

## Appendix A

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

**Product Name: Bluetooth Speaker**

**Trade Mark: 55945**

**Test Model: 55942, 55943, 55944**

#### Environmental Conditions

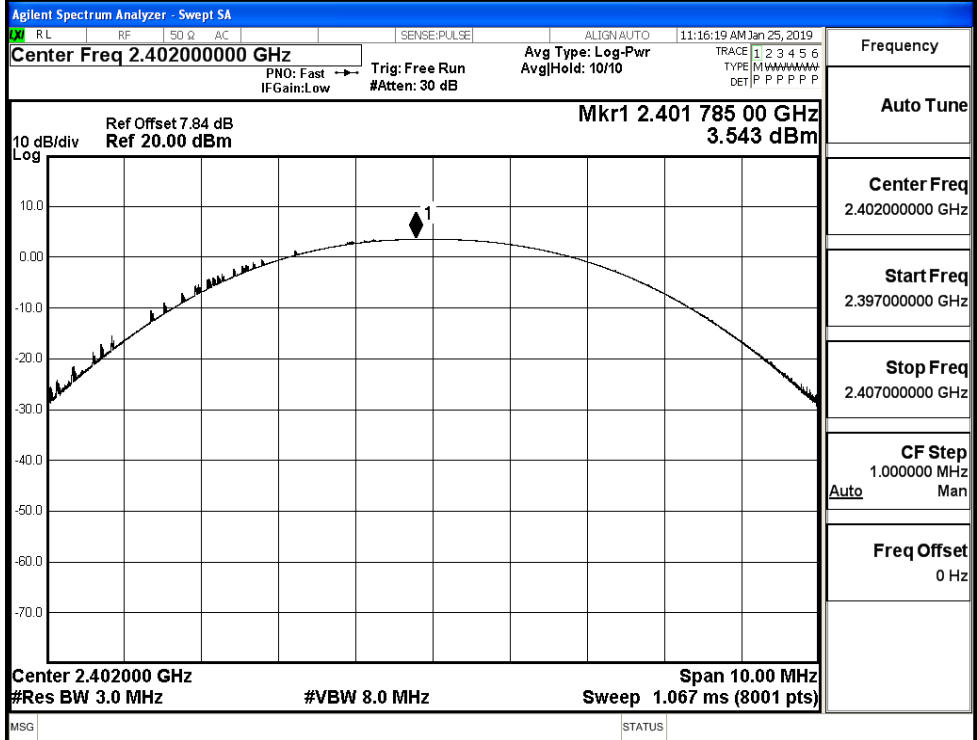
Temperature:	24.4 ° C
Relative Humidity:	53.7%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

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

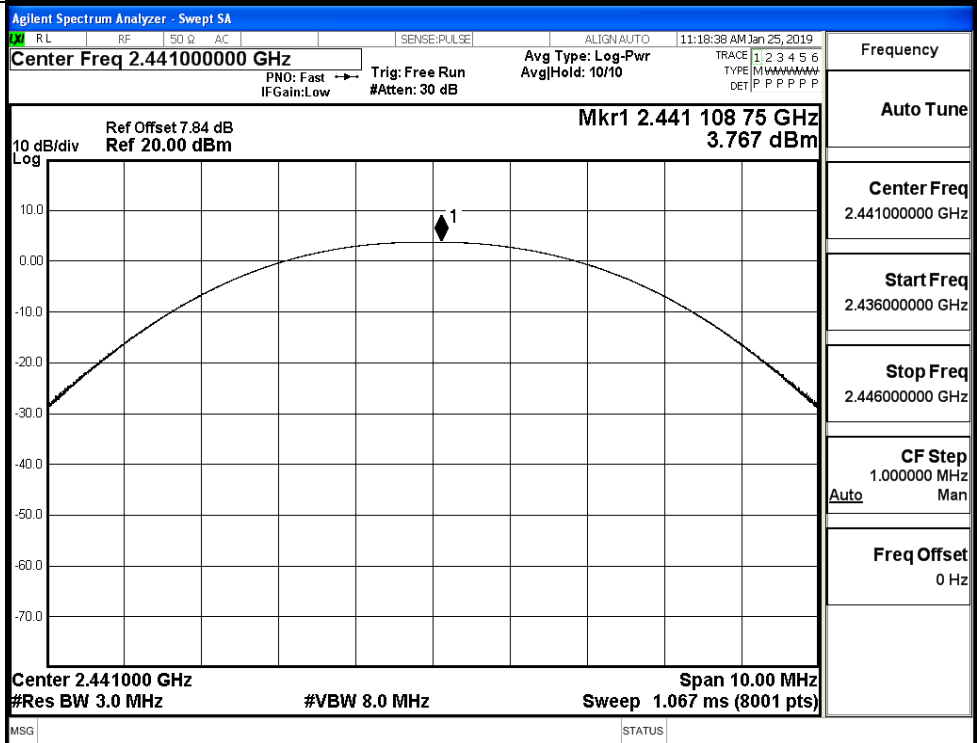
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.543	21	PASS
	MCH	3.767	21	PASS
	HCH	3.666	21	PASS
π/4DQPSK	LCH	3.109	21	PASS
	MCH	3.017	21	PASS
	HCH	2.758	21	PASS

Test Graphs

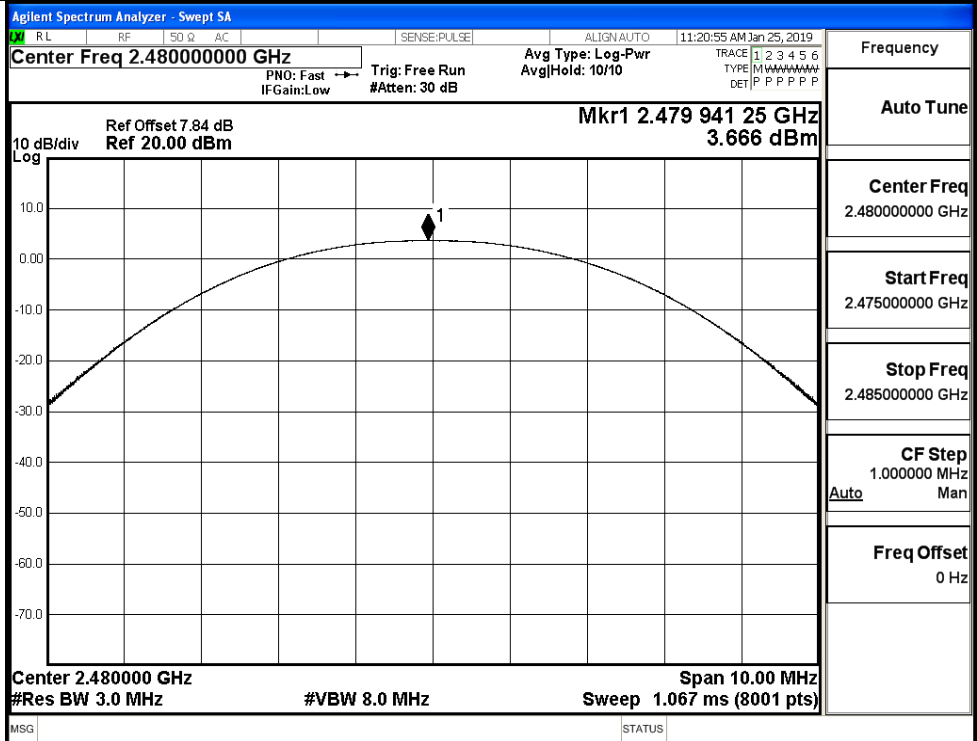
GFSK/LCH



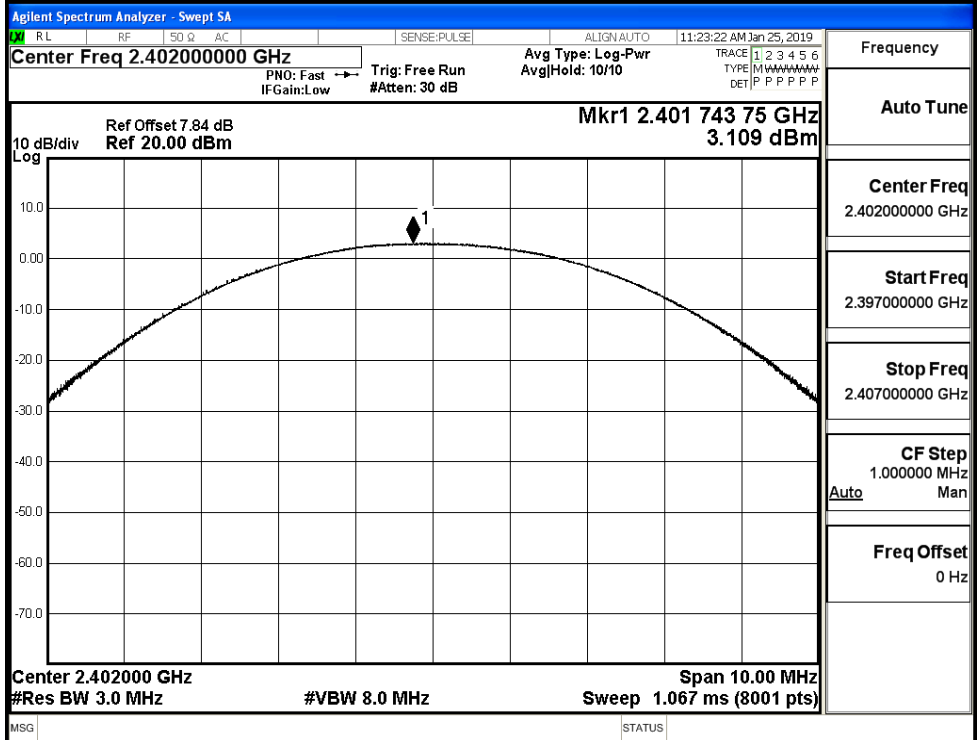
GFSK/MCH



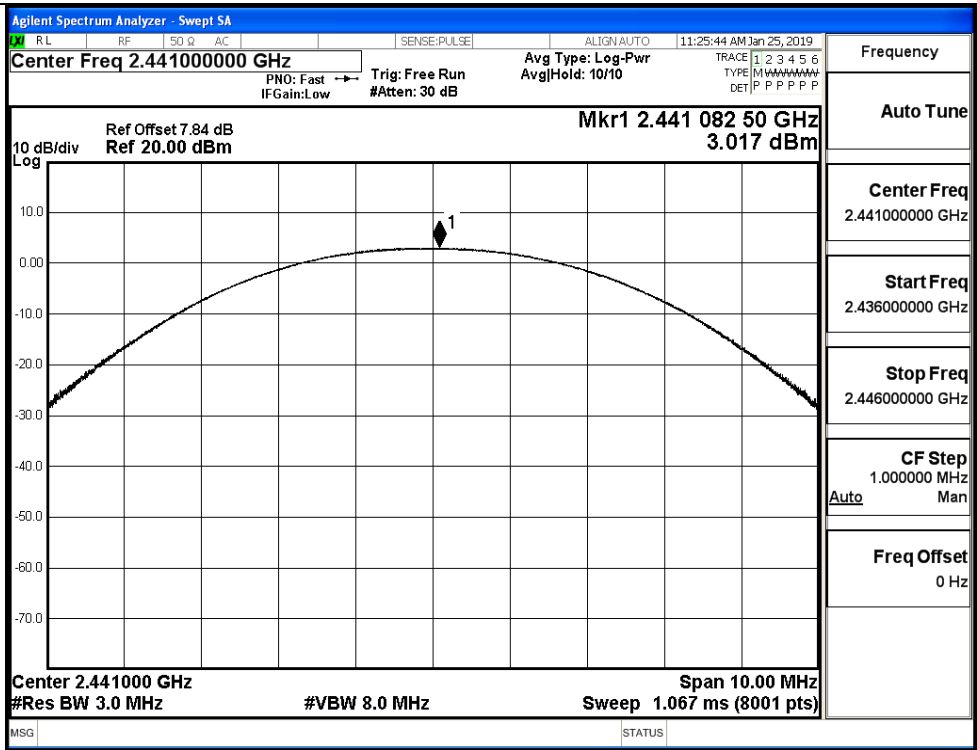
GFSK/HCH



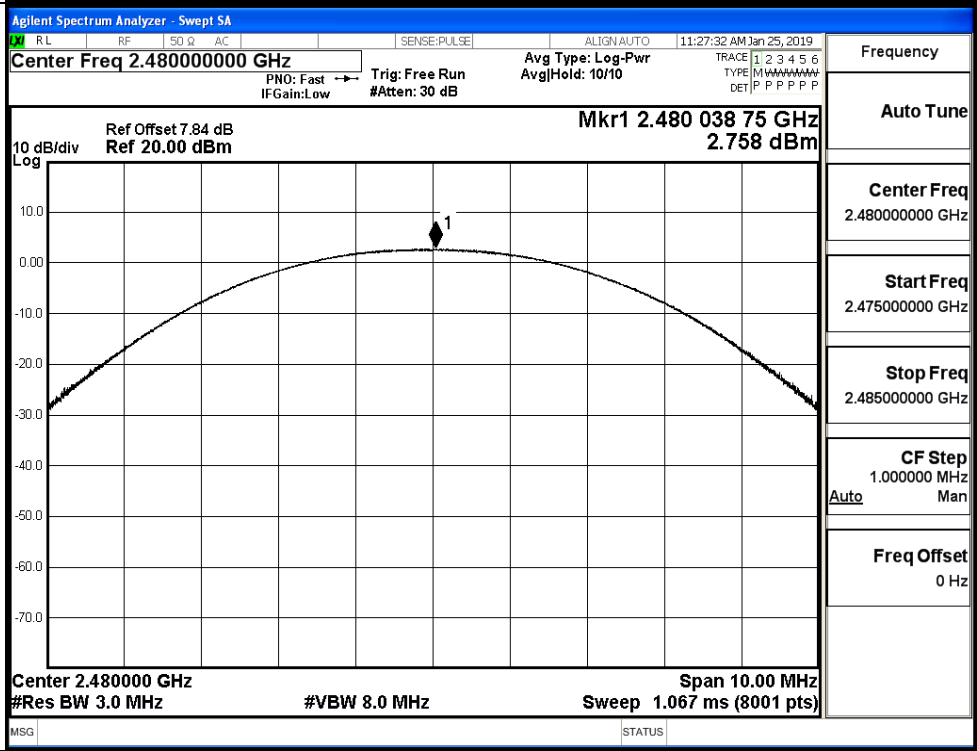
$\pi$ /4DQPSK/LCH



$\pi$ /4DQPSK/MCH

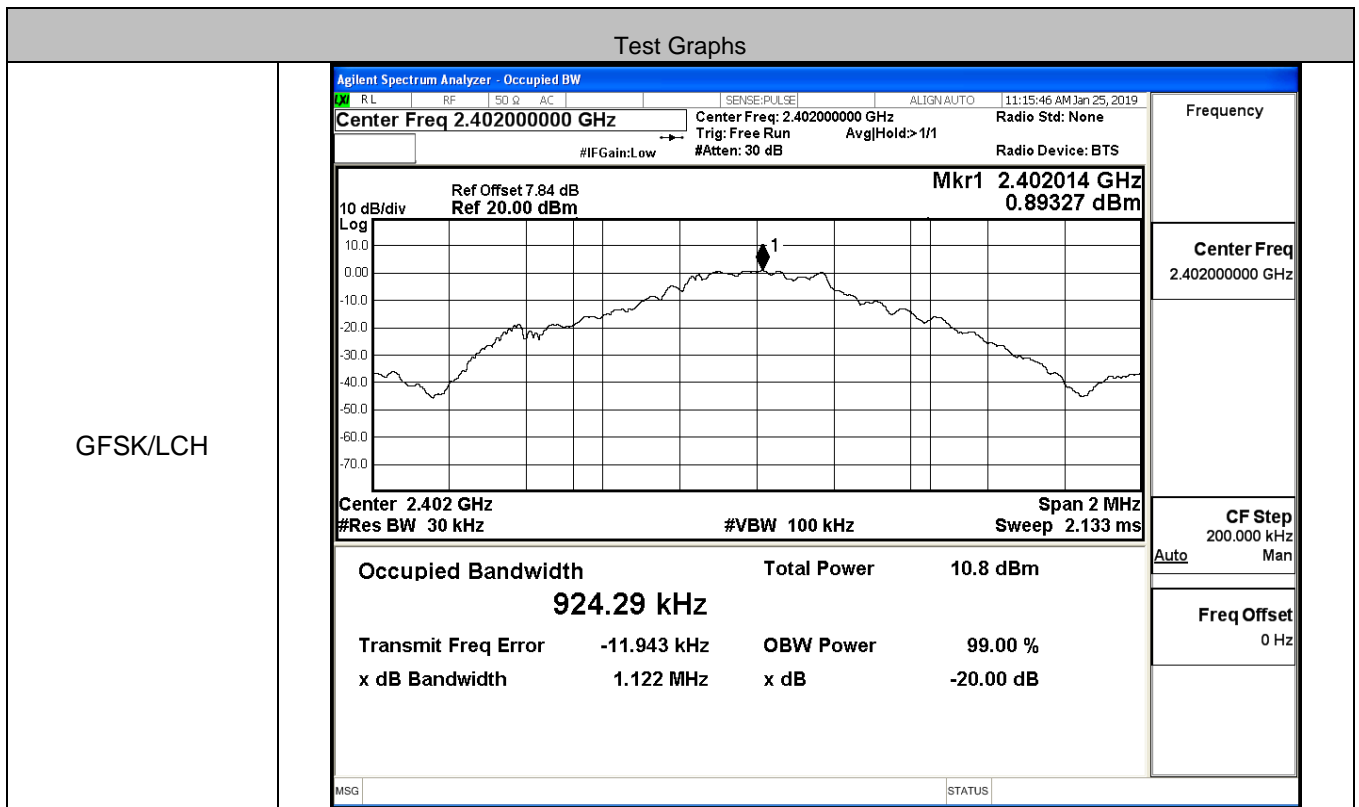


$\pi$ /4DQPSK/HCH

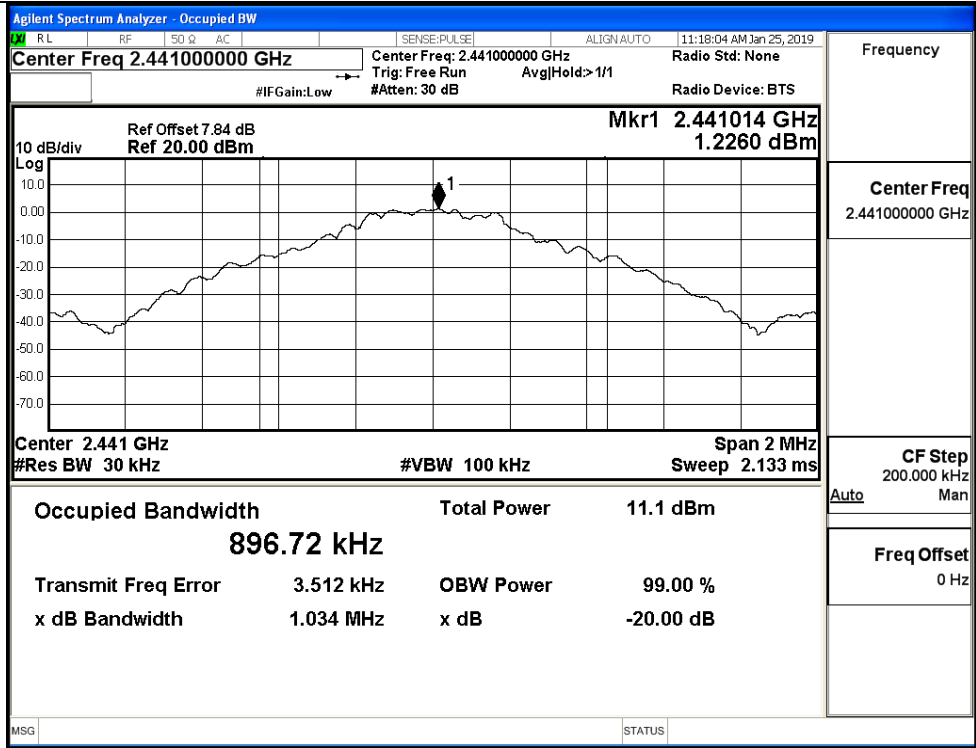


**A.2 99% and 20dB Bandwidth**

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.92429	1.122	Not Specified	PASS
	MCH	0.89672	1.034	Not Specified	PASS
	HCH	0.89538	1.038	Not Specified	PASS
π/4DQPSK	LCH	1.1724	1.290	Not Specified	PASS
	MCH	1.1721	1.292	Not Specified	PASS
	HCH	1.1703	1.289	Not Specified	PASS

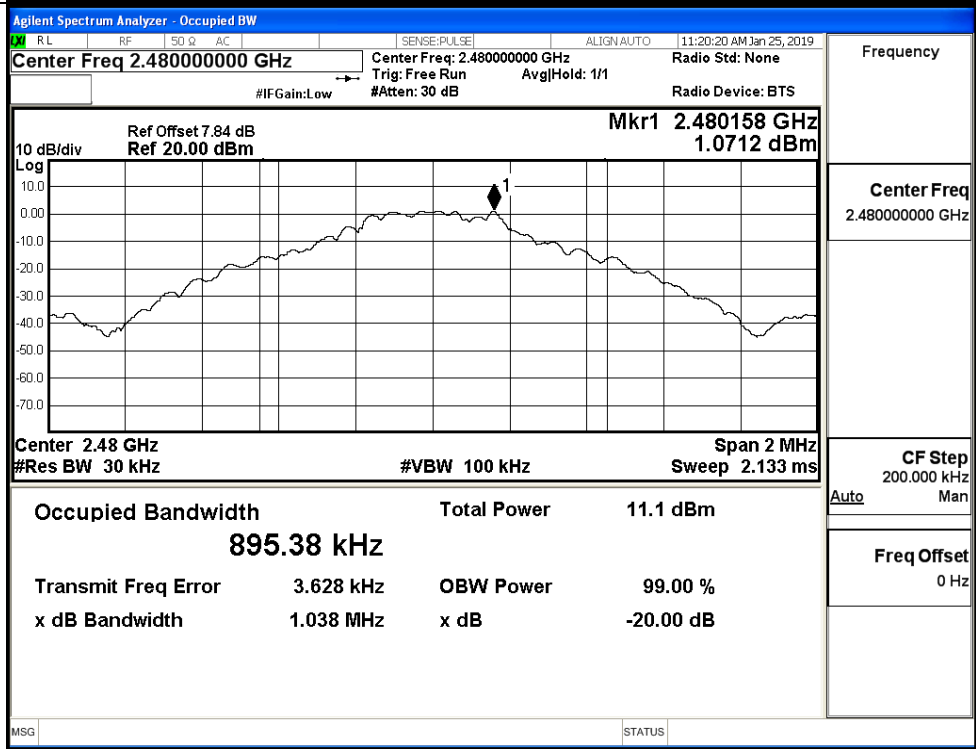


GFSK/MCH



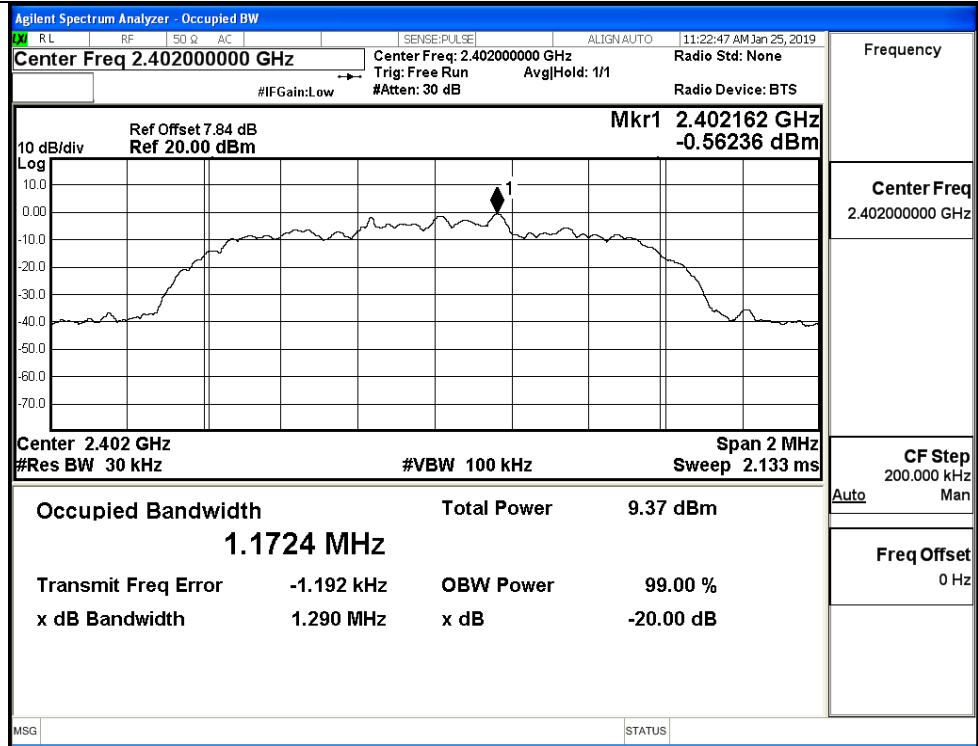
Frequency	2.441000000 GHz
Center Freq	2.441000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH

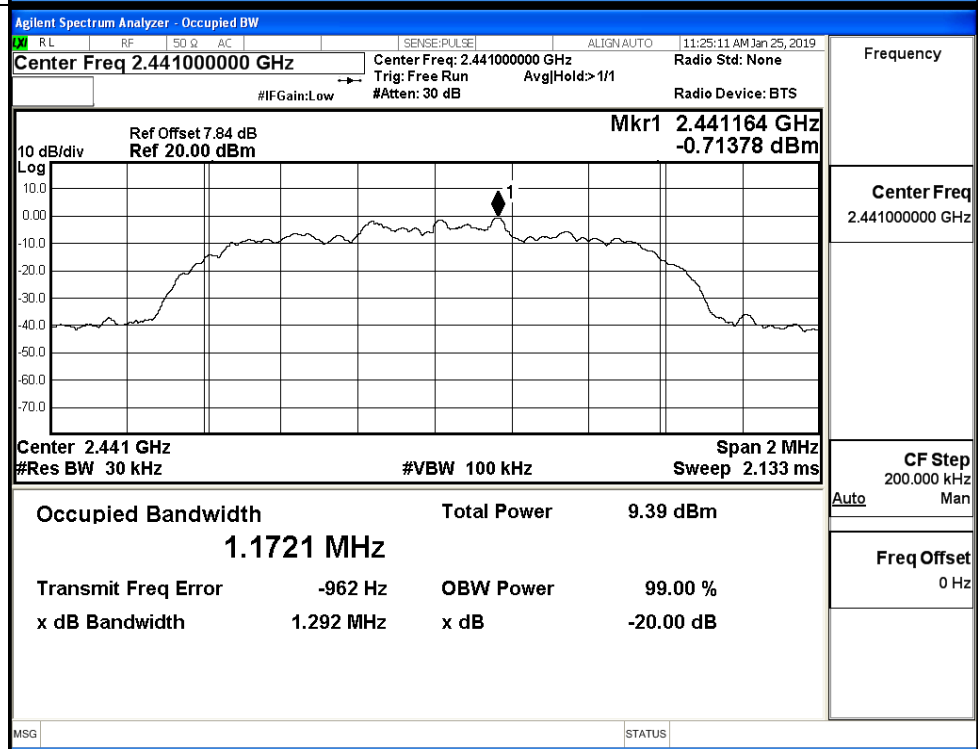


Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

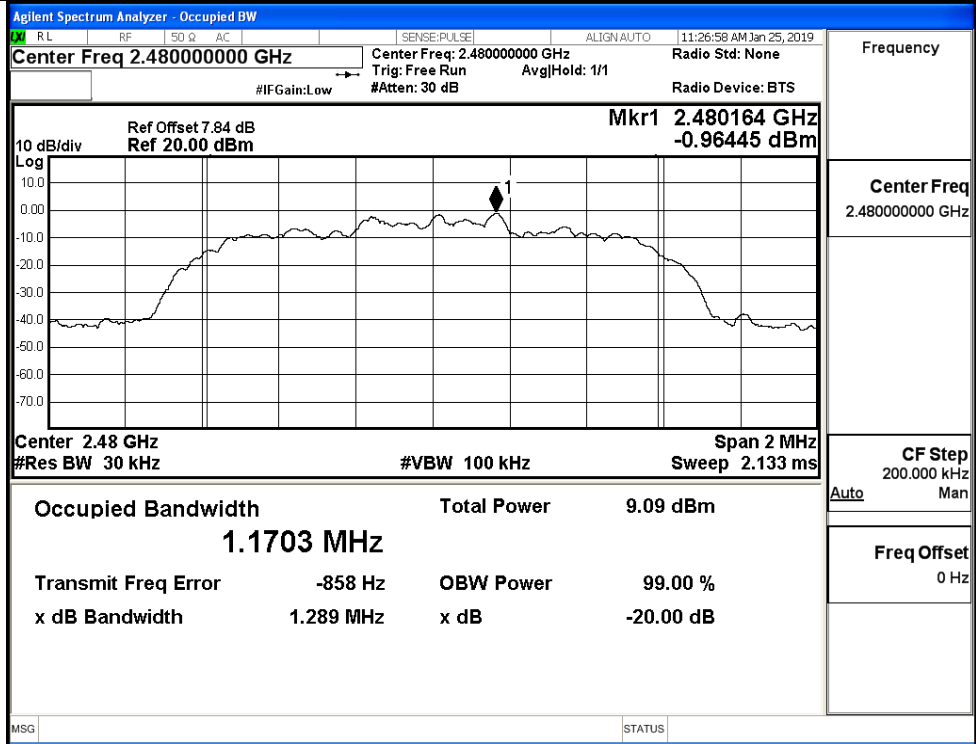
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



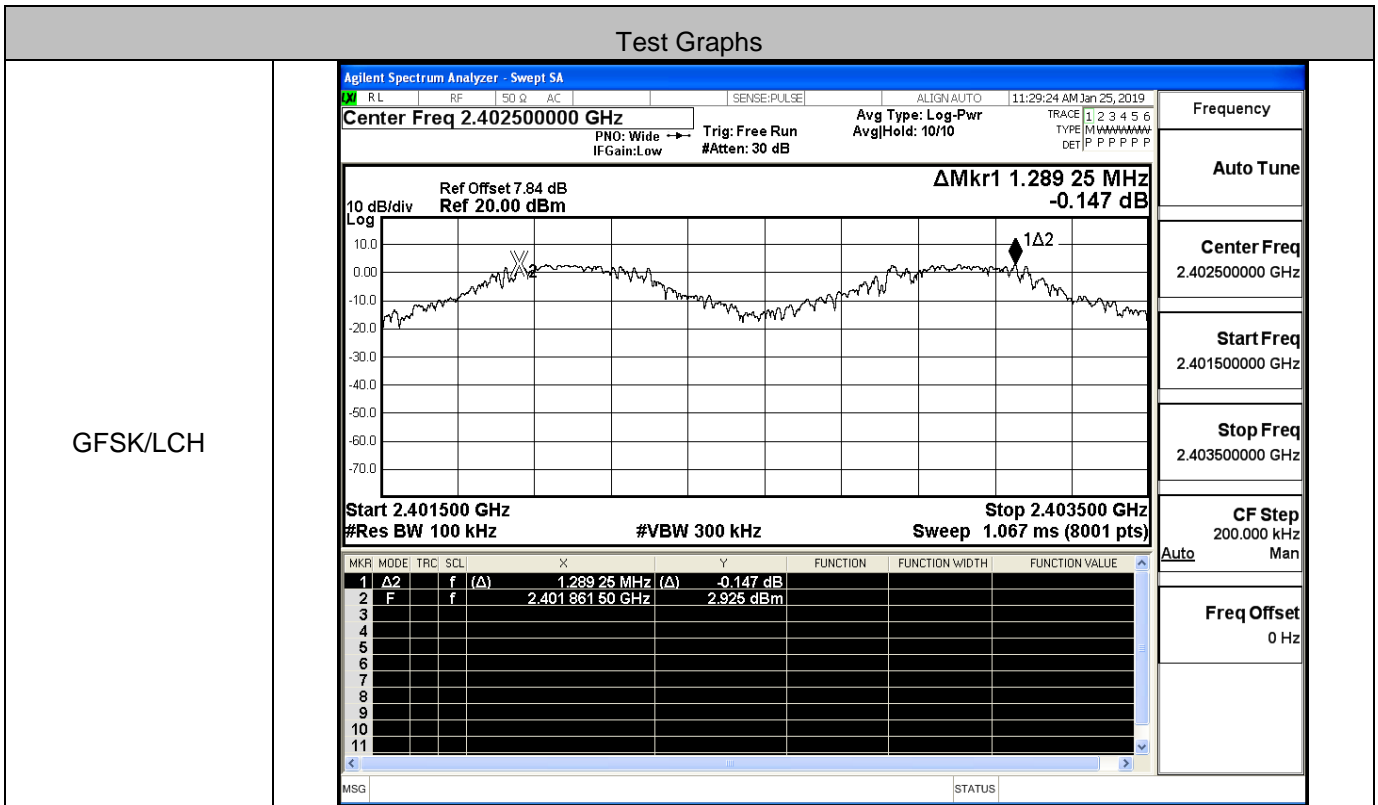
$\pi/4$ DQPSK/HCH



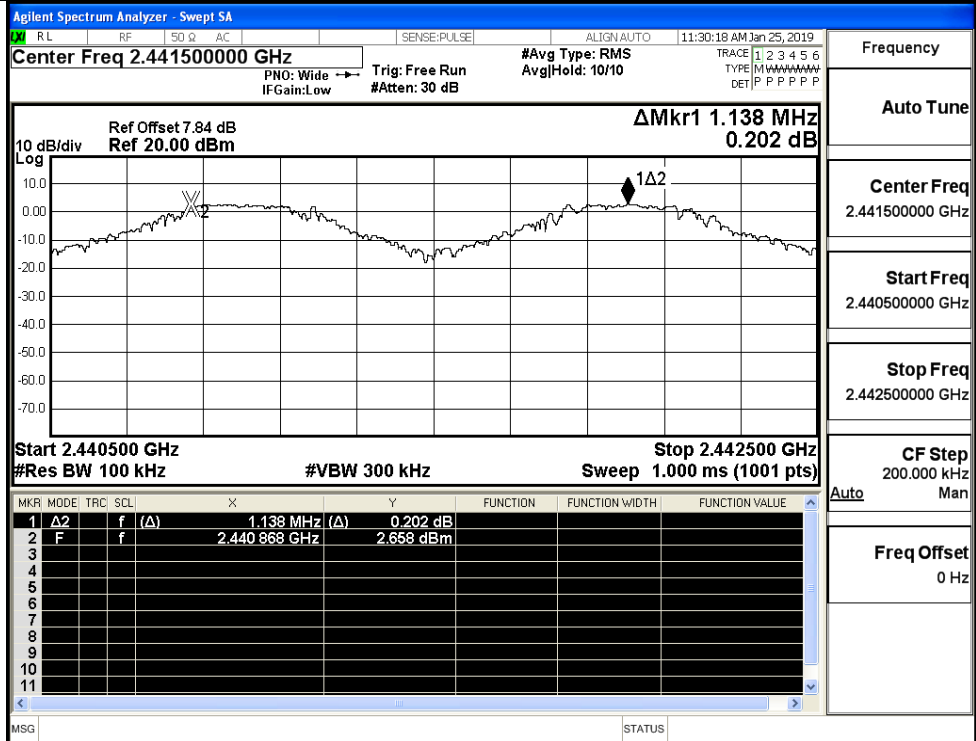


### A.3 Carrier Frequency Separation

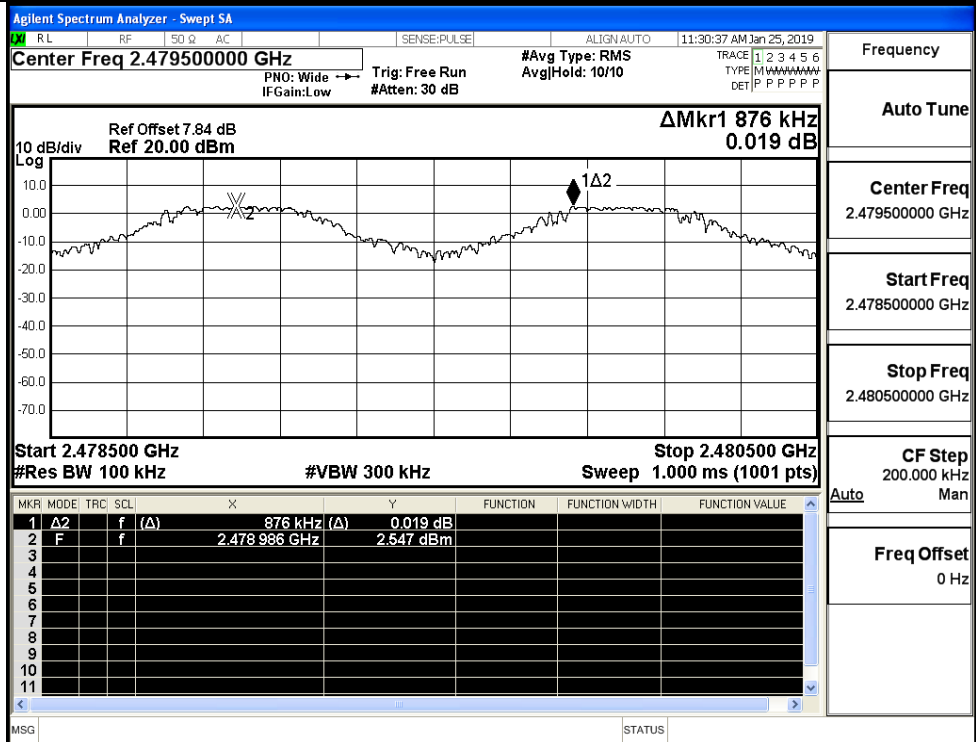
Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.289	0.748	PASS
	MCH	1.138	0.748	PASS
	HCH	0.876	0.748	PASS
π/4DQPSK	LCH	0.882	0.861	PASS
	MCH	1.020	0.861	PASS
	HCH	0.870	0.861	PASS



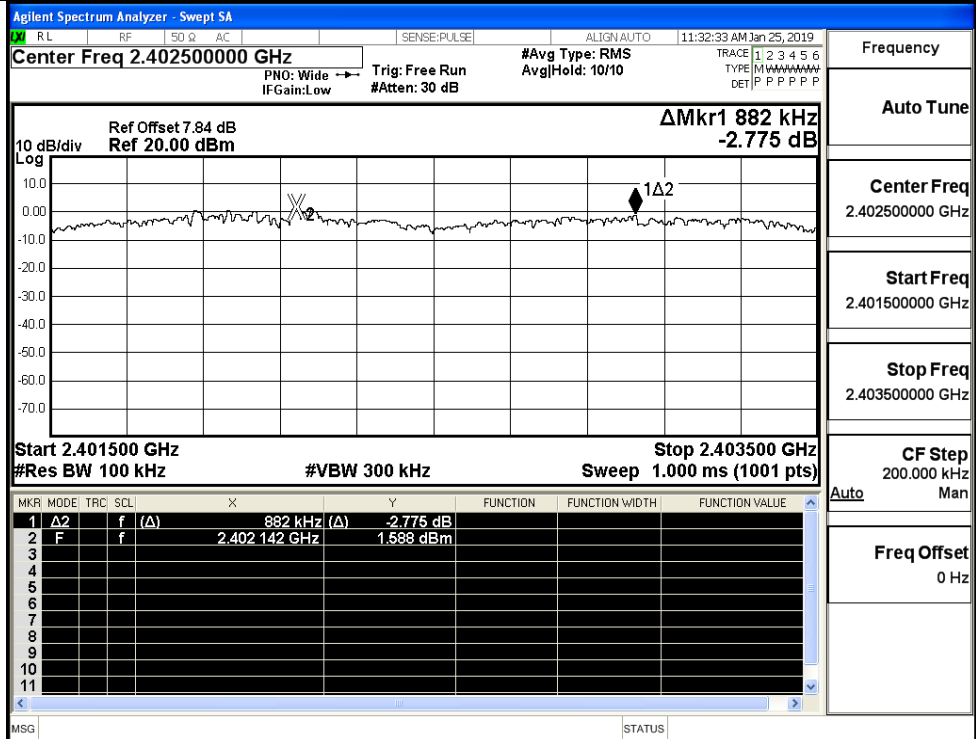
GFSK/MCH



GFSK/HCH

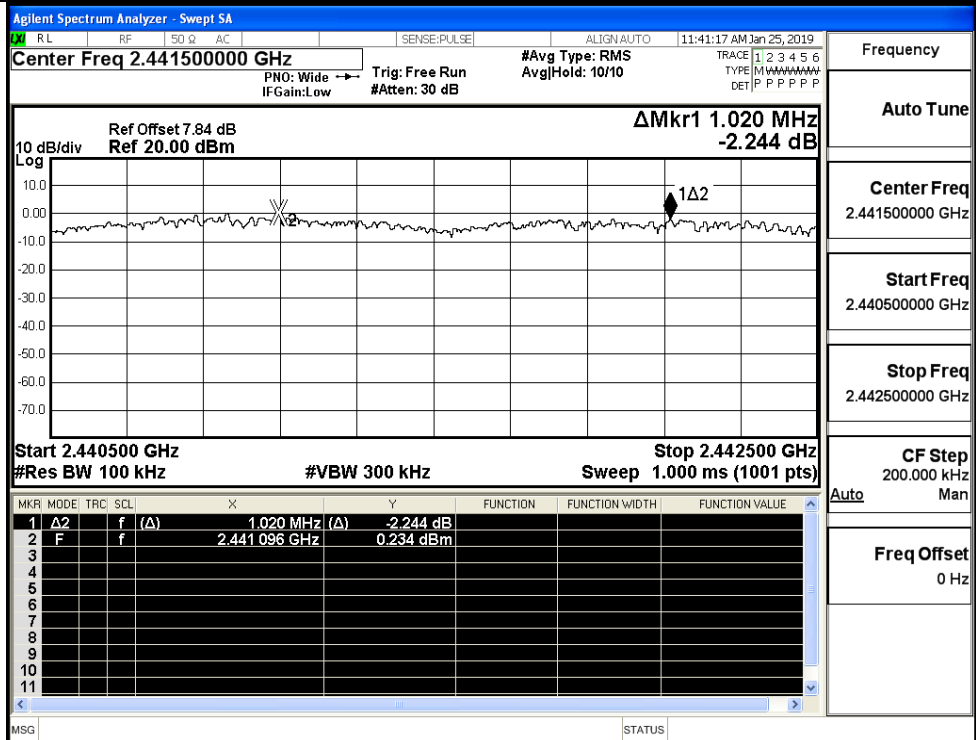


$\pi/4$ DQPSK/LCH



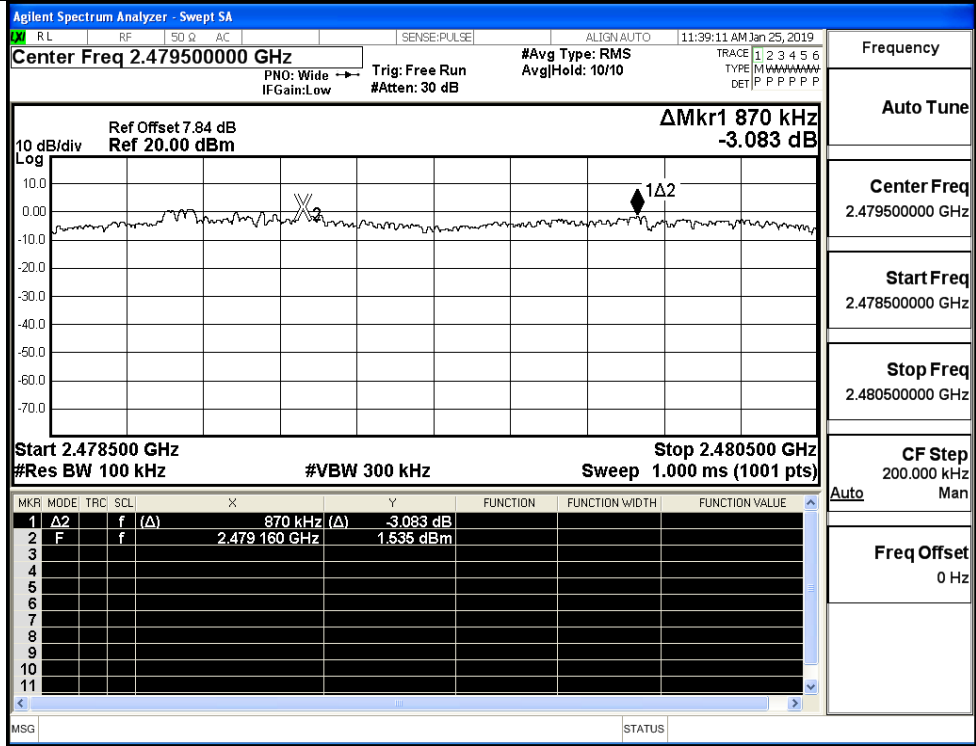
Frequency  
Auto Tune  
Center Freq  
2.402500000 GHz  
Start Freq  
2.401500000 GHz  
Stop Freq  
2.403500000 GHz  
CF Step  
200.000 kHz  
Auto  
Man  
Freq Offset  
0 Hz

$\pi/4$ 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

$\pi/4$ DQPSK/HCH



### A.4 Hopping Channel Number

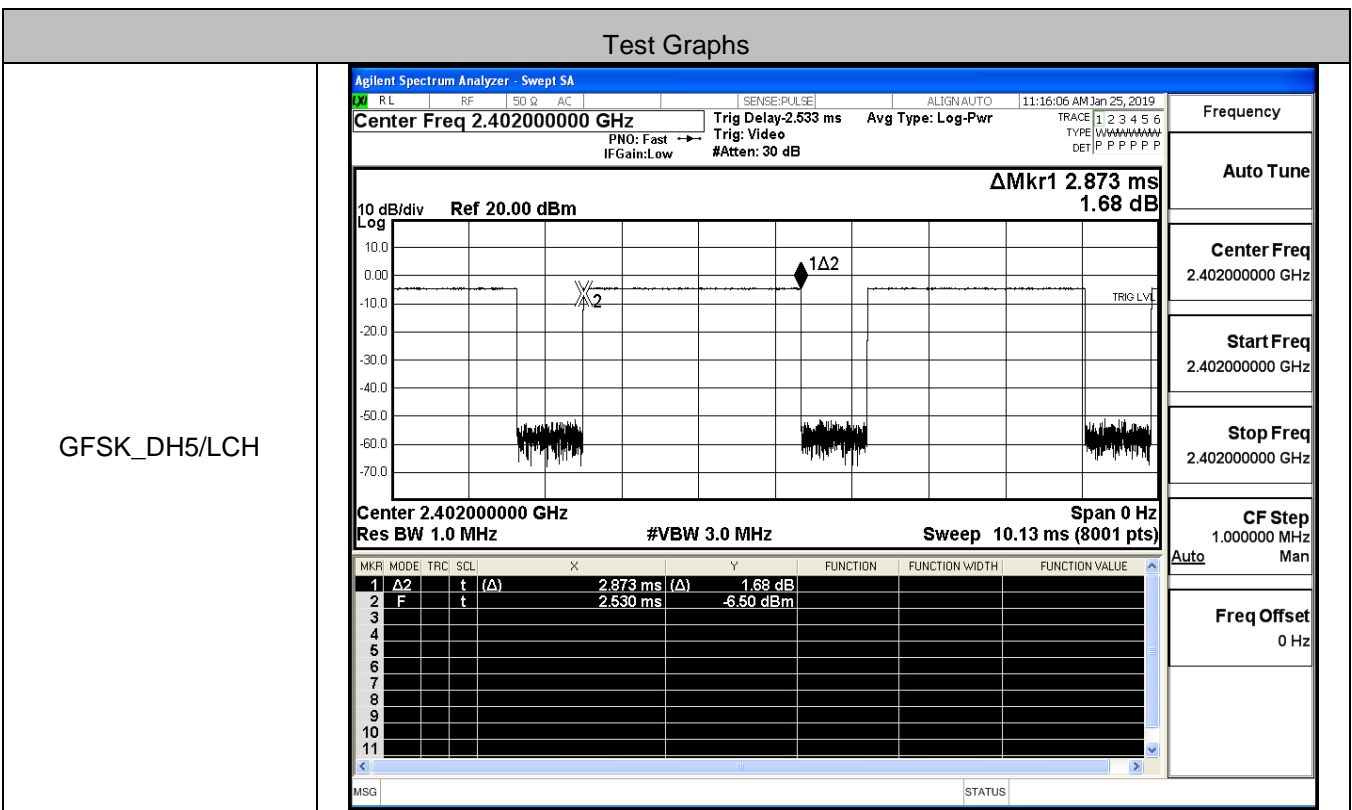
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS

Test Graphs

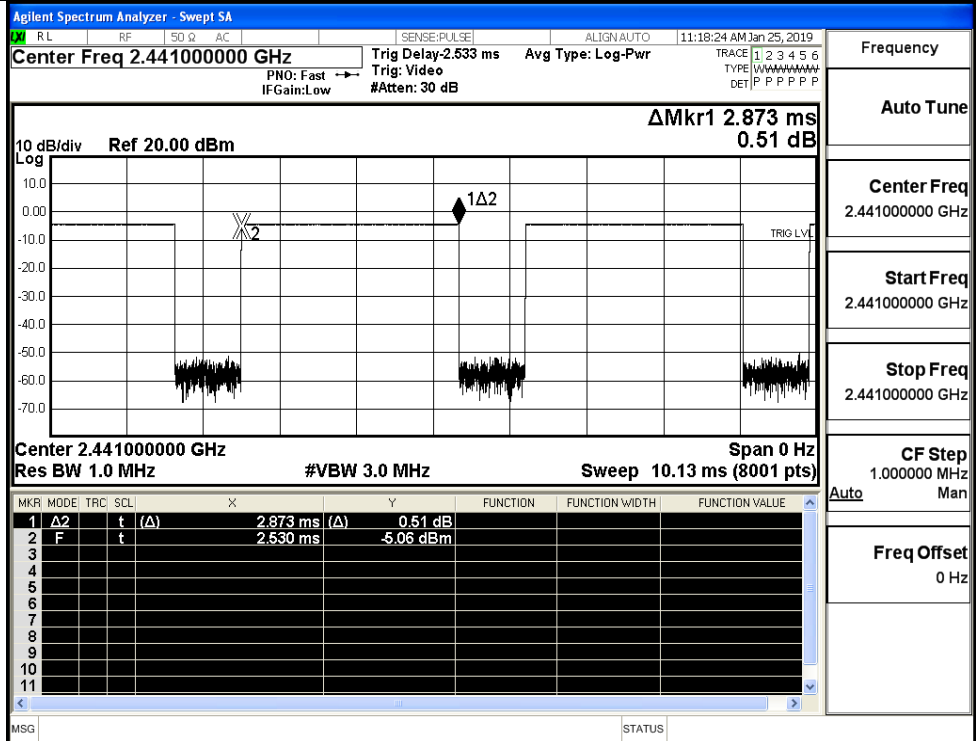
GFSK/Hop	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz      #Avg Type: RMS      11:31:57 AM Jan 25, 2019</p> <p>Ref Offset 7.84 dB      Ref 20.00 dBm      <math>\Delta</math>Mkr1 78.114 MHz      0.146 dB</p> <p>Start 2.40000 GHz      Stop 2.48350 GHz</p> <p>#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: 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>78.114 MHz (<math>\Delta</math>)</td> <td>0.146 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401952 GHz</td> <td>2.943 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	$\Delta$ 2	f	( $\Delta$ )	78.114 MHz ( $\Delta$ )	0.146 dB				2	F	f		2.401952 GHz	2.943 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	$\Delta$ 2	f	( $\Delta$ )	78.114 MHz ( $\Delta$ )	0.146 dB																							
2	F	f		2.401952 GHz	2.943 dBm																							
$\pi/4$ DQPSK/Hop	<div style="border: 1px solid black; padding: 5px;"> <p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz      #Avg Type: RMS      11:37:05 AM Jan 25, 2019</p> <p>Ref Offset 7.84 dB      Ref 20.00 dBm      <math>\Delta</math>Mkr1 77.801 MHz      1.198 dB</p> <p>Start 2.40000 GHz      Stop 2.48350 GHz</p> <p>#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: 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>77.801 MHz (<math>\Delta</math>)</td> <td>1.198 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402035 GHz</td> <td>0.261 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	$\Delta$ 2	f	( $\Delta$ )	77.801 MHz ( $\Delta$ )	1.198 dB				2	F	f		2.402035 GHz	0.261 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	$\Delta$ 2	f	( $\Delta$ )	77.801 MHz ( $\Delta$ )	1.198 dB																							
2	F	f		2.402035 GHz	0.261 dBm																							

### A.5 Dwell Time

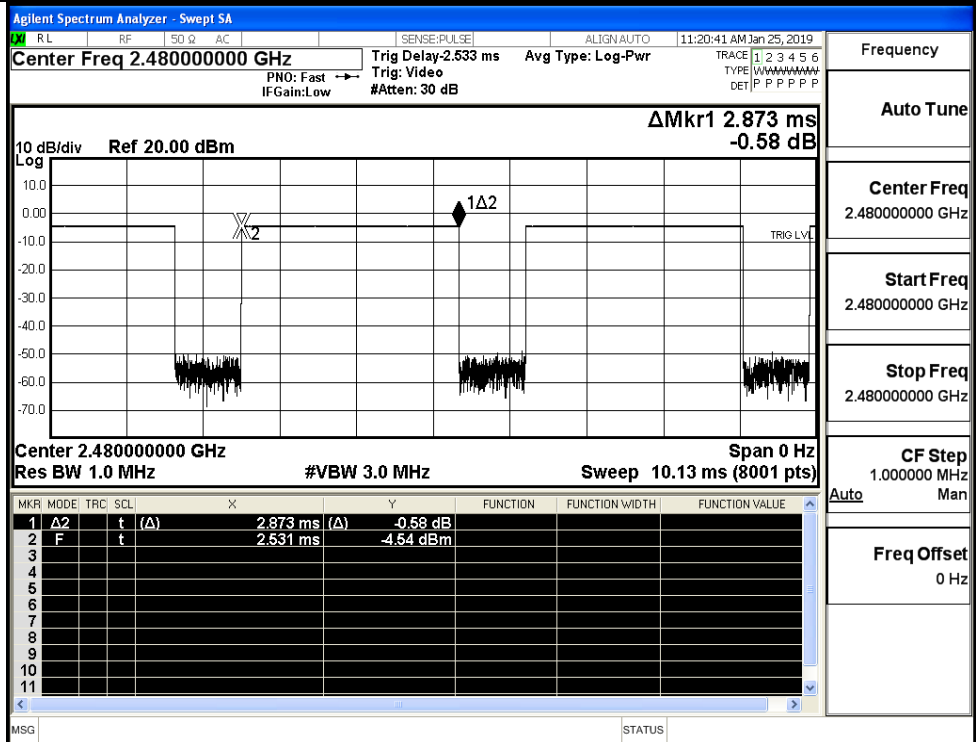
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS



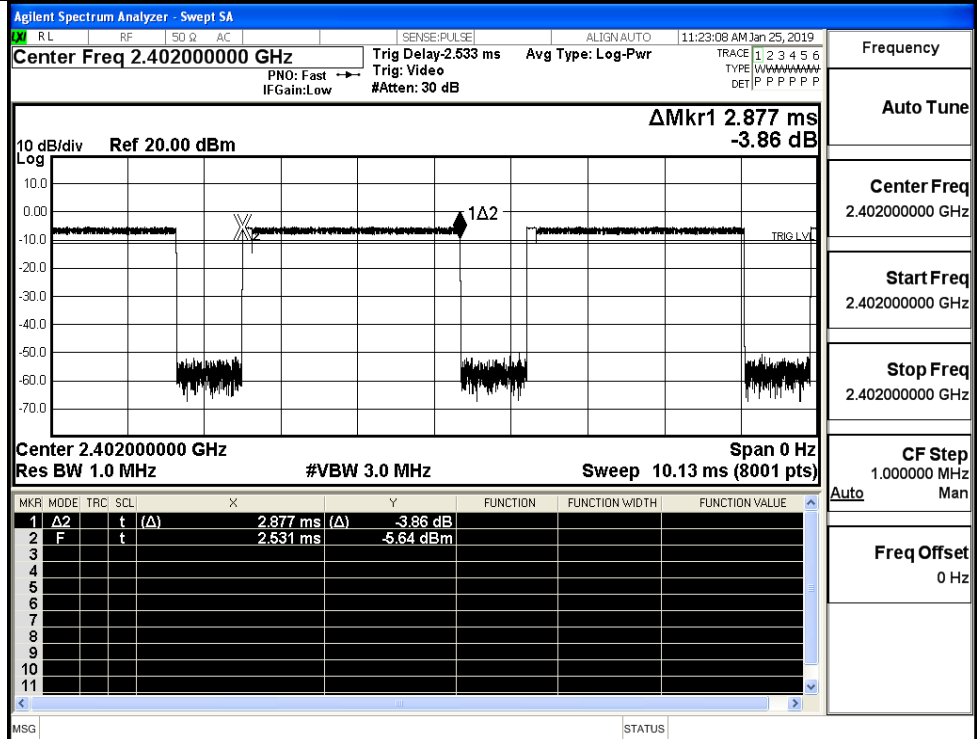
GFSK\_DH5/MCH



GFSK\_DH5/HCH

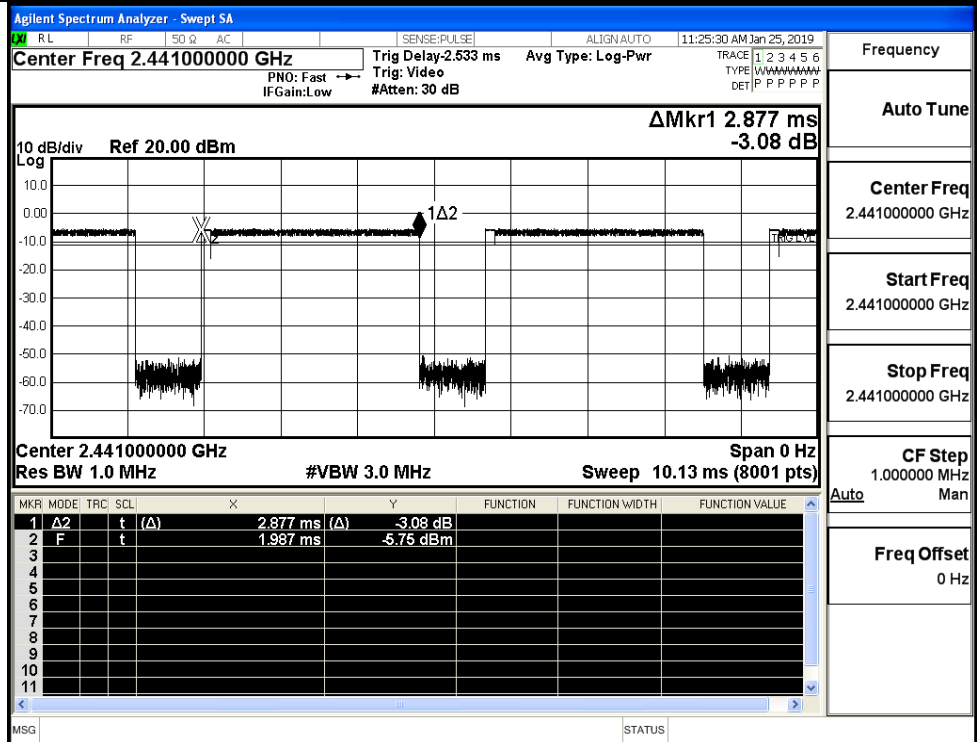


$\pi/4$ DQPSK  
\_2DH5/LCH



Frequency	2.402000000 GHz
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

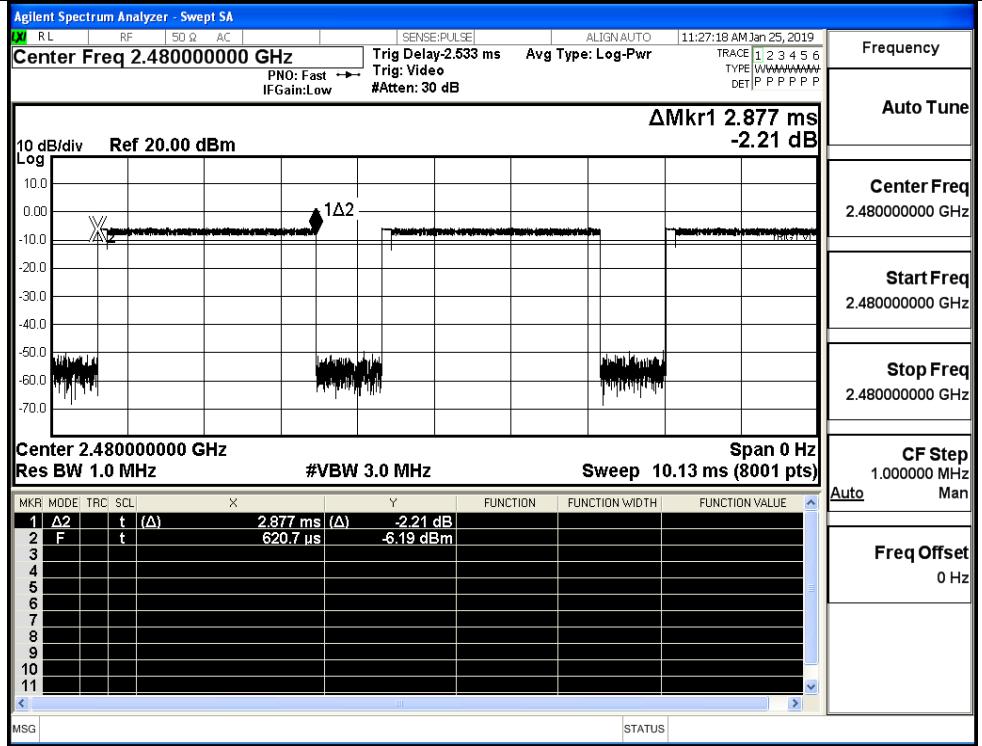
$\pi/4$ DQPSK  
\_2DH5/MCH



Frequency	2.441000000 GHz
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



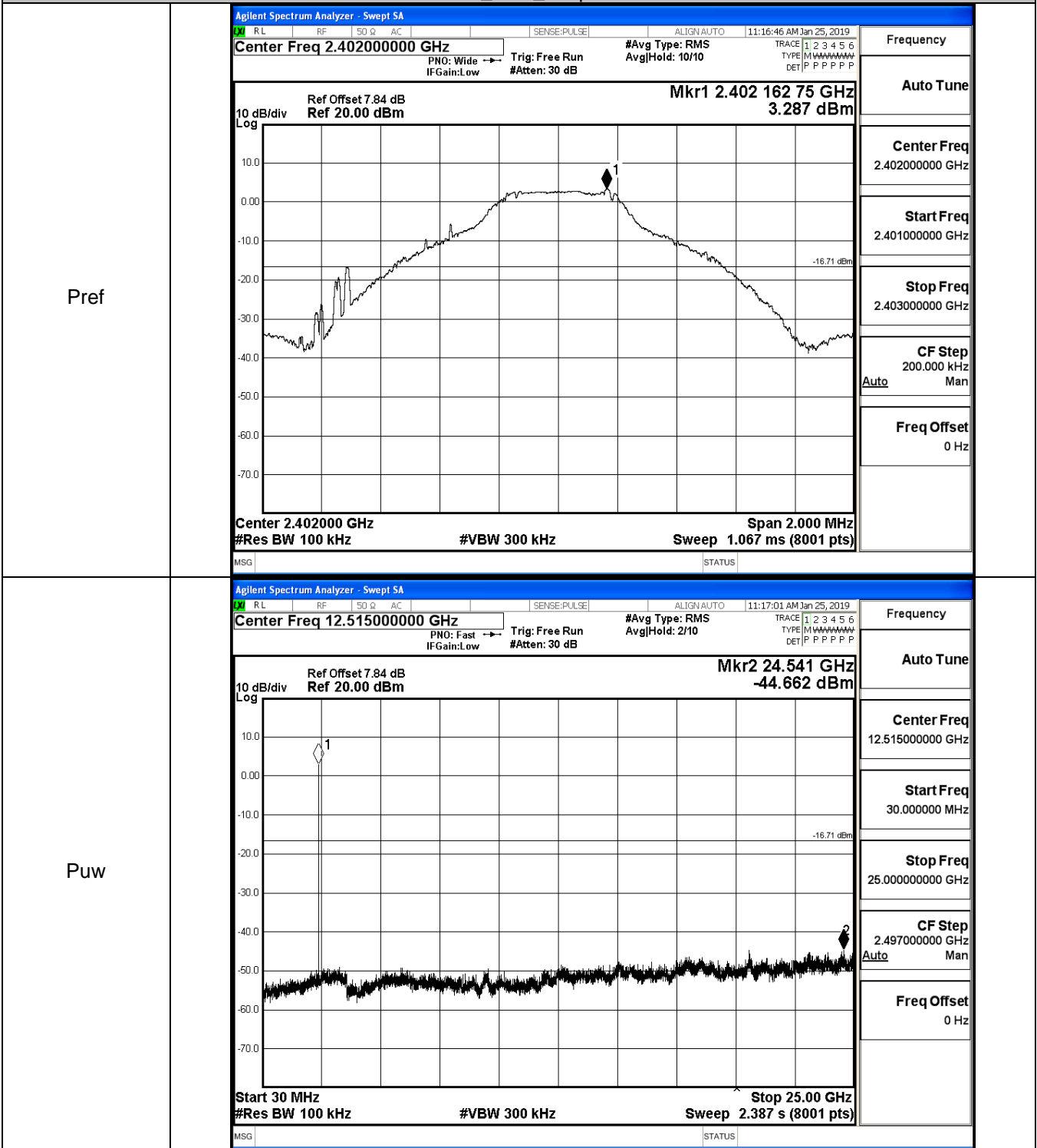
$\pi/4$ DQPSK  
\_2DH5/HCH



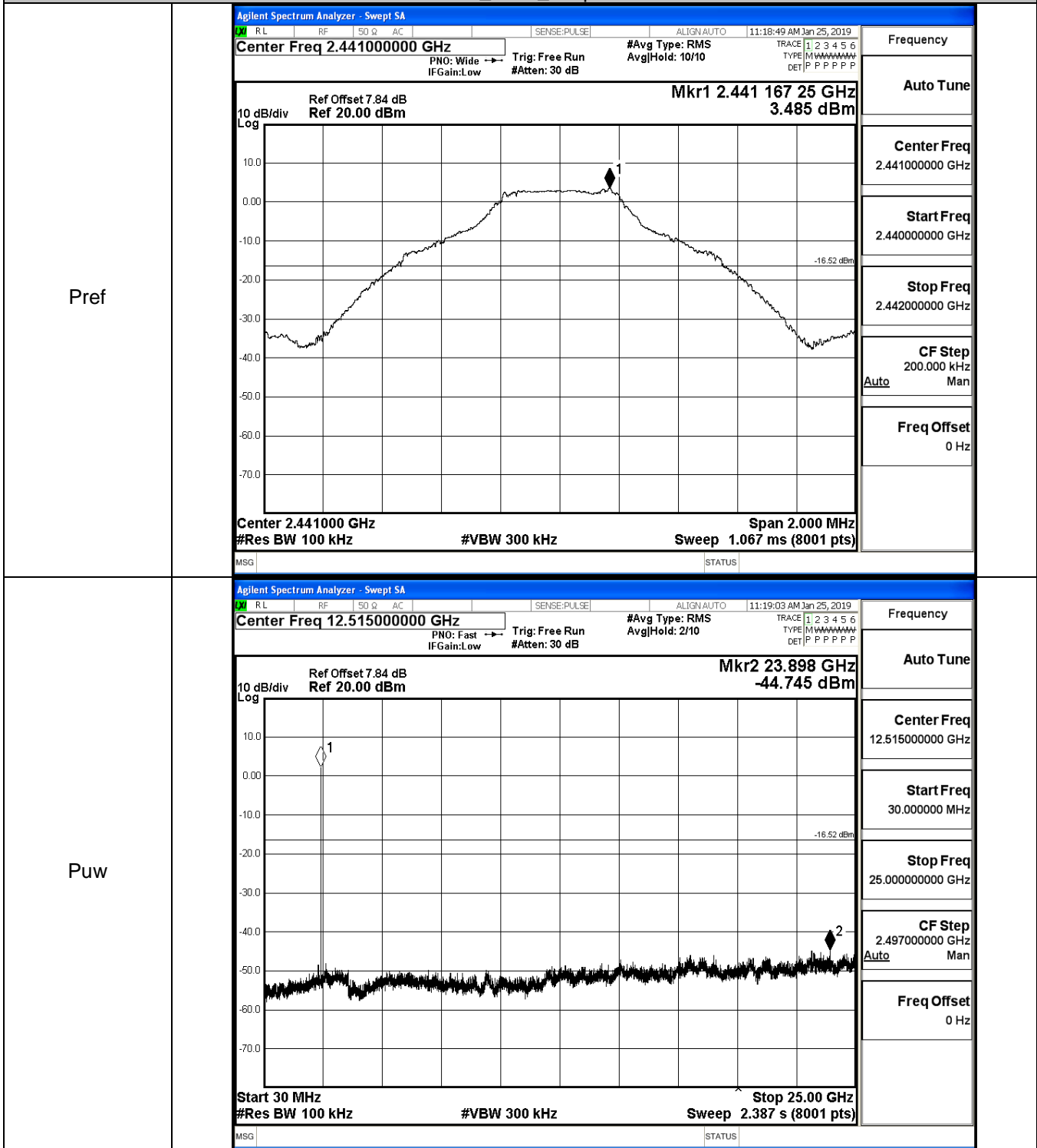
### A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.287	-44.662	-16.713	PASS
	MCH	3.485	-44.745	-16.515	PASS
	HCH	3.298	-45.497	-16.702	PASS
$\pi/4$ DQPSK	LCH	1.918	-44.467	-18.082	PASS
	MCH	2.142	-44.579	-17.858	PASS
	HCH	1.71	-45.020	-18.290	PASS

GFSK\_LCH\_Graphs

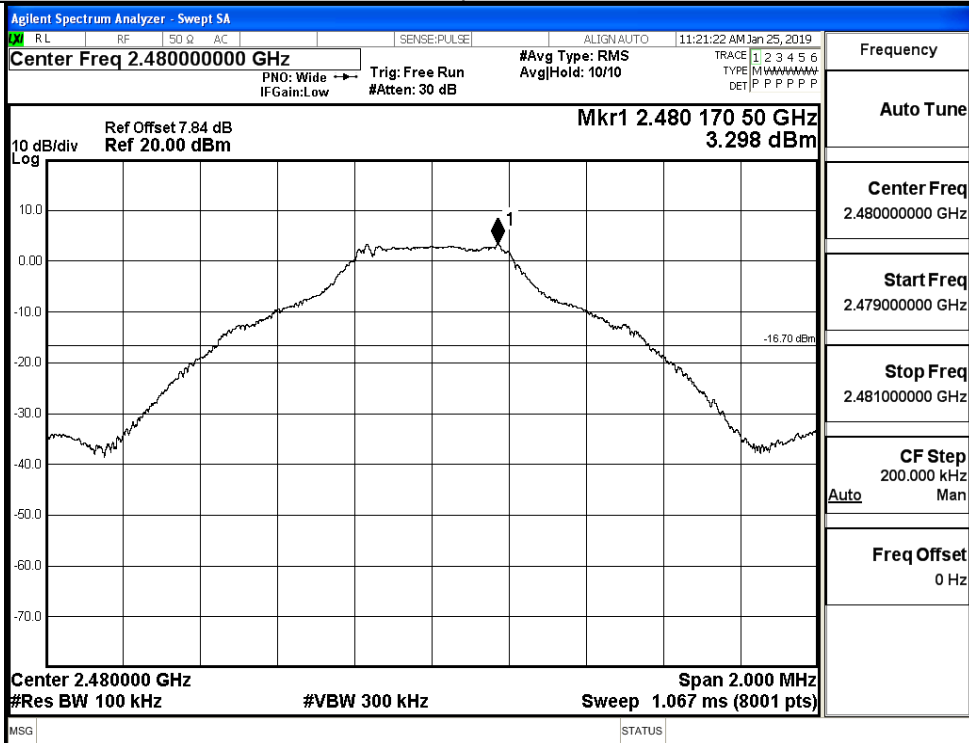


GFSK\_MCH\_Graphs

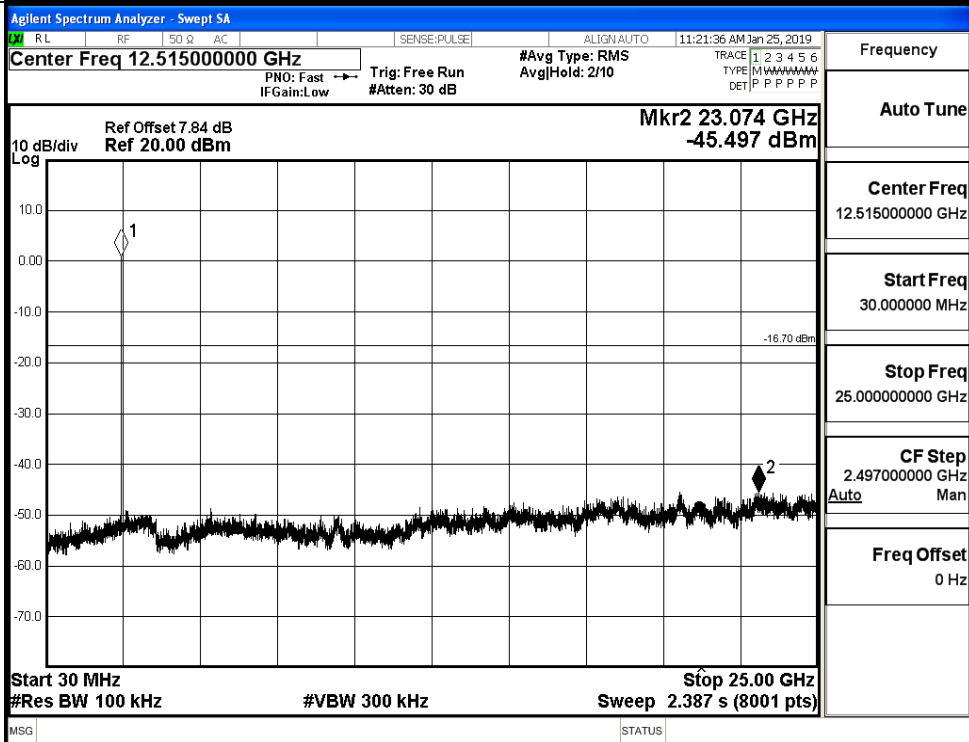


GFSK\_HCH\_Graphs

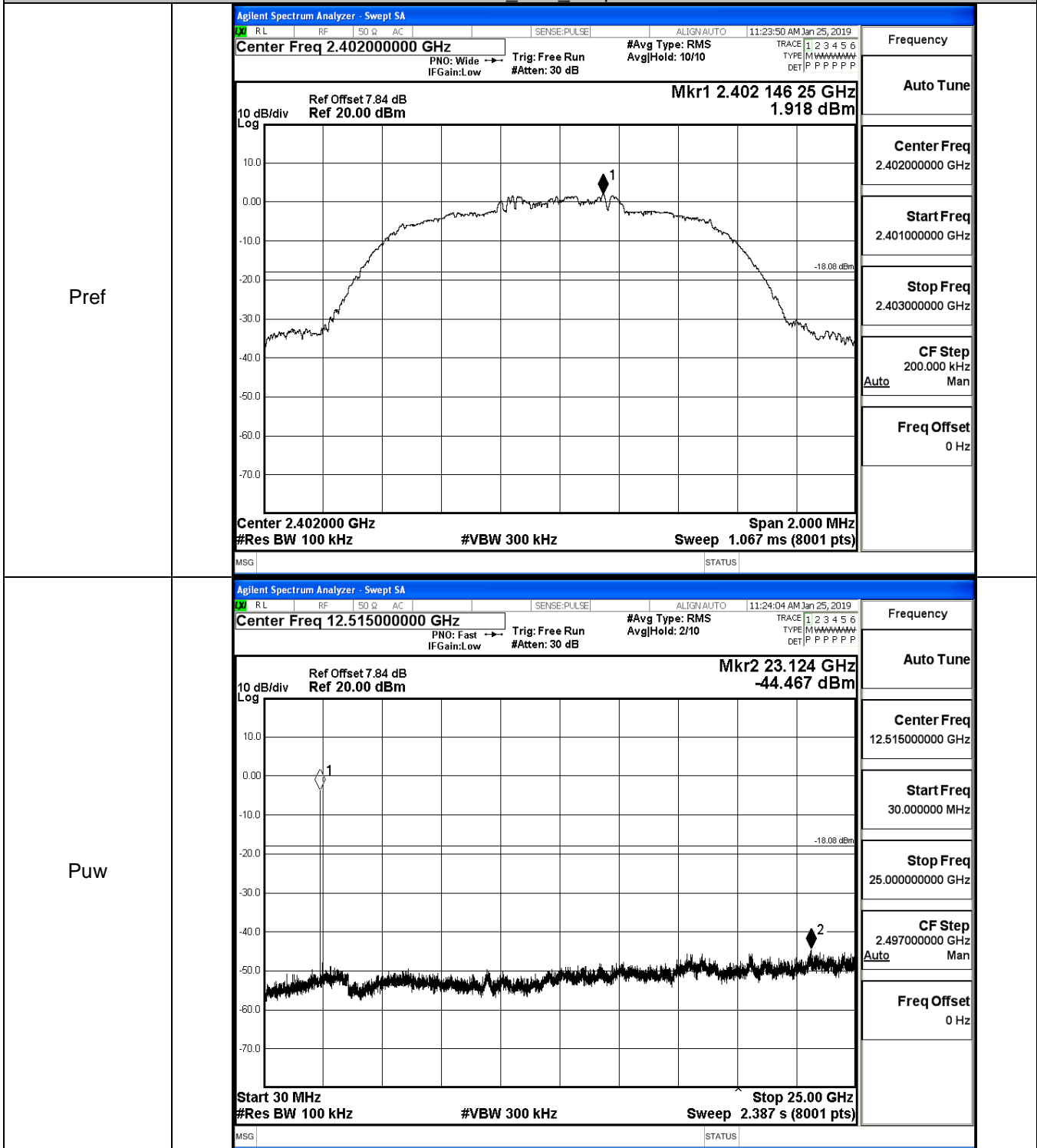
Pref



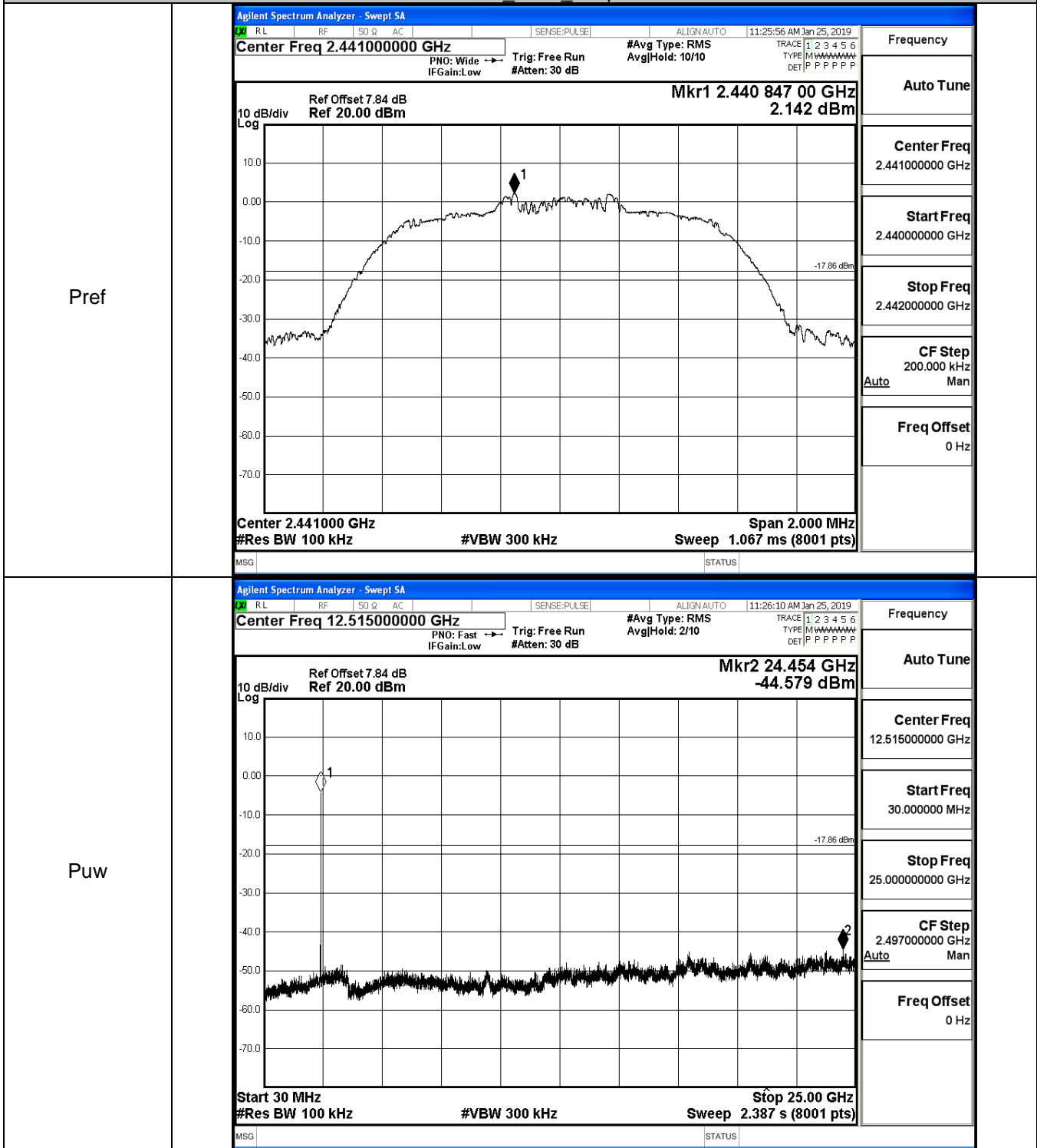
Puw



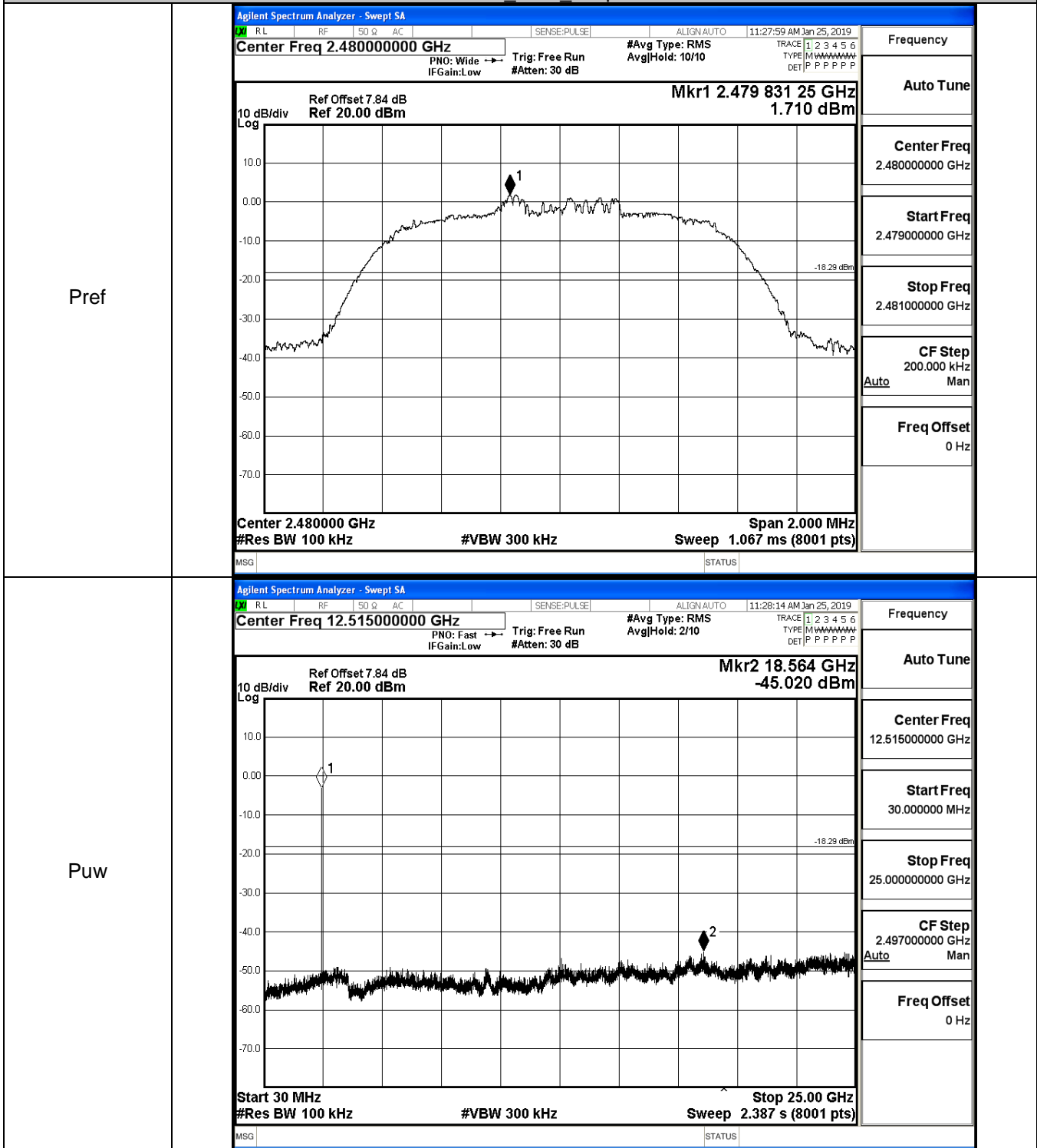
$\pi/4$ DQPSK LCH\_Graphs



$\pi/4$ DQPSK\_MCH\_Graphs



$\pi/4$ DQPSK\_HCH\_Graphs





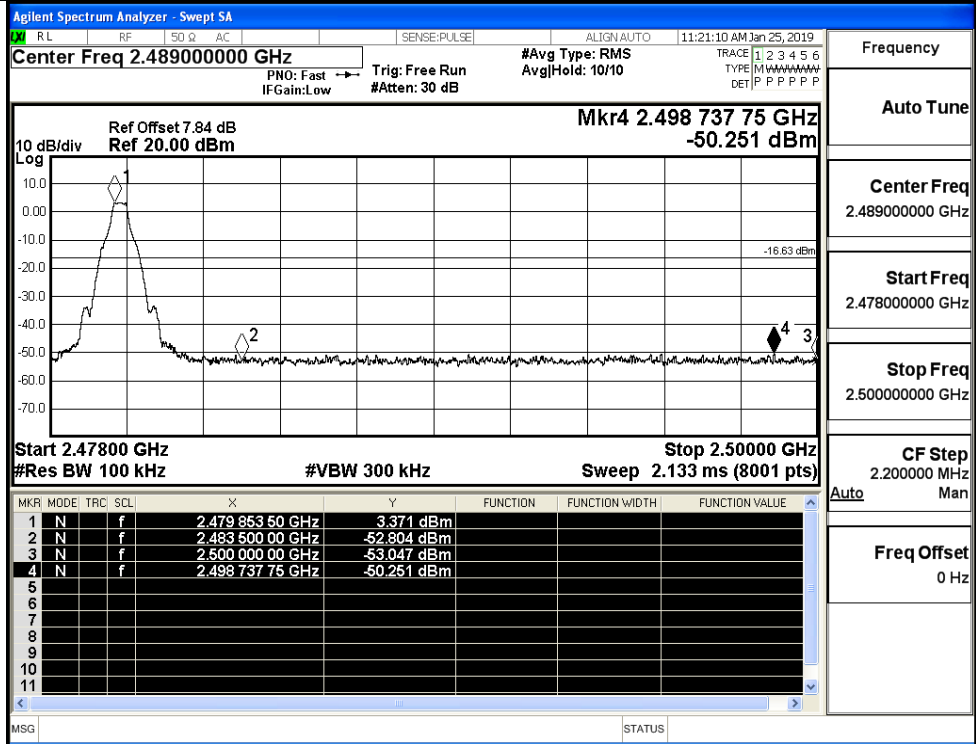
### A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.199	Off	-50.633	-16.8	PASS
			3.316	On	-50.415	-16.68	PASS
	HCH	2480	3.371	Off	-50.251	-16.63	PASS
			3.204	On	-50.017	-16.8	PASS
$\pi/4$ DQPSK	LCH	2402	1.366	Off	-50.098	-18.63	PASS
			2.004	On	-49.561	-18.00	PASS
	HCH	2480	1.662	Off	-49.663	-18.34	PASS
			1.726	On	-49.416	-18.27	PASS

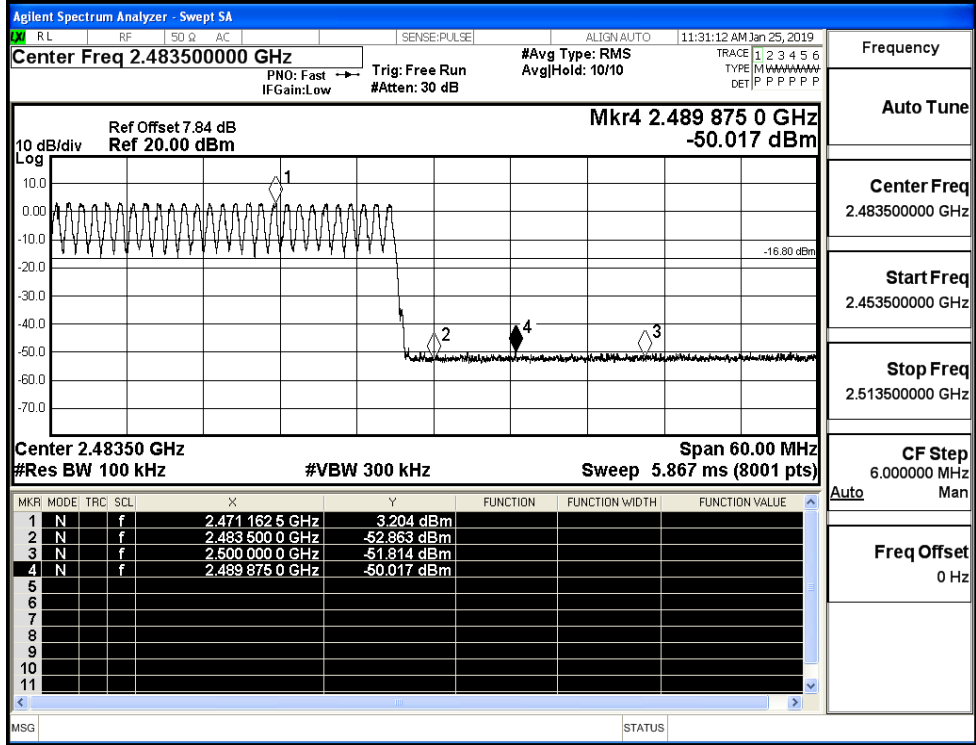
Test Graphs

GFSK/LCH/No Hop	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.35700000 GHz</p> <p>Ref Offset 7.84 dB Ref 20.00 dBm</p> <p>Mkr4 2.337 636 GHz -50.633 dBm</p> <p>Start 2.31000 GHz #Res BW 100 kHz</p> <p>Stop 2.40400 GHz #VBW 300 kHz Sweep 9.067 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>N</td><td>f</td><td></td><td>2.401 838 GHz</td><td>3.199 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.400 000 GHz</td><td>-51.124 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.390 000 GHz</td><td>-54.289 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.337 636 GHz</td><td>-50.633 dBm</td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.401 838 GHz	3.199 dBm				2	N	f		2.400 000 GHz	-51.124 dBm				3	N	f		2.390 000 GHz	-54.289 dBm				4	N	f		2.337 636 GHz	-50.633 dBm				<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.357000000 GHz</p> <p>Start Freq 2.310000000 GHz</p> <p>Stop Freq 2.404000000 GHz</p> <p>CF Step 9.400000 MHz</p> <p>Freq Offset 0 Hz</p>
	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																						
1	N	f		2.401 838 GHz	3.199 dBm																																										
2	N	f		2.400 000 GHz	-51.124 dBm																																										
3	N	f		2.390 000 GHz	-54.289 dBm																																										
4	N	f		2.337 636 GHz	-50.633 dBm																																										
GFSK/LCH/Hop	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.40000000 GHz</p> <p>Ref Offset 7.84 dB Ref 20.00 dBm</p> <p>Mkr4 2.381 242 5 GHz -50.415 dBm</p> <p>Center 2.40000 GHz #Res BW 100 kHz</p> <p>Span 60.00 MHz #VBW 300 kHz Sweep 5.867 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>N</td><td>f</td><td></td><td>2.402 056 0 GHz</td><td>3.316 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.400 000 0 GHz</td><td>-52.253 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.390 000 0 GHz</td><td>-52.854 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.381 242 5 GHz</td><td>-50.415 dBm</td><td></td><td></td><td></td></tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	f		2.402 056 0 GHz	3.316 dBm				2	N	f		2.400 000 0 GHz	-52.253 dBm				3	N	f		2.390 000 0 GHz	-52.854 dBm				4	N	f		2.381 242 5 GHz	-50.415 dBm				<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.400000000 GHz</p> <p>Start Freq 2.370000000 GHz</p> <p>Stop Freq 2.430000000 GHz</p> <p>CF Step 6.000000 MHz</p> <p>Freq Offset 0 Hz</p>
	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																						
1	N	f		2.402 056 0 GHz	3.316 dBm																																										
2	N	f		2.400 000 0 GHz	-52.253 dBm																																										
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4	N	f		2.381 242 5 GHz	-50.415 dBm																																										

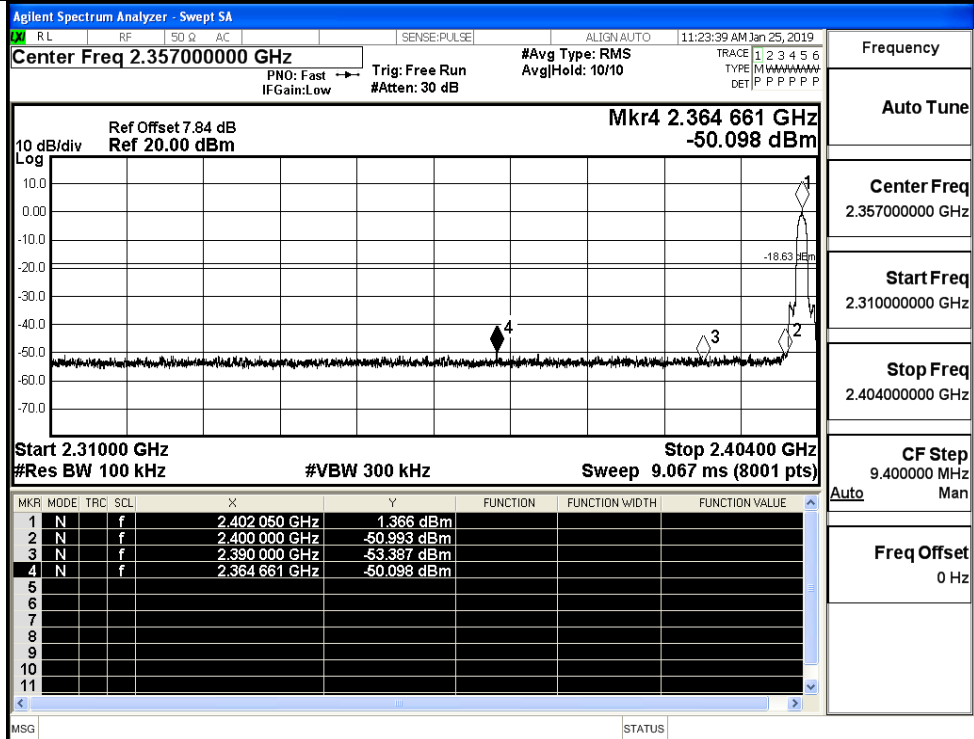
GFSK/HCH/No Hop



GFSK/HCH/Hop

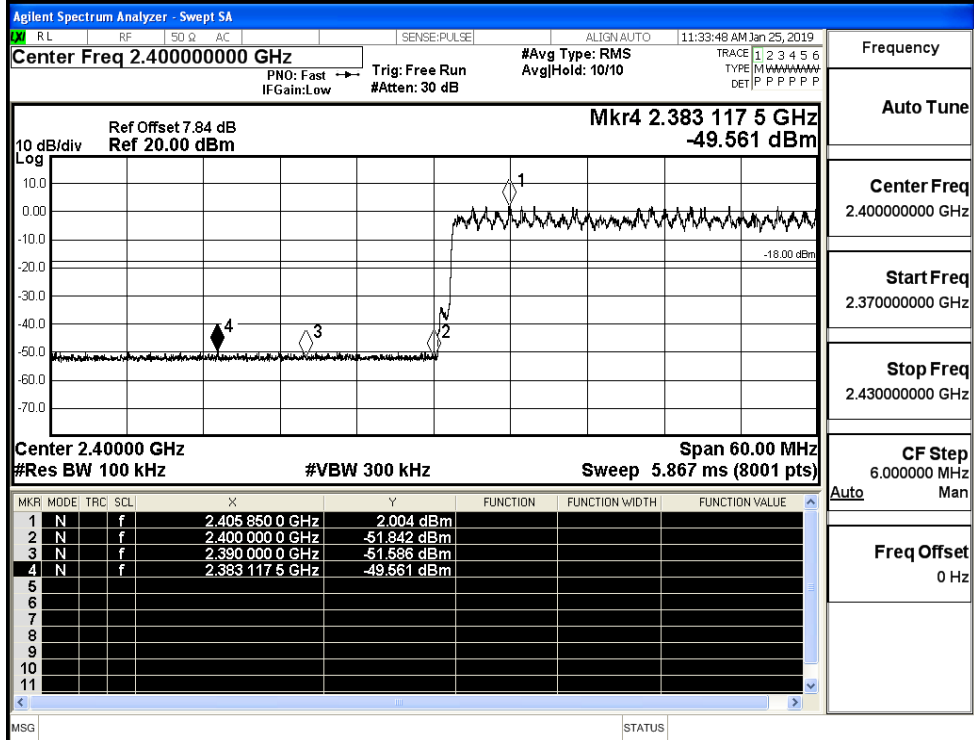


$\pi/4$ DQPSK/LCH/No  
Hop



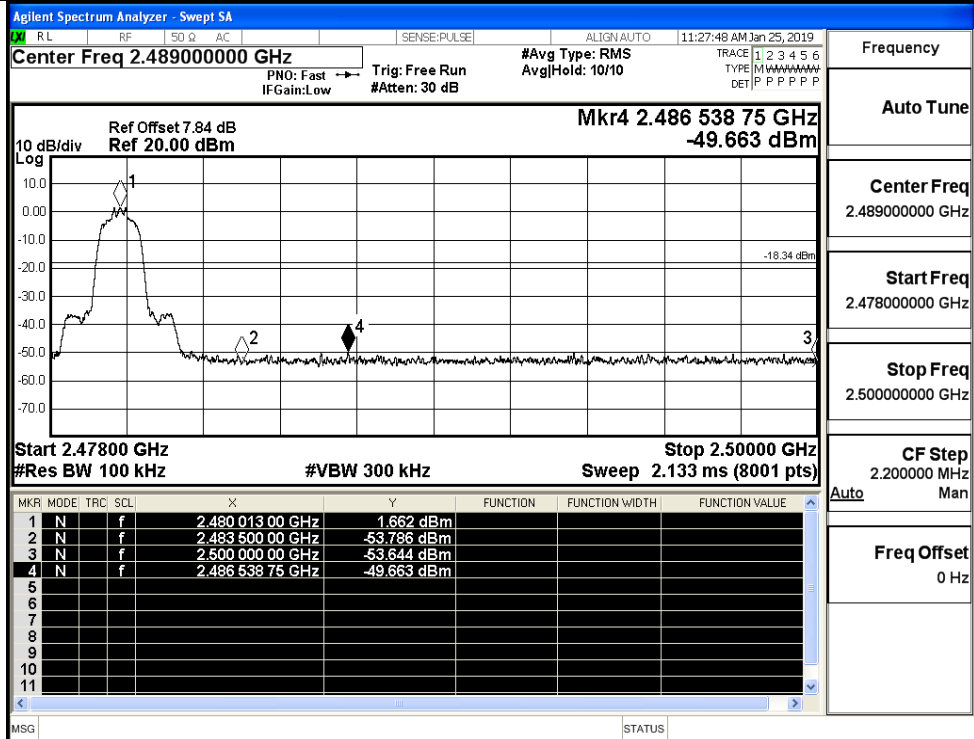
Frequency	
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH/Hop

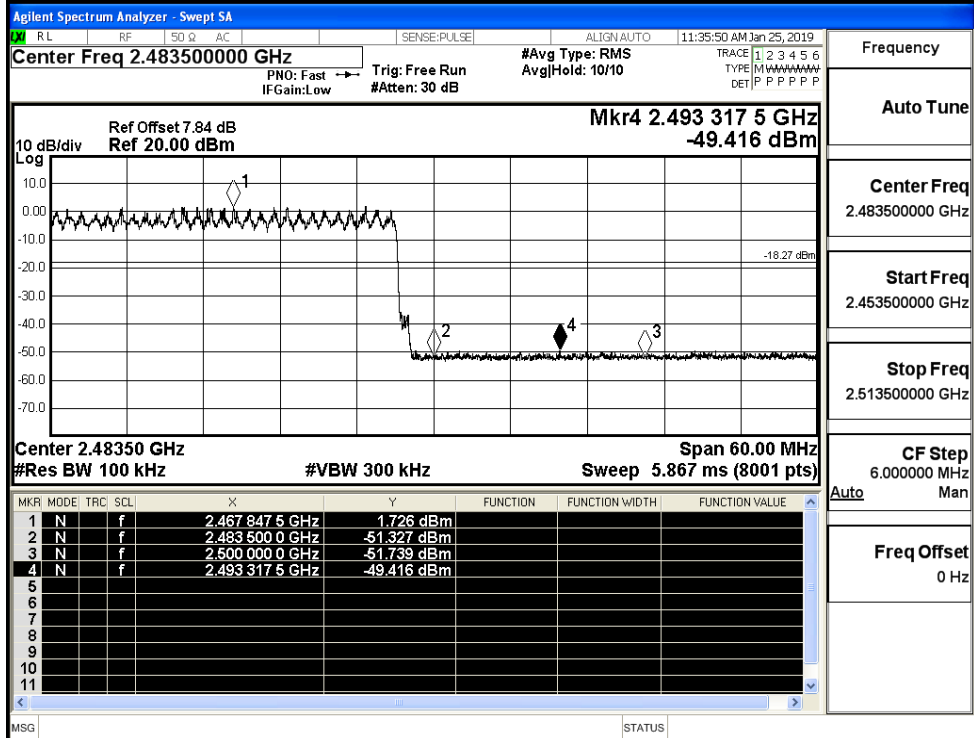


Frequency	
Auto Tune	
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

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



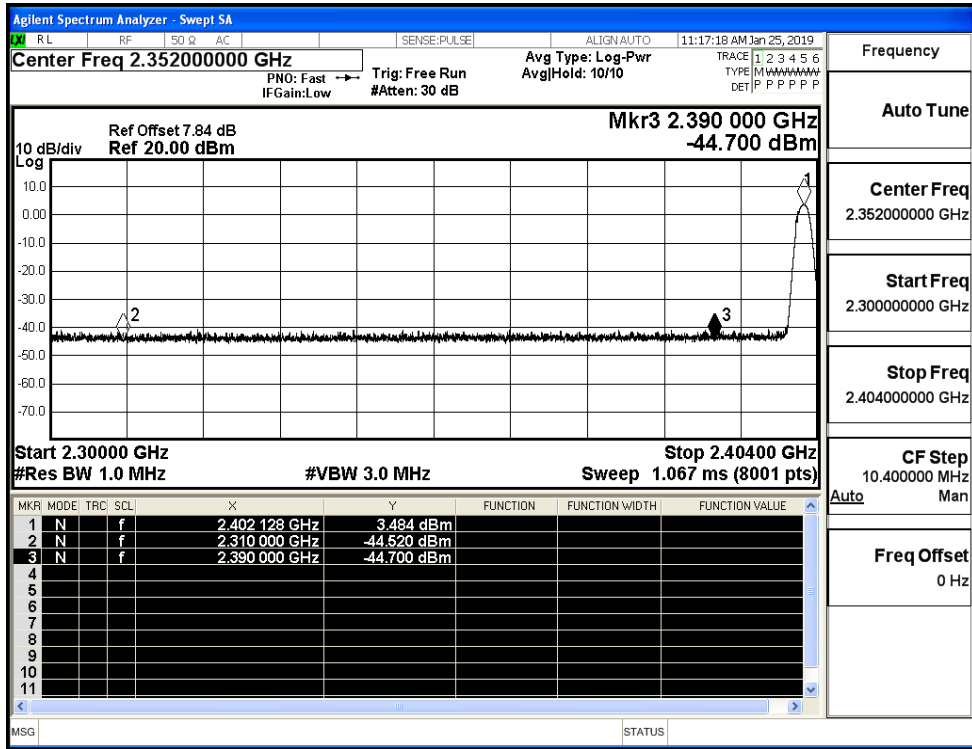
$\pi/4$ DQPSK/HCH/Hop



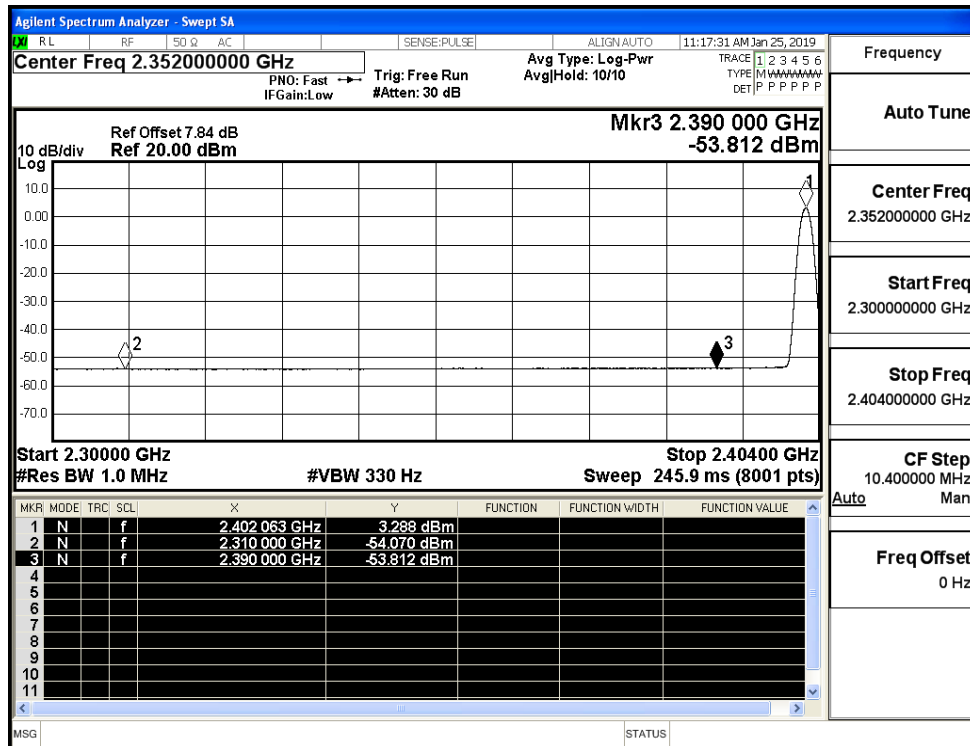
### A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.52	2.0	0	52.74	PEAK	74	PASS
	Off	2310.0	-54.07	2.0	0	43.19	AV	54	PASS
	Off	2390.0	-44.70	2.0	0	52.56	PEAK	74	PASS
	Off	2390.0	-53.81	2.0	0	43.45	AV	54	PASS
	Off	2483.5	-42.77	2.0	0	54.48	PEAK	74	PASS
	Off	2483.5	-53.30	2.0	0	43.96	AV	54	PASS
	Off	2500.0	-42.06	2.0	0	55.20	PEAK	74	PASS
	Off	2500.0	-53.25	2.0	0	44.01	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.23	2.0	0	54.02	PEAK	74	PASS
	Off	2310.0	-54.10	2.0	0	43.16	AV	54	PASS
	Off	2390.0	-43.53	2.0	0	53.73	PEAK	74	PASS
	Off	2390.0	-53.69	2.0	0	43.57	AV	54	PASS
	Off	2483.5	-43.69	2.0	0	53.57	PEAK	74	PASS
	Off	2483.5	-53.25	2.0	0	44.01	AV	54	PASS
	Off	2500.0	-43.55	2.0	0	53.71	PEAK	74	PASS
	Off	2500.0	-53.45	2.0	0	43.81	AV	54	PASS

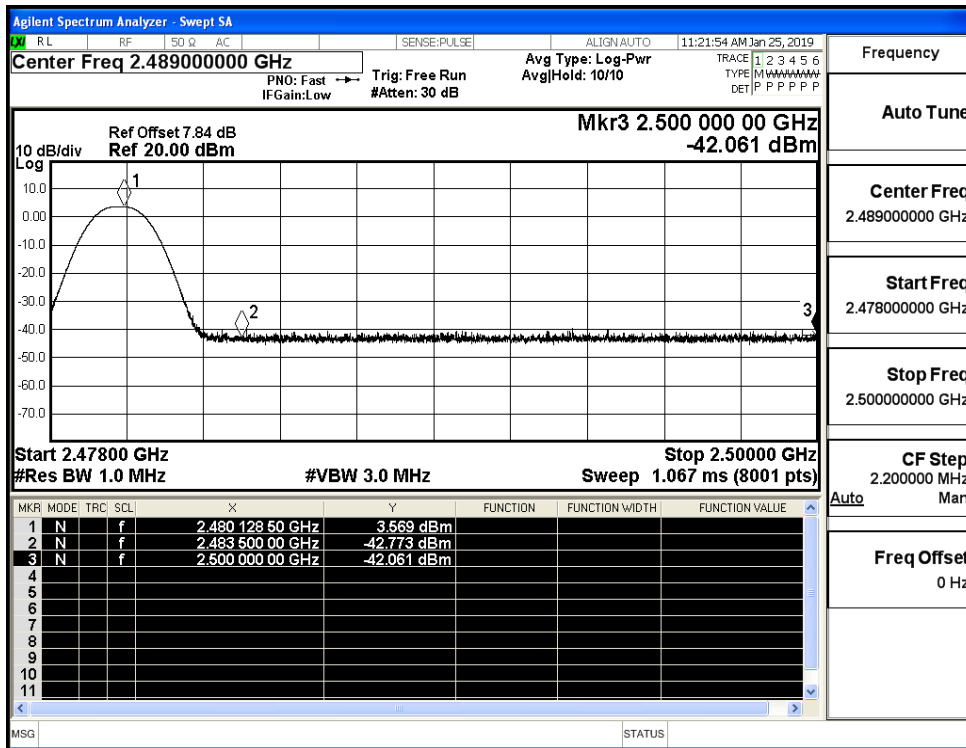
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



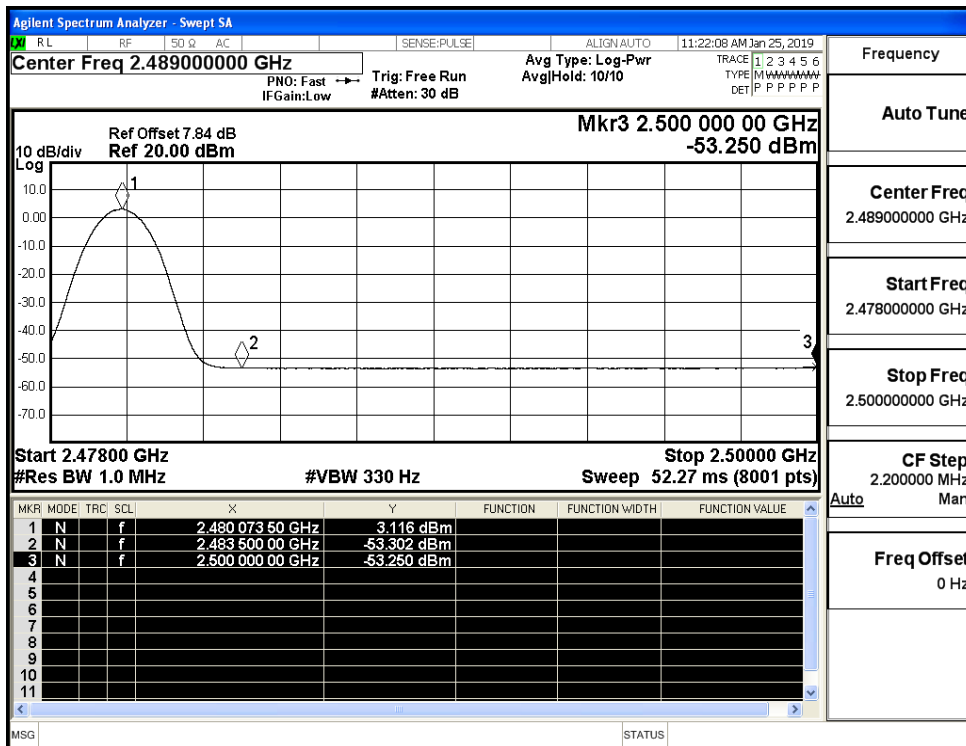
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



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

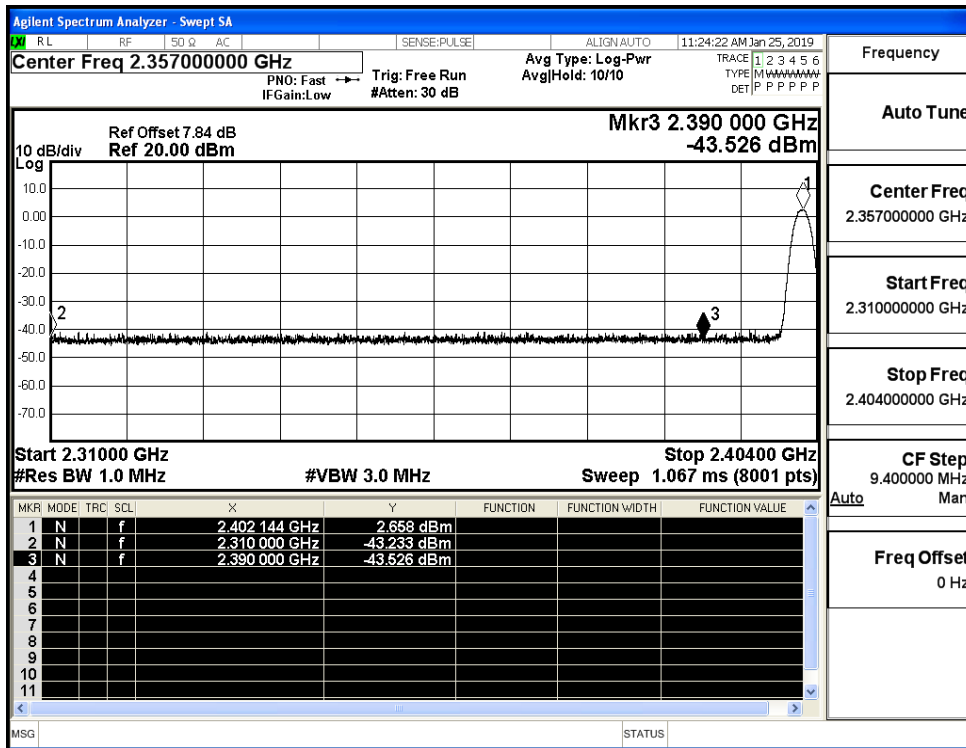


Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)

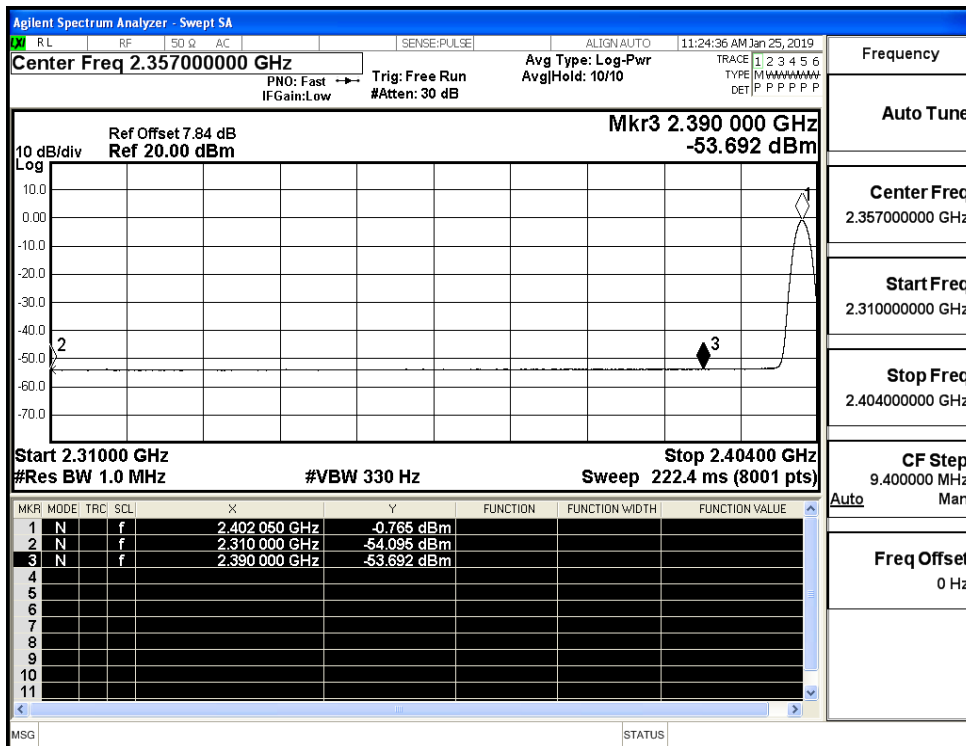




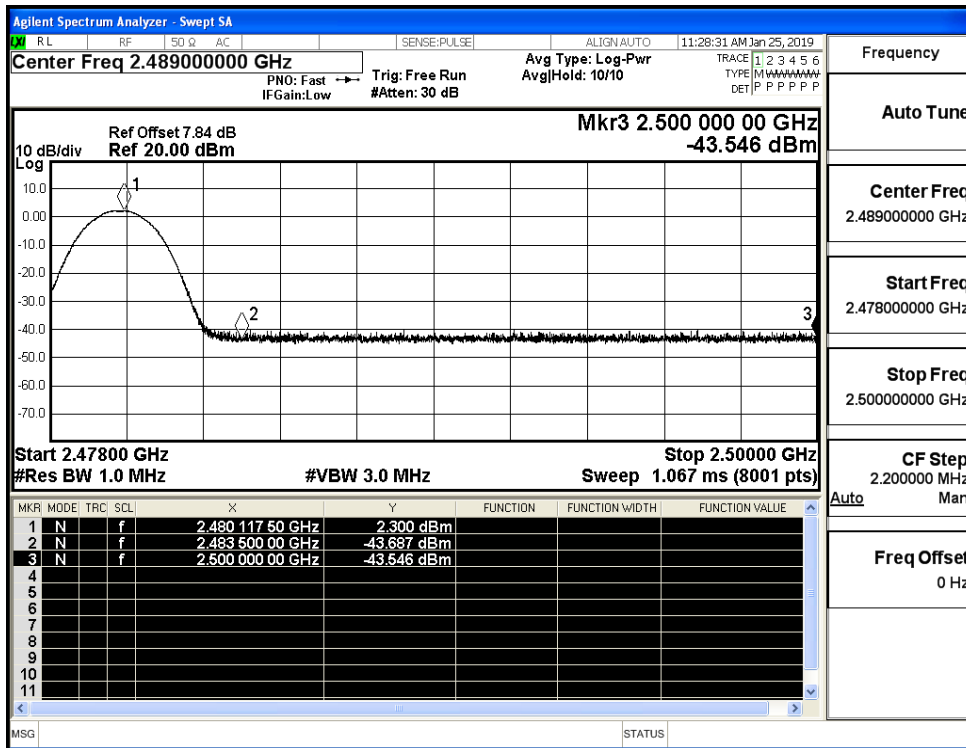
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



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)

