

Appendix A

RF Test Data for BT 4.2(BDR/EDR) (Conducted Measurement)

Product Name: HEADSET

Trade Mark: microlab

Test Model: Necklace 200

Environmental Conditions

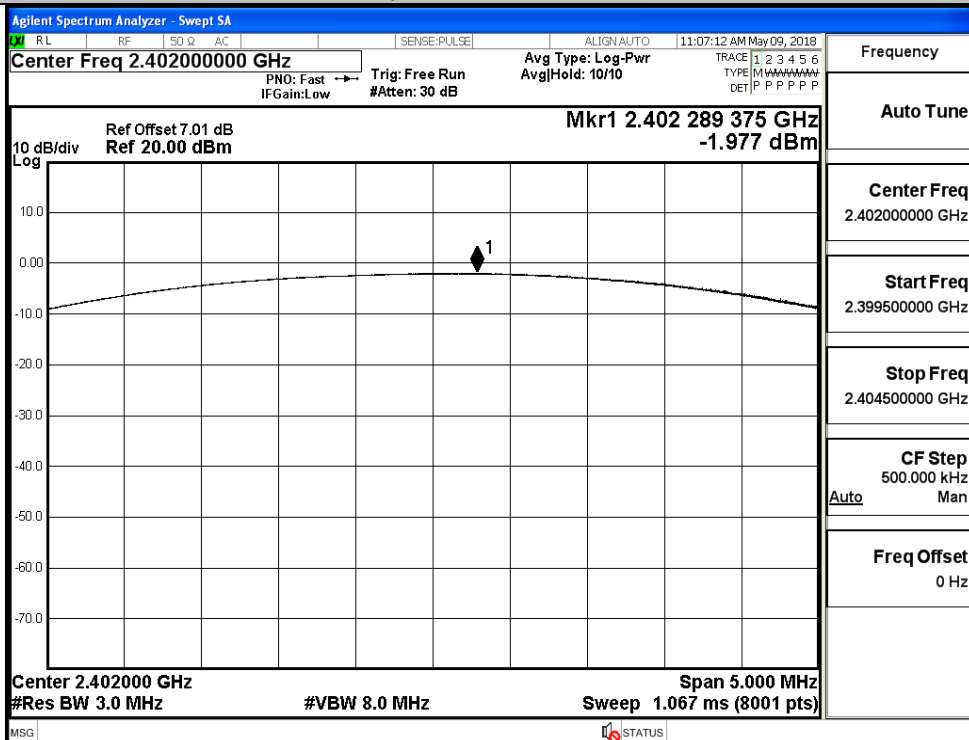
Temperature:	21.6 ° C
Relative Humidity:	52.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.xu
Supervised by:	Jayden.Zhuo

A.1 Maxmum Conducted Peak Output Power

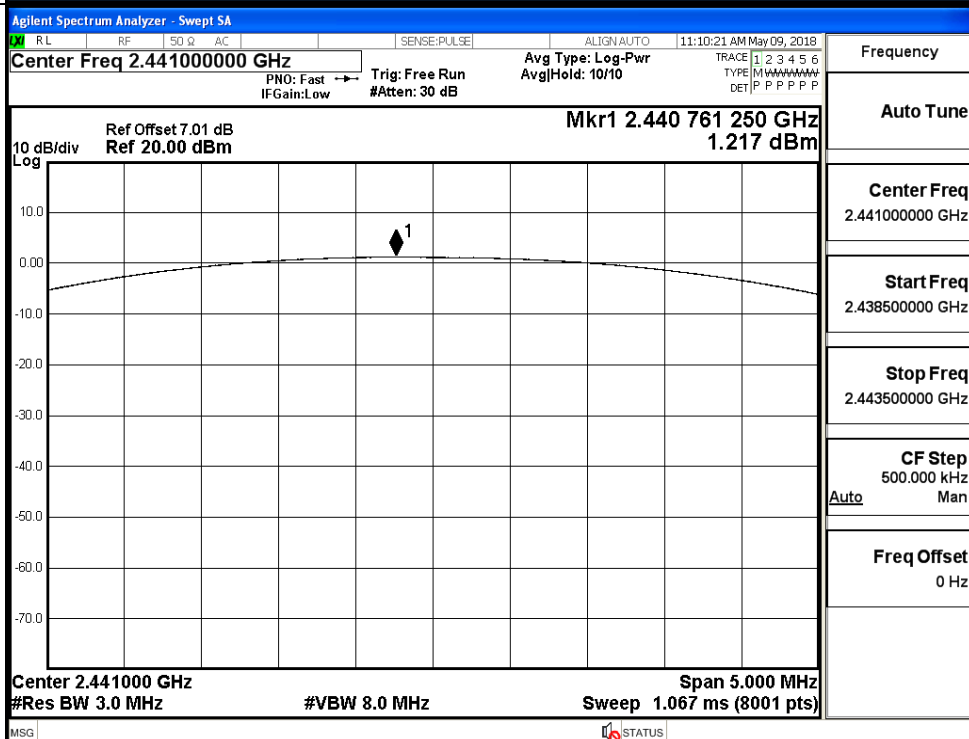
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.977	30	PASS
	MCH	1.217	30	PASS
	HCH	2.638	30	PASS
$\pi/4$ DQPSK	LCH	-1.029	21	PASS
	MCH	-0.212	21	PASS
	HCH	1.500	21	PASS
8DPSK	LCH	-0.913	21	PASS
	MCH	0.085	21	PASS
	HCH	1.743	21	PASS

Test Graphs

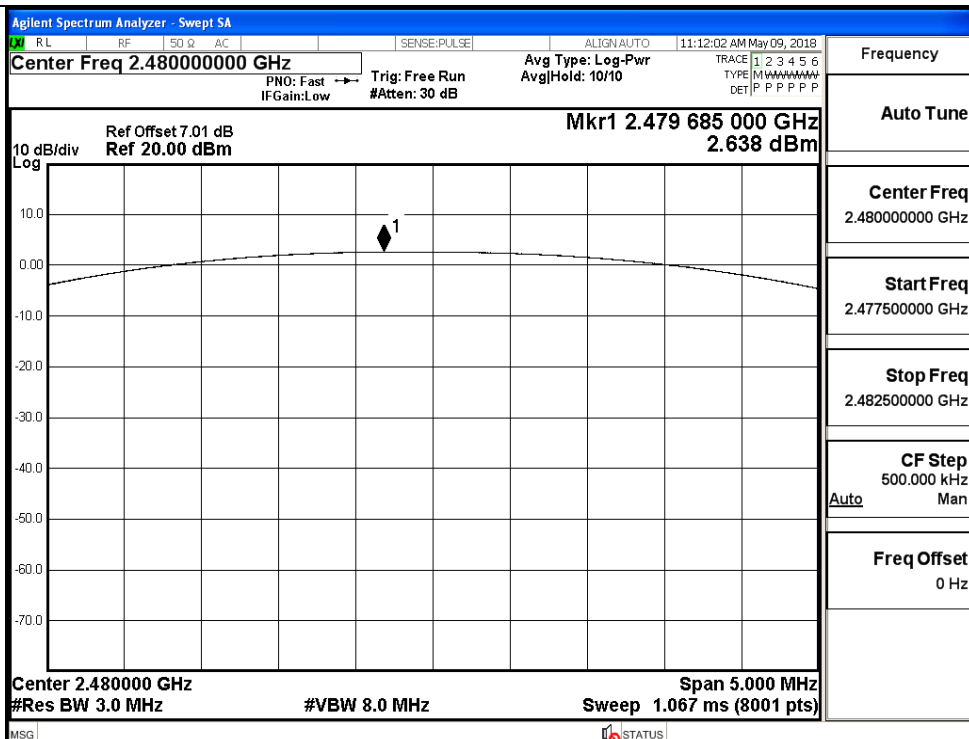
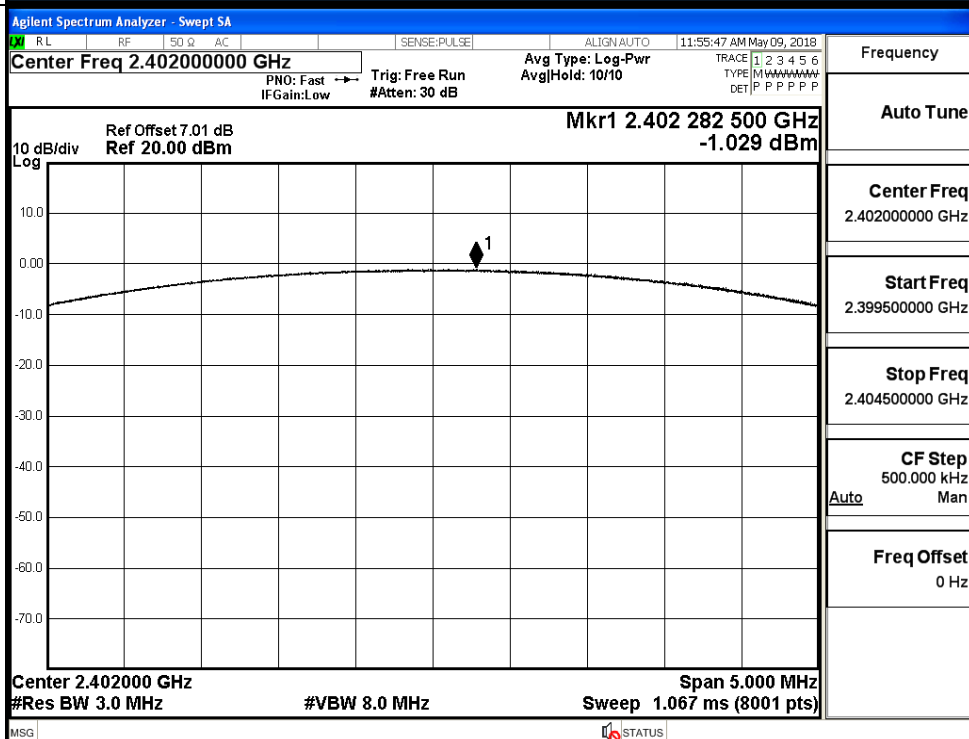
GFSK/LCH

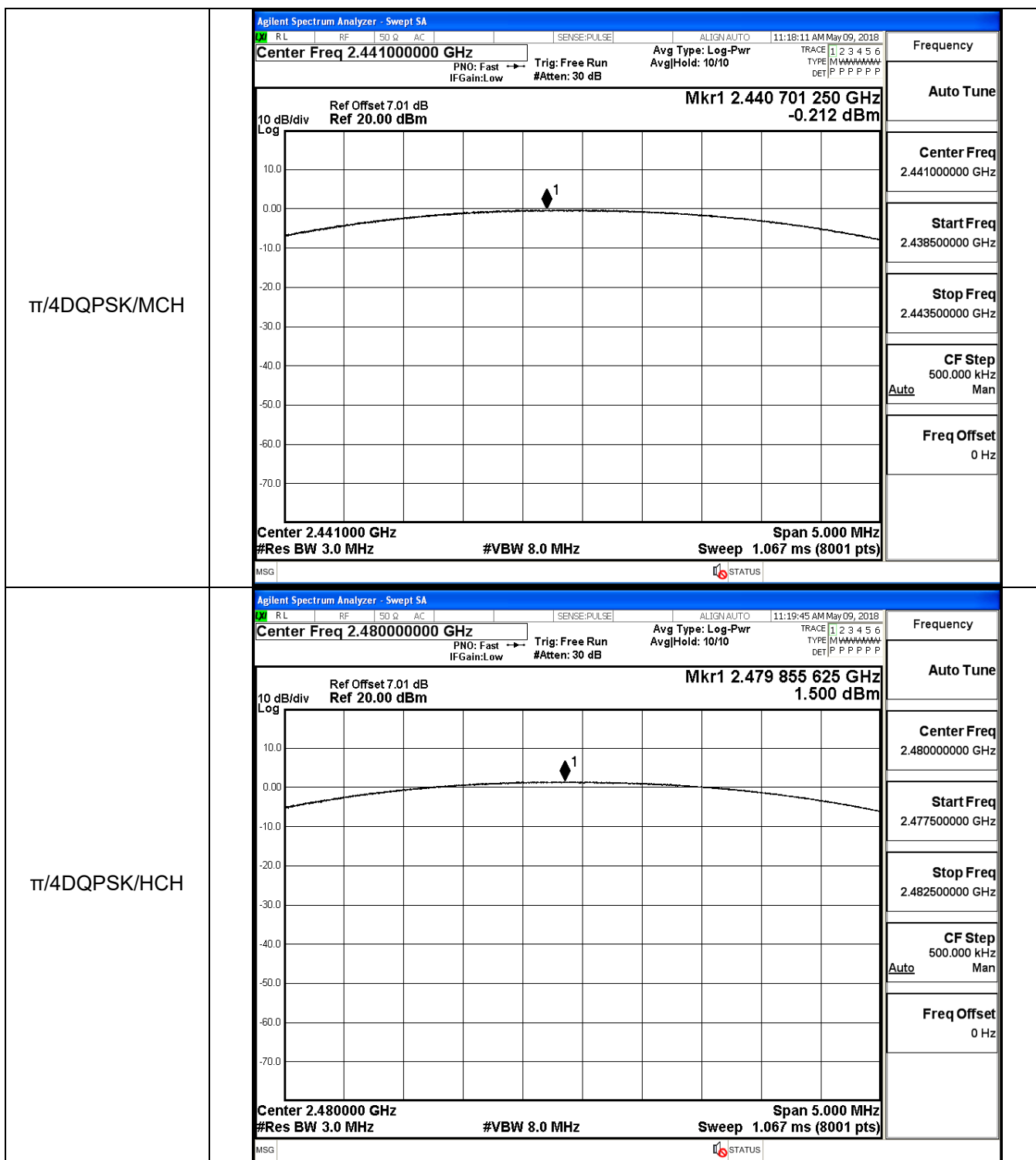


GFSK/MCH

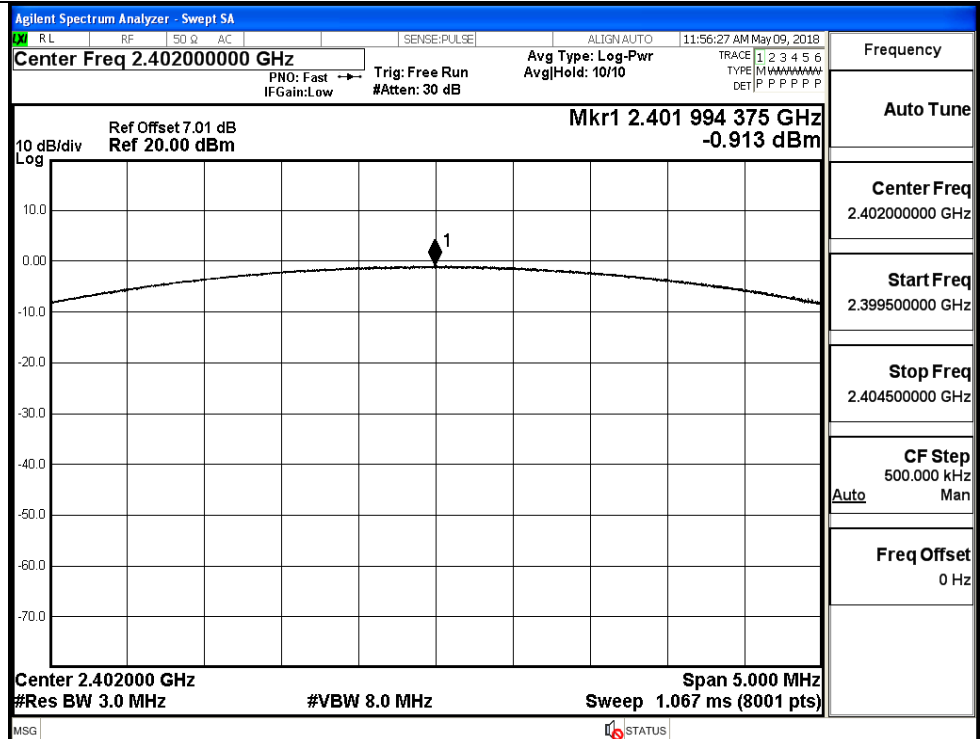


GFSK/HCH

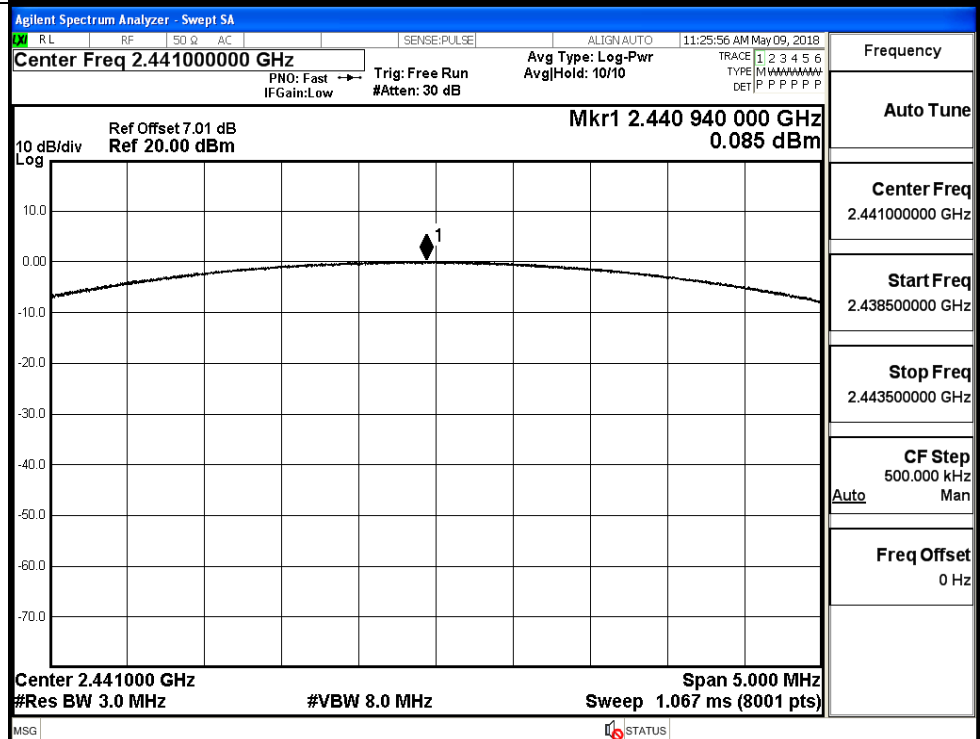
 π /4DQPSK/LCH



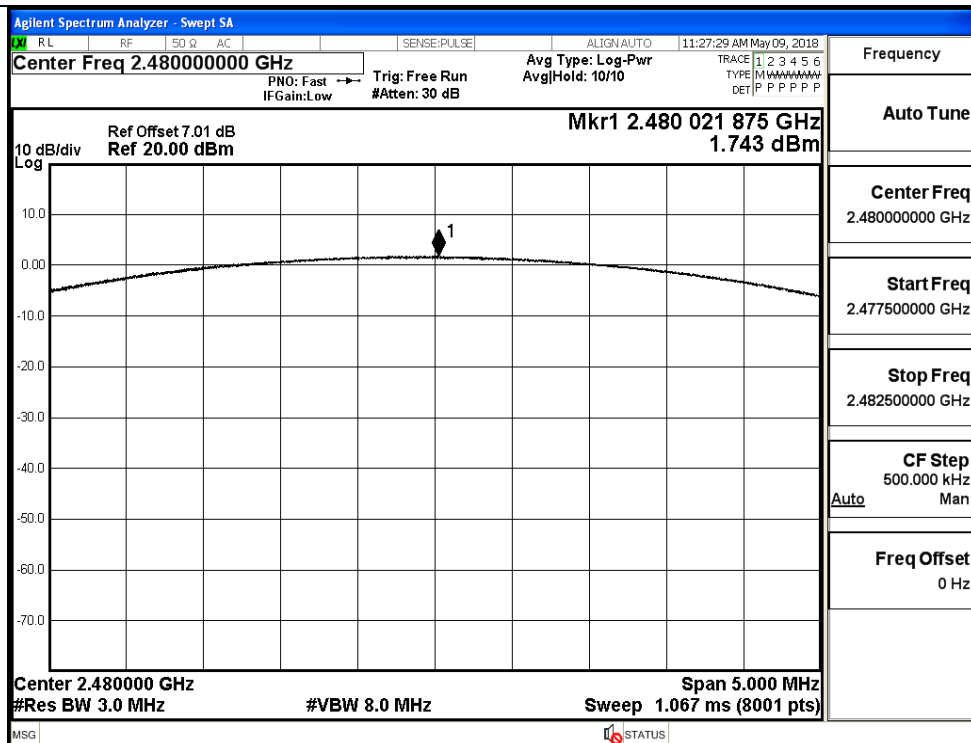
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

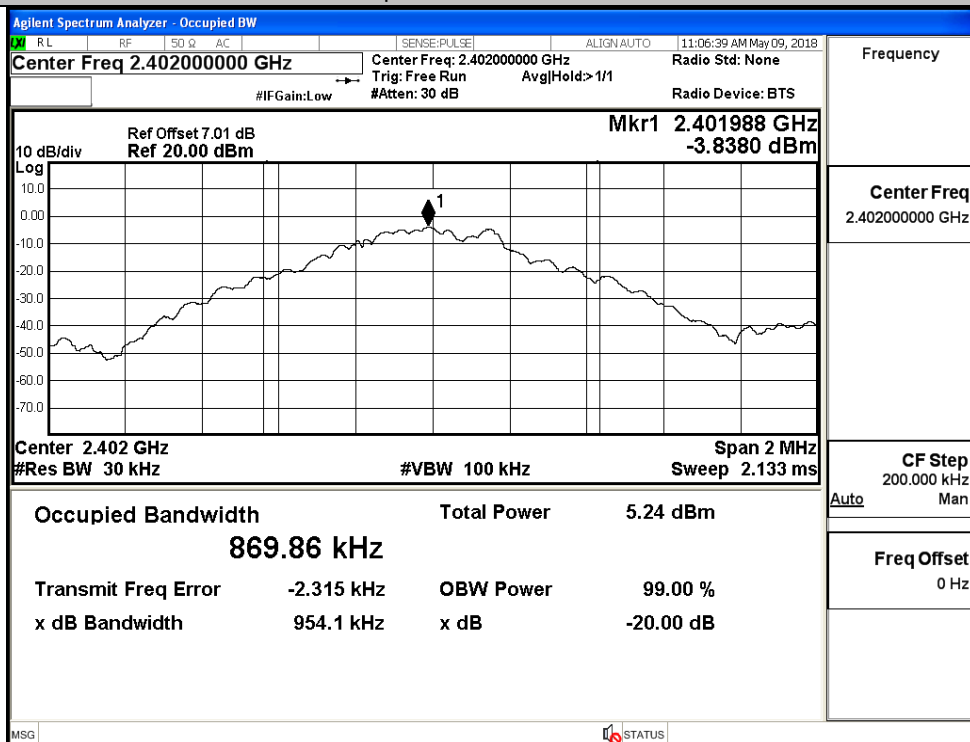


A.2 20dB Bandwidth

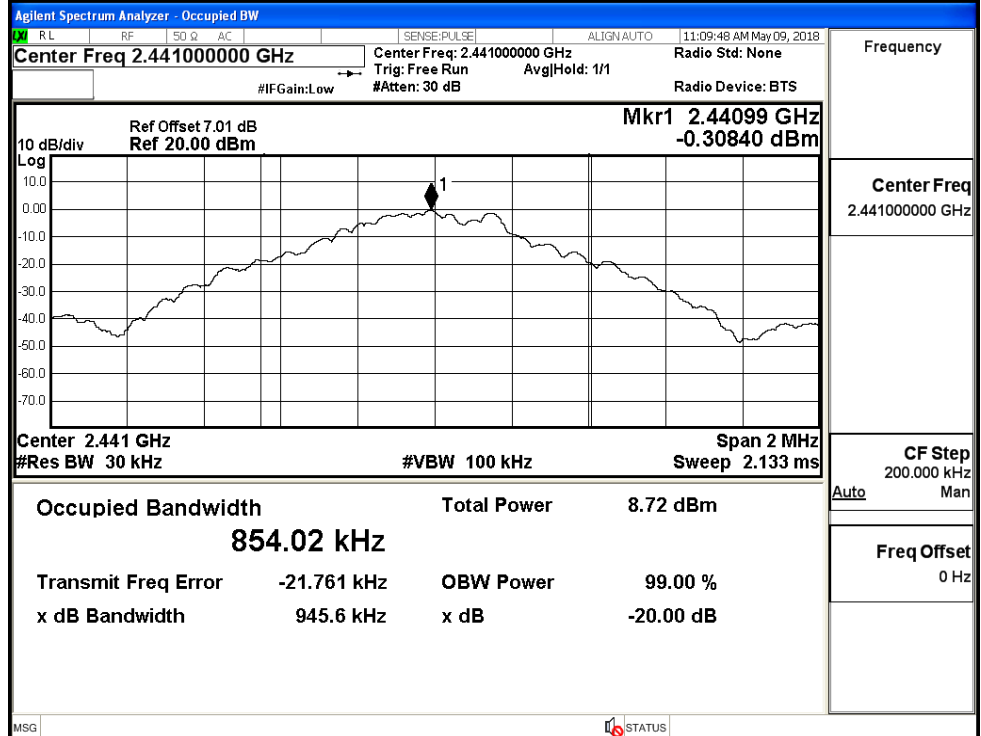
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9541	Not Specified	PASS
	MCH	0.9456	Not Specified	PASS
	HCH	0.9446	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.265	Not Specified	PASS
	MCH	1.231	Not Specified	PASS
	HCH	1.232	Not Specified	PASS
8DPSK	LCH	1.282	Not Specified	PASS
	MCH	1.267	Not Specified	PASS
	HCH	1.261	Not Specified	PASS

Test Graphs

GFSK/LCH



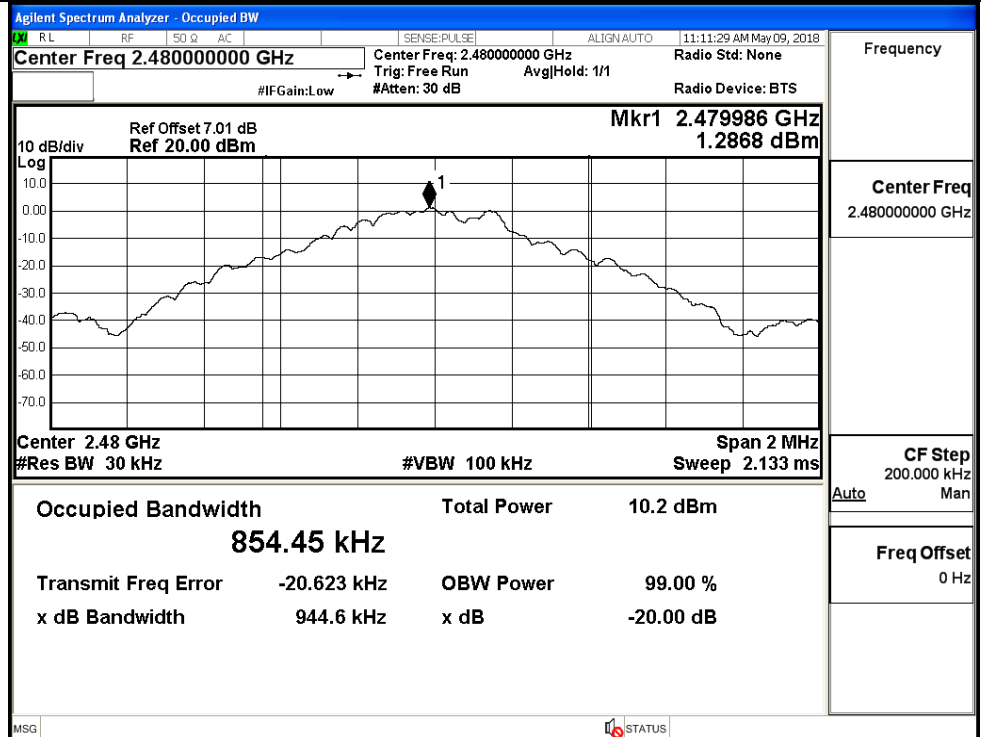
GFSK/MCH



Frequency

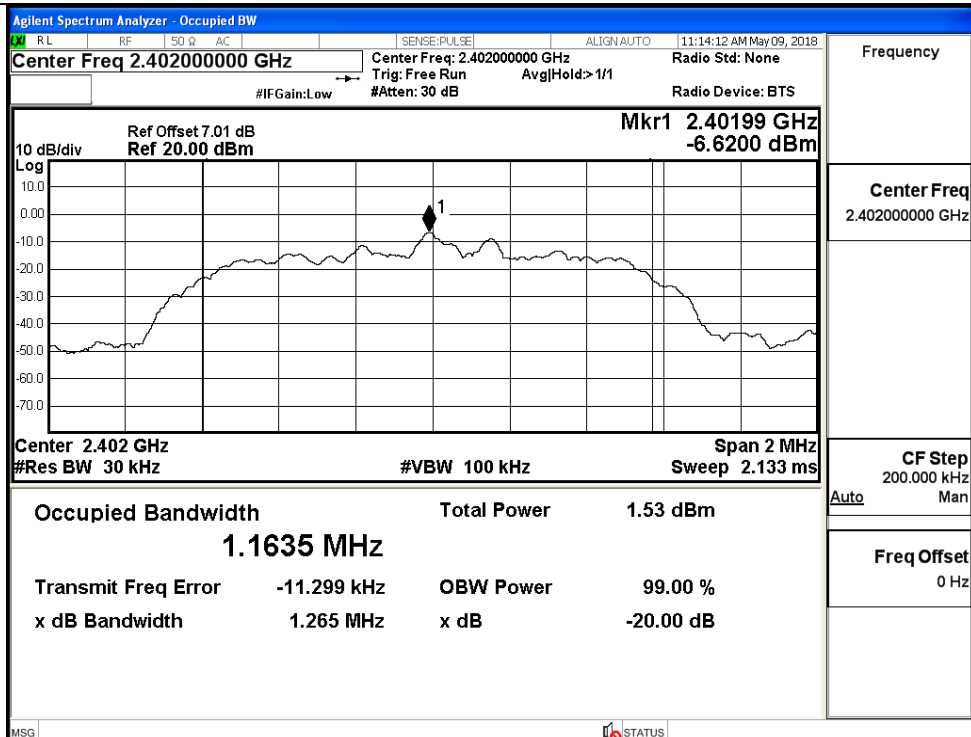
Center Freq
2.441000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

GFSK/HCH



Frequency

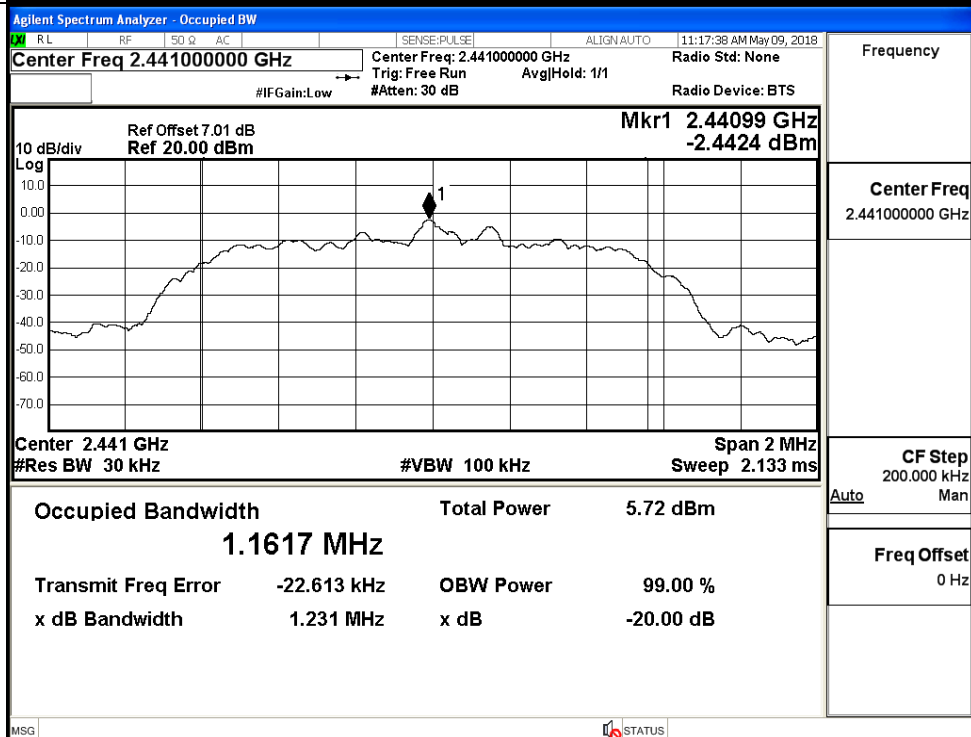
Center Freq
2.480000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

$\pi/4$ DQPSK/LCH

Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
Man

Auto

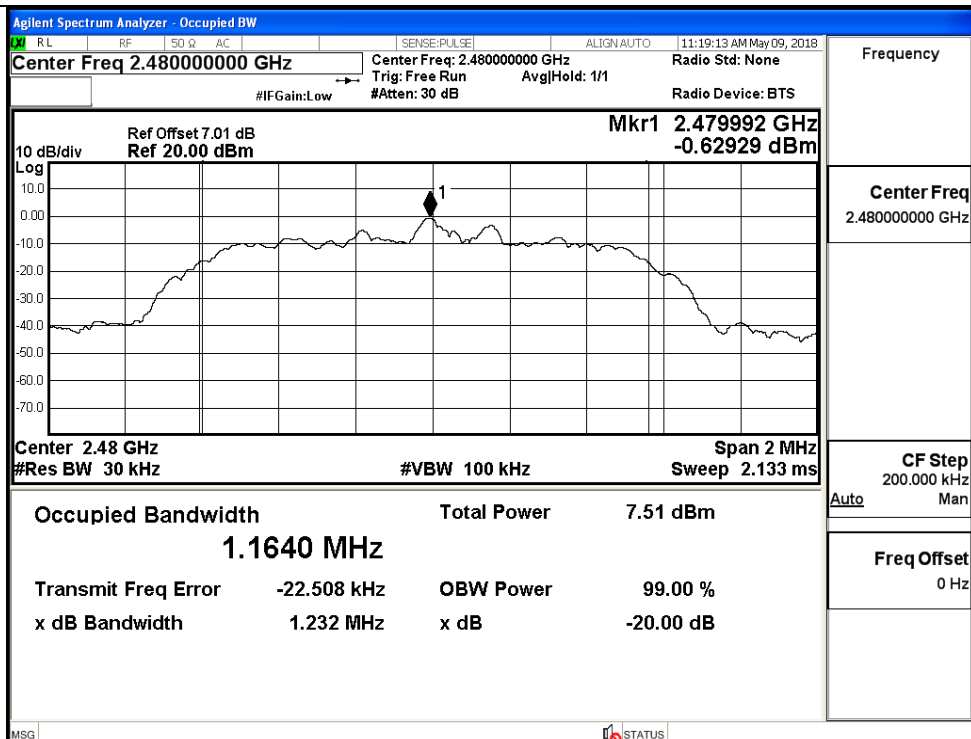
Freq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Man

Auto

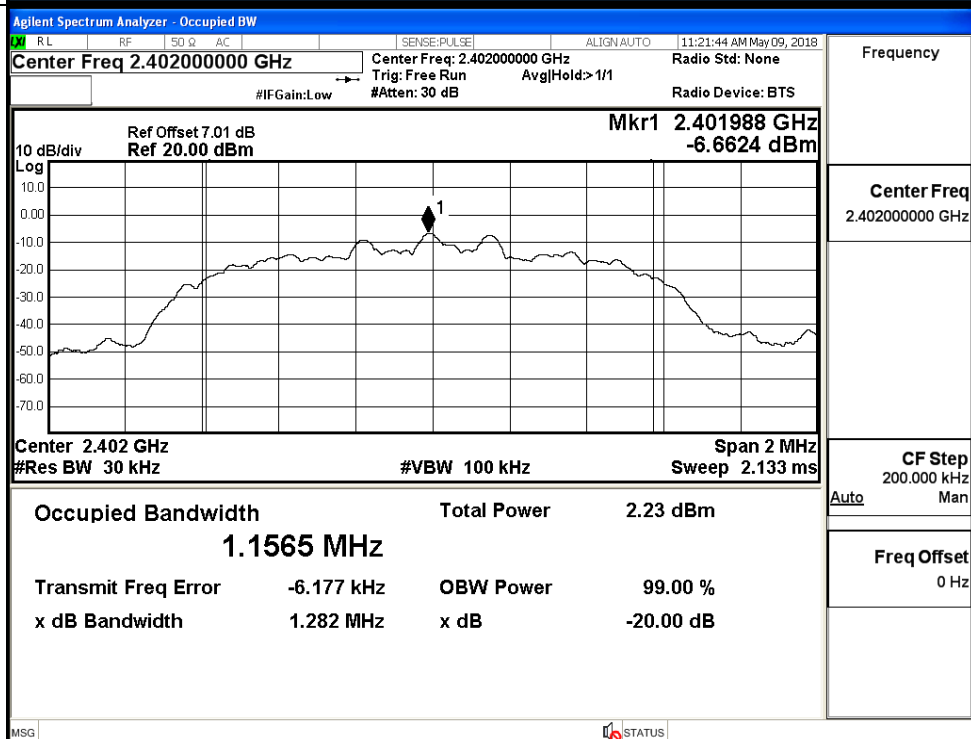
Freq Offset
0 Hz

π /4DQPSK/HCH

Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

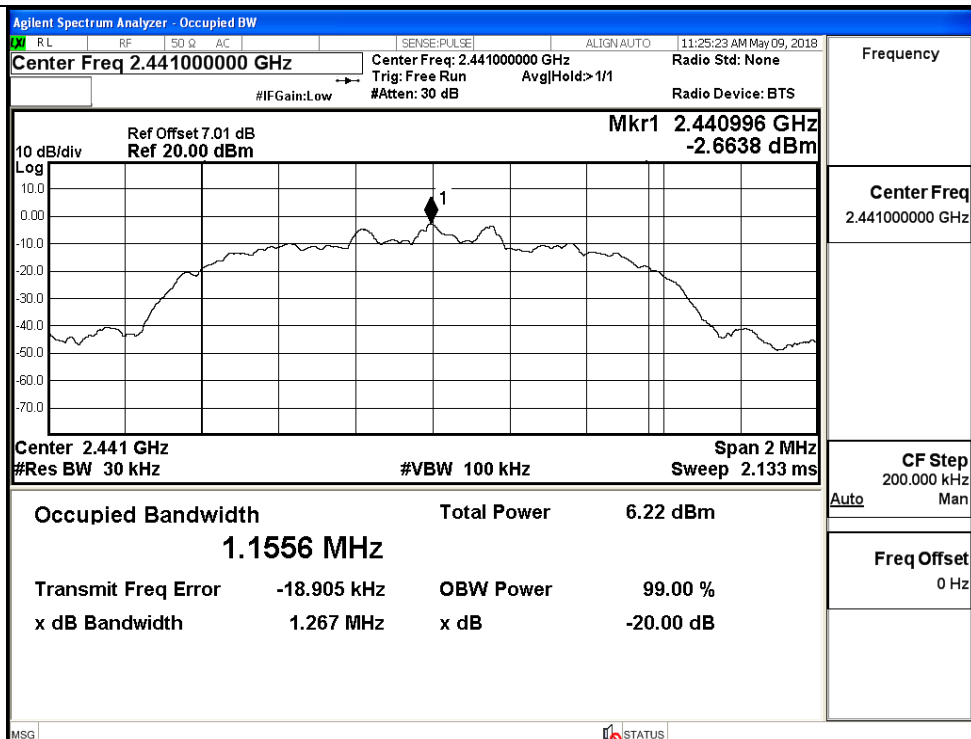
8DPSK/LCH



Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

8DPSK/MCH



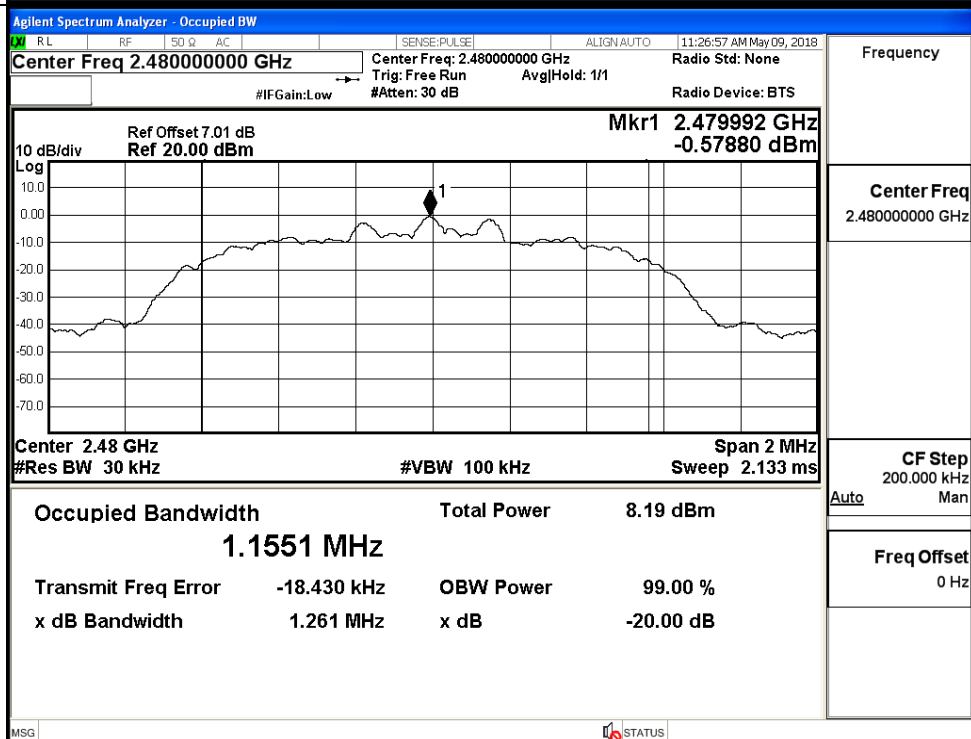
Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

8DPSK/HCH



Frequency

Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

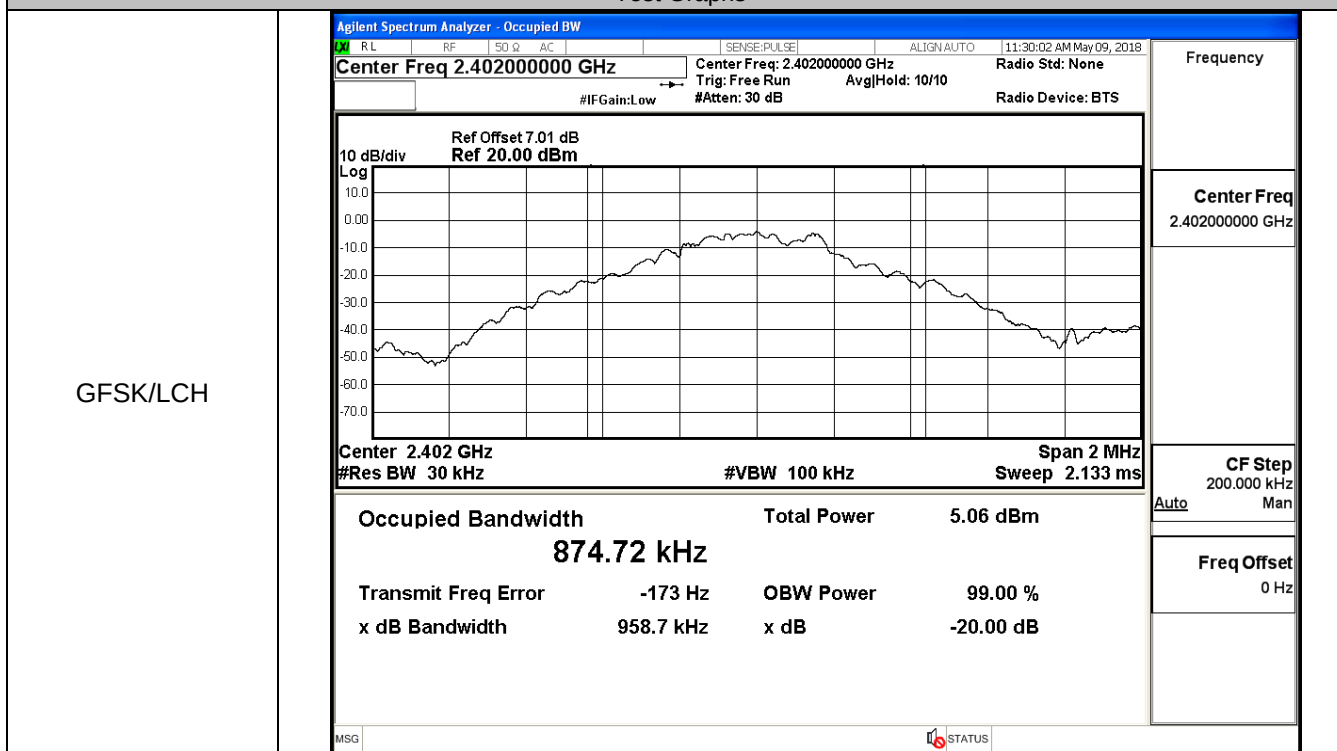
Auto

Freq Offset
0 Hz

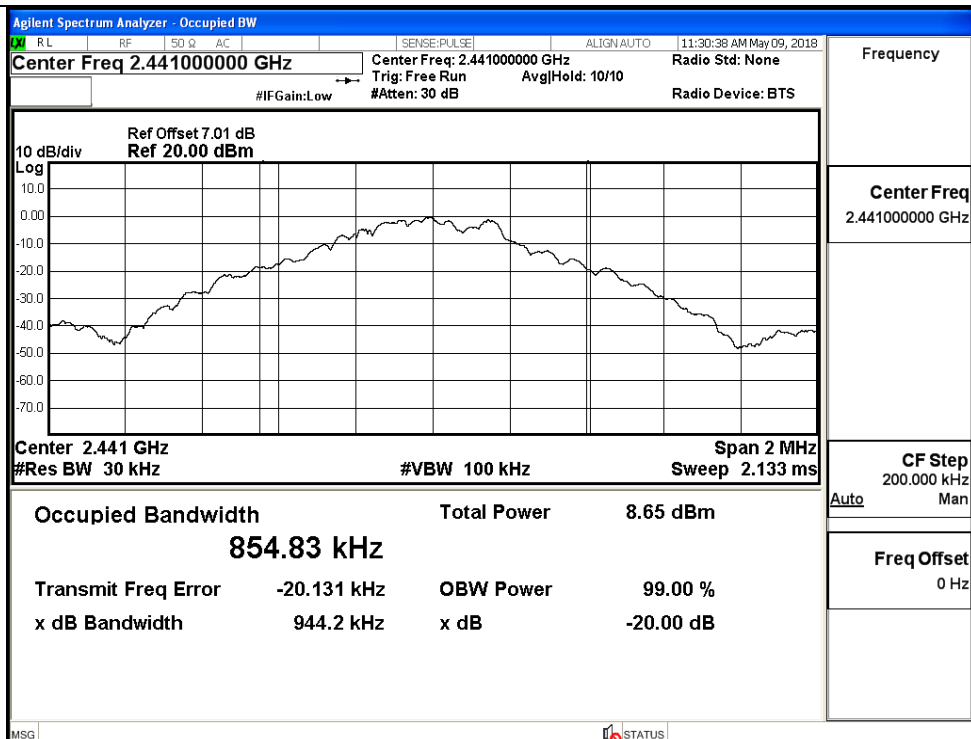
A.3 Occupied Bandwidth

Mode	Channel.	Occupied Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.87472	Not Specified	PASS
	MCH	0.85483	Not Specified	PASS
	HCH	0.85411	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.1666	Not Specified	PASS
	MCH	1.1620	Not Specified	PASS
	HCH	1.1628	Not Specified	PASS
8DPSK	LCH	1.1574	Not Specified	PASS
	MCH	1.1558	Not Specified	PASS
	HCH	1.1572	Not Specified	PASS

Test Graphs



GFSK/MCH



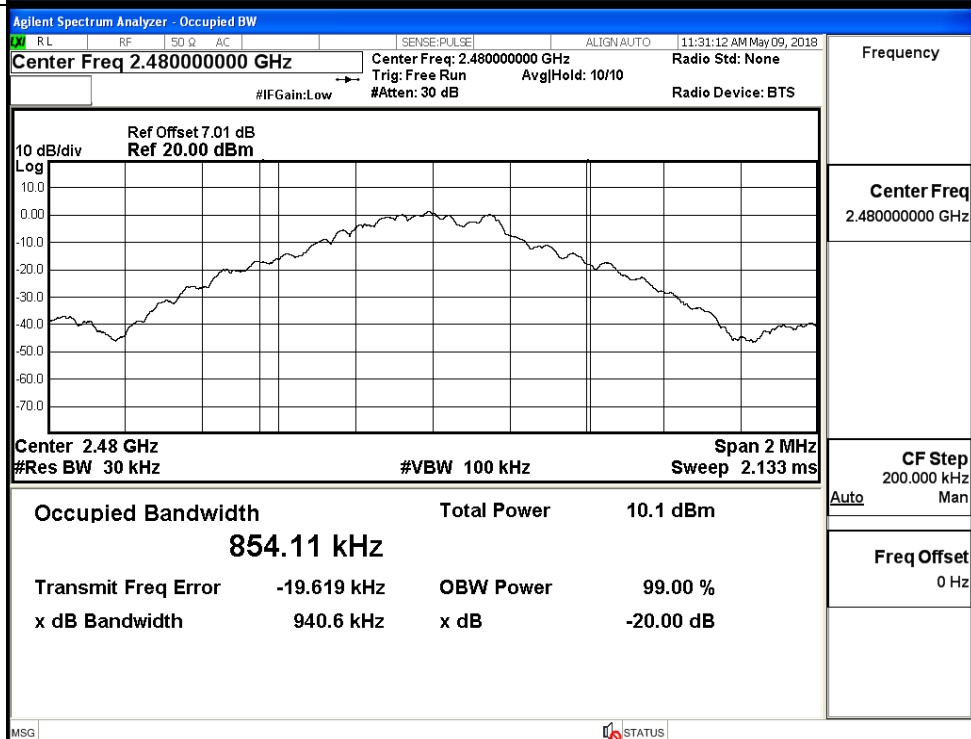
Frequency

Center Freq
2.441000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

GFSK/HCH

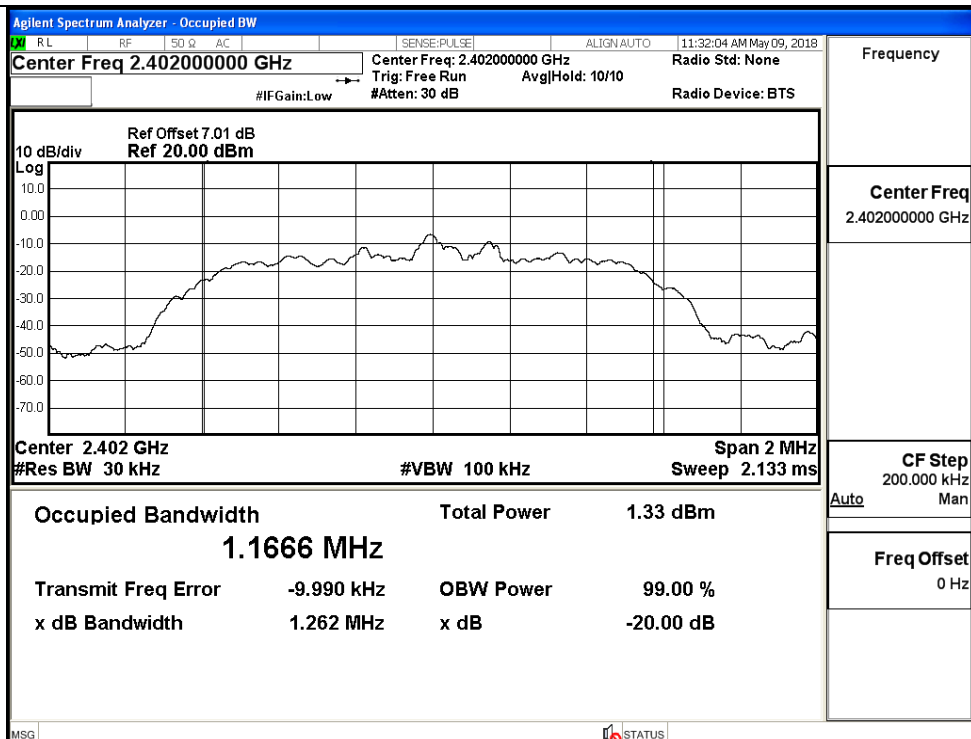


Frequency

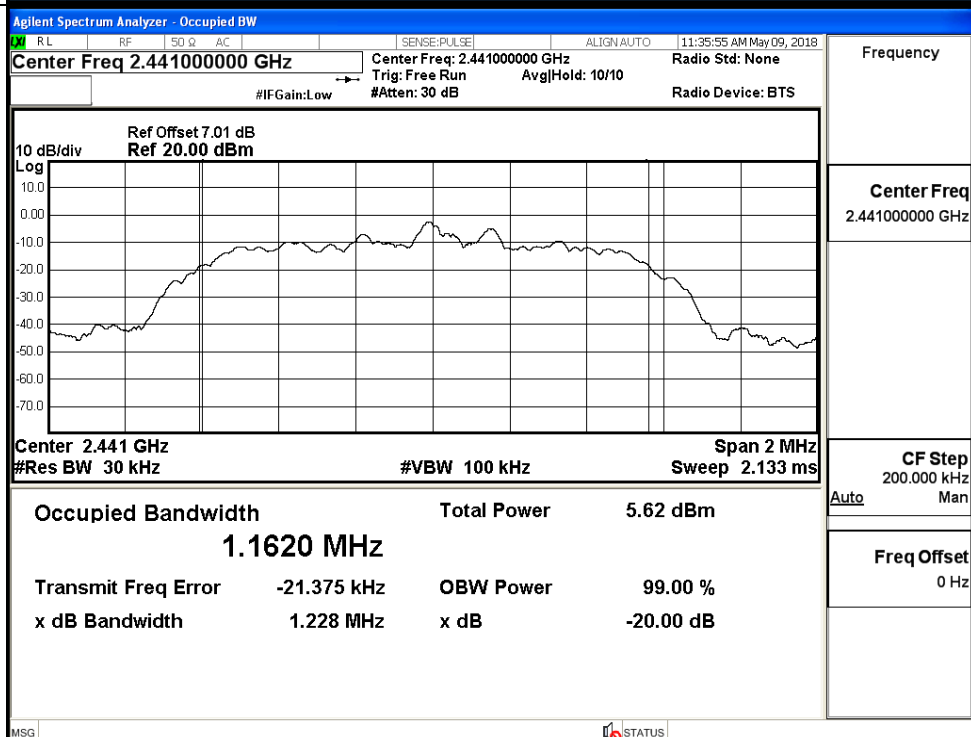
Center Freq
2.480000000 GHzCF Step
200.000 kHz
Man

Auto

Freq Offset
0 Hz

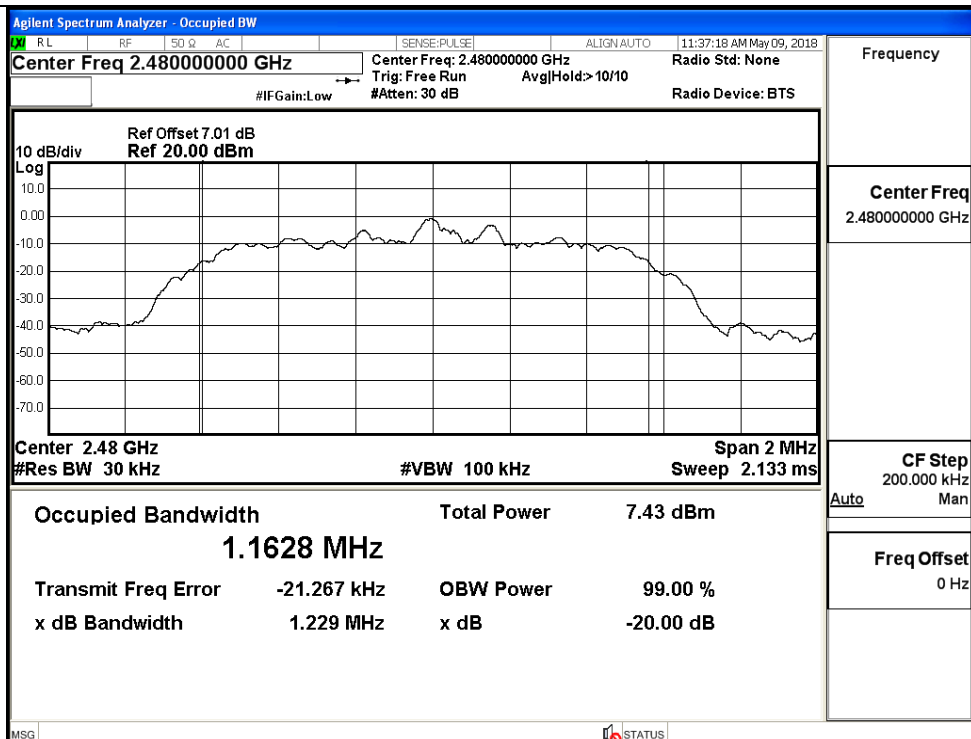
$\pi/4$ DQPSK/LCH

Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

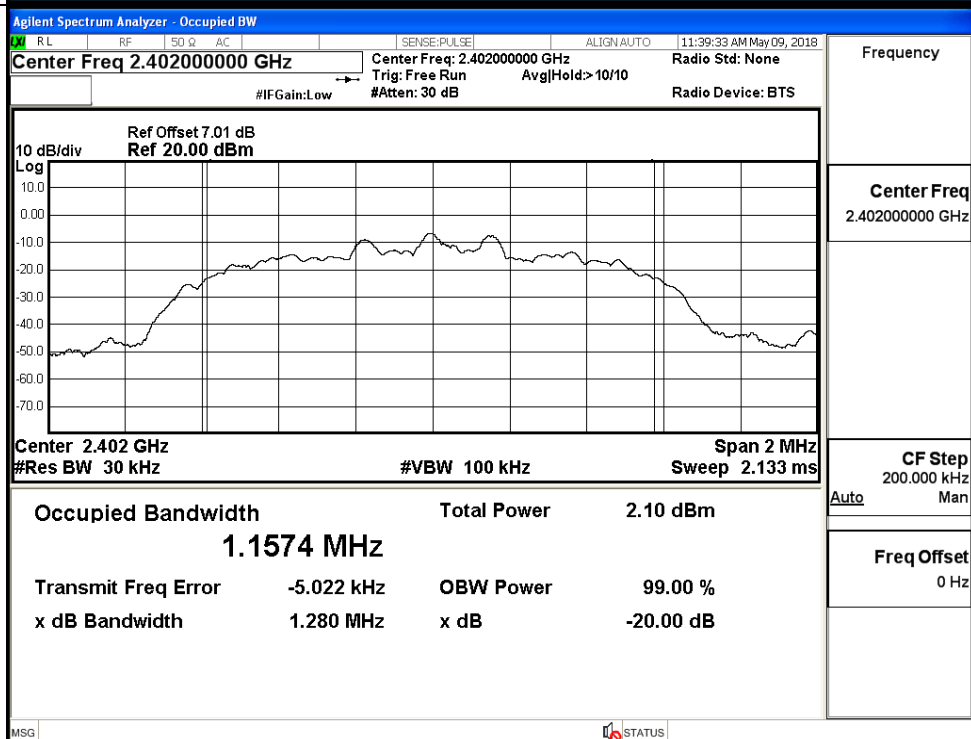
Center Freq
2.441000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH

Frequency

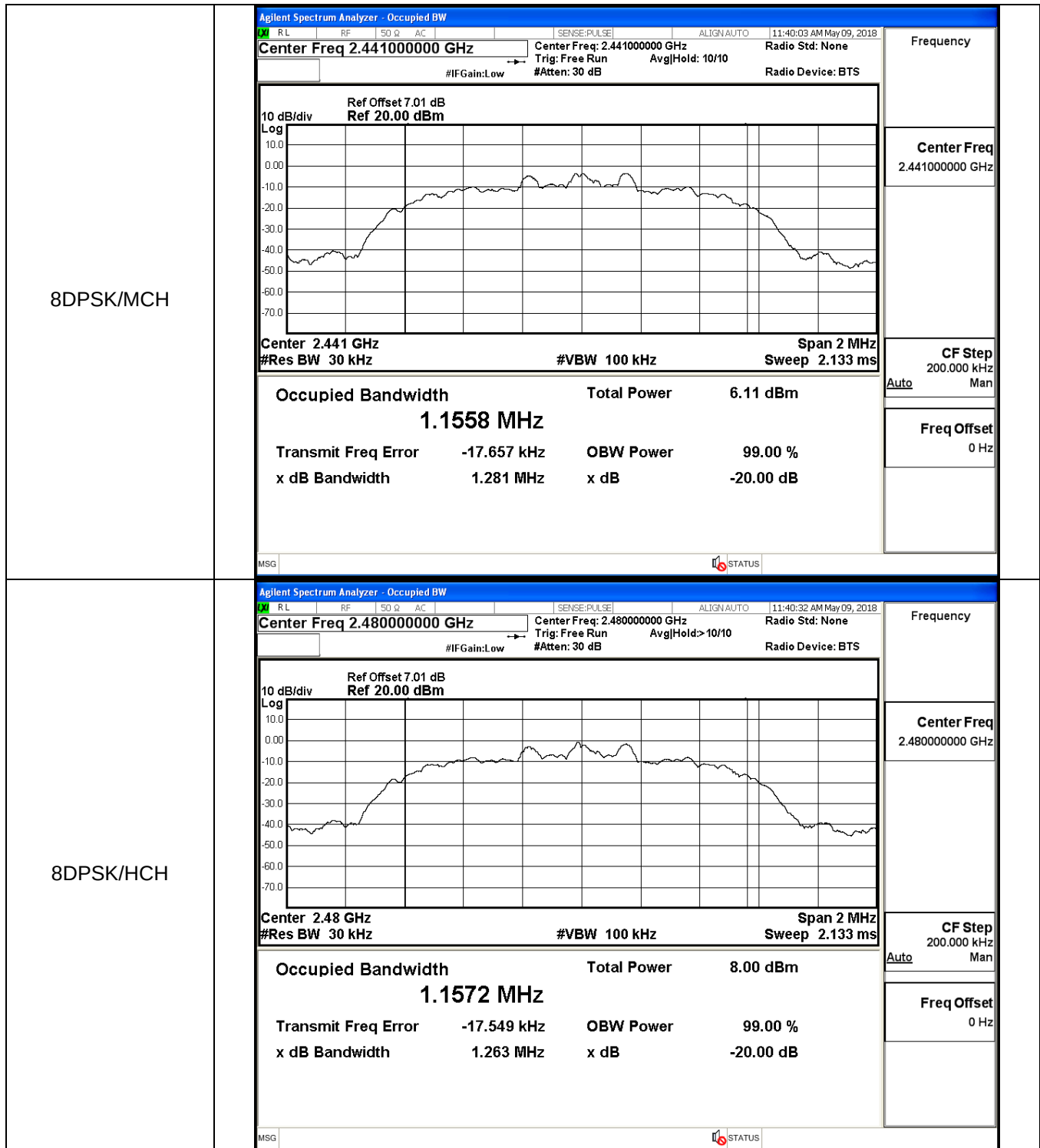
Center Freq
2.480000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

8DPSK/LCH



Frequency

Center Freq
2.402000000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz



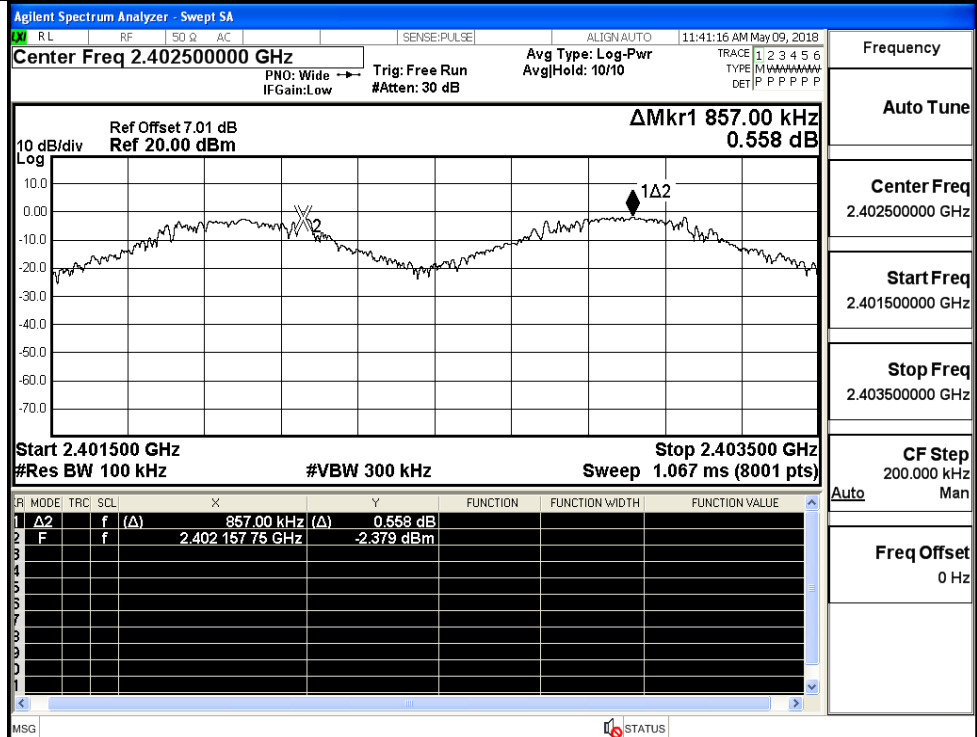
A.4 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.857	0.636	PASS
	MCH	1.216	0.636	PASS
	HCH	1.108	0.636	PASS
$\pi/4$ DQPSK	LCH	1.172	0.843	PASS

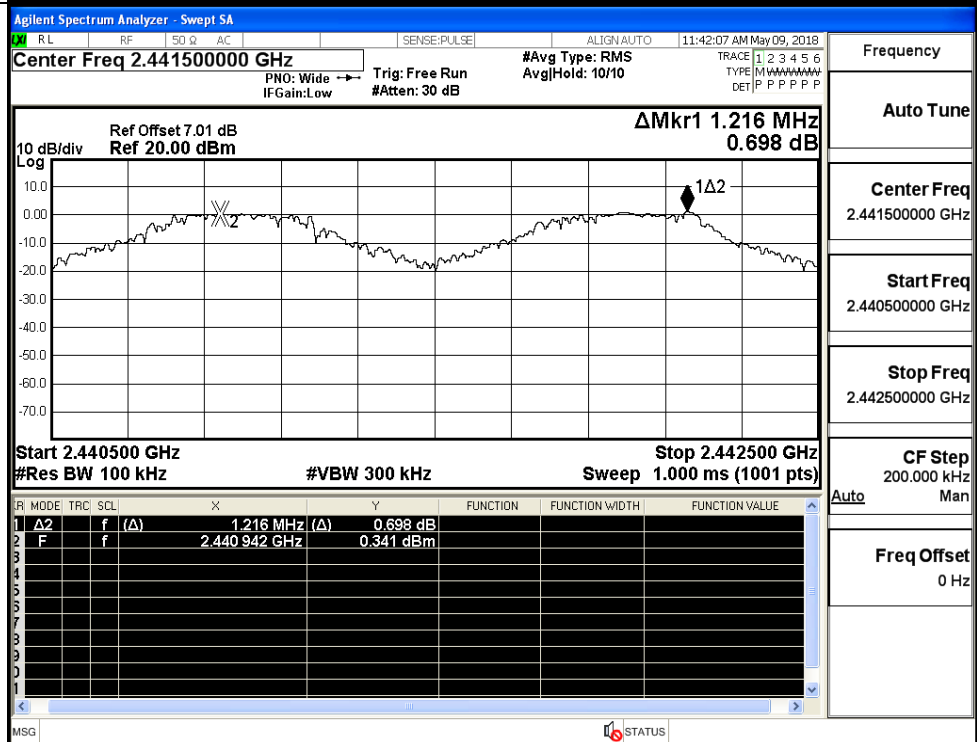
8DPSK	MCH	1.004	0.843	PASS
	HCH	0.904	0.843	PASS
	LCH	1.168	0.855	PASS
	MCH	1.012	0.855	PASS
	HCH	1.132	0.855	PASS

Test Graphs

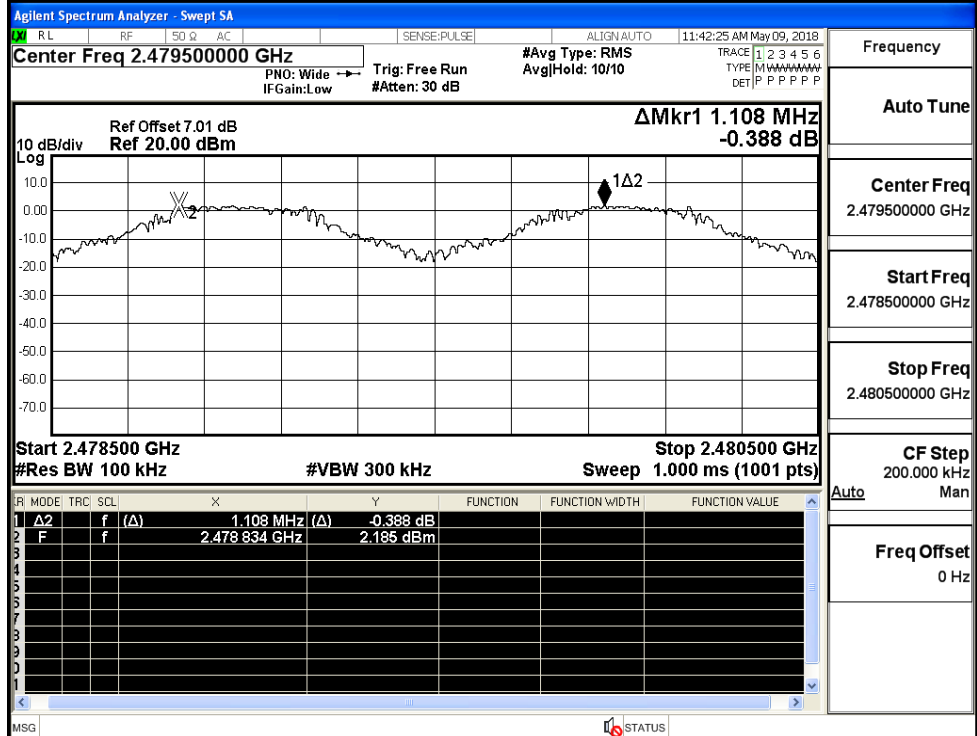
GFSK/LCH



GFSK/MCH



GFSK/HCH

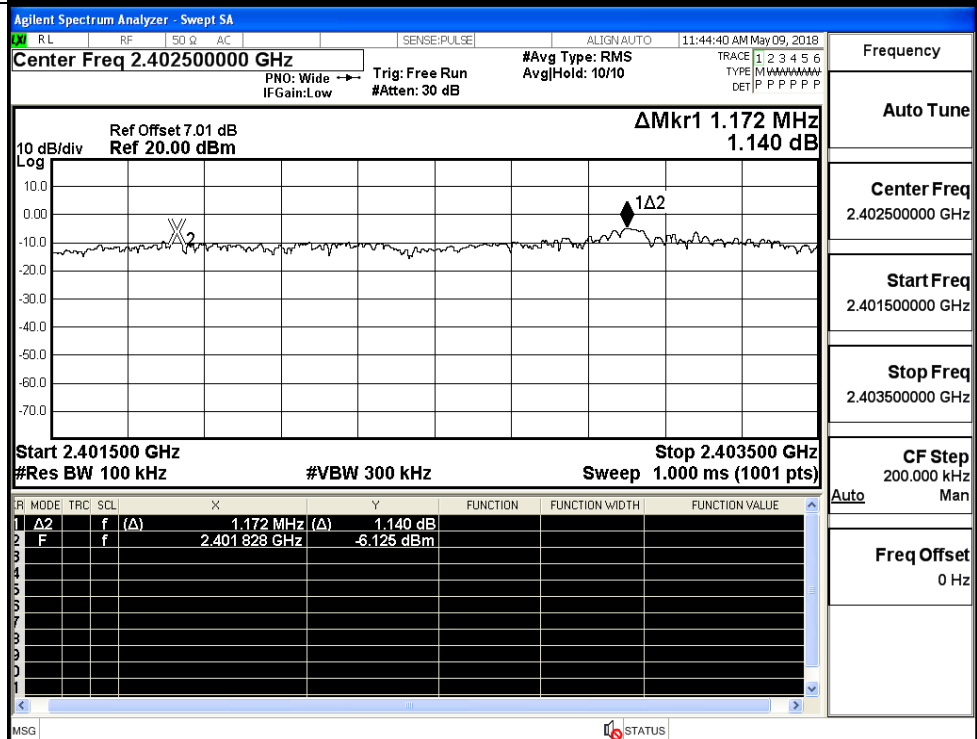


Frequency

Auto Tune

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

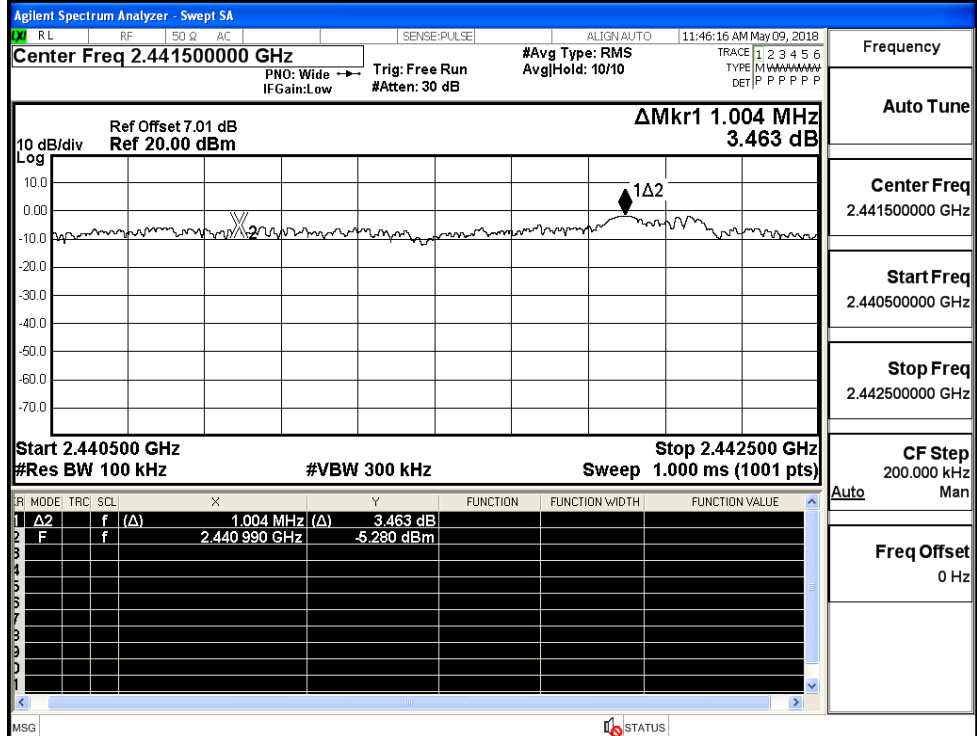
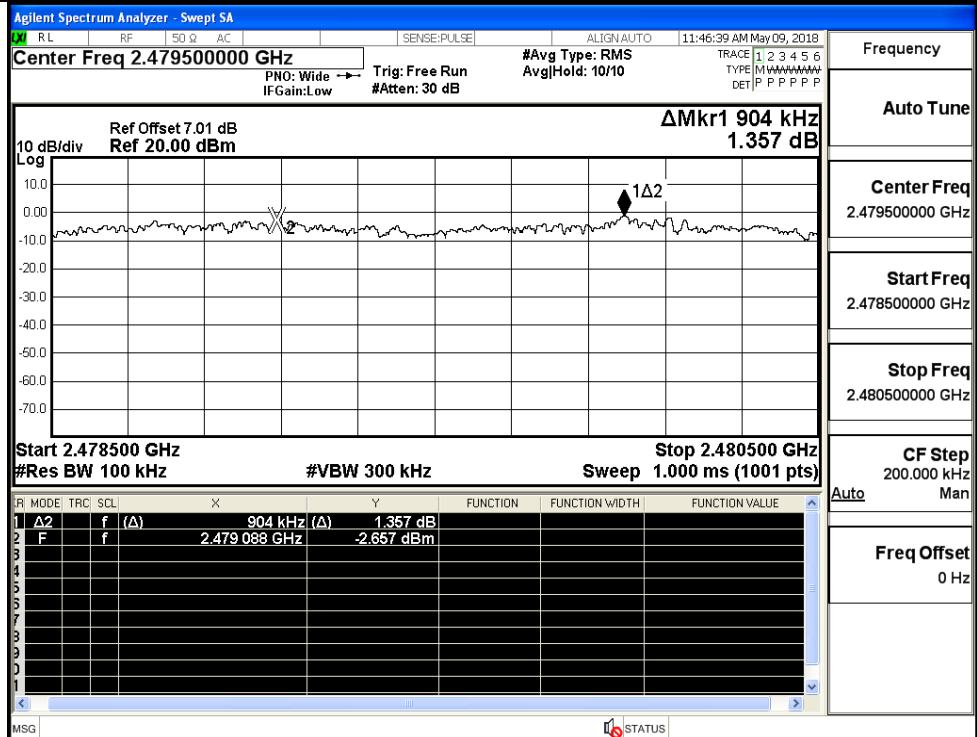
π/4DQPSK/LCH



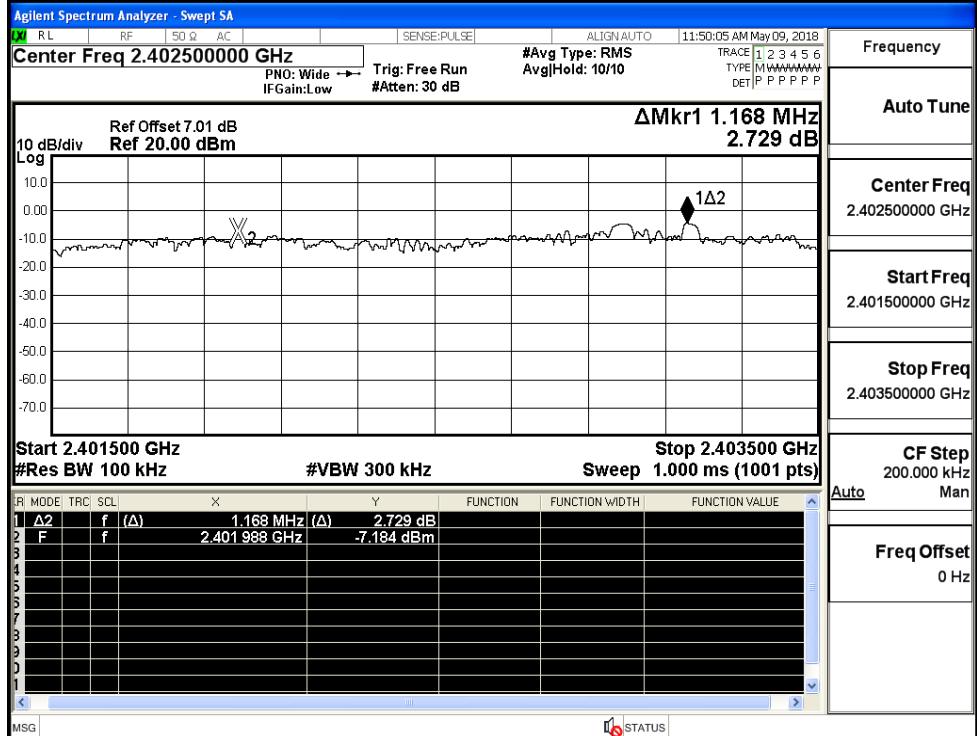
Frequency

Auto Tune

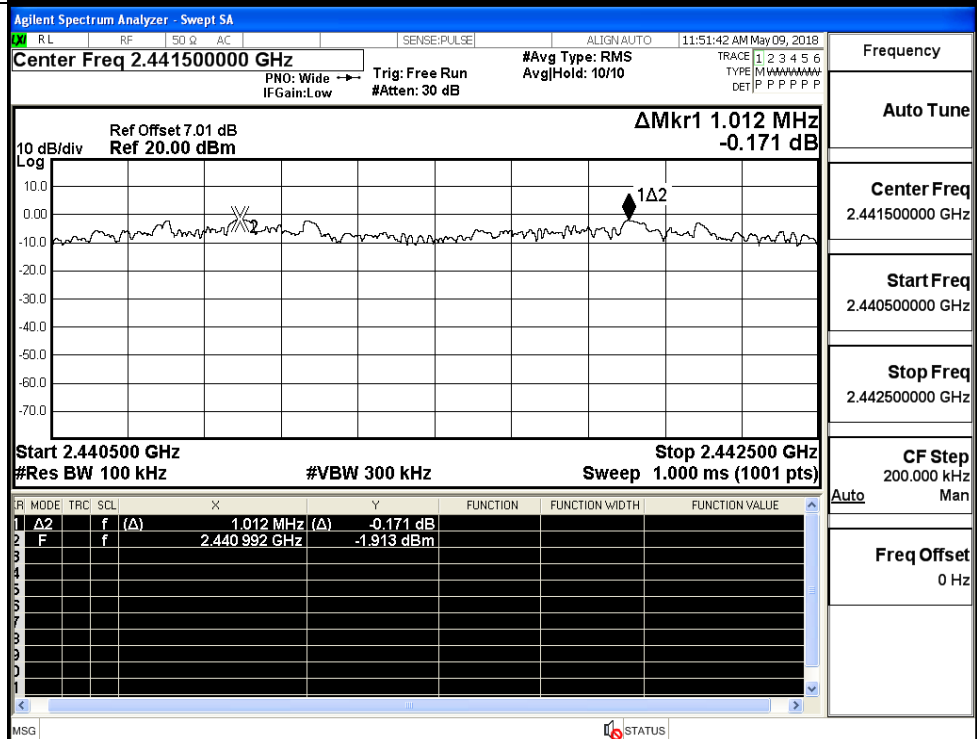
Center Freq
2.402500000 GHzStart Freq
2.401500000 GHzStop Freq
2.403500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

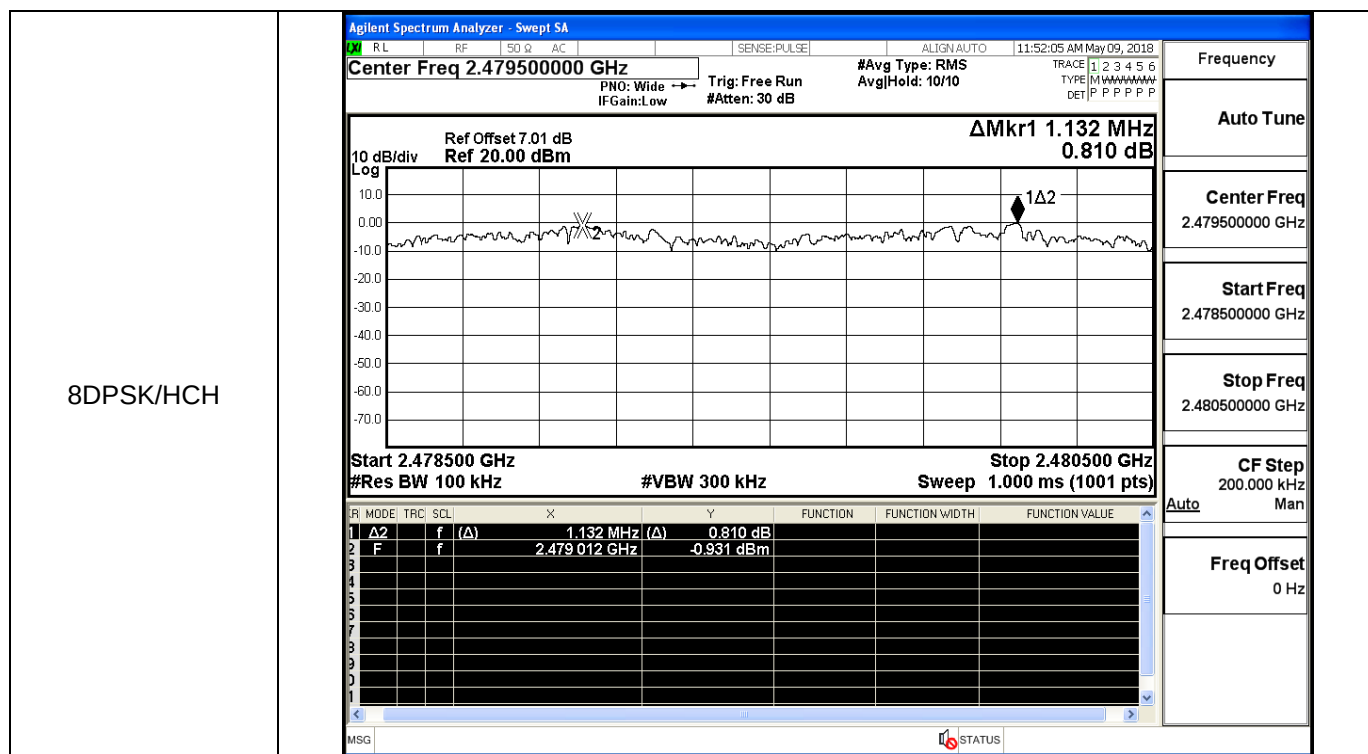
$\pi/4$ DQPSK/MCH $\pi/4$ DQPSK/HCH

8DPSK/LCH



8DPSK/MCH



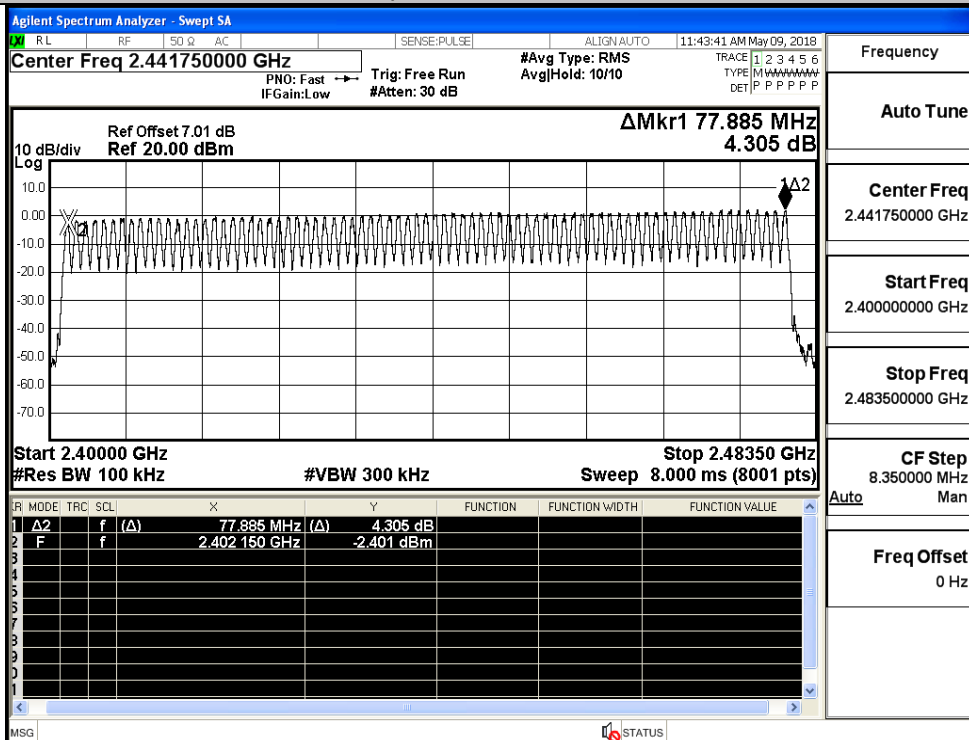


A.5 Hopping Channel Number

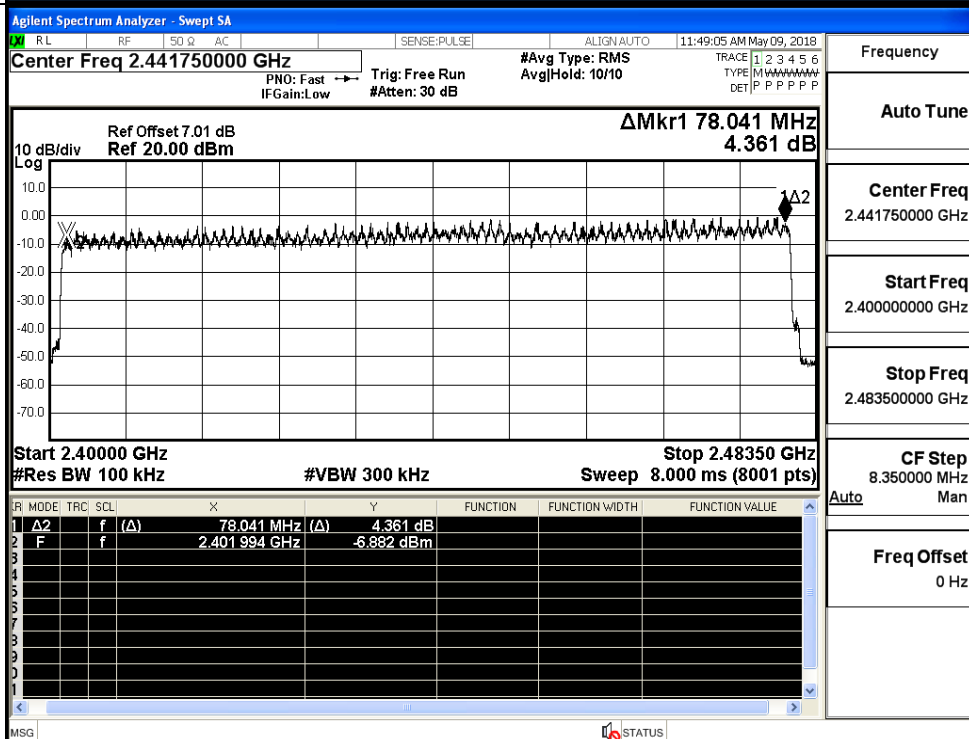
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

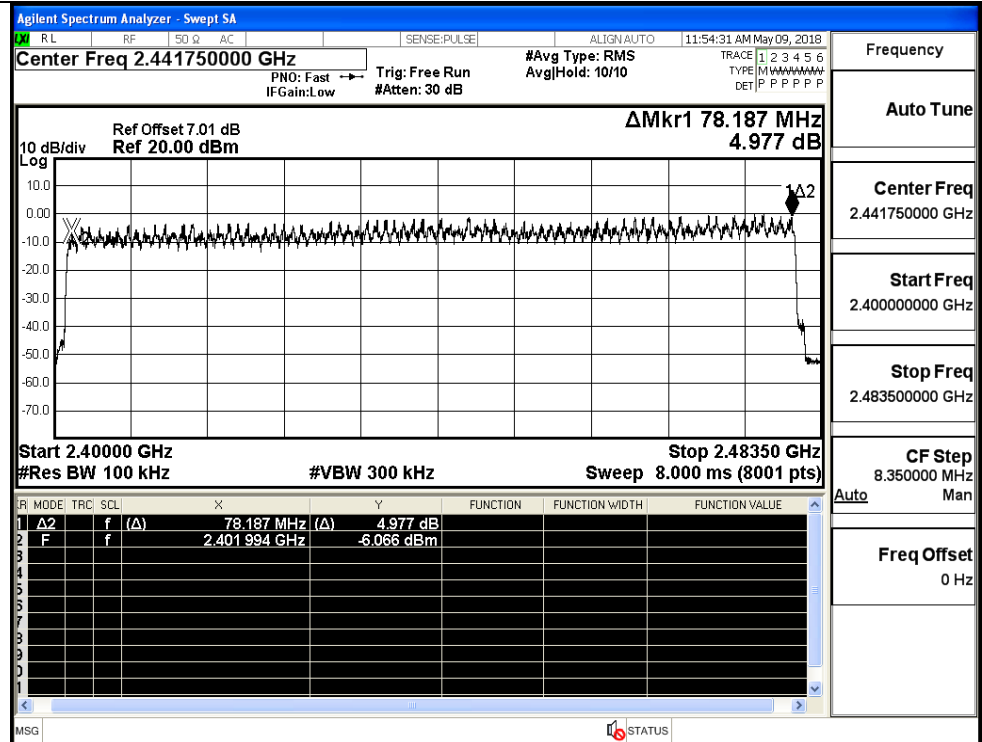
GFSK/Hop



π/4DQPSK/Hop



8DPSK/Hop

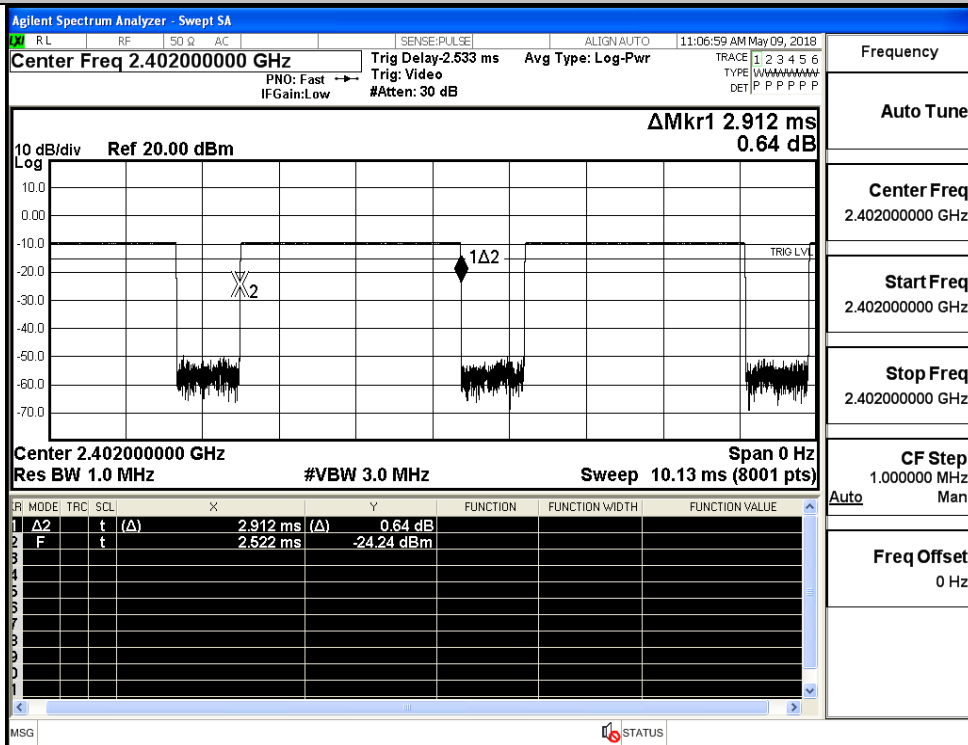


A.6 Dwell Time

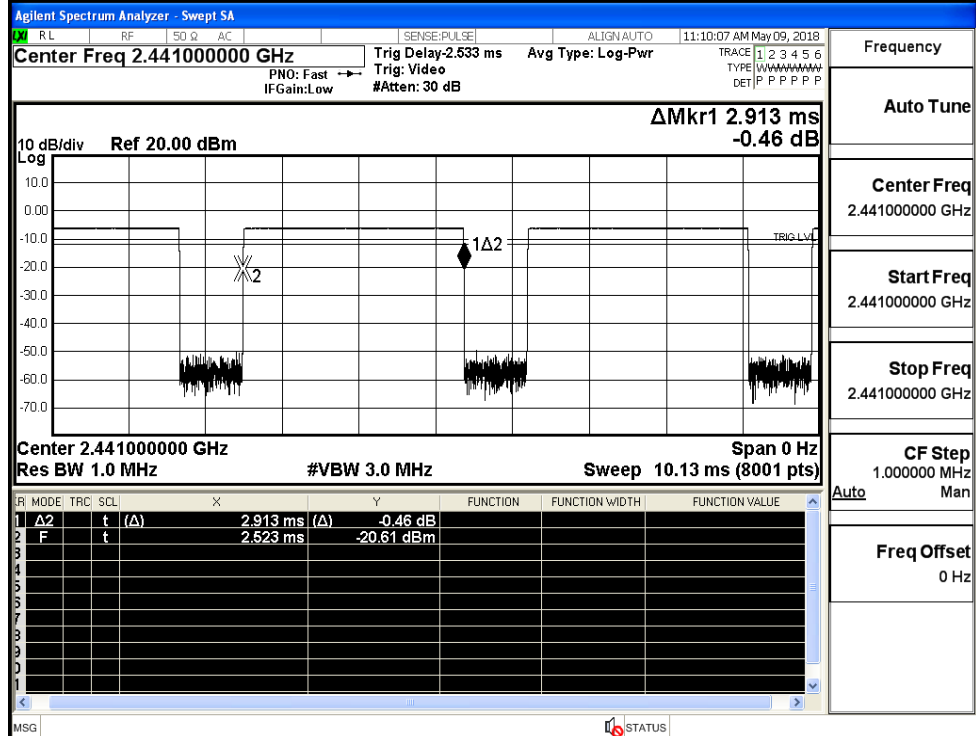
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.91	106.7	0.31	0.4	PASS
	DH5	MCH	2.91	106.7	0.31	0.4	PASS
	DH5	HCH	2.91	106.7	0.31	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.91	106.7	0.312	0.4	PASS
	2DH5	MCH	2.91	106.7	0.312	0.4	PASS
	2DH5	HCH	2.91	106.7	0.312	0.4	PASS
8DPSK	3DH5	LCH	2.91	106.7	0.312	0.4	PASS
	3DH5	MCH	2.91	106.7	0.312	0.4	PASS
	3DH5	HCH	2.91	106.7	0.312	0.4	PASS

Test Graphs

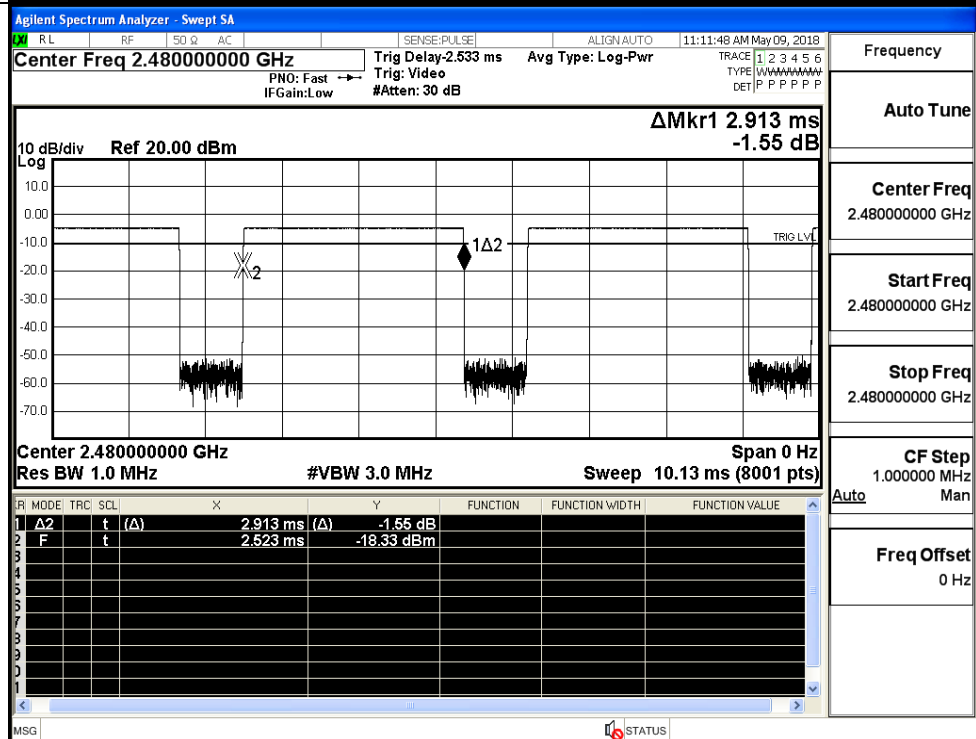
GFSK_DH5/LCH

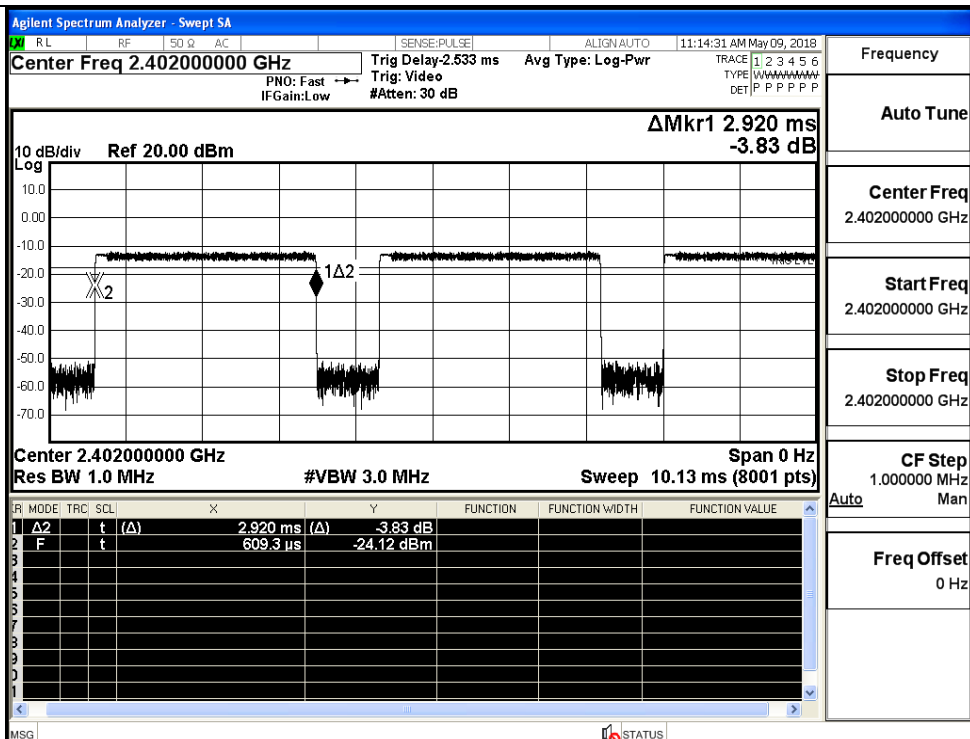
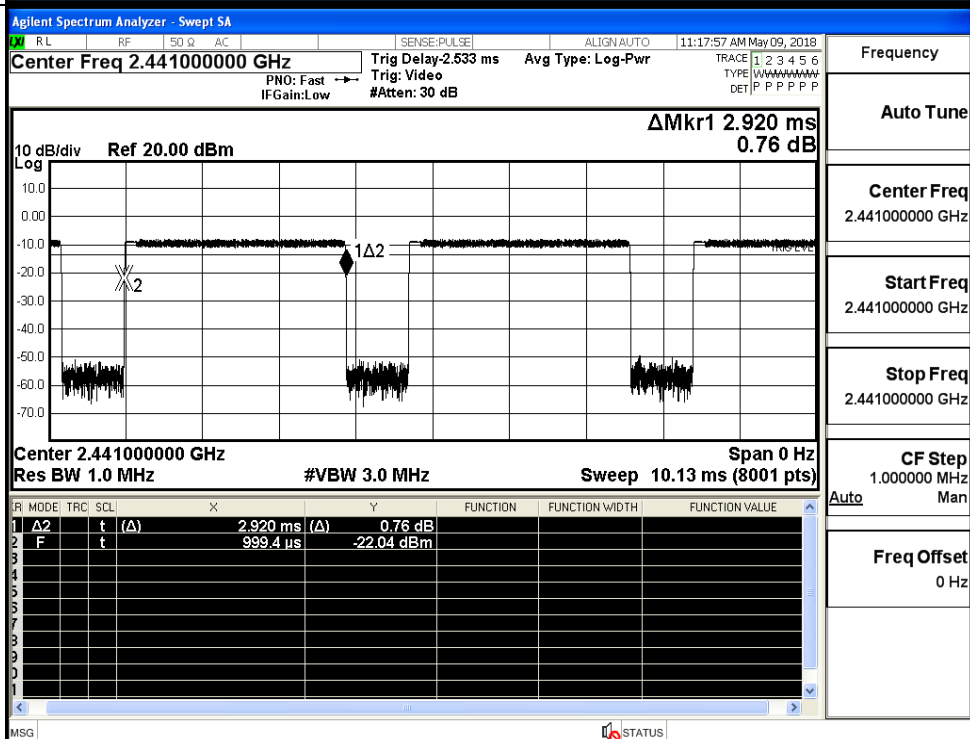


GFSK_DH5/MCH

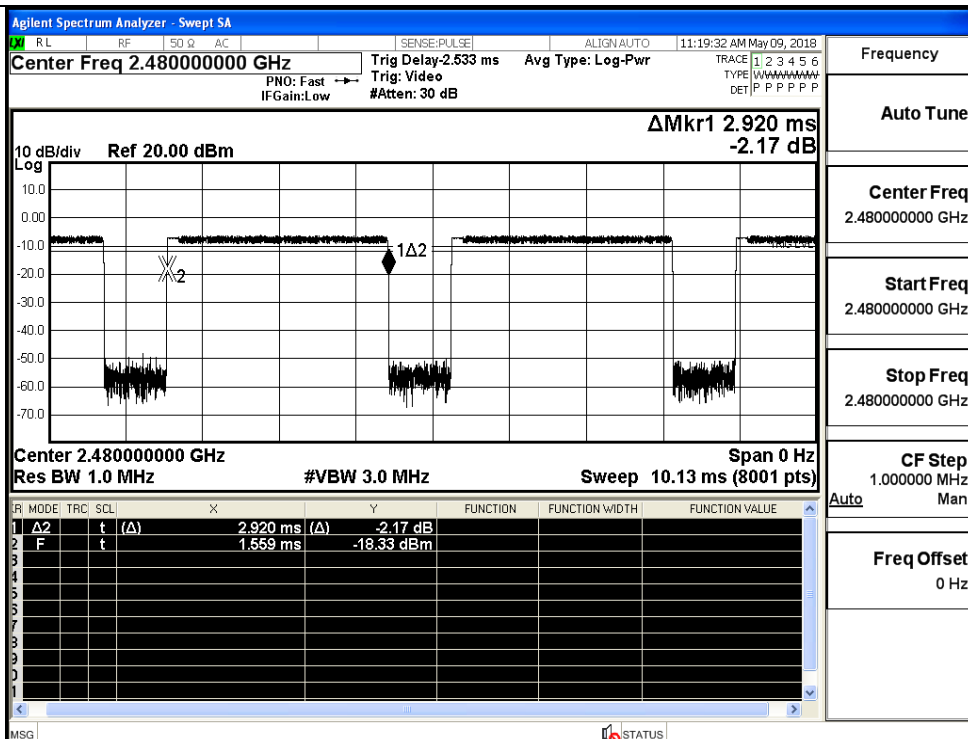


GFSK_DH5/HCH

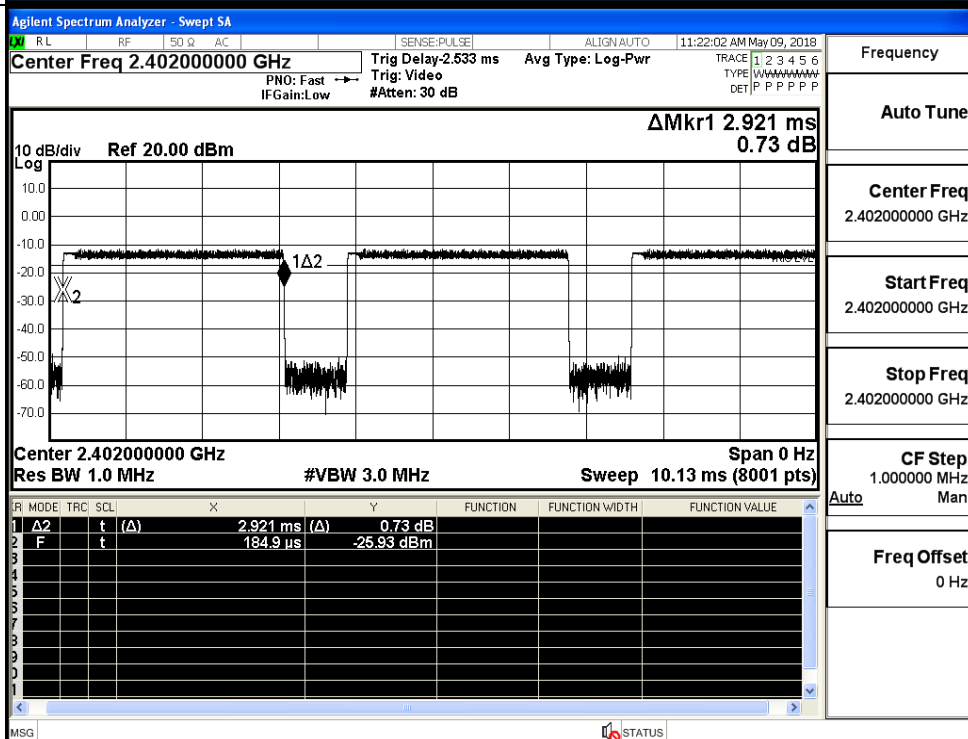


$\pi/4$ DQPSK
_2DH5/LCH $\pi/4$ DQPSK
_2DH5/MCH

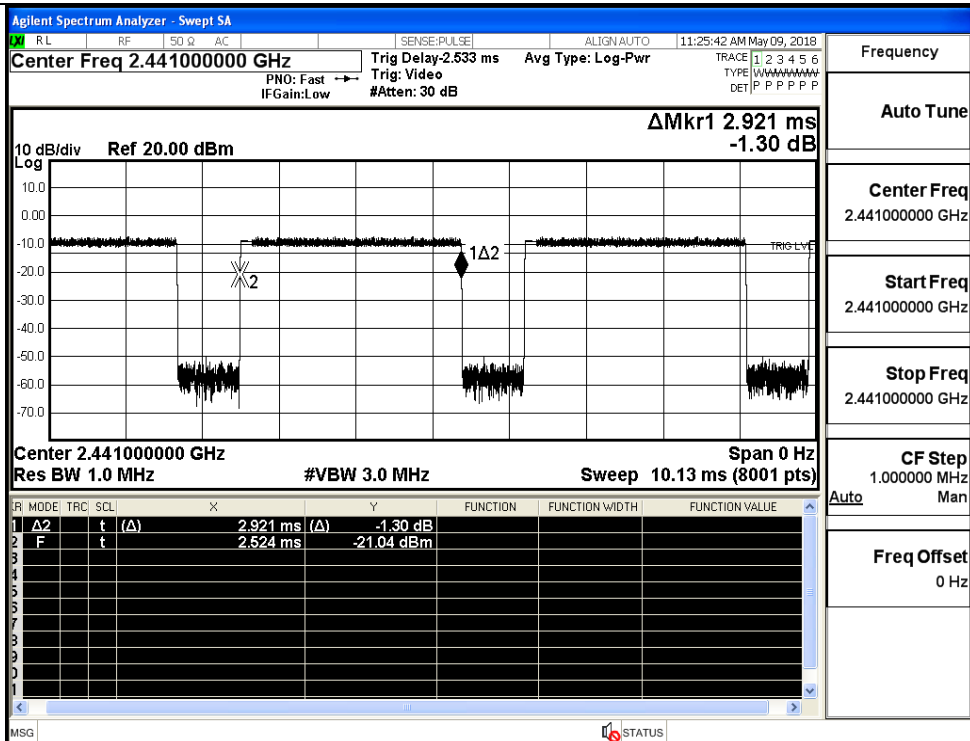
$\pi/4$ DQPSK
_2DH5/HCH



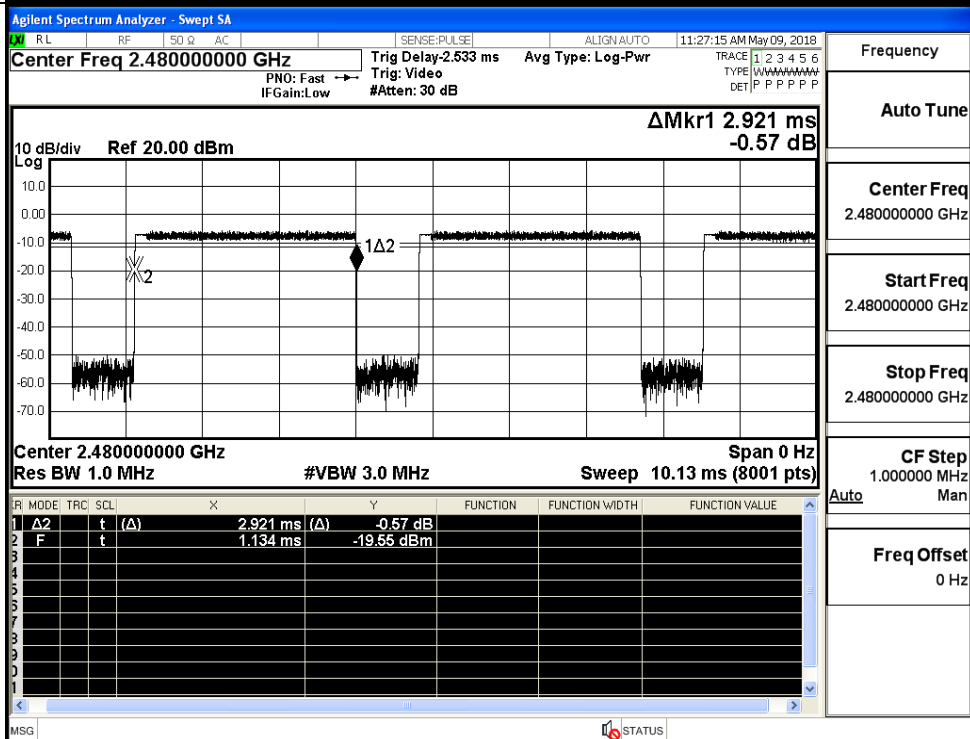
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



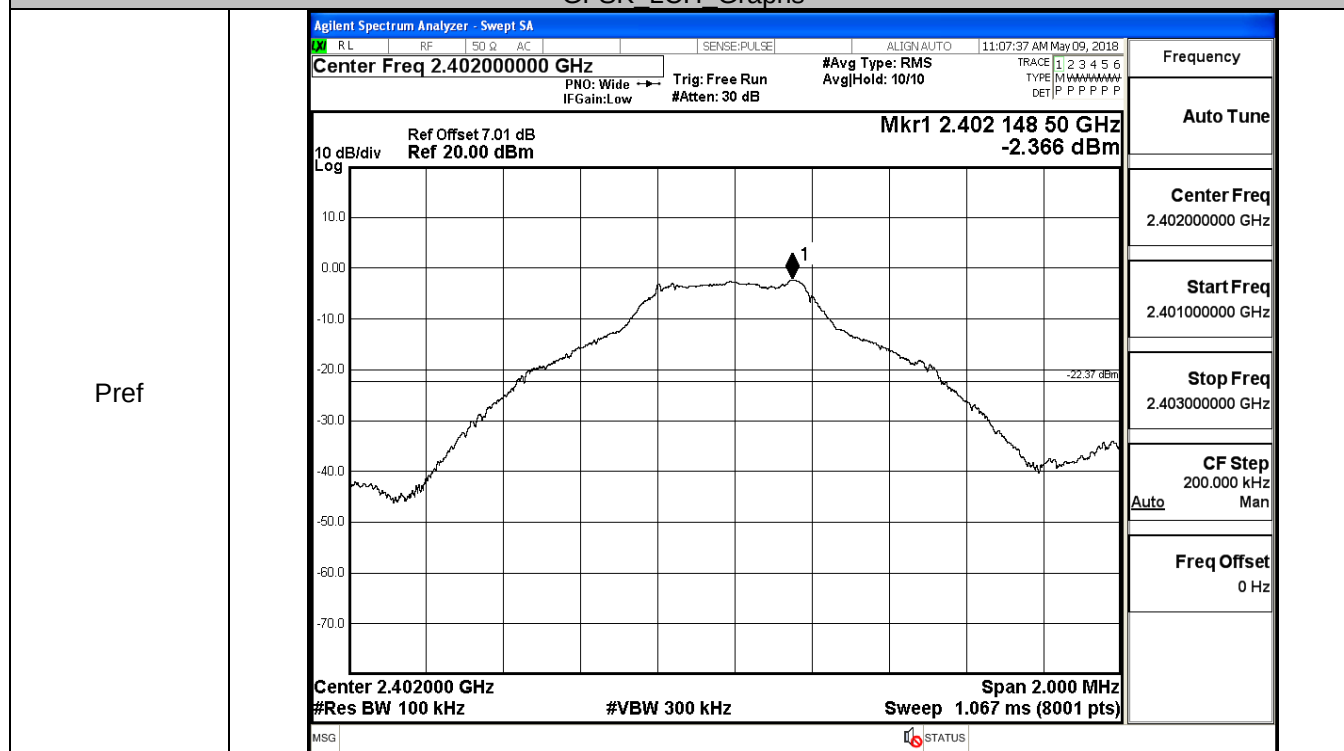
8DPSK_3DH5/HCH



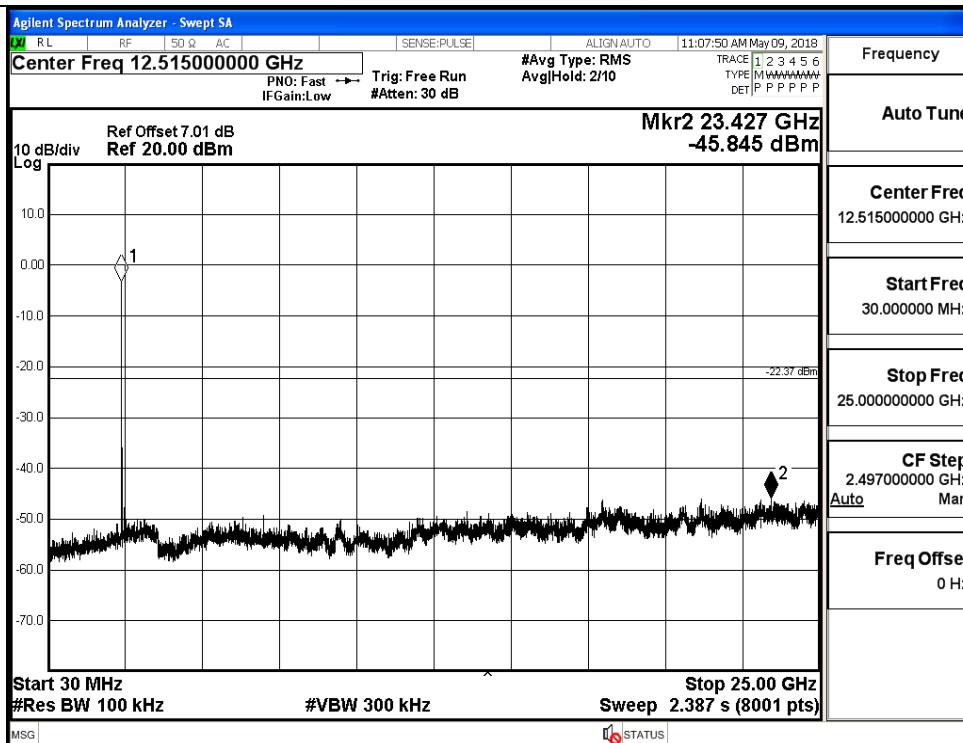
A.7 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.366	-45.845	-22.366	PASS
	MCH	0.759	-45.808	-19.241	PASS
	HCH	2.296	-44.686	-17.704	PASS
$\pi/4$ DQPSK	LCH	-6.213	-45.223	-26.213	PASS
	MCH	-2.096	-46.208	-22.096	PASS
	HCH	-0.158	-45.806	-20.158	PASS
8DPSK	LCH	-5.882	-45.534	-25.882	PASS
	MCH	-1.791	-45.311	-21.791	PASS
	HCH	-0.055	-45.867	-20.055	PASS

GFSK LCH Graphs

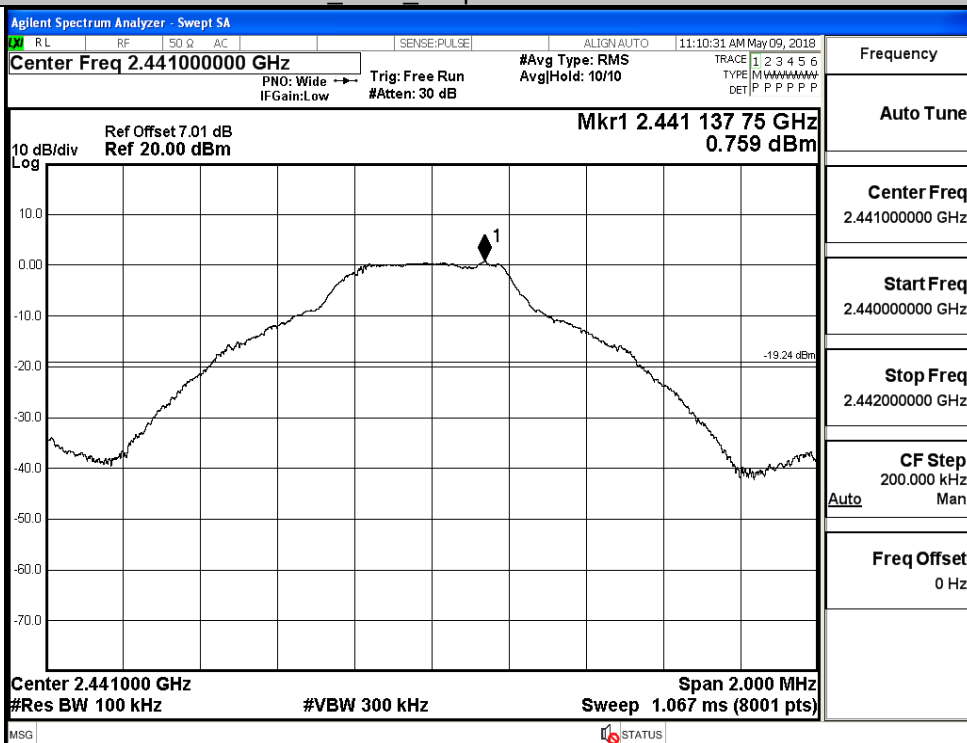


Puw

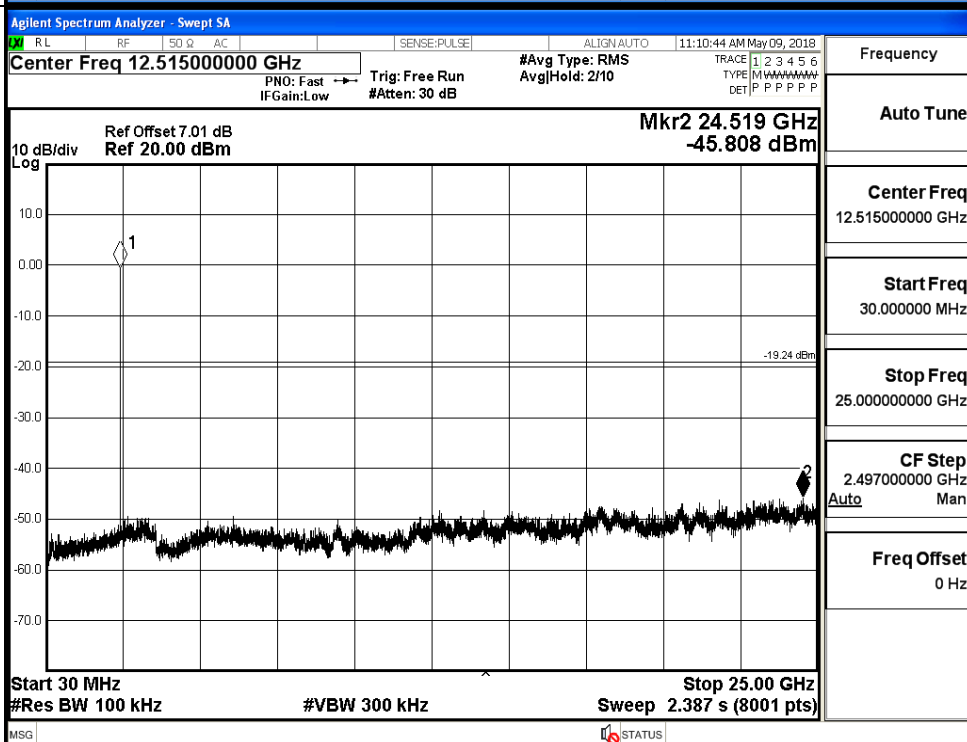


GFSK MCH_Graphs

Pref

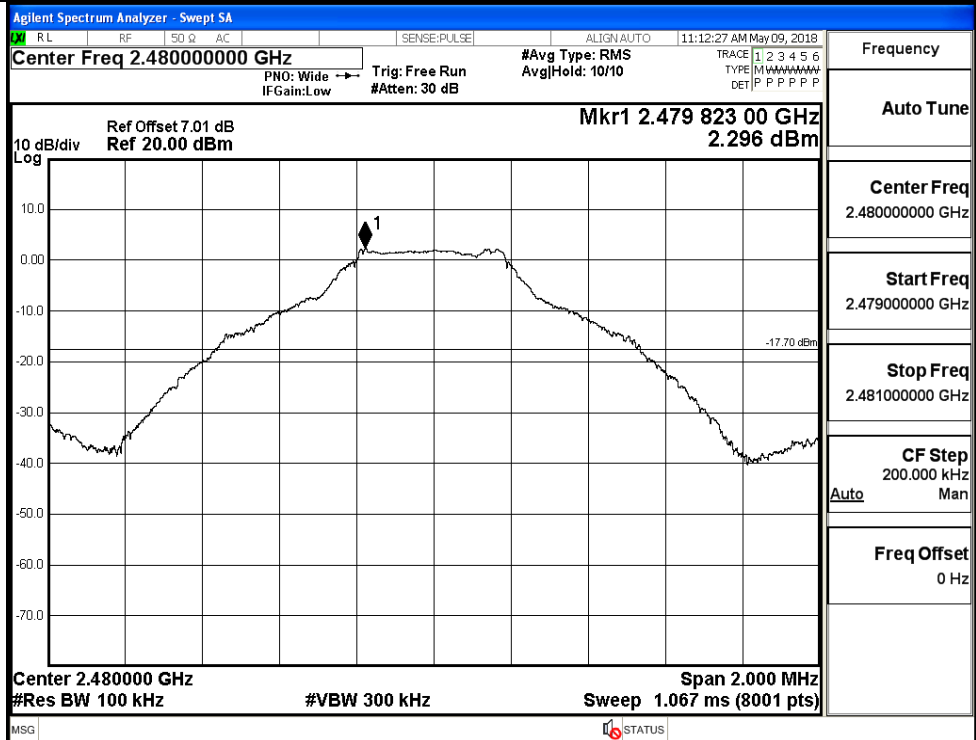


Puw

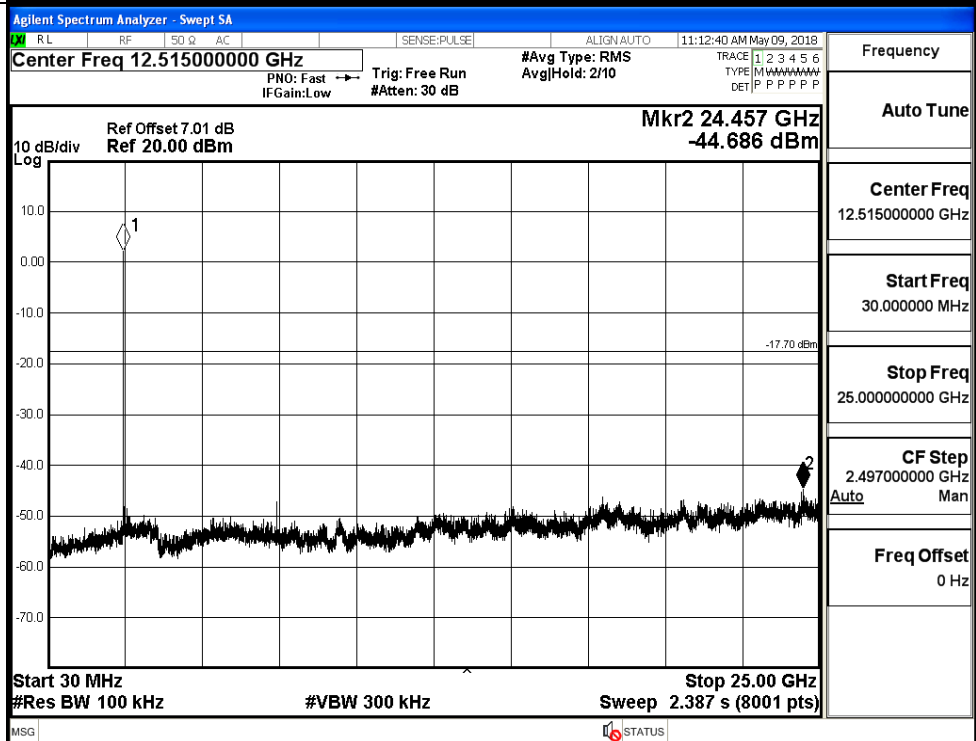


GFSK HCH Graphs

Pref

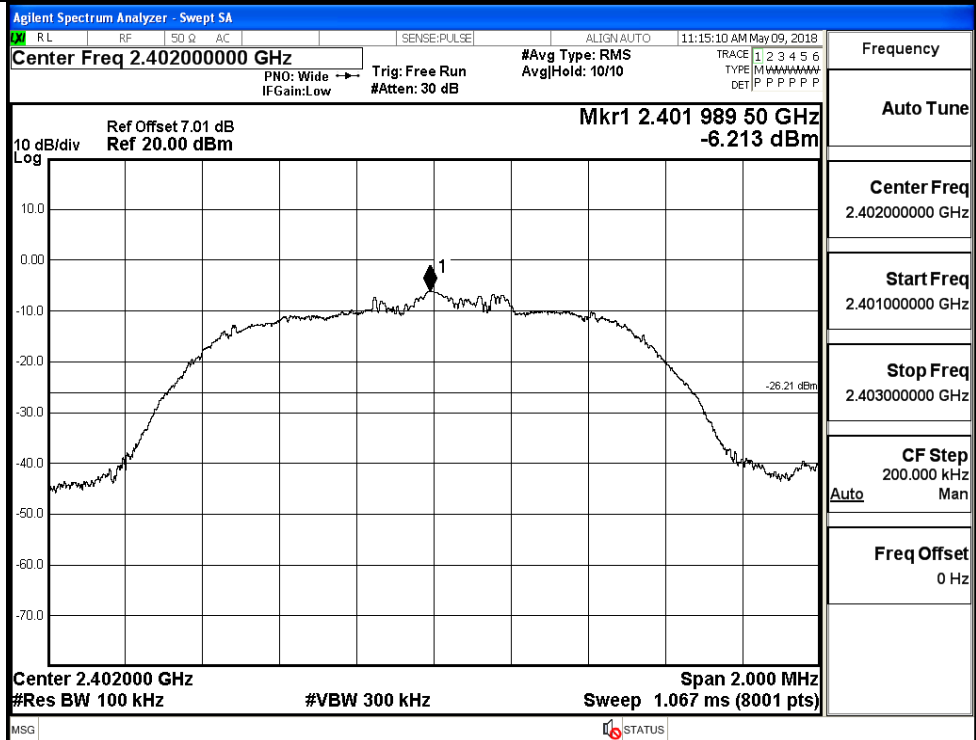


Puw

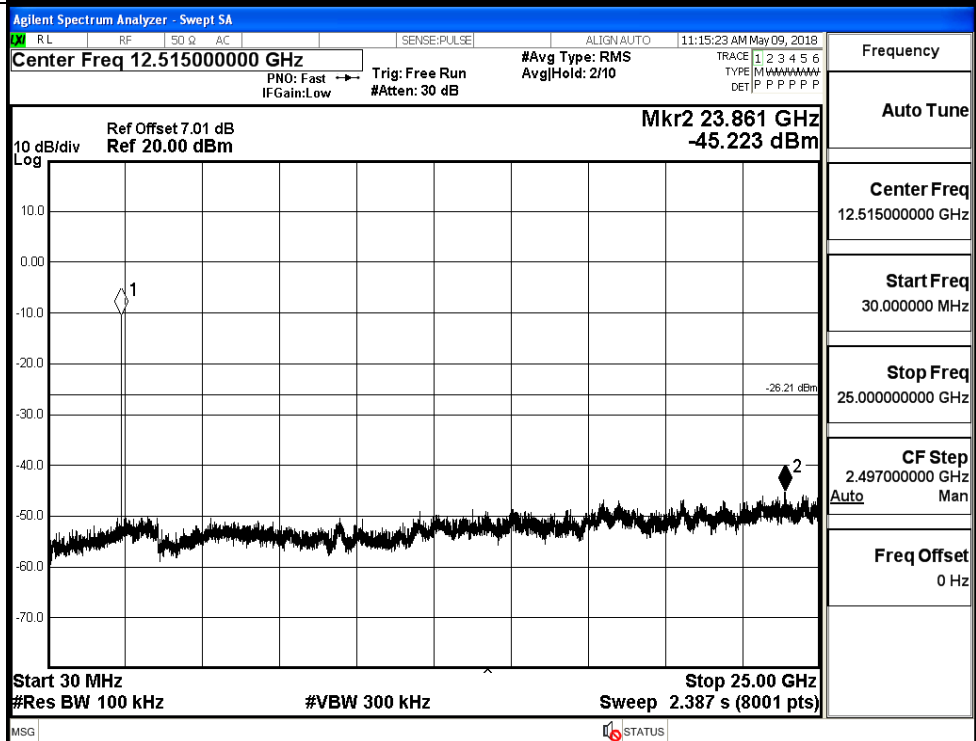


$\pi/4$ DQPSK LCH Graphs

Pref

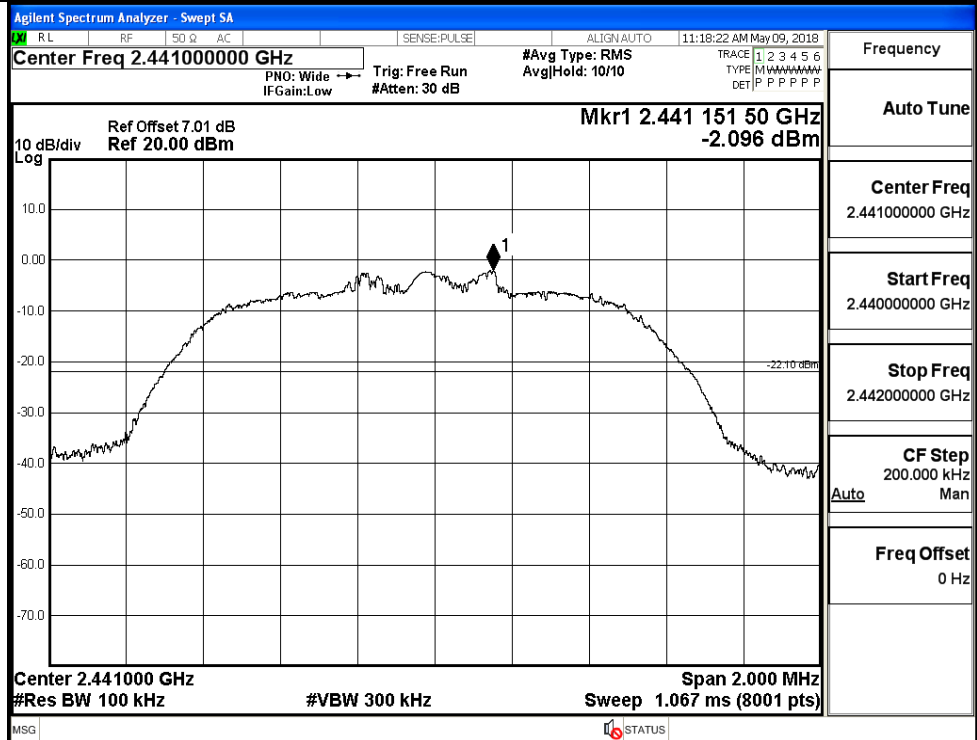


Puw

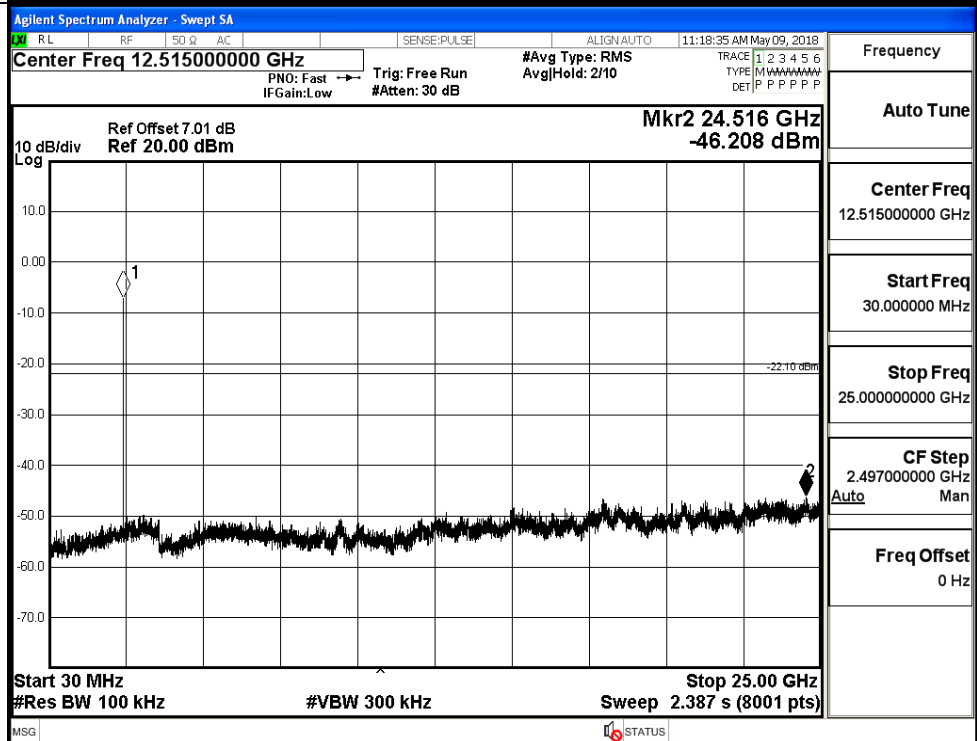


$\pi/4$ DQPSK MCH_Graphs

Pref

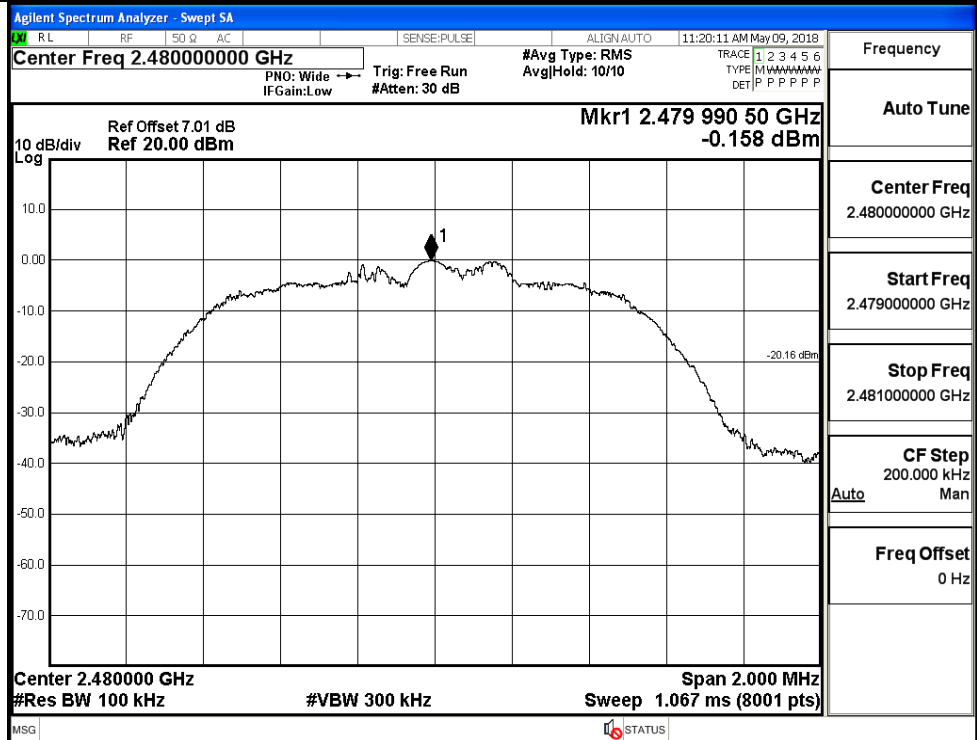


Puw

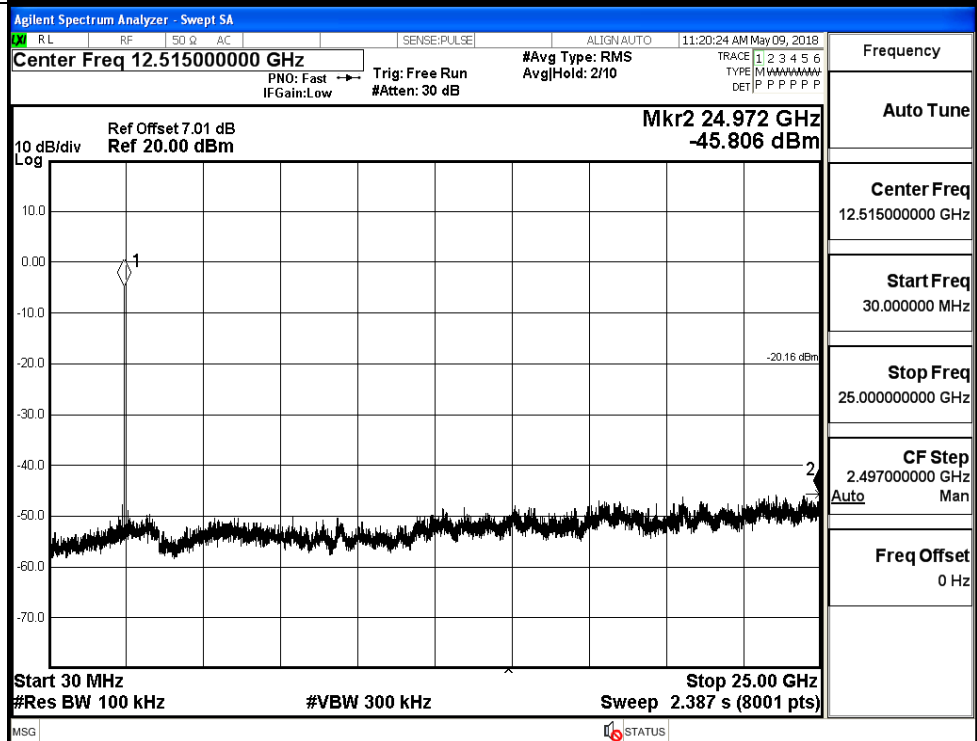


$\pi/4$ DQPSK HCH Graphs

Pref

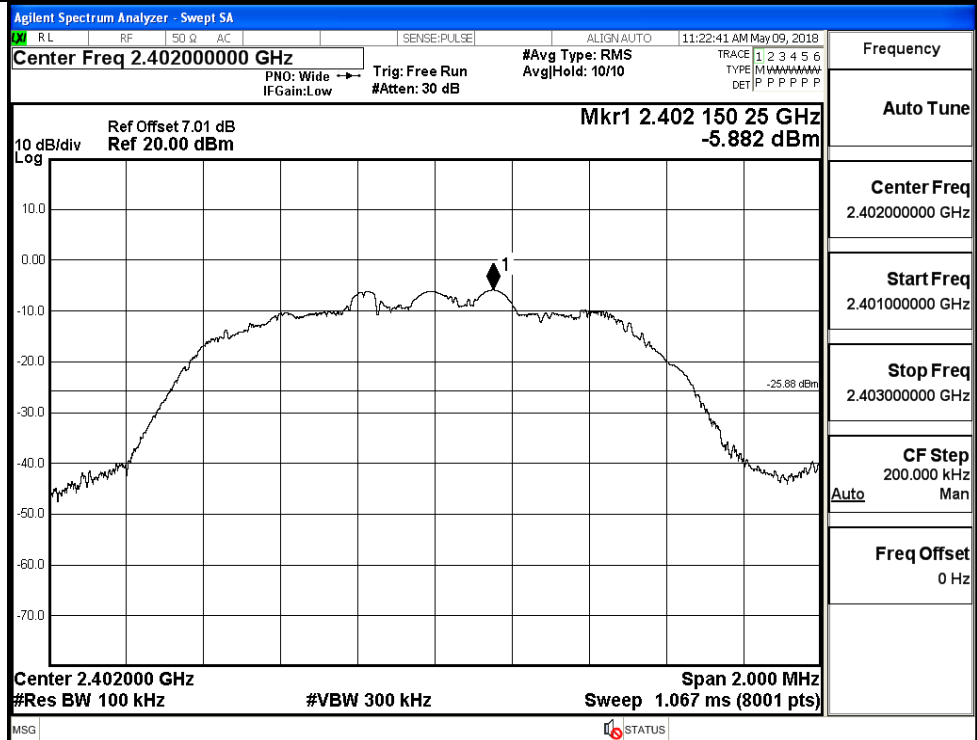


Puw

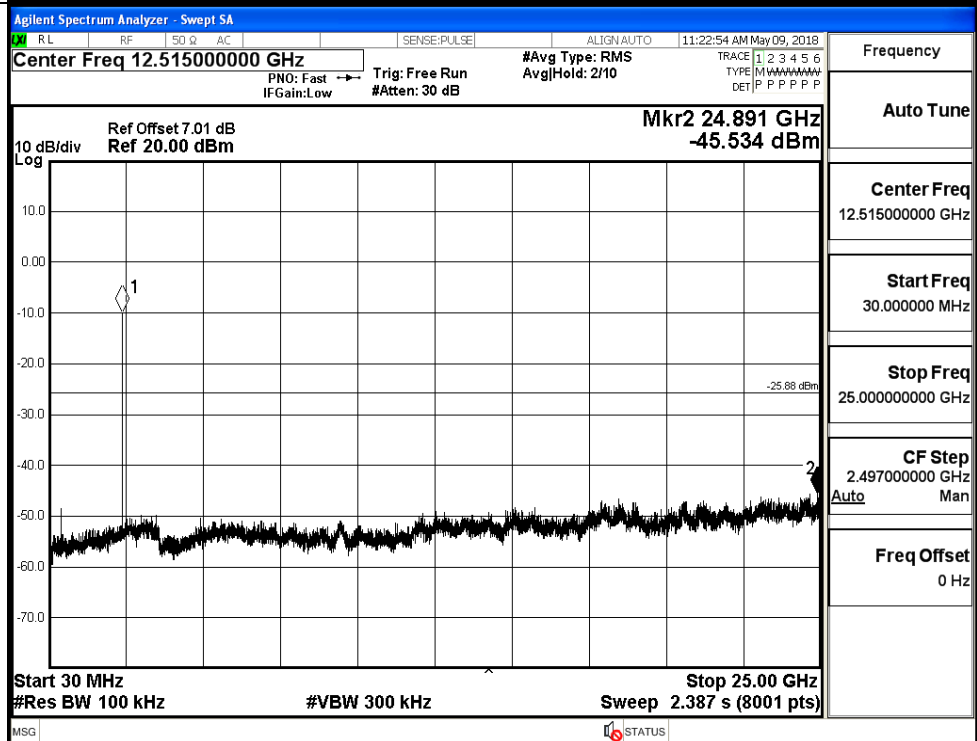


8DPSK_LCH Graphs

Pref

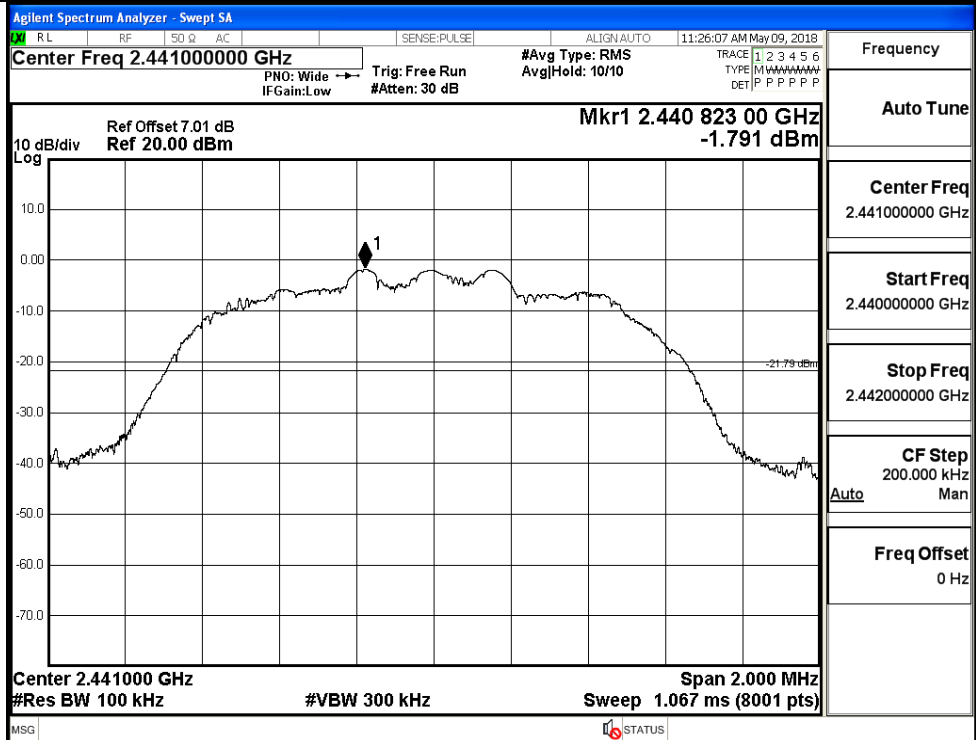


Puw

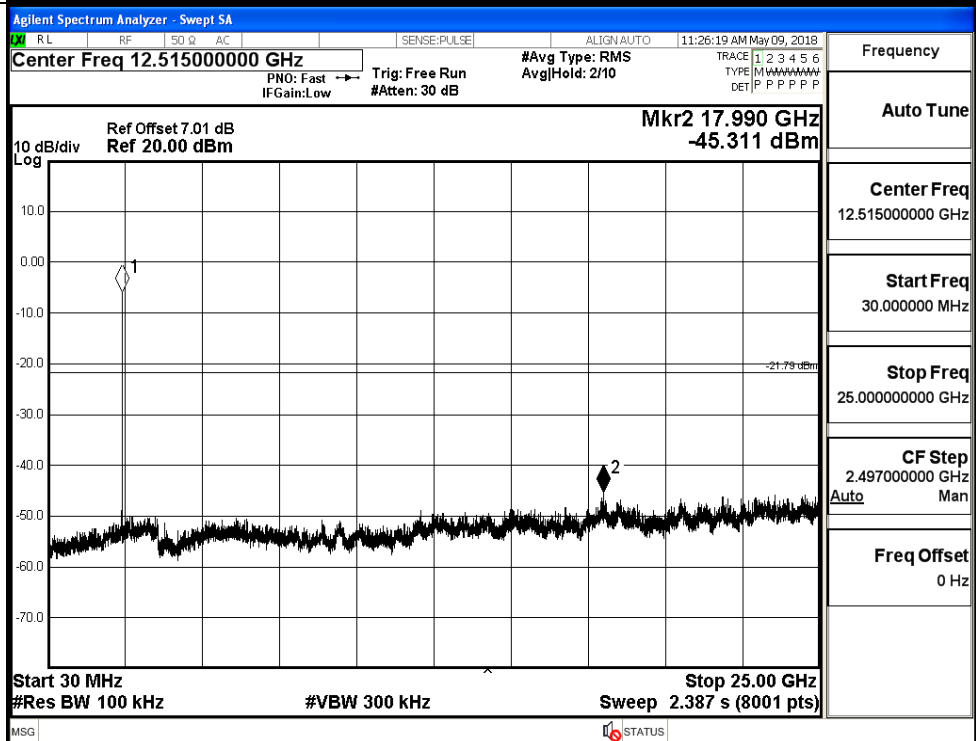


8DPSK MCH_Graphs

Pref

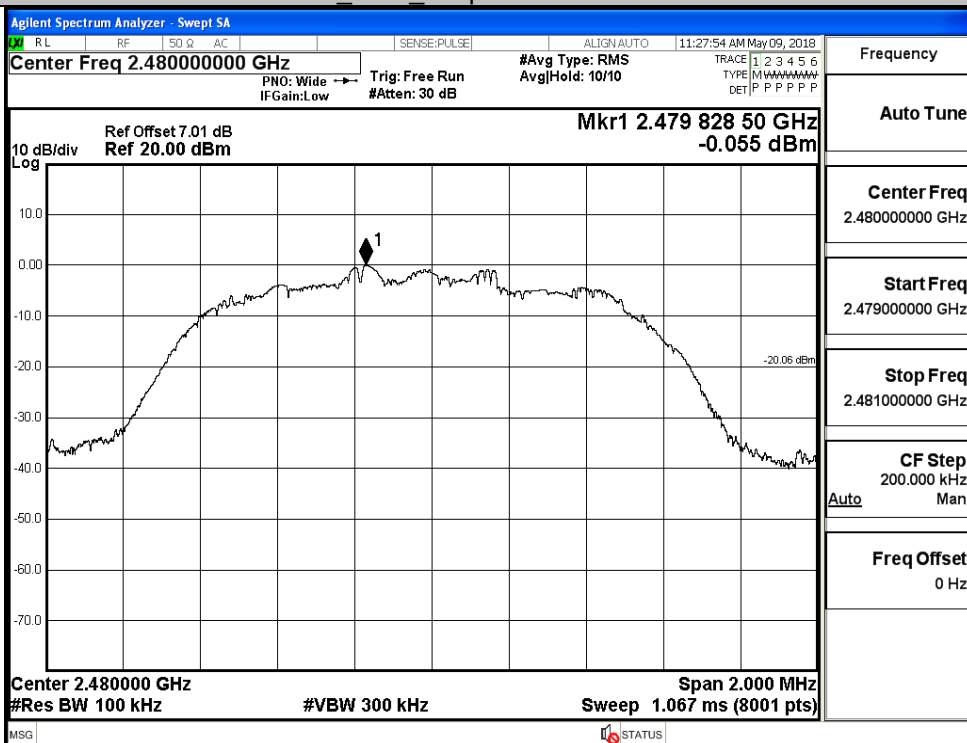


Puw

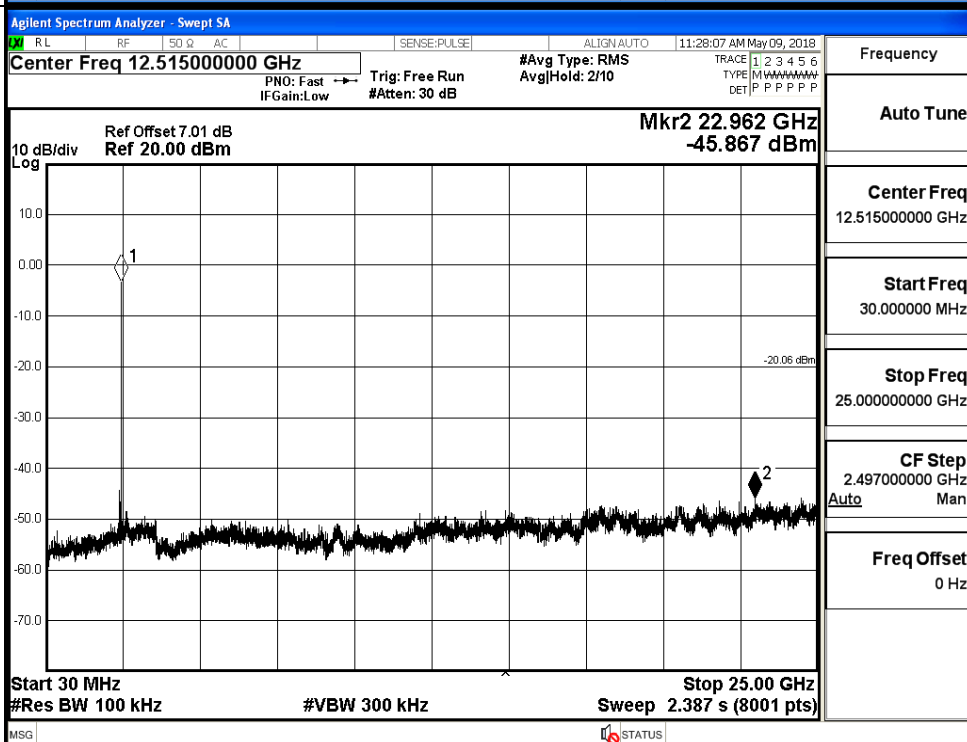


8DPSK_HCH_Graphs

Pref



Puw

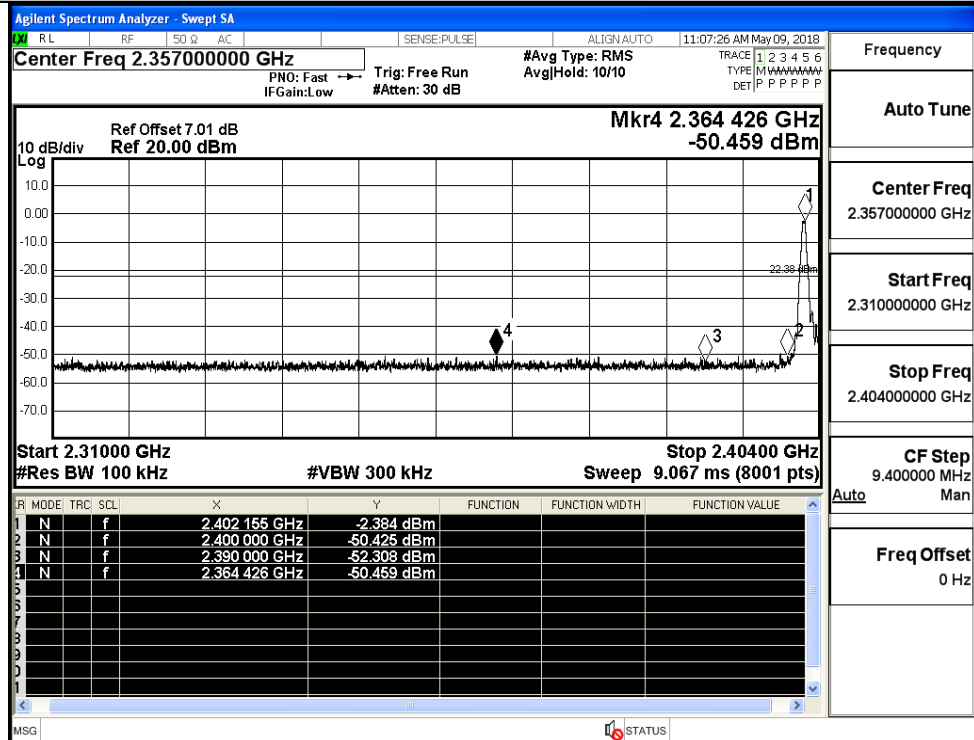


A.8 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.384	Off	-50.459	-22.38	PASS
			-0.342	On	-50.852	-20.34	PASS
	HCH	2480	2.473	Off	-50.237	-17.53	PASS
			2.316	On	-49.746	-17.68	PASS
π /4DQPSK	LCH	2402	-6.184	Off	-51.057	-26.18	PASS
			-3.301	On	-50.676	-23.3	PASS
	HCH	2480	-0.113	Off	-50.126	-20.11	PASS
			-0.077	On	-49.407	-20.08	PASS
8DPSK	LCH	2402	-5.760	Off	-50.609	-25.76	PASS
			-2.807	On	-50.380	-22.81	PASS
	HCH	2480	0.145	Off	-50.218	-19.86	PASS
			0.059	On	-49.580	-19.94	PASS

Test Graphs

GFSK/LCH/No Hop

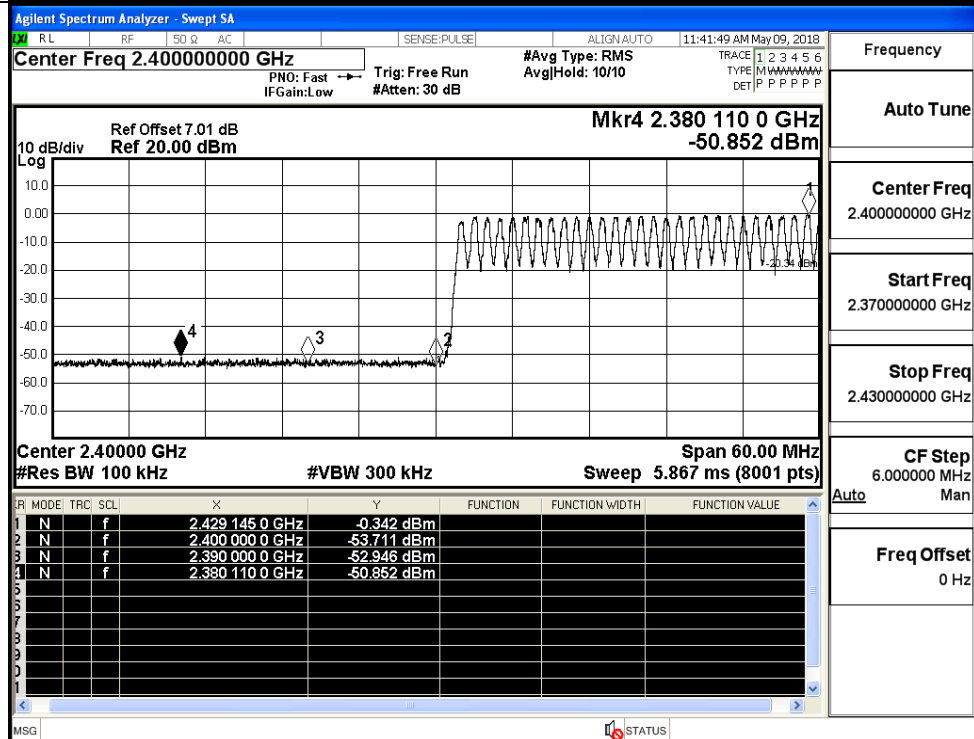


Frequency

Auto Tune

Center Freq
2.357000000 GHzStart Freq
2.310000000 GHzStop Freq
2.404000000 GHzCF Step
9.400000 MHz
ManFreq Offset
0 Hz

GFSK/LCH/Hop

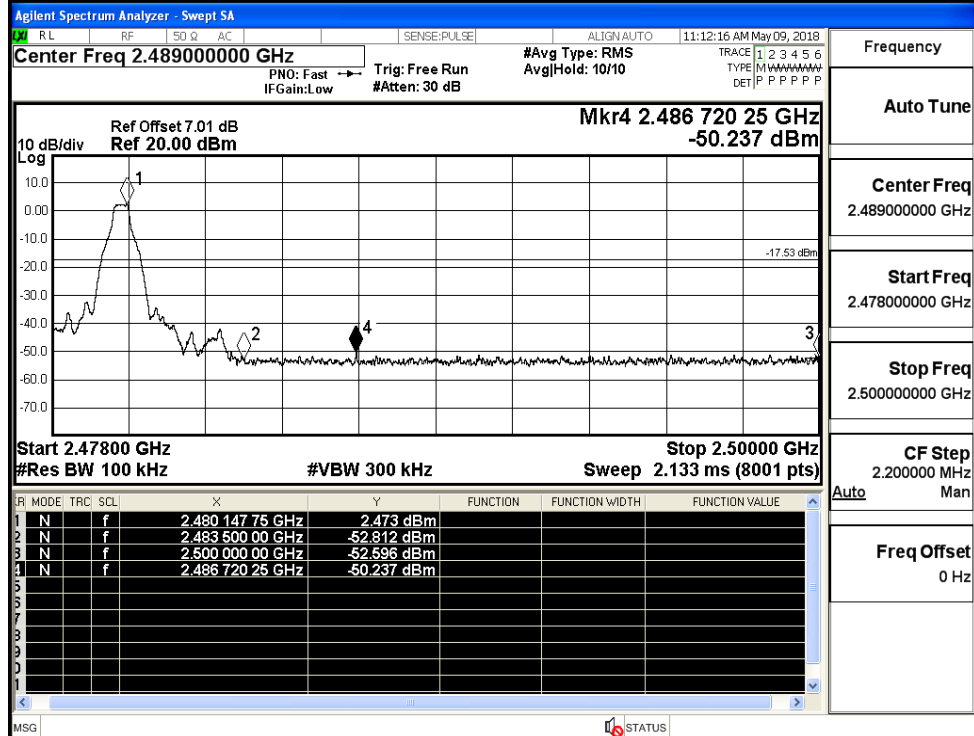


Frequency

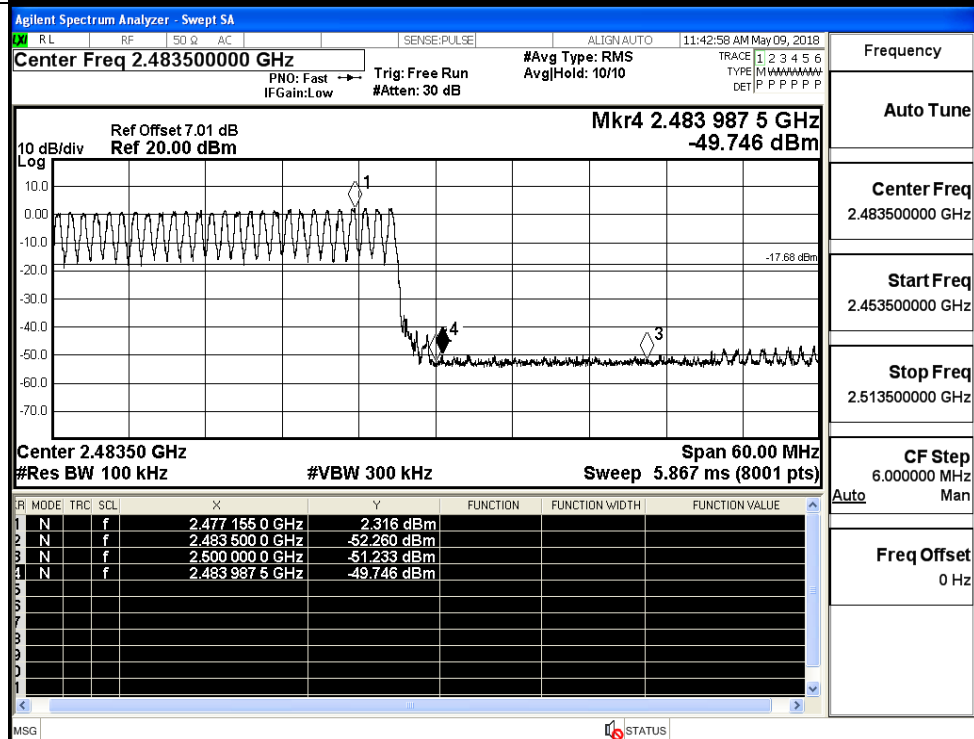
Auto Tune

Center Freq
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2.370000000 GHzStop Freq
2.430000000 GHzCF Step
6.000000 MHz
ManFreq Offset
0 Hz

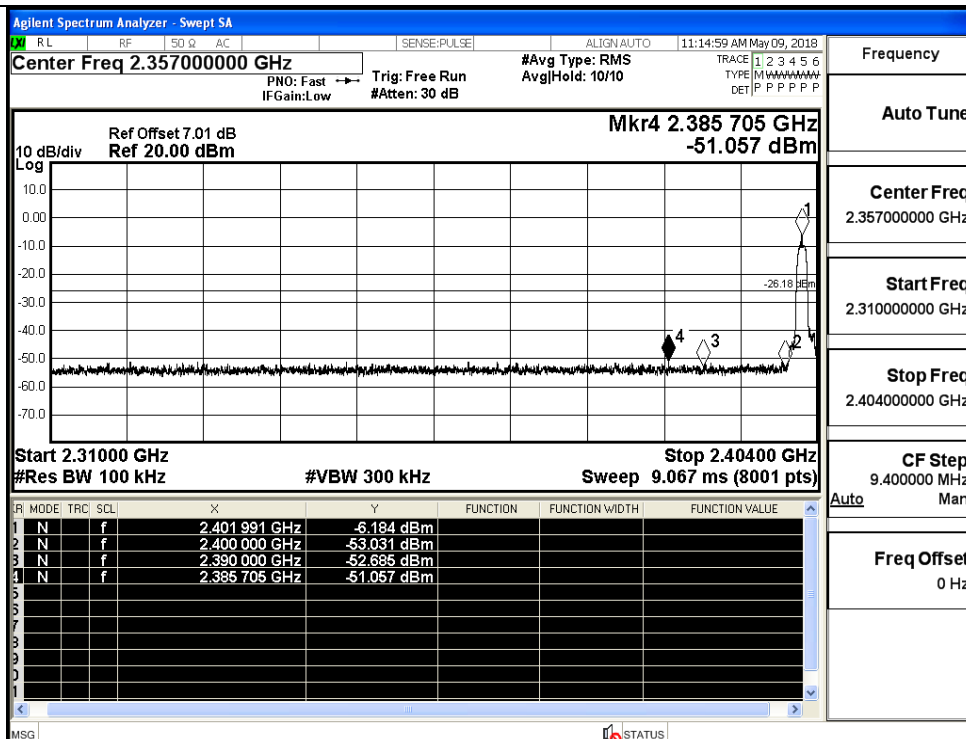
GFSK/HCH/No Hop



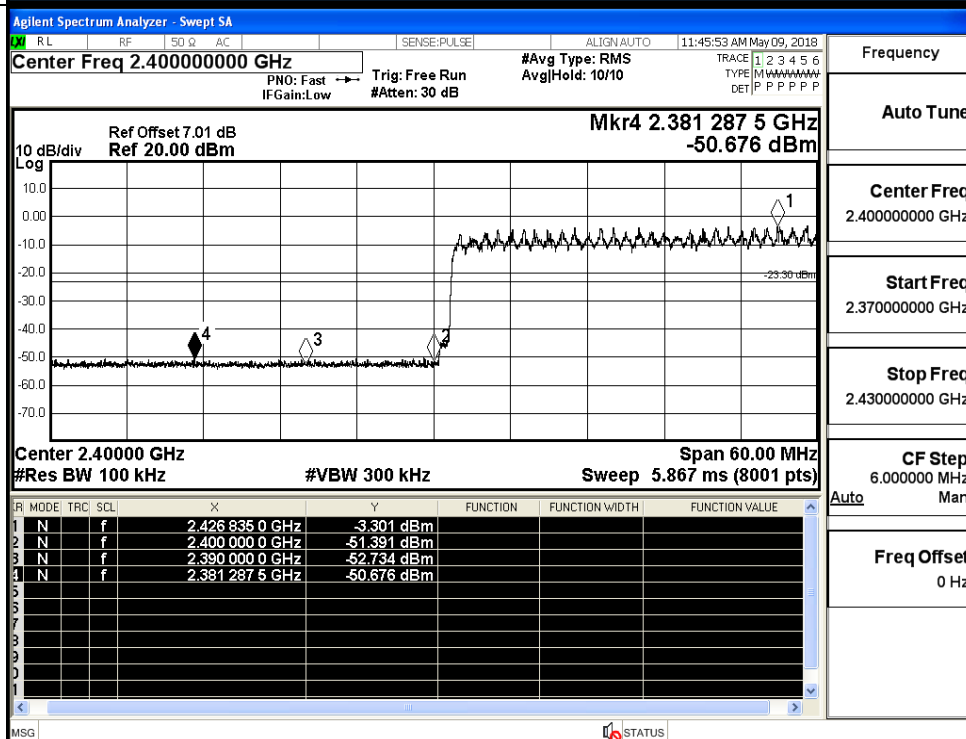
GFSK/HCH/Hop



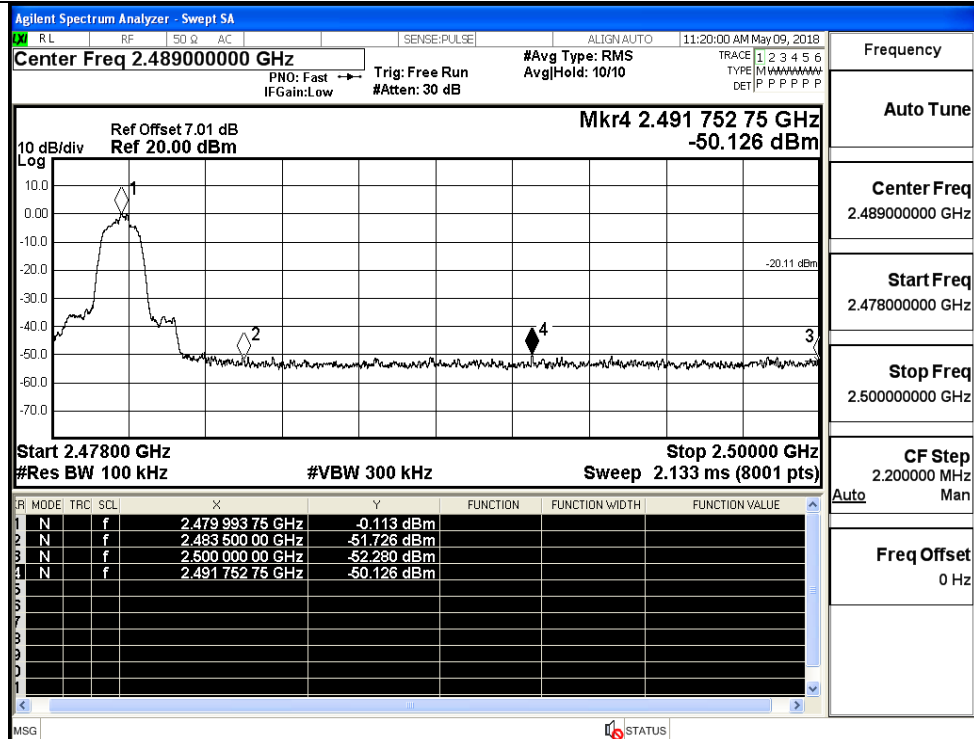
$\pi/4$ DQPSK/LCH/No
Hop



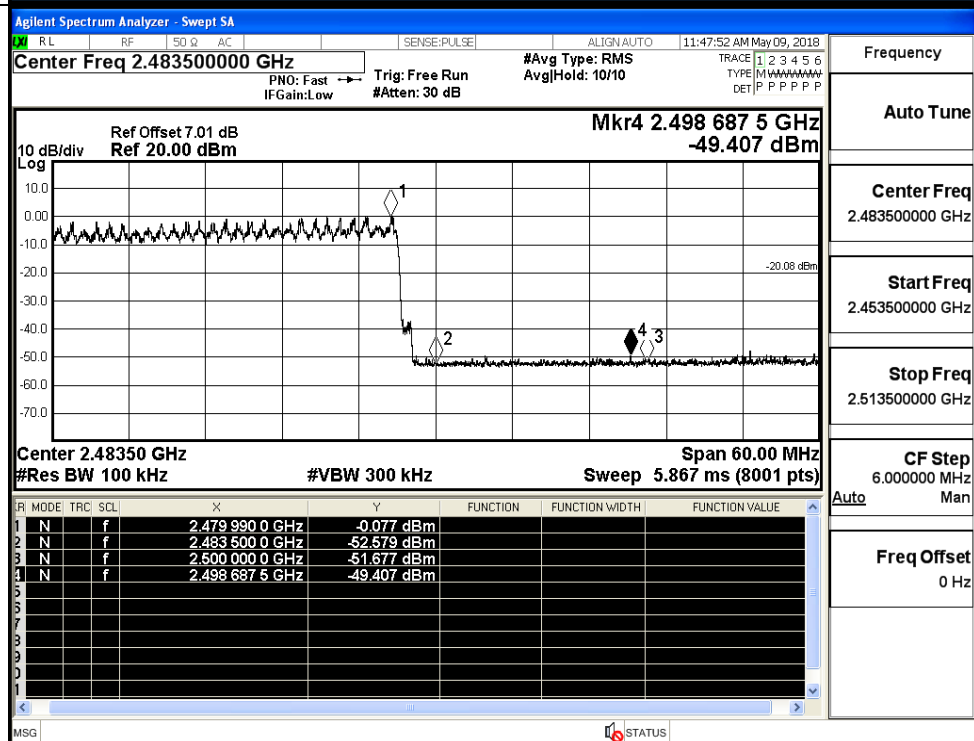
$\pi/4$ DQPSK/LCH/Hop



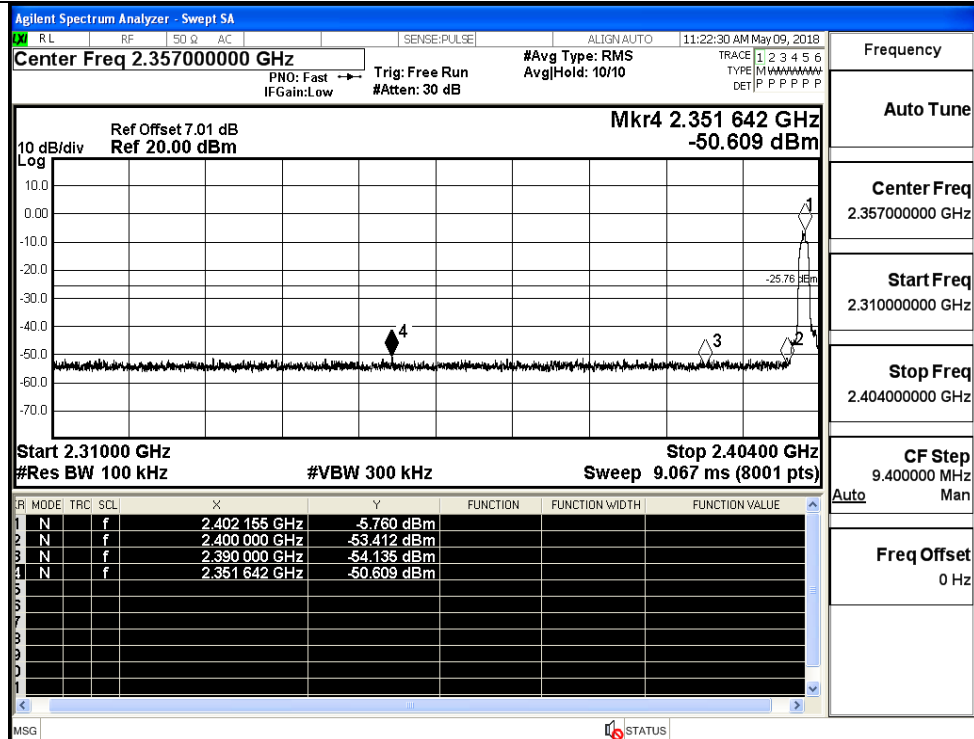
$\pi/4$ DQPSK/HCH/No
Hop



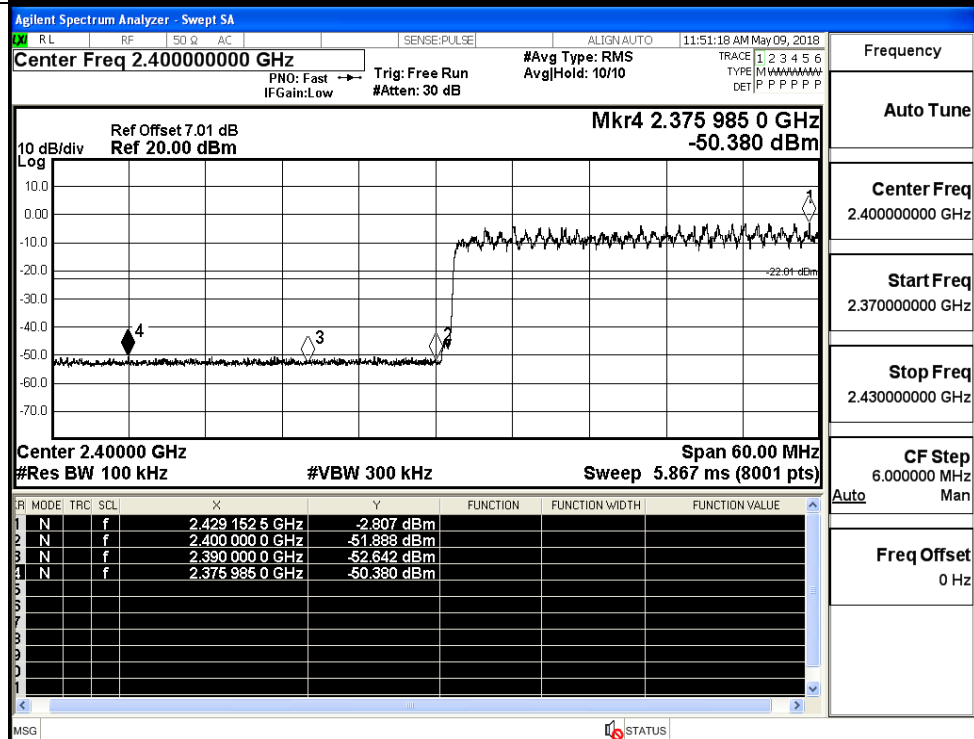
$\pi/4$ DQPSK/HCH/Hop



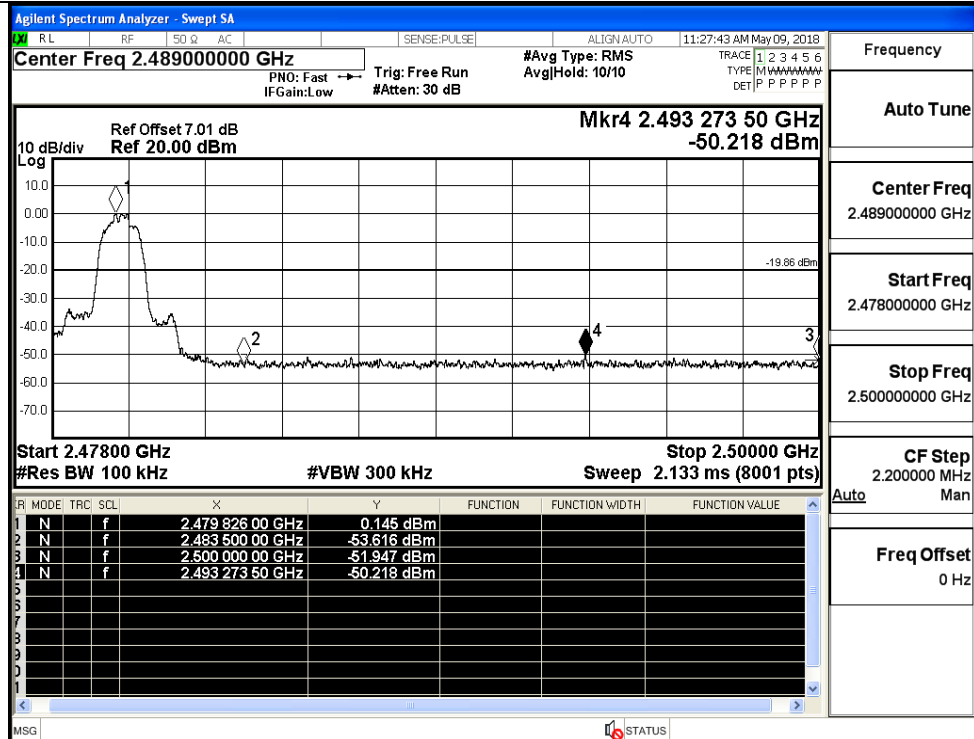
8DPSK/LCH/No Hop



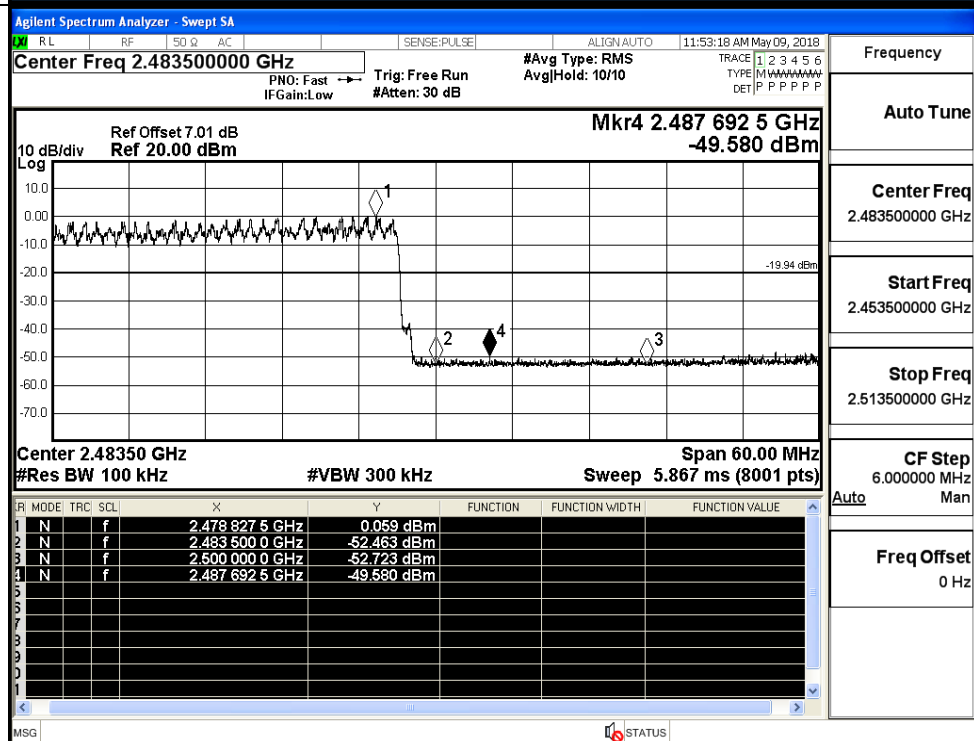
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



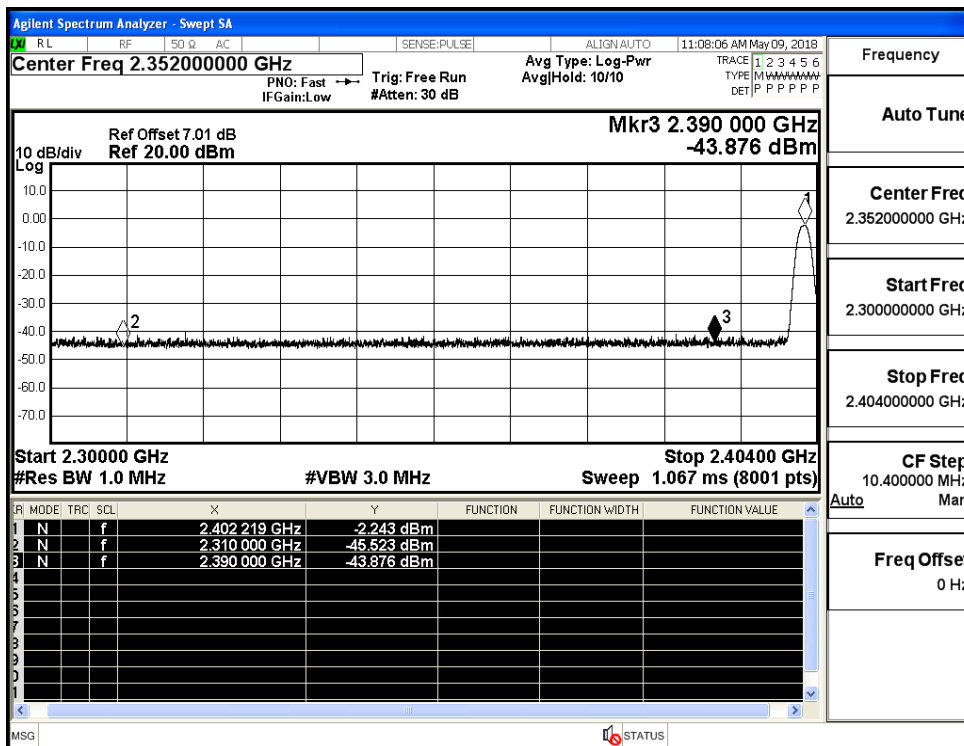
8DPSK/HCH/Hop



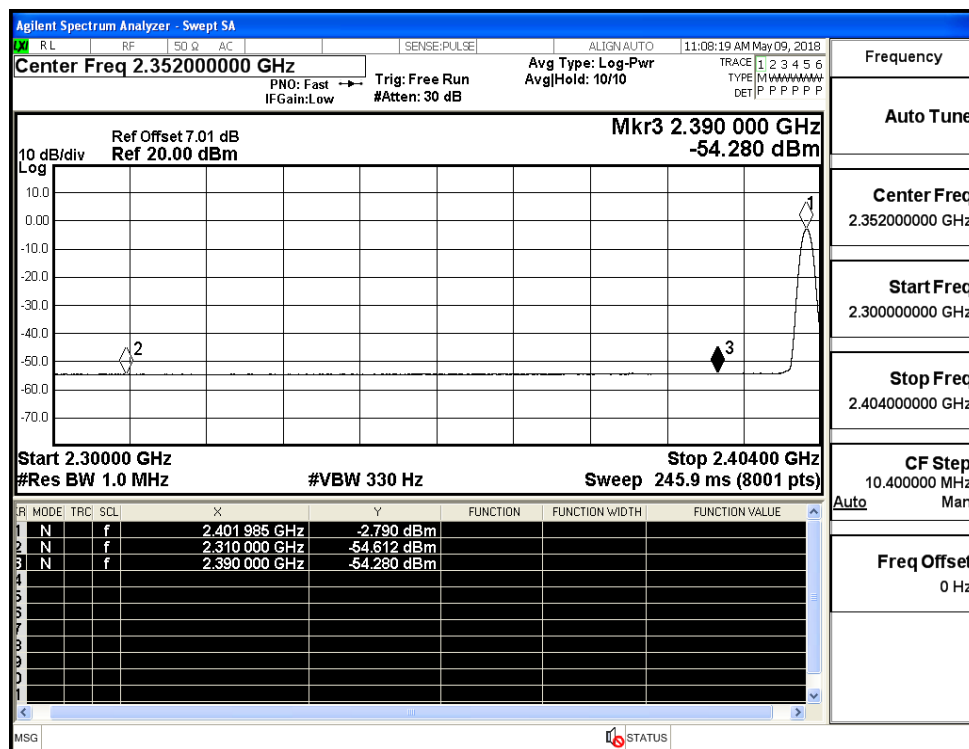
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-45.52	2.5	0	52.23	PEAK	74	PASS
	Off	2310.0	-54.61	2.5	0	43.15	AV	54	PASS
	Off	2390.0	-43.88	2.5	0	53.88	PEAK	74	PASS
	Off	2390.0	-54.28	2.5	0	43.48	AV	54	PASS
	Off	2483.5	-41.54	2.5	0	56.21	PEAK	74	PASS
	Off	2483.5	-51.36	2.5	0	46.40	AV	54	PASS
	Off	2500.0	-42.51	2.5	0	55.25	PEAK	74	PASS
	Off	2500.0	-53.81	2.5	0	43.95	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.17	2.5	0	53.59	PEAK	74	PASS
	Off	2310.0	-54.56	2.5	0	43.19	AV	54	PASS
	Off	2390.0	-43.92	2.5	0	53.83	PEAK	74	PASS
	Off	2390.0	-54.37	2.5	0	43.38	AV	54	PASS
	Off	2483.5	-44.08	2.5	0	53.68	PEAK	74	PASS
	Off	2483.5	-53.62	2.5	0	44.14	AV	54	PASS
	Off	2500.0	-42.63	2.5	0	55.12	PEAK	74	PASS
	Off	2500.0	-53.90	2.5	0	43.86	AV	54	PASS
8DPSK	Off	2310.0	-43.90	2.5	0	53.86	PEAK	74	PASS
	Off	2310.0	-54.56	2.5	0	43.20	AV	54	PASS
	Off	2390.0	-44.01	2.5	0	53.75	PEAK	74	PASS
	Off	2390.0	-54.33	2.5	0	43.43	AV	54	PASS
	Off	2483.5	-42.17	2.5	0	55.59	PEAK	74	PASS
	Off	2483.5	-53.65	2.5	0	44.11	AV	54	PASS
	Off	2500.0	-44.44	2.5	0	53.32	PEAK	74	PASS
	Off	2500.0	-53.93	2.5	0	43.83	AV	54	PASS

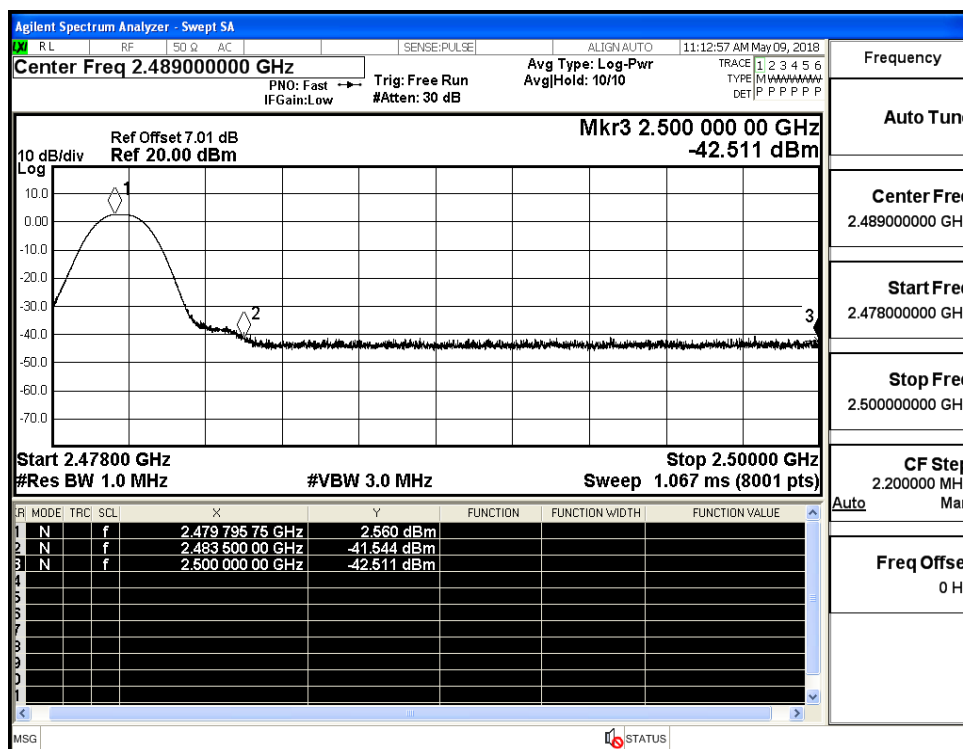
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



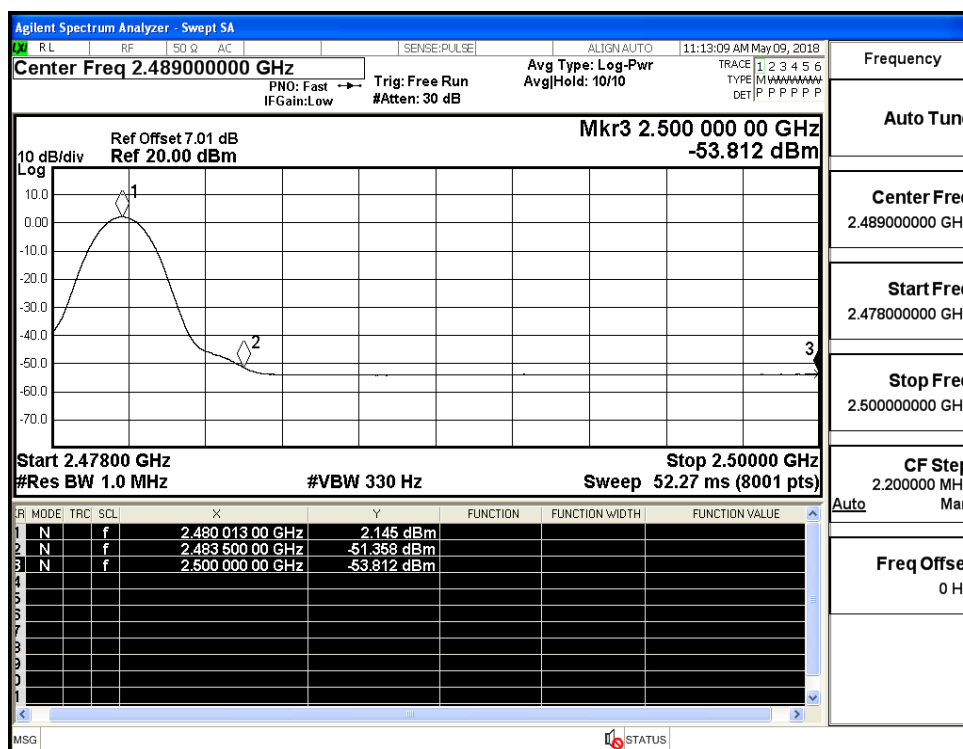
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)

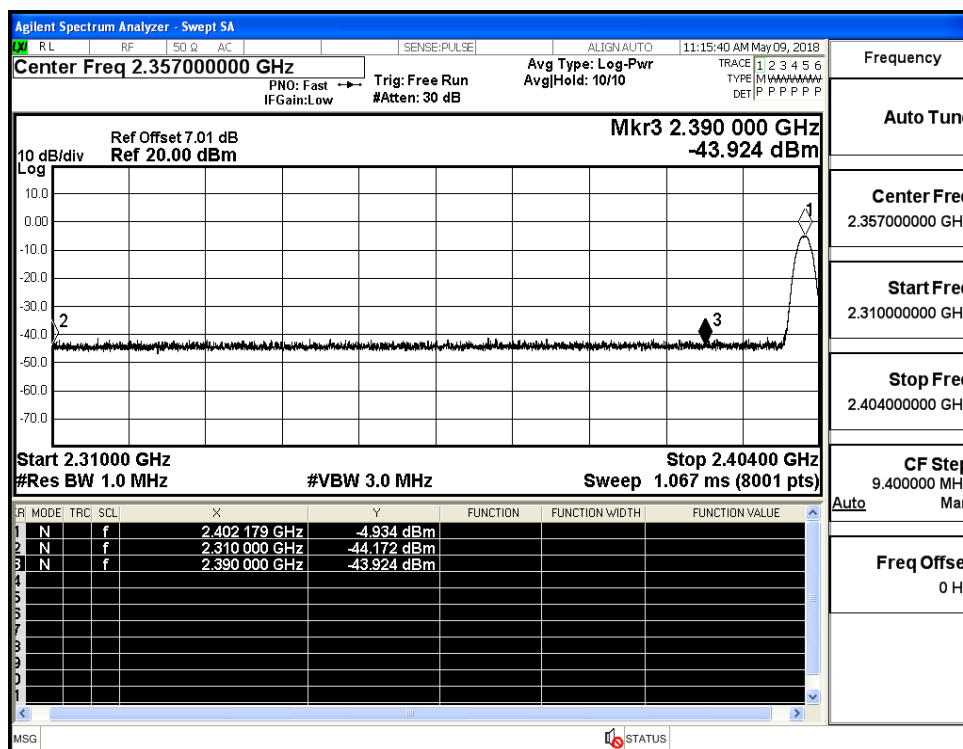
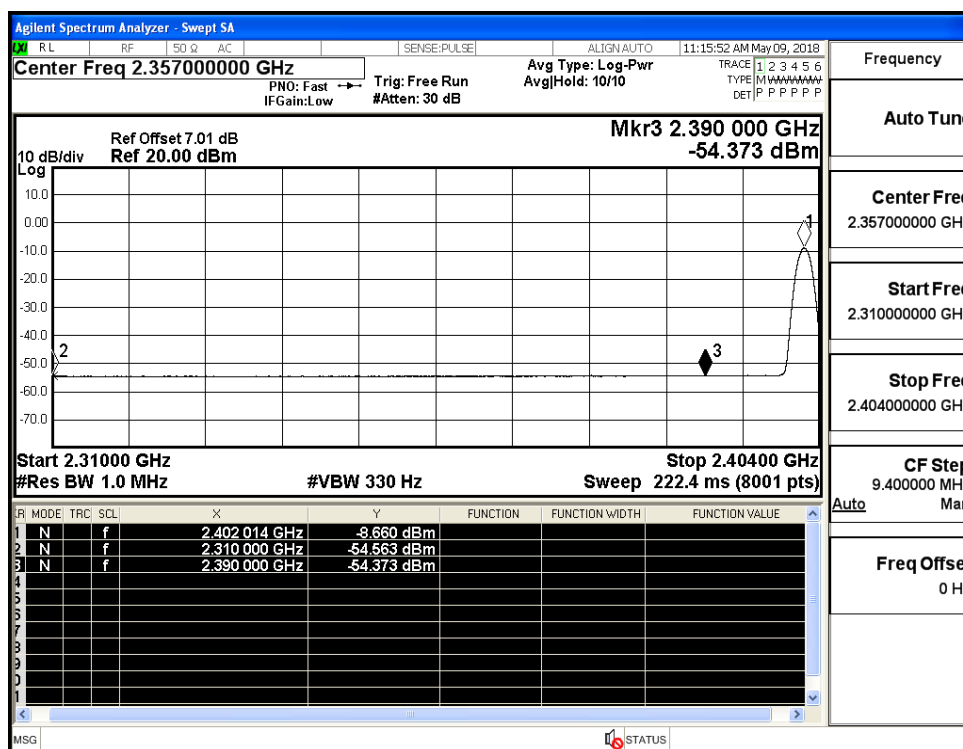


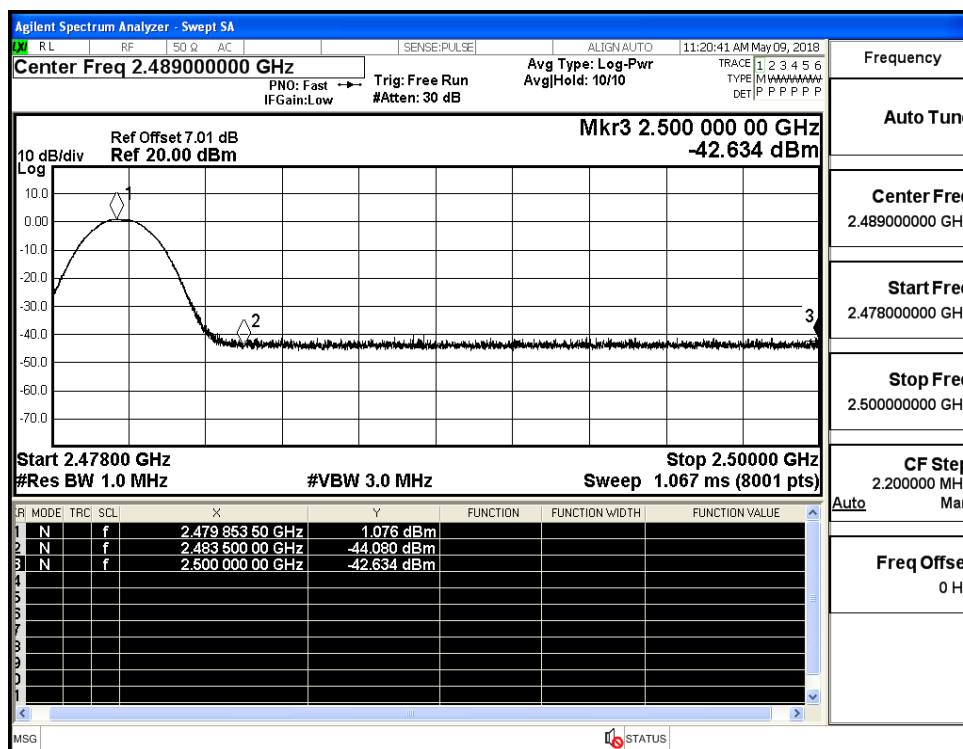
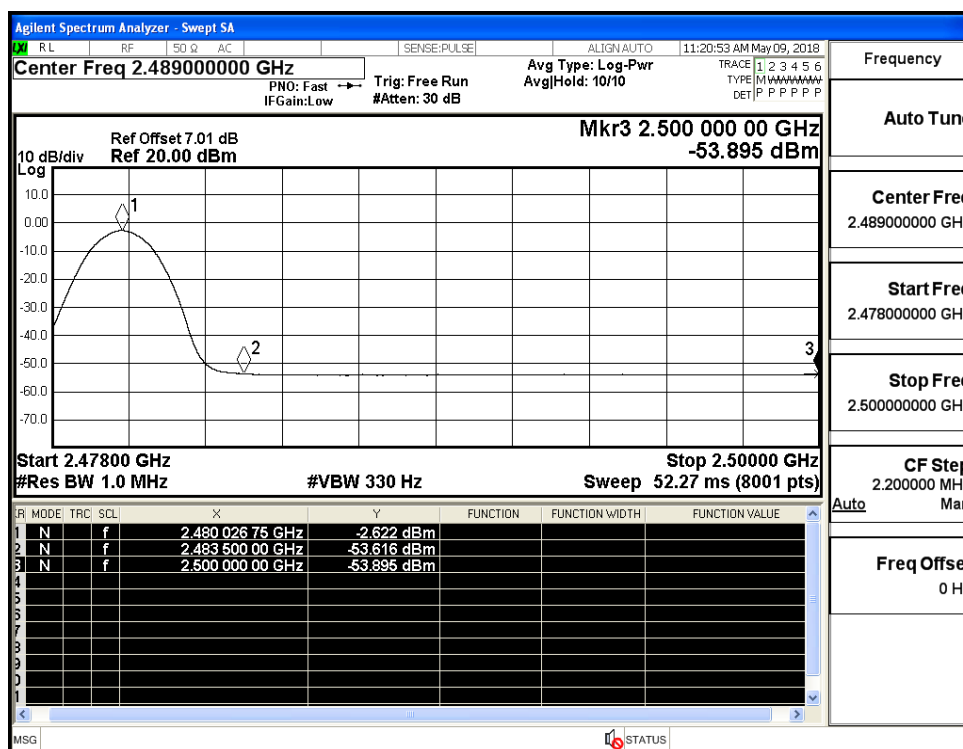
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



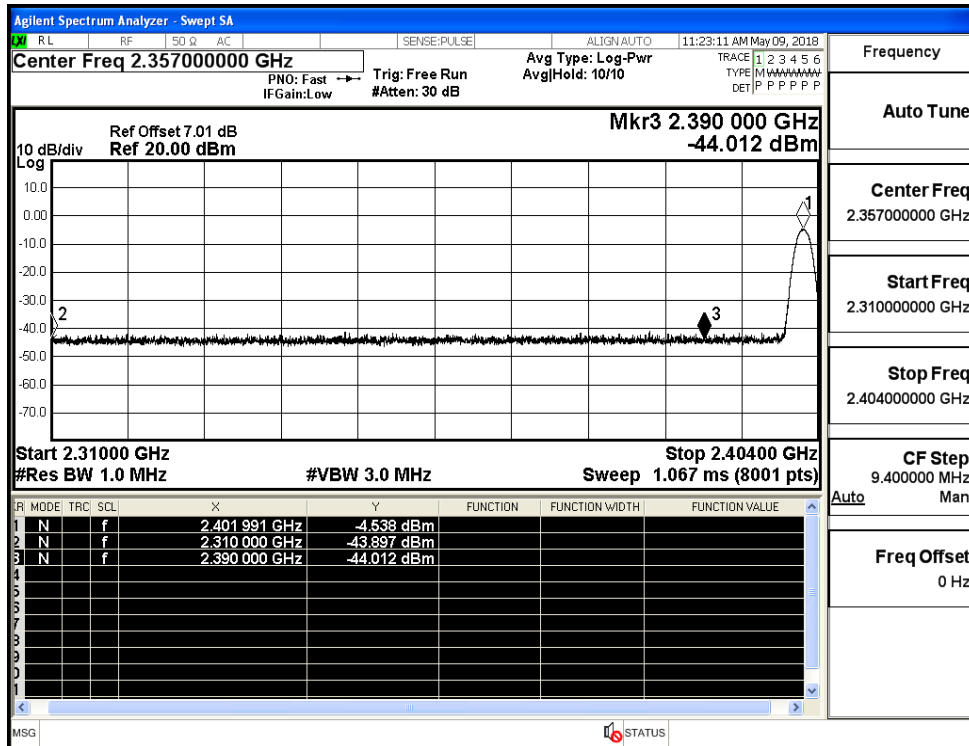
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



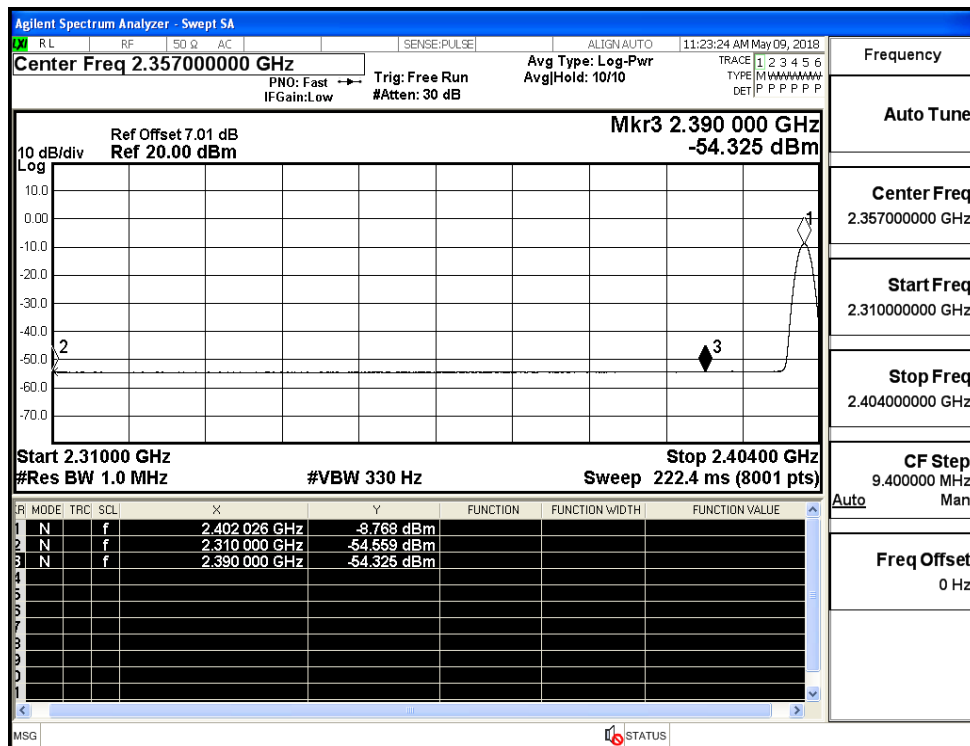
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

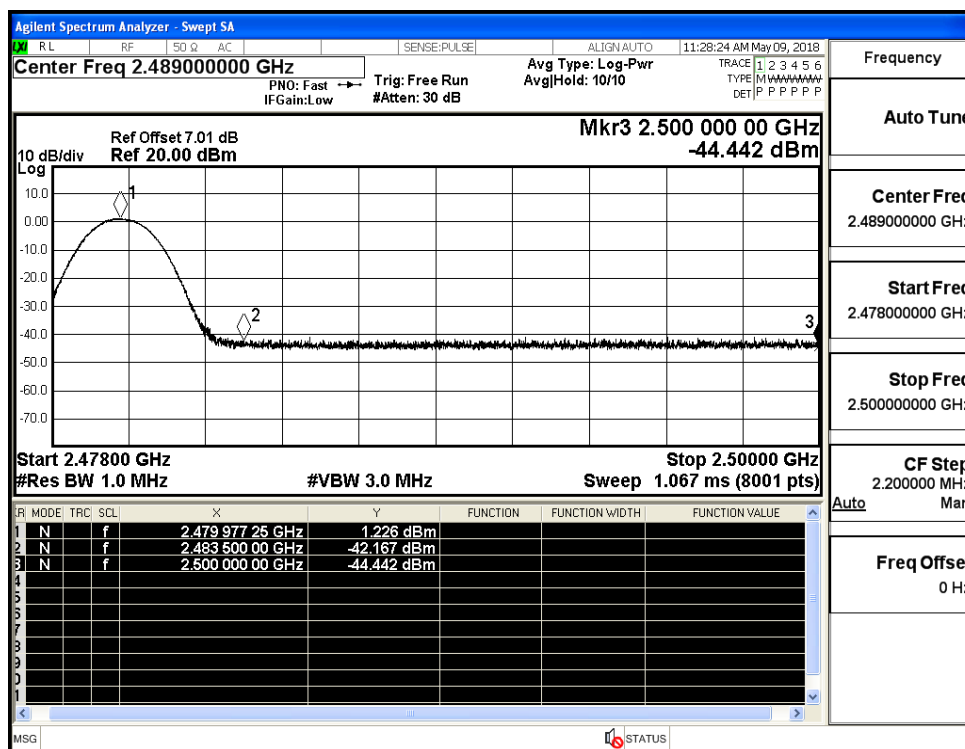
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

