

## Appendix A

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

Product Name: Light Up Logo Bluetooth Earbuds

Trade Mark: N/A

Test Model: XO-9720

#### Environmental Conditions

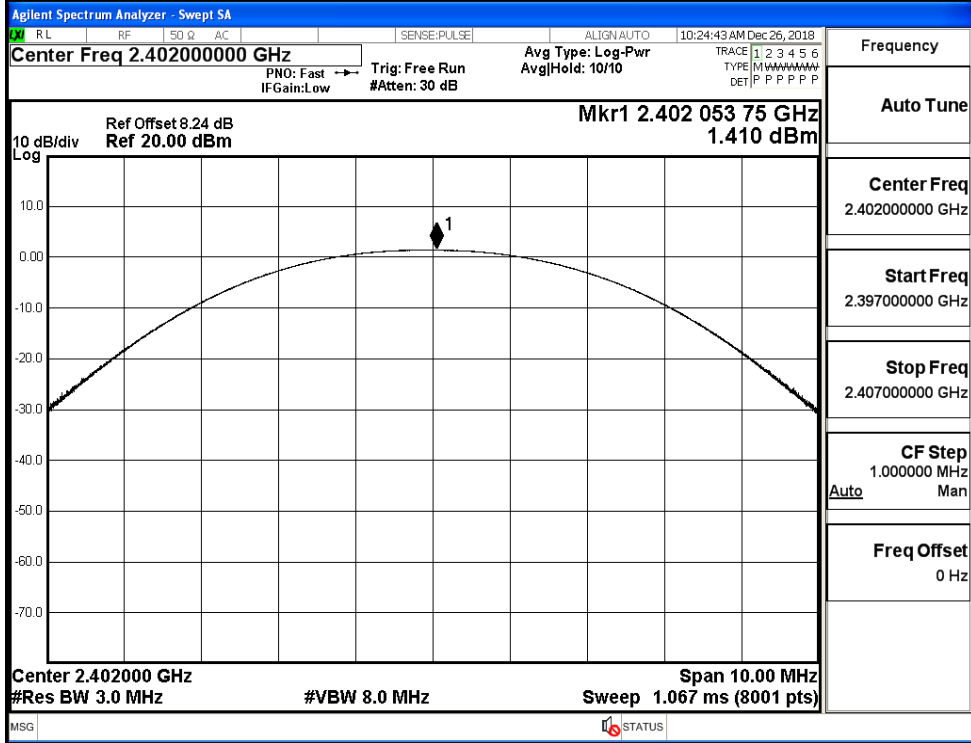
Temperature:	24.8 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Jayden.Zhuo

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

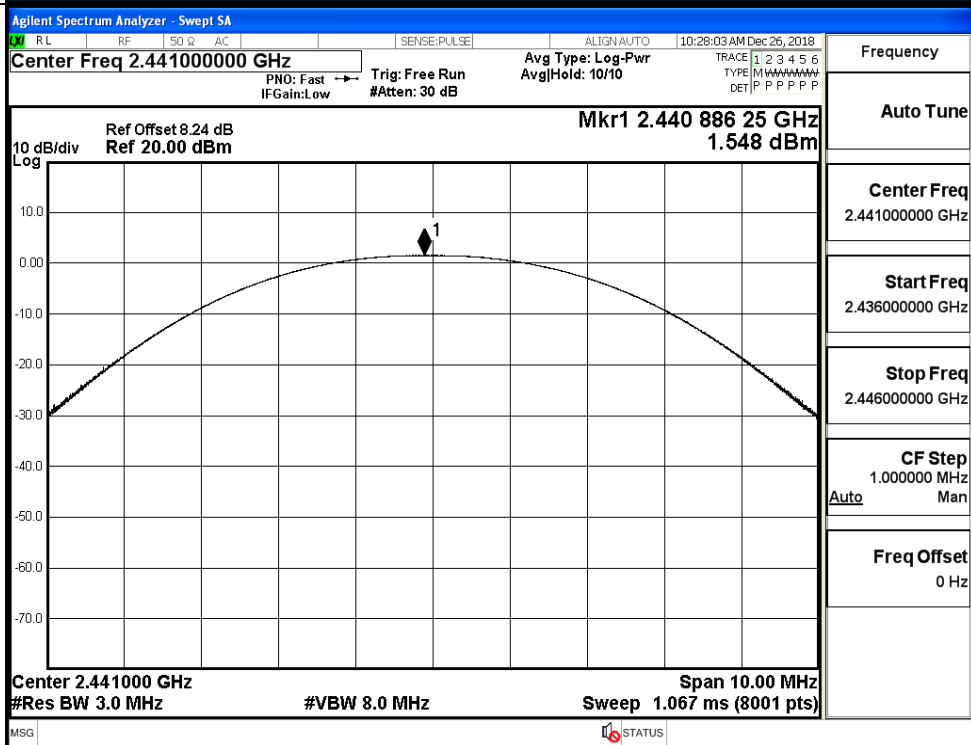
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.410	21	PASS
	MCH	1.548	21	PASS
	HCH	1.479	21	PASS
$\pi/4$ DQPSK	LCH	0.625	21	PASS
	MCH	0.734	21	PASS
	HCH	0.681	21	PASS
8DPSK	LCH	0.788	21	PASS
	MCH	0.906	21	PASS
	HCH	0.811	21	PASS

Test Graphs

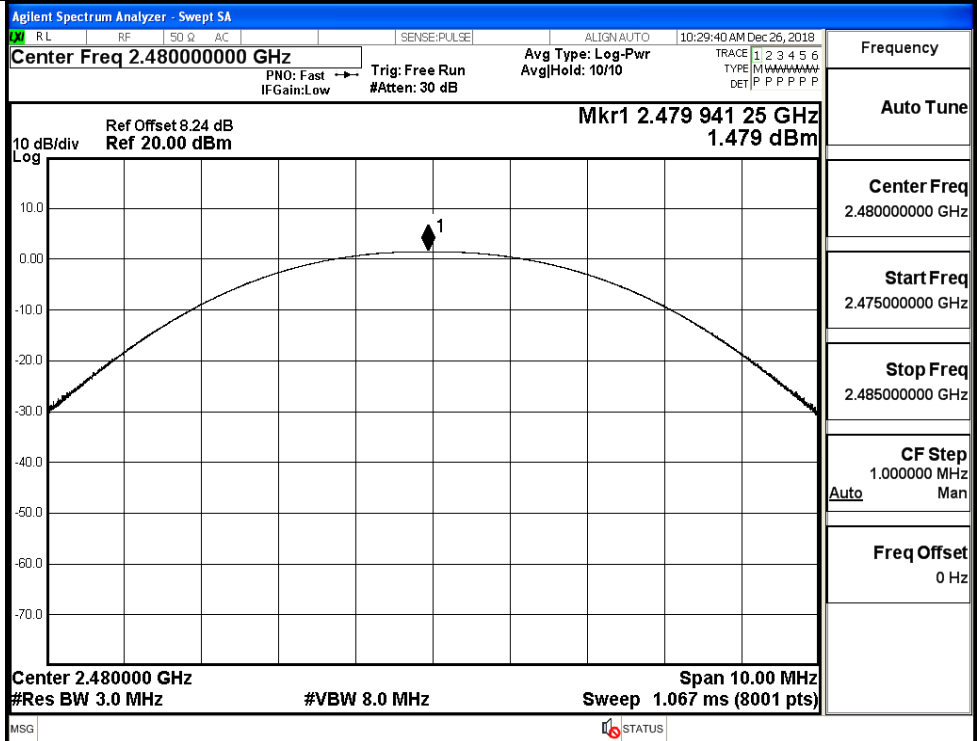
GFSK/LCH



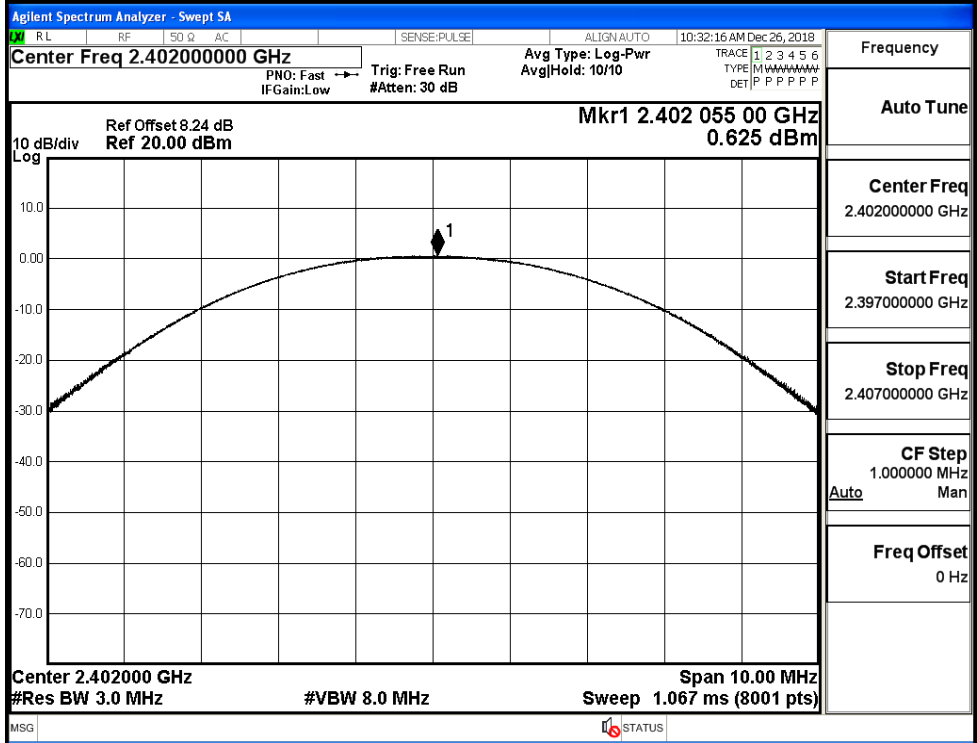
GFSK/MCH



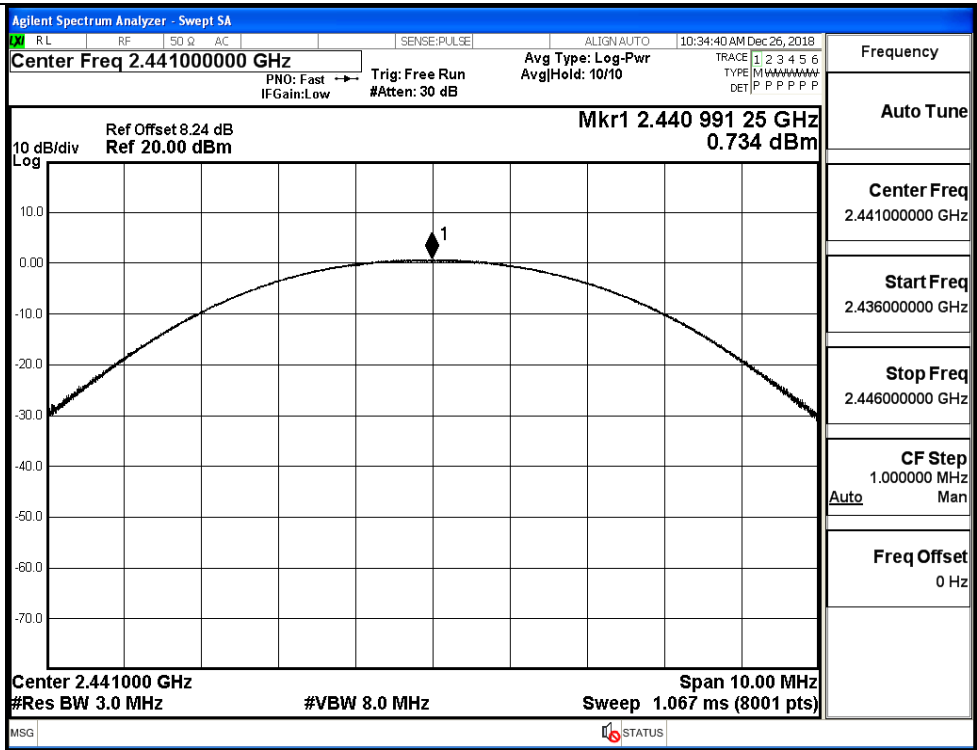
GFSK/HCH



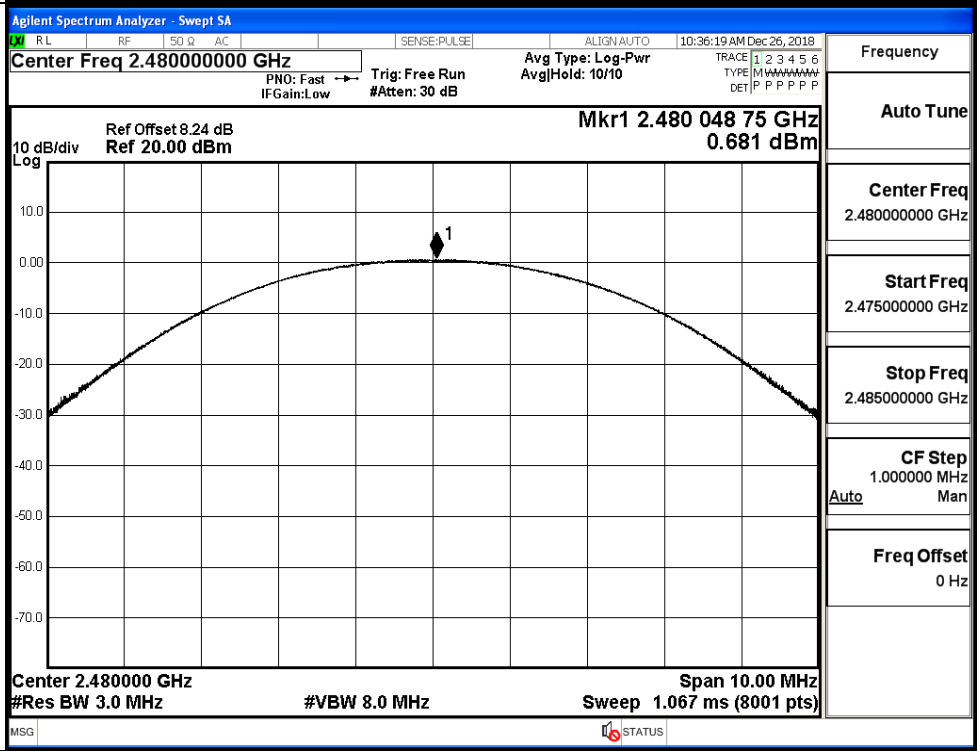
$\pi/4$ DQPSK/LCH



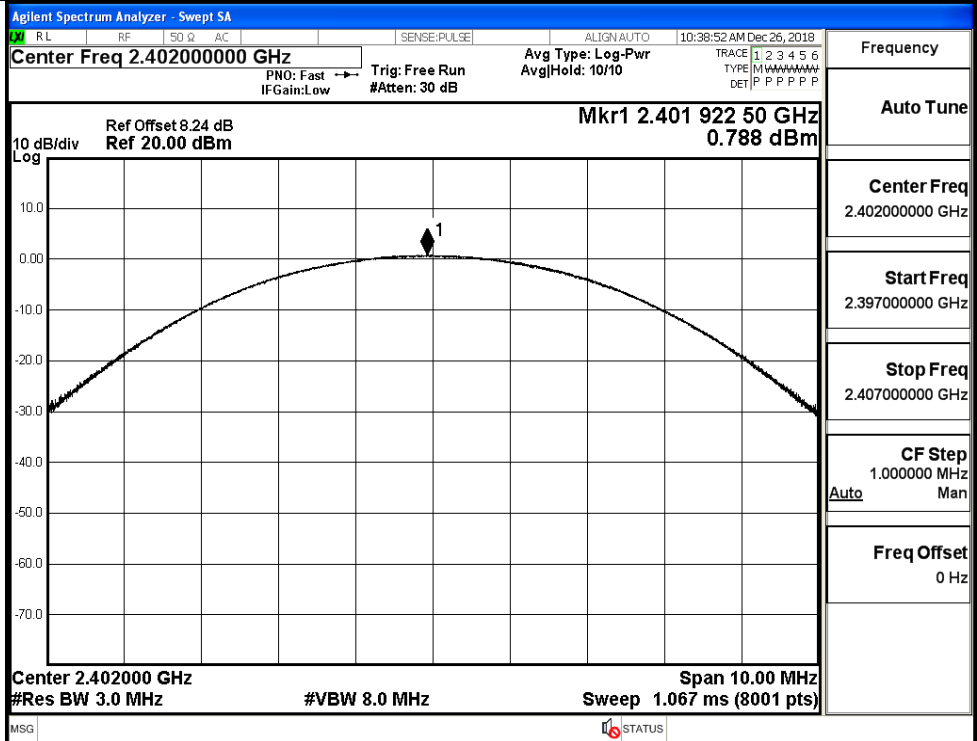
$\pi$ /4DQPSK/MCH



$\pi$ /4DQPSK/HCH

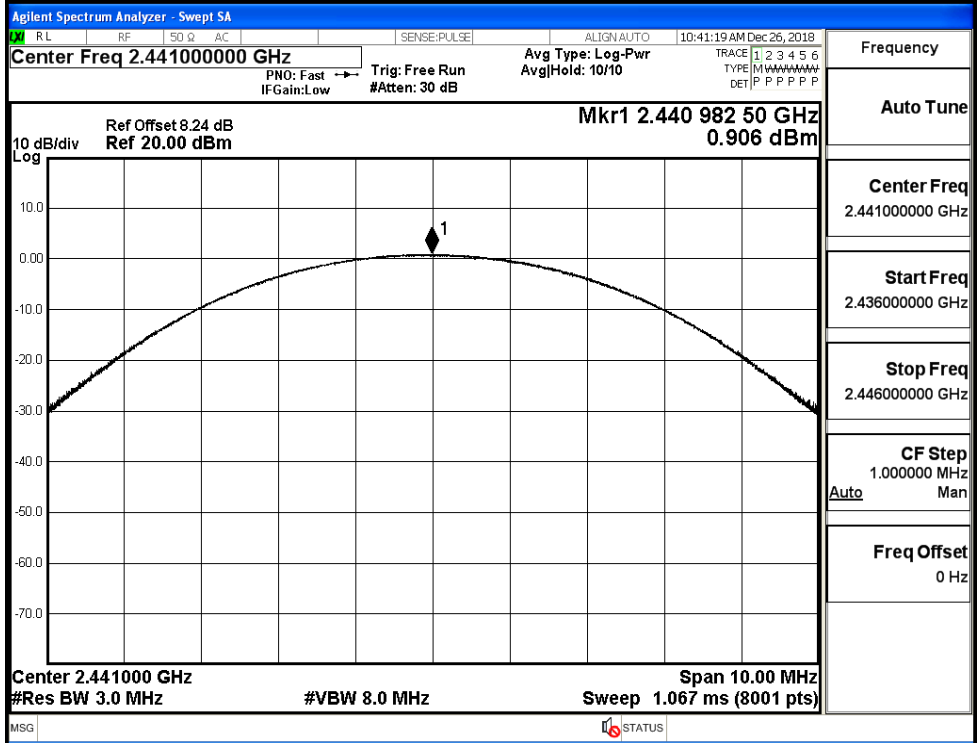


8DPSK/LCH



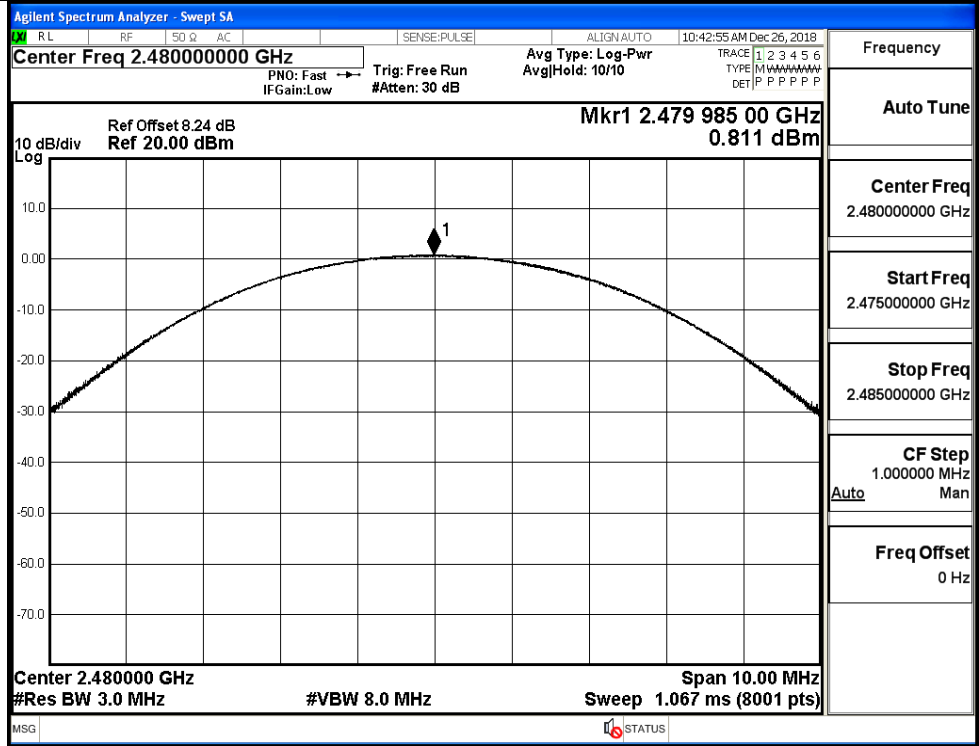
Frequency	2.402000000 GHz
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.397000000 GHz
Stop Freq	2.407000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK/MCH



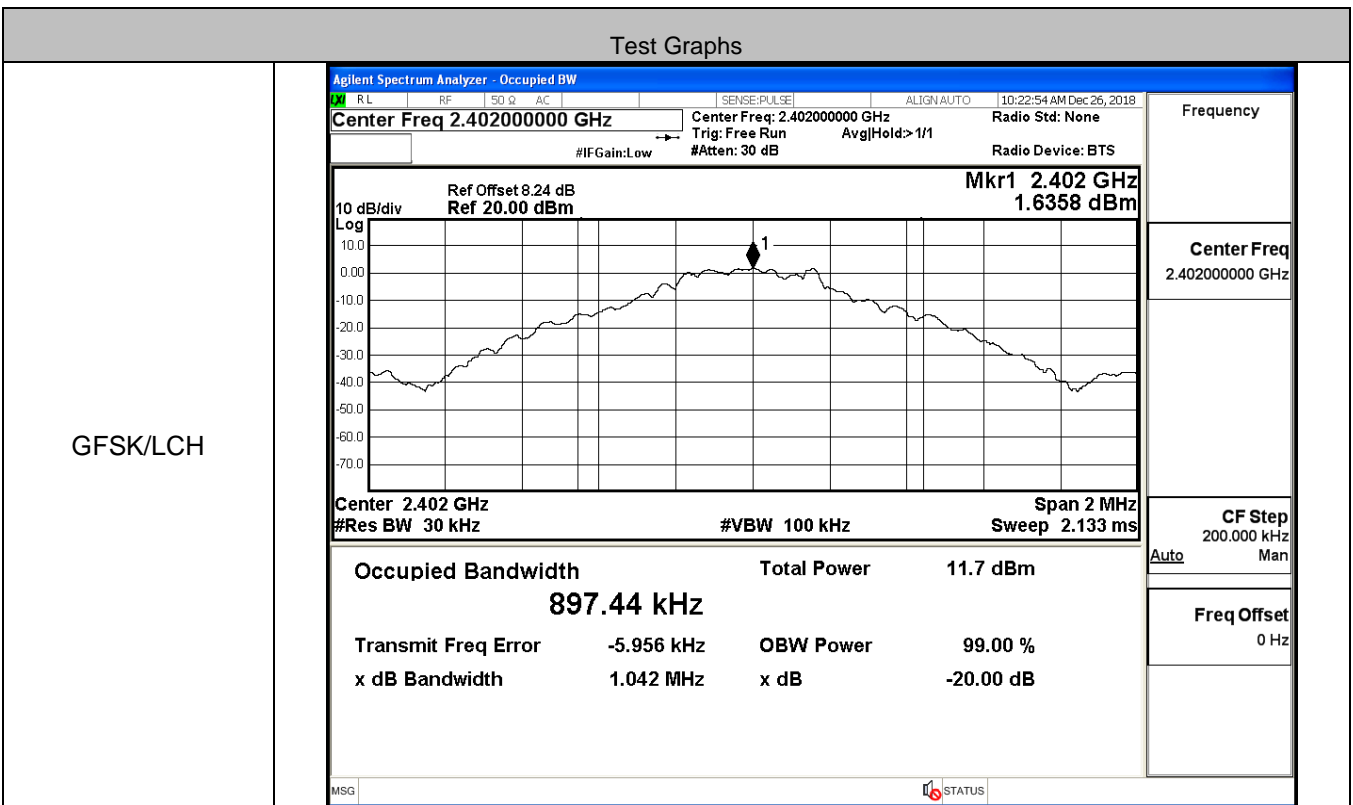
Frequency	2.441000000 GHz
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.436000000 GHz
Stop Freq	2.446000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK/HCH

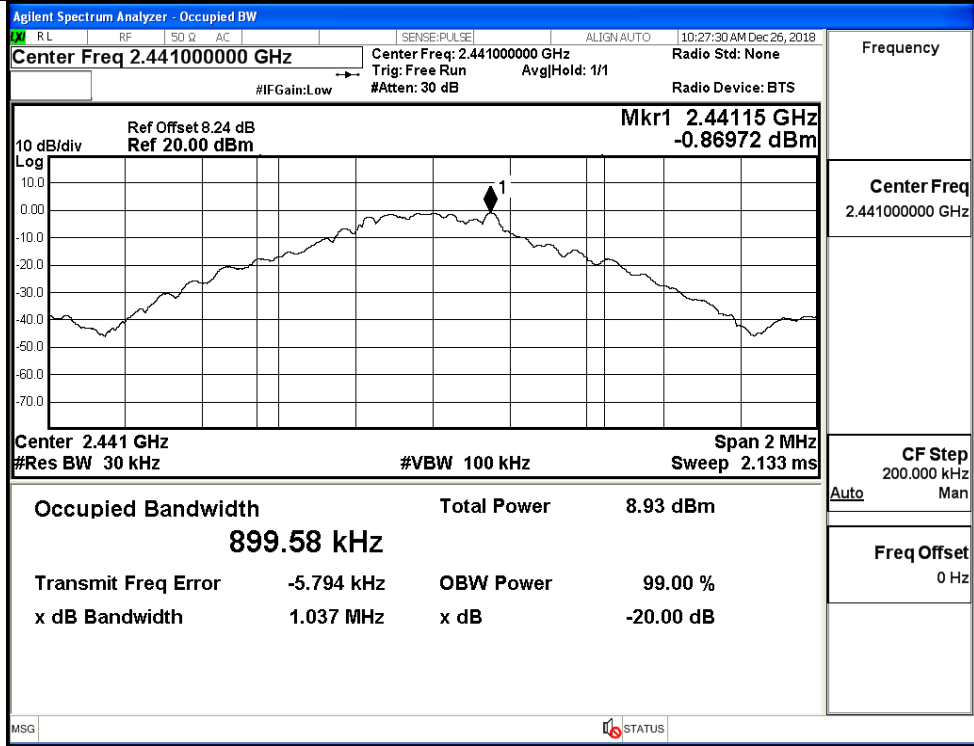


**A.2 99% and 20dB Bandwidth**

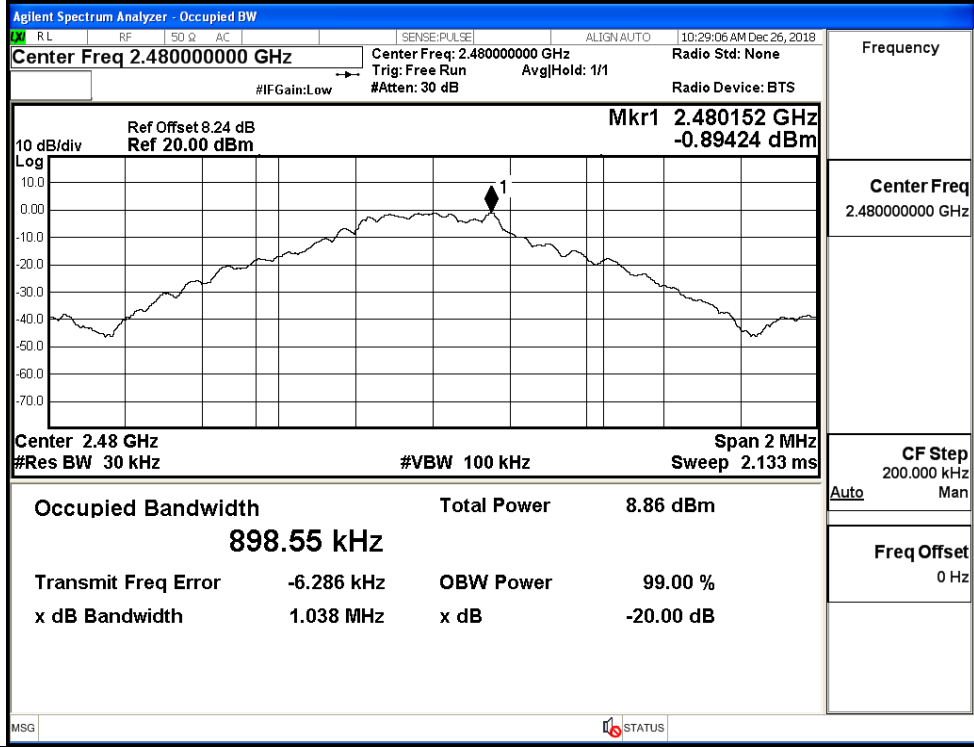
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89744	1.042	Not Specified	PASS
	MCH	0.89958	1.037	Not Specified	PASS
	HCH	0.89855	1.038	Not Specified	PASS
π/4DQPSK	LCH	1.1743	1.291	Not Specified	PASS
	MCH	1.1720	1.292	Not Specified	PASS
	HCH	1.1718	1.290	Not Specified	PASS
8DPSK	LCH	1.1814	1.295	Not Specified	PASS
	MCH	1.1808	1.303	Not Specified	PASS
	HCH	1.1795	1.294	Not Specified	PASS



GFSK/MCH

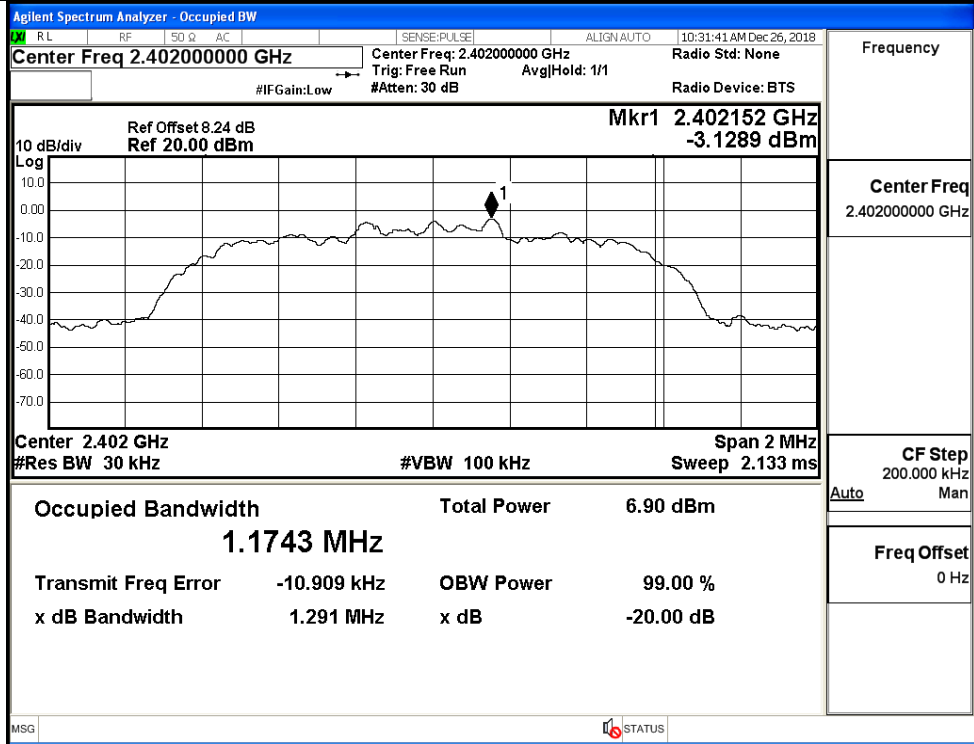


GFSK/HCH

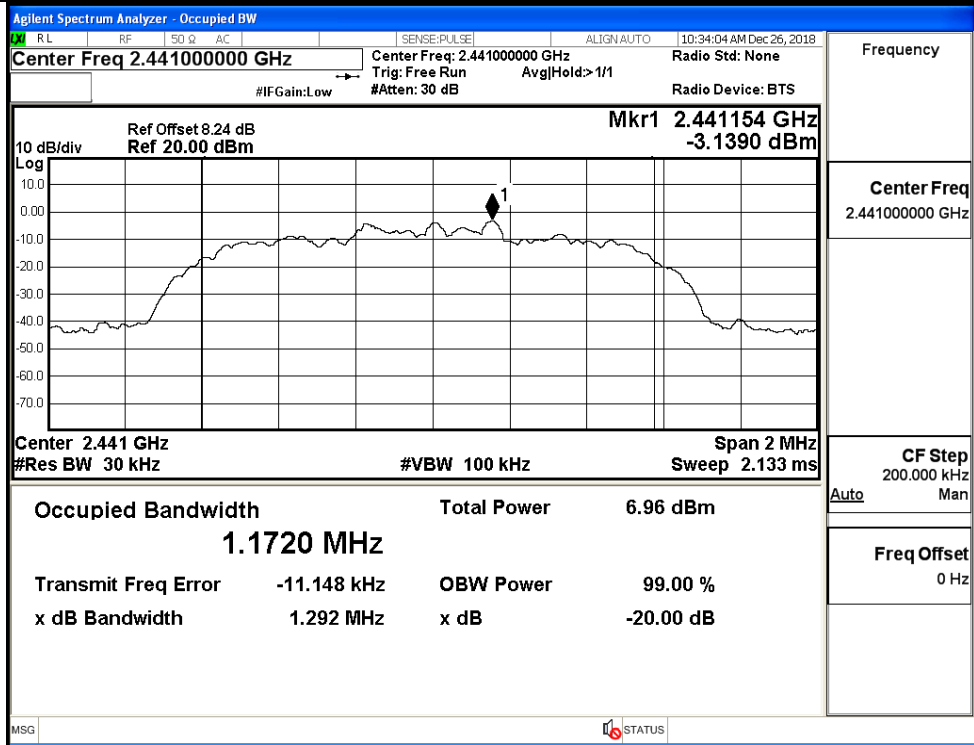




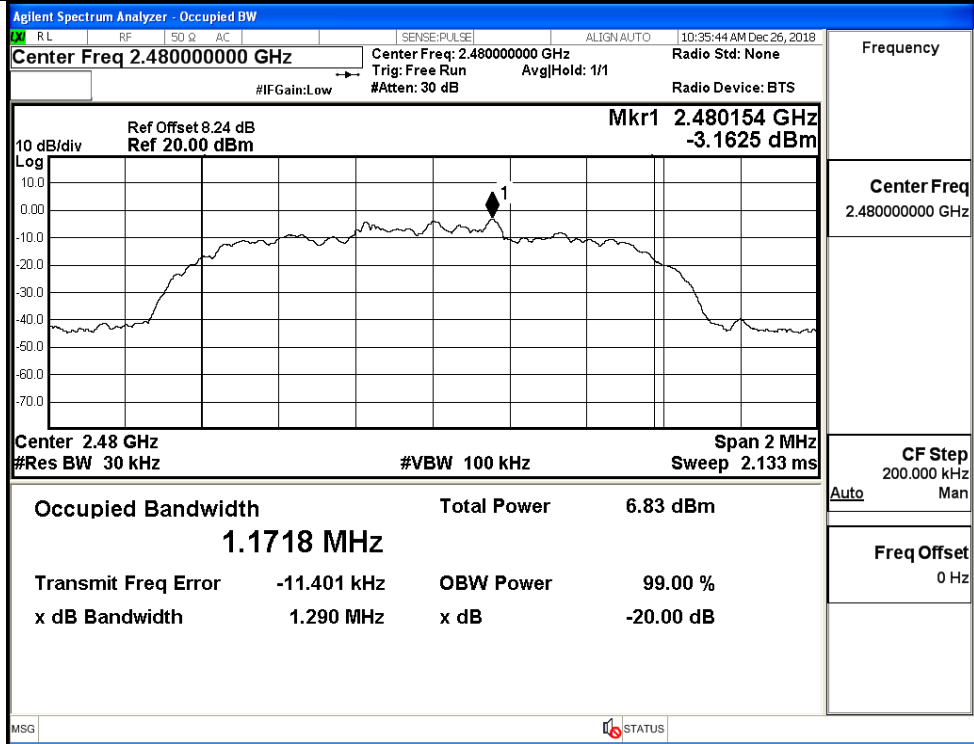
$\pi/4$ DQPSK/LCH



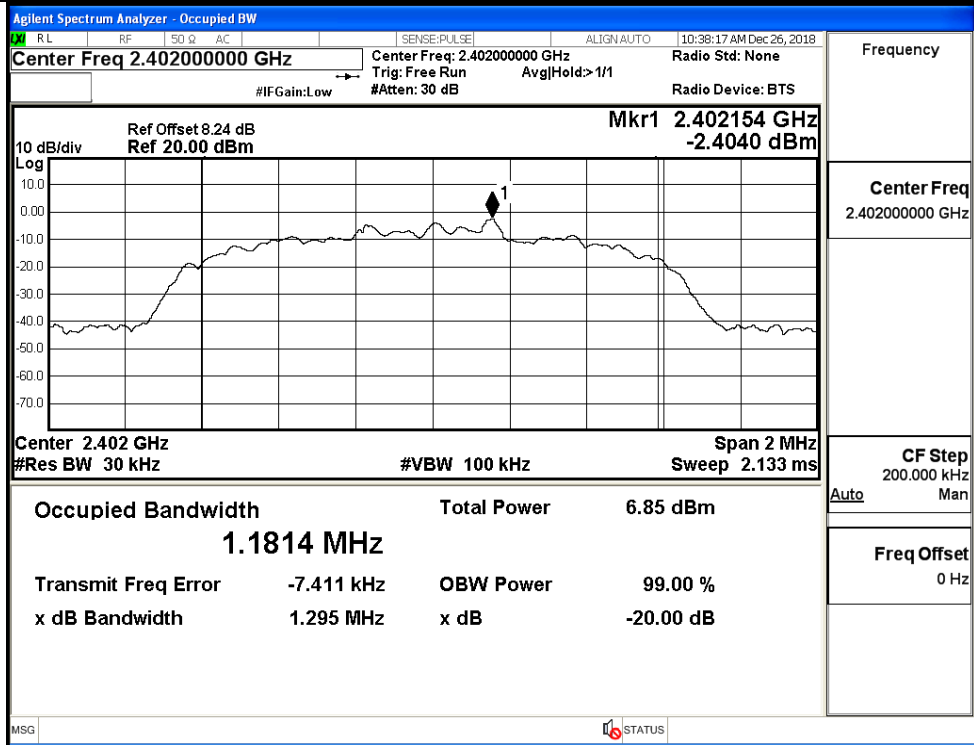
$\pi/4$ DQPSK/MCH



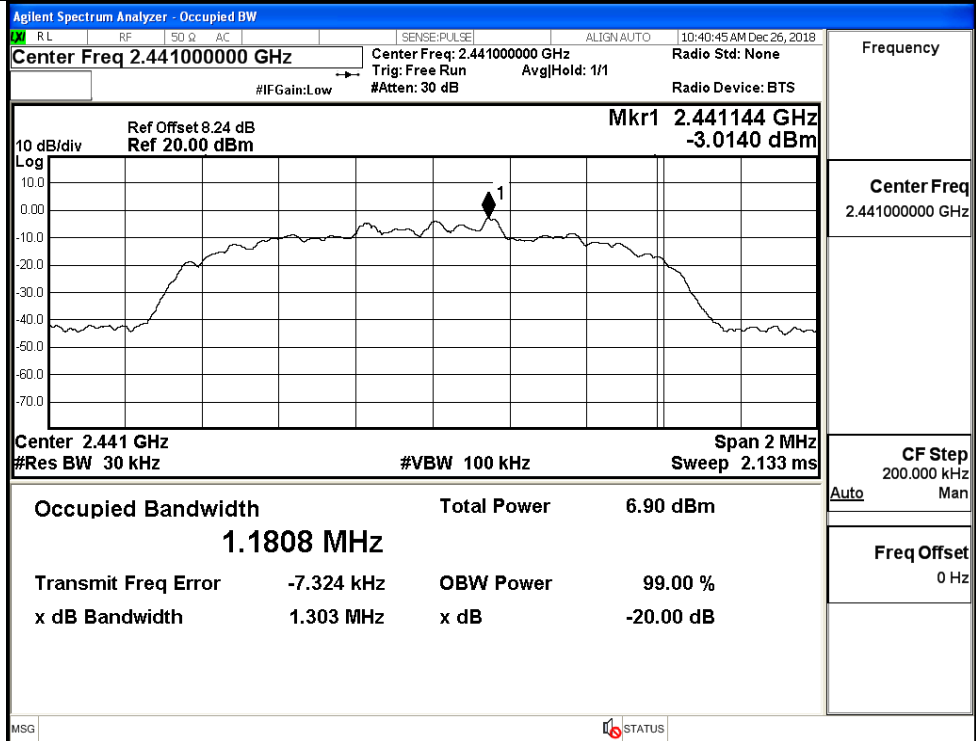
$\pi/4$ DQPSK/HCH



8DPSK/LCH

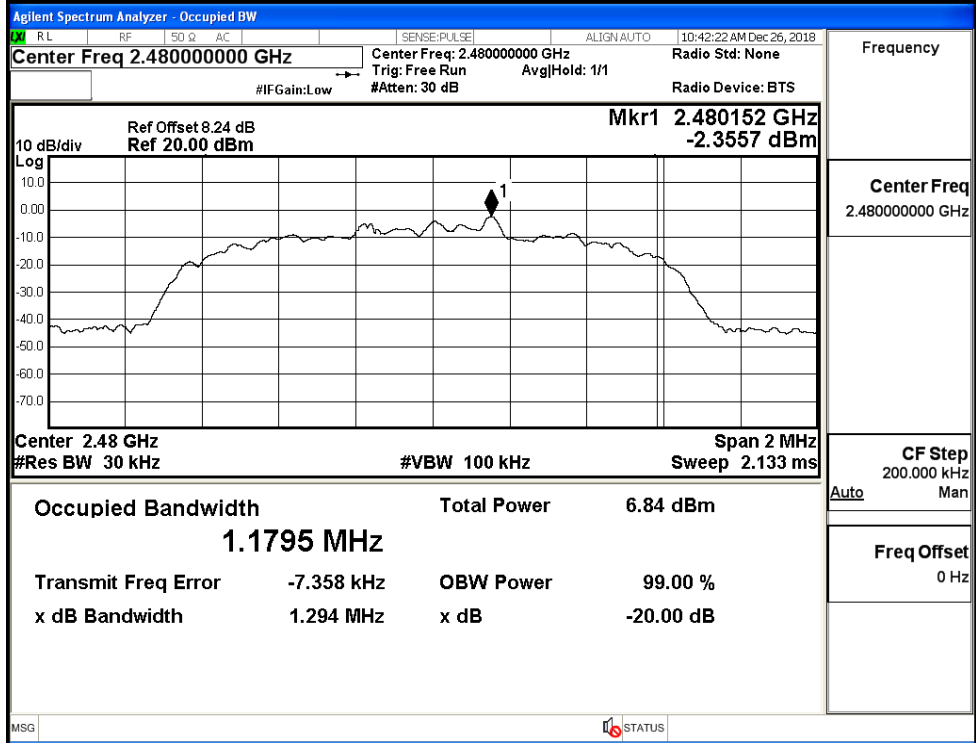


8DPSK/MCH



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

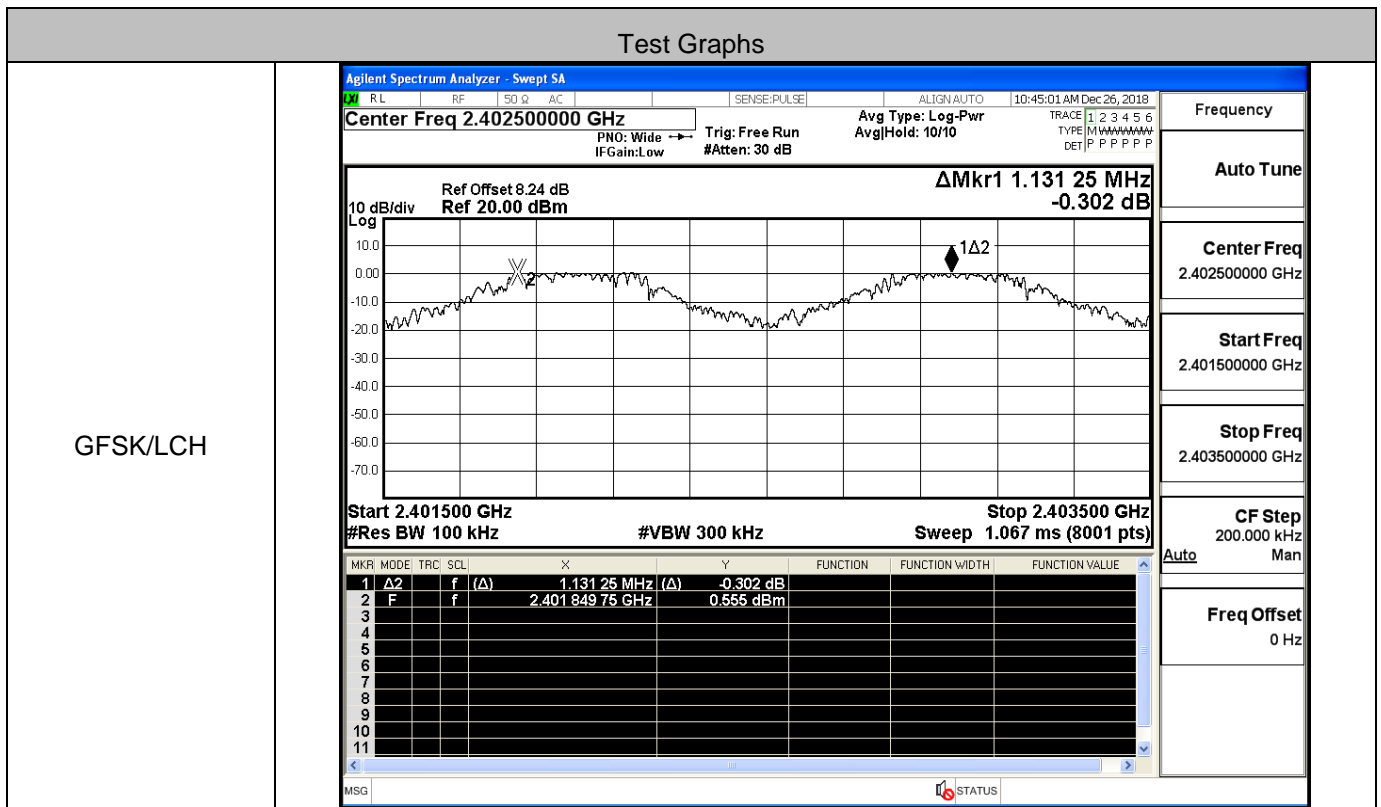
8DPSK/HCH



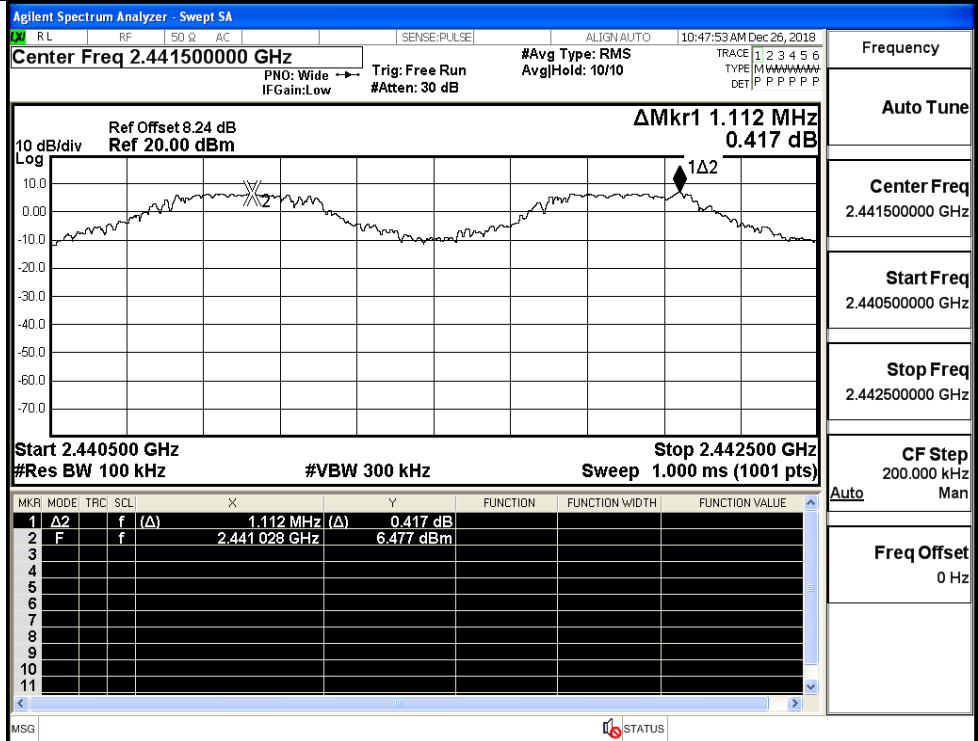
Frequency	2.48000000 GHz
Center Freq	2.48000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

### A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.131	0.695	PASS
	MCH	1.112	0.695	PASS
	HCH	0.954	0.695	PASS
π/4DQPSK	LCH	1.122	0.861	PASS
	MCH	0.922	0.861	PASS
	HCH	1.086	0.861	PASS
8DPSK	LCH	1.172	0.869	PASS
	MCH	0.878	0.869	PASS
	HCH	1.318	0.869	PASS

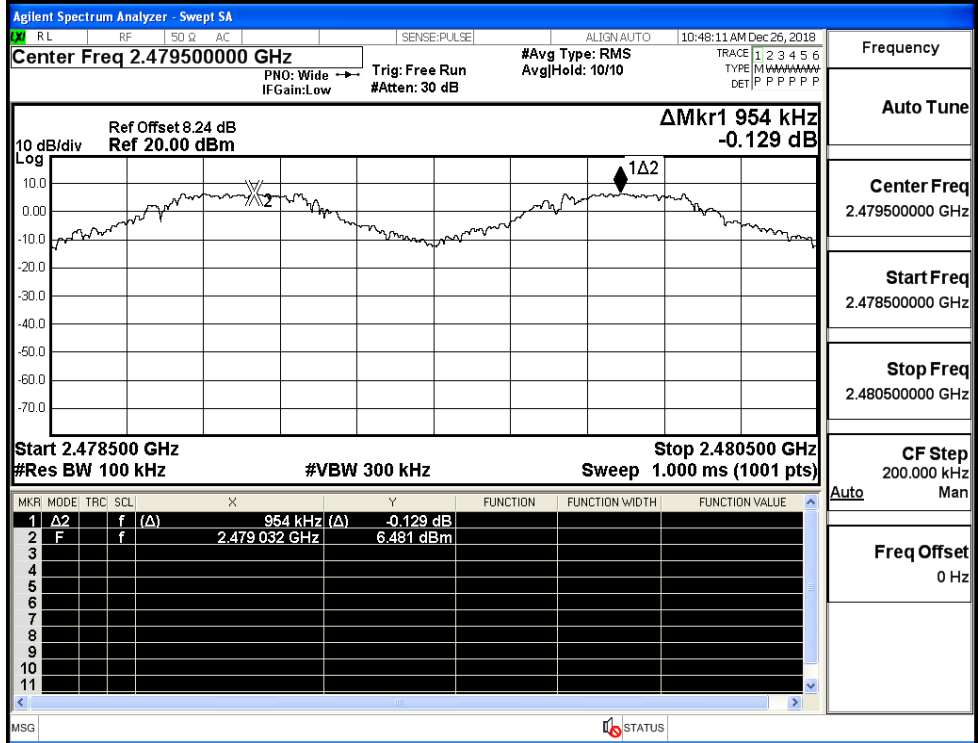


GFSK/MCH



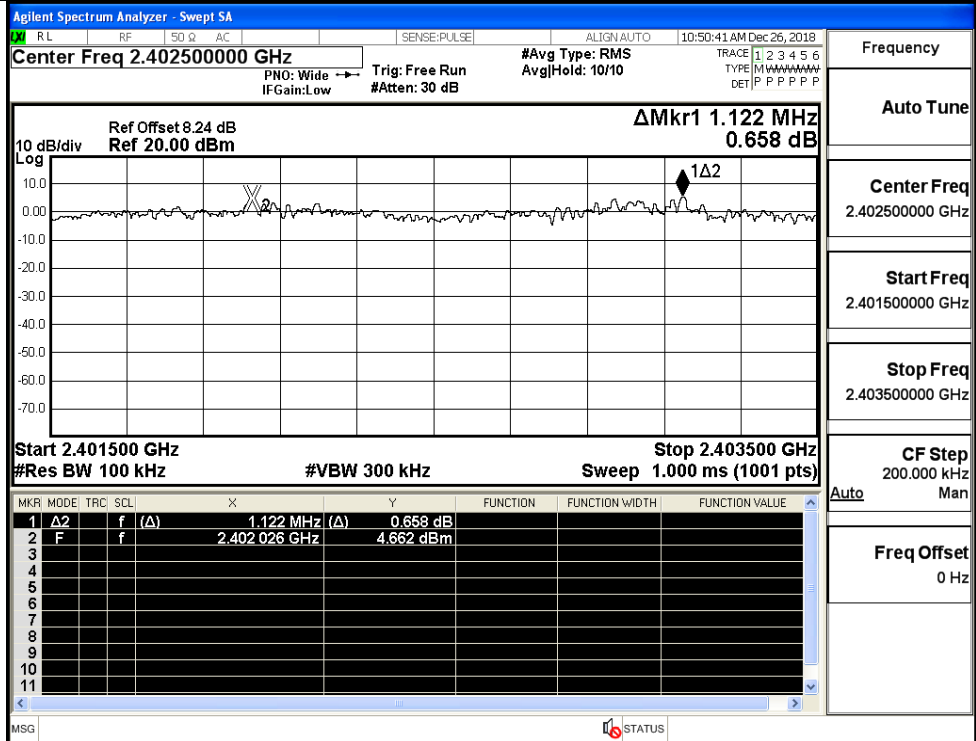
Frequency  
Auto Tune  
Center Freq  
2.441500000 GHz  
Start Freq  
2.440500000 GHz  
Stop Freq  
2.442500000 GHz  
CF Step  
200.000 kHz  
Auto  
Man  
Freq Offset  
0 Hz

GFSK/HCH



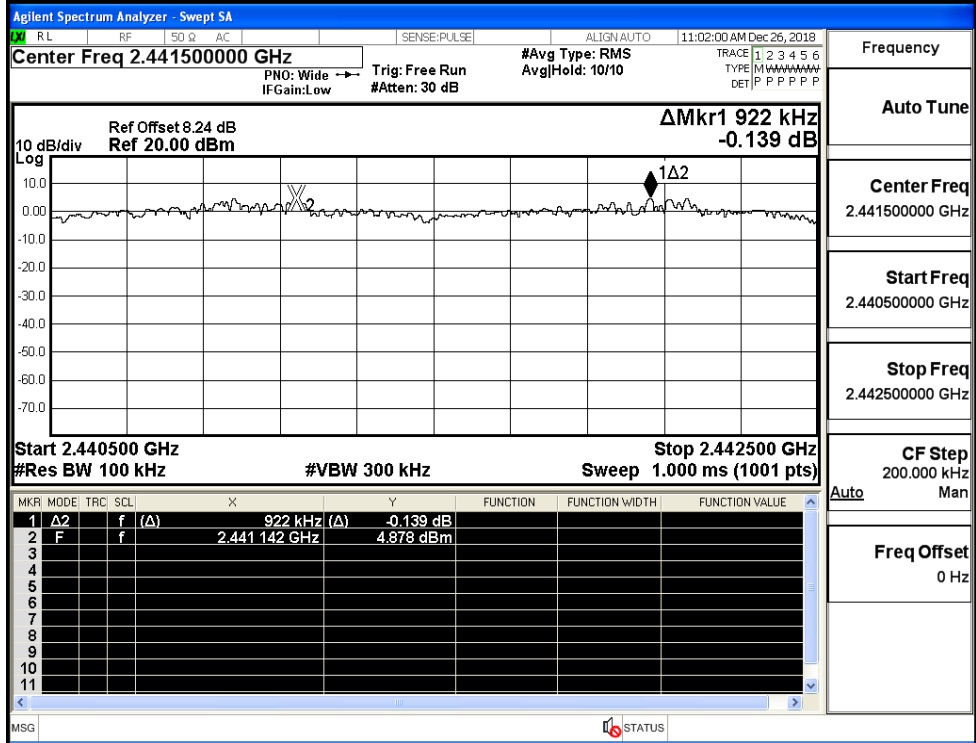
Frequency  
Auto Tune  
Center Freq  
2.479500000 GHz  
Start Freq  
2.478500000 GHz  
Stop Freq  
2.480500000 GHz  
CF Step  
200.000 kHz  
Auto  
Man  
Freq Offset  
0 Hz

$\pi/4$ DQPSK/LCH



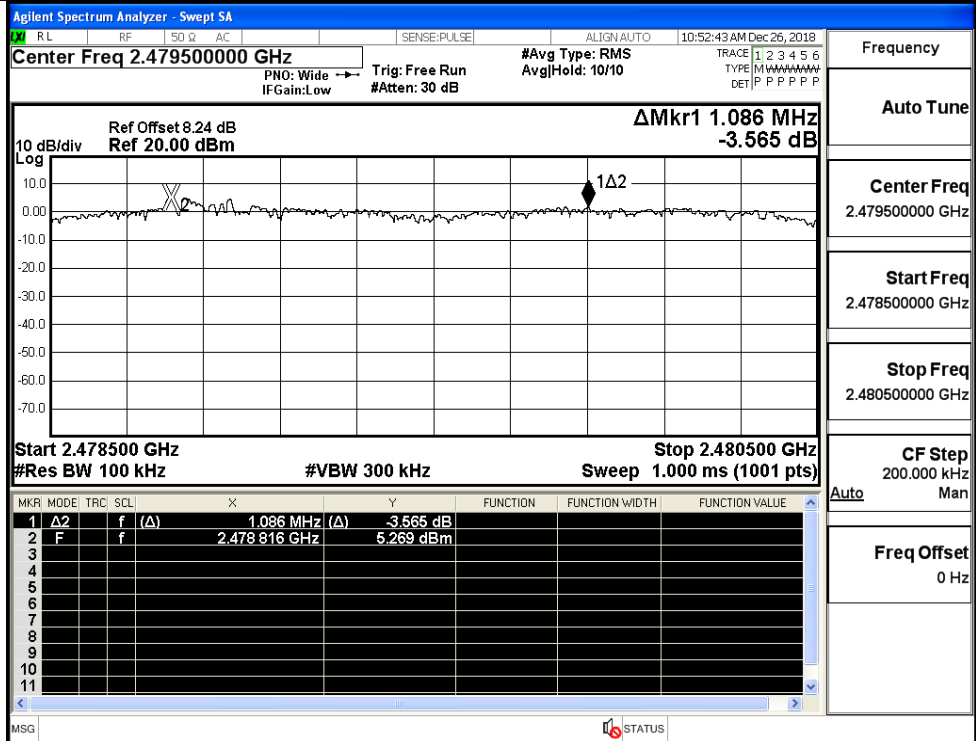
Frequency  
Auto Tune  
Center Freq  
2.402500000 GHz  
Start Freq  
2.401500000 GHz  
Stop Freq  
2.403500000 GHz  
CF Step  
200.000 kHz  
Man  
Freq Offset  
0 Hz

$\pi/4$ 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  
Man  
Freq Offset  
0 Hz

π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq  
2.479500000 GHz

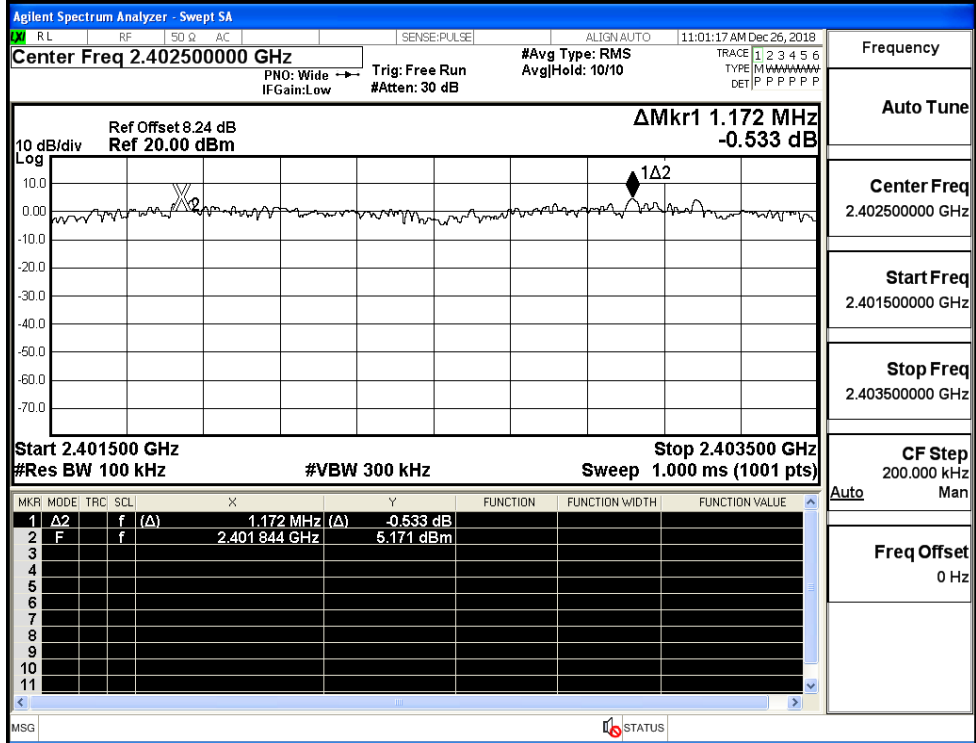
Start Freq  
2.478500000 GHz

Stop Freq  
2.480500000 GHz

CF Step  
200.000 kHz  
Auto Man

Freq Offset  
0 Hz

8DPSK/LCH



Frequency

Auto Tune

Center Freq  
2.402500000 GHz

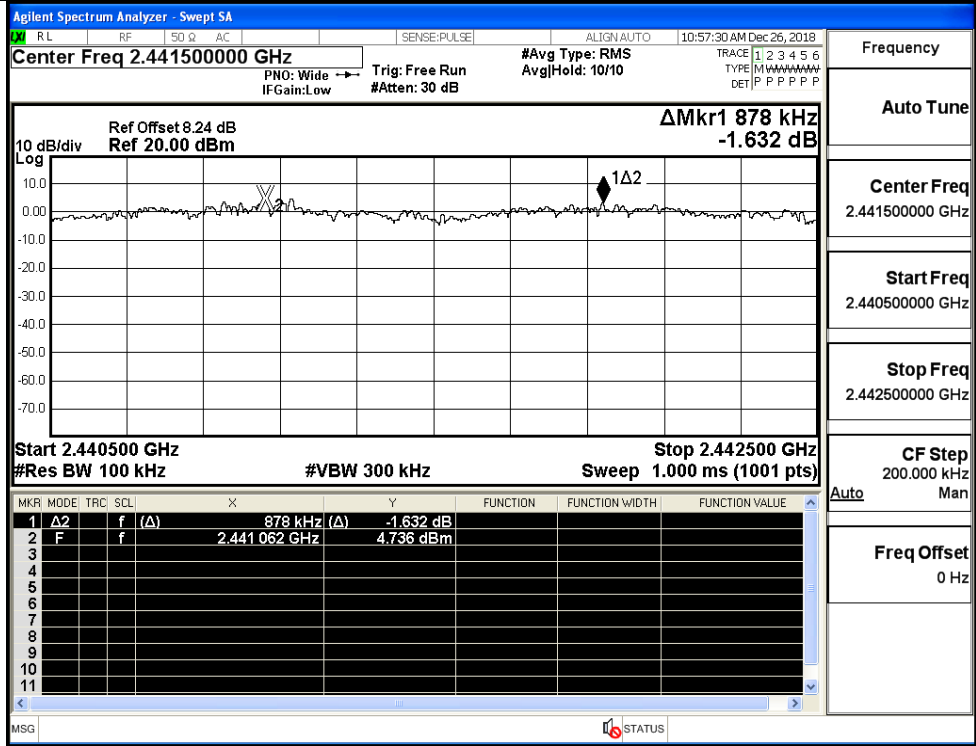
Start Freq  
2.401500000 GHz

Stop Freq  
2.403500000 GHz

CF Step  
200.000 kHz  
Auto Man

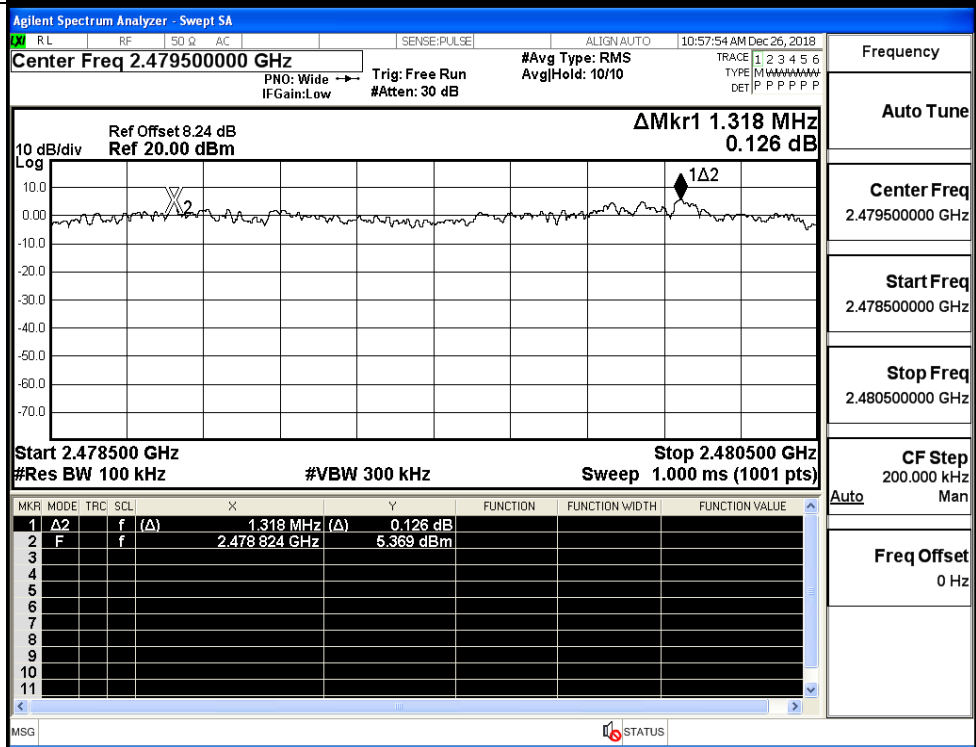
Freq Offset  
0 Hz

8DPSK/MCH



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

8DPSK/HCH



Frequency	2.479500000 GHz
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

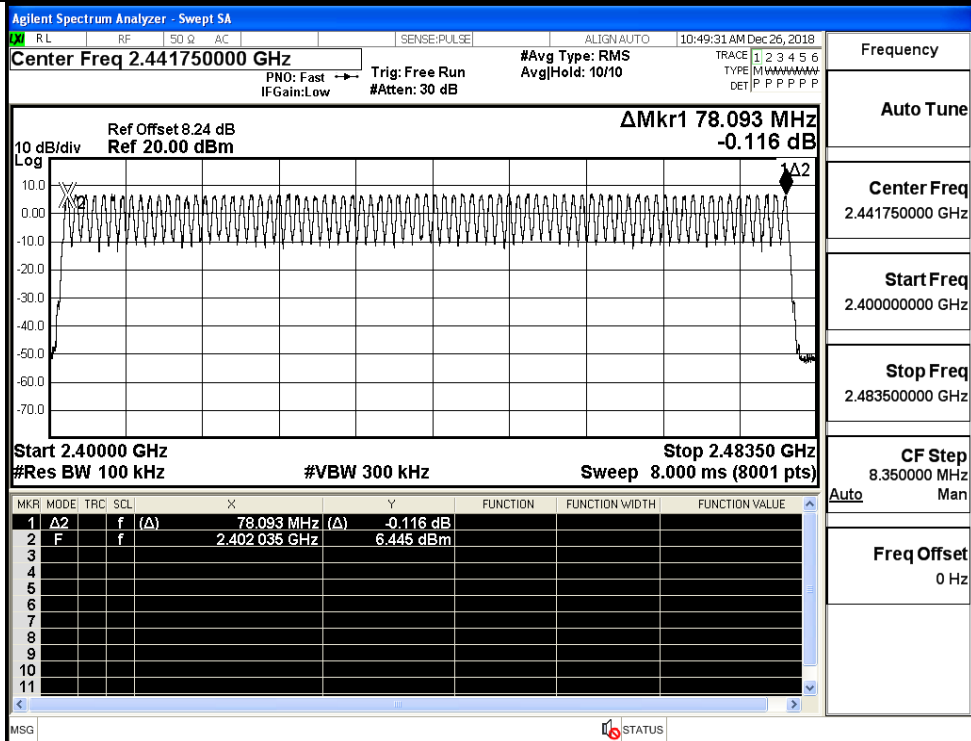


### A.4 Hopping Channel Number

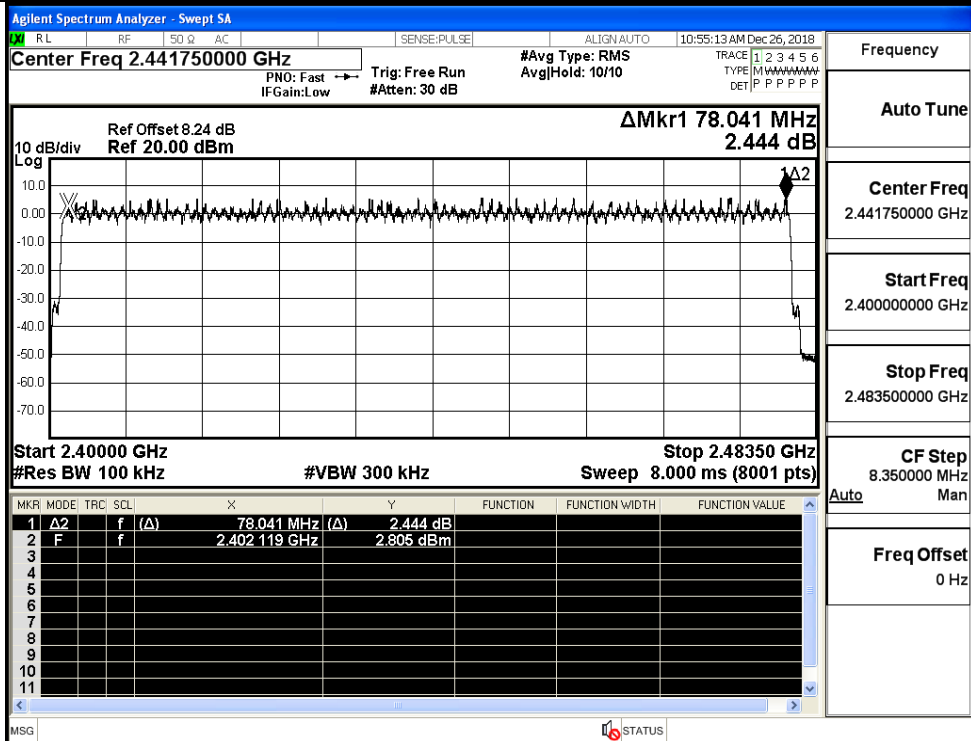
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

#### Test Graphs

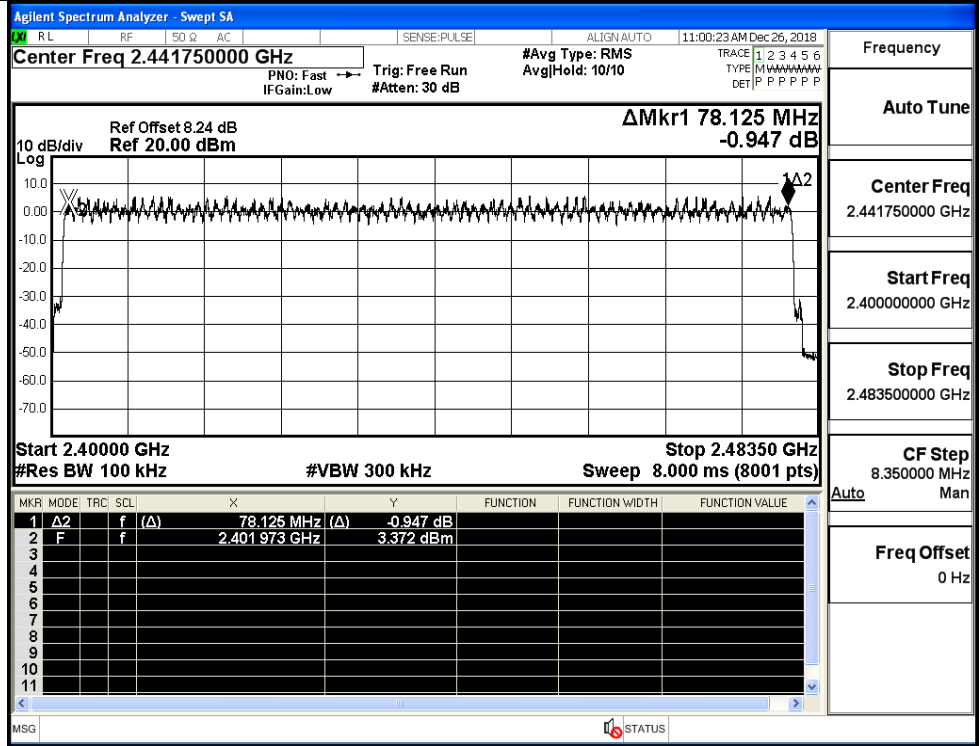
GFSK/Hop



$\pi/4$ DQPSK/Hop

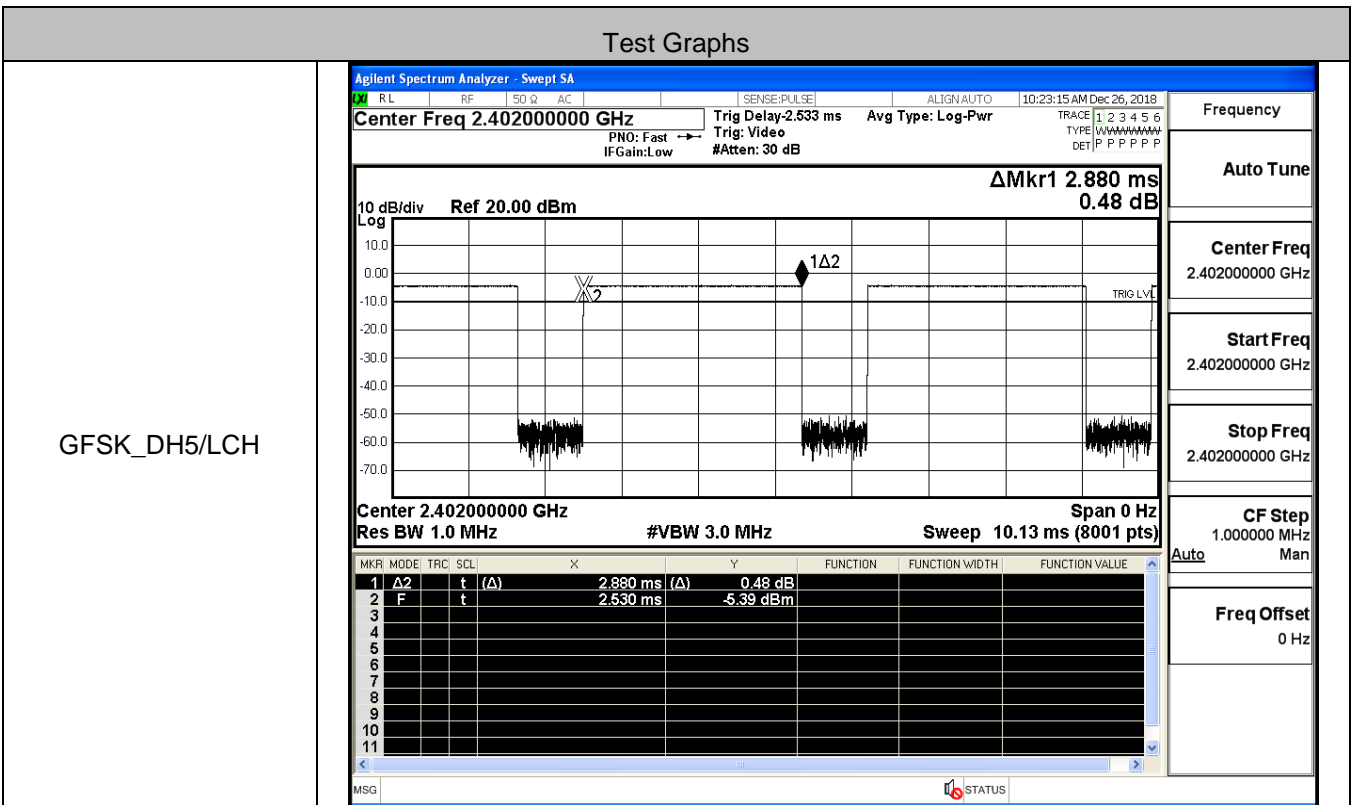


8DPSK/Hop

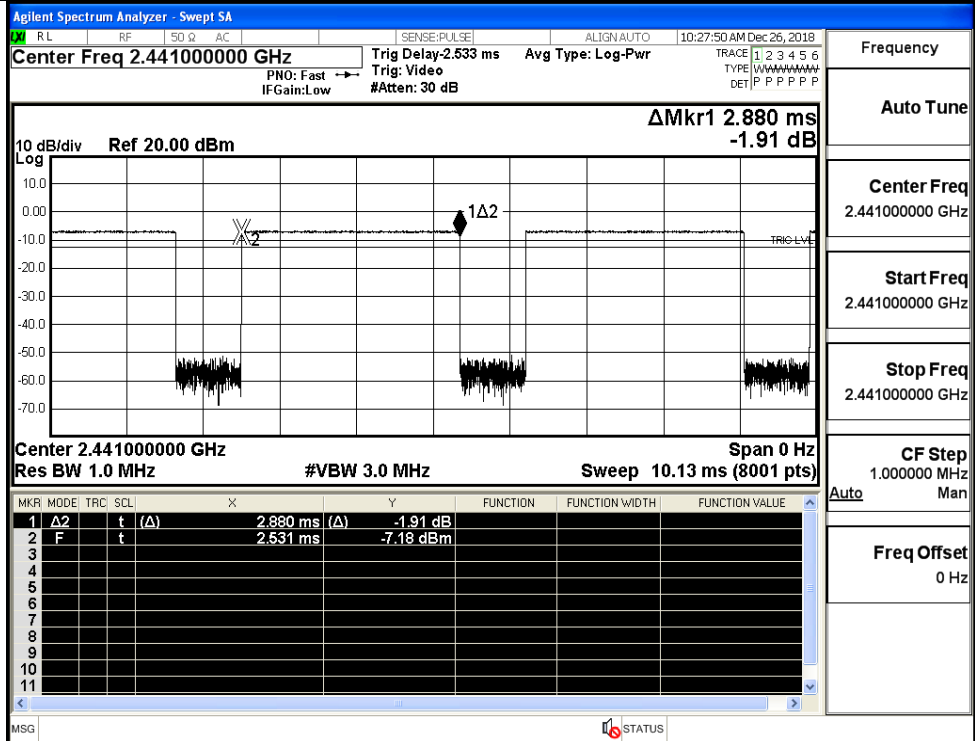


**A.5 Dwell Time**

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.308	0.4	PASS
	3DH5	MCH	2.89	106.7	0.308	0.4	PASS
	3DH5	HCH	2.89	106.7	0.308	0.4	PASS

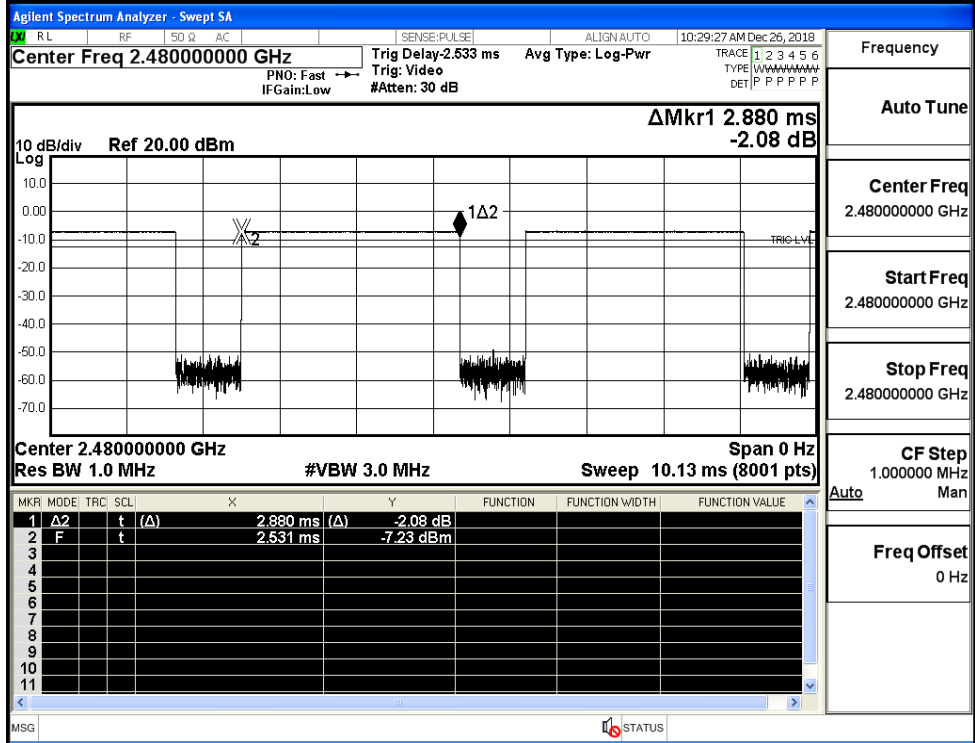


GFSK\_DH5/MCH



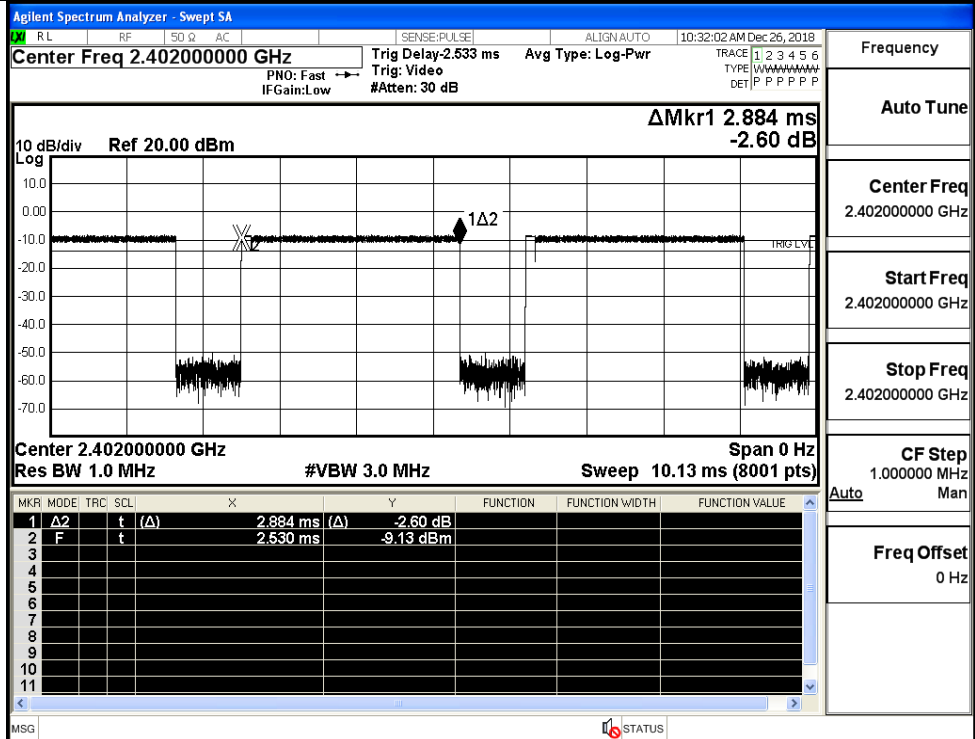
Frequency	2.441000000 GHz
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK\_DH5/HCH

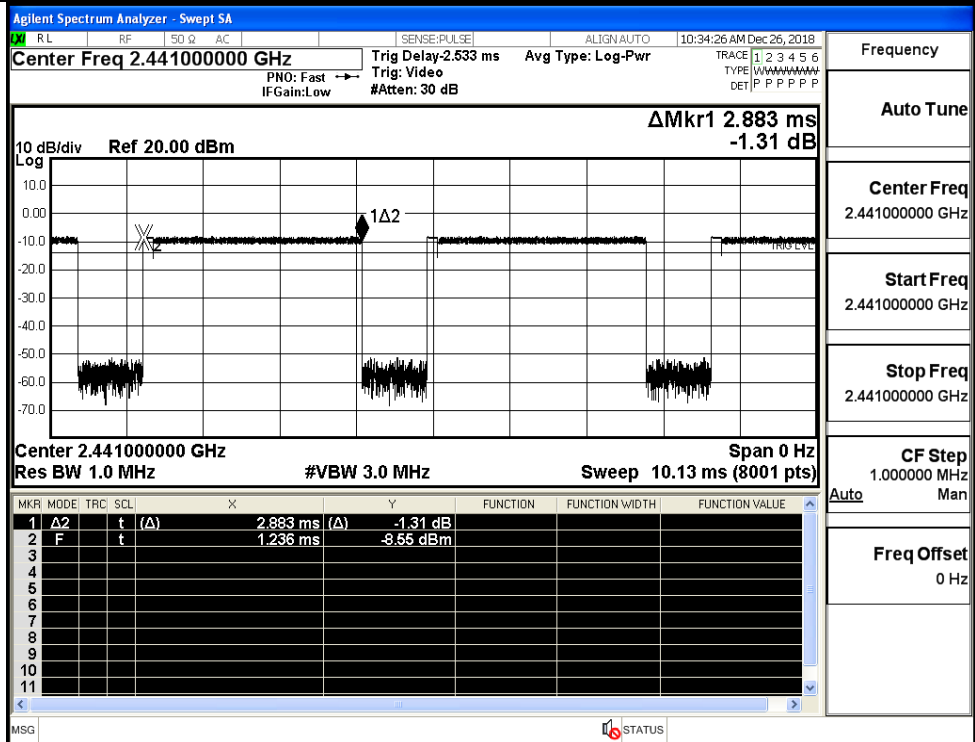


Frequency	2.480000000 GHz
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

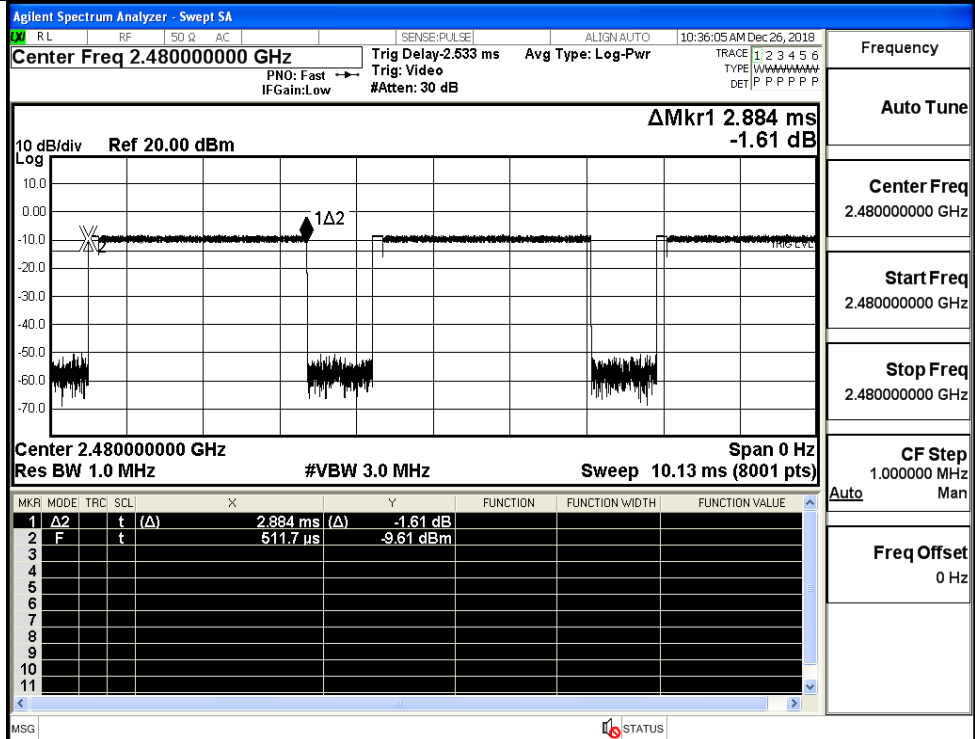
$\pi/4$ DQPSK  
\_2DH5/LCH



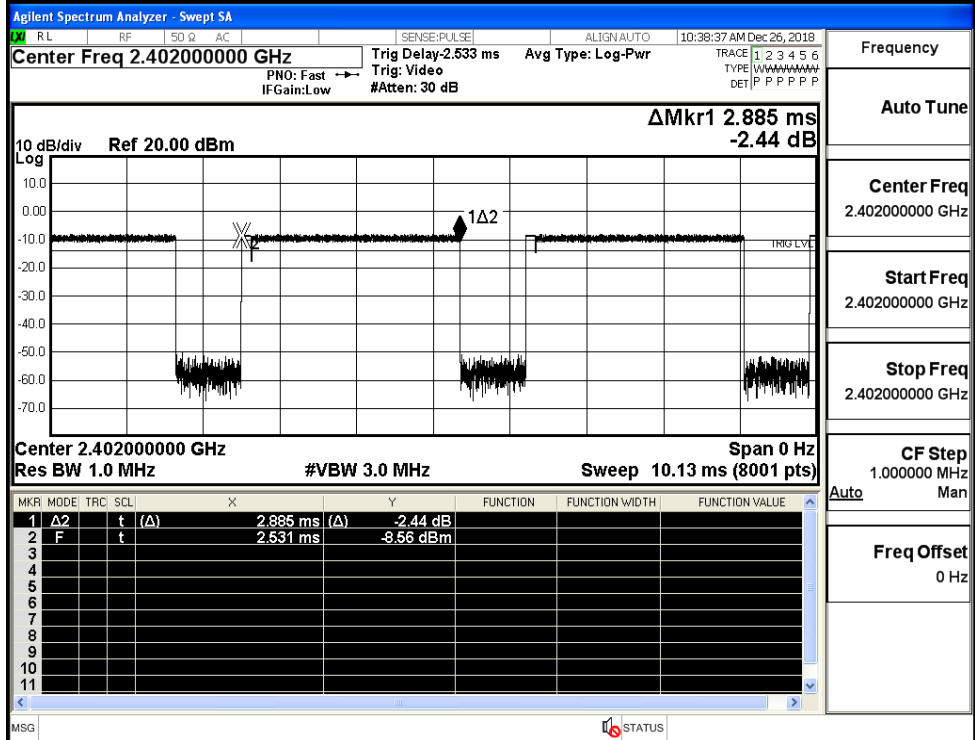
$\pi/4$ DQPSK  
\_2DH5/MCH



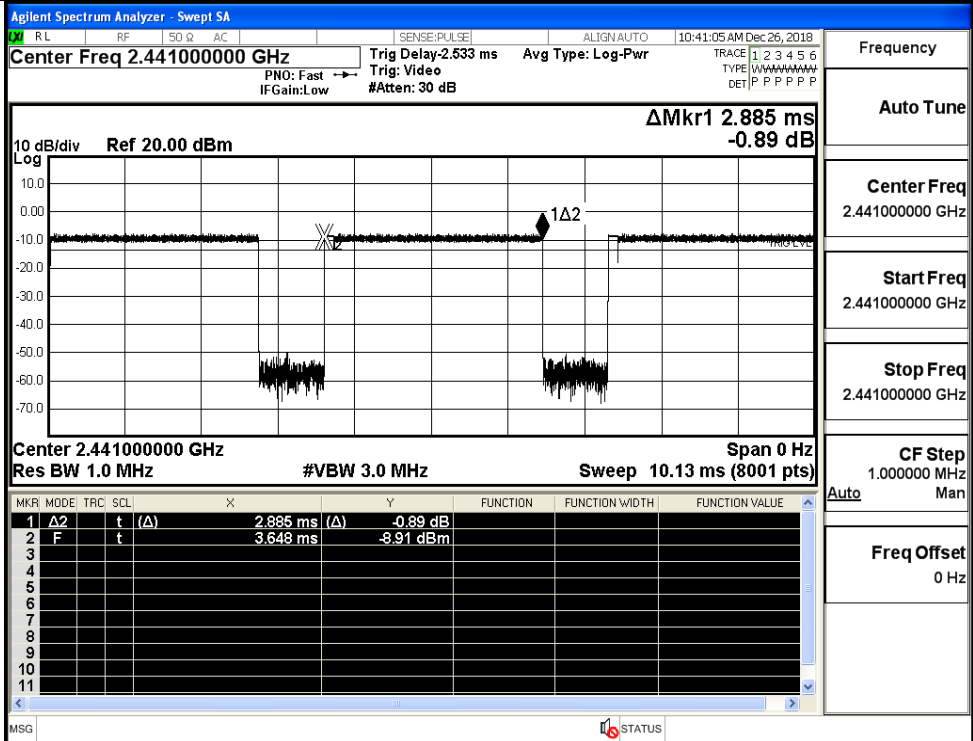
$\pi/4$ DQPSK  
\_2DH5/HCH



8DPSK\_3DH5/LCH

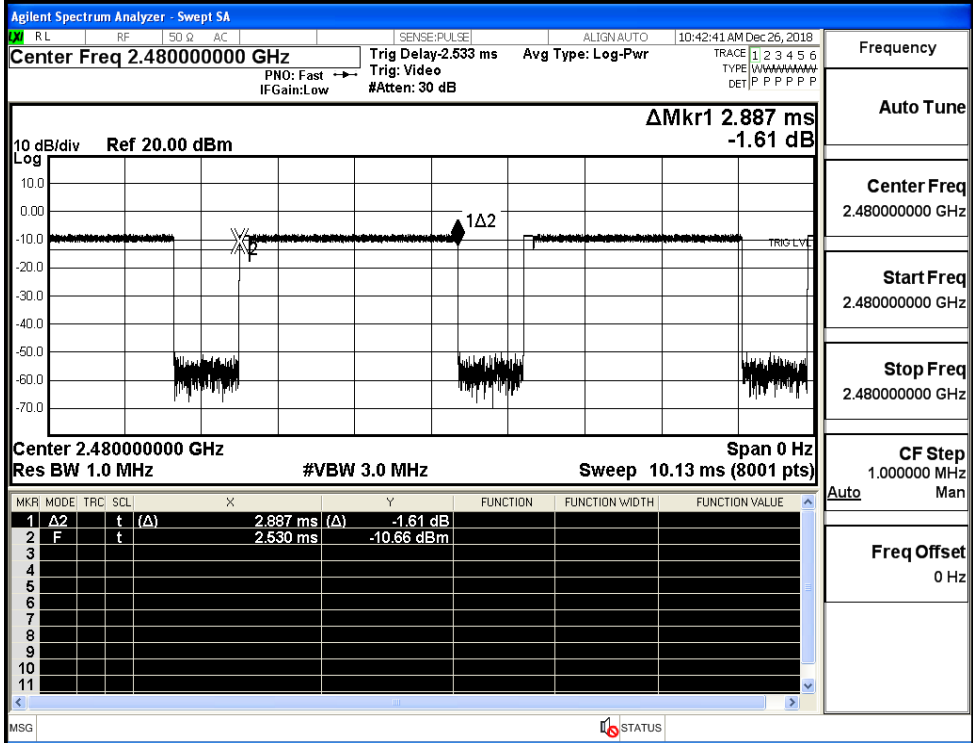


8DPSK\_3DH5/MCH



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

8DPSK\_3DH5/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

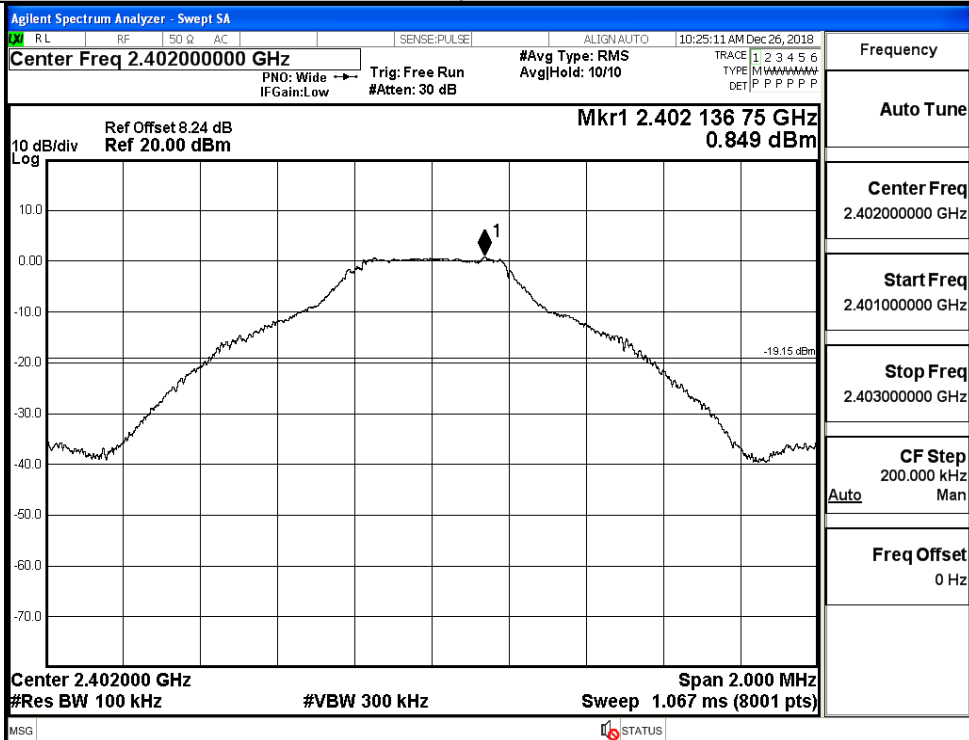
### A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.849	-44.336	-19.151	PASS
	MCH	1.101	-44.188	-18.899	PASS
	HCH	1.177	-43.966	-18.823	PASS
$\pi/4$ DQPSK	LCH	-1.084	-44.882	-21.084	PASS
	MCH	-0.391	-44.452	-20.391	PASS
	HCH	-0.53	-44.708	-20.530	PASS
8DPSK	LCH	-0.293	-44.321	-20.293	PASS
	MCH	-0.569	-44.735	-20.569	PASS
	HCH	-0.277	-44.364	-20.277	PASS

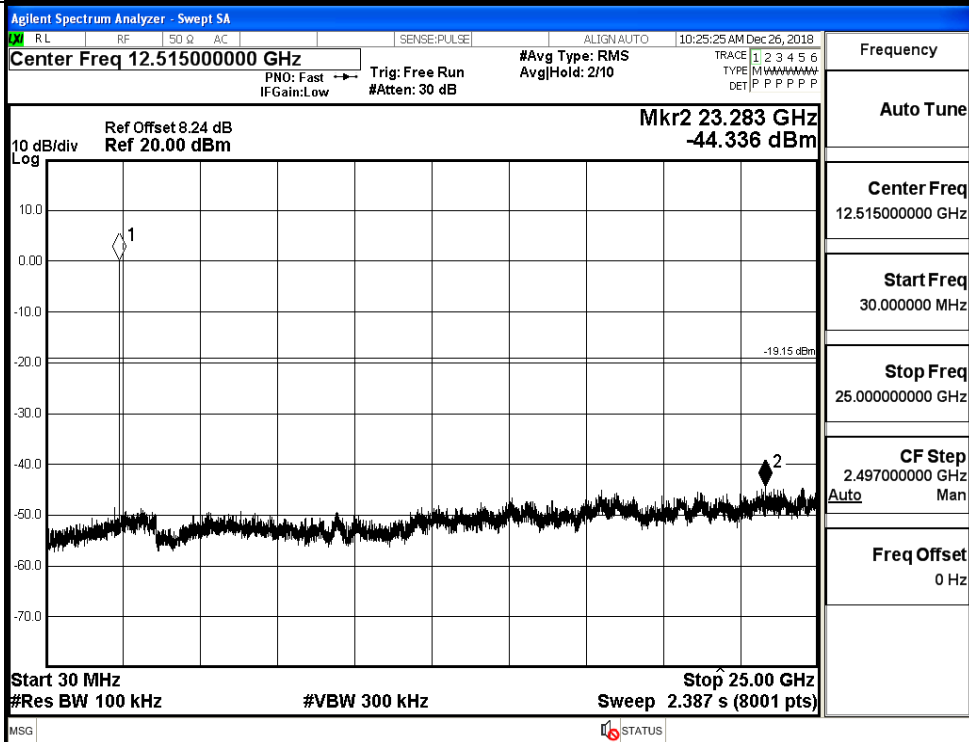


GFSK\_LCH\_Graphs

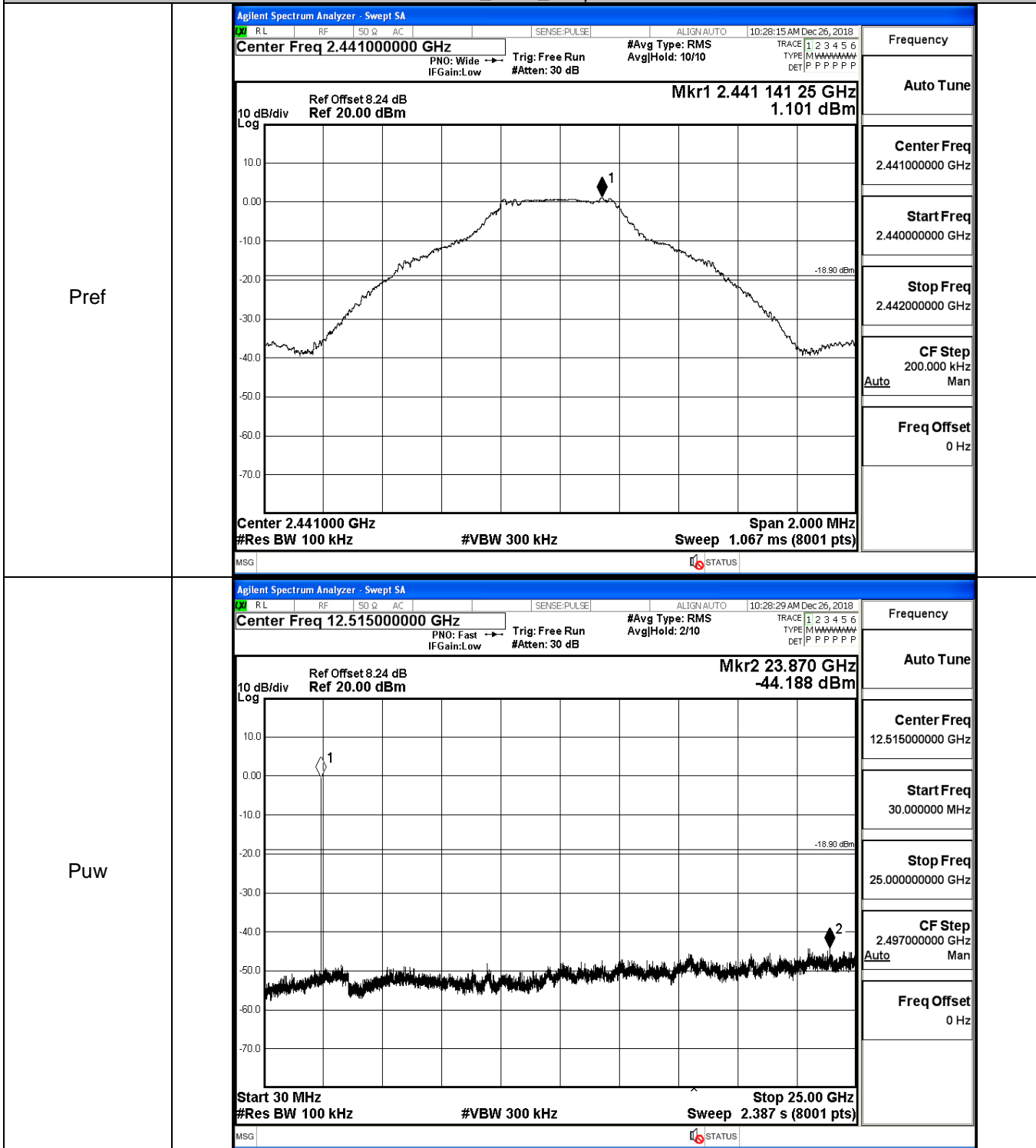
Pref



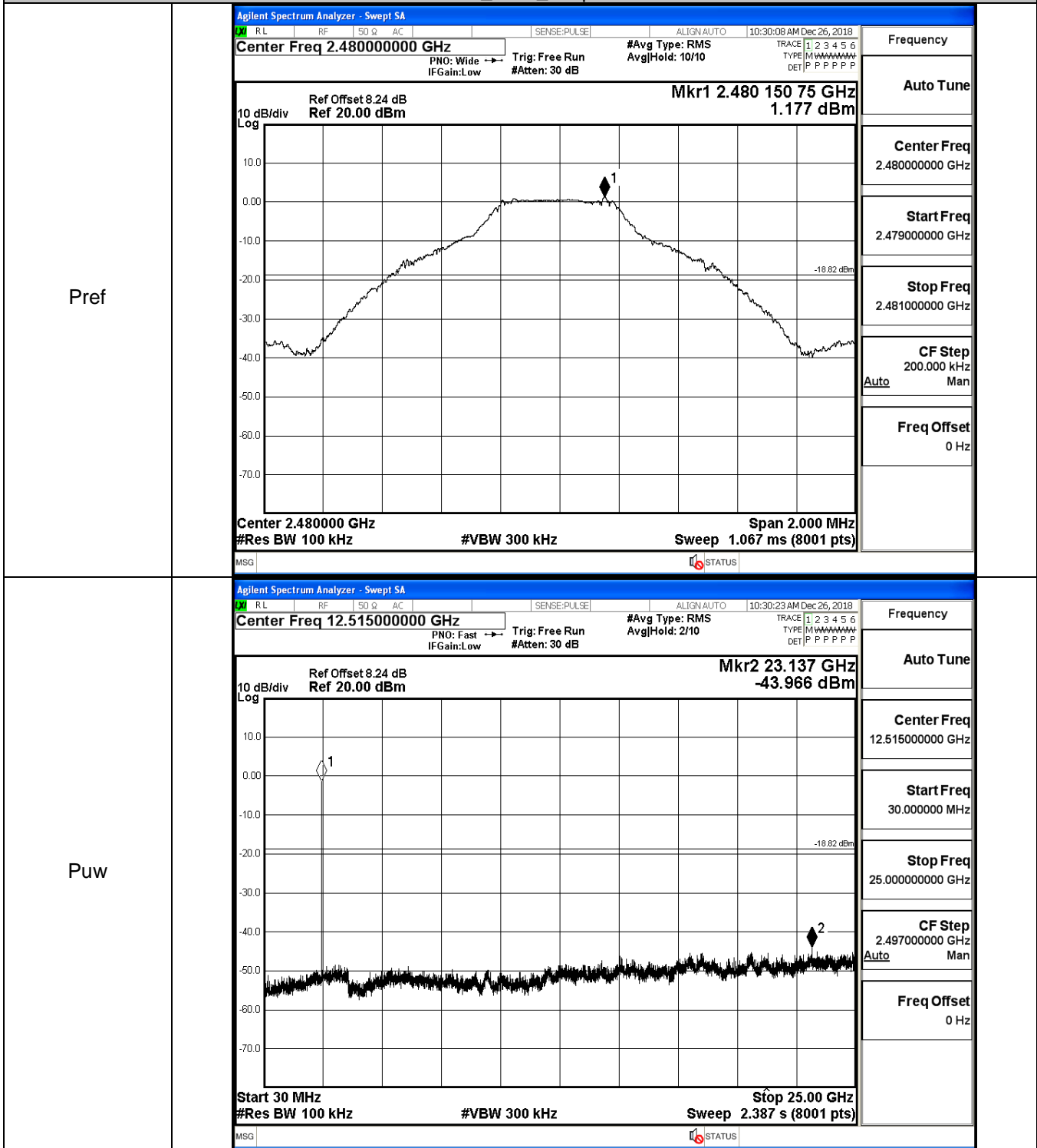
Puw



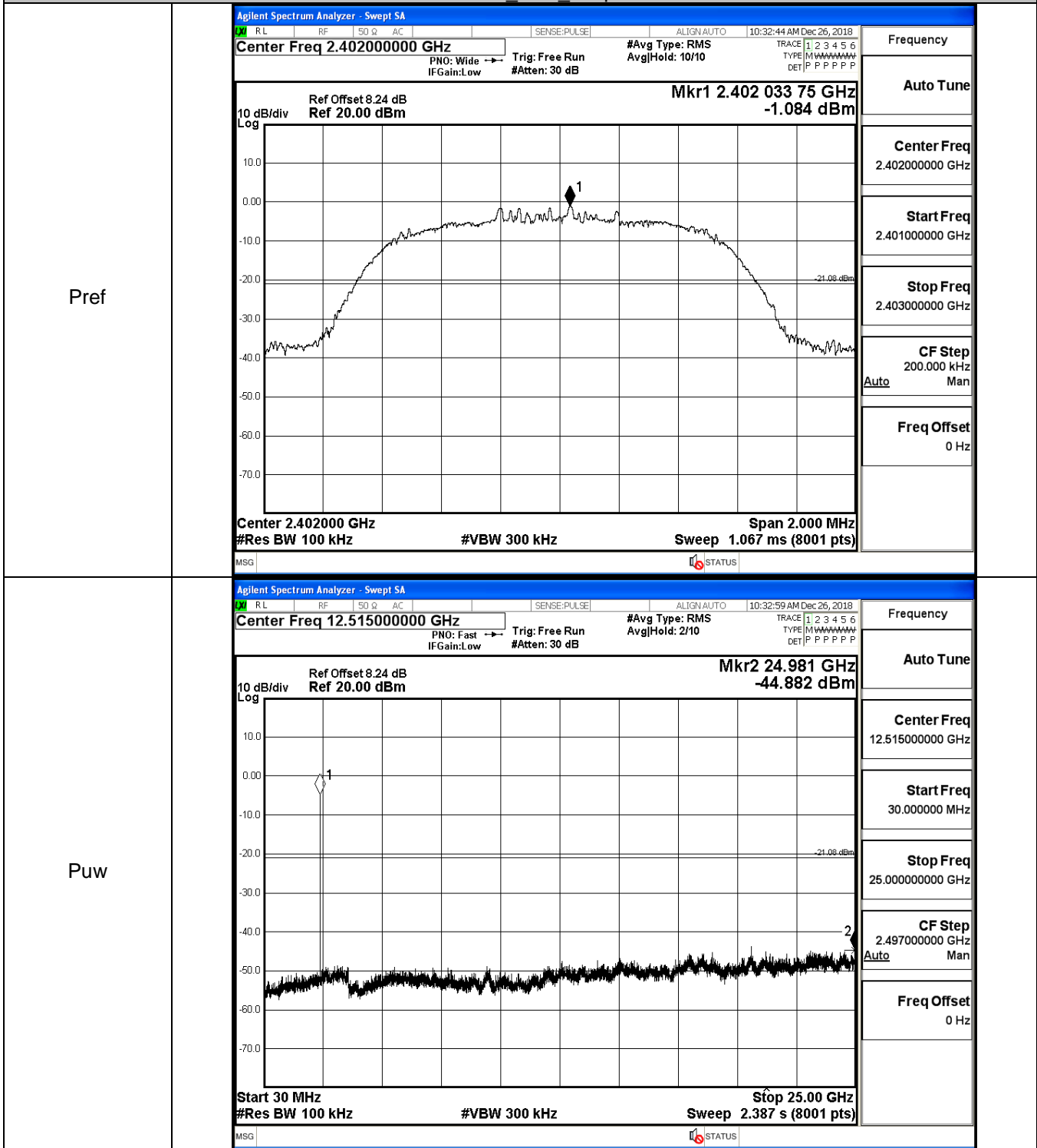
GFSK\_MCH\_Graphs



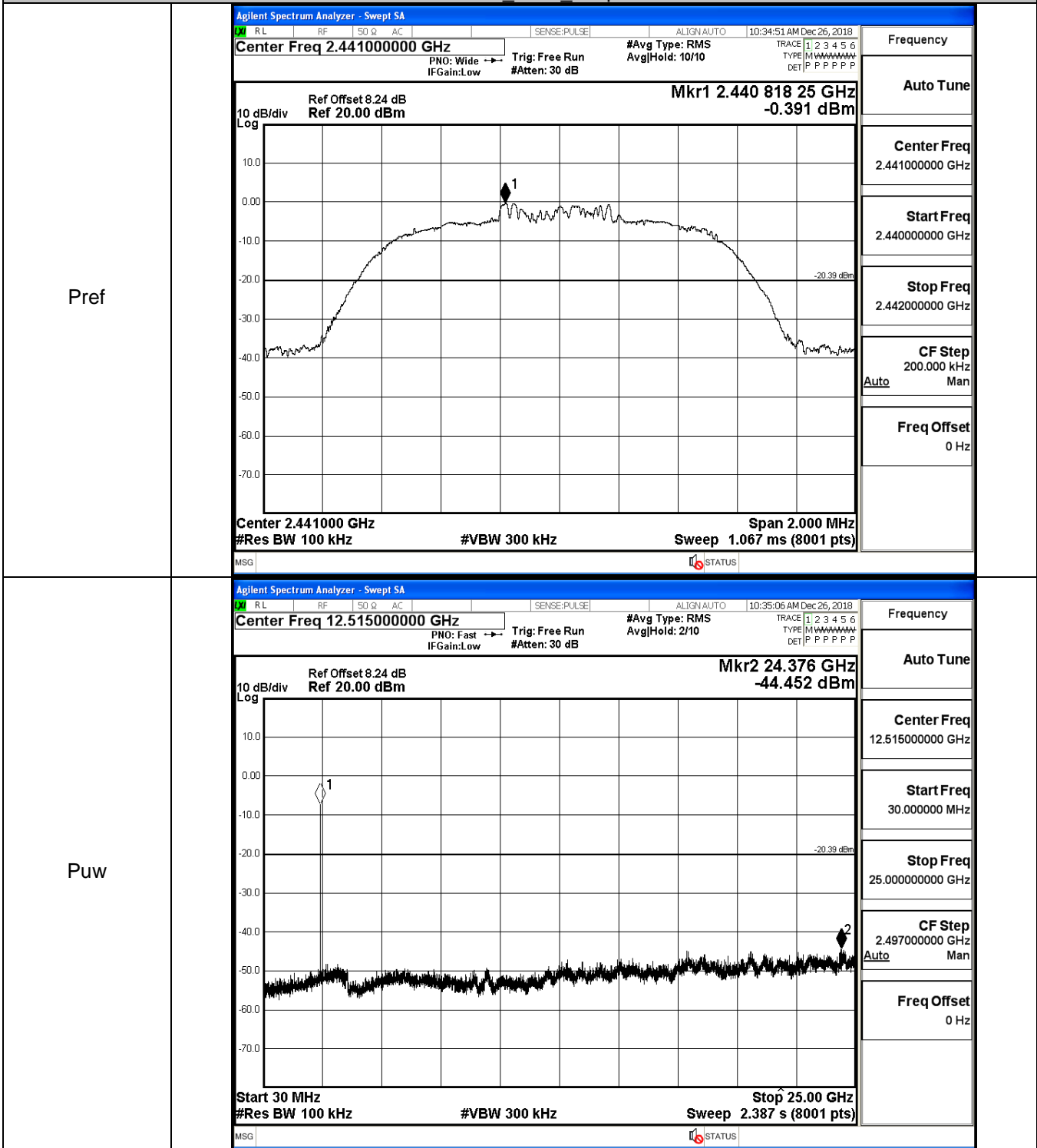
GFSK\_HCH\_Graphs



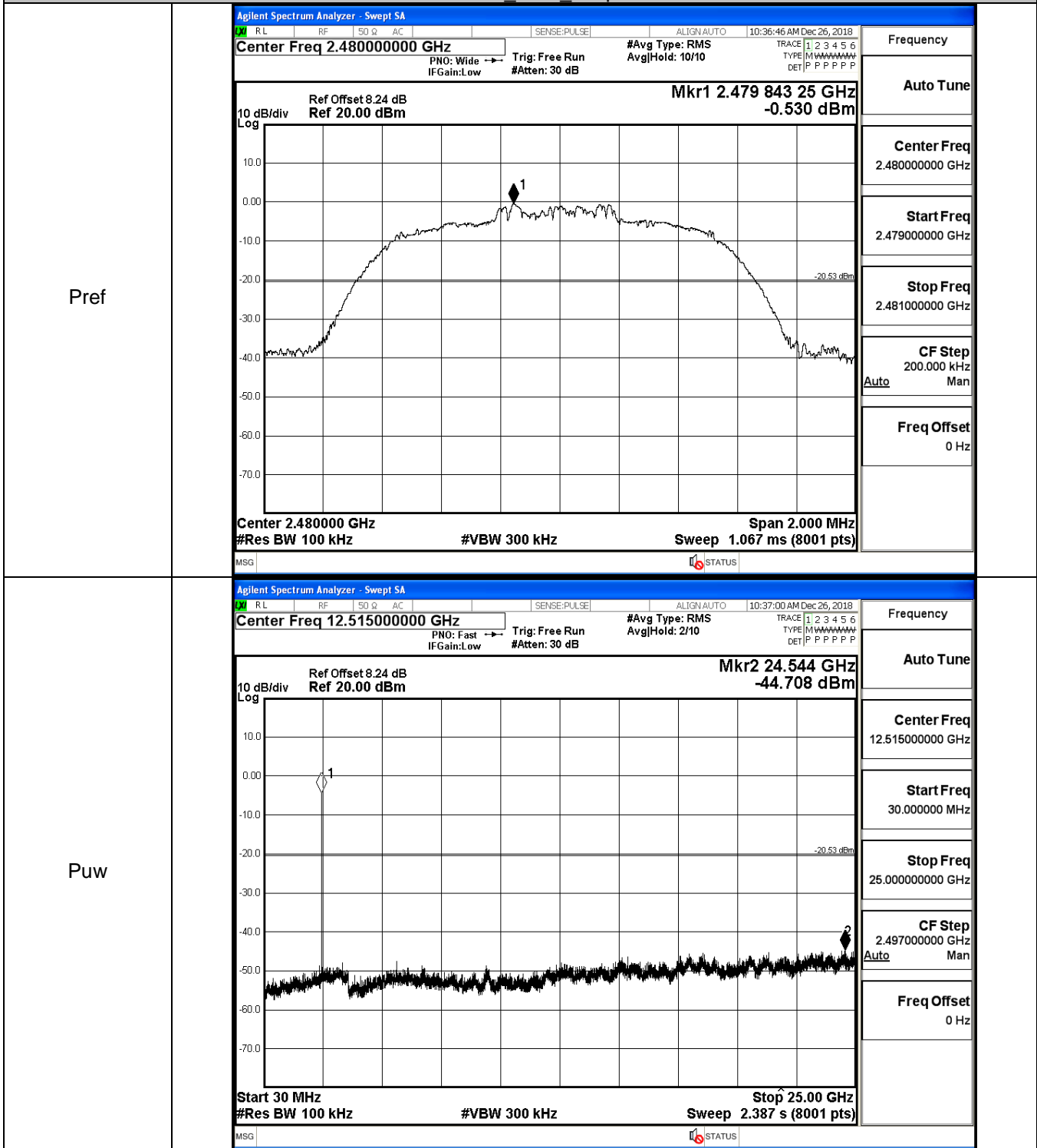
$\pi/4$ DQPSK LCH\_Graphs



$\pi$ /4DQPSK\_MCH\_Graphs

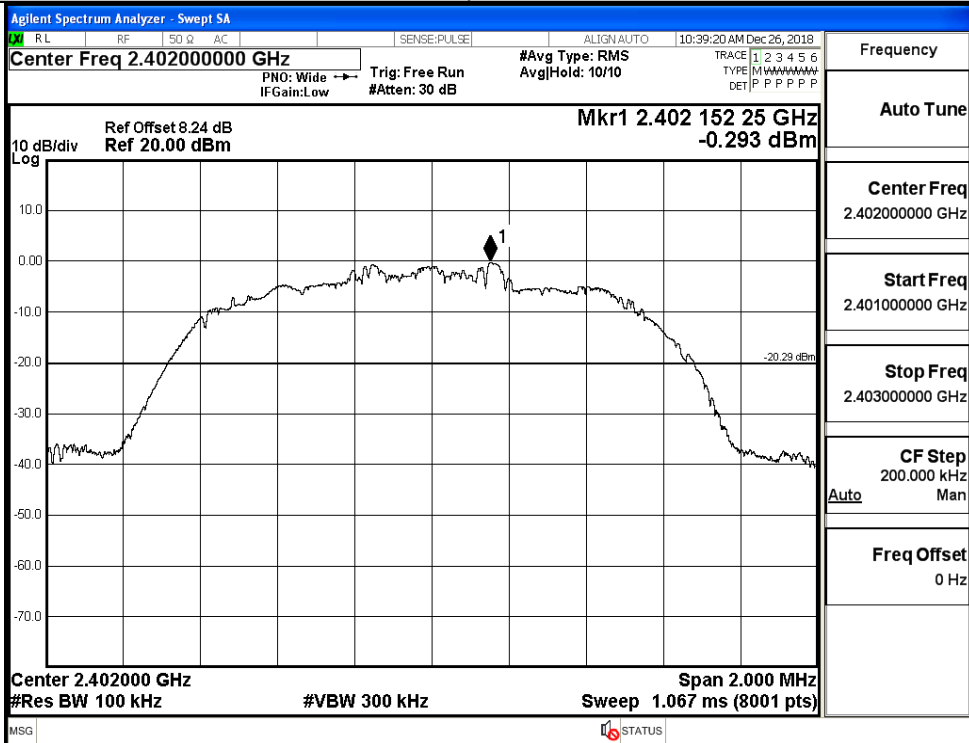


$\pi/4$ DQPSK\_HCH\_Graphs

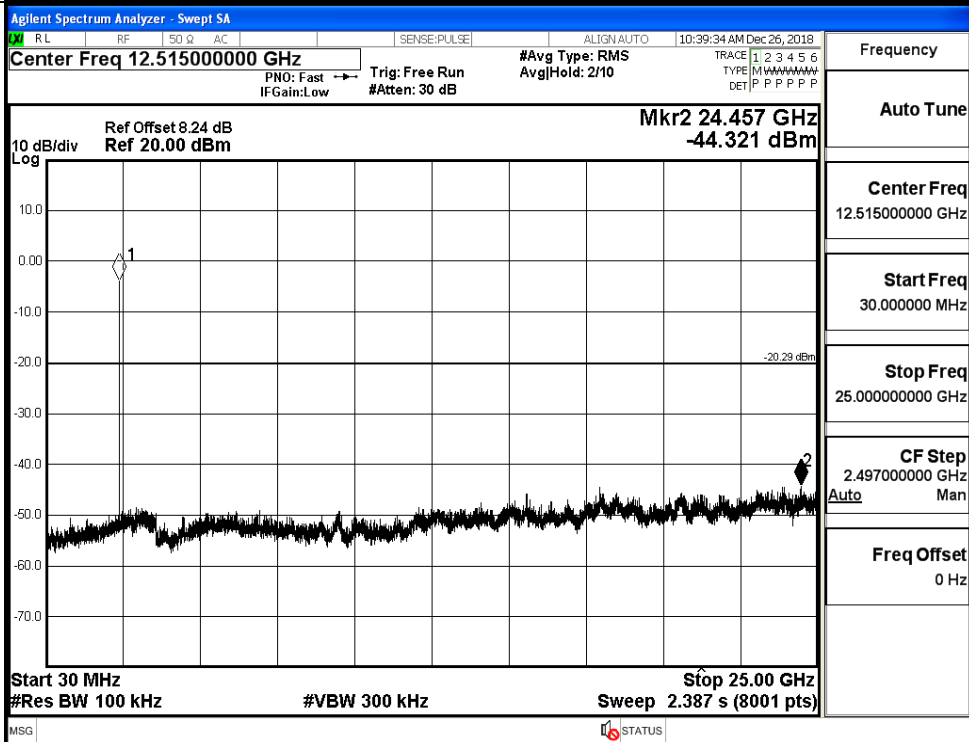


8DPSK\_LCH\_Graphs

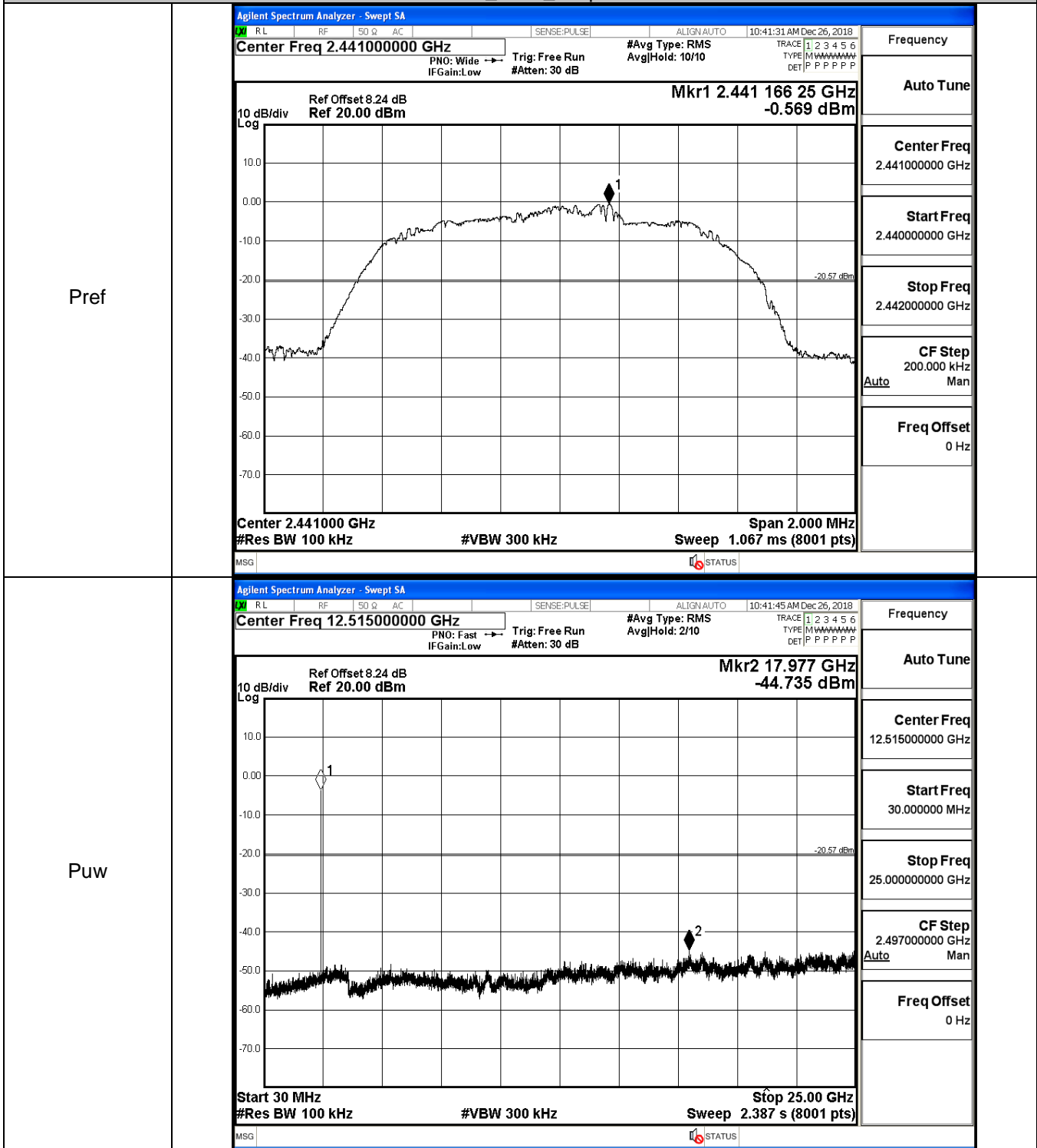
Pref



Puw



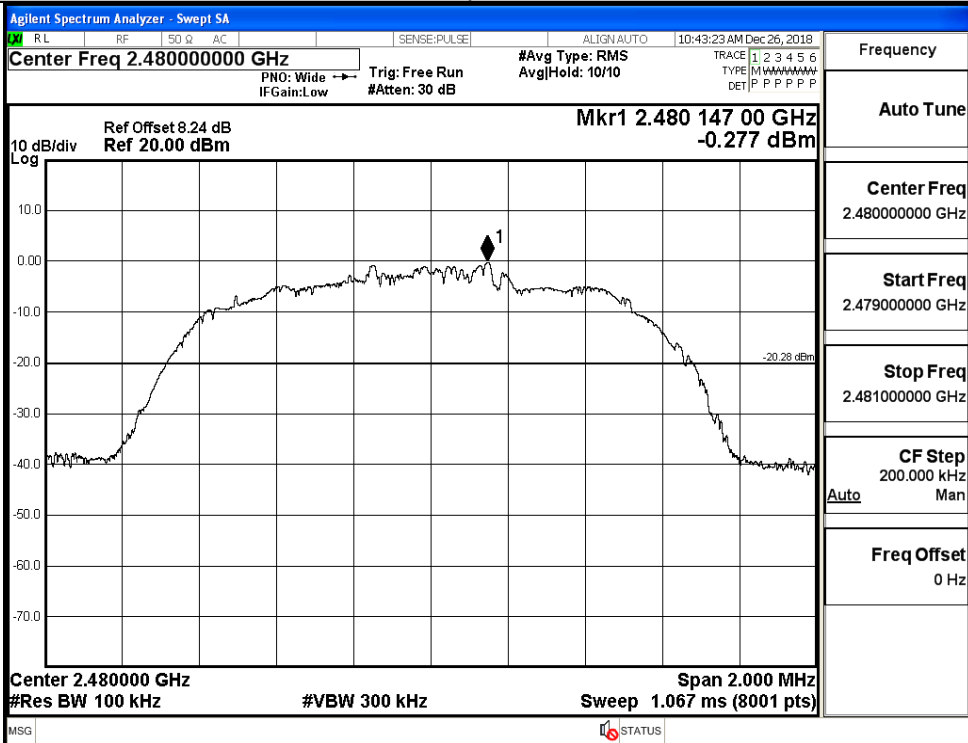
8DPSK\_MCH\_Graphs



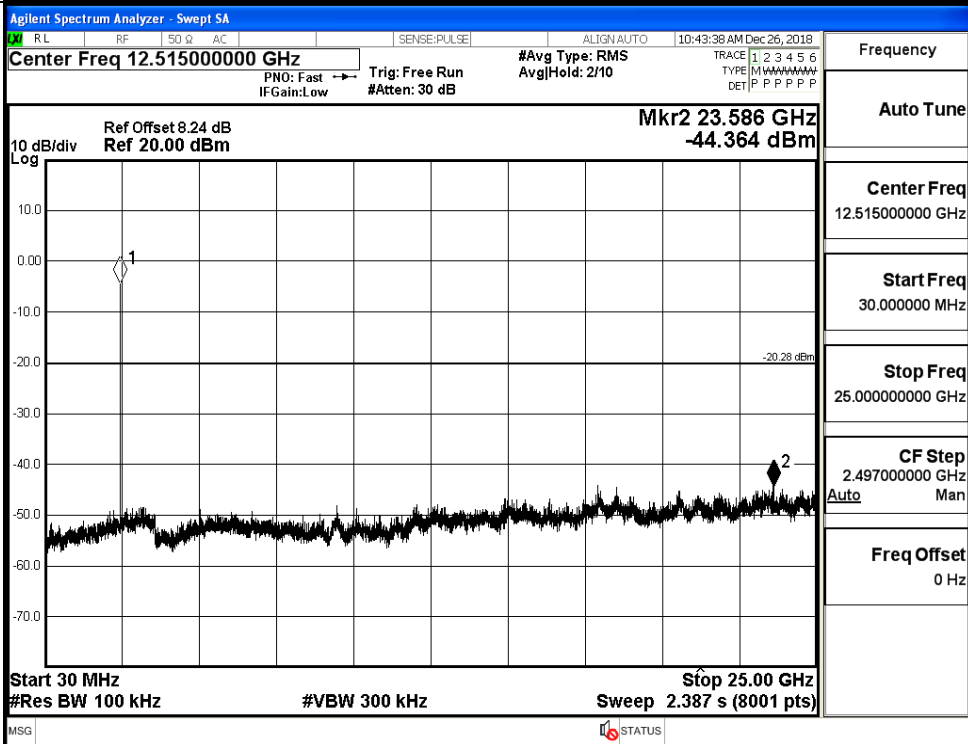


8DPSK\_HCH\_Graphs

Pref



Puw

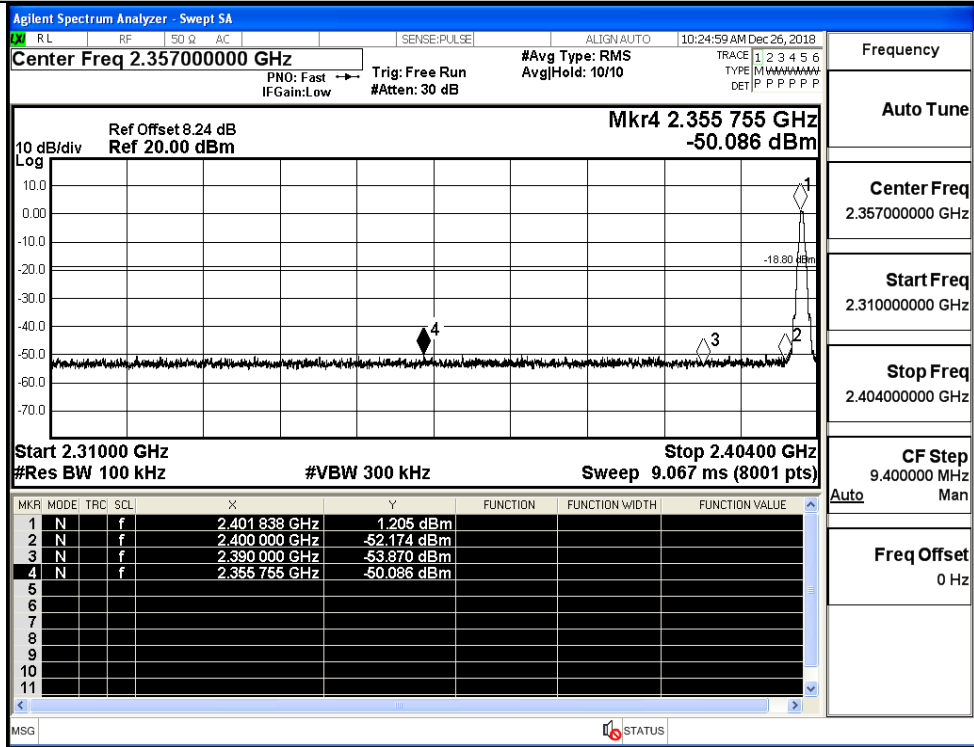


### A.7 Band-edge for RF Conducted Emissions

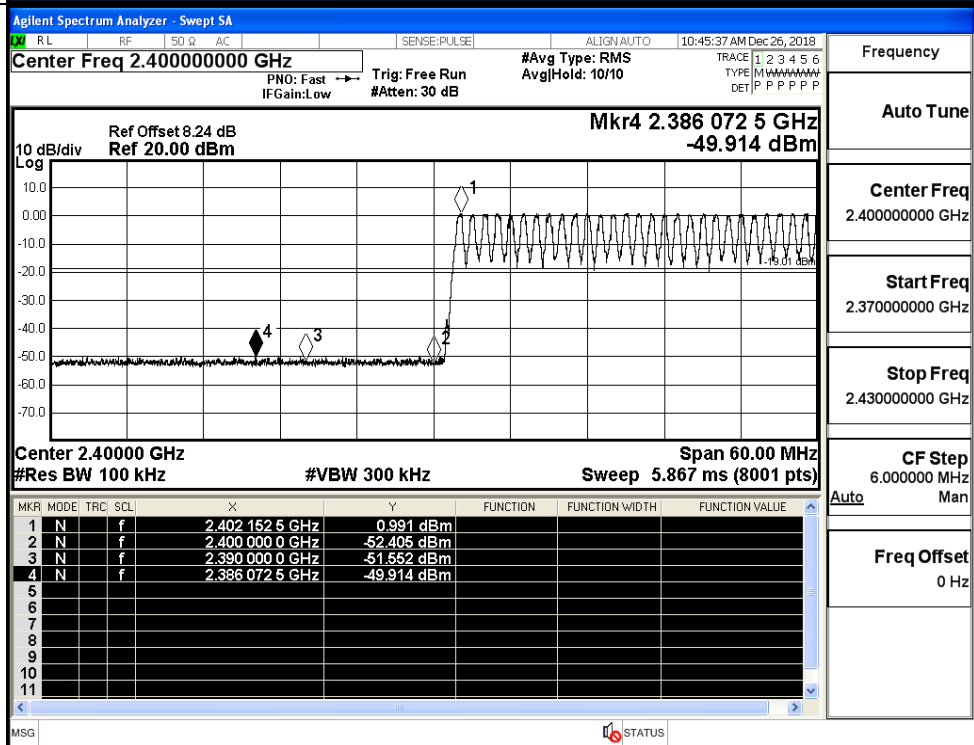
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.205	Off	-50.086	-18.8	PASS
			0.991	On	-49.914	-19.01	PASS
	HCH	2480	1.004	Off	-49.640	-19	PASS
			6.943	On	-49.627	-13.06	PASS
$\pi/4$ DQPSK	LCH	2402	-0.246	Off	-49.795	-20.25	PASS
			5.560	On	-48.983	-14.44	PASS
	HCH	2480	-0.243	Off	-49.089	-20.24	PASS
			5.548	On	-49.243	-14.45	PASS
8DPSK	LCH	2402	-0.285	Off	-50.096	-20.29	PASS
			5.519	On	-48.962	-14.48	PASS
	HCH	2480	-0.290	Off	-50.133	-20.29	PASS
			5.553	On	-48.952	-14.45	PASS

Test Graphs

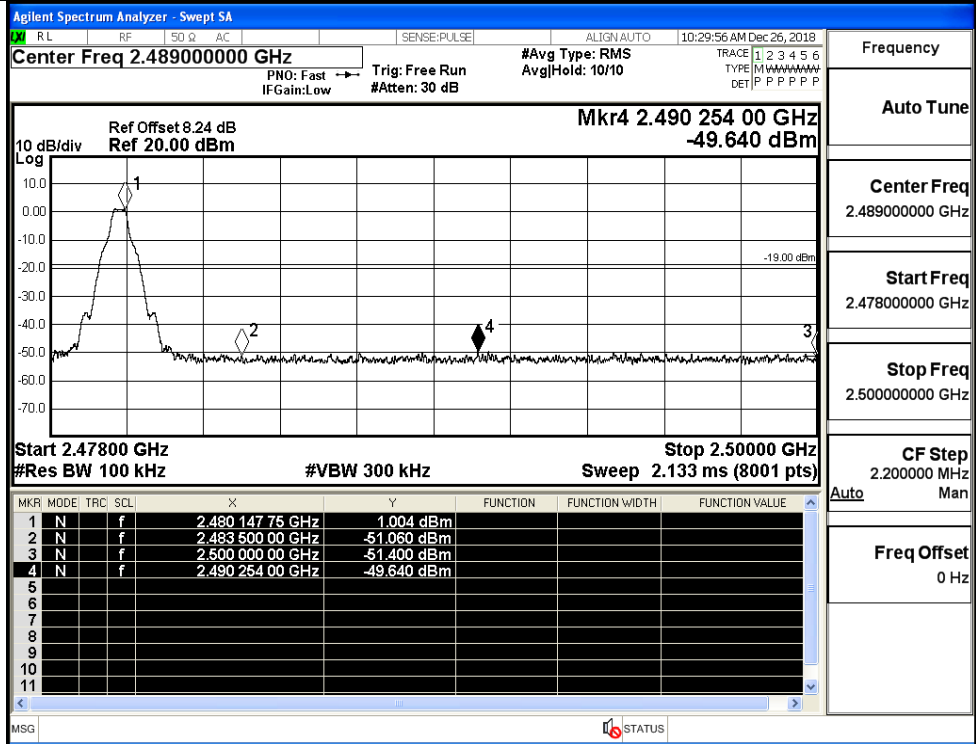
GFSK/LCH/No Hop



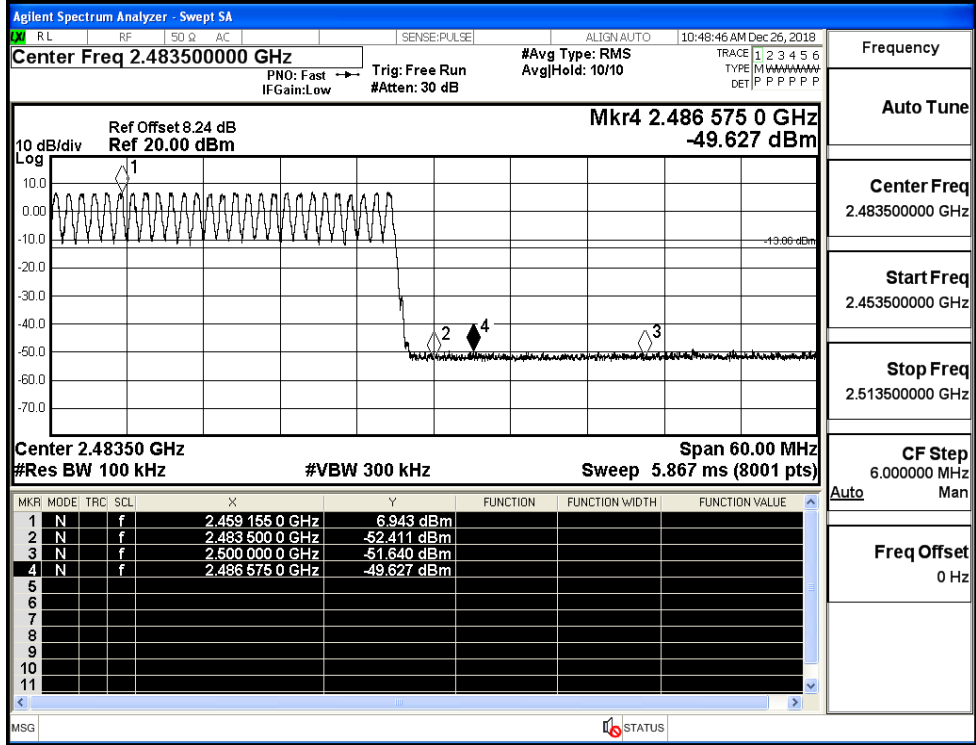
GFSK/LCH/Hop



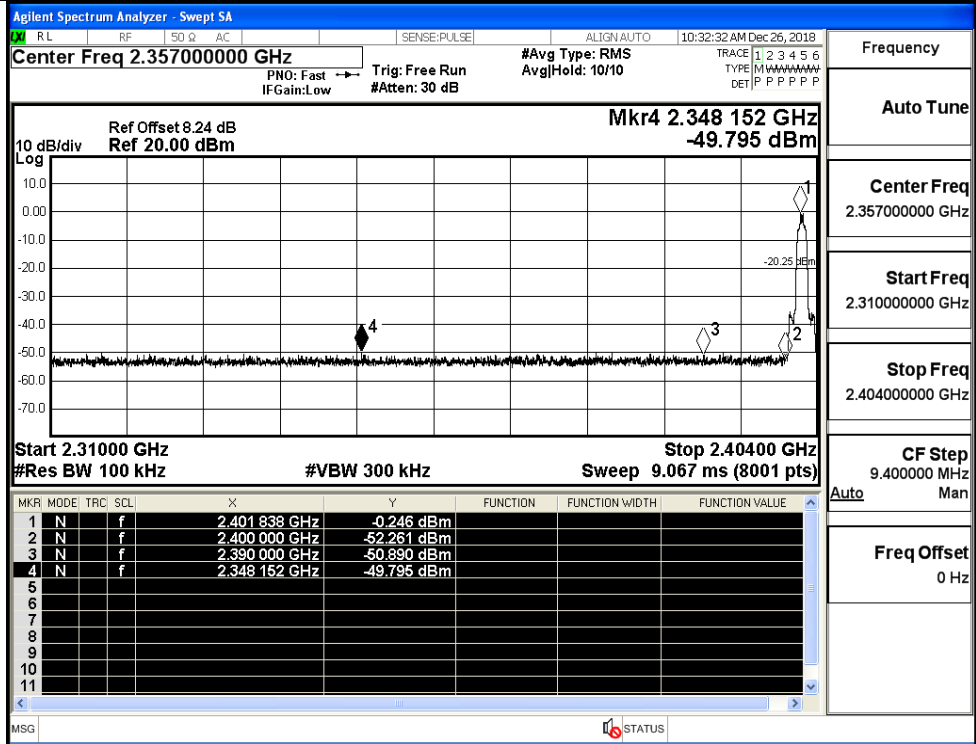
GFSK/HCH/No Hop



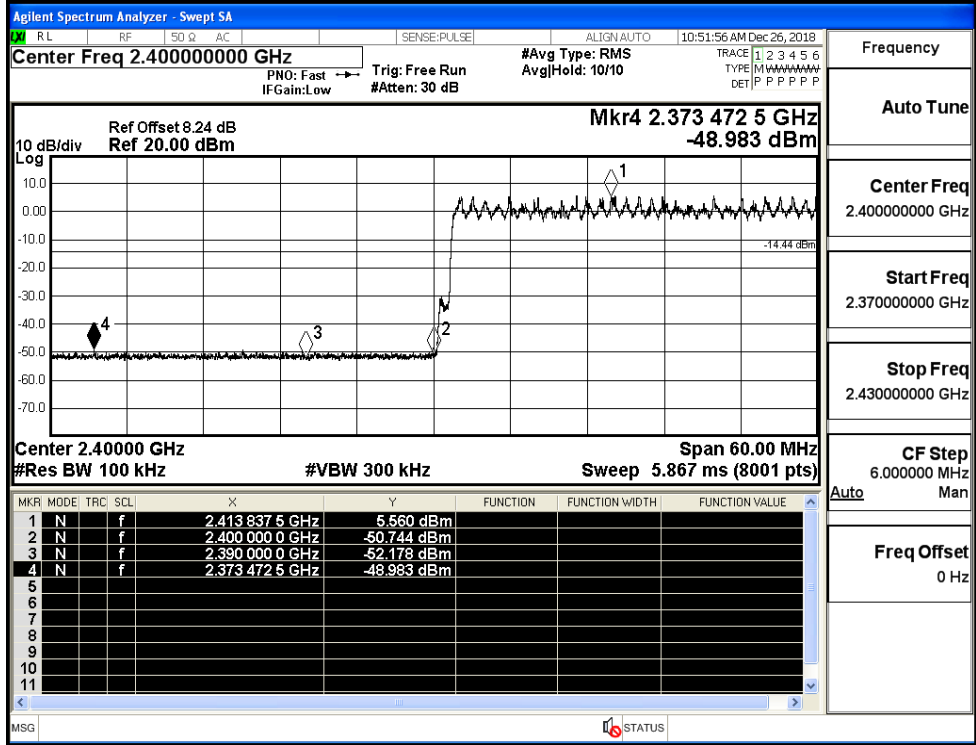
GFSK/HCH/Hop



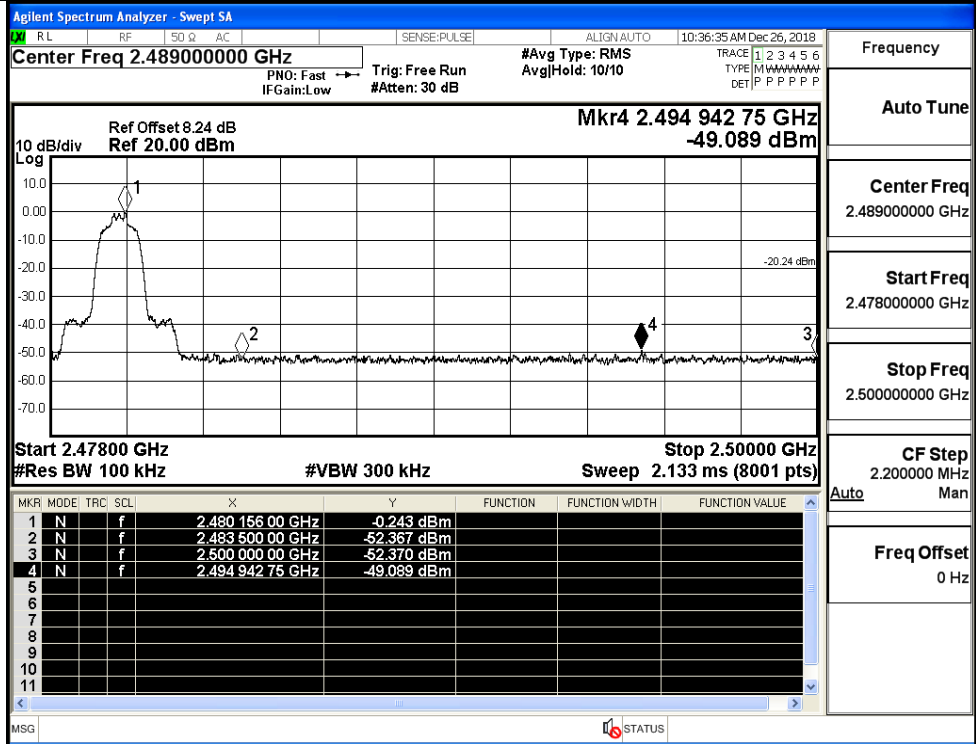
$\pi/4$ DQPSK/LCH/No  
Hop



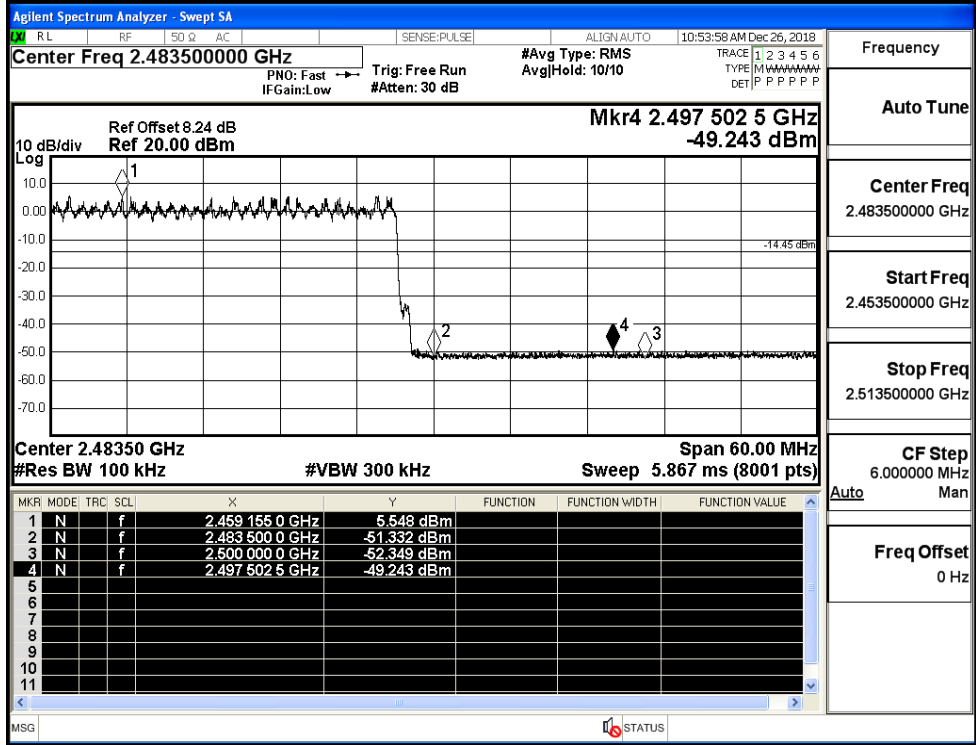
$\pi/4$ DQPSK/LCH/Hop



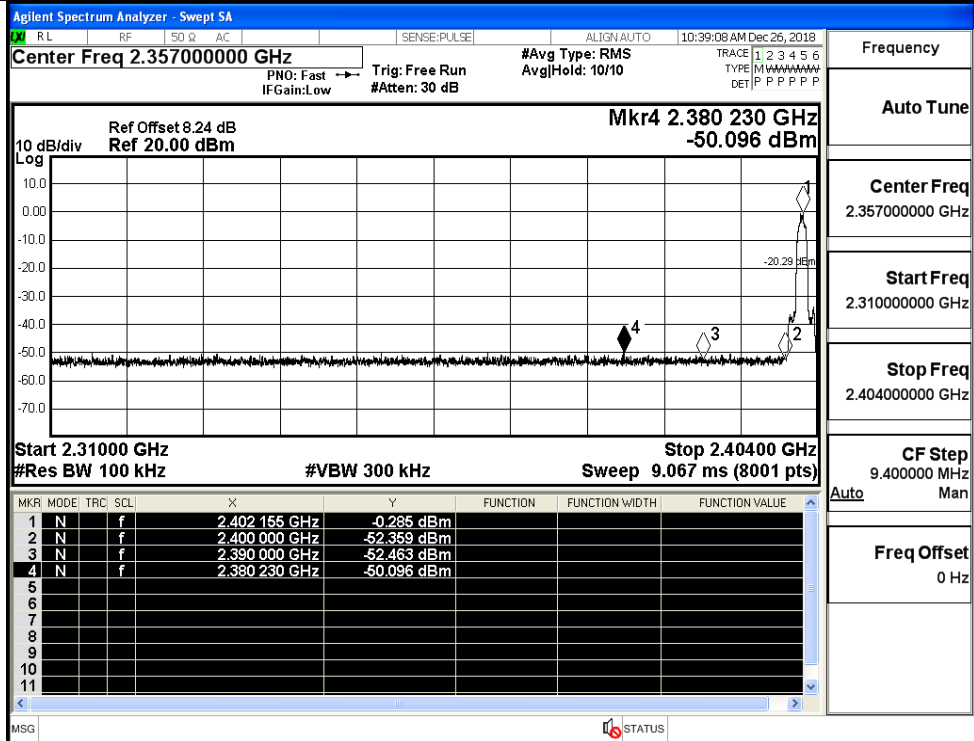
$\pi$ /4DQPSK/HCH/No  
Hop



$\pi$ /4DQPSK/HCH/Hop

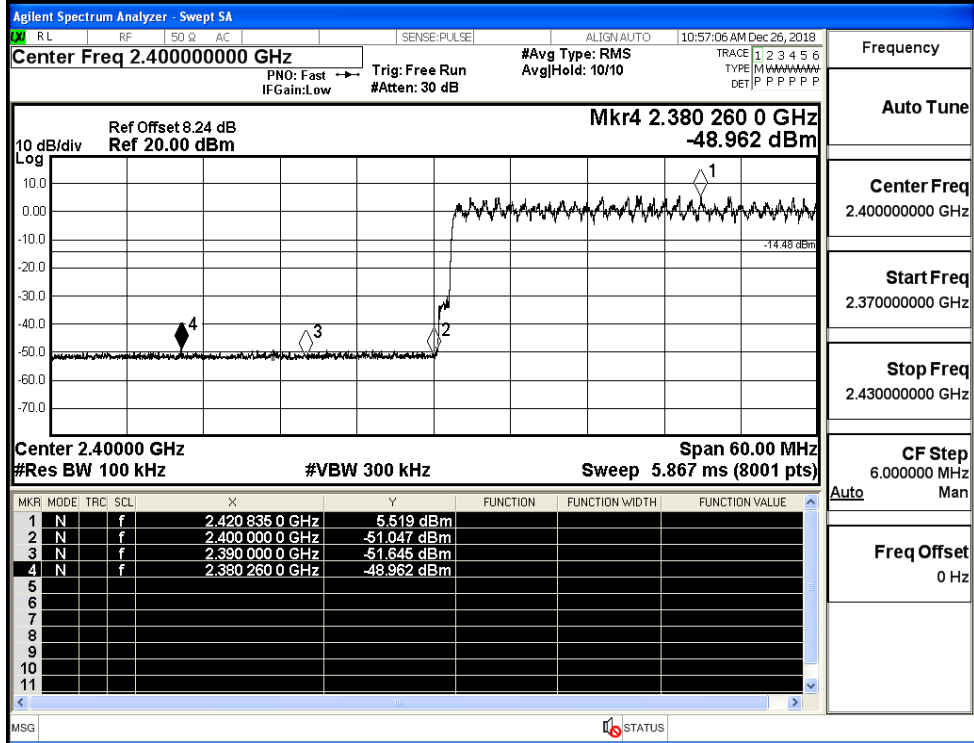


8DPSK/LCH/No Hop



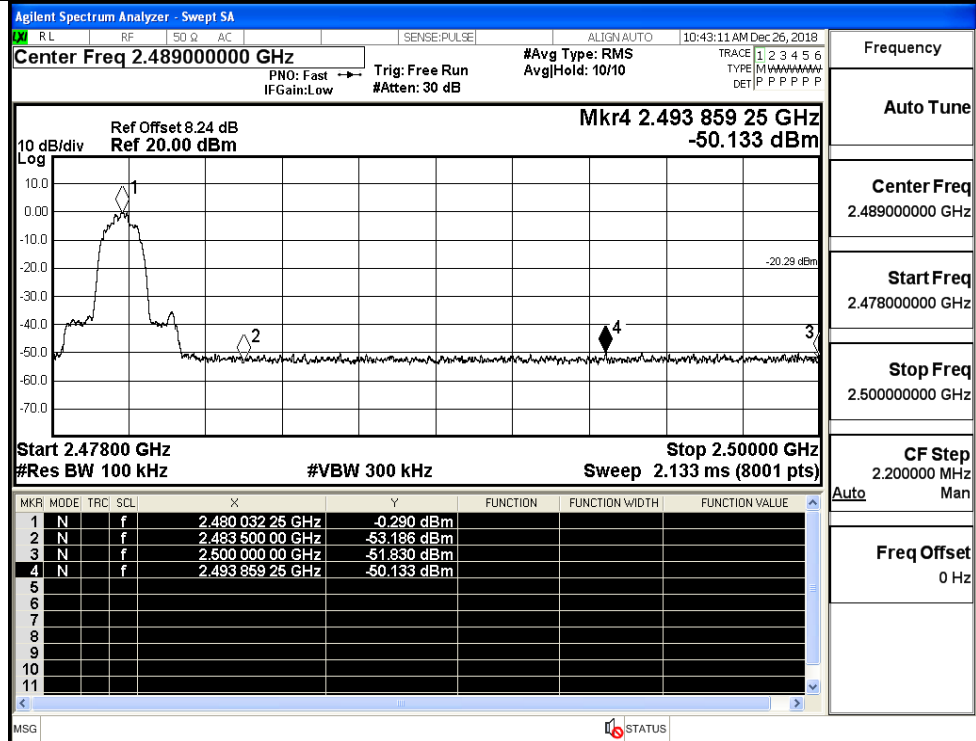
Frequency	
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK/LCH/Hop



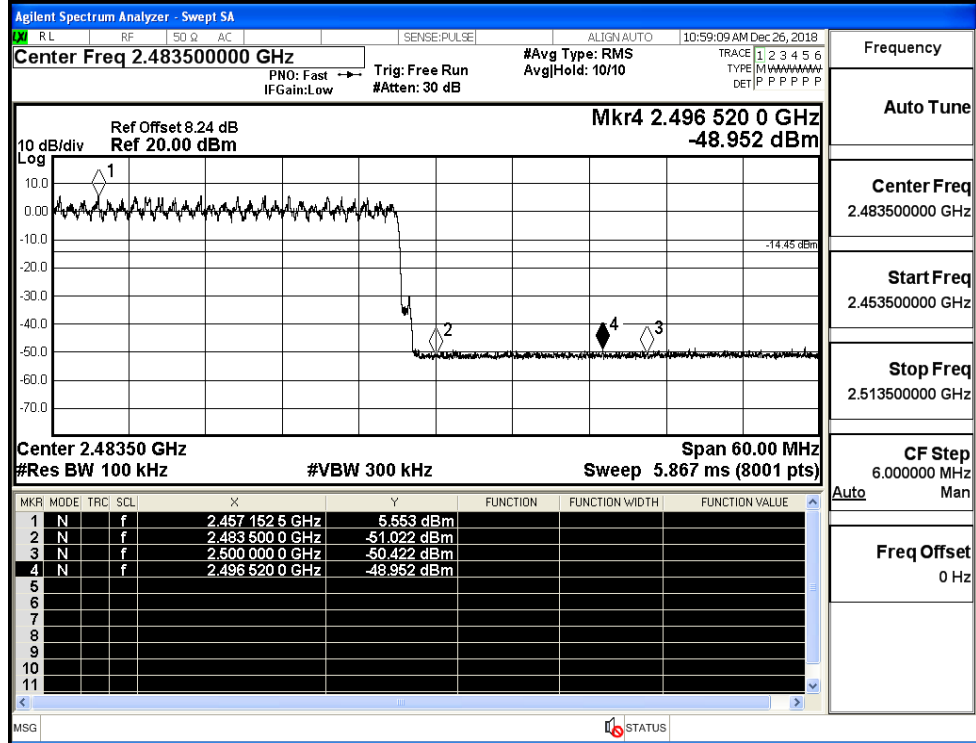
Frequency	
Auto Tune	
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK/HCH/No Hop



Frequency	
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Freq Offset	0 Hz

8DPSK/HCH/Hop



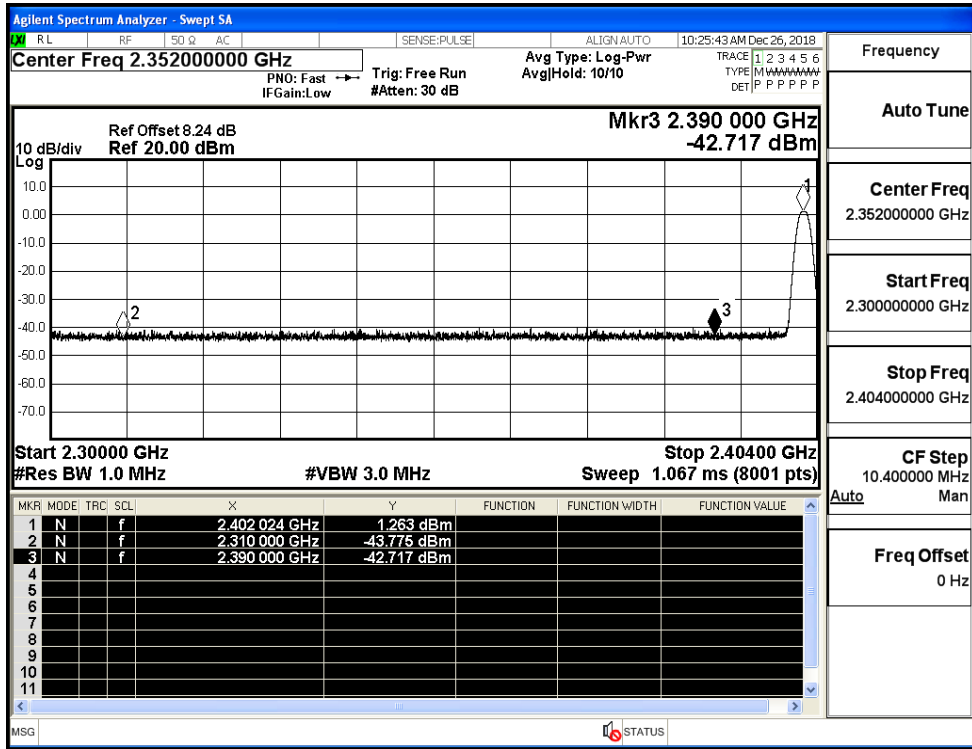
Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz



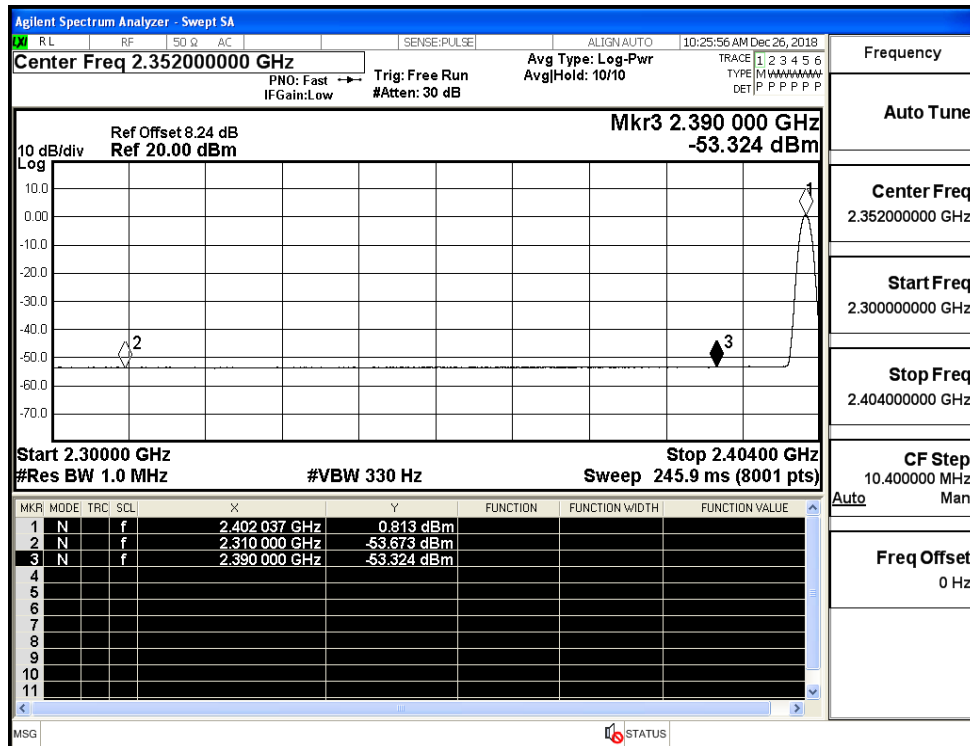
## A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.78	2.0	0	51.48	PEAK	74	PASS
	Off	2310.0	-53.67	2.0	0	41.58	AV	54	PASS
	Off	2390.0	-42.72	2.0	0	52.54	PEAK	74	PASS
	Off	2390.0	-53.32	2.0	0	41.93	AV	54	PASS
	Off	2483.5	-41.74	2.0	0	53.52	PEAK	74	PASS
	Off	2483.5	-53.04	2.0	0	42.22	AV	54	PASS
	Off	2500.0	-43.50	2.0	0	51.76	PEAK	74	PASS
	Off	2500.0	-52.92	2.0	0	42.33	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.27	2.0	0	52.99	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	41.75	AV	54	PASS
	Off	2390.0	-43.41	2.0	0	51.85	PEAK	74	PASS
	Off	2390.0	-53.27	2.0	0	41.99	AV	54	PASS
	Off	2483.5	-42.92	2.0	0	52.34	PEAK	74	PASS
	Off	2483.5	-52.97	2.0	0	42.29	AV	54	PASS
	Off	2500.0	-41.87	2.0	0	53.38	PEAK	74	PASS
	Off	2500.0	-52.91	2.0	0	42.35	AV	54	PASS
8DPSK	Off	2310.0	-43.77	2.0	0	51.49	PEAK	74	PASS
	Off	2310.0	-53.63	2.0	0	41.62	AV	54	PASS
	Off	2390.0	-41.38	2.0	0	53.88	PEAK	74	PASS
	Off	2390.0	-53.26	2.0	0	41.99	AV	54	PASS
	Off	2483.5	-42.08	2.0	0	53.18	PEAK	74	PASS
	Off	2483.5	-53.00	2.0	0	42.26	AV	54	PASS
	Off	2500.0	-43.09	2.0	0	52.16	PEAK	74	PASS
	Off	2500.0	-52.82	2.0	0	42.44	AV	54	PASS

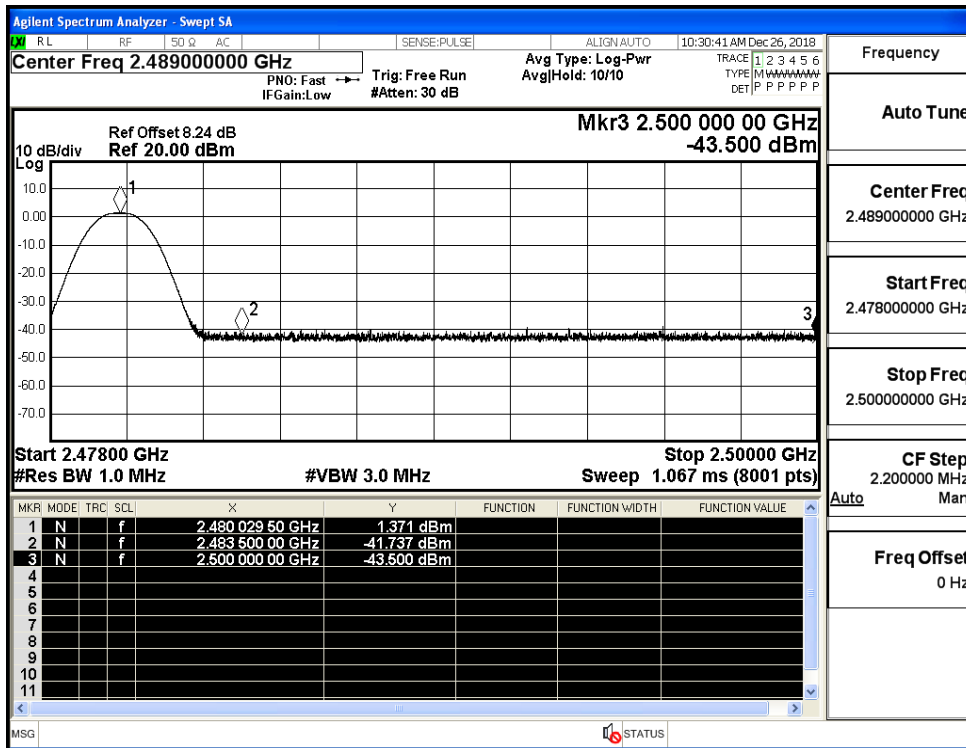
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



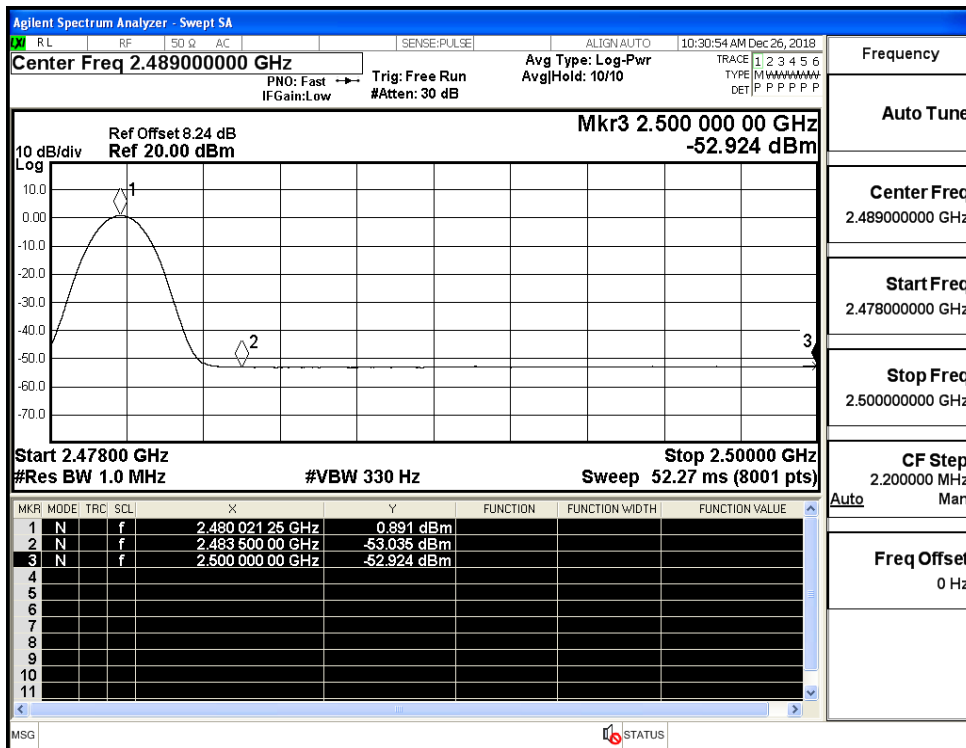
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



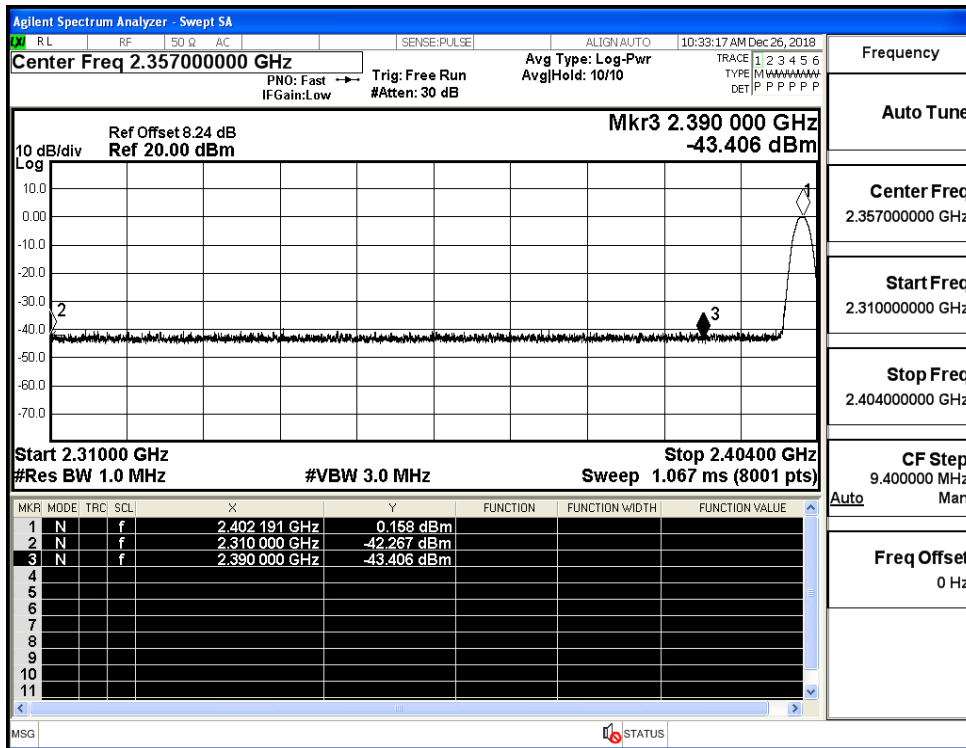
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



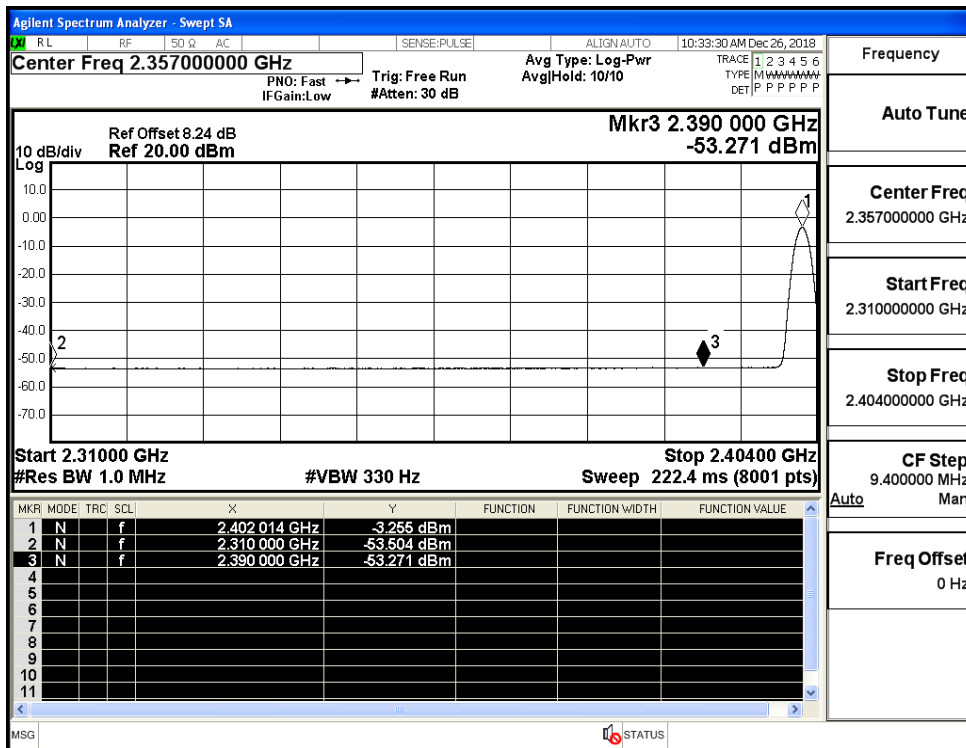
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



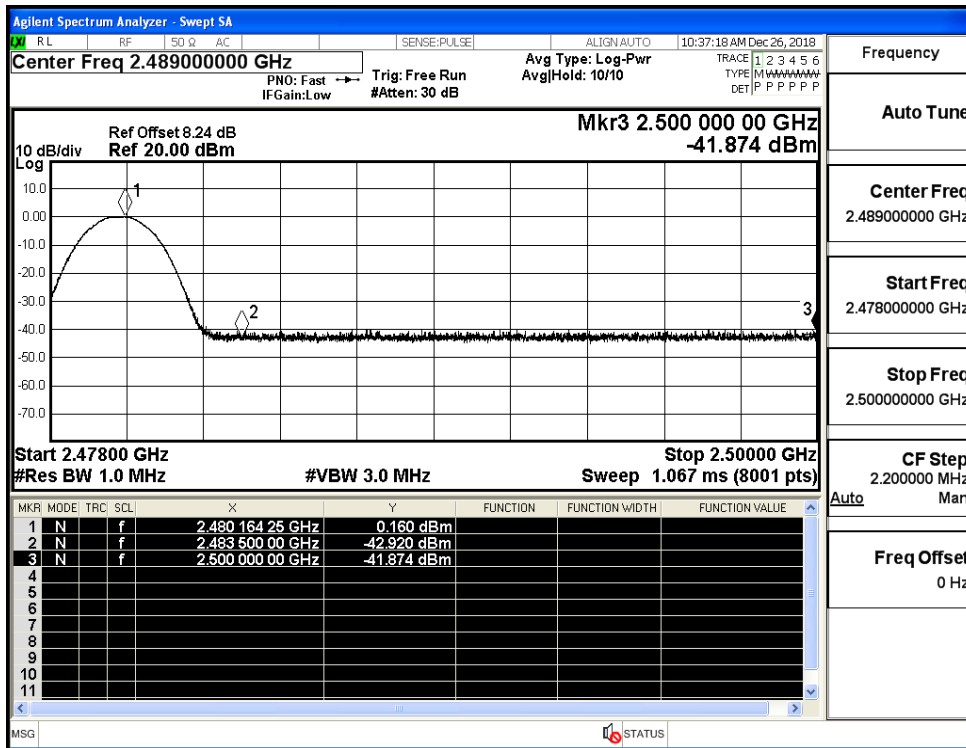
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



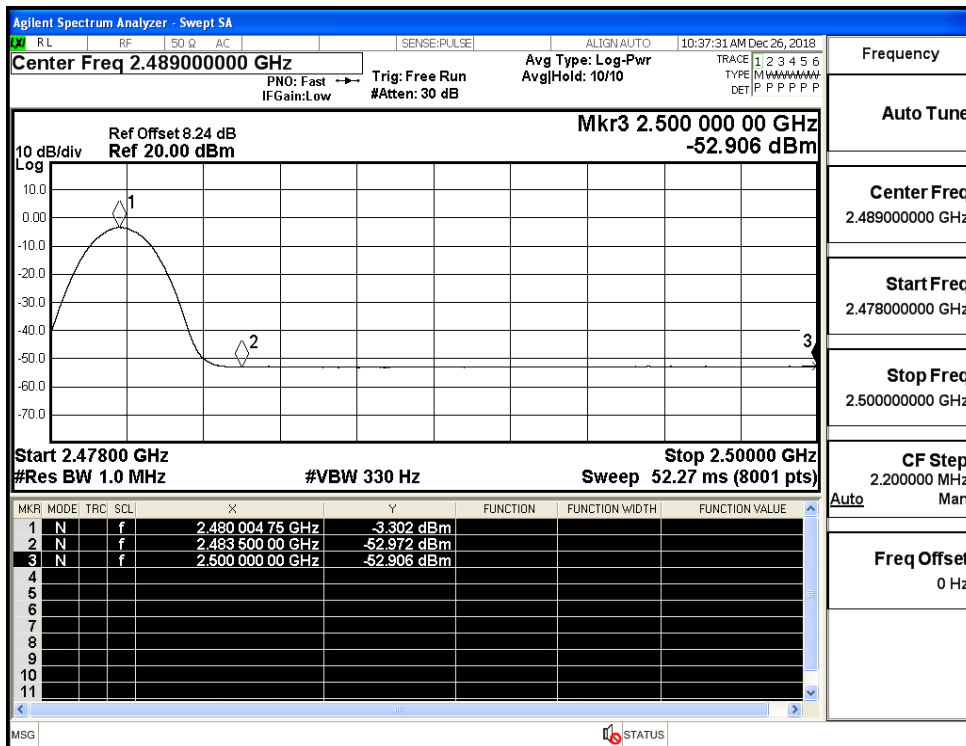
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)



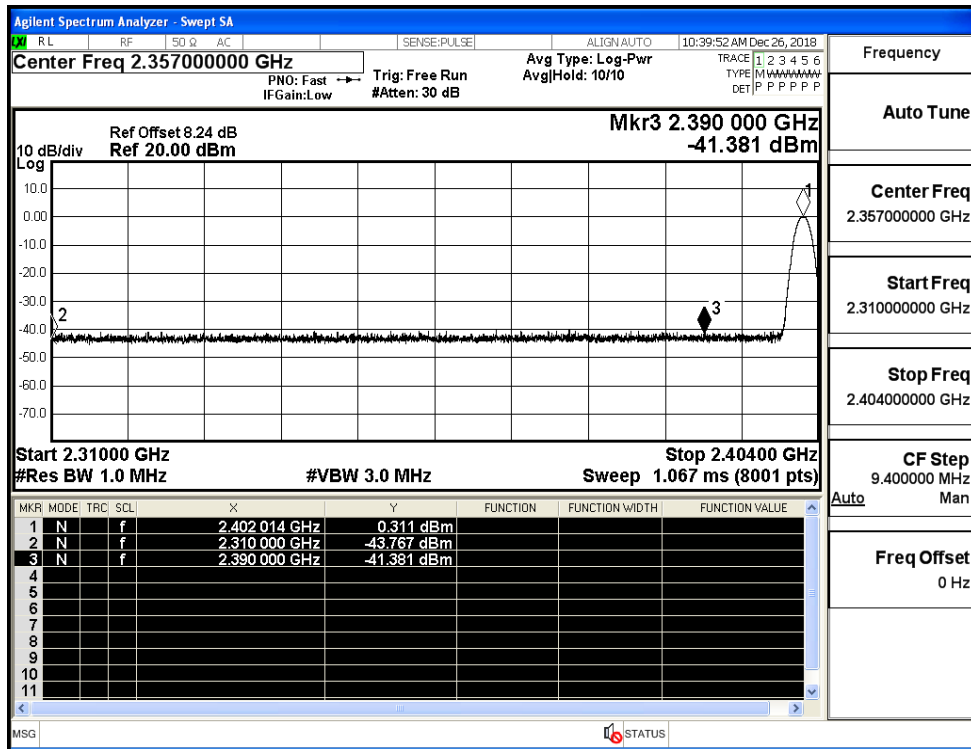
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (High Channel)



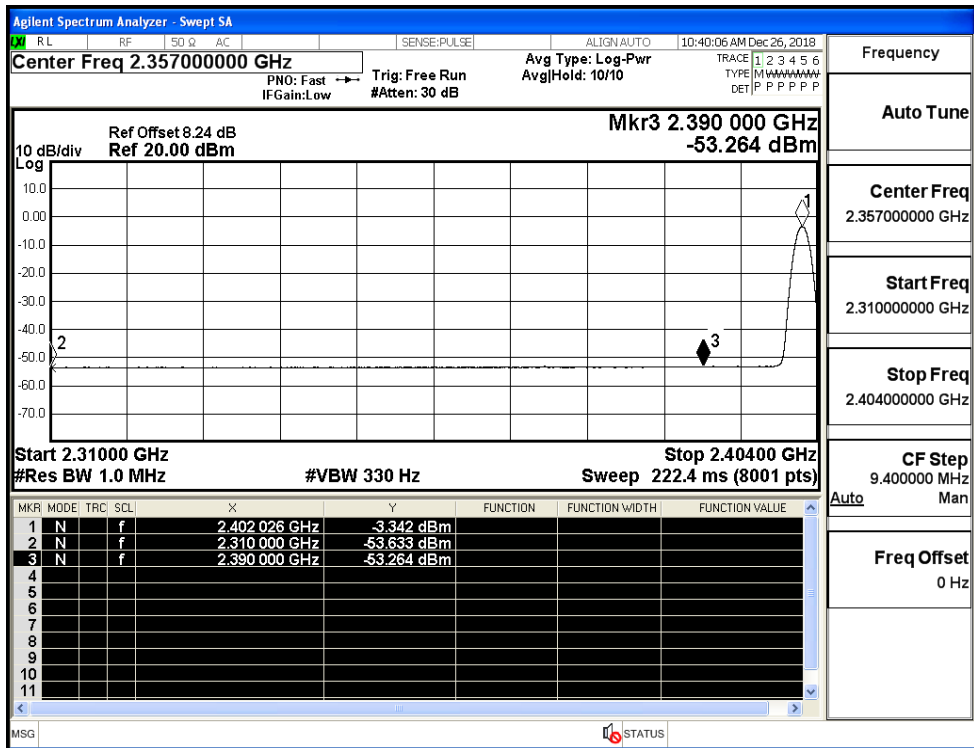
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (High Channel)



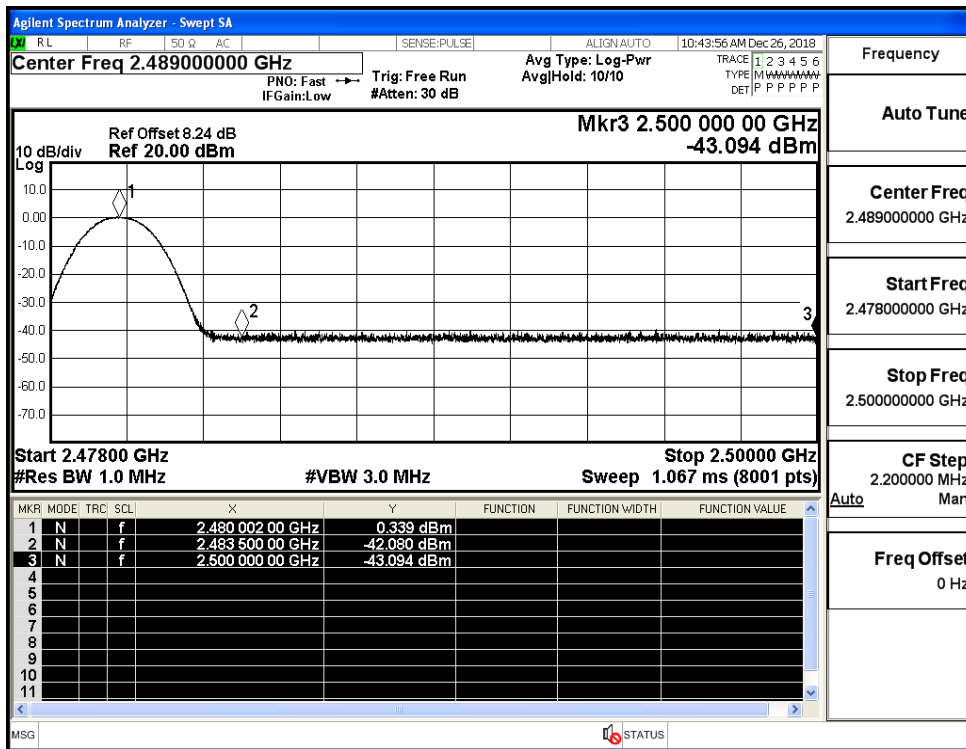
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

