

## Appendix A

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

Product Name: Bluetooth Speaker

Trade Mark: Origaudio

Test Model: Wristler

#### Environmental Conditions

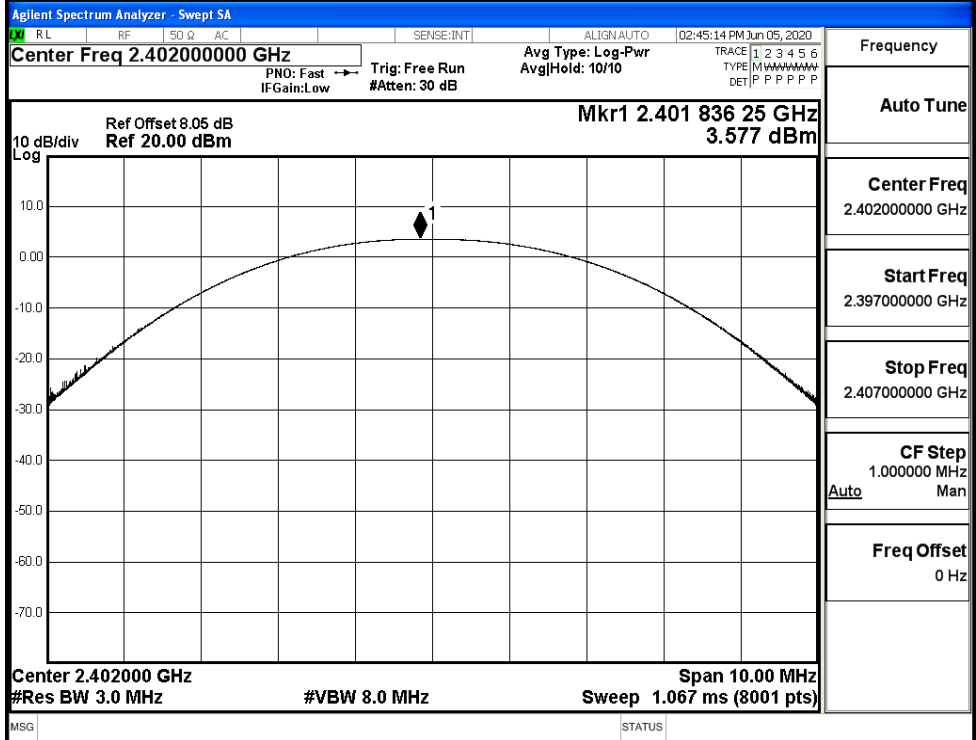
Temperature:	23.5 ° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Scout Wu
Supervised by:	Li Huan

#### A.1 Maxmum Conducted Peak Output Power

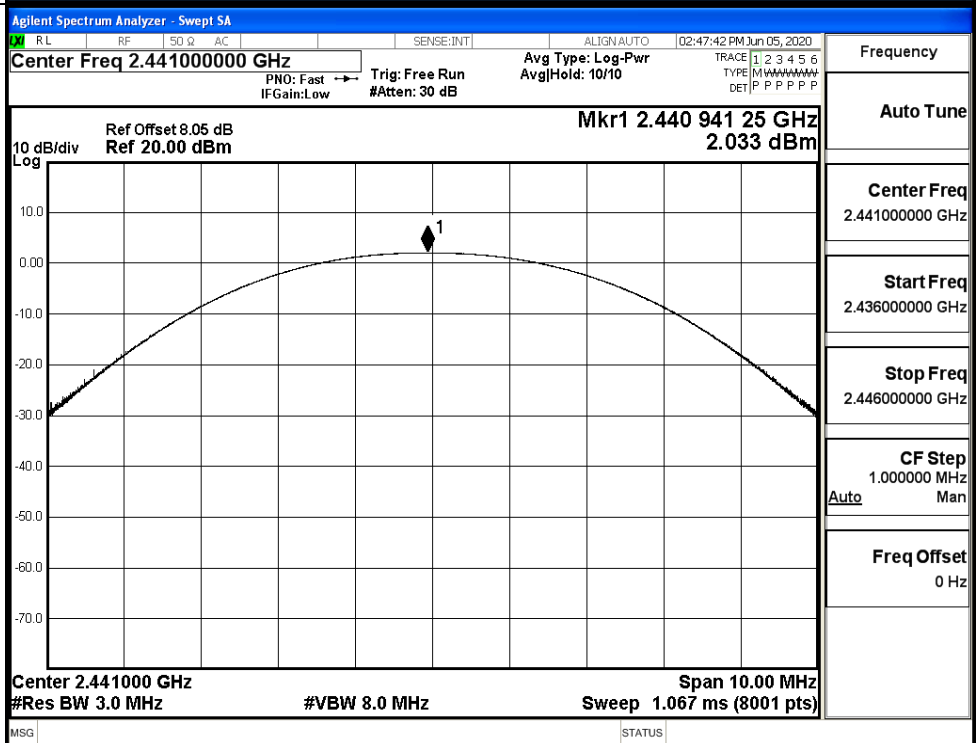
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.577	30	PASS
	MCH	2.033	30	PASS
	HCH	0.420	30	PASS
$\pi/4$ DQPSK	LCH	3.066	30	PASS
	MCH	1.445	30	PASS
	HCH	-0.222	30	PASS
8DPSK	LCH	3.665	30	PASS
	MCH	2.096	30	PASS
	HCH	0.412	30	PASS

Test Graphs

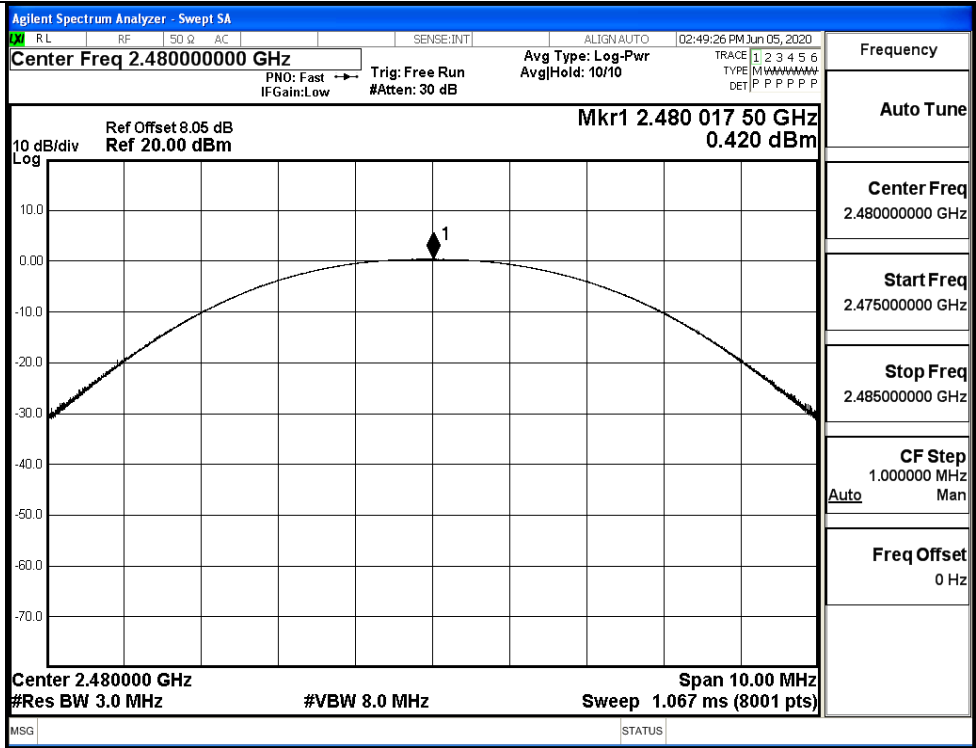
GFSK/LCH



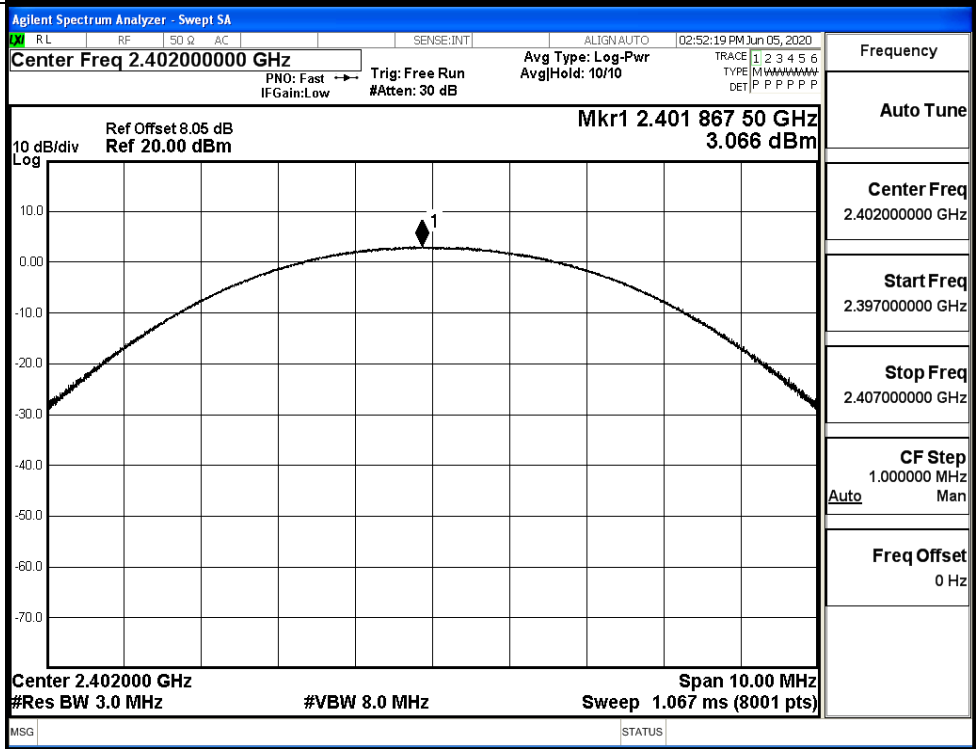
GFSK/MCH

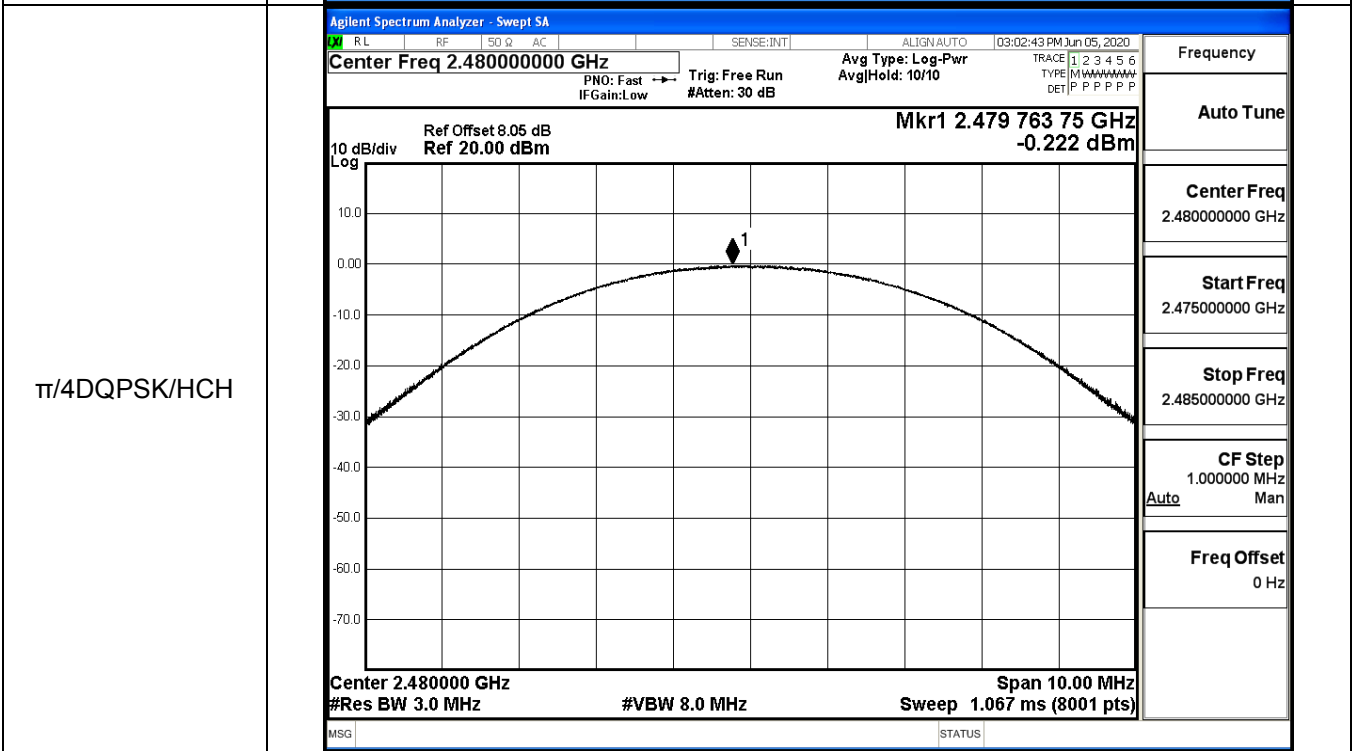
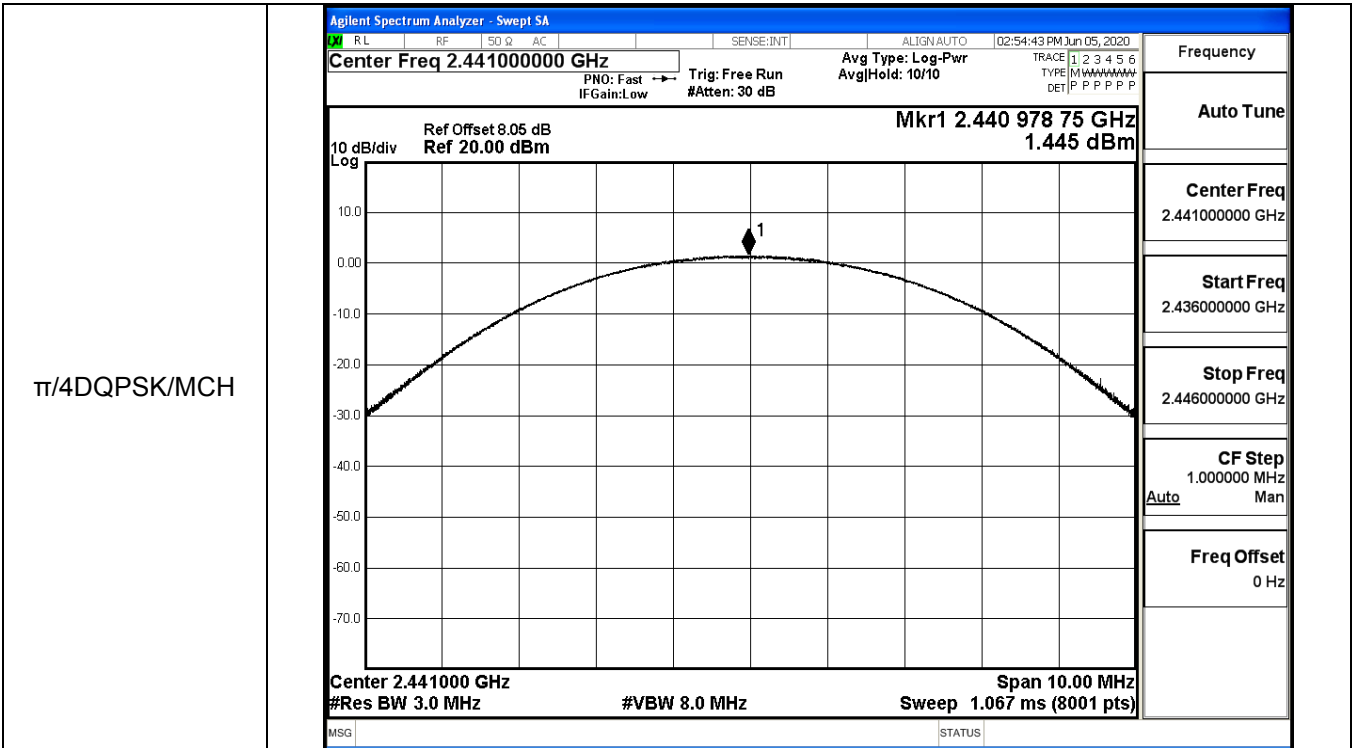


GFSK/HCH

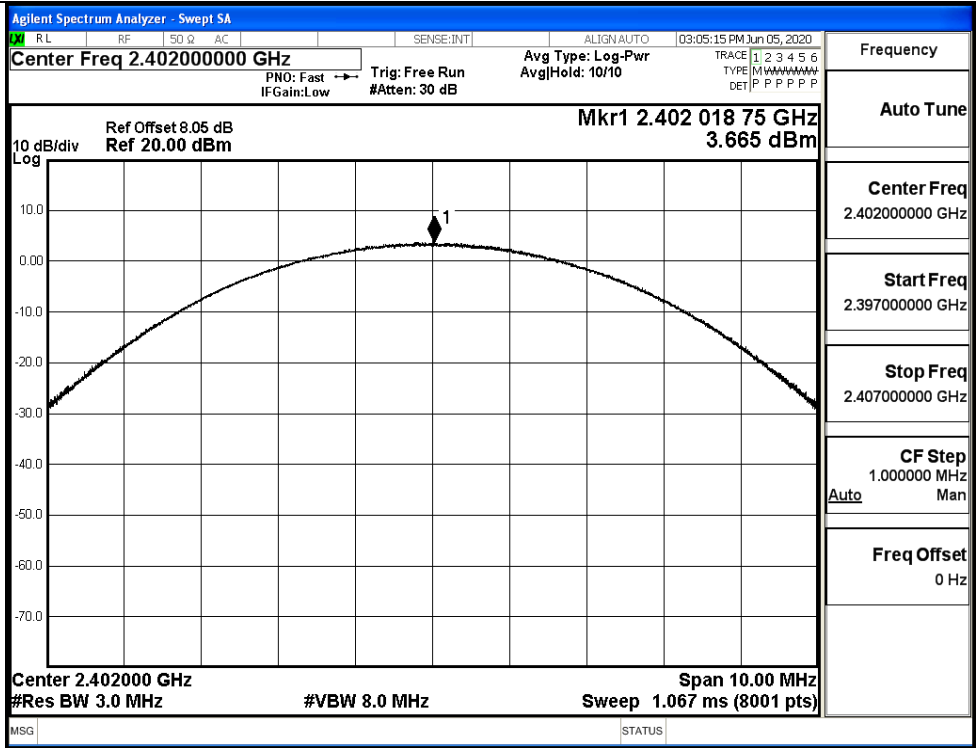


$\pi/4$ DQPSK/LCH

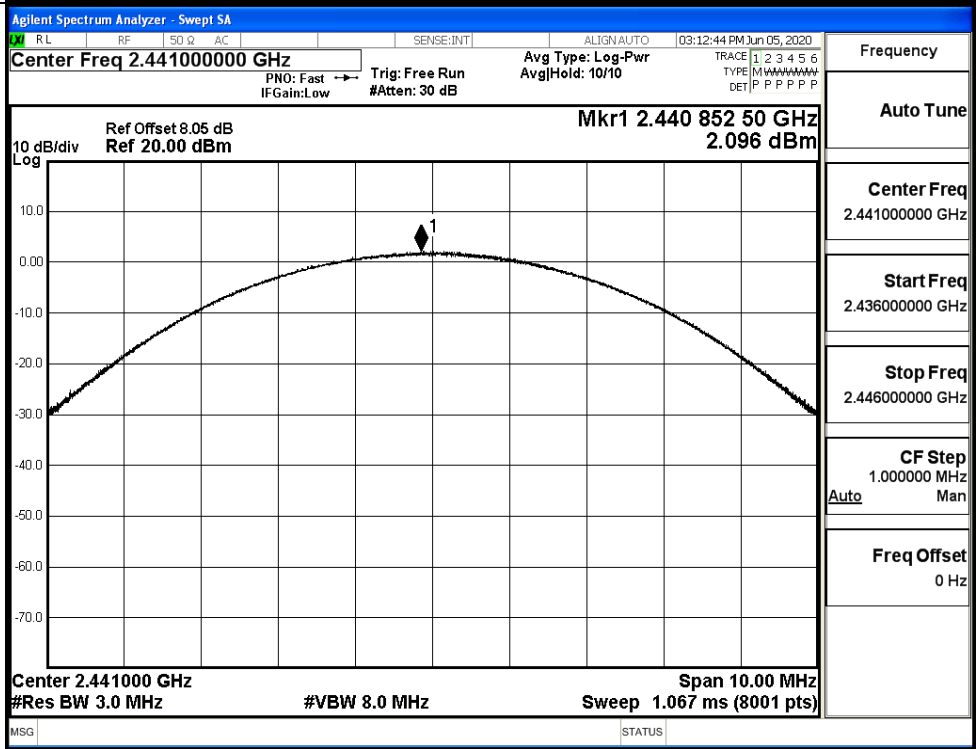




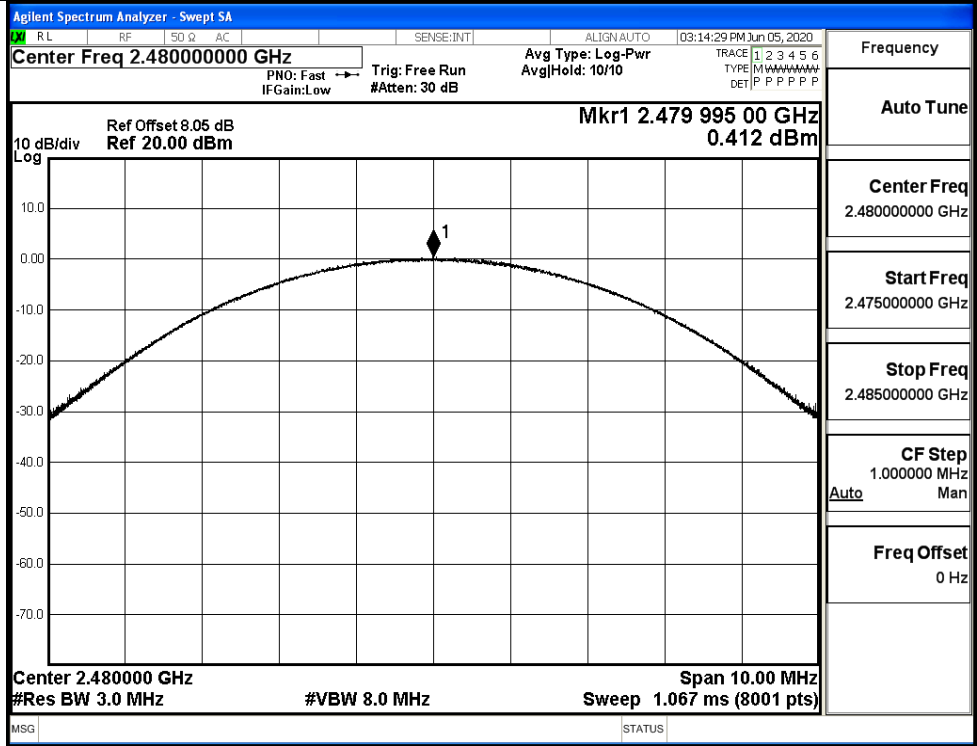
8DPSK/LCH



8DPSK/MCH

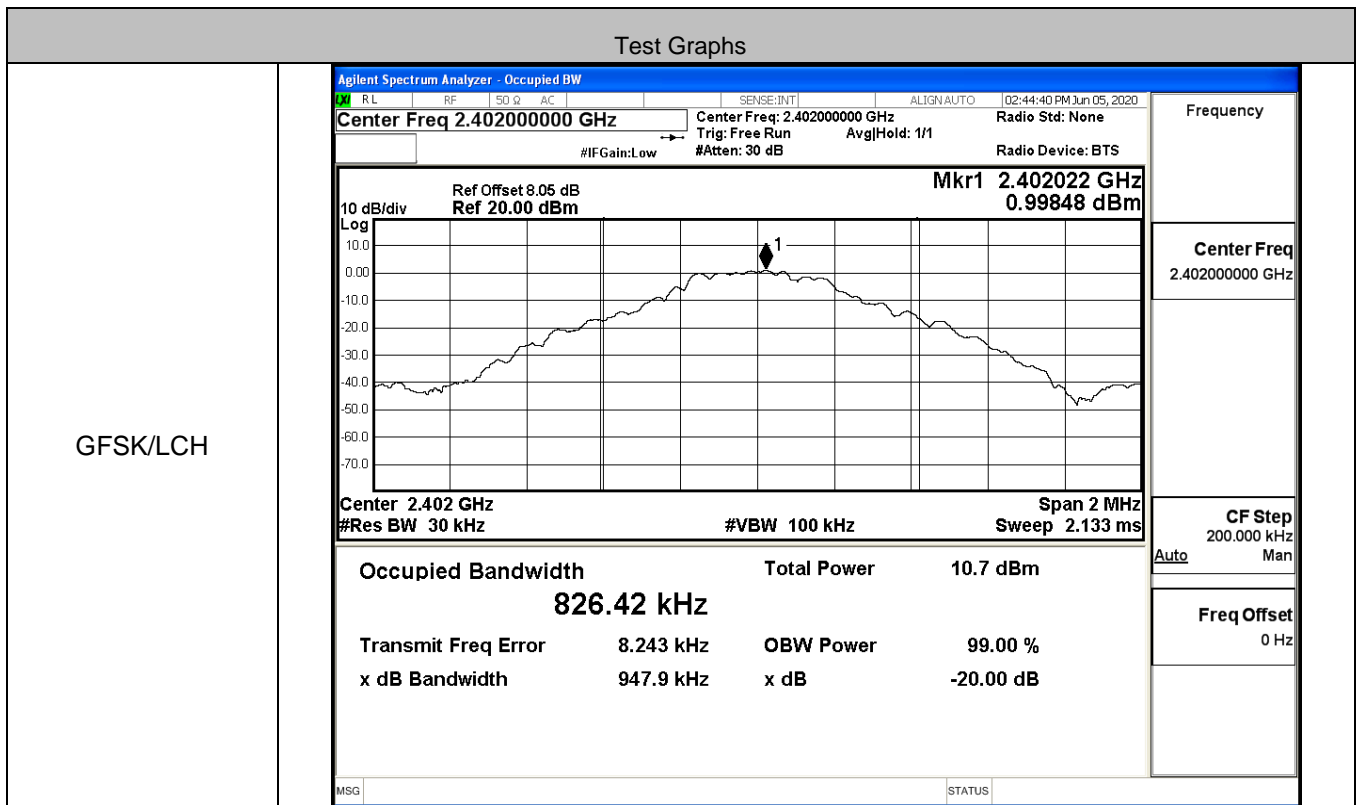


8DPSK/HCH

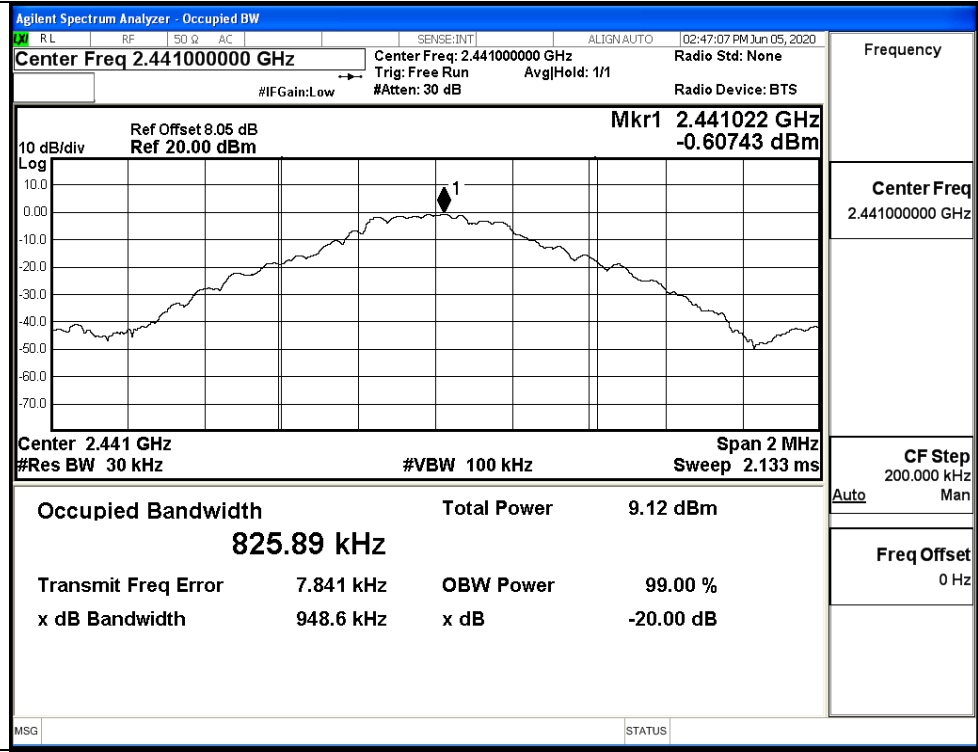


**A.2 20dB Bandwidth**

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9479	Not Specified	PASS
	MCH	0.9486	Not Specified	PASS
	HCH	0.9489	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.323	Not Specified	PASS
	MCH	1.323	Not Specified	PASS
	HCH	1.323	Not Specified	PASS
8DPSK	LCH	1.298	Not Specified	PASS
	MCH	1.299	Not Specified	PASS
	HCH	1.304	Not Specified	PASS

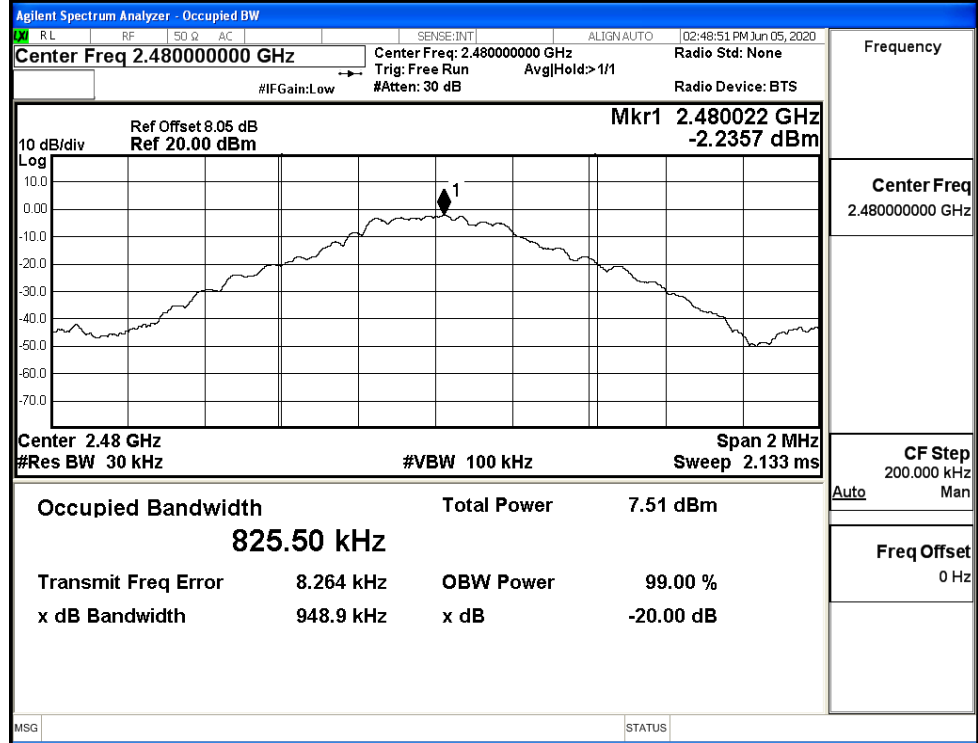


GFSK/MCH



Frequency	2.441000000 GHz
Center Freq	2.441000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

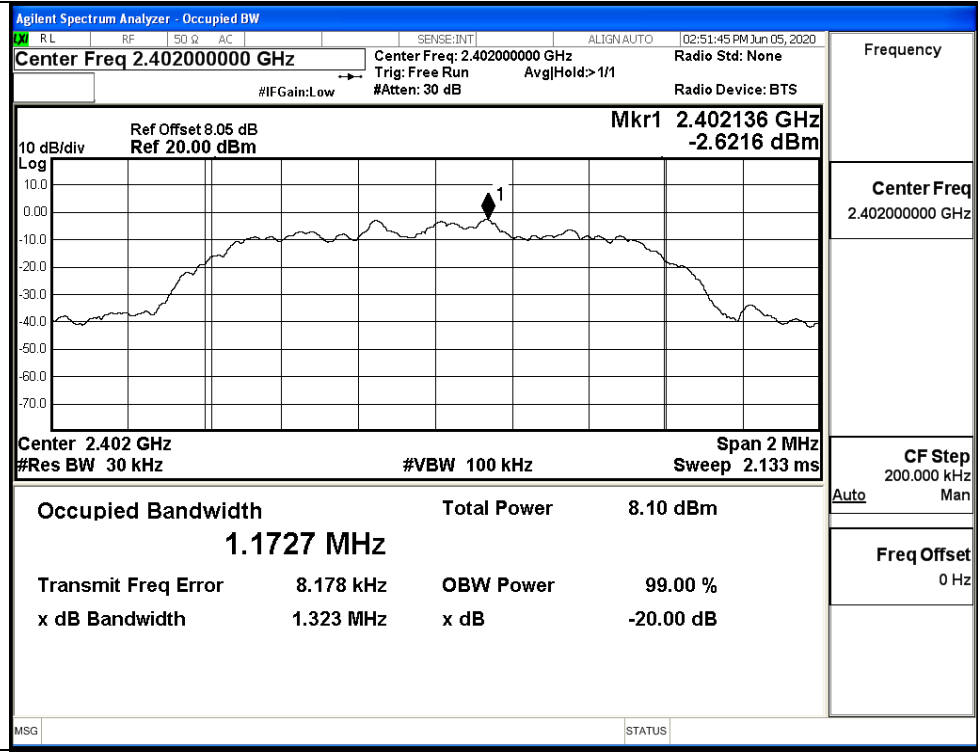
GFSK/HCH



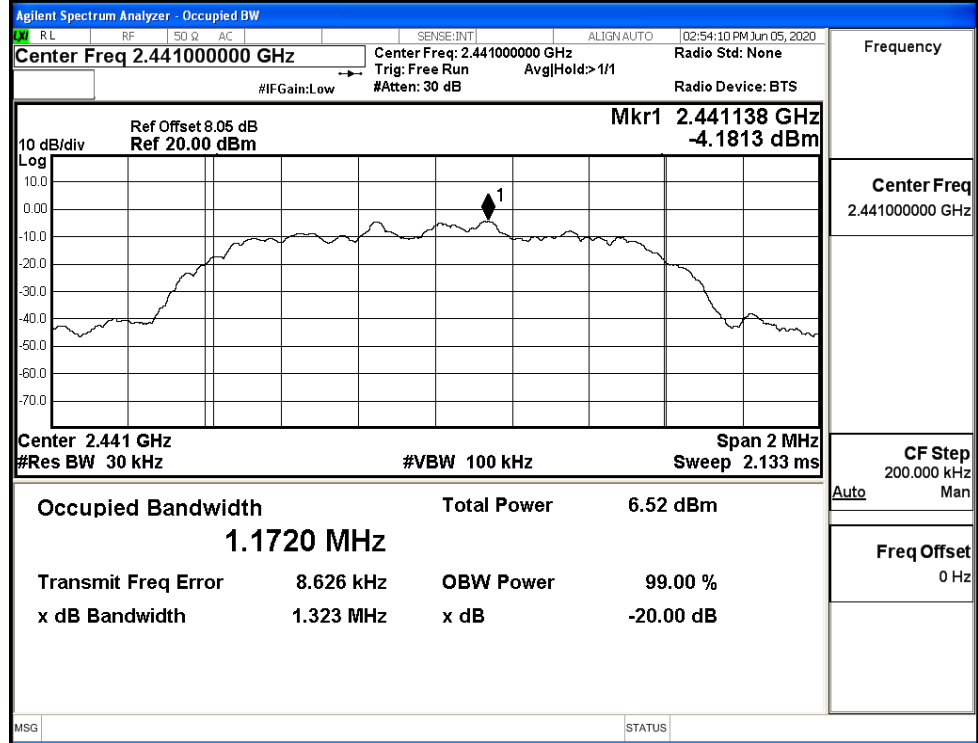
Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

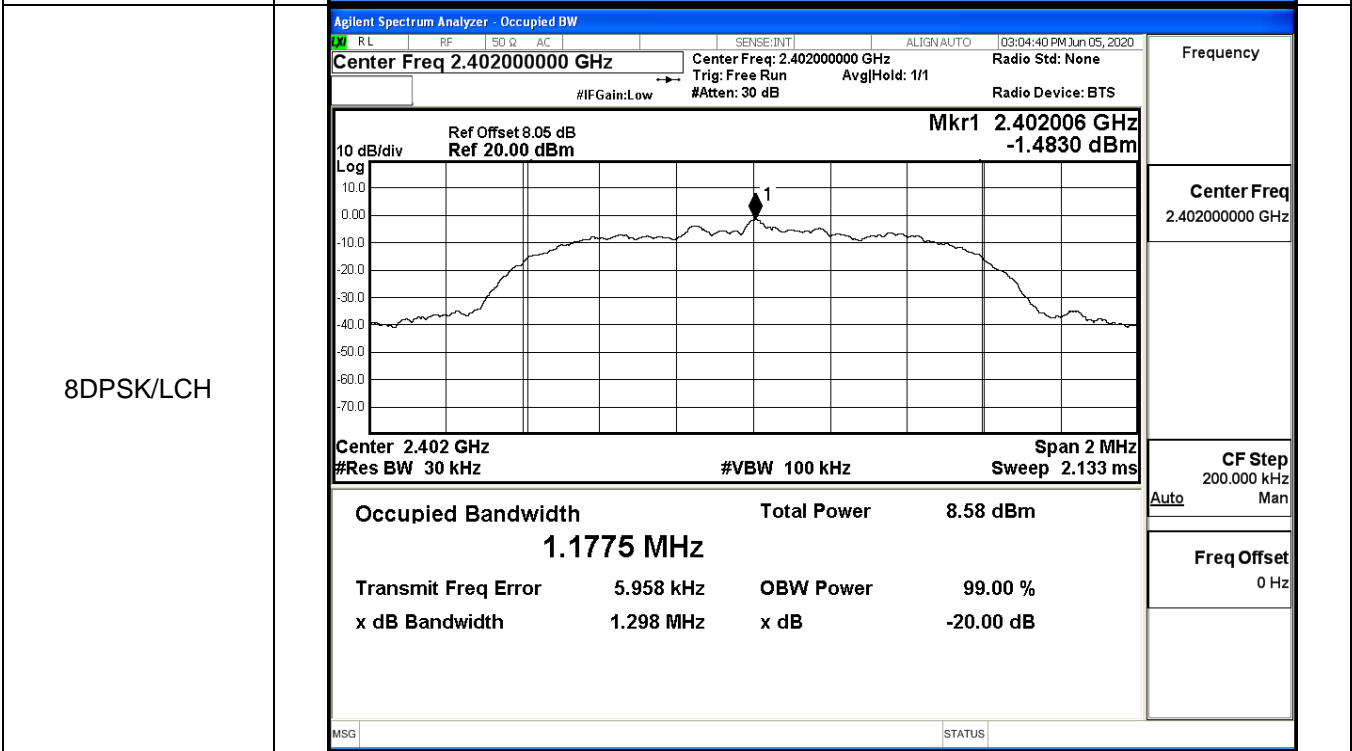
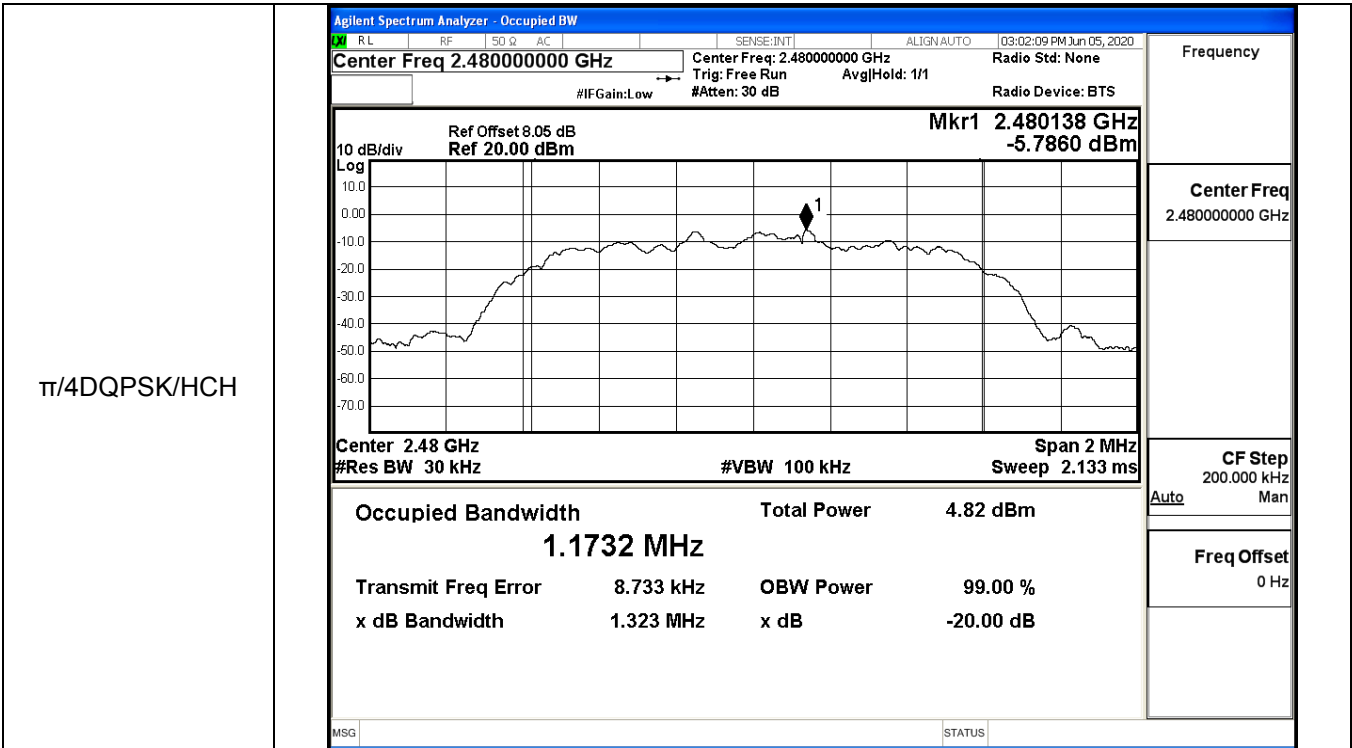


$\pi/4$ DQPSK/LCH

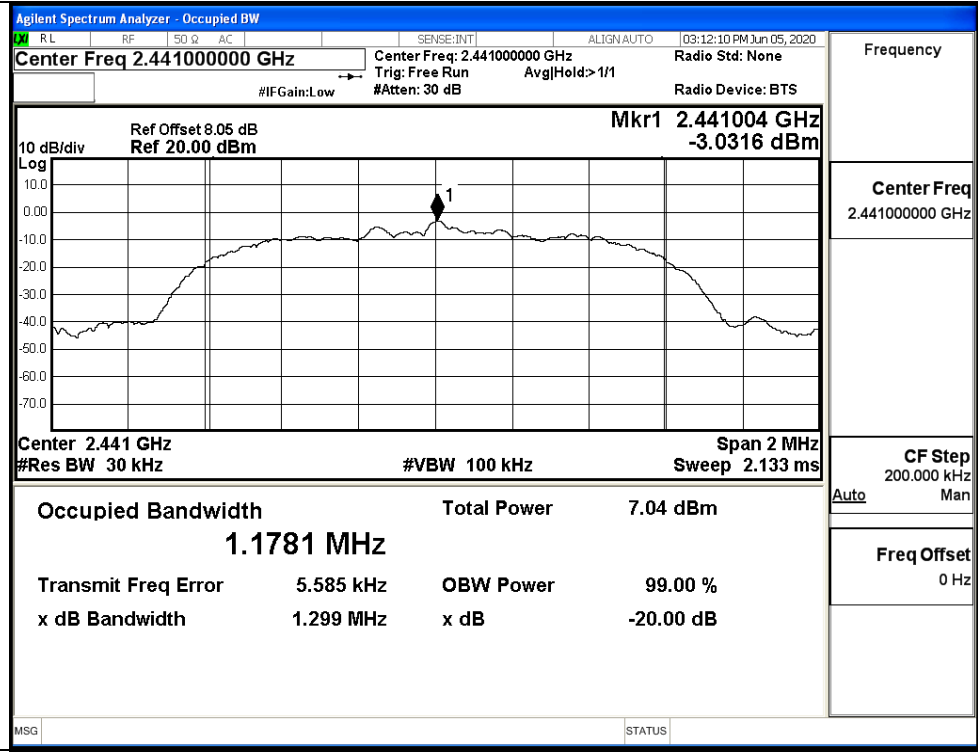


$\pi/4$ DQPSK/MCH



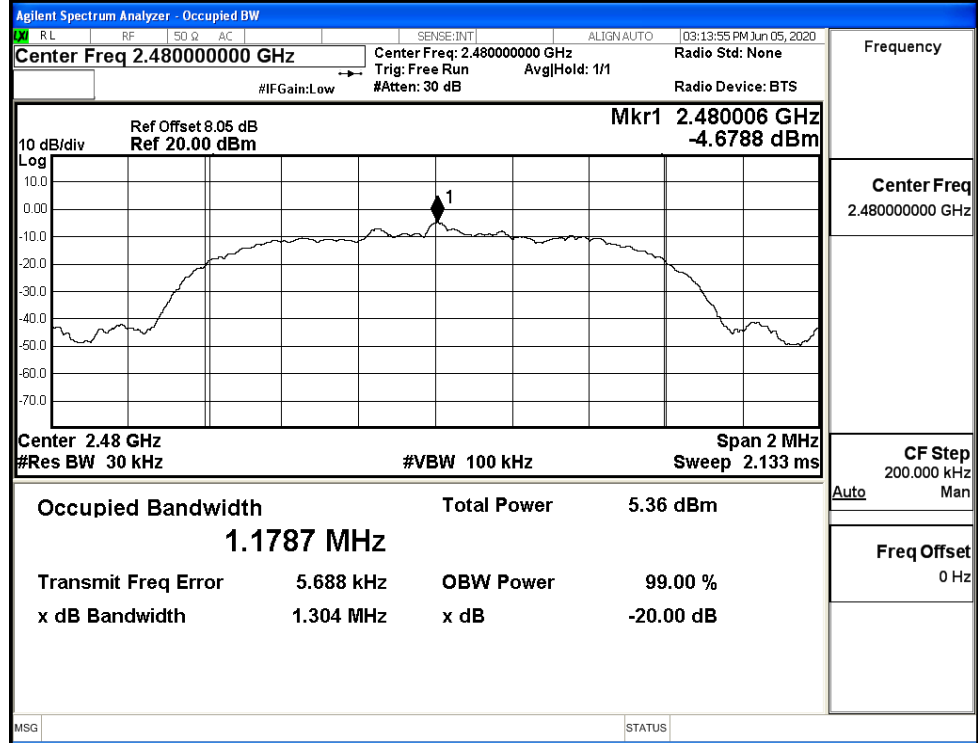


8DPSK/MCH



Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

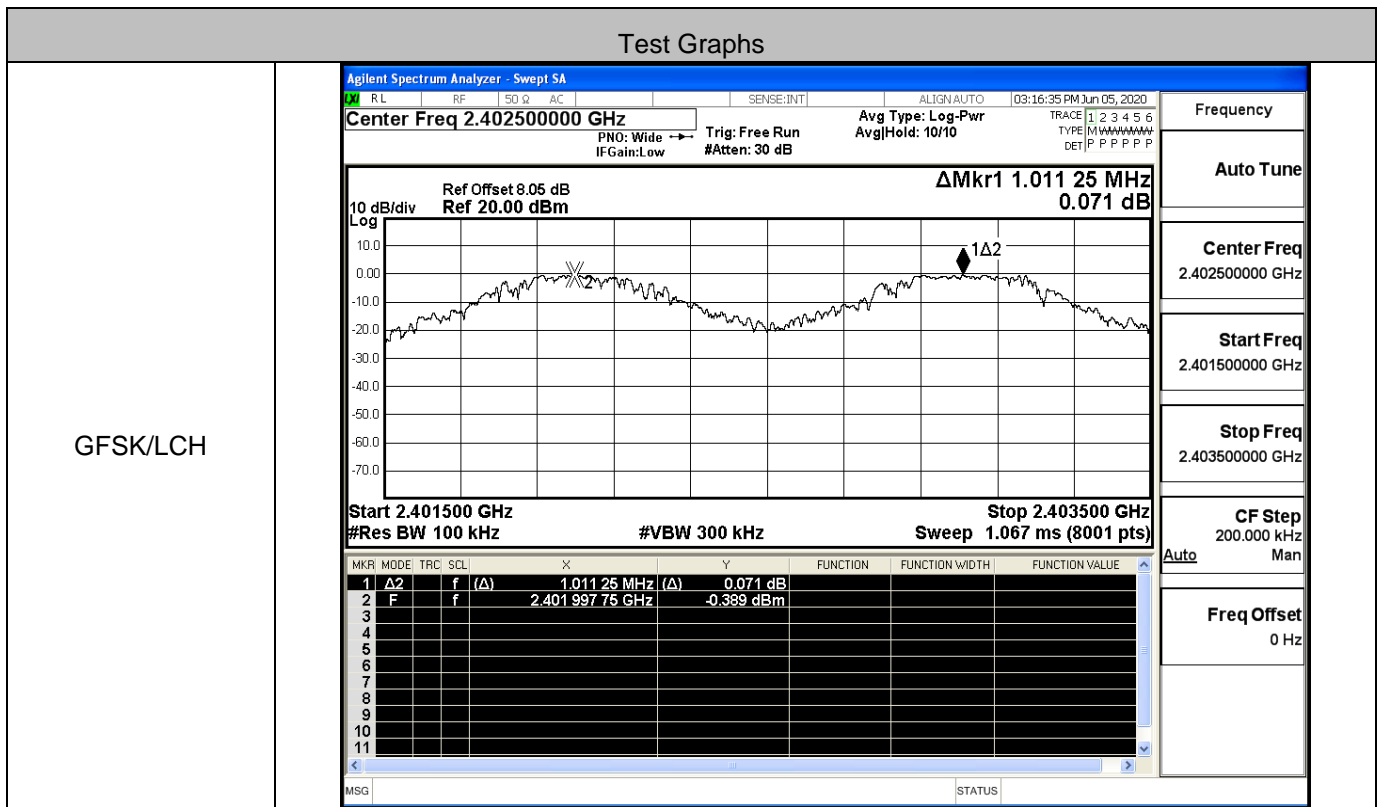
8DPSK/HCH



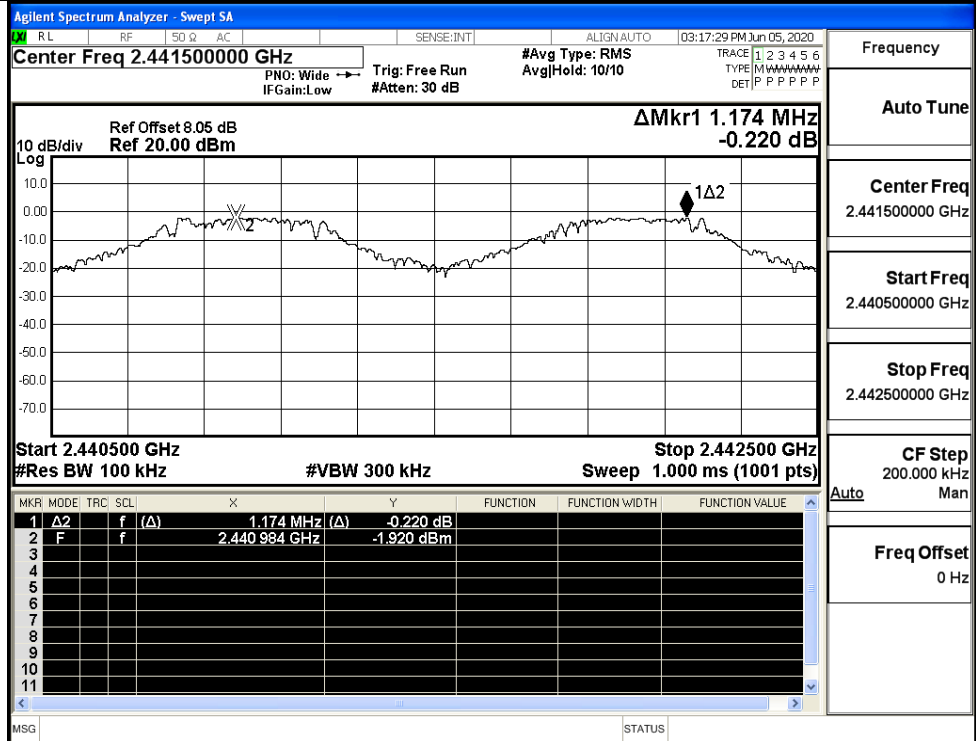
Frequency	2.48000000 GHz
Center Freq	2.48000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

### A.3 Carrier Frequency Separation

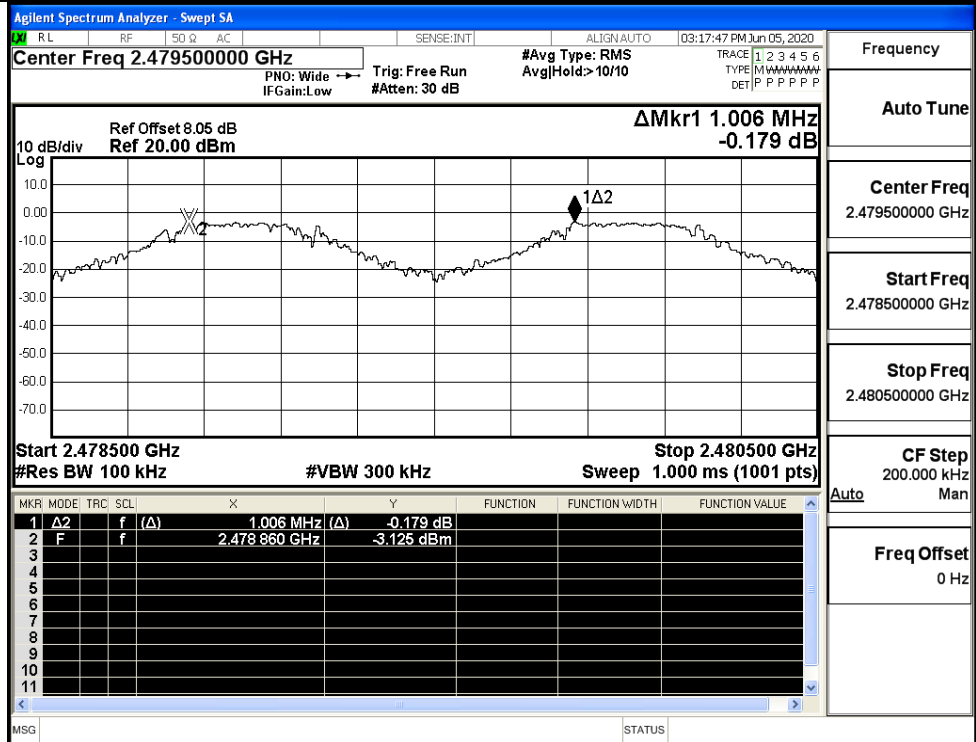
Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.011	0.633	PASS
	MCH	1.174	0.633	PASS
	HCH	1.006	0.633	PASS
π/4DQPSK	LCH	1.034	0.882	PASS
	MCH	1.092	0.882	PASS
	HCH	0.906	0.882	PASS
8DPSK	LCH	1.290	0.869	PASS
	MCH	0.986	0.869	PASS
	HCH	1.160	0.869	PASS



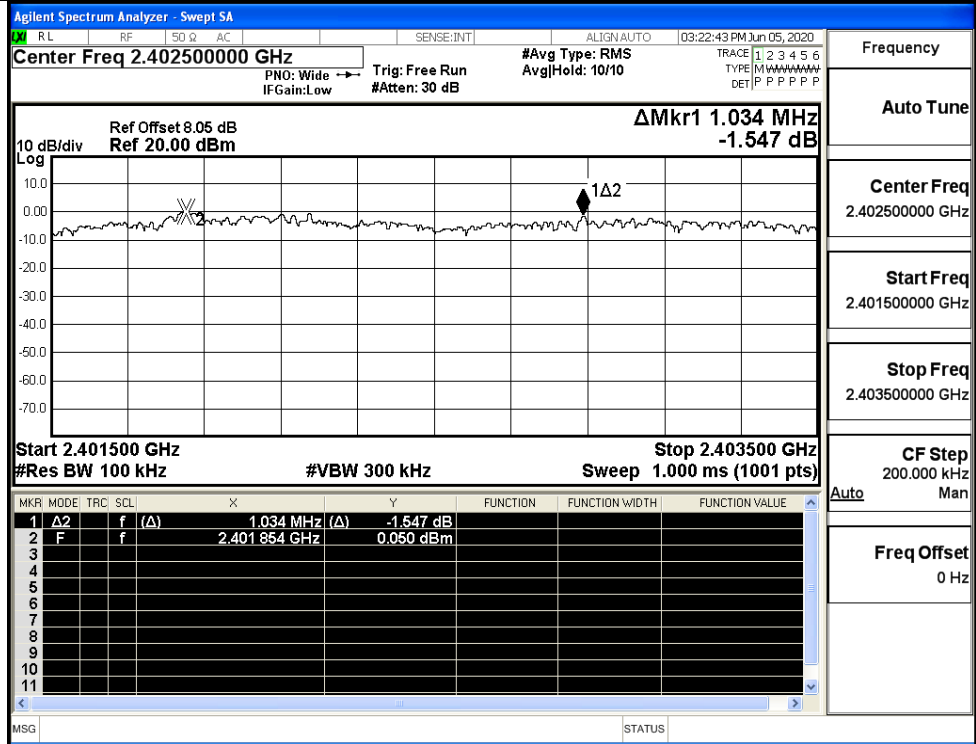
GFSK/MCH



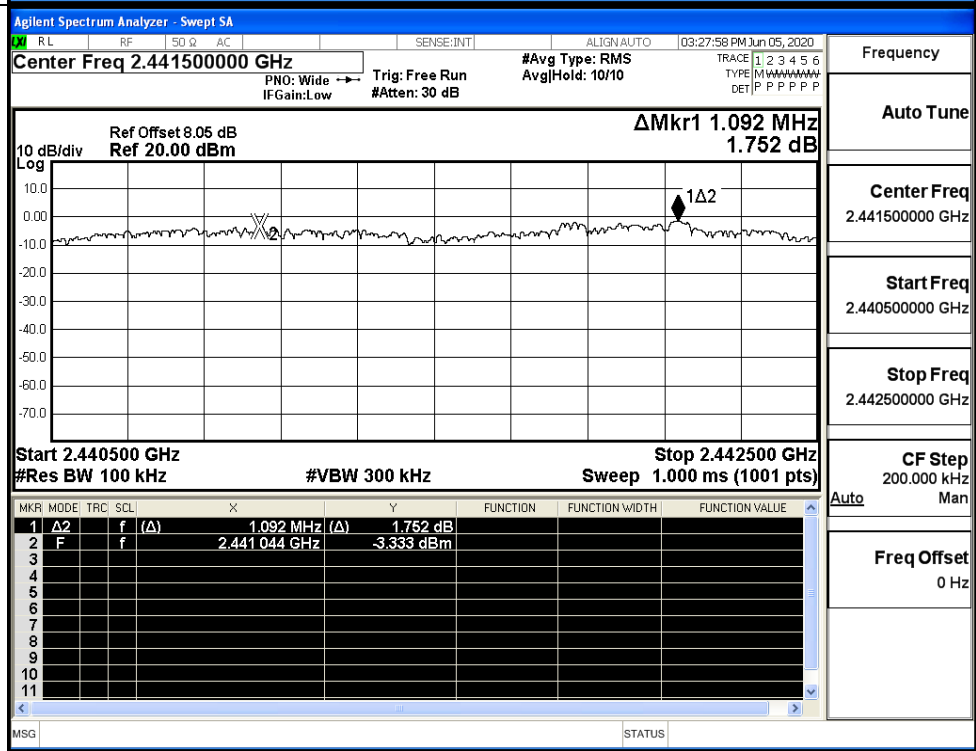
GFSK/HCH



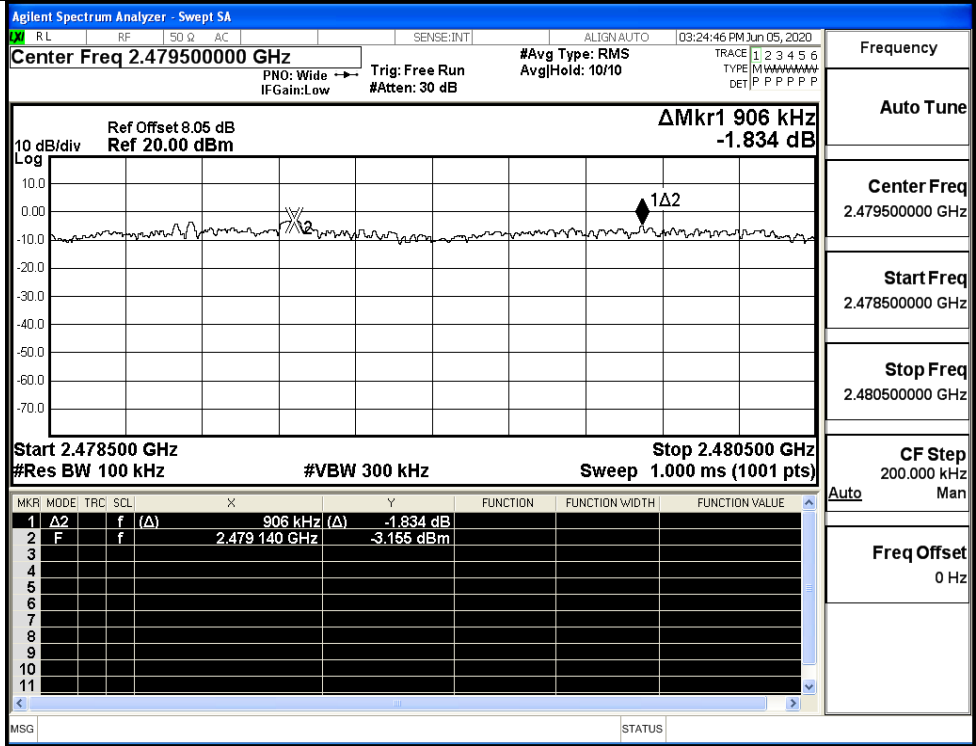
$\pi/4$ DQPSK/LCH



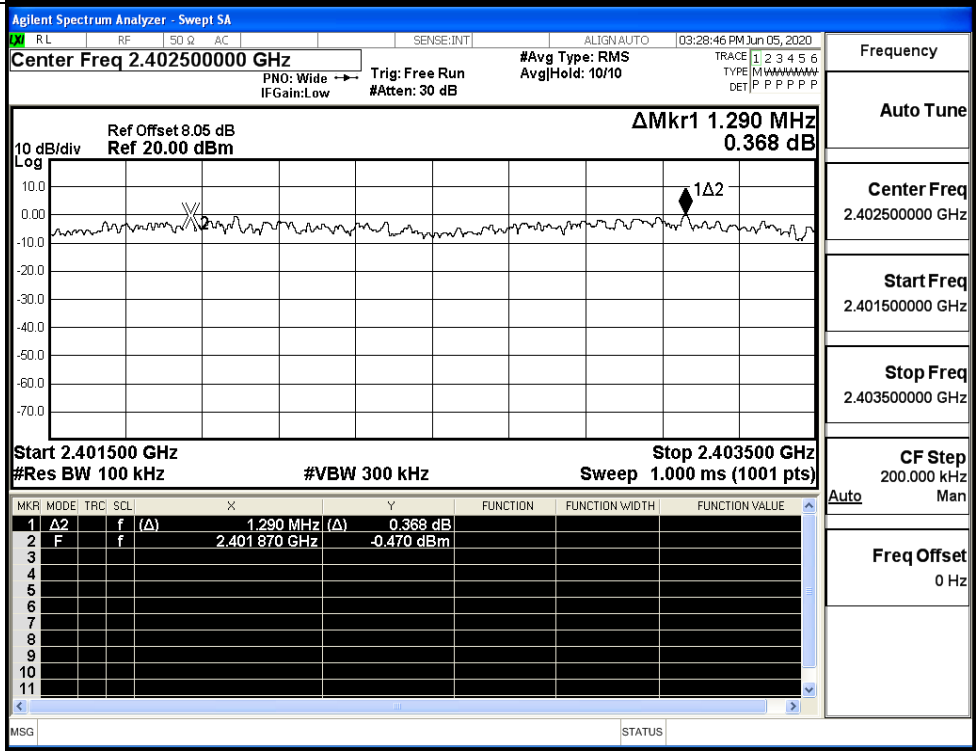
$\pi/4$ DQPSK/MCH



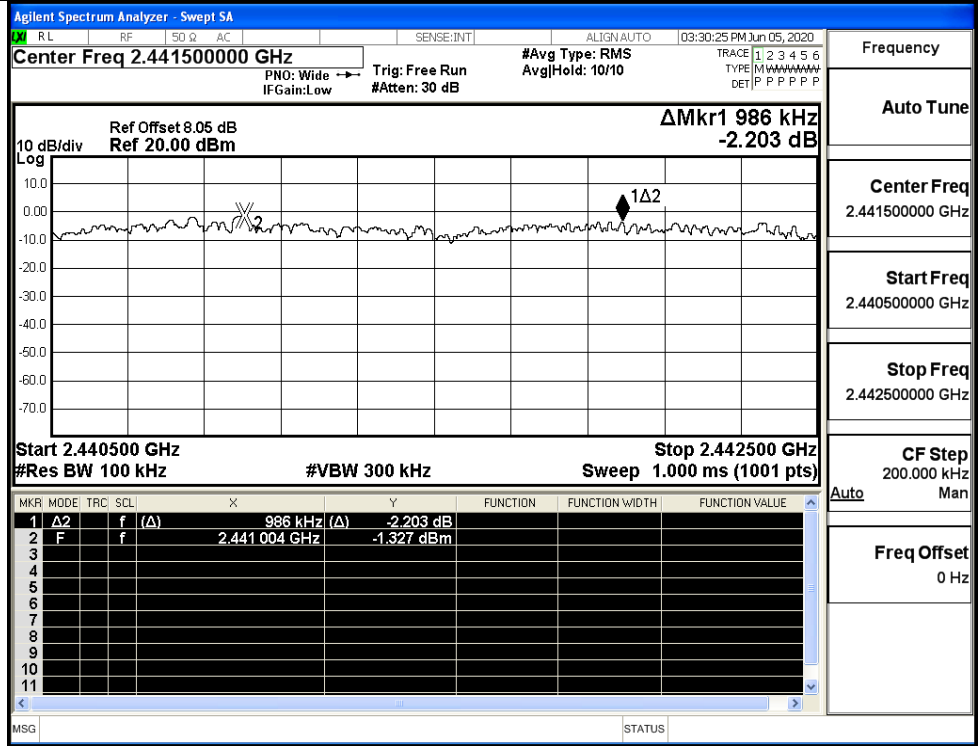
π/4DQPSK/HCH



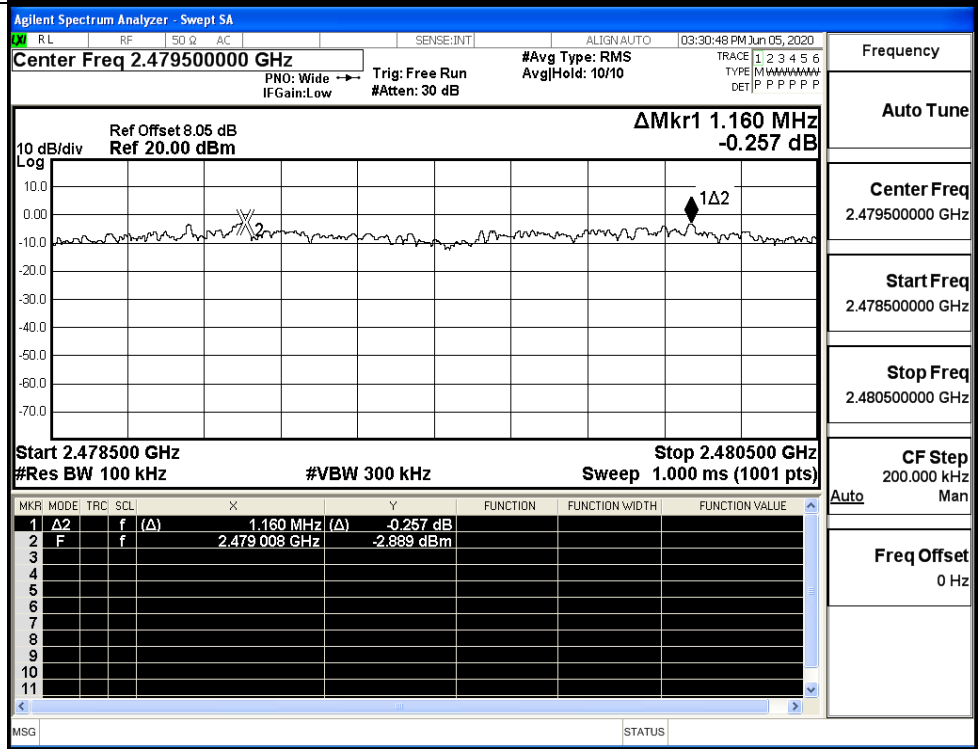
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH





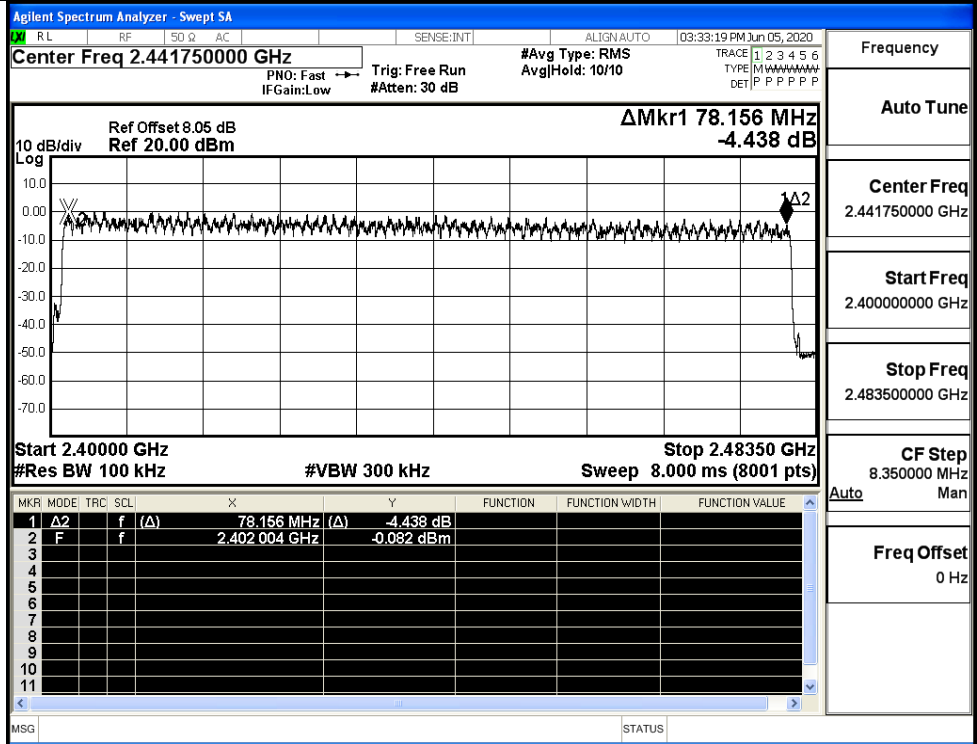
### A.4 Hopping Channel Number

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

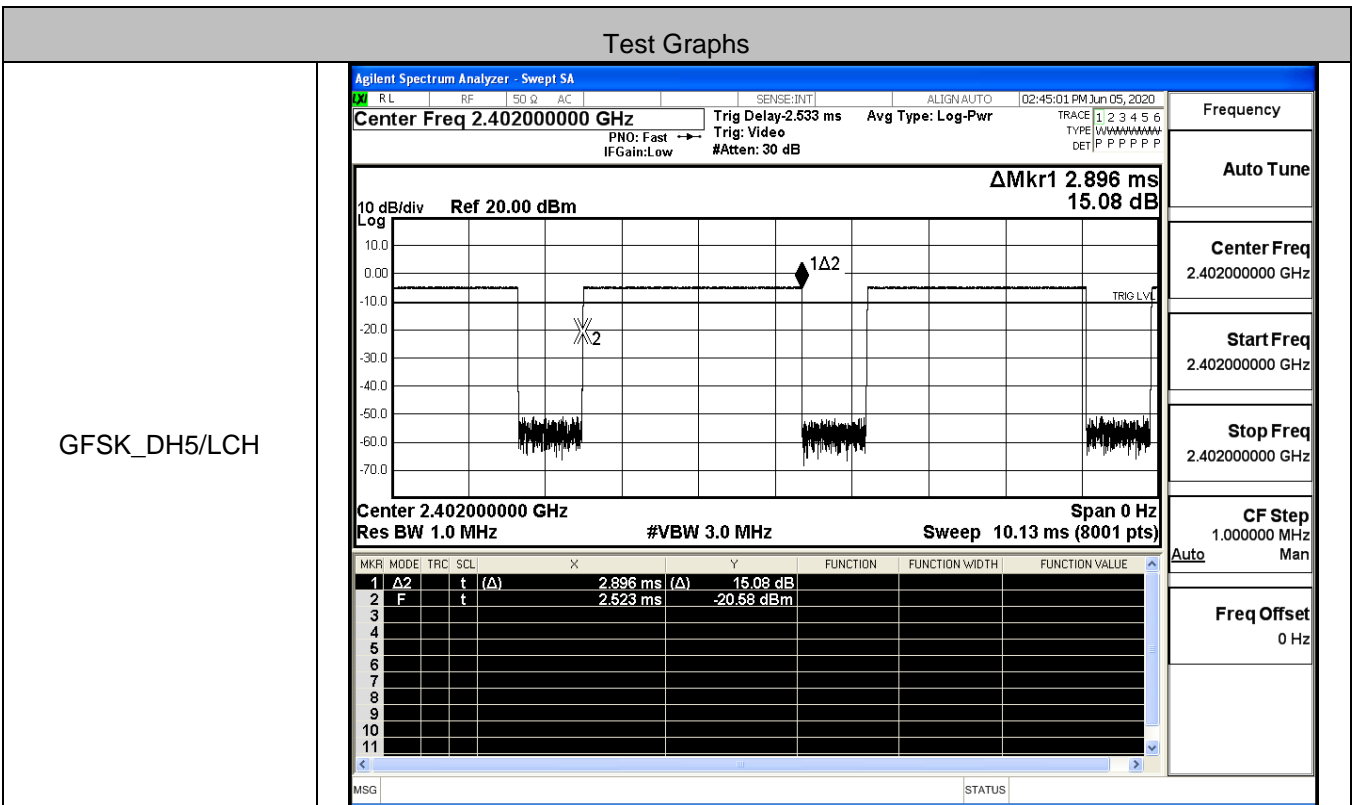
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA                  Center Freq 2.441750000 GHz                  Ref Offset 8.05 dB                  Ref 20.00 dBm  <math>\Delta</math>Mkr1 77.895 MHz                  -2.653 dB                  Start 2.40000 GHz                  #Res BW 100 kHz                  #VBW 300 kHz                  Stop 2.48350 GHz                  Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <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><math>\Delta</math>2</td> <td>f</td> <td>(<math>\Delta</math>)</td> <td>77.895 MHz (<math>\Delta</math>)</td> <td>-2.653 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td>(<math>\Delta</math>)</td> <td>2.402108 GHz</td> <td>-0.456 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	$\Delta$ 2	f	( $\Delta$ )	77.895 MHz ( $\Delta$ )	-2.653 dB				2	F	f	( $\Delta$ )	2.402108 GHz	-0.456 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	$\Delta$ 2	f	( $\Delta$ )	77.895 MHz ( $\Delta$ )	-2.653 dB																							
2	F	f	( $\Delta$ )	2.402108 GHz	-0.456 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  <math>\Delta</math>Mkr1 78.041 MHz                  -1.691 dB                  Start 2.40000 GHz                  #Res BW 100 kHz                  #VBW 300 kHz                  Stop 2.48350 GHz                  Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <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><math>\Delta</math>2</td> <td>f</td> <td>(<math>\Delta</math>)</td> <td>78.041 MHz (<math>\Delta</math>)</td> <td>-1.691 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td>(<math>\Delta</math>)</td> <td>2.401827 GHz</td> <td>-1.198 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	$\Delta$ 2	f	( $\Delta$ )	78.041 MHz ( $\Delta$ )	-1.691 dB				2	F	f	( $\Delta$ )	2.401827 GHz	-1.198 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	$\Delta$ 2	f	( $\Delta$ )	78.041 MHz ( $\Delta$ )	-1.691 dB																							
2	F	f	( $\Delta$ )	2.401827 GHz	-1.198 dBm																							

8DPSK/Hop

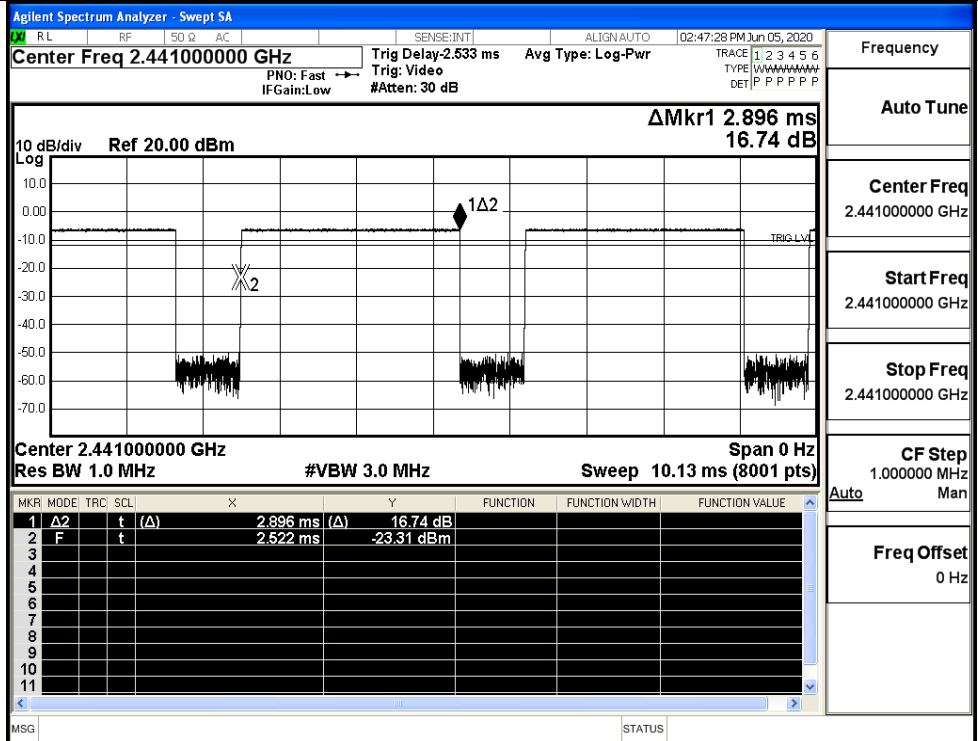


### A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
π/4DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS



GFSK\_DH5/MCH



Frequency

Auto Tune

Center Freq 2.441000000 GHz

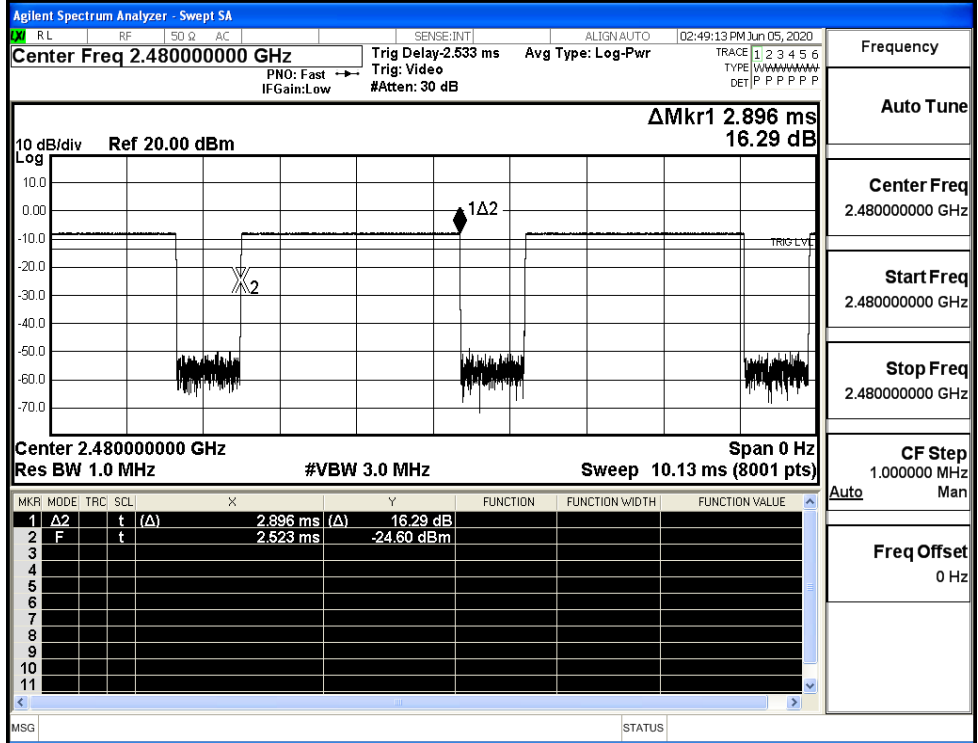
Start Freq 2.441000000 GHz

Stop Freq 2.441000000 GHz

CF Step 1.000000 MHz

Freq Offset 0 Hz

GFSK\_DH5/HCH



Frequency

Auto Tune

Center Freq 2.480000000 GHz

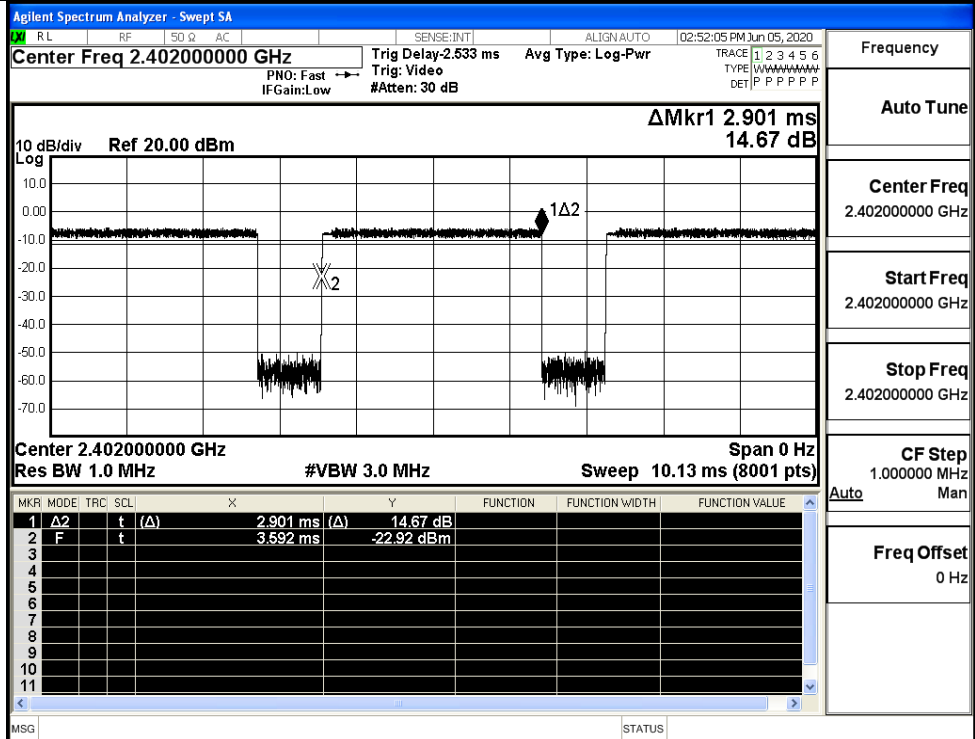
Start Freq 2.480000000 GHz

Stop Freq 2.480000000 GHz

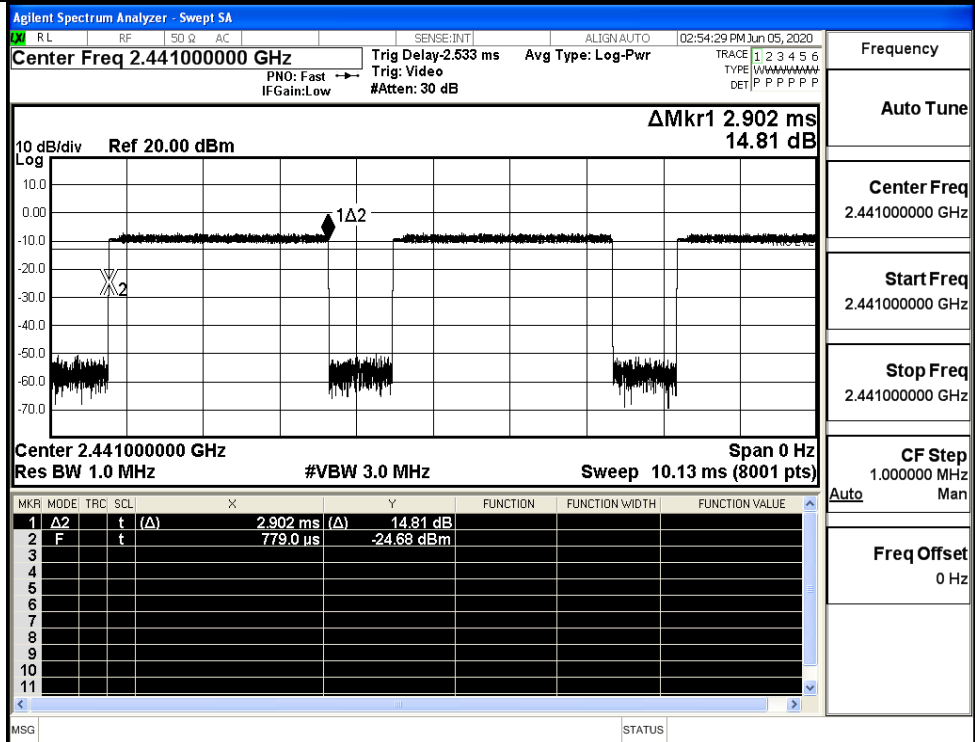
CF Step 1.000000 MHz

Freq Offset 0 Hz

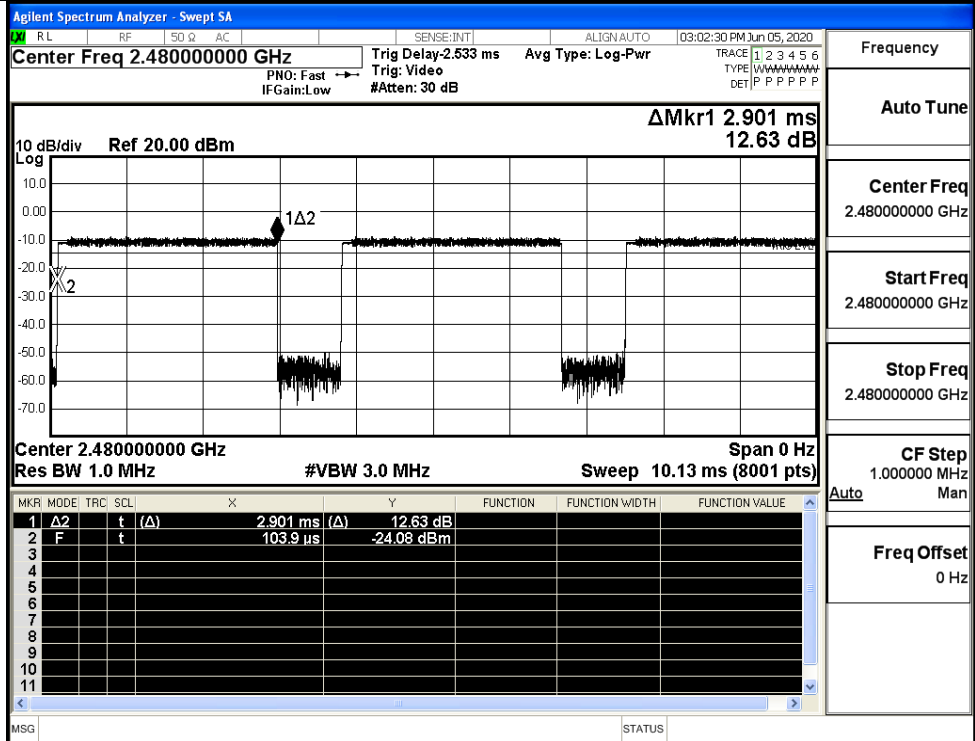
$\pi/4$ DQPSK  
\_2DH5/LCH



$\pi/4$ DQPSK  
\_2DH5/MCH

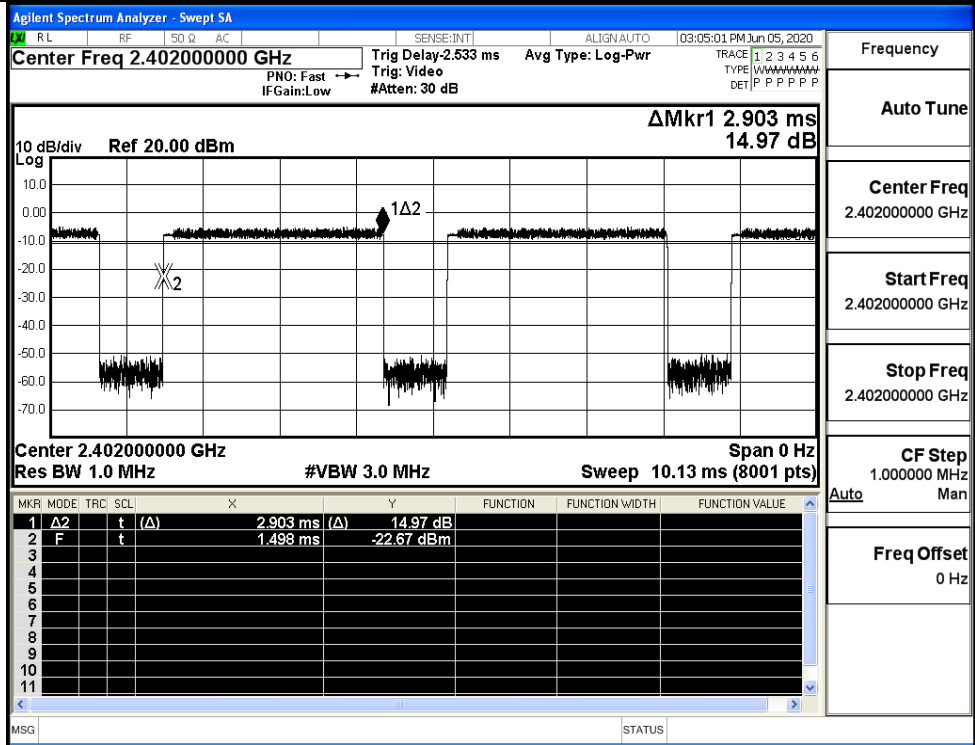


$\pi/4$ DQPSK  
\_2DH5/HCH



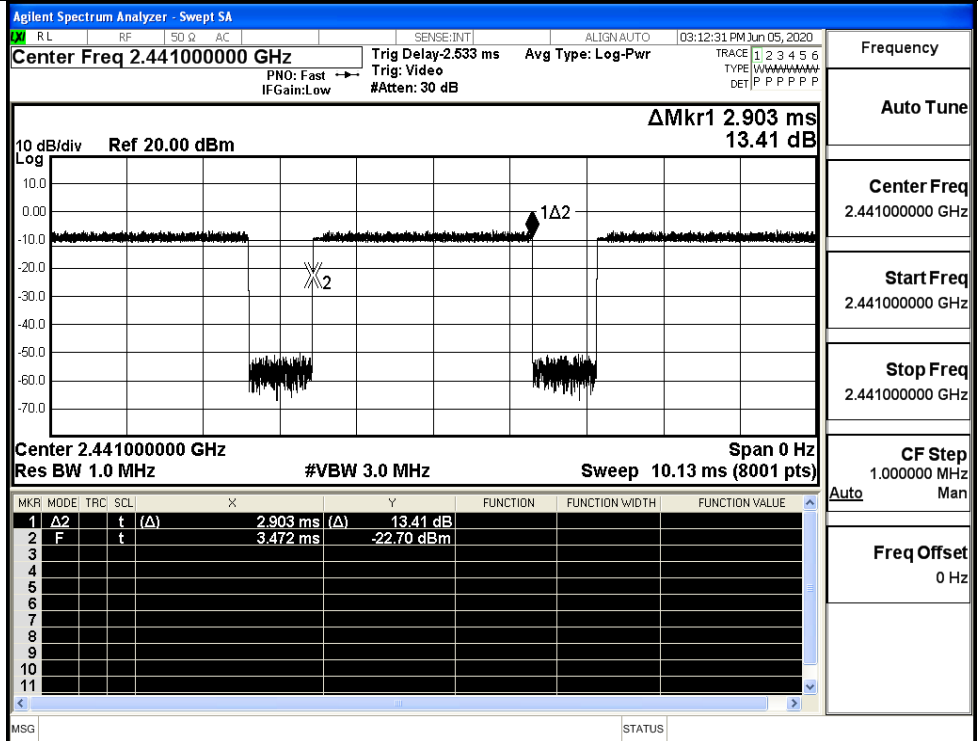
Frequency	
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK\_3DH5/LCH

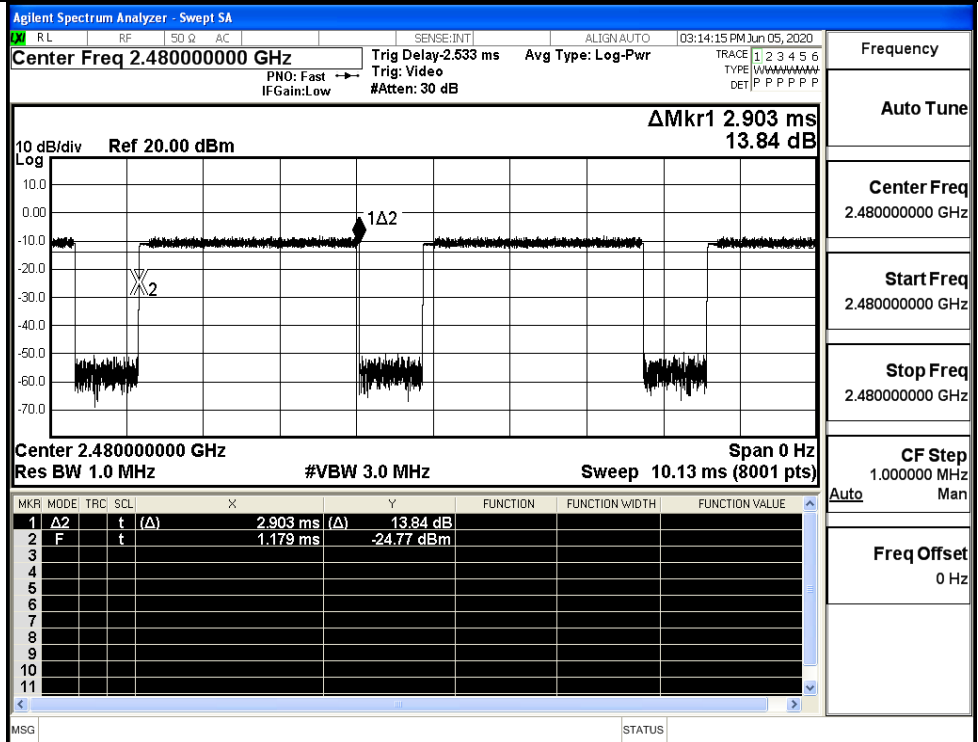


Frequency	
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.402000000 GHz
Stop Freq	2.402000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK\_3DH5/MCH

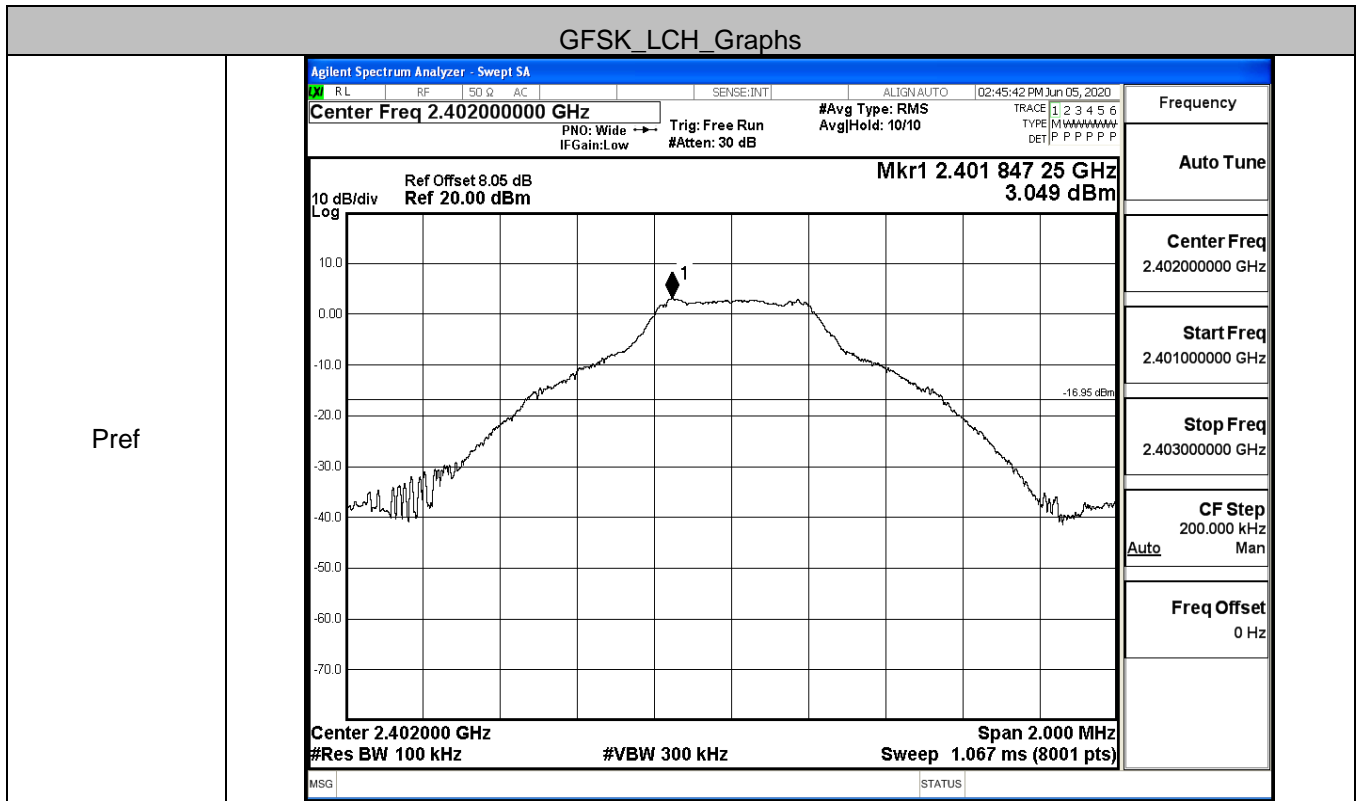


8DPSK\_3DH5/HCH

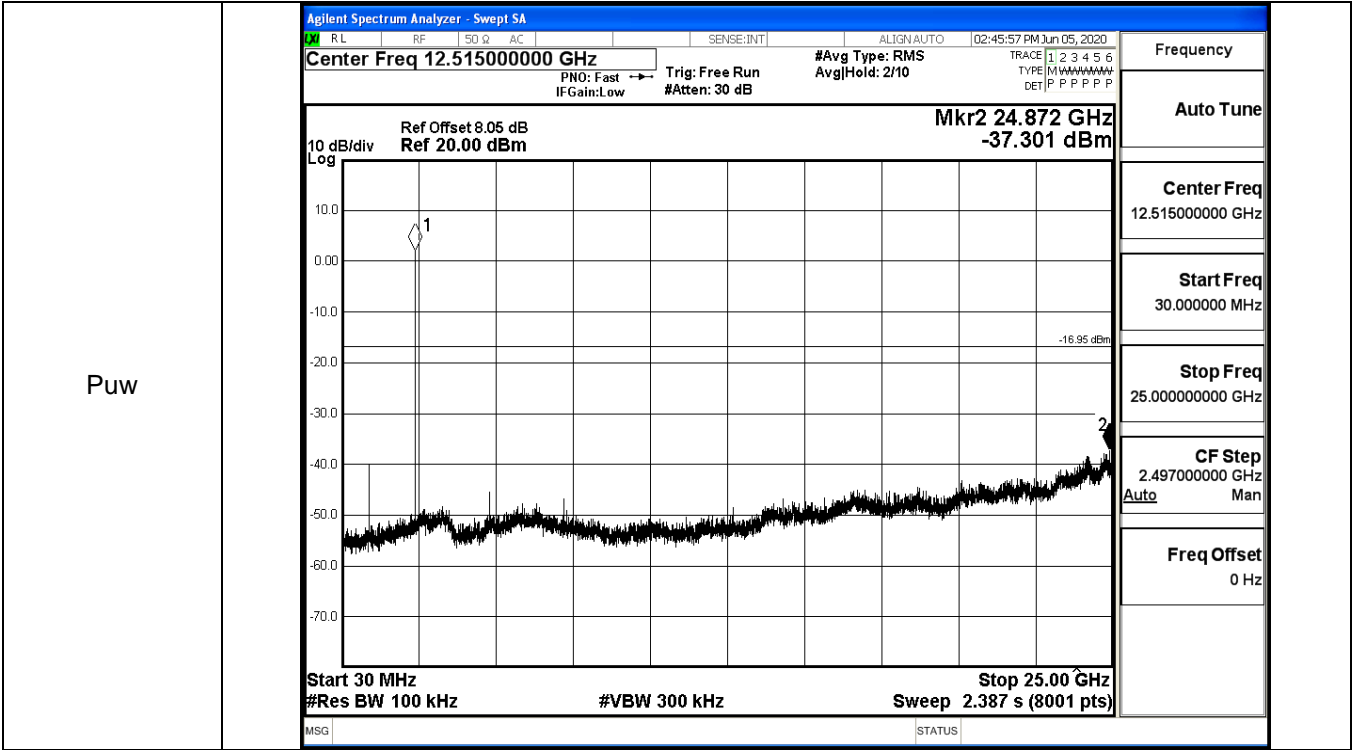


### A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.049	-37.301	-16.951	PASS
	MCH	1.513	-37.944	-18.487	PASS
	HCH	-0.108	-38.010	-20.108	PASS
$\pi$ /4DQPSK	LCH	0.014	-37.492	-19.986	PASS
	MCH	-1.53	-37.109	-21.530	PASS
	HCH	-3.154	-38.196	-23.154	PASS
8DPSK	LCH	0.175	-37.570	-19.825	PASS
	MCH	-1.322	-37.293	-21.322	PASS
	HCH	-2.924	-37.937	-22.924	PASS

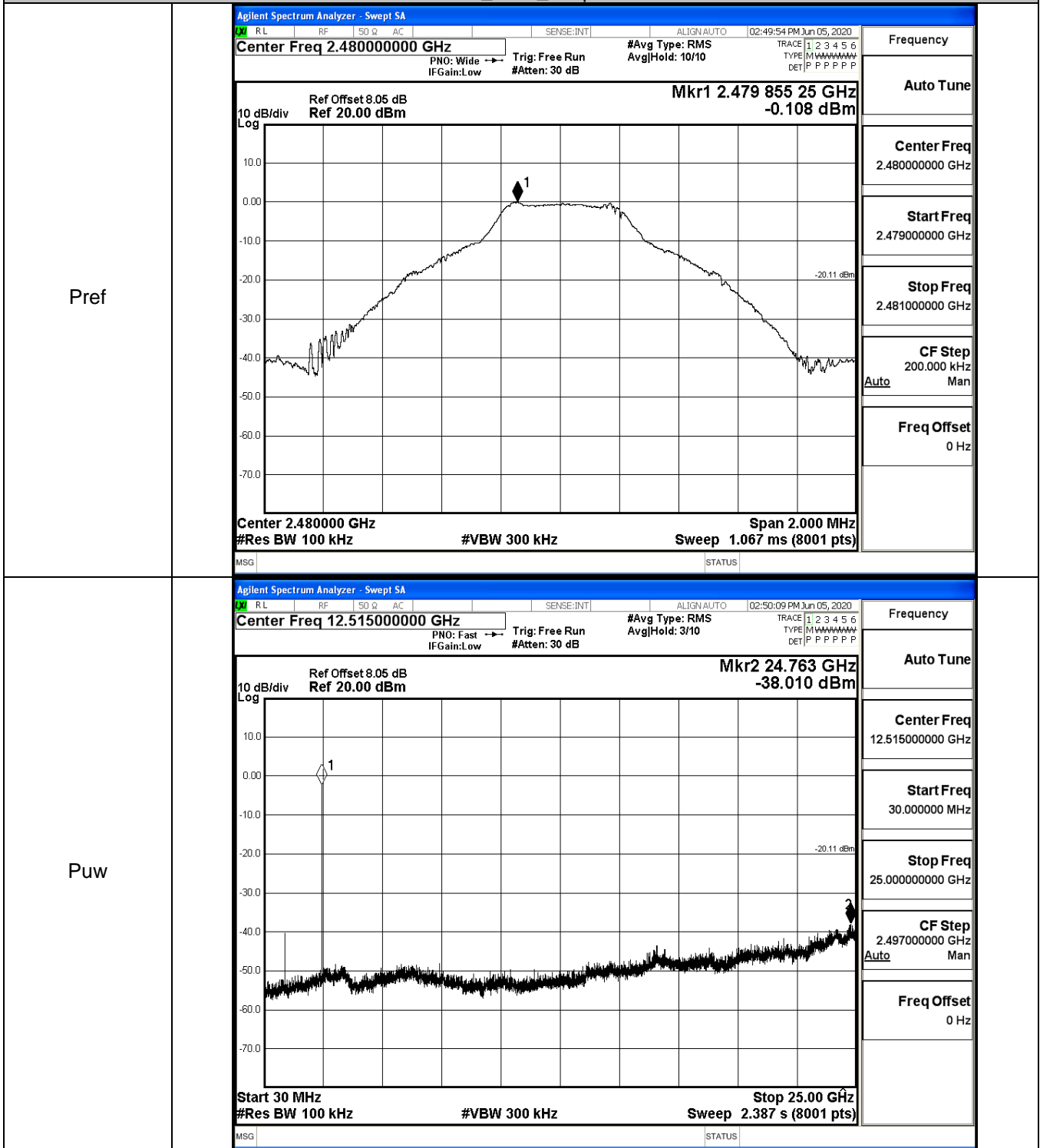




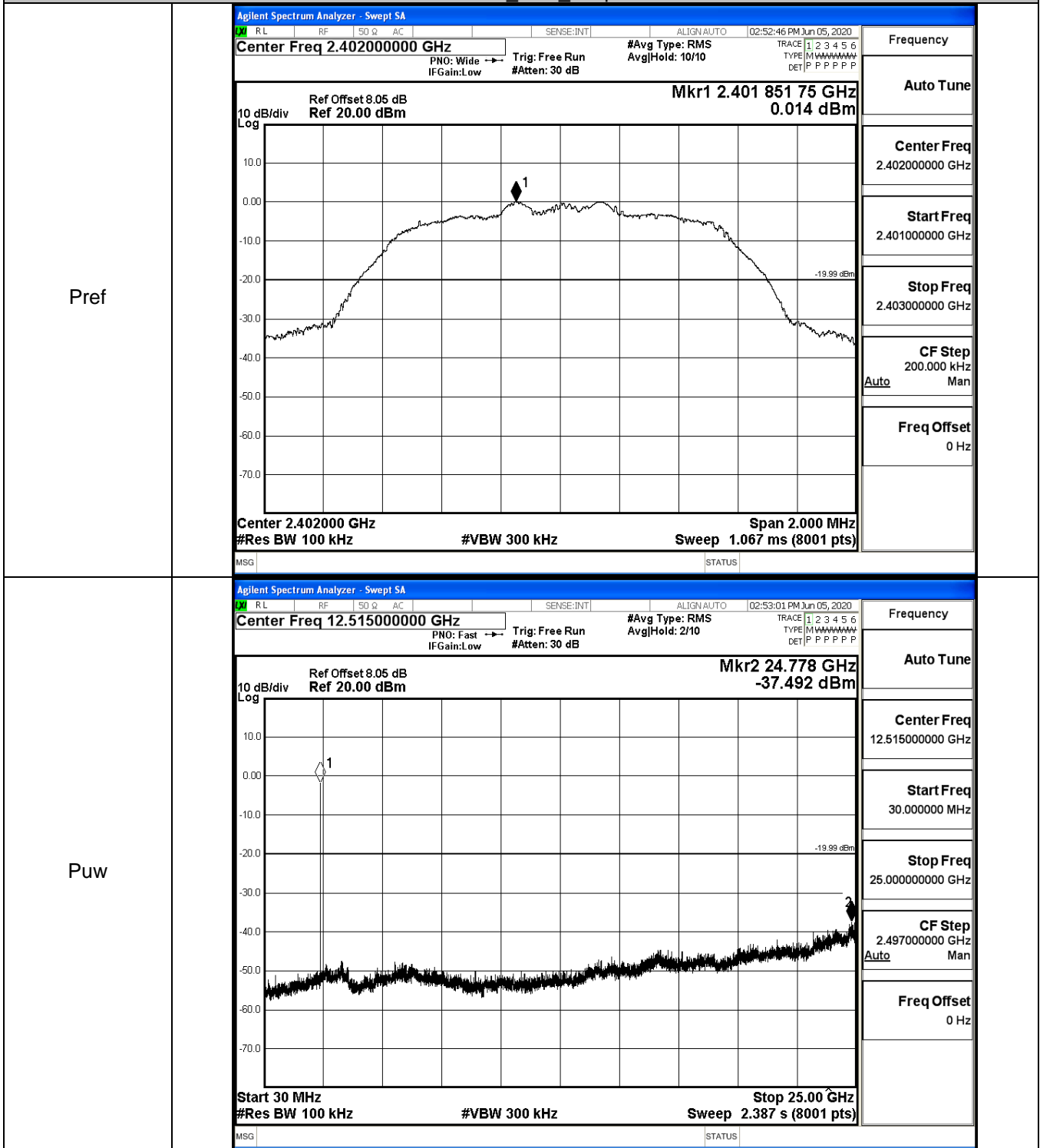




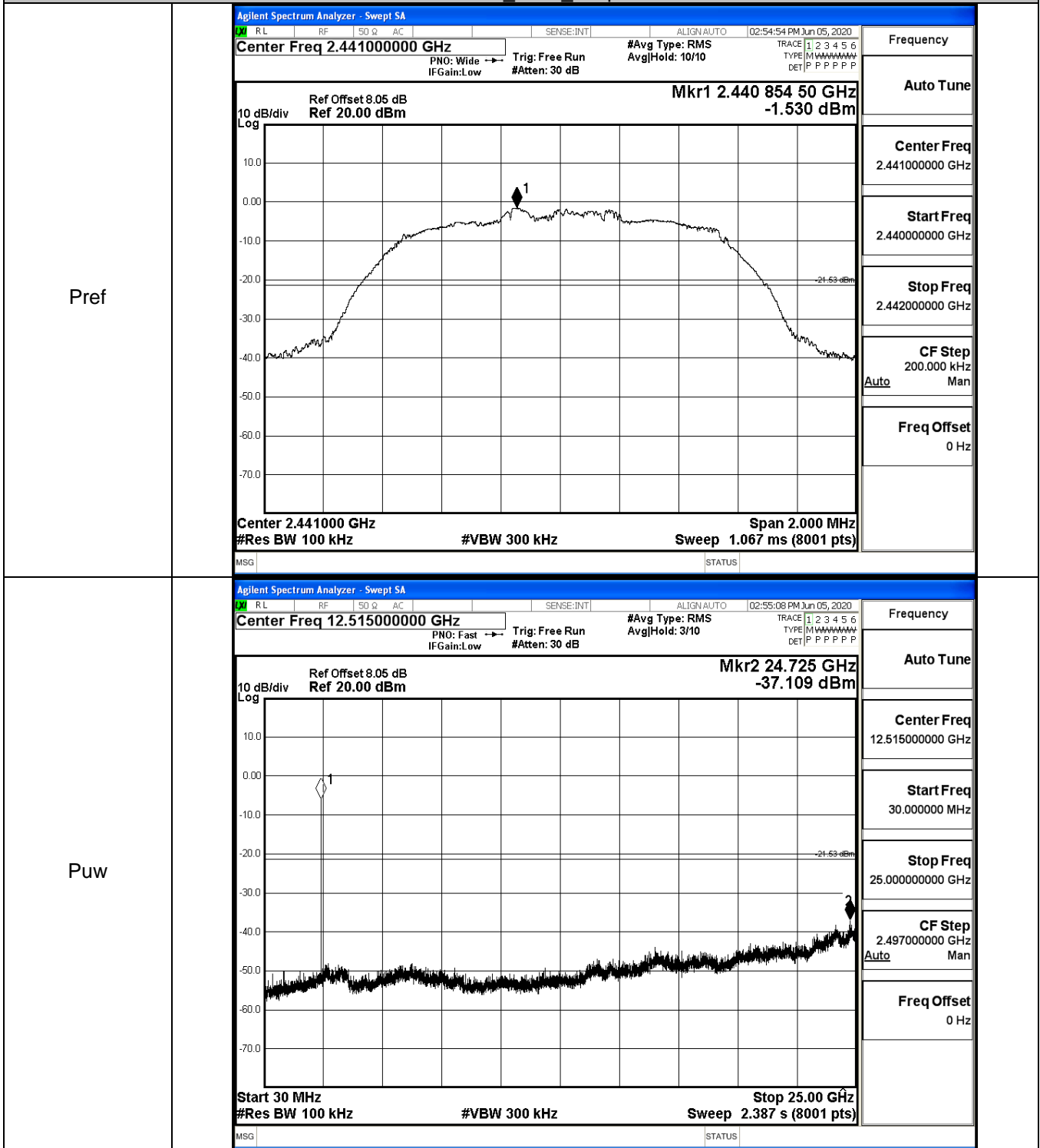
GFSK\_HCH\_Graphs



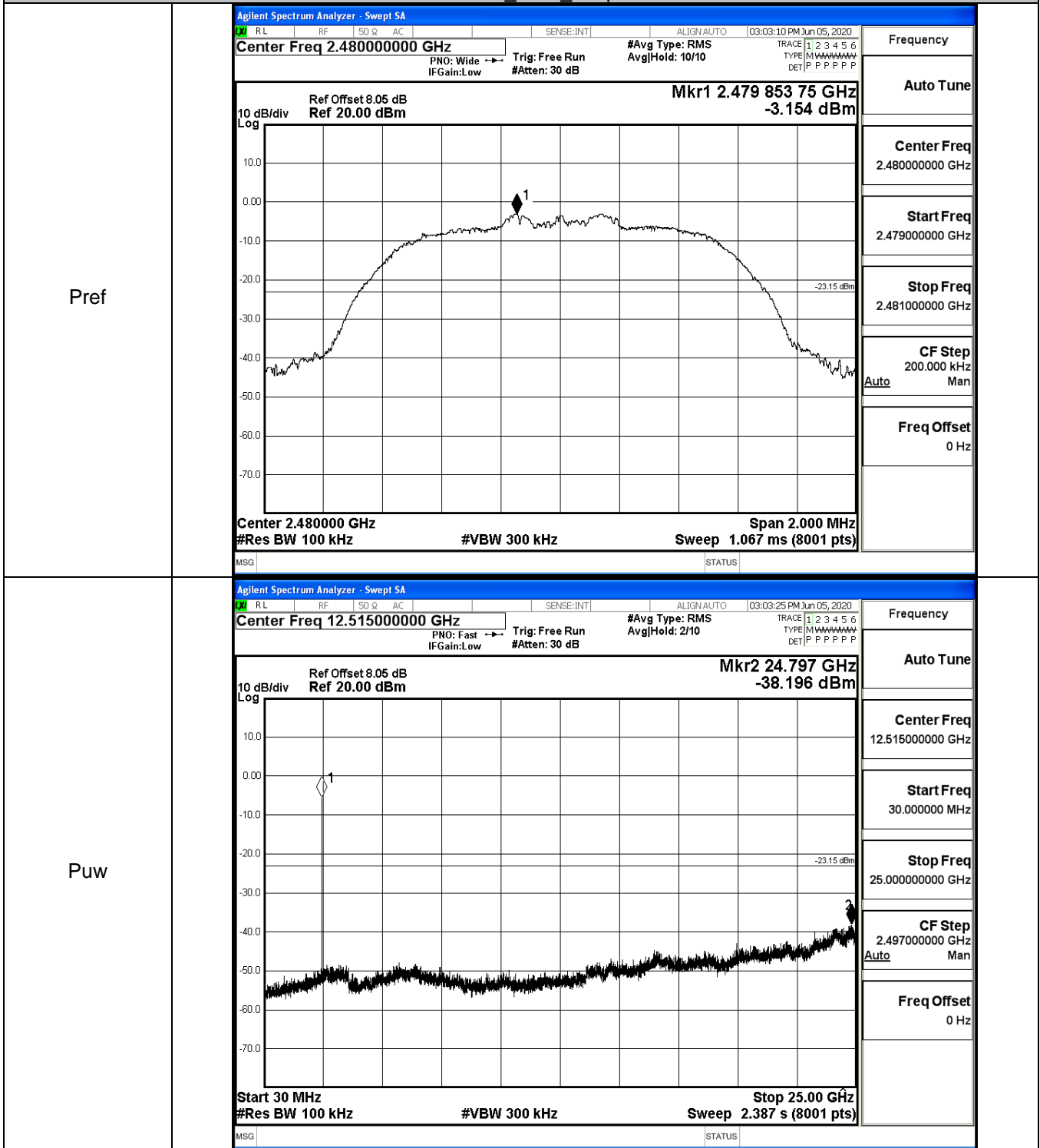
$\pi/4$ DQPSK\_LCH\_Graphs



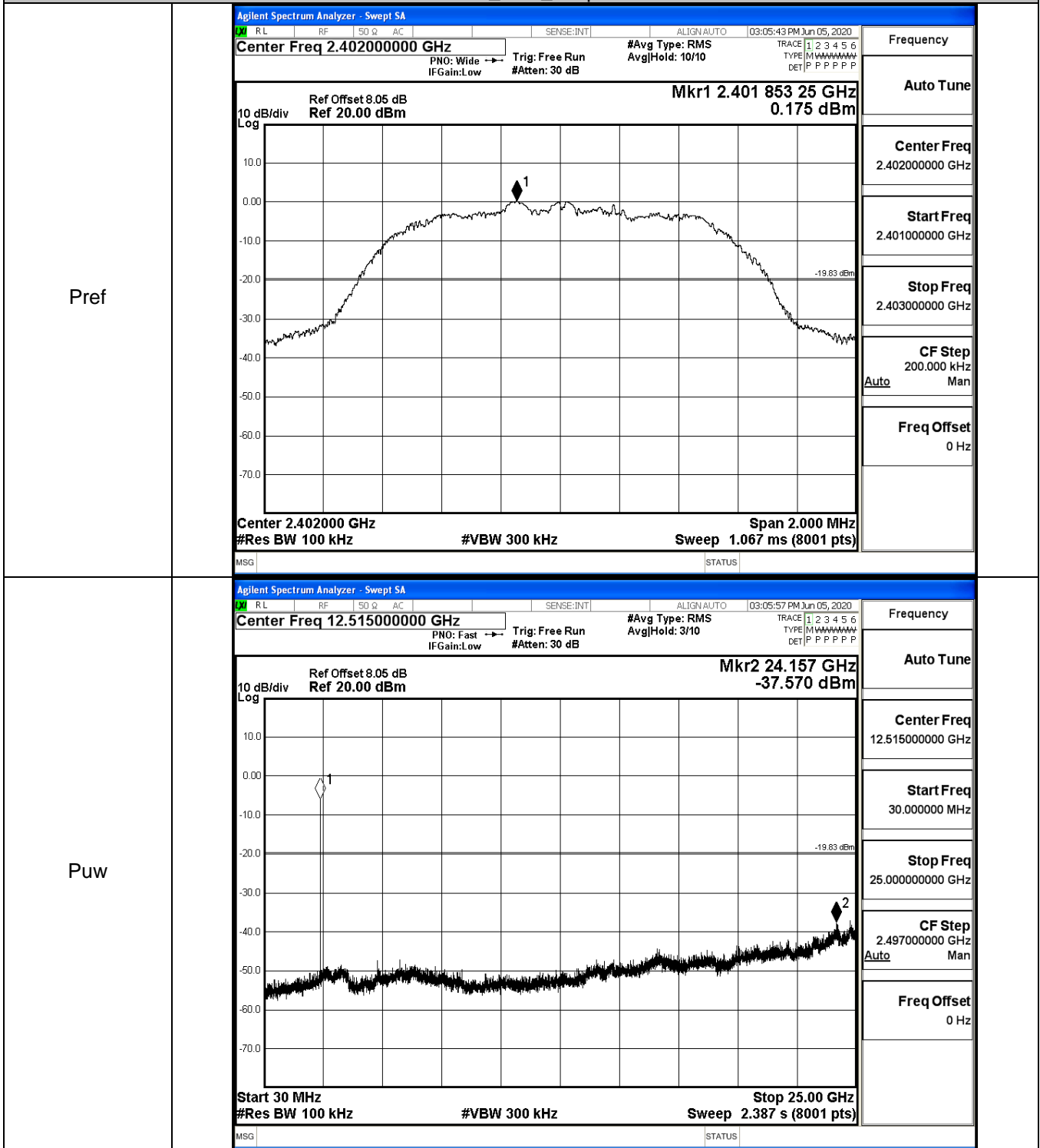
$\pi/4$ DQPSK\_MCH\_Graphs



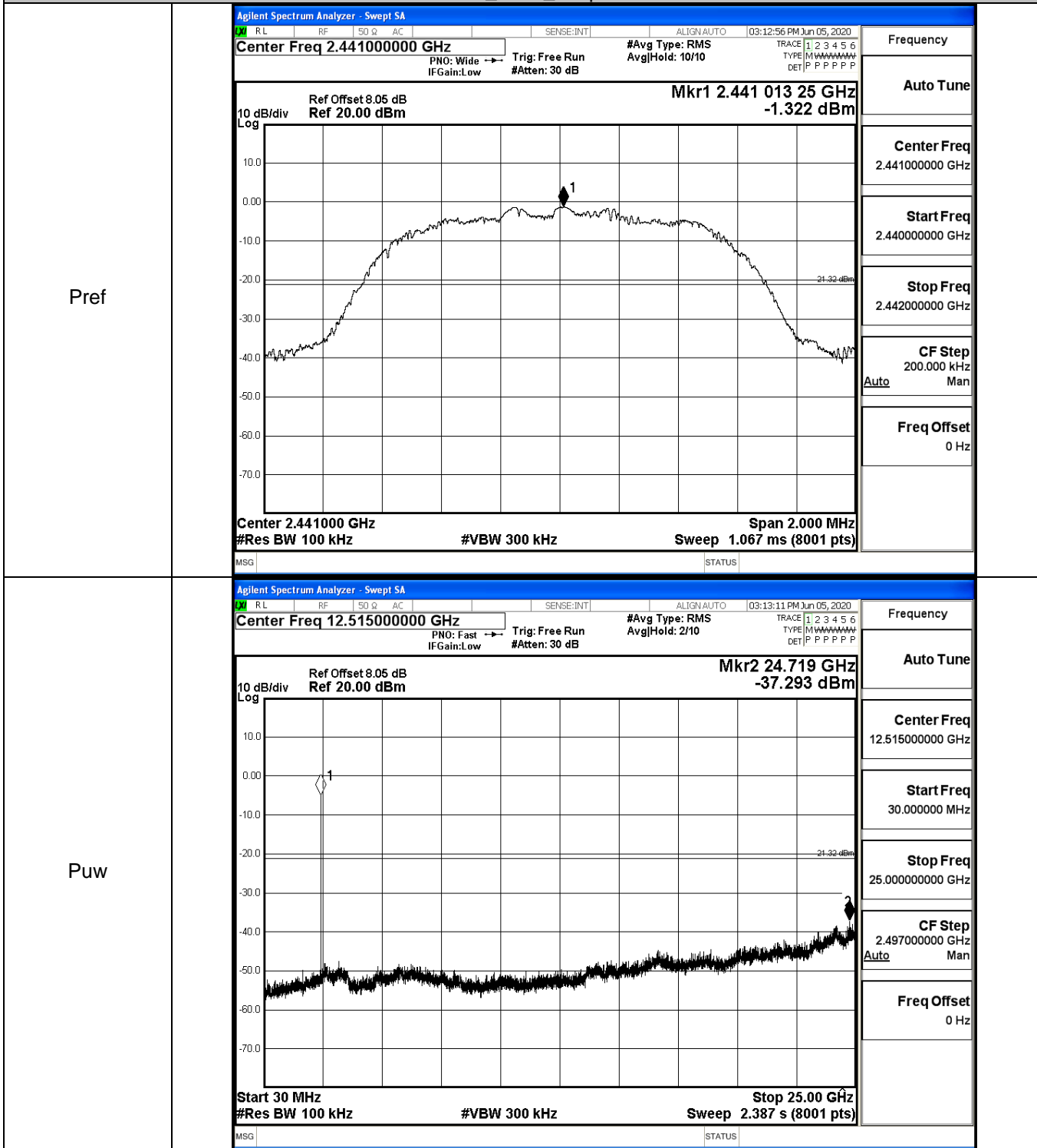
$\pi/4$ DQPSK\_HCH\_Graphs



8DPSK\_LCH\_Graphs

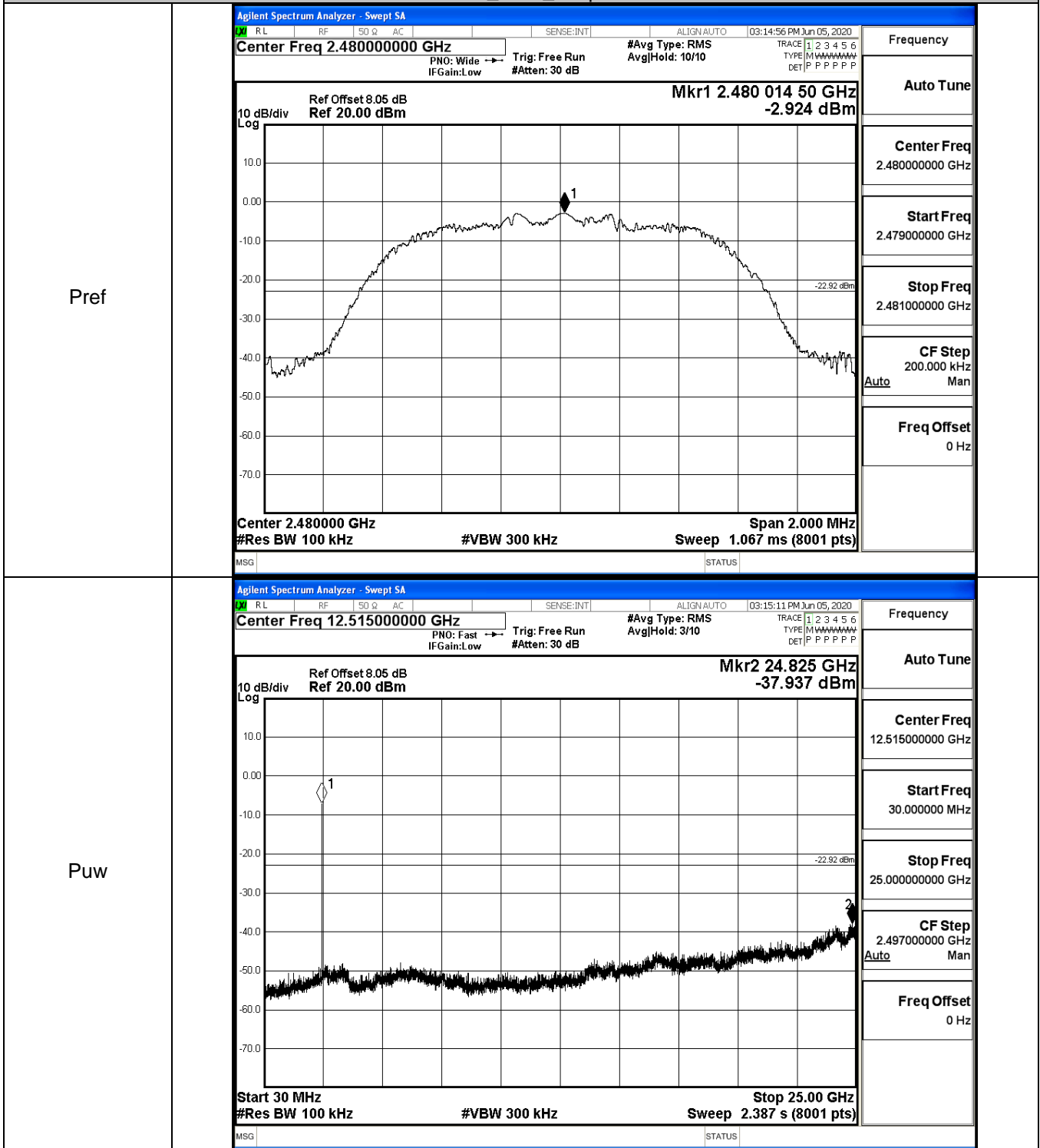


8DPSK\_MCH\_Graphs





8DPSK\_HCH\_Graphs

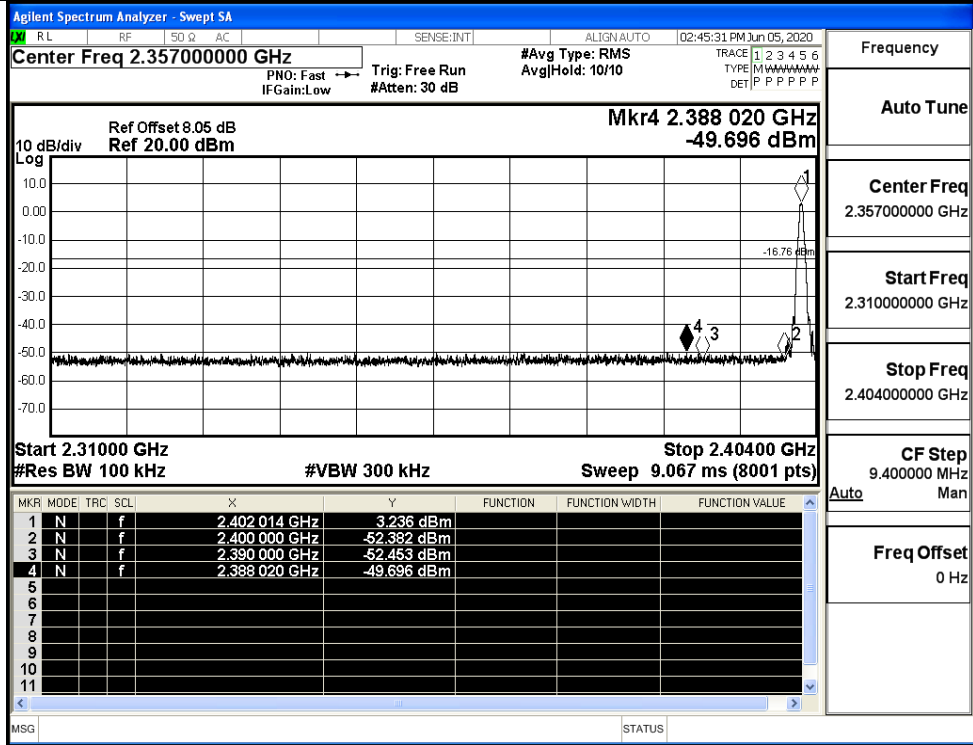


### A.7 Band-edge for RF Conducted Emissions

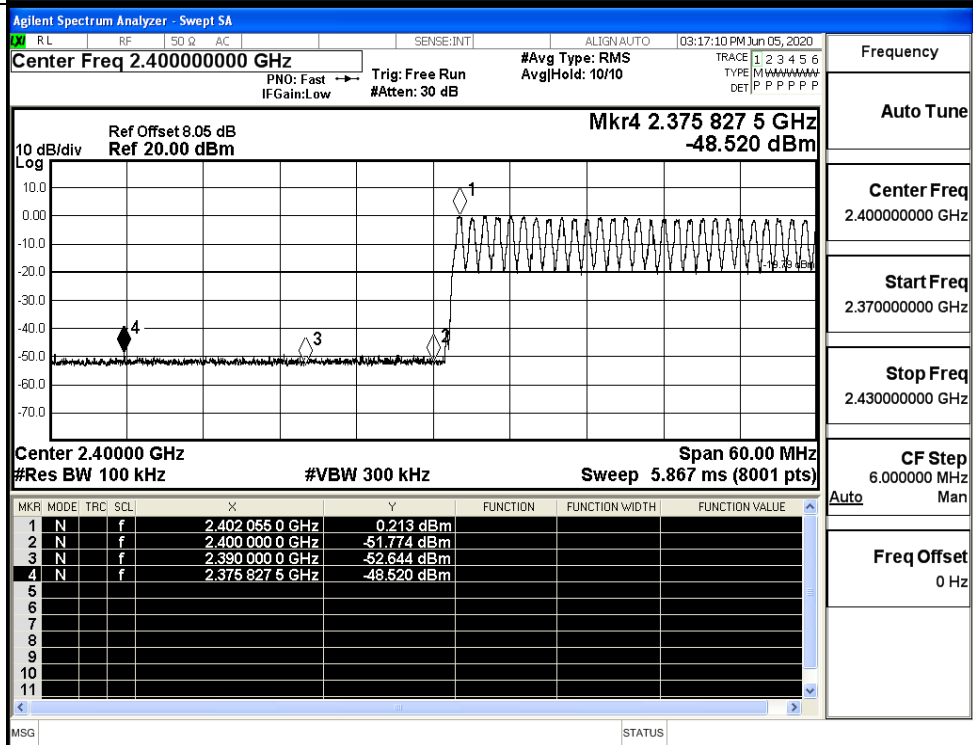
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.236	Off	-49.696	-16.76	PASS
			0.213	On	-48.520	-19.79	PASS
	HCH	2480	-0.025	Off	-48.563	-20.03	PASS
			-2.101	On	-48.841	-22.1	PASS
$\pi/4$ DQPSK	LCH	2402	0.191	Off	-49.249	-19.81	PASS
			-0.006	On	-49.107	-20.01	PASS
	HCH	2480	-3.207	Off	-48.771	-23.21	PASS
			-2.216	On	-48.516	-22.22	PASS
8DPSK	LCH	2402	-0.091	Off	-49.688	-20.09	PASS
			0.226	On	-49.674	-19.77	PASS
	HCH	2480	-2.776	Off	-49.355	-22.78	PASS
			-1.900	On	-48.605	-21.9	PASS

Test Graphs

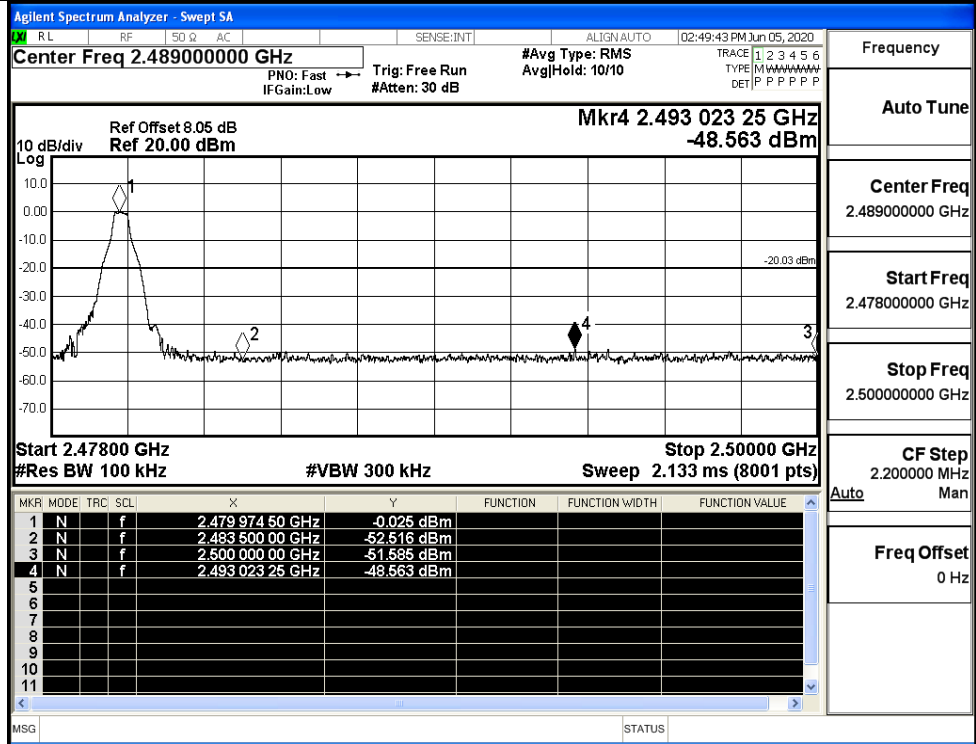
GFSK/LCH/No Hop



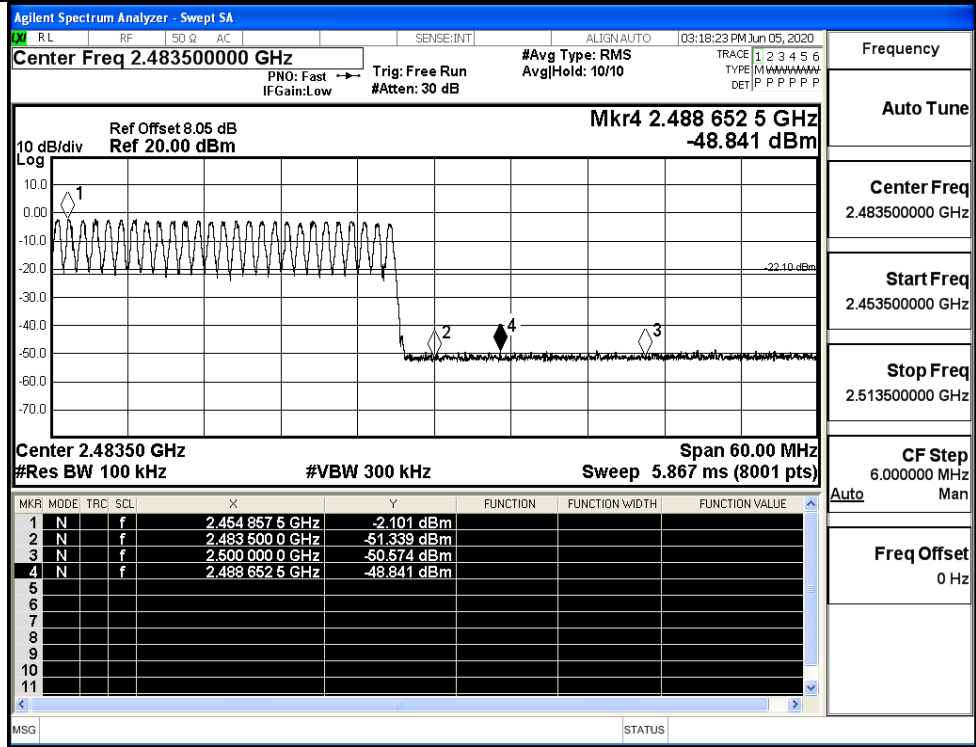
GFSK/LCH/Hop



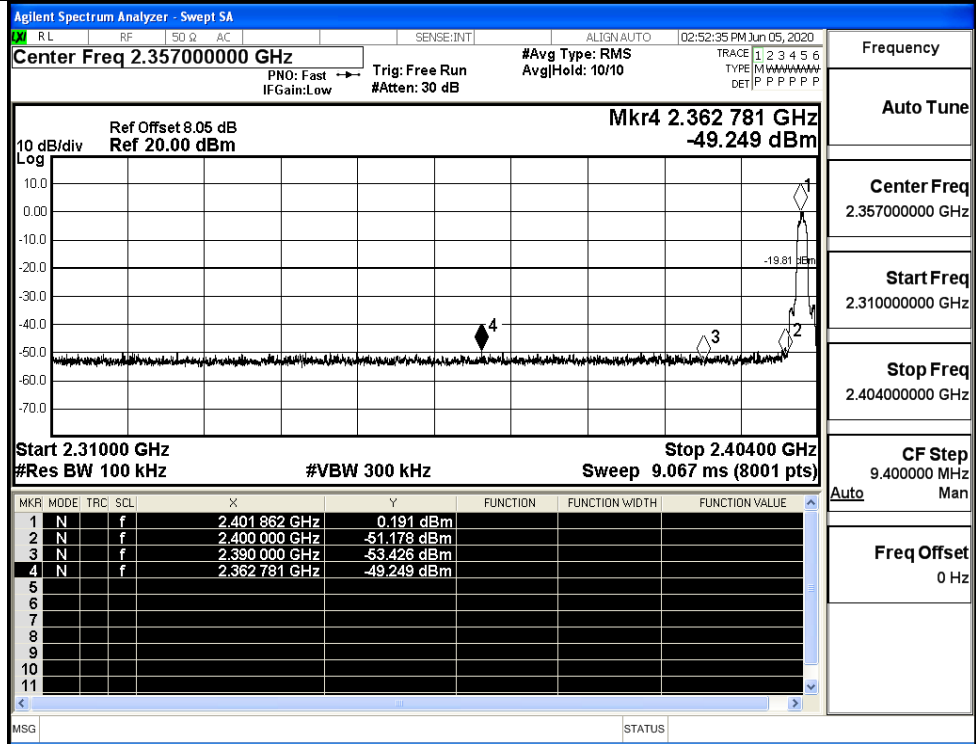
GFSK/HCH/No Hop



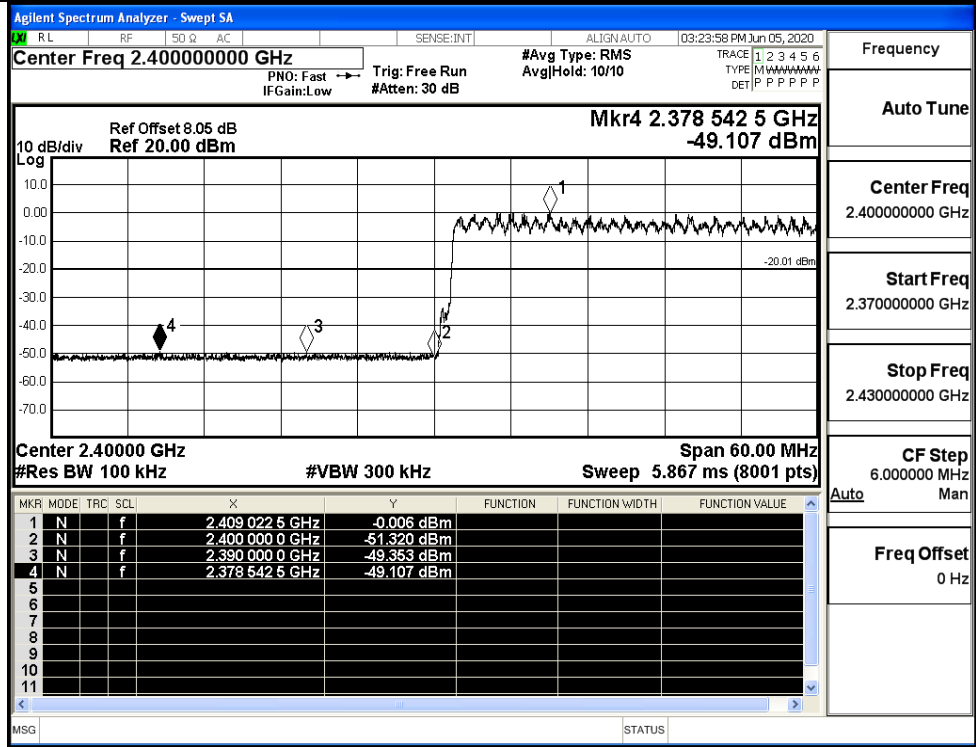
GFSK/HCH/Hop



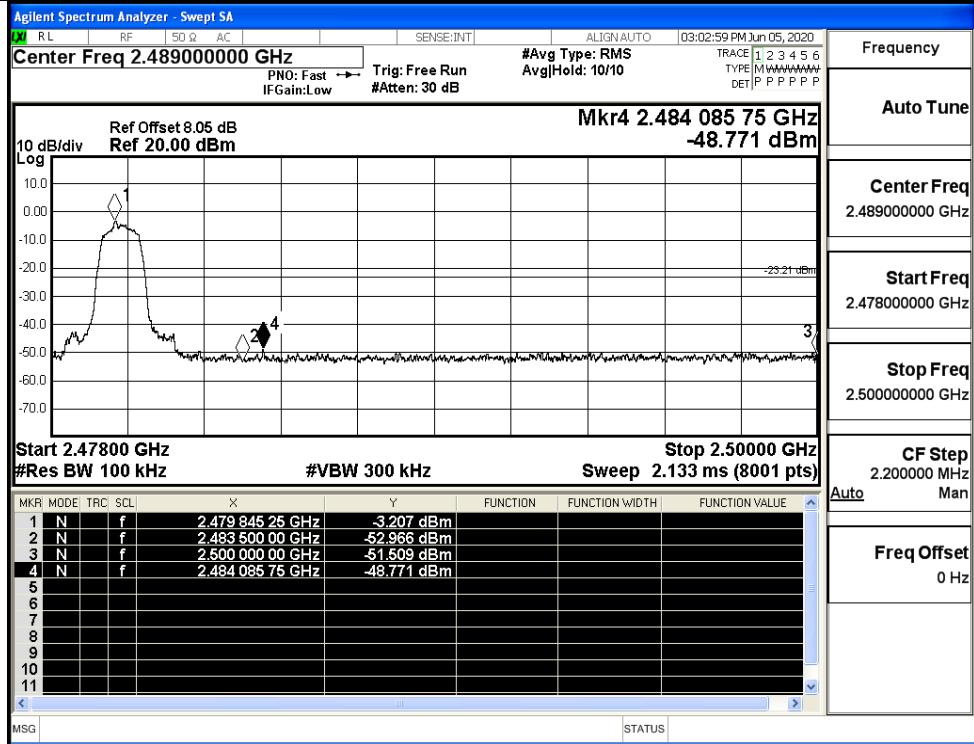
$\pi/4$ DQPSK/LCH/No  
Hop



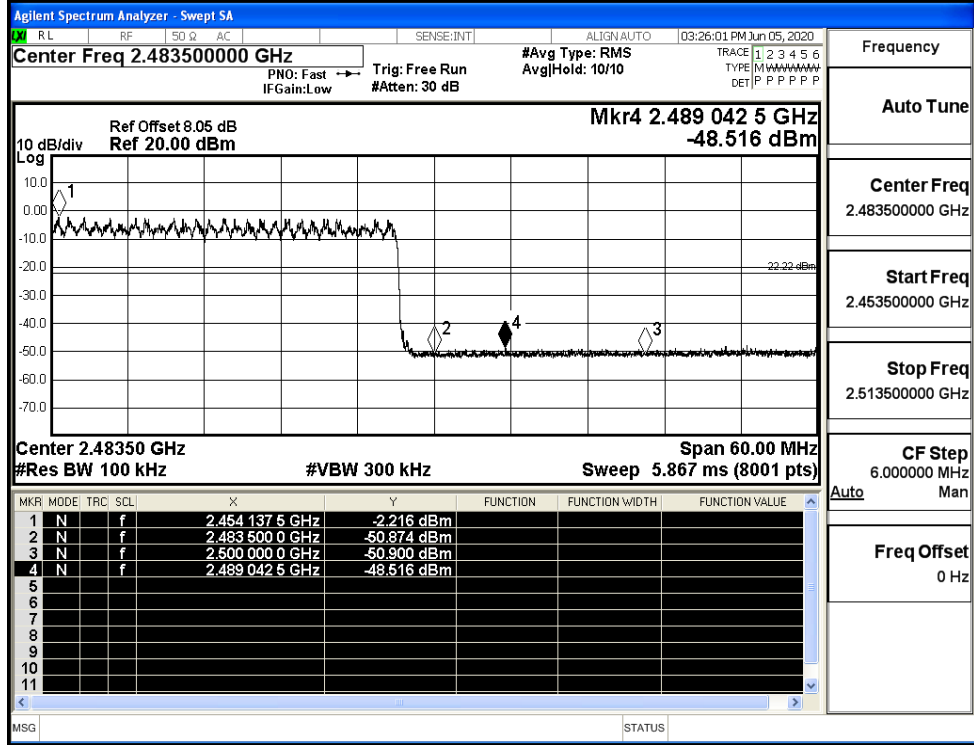
$\pi/4$ DQPSK/LCH/Hop



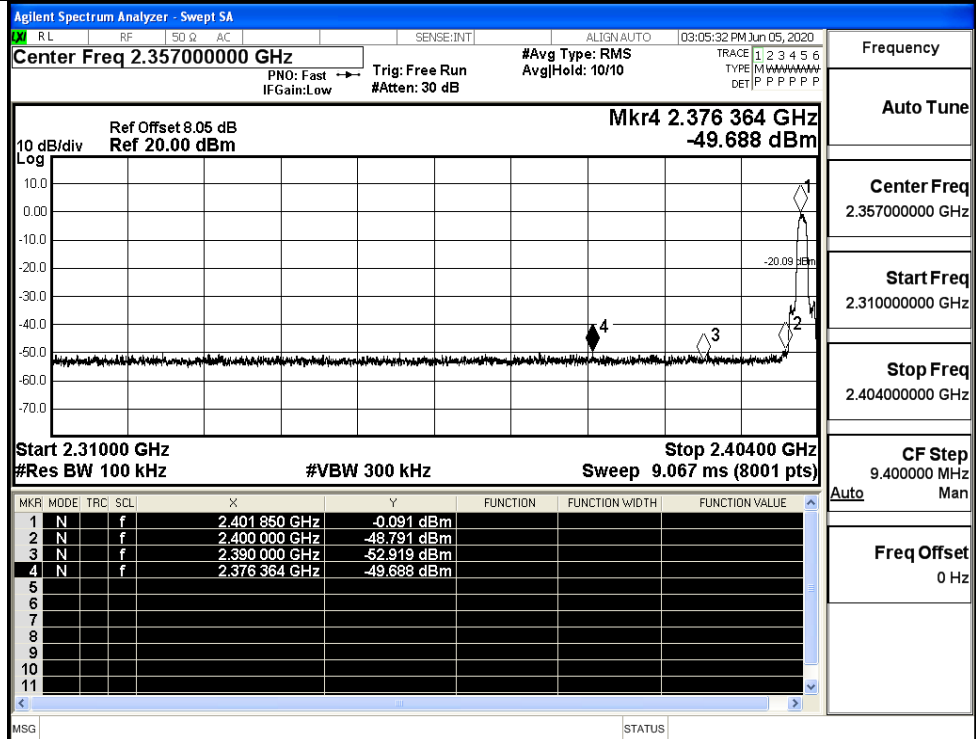
$\pi$ /4DQPSK/HCH/No  
Hop



$\pi$ /4DQPSK/HCH/Hop

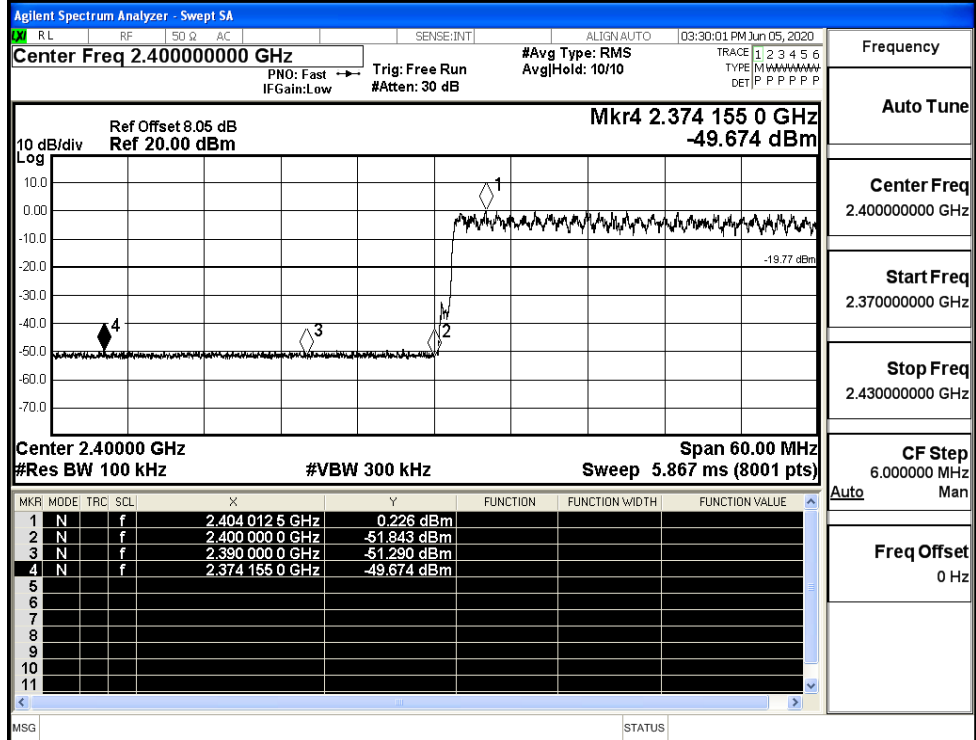


8DPSK/LCH/No Hop



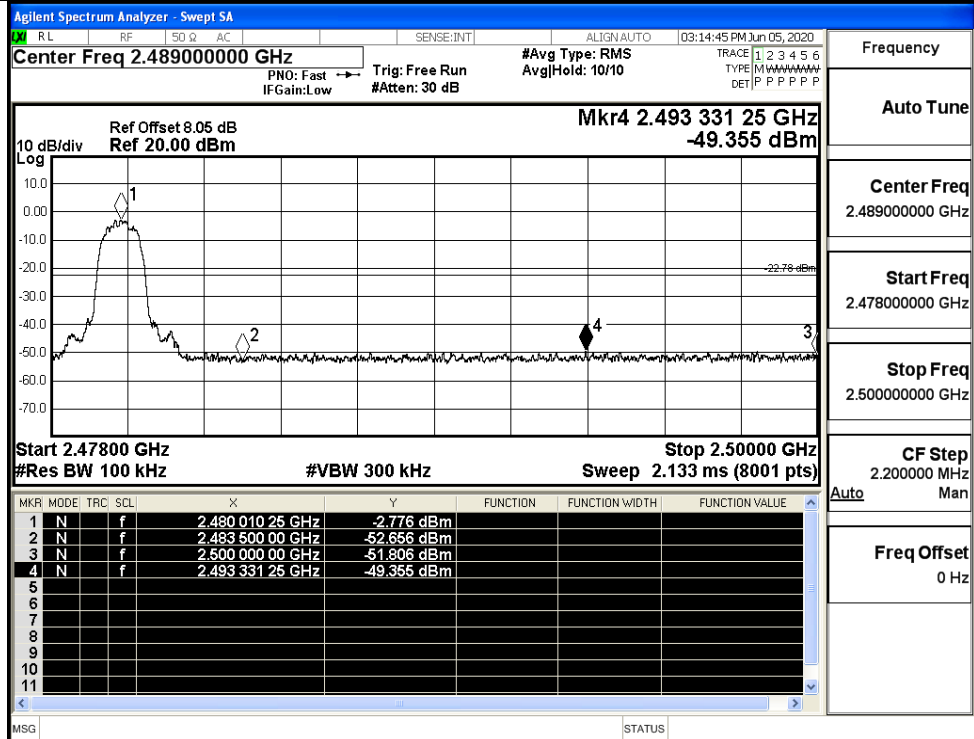
Frequency  
Auto Tune  
Center Freq  
2.357000000 GHz  
Start Freq  
2.310000000 GHz  
Stop Freq  
2.404000000 GHz  
CF Step  
9.400000 MHz  
Freq Offset  
0 Hz

8DPSK/LCH/Hop



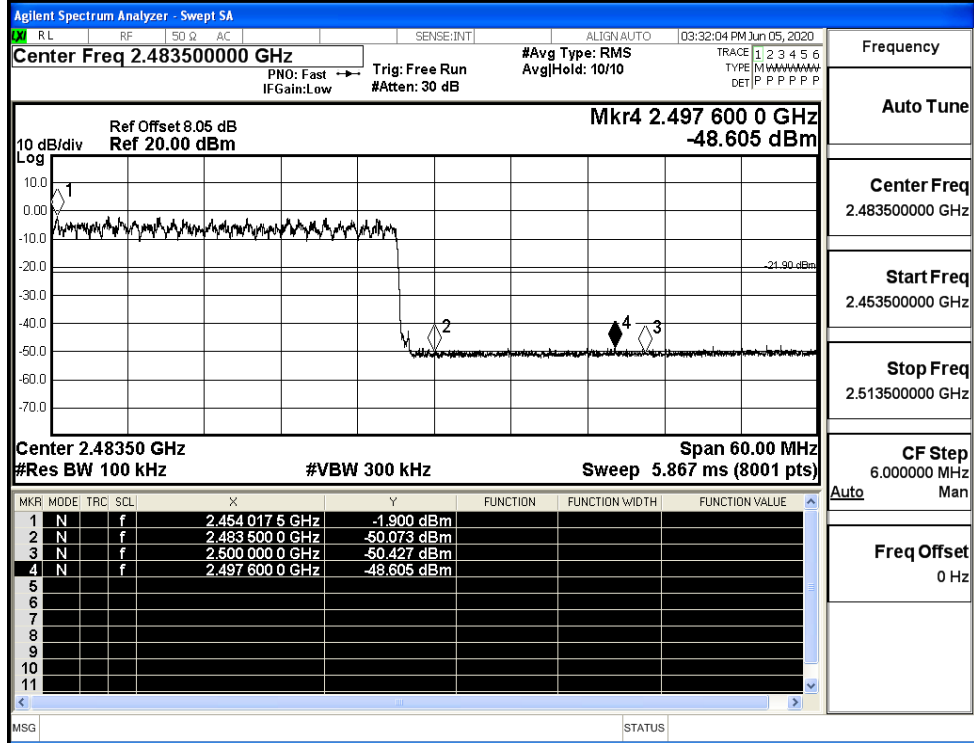
Frequency  
Auto Tune  
Center Freq  
2.400000000 GHz  
Start Freq  
2.370000000 GHz  
Stop Freq  
2.430000000 GHz  
CF Step  
6.000000 MHz  
Freq Offset  
0 Hz

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  
Auto Man  
Freq Offset  
0 Hz

8DPSK/HCH/Hop



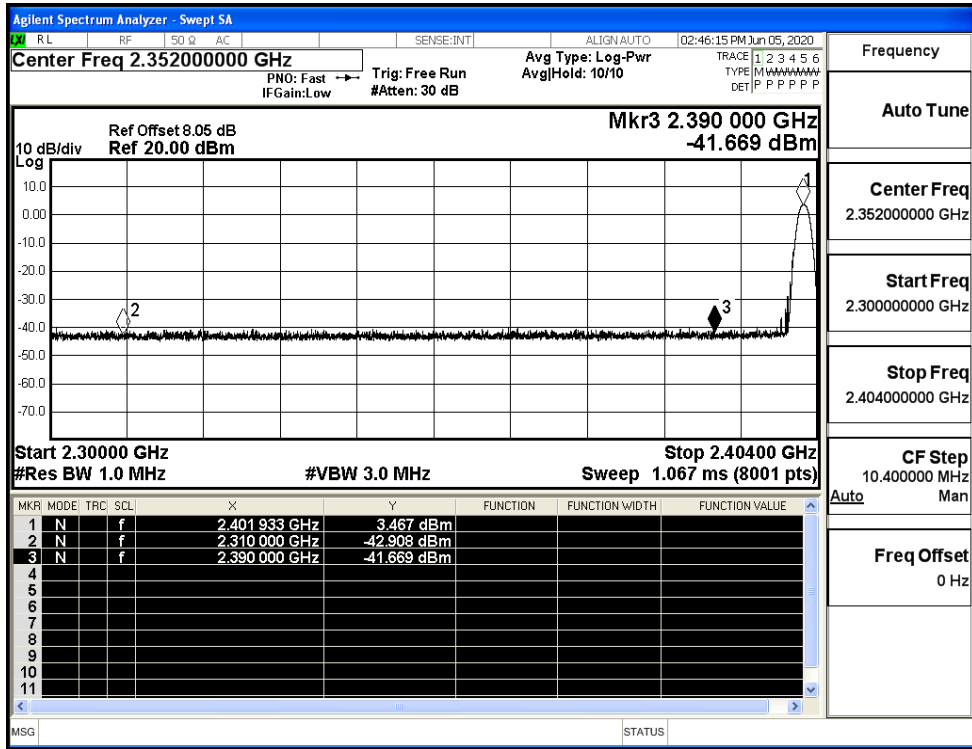
Frequency  
Auto Tune  
Center Freq  
2.483500000 GHz  
Start Freq  
2.453500000 GHz  
Stop Freq  
2.513500000 GHz  
CF Step  
6.000000 MHz  
Auto Man  
Freq Offset  
0 Hz



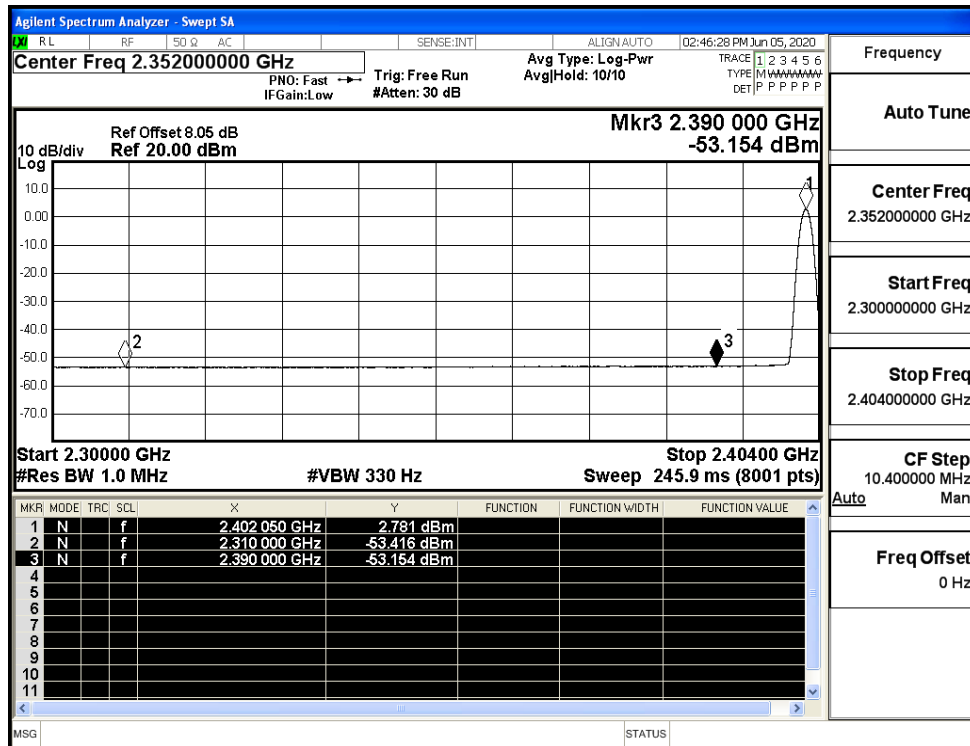
### A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.91	2.0	0	54.35	PEAK	74	PASS
	Off	2310.0	-53.42	2.0	0	43.84	AV	54	PASS
	Off	2390.0	-41.67	2.0	0	55.59	PEAK	74	PASS
	Off	2390.0	-53.15	2.0	0	44.11	AV	54	PASS
	Off	2483.5	-42.58	2.0	0	54.68	PEAK	74	PASS
	Off	2483.5	-52.35	2.0	0	44.91	AV	54	PASS
	Off	2500.0	-41.67	2.0	0	55.59	PEAK	74	PASS
	Off	2500.0	-52.42	2.0	0	44.84	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.44	2.0	0	54.82	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	43.76	AV	54	PASS
	Off	2390.0	-43.39	2.0	0	53.87	PEAK	74	PASS
	Off	2390.0	-53.06	2.0	0	44.2	AV	54	PASS
	Off	2483.5	-42.31	2.0	0	54.95	PEAK	74	PASS
	Off	2483.5	-52.58	2.0	0	44.68	AV	54	PASS
	Off	2500.0	-42.52	2.0	0	54.74	PEAK	74	PASS
	Off	2500.0	-52.47	2.0	0	44.79	AV	54	PASS
8DPSK	Off	2310.0	-43.19	2.0	0	54.07	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	43.76	AV	54	PASS
	Off	2390.0	-43.37	2.0	0	53.89	PEAK	74	PASS
	Off	2390.0	-53.16	2.0	0	44.1	AV	54	PASS
	Off	2483.5	-41.96	2.0	0	55.3	PEAK	74	PASS
	Off	2483.5	-52.55	2.0	0	44.71	AV	54	PASS
	Off	2500.0	-42.83	2.0	0	54.43	PEAK	74	PASS
	Off	2500.0	-52.42	2.0	0	44.84	AV	54	PASS

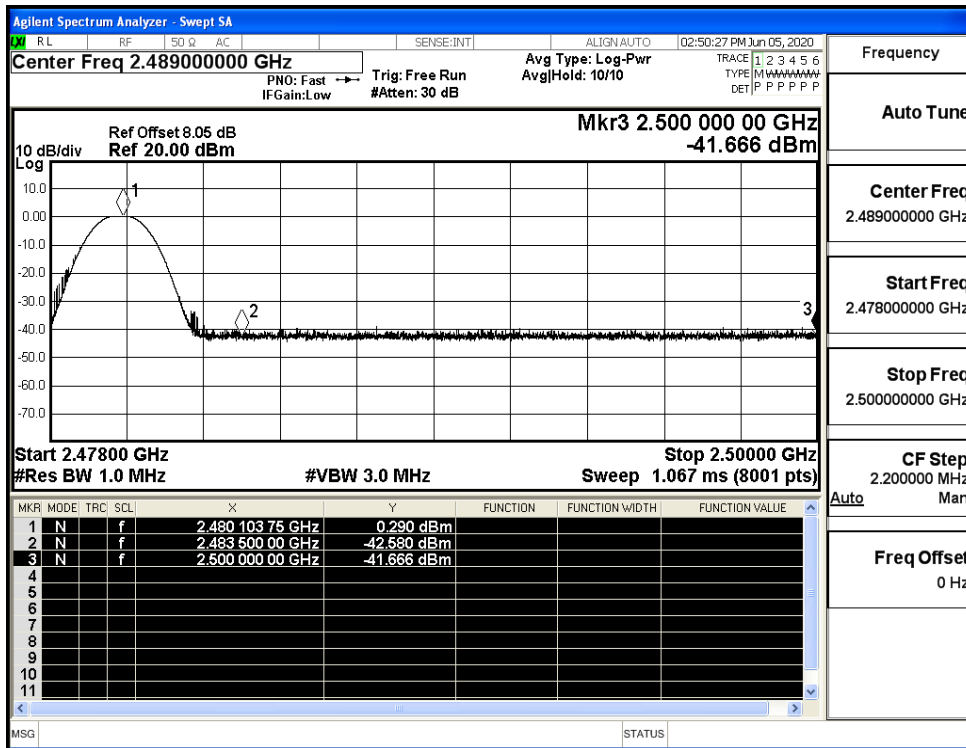
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



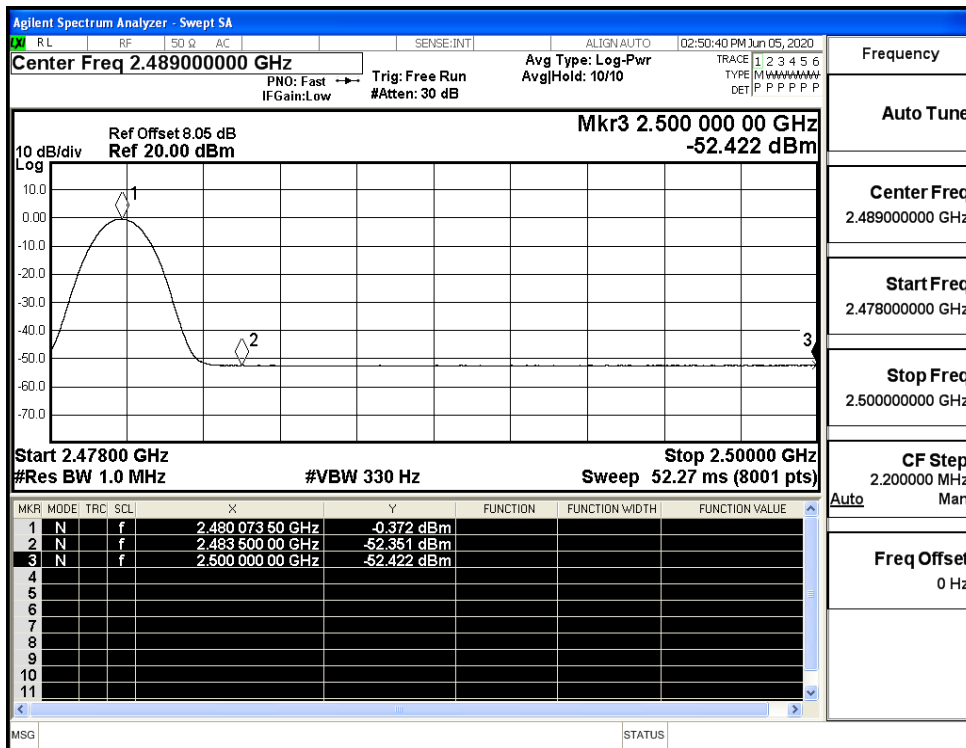
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



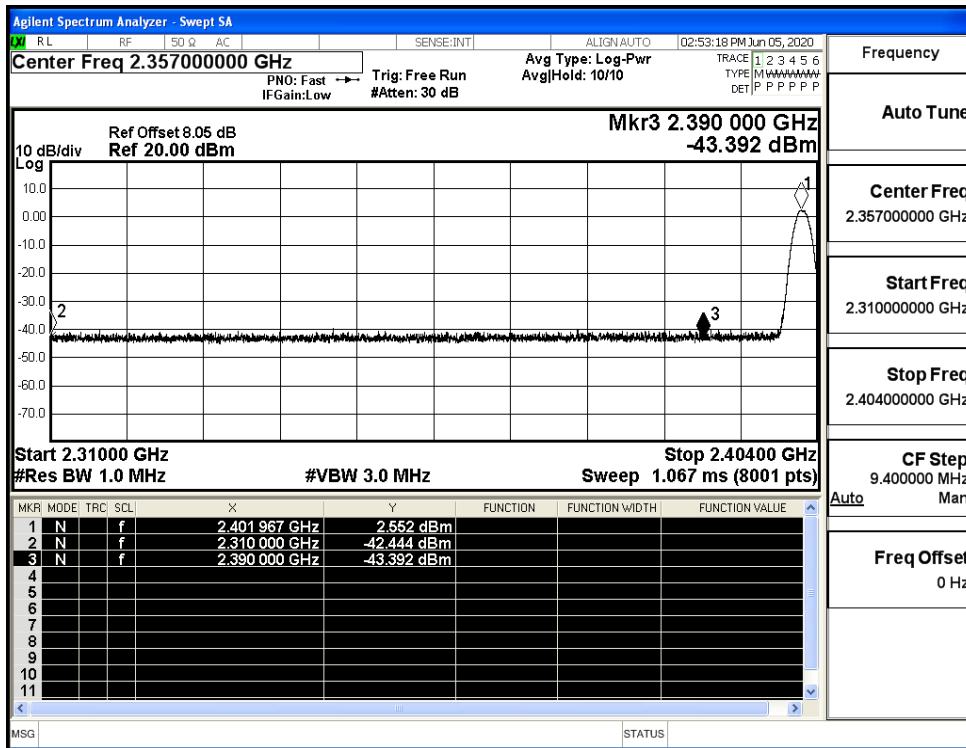
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



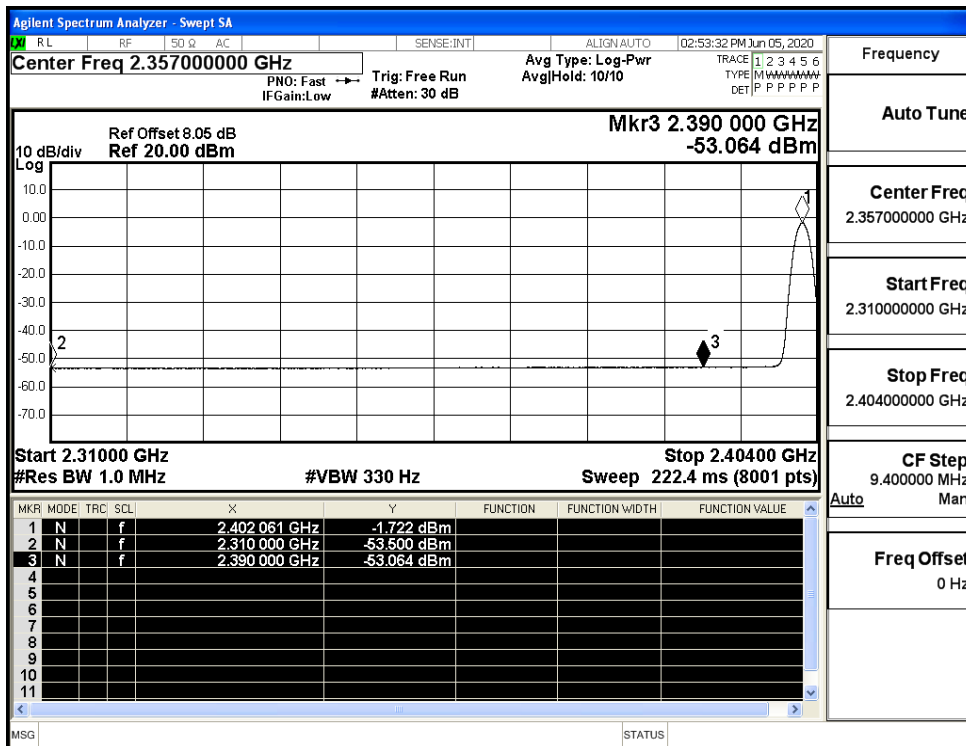
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



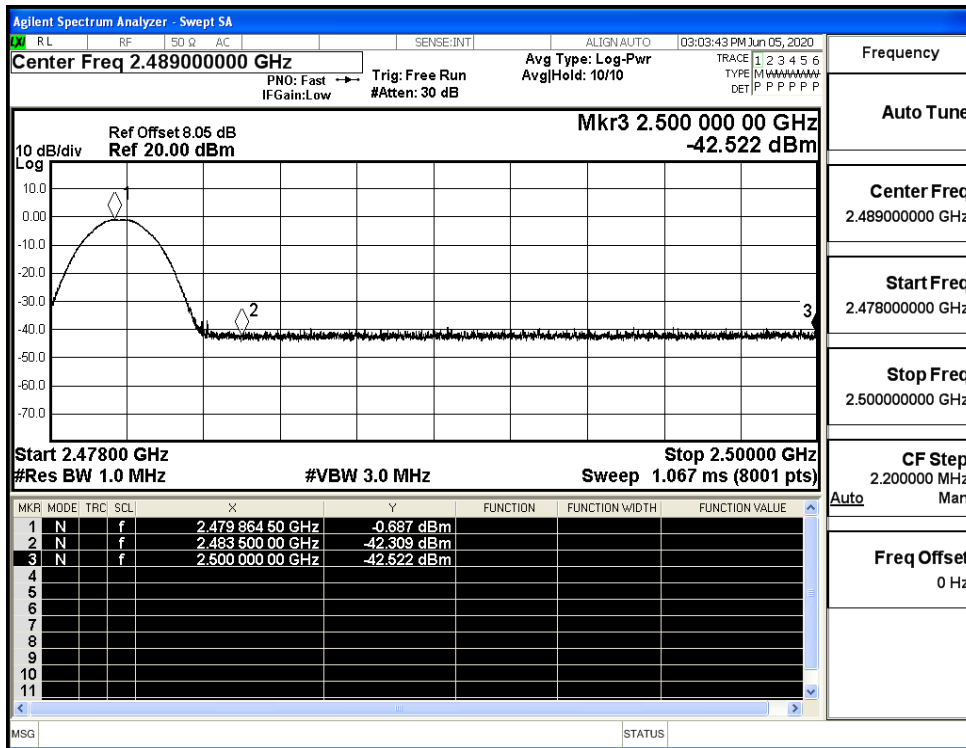
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



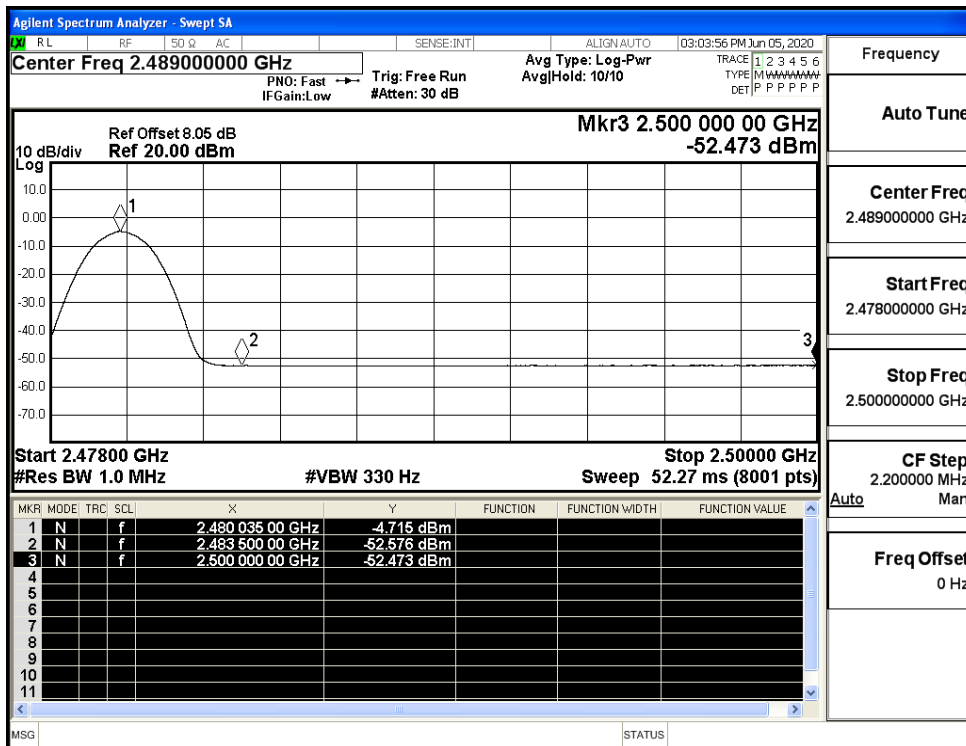
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)



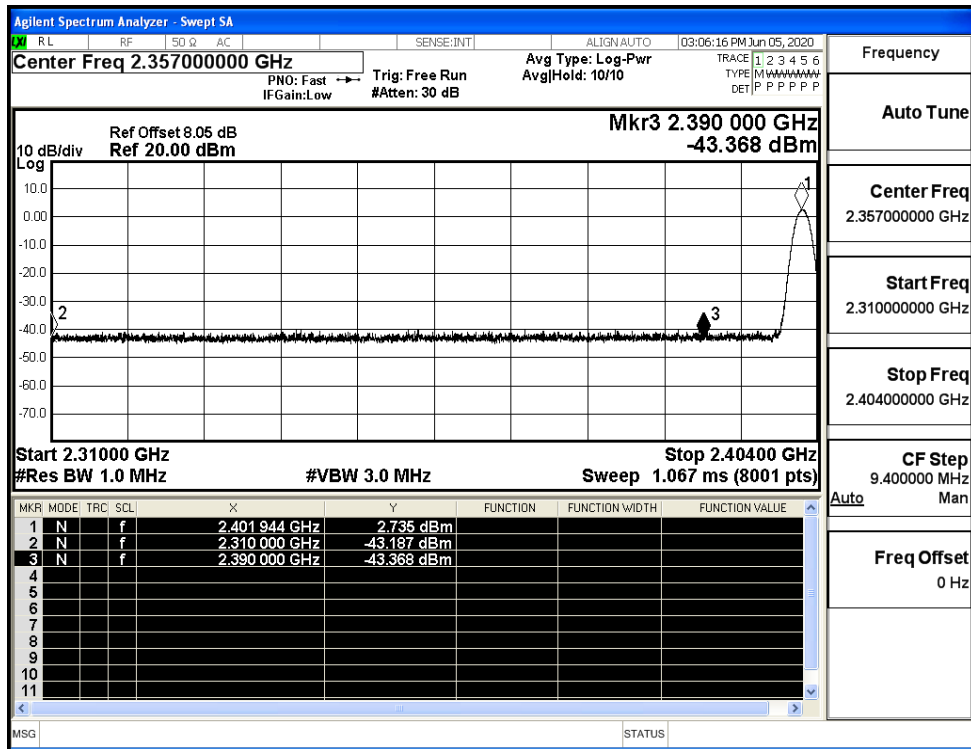
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (High Channel)



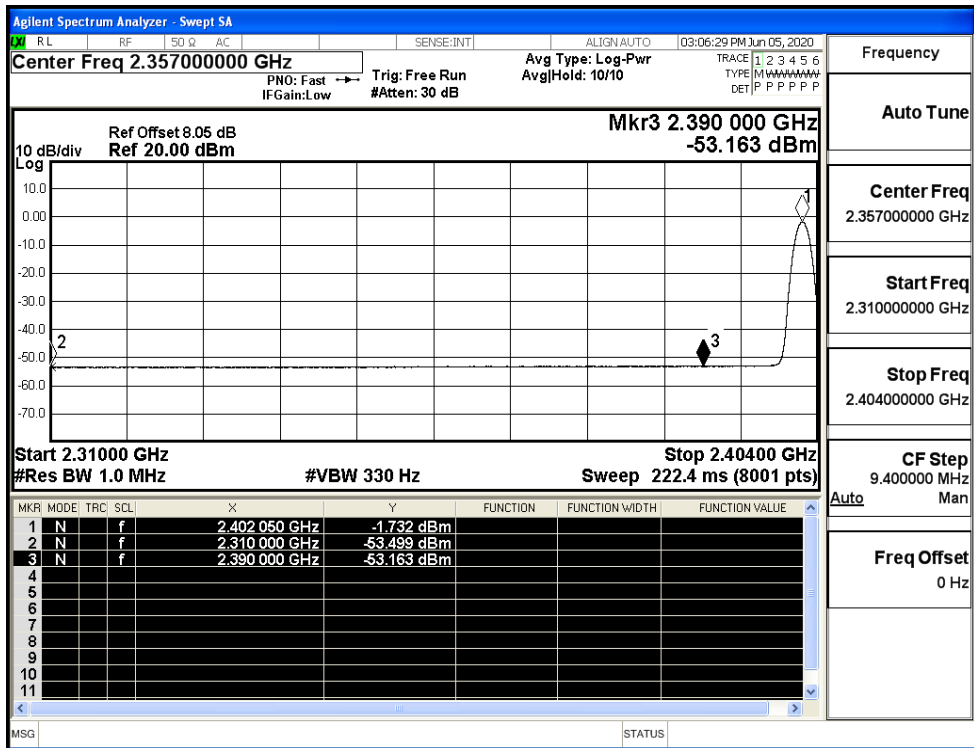
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (High Channel)



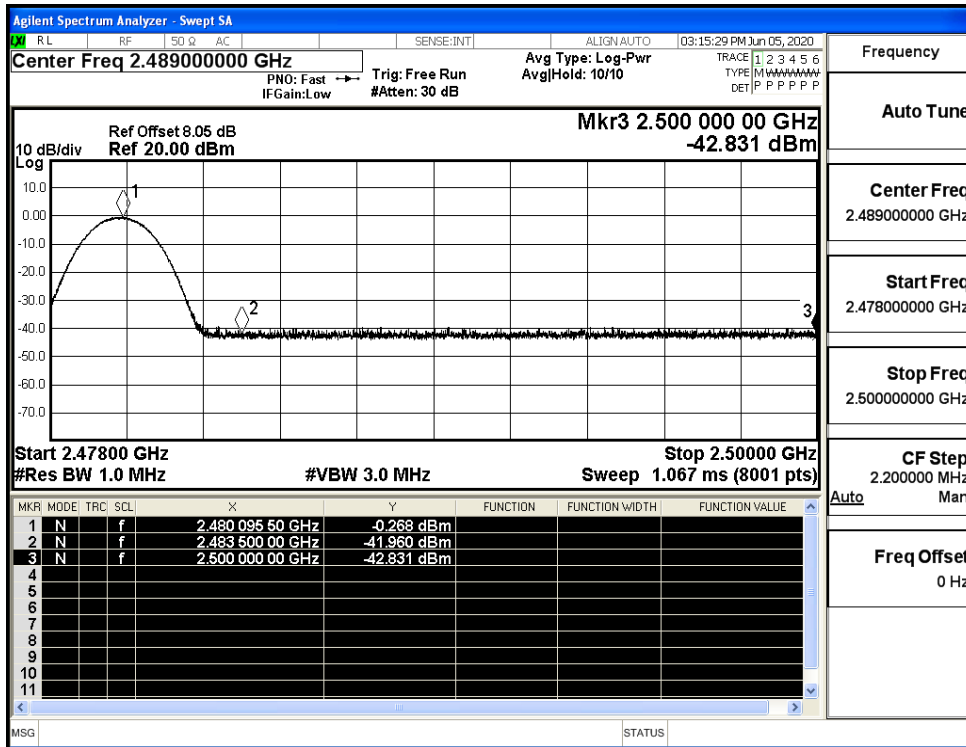
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

