

Appendix A

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

Product Name: Wireless Speaker

Trade Mark: billboard

Test Model: MEN-894

Environmental Conditions

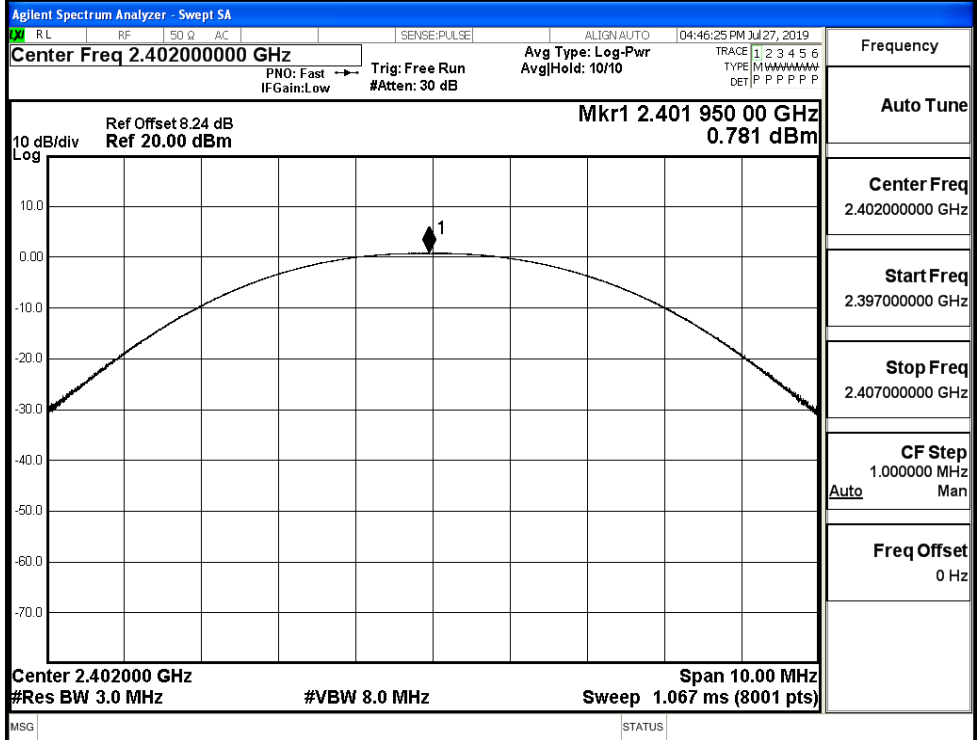
Temperature:	24.5 ° C
Relative Humidity:	53.6 %
ATM Pressure:	100.0 kPa
Test Engineer:	SCENT HU
Supervised by:	Wang.Chuang

A.1 Maximum Conducted Peak Output Power

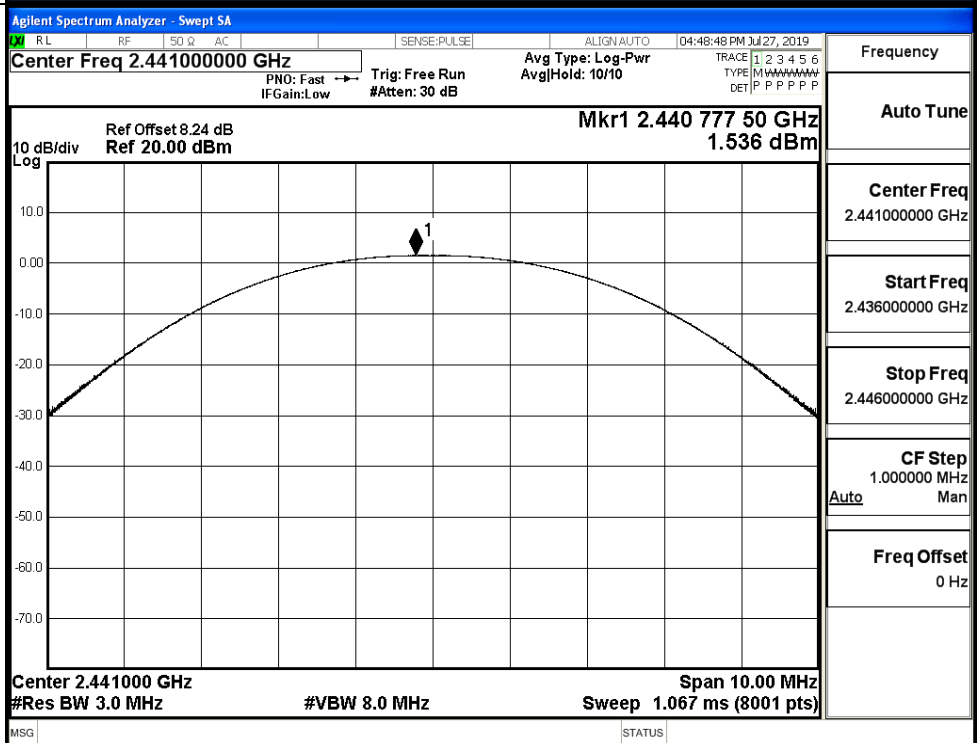
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.781	21	PASS
	MCH	1.536	21	PASS
	HCH	0.206	21	PASS
$\pi/4$ DQPSK	LCH	0.013	21	PASS
	MCH	0.781	21	PASS
	HCH	-0.635	21	PASS

Test Graphs

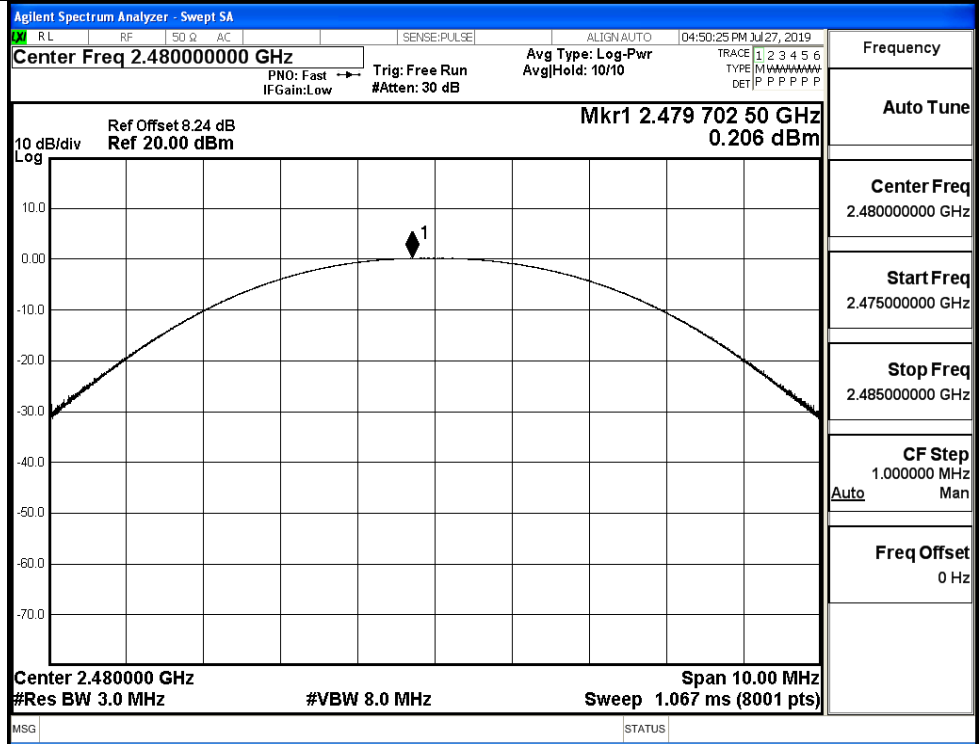
GFSK/LCH



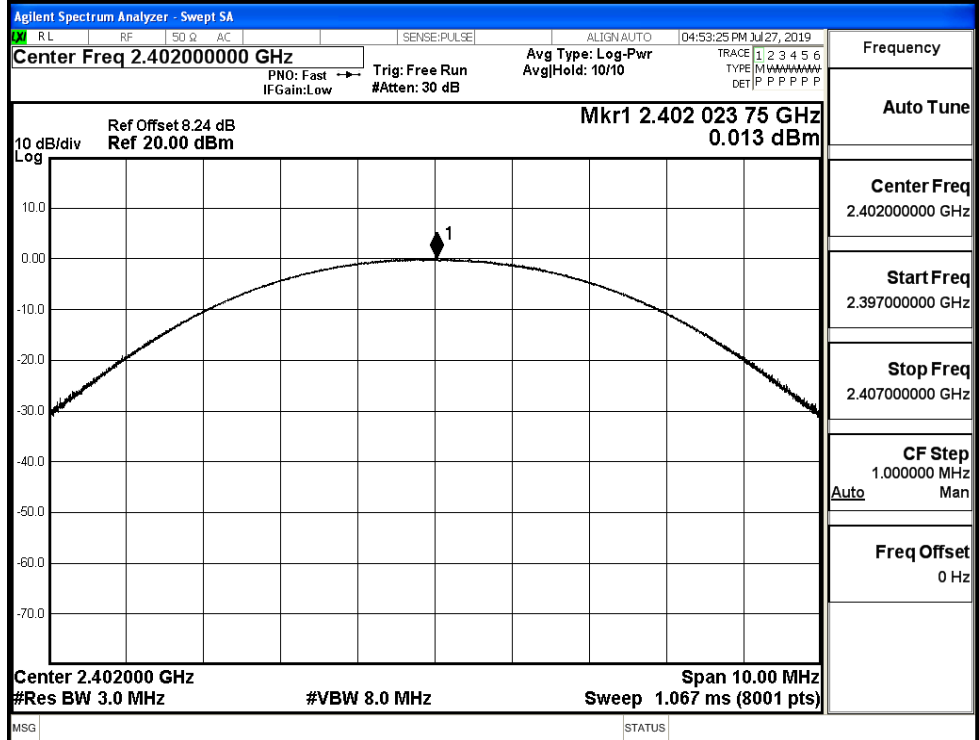
GFSK/MCH



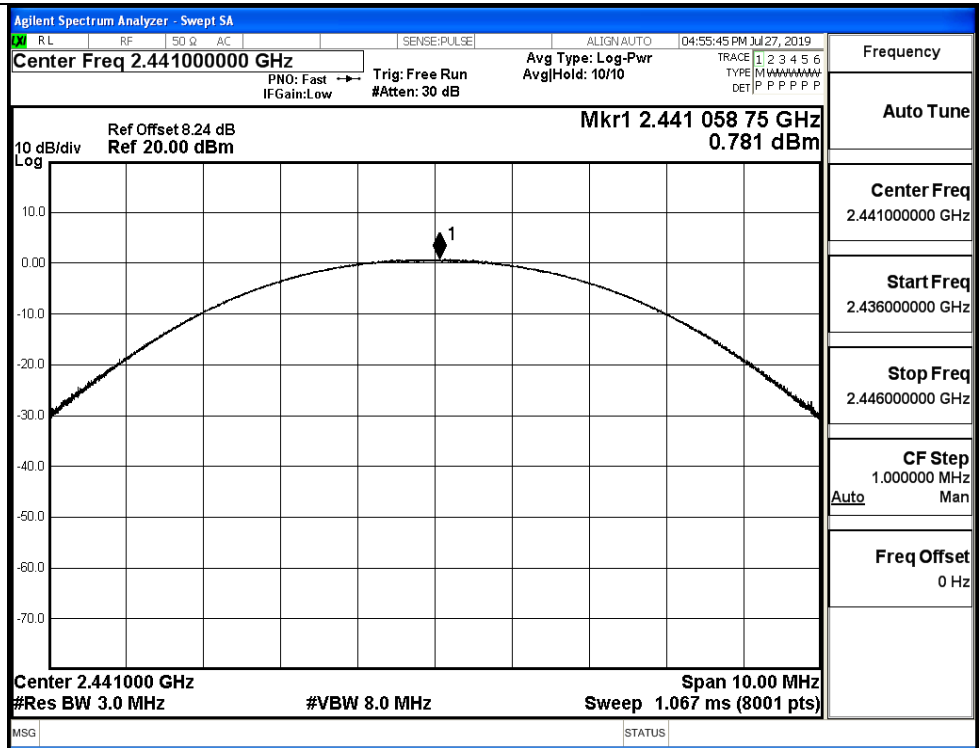
GFSK/HCH



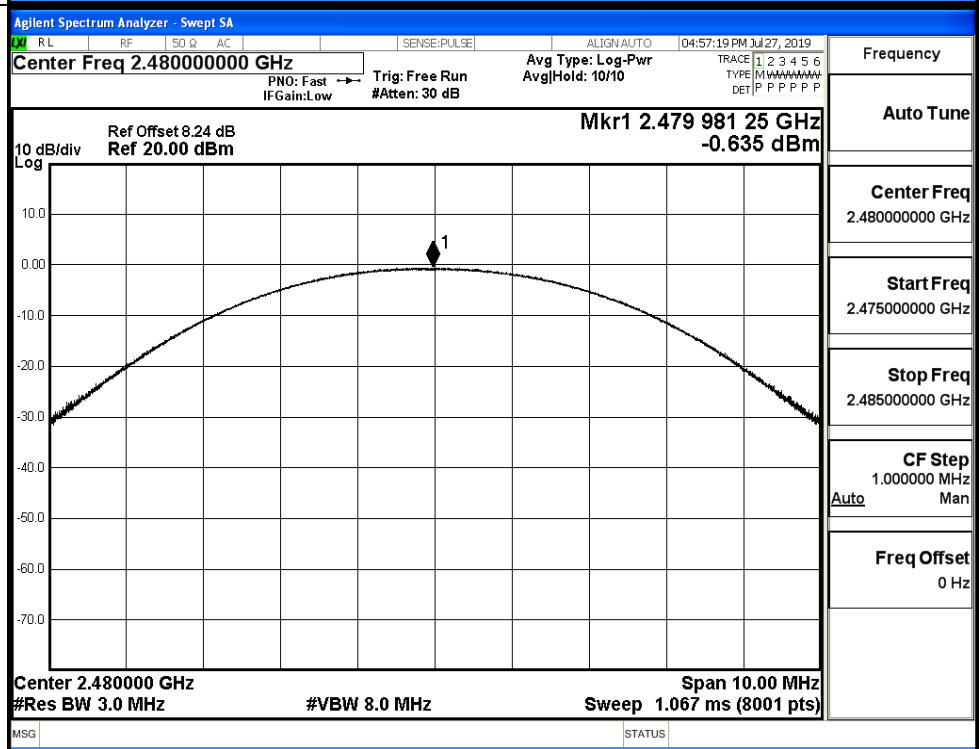
π /4DQPSK/LCH



π /4DQPSK/MCH

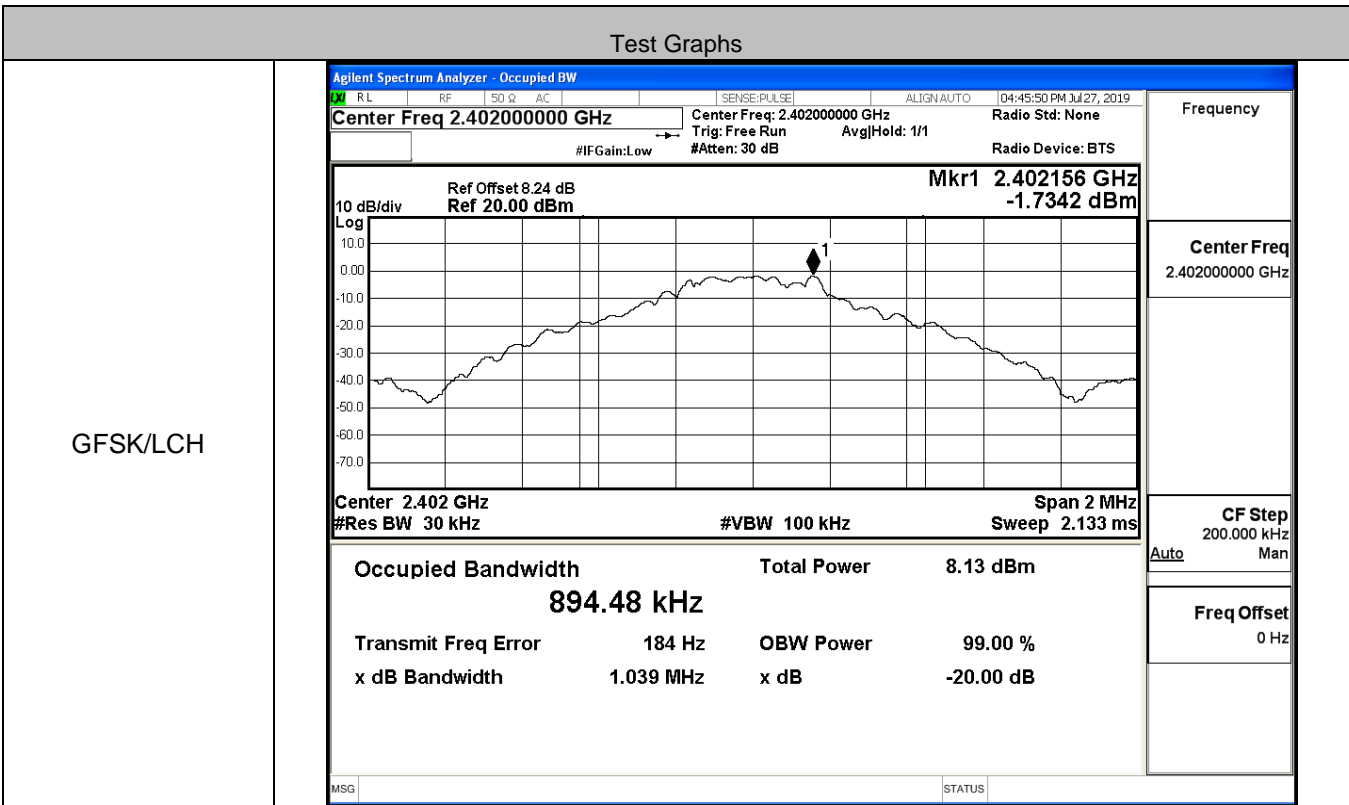


π /4DQPSK/HCH

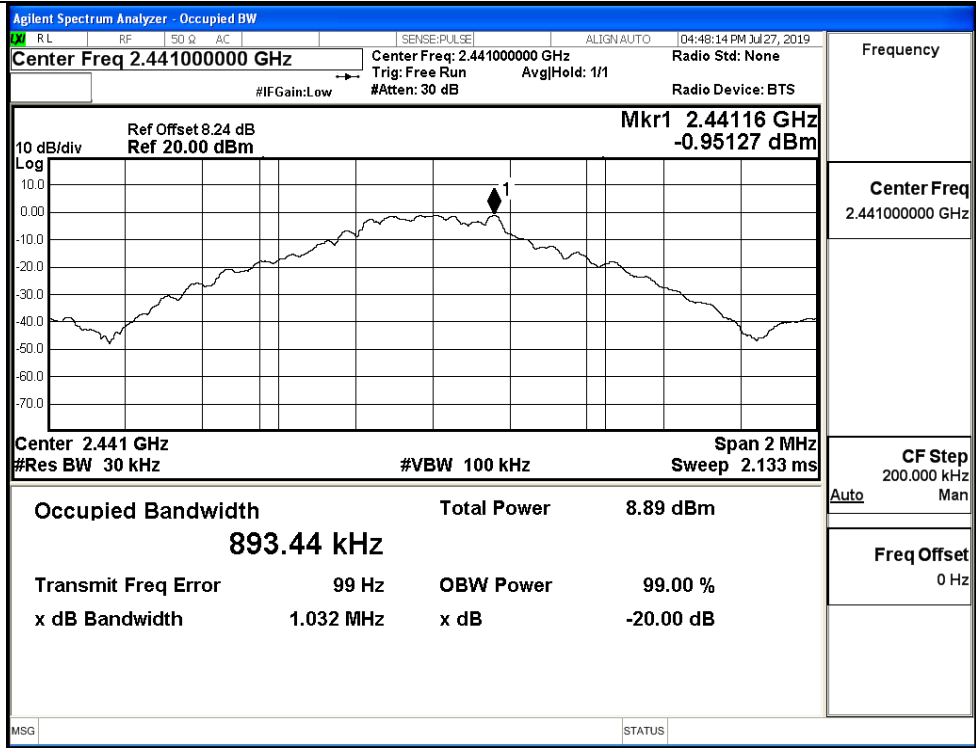


A.2 20dB Bandwidth

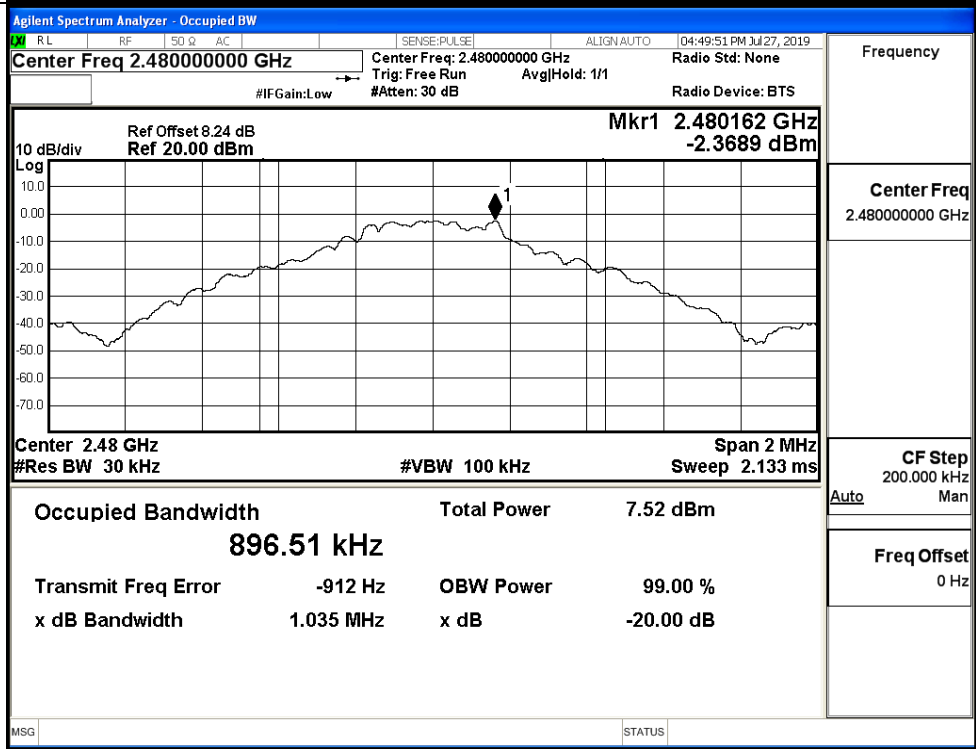
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.039	Not Specified	PASS
	MCH	1.032	Not Specified	PASS
	HCH	1.035	Not Specified	PASS
π/4DQPSK	LCH	1.318	Not Specified	PASS
	MCH	1.289	Not Specified	PASS
	HCH	1.288	Not Specified	PASS

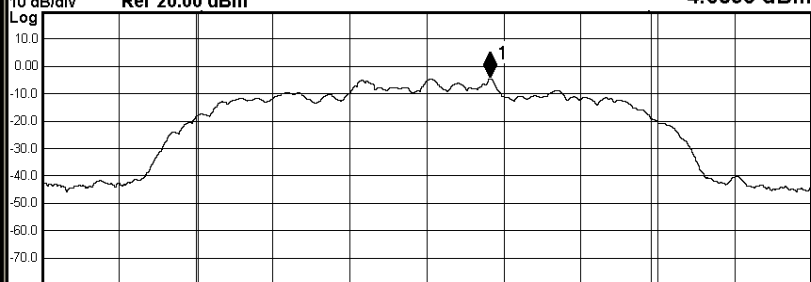
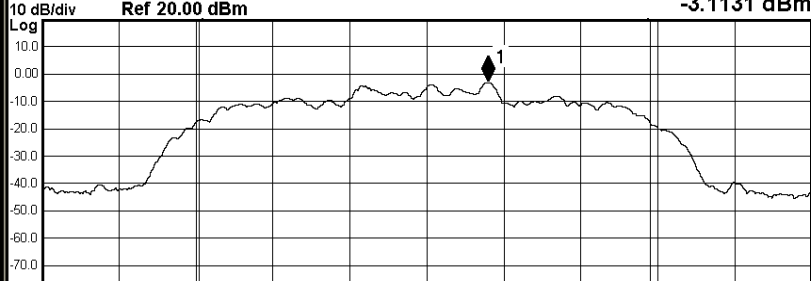


GFSK/MCH

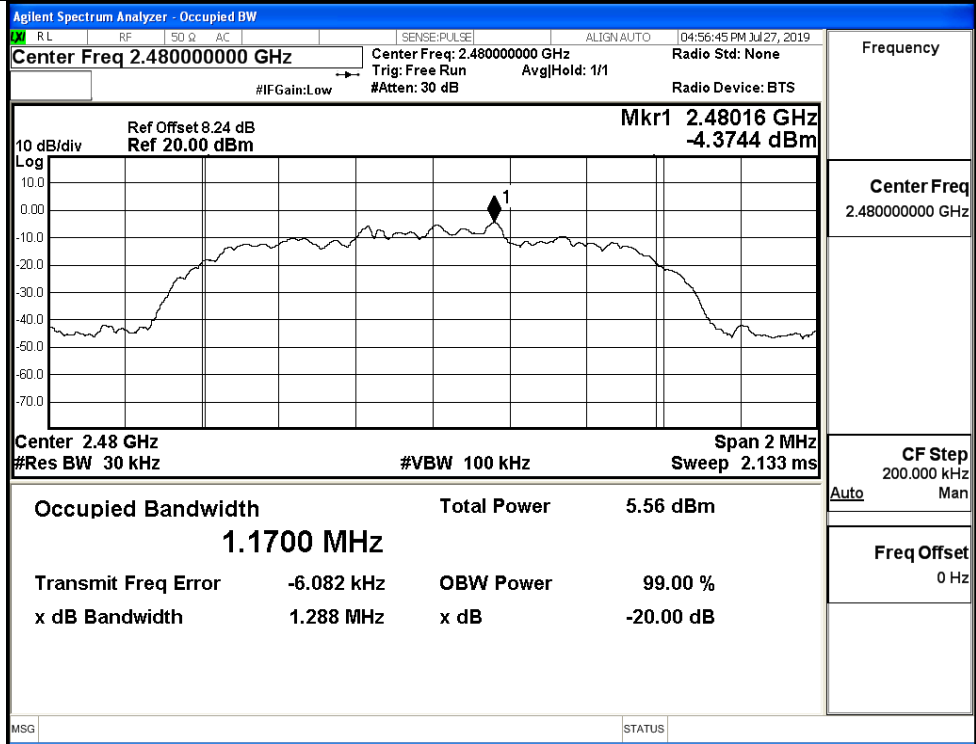


GFSK/HCH



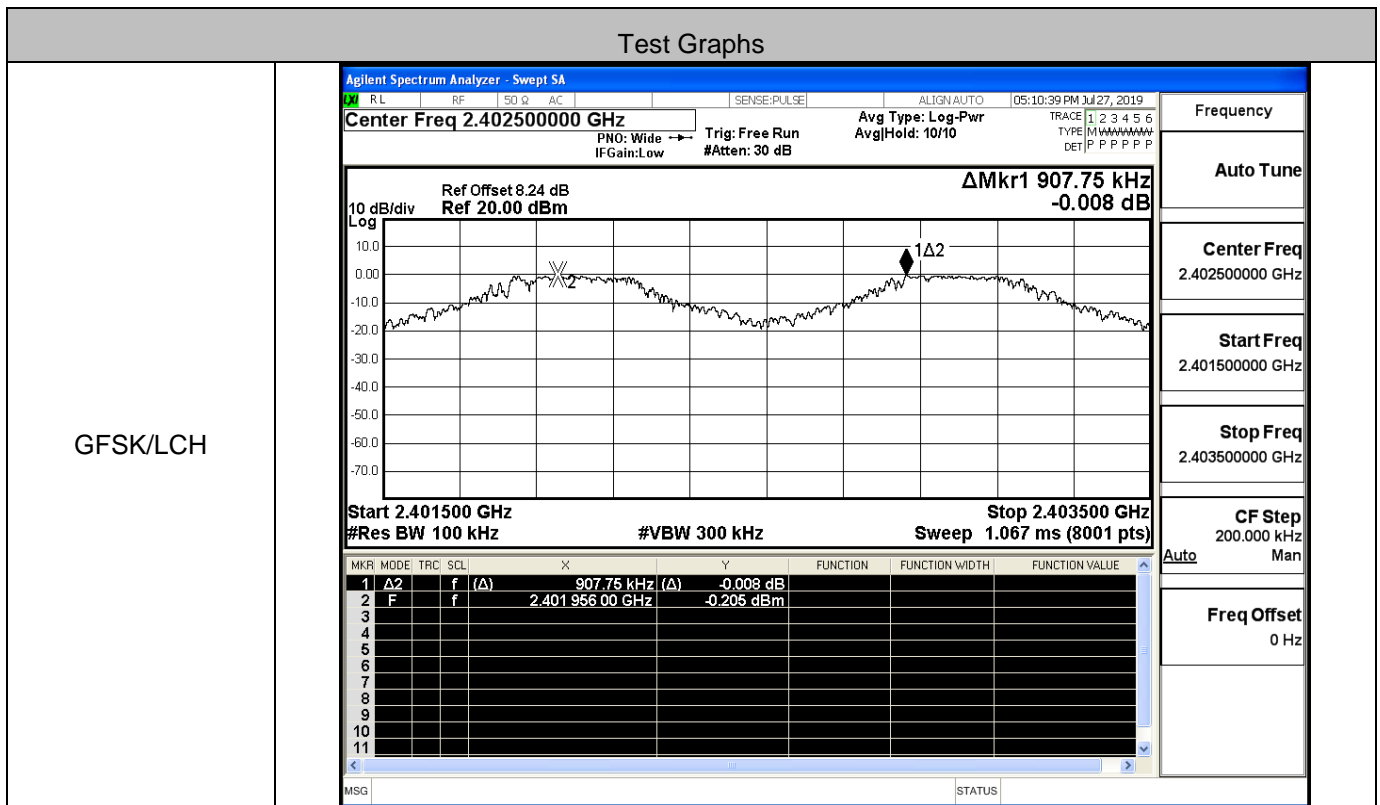
<p style="text-align: center;">π/4DQPSK/LCH</p>	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz Center Freq: 2.40200000 GHz Radio Std: None Trig: Free Run AvgHold: 1/1</p> <p>Ref Offset 8.24 dB Mkr1 2.402164 GHz Ref 20.00 dBm -4.5893 dBm</p>  <p>Center 2.402 GHz Span 2 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms</p> <p>Occupied Bandwidth Total Power 6.08 dBm 1.1736 MHz</p> <p>Transmit Freq Error -4.376 kHz OBW Power 99.00 % x dB Bandwidth 1.318 MHz x dB -20.00 dB</p> </div>	<p>Frequency 2.40200000 GHz</p> <p>CF Step 200.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
<p style="text-align: center;">π/4DQPSK/MCH</p>	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.44100000 GHz Center Freq: 2.44100000 GHz Radio Std: None Trig: Free Run AvgHold: >1/1</p> <p>Ref Offset 8.24 dB Mkr1 2.441116 GHz Ref 20.00 dBm -3.1131 dBm</p>  <p>Center 2.441 GHz Span 2 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms</p> <p>Occupied Bandwidth Total Power 7.01 dBm 1.1690 MHz</p> <p>Transmit Freq Error -5.610 kHz OBW Power 99.00 % x dB Bandwidth 1.289 MHz x dB -20.00 dB</p> </div>	<p>Frequency 2.44100000 GHz</p> <p>CF Step 200.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>

$\pi/4$ DQPSK/HCH

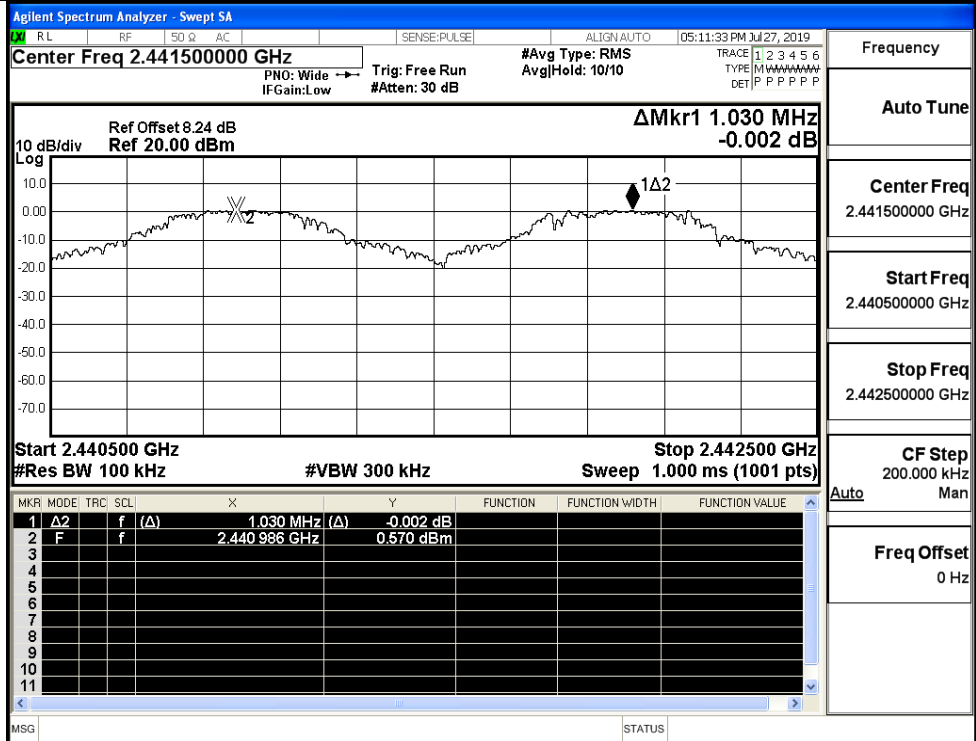


A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.908	0.693	PASS
	MCH	1.030	0.693	PASS
	HCH	1.140	0.693	PASS
π/4DQPSK	LCH	1.318	0.879	PASS
	MCH	0.684	0.879	PASS
	HCH	1.320	0.879	PASS

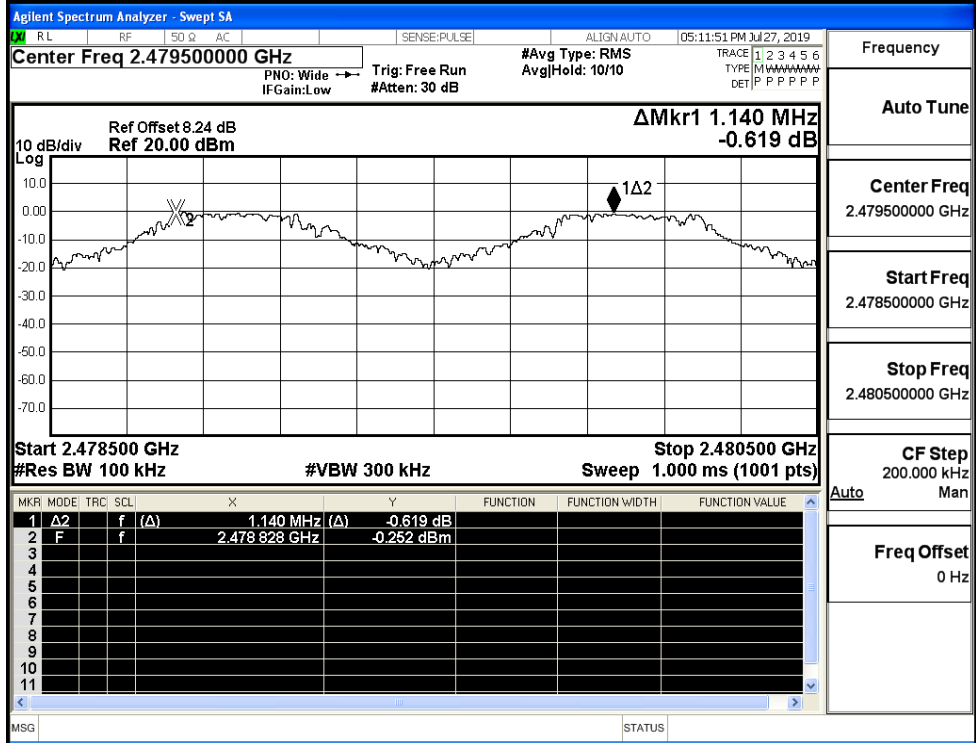


GFSK/MCH



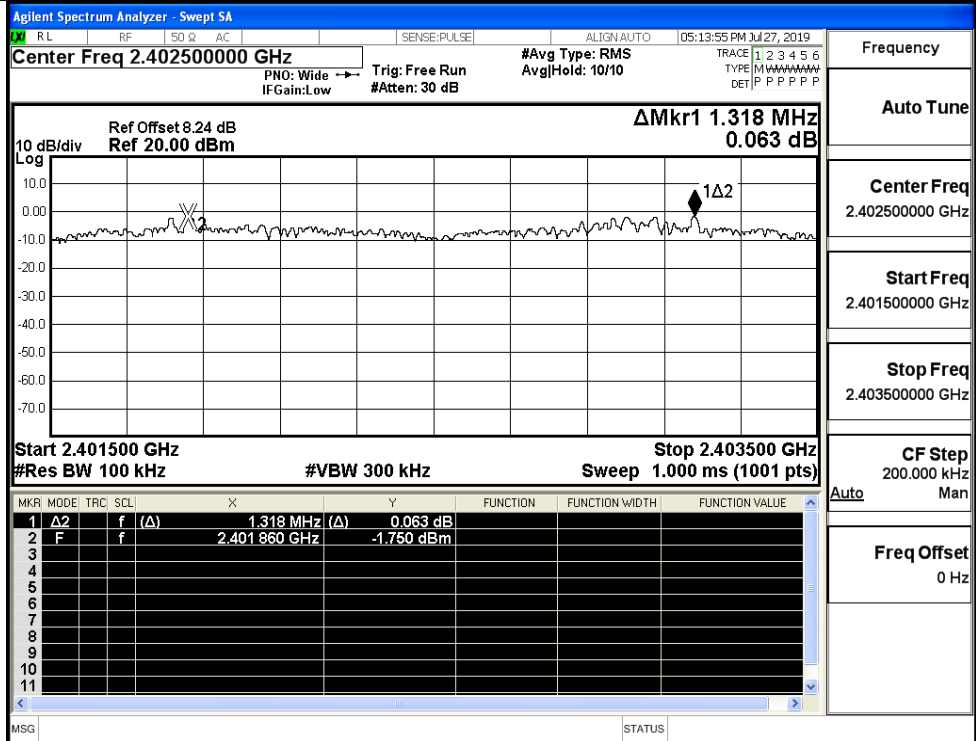
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

GFSK/HCH



Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

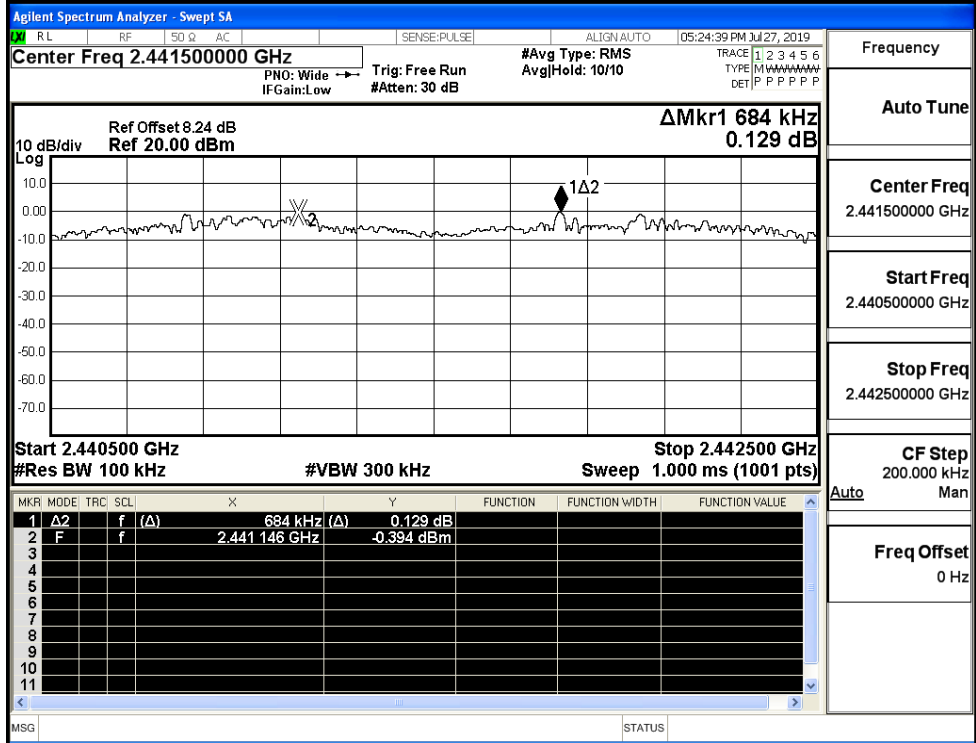
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

$\pi/4$ DQPSK/MCH



Frequency

Auto Tune

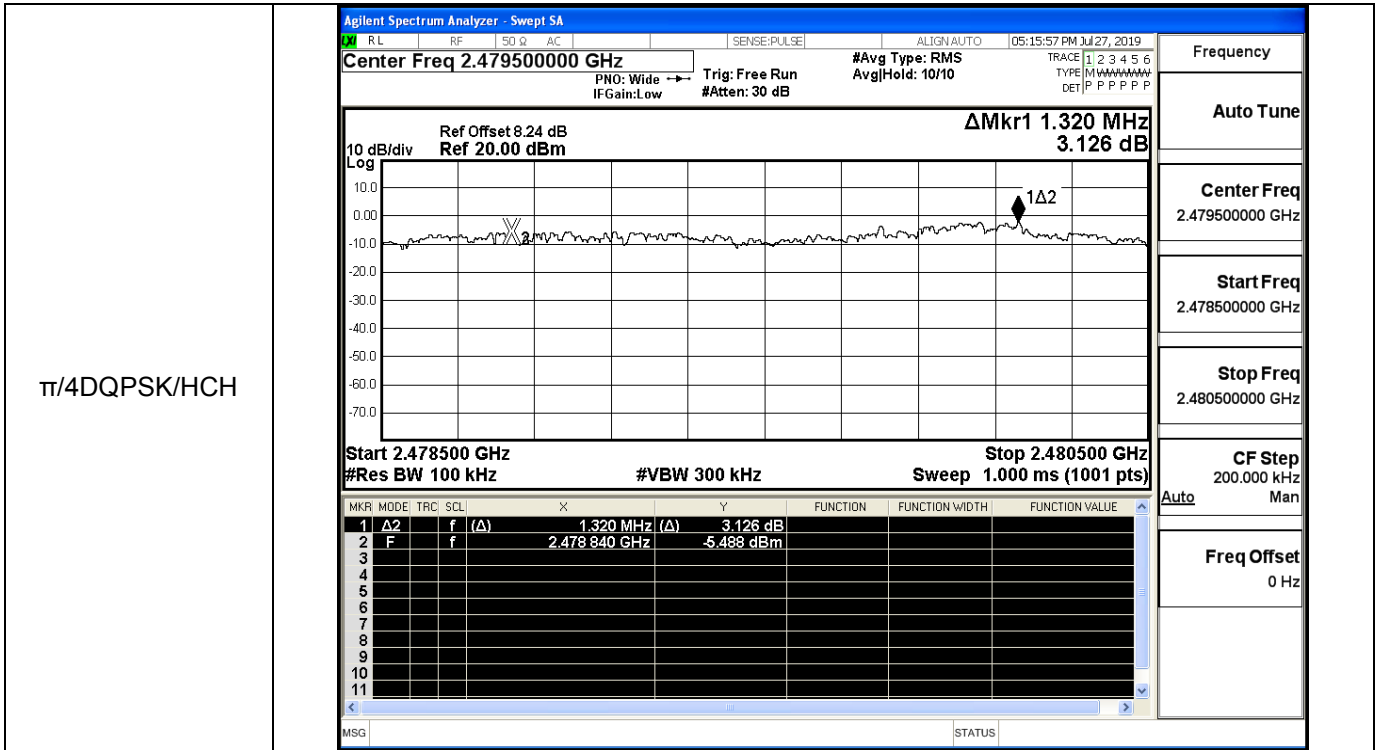
Center Freq
2.441500000 GHz

Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

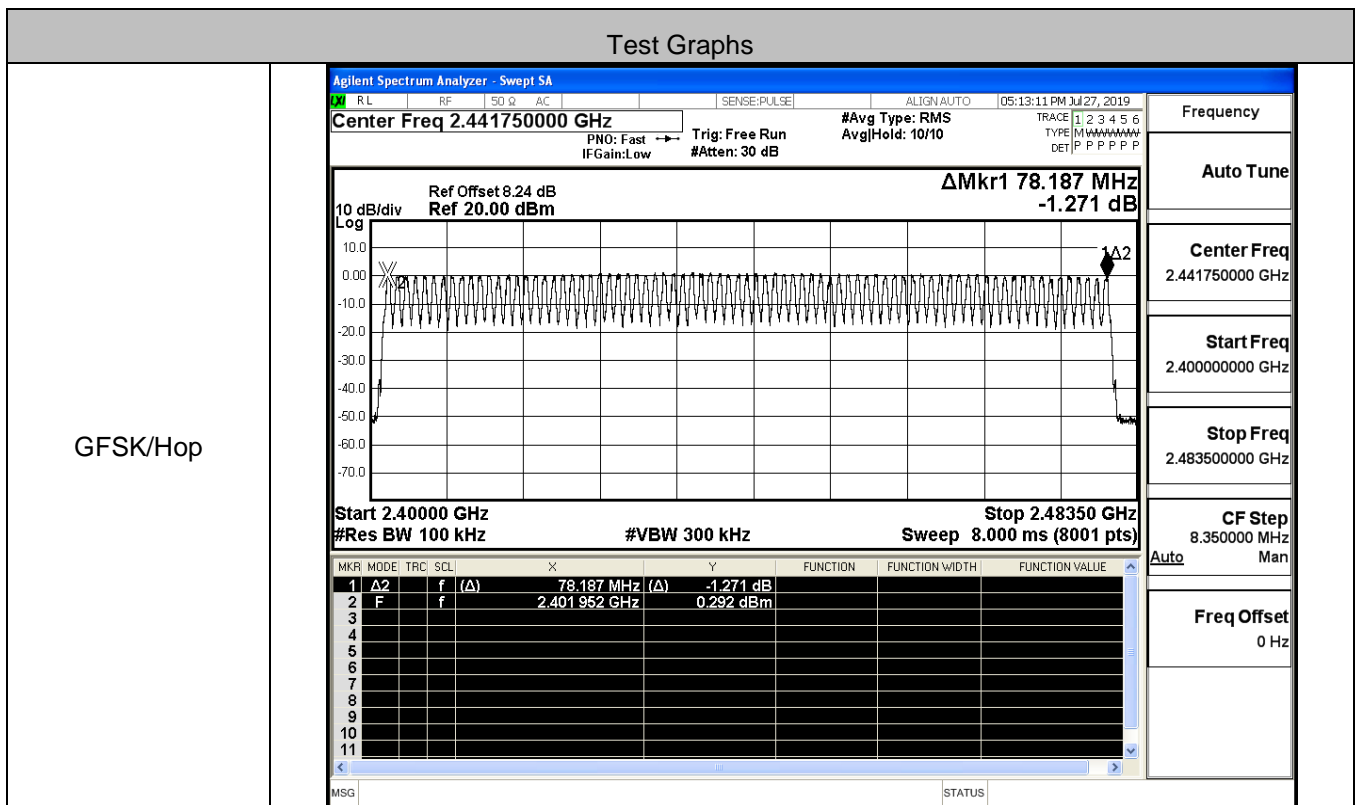
CF Step
200.000 kHz

Freq Offset
0 Hz

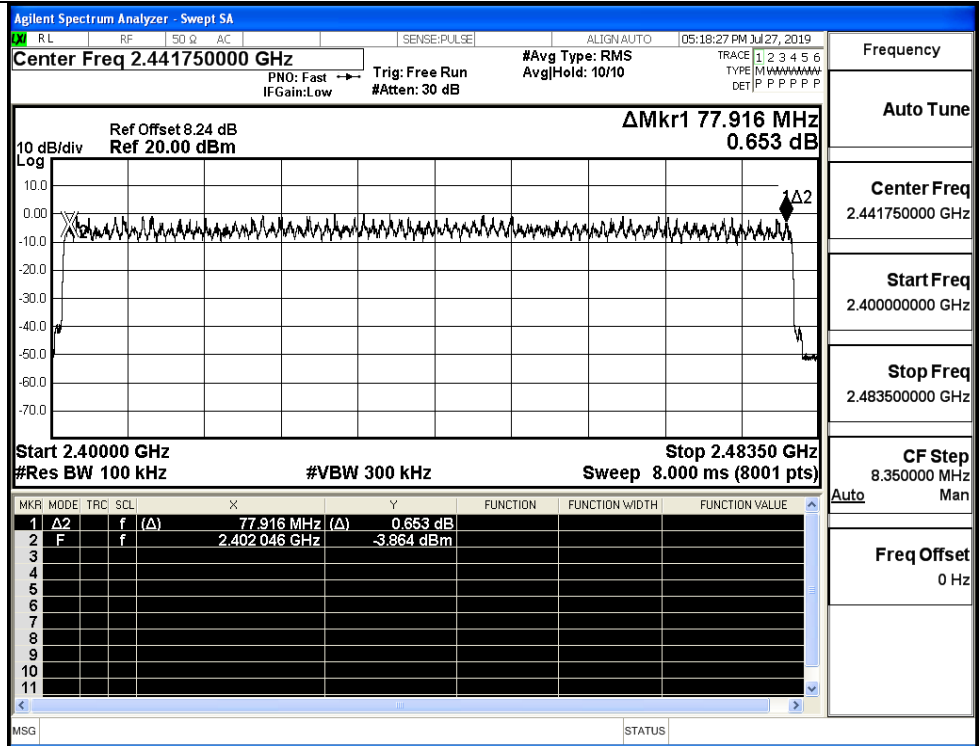


A.4 Hopping Channel Number

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

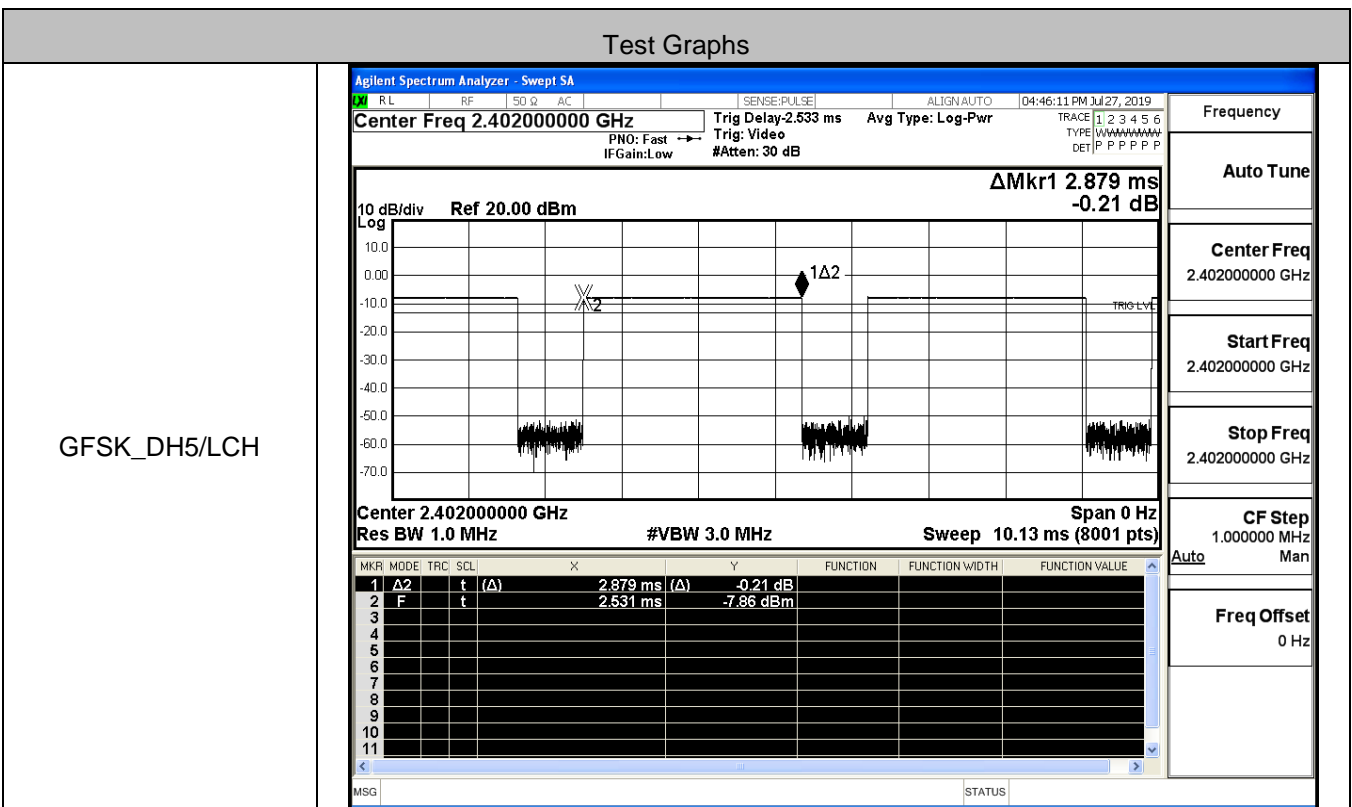


$\pi/4$ DQPSK/Hop

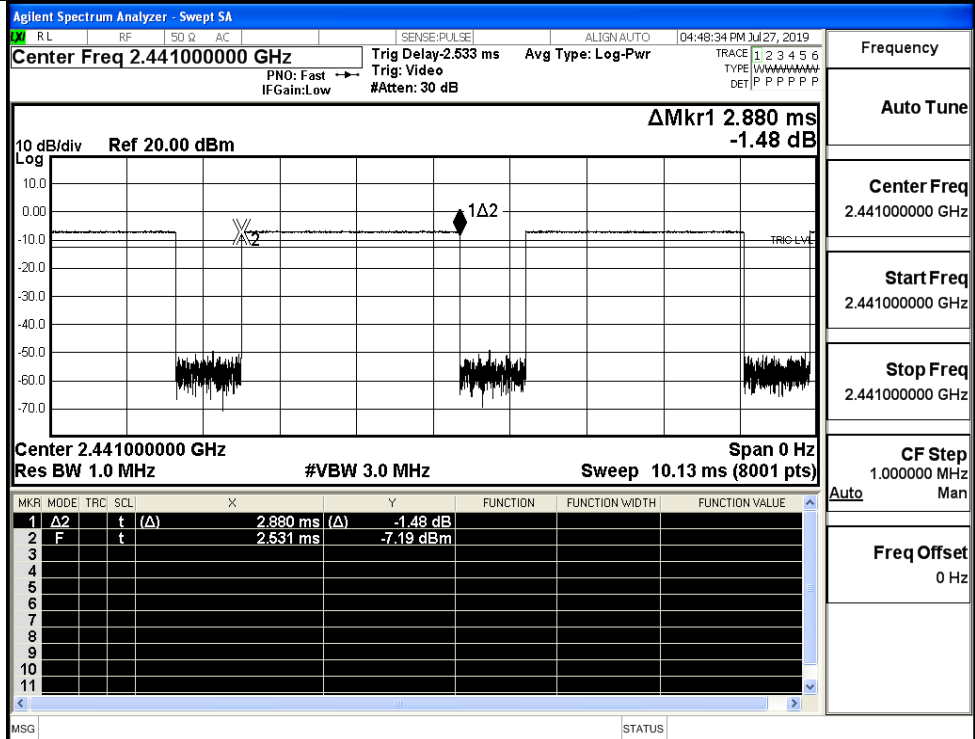


A.5 Dwell Time

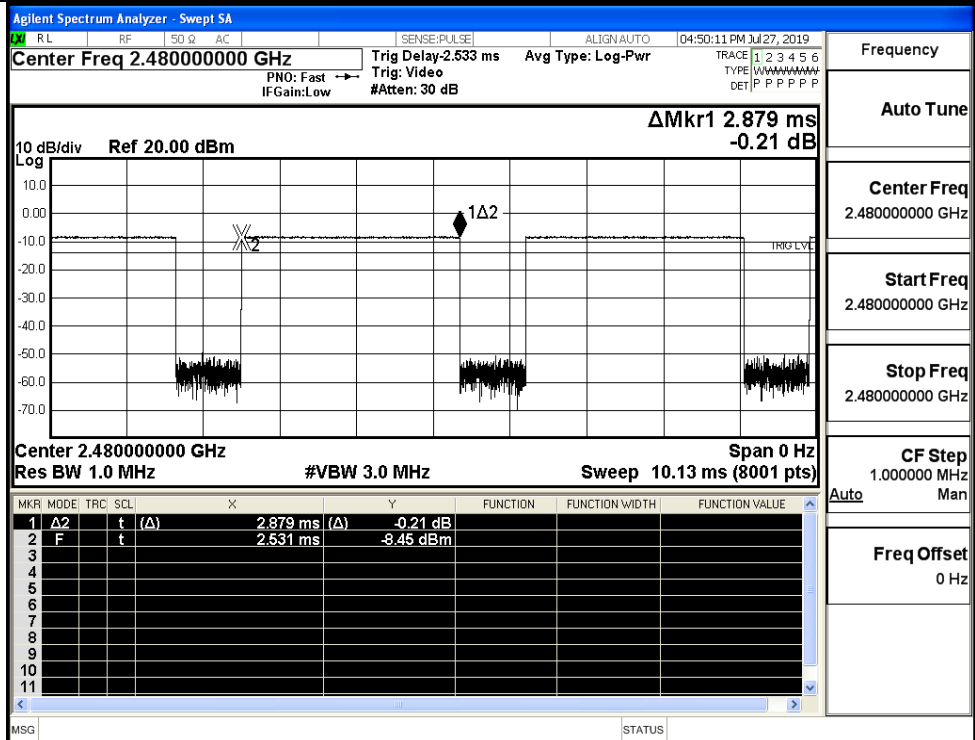
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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



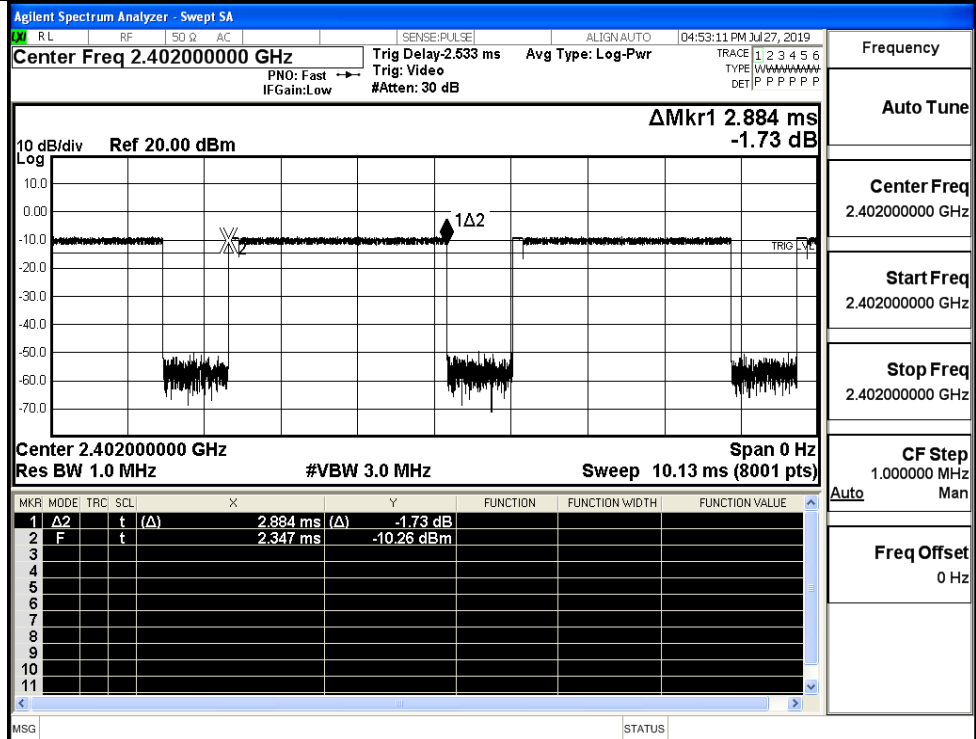
GFSK_DH5/MCH



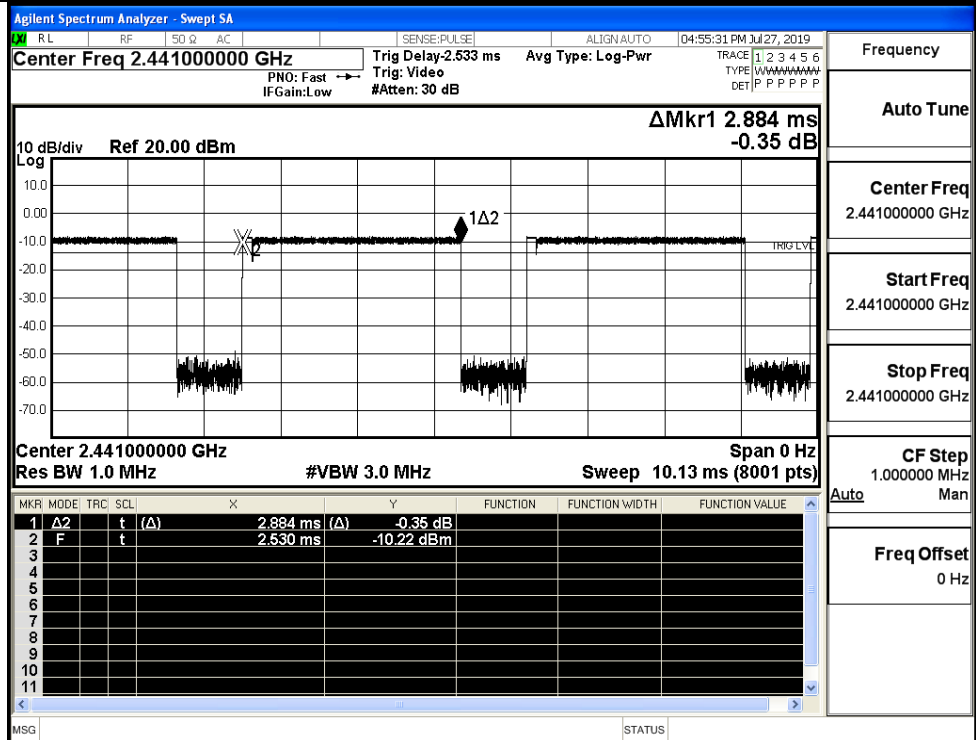
GFSK_DH5/HCH



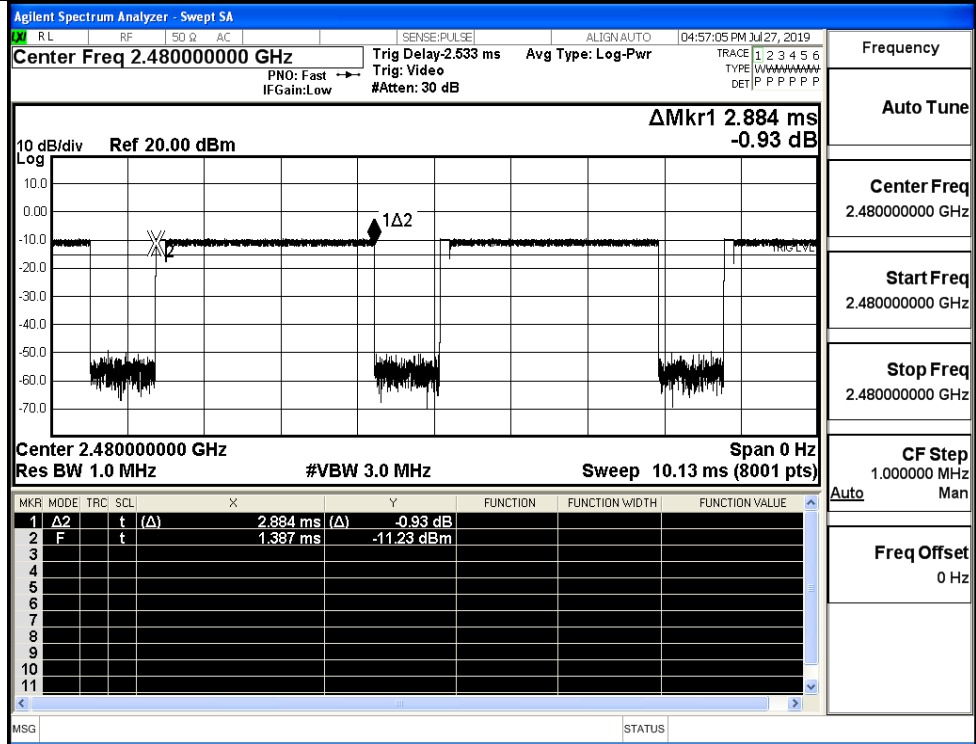
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH

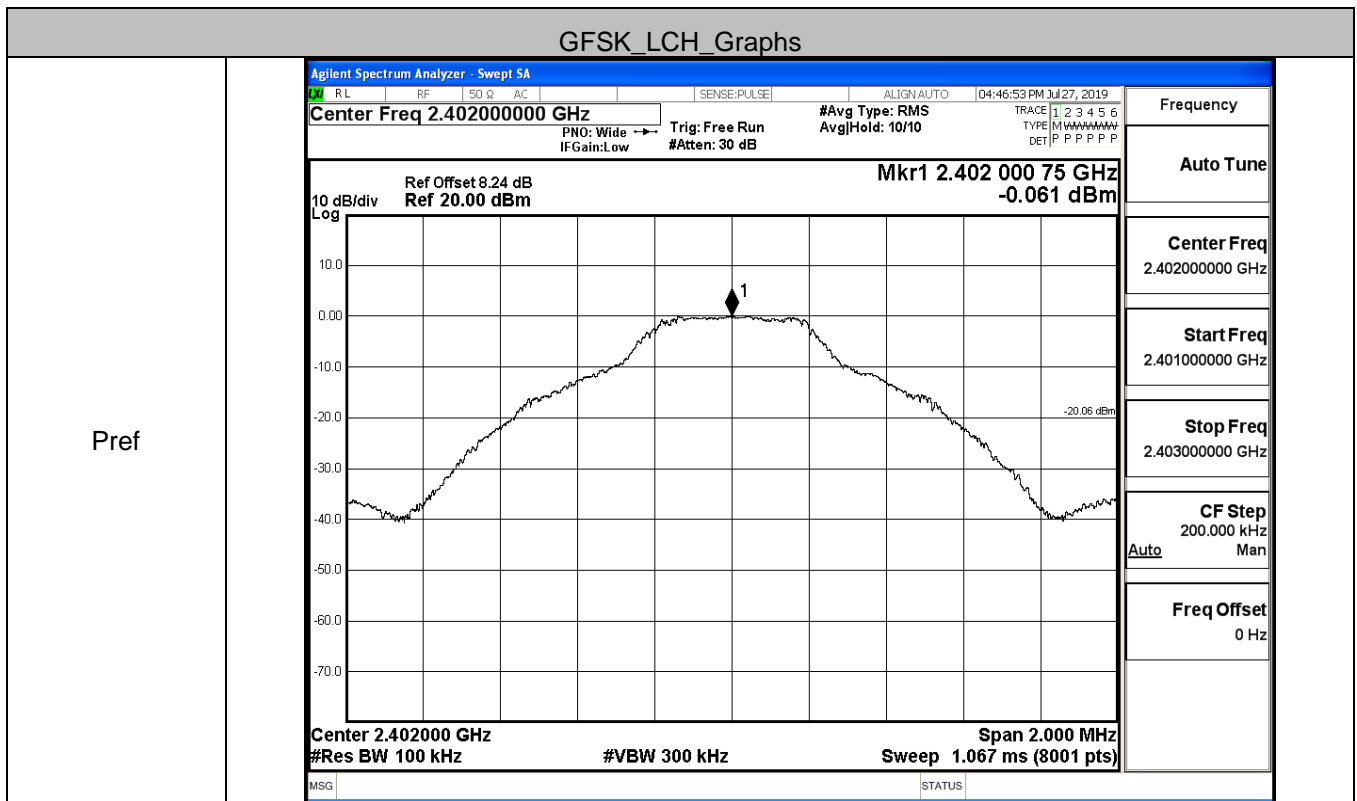


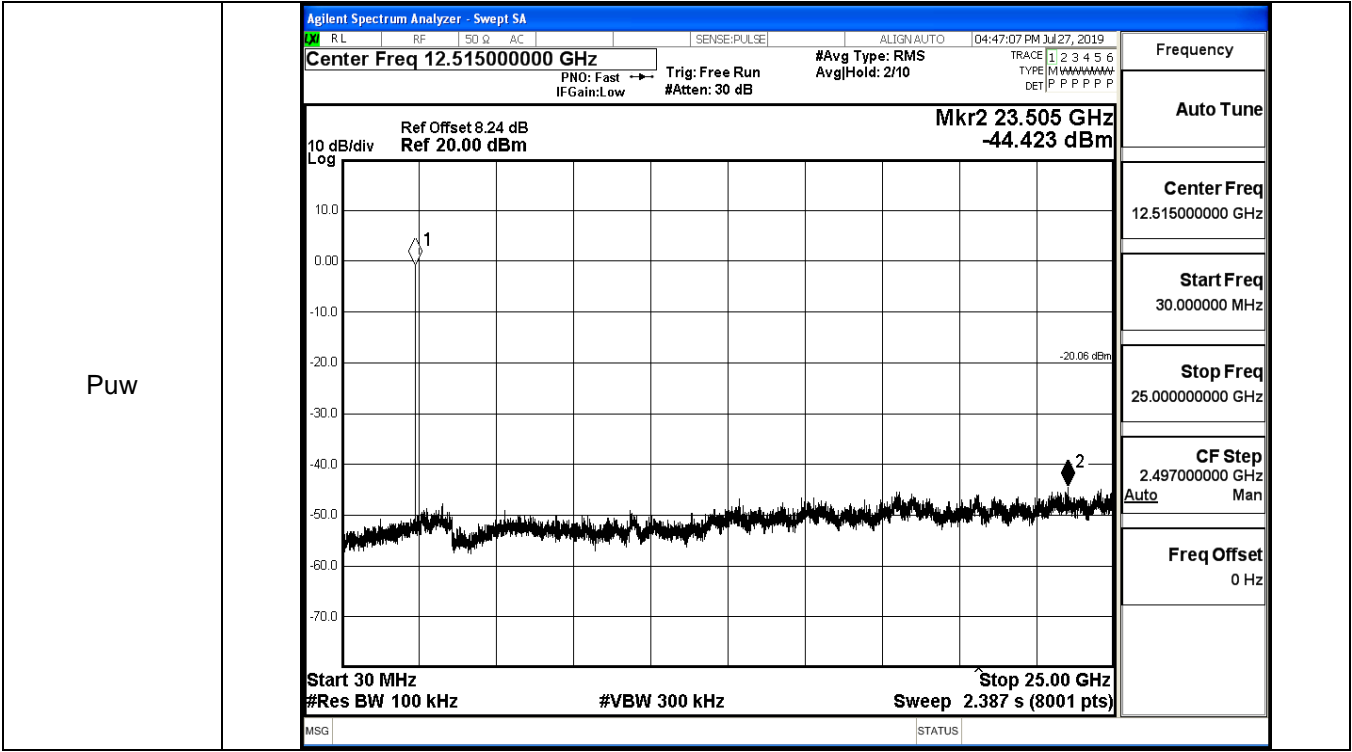
$\pi/4$ DQPSK
_2DH5/HCH



A.6 RF Conducted Spurious Emissions

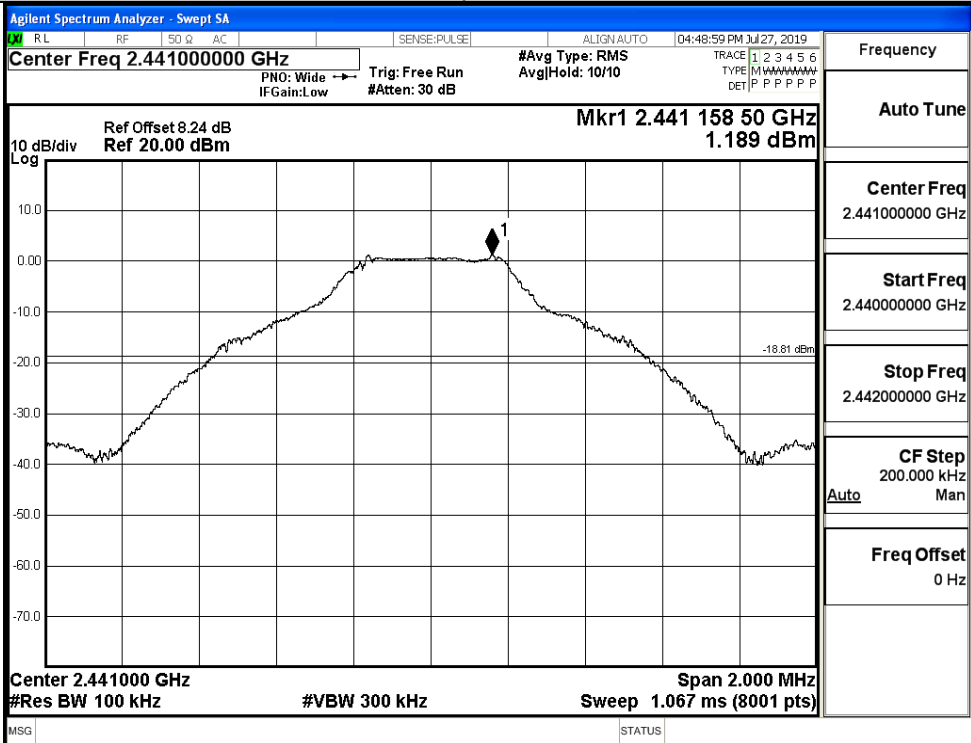
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.061	-44.423	-20.061	PASS
	MCH	1.189	-44.954	-18.811	PASS
	HCH	-0.164	-44.468	-20.164	PASS
π /4DQPSK	LCH	-0.969	-44.297	-20.969	PASS
	MCH	-0.334	-44.861	-20.334	PASS
	HCH	-1.713	-43.696	-21.713	PASS



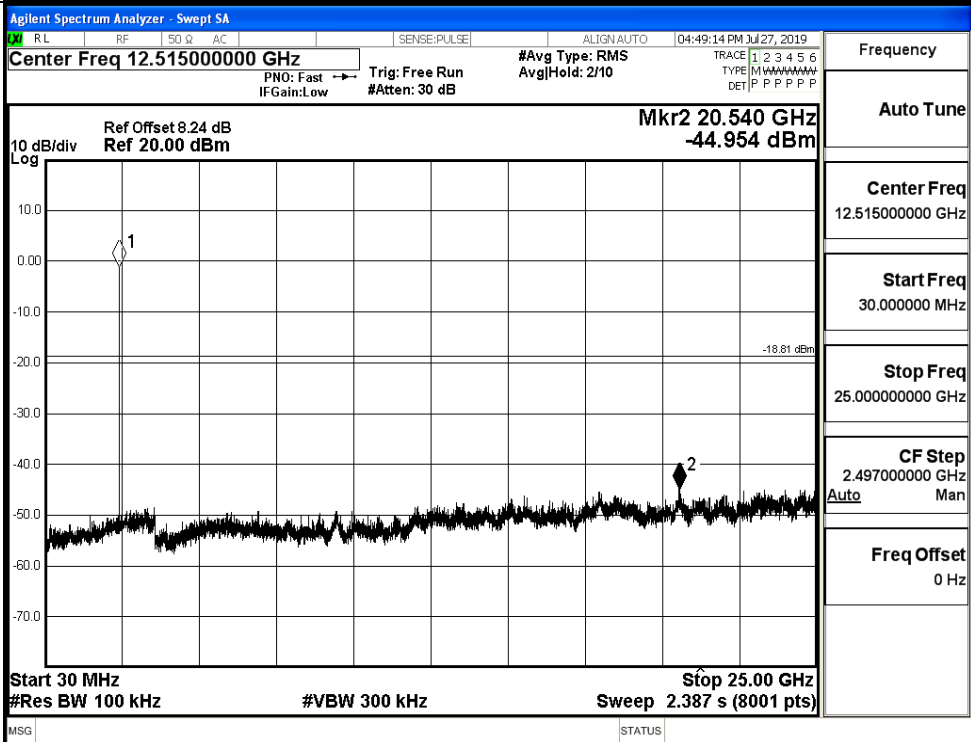


GFSK_MCH_Graphs

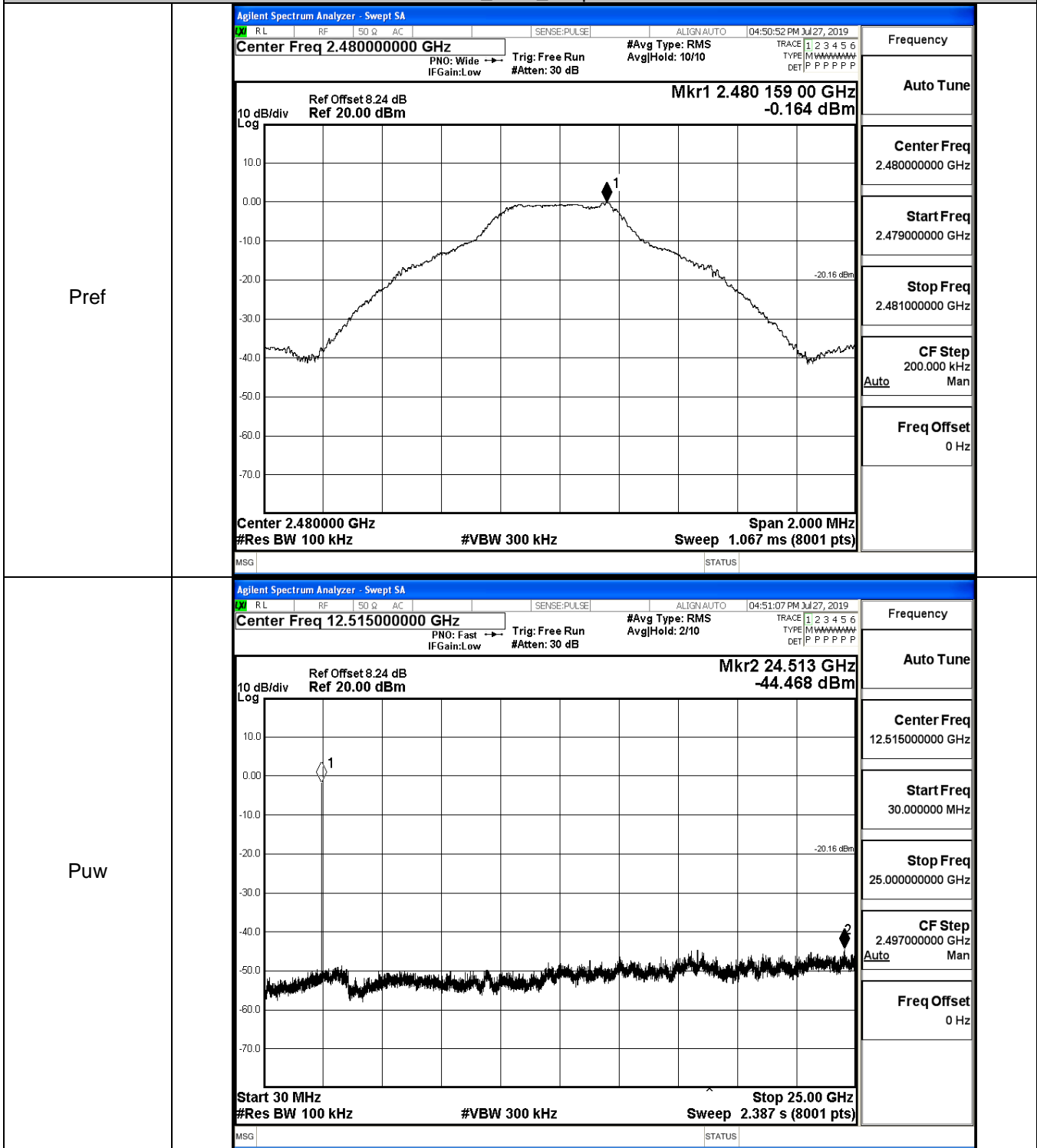
Pref



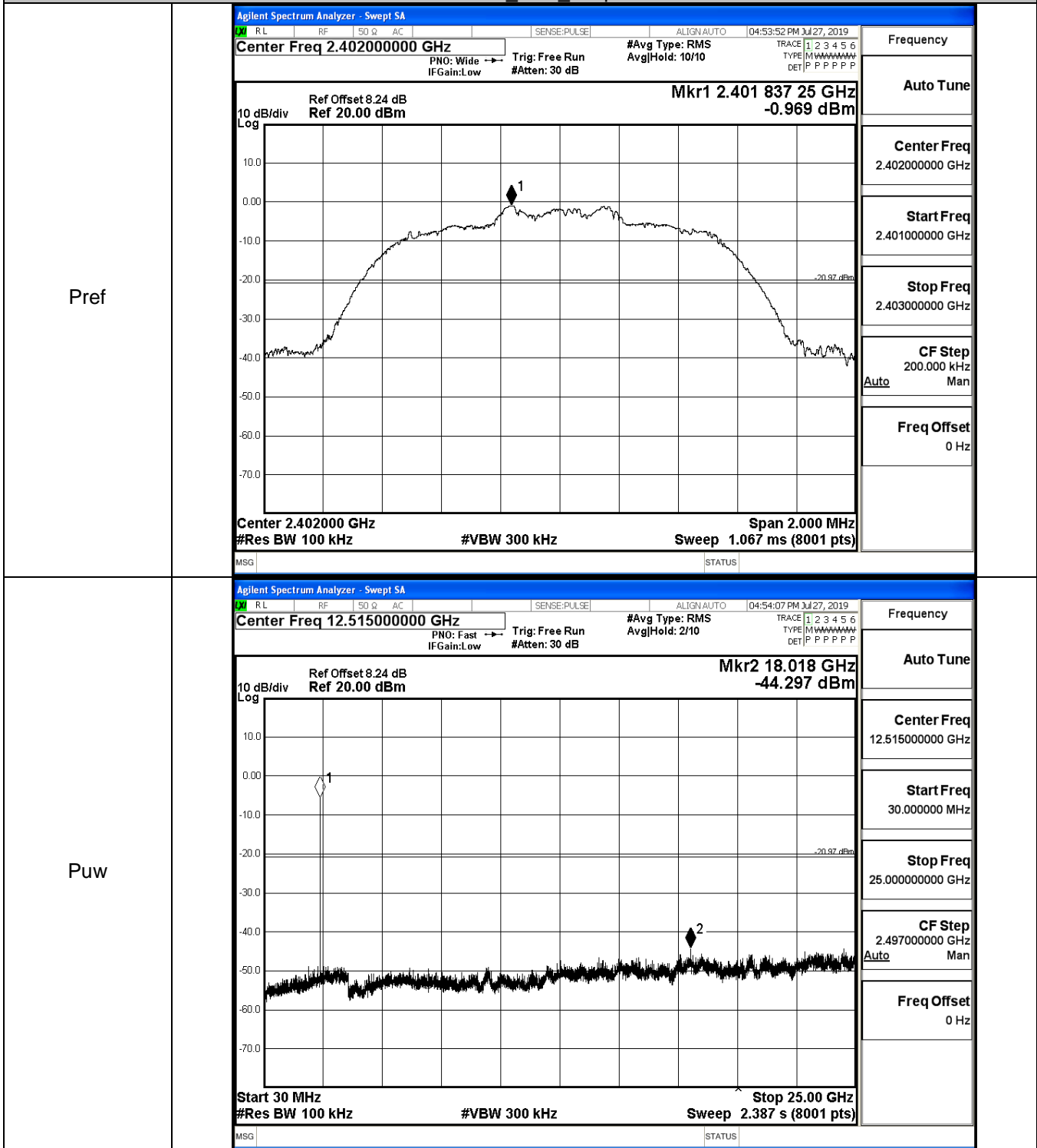
Puw



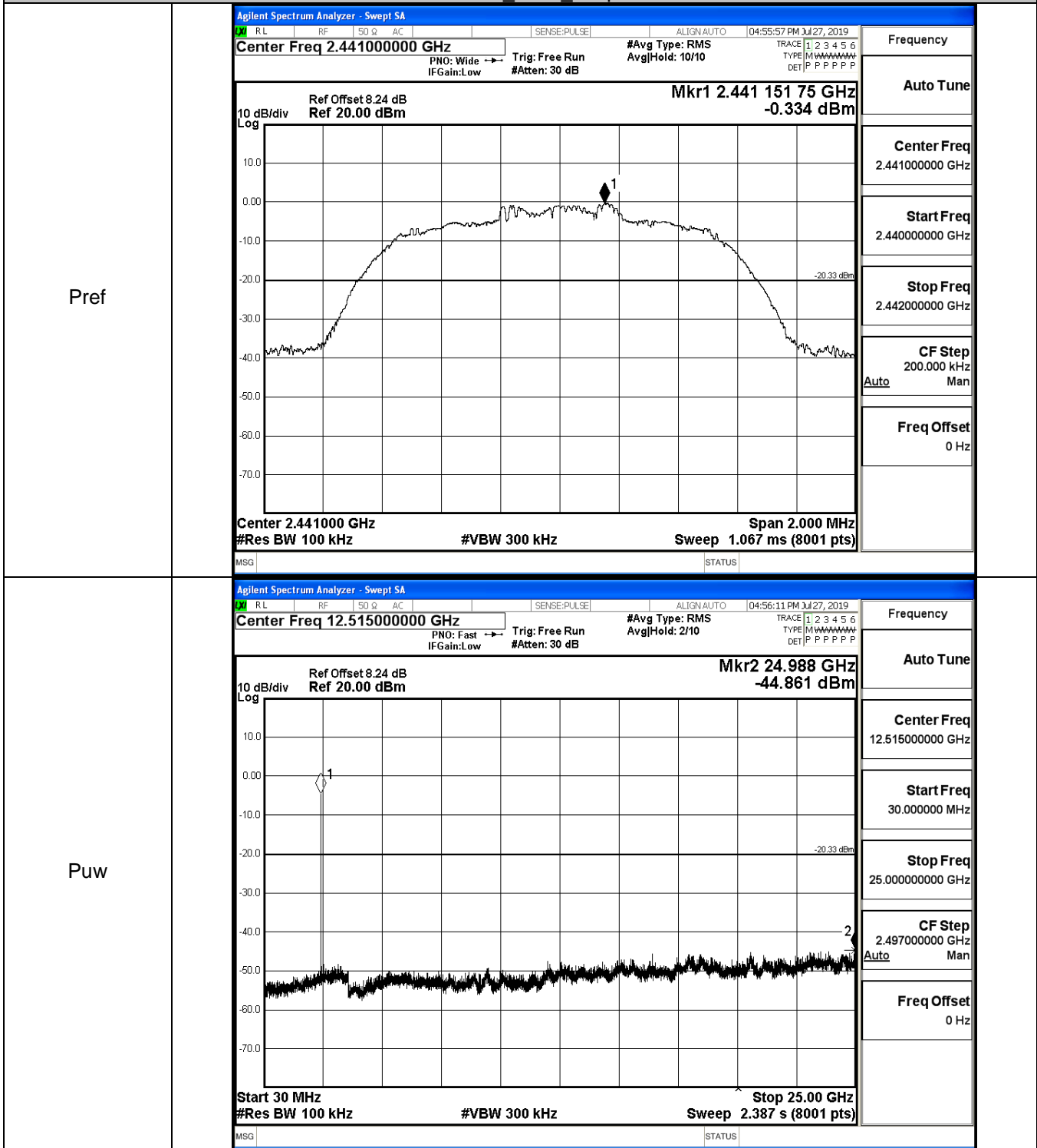
GFSK_HCH_Graphs



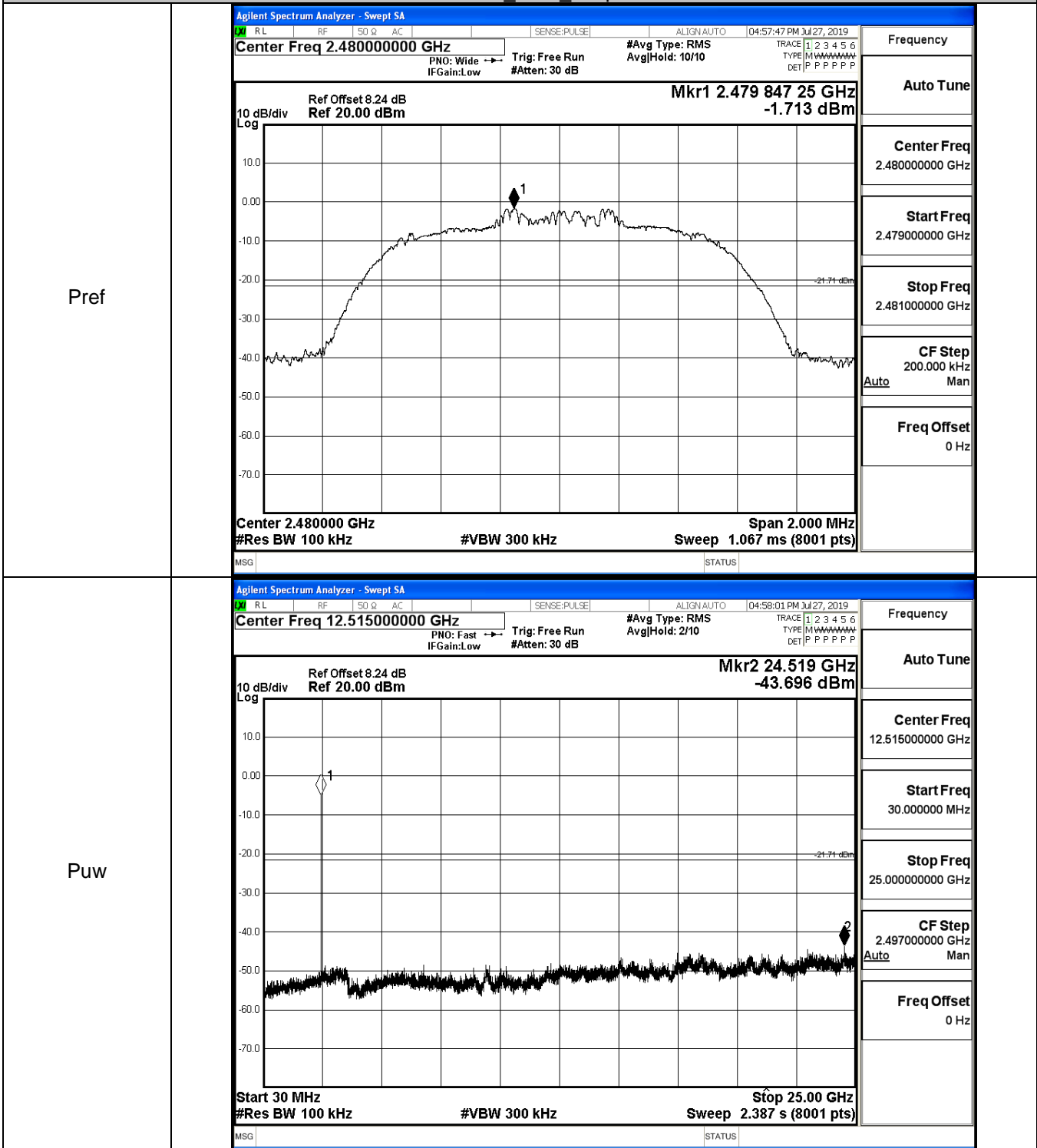
$\pi/4$ DQPSK_LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs



$\pi/4$ DQPSK_HCH_Graphs

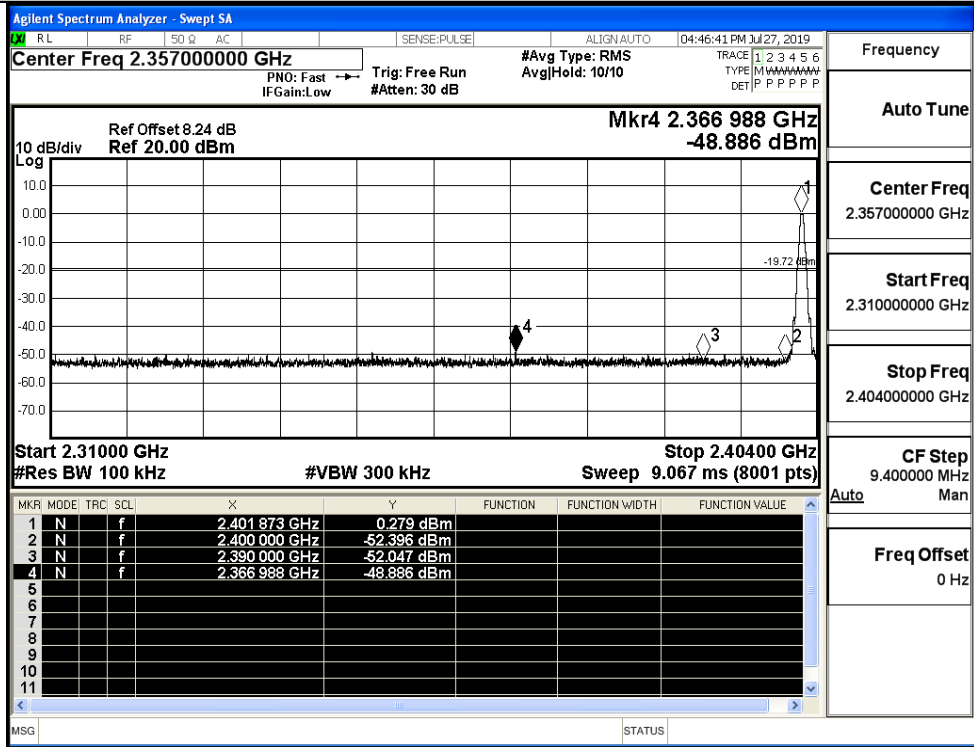


A.7 Band-edge for RF Conducted Emissions

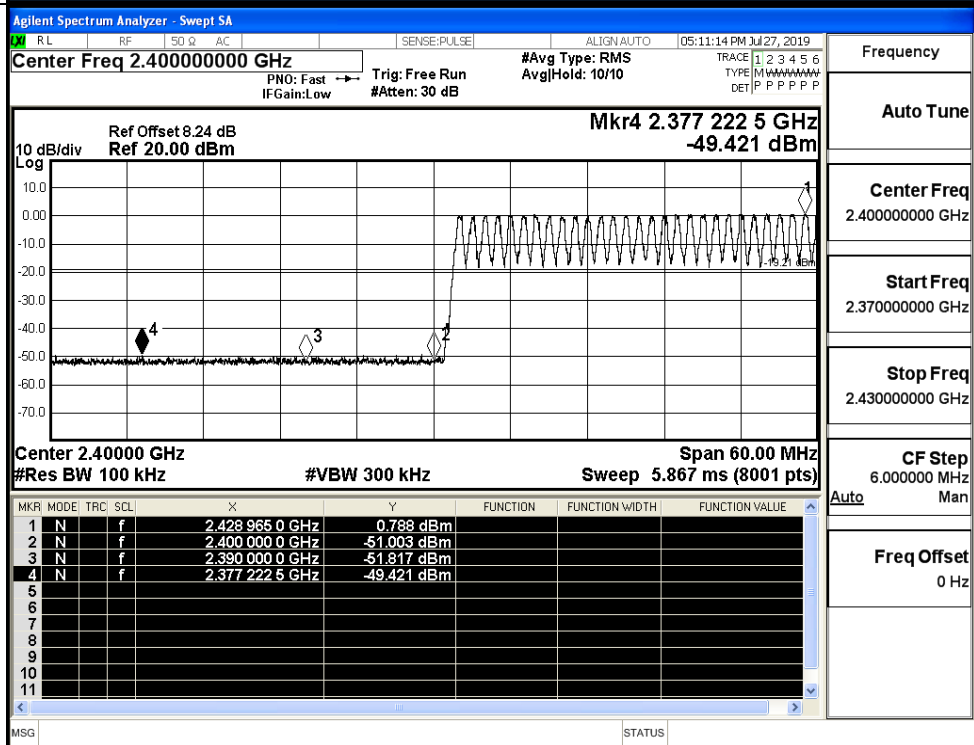
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.279	Off	-48.886	-19.72	PASS
			0.788	On	-49.421	-19.21	PASS
	HCH	2480	-0.226	Off	-49.011	-20.23	PASS
			0.777	On	-48.670	-19.22	PASS
$\pi/4$ DQPSK	LCH	2402	-1.553	Off	-49.559	-21.55	PASS
			-0.705	On	-48.060	-20.71	PASS
	HCH	2480	-1.568	Off	-49.555	-21.57	PASS
			-0.374	On	-48.835	-20.37	PASS

Test Graphs

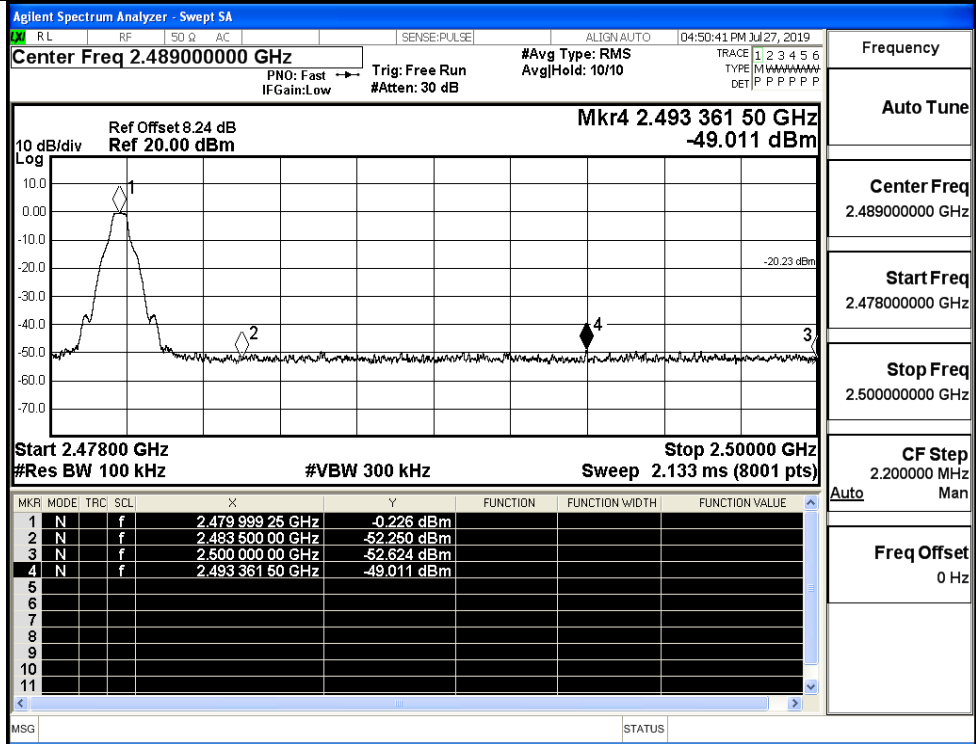
GFSK/LCH/No Hop



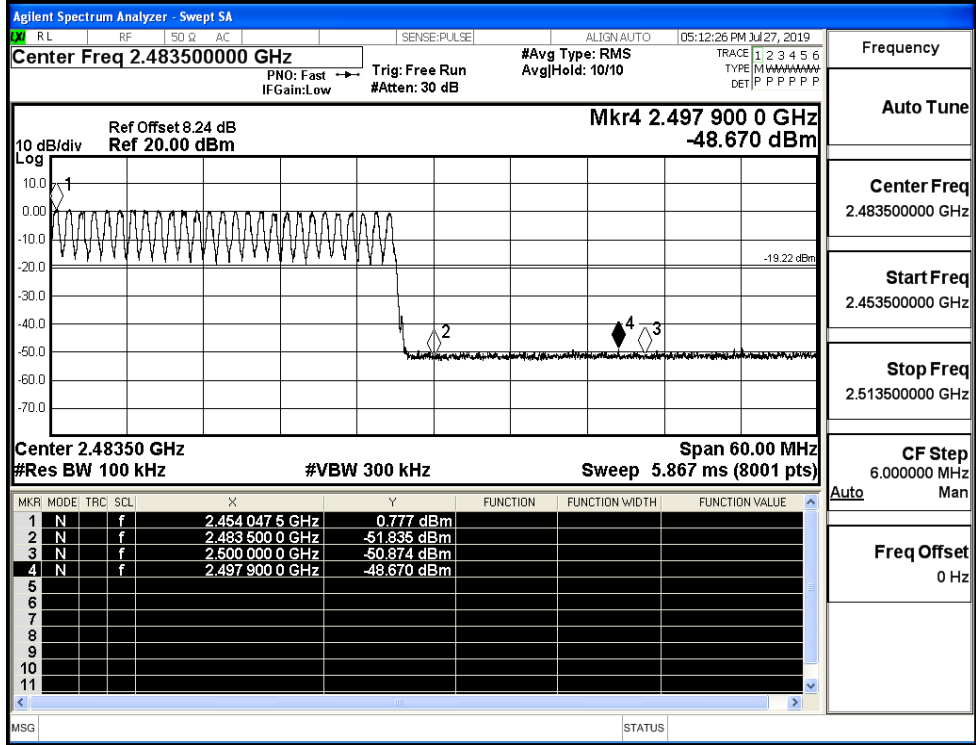
GFSK/LCH/Hop



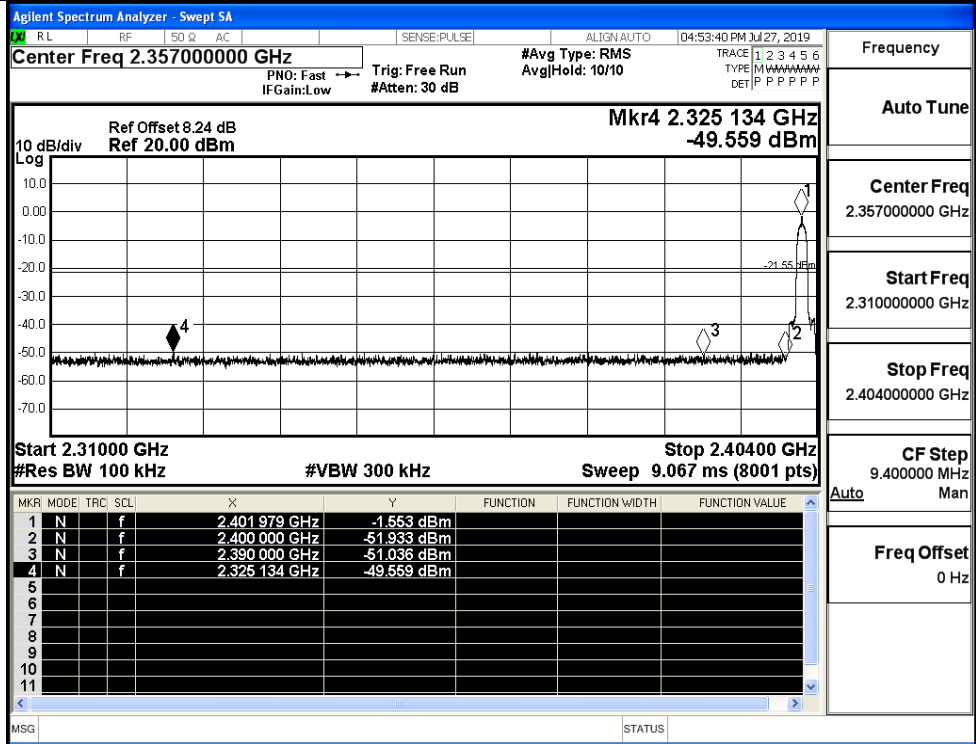
GFSK/HCH/No Hop



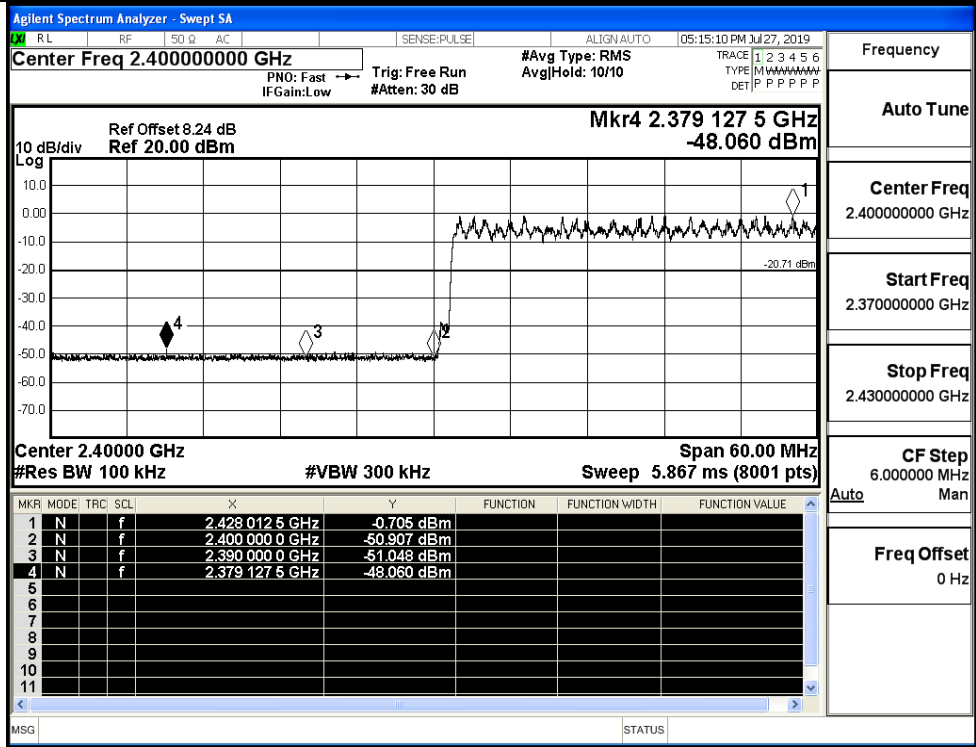
GFSK/HCH/Hop



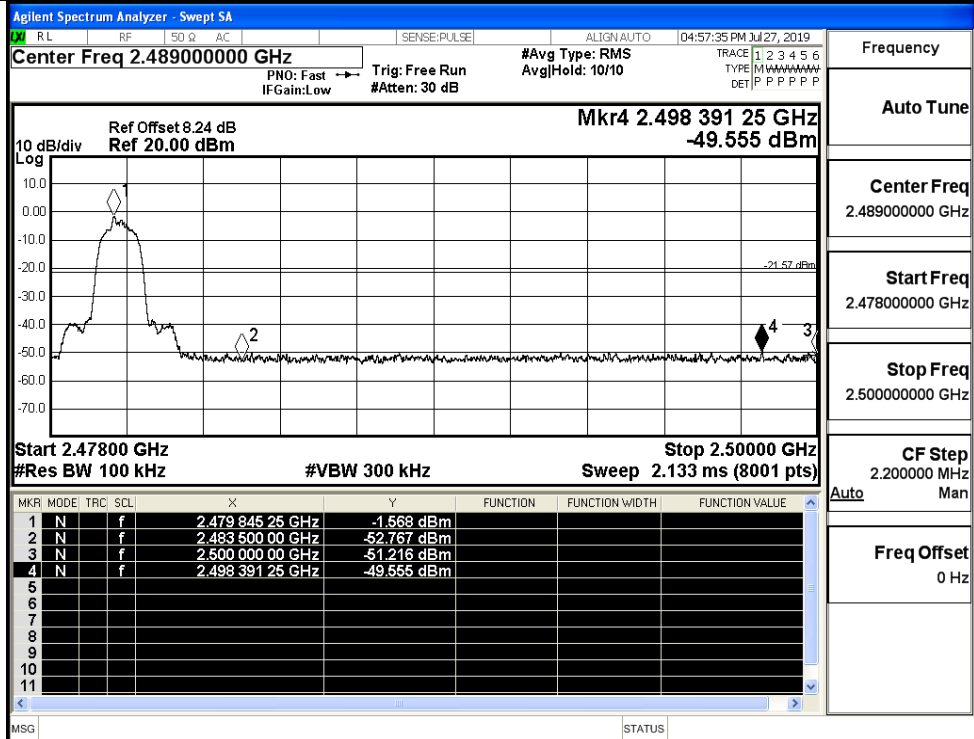
$\pi/4$ DQPSK/LCH/No Hop



$\pi/4$ DQPSK/LCH/Hop

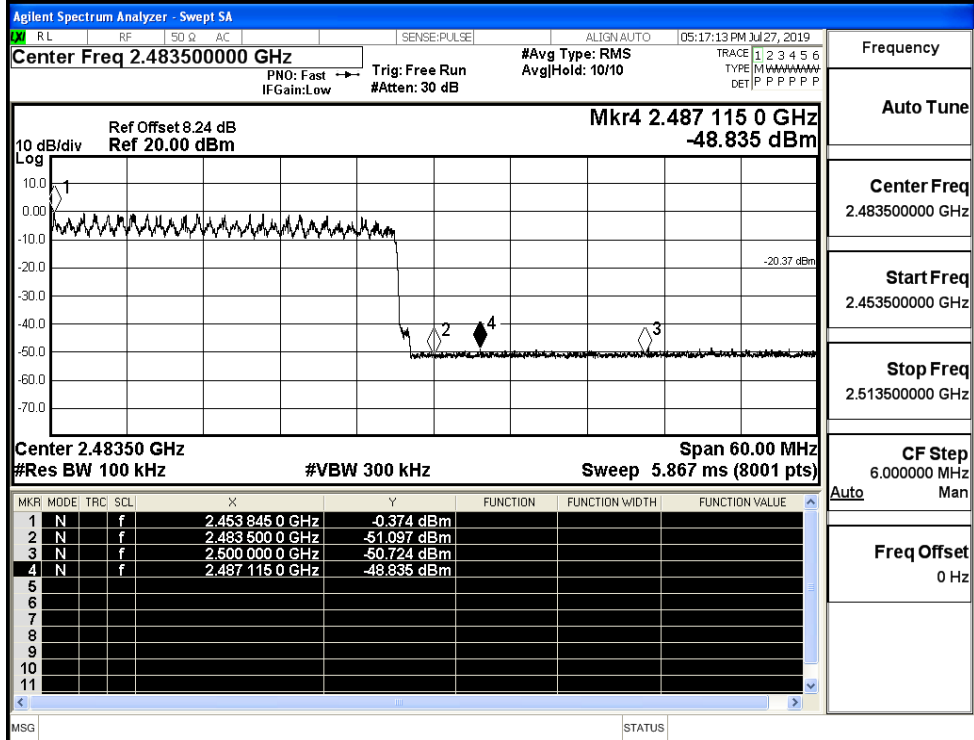


$\pi/4$ DQPSK/HCH/No
Hop



Frequency	
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Freq Offset	0 Hz

$\pi/4$ DQPSK/HCH/Hop

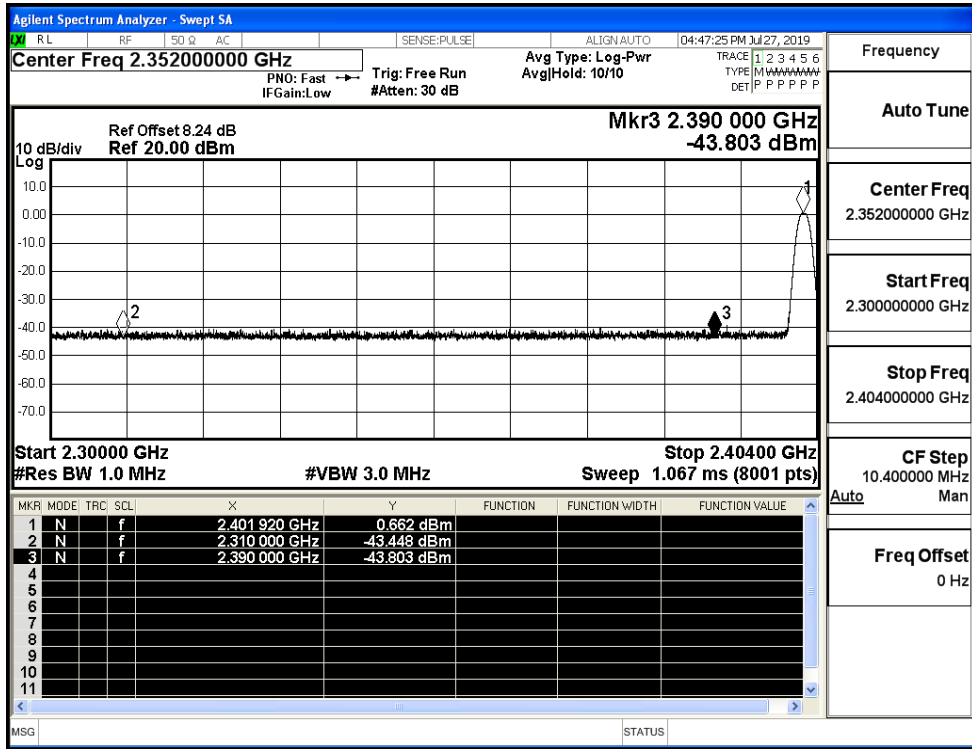


Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

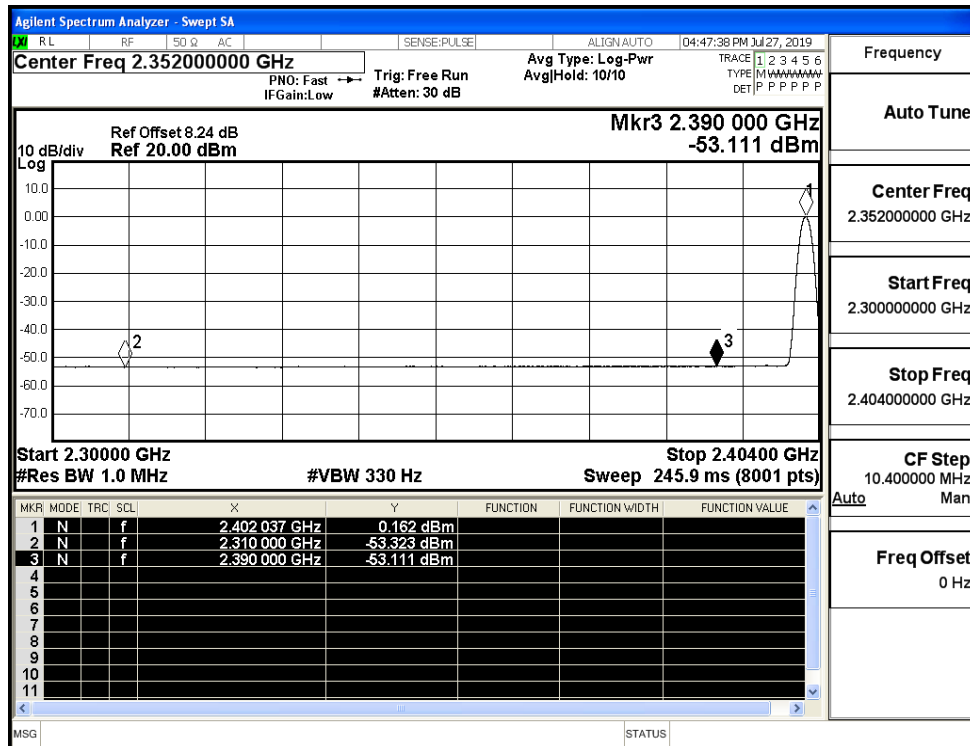
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.45	2.0	0	51.81	PEAK	74	PASS
	Off	2310.0	-53.32	2.0	0	41.93	AV	54	PASS
	Off	2390.0	-43.80	2.0	0	51.45	PEAK	74	PASS
	Off	2390.0	-53.11	2.0	0	42.15	AV	54	PASS
	Off	2483.5	-42.05	2.0	0	53.20	PEAK	74	PASS
	Off	2483.5	-52.70	2.0	0	42.55	AV	54	PASS
	Off	2500.0	-42.38	2.0	0	52.87	PEAK	74	PASS
	Off	2500.0	-52.68	2.0	0	42.58	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.52	2.0	0	52.74	PEAK	74	PASS
	Off	2310.0	-53.40	2.0	0	41.86	AV	54	PASS
	Off	2390.0	-43.84	2.0	0	51.41	PEAK	74	PASS
	Off	2390.0	-53.11	2.0	0	42.15	AV	54	PASS
	Off	2483.5	-43.42	2.0	0	51.84	PEAK	74	PASS
	Off	2483.5	-52.66	2.0	0	42.59	AV	54	PASS
	Off	2500.0	-43.19	2.0	0	52.07	PEAK	74	PASS
	Off	2500.0	-52.73	2.0	0	42.53	AV	54	PASS

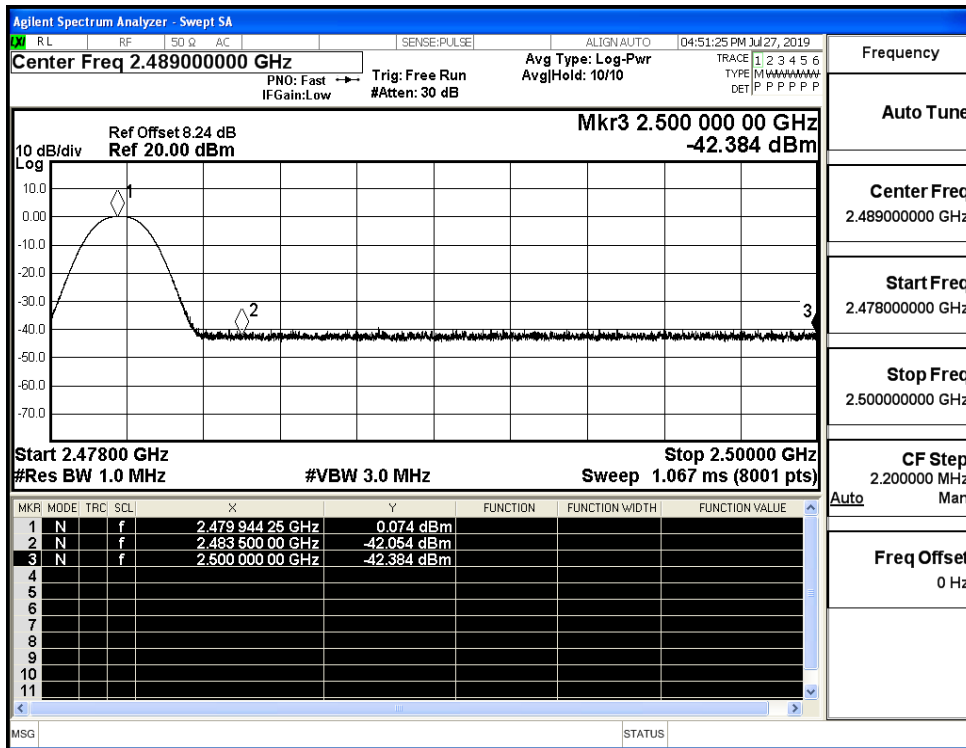
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



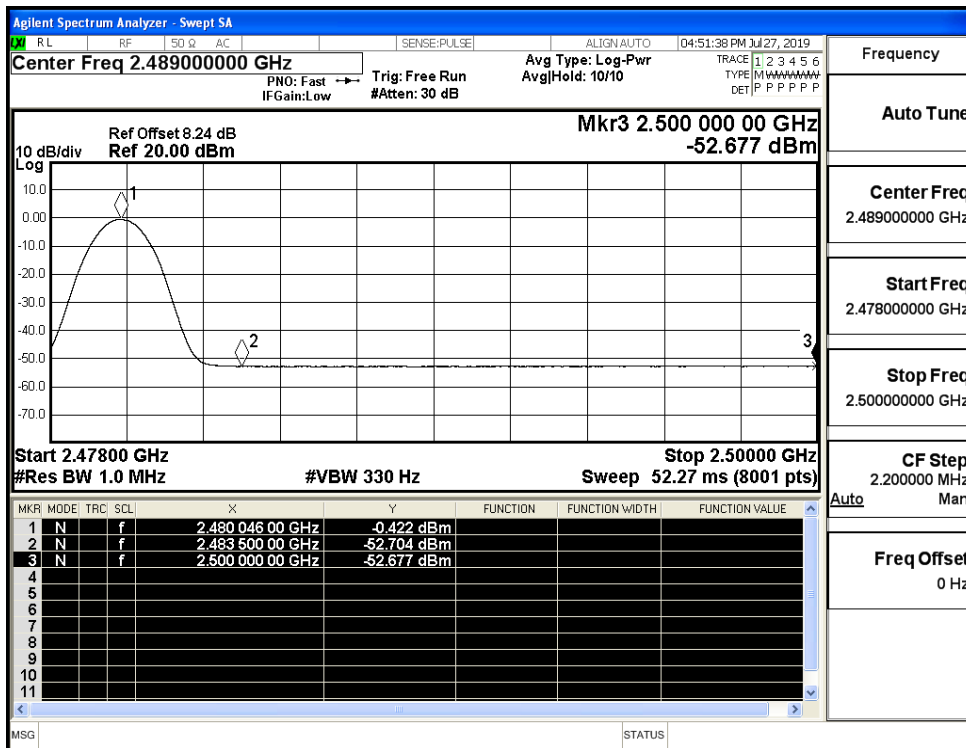
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



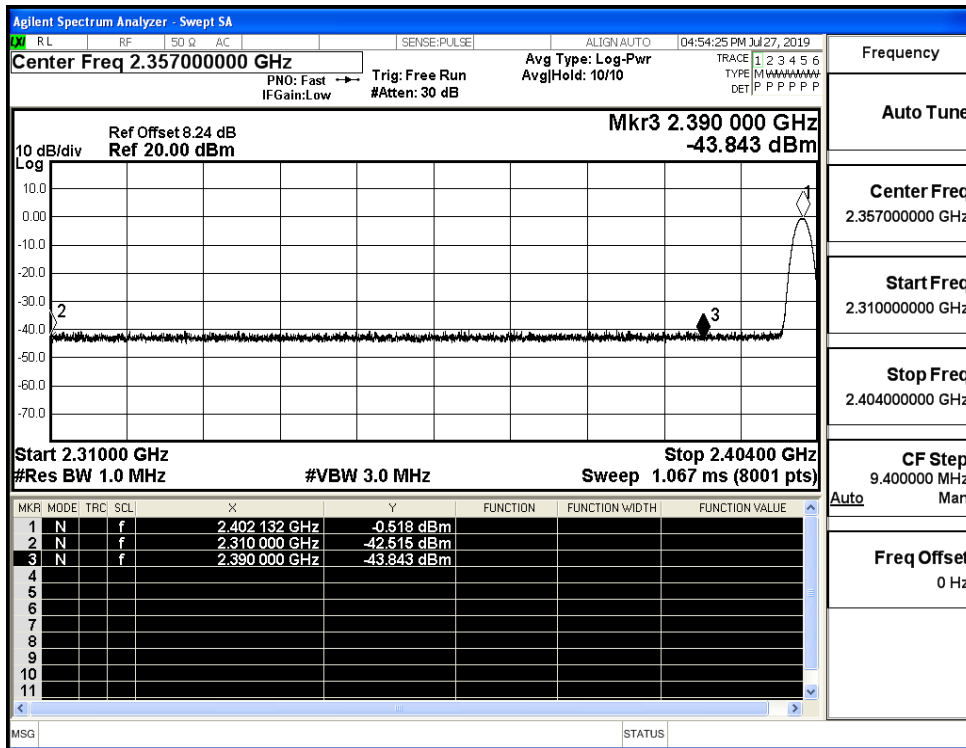
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



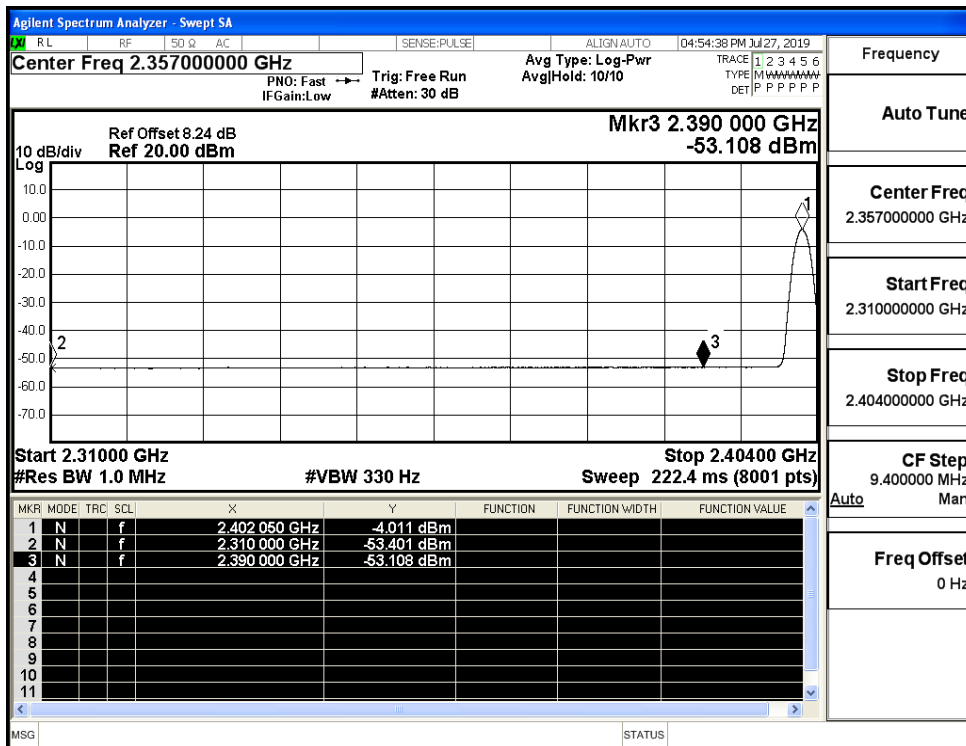
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



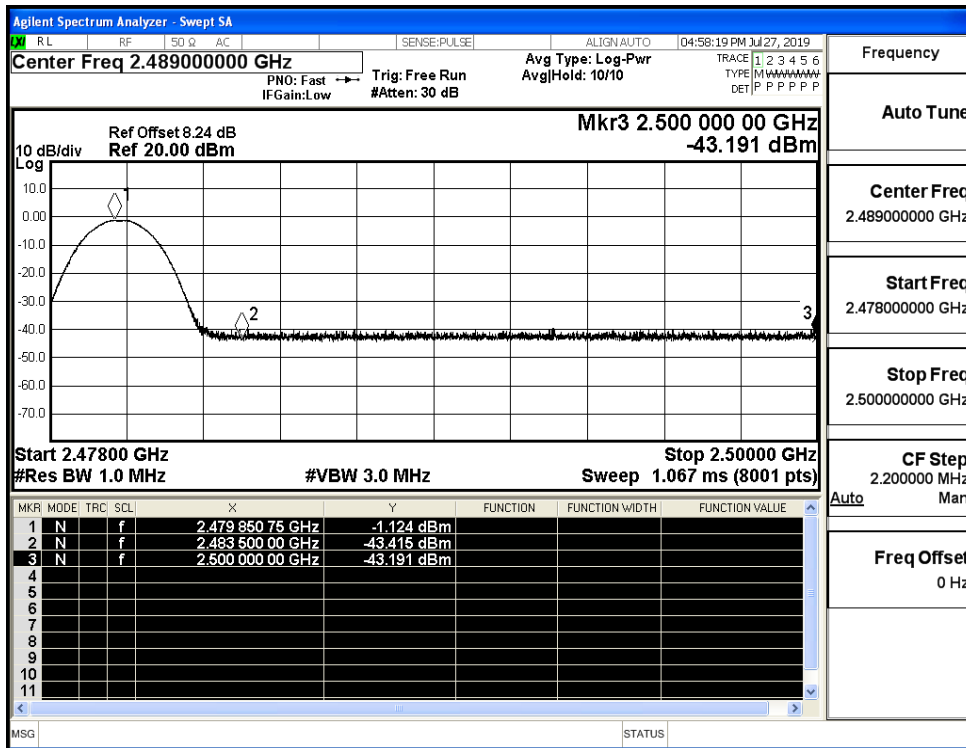
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



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)

