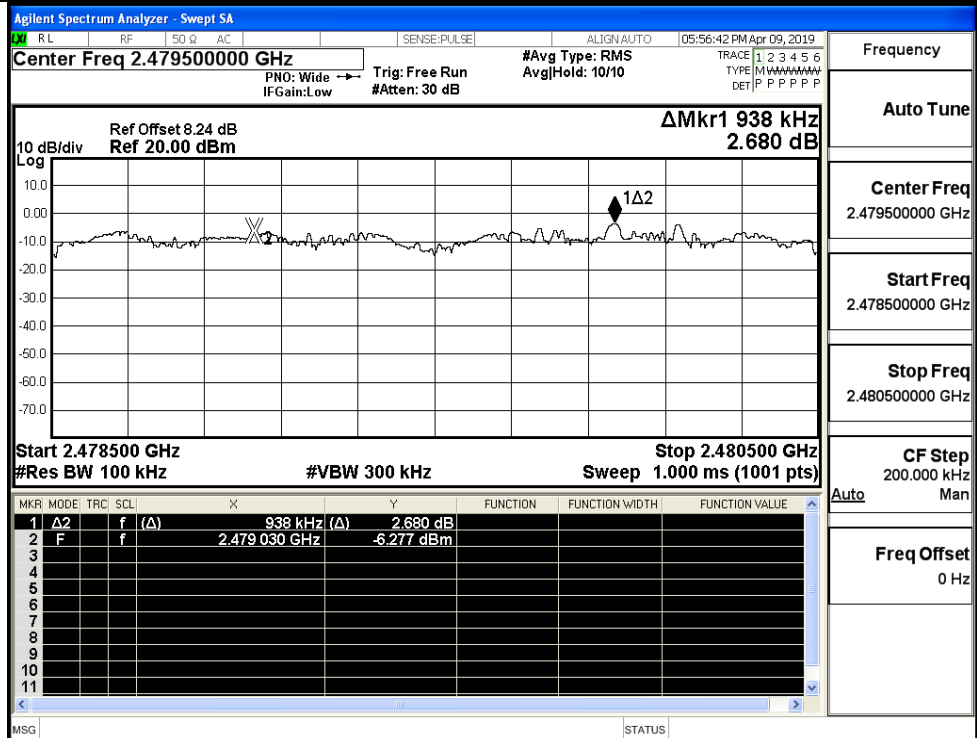
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

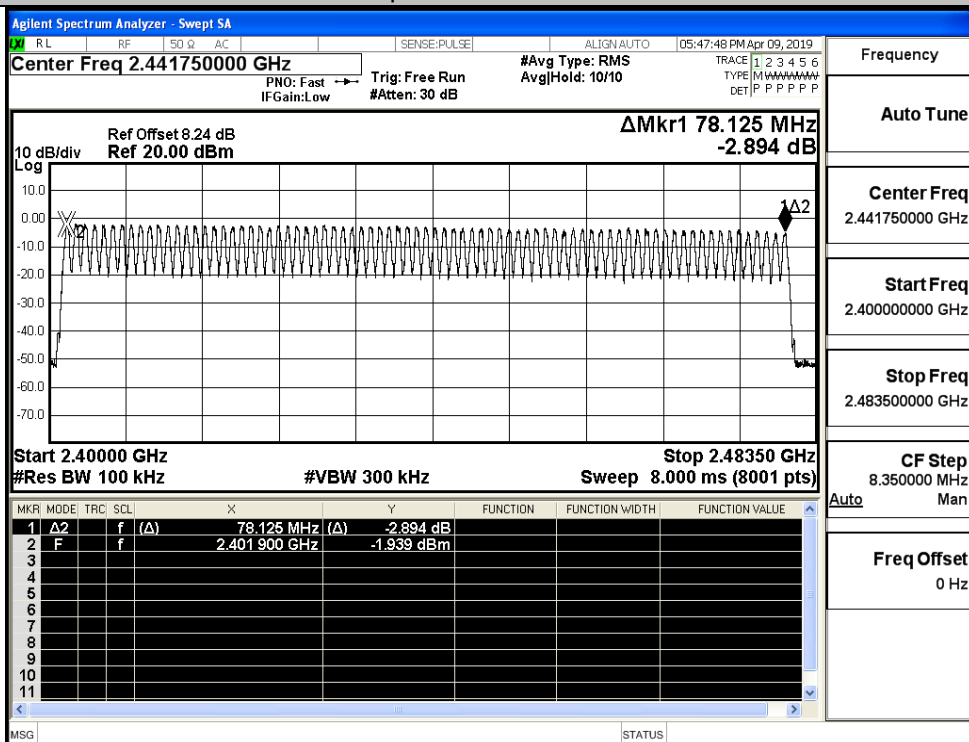


A.4 Hopping Channel Number

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

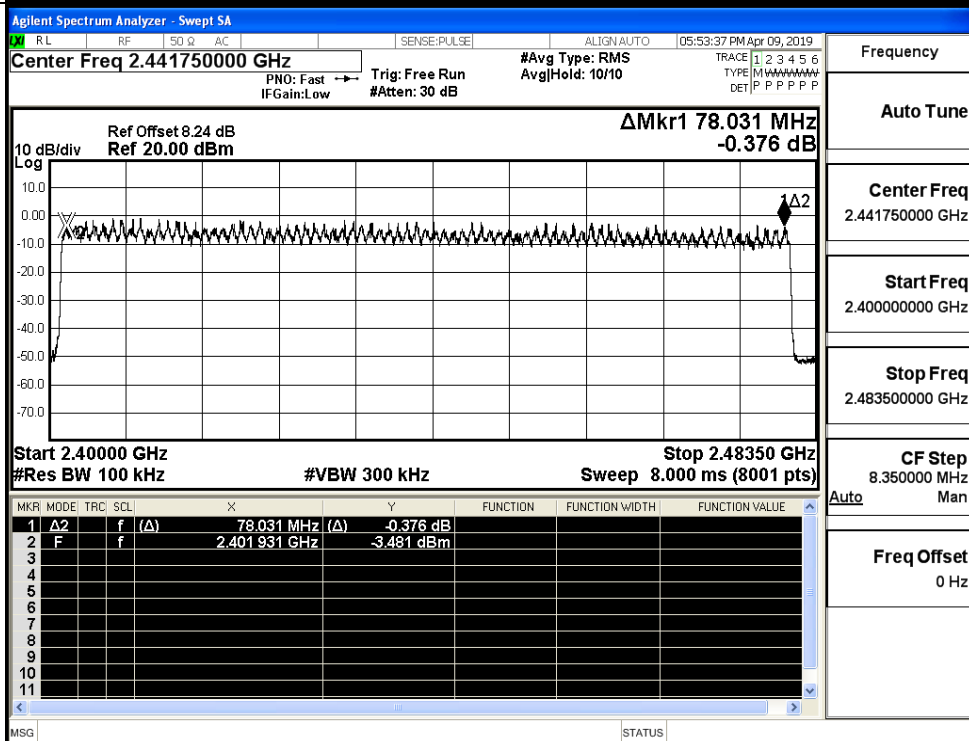
Test Graphs

GFSK/Hop



Frequency

Auto Tune

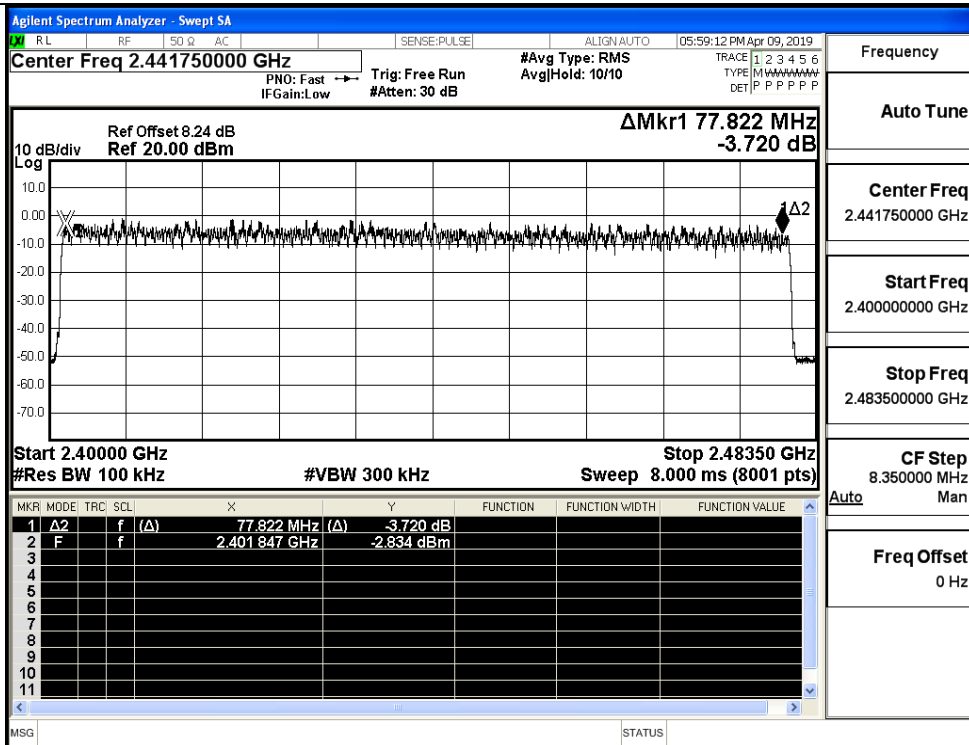
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
ManFreq Offset
0 Hz $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

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

8DPSK/Hop

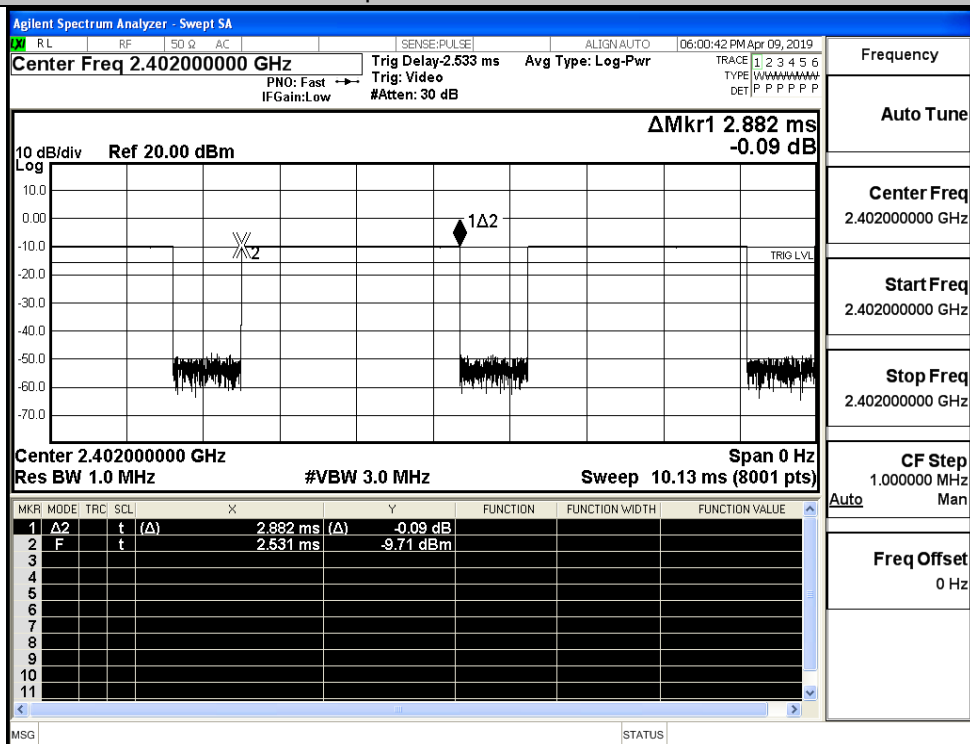


A.5 Dwell Time

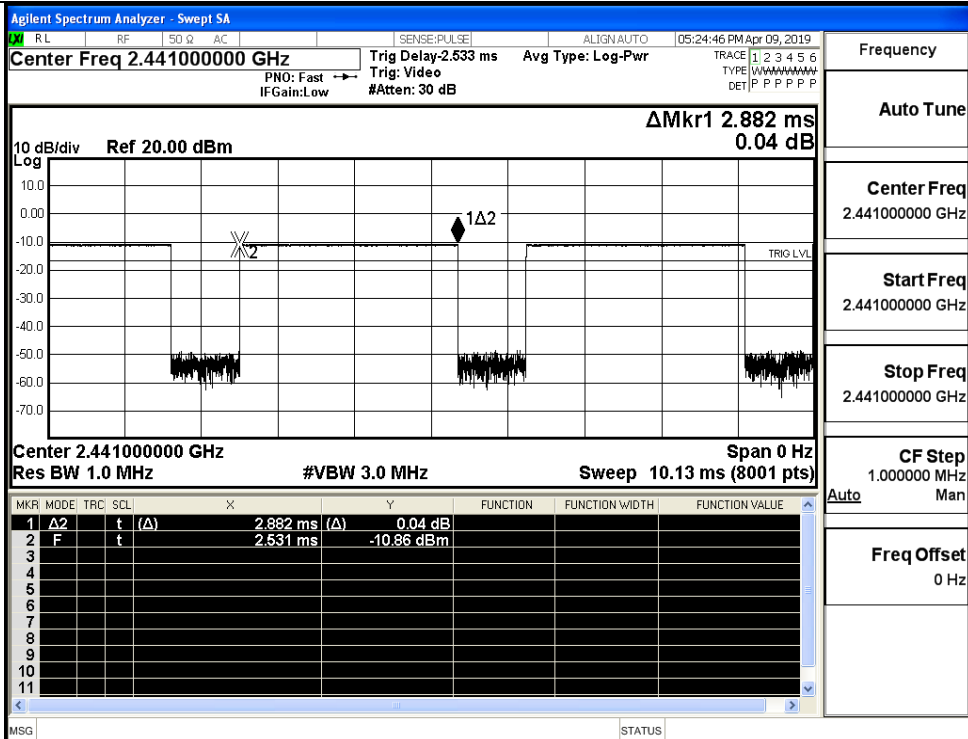
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.308	0.4	PASS
	3DH5	MCH	2.89	106.7	0.308	0.4	PASS
	3DH5	HCH	2.89	106.7	0.308	0.4	PASS

Test Graphs

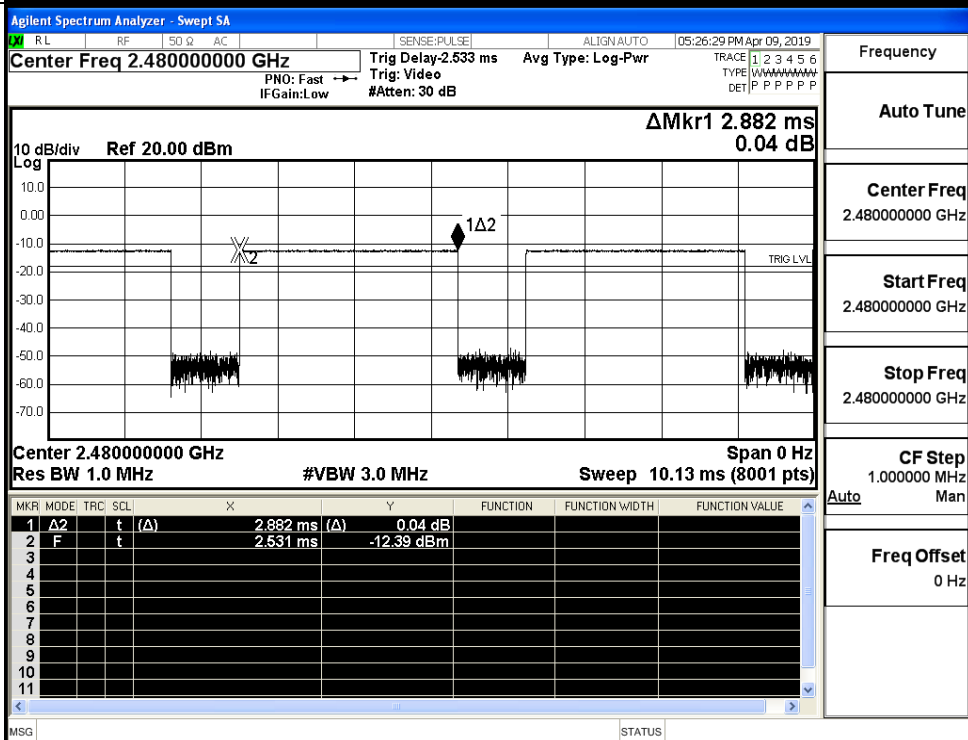
GFSK_DH5/LCH



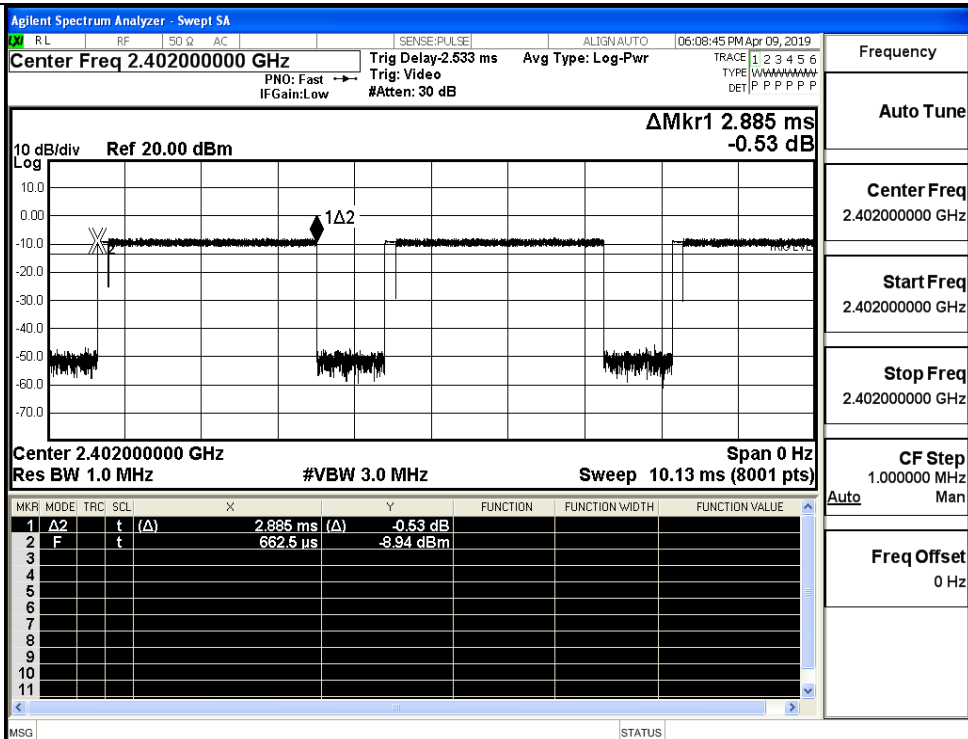
GFSK_DH5/MCH



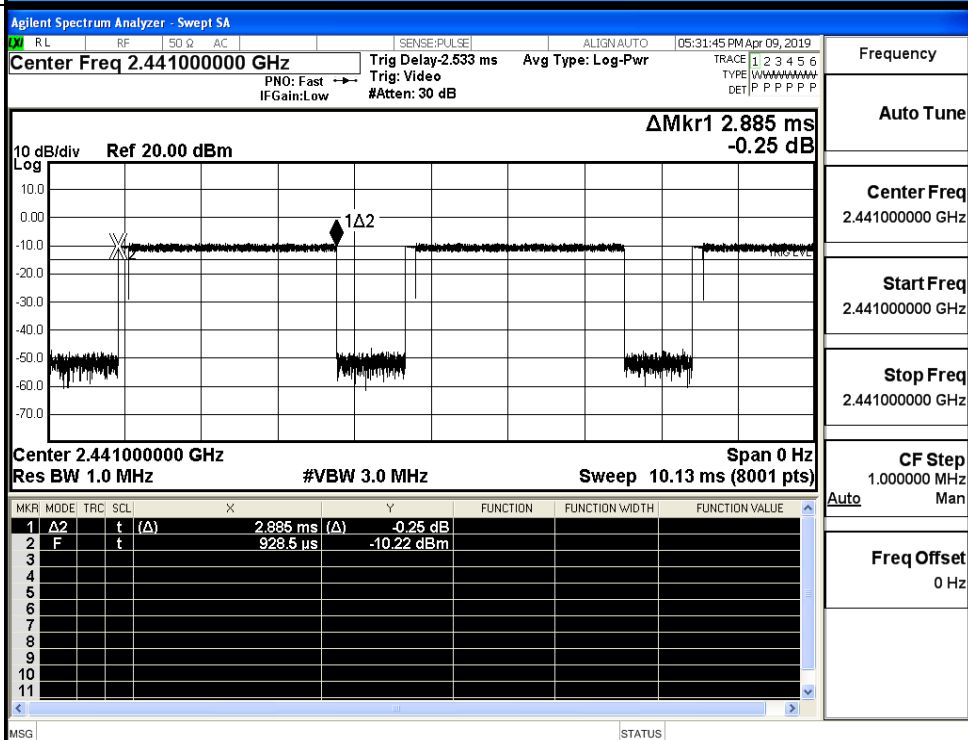
GFSK_DH5/HCH



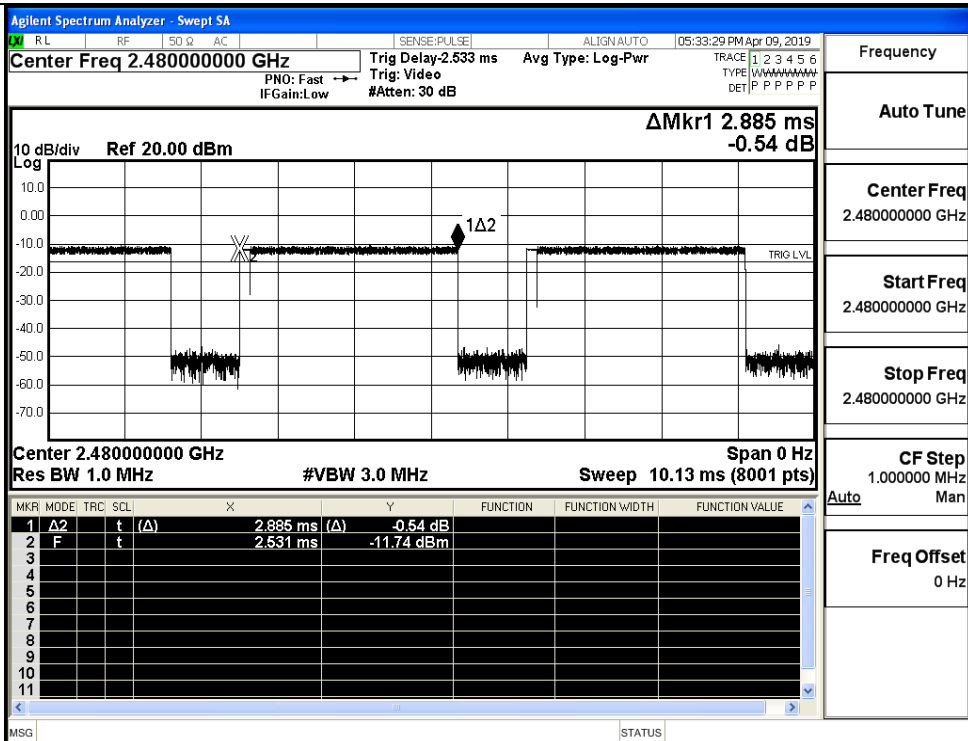
$\pi/4$ DQPSK
_2DH5/LCH



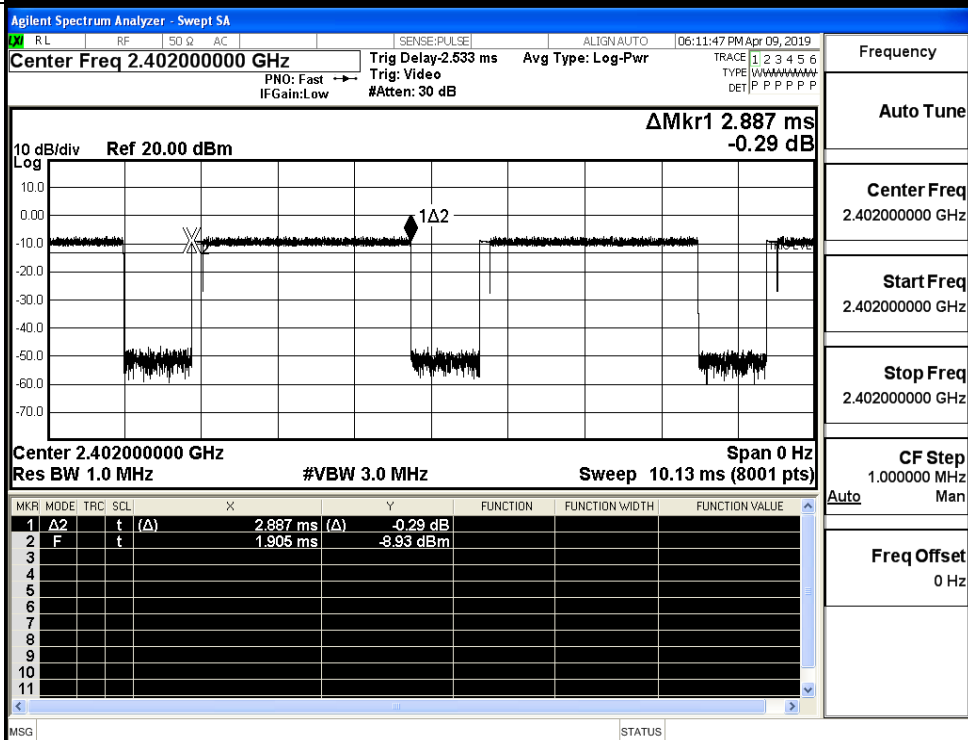
$\pi/4$ DQPSK
_2DH5/MCH



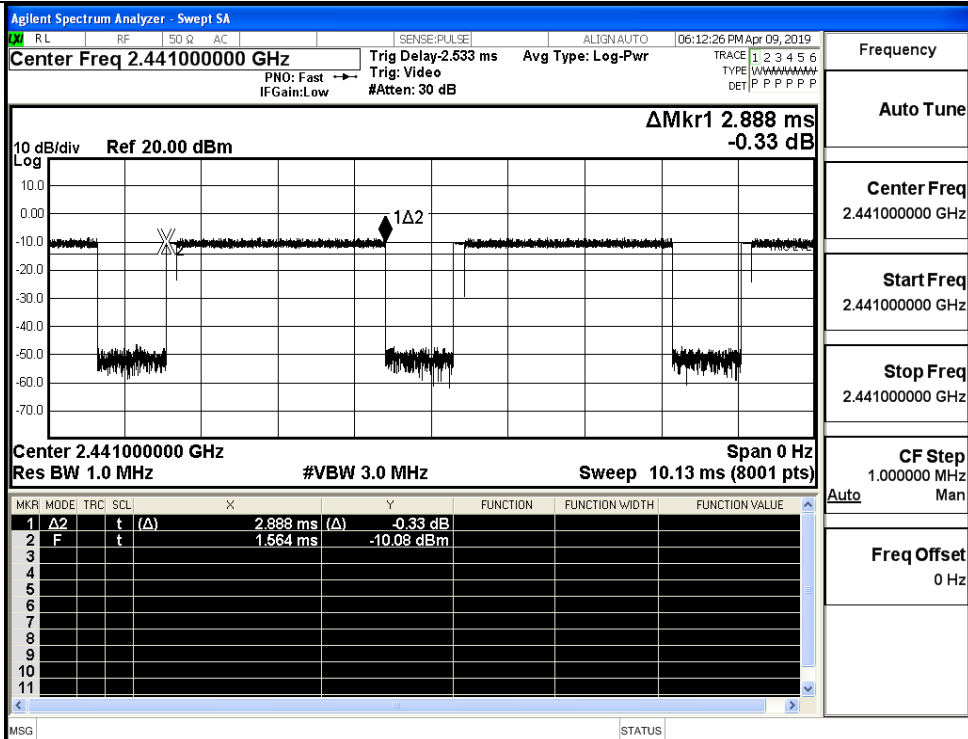
$\pi/4$ DQPSK
_2DH5/HCH



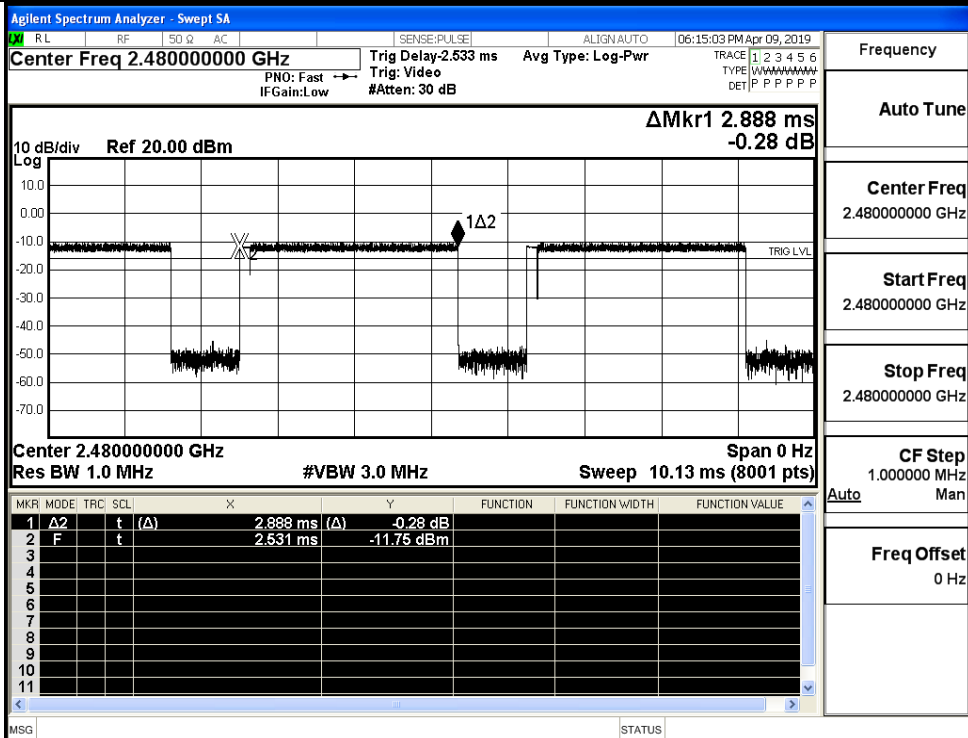
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



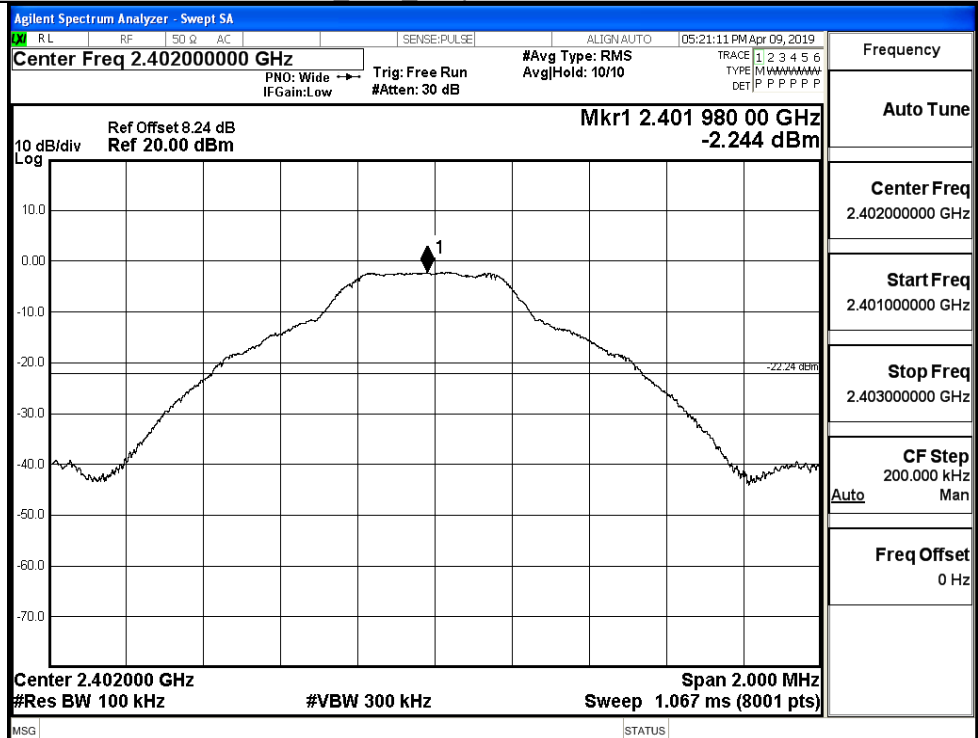
8DPSK_3DH5/HCH



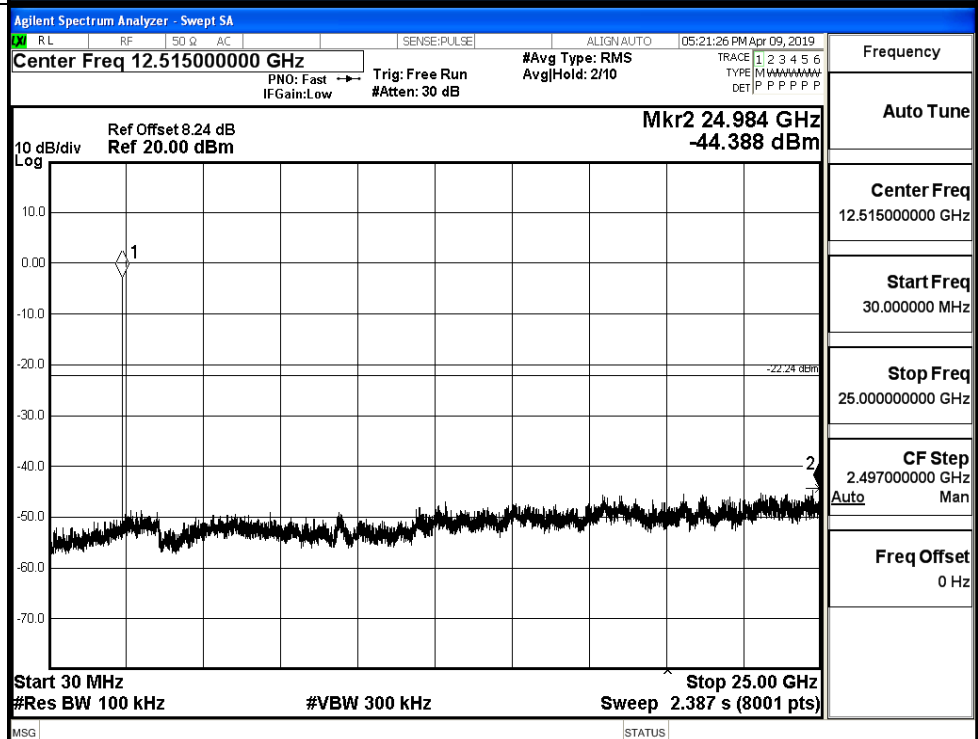
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.244	-44.388	-22.244	PASS
	MCH	-2.665	-44.174	-22.665	PASS
	HCH	-4.21	-44.208	-24.210	PASS
$\pi/4$ DQPSK	LCH	-0.749	-45.307	-20.749	PASS
	MCH	-2.001	-44.431	-22.001	PASS
	HCH	-3.559	-44.835	-23.559	PASS
8DPSK	LCH	-0.758	-45.127	-20.758	PASS
	MCH	-1.933	-44.900	-21.933	PASS
	HCH	-3.505	-44.651	-23.505	PASS

Pref

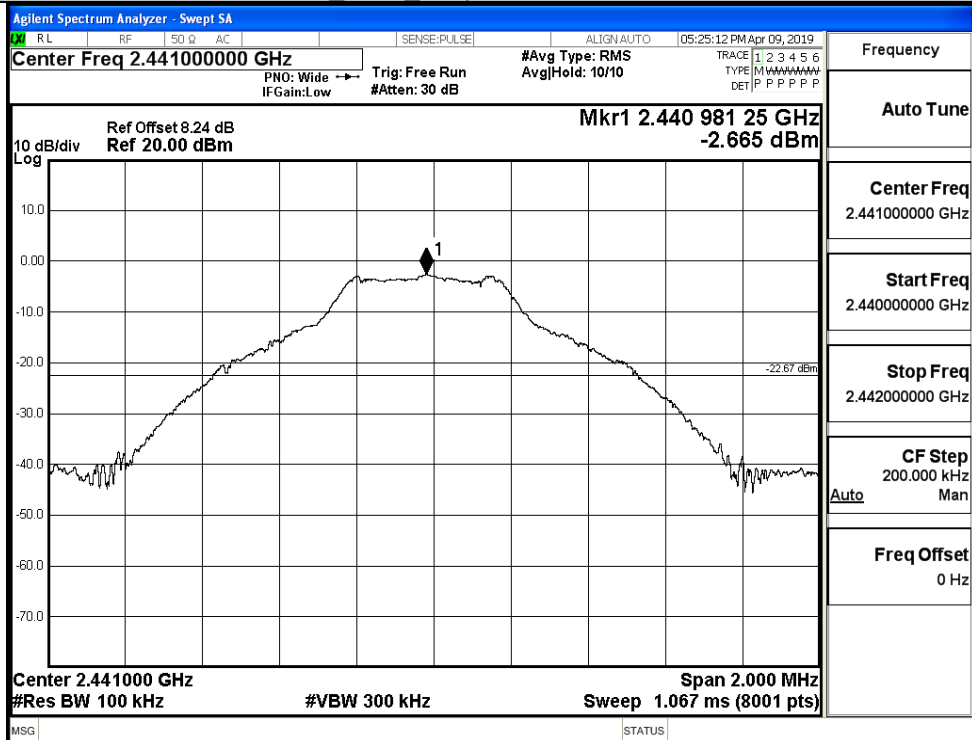


Puw

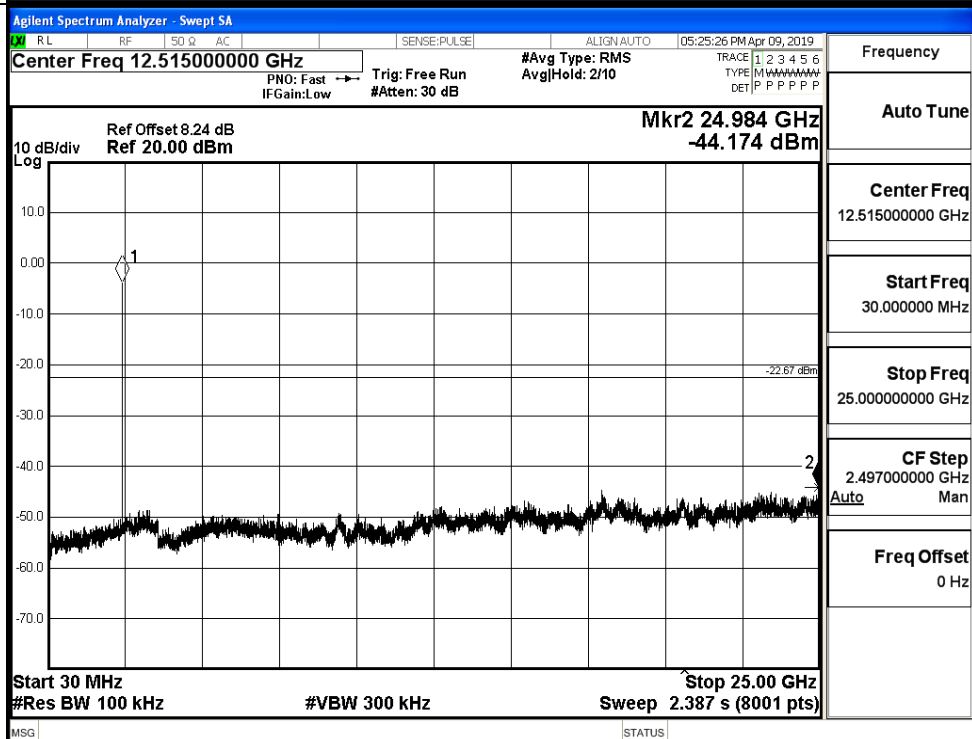


GFSK_MCH_Graphs

Pref

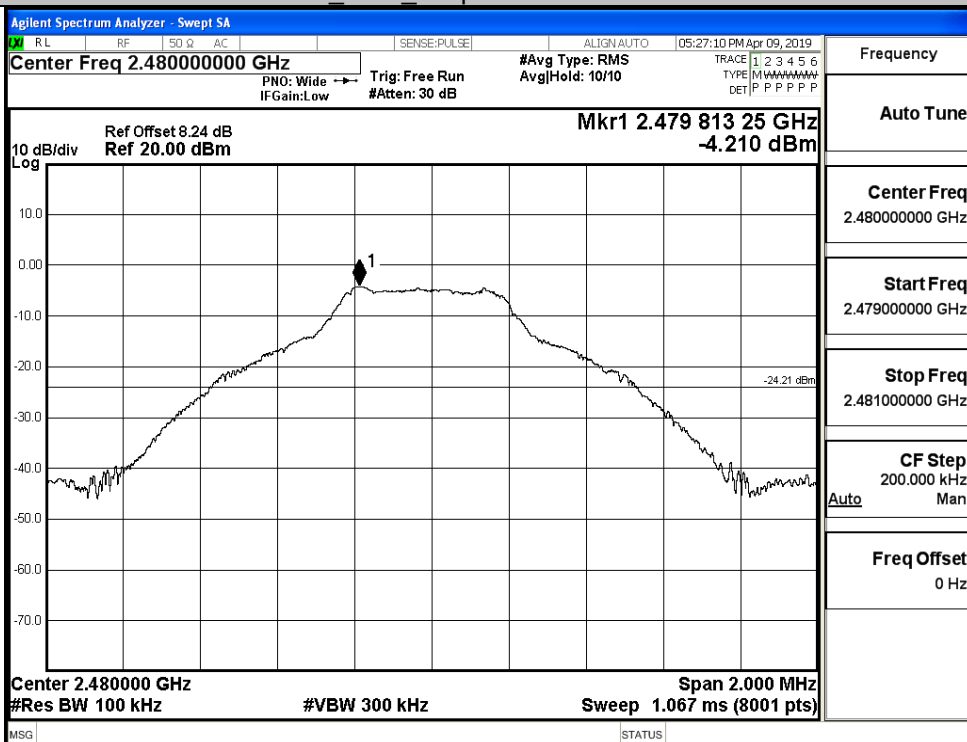


Puw

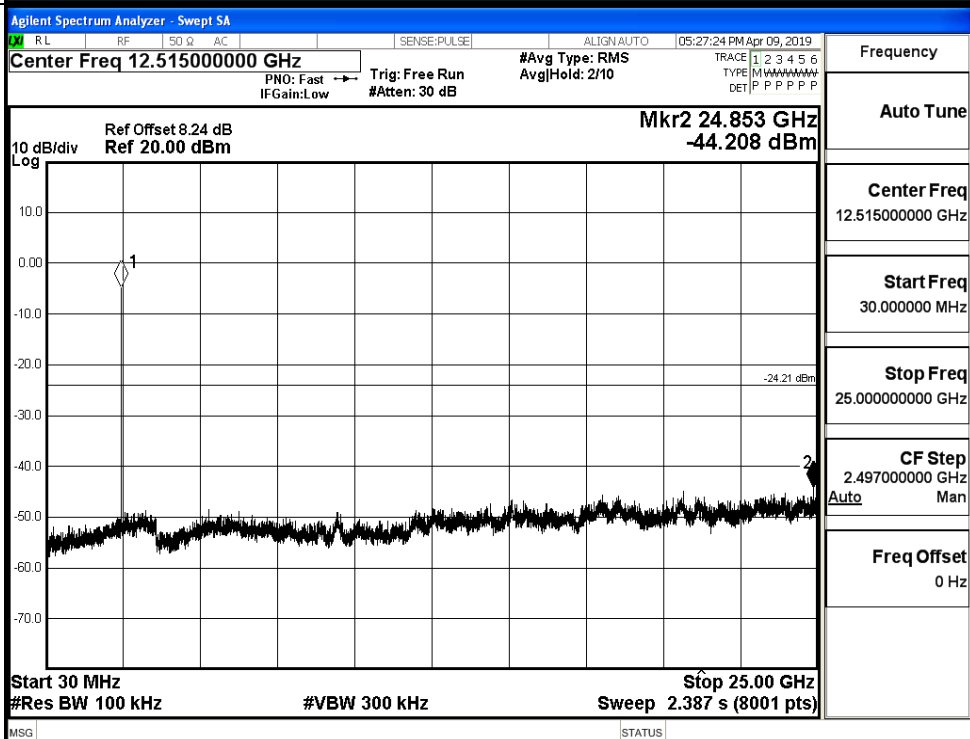


GFSK_HCH_Graphs

Pref

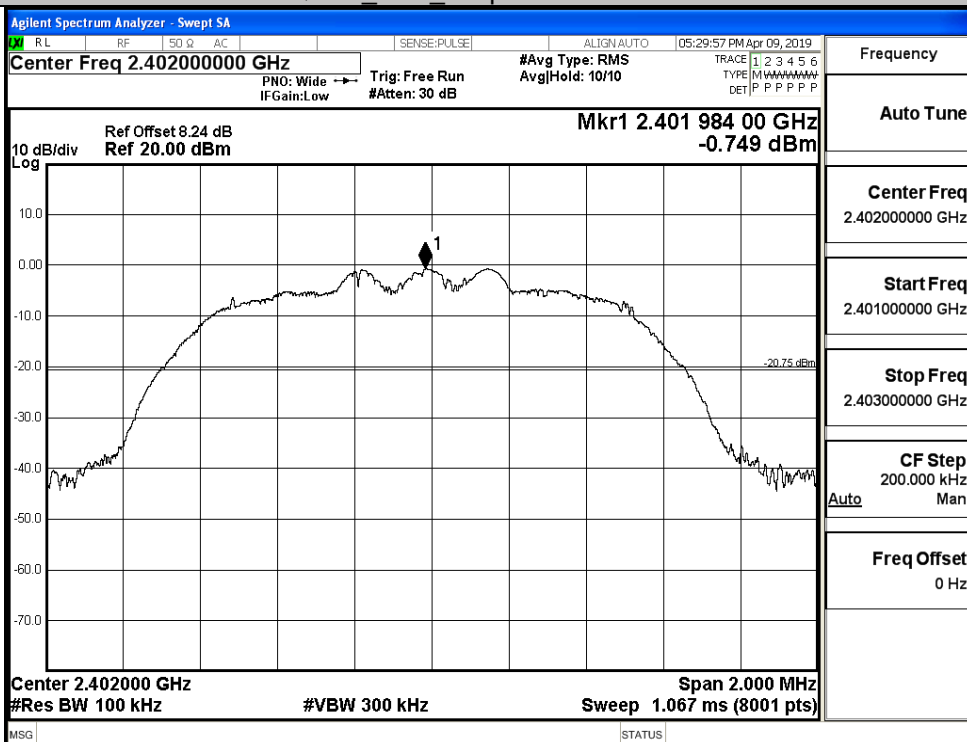


Puw

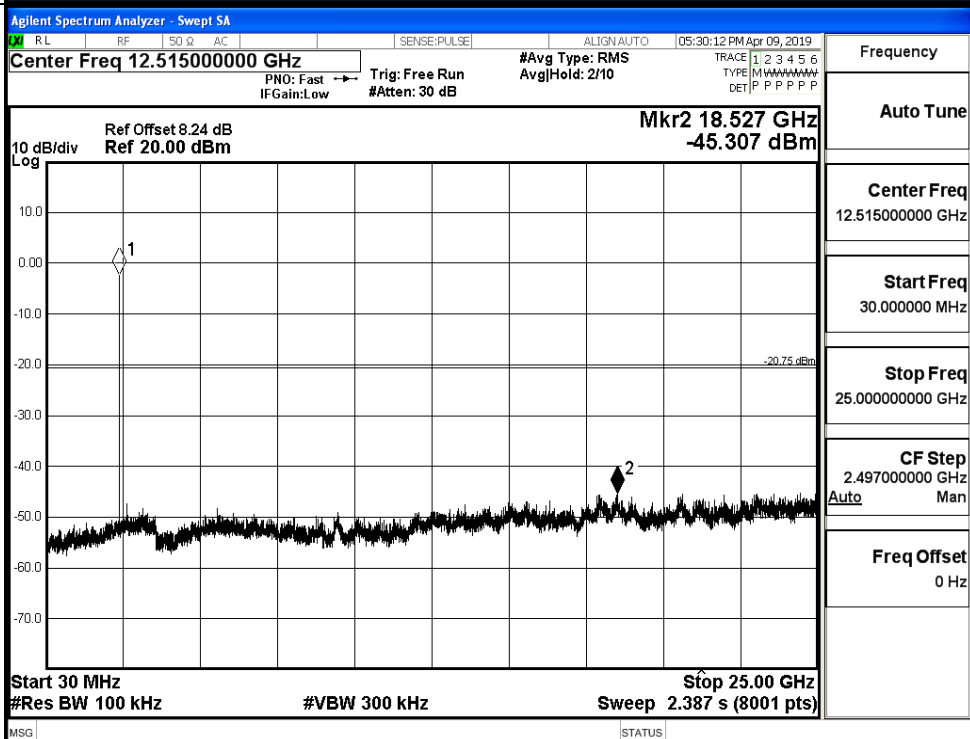


$\pi/4$ DQPSK LCH_Graphs

Pref

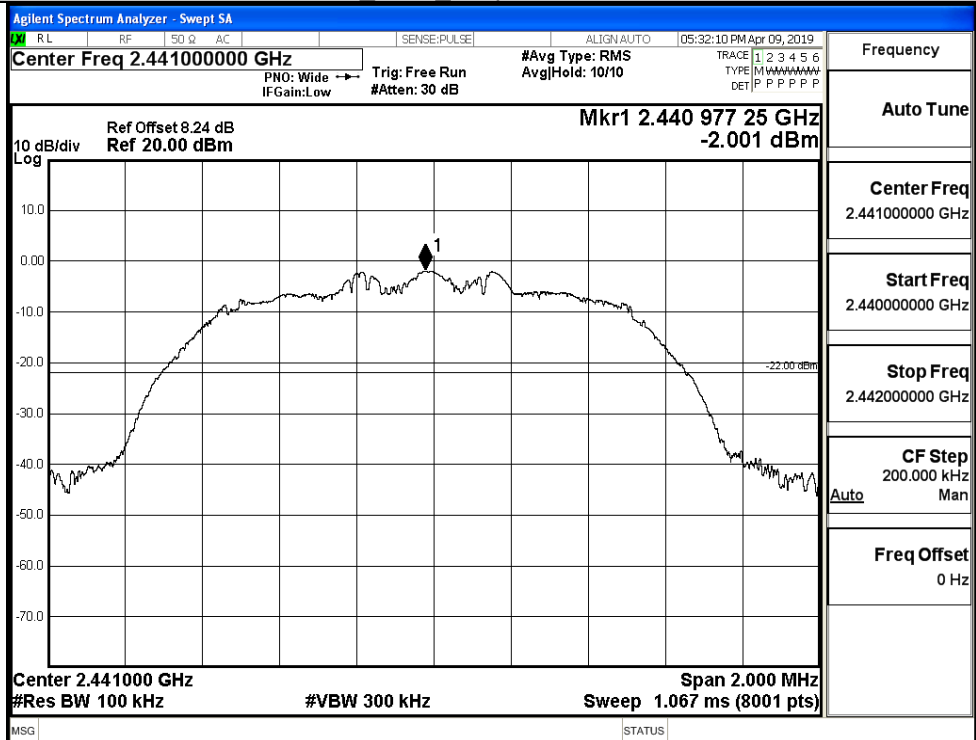


Puw

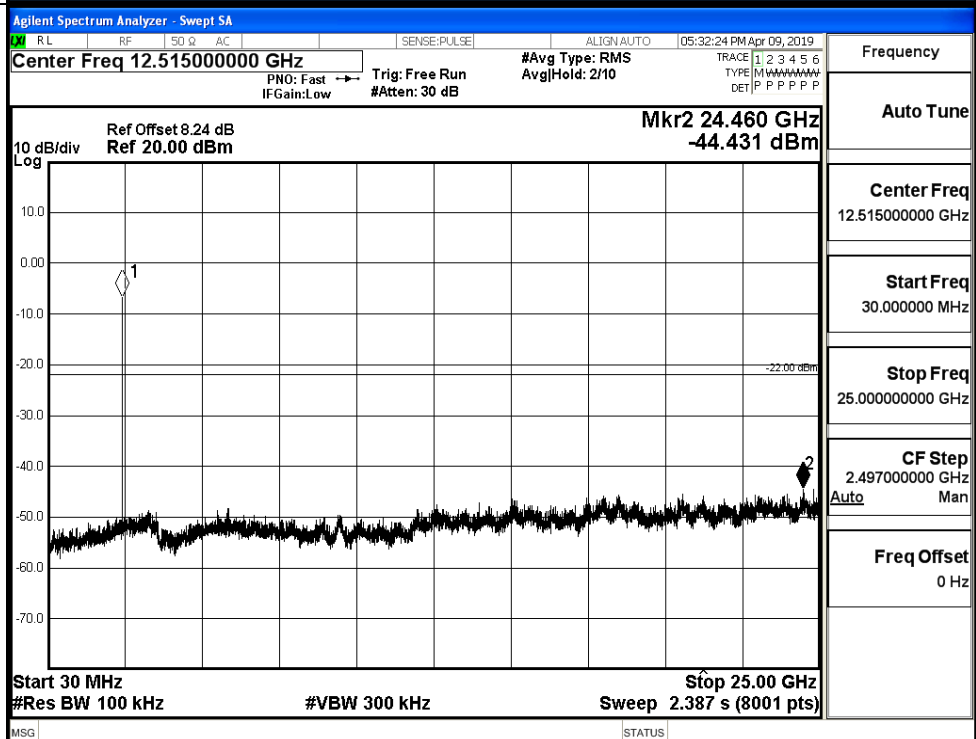


π /4DQPSK_MCH_Graphs

Pref

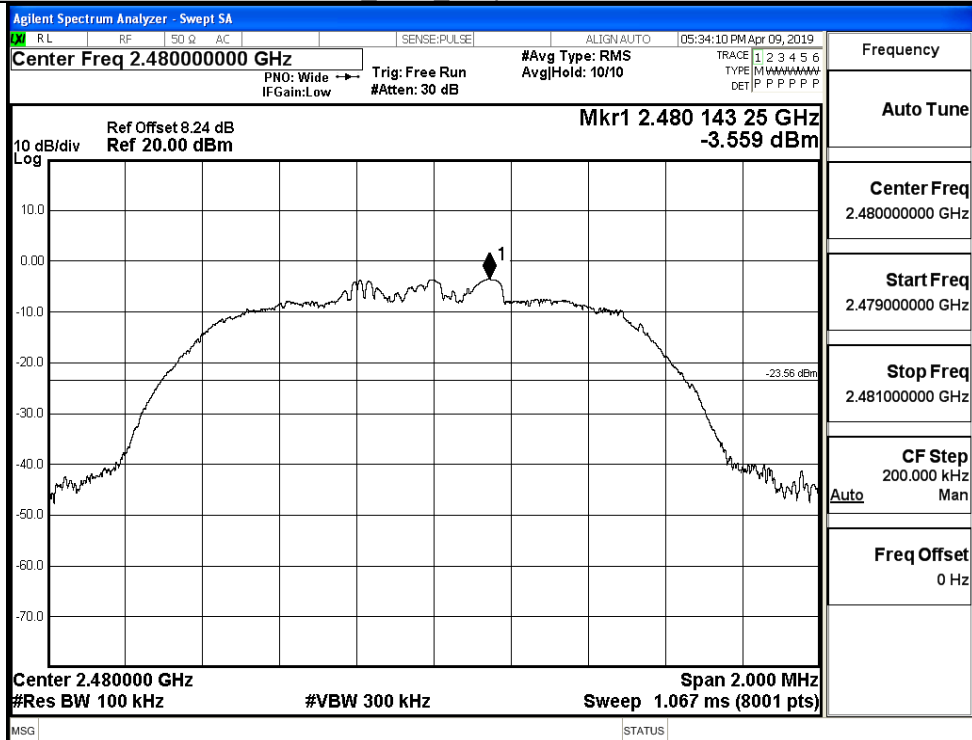


Puw

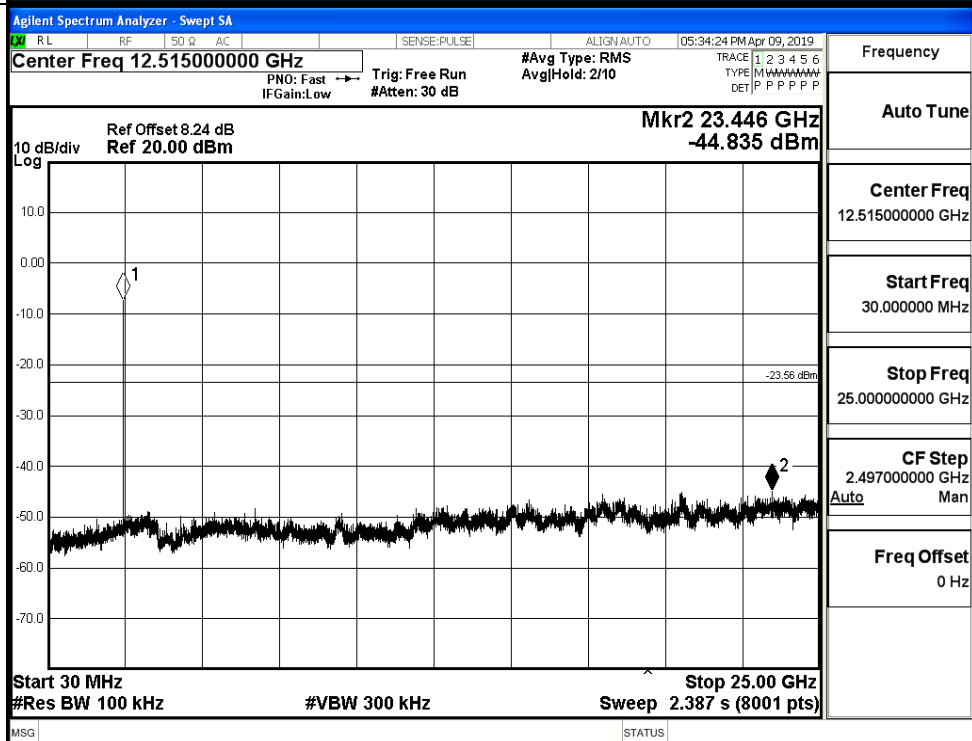


$\pi/4$ DQPSK_HCH_Graphs

Pref

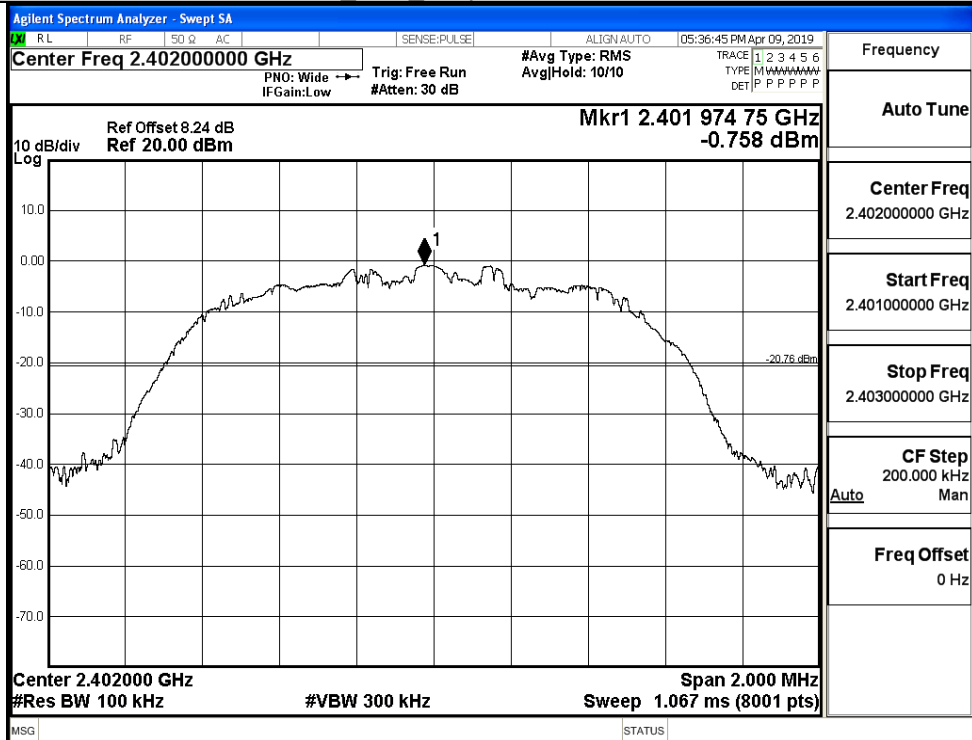


Puw

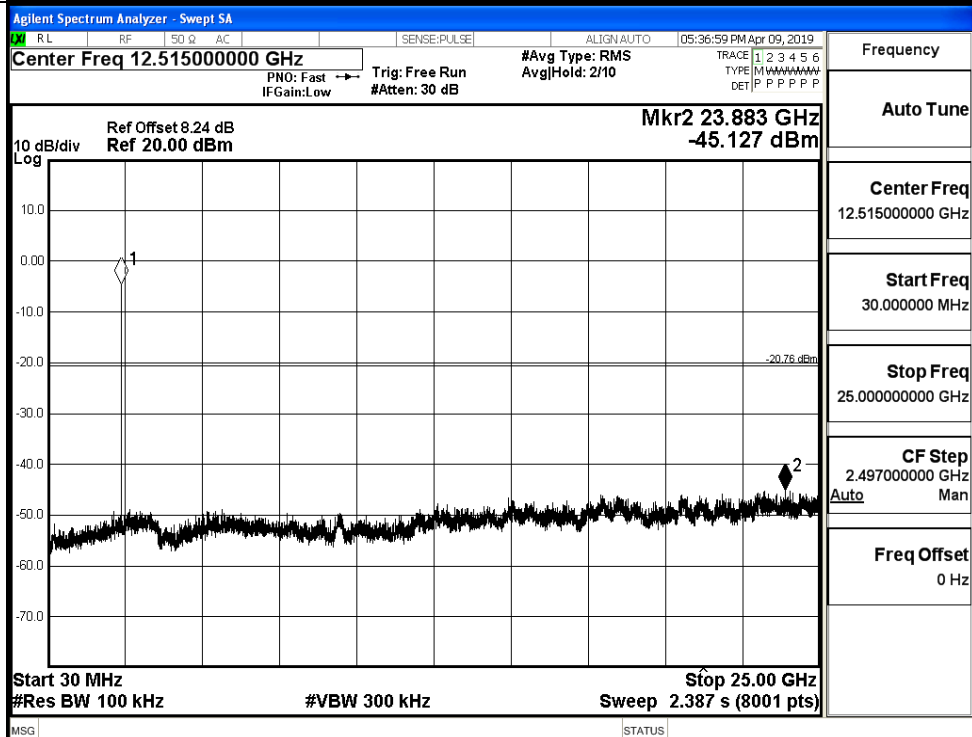


8DPSK_LCH_Graphs

Pref

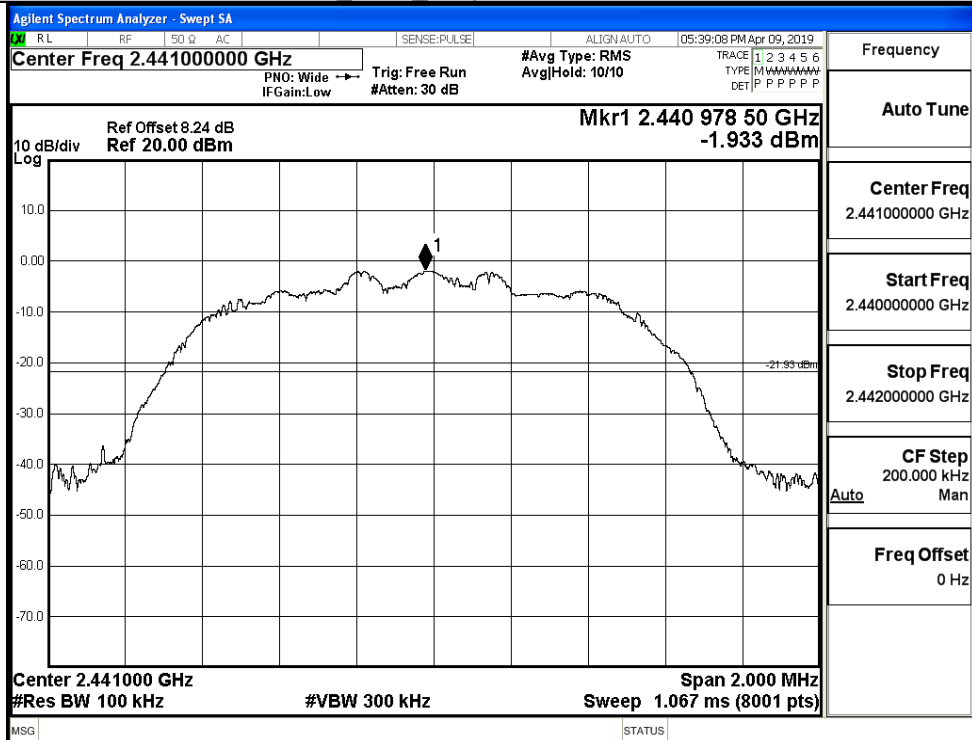


Puw

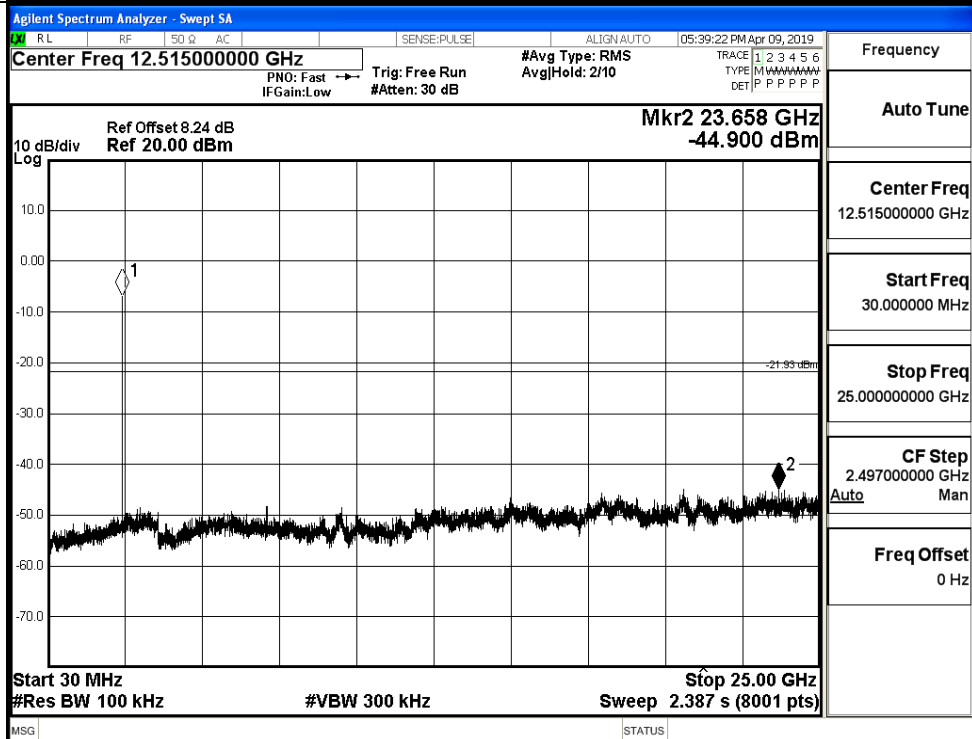


8DPSK_MCH_Graphs

Pref

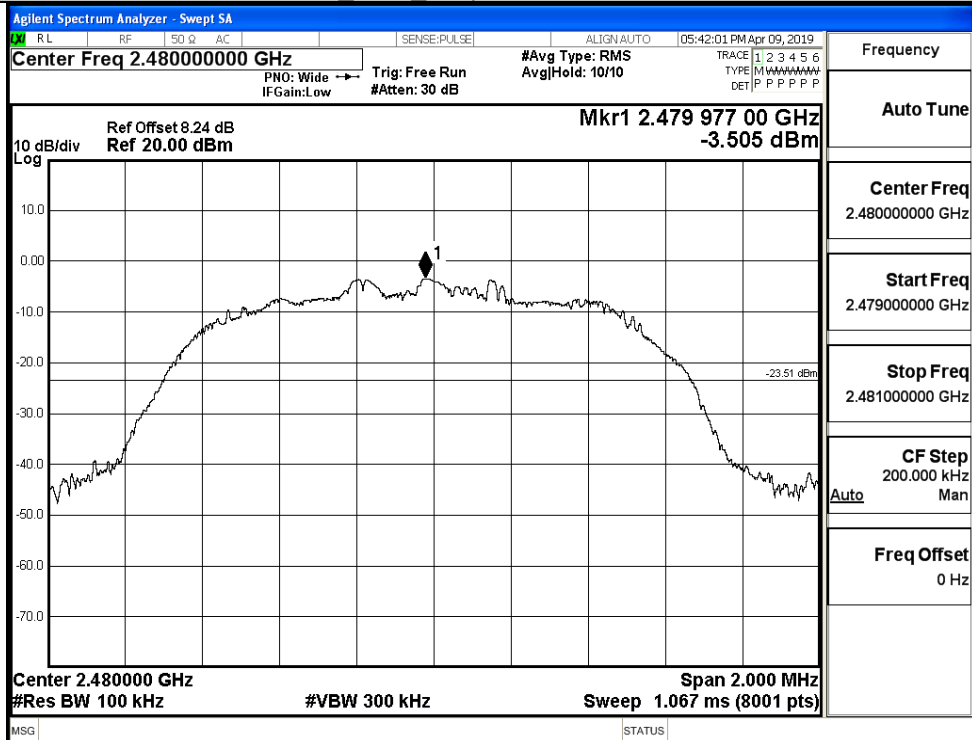


Puw

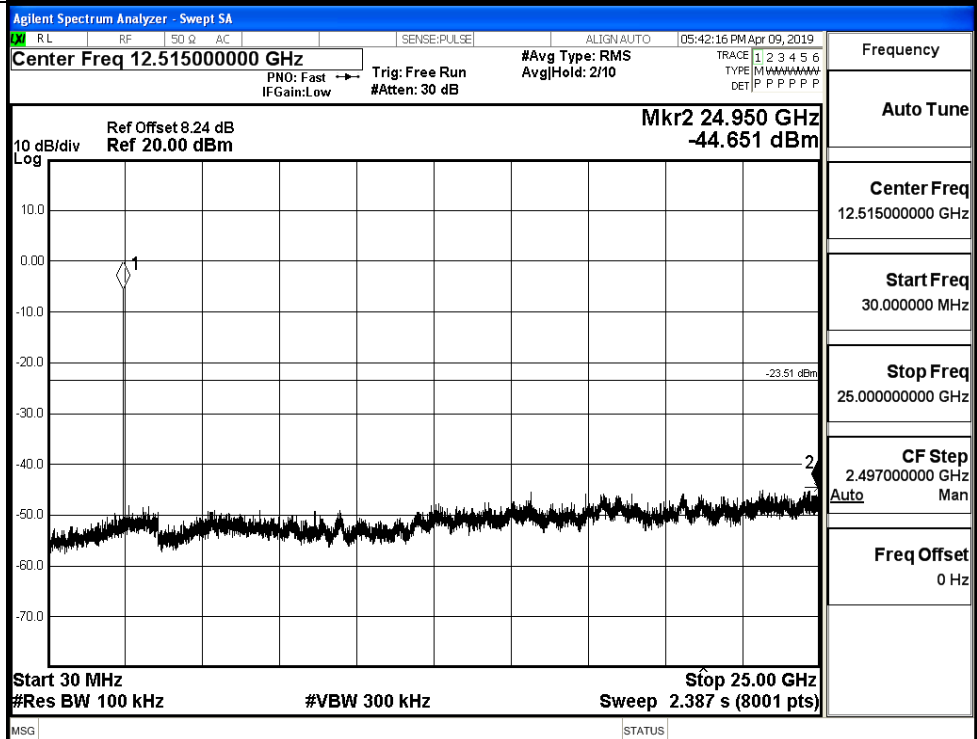


8DPSK_HCH_Graphs

Pref



Puw

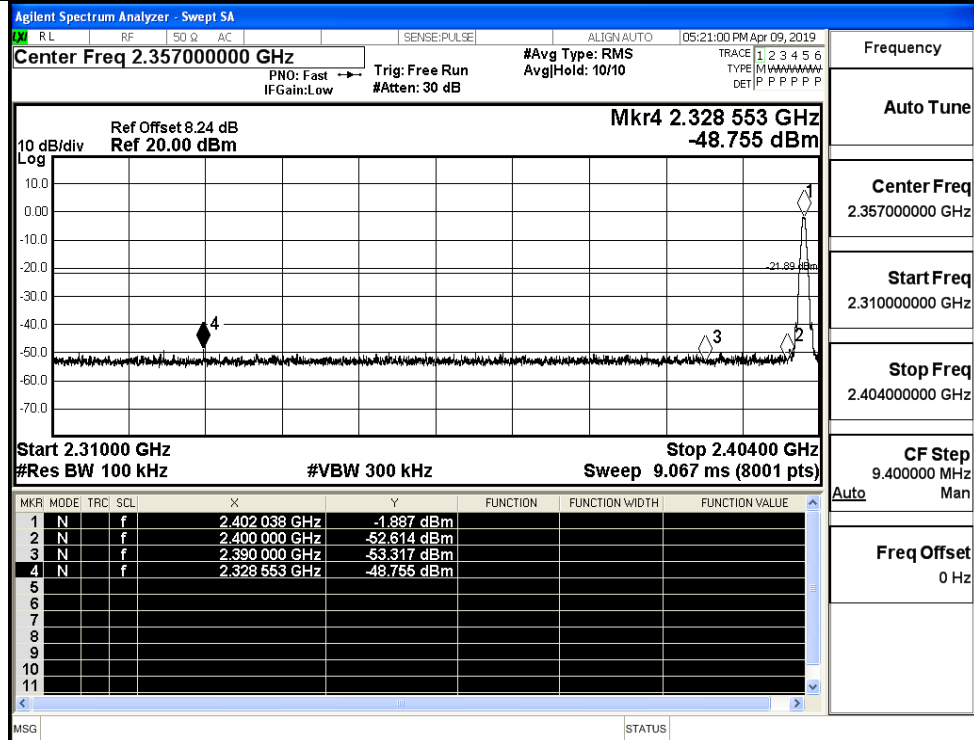


A.7 Band-edge for RF Conducted Emissions

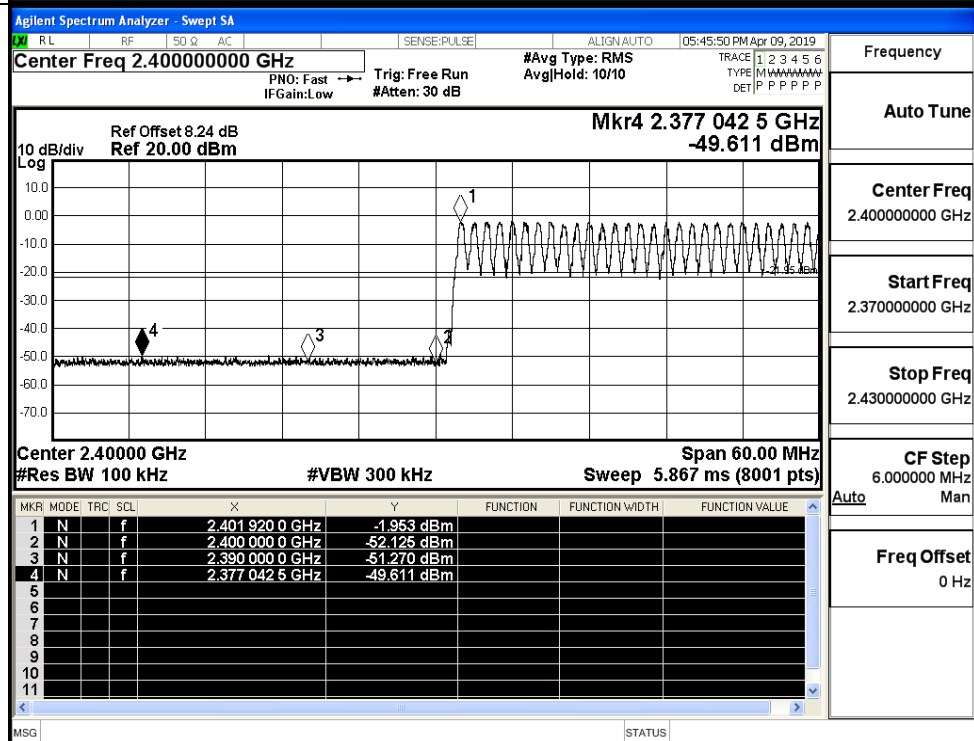
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.887	Off	-48.755	-21.89	PASS
			-1.953	On	-49.611	-21.95	PASS
	HCH	2480	-4.220	Off	-50.062	-24.22	PASS
			-3.529	On	-48.584	-23.53	PASS
$\pi/4$ DQPSK	LCH	2402	-0.747	Off	-50.129	-20.75	PASS
			-1.071	On	-49.043	-21.07	PASS
	HCH	2480	-3.380	Off	-48.825	-23.38	PASS
			-2.410	On	-48.037	-22.41	PASS
8DPSK	LCH	2402	-0.770	Off	-48.949	-20.77	PASS
			-1.253	On	-49.074	-21.25	PASS
	HCH	2480	-3.612	Off	-48.601	-23.61	PASS
			-2.988	On	-49.178	-22.99	PASS

Test Graphs

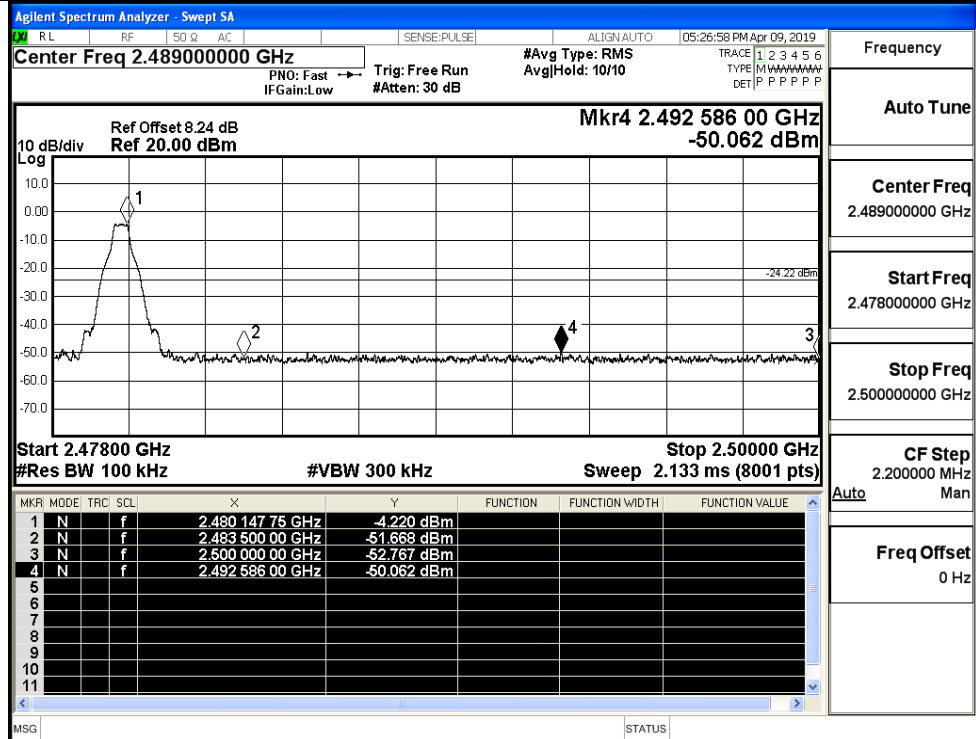
GFSK/LCH/No Hop



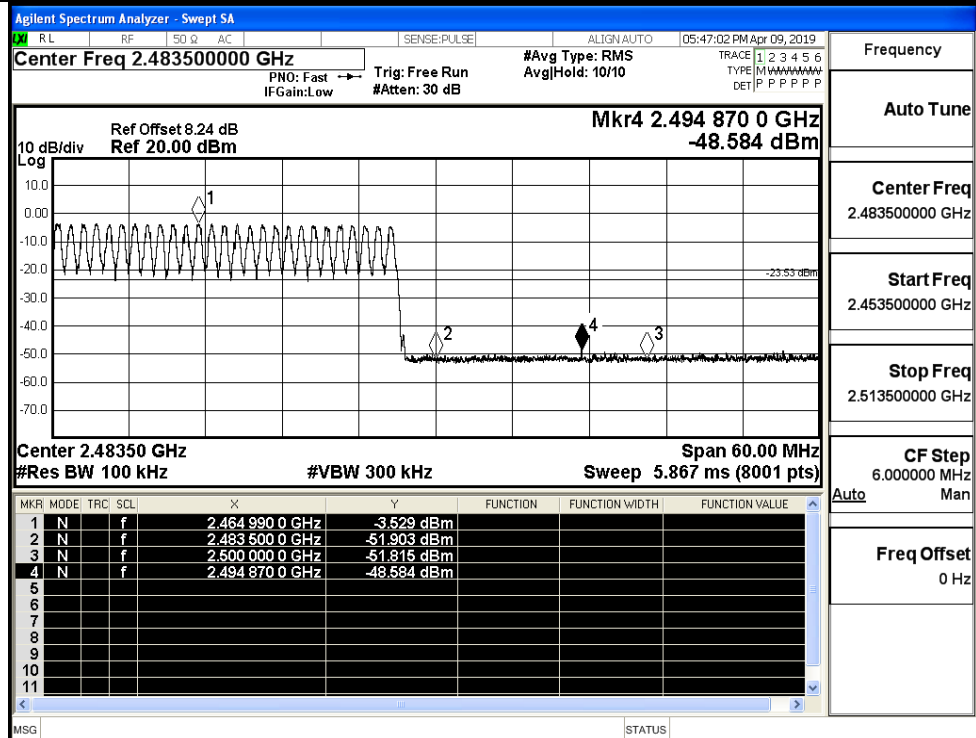
GFSK/LCH/Hop



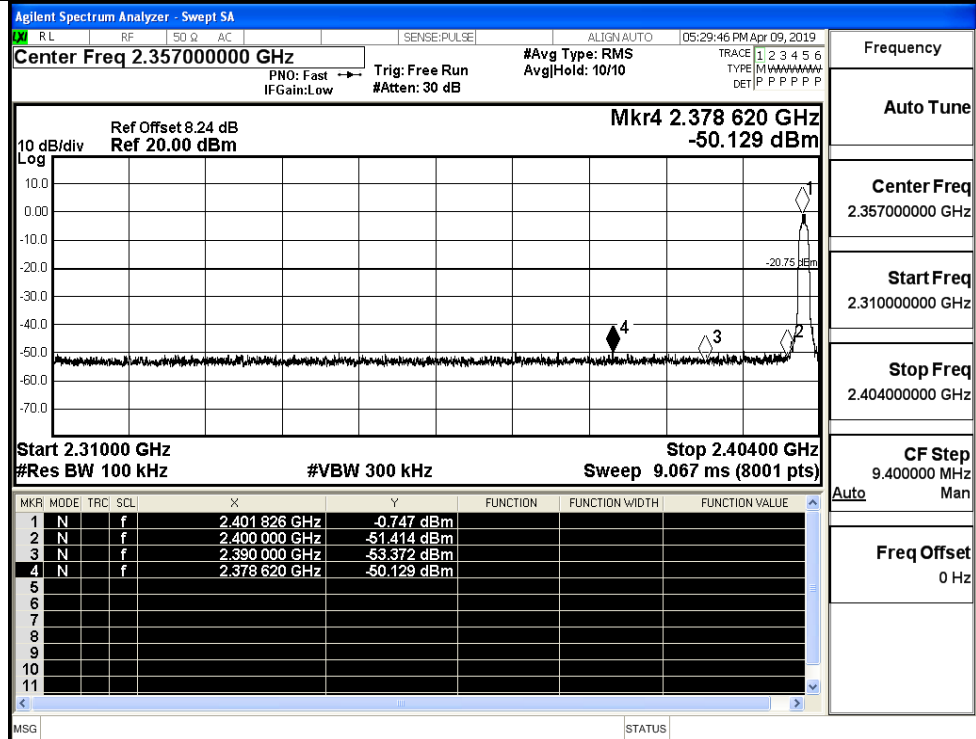
GFSK/HCH/No Hop



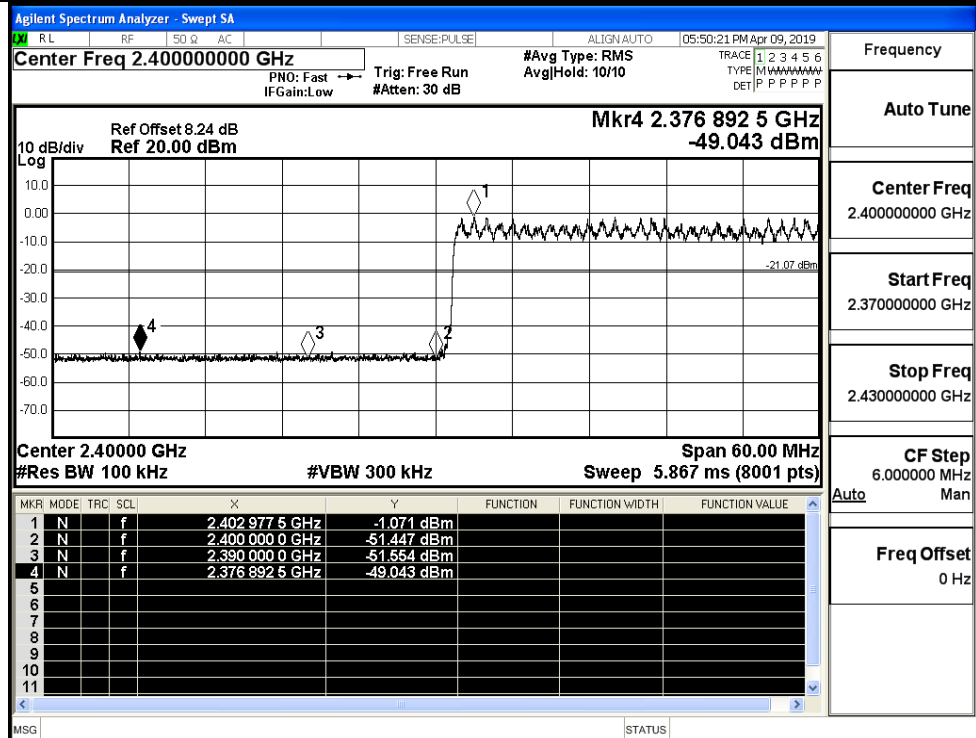
GFSK/HCH/Hop



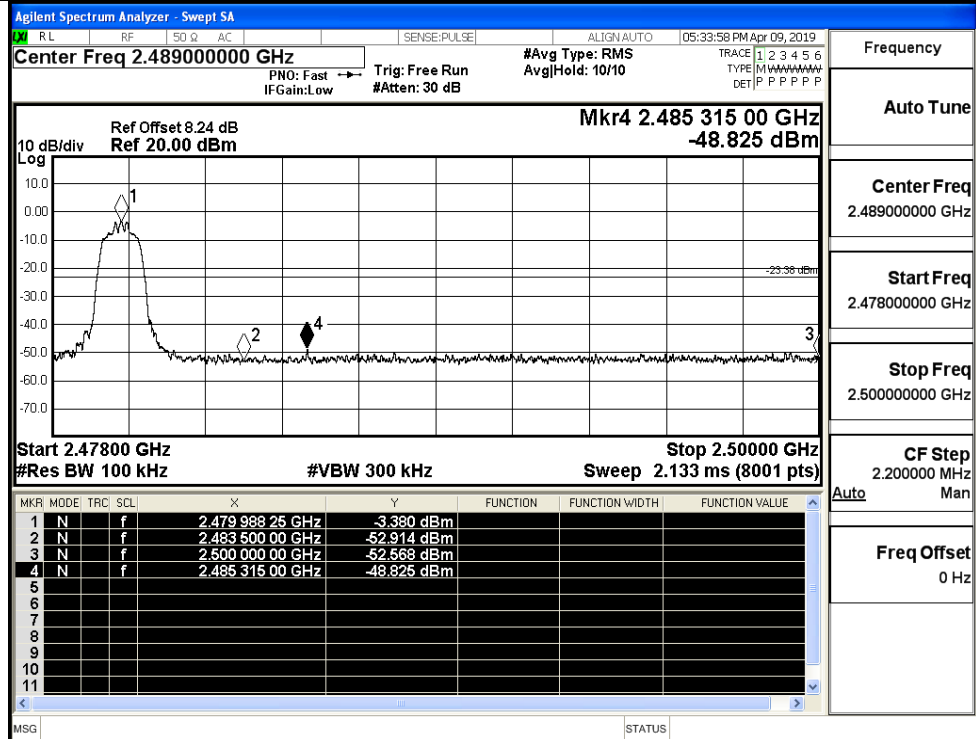
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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

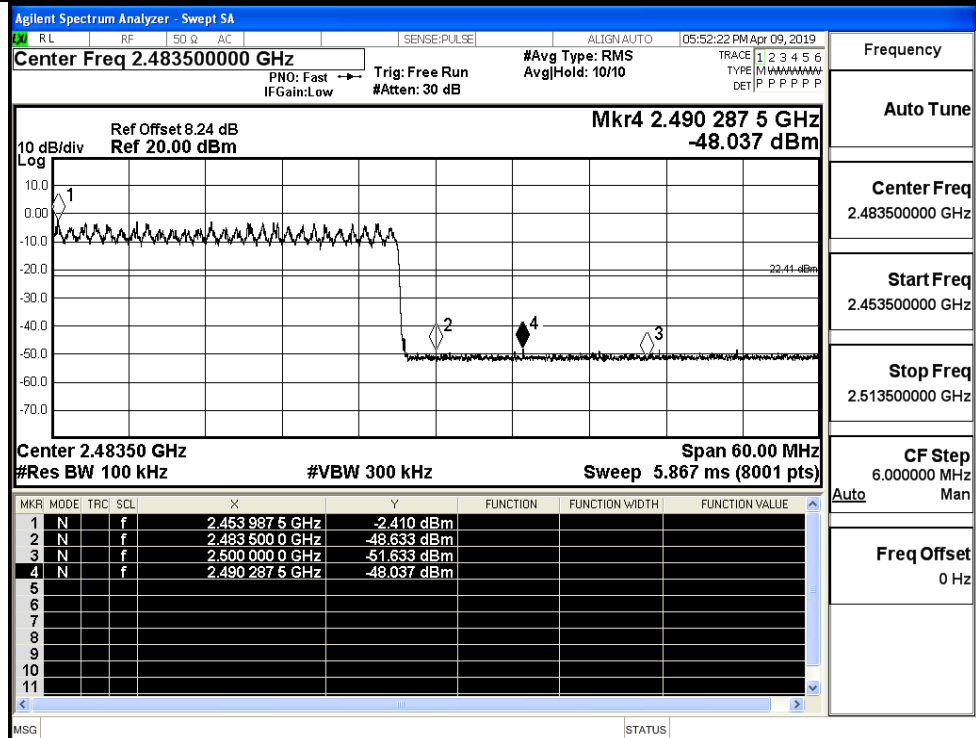


Frequency

Auto Tune

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

$\pi/4$ DQPSK/HCH/Hop

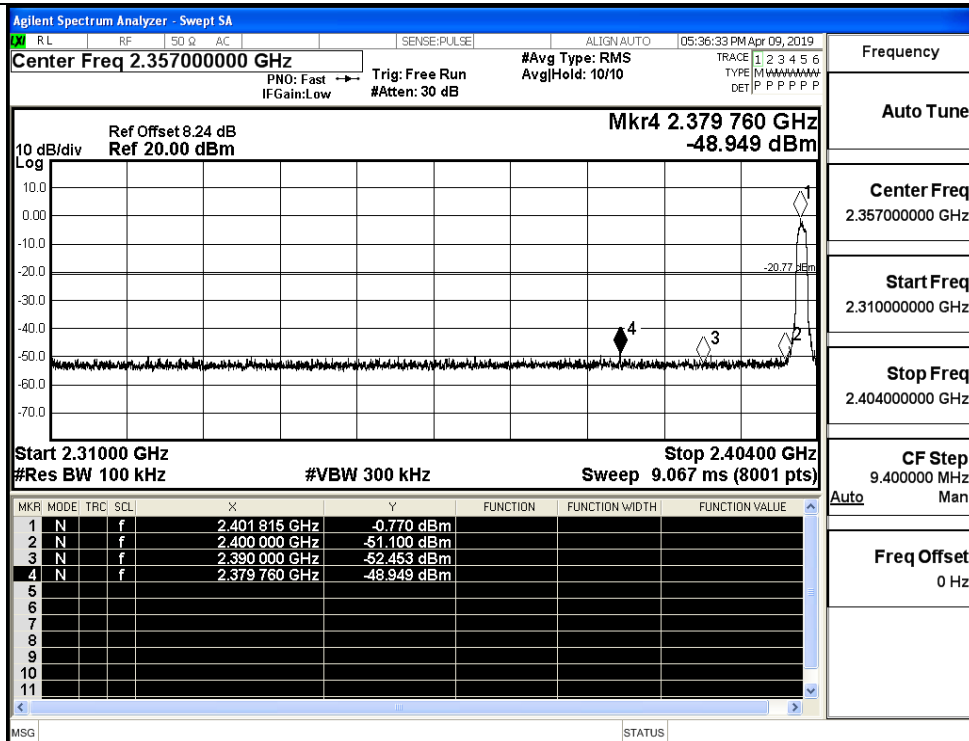


Frequency

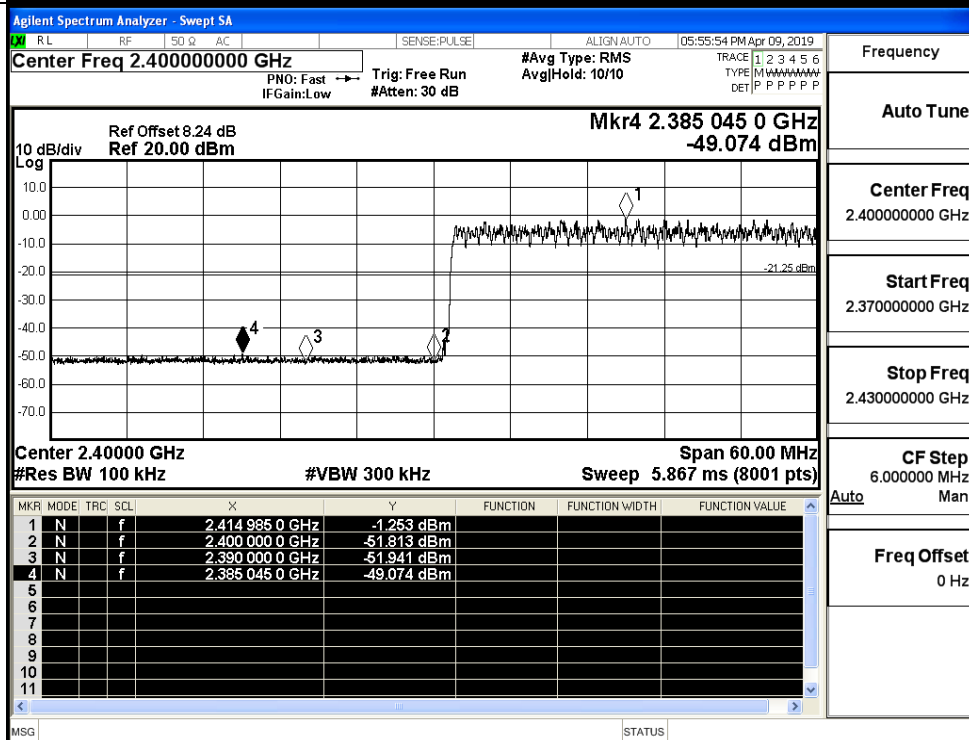
Auto Tune

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

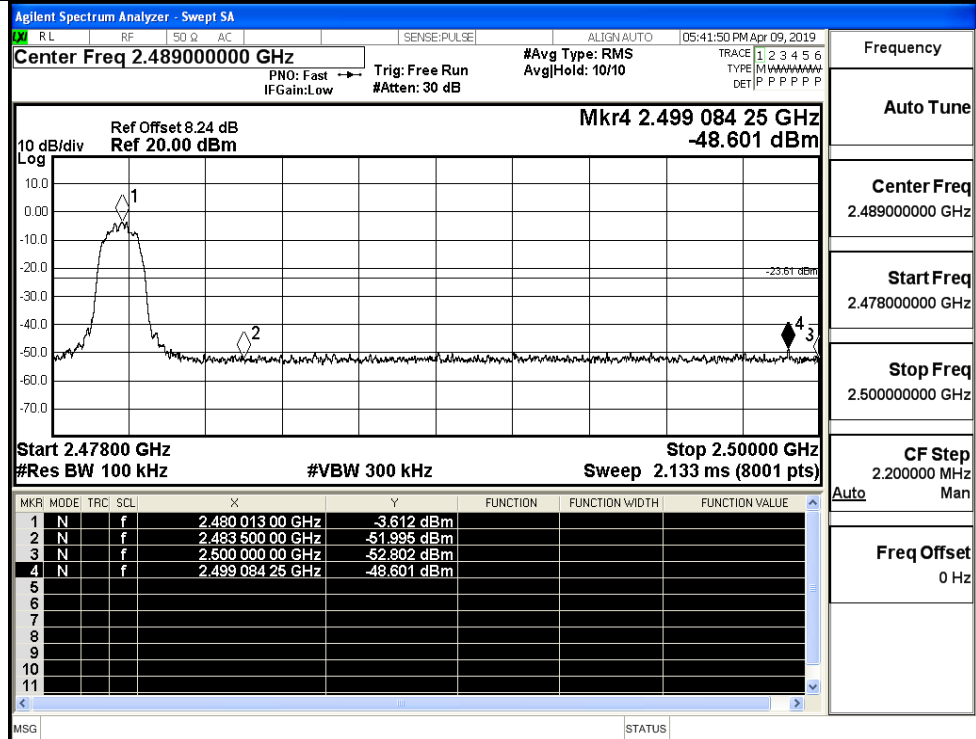
8DPSK/LCH/No Hop



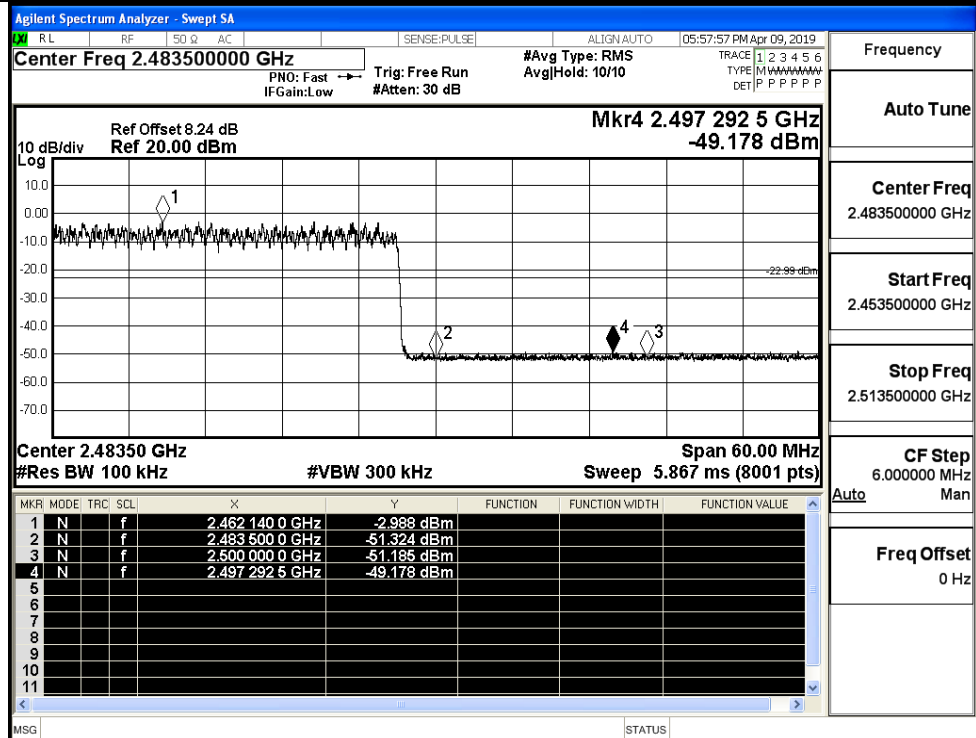
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



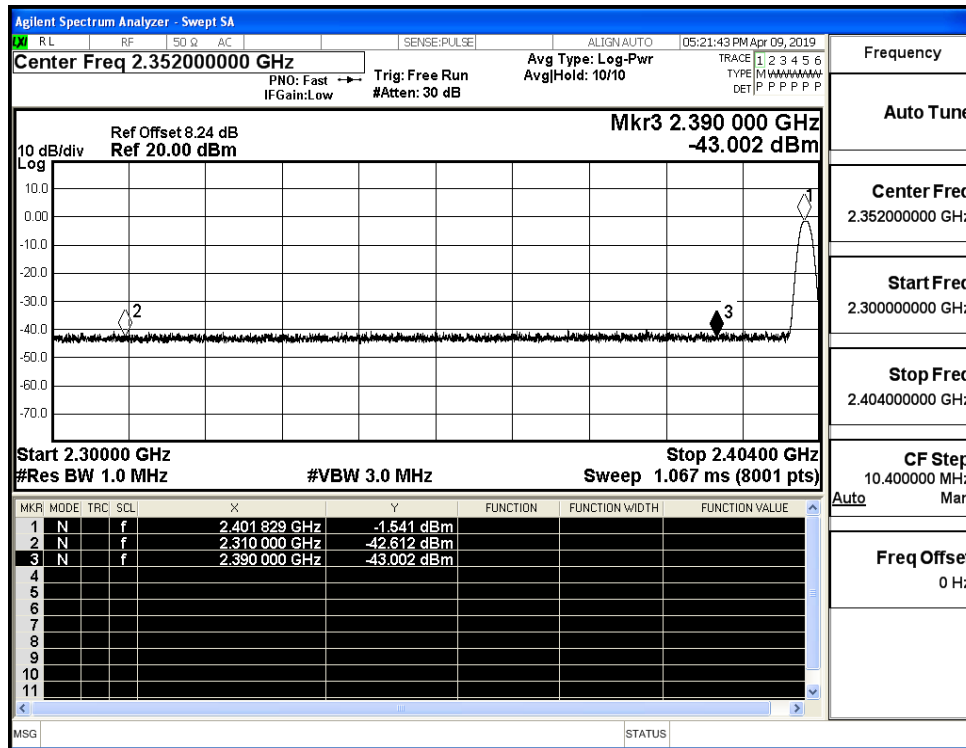
8DPSK/HCH/Hop



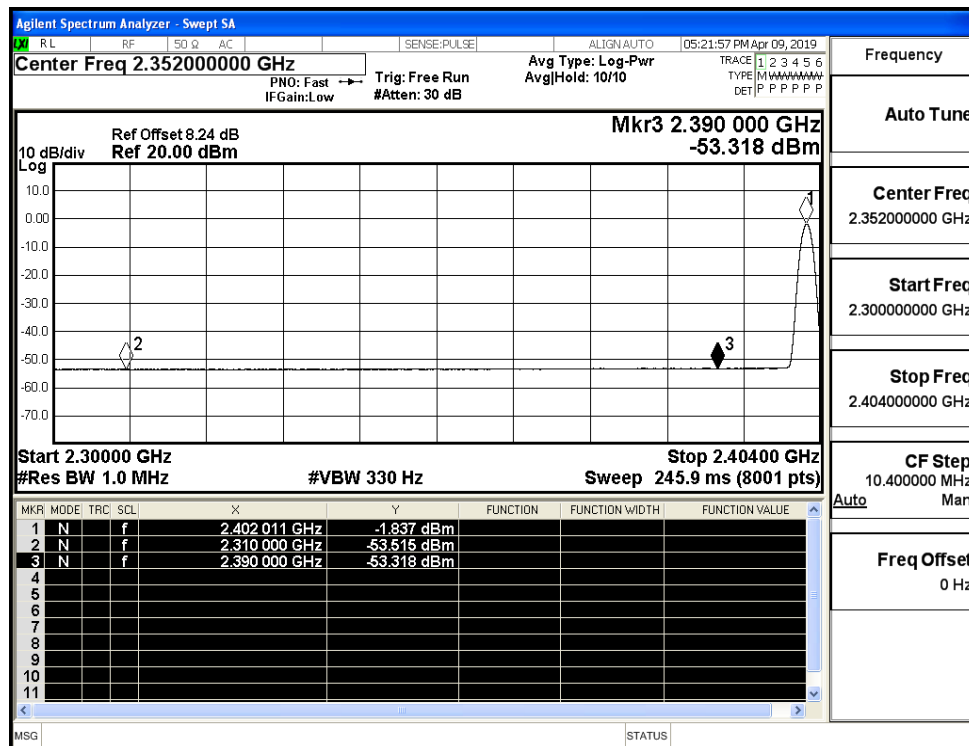
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.61	2.0	0	52.65	PEAK	74	PASS
	Off	2310.0	-53.52	2.0	0	41.74	AV	54	PASS
	Off	2390.0	-43.00	2.0	0	52.26	PEAK	74	PASS
	Off	2390.0	-53.32	2.0	0	41.94	AV	54	PASS
	Off	2483.5	-42.20	2.0	0	53.06	PEAK	74	PASS
	Off	2483.5	-52.95	2.0	0	42.31	AV	54	PASS
	Off	2500.0	-42.61	2.0	0	52.65	PEAK	74	PASS
	Off	2500.0	-52.66	2.0	0	42.60	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.56	2.0	0	52.70	PEAK	74	PASS
	Off	2310.0	-53.45	2.0	0	41.81	AV	54	PASS
	Off	2390.0	-42.92	2.0	0	52.34	PEAK	74	PASS
	Off	2390.0	-53.20	2.0	0	42.06	AV	54	PASS
	Off	2483.5	-43.25	2.0	0	52.01	PEAK	74	PASS
	Off	2483.5	-52.86	2.0	0	42.40	AV	54	PASS
	Off	2500.0	-41.65	2.0	0	53.61	PEAK	74	PASS
	Off	2500.0	-52.90	2.0	0	42.36	AV	54	PASS
8DPSK	Off	2310.0	-43.46	2.0	0	51.79	PEAK	74	PASS
	Off	2310.0	-53.56	2.0	0	41.70	AV	54	PASS
	Off	2390.0	-42.09	2.0	0	53.17	PEAK	74	PASS
	Off	2390.0	-53.10	2.0	0	42.16	AV	54	PASS
	Off	2483.5	-42.75	2.0	0	52.51	PEAK	74	PASS
	Off	2483.5	-52.90	2.0	0	42.36	AV	54	PASS
	Off	2500.0	-43.01	2.0	0	52.25	PEAK	74	PASS
	Off	2500.0	-52.80	2.0	0	42.45	AV	54	PASS

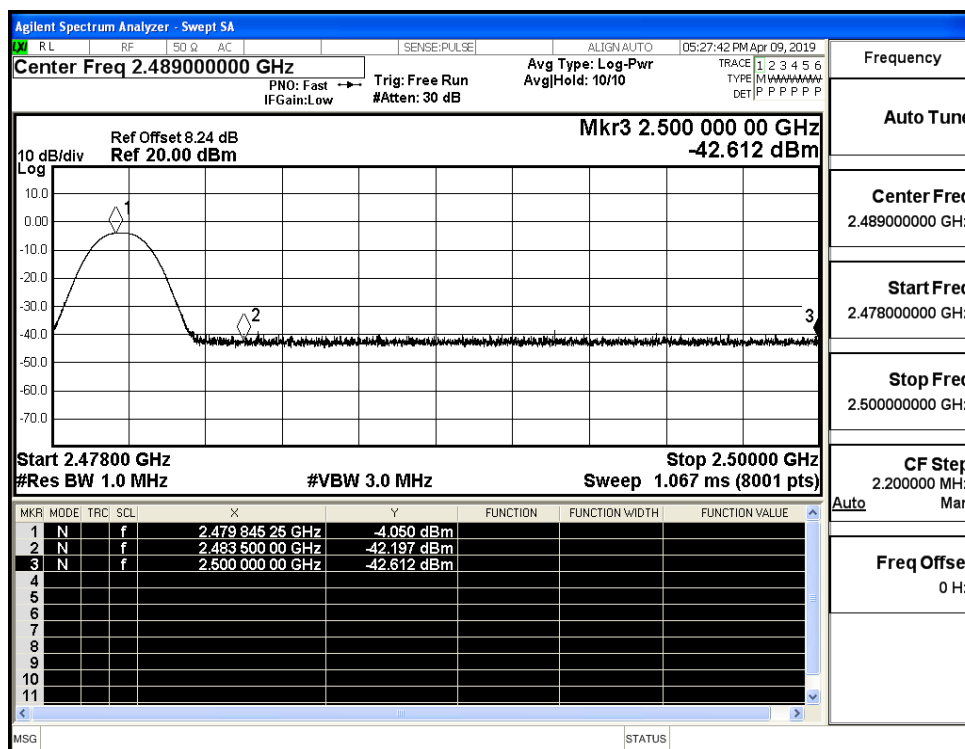
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



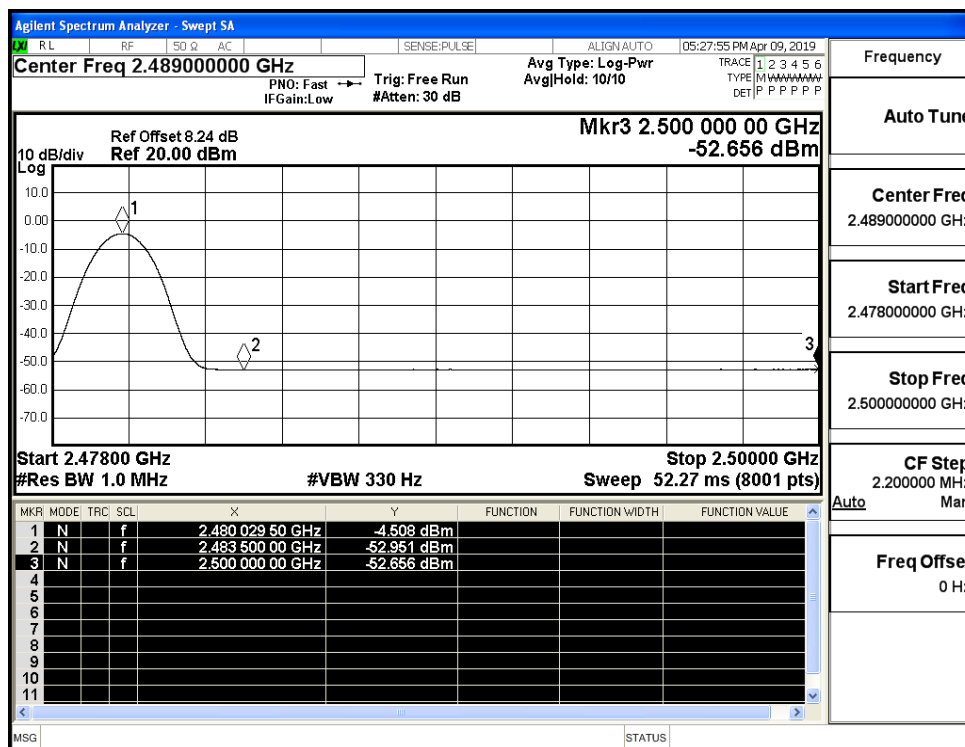
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

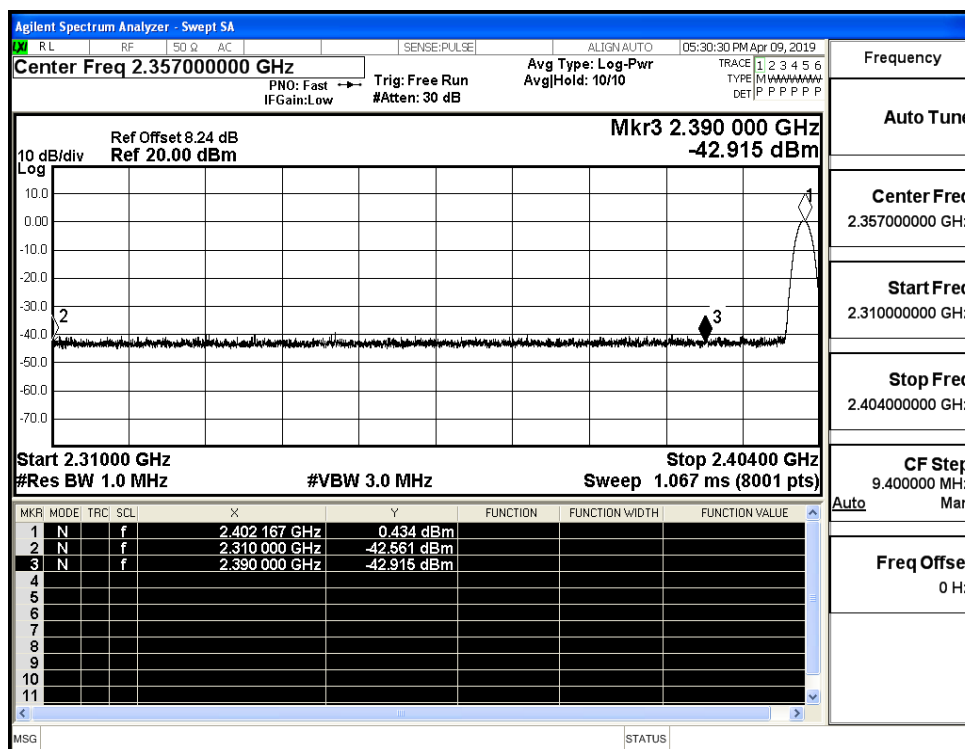
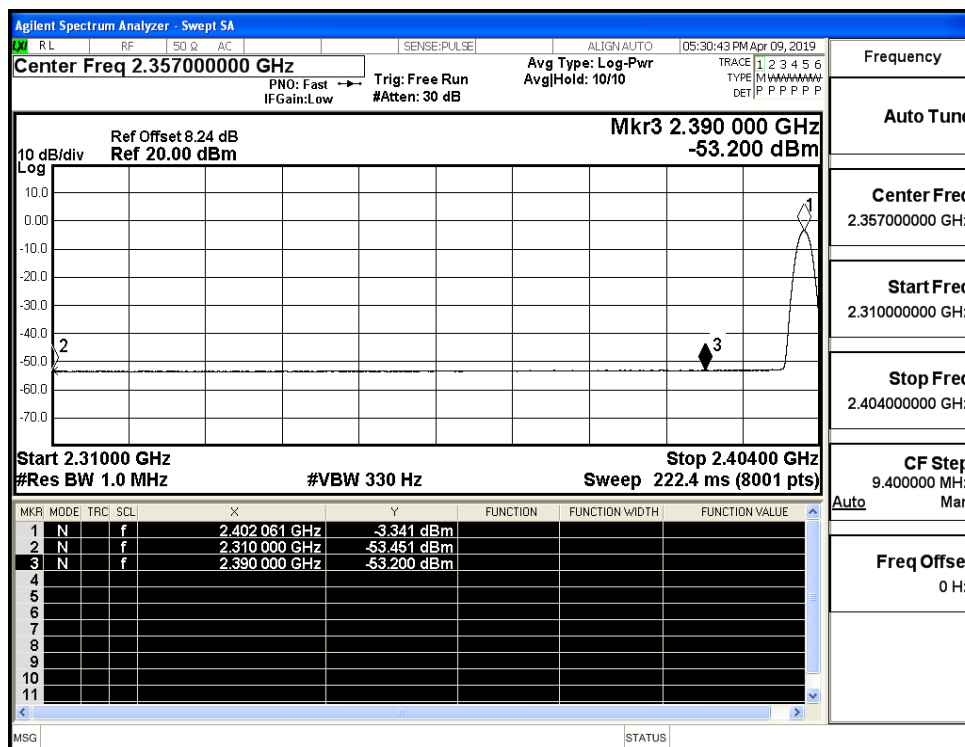


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

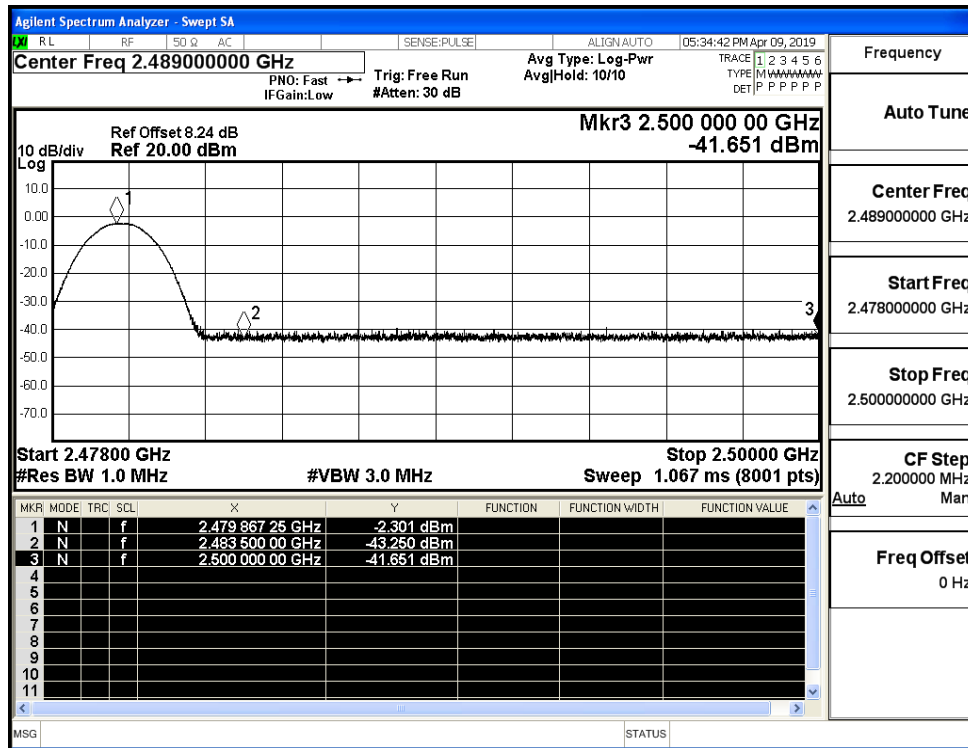


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

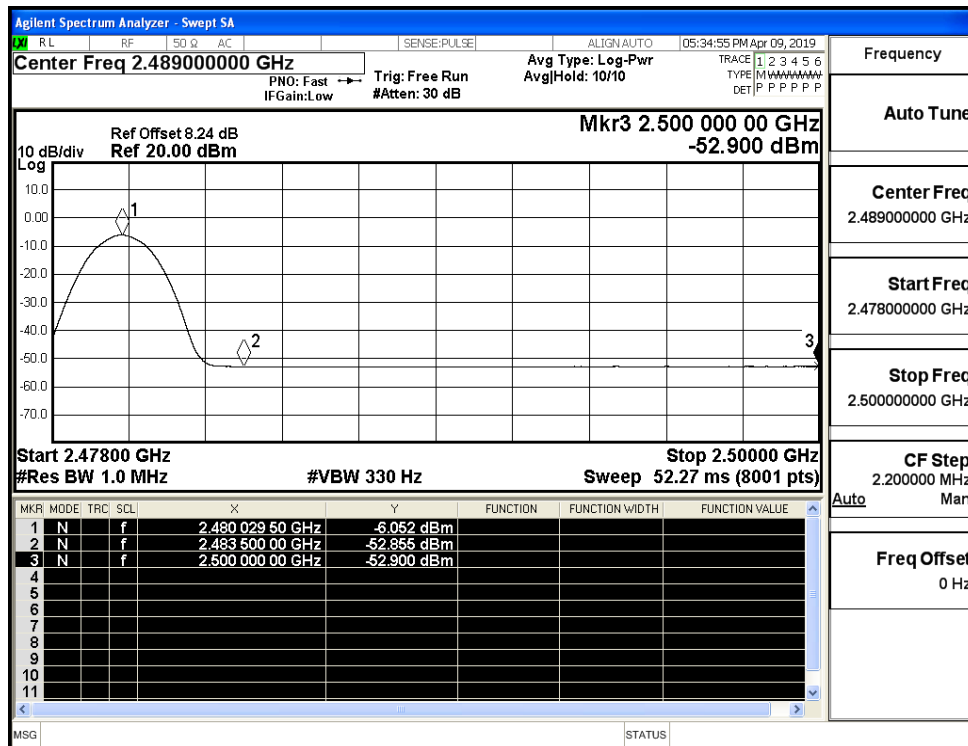


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

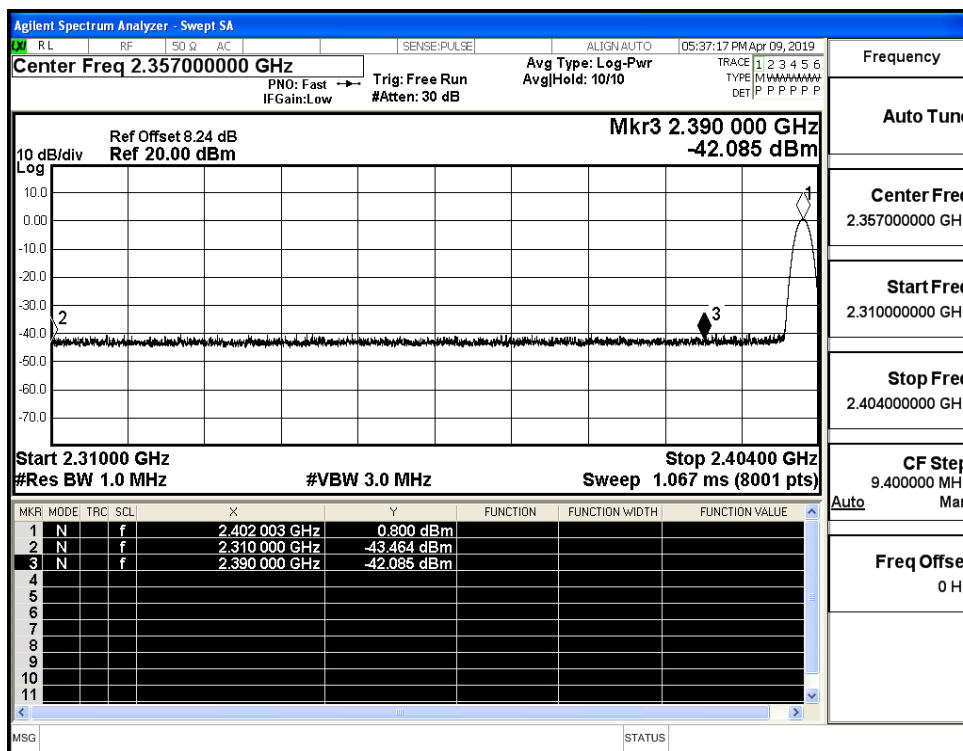
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



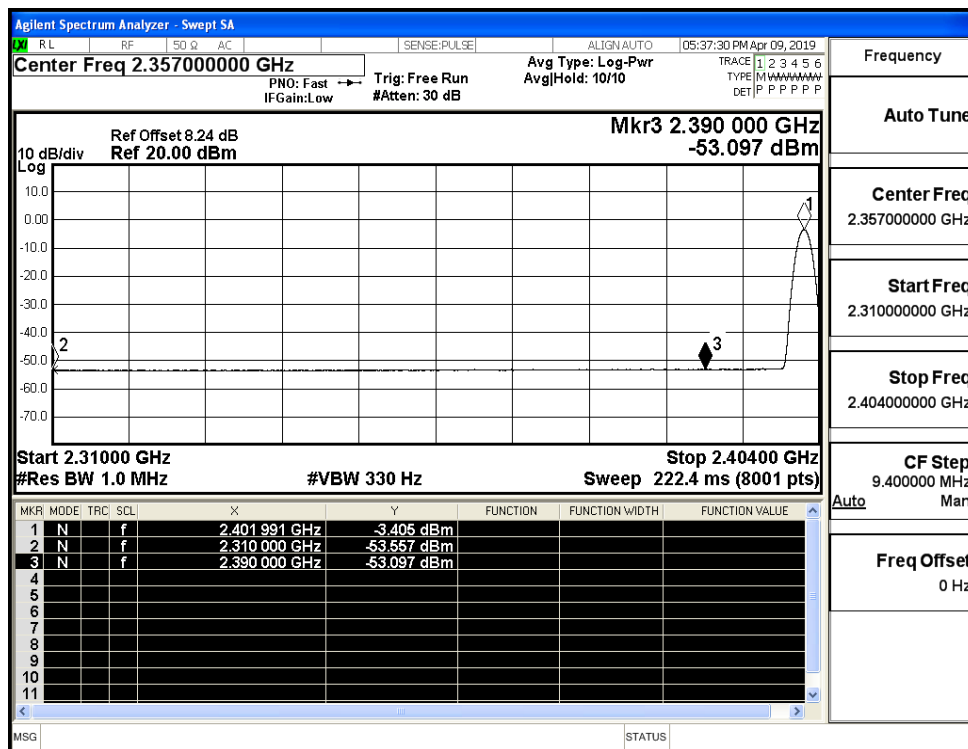
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



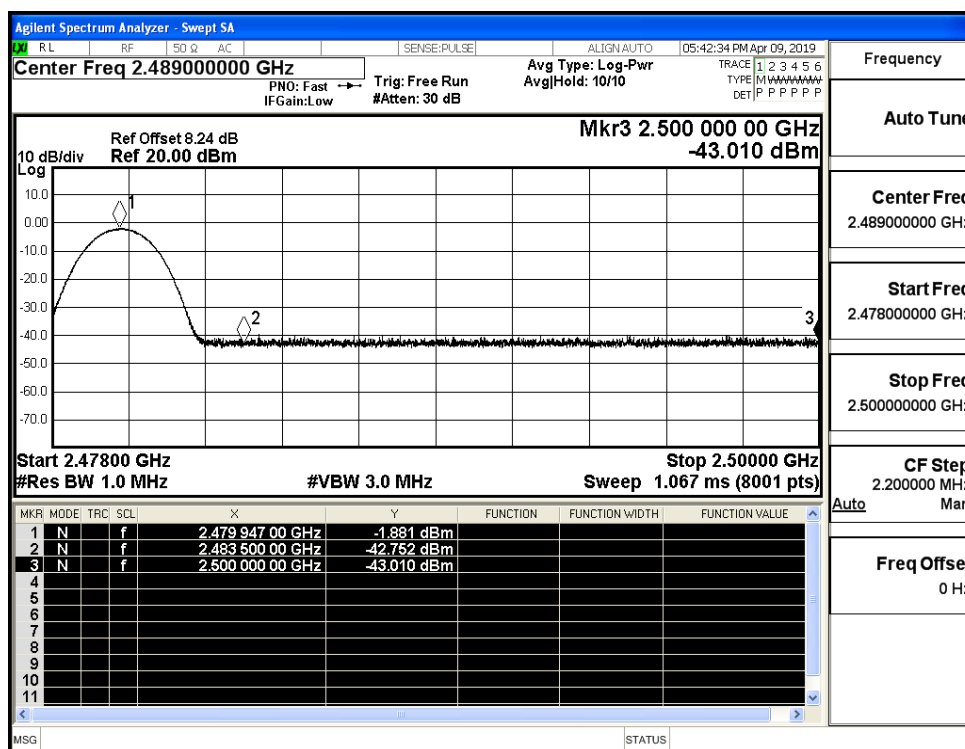
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

