

## Appendix A

### RF Test Data for BT V4.1 (BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth Speaker

Trade Mark: N/A

Test Model: S5

#### Environmental Conditions

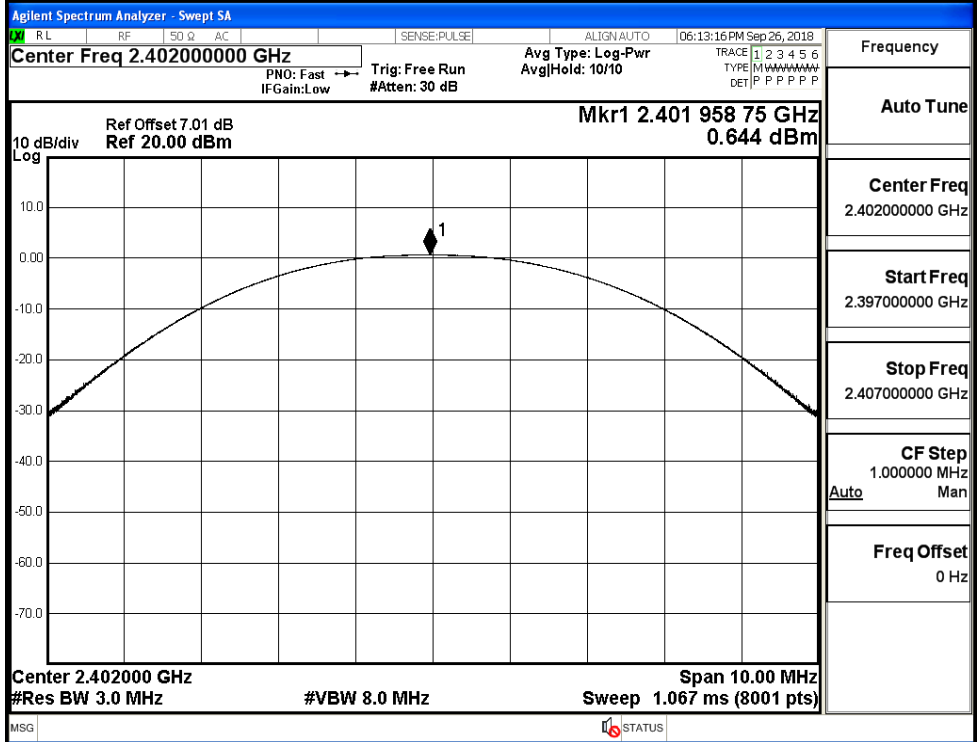
Temperature:	24.3 ° C
Relative Humidity:	53.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

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

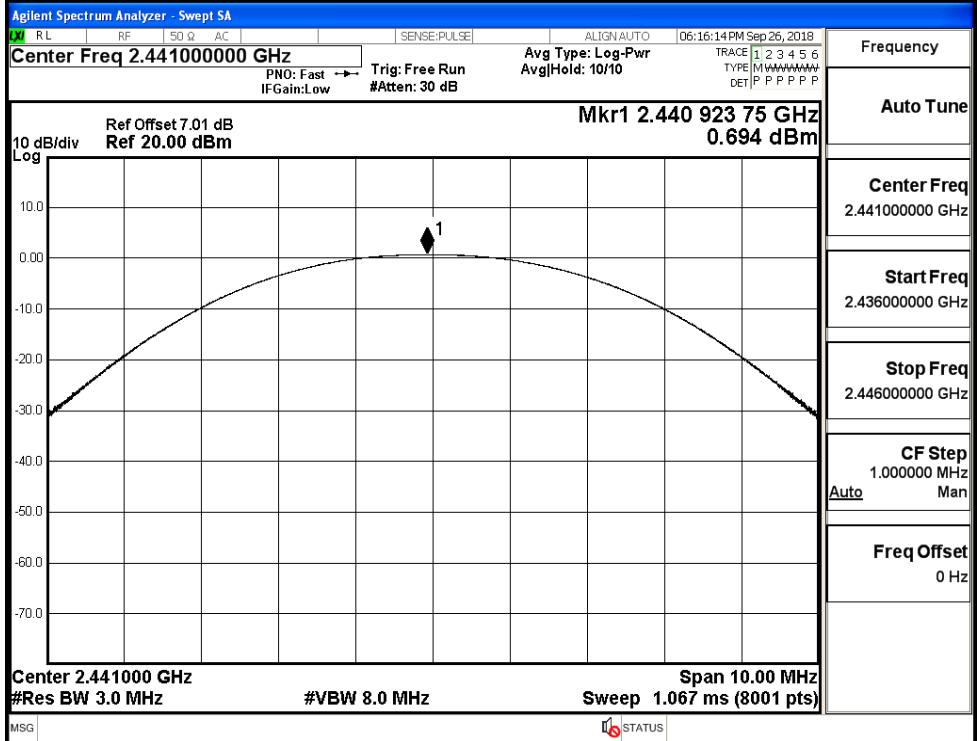
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.644	21	PASS
	MCH	0.694	21	PASS
	HCH	0.244	21	PASS
$\pi/4$ DQPSK	LCH	0.359	21	PASS
	MCH	0.710	21	PASS
	HCH	0.290	21	PASS
8DPSK	LCH	0.810	21	PASS
	MCH	0.892	21	PASS
	HCH	0.477	21	PASS

Test Graphs

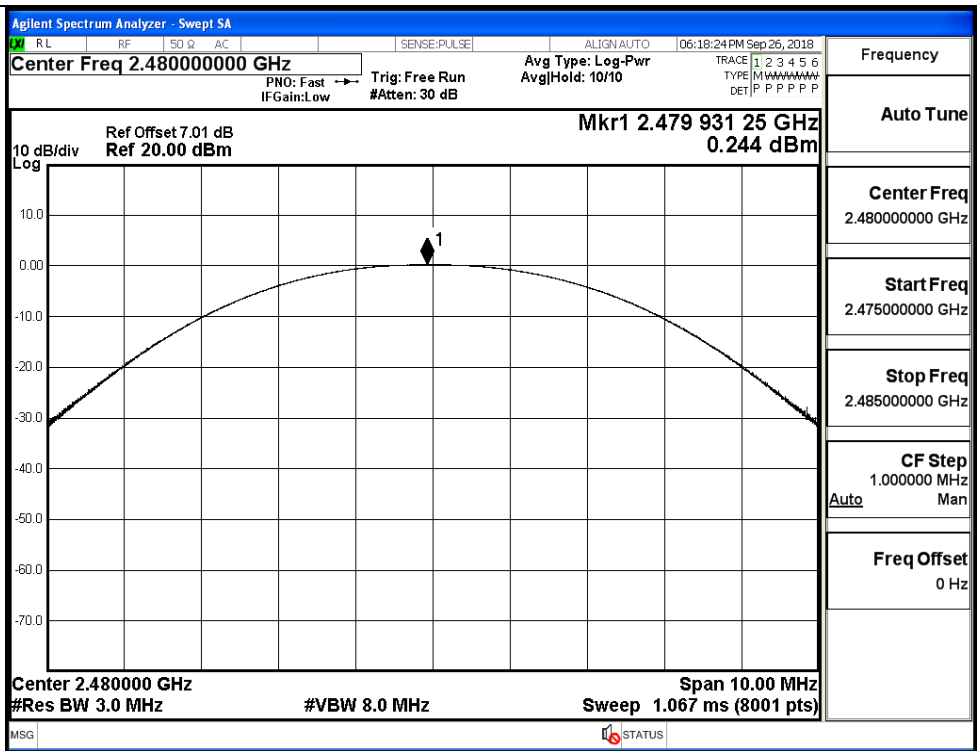
GFSK/LCH



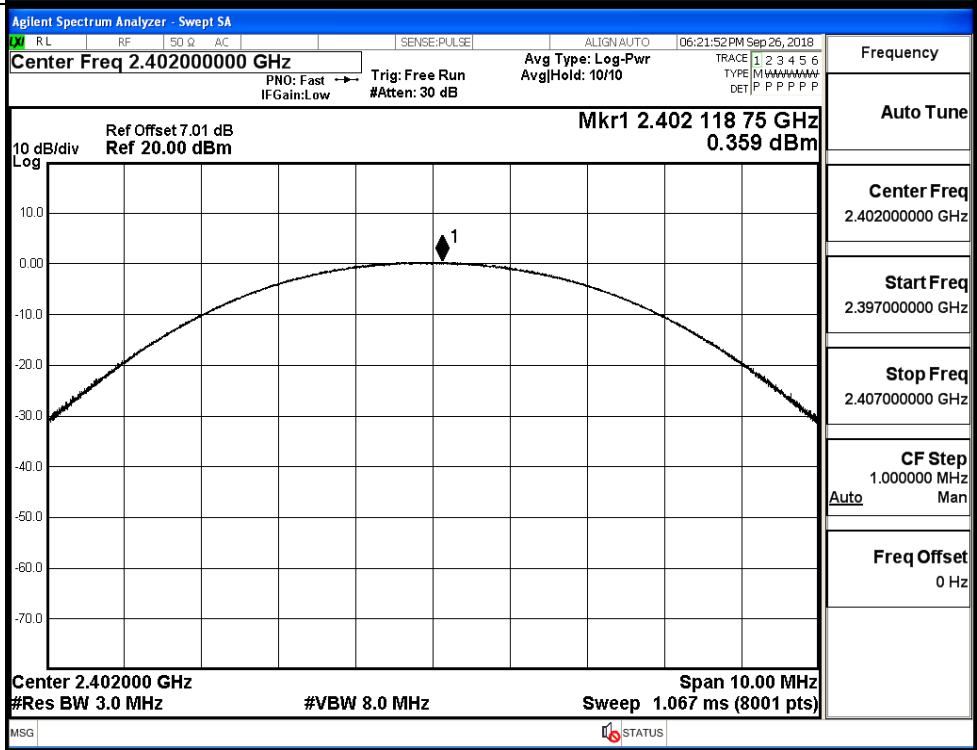
GFSK/MCH



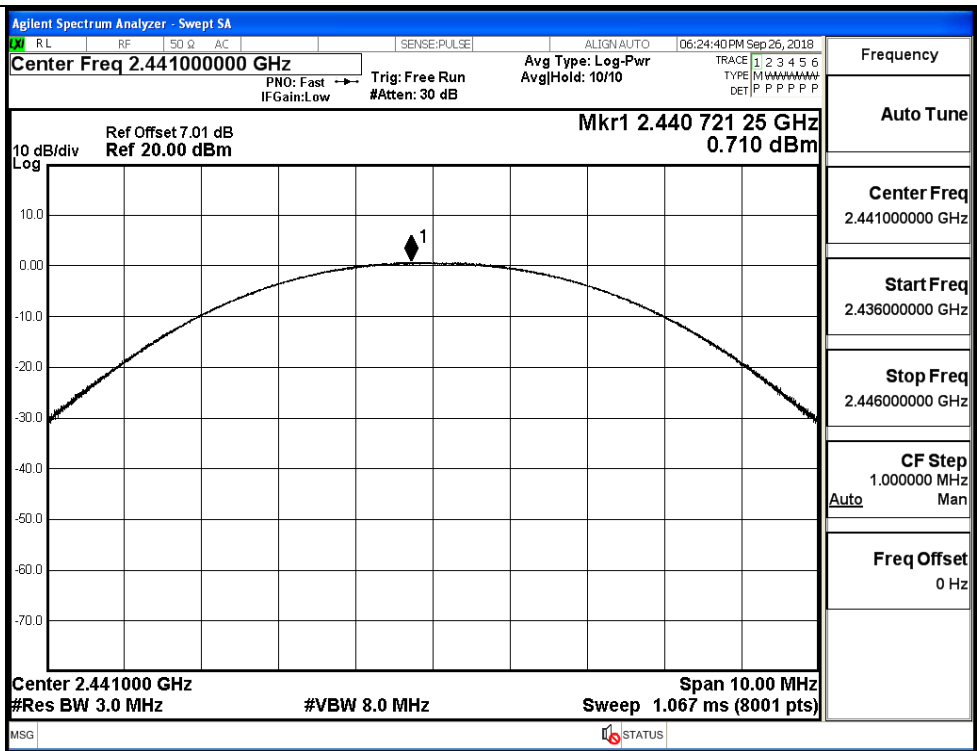
GFSK/HCH



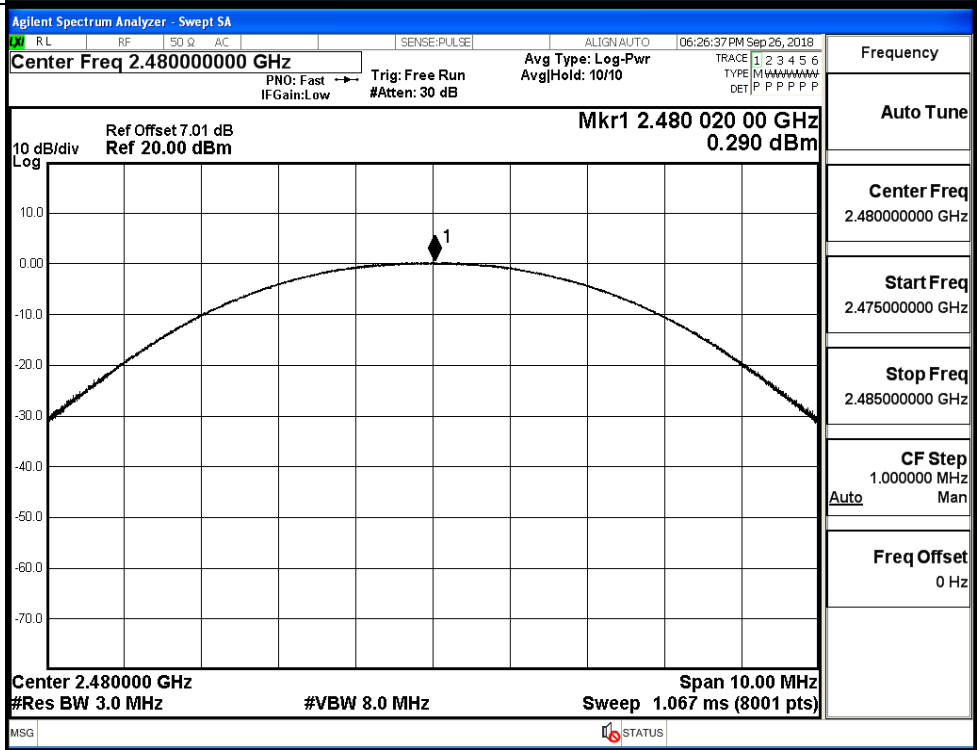
$\pi$ /4DQPSK/LCH



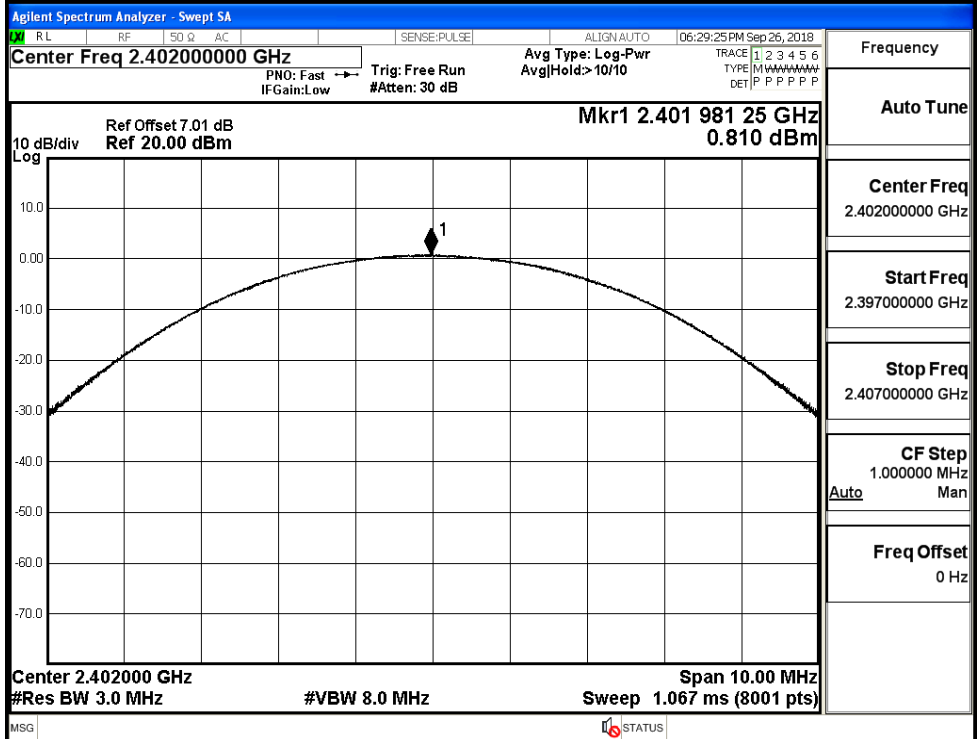
$\pi$ /4DQPSK/MCH



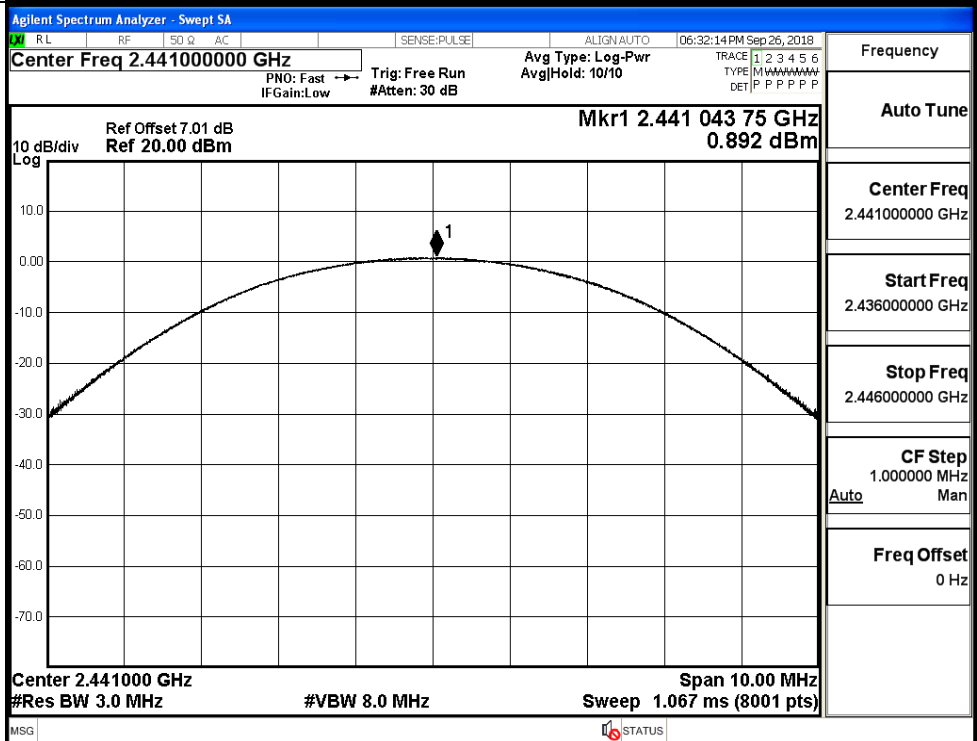
$\pi$ /4DQPSK/HCH



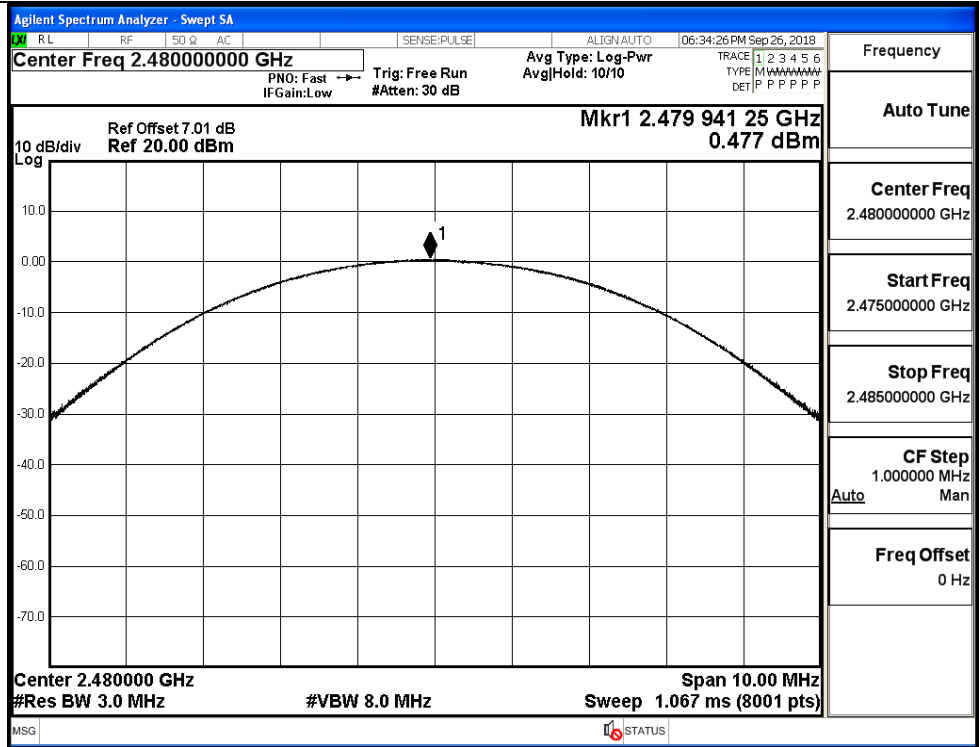
8DPSK/LCH



8DPSK/MCH

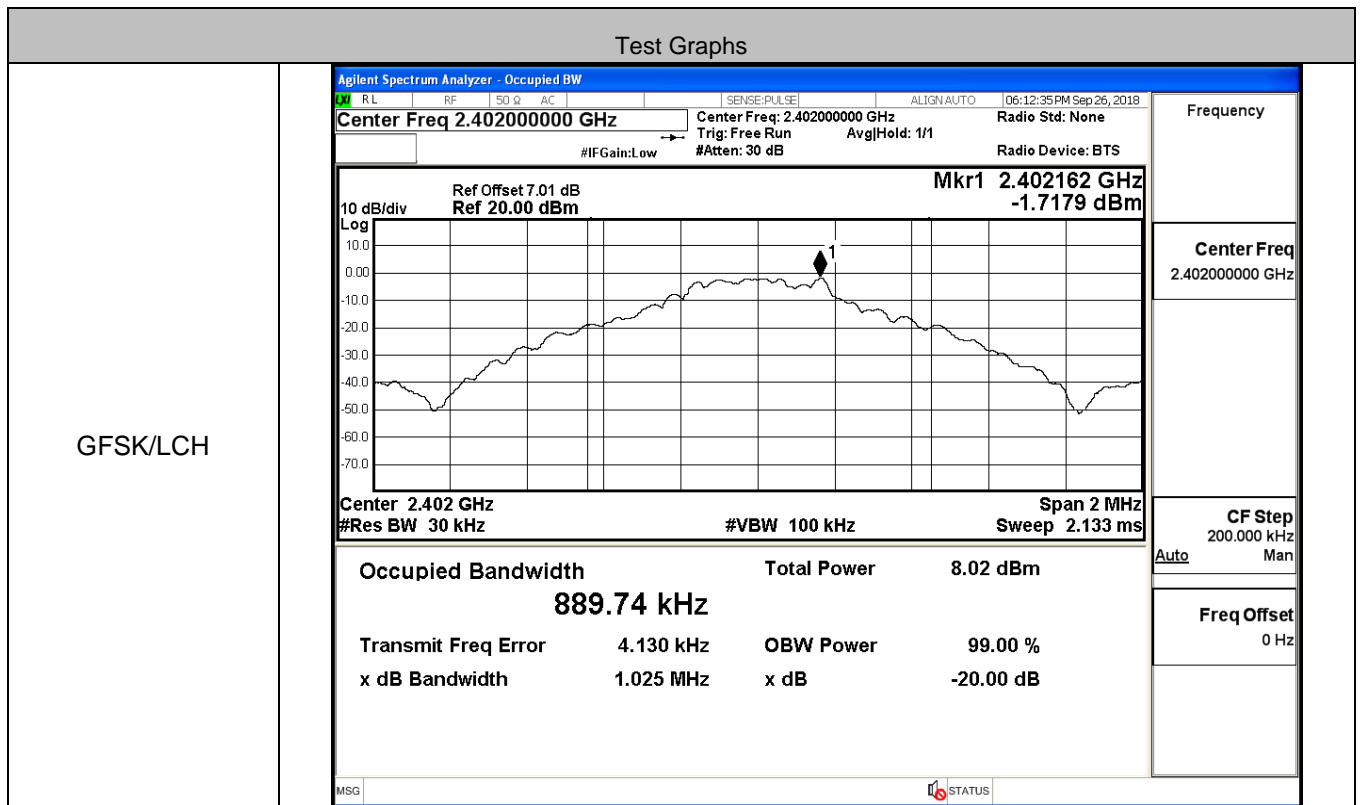


8DPSK/HCH

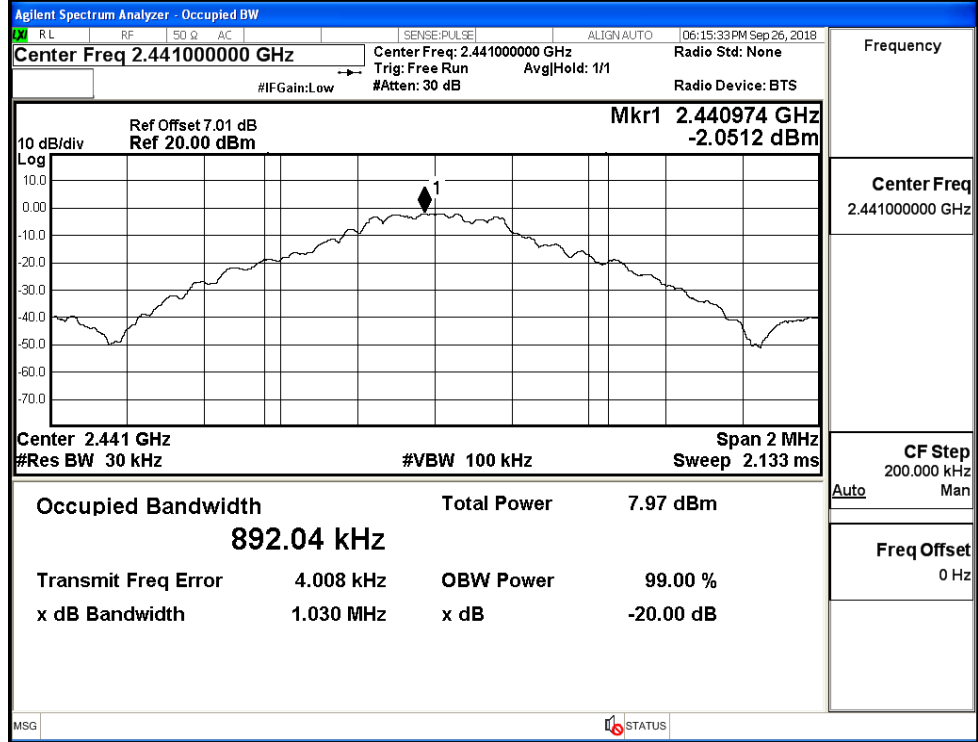


**A.2 99% and 20dB Bandwidth**

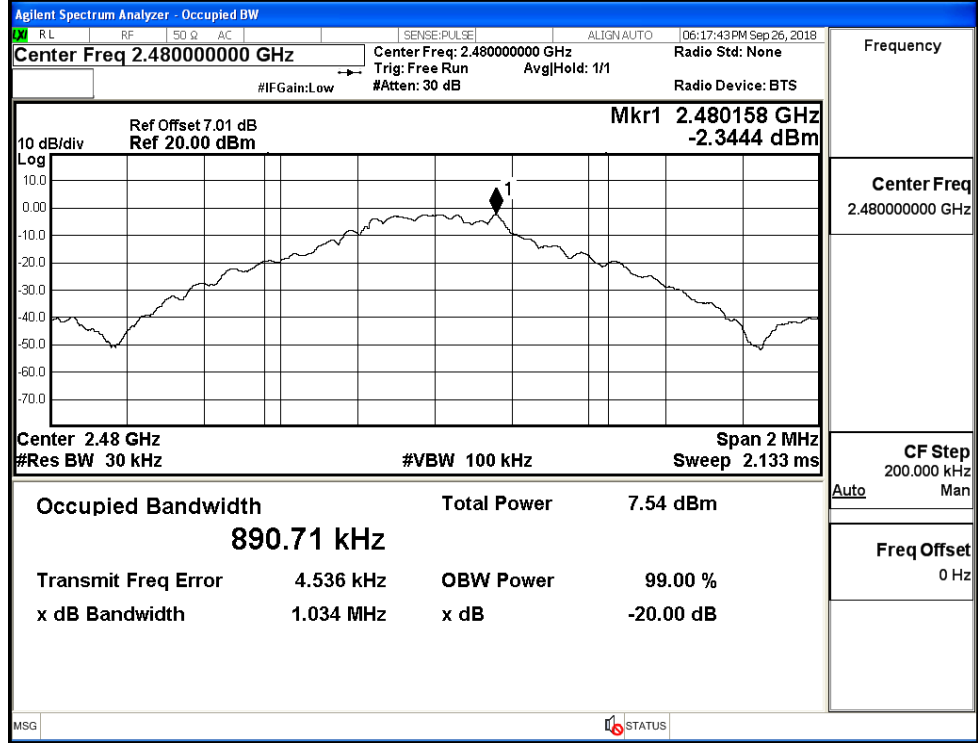
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.88974	1.025	Not Specified	PASS
	MCH	0.89204	1.030	Not Specified	PASS
	HCH	0.89071	1.034	Not Specified	PASS
π/4DQPSK	LCH	1.1676	1.290	Not Specified	PASS
	MCH	1.1680	1.288	Not Specified	PASS
	HCH	1.1669	1.287	Not Specified	PASS
8DPSK	LCH	1.1727	1.287	Not Specified	PASS
	MCH	1.1717	1.289	Not Specified	PASS
	HCH	1.1732	1.286	Not Specified	PASS



GFSK/MCH

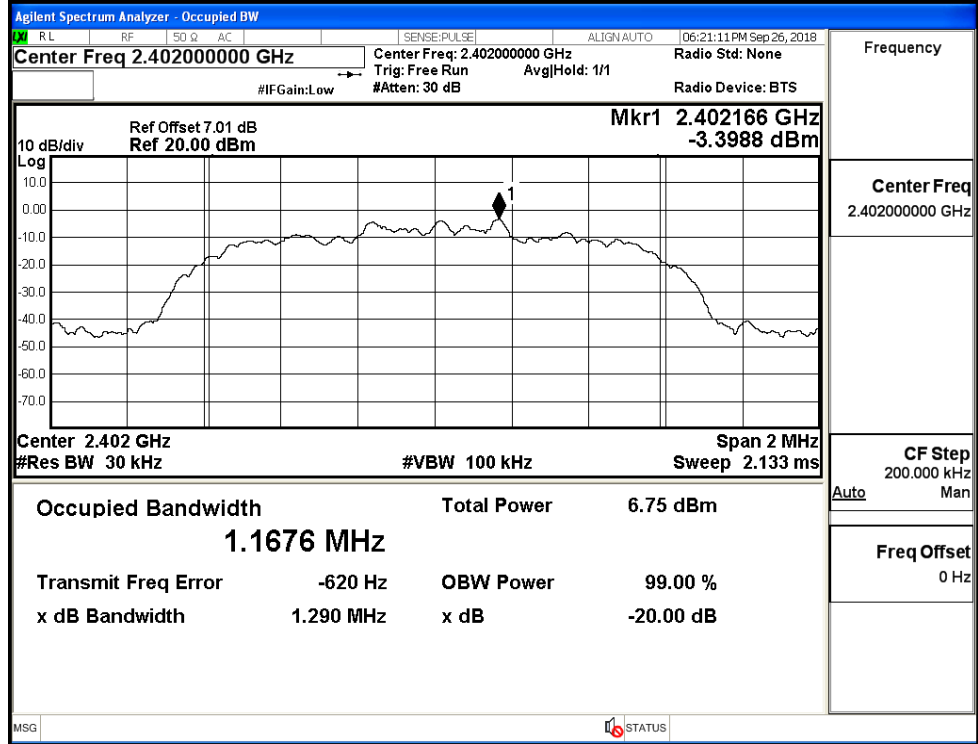


GFSK/HCH



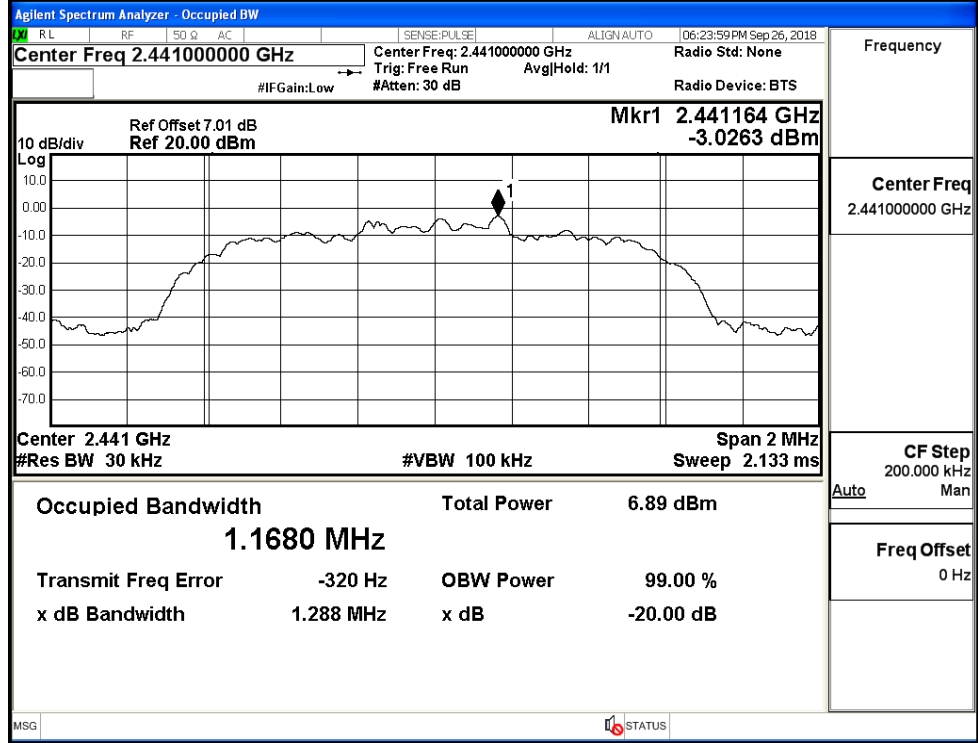


$\pi$ /4DQPSK/LCH



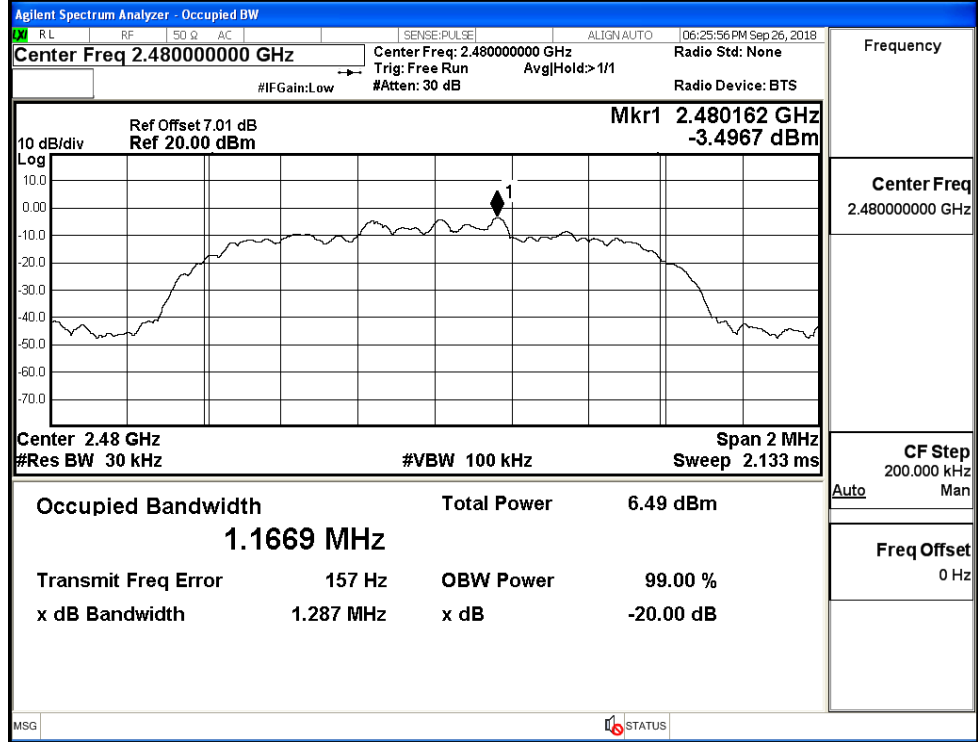
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi$ /4DQPSK/MCH

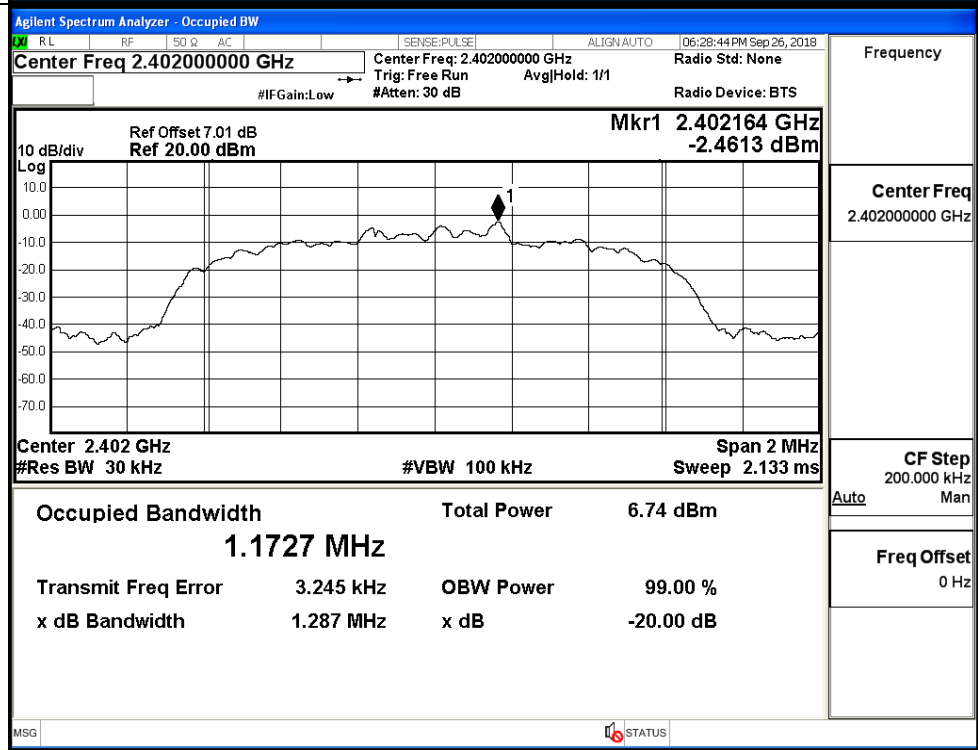


Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

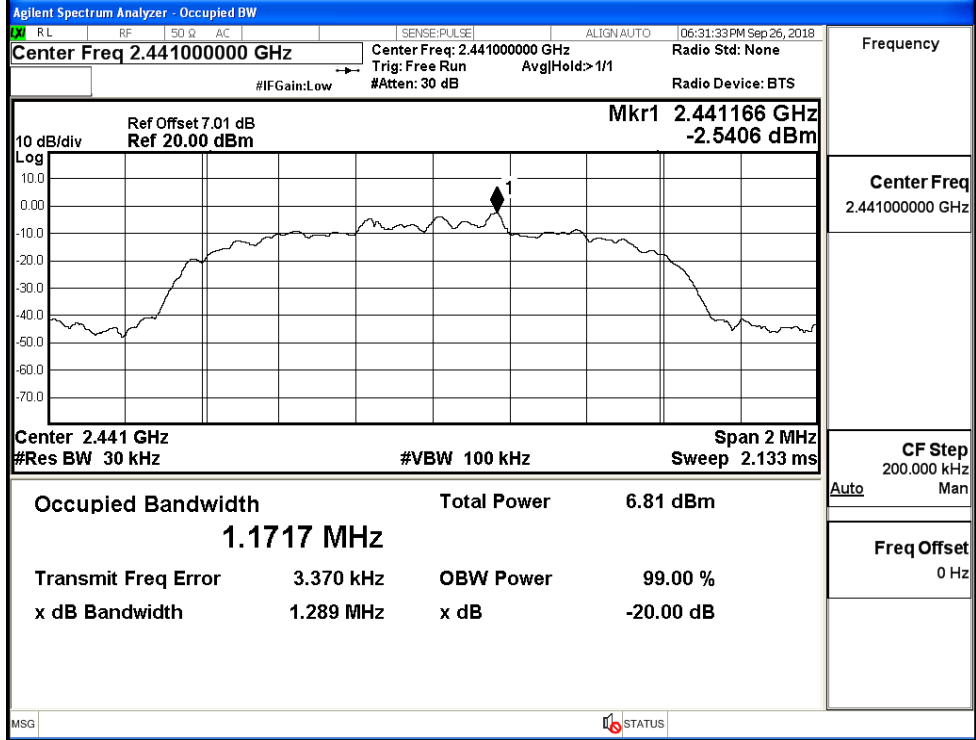
π/4DQPSK/HCH



8DPSK/LCH

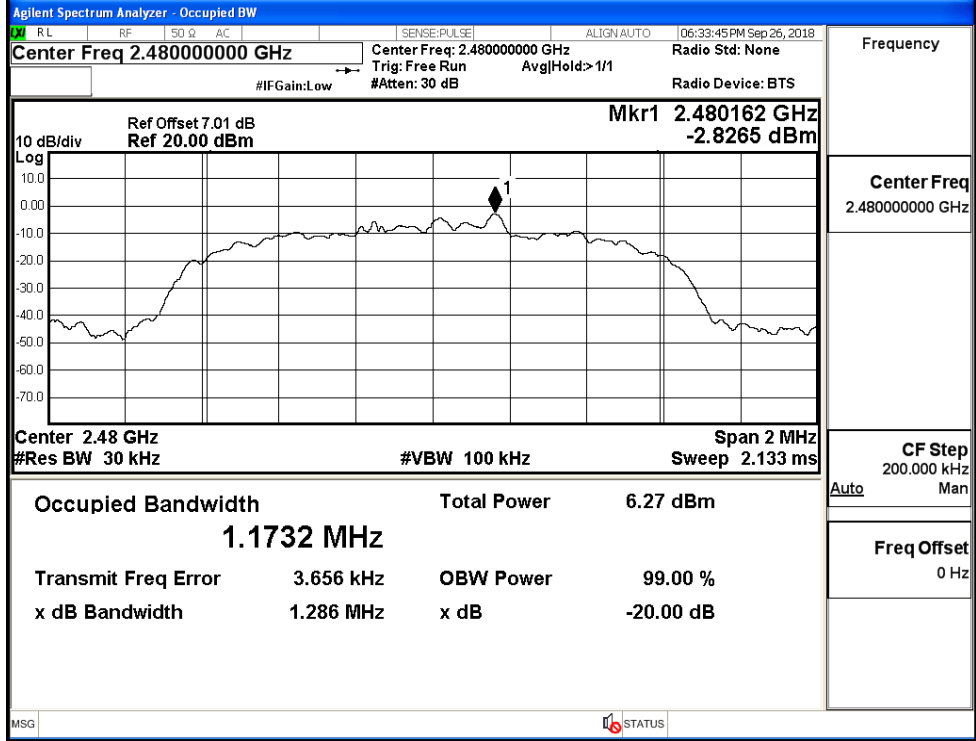


8DPSK/MCH



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

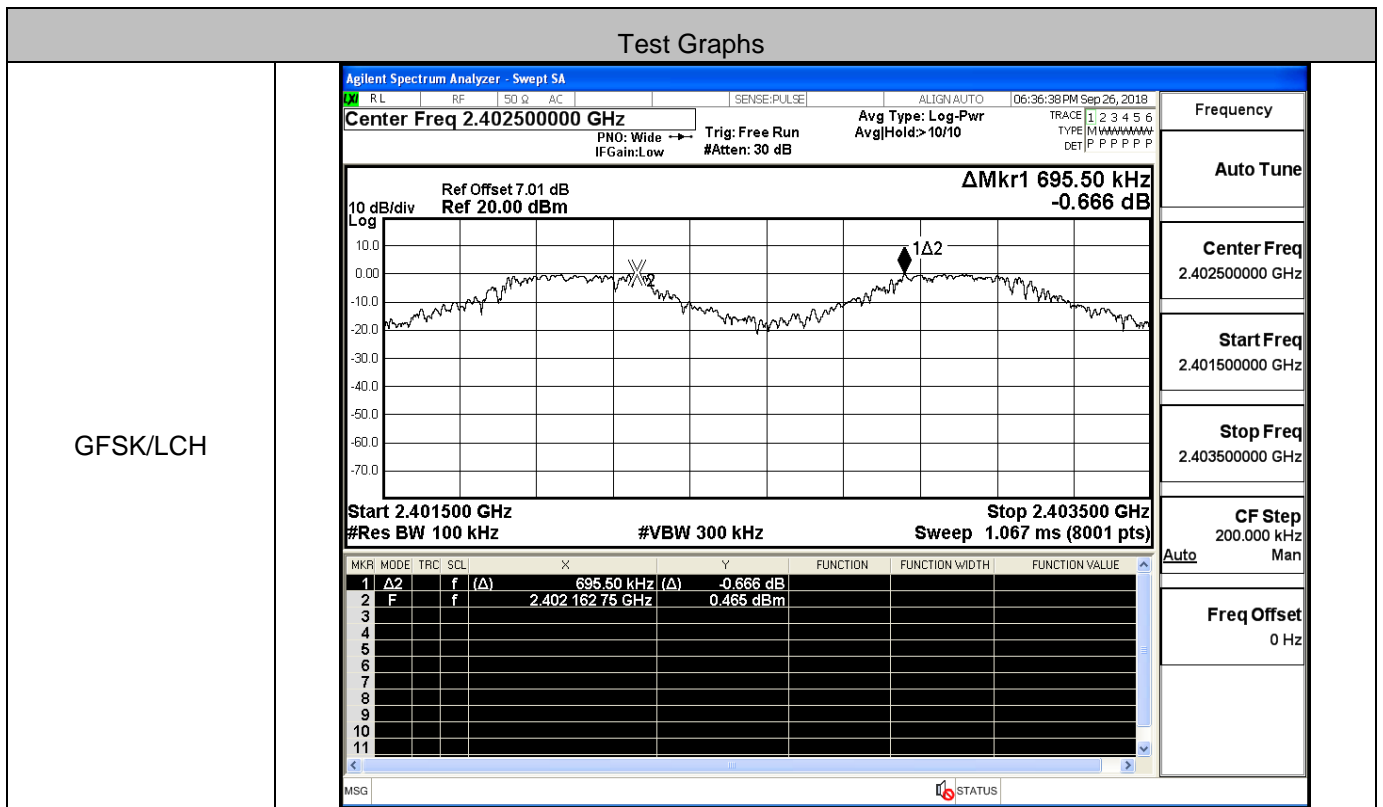
8DPSK/HCH



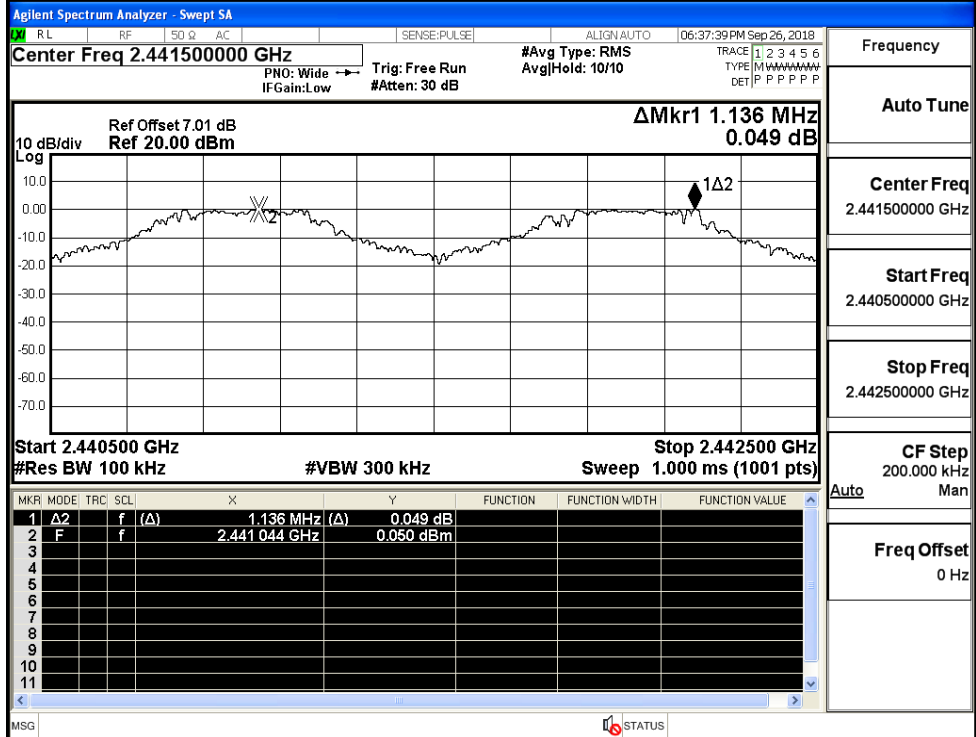
Frequency
Center Freq 2.48000000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

### A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.696	0.689	PASS
	MCH	1.136	0.689	PASS
	HCH	1.124	0.689	PASS
π/4DQPSK	LCH	0.874	0.860	PASS
	MCH	1.280	0.860	PASS
	HCH	1.026	0.860	PASS
8DPSK	LCH	1.114	0.859	PASS
	MCH	0.988	0.859	PASS
	HCH	1.048	0.859	PASS



GFSK/MCH



Frequency

Auto Tune

Center Freq

2.441500000 GHz

Start Freq

2.440500000 GHz

Stop Freq

2.442500000 GHz

CF Step

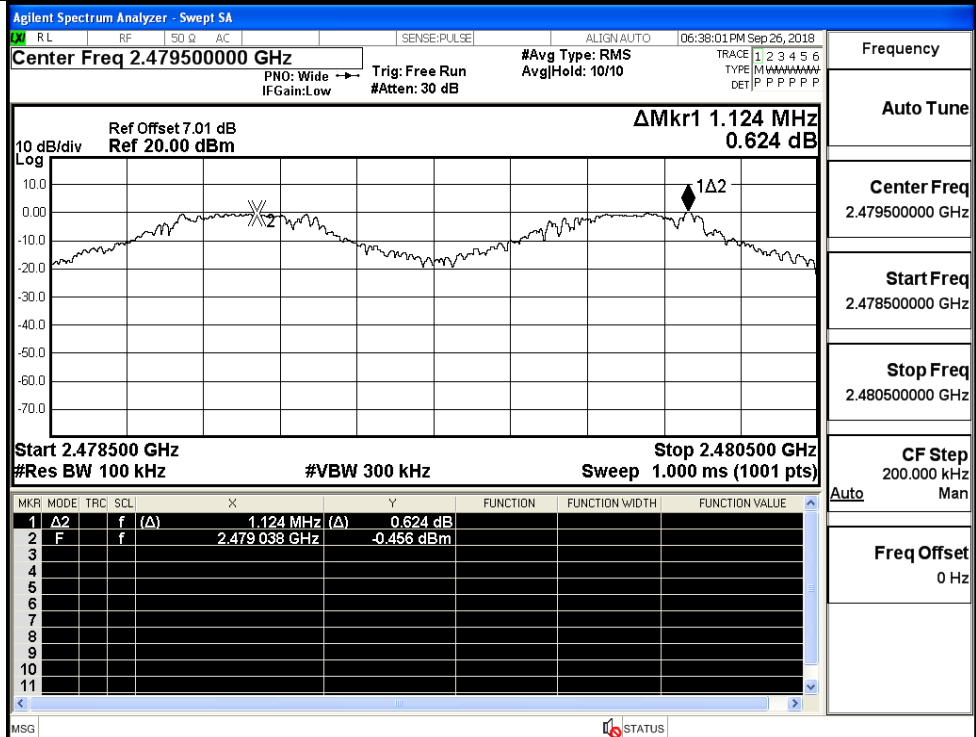
200.000 kHz

Auto

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

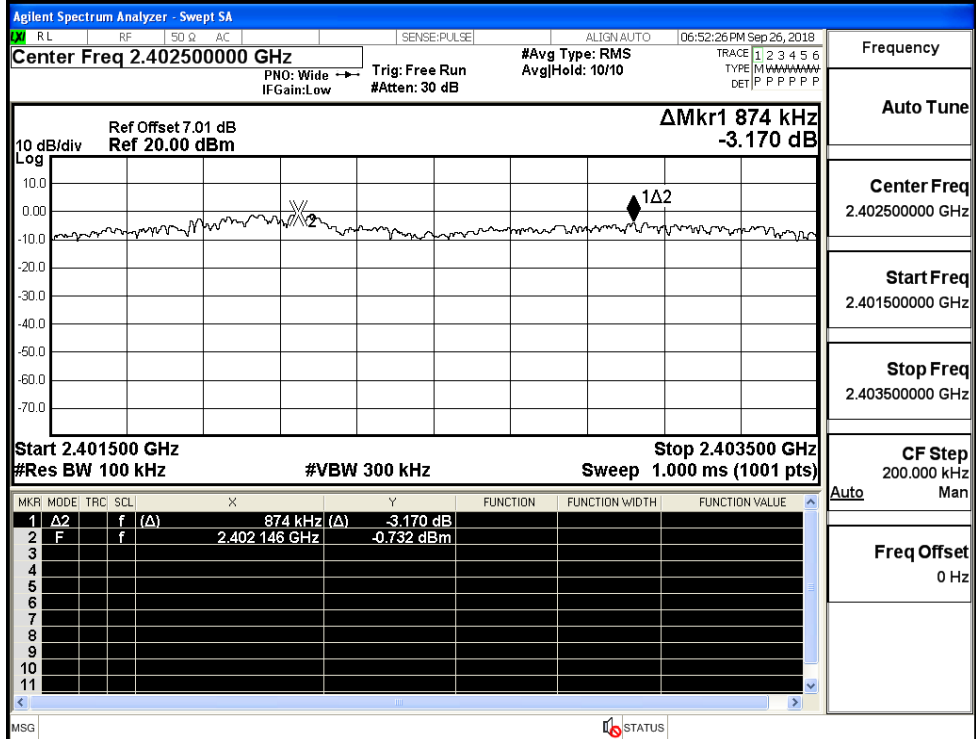
200.000 kHz

Auto

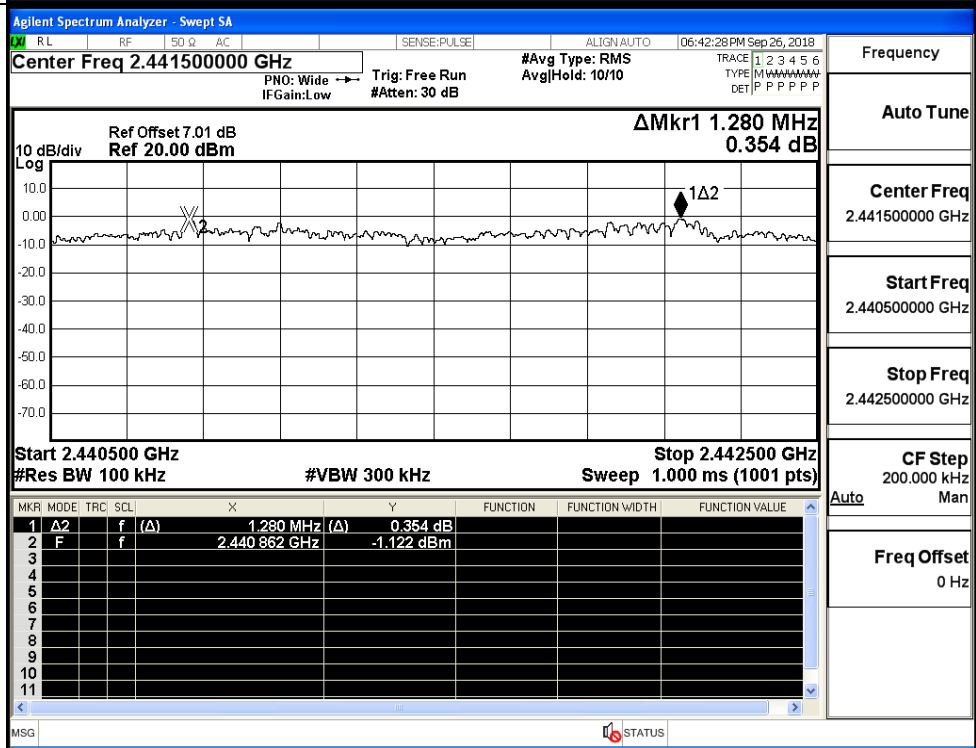
Freq Offset

0 Hz

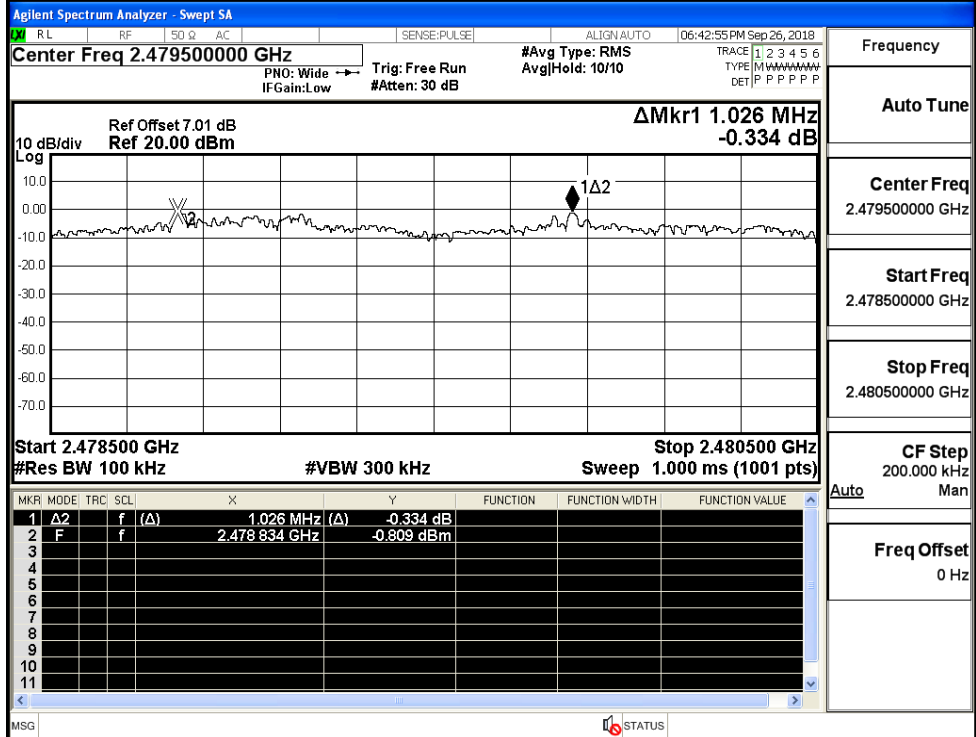
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

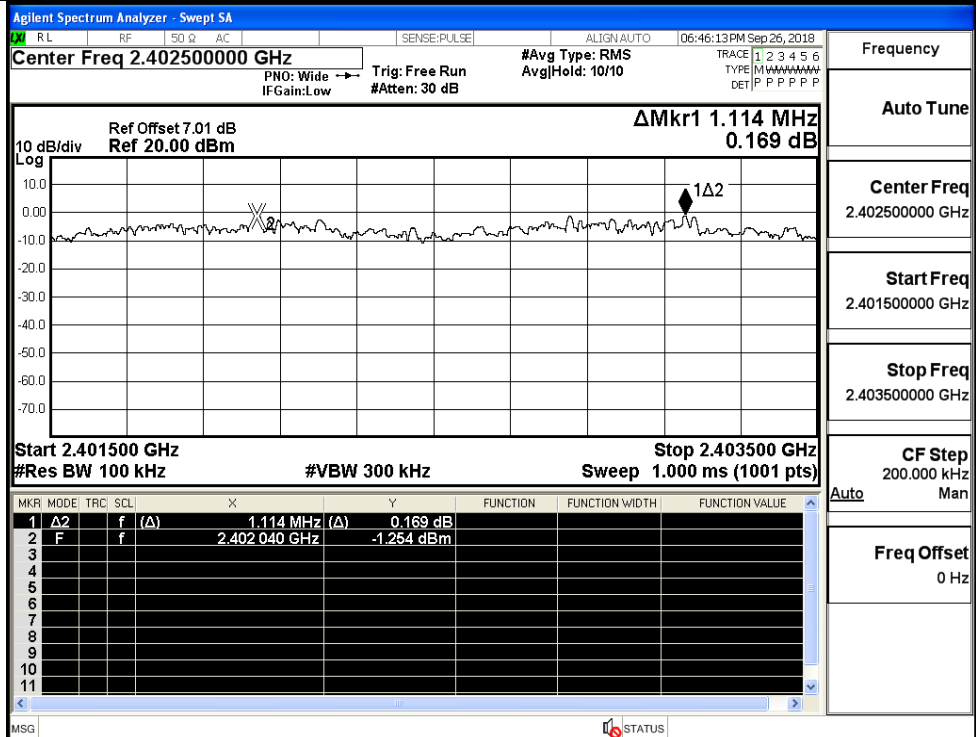


π/4DQPSK/HCH



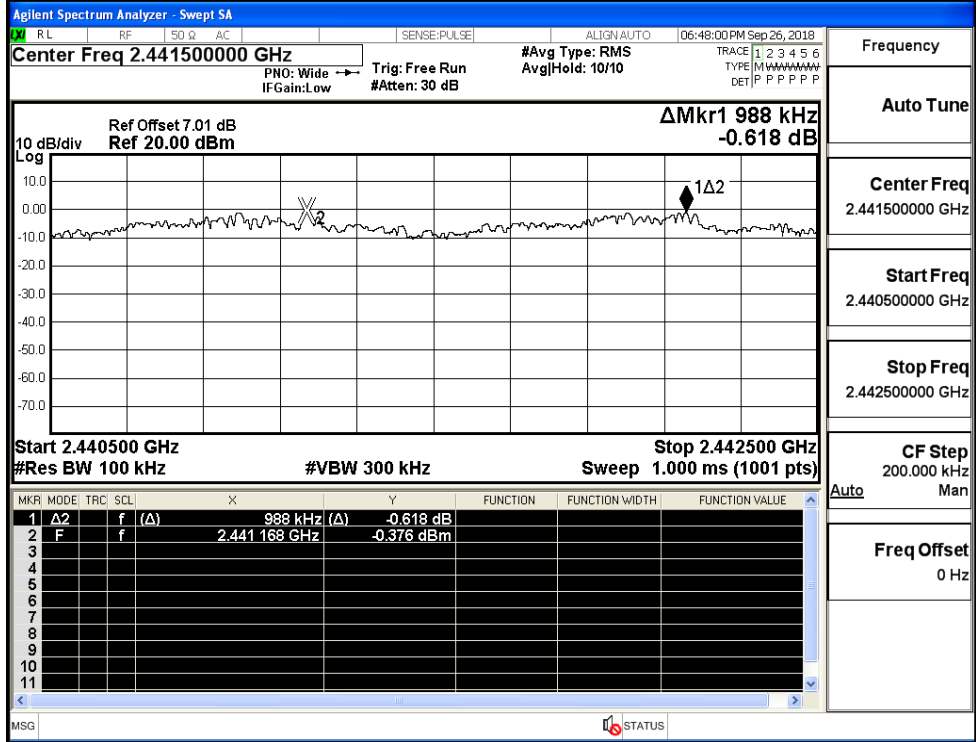
Frequency
Auto Tune
Center Freq 2.479500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.480500000 GHz
CF Step 200.000 kHz
Auto Man
Freq Offset 0 Hz

8DPSK/LCH

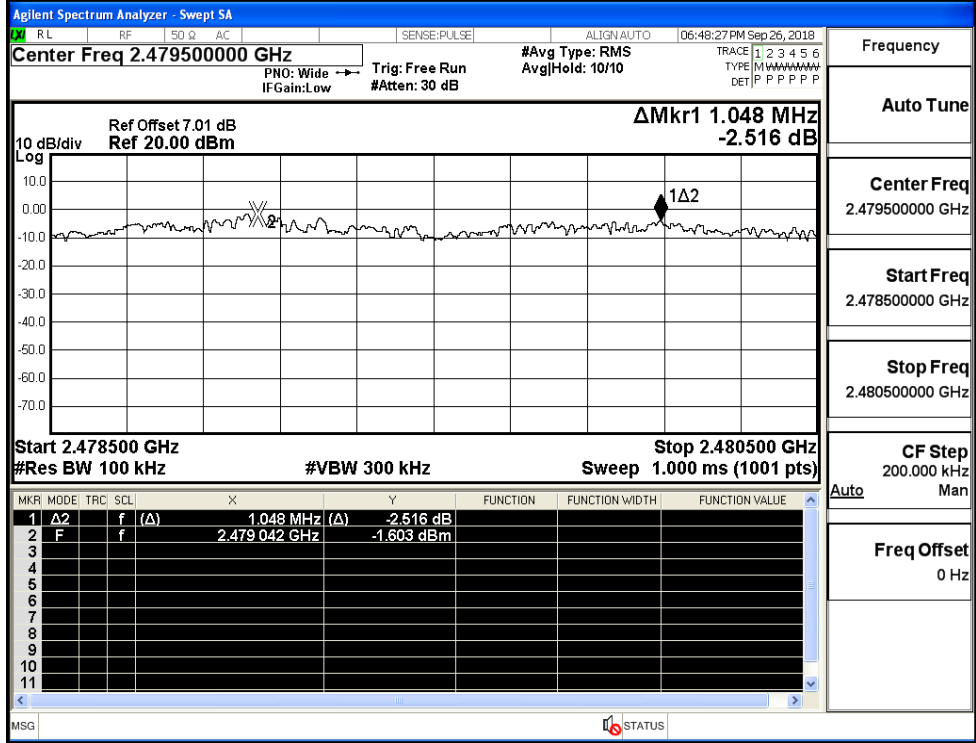


Frequency
Auto Tune
Center Freq 2.402500000 GHz
Start Freq 2.401500000 GHz
Stop Freq 2.403500000 GHz
CF Step 200.000 kHz
Auto Man
Freq Offset 0 Hz

8DPSK/MCH



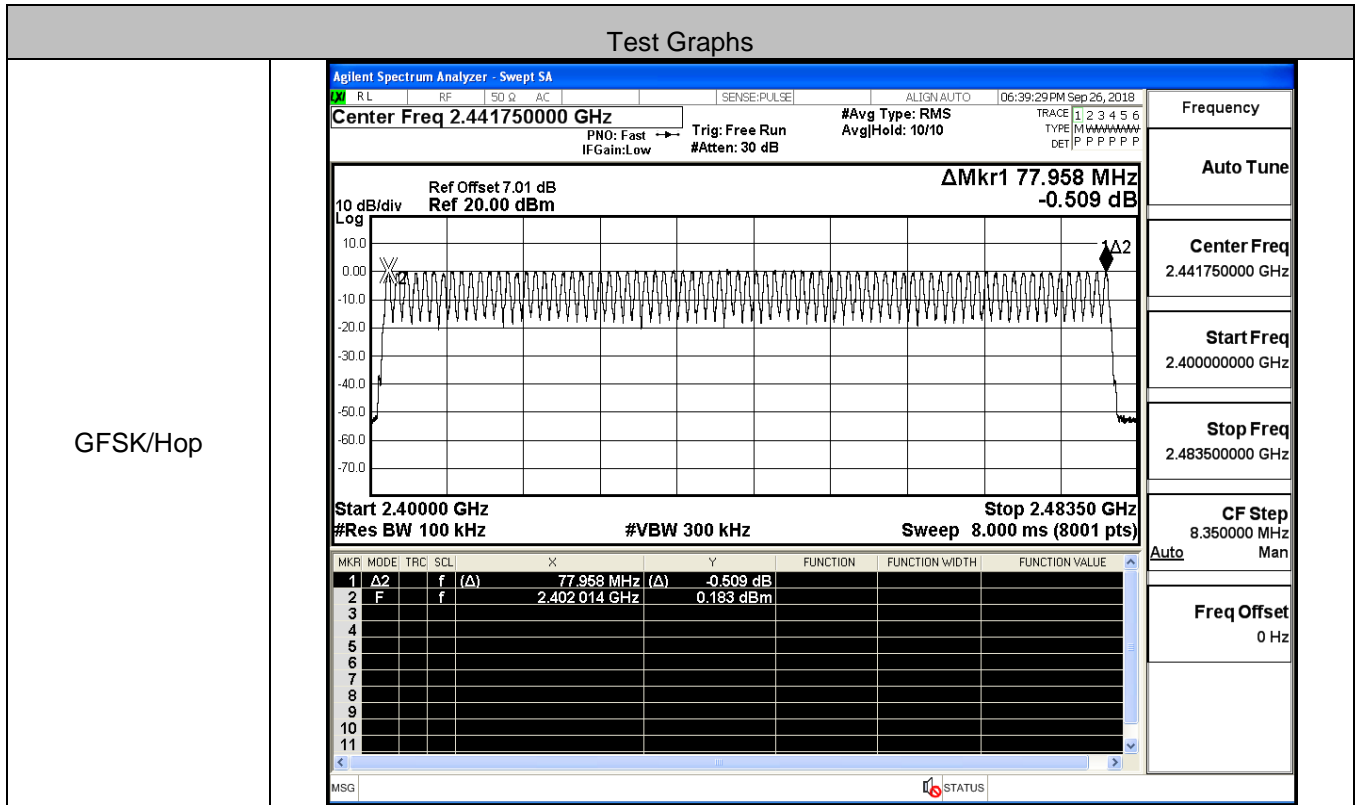
8DPSK/HCH



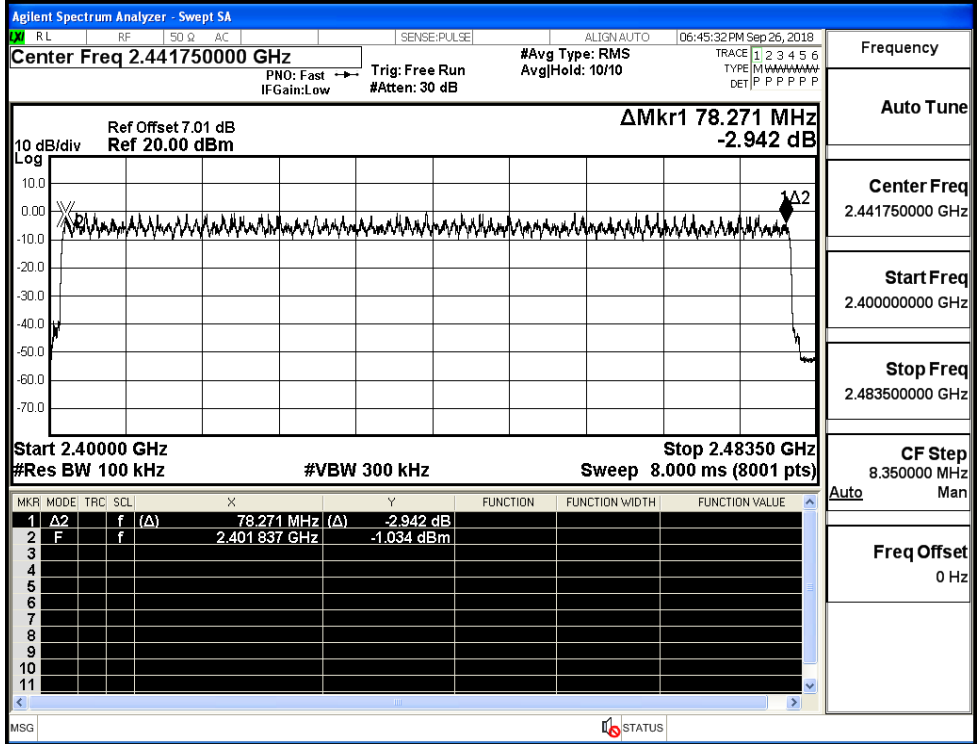


### A.4 Hopping Channel Number

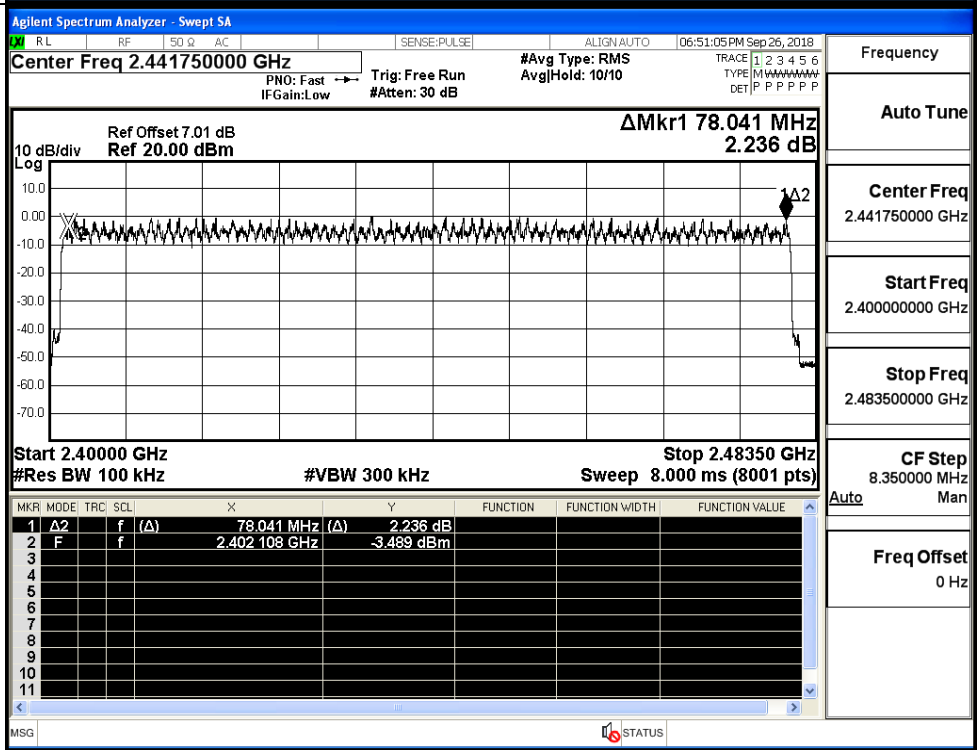
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS



$\pi/4$ DQPSK/Hop

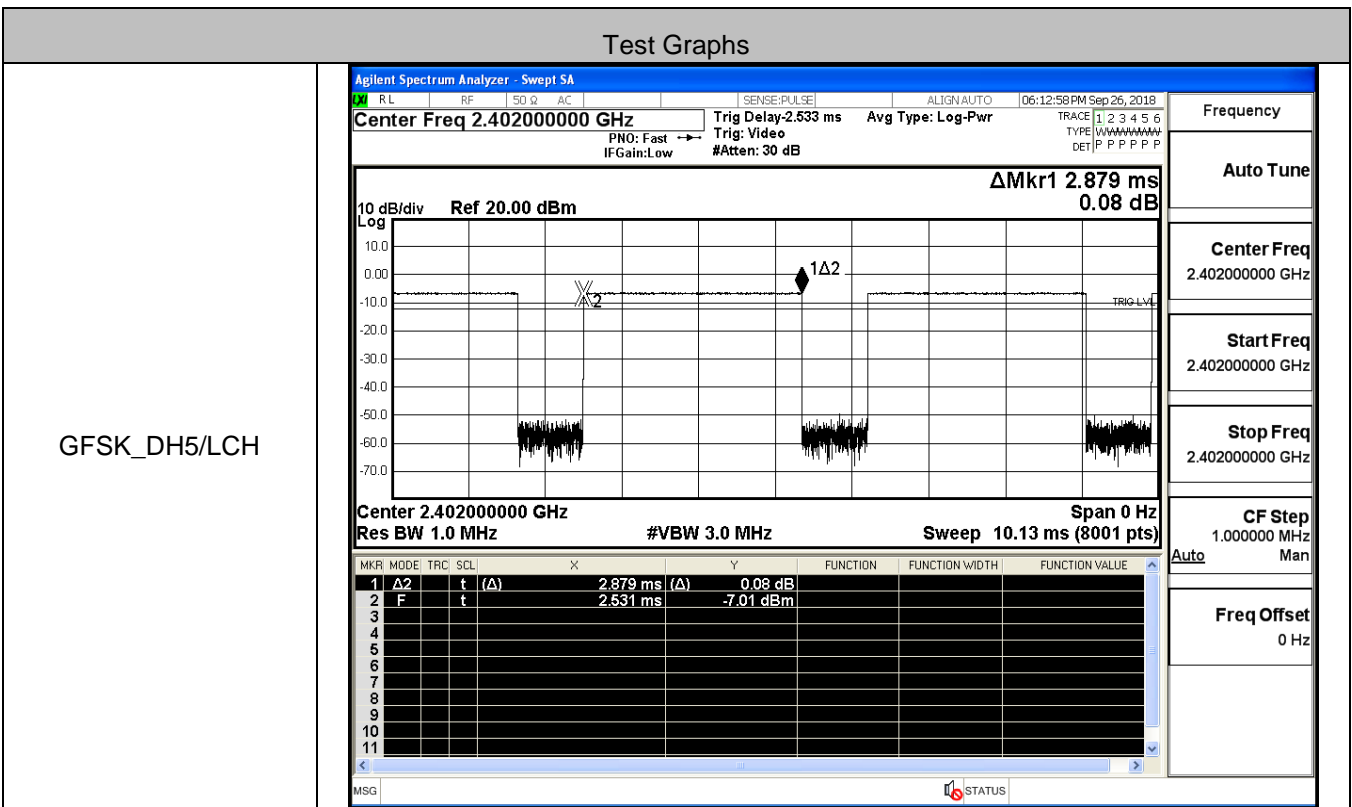


8DPSK/Hop

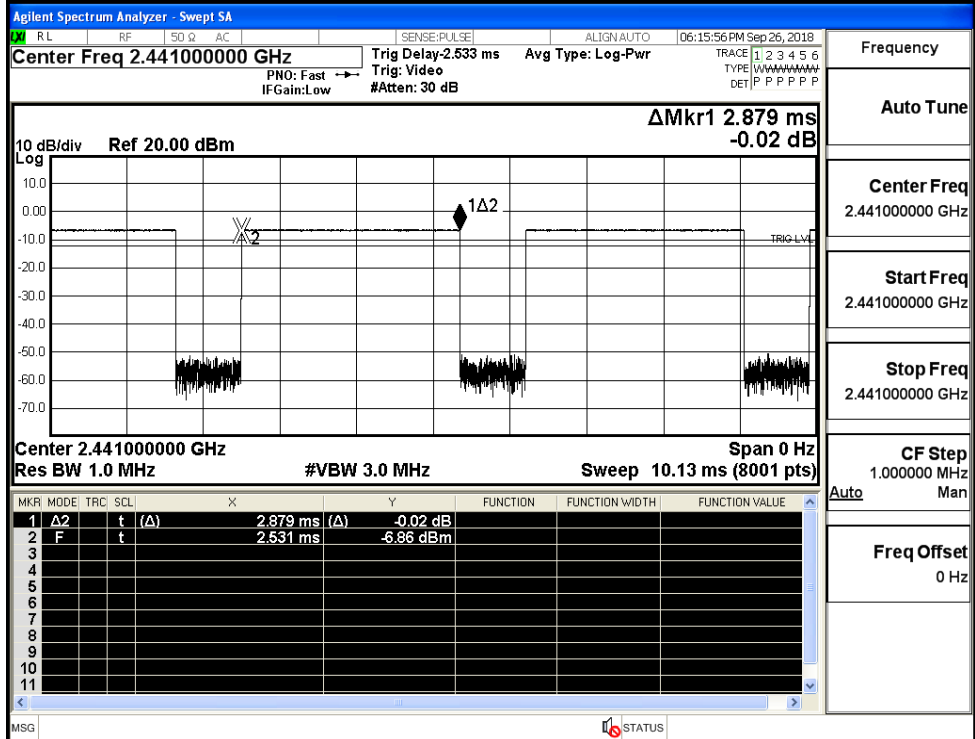


### A.5 Dwell Time

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

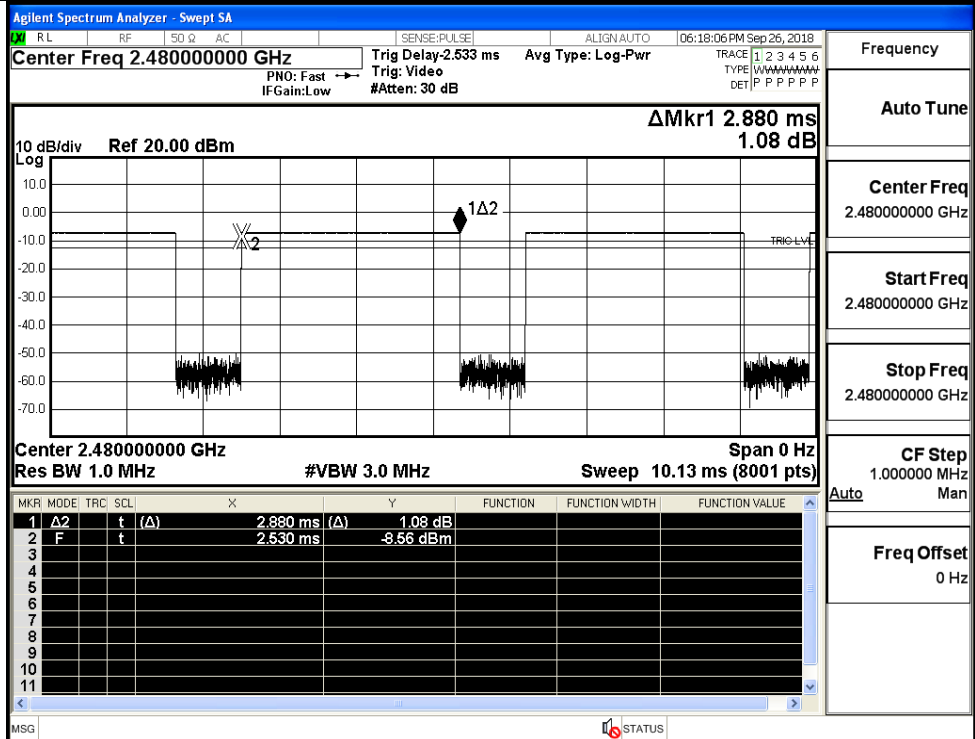


GFSK\_DH5/MCH



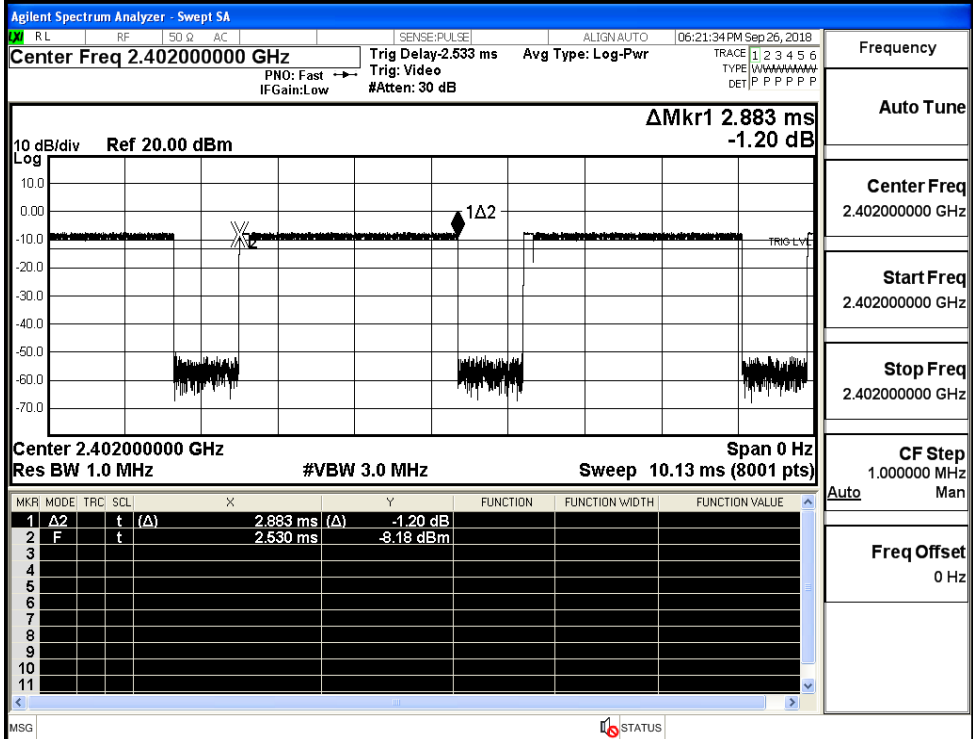
Frequency	
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Freq Offset	0 Hz

GFSK\_DH5/HCH

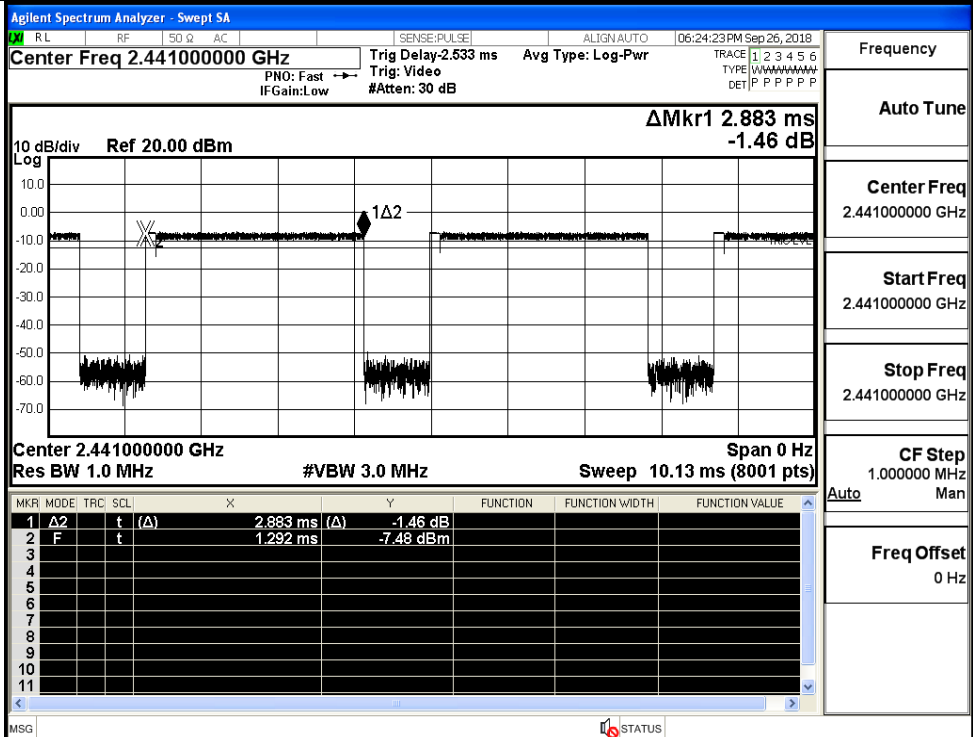


Frequency	
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Freq Offset	0 Hz

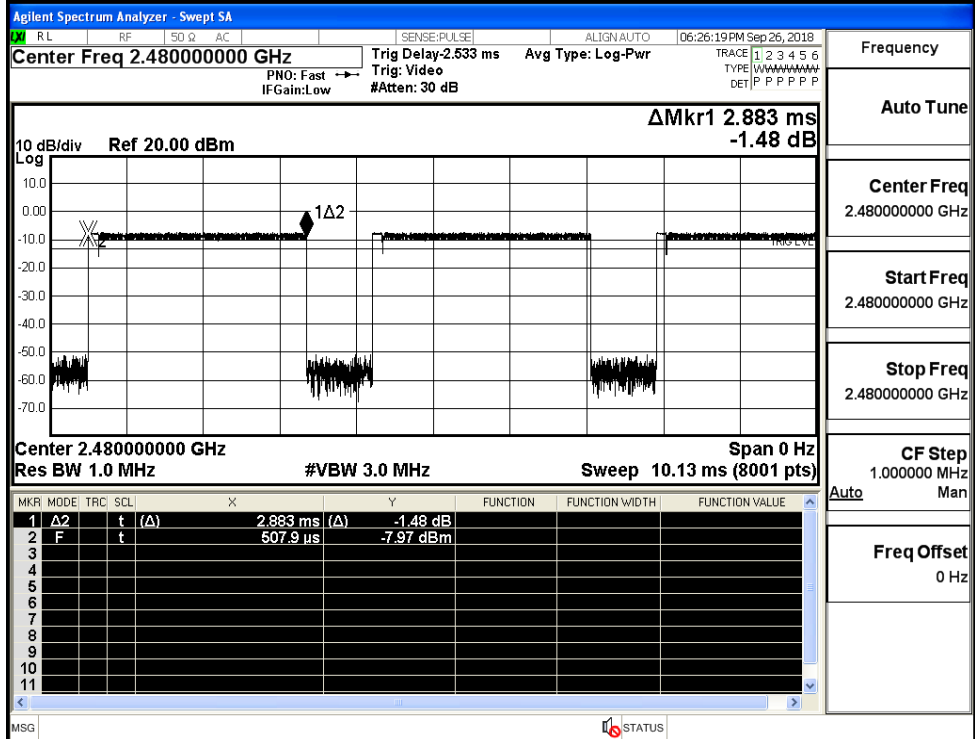
$\pi/4$ DQPSK  
\_2DH5/LCH



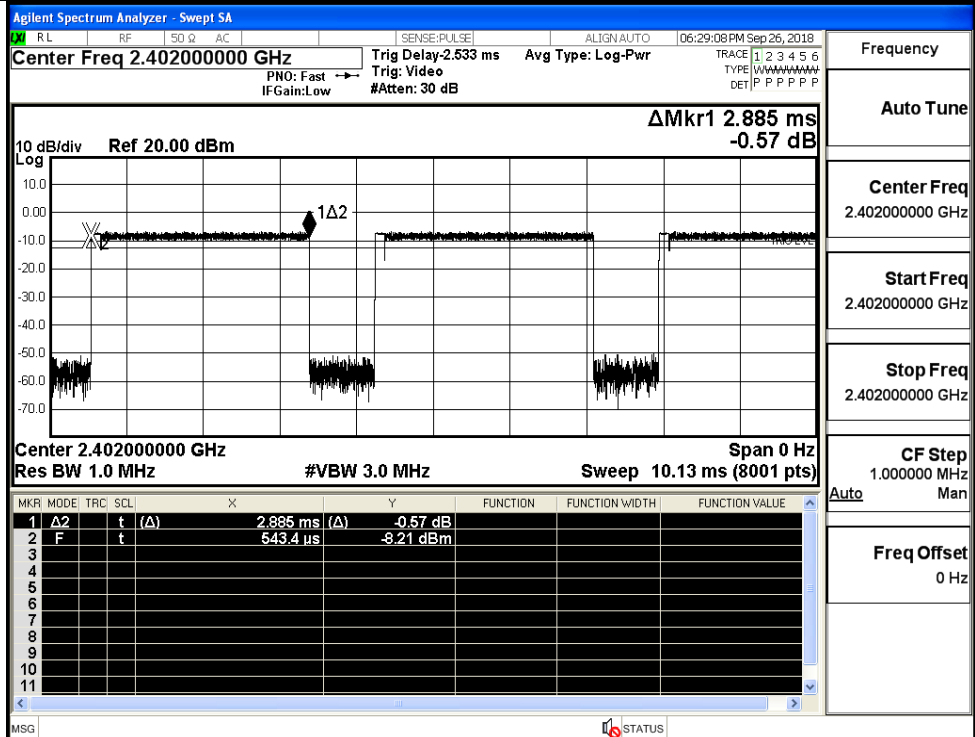
$\pi/4$ DQPSK  
\_2DH5/MCH



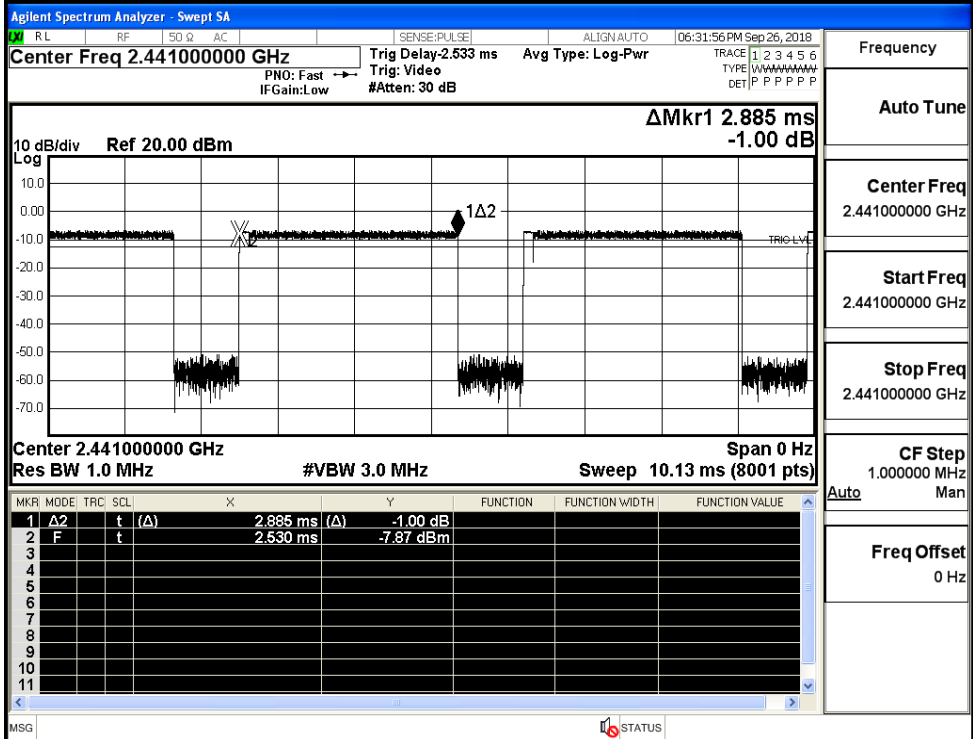
$\pi/4$ DQPSK  
\_2DH5/HCH



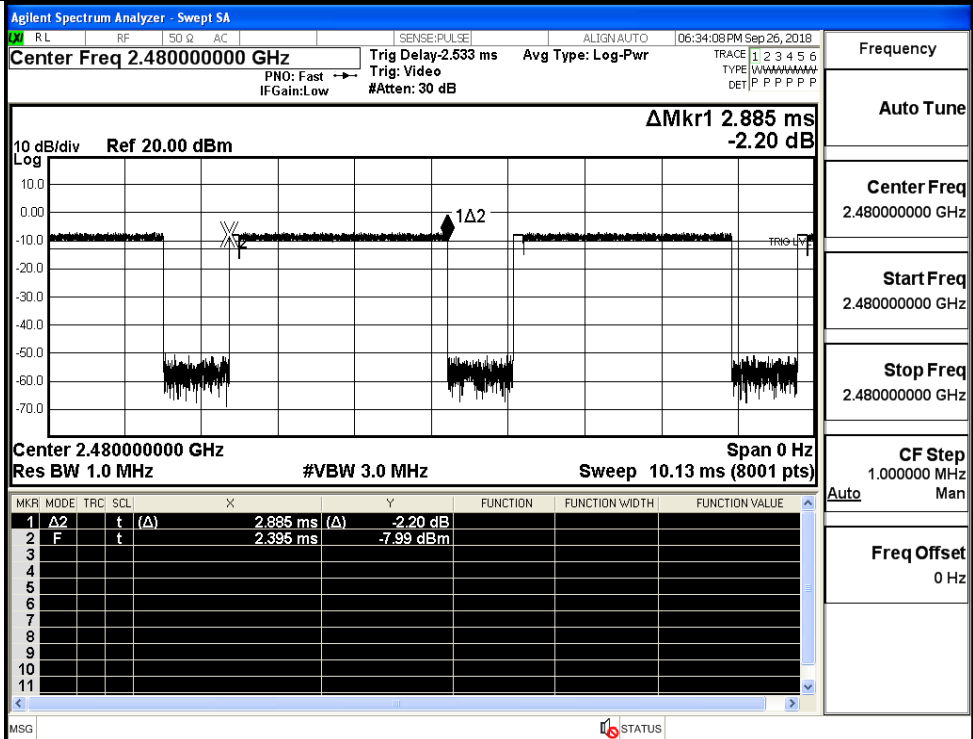
8DPSK\_3DH5/LCH



8DPSK\_3DH5/MCH



8DPSK\_3DH5/HCH



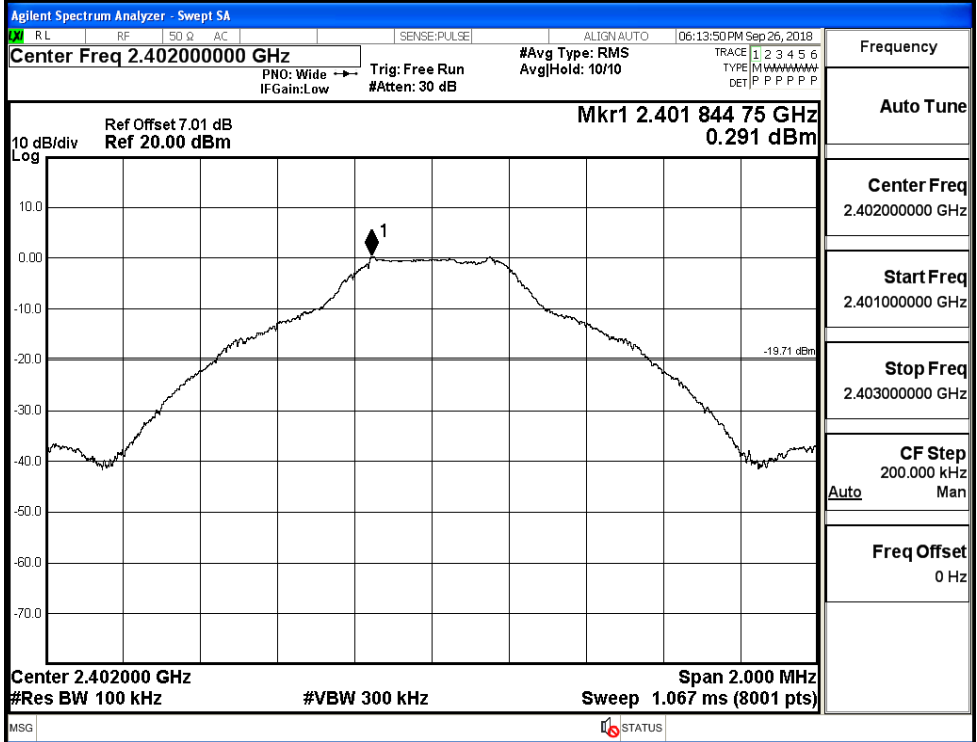
**A.6 RF Conducted Spurious Emissions**

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.291	-44.786	-19.709	PASS
	MCH	0.404	-46.201	-19.596	PASS
	HCH	-0.103	-45.680	-20.103	PASS
$\pi/4$ DQPSK	LCH	-0.828	-45.101	-20.828	PASS
	MCH	-0.398	-45.757	-20.398	PASS
	HCH	-0.708	-45.352	-20.708	PASS
8DPSK	LCH	-0.36	-45.399	-20.360	PASS
	MCH	-0.334	-45.706	-20.334	PASS
	HCH	-0.761	-46.134	-20.761	PASS

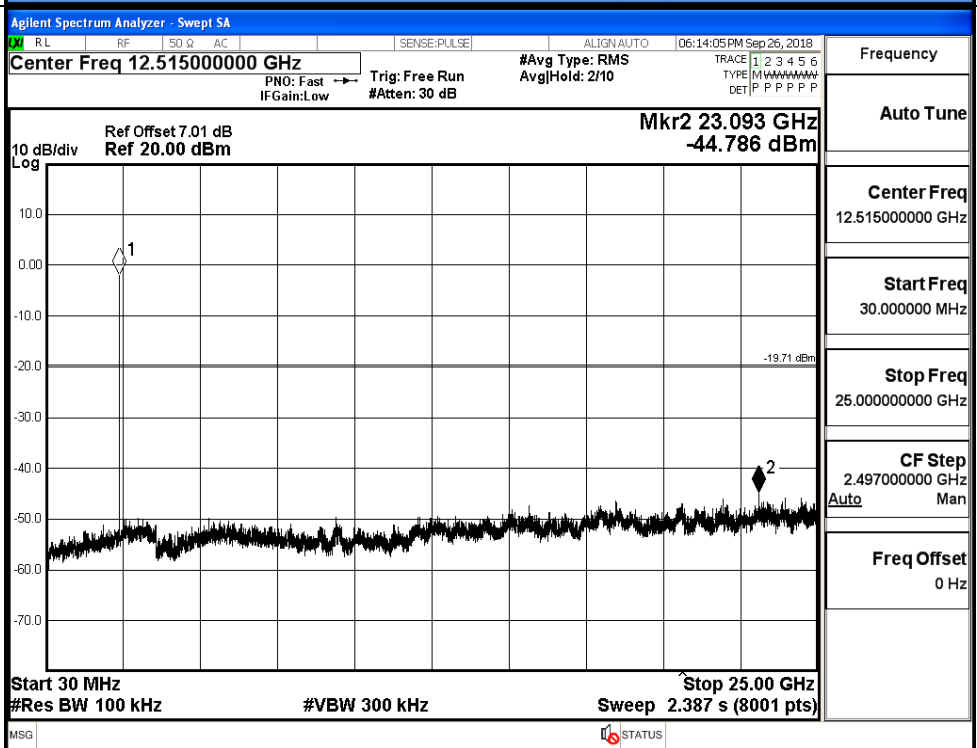


GFSK\_LCH\_Graphs

Pref

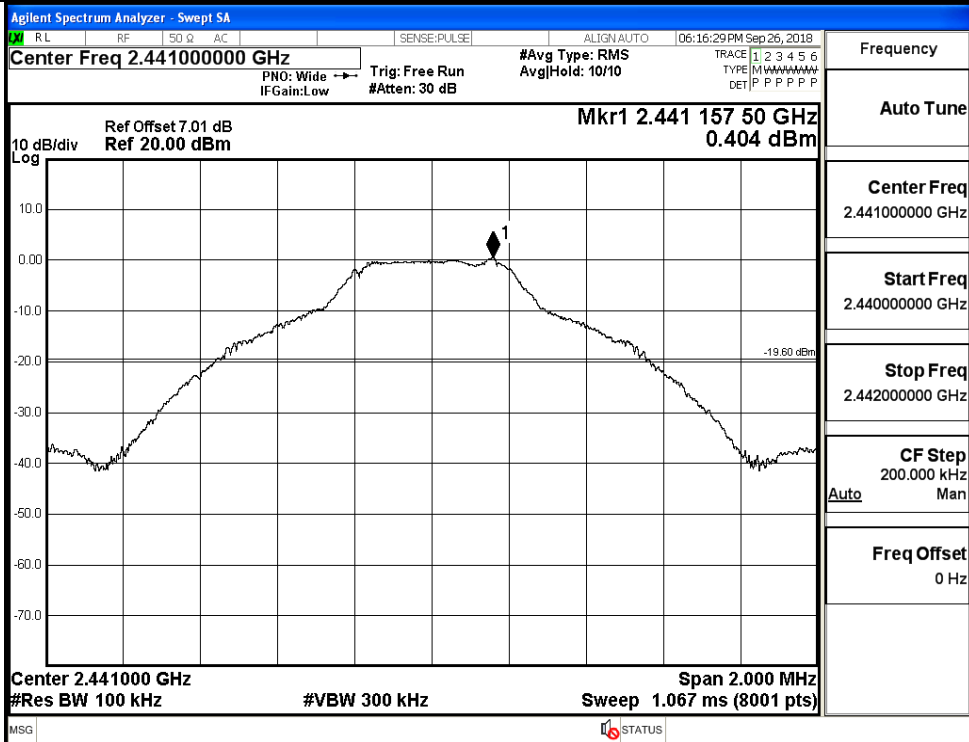


Puw

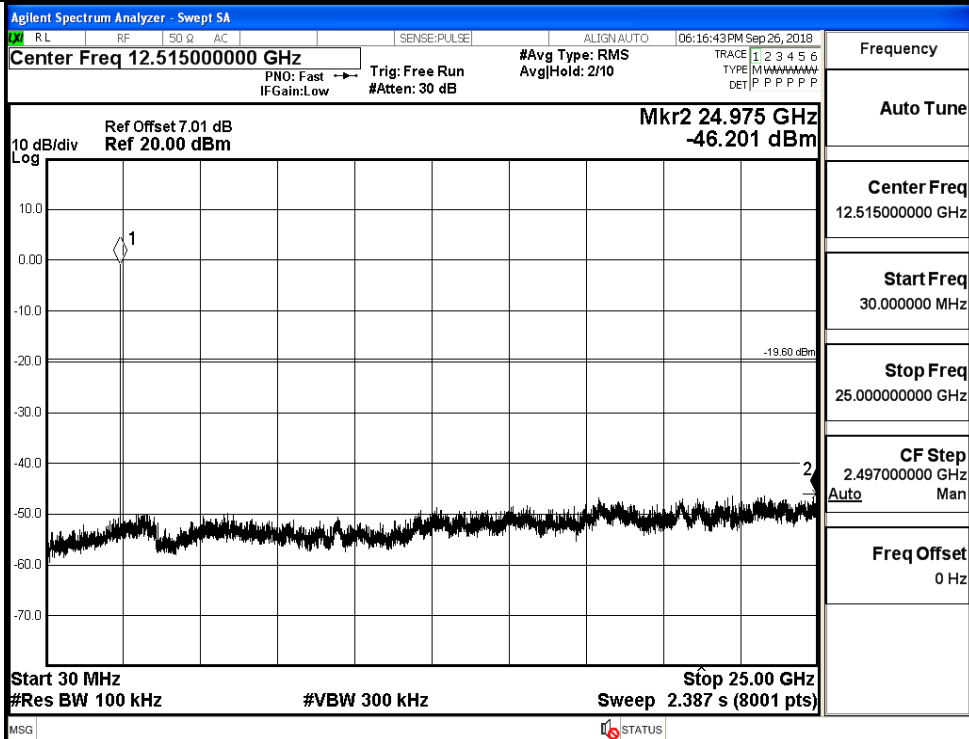


GFSK\_MCH\_Graphs

Pref

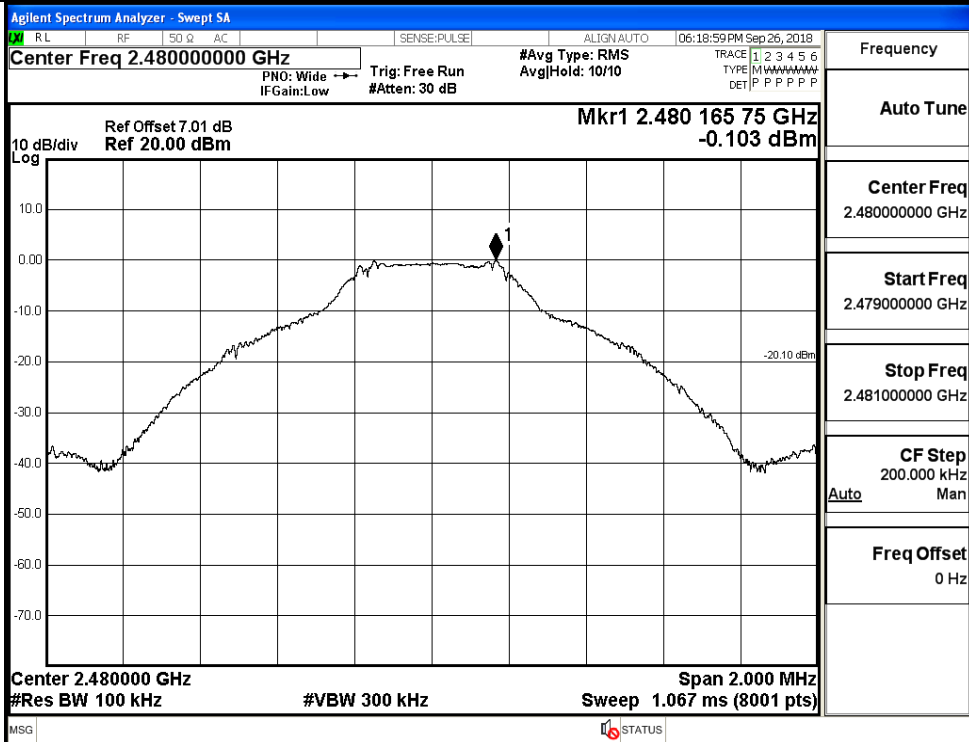


Puw

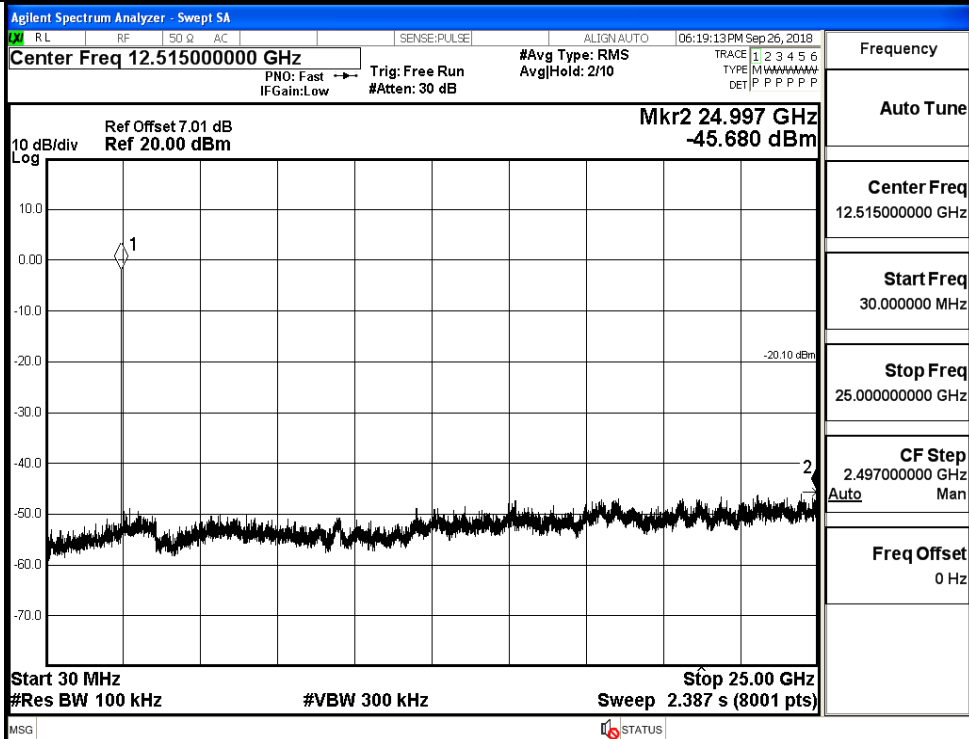


GFSK\_HCH\_Graphs

Pref

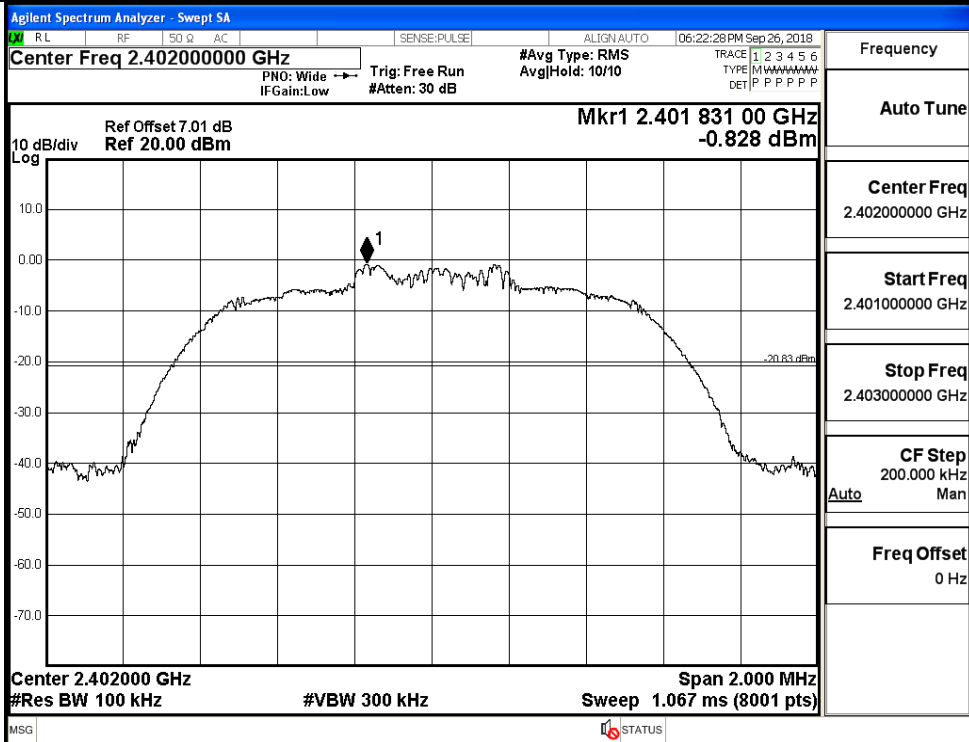


Puw

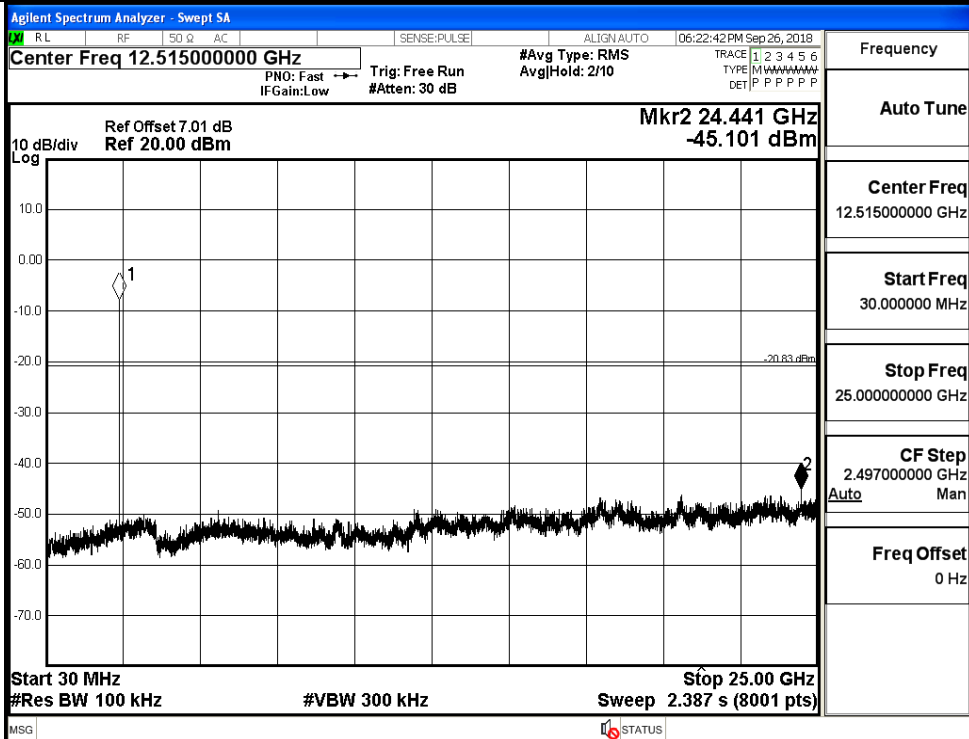


$\pi/4$ DQPSK LCH Graphs

Pref

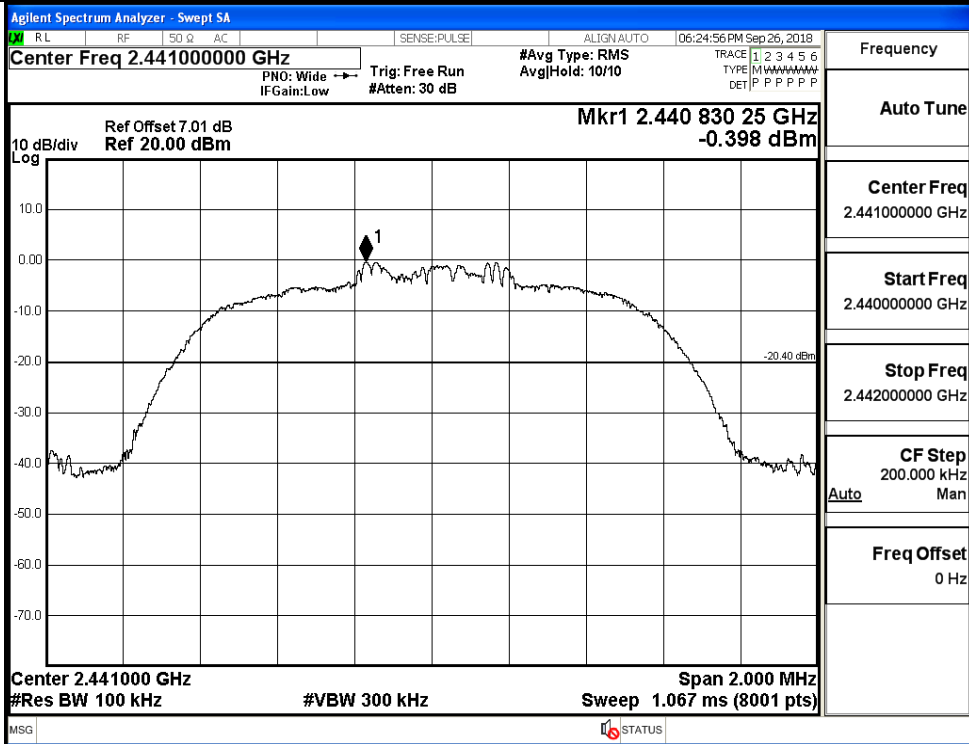


Puw

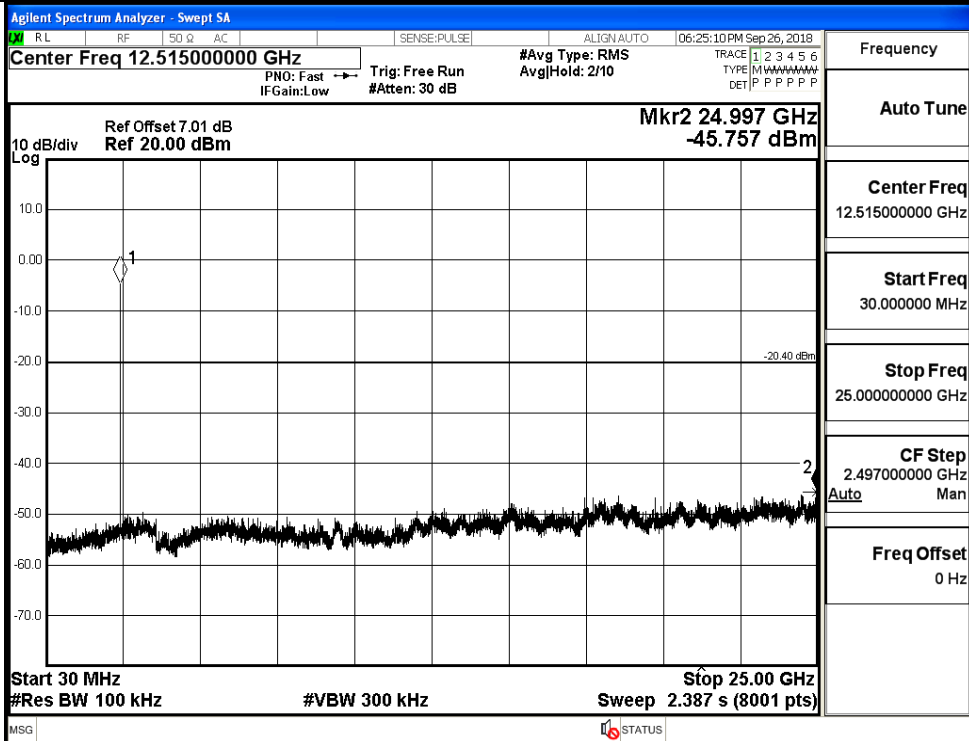


$\pi$ /4DQPSK MCH Graphs

Pref

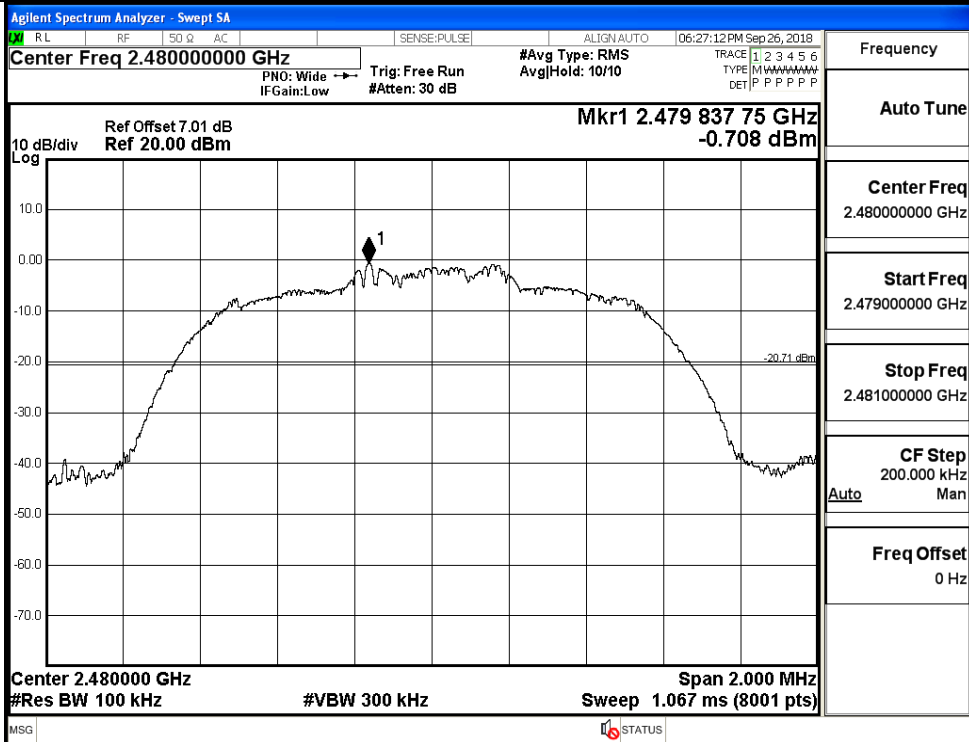


Puw

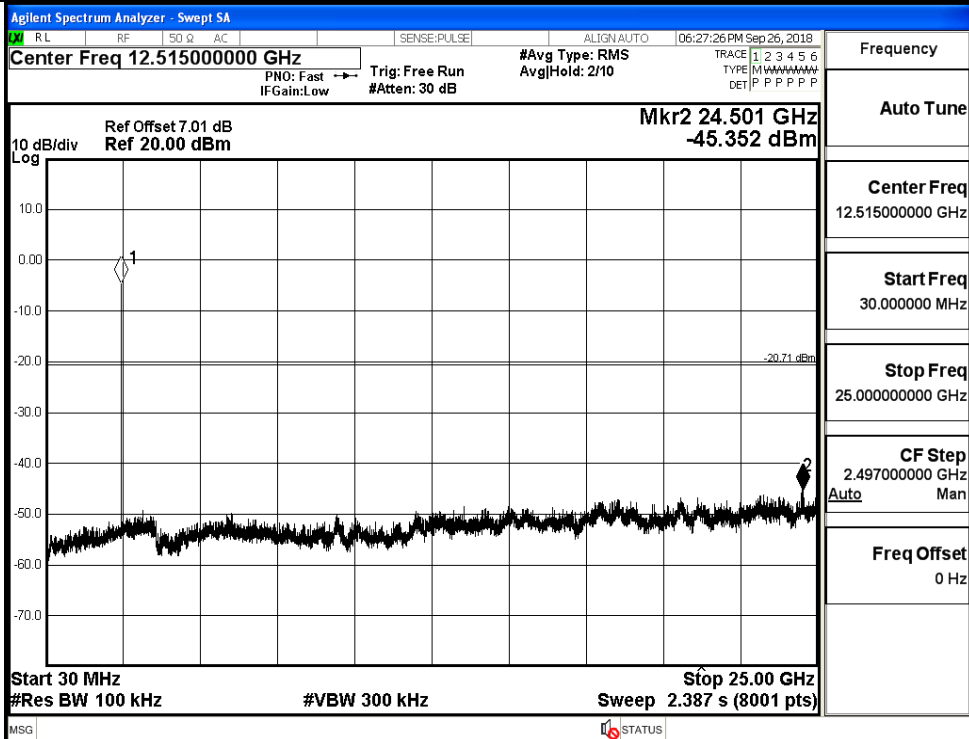


$\pi/4$ DQPSK HCH Graphs

Pref

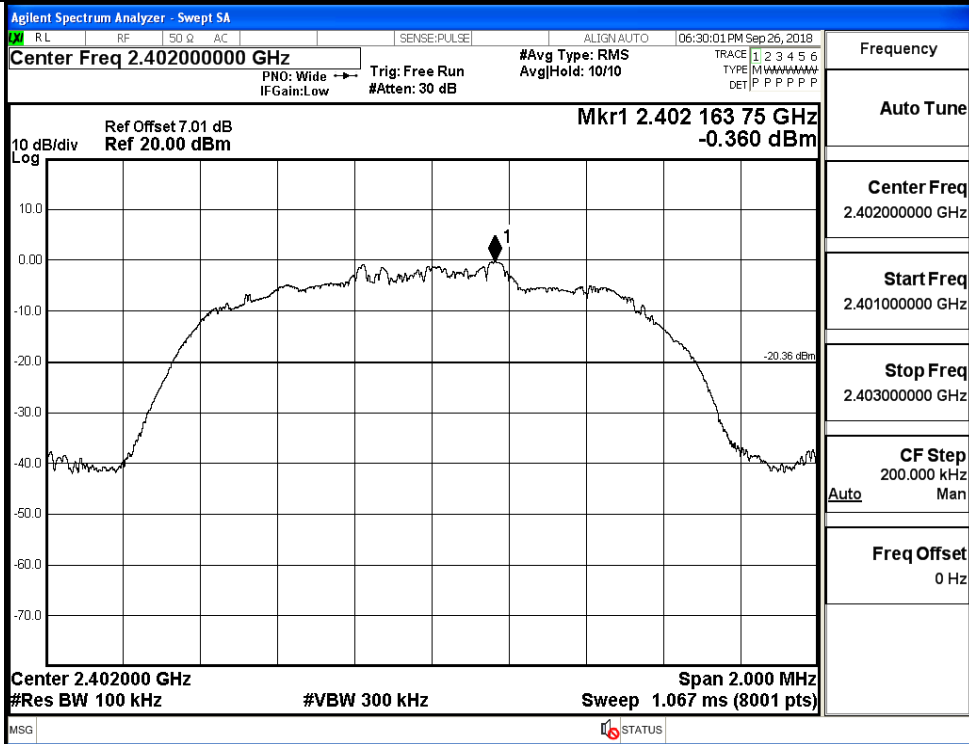


Puw

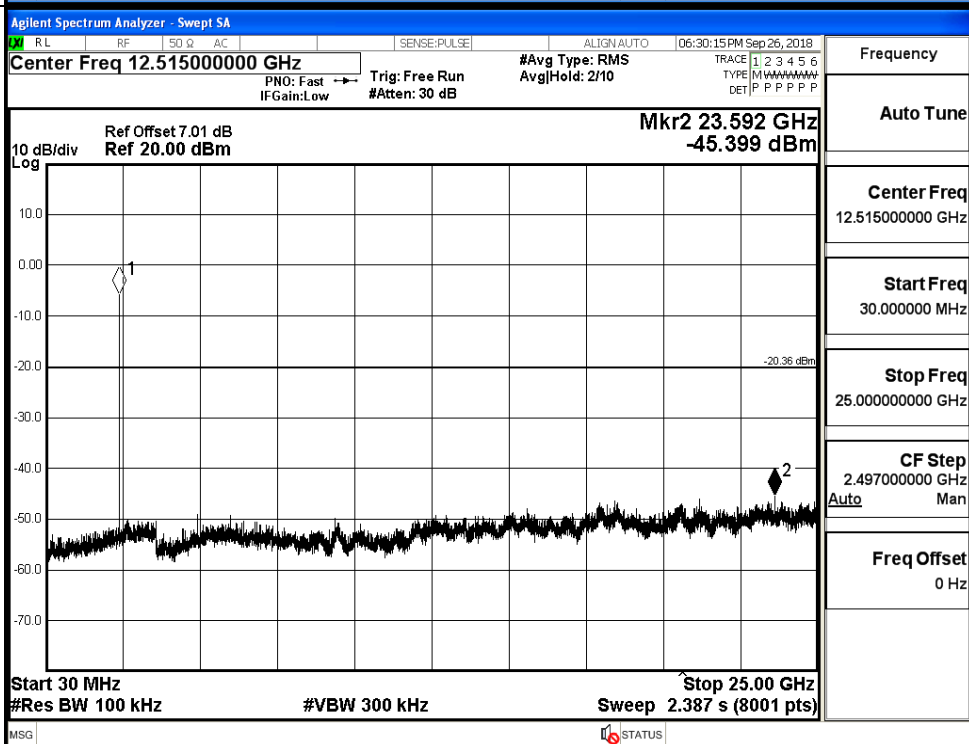


8DPSK\_LCH\_Graphs

Pref

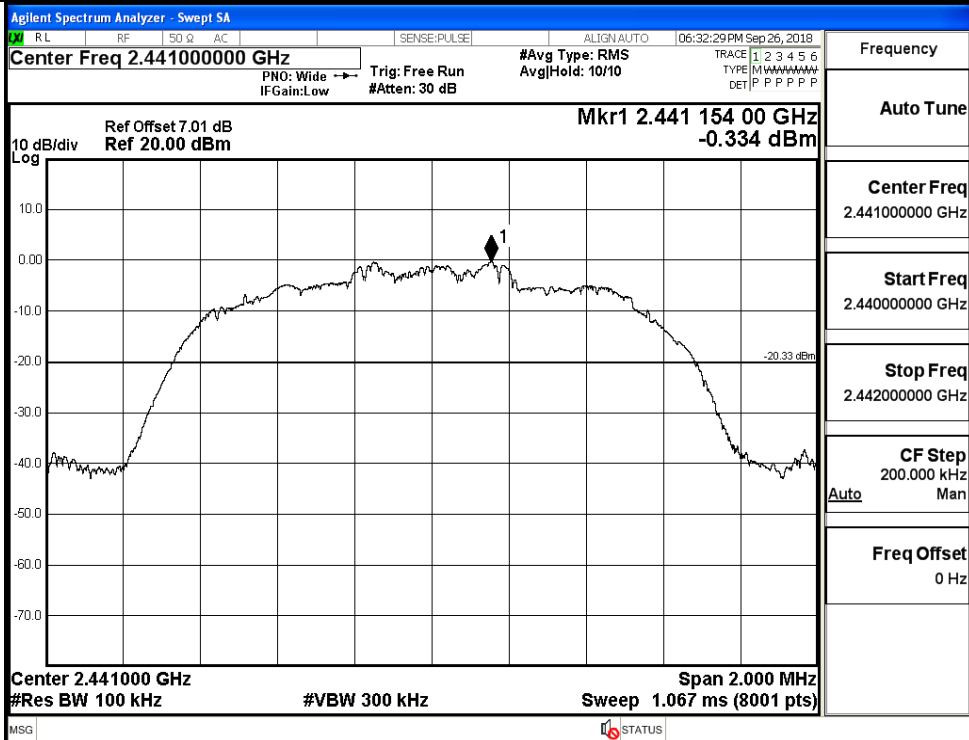


Puw

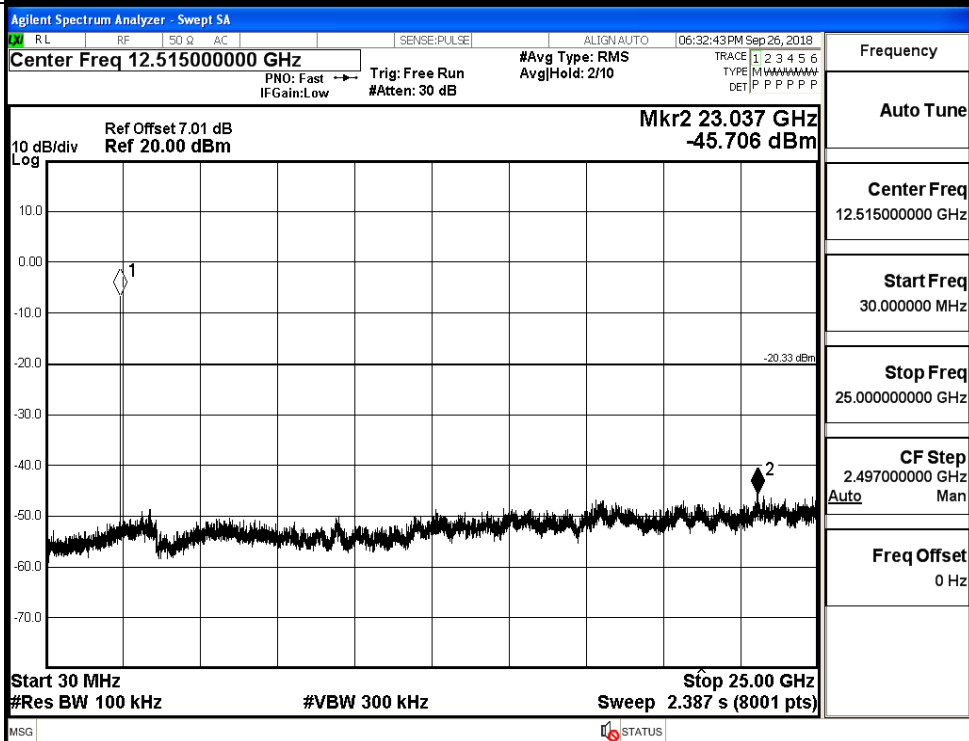


8DPSK\_MCH\_Graphs

Pref



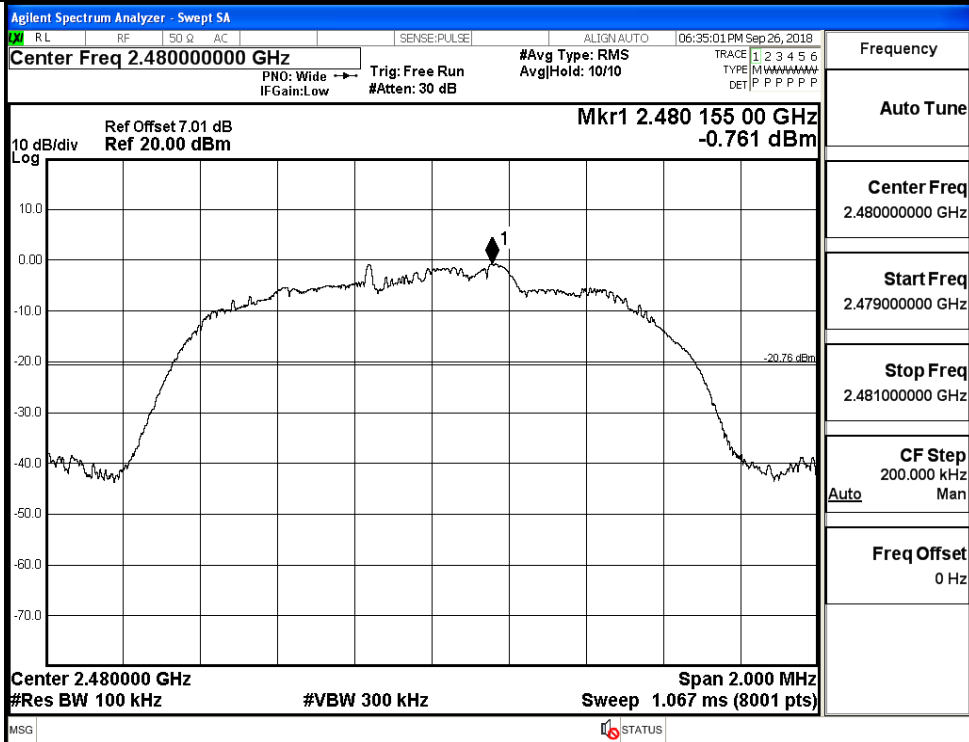
Puw



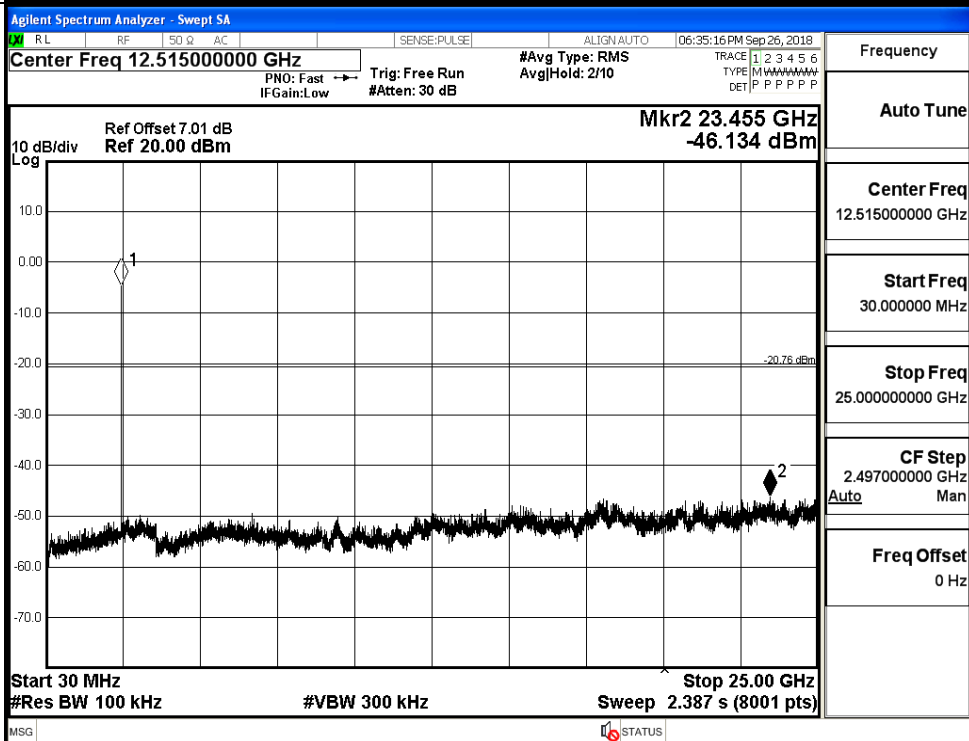


8DPSK\_HCH\_Graphs

Pref



Puw

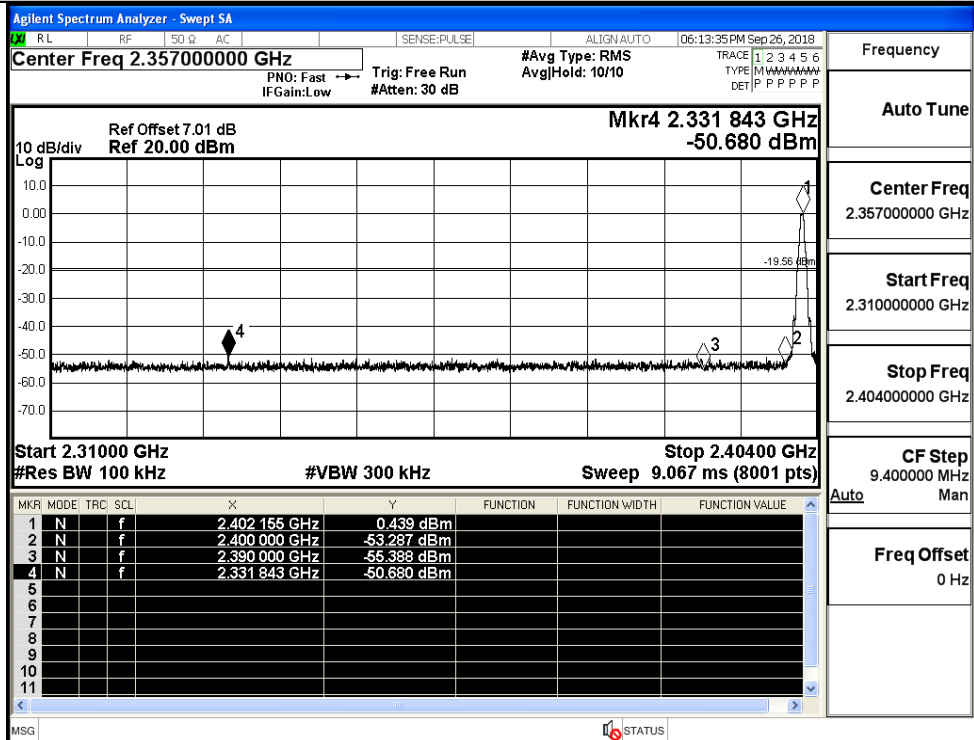


## A.7 Band-edge for RF Conducted Emissions

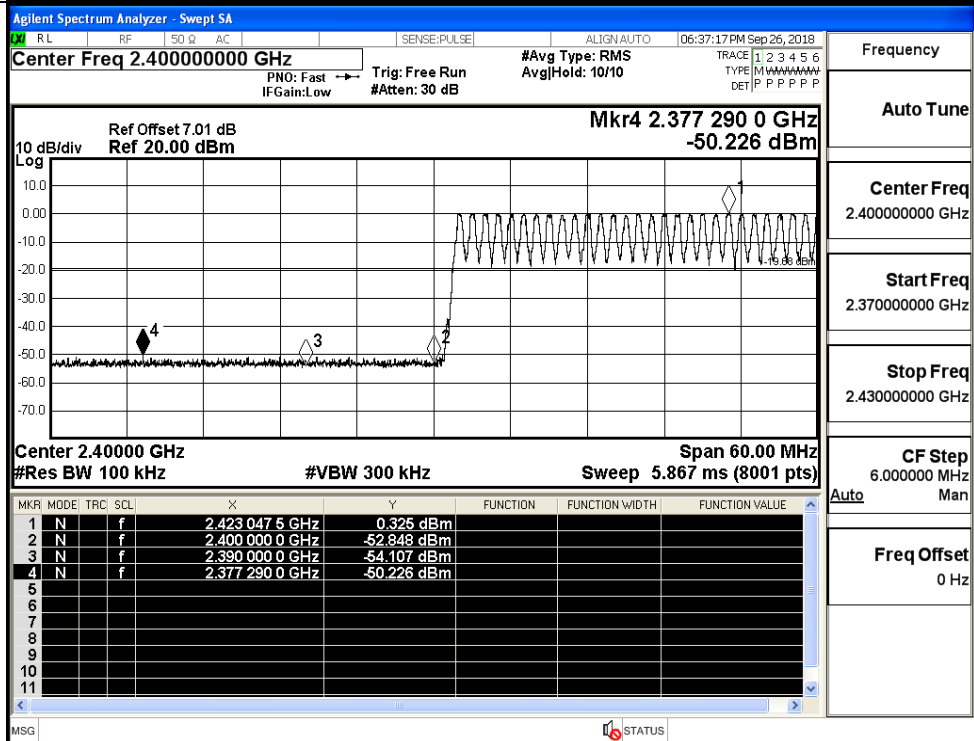
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.439	Off	-50.680	-19.56	PASS
			0.325	On	-50.226	-19.68	PASS
	HCH	2480	-0.031	Off	-51.082	-20.03	PASS
			0.414	On	-50.259	-19.59	PASS
$\pi/4$ DQPSK	LCH	2402	-0.913	Off	-50.509	-20.91	PASS
			-0.394	On	-49.731	-20.39	PASS
	HCH	2480	-0.757	Off	-50.512	-20.76	PASS
			-0.562	On	-50.692	-20.56	PASS
8DPSK	LCH	2402	-0.704	Off	-51.213	-20.7	PASS
			-0.409	On	-49.891	-20.41	PASS
	HCH	2480	-0.610	Off	-50.281	-20.61	PASS
			-0.587	On	-49.866	-20.59	PASS

Test Graphs

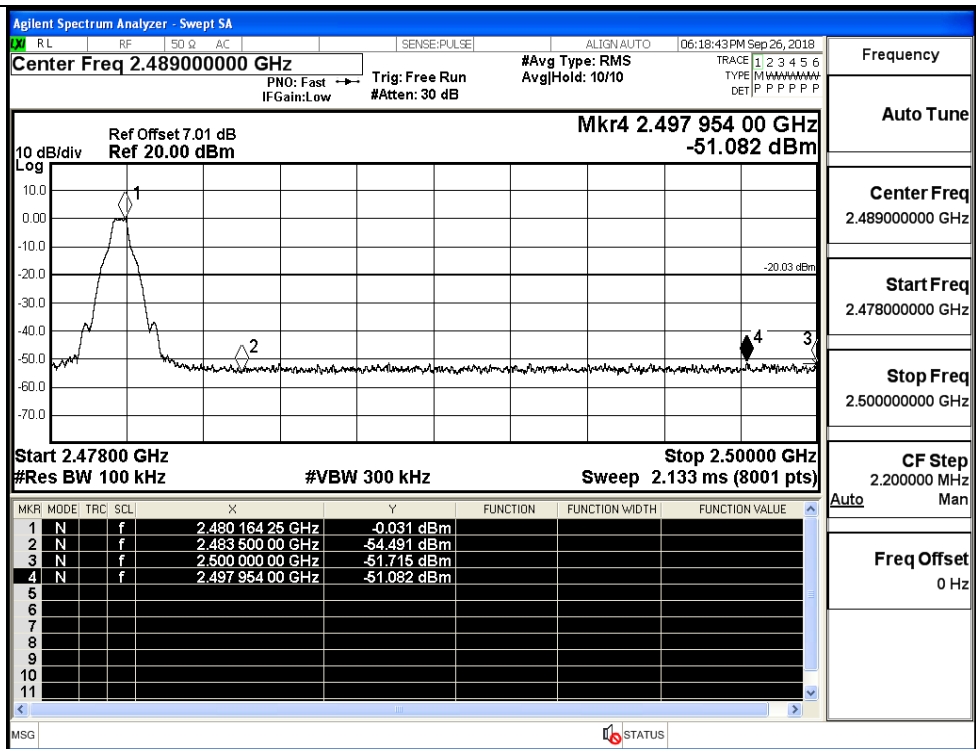
GFSK/LCH/No Hop



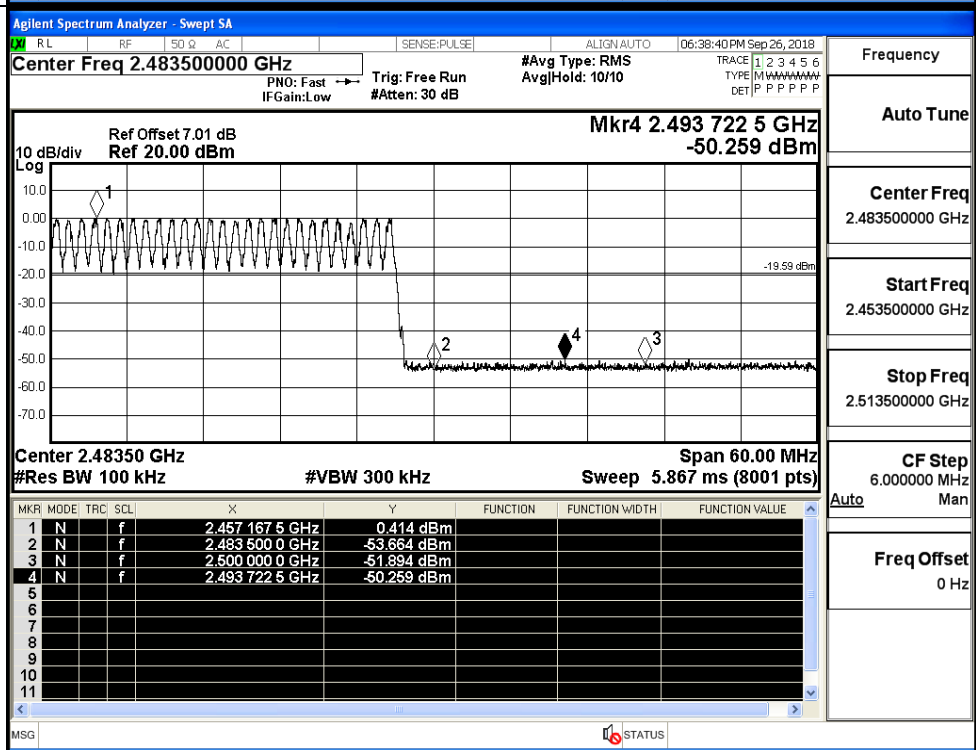
GFSK/LCH/Hop



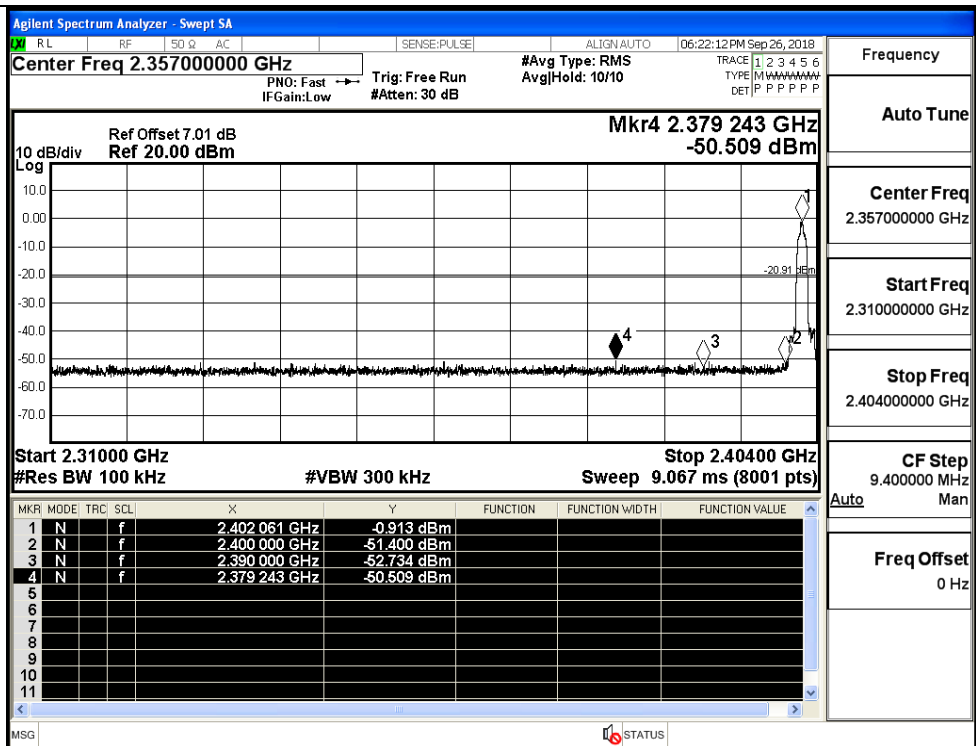
GFSK/HCH/No Hop



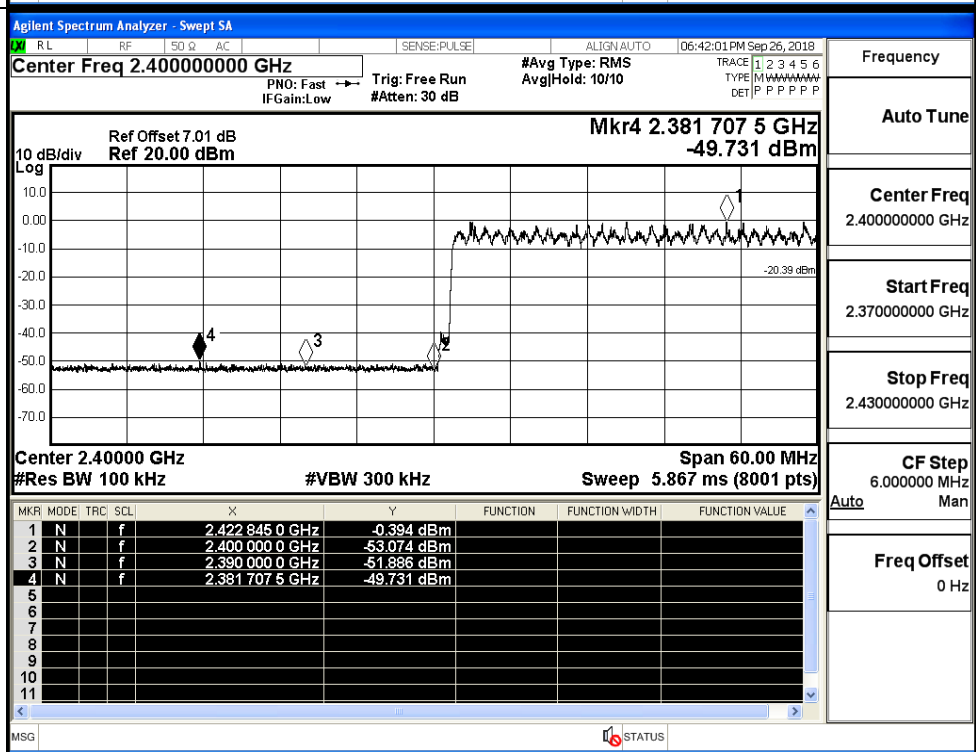
GFSK/HCH/Hop



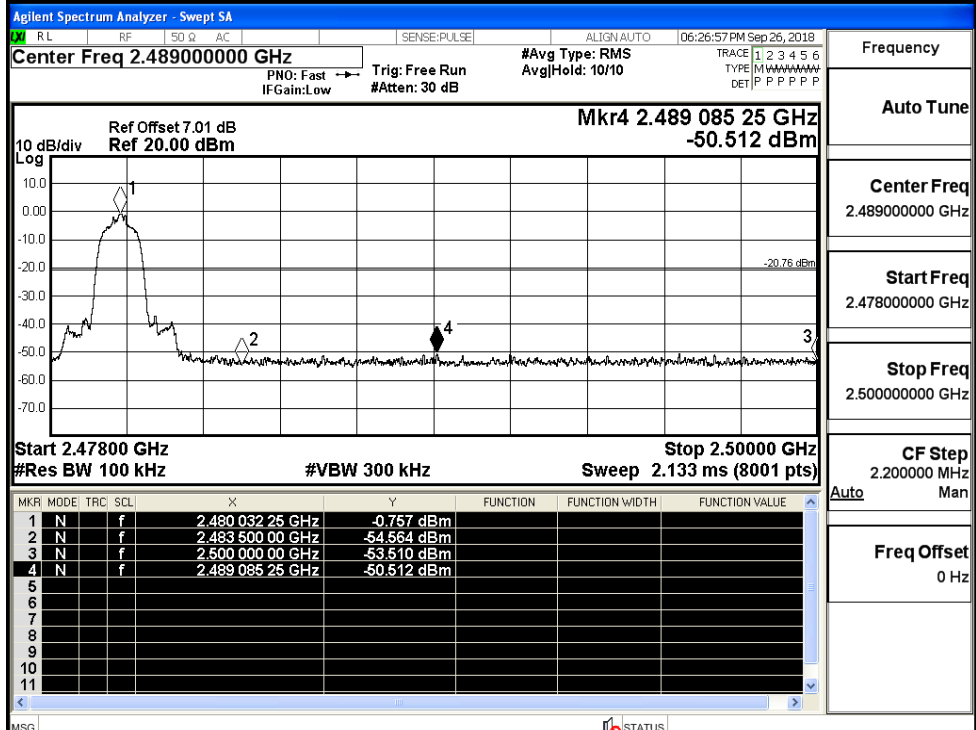
$\pi/4$ DQPSK/LCH/No  
Hop



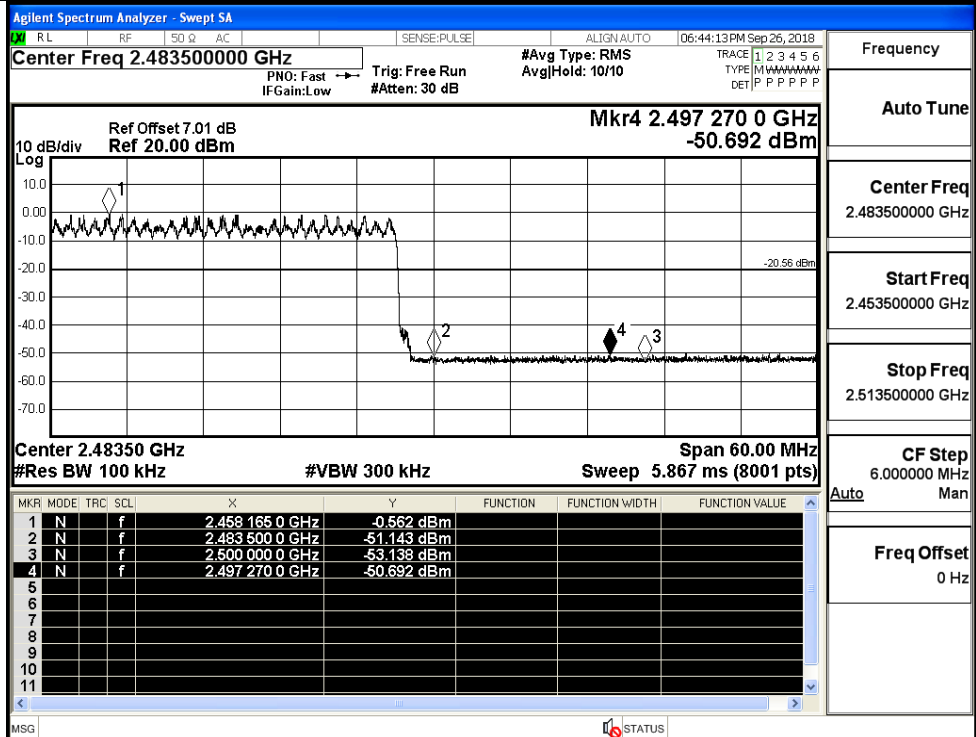
$\pi/4$ DQPSK/LCH/Hop



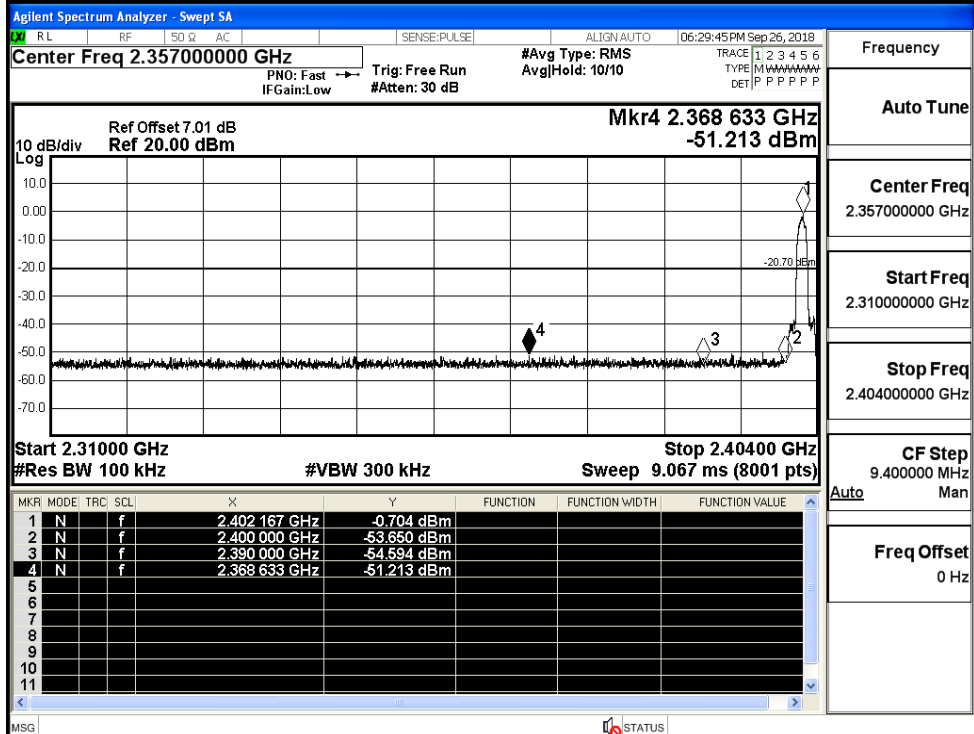
$\pi/4$ DQPSK/HCH/No  
Hop



$\pi/4$ DQPSK/HCH/Hop

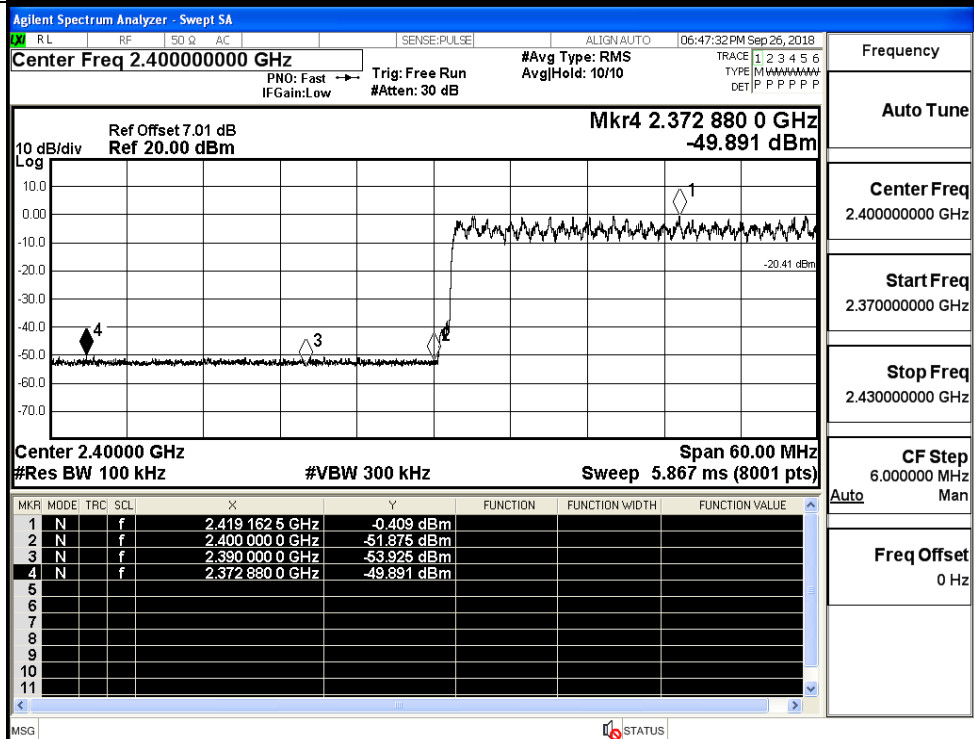


8DPSK/LCH/No Hop



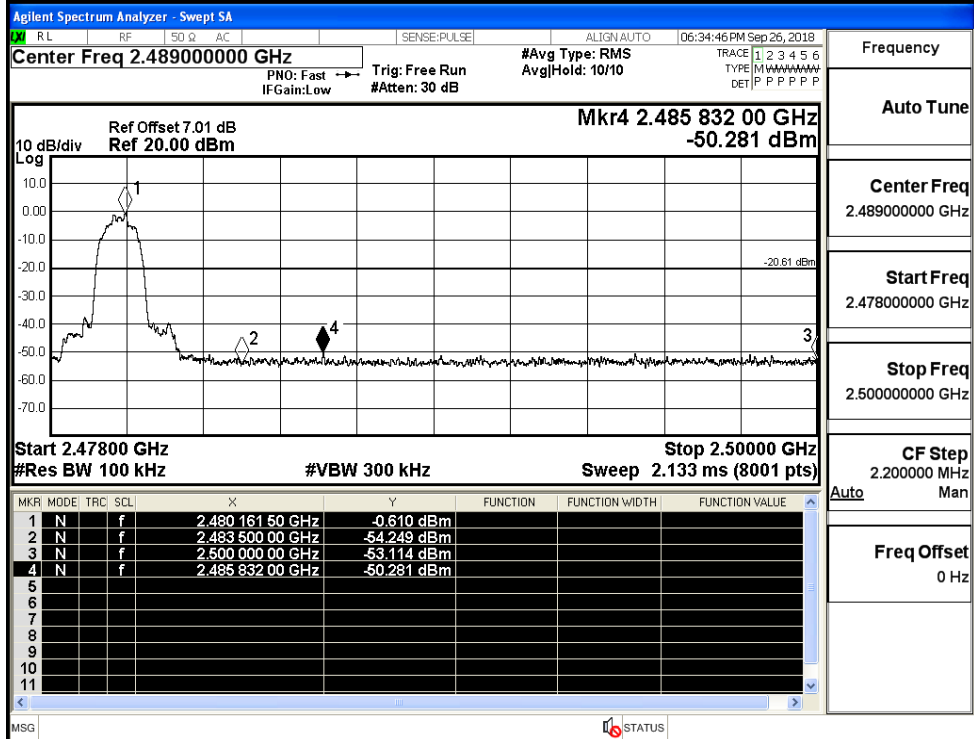
Frequency	
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK/LCH/Hop



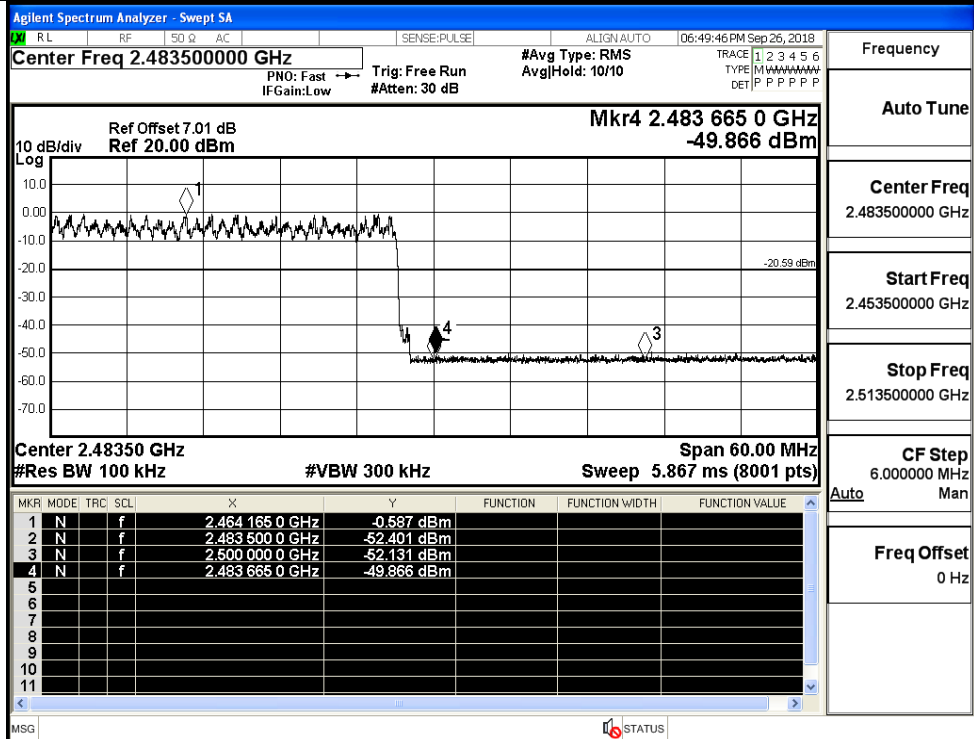
Frequency	
Auto Tune	
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

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
Auto	Man
Freq Offset	0 Hz

8DPSK/HCH/Hop



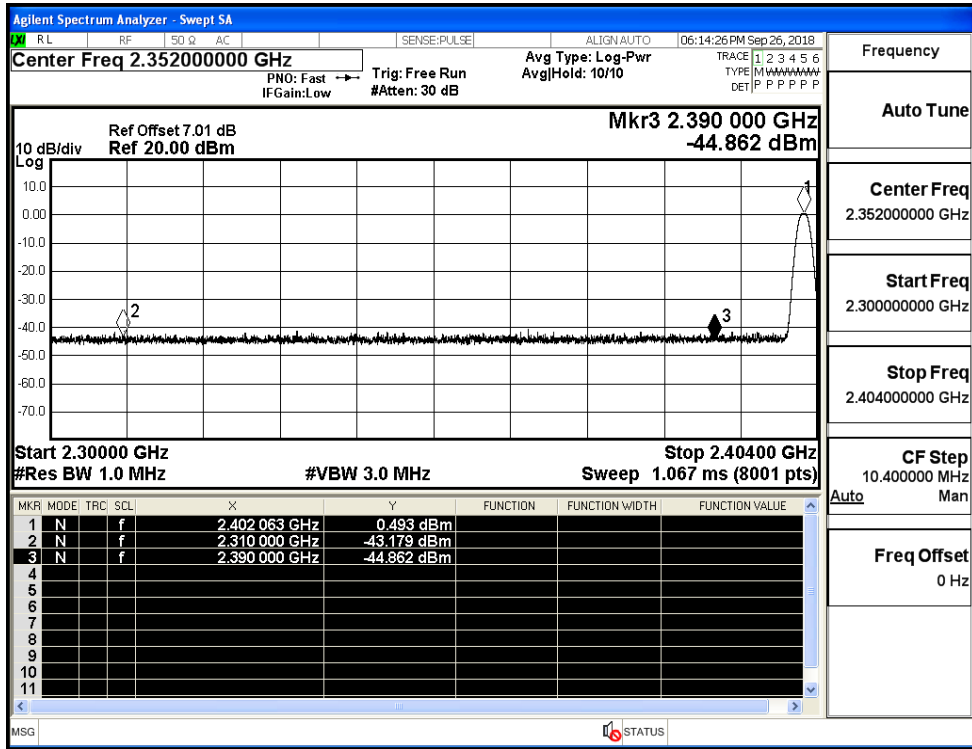
Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz



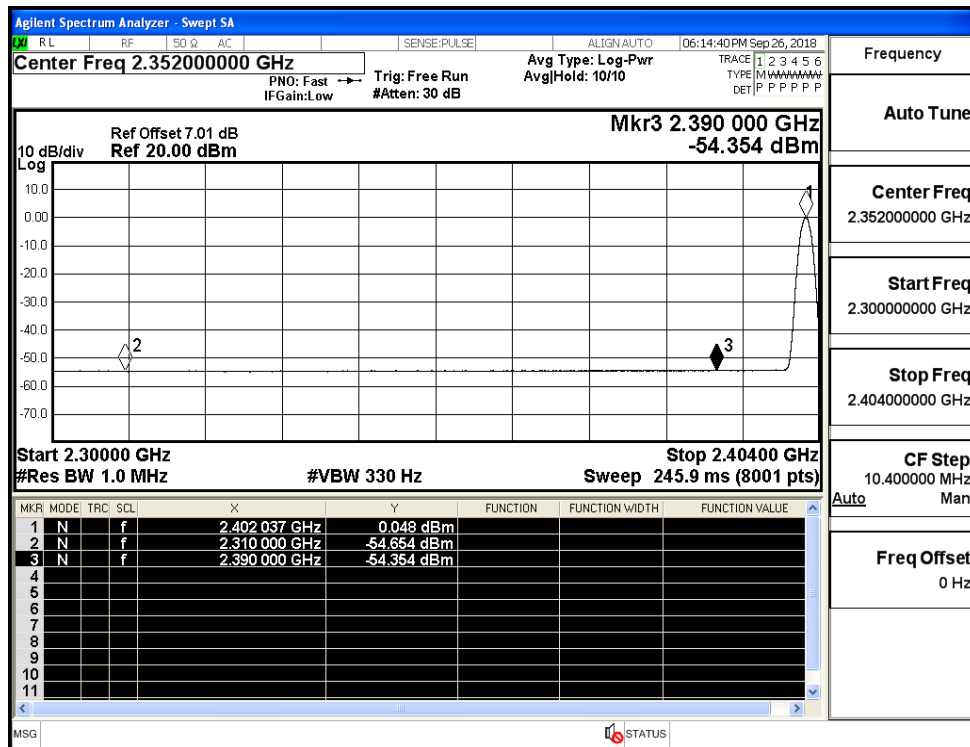
## A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.18	2.0	0	54.08	PEAK	74	PASS
	Off	2310.0	-54.65	2.0	0	42.60	AV	54	PASS
	Off	2390.0	-44.86	2.0	0	52.40	PEAK	74	PASS
	Off	2390.0	-54.35	2.0	0	42.90	AV	54	PASS
	Off	2483.5	-44.67	2.0	0	52.59	PEAK	74	PASS
	Off	2483.5	-54.05	2.0	0	43.21	AV	54	PASS
	Off	2500.0	-43.54	2.0	0	53.72	PEAK	74	PASS
	Off	2500.0	-53.98	2.0	0	43.28	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.11	2.0	0	54.15	PEAK	74	PASS
	Off	2310.0	-54.76	2.0	0	42.50	AV	54	PASS
	Off	2390.0	-44.28	2.0	0	52.97	PEAK	74	PASS
	Off	2390.0	-54.48	2.0	0	42.78	AV	54	PASS
	Off	2483.5	-44.07	2.0	0	53.18	PEAK	74	PASS
	Off	2483.5	-54.08	2.0	0	43.18	AV	54	PASS
	Off	2500.0	-43.75	2.0	0	53.51	PEAK	74	PASS
	Off	2500.0	-54.00	2.0	0	43.25	AV	54	PASS
8DPSK	Off	2310.0	-43.22	2.0	0	54.04	PEAK	74	PASS
	Off	2310.0	-54.75	2.0	0	42.50	AV	54	PASS
	Off	2390.0	-43.03	2.0	0	54.23	PEAK	74	PASS
	Off	2390.0	-54.45	2.0	0	42.81	AV	54	PASS
	Off	2483.5	-44.14	2.0	0	53.12	PEAK	74	PASS
	Off	2483.5	-54.17	2.0	0	43.09	AV	54	PASS
	Off	2500.0	-44.37	2.0	0	52.88	PEAK	74	PASS
	Off	2500.0	-53.95	2.0	0	43.30	AV	54	PASS

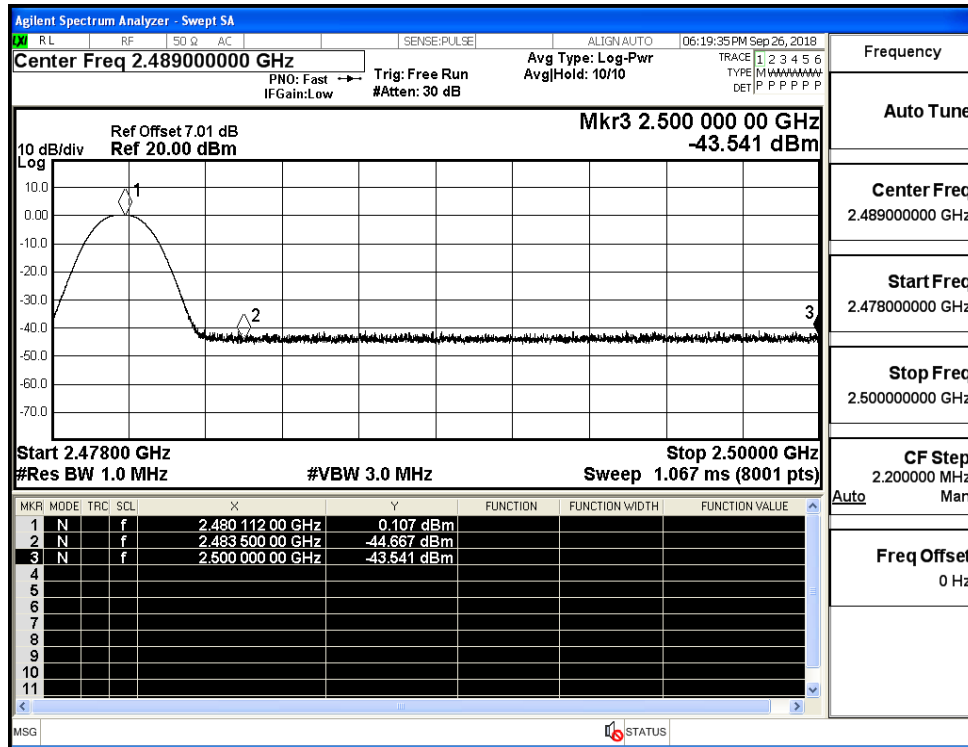
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (Low Channel)



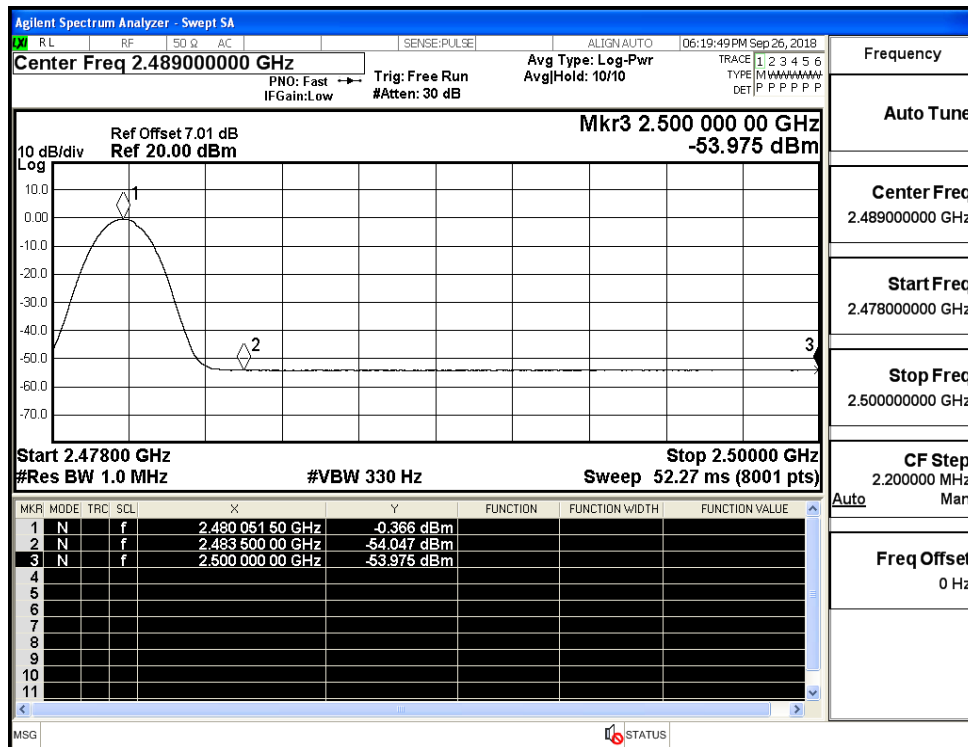
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (Low Channel)



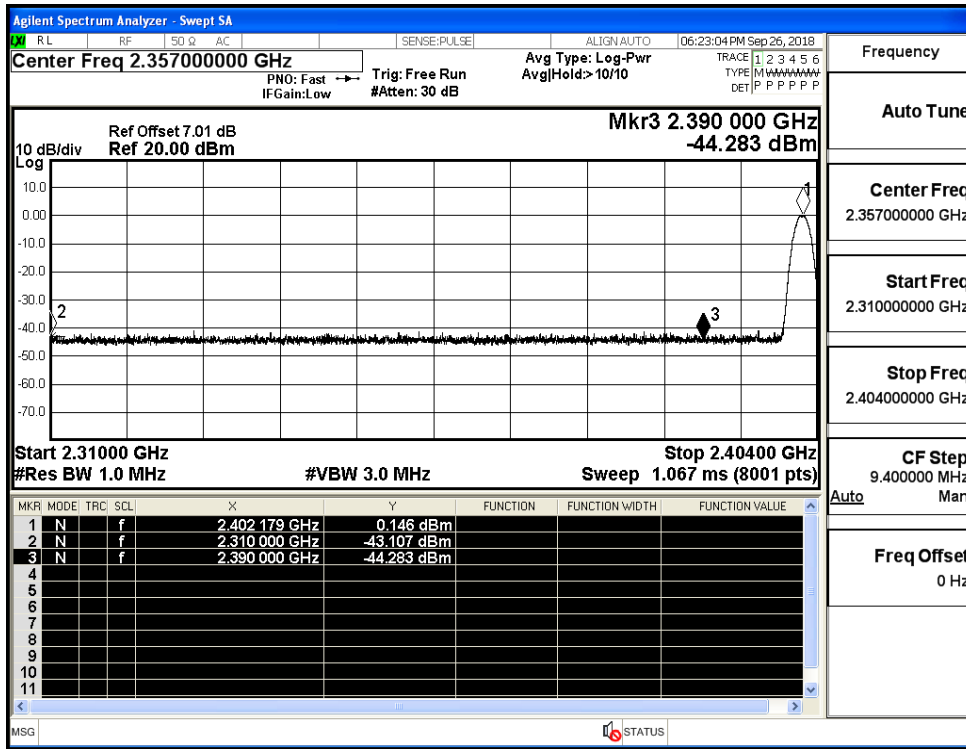
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_PEAK (High Channel)



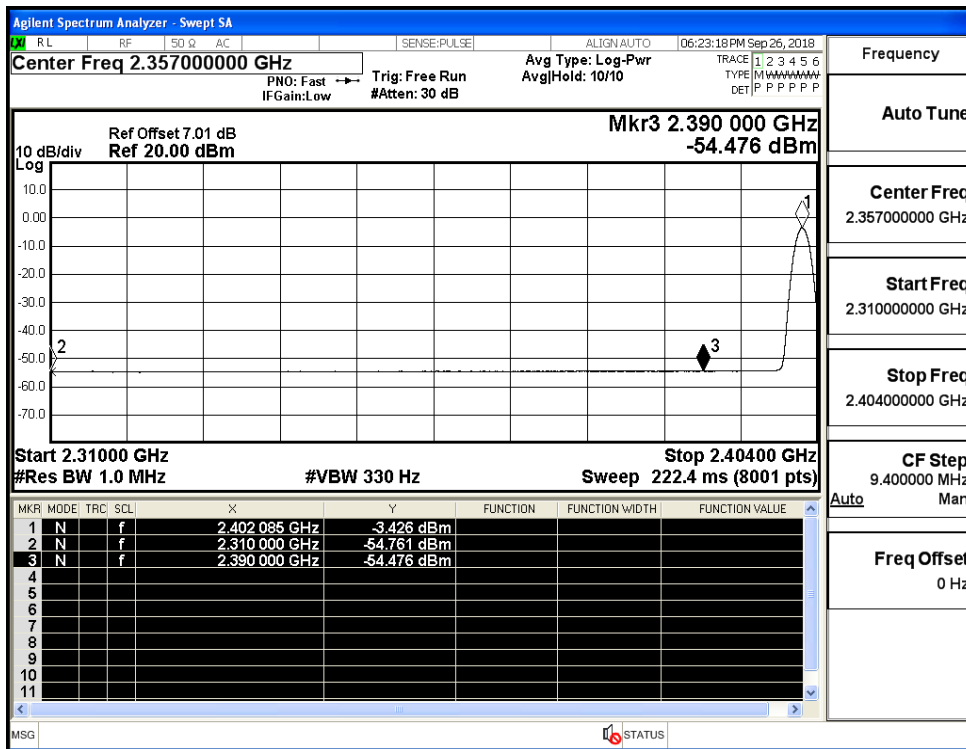
Restrict-band band-edge measurements\_Hopping Off\_GFSK\_Average (High Channel)



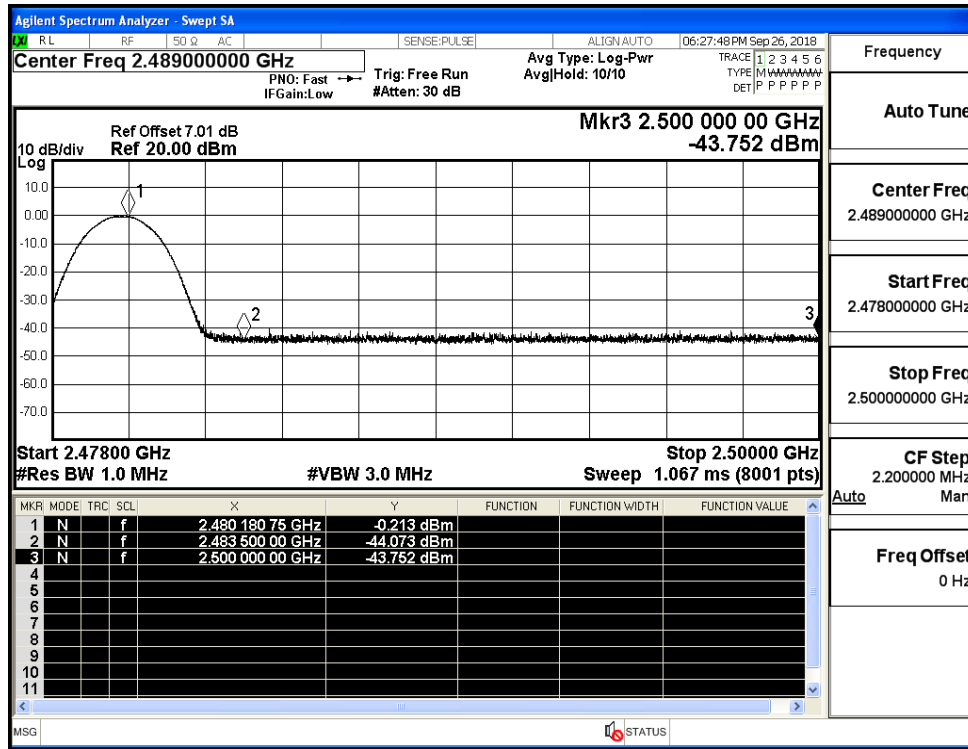
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (Low Channel)



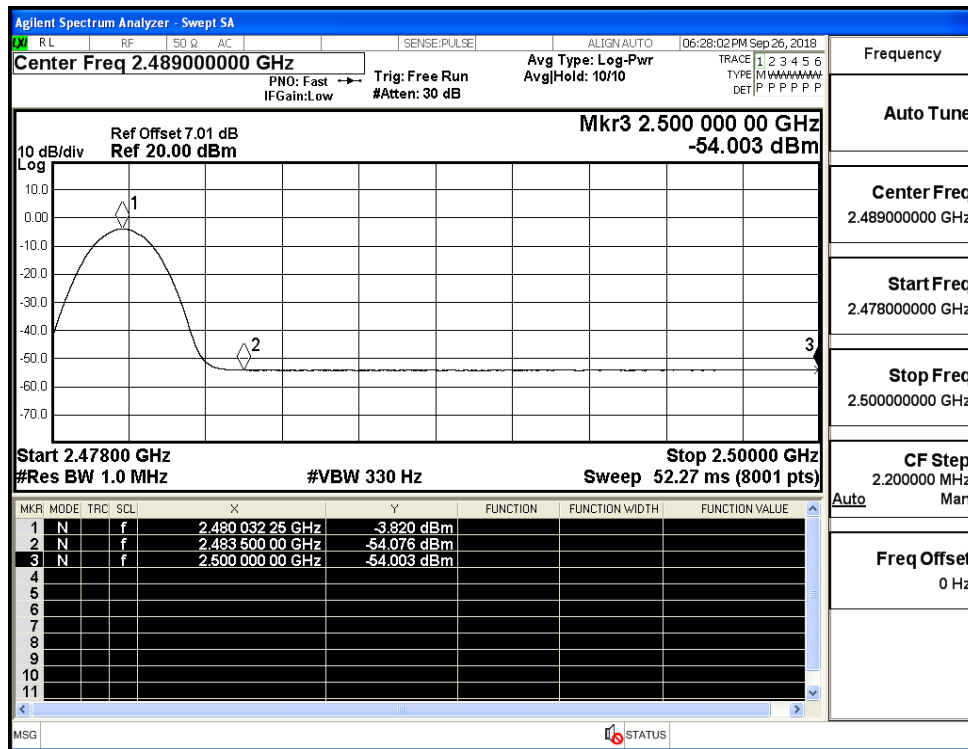
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (Low Channel)



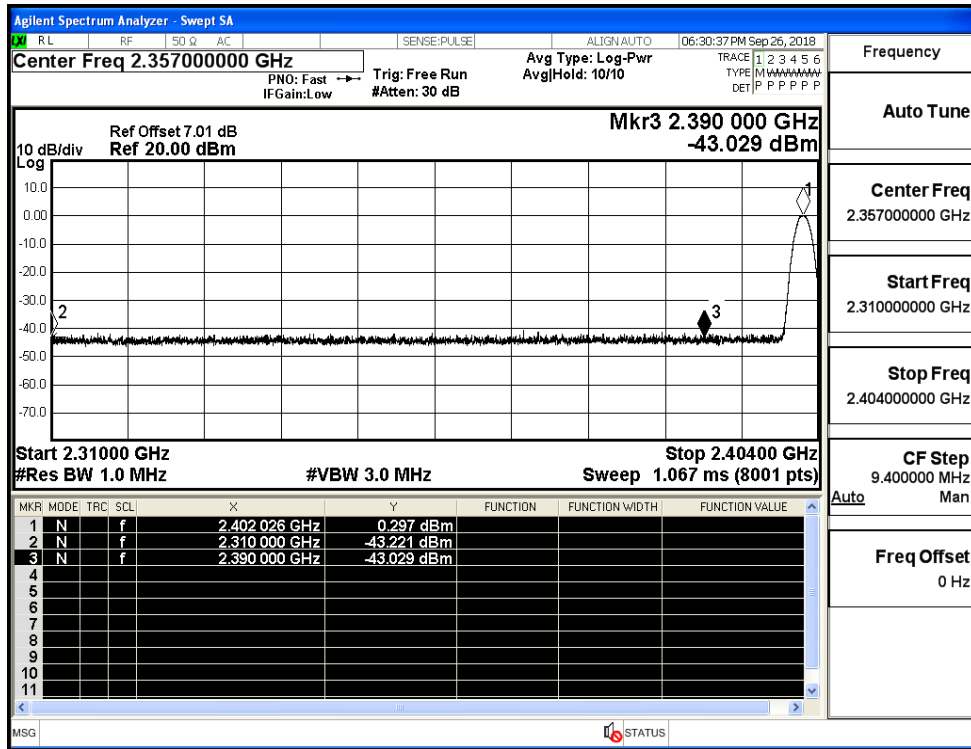
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_PEAK (High Channel)



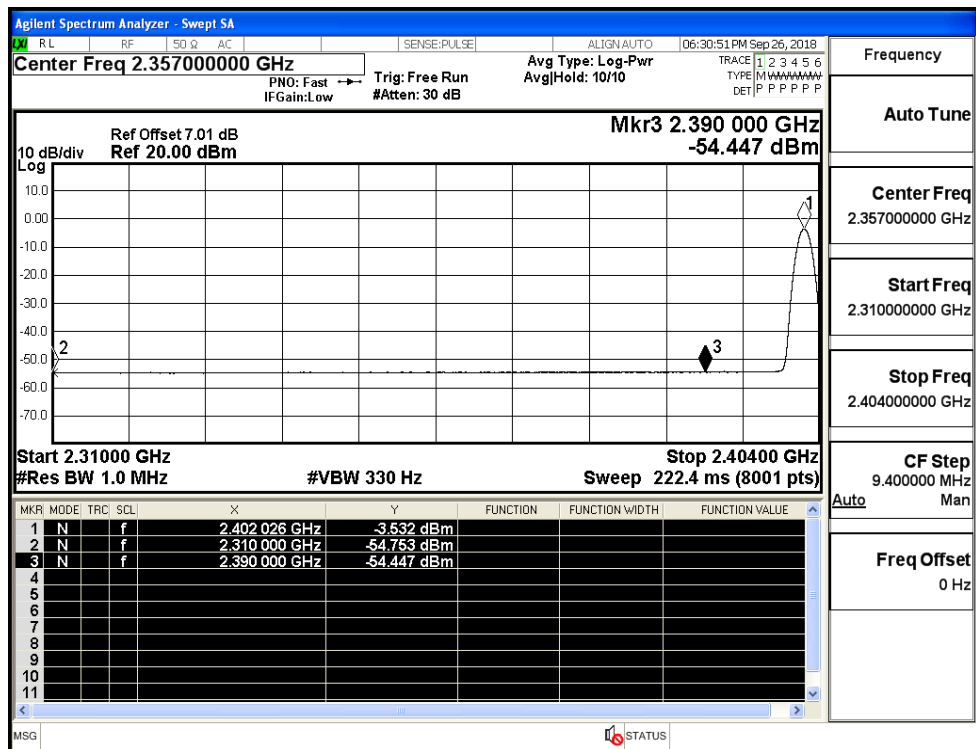
Restrict-band band-edge measurements\_Hopping Off\_π/4-DQPSK\_Average (High Channel)



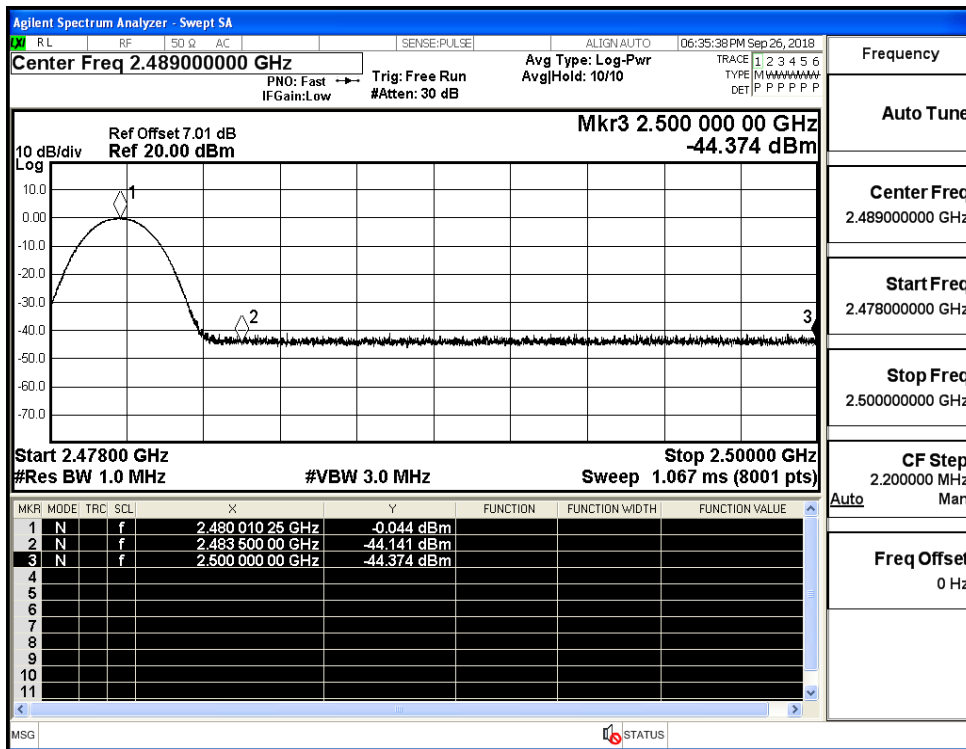
Restrict-band band-edge measurements\_Hopping Off\_8DPSK\_PEAK (Low Channel)



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)

