

## Appendix A

### RF Test Data for BT V4.2(BDR/EDR) (Conducted Measurement)

Product Name: BLUETOOTH SPEAKER

Trade Mark: ALTEC

Test Model: ALP-XP400

#### Environmental Conditions

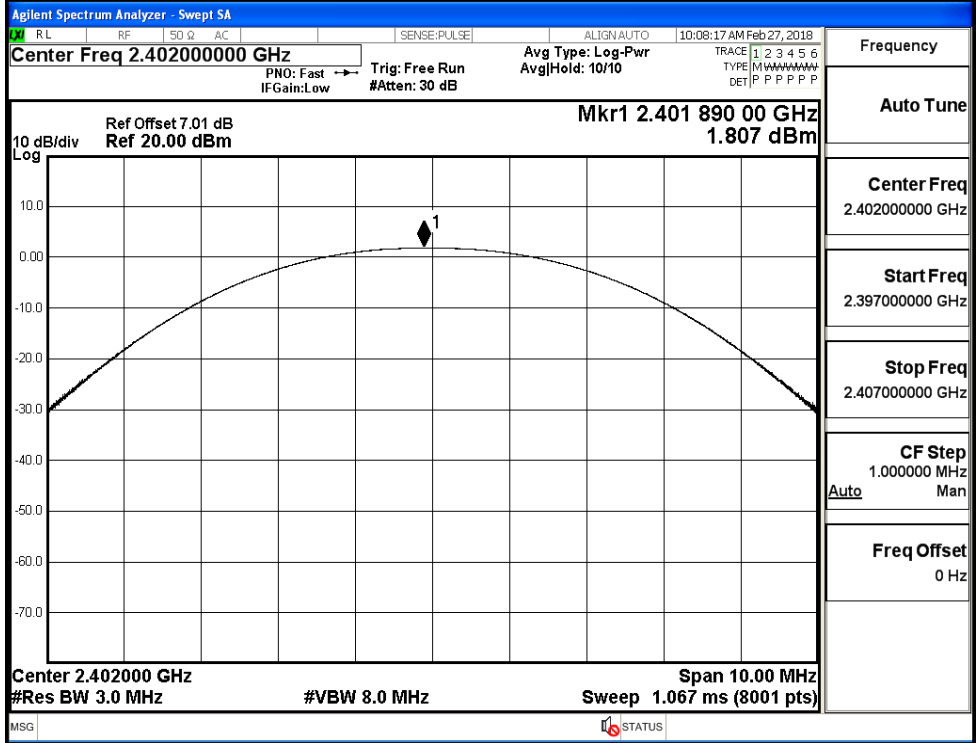
Temperature:	20.8 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom Liu
Supervised by:	Jayden Zhuo

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

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.807	30	PASS
	MCH	1.901	30	PASS
	HCH	1.879	30	PASS
$\pi/4$ DQPSK	LCH	1.628	21	PASS
	MCH	1.754	21	PASS
	HCH	1.740	21	PASS
8DPSK	LCH	1.854	21	PASS
	MCH	1.971	21	PASS
	HCH	1.972	21	PASS

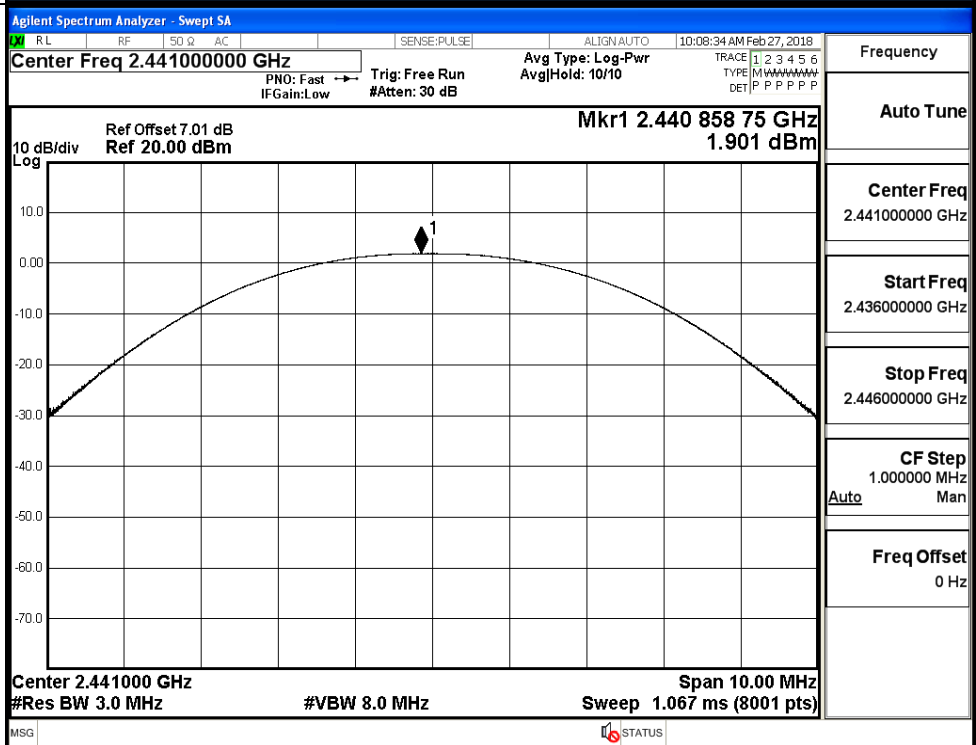
Test Graphs

GFSK/LCH



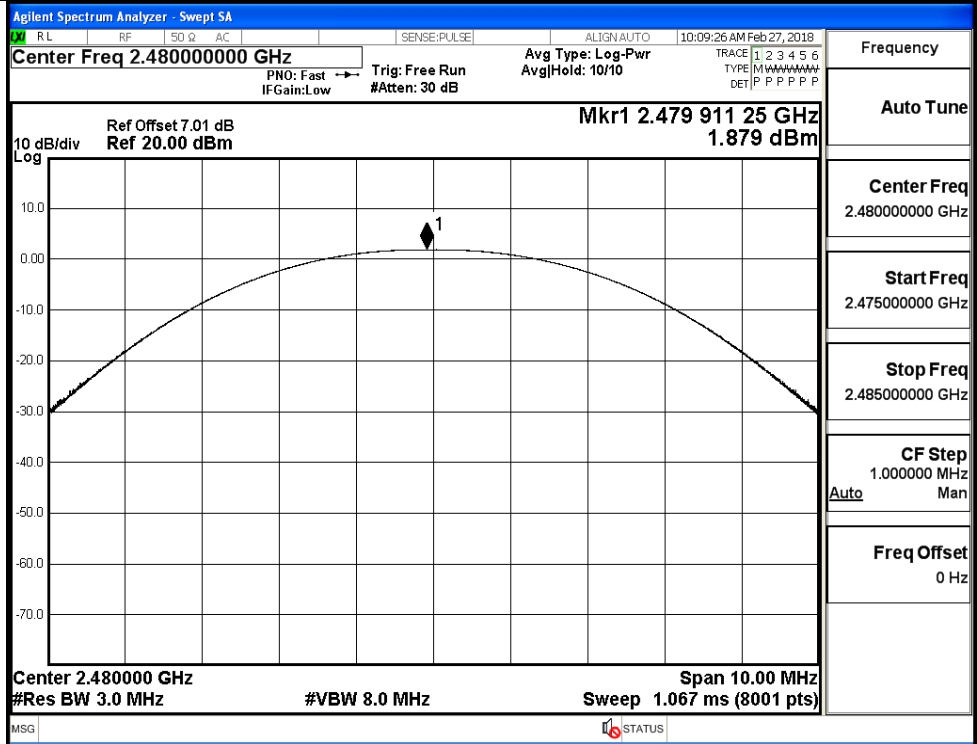
Frequency
Auto Tune
Center Freq 2.402000000 GHz
Start Freq 2.397000000 GHz
Stop Freq 2.407000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

GFSK/MCH

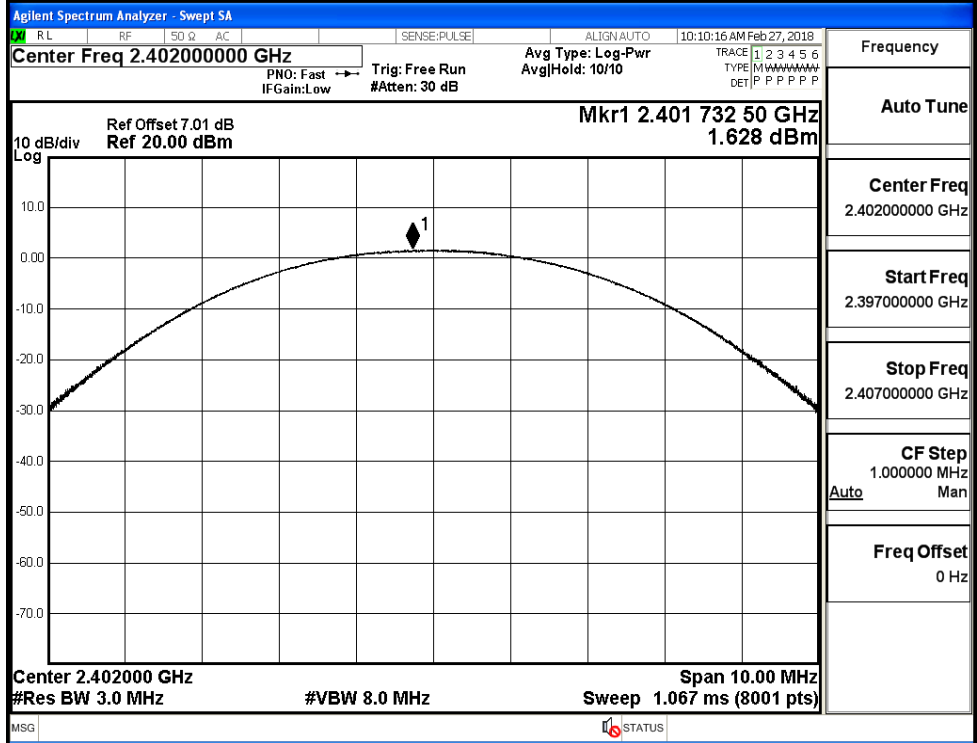


Frequency
Auto Tune
Center Freq 2.441000000 GHz
Start Freq 2.436000000 GHz
Stop Freq 2.446000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

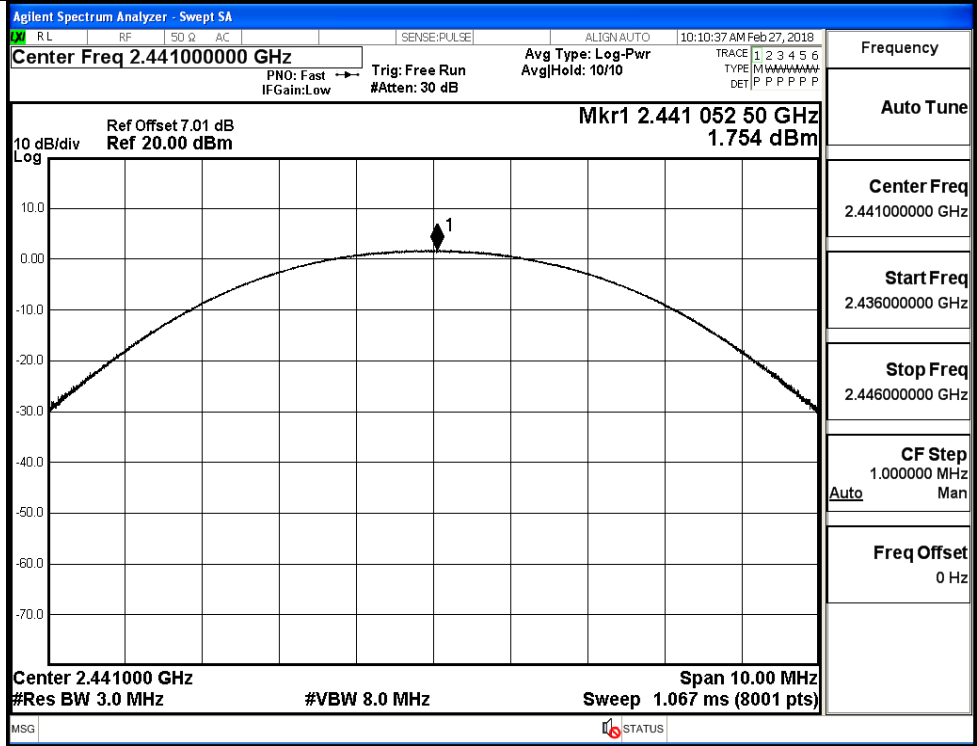
GFSK/HCH



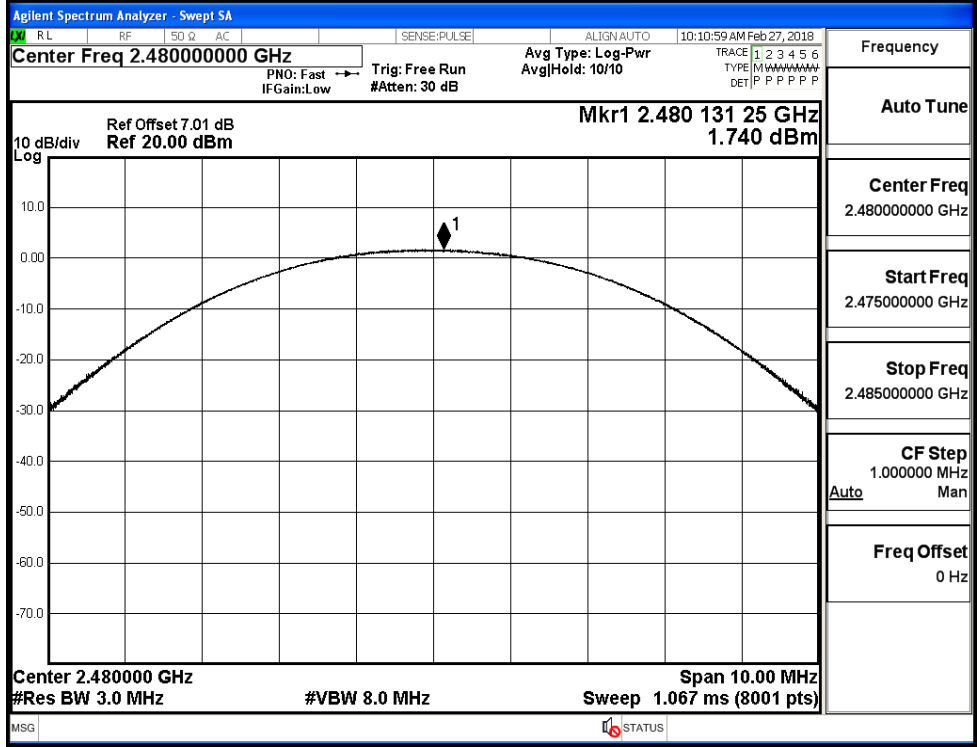
$\pi/4$ DQPSK/LCH



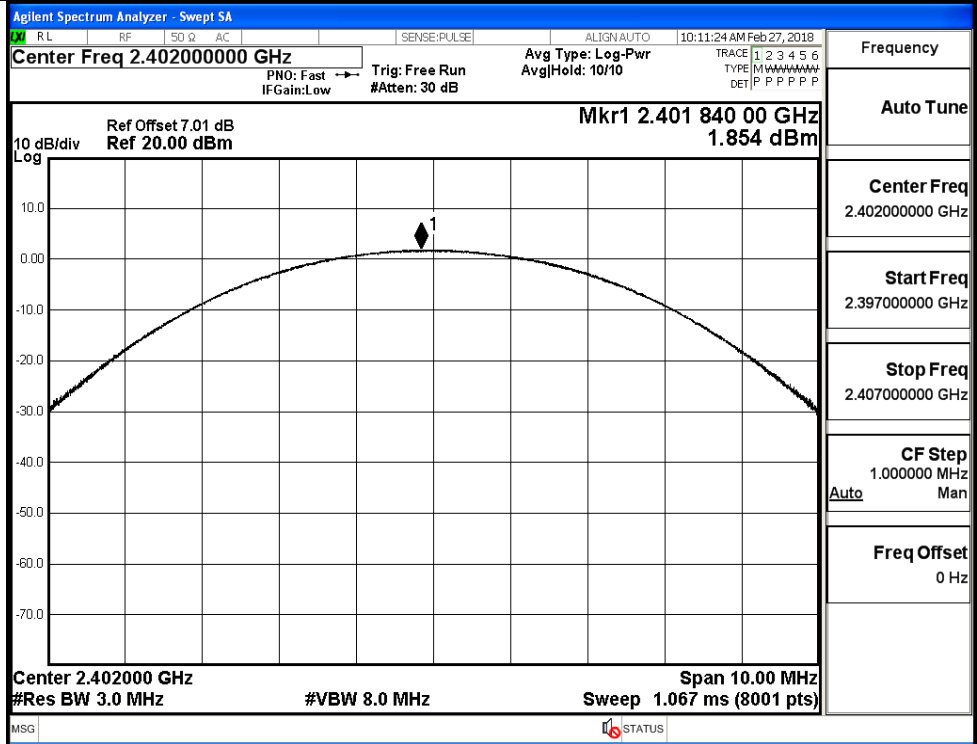
$\pi/4$ DQPSK/MCH



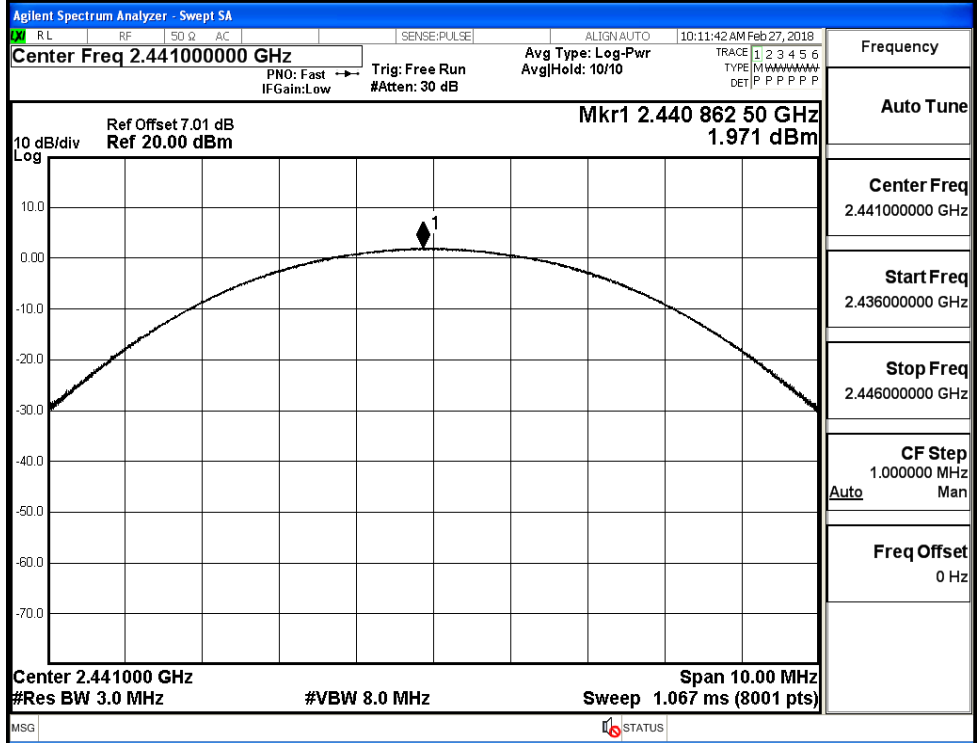
$\pi/4$ DQPSK/HCH



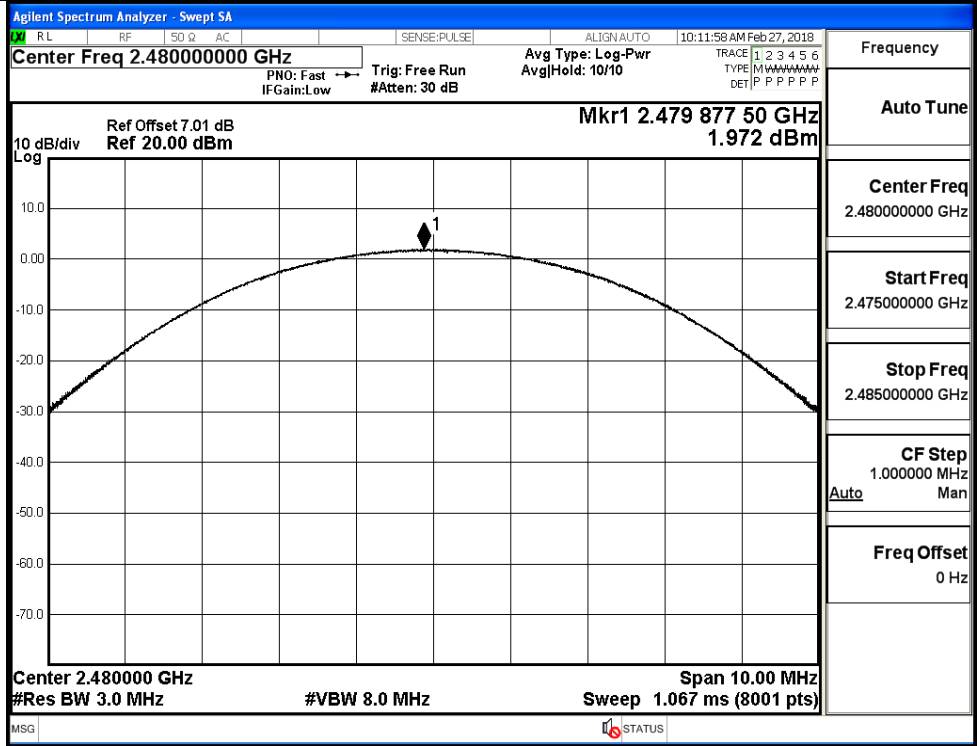
8DPSK/LCH



8DPSK/MCH

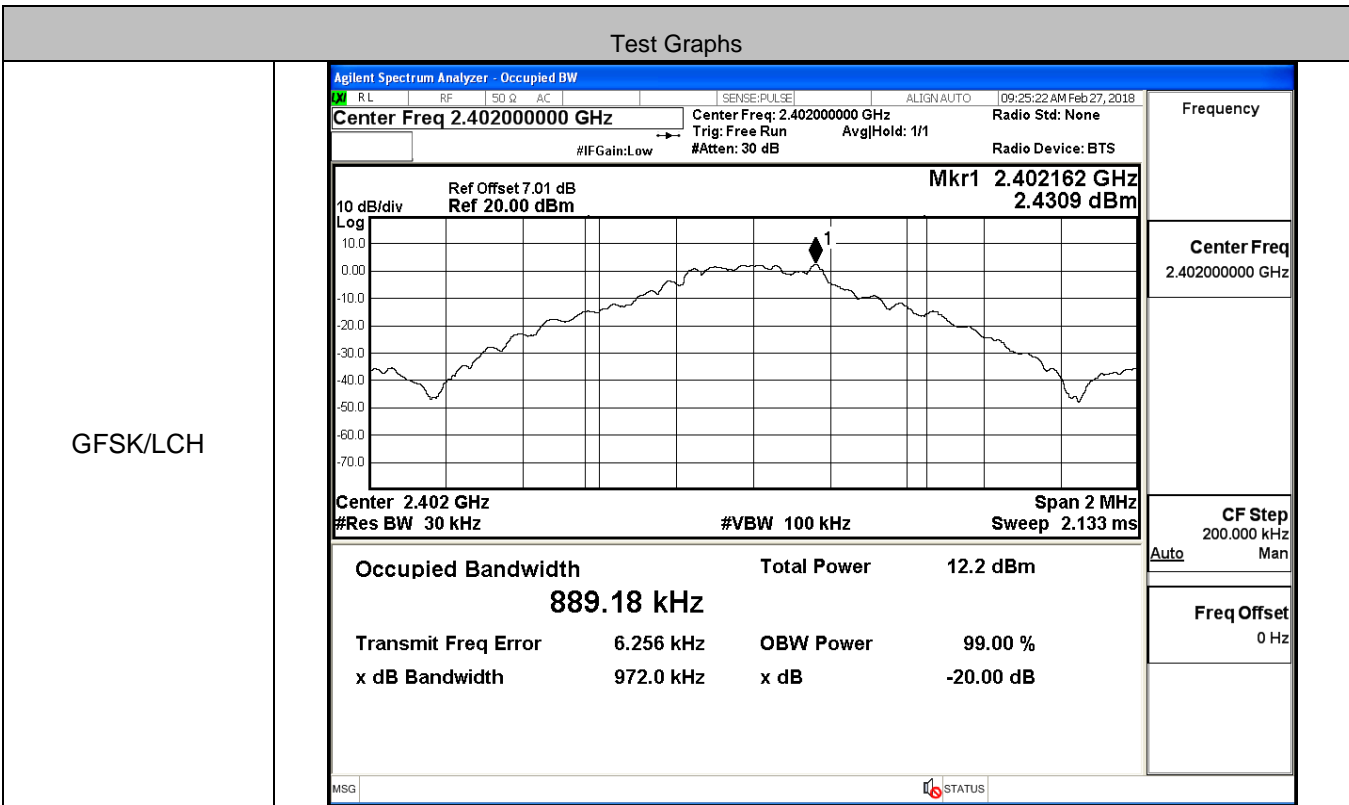


8DPSK/HCH

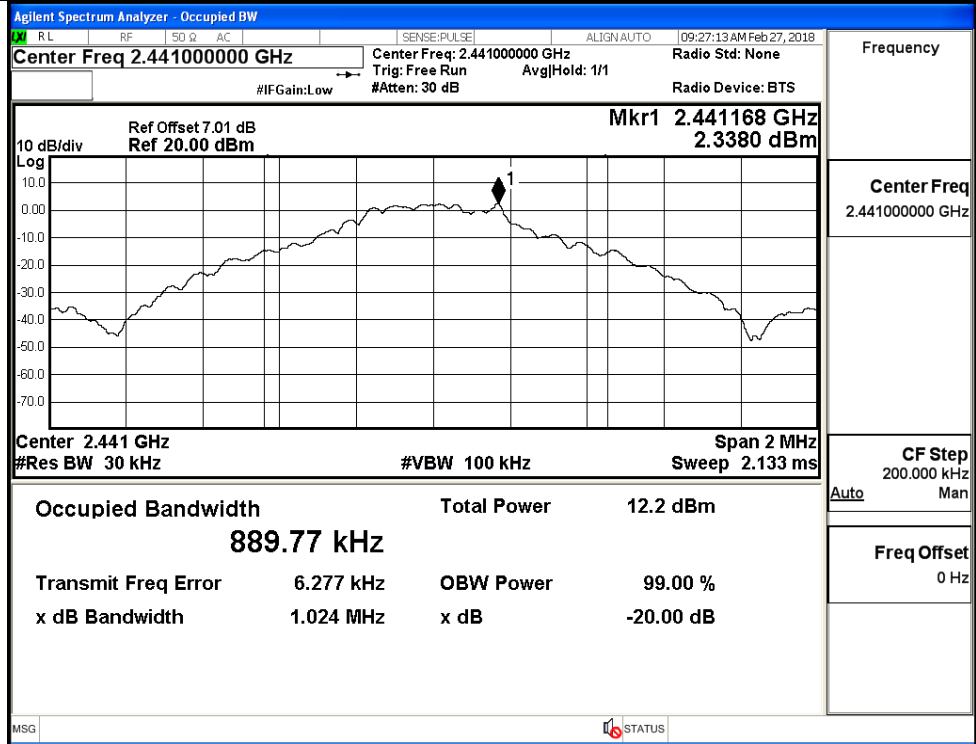


**A.2 20dB Bandwidth**

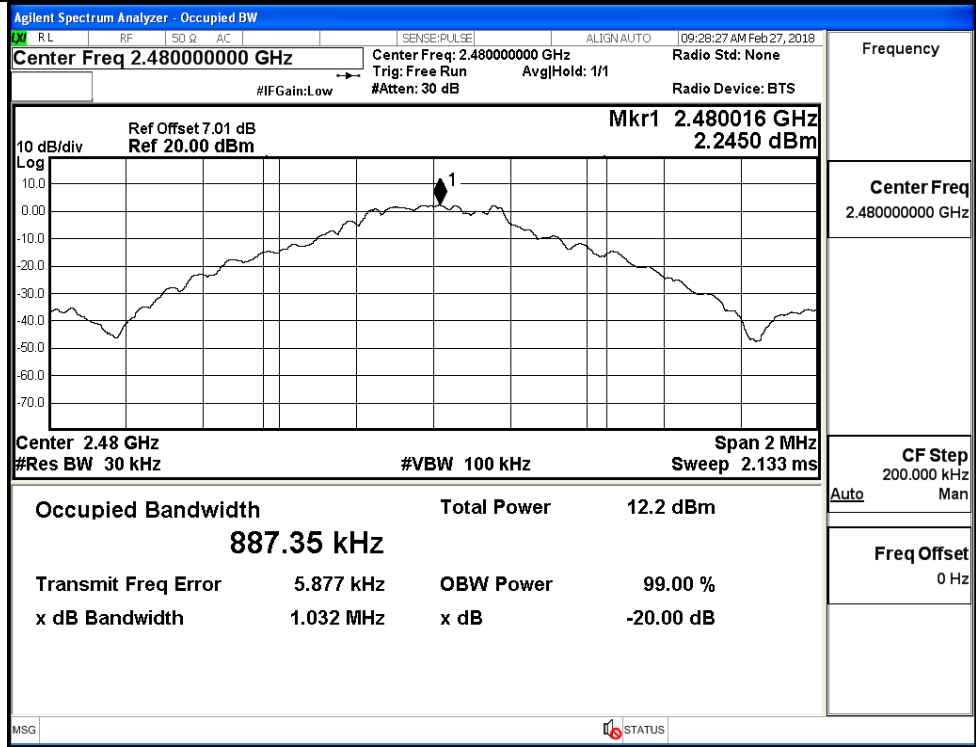
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9720	Not Specified	PASS
	MCH	1.024	Not Specified	PASS
	HCH	1.032	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.289	Not Specified	PASS
	MCH	1.293	Not Specified	PASS
	HCH	1.287	Not Specified	PASS
8DPSK	LCH	1.294	Not Specified	PASS
	MCH	1.292	Not Specified	PASS
	HCH	1.294	Not Specified	PASS



GFSK/MCH

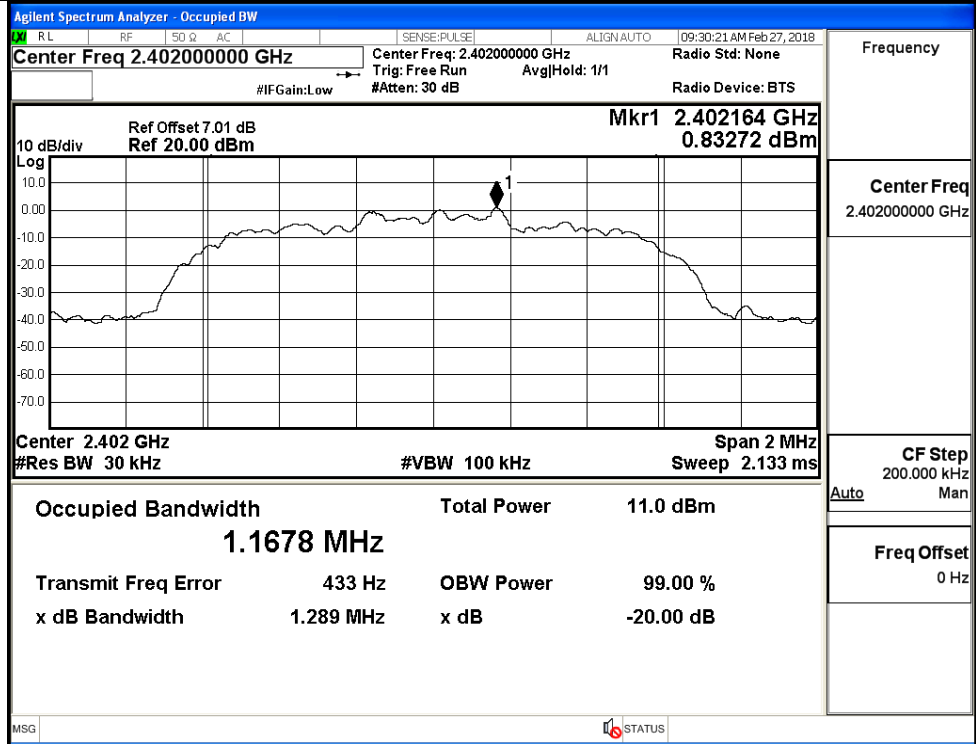


GFSK/HCH

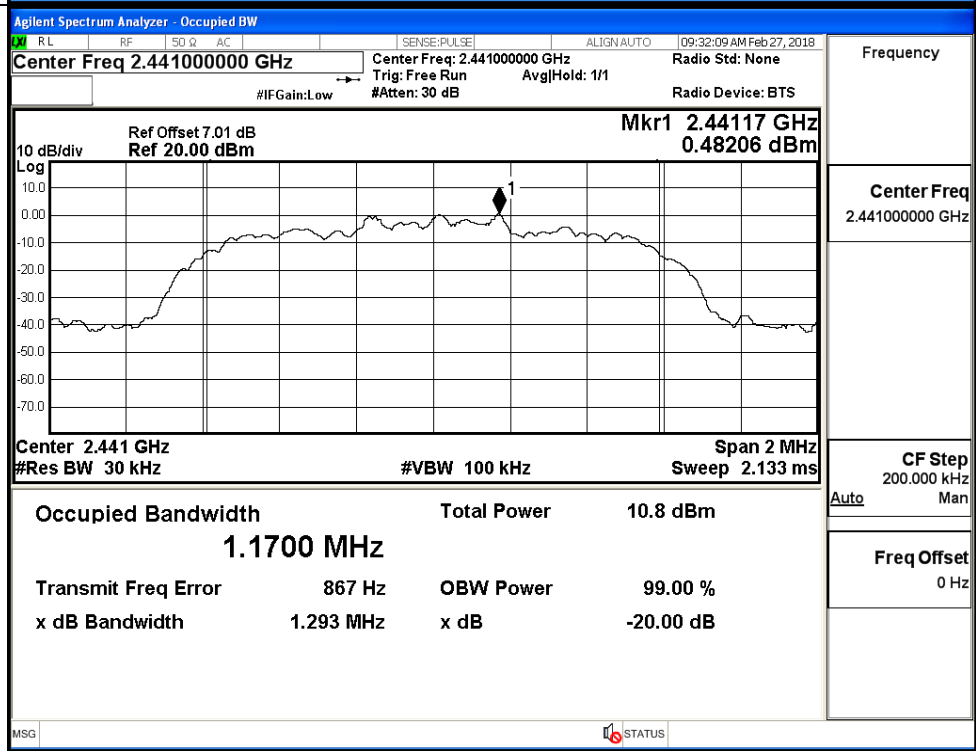




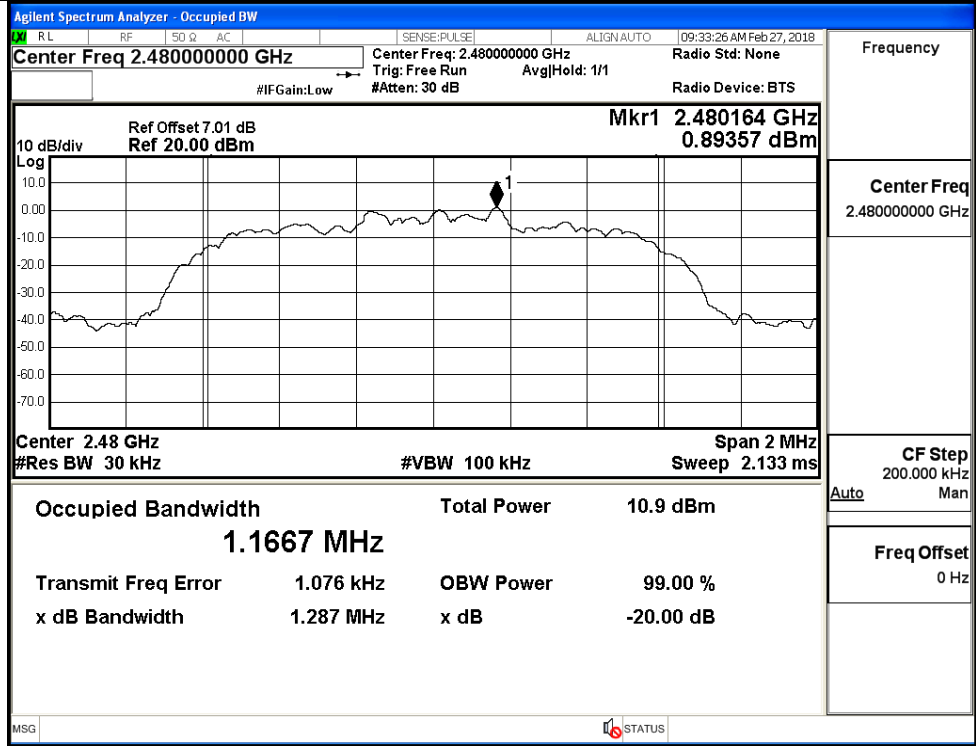
$\pi/4$ DQPSK/LCH



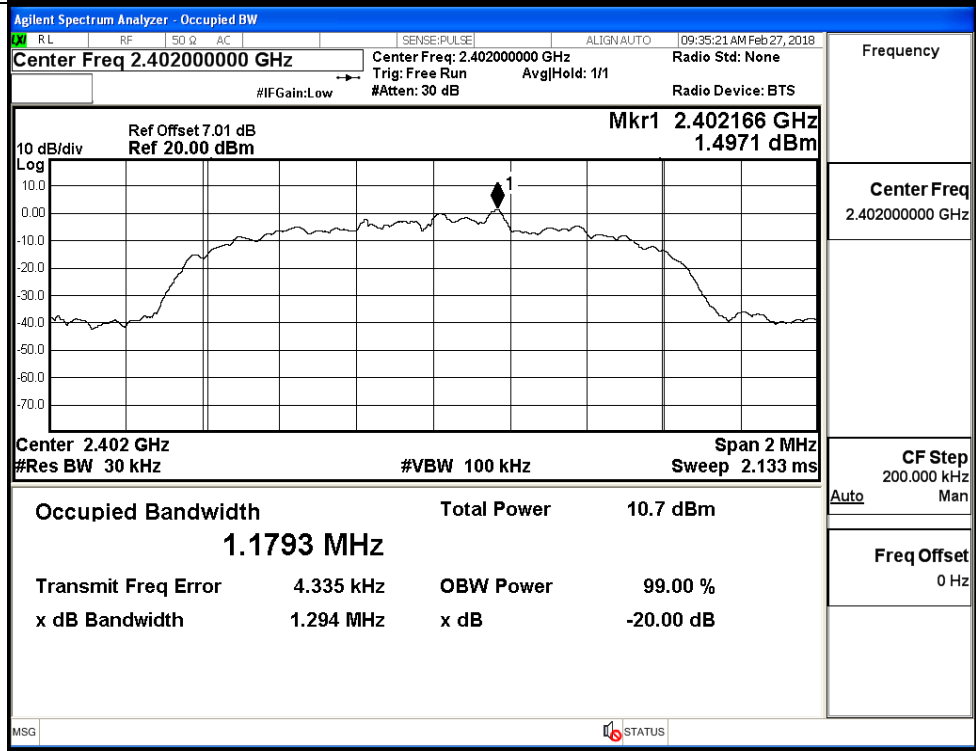
$\pi/4$ DQPSK/MCH



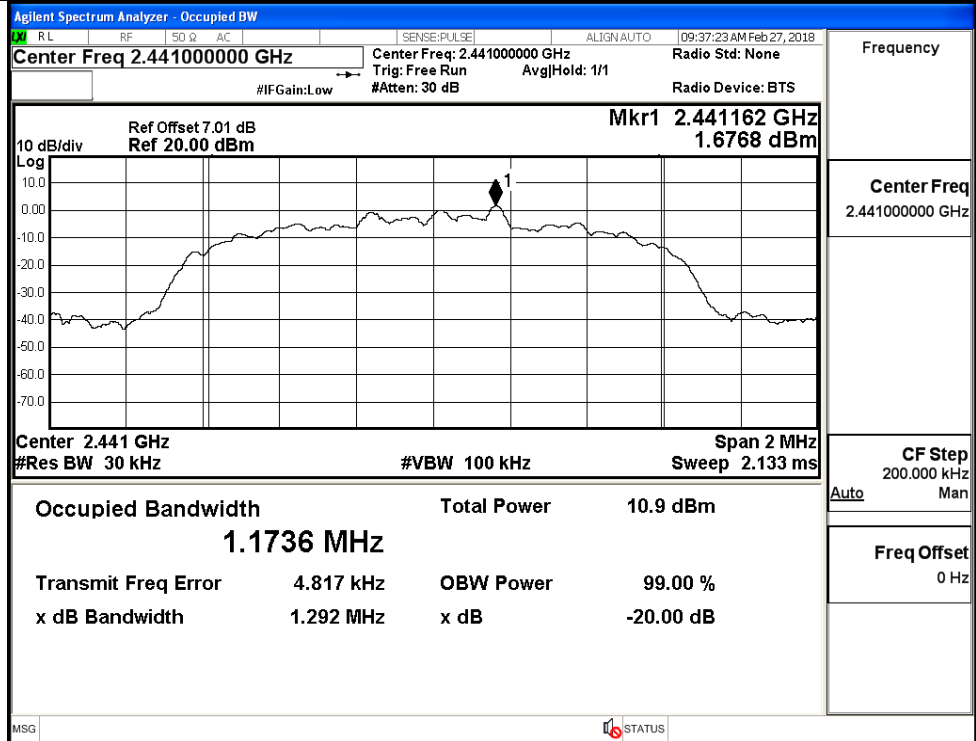
$\pi/4$ DQPSK/HCH



8DPSK/LCH

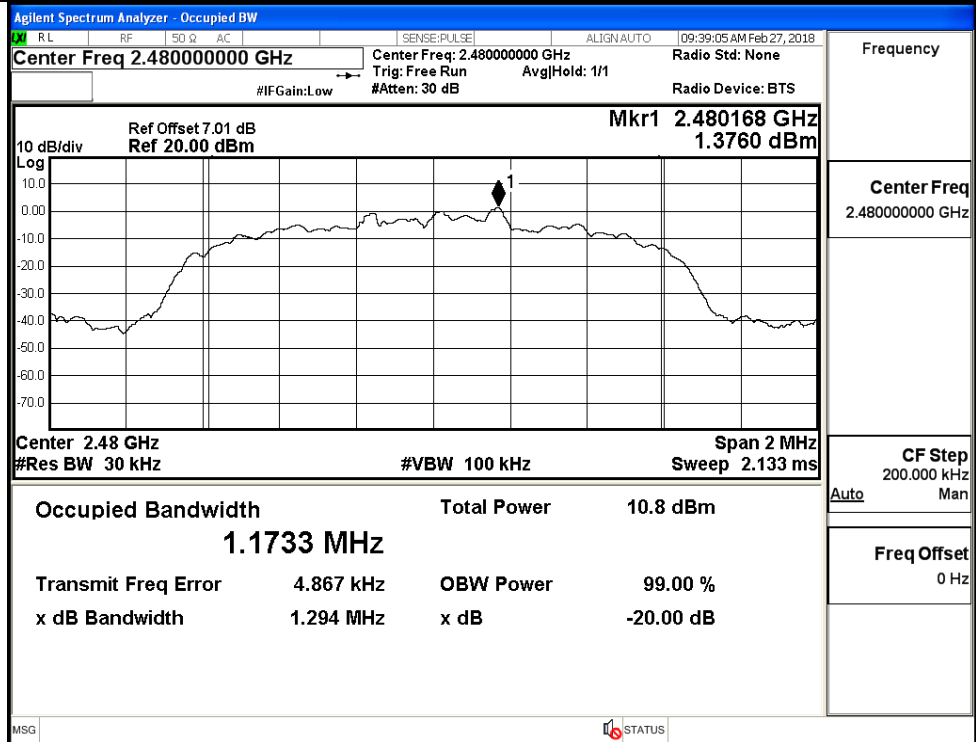


8DPSK/MCH



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

8DPSK/HCH



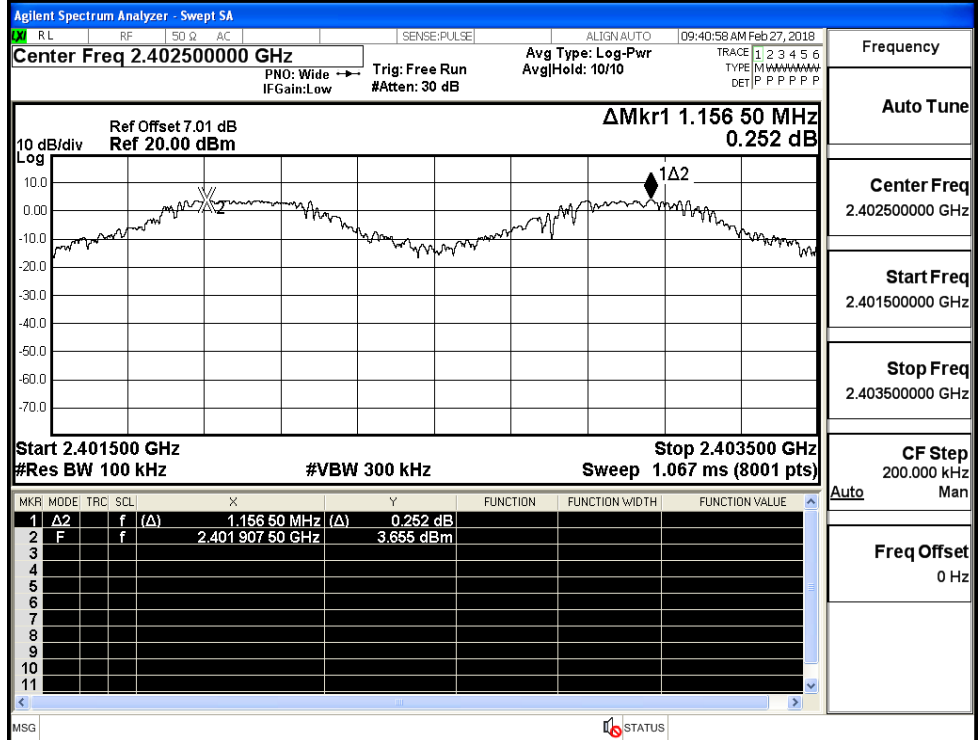
Frequency	2.48000000 GHz
Center Freq	2.48000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

### A.3 Carrier Frequency Separation

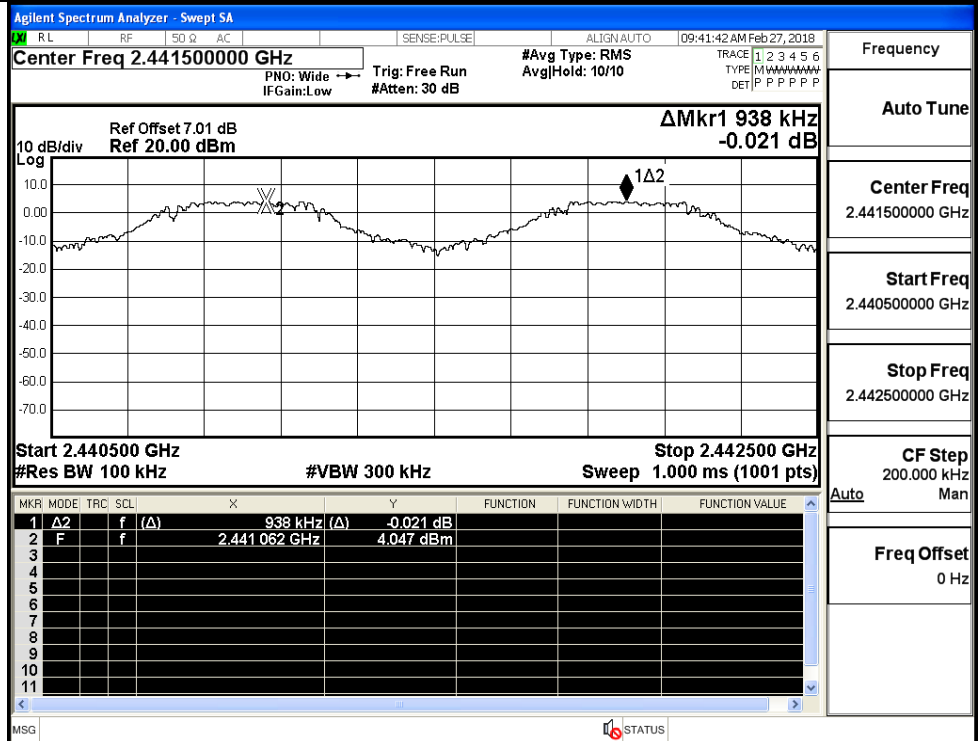
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.157	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
	MCH	0.938	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
	HCH	0.786	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
$\pi/4$ DQPSK	LCH	1.092	2/3 of the 20dB Bandwidth	PASS
	MCH	1.156	2/3 of the 20dB Bandwidth	PASS
	HCH	0.866	2/3 of the 20dB Bandwidth	PASS
8DPSK	LCH	1.002	2/3 of the 20dB Bandwidth	PASS
	MCH	0.862	2/3 of the 20dB Bandwidth	PASS
	HCH	0.986	2/3 of the 20dB Bandwidth	PASS

Test Graphs

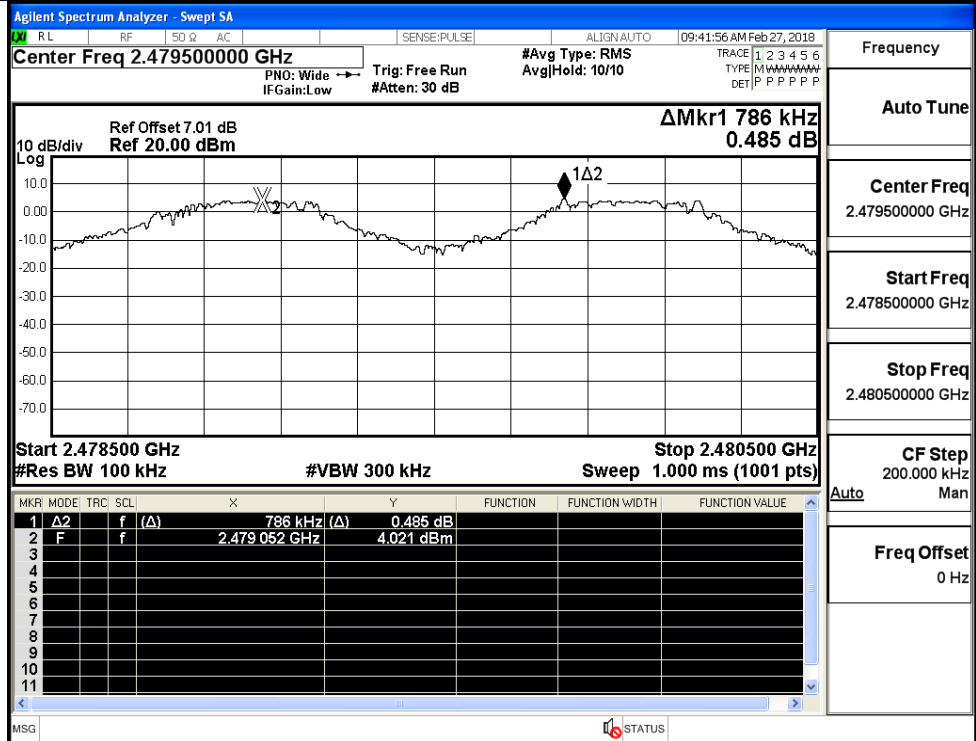
GFSK/LCH



GFSK/MCH



GFSK/HCH



Frequency

Auto Tune

Center Freq  
2.479500000 GHz

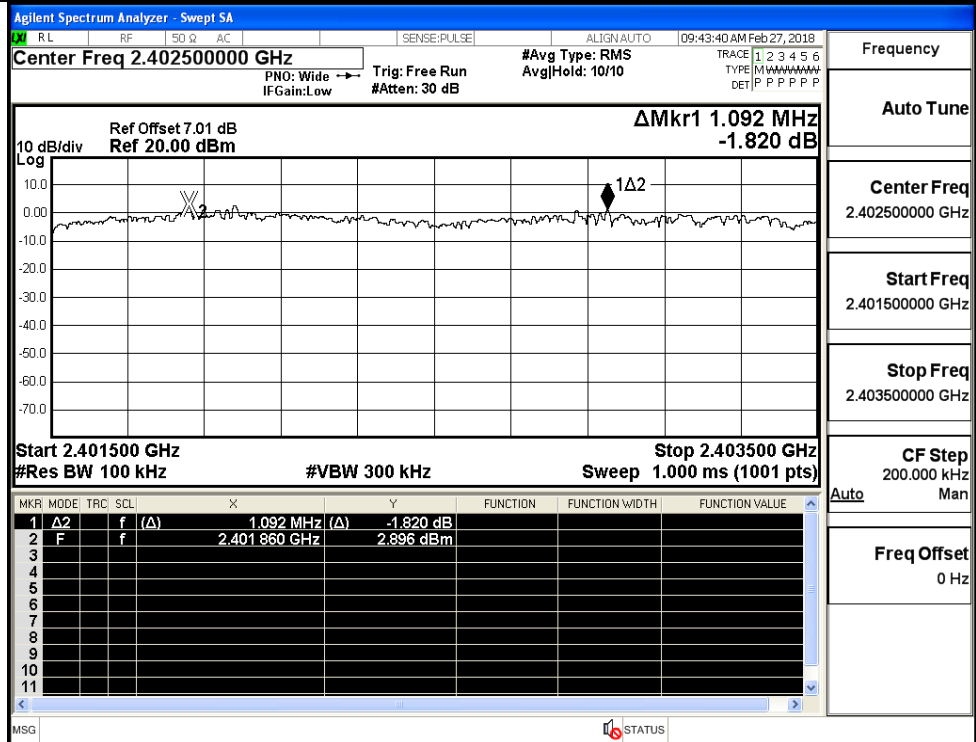
Start Freq  
2.478500000 GHz

Stop Freq  
2.480500000 GHz

CF Step  
200.000 kHz  
Man

Freq Offset  
0 Hz

π/4DQPSK/LCH



Frequency

Auto Tune

Center Freq  
2.402500000 GHz

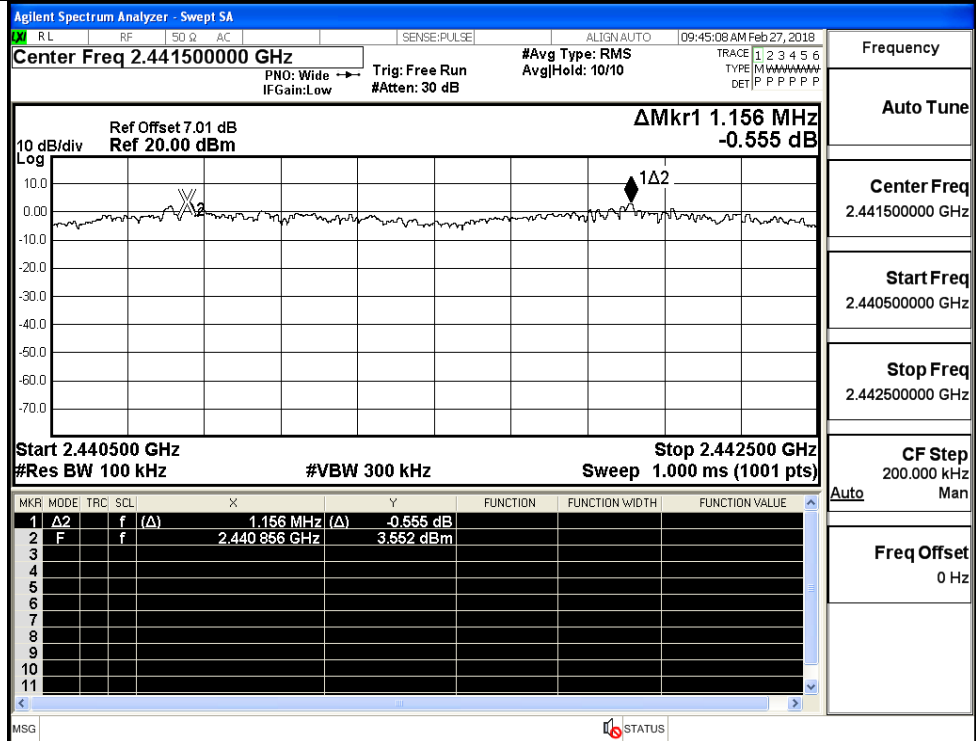
Start Freq  
2.401500000 GHz

Stop Freq  
2.403500000 GHz

CF Step  
200.000 kHz  
Man

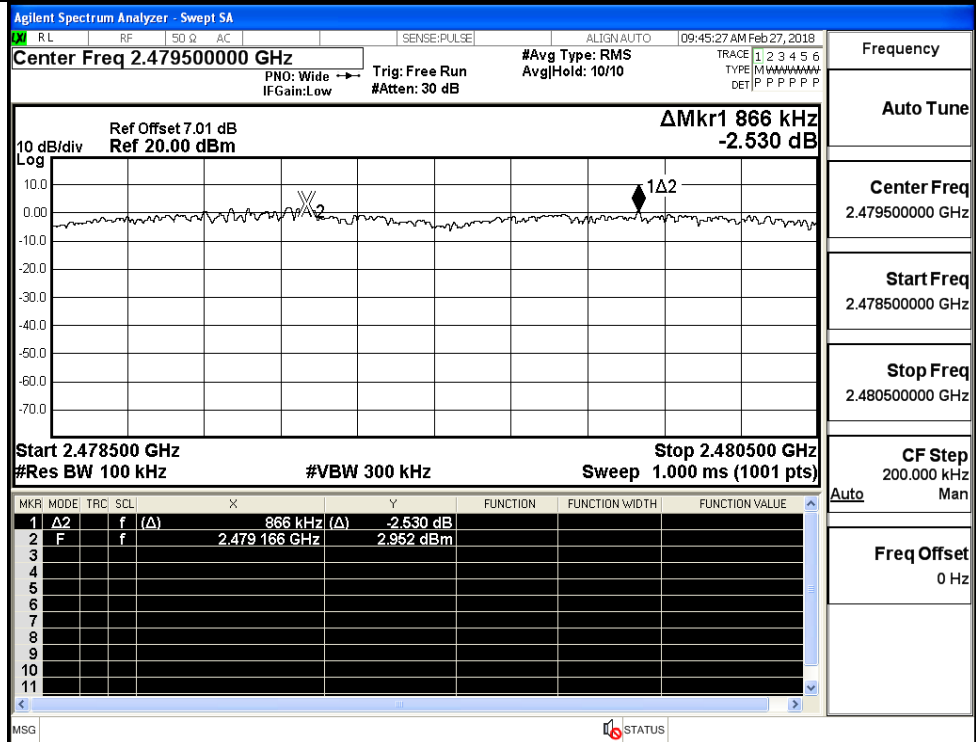
Freq Offset  
0 Hz

$\pi/4$ DQPSK/MCH



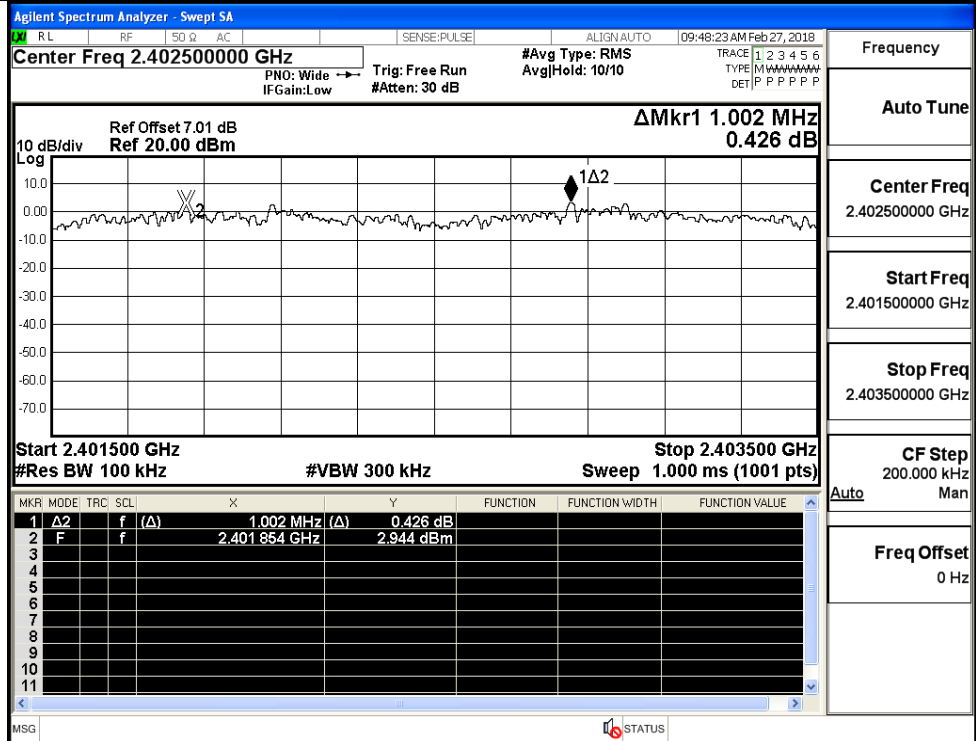
Frequency  
Auto Tune  
Center Freq  
2.441500000 GHz  
Start Freq  
2.440500000 GHz  
Stop Freq  
2.442500000 GHz  
CF Step  
200.000 kHz  
Auto Man  
Freq Offset  
0 Hz

$\pi/4$ DQPSK/HCH

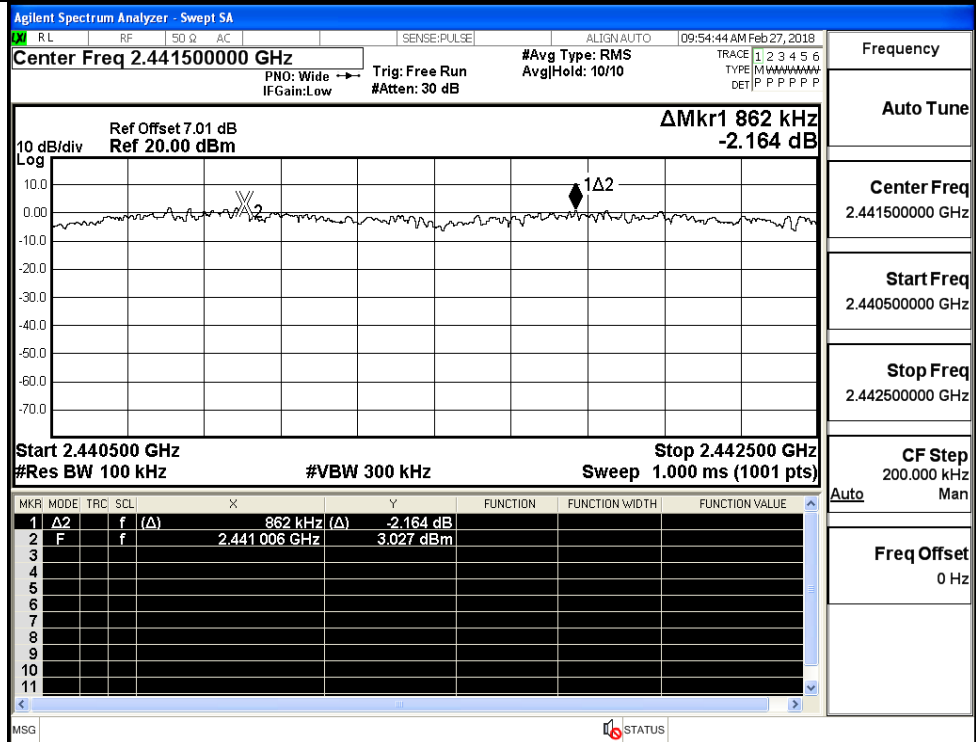


Frequency  
Auto Tune  
Center Freq  
2.479500000 GHz  
Start Freq  
2.478500000 GHz  
Stop Freq  
2.480500000 GHz  
CF Step  
200.000 kHz  
Auto Man  
Freq Offset  
0 Hz

8DPSK/LCH

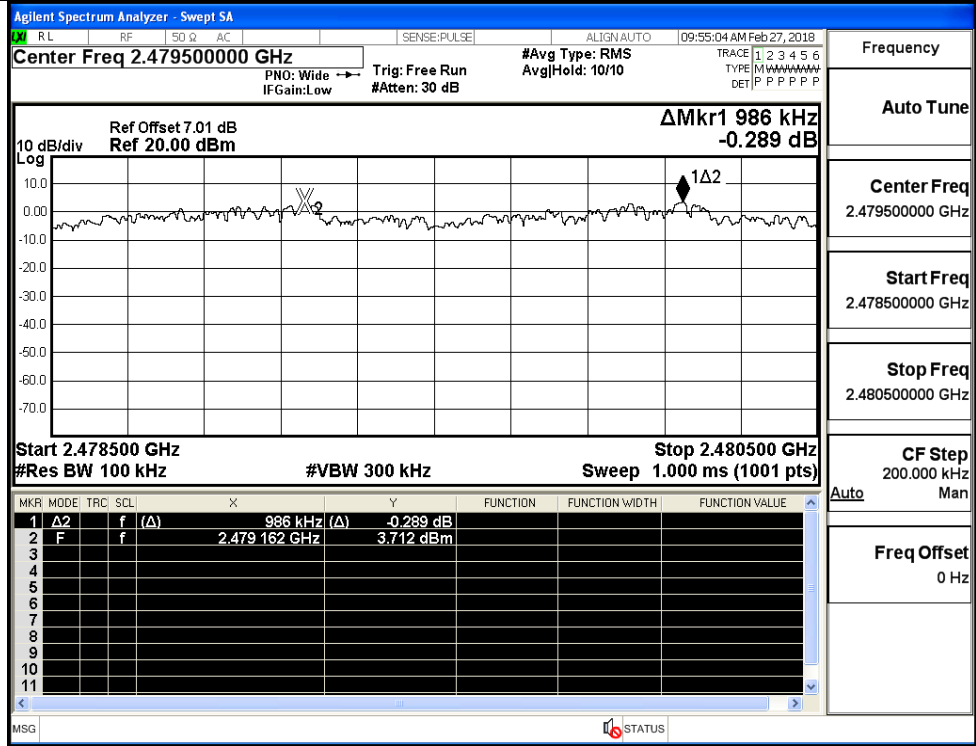


8DPSK/MCH





8DPSK/HCH

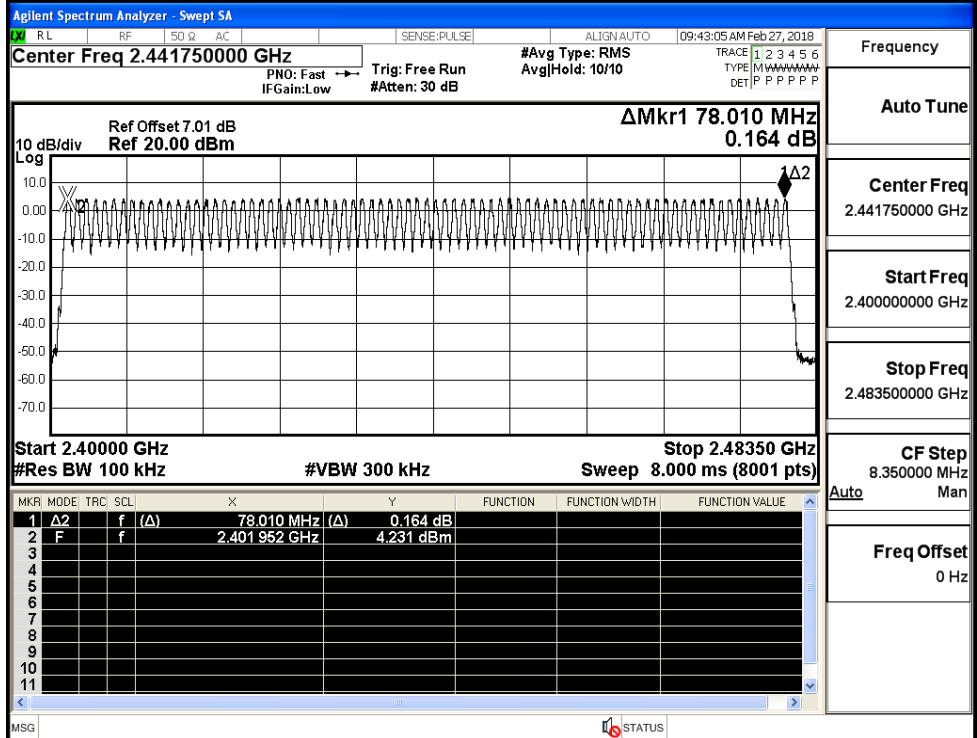


#### A.4 Hopping Channel Number

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

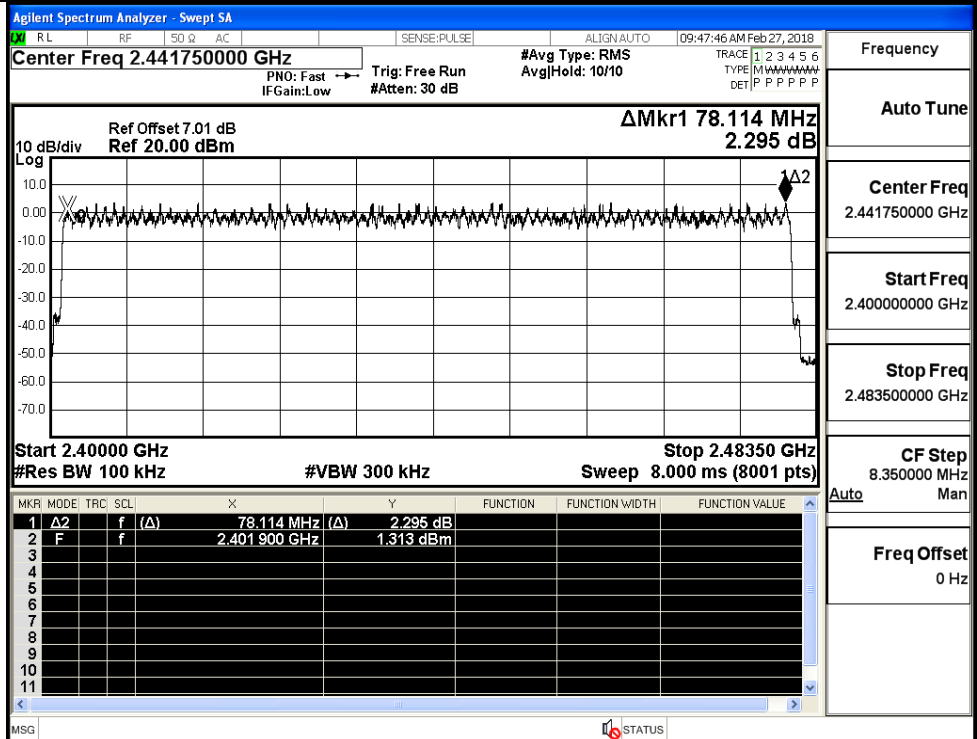
Test Graphs

GFSK/Hop



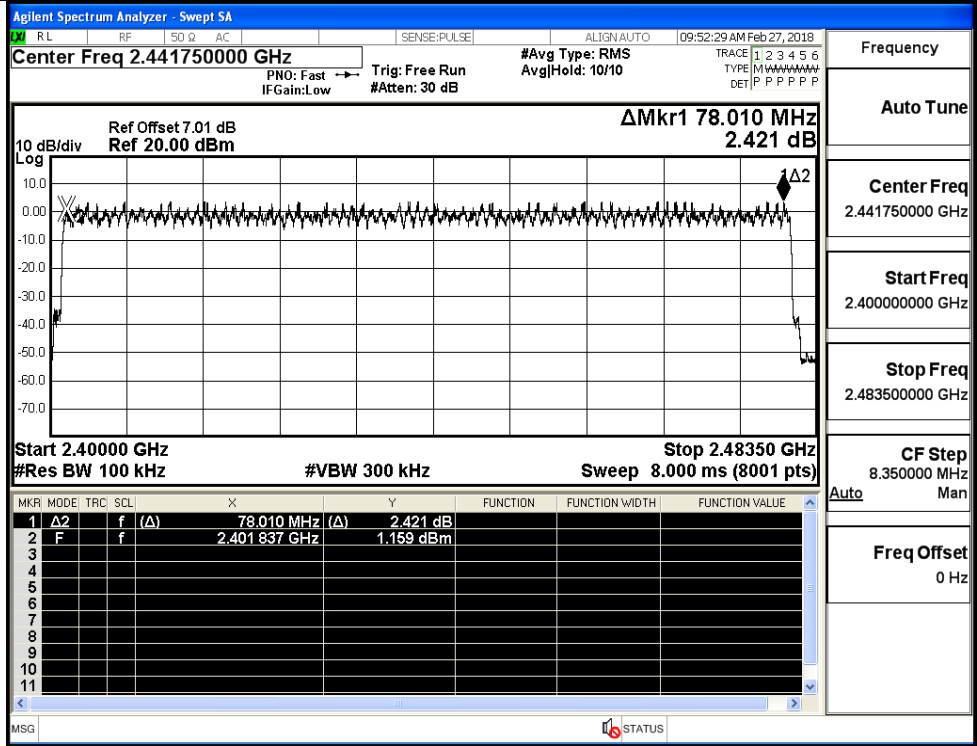
Frequency	
Auto Tune	
Center Freq	2.441750000 GHz
Start Freq	2.400000000 GHz
Stop Freq	2.483500000 GHz
CF Step	8.350000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/Hop



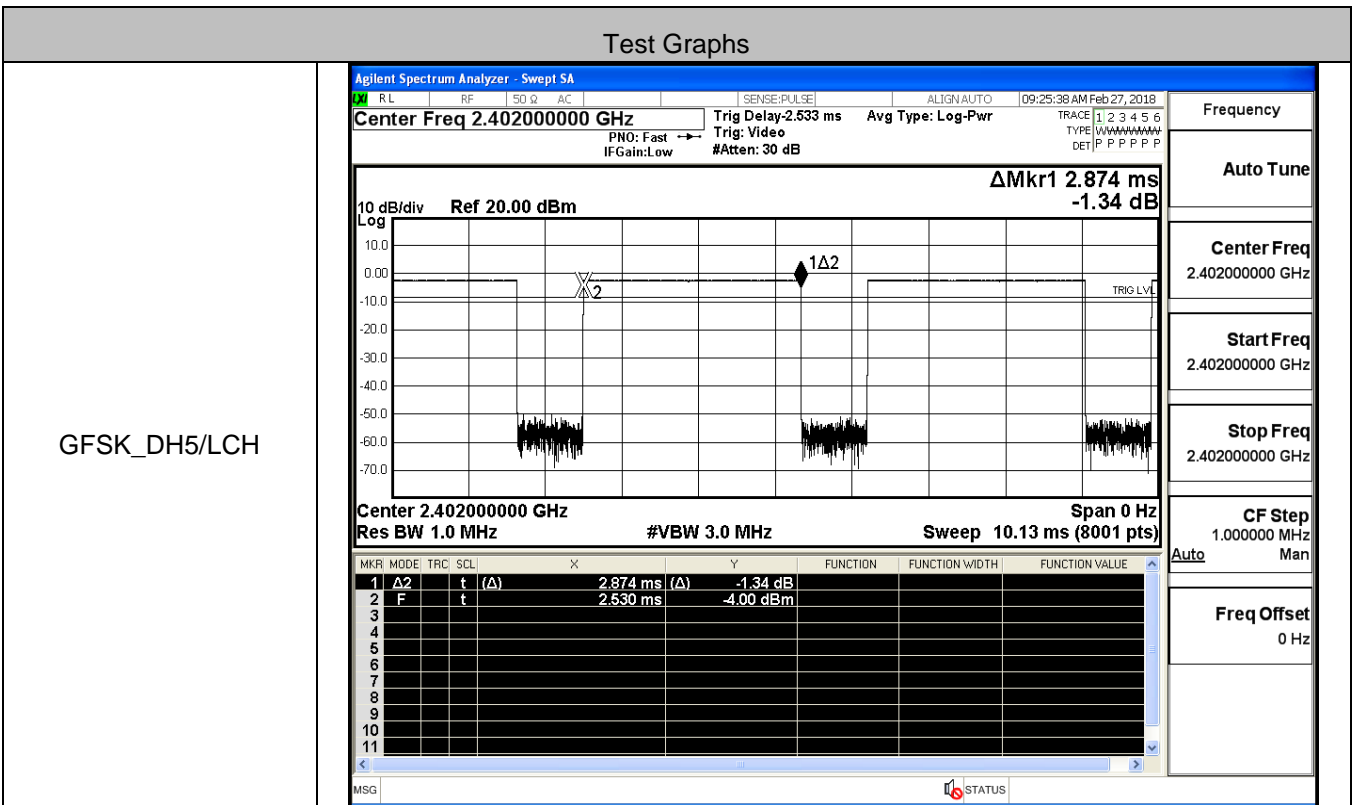
Frequency	
Auto Tune	
Center Freq	2.441750000 GHz
Start Freq	2.400000000 GHz
Stop Freq	2.483500000 GHz
CF Step	8.350000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK/Hop

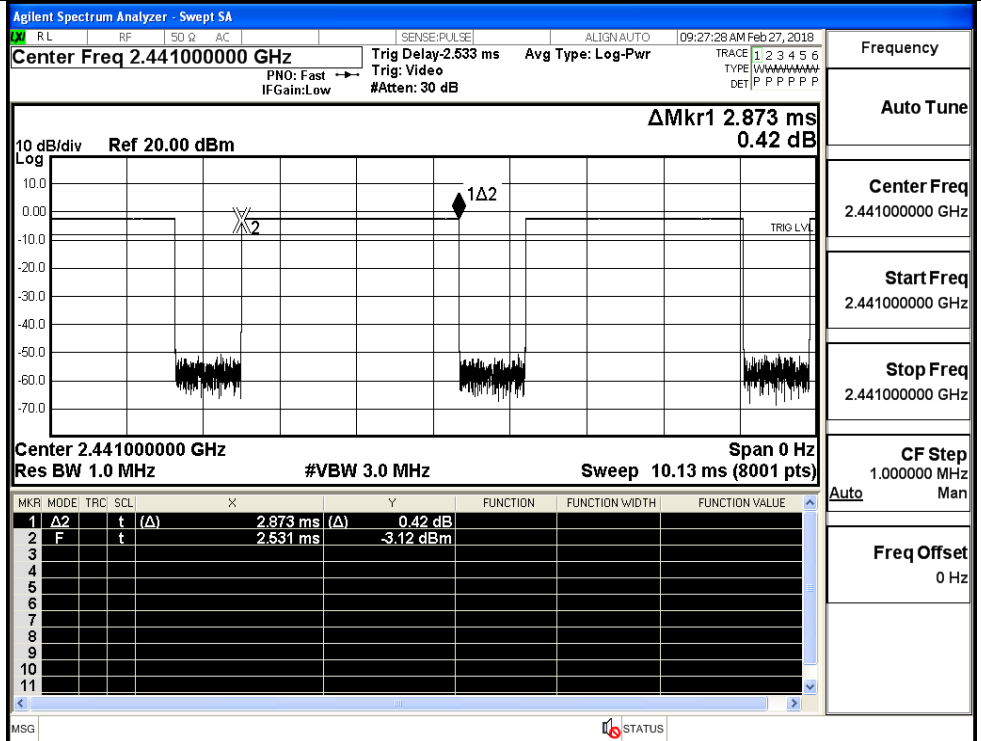


### A.5 Dwell Time

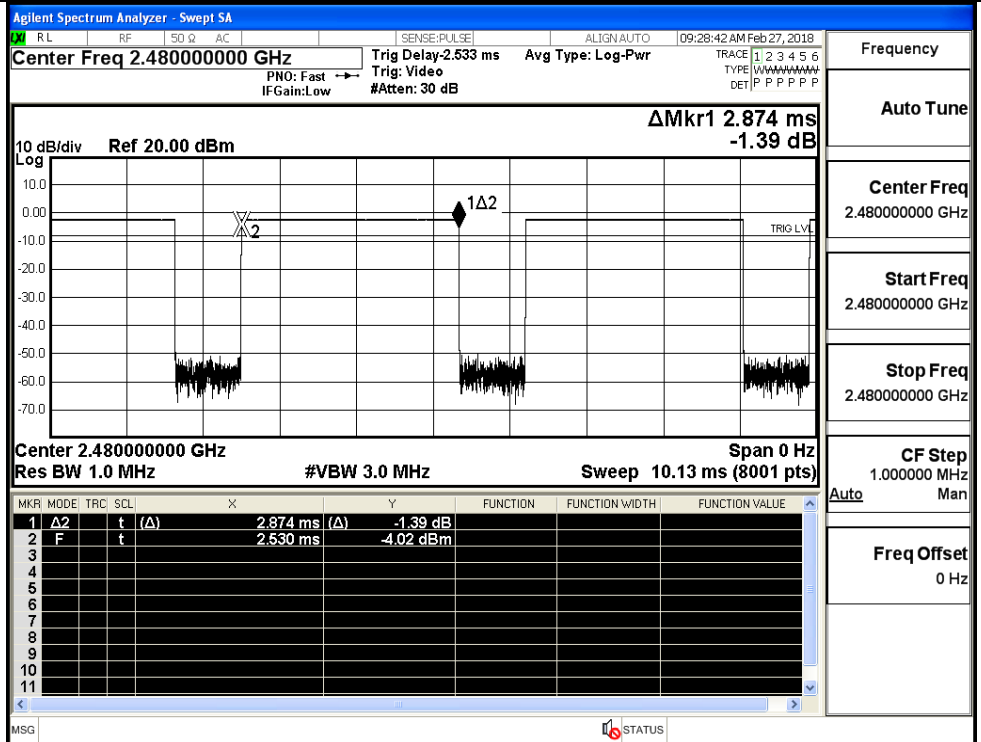
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
π/4DQPSK	2DH5	LCH	2.87	106.7	0.307	0.4	PASS
	2DH5	MCH	2.87	106.7	0.307	0.4	PASS
	2DH5	HCH	2.87	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.87	106.7	0.307	0.4	PASS
	3DH5	MCH	2.87	106.7	0.307	0.4	PASS
	3DH5	HCH	2.87	106.7	0.307	0.4	PASS



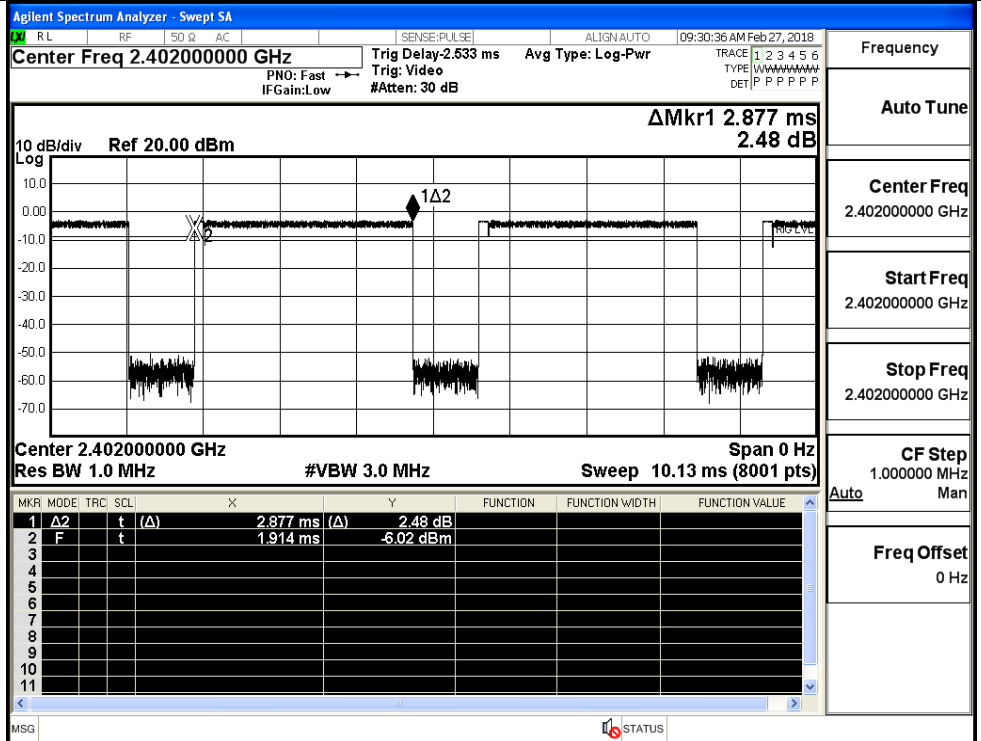
GFSK\_DH5/MCH



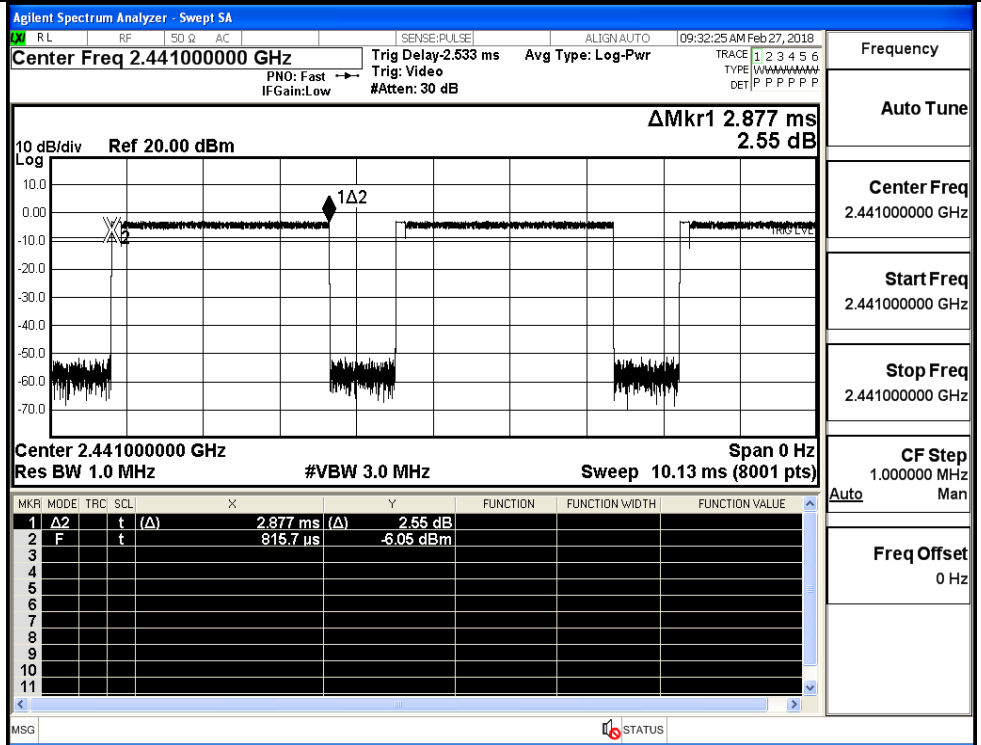
GFSK\_DH5/HCH



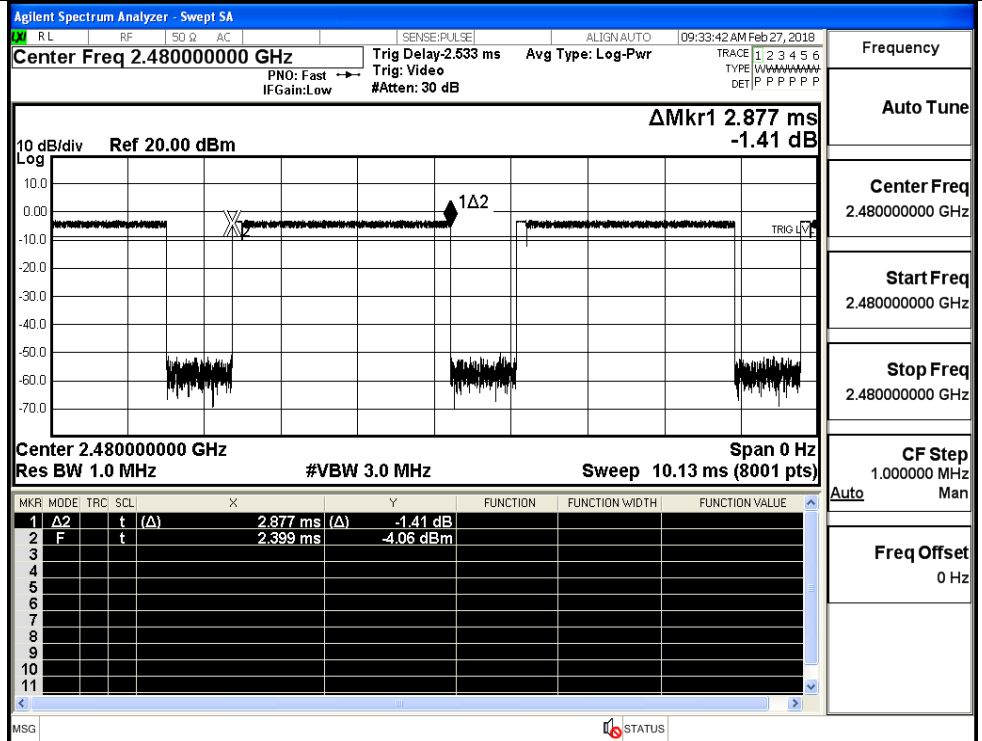
$\pi/4$ DQPSK  
\_2DH5/LCH



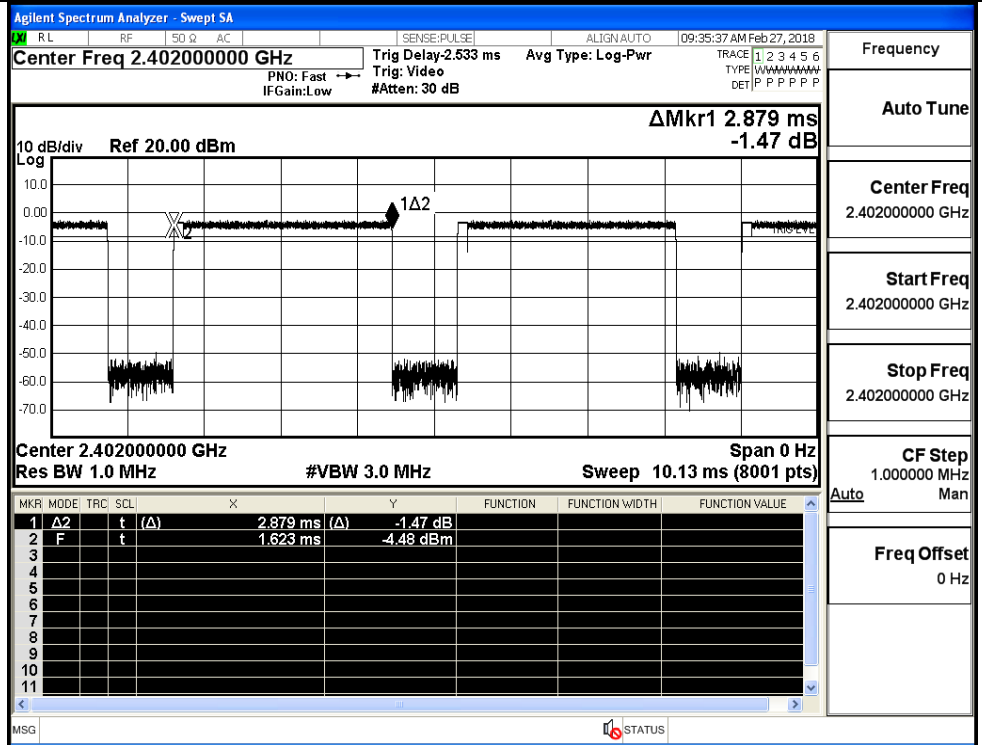
$\pi/4$ DQPSK  
\_2DH5/MCH



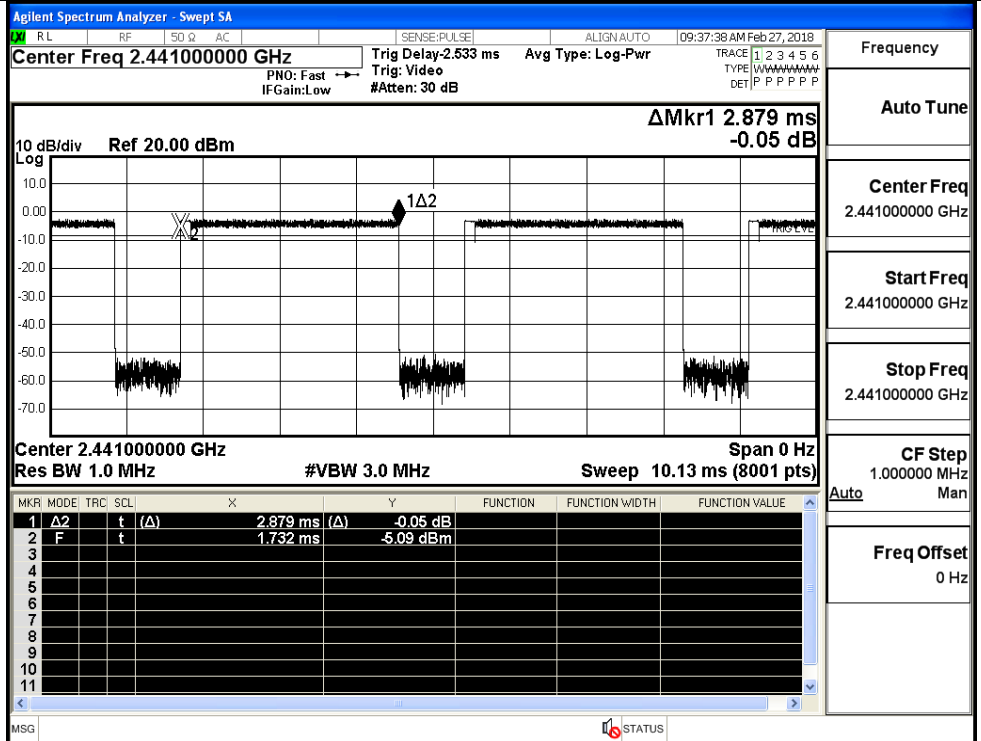
$\pi/4$ DQPSK  
\_2DH5/HCH



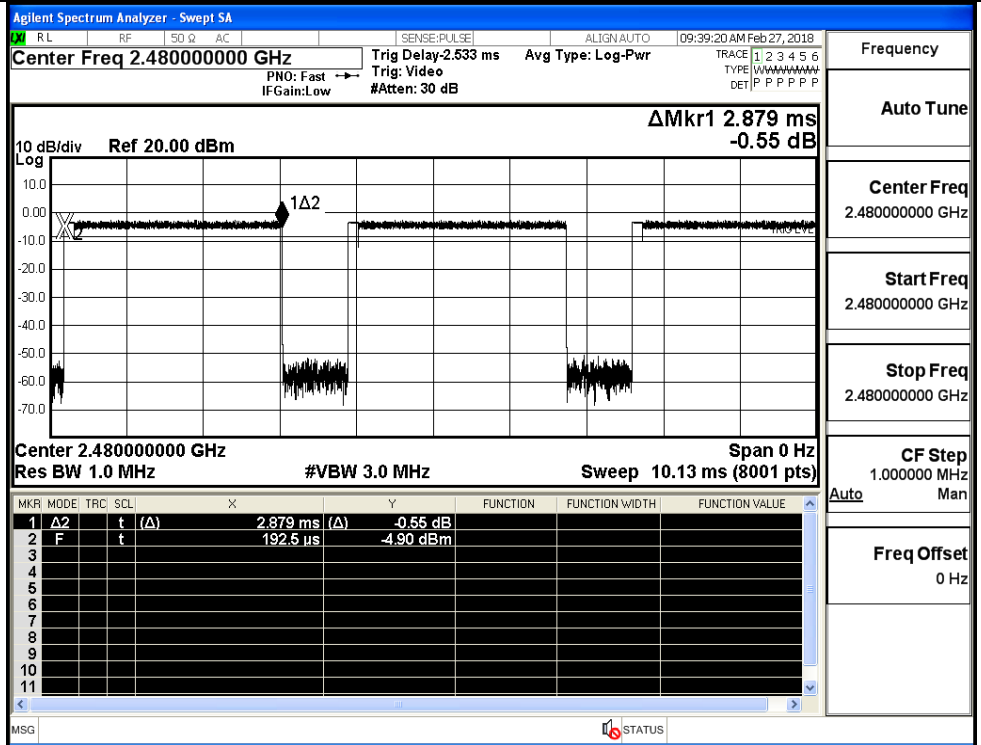
8DPSK\_3DH5/LCH



8DPSK\_3DH5/MCH



8DPSK\_3DH5/HCH

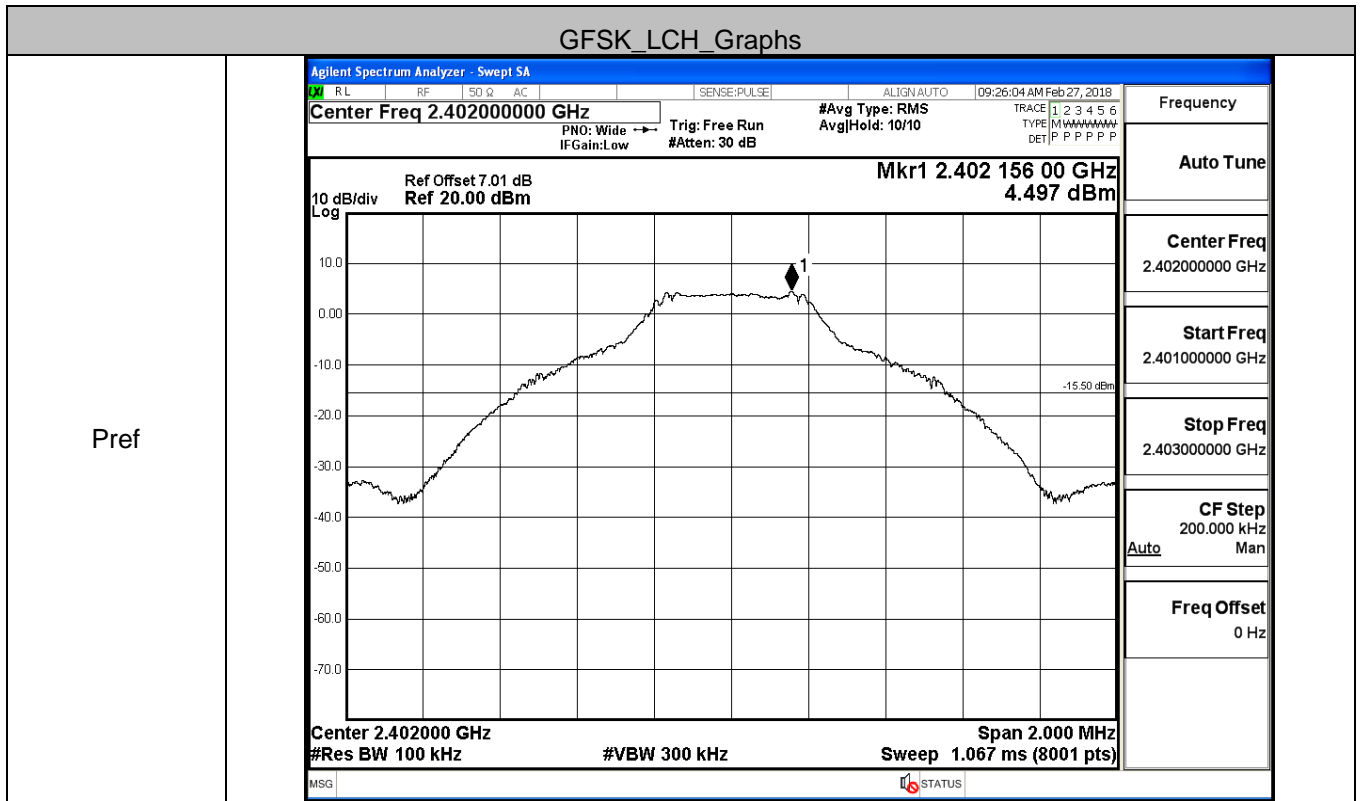


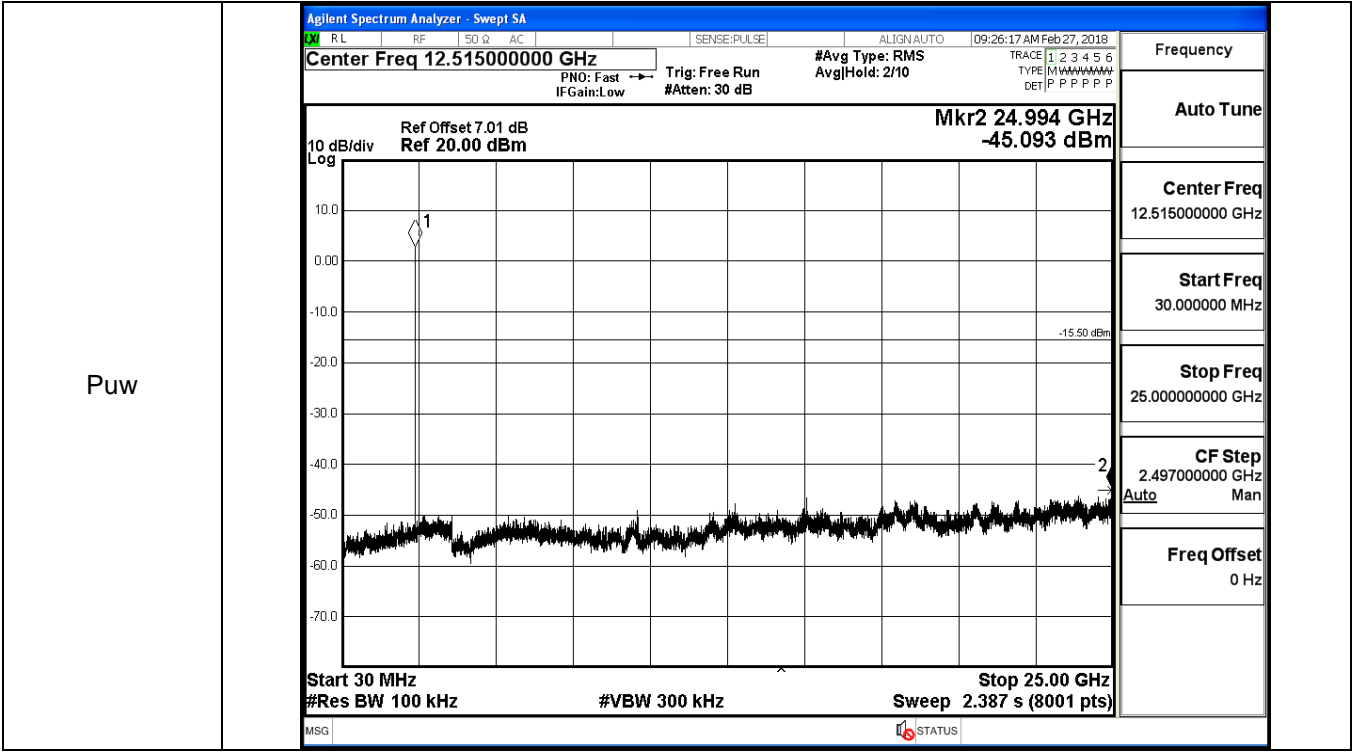


**A.6 RF Conducted Spurious Emissions**

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.497	-45.095	<-15.503	PASS
	MCH	4.154	-45.468	<-15.846	PASS
	HCH	4.59	-45.600	<-15.410	PASS
$\pi$ /4DQPSK	LCH	3.588	-44.779	<-16.412	PASS
	MCH	3.656	-44.922	<-16.344	PASS
	HCH	3.722	-45.660	<-16.278	PASS
8DPSK	LCH	3.598	-46.008	<-16.402	PASS
	MCH	3.797	-45.979	<-16.203	PASS
	HCH	3.624	-46.205	<-16.376	PASS

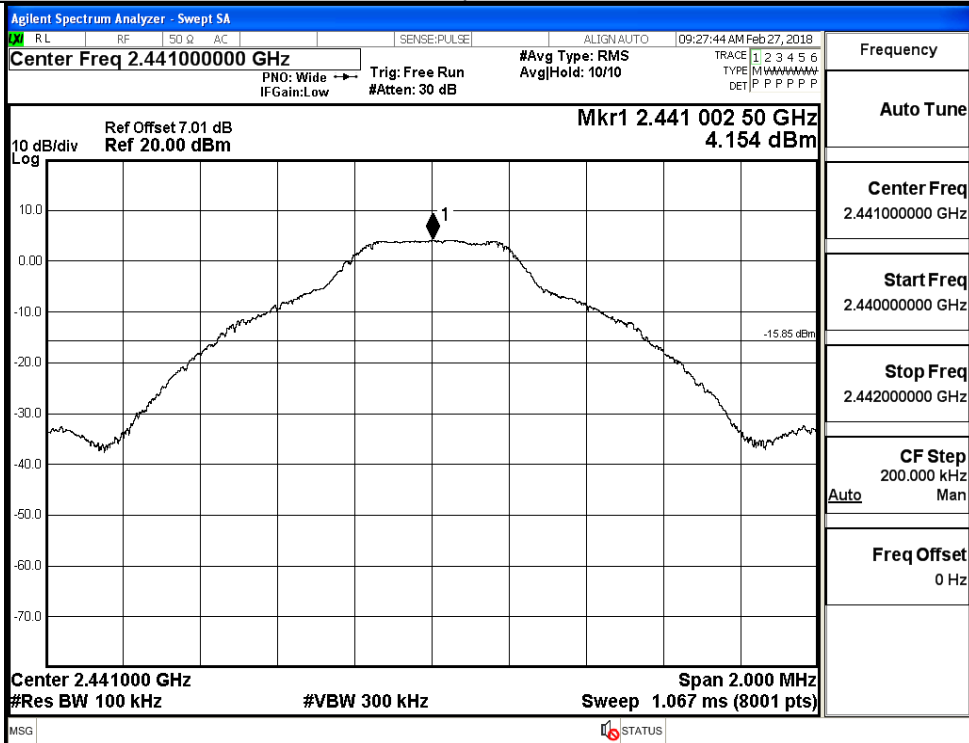
GFSK\_LCH\_Graphs



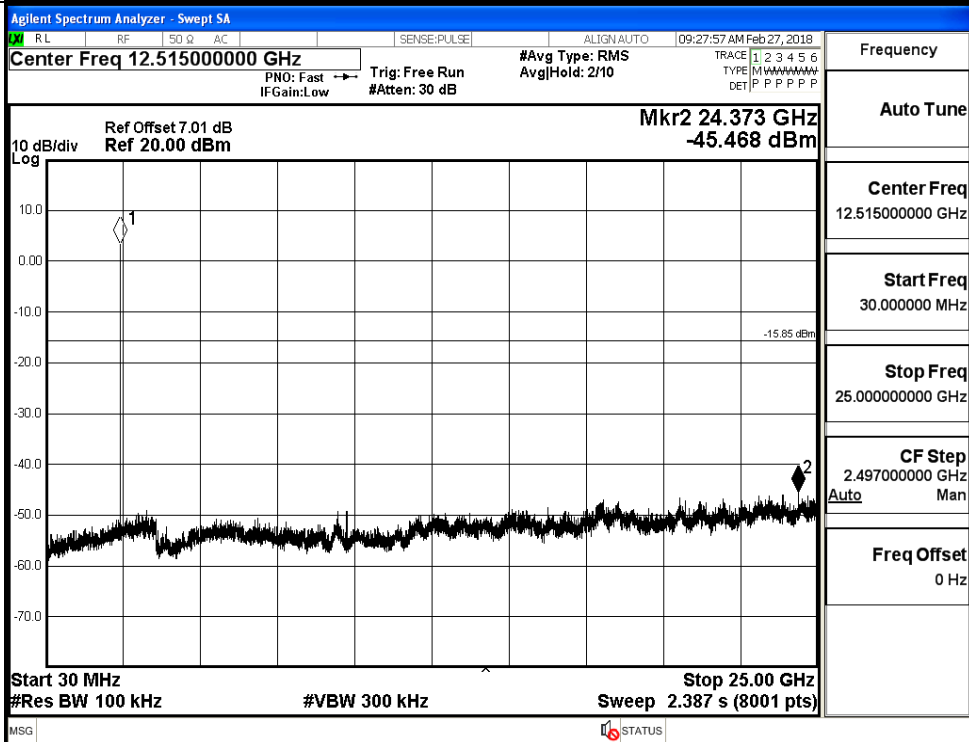


GFSK\_MCH\_Graphs

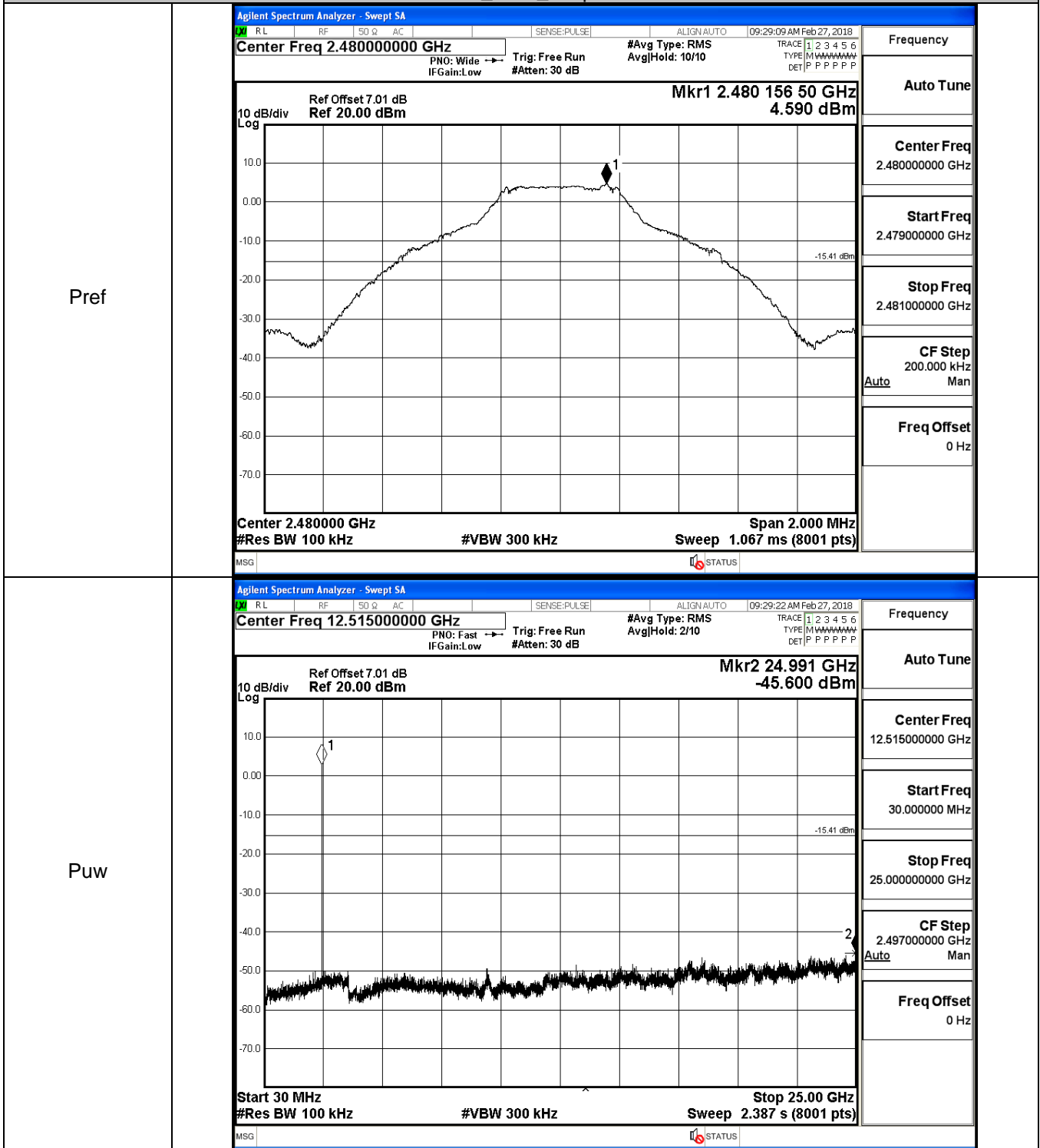
Pref



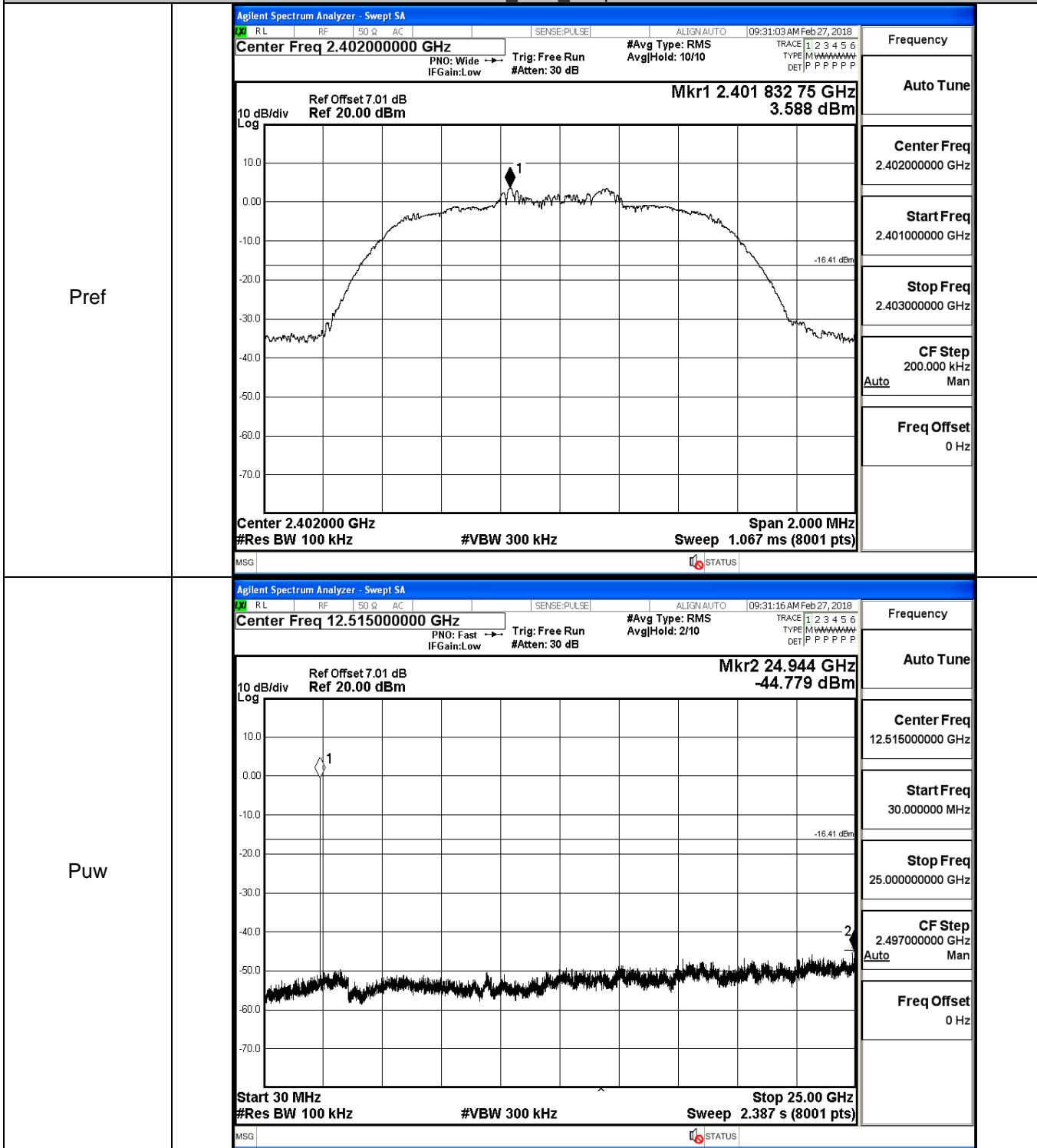
Puw



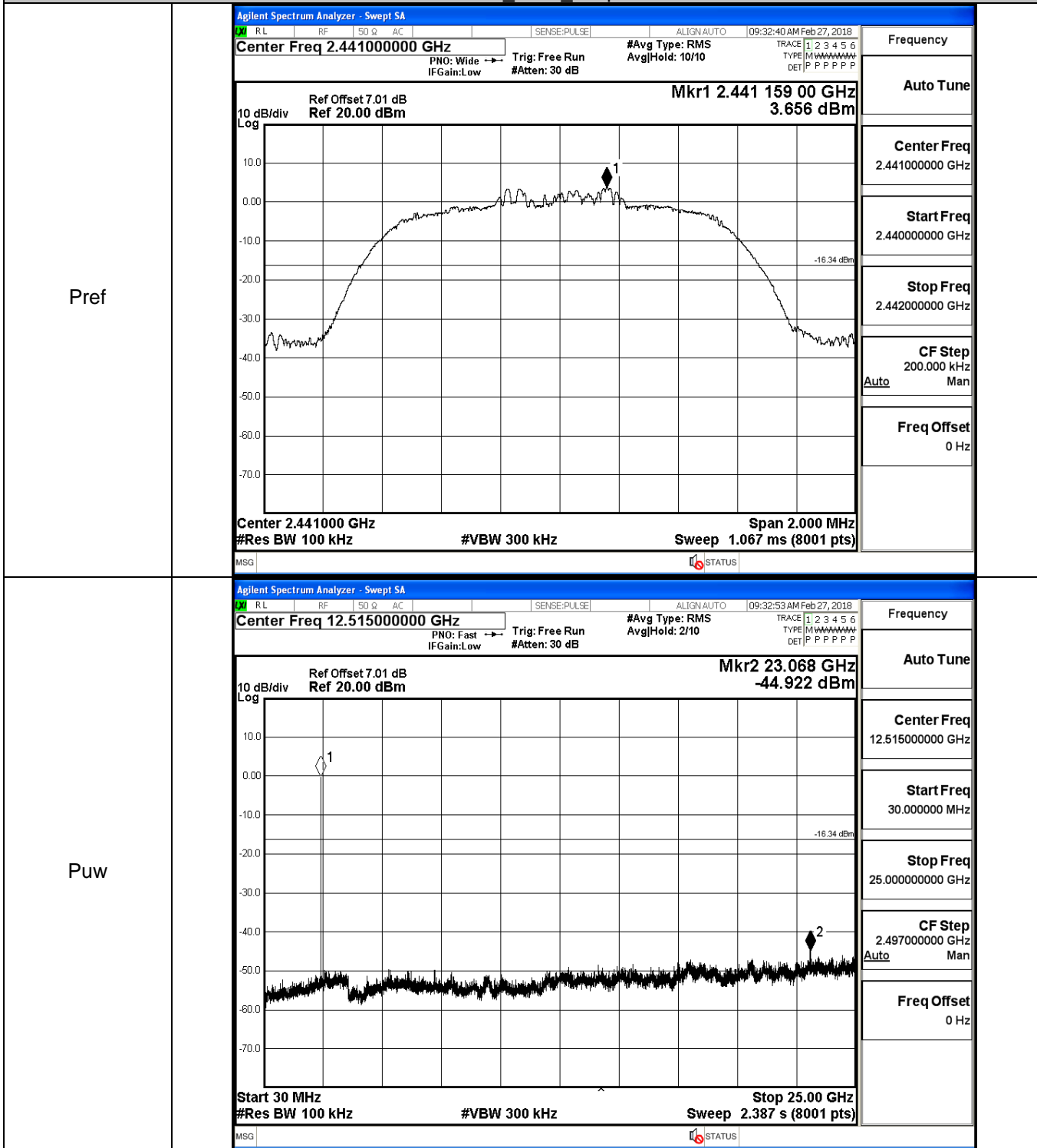
GFSK\_HCH\_Graphs



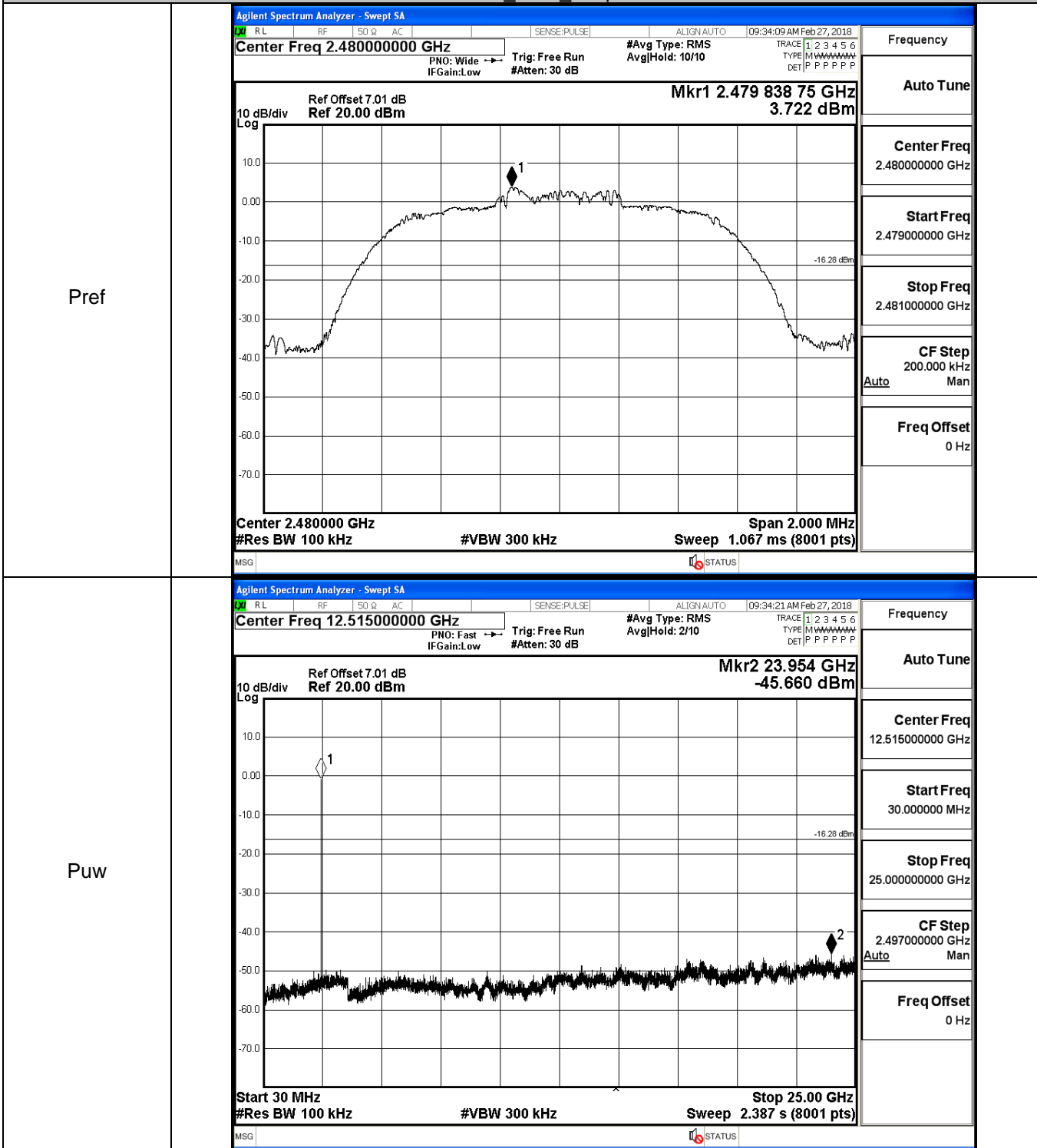
$\pi/4$ DQPSK\_LCH\_Graphs



$\pi/4$ DQPSK\_MCH\_Graphs

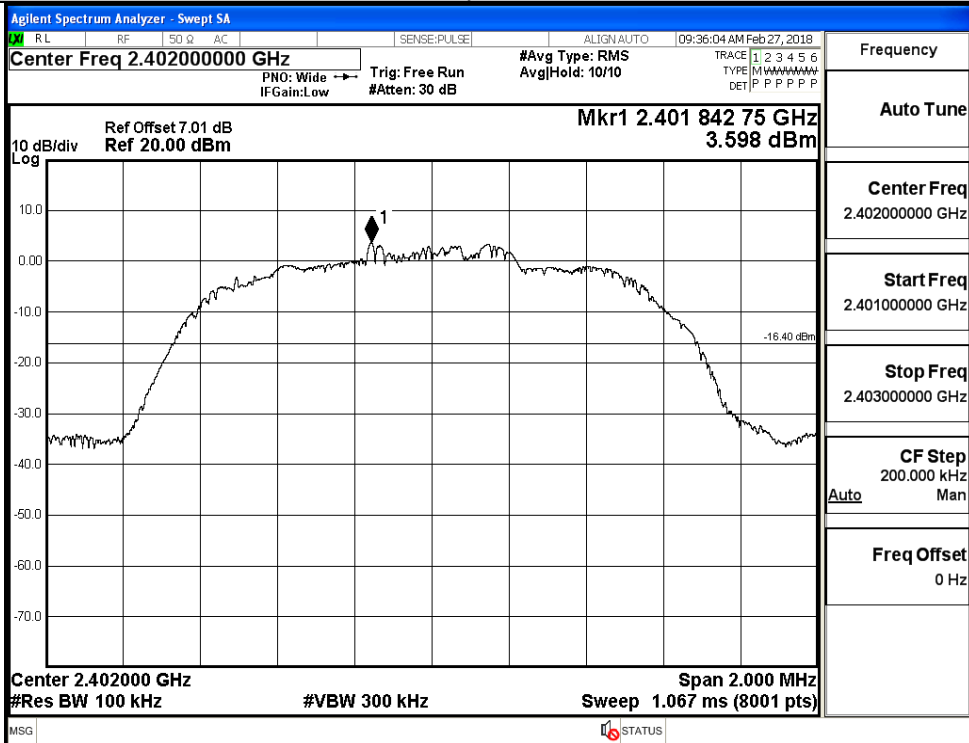


$\pi/4$ DQPSK\_HCH\_Graphs

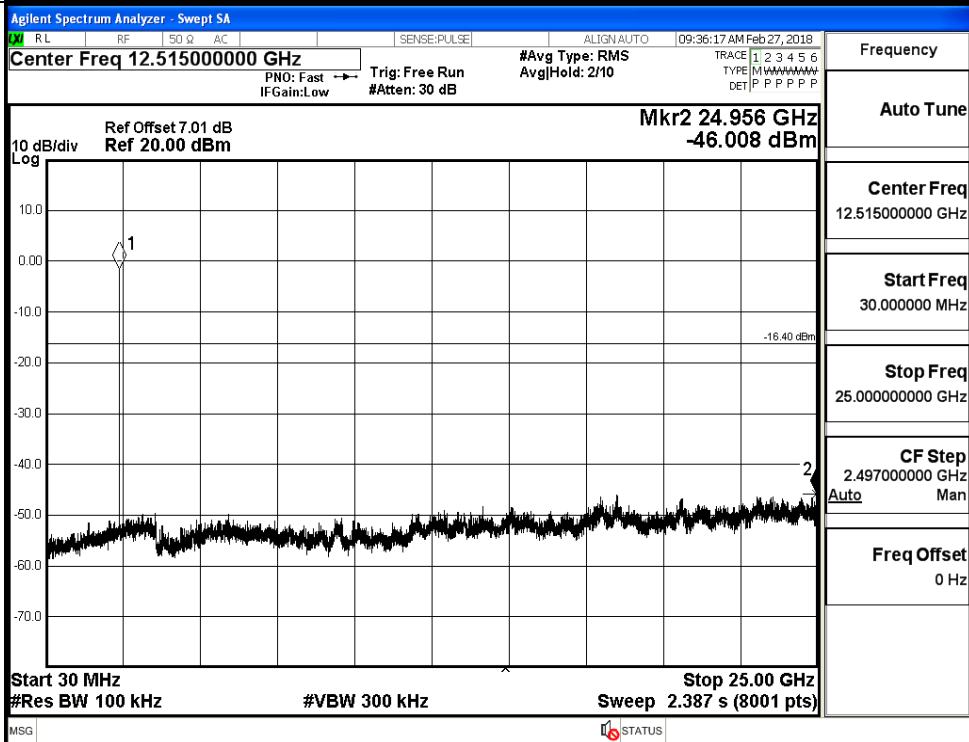


8DPSK\_LCH\_Graphs

Pref

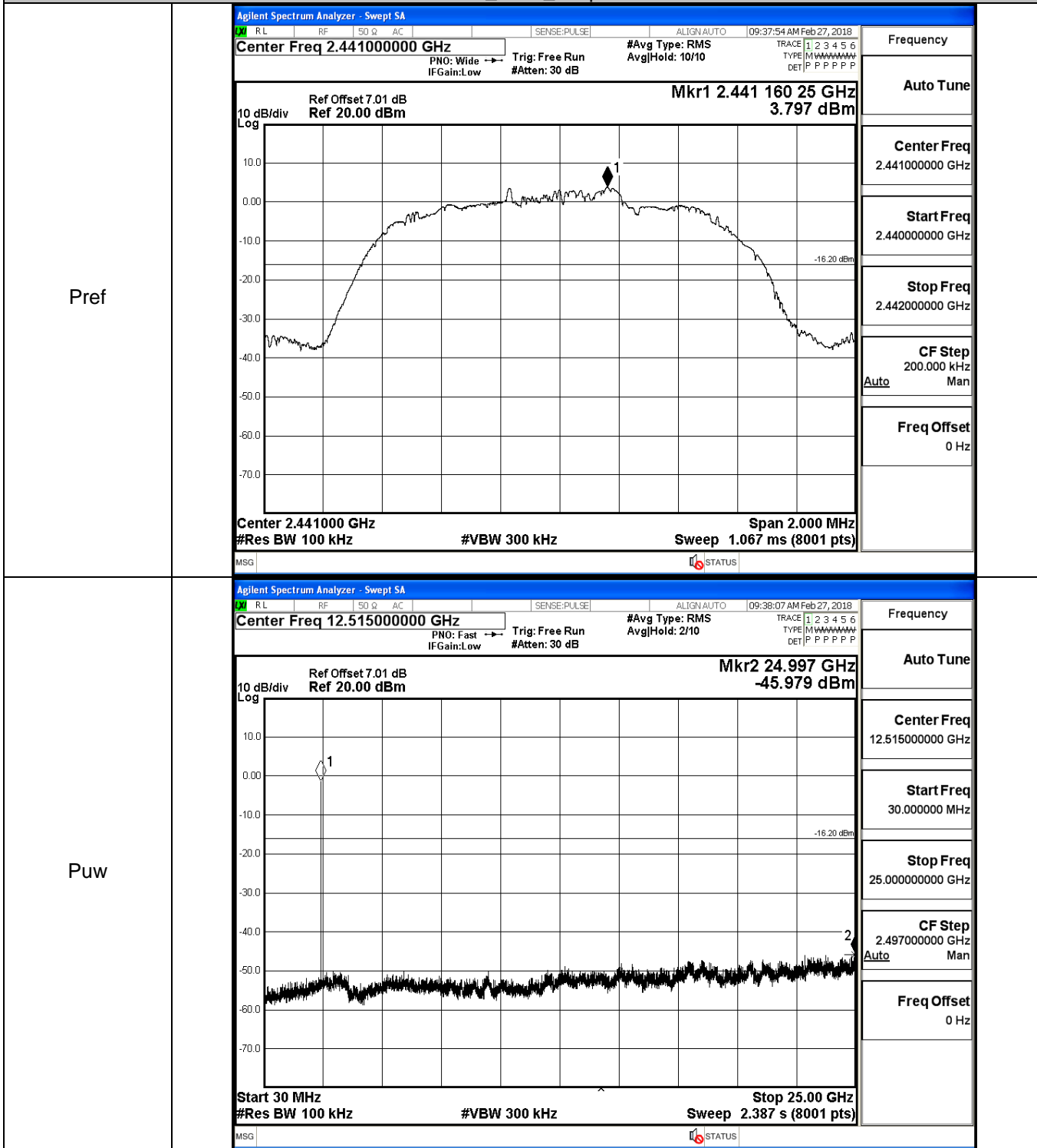


Puw



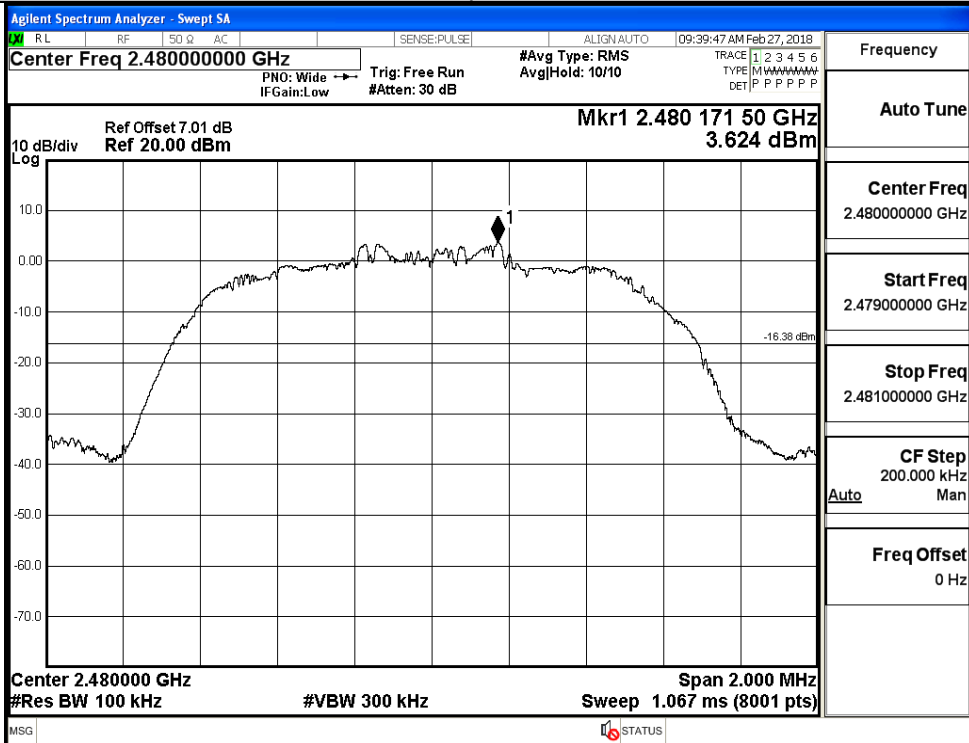


8DPSK\_MCH\_Graphs

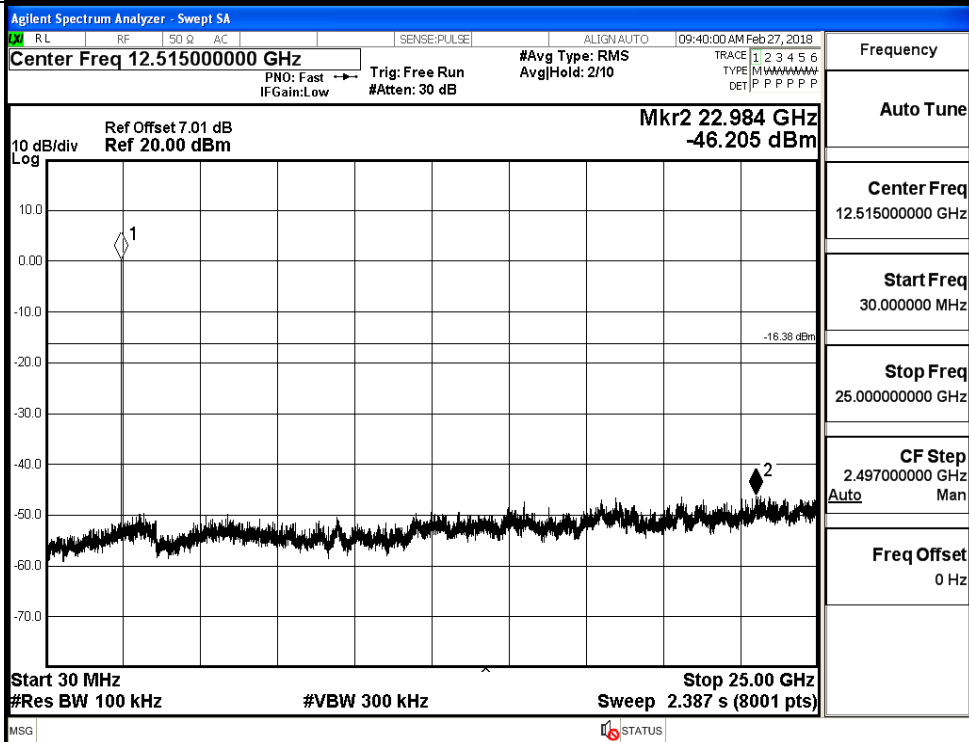


8DPSK\_HCH\_Graphs

Pref



Puw

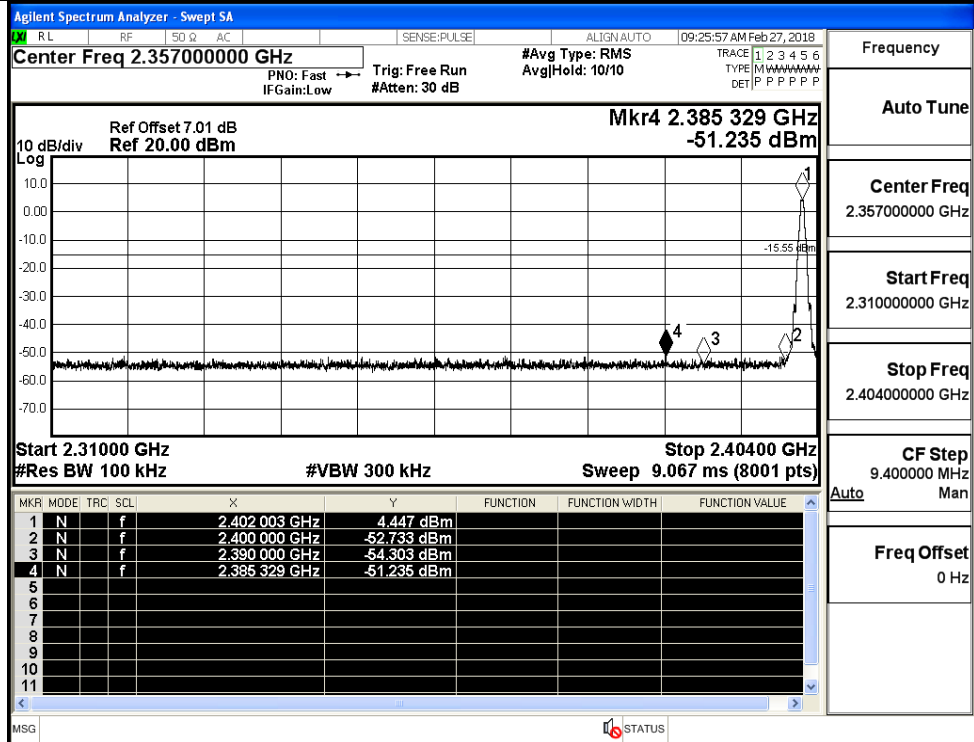


## A.7 Band-edge for RF Conducted Emissions

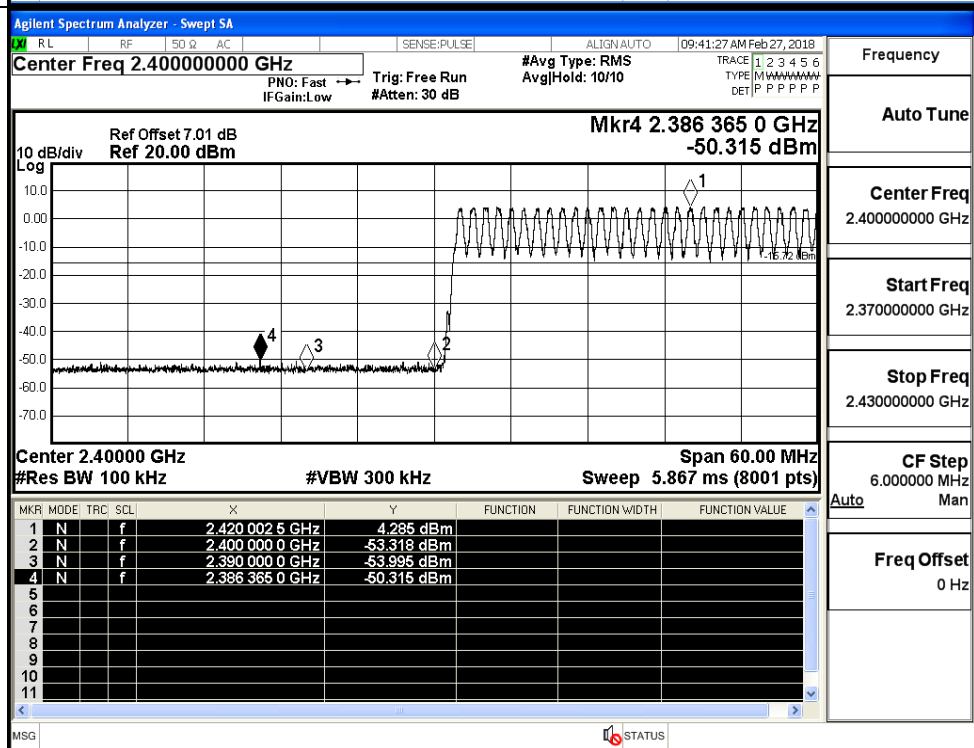
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.447	Off	-51.235	-15.55	PASS
			4.285	On	-50.315	-15.72	PASS
	HCH	2480	4.712	Off	-49.930	-15.29	PASS
			4.403	On	-50.732	-15.6	PASS
$\pi/4$ DQPSK	LCH	2402	1.825	Off	-51.131	-18.18	PASS
			3.681	On	-50.884	-16.32	PASS
	HCH	2480	3.633	Off	-51.087	-16.37	PASS
			3.739	On	-49.924	-16.26	PASS
8DPSK	LCH	2402	1.408	Off	-50.575	-18.59	PASS
			3.706	On	-50.278	-16.29	PASS
	HCH	2480	3.764	Off	-50.967	-16.24	PASS
			3.777	On	-50.339	-16.22	PASS

Test Graphs

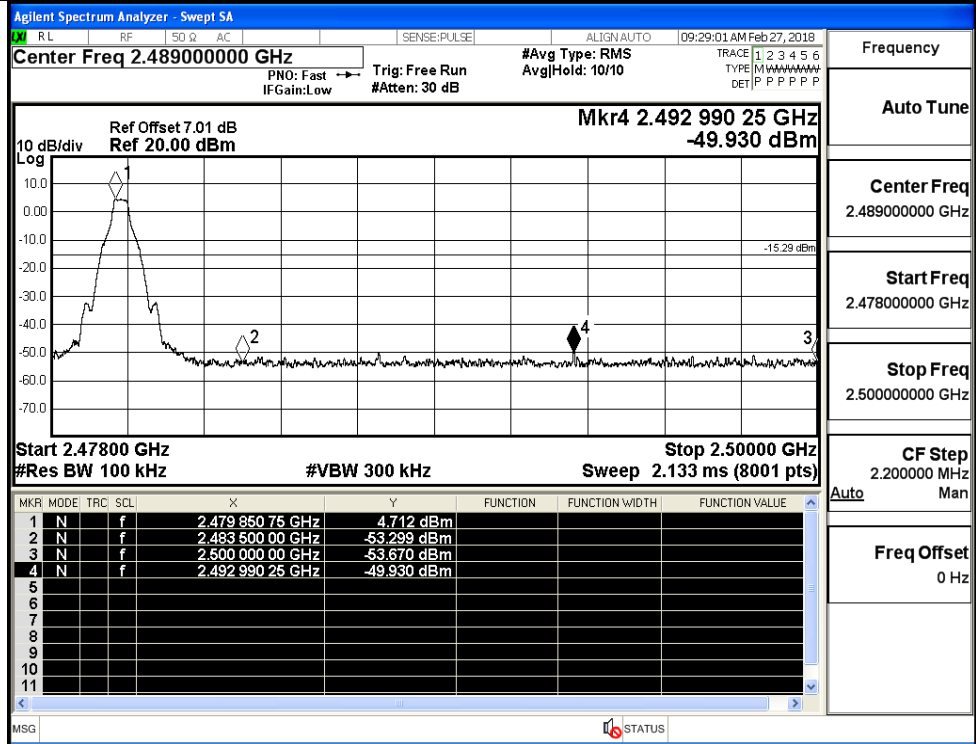
GFSK/LCH/No Hop



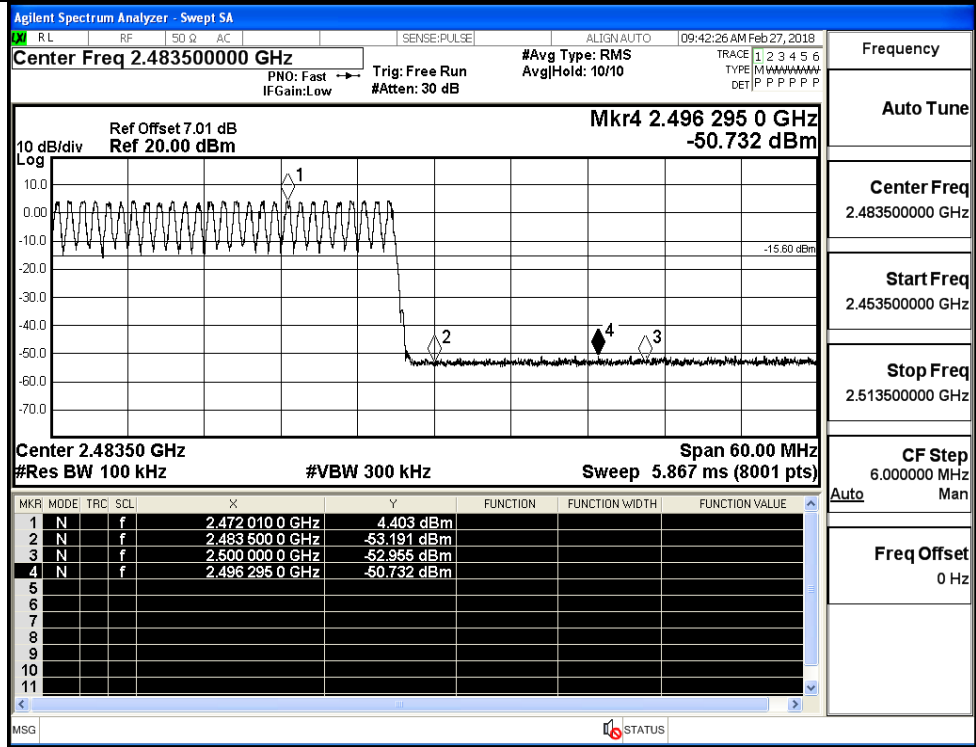
GFSK/LCH/Hop



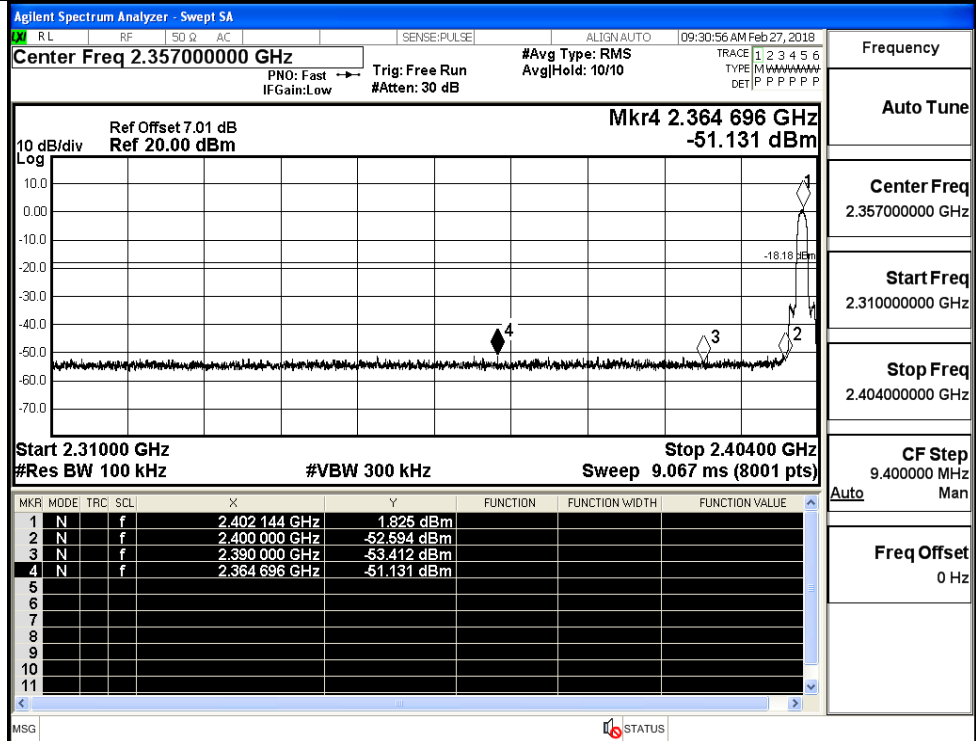
GFSK/HCH/No Hop



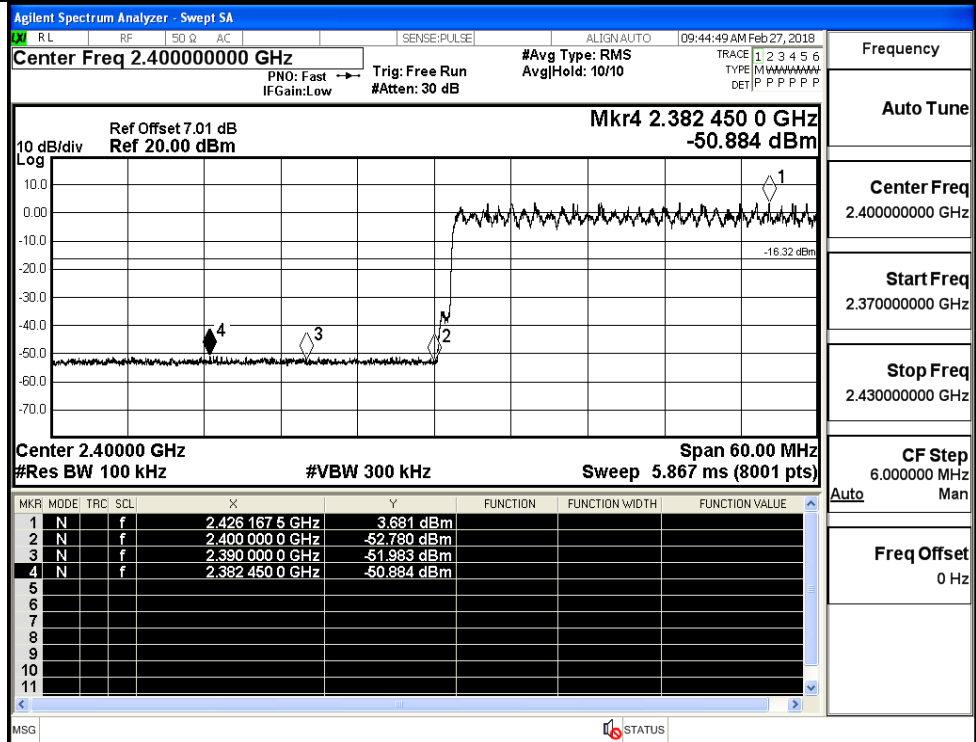
GFSK/HCH/Hop



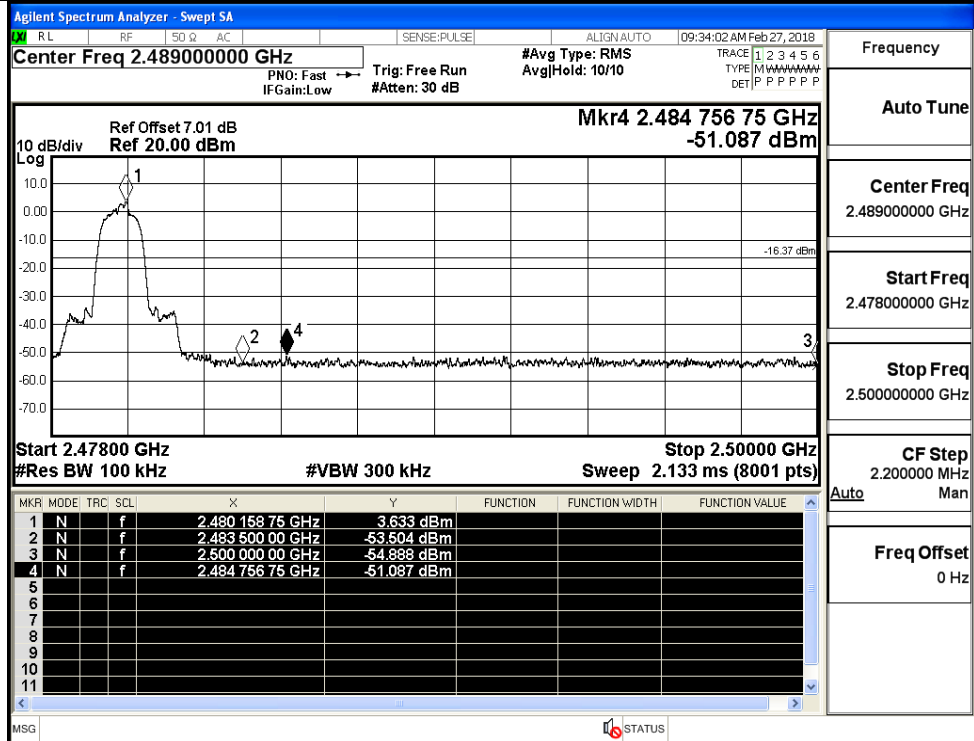
$\pi/4$ DQPSK/LCH/No  
Hop



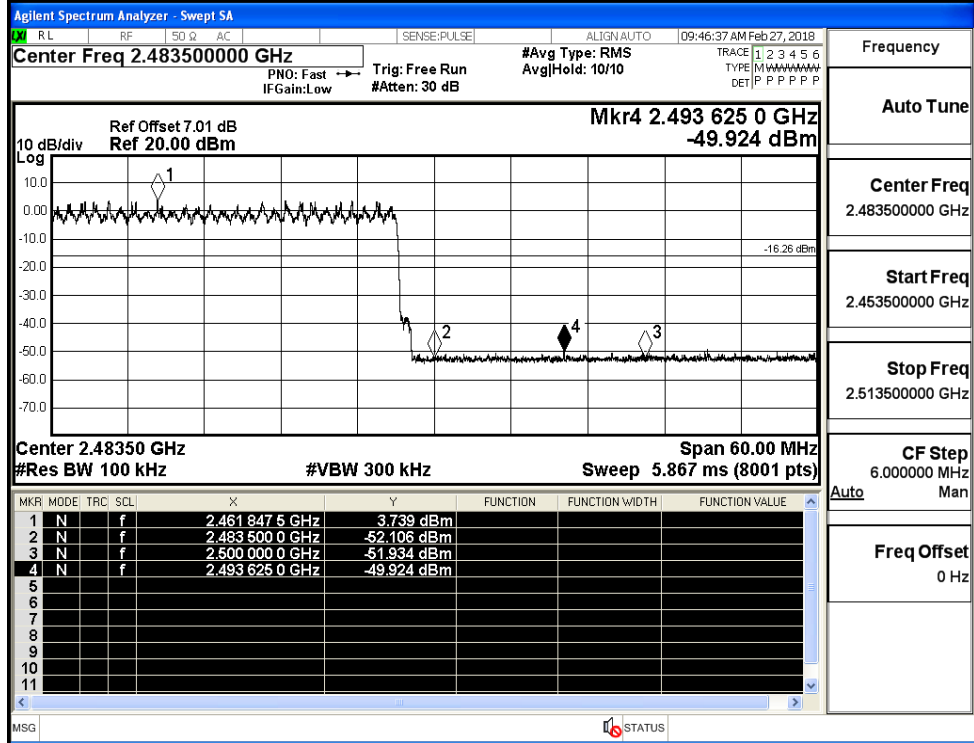
$\pi/4$ DQPSK/LCH/Hop



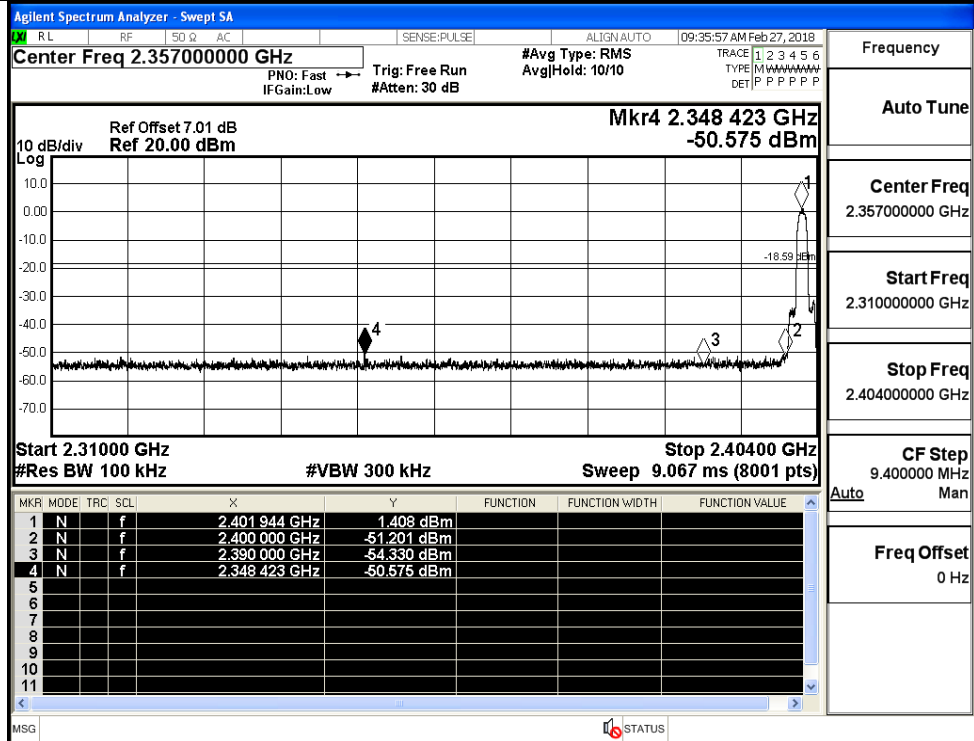
$\pi$ /4DQPSK/HCH/No  
Hop



$\pi$ /4DQPSK/HCH/Hop

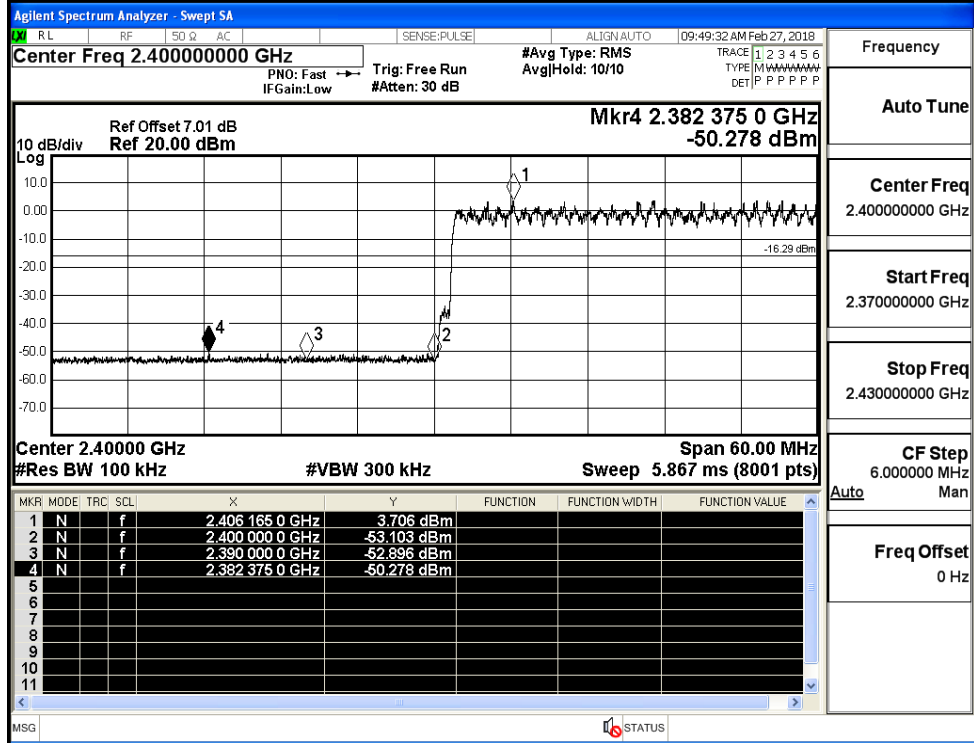


8DPSK/LCH/No Hop



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

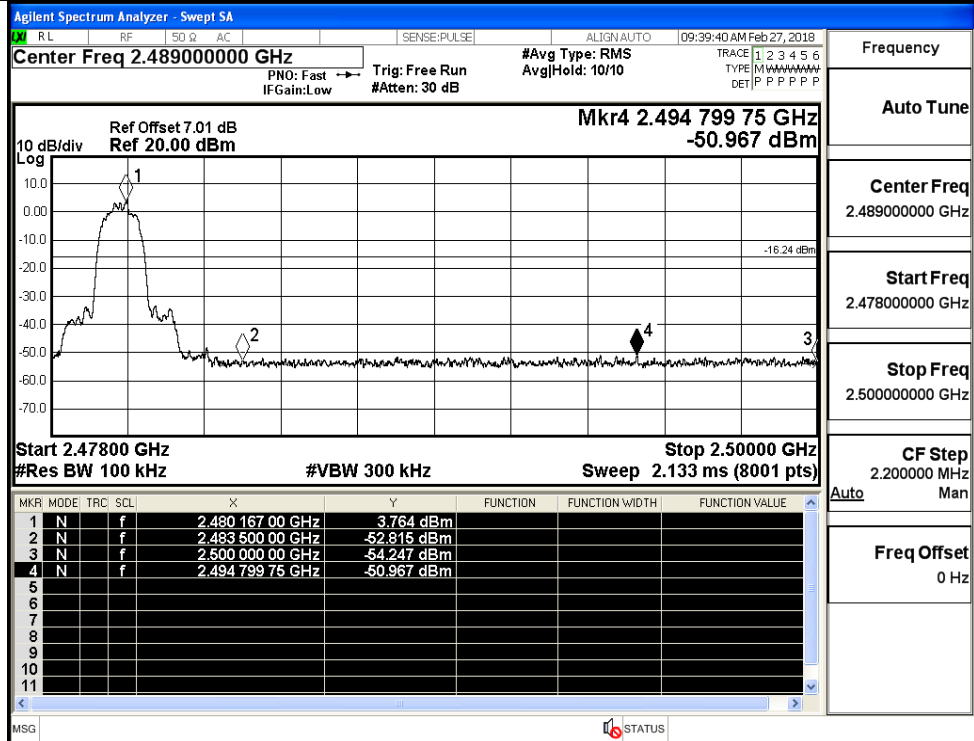
8DPSK/LCH/Hop



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

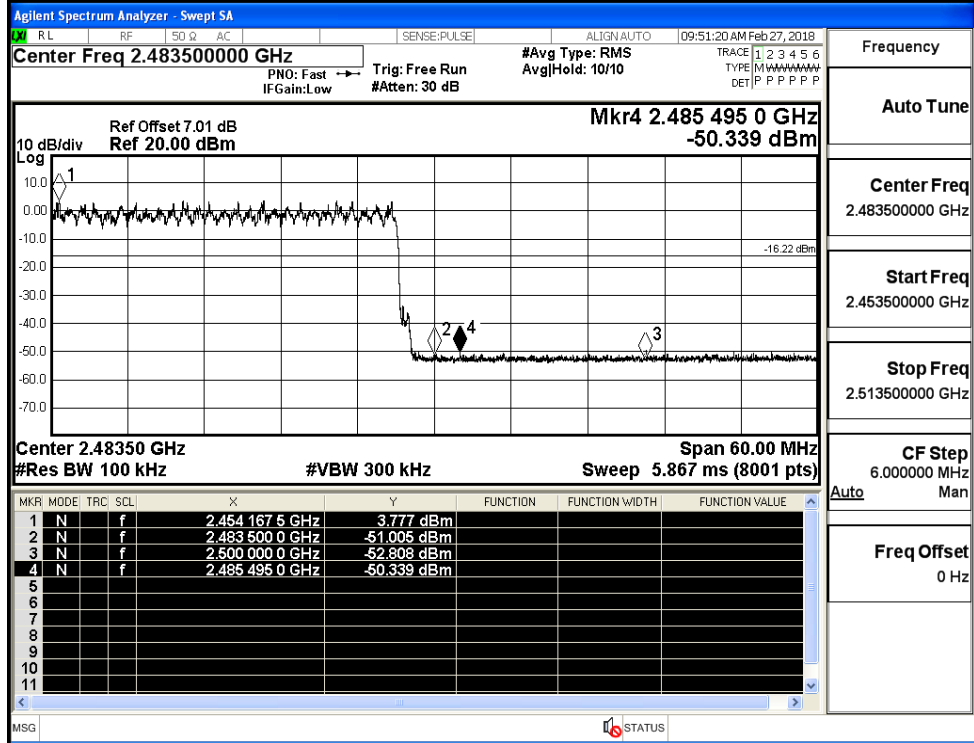
Start Freq  
2.478000000 GHz

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

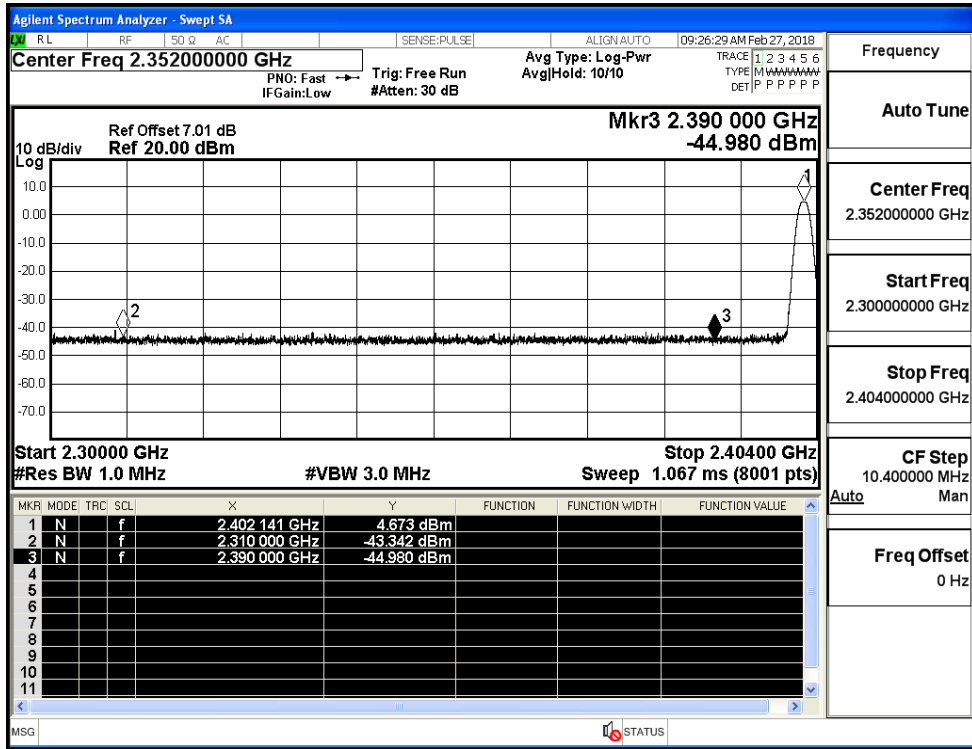
CF Step  
6.000000 MHz

Freq Offset  
0 Hz

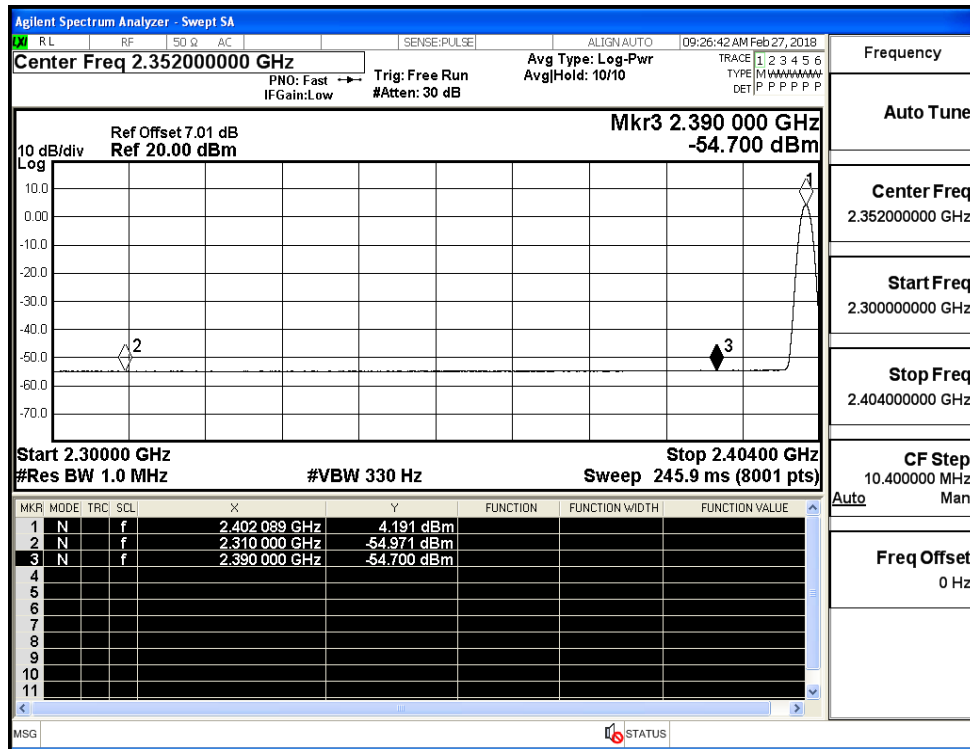
## A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.34	2.3	0	54.22	PEAK	74	PASS
	Off	2310.0	-54.97	2.3	0	42.59	AV	54	PASS
	Off	2390.0	-44.98	2.3	0	52.58	PEAK	74	PASS
	Off	2390.0	-54.70	2.3	0	42.86	AV	54	PASS
	Off	2483.5	-44.34	2.3	0	53.22	PEAK	74	PASS
	Off	2483.5	-54.15	2.3	0	43.41	AV	54	PASS
	Off	2500.0	-44.72	2.3	0	52.84	PEAK	74	PASS
	Off	2500.0	-54.27	2.3	0	43.29	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.85	2.3	0	52.71	PEAK	74	PASS
	Off	2310.0	-54.87	2.3	0	42.69	AV	54	PASS
	Off	2390.0	-43.46	2.3	0	54.10	PEAK	74	PASS
	Off	2390.0	-54.52	2.3	0	43.04	AV	54	PASS
	Off	2483.5	-44.86	2.3	0	52.70	PEAK	74	PASS
	Off	2483.5	-54.02	2.3	0	43.54	AV	54	PASS
	Off	2500.0	-43.90	2.3	0	53.66	PEAK	74	PASS
	Off	2500.0	-54.29	2.3	0	43.27	AV	54	PASS
8DPSK	Off	2310.0	-44.64	2.3	0	52.92	PEAK	74	PASS
	Off	2310.0	-54.94	2.3	0	42.62	AV	54	PASS
	Off	2390.0	-44.45	2.3	0	53.11	PEAK	74	PASS
	Off	2390.0	-54.69	2.3	0	42.87	AV	54	PASS
	Off	2483.5	-44.31	2.3	0	53.25	PEAK	74	PASS
	Off	2483.5	-54.08	2.3	0	43.48	AV	54	PASS
	Off	2500.0	-43.09	2.3	0	54.47	PEAK	74	PASS
	Off	2500.0	-54.17	2.3	0	43.39	AV	54	PASS

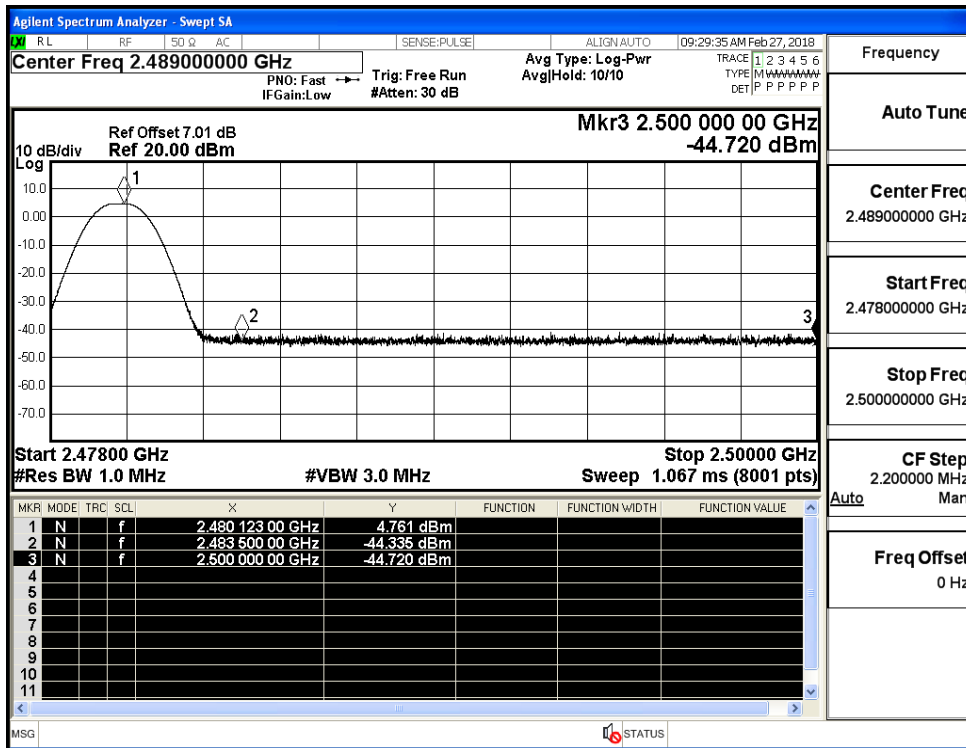
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



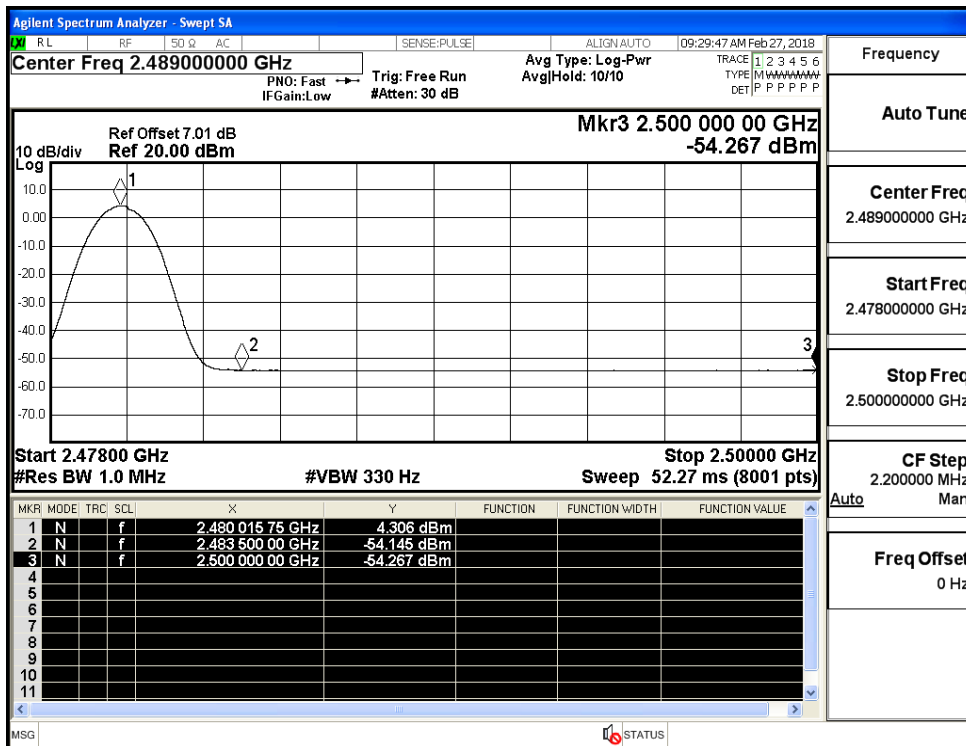
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



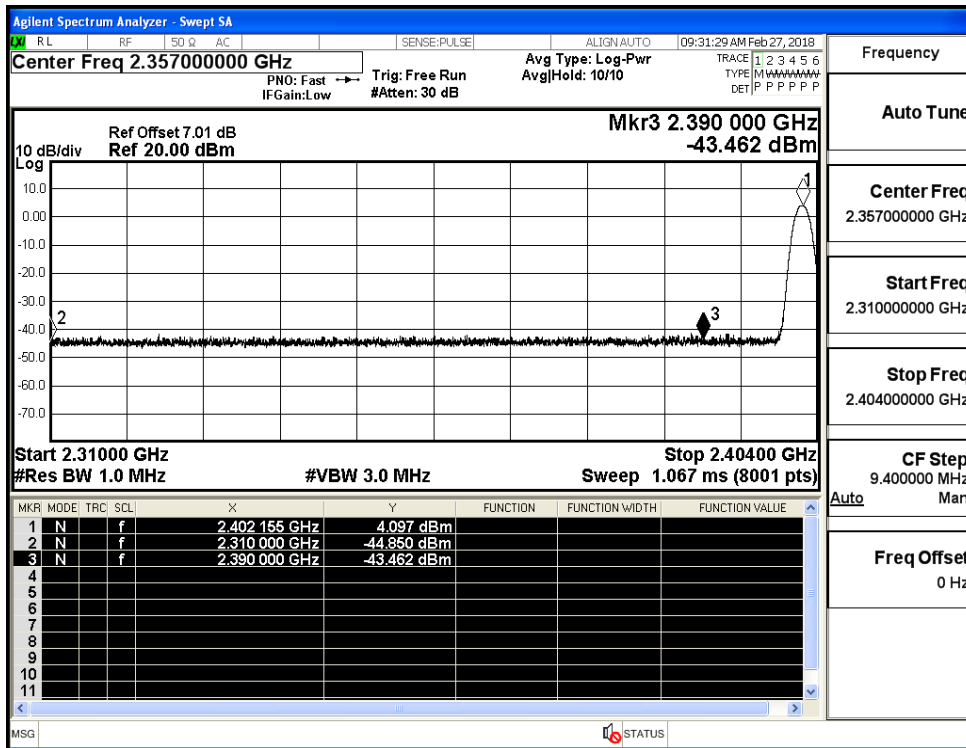
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



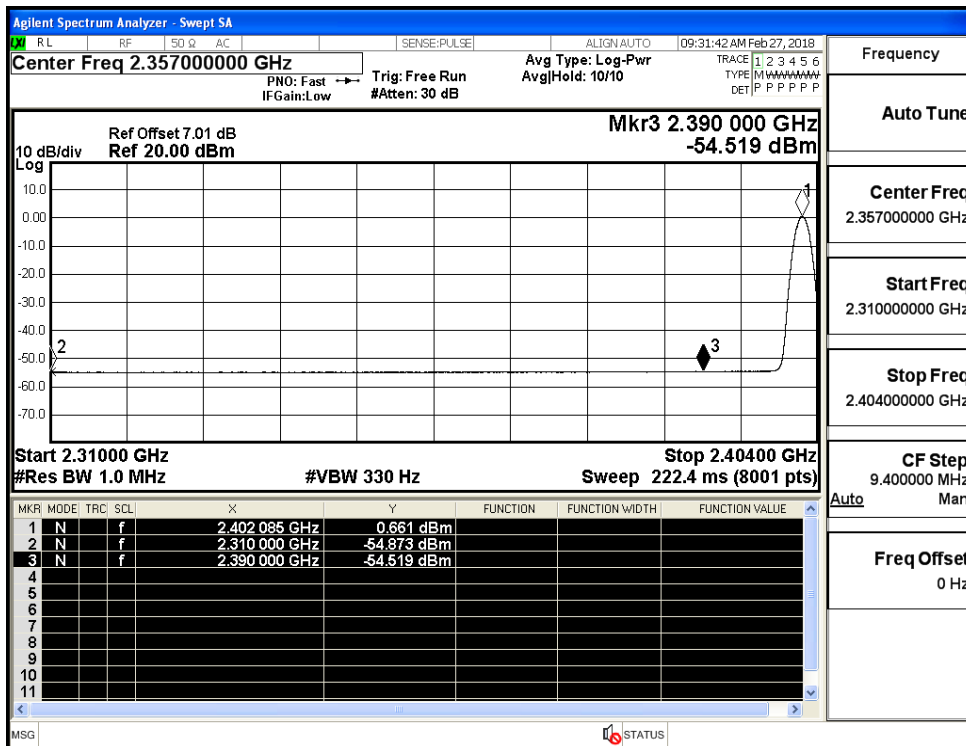
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



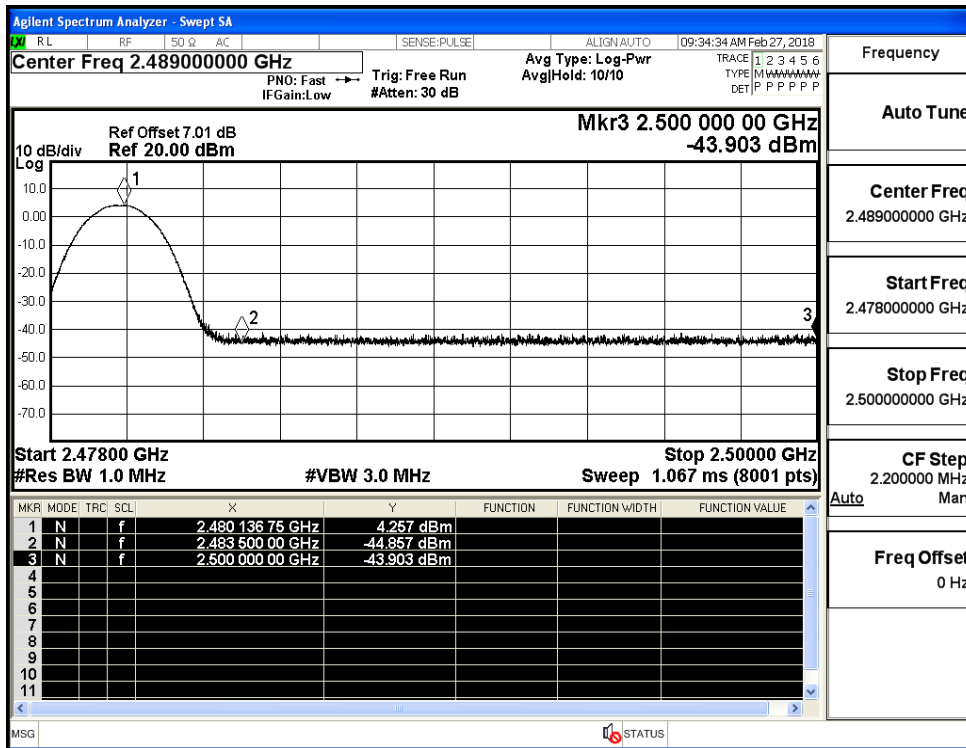
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_PEAK (Low Channel)



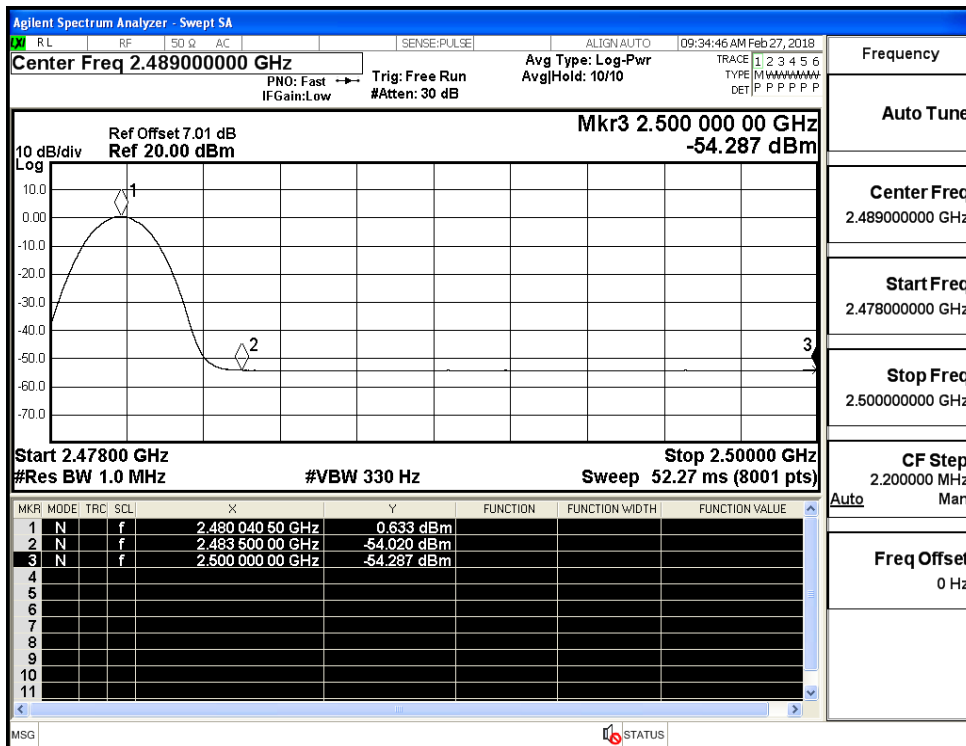
Restrict-band band-edge measurements\_Hopping Off  $\pi/4$ -DQPSK\_Average (Low Channel)



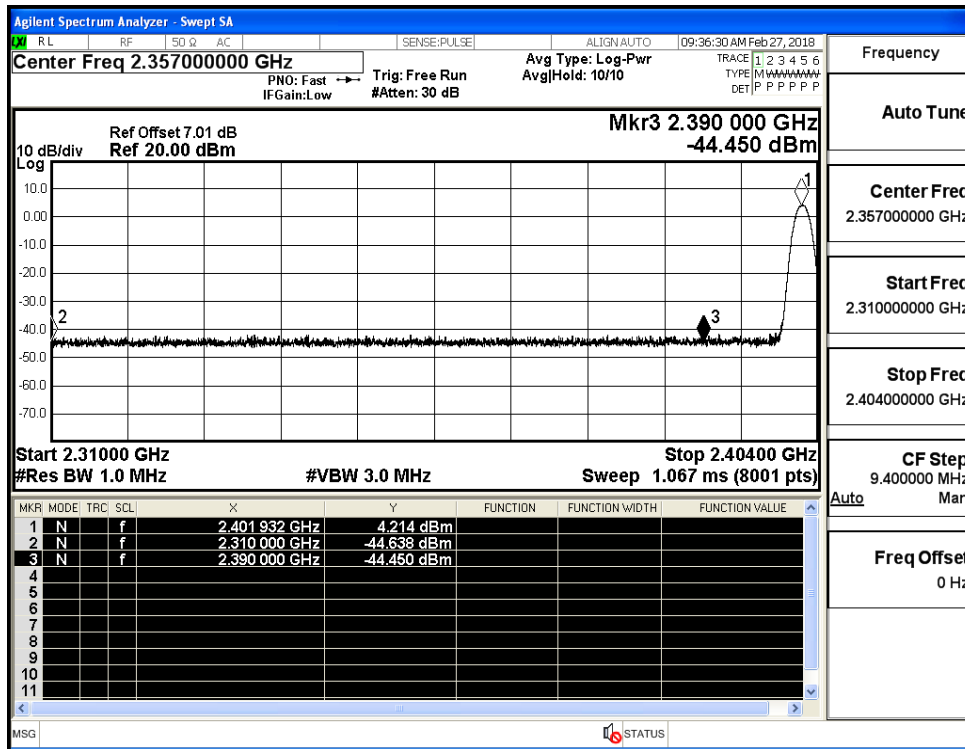
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



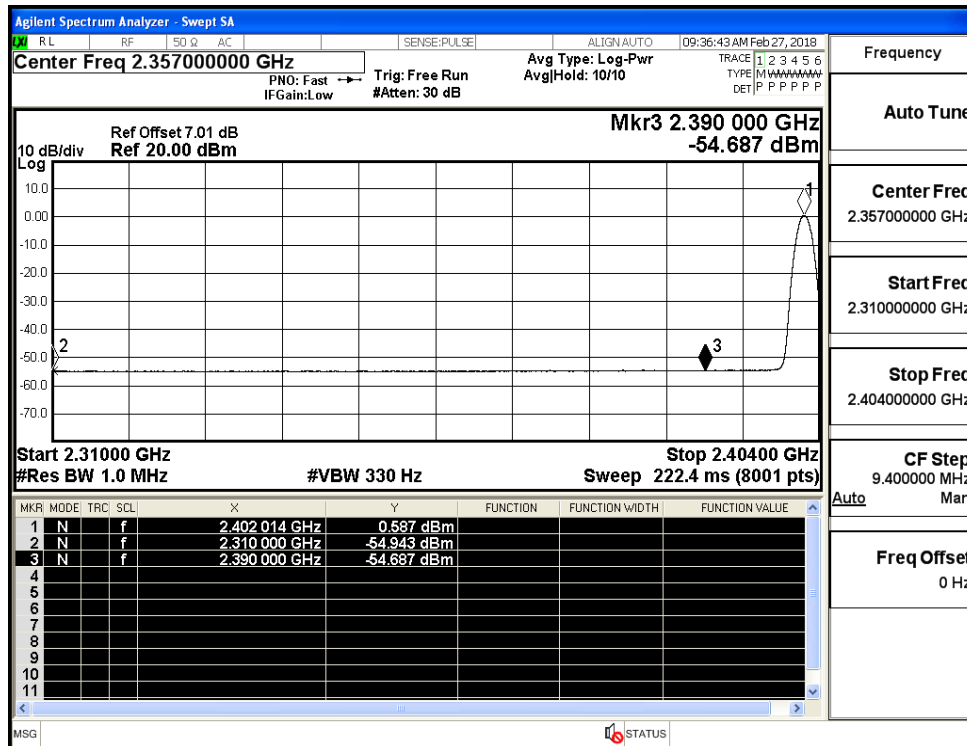
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



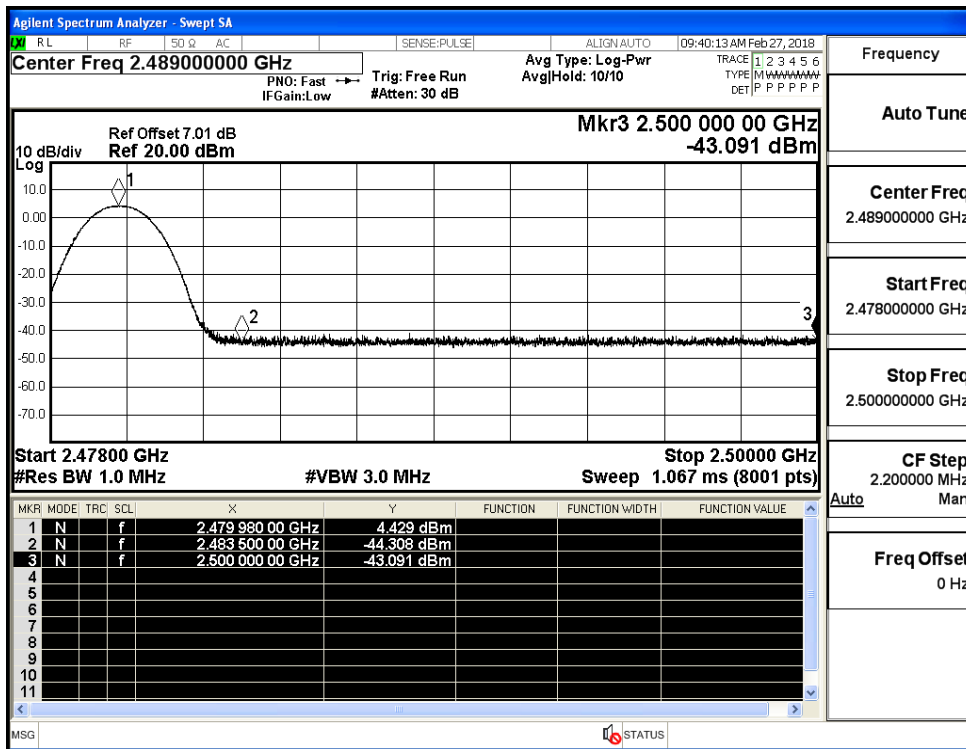
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

