

Appendix A

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

Product Name: BT510ANC On Ear Wireless Headphone

Trade Mark: Monoprice, IIIP

Test Model: 34439

Environmental Conditions

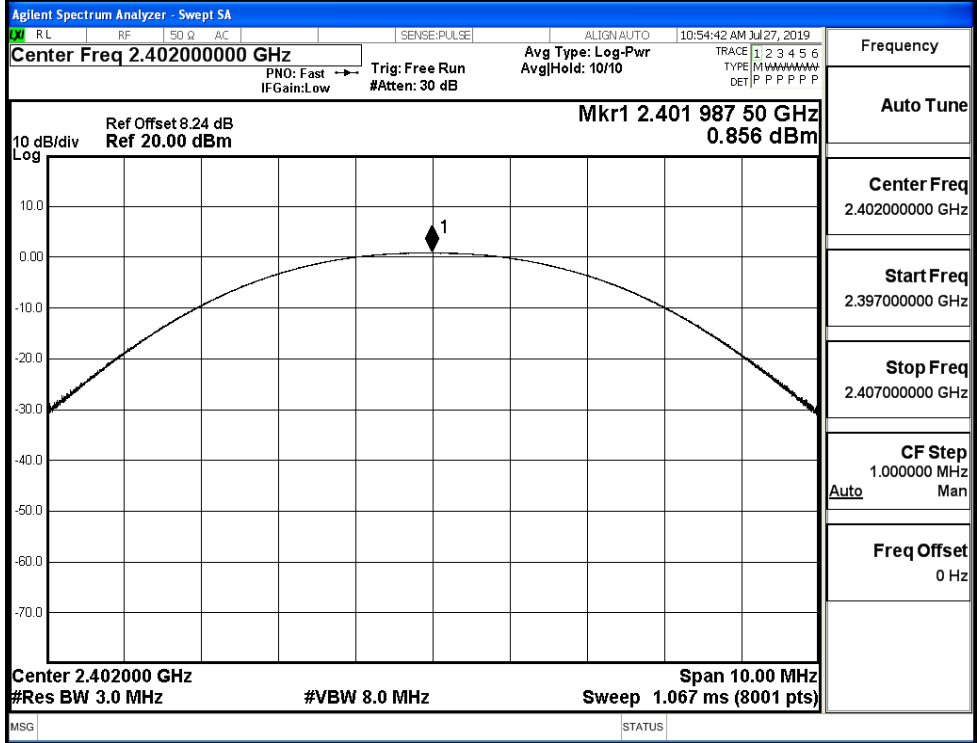
Temperature:	24.5 ° C
Relative Humidity:	53.6%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.ZENG
Supervised by:	Wang.Chuang

A.1 Maxmum Conducted Peak Output Power

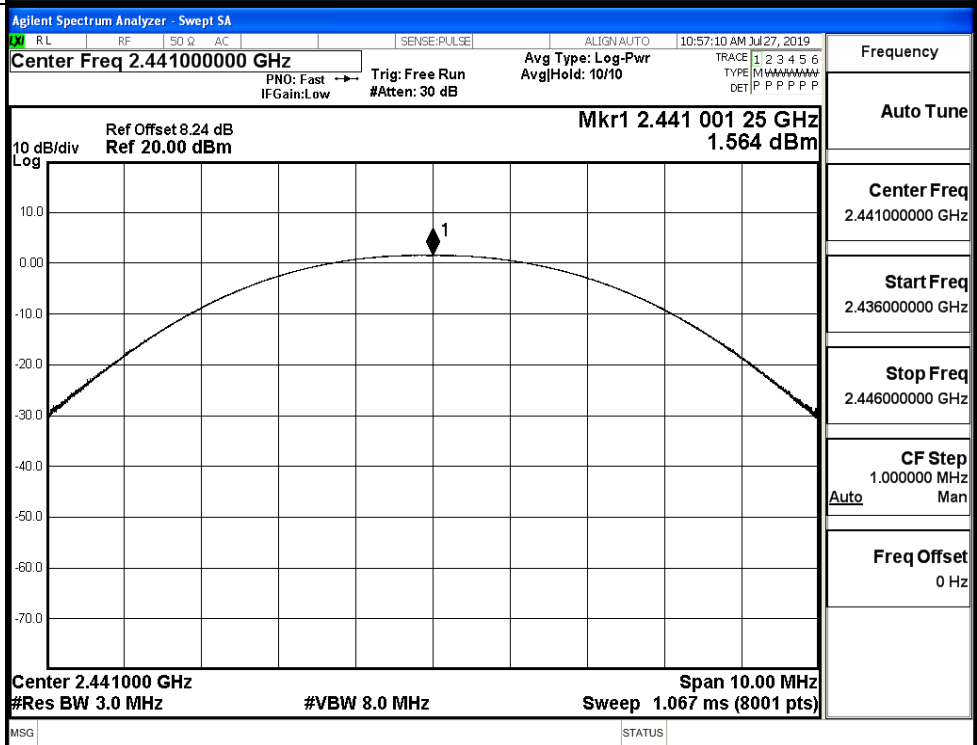
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.856	30	PASS
	MCH	1.564	30	PASS
	HCH	0.228	30	PASS
$\pi/4$ DQPSK	LCH	0.054	21	PASS
	MCH	0.737	21	PASS
	HCH	-0.556	21	PASS
8DPSK	LCH	0.162	21	PASS
	MCH	0.911	21	PASS
	HCH	-0.424	21	PASS

Test Graphs

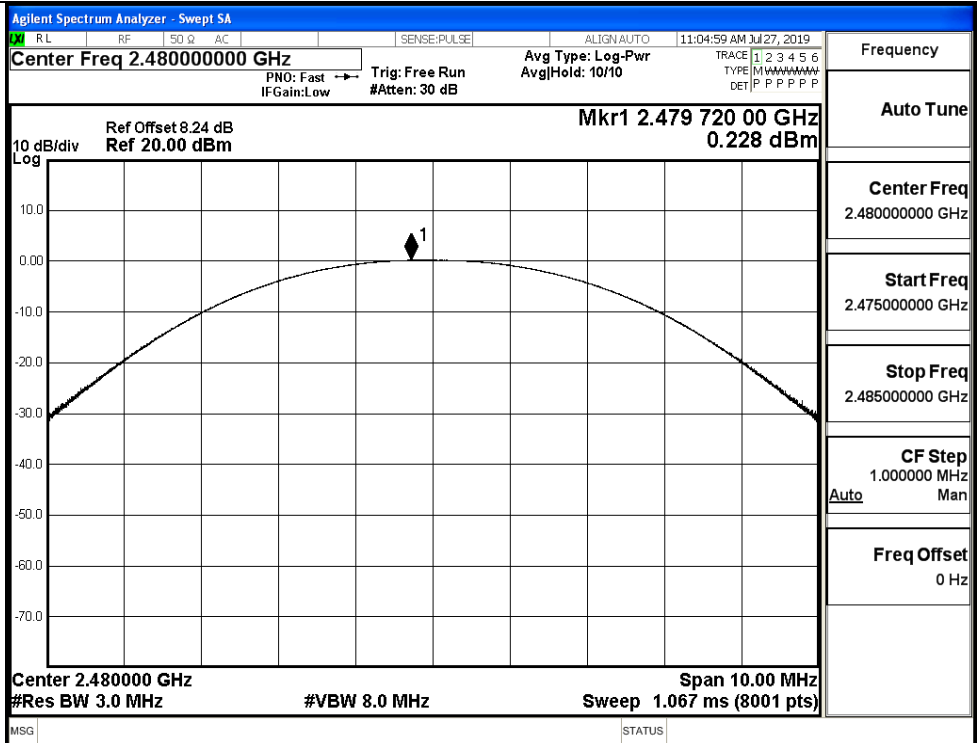
GFSK/LCH



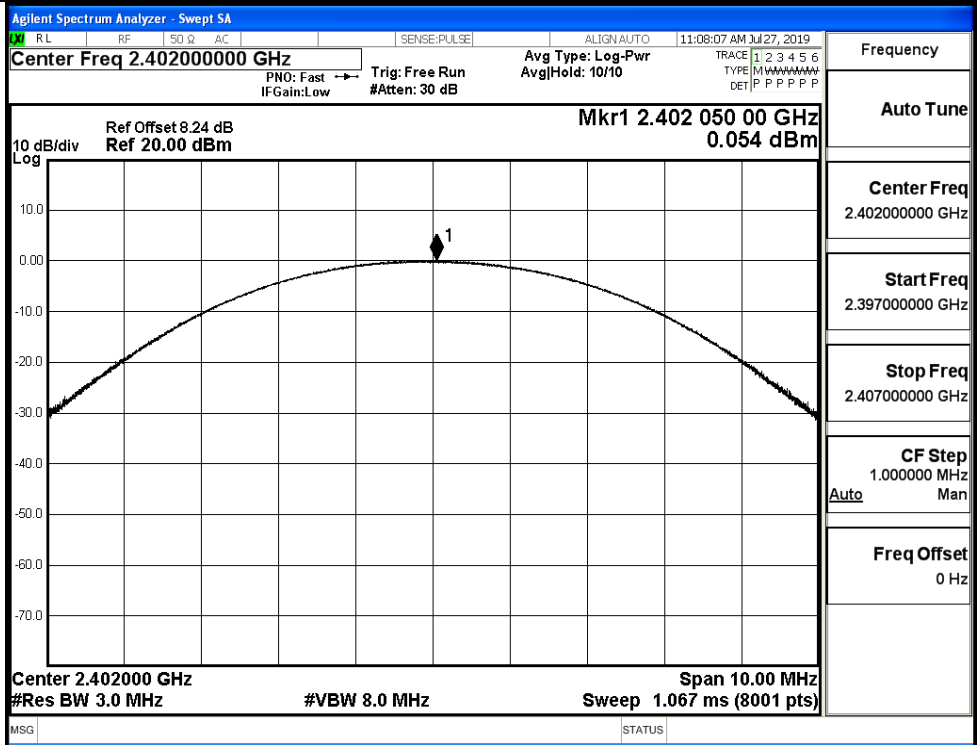
GFSK/MCH



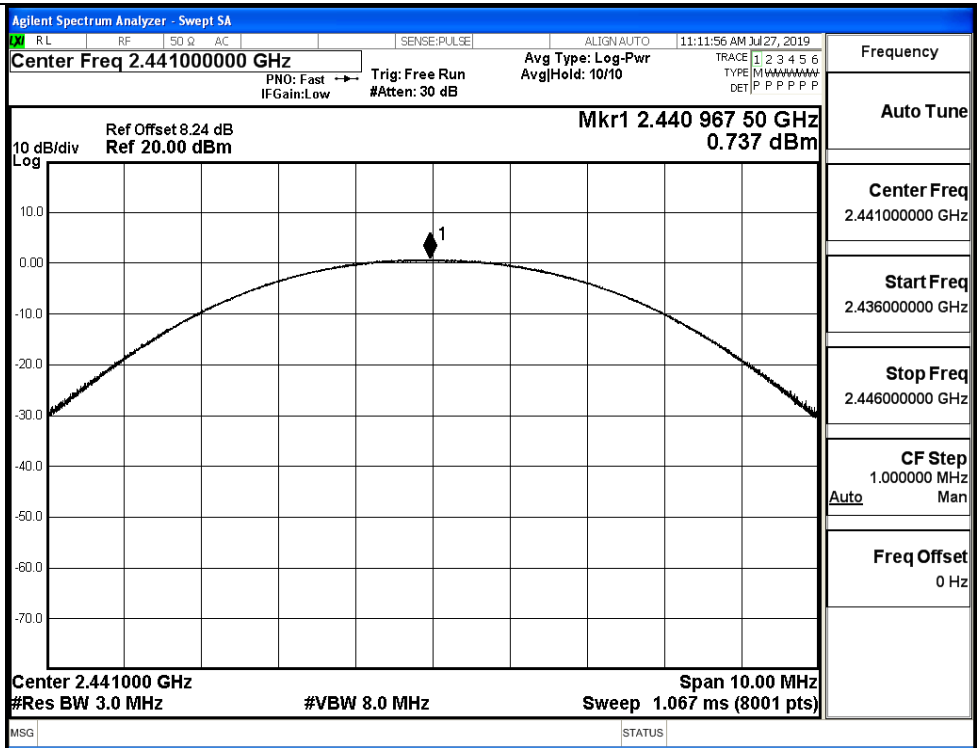
GFSK/HCH



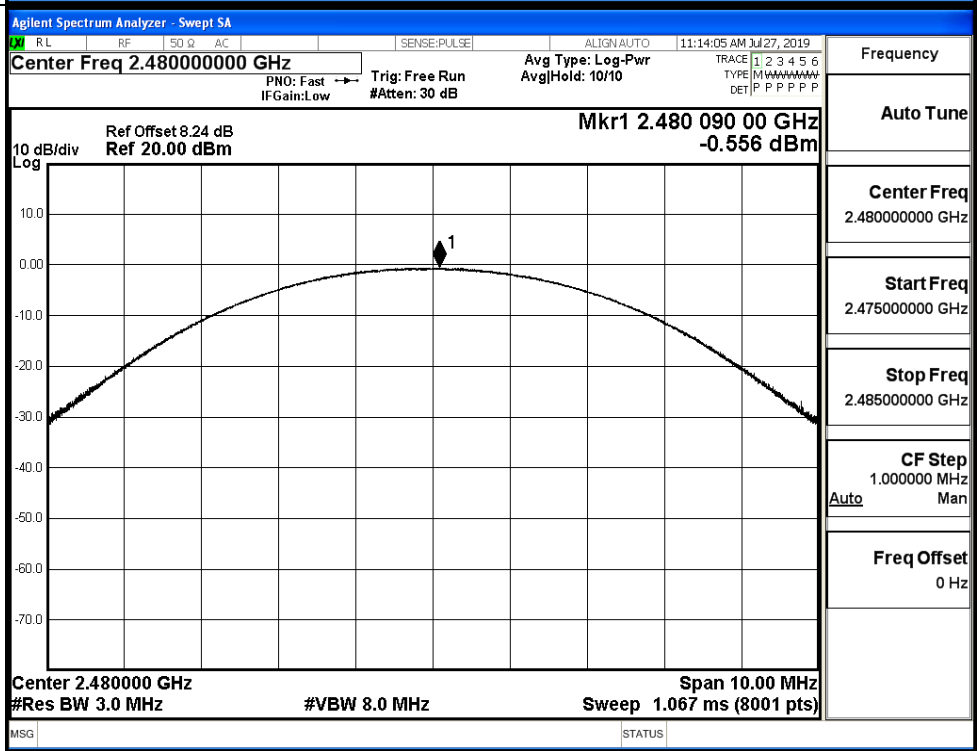
π /4DQPSK/LCH



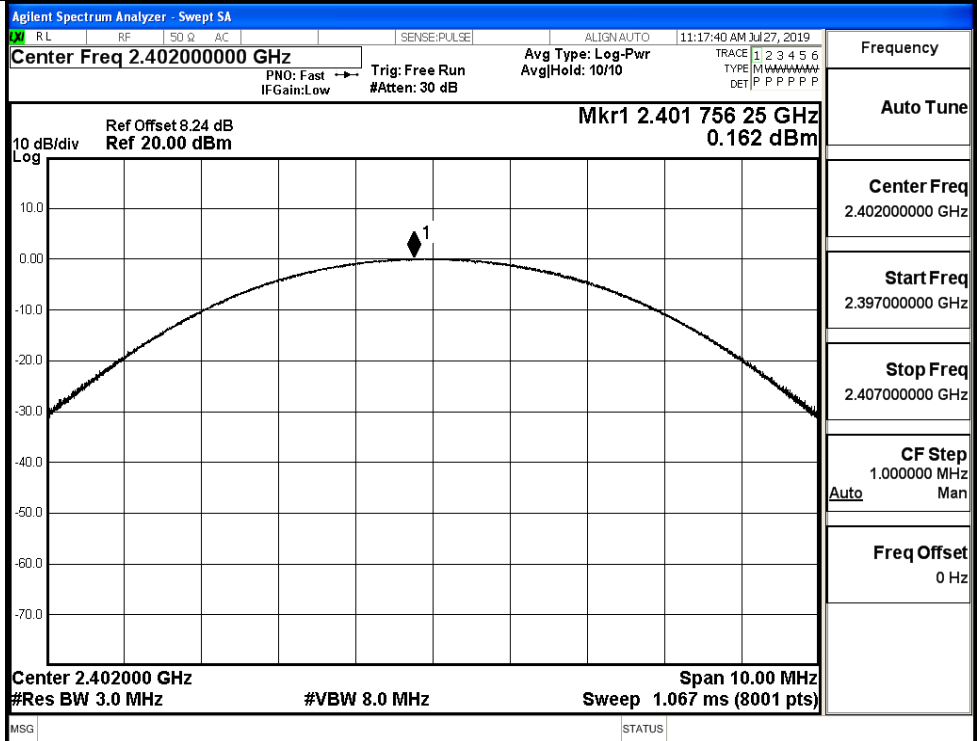
π /4DQPSK/MCH



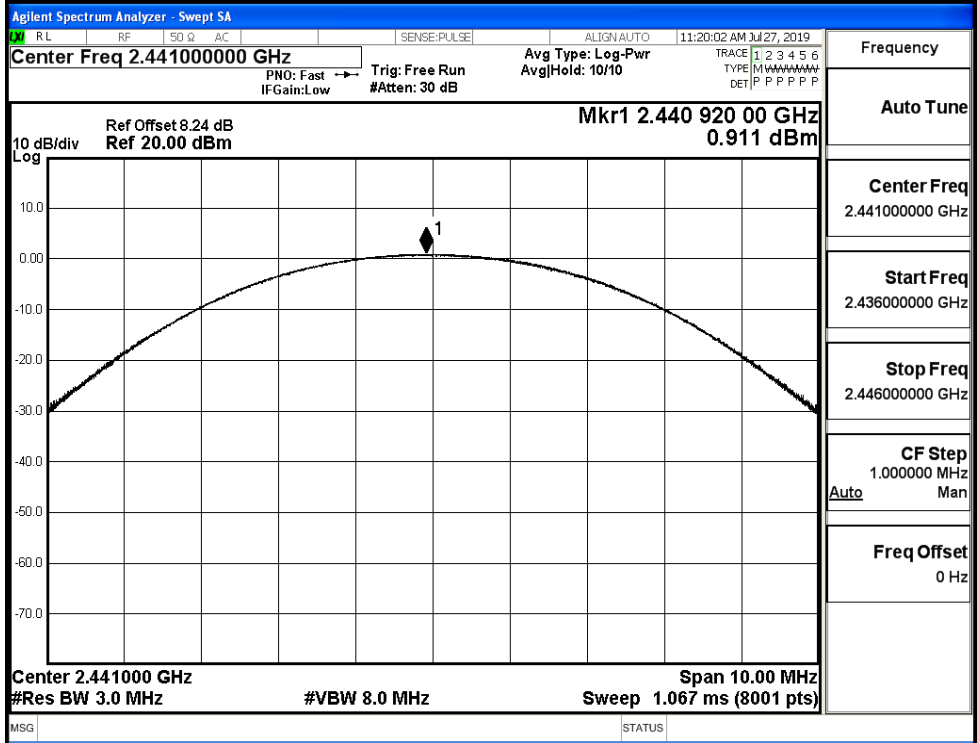
π /4DQPSK/HCH



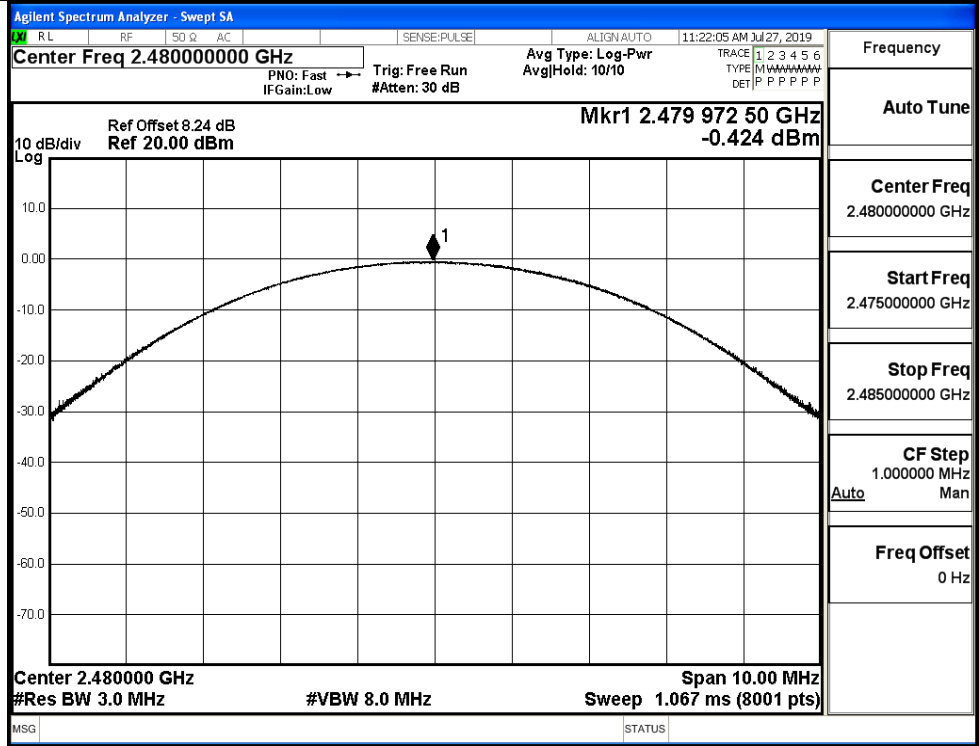
8DPSK/LCH



8DPSK/MCH

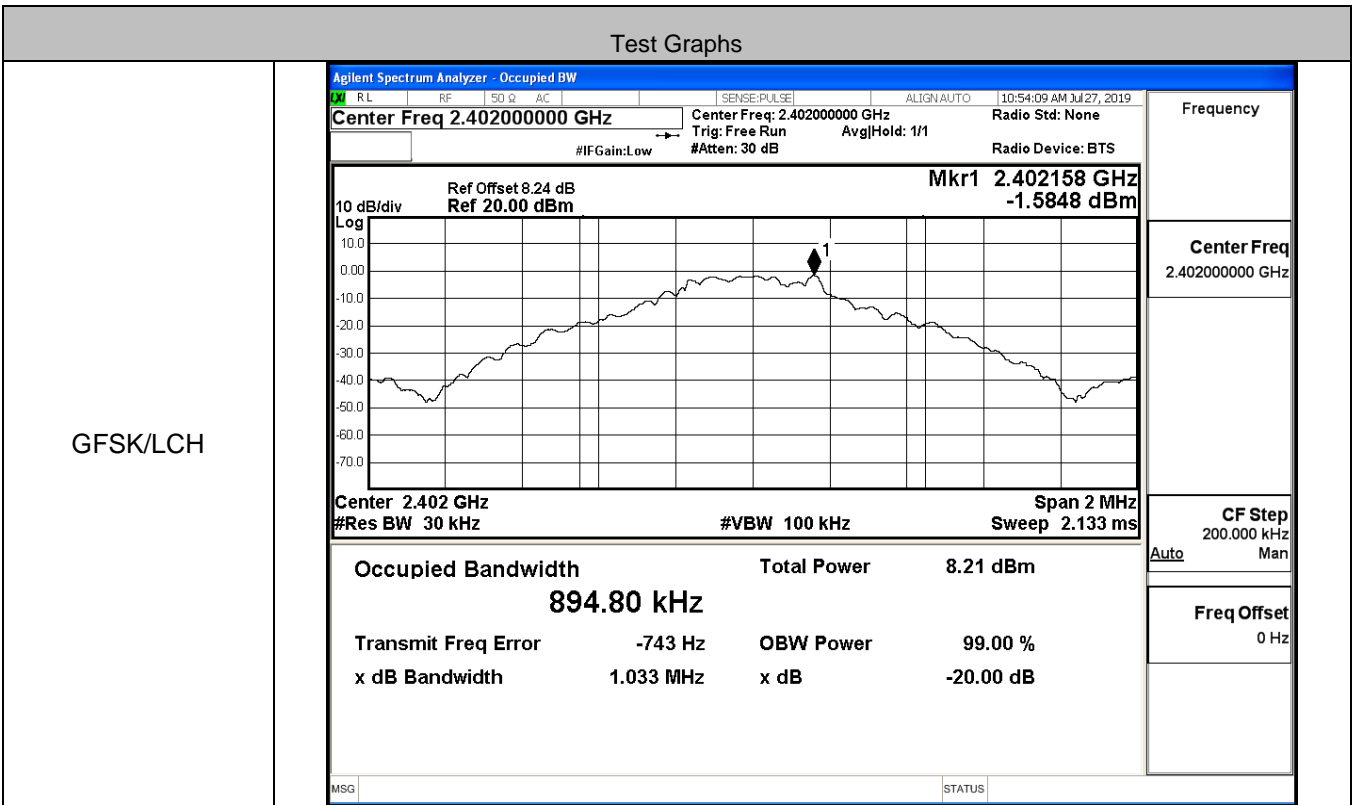


8DPSK/HCH

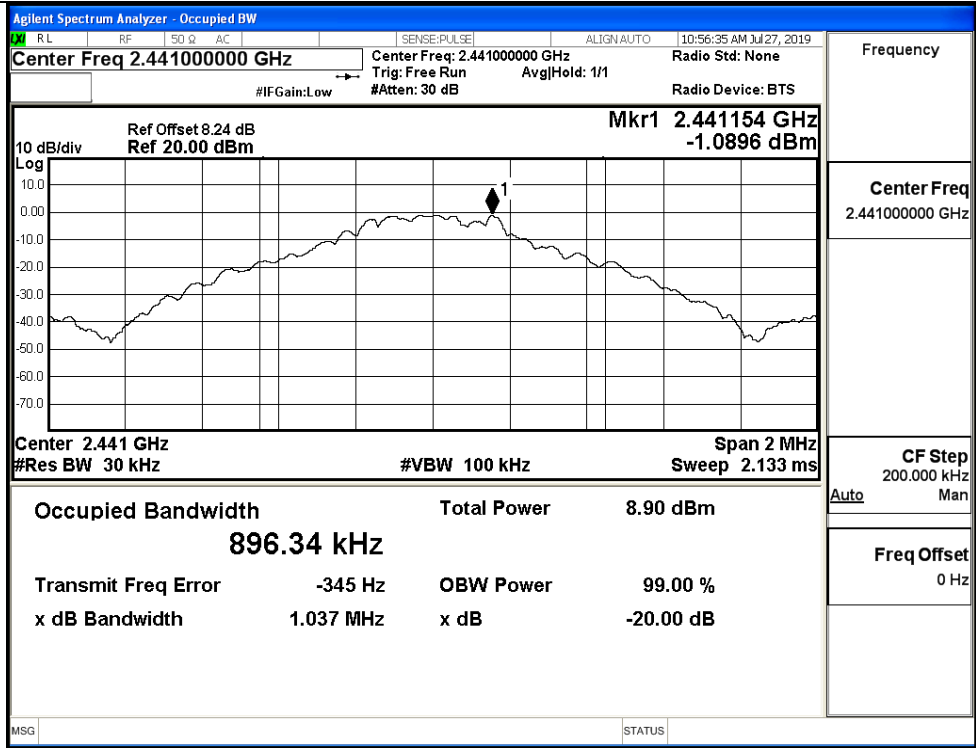


A.2 20dB Bandwidth

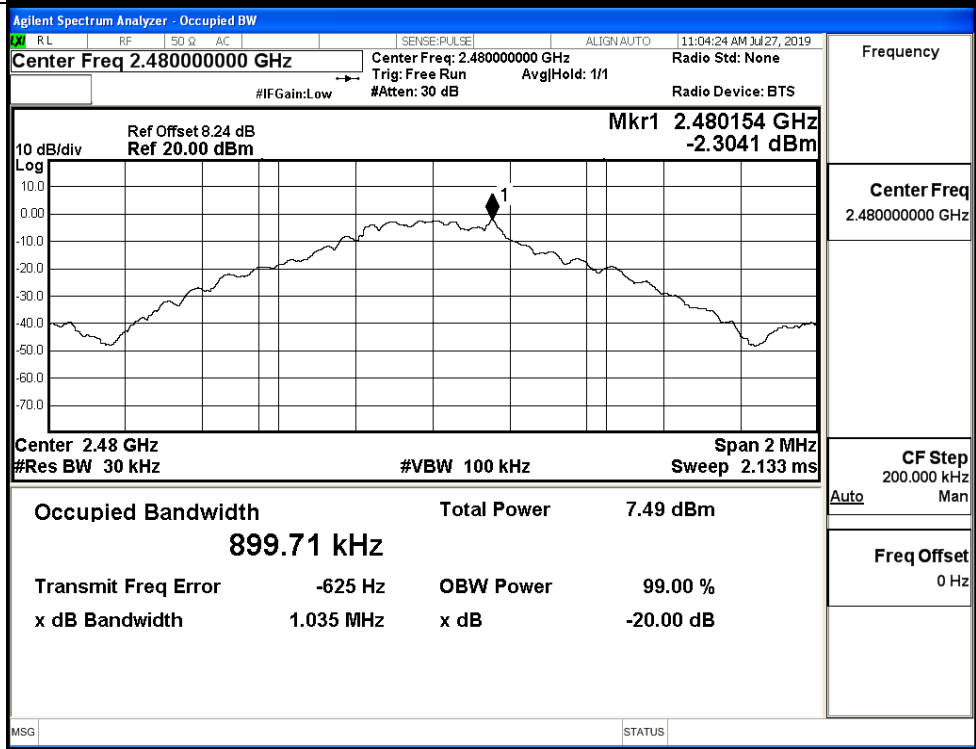
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.033	Not Specified	PASS
	MCH	1.037	Not Specified	PASS
	HCH	1.035	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.289	Not Specified	PASS
	MCH	1.290	Not Specified	PASS
	HCH	1.287	Not Specified	PASS
8DPSK	LCH	1.291	Not Specified	PASS
	MCH	1.293	Not Specified	PASS
	HCH	1.294	Not Specified	PASS



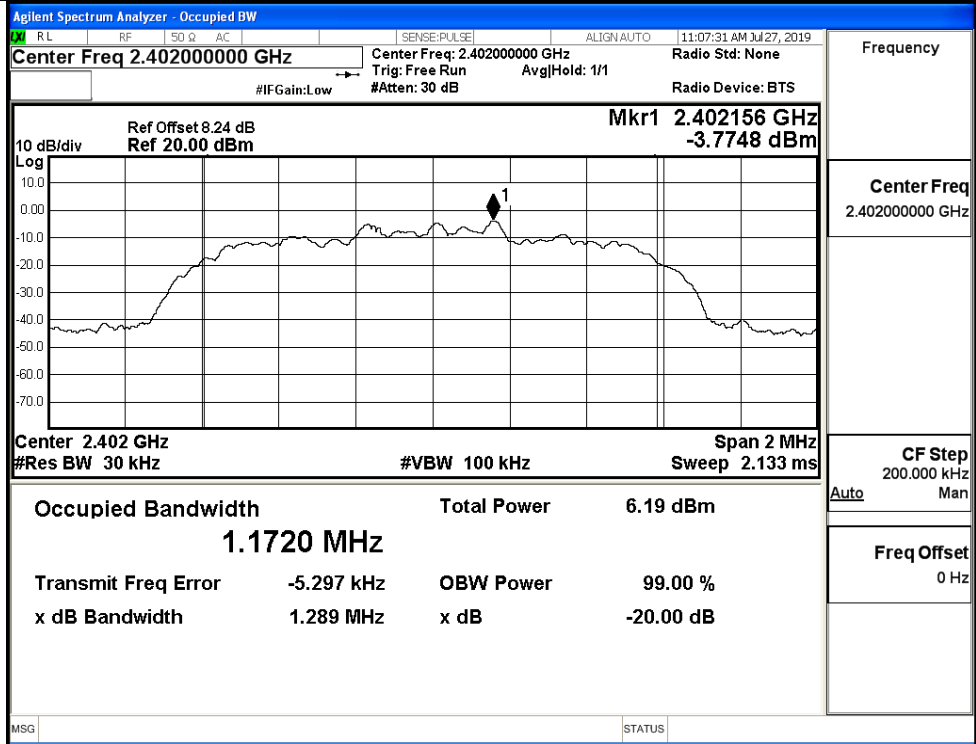
GFSK/MCH



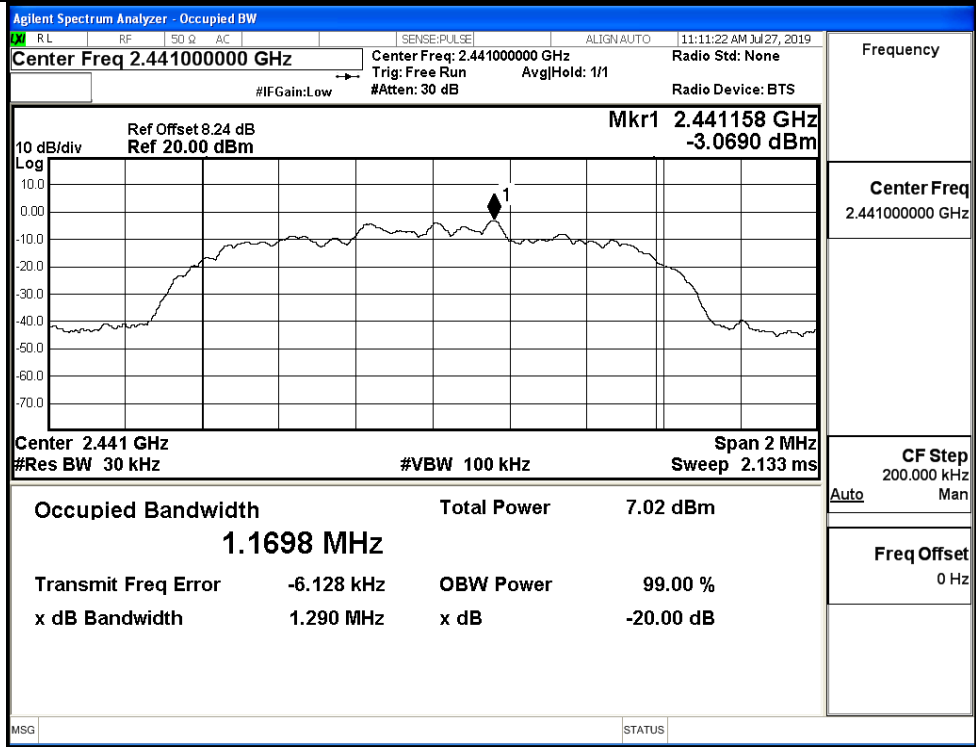
GFSK/HCH



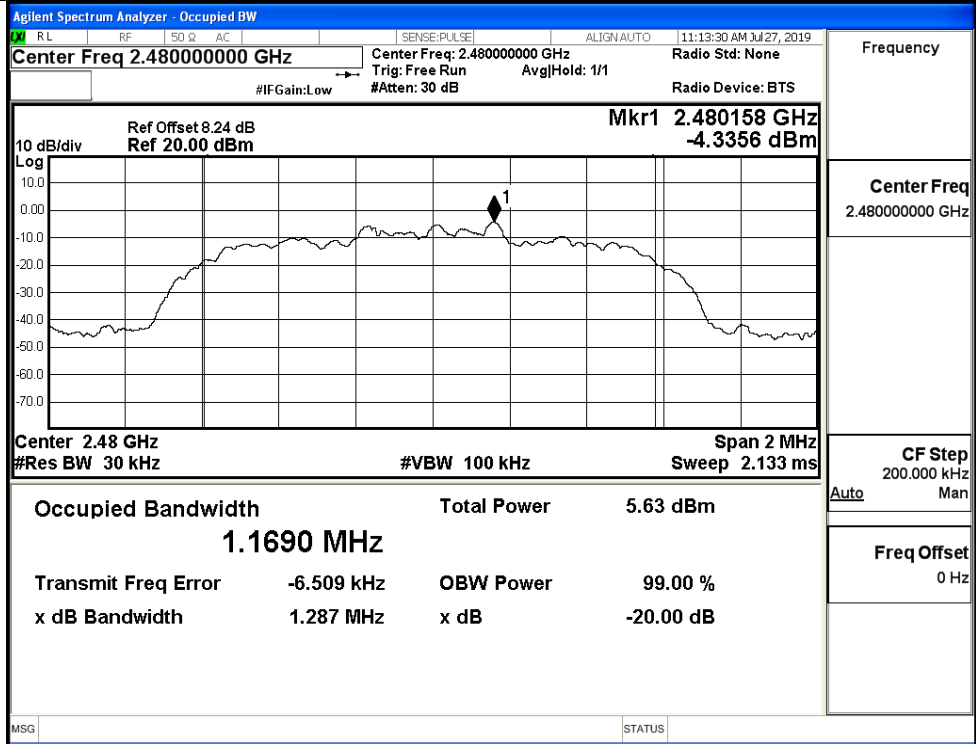
$\pi/4$ DQPSK/LCH



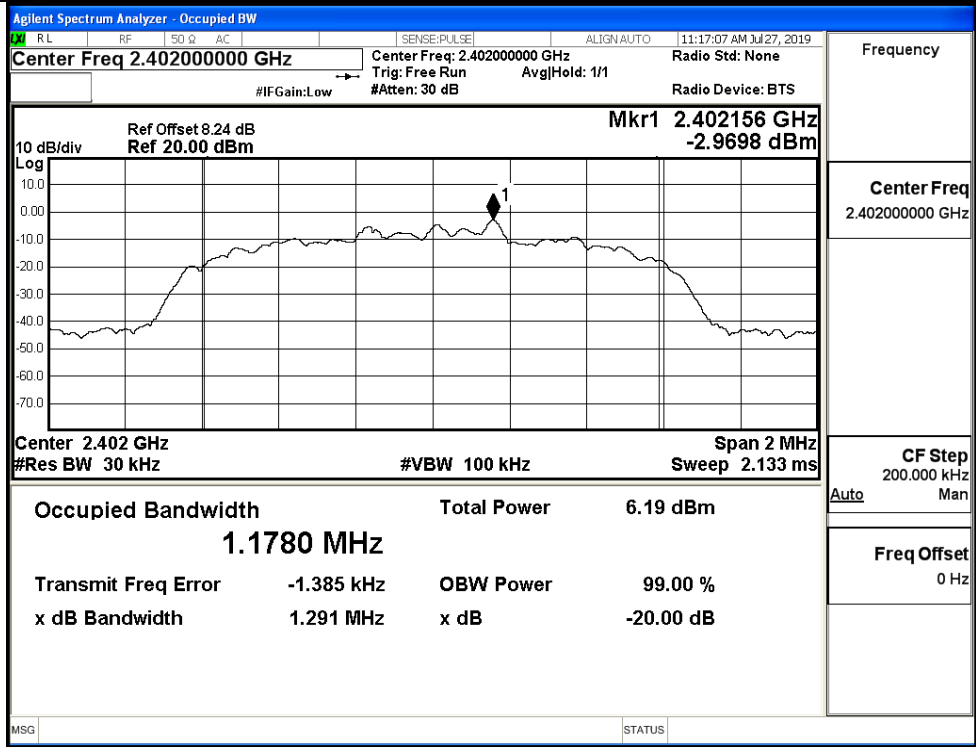
$\pi/4$ DQPSK/MCH



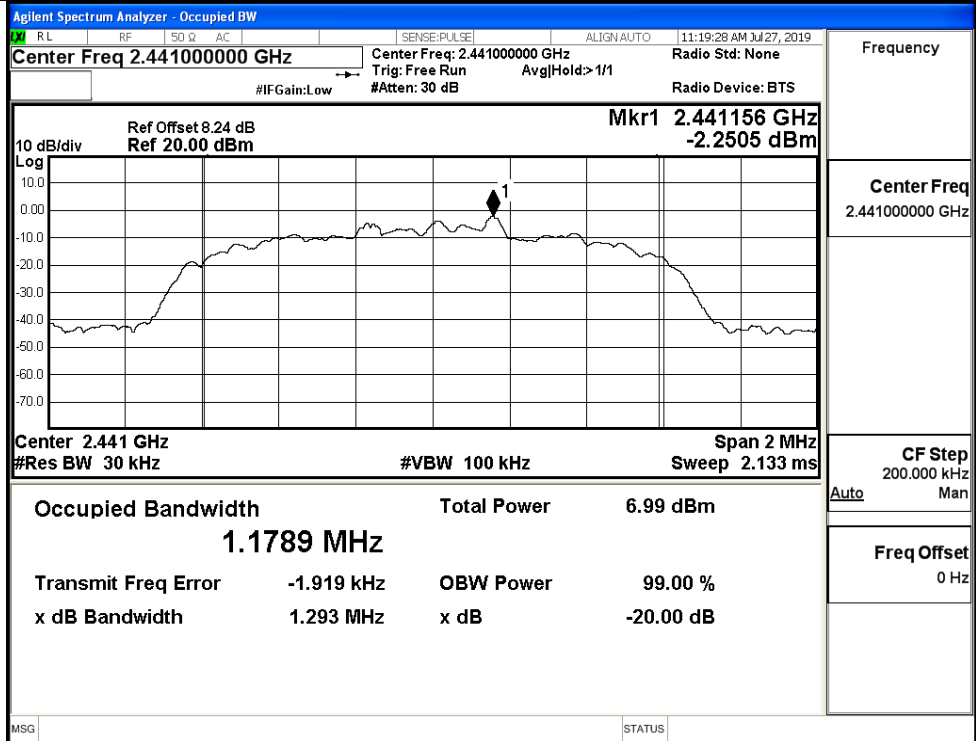
$\pi/4$ DQPSK/HCH



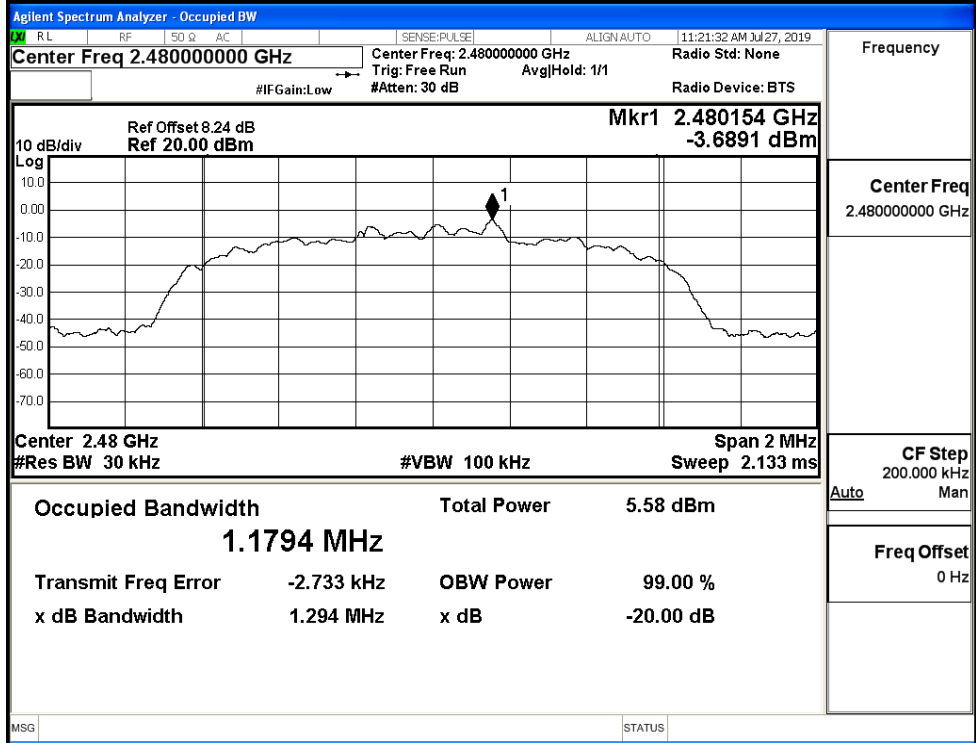
8DPSK/LCH



8DPSK/MCH

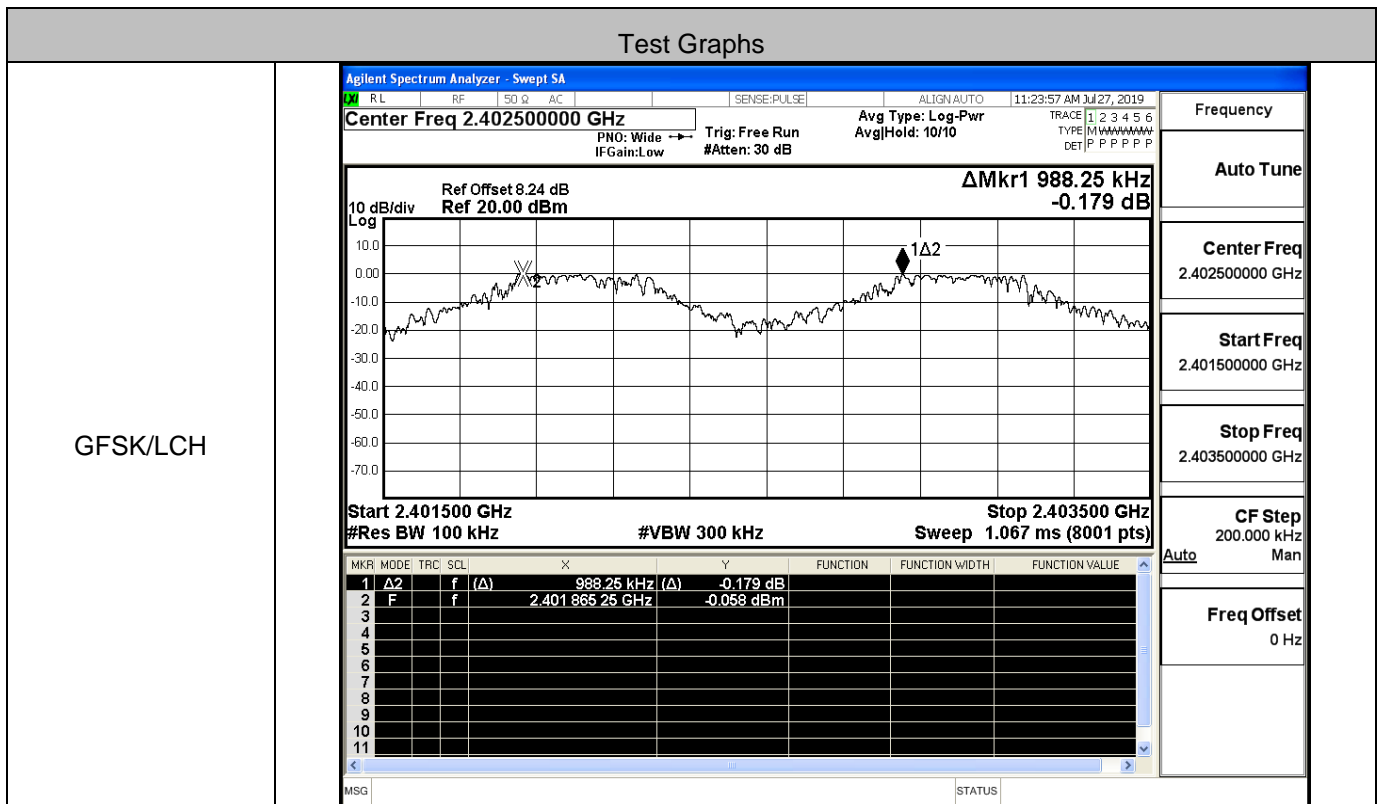


8DPSK/HCH

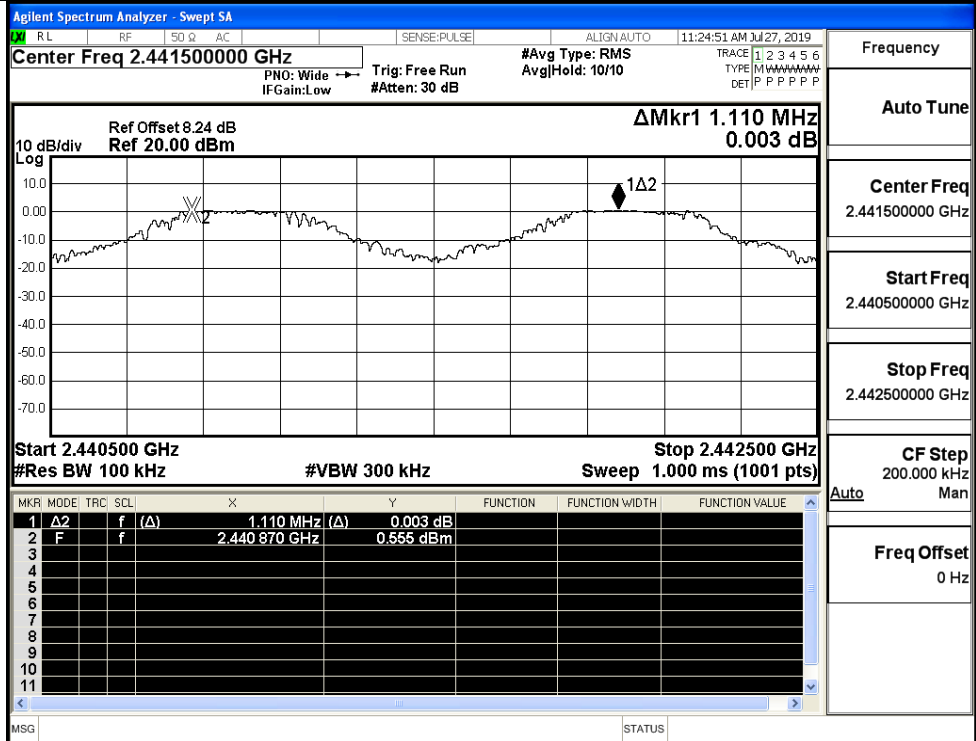


A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.988	0.691	PASS
	MCH	1.110	0.691	PASS
	HCH	1.038	0.691	PASS
π/4DQPSK	LCH	1.016	0.860	PASS
	MCH	0.872	0.860	PASS
	HCH	0.930	0.860	PASS
8DPSK	LCH	1.324	0.863	PASS
	MCH	1.208	0.863	PASS
	HCH	1.210	0.863	PASS



GFSK/MCH



Frequency

Auto Tune

Center Freq

2.441500000 GHz

Start Freq

2.440500000 GHz

Stop Freq

2.442500000 GHz

CF Step

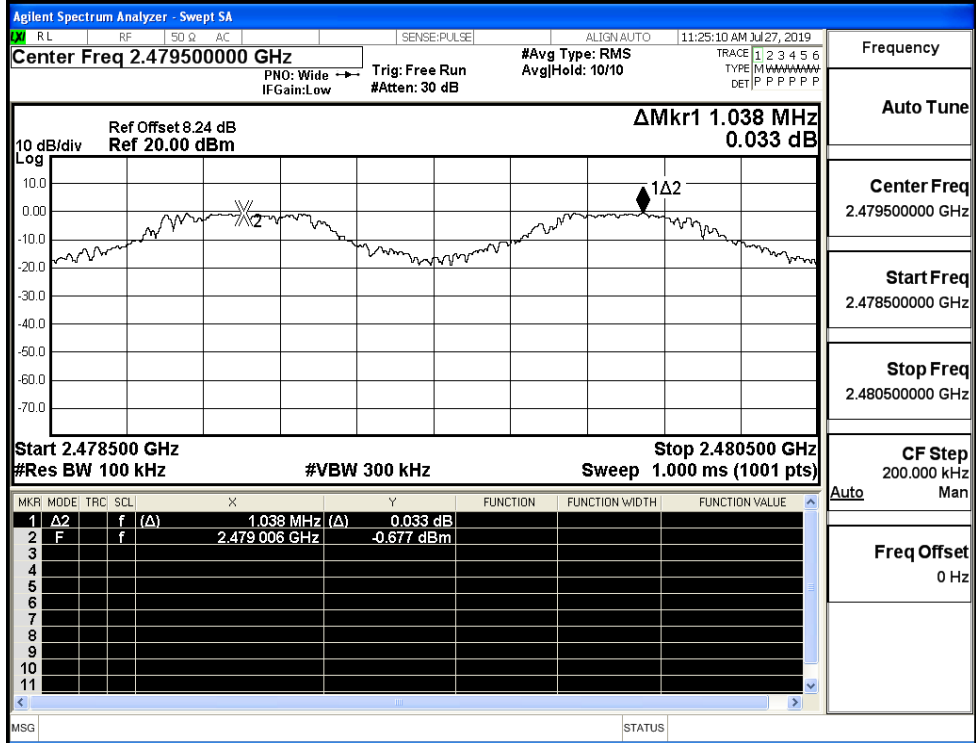
200.000 kHz

Auto

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

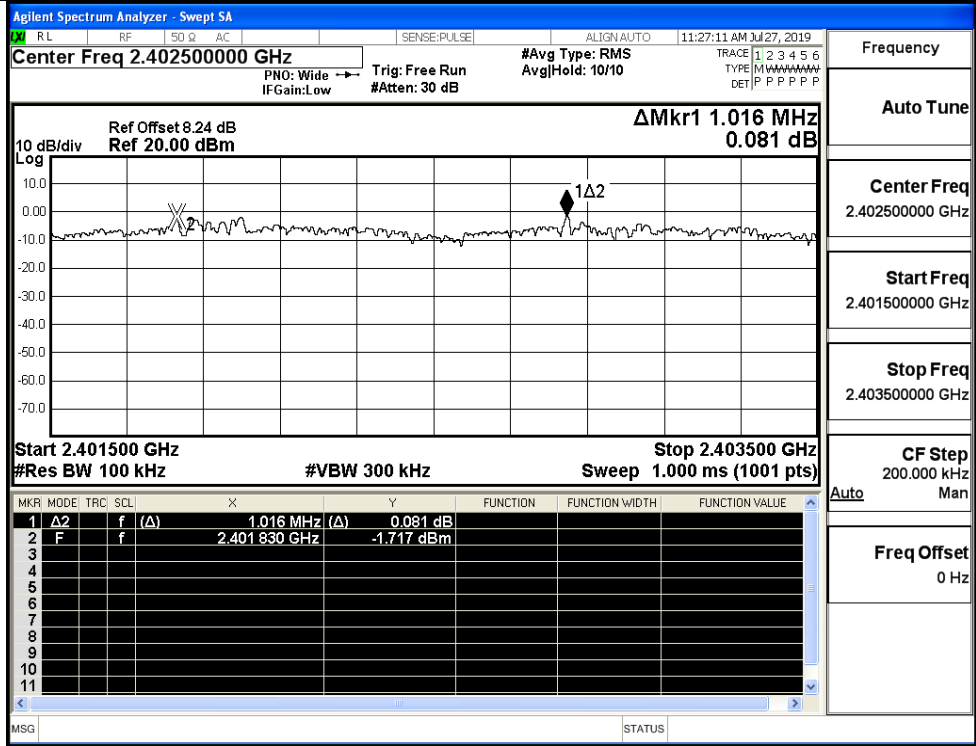
200.000 kHz

Auto

Freq Offset

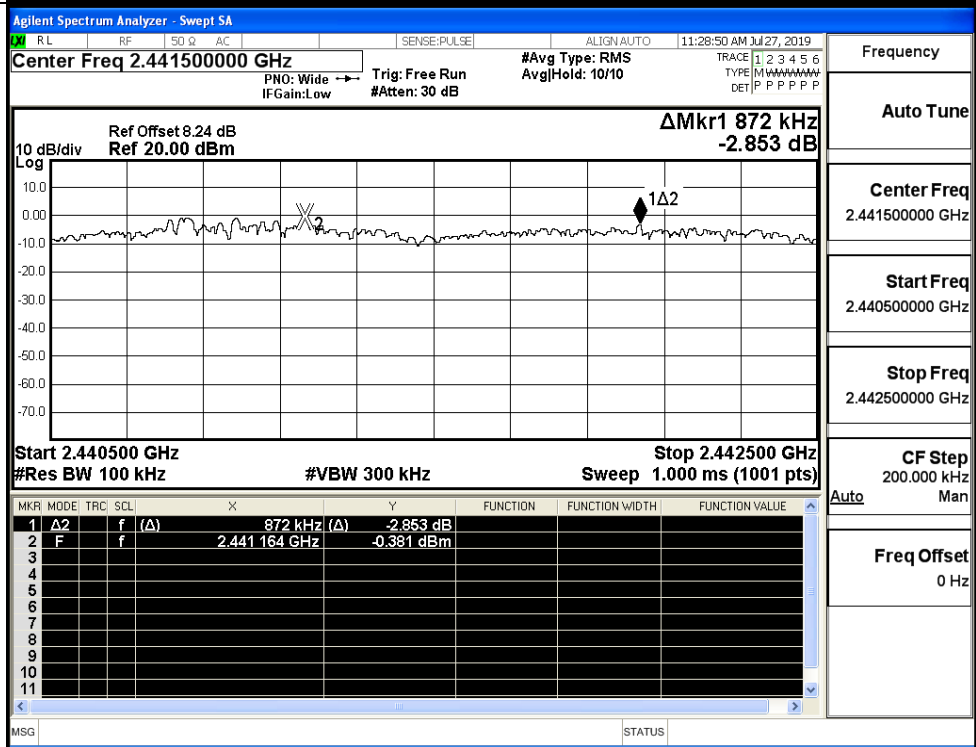
0 Hz

$\pi/4$ DQPSK/LCH



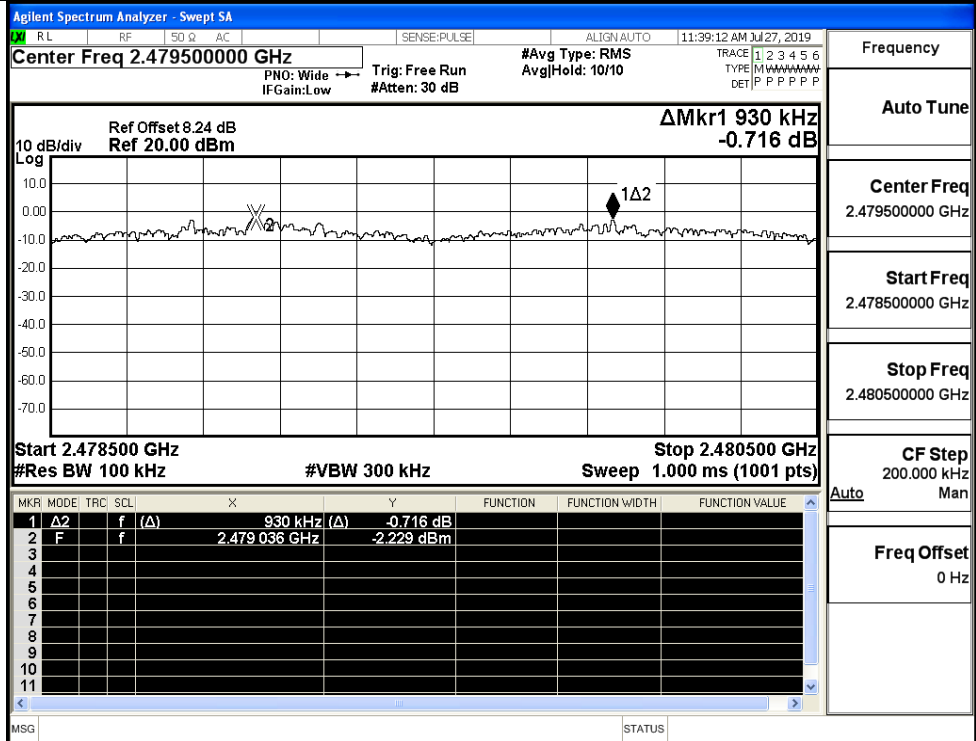
Frequency
Auto Tune
Center Freq 2.402500000 GHz
Start Freq 2.401500000 GHz
Stop Freq 2.403500000 GHz
CF Step 200.000 kHz Auto
Freq Offset 0 Hz

$\pi/4$ 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 Auto
Freq Offset 0 Hz

π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

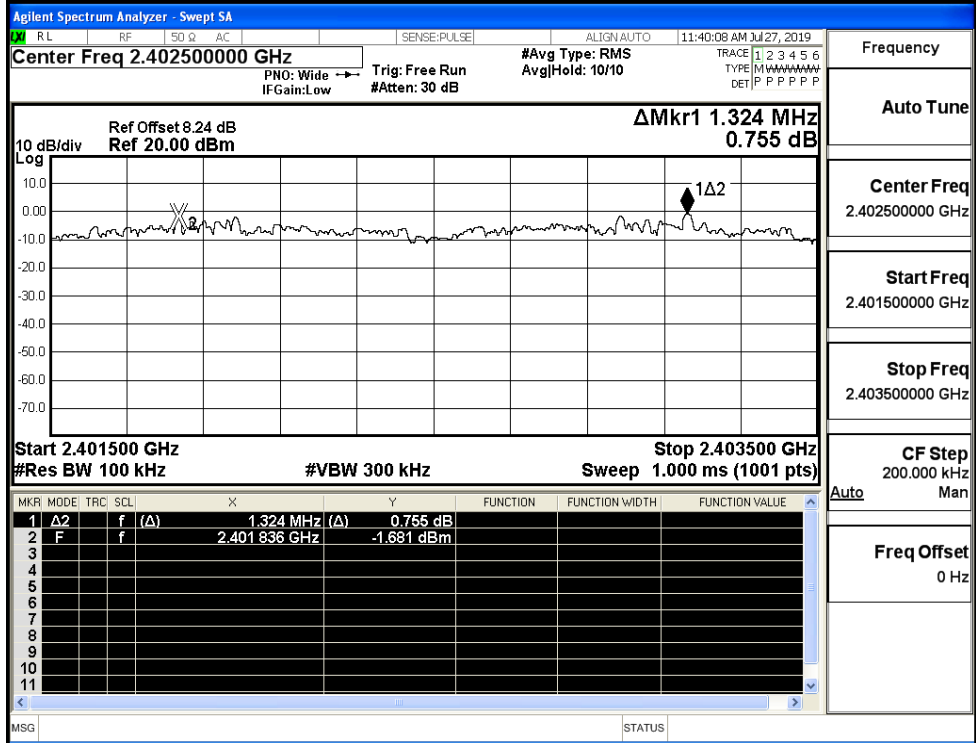
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

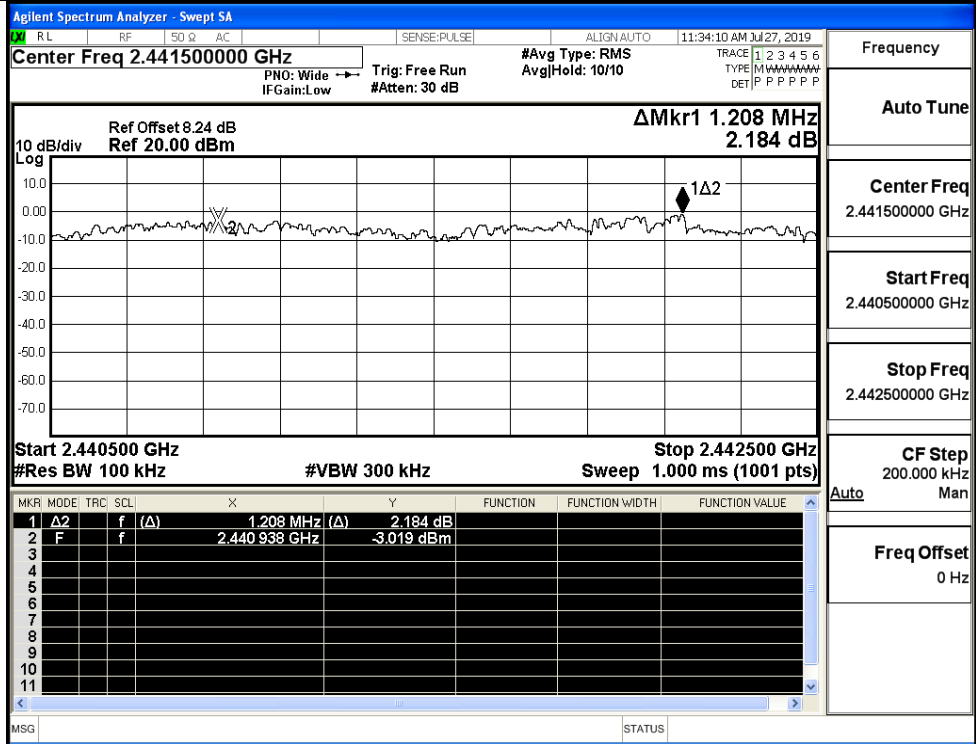
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

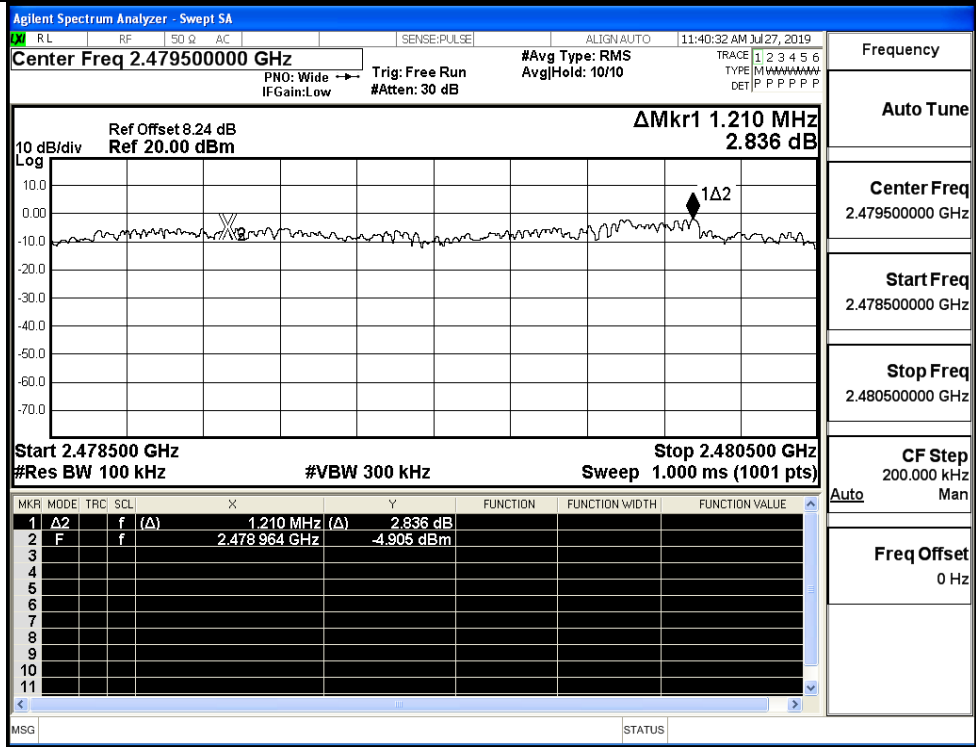
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH



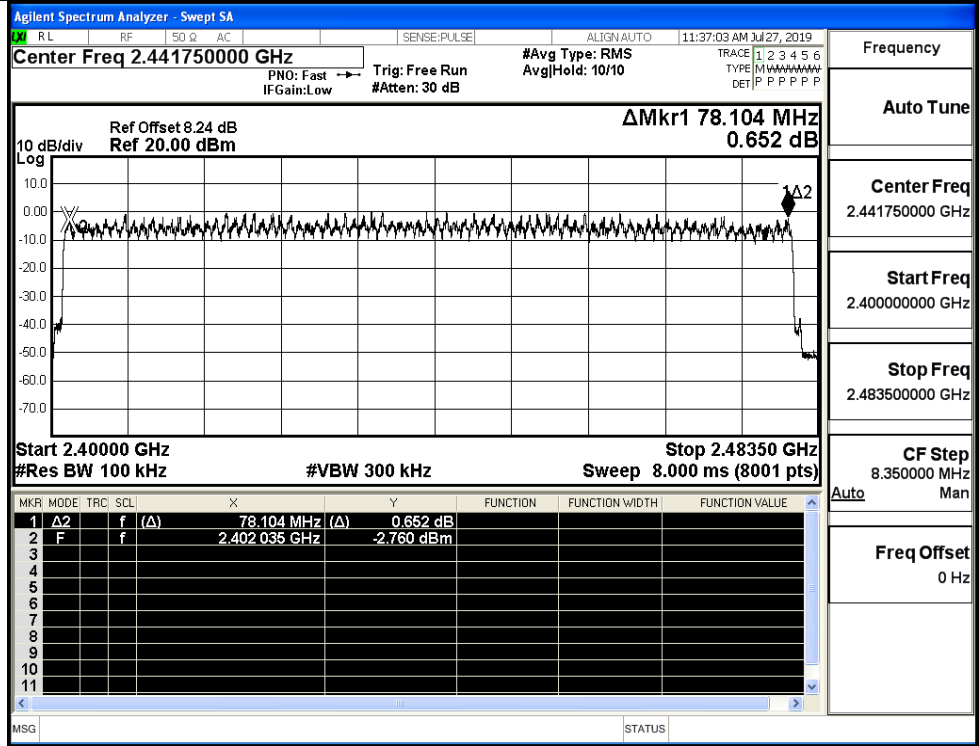
A.4 Hopping Channel Number

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

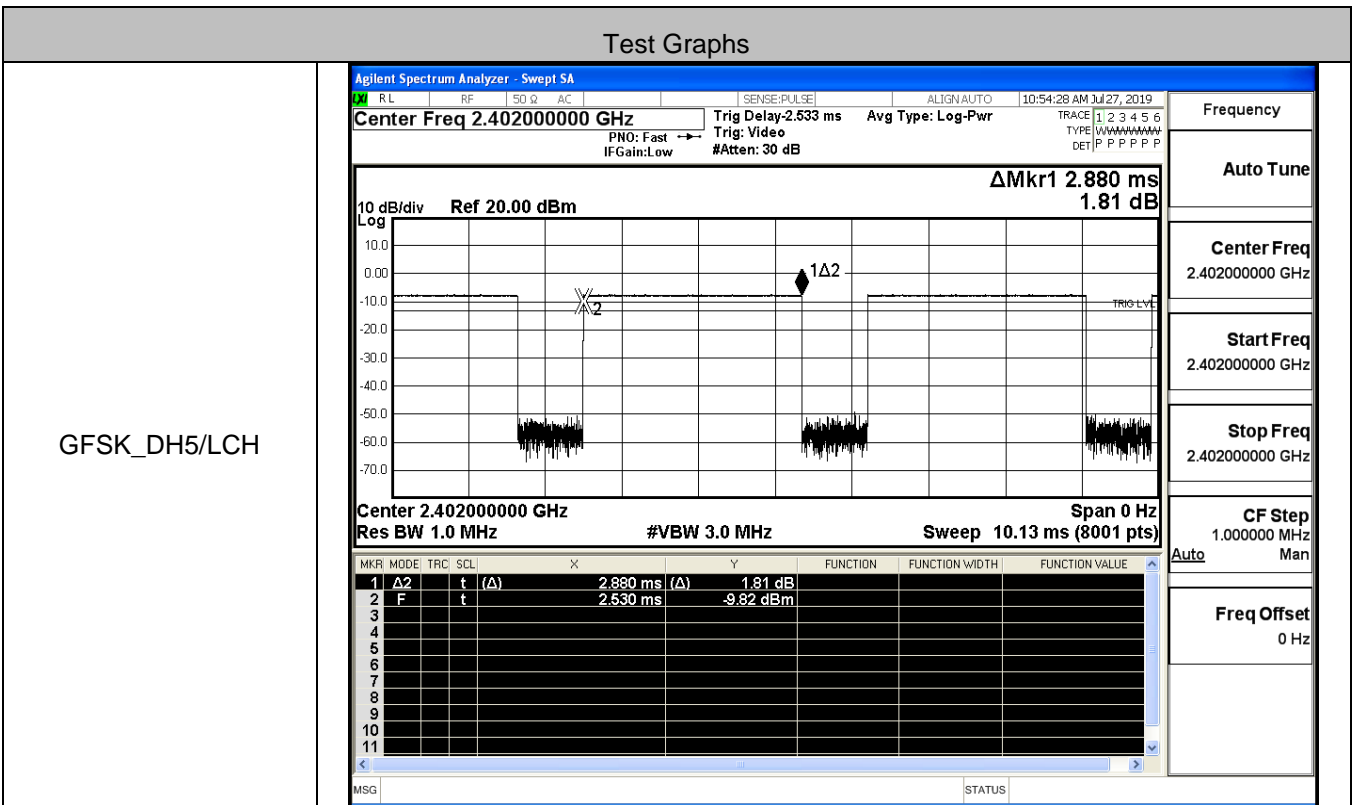
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz #Avg Type: RMS AvgHold: 10/10 PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 78.323 MHz 0.073 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Δ2</td> <td>f</td> <td>(Δ)</td> <td>78.323 MHz (Δ)</td> <td>0.073 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401837 GHz</td> <td>-0.202 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	78.323 MHz (Δ)	0.073 dB				2	F	f		2.401837 GHz	-0.202 dBm				<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.441750000 GHz</p> <p>Start Freq 2.400000000 GHz</p> <p>Stop Freq 2.483500000 GHz</p> <p>CF Step 8.350000 MHz Man</p> <p>Freq Offset 0 Hz</p>
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1	Δ 2	f	(Δ)	78.323 MHz (Δ)	0.073 dB																								
2	F	f		2.401837 GHz	-0.202 dBm																								
$\pi/4$ DQPSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz #Avg Type: RMS AvgHold: 10/10 PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 77.853 MHz 0.624 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Δ2</td> <td>f</td> <td>(Δ)</td> <td>77.853 MHz (Δ)</td> <td>0.624 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402119 GHz</td> <td>-3.873 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	77.853 MHz (Δ)	0.624 dB				2	F	f		2.402119 GHz	-3.873 dBm				<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.441750000 GHz</p> <p>Start Freq 2.400000000 GHz</p> <p>Stop Freq 2.483500000 GHz</p> <p>CF Step 8.350000 MHz Man</p> <p>Freq Offset 0 Hz</p>
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ 2	f	(Δ)	77.853 MHz (Δ)	0.624 dB																								
2	F	f		2.402119 GHz	-3.873 dBm																								

8DPSK/Hop

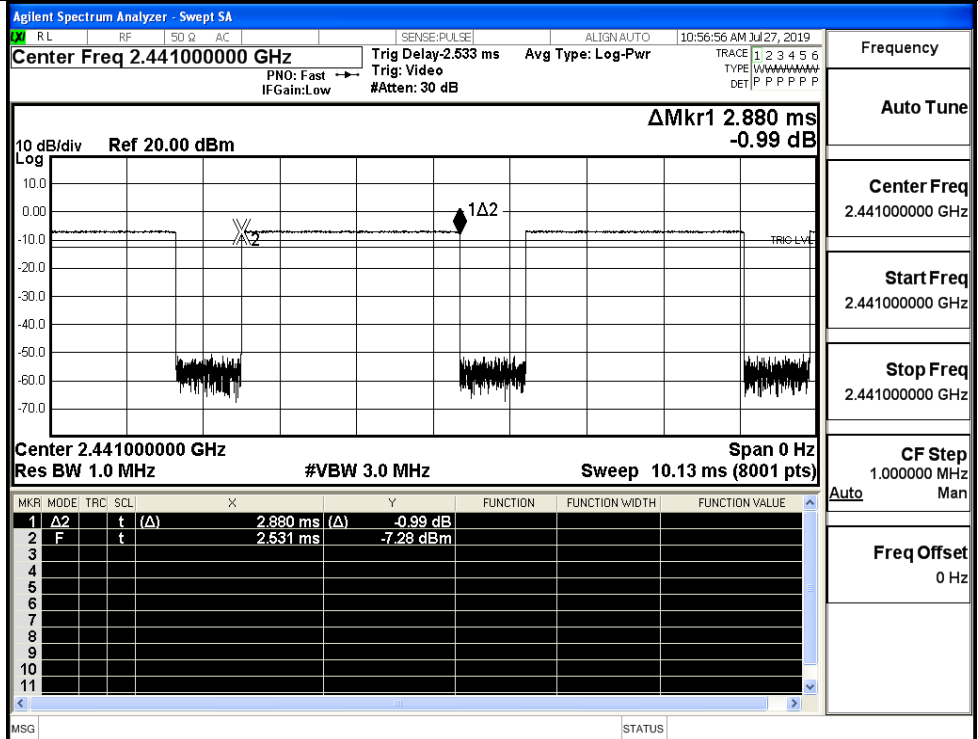


A.5 Dwell Time

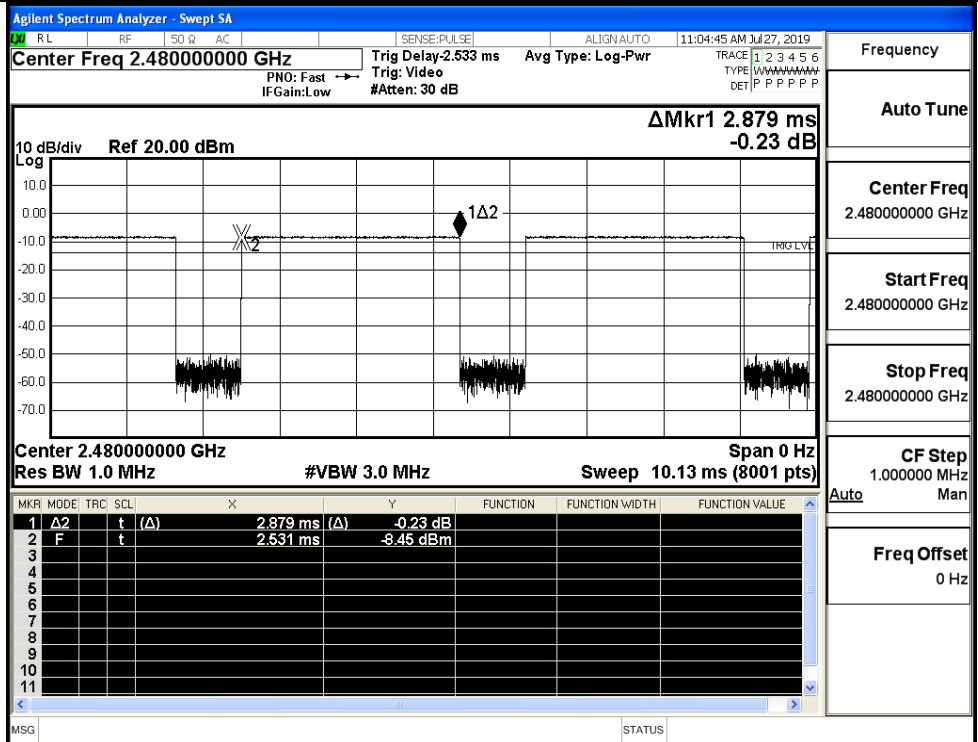
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.308	0.4	PASS
	3DH5	MCH	2.88	106.7	0.308	0.4	PASS
	3DH5	HCH	2.88	106.7	0.308	0.4	PASS



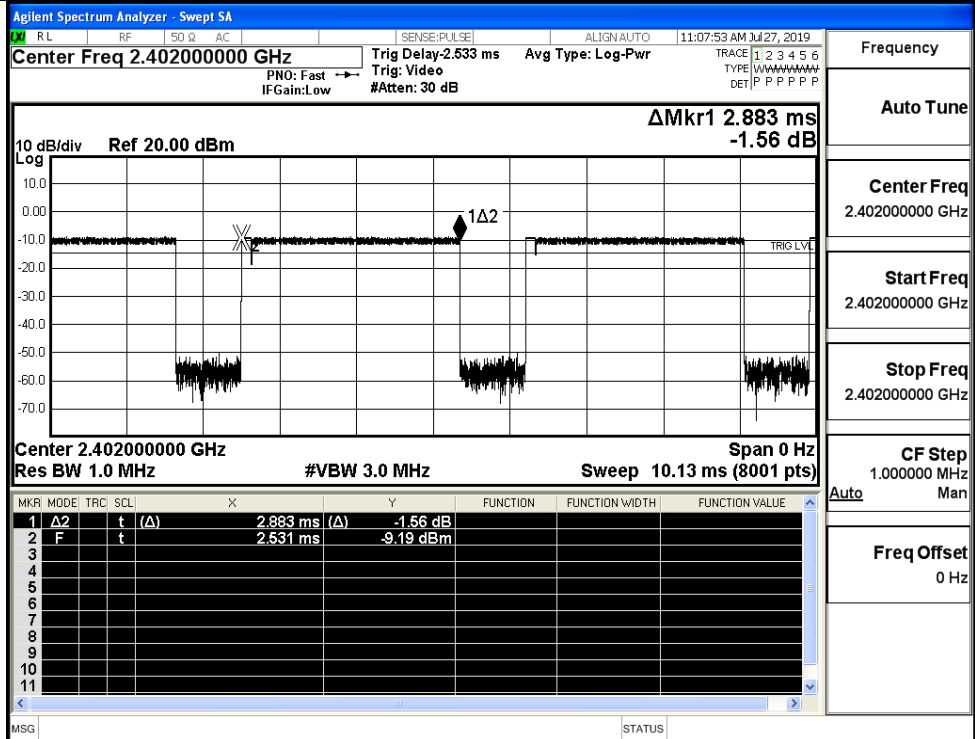
GFSK_DH5/MCH



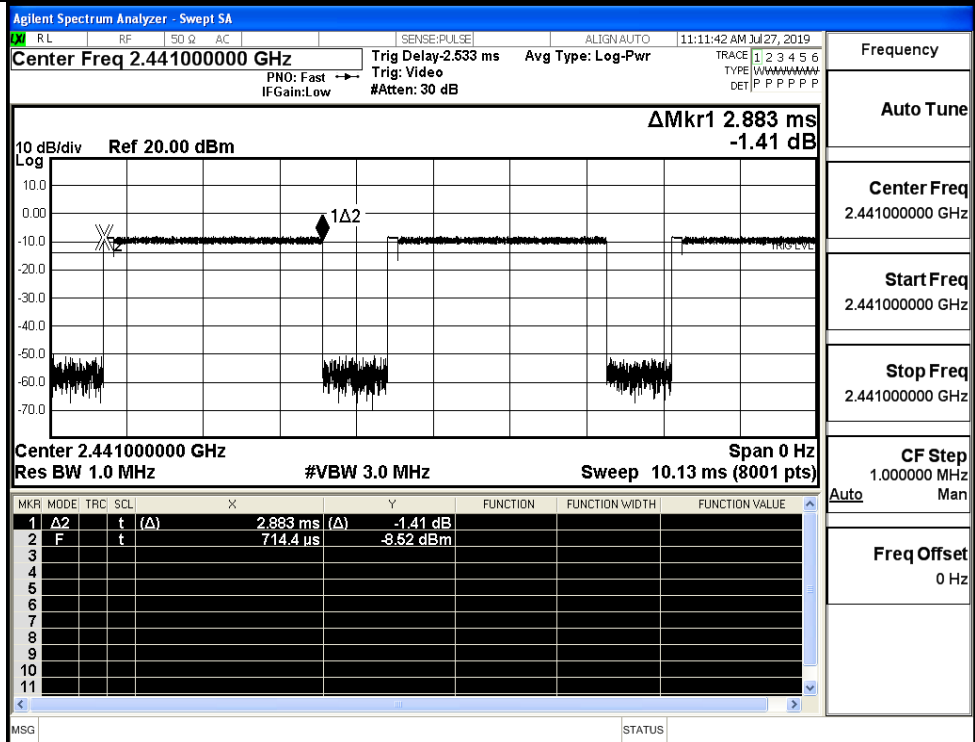
GFSK_DH5/HCH



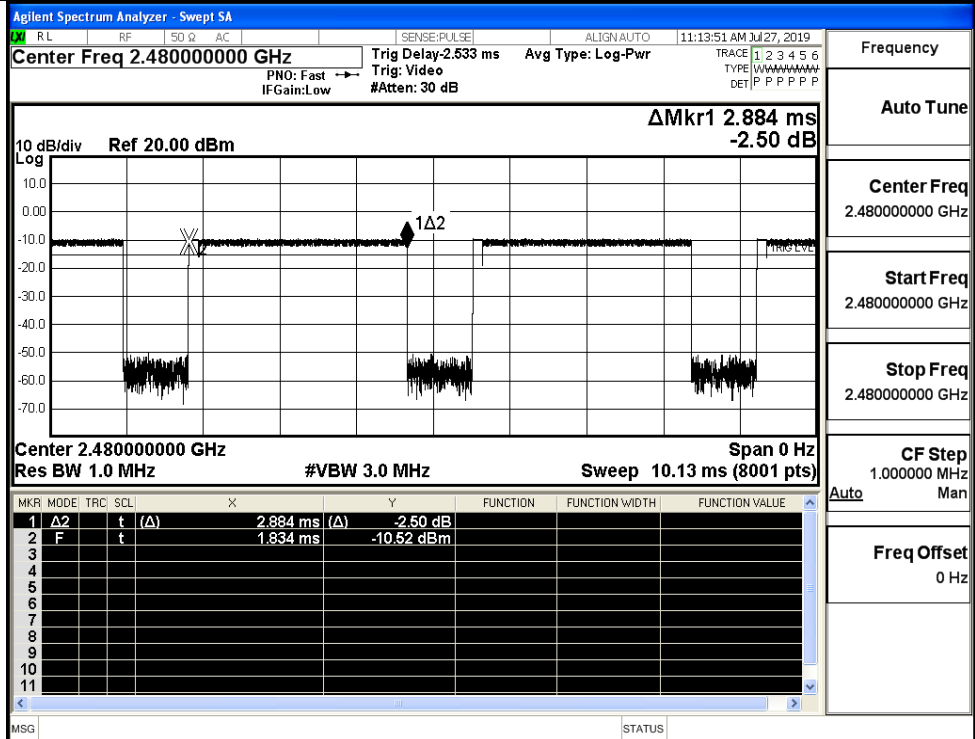
$\pi/4$ DQPSK
_2DH5/LCH



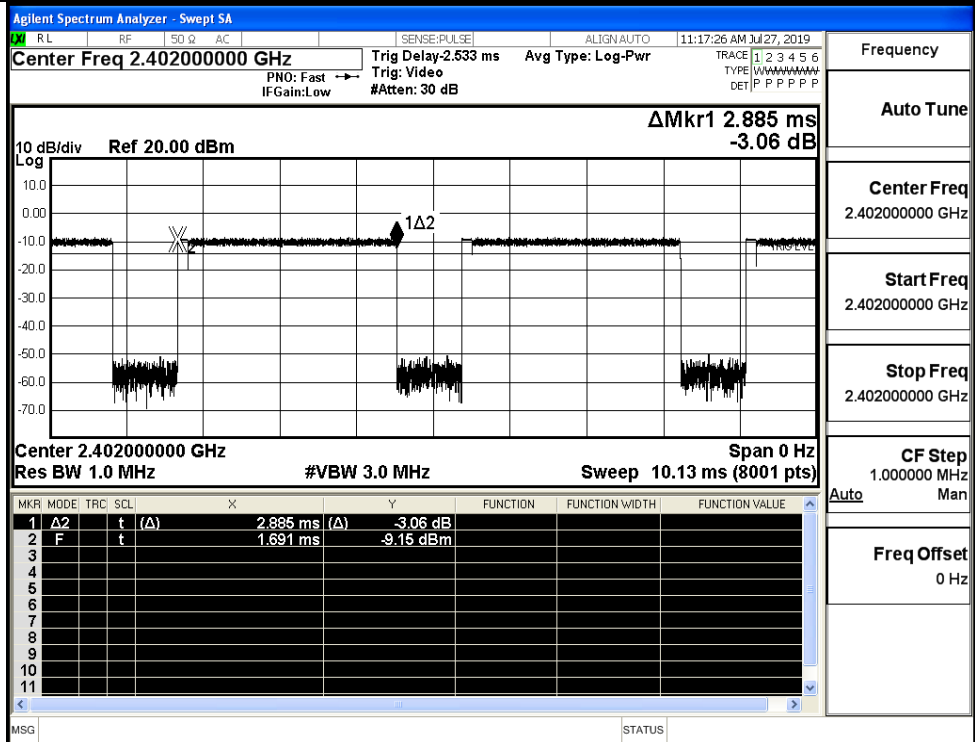
$\pi/4$ DQPSK
_2DH5/MCH



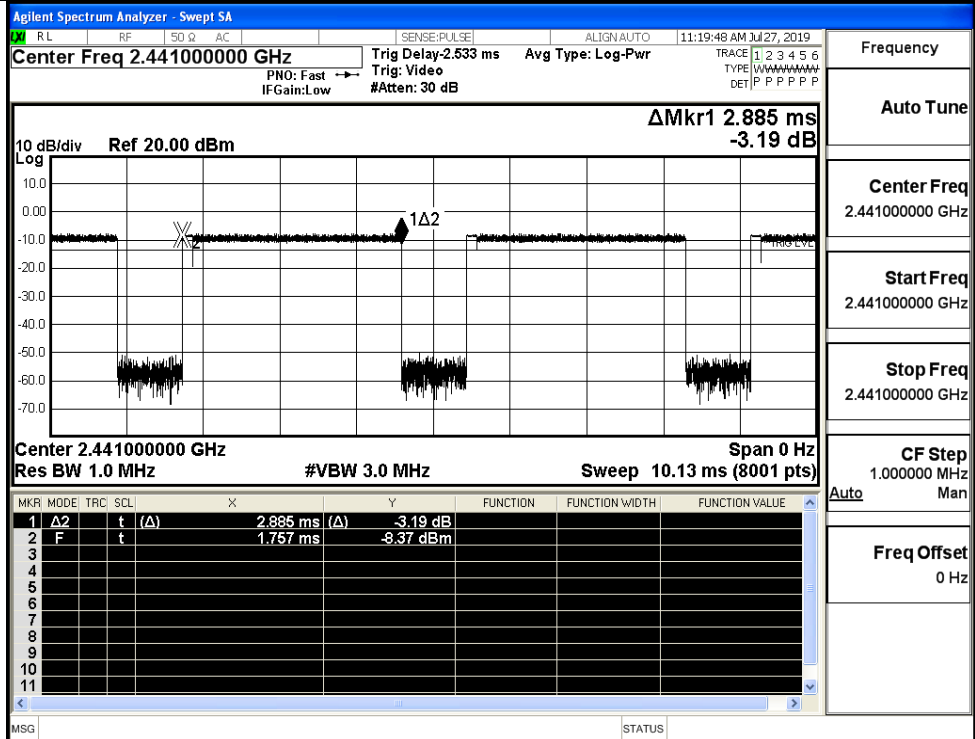
$\pi/4$ DQPSK
_2DH5/HCH



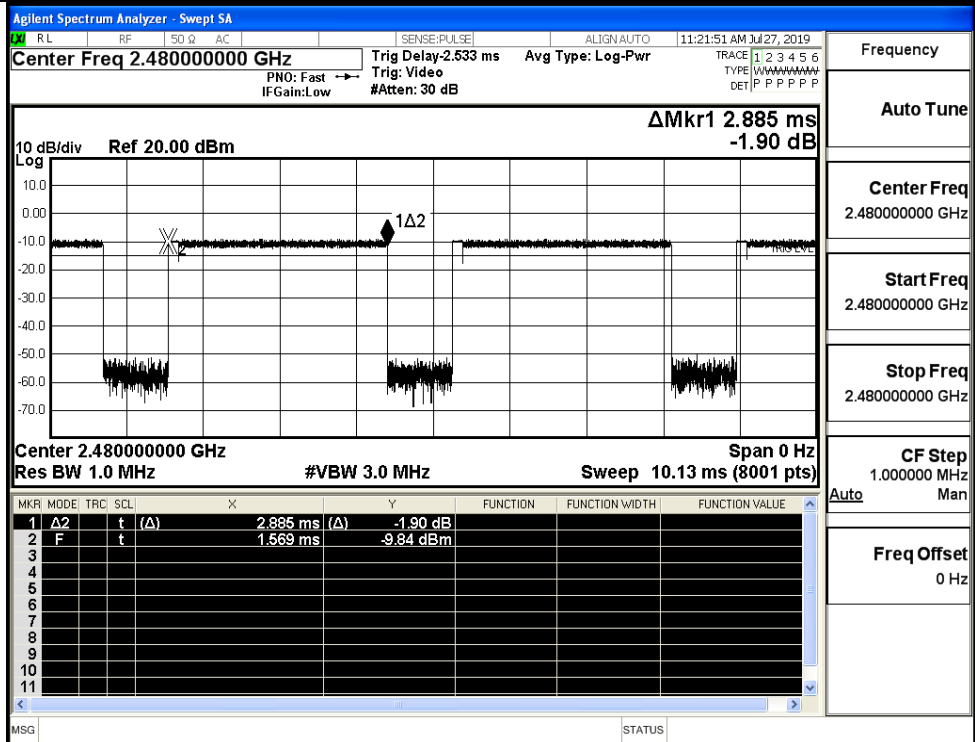
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



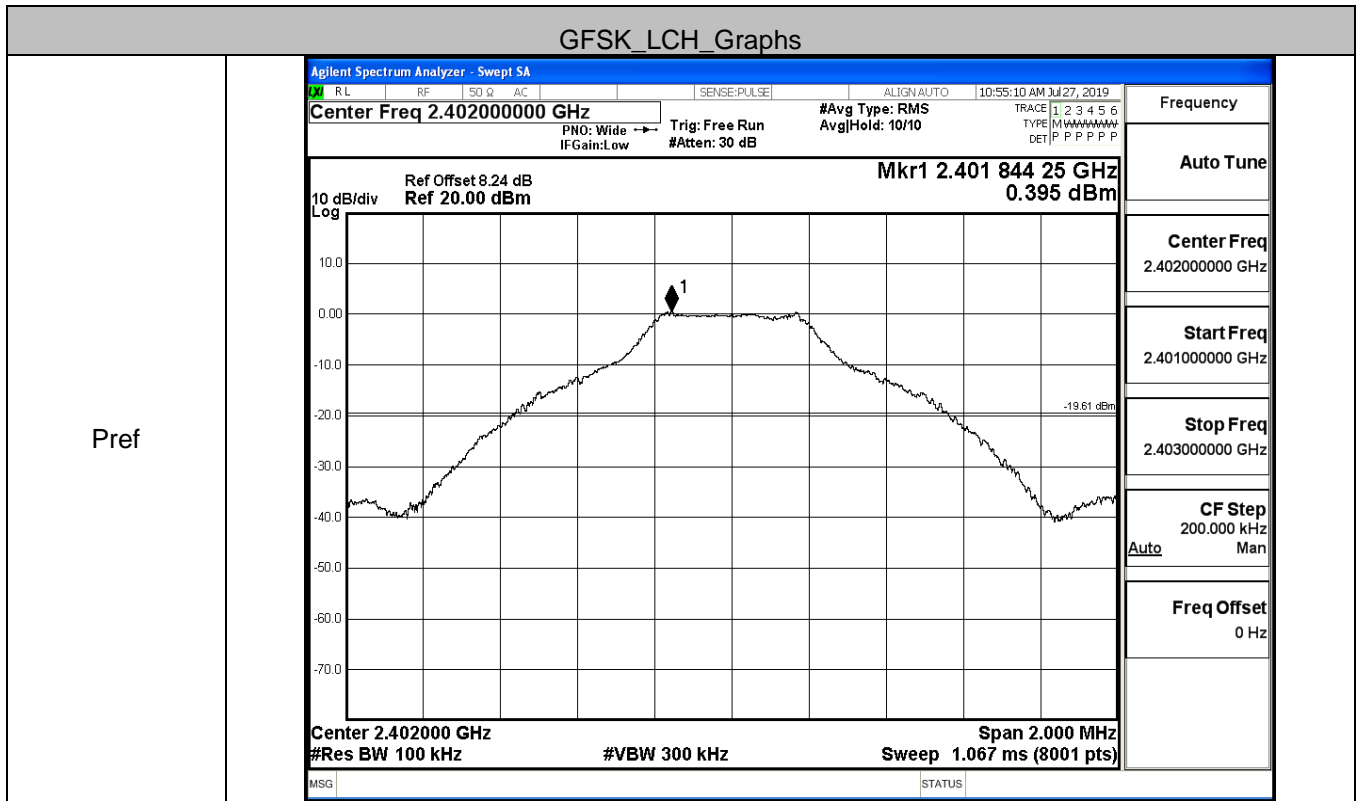
8DPSK_3DH5/HCH



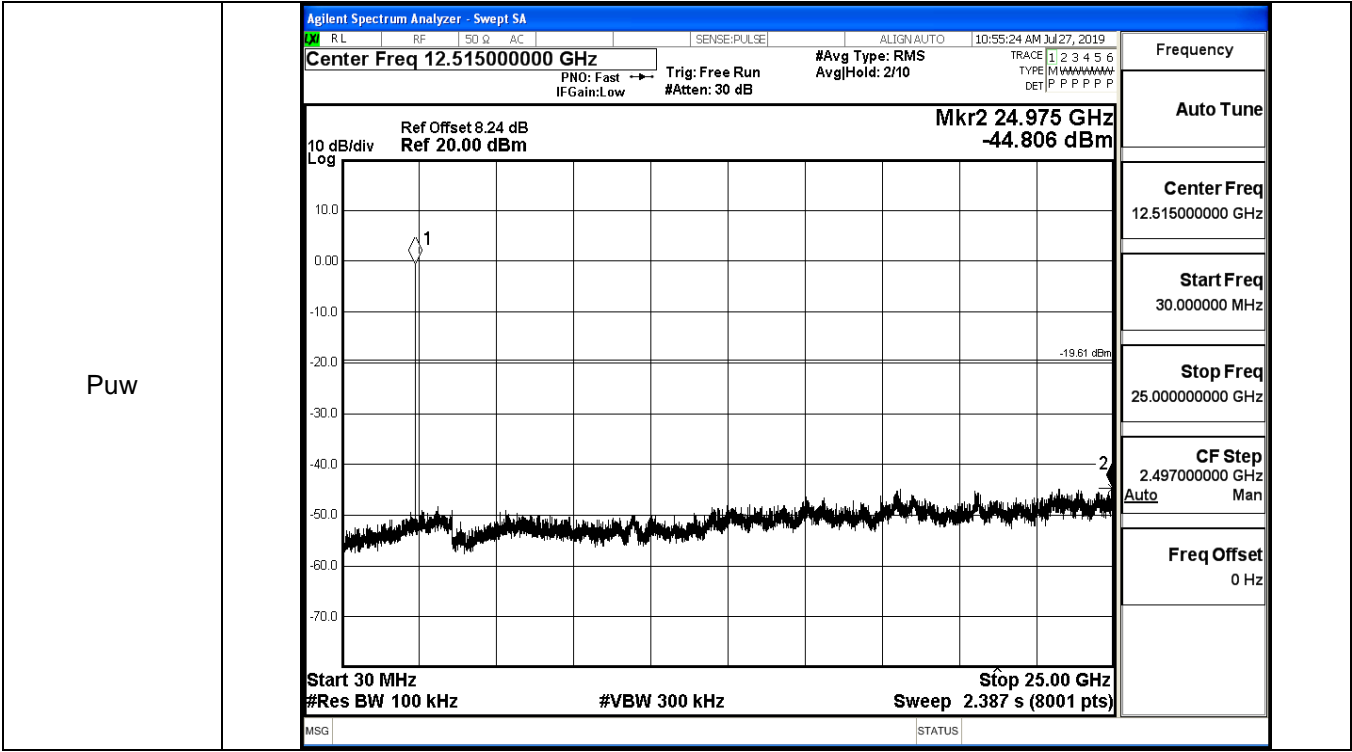
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.395	-44.806	-19.605	PASS
	MCH	1.127	-44.223	-18.873	PASS
	HCH	-0.146	-43.919	-20.146	PASS
π /4DQPSK	LCH	-0.98	-44.330	-20.980	PASS
	MCH	-0.247	-44.526	-20.247	PASS
	HCH	-1.565	-45.182	-21.565	PASS
8DPSK	LCH	-0.909	-42.807	-20.909	PASS
	MCH	-0.16	-44.880	-20.160	PASS
	HCH	-1.527	-43.797	-21.527	PASS

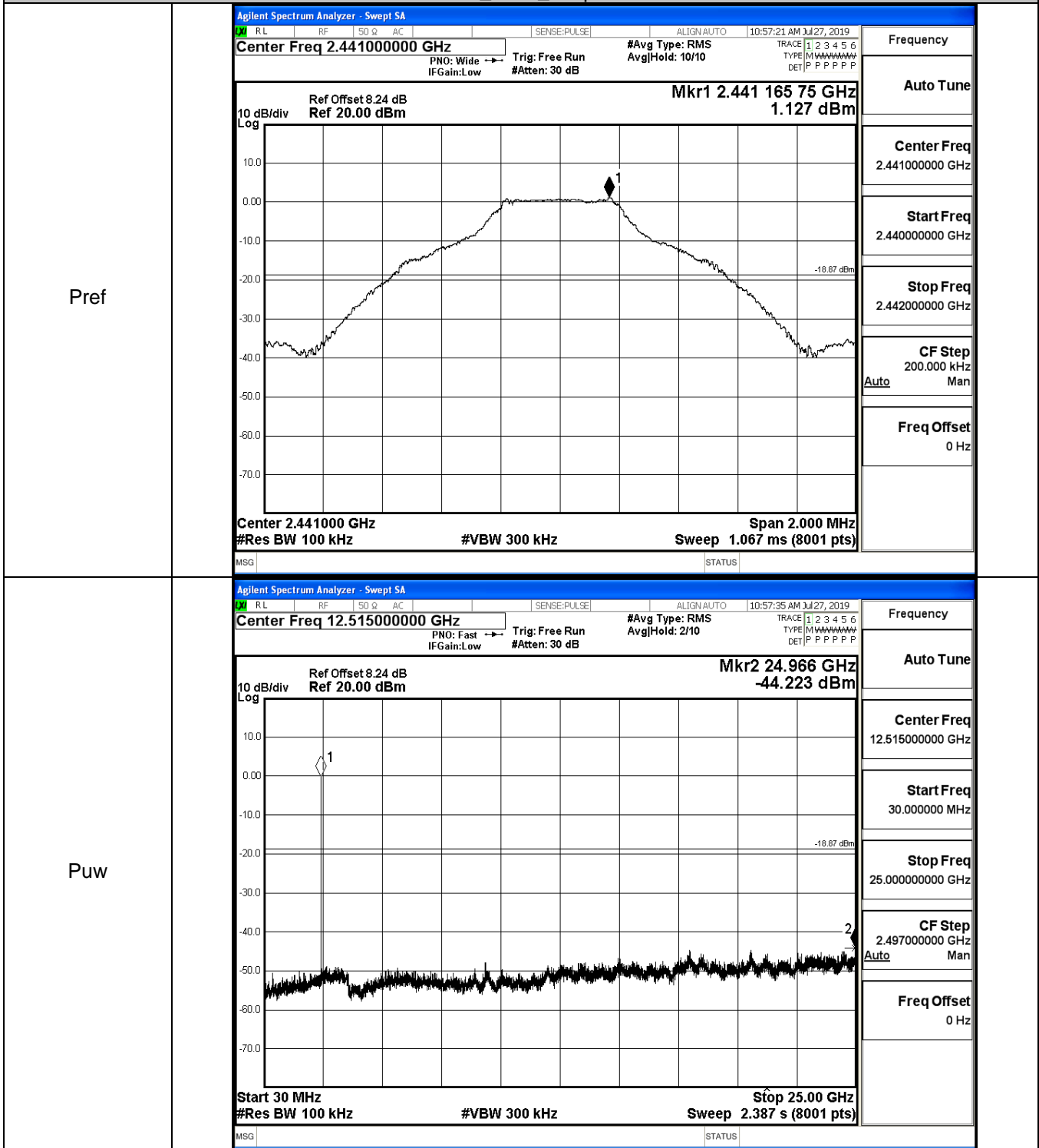
GFSK_LCH_Graphs



Pref

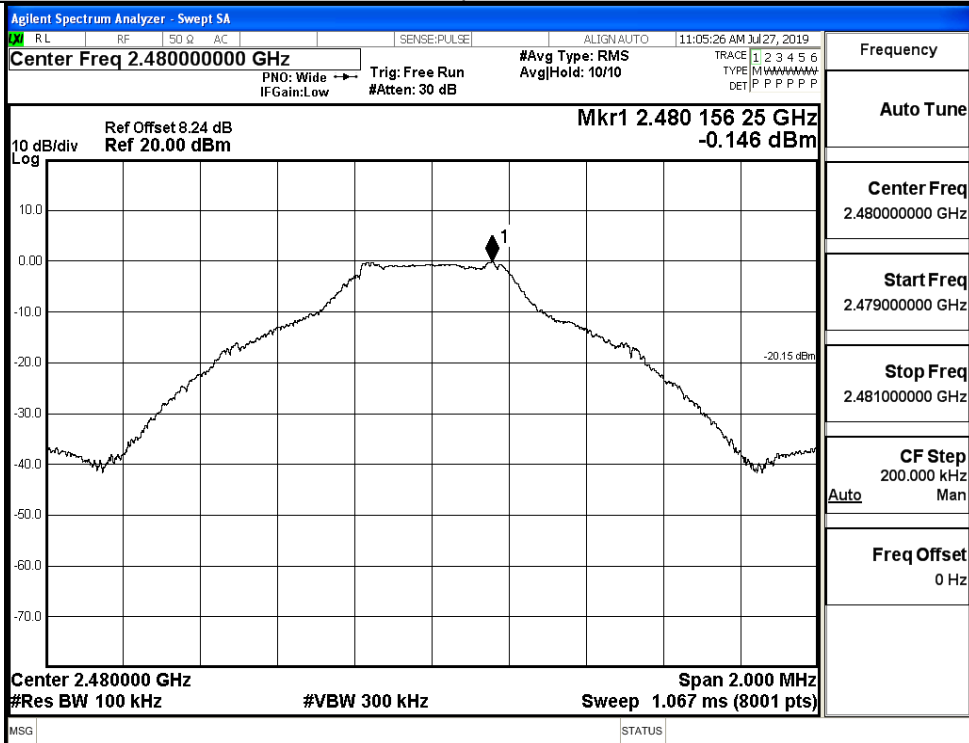


GFSK_MCH_Graphs

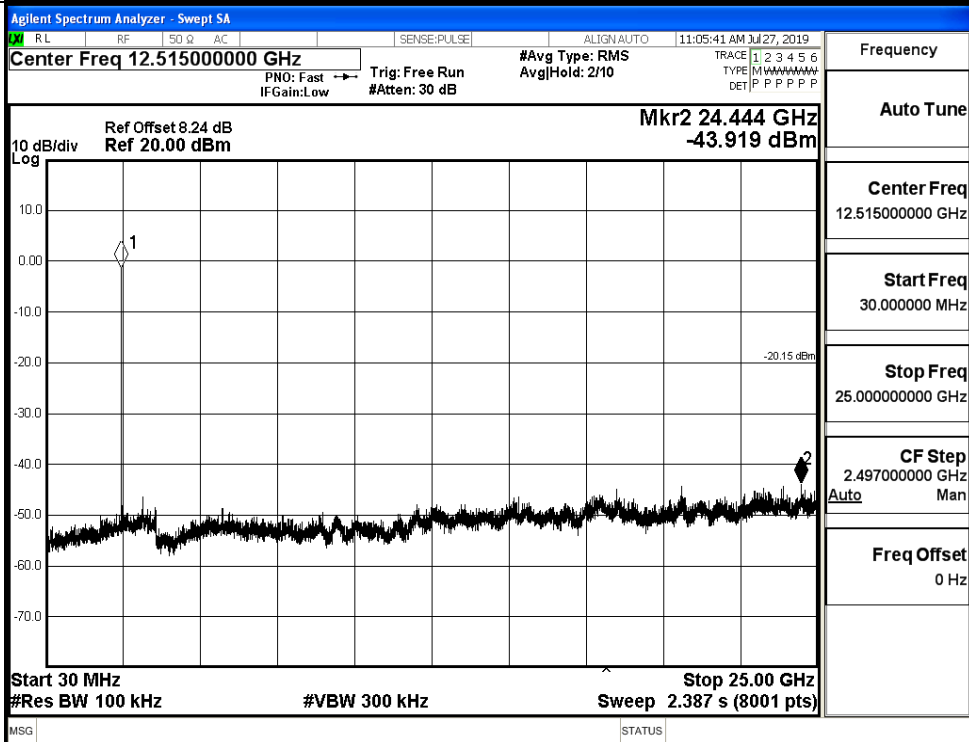


GFSK_HCH_Graphs

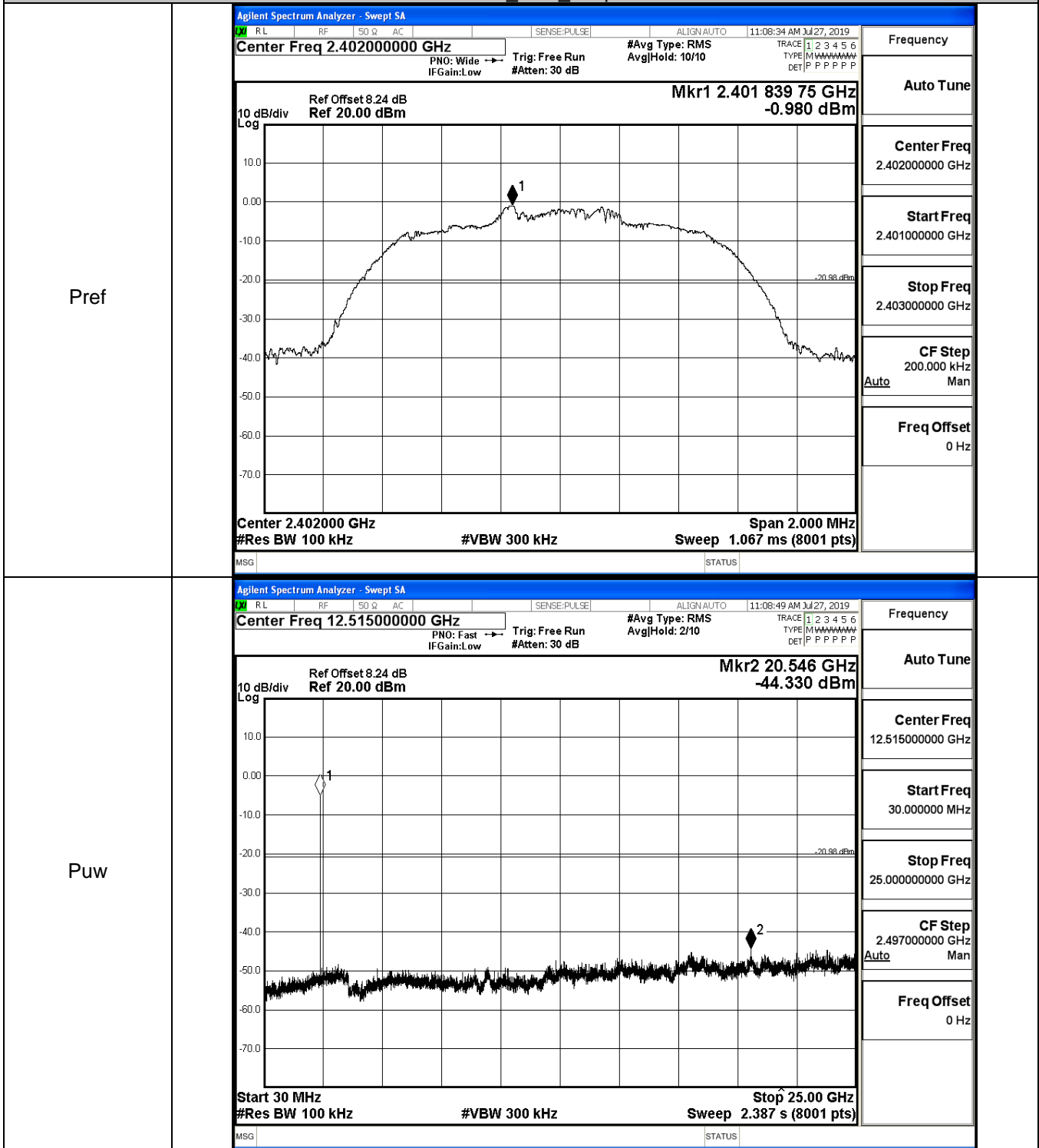
Pref



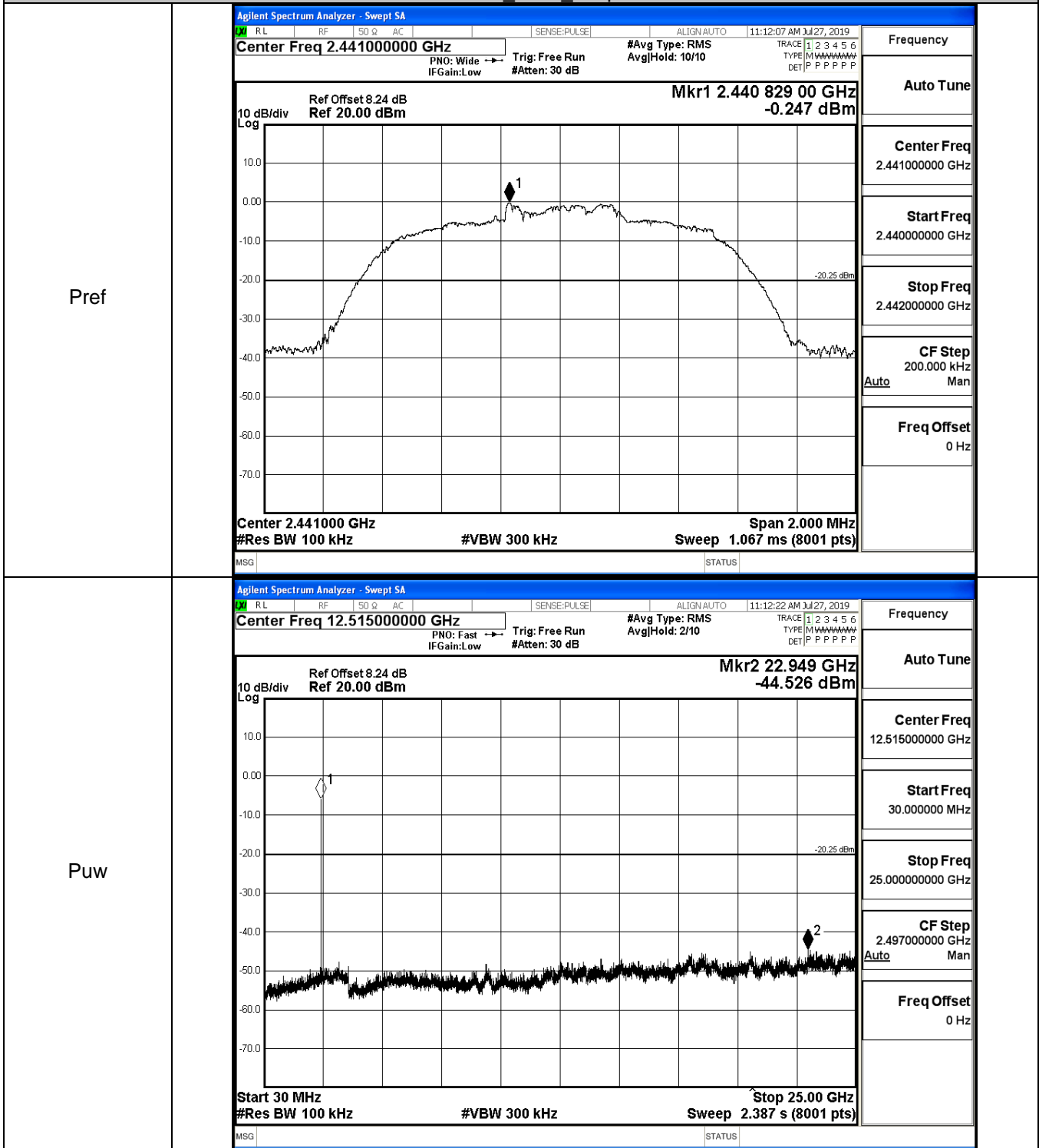
Puw



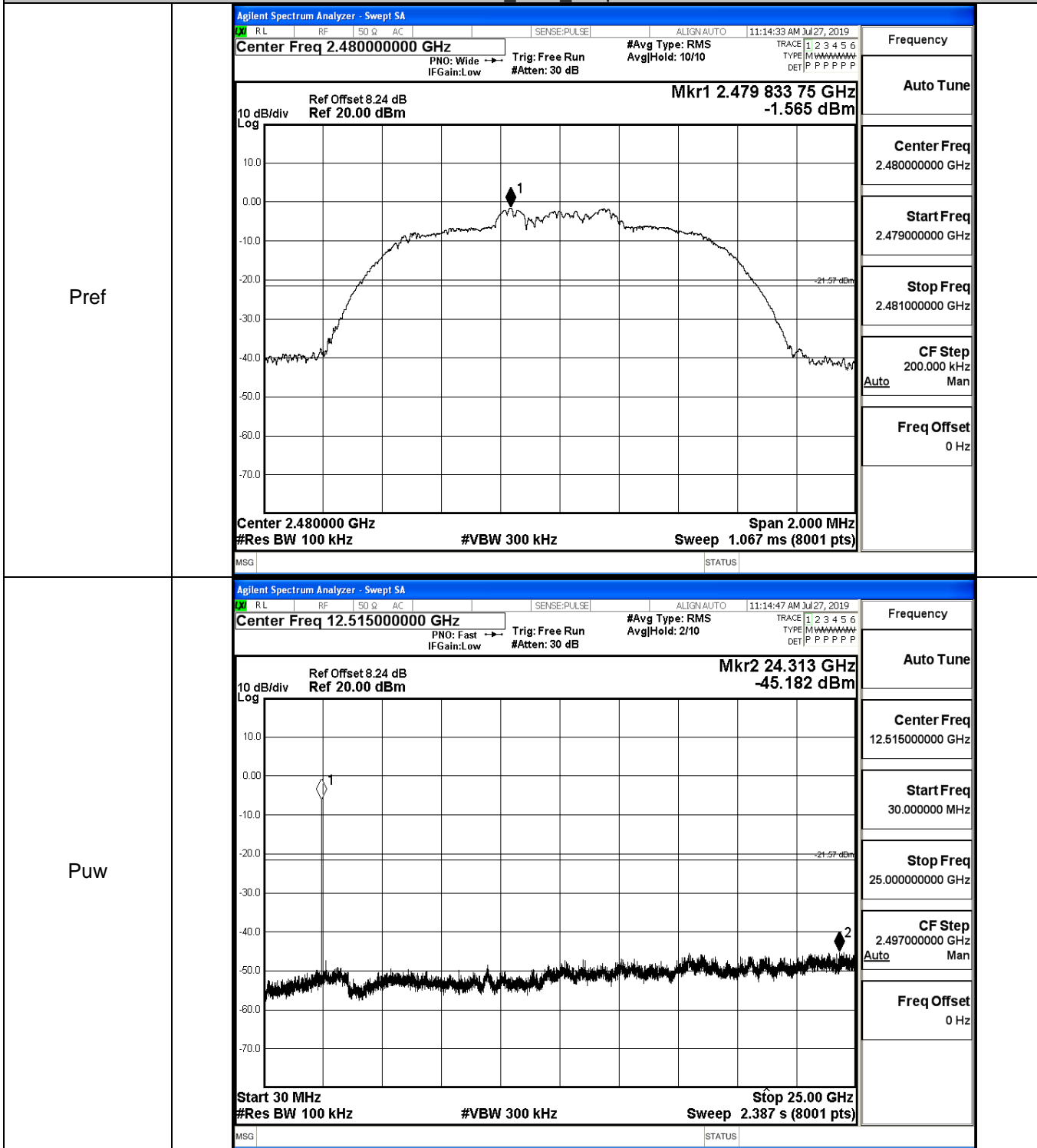
$\pi/4$ DQPSK_LCH_Graphs



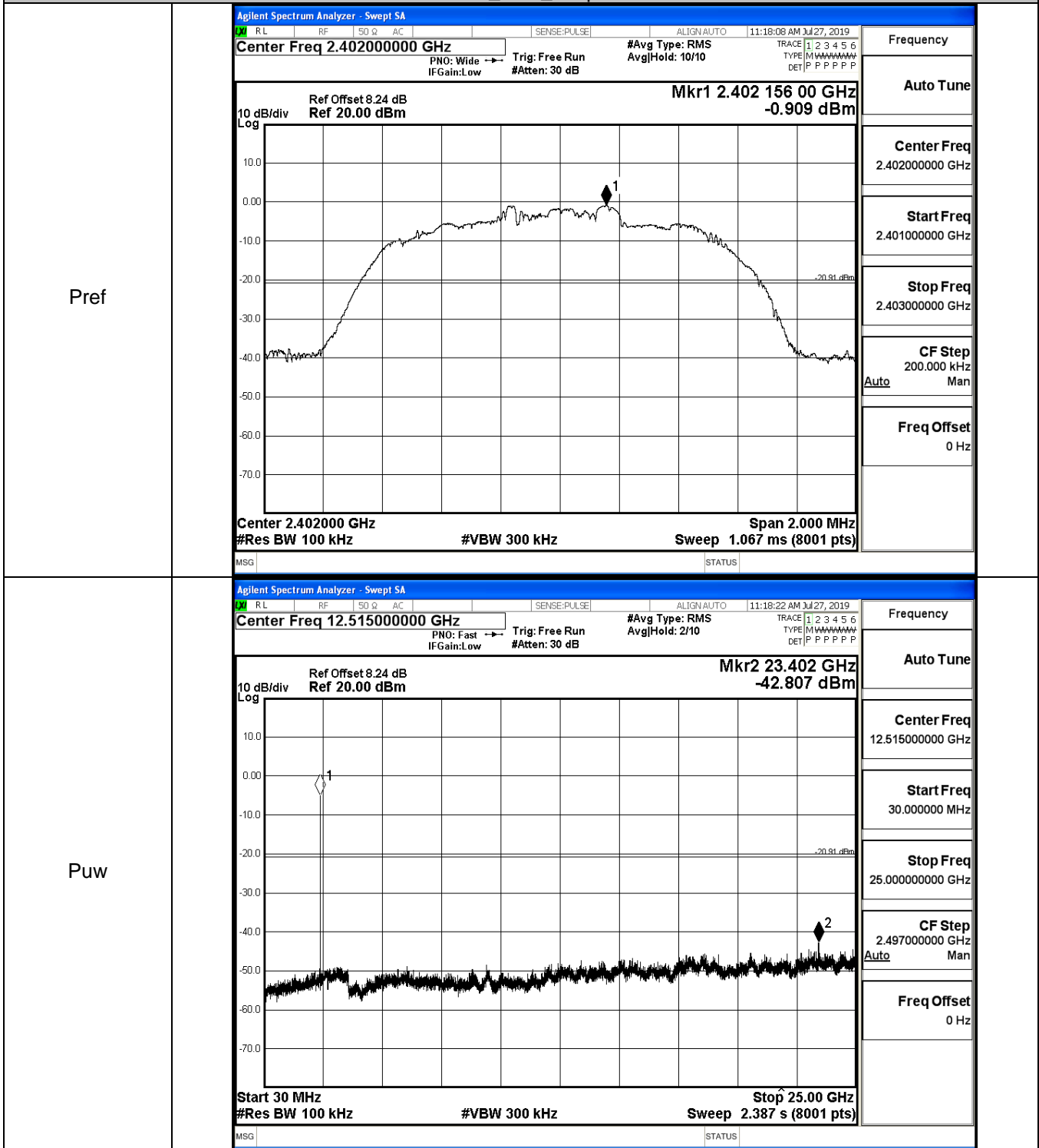
$\pi/4$ DQPSK_MCH_Graphs



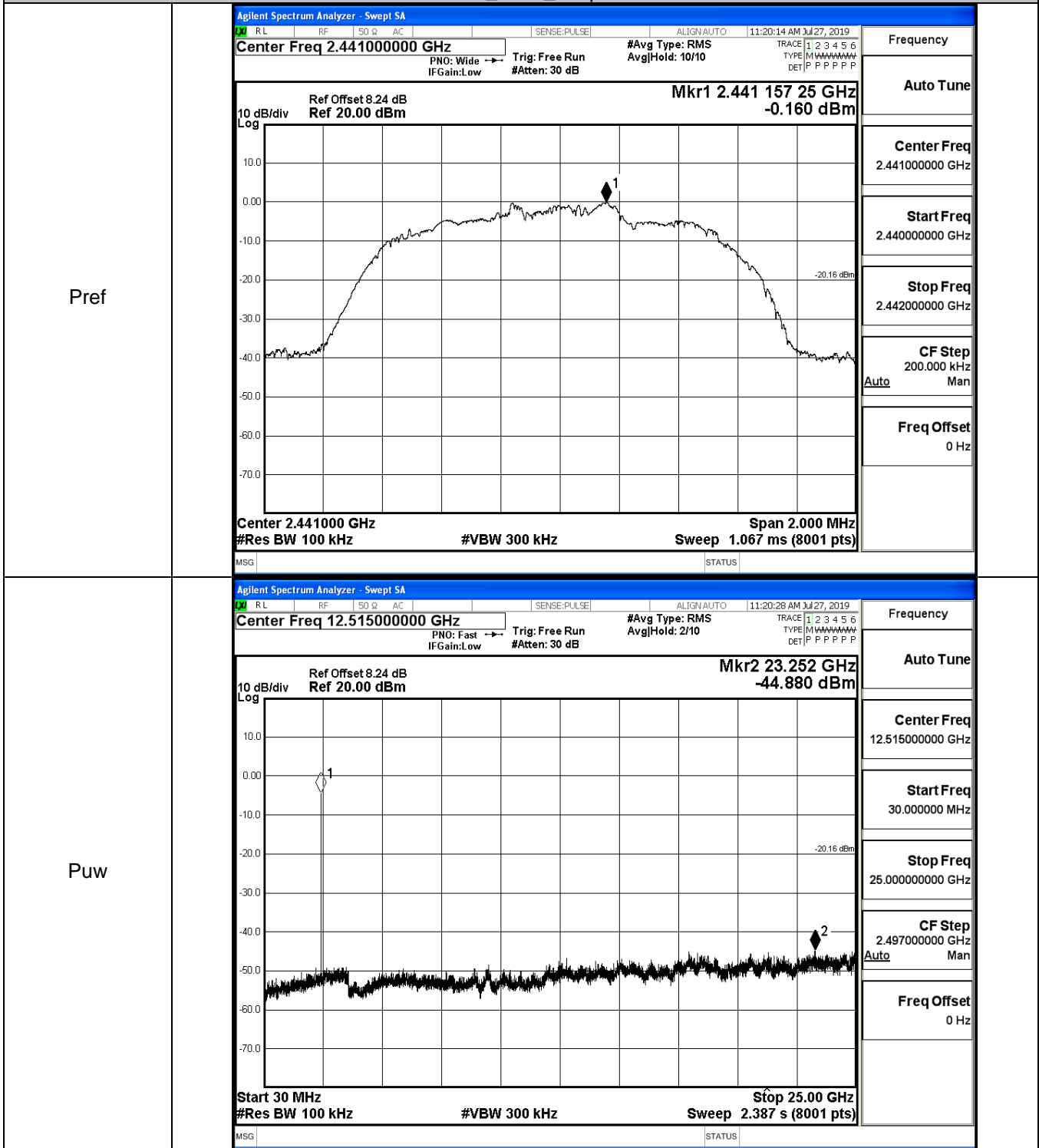
$\pi/4$ DQPSK_HCH_Graphs



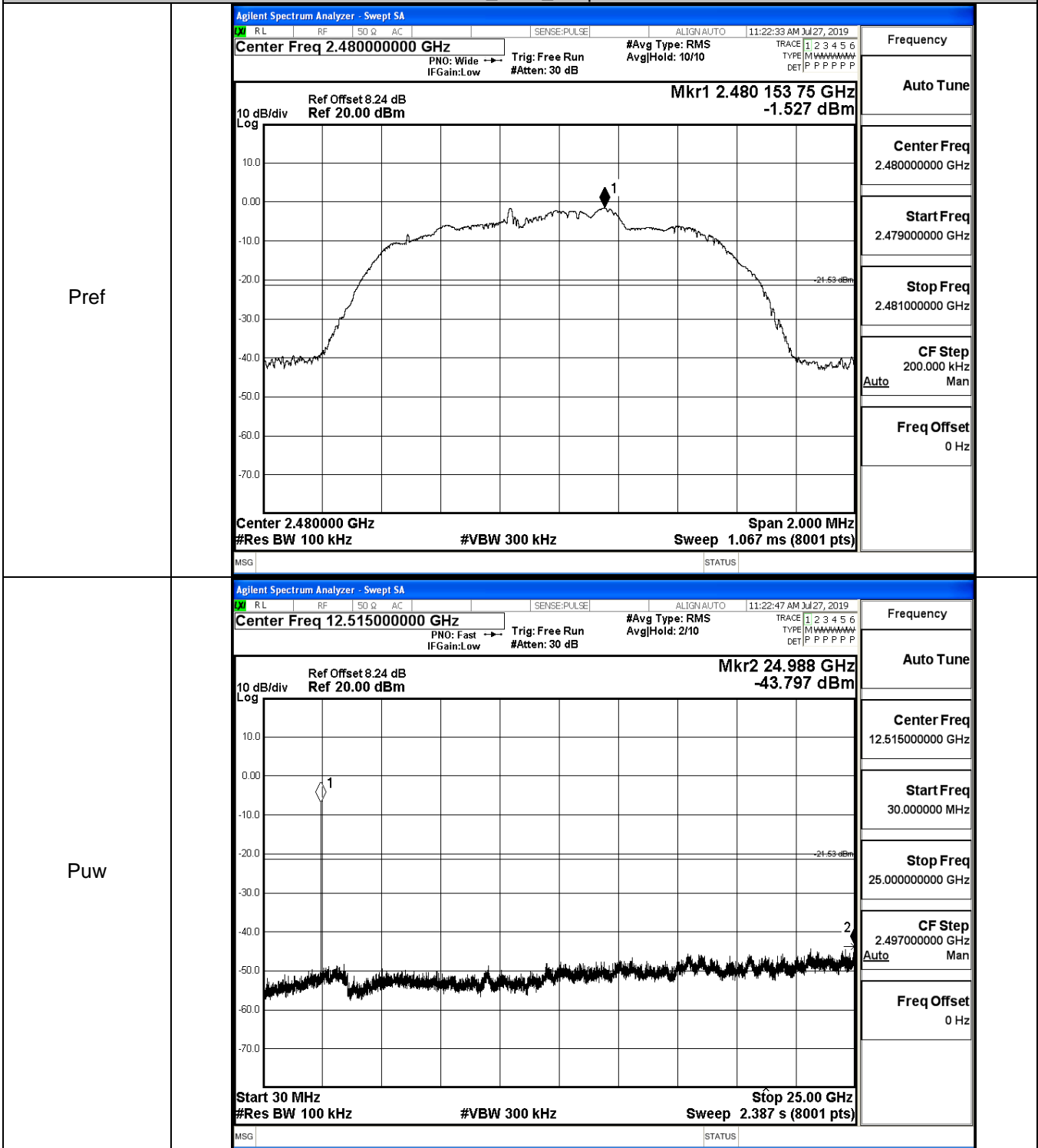
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

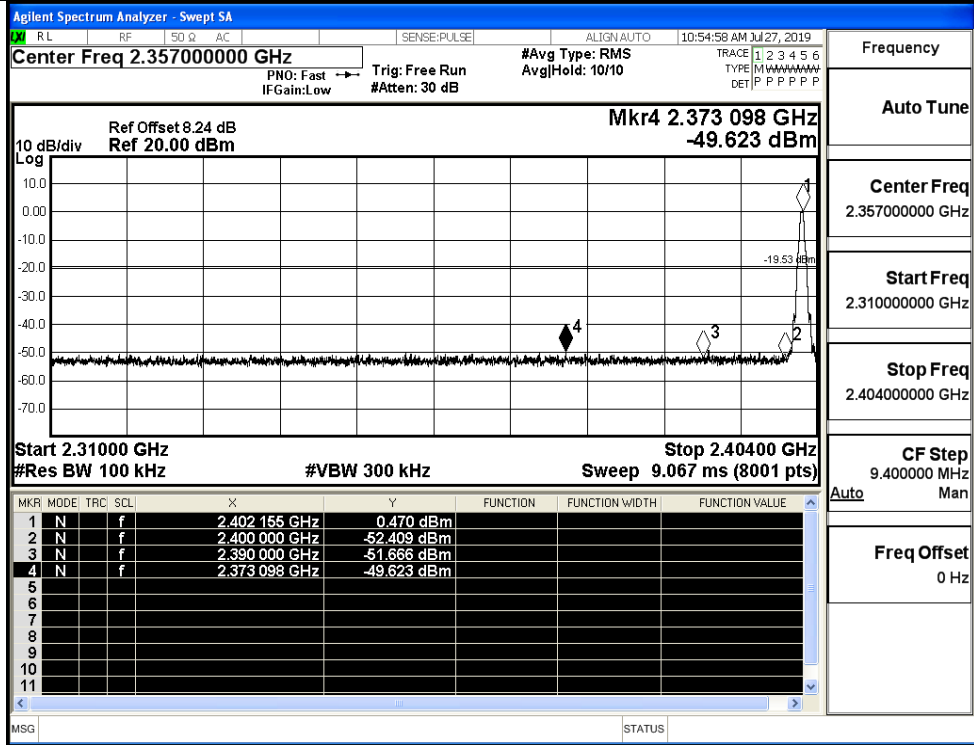


A.7 Band-edge for RF Conducted Emissions

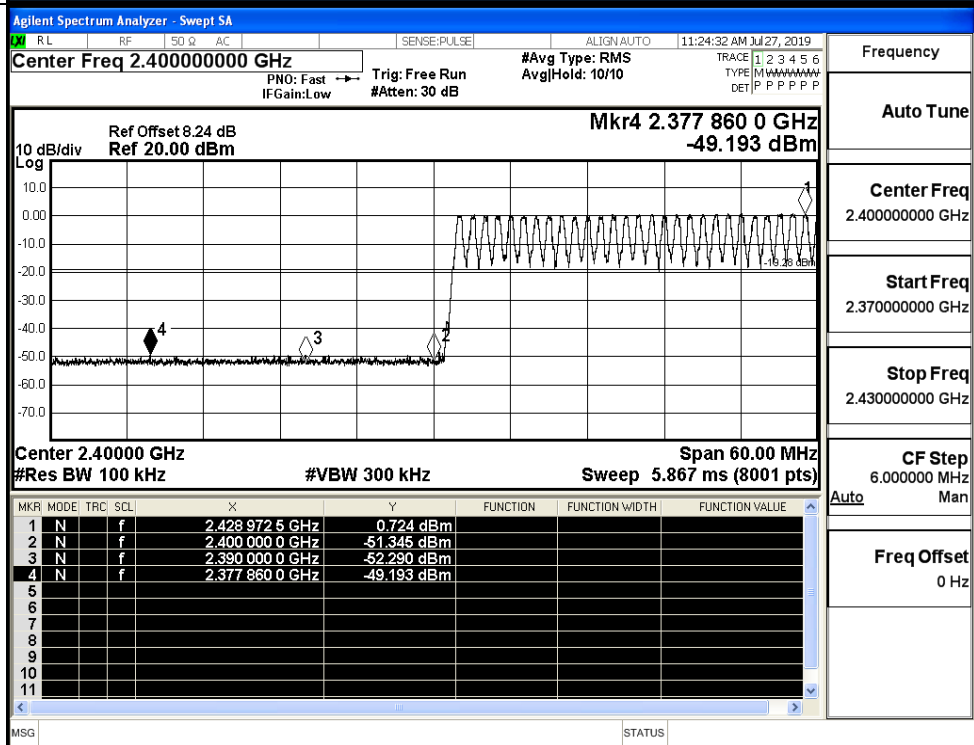
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.470	Off	-49.623	-19.53	PASS
			0.724	On	-49.193	-19.28	PASS
	HCH	2480	-0.182	Off	-49.201	-20.18	PASS
			0.716	On	-49.192	-19.28	PASS
$\pi/4$ DQPSK	LCH	2402	-0.952	Off	-49.452	-20.95	PASS
			-0.355	On	-48.131	-20.36	PASS
	HCH	2480	-1.826	Off	-49.402	-21.83	PASS
			-0.585	On	-48.715	-20.59	PASS
8DPSK	LCH	2402	-1.995	Off	-49.629	-22	PASS
			-0.442	On	-49.279	-20.44	PASS
	HCH	2480	-1.512	Off	-49.715	-21.51	PASS
			-0.591	On	-48.959	-20.59	PASS

Test Graphs

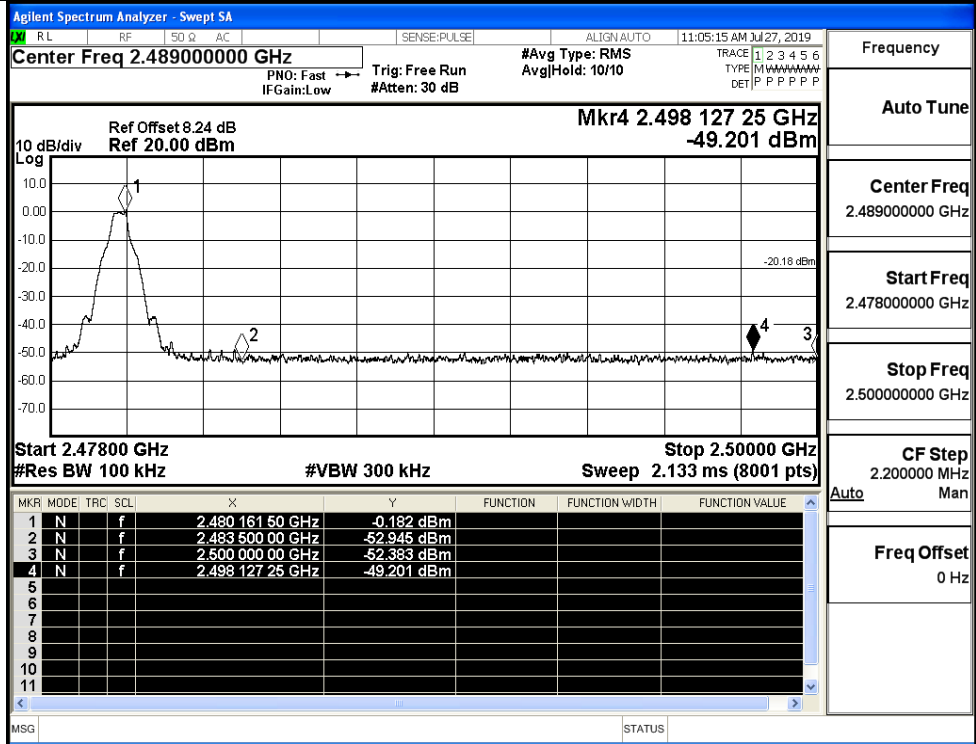
GFSK/LCH/No Hop



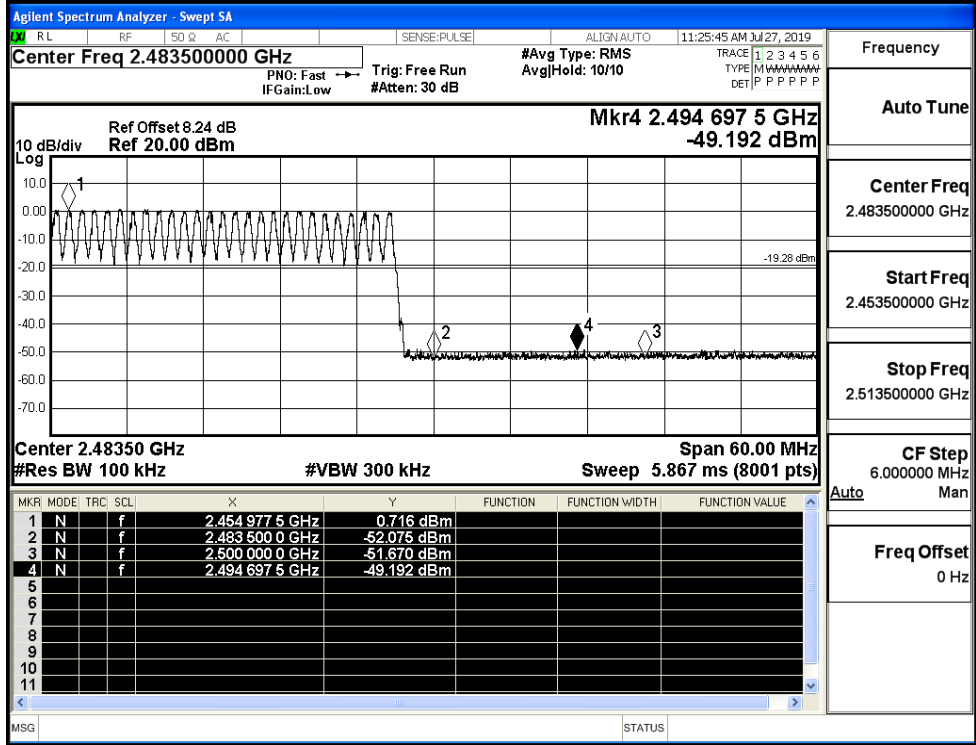
GFSK/LCH/Hop



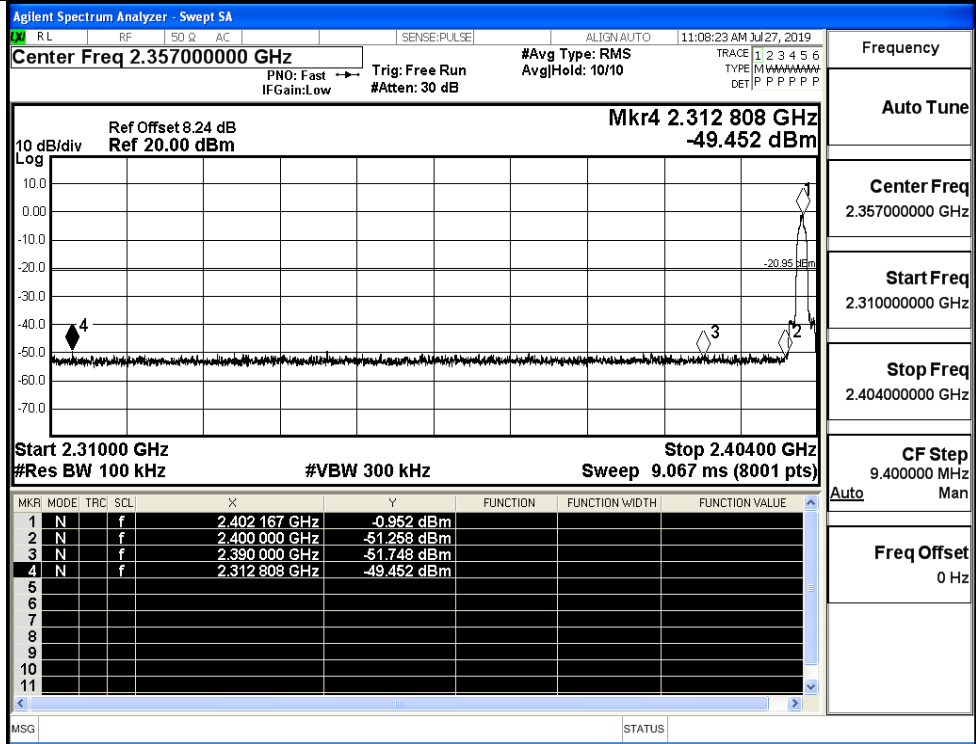
GFSK/HCH/No Hop



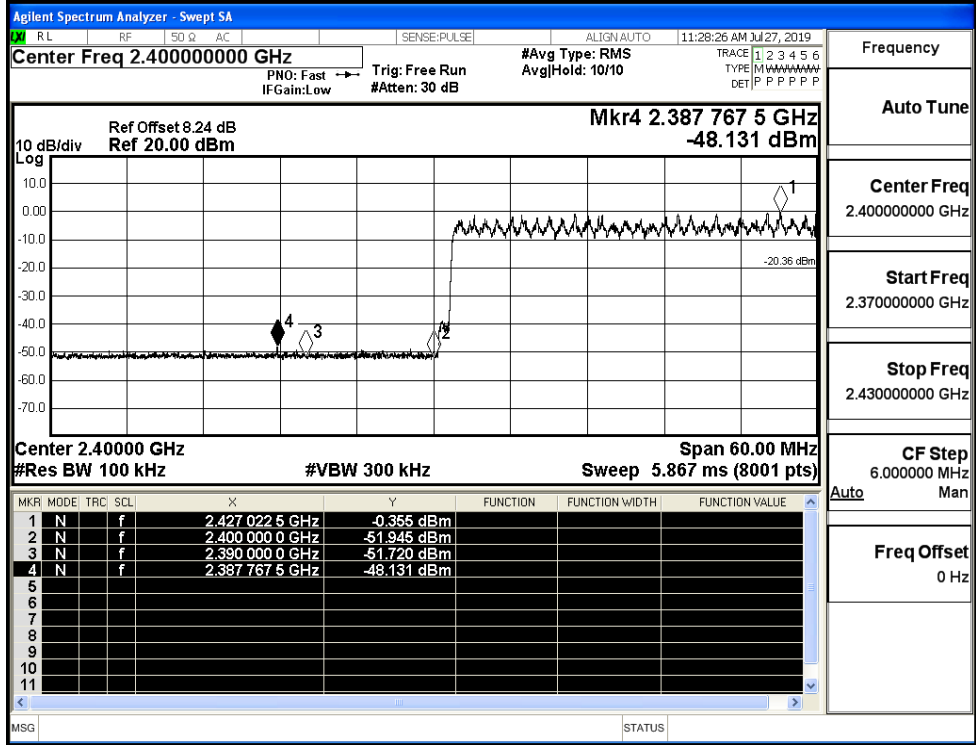
GFSK/HCH/Hop



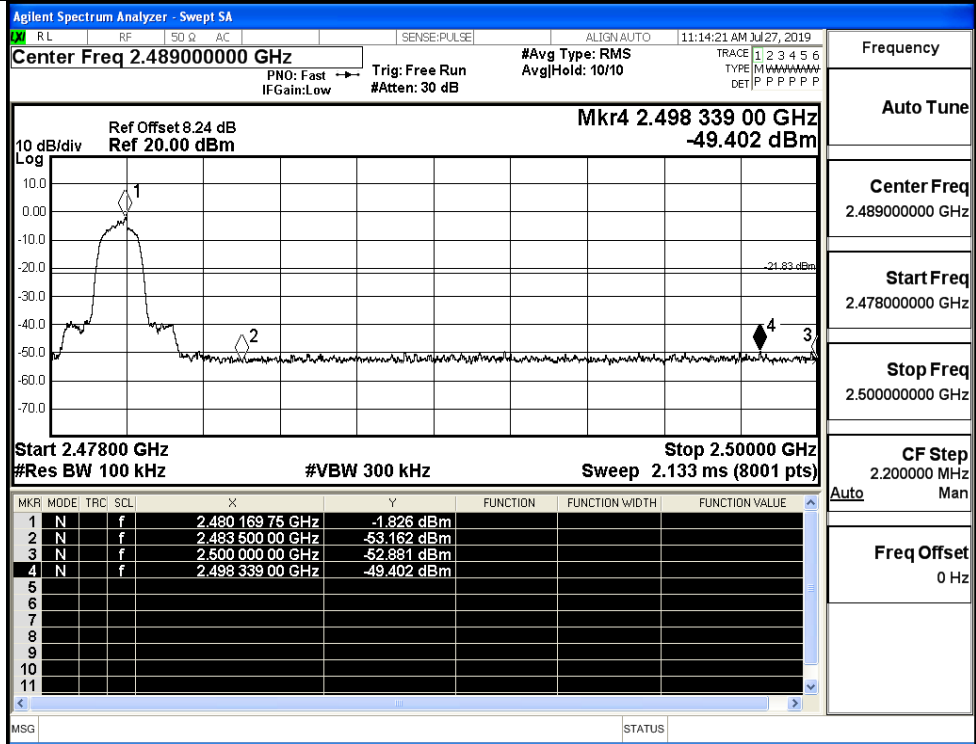
$\pi/4$ DQPSK/LCH/No
Hop



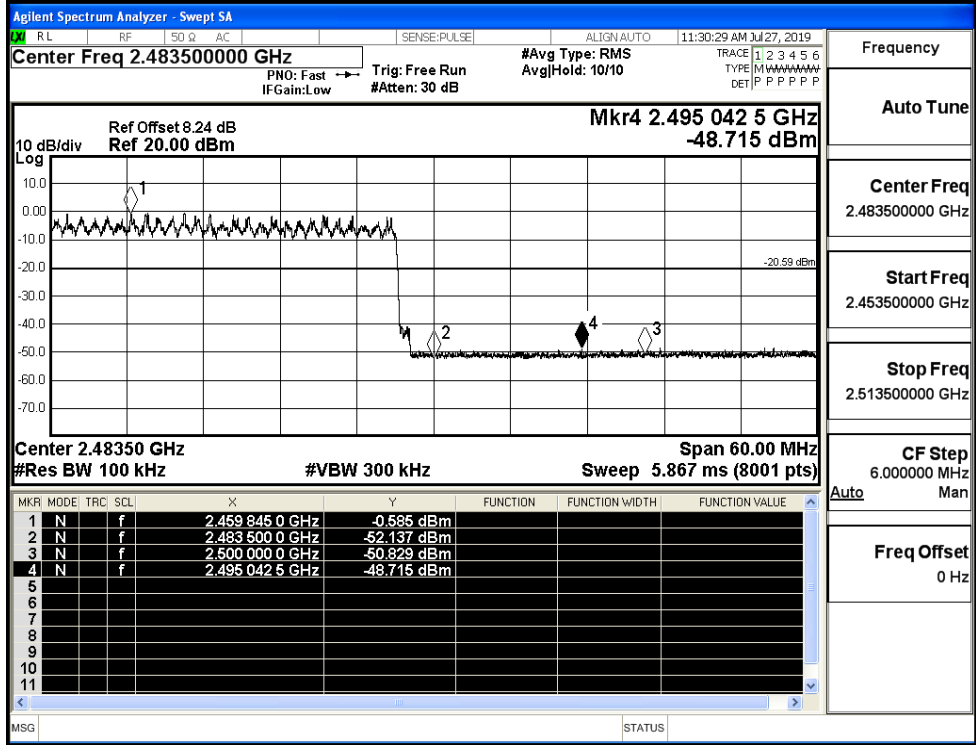
$\pi/4$ DQPSK/LCH/Hop



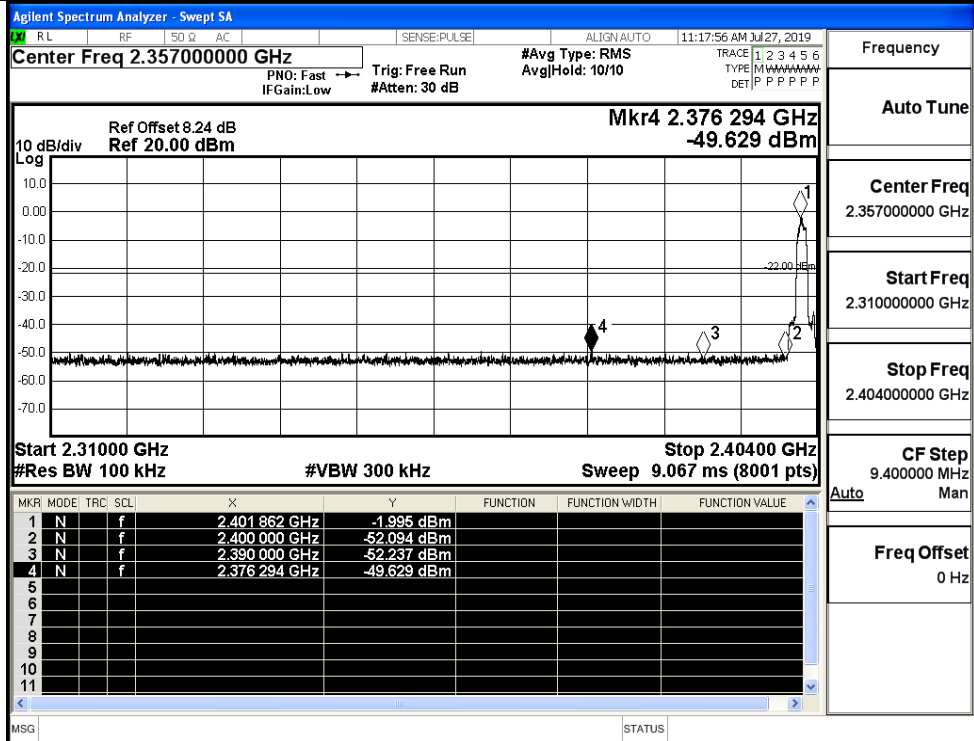
$\pi/4$ DQPSK/HCH/No Hop



$\pi/4$ DQPSK/HCH/Hop

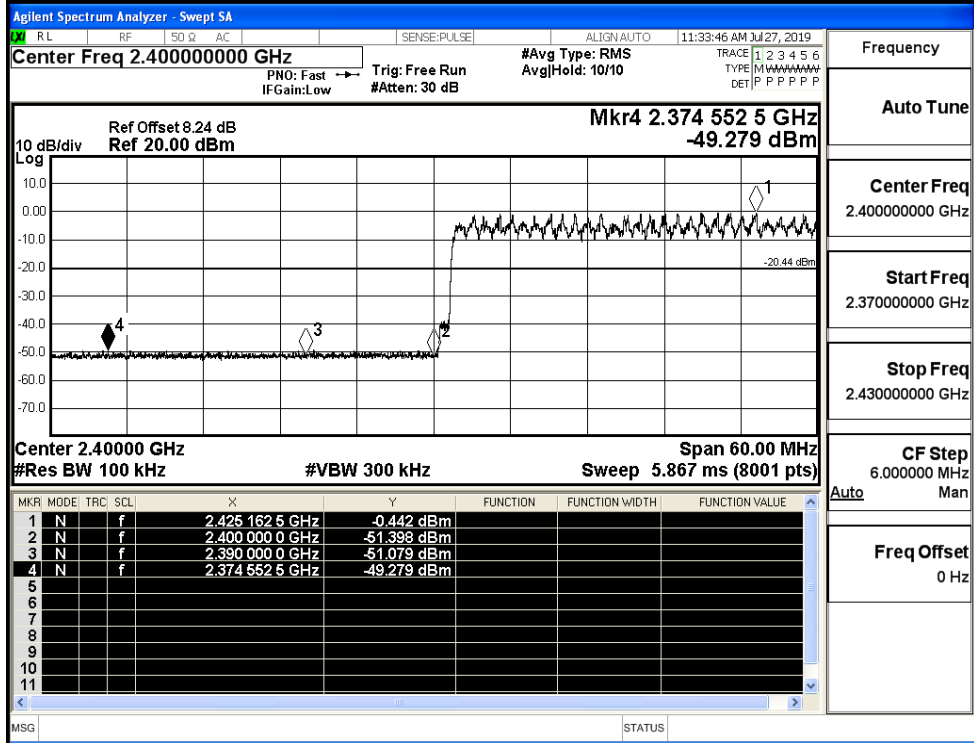


8DPSK/LCH/No Hop



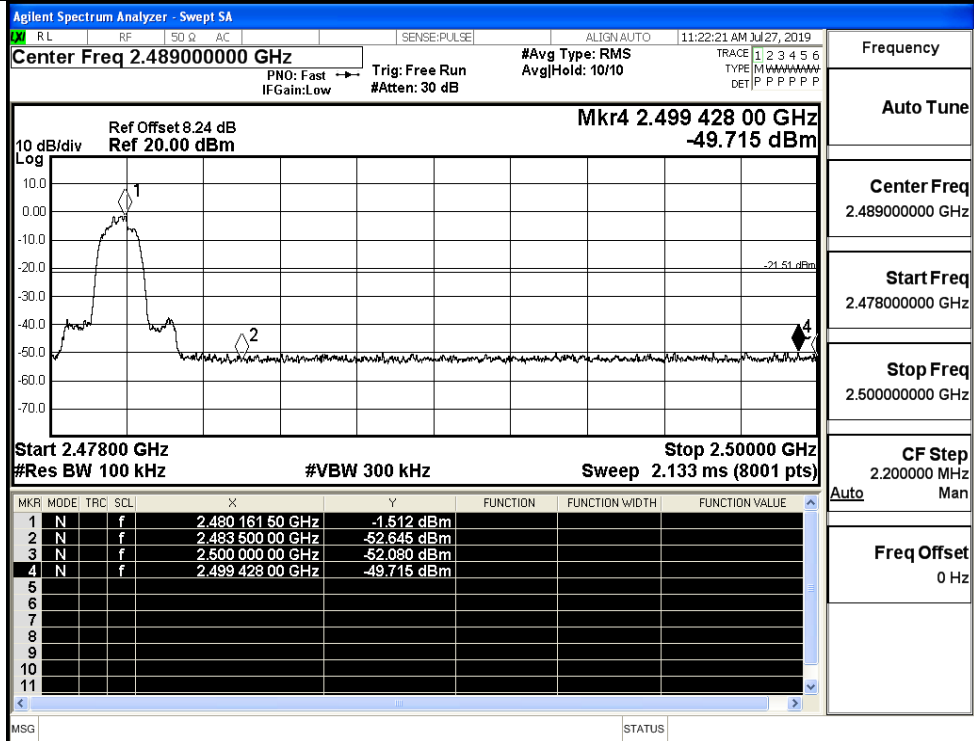
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



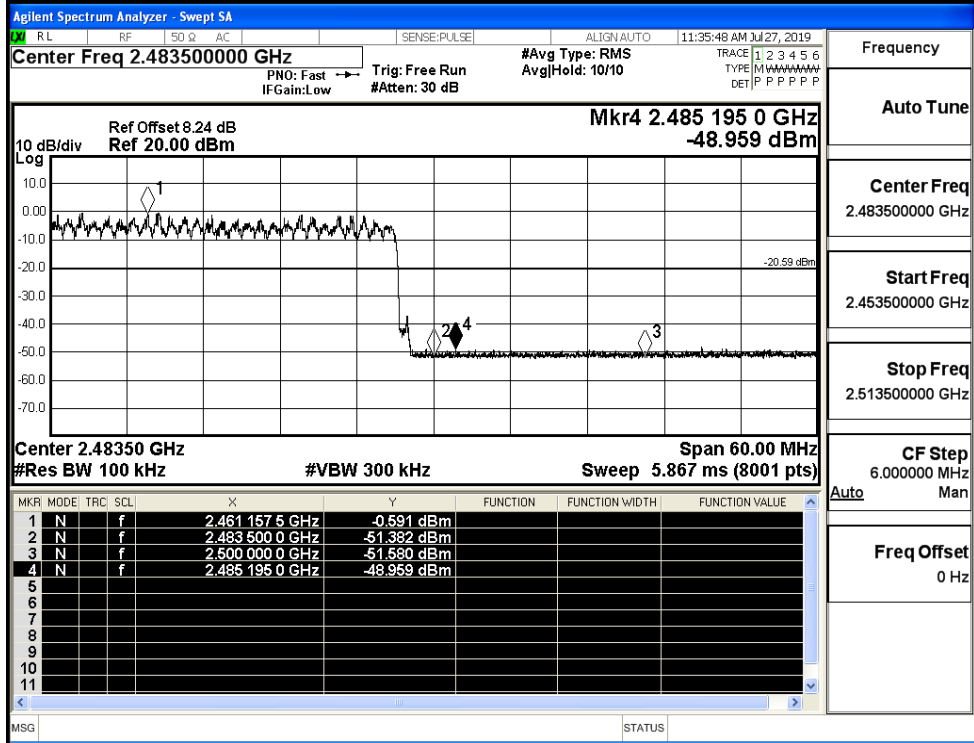
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/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

8DPSK/HCH/Hop

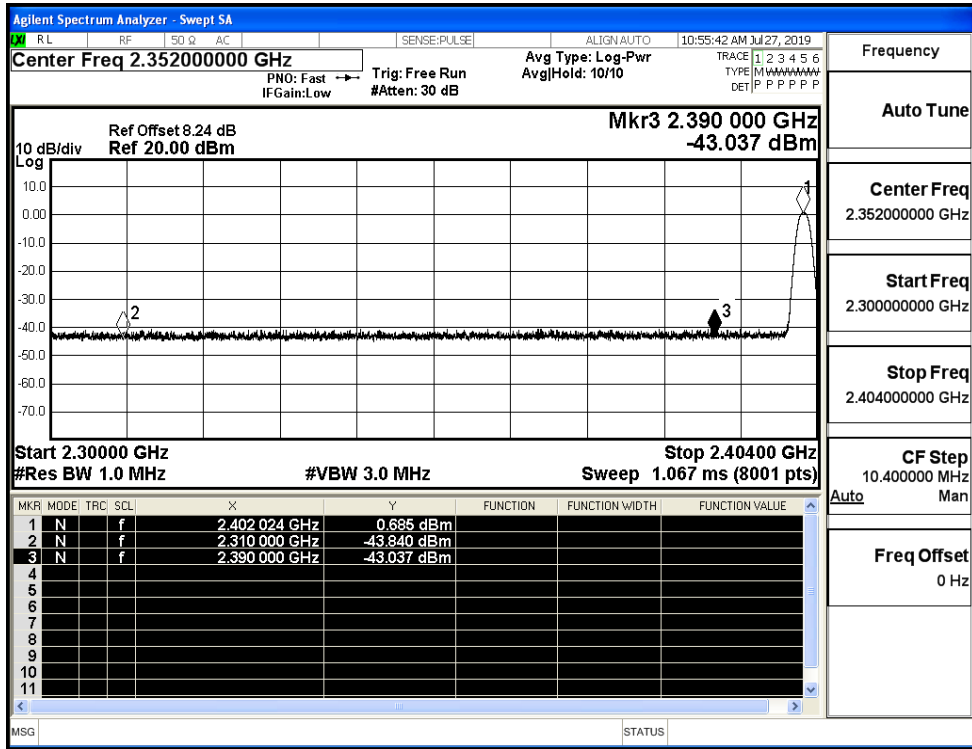


Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.461500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

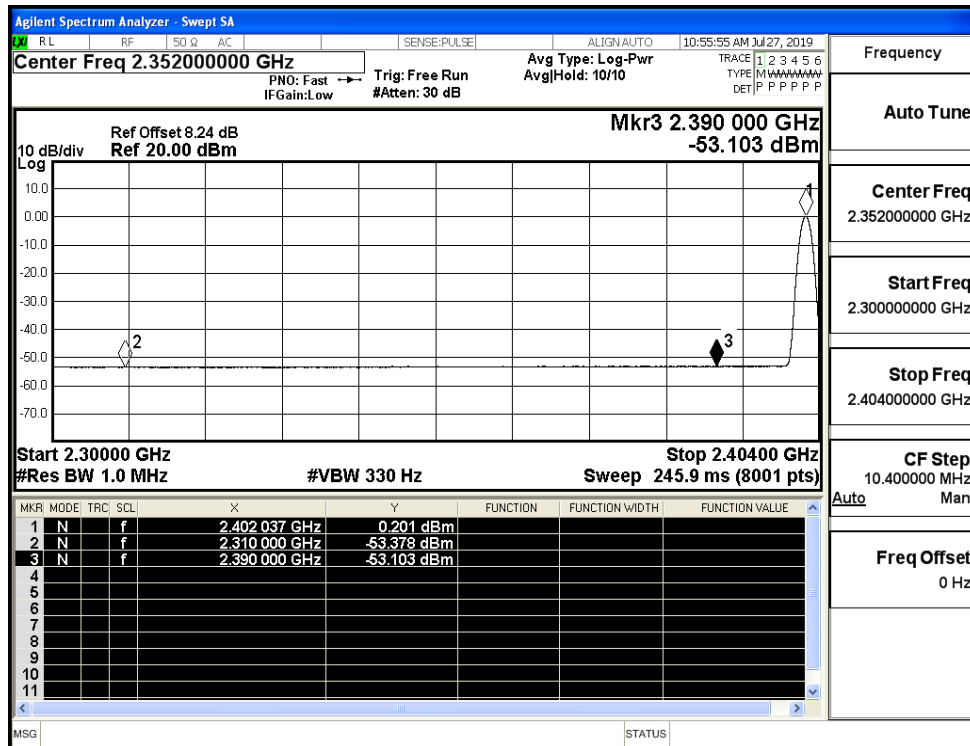
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.84	2.0	0	51.42	PEAK	74	PASS
	Off	2310.0	-53.38	2.0	0	41.88	AV	54	PASS
	Off	2390.0	-43.04	2.0	0	52.22	PEAK	74	PASS
	Off	2390.0	-53.10	2.0	0	42.15	AV	54	PASS
	Off	2483.5	-41.77	2.0	0	53.49	PEAK	74	PASS
	Off	2483.5	-52.88	2.0	0	42.38	AV	54	PASS
	Off	2500.0	-42.79	2.0	0	52.47	PEAK	74	PASS
	Off	2500.0	-52.75	2.0	0	42.51	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.35	2.0	0	51.91	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	41.97	AV	54	PASS
	Off	2390.0	-43.06	2.0	0	52.20	PEAK	74	PASS
	Off	2390.0	-53.15	2.0	0	42.11	AV	54	PASS
	Off	2483.5	-44.18	2.0	0	51.08	PEAK	74	PASS
	Off	2483.5	-52.77	2.0	0	42.49	AV	54	PASS
	Off	2500.0	-42.91	2.0	0	52.35	PEAK	74	PASS
	Off	2500.0	-52.80	2.0	0	42.46	AV	54	PASS
8DPSK	Off	2310.0	-43.03	2.0	0	52.23	PEAK	74	PASS
	Off	2310.0	-53.18	2.0	0	42.07	AV	54	PASS
	Off	2390.0	-43.25	2.0	0	52.01	PEAK	74	PASS
	Off	2390.0	-53.05	2.0	0	42.21	AV	54	PASS
	Off	2483.5	-42.21	2.0	0	53.04	PEAK	74	PASS
	Off	2483.5	-52.77	2.0	0	42.49	AV	54	PASS
	Off	2500.0	-43.16	2.0	0	52.10	PEAK	74	PASS
	Off	2500.0	-52.71	2.0	0	42.55	AV	54	PASS

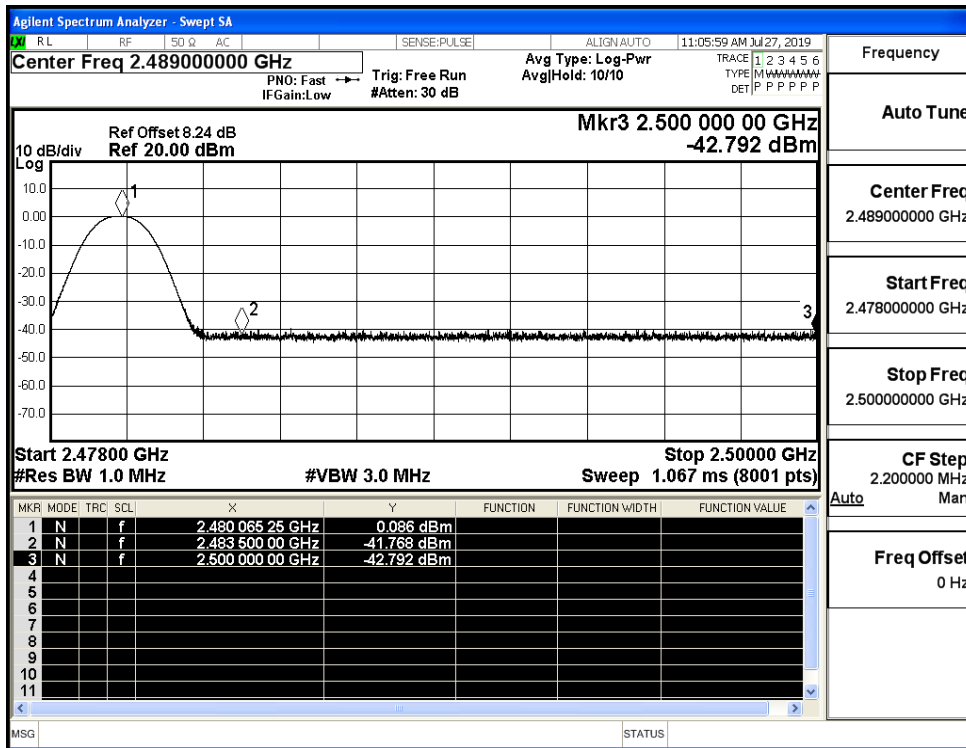
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



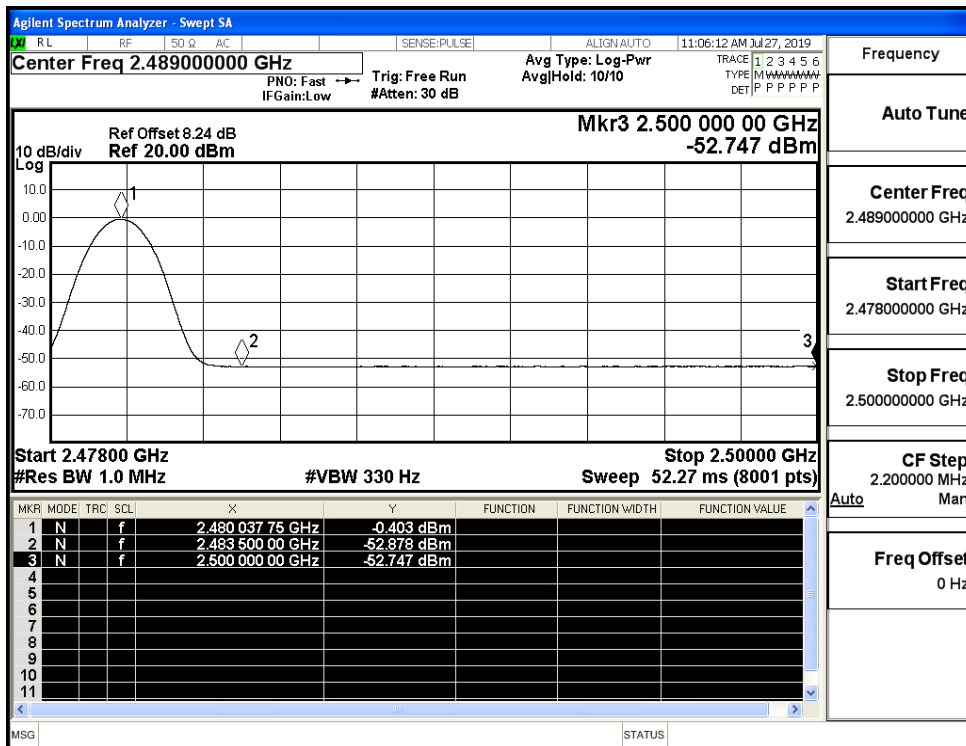
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



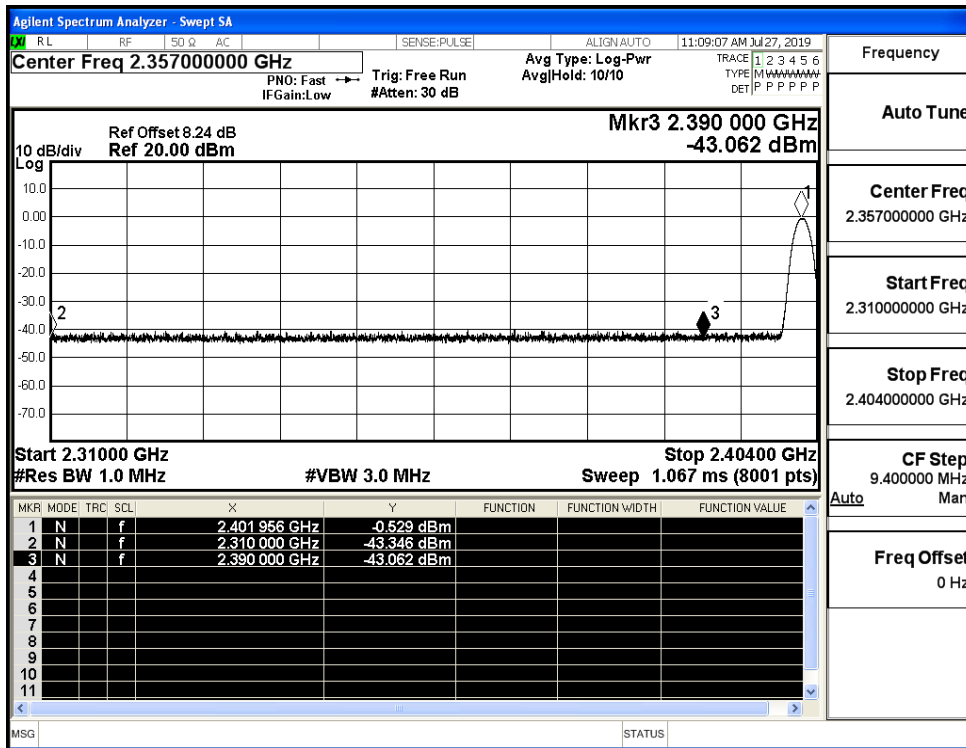
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



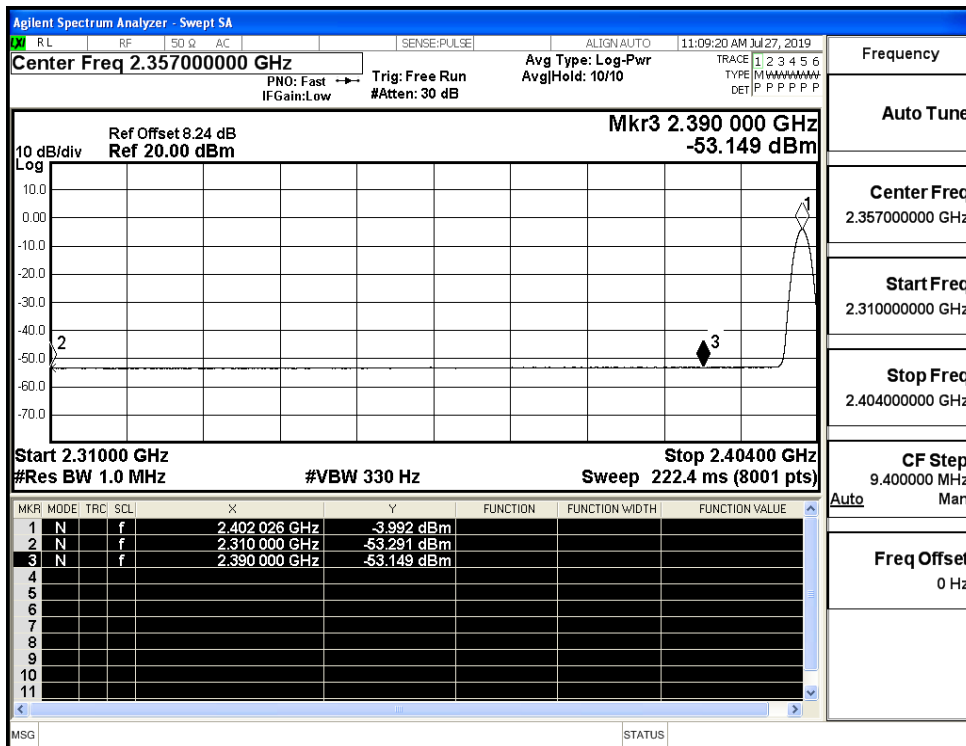
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



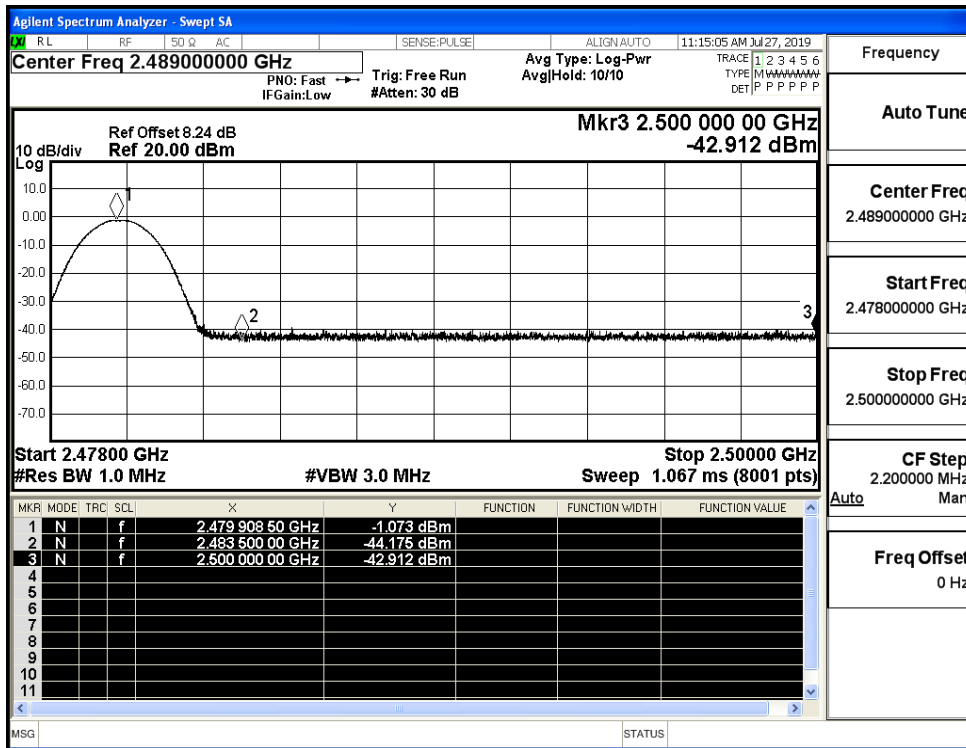
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



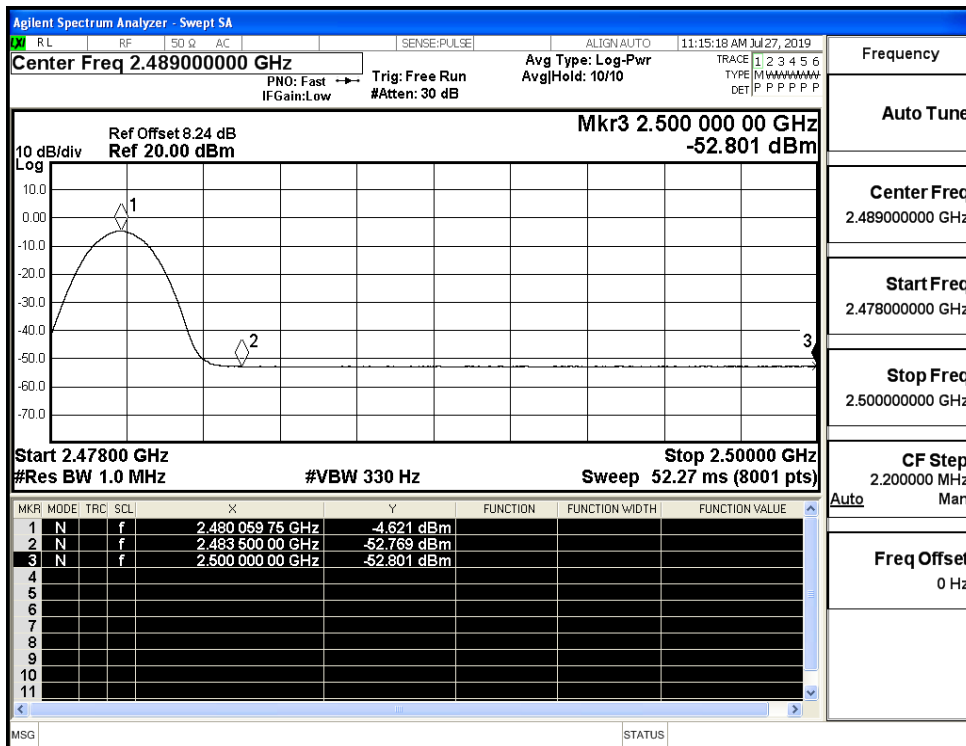
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



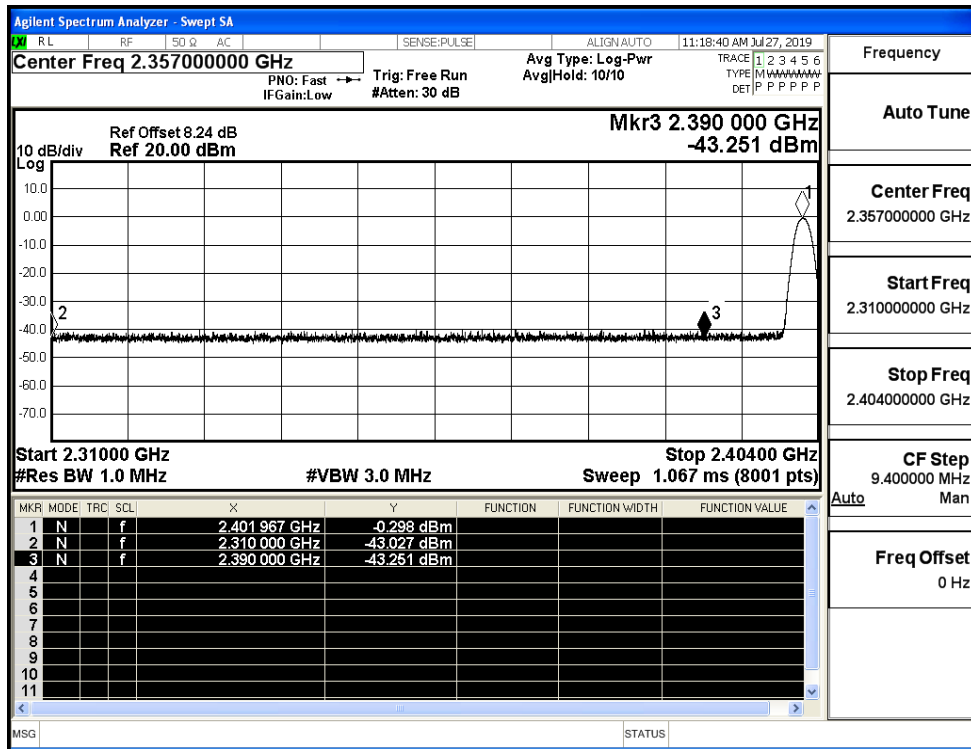
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



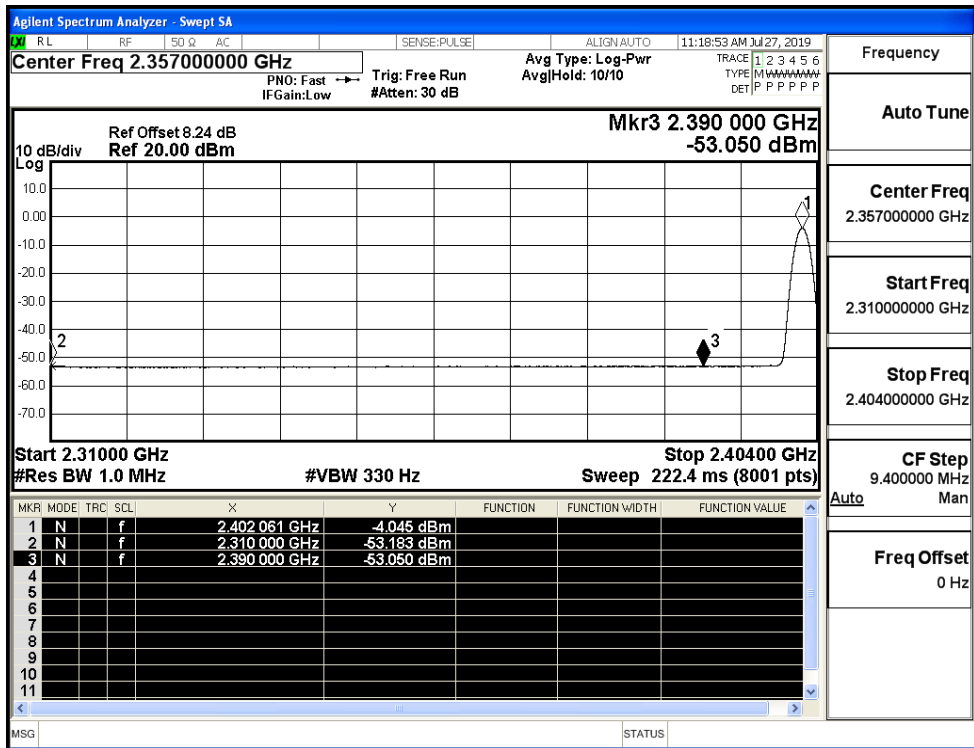
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



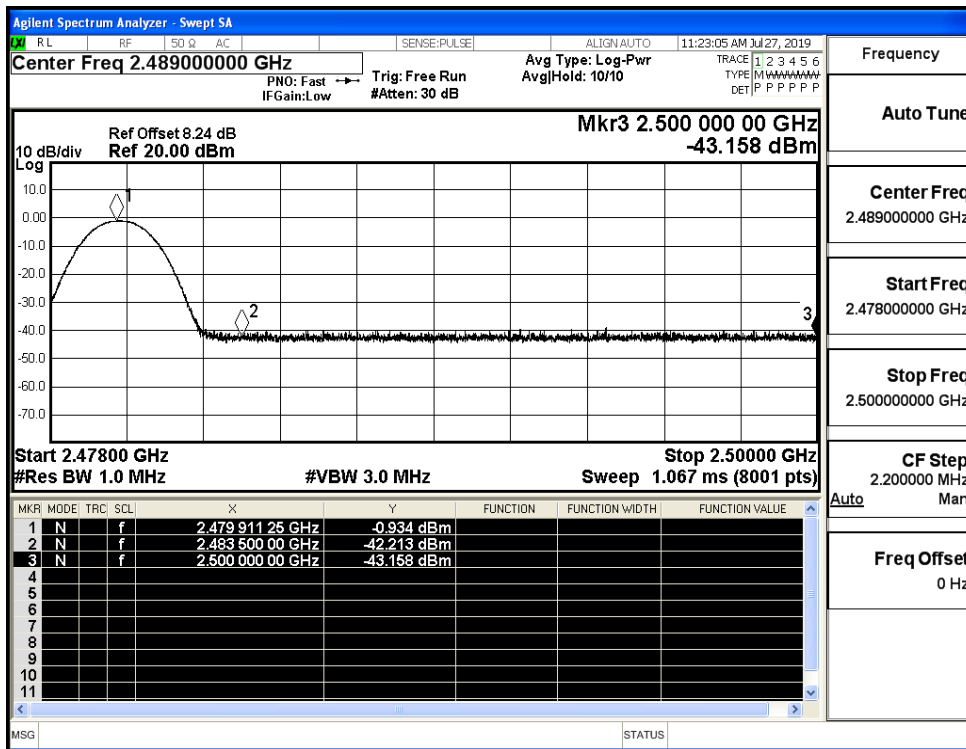
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

