

Appendix A

RF Test Data for BT V5.0 (BDR/EDR) (Conducted Measurement)

Product Name: Light Up Logo Bluetooth Earbuds

Trade Mark: N/A

Test Model: XO-9720

Environmental Conditions

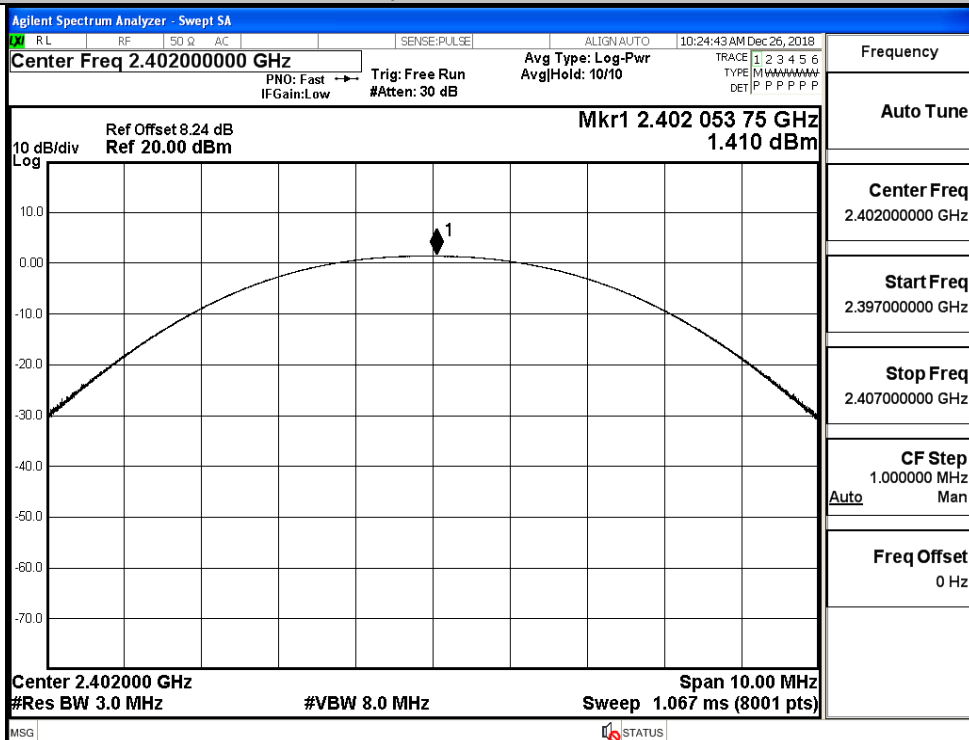
Temperature:	24.8 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

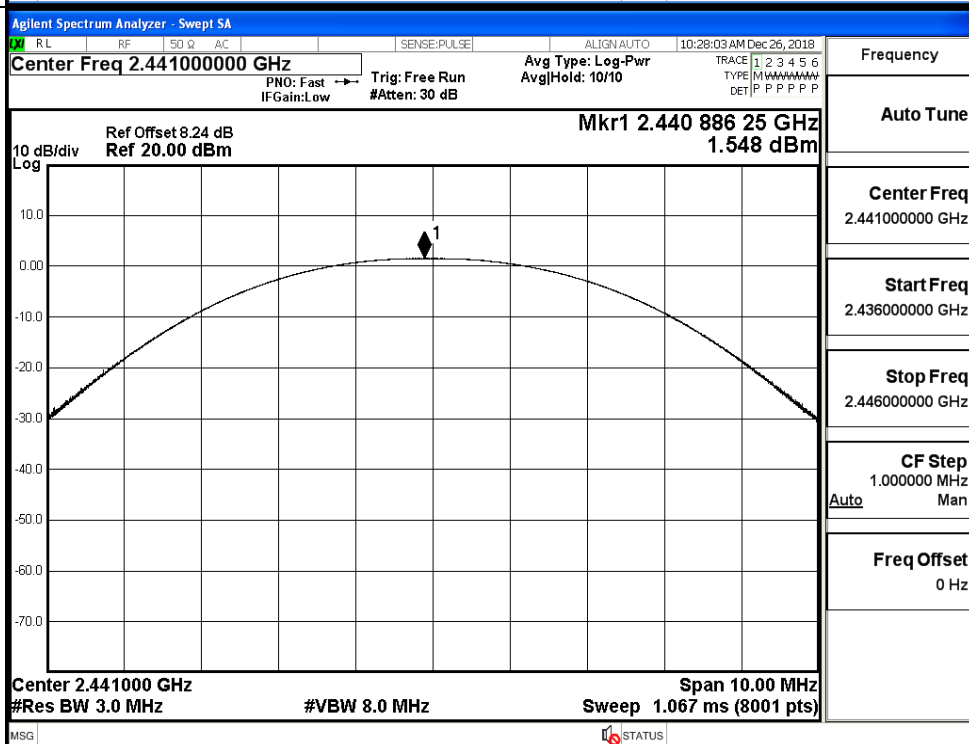
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.410	21	PASS
	MCH	1.548	21	PASS
	HCH	1.479	21	PASS
$\pi/4$ DQPSK	LCH	0.625	21	PASS
	MCH	0.734	21	PASS
	HCH	0.681	21	PASS
8DPSK	LCH	0.788	21	PASS
	MCH	0.906	21	PASS
	HCH	0.811	21	PASS

Test Graphs

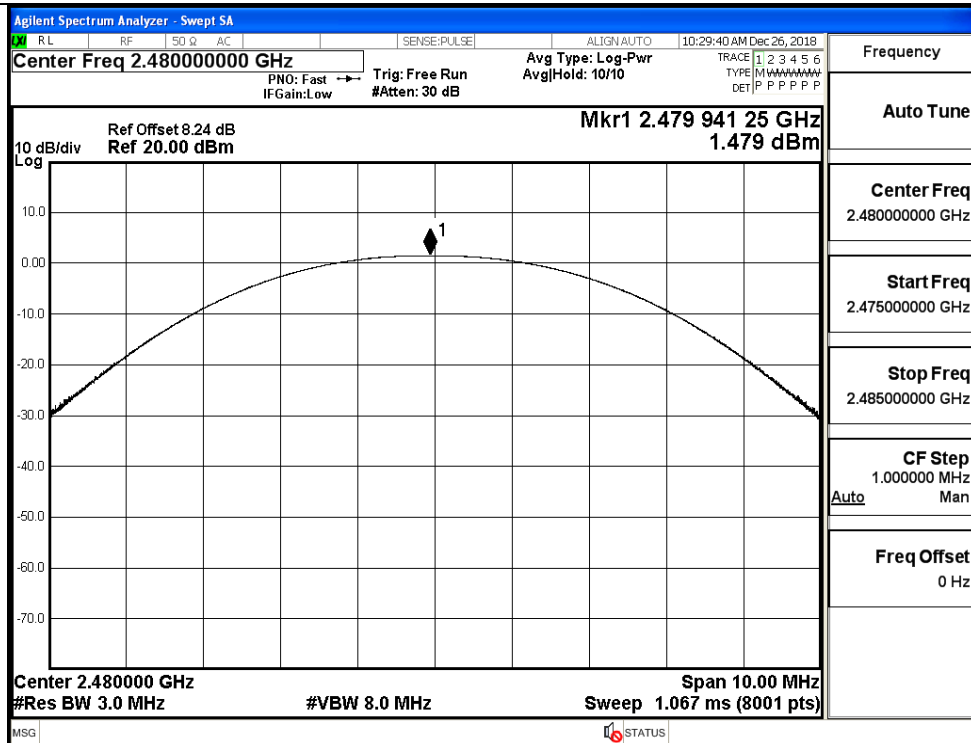
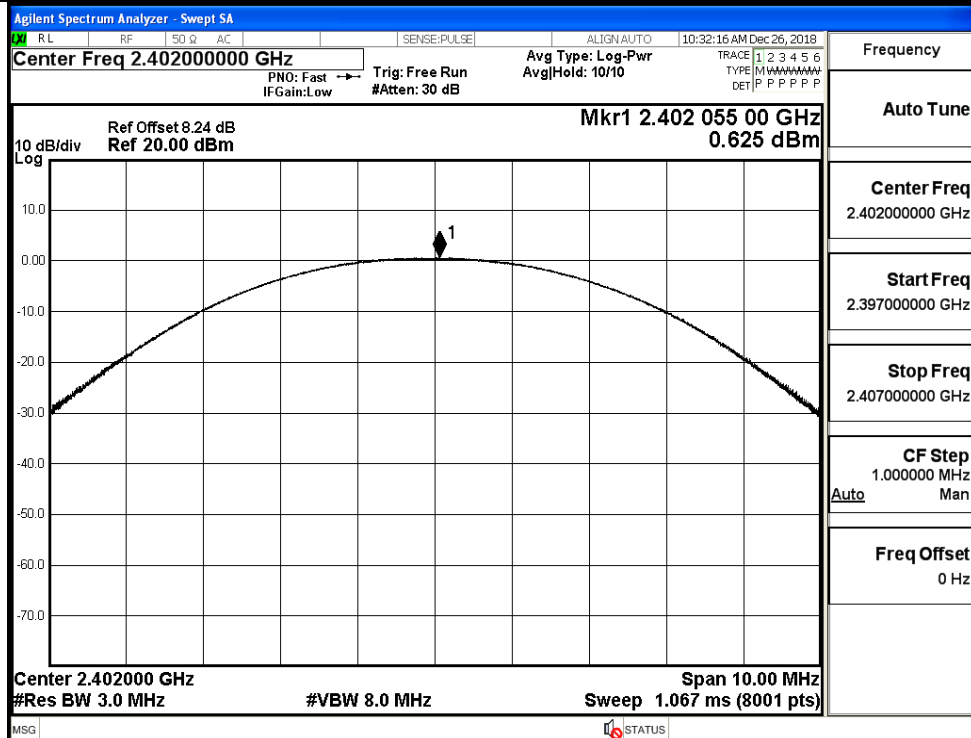
GFSK/LCH

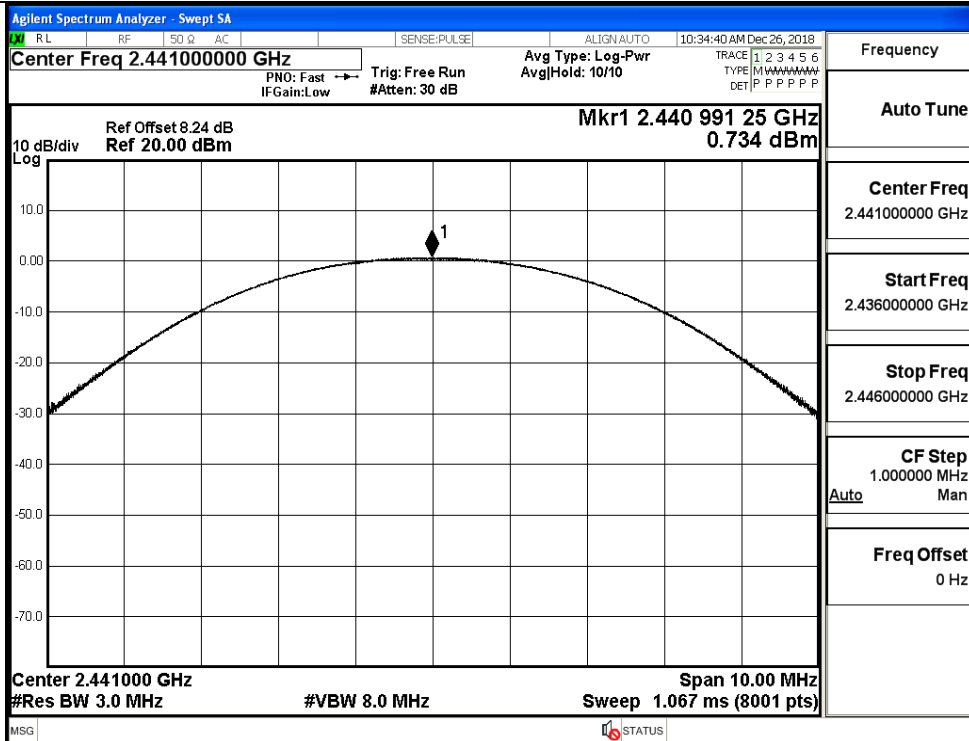
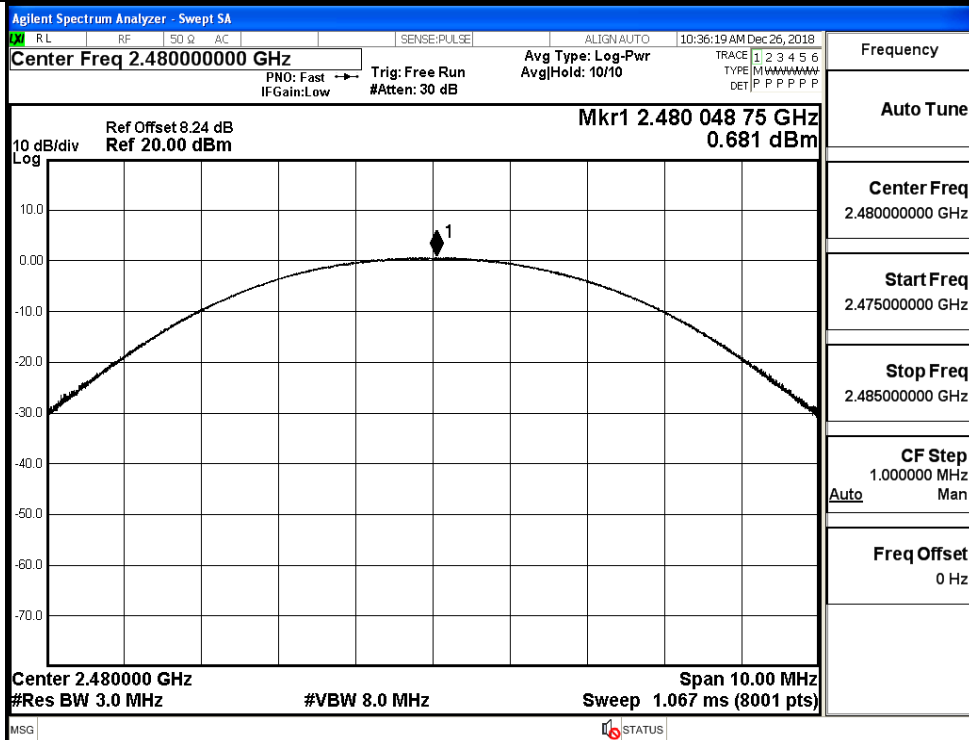


GFSK/MCH

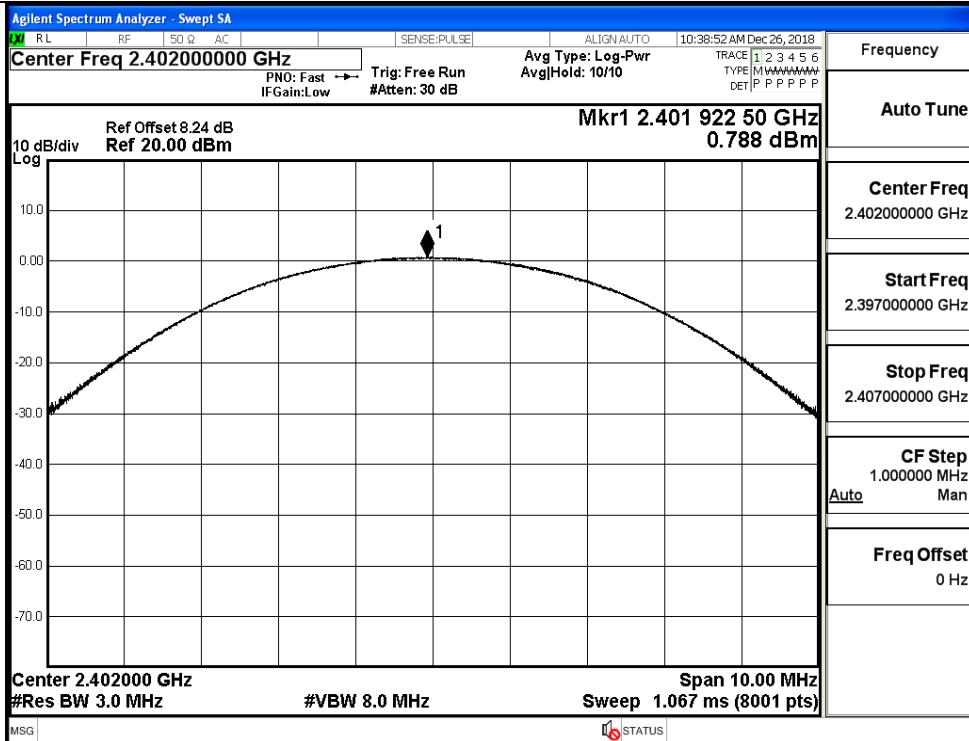


GFSK/HCH

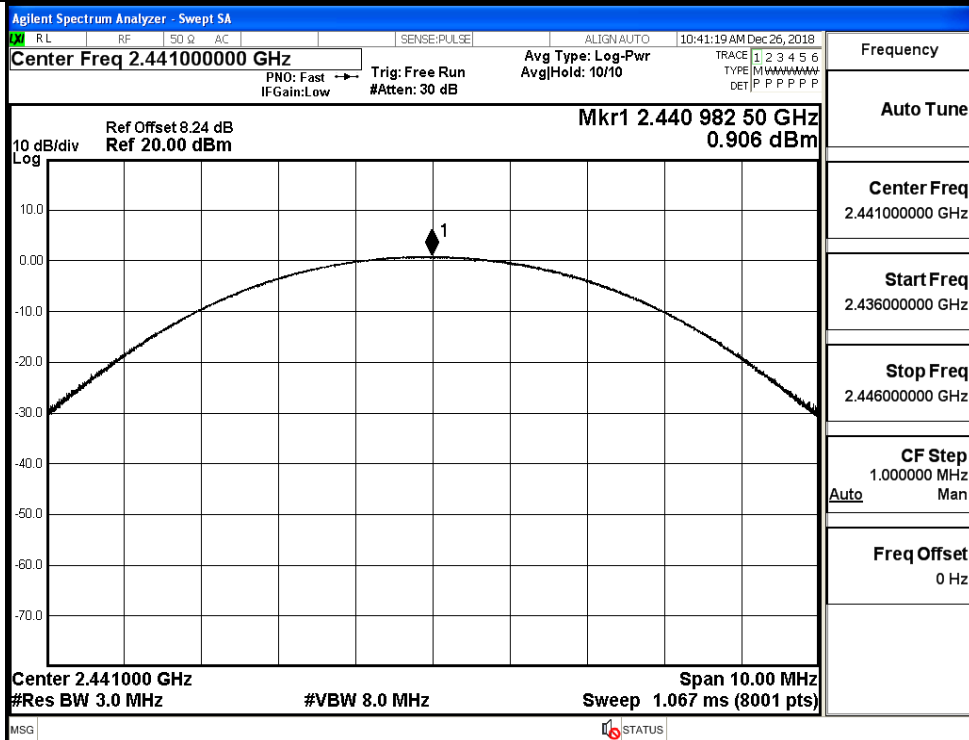
 π /4DQPSK/LCH

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

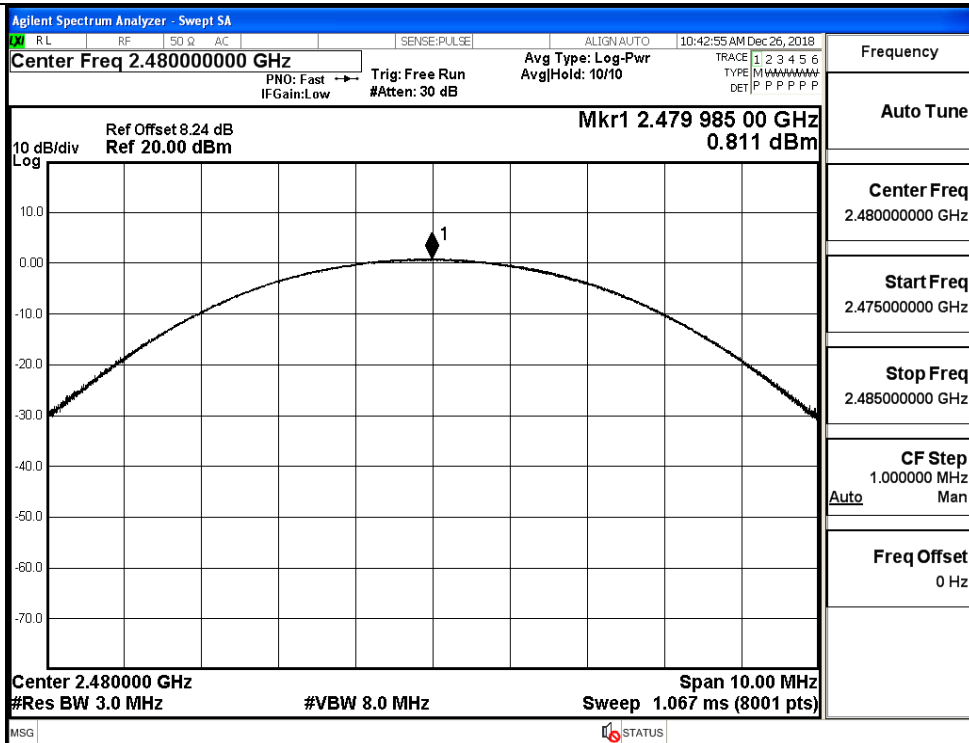
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

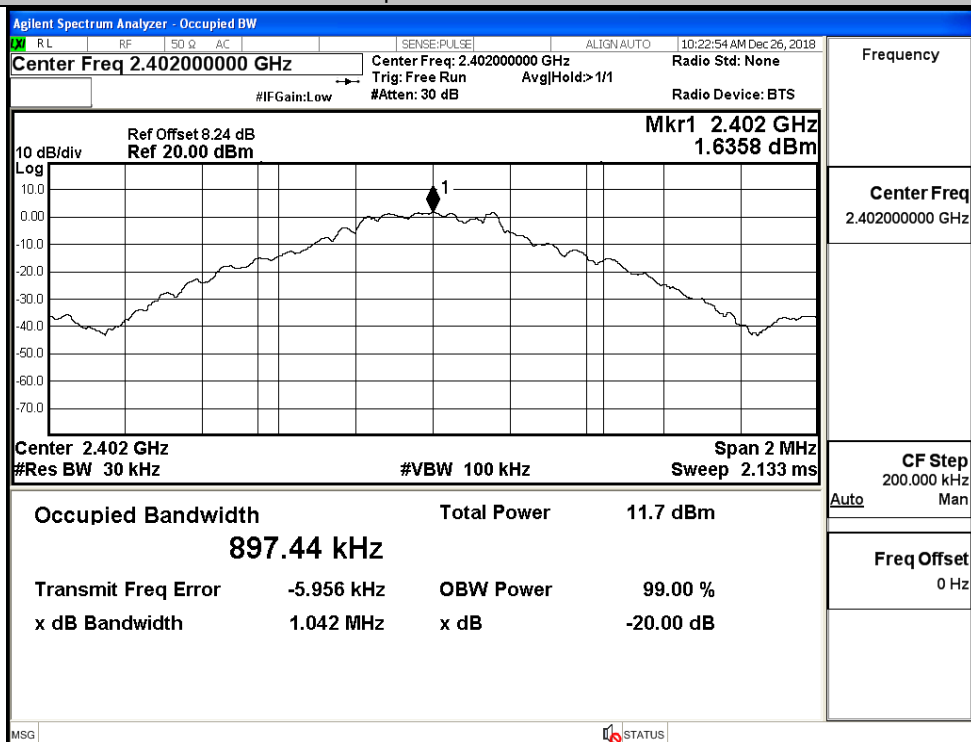


A.2 99% and 20dB Bandwidth

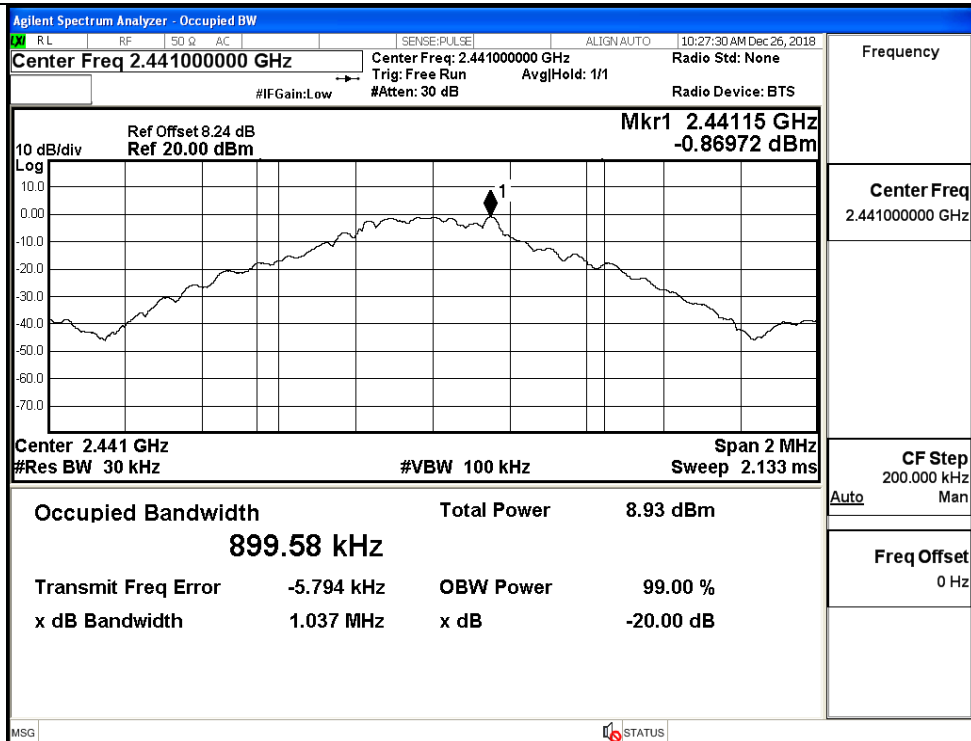
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89744	1.042	Not Specified	PASS
	MCH	0.89958	1.037	Not Specified	PASS
	HCH	0.89855	1.038	Not Specified	PASS
π /4DQPSK	LCH	1.1743	1.291	Not Specified	PASS
	MCH	1.1720	1.292	Not Specified	PASS
	HCH	1.1718	1.290	Not Specified	PASS
8DPSK	LCH	1.1814	1.295	Not Specified	PASS
	MCH	1.1808	1.303	Not Specified	PASS
	HCH	1.1795	1.294	Not Specified	PASS

Test Graphs

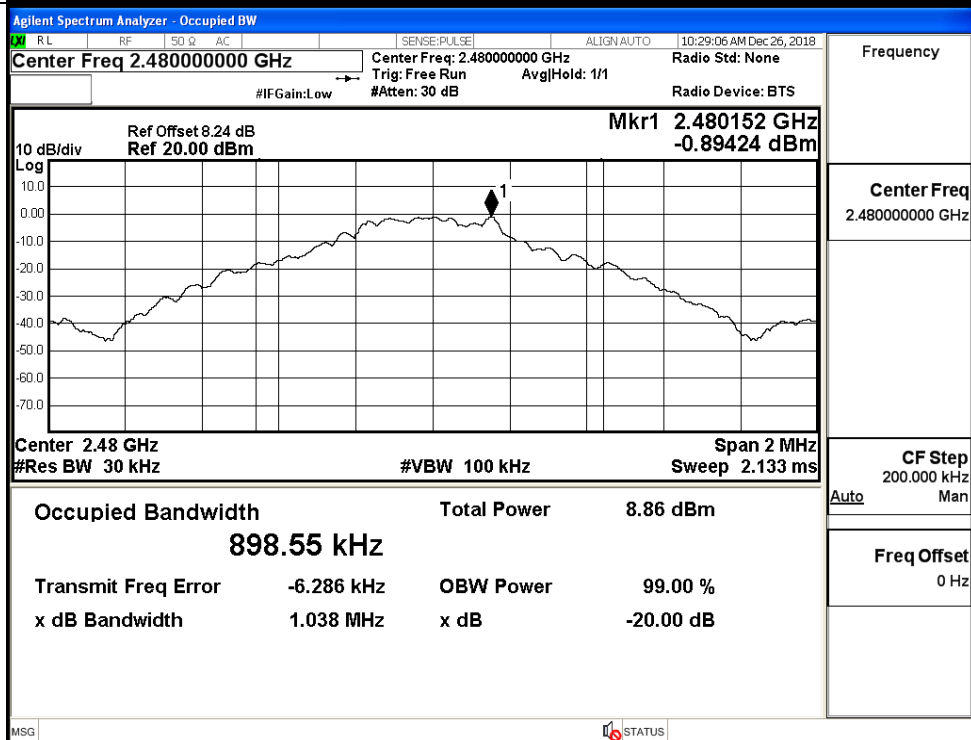
GFSK/LCH

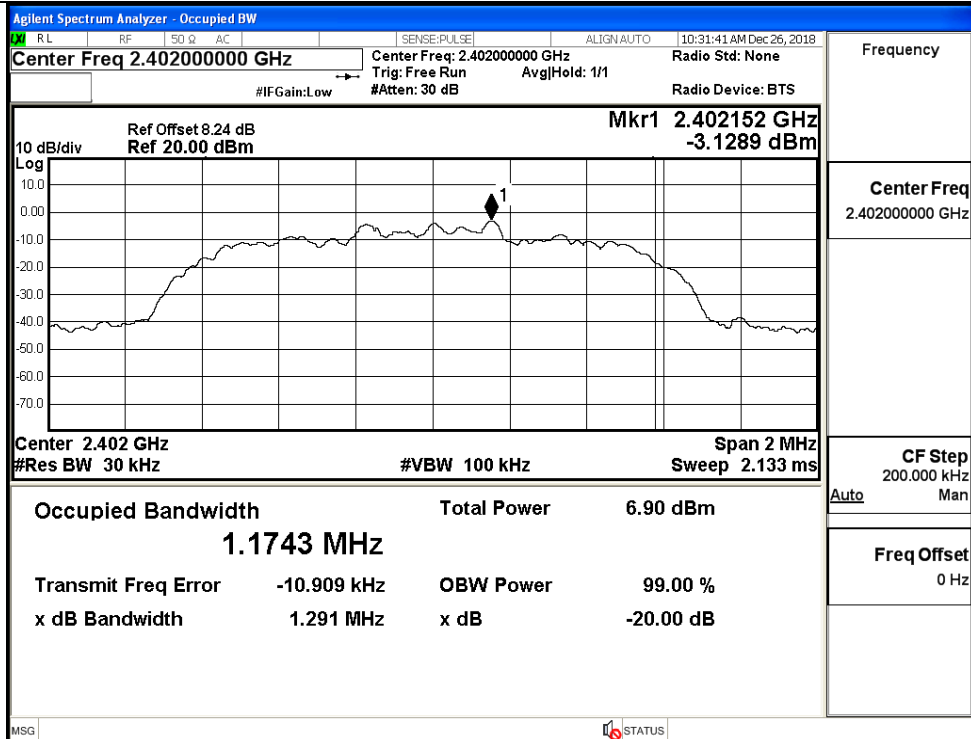
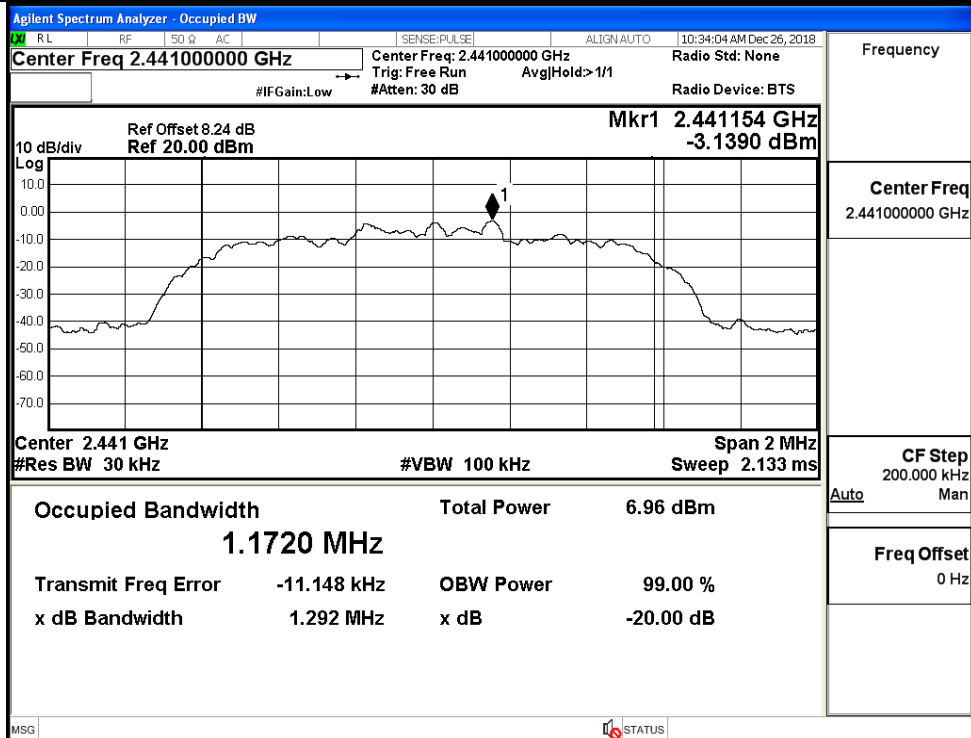


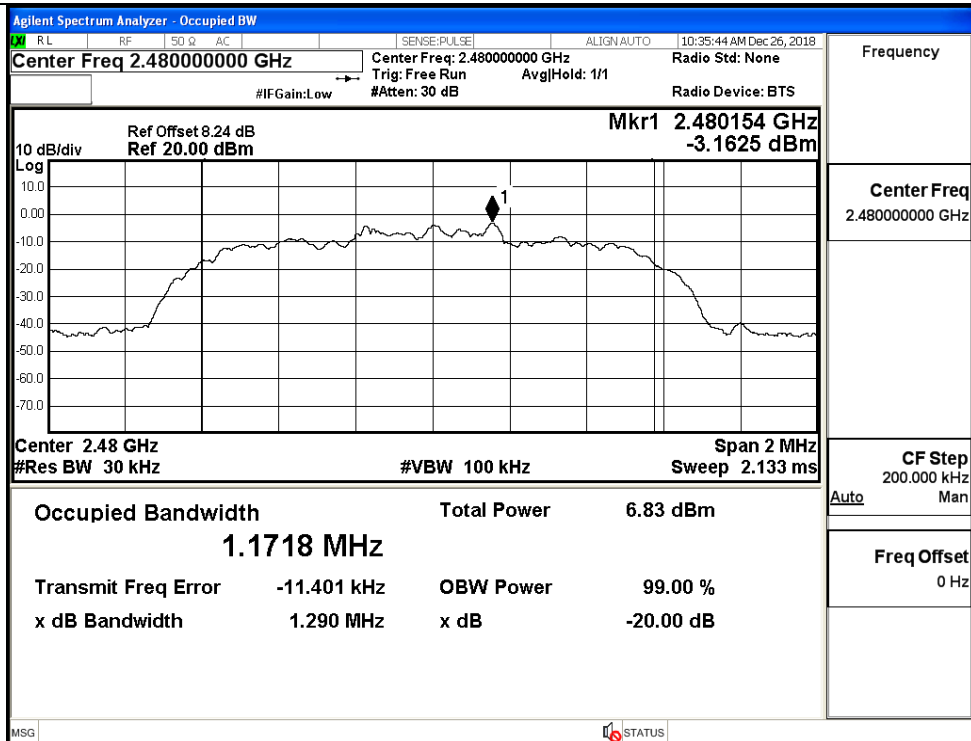
GFSK/MCH



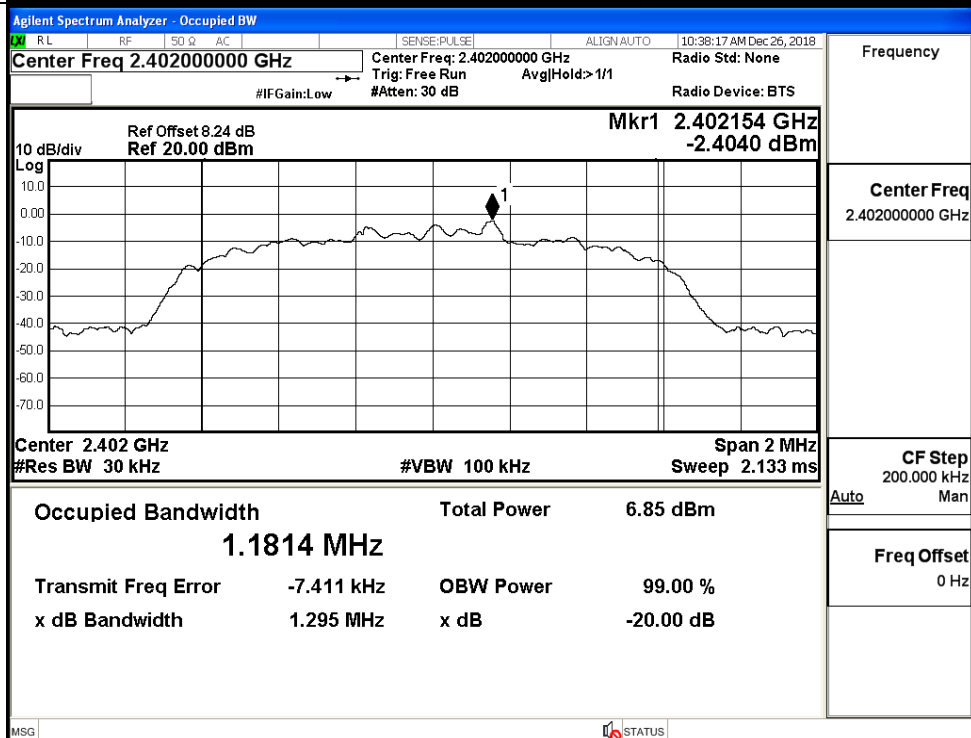
GFSK/HCH



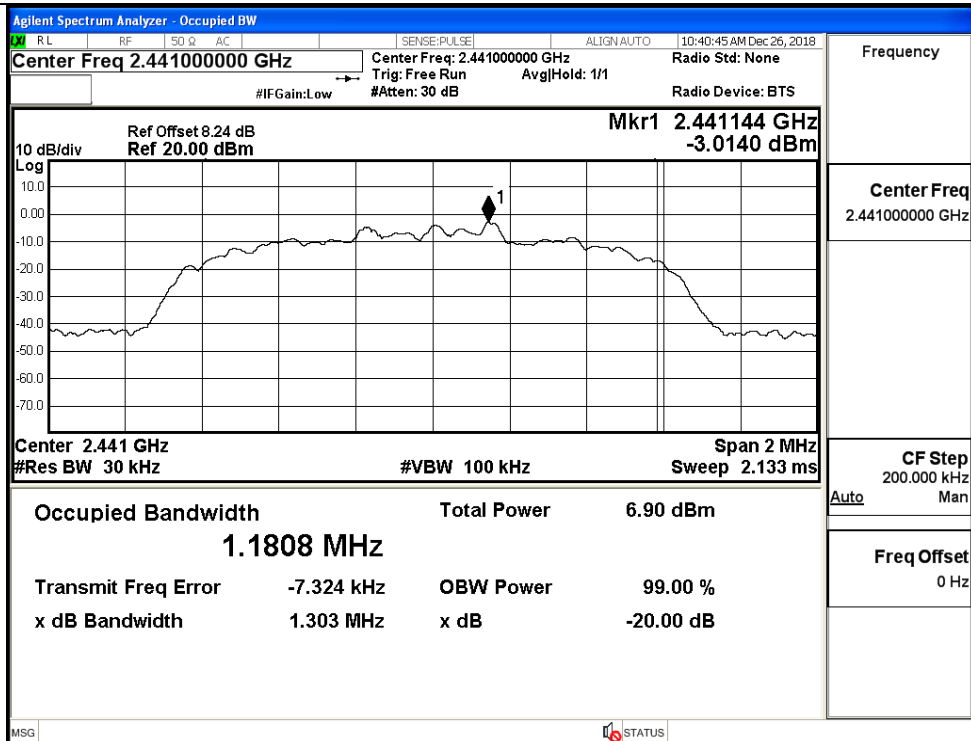
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

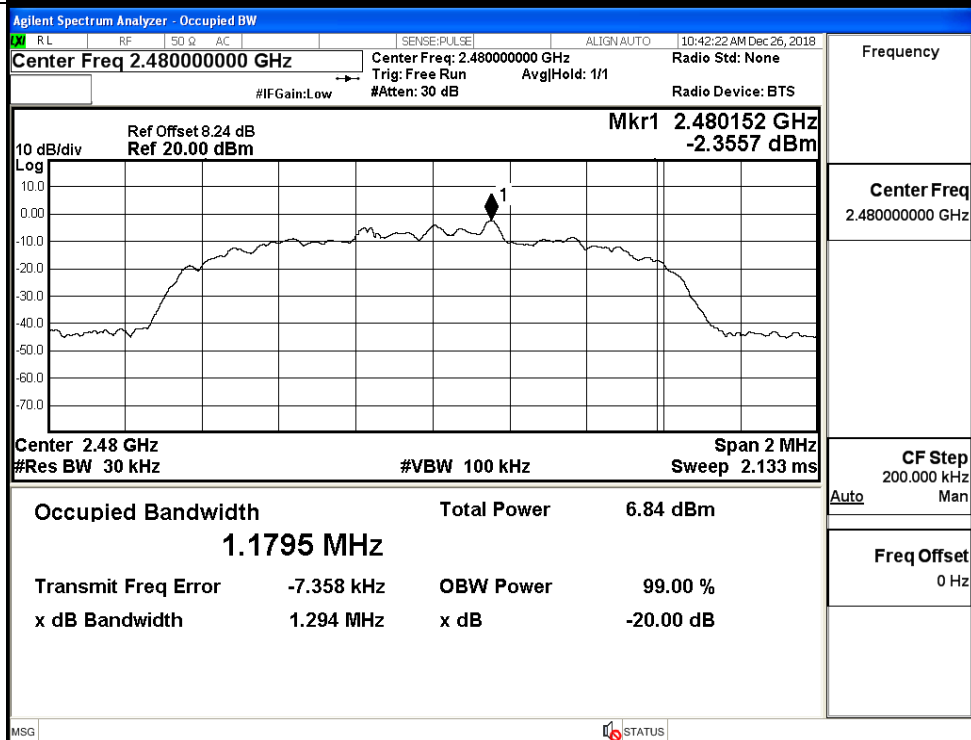
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

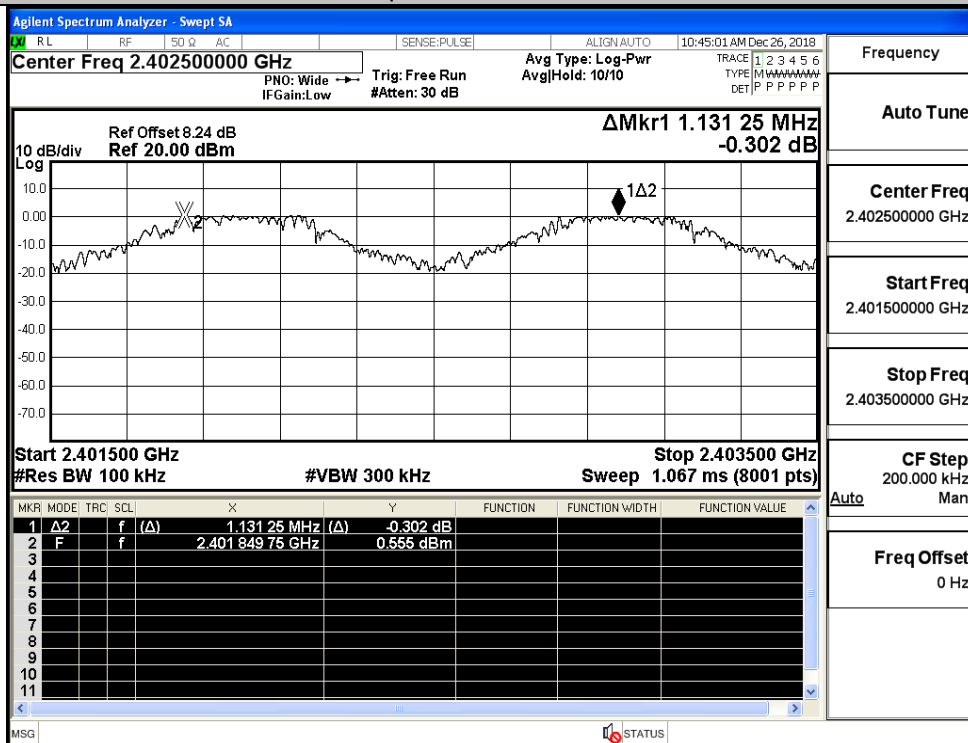


A.3 Carrier Frequency Separation

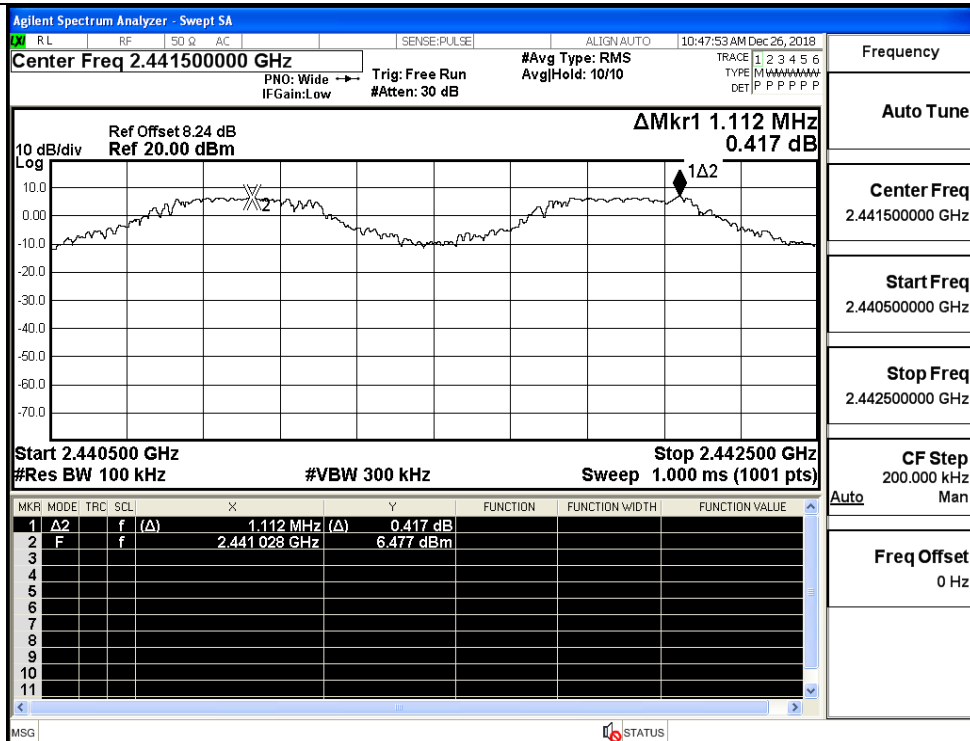
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.131	0.695	PASS
	MCH	1.112	0.695	PASS
	HCH	0.954	0.695	PASS
π /4DQPSK	LCH	1.122	0.861	PASS
	MCH	0.922	0.861	PASS
	HCH	1.086	0.861	PASS
8DPSK	LCH	1.172	0.869	PASS
	MCH	0.878	0.869	PASS
	HCH	1.318	0.869	PASS

Test Graphs

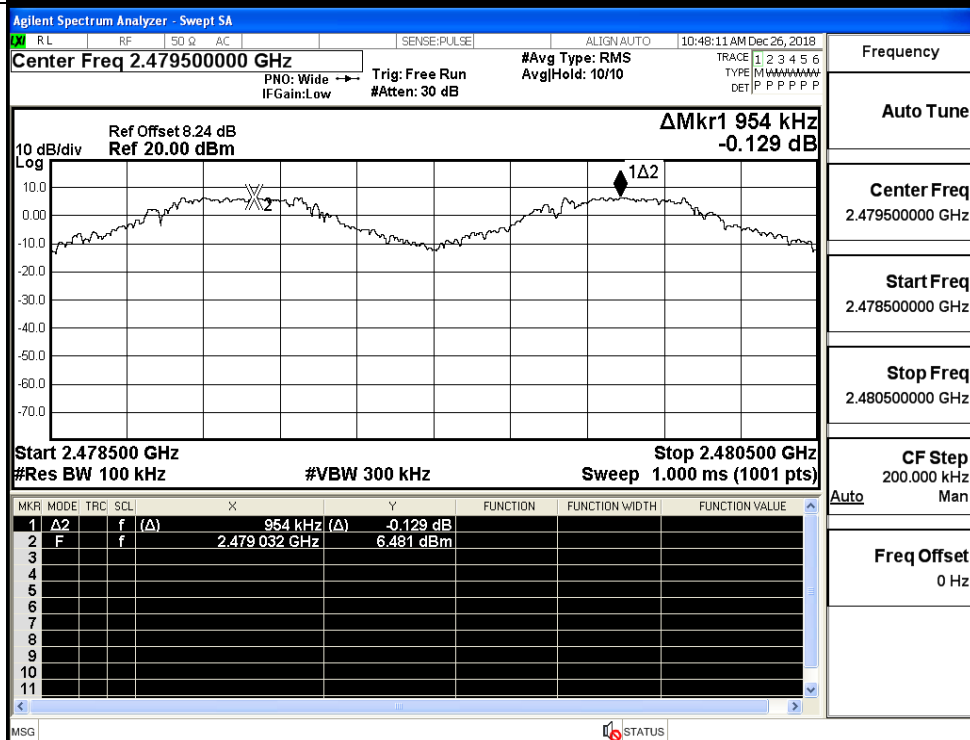
GFSK/LCH

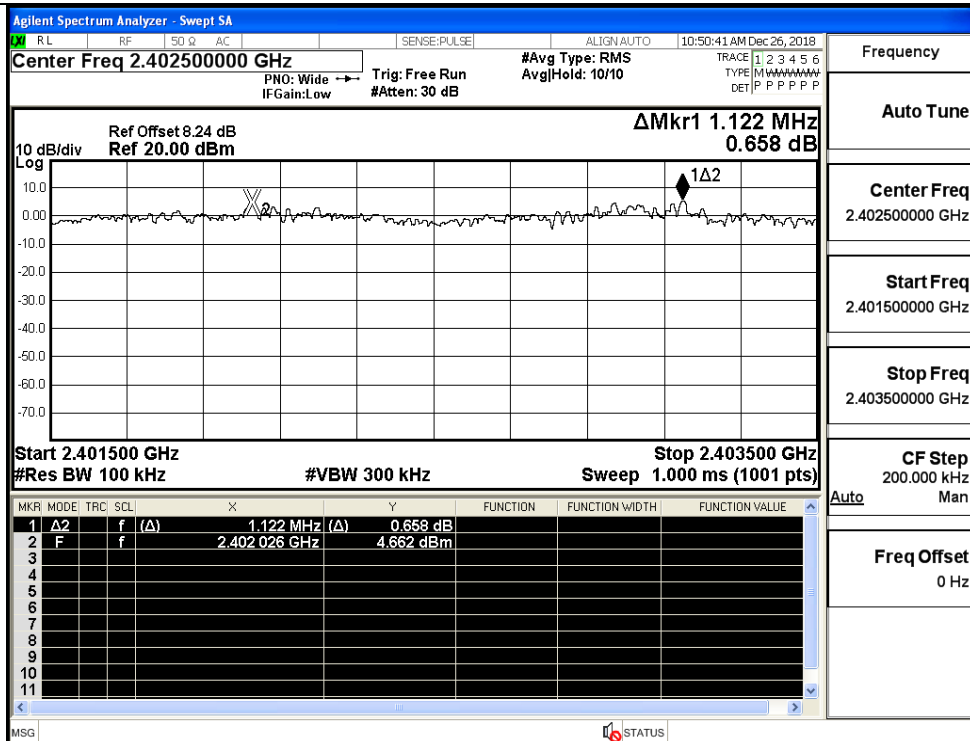


GFSK/MCH



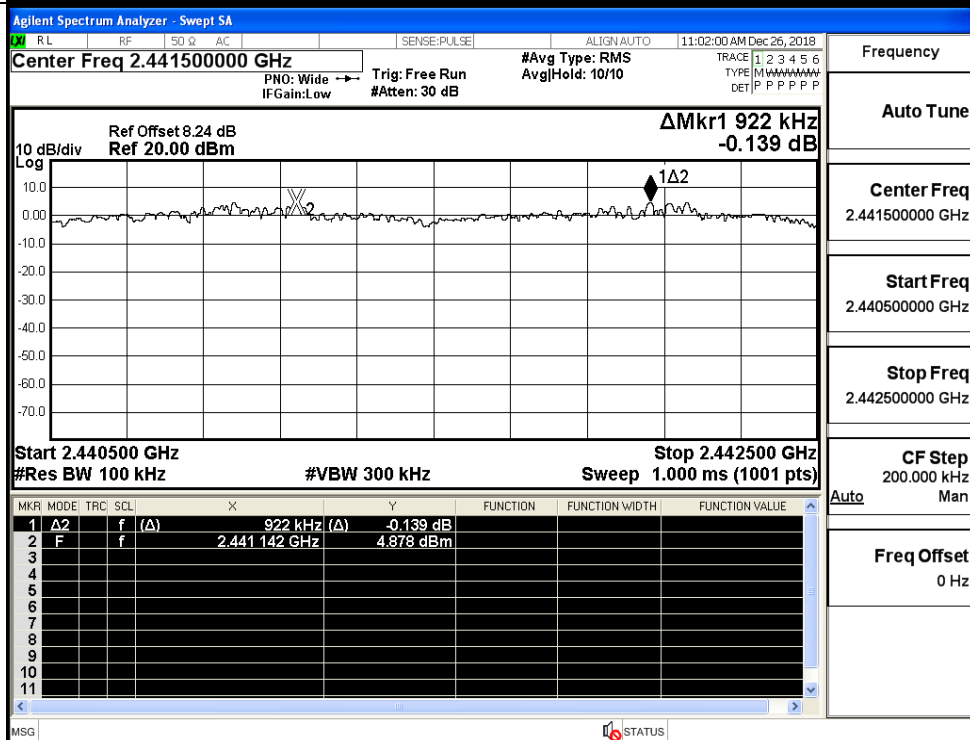
GFSK/HCH



$\pi/4$ DQPSK/LCH

Frequency

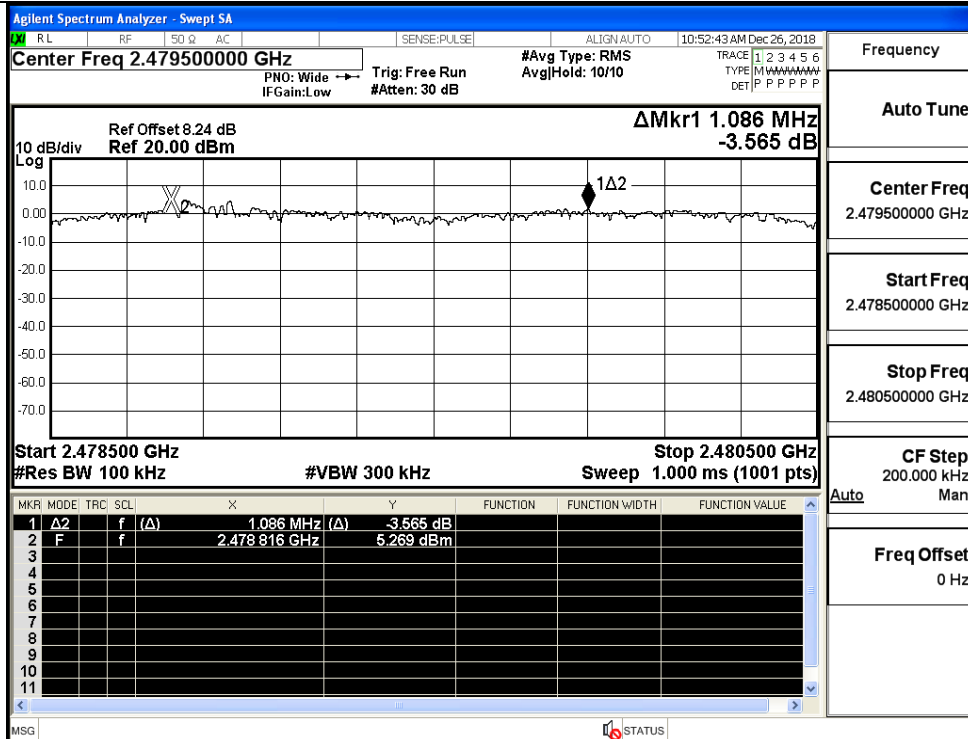
Auto Tune

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

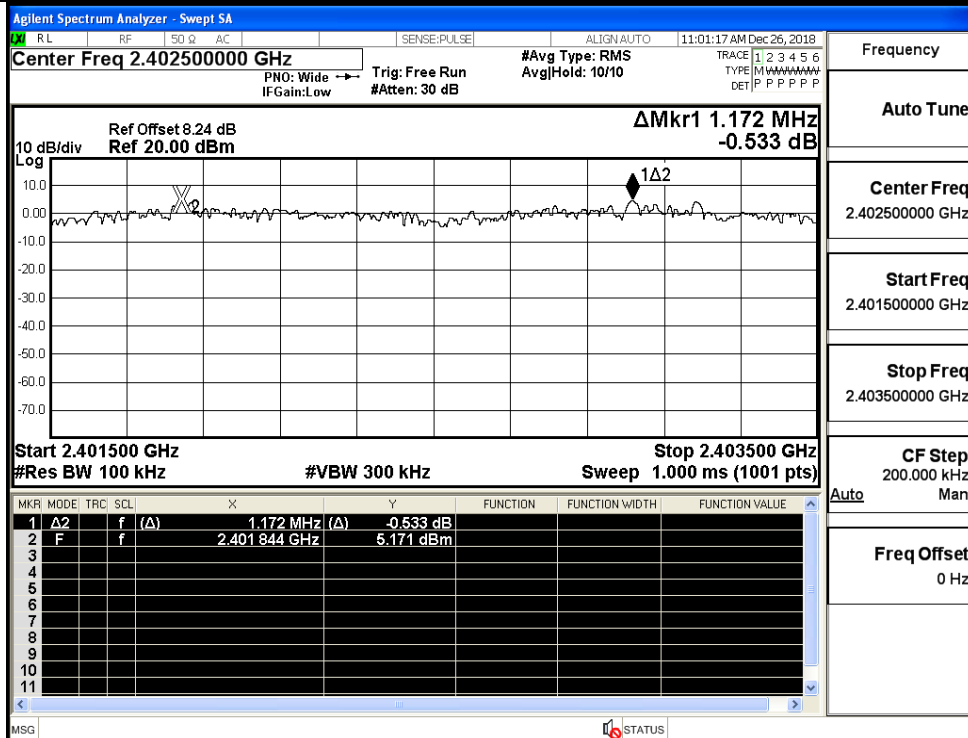
Frequency

Auto Tune

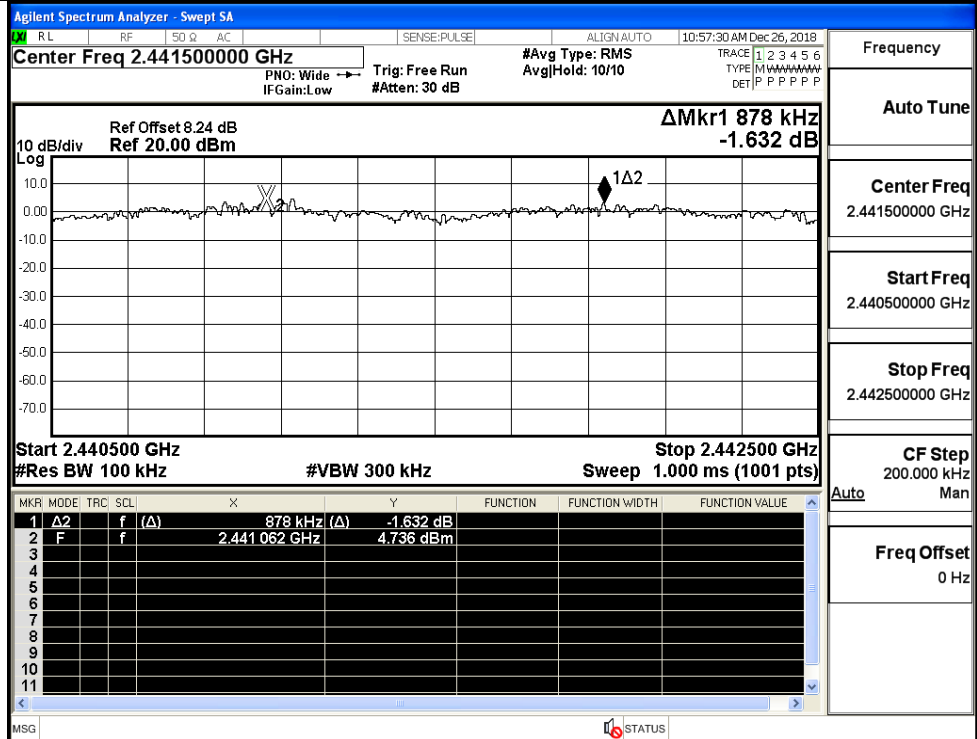
Center Freq
2.441500000 GHzStart Freq
2.440500000 GHzStop Freq
2.442500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH

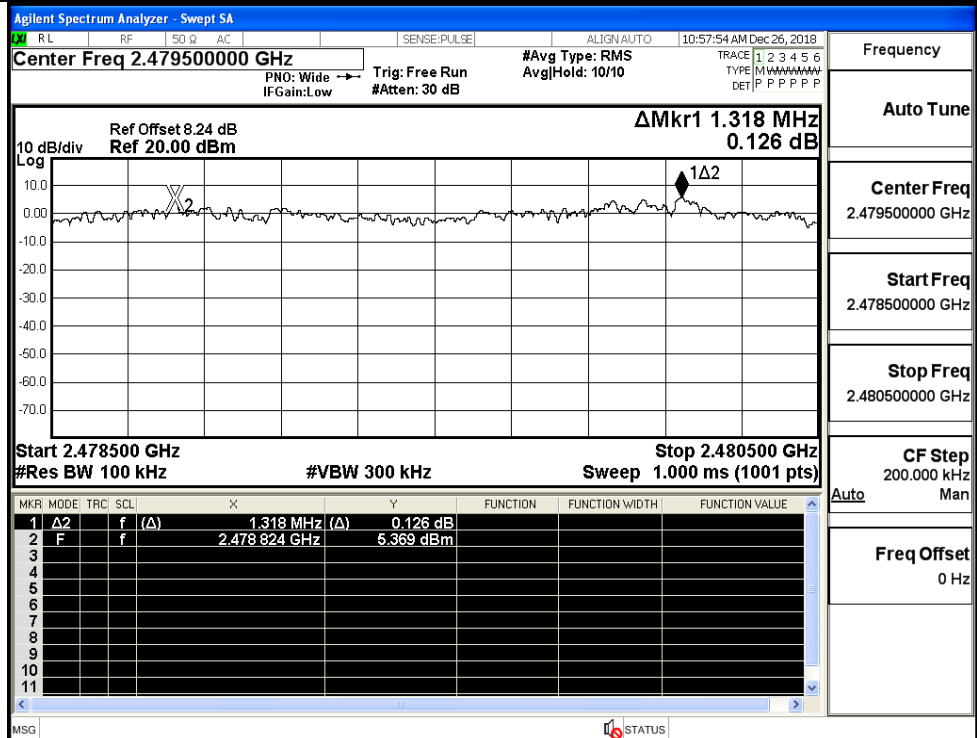
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

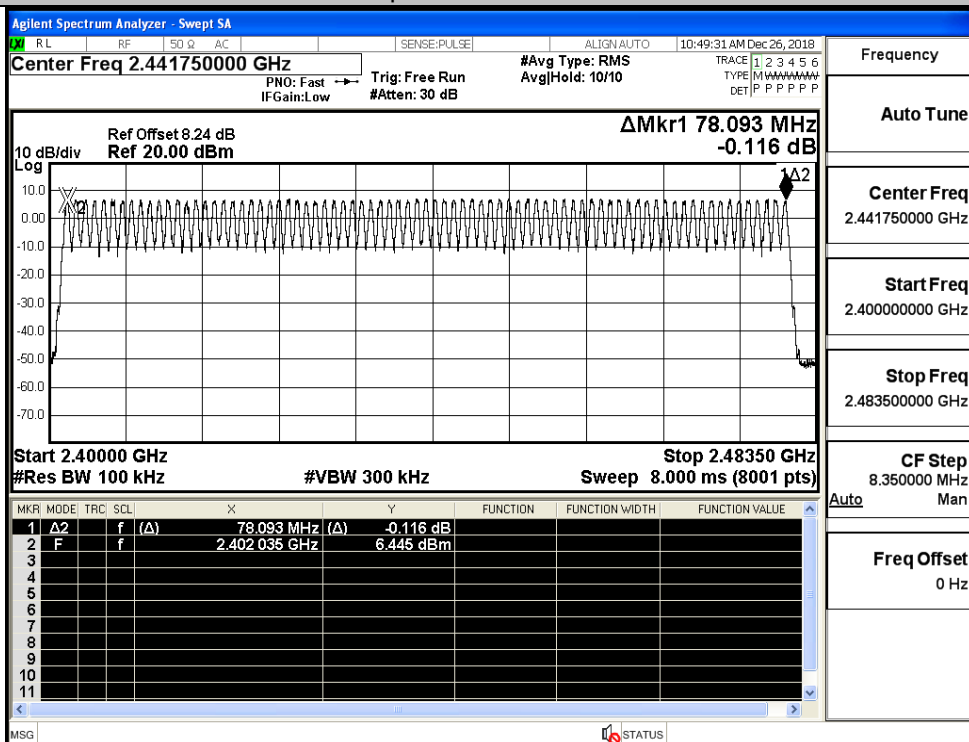
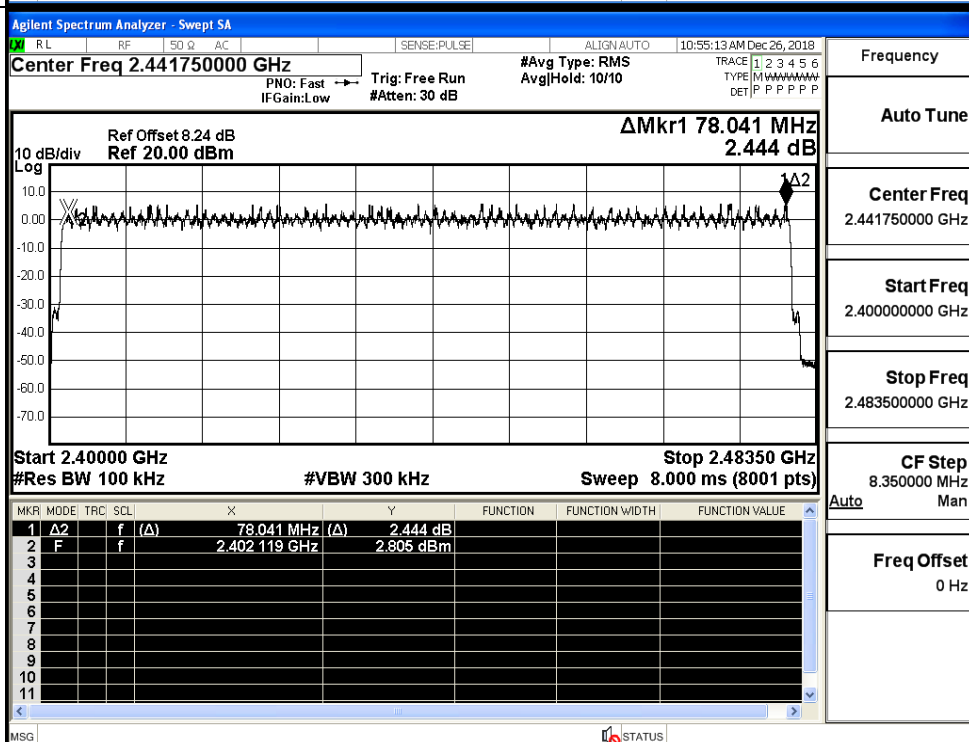


A.4 Hopping Channel Number

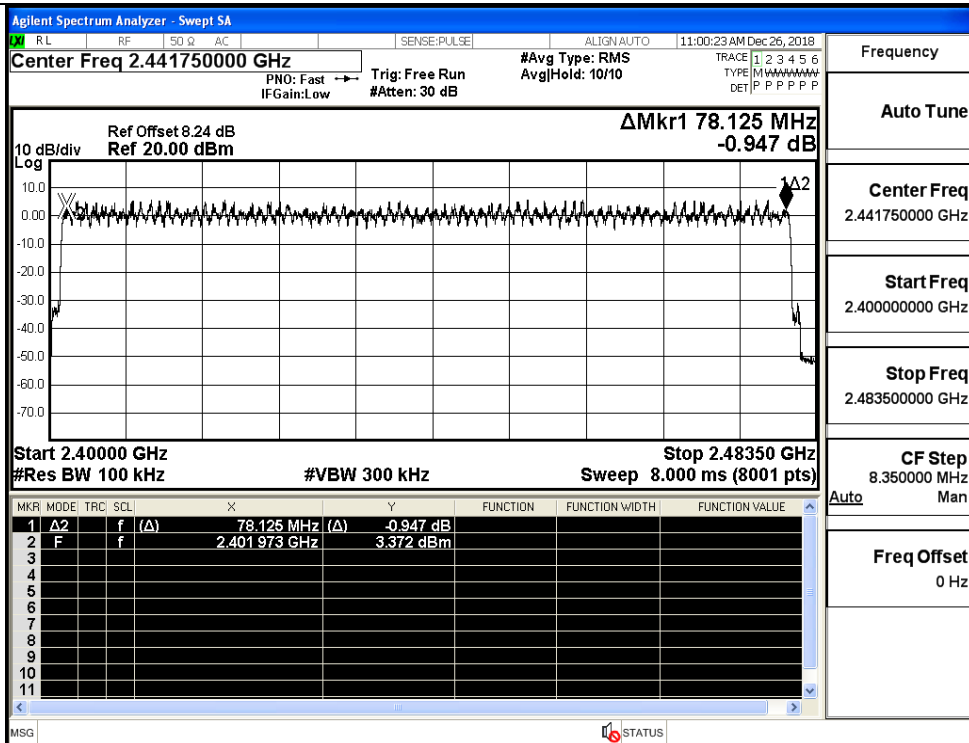
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

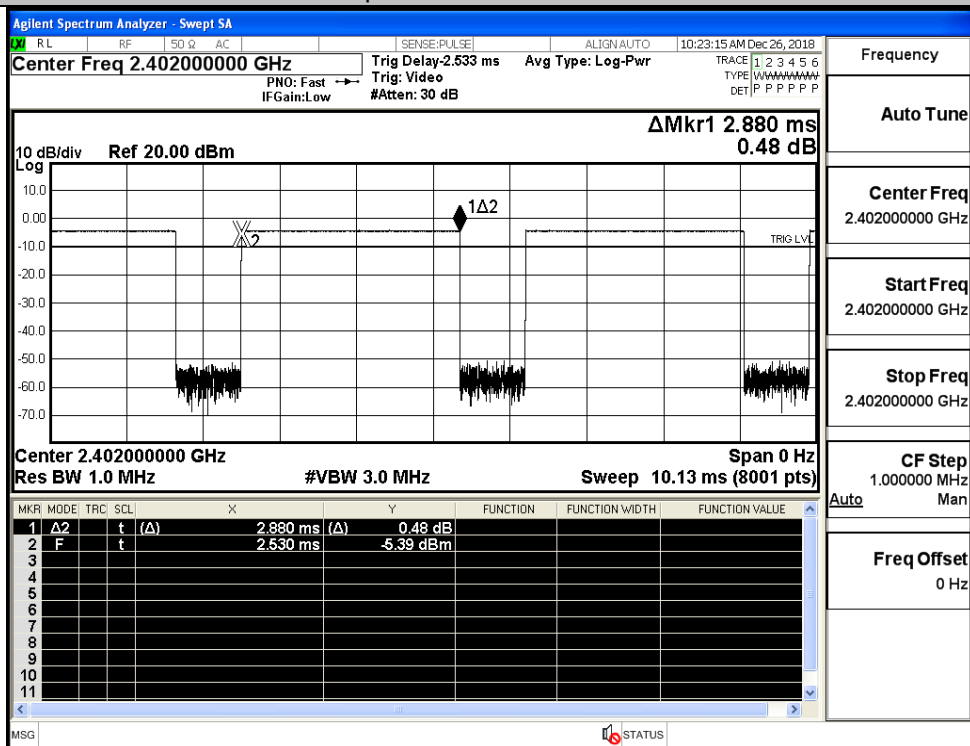


A.5 Dwell Time

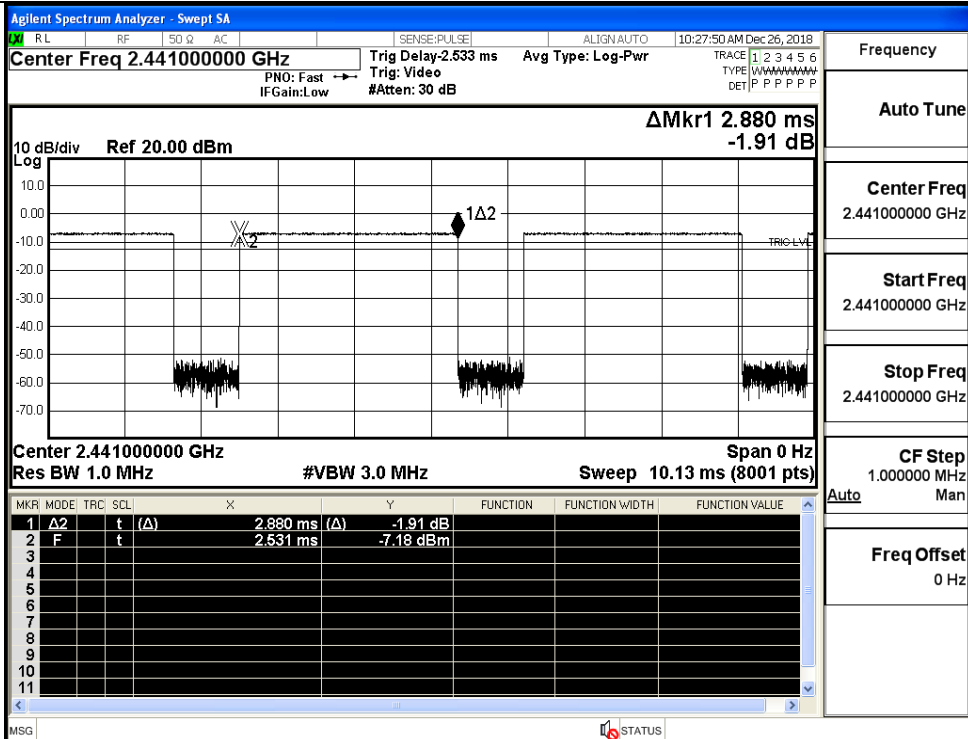
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

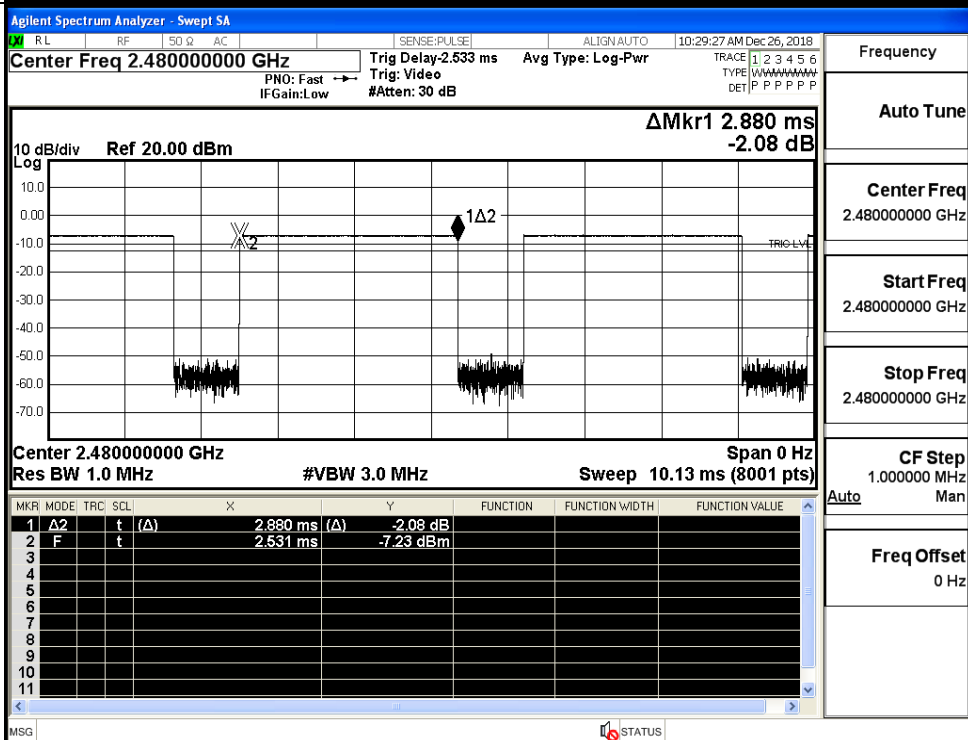
GFSK_DH5/LCH



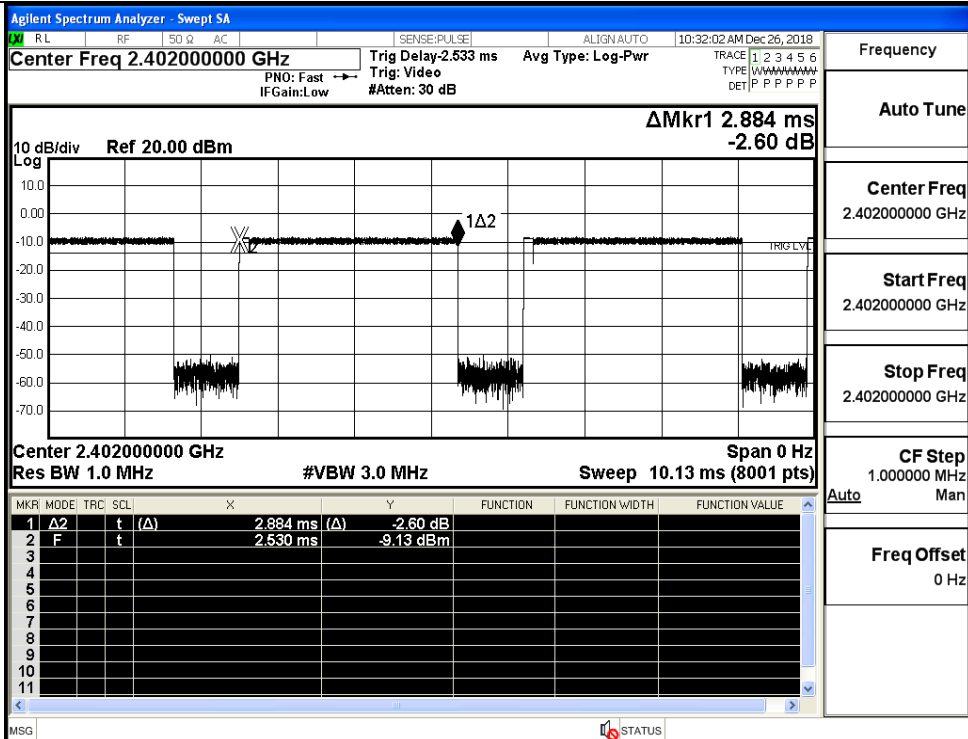
GFSK_DH5/MCH



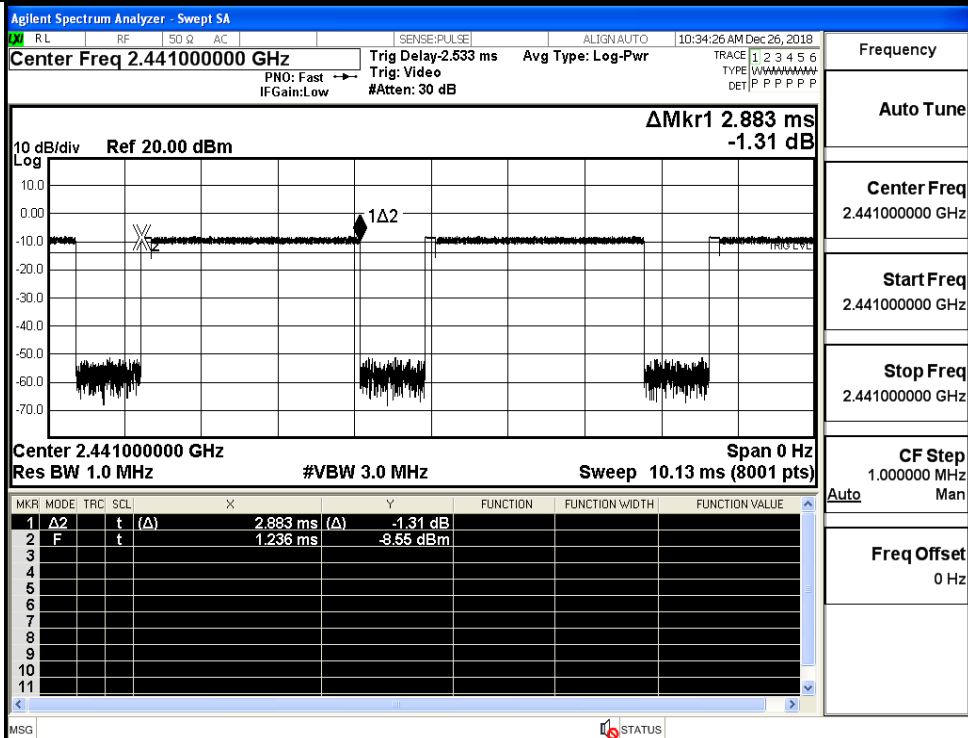
GFSK_DH5/HCH



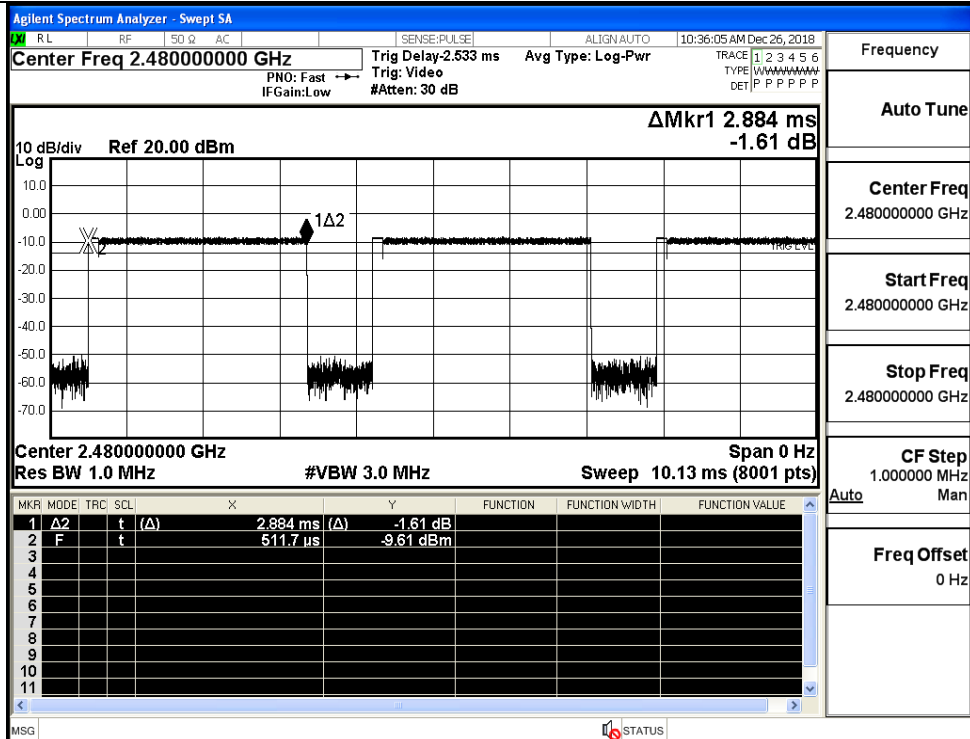
$\pi/4$ DQPSK
_2DH5/LCH



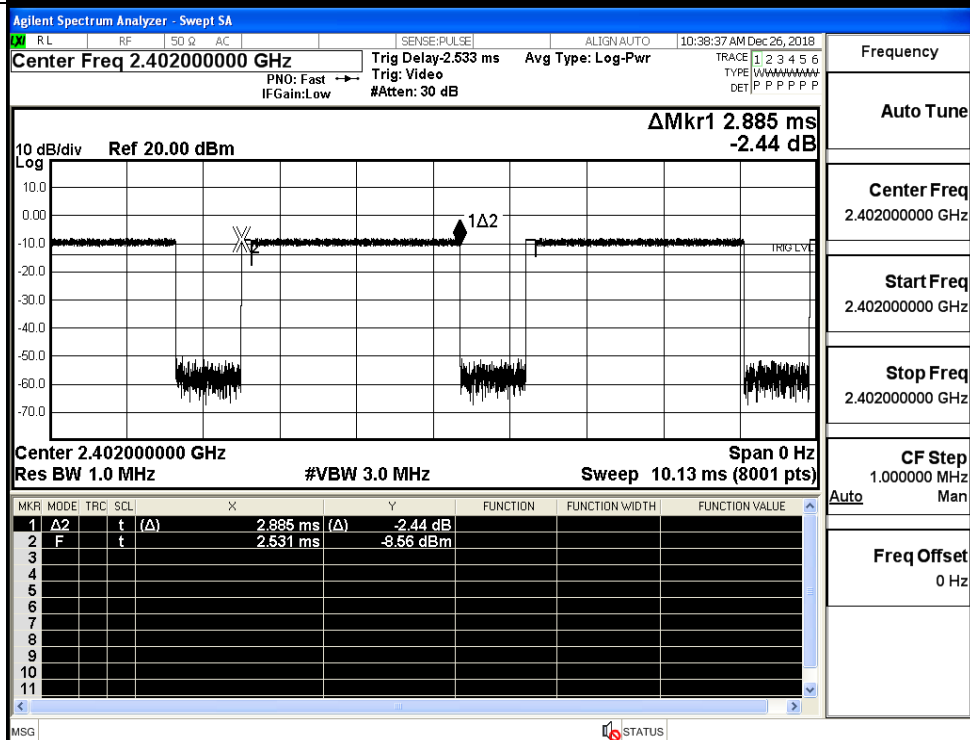
$\pi/4$ DQPSK
_2DH5/MCH



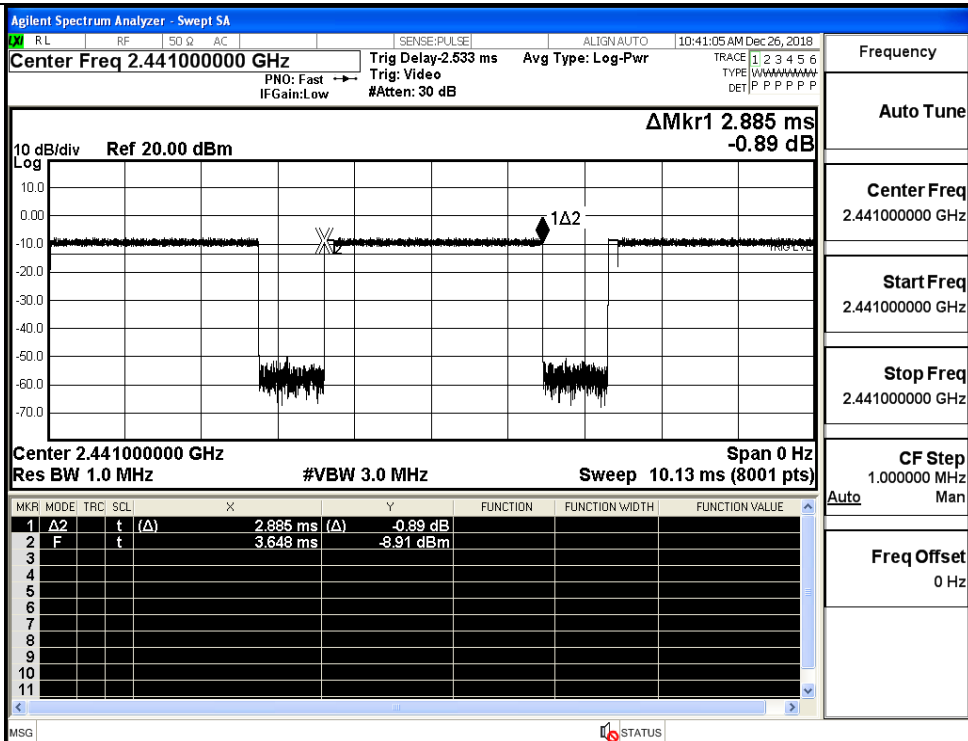
$\pi/4$ DQPSK
_2DH5/HCH



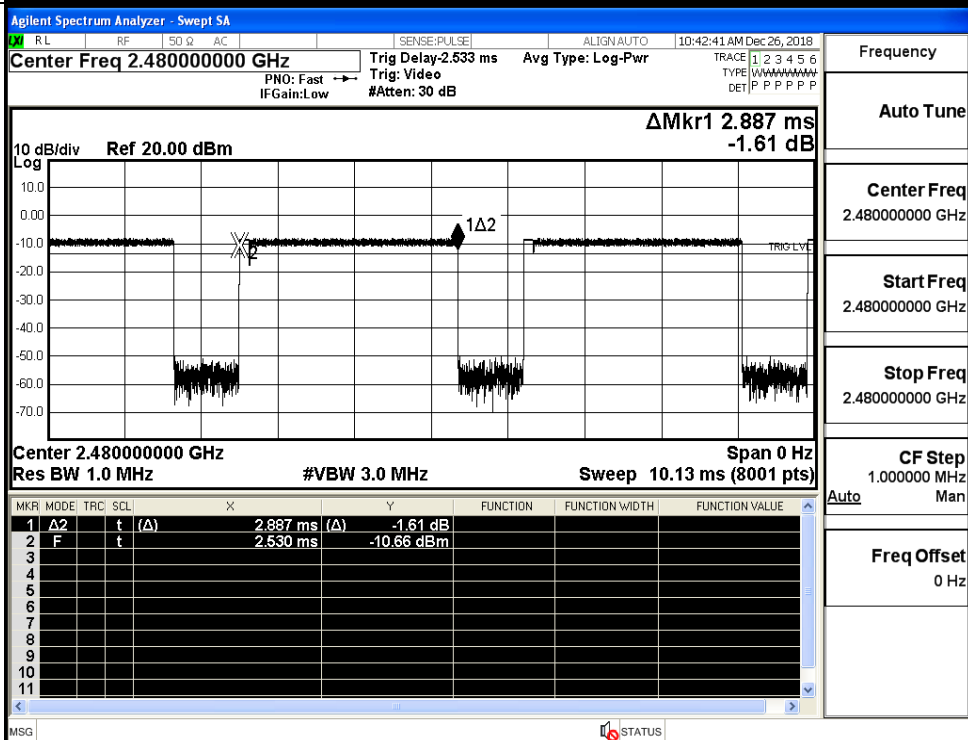
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

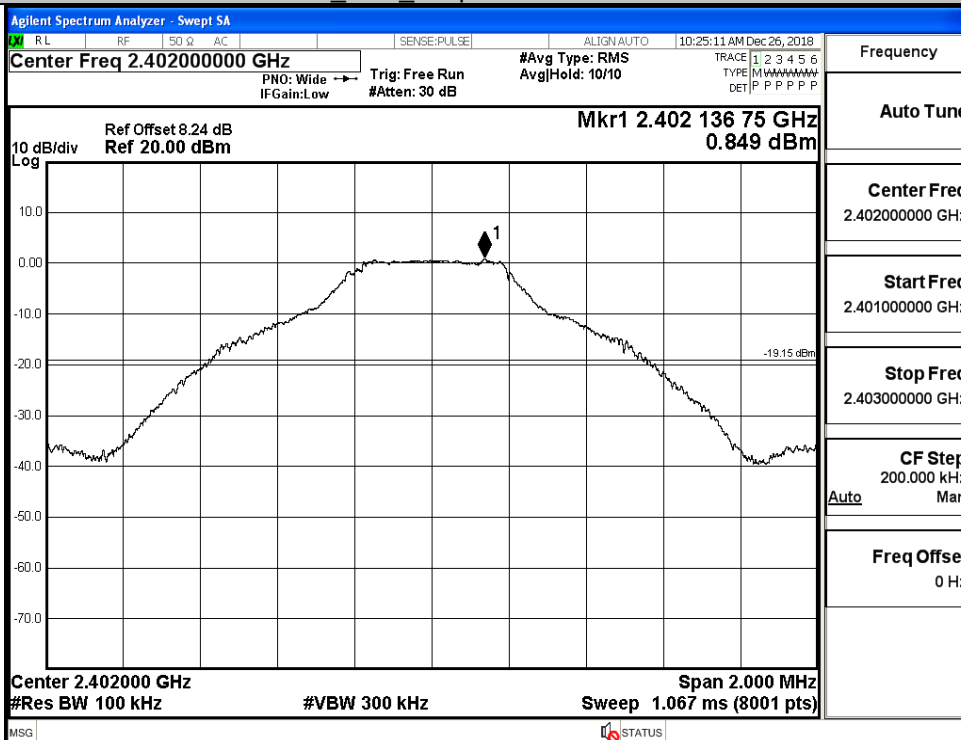


A.6 RF Conducted Spurious Emissions

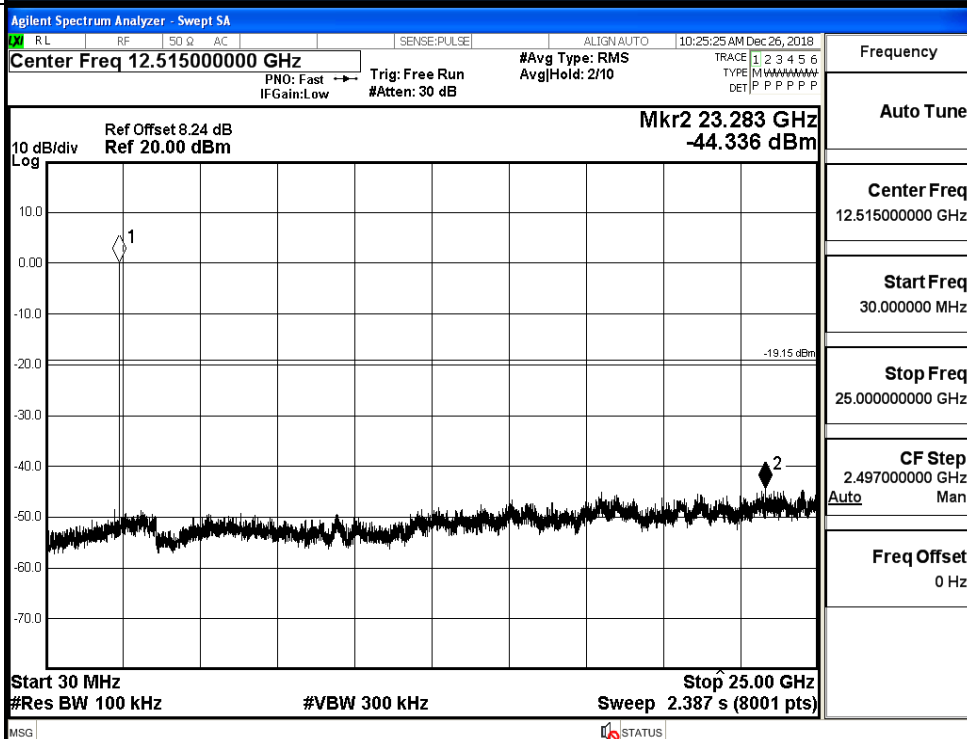
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.849	-44.336	-19.151	PASS
	MCH	1.101	-44.188	-18.899	PASS
	HCH	1.177	-43.966	-18.823	PASS
$\pi/4$ DQPSK	LCH	-1.084	-44.882	-21.084	PASS
	MCH	-0.391	-44.452	-20.391	PASS
	HCH	-0.53	-44.708	-20.530	PASS
8DPSK	LCH	-0.293	-44.321	-20.293	PASS
	MCH	-0.569	-44.735	-20.569	PASS
	HCH	-0.277	-44.364	-20.277	PASS

GFSK LCH Graphs

Pref

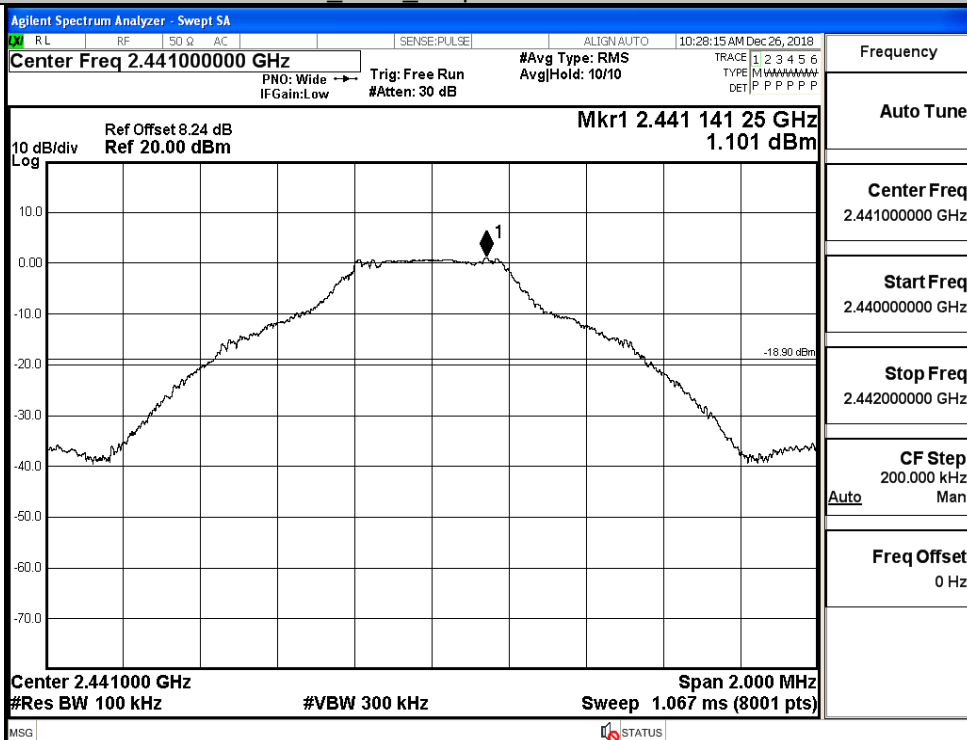


Puw

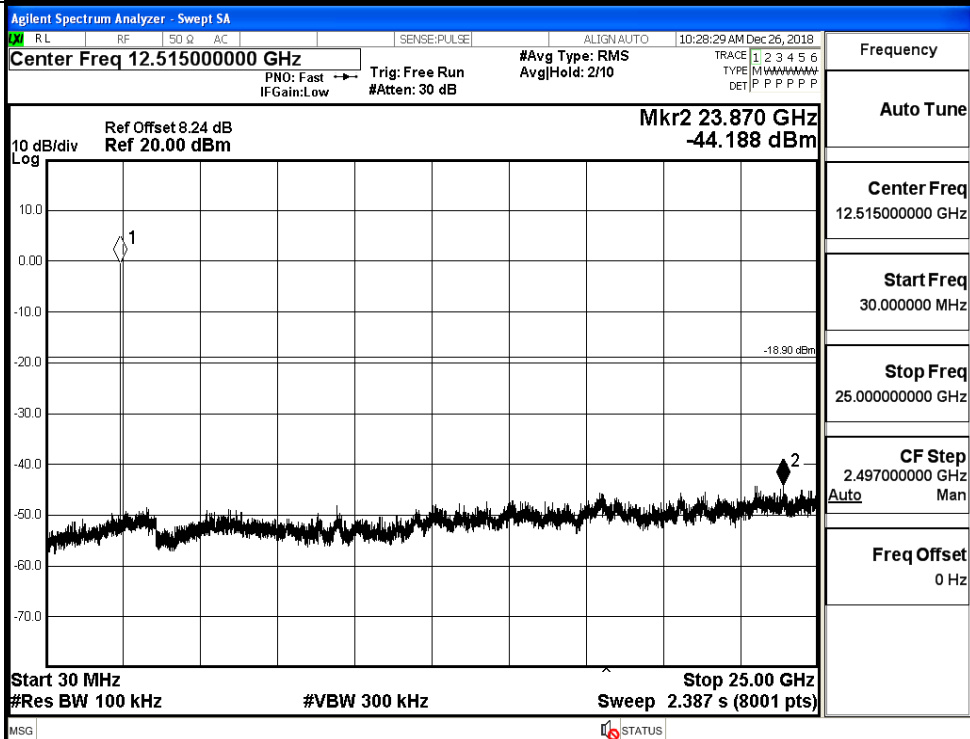


GFSK_MCH_Graphs

Pref

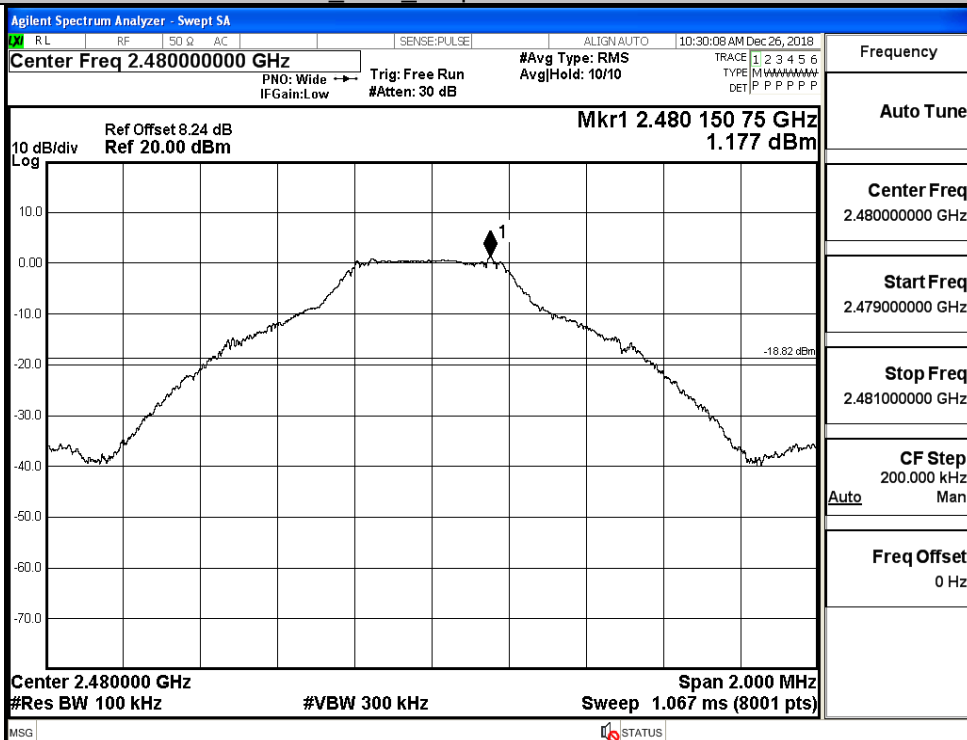


Puw

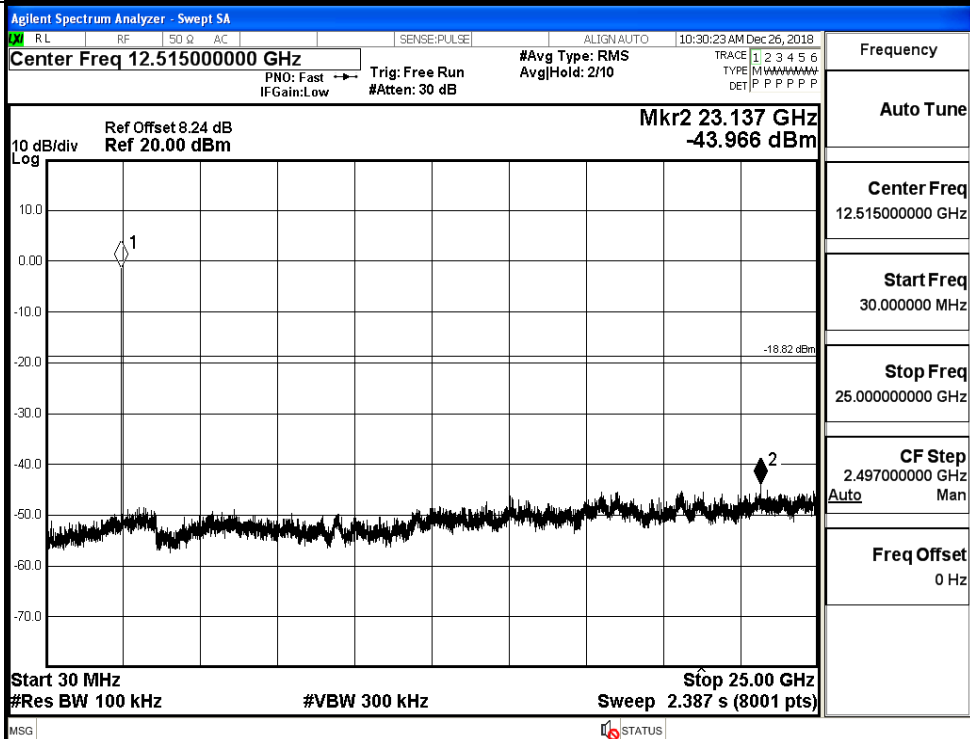


GFSK_HCH_Graphs

Pref

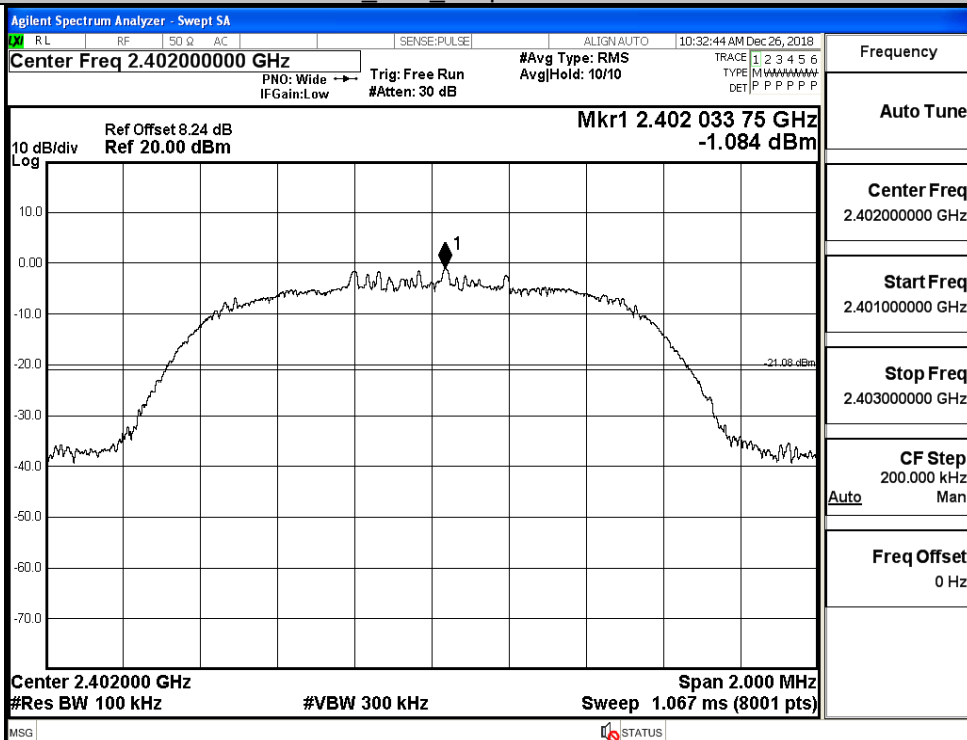


Puw

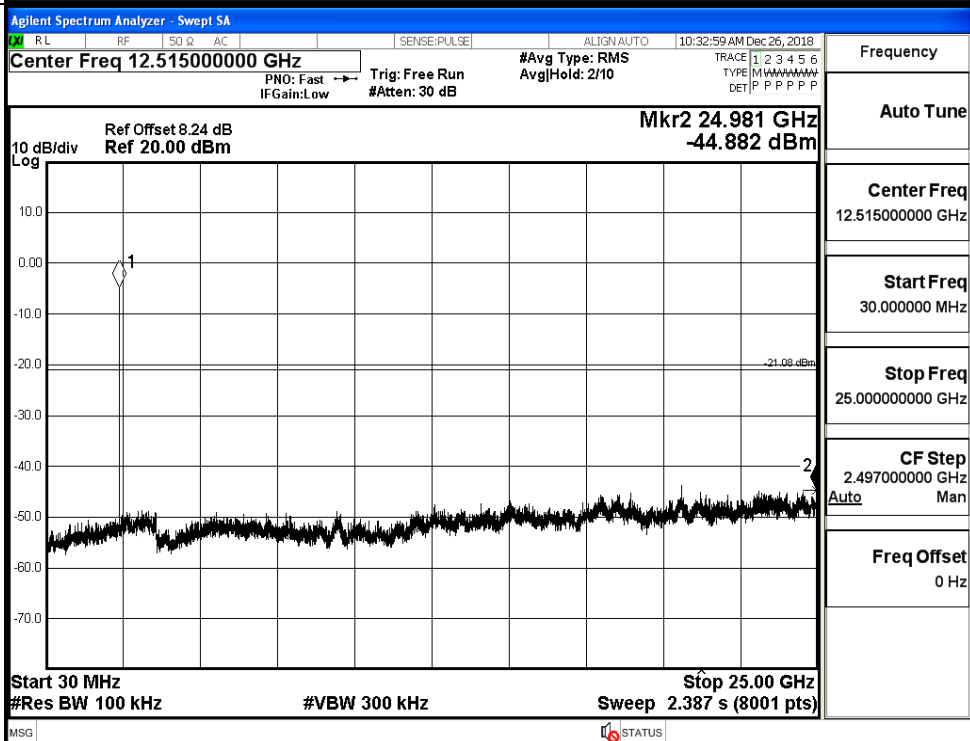


$\pi/4$ DQPSK LCH_Graphs

Pref

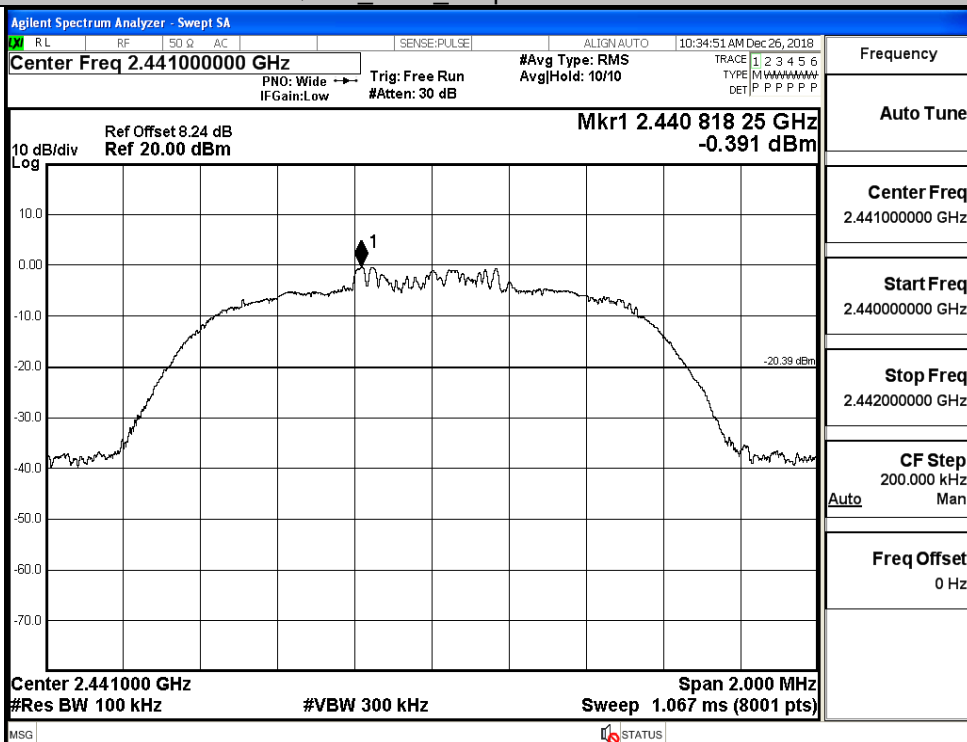


Puw

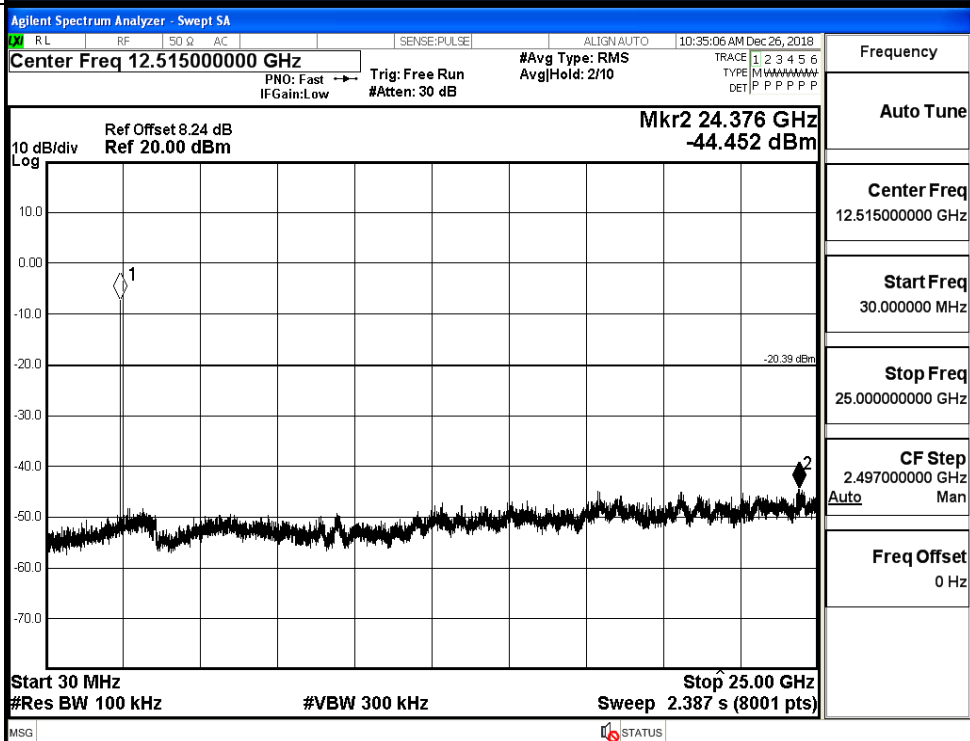


π /4DQPSK_MCH_Graphs

Pref

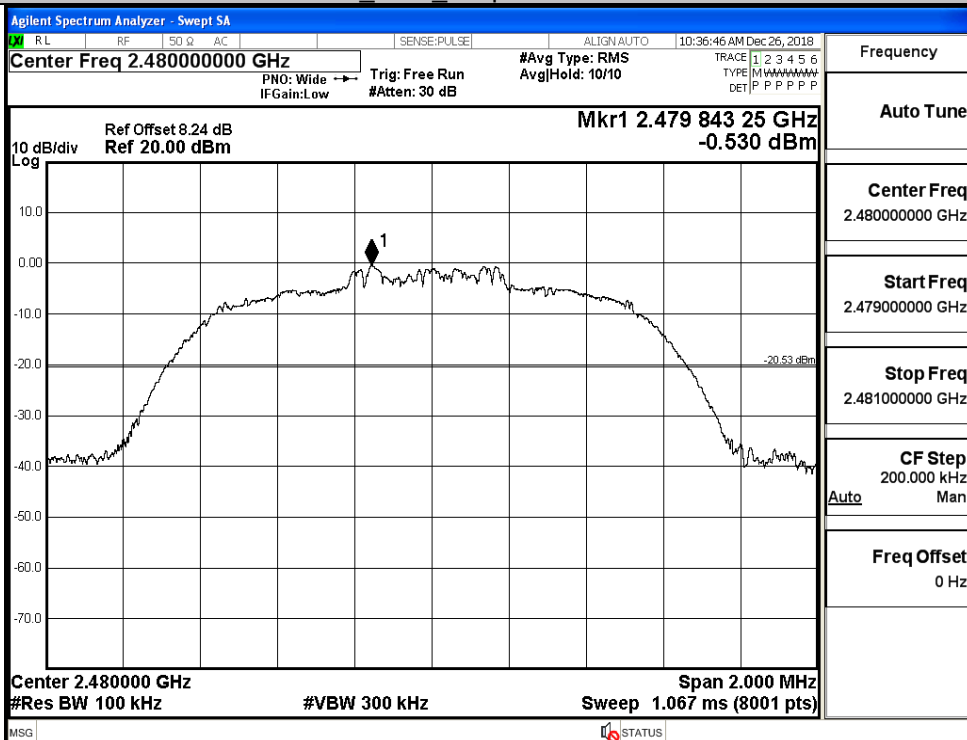


Puw

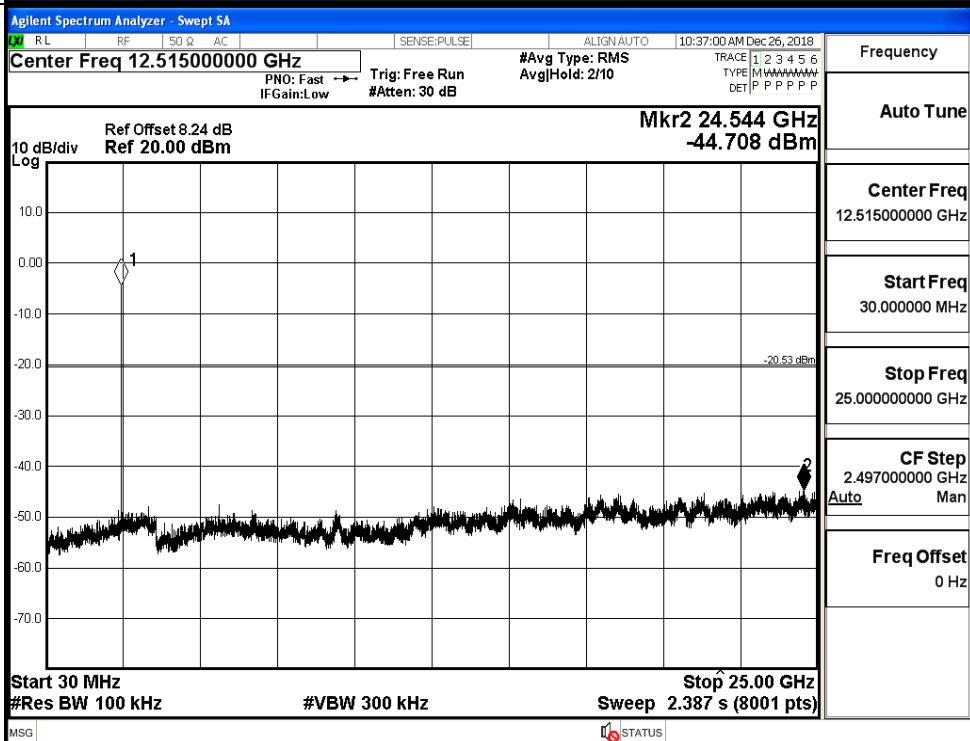


π /4DQPSK_HCH_Graphs

Pref

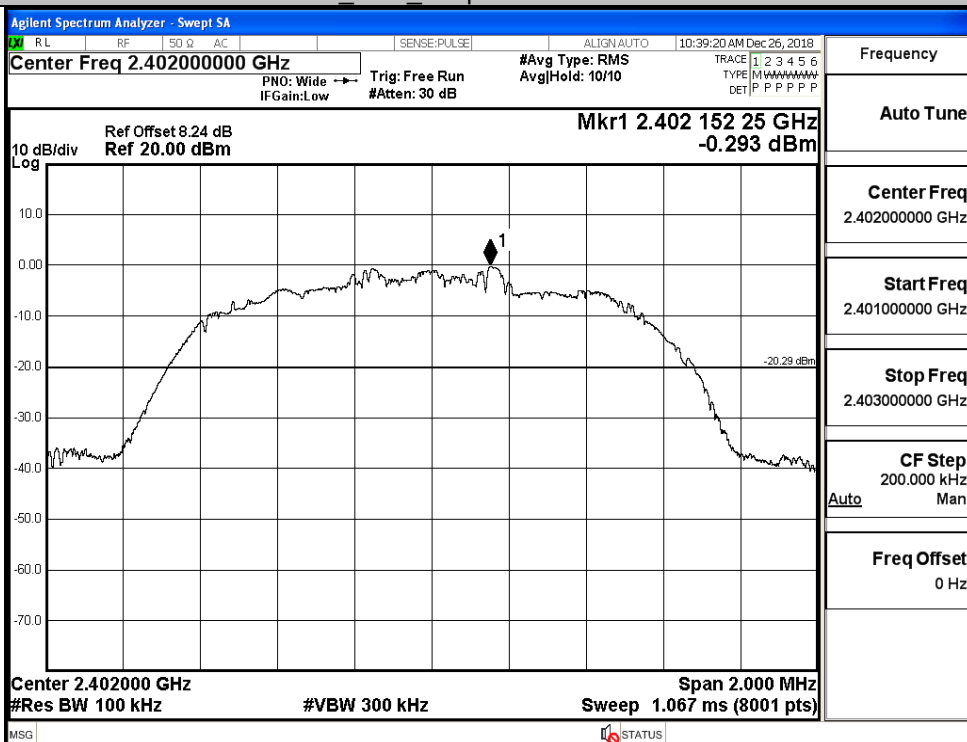


Puw

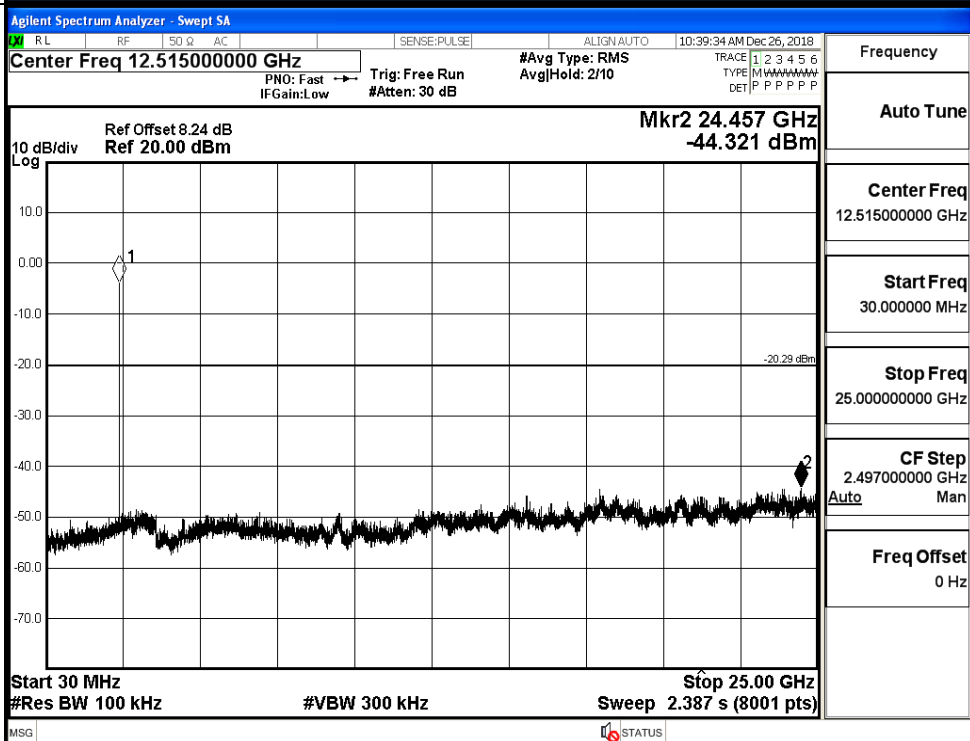


8DPSK_LCH_Graphs

Pref

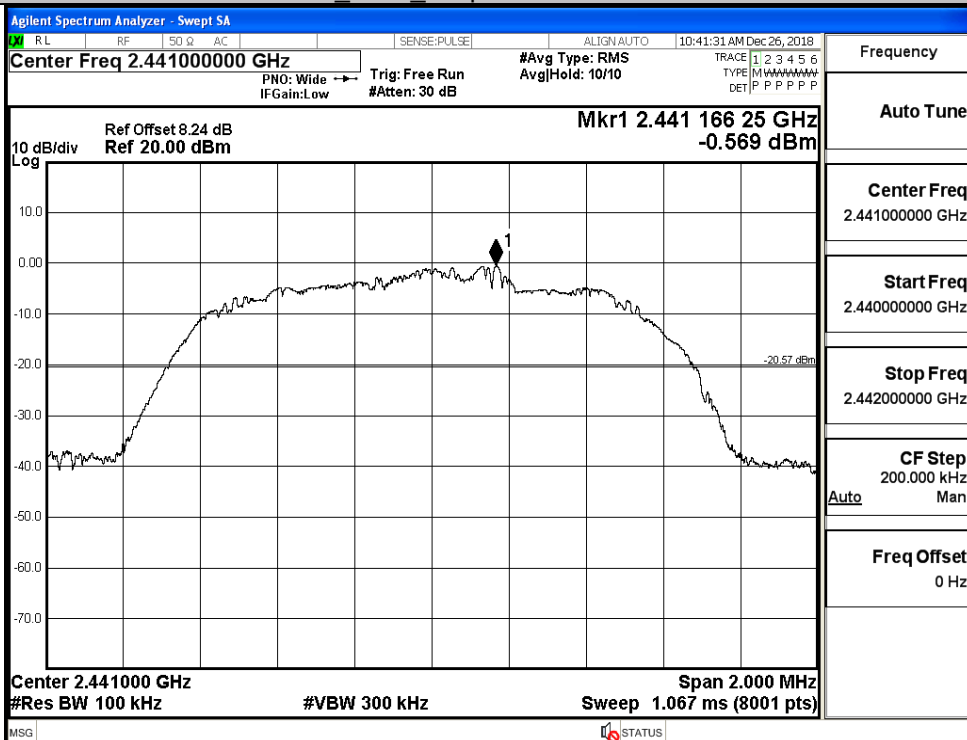


Puw

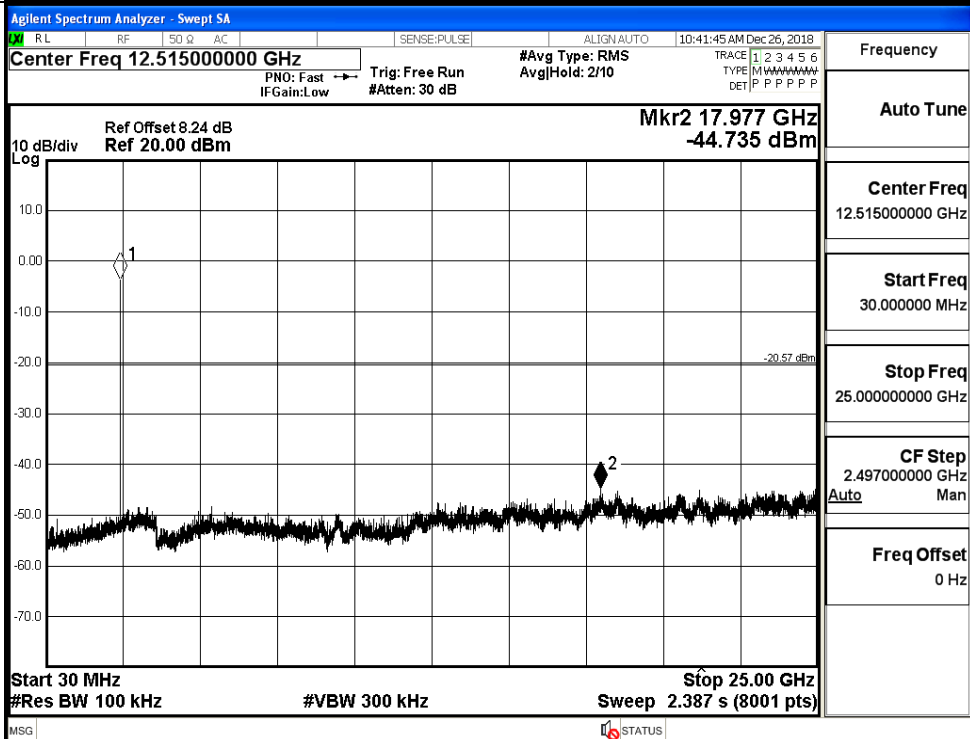


8DPSK_MCH_Graphs

Pref

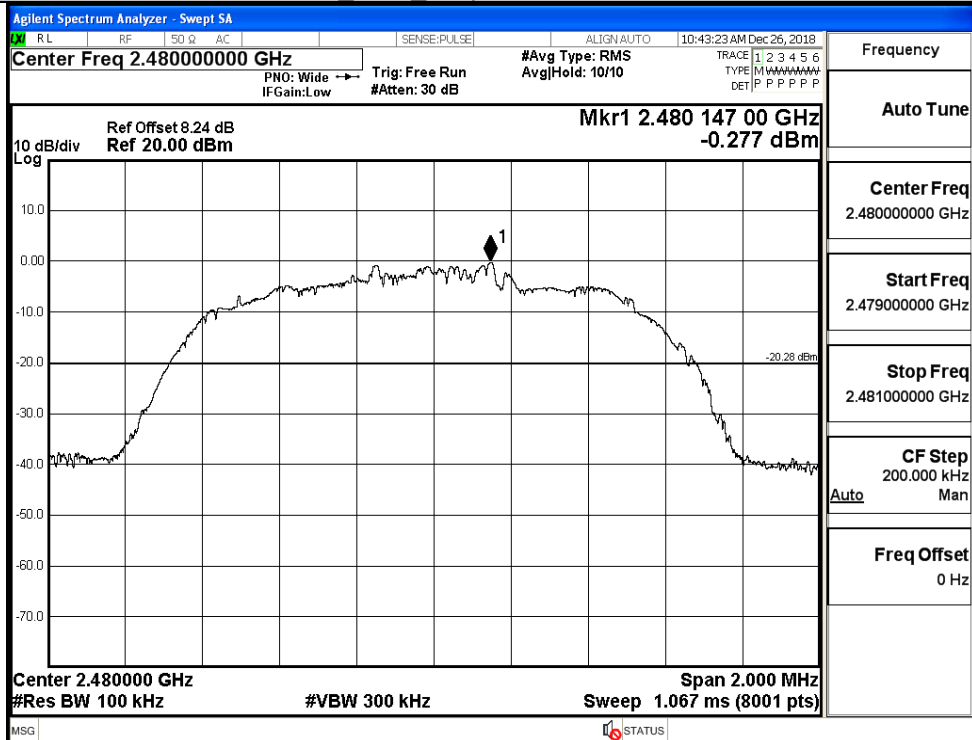


Puw

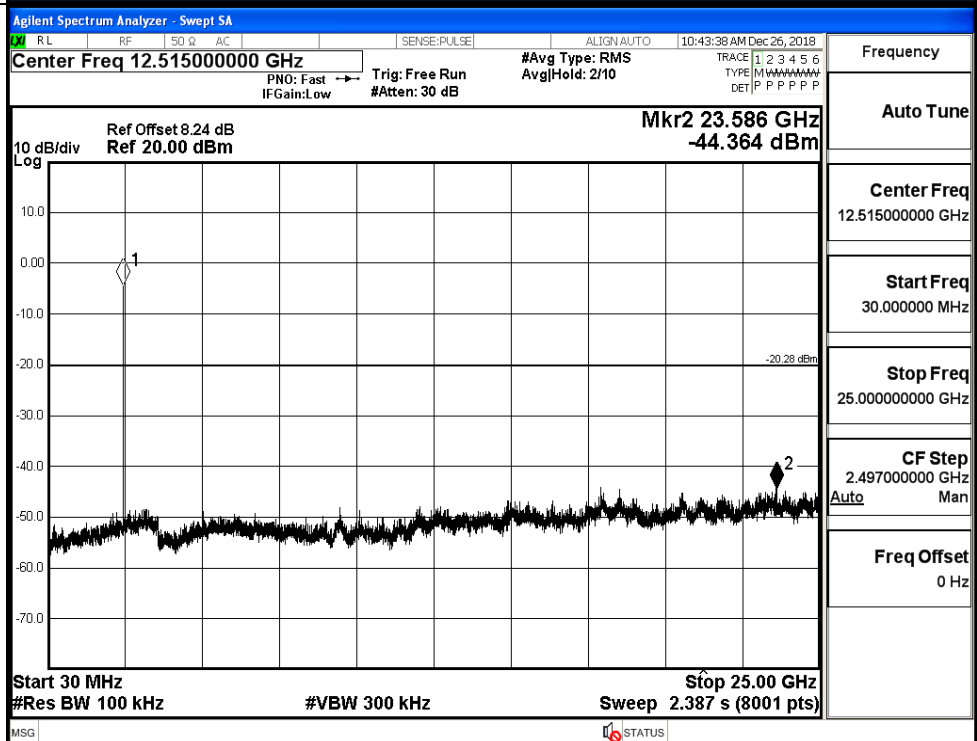


8DPSK_HCH_Graphs

Pref



Puw

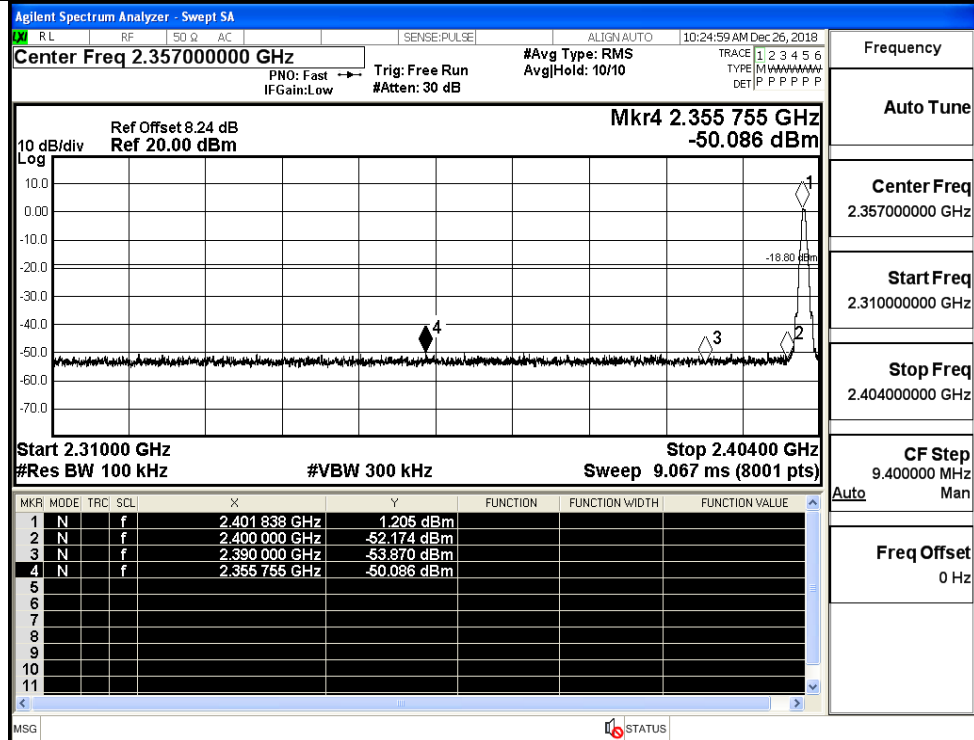


A.7 Band-edge for RF Conducted Emissions

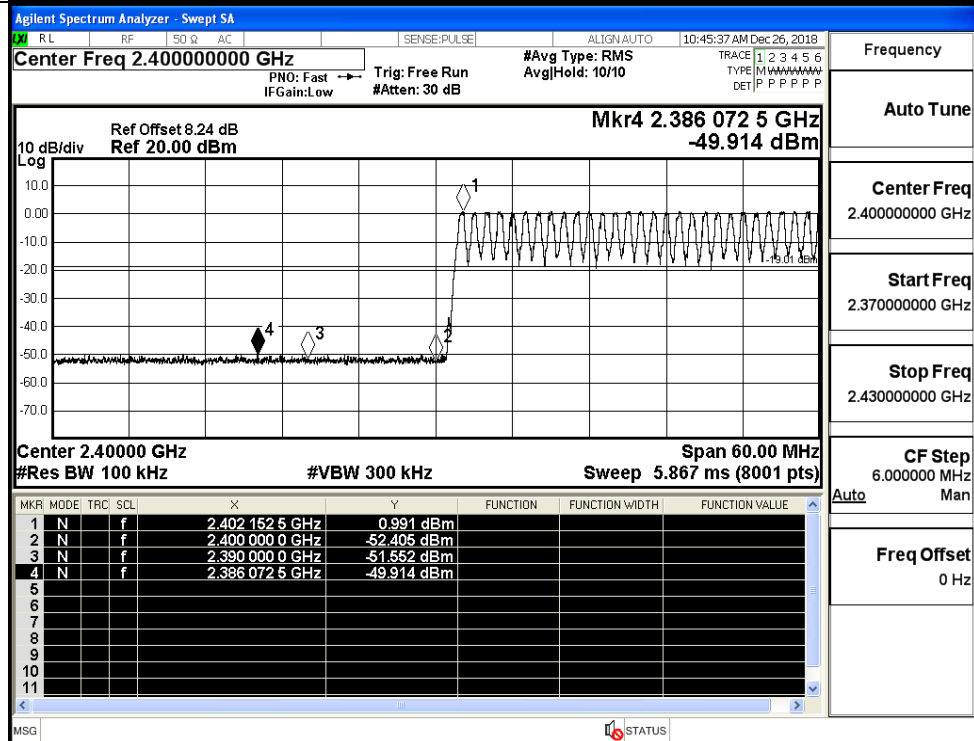
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.205	Off	-50.086	-18.8	PASS
			0.991	On	-49.914	-19.01	PASS
	HCH	2480	1.004	Off	-49.640	-19	PASS
			6.943	On	-49.627	-13.06	PASS
$\pi/4$ DQPSK	LCH	2402	-0.246	Off	-49.795	-20.25	PASS
			5.560	On	-48.983	-14.44	PASS
	HCH	2480	-0.243	Off	-49.089	-20.24	PASS
			5.548	On	-49.243	-14.45	PASS
8DPSK	LCH	2402	-0.285	Off	-50.096	-20.29	PASS
			5.519	On	-48.962	-14.48	PASS
	HCH	2480	-0.290	Off	-50.133	-20.29	PASS
			5.553	On	-48.952	-14.45	PASS

Test Graphs

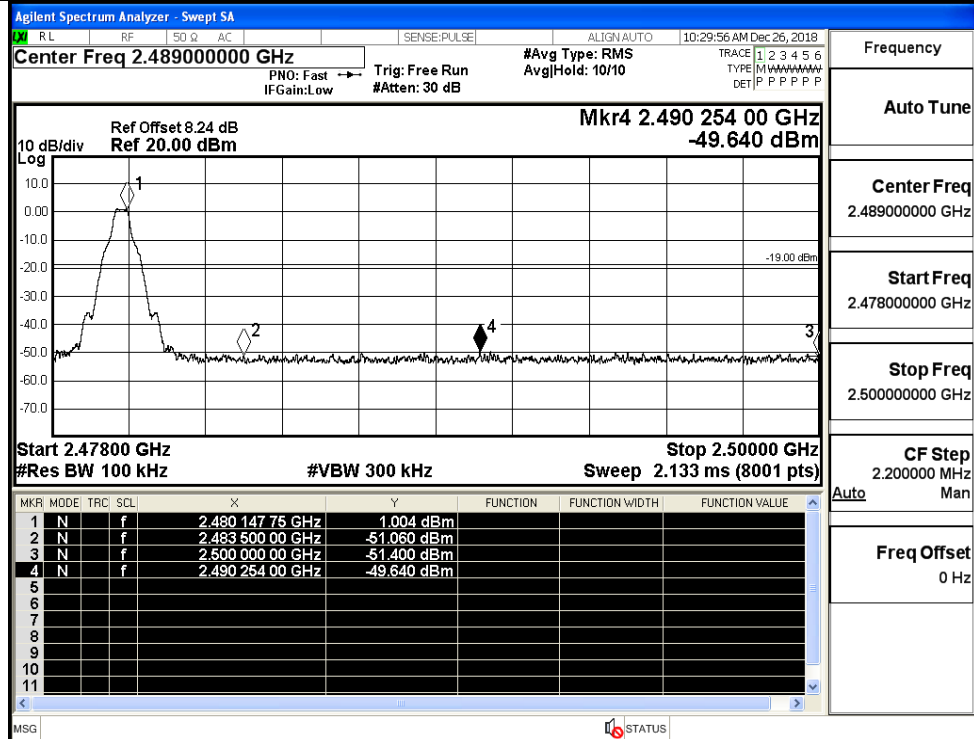
GFSK/LCH/No Hop



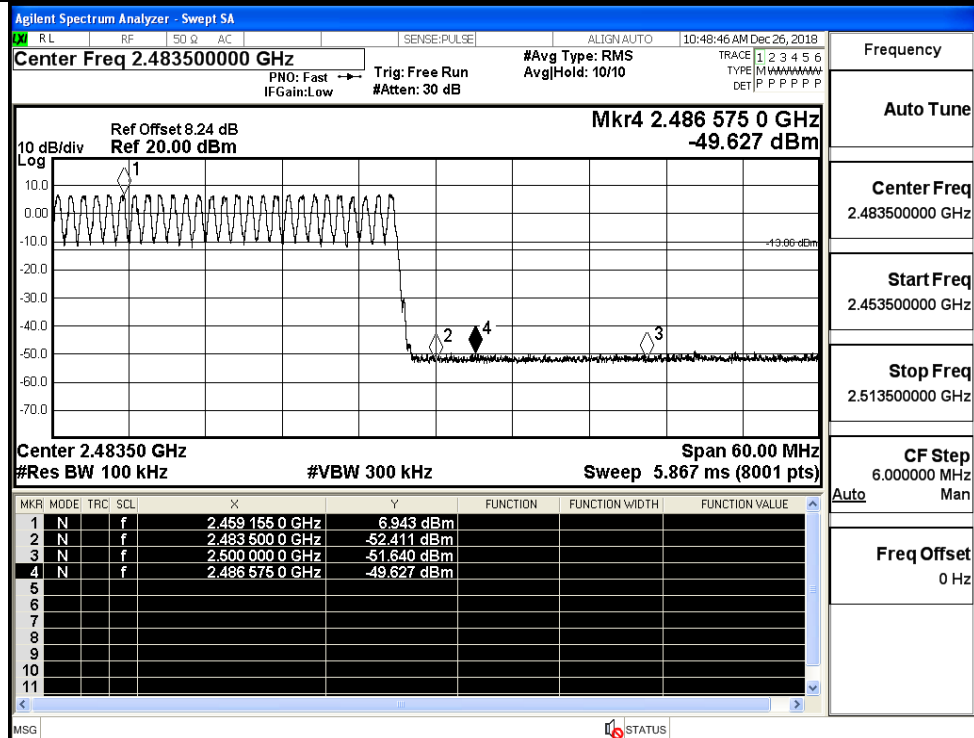
GFSK/LCH/Hop



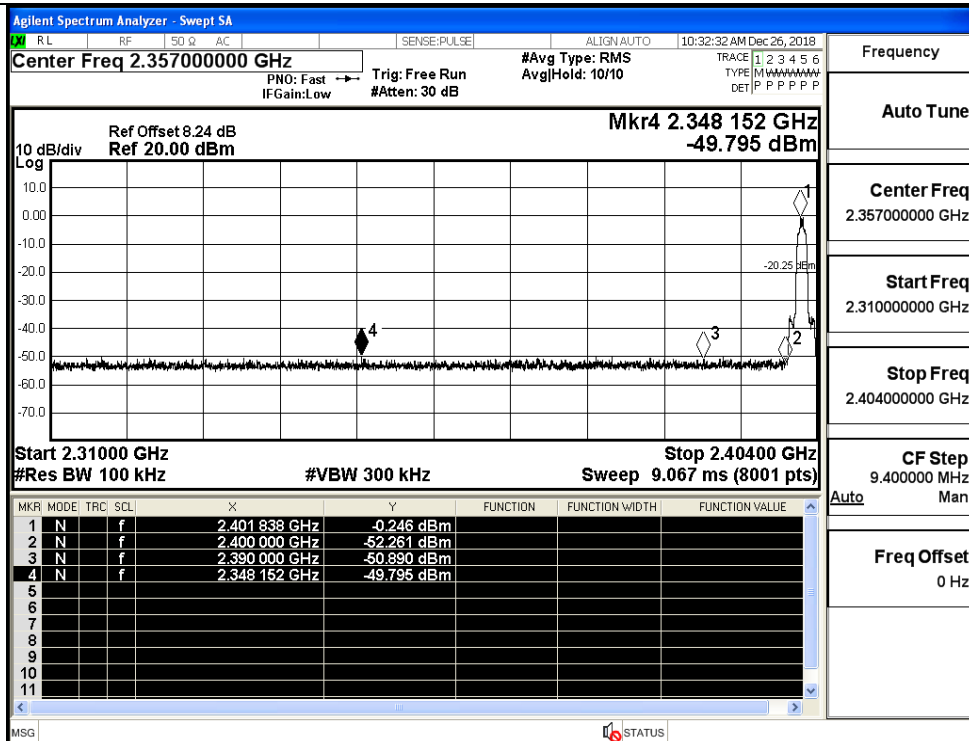
GFSK/HCH/No Hop



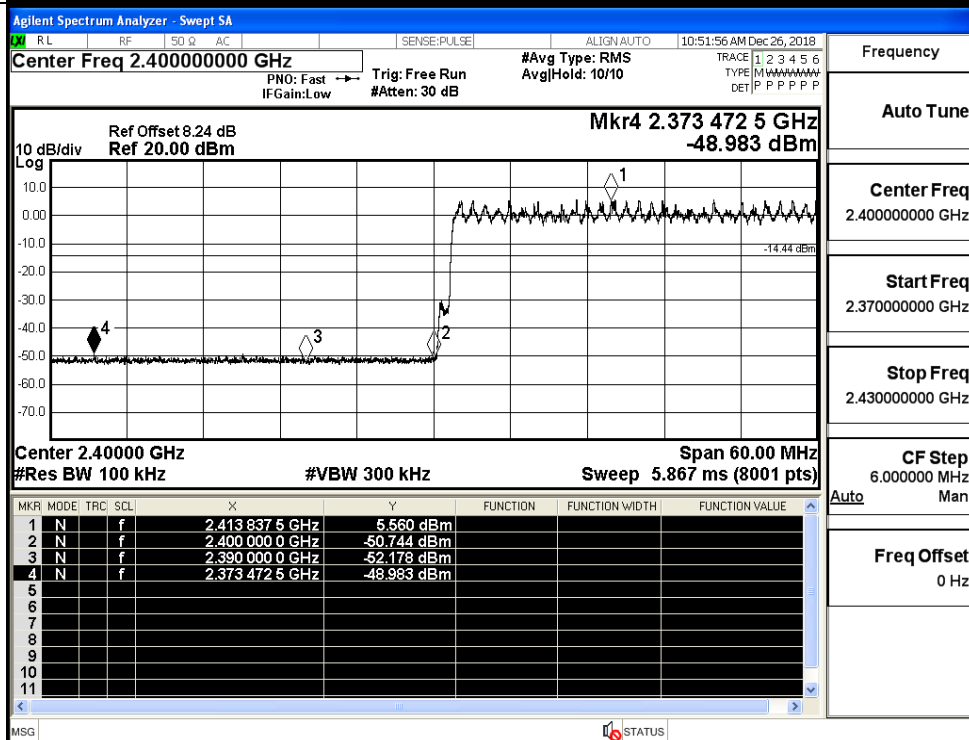
GFSK/HCH/Hop



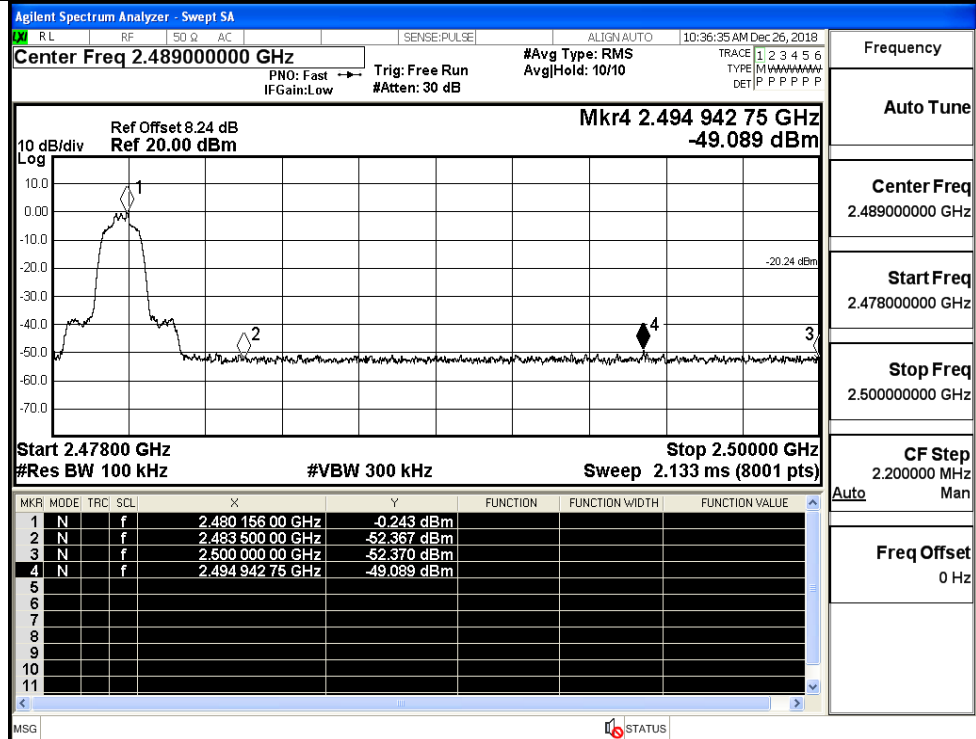
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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

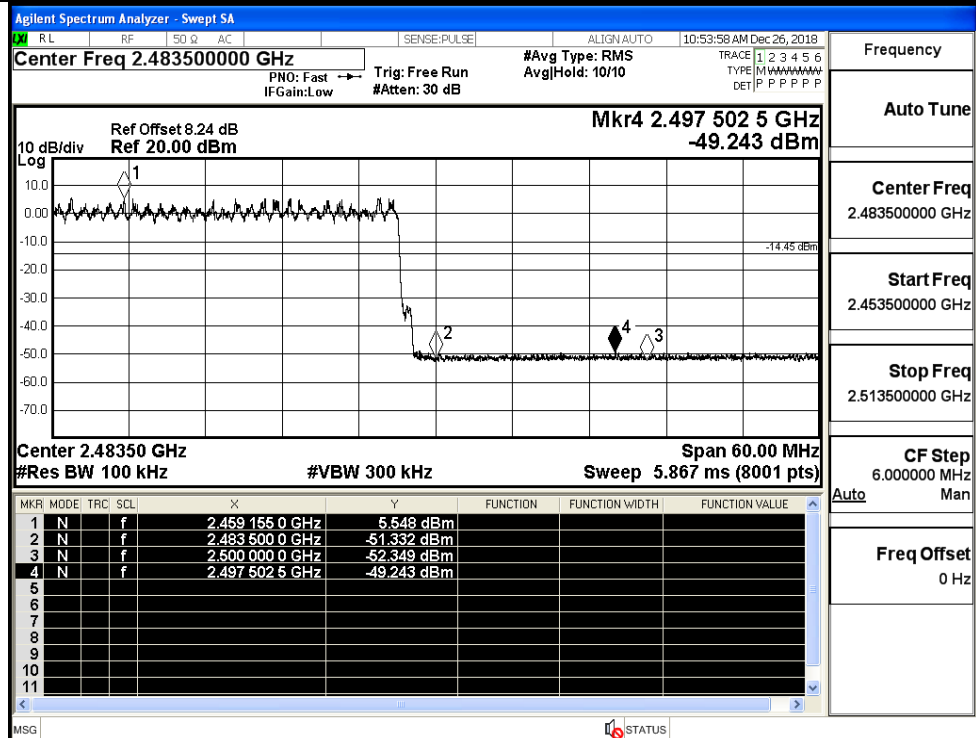


Frequency

Auto Tune

Center Freq
2.489000000 GHzStart Freq
2.478000000 GHzStop Freq
2.500000000 GHzCF Step
2.200000 MHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop

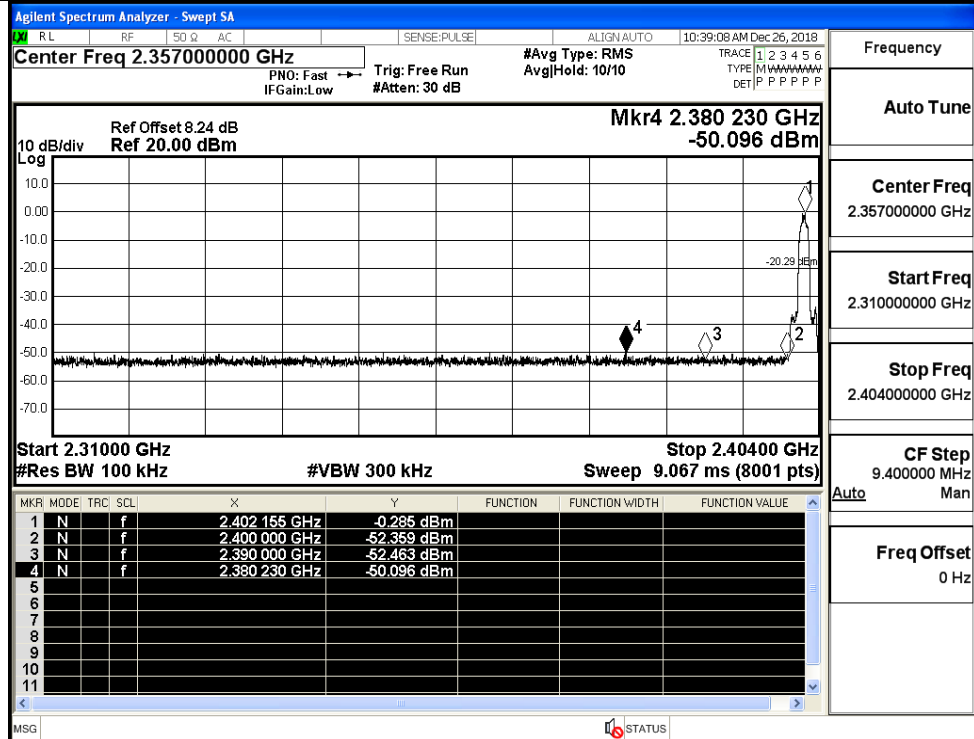


Frequency

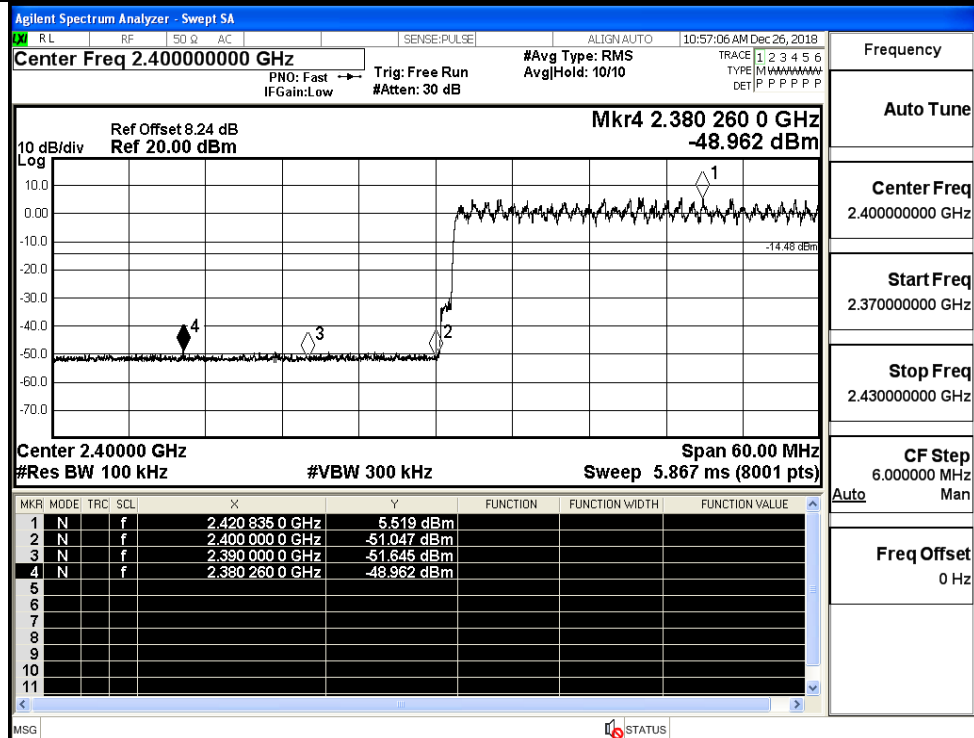
Auto Tune

Center Freq
2.483500000 GHzStart Freq
2.453500000 GHzStop Freq
2.513500000 GHzCF Step
6.000000 MHz
Auto ManFreq Offset
0 Hz

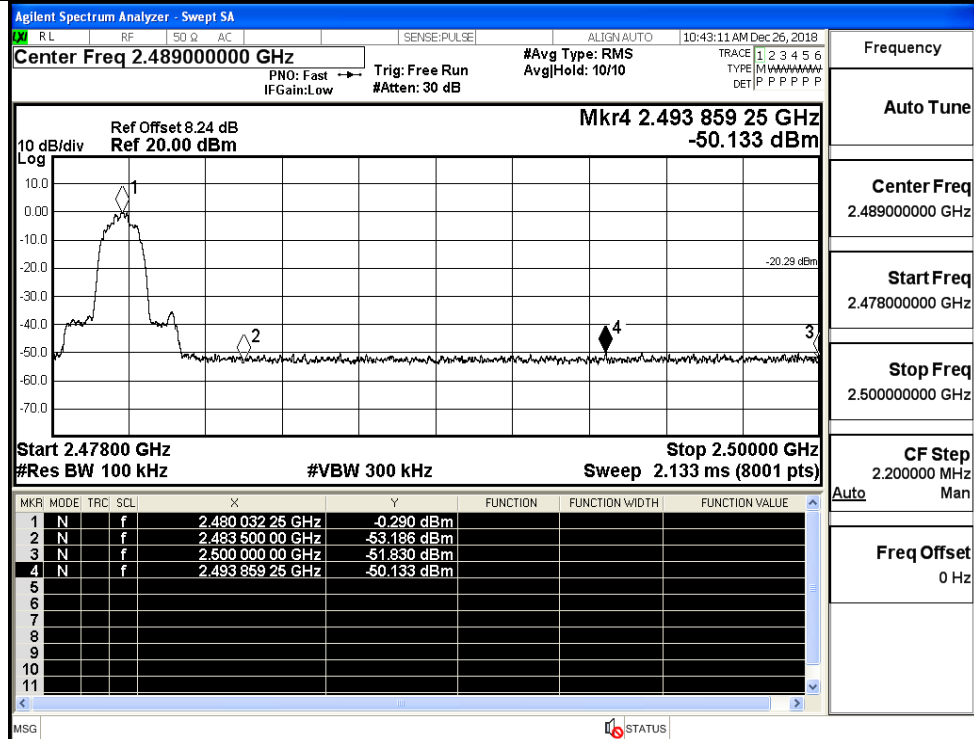
8DPSK/LCH/No Hop



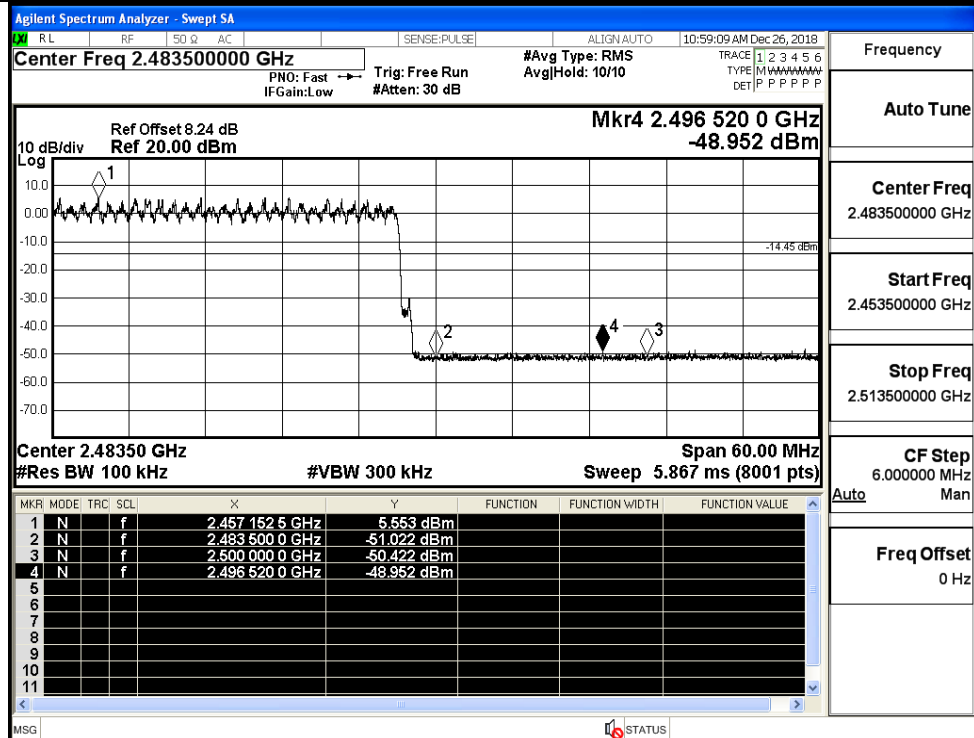
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



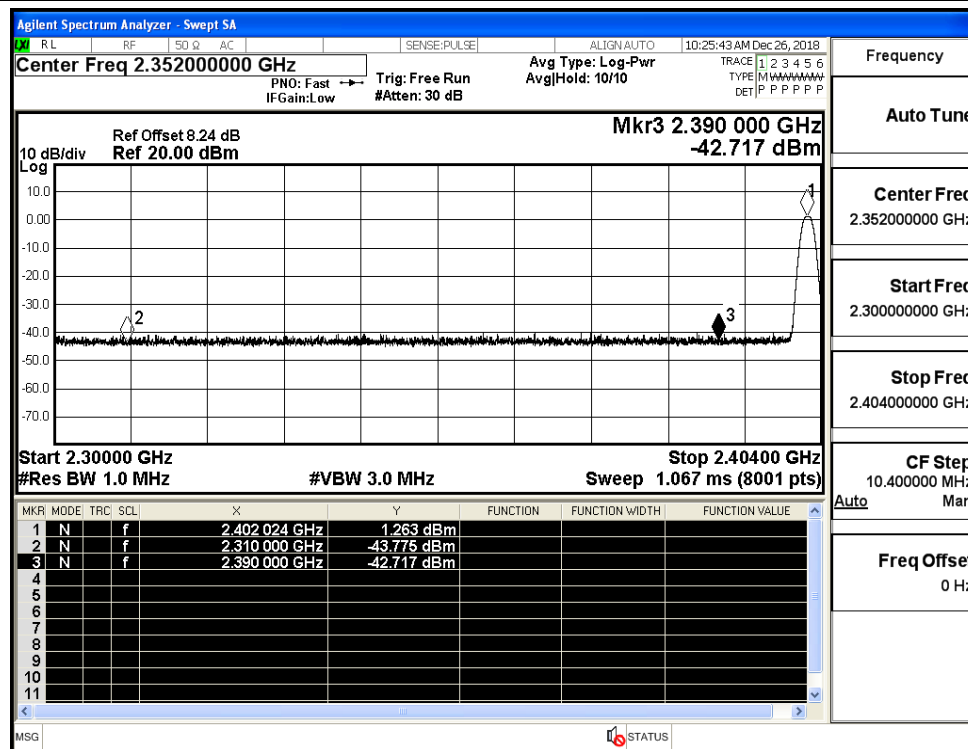
8DPSK/HCH/Hop



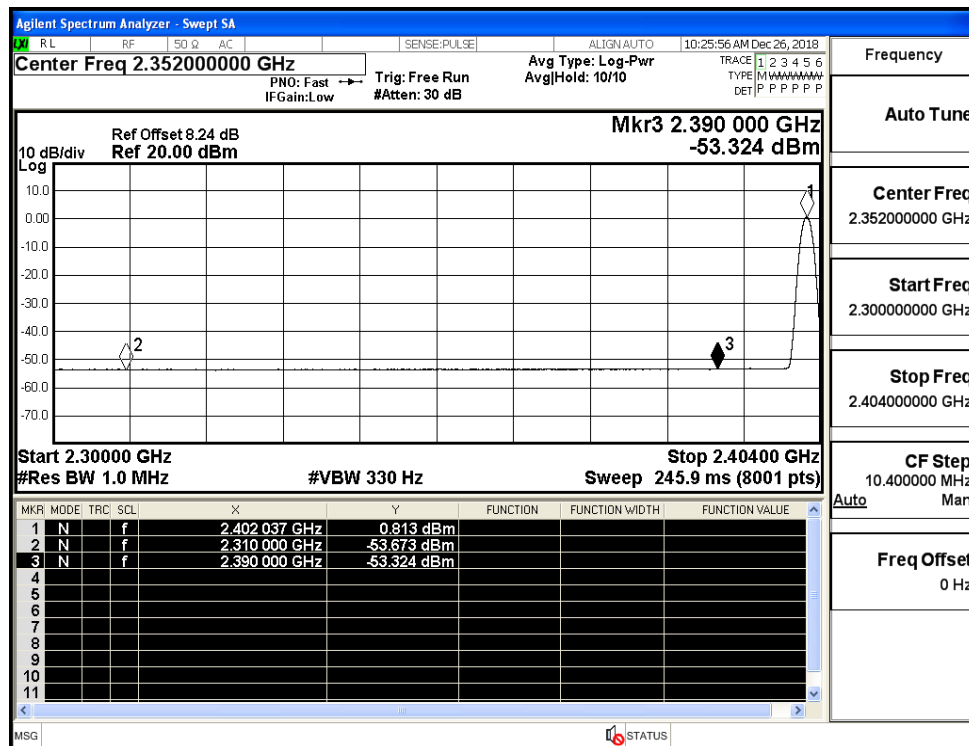
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.78	2.0	0	51.48	PEAK	74	PASS
	Off	2310.0	-53.67	2.0	0	41.58	AV	54	PASS
	Off	2390.0	-42.72	2.0	0	52.54	PEAK	74	PASS
	Off	2390.0	-53.32	2.0	0	41.93	AV	54	PASS
	Off	2483.5	-41.74	2.0	0	53.52	PEAK	74	PASS
	Off	2483.5	-53.04	2.0	0	42.22	AV	54	PASS
	Off	2500.0	-43.50	2.0	0	51.76	PEAK	74	PASS
	Off	2500.0	-52.92	2.0	0	42.33	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.27	2.0	0	52.99	PEAK	74	PASS
	Off	2310.0	-53.50	2.0	0	41.75	AV	54	PASS
	Off	2390.0	-43.41	2.0	0	51.85	PEAK	74	PASS
	Off	2390.0	-53.27	2.0	0	41.99	AV	54	PASS
	Off	2483.5	-42.92	2.0	0	52.34	PEAK	74	PASS
	Off	2483.5	-52.97	2.0	0	42.29	AV	54	PASS
	Off	2500.0	-41.87	2.0	0	53.38	PEAK	74	PASS
	Off	2500.0	-52.91	2.0	0	42.35	AV	54	PASS
8DPSK	Off	2310.0	-43.77	2.0	0	51.49	PEAK	74	PASS
	Off	2310.0	-53.63	2.0	0	41.62	AV	54	PASS
	Off	2390.0	-41.38	2.0	0	53.88	PEAK	74	PASS
	Off	2390.0	-53.26	2.0	0	41.99	AV	54	PASS
	Off	2483.5	-42.08	2.0	0	53.18	PEAK	74	PASS
	Off	2483.5	-53.00	2.0	0	42.26	AV	54	PASS
	Off	2500.0	-43.09	2.0	0	52.16	PEAK	74	PASS
	Off	2500.0	-52.82	2.0	0	42.44	AV	54	PASS

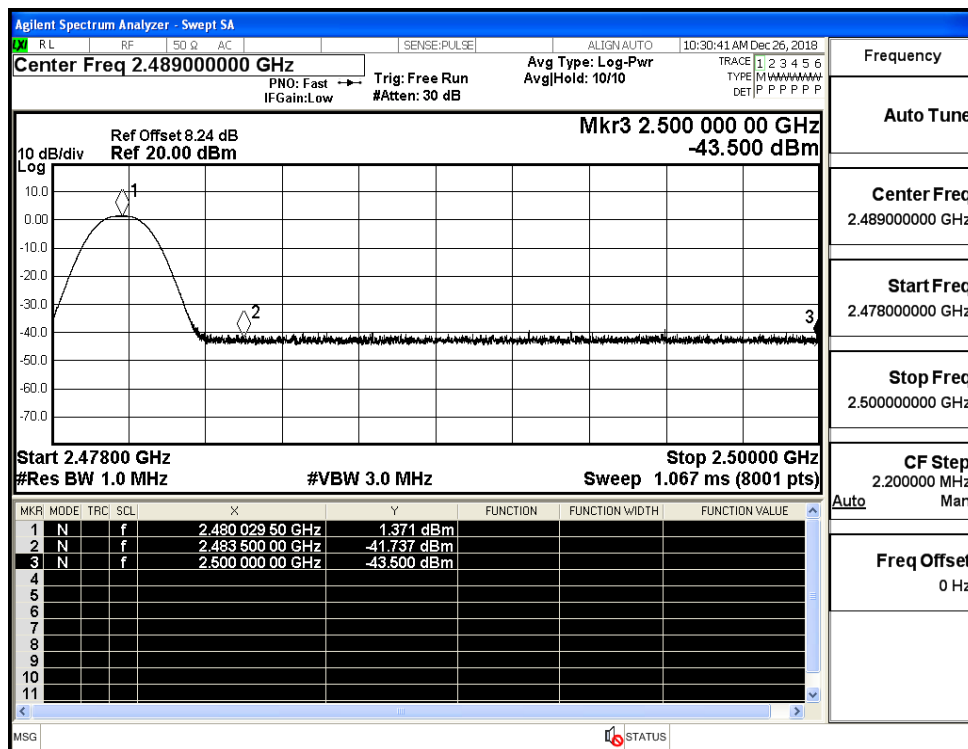
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



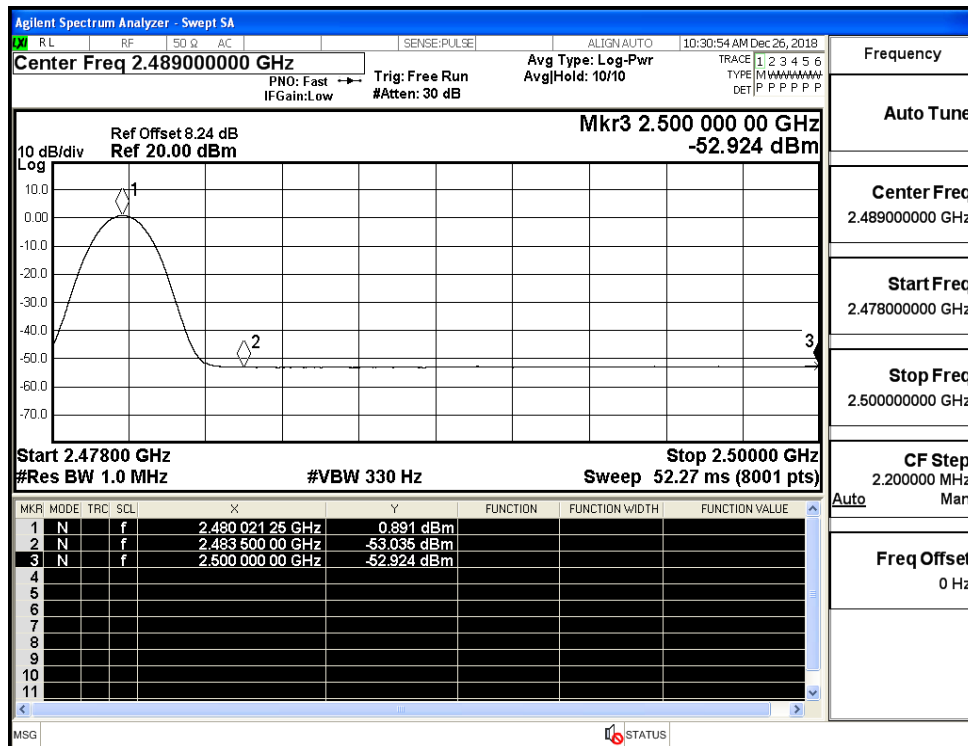
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

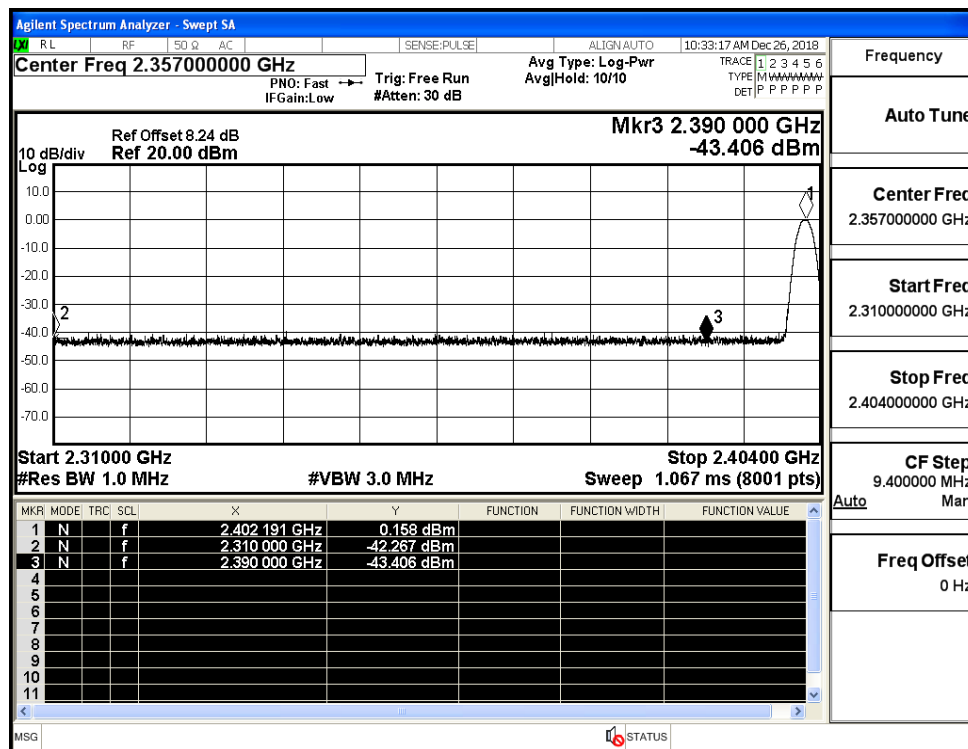
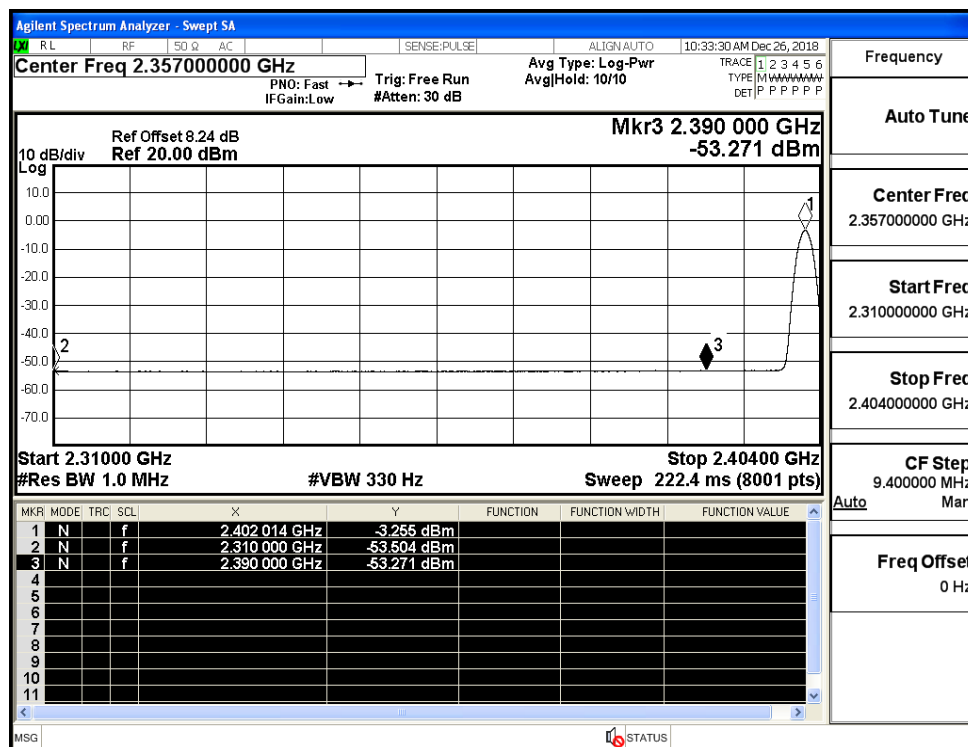


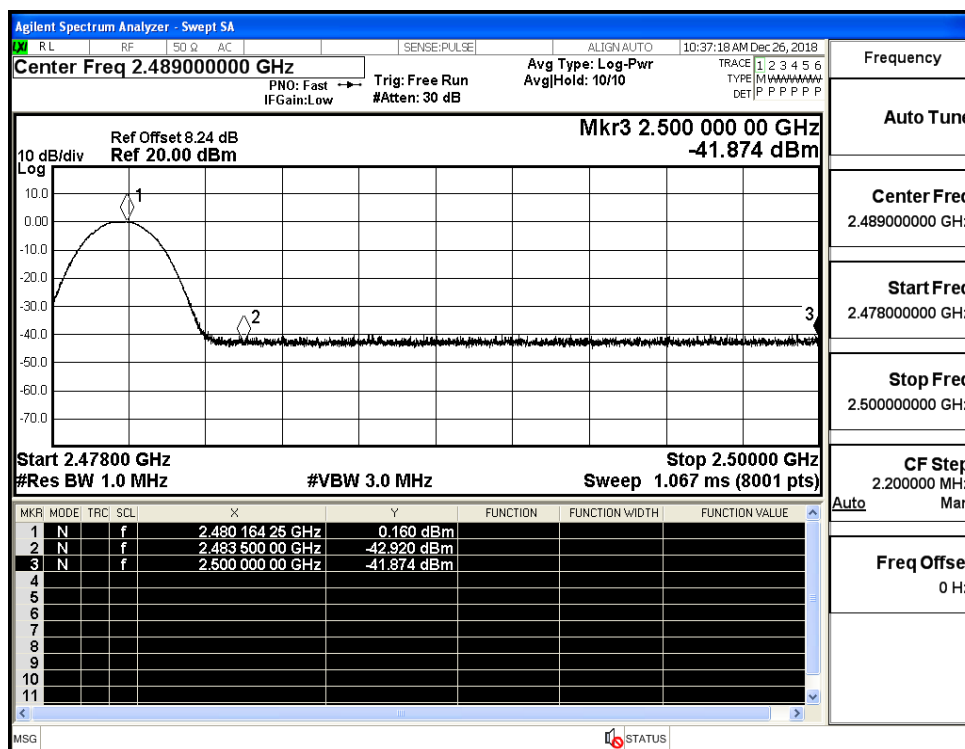
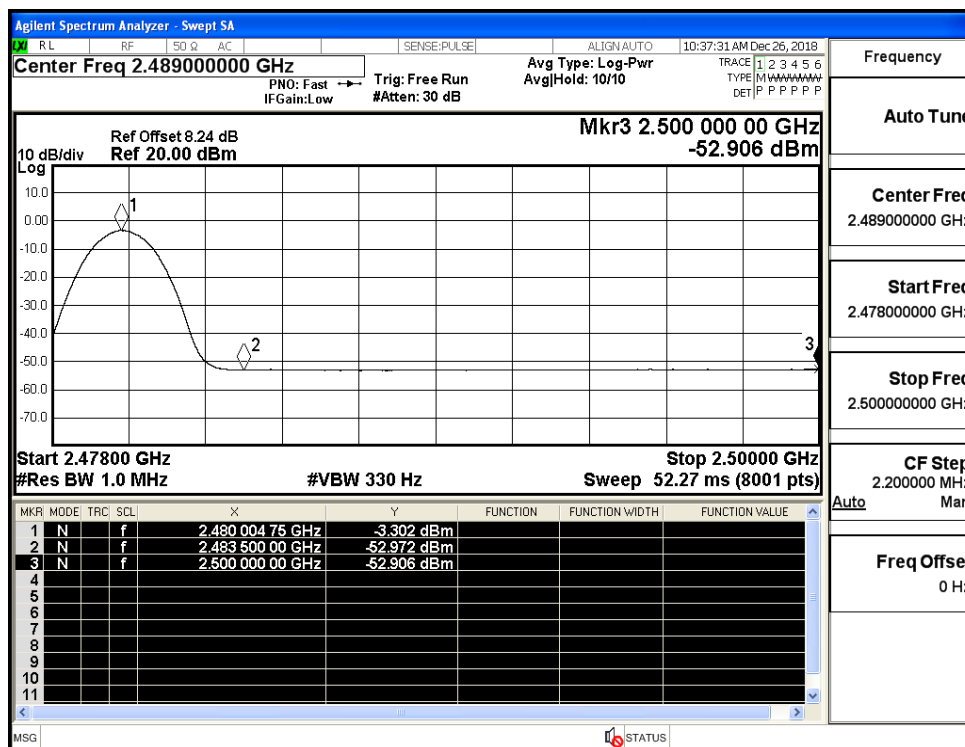
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



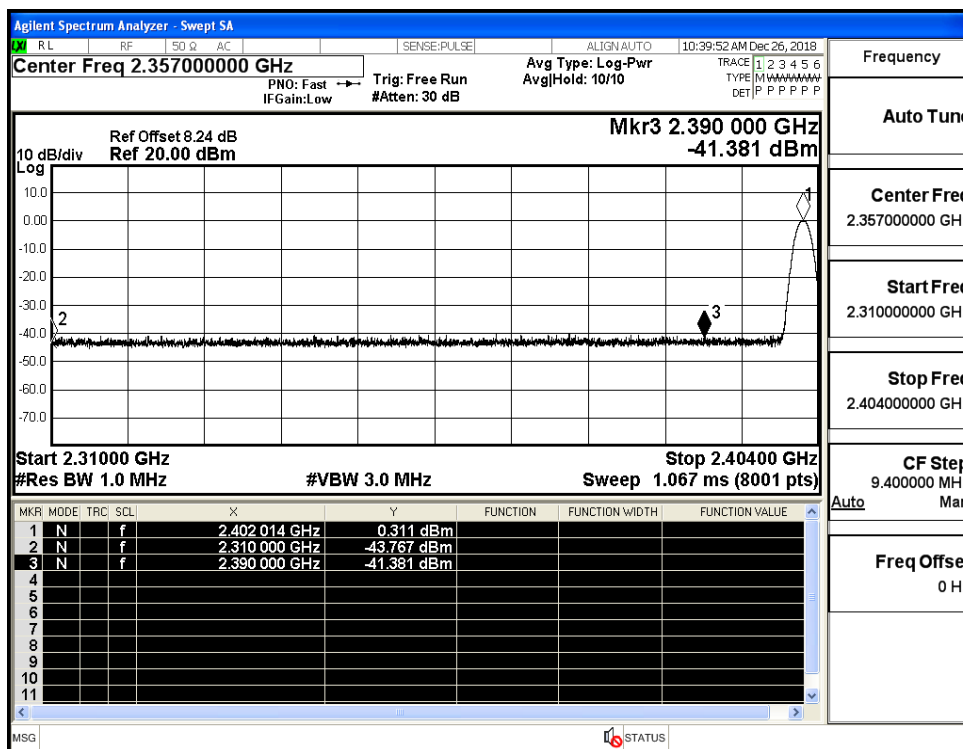
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



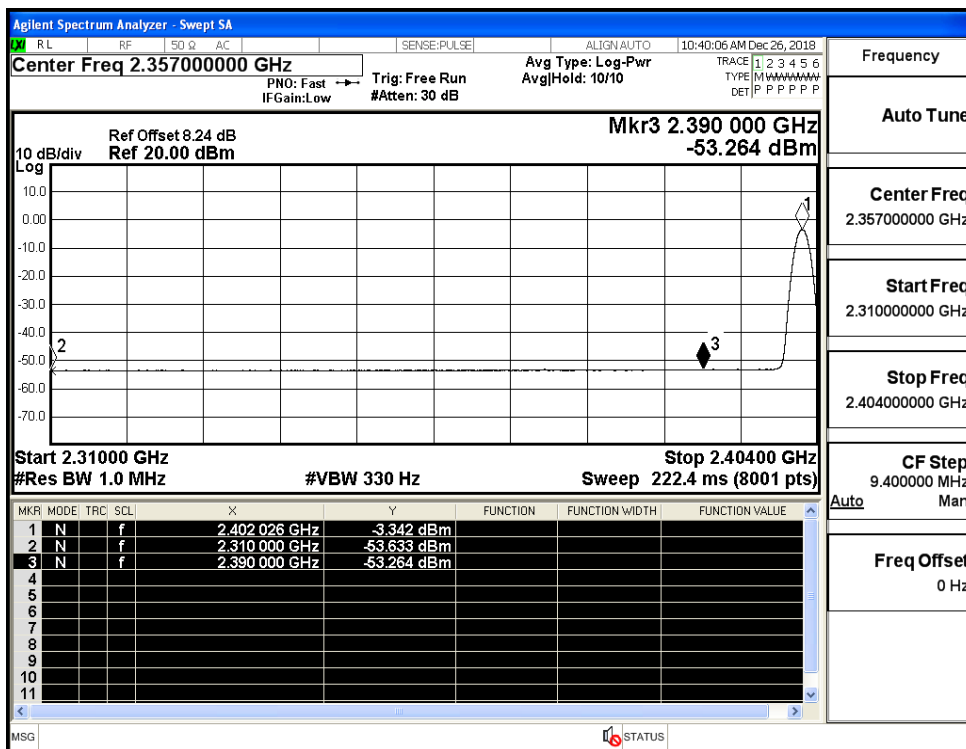
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

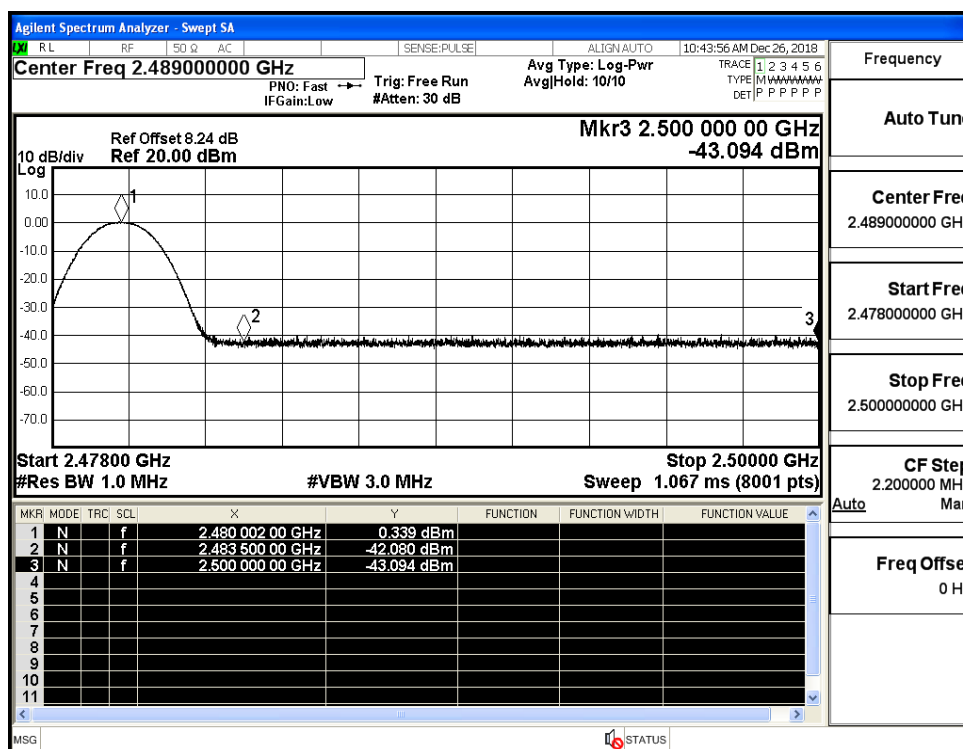
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

