

Appendix A

RF Test Data for BT V4.0 (BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth Speaker

Trade Mark: N/A

Test Model: MS-F1

Environmental Conditions

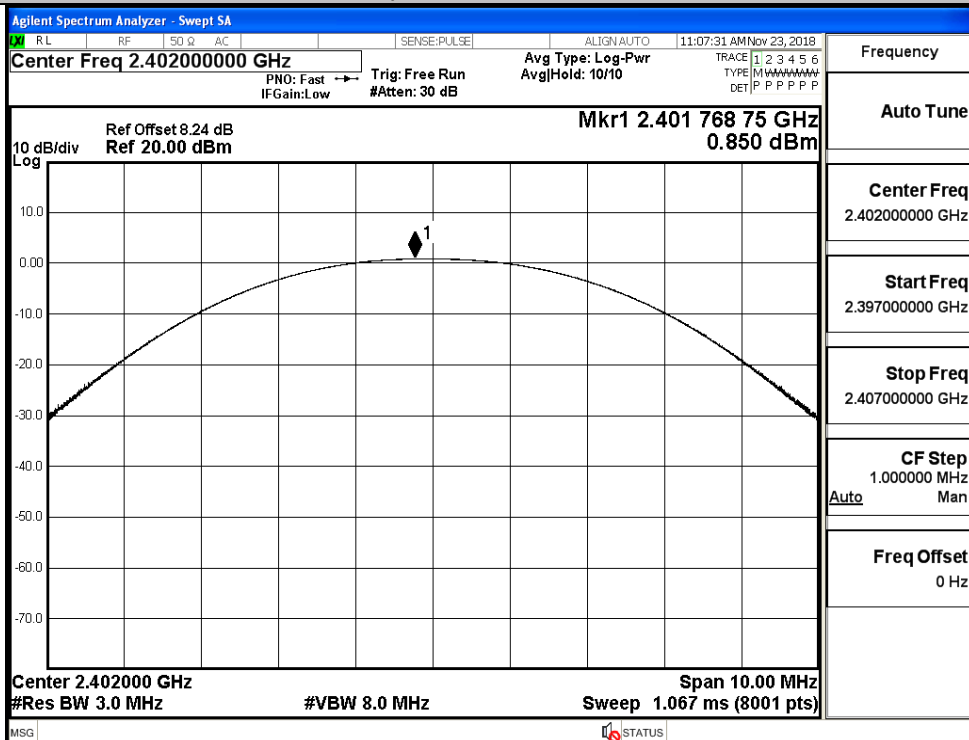
Temperature:	23.4 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

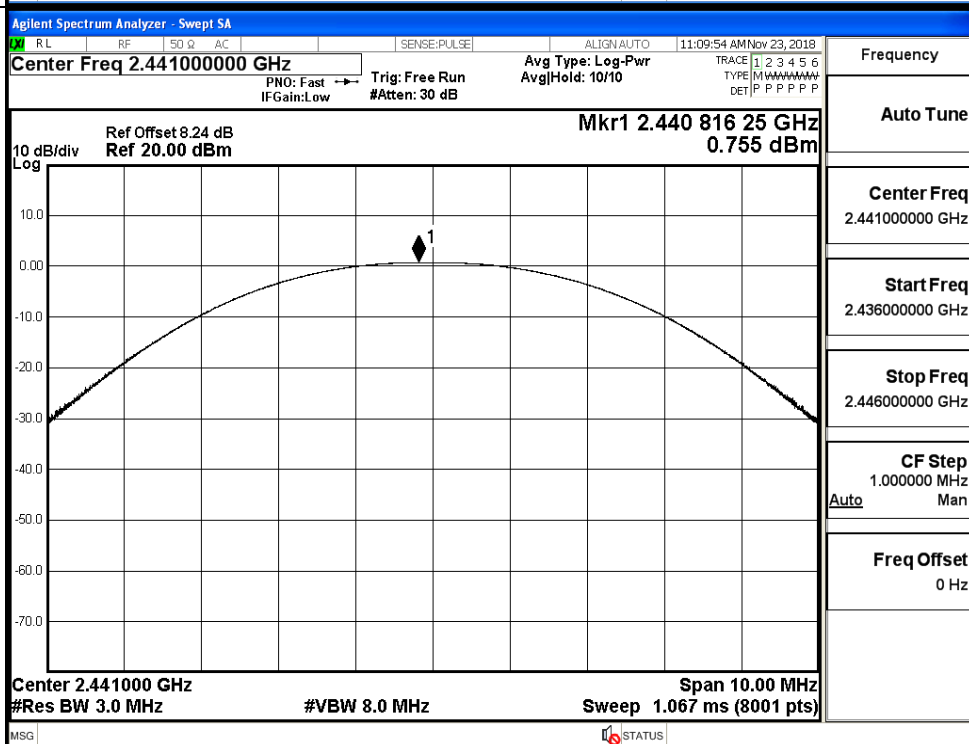
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.850	21	PASS
	MCH	0.755	21	PASS
	HCH	0.307	21	PASS
$\pi/4$ DQPSK	LCH	0.110	21	PASS
	MCH	0.008	21	PASS
	HCH	-0.453	21	PASS
8DPSK	LCH	0.241	21	PASS
	MCH	0.173	21	PASS
	HCH	-0.288	21	PASS

Test Graphs

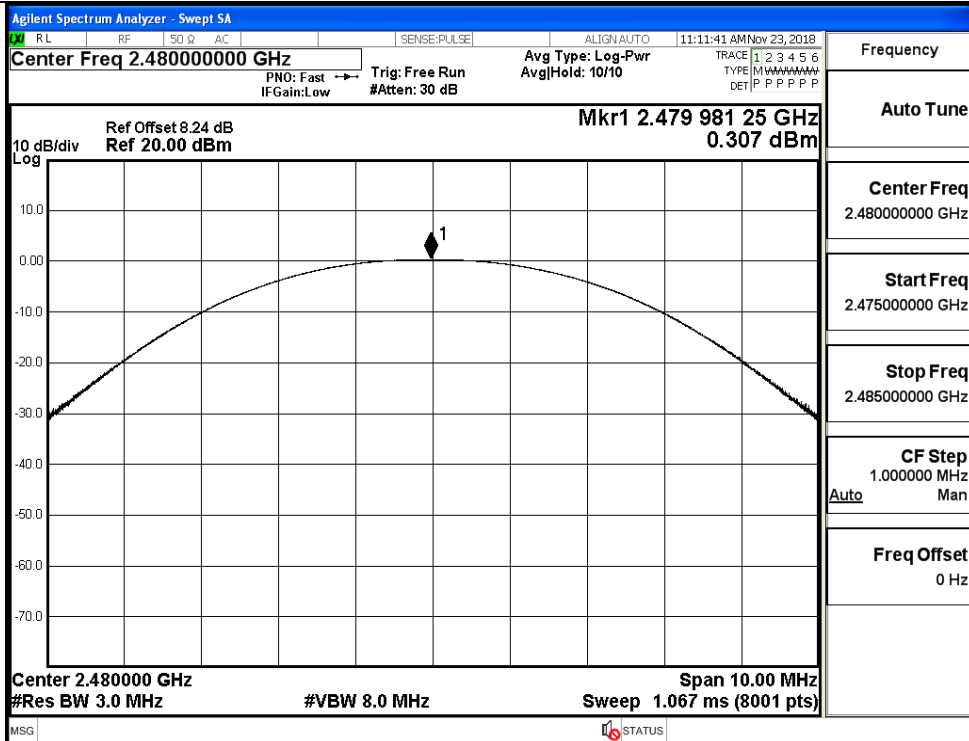
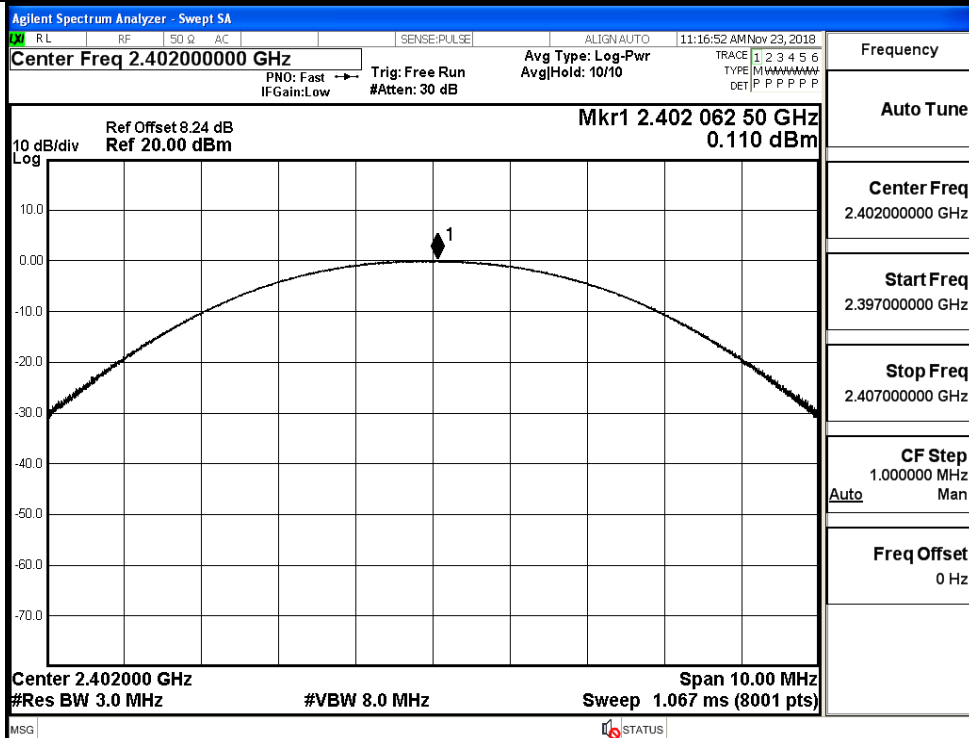
GFSK/LCH

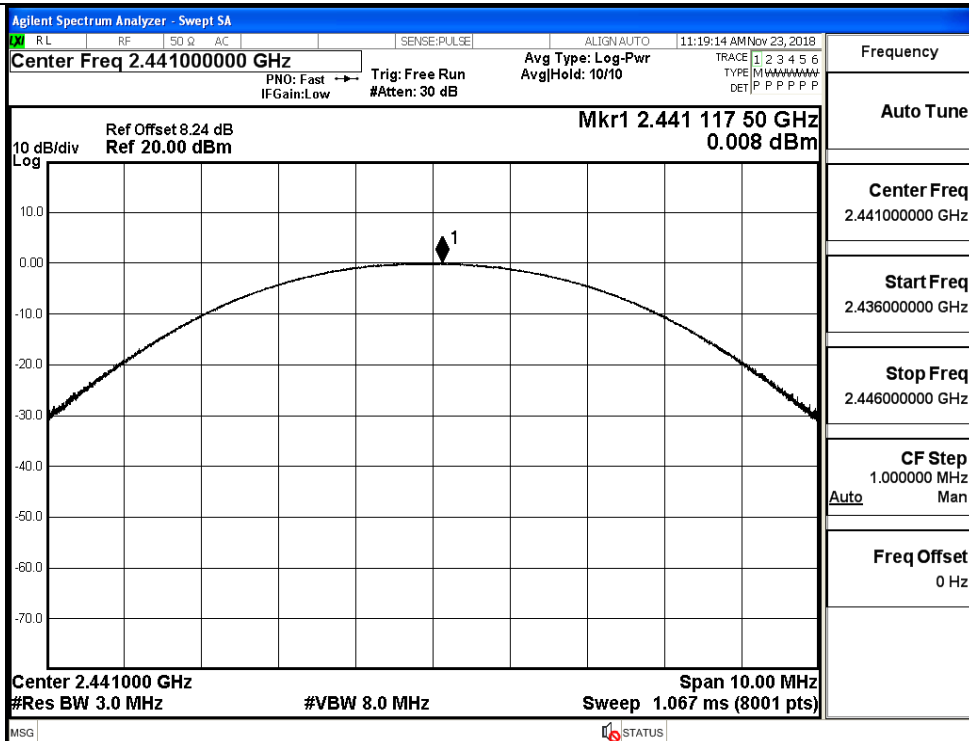
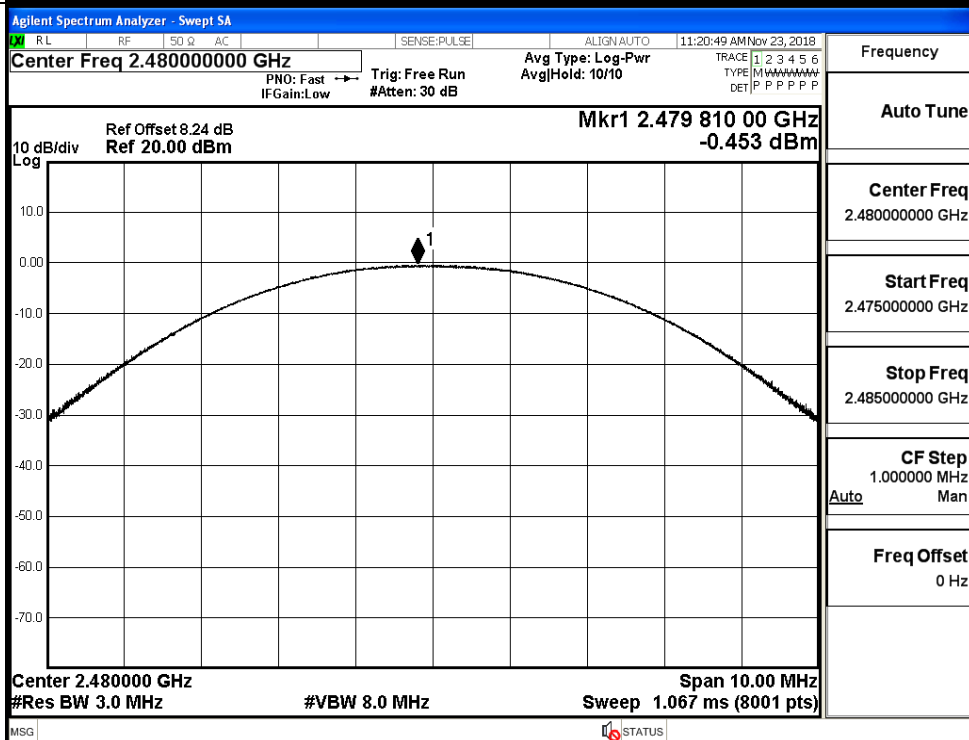


GFSK/MCH

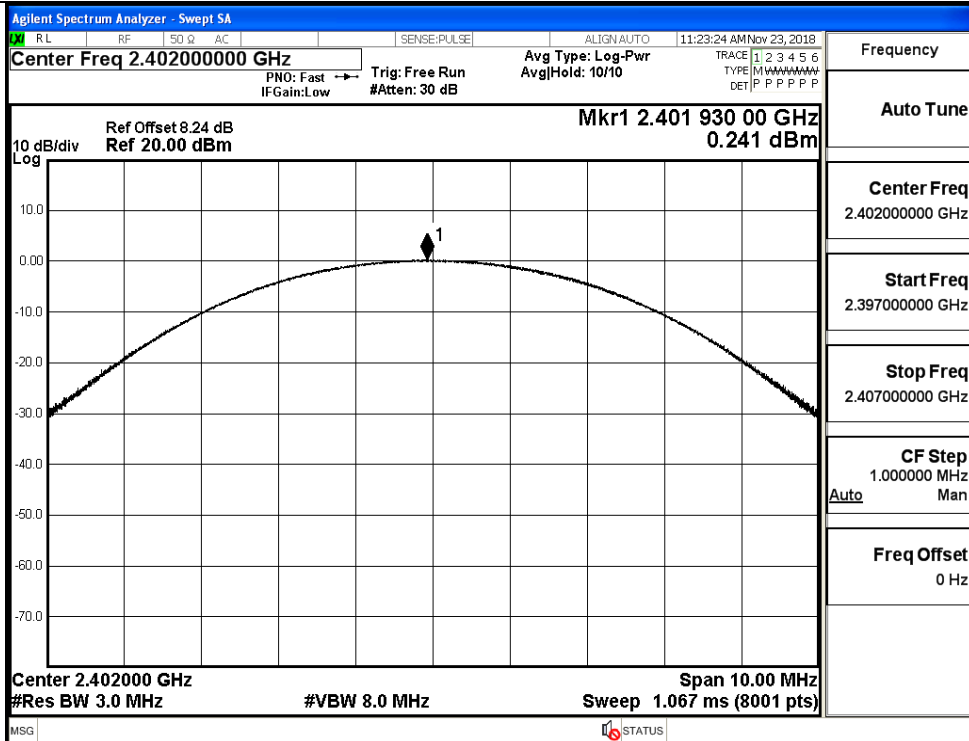


GFSK/HCH

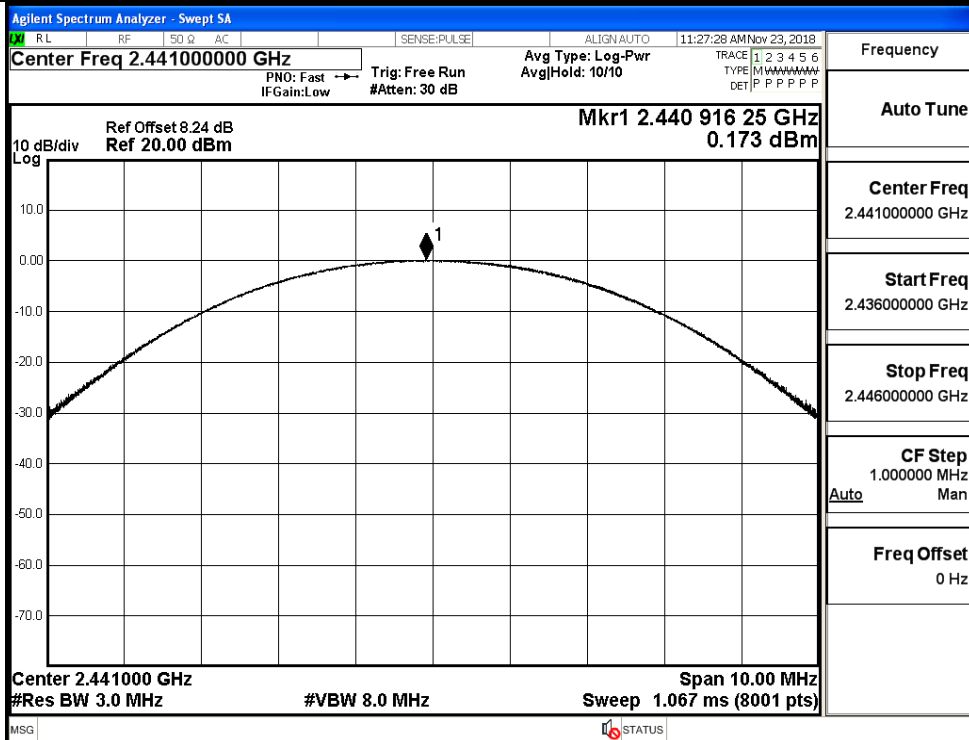
 π /4DQPSK/LCH

$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

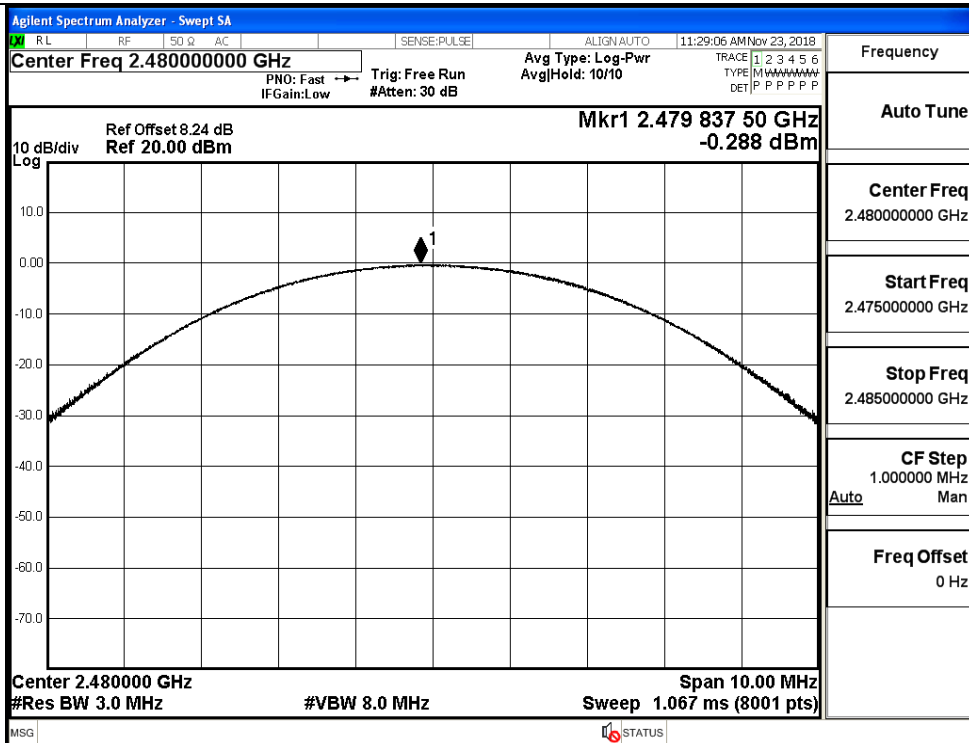
8DPSK/LCH



8DPSK/MCH



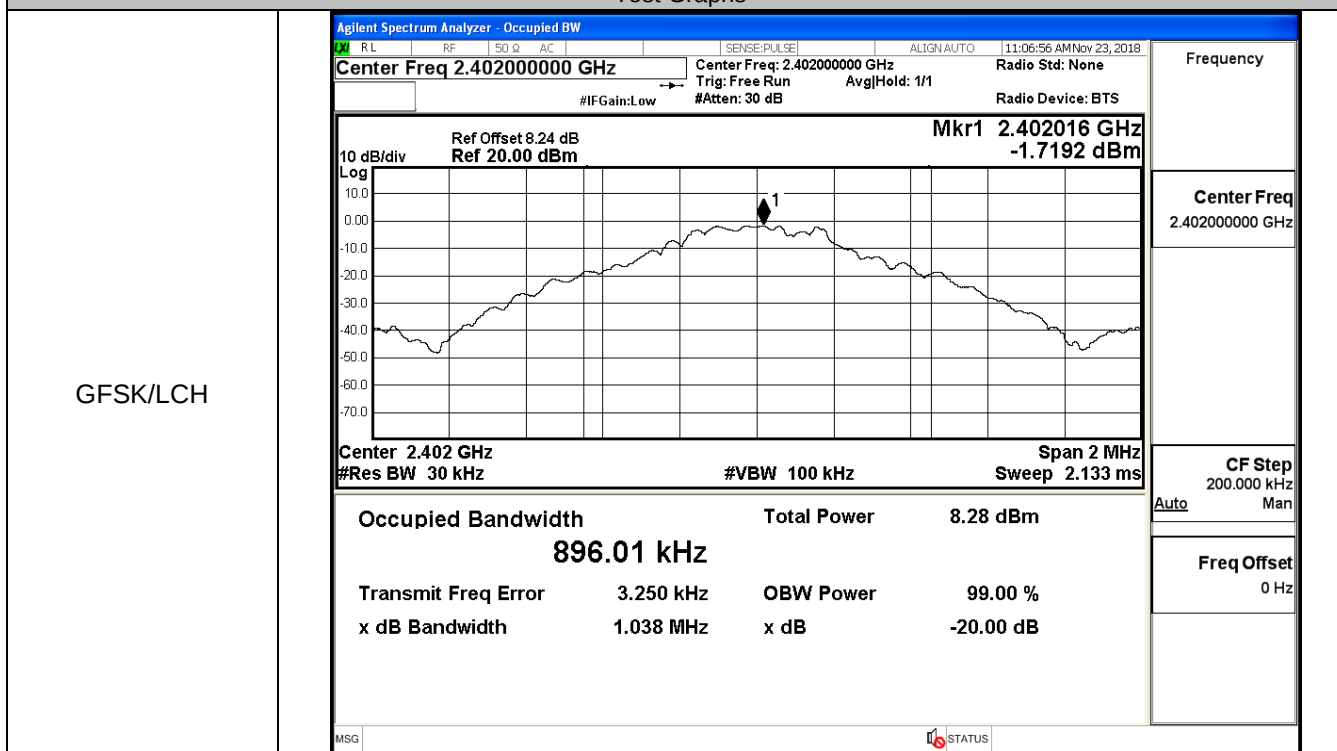
8DPSK/HCH



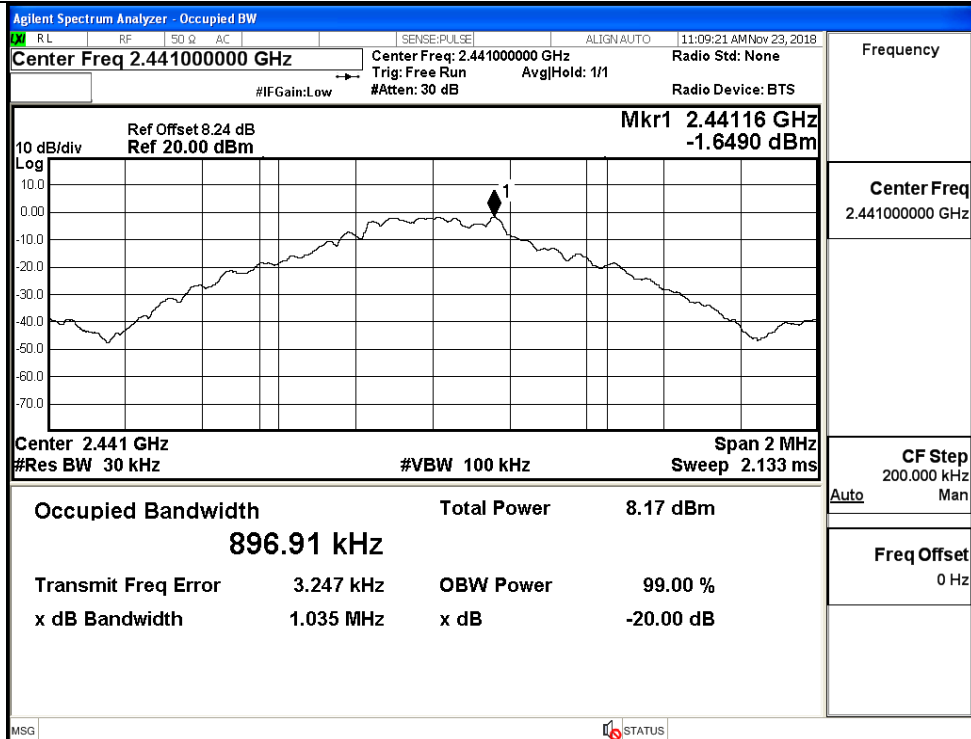
A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89601	1.038	Not Specified	PASS
	MCH	0.89691	1.035	Not Specified	PASS
	HCH	0.89846	1.041	Not Specified	PASS
π /4DQPSK	LCH	1.1732	1.290	Not Specified	PASS
	MCH	1.1745	1.292	Not Specified	PASS
	HCH	1.1707	1.289	Not Specified	PASS
8DPSK	LCH	1.1830	1.292	Not Specified	PASS
	MCH	1.1816	1.298	Not Specified	PASS
	HCH	1.1782	1.294	Not Specified	PASS

Test Graphs



GFSK/MCH



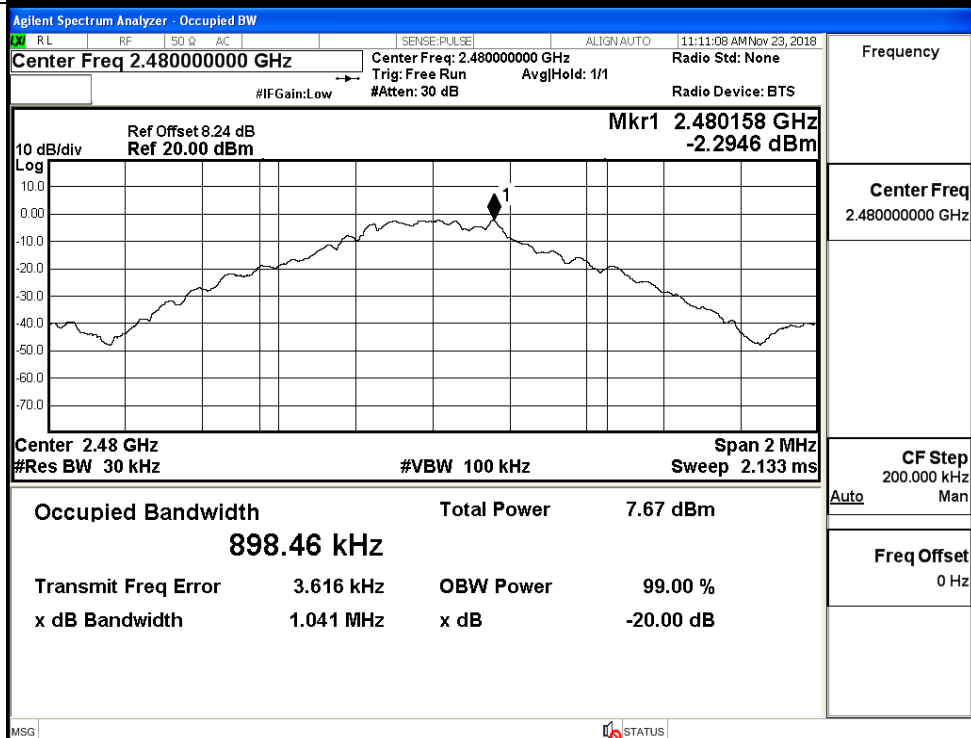
Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

GFSK/HCH

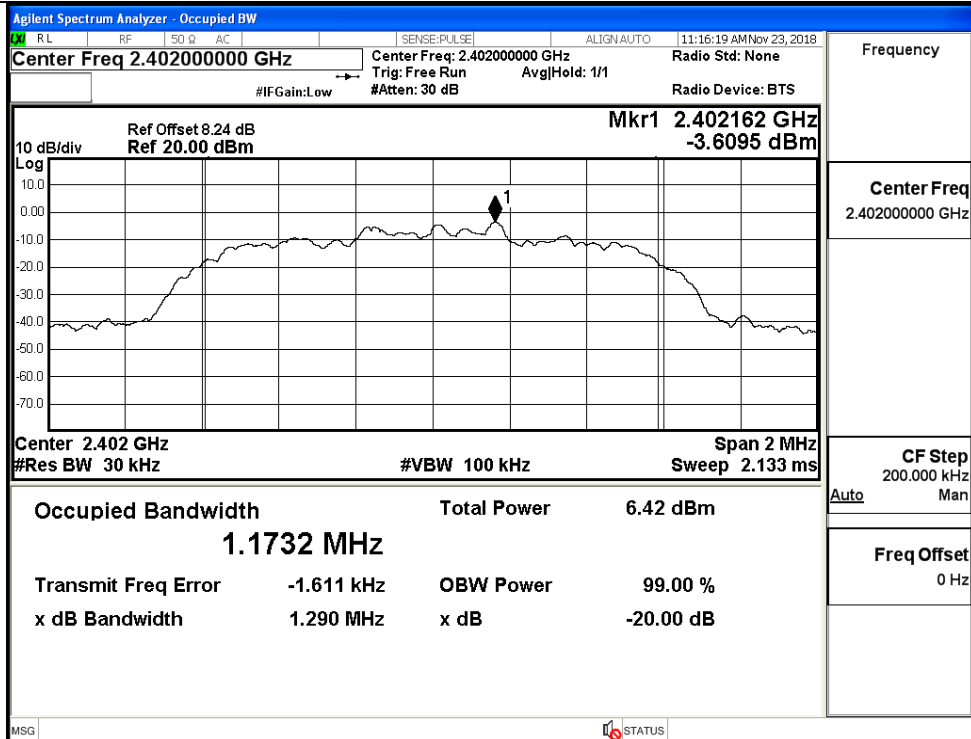
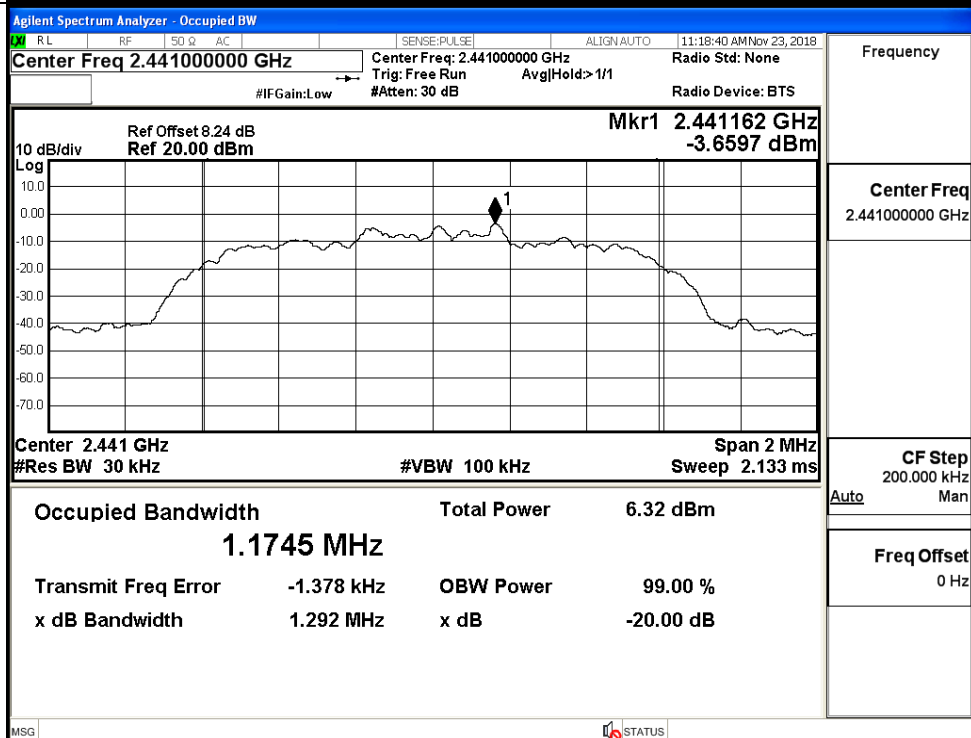


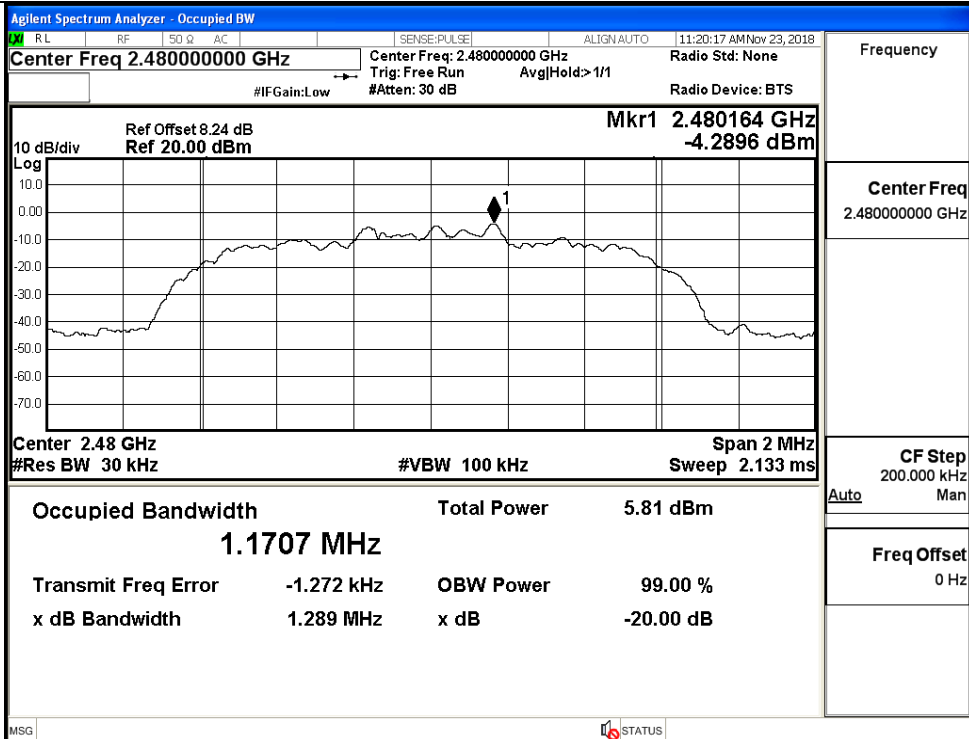
Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

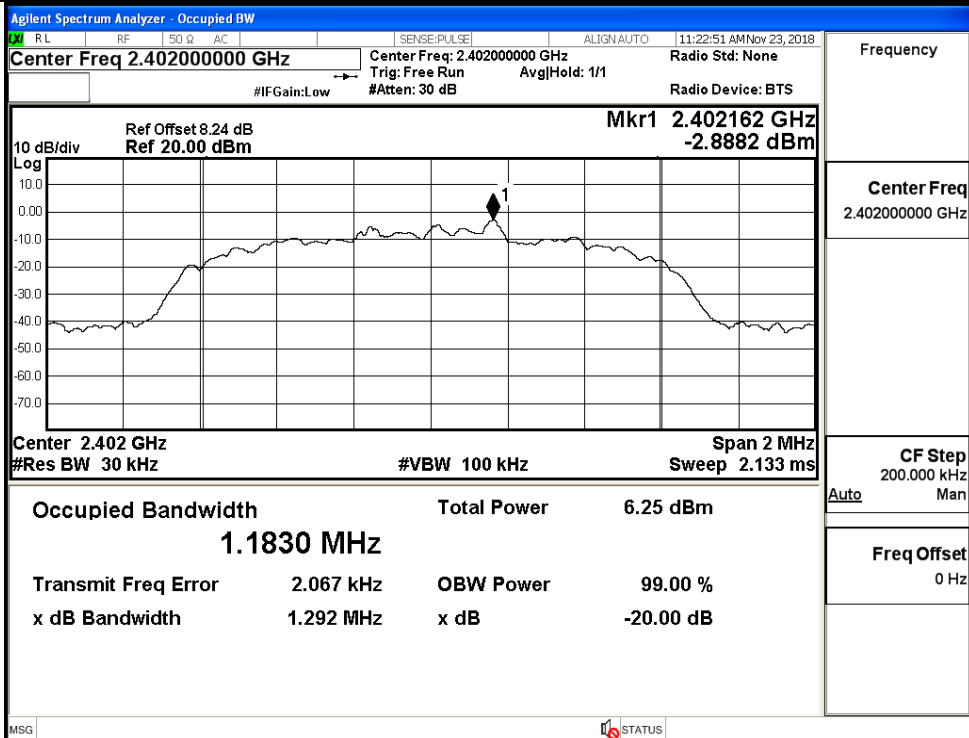
Auto

Freq Offset
0 Hz

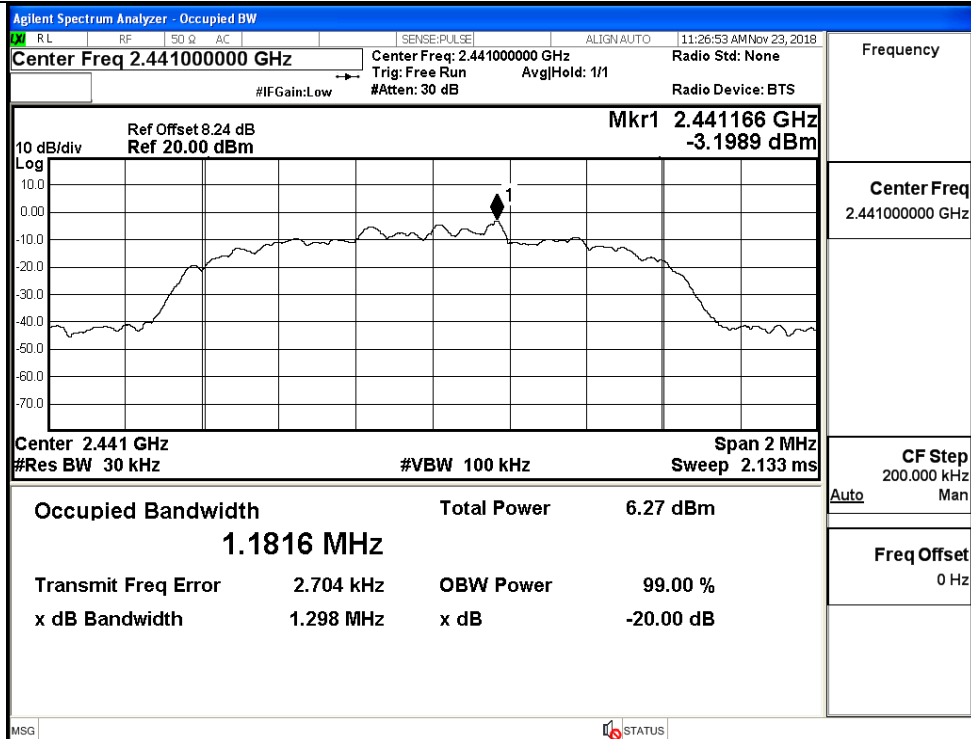
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

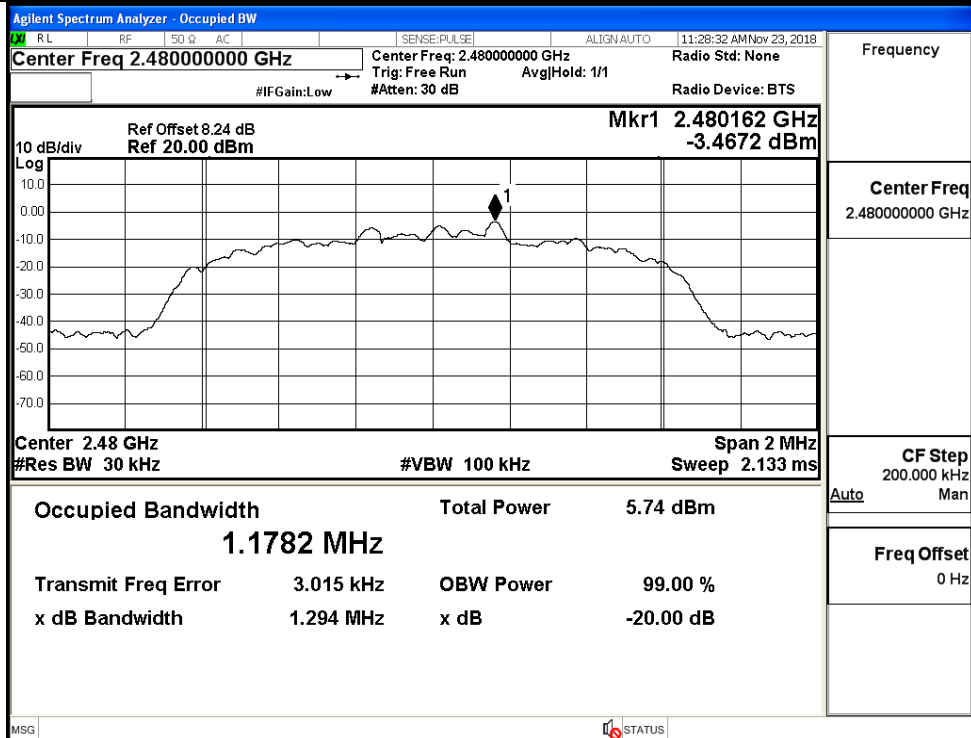
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

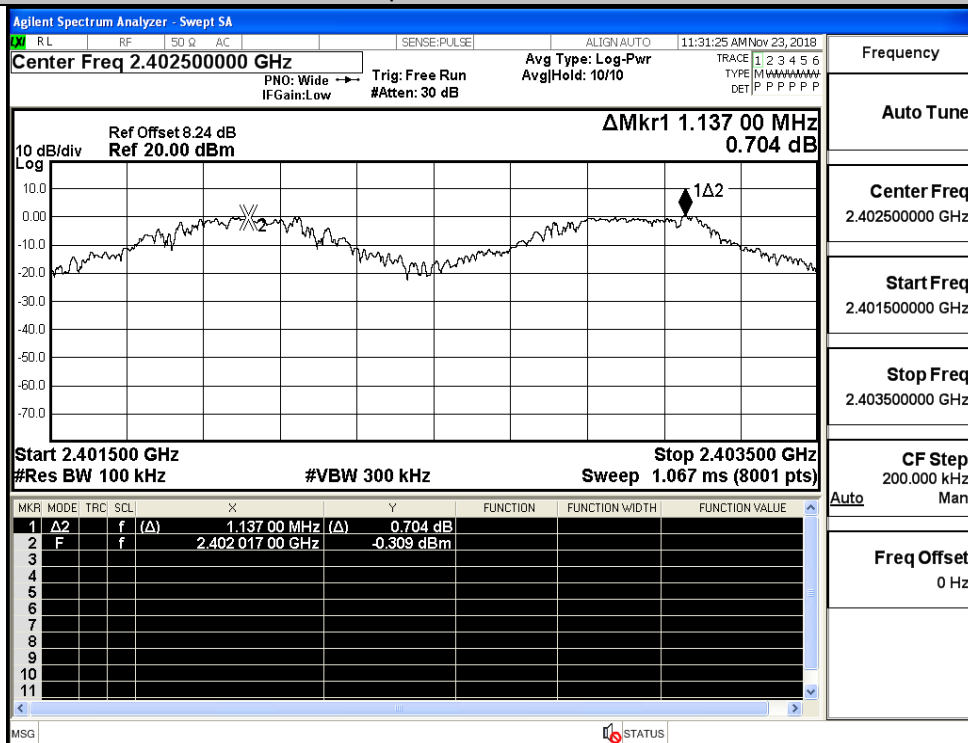


A.3 Carrier Frequency Separation

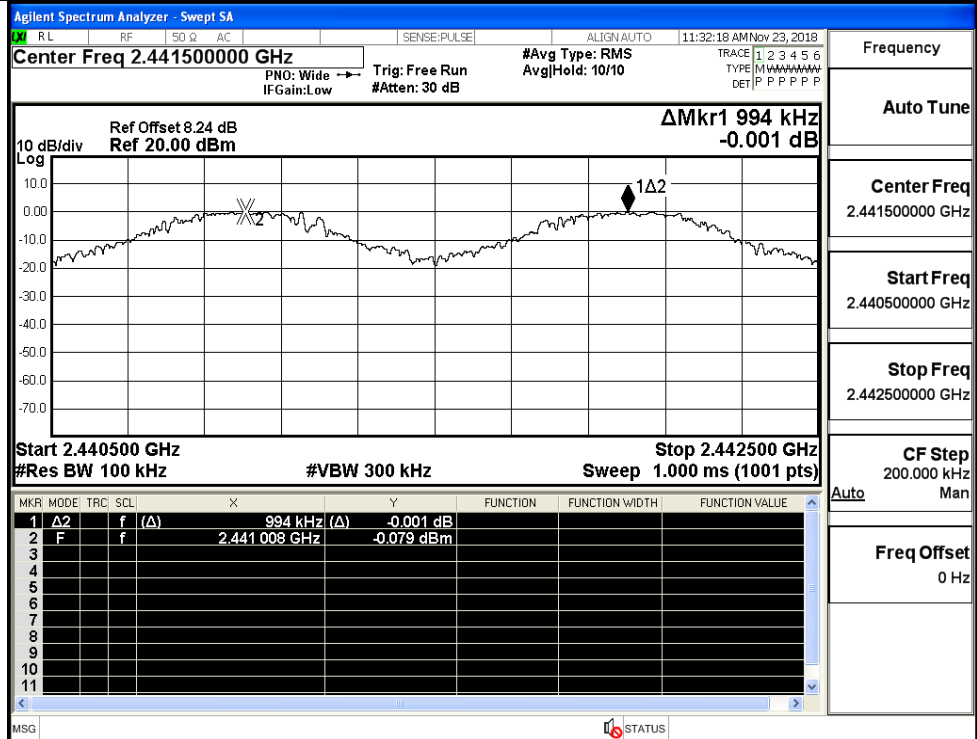
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.137	0.694	PASS
	MCH	0.994	0.694	PASS
	HCH	1.182	0.694	PASS
$\pi/4$ DQPSK	LCH	0.996	0.861	PASS
	MCH	1.002	0.861	PASS
	HCH	1.012	0.861	PASS
8DPSK	LCH	0.890	0.865	PASS
	MCH	1.164	0.865	PASS
	HCH	1.098	0.865	PASS

Test Graphs

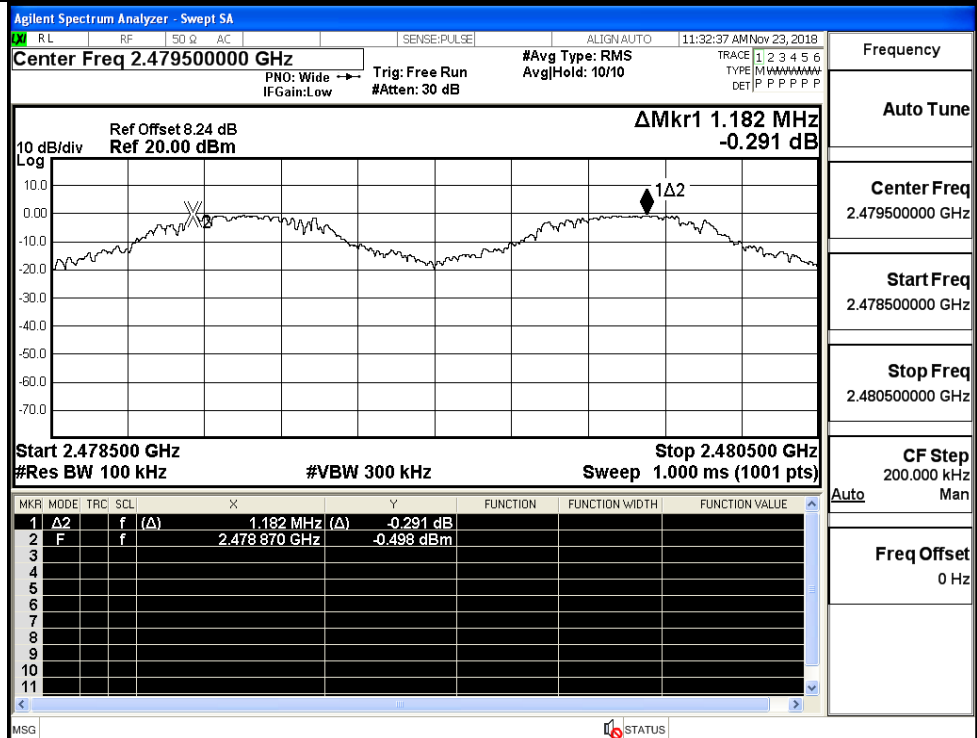
GFSK/LCH

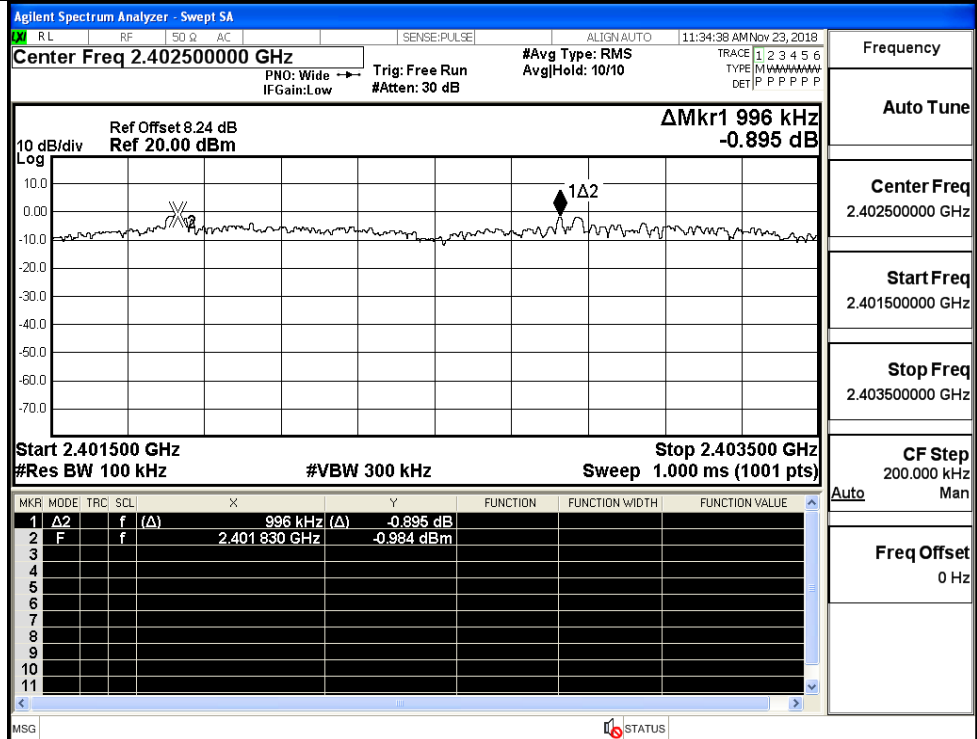
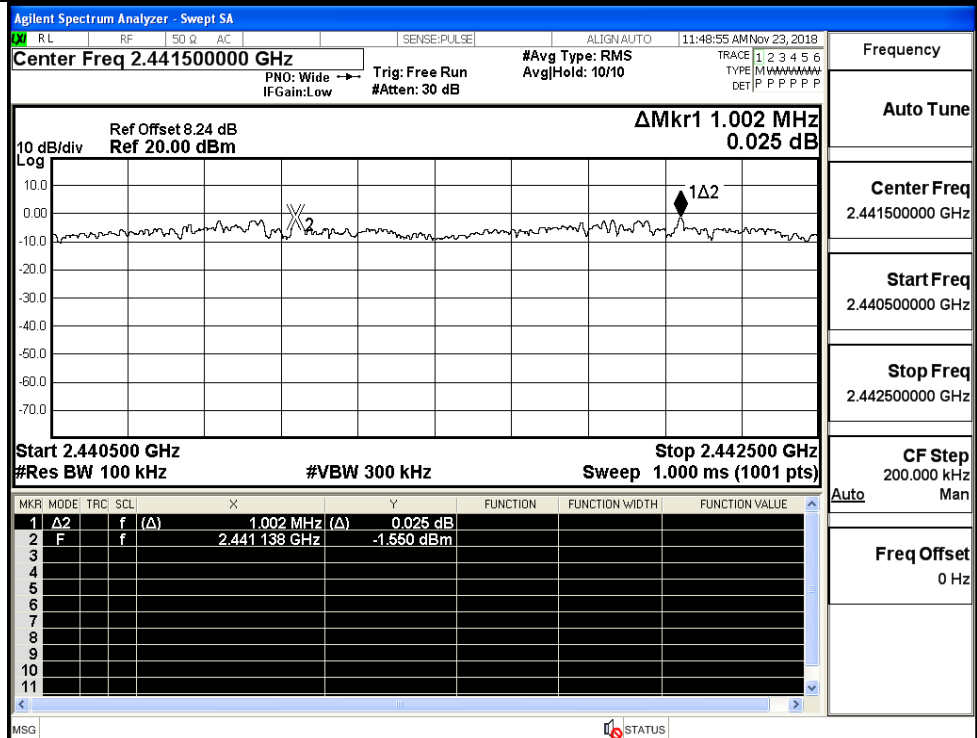


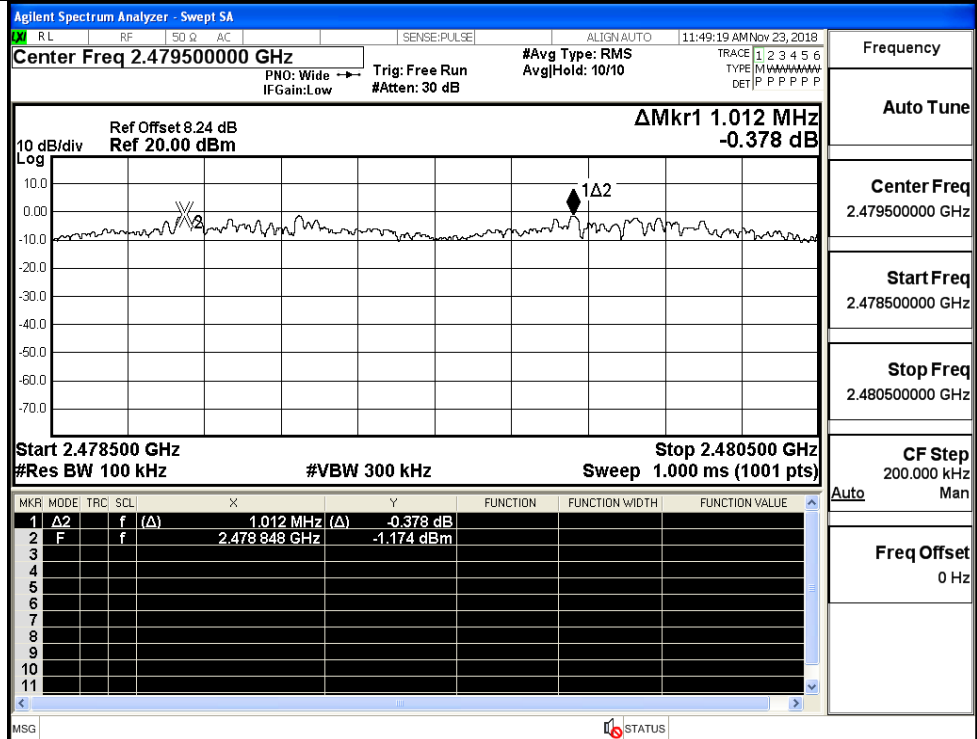
GFSK/MCH



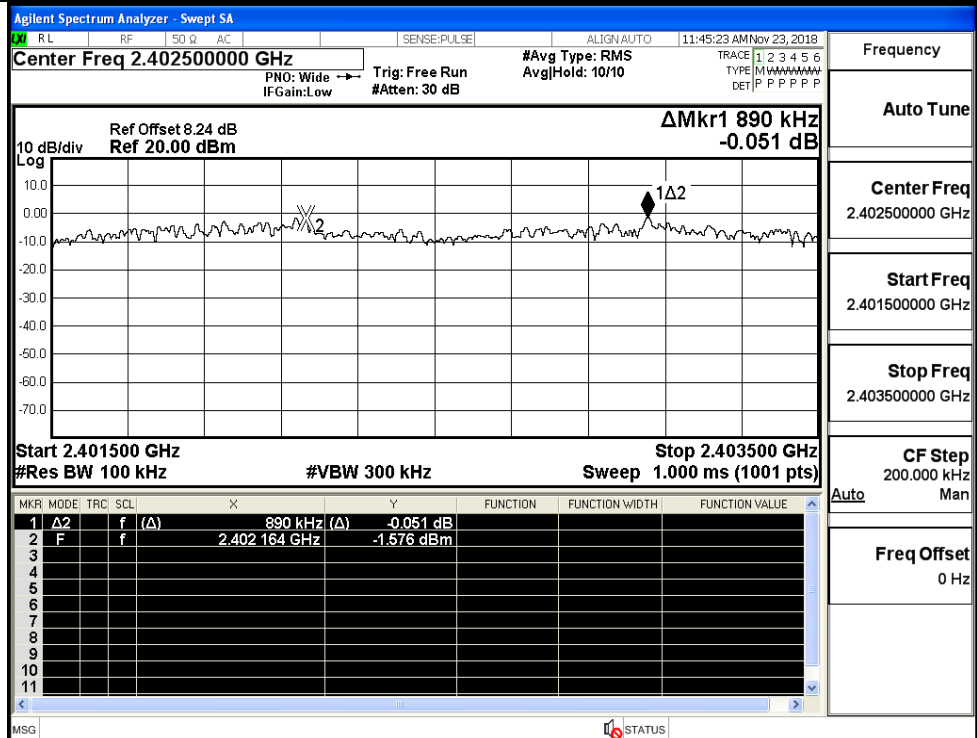
GFSK/HCH



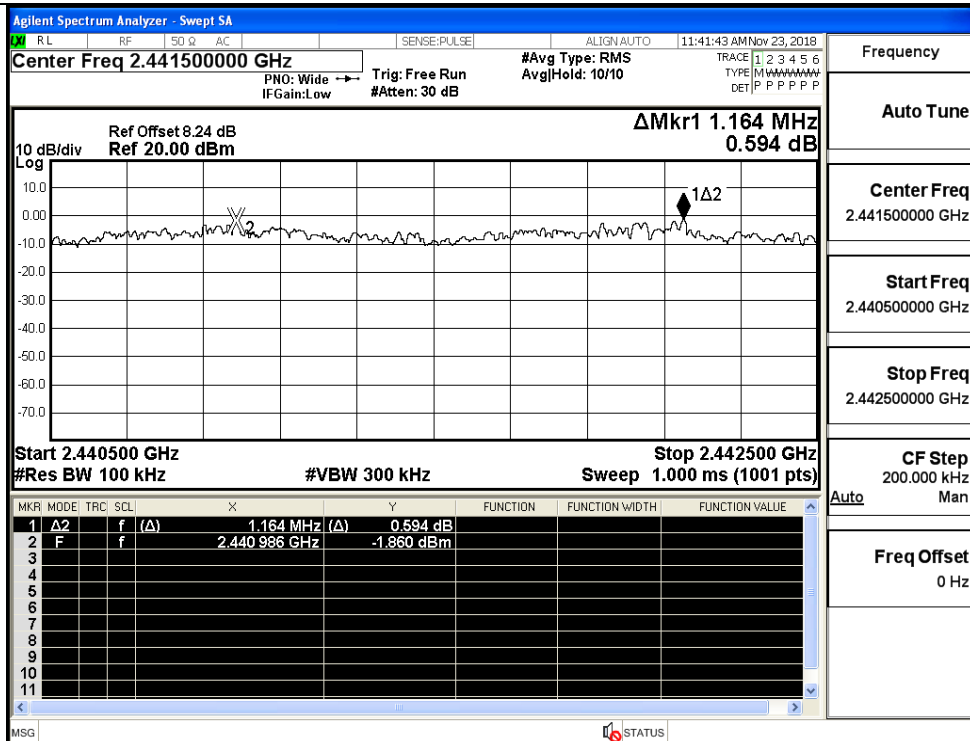
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

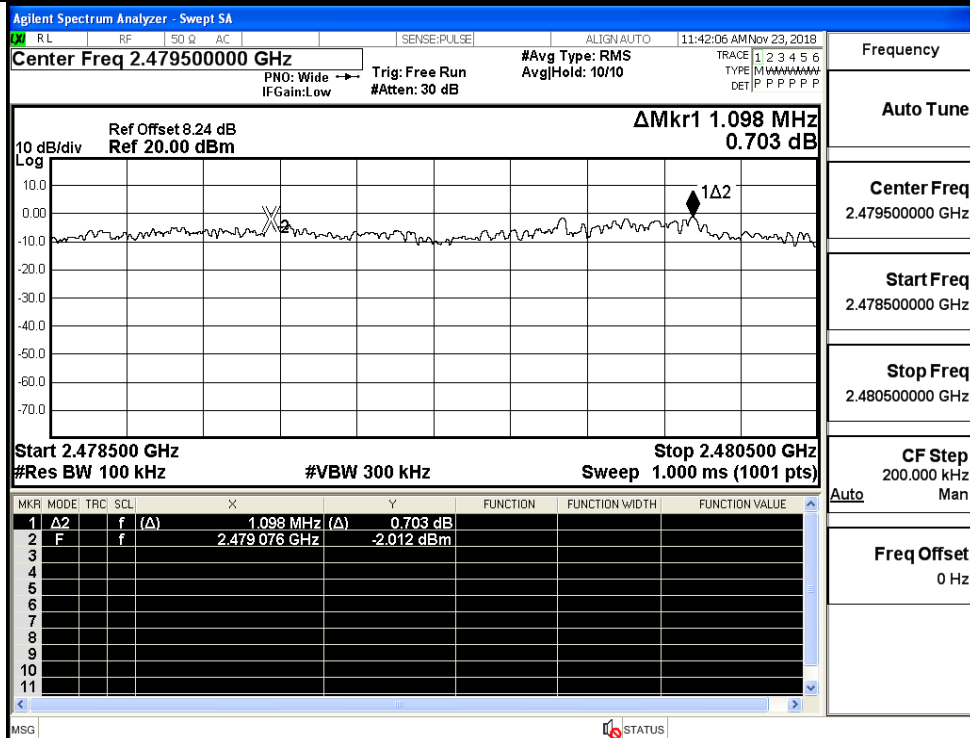
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

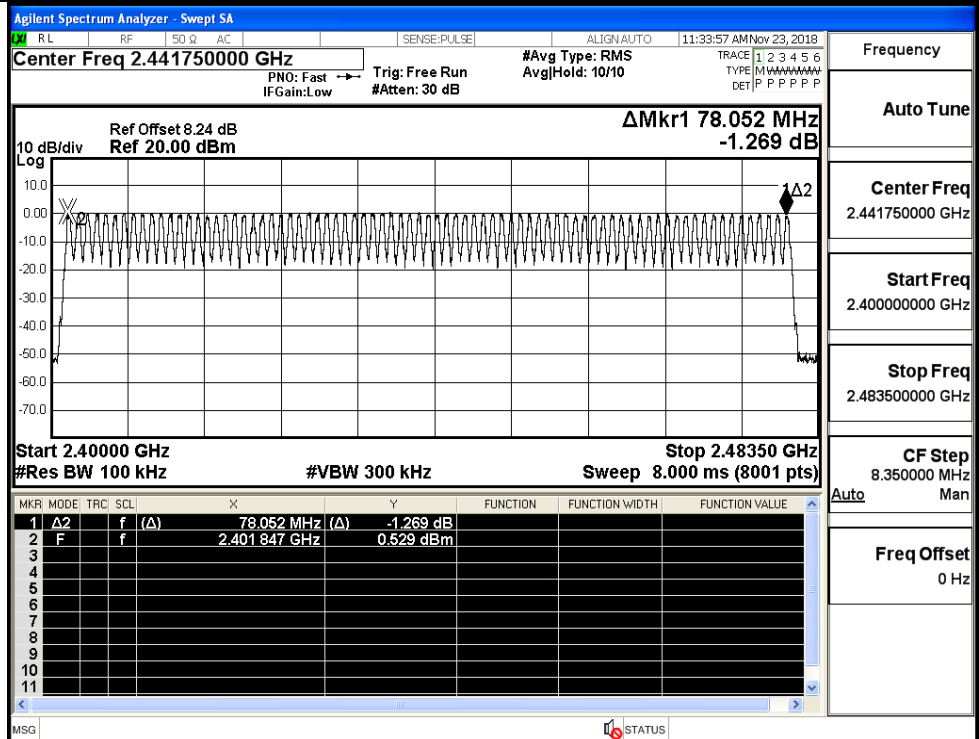
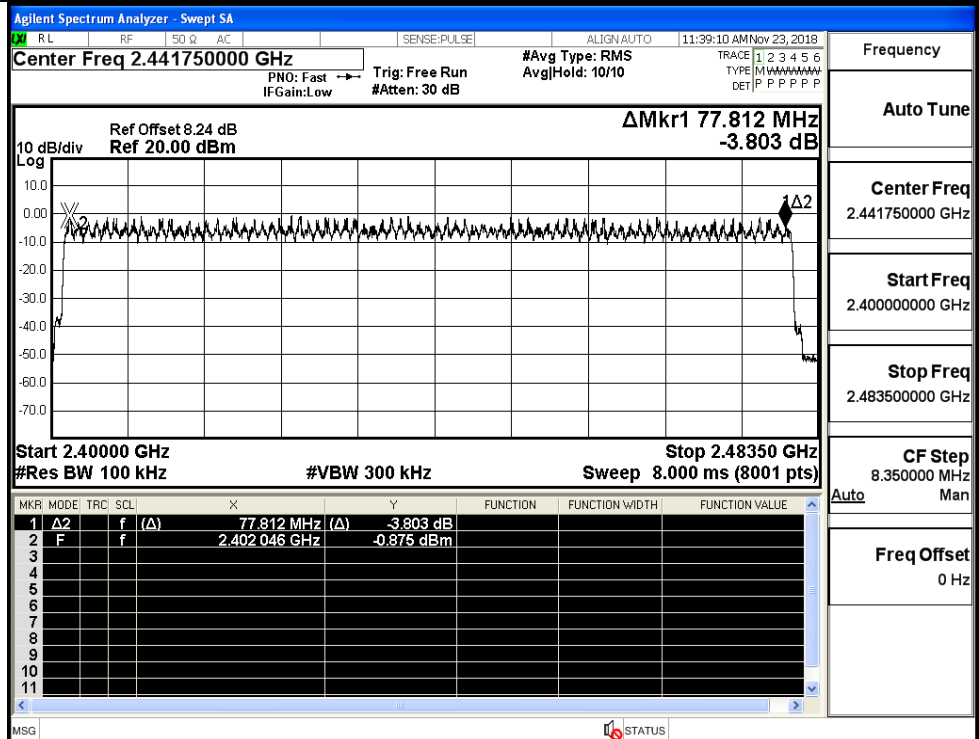


A.4 Hopping Channel Number

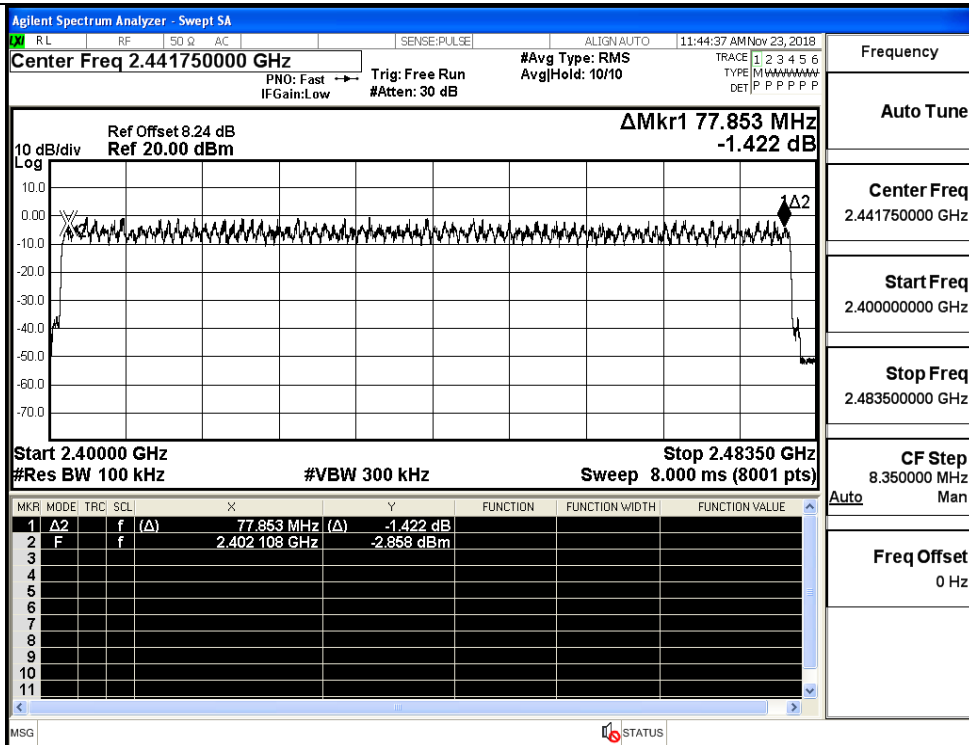
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

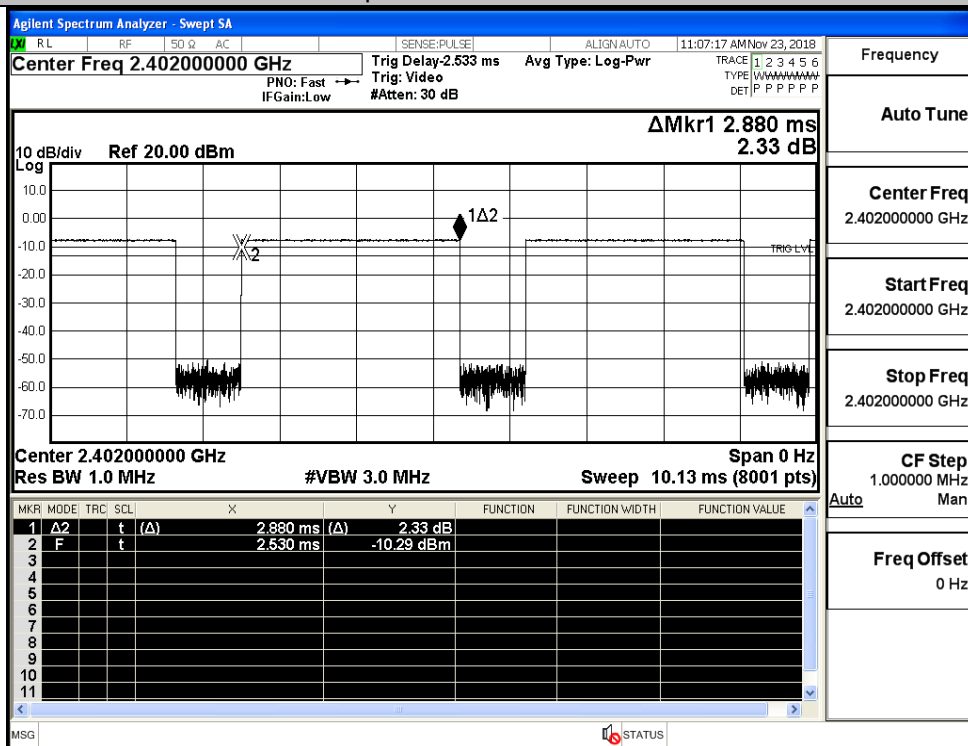


A.5 Dwell Time

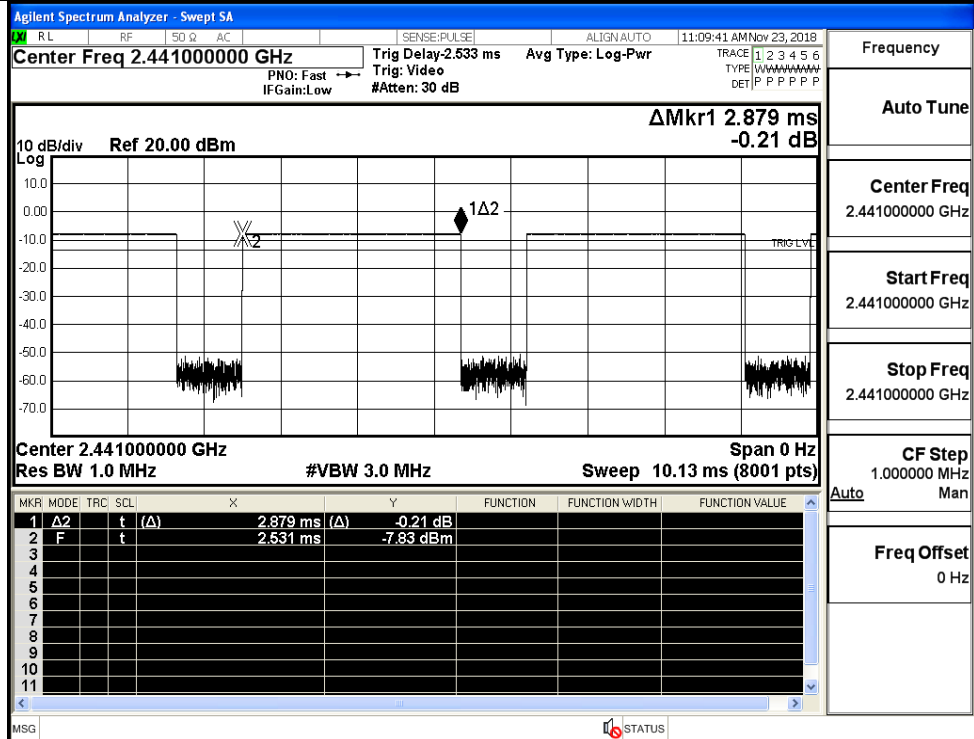
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

Test Graphs

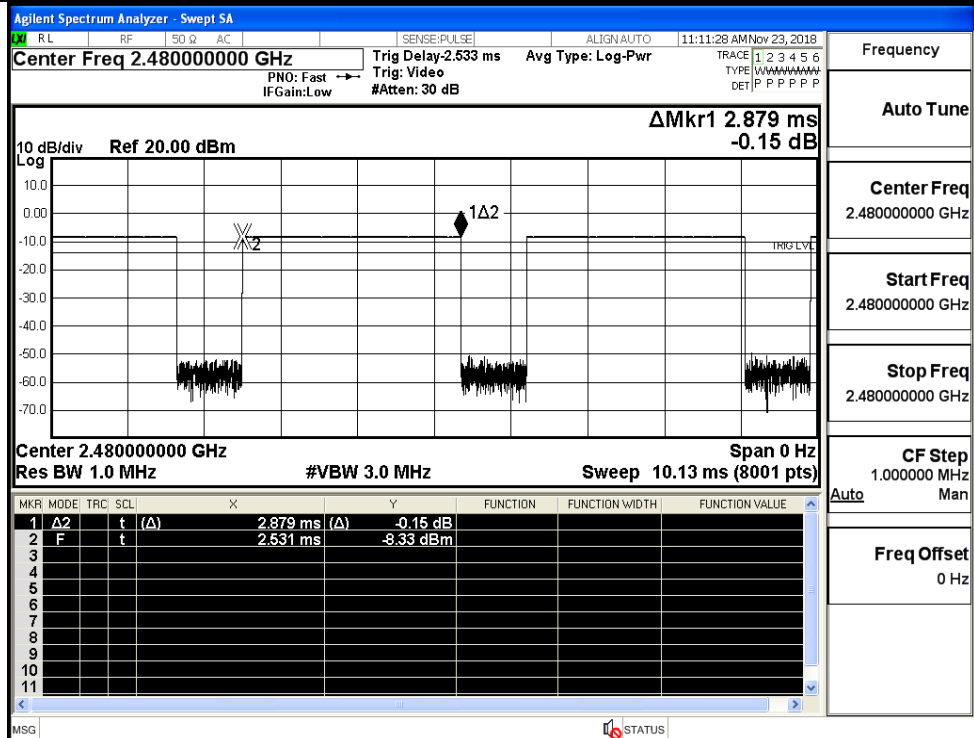
GFSK_DH5/LCH



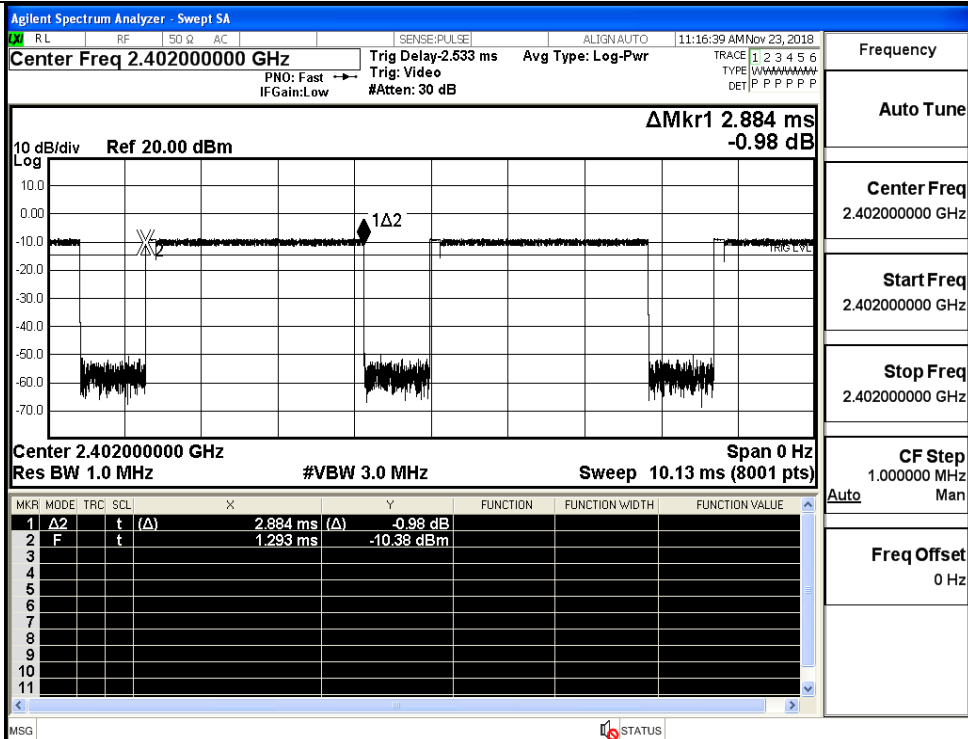
GFSK_DH5/MCH



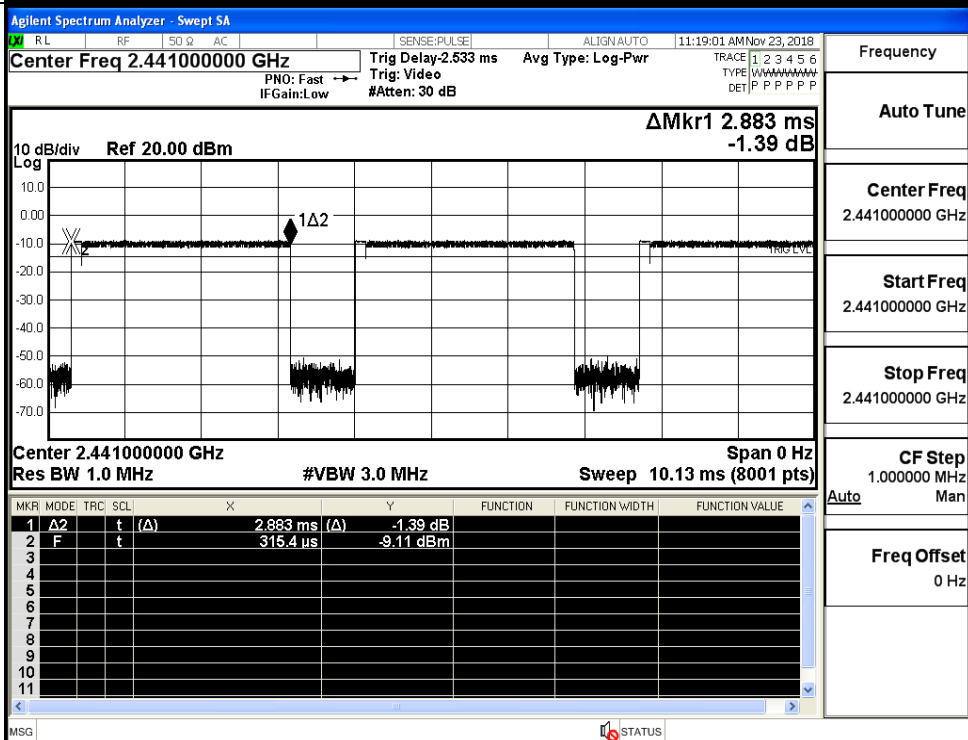
GFSK_DH5/HCH



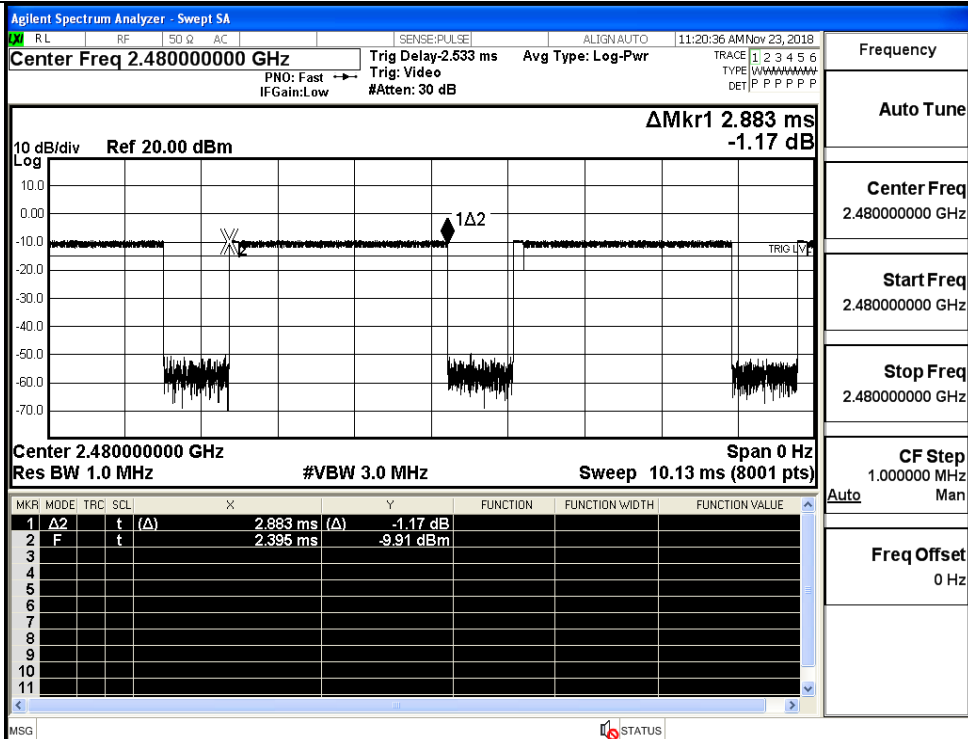
$\pi/4$ DQPSK
_2DH5/LCH



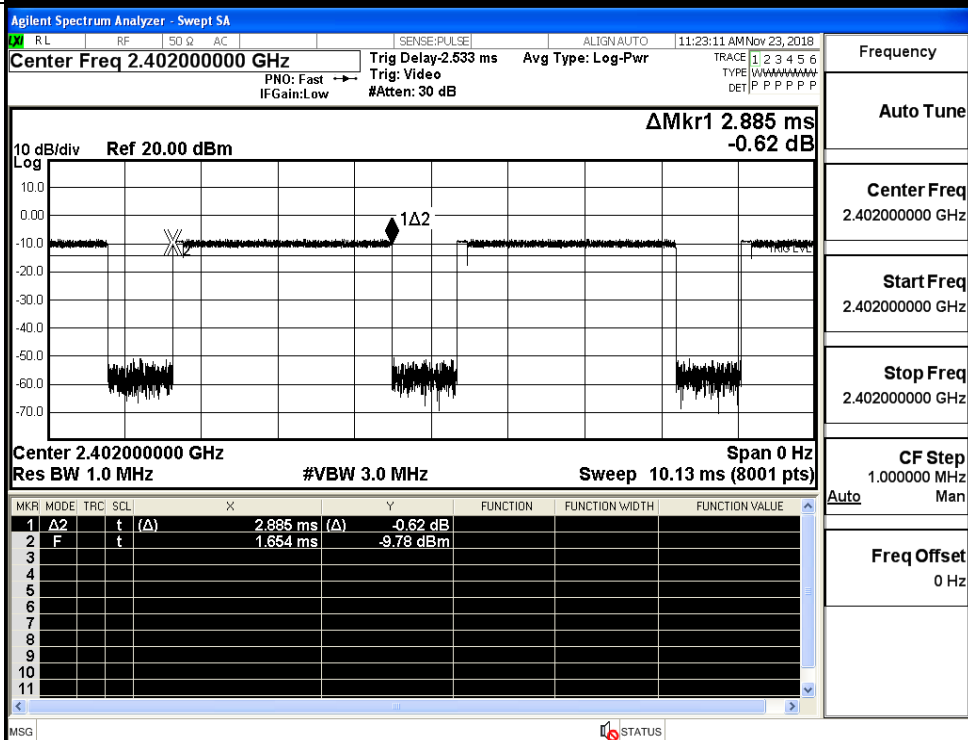
$\pi/4$ DQPSK
_2DH5/MCH



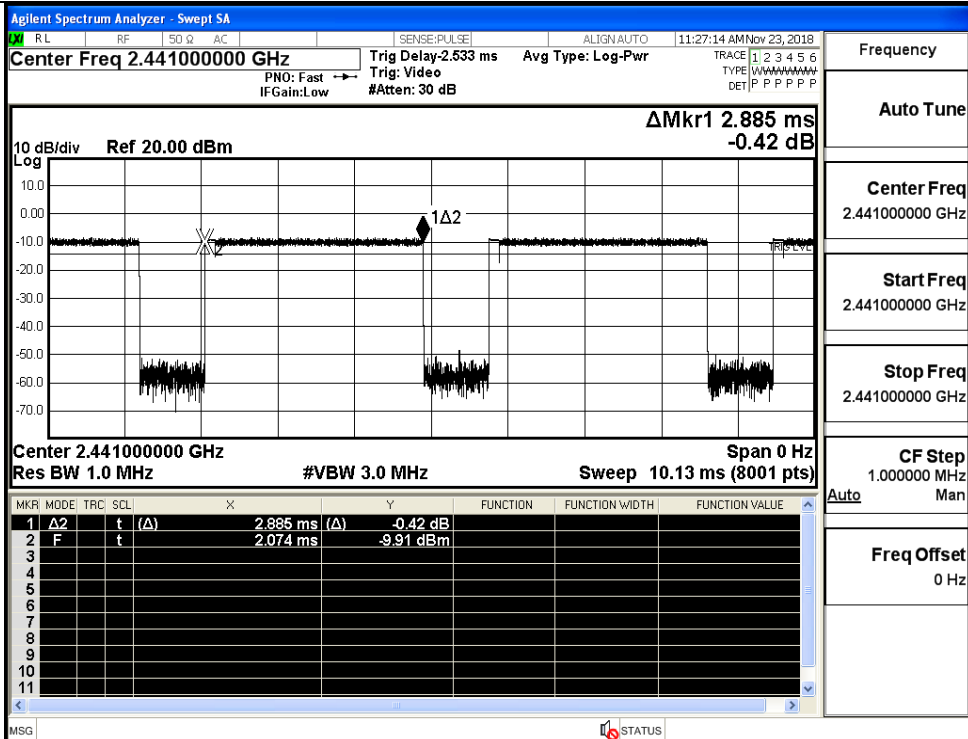
$\pi/4$ DQPSK
_2DH5/HCH



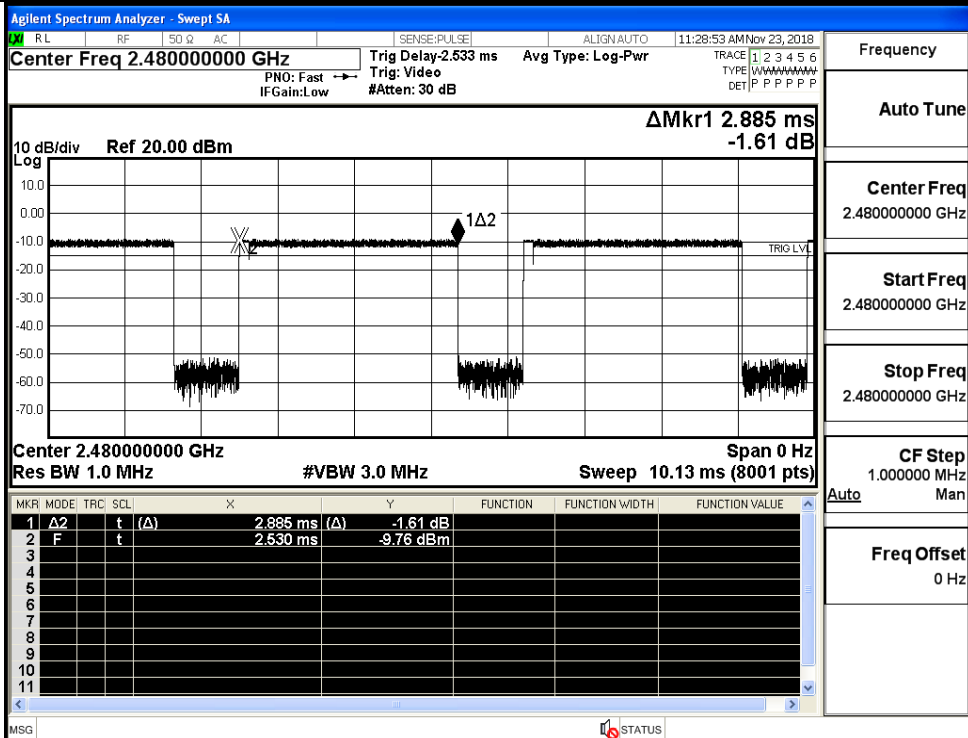
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

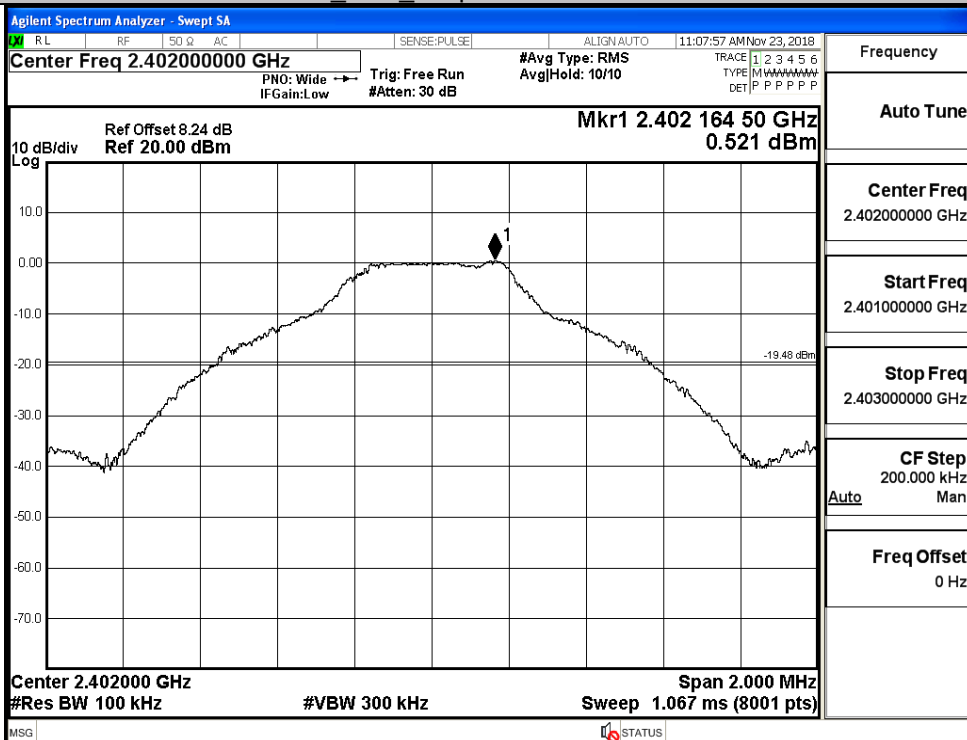


A.6 RF Conducted Spurious Emissions

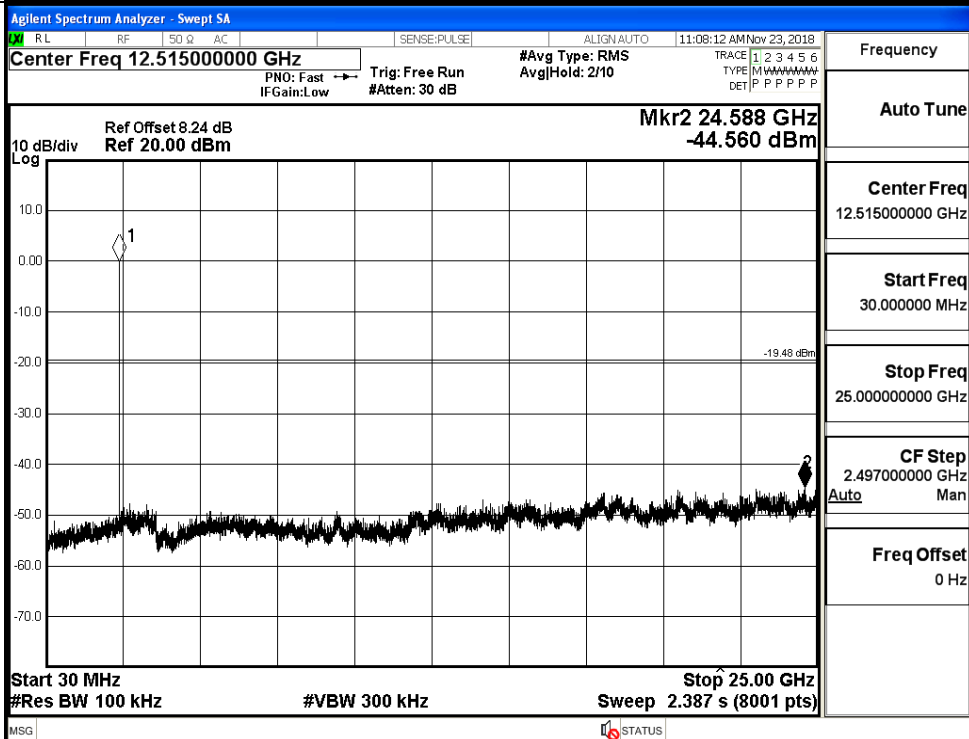
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.521	-44.560	-19.479	PASS
	MCH	0.438	-44.794	-19.562	PASS
	HCH	-0.007	-44.218	-20.007	PASS
$\pi/4$ DQPSK	LCH	-0.95	-44.788	-20.950	PASS
	MCH	-1.077	-43.988	-21.077	PASS
	HCH	-1.394	-44.295	-21.394	PASS
8DPSK	LCH	-1.008	-44.545	-21.008	PASS
	MCH	-0.879	-44.295	-20.879	PASS
	HCH	-1.586	-44.443	-21.586	PASS

GFSK LCH Graphs

Pref

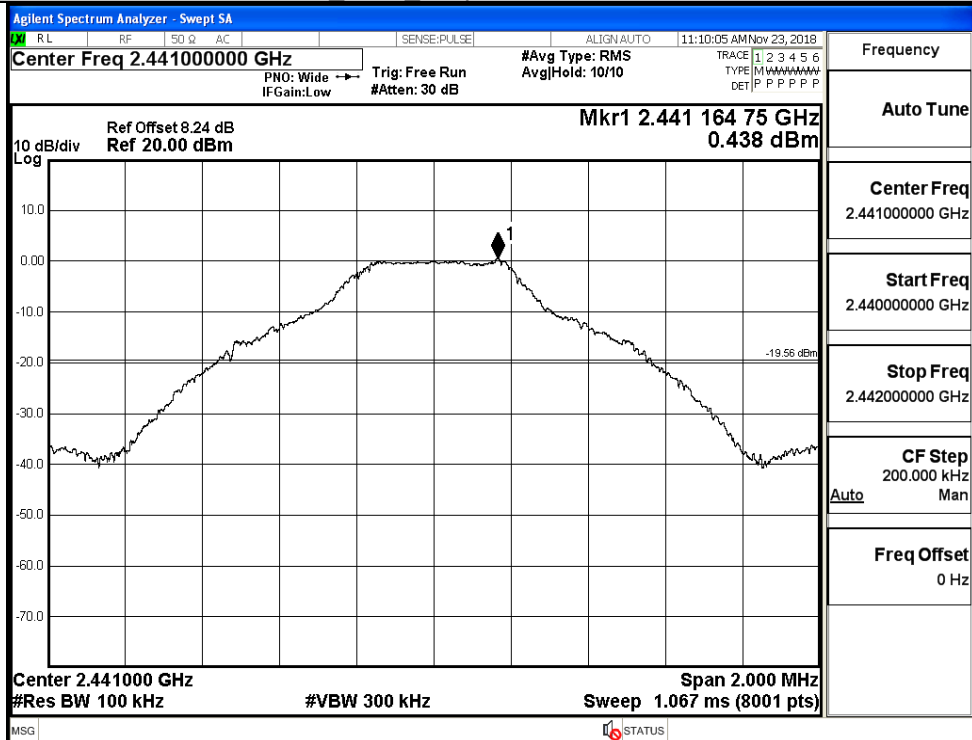


Puw

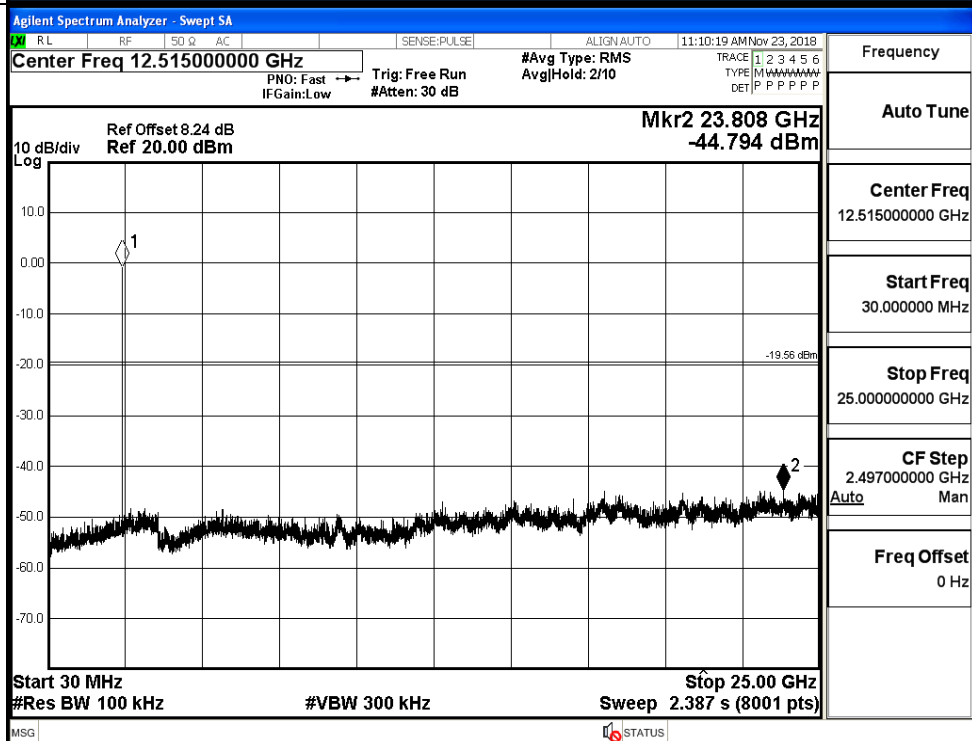


GFSK_MCH_Graphs

Pref

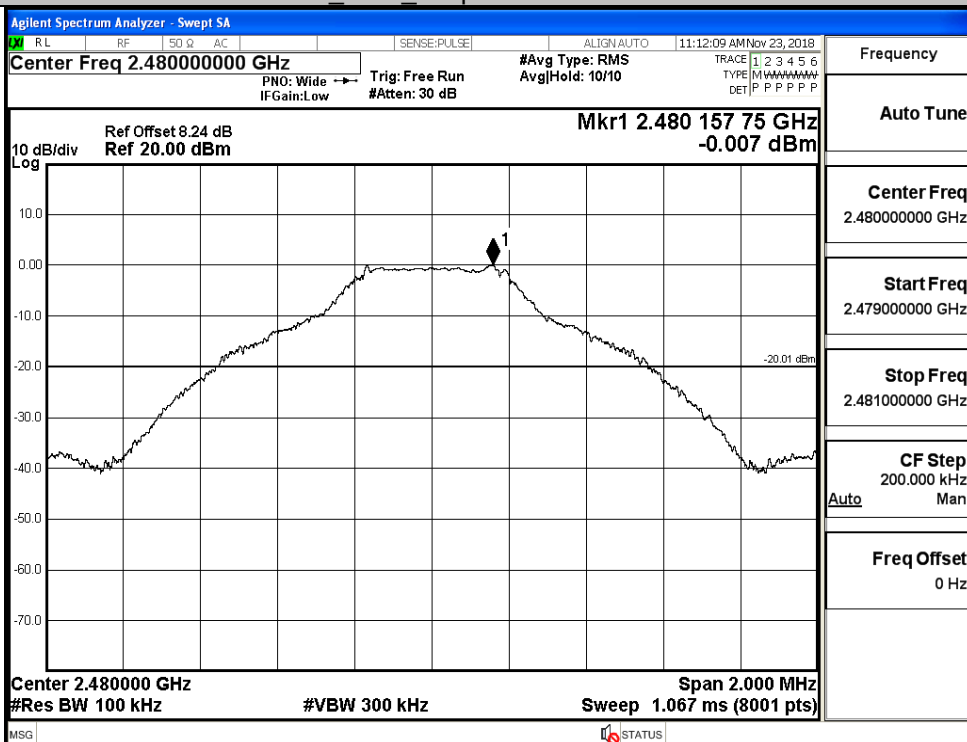


Puw

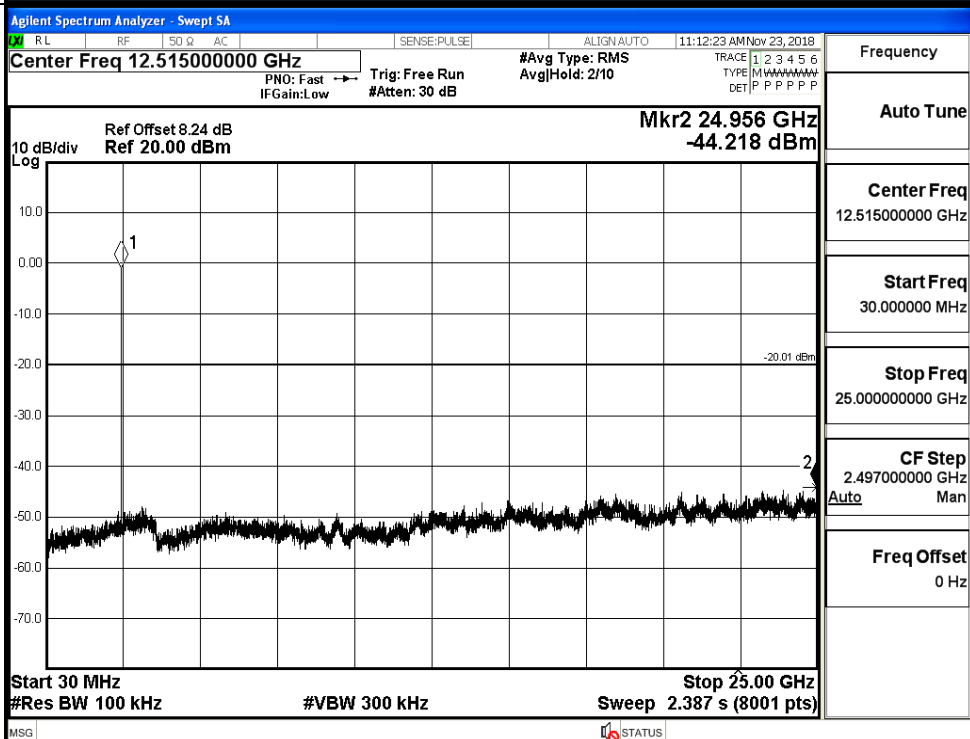


GFSK_HCH_Graphs

Pref

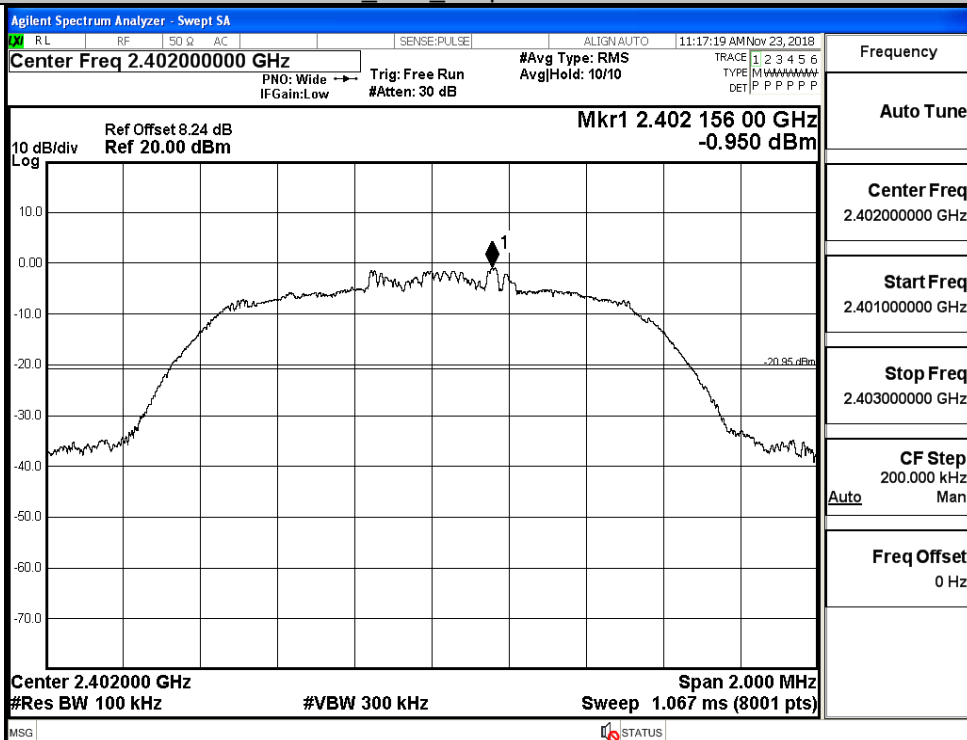


Puw

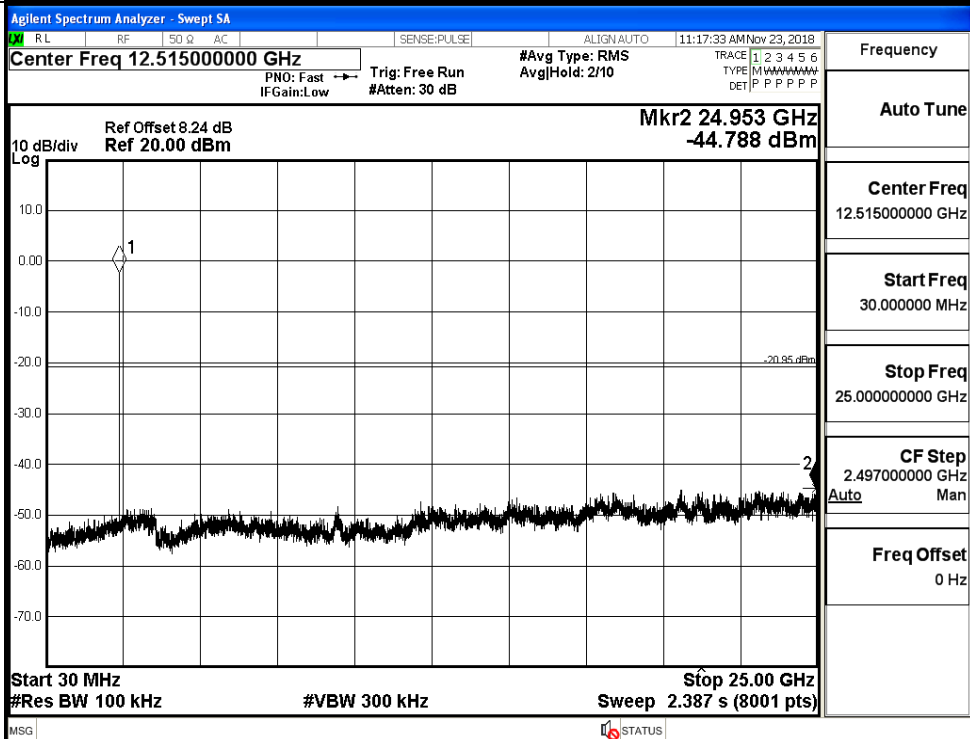


π /4DQPSK LCH_Graphs

Pref

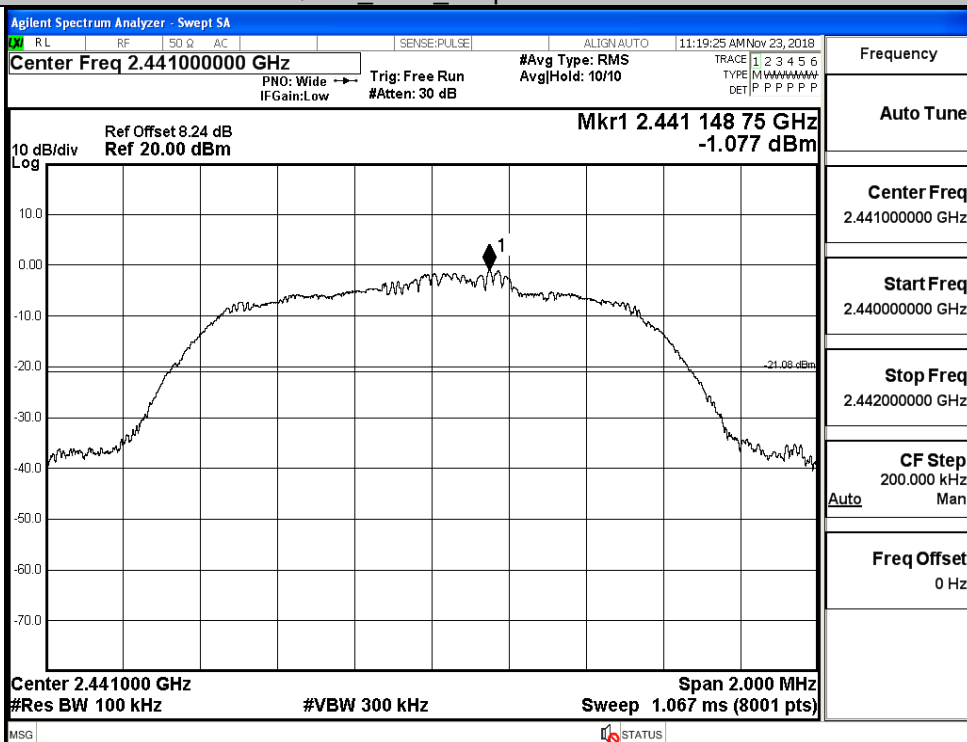


Puw

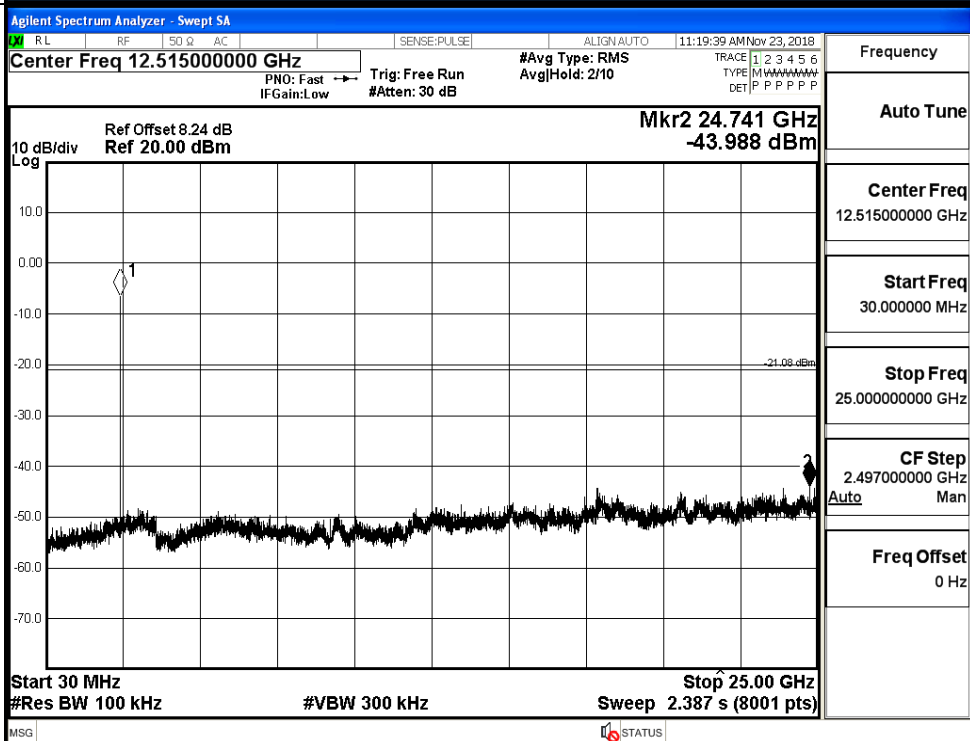


π /4DQPSK_MCH_Graphs

Pref

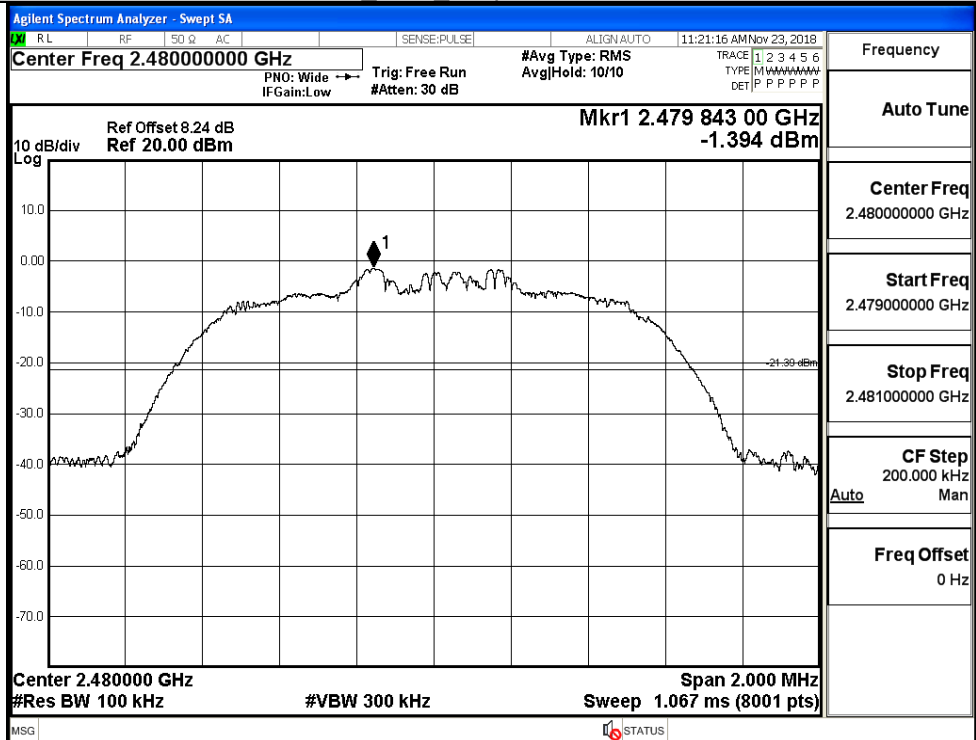


Puw

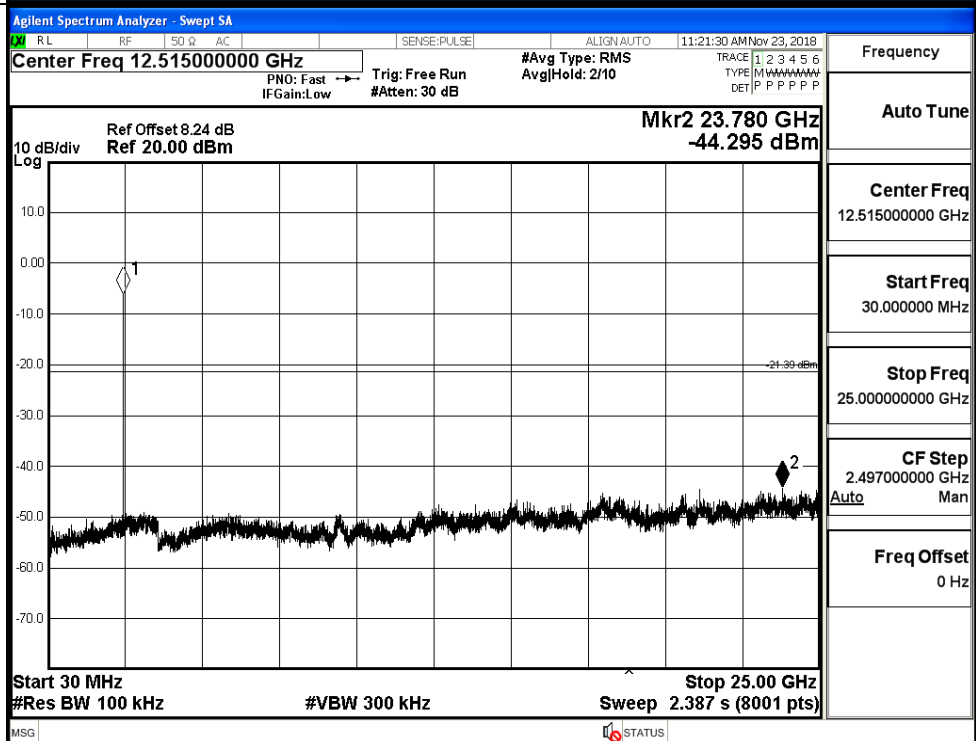


π /4DQPSK_HCH_Graphs

Pref

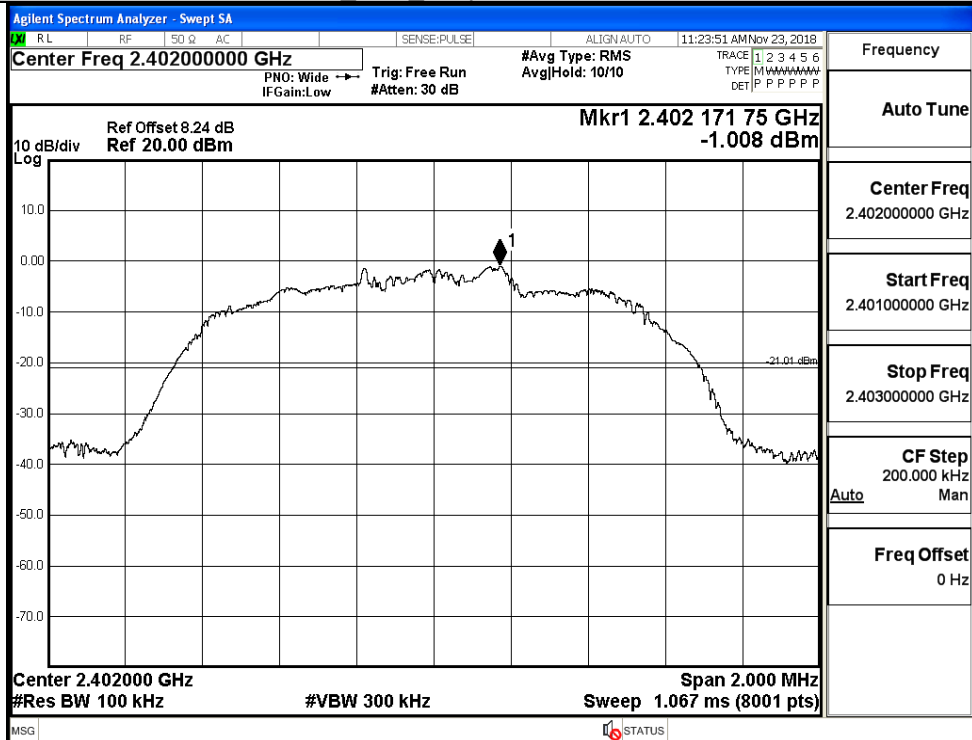


Puw

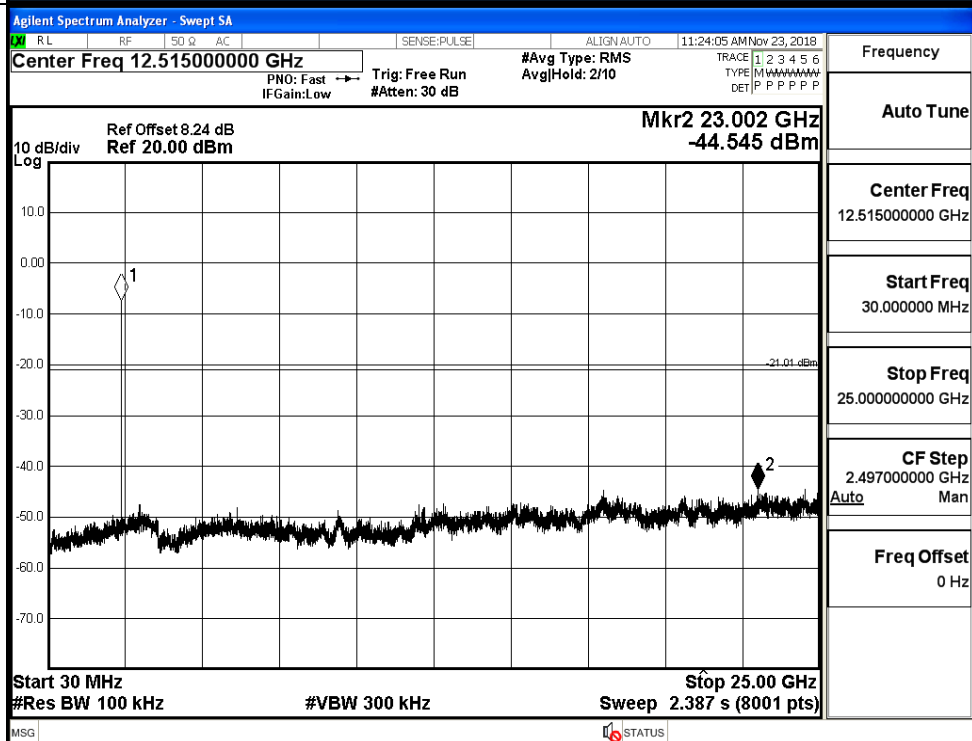


8DPSK_LCH_Graphs

Pref

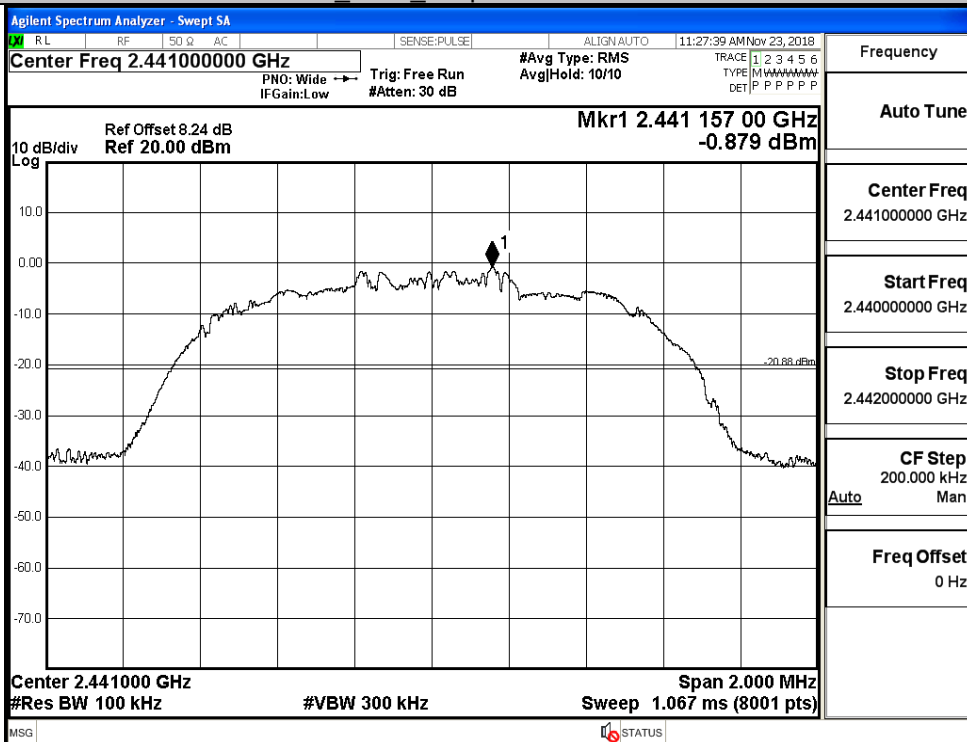


Puw

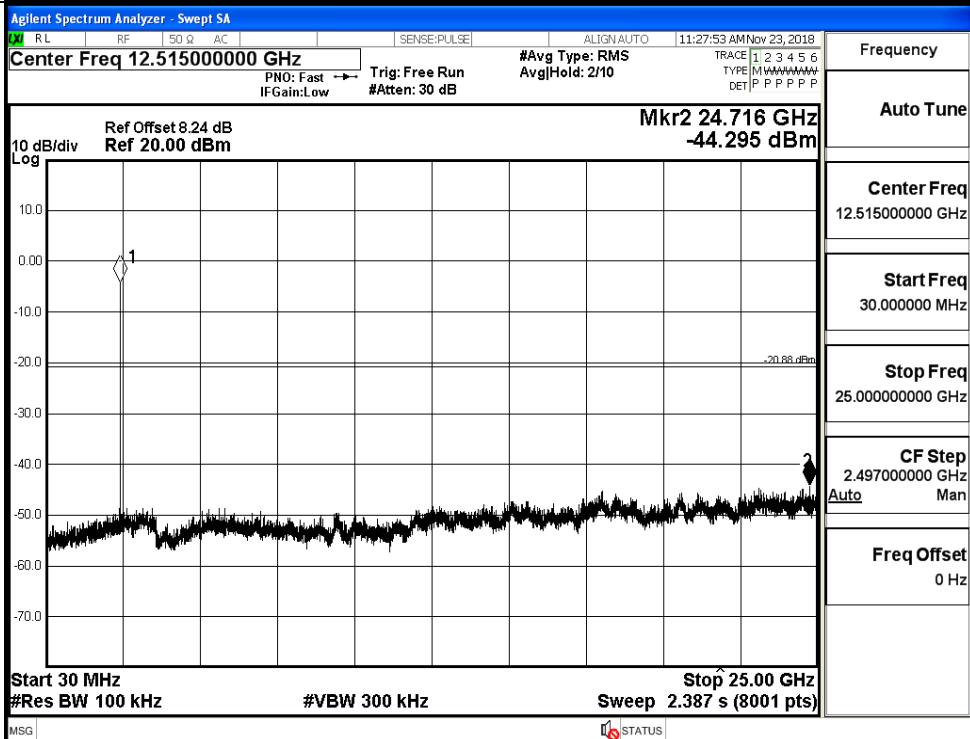


8DPSK_MCH_Graphs

Pref

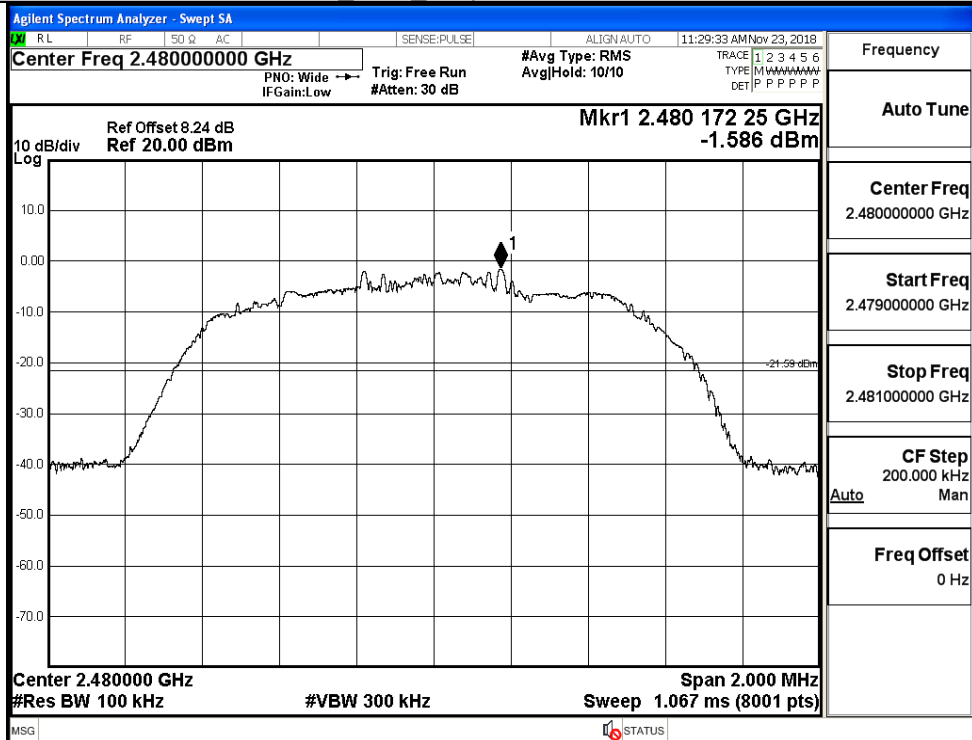


Puw

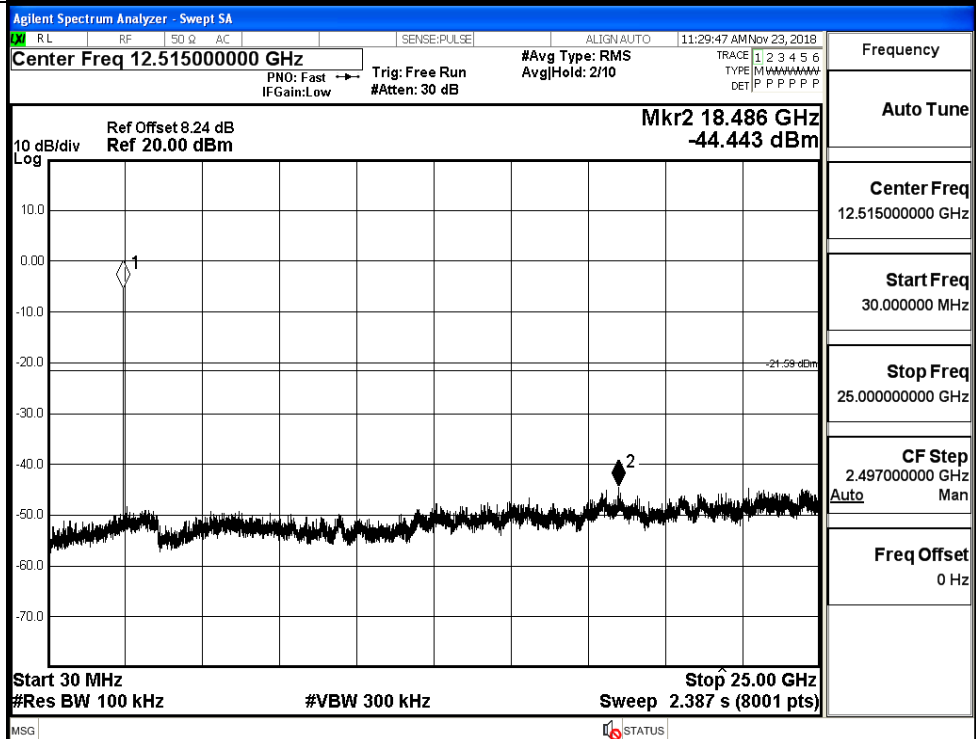


8DPSK_HCH_Graphs

Pref



Puw

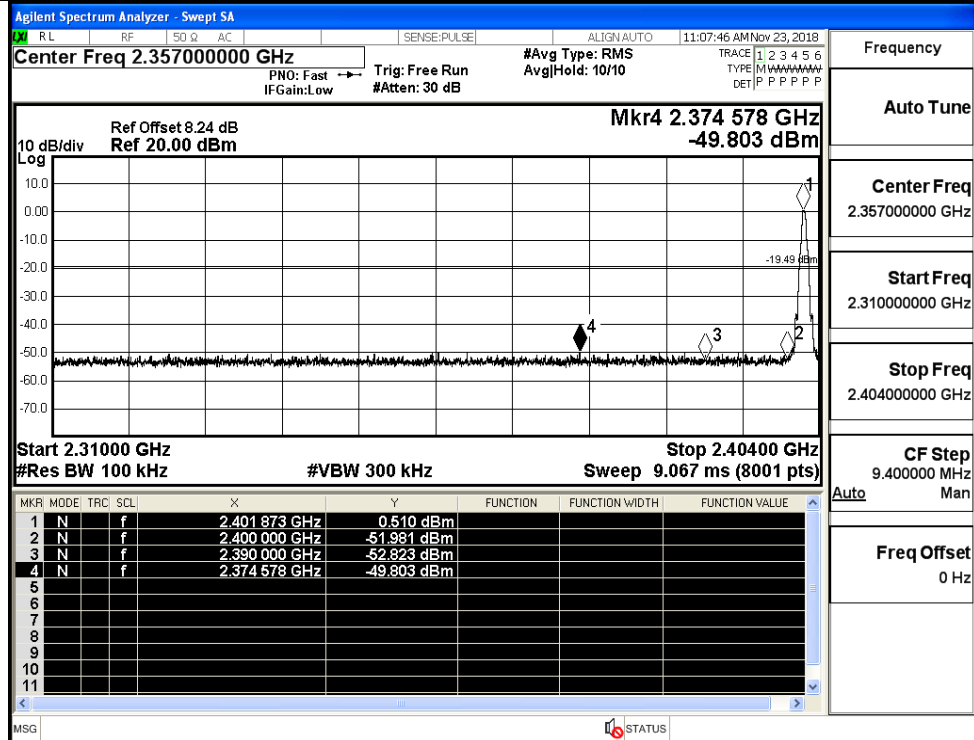


A.7 Band-edge for RF Conducted Emissions

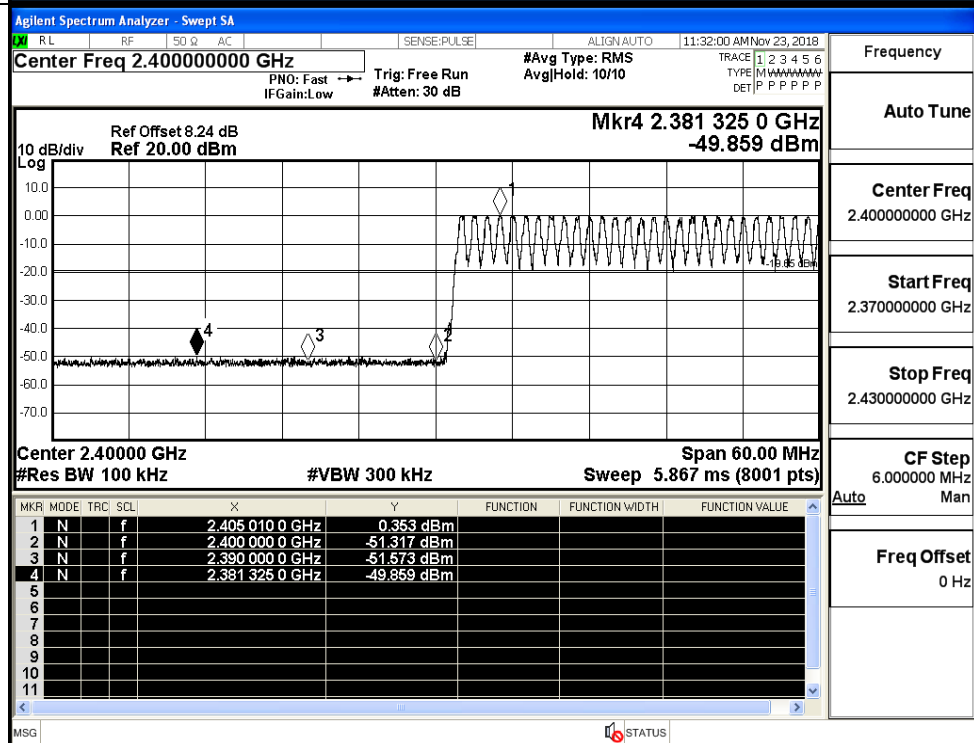
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.510	Off	-49.803	-19.49	PASS
			0.353	On	-49.859	-19.65	PASS
	HCH	2480	0.084	Off	-48.889	-19.92	PASS
			0.057	On	-49.836	-19.94	PASS
$\pi/4$ DQPSK	LCH	2402	-0.726	Off	-49.752	-20.73	PASS
			-0.946	On	-49.319	-20.95	PASS
	HCH	2480	-1.320	Off	-49.813	-21.32	PASS
			-0.965	On	-48.944	-20.97	PASS
8DPSK	LCH	2402	-1.432	Off	-50.091	-21.43	PASS
			-0.712	On	-48.791	-20.71	PASS
	HCH	2480	-1.356	Off	-49.858	-21.36	PASS
			-1.103	On	-48.828	-21.1	PASS

Test Graphs

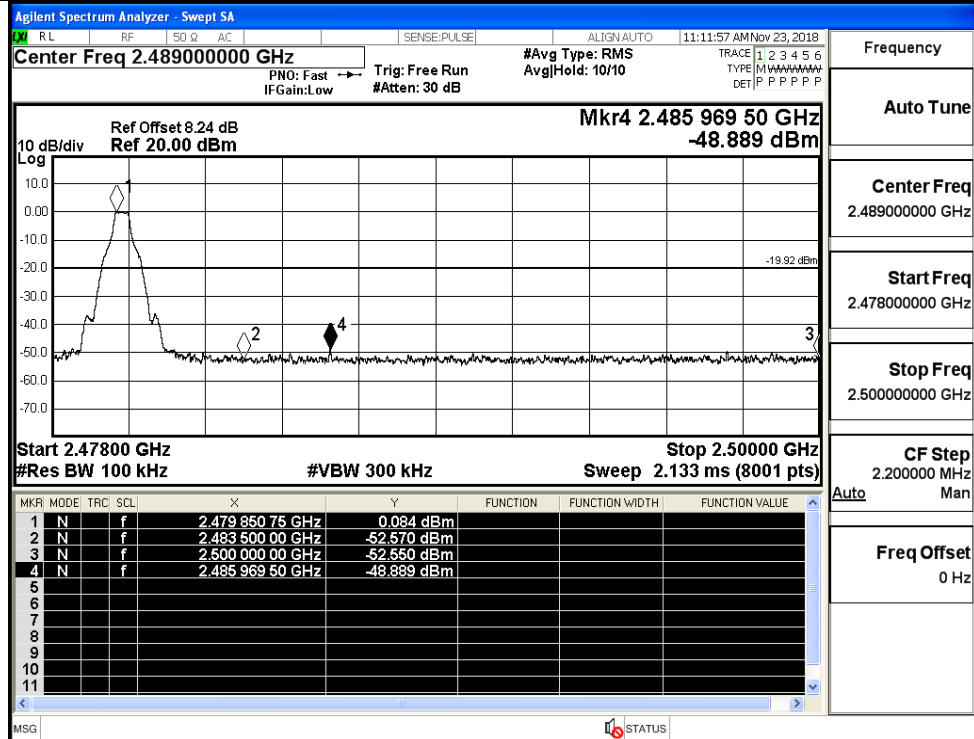
GFSK/LCH/No Hop



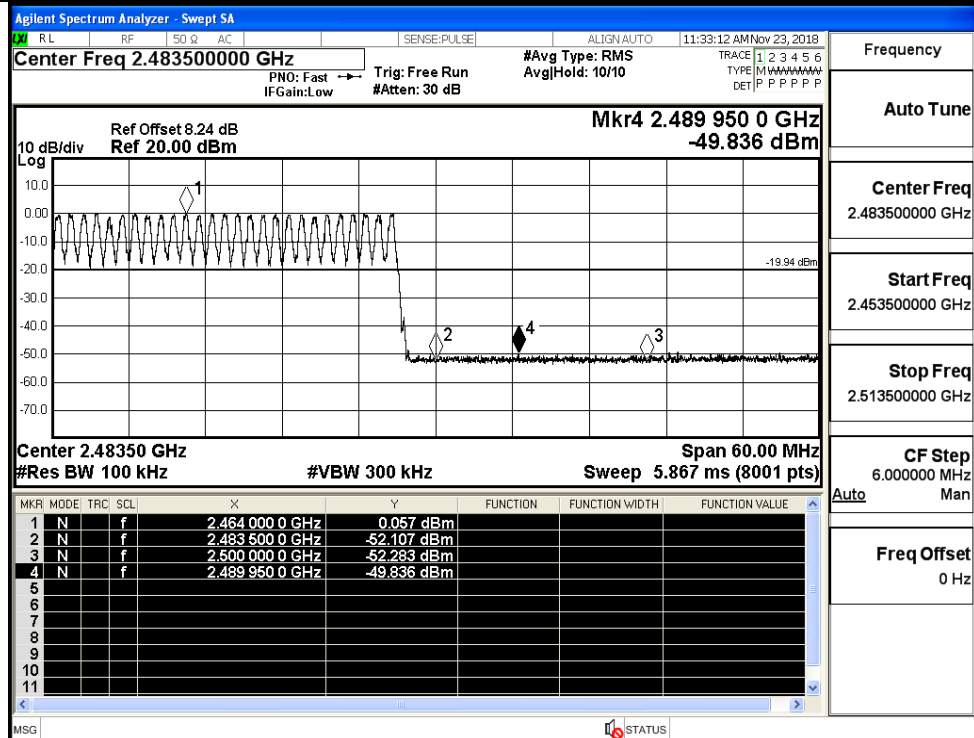
GFSK/LCH/Hop



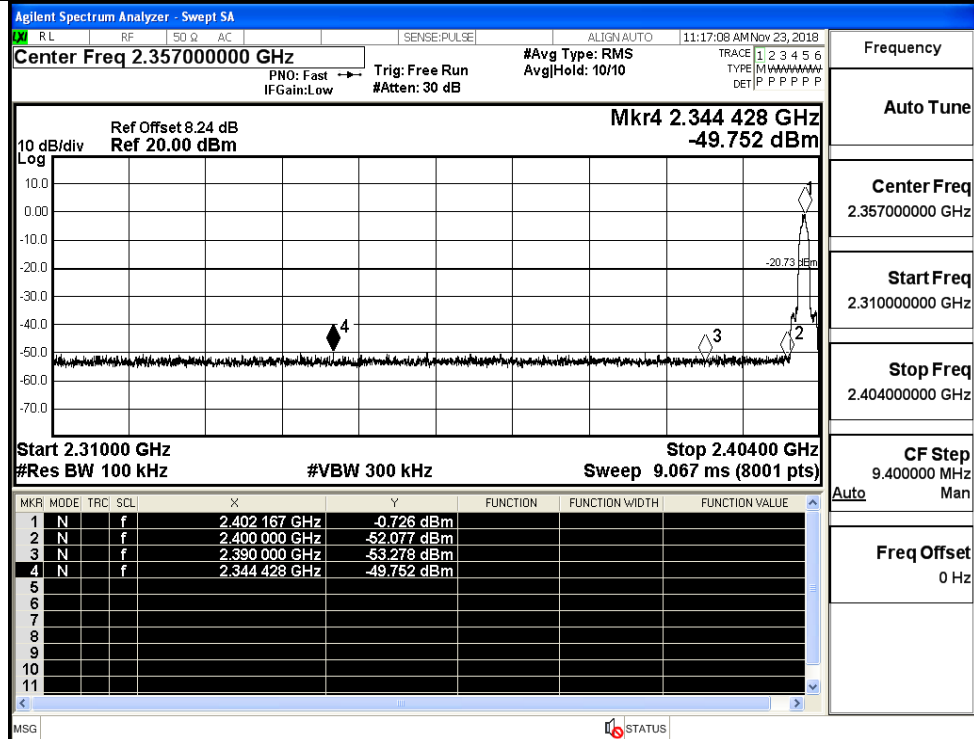
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

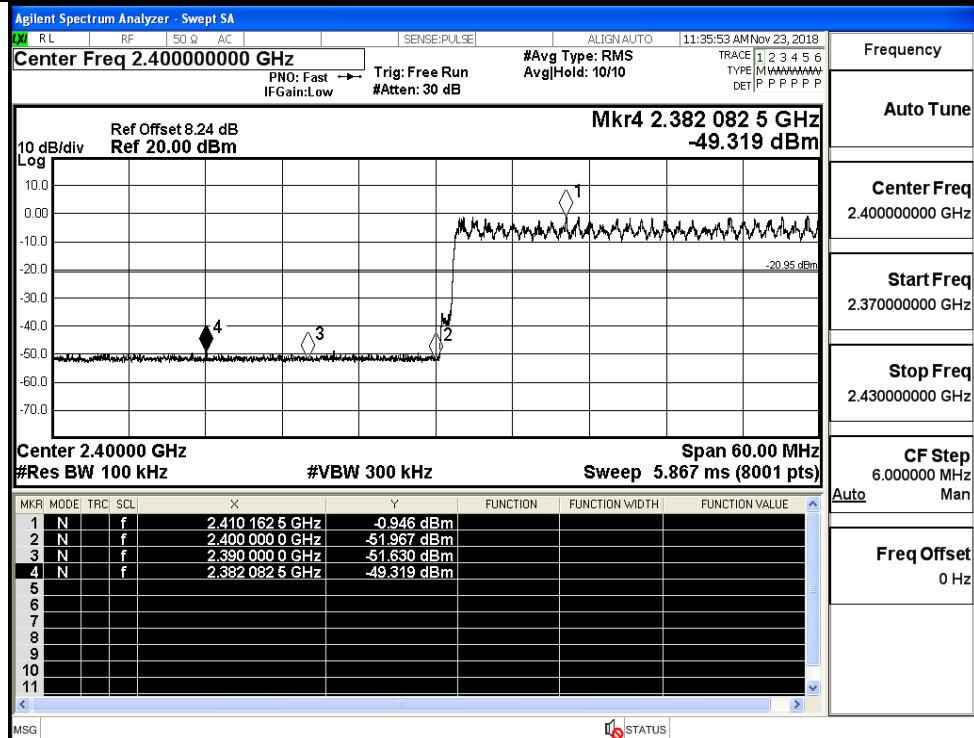
Start Freq
2.310000000 GHz

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

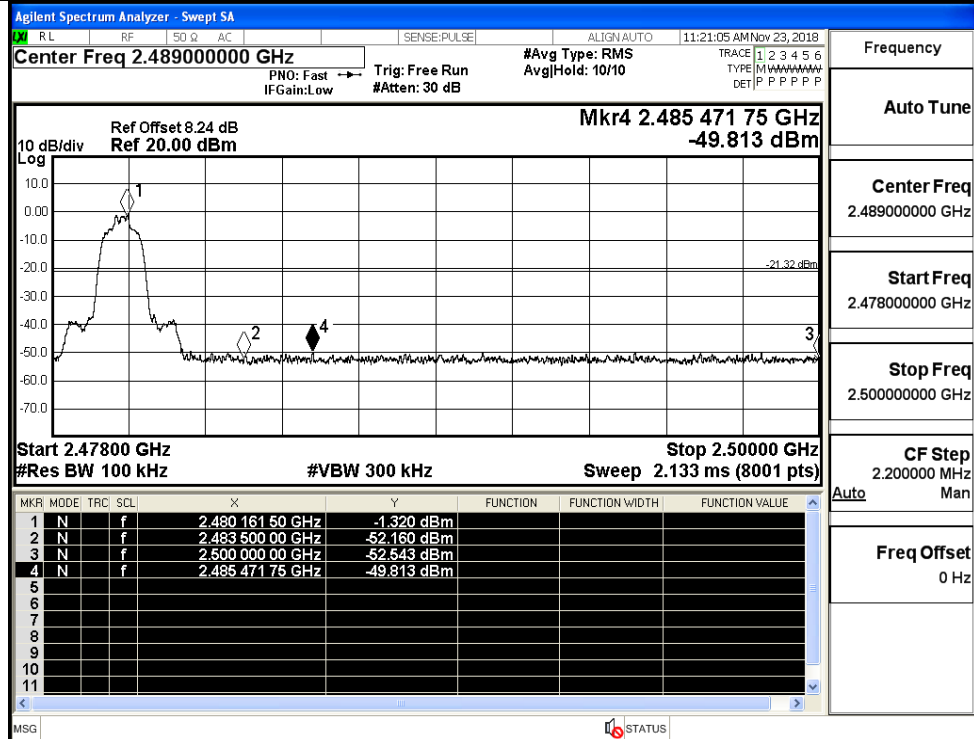
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

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



Frequency

Auto Tune

Center Freq
2.489000000 GHz

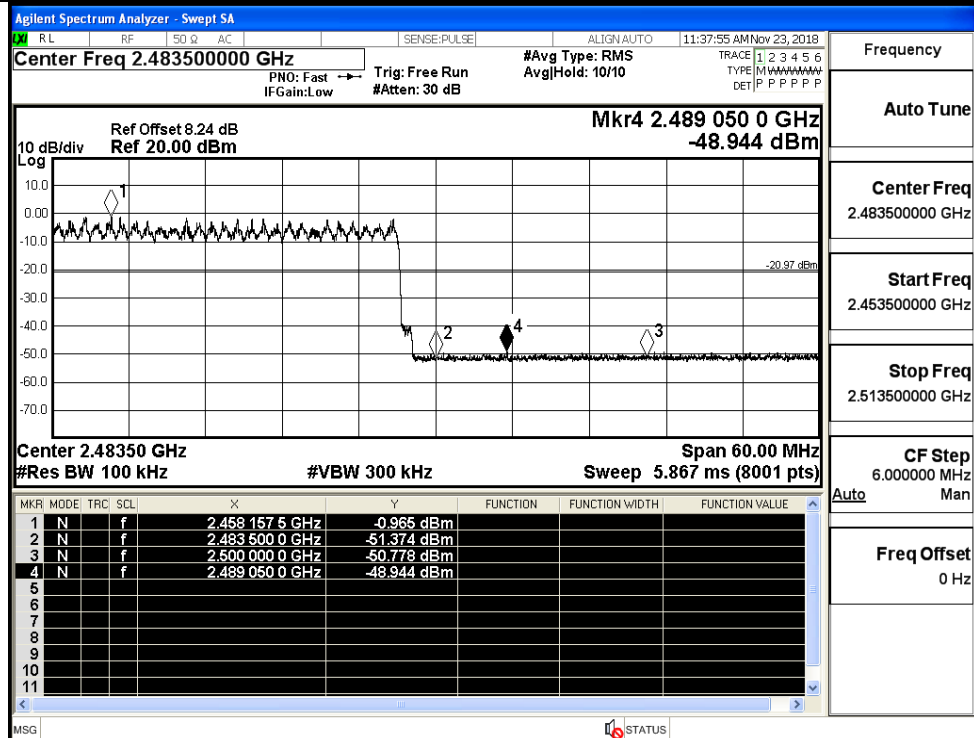
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

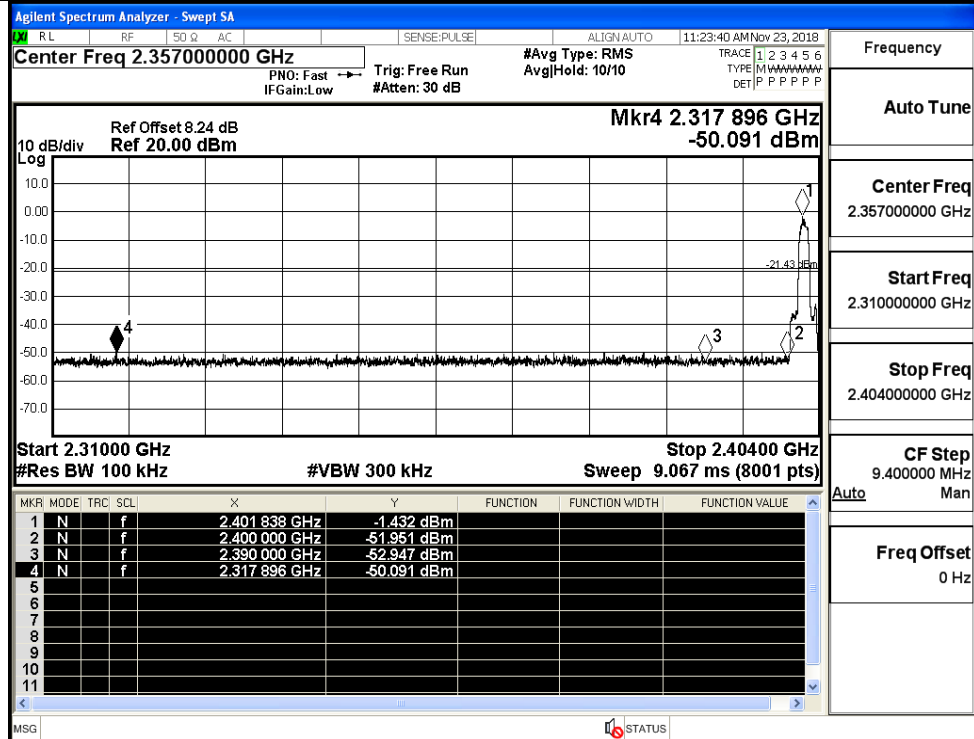
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

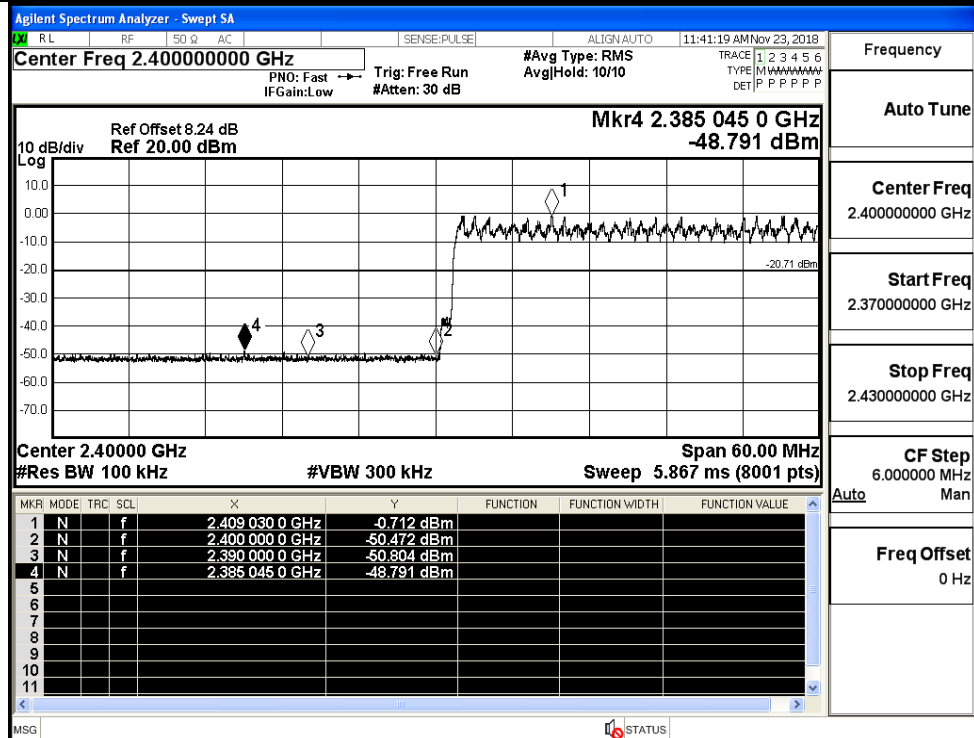
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

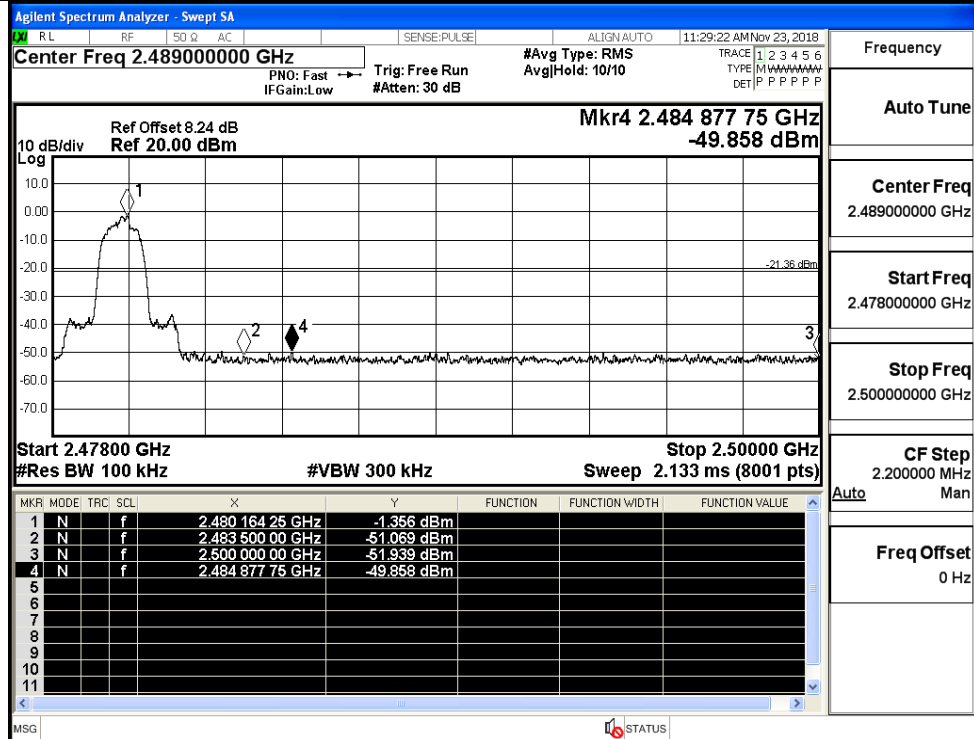
8DPSK/LCH/No Hop



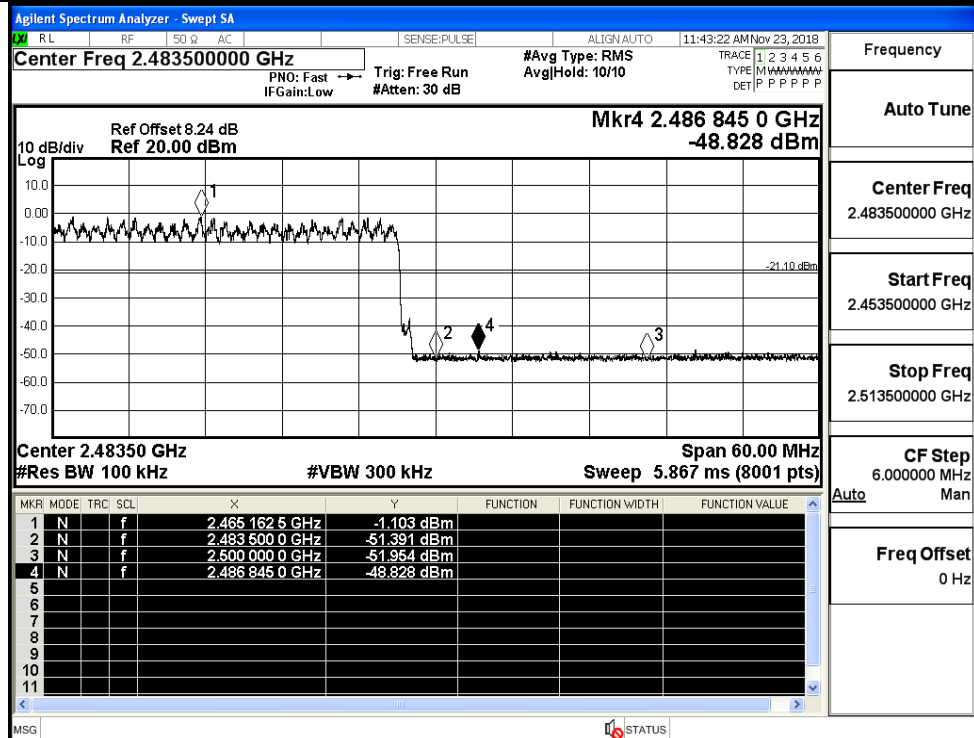
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



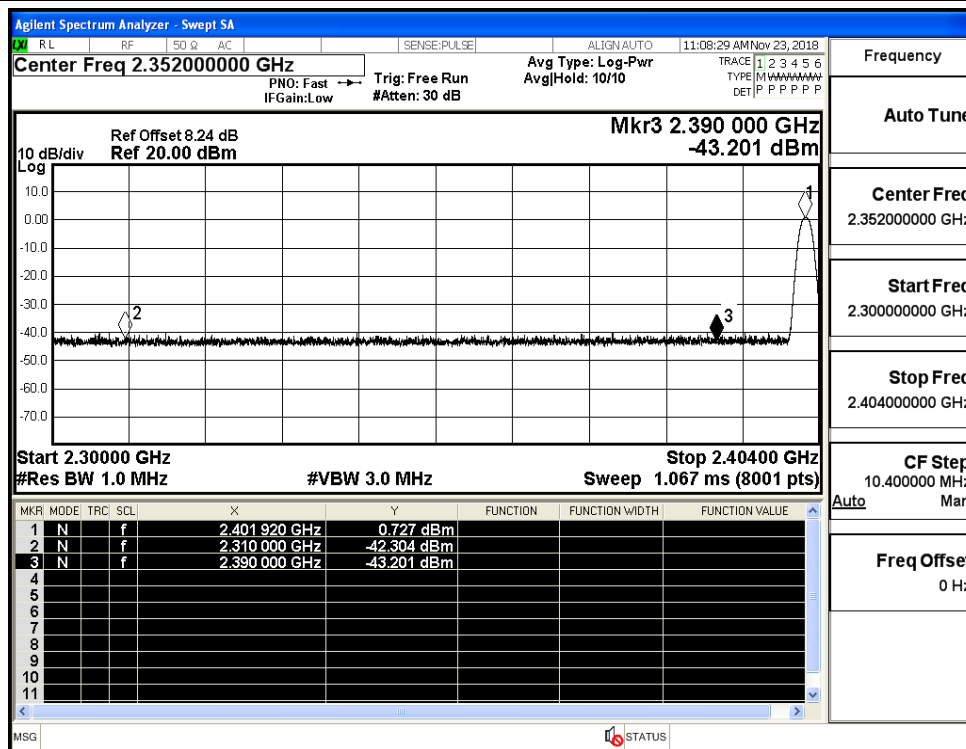
8DPSK/HCH/Hop



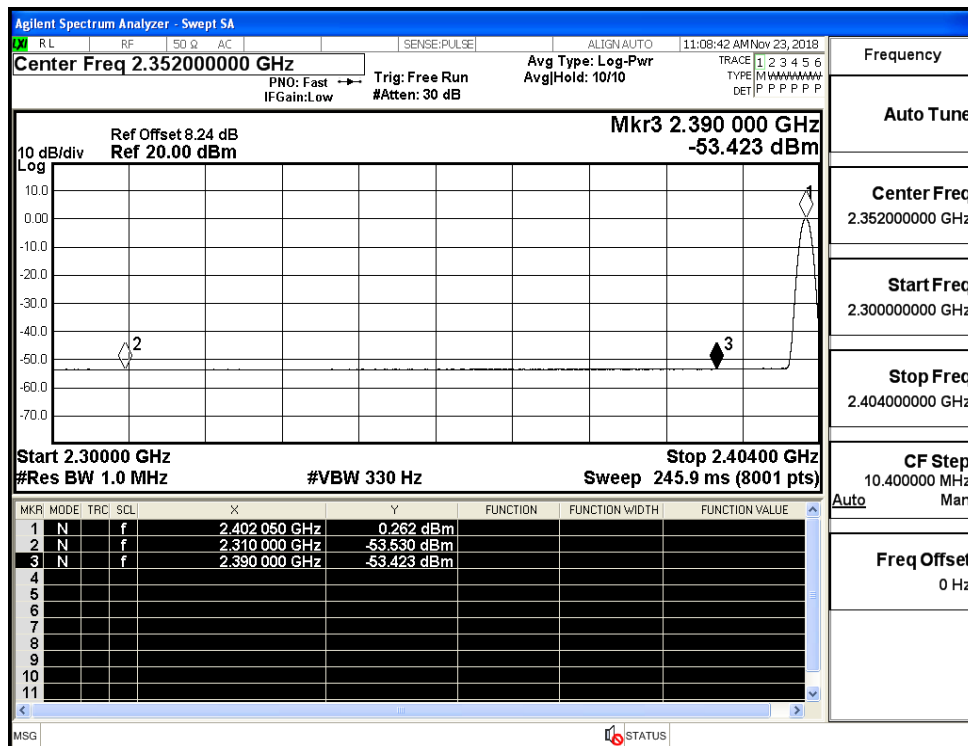
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.304	4.00	0	56.924	PEAK	74	PASS
	Off	2310.0	-53.530	4.00	0	45.698	AV	54	PASS
	Off	2390.0	-43.201	4.00	0	56.027	PEAK	74	PASS
	Off	2390.0	-53.423	4.00	0	45.805	AV	54	PASS
	Off	2483.5	-42.588	4.00	0	56.640	PEAK	74	PASS
	Off	2483.5	-52.983	4.00	0	46.245	AV	54	PASS
	Off	2500.0	-41.851	4.00	0	57.377	PEAK	74	PASS
	Off	2500.0	-52.922	4.00	0	46.306	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.704	4.00	0	55.524	PEAK	74	PASS
	Off	2310.0	-53.493	4.00	0	45.735	AV	54	PASS
	Off	2390.0	-43.534	4.00	0	55.694	PEAK	74	PASS
	Off	2390.0	-53.310	4.00	0	45.918	AV	54	PASS
	Off	2483.5	-42.473	4.00	0	56.755	PEAK	74	PASS
	Off	2483.5	-53.038	4.00	0	46.190	AV	54	PASS
	Off	2500.0	-42.956	4.00	0	56.272	PEAK	74	PASS
	Off	2500.0	-52.930	4.00	0	46.298	AV	54	PASS
8DPSK	Off	2310.0	-43.434	4.00	0	55.794	PEAK	74	PASS
	Off	2310.0	-53.588	4.00	0	45.640	AV	54	PASS
	Off	2390.0	-43.592	4.00	0	55.636	PEAK	74	PASS
	Off	2390.0	-53.359	4.00	0	45.869	AV	54	PASS
	Off	2483.5	-43.221	4.00	0	56.007	PEAK	74	PASS
	Off	2483.5	-53.034	4.00	0	46.194	AV	54	PASS
	Off	2500.0	-42.739	4.00	0	56.489	PEAK	74	PASS
	Off	2500.0	-52.934	4.00	0	46.294	AV	54	PASS

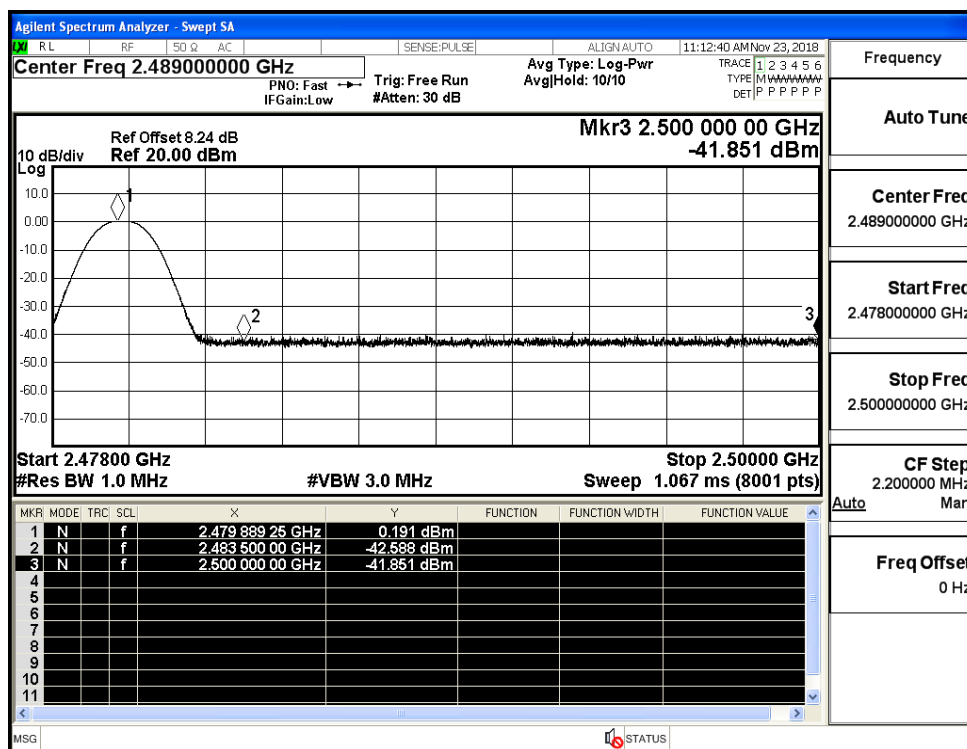
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



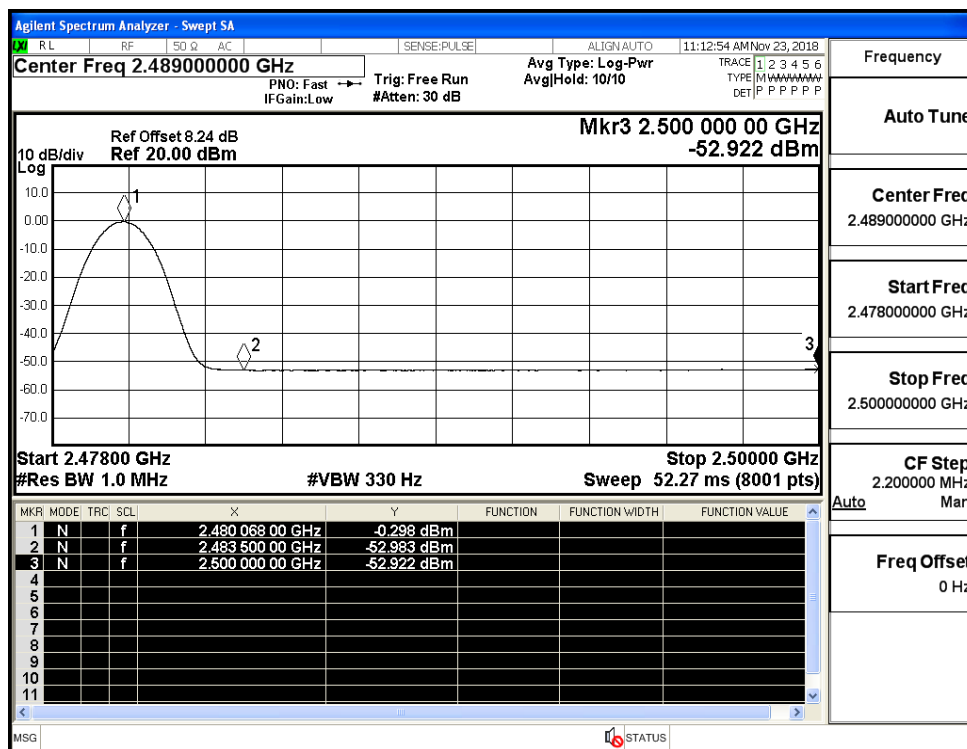
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

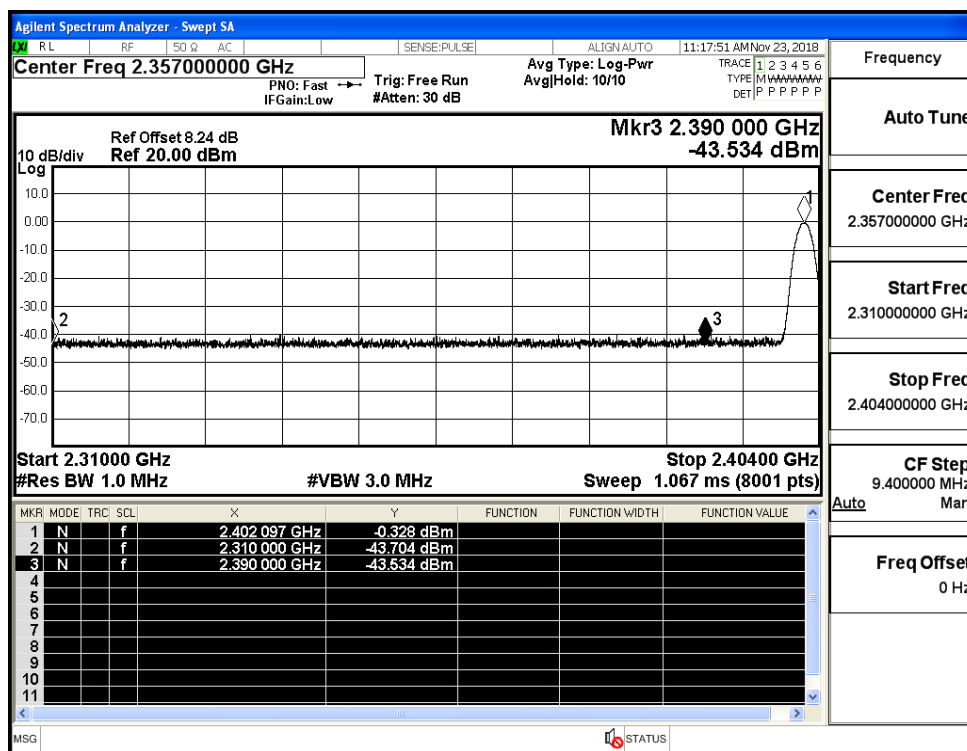
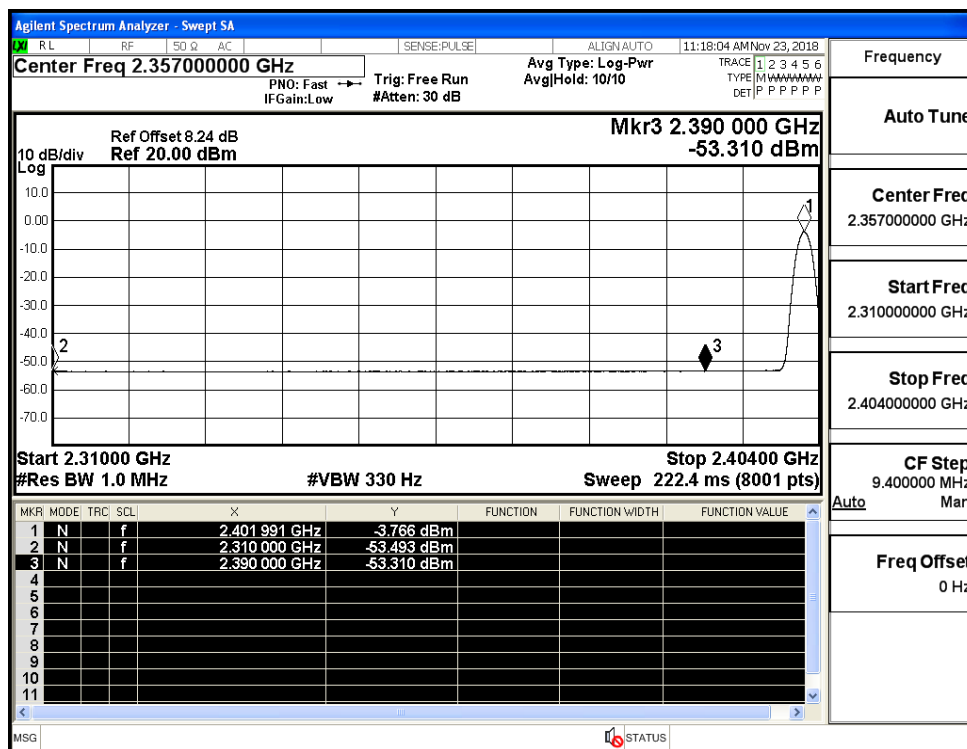


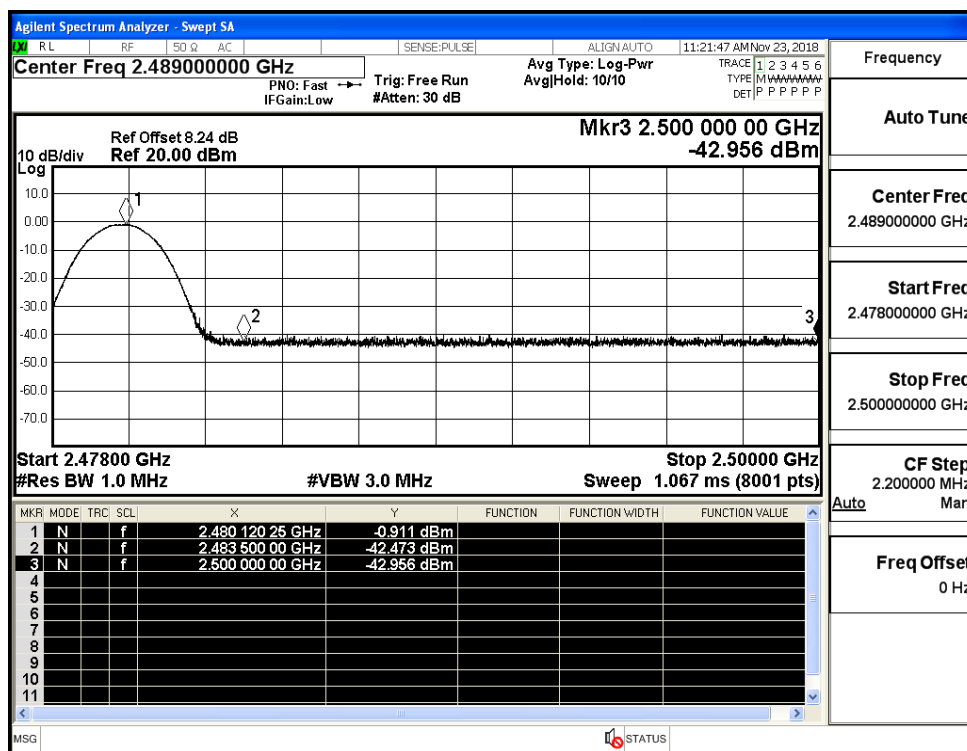
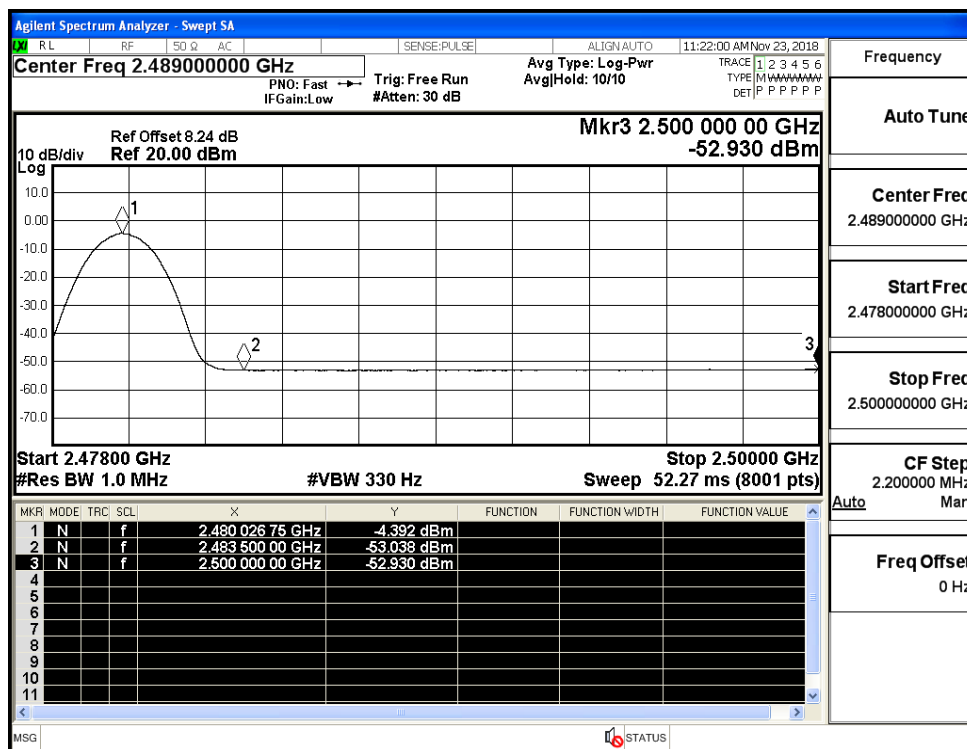
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



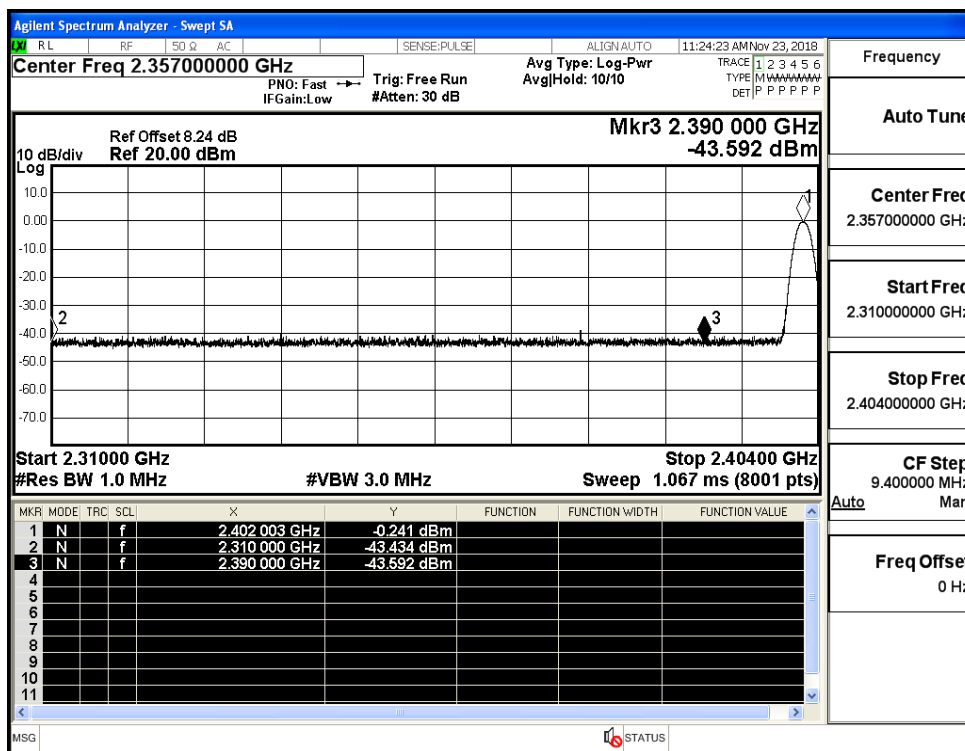
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



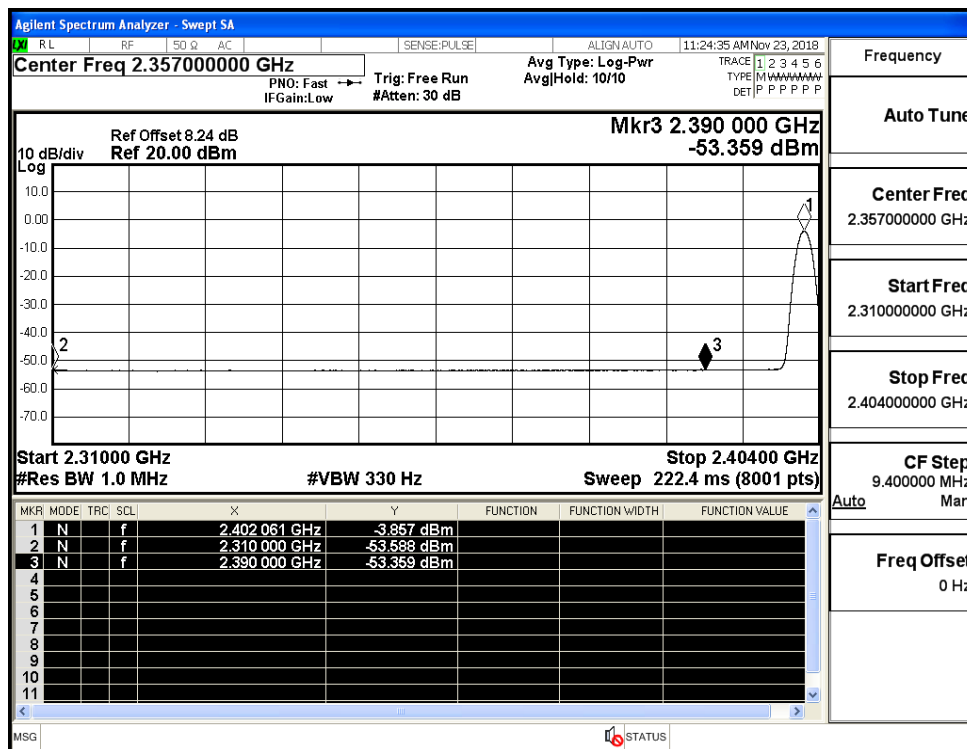
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

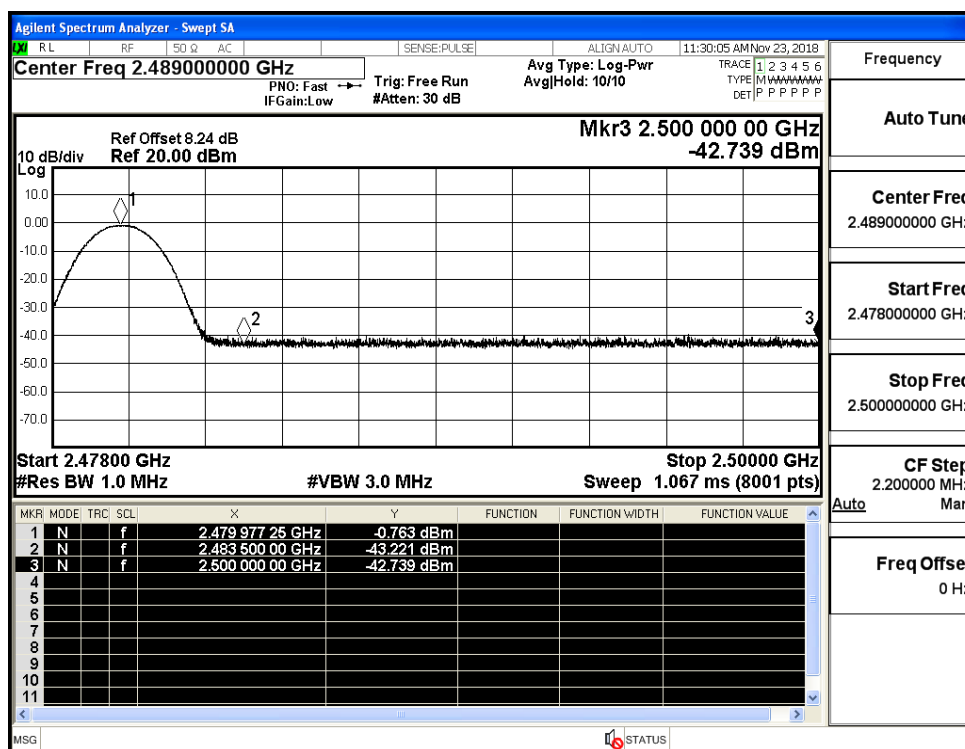
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

