

Appendix A

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

Product Name: Kai Bluetooth® Earbuds

Trade Mark: Gemline

Test Model: 100253-001B

Environmental Conditions

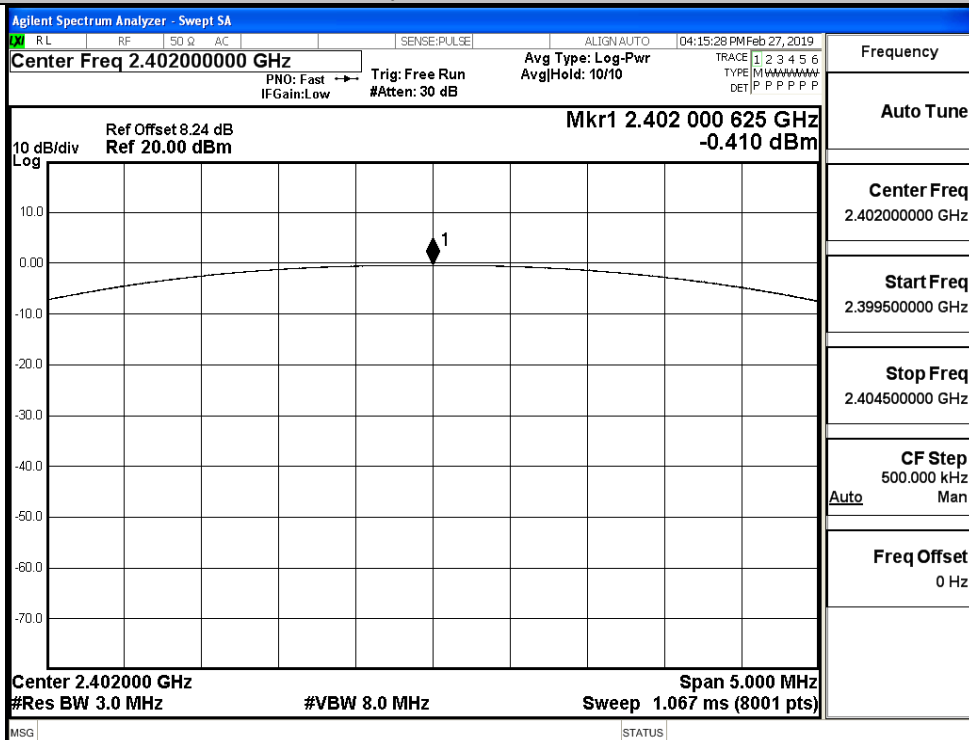
Temperature:	22.8 ° C
Relative Humidity:	53.3%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.Zeng
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

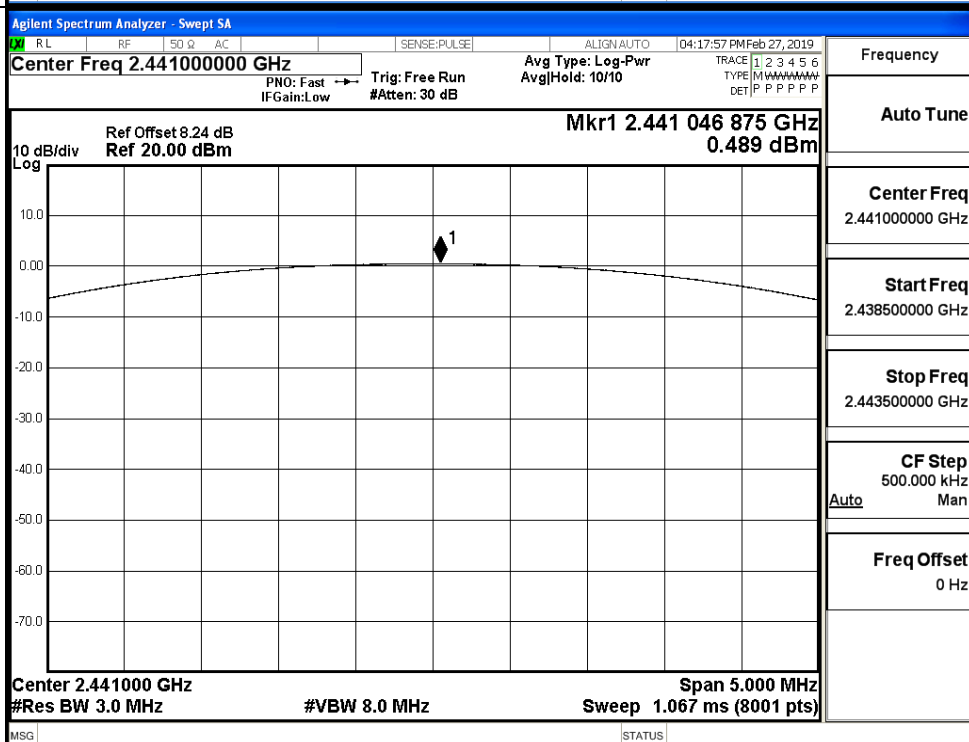
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.410	21	PASS
	MCH	0.489	21	PASS
	HCH	-0.900	21	PASS
$\pi/4$ DQPSK	LCH	-0.921	21	PASS
	MCH	-0.066	21	PASS
	HCH	-1.480	21	PASS
8DPSK	LCH	-0.784	21	PASS
	MCH	0.071	21	PASS
	HCH	-1.315	21	PASS

Test Graphs

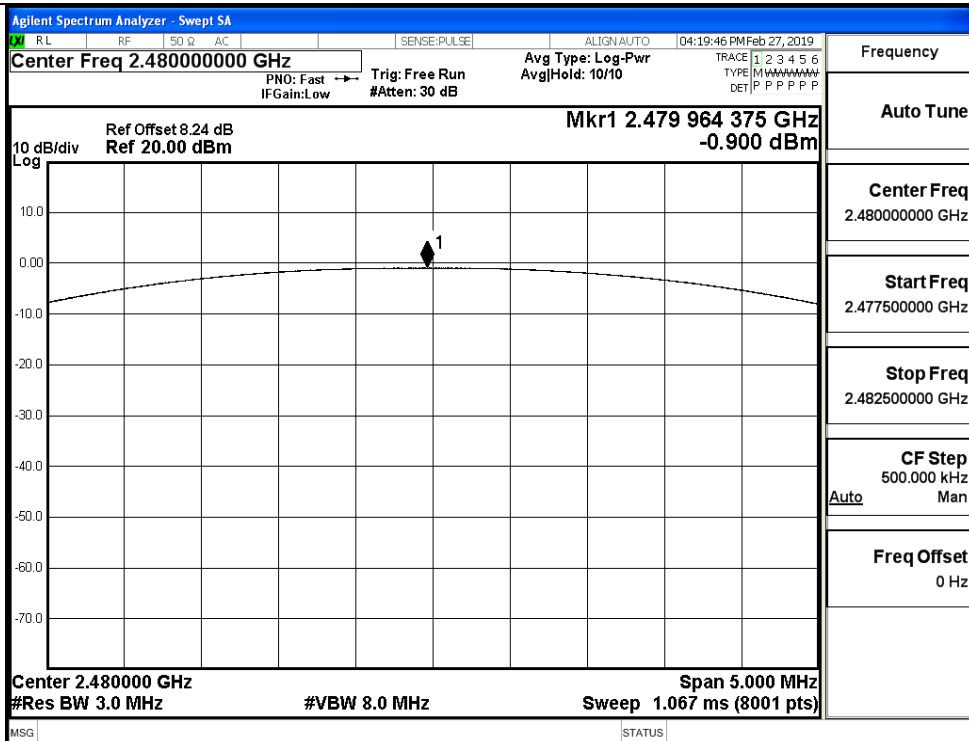
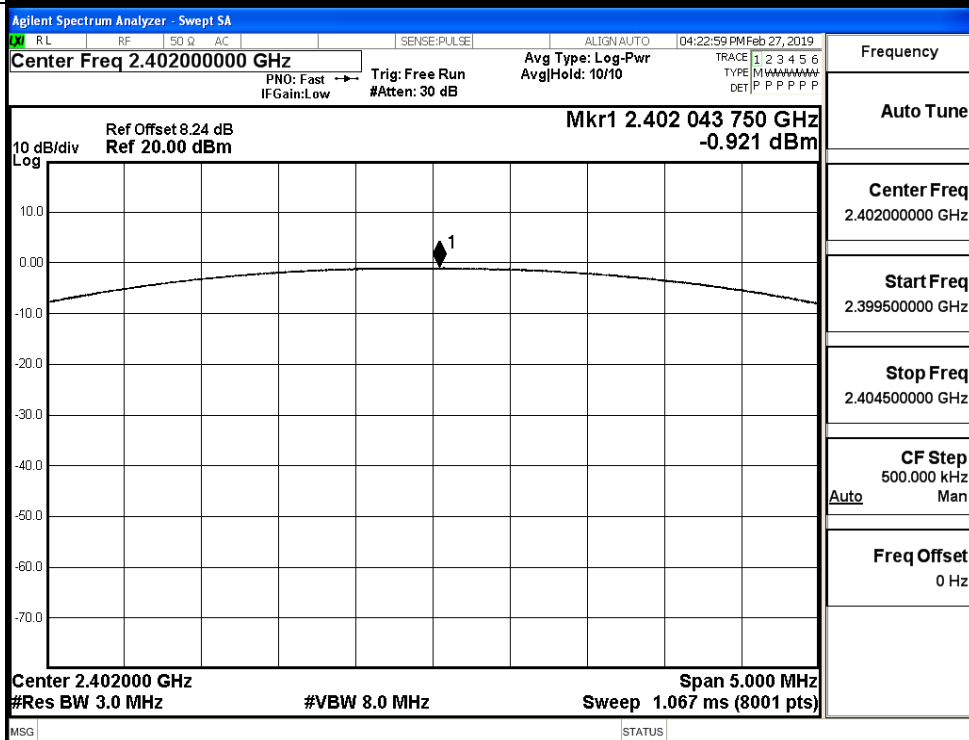
GFSK/LCH

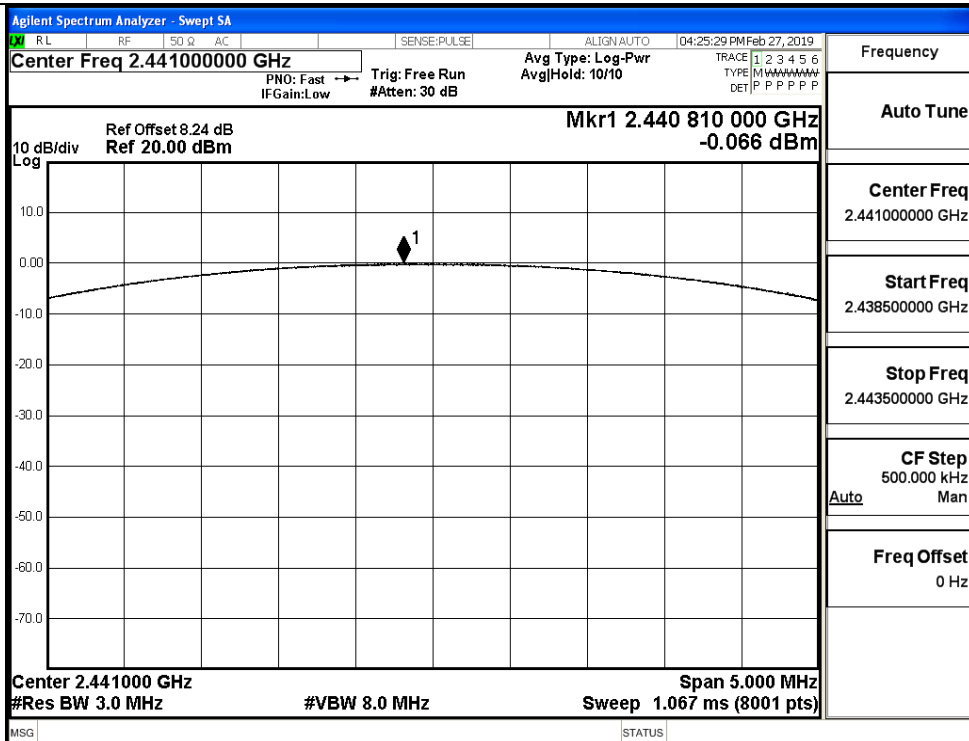
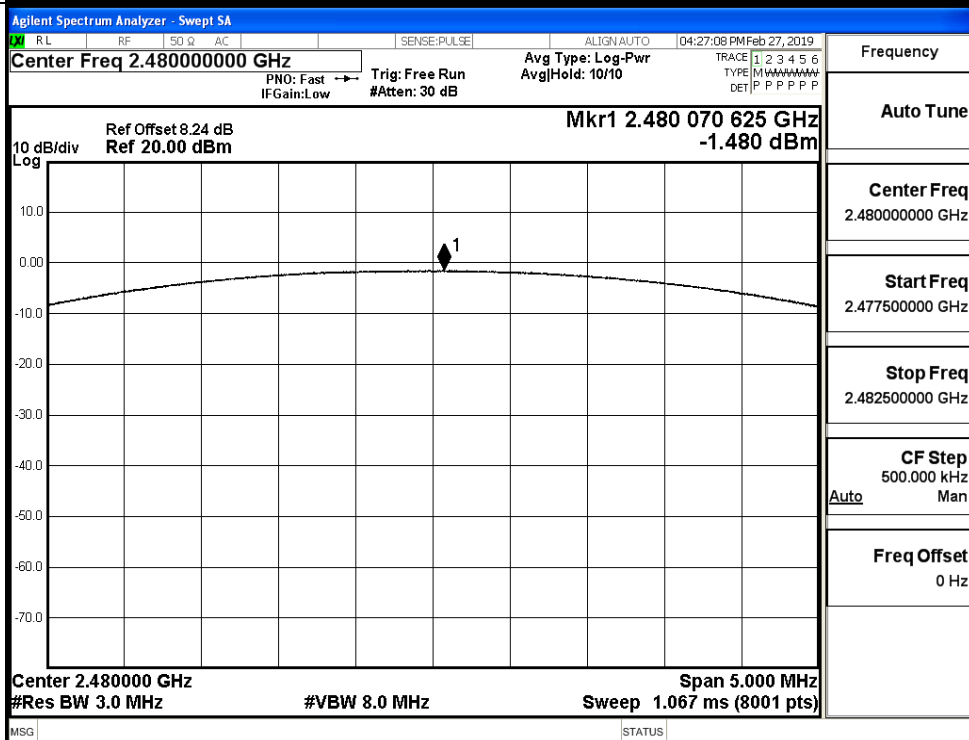


GFSK/MCH

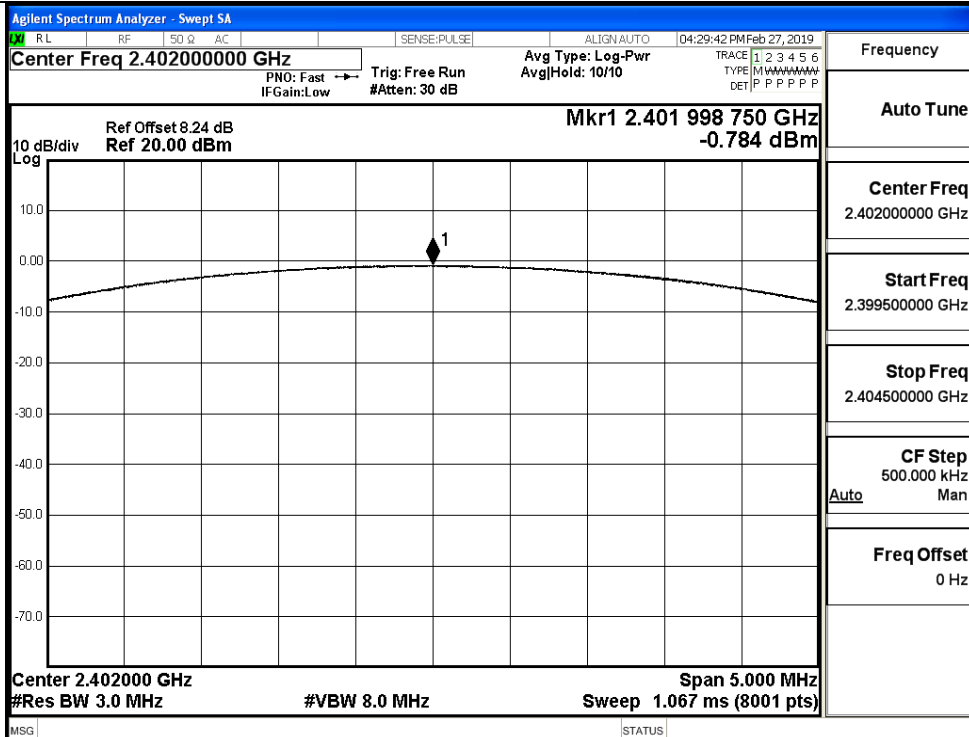


GFSK/HCH

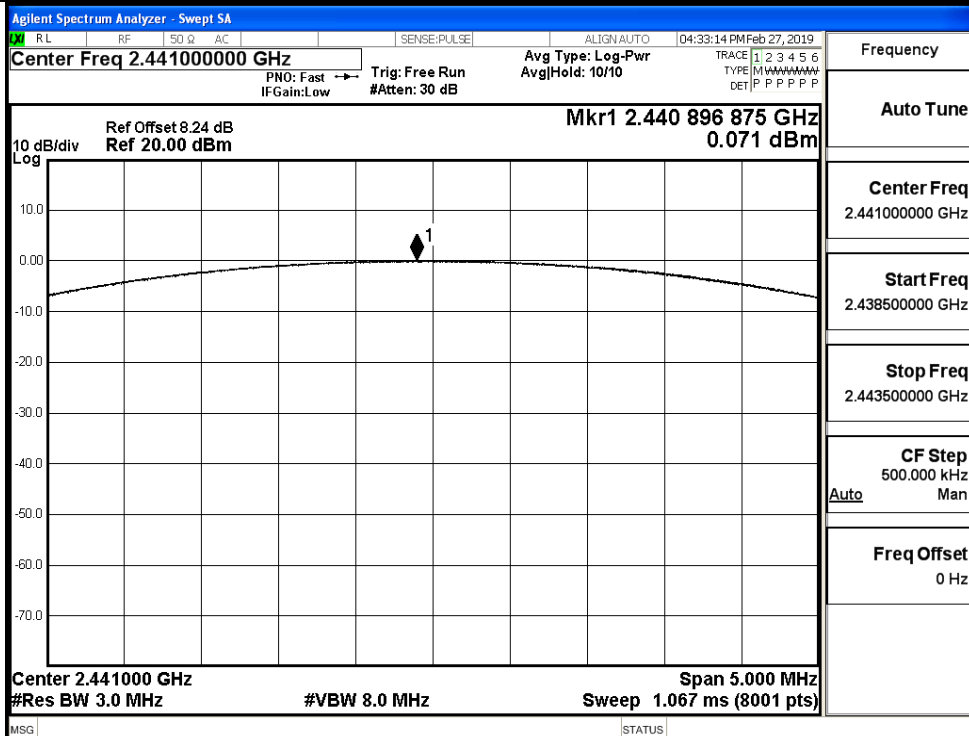
 π /4DQPSK/LCH

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

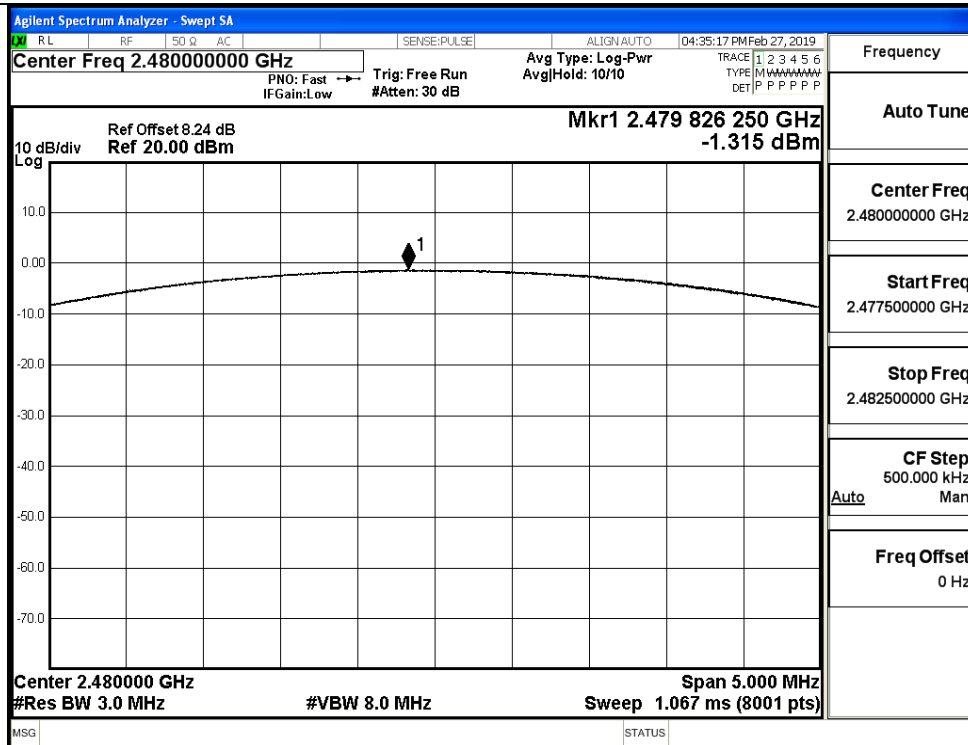
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

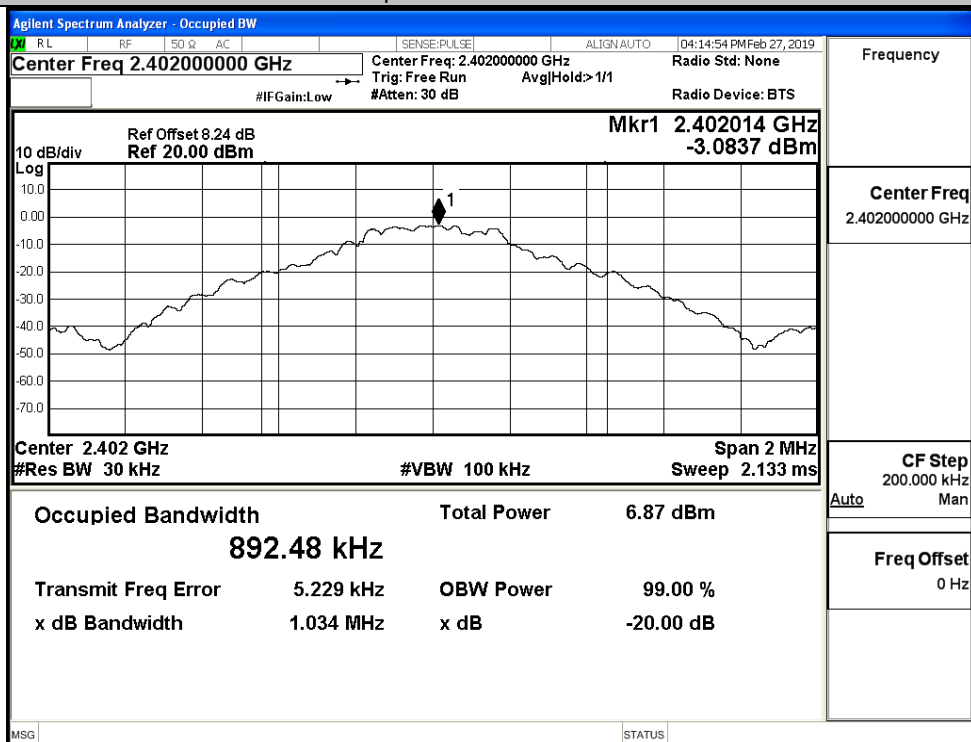


A.2 99% and 20dB Bandwidth

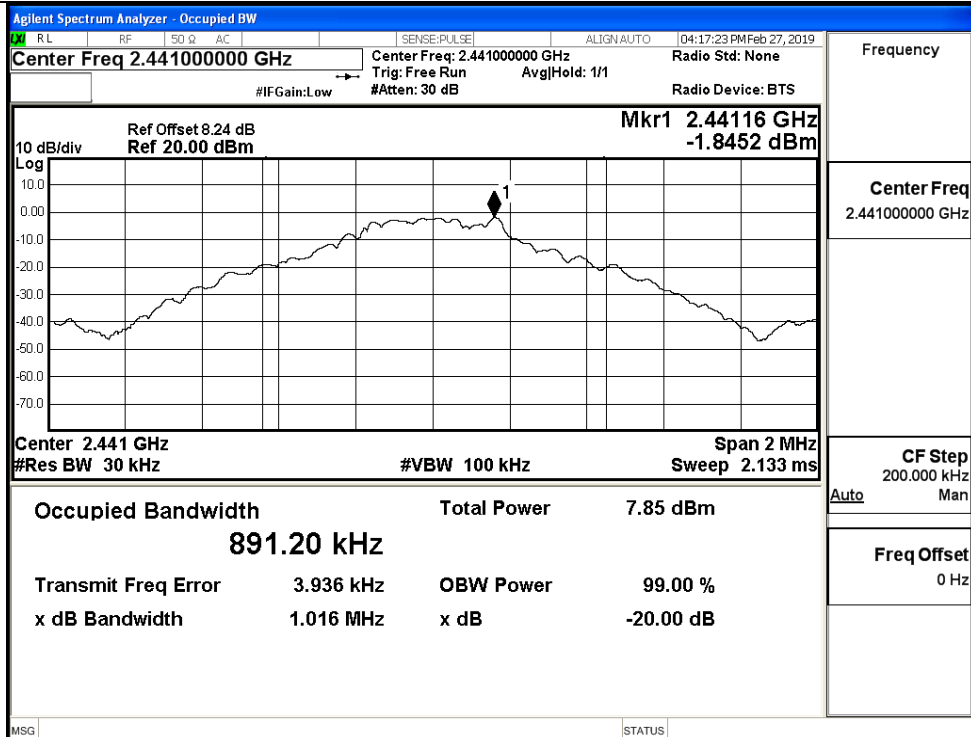
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89248	1.034	Not Specified	PASS
	MCH	0.89120	1.016	Not Specified	PASS
	HCH	0.89671	1.024	Not Specified	PASS
π /4DQPSK	LCH	1.1792	1.293	Not Specified	PASS
	MCH	1.1748	1.310	Not Specified	PASS
	HCH	1.1734	1.306	Not Specified	PASS
8DPSK	LCH	1.1922	1.296	Not Specified	PASS
	MCH	1.1933	1.304	Not Specified	PASS
	HCH	1.1879	1.302	Not Specified	PASS

Test Graphs

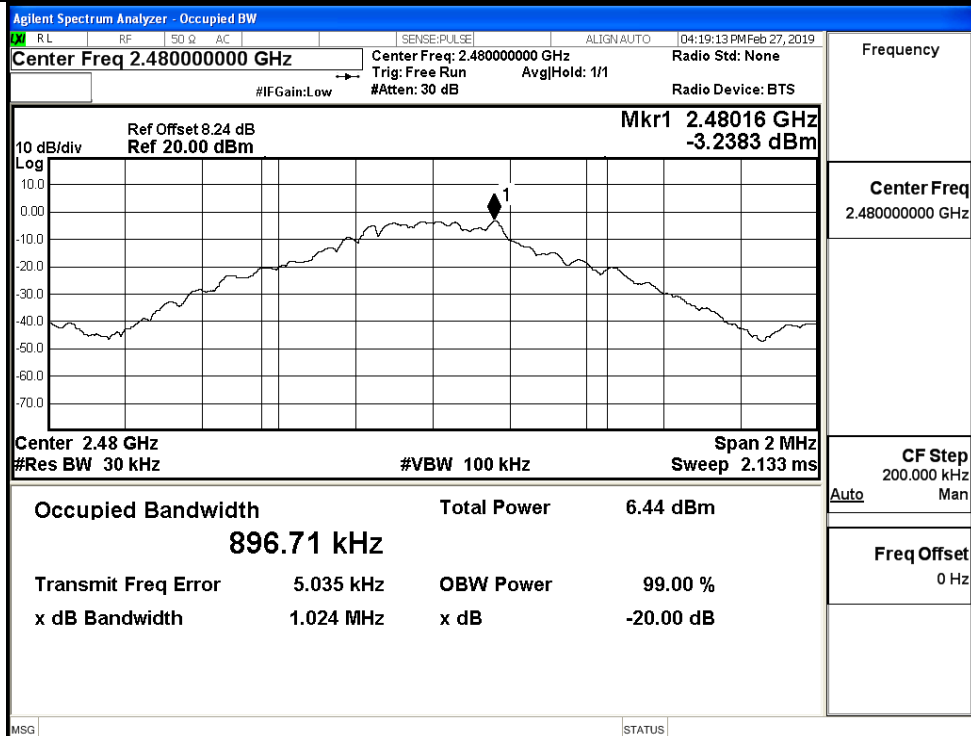
GFSK/LCH

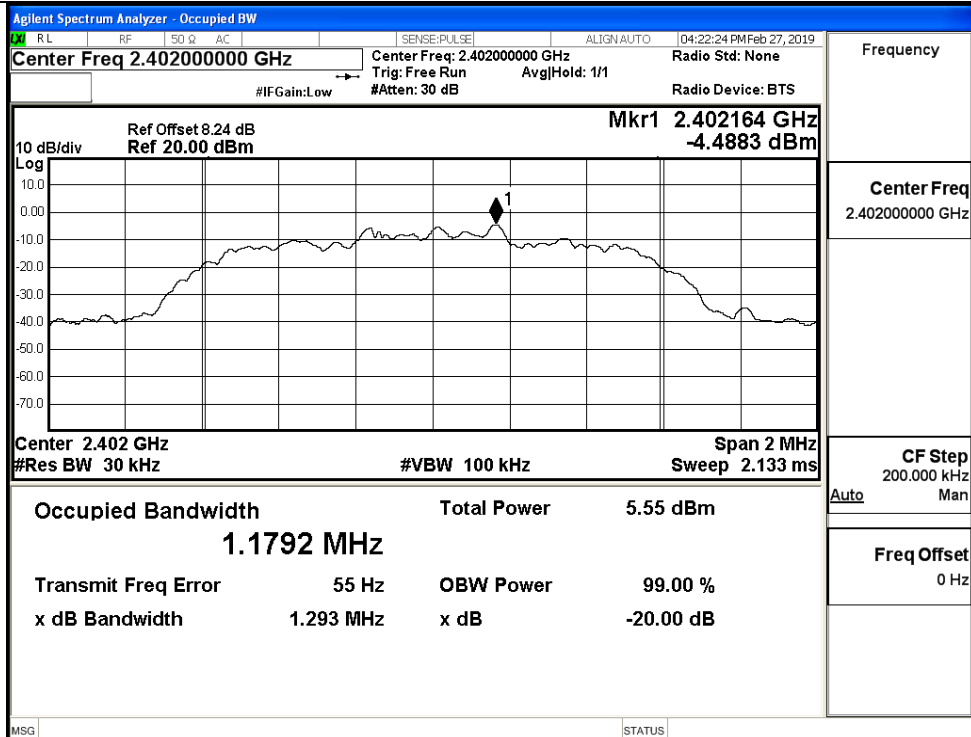
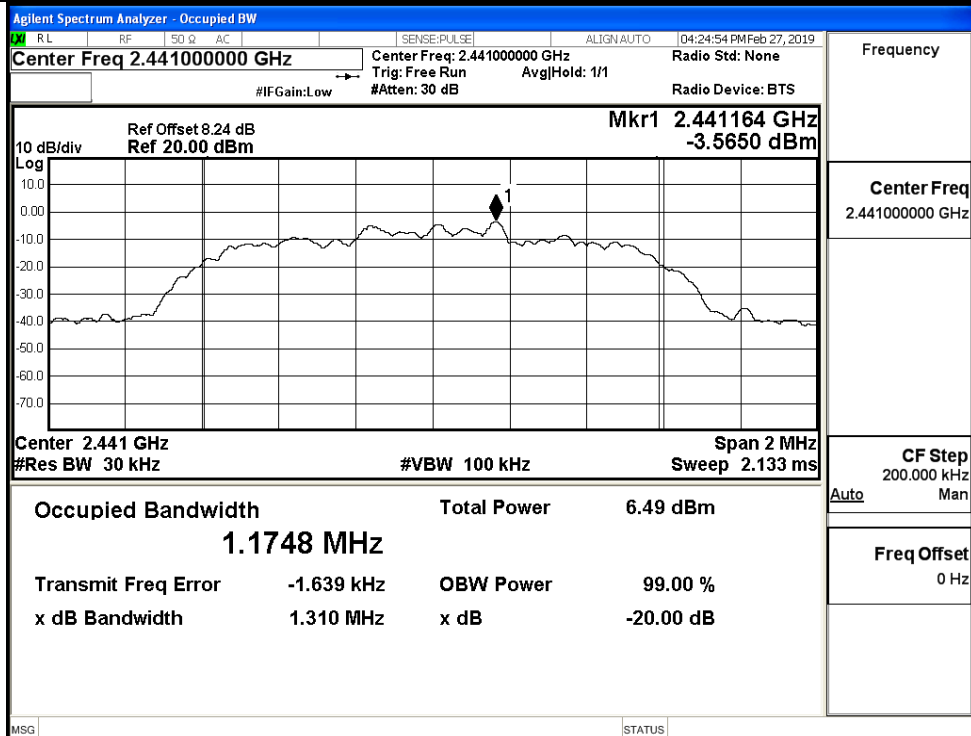


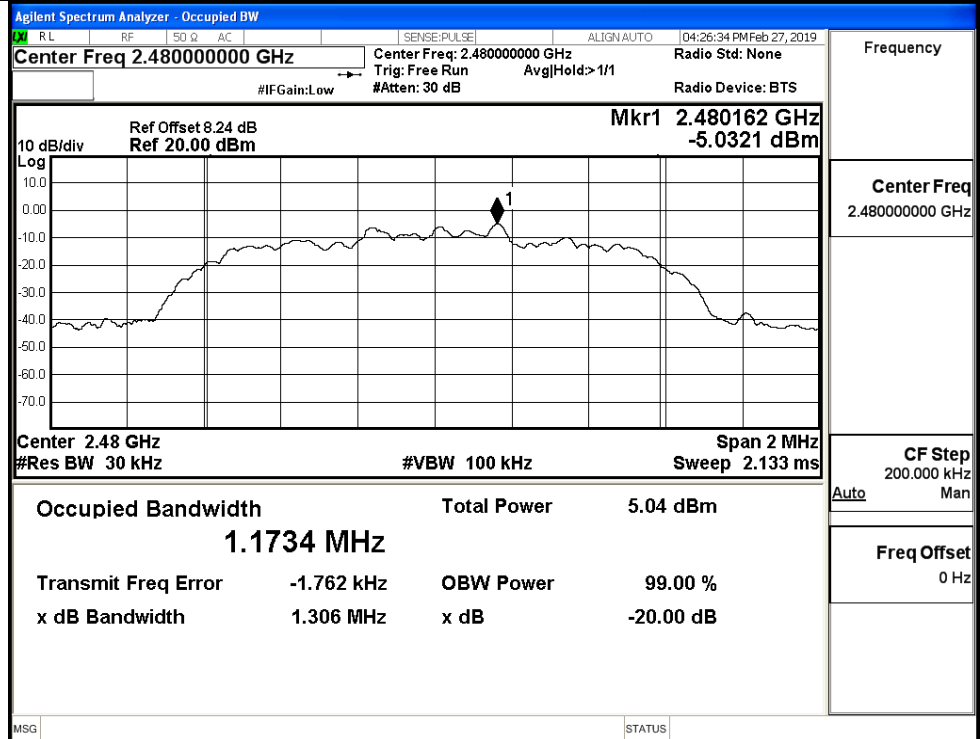
GFSK/MCH



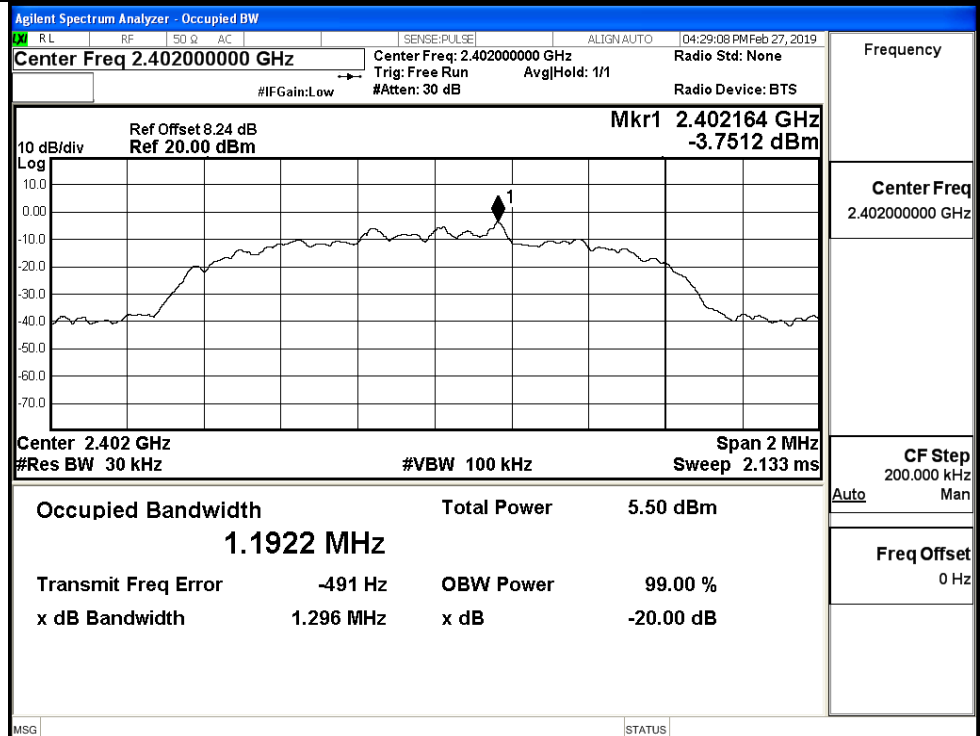
GFSK/HCH



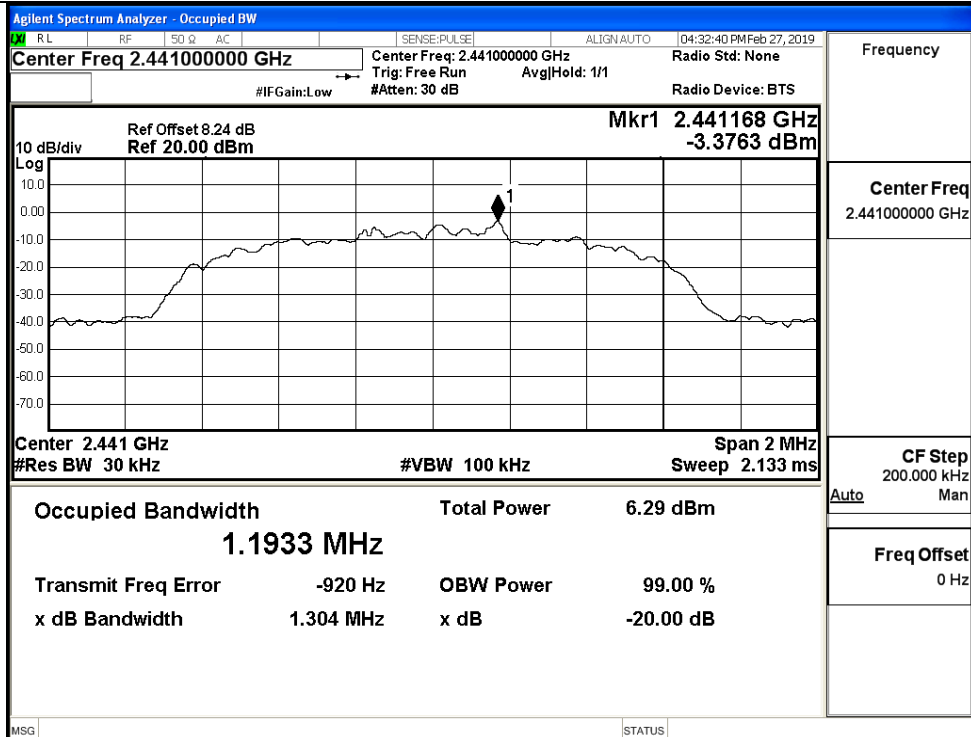
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

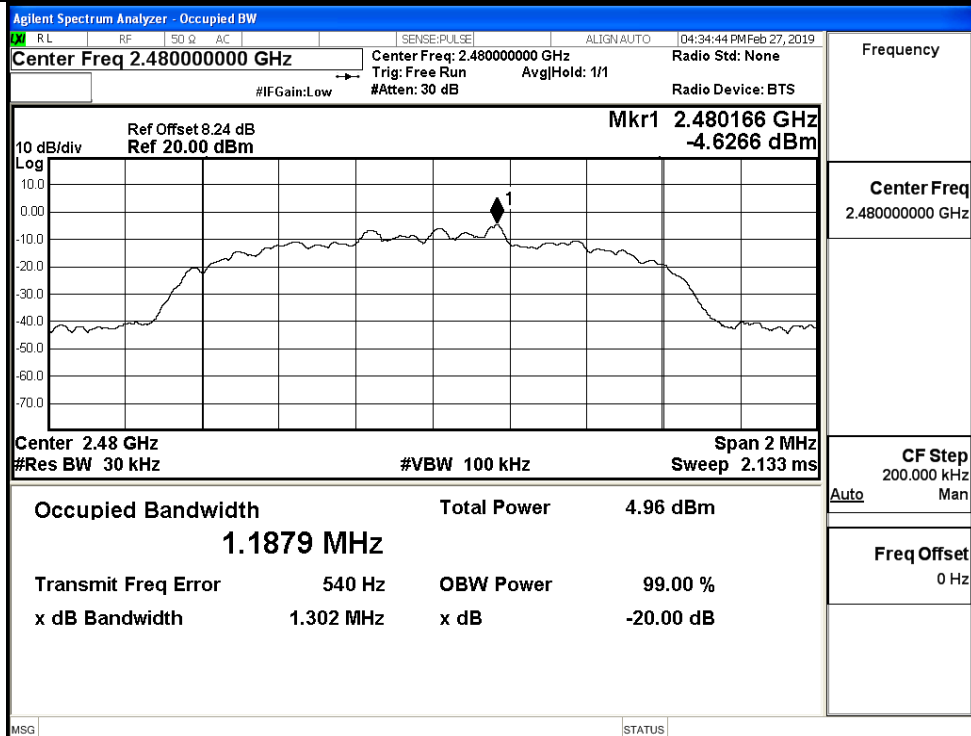
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

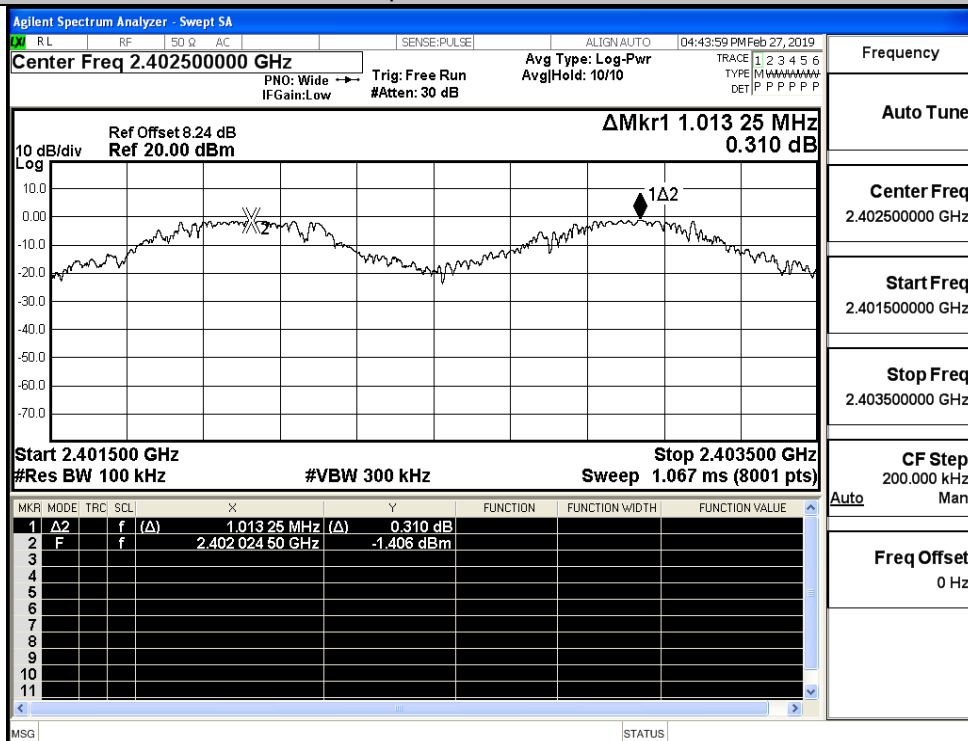


A.3 Carrier Frequency Separation

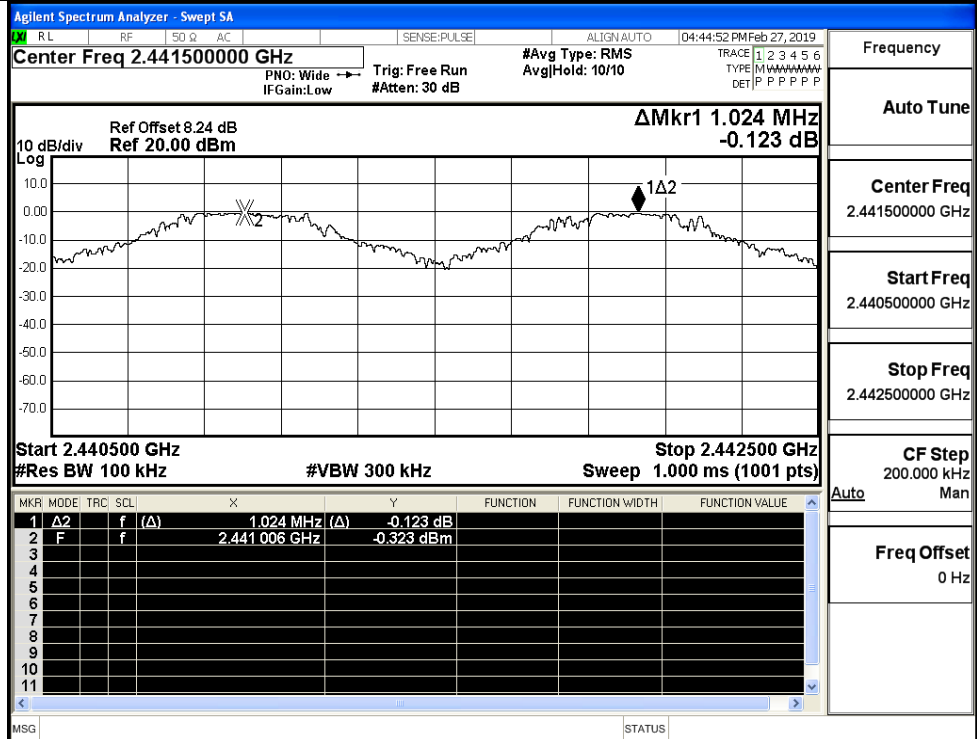
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.013	0.689	PASS
	MCH	1.024	0.689	PASS
	HCH	1.108	0.689	PASS
$\pi/4$ DQPSK	LCH	1.346	0.873	PASS
	MCH	0.990	0.873	PASS
	HCH	1.320	0.873	PASS
8DPSK	LCH	1.010	0.869	PASS
	MCH	1.346	0.869	PASS
	HCH	1.222	0.869	PASS

Test Graphs

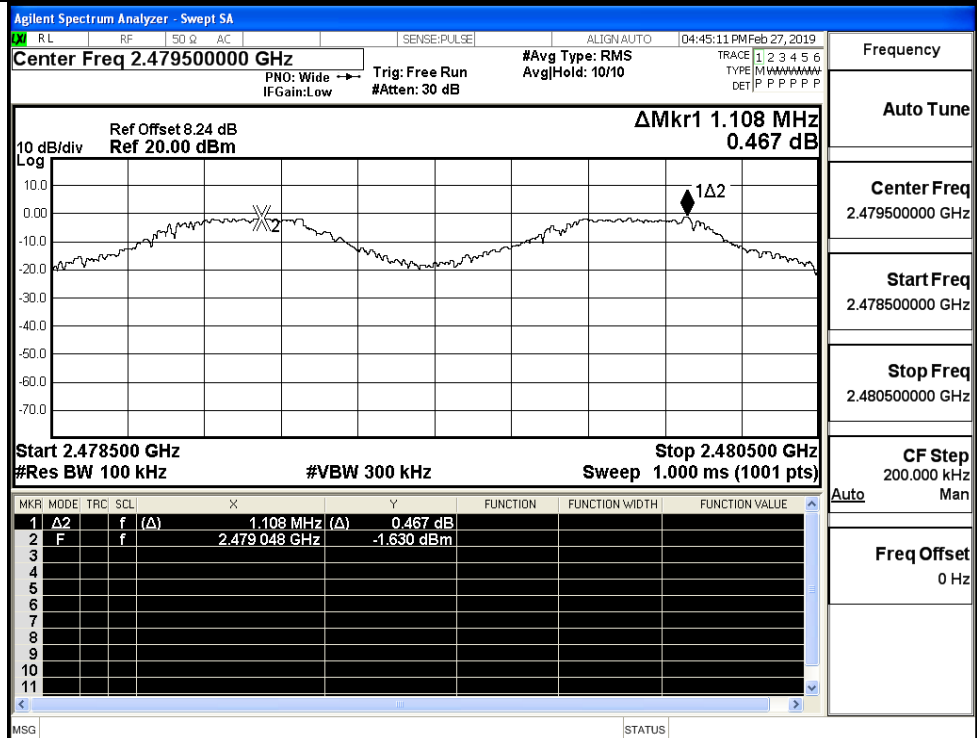
GFSK/LCH

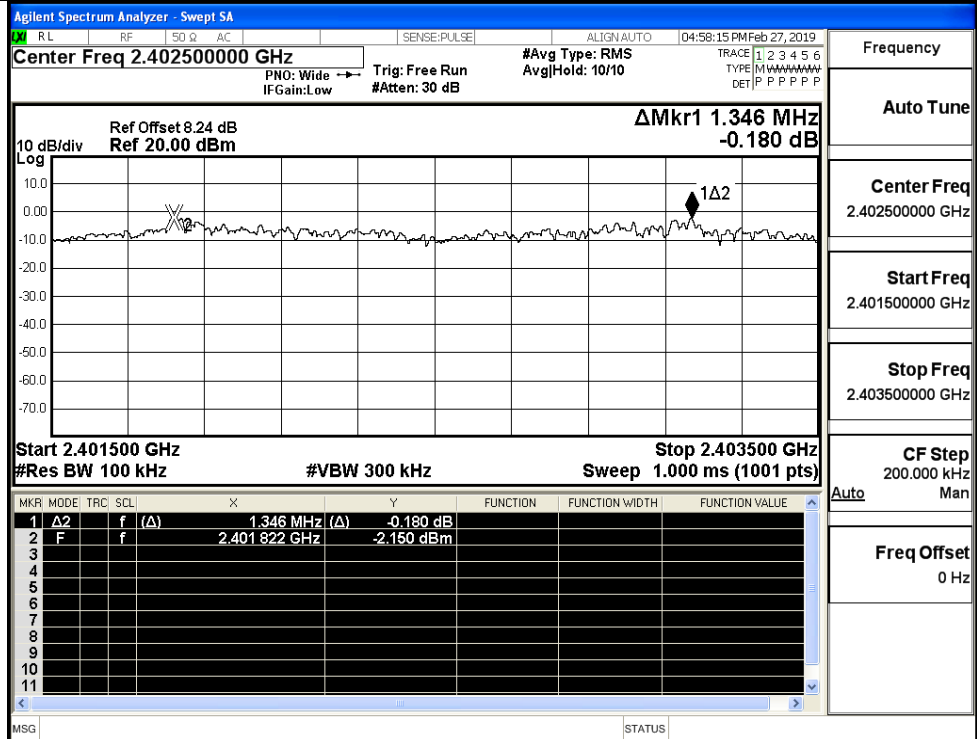
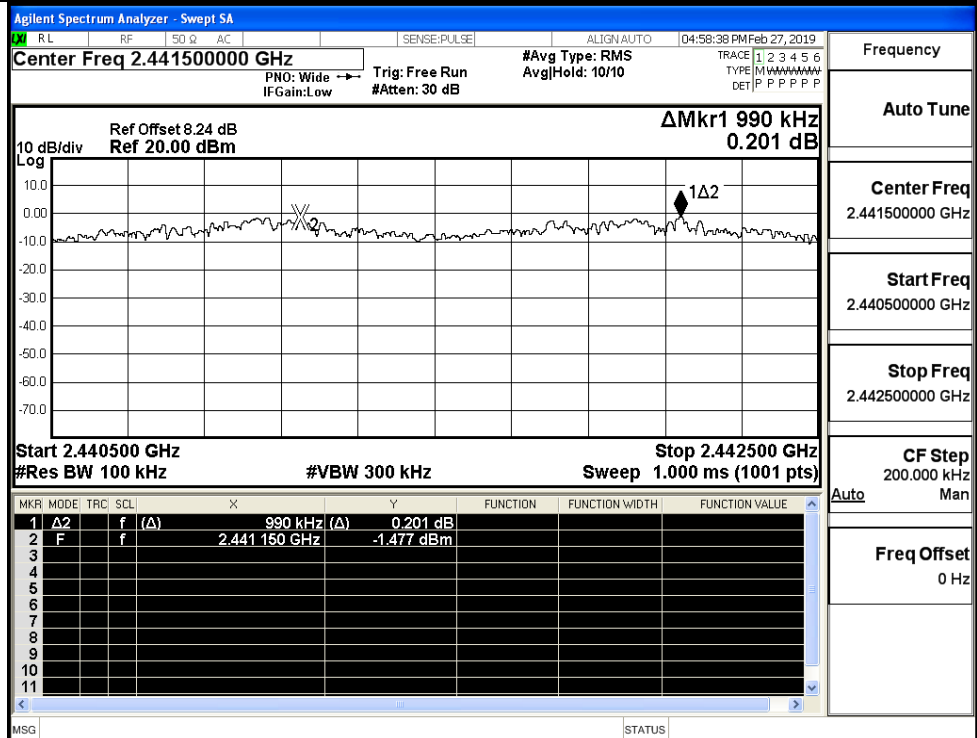


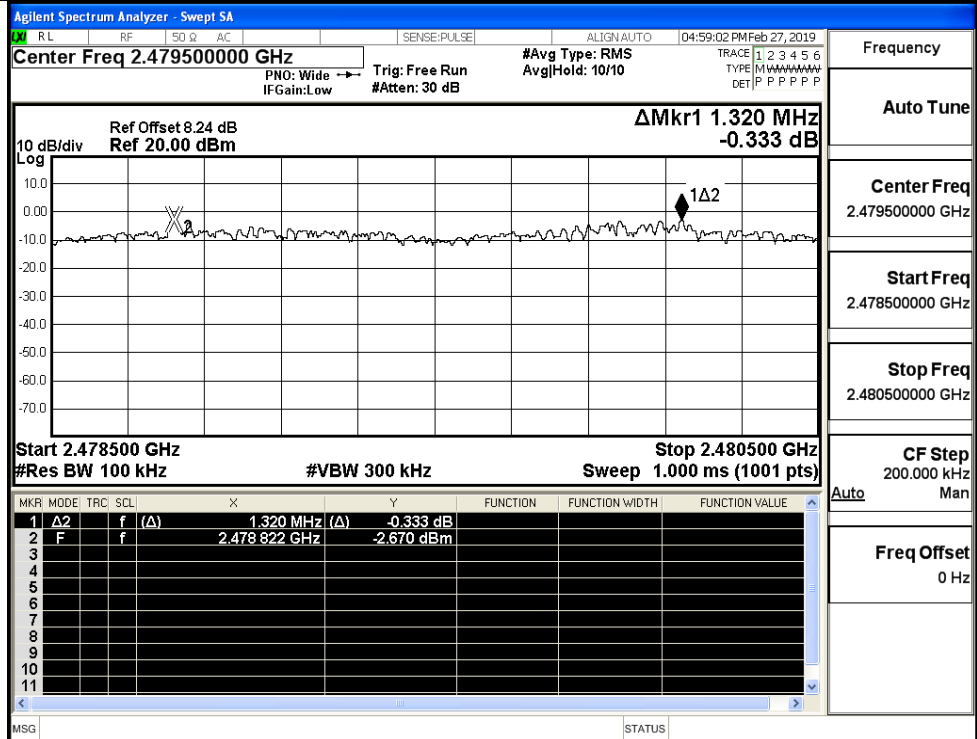
GFSK/MCH



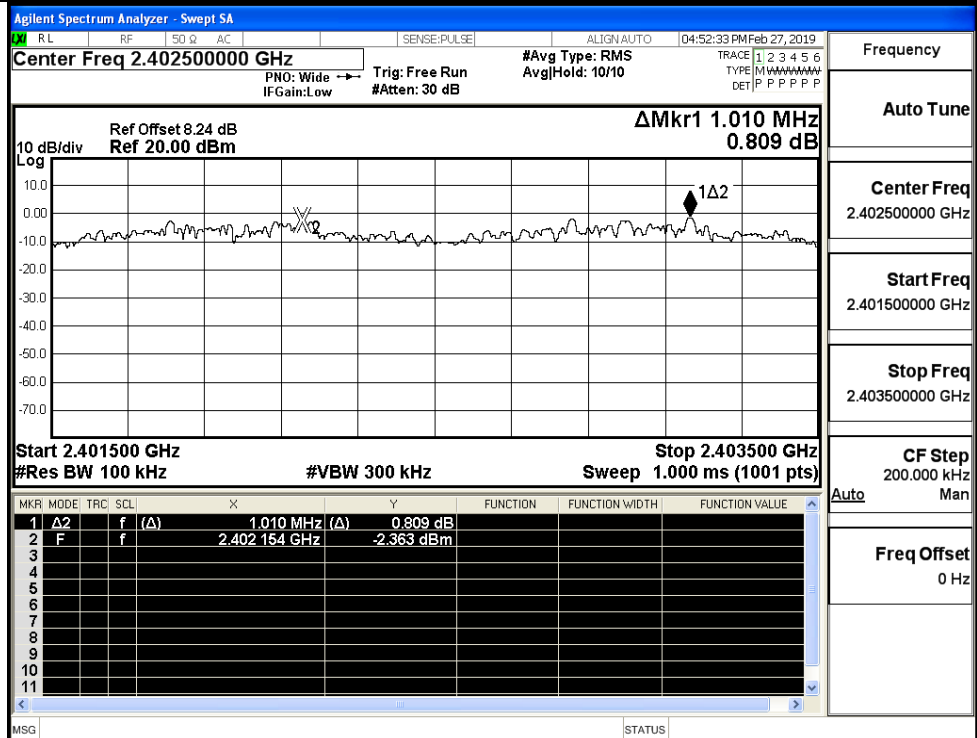
GFSK/HCH



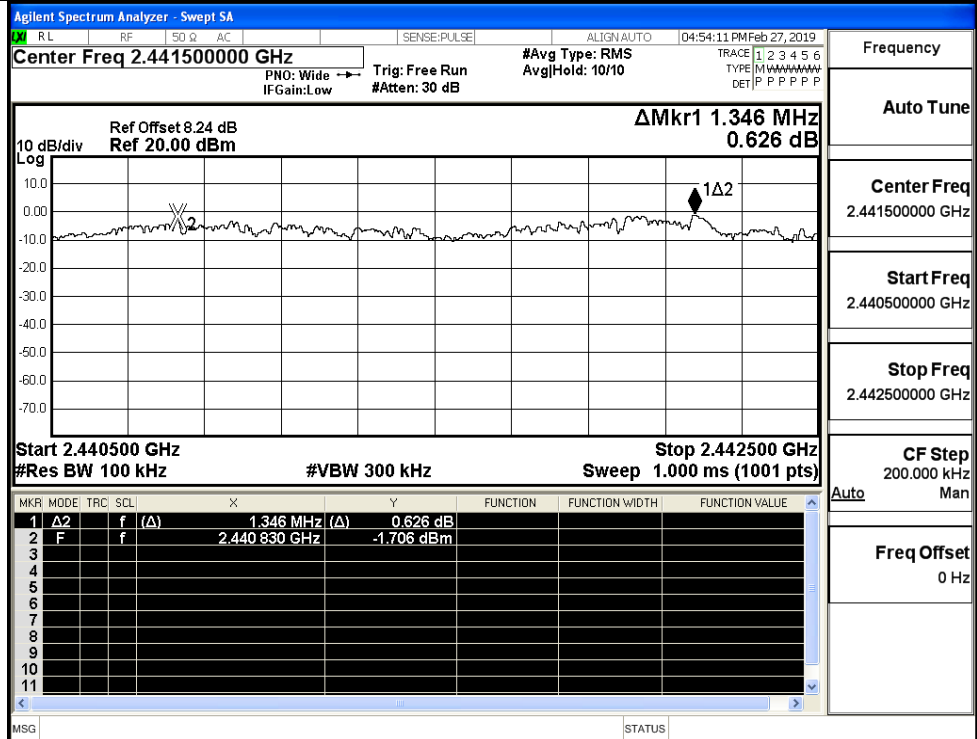
π /4DQPSK/LCH π /4DQPSK/MCH

$\pi/4$ DQPSK/HCH

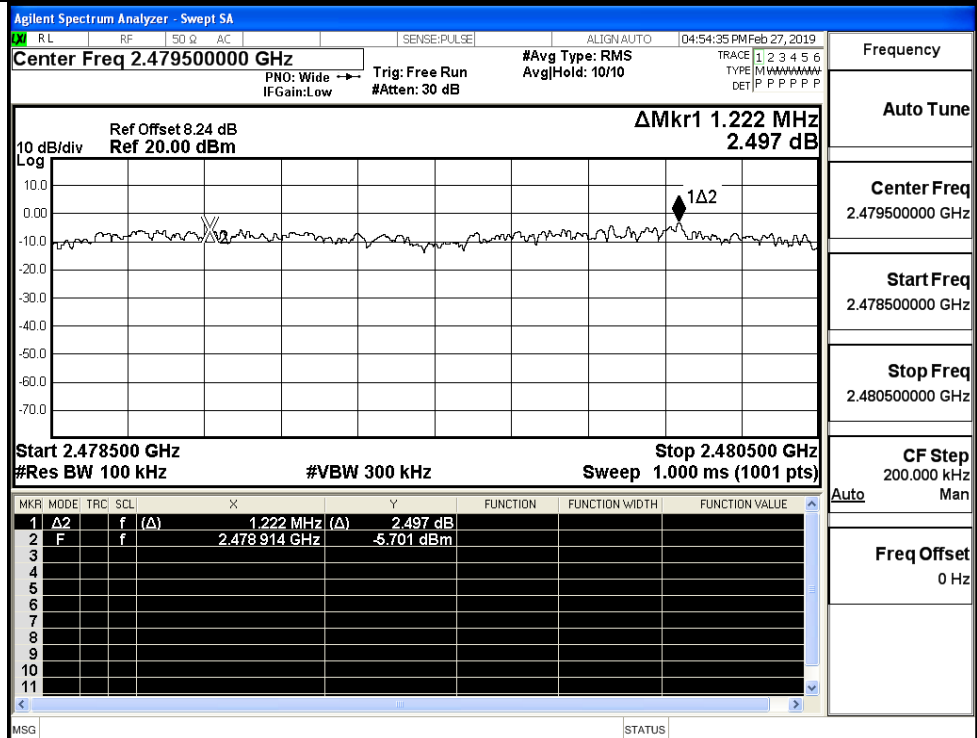
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

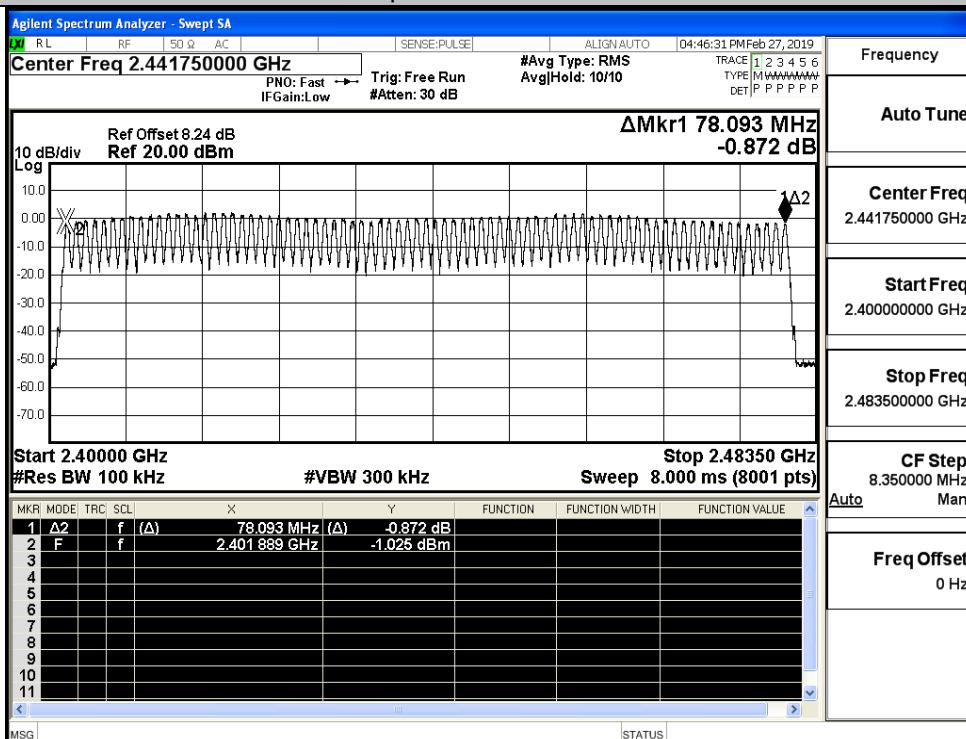
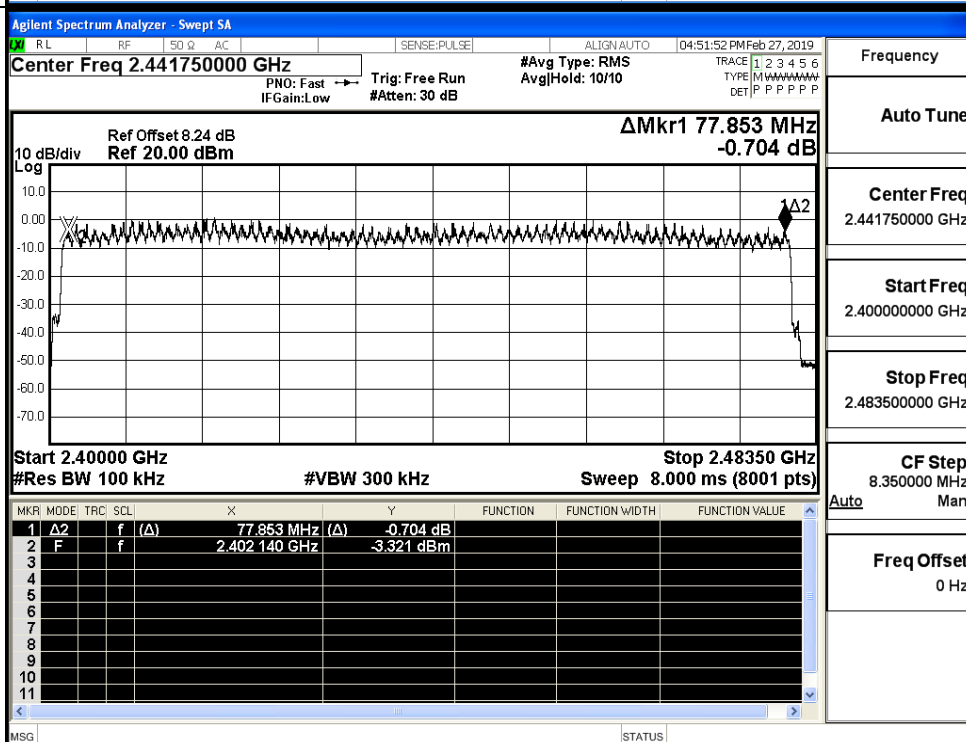


A.4 Hopping Channel Number

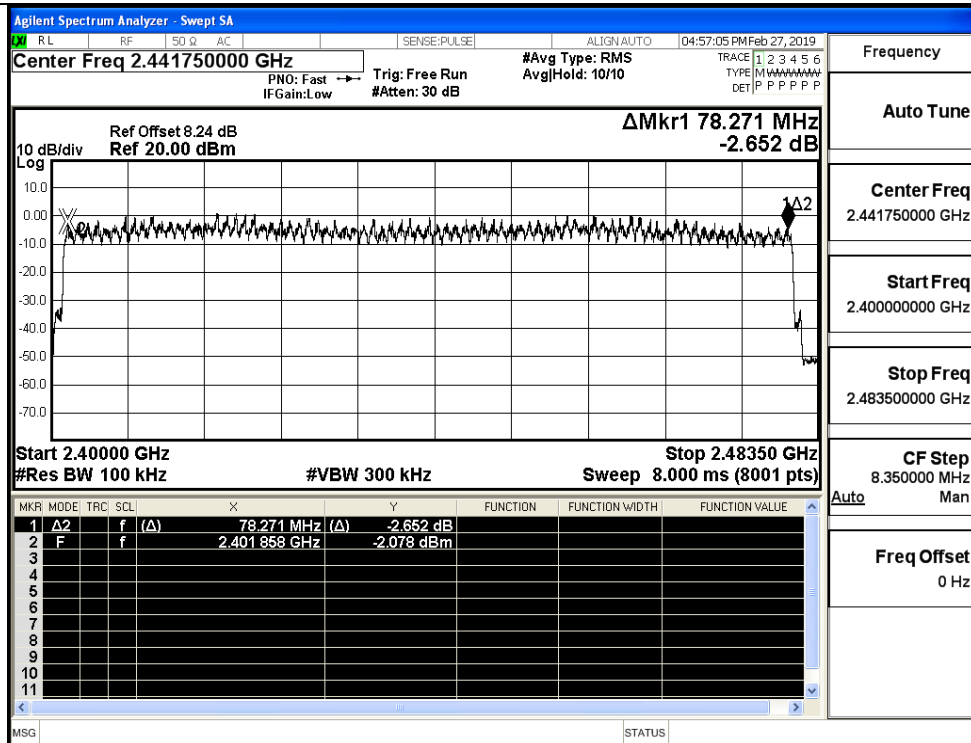
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

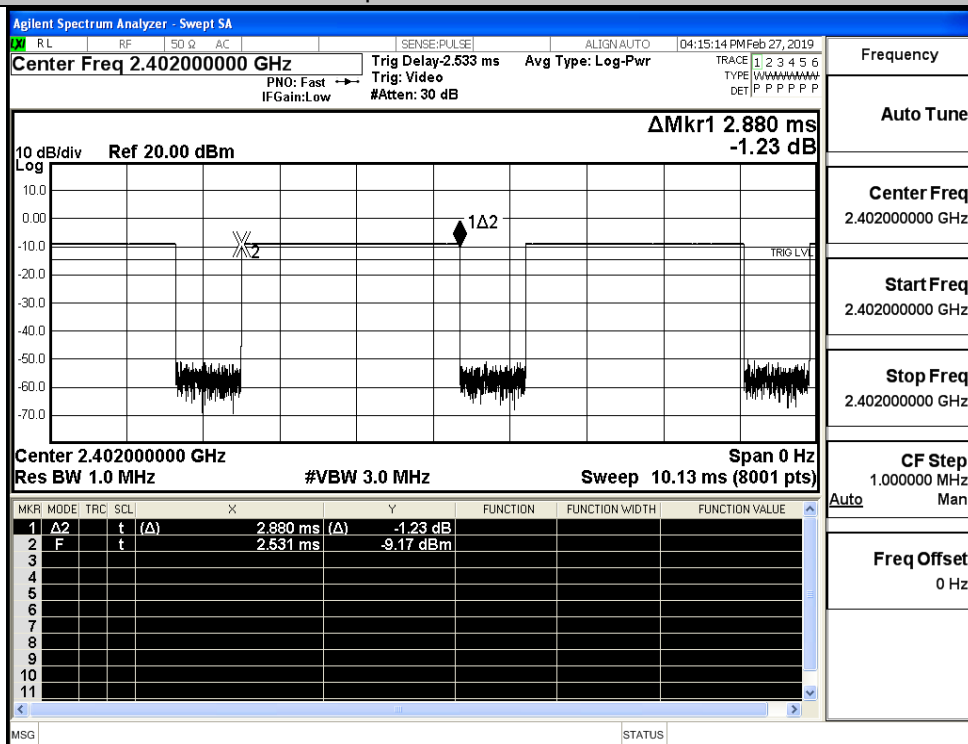


A.5 Dwell Time

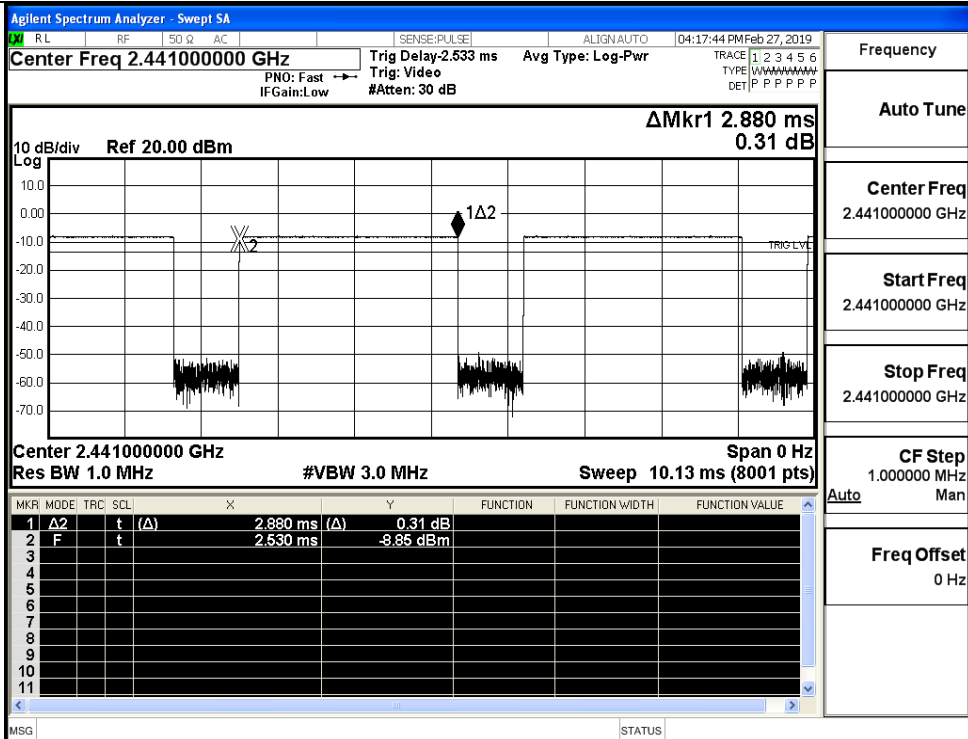
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

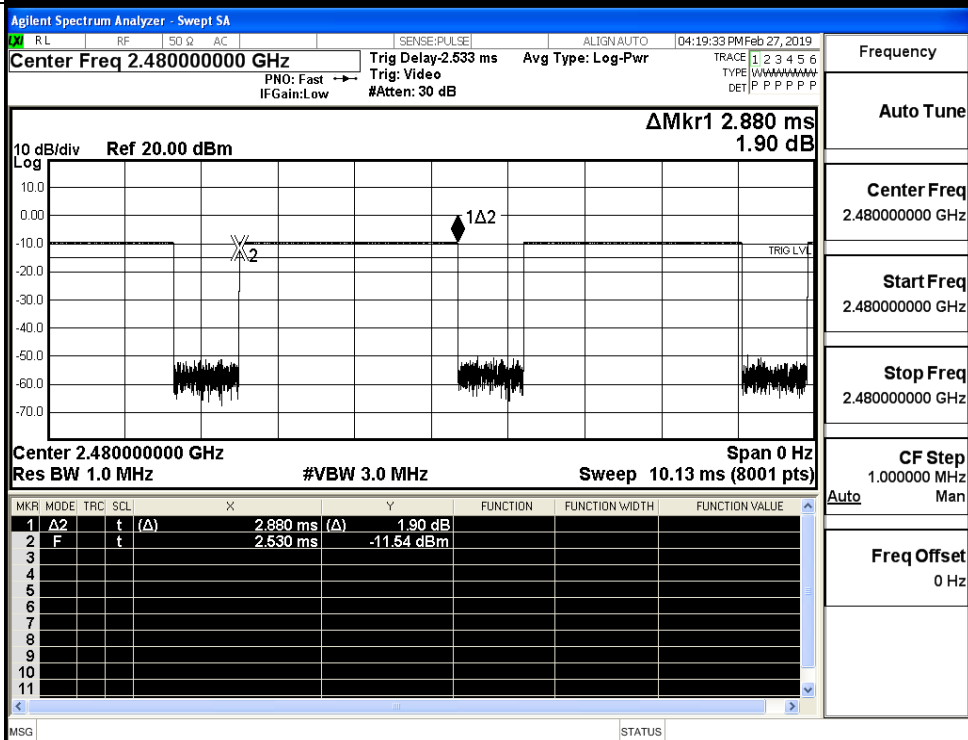
GFSK_DH5/LCH



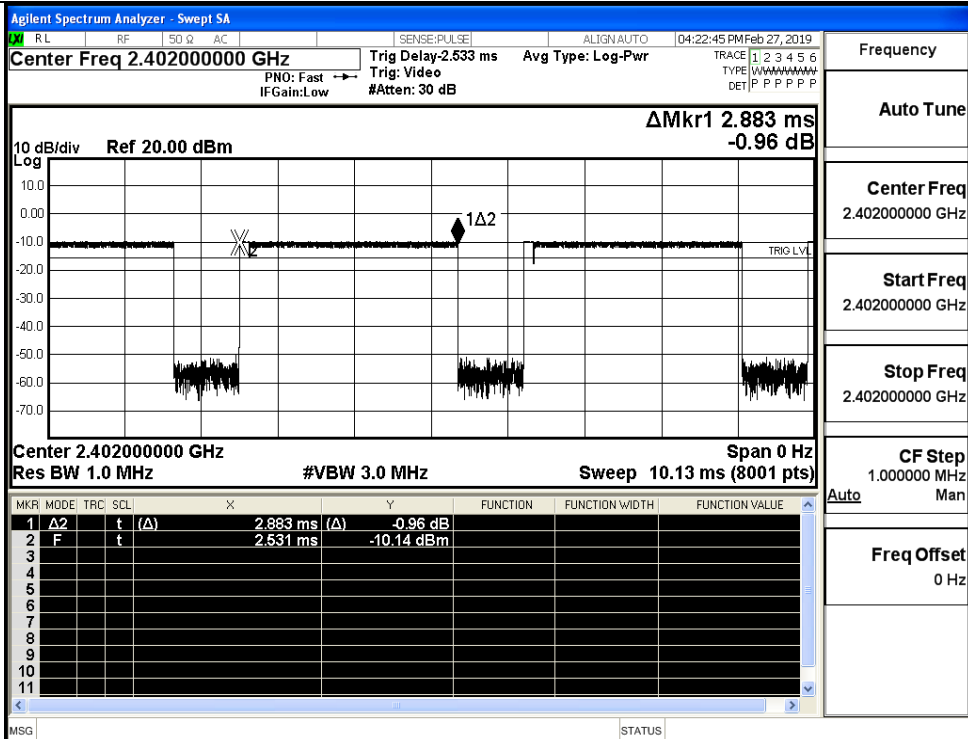
GFSK_DH5/MCH



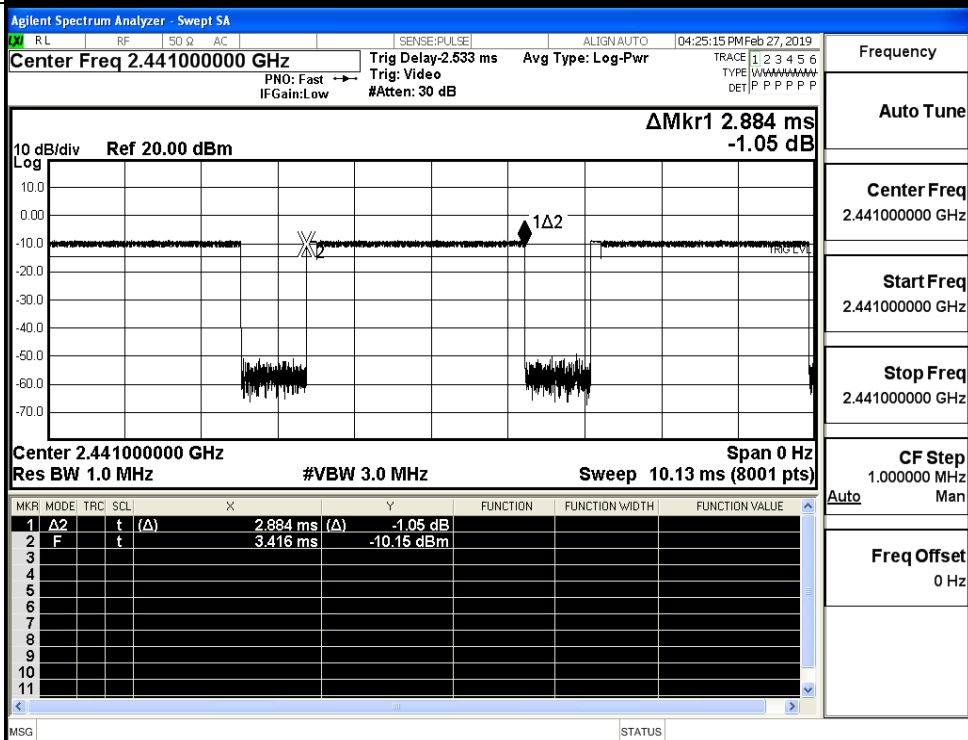
GFSK_DH5/HCH



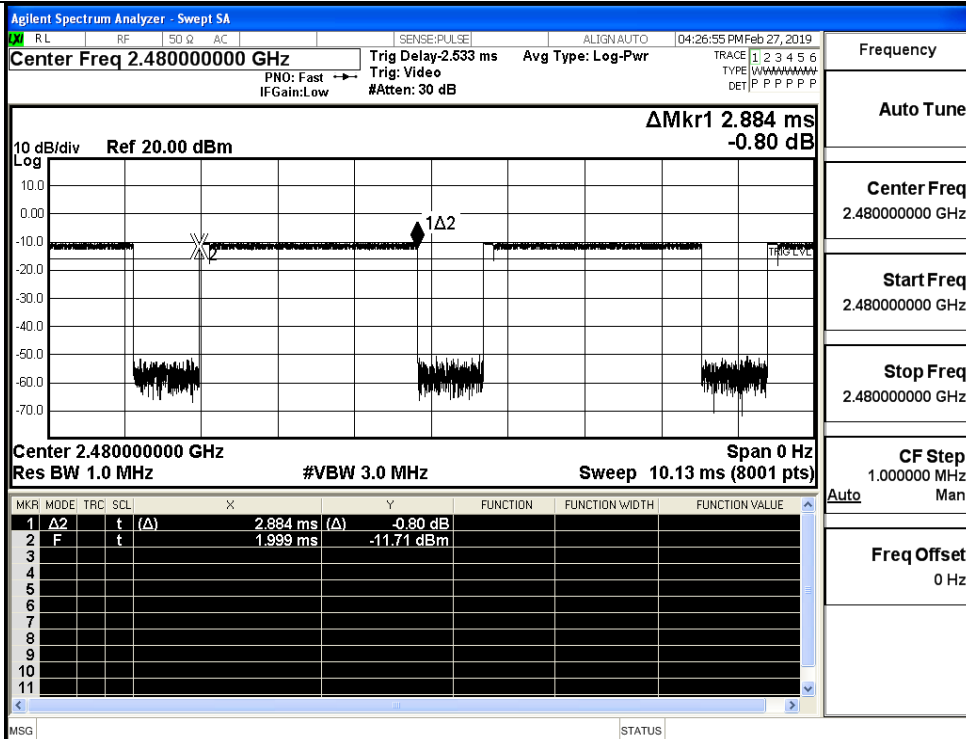
$\pi/4$ DQPSK
_2DH5/LCH



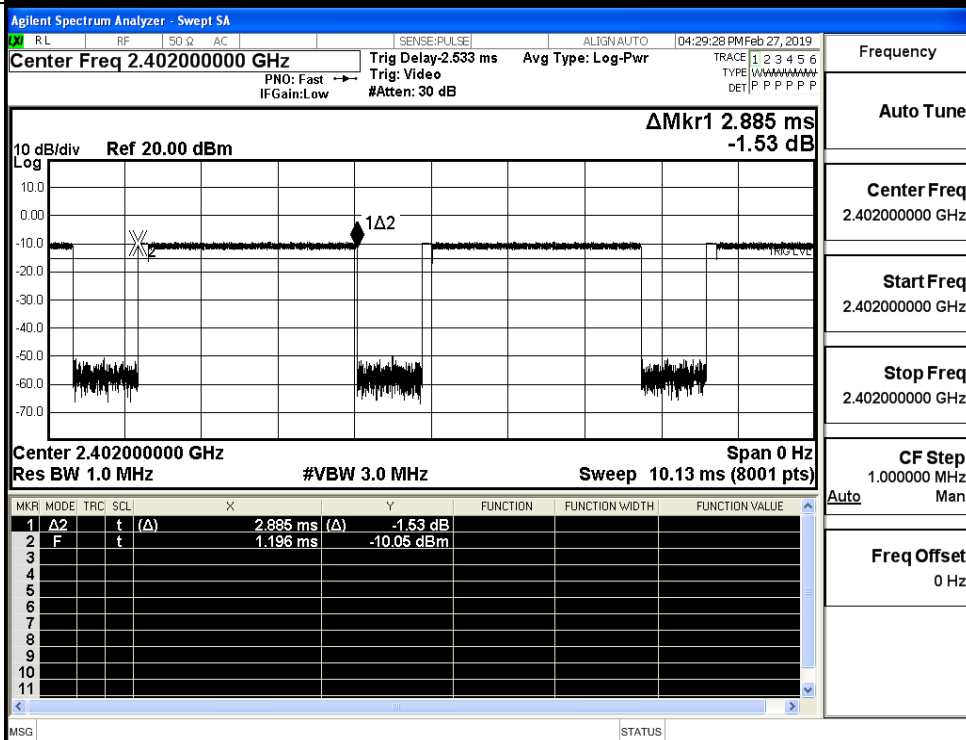
$\pi/4$ DQPSK
_2DH5/MCH



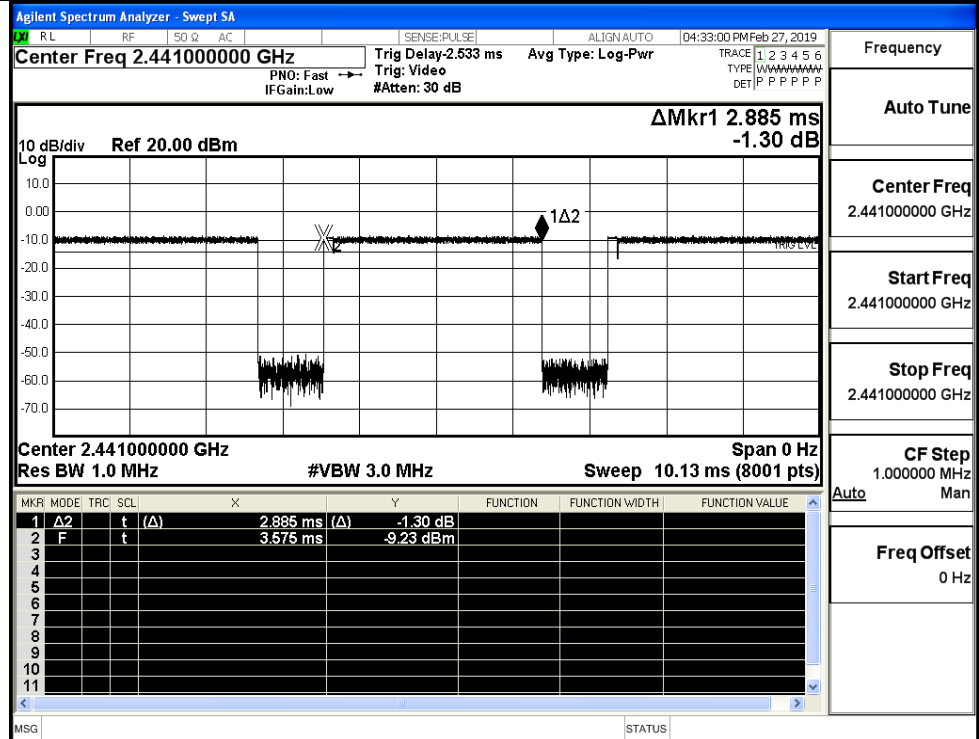
$\pi/4$ DQPSK
_2DH5/HCH



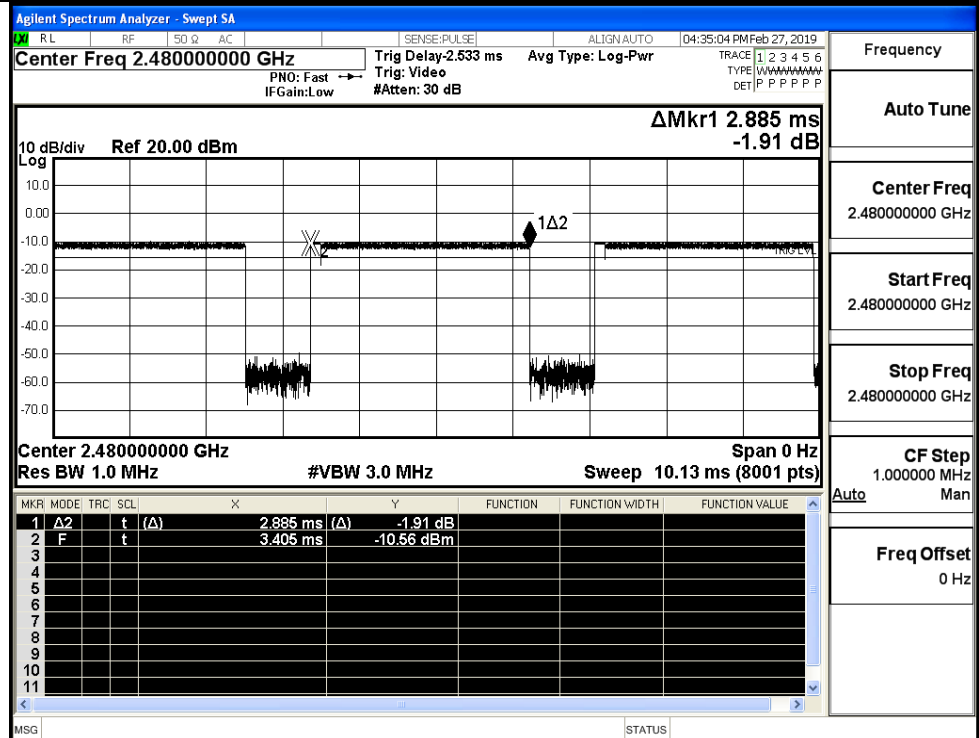
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

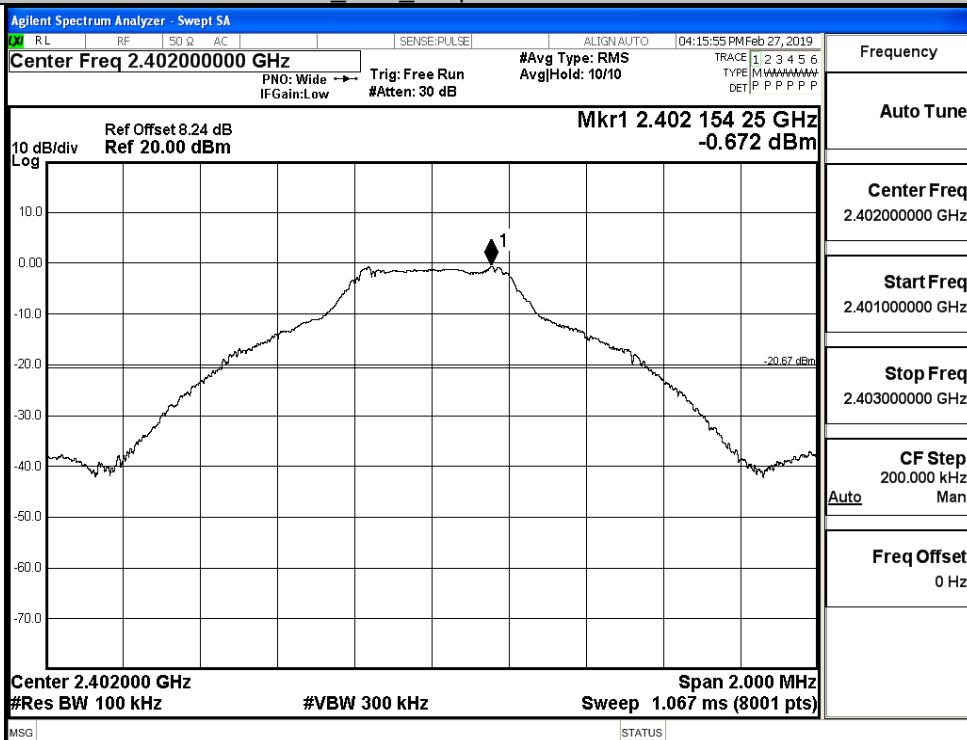


A.6 RF Conducted Spurious Emissions

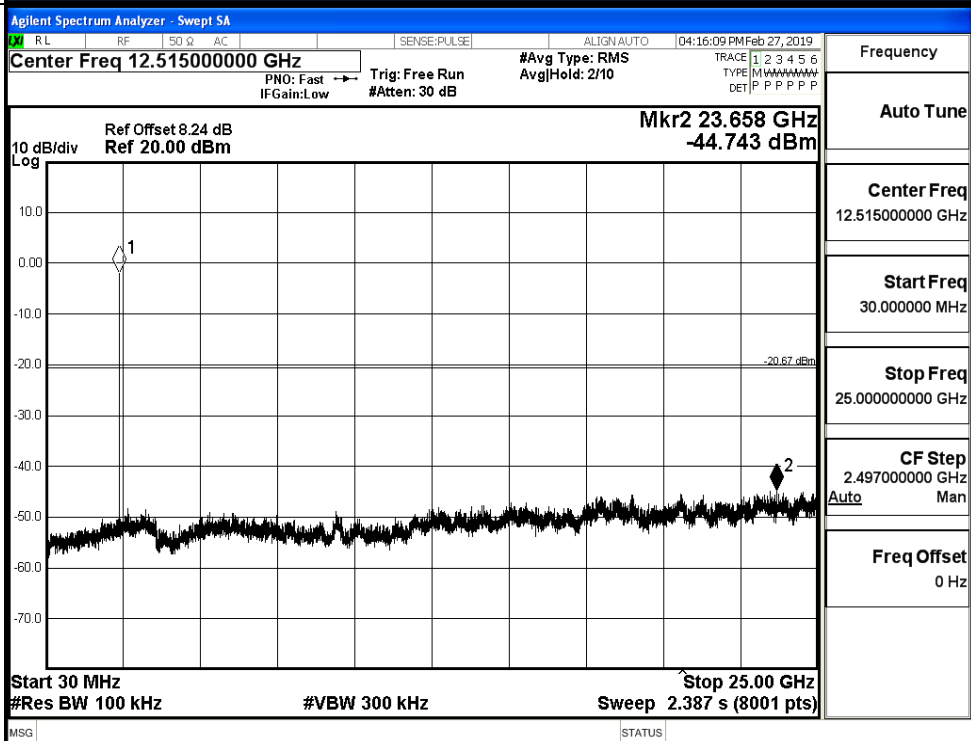
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.672	-44.743	-20.672	PASS
	MCH	0.245	-44.162	-19.755	PASS
	HCH	-1.194	-44.622	-21.194	PASS
$\pi/4$ DQPSK	LCH	-1.956	-43.468	-21.956	PASS
	MCH	-0.996	-43.774	-20.996	PASS
	HCH	-2.952	-44.251	-22.952	PASS
8DPSK	LCH	-1.618	-44.112	-21.618	PASS
	MCH	-1.531	-44.296	-21.531	PASS
	HCH	-2.48	-44.387	-22.480	PASS

GFSK LCH Graphs

Pref

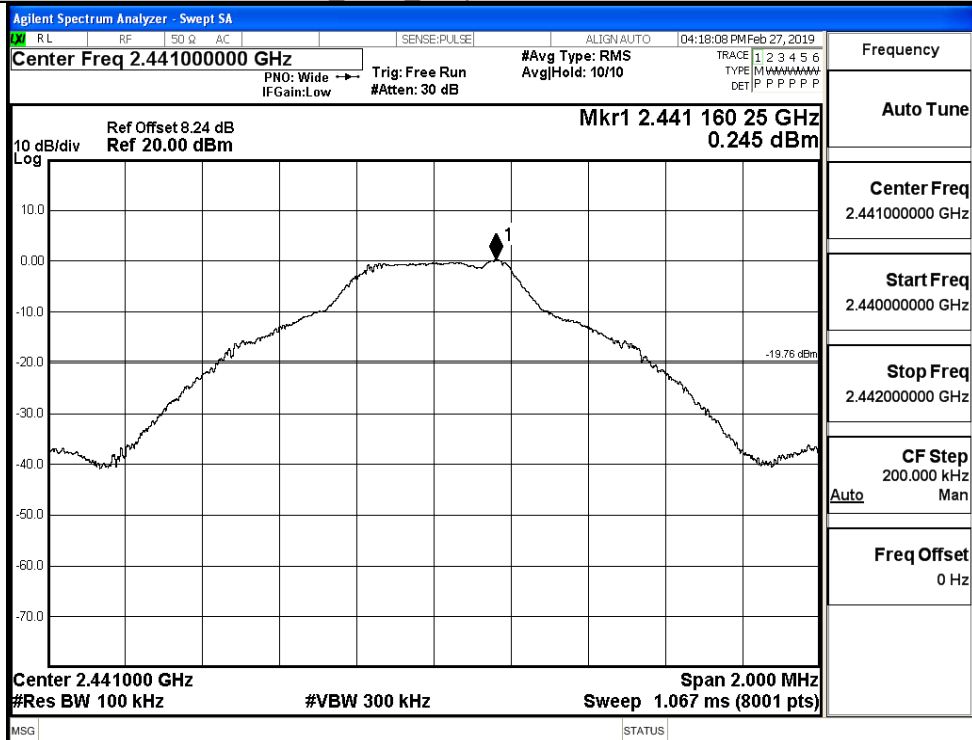


Puw

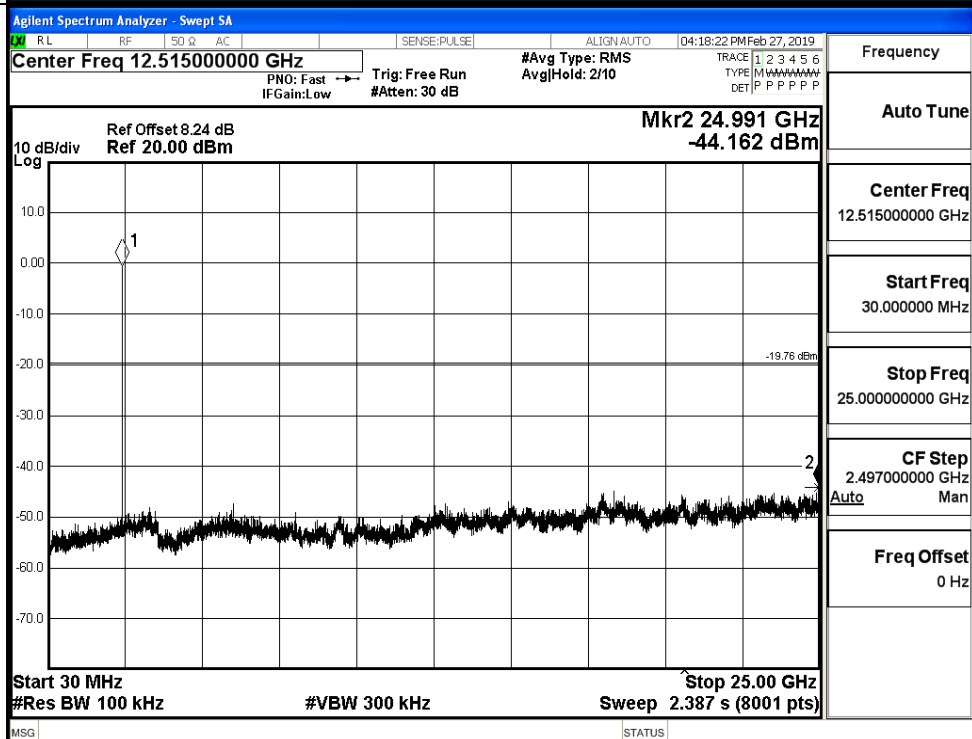


GFSK_MCH_Graphs

Pref

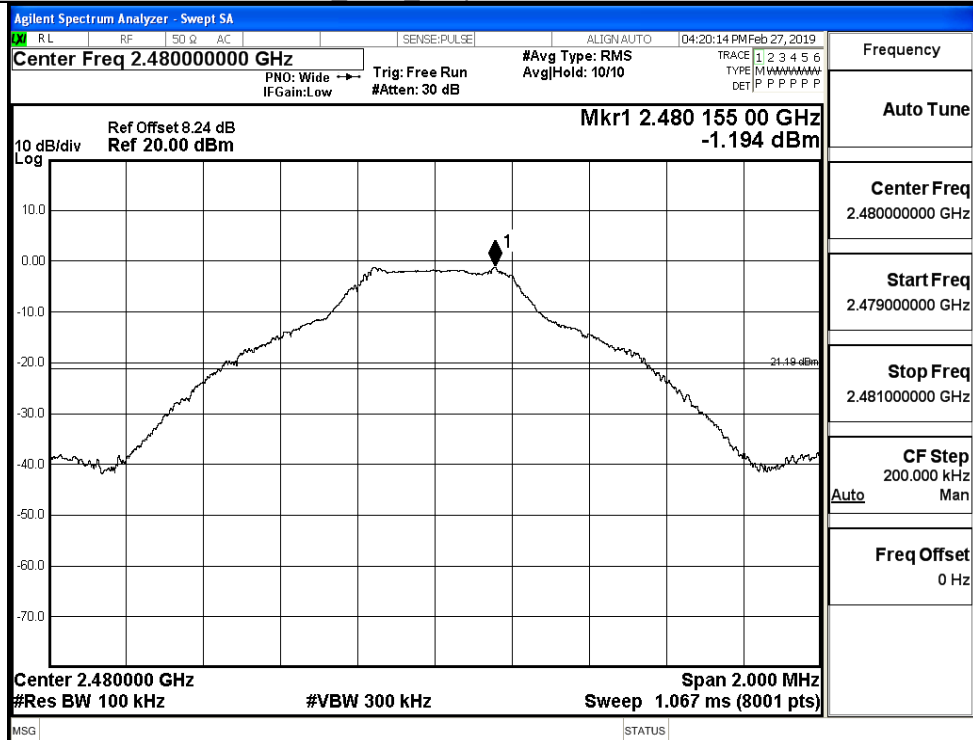


Puw

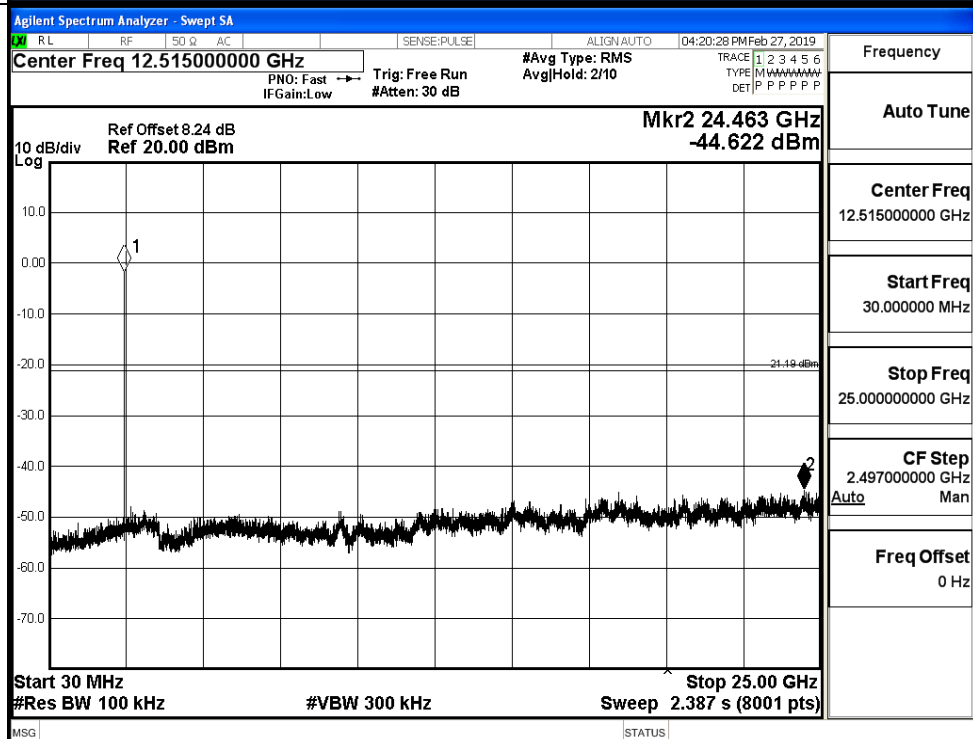


GFSK_HCH_Graphs

Pref

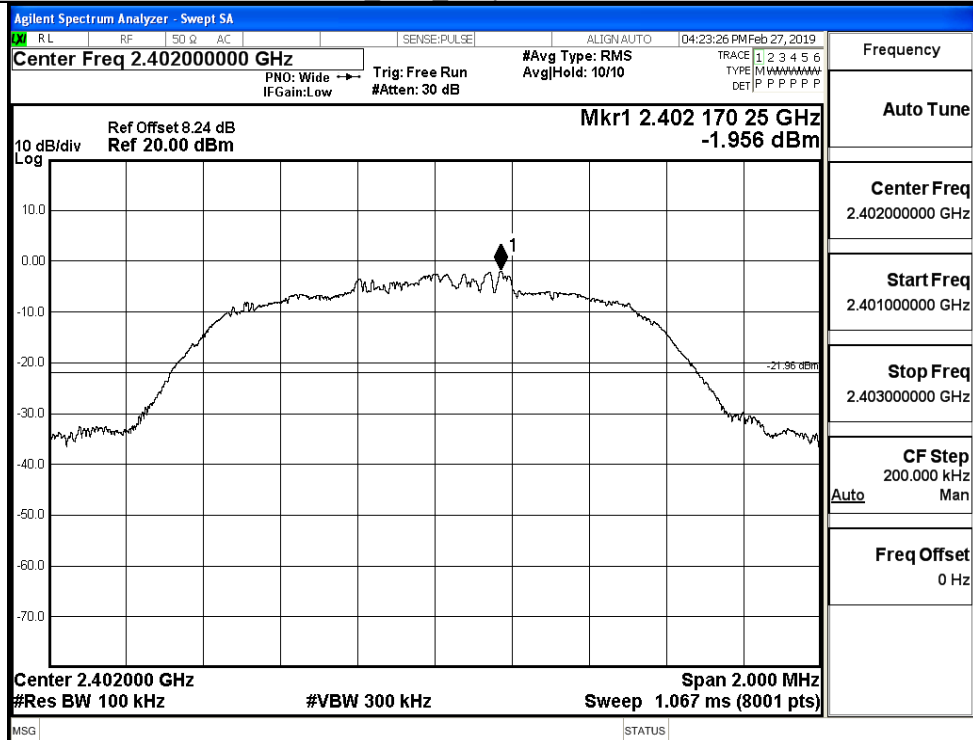


Puw

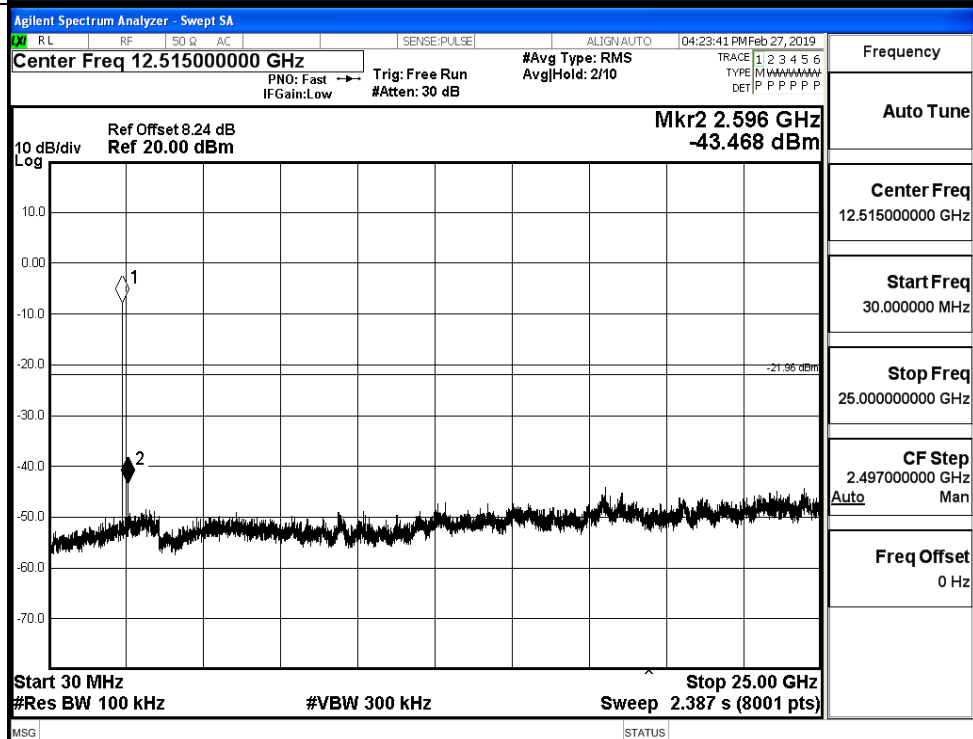


π /4DQPSK LCH_Graphs

Pref

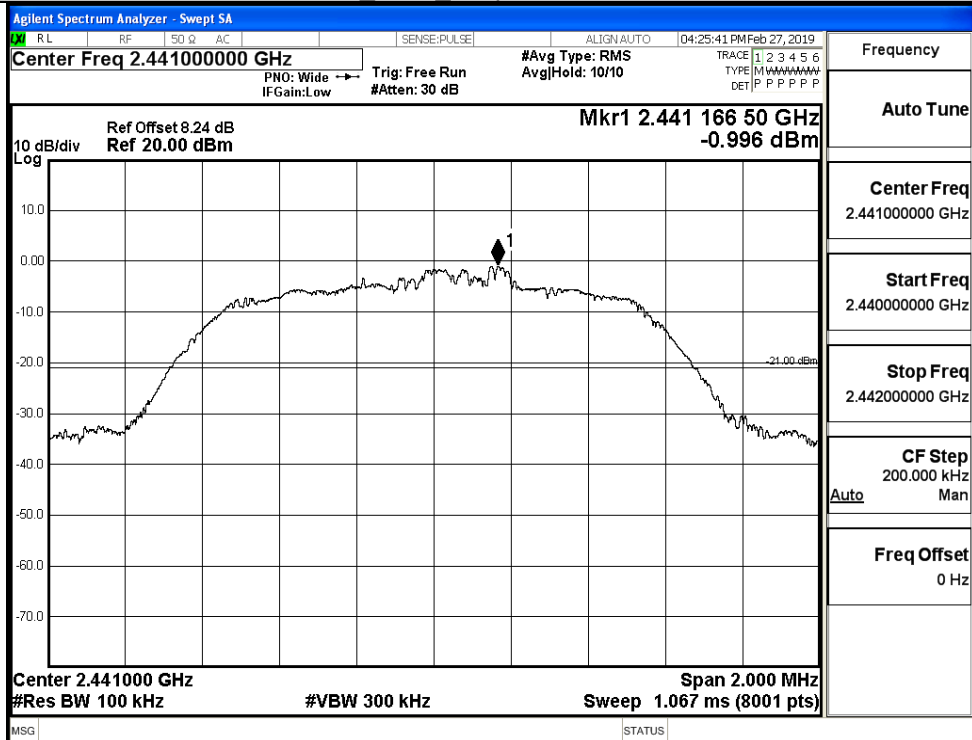


Puw

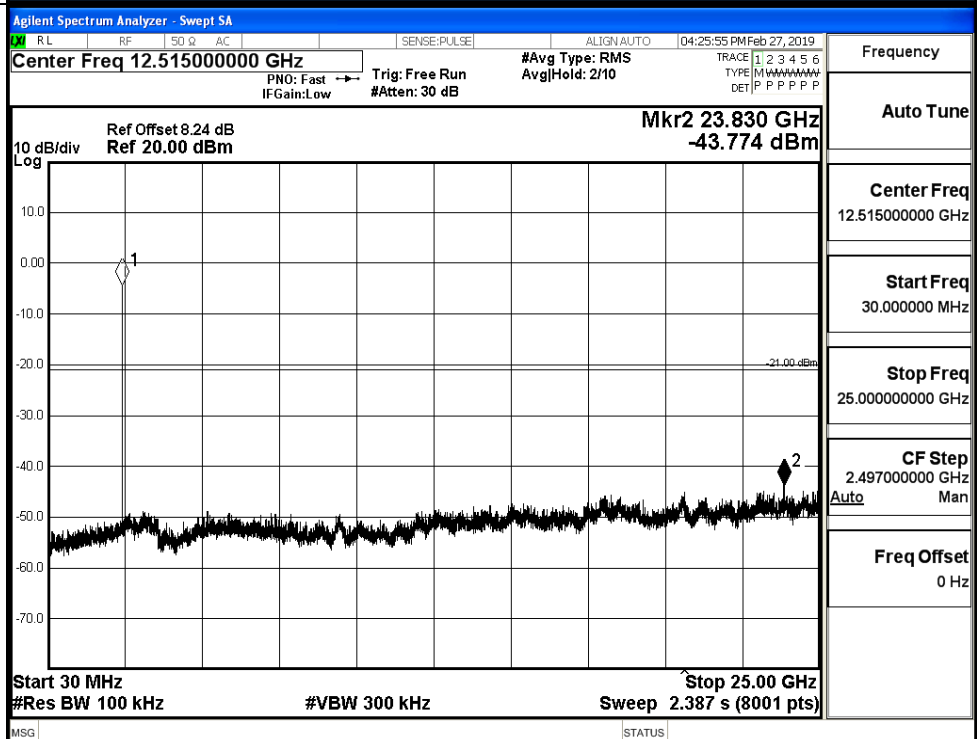


π /4DQPSK_MCH_Graphs

Pref

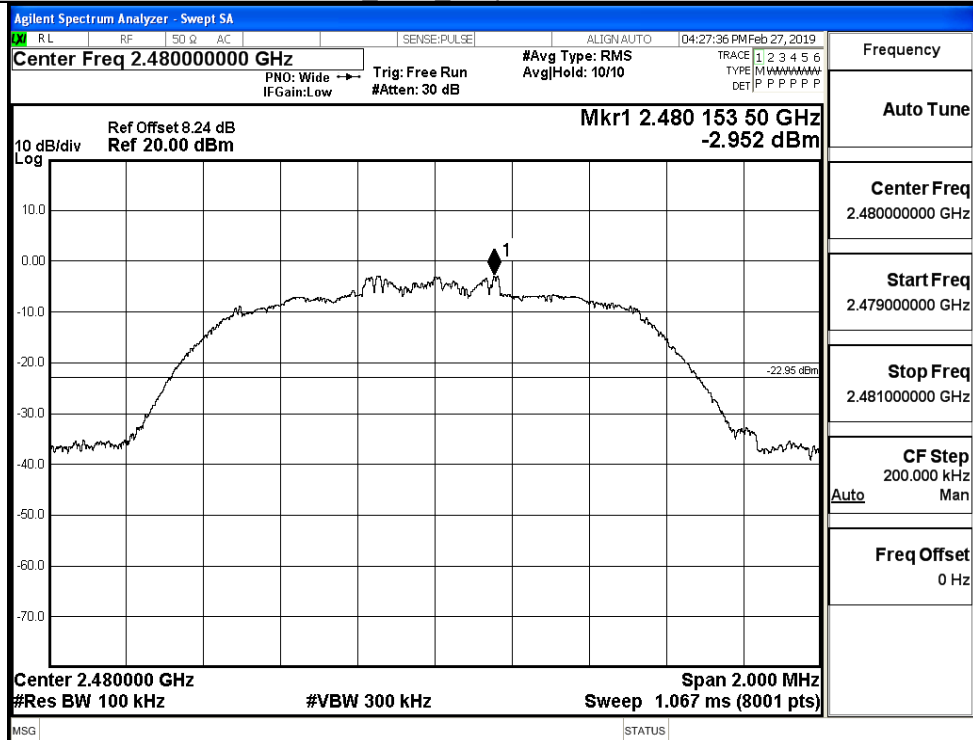


Puw

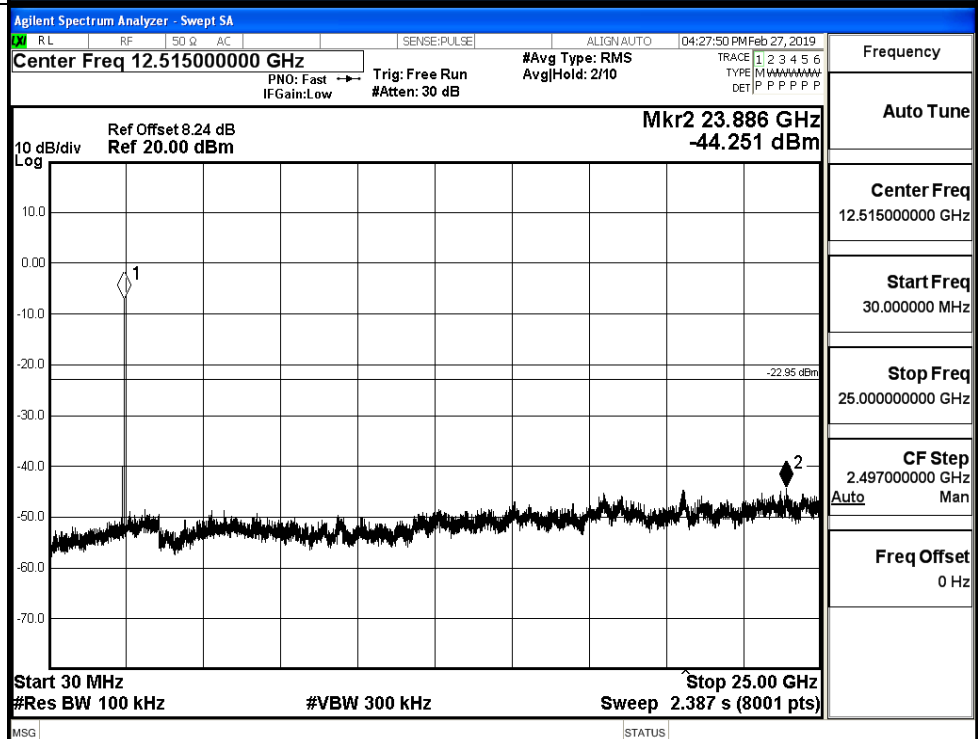


π /4DQPSK_HCH_Graphs

Pref

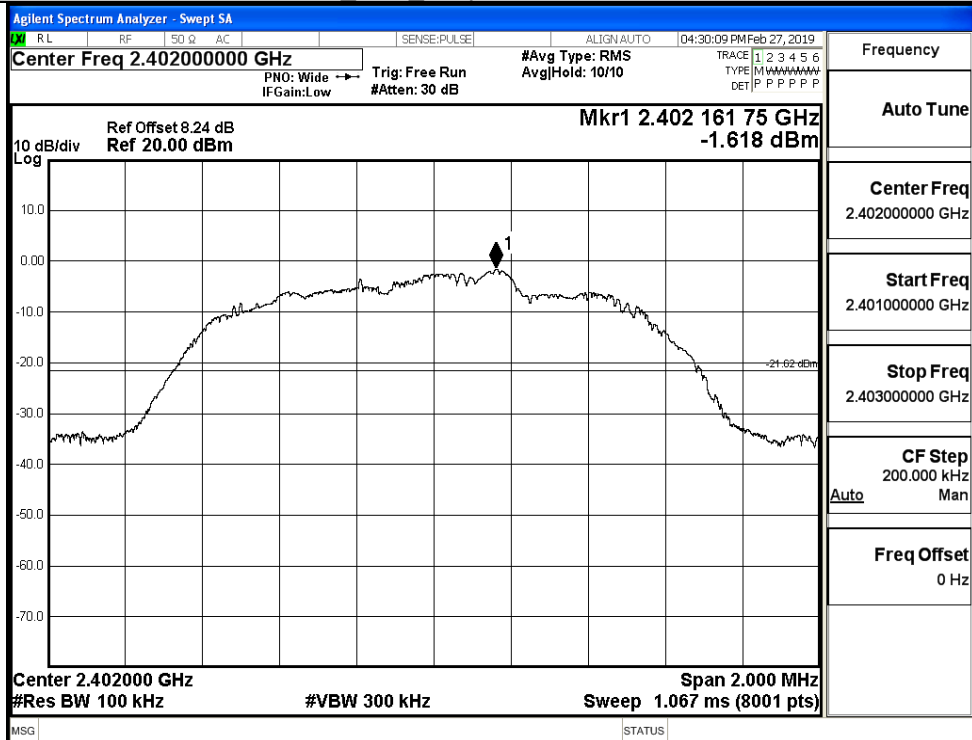


Puw

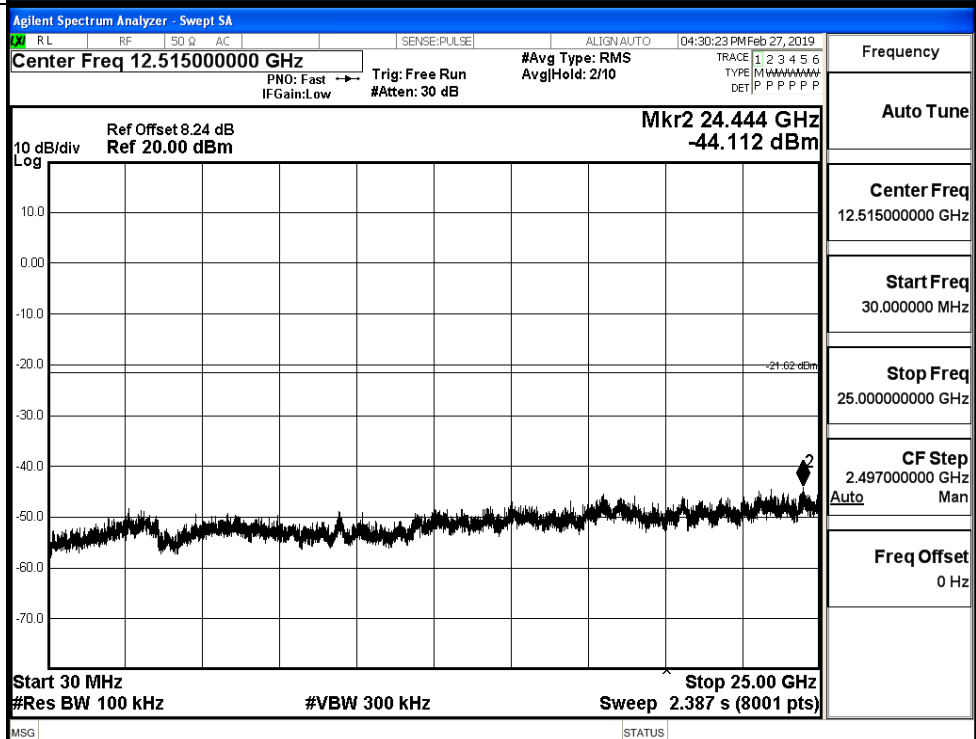


8DPSK_LCH_Graphs

Pref

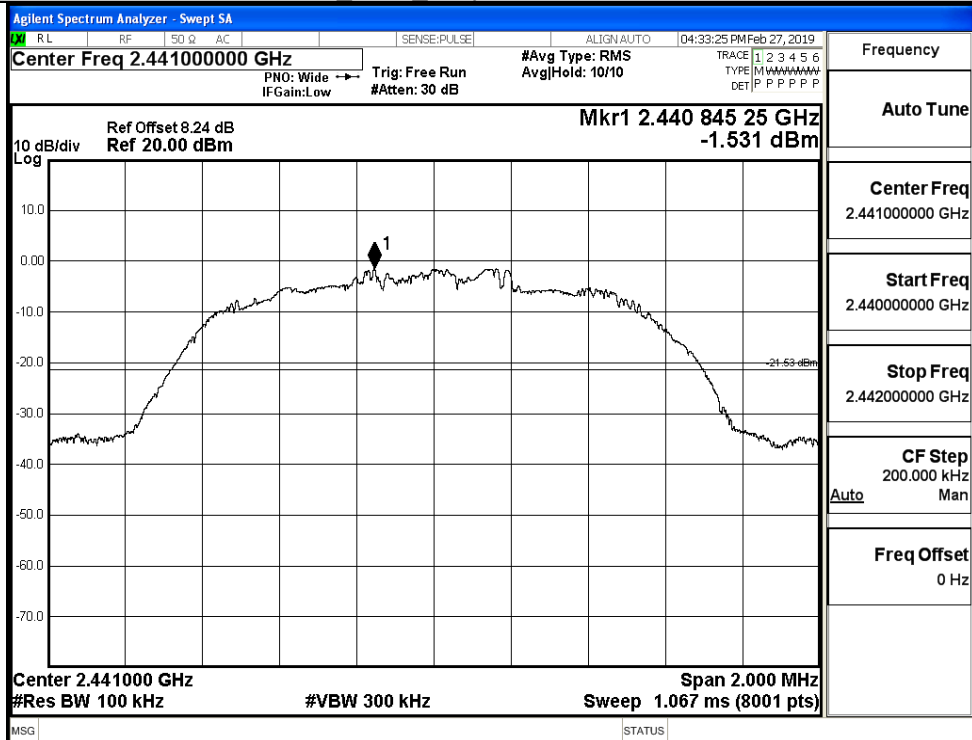


Puw

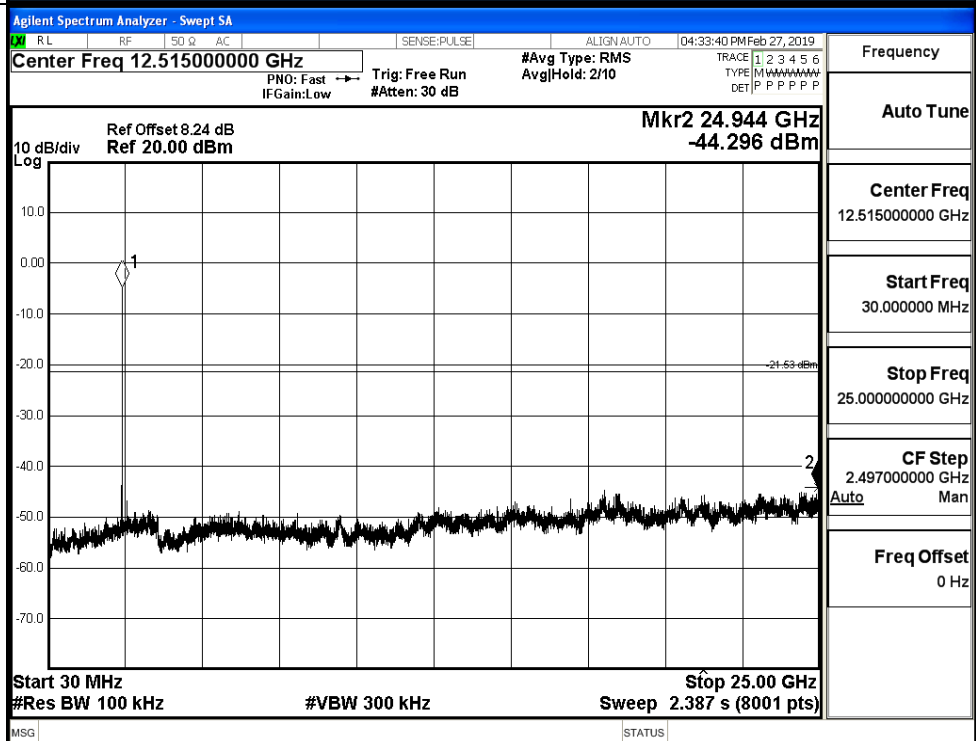


8DPSK_MCH_Graphs

Pref

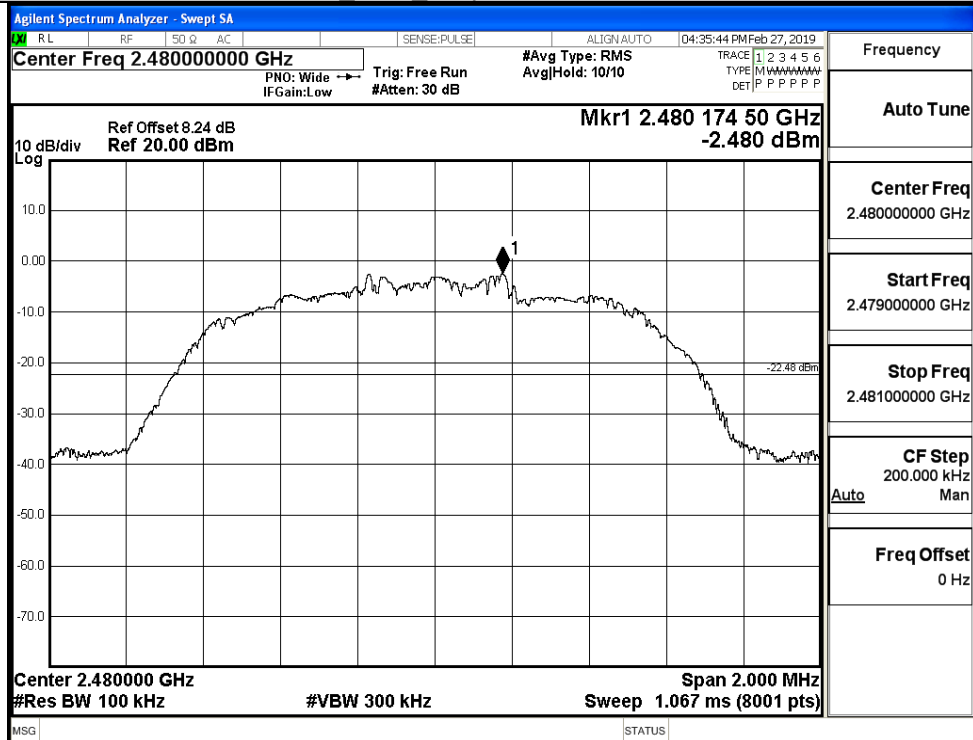


Puw

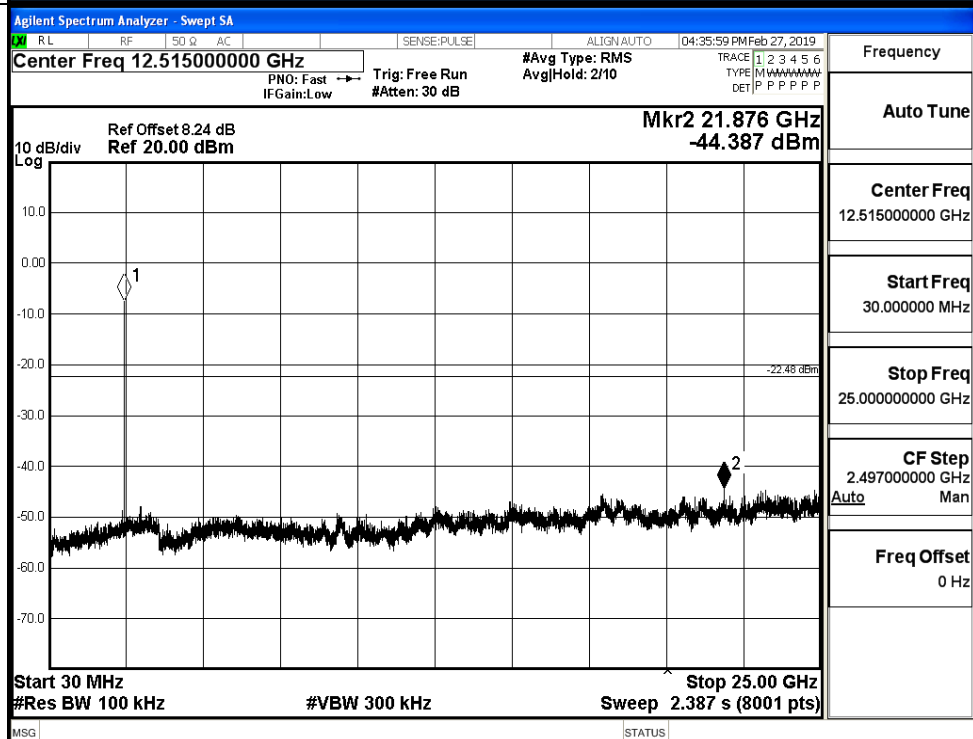


8DPSK_HCH_Graphs

Pref



Puw

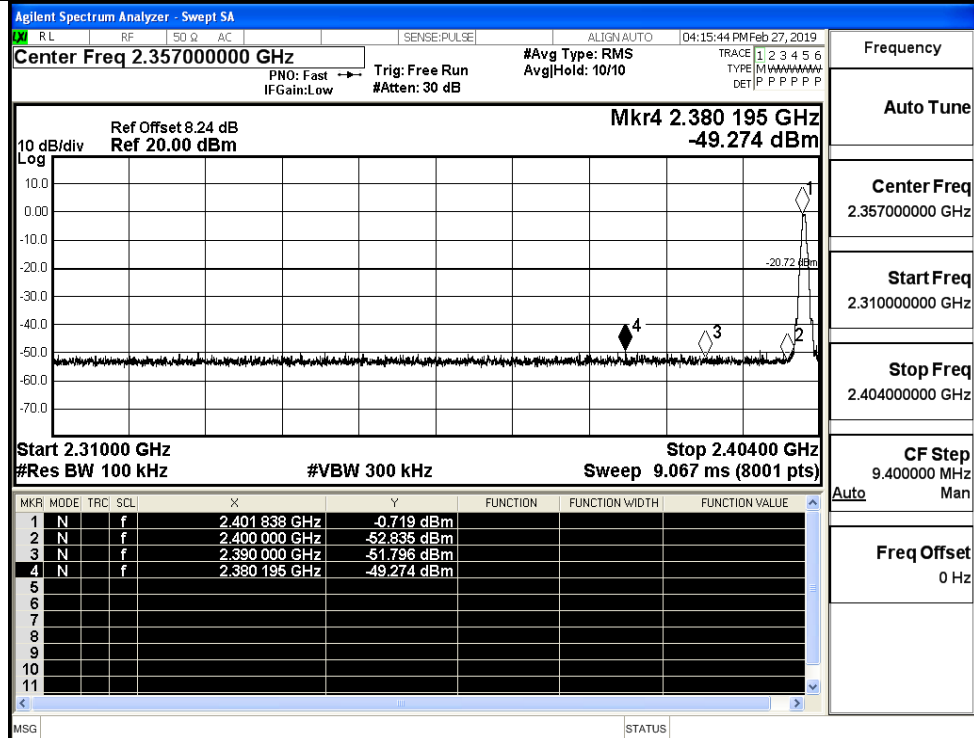


A.7 Band-edge for RF Conducted Emissions

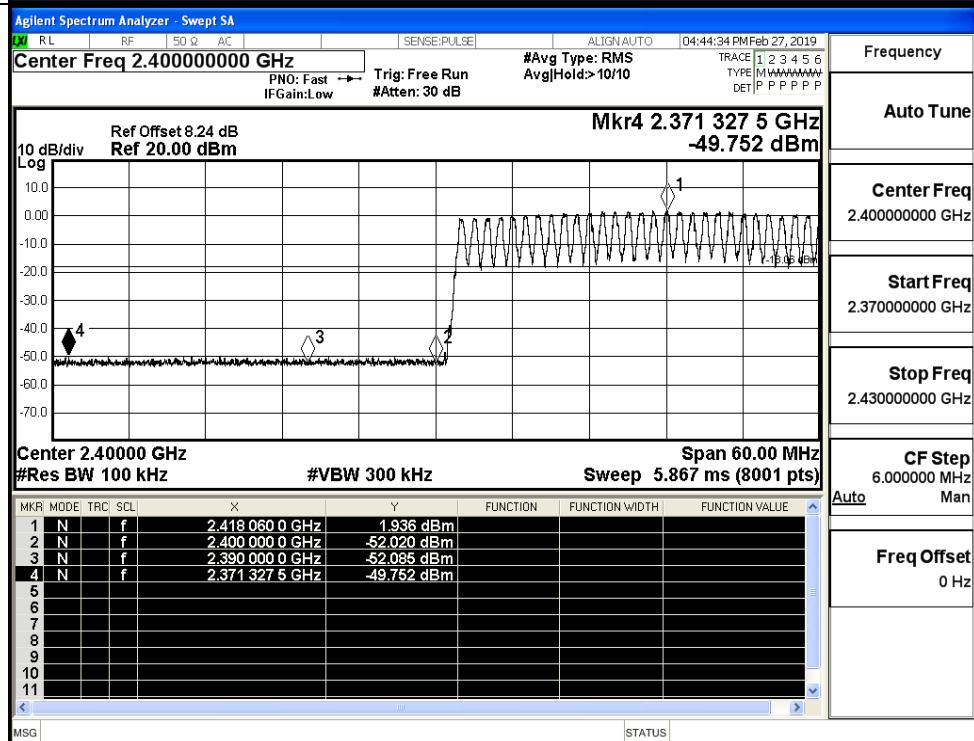
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.719	Off	-49.274	-20.72	PASS
			1.936	On	-49.752	-18.06	PASS
	HCH	2480	-1.116	Off	-49.697	-21.12	PASS
			2.006	On	-48.822	-17.99	PASS
$\pi/4$ DQPSK	LCH	2402	-4.609	Off	-49.140	-24.61	PASS
			0.743	On	-48.676	-19.26	PASS
	HCH	2480	-2.206	Off	-48.846	-22.21	PASS
			0.562	On	-48.584	-19.44	PASS
8DPSK	LCH	2402	-4.208	Off	-49.788	-24.21	PASS
			0.575	On	-48.877	-19.43	PASS
	HCH	2480	-2.262	Off	-49.598	-22.26	PASS
			0.551	On	-49.492	-19.45	PASS

Test Graphs

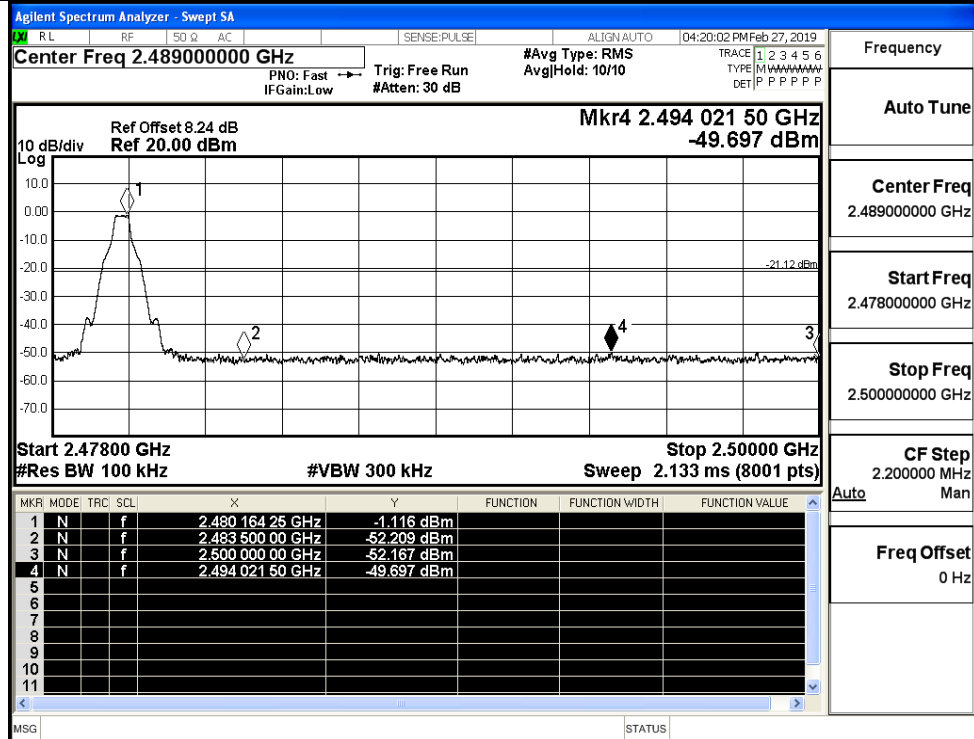
GFSK/LCH/No Hop



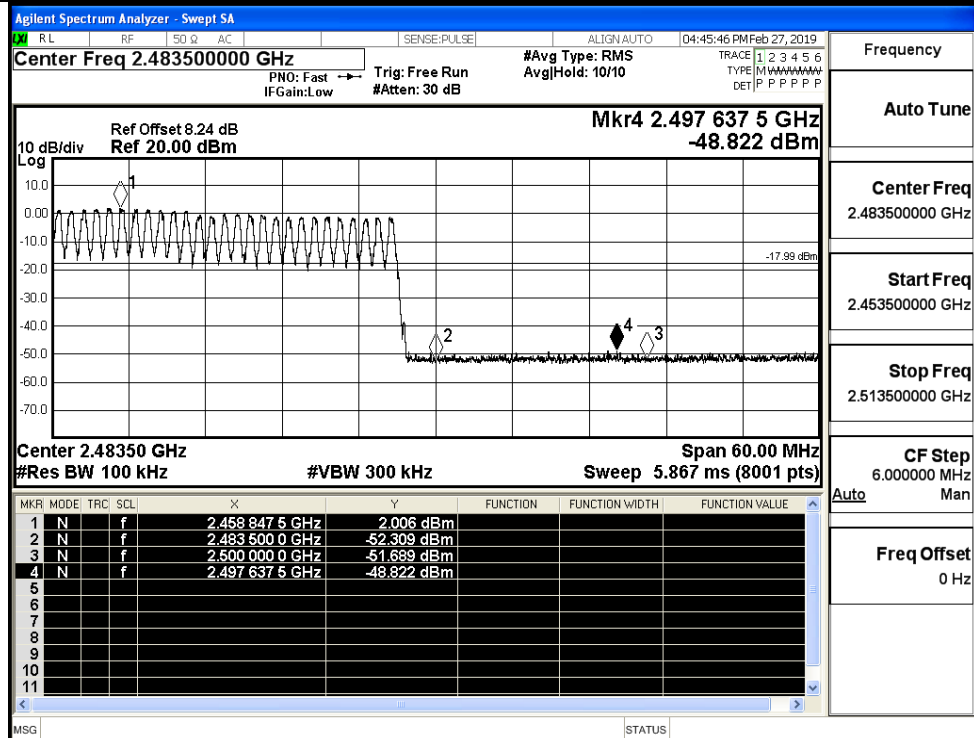
GFSK/LCH/Hop



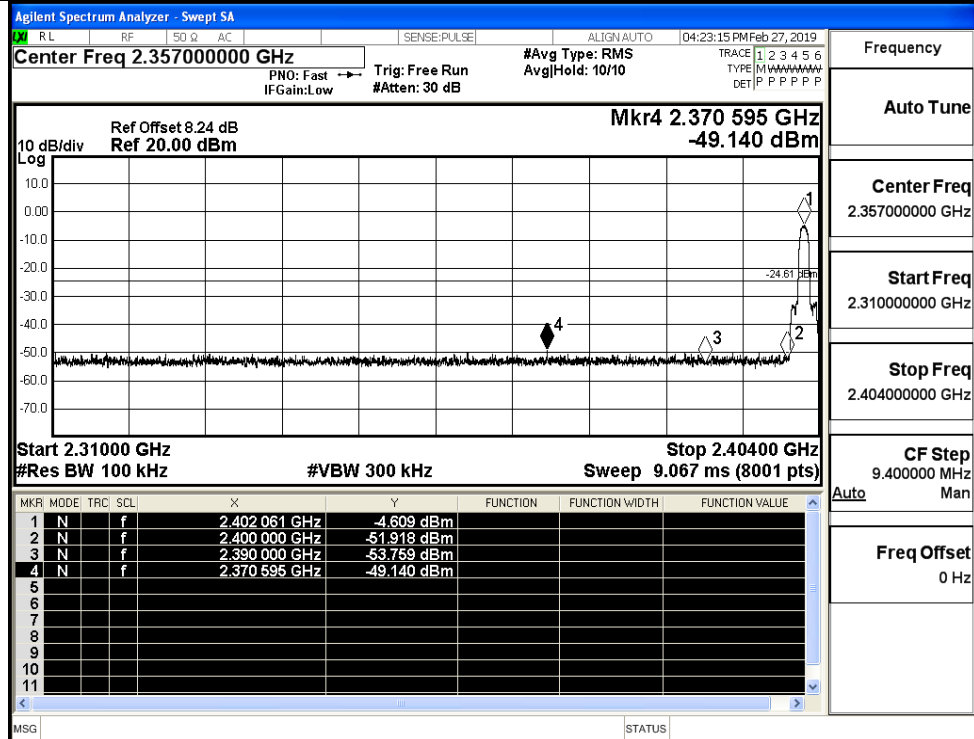
GFSK/HCH/No Hop



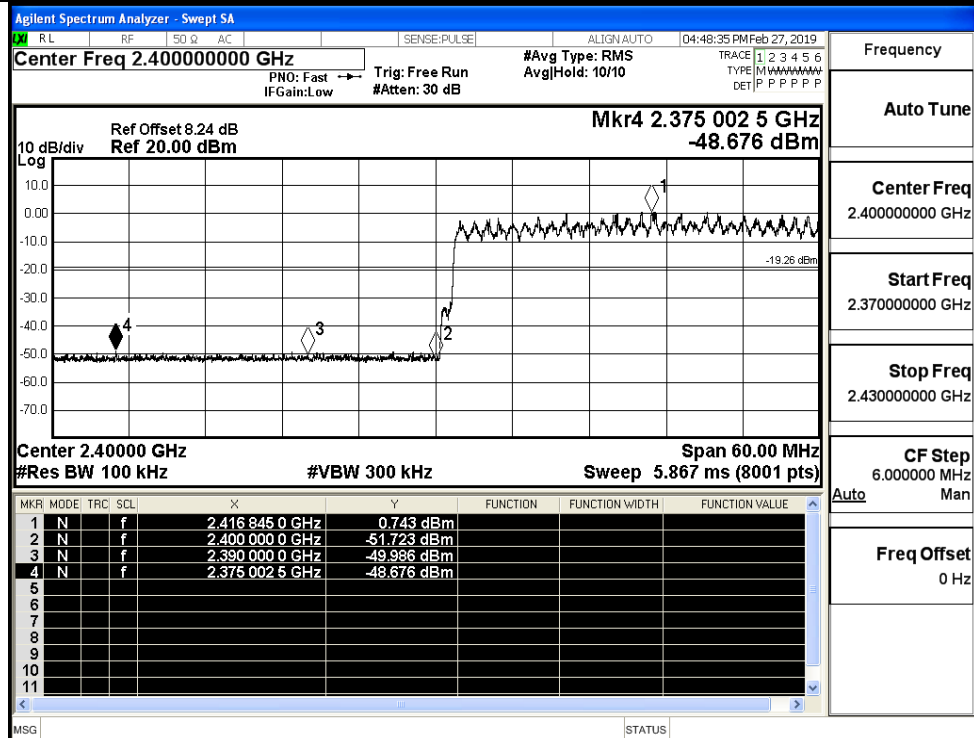
GFSK/HCH/Hop



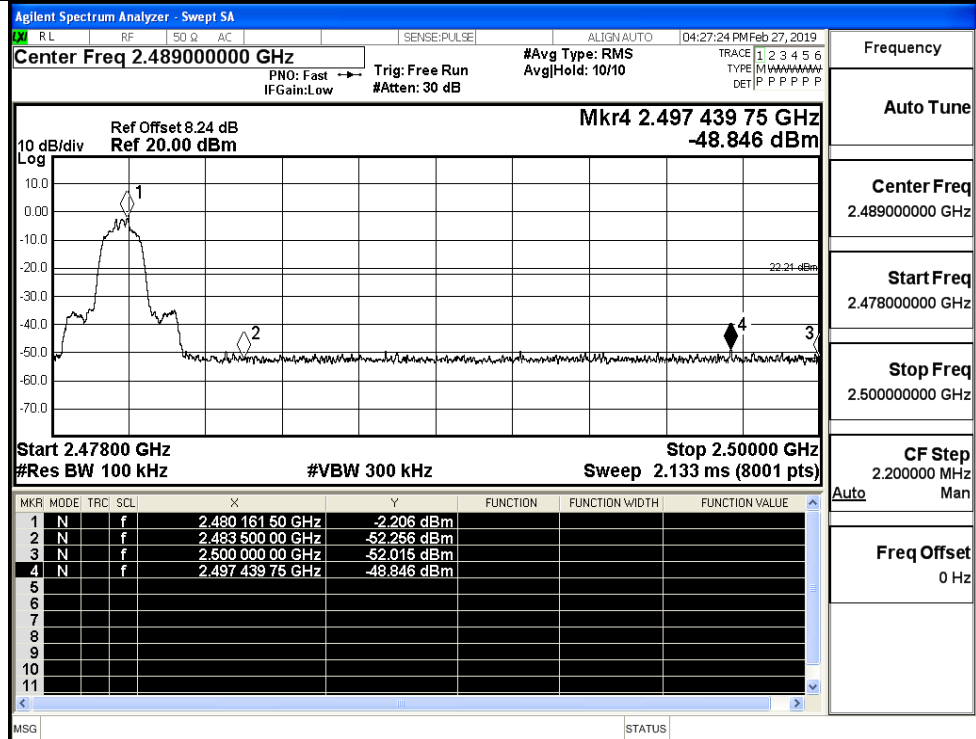
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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

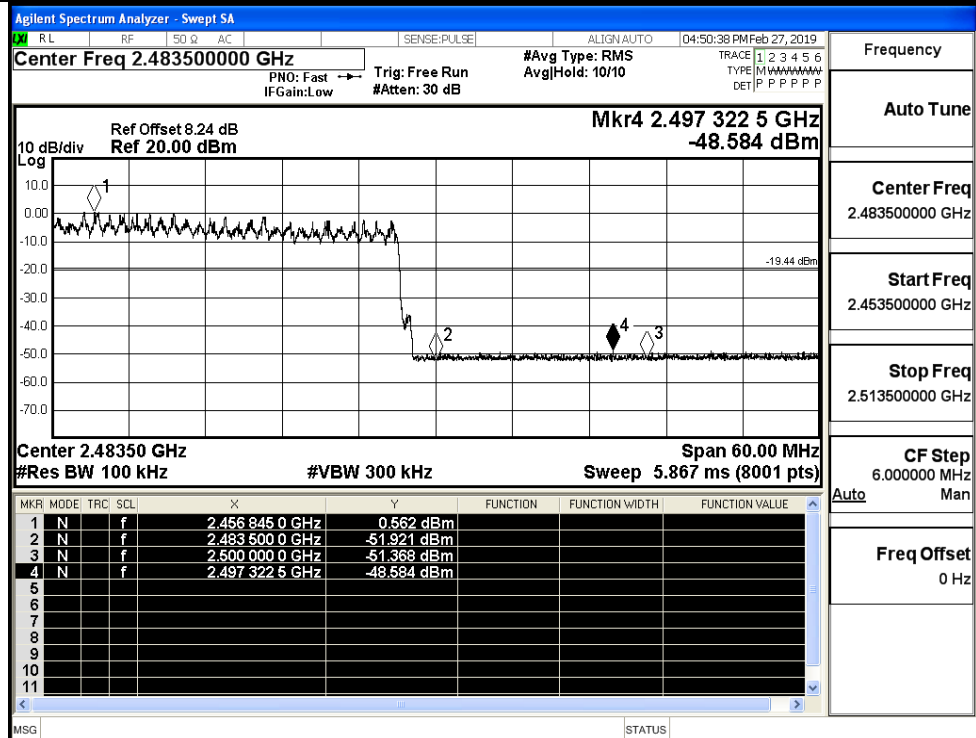


Frequency

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

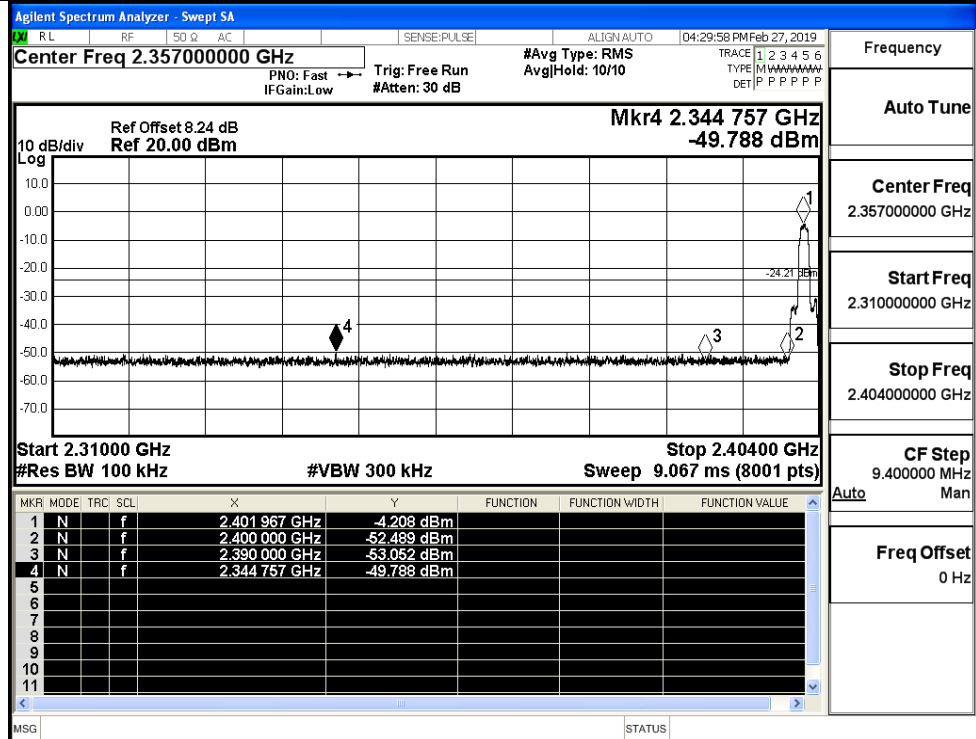


Frequency

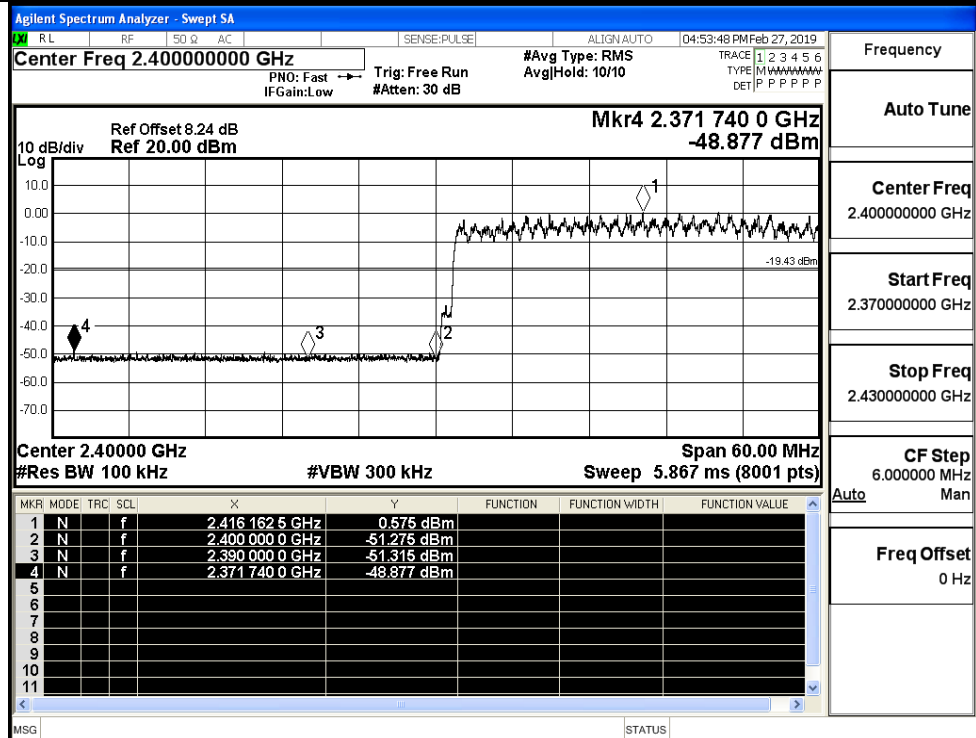
Auto Tune

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

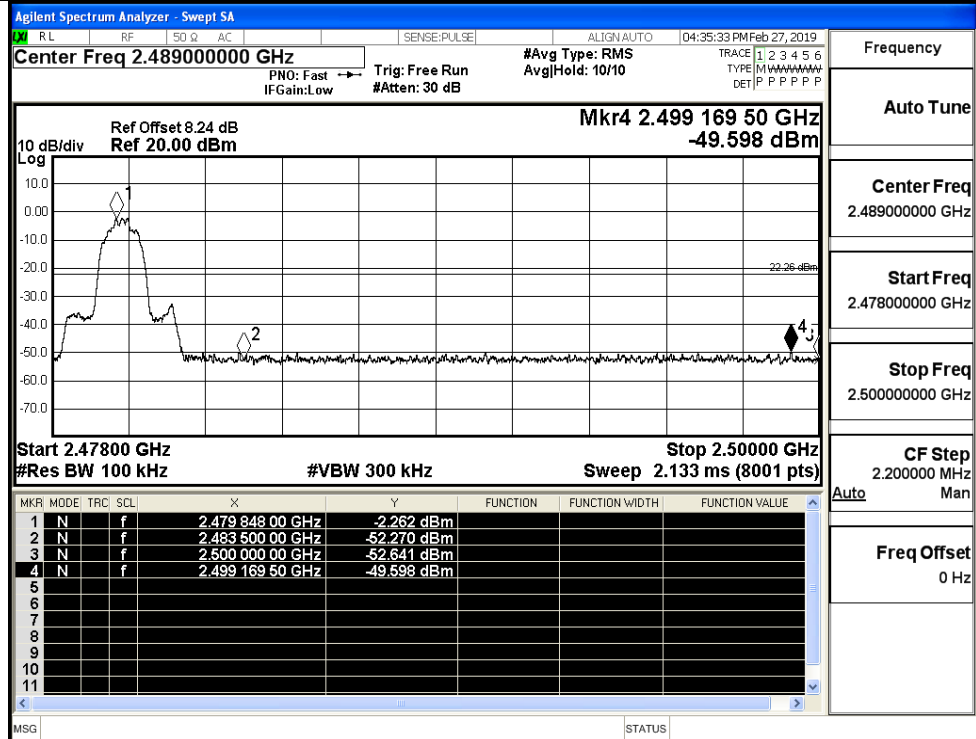
8DPSK/LCH/No Hop



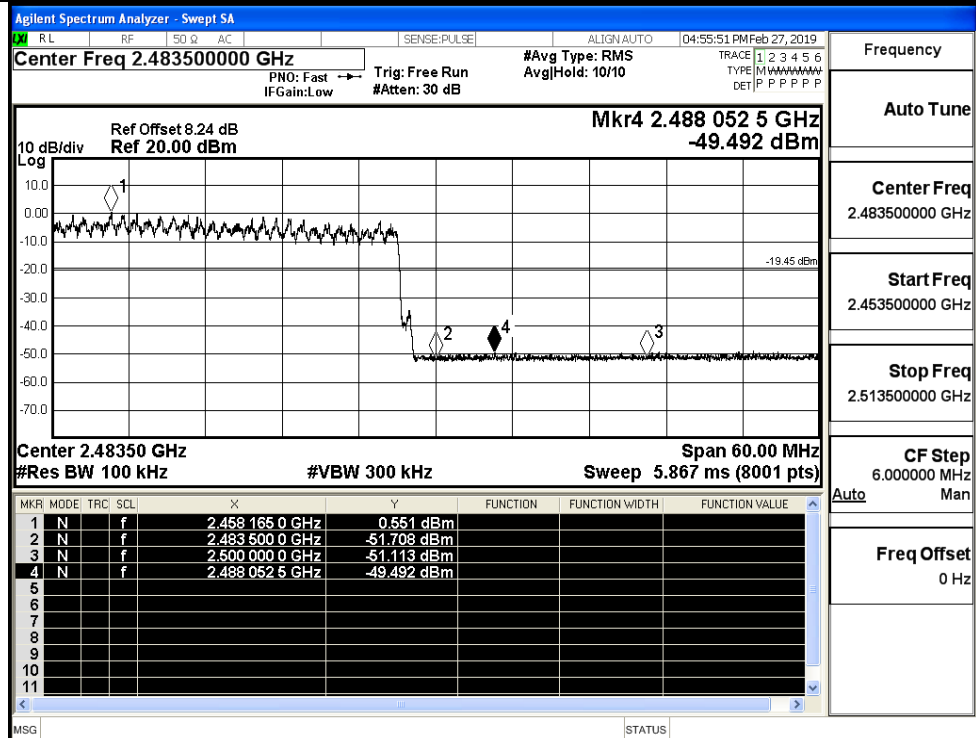
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



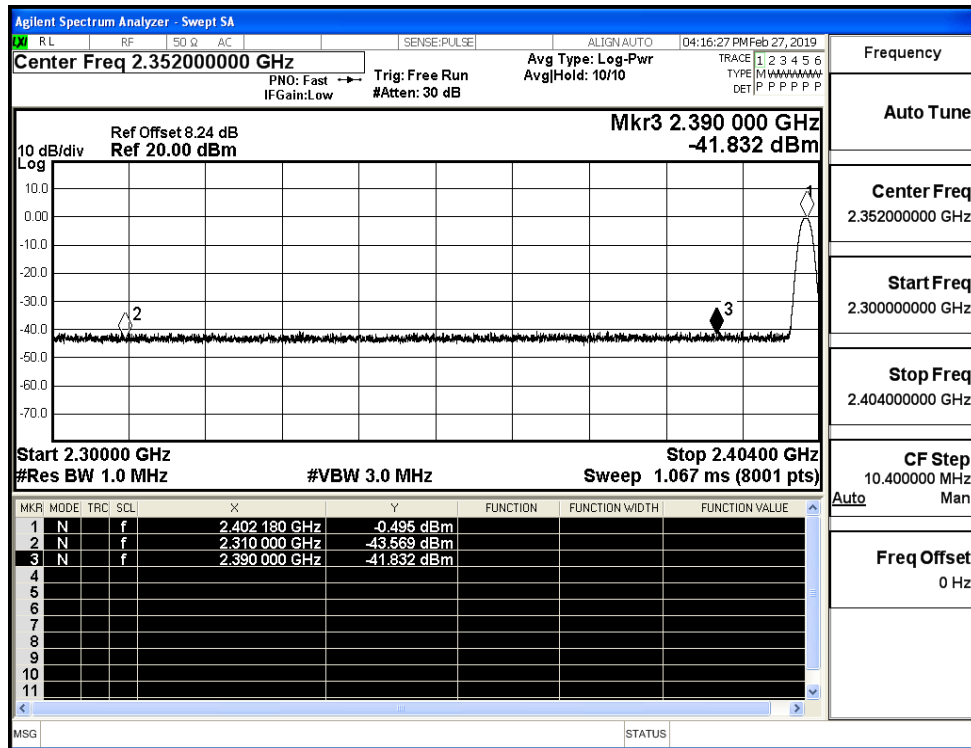
8DPSK/HCH/Hop



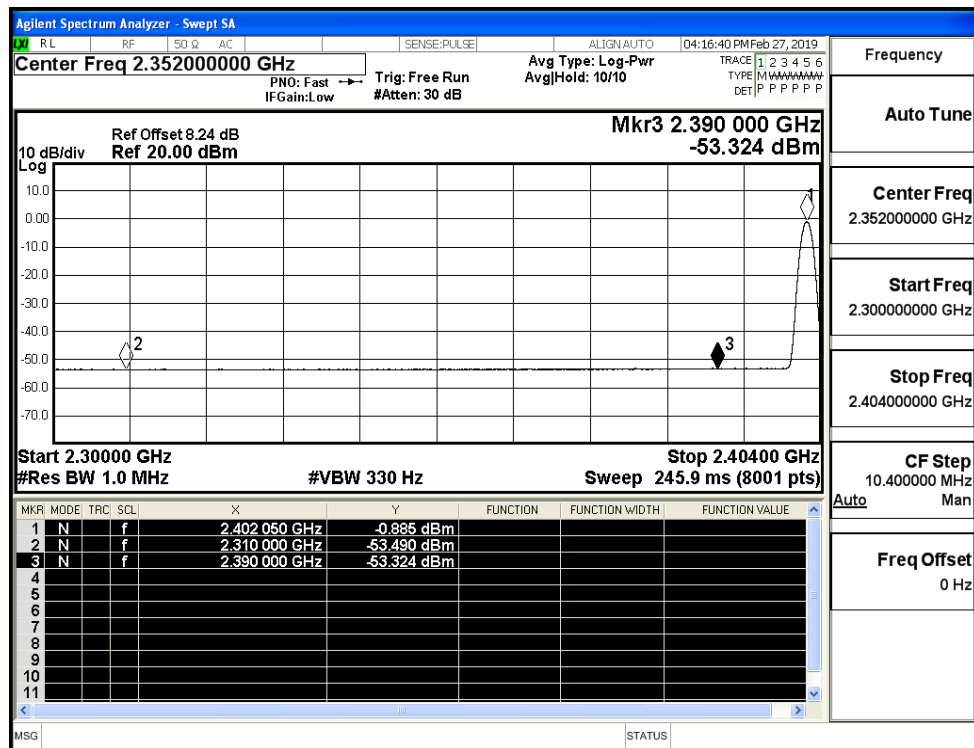
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.57	2.0	0	53.69	PEAK	74	PASS
	Off	2310.0	-53.49	2.0	0	43.77	AV	54	PASS
	Off	2390.0	-41.83	2.0	0	55.43	PEAK	74	PASS
	Off	2390.0	-53.32	2.0	0	43.93	AV	54	PASS
	Off	2483.5	-43.44	2.0	0	53.82	PEAK	74	PASS
	Off	2483.5	-52.99	2.0	0	44.27	AV	54	PASS
	Off	2500.0	-43.28	2.0	0	53.98	PEAK	74	PASS
	Off	2500.0	-52.95	2.0	0	44.31	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.54	2.0	0	54.72	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	43.76	AV	54	PASS
	Off	2390.0	-43.15	2.0	0	54.11	PEAK	74	PASS
	Off	2390.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2483.5	-42.71	2.0	0	54.55	PEAK	74	PASS
	Off	2483.5	-53.05	2.0	0	44.20	AV	54	PASS
	Off	2500.0	-42.44	2.0	0	54.82	PEAK	74	PASS
	Off	2500.0	-52.75	2.0	0	44.50	AV	54	PASS
8DPSK	Off	2310.0	-43.21	2.0	0	54.05	PEAK	74	PASS
	Off	2310.0	-53.58	2.0	0	43.68	AV	54	PASS
	Off	2390.0	-42.96	2.0	0	54.30	PEAK	74	PASS
	Off	2390.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2483.5	-42.42	2.0	0	54.84	PEAK	74	PASS
	Off	2483.5	-52.96	2.0	0	44.30	AV	54	PASS
	Off	2500.0	-43.01	2.0	0	54.25	PEAK	74	PASS
	Off	2500.0	-52.84	2.0	0	44.42	AV	54	PASS

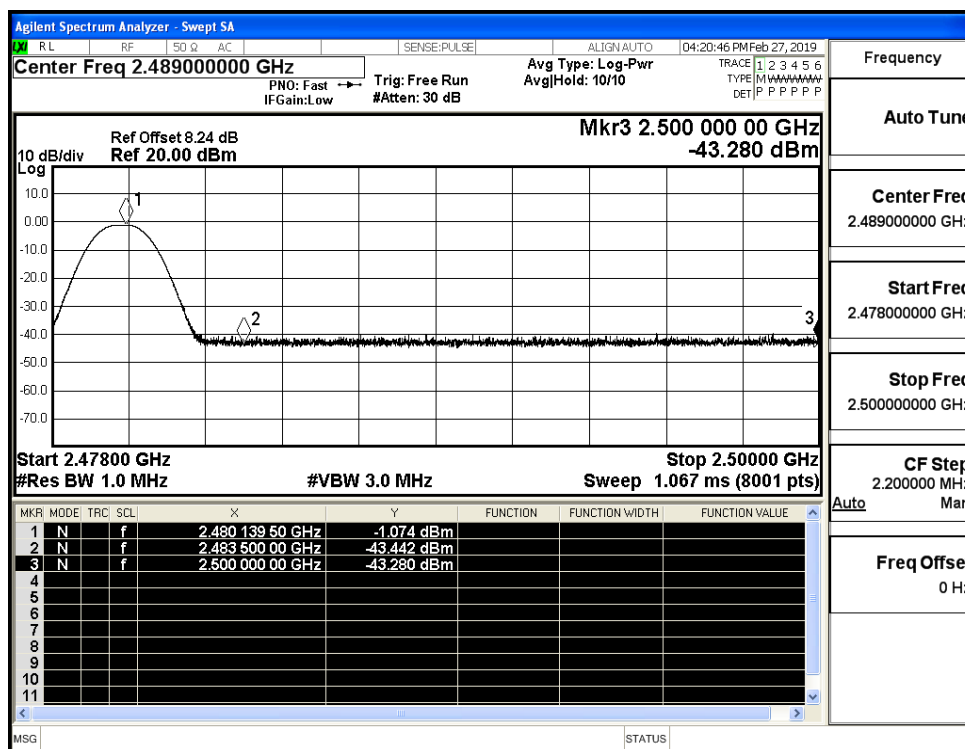
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



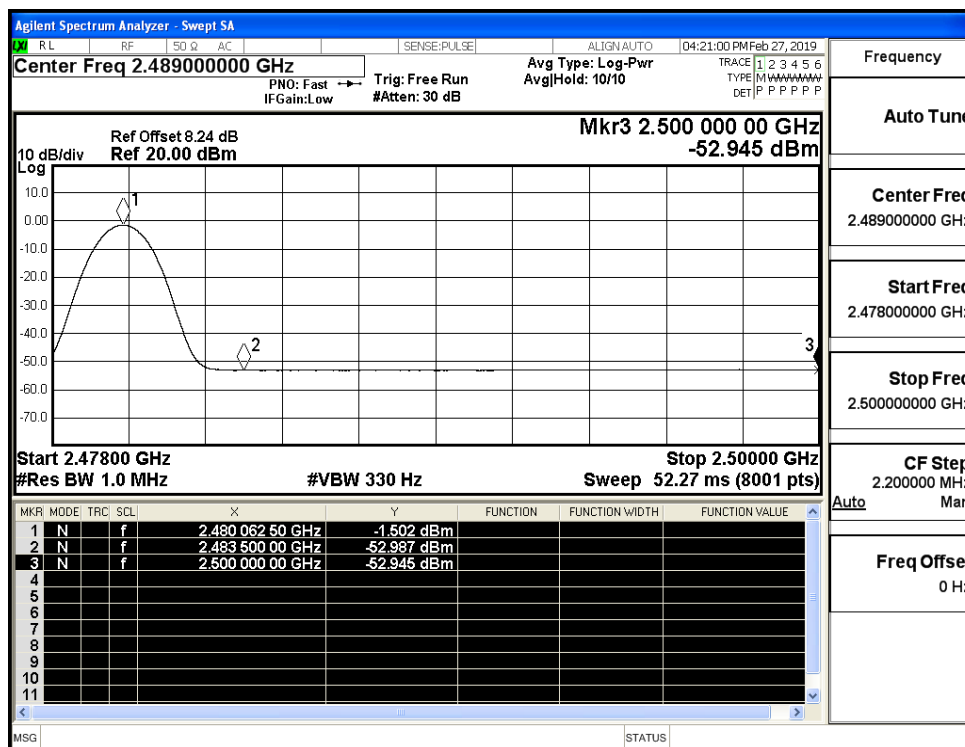
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

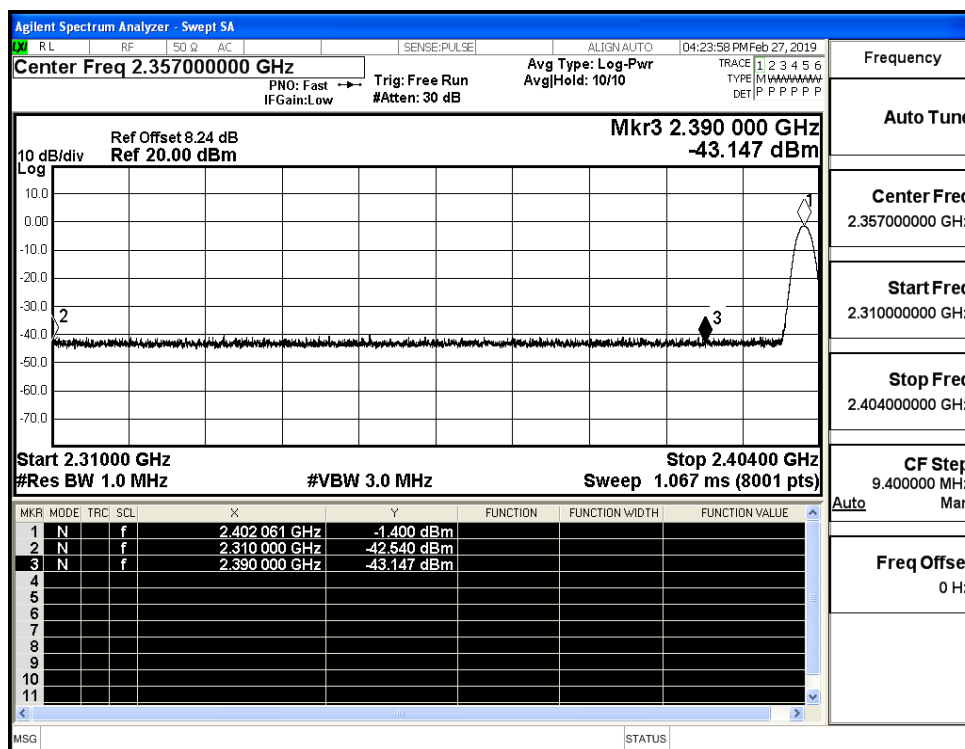
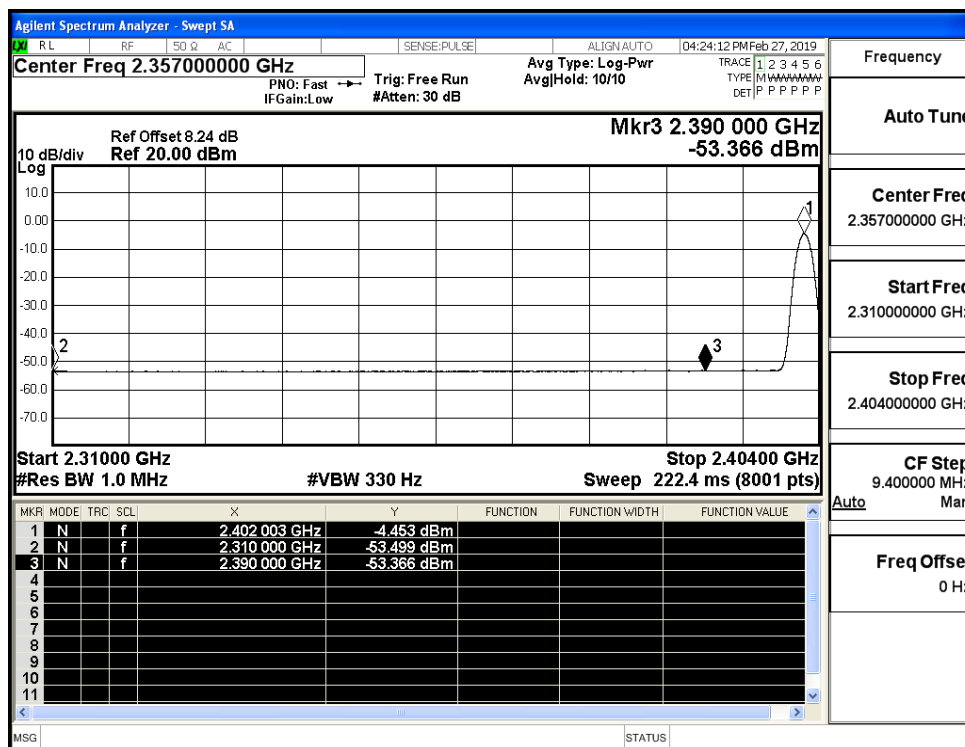


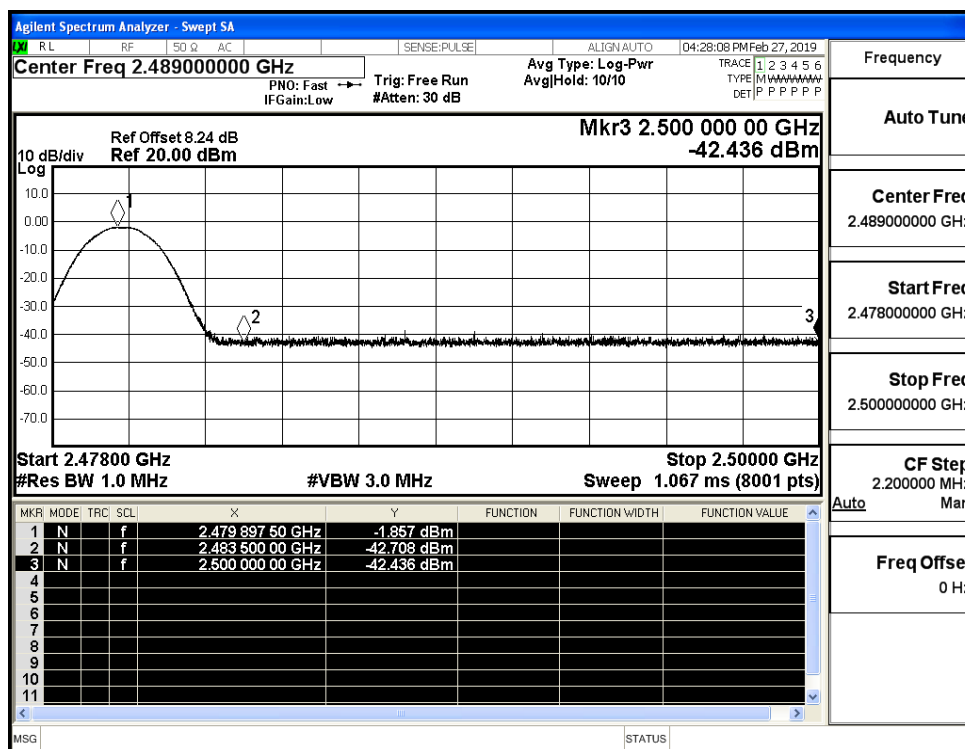
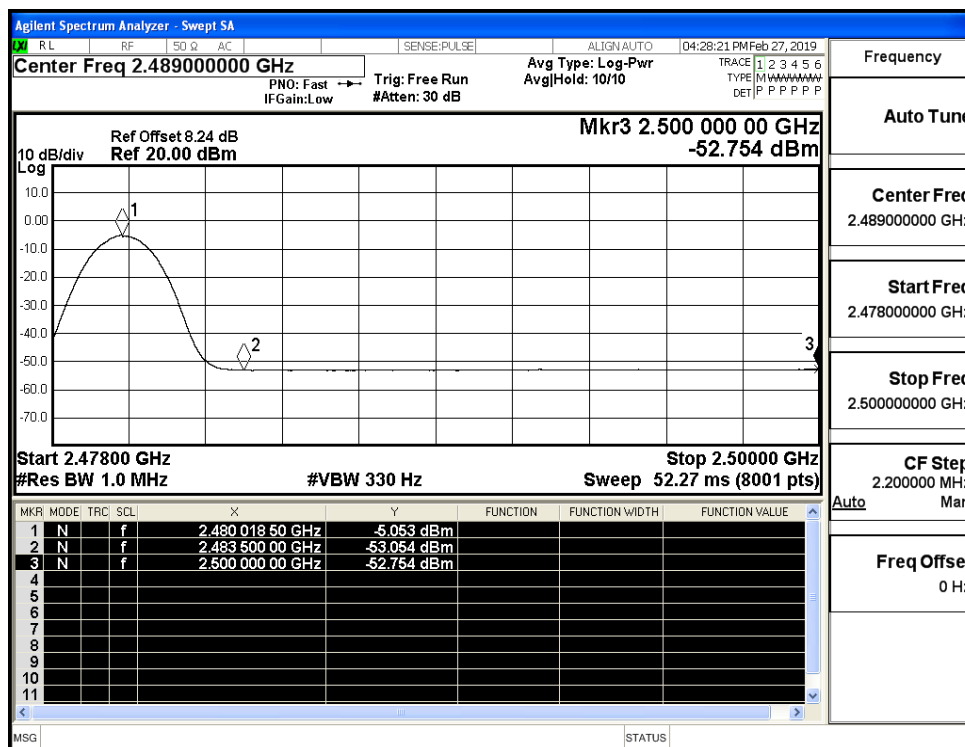
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



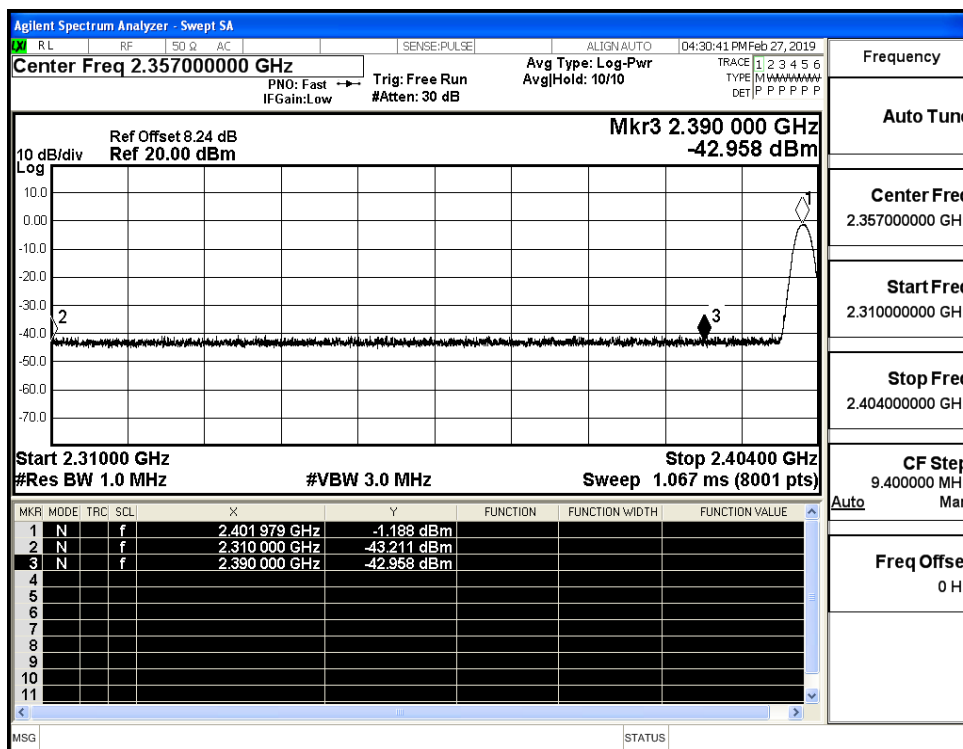
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



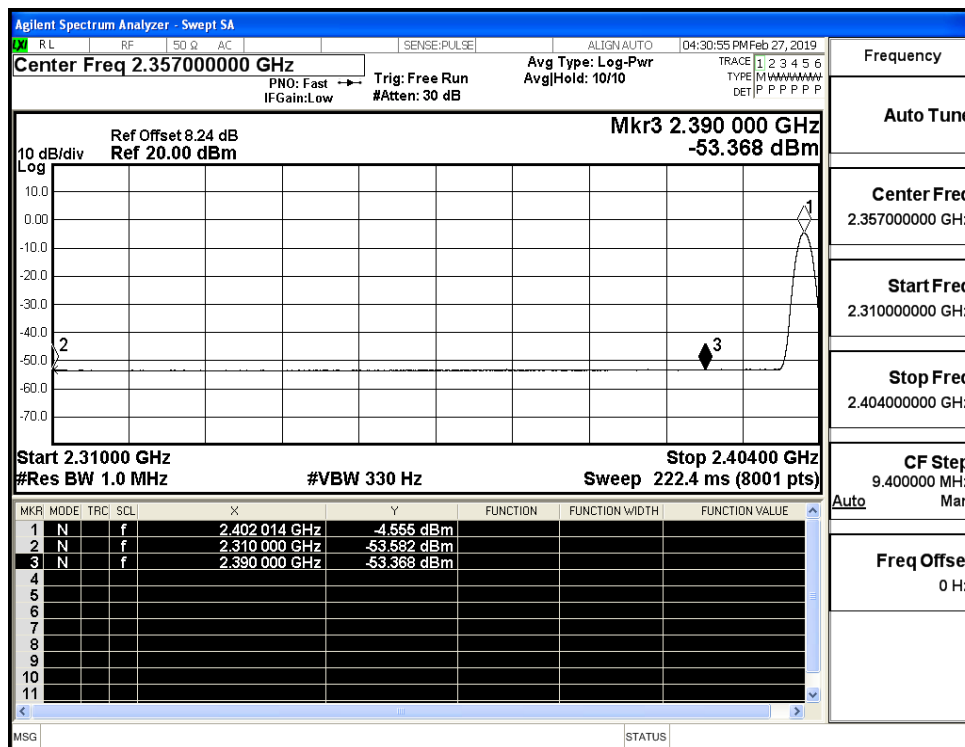
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

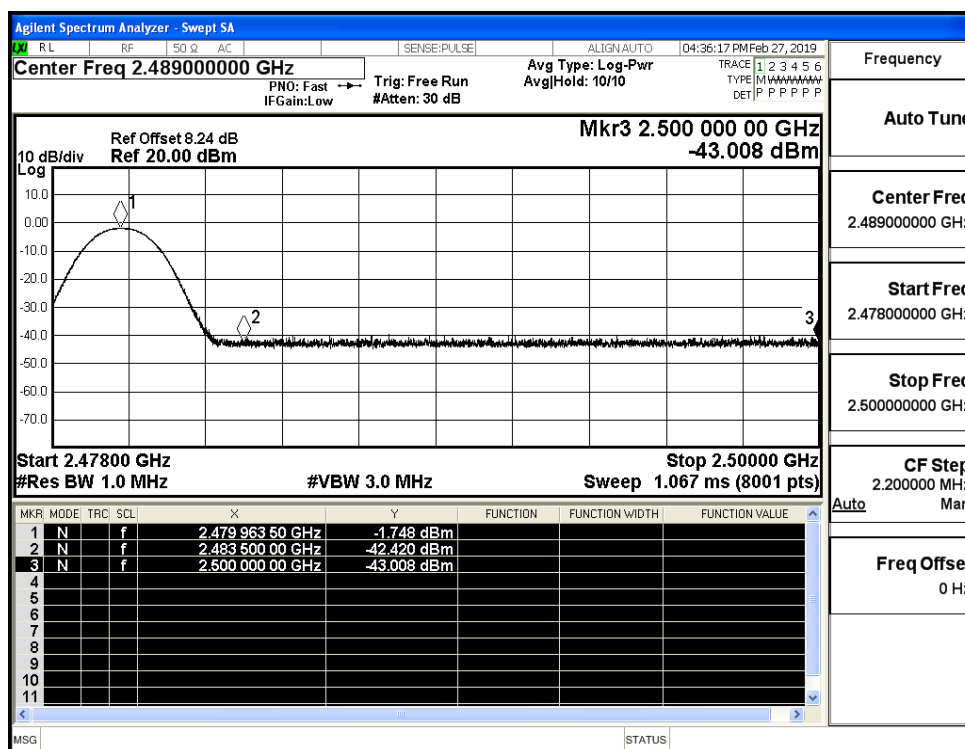
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

