

Appendix A

RF Test Data for BT V4.2 (BDR/EDR) (Conducted Measurement)

Product Name: Astra 3D Bluetooth® Headphones

Trade Mark: Gemline

Test Model: 100237-001B

Environmental Conditions

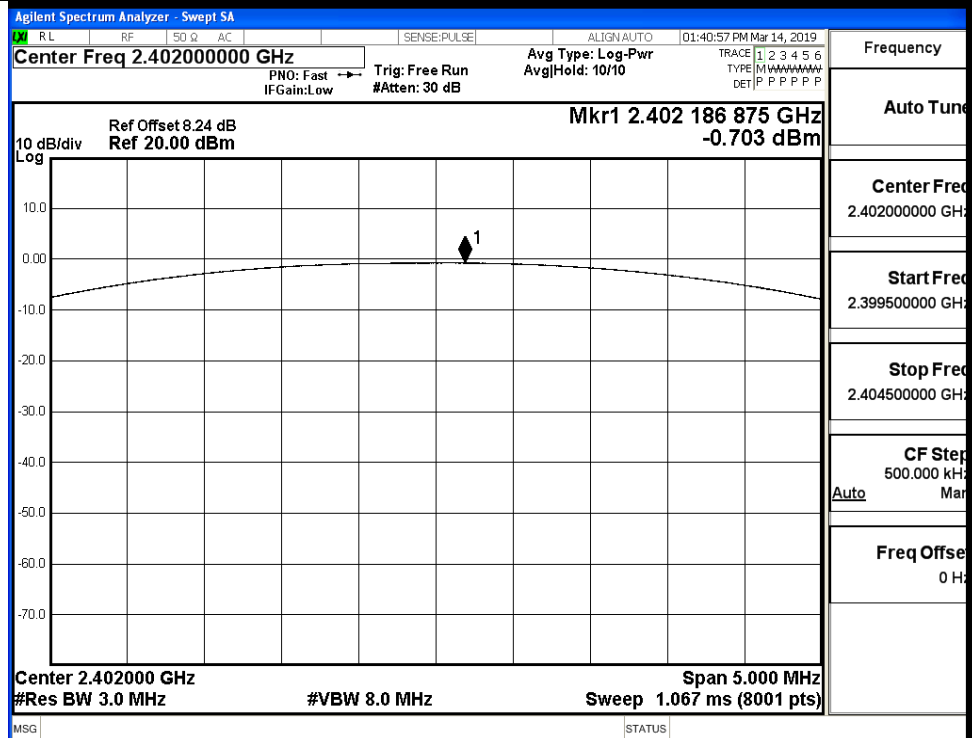
Temperature:	24.5 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.Zeng
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

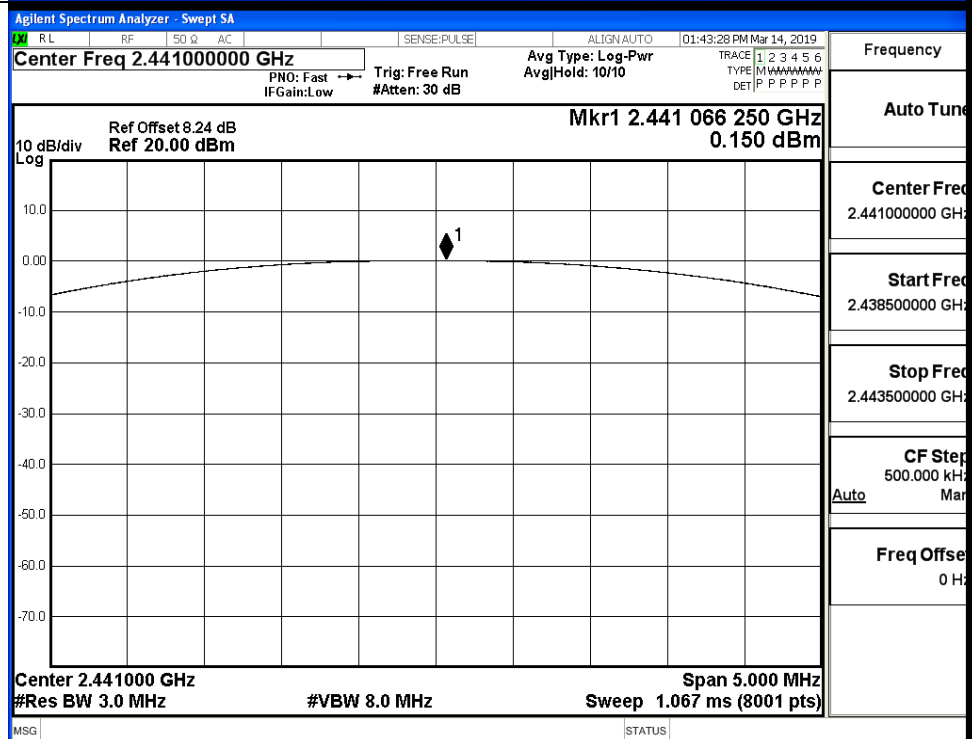
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.703	21	PASS
	MCH	0.150	21	PASS
	HCH	-0.828	21	PASS
$\pi/4$ DQPSK	LCH	-1.216	21	PASS
	MCH	-0.474	21	PASS
	HCH	-1.513	21	PASS
8DPSK	LCH	-1.121	21	PASS
	MCH	-0.310	21	PASS
	HCH	-1.348	21	PASS

Test Graphs

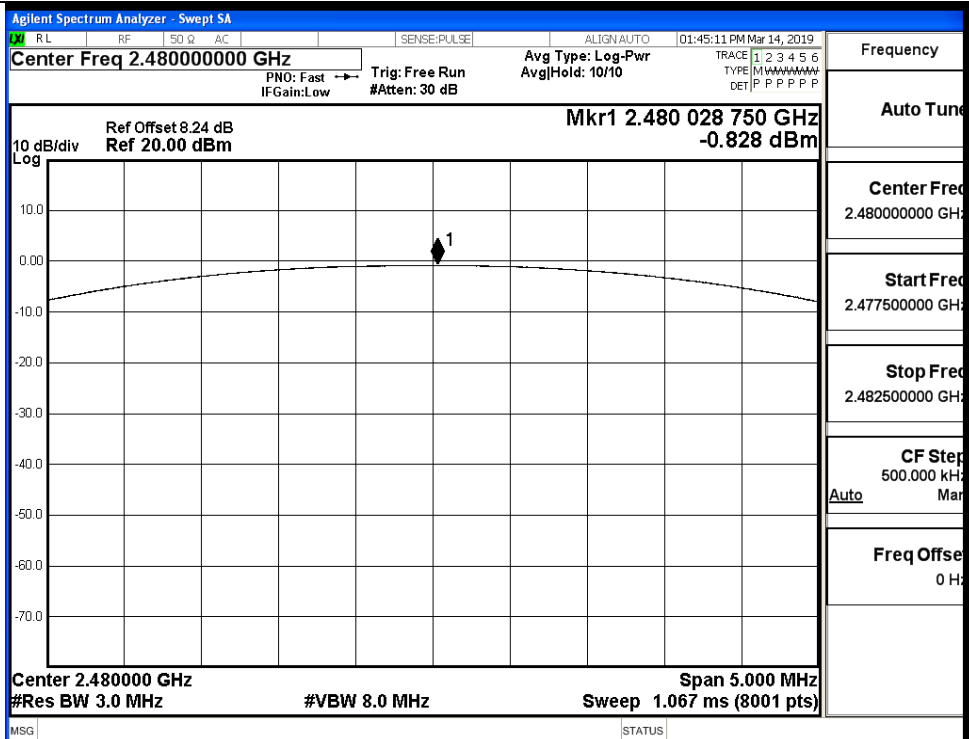
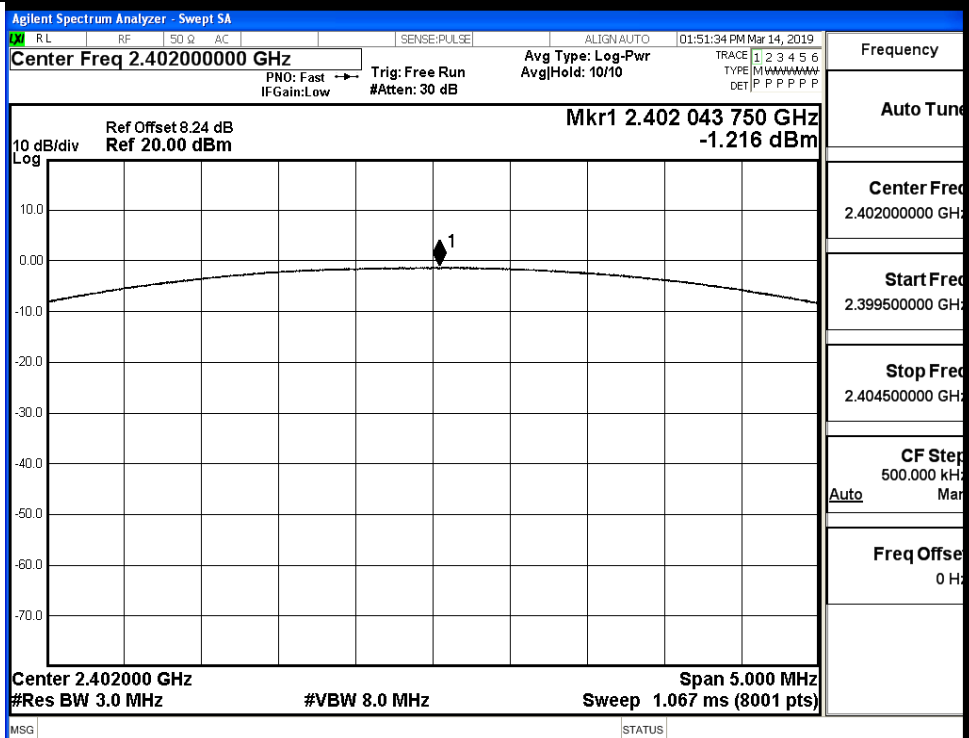
GFSK/LCH

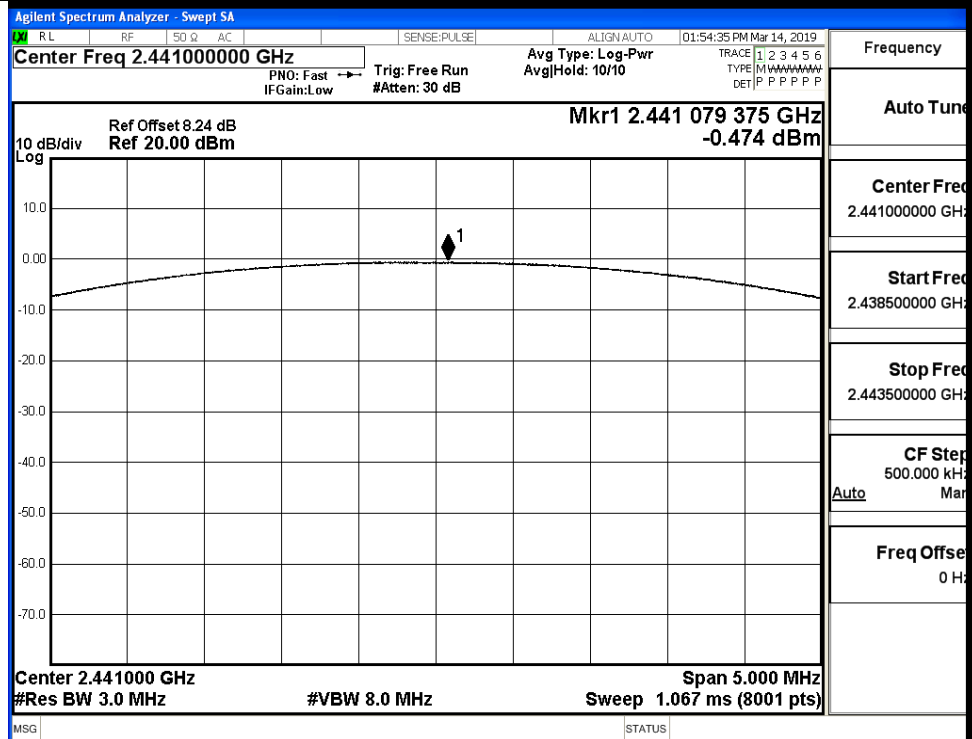
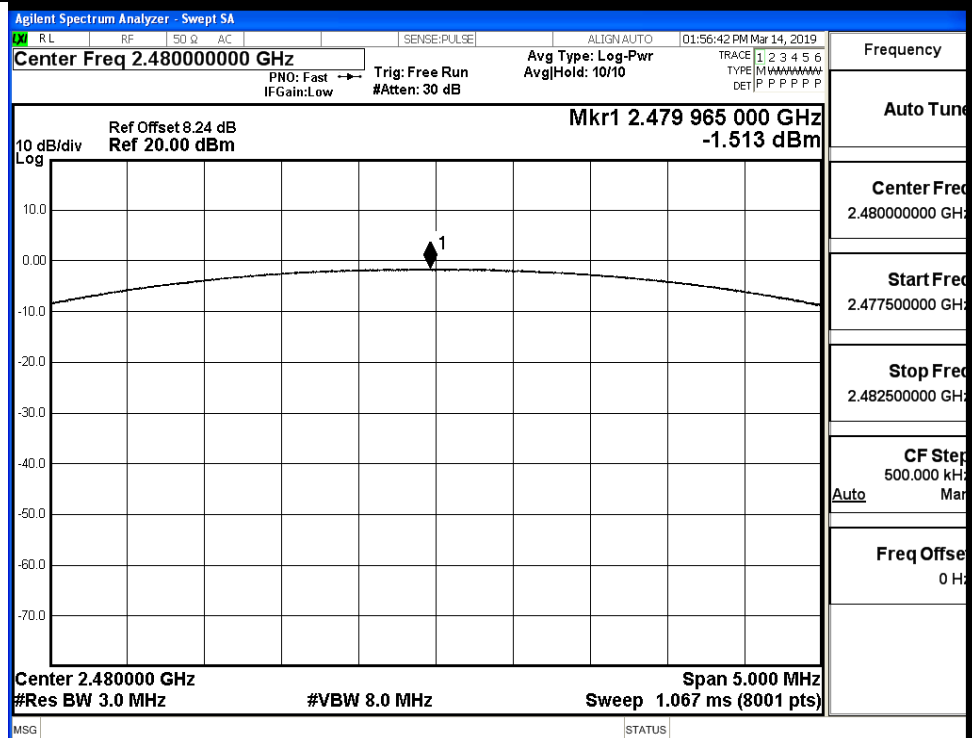


GFSK/MCH

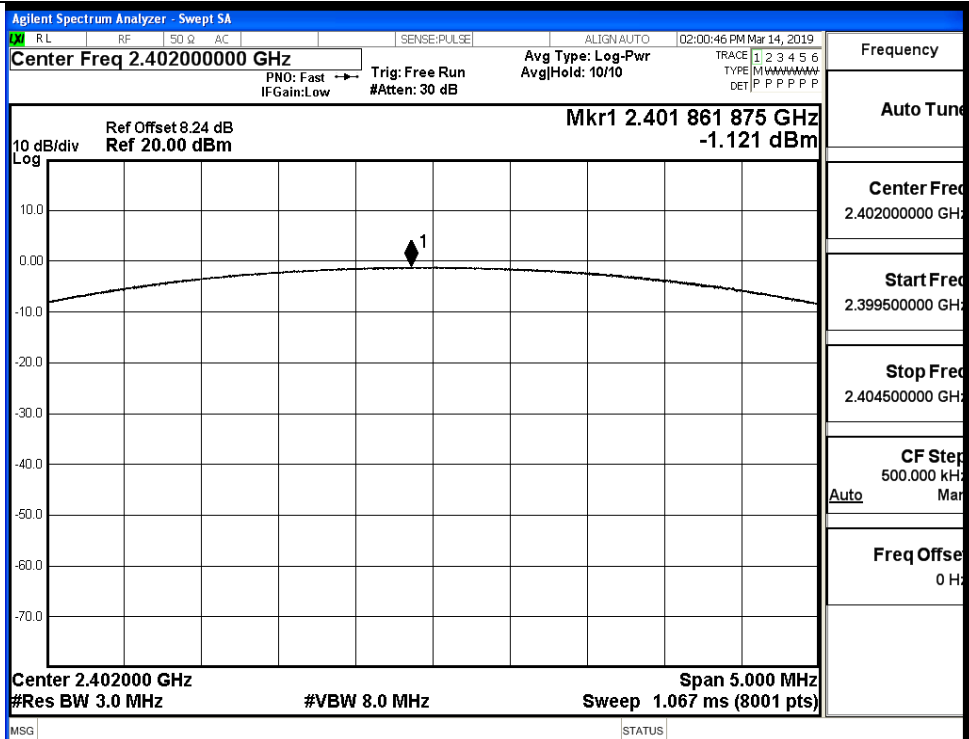


GFSK/HCH

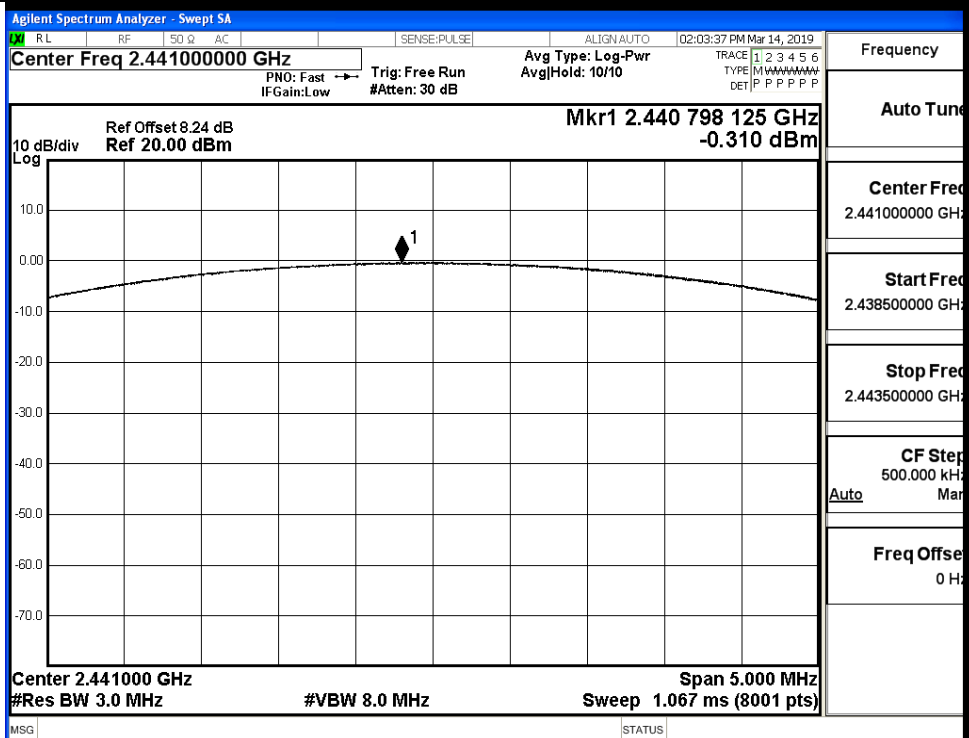
 π /4DQPSK/LCH

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

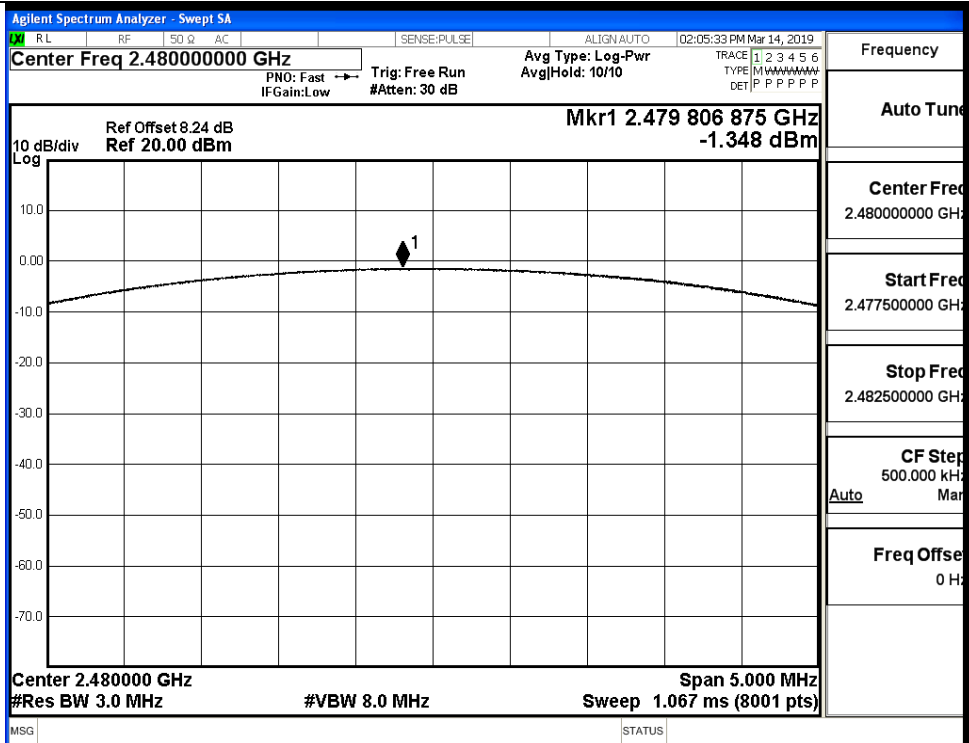
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

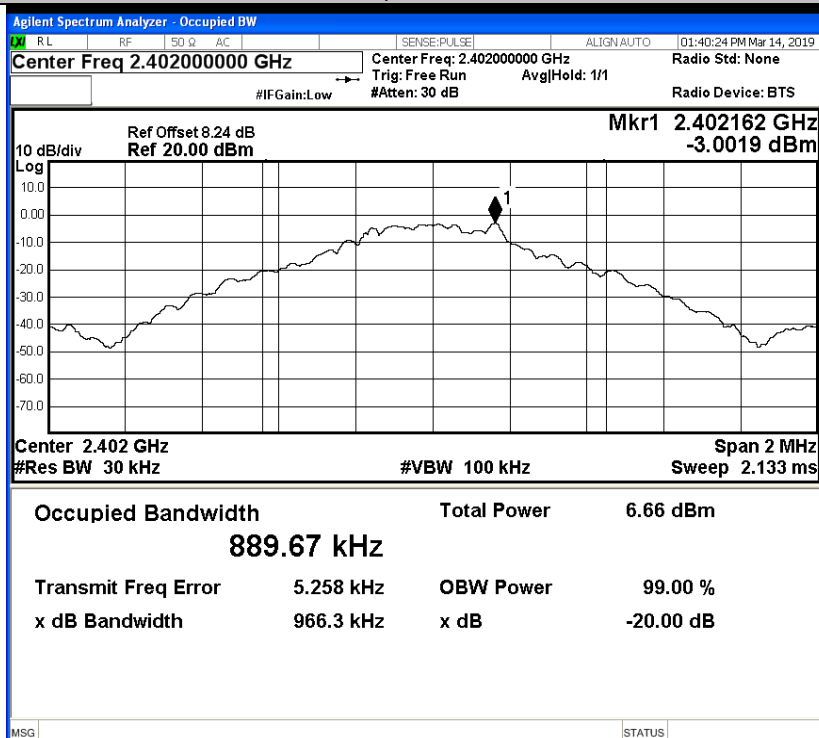


A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.88967	0.9663	Not Specified	PASS
	MCH	0.89316	1.028	Not Specified	PASS
	HCH	0.89586	1.029	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.1793	1.292	Not Specified	PASS
	MCH	1.1747	1.306	Not Specified	PASS
	HCH	1.1735	1.291	Not Specified	PASS
8DPSK	LCH	1.1888	1.296	Not Specified	PASS
	MCH	1.1880	1.296	Not Specified	PASS
	HCH	1.1870	1.302	Not Specified	PASS

Test Graphs

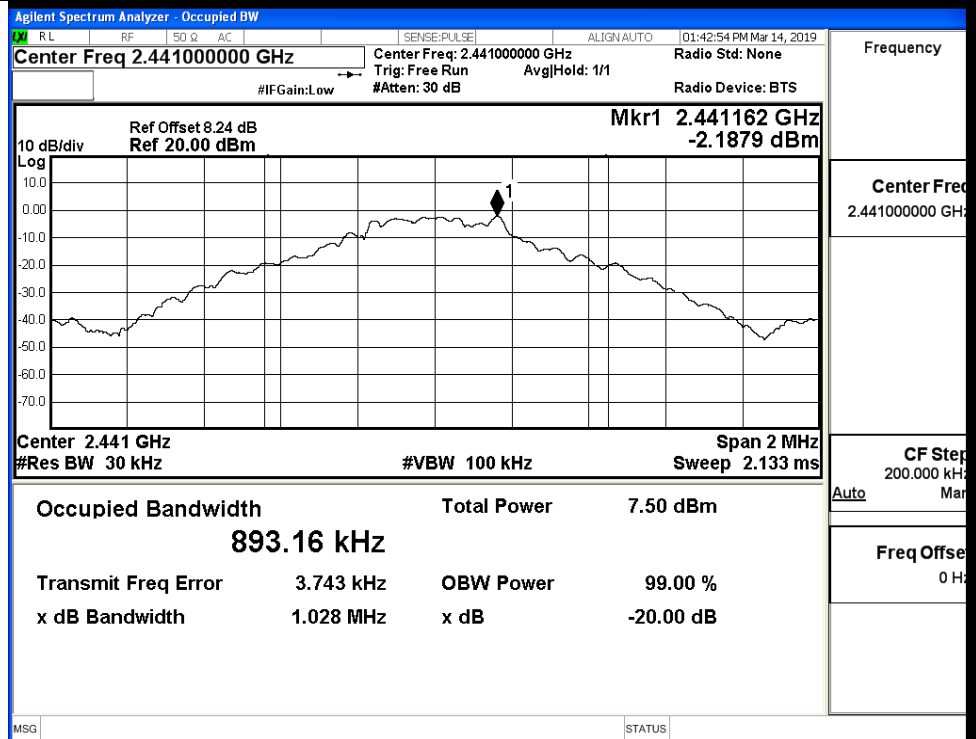
GFSK/LCH



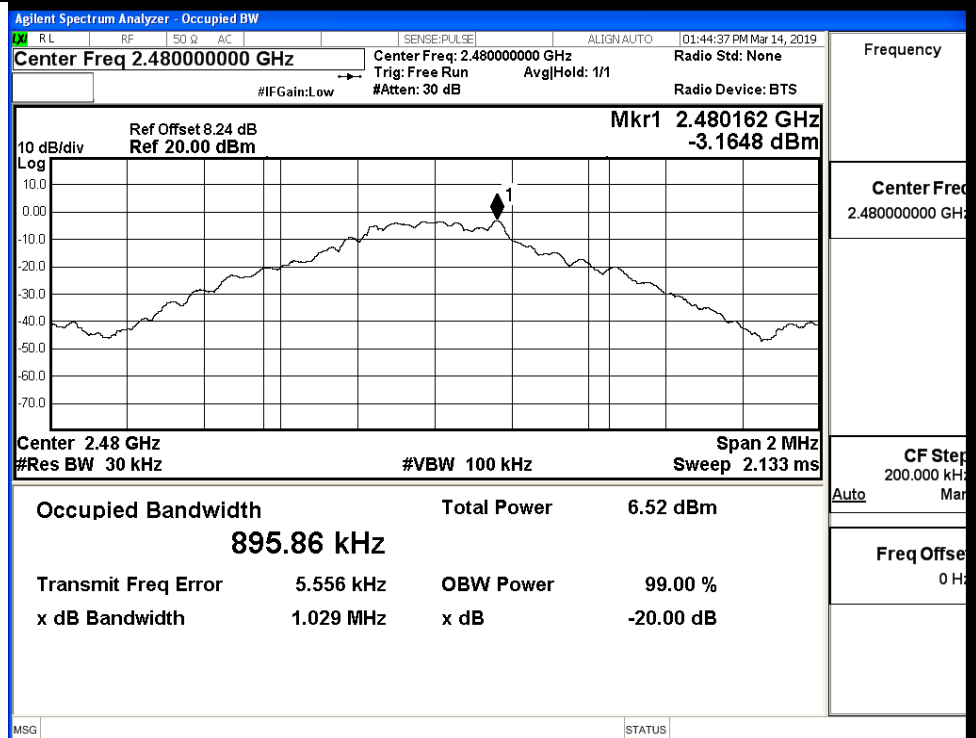
Frequency

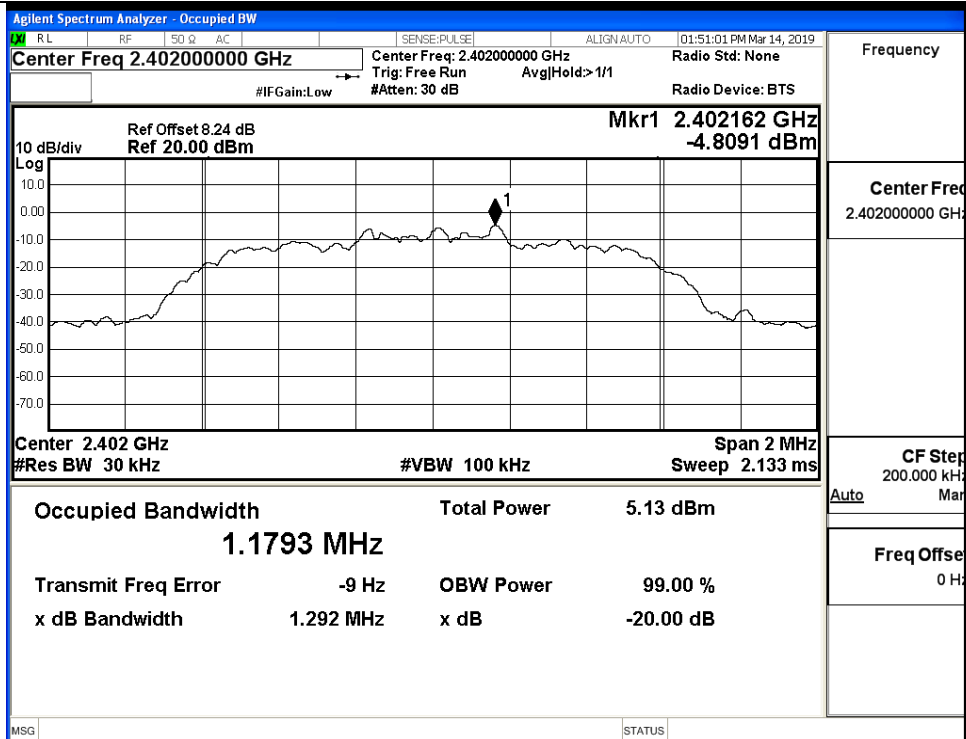
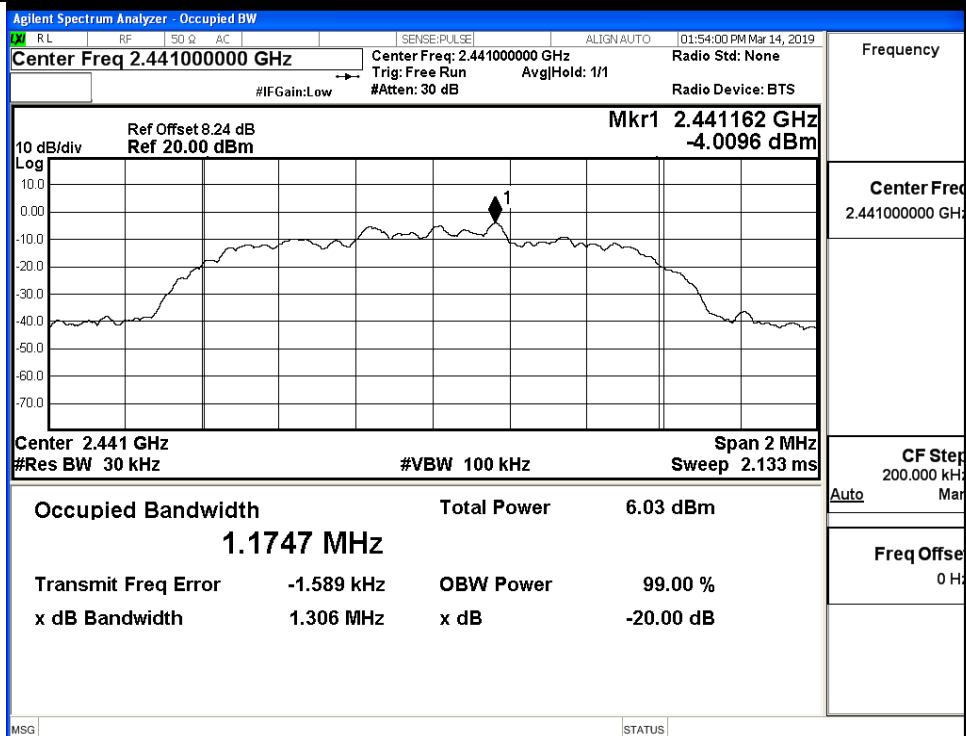
Center Freq
2.402000000 GHzCF Step
200.000 kHzFreq Offset
0 Hz

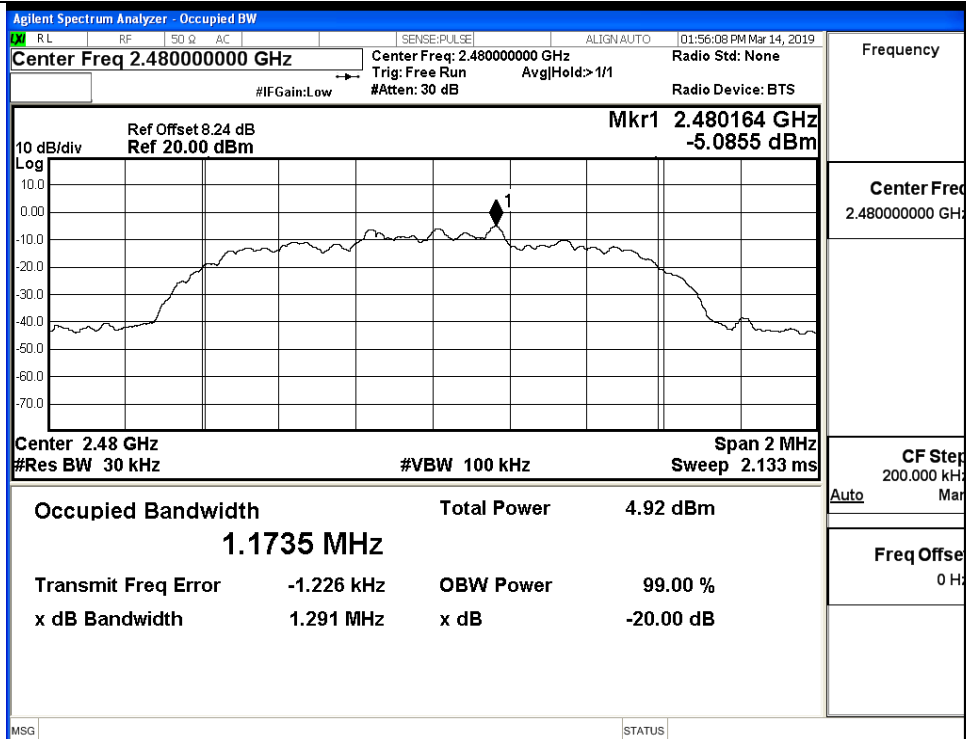
GFSK/MCH



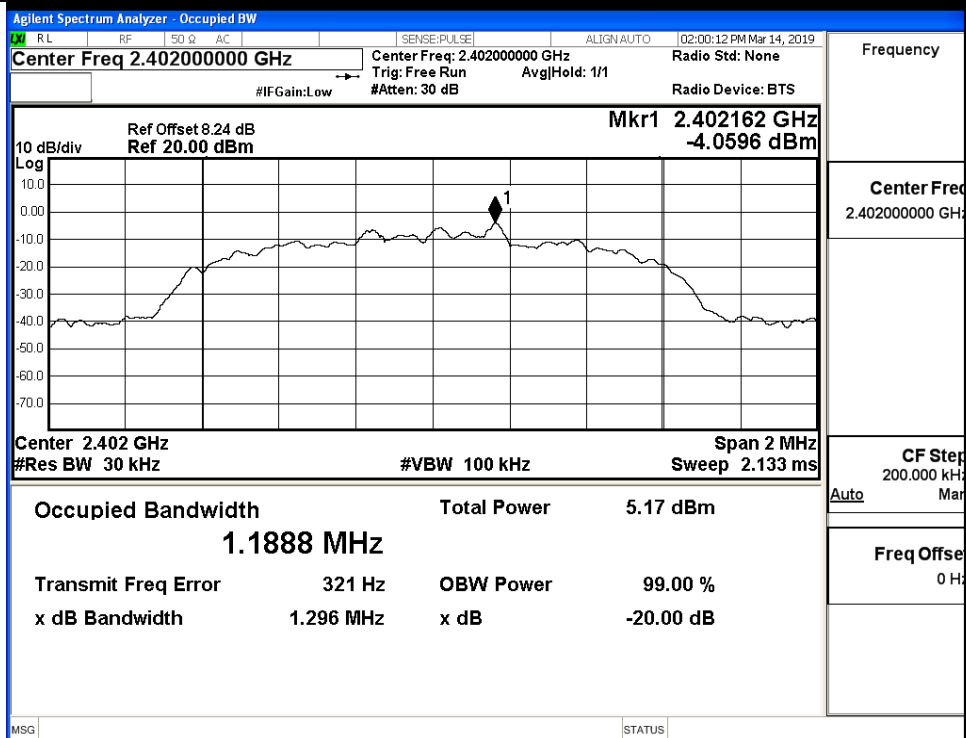
GFSK/HCH



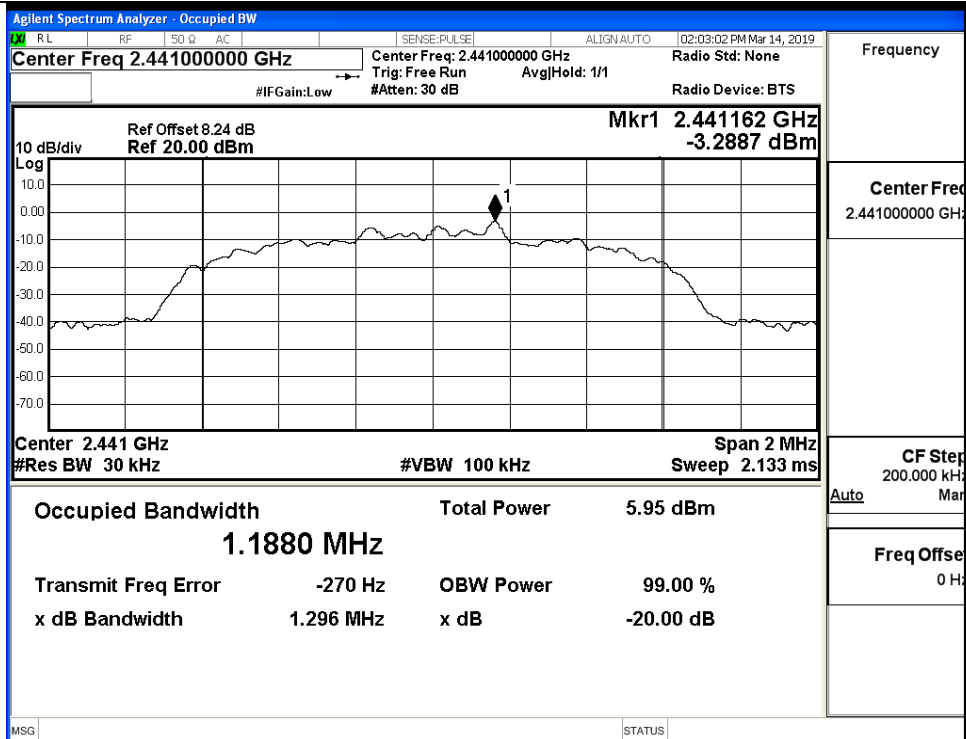
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

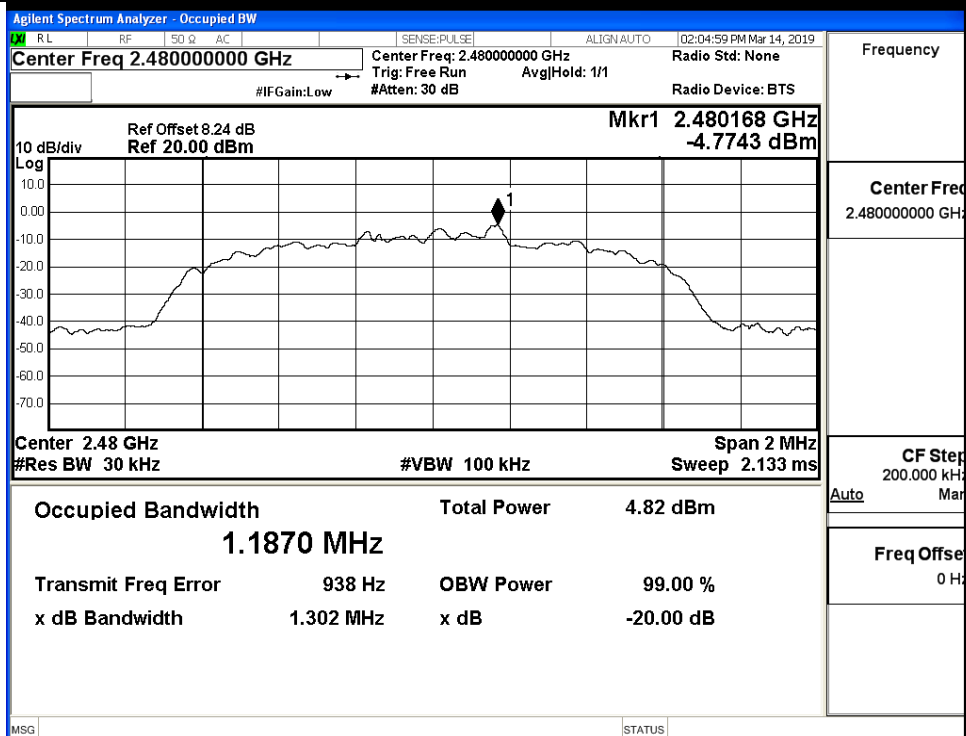
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

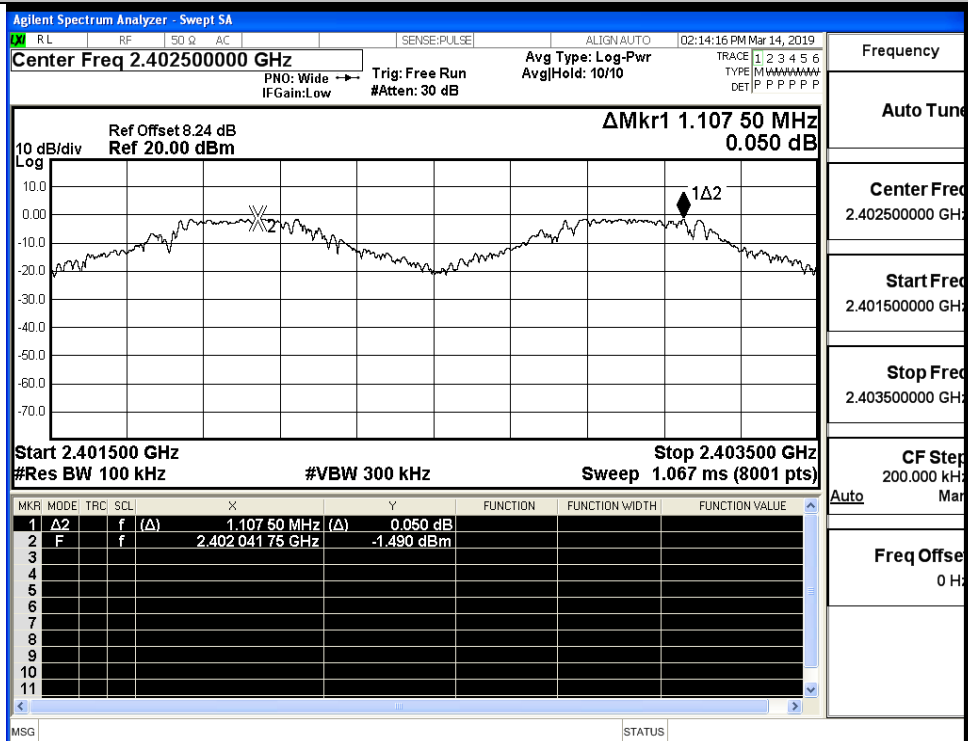


A.3 Carrier Frequency Separation

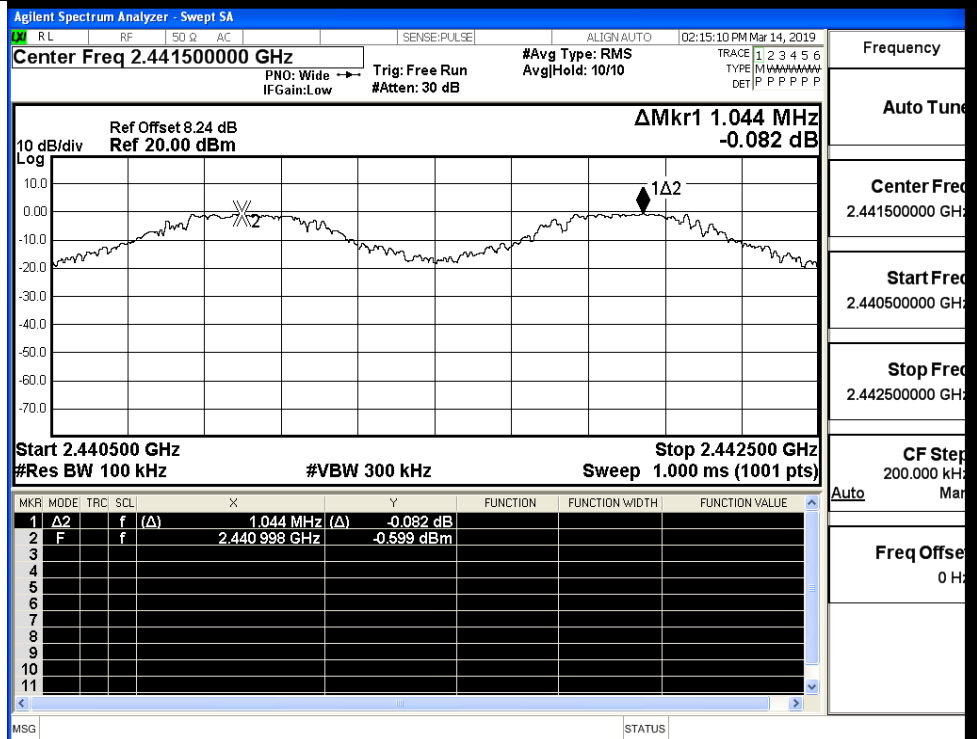
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.108	0.686	PASS
	MCH	1.044	0.686	PASS
	HCH	1.132	0.686	PASS
$\pi/4$ DQPSK	LCH	1.076	0.871	PASS
	MCH	0.926	0.871	PASS
	HCH	0.972	0.871	PASS
8DPSK	LCH	0.926	0.868	PASS
	MCH	1.238	0.868	PASS
	HCH	1.250	0.868	PASS

Test Graphs

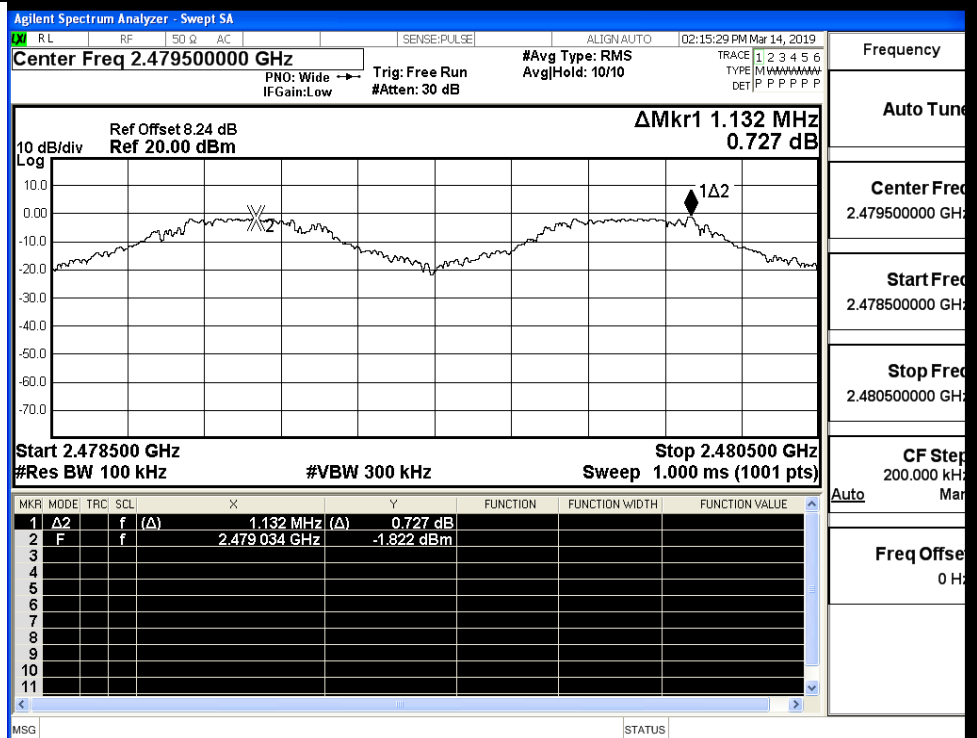
GFSK/LCH

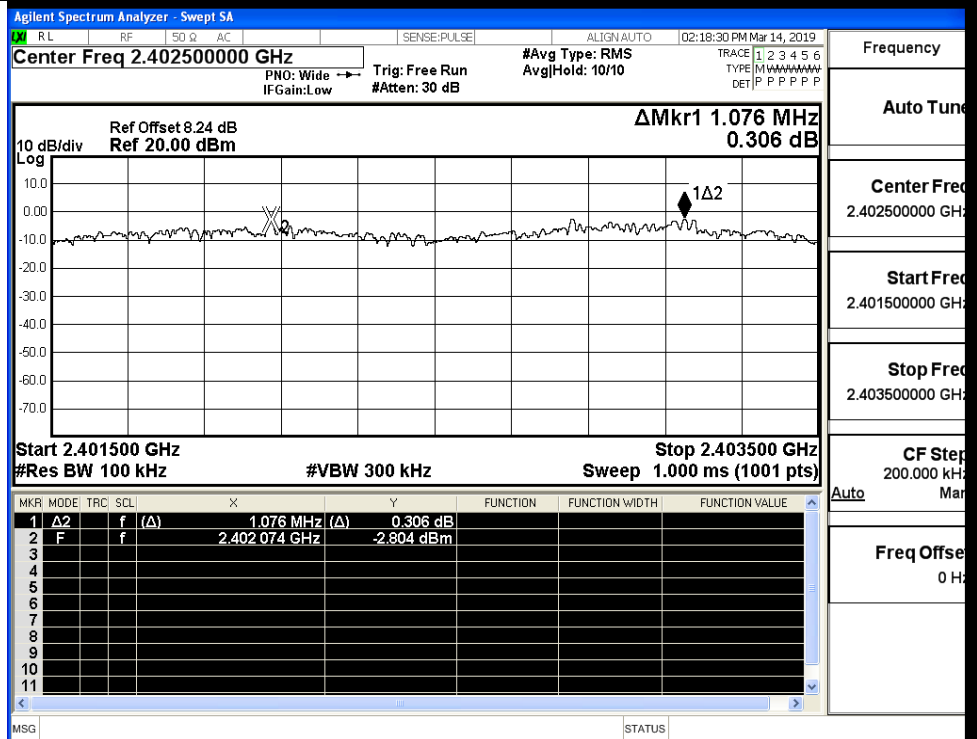
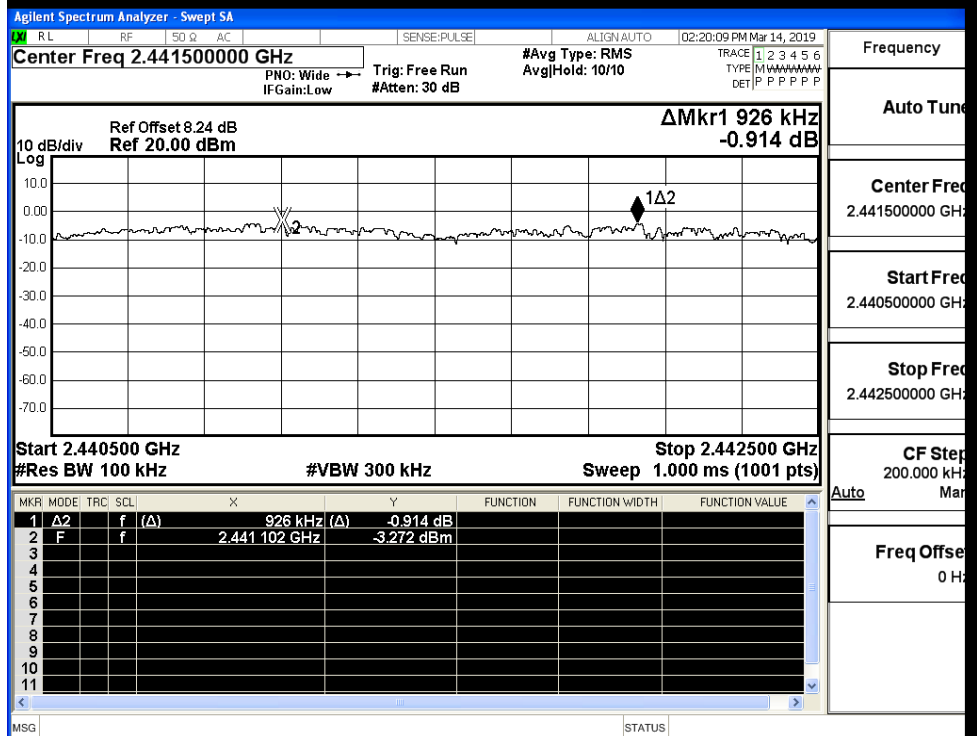


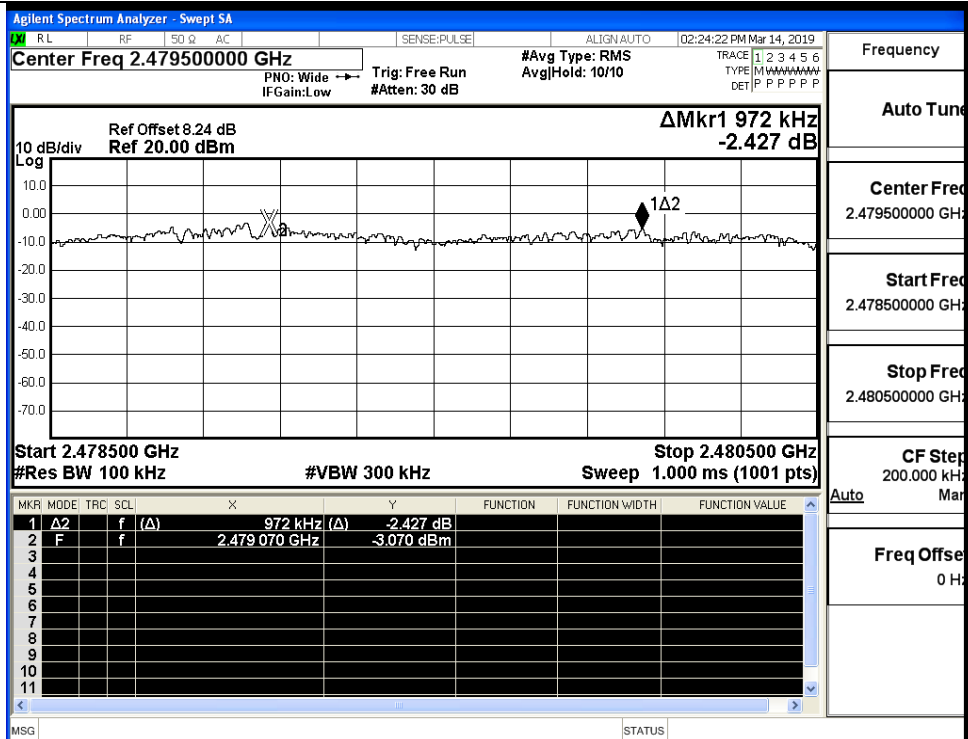
GFSK/MCH



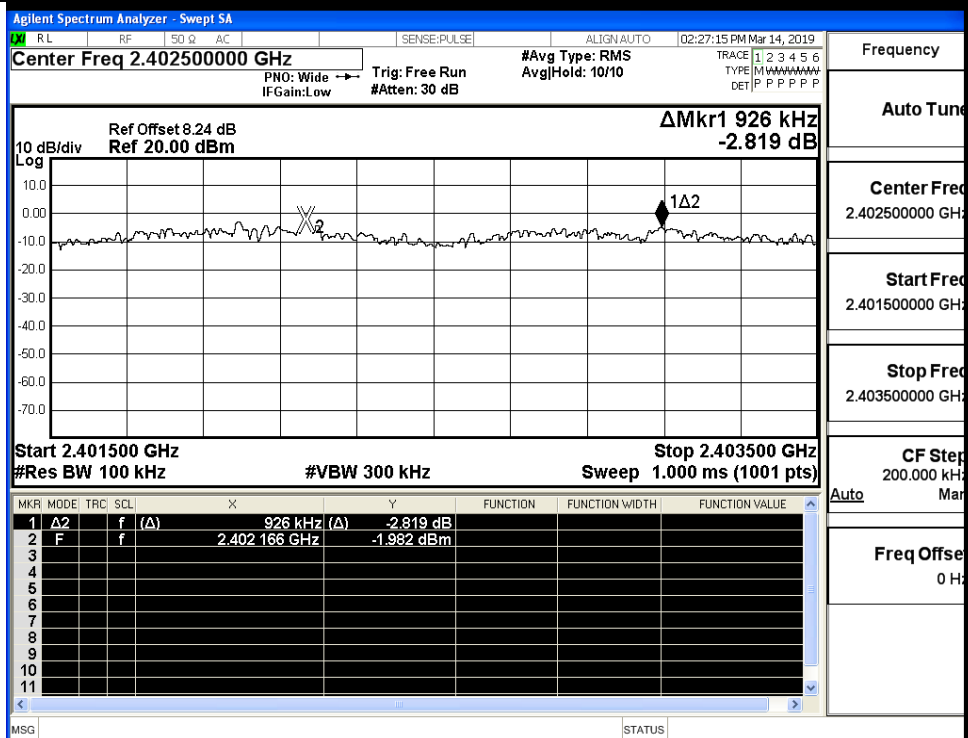
GFSK/HCH



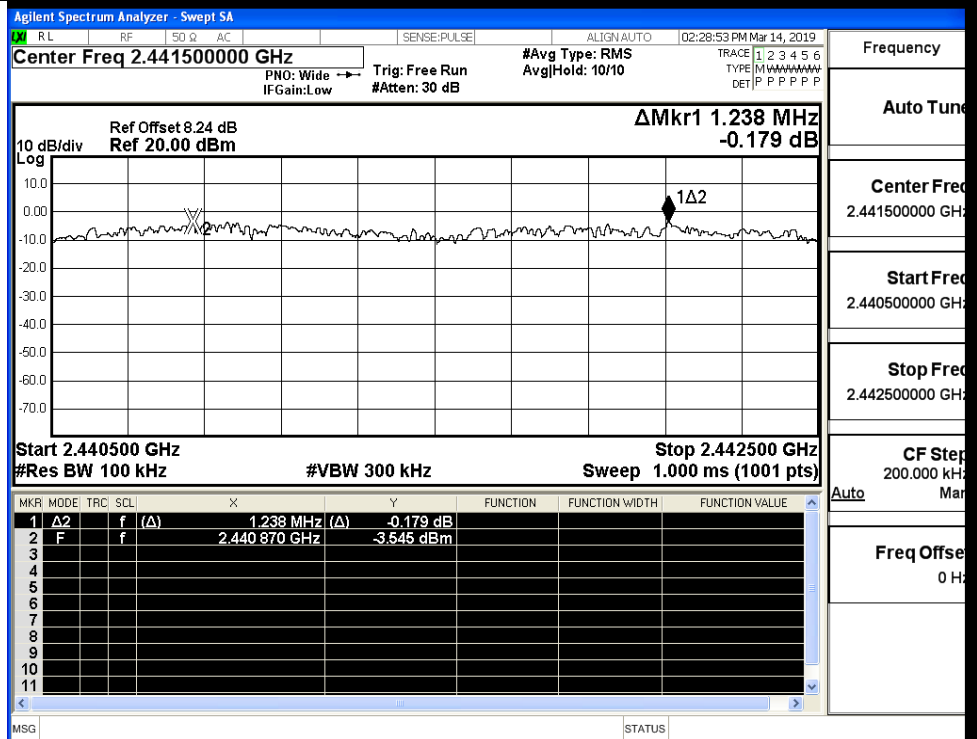
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

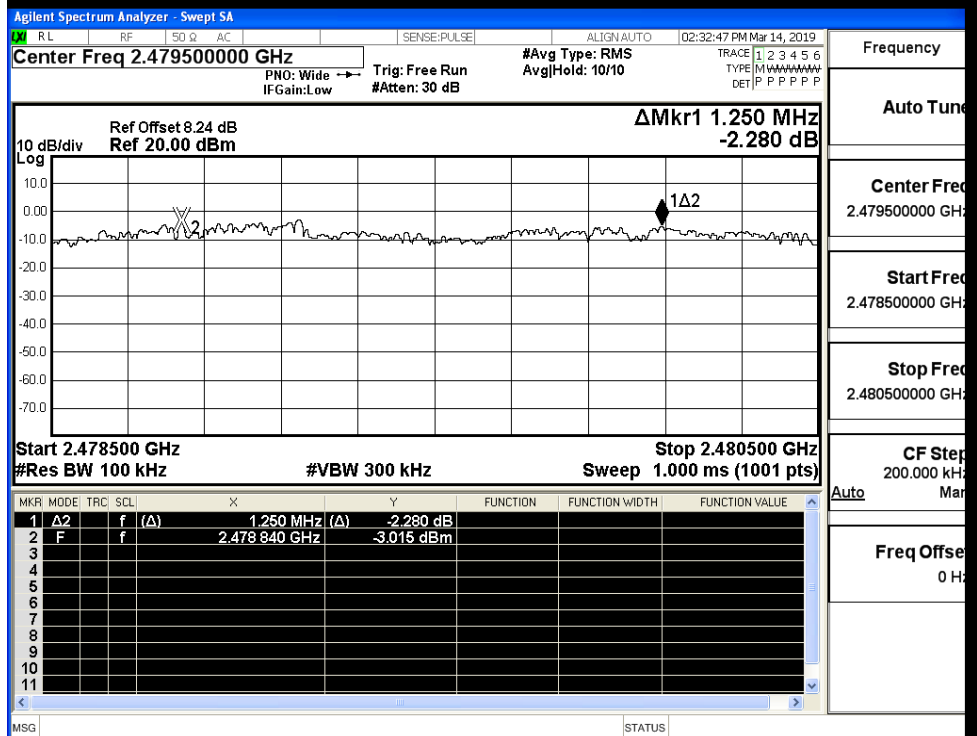
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

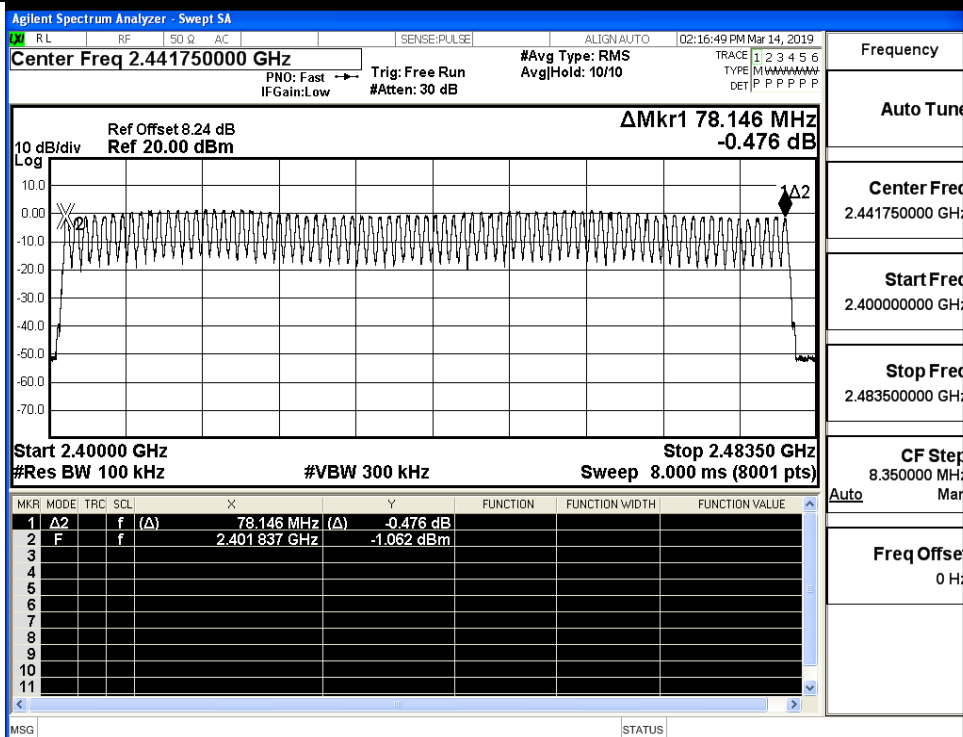
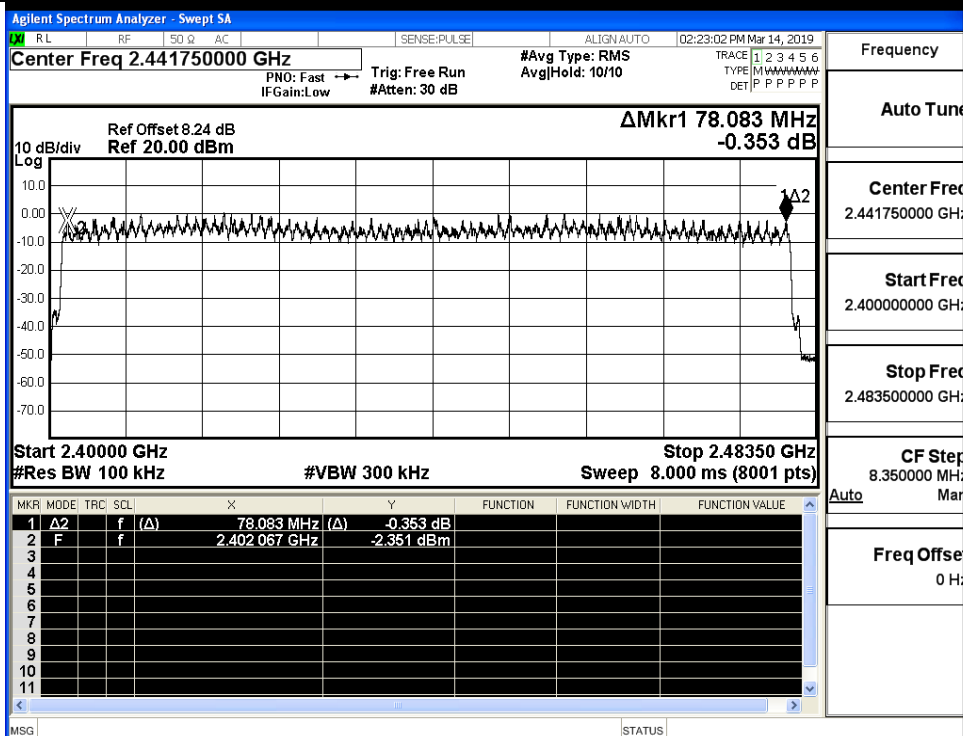


A.4 Hopping Channel Number

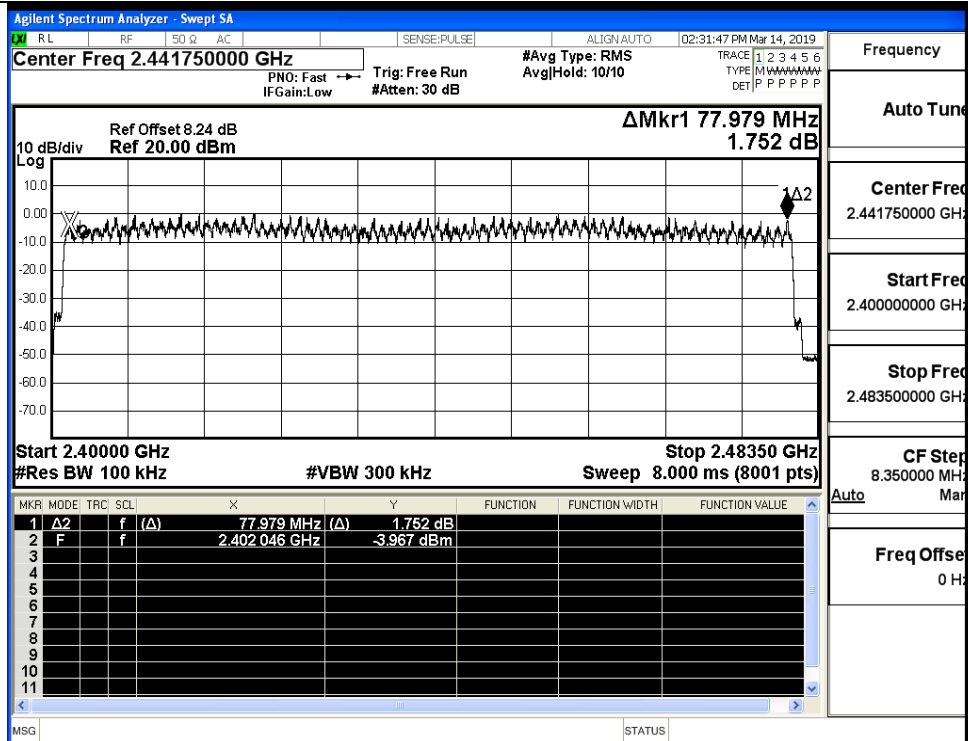
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

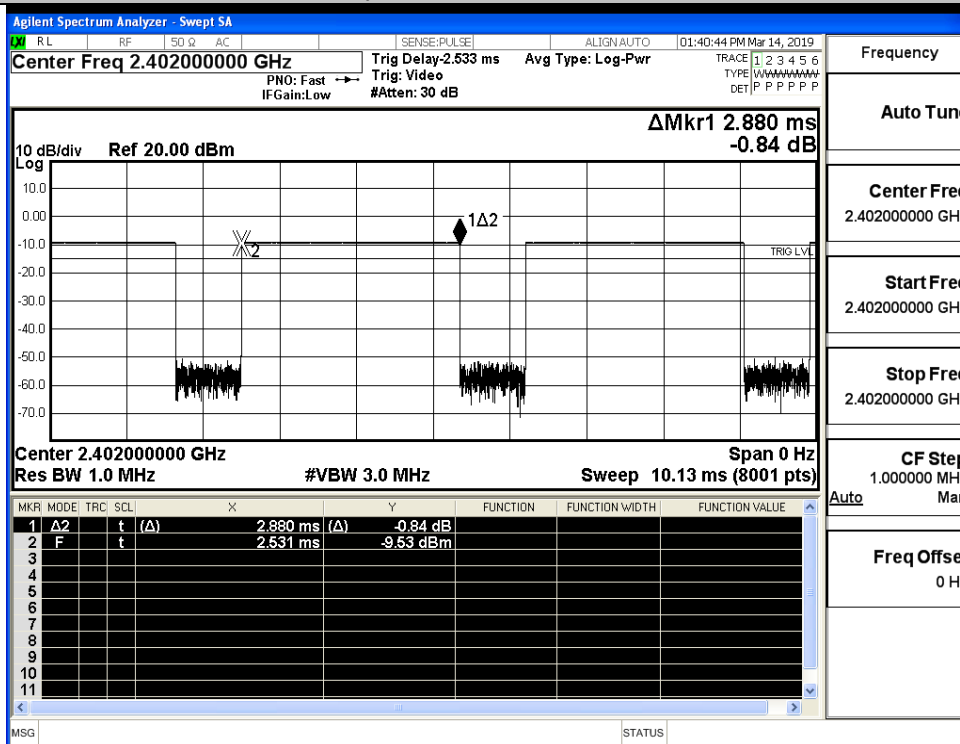


A.5 Dwell Time

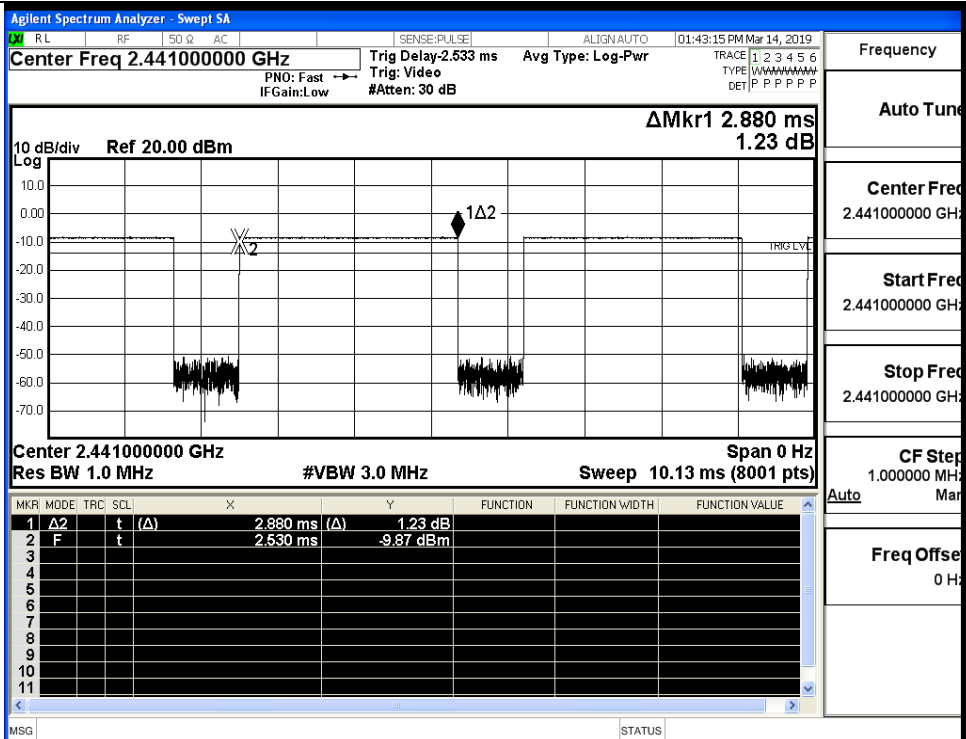
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

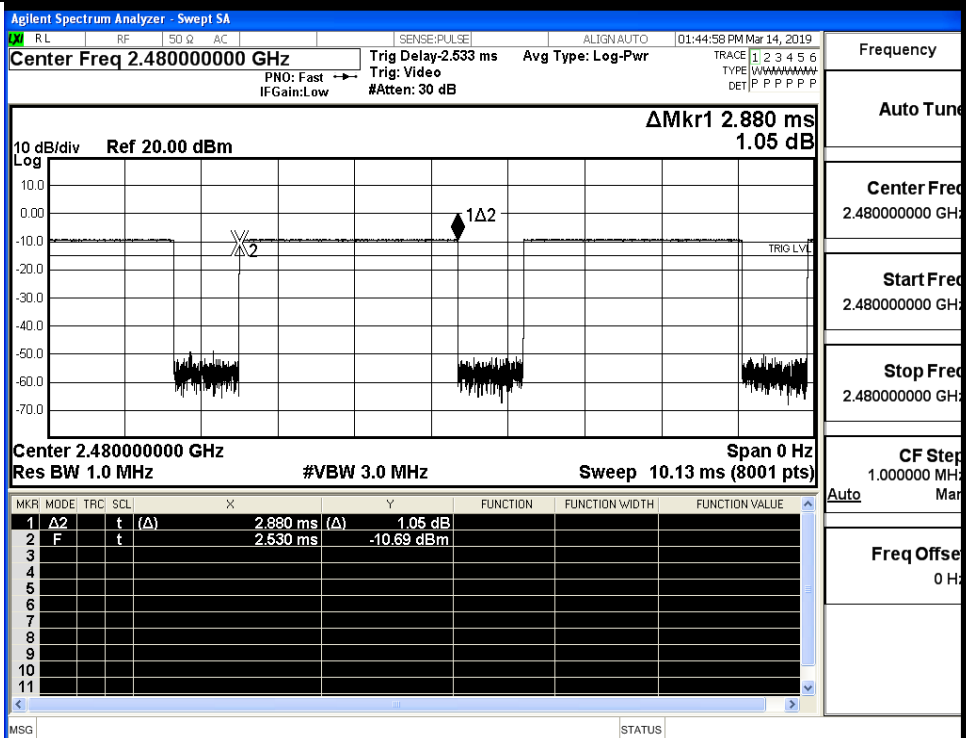
GFSK_DH5/LCH



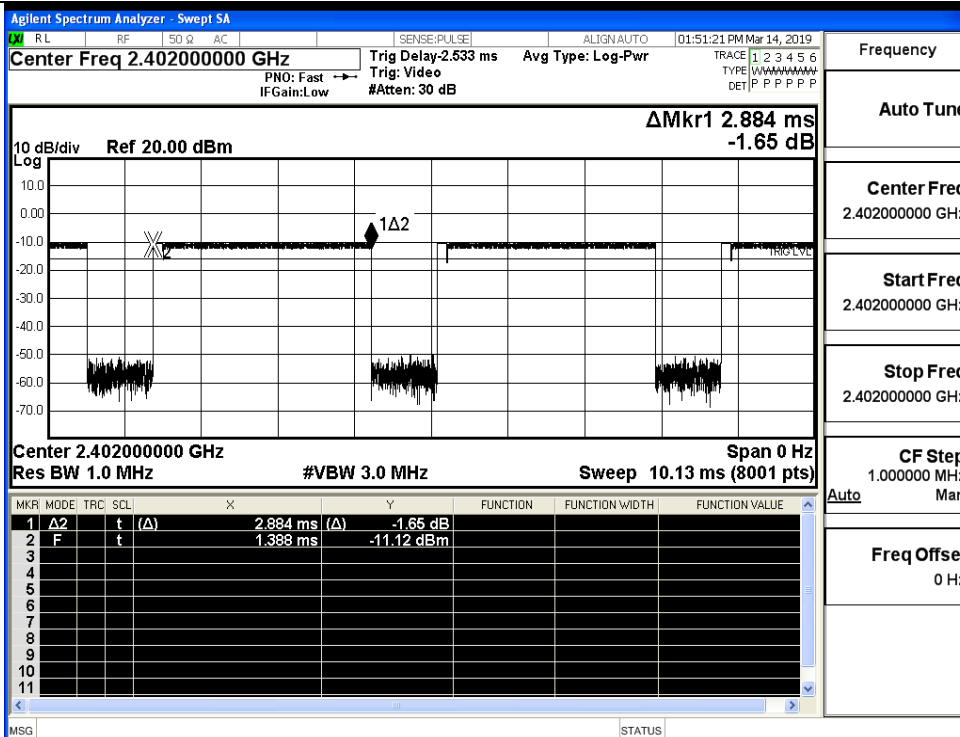
GFSK_DH5/MCH



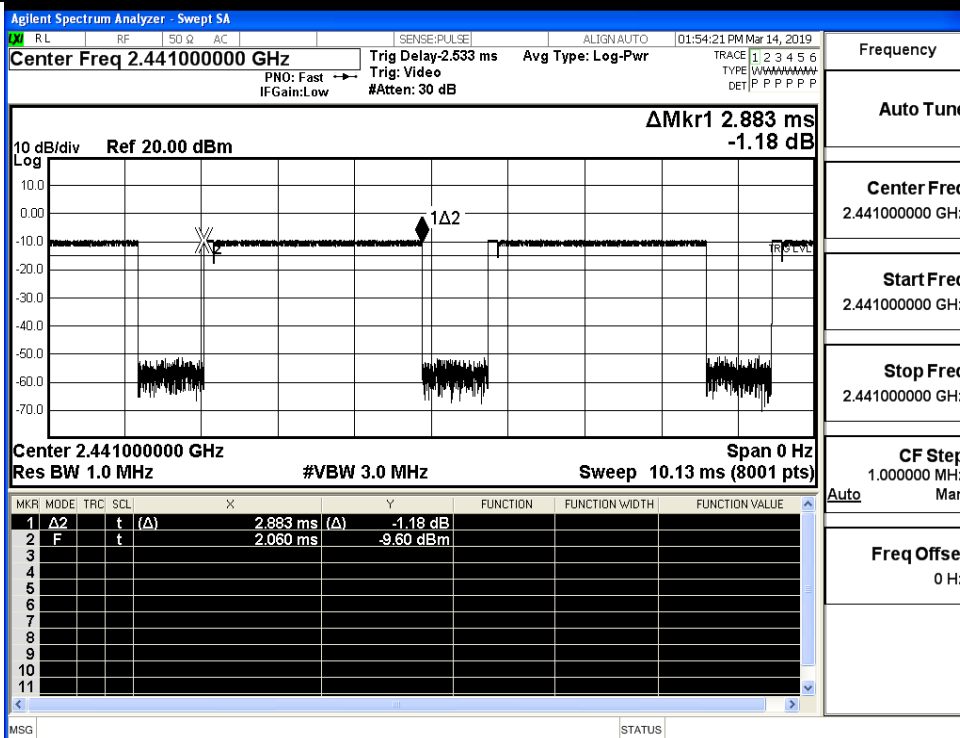
GFSK_DH5/HCH



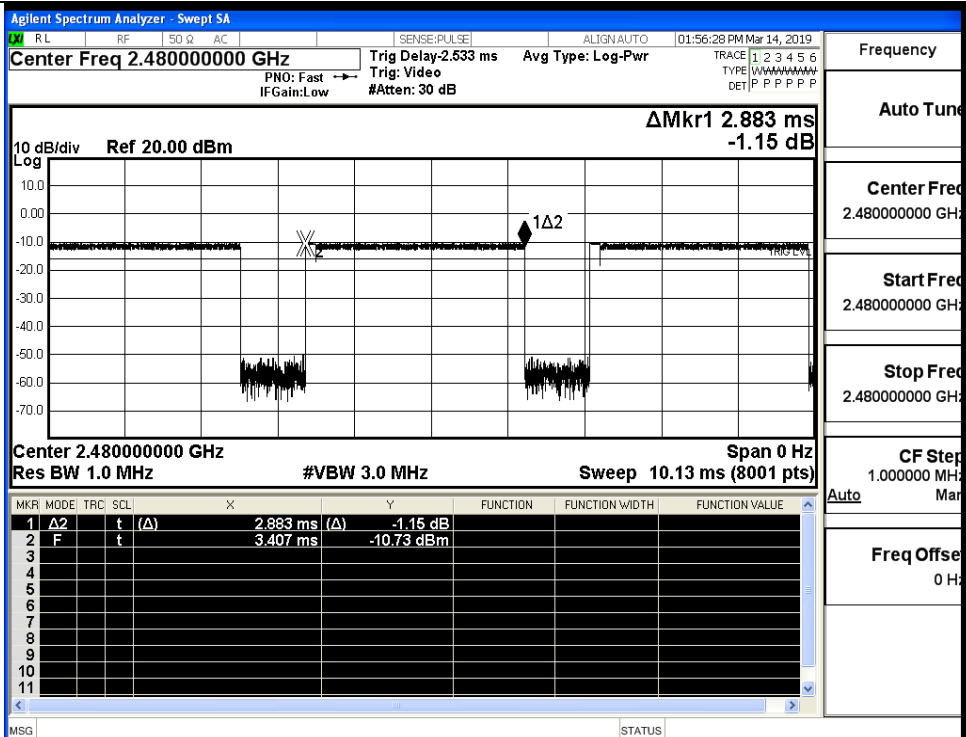
$\pi/4$ DQPSK
_2DH5/LCH



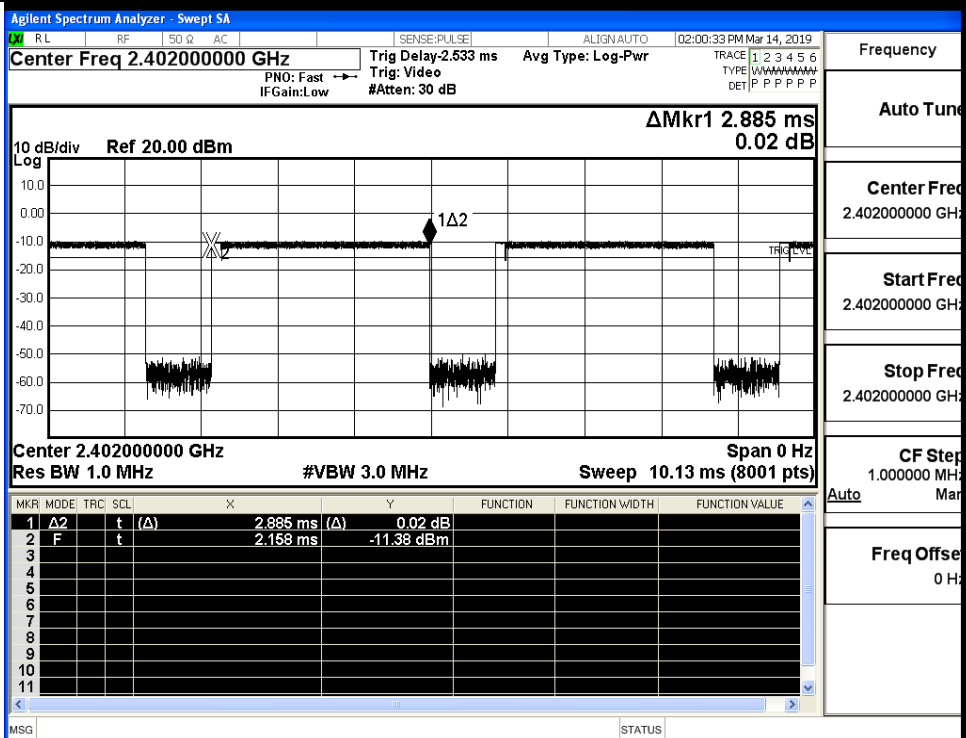
$\pi/4$ DQPSK
_2DH5/MCH



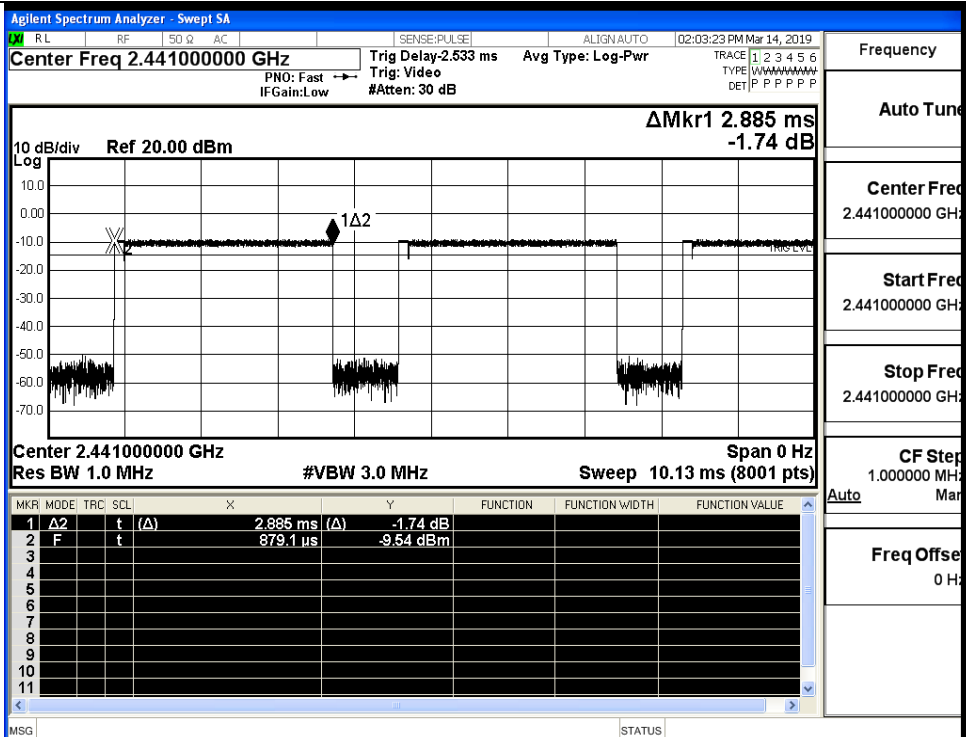
$\pi/4$ DQPSK
_2DH5/HCH



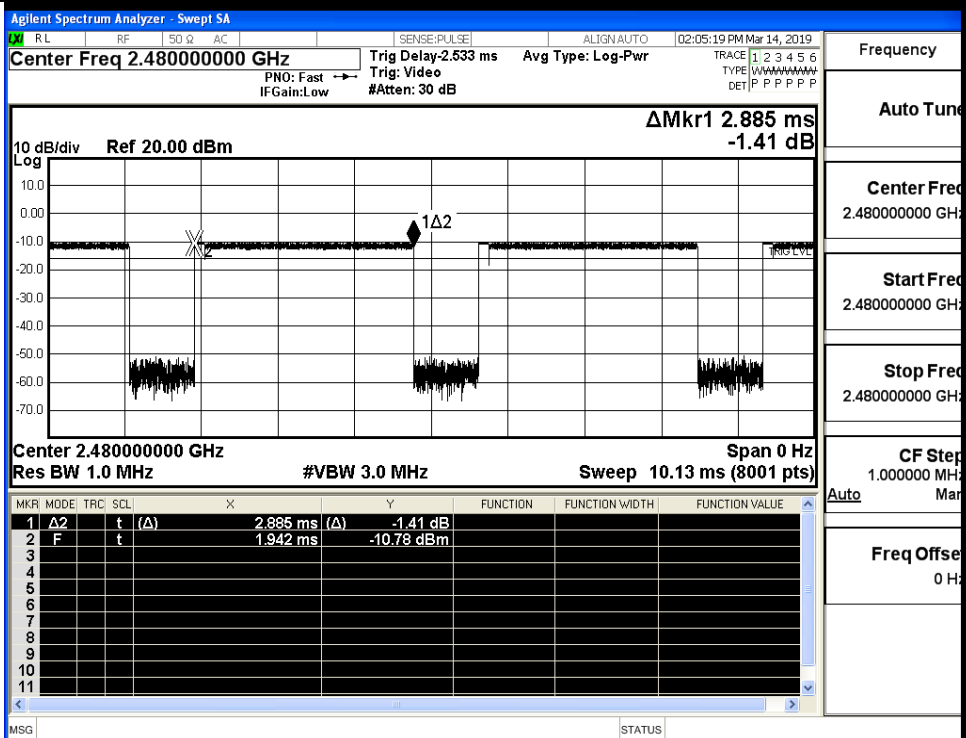
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

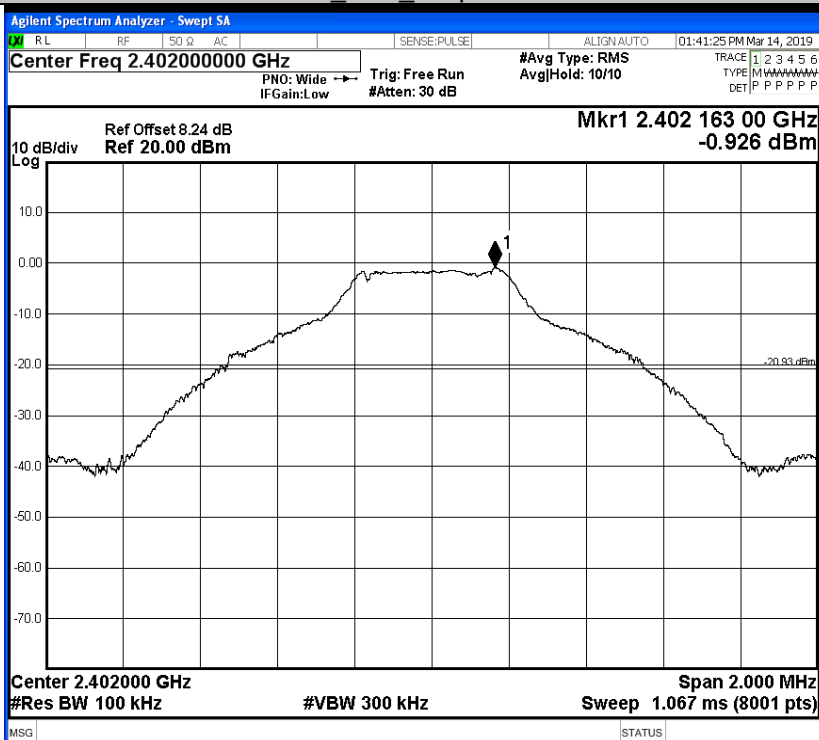


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.926	-44.684	-20.926	PASS
	MCH	-0.091	-44.436	-20.091	PASS
	HCH	-1.065	-44.898	-21.065	PASS
$\pi/4$ DQPSK	LCH	-2.533	-45.144	-22.533	PASS
	MCH	-1.313	-44.905	-21.313	PASS
	HCH	-2.525	-43.556	-22.525	PASS
8DPSK	LCH	-2.121	-44.495	-22.121	PASS
	MCH	-1.345	-44.405	-21.345	PASS
	HCH	-2.326	-44.000	-22.326	PASS

GFSK_LCH_Graphs

Pref



Frequency

Auto Tune

Center Freq

2.402000000 GHz

Start Freq

2.401000000 GHz

Stop Freq

2.403000000 GHz

CF Step

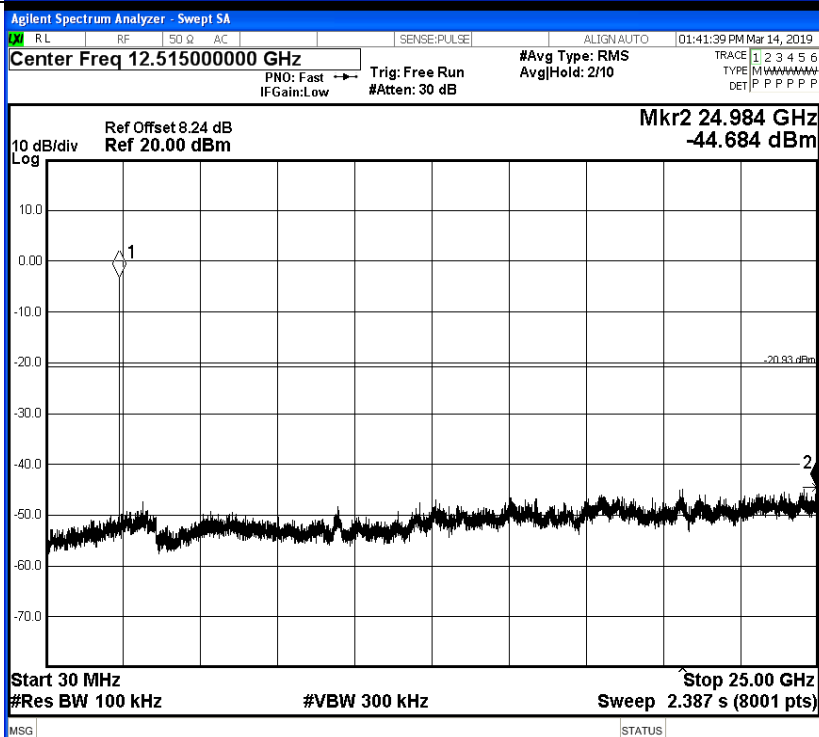
200.000 kHz

Auto

Freq Offset

0 Hz

Puw



Frequency

Auto Tune

Center Freq

12.515000000 GHz

Start Freq

30.000000 MHz

Stop Freq

25.000000000 GHz

CF Step

2.497000000 GHz

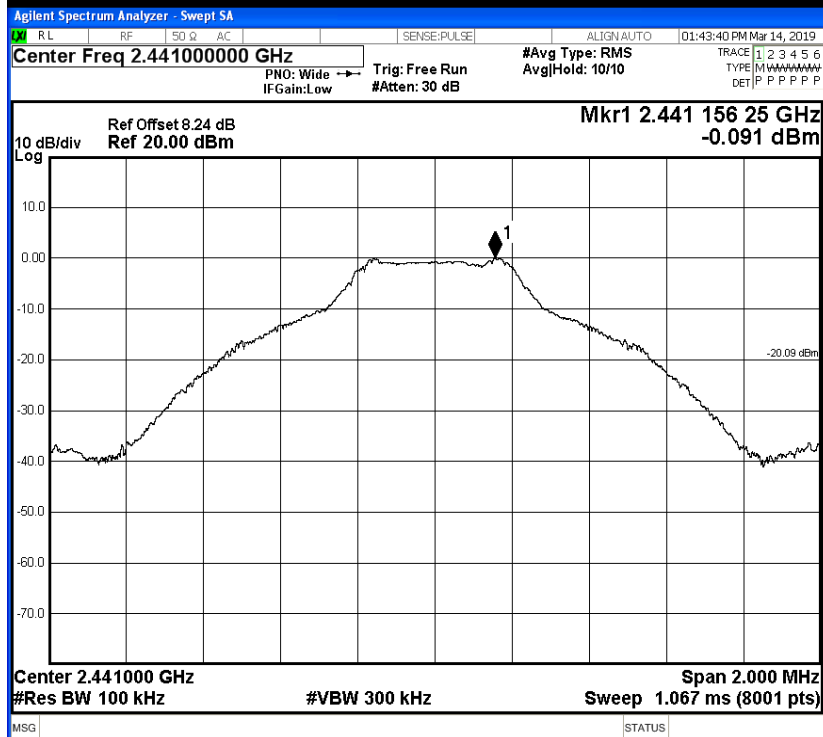
Auto

Freq Offset

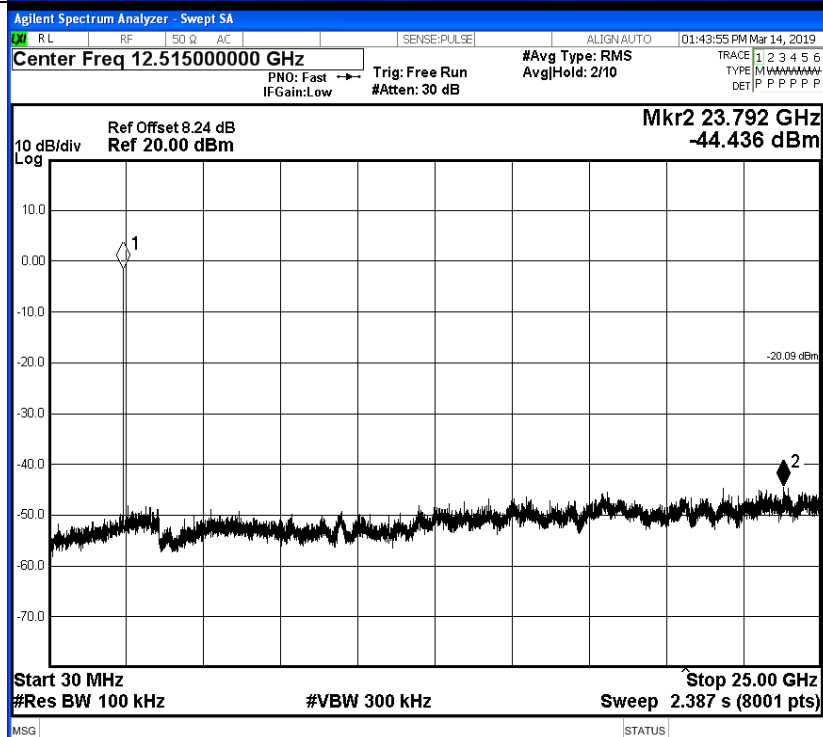
0 Hz

GFSK_MCH_Graphs

Pref

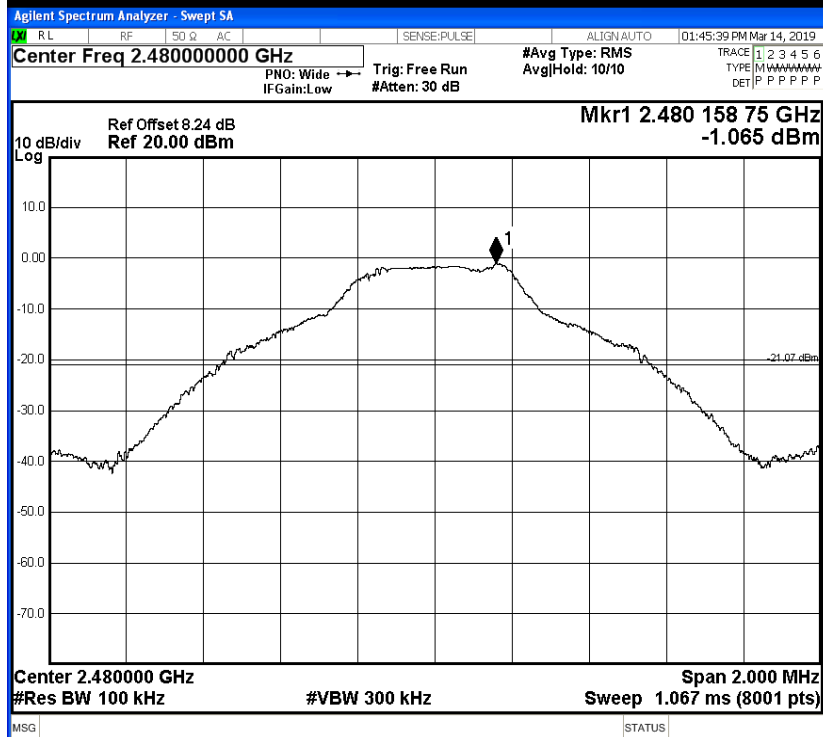


Puw

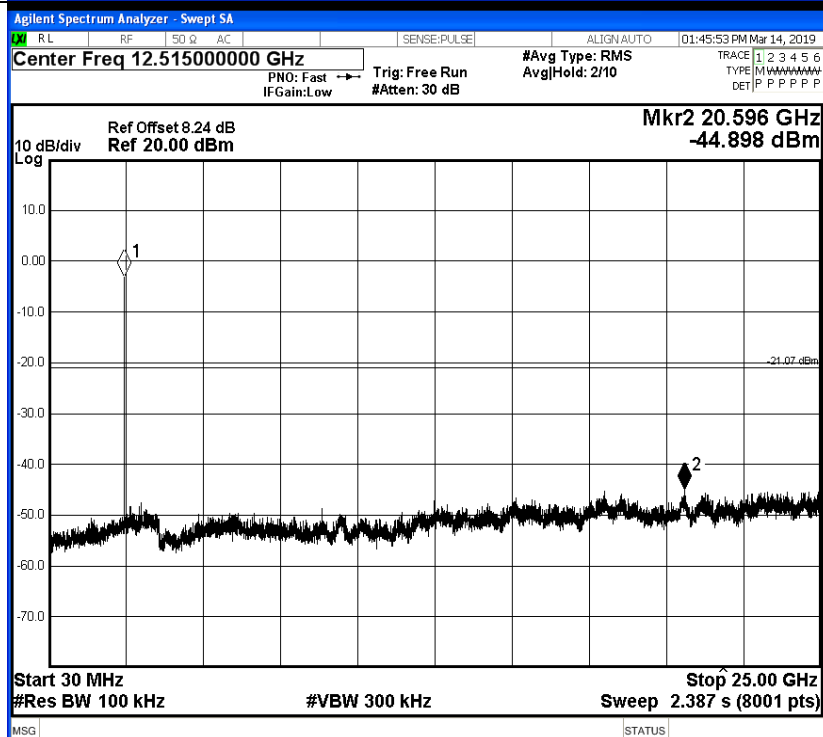


GFSK_HCH_Graphs

Pref

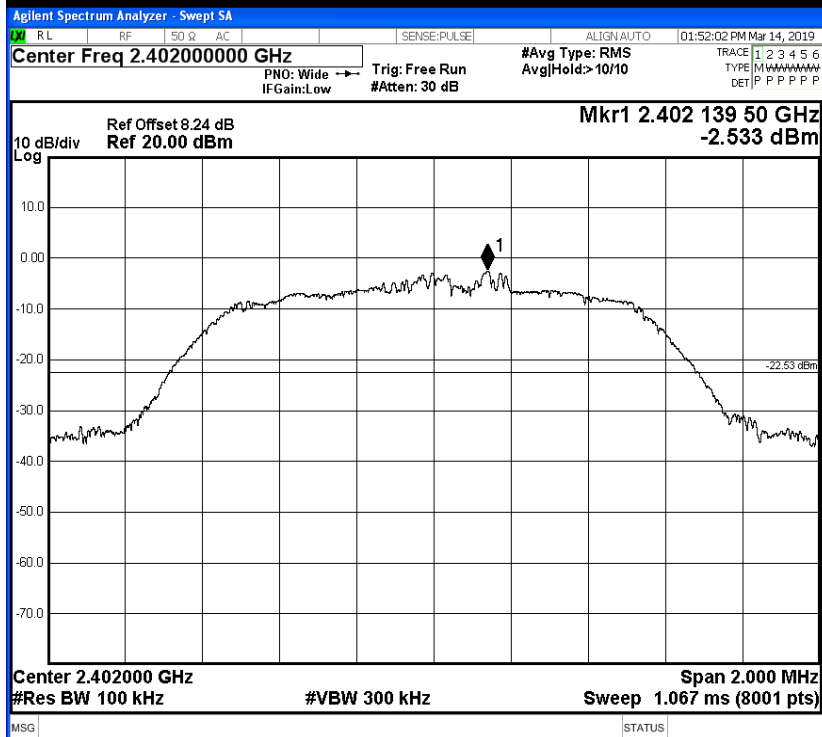


Puw

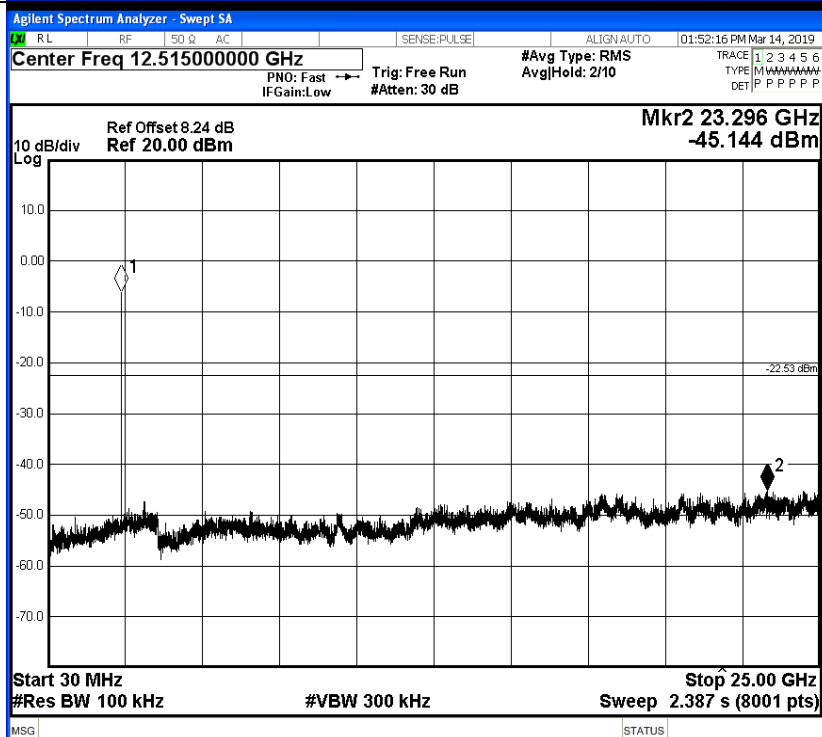


π /4DQPSK_LCH_Graphs

Pref

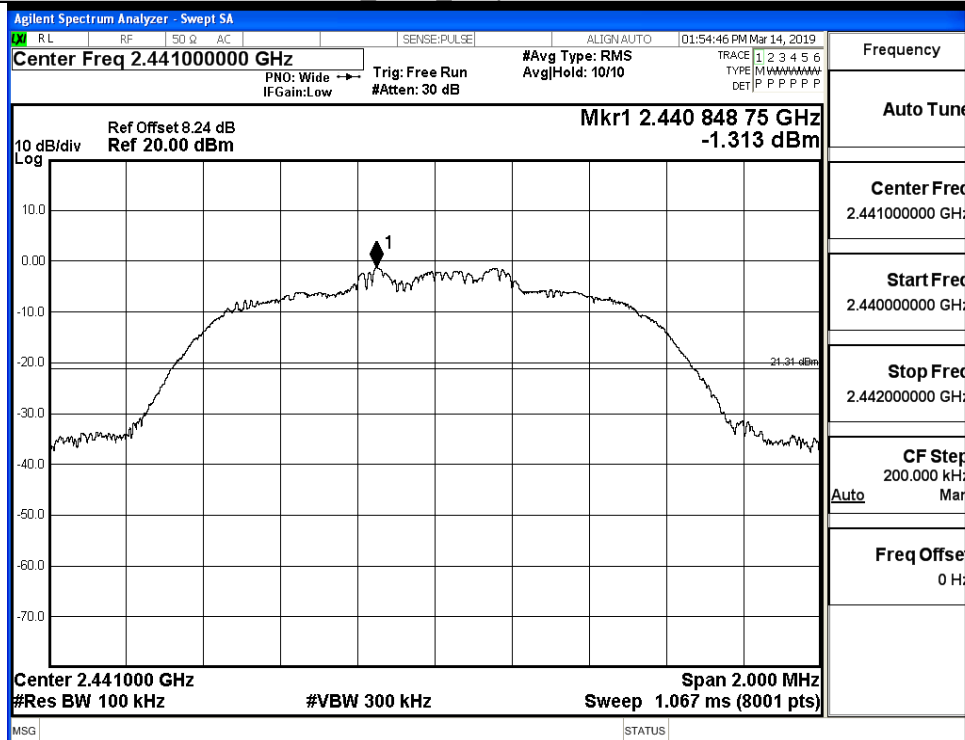


Puw

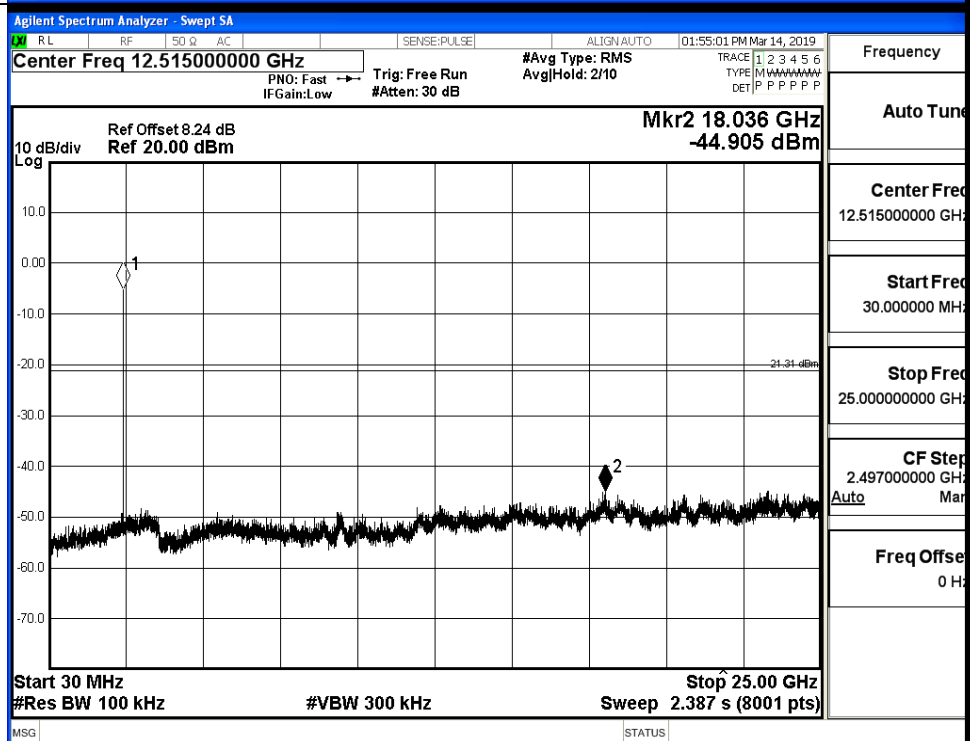


π /4DQPSK_MCH_Graphs

Pref

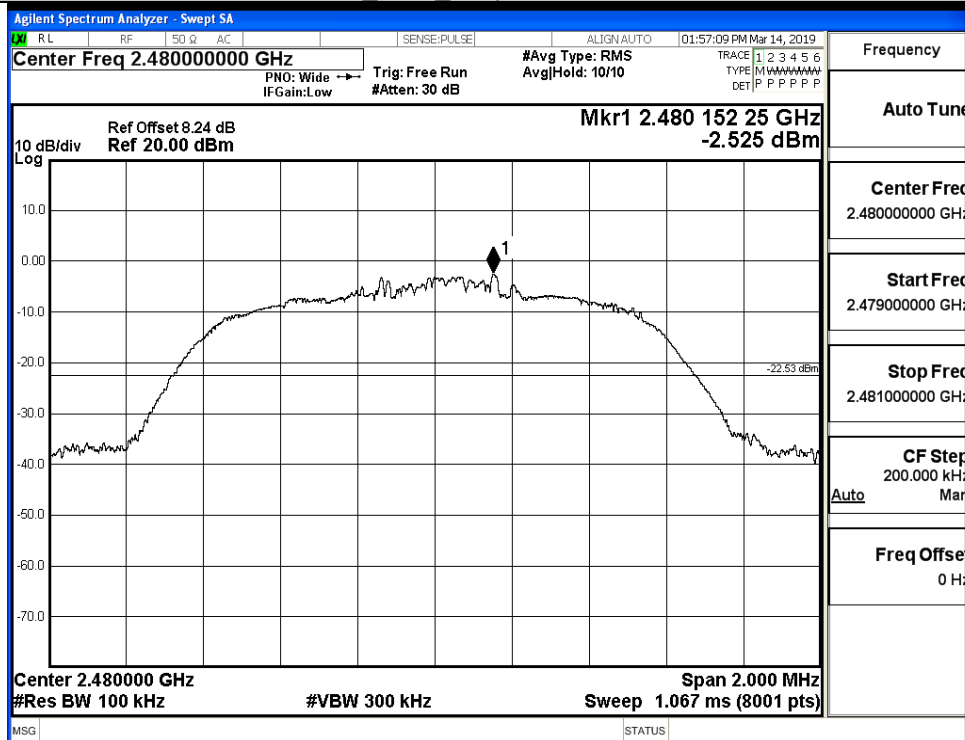


Puw

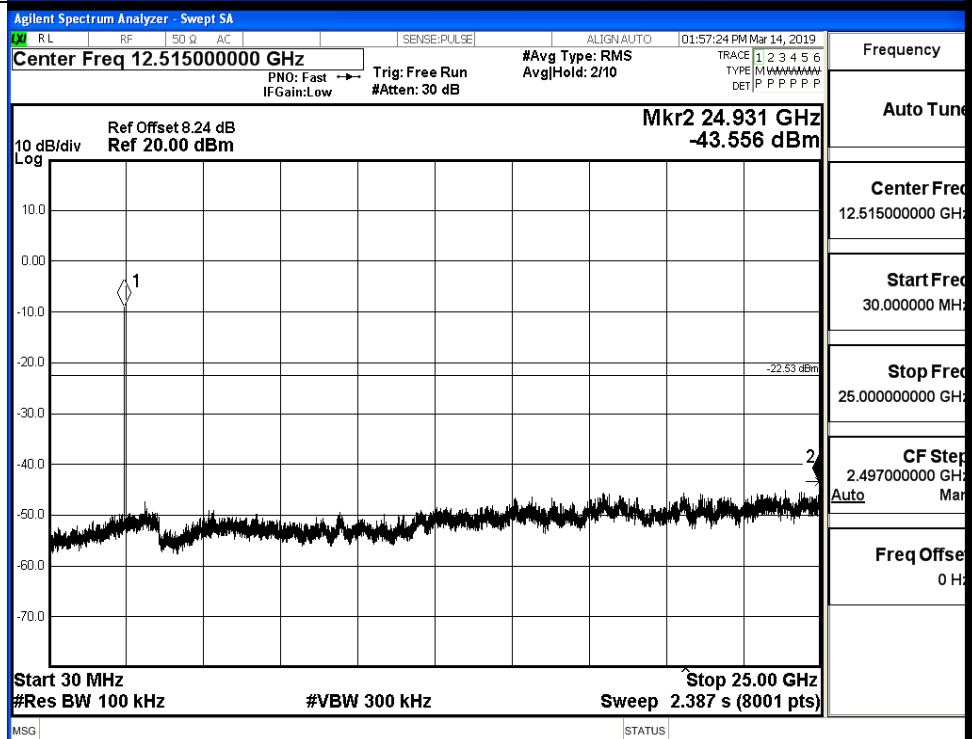


π /4DQPSK_HCH_Graphs

Pref

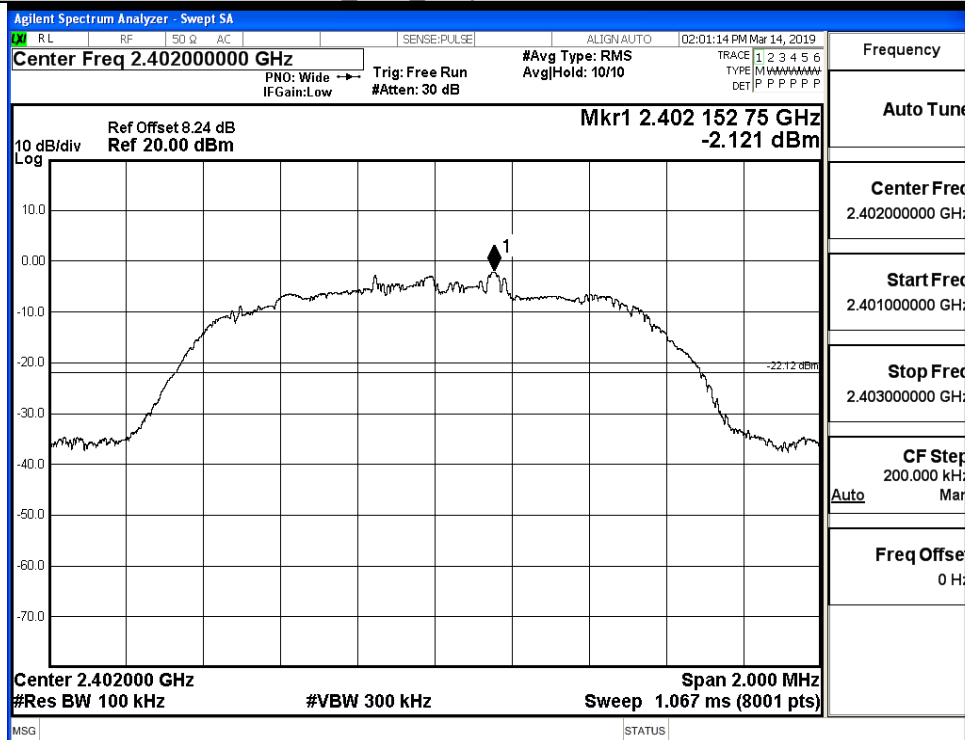


Puw

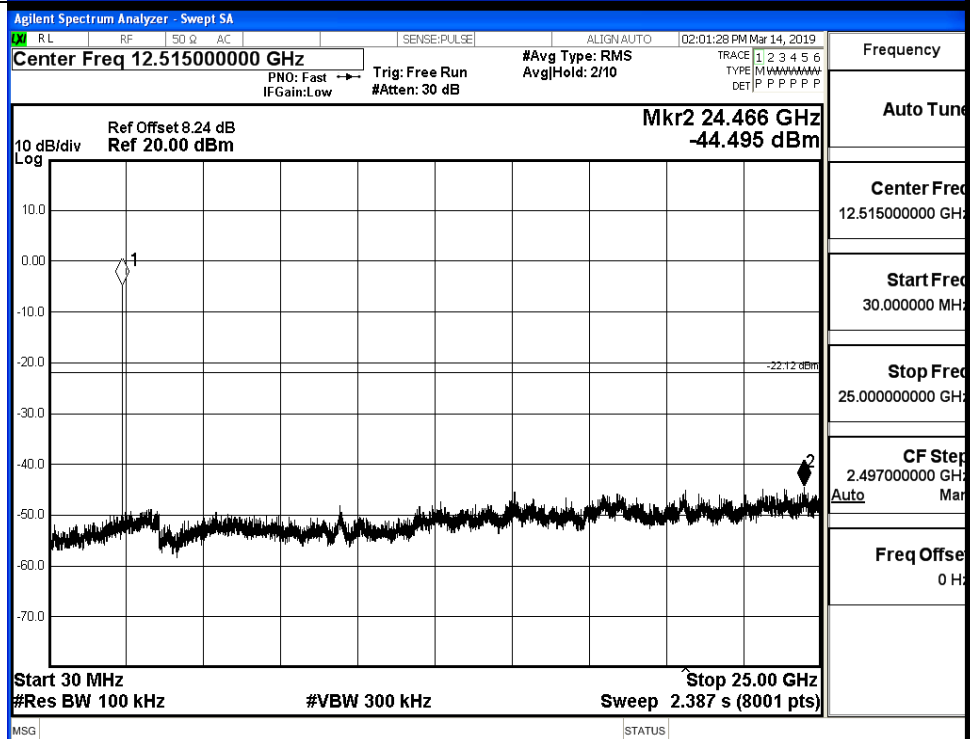


8DPSK_LCH_Graphs

Pref

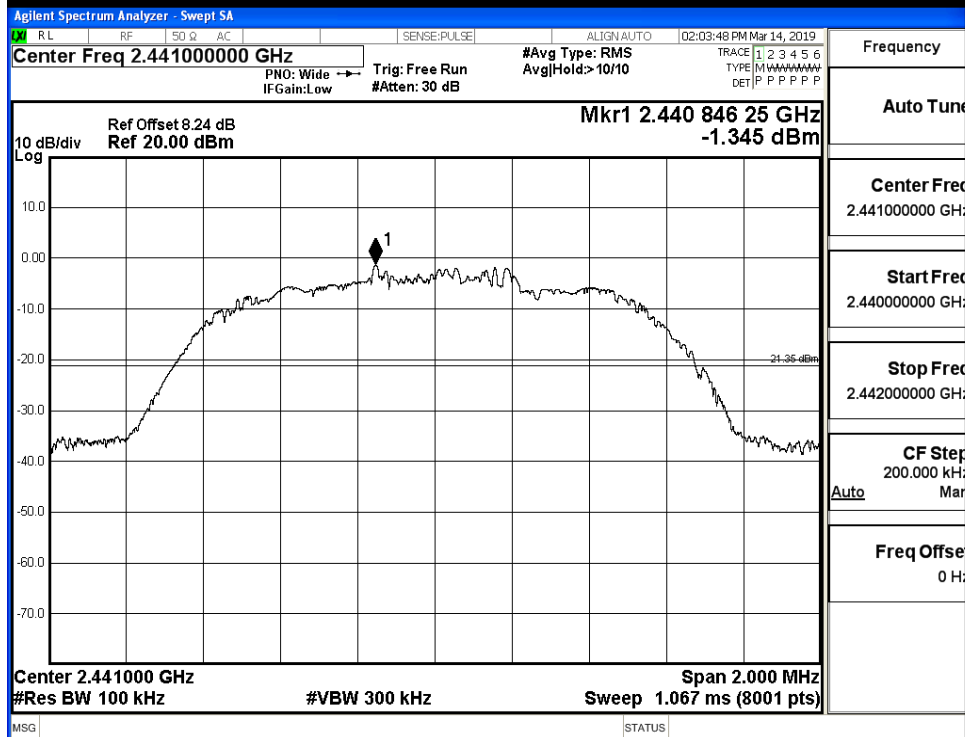


Puw

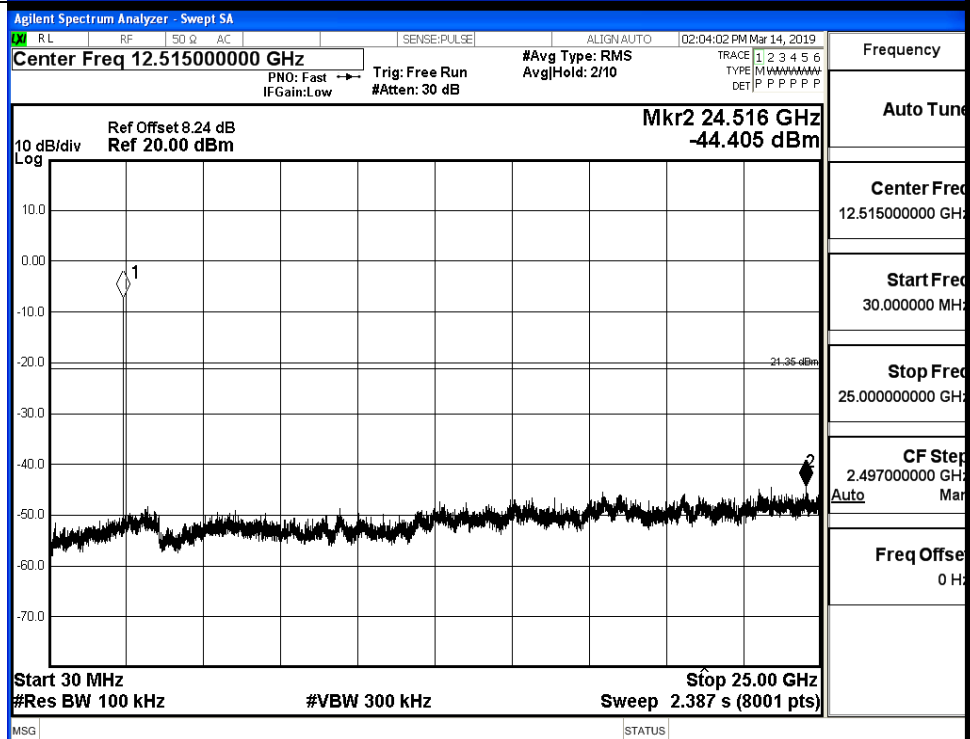


8DPSK_MCH_Graphs

Pref

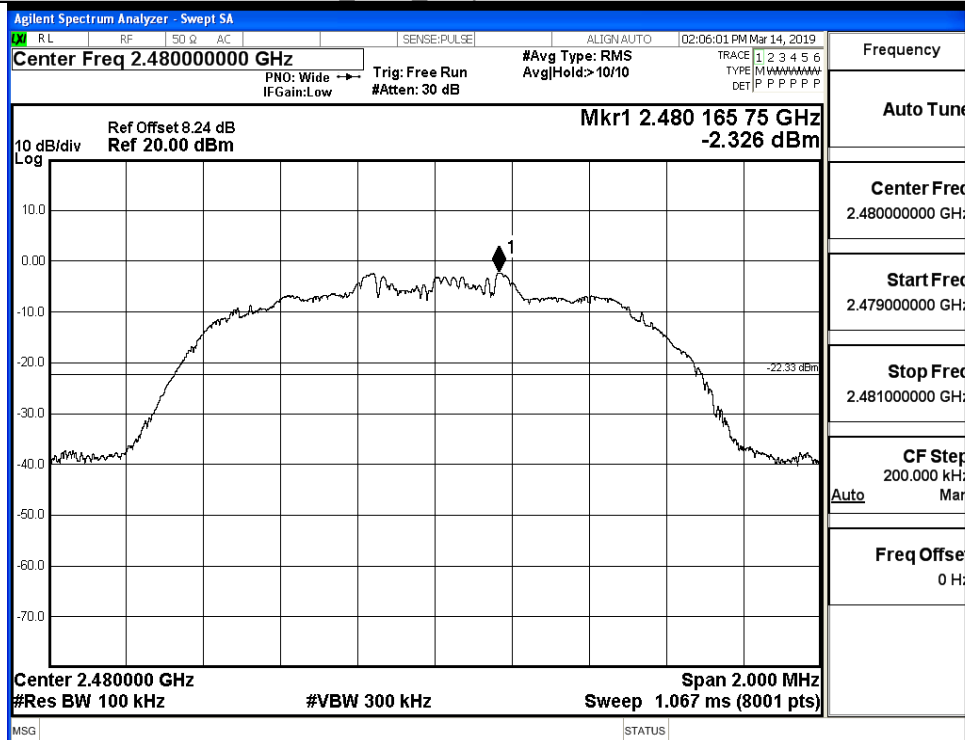


Puw

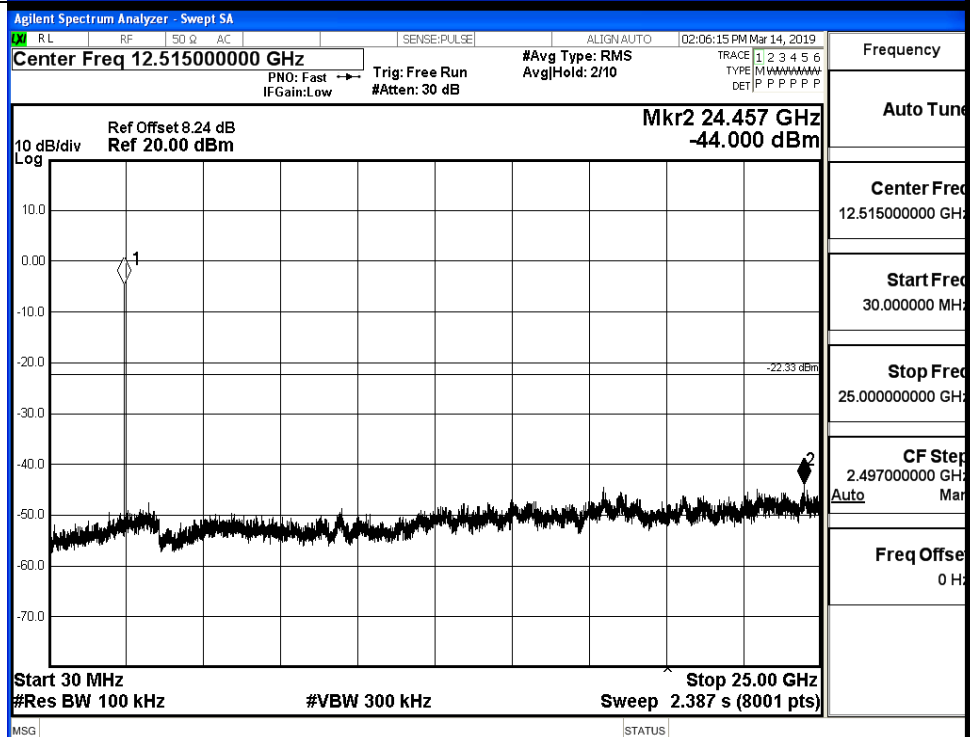


8DPSK_HCH_Graphs

Pref



Puw

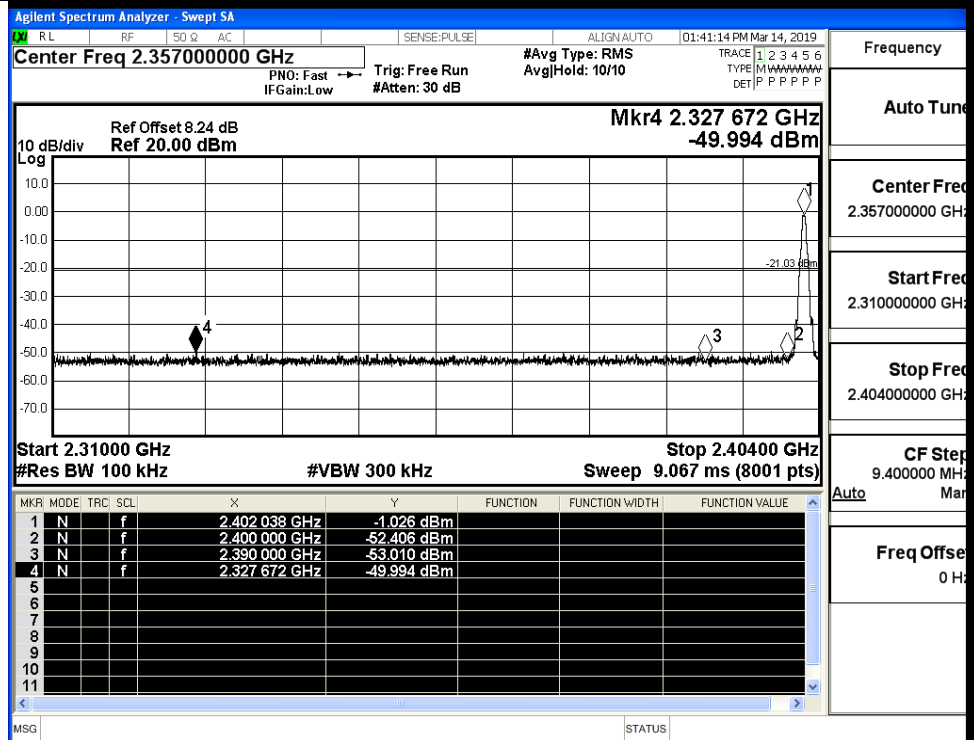


A.7 Band-edge for RF Conducted Emissions

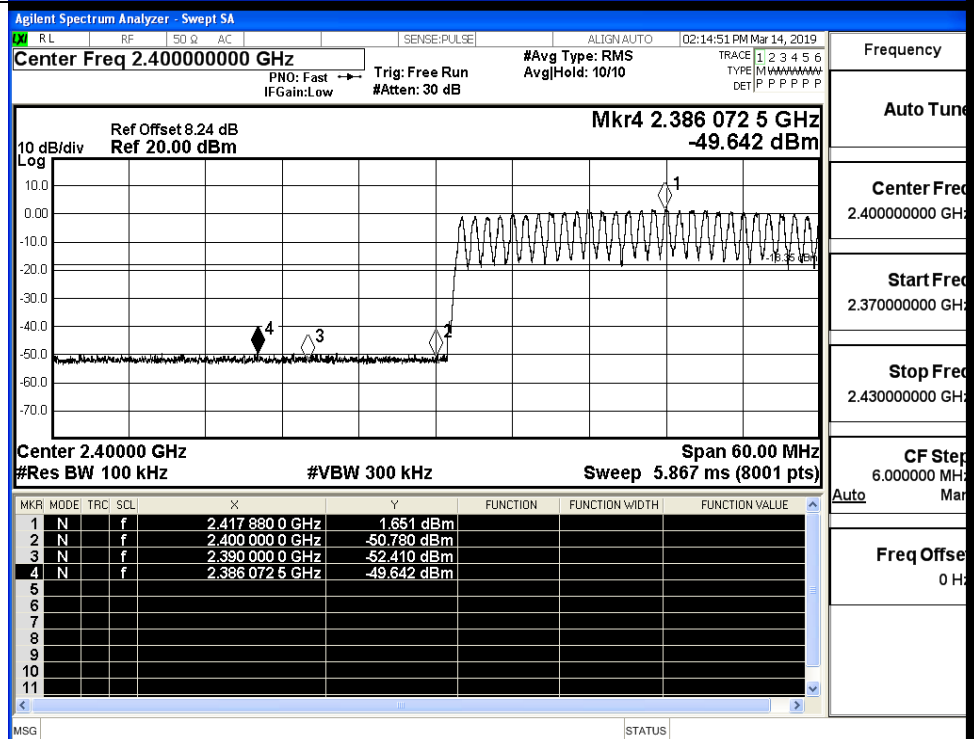
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.026	Off	-49.994	-21.03	PASS
			1.651	On	-49.642	-18.35	PASS
	HCH	2480	-1.073	Off	-48.718	-21.07	PASS
			1.277	On	-49.423	-18.72	PASS
$\pi/4$ DQPSK	LCH	2402	-2.417	Off	-49.956	-22.42	PASS
			-0.192	On	-48.719	-20.19	PASS
	HCH	2480	-2.502	Off	-49.783	-22.5	PASS
			-0.187	On	-48.679	-20.19	PASS
8DPSK	LCH	2402	-1.939	Off	-49.844	-21.94	PASS
			0.326	On	-49.308	-19.67	PASS
	HCH	2480	-2.317	Off	-49.481	-22.32	PASS
			-0.163	On	-49.239	-20.16	PASS

Test Graphs

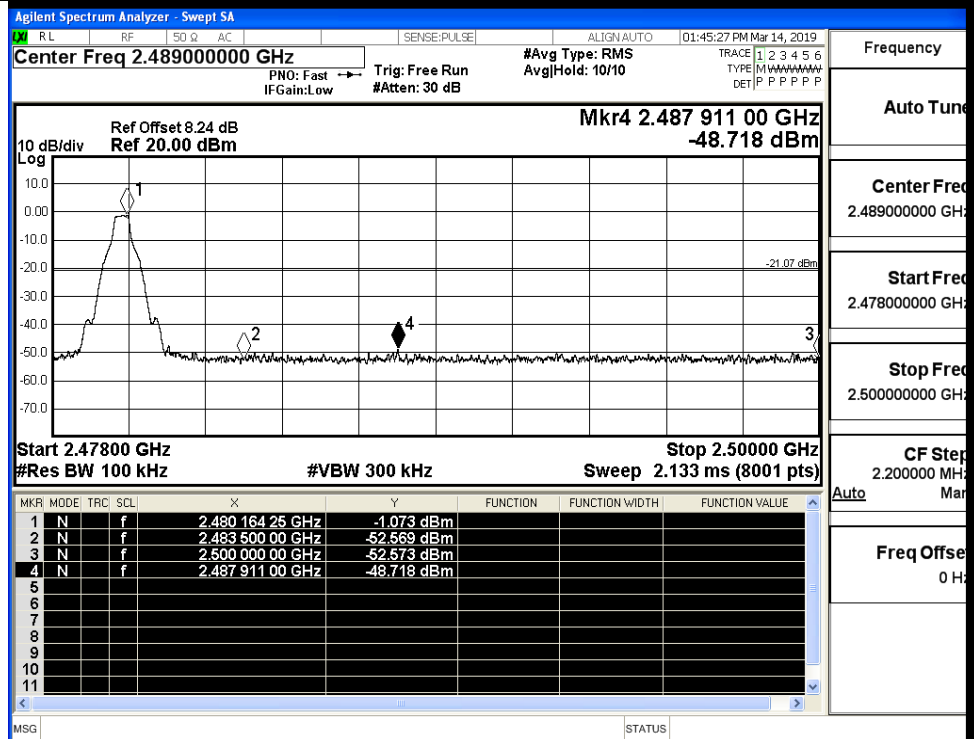
GFSK/LCH/No Hop



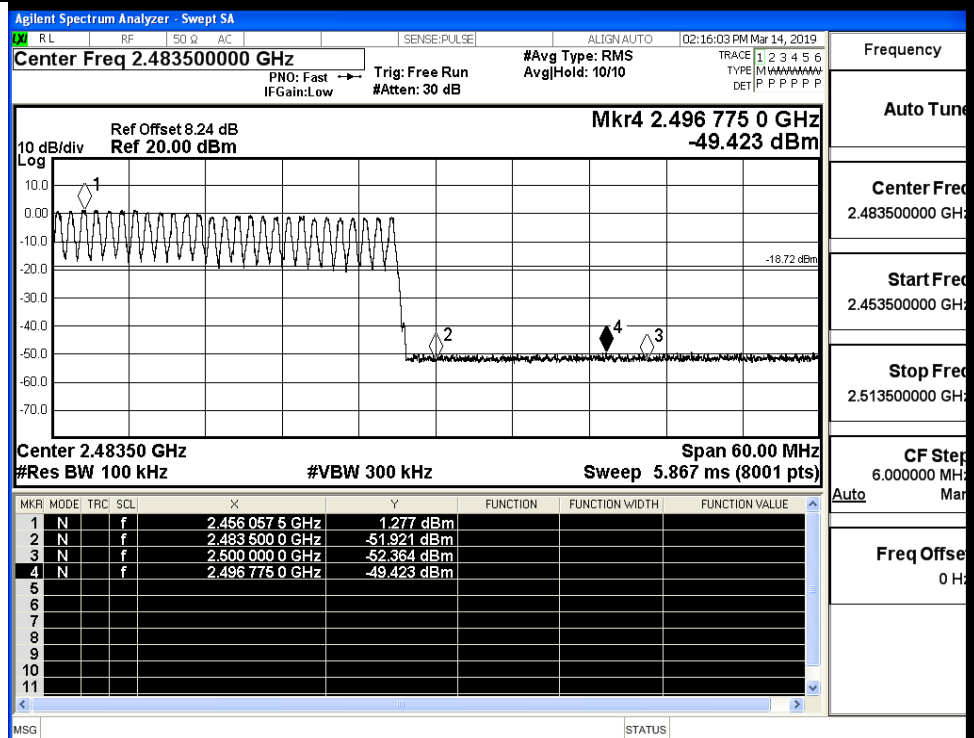
GFSK/LCH/Hop



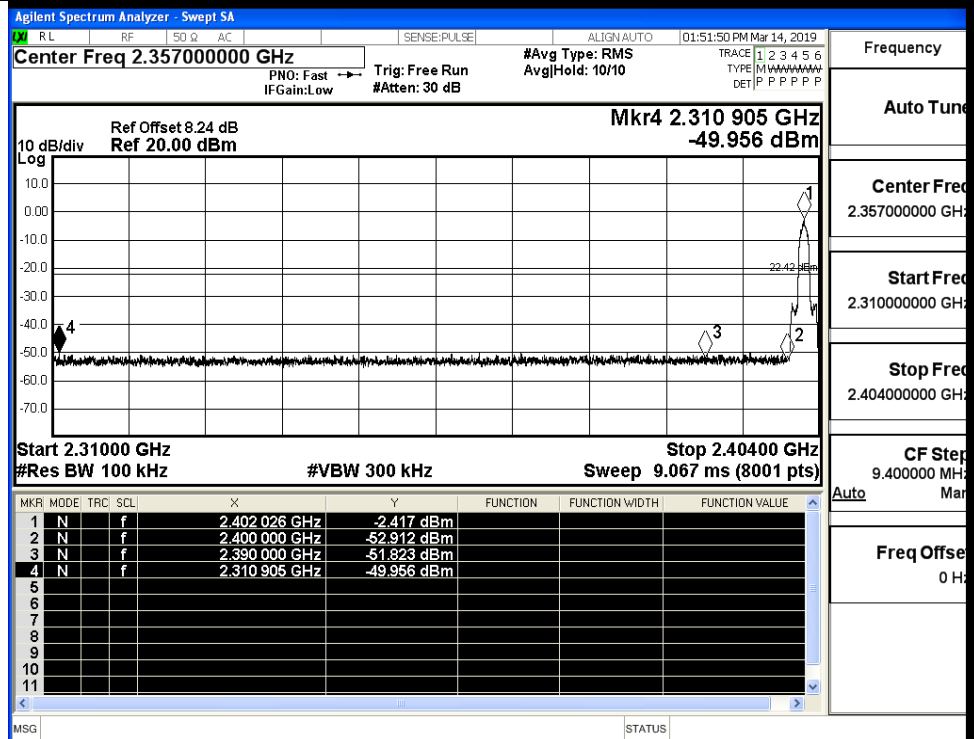
GFSK/HCH/No Hop



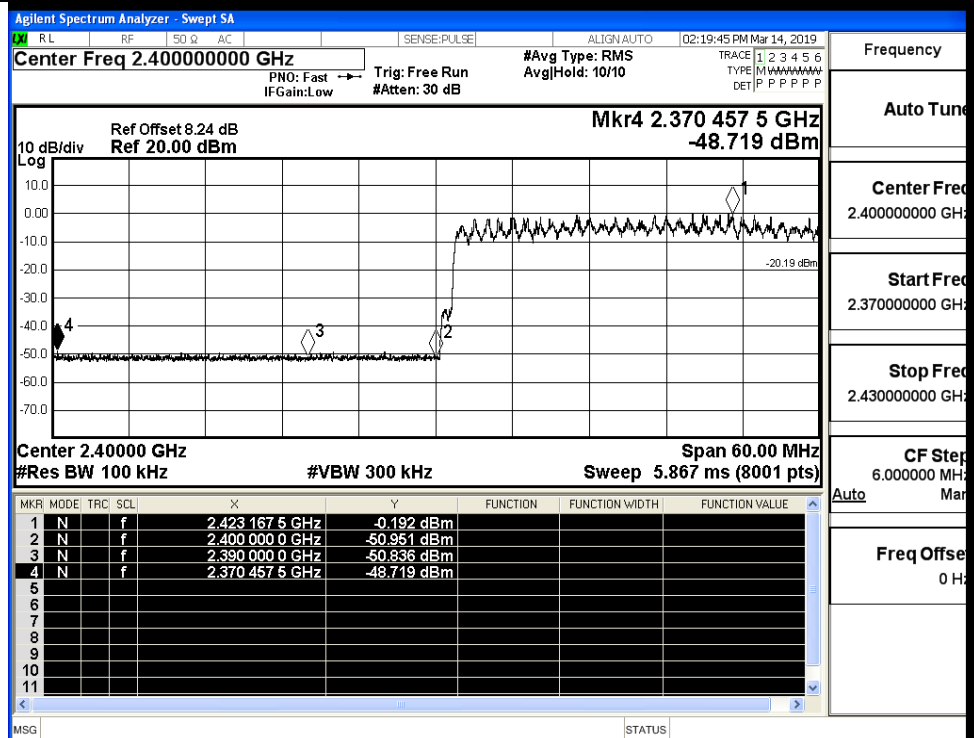
GFSK/HCH/Hop



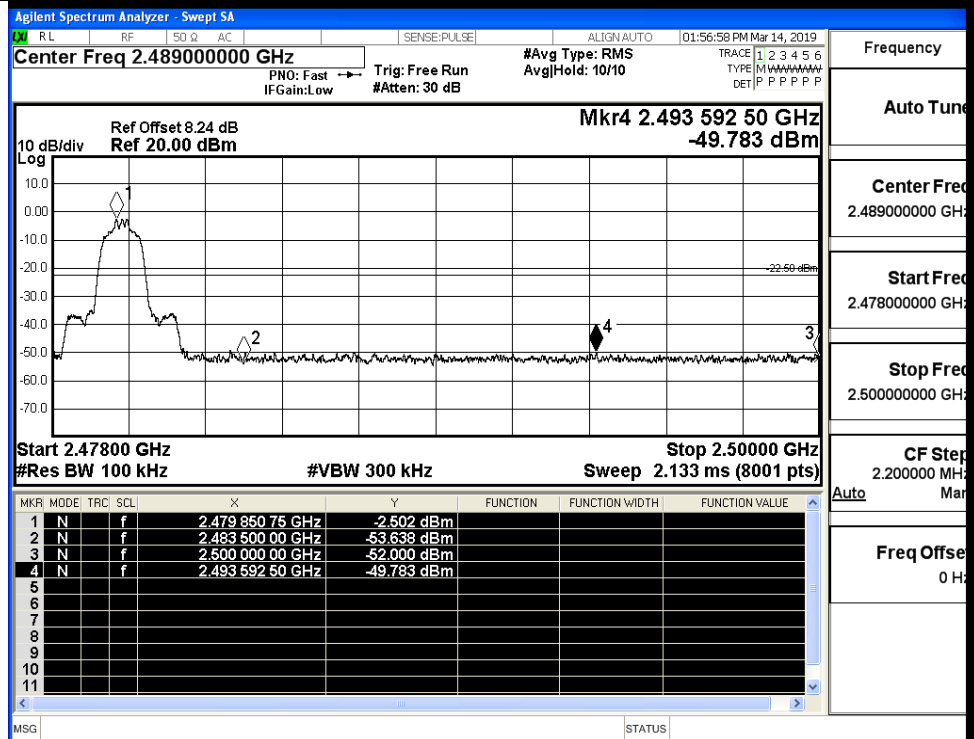
$\pi/4$ DQPSK/LCH/No
Hop



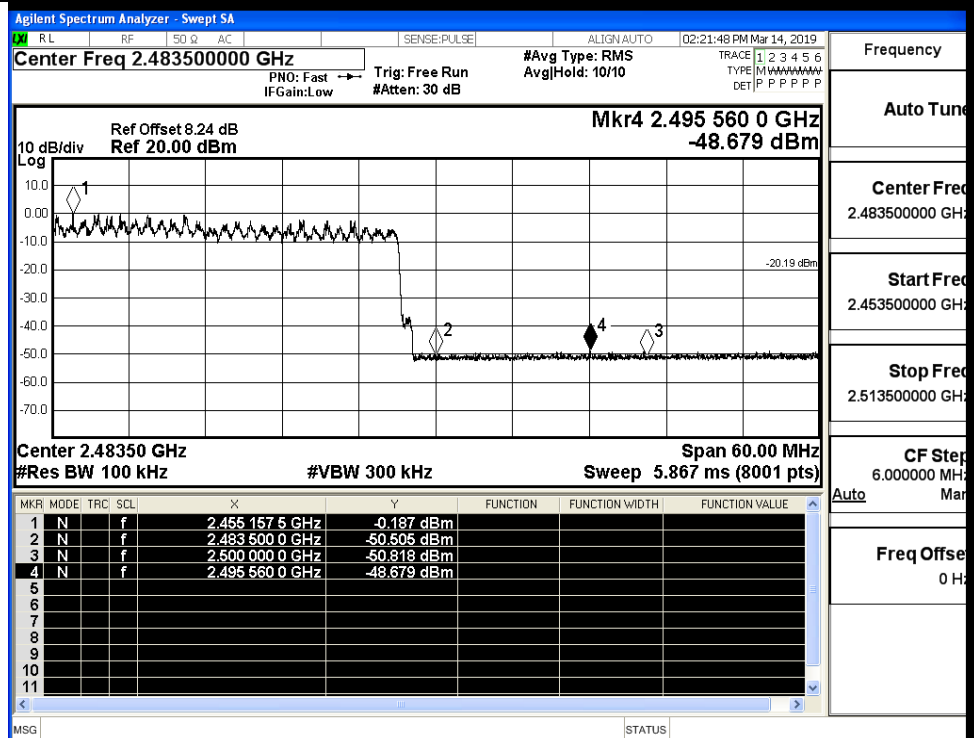
$\pi/4$ DQPSK/LCH/Hop



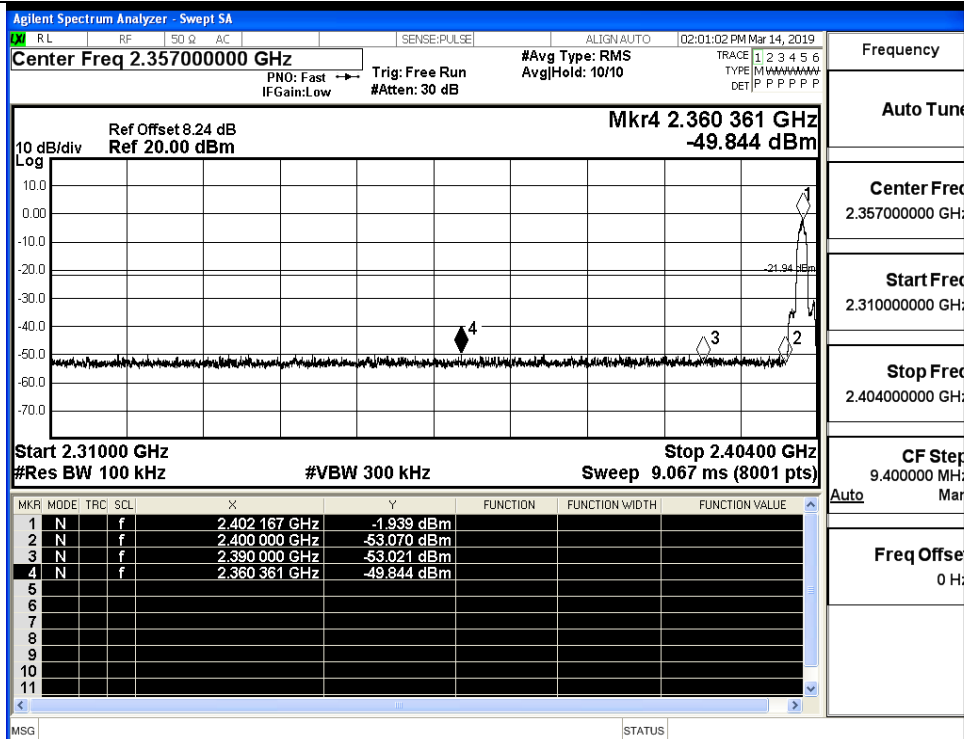
$\pi/4$ DQPSK/HCH/No
Hop



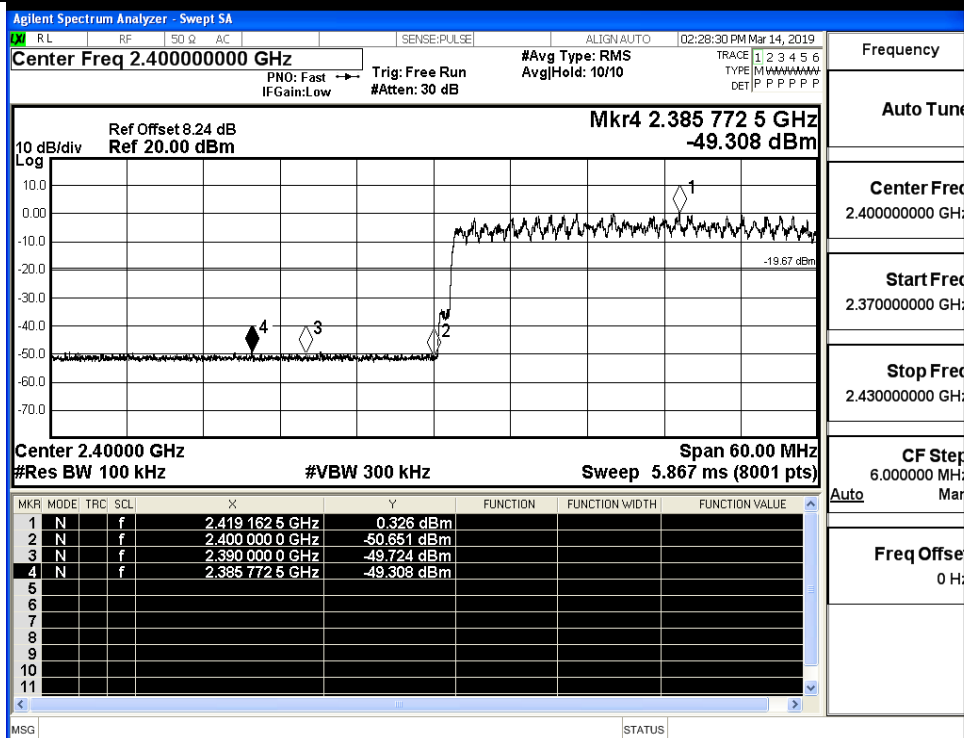
$\pi/4$ DQPSK/HCH/Hop



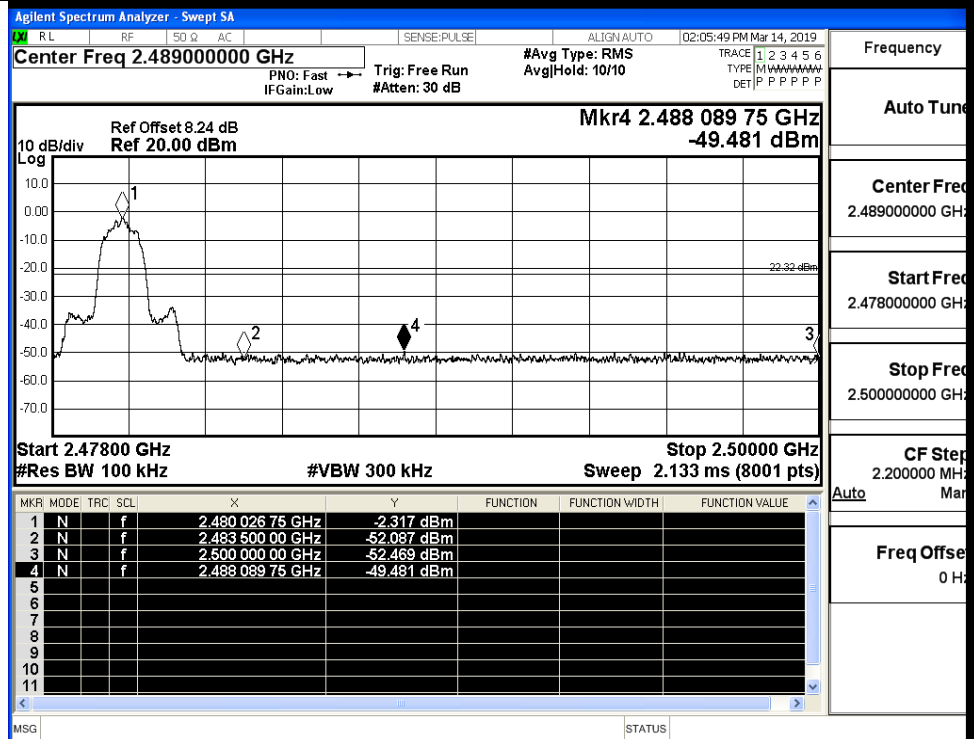
8DPSK/LCH/No Hop



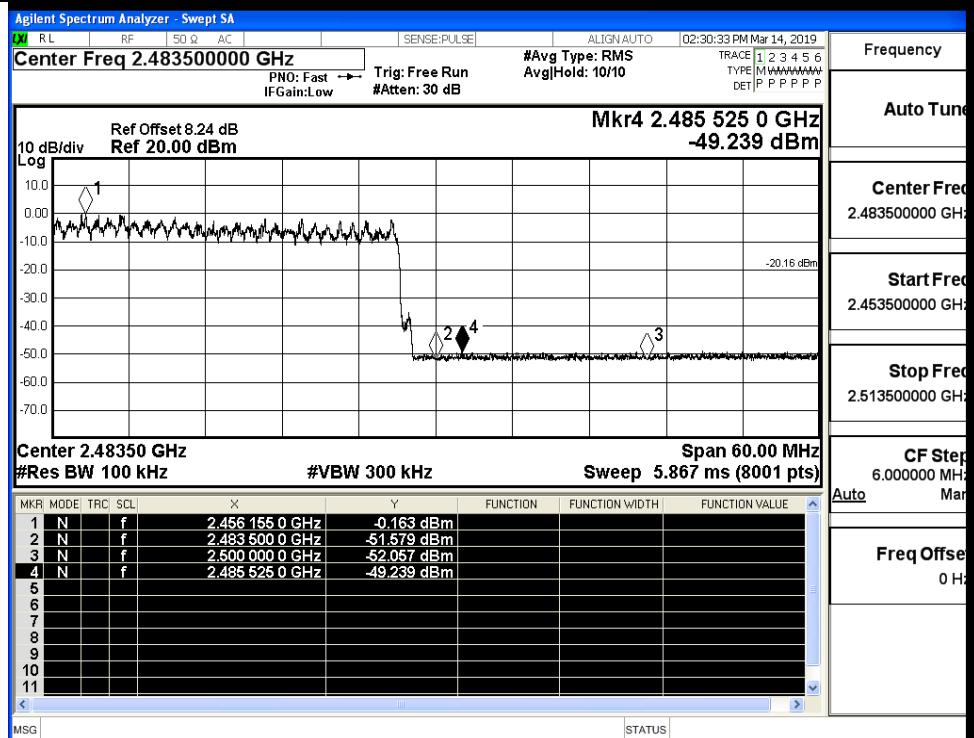
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



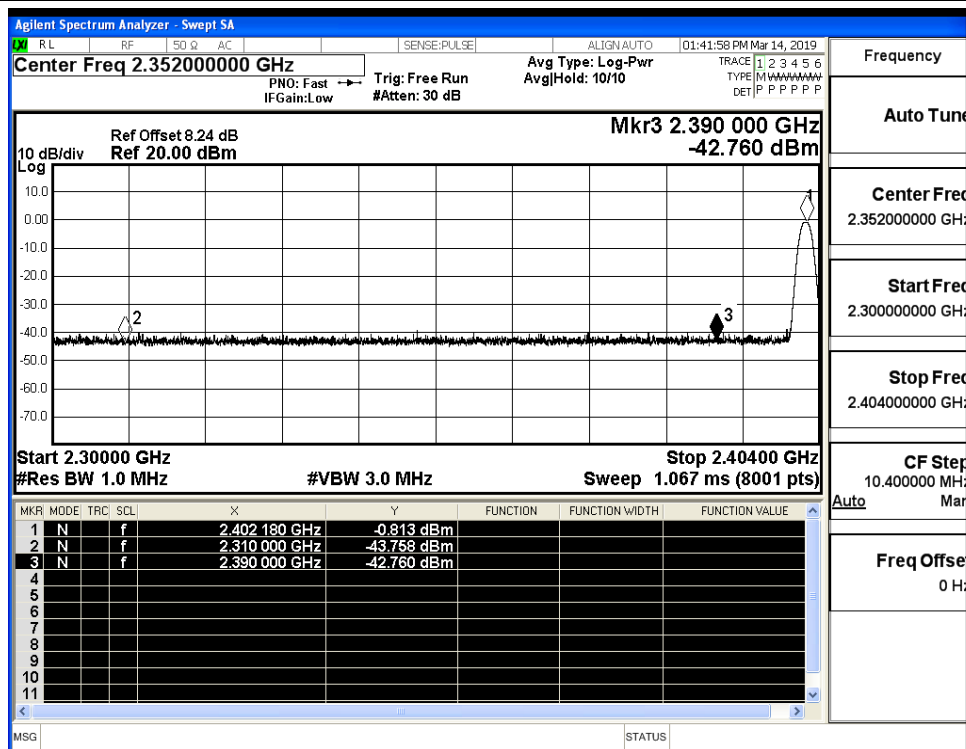
8DPSK/HCH/Hop



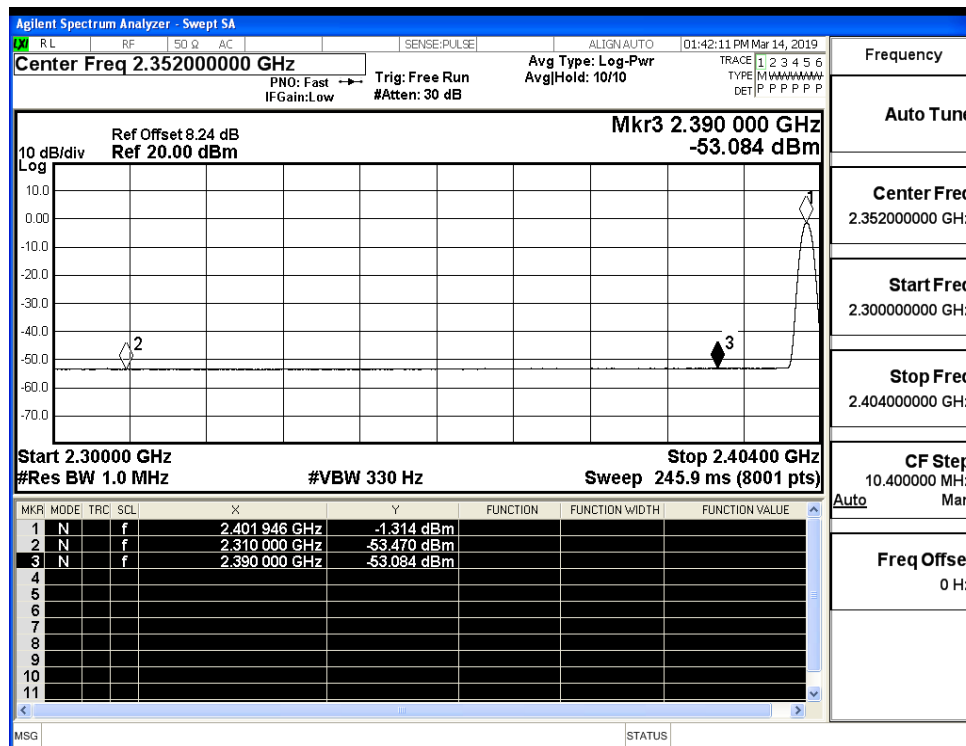
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.76	2.0	0	53.50	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	43.79	AV	54	PASS
	Off	2390.0	-42.76	2.0	0	54.50	PEAK	74	PASS
	Off	2390.0	-53.08	2.0	0	44.17	AV	54	PASS
	Off	2483.5	-43.11	2.0	0	54.14	PEAK	74	PASS
	Off	2483.5	-52.91	2.0	0	44.34	AV	54	PASS
	Off	2500.0	-43.23	2.0	0	54.03	PEAK	74	PASS
	Off	2500.0	-52.88	2.0	0	44.38	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.92	2.0	0	54.34	PEAK	74	PASS
	Off	2310.0	-53.36	2.0	0	43.90	AV	54	PASS
	Off	2390.0	-43.18	2.0	0	54.08	PEAK	74	PASS
	Off	2390.0	-53.17	2.0	0	44.09	AV	54	PASS
	Off	2483.5	-41.88	2.0	0	55.38	PEAK	74	PASS
	Off	2483.5	-52.91	2.0	0	44.35	AV	54	PASS
	Off	2500.0	-42.96	2.0	0	54.29	PEAK	74	PASS
	Off	2500.0	-52.74	2.0	0	44.52	AV	54	PASS
8DPSK	Off	2310.0	-42.97	2.0	0	54.29	PEAK	74	PASS
	Off	2310.0	-53.27	2.0	0	43.99	AV	54	PASS
	Off	2390.0	-43.29	2.0	0	53.97	PEAK	74	PASS
	Off	2390.0	-53.20	2.0	0	44.06	AV	54	PASS
	Off	2483.5	-44.12	2.0	0	53.14	PEAK	74	PASS
	Off	2483.5	-52.88	2.0	0	44.38	AV	54	PASS
	Off	2500.0	-43.15	2.0	0	54.10	PEAK	74	PASS
	Off	2500.0	-52.77	2.0	0	44.49	AV	54	PASS

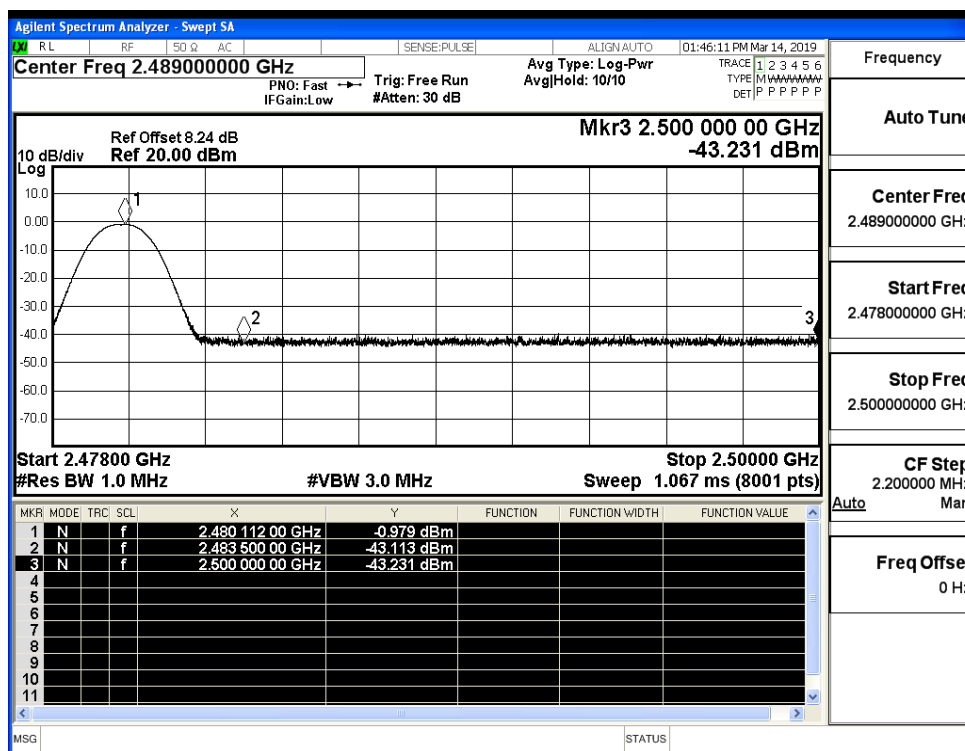
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



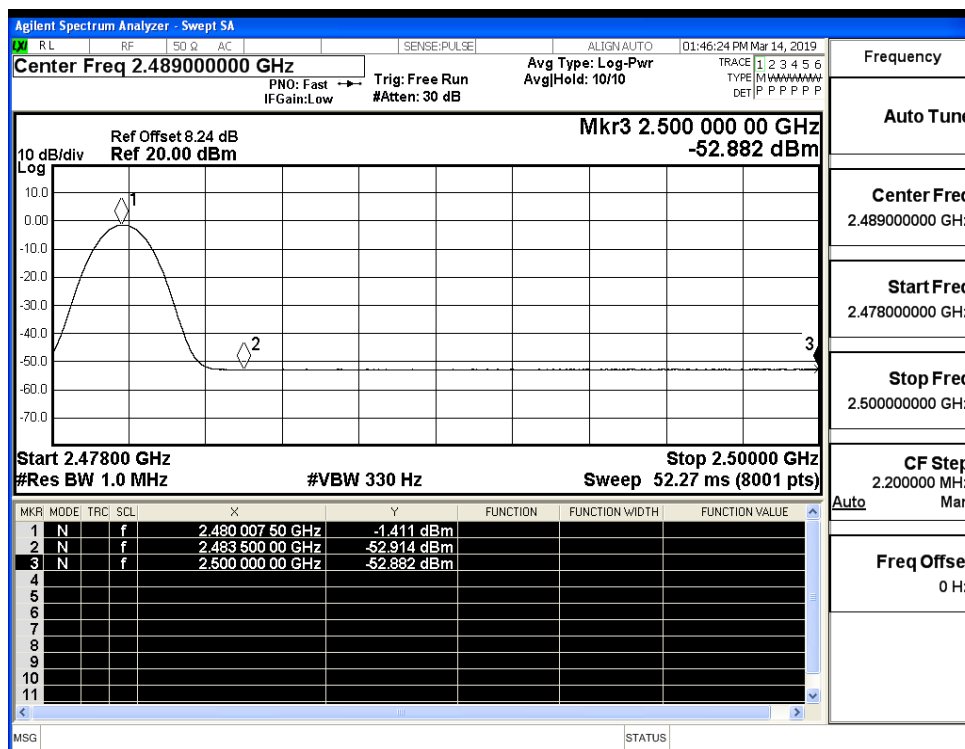
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

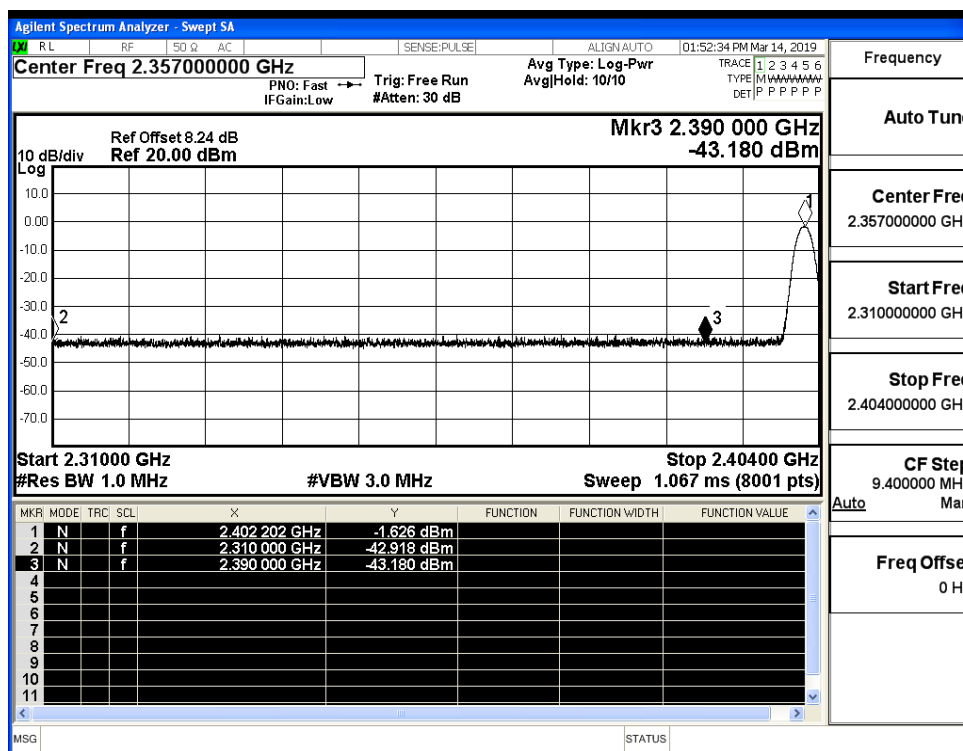
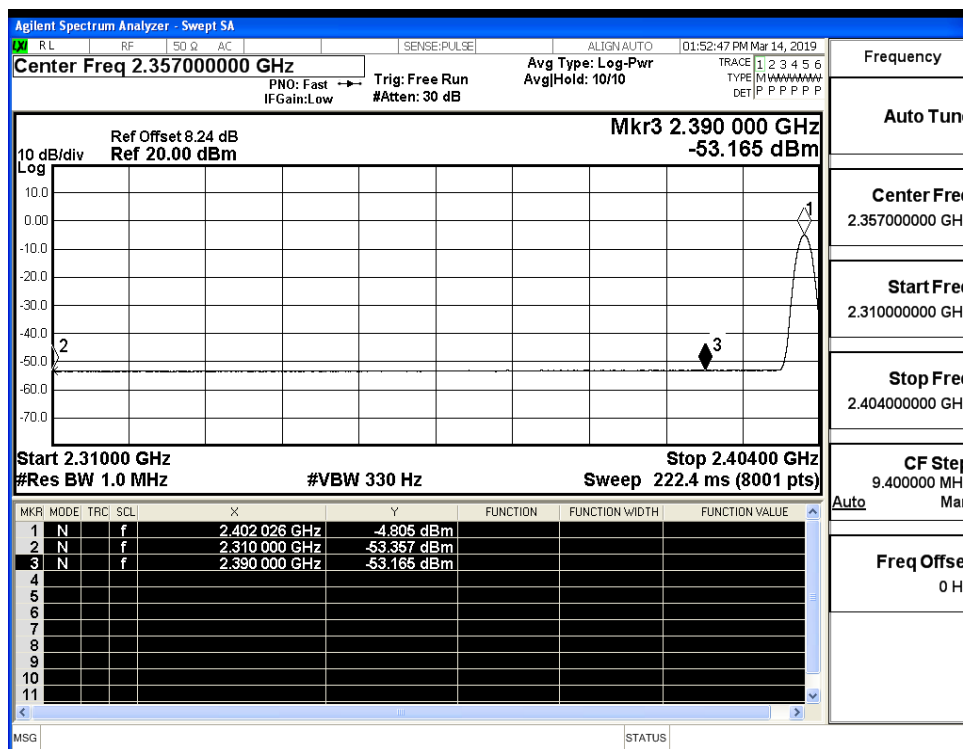


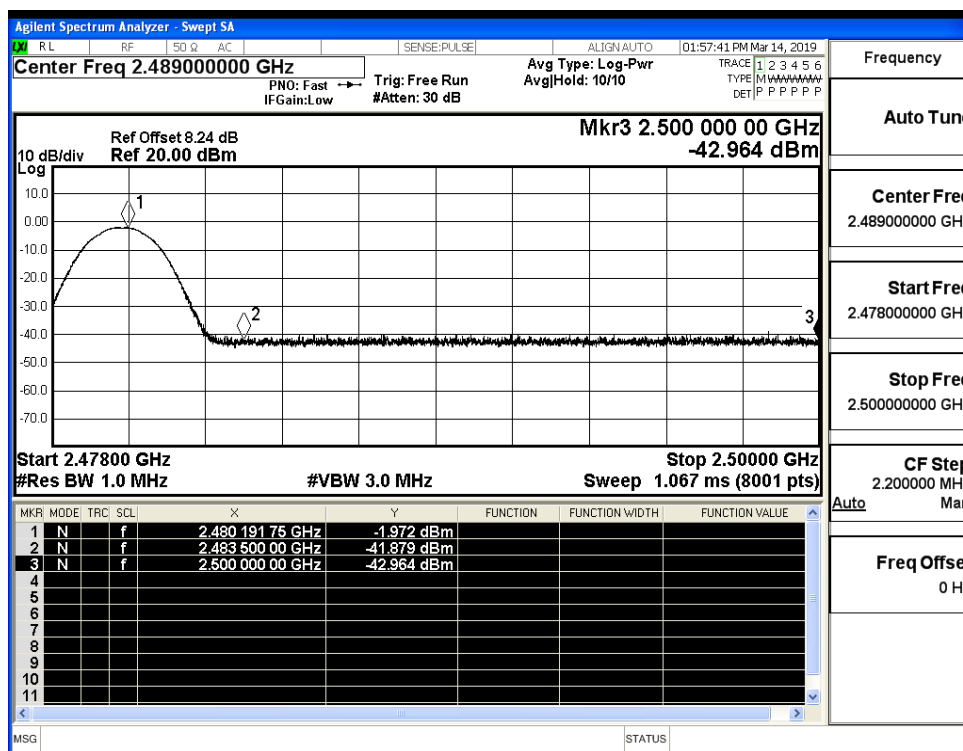
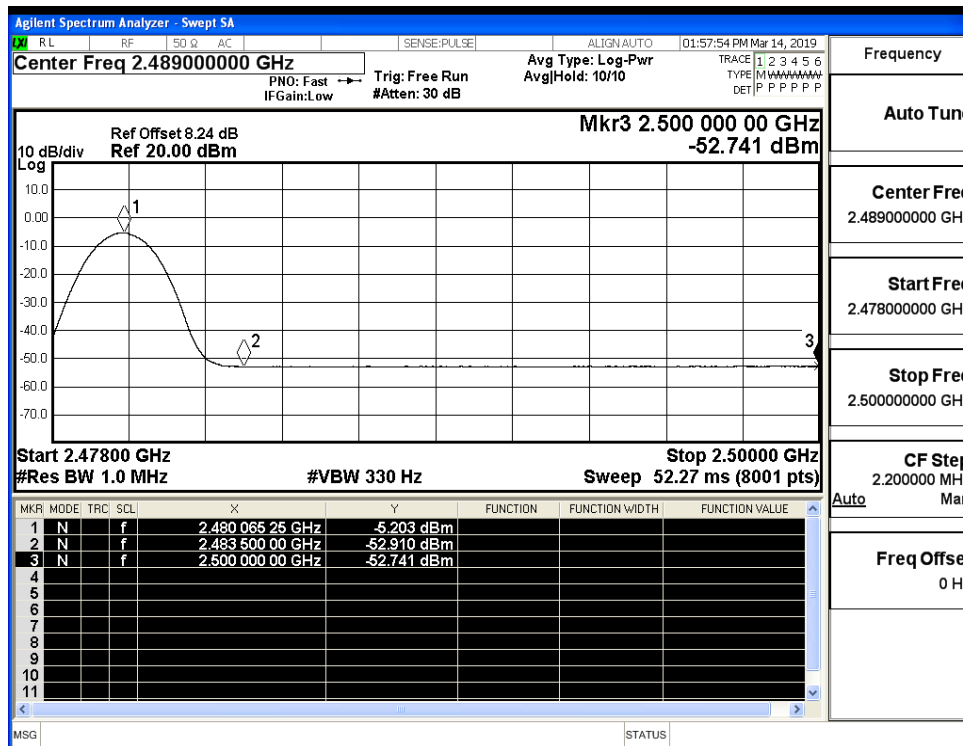
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



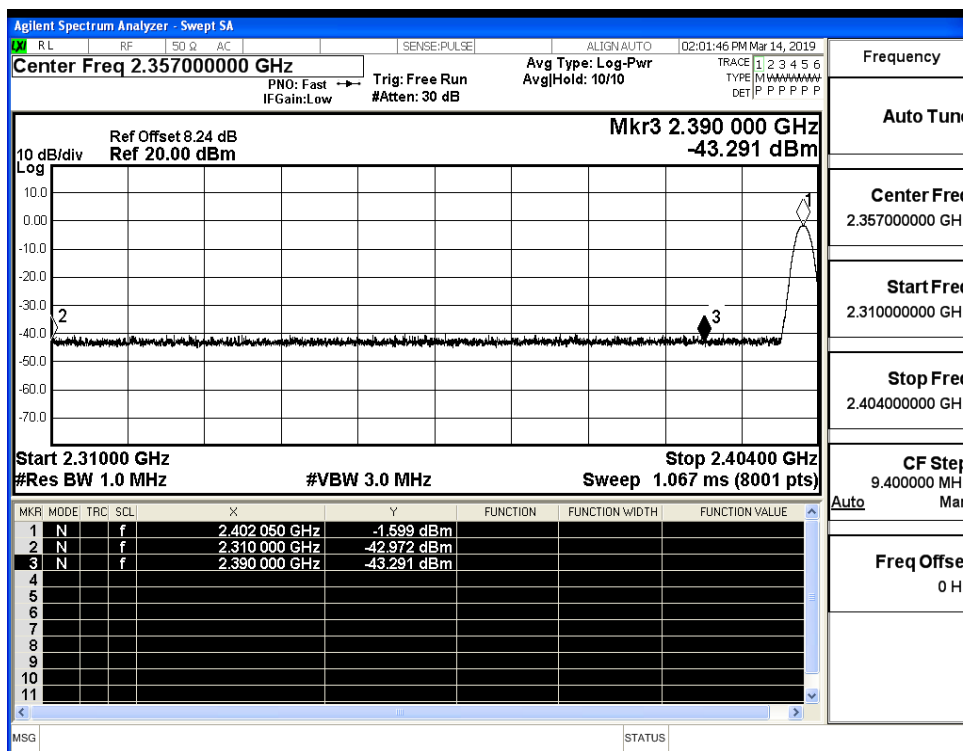
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



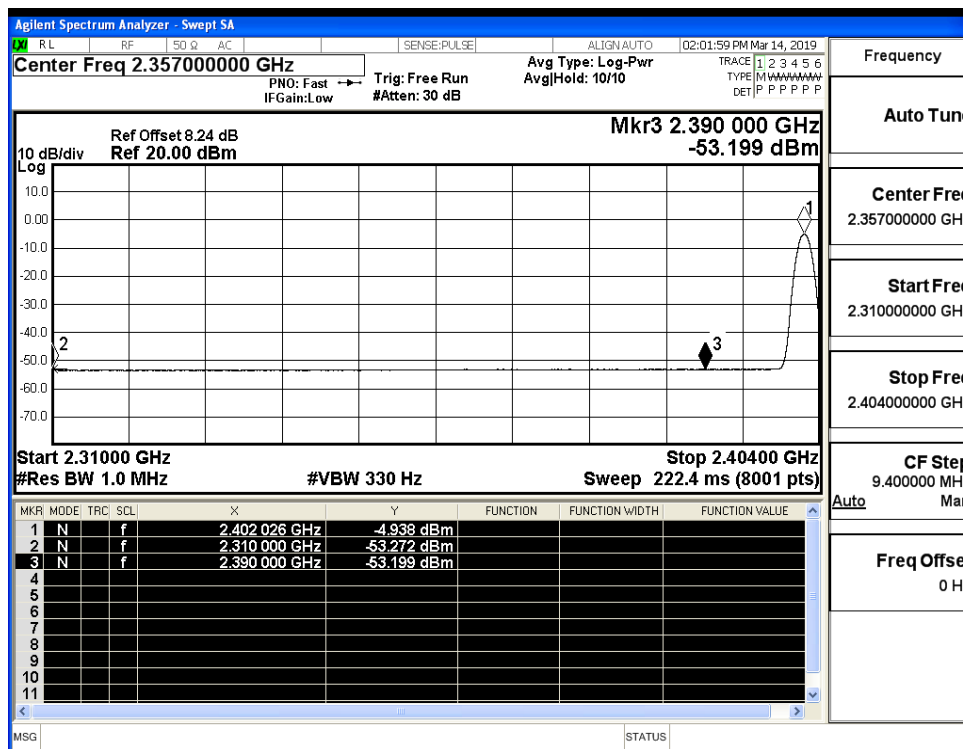
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

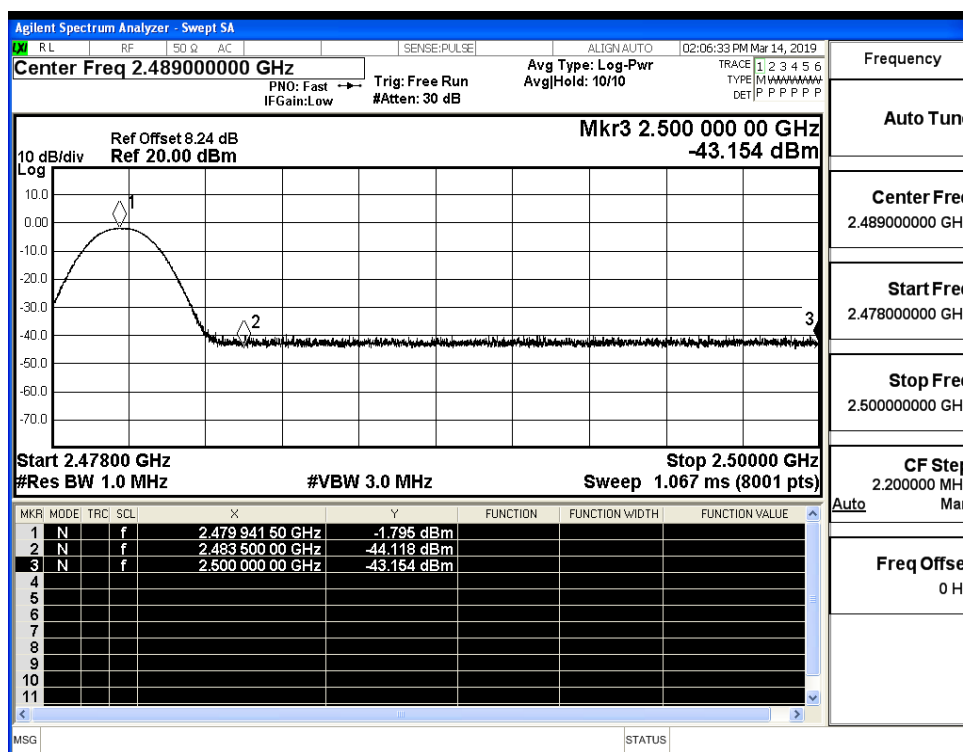
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

