

Appendix A

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

Product Name: Ruggedized In-vehicle Tablet

Test Model: APOLLO 10L

Environmental Conditions

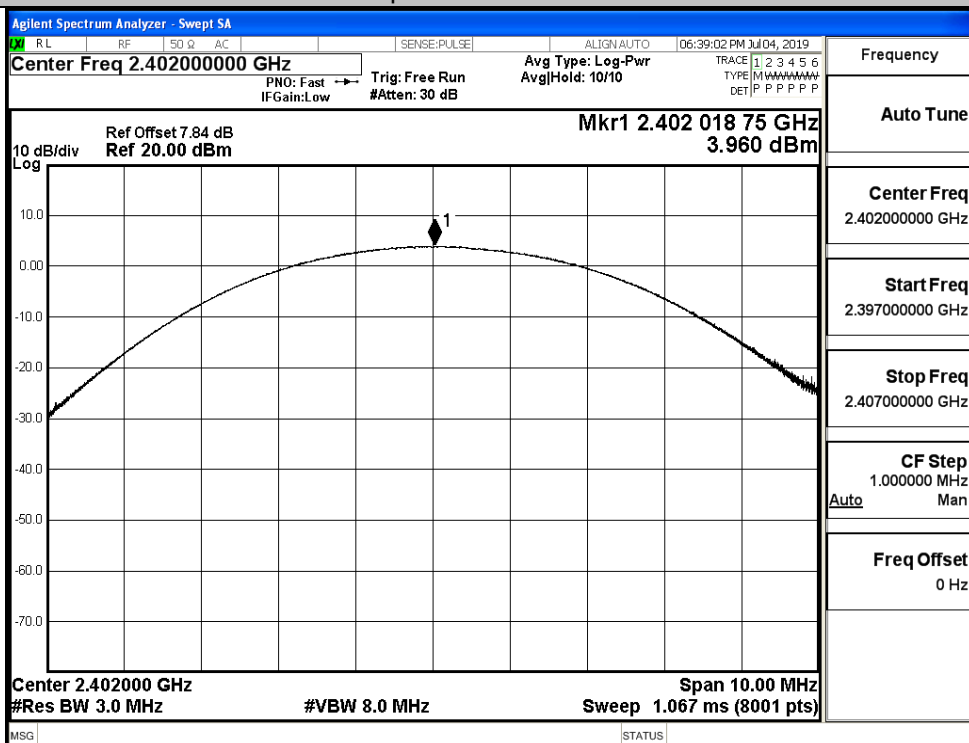
Temperature:	23.8 ° C
Relative Humidity:	53.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom Liu
Supervised by:	Aking Jin

A.1 Maxmum Conducted Peak Output Power

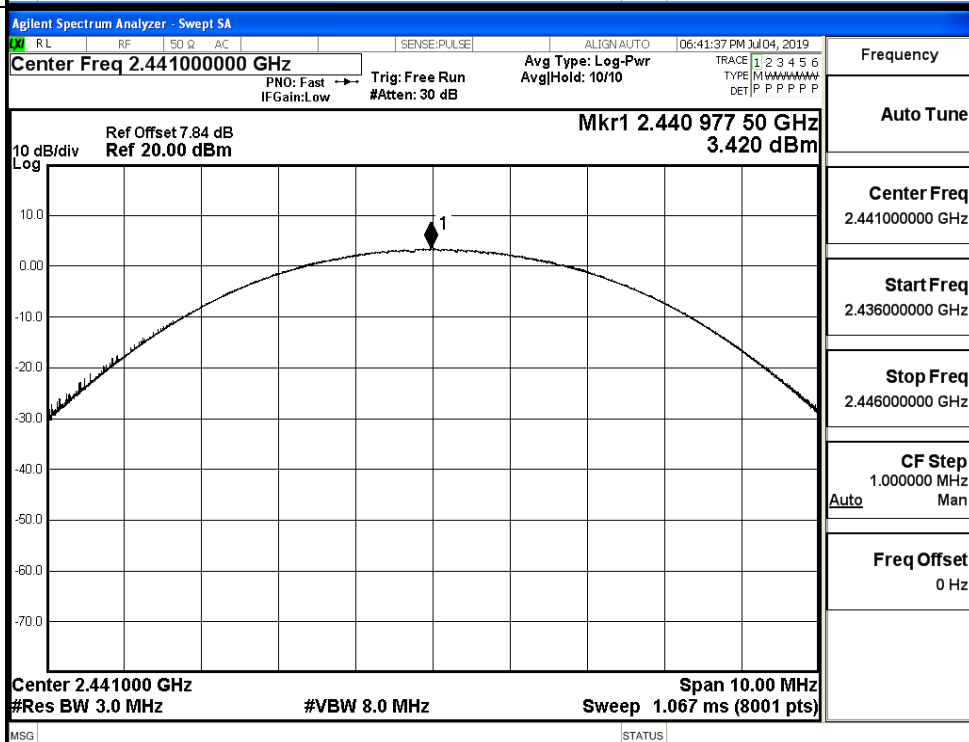
Mode	Channel.	Maximum Peak Output Power [dBm]	Maximum Average Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.960	3.811	30	PASS
	MCH	3.420	3.266	30	PASS
	HCH	2.735	2.573	30	PASS
$\pi/4$ DQPSK	LCH	1.530	1.322	21	PASS
	MCH	1.135	0.923	21	PASS
	HCH	0.483	0.357	21	PASS
8DPSK	LCH	1.953	1.761	21	PASS
	MCH	1.500	1.357	21	PASS
	HCH	0.752	0.614	21	PASS

Test Graphs

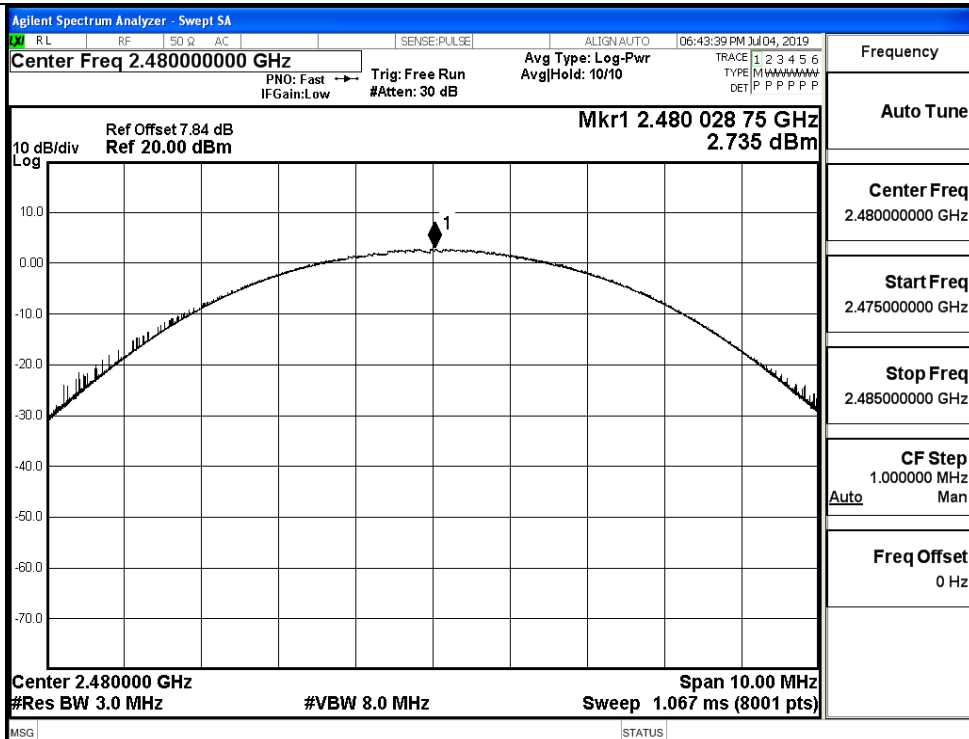
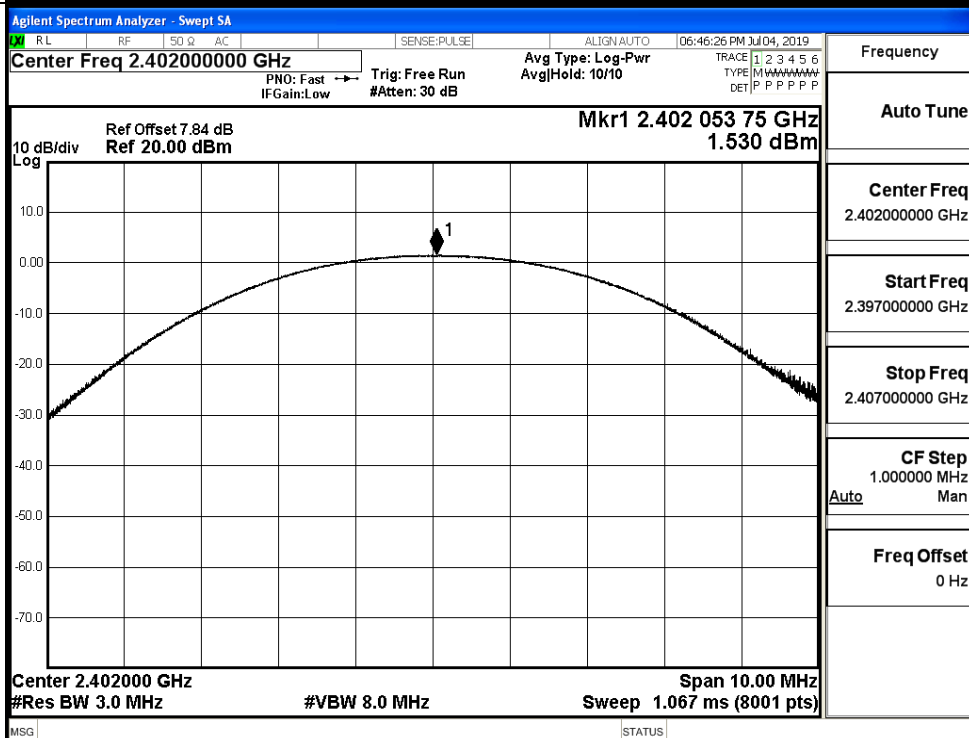
GFSK/LCH

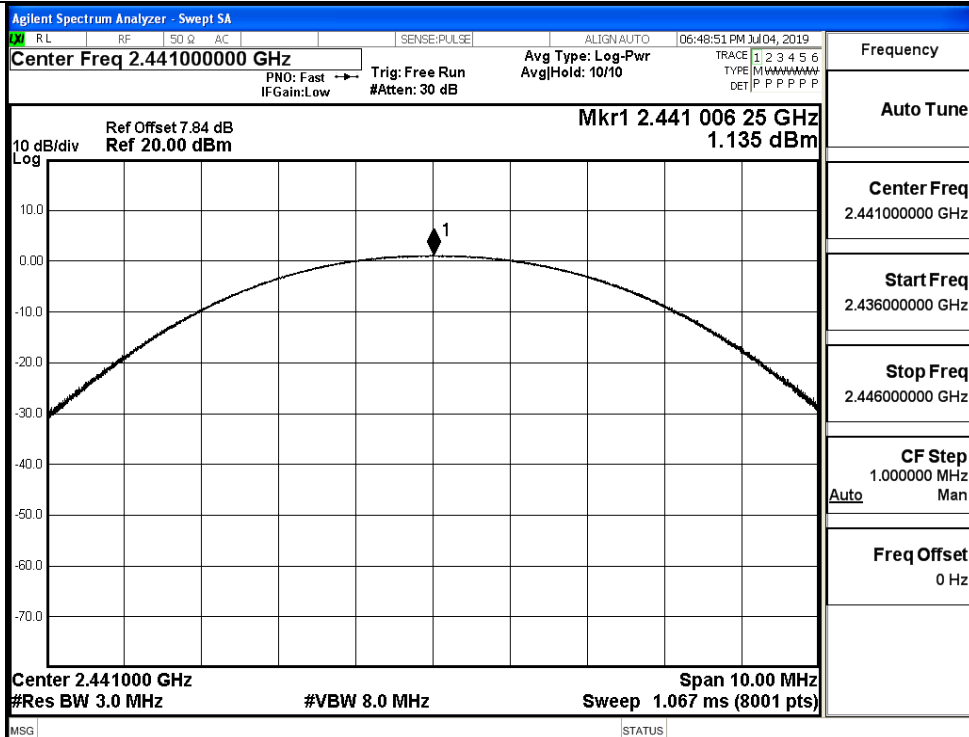
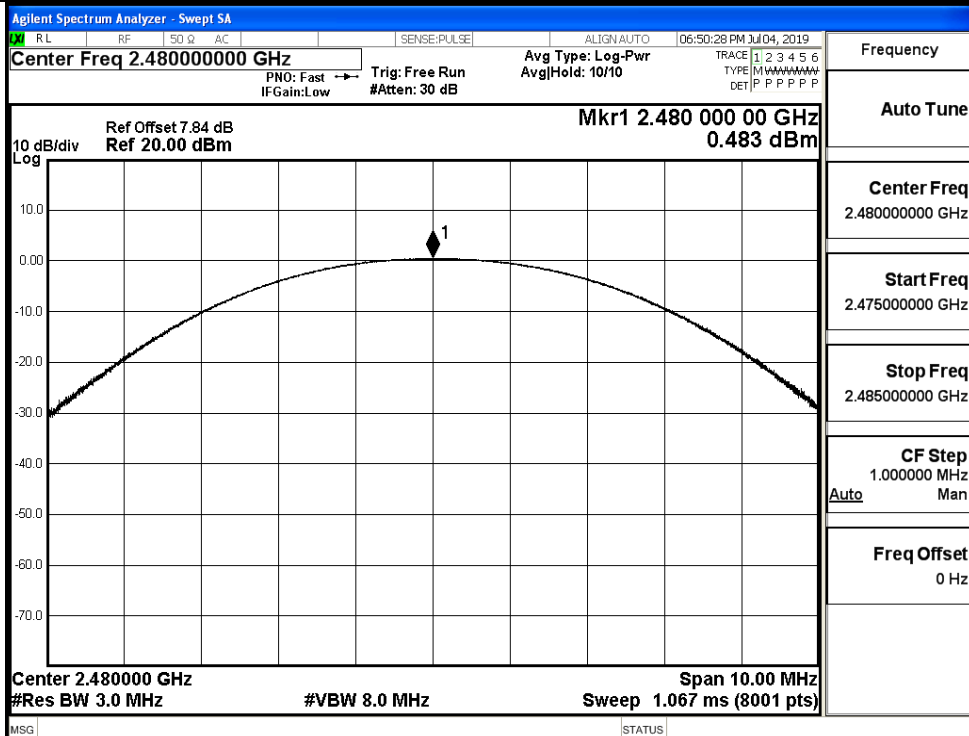


GFSK/MCH

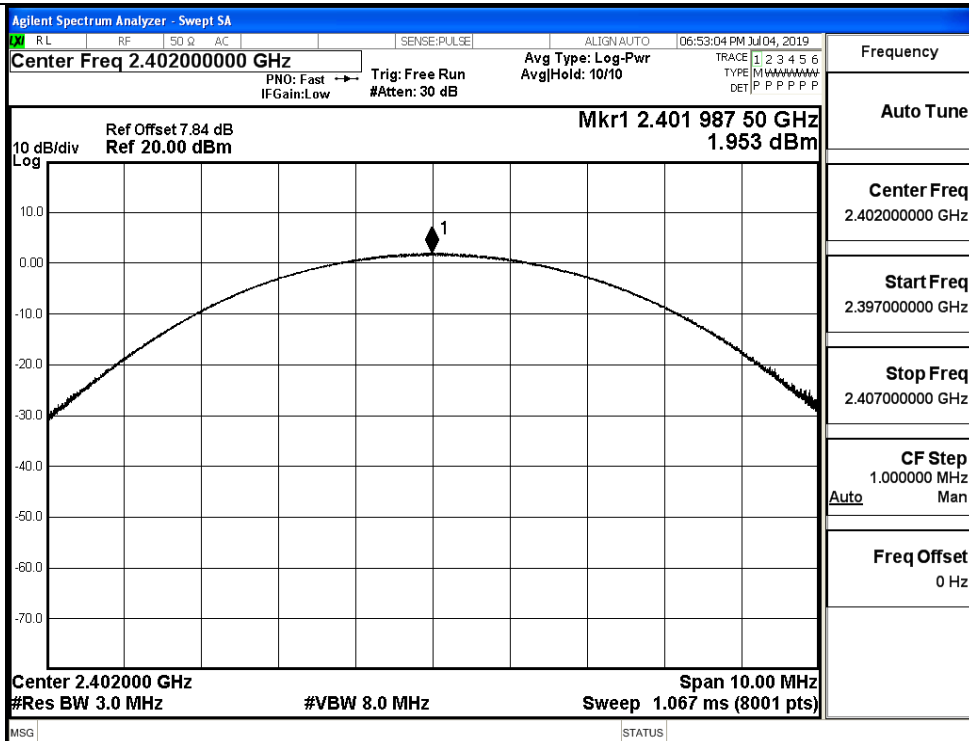


GFSK/HCH

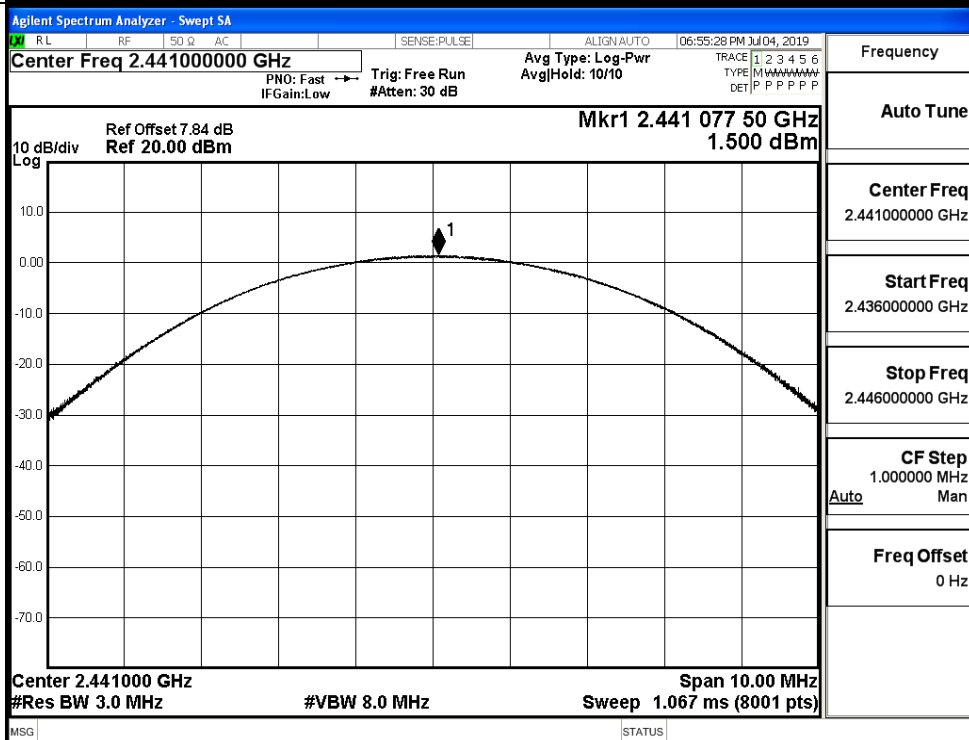
 $\pi/4$ DQPSK/LCH

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

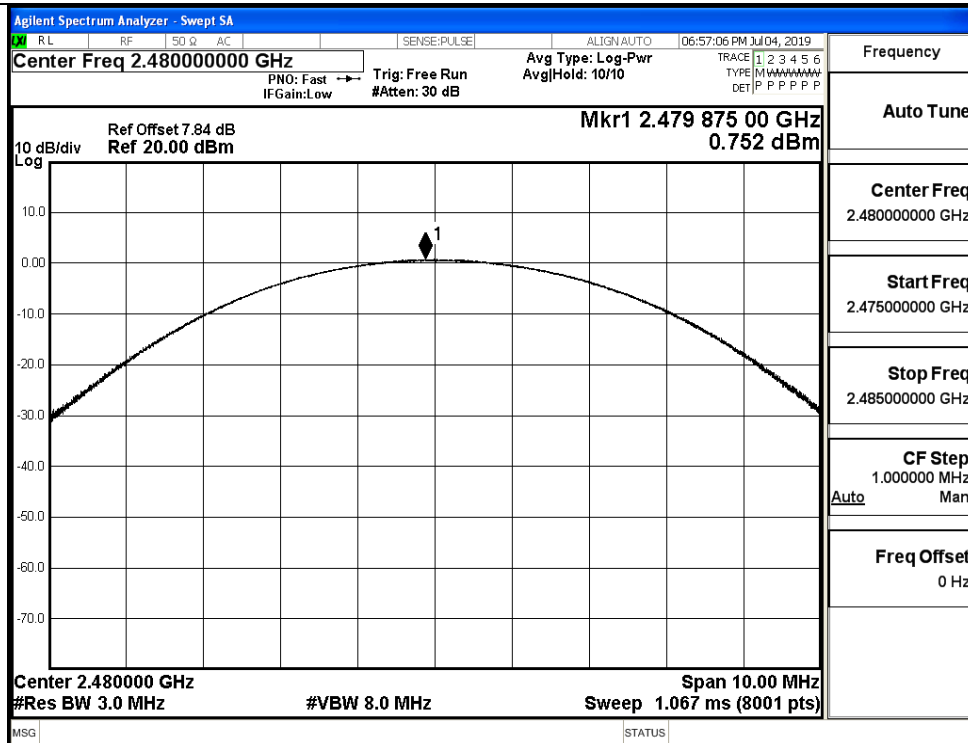
8DPSK/LCH



8DPSK/MCH



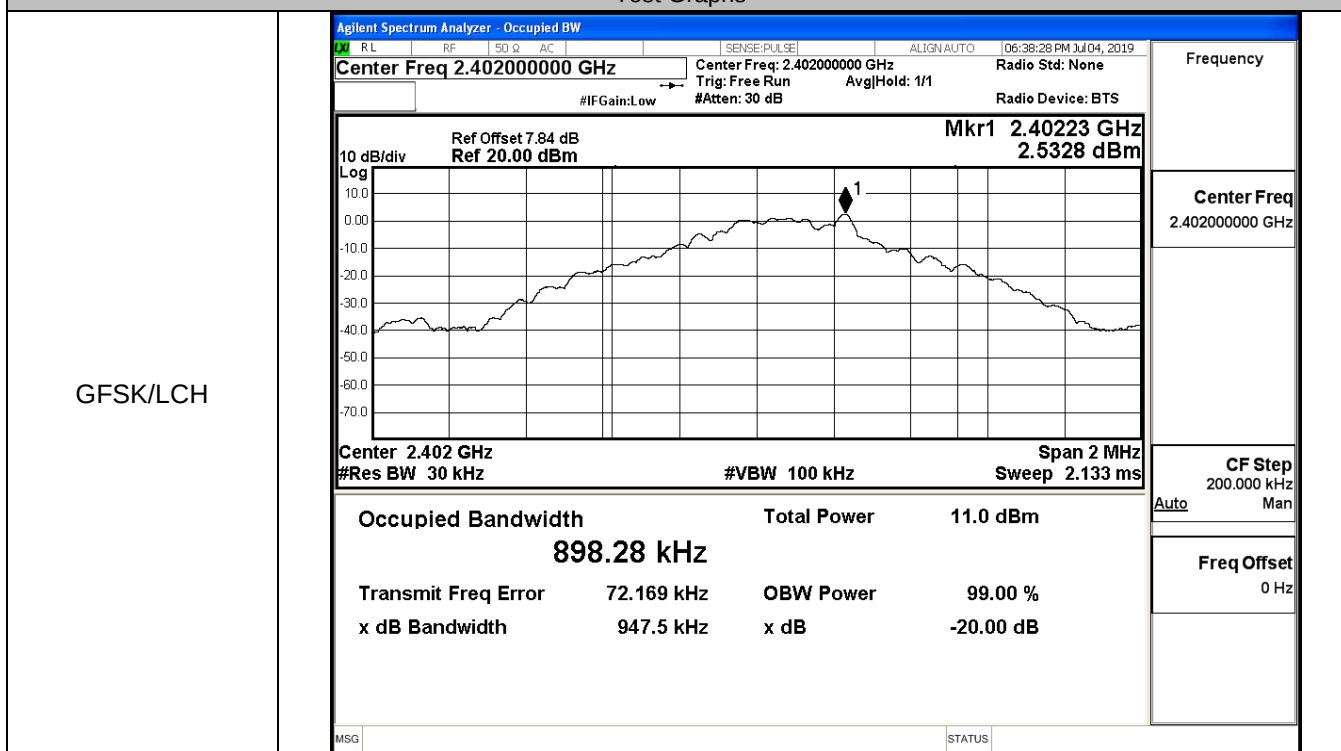
8DPSK/HCH



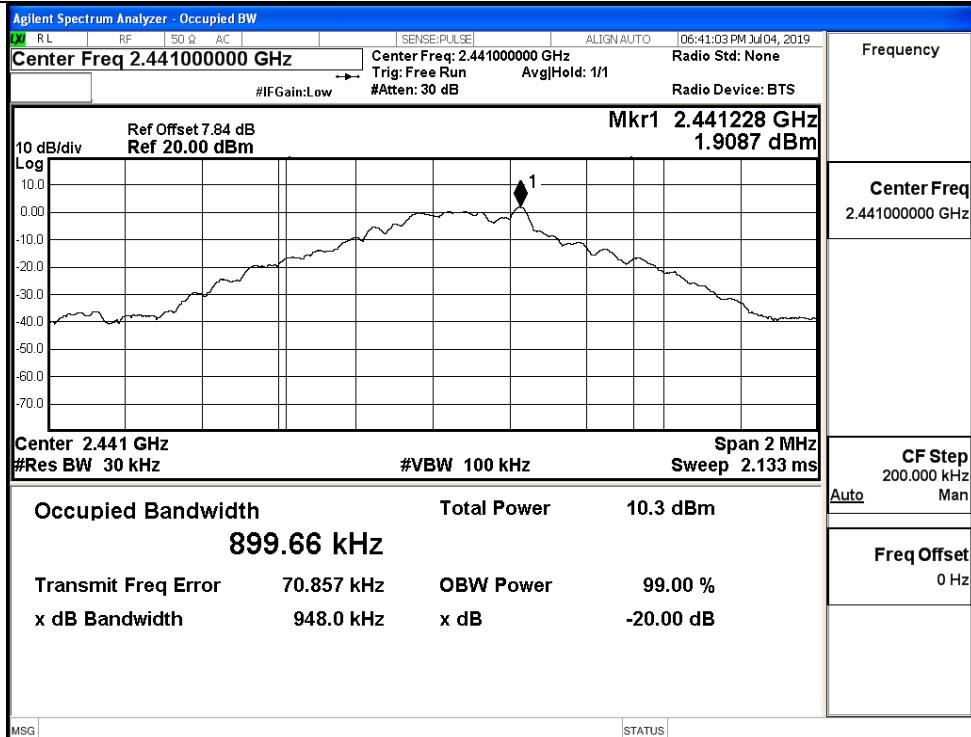
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9475	Not Specified	PASS
	MCH	0.9480	Not Specified	PASS
	HCH	0.9497	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.355	Not Specified	PASS
	MCH	1.355	Not Specified	PASS
	HCH	1.359	Not Specified	PASS
8DPSK	LCH	1.315	Not Specified	PASS
	MCH	1.314	Not Specified	PASS
	HCH	1.313	Not Specified	PASS

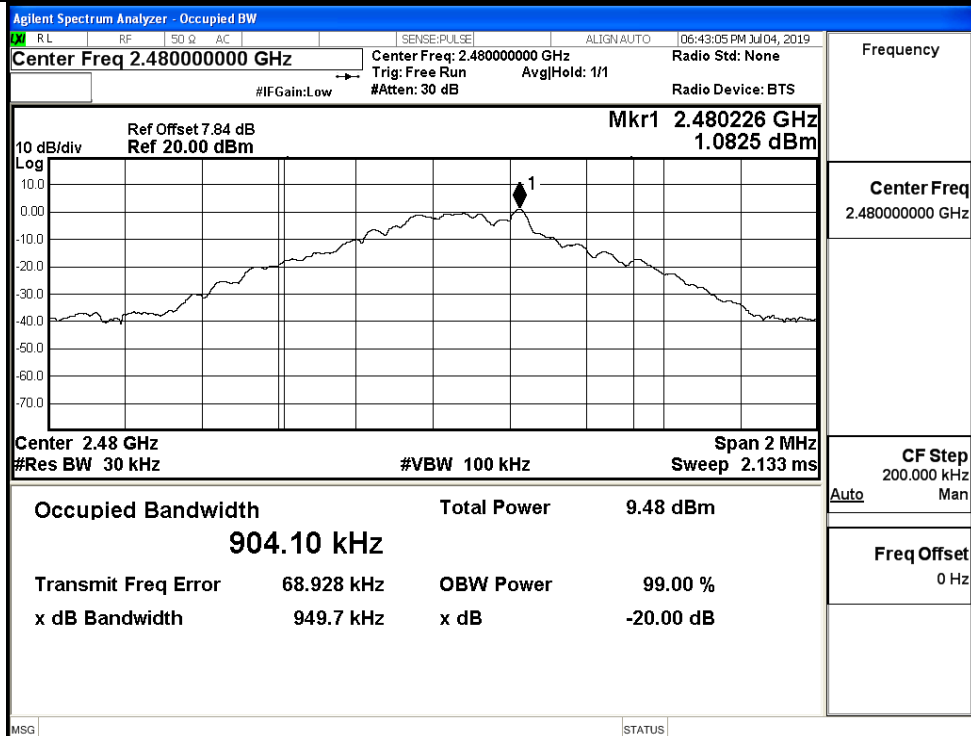
Test Graphs

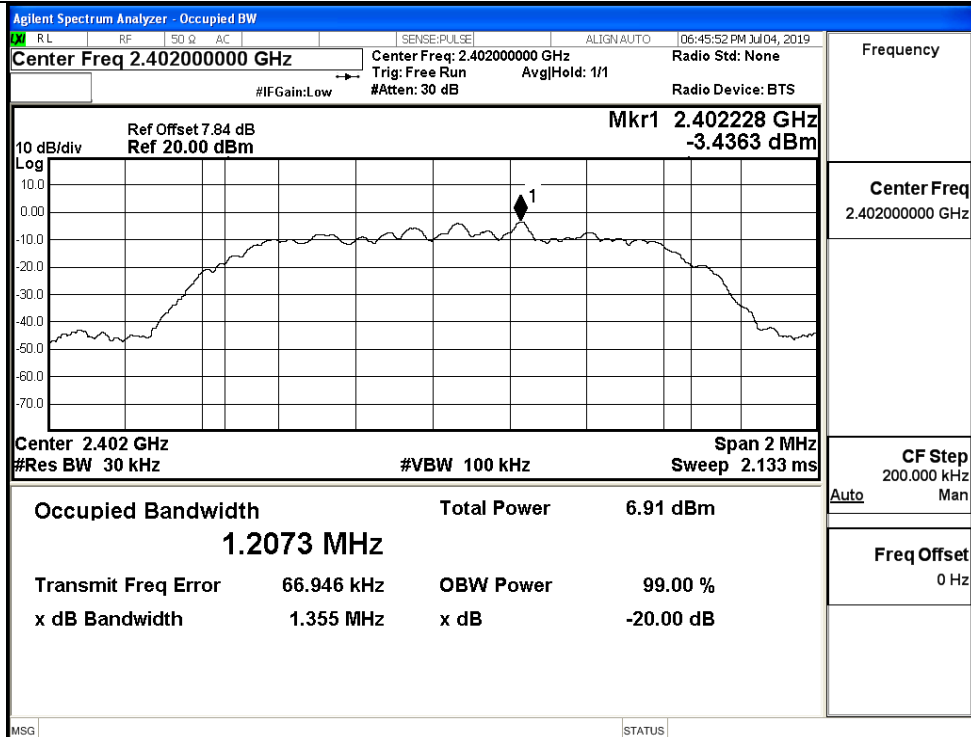
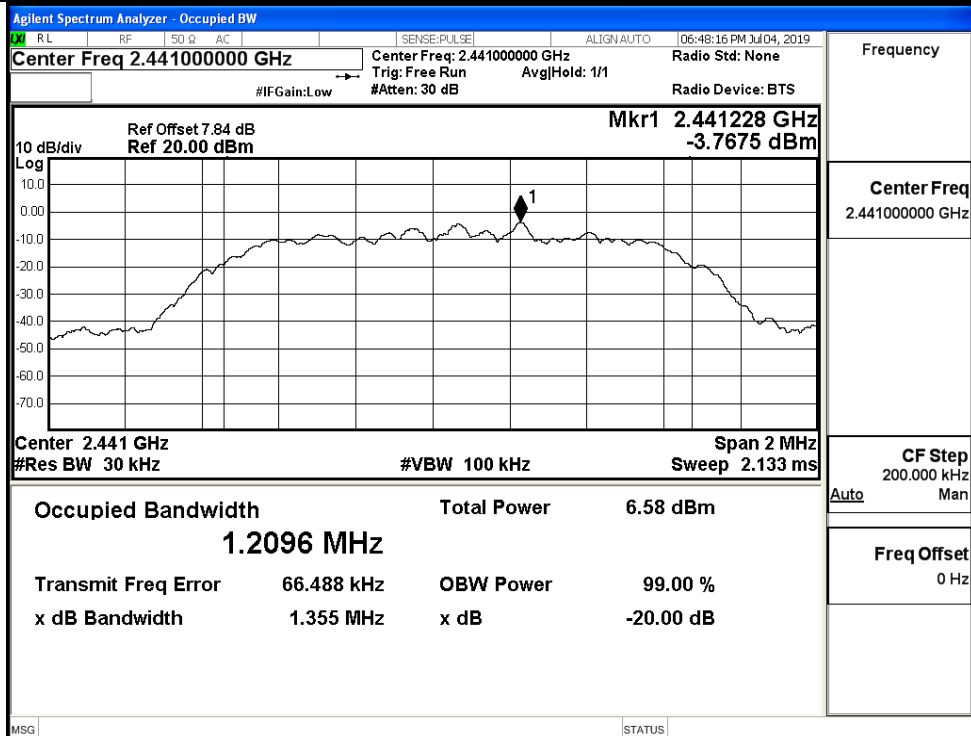


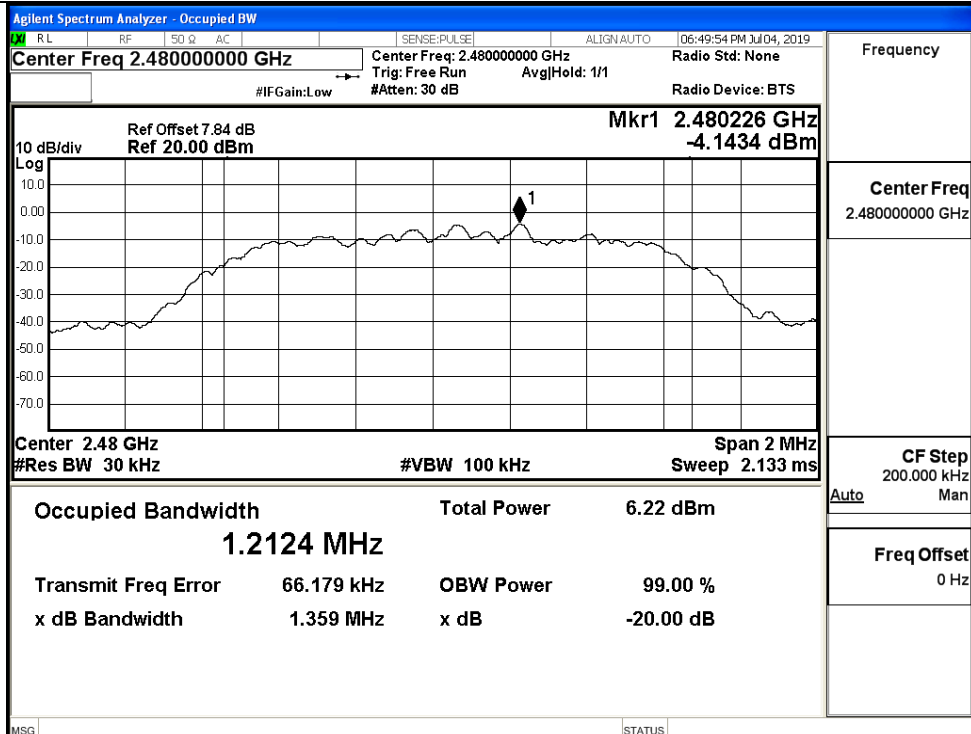
GFSK/MCH



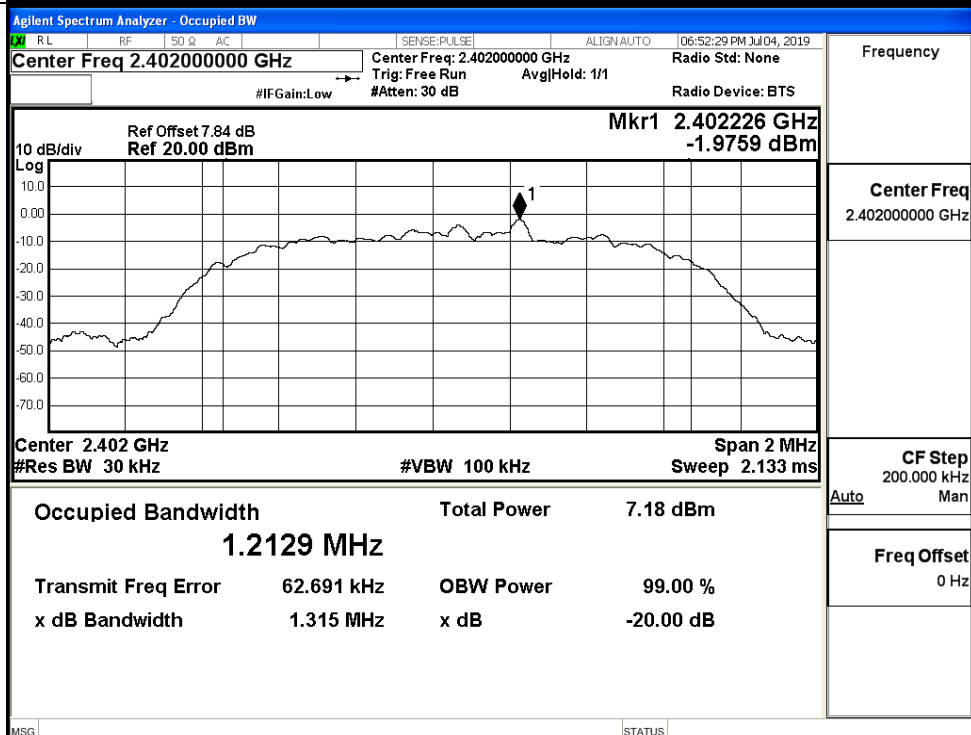
GFSK/HCH



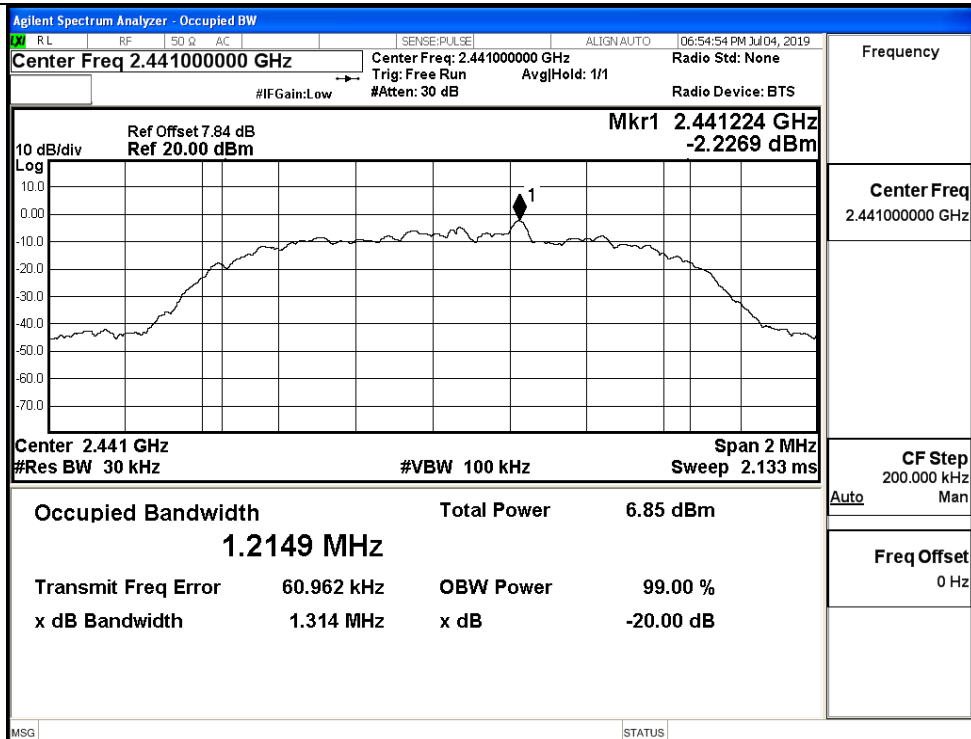
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

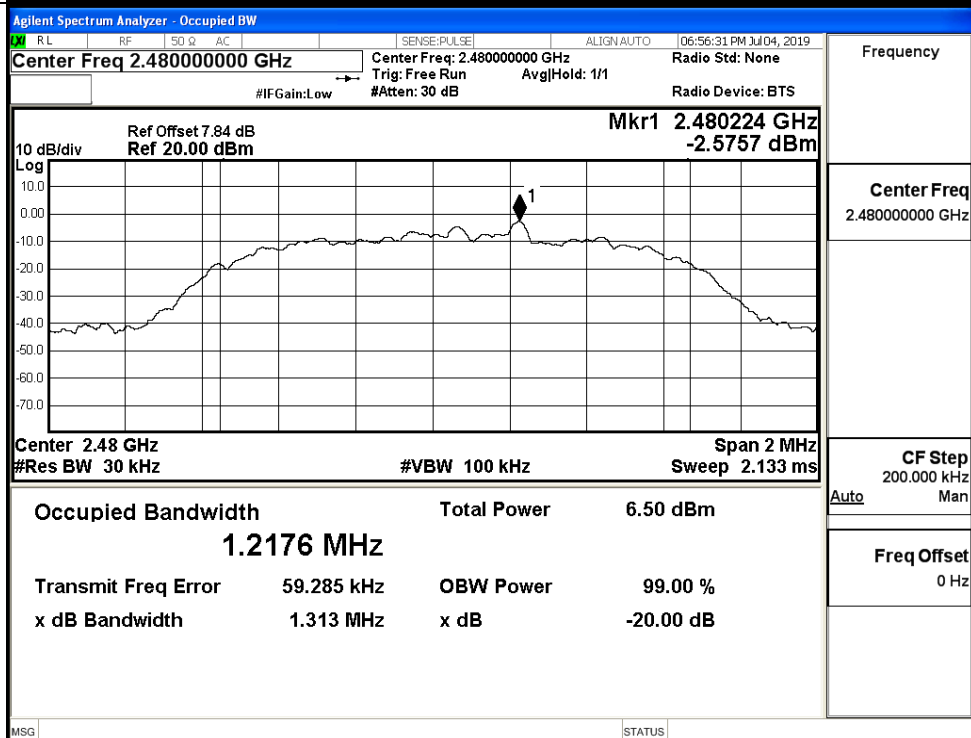
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

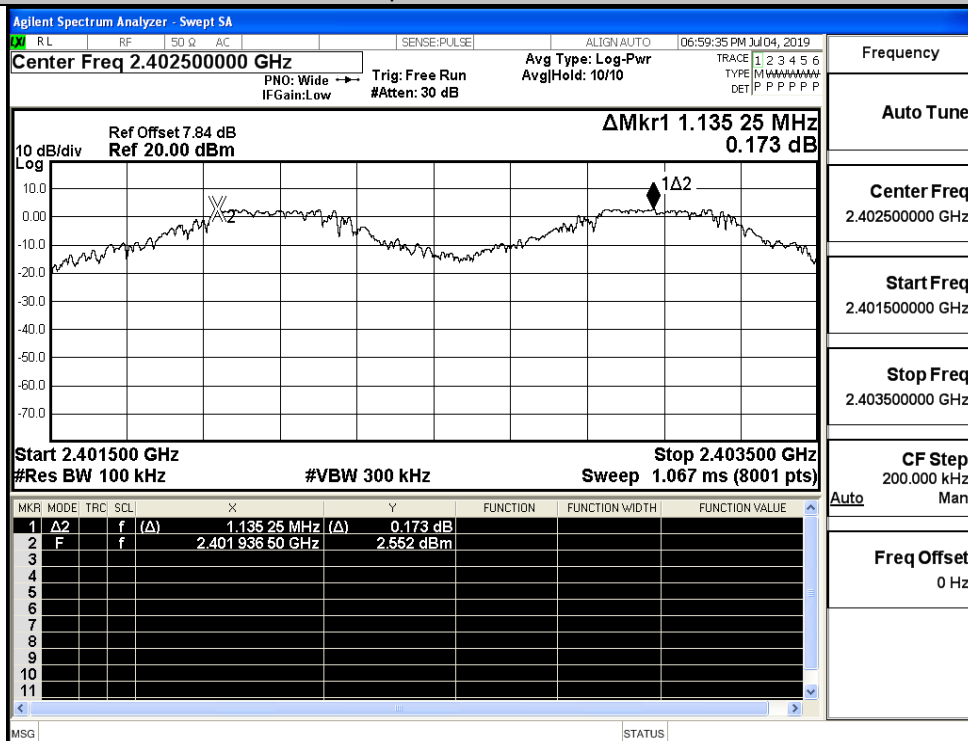


A.3 Carrier Frequency Separation

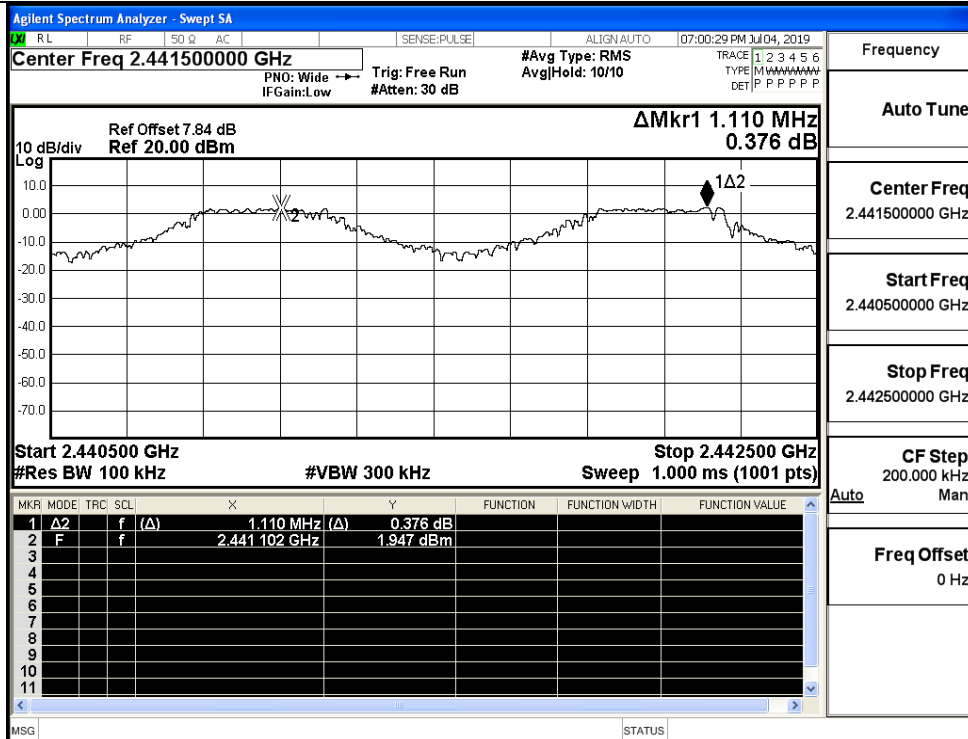
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.135	0.9475	PASS
	MCH	1.110	0.9480	PASS
	HCH	0.976	0.9497	PASS
$\pi/4$ DQPSK	LCH	0.908	0.903	PASS
	MCH	1.112	0.903	PASS
	HCH	0.972	0.906	PASS
8DPSK	LCH	0.912	0.877	PASS
	MCH	1.304	0.876	PASS
	HCH	1.082	0.875	PASS

Test Graphs

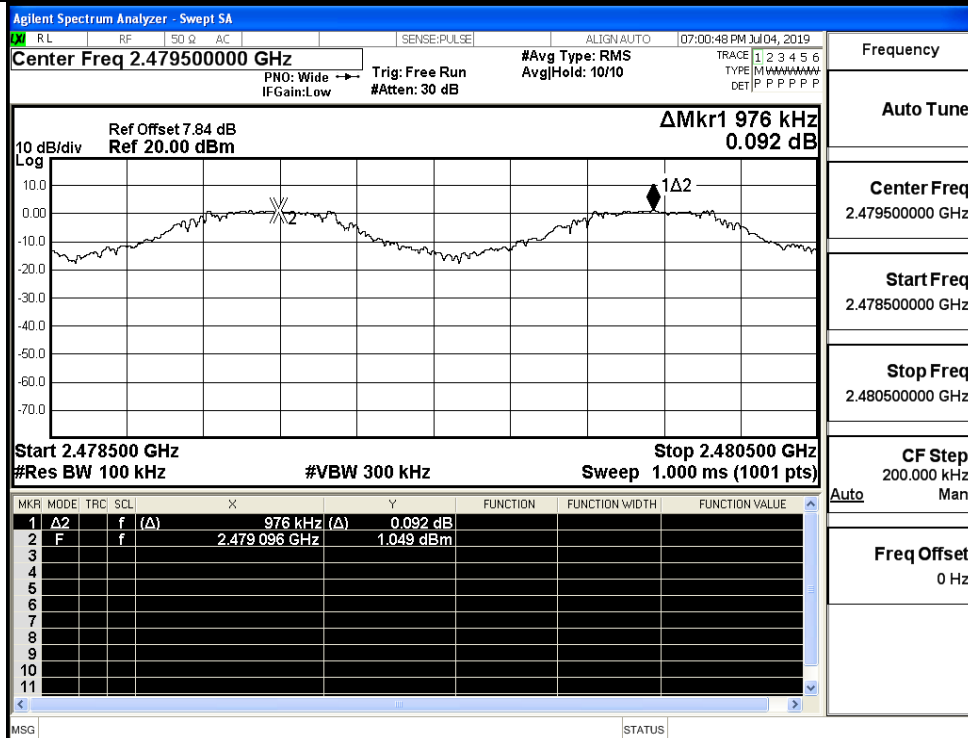
GFSK/LCH

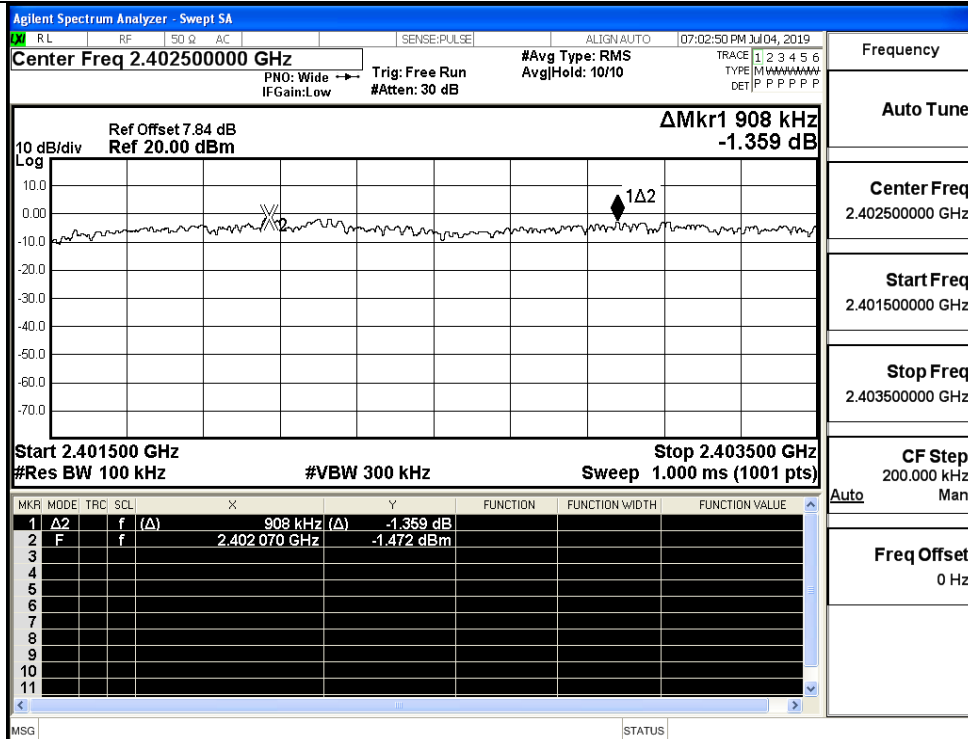


GFSK/MCH



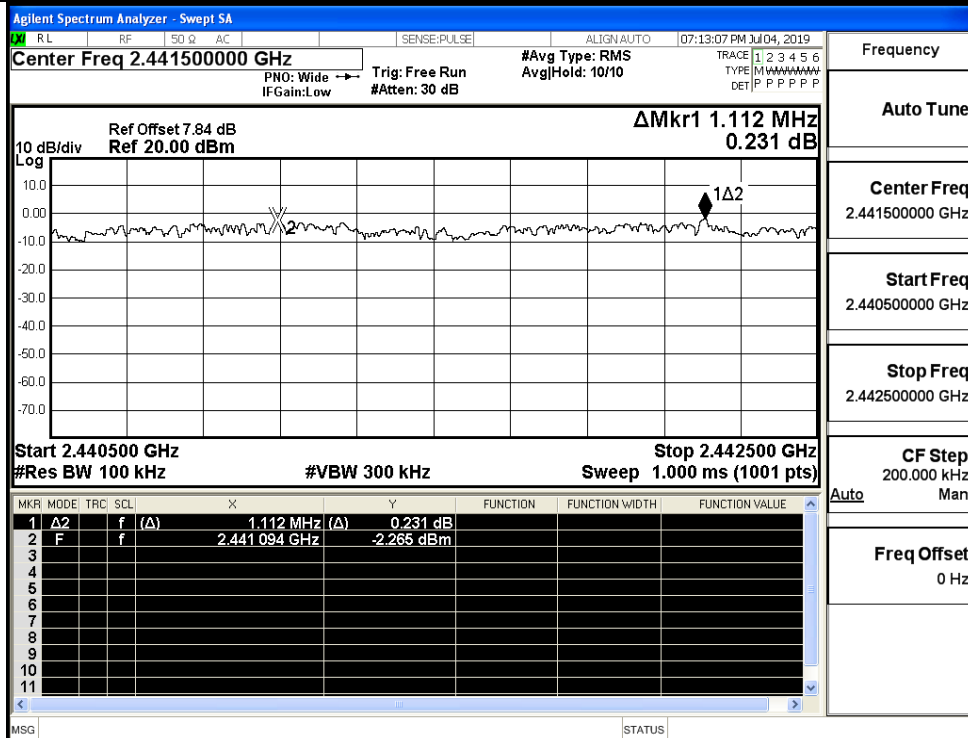
GFSK/HCH



$\pi/4$ DQPSK/LCH

Frequency

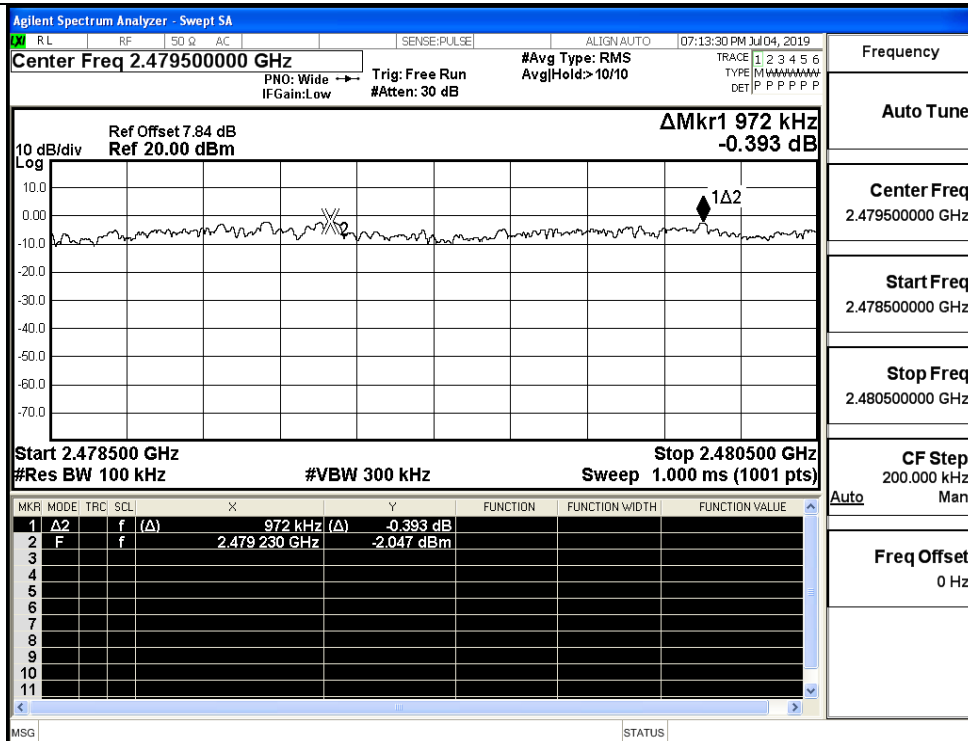
Auto Tune

Center Freq
2.402500000 GHzStart Freq
2.401500000 GHzStop Freq
2.403500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz $\pi/4$ DQPSK/MCH

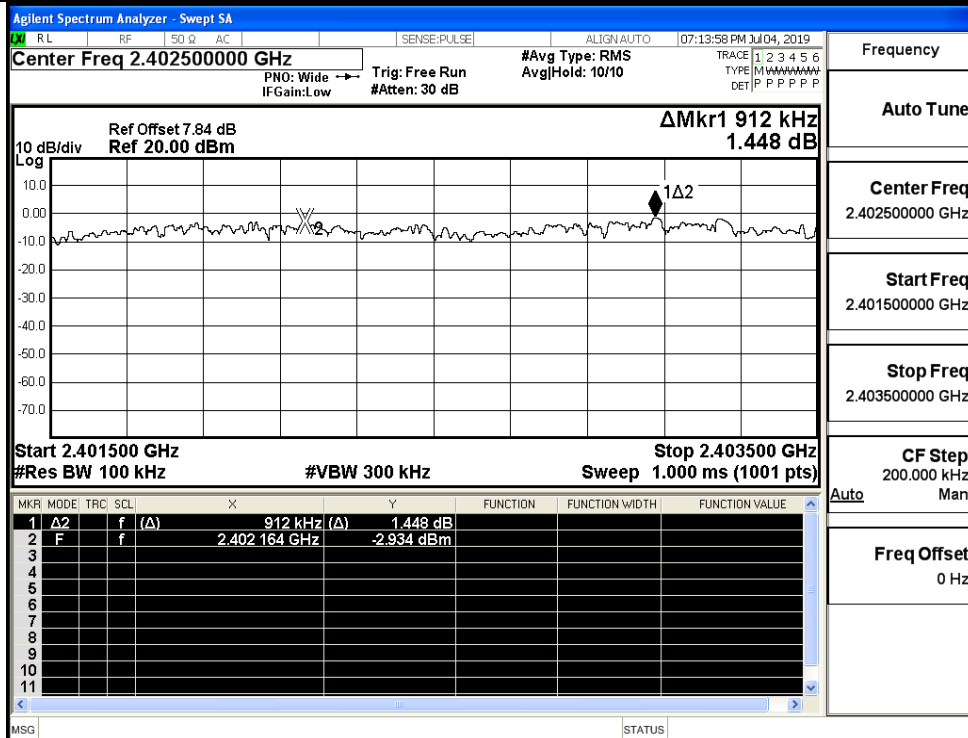
Frequency

Auto Tune

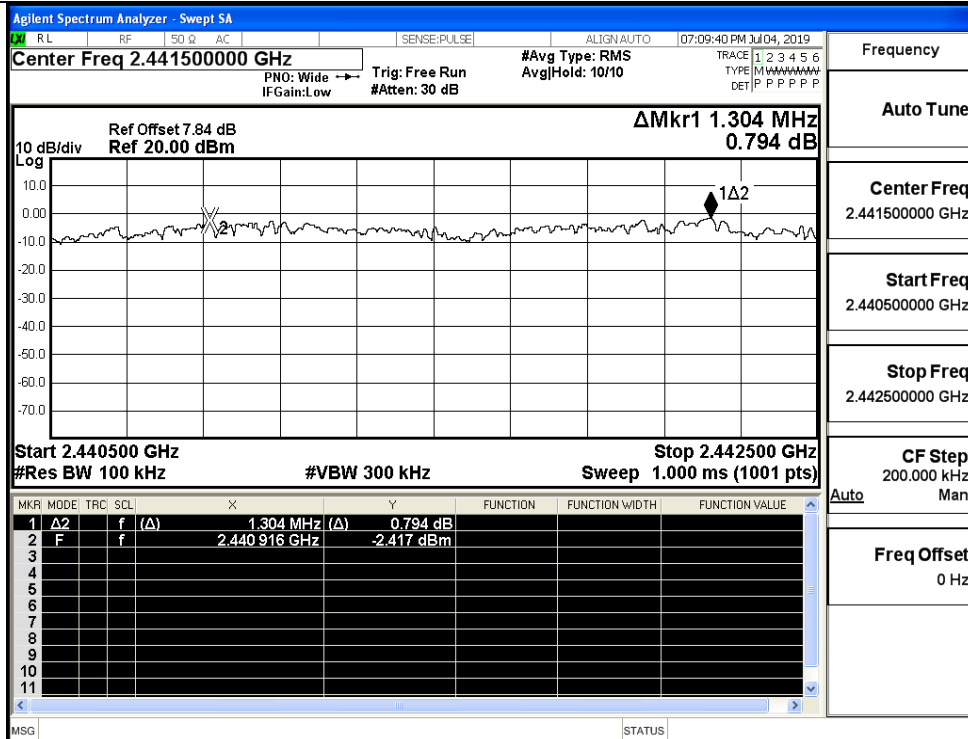
Center Freq
2.441500000 GHzStart Freq
2.440500000 GHzStop Freq
2.442500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH

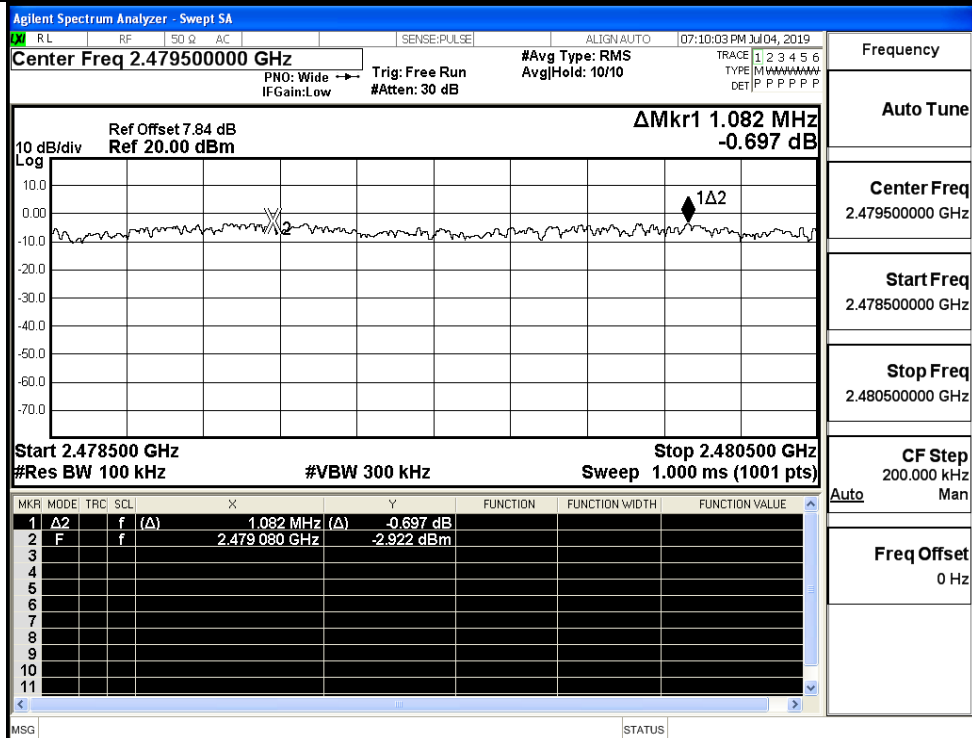
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

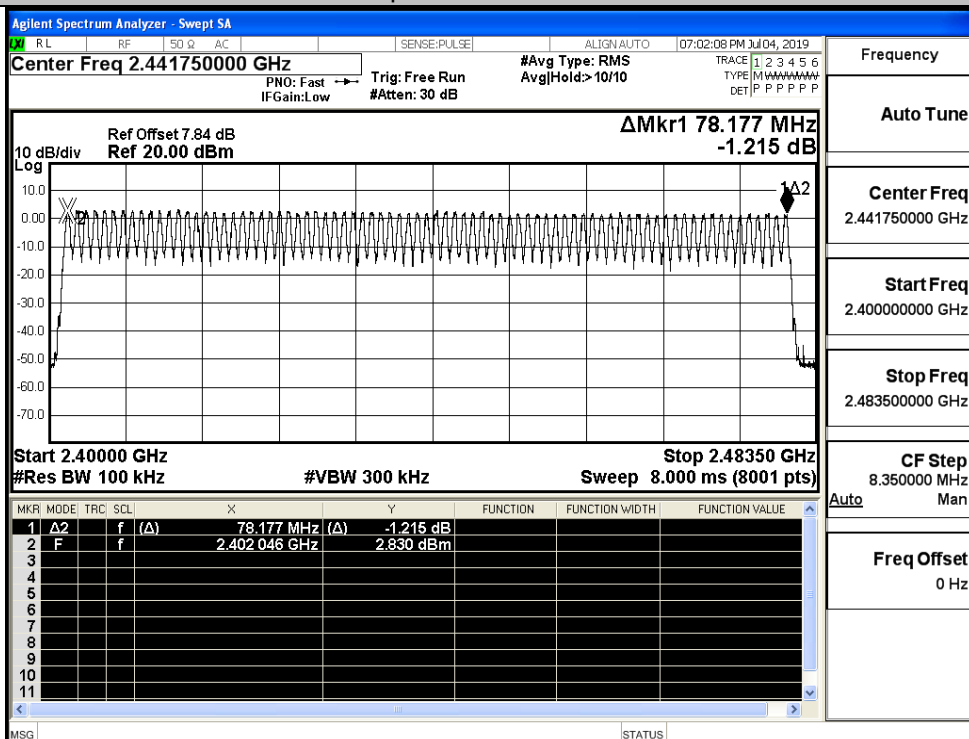
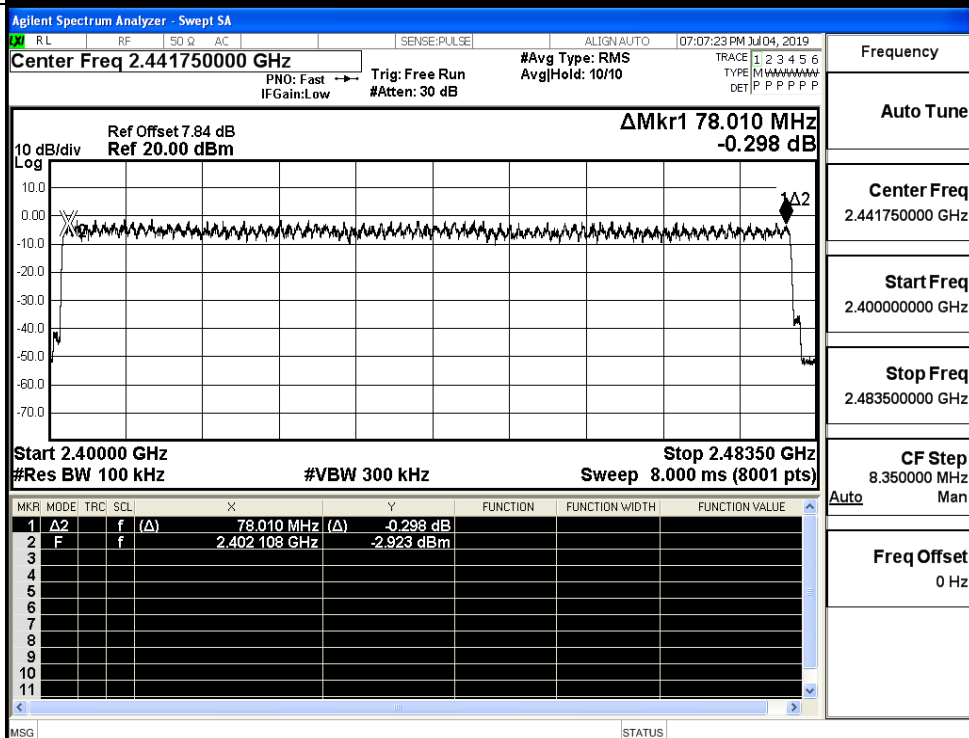


A.4 Hopping Channel Number

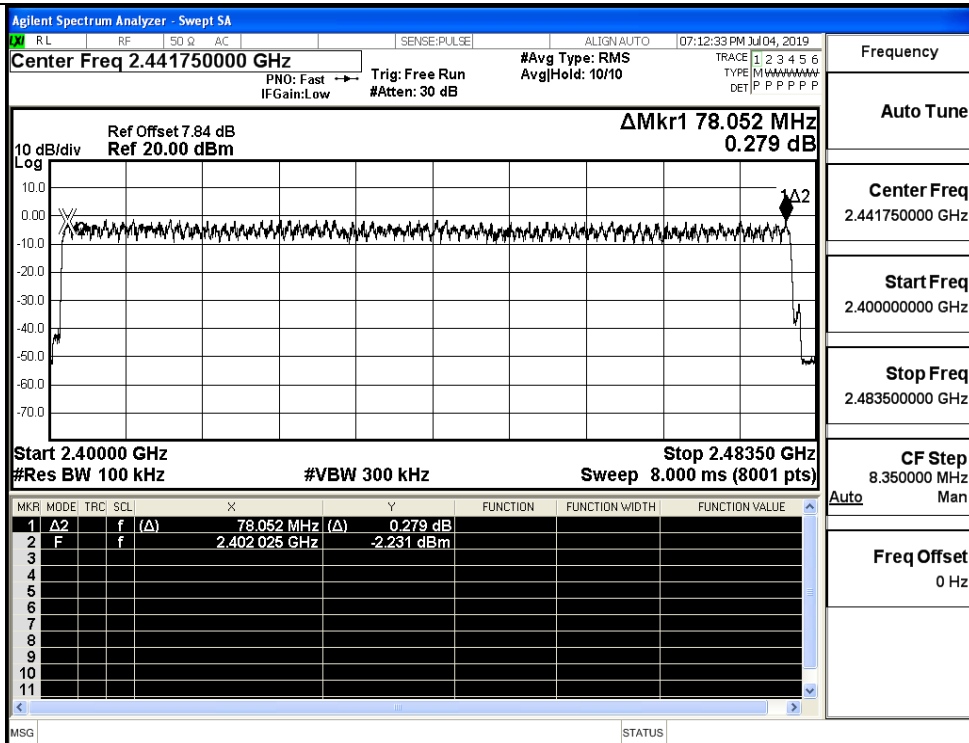
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

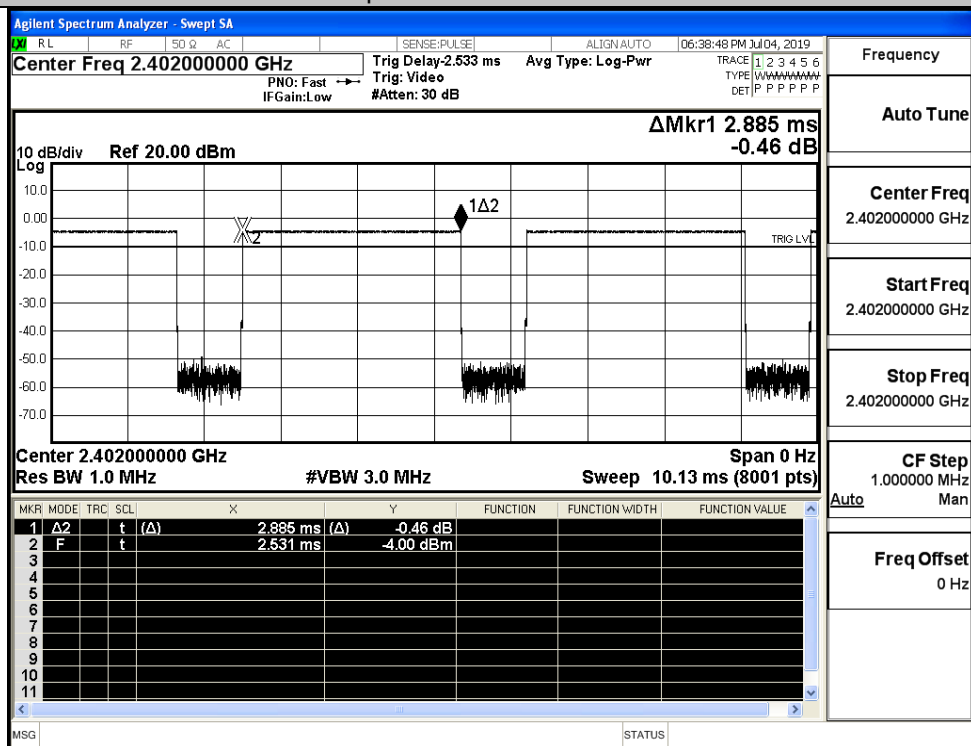


A.5 Dwell Time

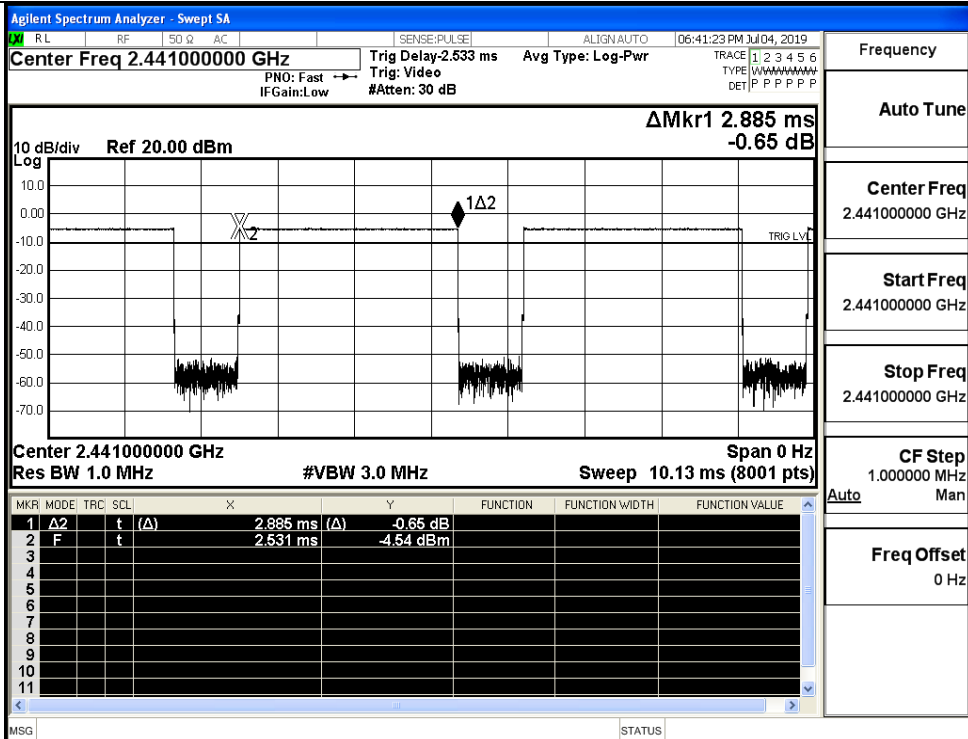
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89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

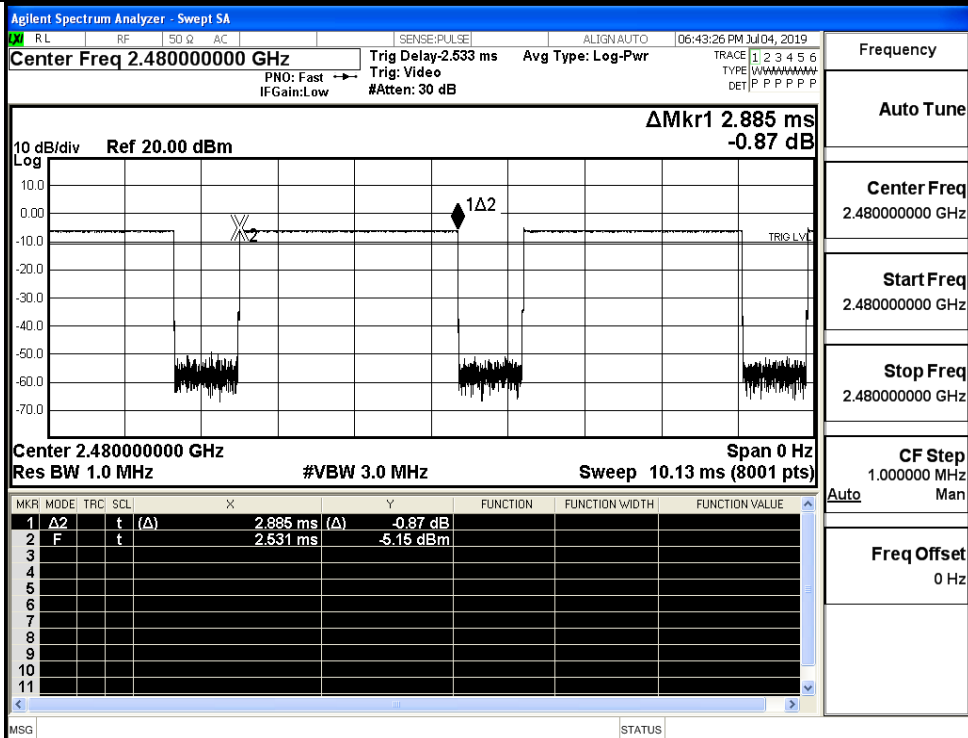
GFSK_DH5/LCH



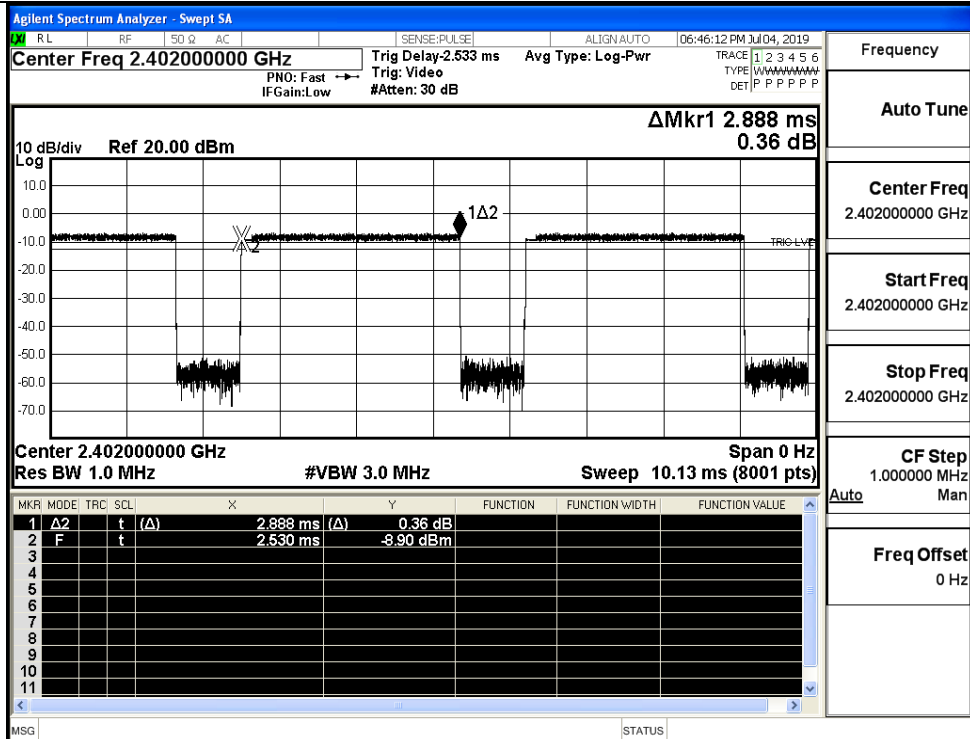
GFSK_DH5/MCH



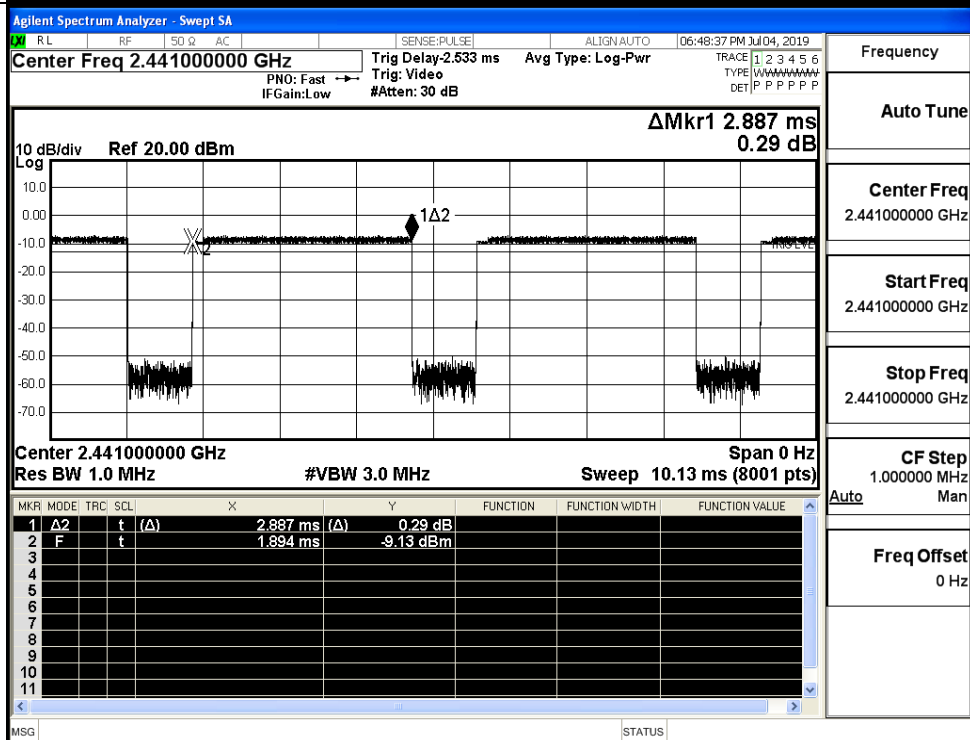
GFSK_DH5/HCH



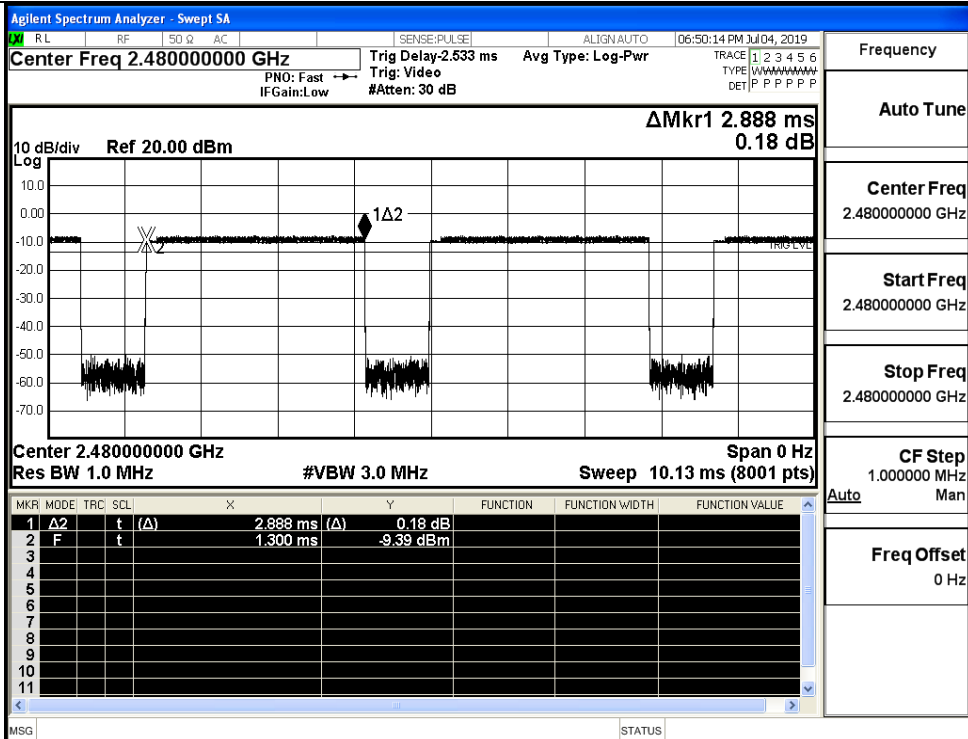
$\pi/4$ DQPSK
_2DH5/LCH



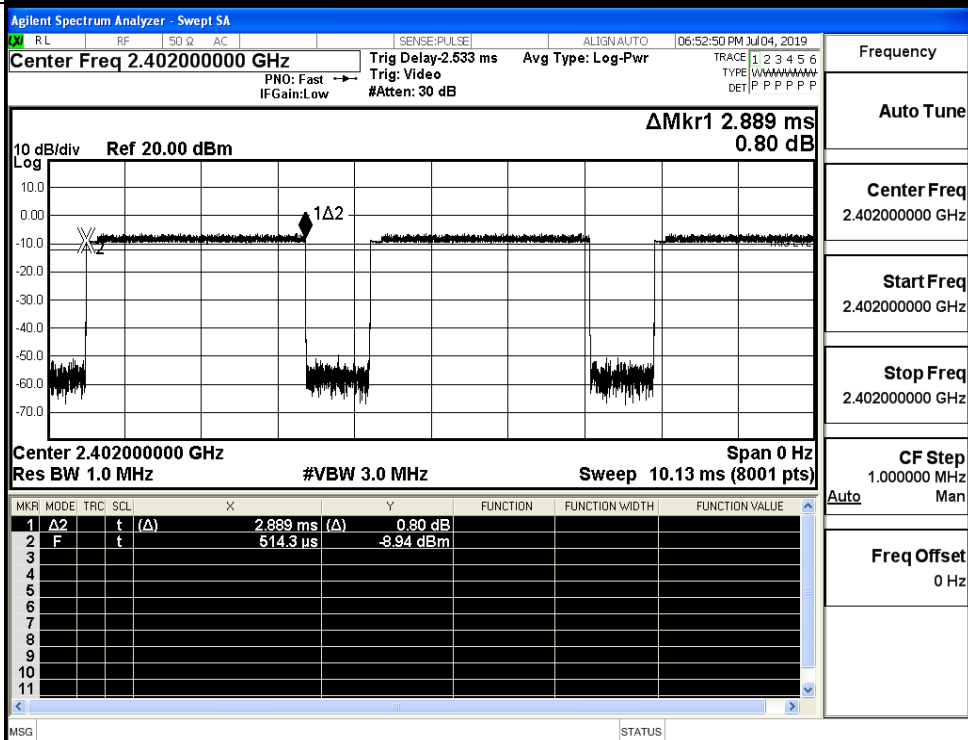
$\pi/4$ DQPSK
_2DH5/MCH



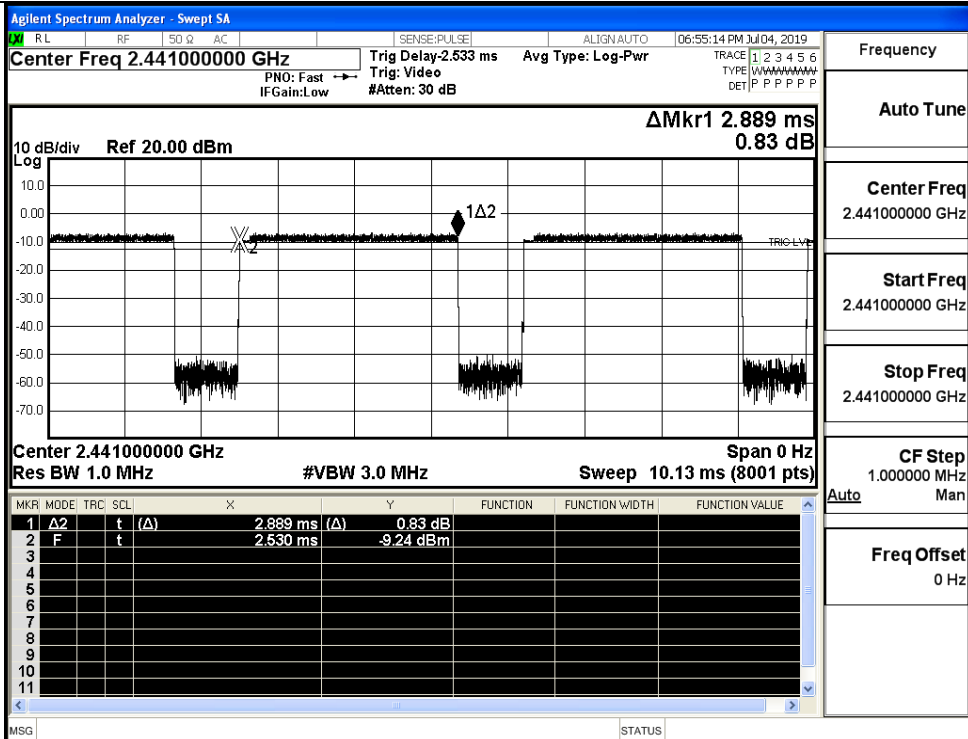
$\pi/4$ DQPSK
_2DH5/HCH



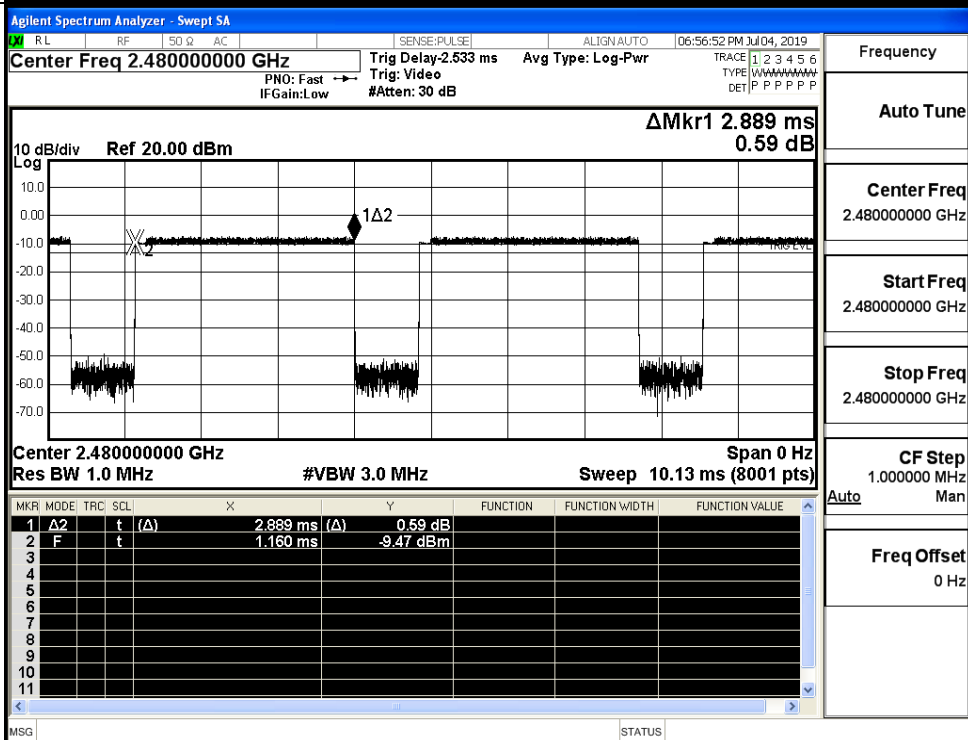
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



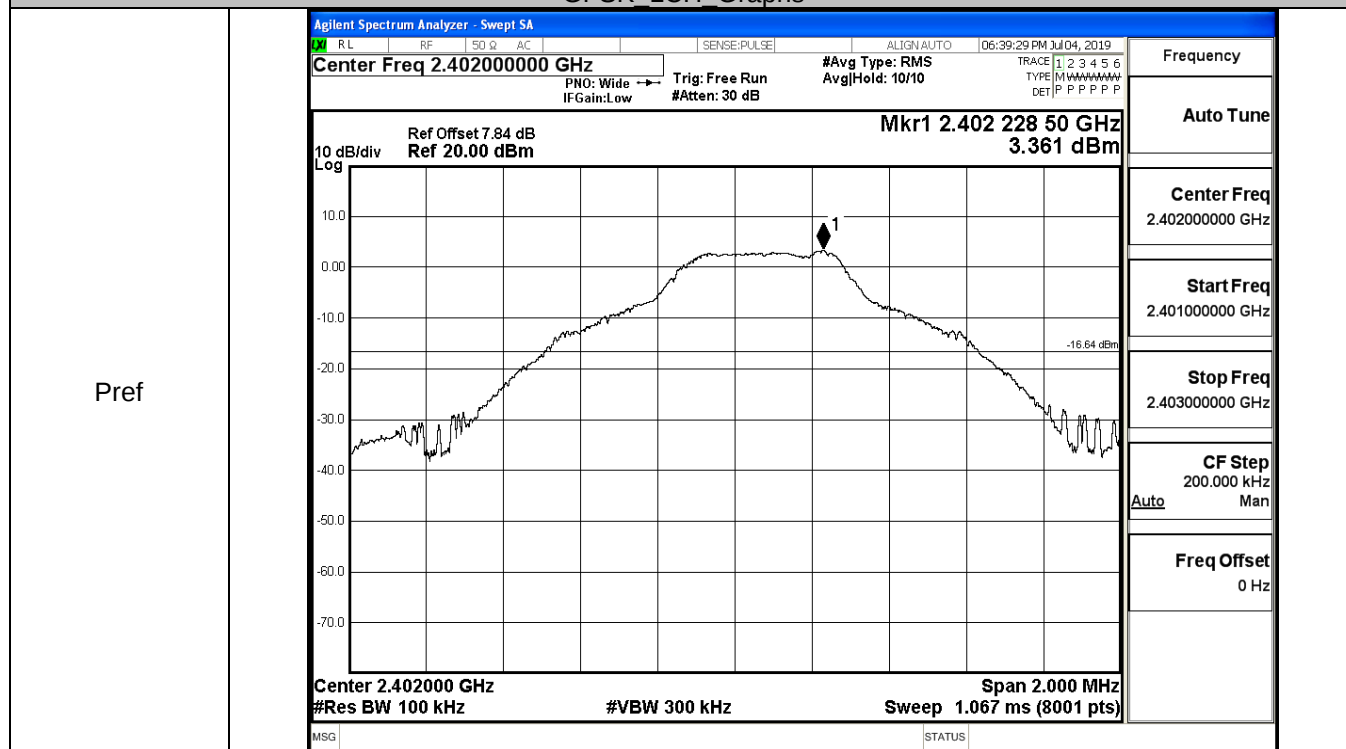
8DPSK_3DH5/HCH

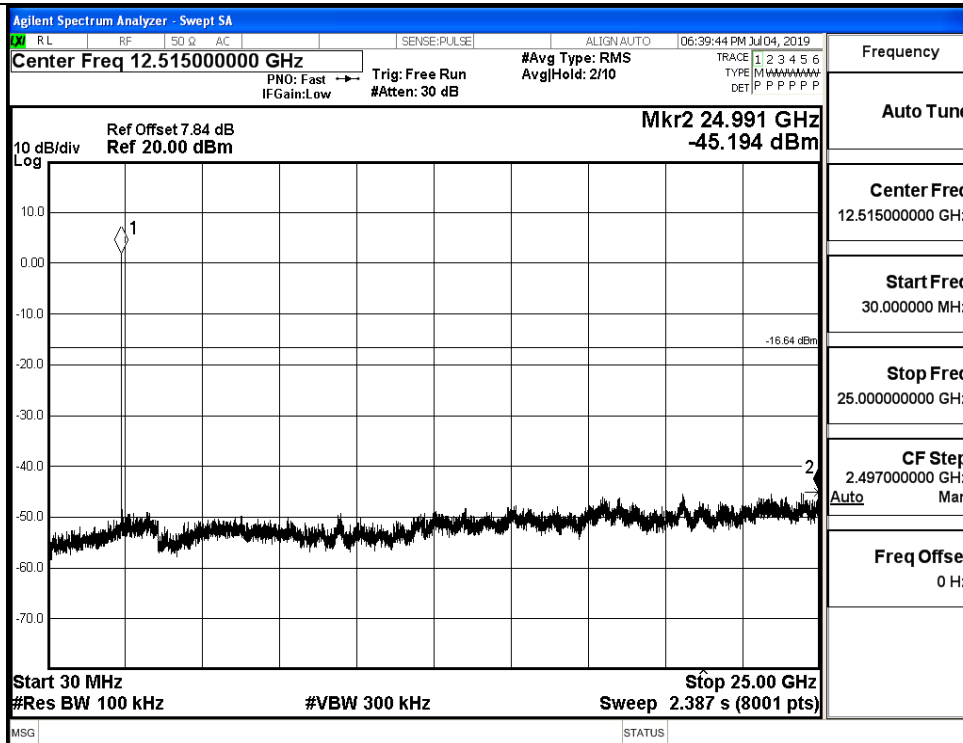


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.361	-45.194	-16.639	PASS
	MCH	2.721	-44.117	-17.279	PASS
	HCH	1.98	-44.008	-18.020	PASS
$\pi/4$ DQPSK	LCH	-1.251	-44.284	-21.251	PASS
	MCH	-1.601	-45.664	-21.601	PASS
	HCH	-1.911	-44.952	-21.911	PASS
8DPSK	LCH	-1.279	-44.686	-21.279	PASS
	MCH	-1.52	-44.076	-21.520	PASS
	HCH	-1.868	-44.311	-21.868	PASS

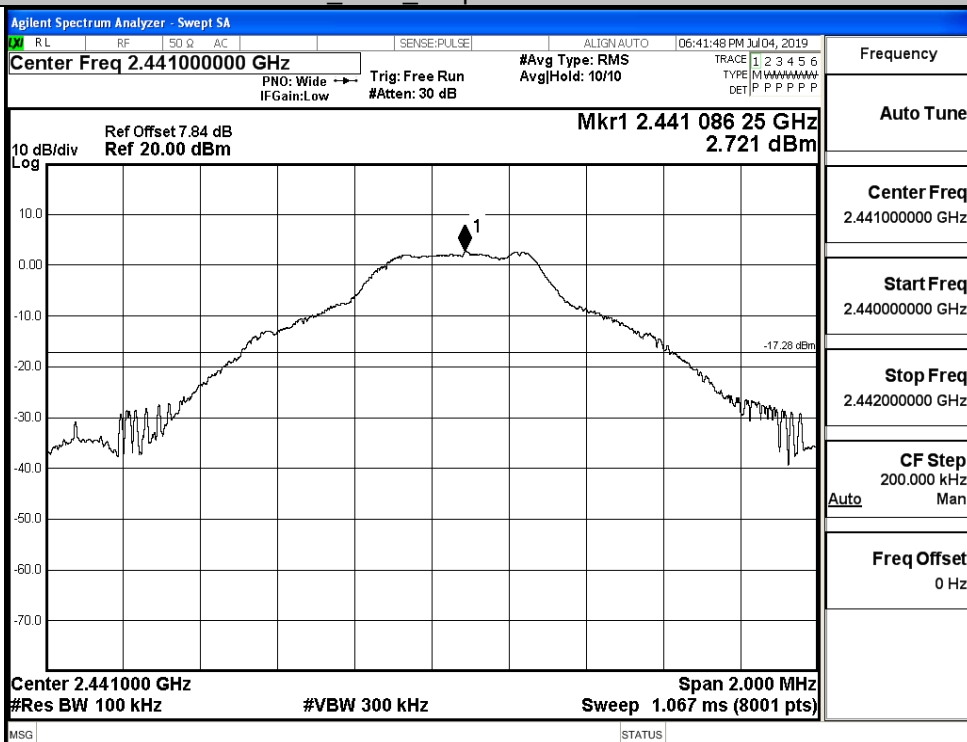
GFSK LCH Graphs



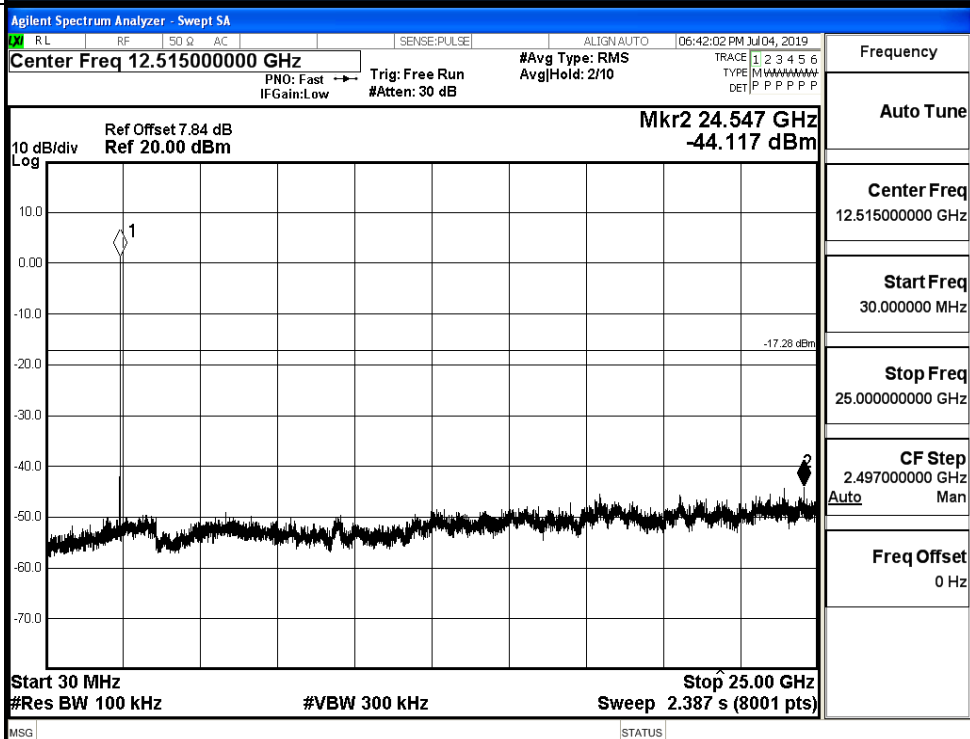


GFSK_MCH_Graphs

Pref

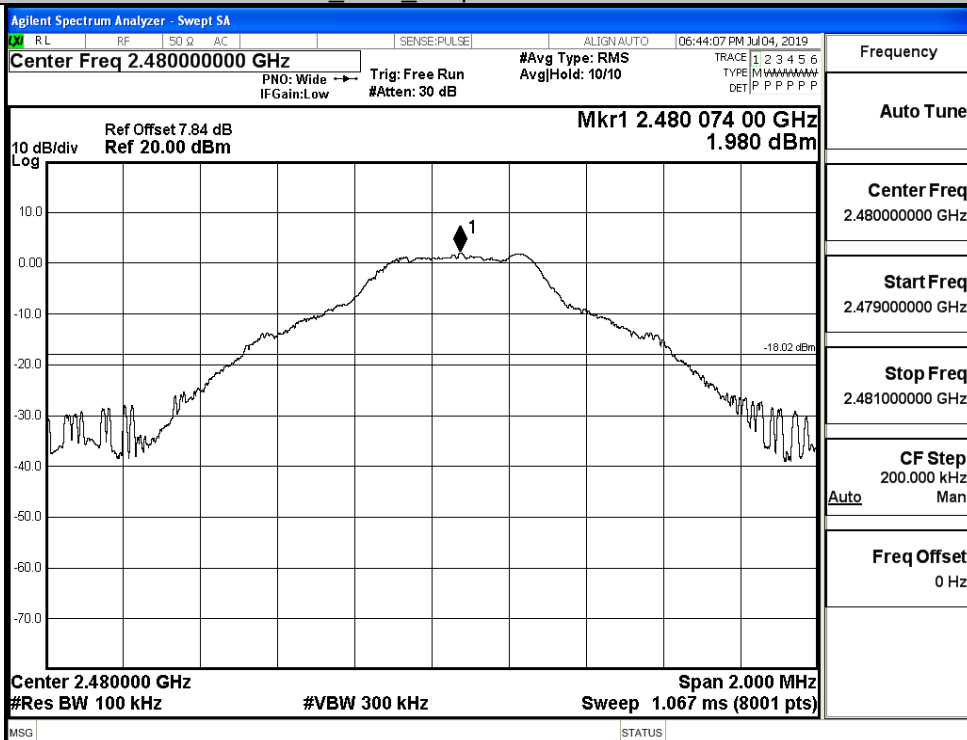


Puw

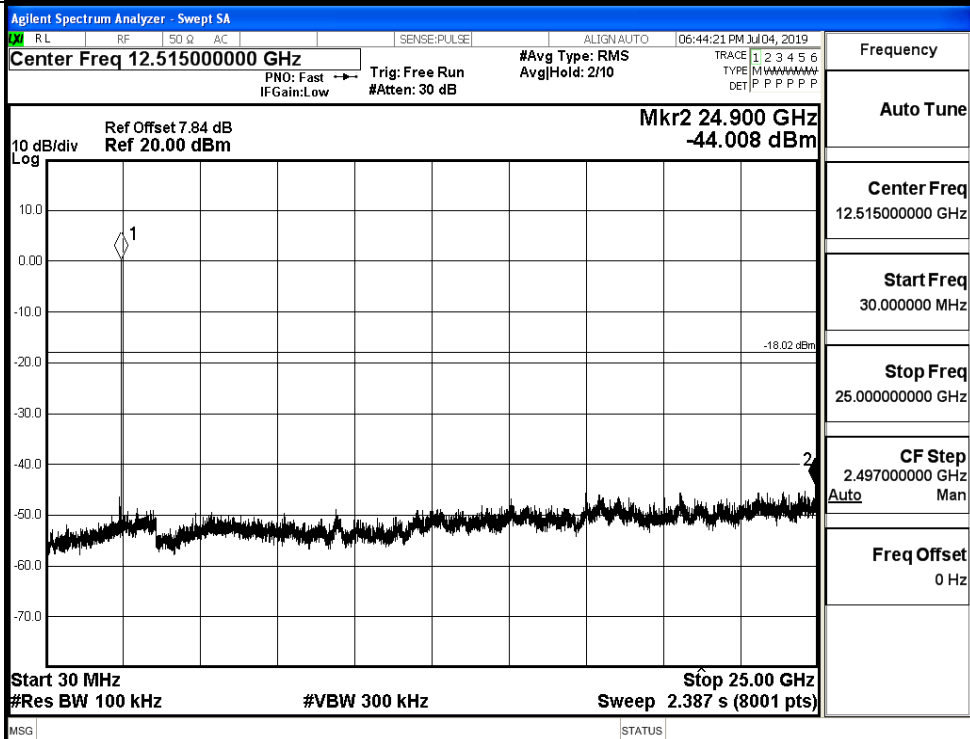


GFSK_HCH_Graphs

Pref

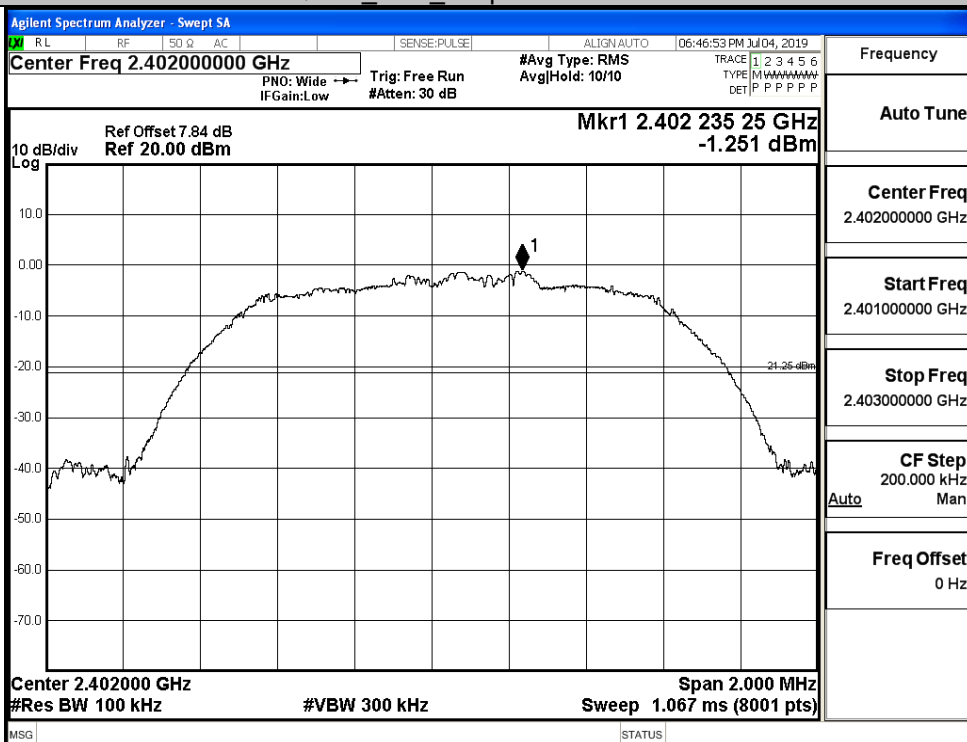


Puw

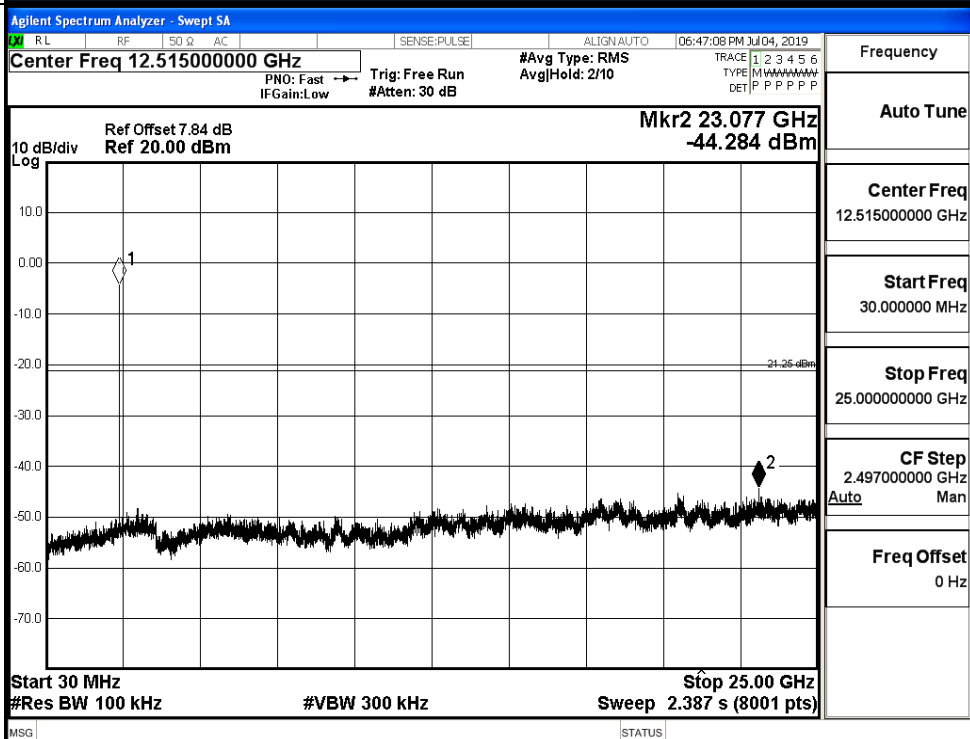


π /4DQPSK_LCH_Graphs

Pref

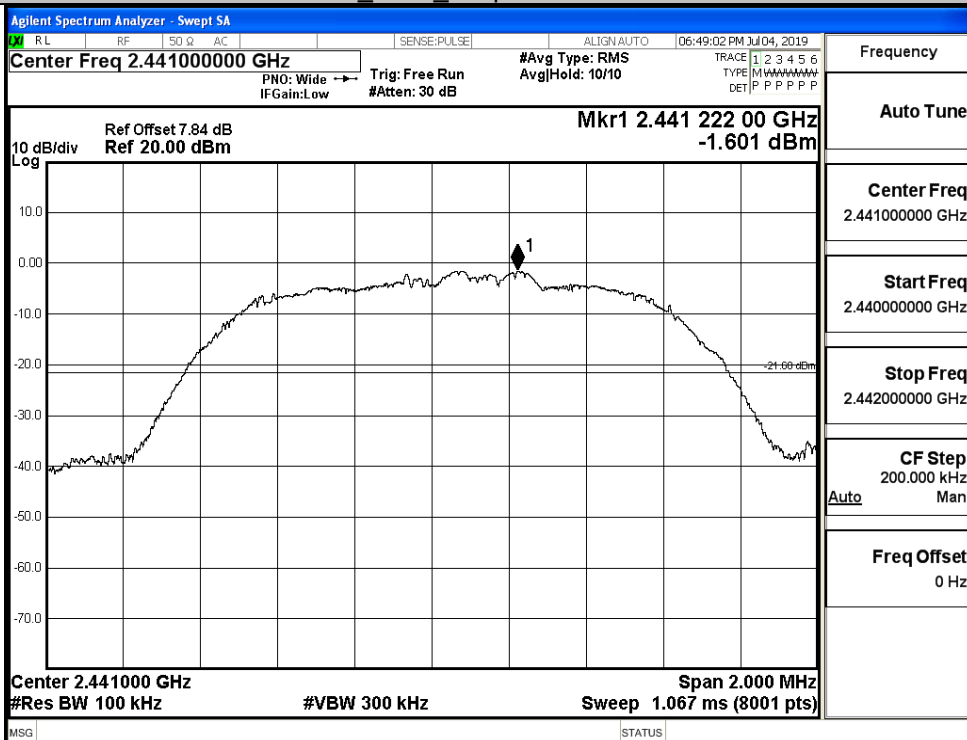


Puw

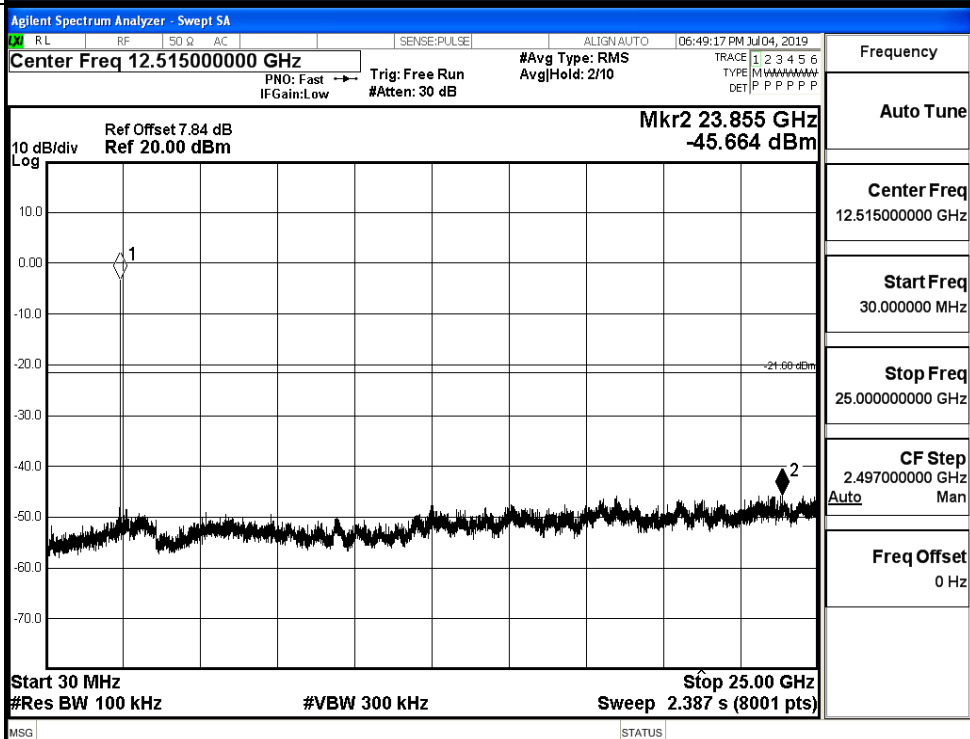


π /4DQPSK_MCH_Graphs

Pref

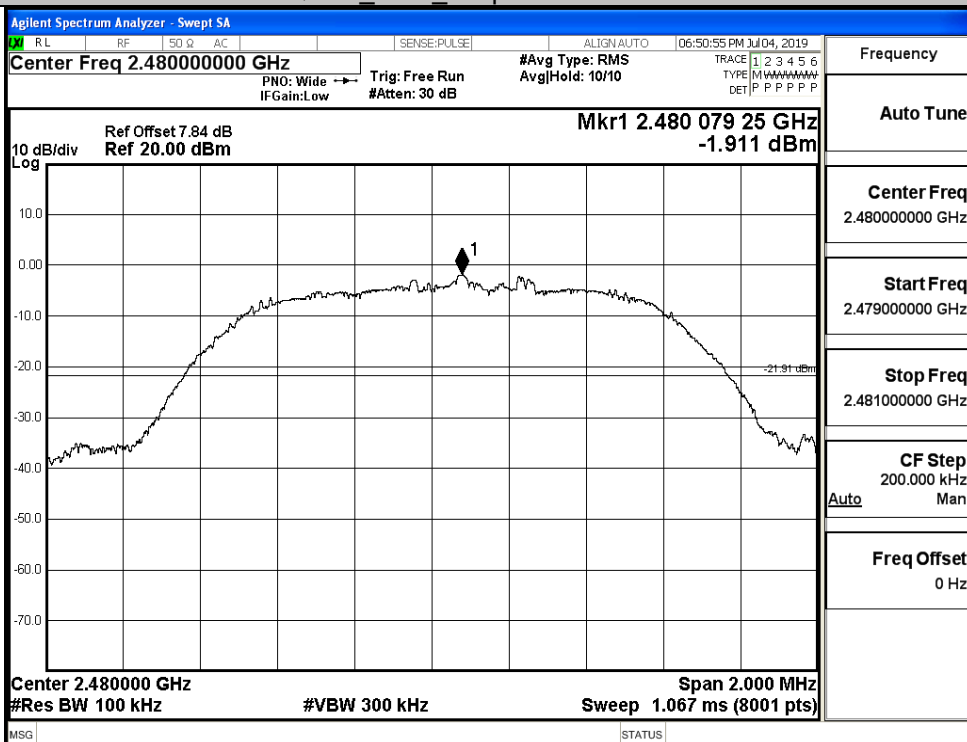


Puw

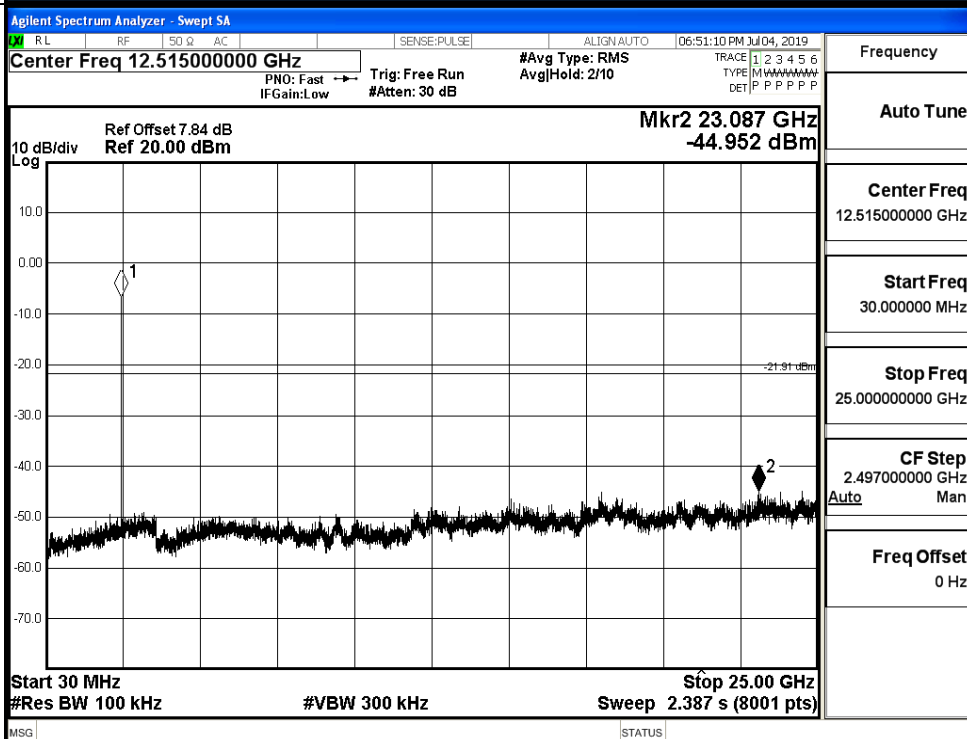


π /4DQPSK_HCH_Graphs

Pref

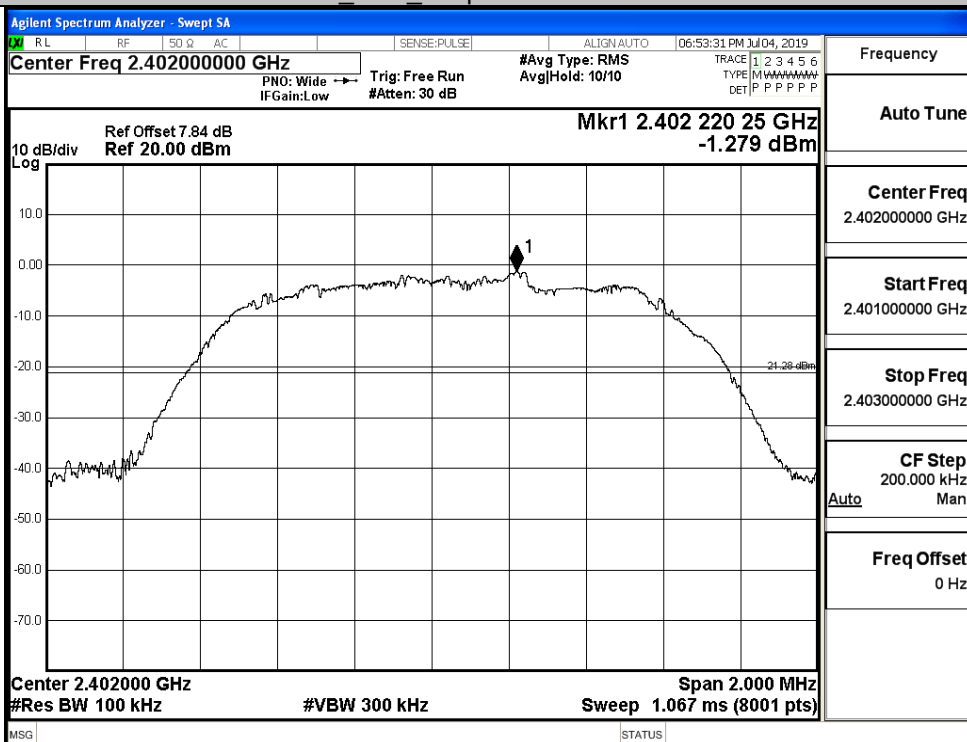


Puw

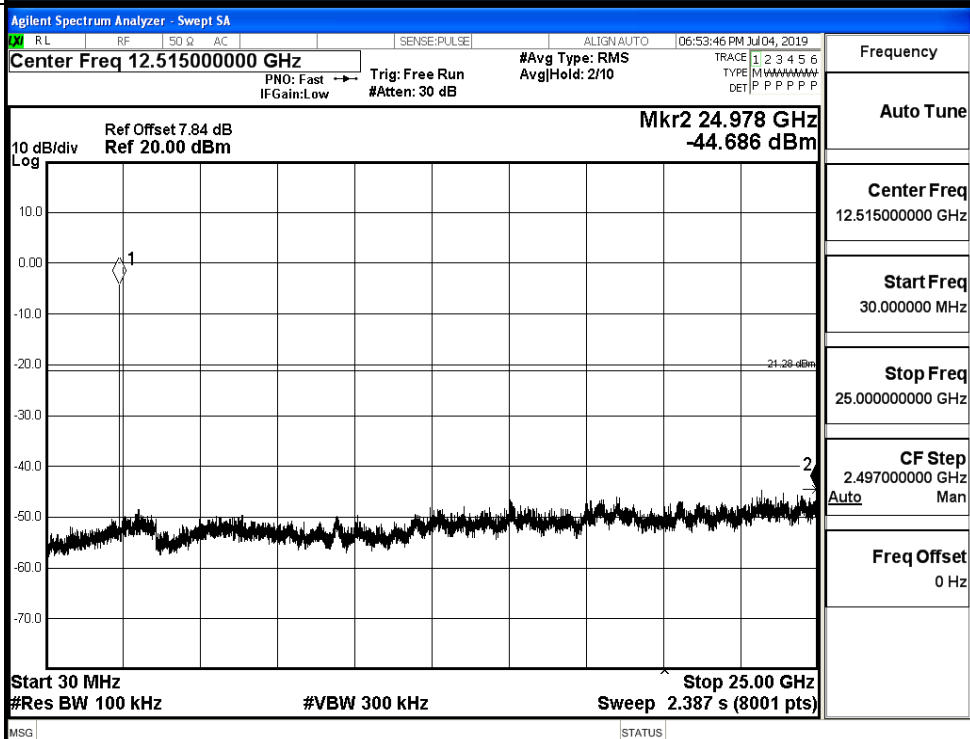


8DPSK_LCH_Graphs

Pref

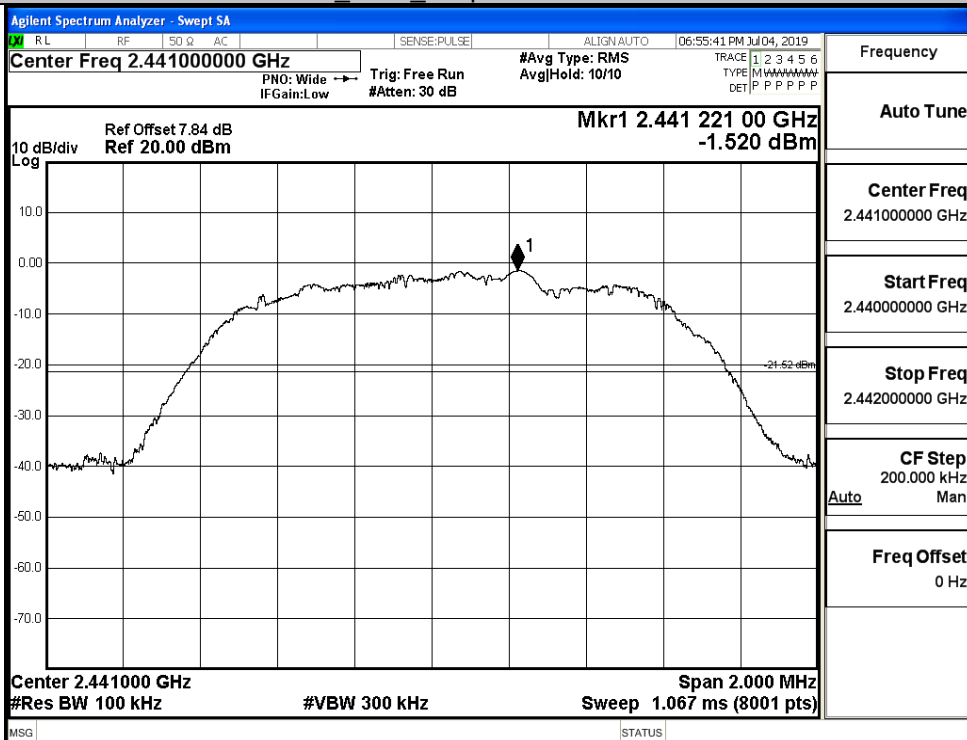


Puw

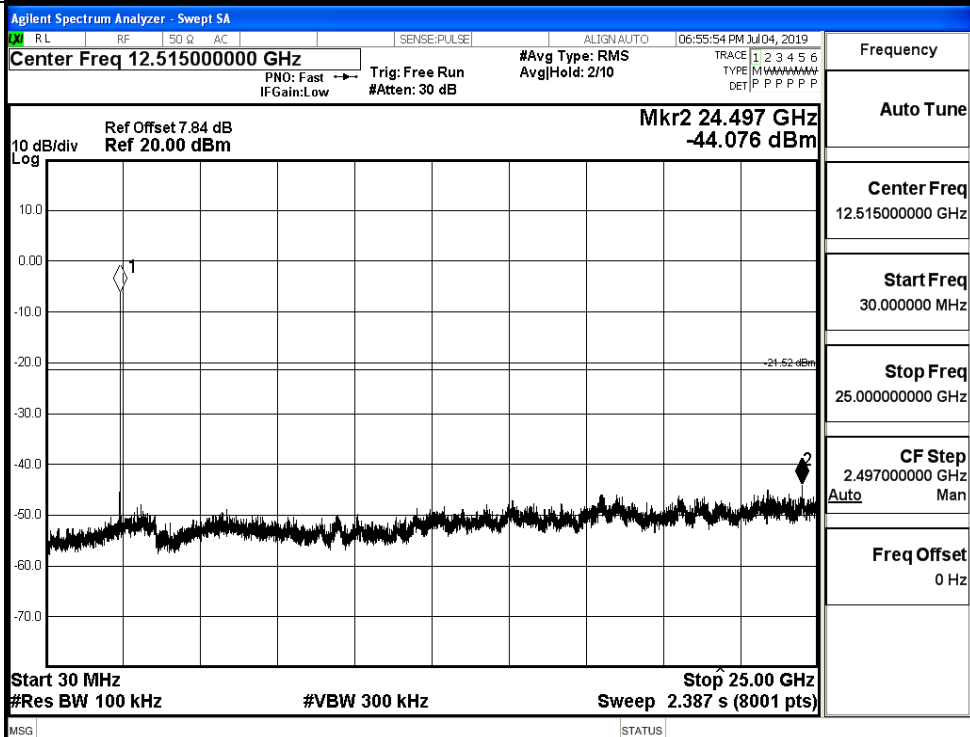


8DPSK_MCH_Graphs

Pref

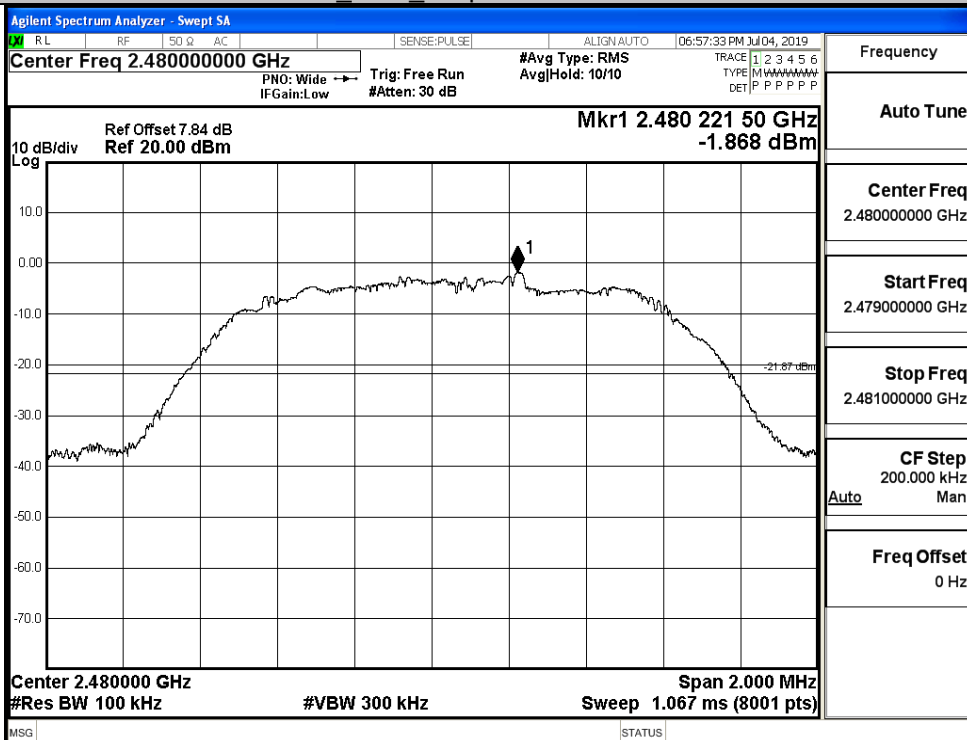


Puw

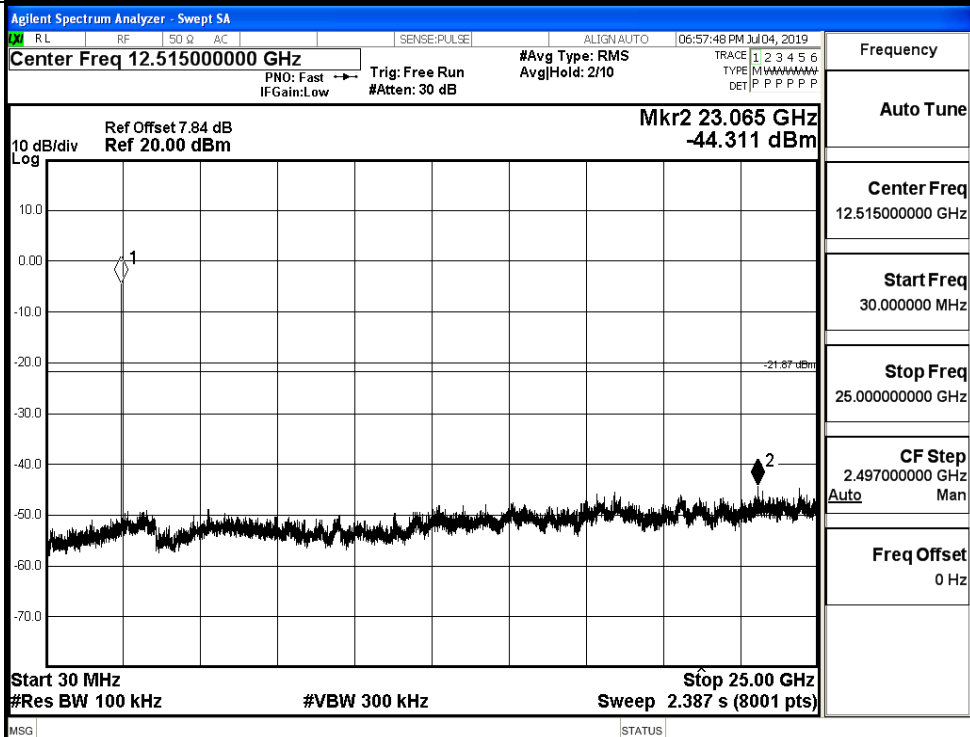


8DPSK_HCH_Graphs

Pref



Puw

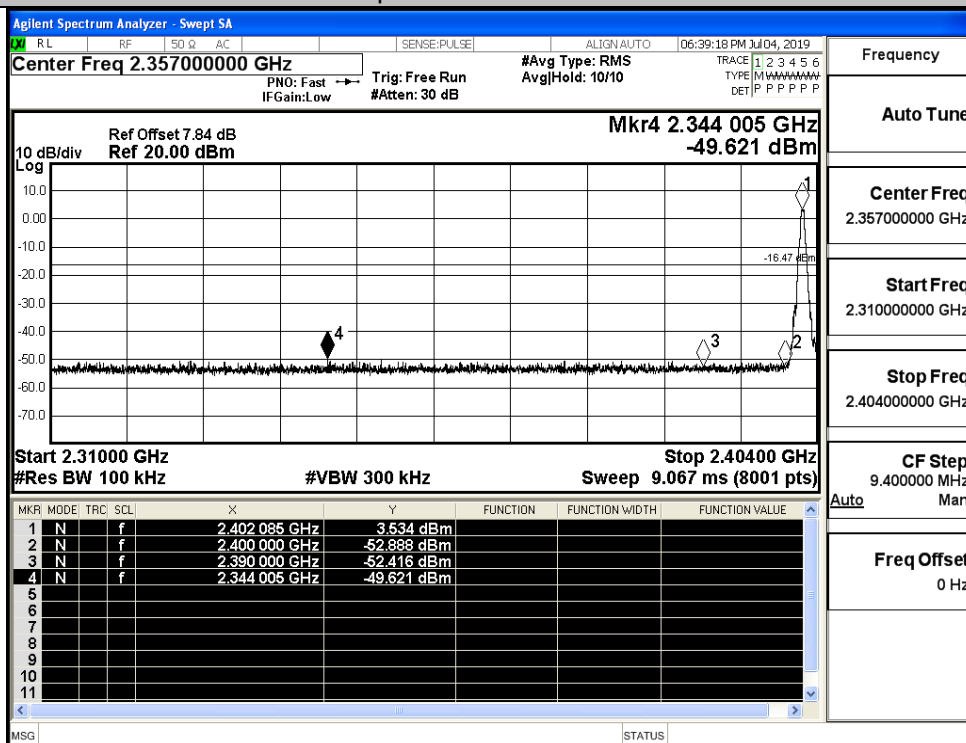


A.7 Band-edge for RF Conducted Emissions

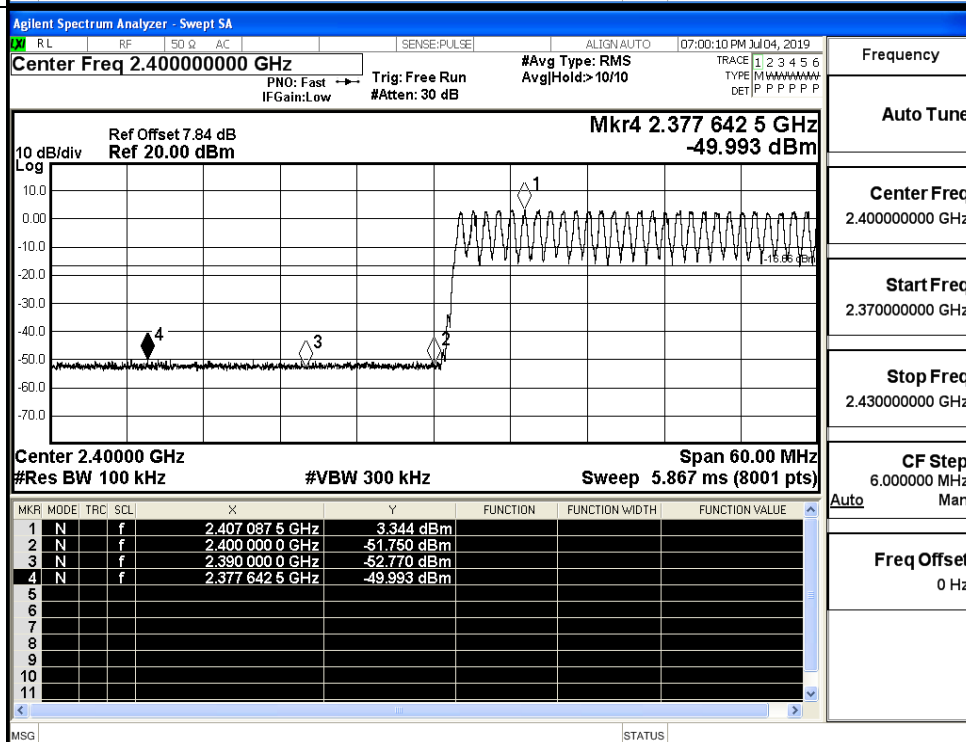
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.534	Off	-49.621	-16.47	PASS
			3.344	On	-49.993	-16.66	PASS
	HCH	2480	2.131	Off	-50.229	-17.87	PASS
			2.137	On	-49.693	-17.86	PASS
$\pi/4$ DQPSK	LCH	2402	-1.479	Off	-49.664	-21.48	PASS
			-1.238	On	-49.573	-21.24	PASS
	HCH	2480	-1.766	Off	-49.467	-21.77	PASS
			-2.086	On	-48.703	-22.09	PASS
8DPSK	LCH	2402	-1.119	Off	-50.251	-21.12	PASS
			-1.214	On	-49.519	-21.21	PASS
	HCH	2480	-1.823	Off	-49.709	-21.82	PASS
			-1.967	On	-49.490	-21.97	PASS

Test Graphs

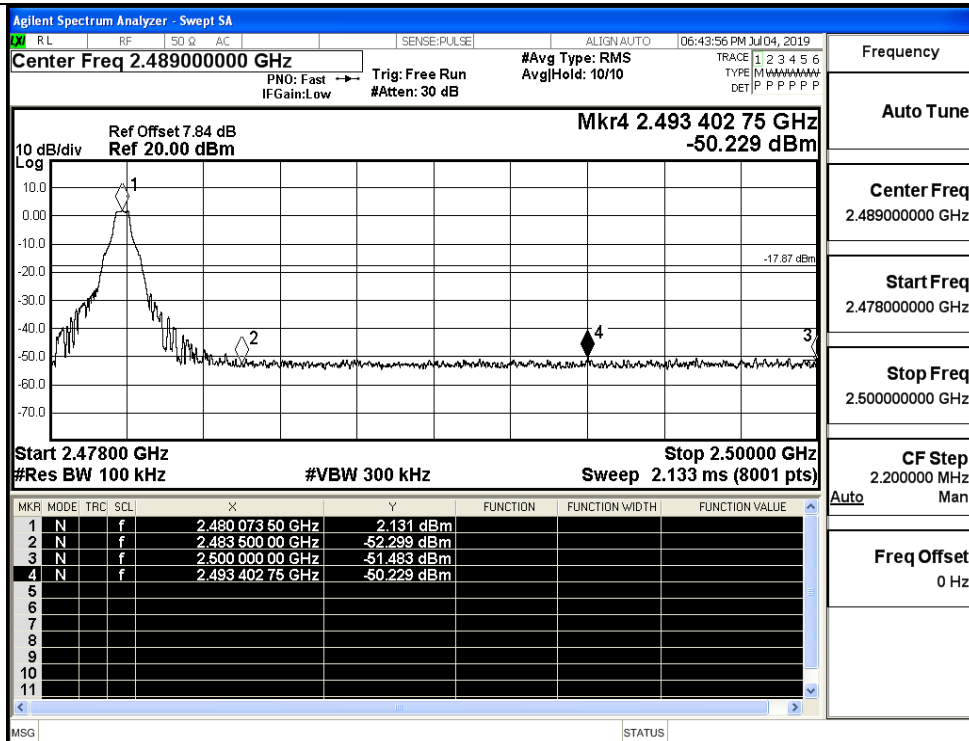
GFSK/LCH/No Hop



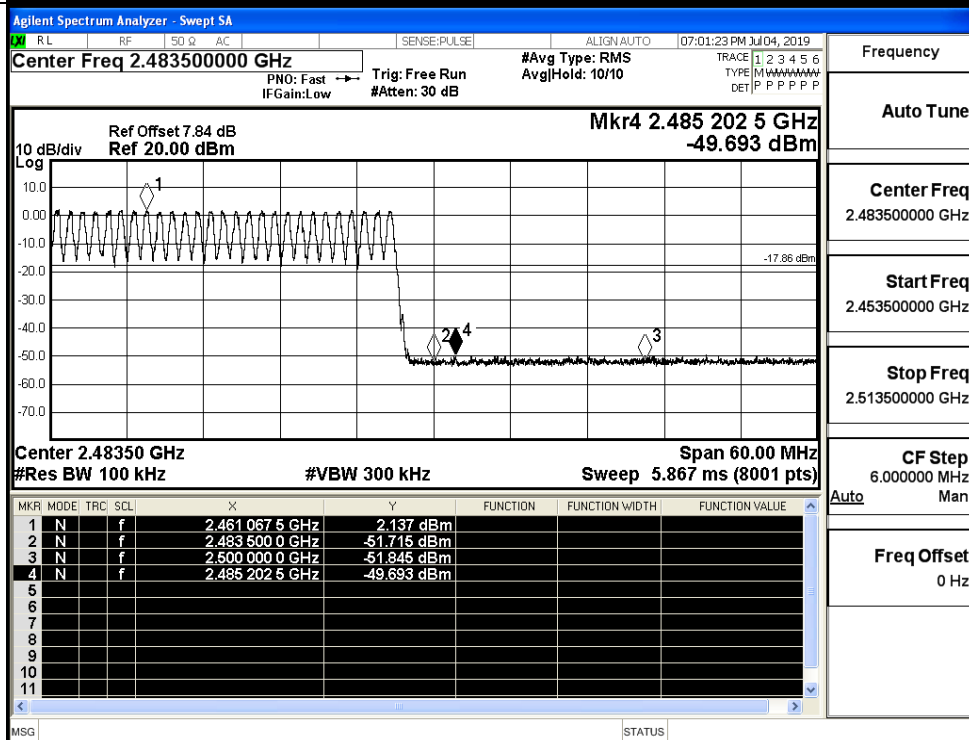
GFSK/LCH/Hop



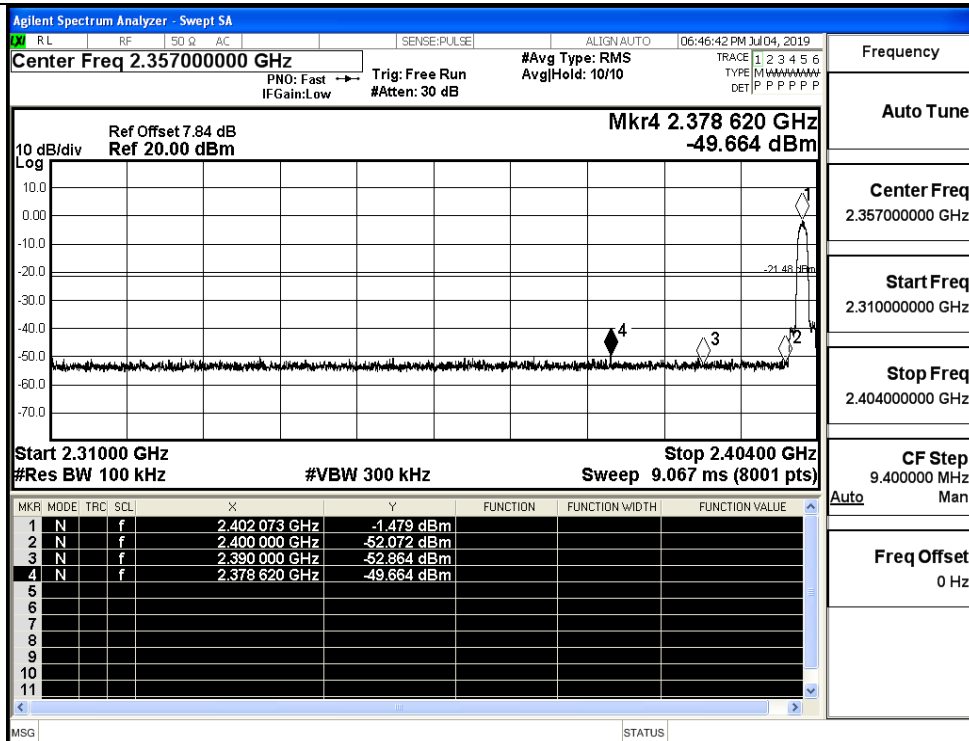
GFSK/HCH/No Hop



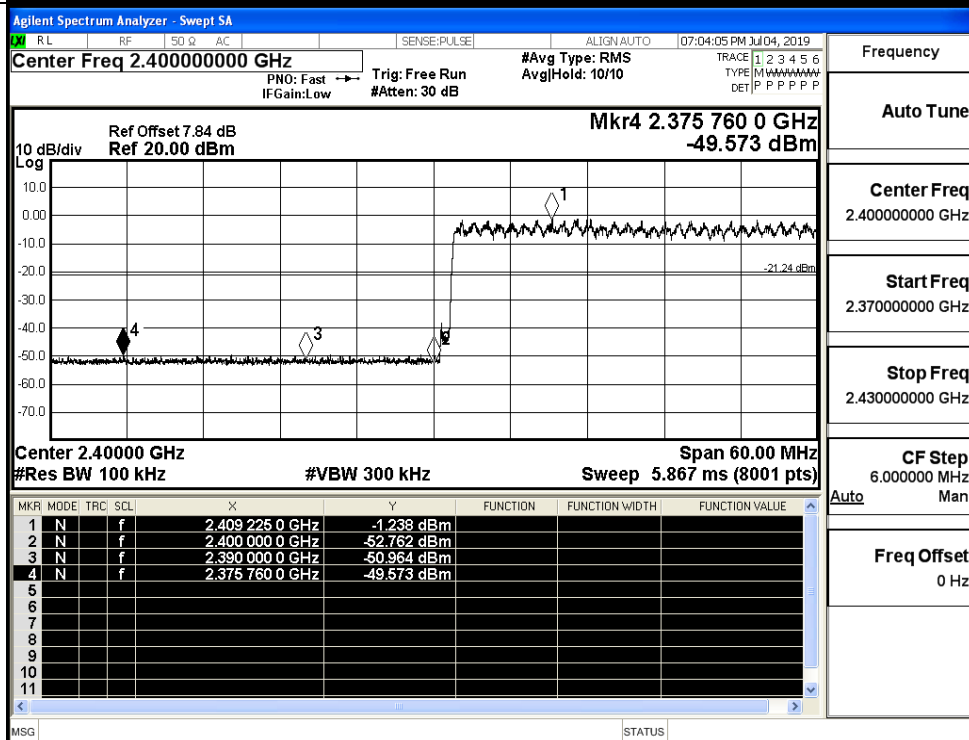
GFSK/HCH/Hop



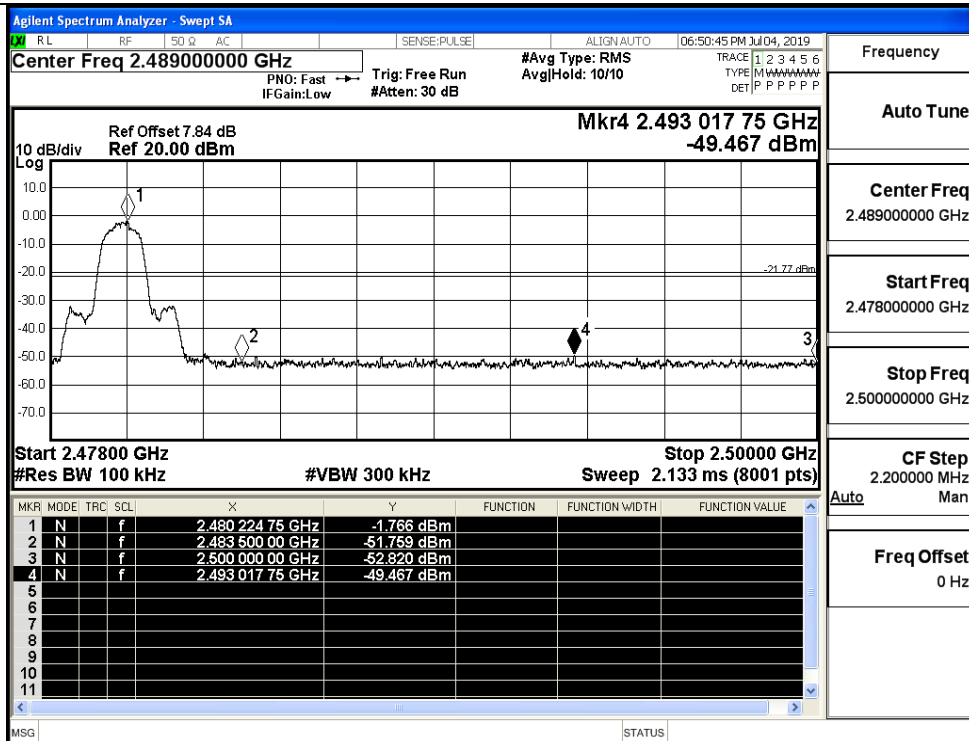
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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

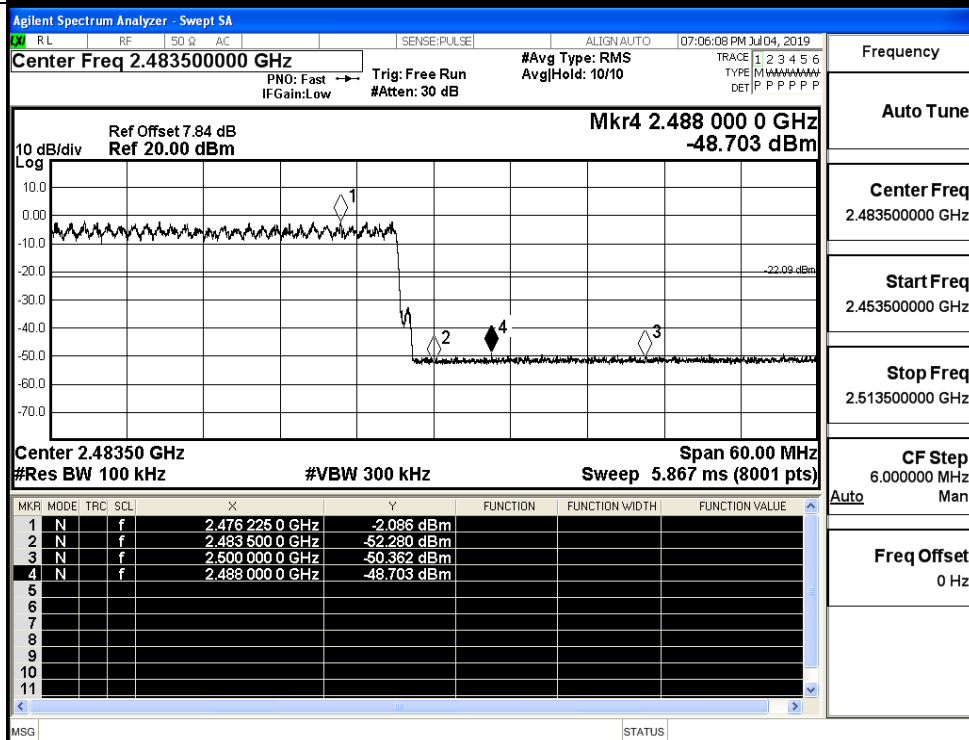


Frequency

Auto Tune

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

$\pi/4$ DQPSK/HCH/Hop

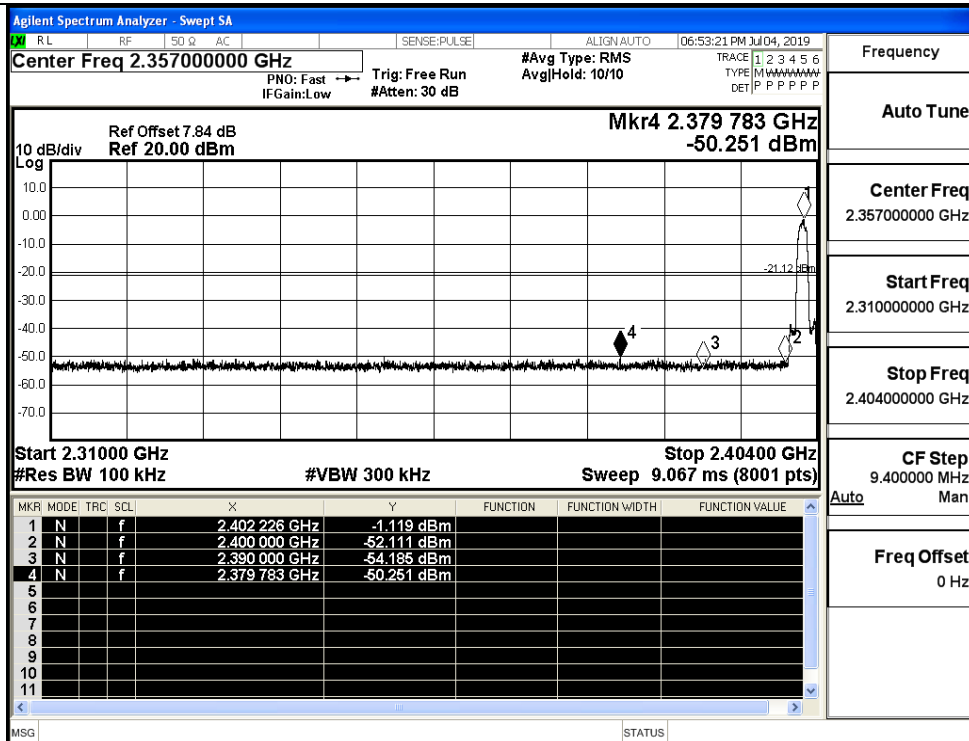


Frequency

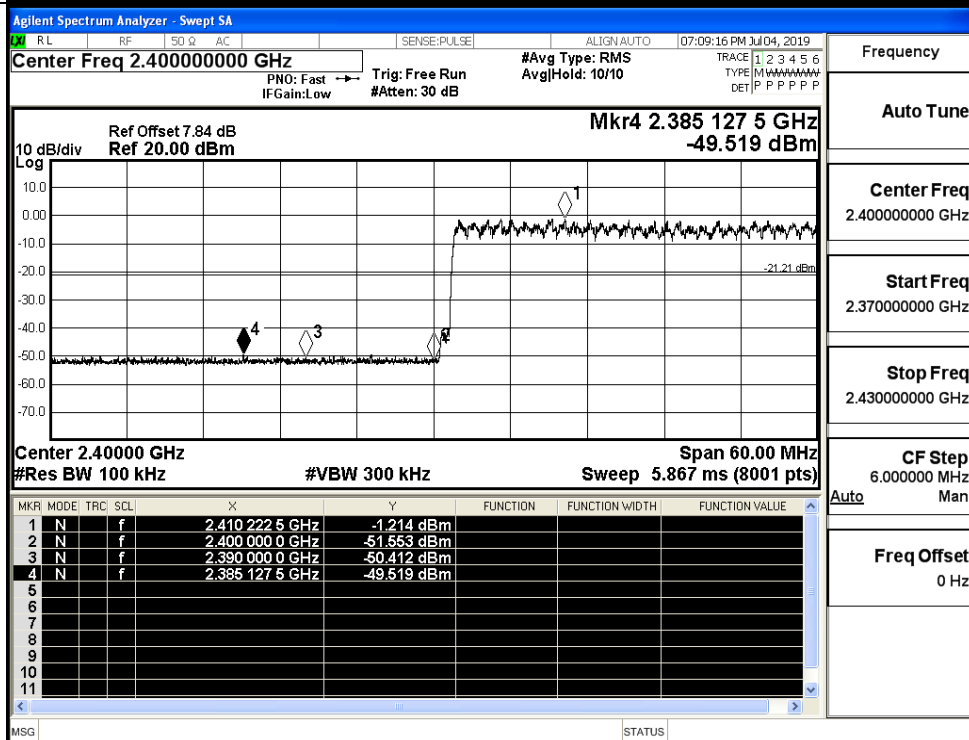
Auto Tune

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

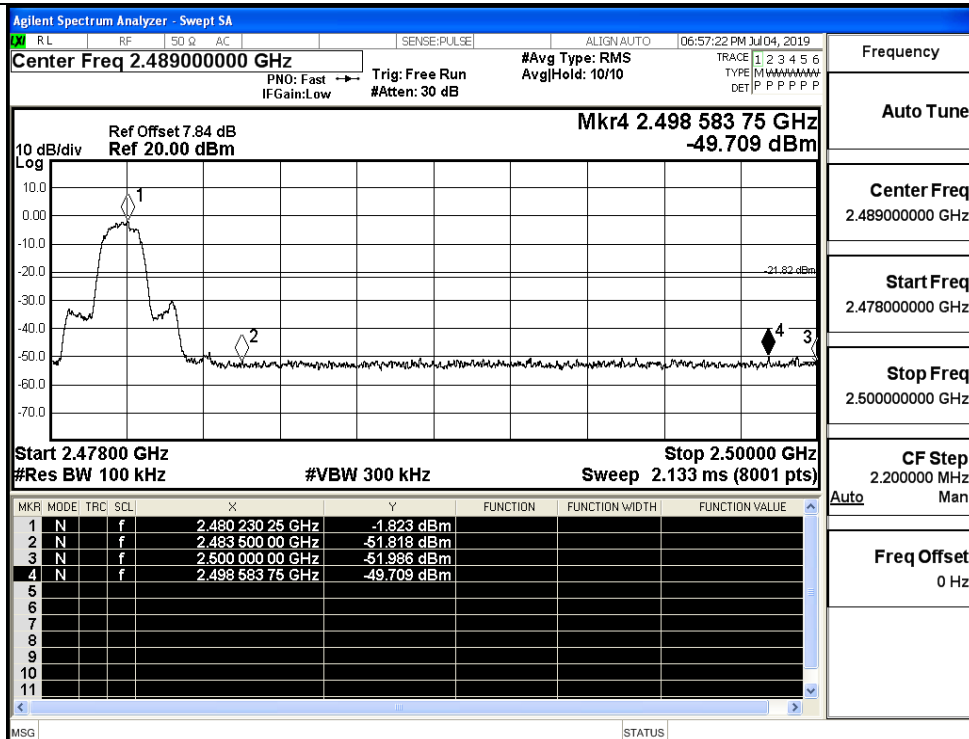
8DPSK/LCH/No Hop



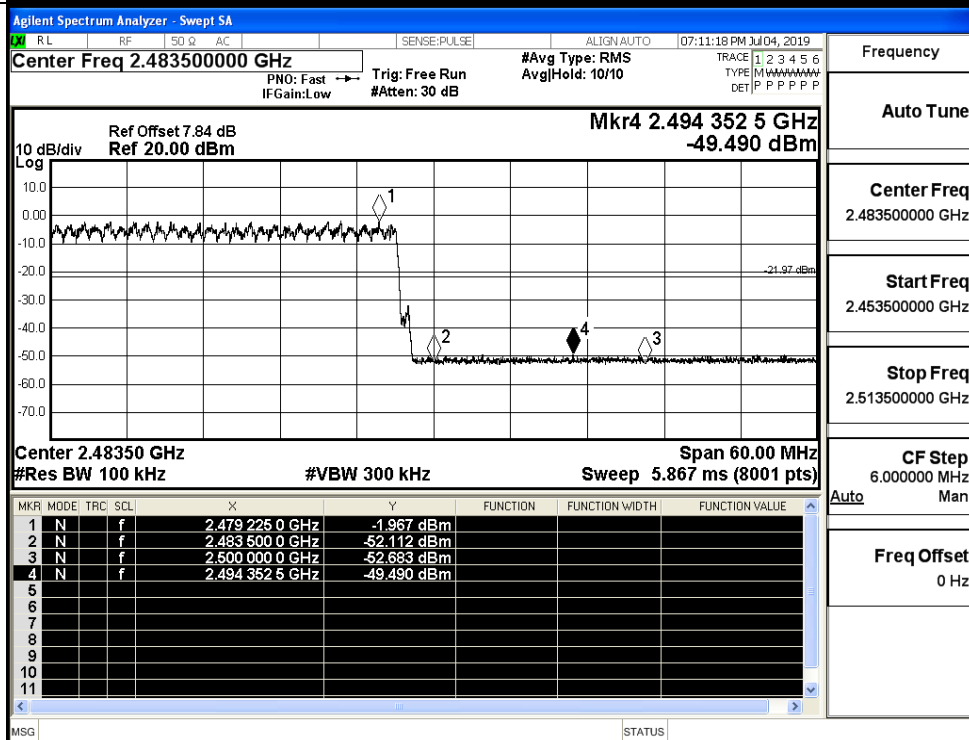
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



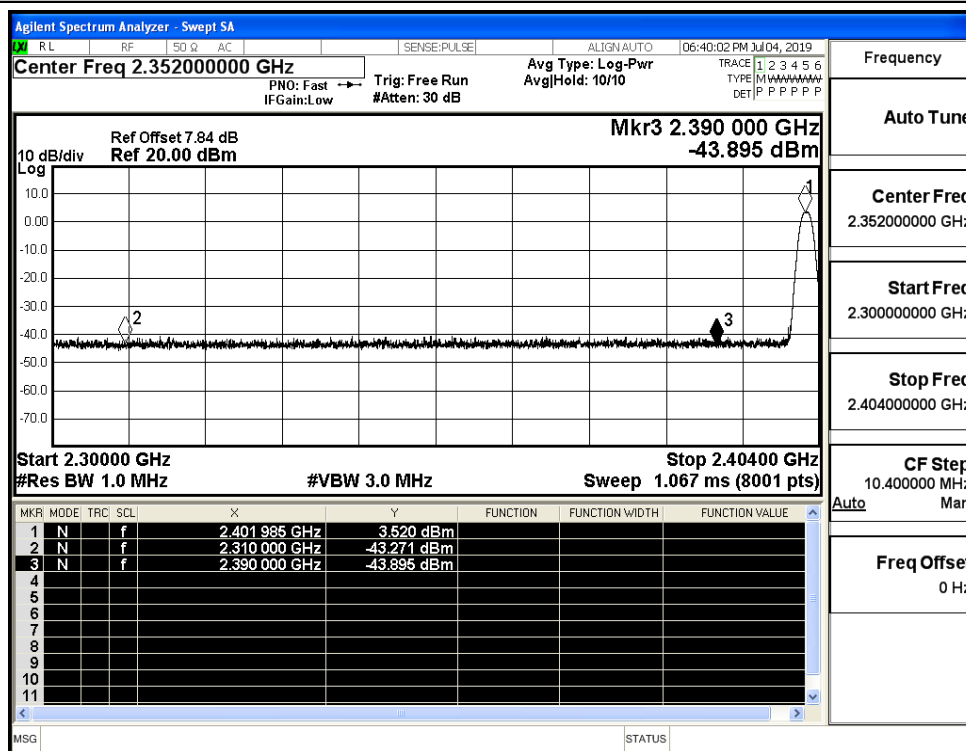
8DPSK/HCH/Hop



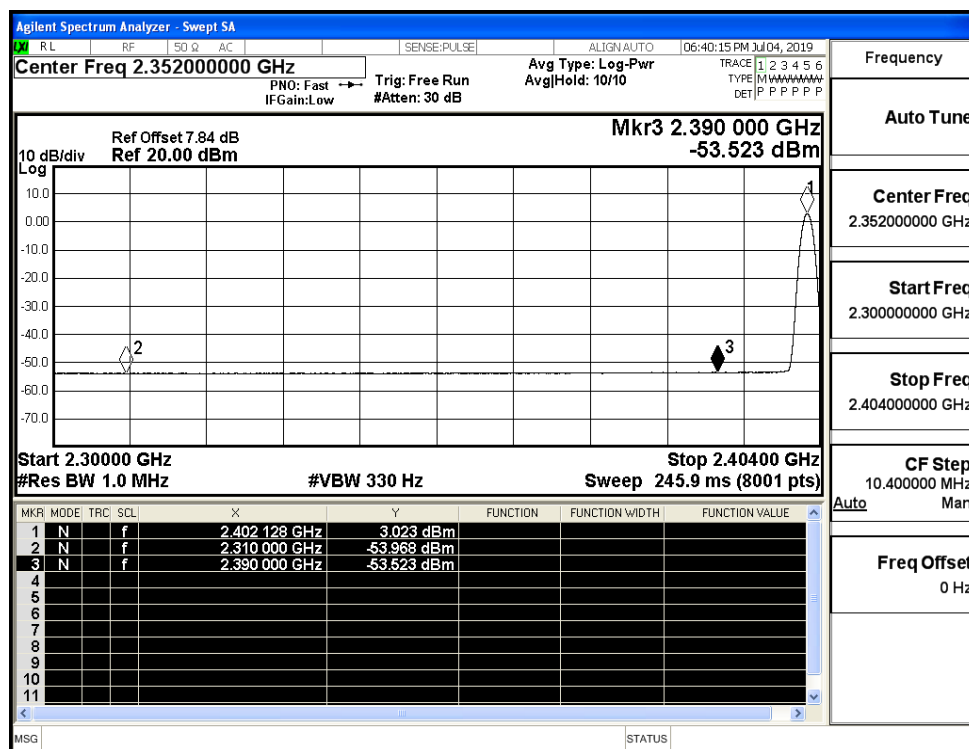
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.27	2.0	0	53.99	PEAK	74	PASS
	Off	2310.0	-53.97	2.0	0	43.29	AV	54	PASS
	Off	2390.0	-43.90	2.0	0	53.36	PEAK	74	PASS
	Off	2390.0	-53.52	2.0	0	43.73	AV	54	PASS
	Off	2483.5	-42.62	2.0	0	54.64	PEAK	74	PASS
	Off	2483.5	-53.15	2.0	0	44.11	AV	54	PASS
	Off	2500.0	-42.14	2.0	0	55.12	PEAK	74	PASS
	Off	2500.0	-53.21	2.0	0	44.05	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.50	2.0	0	53.76	PEAK	74	PASS
	Off	2310.0	-53.83	2.0	0	43.43	AV	54	PASS
	Off	2390.0	-44.10	2.0	0	53.15	PEAK	74	PASS
	Off	2390.0	-53.63	2.0	0	43.63	AV	54	PASS
	Off	2483.5	-42.32	2.0	0	54.94	PEAK	74	PASS
	Off	2483.5	-53.16	2.0	0	44.10	AV	54	PASS
	Off	2500.0	-43.39	2.0	0	53.87	PEAK	74	PASS
	Off	2500.0	-53.21	2.0	0	44.05	AV	54	PASS
8DPSK	Off	2310.0	-44.02	2.0	0	53.24	PEAK	74	PASS
	Off	2310.0	-53.86	2.0	0	43.40	AV	54	PASS
	Off	2390.0	-42.67	2.0	0	54.59	PEAK	74	PASS
	Off	2390.0	-53.59	2.0	0	43.66	AV	54	PASS
	Off	2483.5	-41.78	2.0	0	55.48	PEAK	74	PASS
	Off	2483.5	-53.26	2.0	0	43.99	AV	54	PASS
	Off	2500.0	-43.50	2.0	0	53.75	PEAK	74	PASS
	Off	2500.0	-53.21	2.0	0	44.04	AV	54	PASS

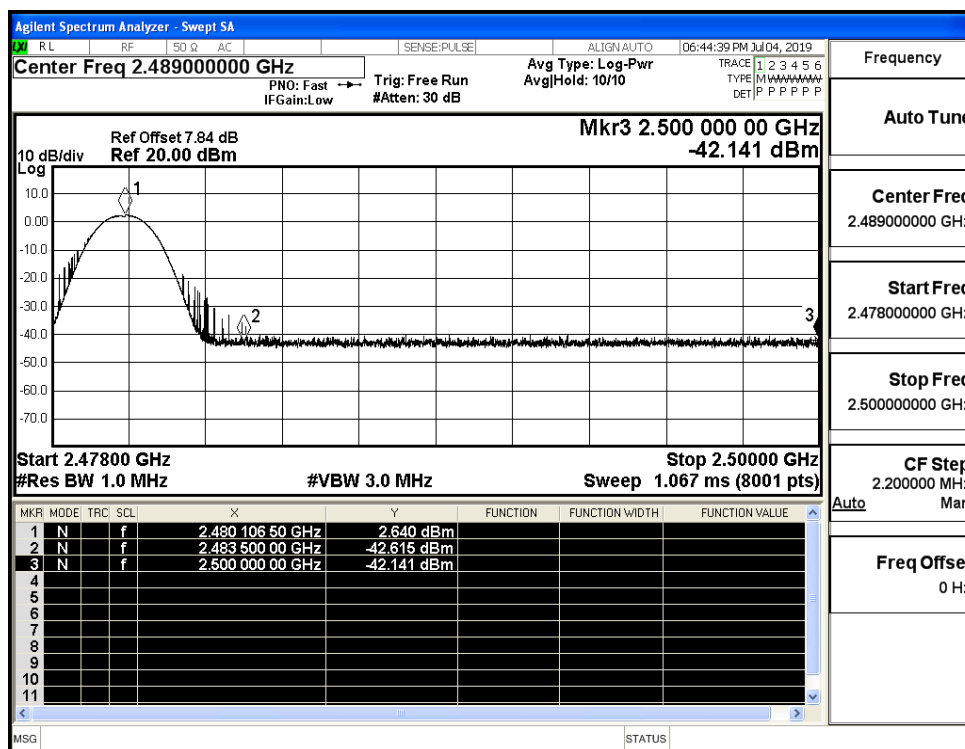
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



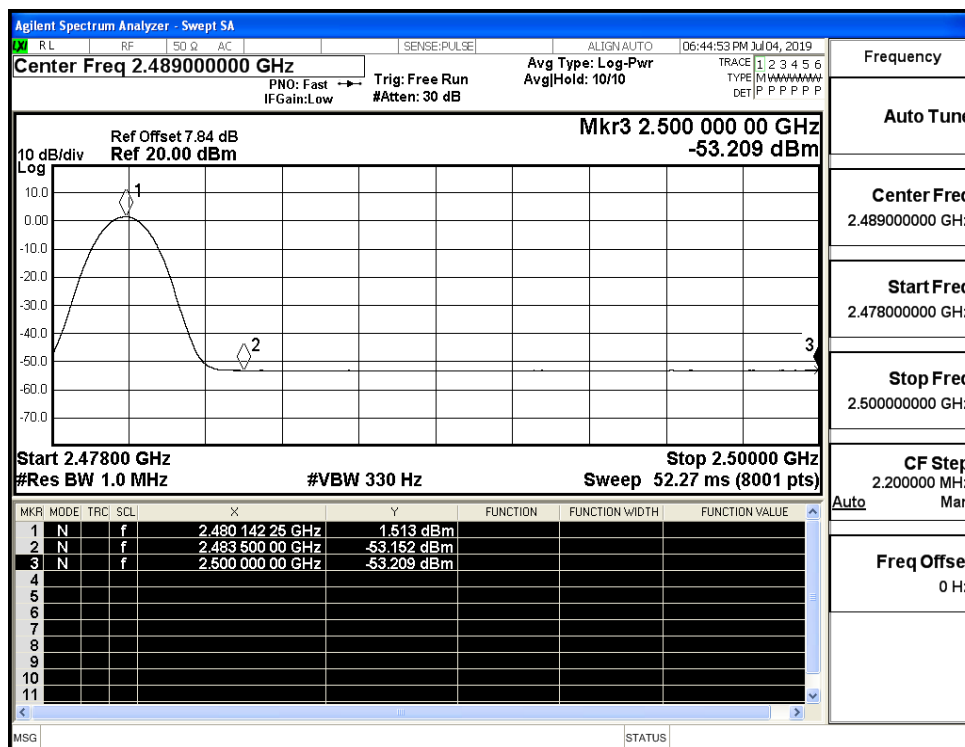
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

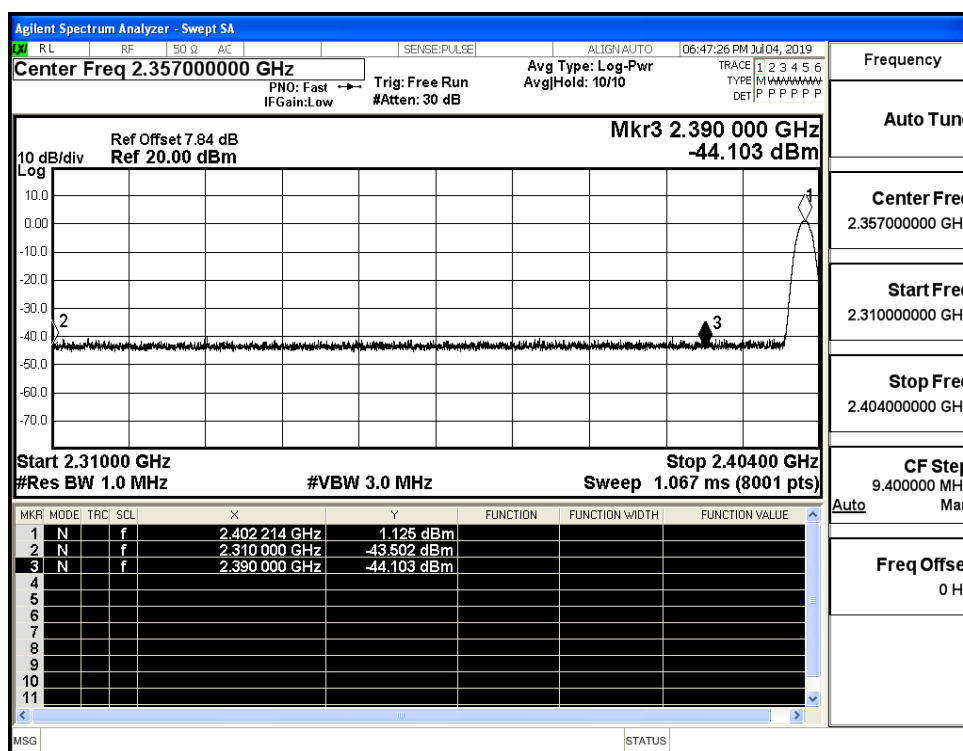
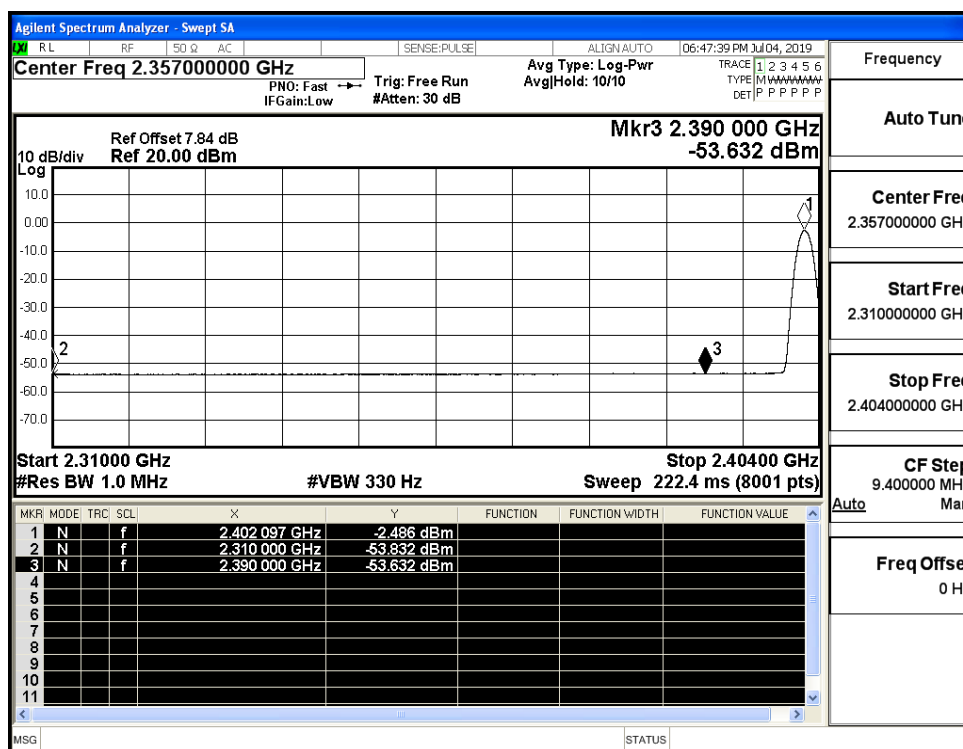


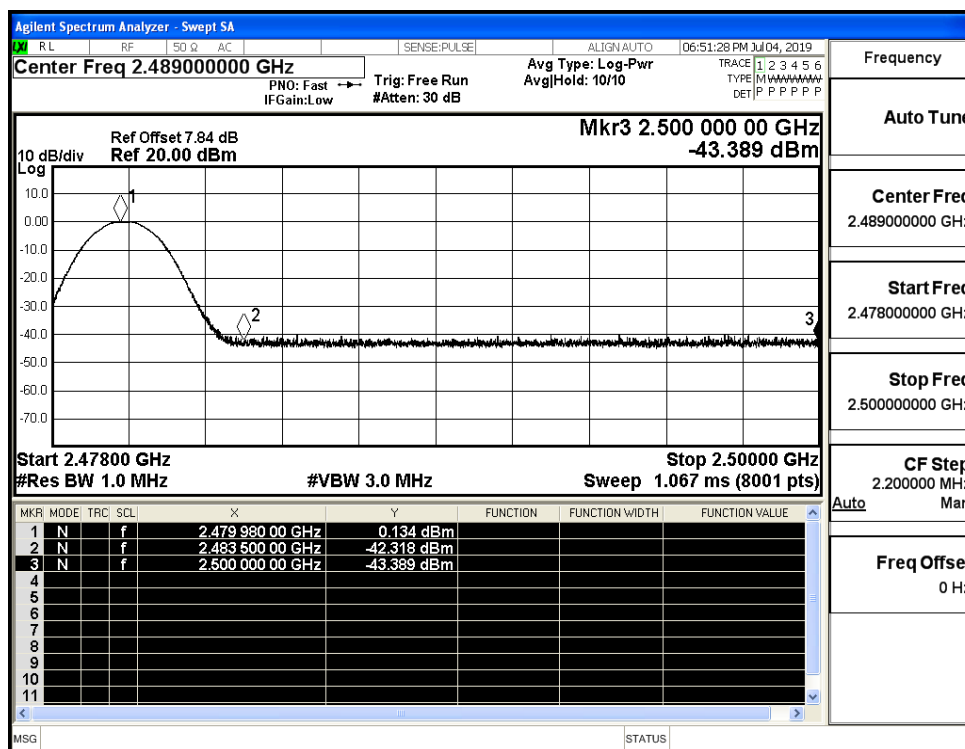
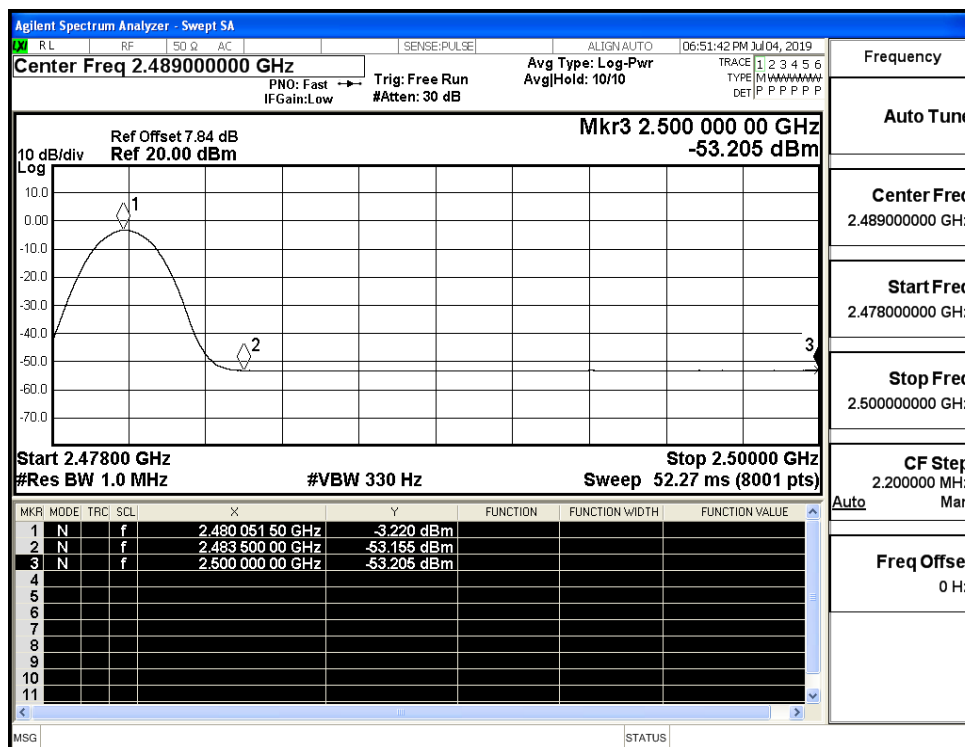
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



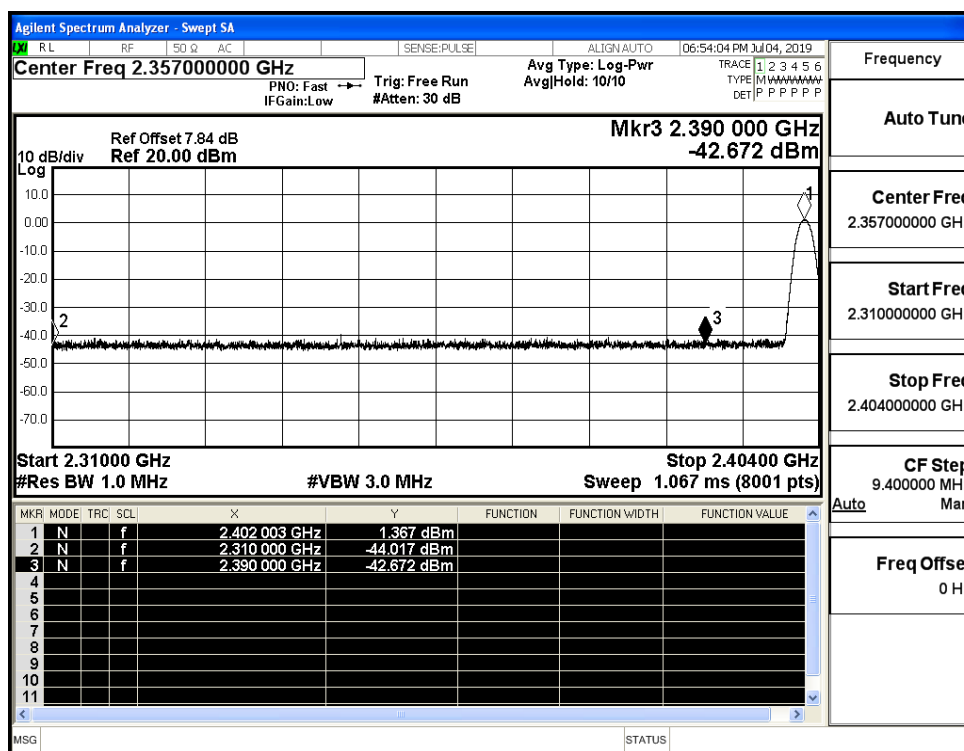
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



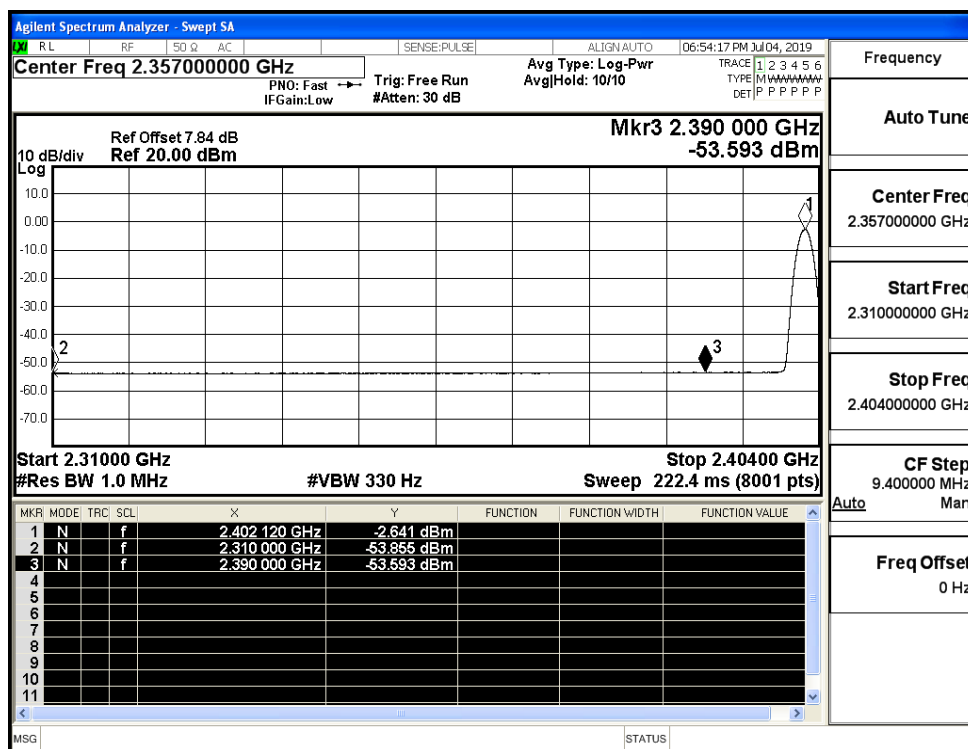
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

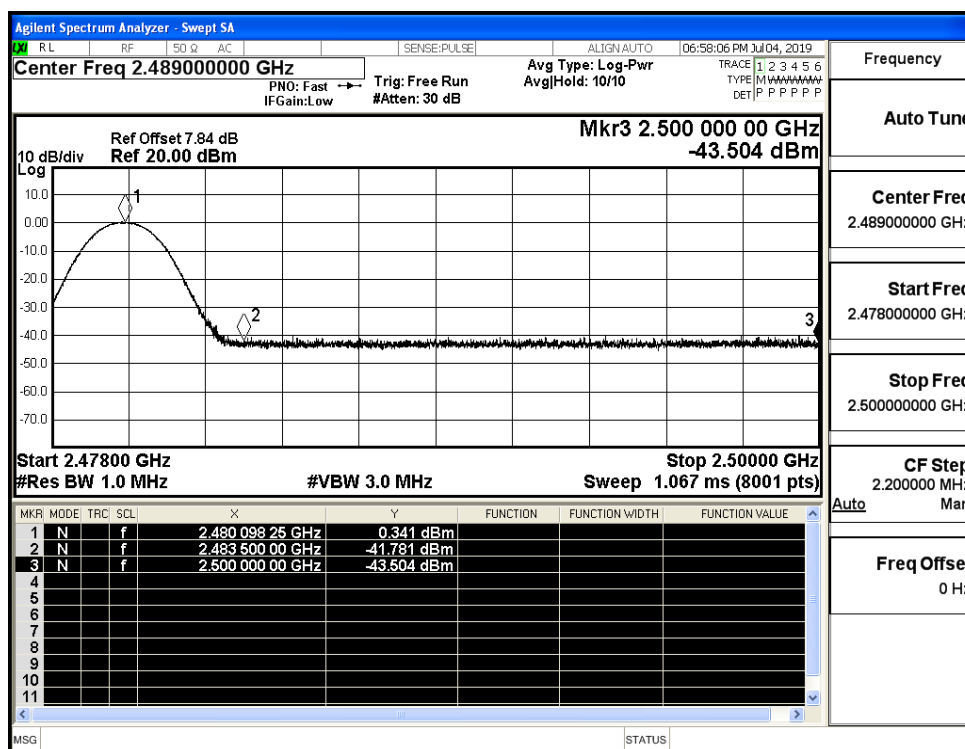
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

