

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: LED Bathroom Mirror Luminaires



Trade Mark:

Test Model: JTSM-R01-3224

Environmental Conditions

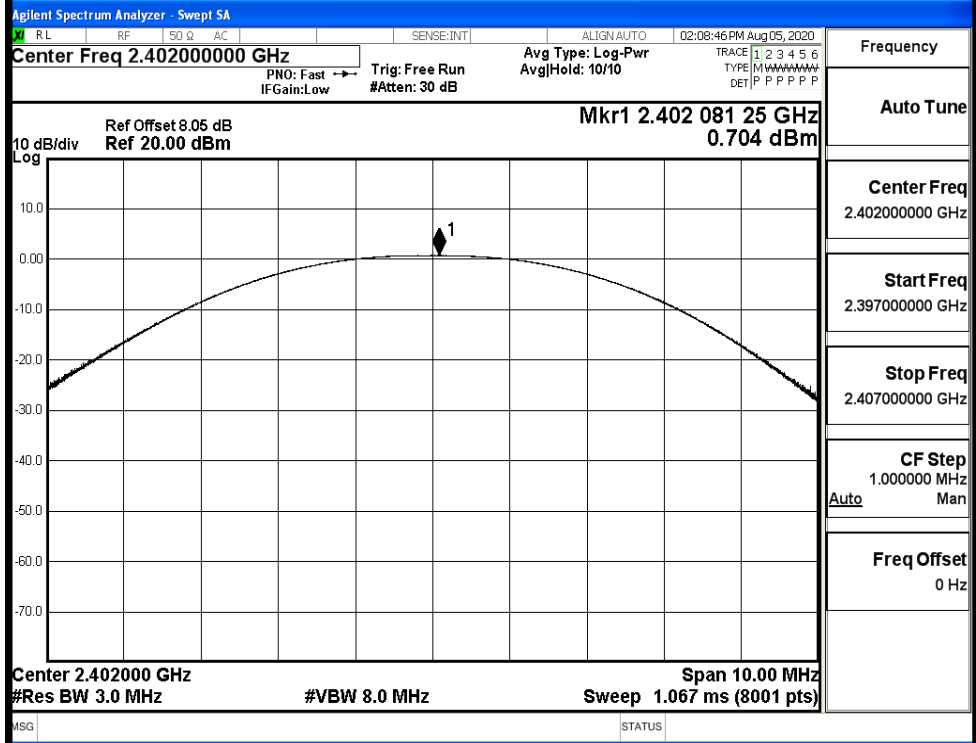
Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

A.1 Maxmum Conducted Peak Output Power

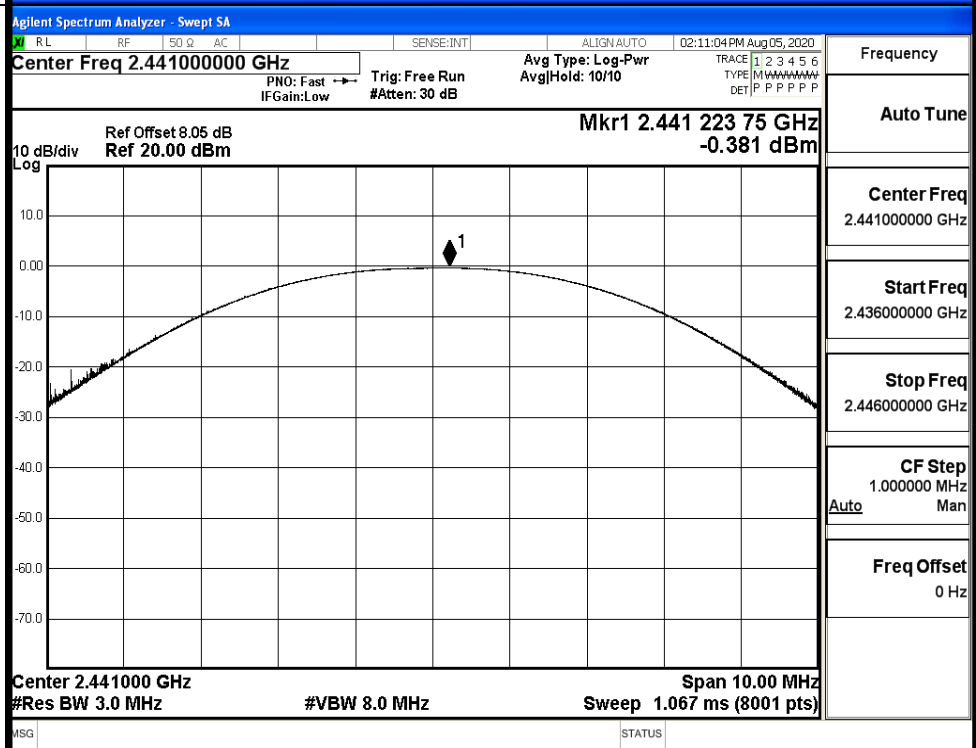
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.704	21	PASS
	MCH	-0.381	21	PASS
	HCH	-1.052	21	PASS
$\pi/4$ DQPSK	LCH	0.779	21	PASS
	MCH	-0.216	21	PASS
	HCH	-0.865	21	PASS
8DPSK	LCH	0.778	21	PASS
	MCH	-0.263	21	PASS
	HCH	-0.937	21	PASS

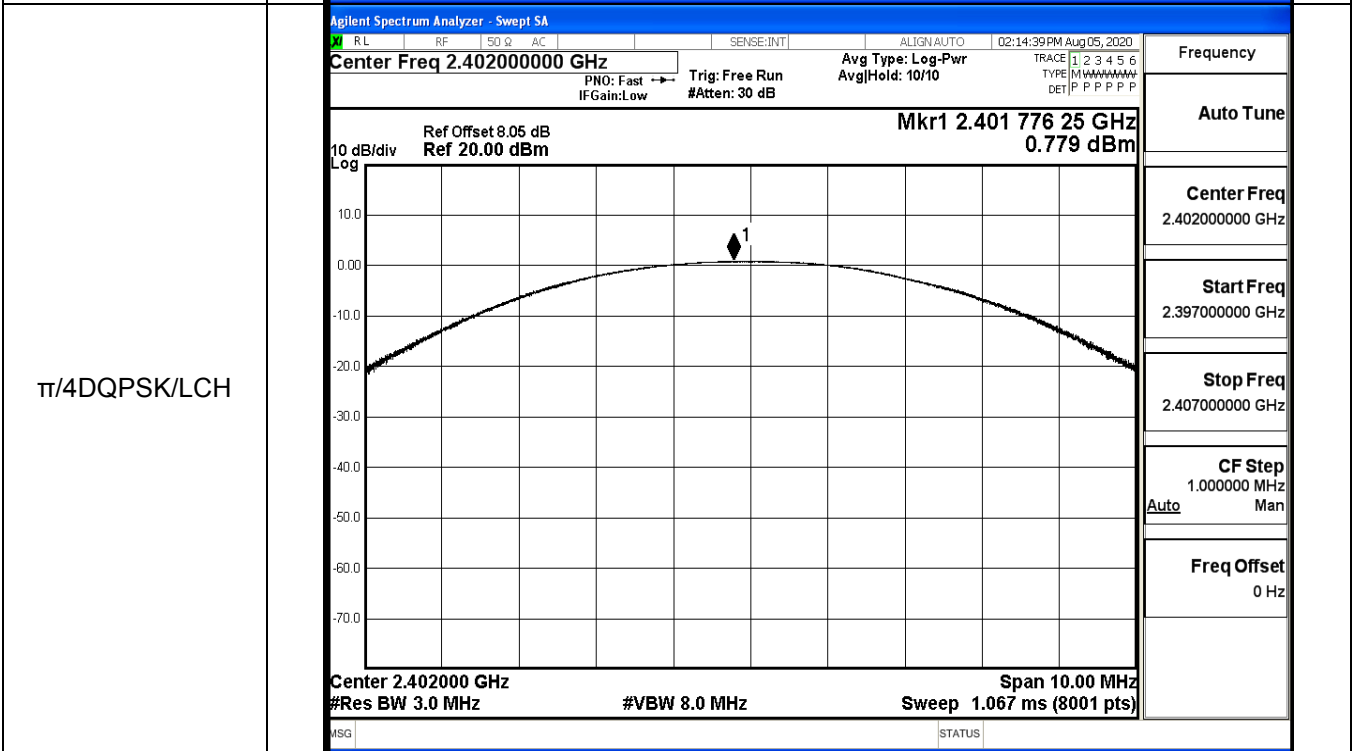
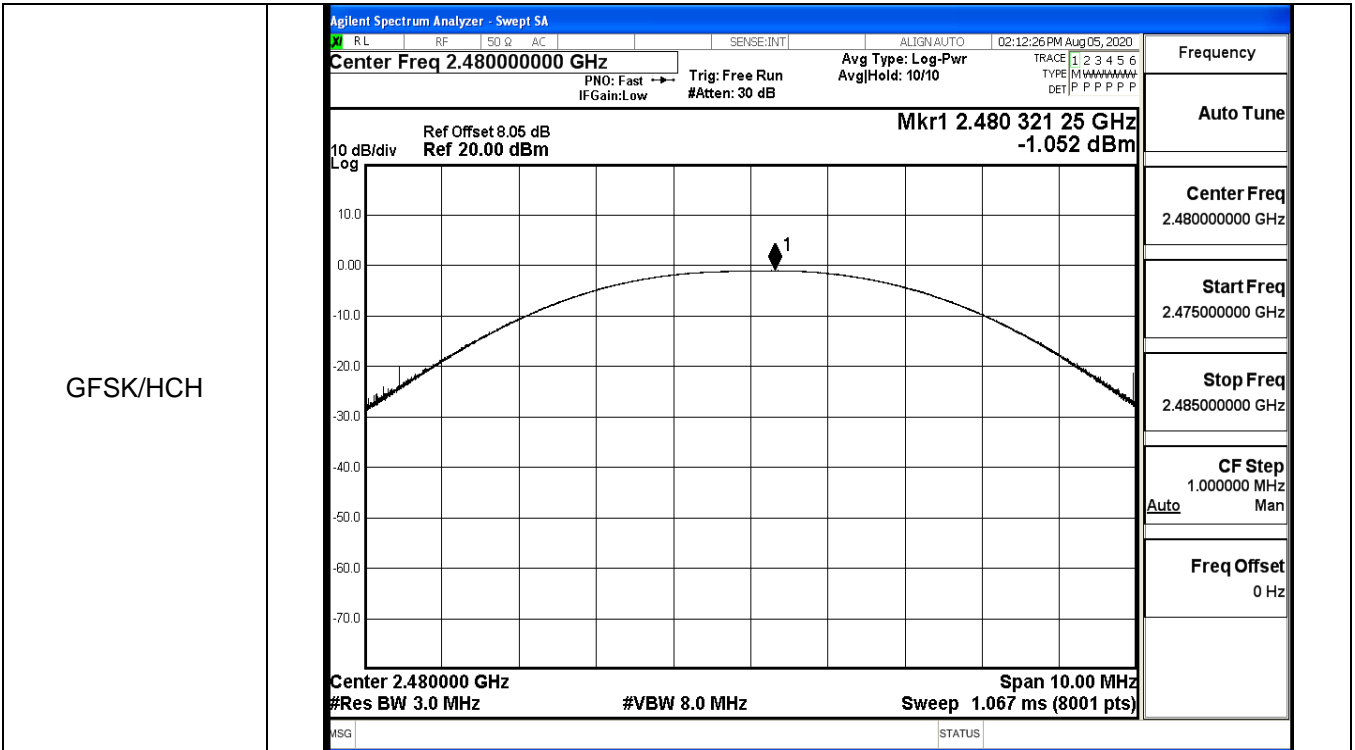
Test Graphs

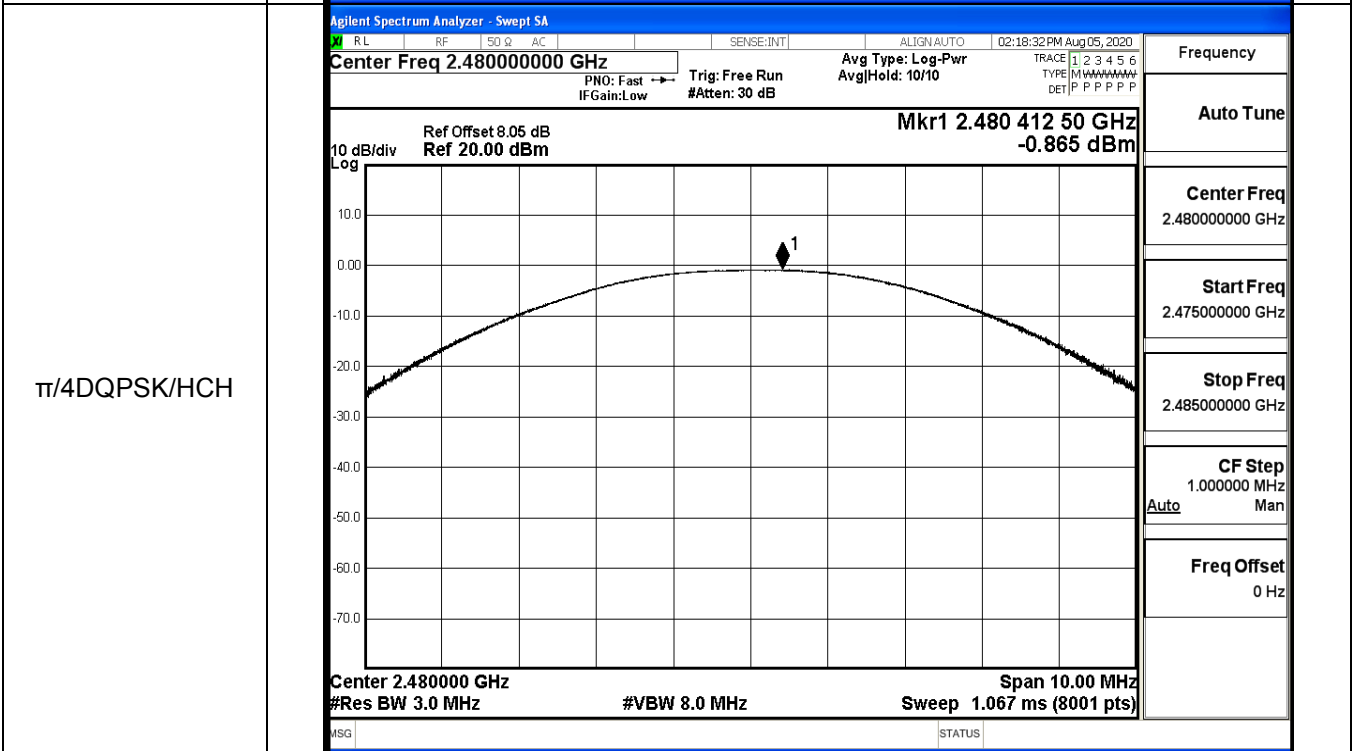
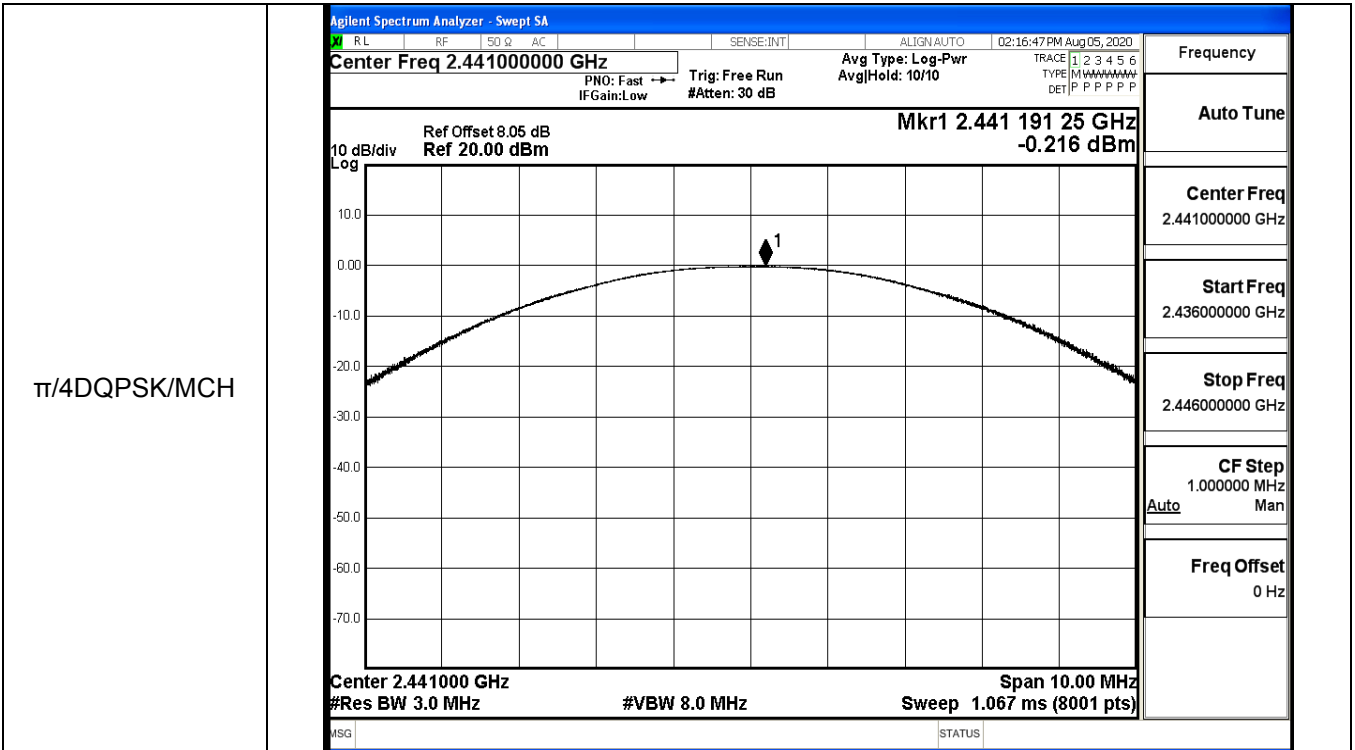
GFSK/LCH



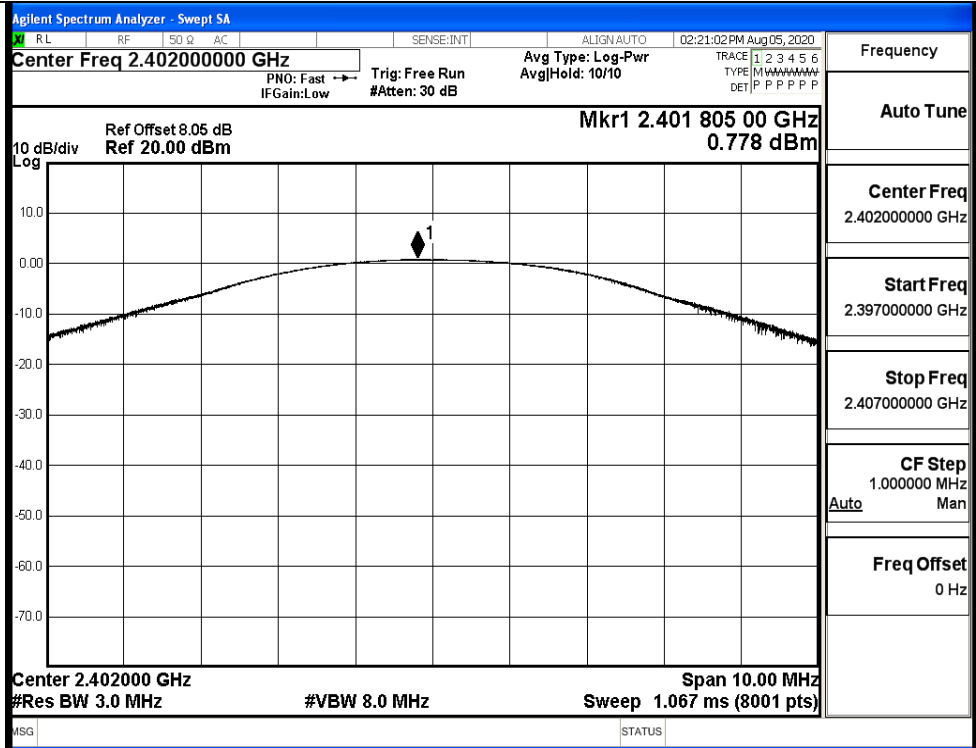
GFSK/MCH



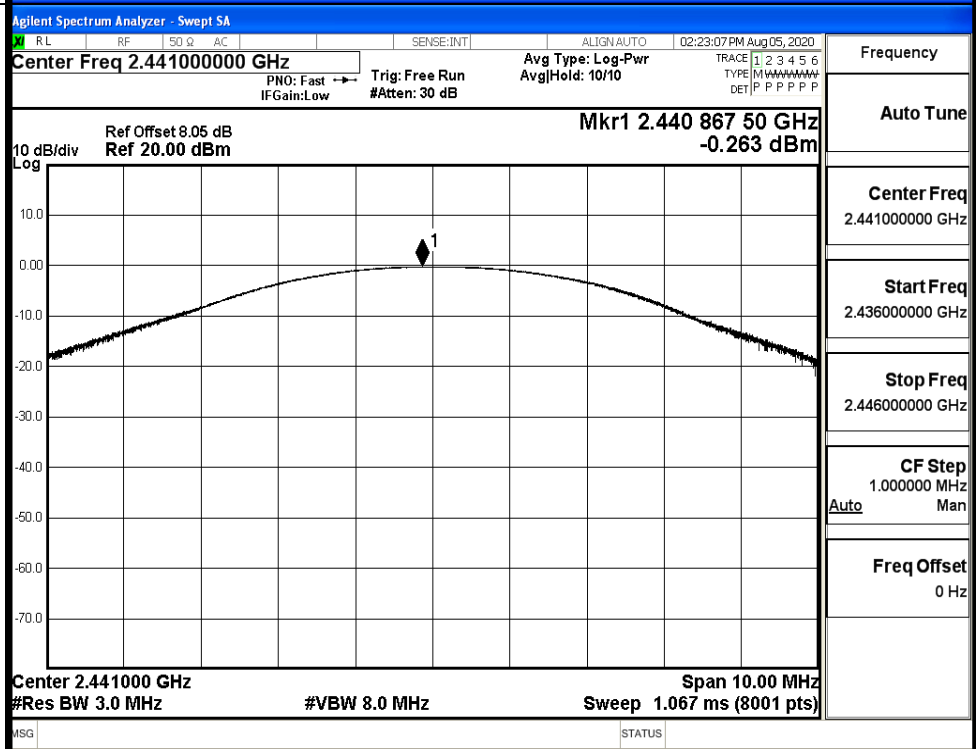




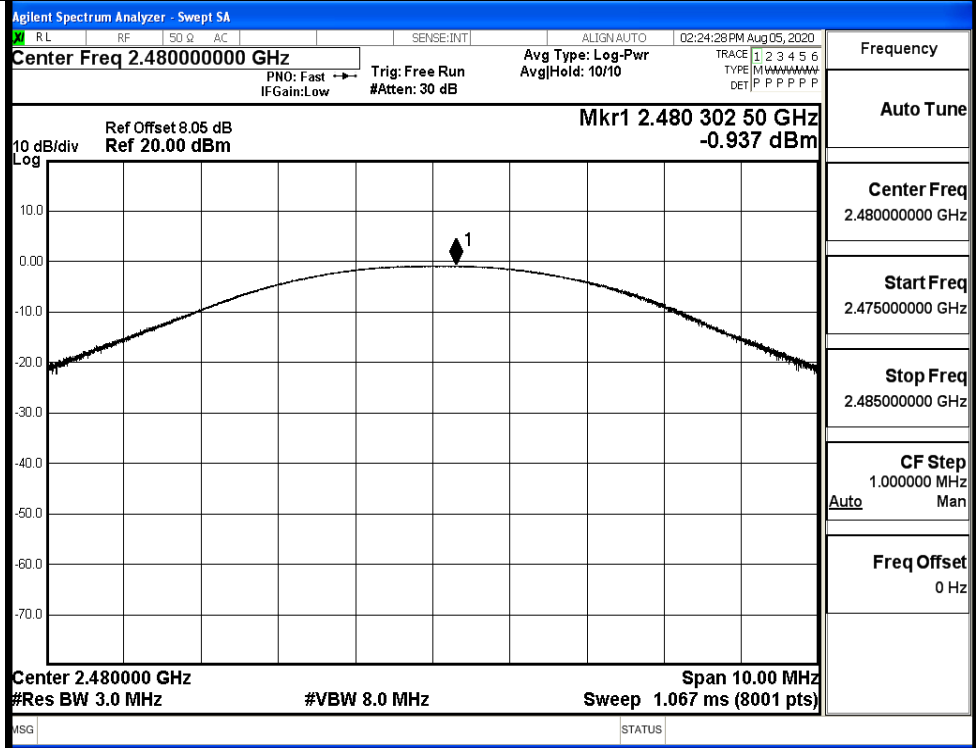
8DPSK/LCH



8DPSK/MCH

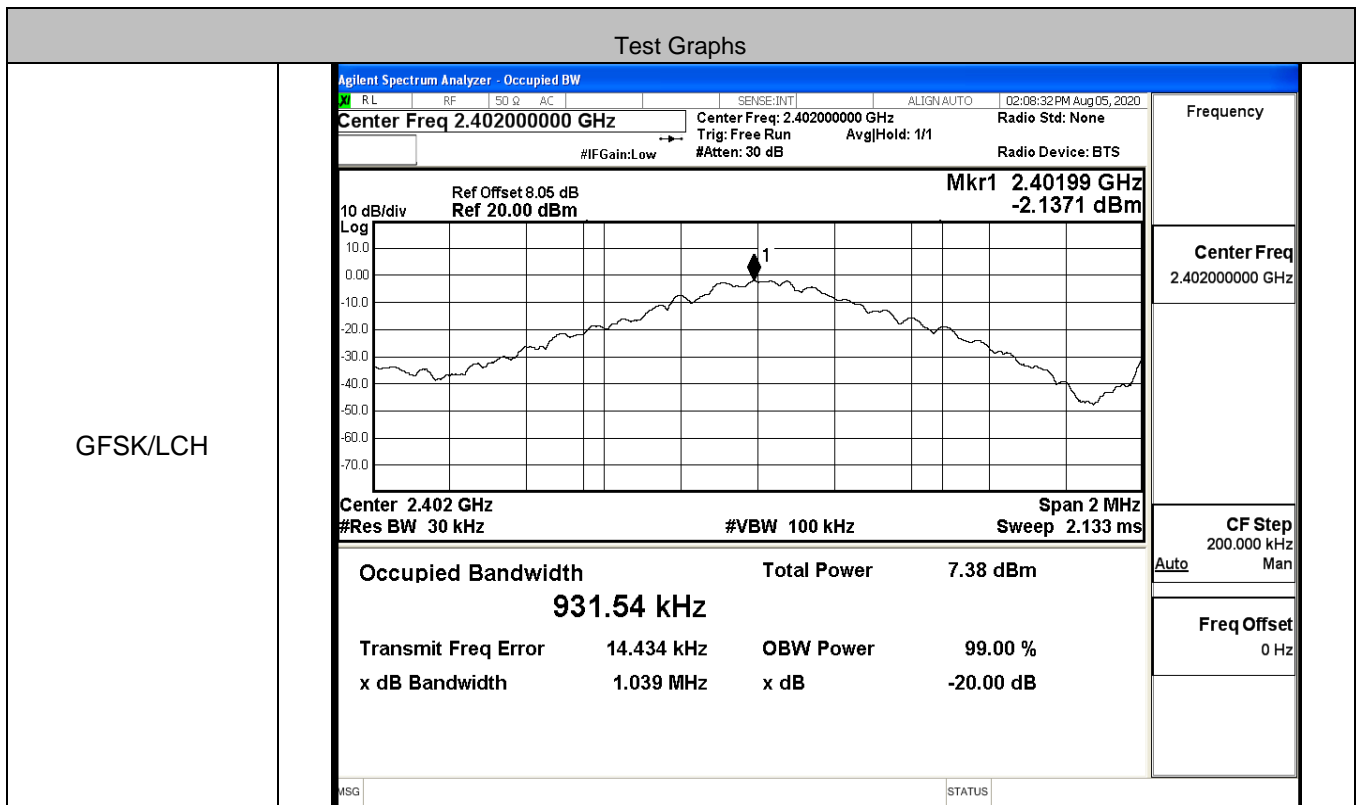


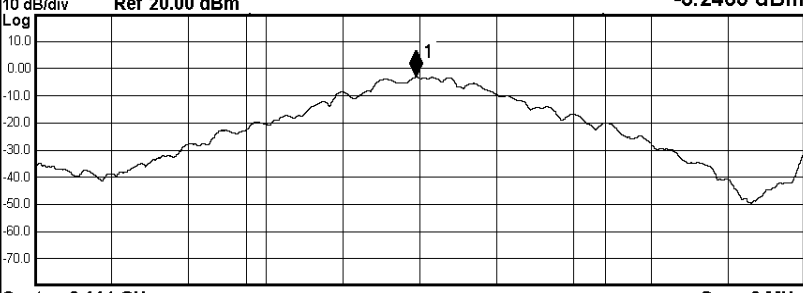
8DPSK/HCH

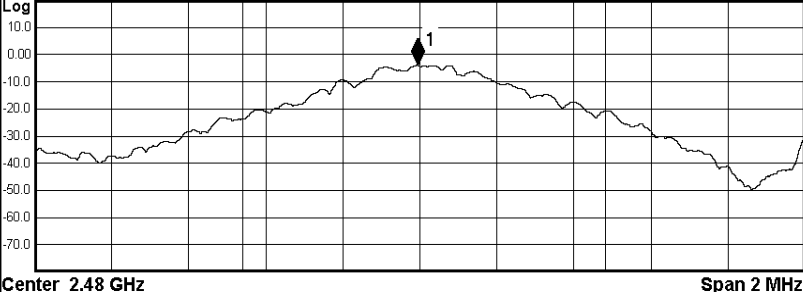


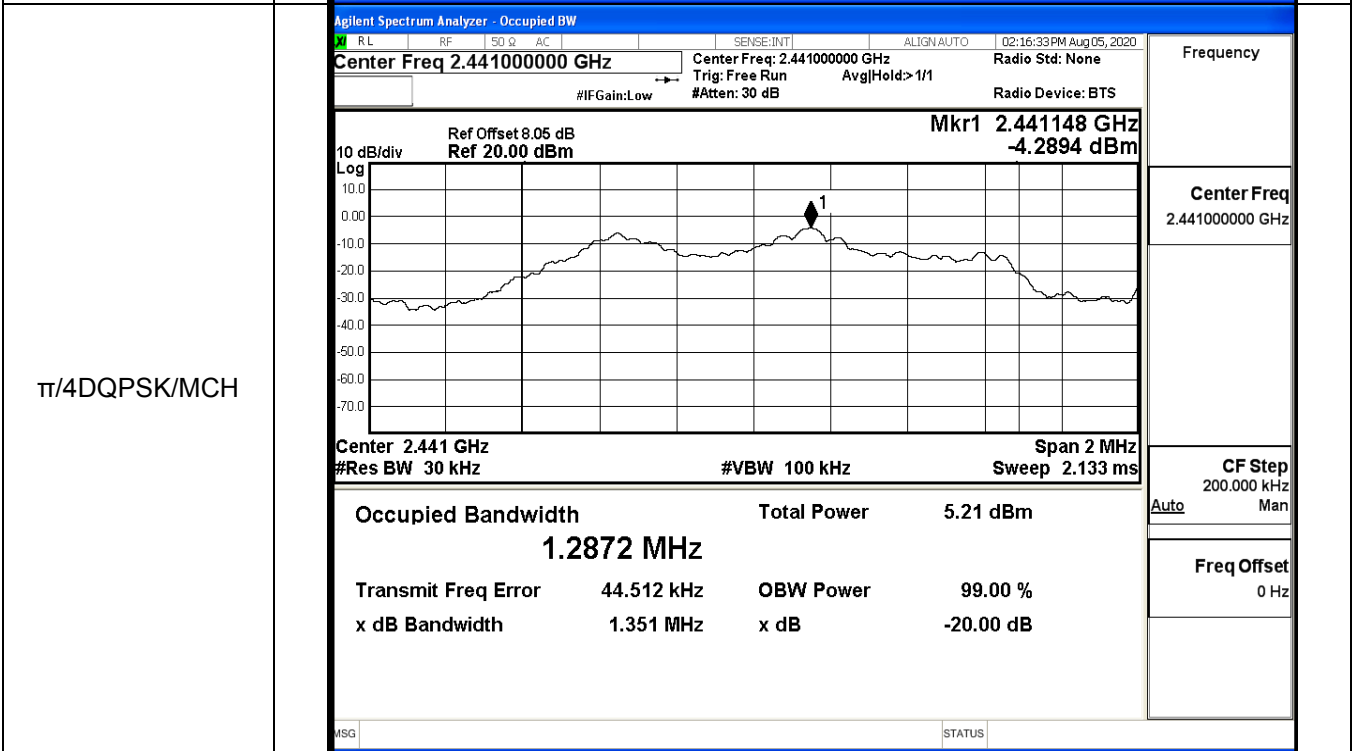
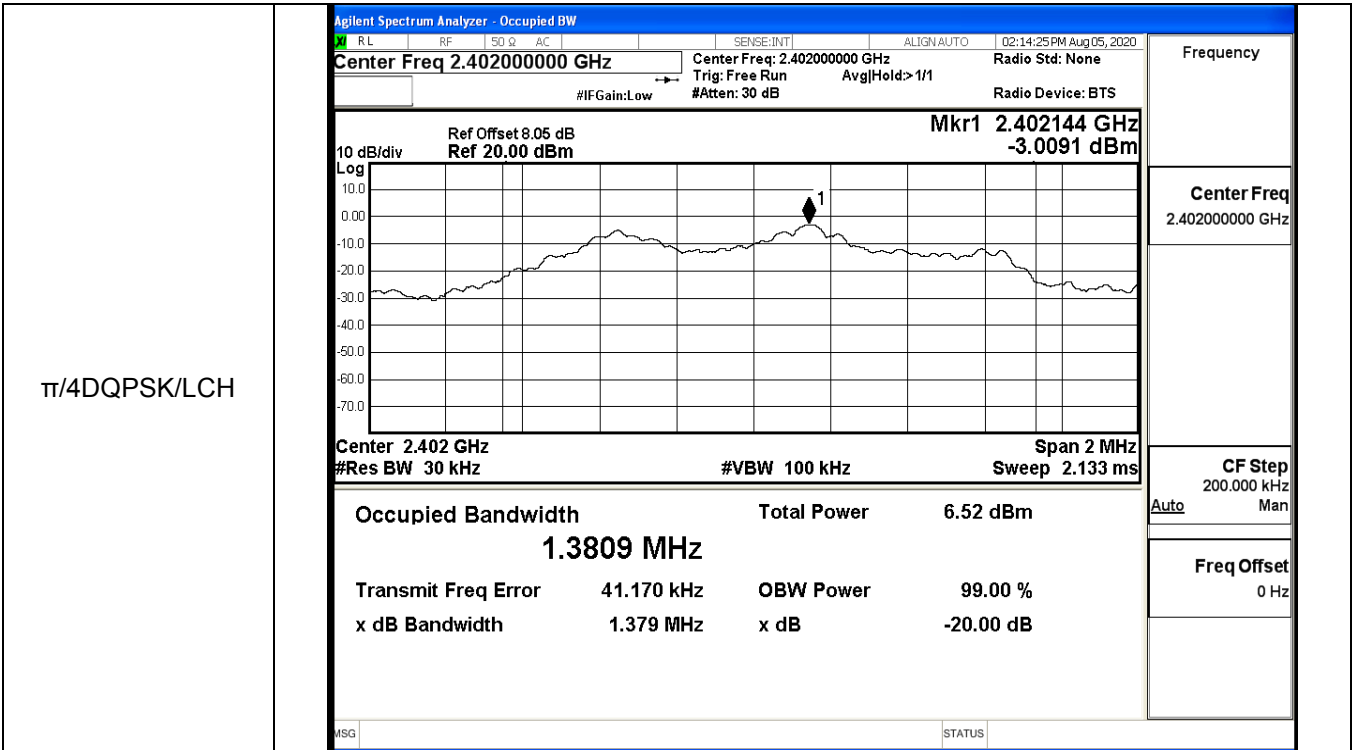
A.2 20dB Bandwidth

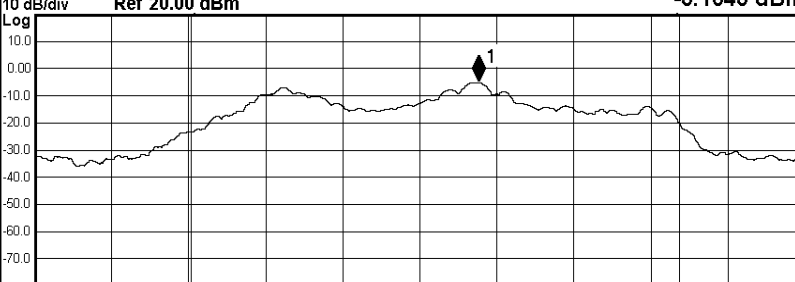
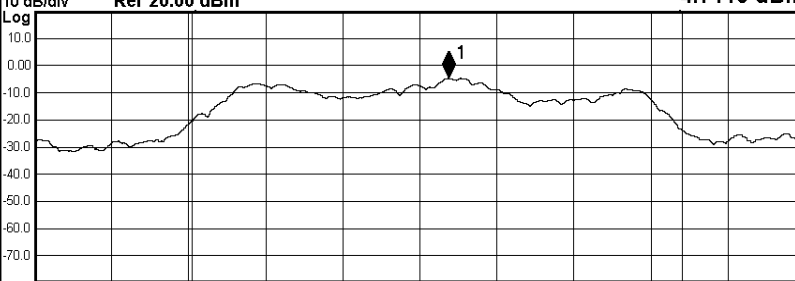
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.039	Not Specified	PASS
	MCH	1.039	Not Specified	PASS
	HCH	1.040	Not Specified	PASS
π/4DQPSK	LCH	1.379	Not Specified	PASS
	MCH	1.351	Not Specified	PASS
	HCH	1.343	Not Specified	PASS
8DPSK	LCH	1.624	Not Specified	PASS
	MCH	1.312	Not Specified	PASS
	HCH	1.620	Not Specified	PASS

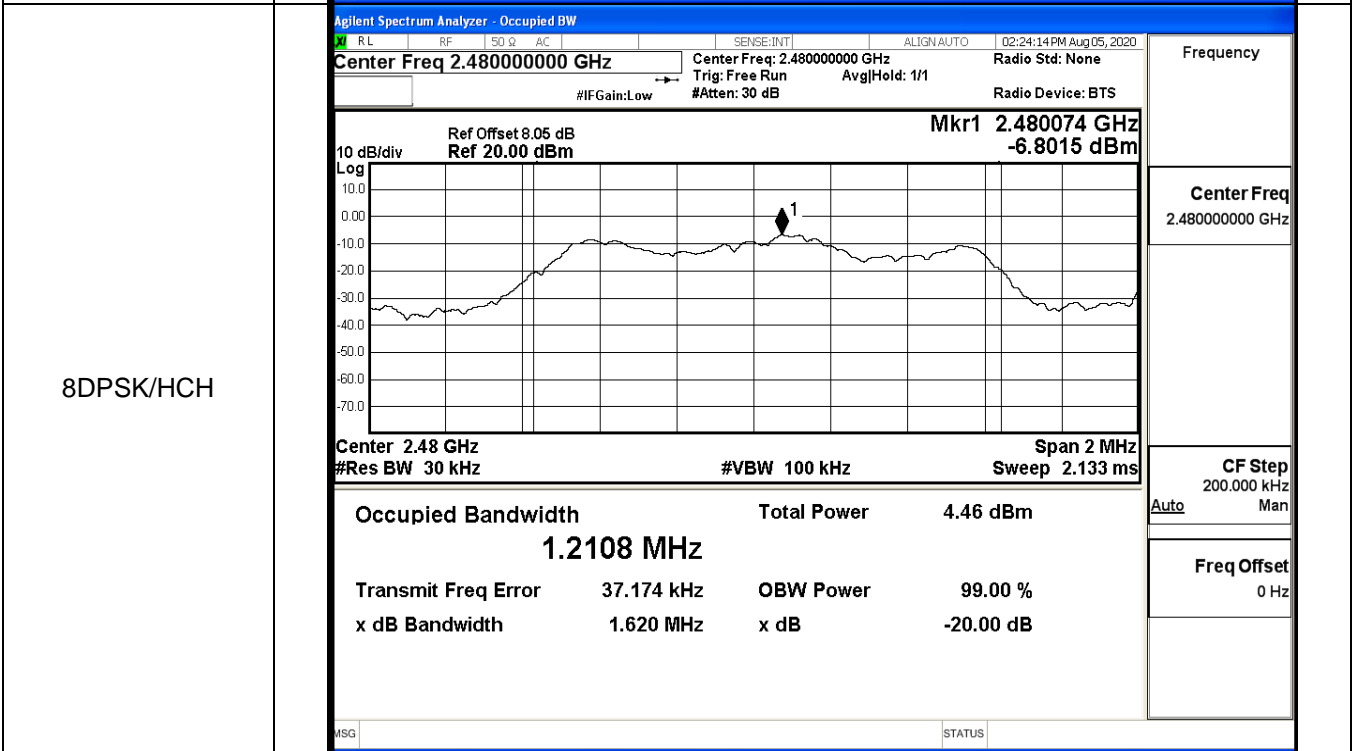
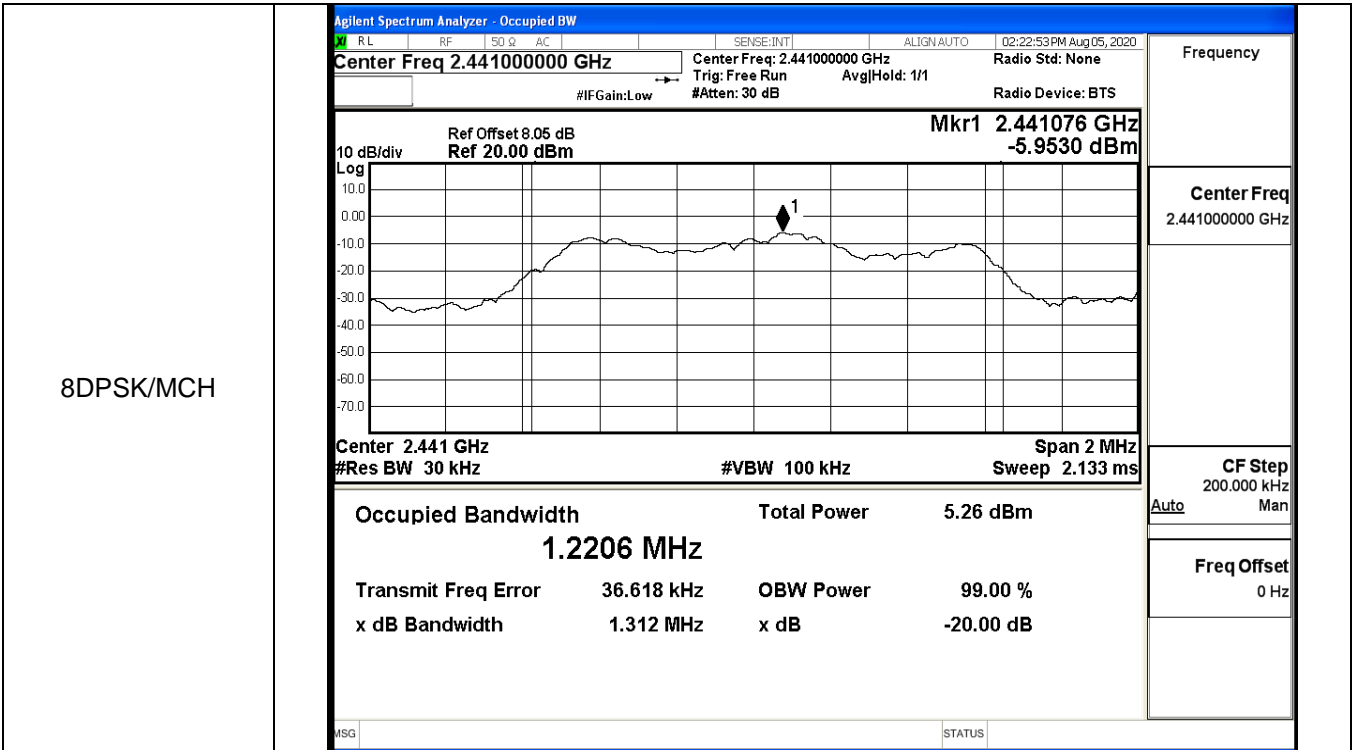


GFSK/MCH	Agilent Spectrum Analyzer - Occupied BW	X RL RF 50 Ω AC SENSE:INT ALIGN AUTO 02:10:50 PM Aug 05, 2020 Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Radio Std: None Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS	Frequency
	Ref Offset 8.05 dB Mkr1 2.44099 GHz Ref 20.00 dB -3.2465 dBm		Center Freq 2.441000000 GHz
	Center 2.441 GHz Span 2 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms	Occupied Bandwidth Total Power 6.26 dBm 925.42 kHz	CF Step 200.000 kHz Auto Man
	Transmit Freq Error 18.232 kHz OBW Power 99.00 % x dB Bandwidth 1.039 MHz x dB -20.00 dB	Freq Offset 0 Hz	

GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW	X RL RF 50 Ω AC SENSE:INT ALIGN AUTO 02:12:12 PM Aug 05, 2020 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None Trig: Free Run AvgHold>1/1 #IFGain:Low #Atten: 30 dB Radio Device: BTS	Frequency
	Ref Offset 8.05 dB Mkr1 2.47994 GHz Ref 20.00 dB -3.9543 dBm		Center Freq 2.480000000 GHz
	Center 2.48 GHz Span 2 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms	Occupied Bandwidth Total Power 5.56 dBm 936.78 kHz	CF Step 200.000 kHz Auto Man
	Transmit Freq Error 13.257 kHz OBW Power 99.00 % x dB Bandwidth 1.040 MHz x dB -20.00 dB	Freq Offset 0 Hz	

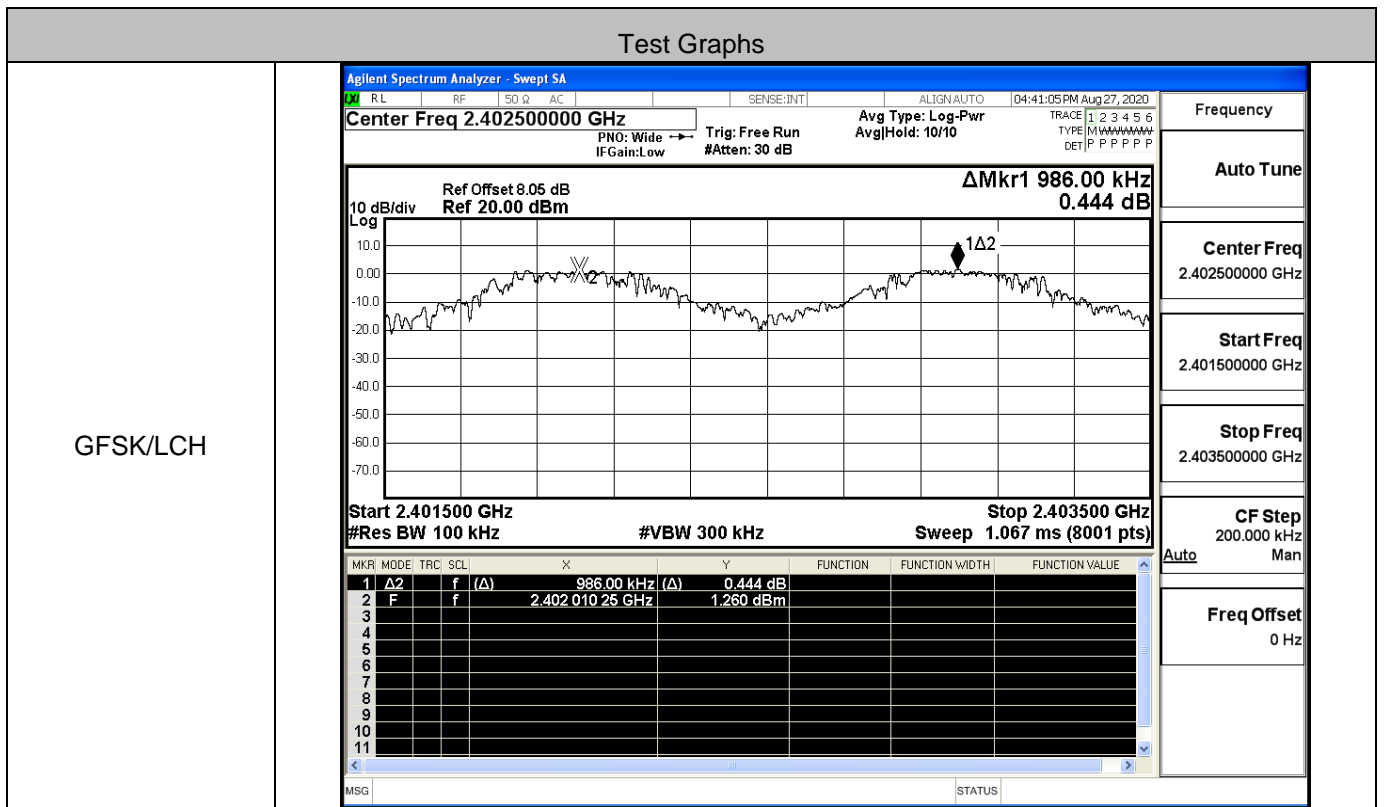


<p style="text-align: center;">π/4DQPSK/HCH</p>	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.48000000 GHz Center Freq: 2.48000000 GHz Radio Std: None Trig: Free Run AvgHold: 1/1 #IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>Ref Offset 8.05 dB Mkr1 2.480154 GHz Ref 20.00 dBm -5.1045 dBm</p>  <p>Center 2.48 GHz Span 2 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms</p> <table border="0" style="width: 100%;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>4.34 dBm</td> </tr> <tr> <td colspan="3" style="text-align: center;">1.2645 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>42.129 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>1.343 MHz</td> <td>x dB -20.00 dB</td> </tr> </table> <p>MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	4.34 dBm	1.2645 MHz			Transmit Freq Error	42.129 kHz	OBW Power 99.00 %	x dB Bandwidth	1.343 MHz	x dB -20.00 dB	<p>Frequency</p> <p>Center Freq 2.48000000 GHz</p> <p>CF Step 200.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
	Occupied Bandwidth	Total Power	4.34 dBm											
1.2645 MHz														
Transmit Freq Error	42.129 kHz	OBW Power 99.00 %												
x dB Bandwidth	1.343 MHz	x dB -20.00 dB												
<p style="text-align: center;">8DPSK/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 #IFGain: Low #Atten: 30 dB Radio Device: BTS</p> <p>Ref Offset 8.05 dB Mkr1 2.402076 GHz Ref 20.00 dBm -4.7113 dBm</p>  <p>Center 2.402 GHz Span 2 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 2.133 ms</p> <table border="0" style="width: 100%;"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>6.50 dBm</td> </tr> <tr> <td colspan="3" style="text-align: center;">1.2723 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>45.100 kHz</td> <td>OBW Power 99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>1.624 MHz</td> <td>x dB -20.00 dB</td> </tr> </table> <p>MSG STATUS</p> </div>	Occupied Bandwidth	Total Power	6.50 dBm	1.2723 MHz			Transmit Freq Error	45.100 kHz	OBW Power 99.00 %	x dB Bandwidth	1.624 MHz	x dB -20.00 dB	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 200.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
Occupied Bandwidth	Total Power	6.50 dBm												
1.2723 MHz														
Transmit Freq Error	45.100 kHz	OBW Power 99.00 %												
x dB Bandwidth	1.624 MHz	x dB -20.00 dB												

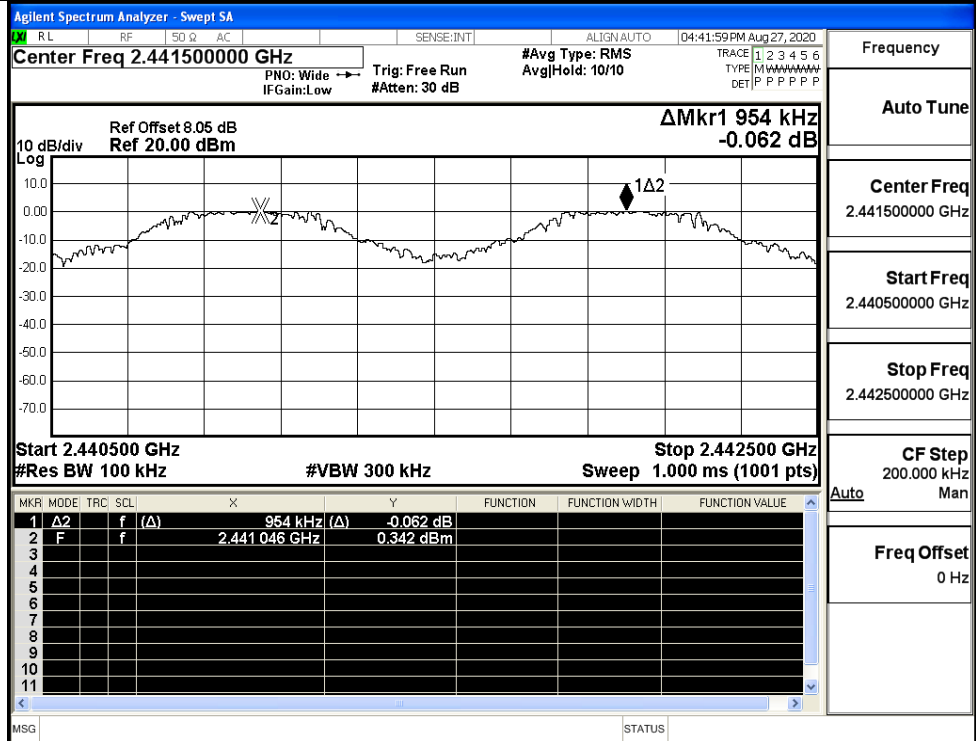


A.3 Carrier Frequency Separation

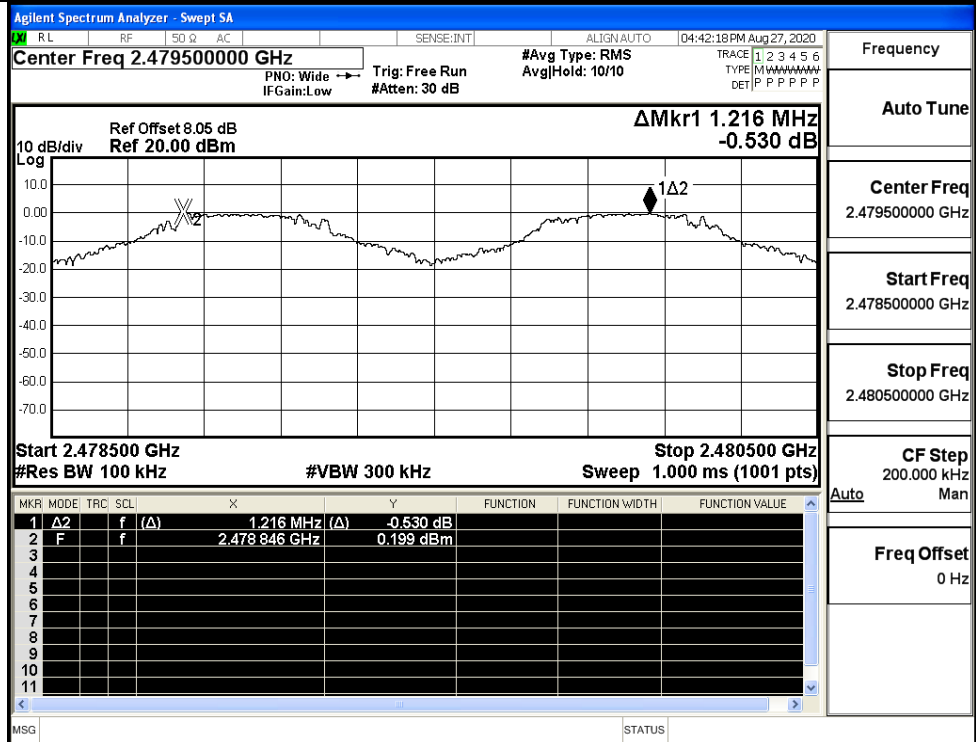
Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.986	0.693	PASS
	MCH	0.954	0.693	PASS
	HCH	1.216	0.693	PASS
π/4DQPSK	LCH	1.060	0.919	PASS
	MCH	1.000	0.919	PASS
	HCH	1.018	0.919	PASS
8DPSK	LCH	0.924	1.083	PASS
	MCH	1.306	1.083	PASS
	HCH	0.924	1.083	PASS



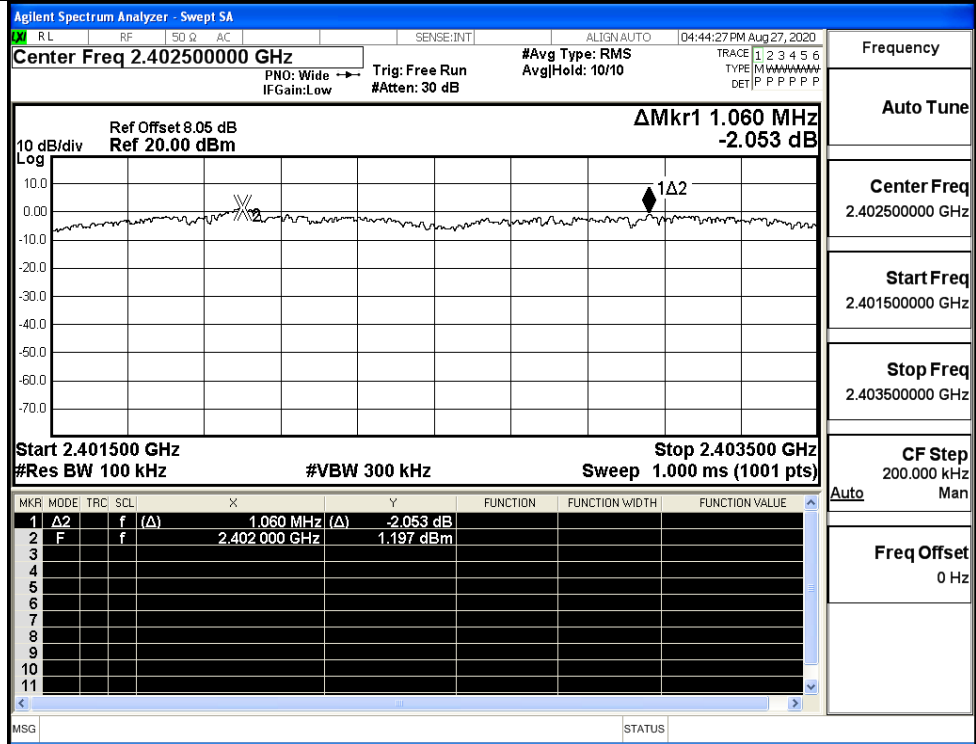
GFSK/MCH



GFSK/HCH

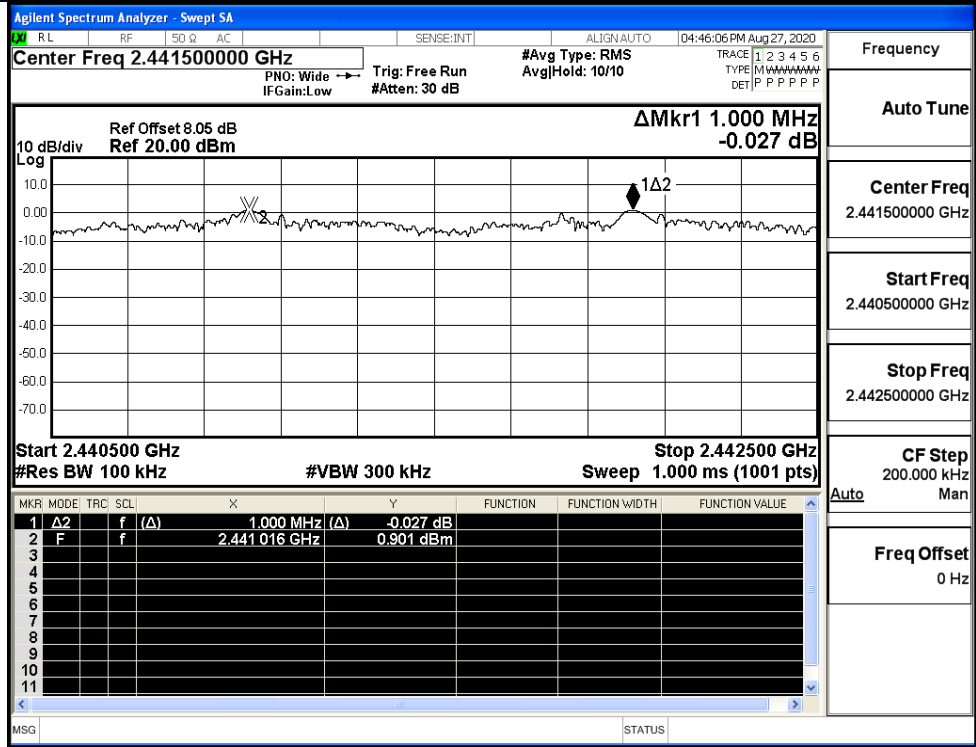


$\pi/4$ DQPSK/LCH



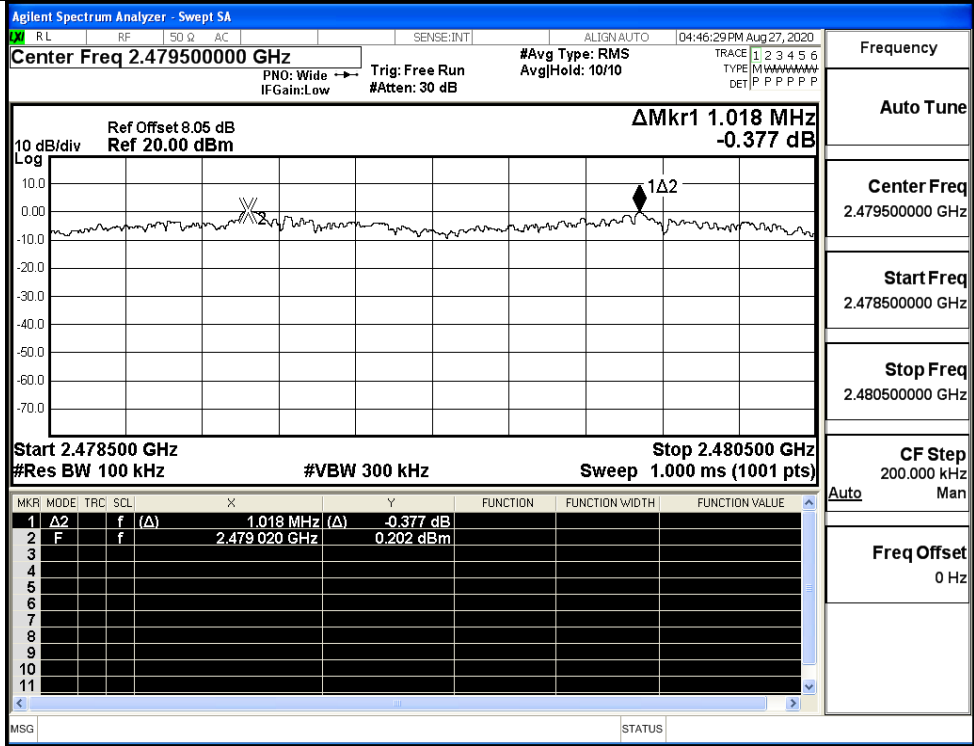
Frequency	2.402500000 GHz
Auto Tune	
Center Freq	2.402500000 GHz
Start Freq	2.401500000 GHz
Stop Freq	2.403500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/MCH



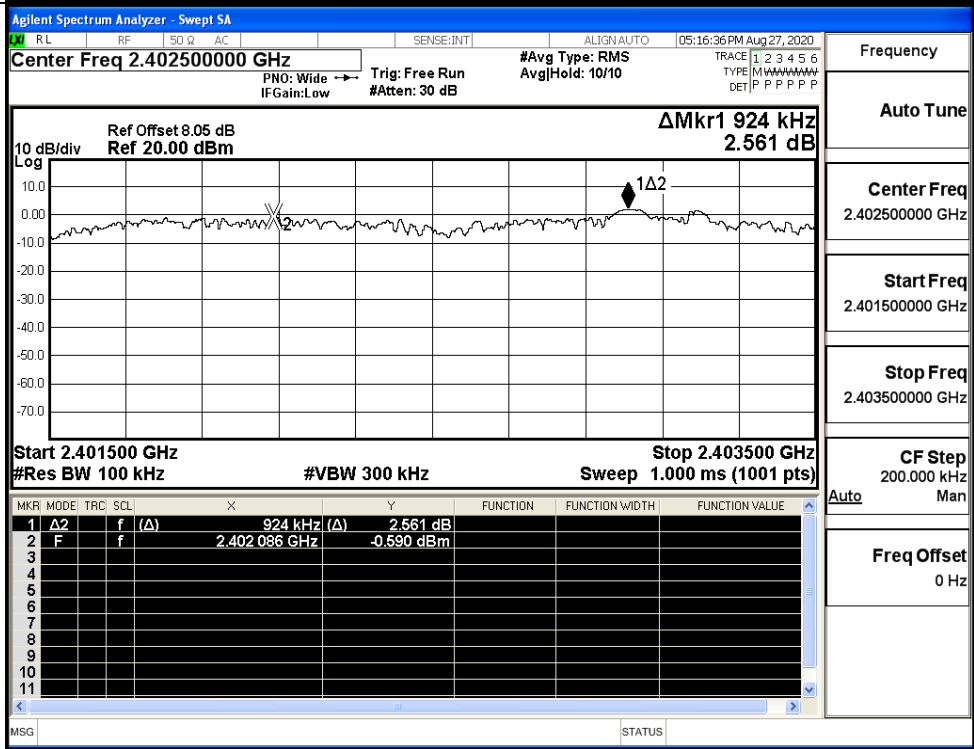
Frequency	2.441500000 GHz
Auto Tune	
Center Freq	2.441500000 GHz
Start Freq	2.440500000 GHz
Stop Freq	2.442500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

π/4DQPSK/HCH



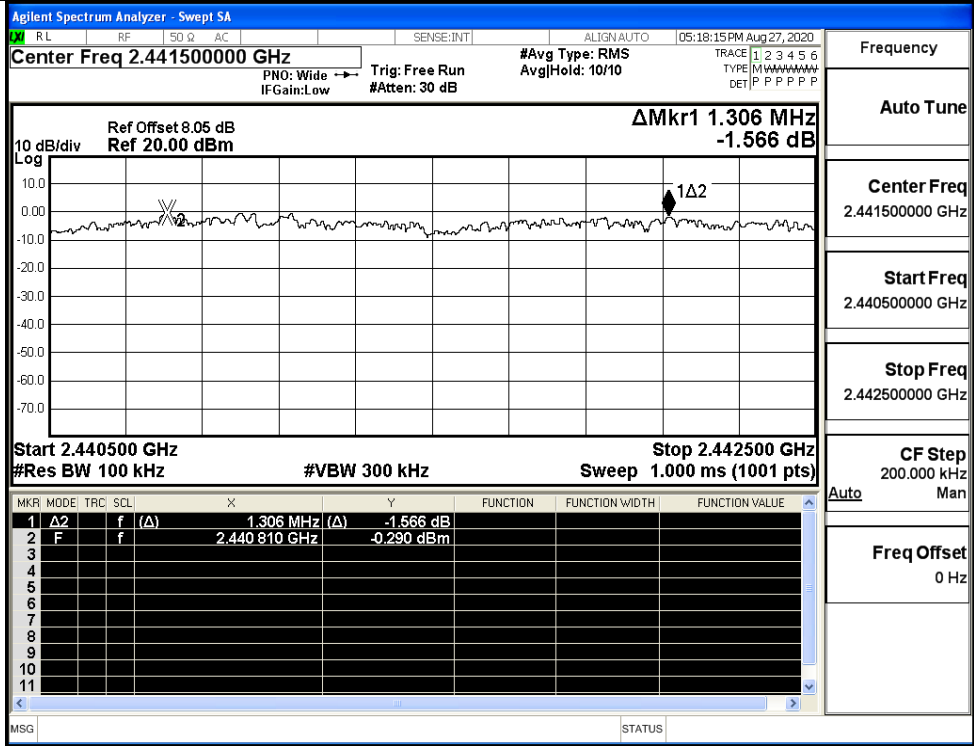
Frequency
Auto Tune
Center Freq 2.479500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.480500000 GHz
CF Step 200.000 kHz
Auto
Freq Offset 0 Hz

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
Freq Offset 0 Hz

8DPSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

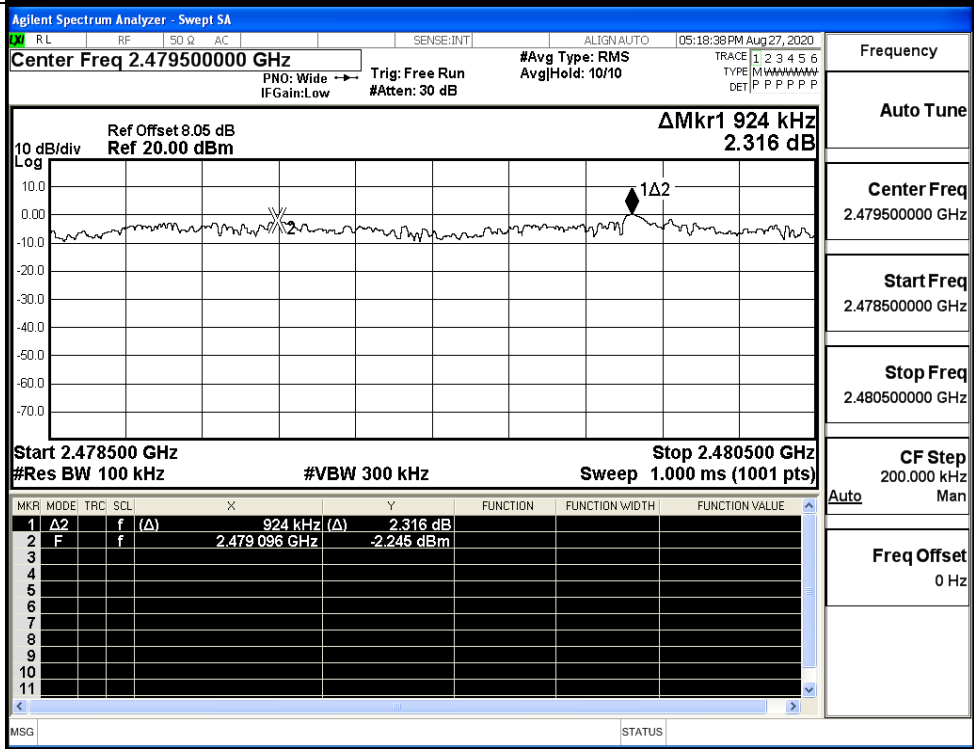
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/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

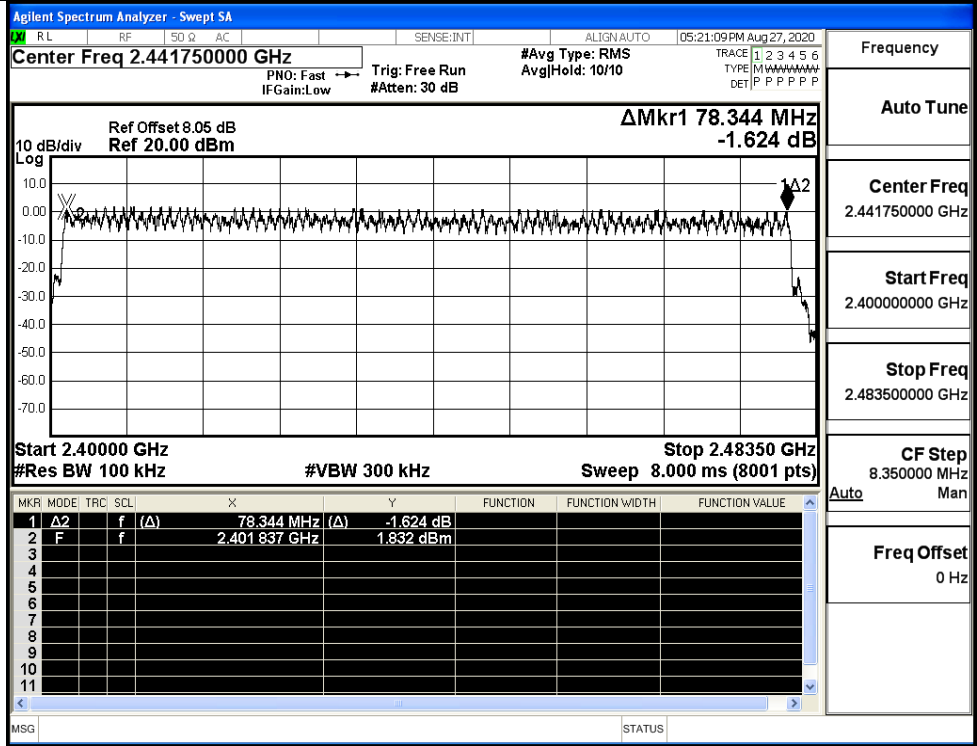
A.4 Hopping Channel Number

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

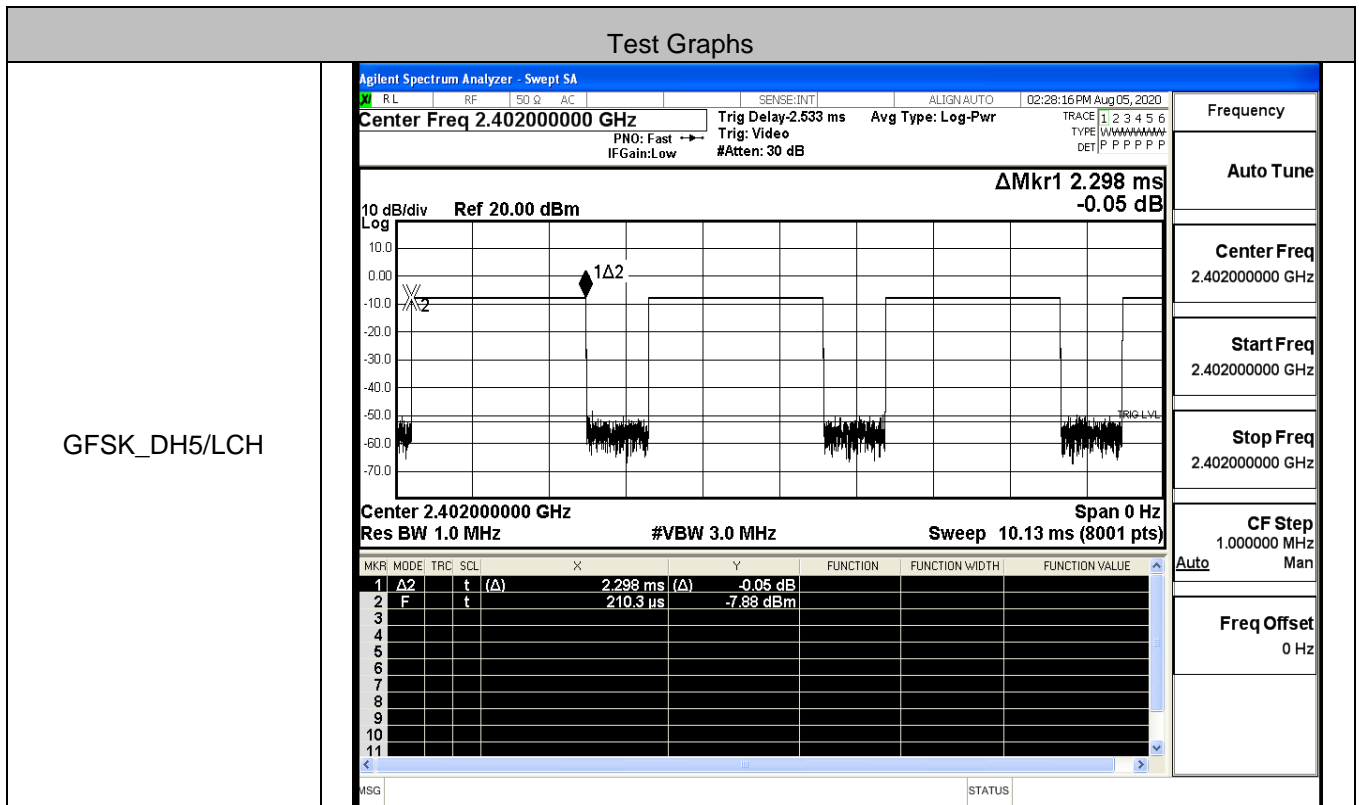
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 78.052 MHz -1.467 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <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>78.052 MHz (Δ)</td> <td>-1.467 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402 004 GHz</td> <td>1.501 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	78.052 MHz (Δ)	-1.467 dB				2	F	f		2.402 004 GHz	1.501 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ2	f	(Δ)	78.052 MHz (Δ)	-1.467 dB																							
2	F	f		2.402 004 GHz	1.501 dBm																							
$\pi/4$ DQPSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 77.999 MHz -1.835 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" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <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>77.999 MHz (Δ)</td> <td>-1.835 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402 014 GHz</td> <td>2.010 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	77.999 MHz (Δ)	-1.835 dB				2	F	f		2.402 014 GHz	2.010 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ2	f	(Δ)	77.999 MHz (Δ)	-1.835 dB																							
2	F	f		2.402 014 GHz	2.010 dBm																							

8DPSK/Hop

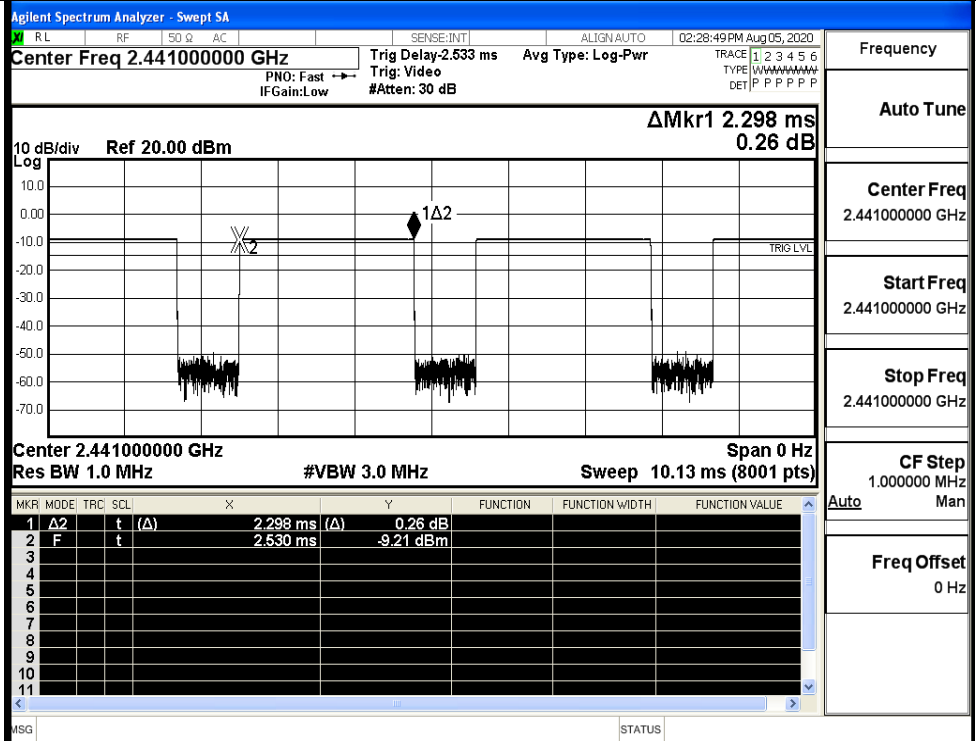


A.5 Dwell Time

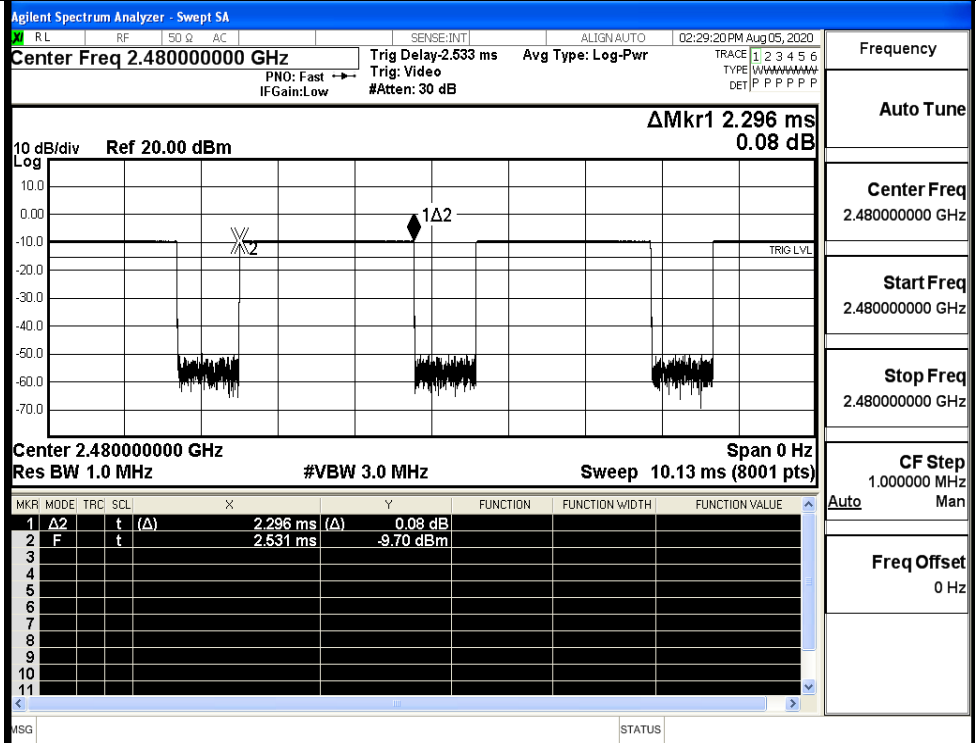
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.3	106.7	0.245	0.4	PASS
	DH5	MCH	2.3	106.7	0.245	0.4	PASS
	DH5	HCH	2.3	106.7	0.245	0.4	PASS
π/4DQPSK	2DH5	LCH	2.3	106.7	0.245	0.4	PASS
	2DH5	MCH	2.3	106.7	0.246	0.4	PASS
	2DH5	HCH	2.3	106.7	0.245	0.4	PASS
8DPSK	3DH5	LCH	2.3	106.7	0.246	0.4	PASS
	3DH5	MCH	2.3	106.7	0.246	0.4	PASS
	3DH5	HCH	2.3	106.7	0.246	0.4	PASS



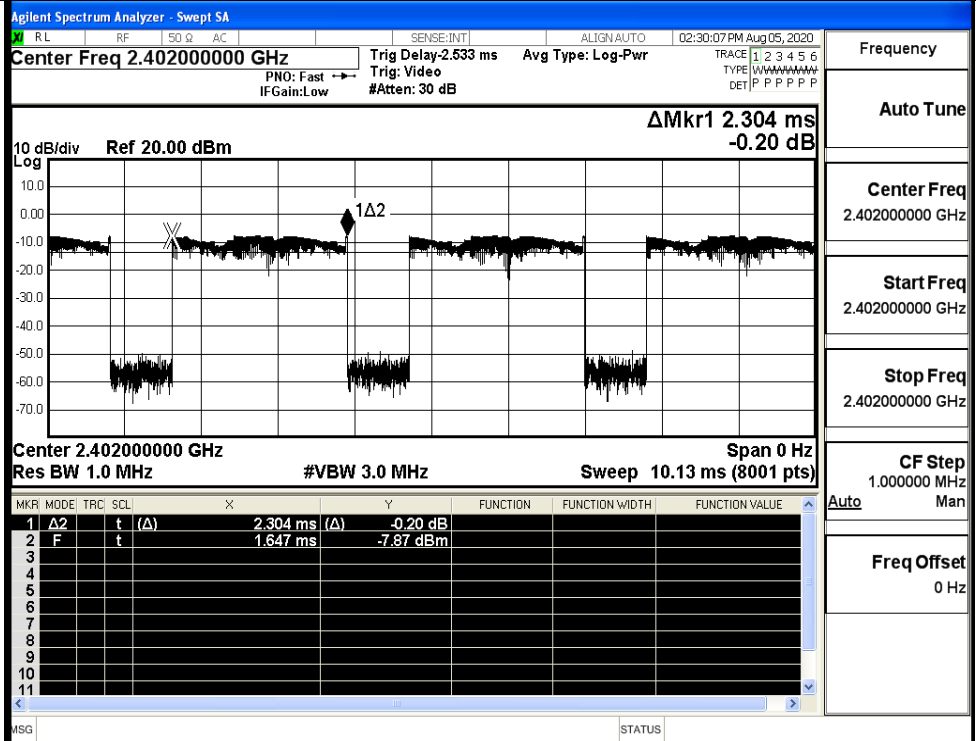
GFSK_DH5/MCH



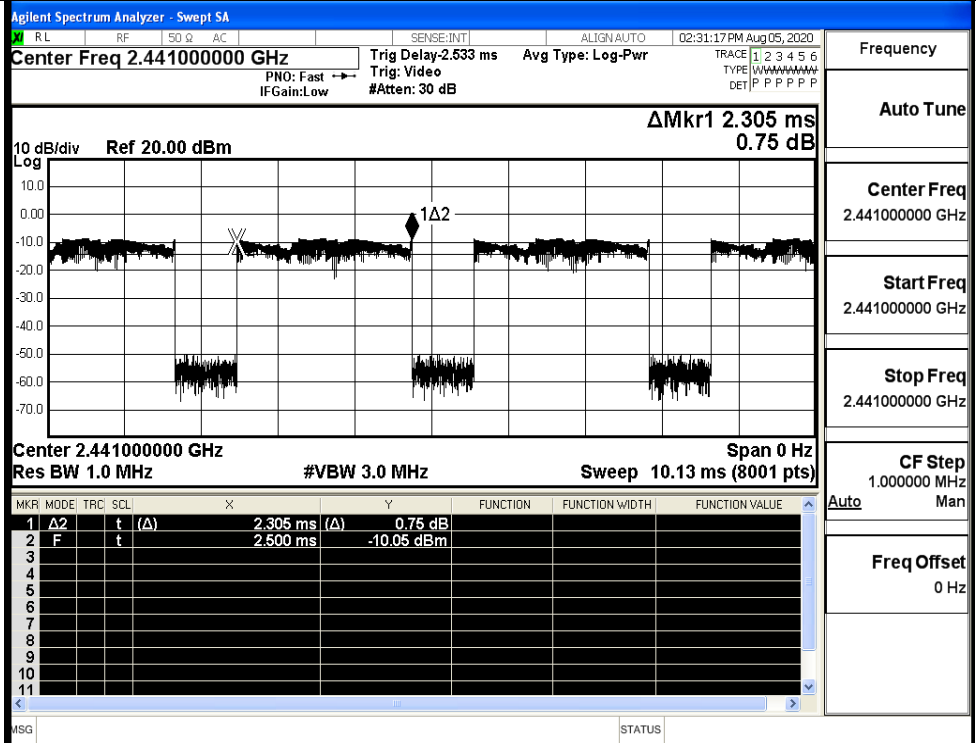
GFSK_DH5/HCH



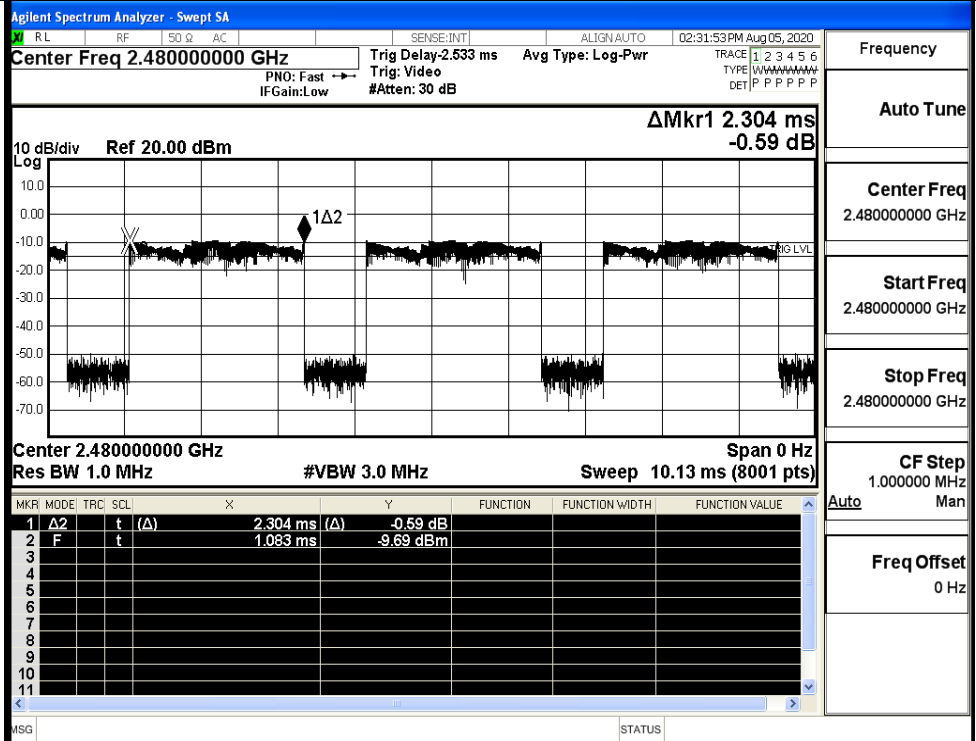
$\pi/4$ DQPSK
_2DH5/LCH



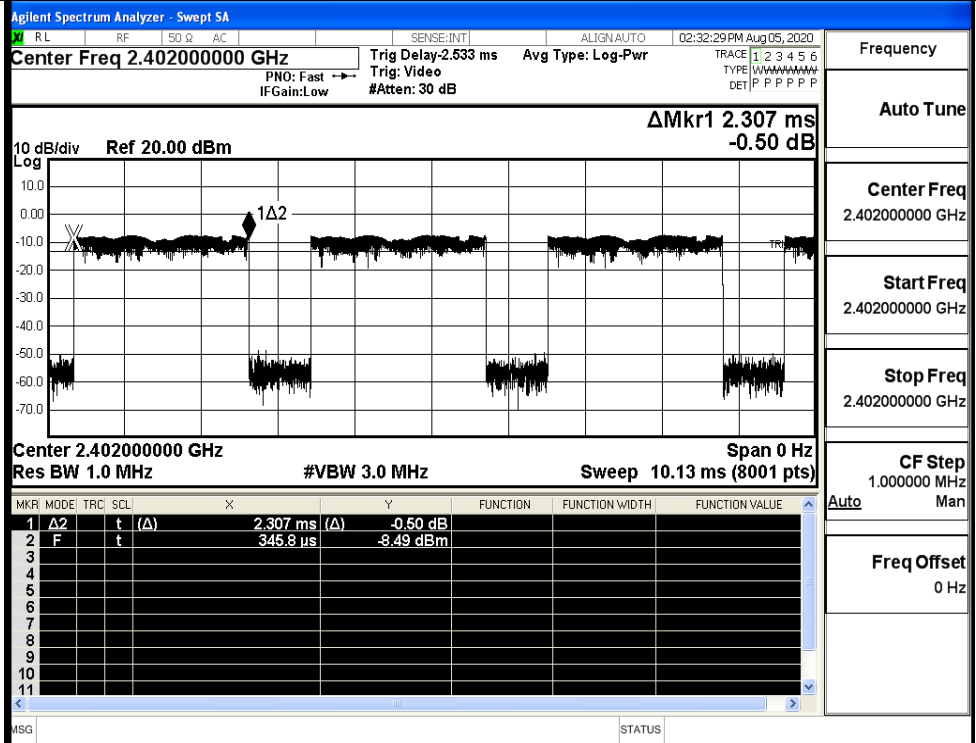
$\pi/4$ DQPSK
_2DH5/MCH



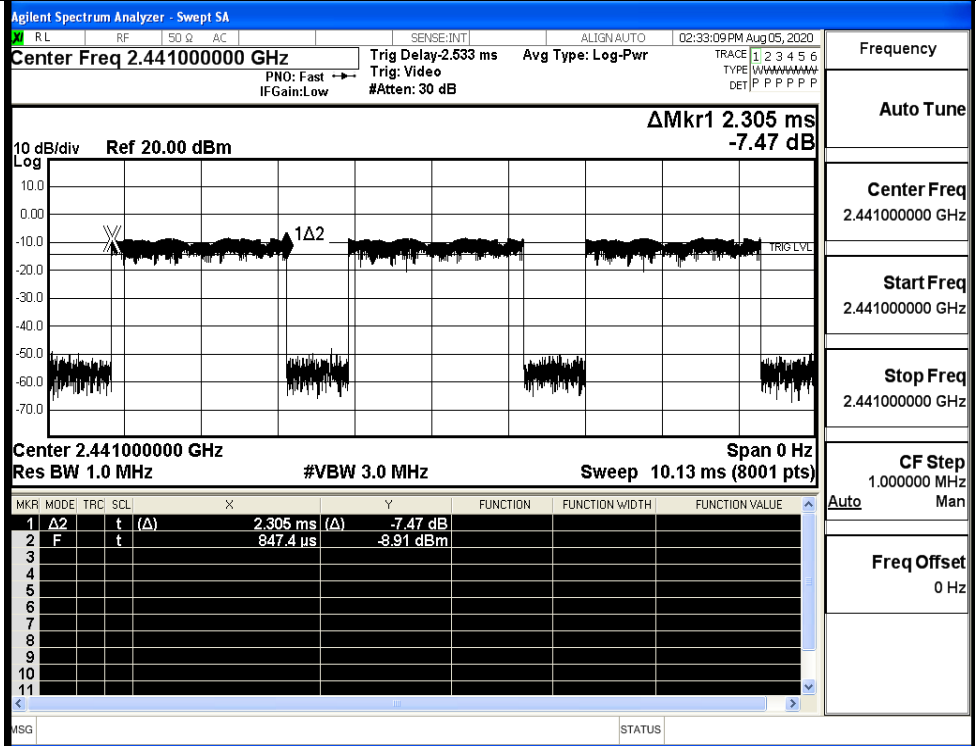
$\pi/4$ DQPSK
_2DH5/HCH



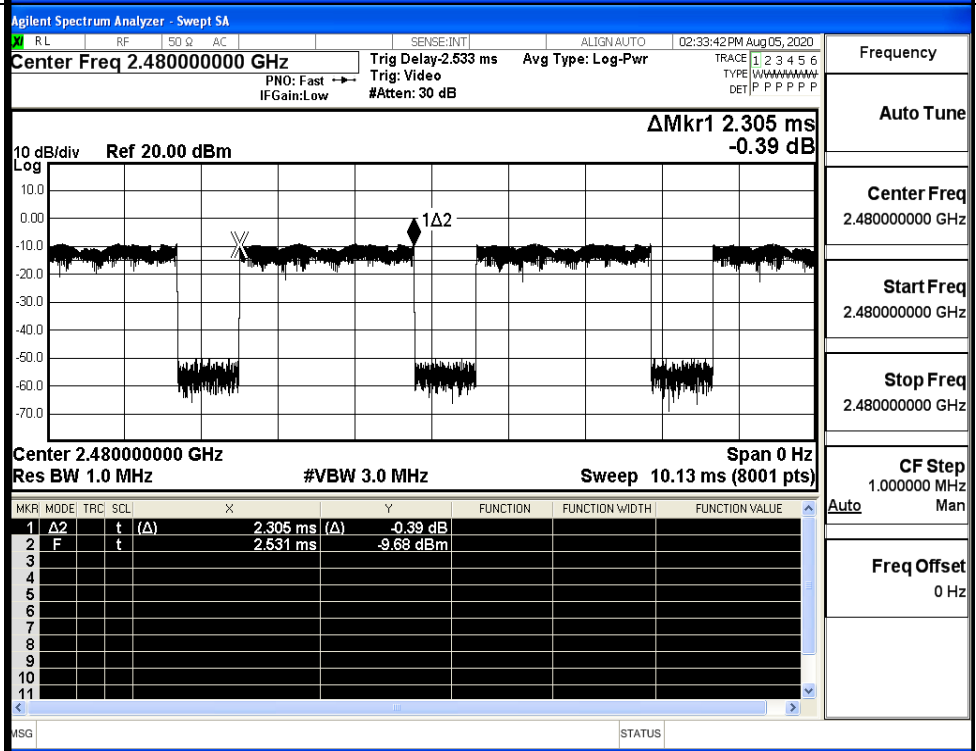
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH

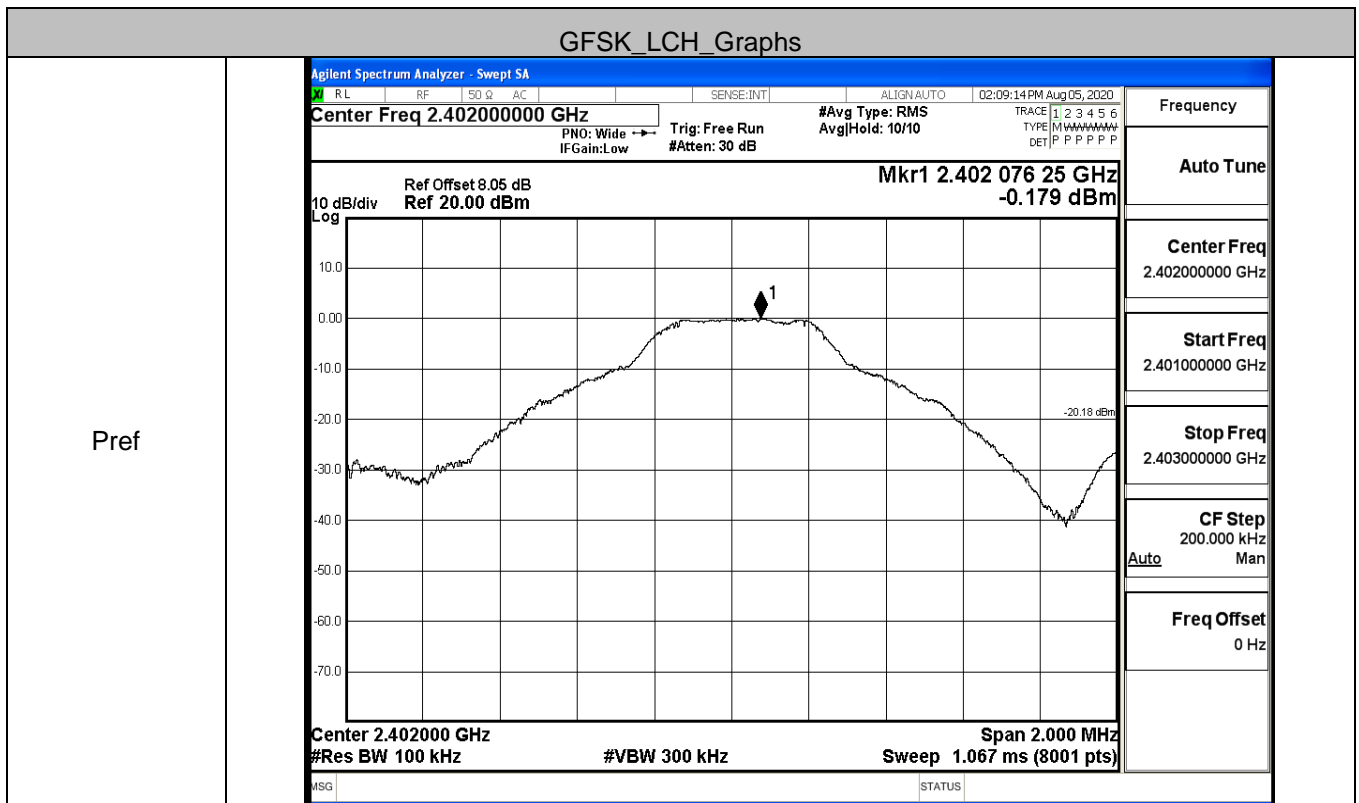


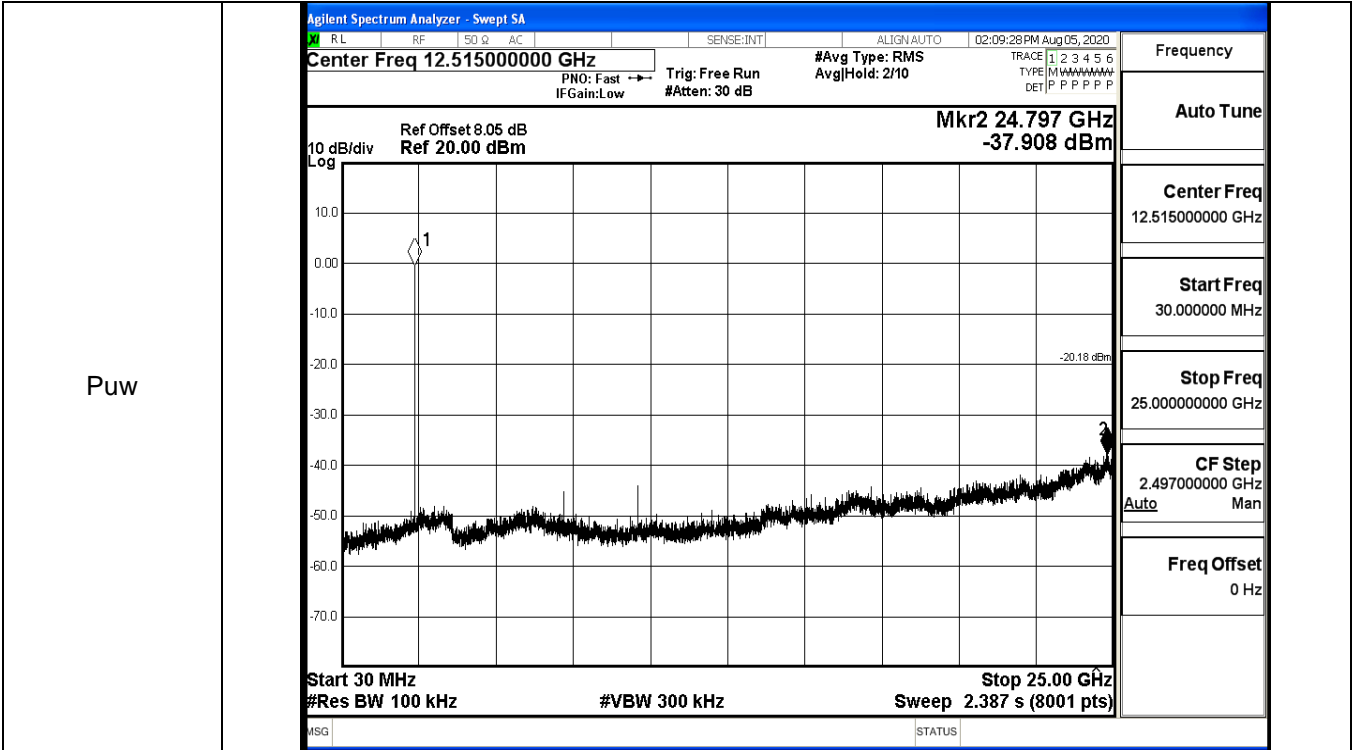
8DPSK_3DH5/HCH



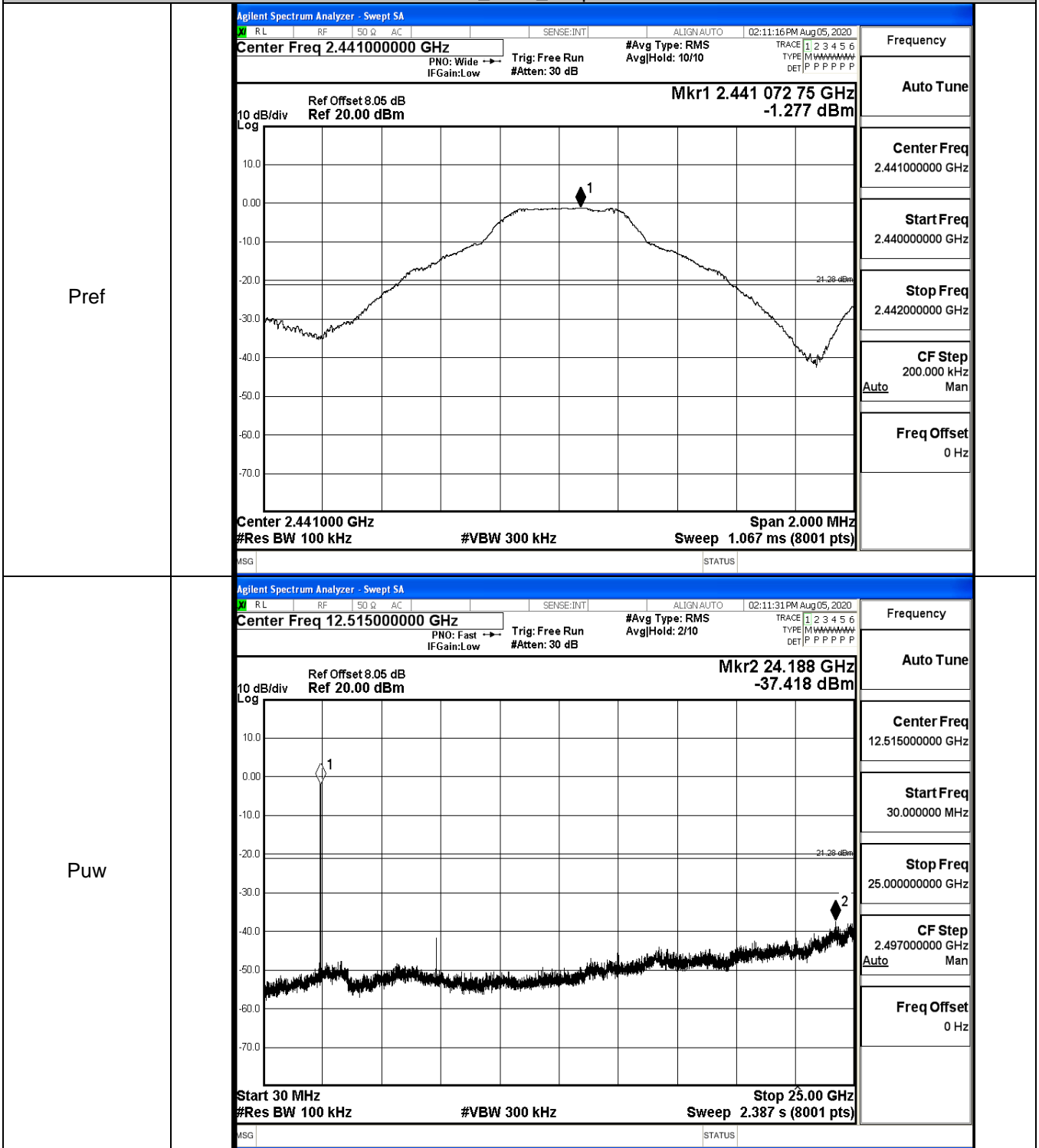
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.179	-37.908	-20.179	PASS
	MCH	-1.277	-37.418	-21.277	PASS
	HCH	-2.015	-37.871	-22.015	PASS
π /4DQPSK	LCH	-0.430	-37.485	-20.430	PASS
	MCH	-1.689	-28.382	-21.689	PASS
	HCH	-2.482	-36.816	-22.482	PASS
8DPSK	LCH	-1.365	-37.776	-21.365	PASS
	MCH	-2.576	-36.749	-22.576	PASS
	HCH	-3.384	-37.712	-23.384	PASS

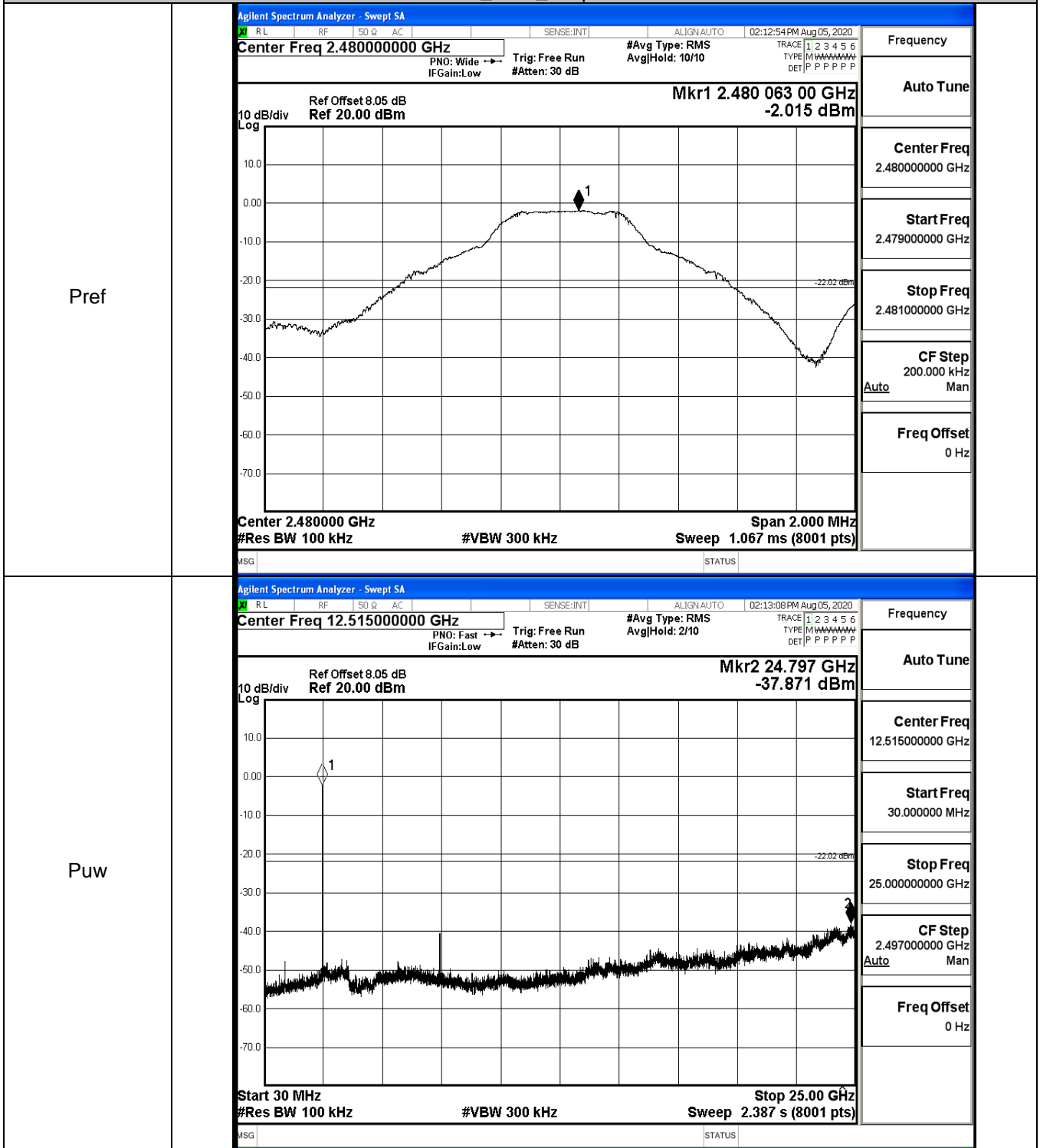




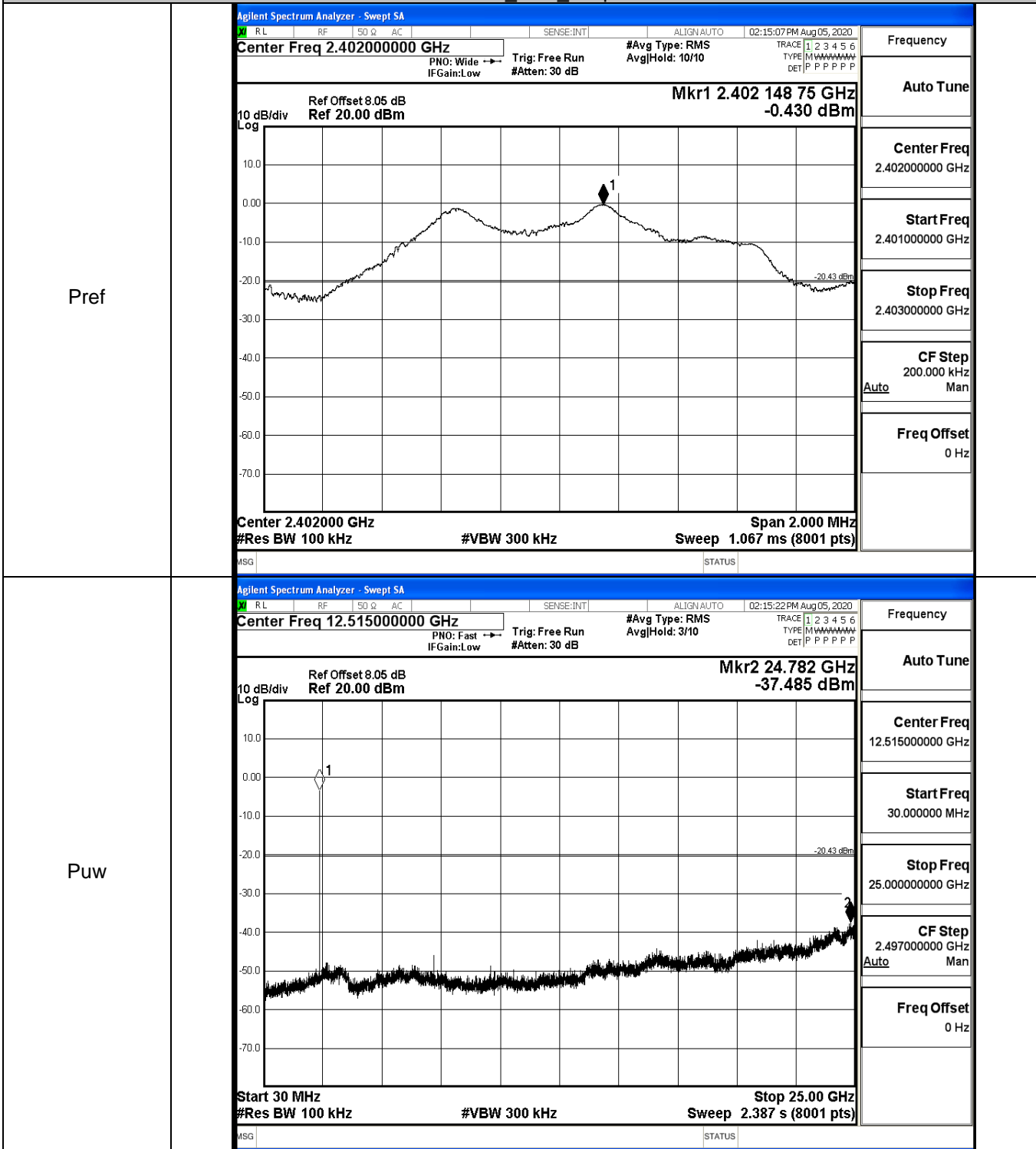
GFSK_MCH_Graphs



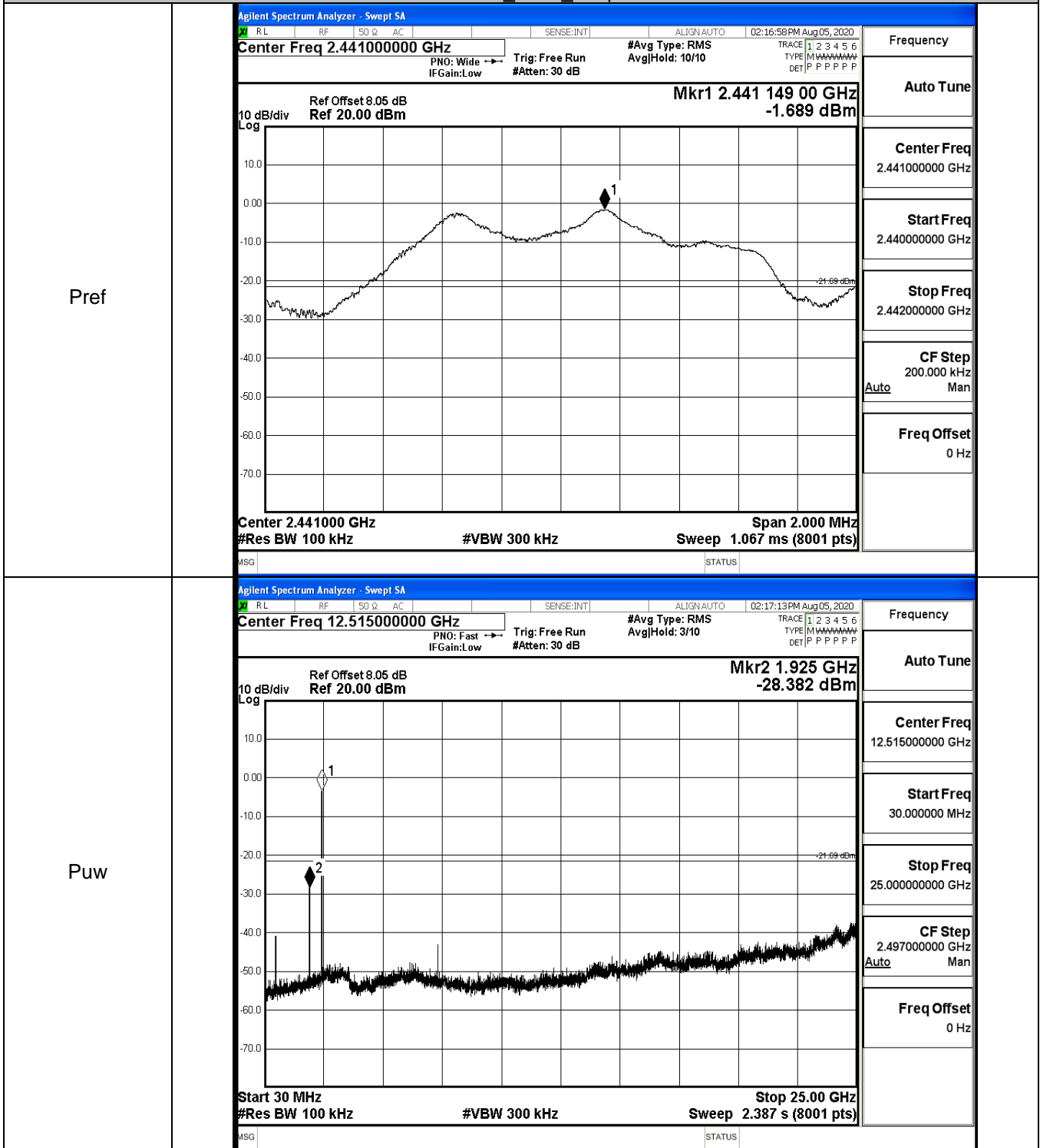
GFSK_HCH_Graphs



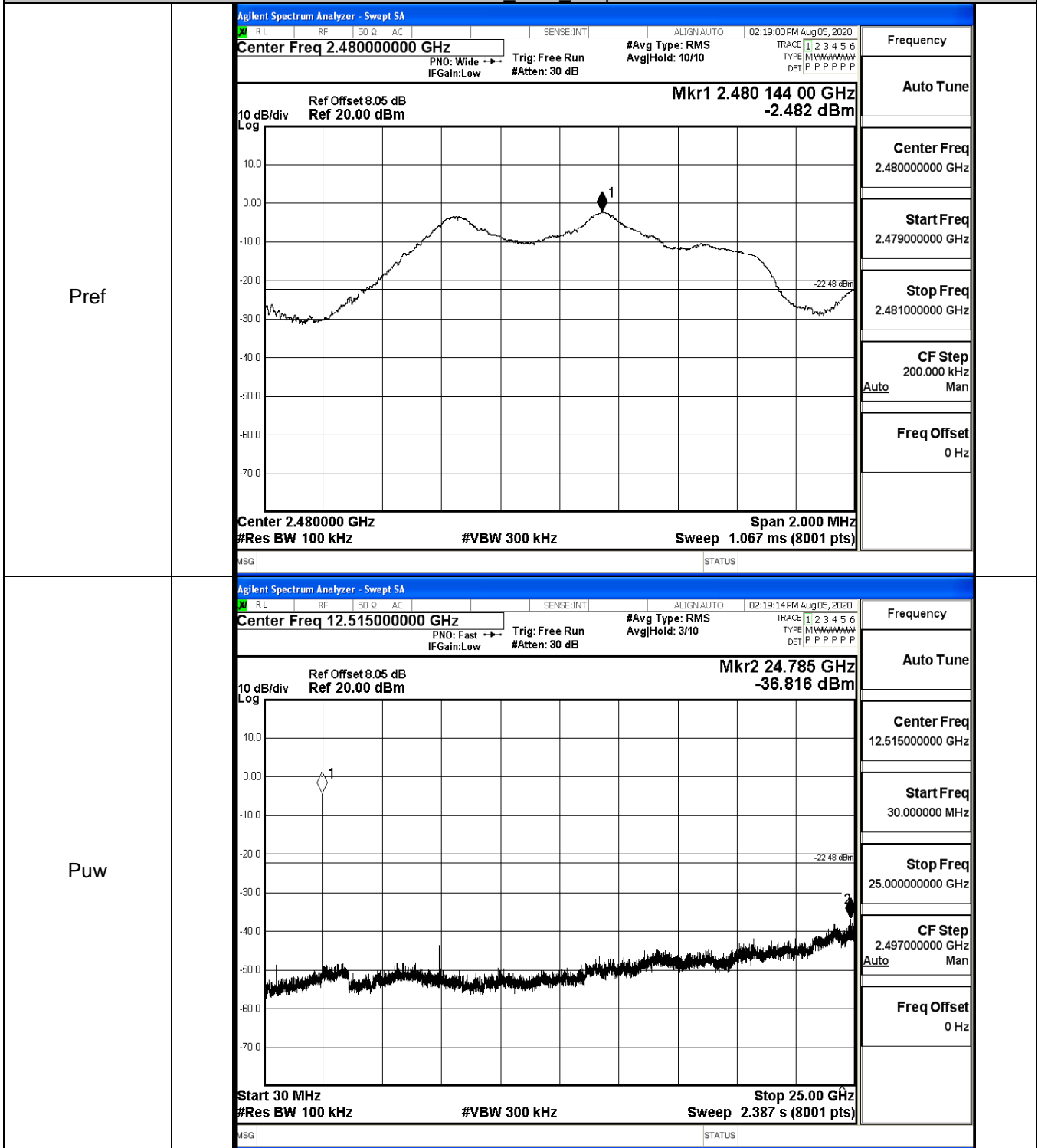
$\pi/4$ DQPSK_LCH_Graphs



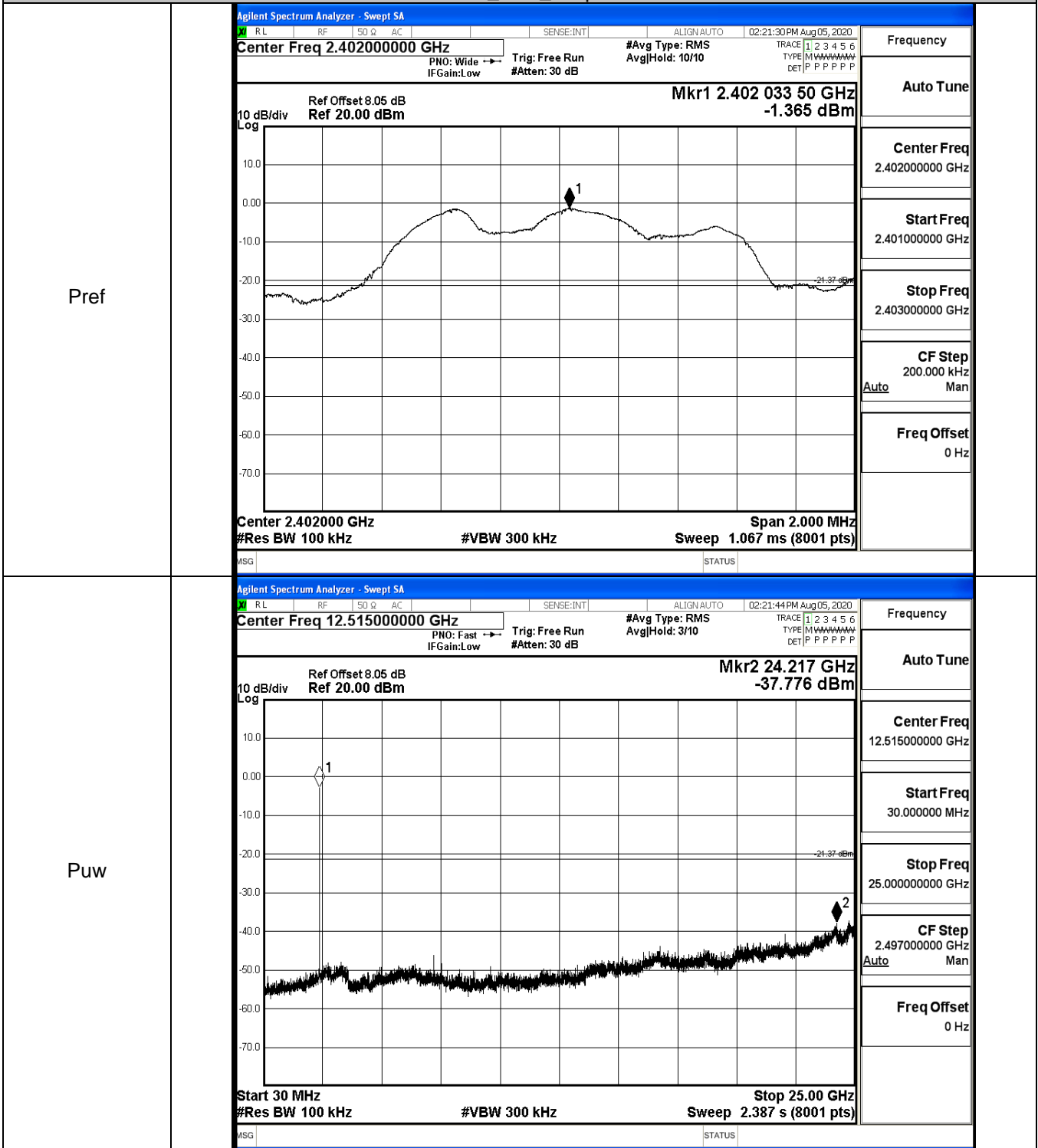
$\pi/4$ DQPSK_MCH_Graphs



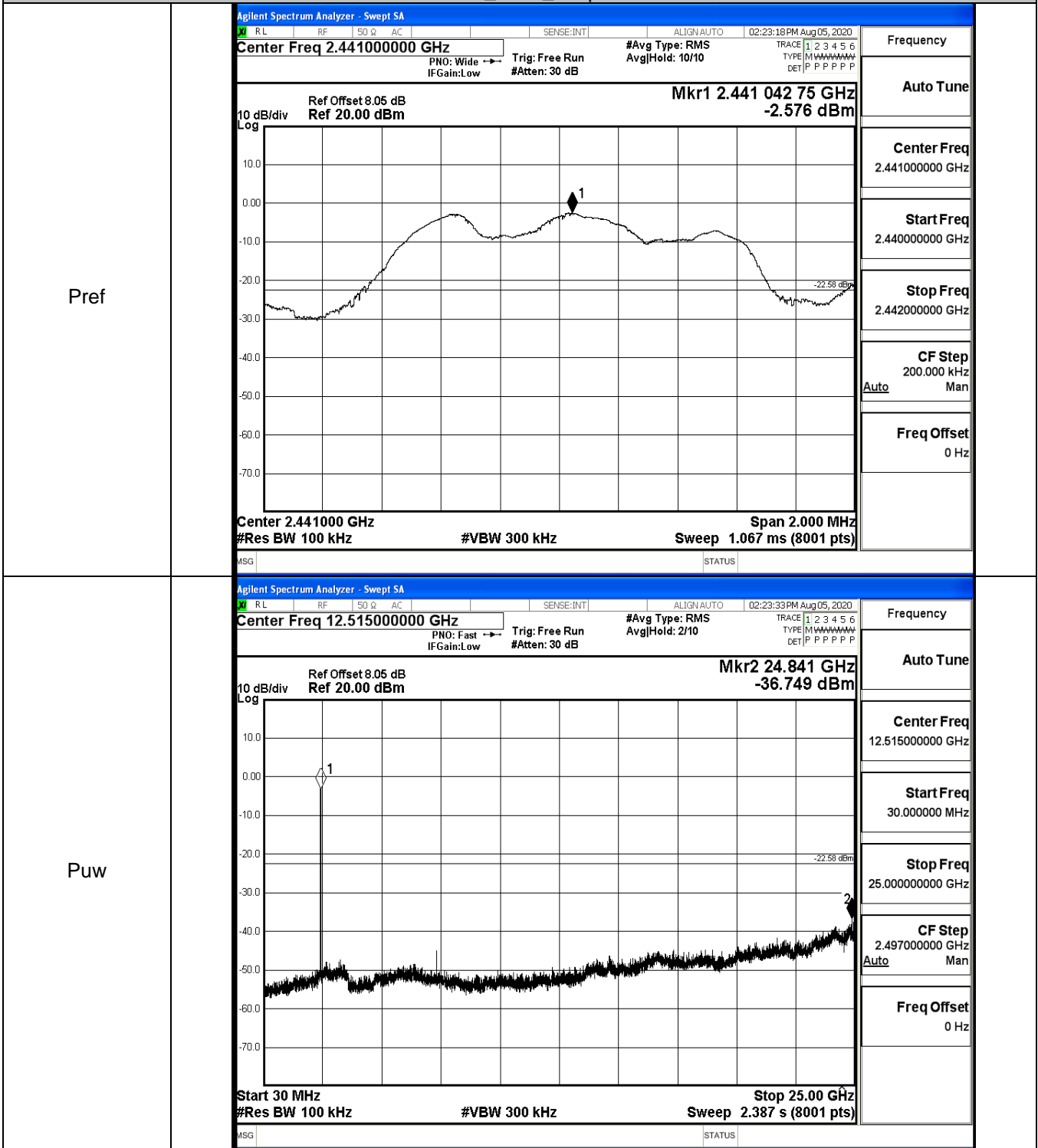
$\pi/4$ DQPSK_HCH_Graphs



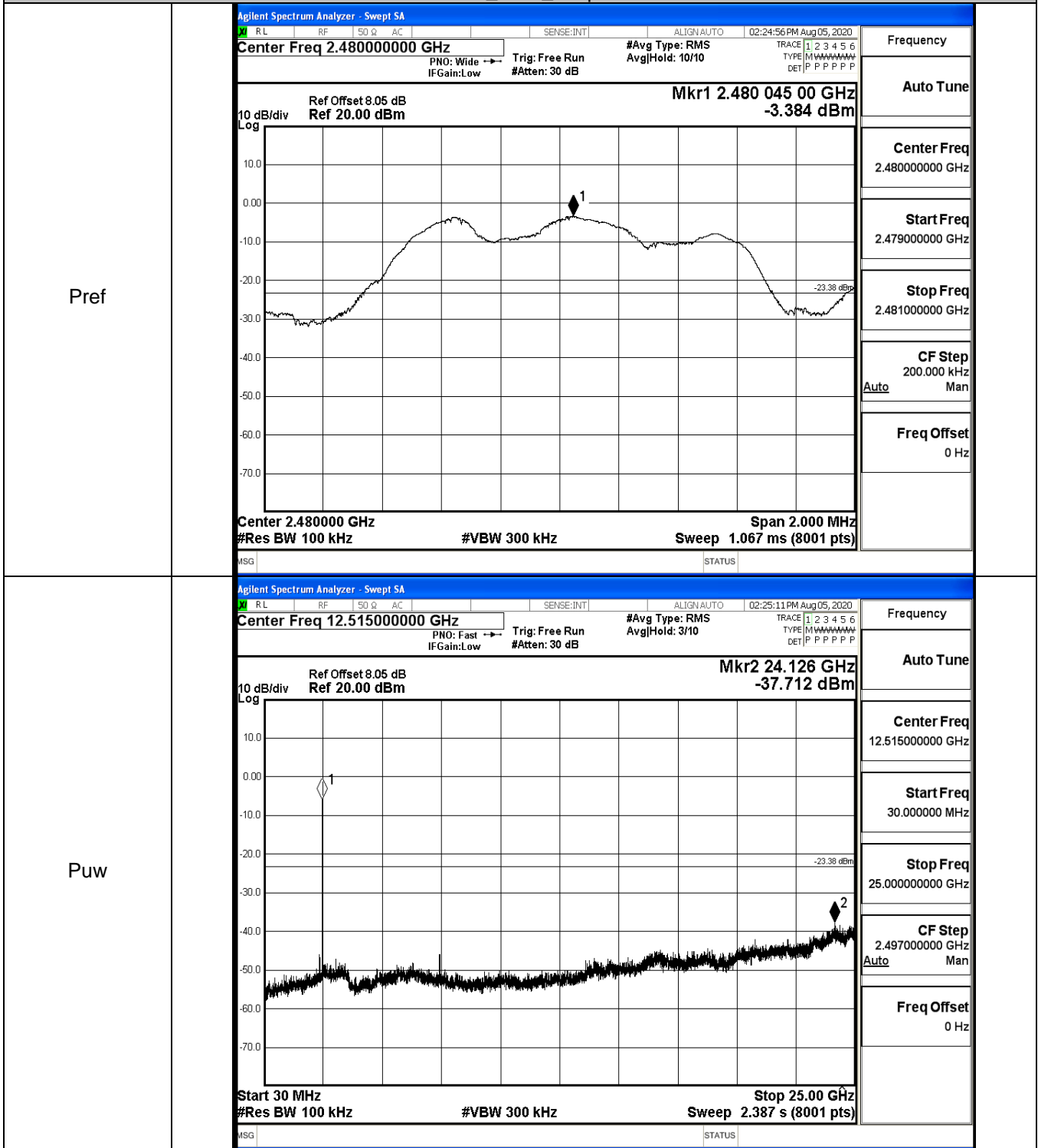
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

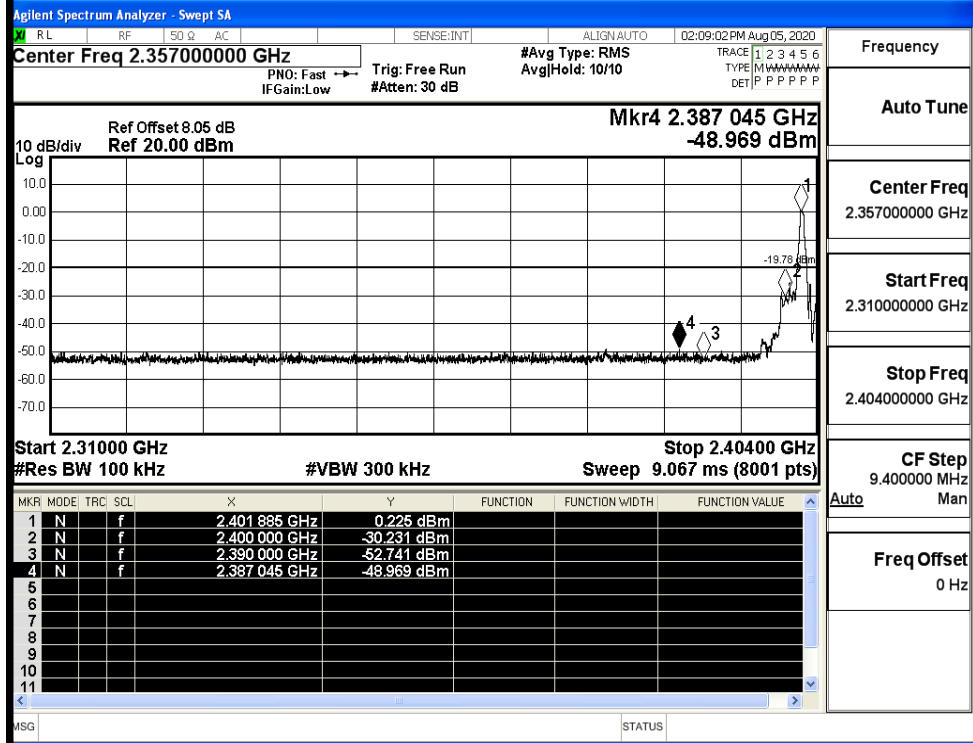


A.7 Band-edge for RF Conducted Emissions

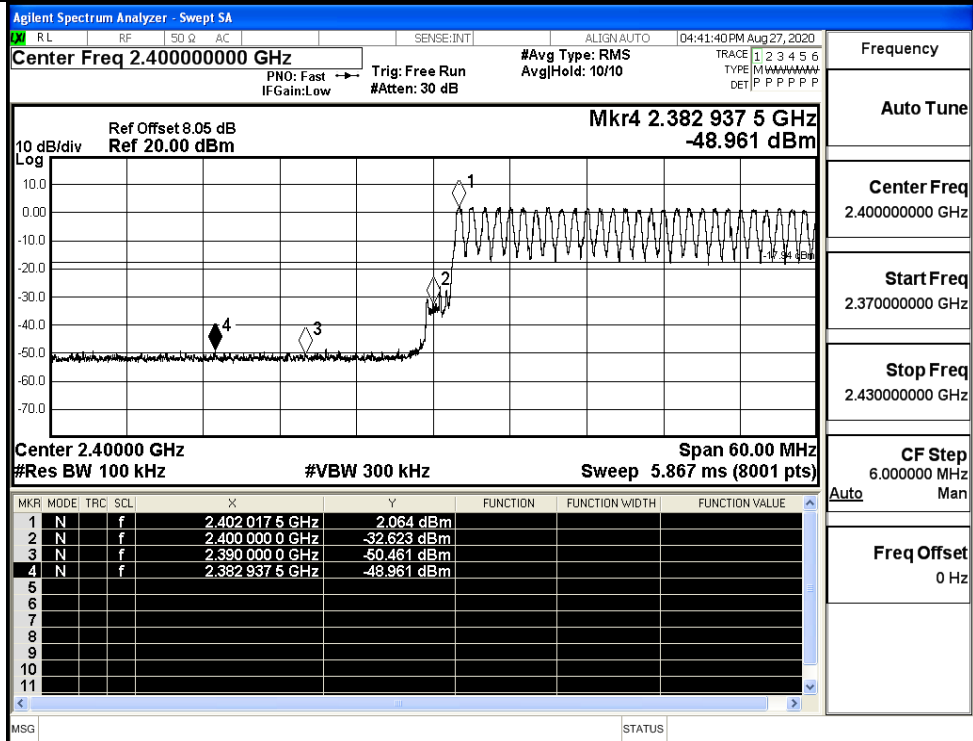
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.225	Off	-48.969	-19.78	PASS
			2.064	On	-48.961	-17.94	PASS
	HCH	2480	-1.627	Off	-46.746	-21.63	PASS
			0.738	On	-44.996	-19.26	PASS
π/4DQPSK	LCH	2402	-0.594	Off	-49.079	-20.59	PASS
			2.027	On	-41.662	-17.97	PASS
	HCH	2480	-2.227	Off	-45.703	-22.23	PASS
			0.729	On	-39.009	-19.27	PASS
8DPSK	LCH	2402	-0.787	Off	-47.210	-20.79	PASS
			1.960	On	-48.842	-18.04	PASS
	HCH	2480	-2.853	Off	-43.180	-22.85	PASS
			0.775	On	-41.839	-19.23	PASS

Test Graphs

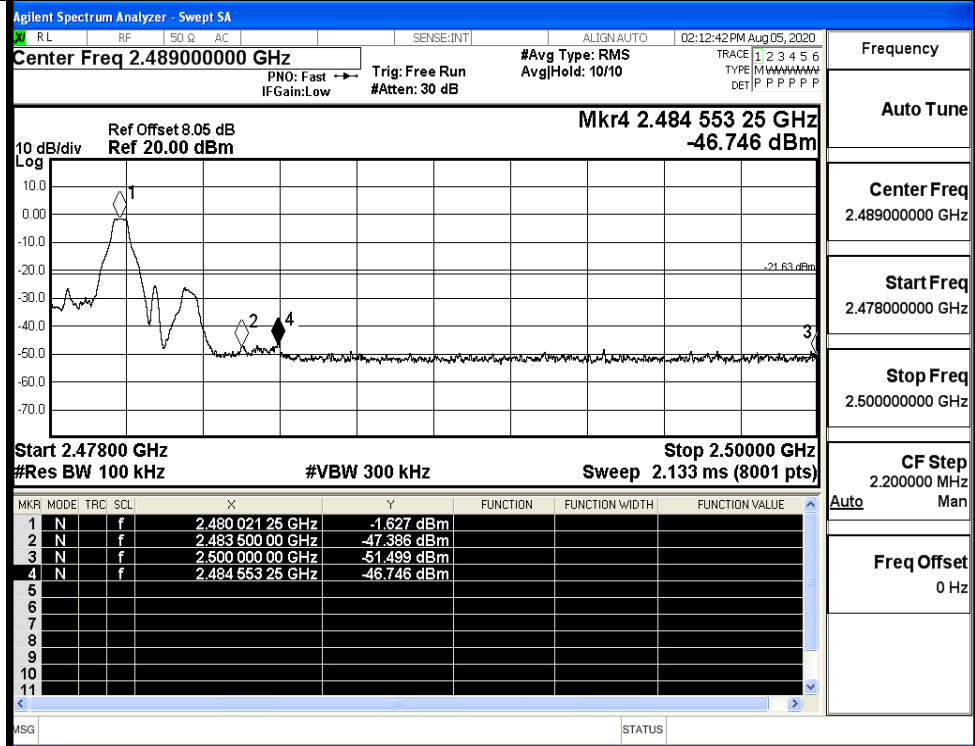
GFSK/LCH/No Hop



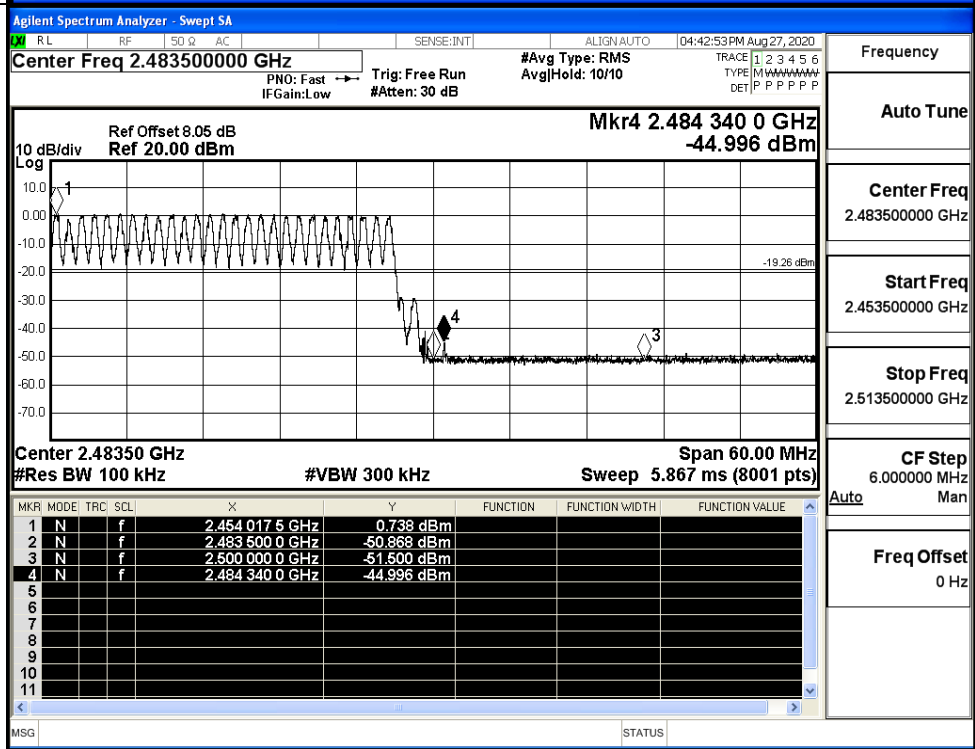
GFSK/LCH/Hop



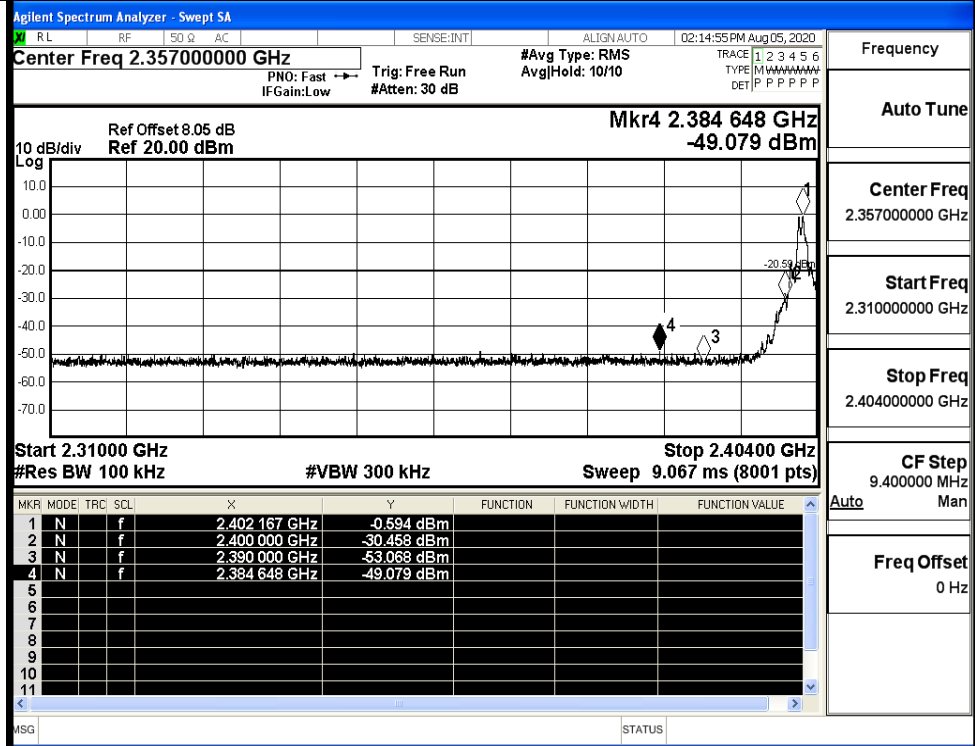
GFSK/HCH/No Hop



GFSK/HCH/Hop

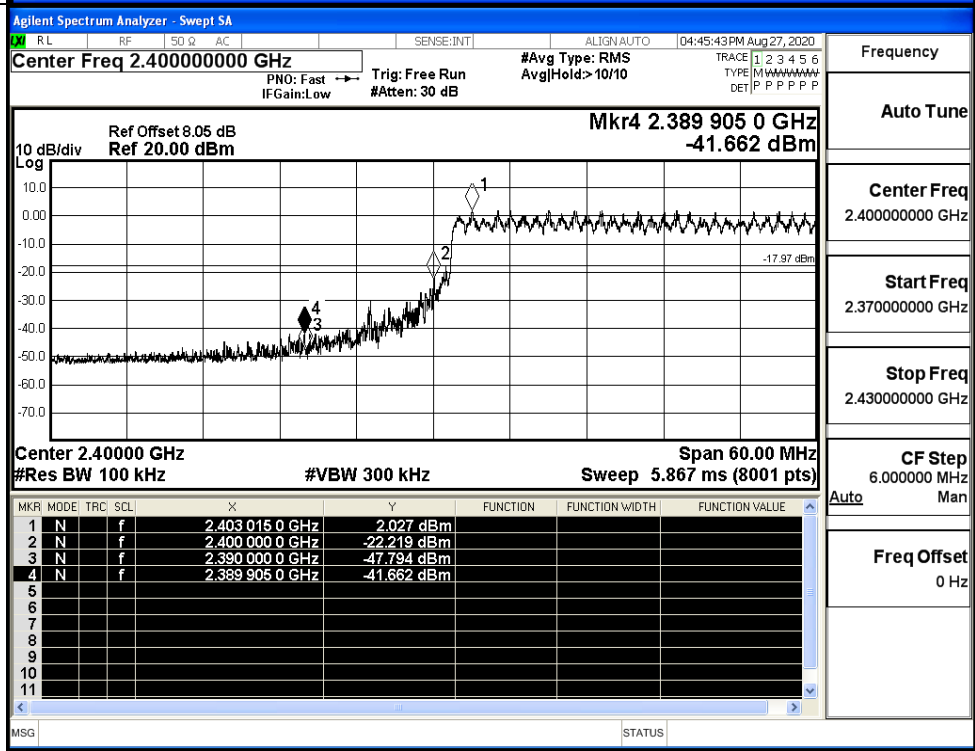


$\pi/4$ DQPSK/LCH/No Hop



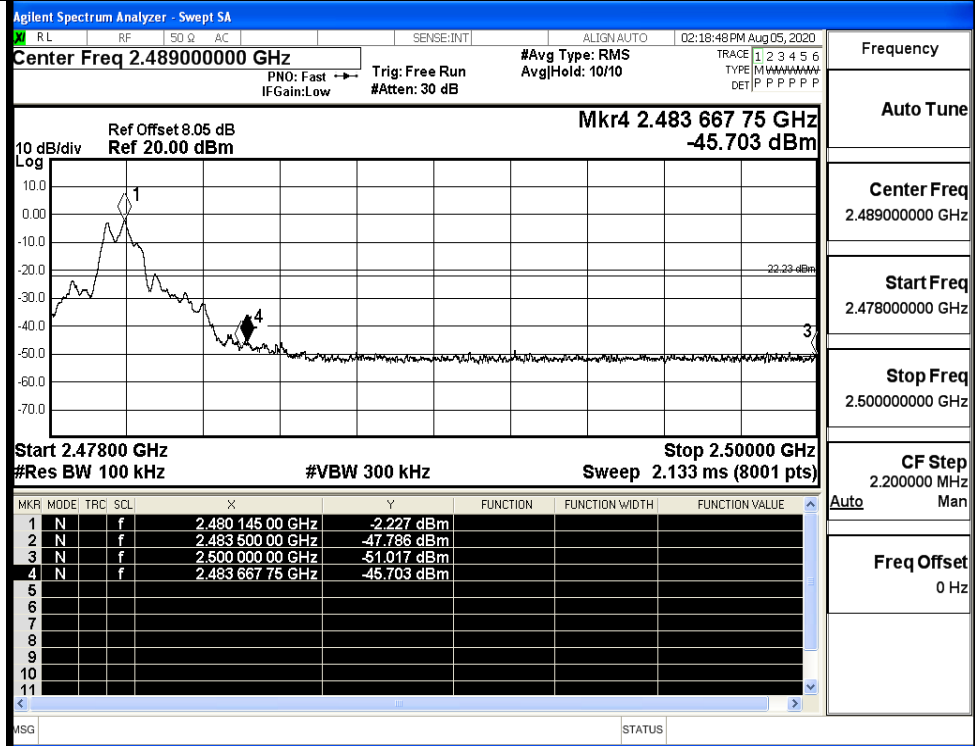
Frequency	2.357000000 GHz
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH/Hop

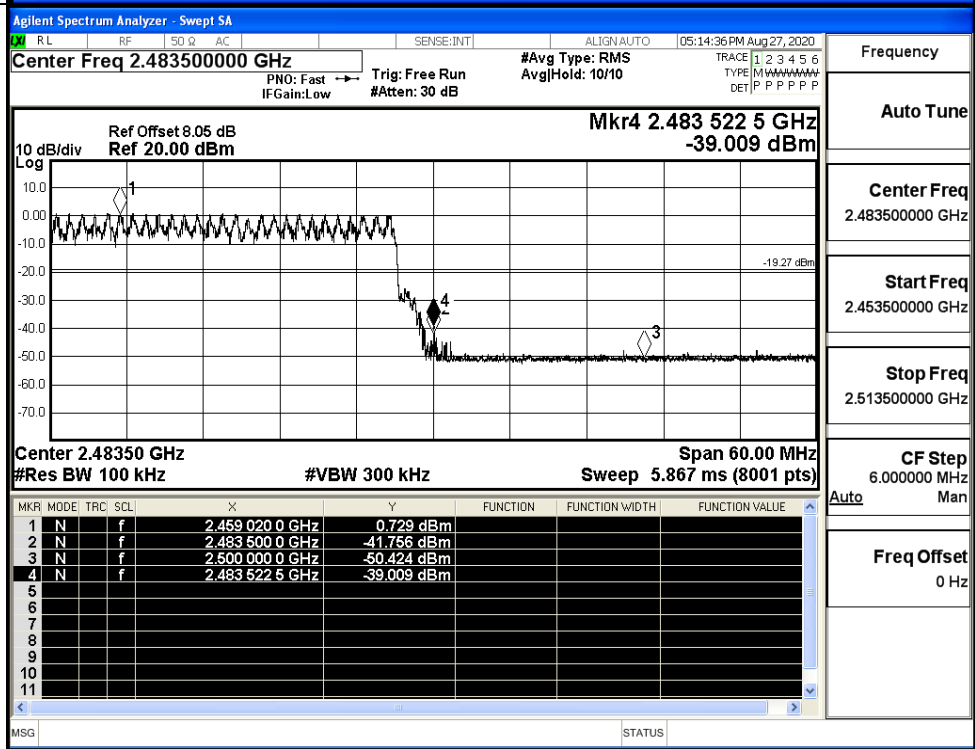


Frequency	2.400000000 GHz
Auto Tune	
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

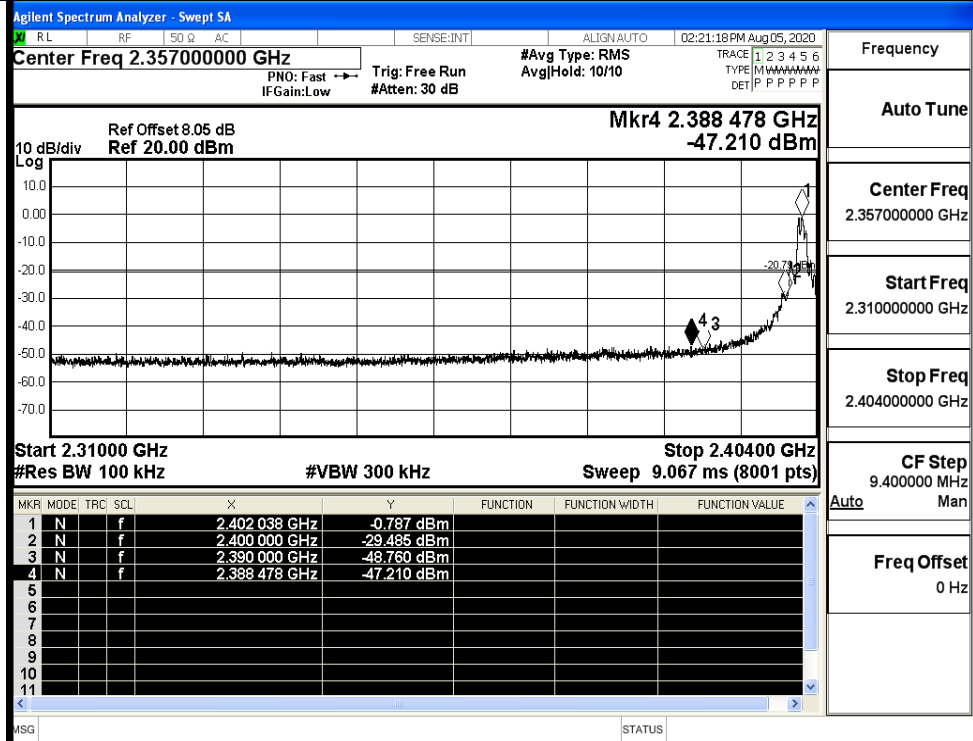
$\pi/4$ DQPSK/HCH/No
Hop



$\pi/4$ DQPSK/HCH/Hop

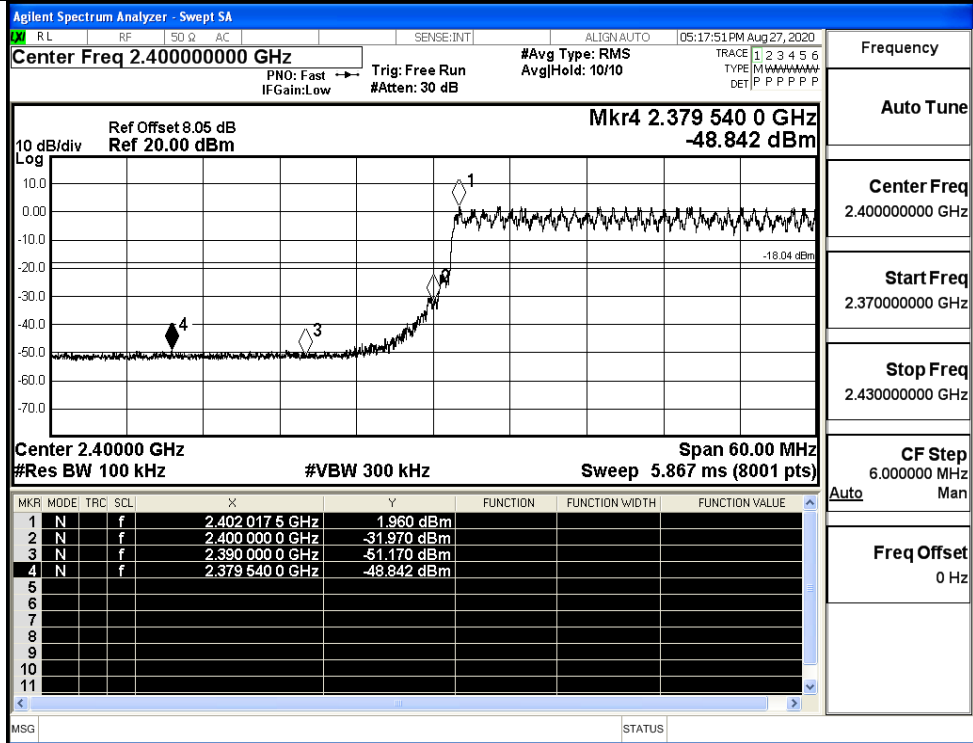


8DPSK/LCH/No Hop



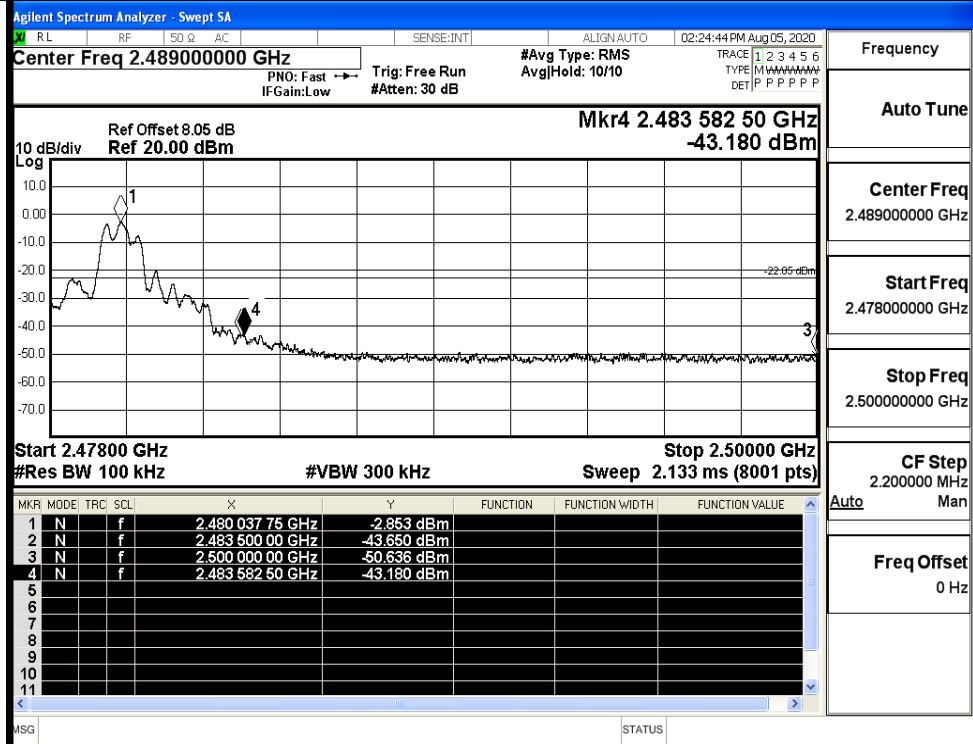
Frequency	2.357000000 GHz
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Freq Offset	0 Hz

8DPSK/LCH/Hop



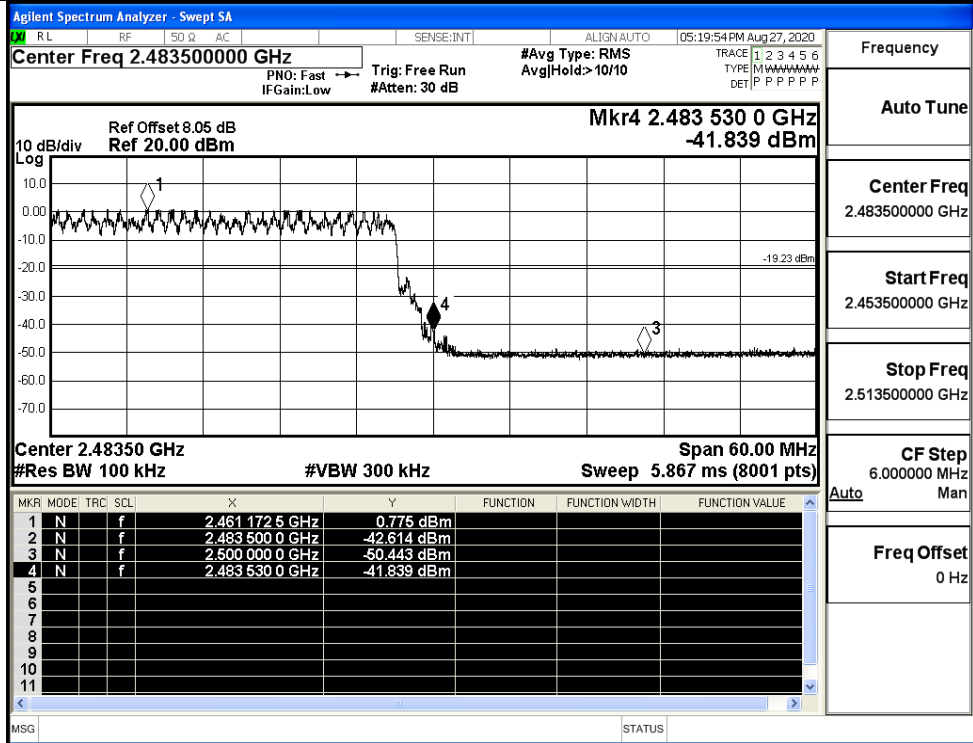
Frequency	2.400000000 GHz
Auto Tune	
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

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

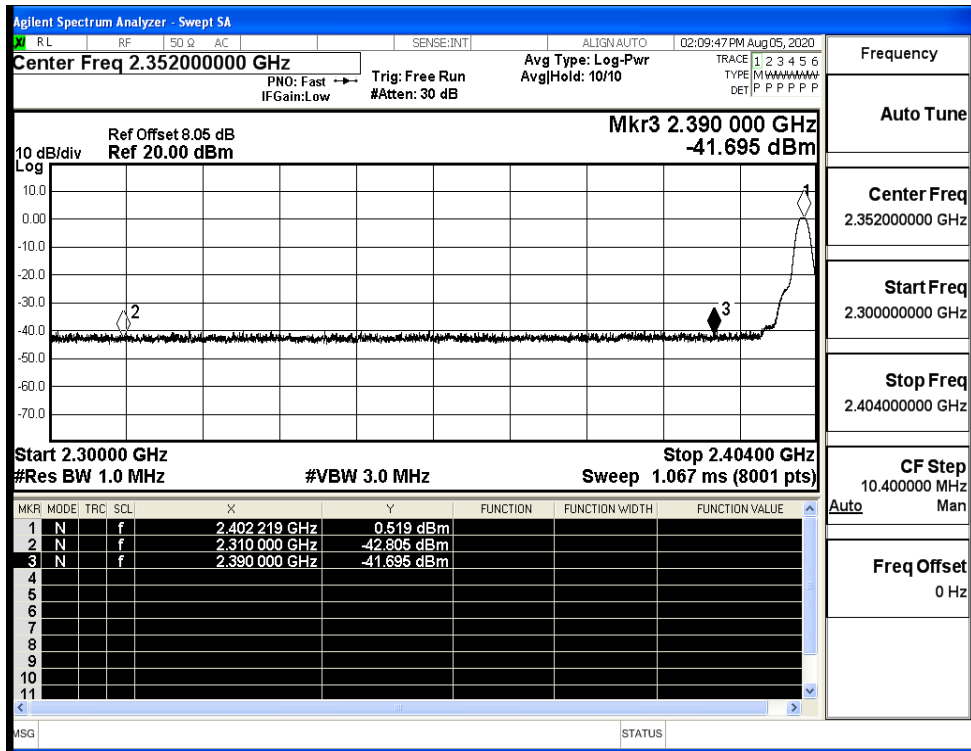


Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

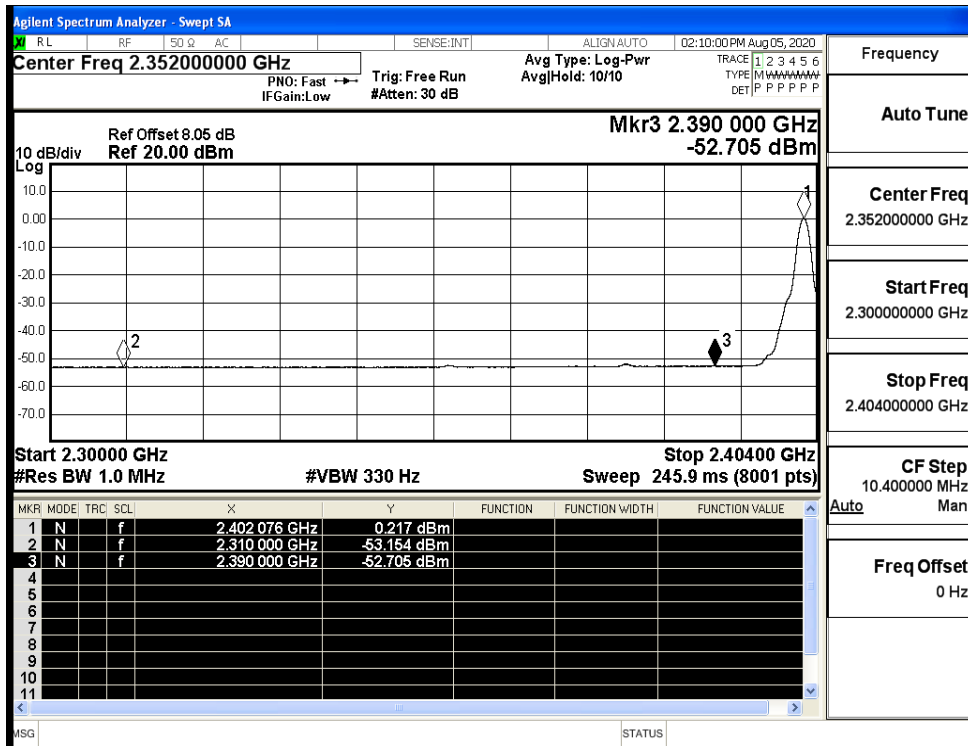
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.81	2.0	0	52.45	PEAK	74	PASS
	Off	2310.0	-53.15	2.0	0	42.10	AV	54	PASS
	Off	2390.0	-41.70	2.0	0	53.56	PEAK	74	PASS
	Off	2390.0	-52.71	2.0	0	42.55	AV	54	PASS
	Off	2483.5	-38.61	2.0	0	56.65	PEAK	74	PASS
	Off	2483.5	-47.18	2.0	0	48.08	AV	54	PASS
	Off	2500.0	-42.25	2.0	0	53.01	PEAK	74	PASS
	Off	2500.0	-52.24	2.0	0	43.02	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.14	2.0	0	51.11	PEAK	74	PASS
	Off	2310.0	-53.20	2.0	0	42.05	AV	54	PASS
	Off	2390.0	-41.90	2.0	0	53.36	PEAK	74	PASS
	Off	2390.0	-52.81	2.0	0	42.44	AV	54	PASS
	Off	2483.5	-33.52	2.0	0	61.73	PEAK	74	PASS
	Off	2483.5	-45.27	2.0	0	49.99	AV	54	PASS
	Off	2500.0	-40.89	2.0	0	54.36	PEAK	74	PASS
	Off	2500.0	-52.18	2.0	0	43.07	AV	54	PASS
8DPSK	Off	2310.0	-43.86	2.0	0	51.39	PEAK	74	PASS
	Off	2310.0	-53.23	2.0	0	42.03	AV	54	PASS
	Off	2390.0	-34.89	2.0	0	60.37	PEAK	74	PASS
	Off	2390.0	-51.92	2.0	0	43.33	AV	54	PASS
	Off	2483.5	-29.88	2.0	0	65.38	PEAK	74	PASS
	Off	2483.5	-44.76	2.0	0	50.49	AV	54	PASS
	Off	2500.0	-42.11	2.0	0	53.15	PEAK	74	PASS
	Off	2500.0	-52.13	2.0	0	43.13	AV	54	PASS

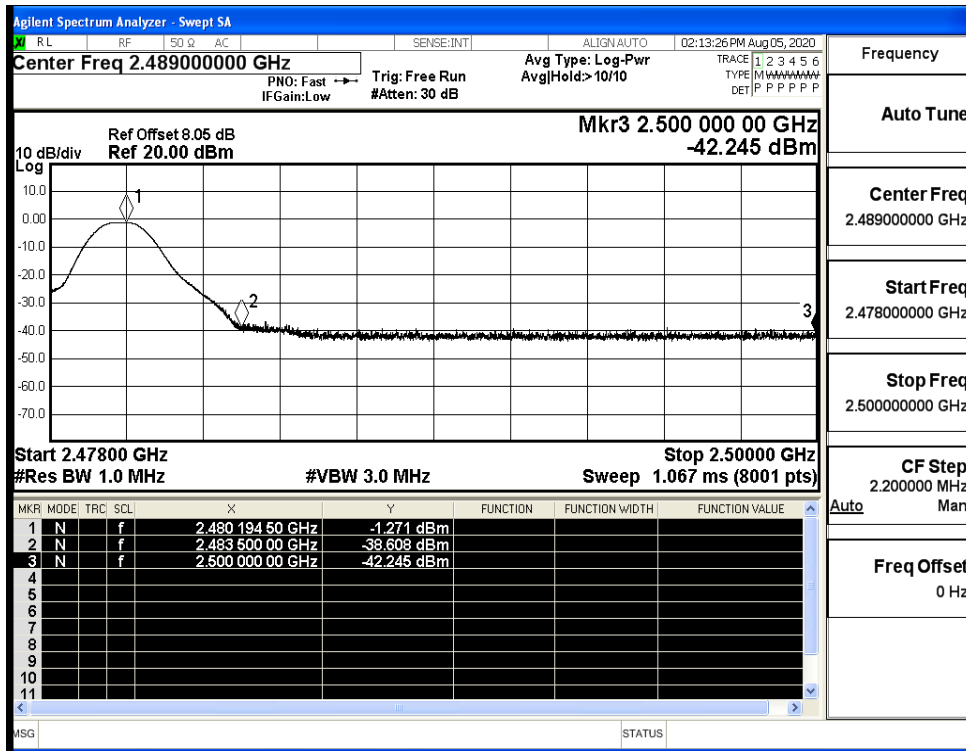
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



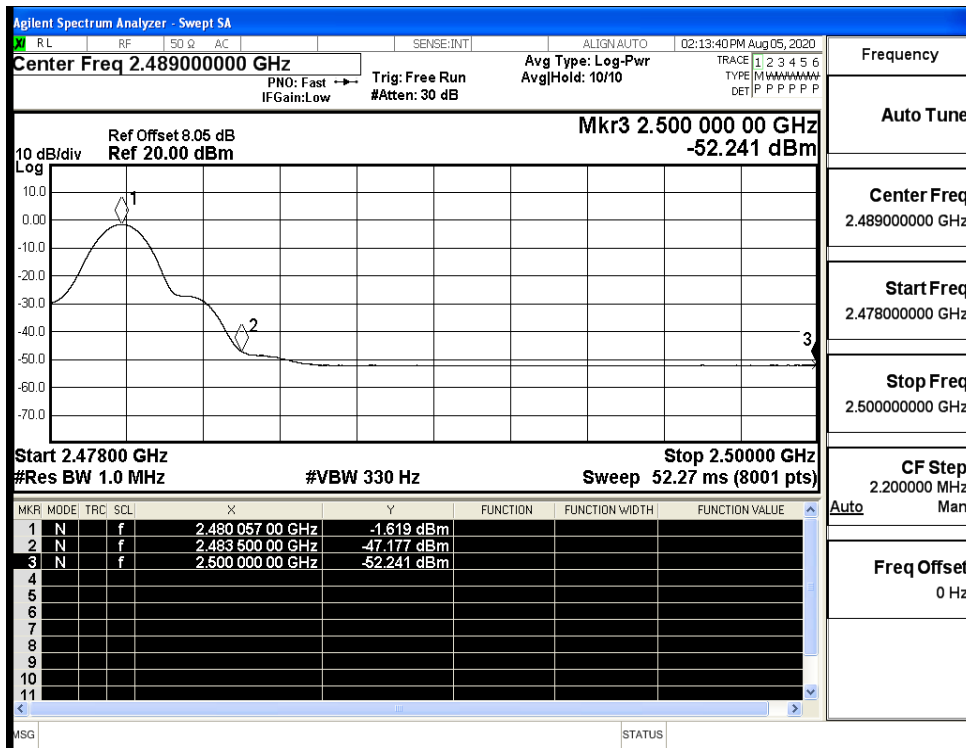
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



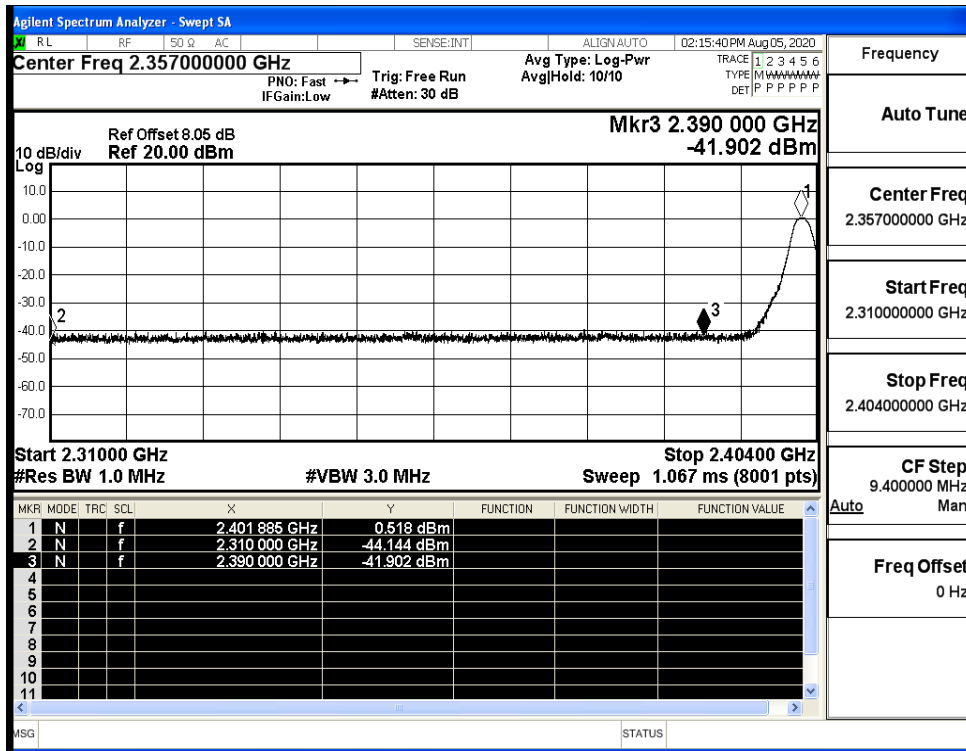
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



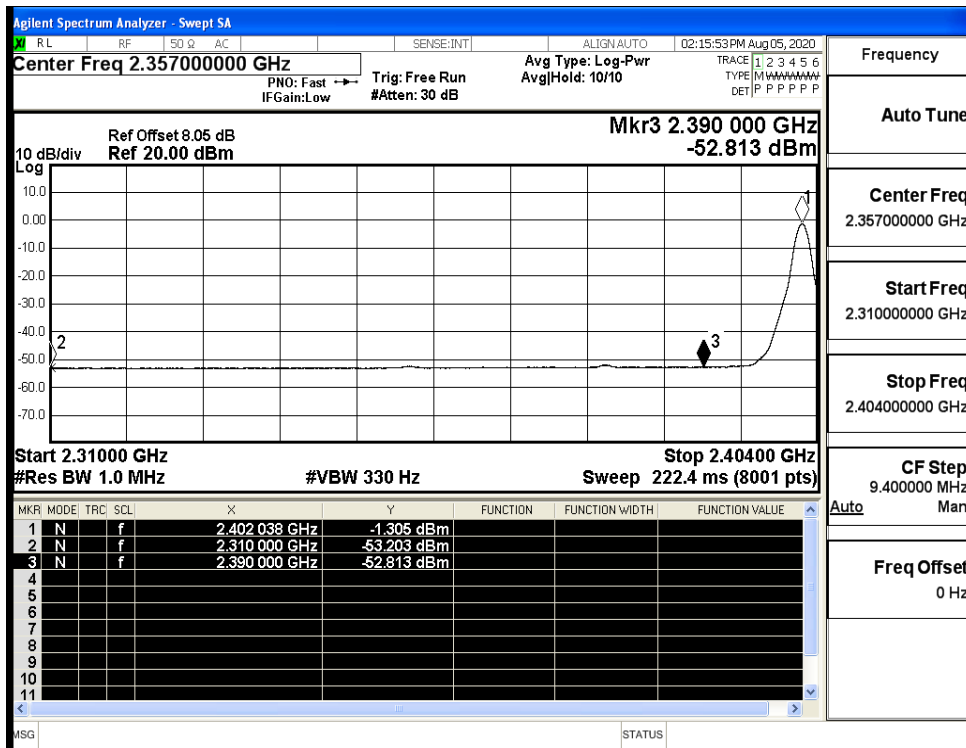
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



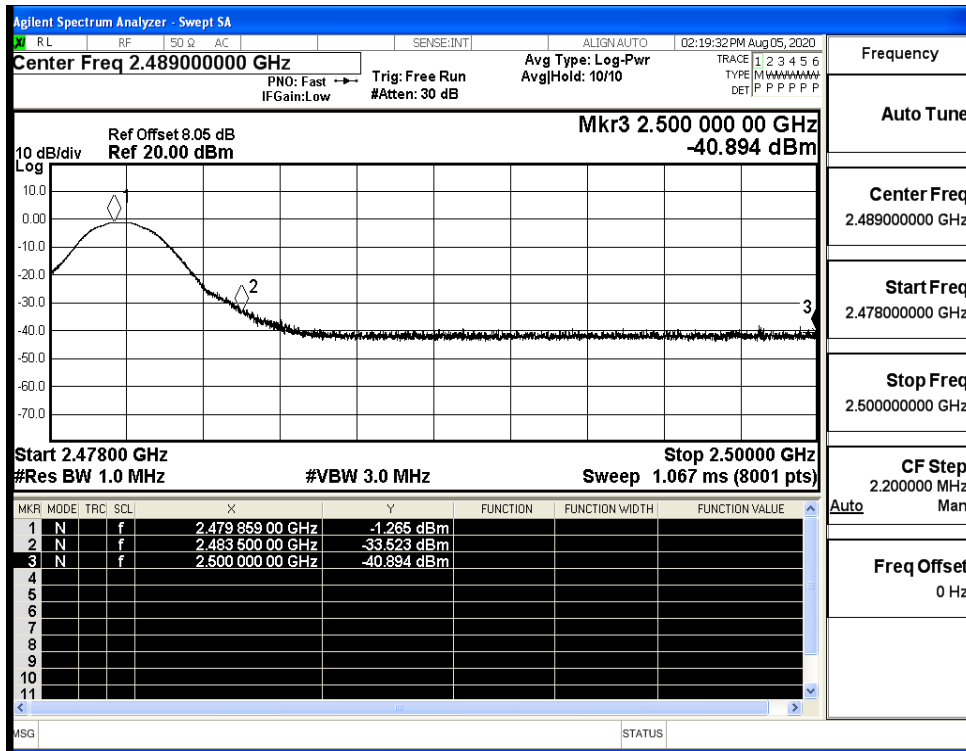
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



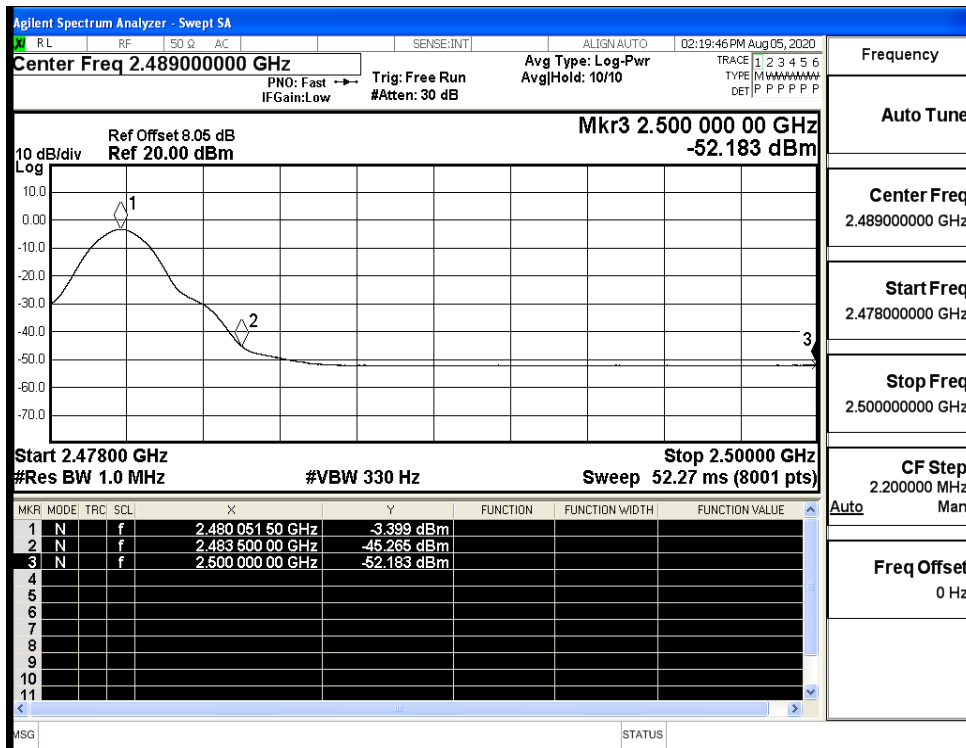
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



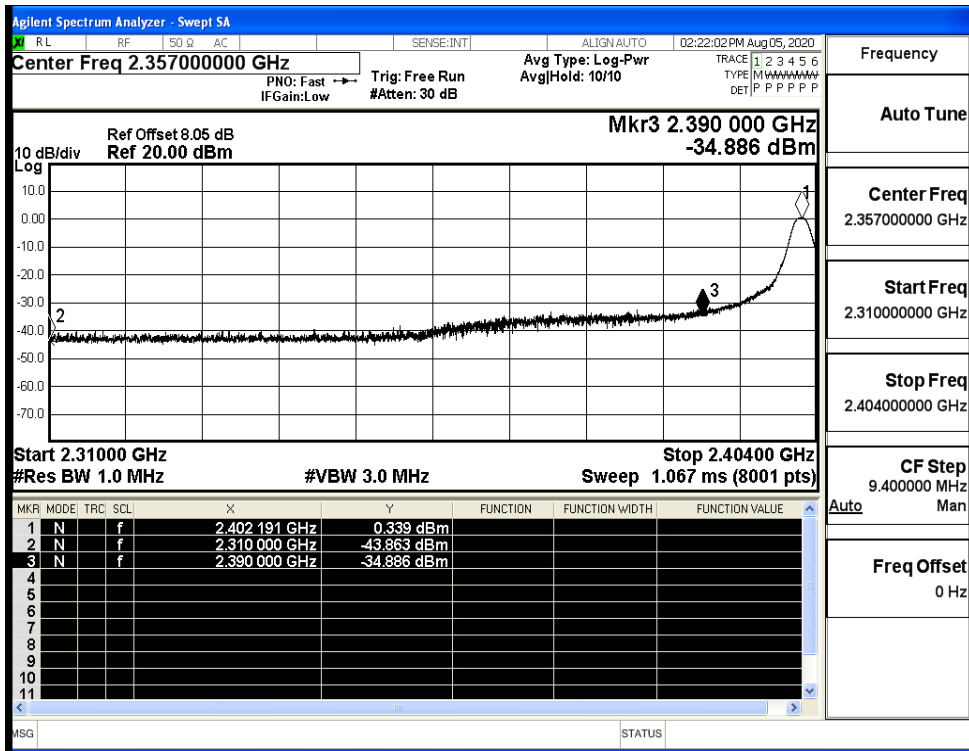
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



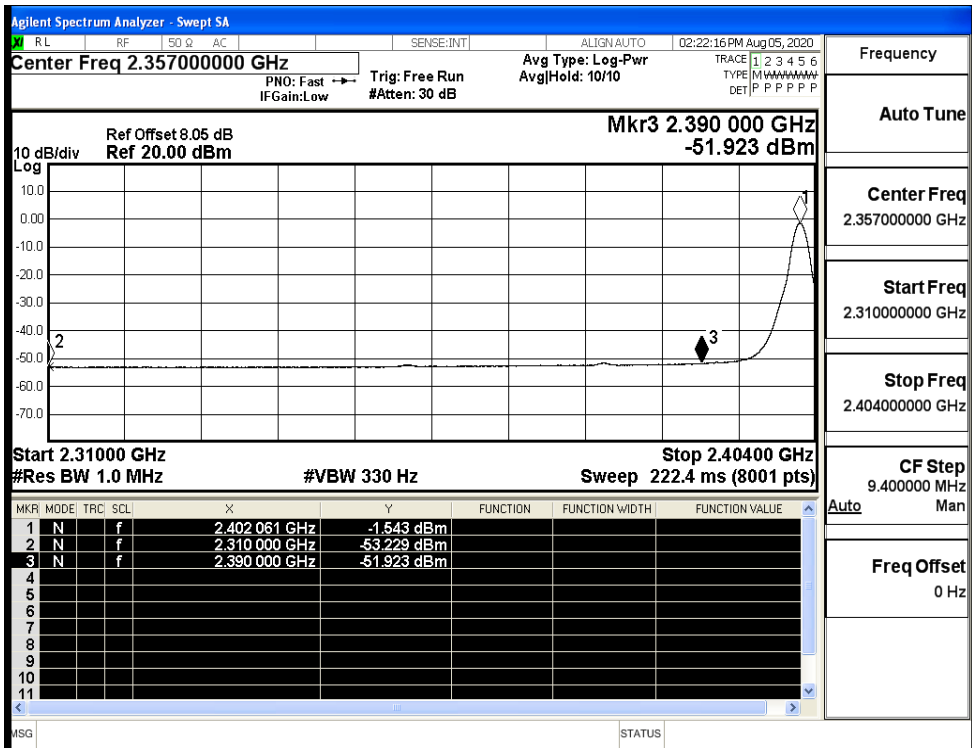
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



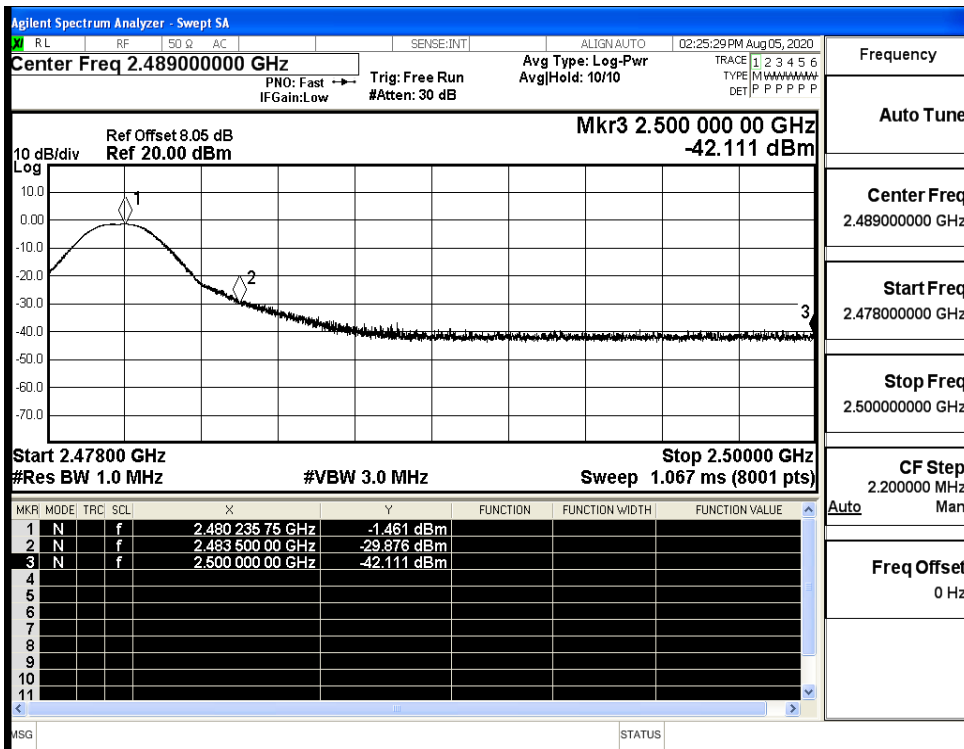
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

