

## Appendix A

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

Product Name: Bluetooth transmitter and receiver 2-in-1

Trade Mark: 1Mii

Test Model: B310Pro

#### Environmental Conditions

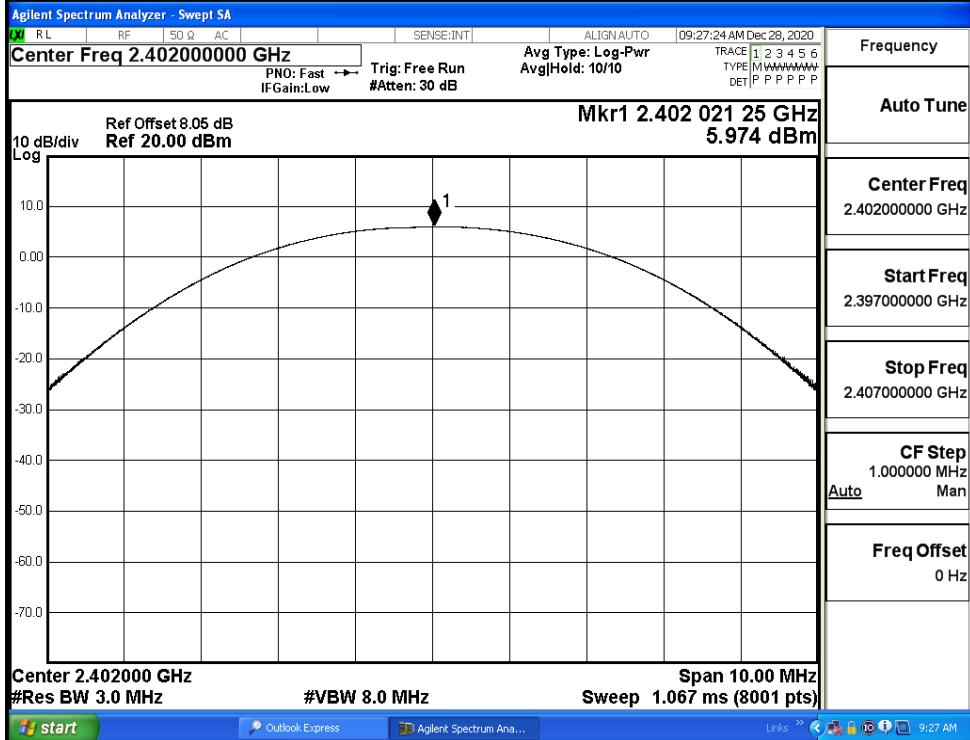
Temperature:	24.6 ° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan

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

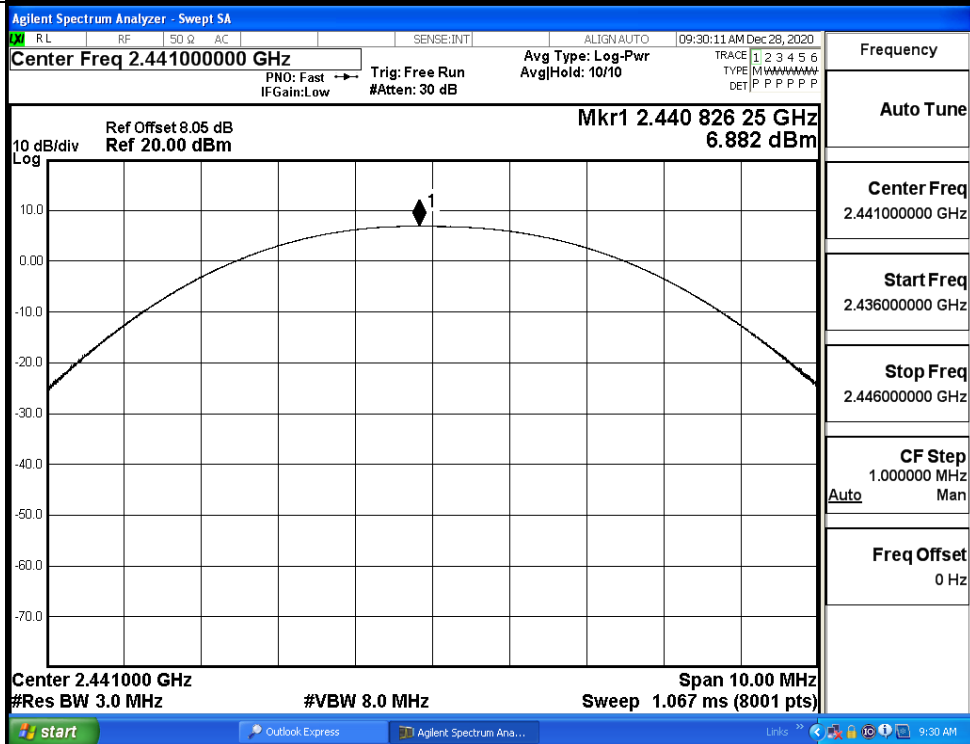
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	5.974	21	PASS
	MCH	6.882	21	PASS
	HCH	6.569	21	PASS
$\pi/4$ DQPSK	LCH	4.882	21	PASS
	MCH	6.135	21	PASS
	HCH	5.871	21	PASS
8DPSK	LCH	5.111	21	PASS
	MCH	6.298	21	PASS
	HCH	6.071	21	PASS

Test Graphs

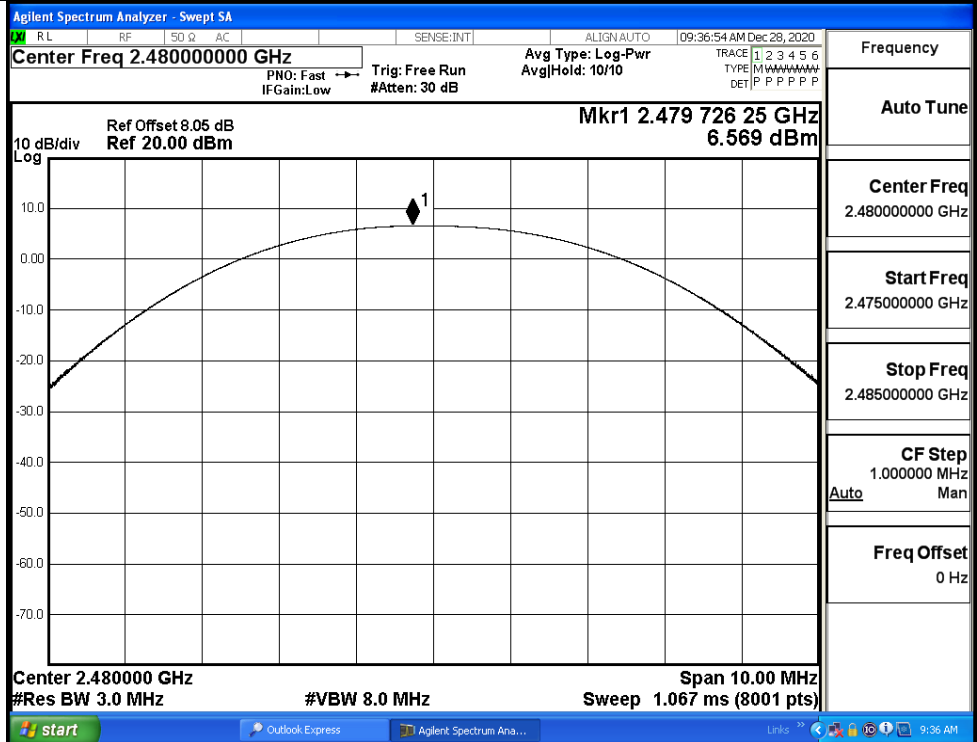
GFSK/LCH



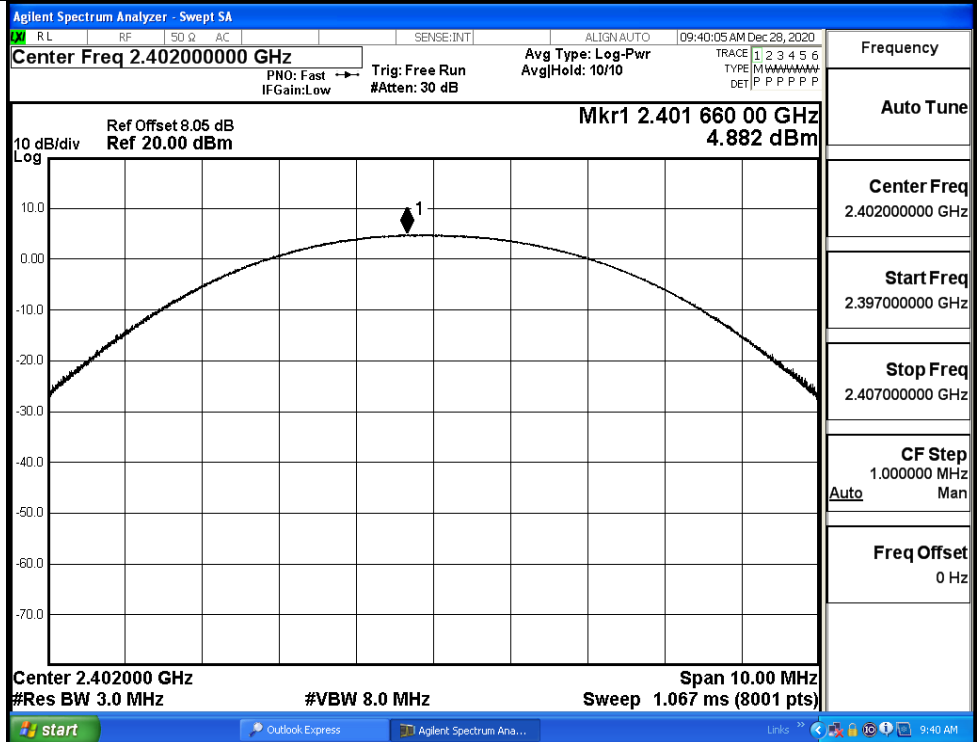
GFSK/MCH



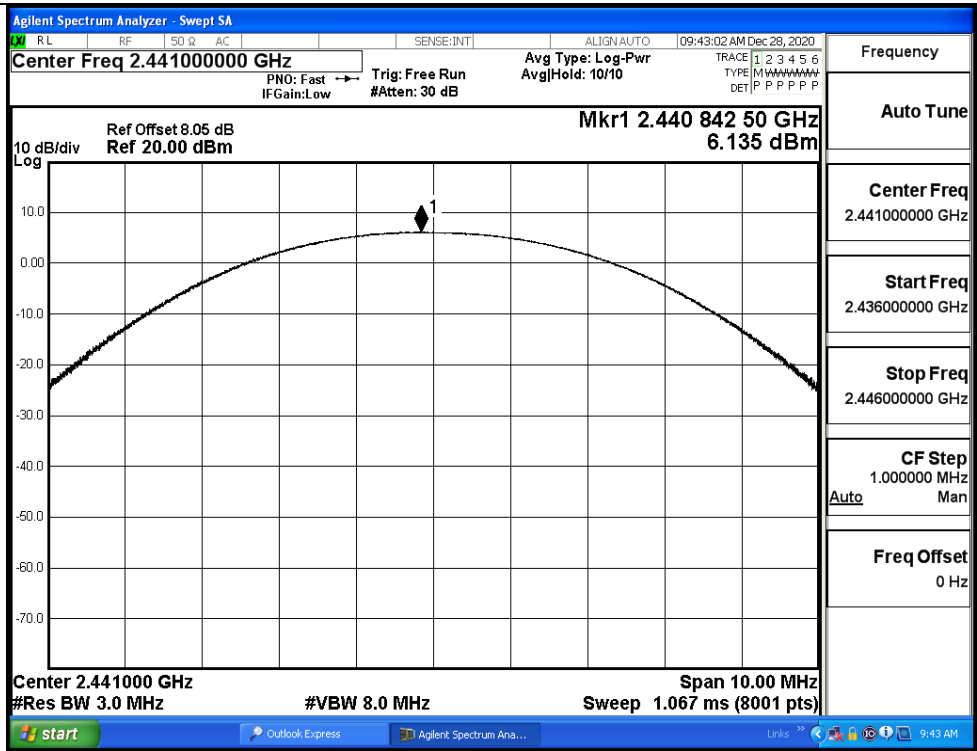
GFSK/HCH



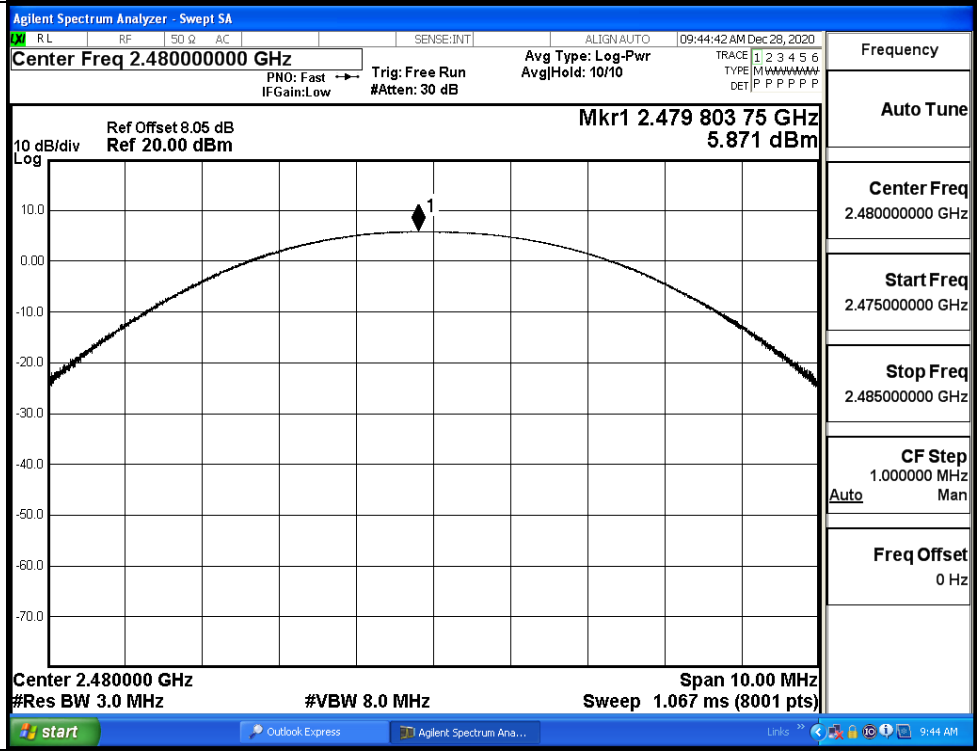
$\pi/4$ DQPSK/LCH



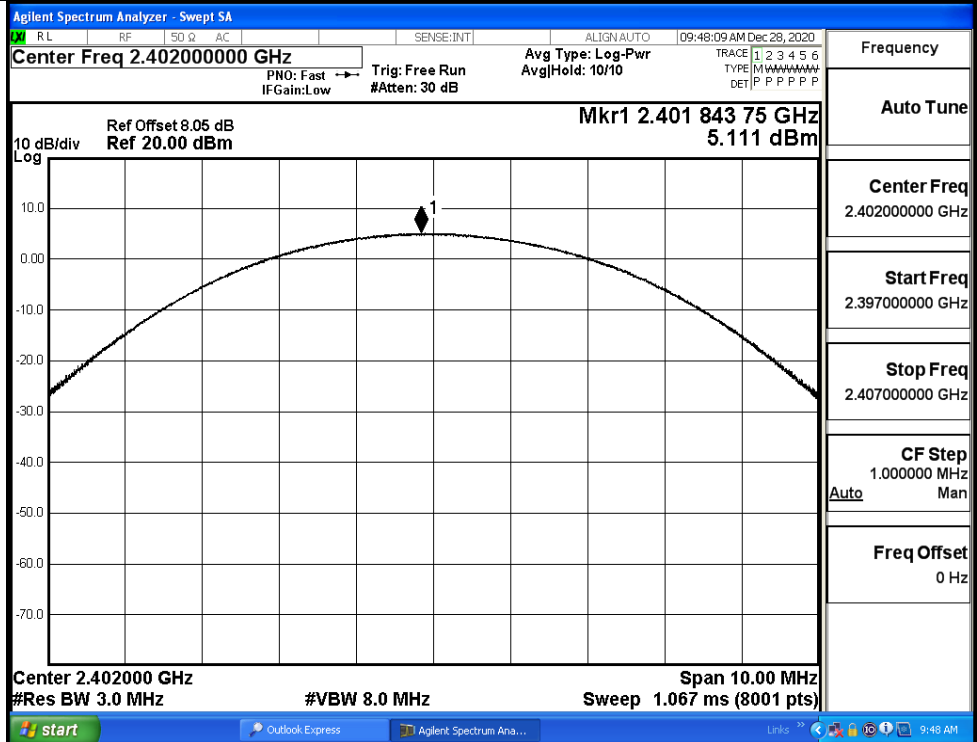
$\pi/4$ DQPSK/MCH



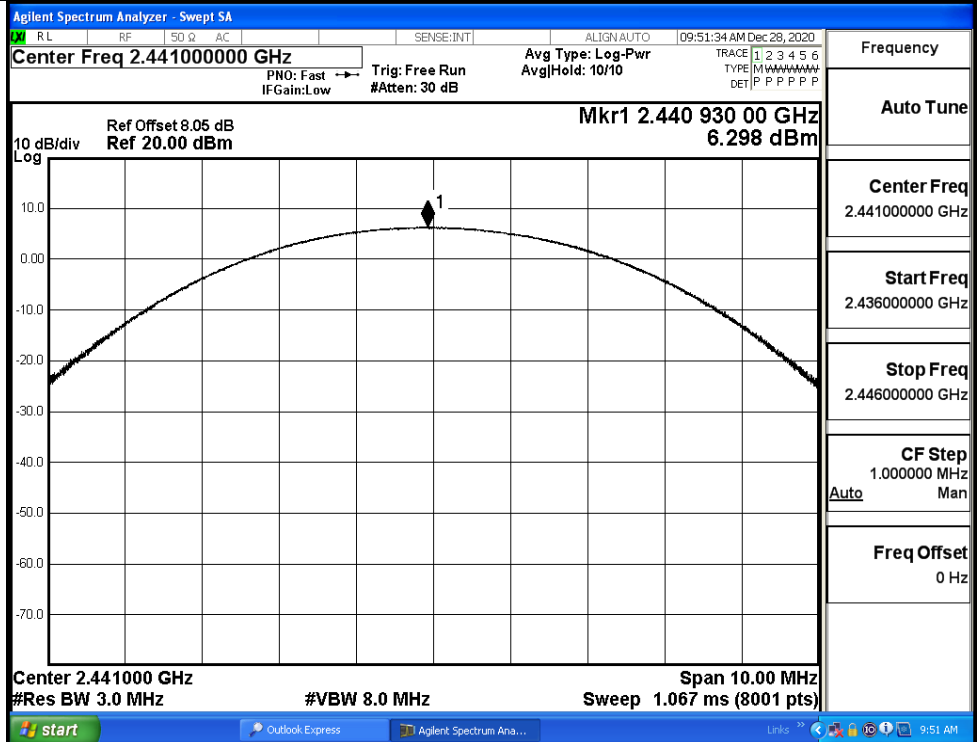
$\pi/4$ DQPSK/HCH



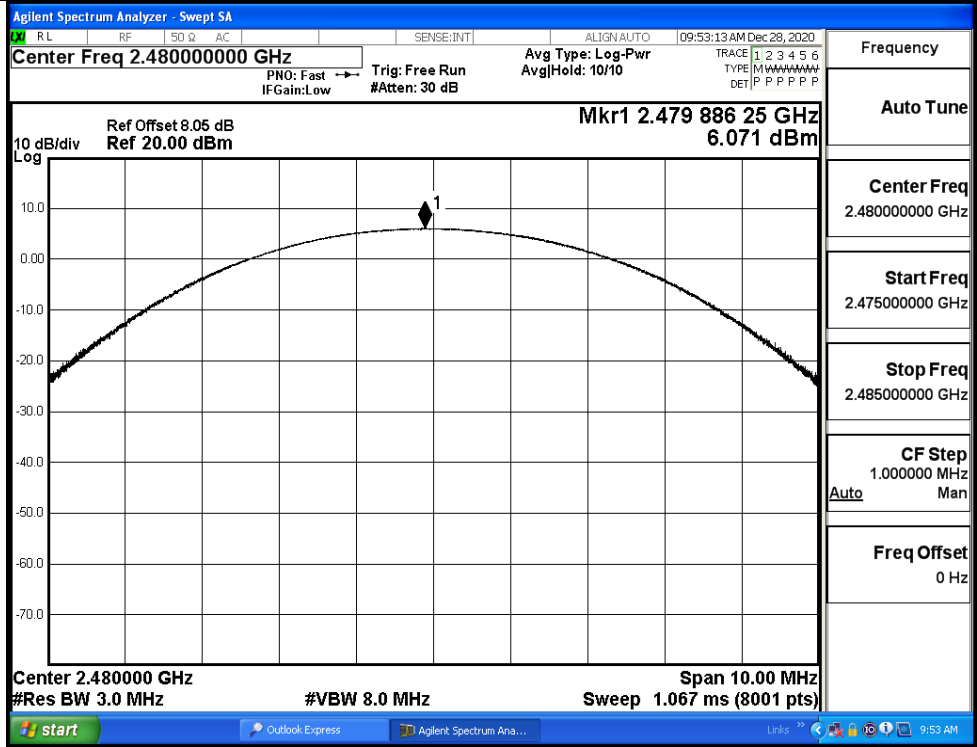
8DPSK/LCH



8DPSK/MCH

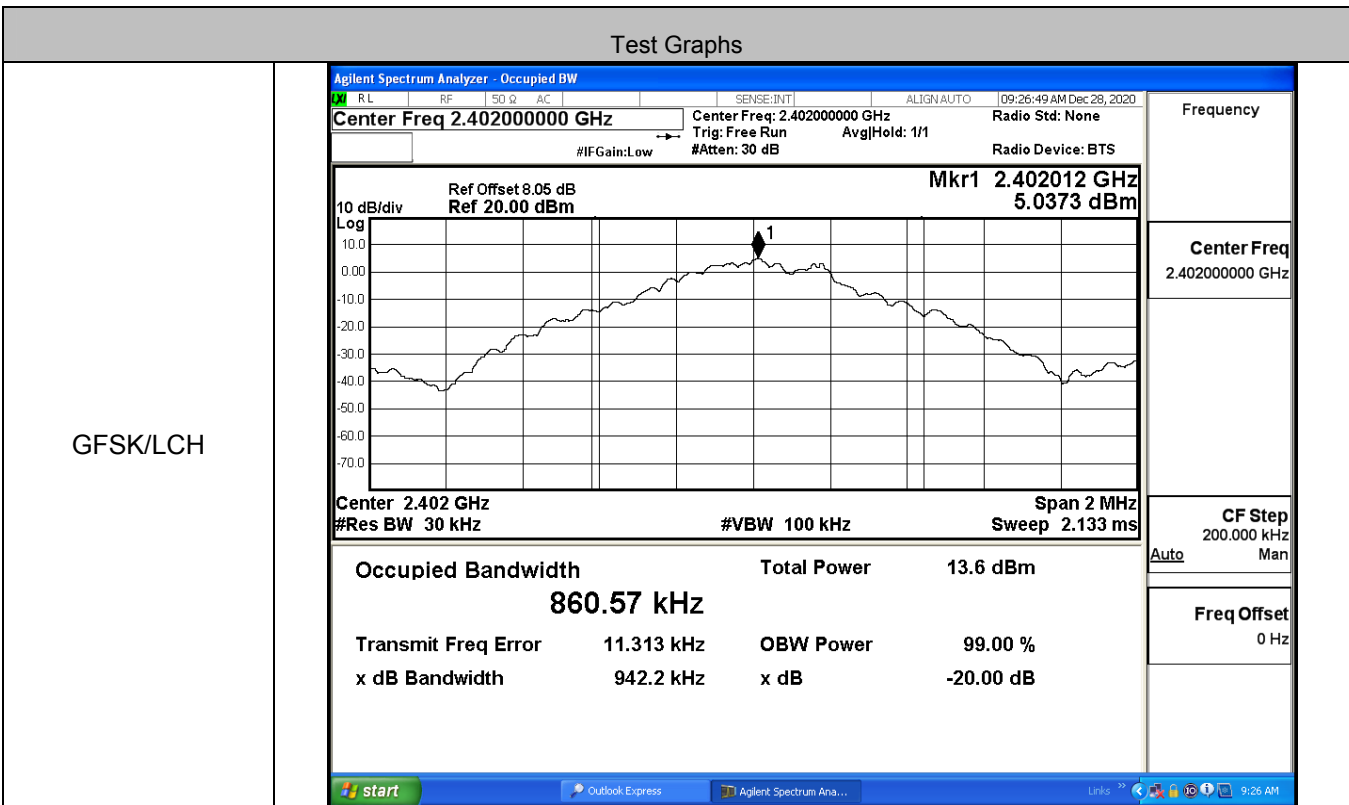


8DPSK/HCH

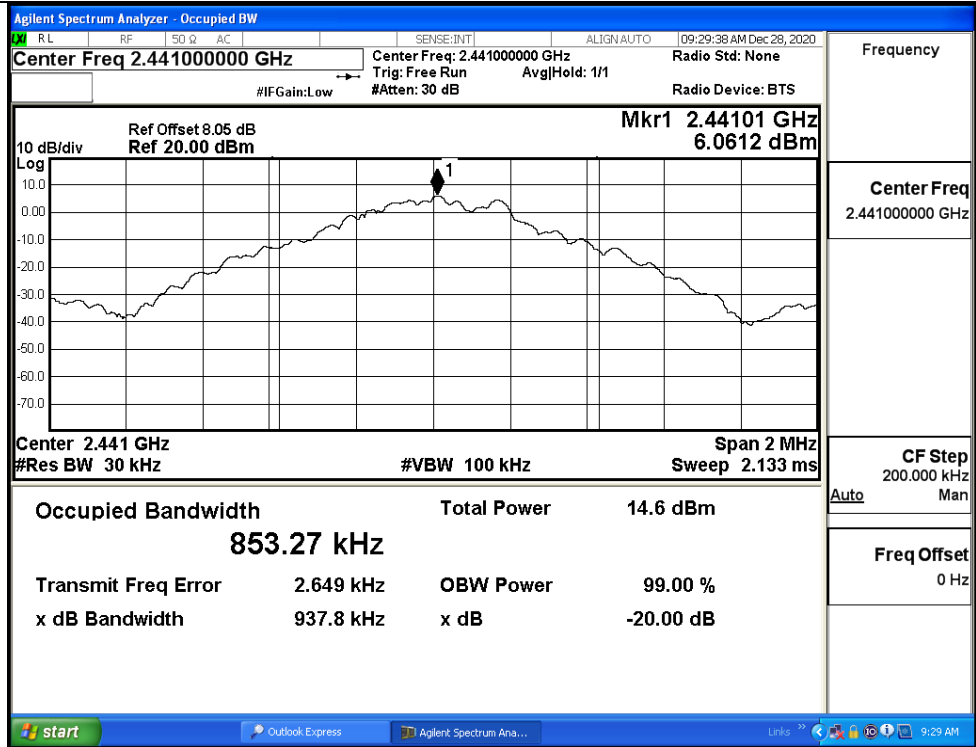


**A.2 20dB Bandwidth**

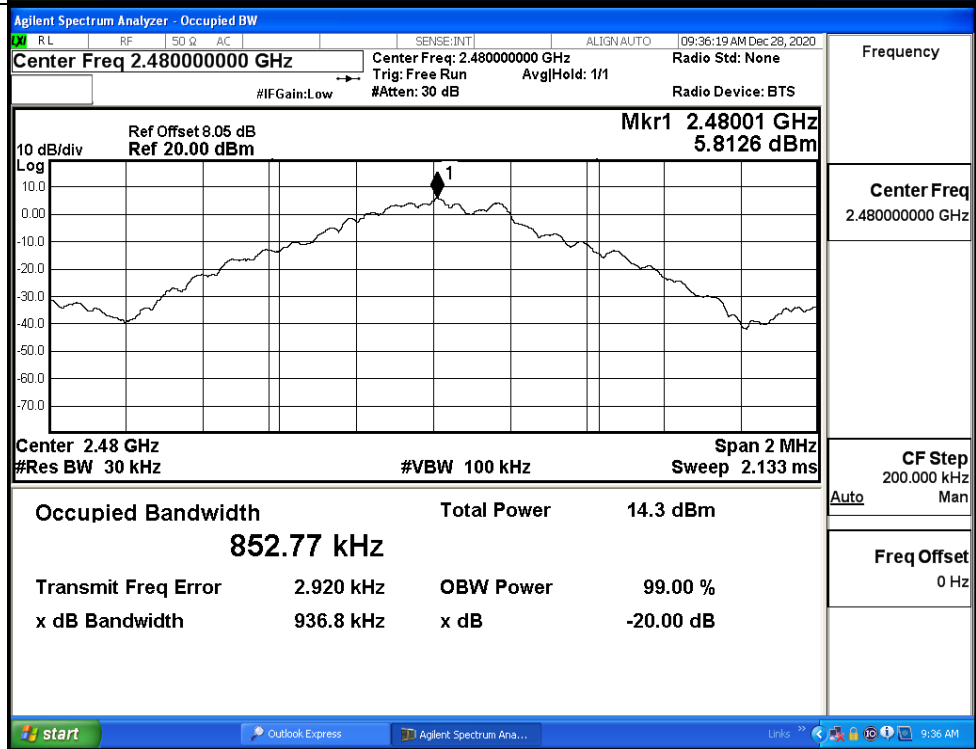
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9422	Not Specified	PASS
	MCH	0.9378	Not Specified	PASS
	HCH	0.9368	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.230	Not Specified	PASS
	MCH	1.262	Not Specified	PASS
	HCH	1.235	Not Specified	PASS
8DPSK	LCH	1.264	Not Specified	PASS
	MCH	1.264	Not Specified	PASS
	HCH	1.265	Not Specified	PASS



GFSK/MCH

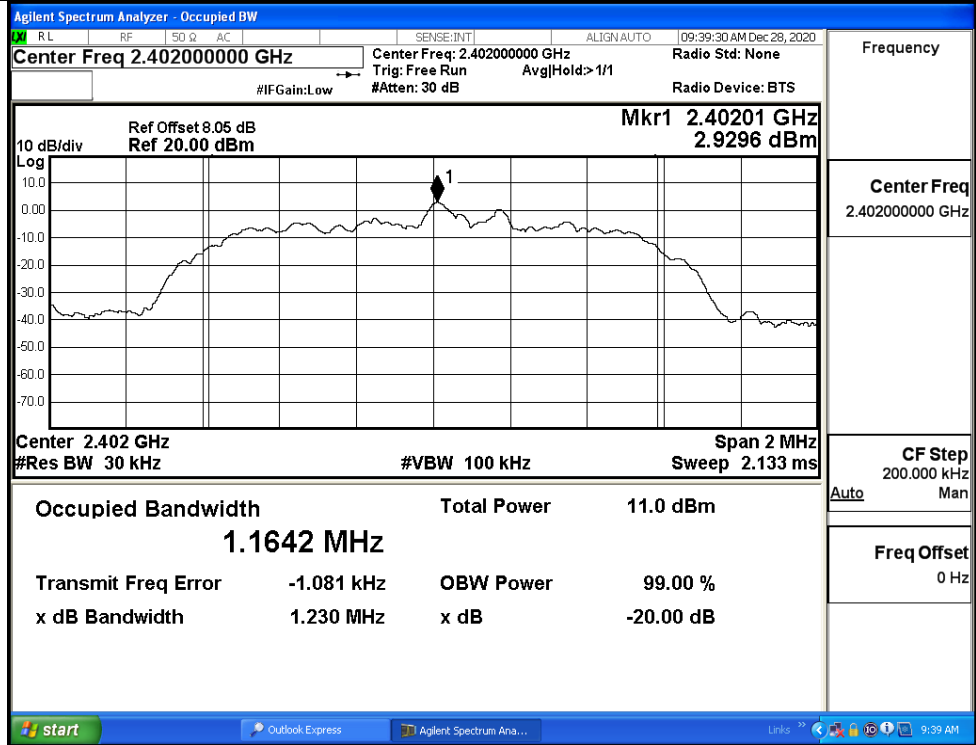


GFSK/HCH

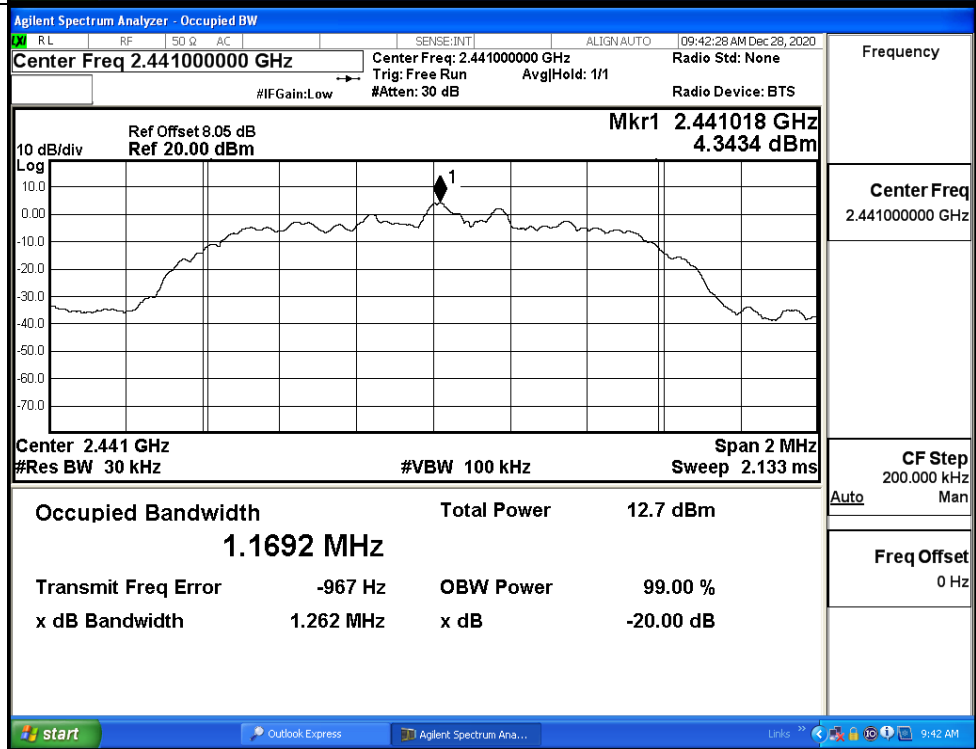




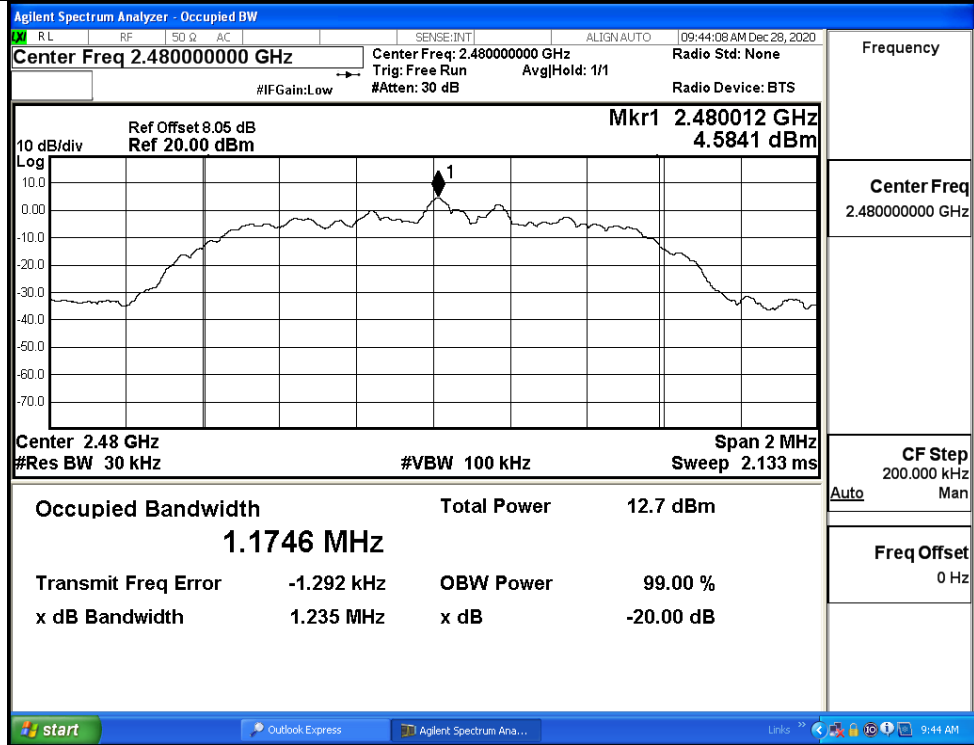
$\pi/4$ DQPSK/LCH



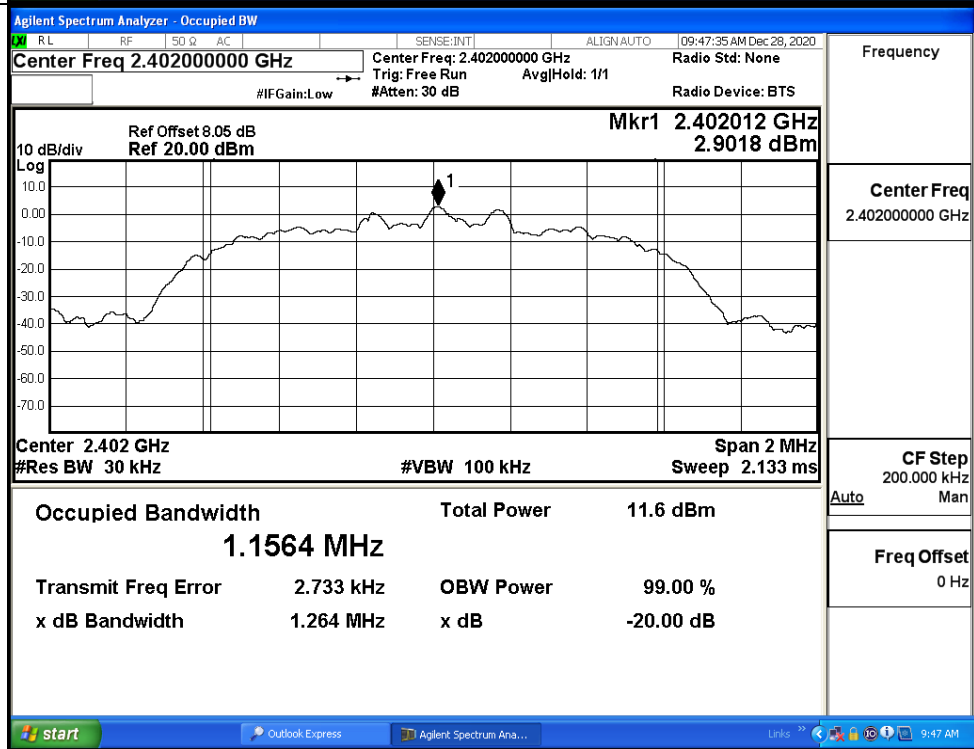
$\pi/4$ DQPSK/MCH



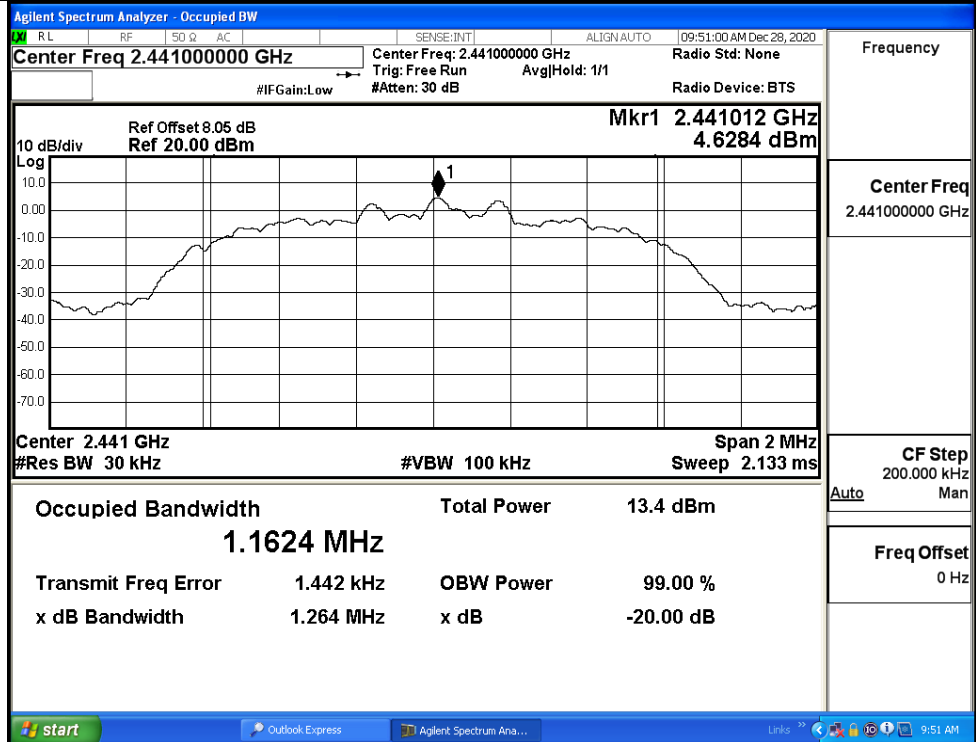
$\pi/4$ DQPSK/HCH



8DPSK/LCH

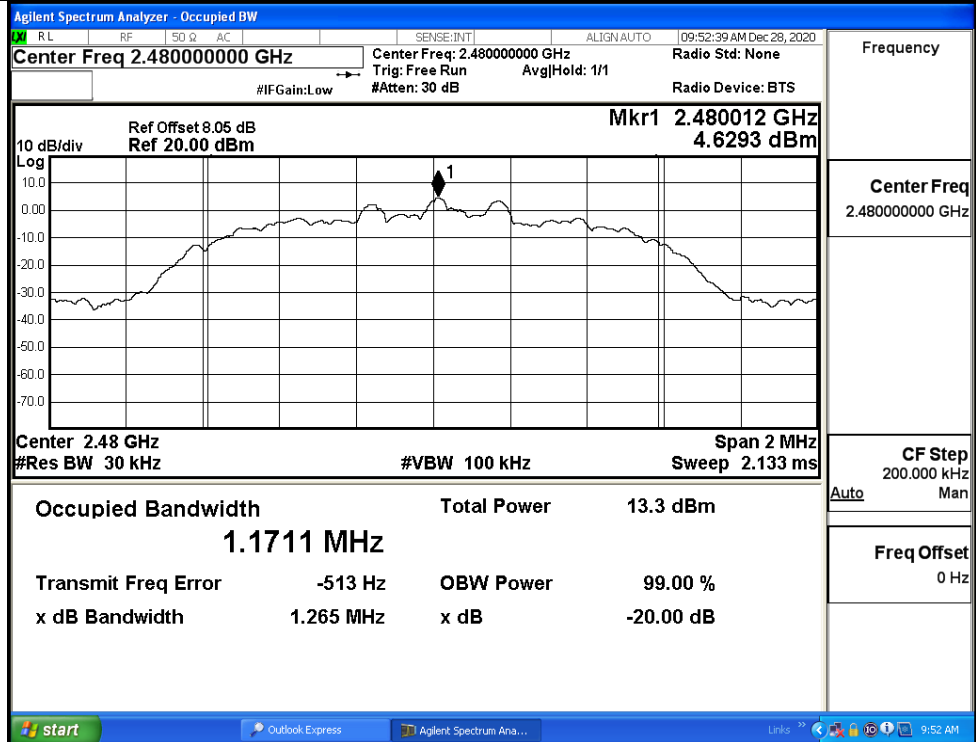


8DPSK/MCH



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

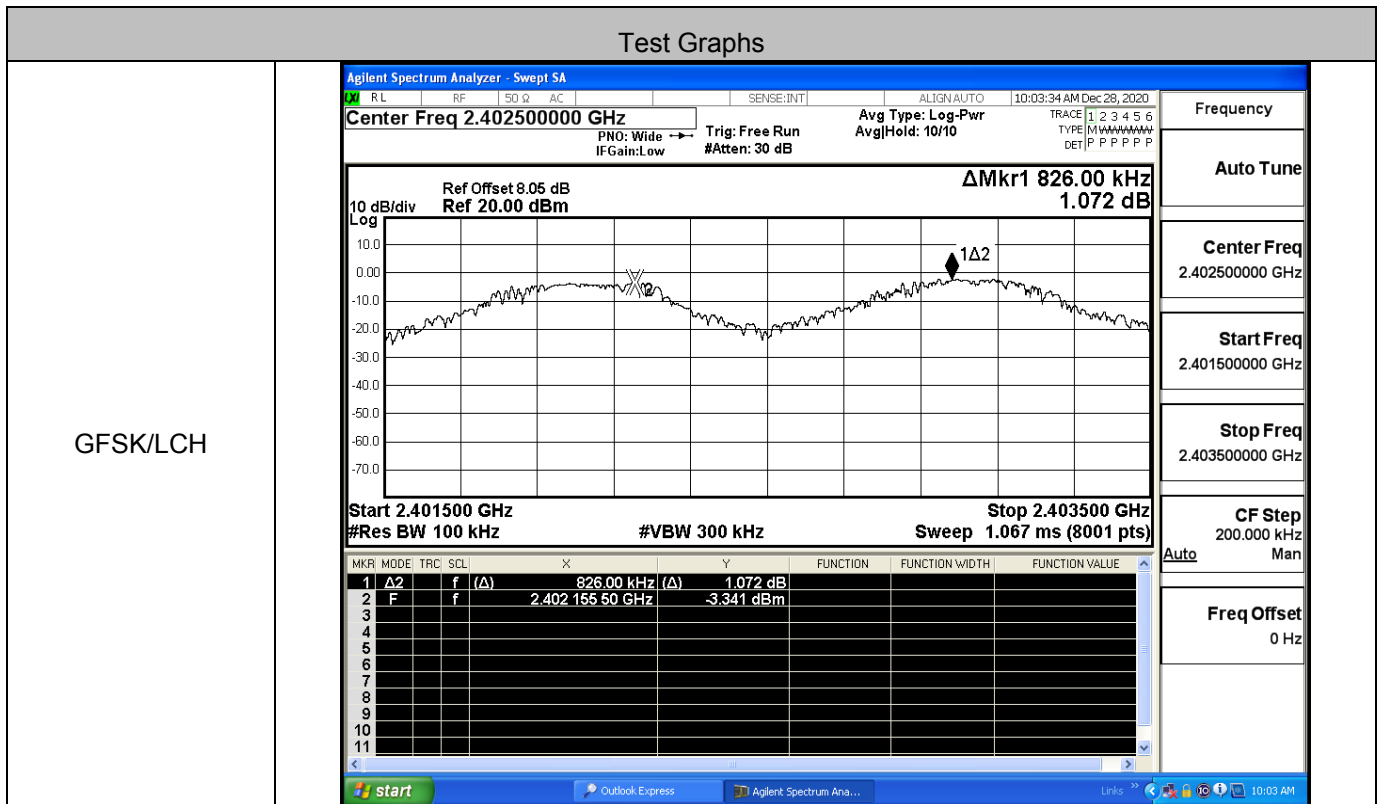
8DPSK/HCH



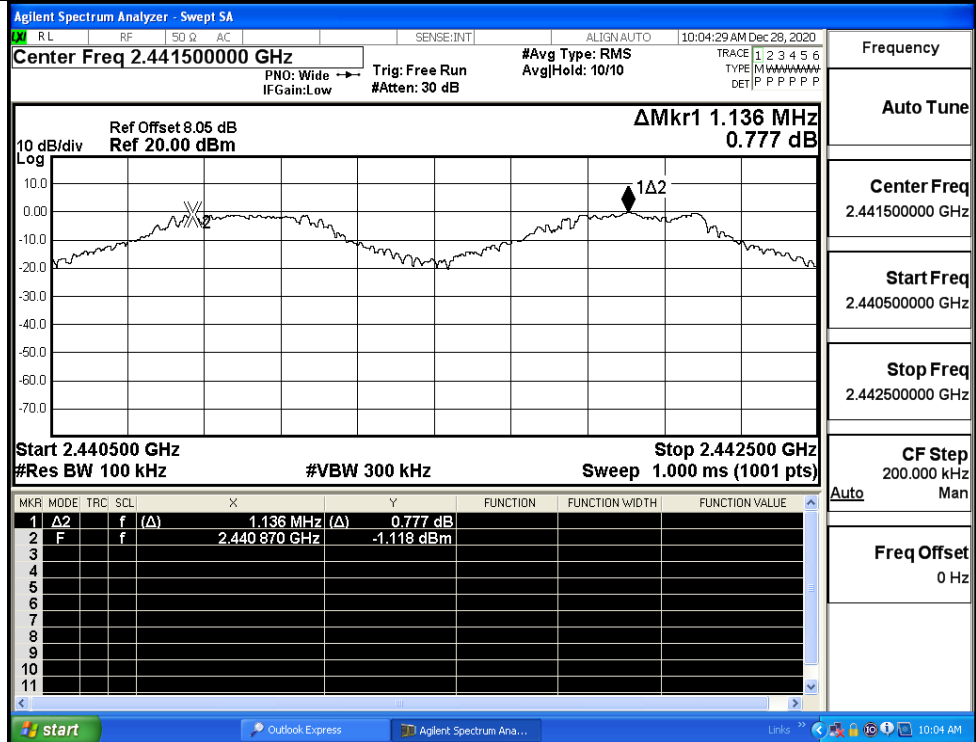
Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

### A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.826	0.628	PASS
	MCH	1.136	0.628	PASS
	HCH	1.058	0.628	PASS
π/4DQPSK	LCH	1.018	0.841	PASS
	MCH	1.052	0.841	PASS
	HCH	1.122	0.841	PASS
8DPSK	LCH	0.990	0.843	PASS
	MCH	0.986	0.843	PASS
	HCH	1.152	0.843	PASS



GFSK/MCH



Frequency

Auto Tune

Center Freq  
2.441500000 GHz

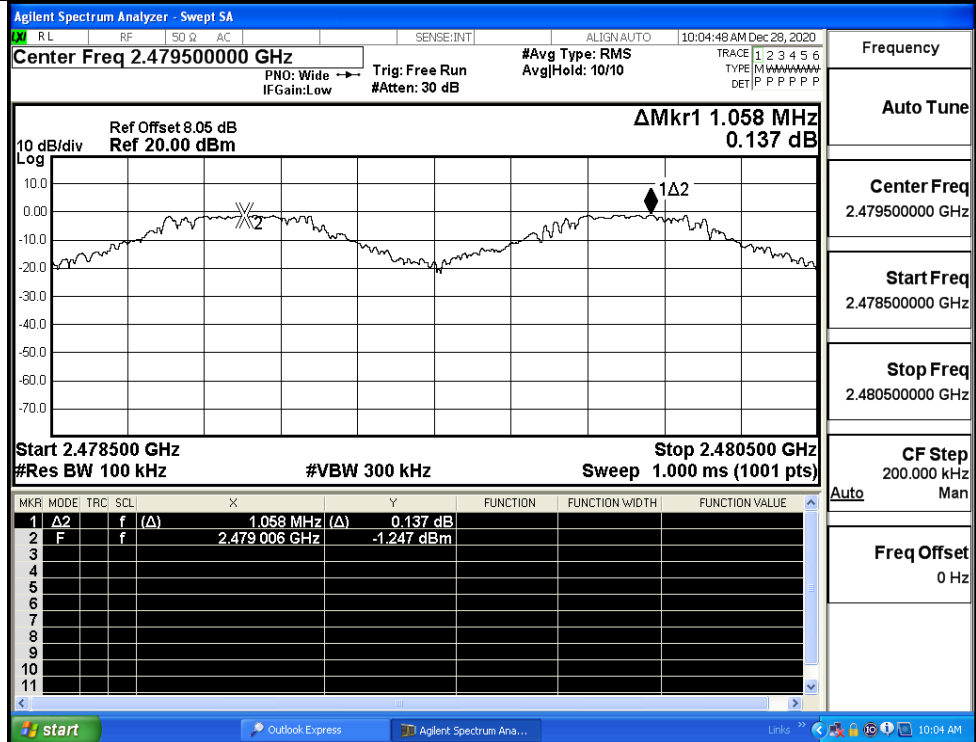
Start Freq  
2.440500000 GHz

Stop Freq  
2.442500000 GHz

CF Step  
200.000 kHz  
Man

Freq Offset  
0 Hz

GFSK/HCH



Frequency

Auto Tune

Center Freq  
2.479500000 GHz

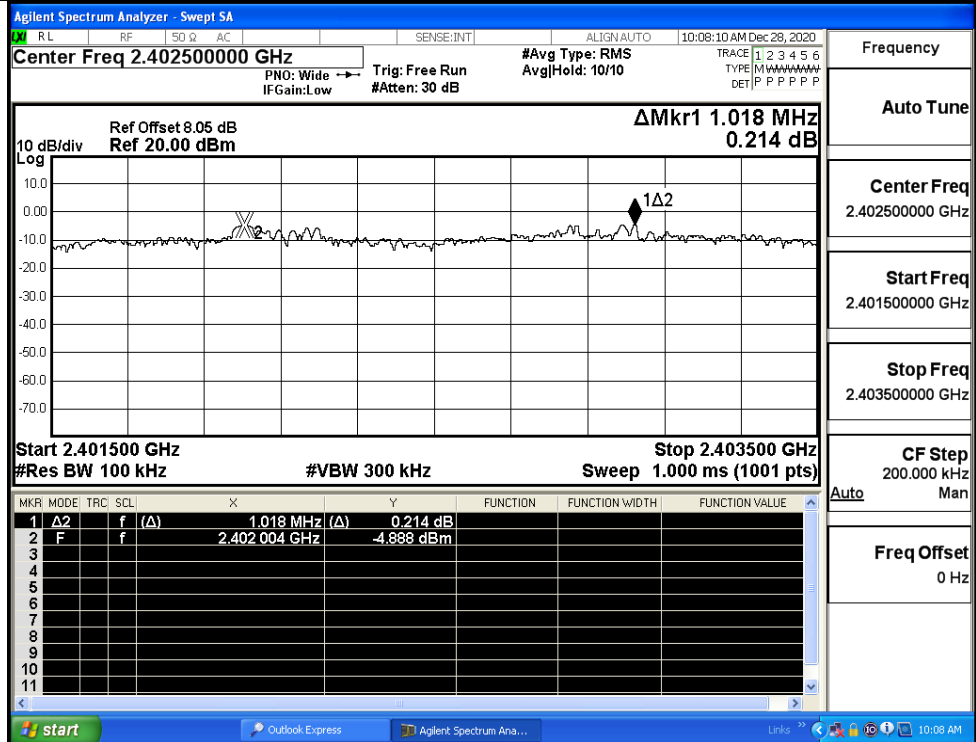
Start Freq  
2.478500000 GHz

Stop Freq  
2.480500000 GHz

CF Step  
200.000 kHz  
Man

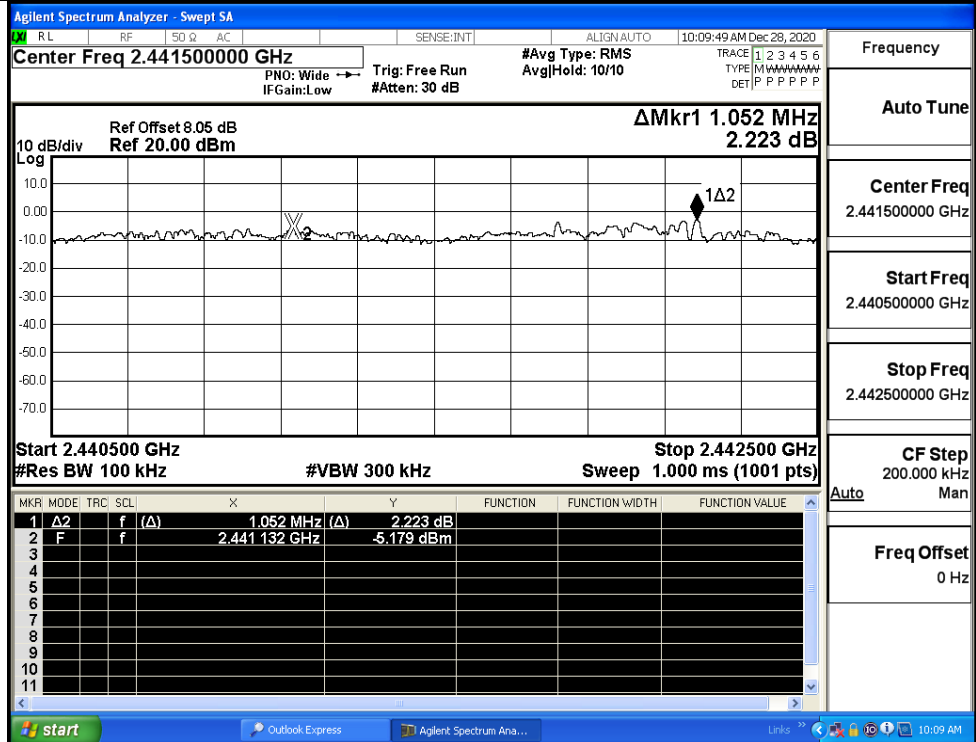
Freq Offset  
0 Hz

$\pi/4$ DQPSK/LCH



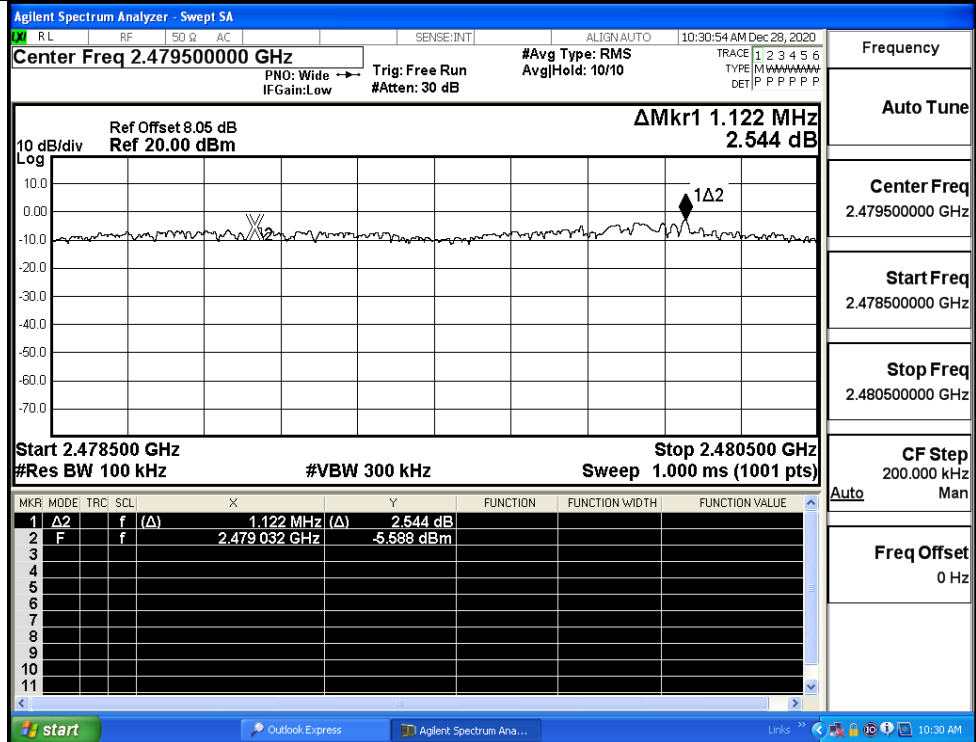
Frequency  
Auto Tune  
Center Freq  
2.402500000 GHz  
Start Freq  
2.401500000 GHz  
Stop Freq  
2.403500000 GHz  
CF Step  
200.000 kHz  
Auto  
Man  
Freq Offset  
0 Hz

$\pi/4$ DQPSK/MCH

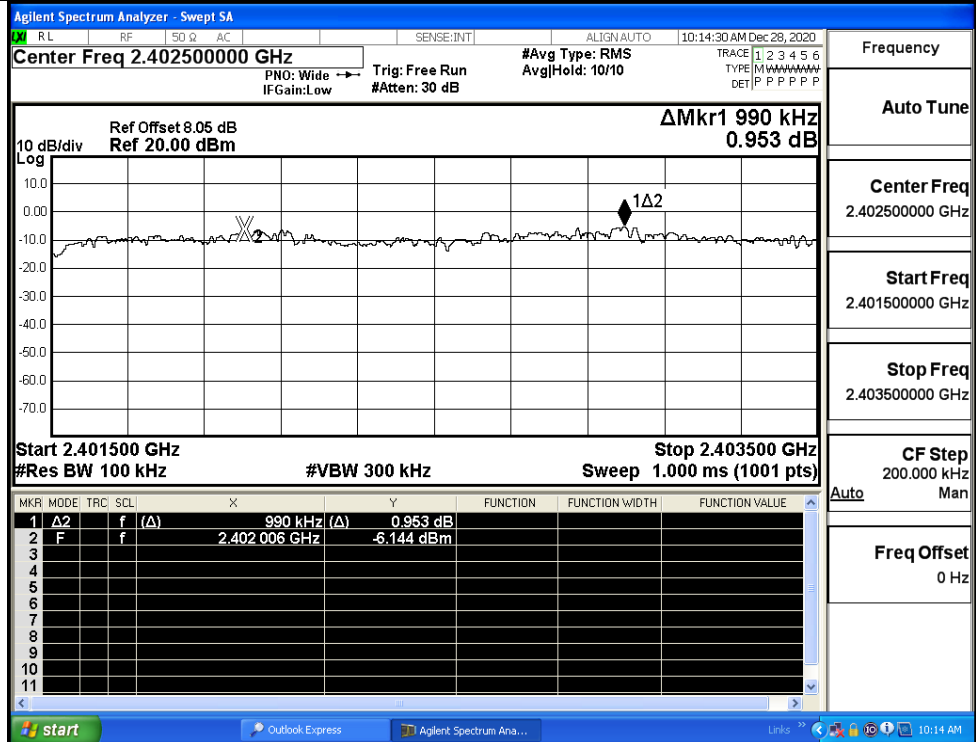


Frequency  
Auto Tune  
Center Freq  
2.441500000 GHz  
Start Freq  
2.440500000 GHz  
Stop Freq  
2.442500000 GHz  
CF Step  
200.000 kHz  
Auto  
Man  
Freq Offset  
0 Hz

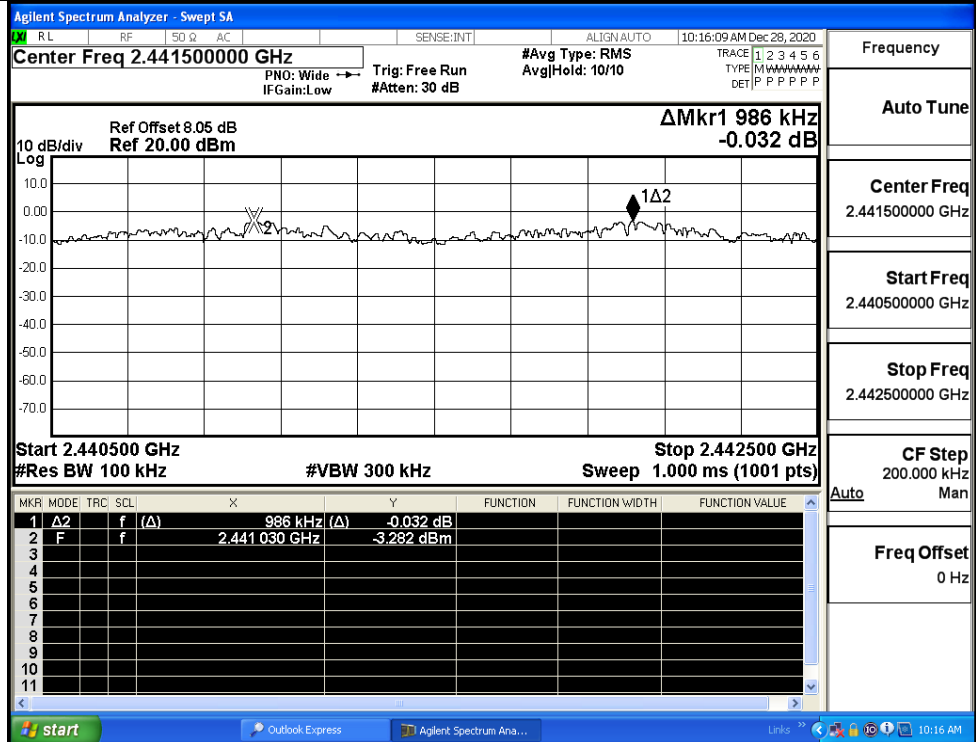
π/4DQPSK/HCH



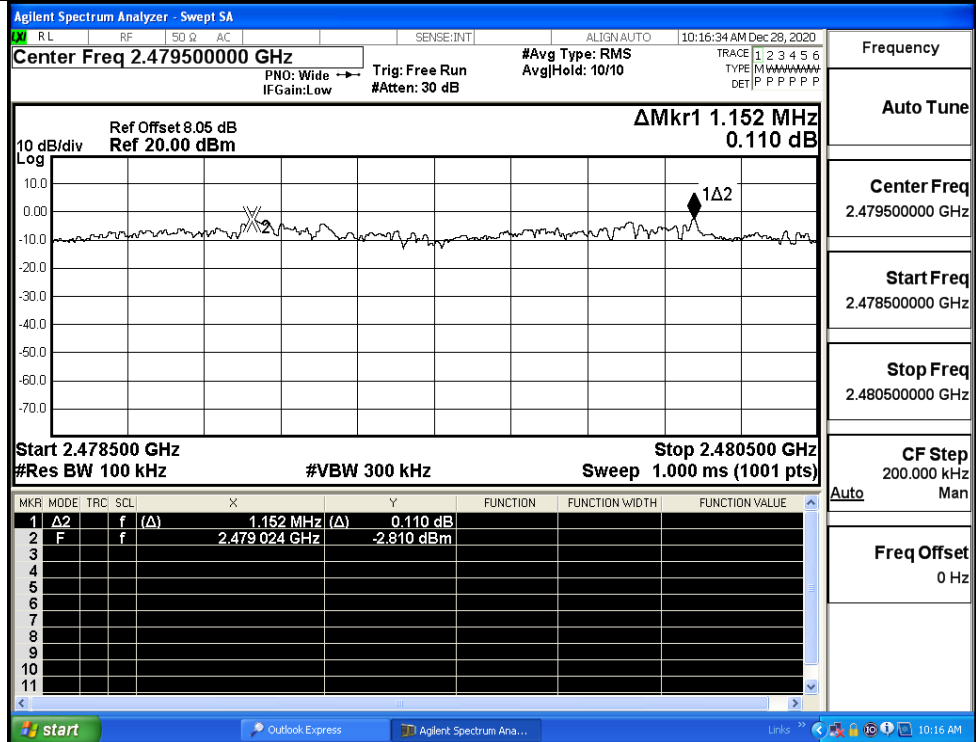
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH





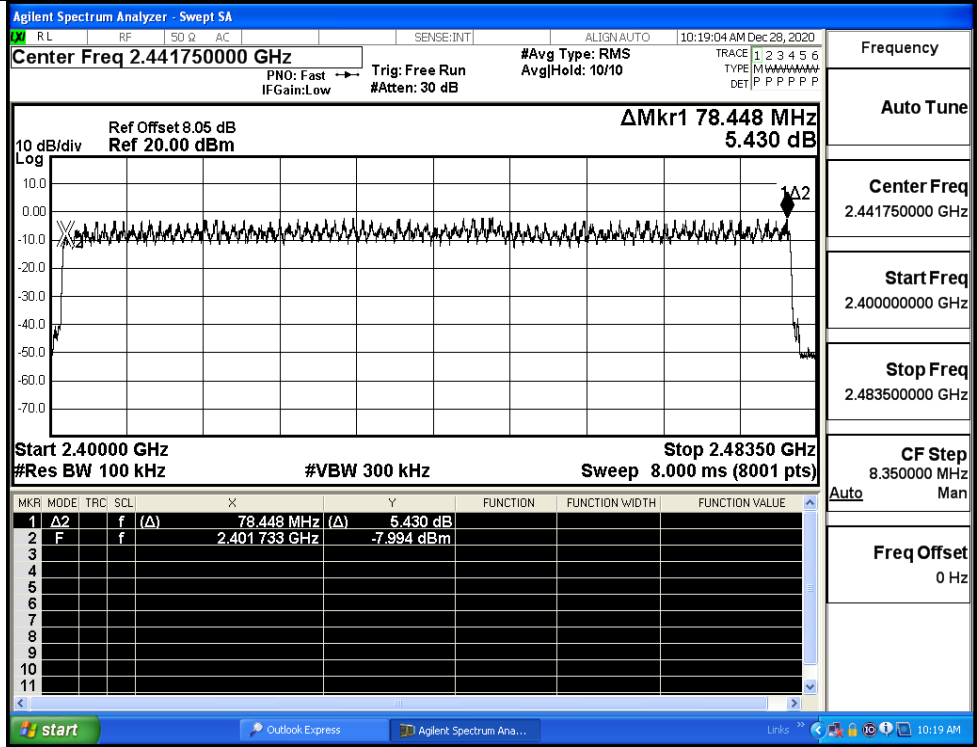
### A.4 Hopping Channel Number

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

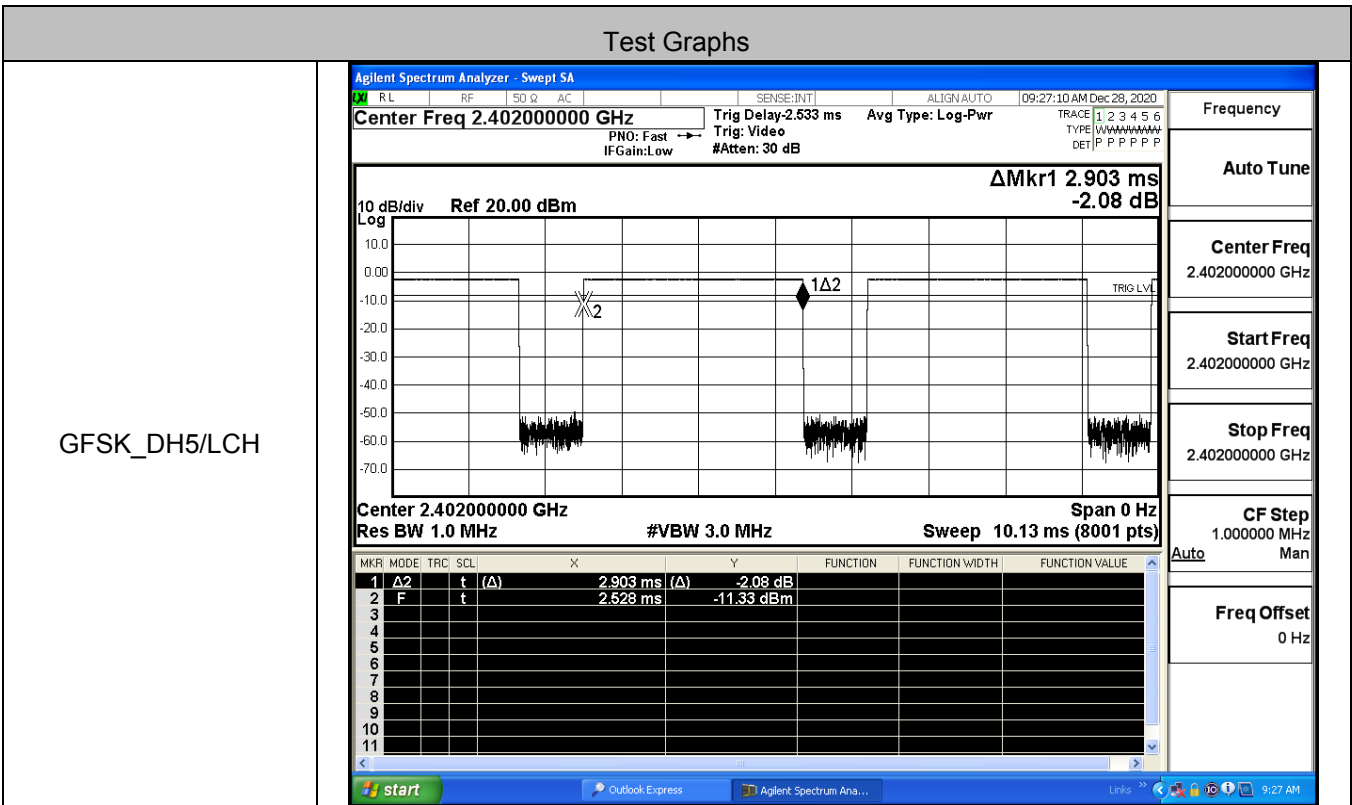
<p>GFSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p><math>\Delta</math>Mkr1 78.031 MHz 2.972 dB</p> <p>Start 2.40000 GHz #Res BW 100 kHz</p> <p>Stop 2.48350 GHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <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><math>\Delta</math>2</td> <td>f</td> <td>(<math>\Delta</math>)</td> <td>78.031 MHz (<math>\Delta</math>)</td> <td>2.972 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>2.401 858 GHz</td> <td>-3.622 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	( $\Delta$ )	78.031 MHz ( $\Delta$ )	2.972 dB				2	F	f	( $\Delta$ )	2.401 858 GHz	-3.622 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	$\Delta$ 2	f	( $\Delta$ )	78.031 MHz ( $\Delta$ )	2.972 dB																							
2	F	f	( $\Delta$ )	2.401 858 GHz	-3.622 dBm																							
<p><math>\pi/4</math>DQPSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p><math>\Delta</math>Mkr1 78.052 MHz 3.129 dB</p> <p>Start 2.40000 GHz #Res BW 100 kHz</p> <p>Stop 2.48350 GHz #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><math>\Delta</math>2</td> <td>f</td> <td>(<math>\Delta</math>)</td> <td>78.052 MHz (<math>\Delta</math>)</td> <td>3.129 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>2.402 046 GHz</td> <td>-7.548 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	( $\Delta$ )	78.052 MHz ( $\Delta$ )	3.129 dB				2	F	f	( $\Delta$ )	2.402 046 GHz	-7.548 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	$\Delta$ 2	f	( $\Delta$ )	78.052 MHz ( $\Delta$ )	3.129 dB																							
2	F	f	( $\Delta$ )	2.402 046 GHz	-7.548 dBm																							

8DPSK/Hop

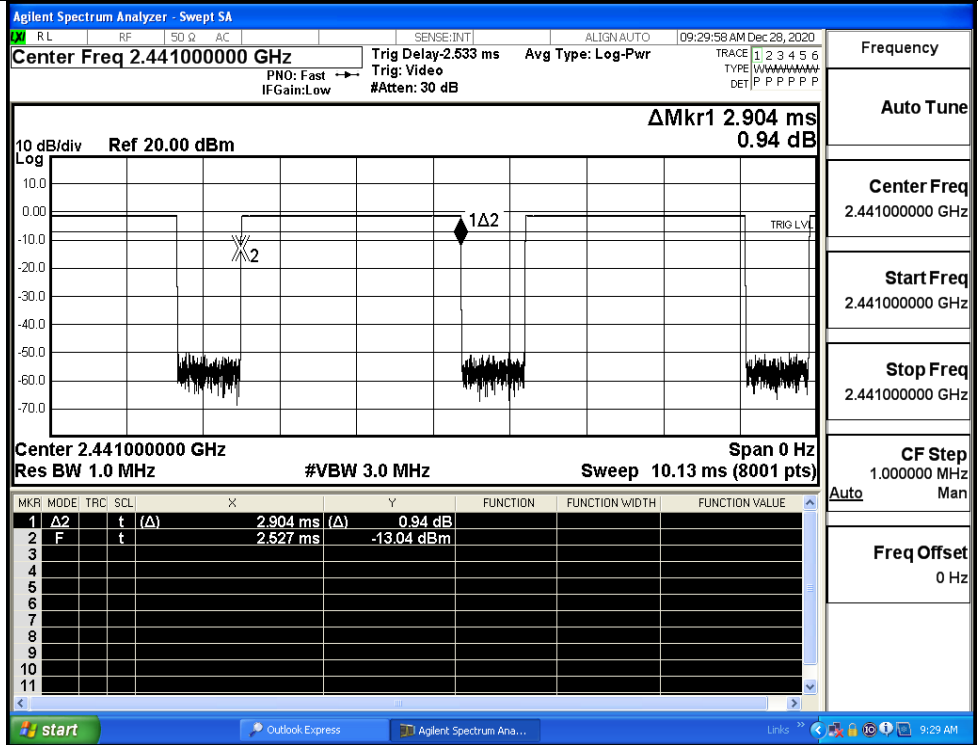


### A.5 Dwell Time

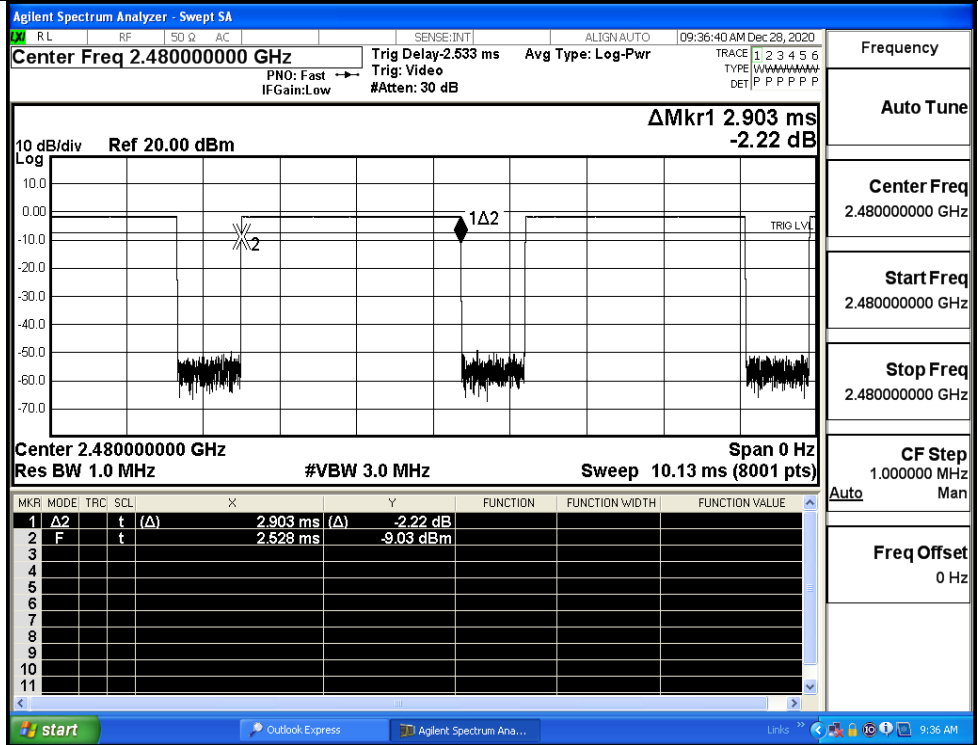
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.9	106.7	0.31	0.4	PASS
	2DH5	MCH	2.9	106.7	0.31	0.4	PASS
	2DH5	HCH	2.9	106.7	0.31	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.31	0.4	PASS
	3DH5	MCH	2.9	106.7	0.31	0.4	PASS
	3DH5	HCH	2.9	106.7	0.31	0.4	PASS



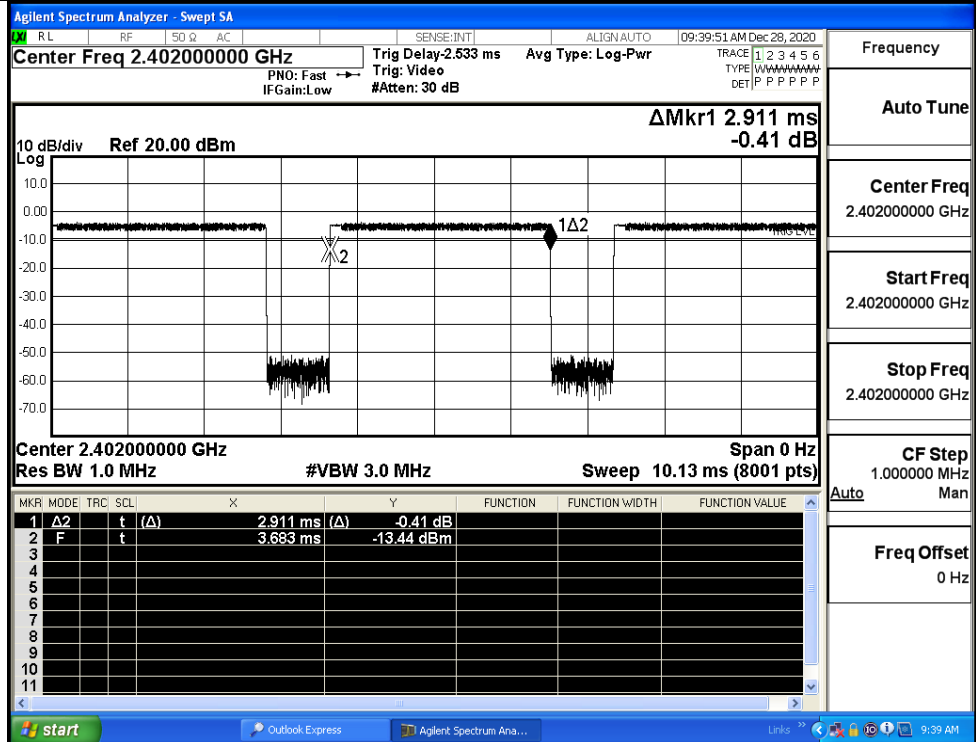
GFSK\_DH5/MCH



GFSK\_DH5/HCH



$\pi/4$ DQPSK  
\_2DH5/LCH



Frequency

Auto Tune

Center Freq  
2.402000000 GHz

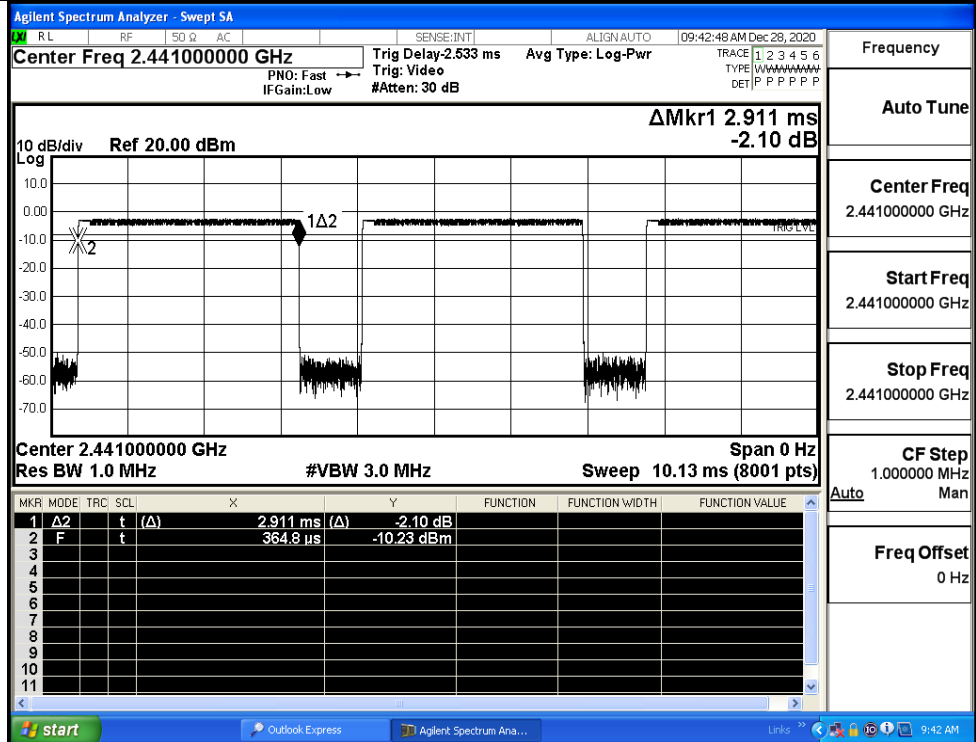
Start Freq  
2.402000000 GHz

Stop Freq  
2.402000000 GHz

CF Step  
1.000000 MHz  
Auto Man

Freq Offset  
0 Hz

$\pi/4$ DQPSK  
\_2DH5/MCH



Frequency

Auto Tune

Center Freq  
2.441000000 GHz

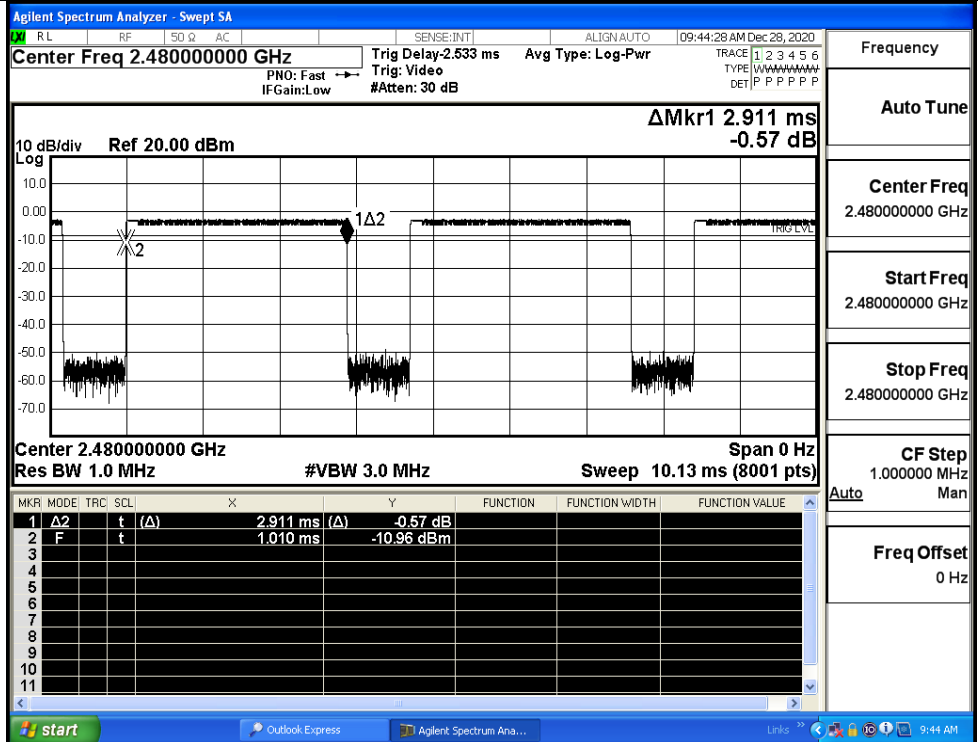
Start Freq  
2.441000000 GHz

Stop Freq  
2.441000000 GHz

CF Step  
1.000000 MHz  
Auto Man

Freq Offset  
0 Hz

$\pi/4$ DQPSK  
\_2DH5/HCH



Frequency

Auto Tune

Center Freq  
2.48000000 GHz

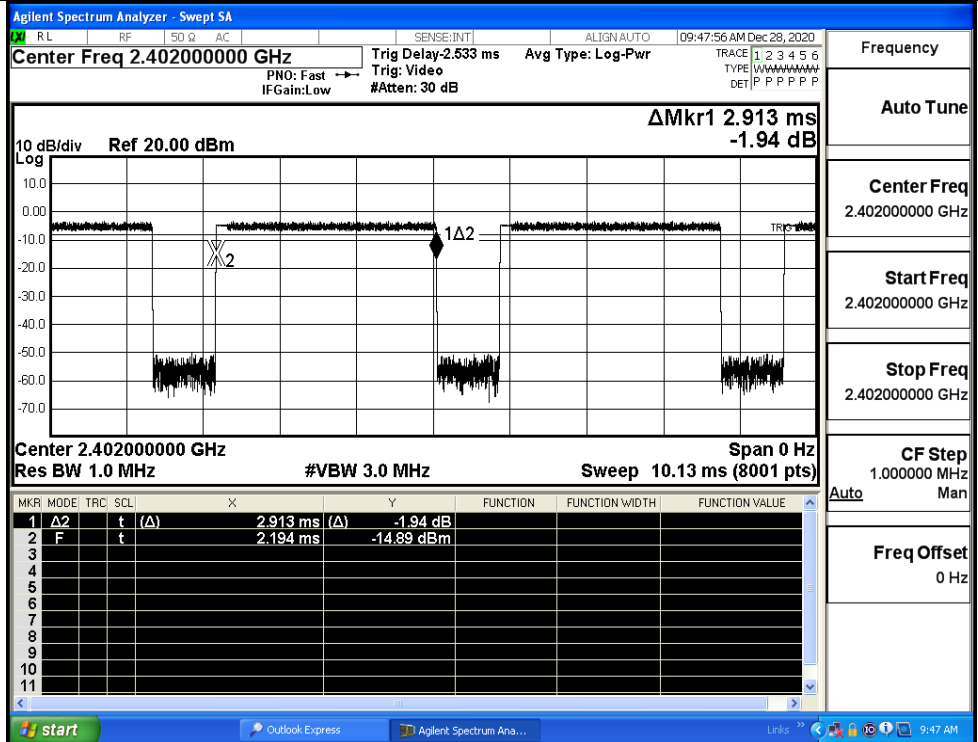
Start Freq  
2.480000000 GHz

Stop Freq  
2.480000000 GHz

CF Step  
1.000000 MHz

Freq Offset  
0 Hz

8DPSK\_3DH5/LCH



Frequency

Auto Tune

Center Freq  
2.40200000 GHz

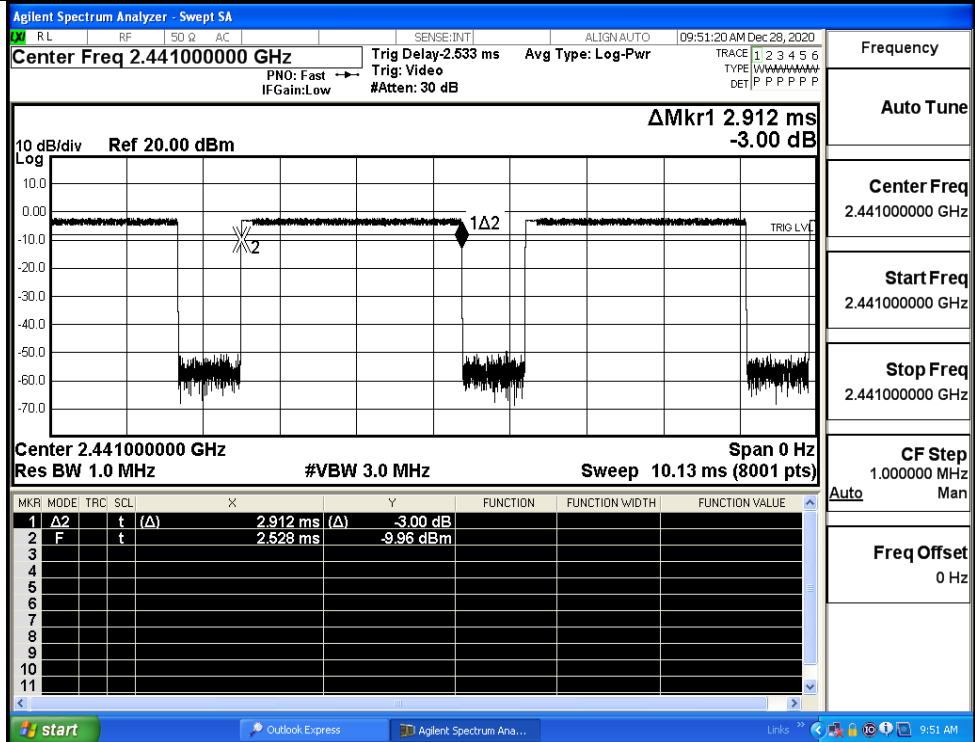
Start Freq  
2.402000000 GHz

Stop Freq  
2.402000000 GHz

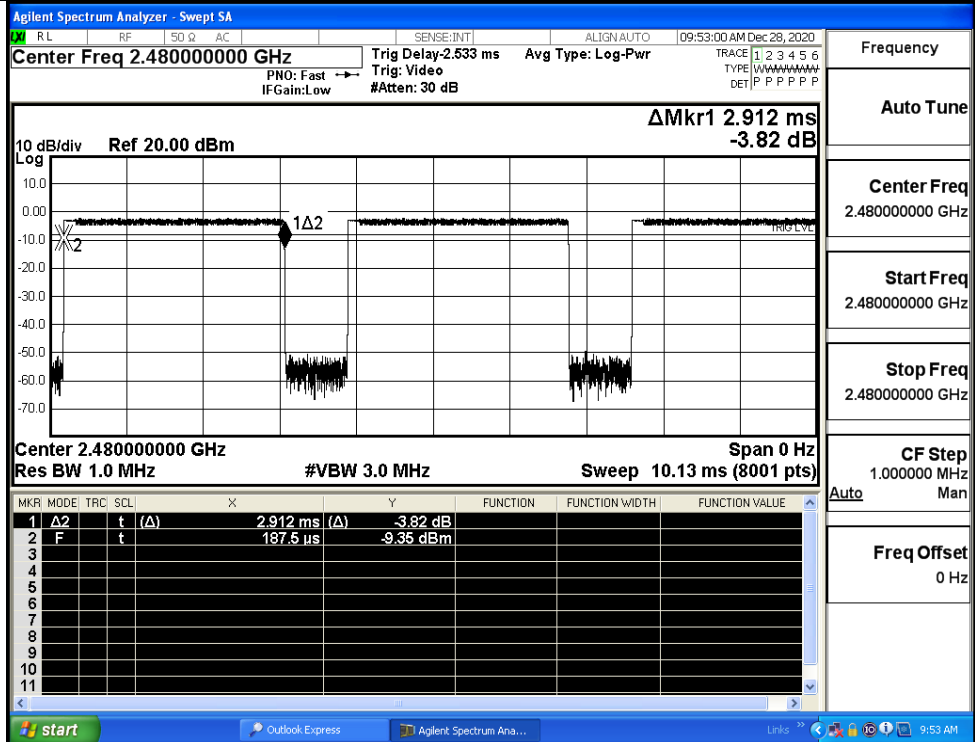
CF Step  
1.000000 MHz

Freq Offset  
0 Hz

8DPSK\_3DH5/MCH



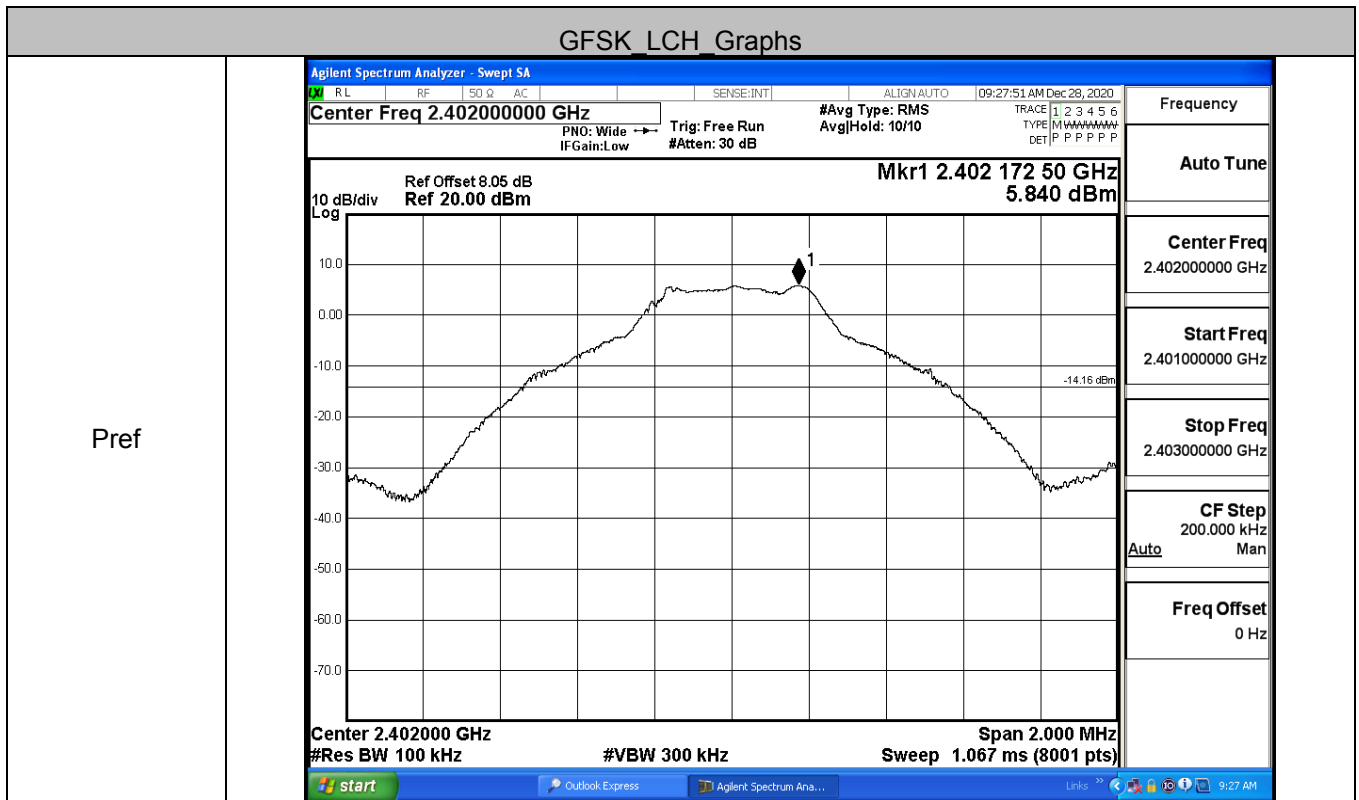
8DPSK\_3DH5/HCH



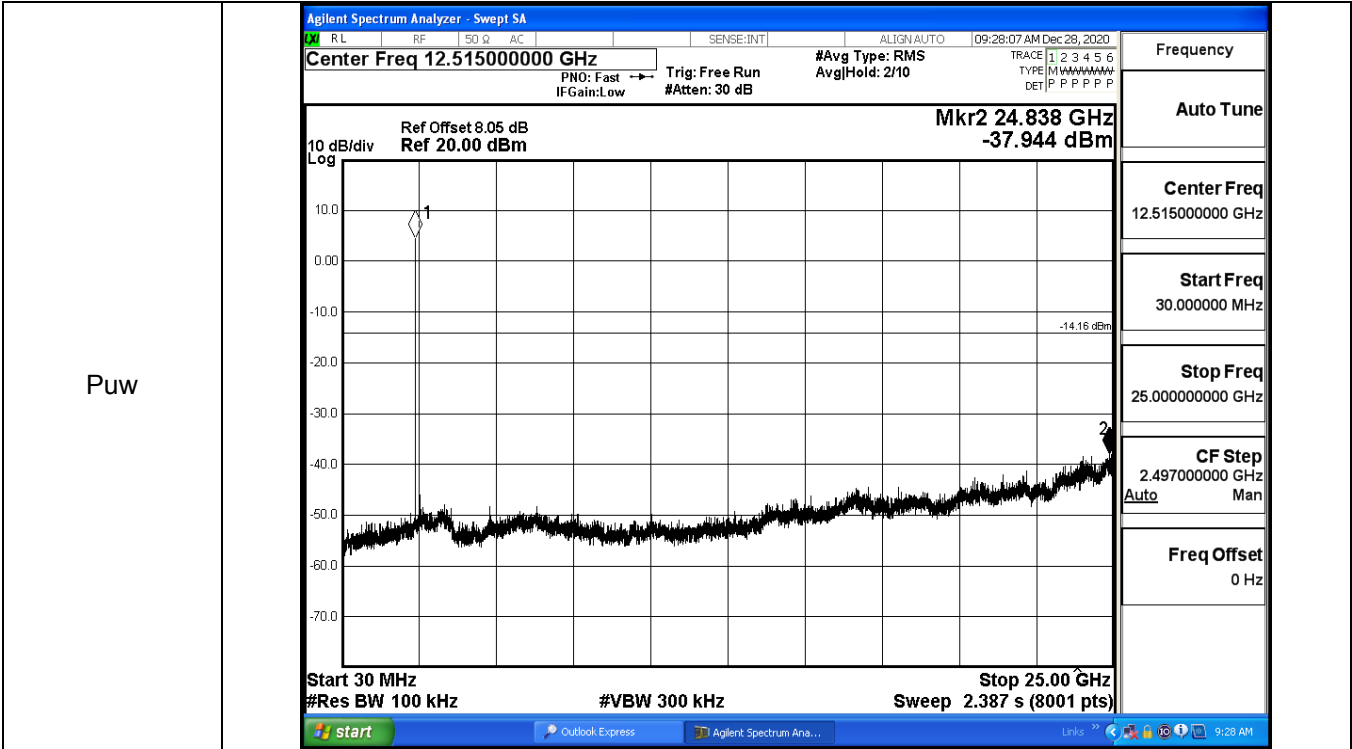
**A.6 RF Conducted Spurious Emissions**

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	5.84	-37.944	-14.160	PASS
	MCH	6.542	-38.077	-13.458	PASS
	HCH	6.415	-37.387	-13.585	PASS
$\pi$ /4DQPSK	LCH	3.378	-38.018	-16.622	PASS
	MCH	4.947	-36.381	-15.053	PASS
	HCH	4.861	-36.983	-15.139	PASS
8DPSK	LCH	2.807	-36.912	-17.193	PASS
	MCH	5.153	-37.918	-14.847	PASS
	HCH	5.105	-36.591	-14.895	PASS

GFSK LCH Graphs

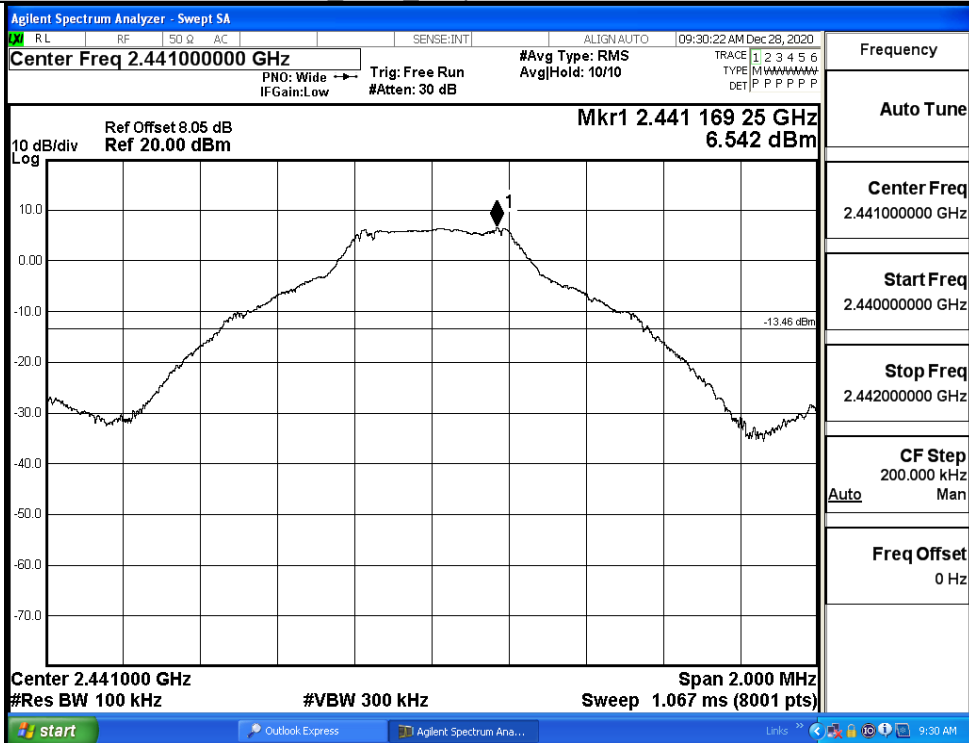






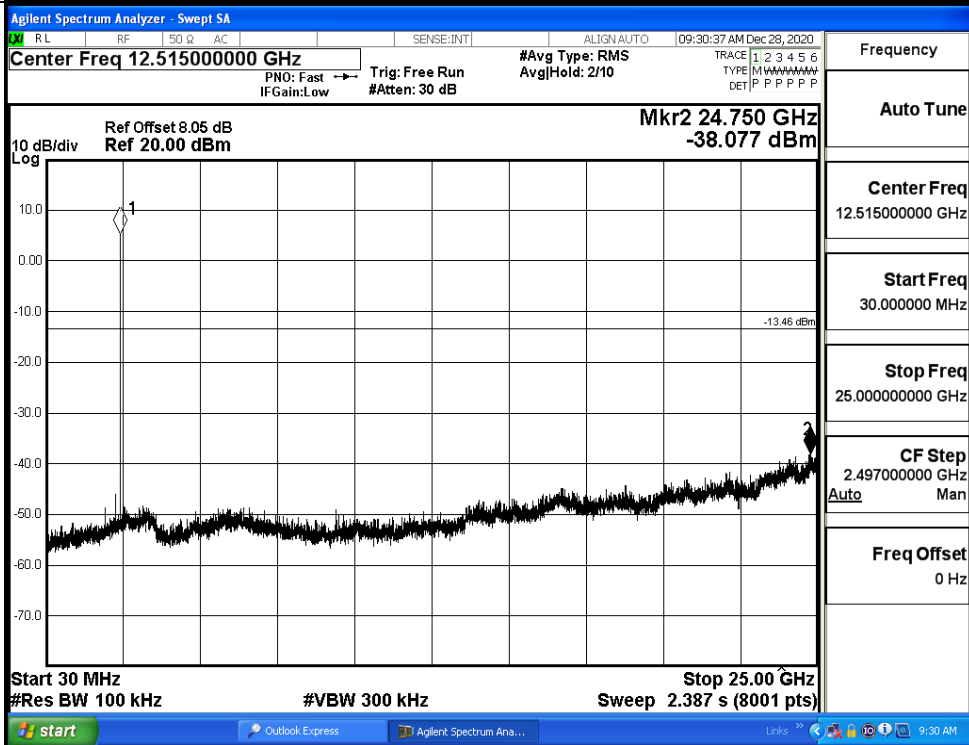
GFSK\_MCH\_Graphs

Pref



Frequency	
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.440000000 GHz
Stop Freq	2.442000000 GHz
CF Step	200.000 kHz Auto Man
Freq Offset	0 Hz

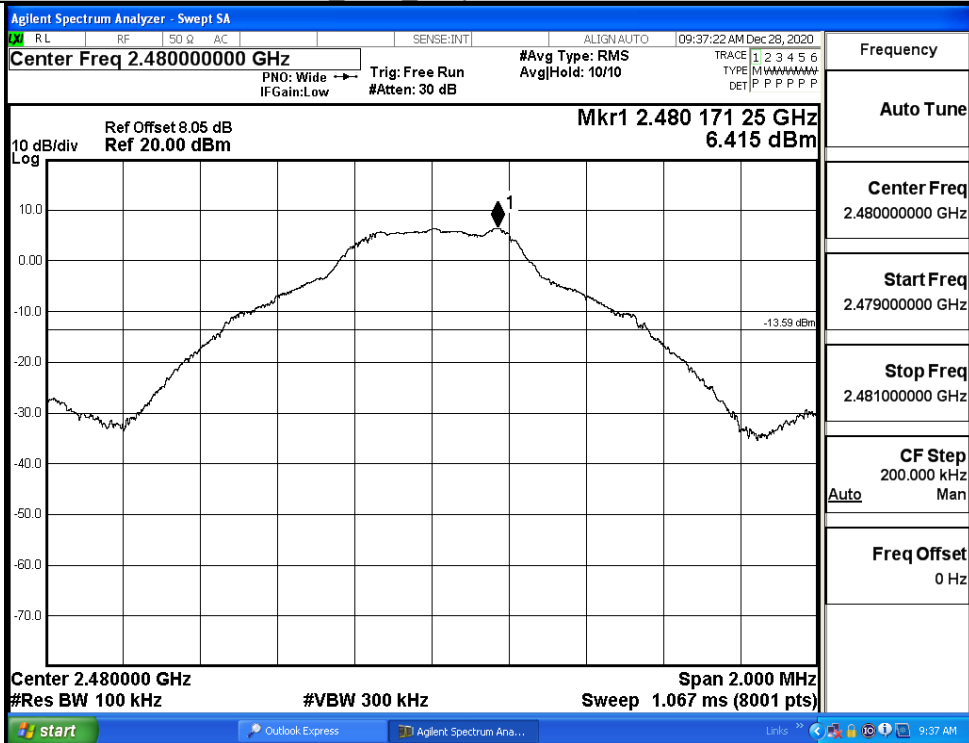
Puw



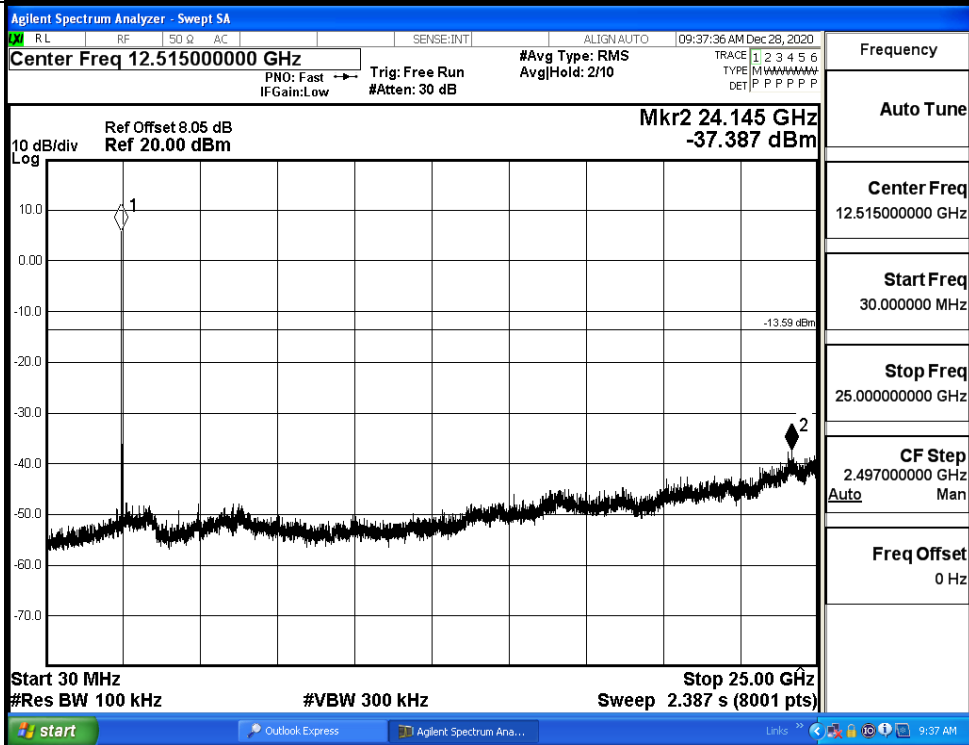
Frequency	
Auto Tune	
Center Freq	12.515000000 GHz
Start Freq	30.000000 MHz
Stop Freq	25.000000000 GHz
CF Step	2.497000000 GHz Auto Man
Freq Offset	0 Hz

GFSK\_HCH\_Graphs

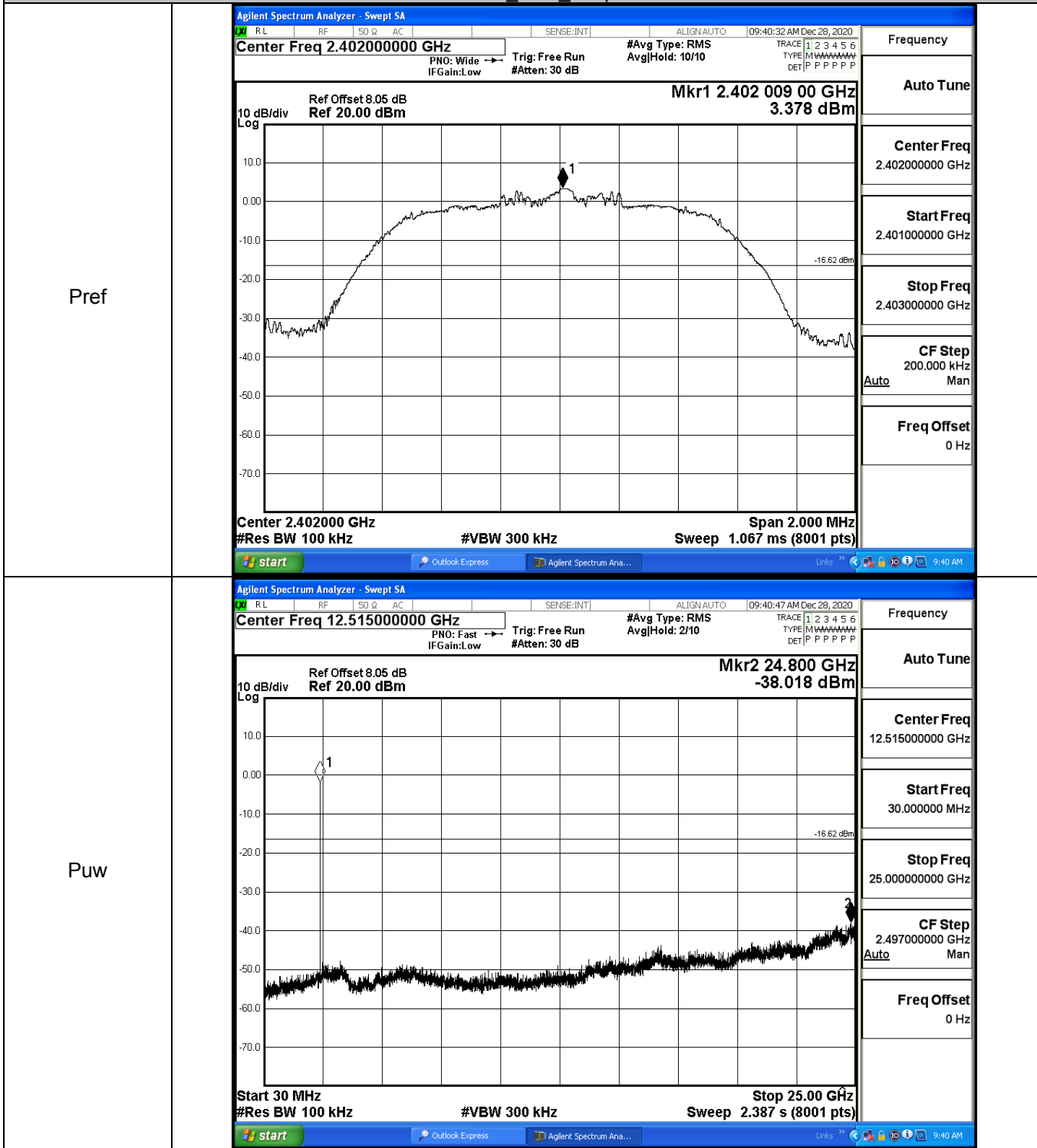
Pref



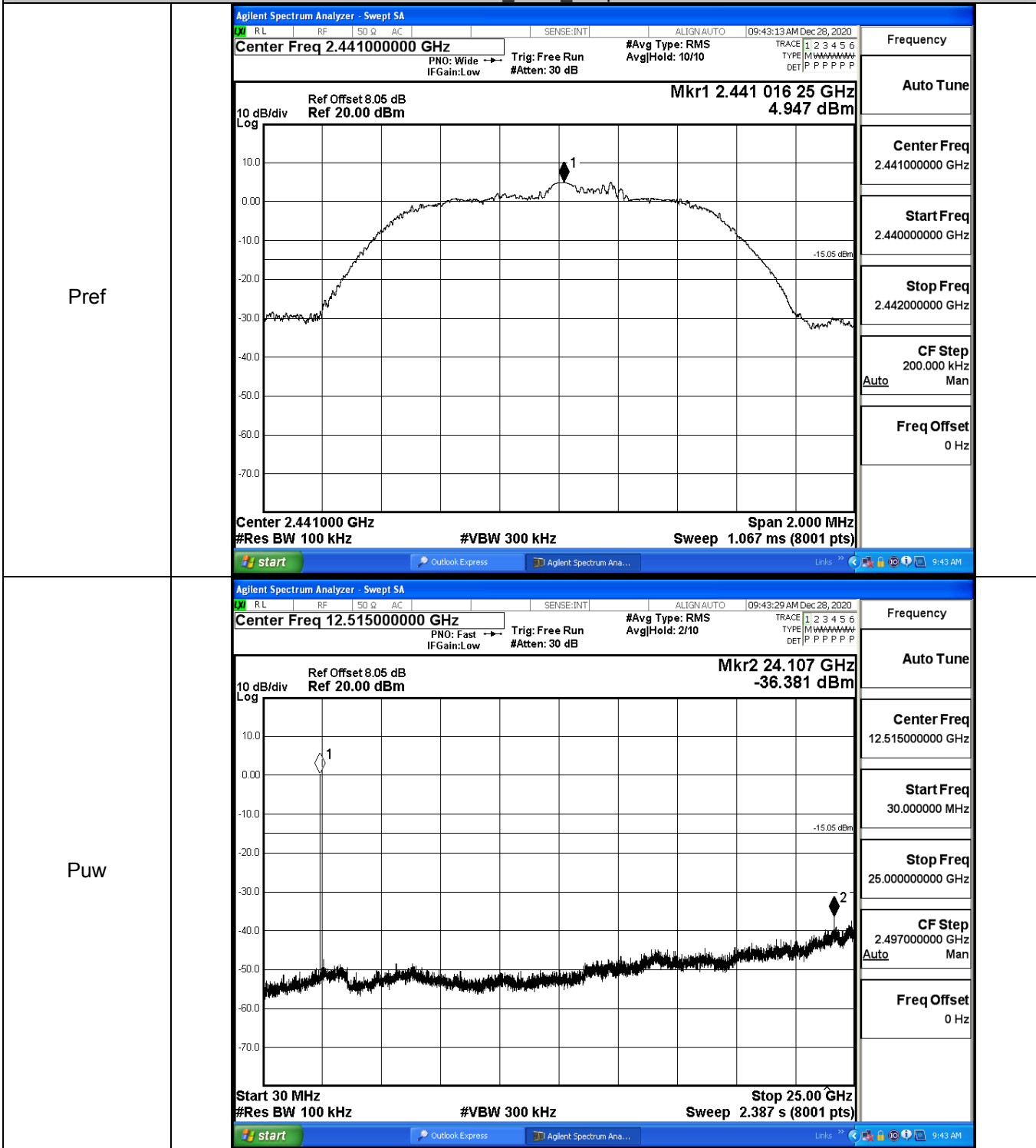
Puw



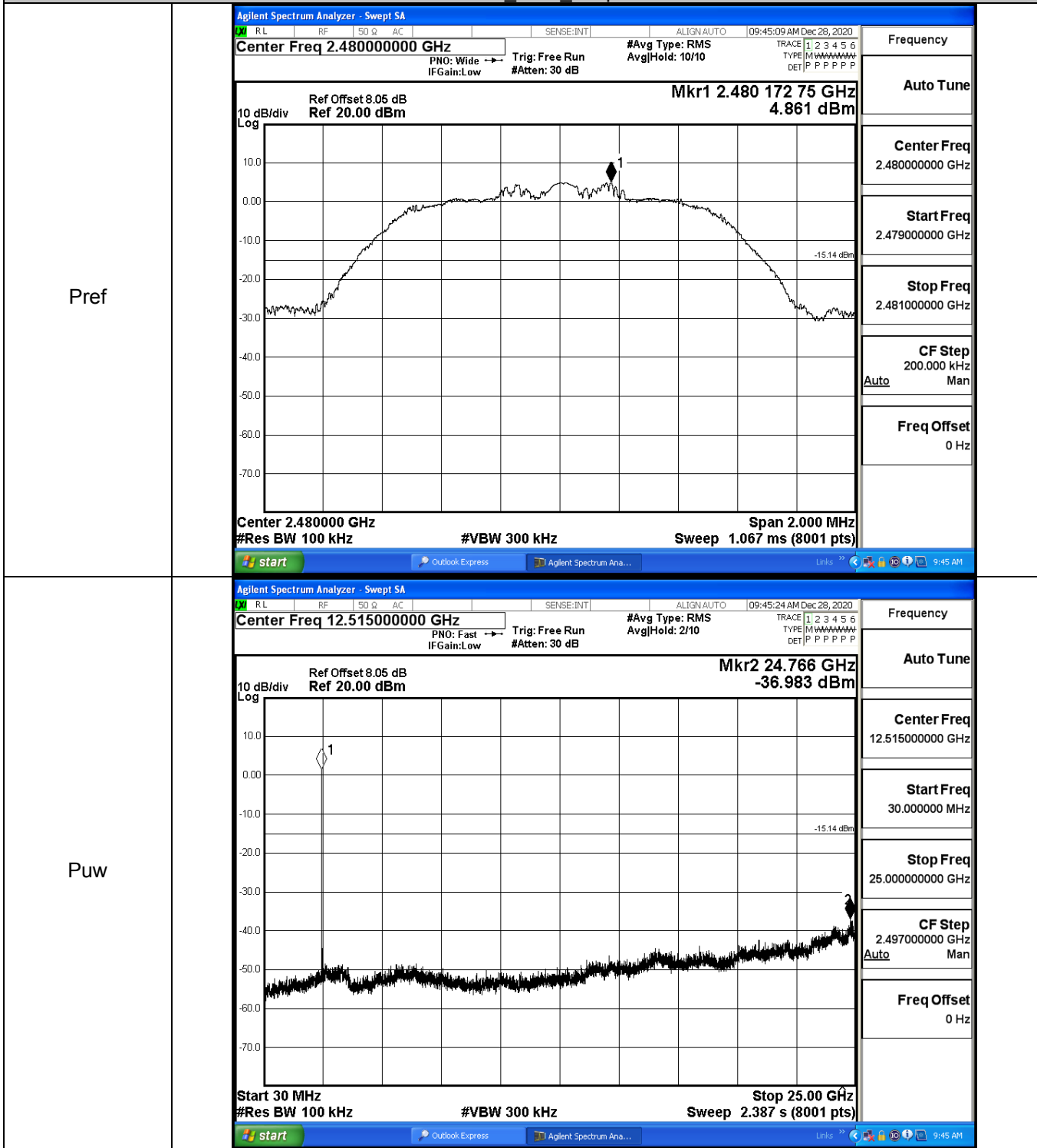
$\pi/4$ DQPSK\_LCH\_Graphs



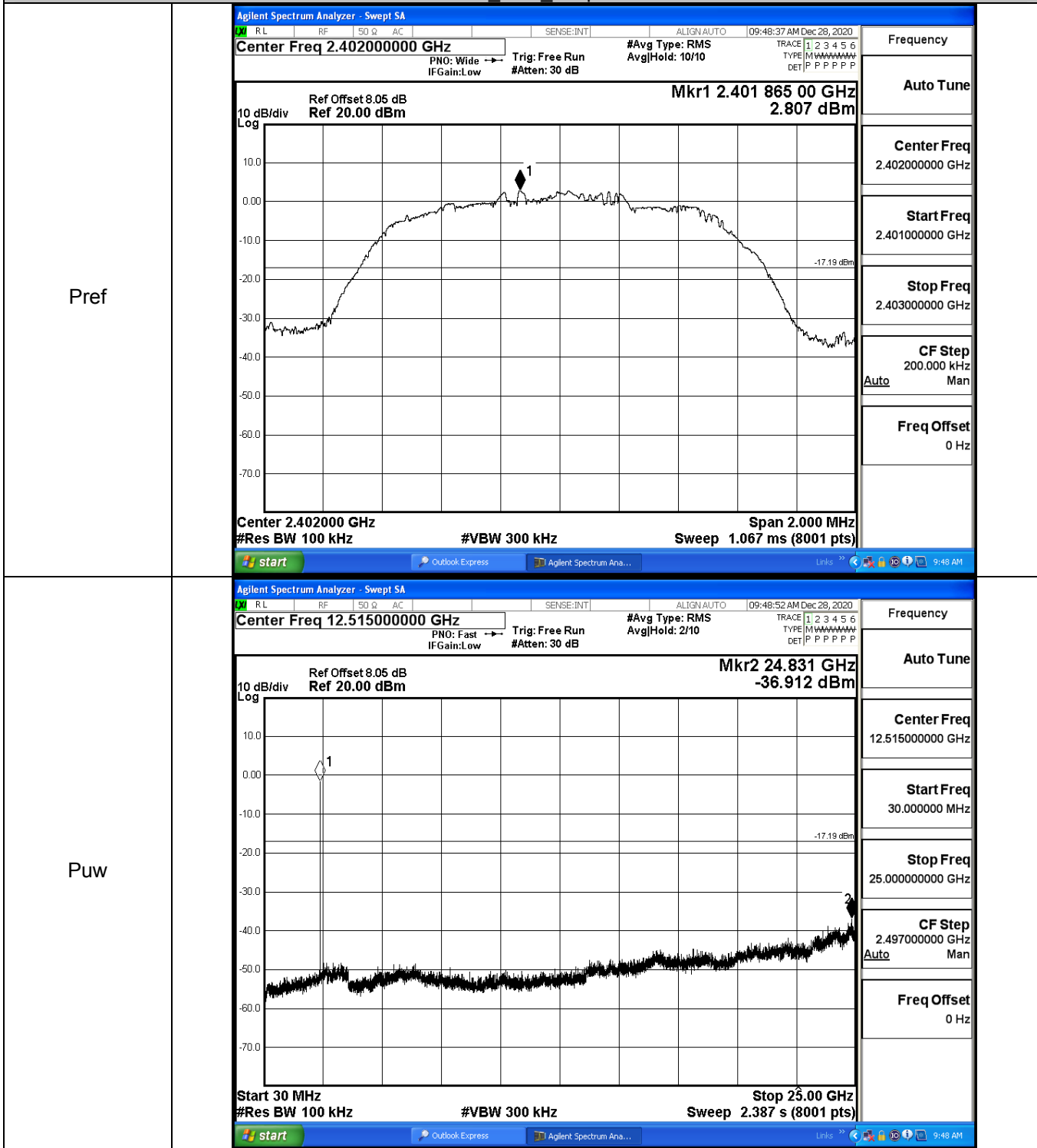
$\pi/4$ DQPSK\_MCH\_Graphs



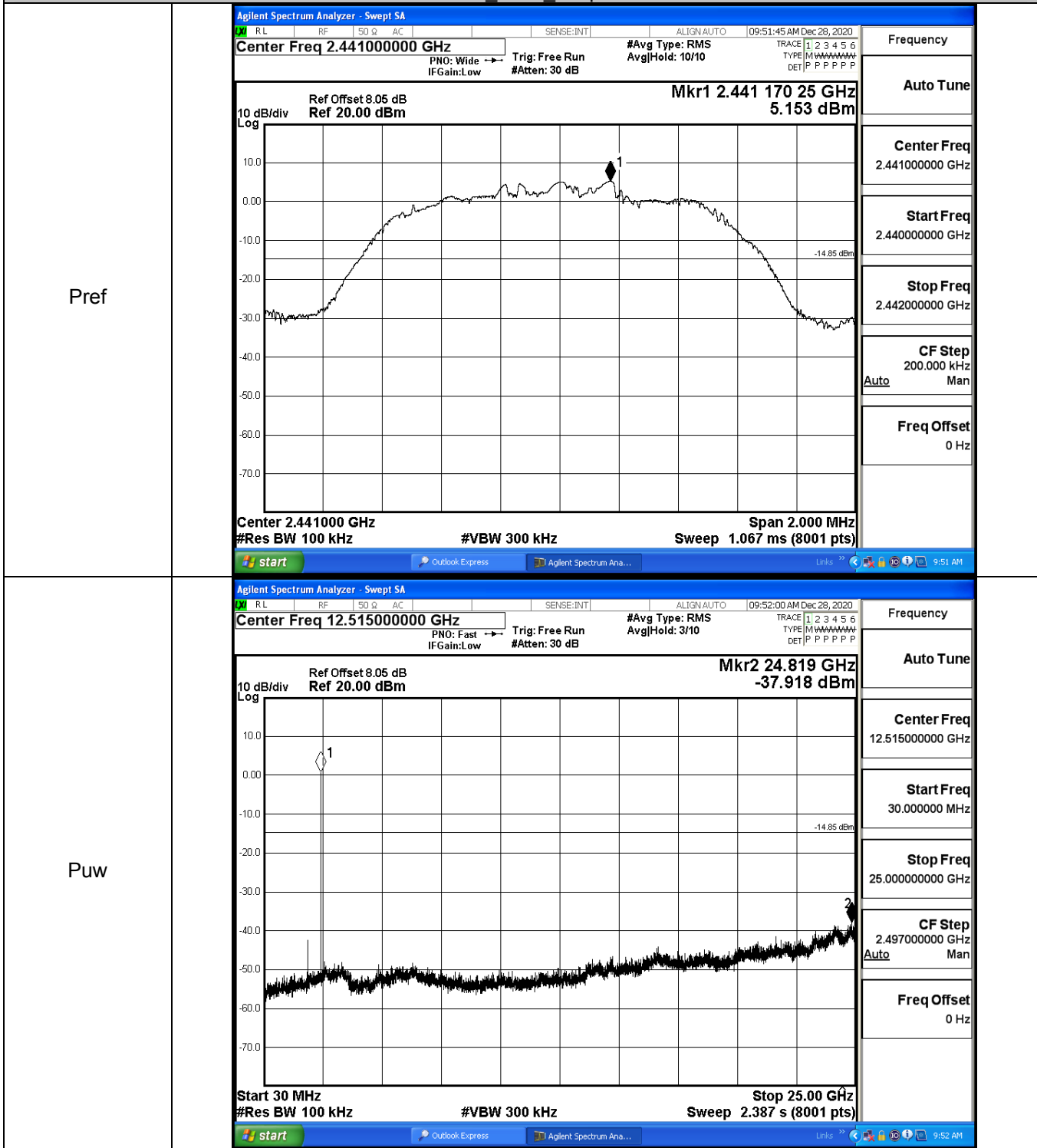
$\pi/4$ DQPSK\_HCH\_Graphs



8DPSK\_LCH\_Graphs



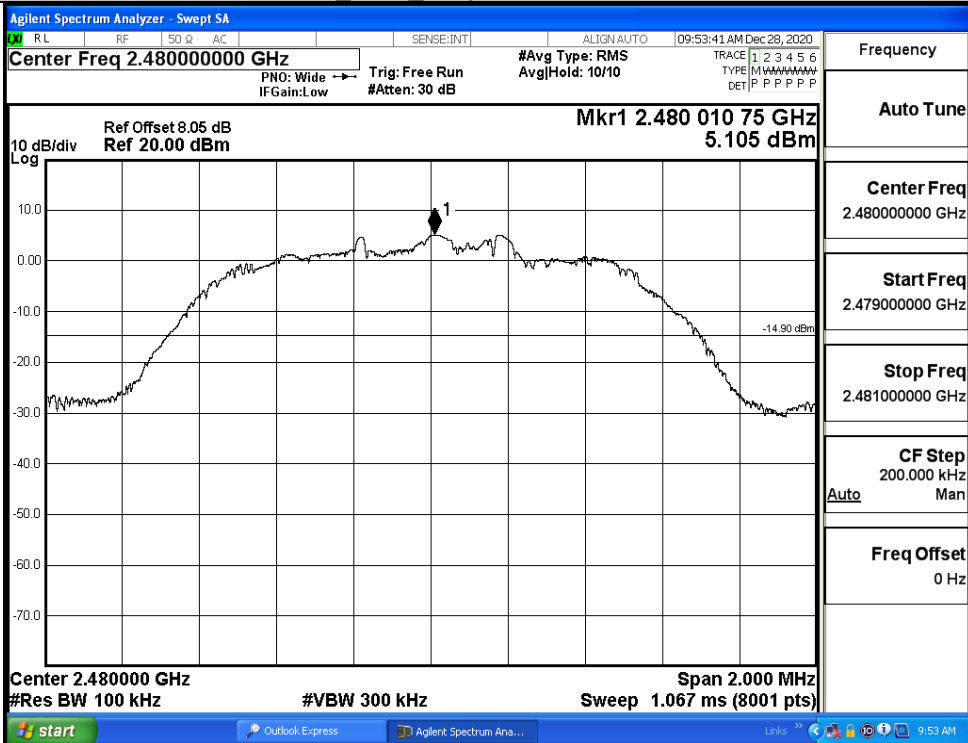
8DPSK\_MCH\_Graphs





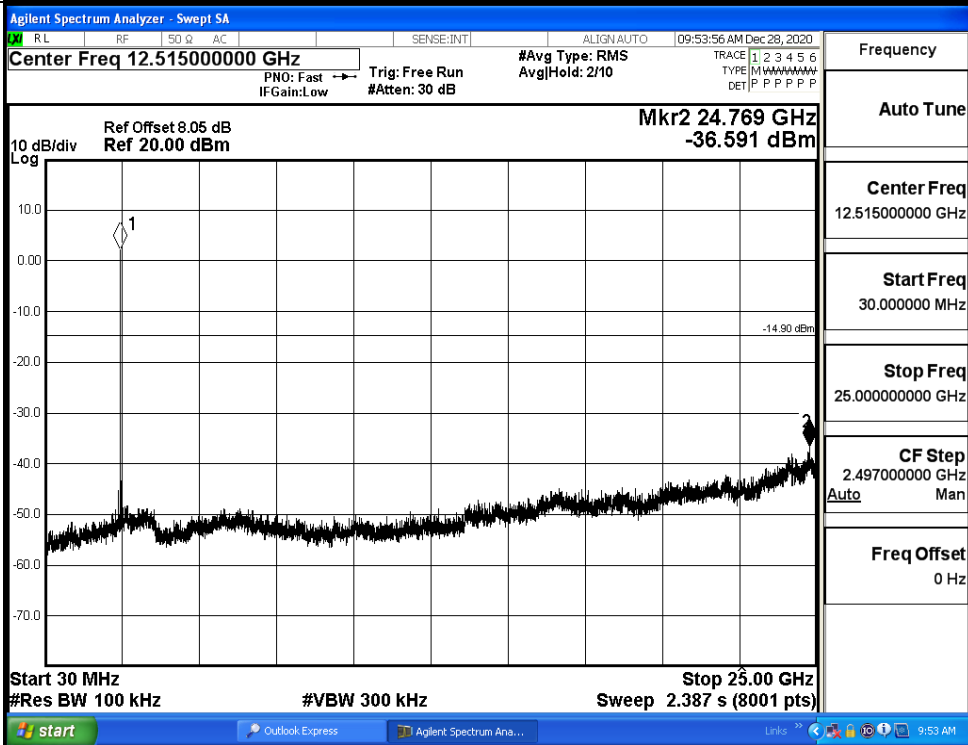
8DPSK\_HCH\_Graphs

Pref



Frequency	
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.479000000 GHz
Stop Freq	2.481000000 GHz
CF Step	200.000 kHz Auto Man
Freq Offset	0 Hz

Puw



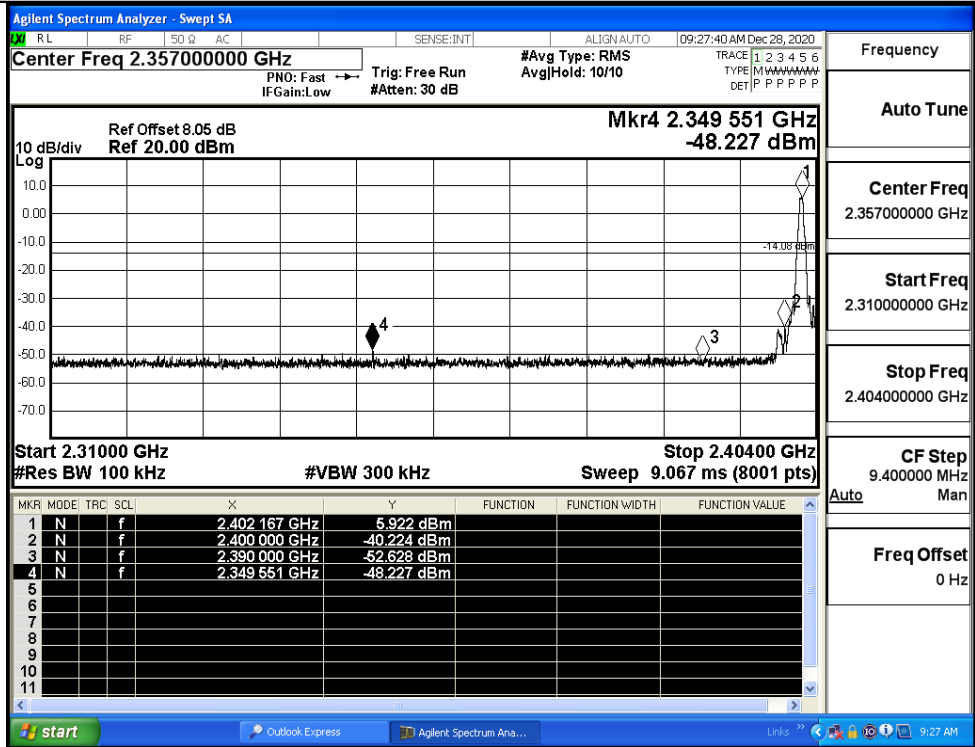
Frequency	
Auto Tune	
Center Freq	12.515000000 GHz
Start Freq	30.000000 MHz
Stop Freq	25.000000000 GHz
CF Step	2.497000000 GHz Auto Man
Freq Offset	0 Hz

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

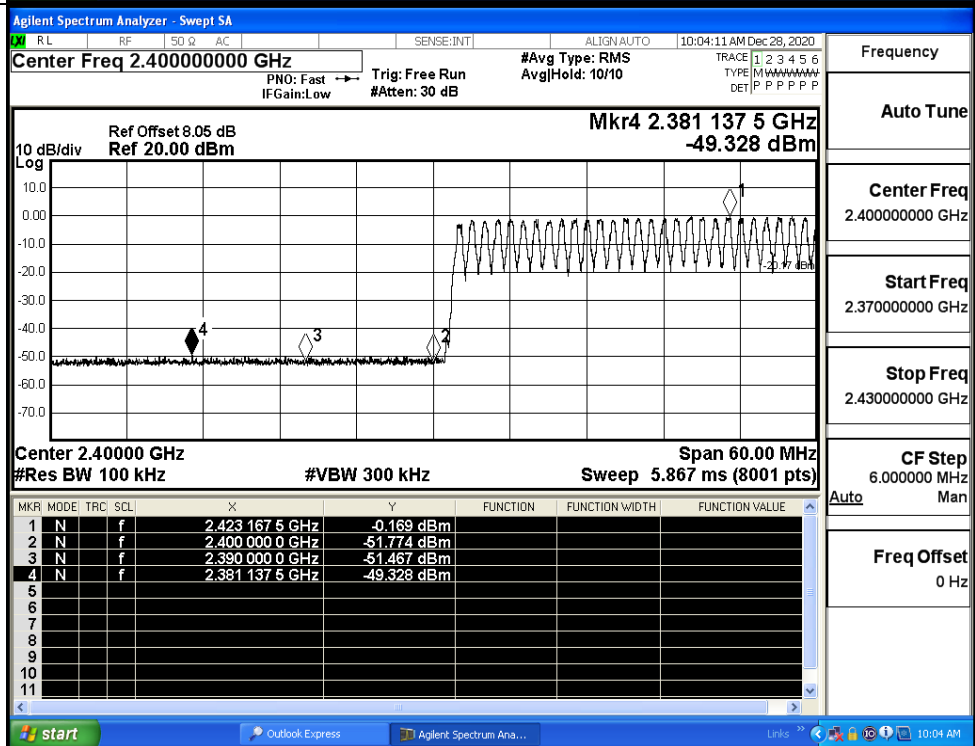
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	5.922	Off	-48.227	-14.08	PASS
			-0.169	On	-49.328	-20.17	PASS
	HCH	2480	6.448	Off	-48.762	-13.55	PASS
			-0.433	On	-48.831	-20.43	PASS
$\pi/4$ DQPSK	LCH	2402	3.378	Off	-49.235	-16.62	PASS
			-2.652	On	-48.959	-22.65	PASS
	HCH	2480	5.117	Off	-48.852	-14.88	PASS
			-2.401	On	-48.599	-22.4	PASS
8DPSK	LCH	2402	3.467	Off	-49.861	-16.53	PASS
			-2.515	On	-49.024	-22.52	PASS
	HCH	2480	5.219	Off	-49.073	-14.78	PASS
			-2.549	On	-48.848	-22.55	PASS

Test Graphs

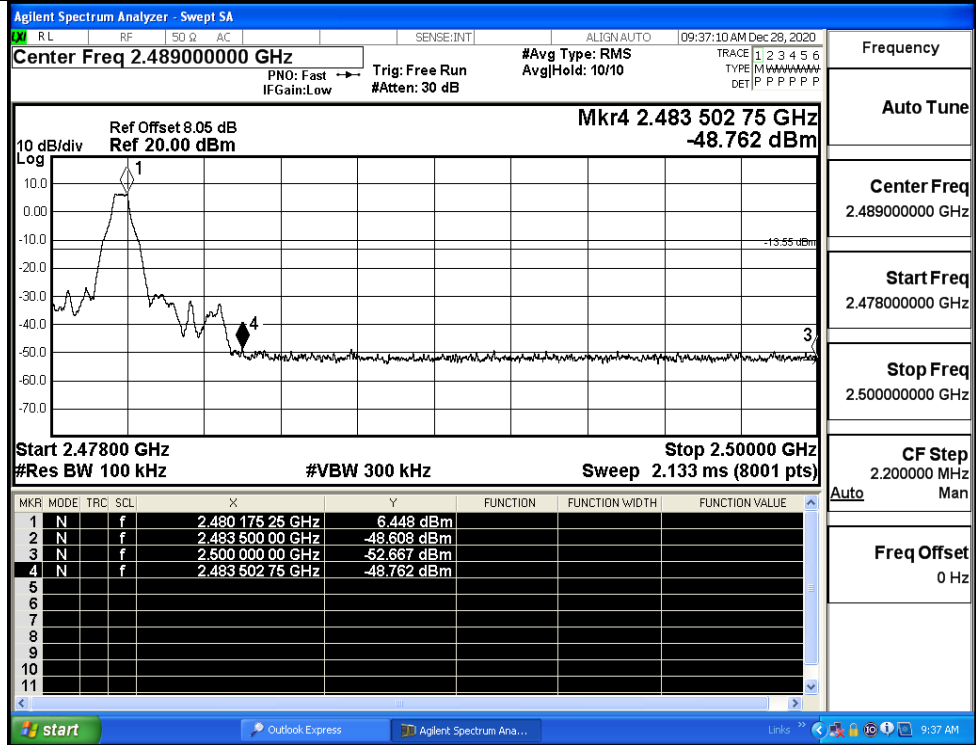
GFSK/LCH/No Hop



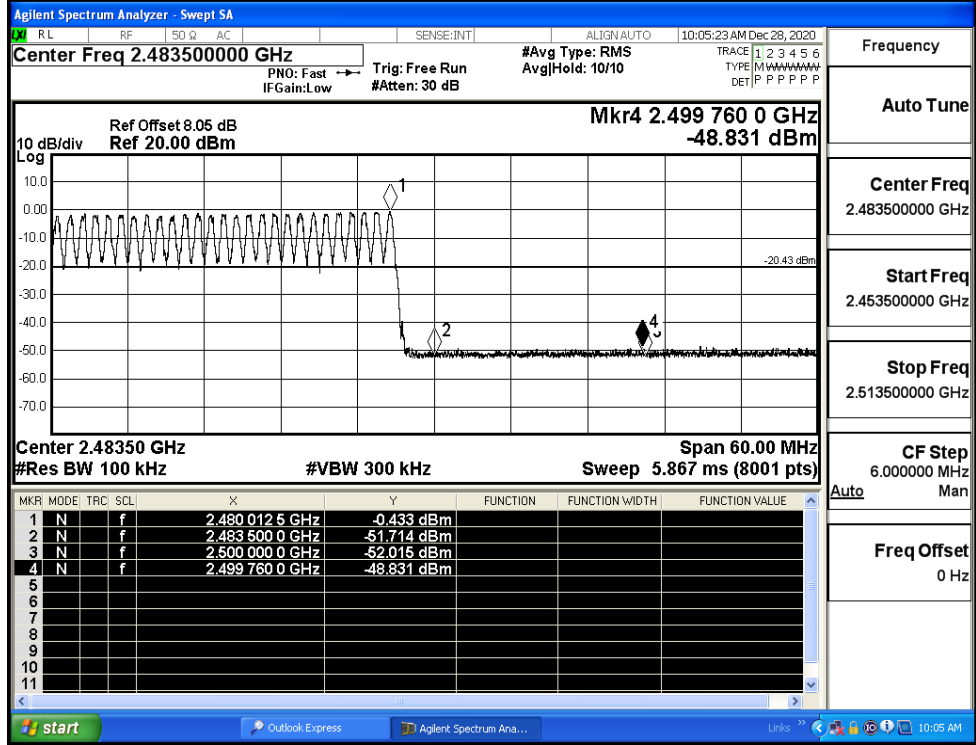
GFSK/LCH/Hop



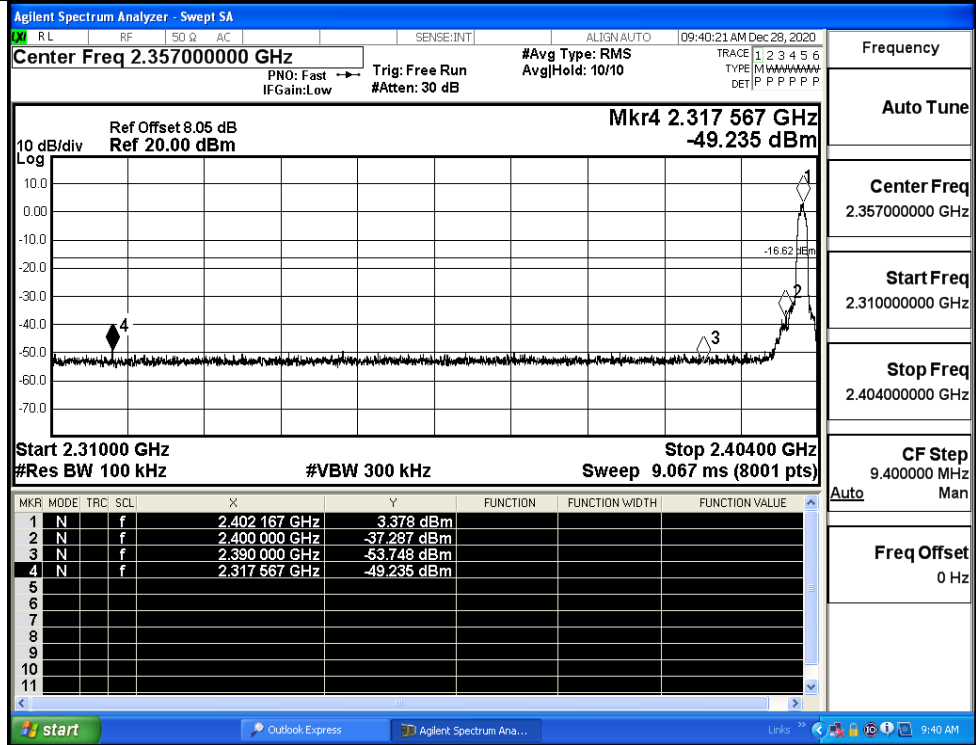
GFSK/HCH/No Hop



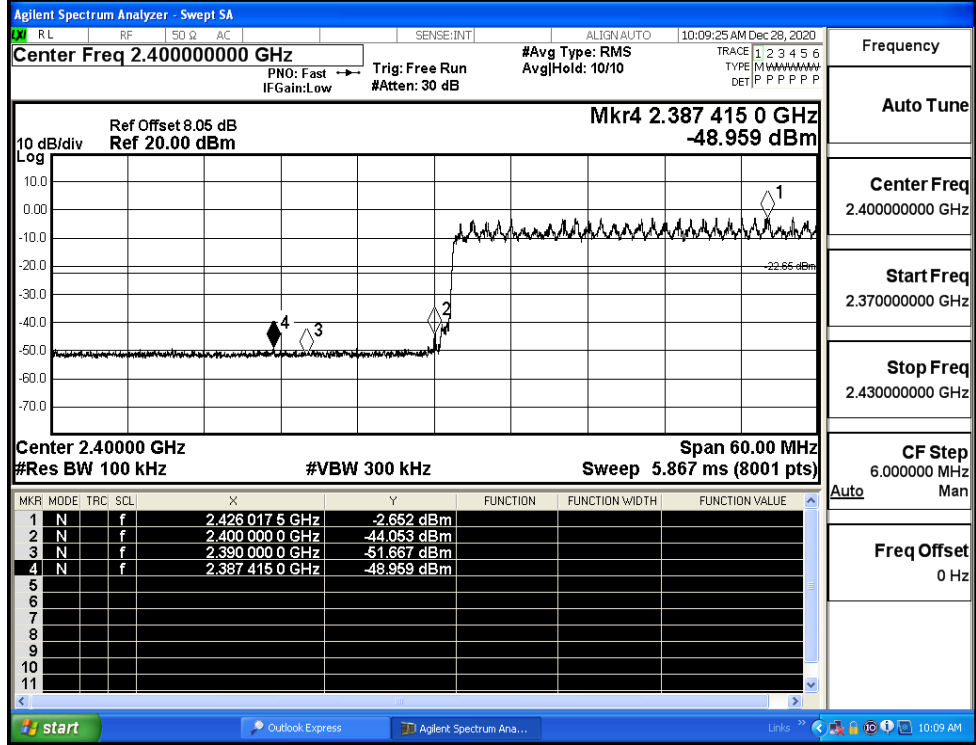
GFSK/HCH/Hop



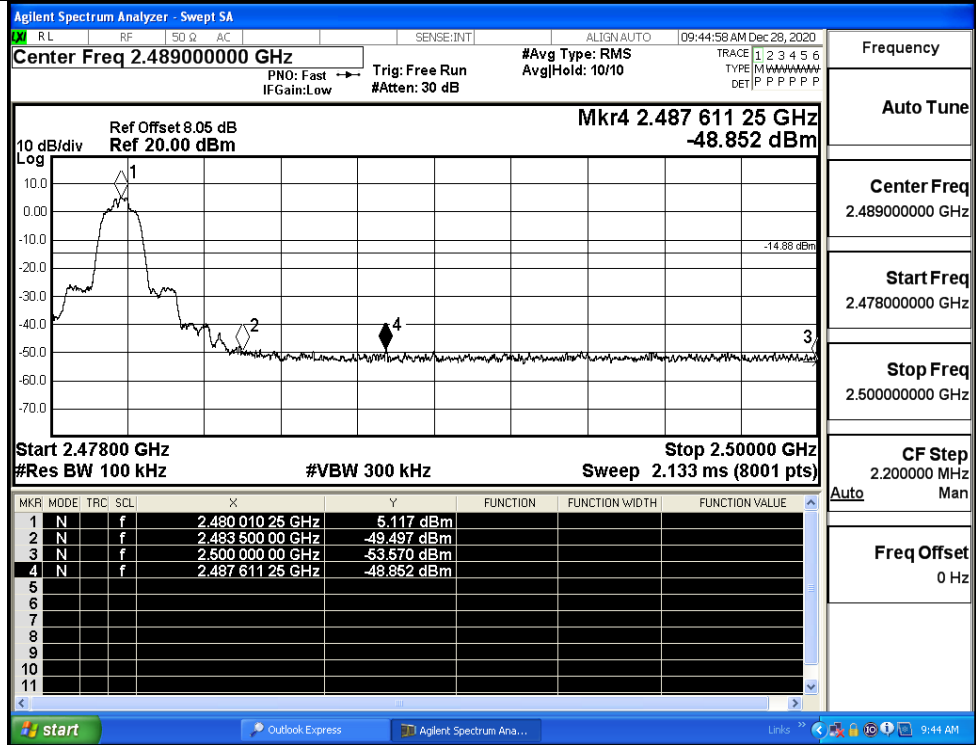
$\pi/4$ DQPSK/LCH/No  
Hop



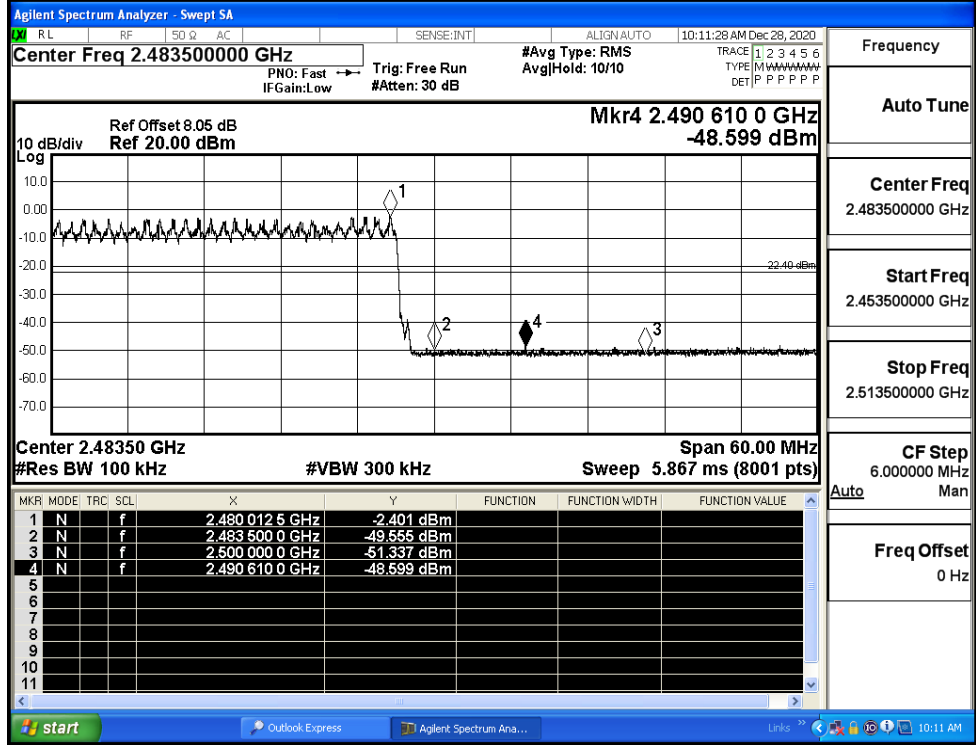
$\pi/4$ DQPSK/LCH/Hop



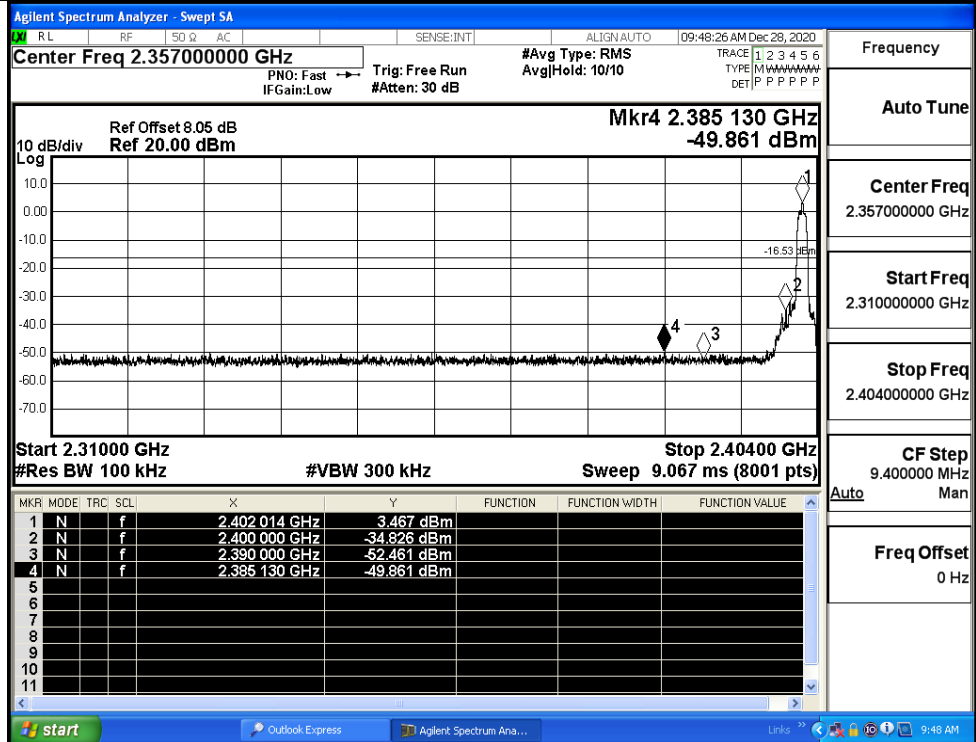
$\pi/4$ DQPSK/HCH/No Hop



$\pi/4$ DQPSK/HCH/Hop

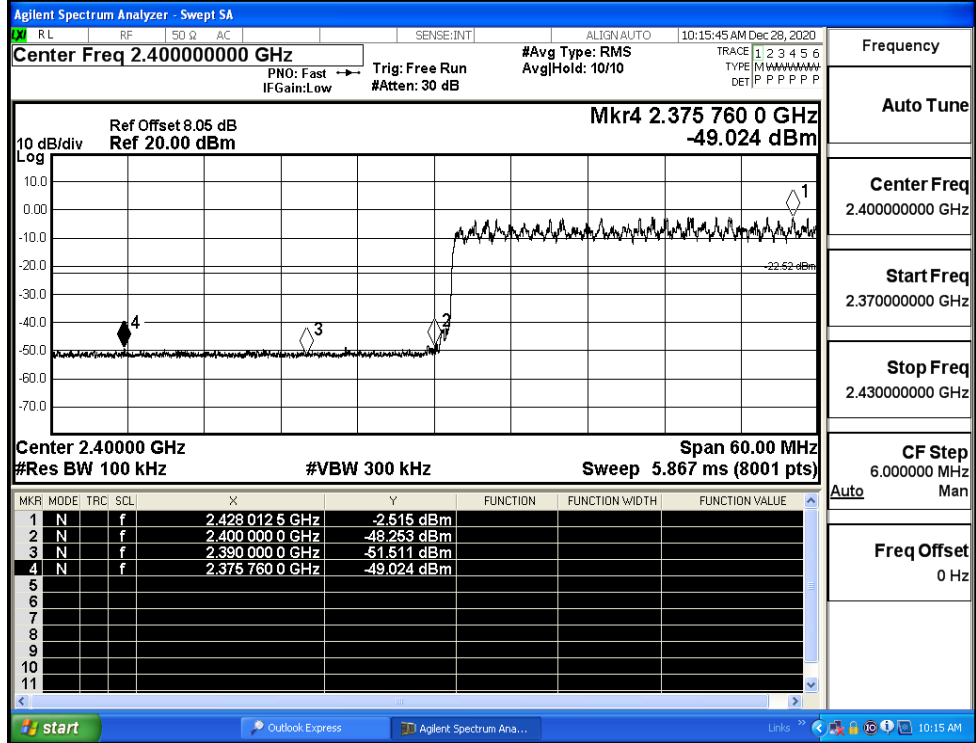


8DPSK/LCH/No Hop



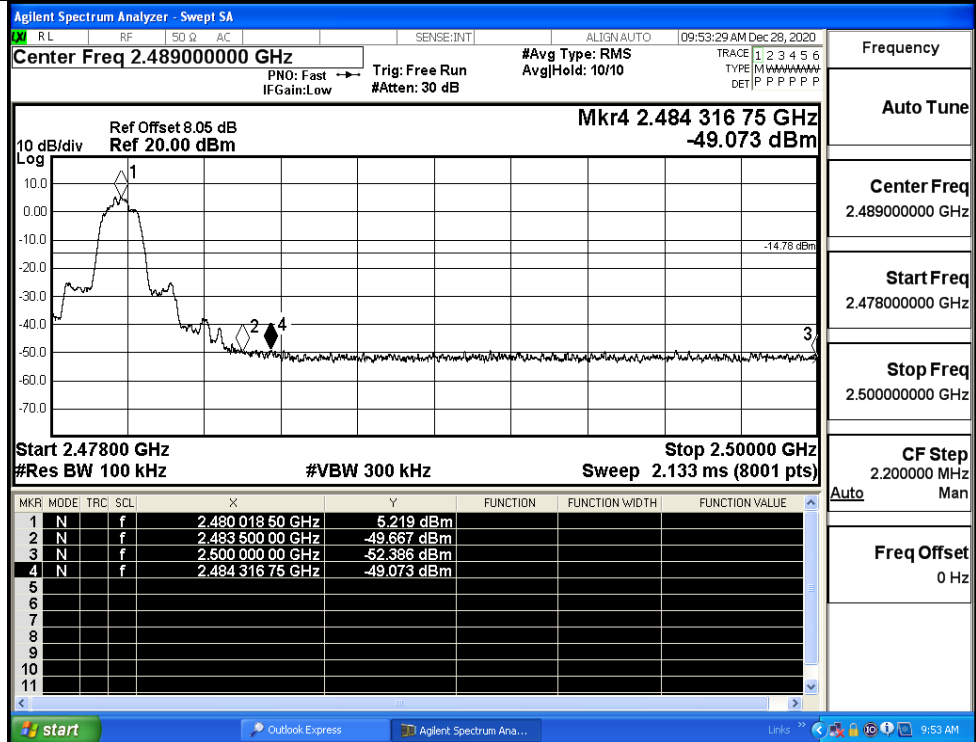
Frequency	
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Freq Offset	0 Hz

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

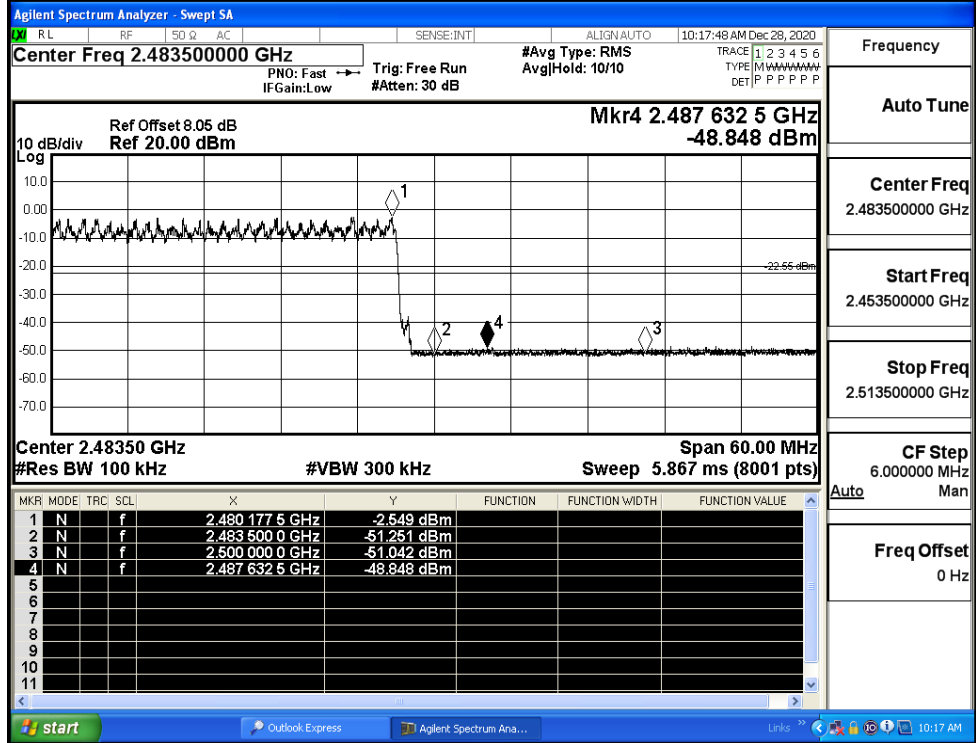
Start Freq  
2.478000000 GHz

Stop Freq  
2.500000000 GHz

CF Step  
2.200000 MHz

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

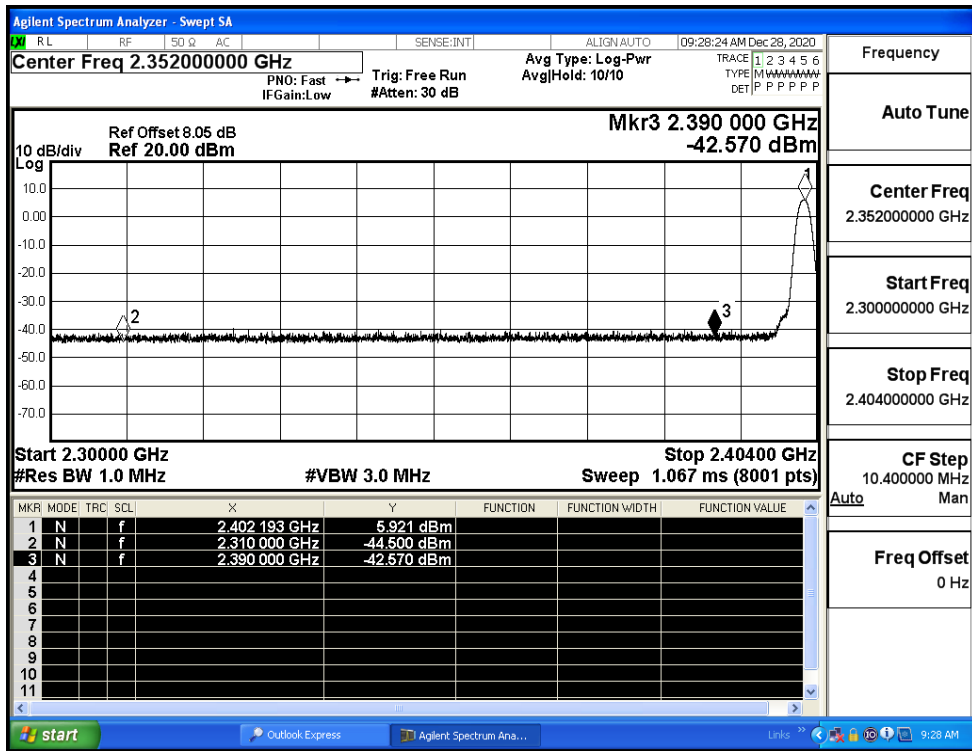
Freq Offset  
0 Hz



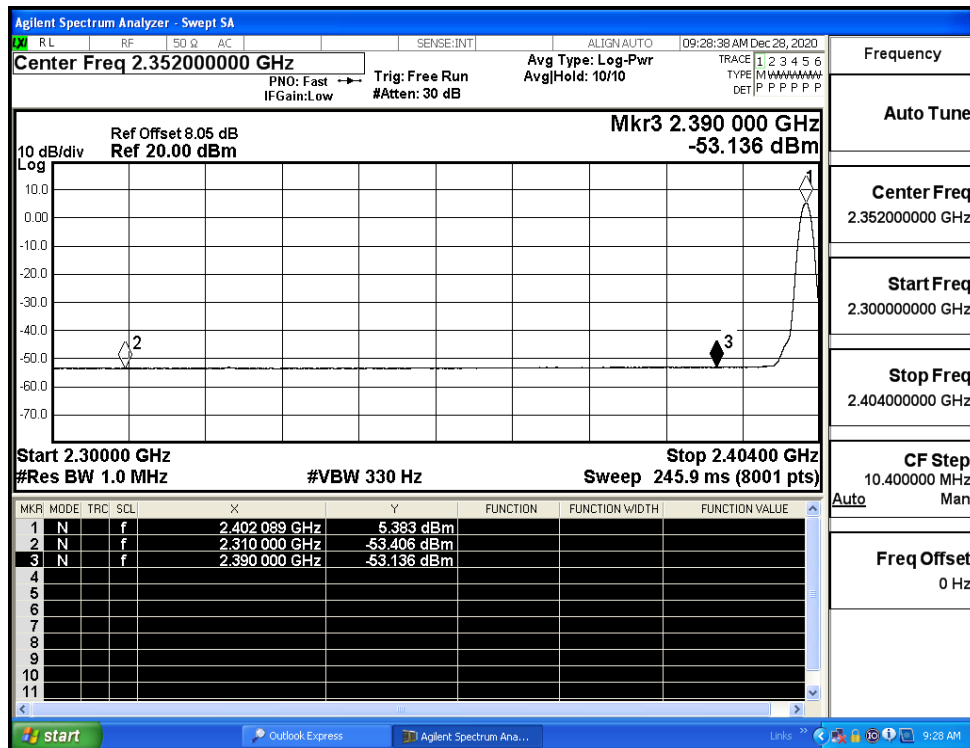
## A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.50	2.0	0	50.76	PEAK	74	PASS
	Off	2310.0	-53.41	2.0	0	41.85	AV	54	PASS
	Off	2390.0	-42.57	2.0	0	52.69	PEAK	74	PASS
	Off	2390.0	-53.14	2.0	0	42.12	AV	54	PASS
	Off	2483.5	-35.49	2.0	0	59.77	PEAK	74	PASS
	Off	2483.5	-45.48	2.0	0	49.77	AV	54	PASS
	Off	2500.0	-41.66	2.0	0	53.60	PEAK	74	PASS
	Off	2500.0	-52.41	2.0	0	42.85	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.90	2.0	0	52.36	PEAK	74	PASS
	Off	2310.0	-53.36	2.0	0	41.90	AV	54	PASS
	Off	2390.0	-43.44	2.0	0	51.82	PEAK	74	PASS
	Off	2390.0	-52.95	2.0	0	42.31	AV	54	PASS
	Off	2483.5	-38.30	2.0	0	56.96	PEAK	74	PASS
	Off	2483.5	-49.77	2.0	0	45.49	AV	54	PASS
	Off	2500.0	-42.51	2.0	0	52.74	PEAK	74	PASS
	Off	2500.0	-52.41	2.0	0	42.84	AV	54	PASS
8DPSK	Off	2310.0	-43.89	2.0	0	51.36	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	41.79	AV	54	PASS
	Off	2390.0	-42.55	2.0	0	52.71	PEAK	74	PASS
	Off	2390.0	-53.08	2.0	0	42.18	AV	54	PASS
	Off	2483.5	-38.56	2.0	0	56.70	PEAK	74	PASS
	Off	2483.5	-49.72	2.0	0	45.54	AV	54	PASS
	Off	2500.0	-42.42	2.0	0	52.84	PEAK	74	PASS
	Off	2500.0	-52.38	2.0	0	42.88	AV	54	PASS

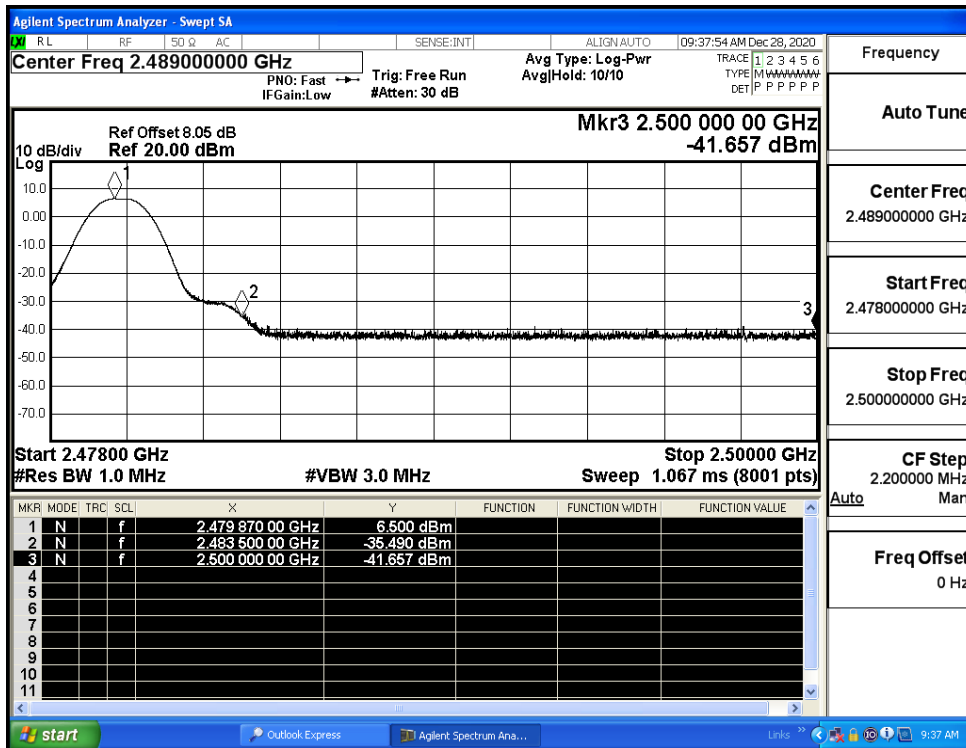
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



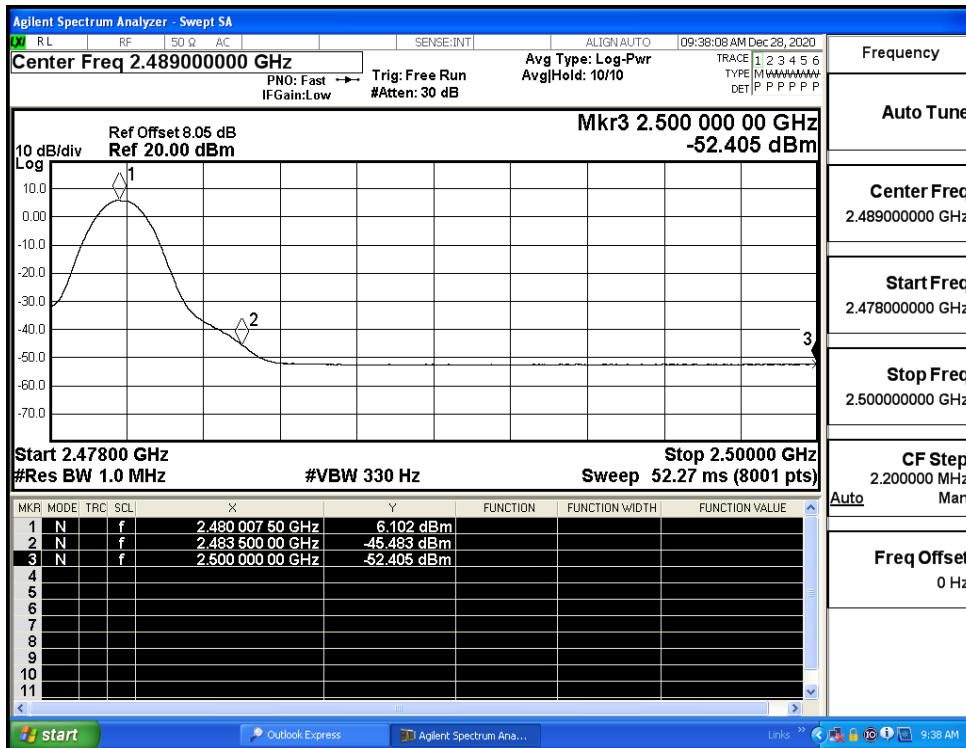
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



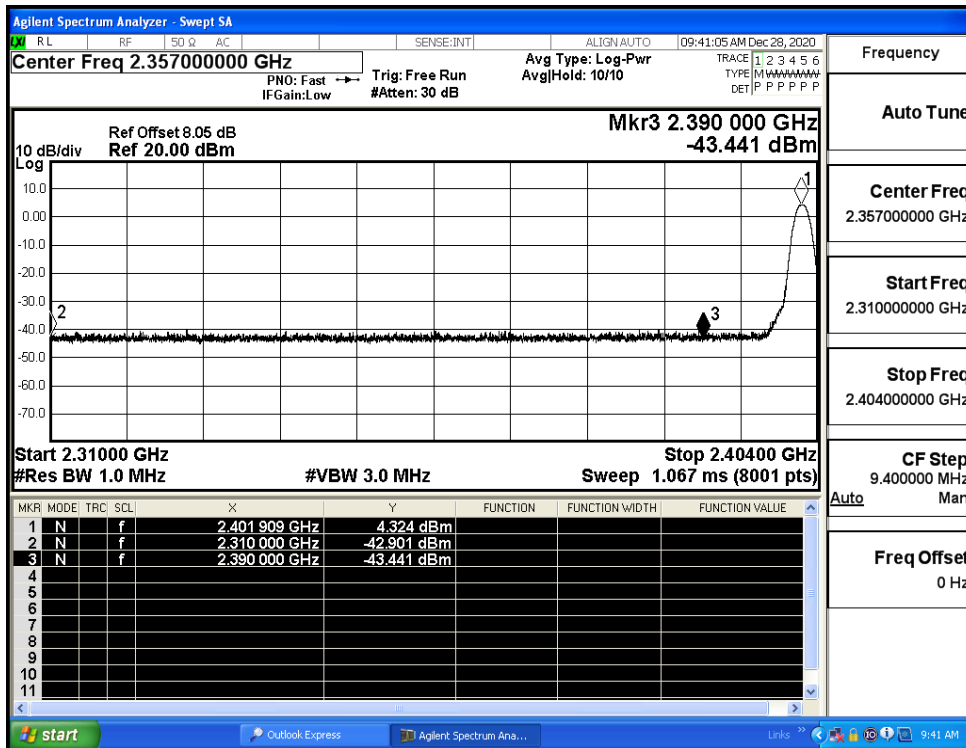
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



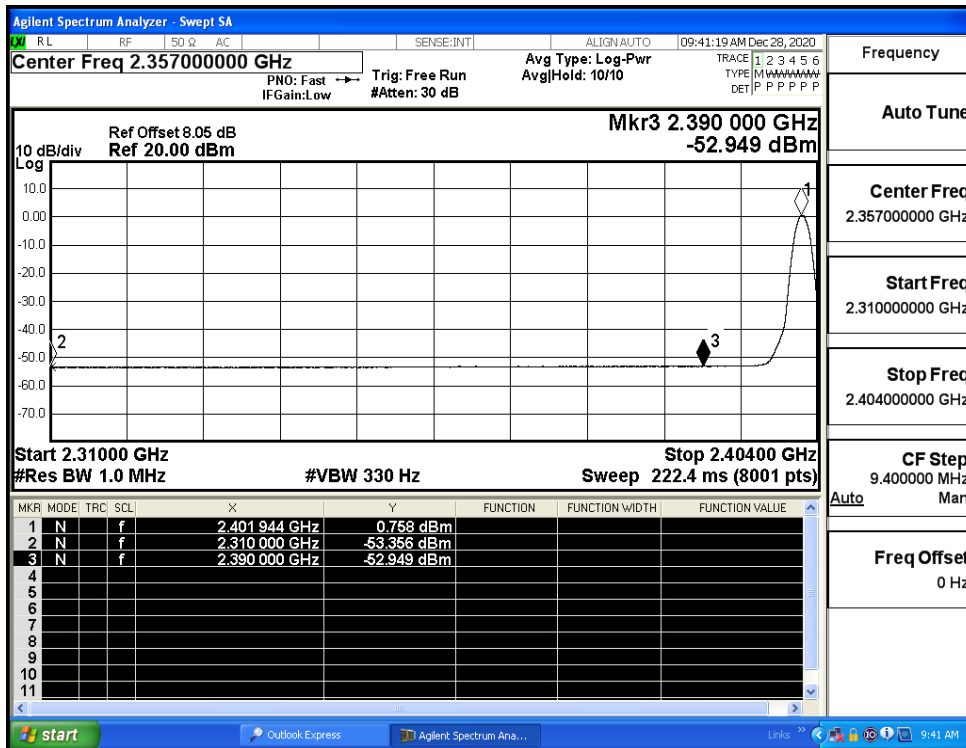
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



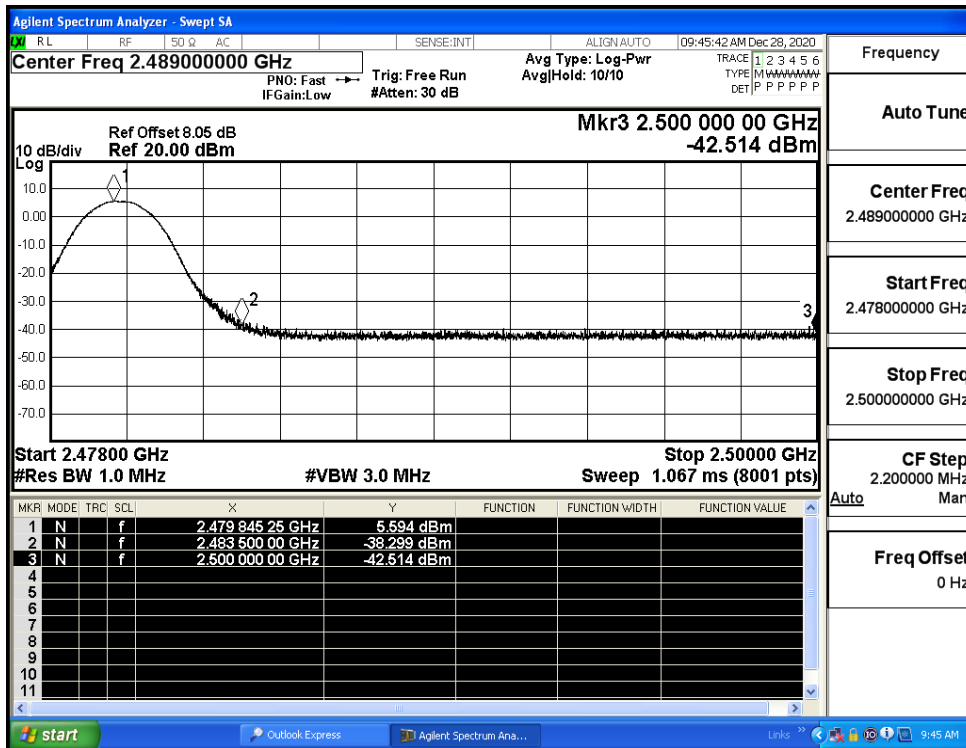
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



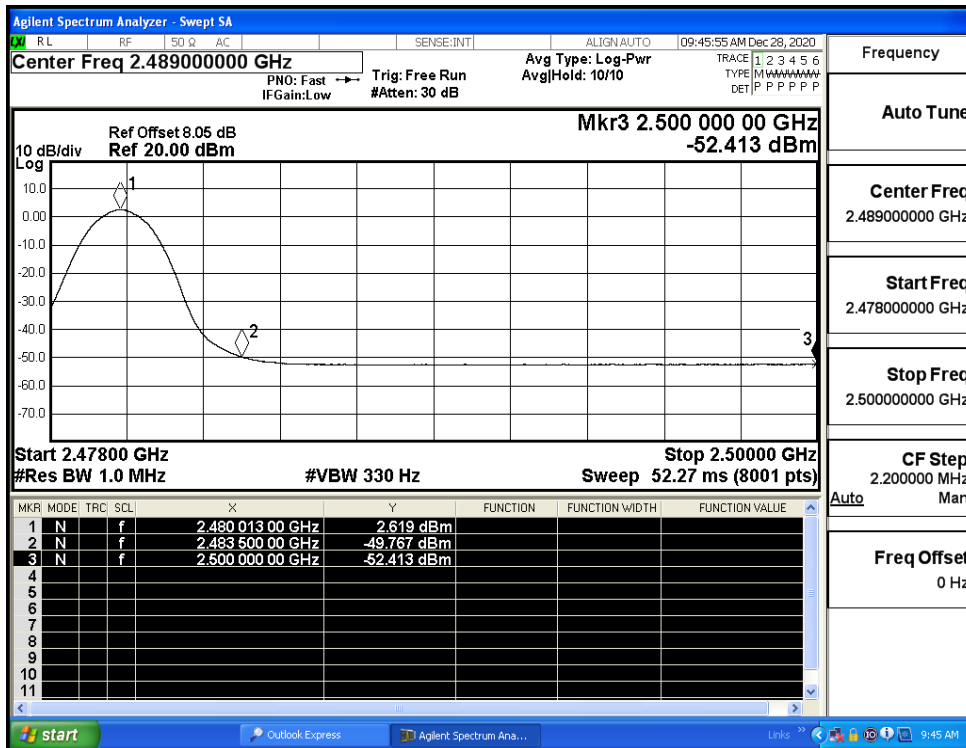
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)



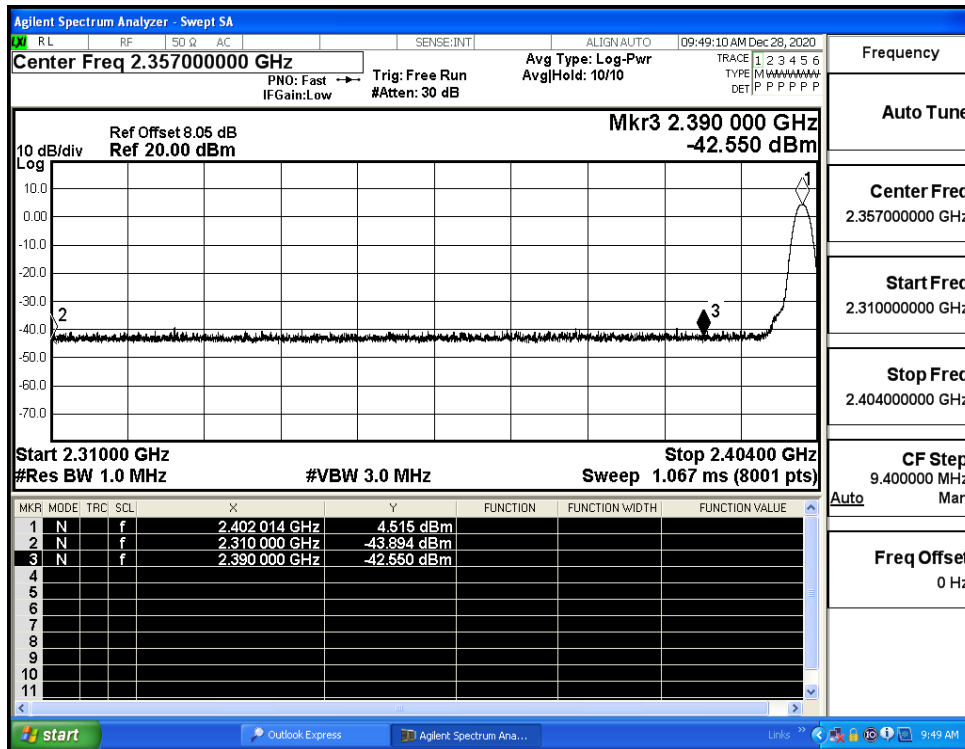
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



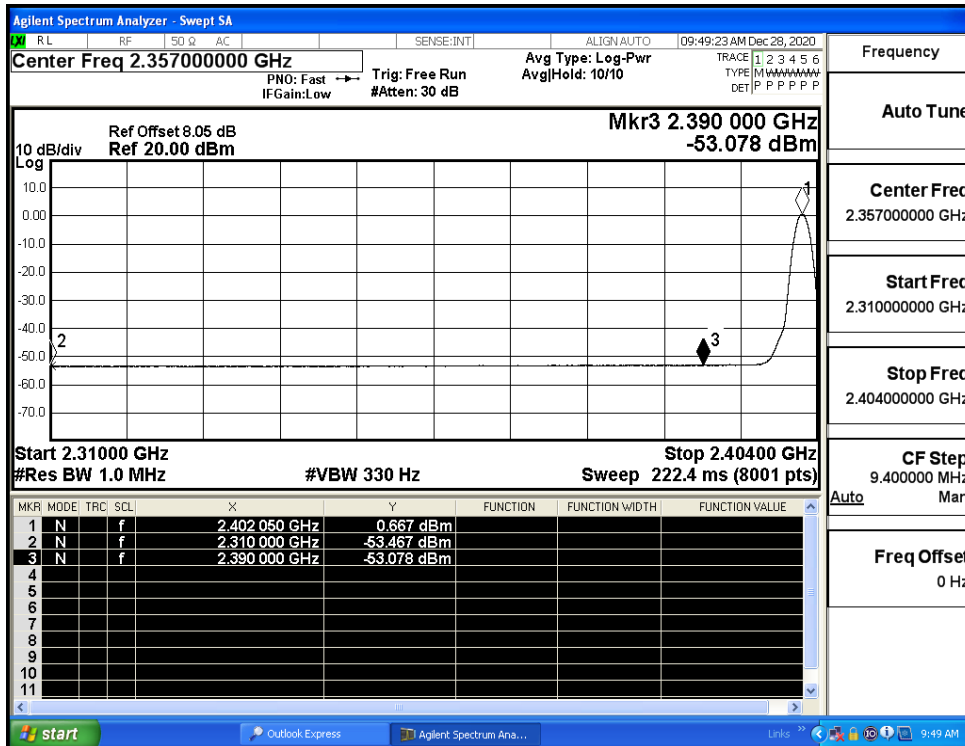
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



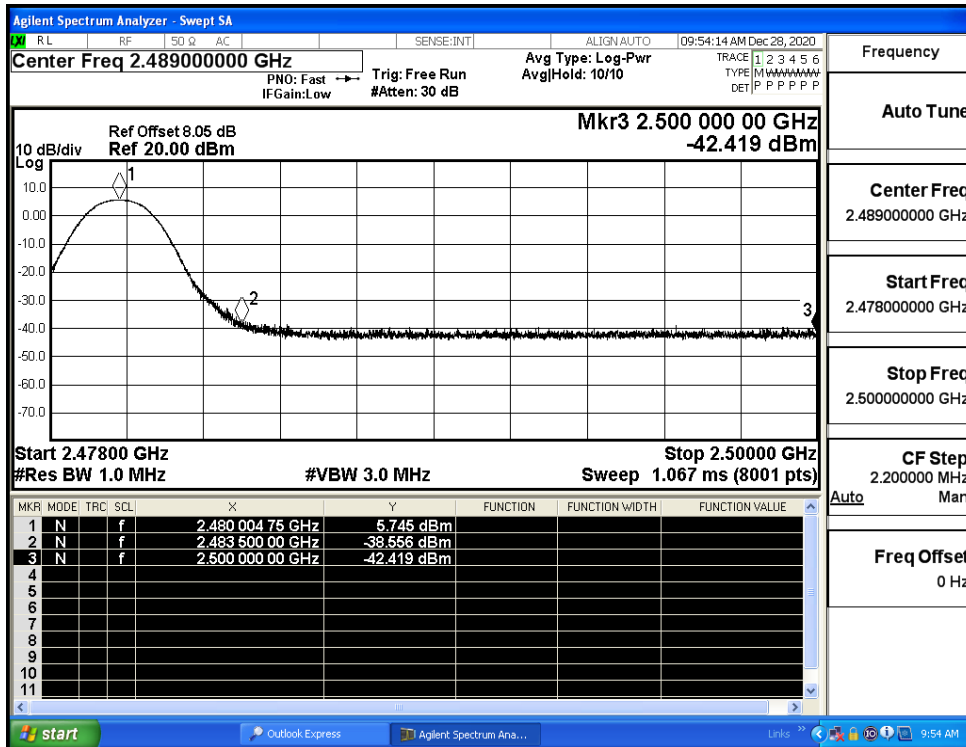
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

