

Appendix A

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

Product Name: COLLAPSIBLE LANTERN WITH BLUETOOTH SPEAKER

Trade Mark: N/A

Test Model: XO-9936

Environmental Conditions

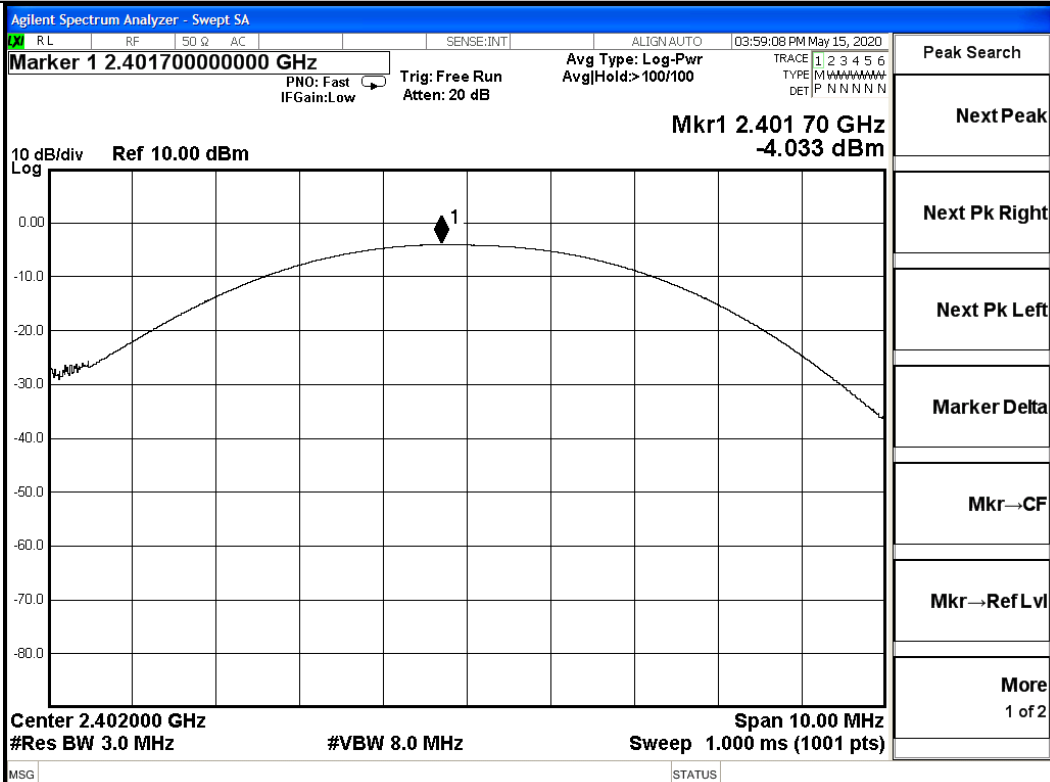
Temperature:	23.4° C
Relative Humidity:	54%
ATM Pressure:	100.0 kPa
Test Engineer:	Jerry Zeng
Supervised by:	Tom Liu

A.1 Maximum Conducted Peak Output Power

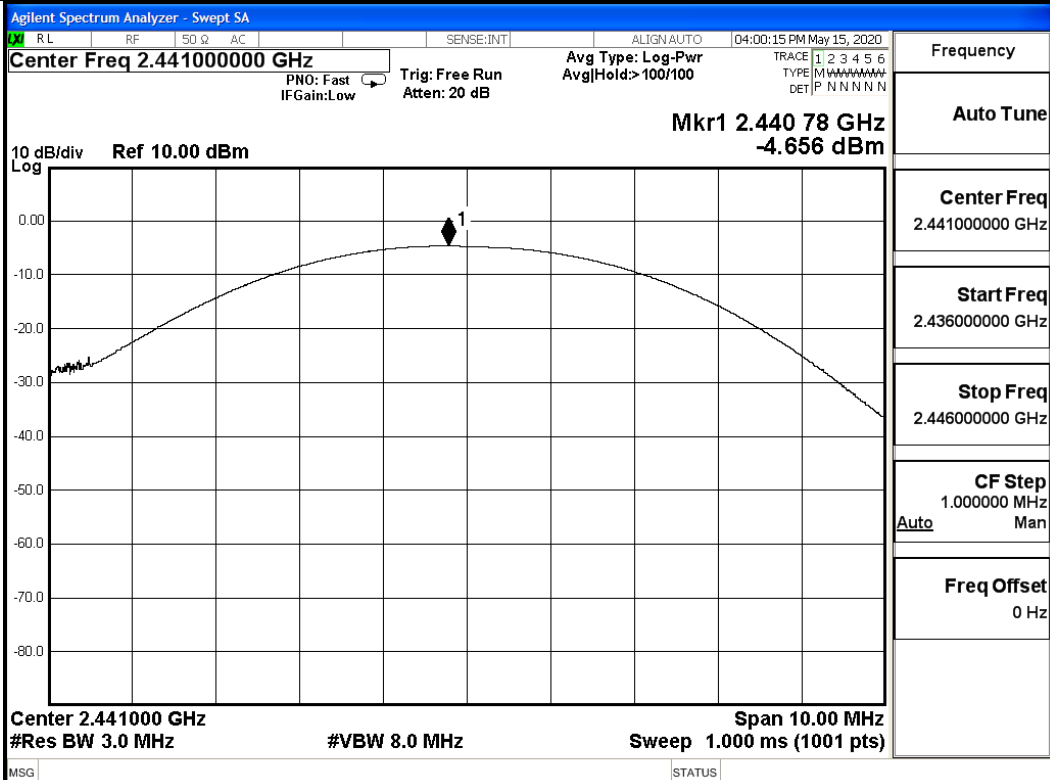
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-4.033	21	PASS
	MCH	-4.656	21	PASS
	HCH	-5.380	21	PASS
$\pi/4$ DQPSK	LCH	-3.337	21	PASS
	MCH	-3.936	21	PASS
	HCH	-4.670	21	PASS

Test Graphs

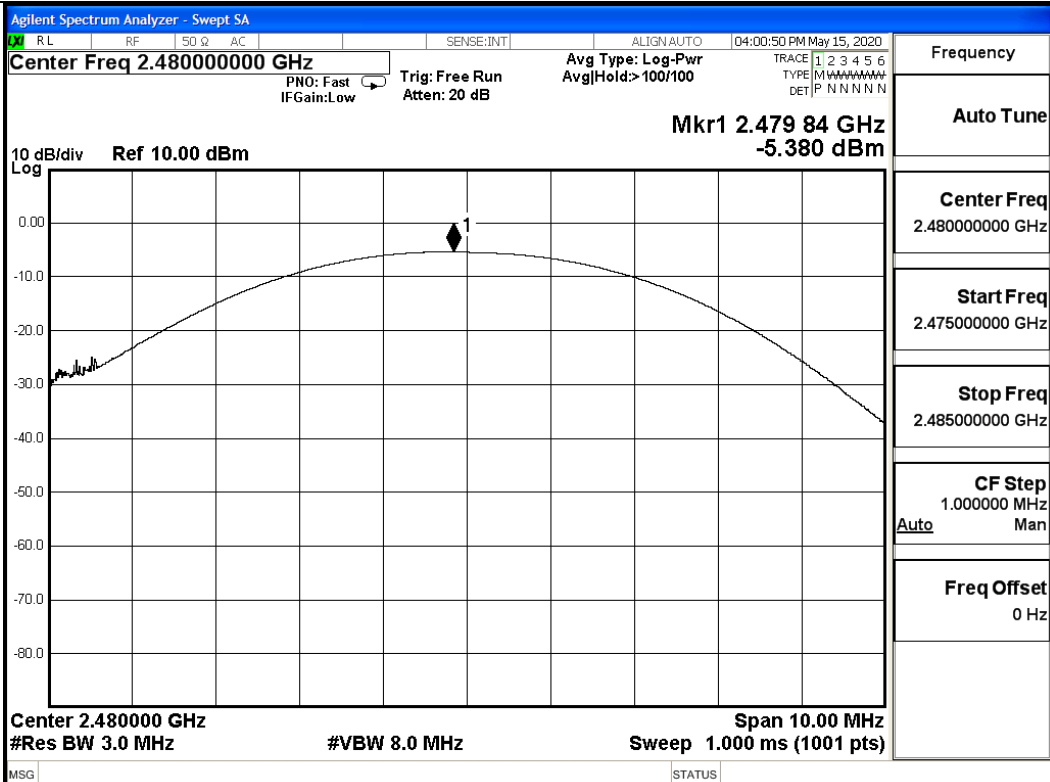
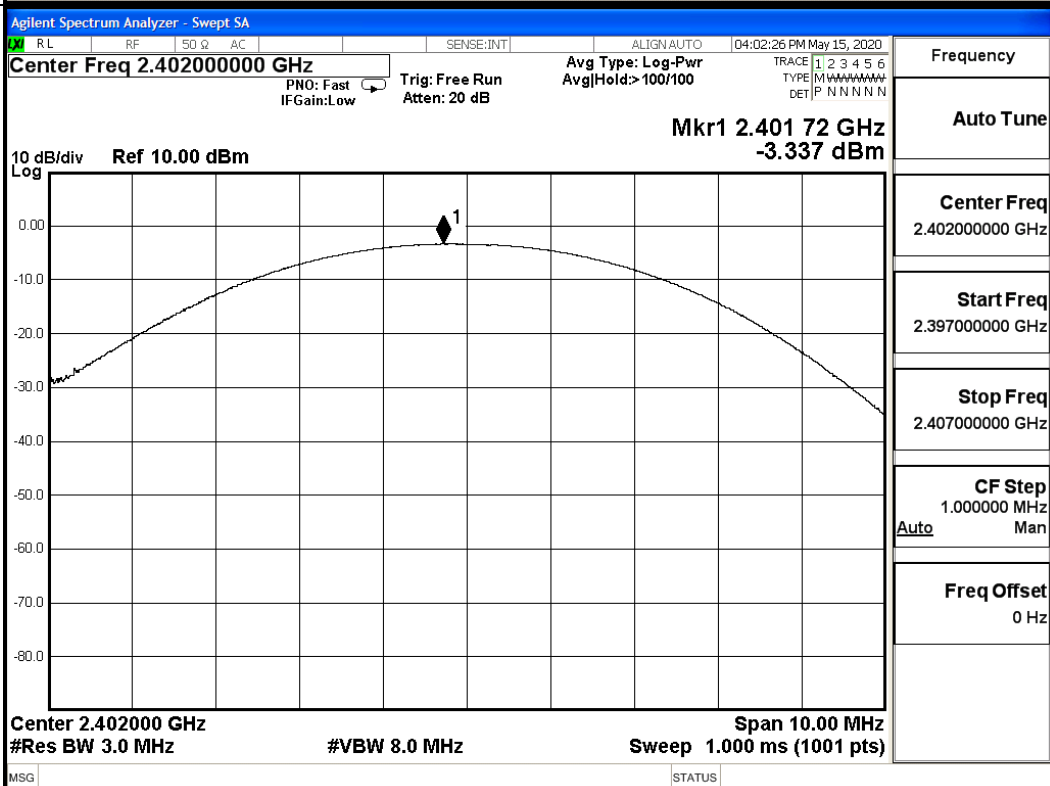
GFSK/LCH

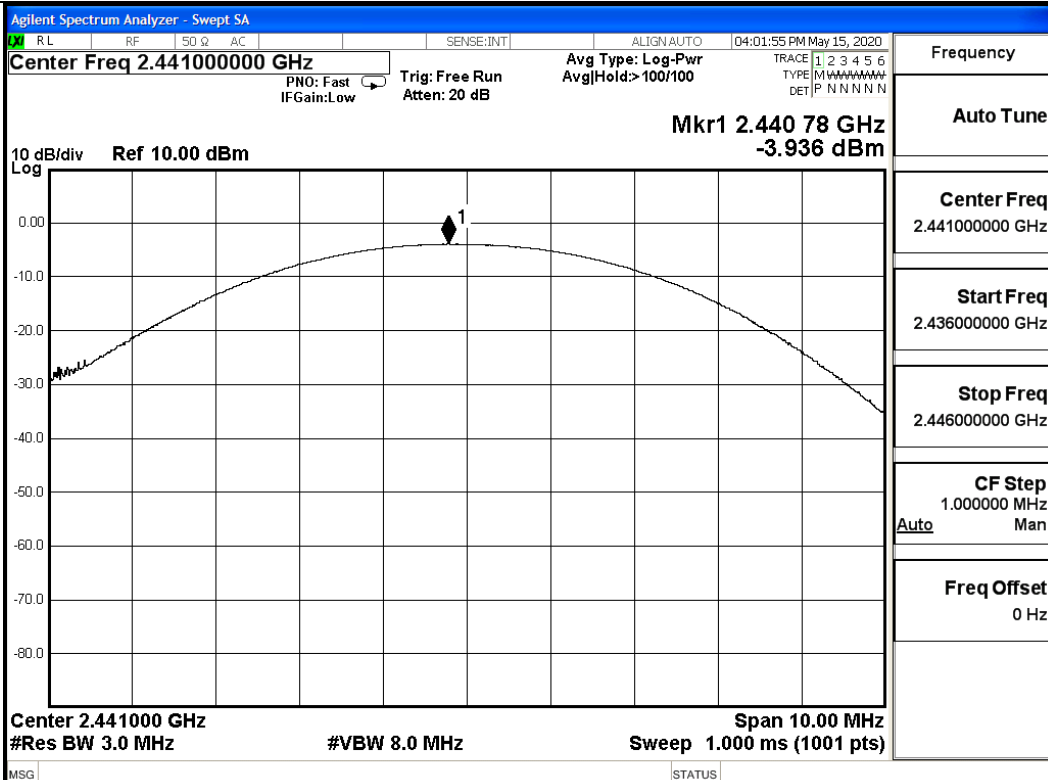
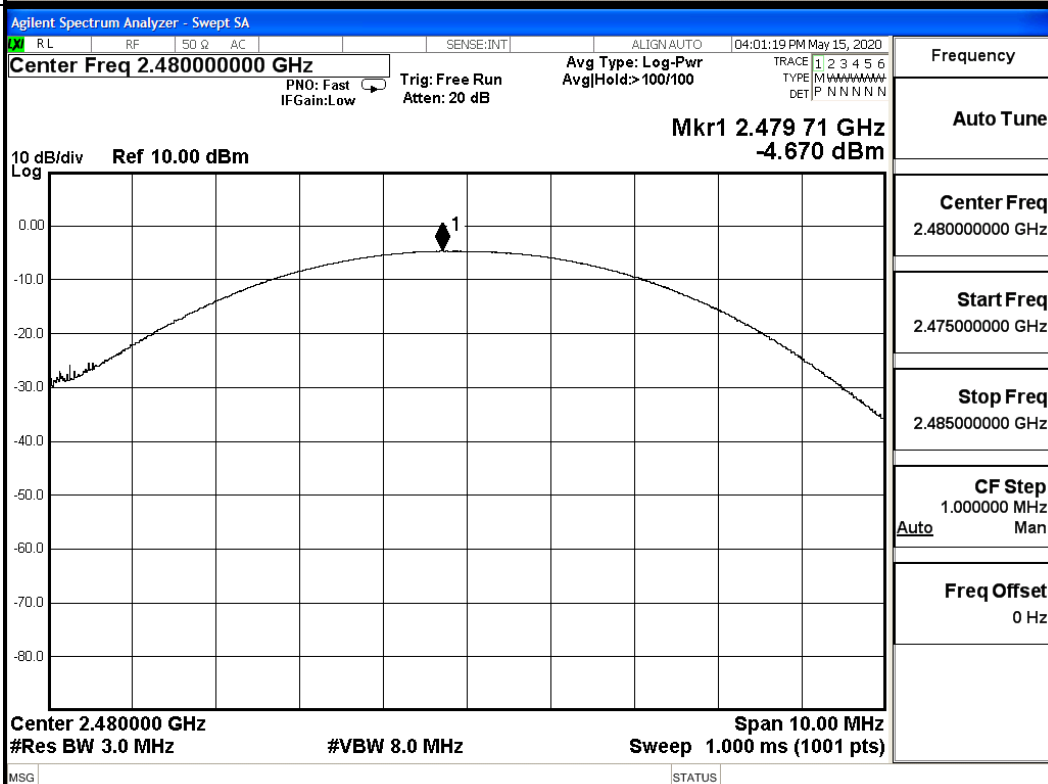


GFSK/MCH



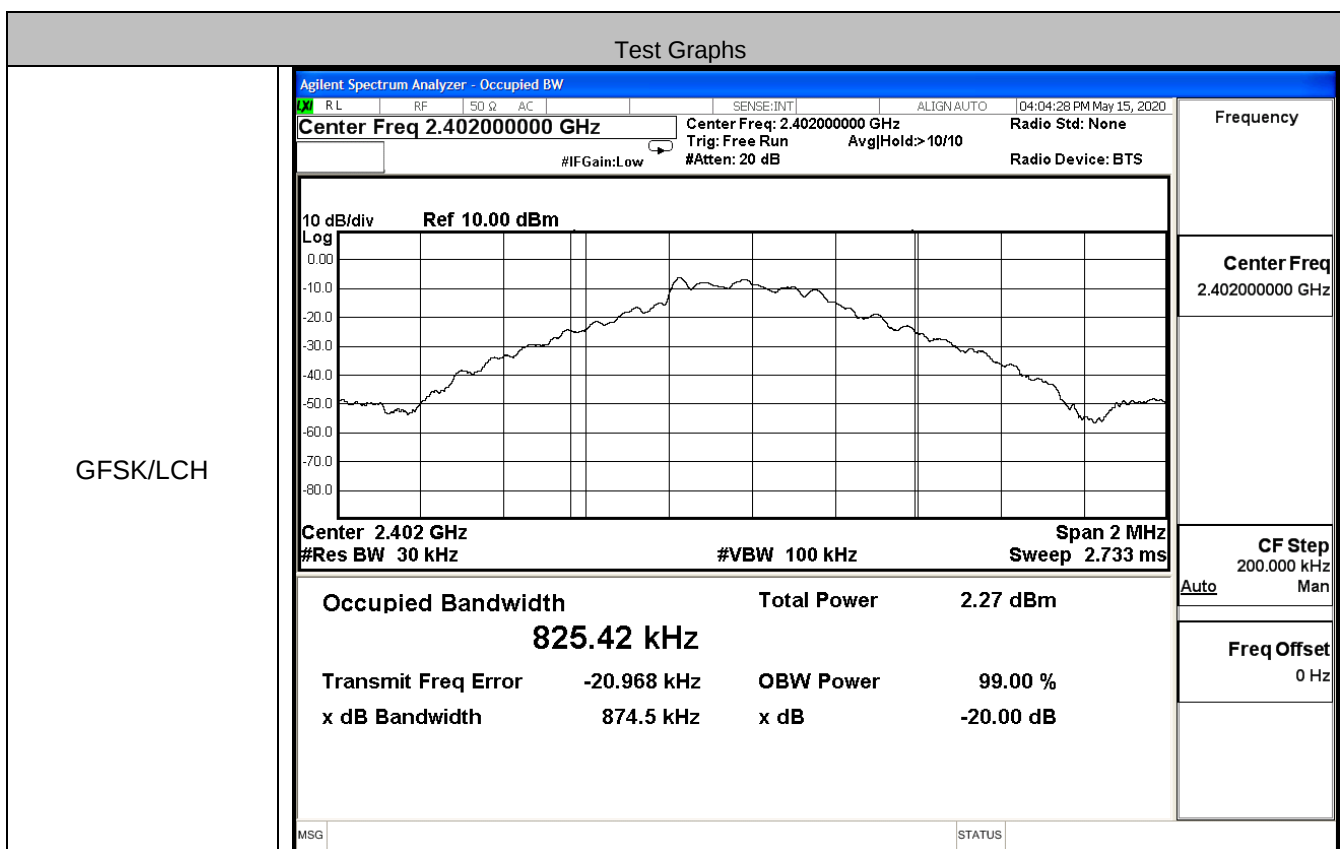
GFSK/HCH

 π /4DQPSK/LCH

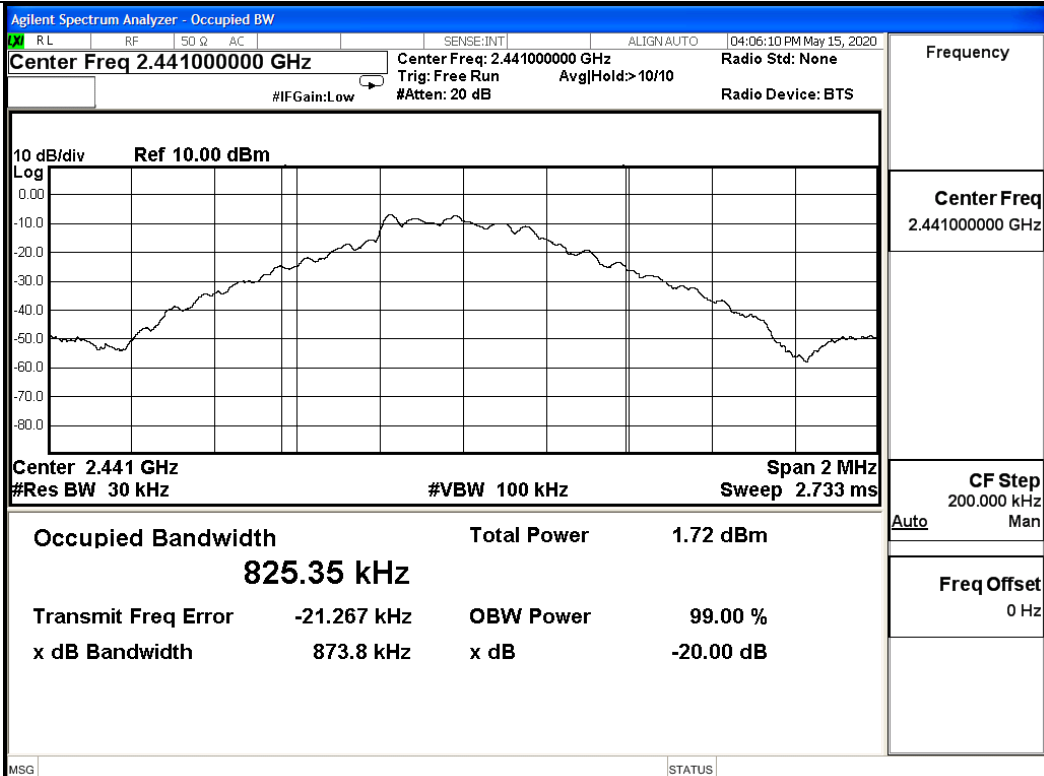
$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

A.2 99% and 20dB Bandwidth

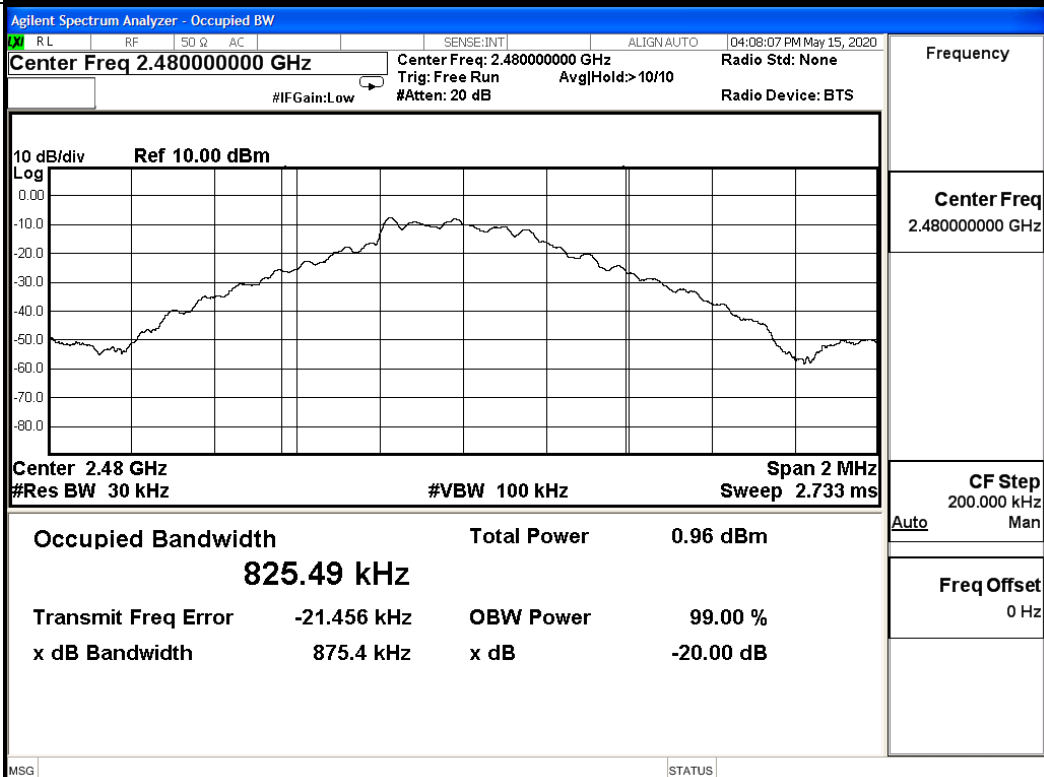
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.82542	0.8745	Not Specified	PASS
	MCH	0.82535	0.8738	Not Specified	PASS
	HCH	0.82549	0.8754	Not Specified	PASS
π /4DQPSK	LCH	1.1678	1.230	Not Specified	PASS
	MCH	1.1683	1.254	Not Specified	PASS
	HCH	1.1688	1.253	Not Specified	PASS

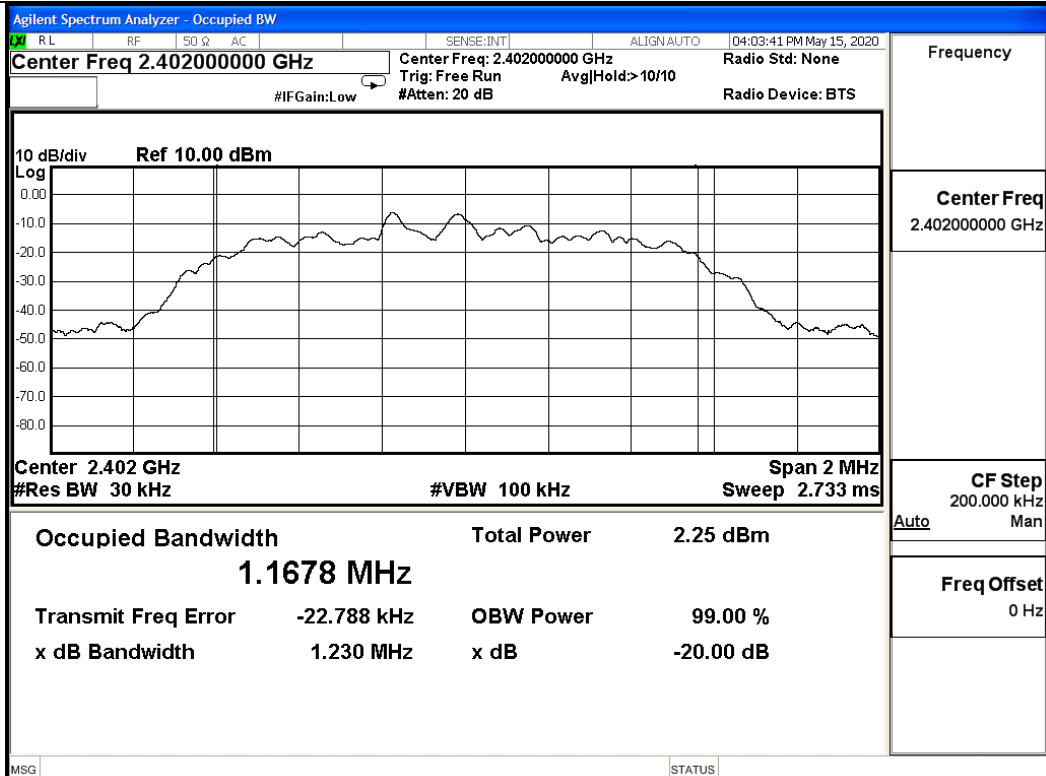
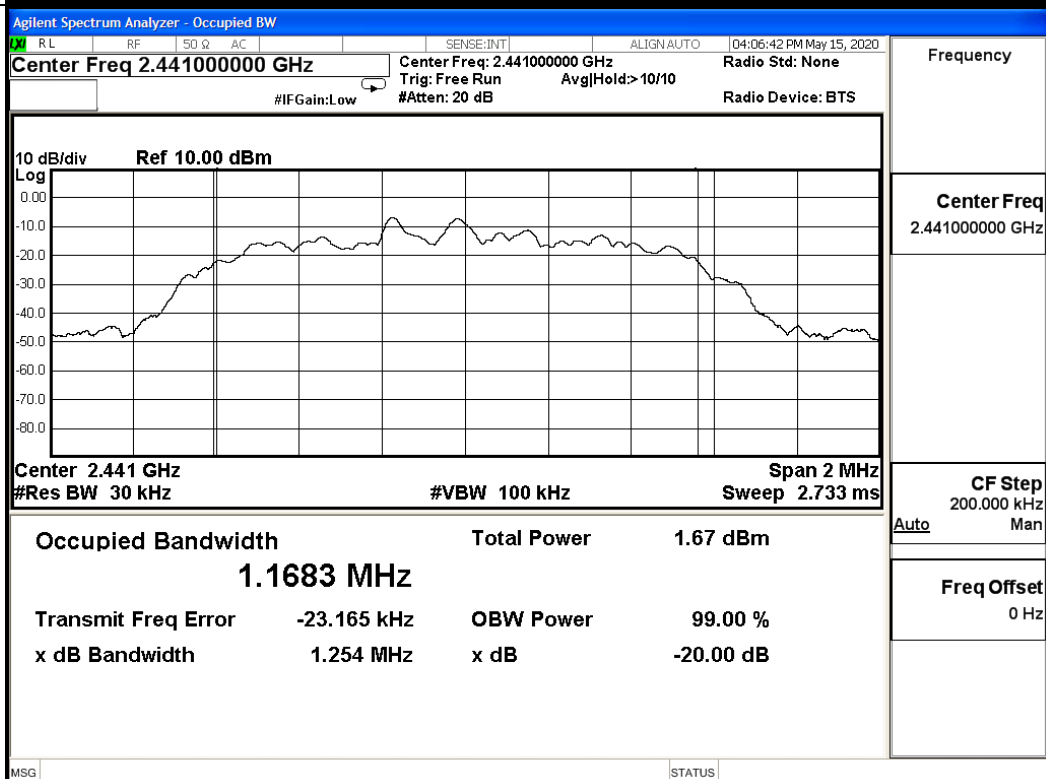


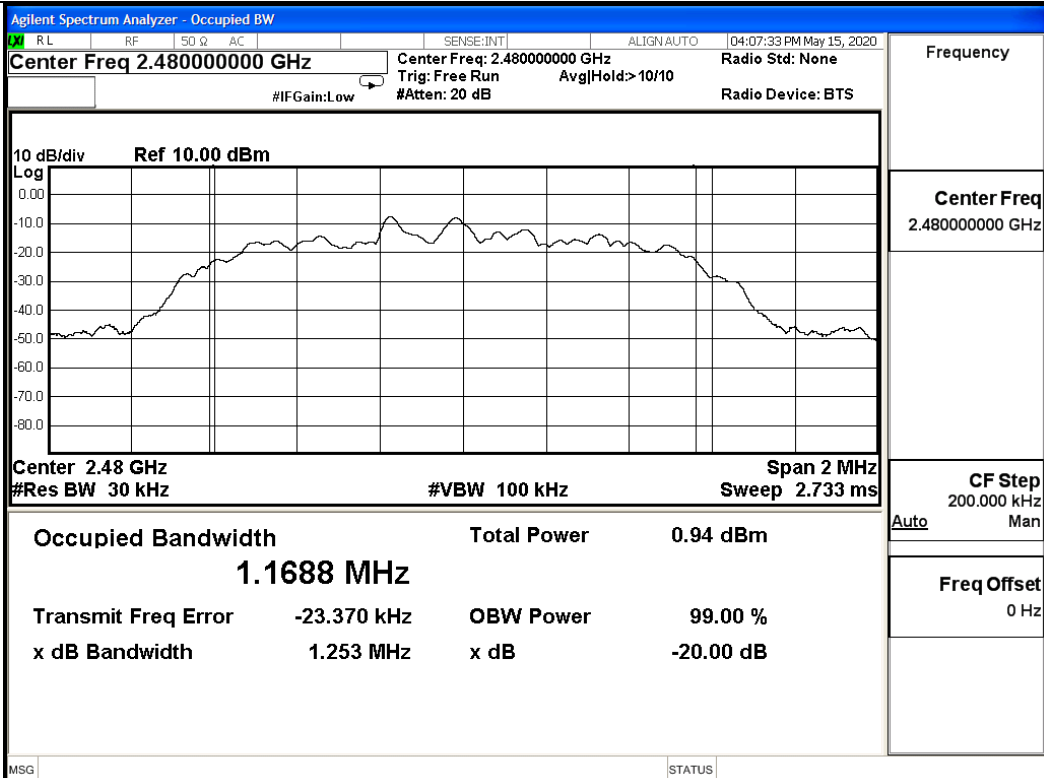
GFSK/MCH



GFSK/HCH



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

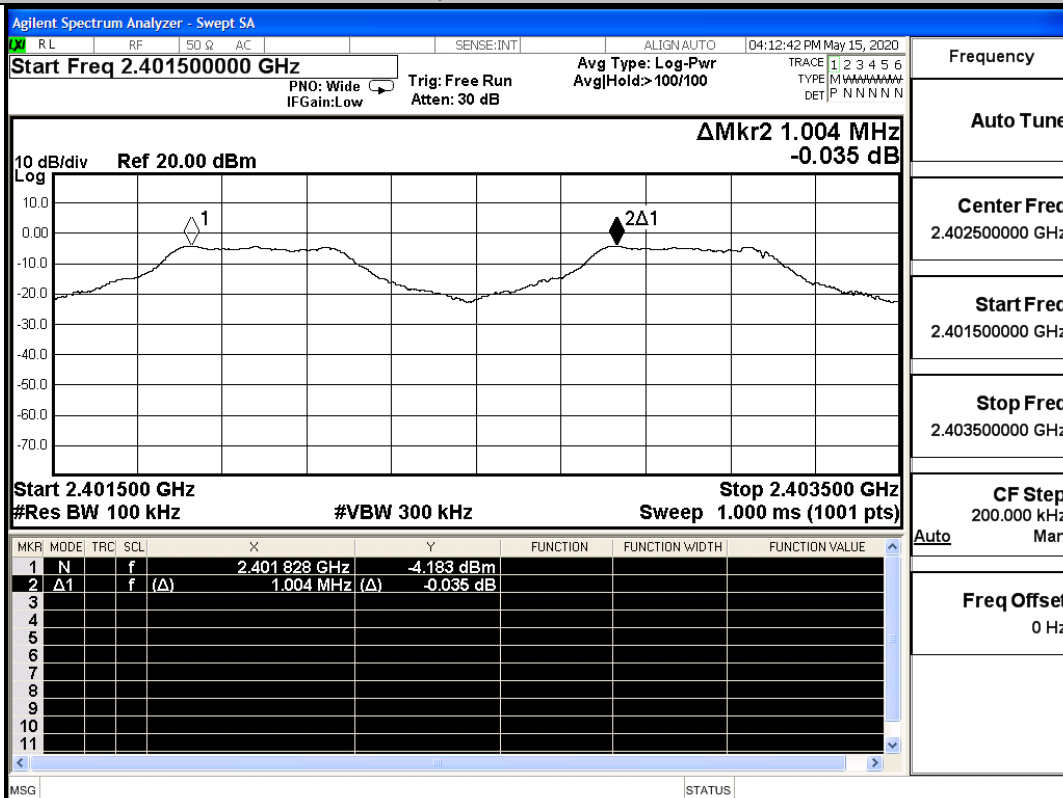
$\pi/4$ DQPSK/HCH

A.3 Carrier Frequency Separation

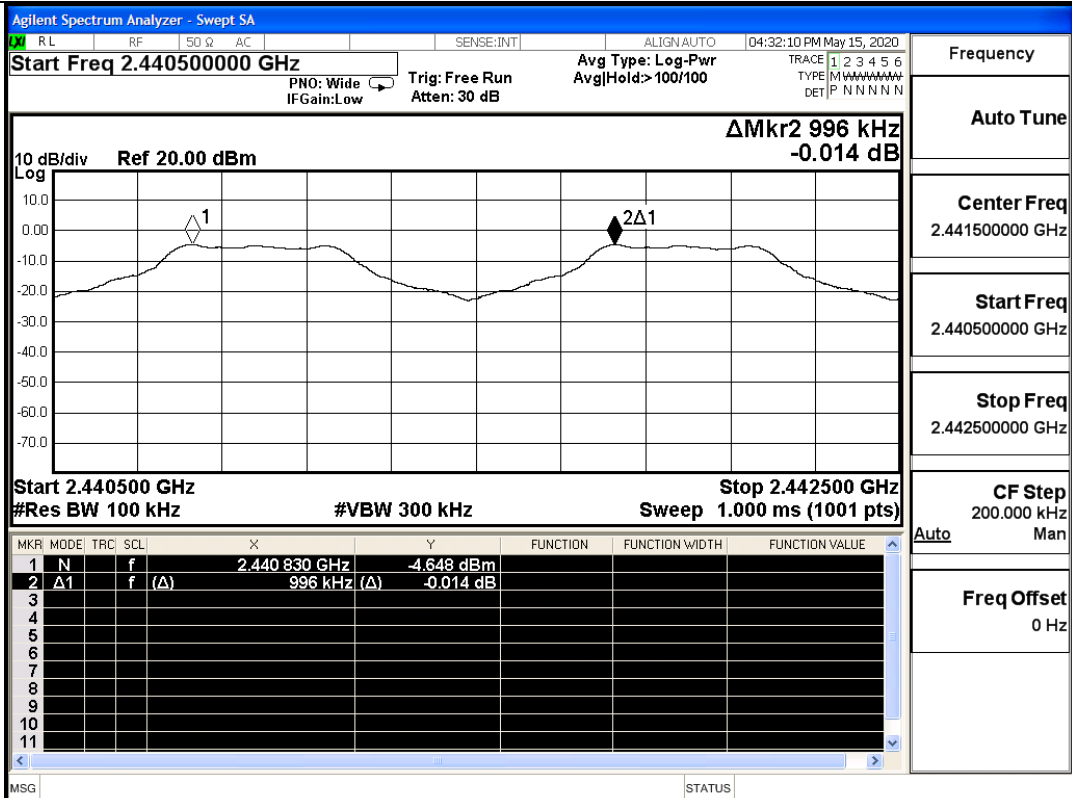
Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.004	0.583	PASS
	MCH	0.996	0.583	PASS
	HCH	0.994	0.584	PASS
$\pi/4$ DQPSK	LCH	1.000	0.820	PASS
	MCH	1.002	0.836	PASS
	HCH	1.000	0.835	PASS

Test Graphs

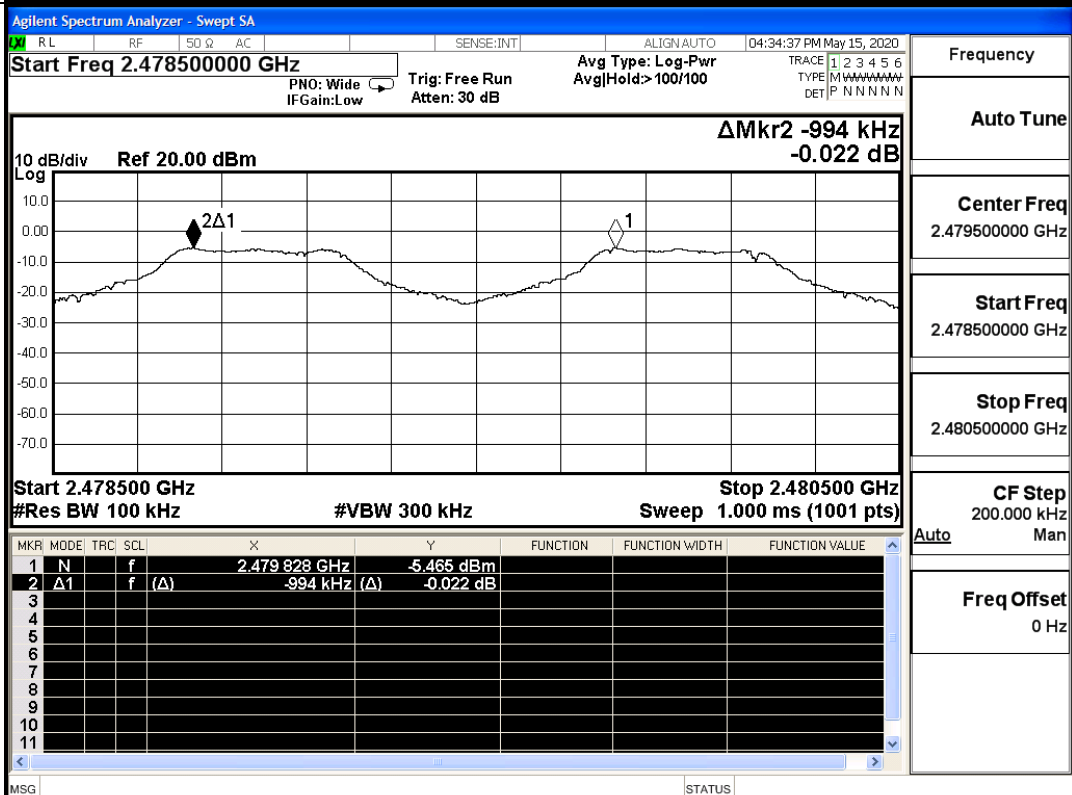
GFSK/LCH

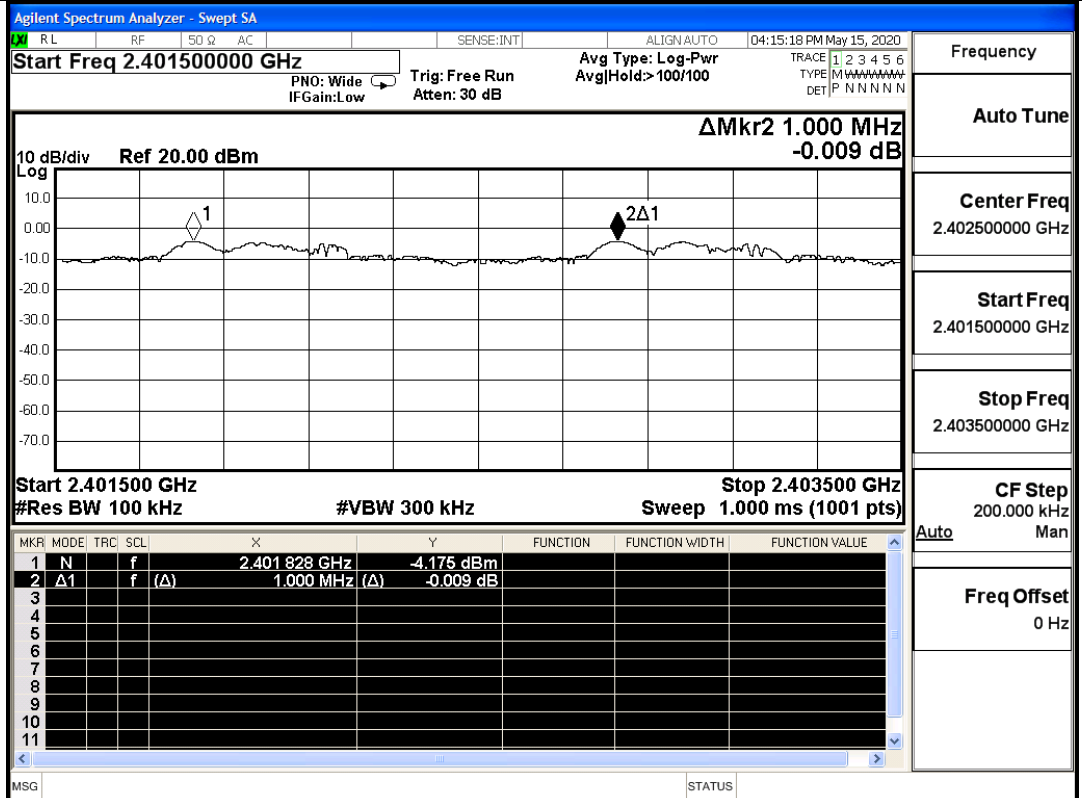
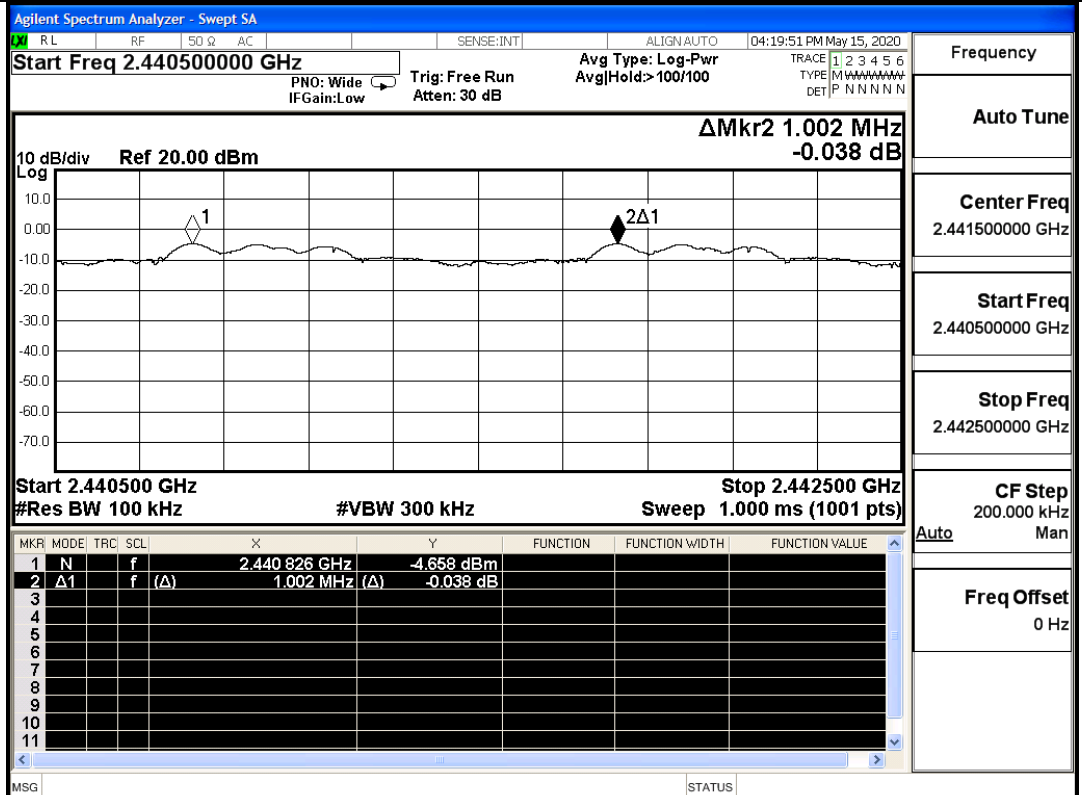


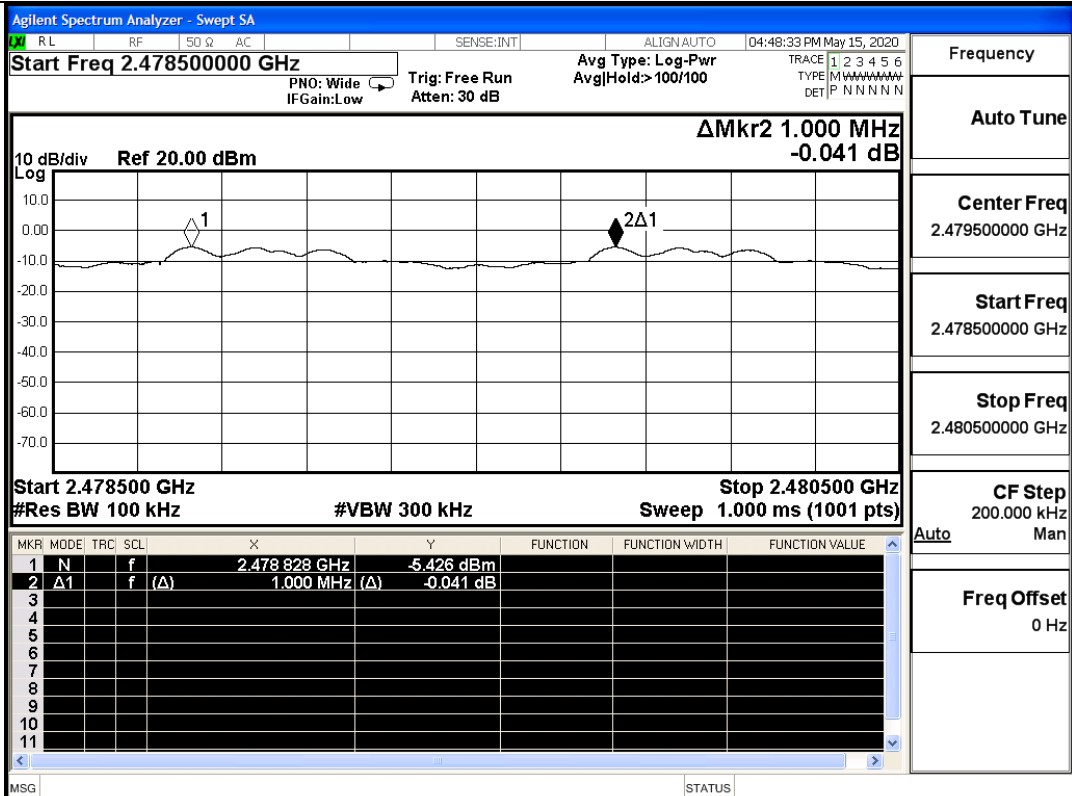
GFSK/MCH



GFSK/HCH



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

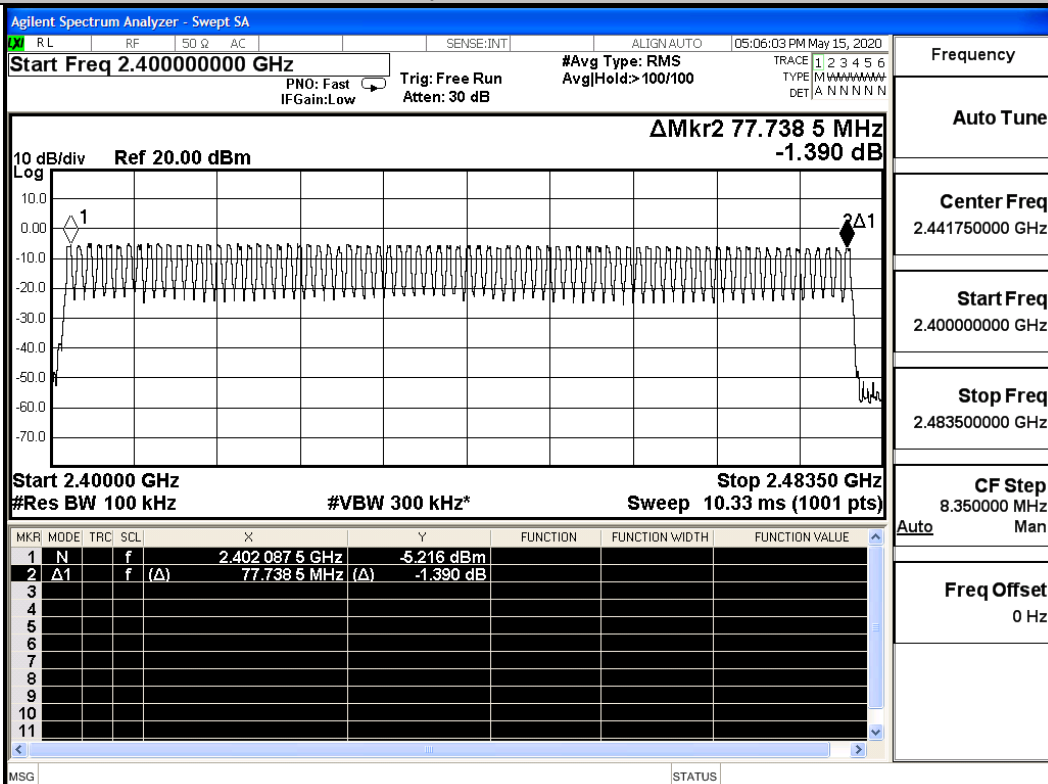
$\pi/4$ DQPSK/HCH

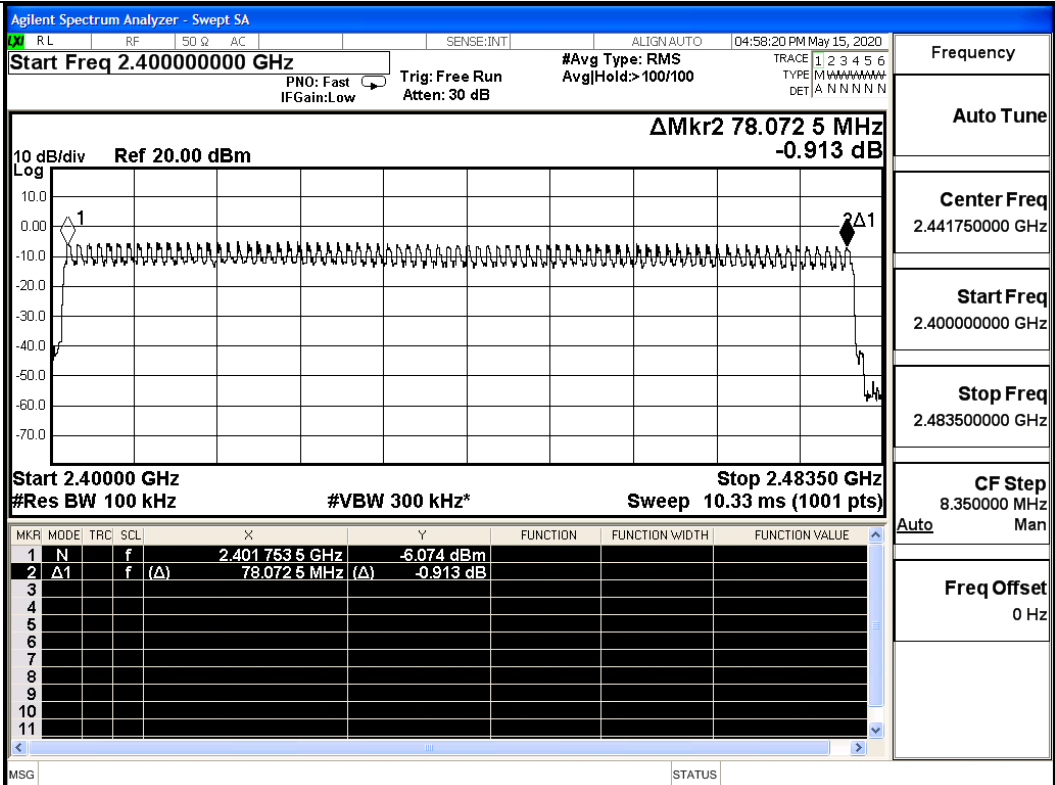
A.4 Hopping Channel Number

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

Test Graphs

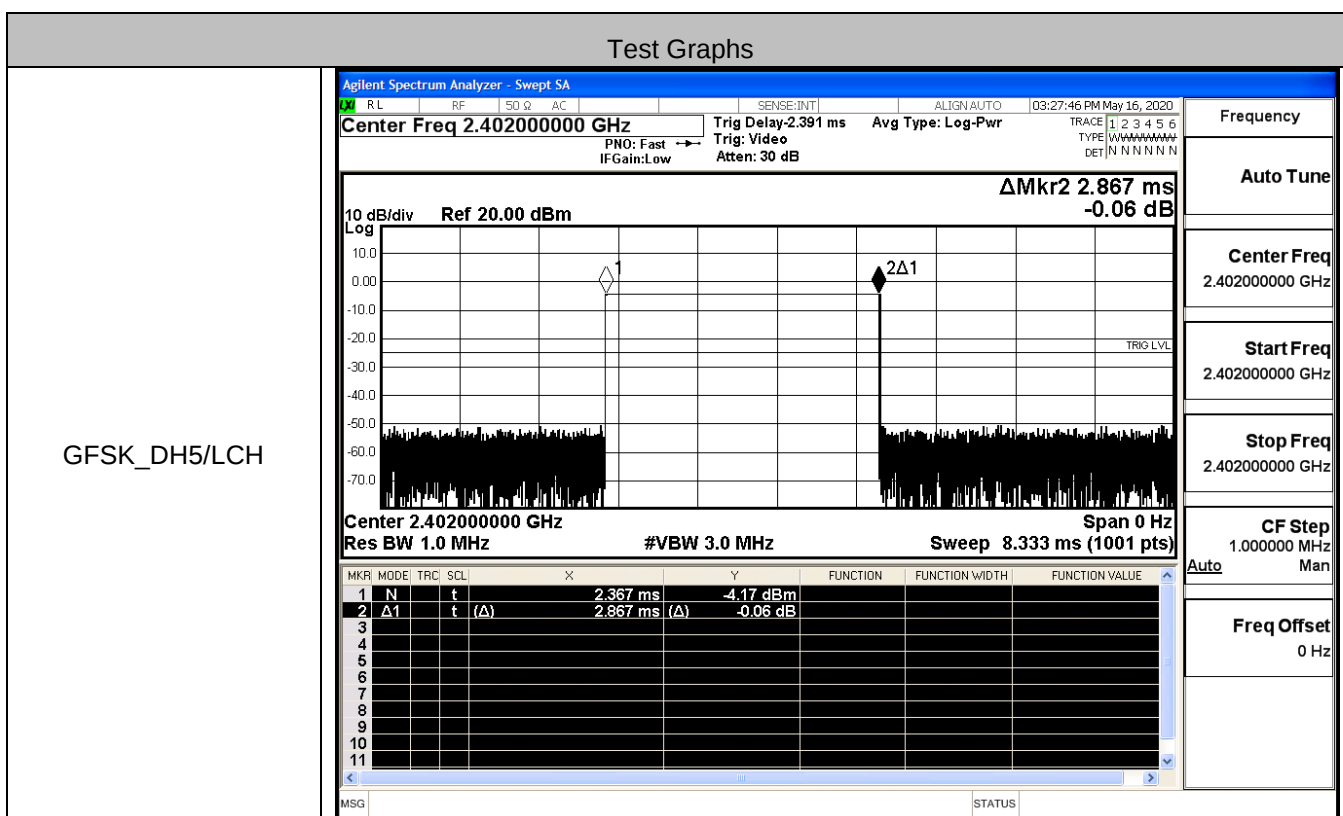
GFSK/Hop



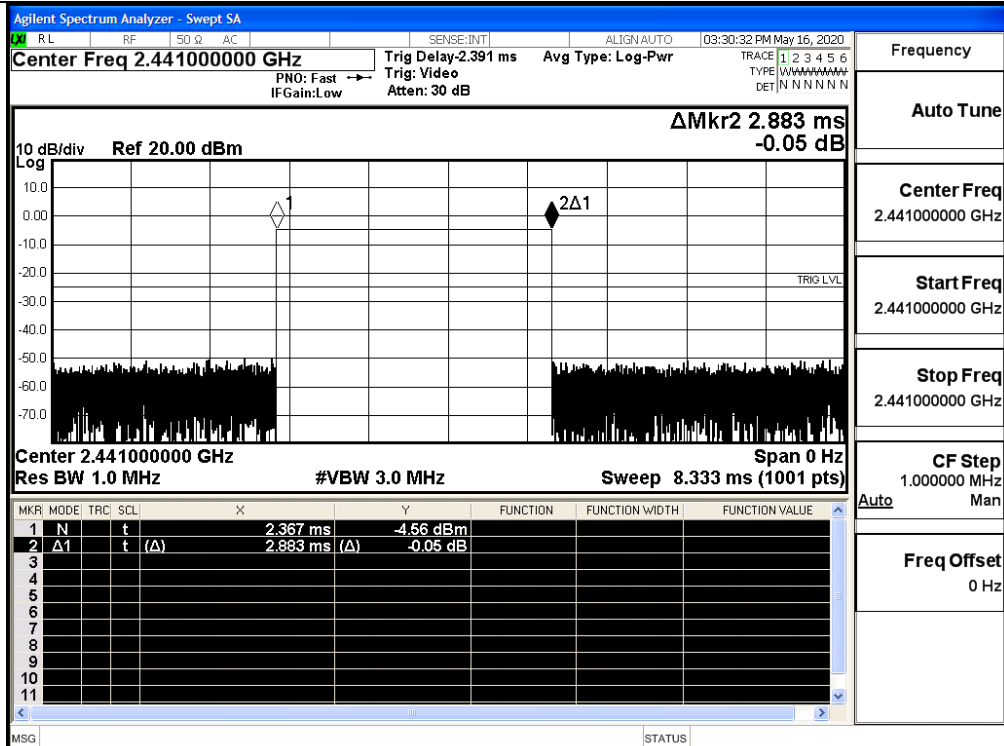
$\pi/4$ DQPSK/Hop

A.5 Dwell Time

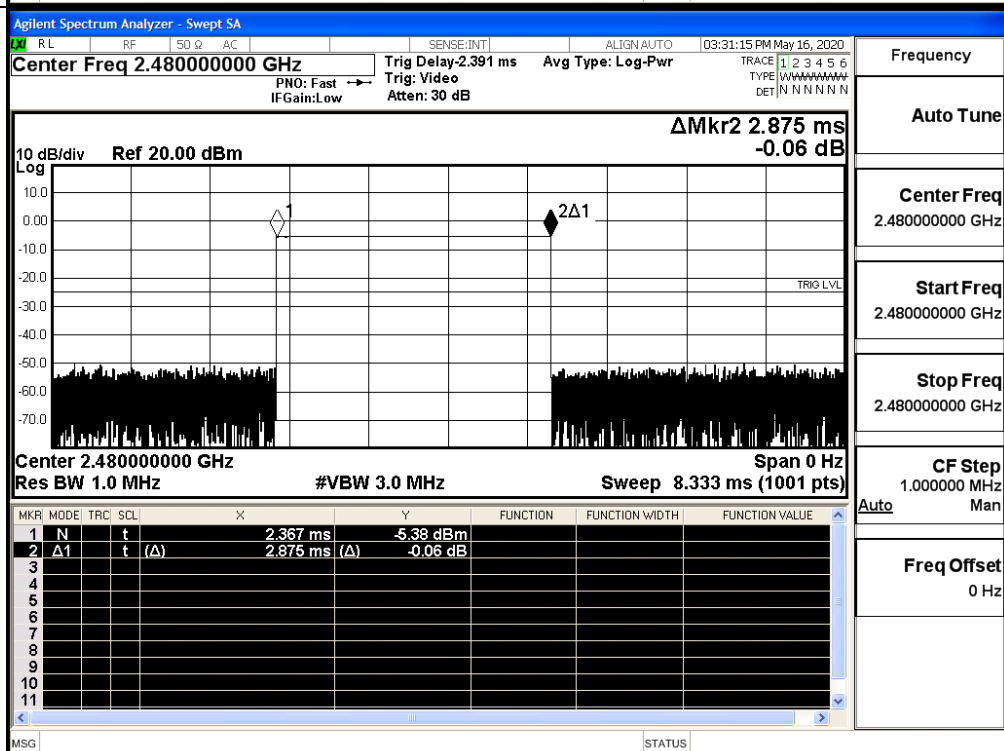
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.867	106.7	0.306	0.4	PASS
	DH5	MCH	2.883	106.7	0.308	0.4	PASS
	DH5	HCH	2.875	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.883	106.7	0.308	0.4	PASS
	2DH5	MCH	2.883	106.7	0.308	0.4	PASS
	2DH5	HCH	2.900	106.7	0.309	0.4	PASS



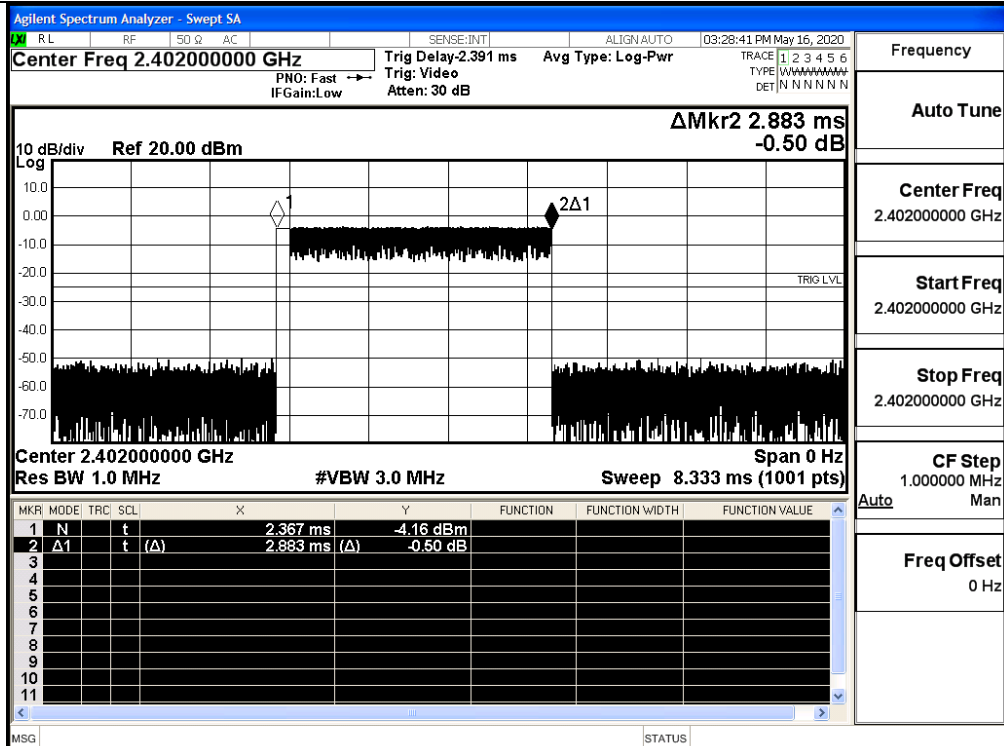
GFSK_DH5/MCH



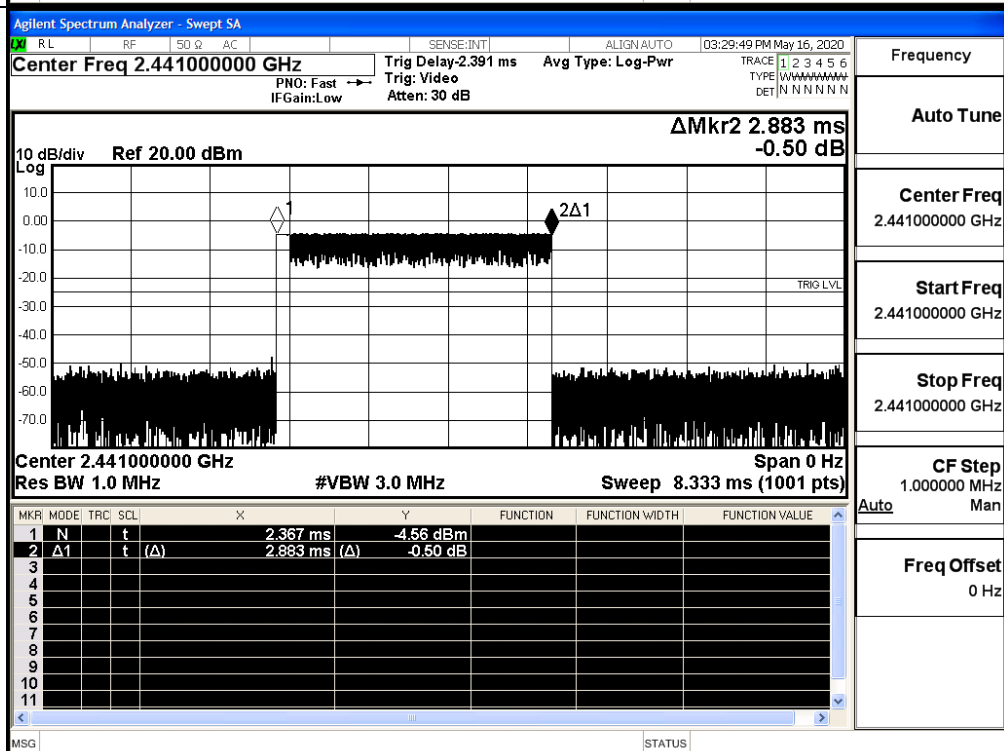
GFSK_DH5/HCH



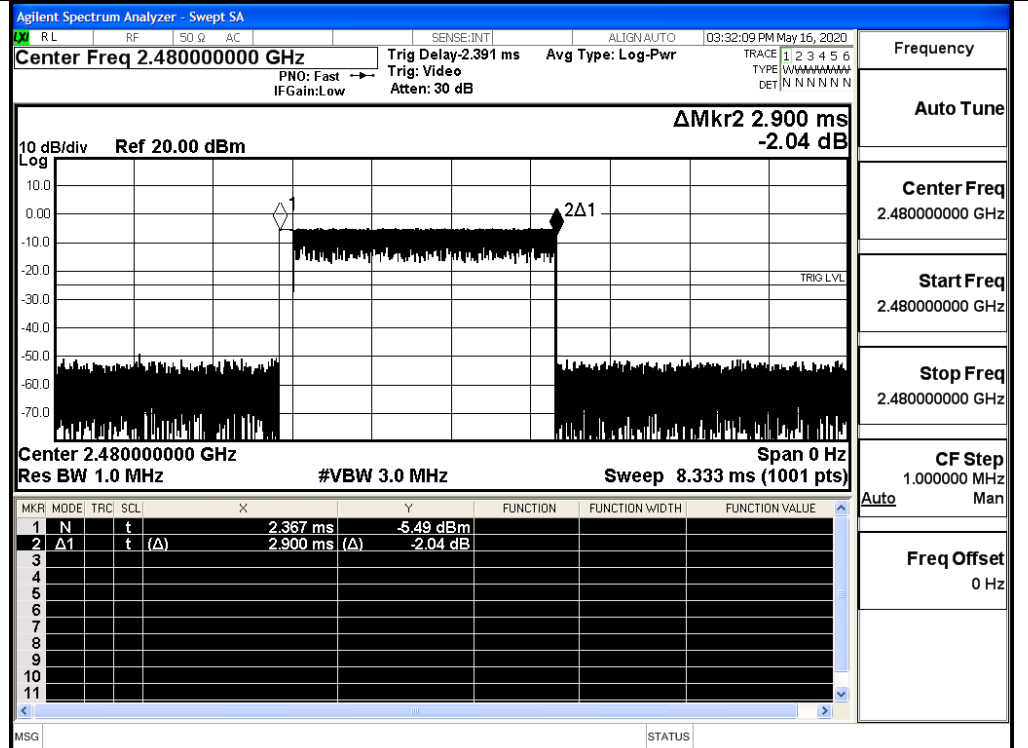
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



$\pi/4$ DQPSK
_2DH5/HCH

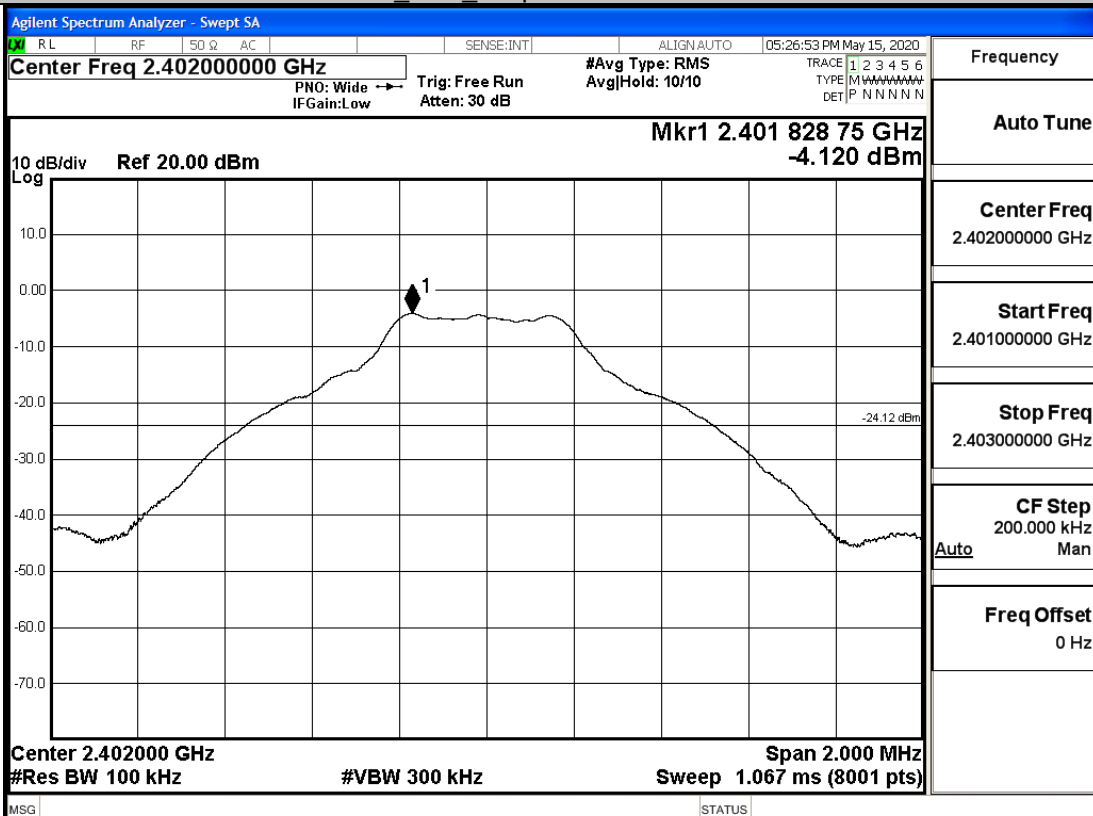


A.6 RF Conducted Spurious Emissions

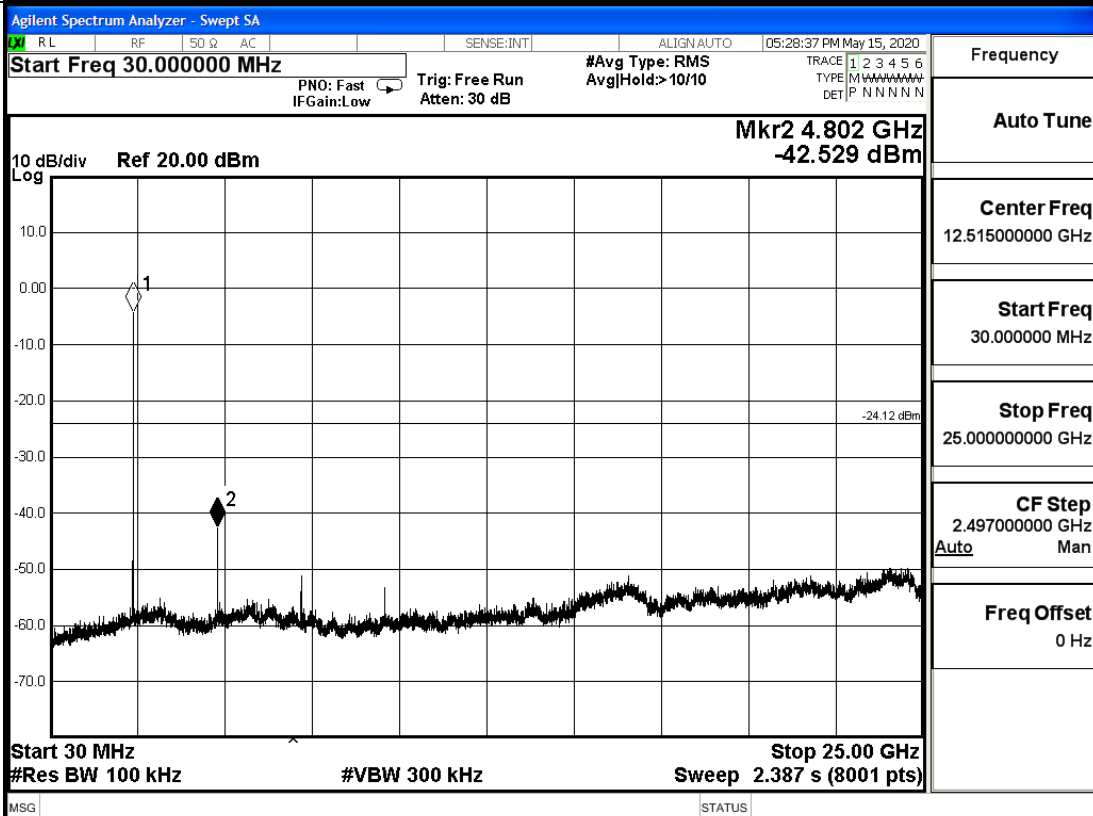
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-4.120	-42.529	-24.12	PASS
	MCH	-4.581	-44.139	-24.58	PASS
	HCH	-5.350	-45.999	-25.35	PASS
$\pi/4$ DQPSK	LCH	-3.985	-42.292	-23.99	PASS
	MCH	-4.486	-43.223	-24.49	PASS
	HCH	-5.369	-45.222	-25.37	PASS

GFSK_LCH_Graphs

Pref



Puw

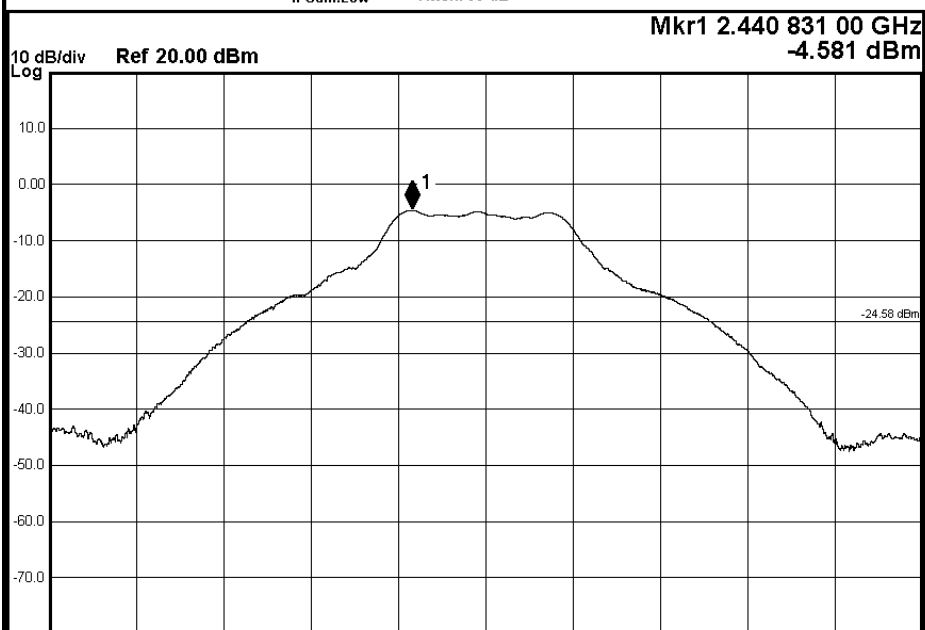


GFSK_MCH_Graphs

Pref

Agilent Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz
PNO: Wide → Trig: Free Run
IFGain: Low Atten: 30 dB
#Avg Type: RMS
AvgHold: 10/10
ALIGN AUTO 05:29:50 PM May 15, 2020
TRACE 1 2 3 4 5 6
TYPE M W W W W W W W
DET P N N N N N



Center 2.441000 GHz Span 2.000 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms (8001 pts)

MSG

STATUS

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.440000000 GHz

Stop Freq
2.442000000 GHz

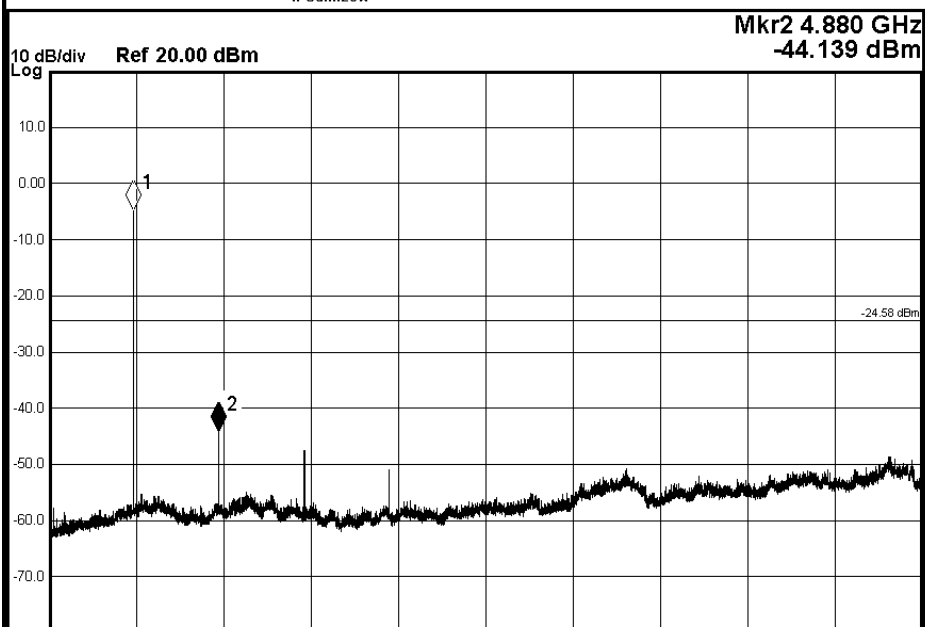
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw

Agilent Spectrum Analyzer - Swept SA

Start Freq 30.000000 MHz
PNO: Fast → Trig: Free Run
IFGain: Low Atten: 30 dB
#Avg Type: RMS
AvgHold: >10/10
ALIGN AUTO 05:33:08 PM May 15, 2020
TRACE 1 2 3 4 5 6
TYPE M W W W W W W W
DET P N N N N N



Start 30 MHz Stop 25.00 GHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.387 s (8001 pts)

MSG

STATUS

Frequency

Auto Tune

Center Freq
12.515000000 GHz

Start Freq
30.000000 MHz

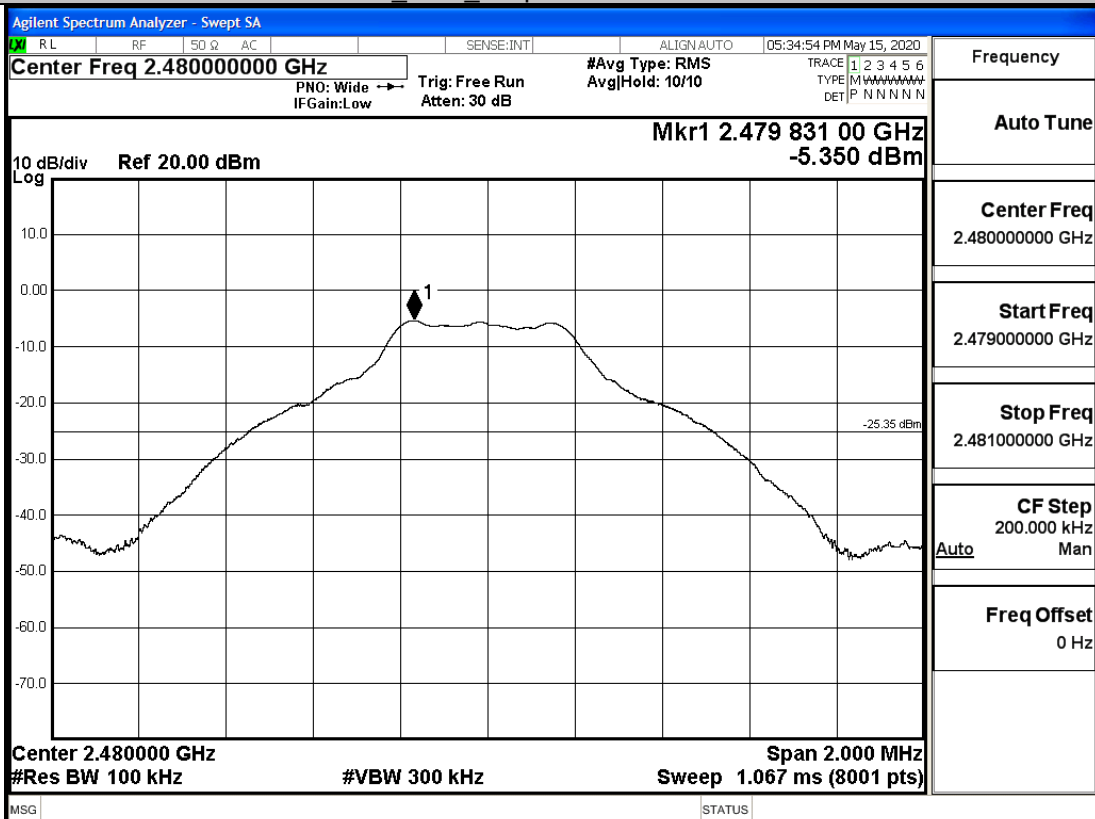
Stop Freq
25.000000000 GHz

CF Step
2.497000000 GHz
Auto Man

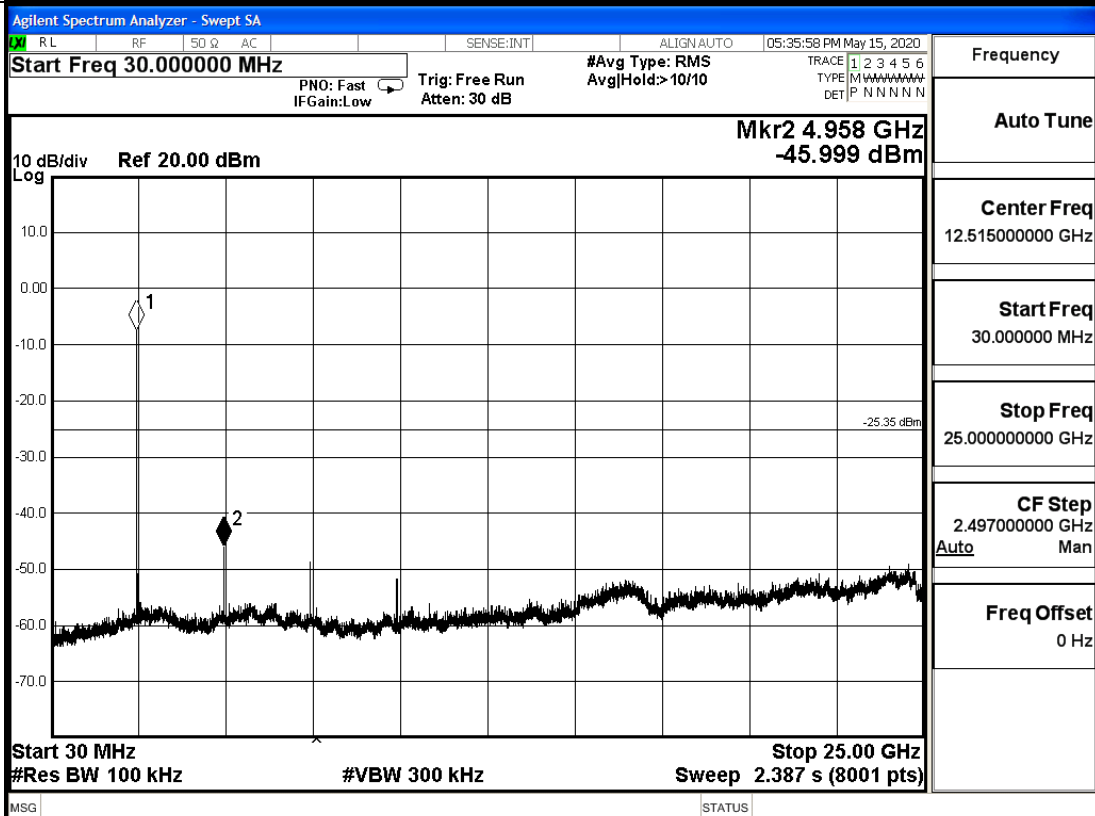
Freq Offset
0 Hz

GFSK_HCH_Graphs

Pref

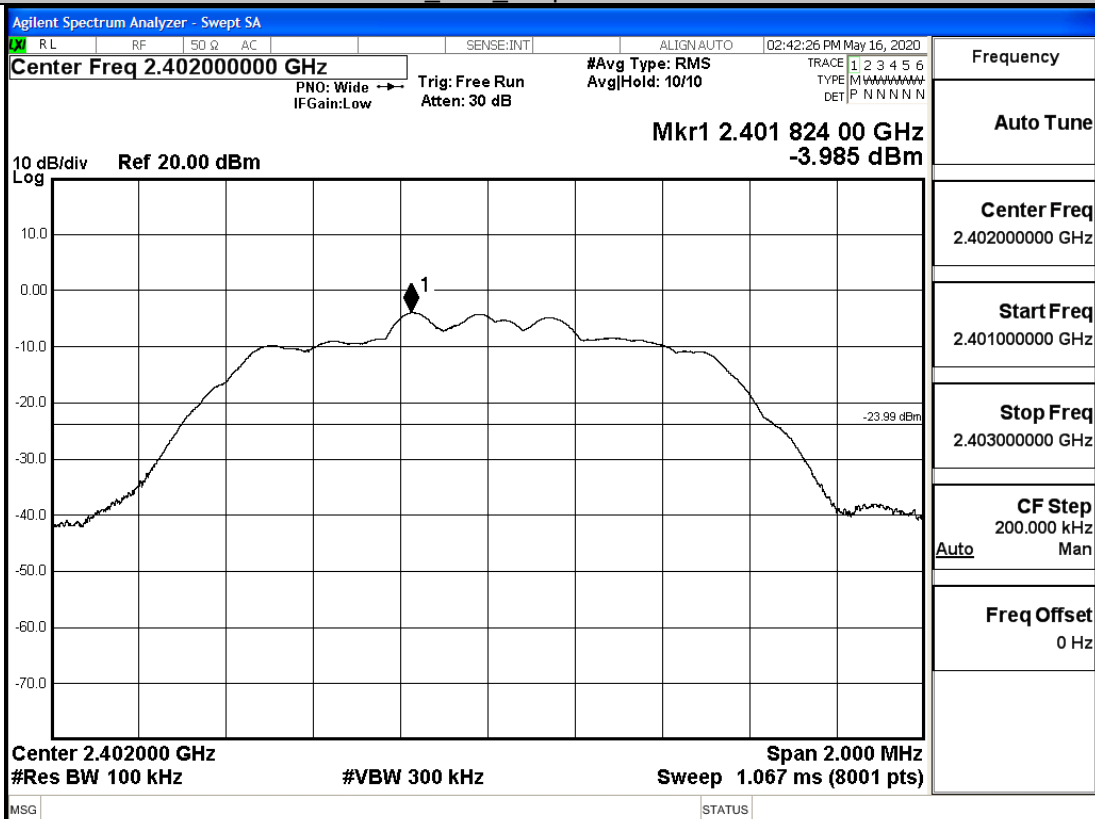


Puw

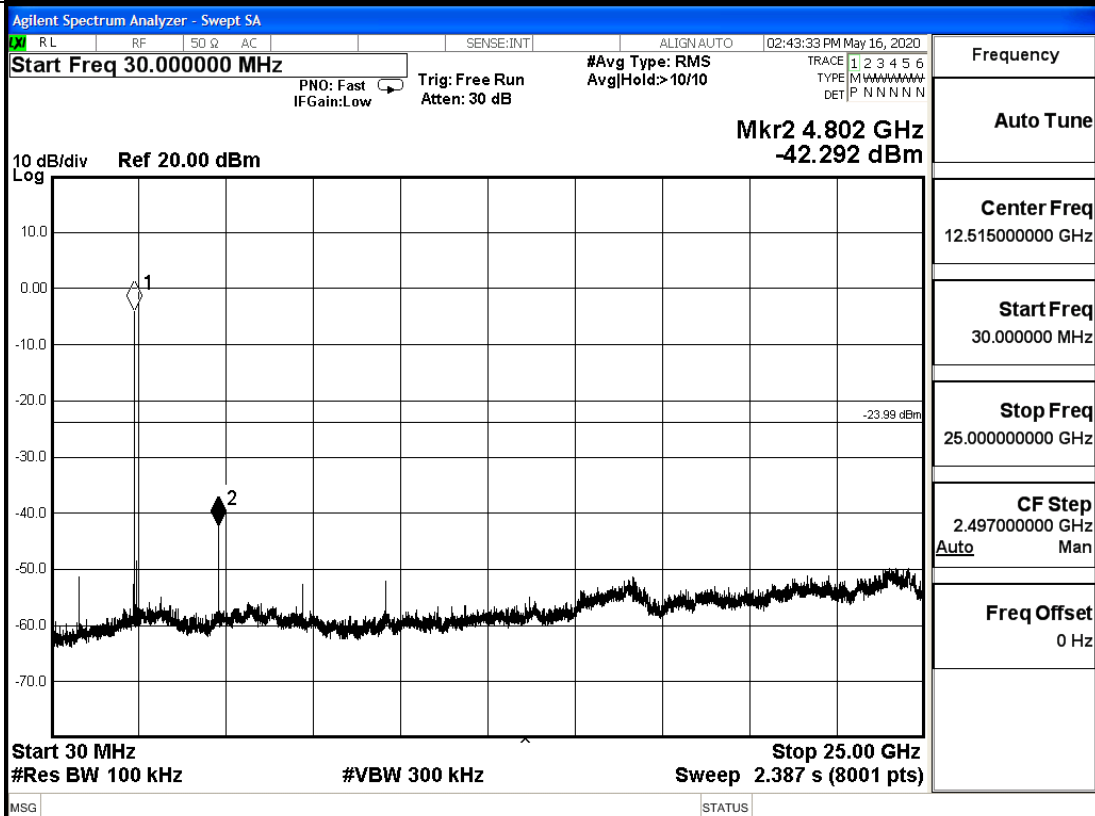


$\pi/4$ DQPSK_LCH_Graphs

Pref

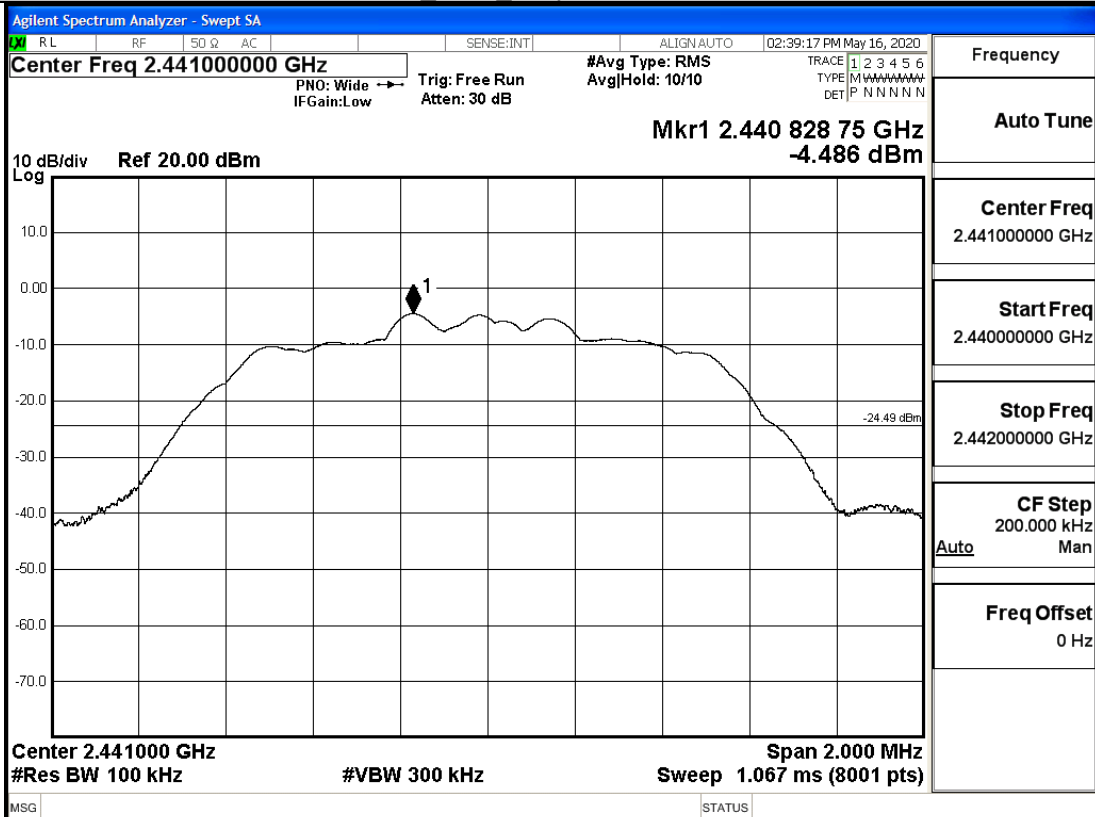


Puw

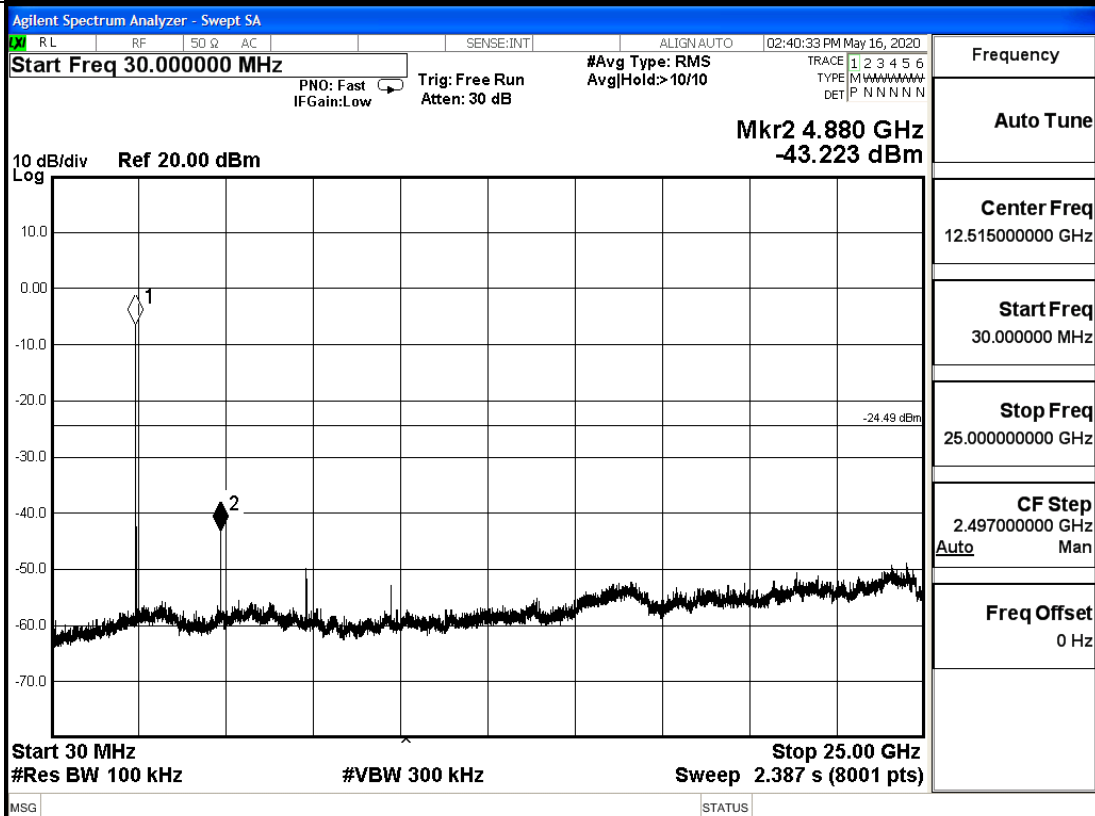


π /4DQPSK_MCH_Graphs

Pref

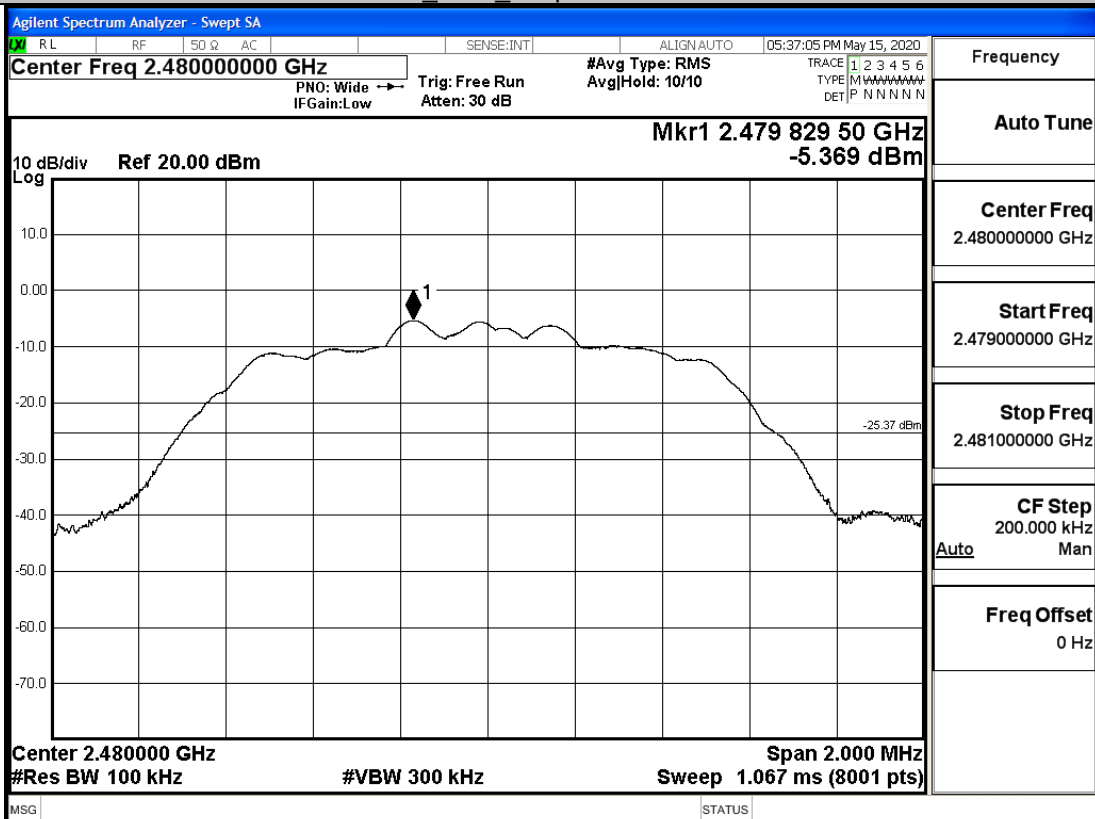


Puw

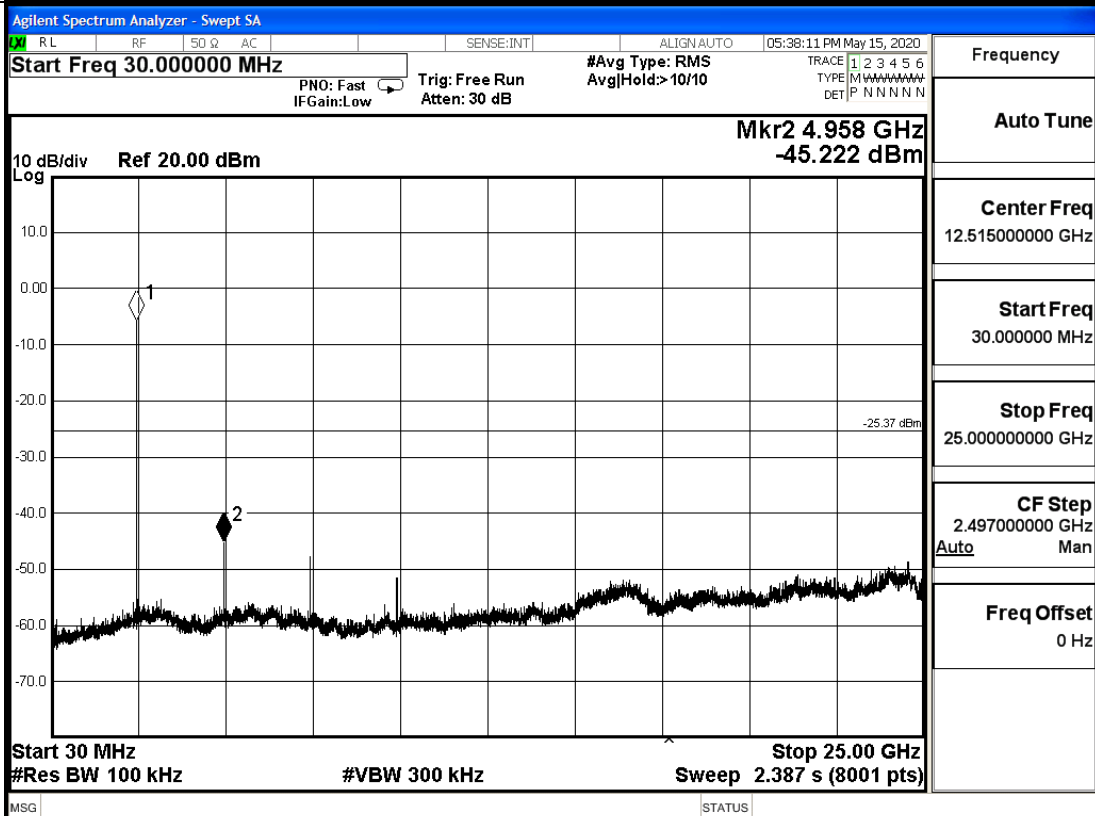


π /4DQPSK_HCH_Graphs

Pref



Puw

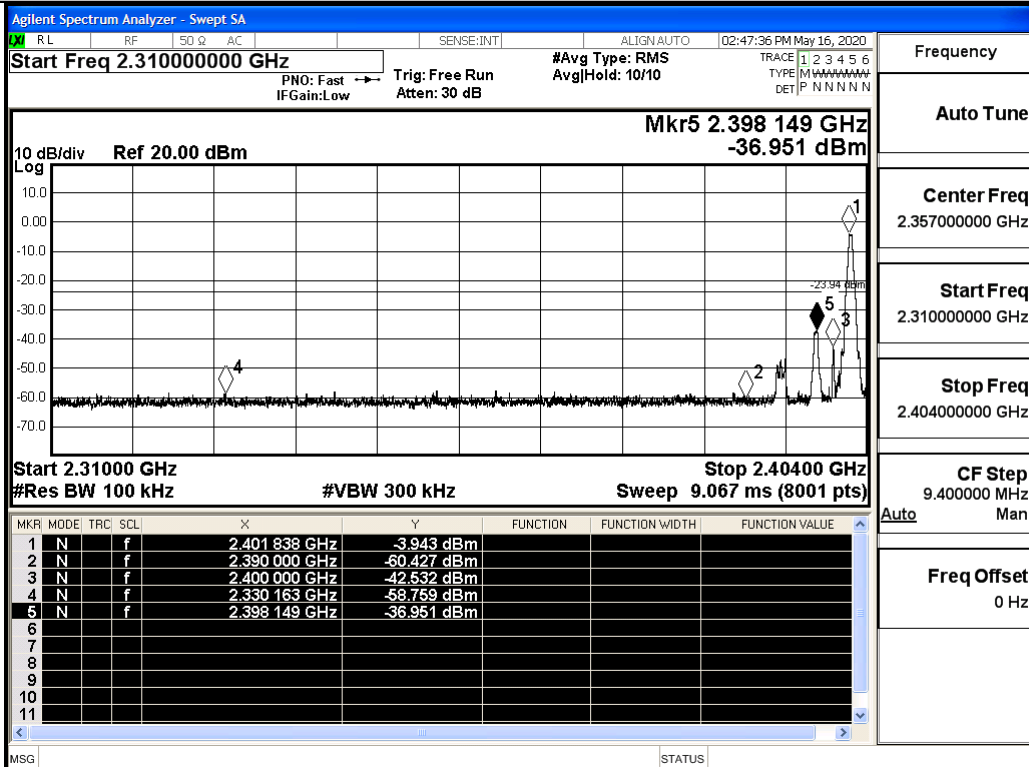


A.7 Band-edge for RF Conducted Emissions

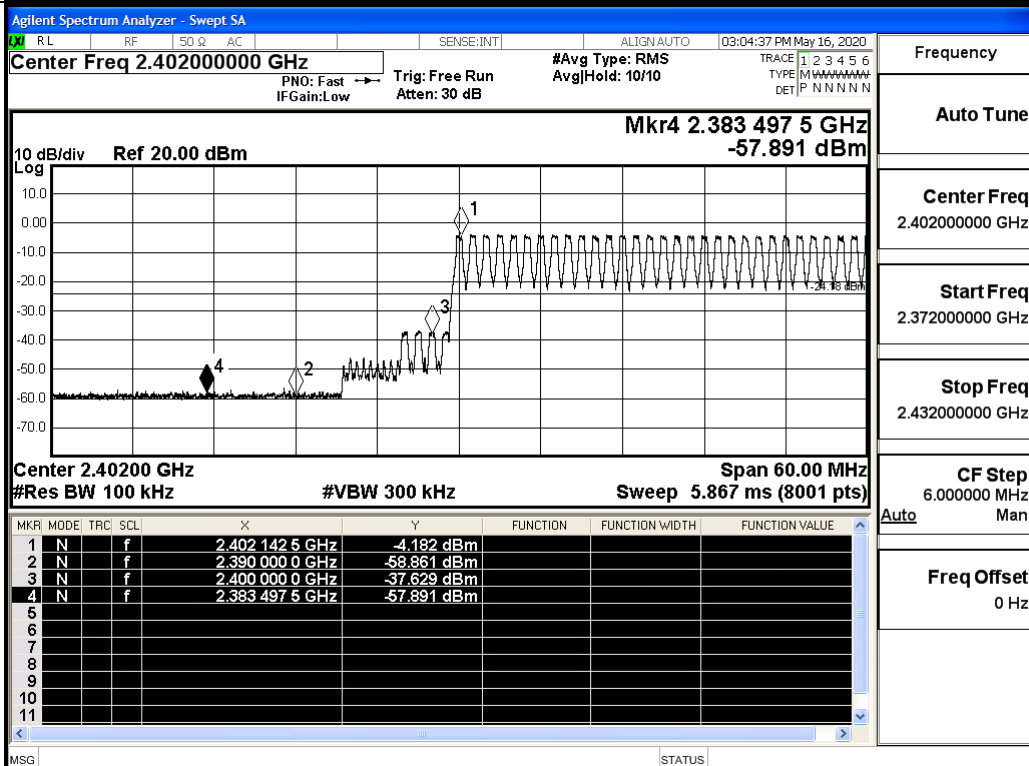
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-3.943	Off	-36.951	-23.94	PASS
			-4.182	On	-37.629	-24.18	PASS
	HCH	2480	-5.237	Off	-49.345	-25.24	PASS
			-5.283	On	-50.035	-25.28	PASS
$\pi/4$ DQPSK	LCH	2402	-3.888	Off	-36.877	-23.89	PASS
			-4.008	On	-37.675	-24.01	PASS
	HCH	2480	-5.277	Off	-49.399	-25.28	PASS
			-5.293	On	-50.456	-25.29	PASS

Test Graphs

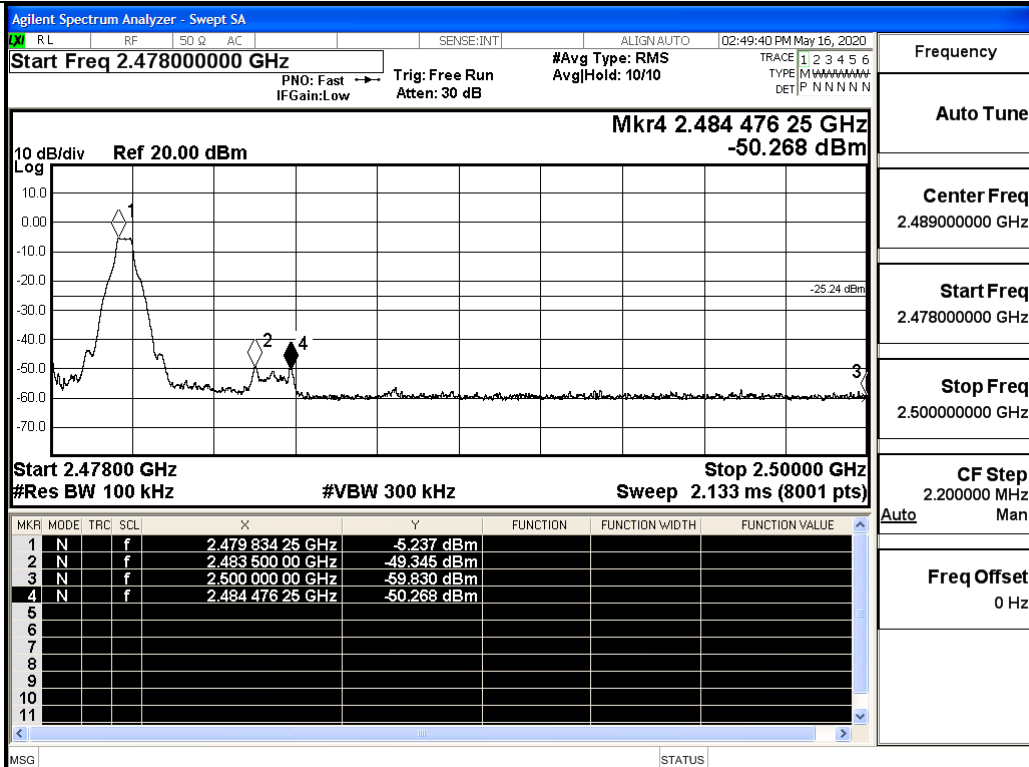
GFSK/LCH/No Hop



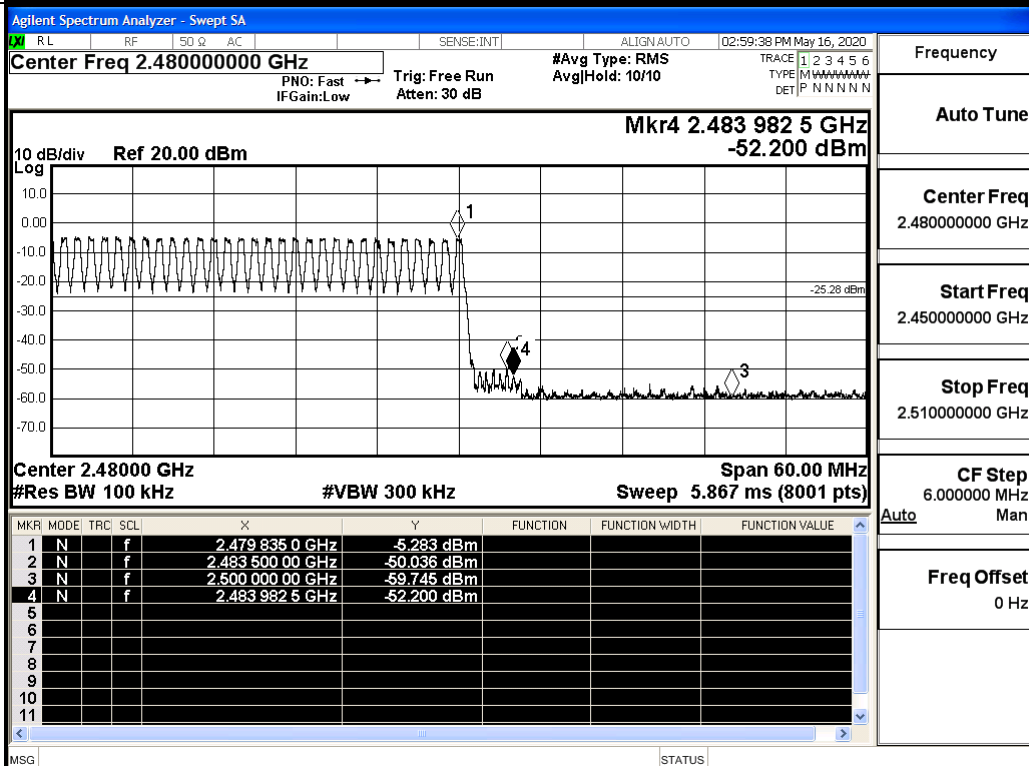
GFSK/LCH/Hop



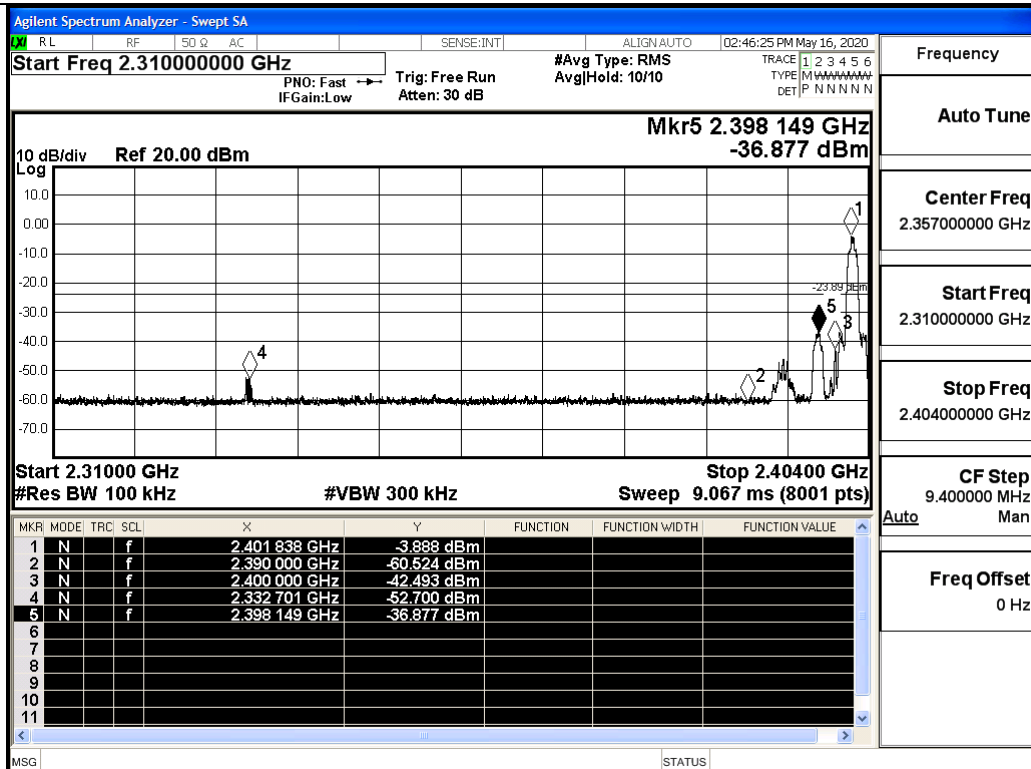
GFSK/HCH/No Hop



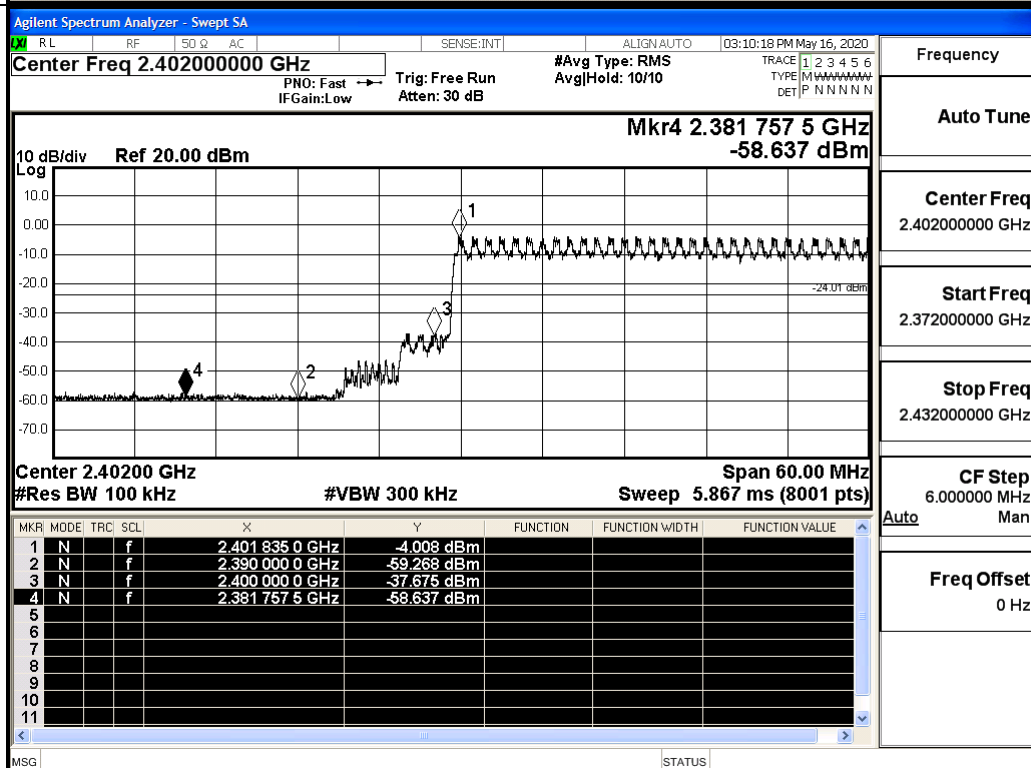
GFSK/HCH/Hop



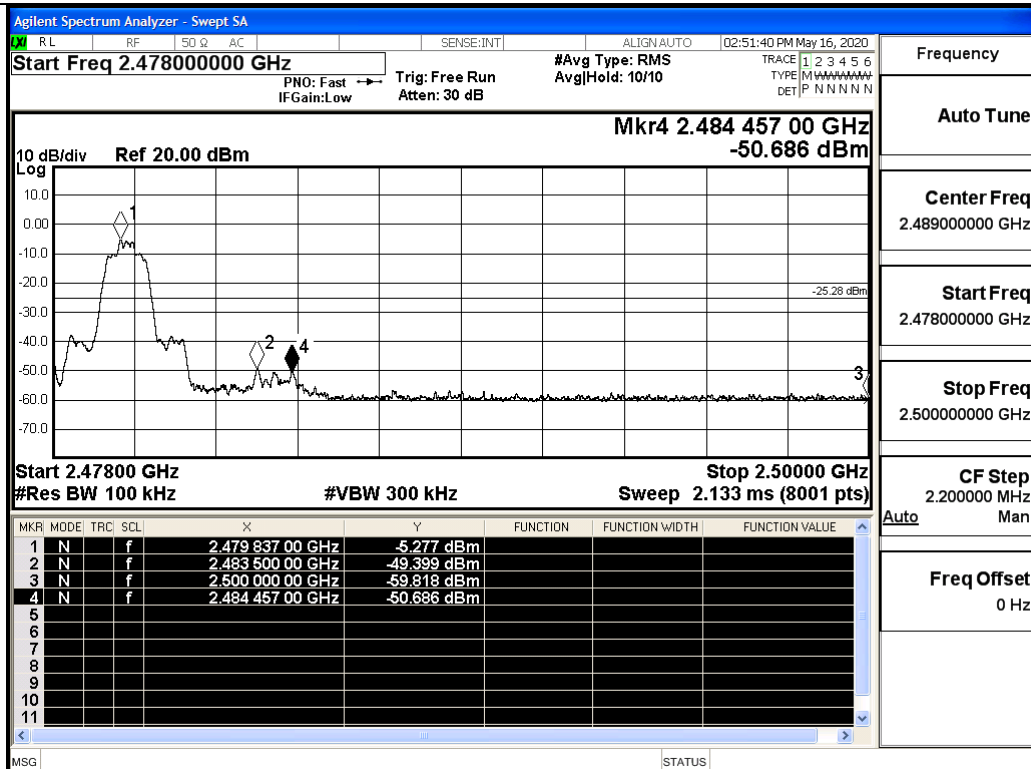
$\pi/4$ DQPSK/LCH/No
Hop



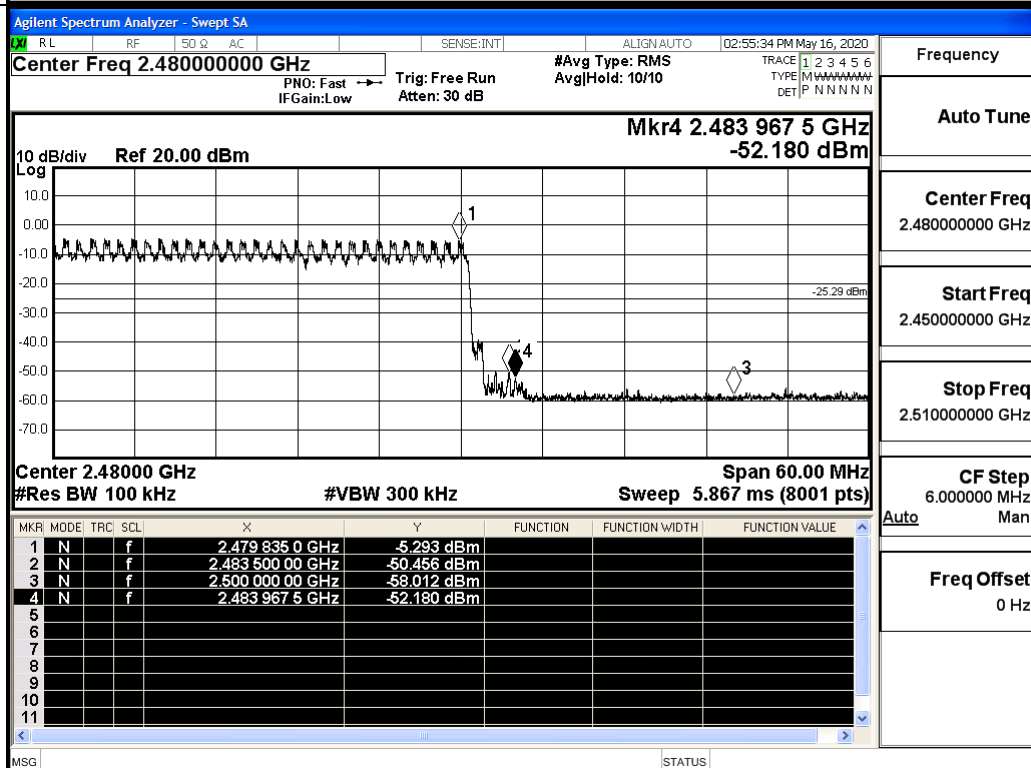
$\pi/4$ DQPSK/LCH/Hop



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



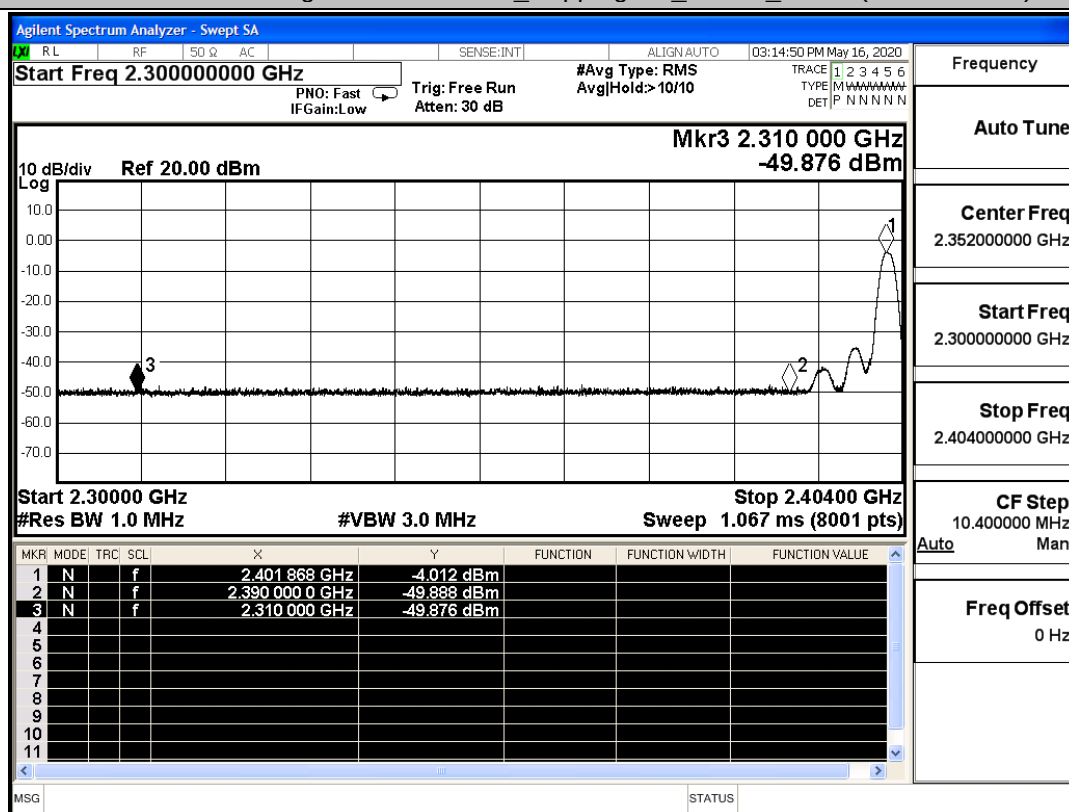
$\pi/4$ DQPSK/HCH/Hop



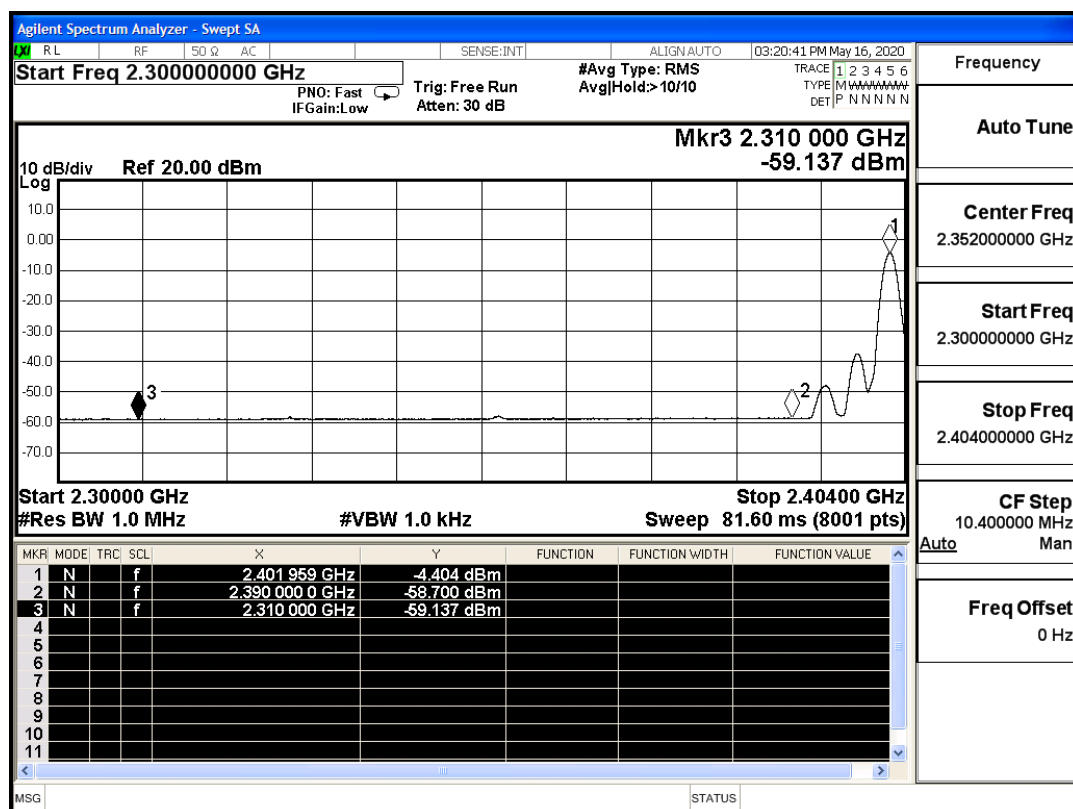
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-49.876	2.0	0	47.35	PEAK	74	PASS
	Off	2310.0	-59.137	2.0	0	38.09	AV	54	PASS
	Off	2390.0	-49.880	2.0	0	47.35	PEAK	74	PASS
	Off	2390.0	-58.700	2.0	0	38.53	AV	54	PASS
	Off	2483.5	-45.041	2.0	0	52.19	PEAK	74	PASS
	Off	2483.5	-51.626	2.0	0	45.60	AV	54	PASS
	Off	2500.0	-49.271	2.0	0	47.96	PEAK	74	PASS
	Off	2500.0	-58.658	2.0	0	38.57	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-51.831	2.0	0	45.40	PEAK	74	PASS
	Off	2310.0	-59.077	2.0	0	38.15	AV	54	PASS
	Off	2390.0	-52.011	2.0	0	45.22	PEAK	74	PASS
	Off	2390.0	-58.694	2.0	0	38.54	AV	54	PASS
	Off	2483.5	-44.439	2.0	0	52.79	PEAK	74	PASS
	Off	2483.5	-53.262	2.0	0	43.97	AV	54	PASS
	Off	2500.0	-50.249	2.0	0	46.98	PEAK	74	PASS
	Off	2500.0	-58.381	2.0	0	38.85	AV	54	PASS

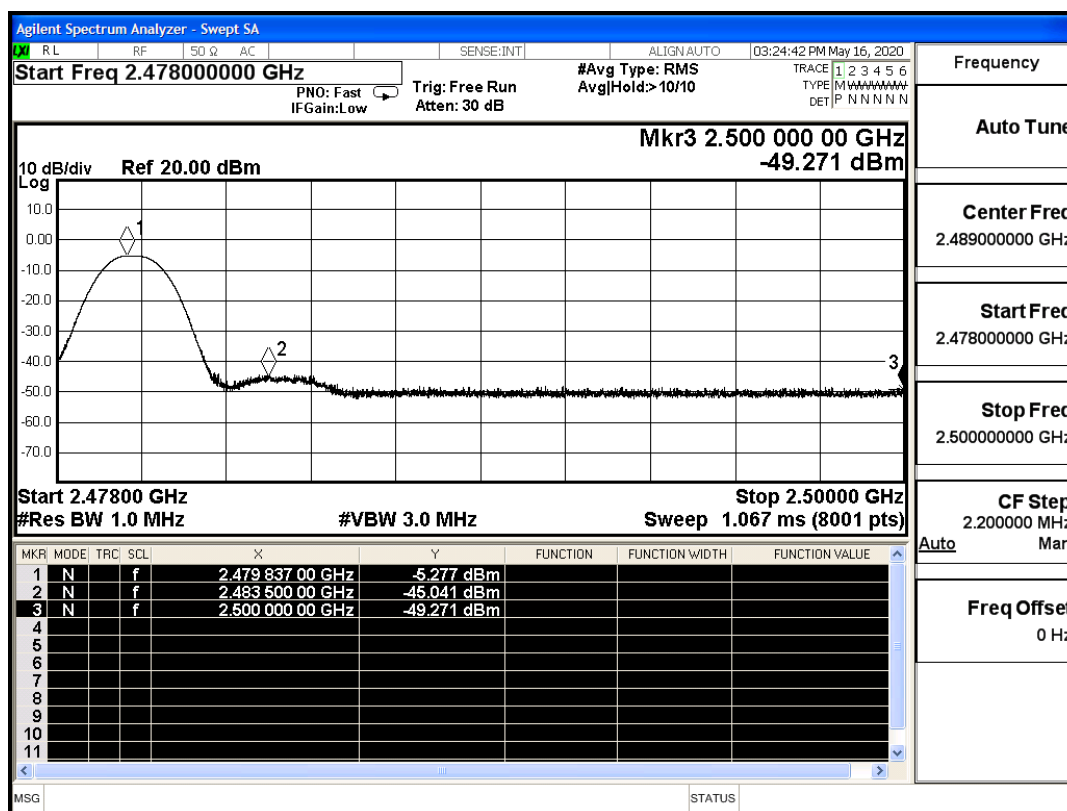
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



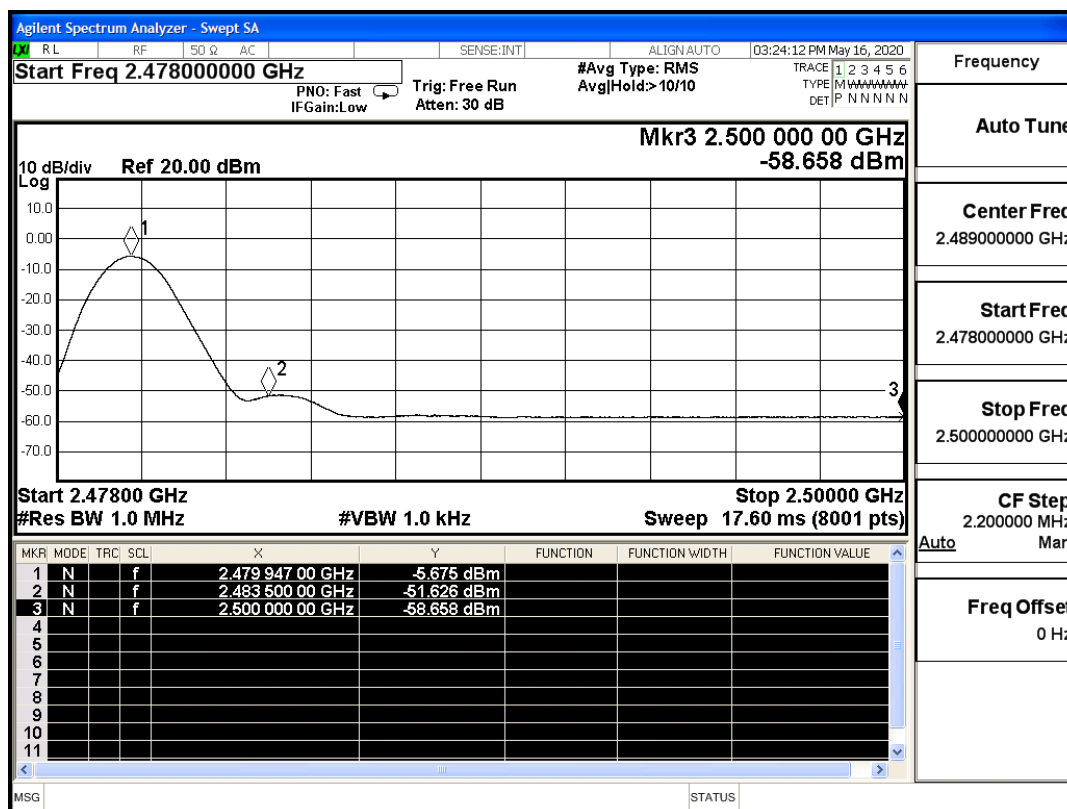
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

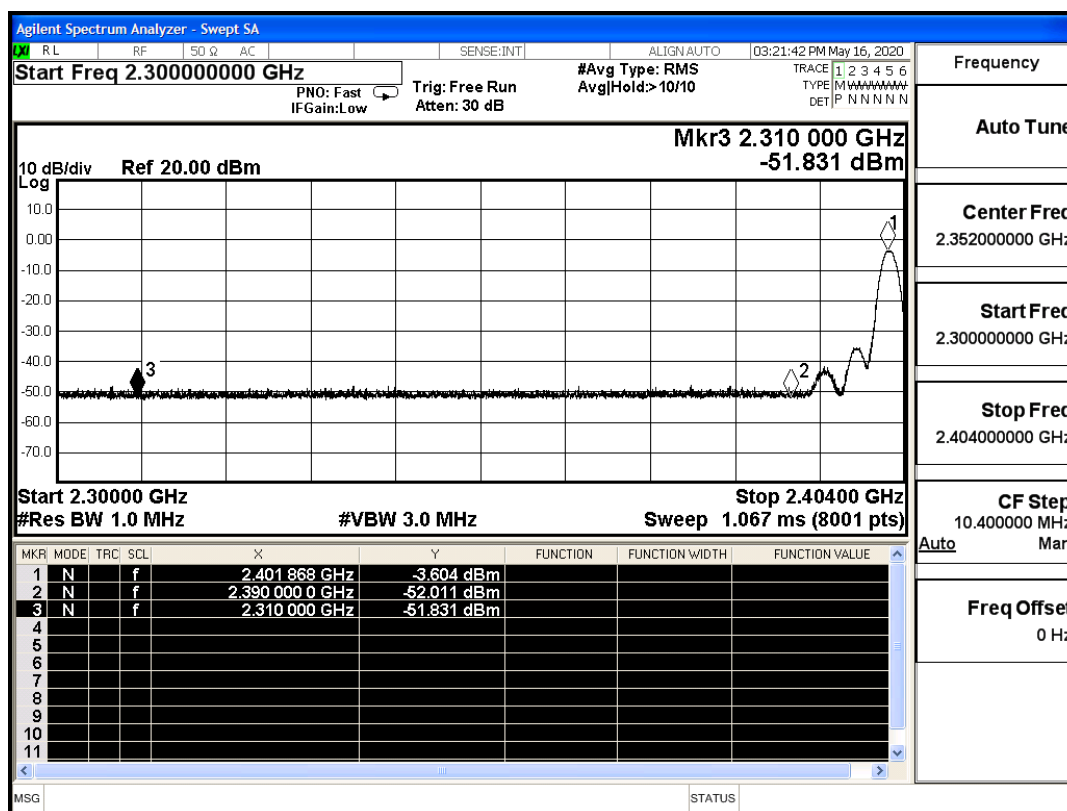
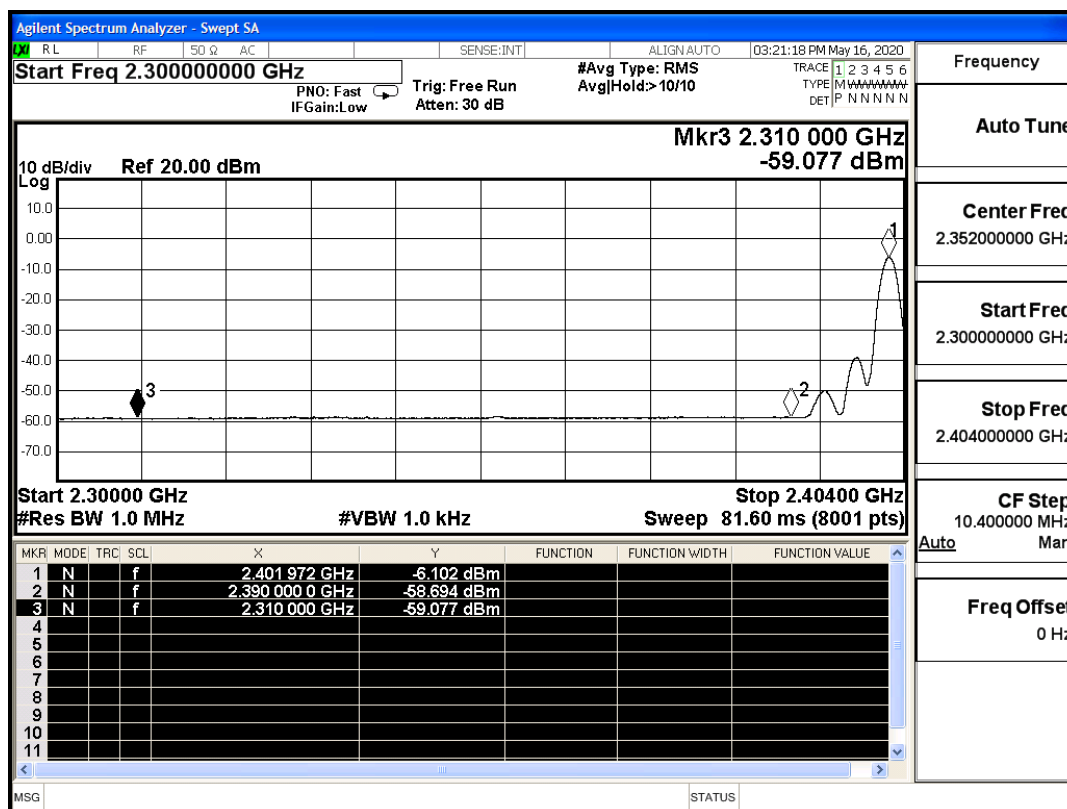


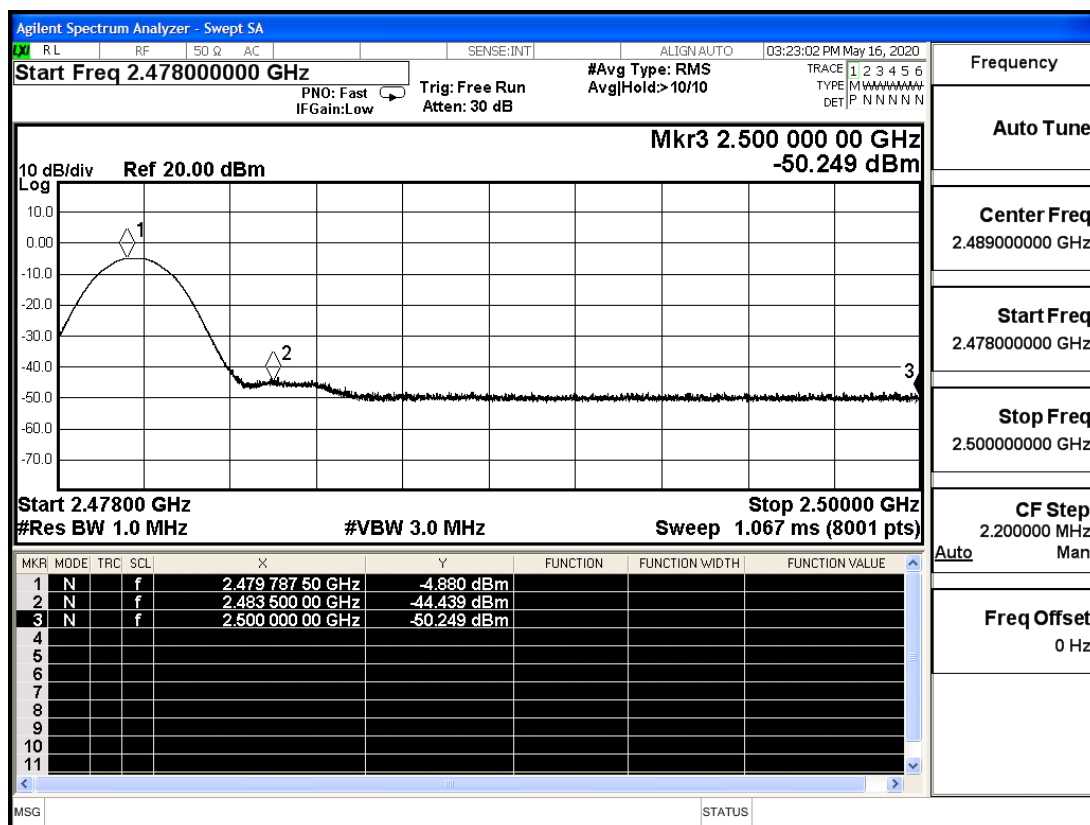
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



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)