

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

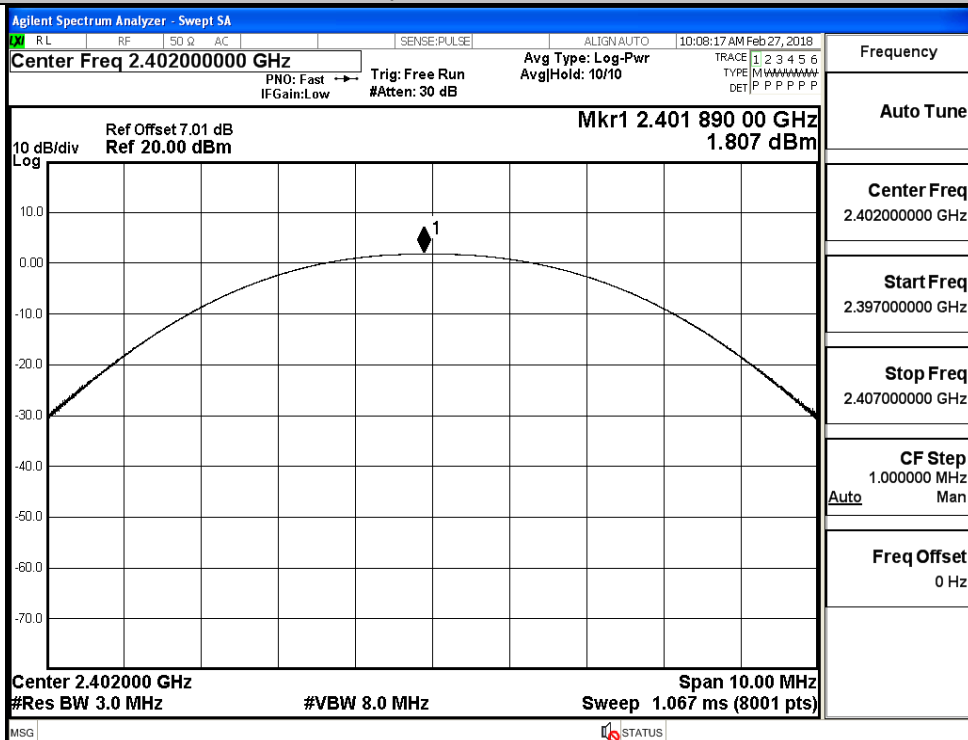
Temperature:	20.8 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom Liu
Supervised by:	Jayden Zhuo

A.1 Maxmum Conducted Peak Output Power

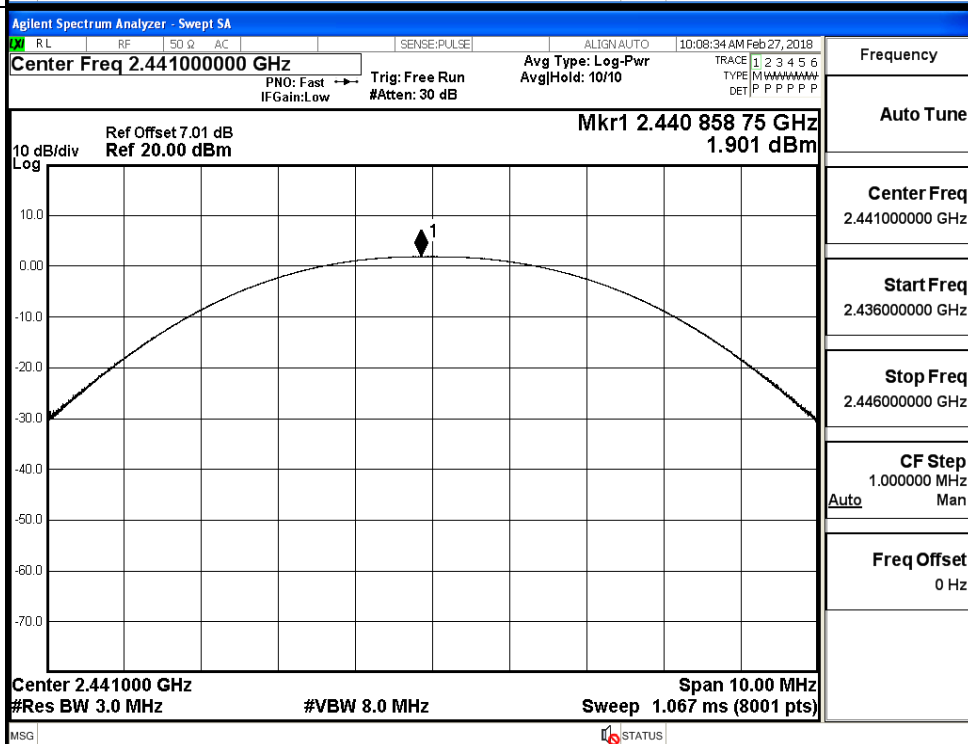
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.807	30	PASS
	MCH	1.901	30	PASS
	HCH	1.879	30	PASS
$\pi/4$ DQPSK	LCH	1.628	21	PASS
	MCH	1.754	21	PASS
	HCH	1.740	21	PASS
8DPSK	LCH	1.854	21	PASS
	MCH	1.971	21	PASS
	HCH	1.972	21	PASS

Test Graphs

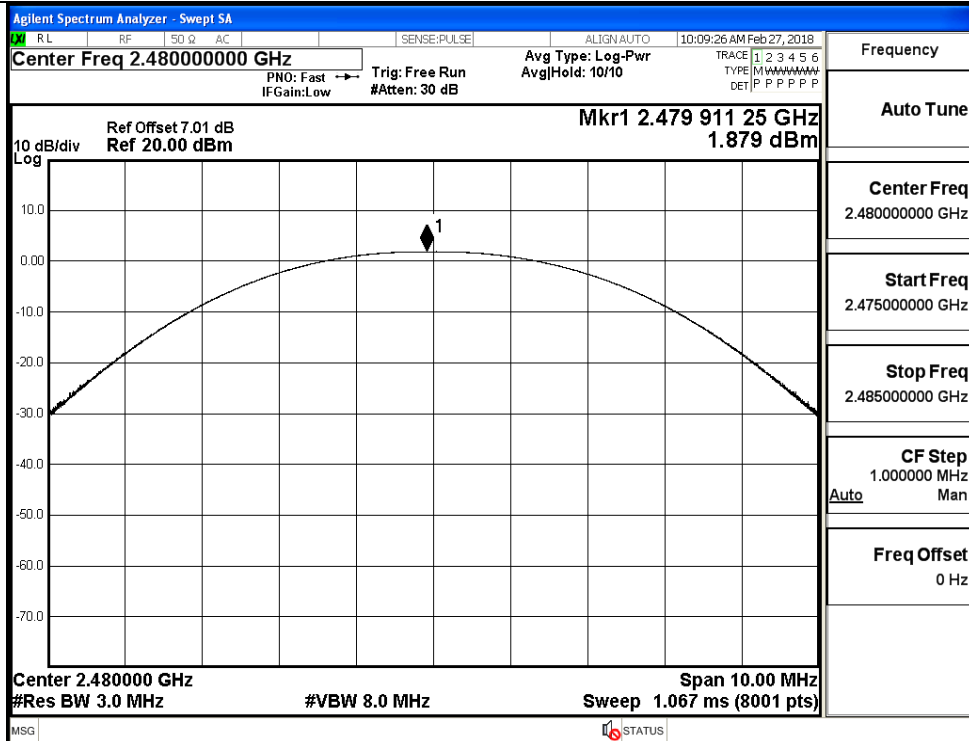
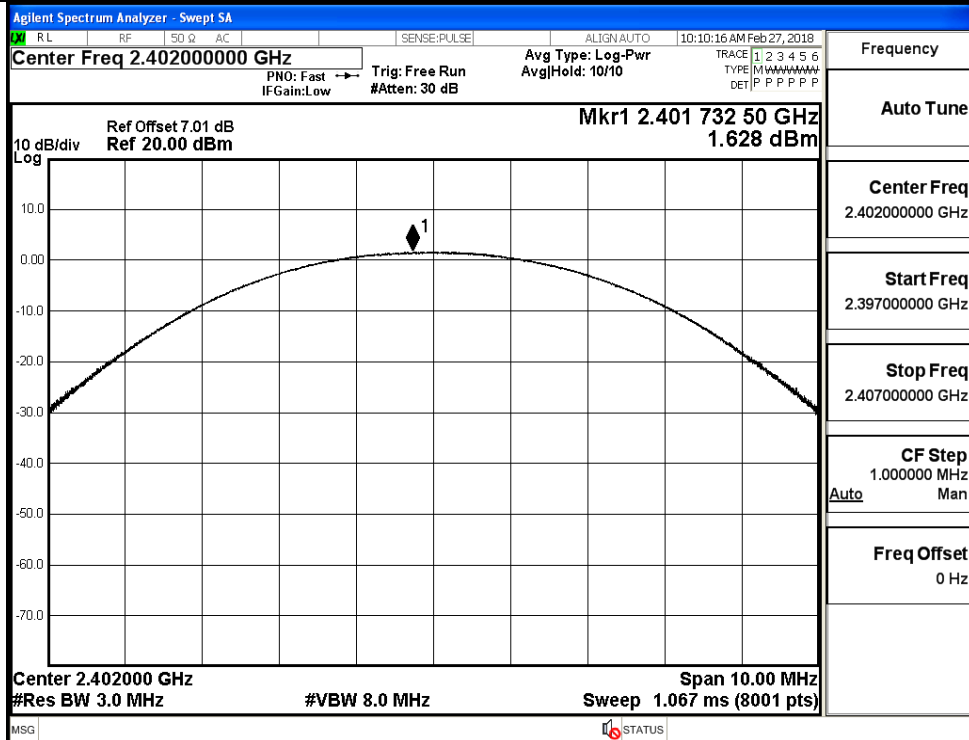
GFSK/LCH

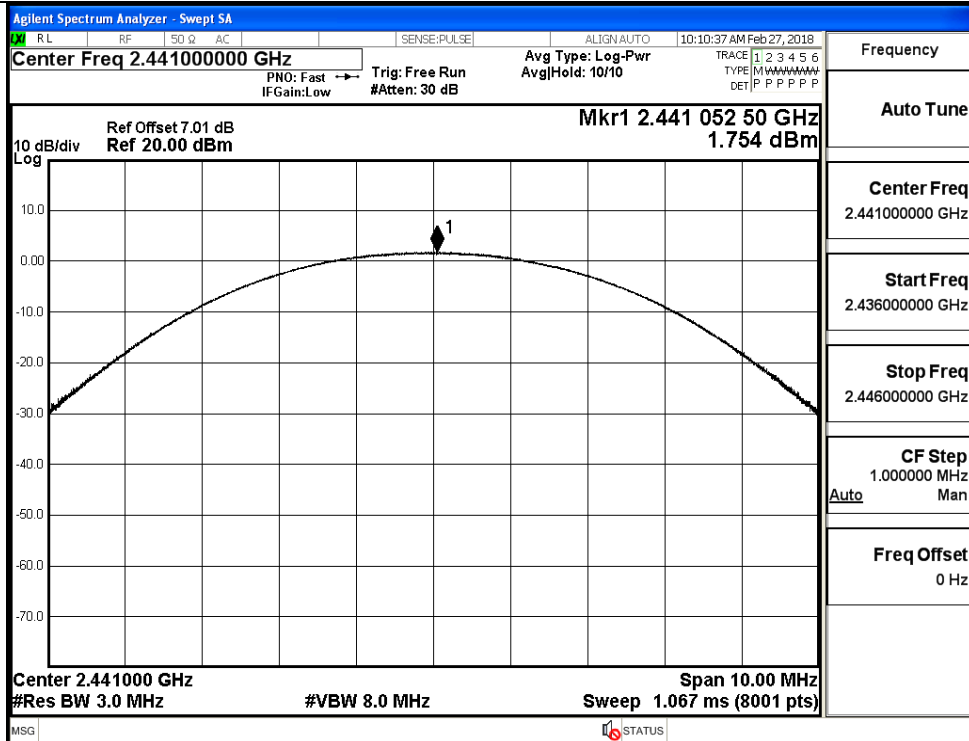
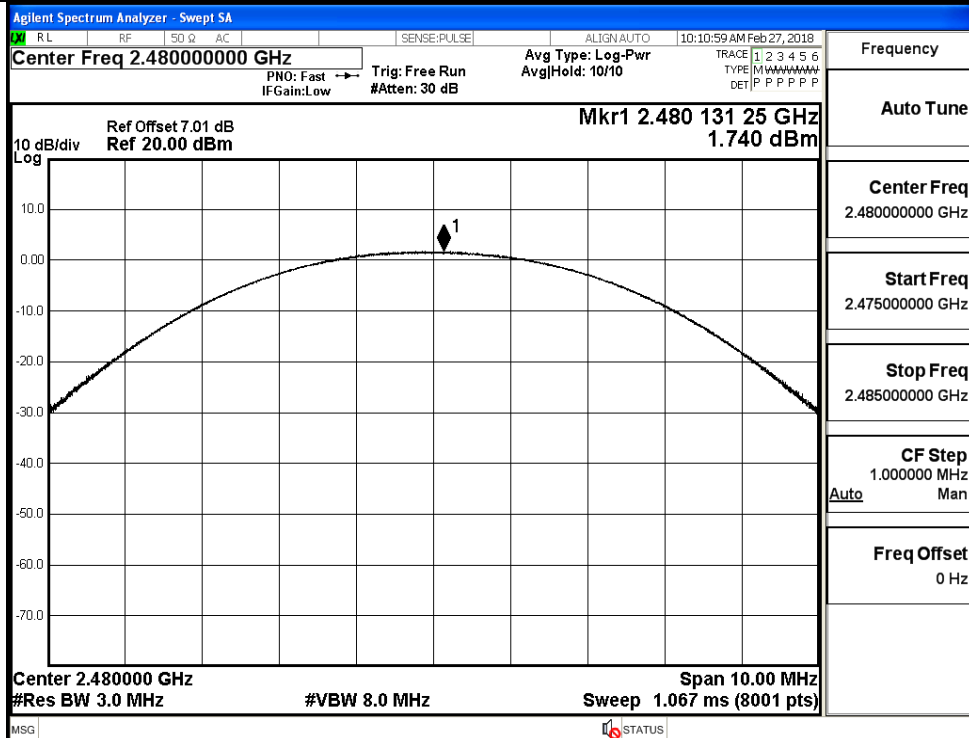


GFSK/MCH

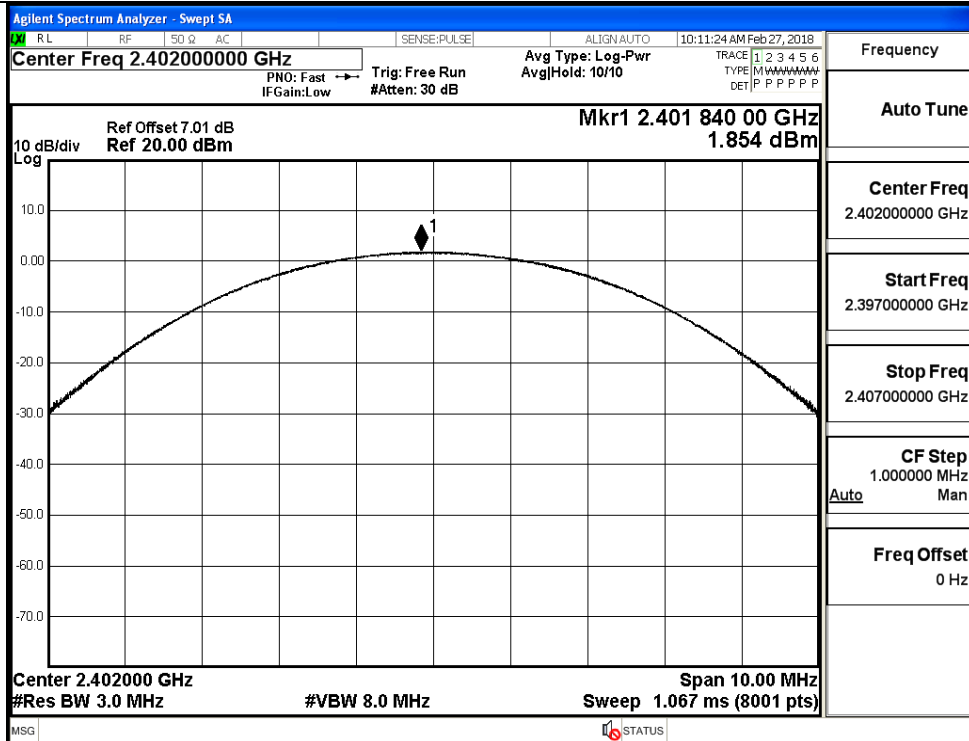


GFSK/HCH

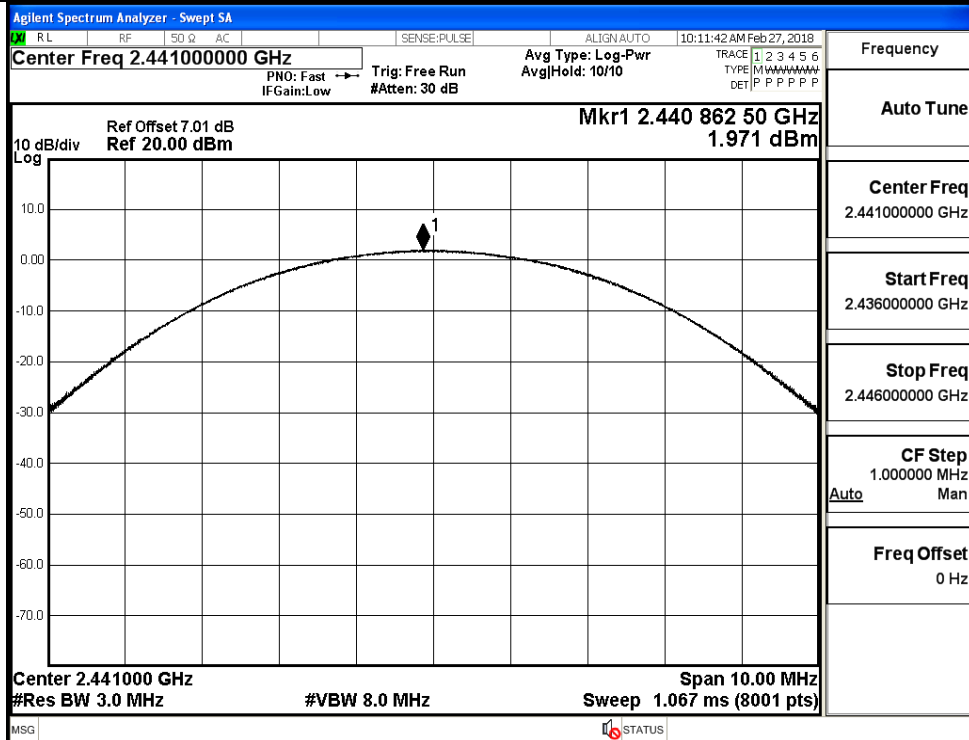
 π /4DQPSK/LCH

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

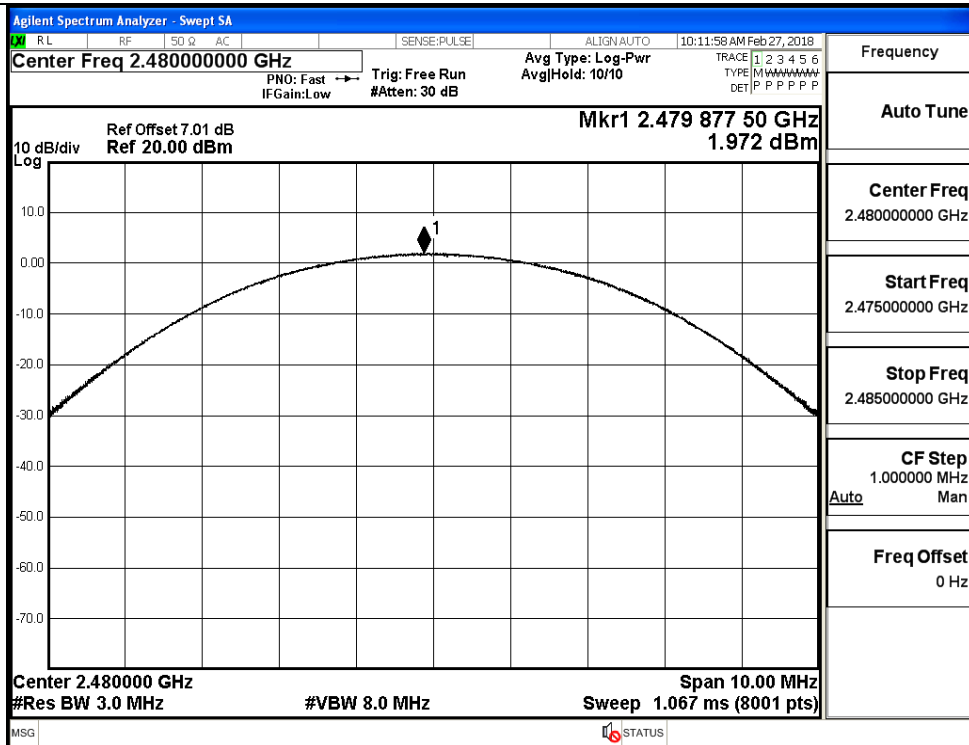
8DPSK/LCH



8DPSK/MCH



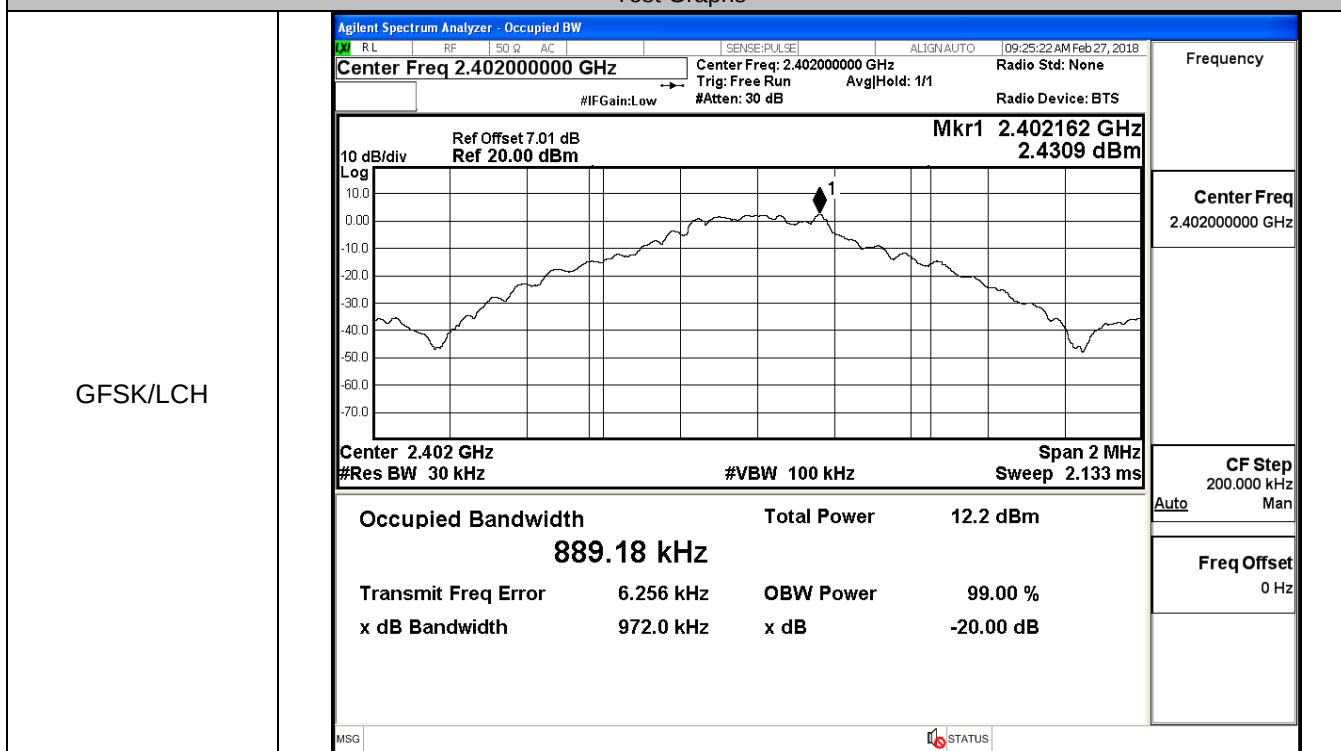
8DPSK/HCH



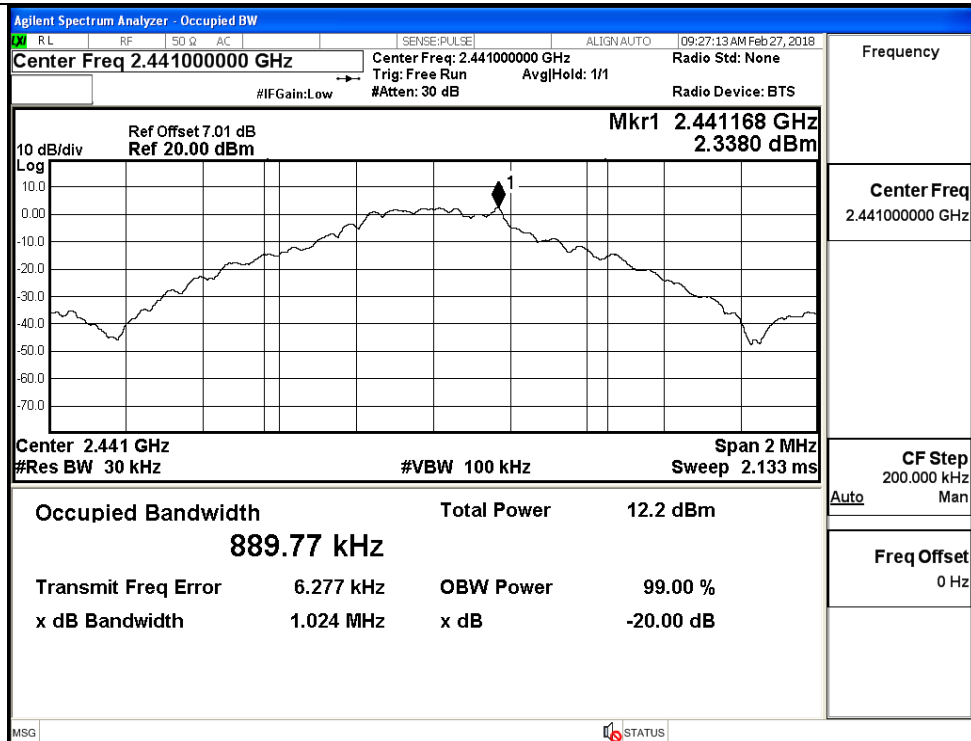
A.2 20dB Bandwidth

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

Test Graphs



GFSK/MCH



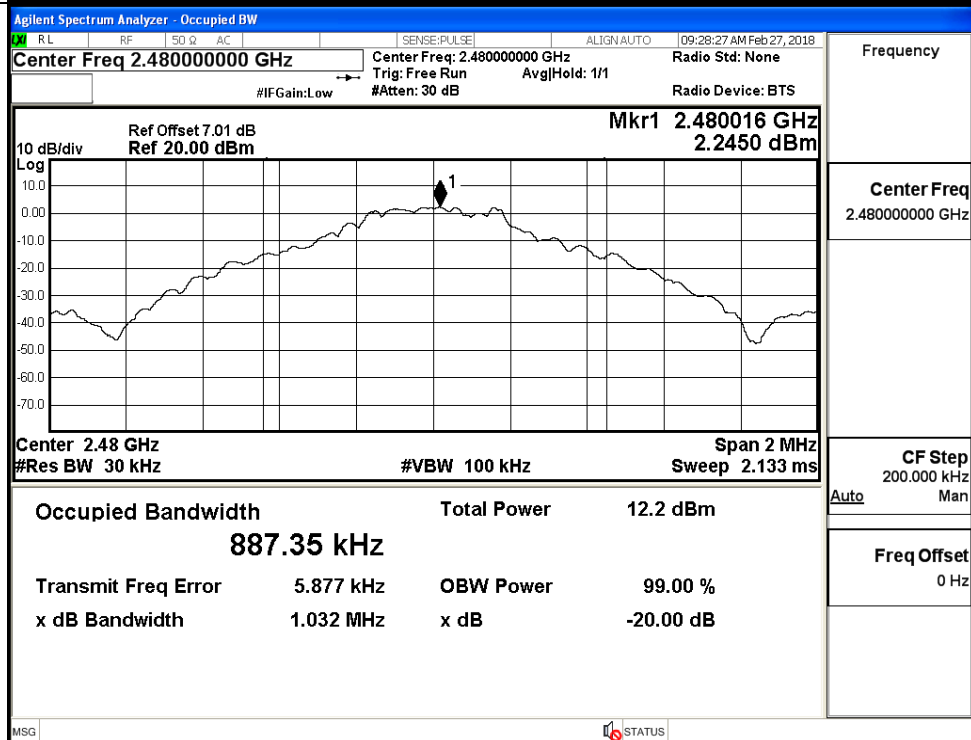
Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

GFSK/HCH

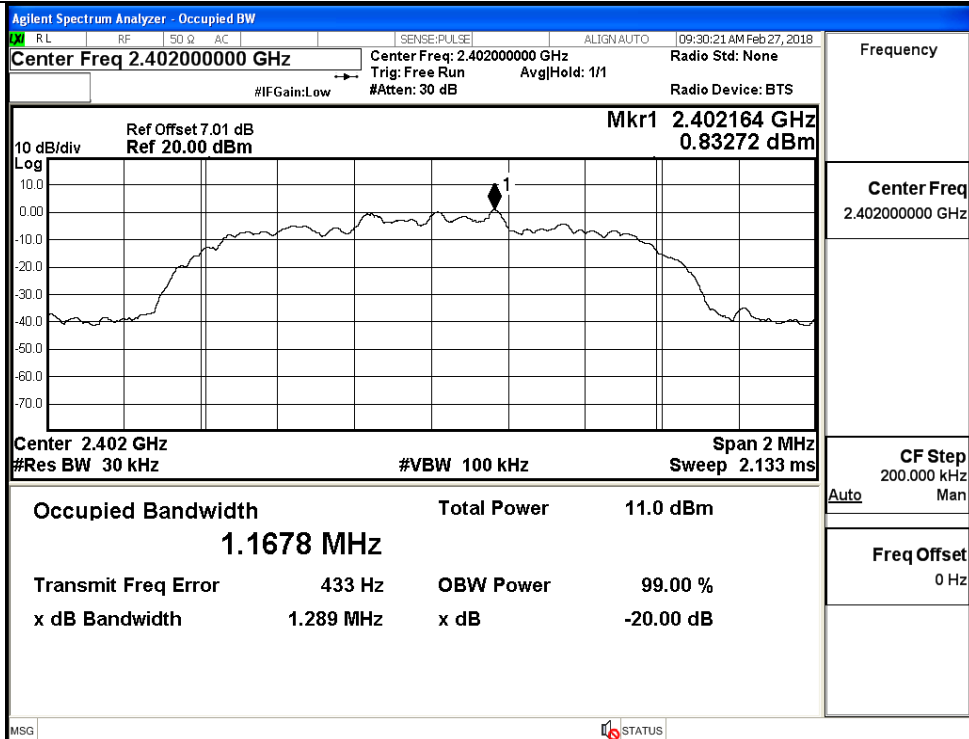
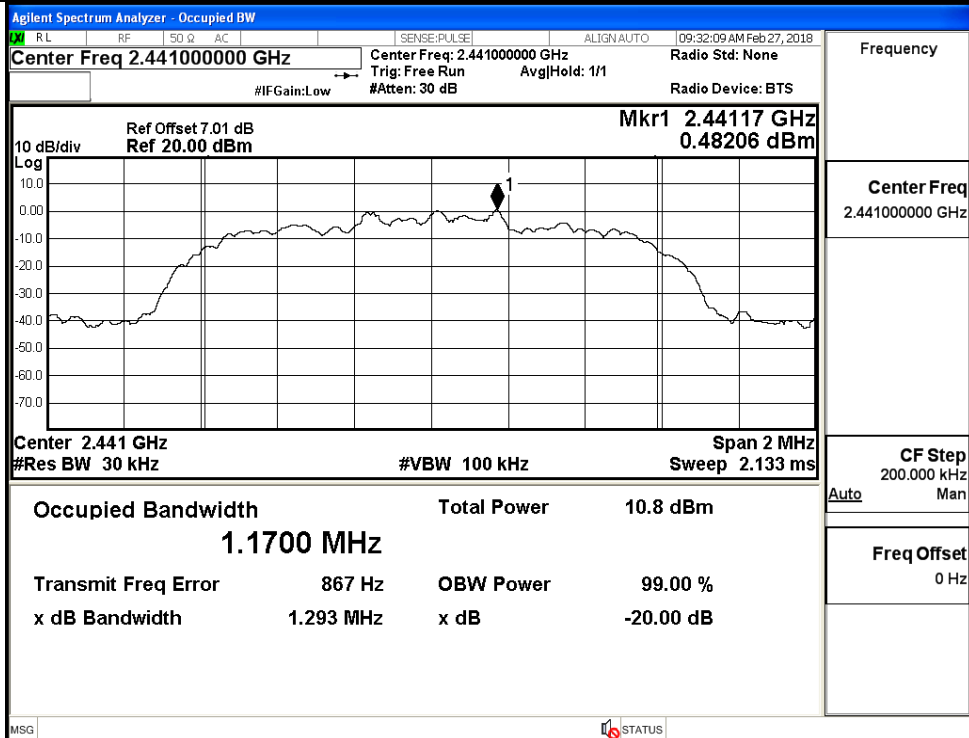


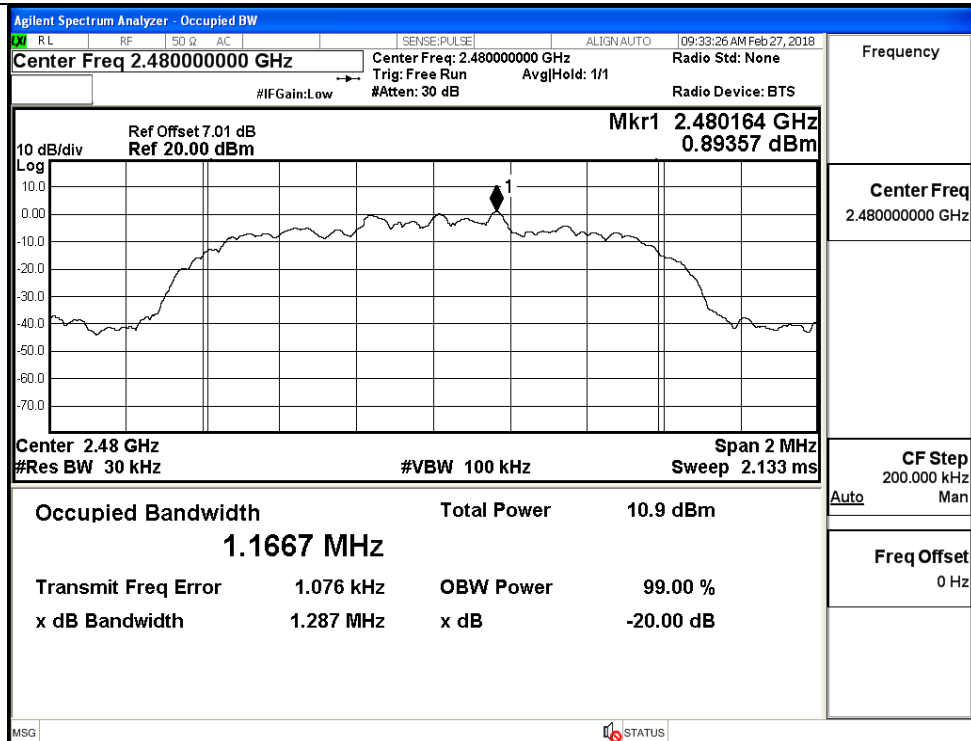
Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

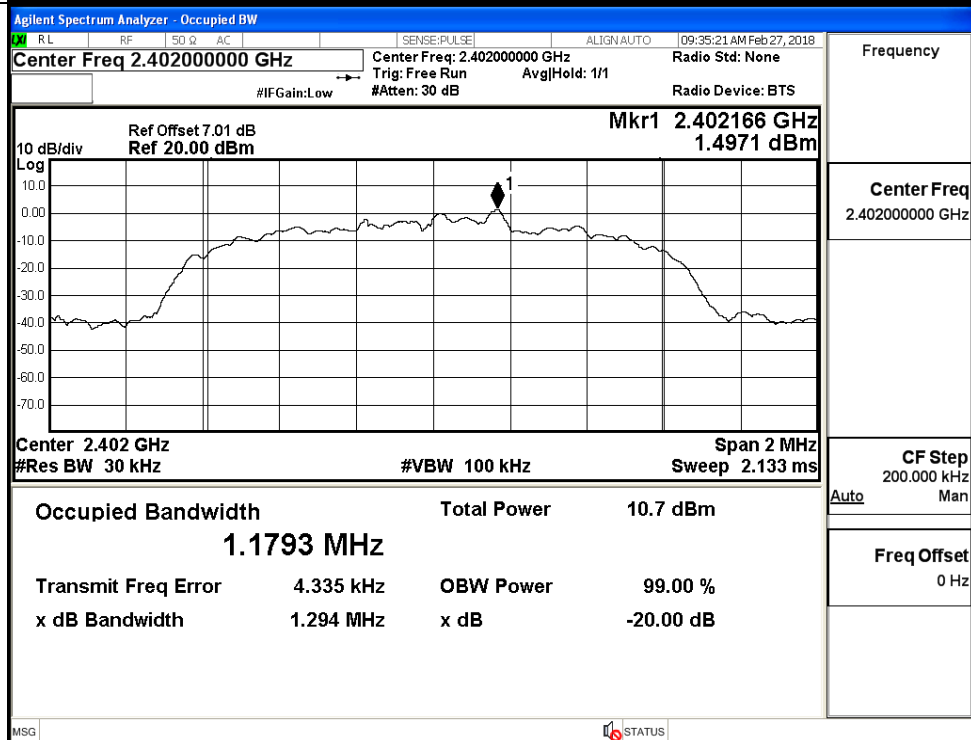
Auto

Freq Offset
0 Hz

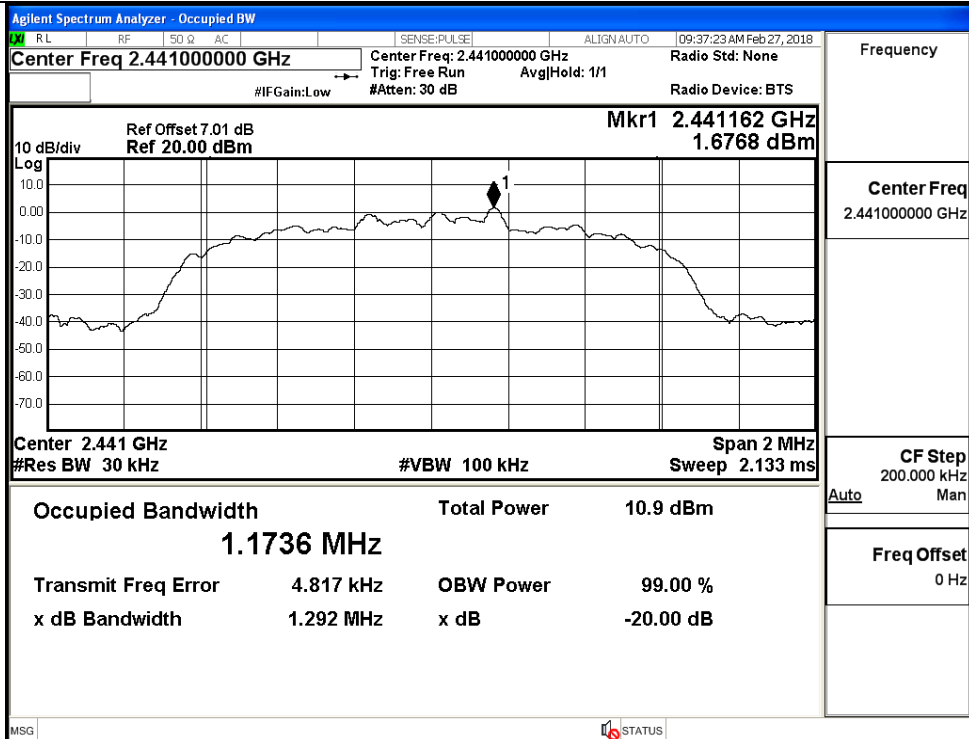
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

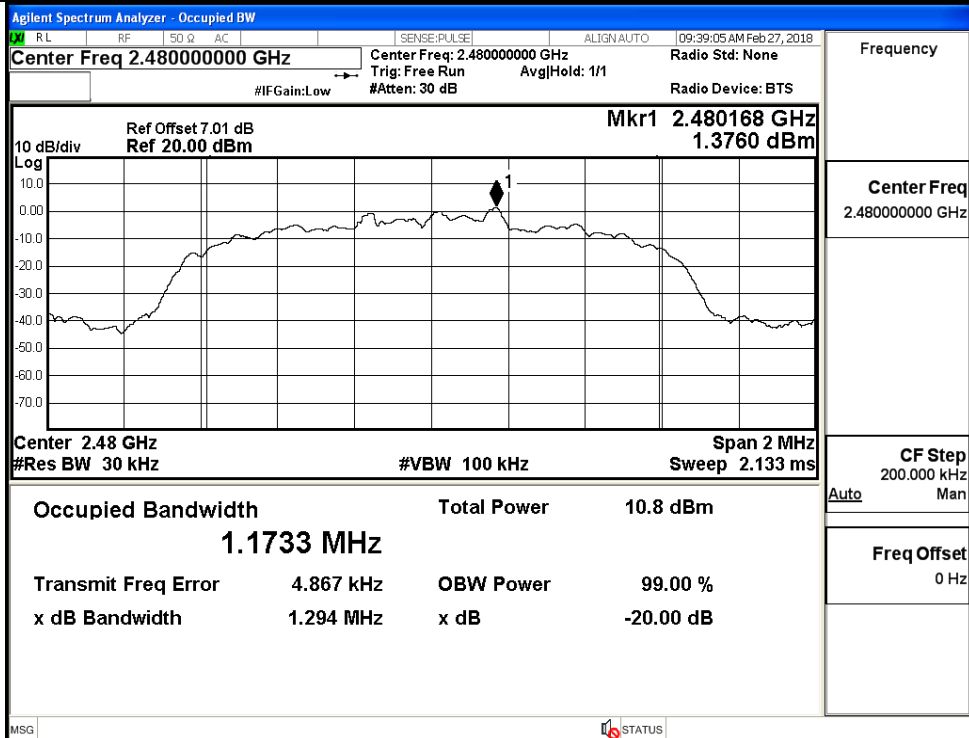
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

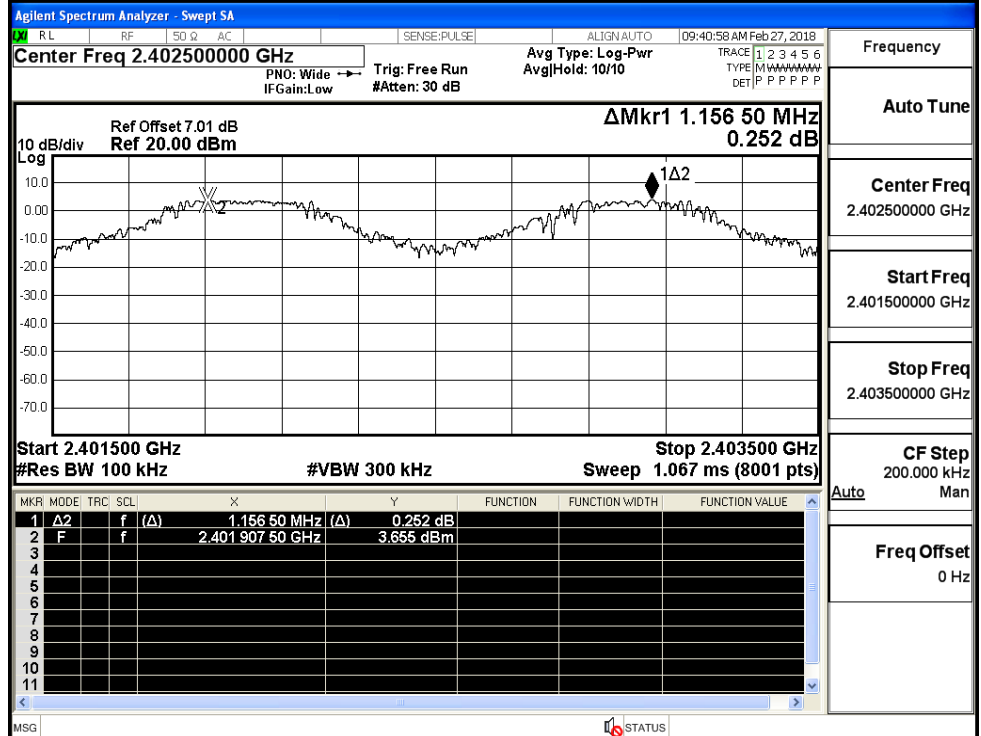


A.3 Carrier Frequency Separation

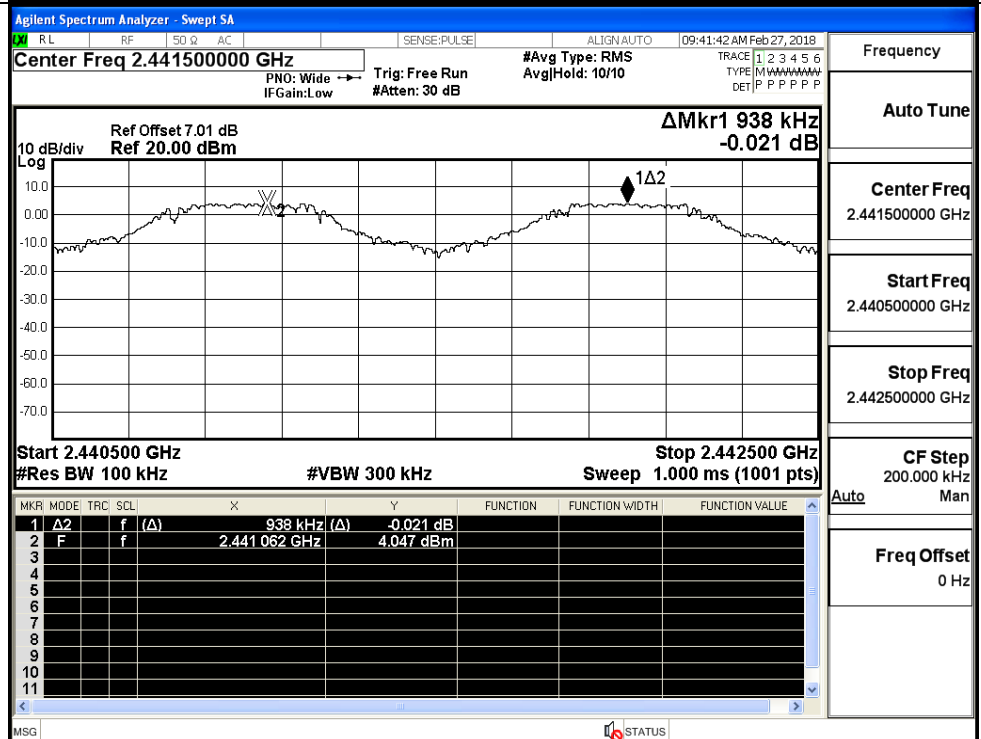
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.157	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
	MCH	0.938	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
	HCH	0.786	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
$\pi/4$ DQPSK	LCH	1.092	2/3 of the 20dB Bandwidth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

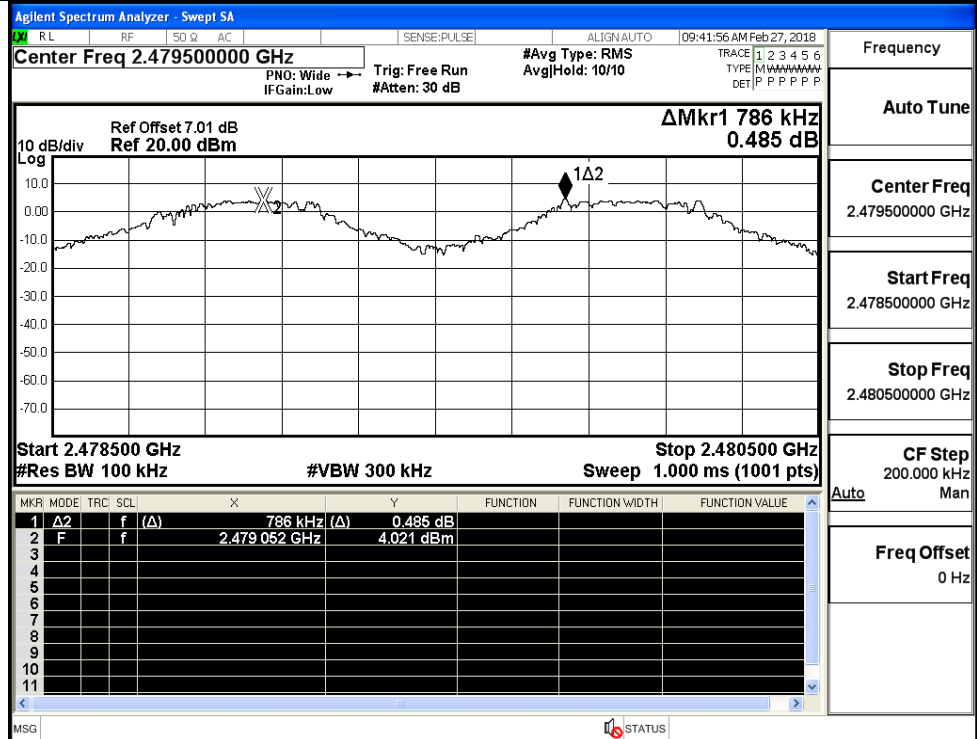
GFSK/LCH



GFSK/MCH



GFSK/HCH

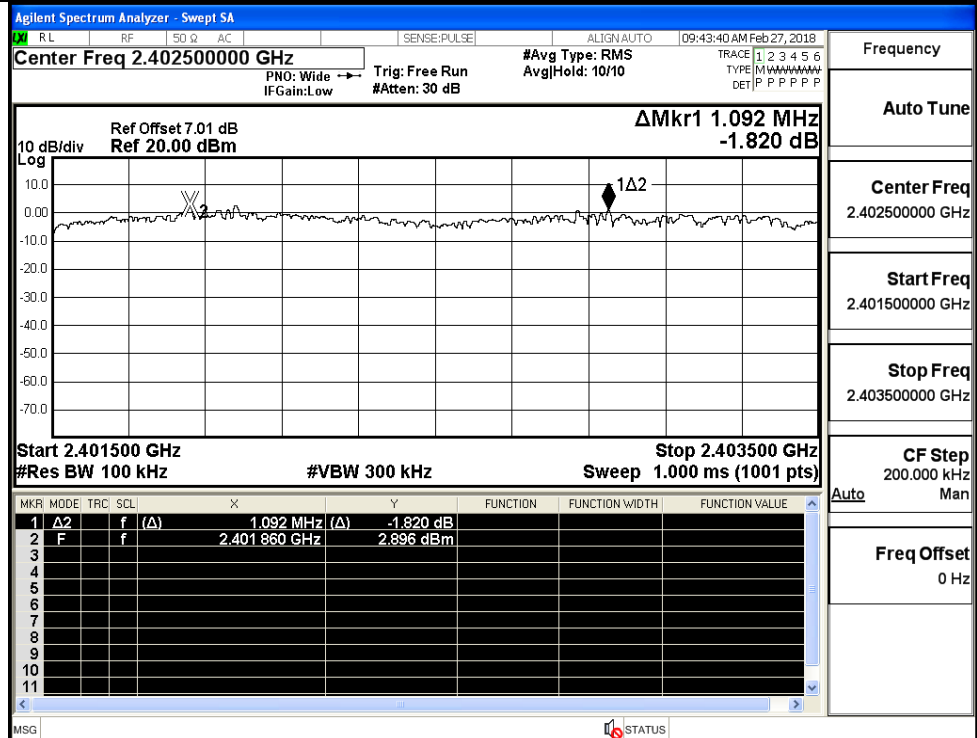


Frequency

Auto Tune

Center Freq
2.479500000 GHzStart Freq
2.478500000 GHzStop Freq
2.480500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

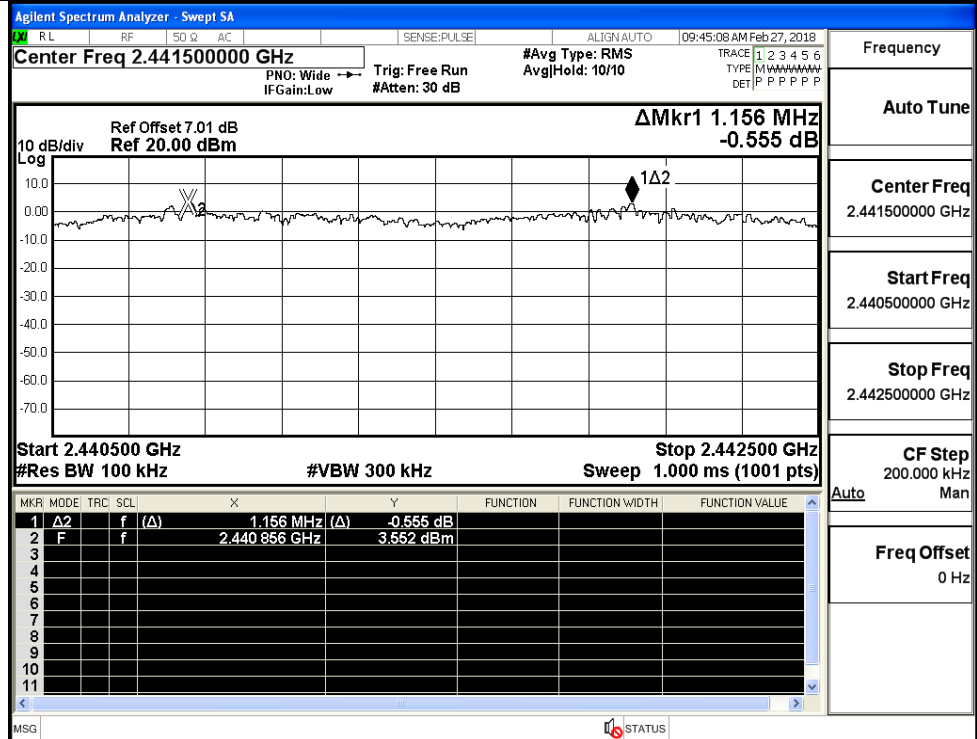
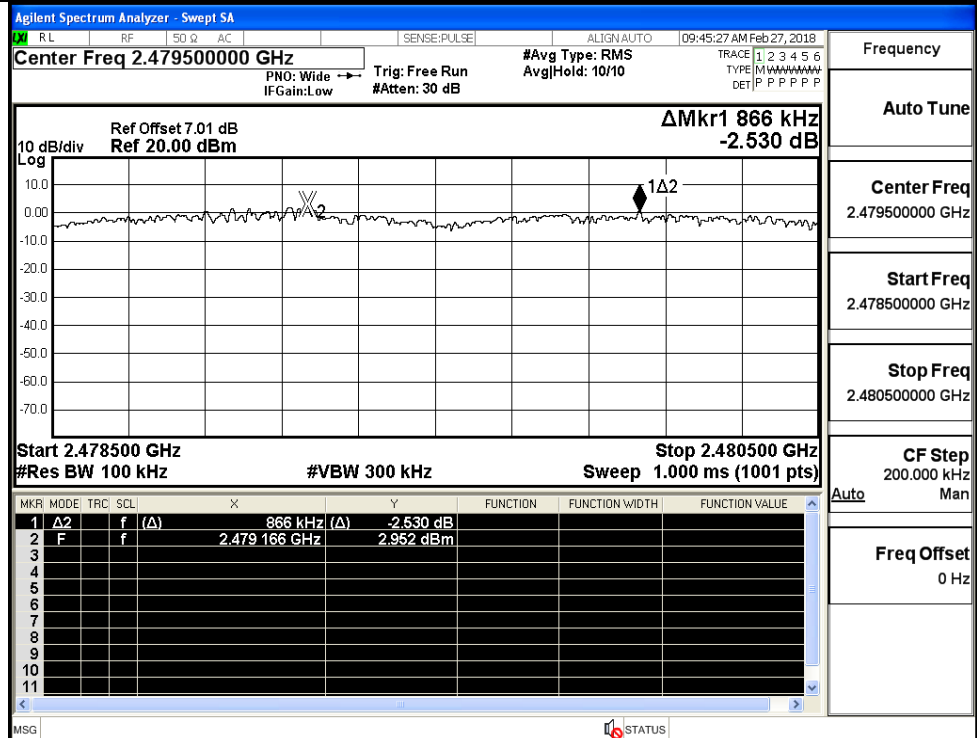
π/4DQPSK/LCH



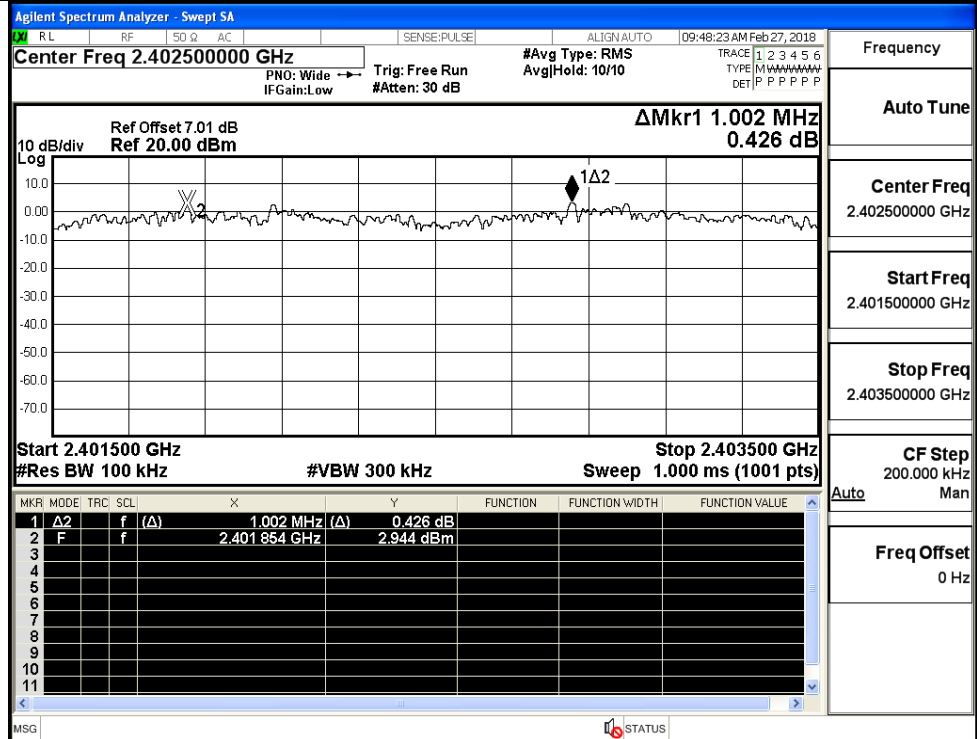
Frequency

Auto Tune

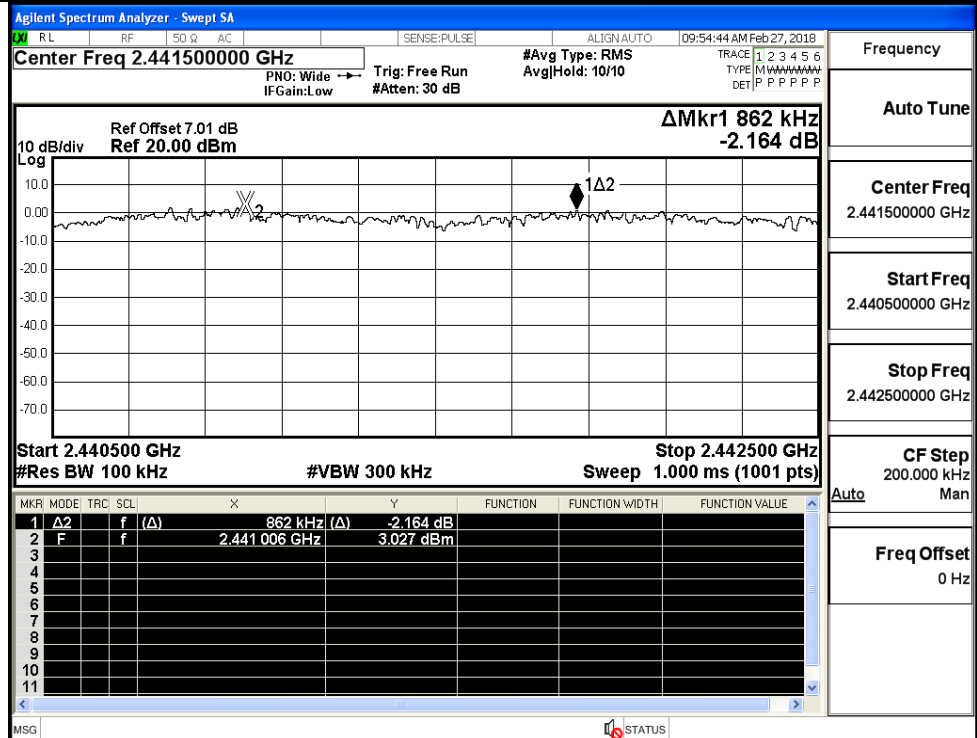
Center Freq
2.402500000 GHzStart Freq
2.401500000 GHzStop Freq
2.403500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

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

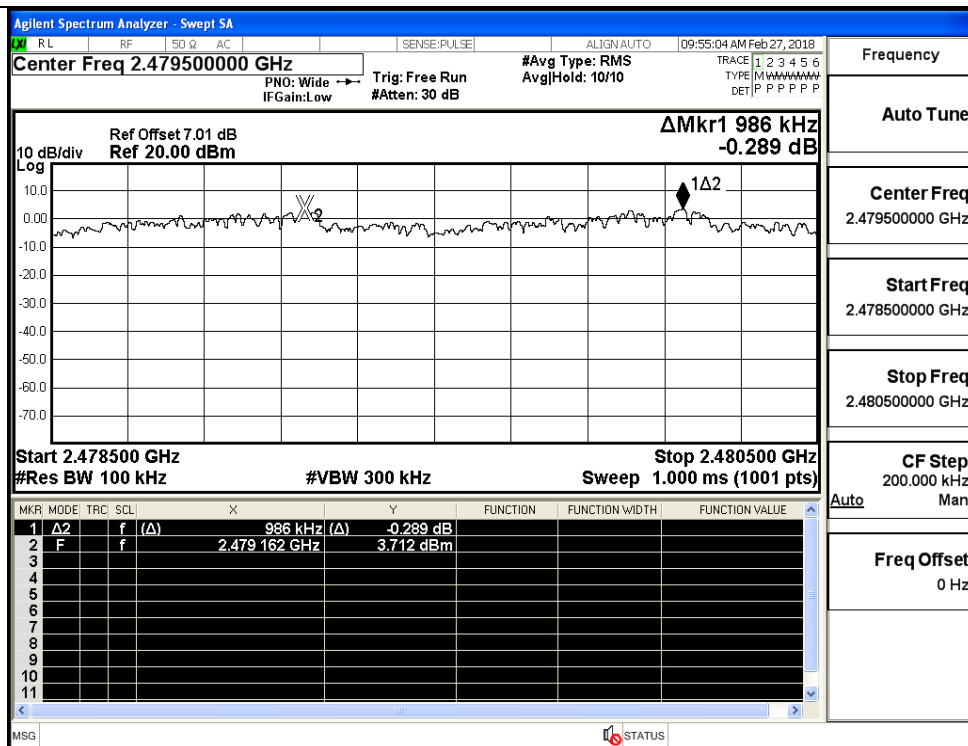
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

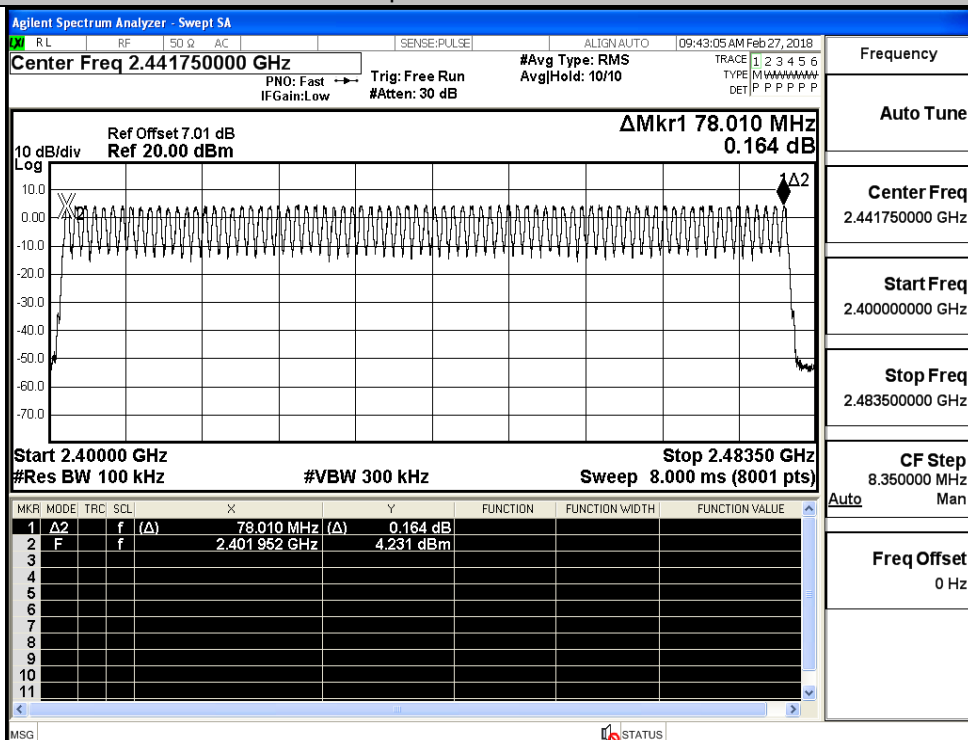
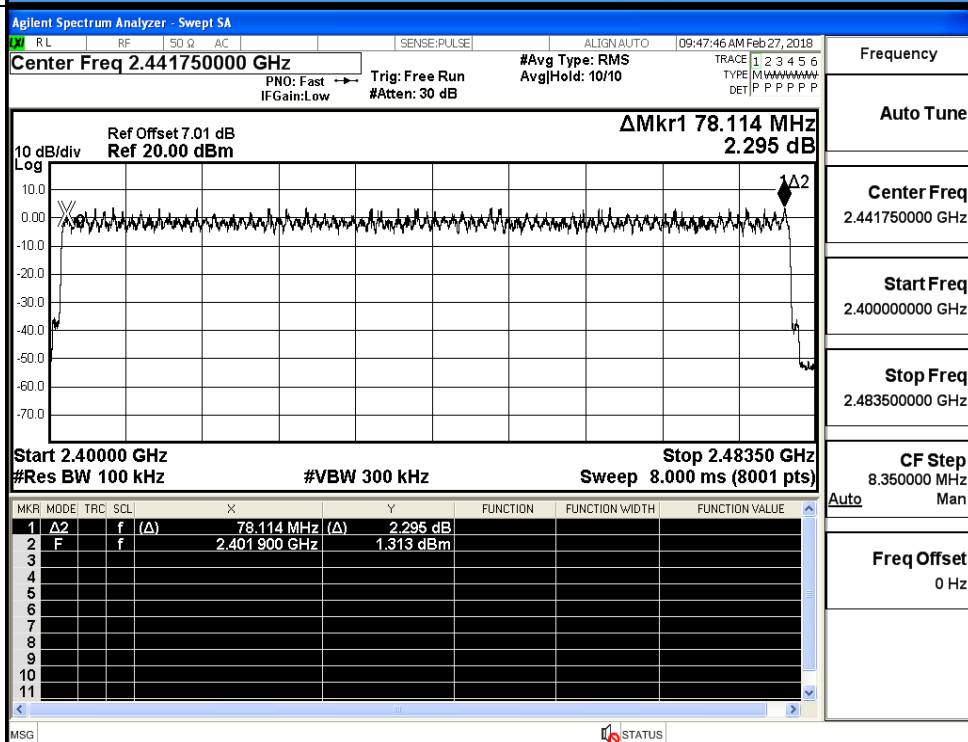


A.4 Hopping Channel Number

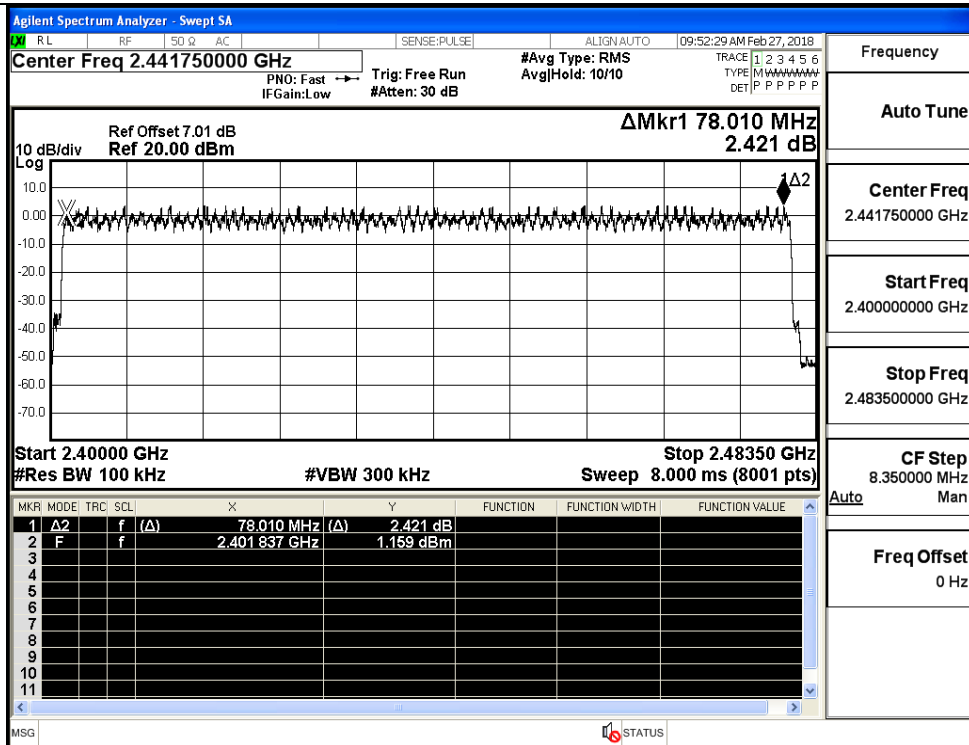
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

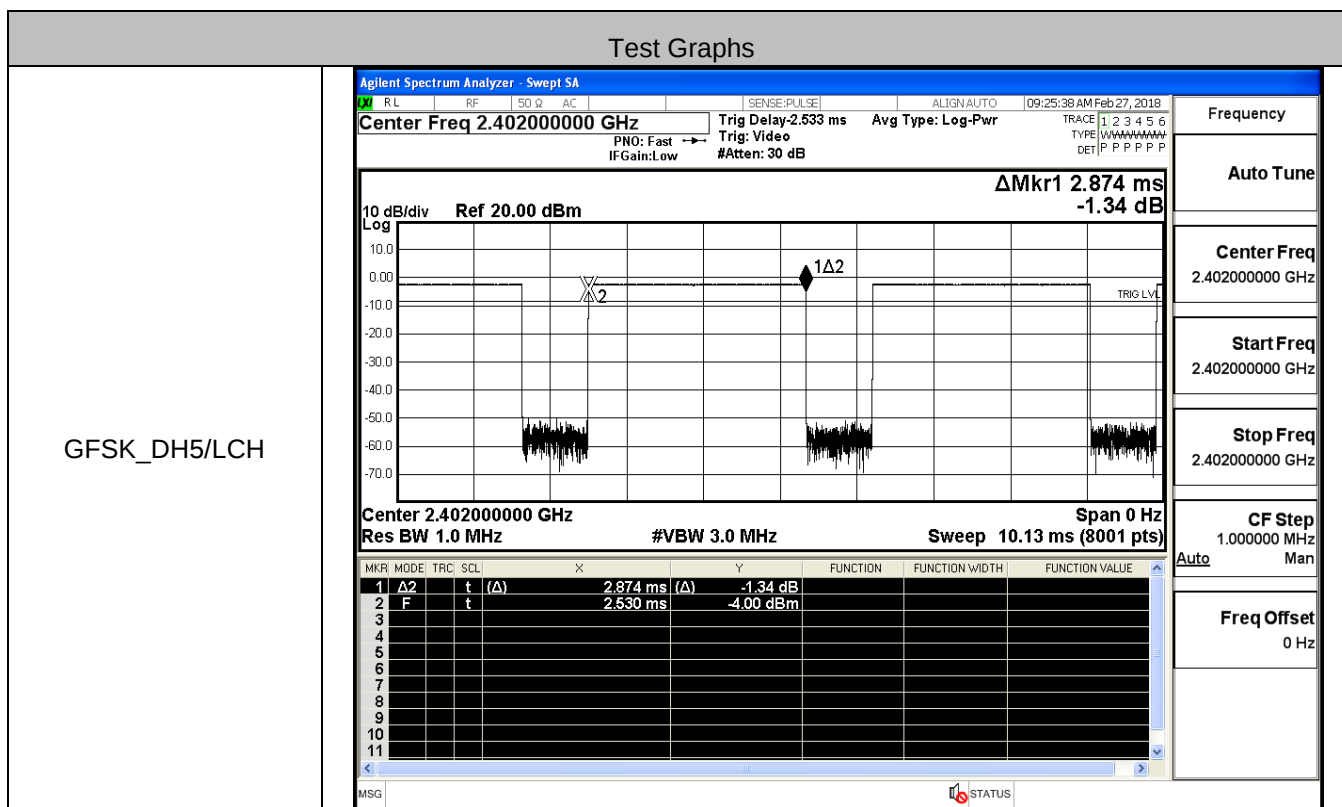
GFSK/Hop

 $\pi/4$ DQPSK/Hop

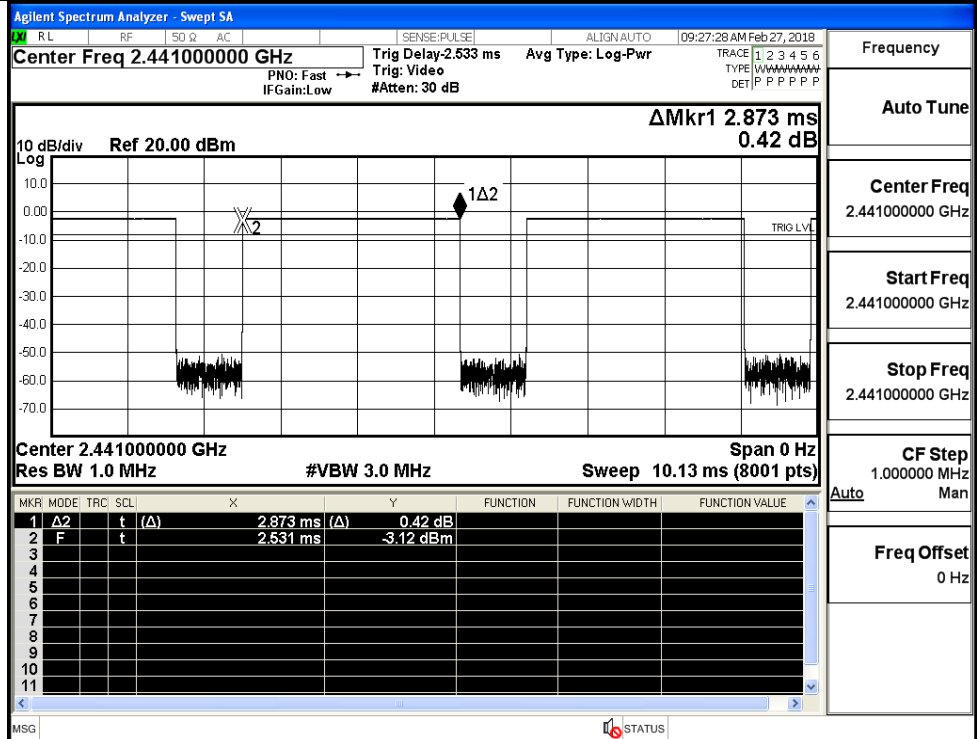
8DPSK/Hop



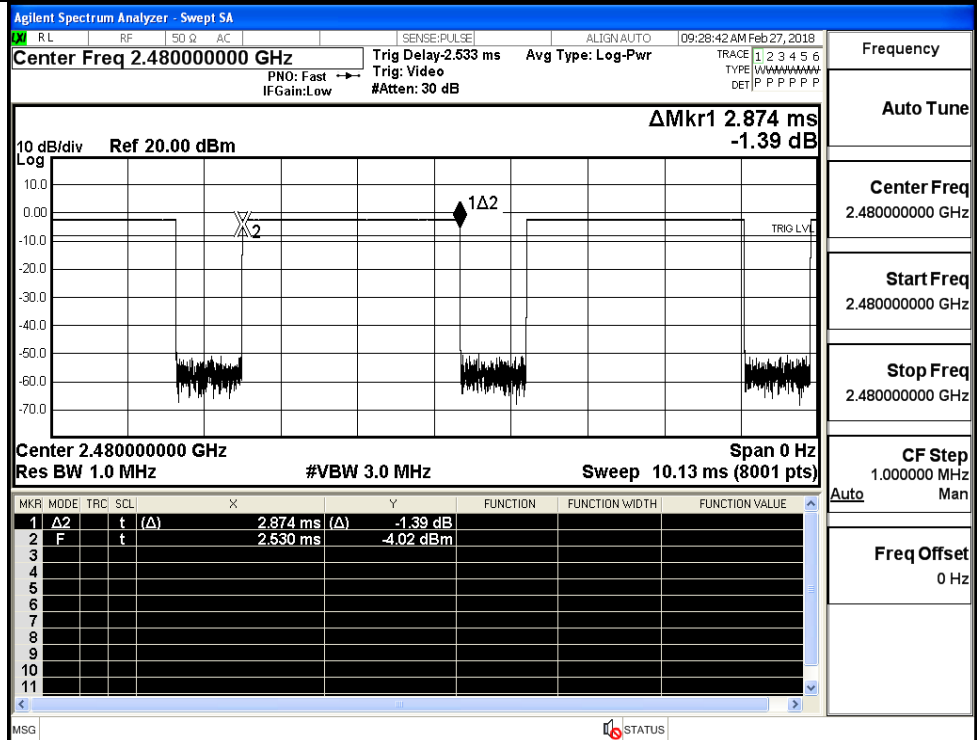
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.87	106.7	0.307	0.4	PASS
	2DH5	MCH	2.87	106.7	0.307	0.4	PASS
	2DH5	HCH	2.87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



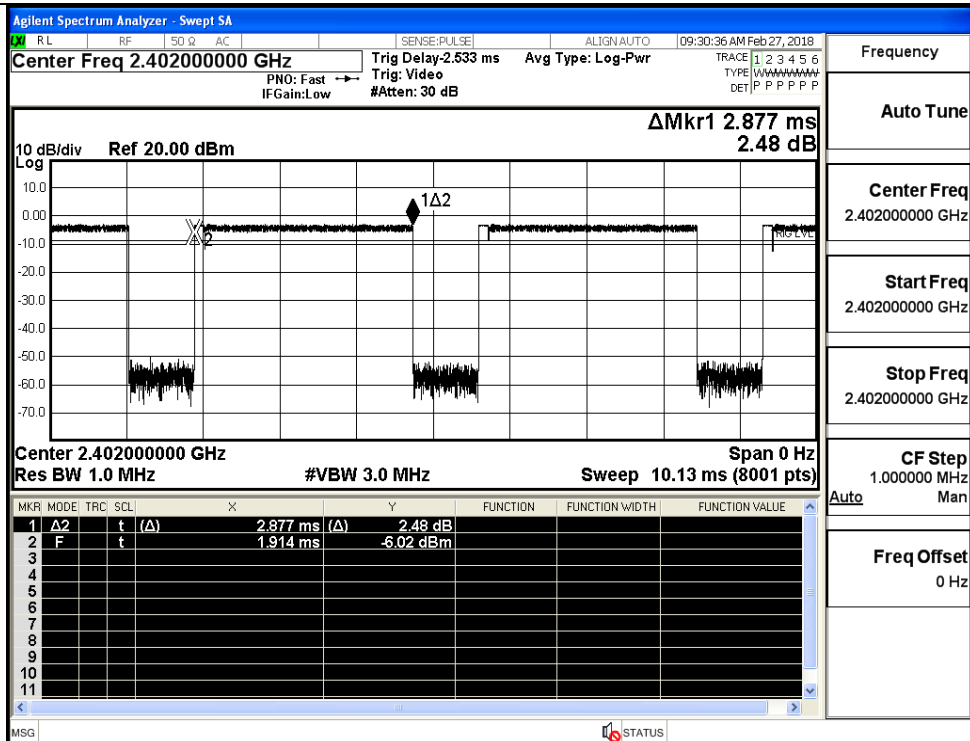
GFSK_DH5/MCH



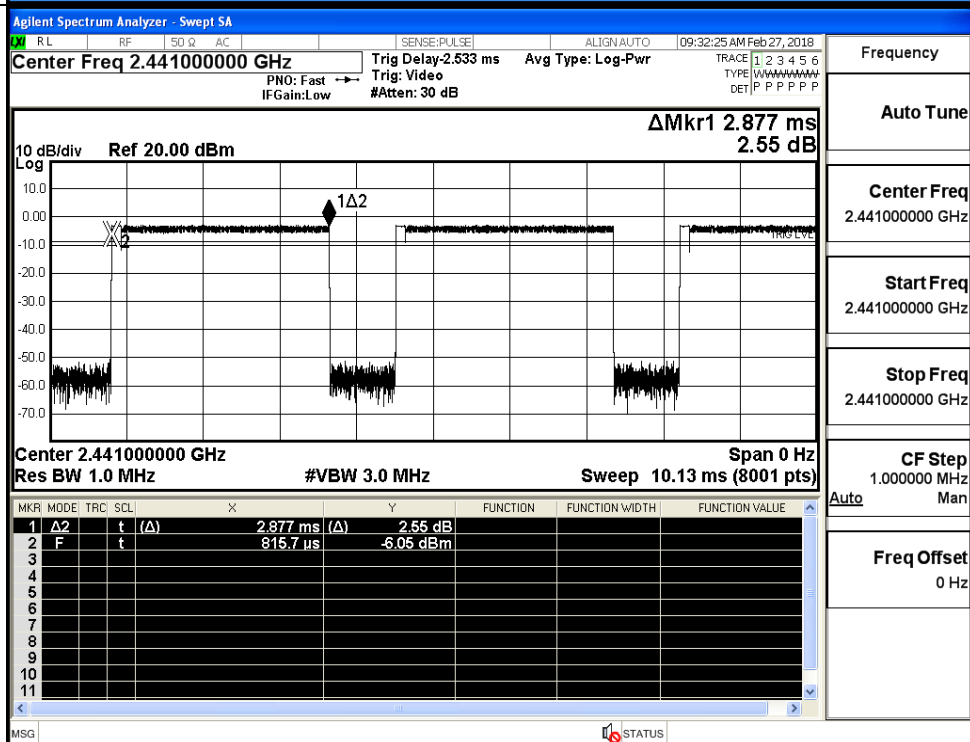
GFSK_DH5/HCH



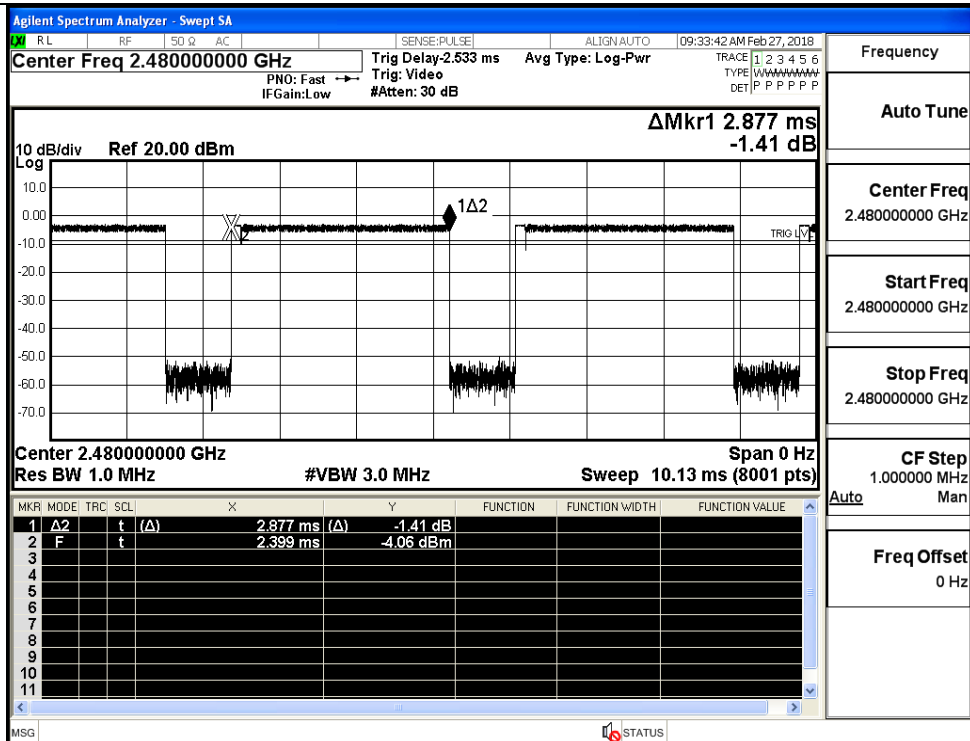
$\pi/4$ DQPSK
_2DH5/LCH



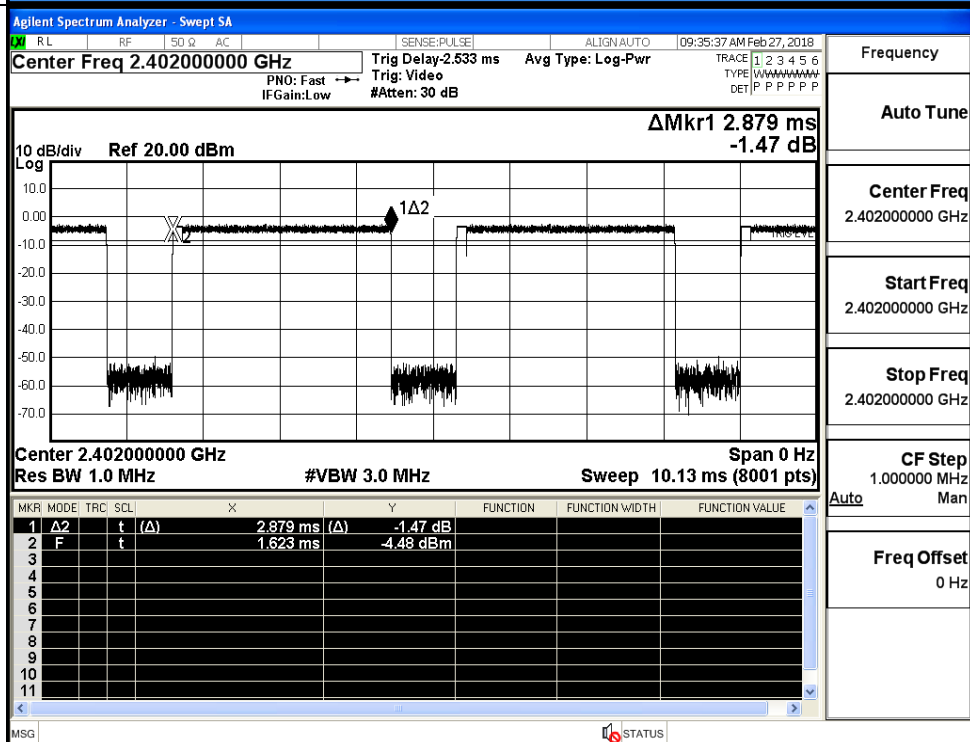
$\pi/4$ DQPSK
_2DH5/MCH



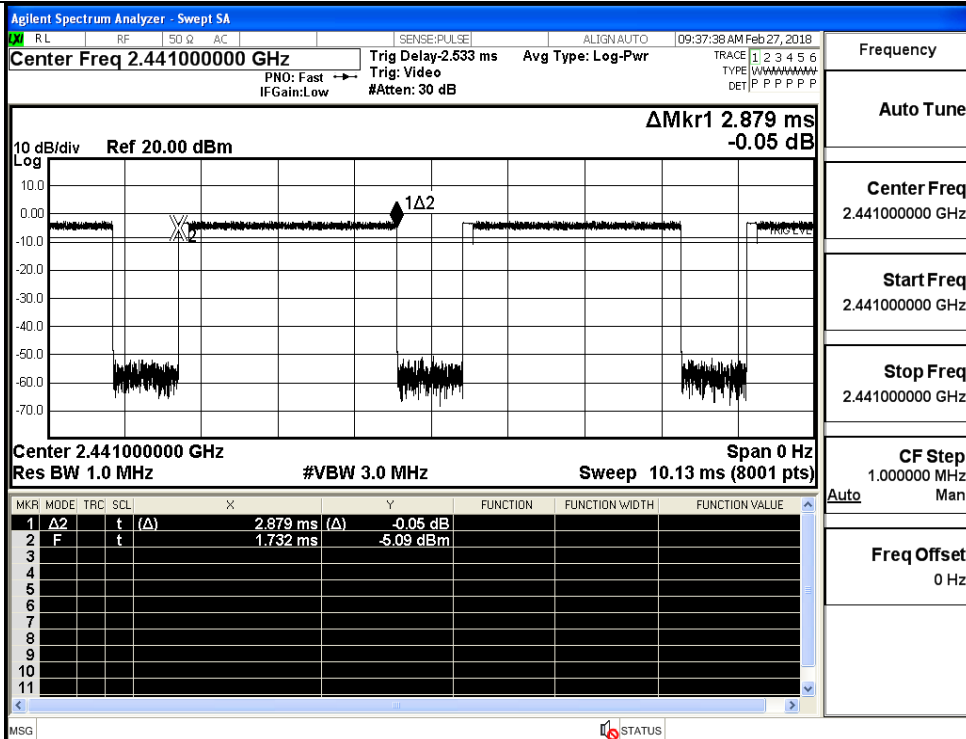
$\pi/4$ DQPSK
_2DH5/HCH



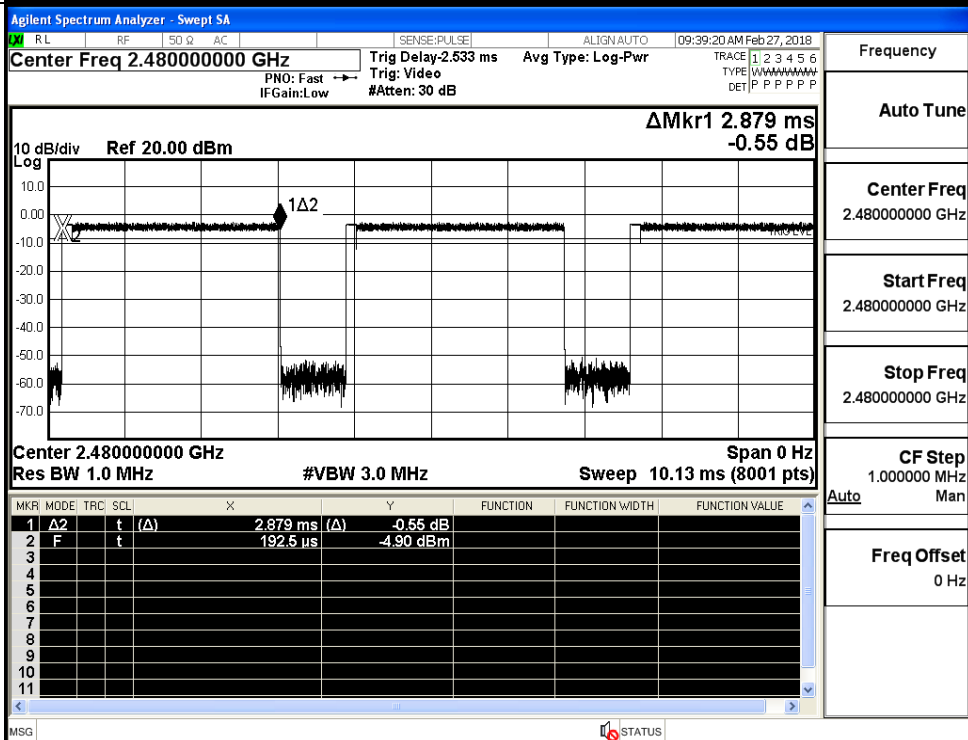
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



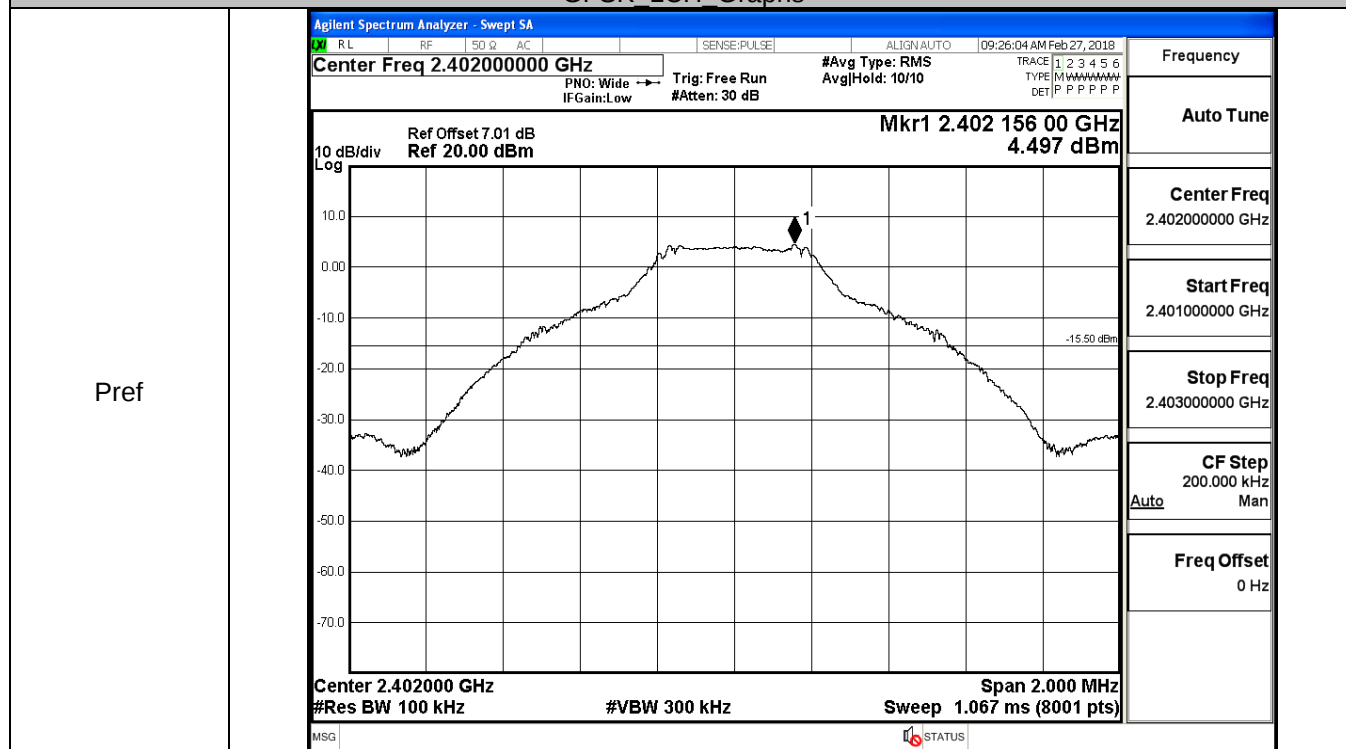
8DPSK_3DH5/HCH



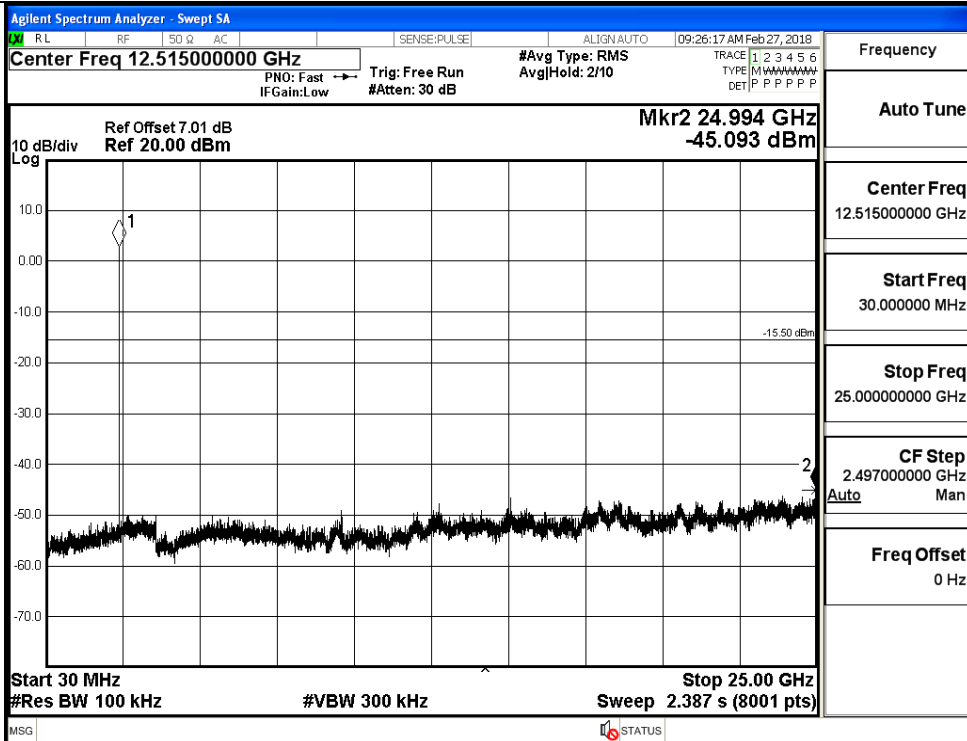
A.6 RF Conducted Spurious Emissions

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
$\pi/4$ DQPSK	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

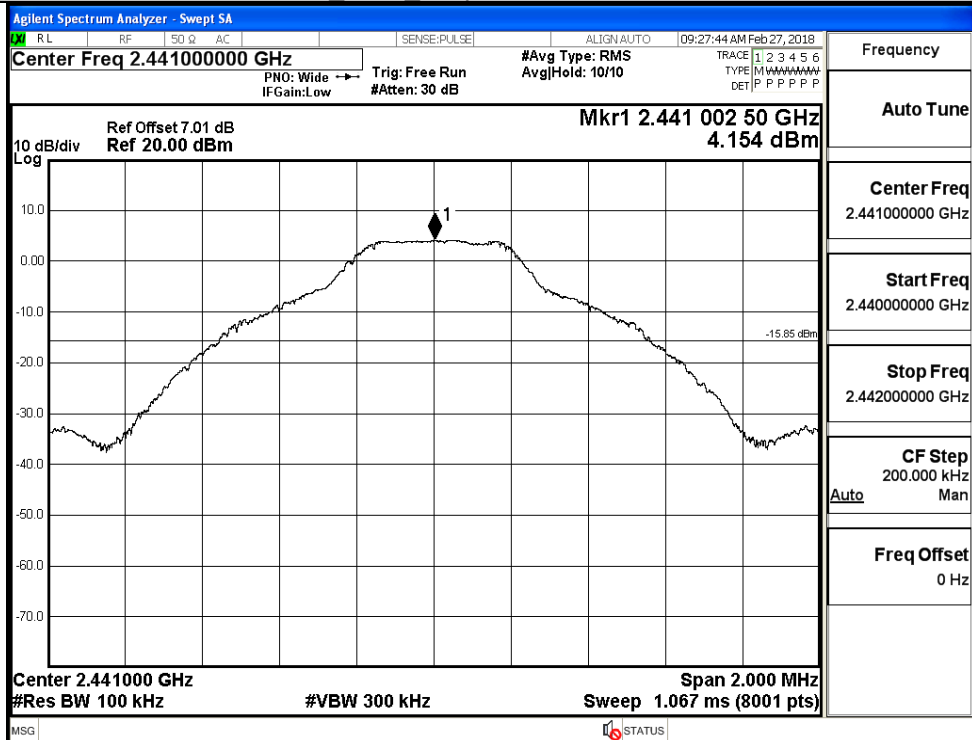


Puw

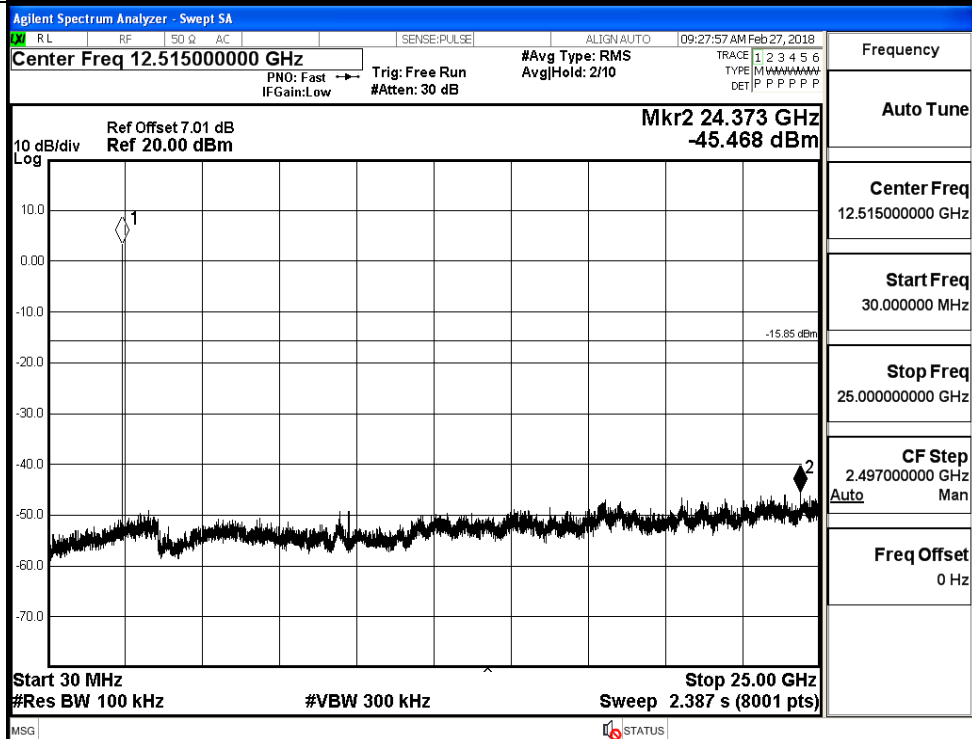


GFSK_MCH_Graphs

Pref

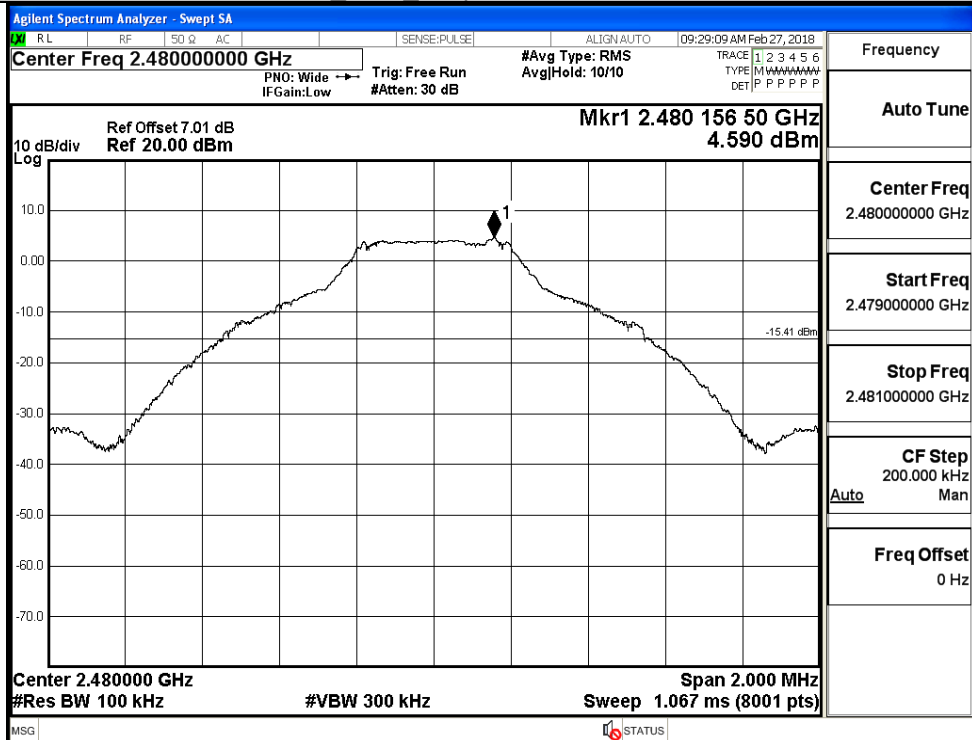


Puw

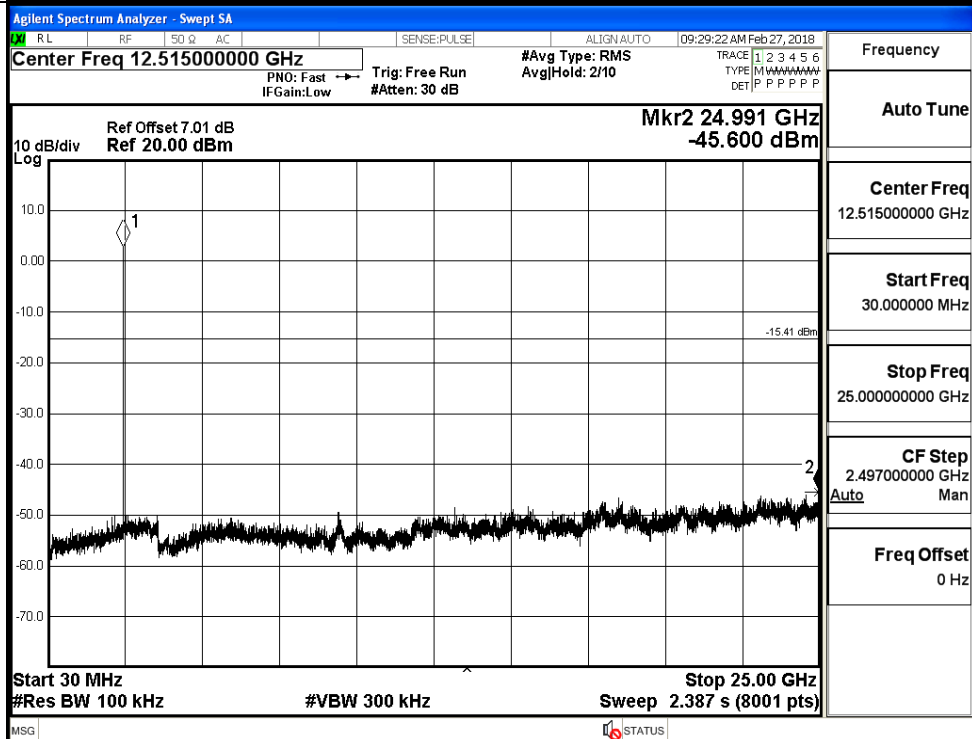


GFSK_HCH_Graphs

Pref

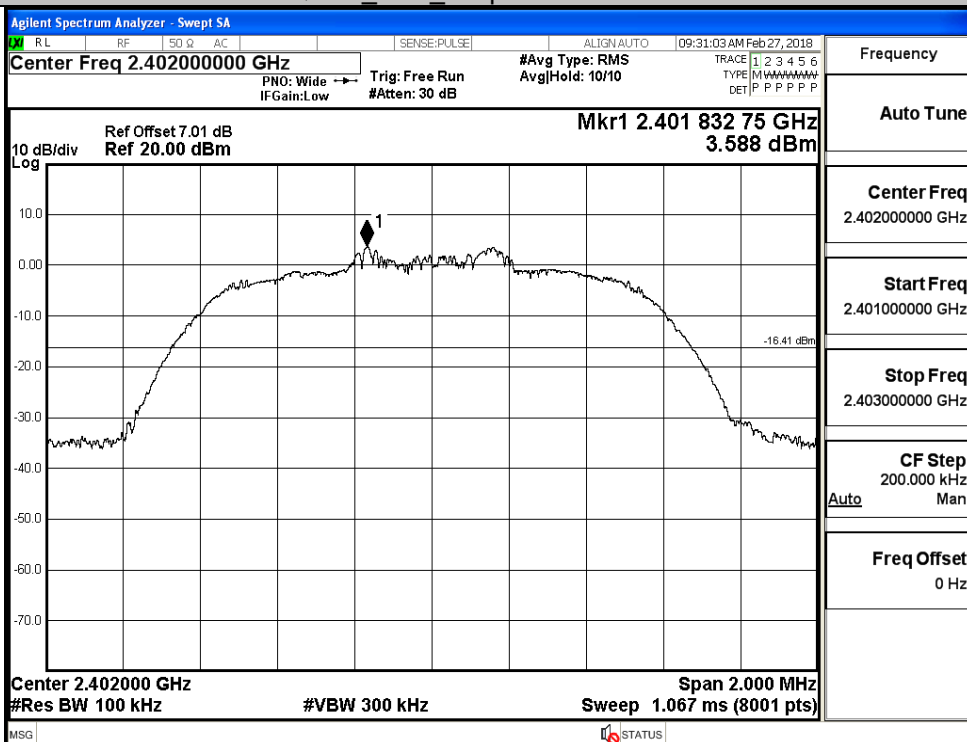


Puw

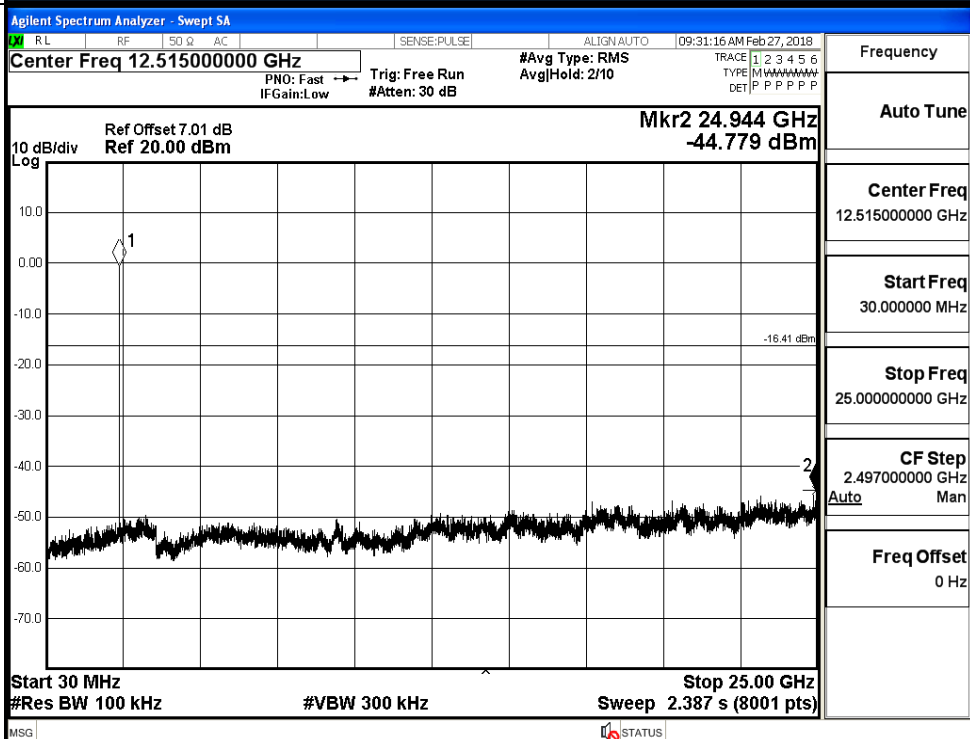


$\pi/4$ DQPSK_LCH_Graphs

Pref

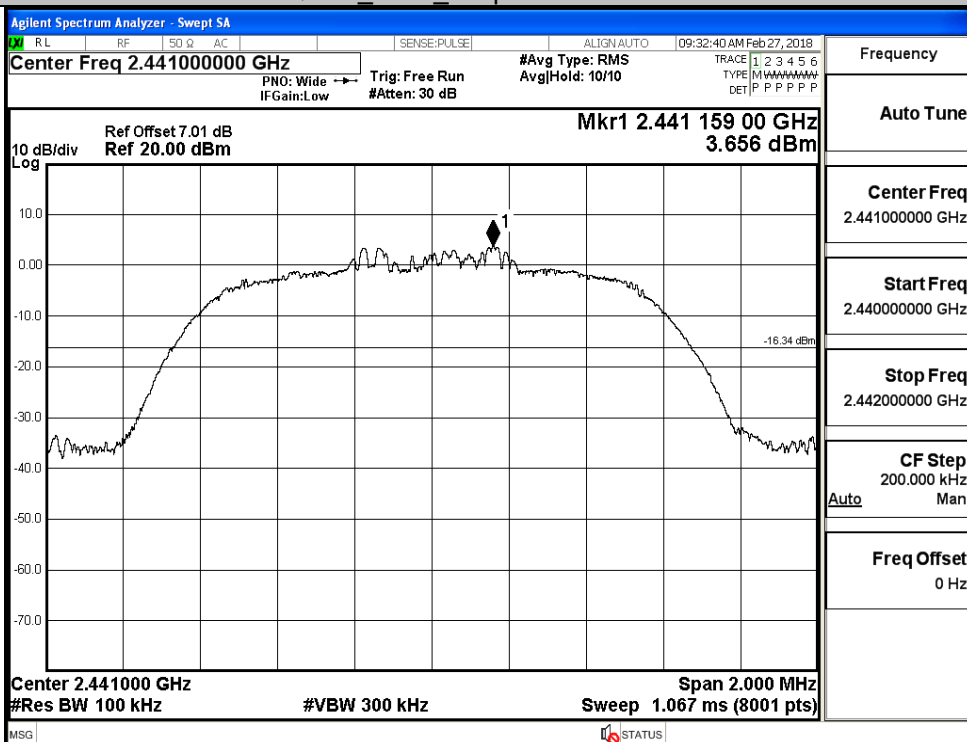


Puw

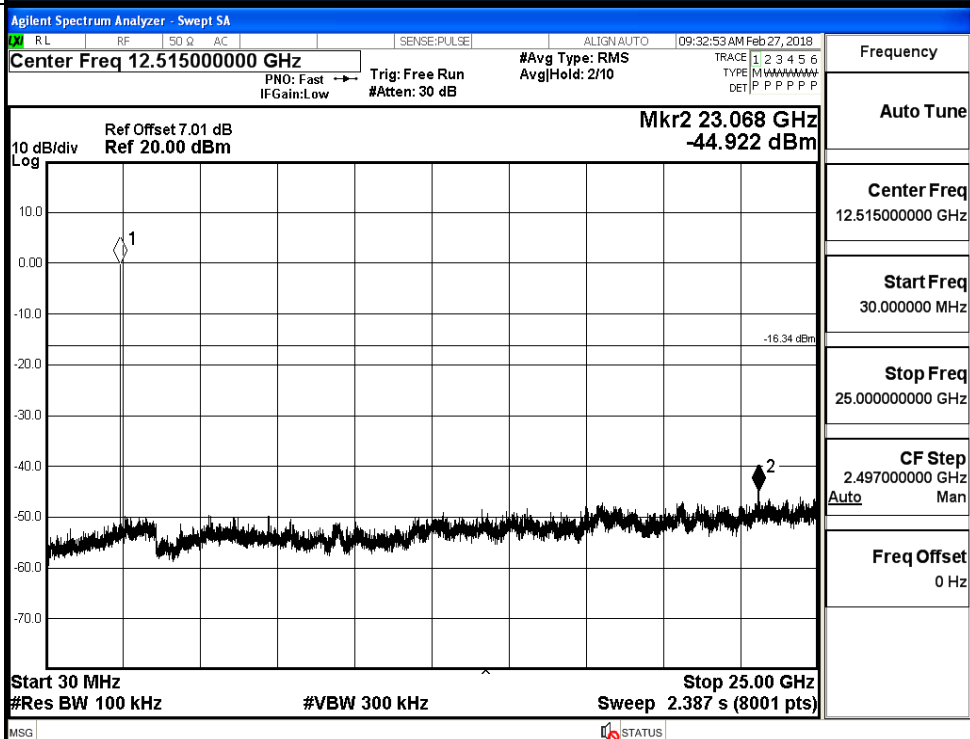


π /4DQPSK_MCH_Graphs

Pref

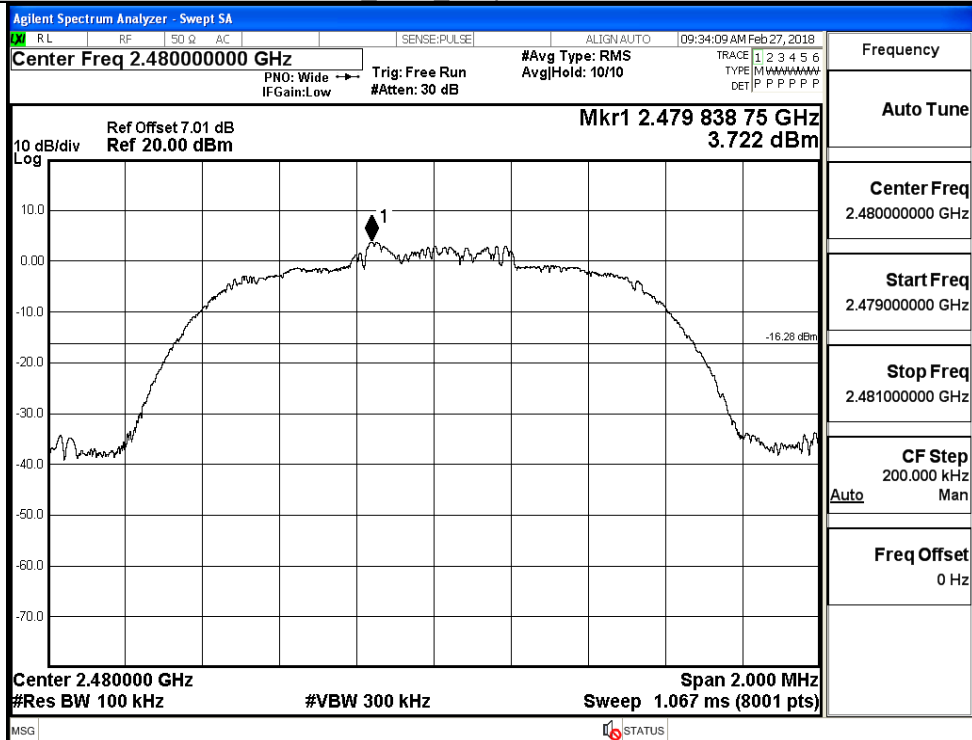


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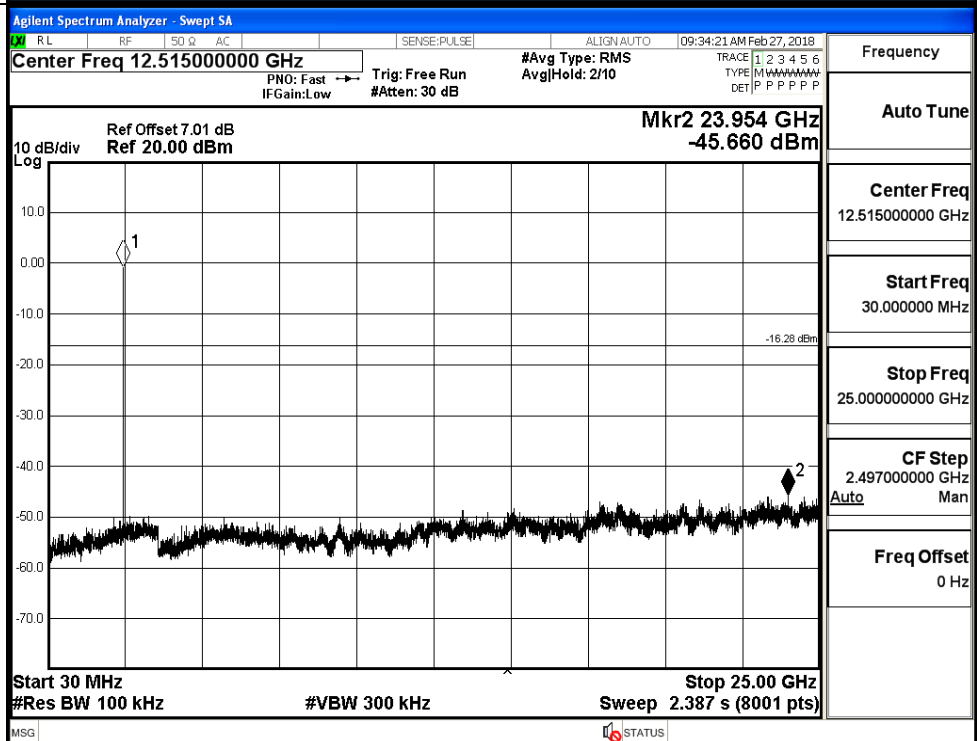


$\pi/4$ DQPSK_HCH_Graphs

Pref

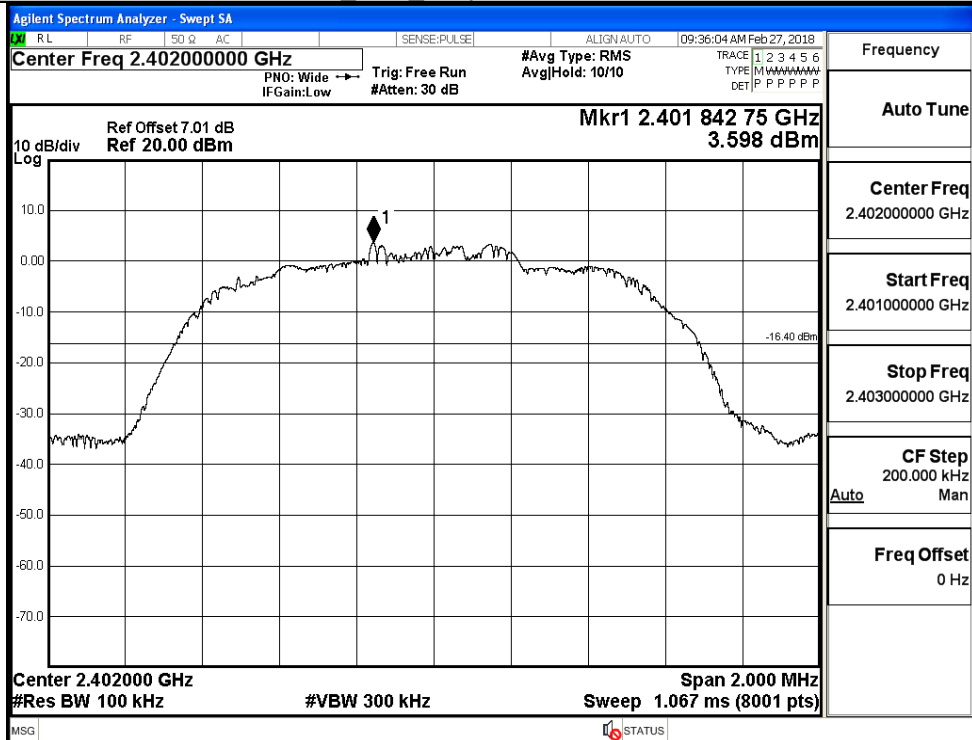


Puw

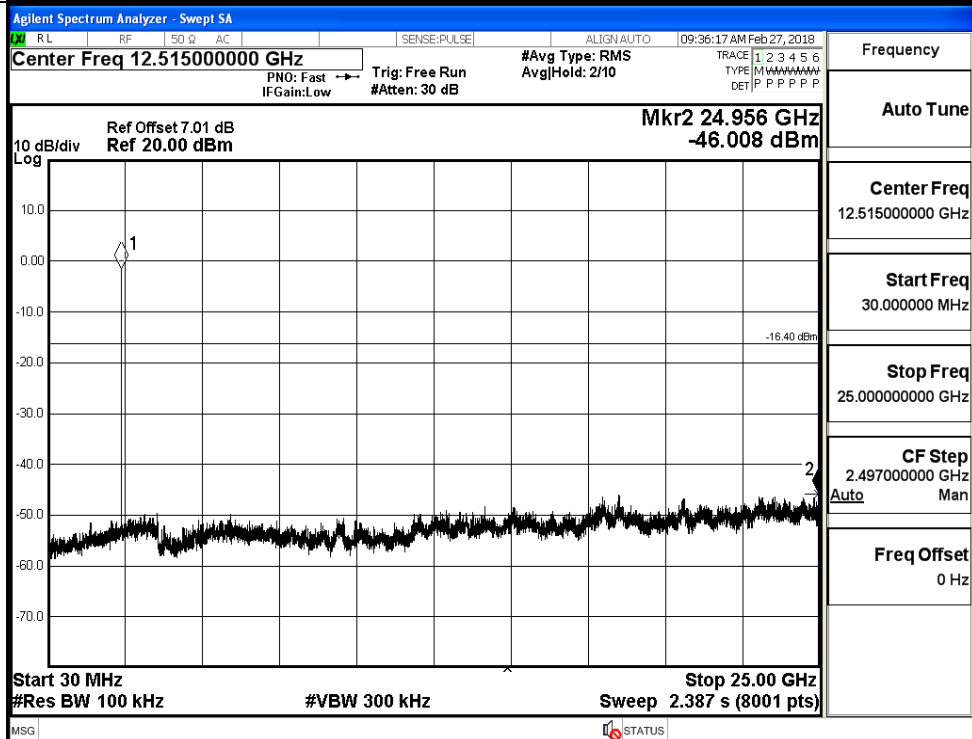


8DPSK_LCH_Graphs

Pref

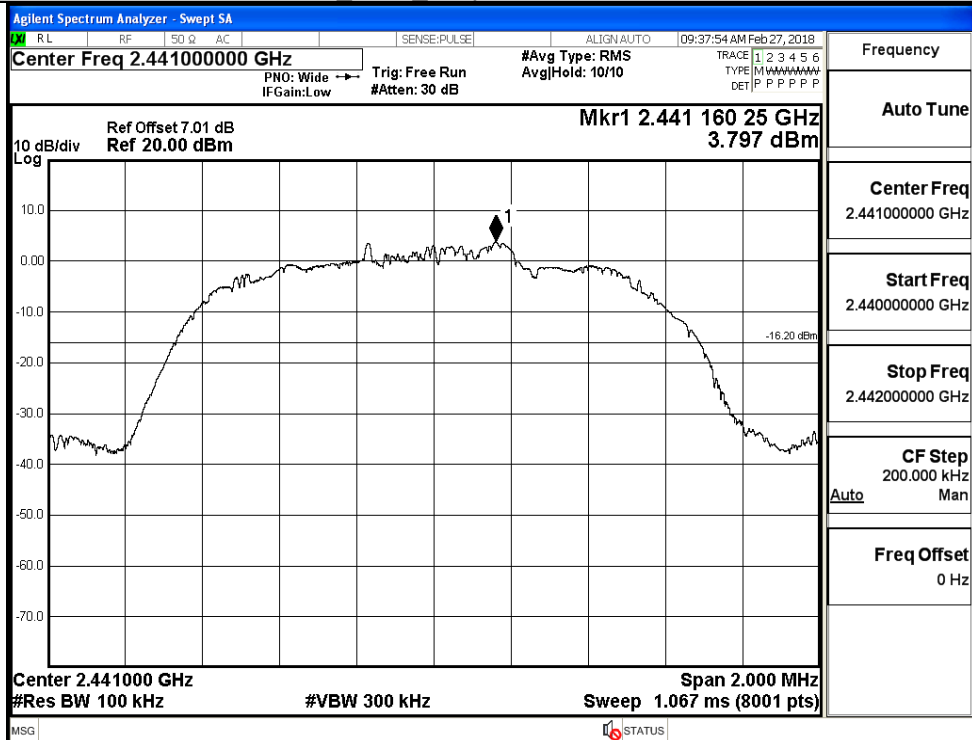


Puw

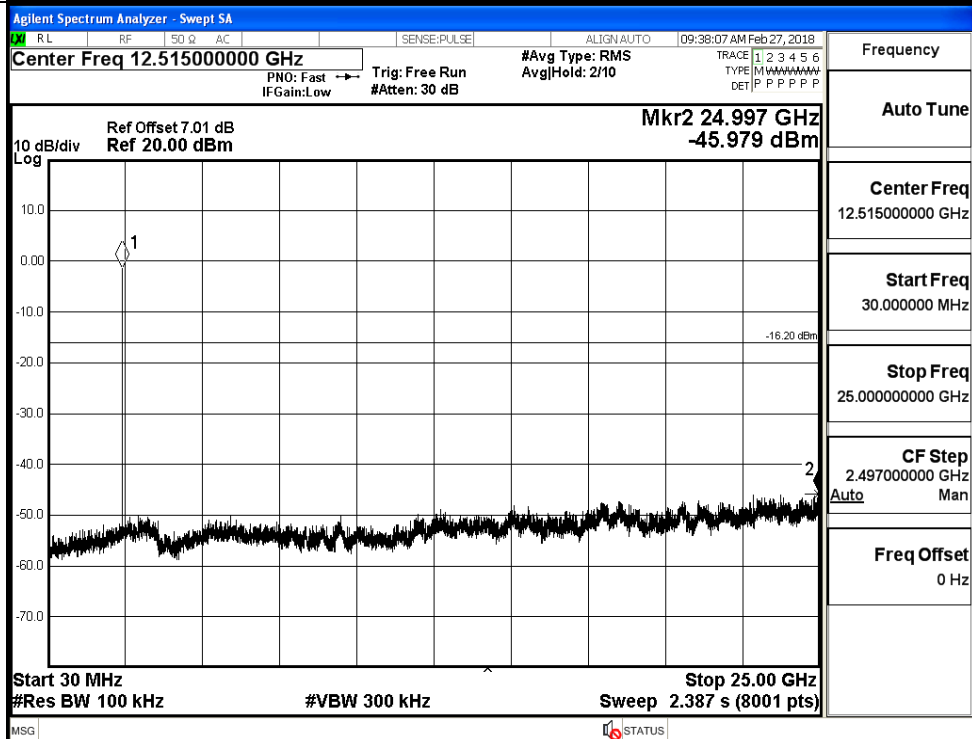


8DPSK_MCH_Graphs

Pref

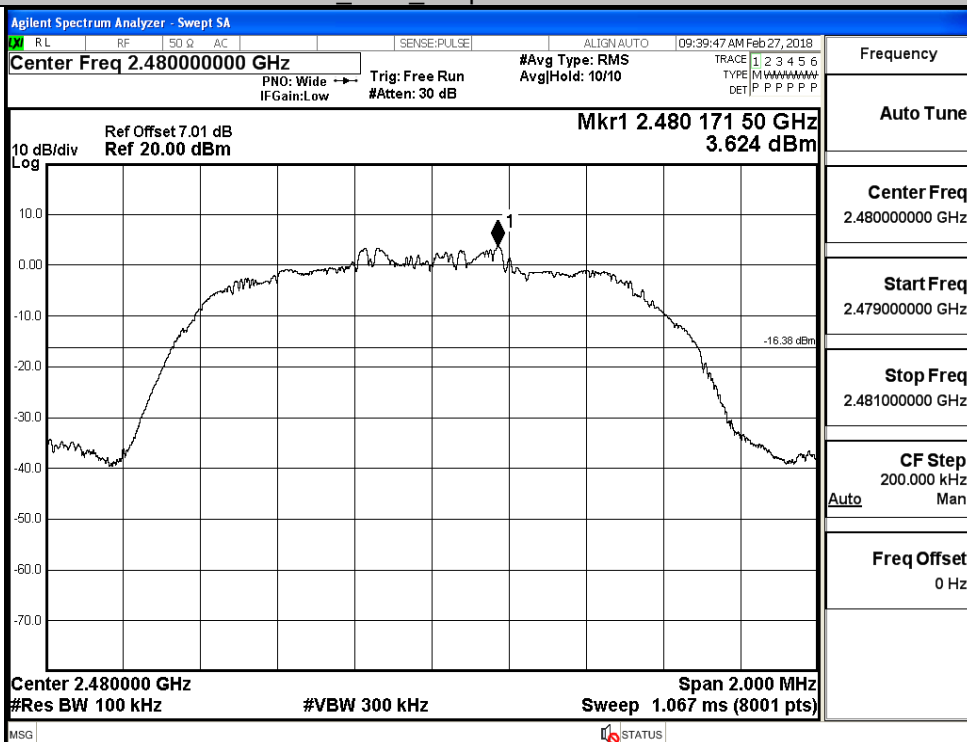


Puw

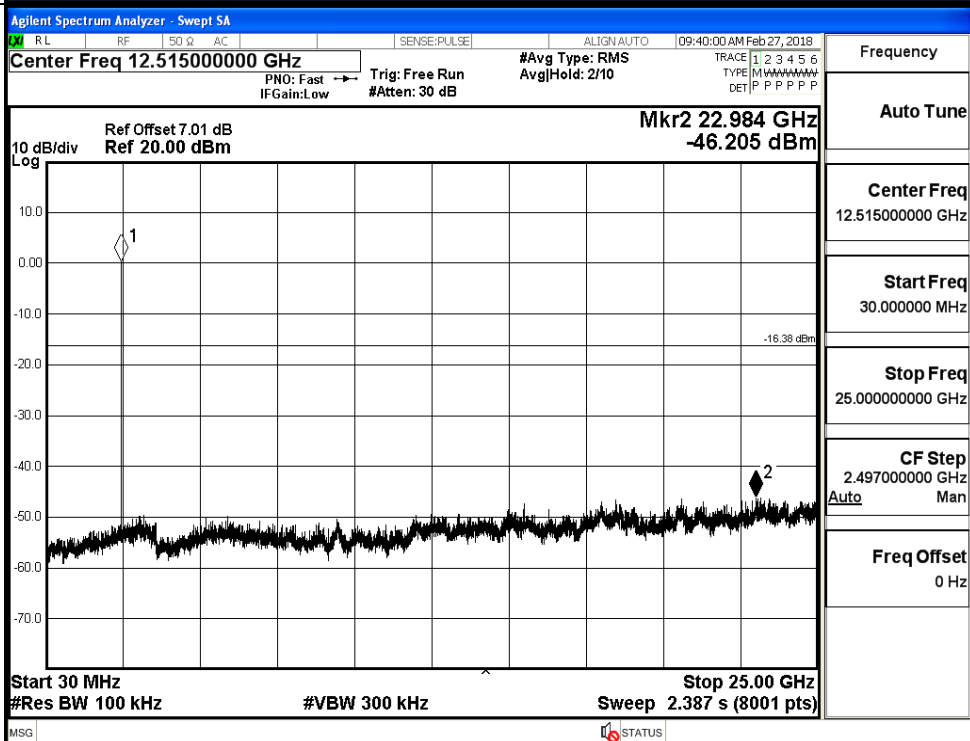


8DPSK_HCH_Graphs

Pref



Puw

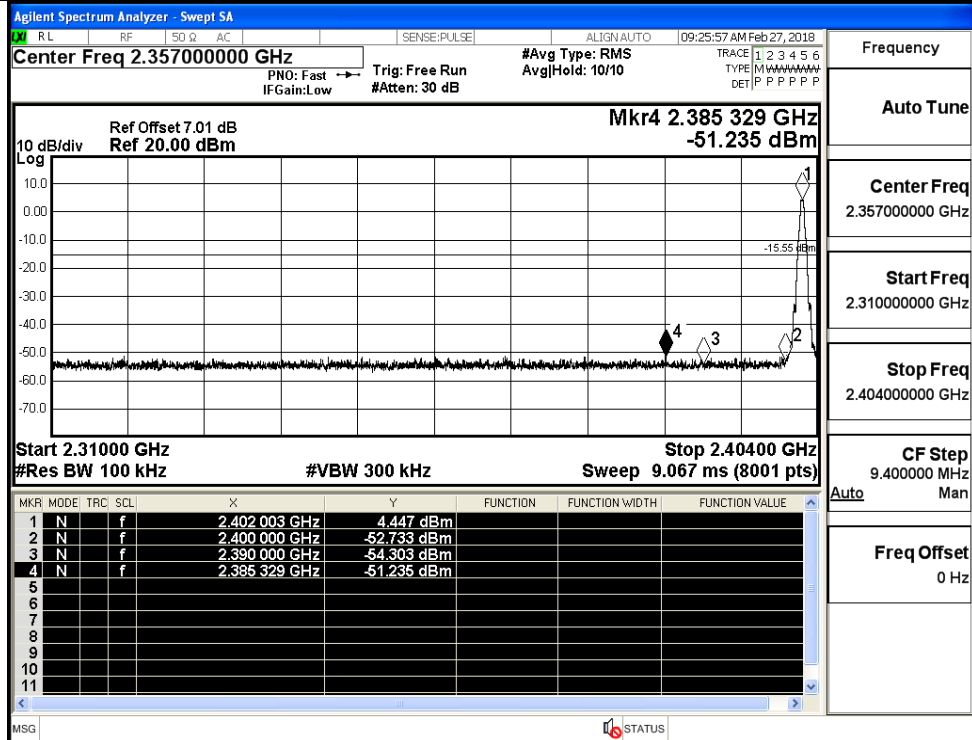


A.7 Band-edge for RF Conducted Emissions

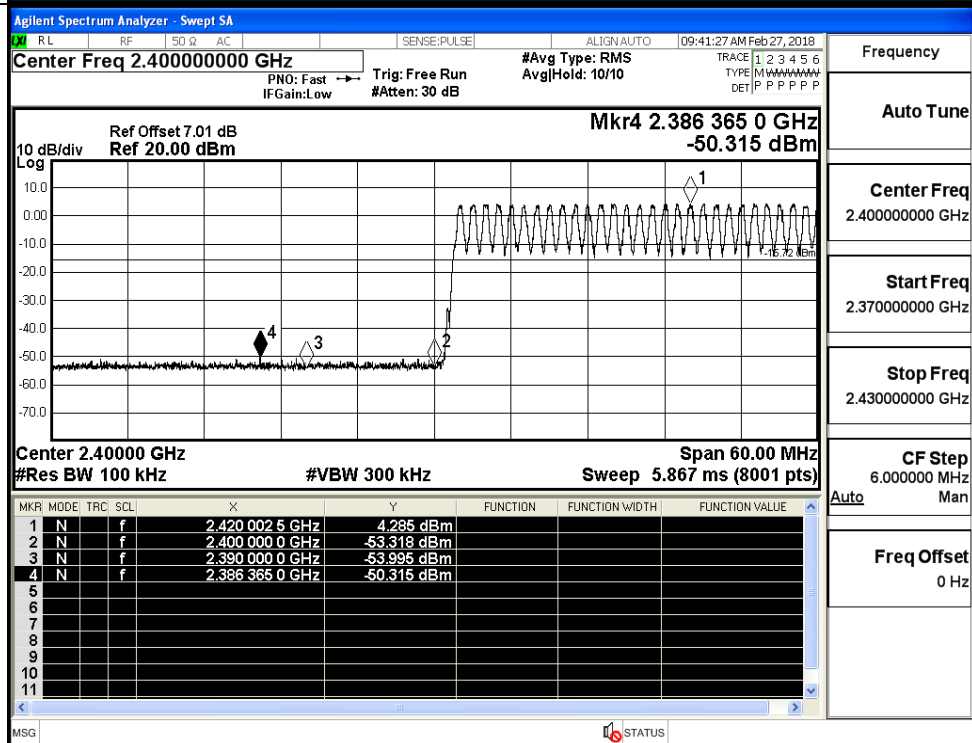
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.447	Off	-51.235	-15.55	PASS
			4.285	On	-50.315	-15.72	PASS
	HCH	2480	4.712	Off	-49.930	-15.29	PASS
			4.403	On	-50.732	-15.6	PASS
$\pi/4$ DQPSK	LCH	2402	1.825	Off	-51.131	-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

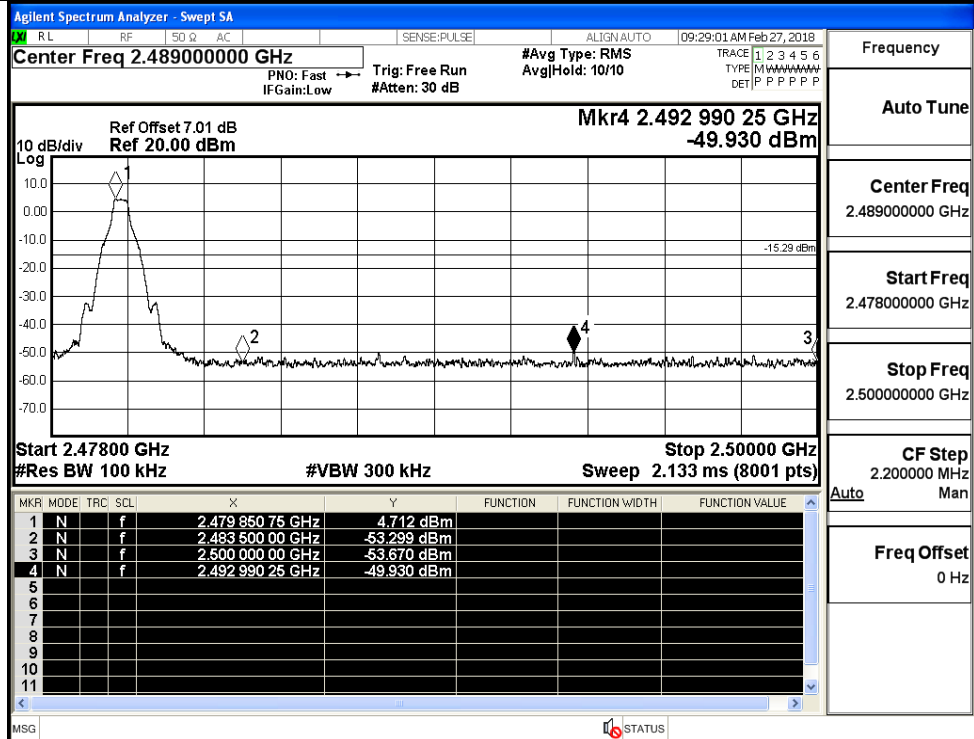
GFSK/LCH/No Hop



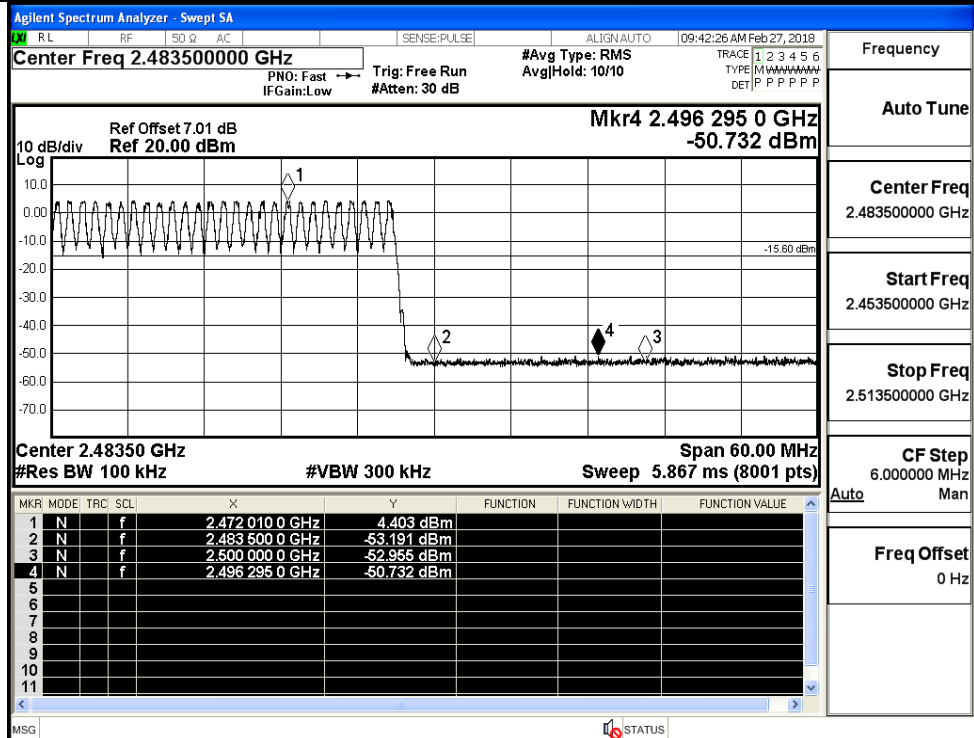
GFSK/LCH/Hop



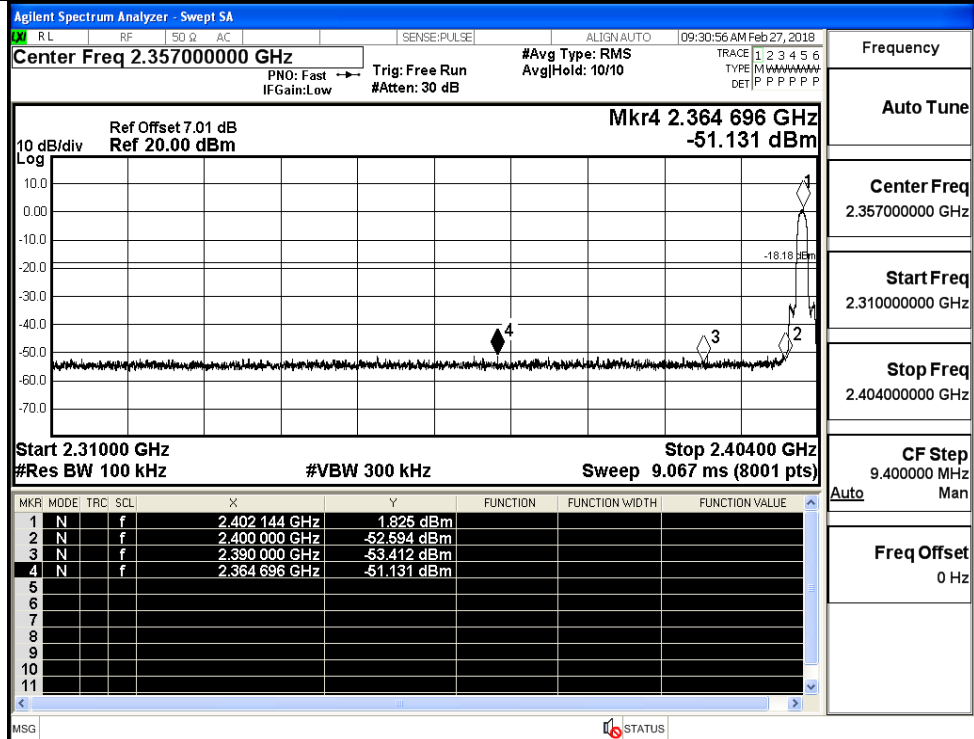
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

Start Freq
2.310000000 GHz

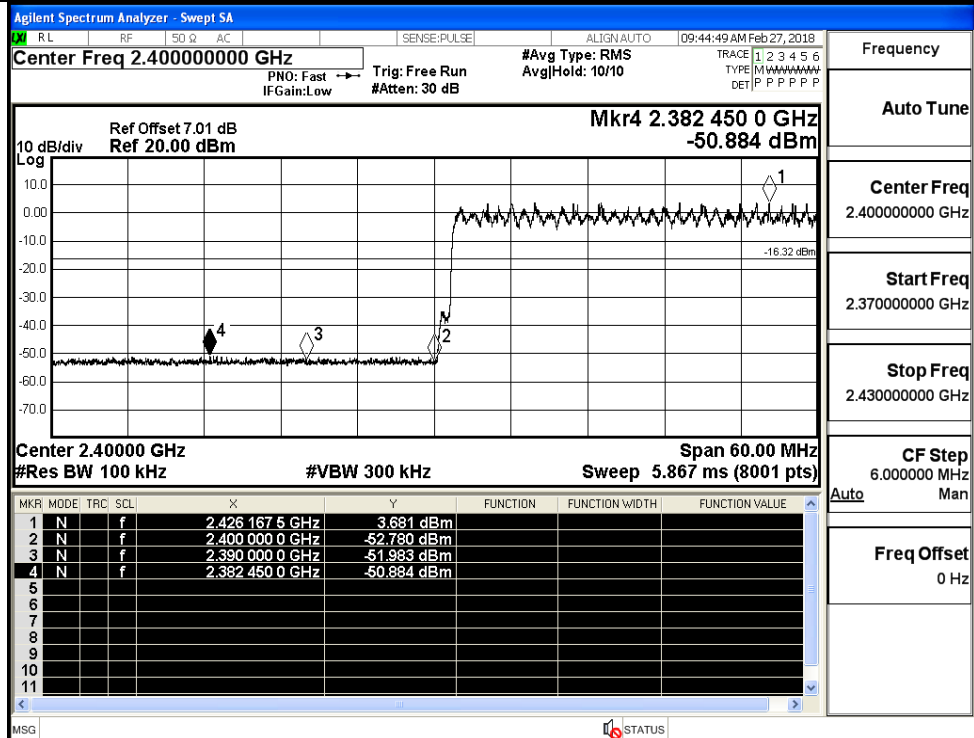
Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz

Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

Start Freq
2.370000000 GHz

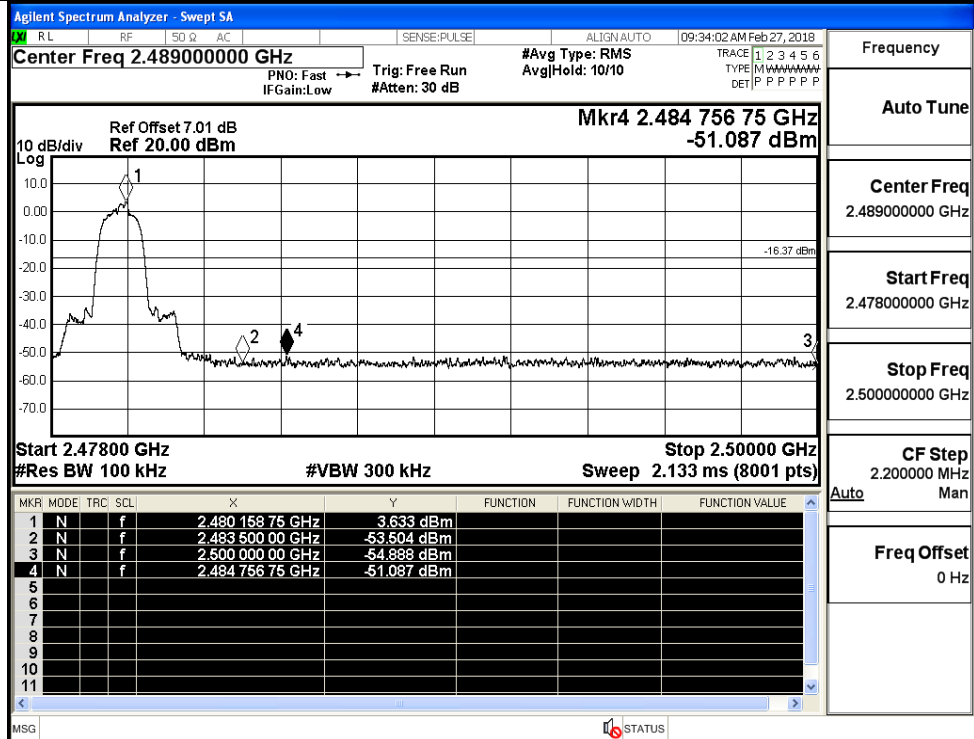
Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz

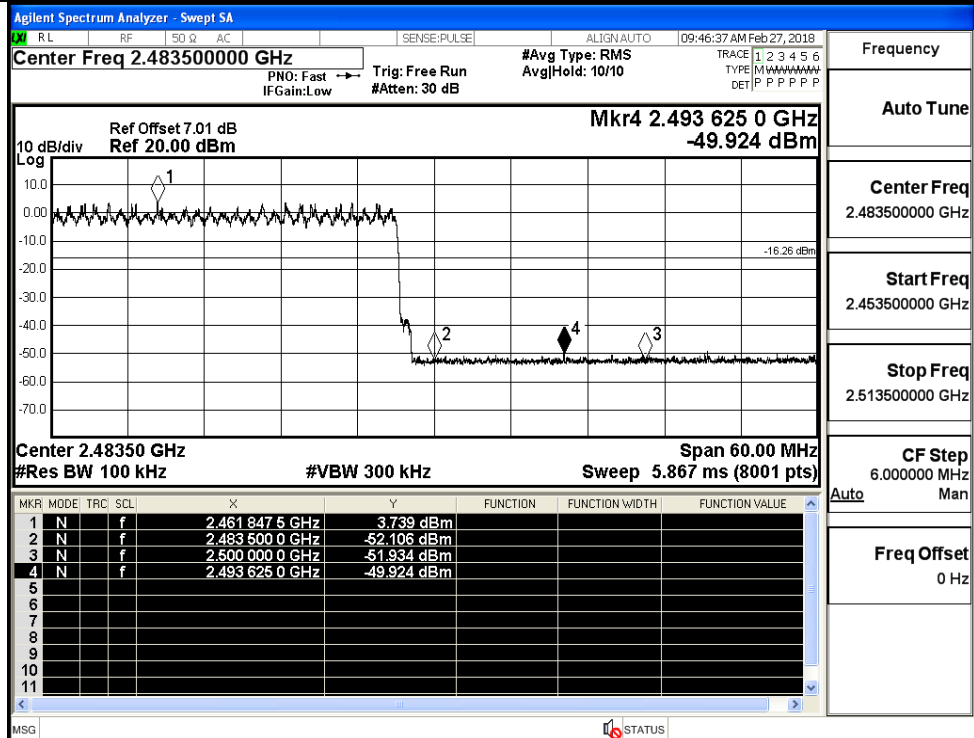
Auto Man

Freq Offset
0 Hz

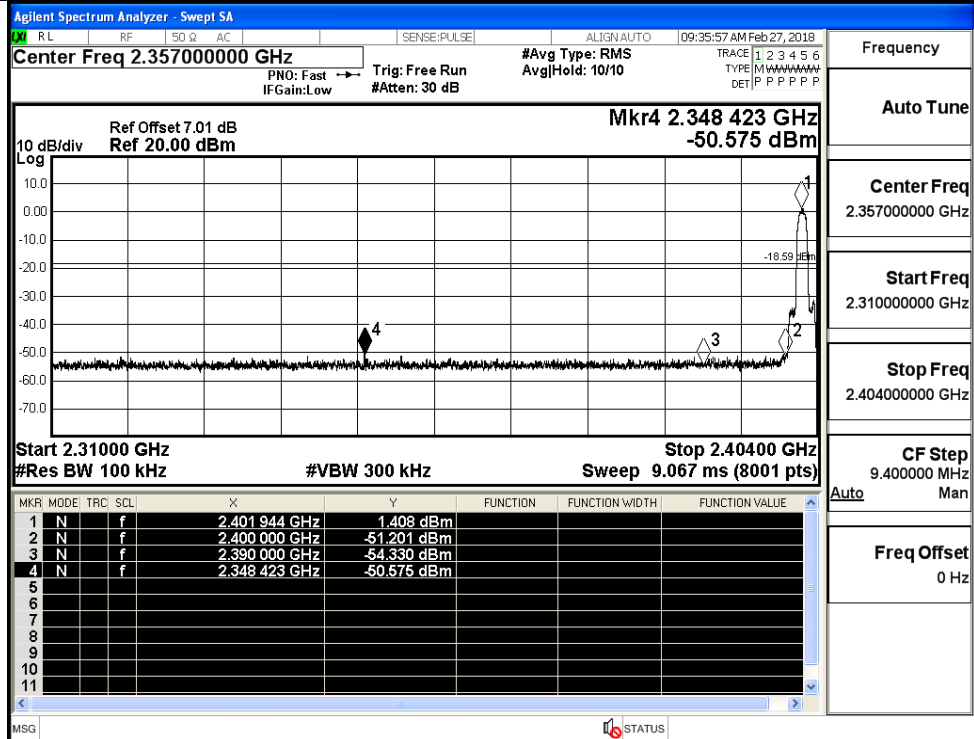
$\pi/4$ DQPSK/HCH/No
Hop



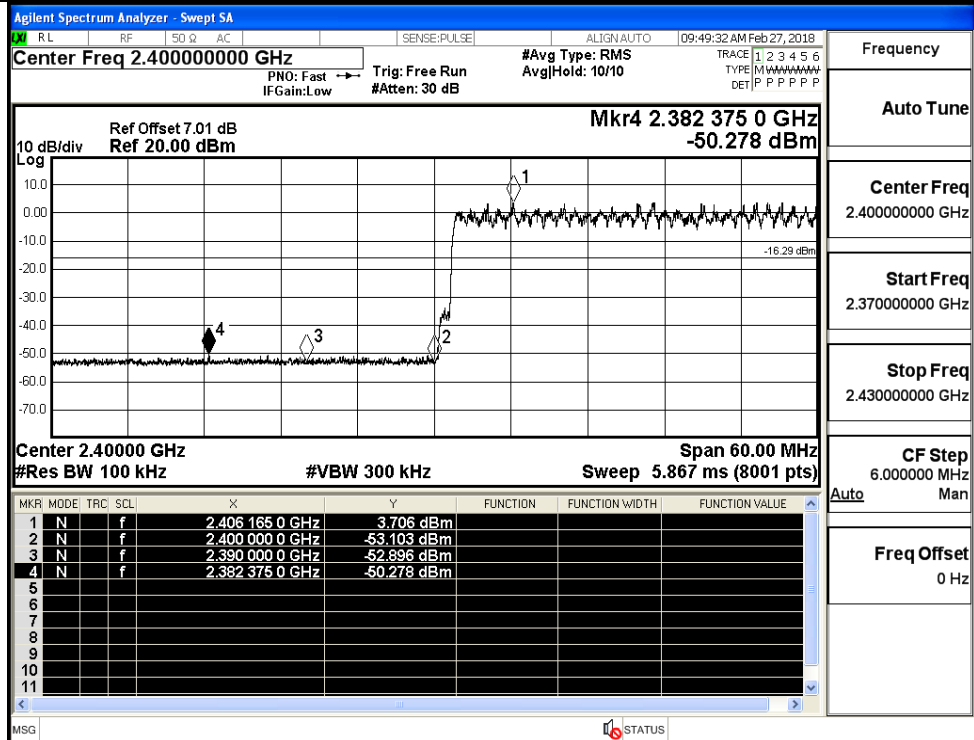
$\pi/4$ DQPSK/HCH/Hop



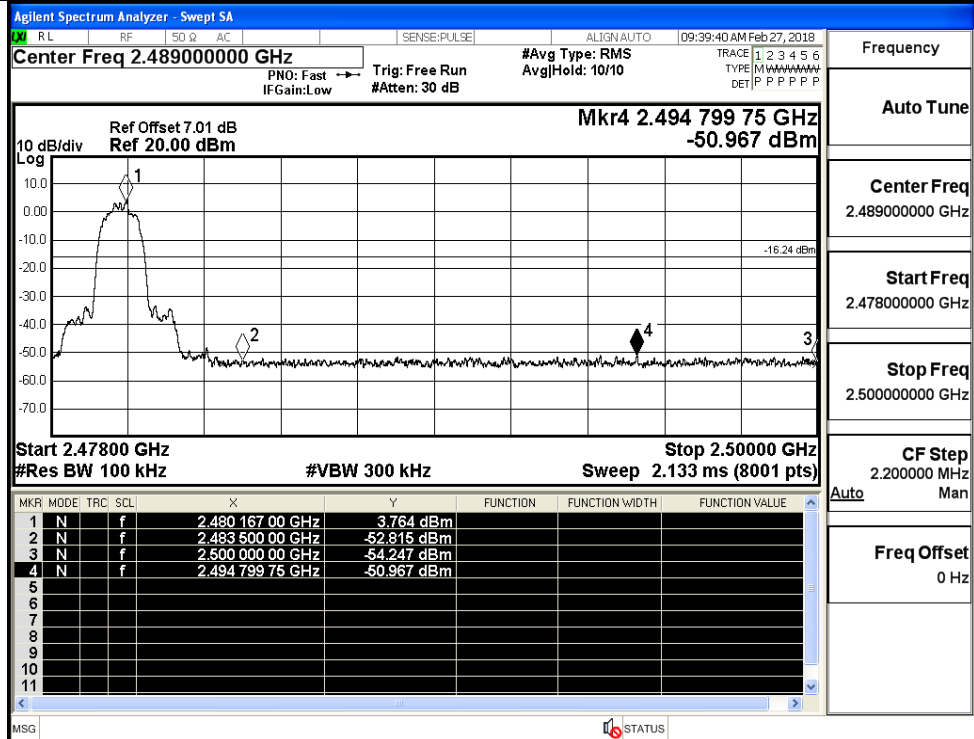
8DPSK/LCH/No Hop



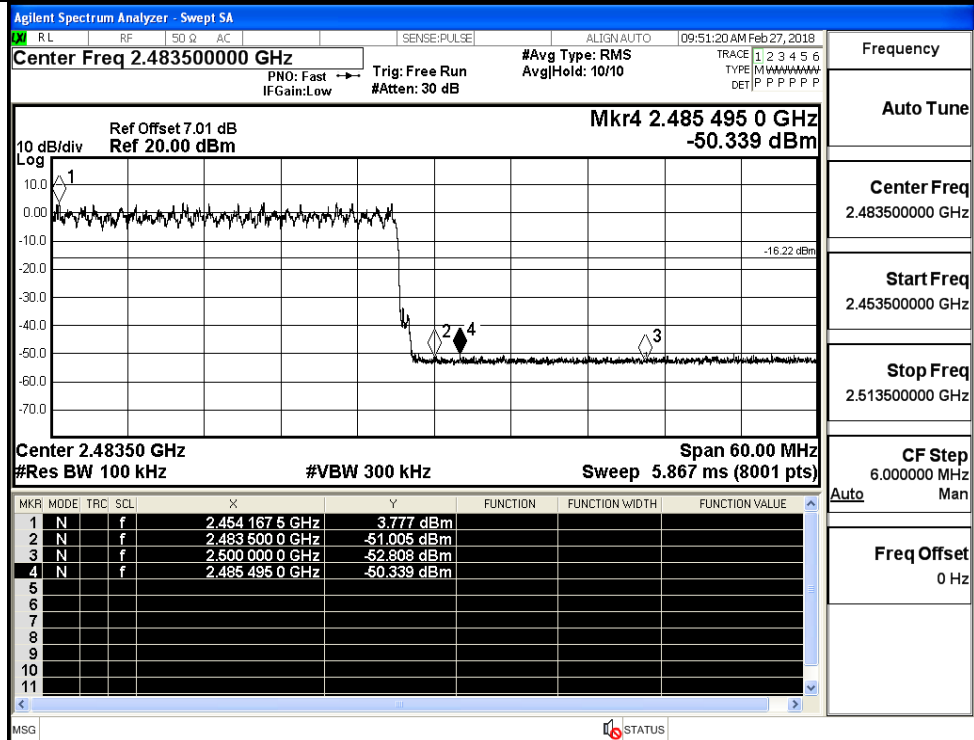
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



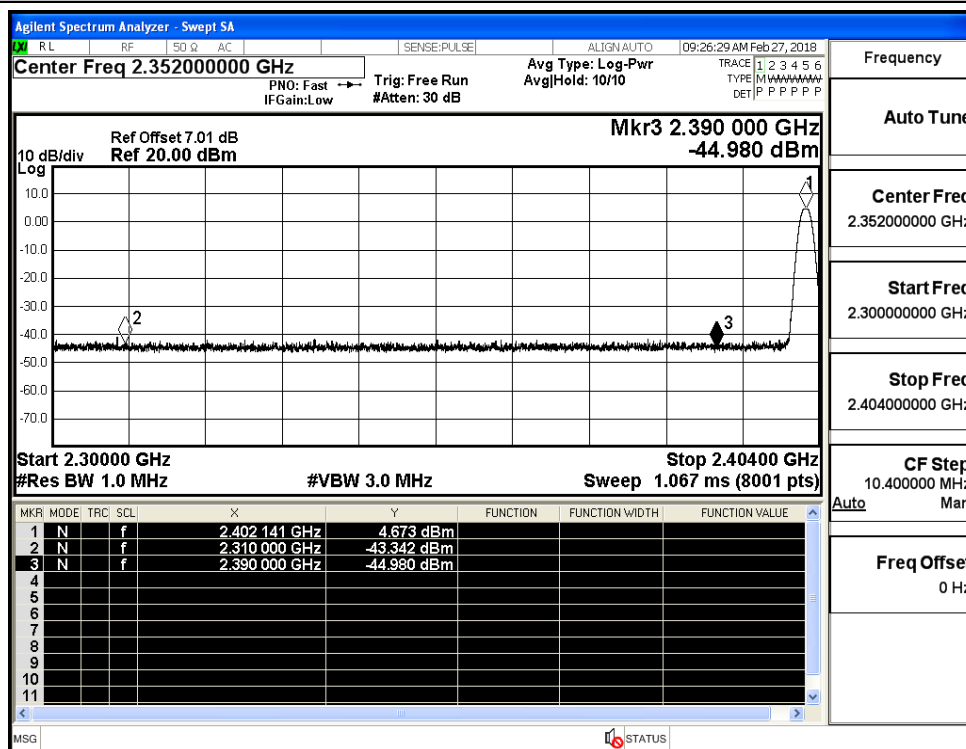
8DPSK/HCH/Hop



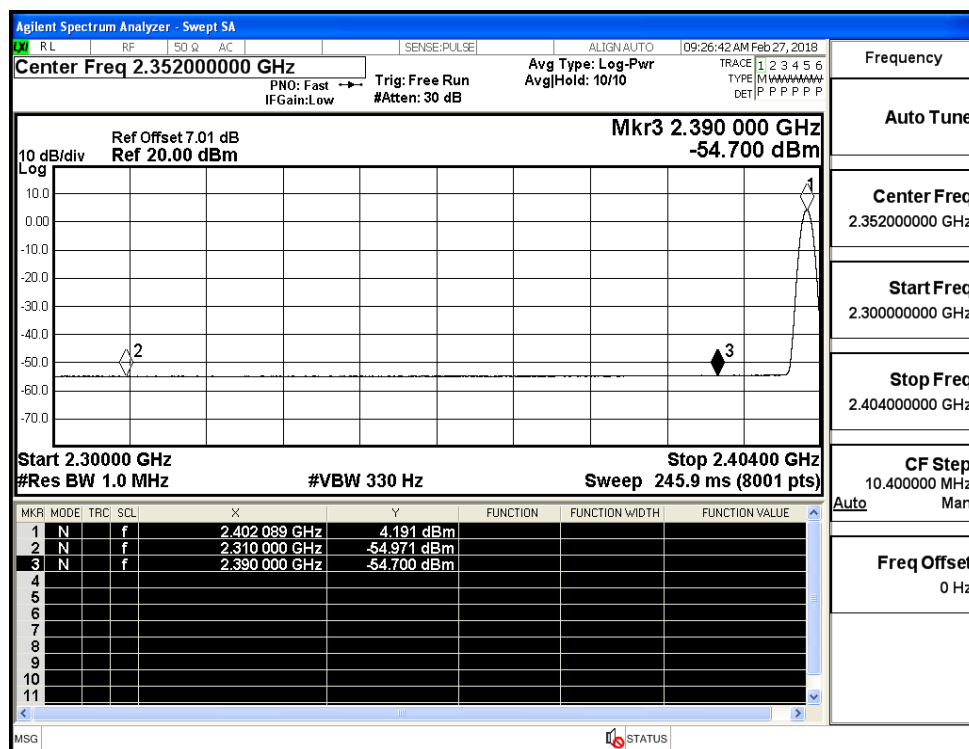
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-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

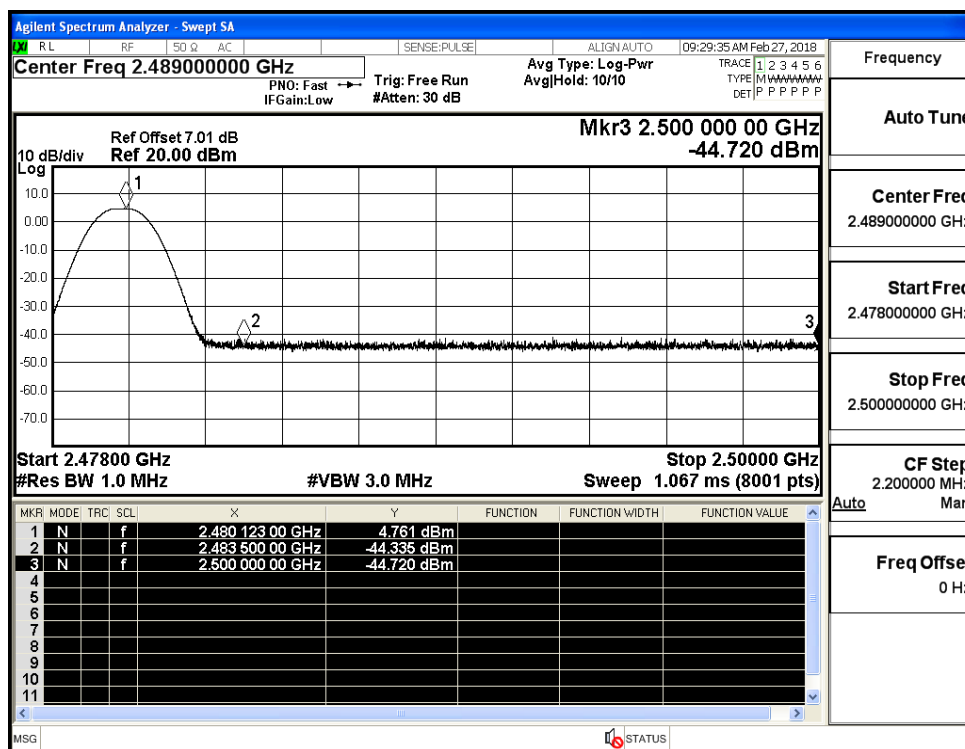
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



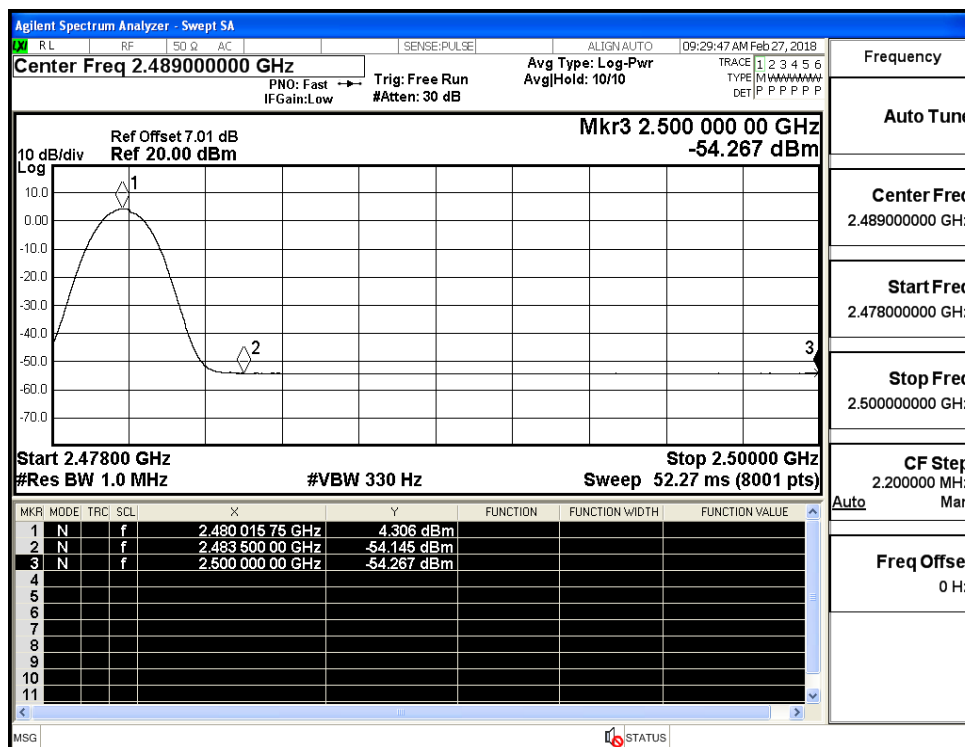
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

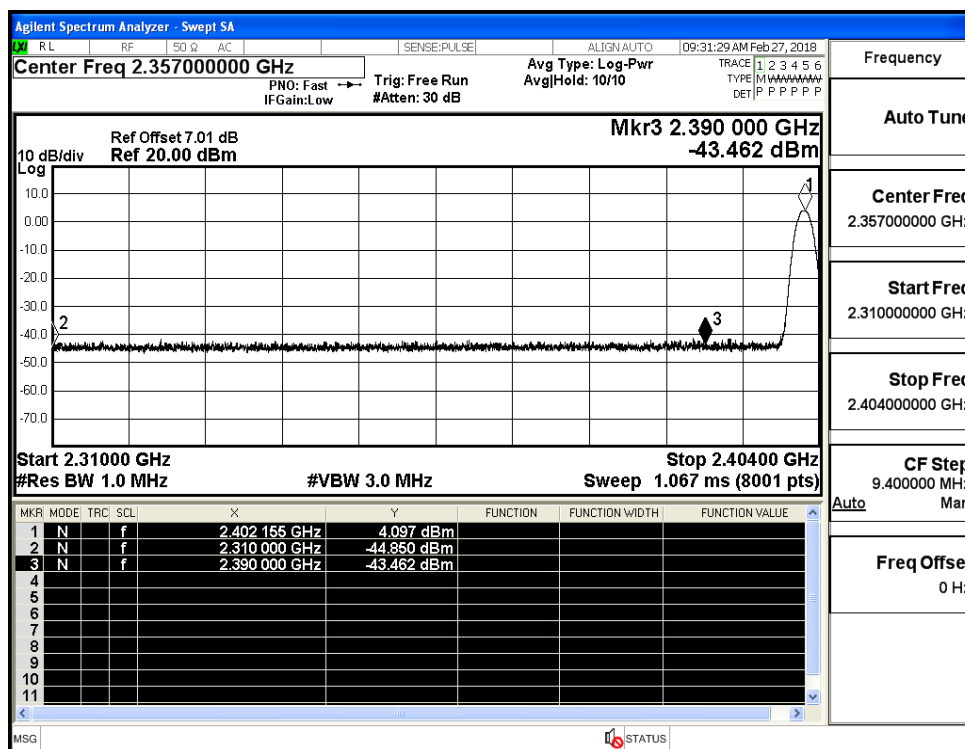
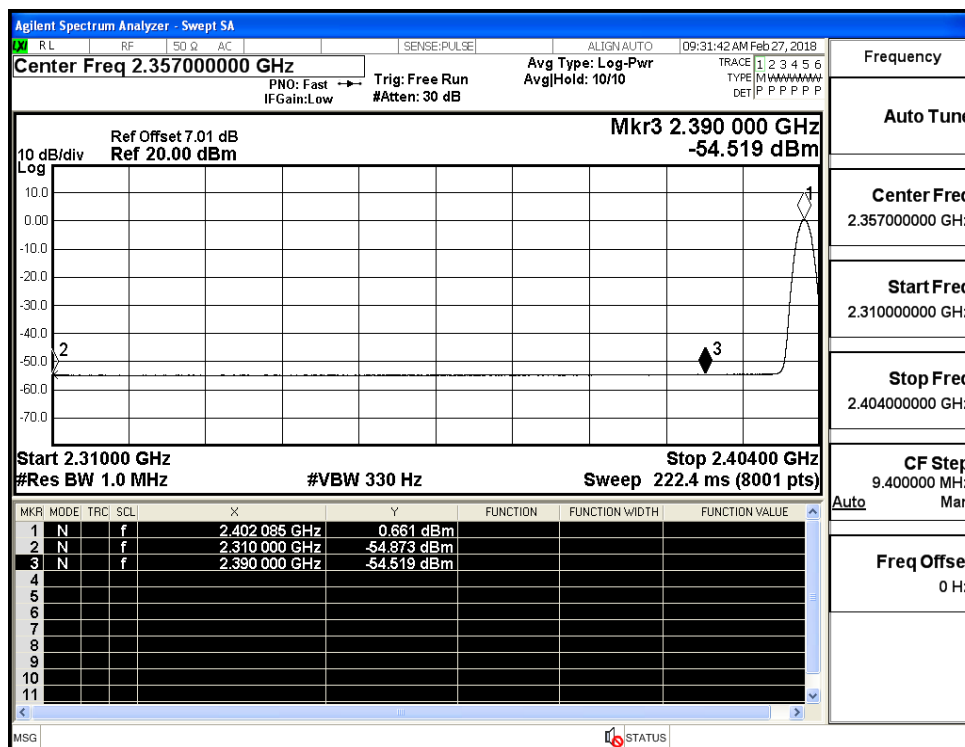


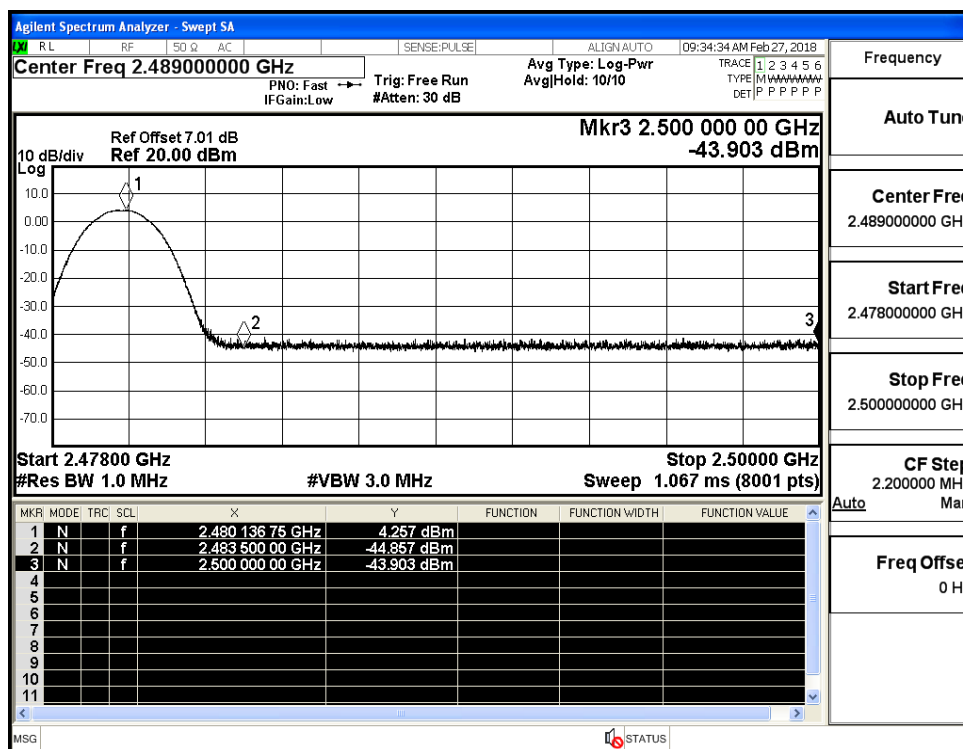
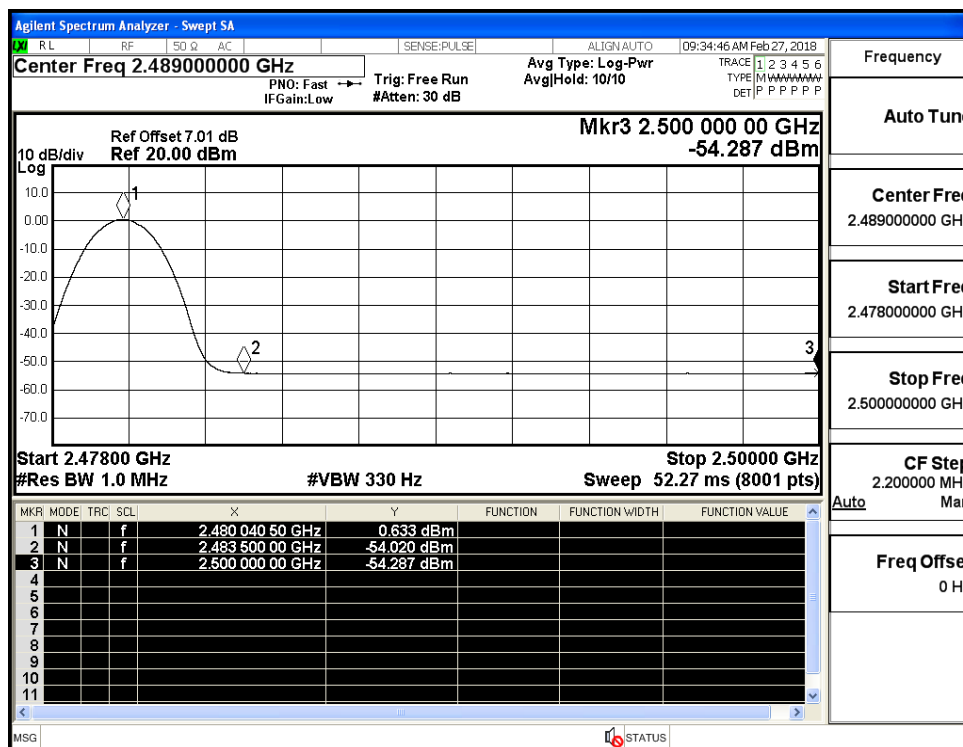
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



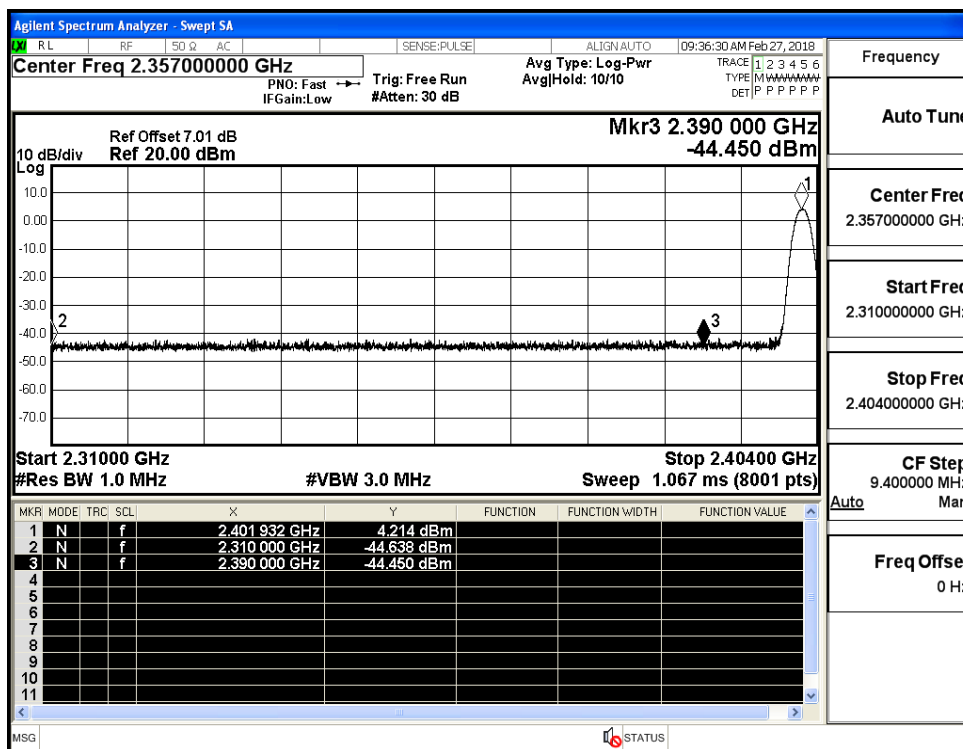
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



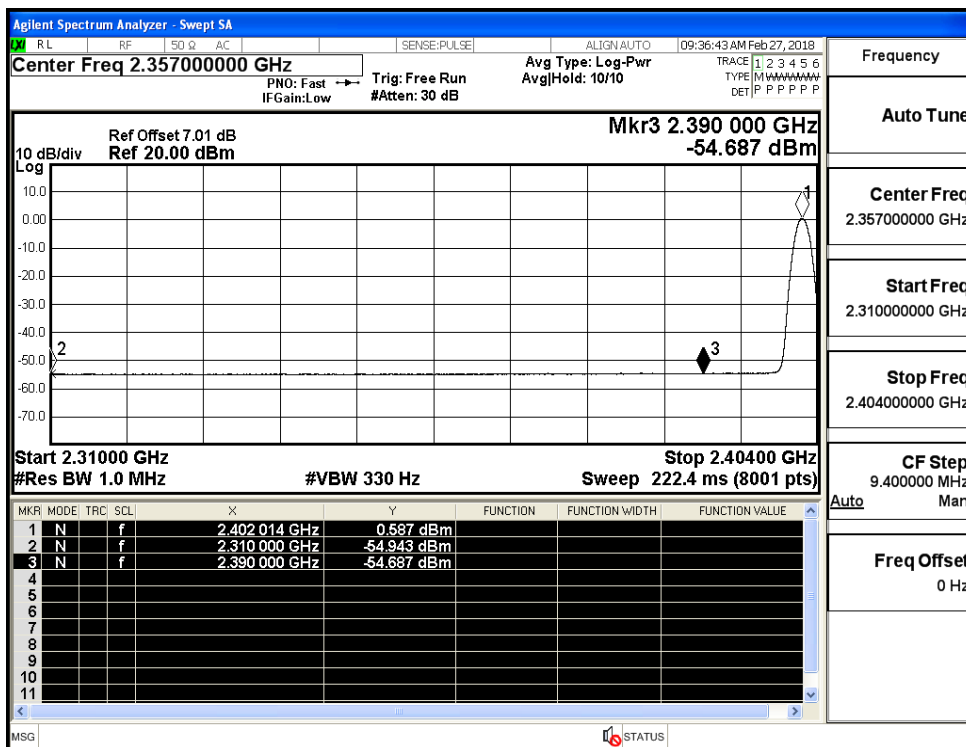
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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

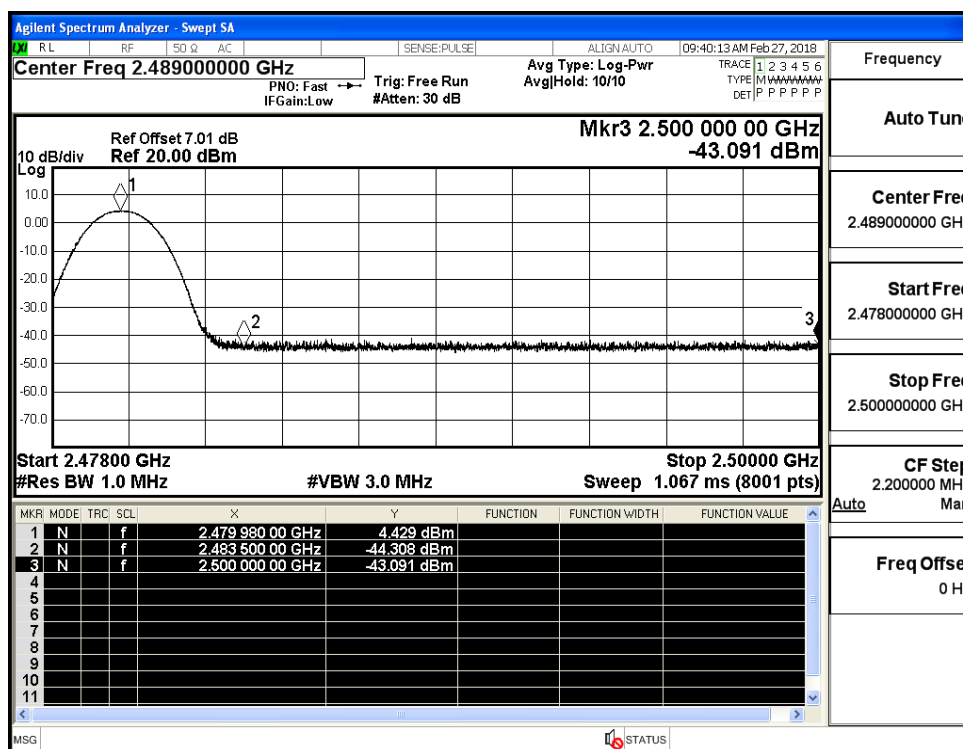
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

