

Appendix A

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

Product Name: earbud

Trade Mark: BEAN X

Test Model: Wayl Bean X

Environmental Conditions

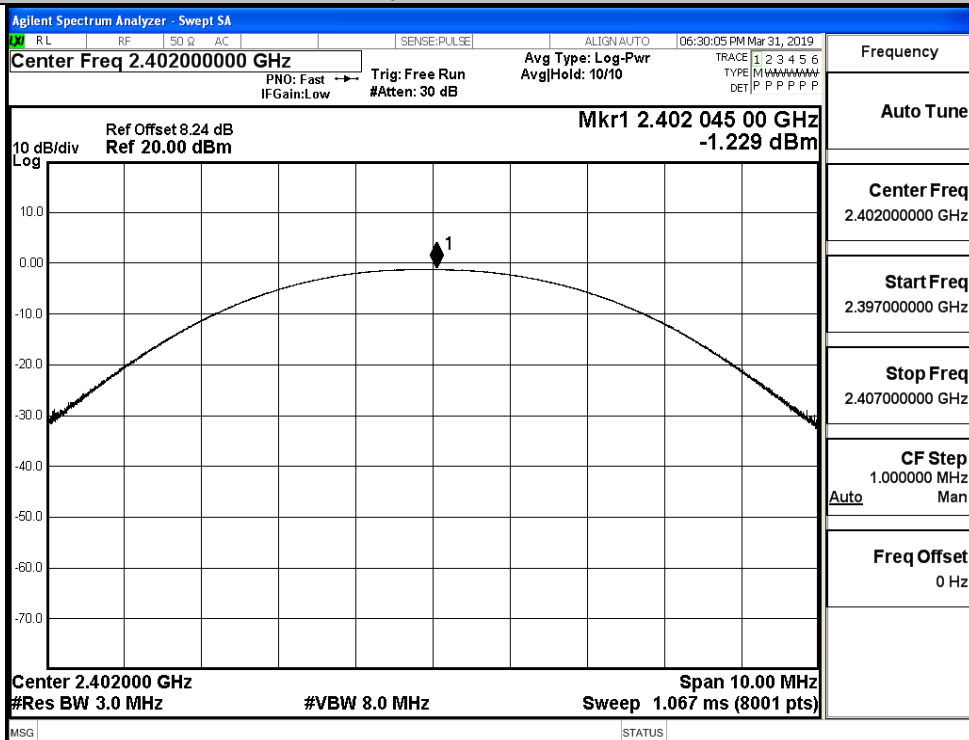
Temperature:	24.4 ° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	David.Luo
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

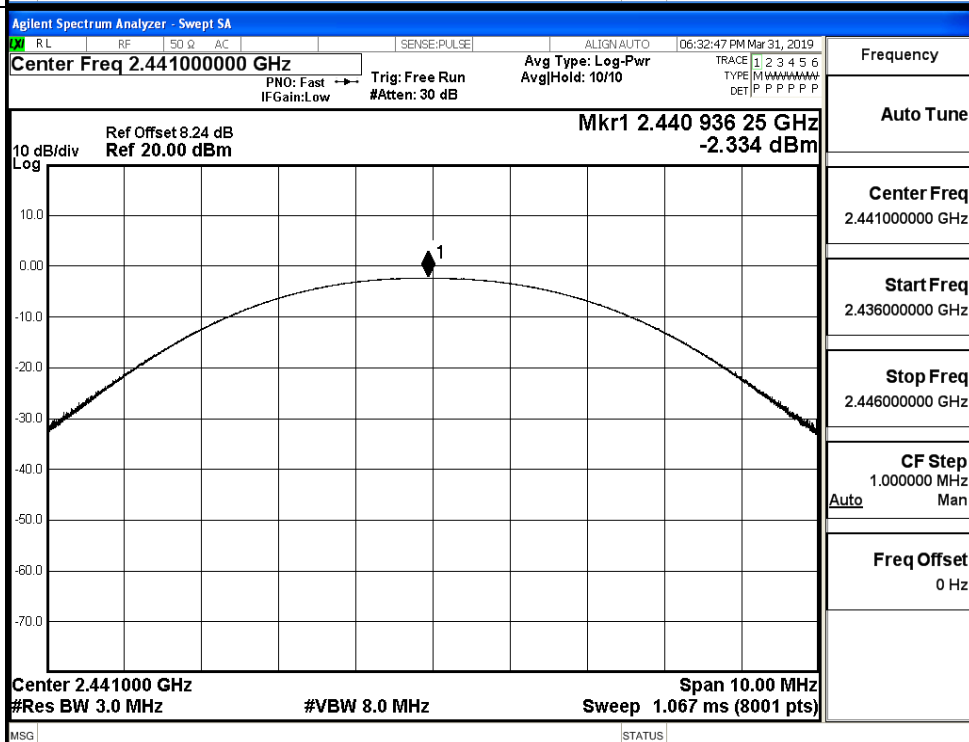
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.229	21	PASS
	MCH	-2.334	21	PASS
	HCH	-3.782	21	PASS
$\pi/4$ DQPSK	LCH	0.933	21	PASS
	MCH	-0.231	21	PASS
	HCH	-1.725	21	PASS
8DPSK	LCH	1.462	21	PASS
	MCH	0.253	21	PASS
	HCH	-1.228	21	PASS

Test Graphs

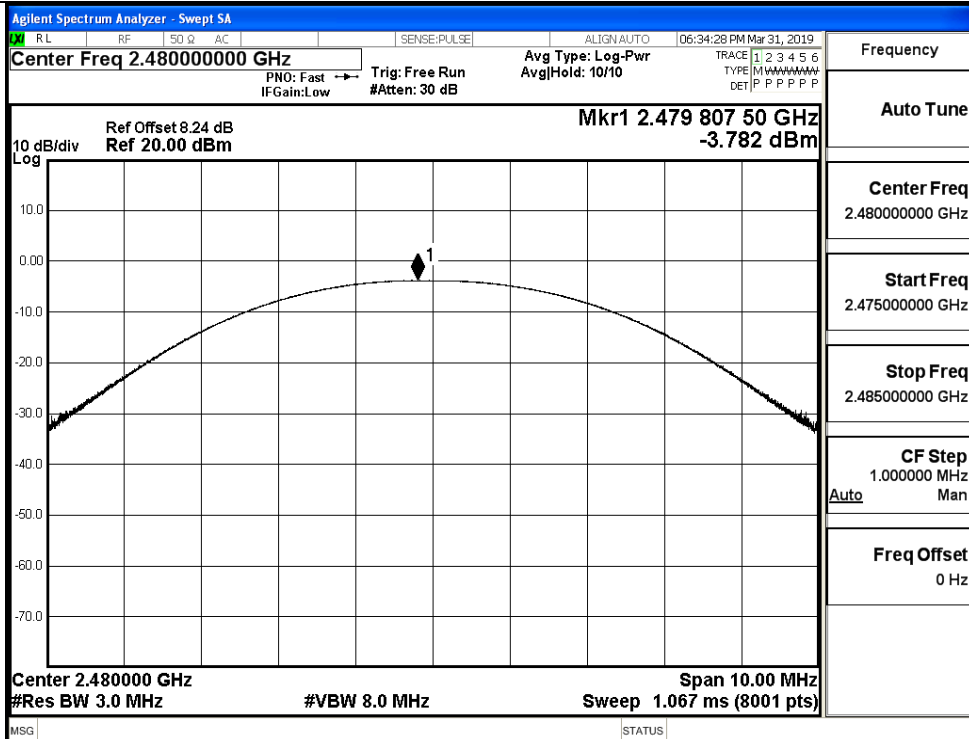
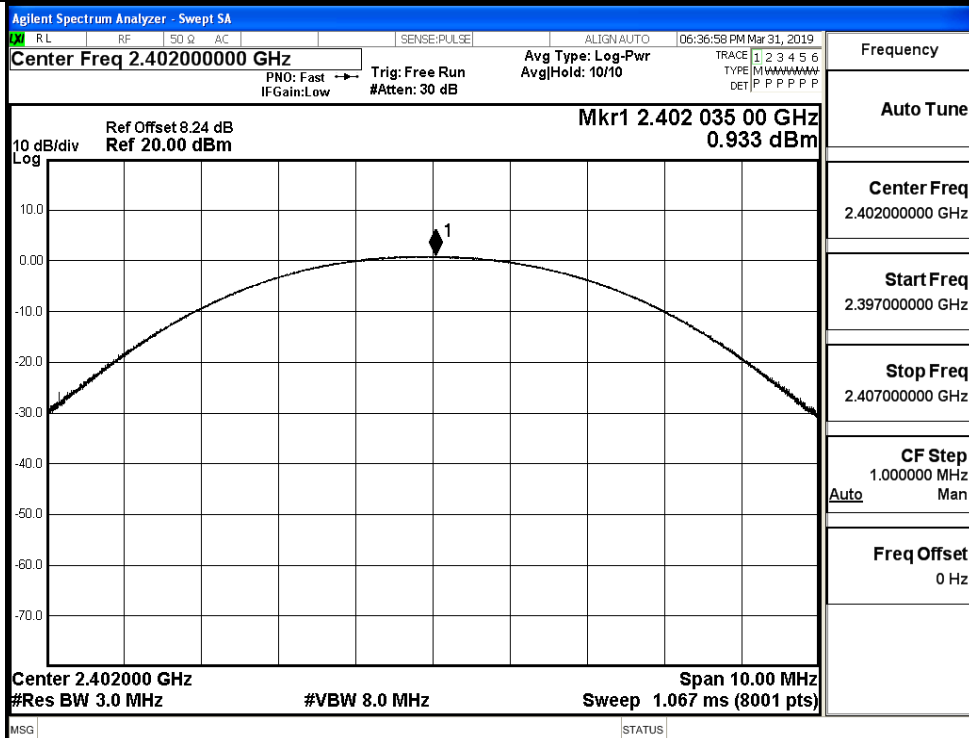
GFSK/LCH

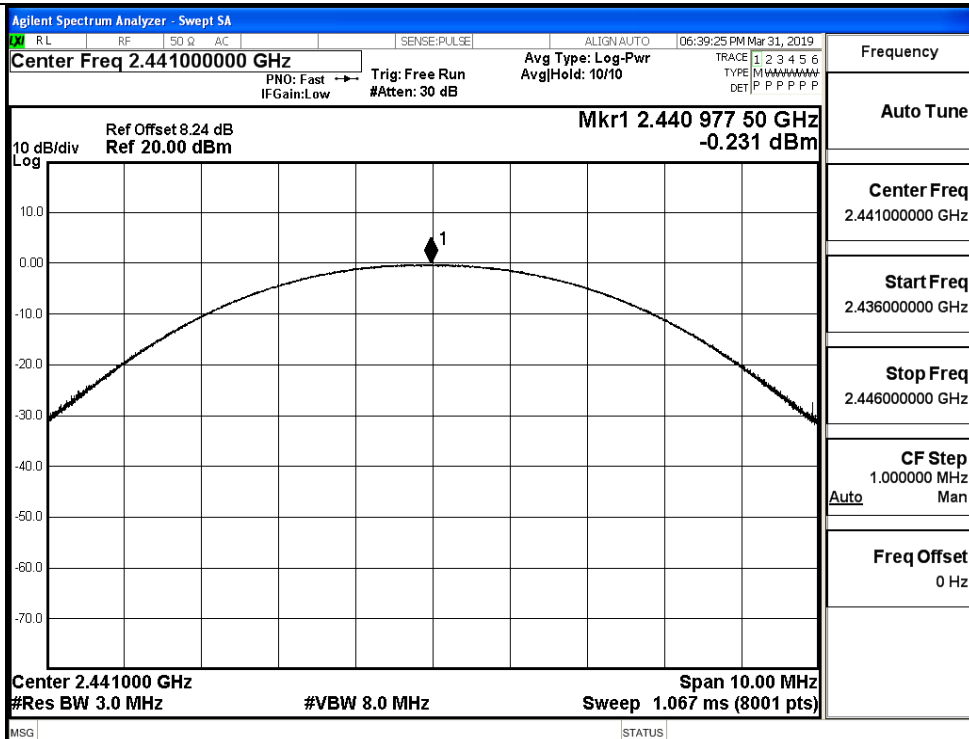
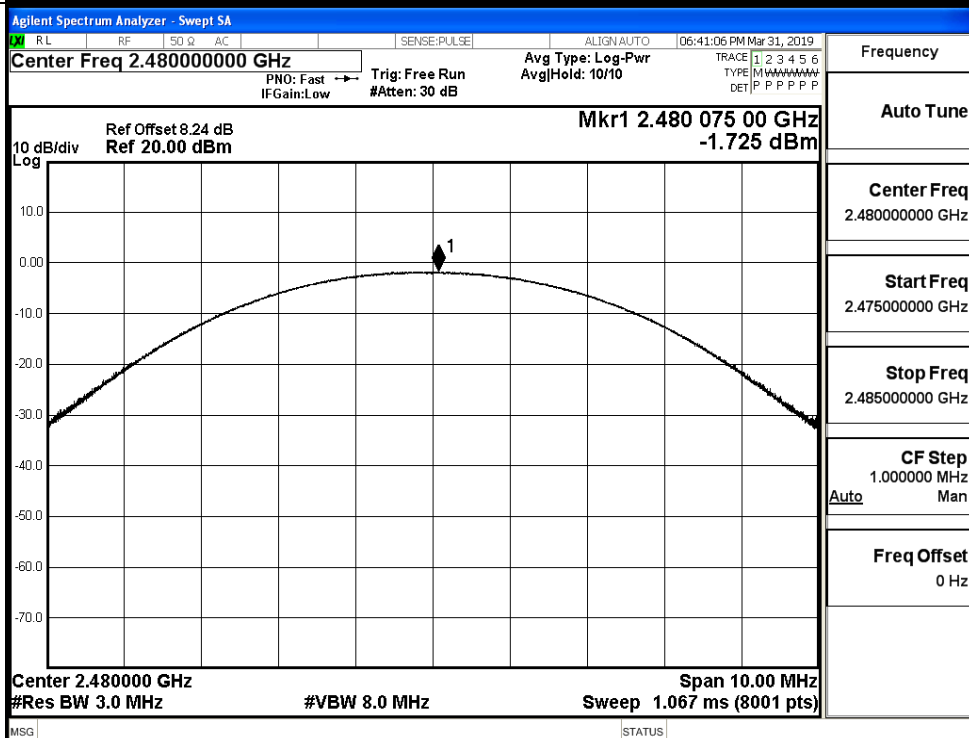


GFSK/MCH

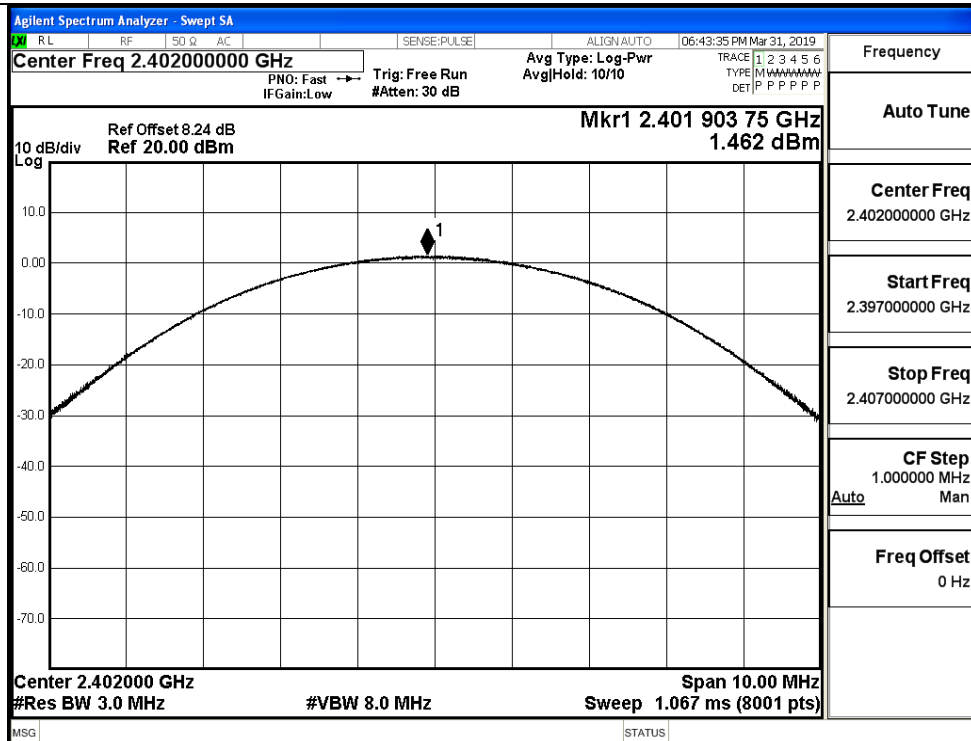


GFSK/HCH

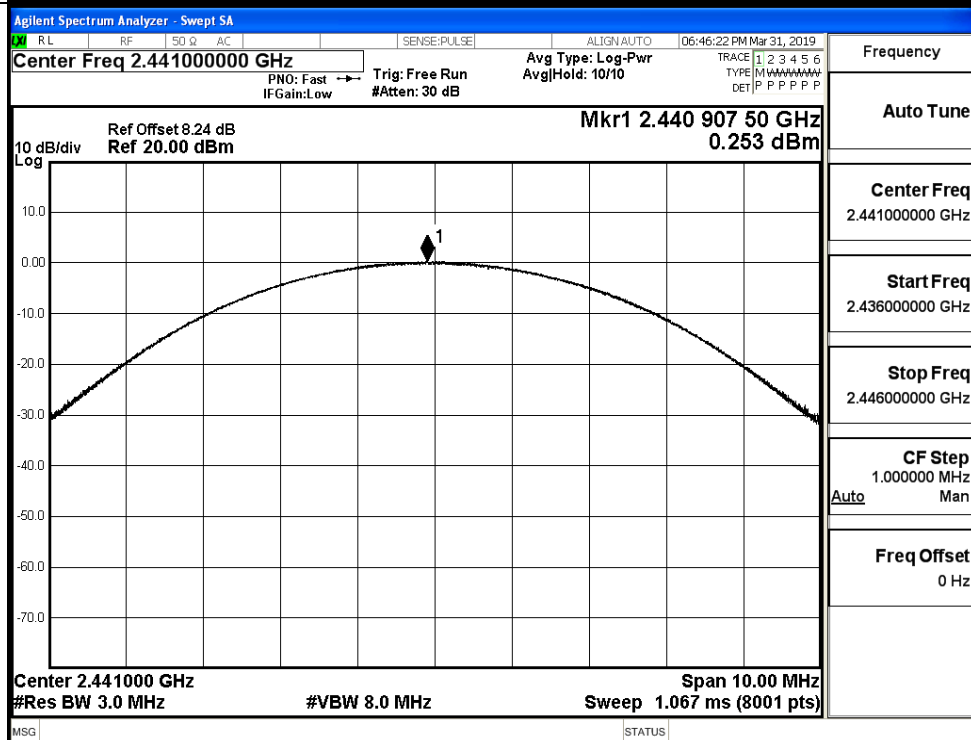
 π /4DQPSK/LCH

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

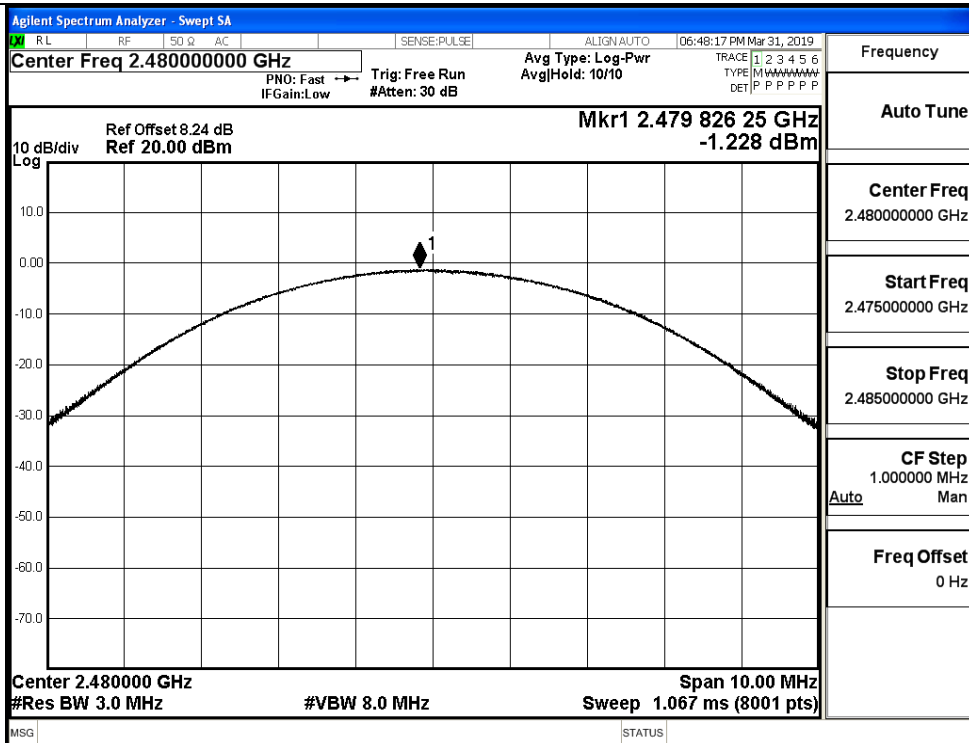
8DPSK/LCH



8DPSK/MCH



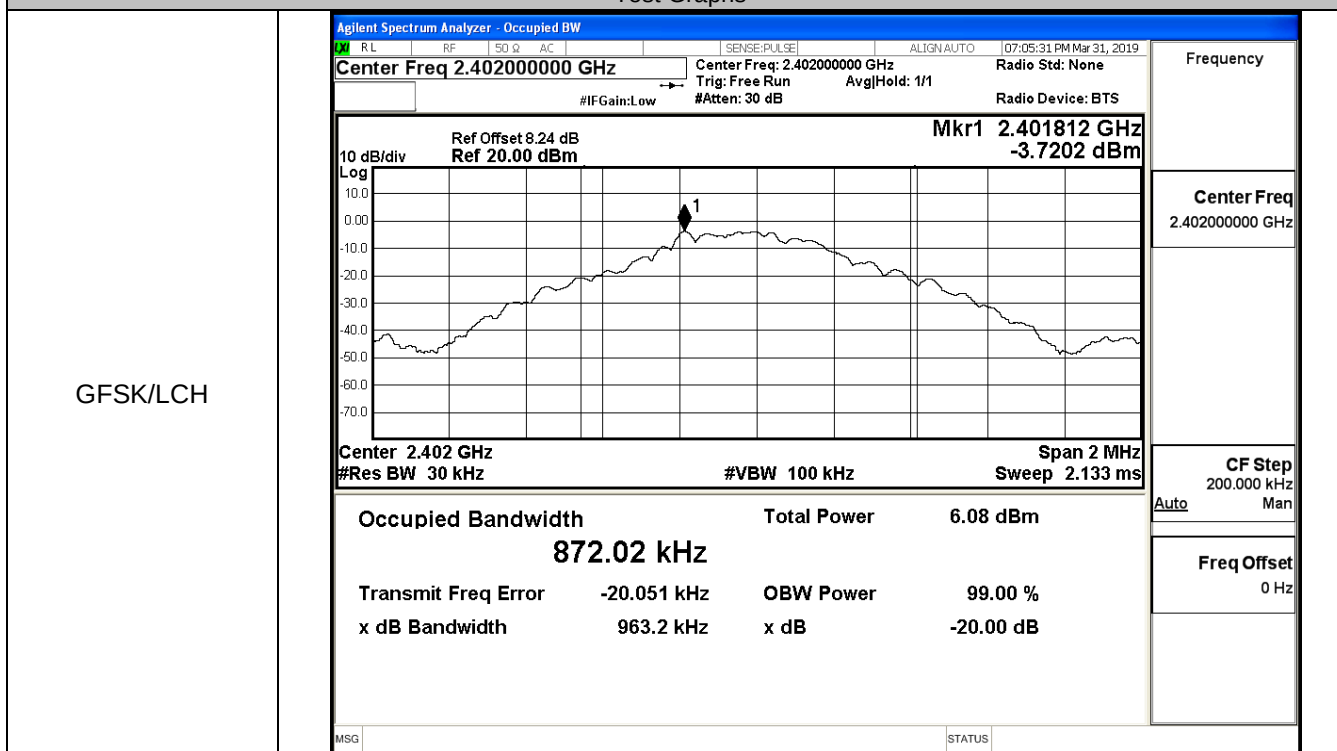
8DPSK/HCH



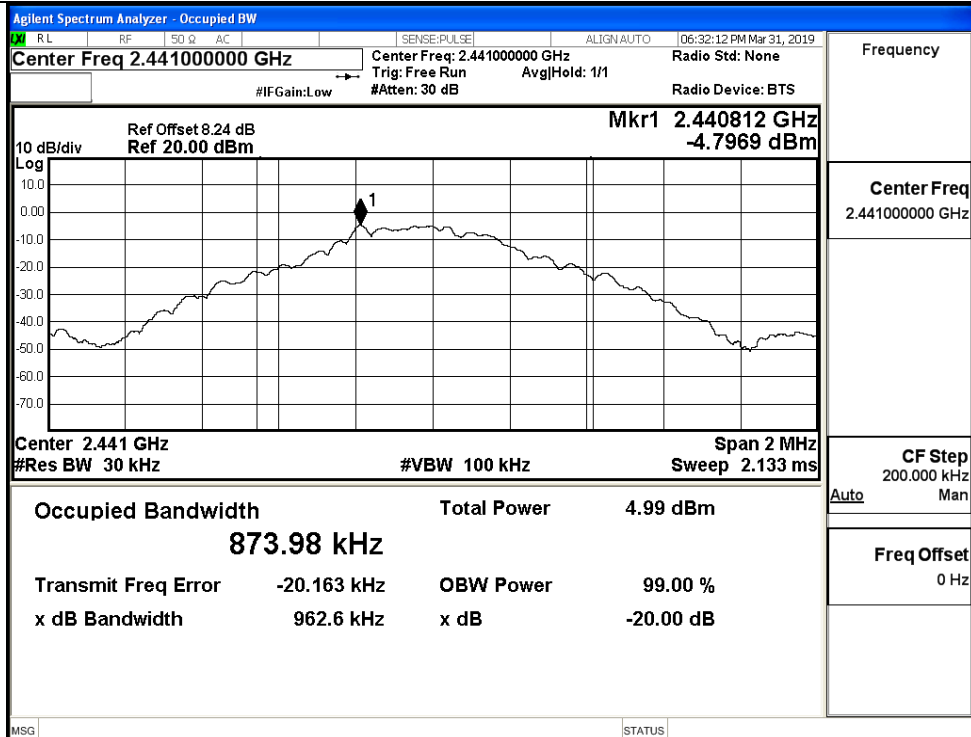
A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.87202	0.9632	Not Specified	PASS
	MCH	0.87398	0.9626	Not Specified	PASS
	HCH	0.87573	0.9636	Not Specified	PASS
π /4DQPSK	LCH	1.1606	1.281	Not Specified	PASS
	MCH	1.1604	1.281	Not Specified	PASS
	HCH	1.1607	1.283	Not Specified	PASS
8DPSK	LCH	1.1689	1.301	Not Specified	PASS
	MCH	1.1690	1.303	Not Specified	PASS
	HCH	1.1699	1.301	Not Specified	PASS

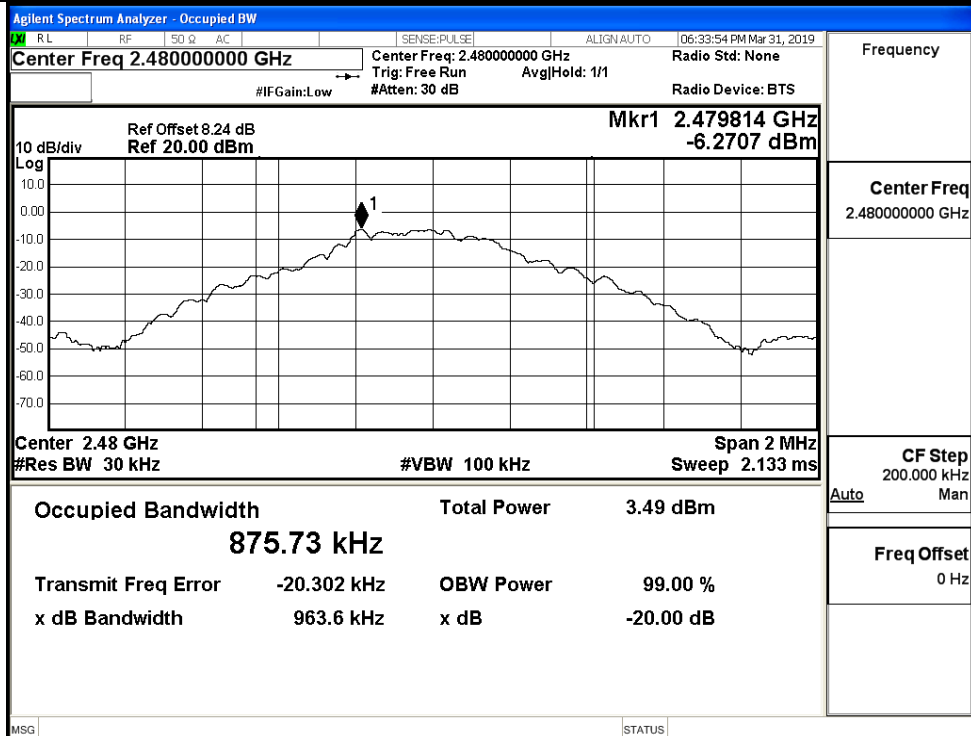
Test Graphs

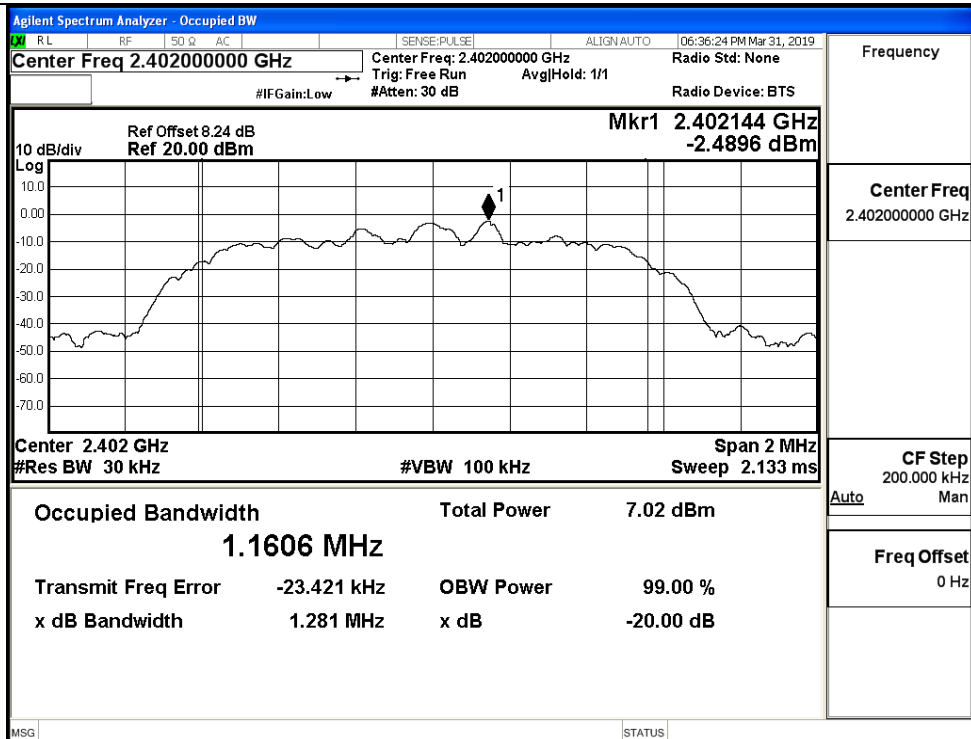
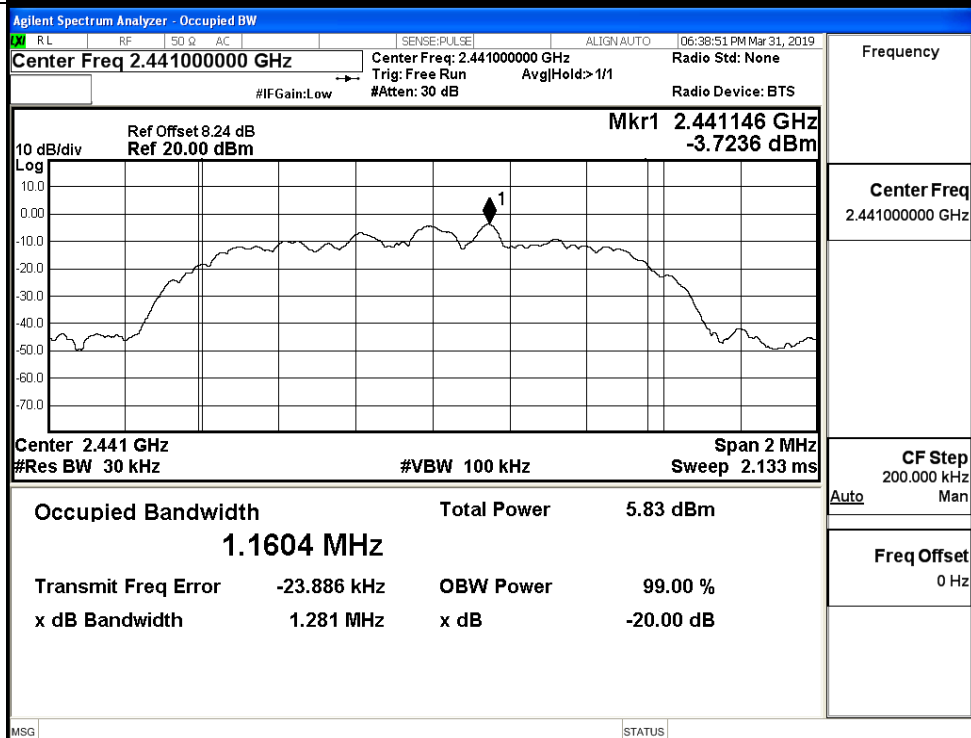


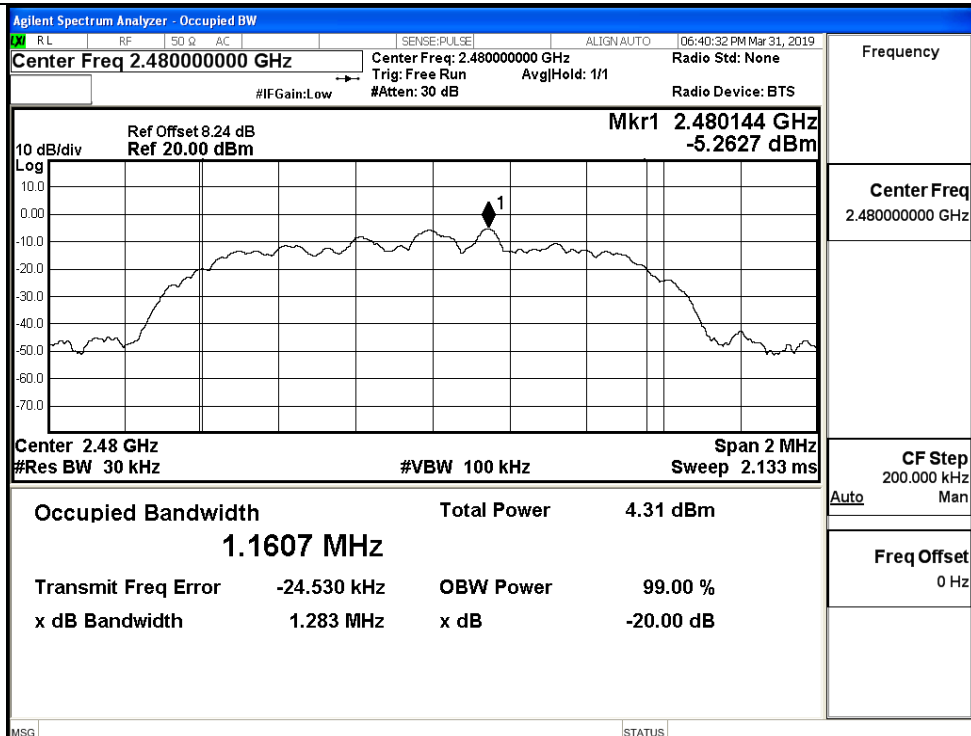
GFSK/MCH



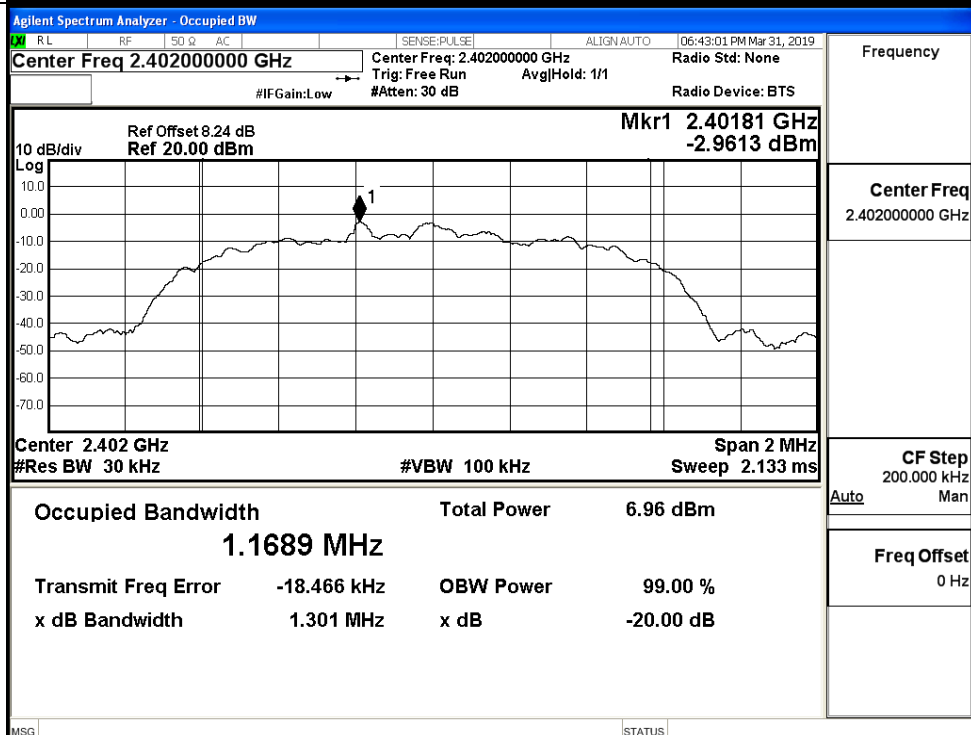
GFSK/HCH



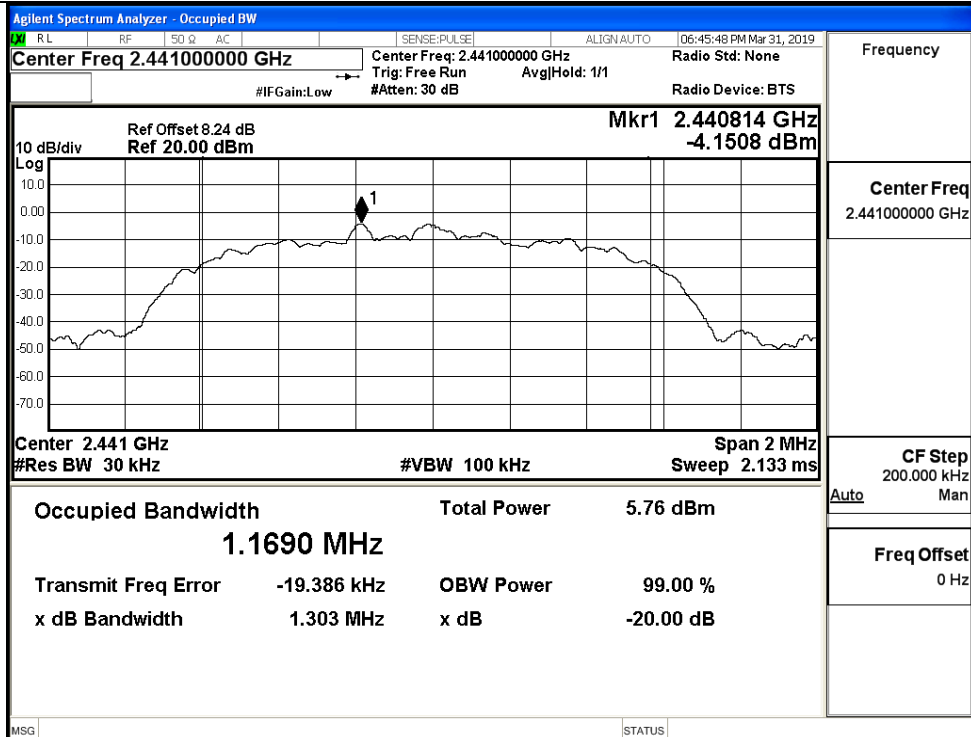
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

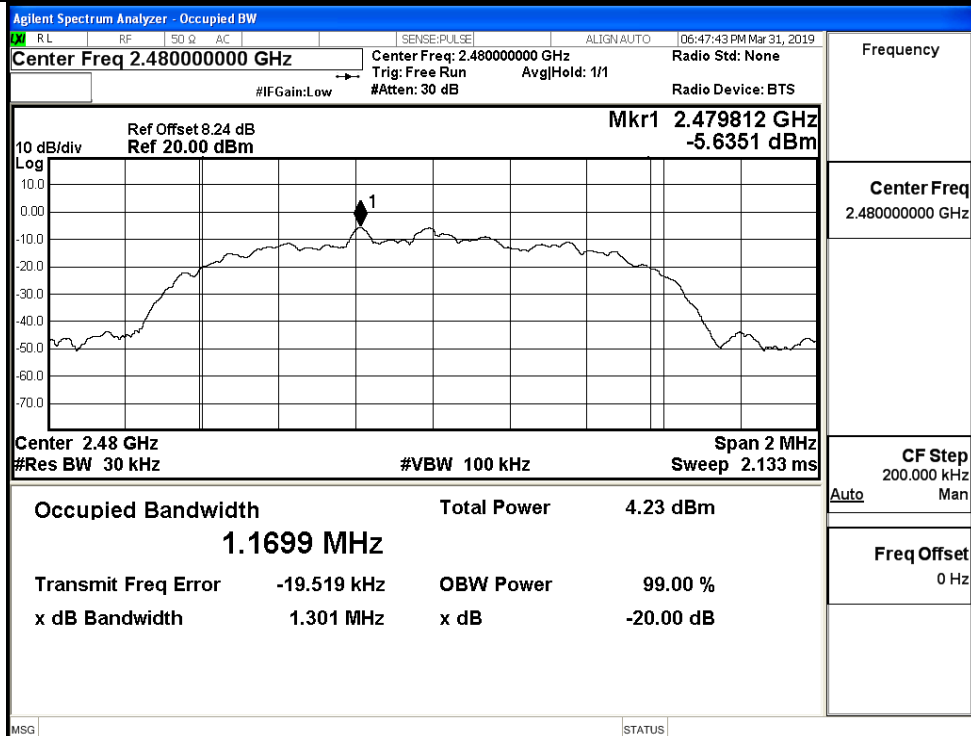
8DPSK/LCH



8DPSK/MCH



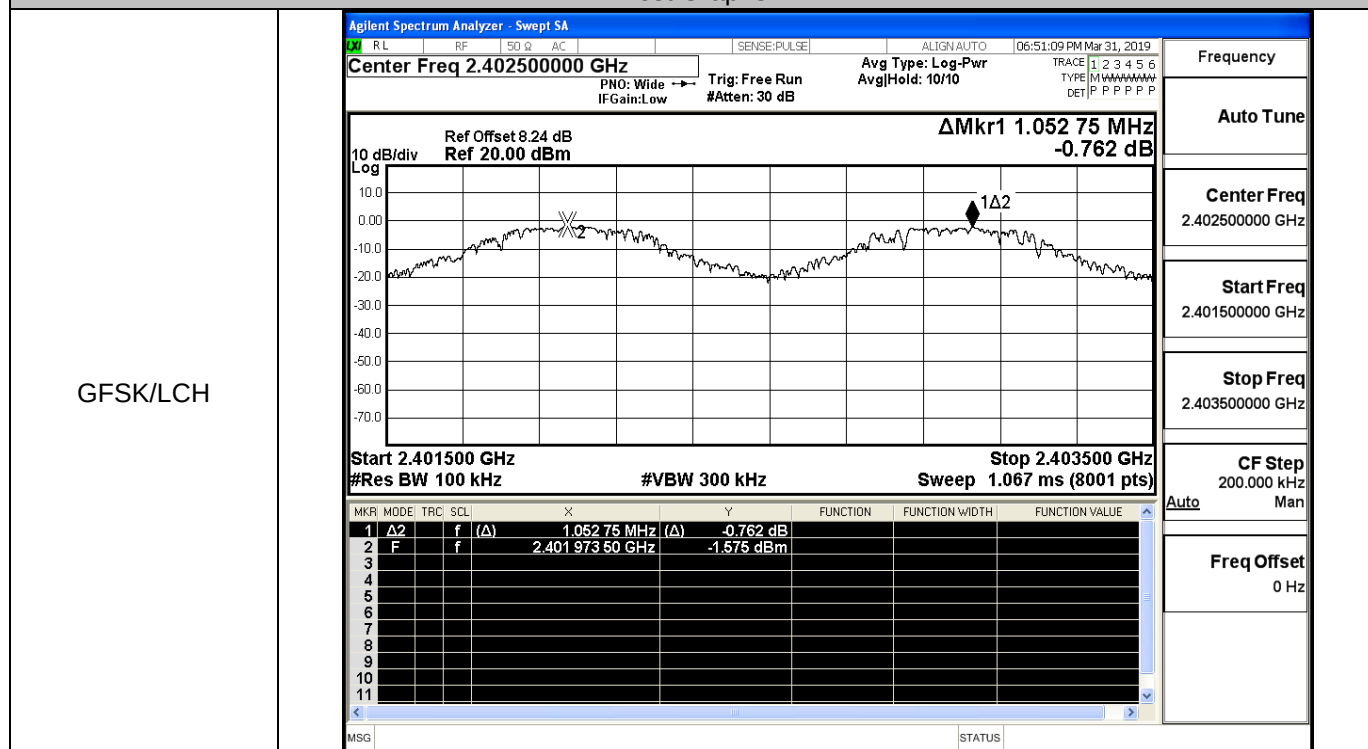
8DPSK/HCH



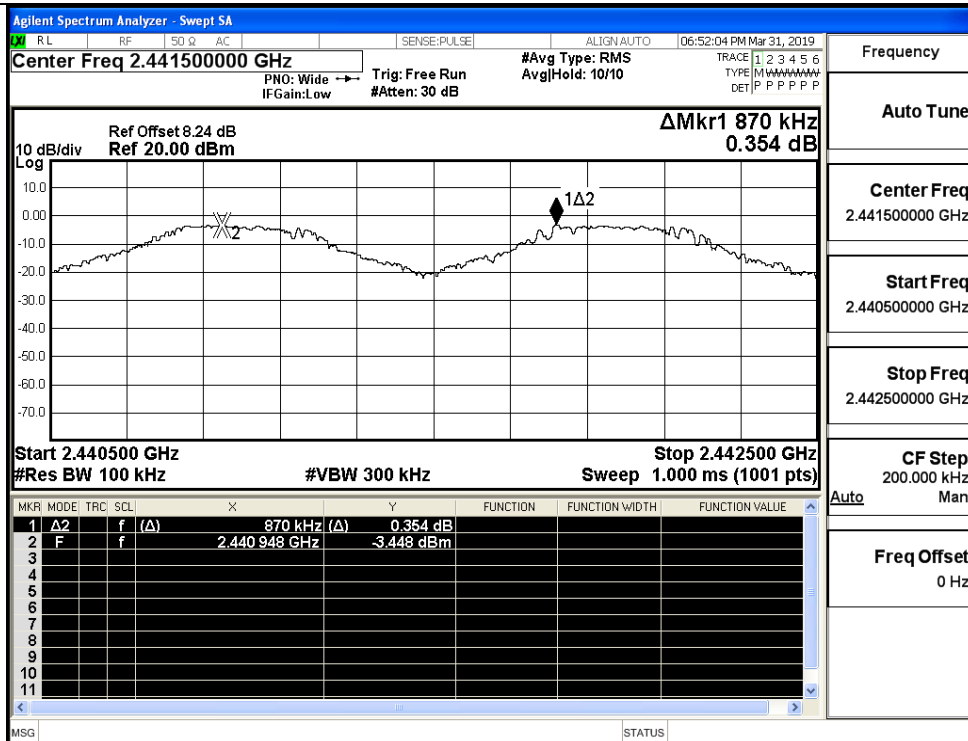
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.053	0.642	PASS
	MCH	0.870	0.642	PASS
	HCH	1.030	0.642	PASS
$\pi/4$ DQPSK	LCH	1.032	0.855	PASS
	MCH	1.194	0.855	PASS
	HCH	1.126	0.855	PASS
8DPSK	LCH	0.914	0.869	PASS
	MCH	1.228	0.869	PASS
	HCH	1.064	0.869	PASS

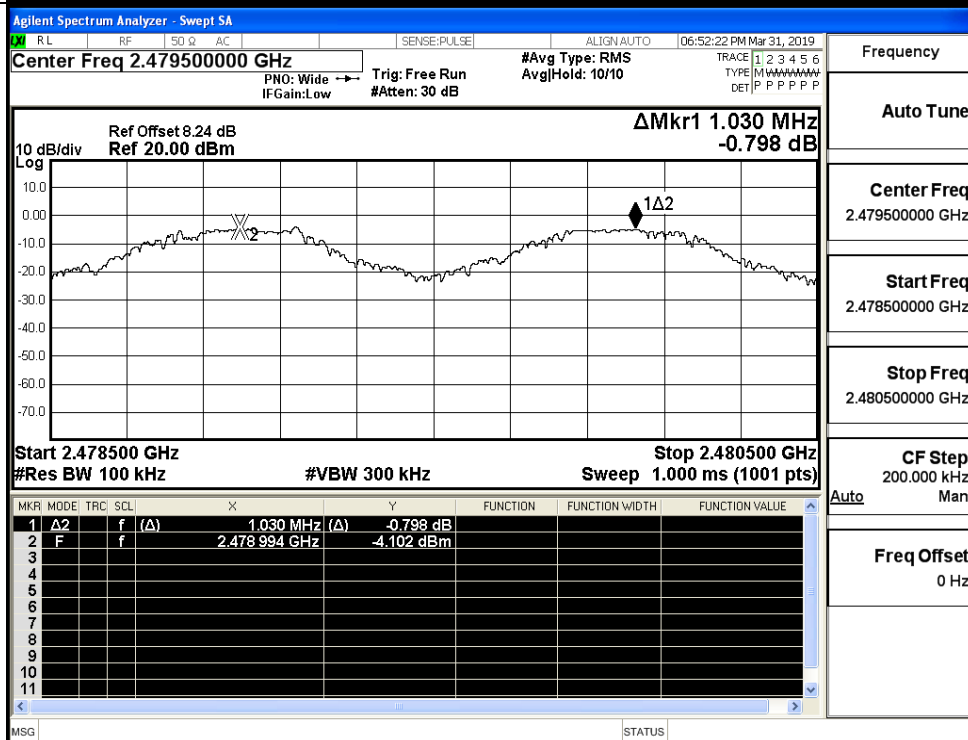
Test Graphs

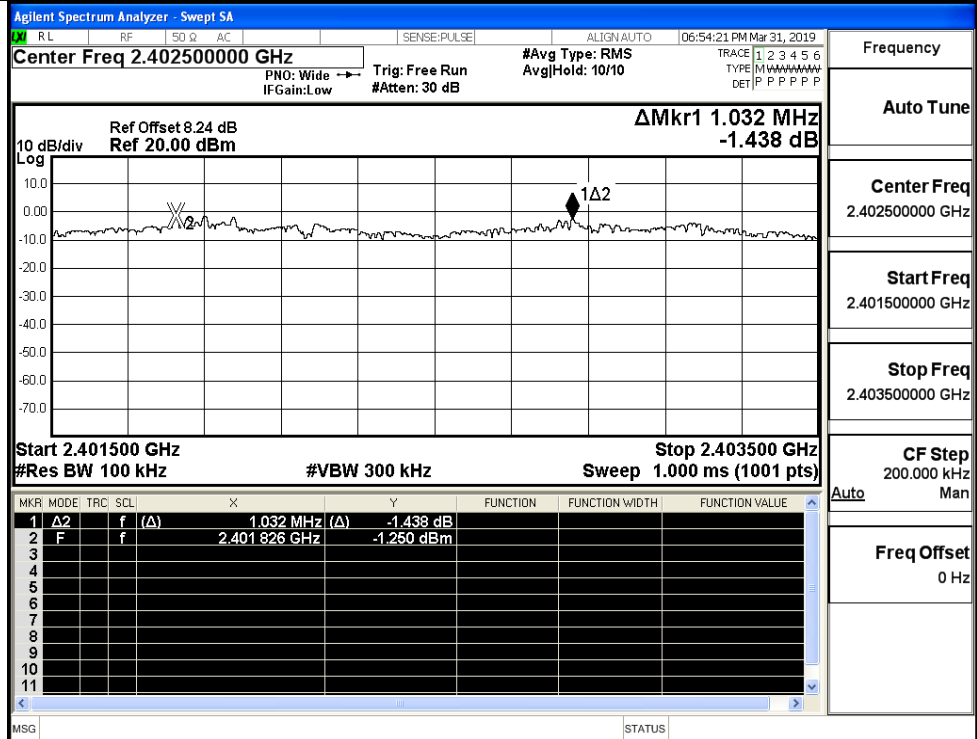
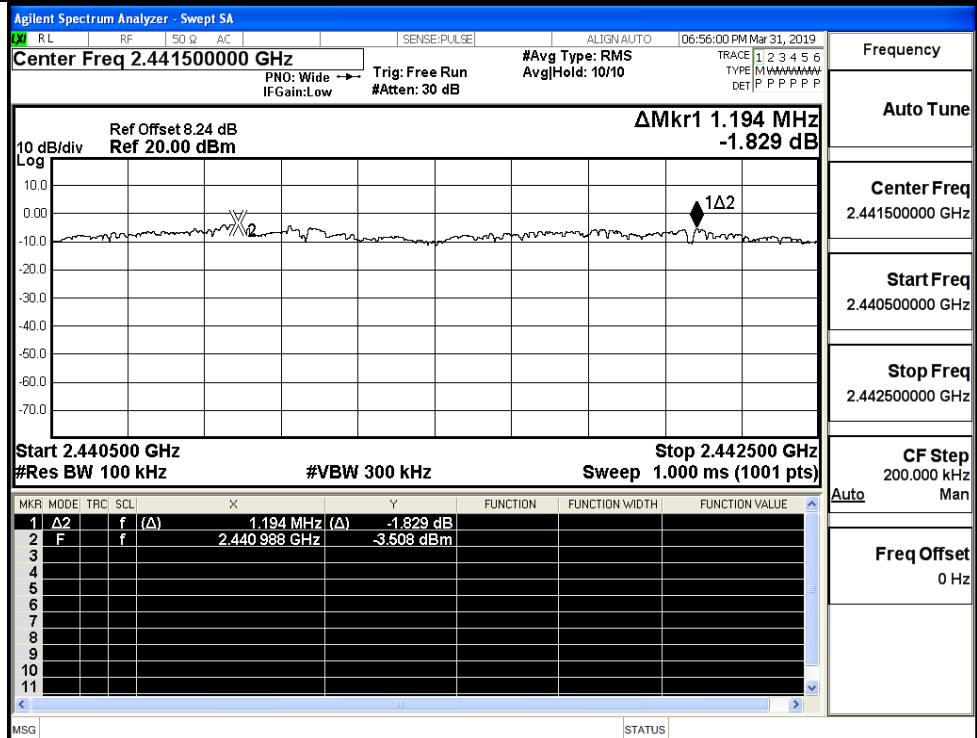


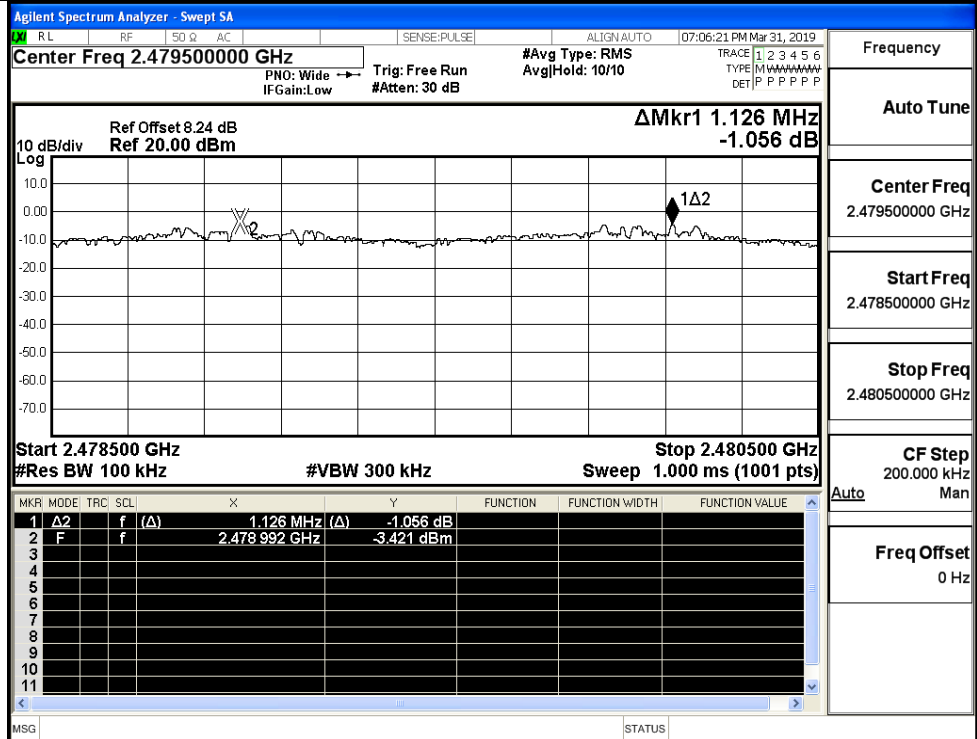
GFSK/MCH



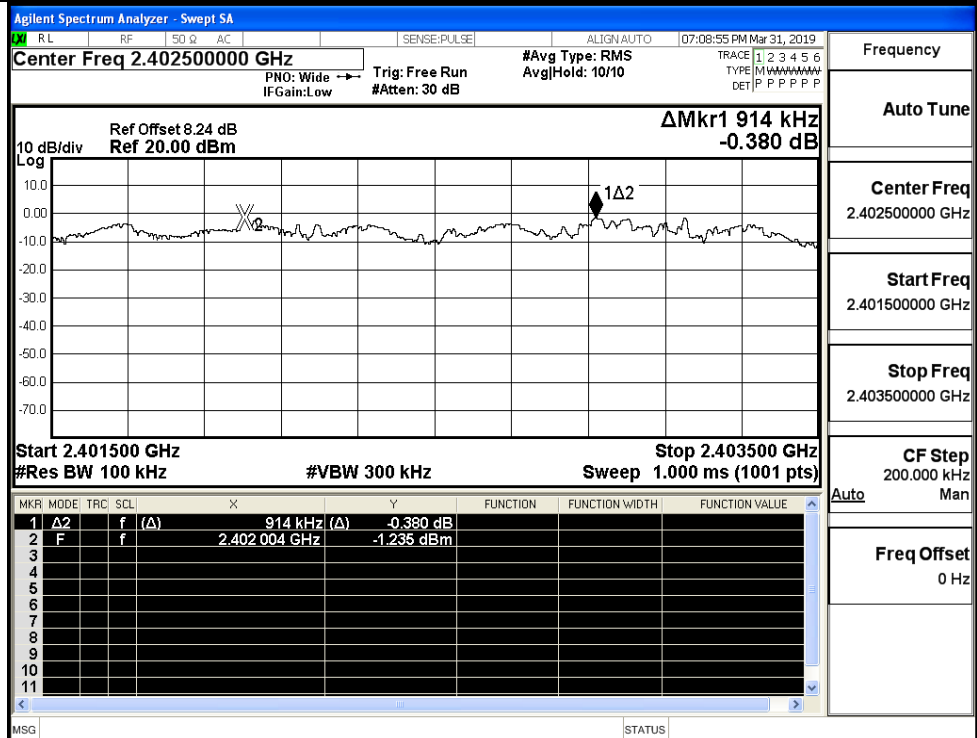
GFSK/HCH



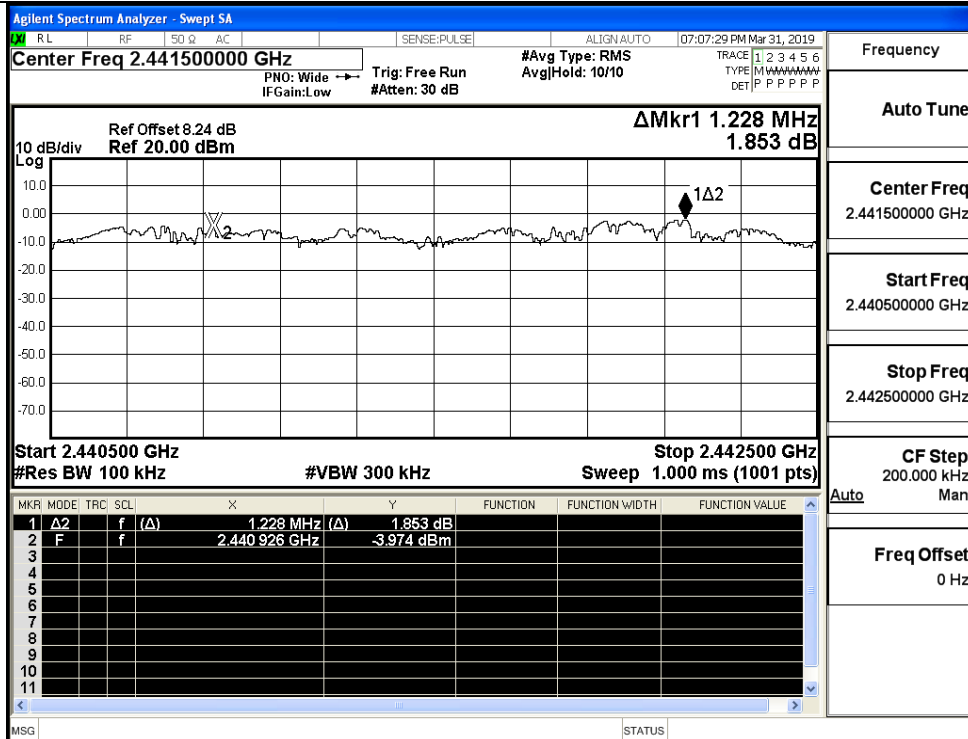
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

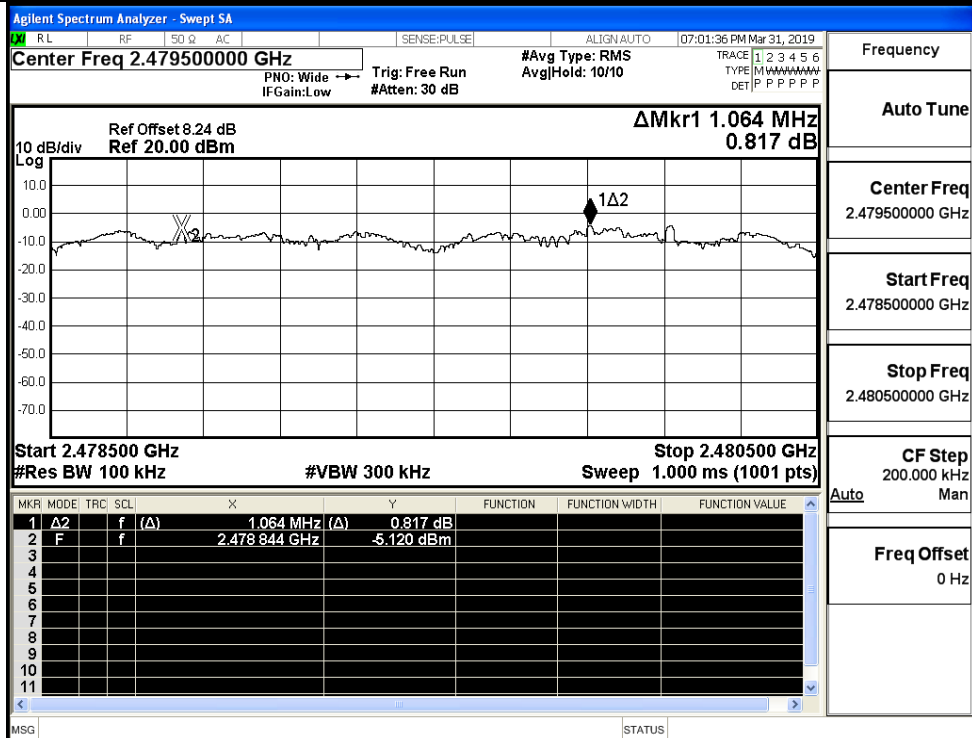
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

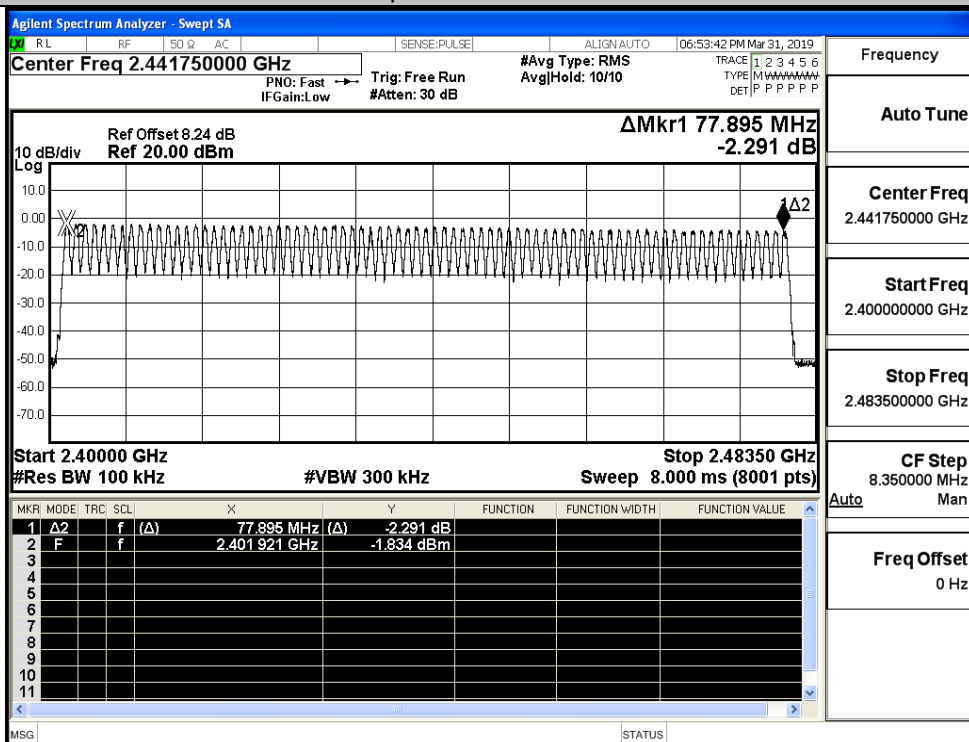


A.4 Hopping Channel Number

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

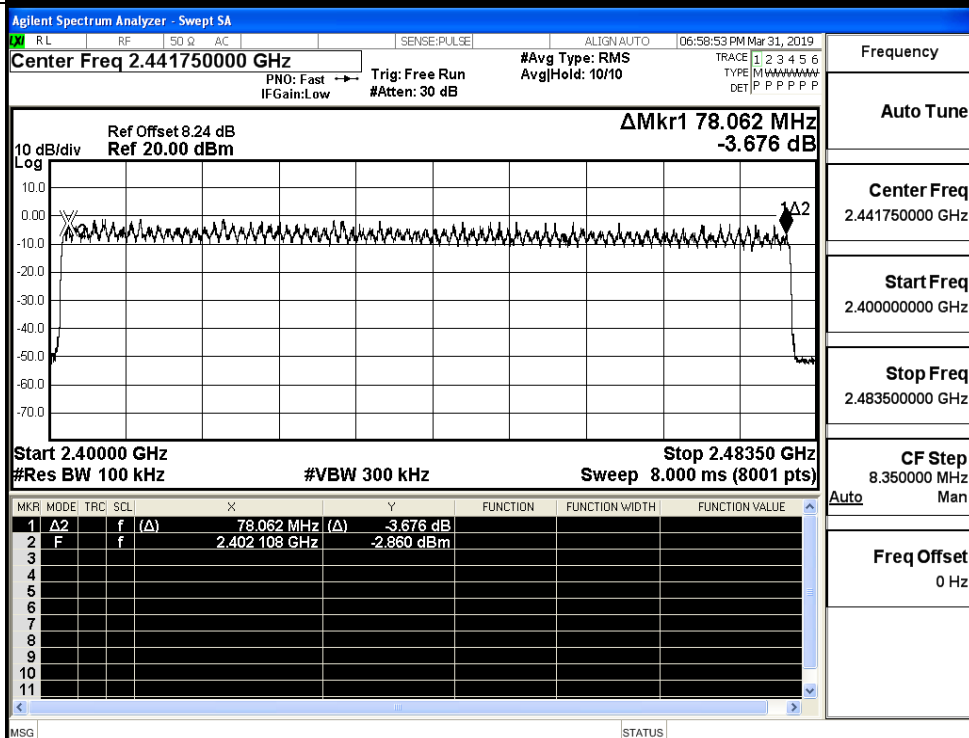
Test Graphs

GFSK/Hop



Frequency

Auto Tune

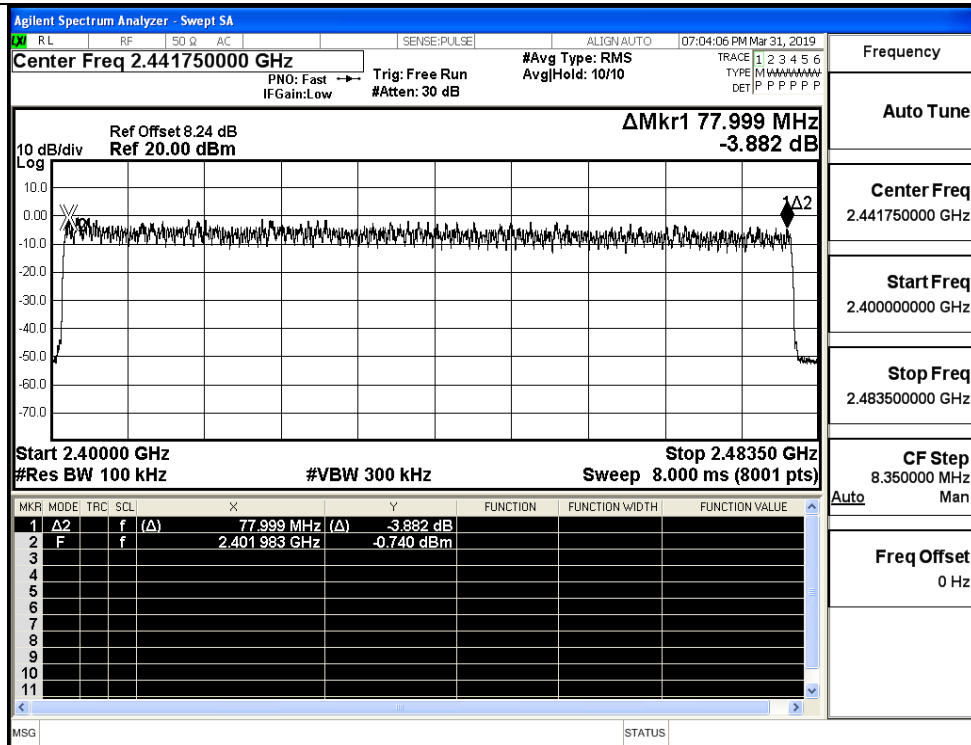
Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
ManFreq Offset
0 Hz $\pi/4$ DQPSK/Hop

Frequency

Auto Tune

Center Freq
2.441750000 GHzStart Freq
2.400000000 GHzStop Freq
2.483500000 GHzCF Step
8.350000 MHz
ManFreq Offset
0 Hz

8DPSK/Hop

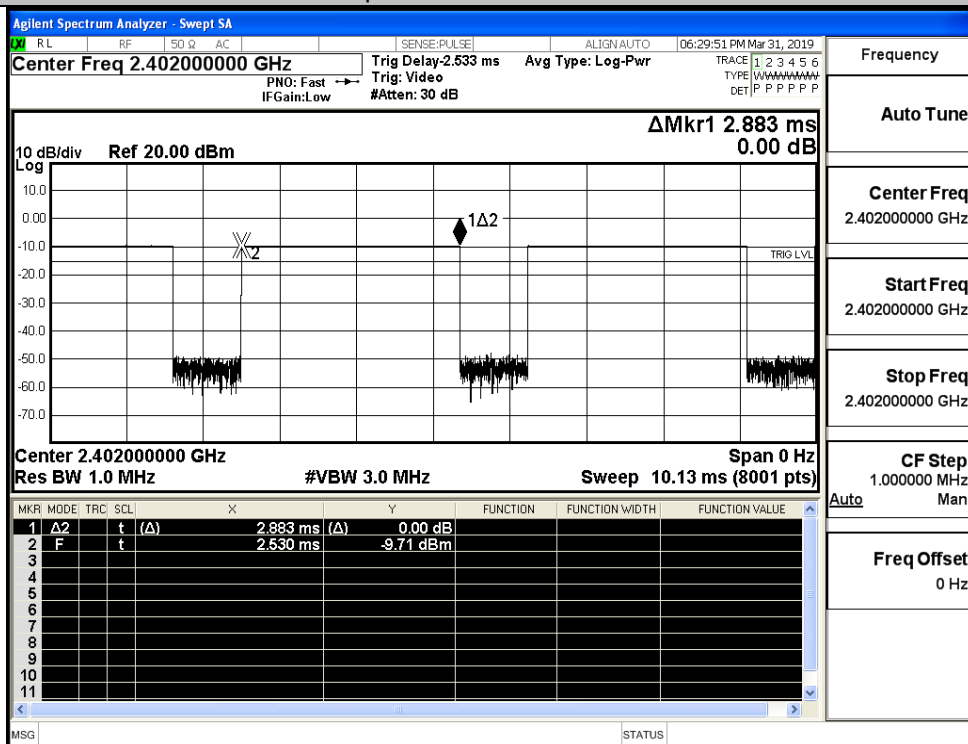


A.5 Dwell Time

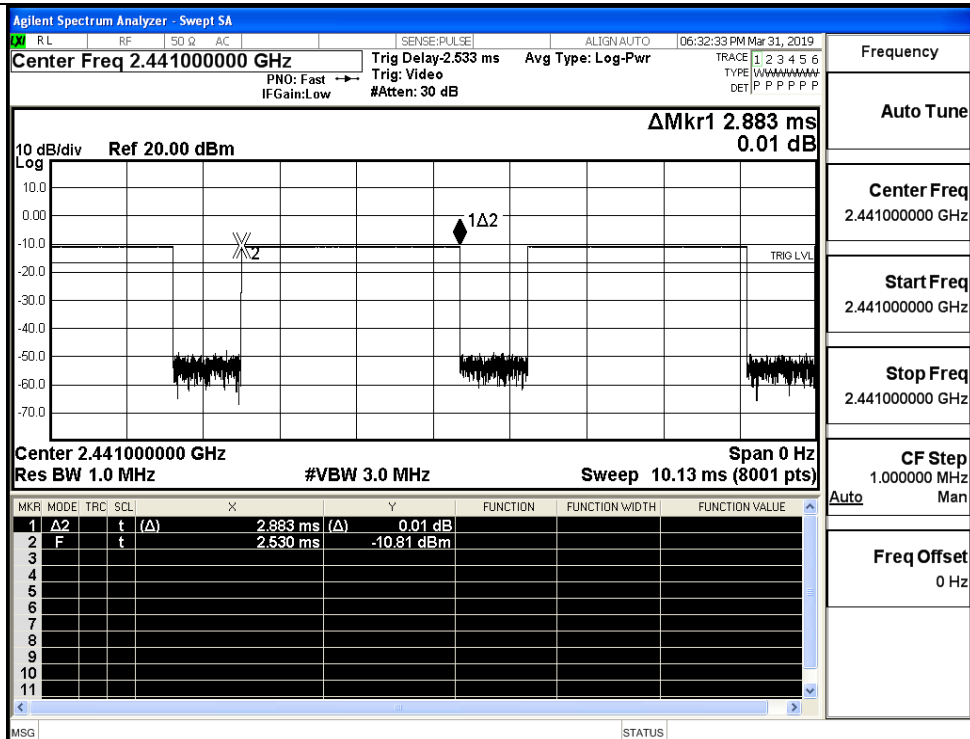
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	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

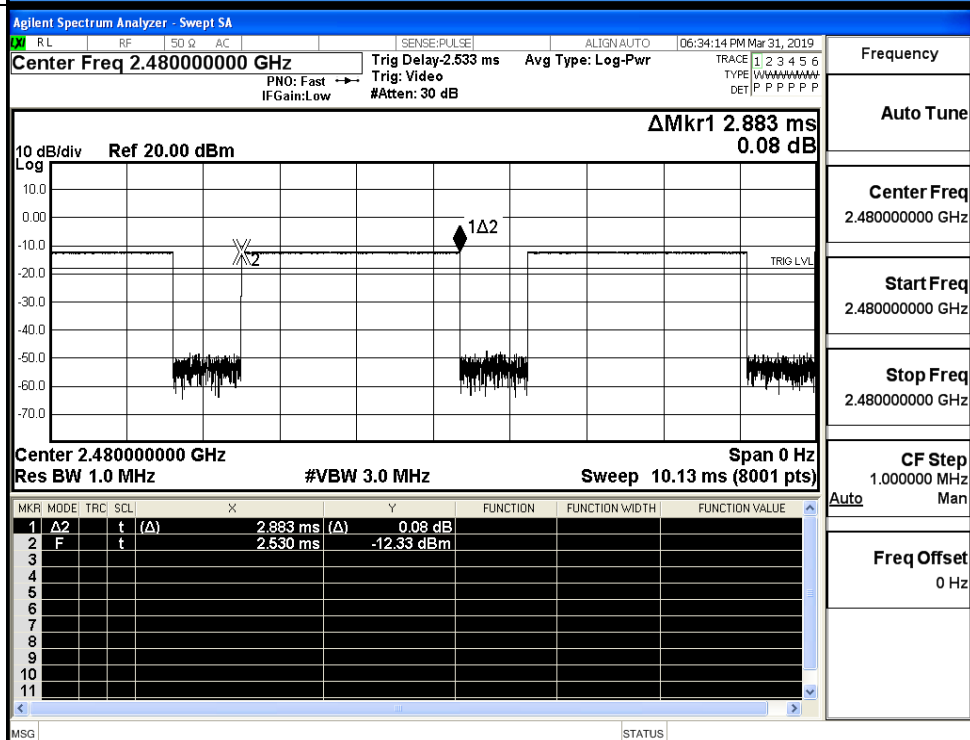
GFSK_DH5/LCH



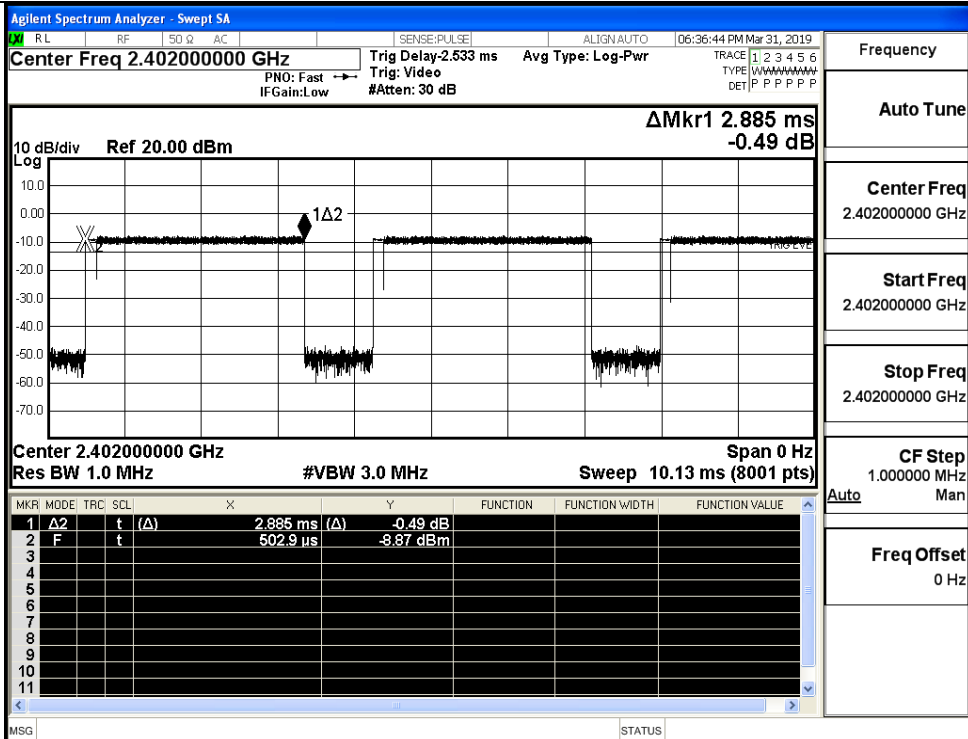
GFSK_DH5/MCH



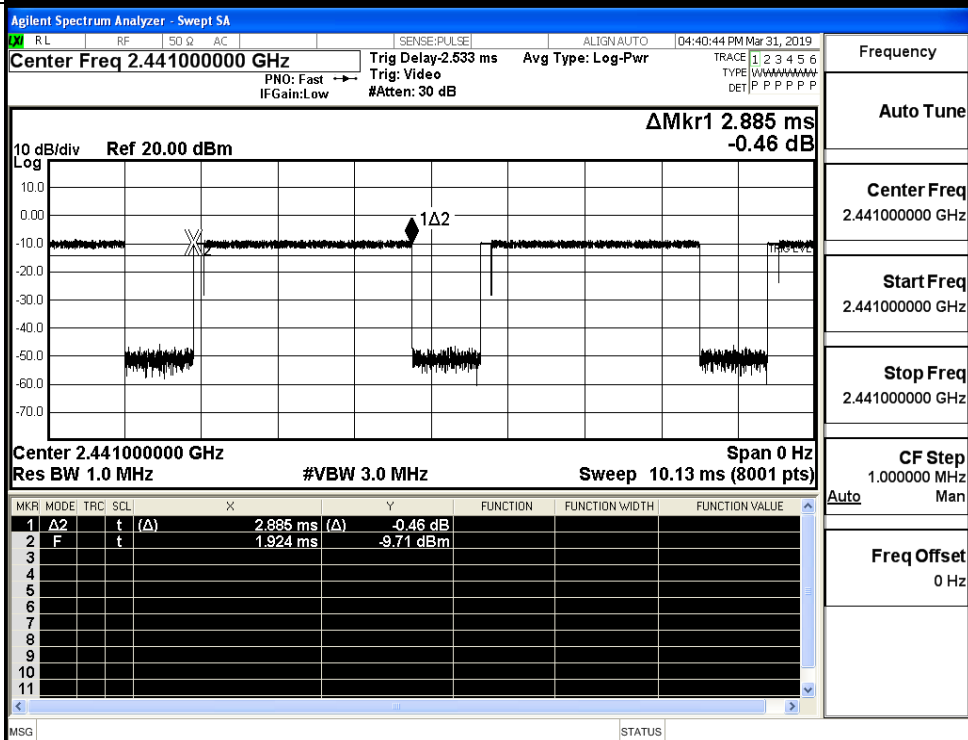
GFSK_DH5/HCH



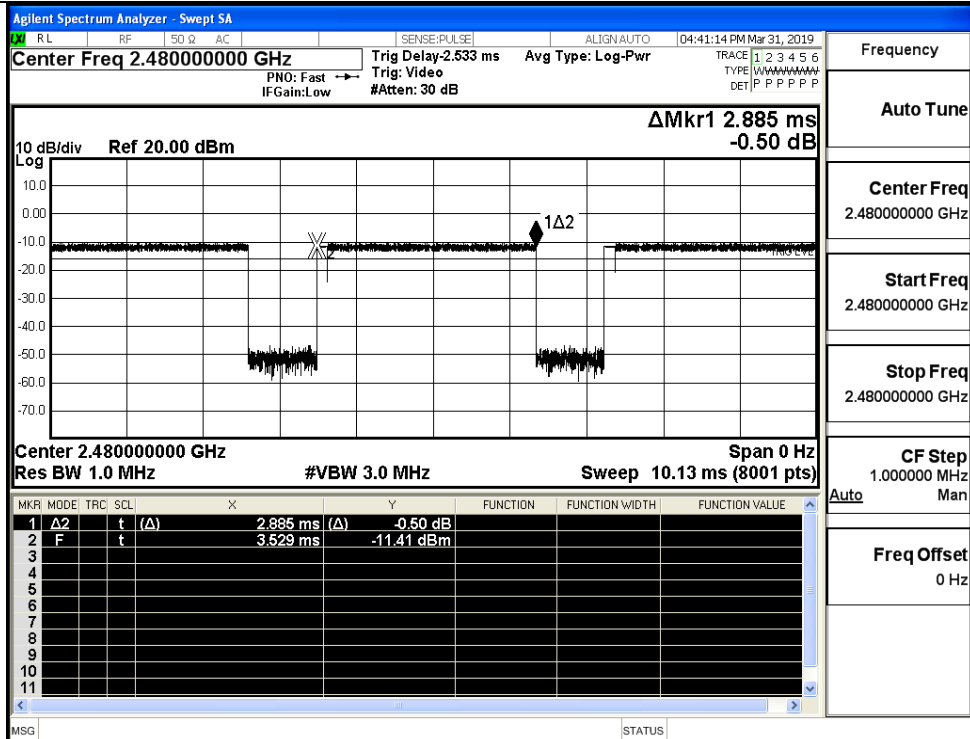
$\pi/4$ DQPSK
_2DH5/LCH



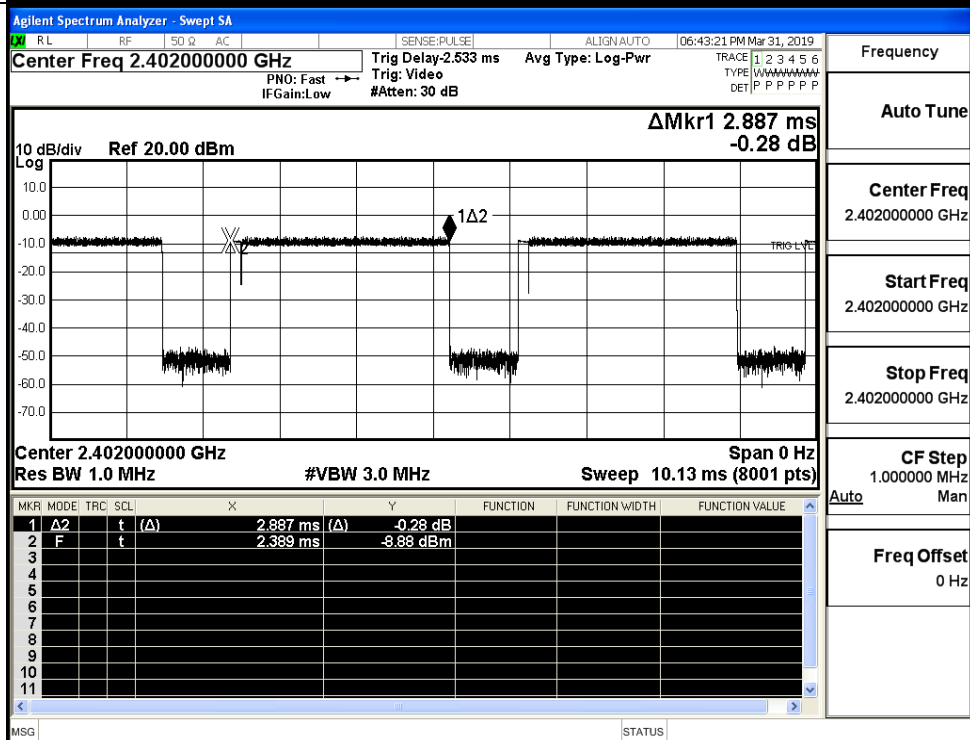
$\pi/4$ DQPSK
_2DH5/MCH



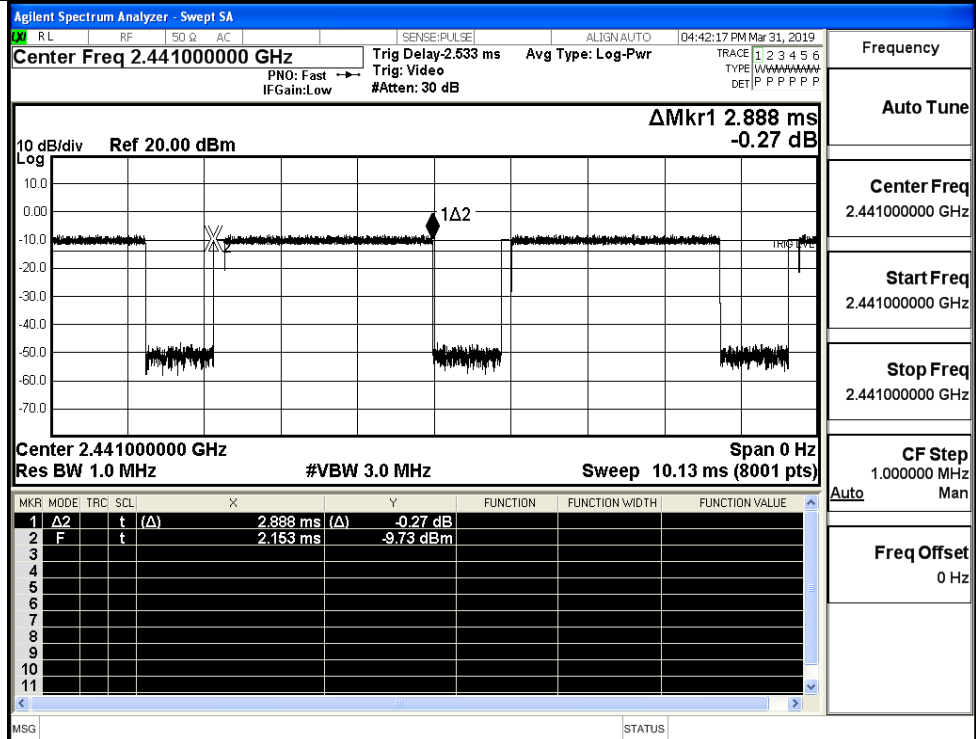
$\pi/4$ DQPSK
_2DH5/HCH



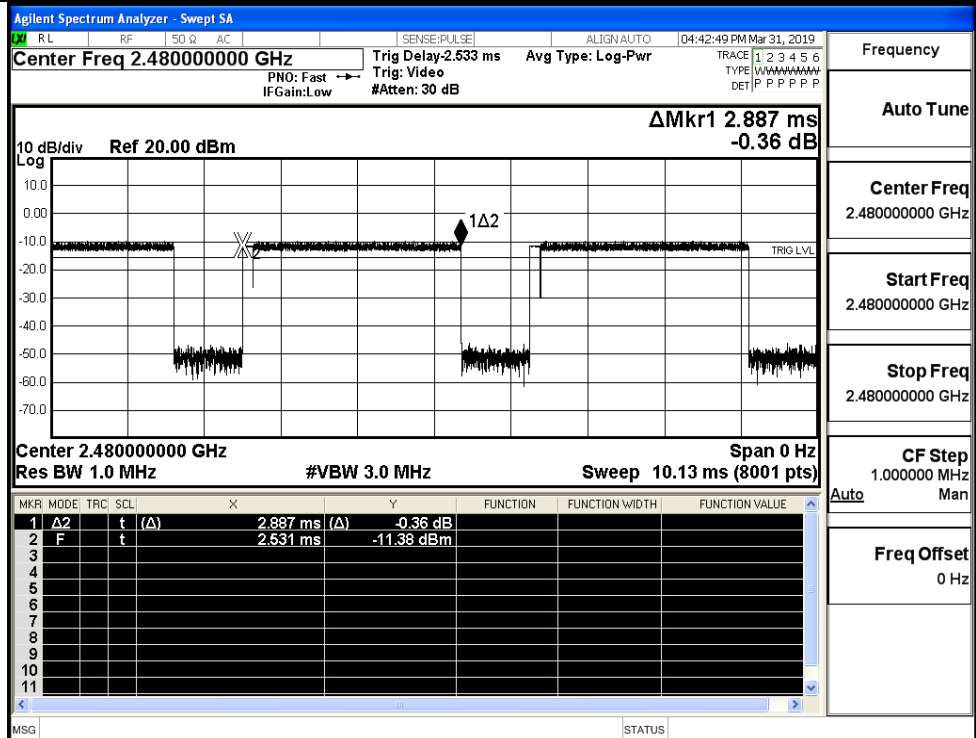
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

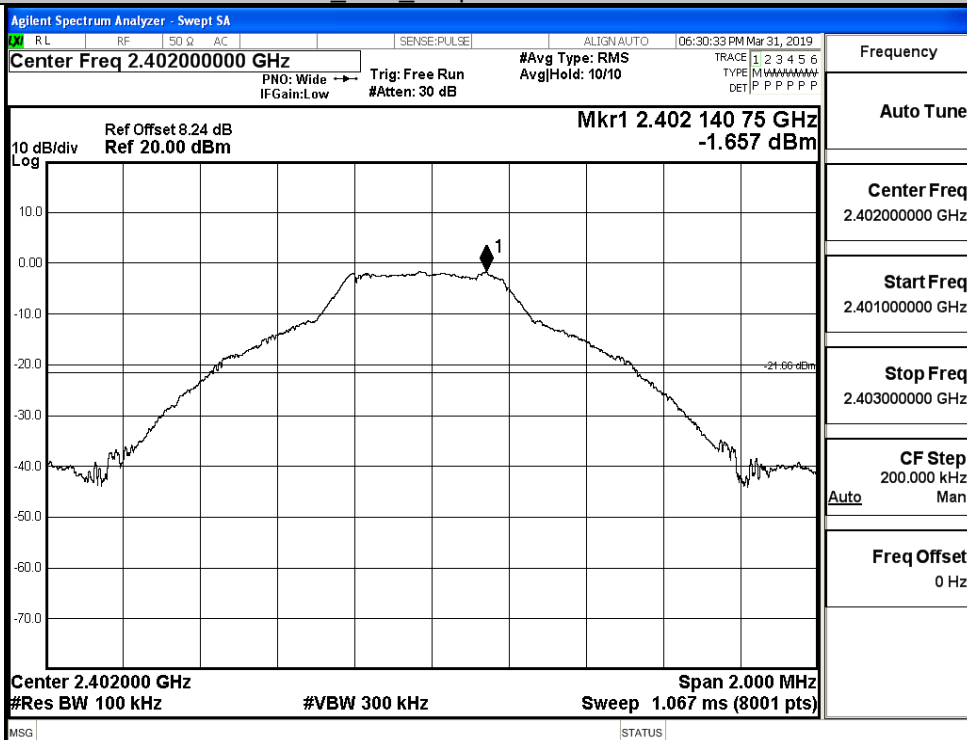


A.6 RF Conducted Spurious Emissions

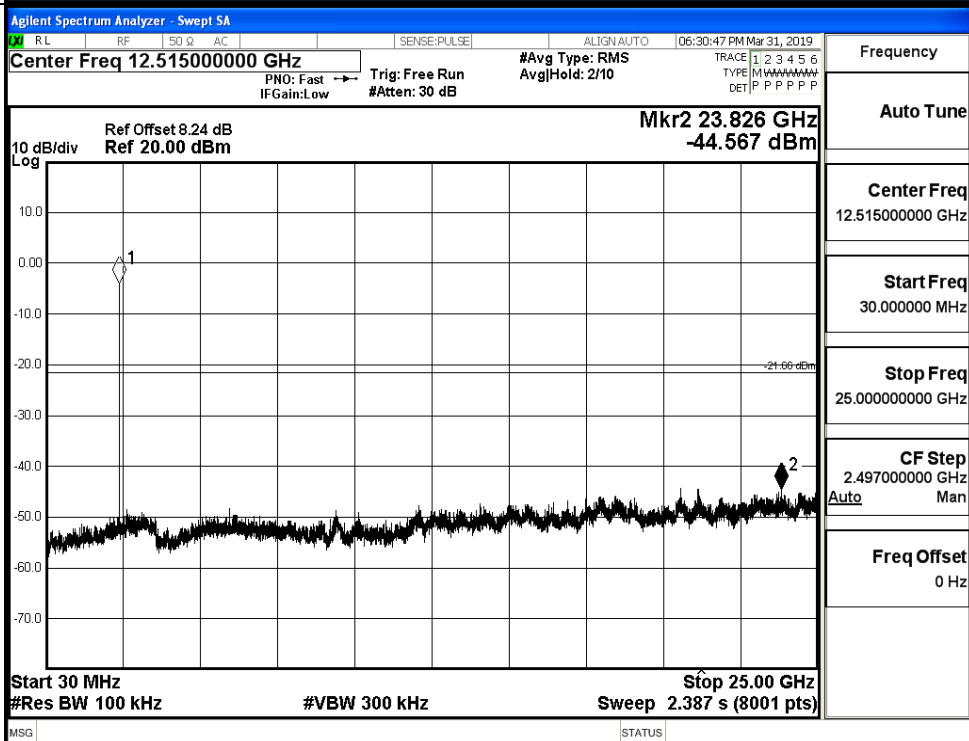
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.657	-44.567	-21.657	PASS
	MCH	-2.585	-44.498	-22.585	PASS
	HCH	-4.47	-45.000	-24.470	PASS
$\pi/4$ DQPSK	LCH	-0.679	-44.191	-20.679	PASS
	MCH	-1.927	-44.603	-21.927	PASS
	HCH	-3.558	-44.720	-23.558	PASS
8DPSK	LCH	-0.689	-44.824	-20.689	PASS
	MCH	-1.948	-44.212	-21.948	PASS
	HCH	-3.469	-43.827	-23.469	PASS

GFSK LCH Graphs

Pref

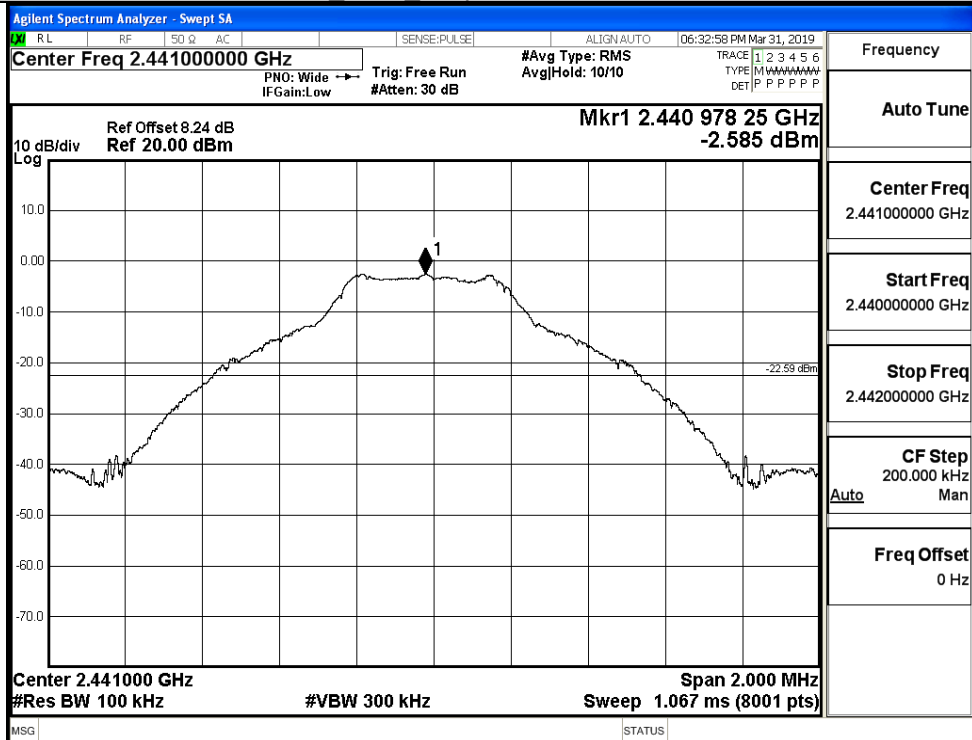


Puw

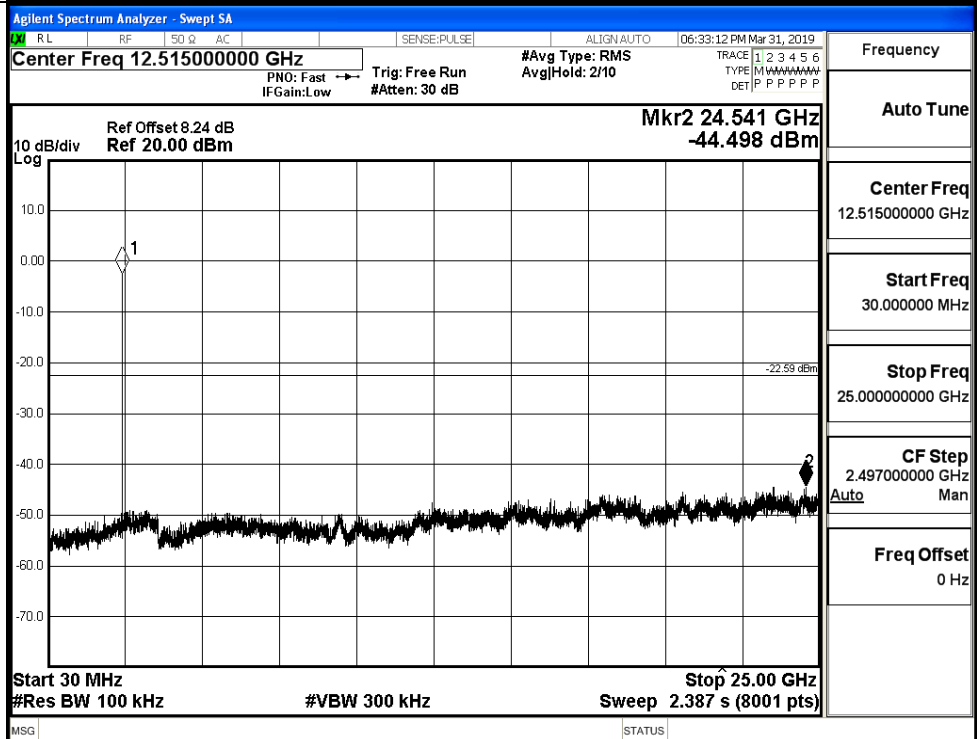


GFSK_MCH_Graphs

Pref

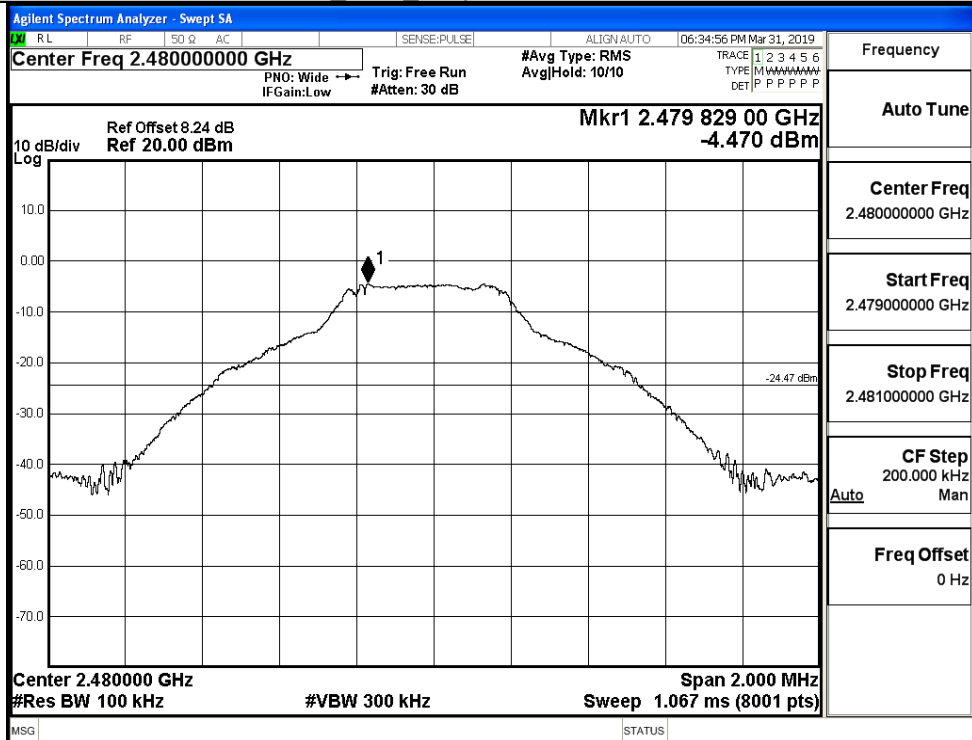


Puw

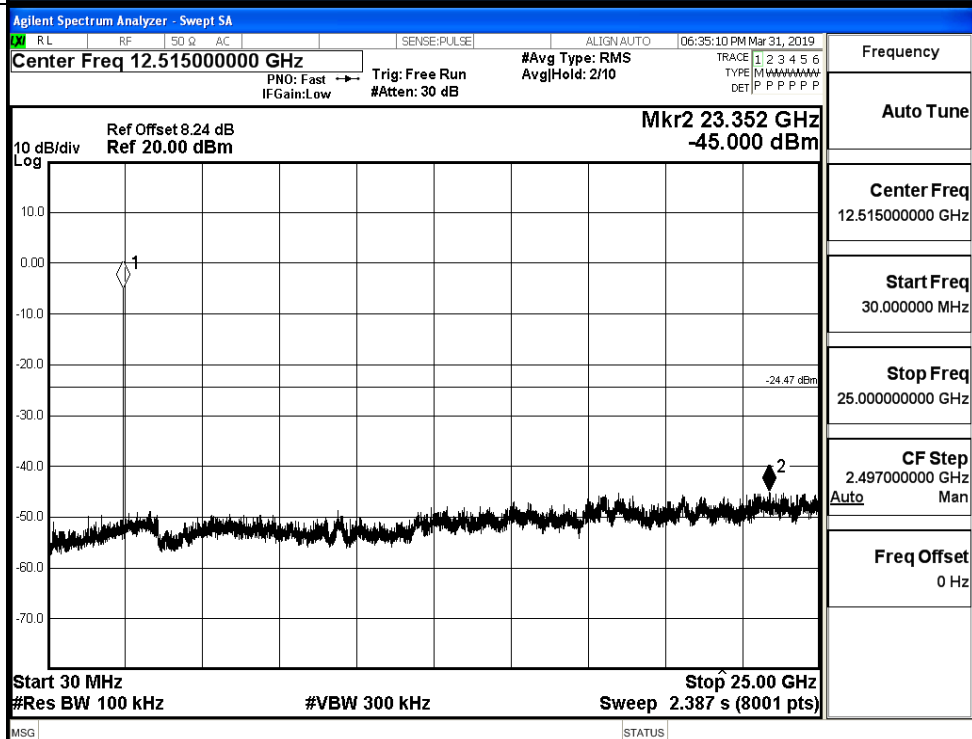


GFSK_HCH_Graphs

Pref

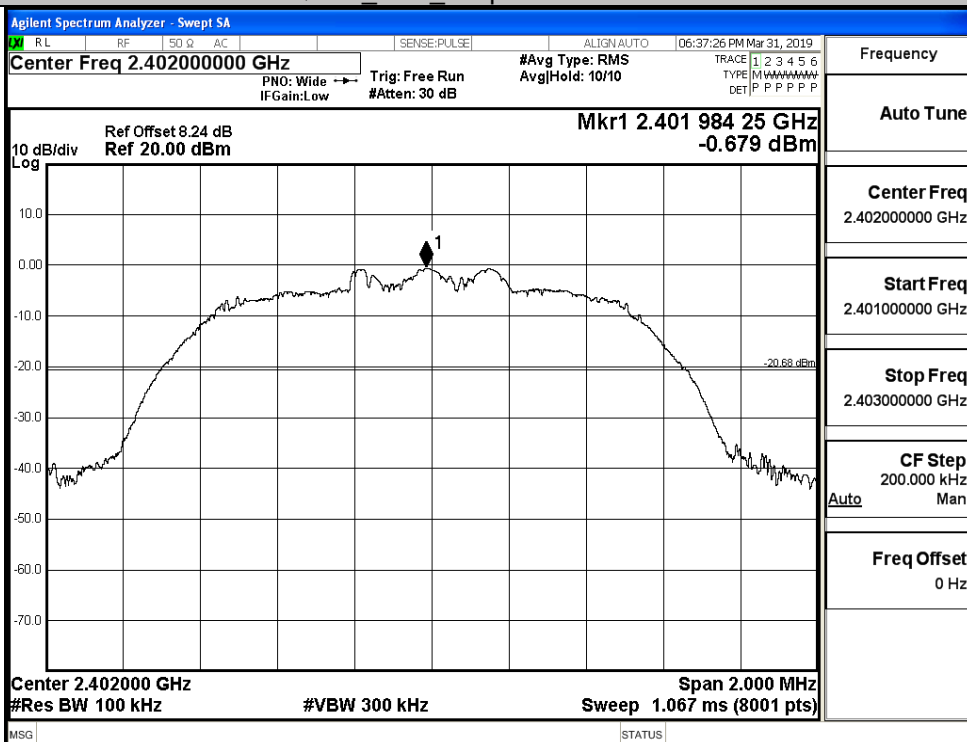


Puw

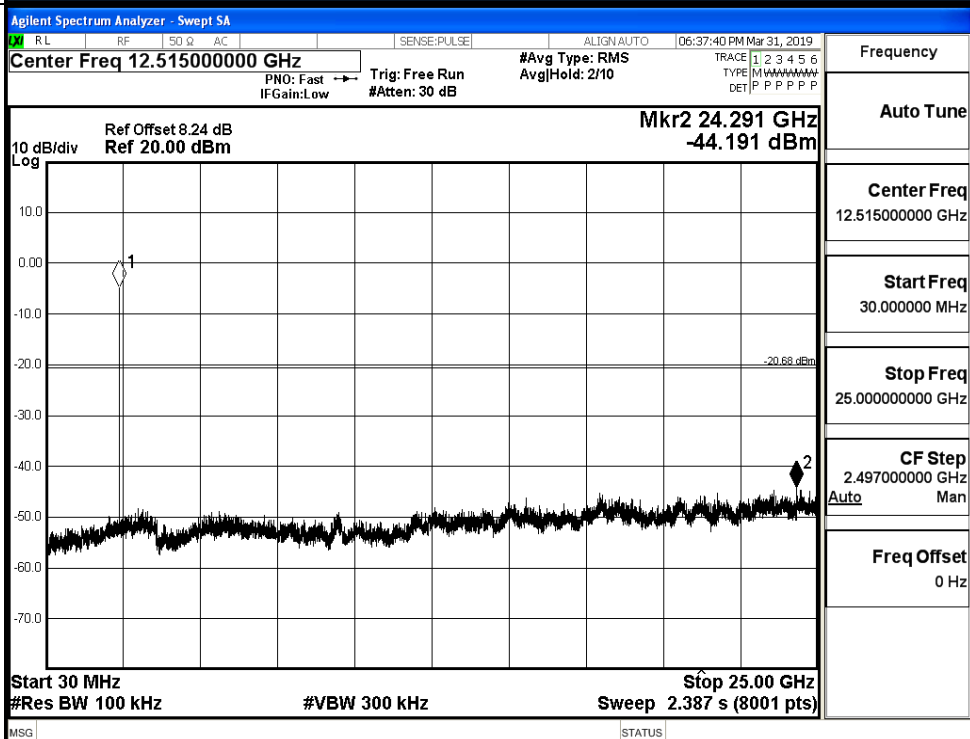


π /4DQPSK LCH_Graphs

Pref

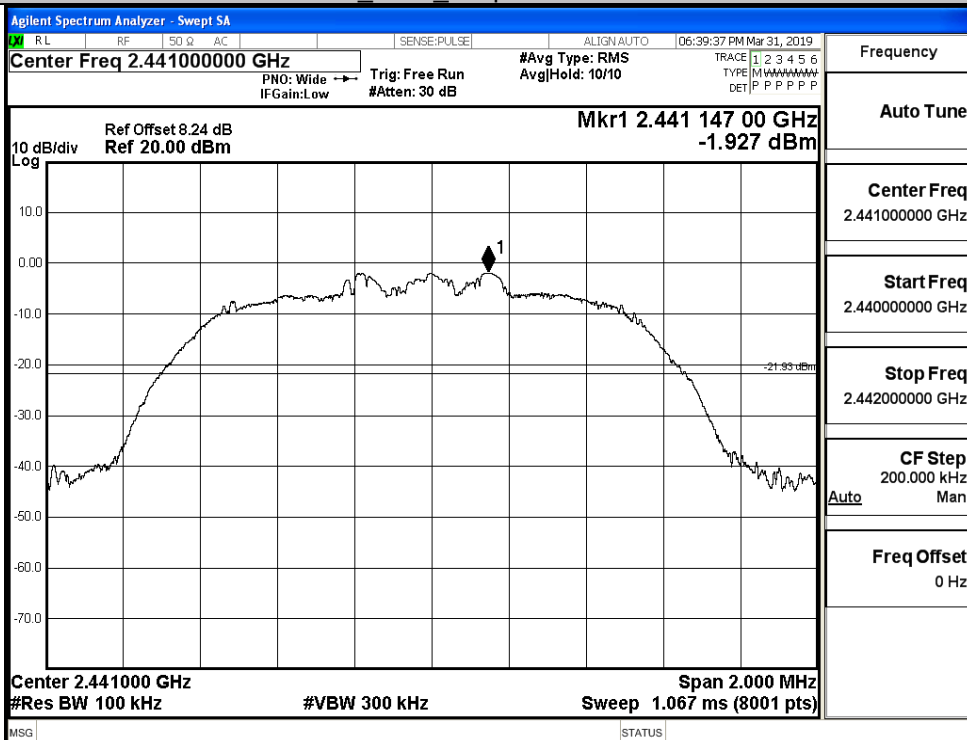


Puw

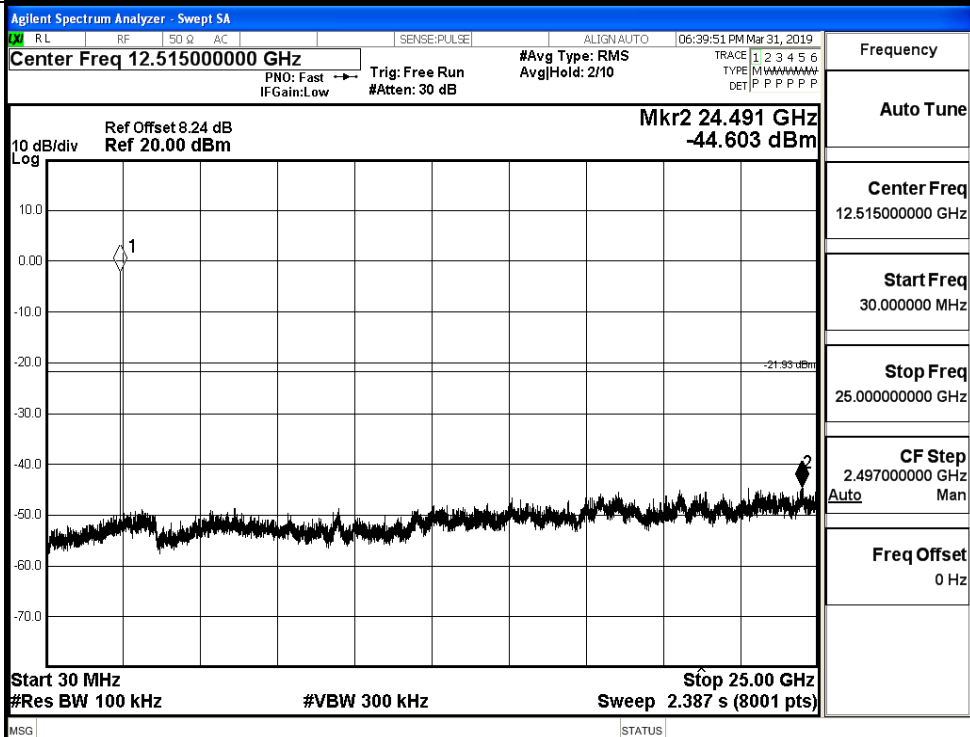


π /4DQPSK_MCH_Graphs

Pref

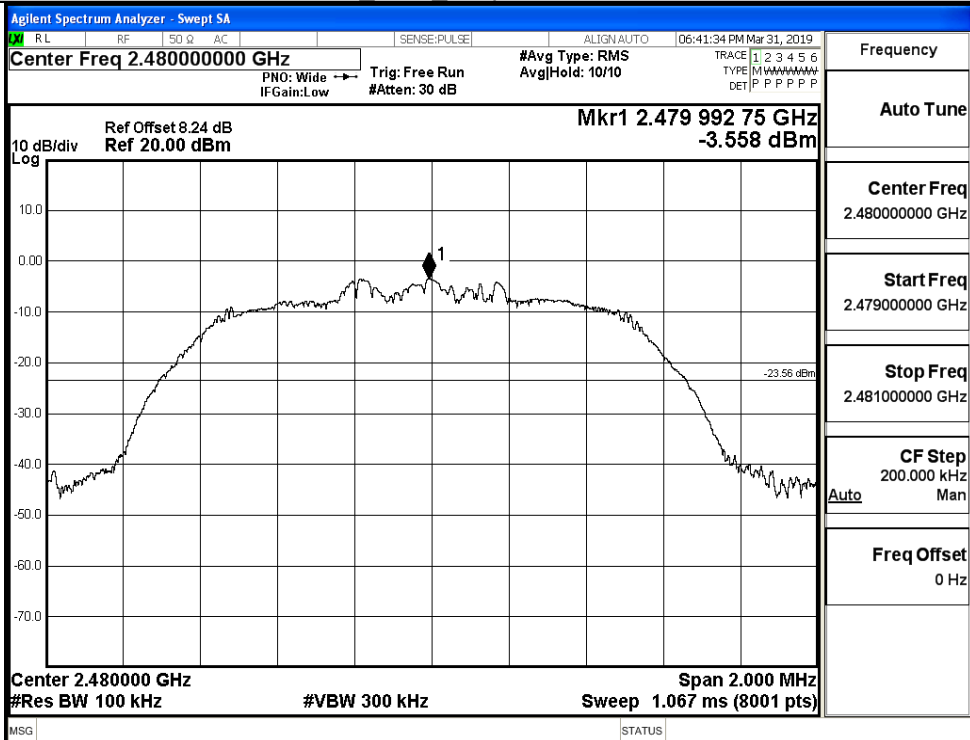


Puw

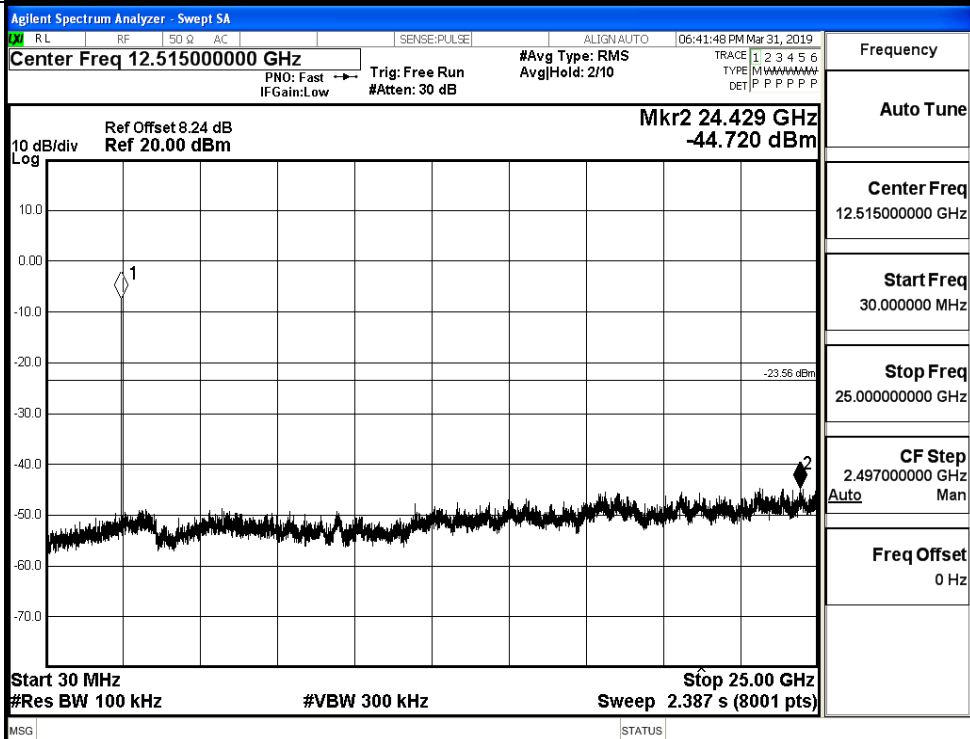


$\pi/4$ DQPSK_HCH_Graphs

Pref

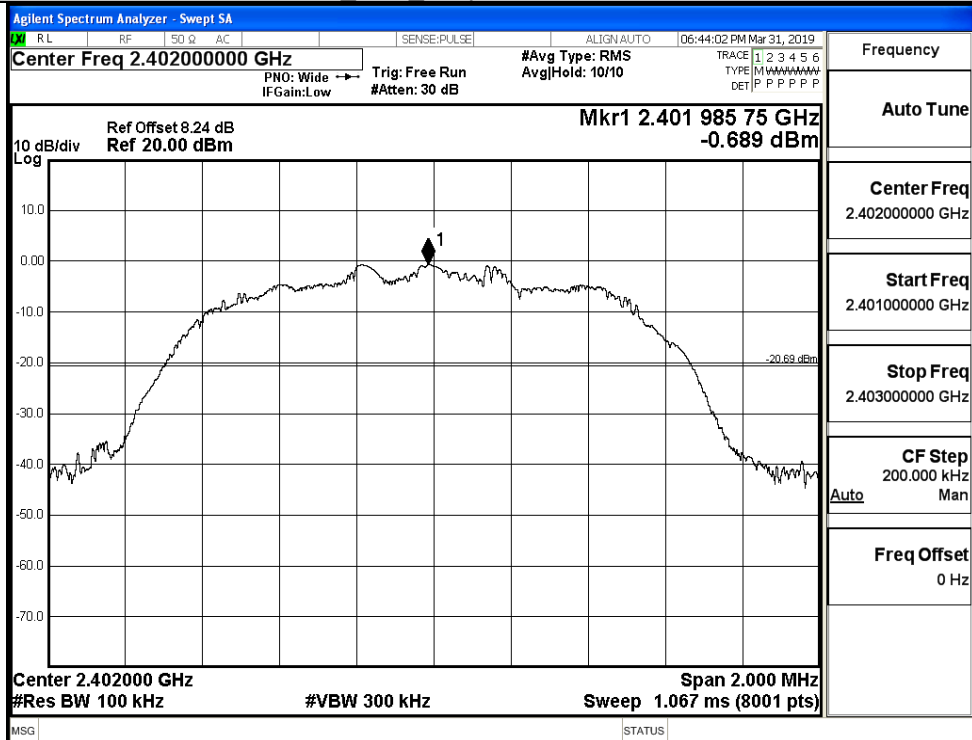


Puw

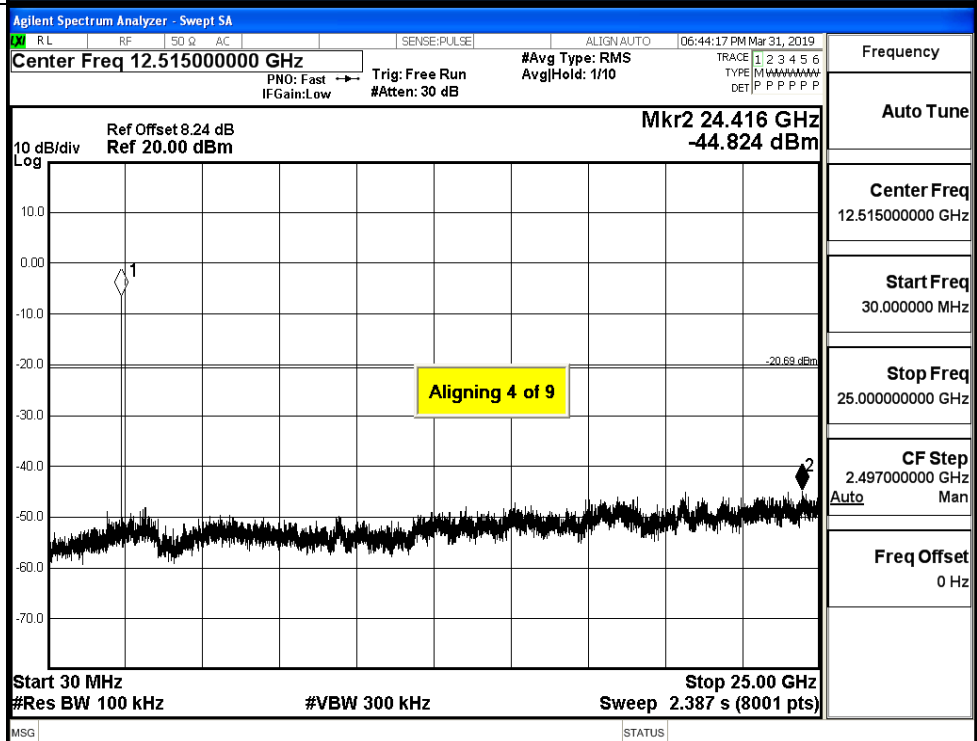


8DPSK_LCH_Graphs

Pref

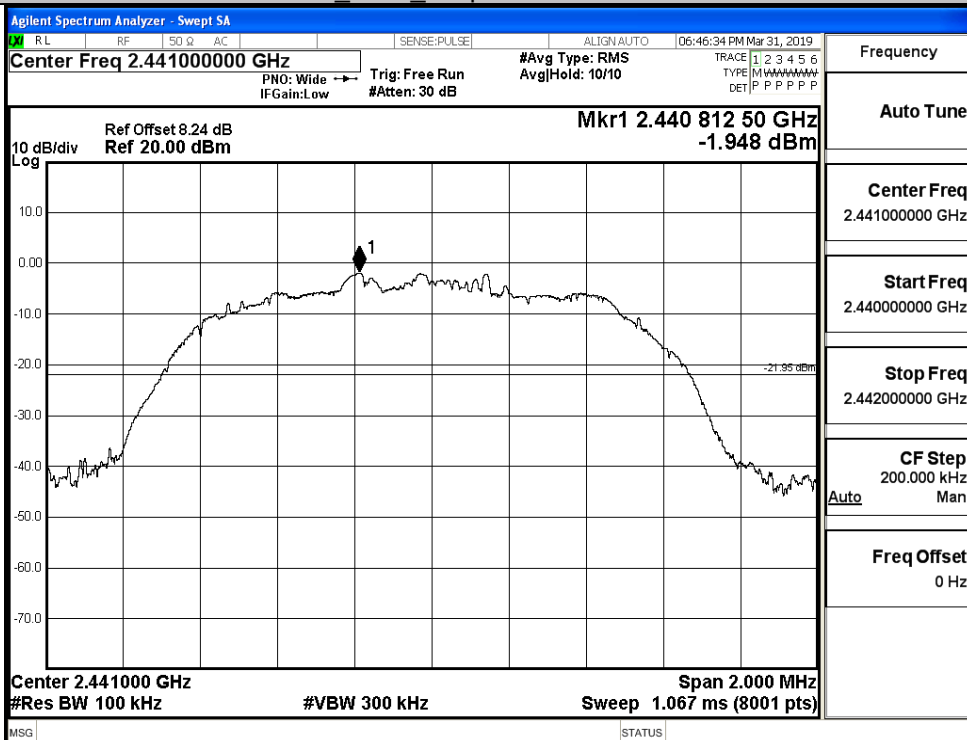


Puw

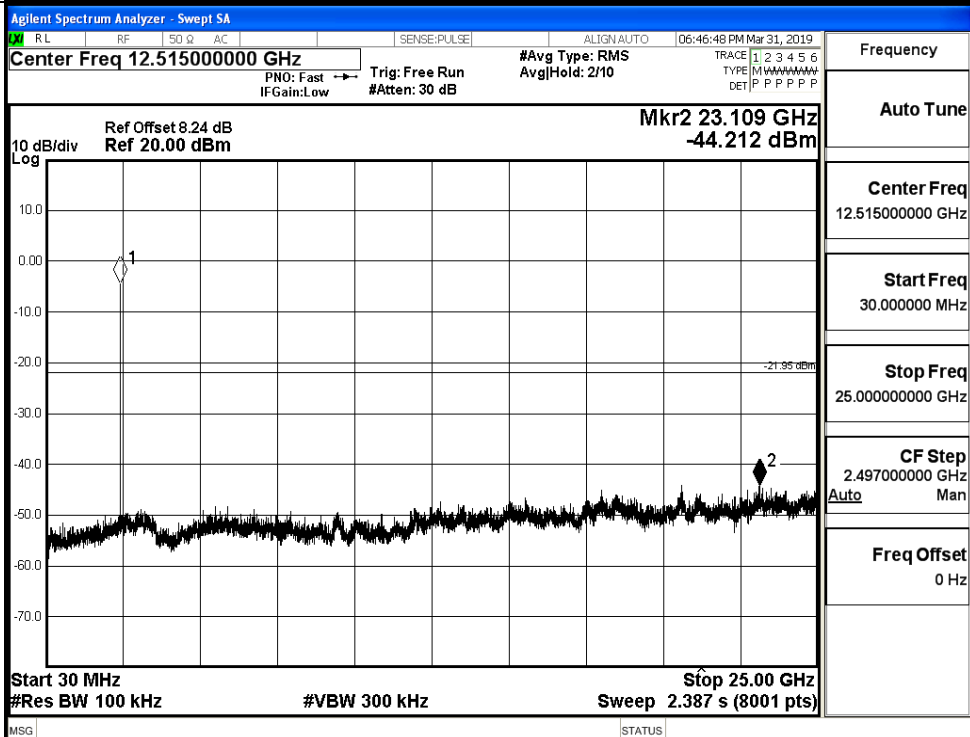


8DPSK_MCH_Graphs

Pref

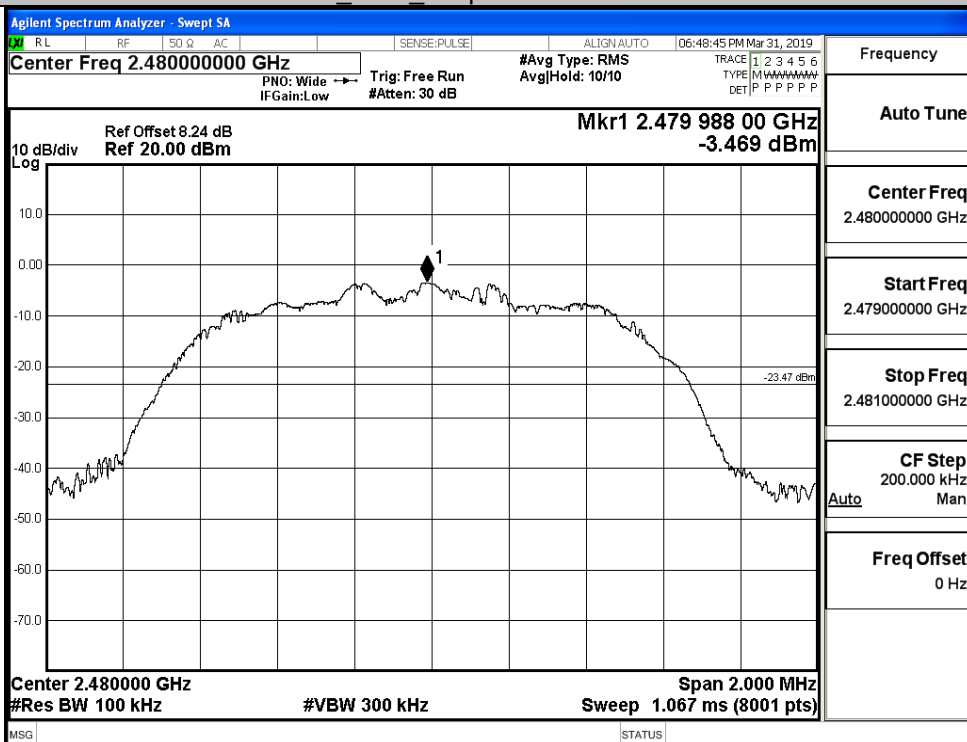


Puw

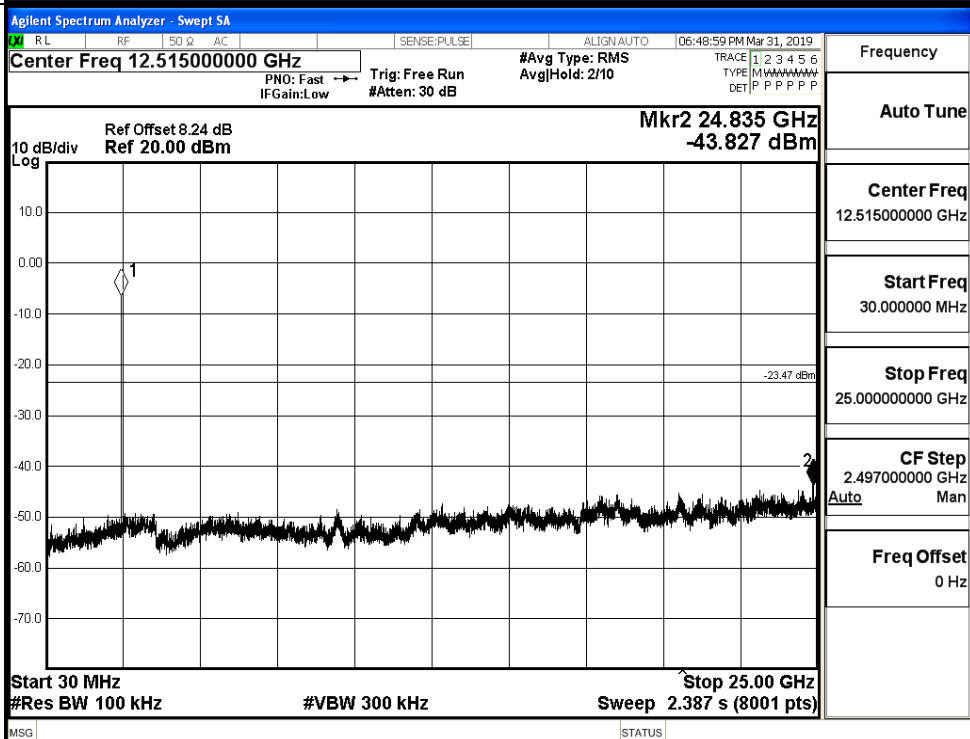


8DPSK_HCH_Graphs

Pref



Puw

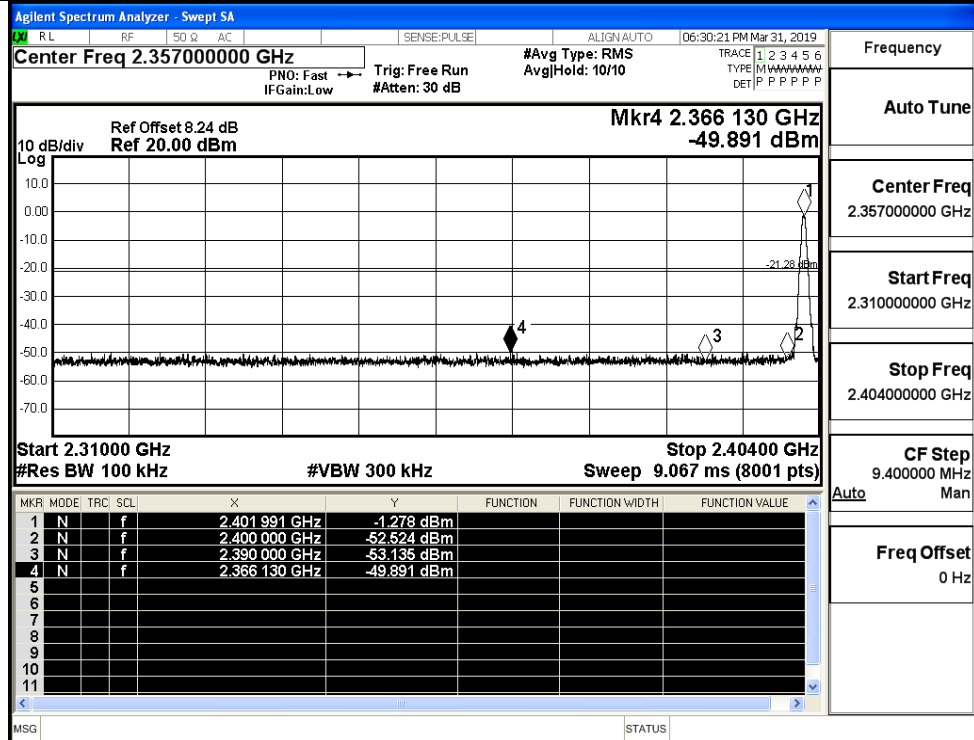


A.7 Band-edge for RF Conducted Emissions

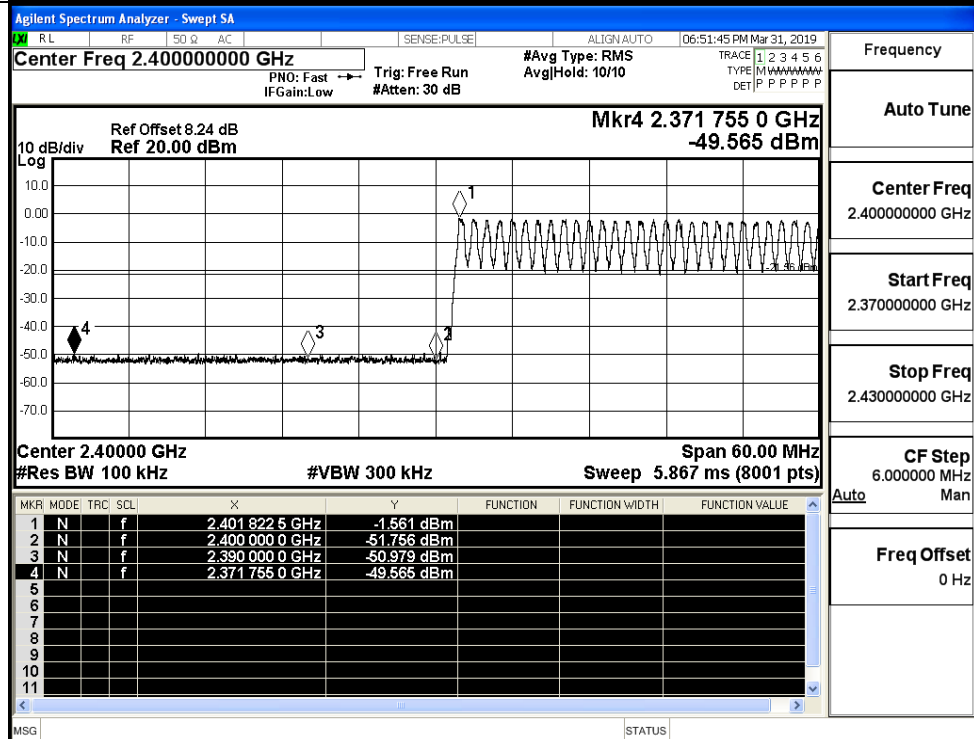
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.278	Off	-49.891	-21.28	PASS
			-1.561	On	-49.565	-21.56	PASS
	HCH	2480	-4.056	Off	-49.937	-24.06	PASS
			-3.413	On	-49.426	-23.41	PASS
$\pi/4$ DQPSK	LCH	2402	-0.719	Off	-49.421	-20.72	PASS
			-0.906	On	-49.610	-20.91	PASS
	HCH	2480	-3.398	Off	-49.318	-23.4	PASS
			-2.501	On	-49.238	-22.5	PASS
8DPSK	LCH	2402	-0.900	Off	-50.075	-20.9	PASS
			-0.819	On	-48.704	-20.82	PASS
	HCH	2480	-3.472	Off	-49.870	-23.47	PASS
			-2.340	On	-48.877	-22.34	PASS

Test Graphs

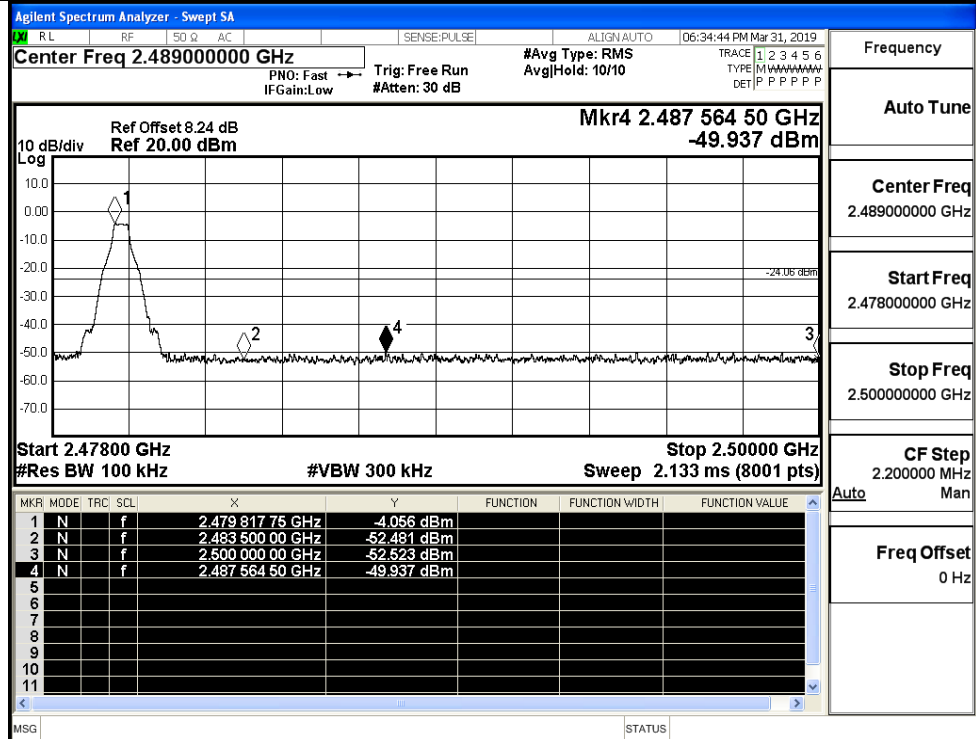
GFSK/LCH/No Hop



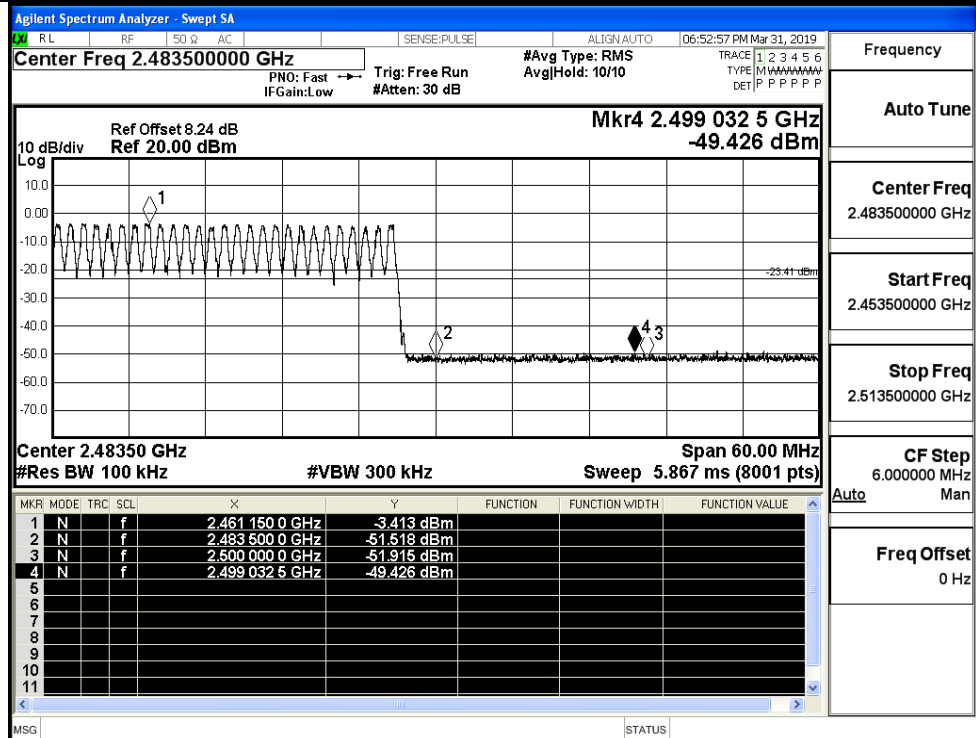
GFSK/LCH/Hop



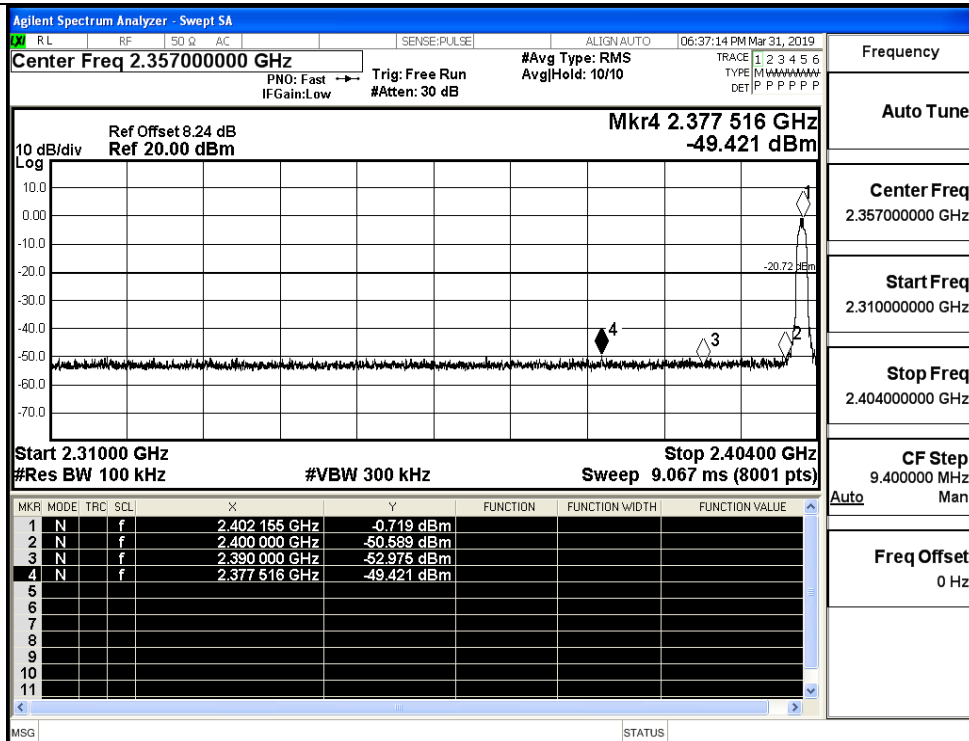
GFSK/HCH/No Hop



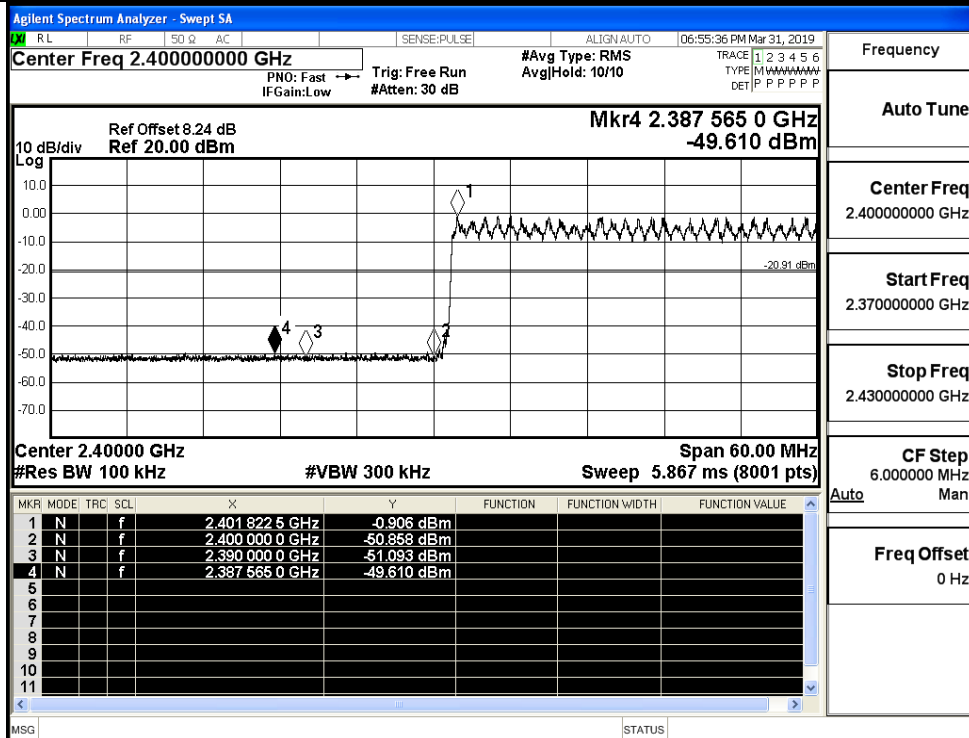
GFSK/HCH/Hop



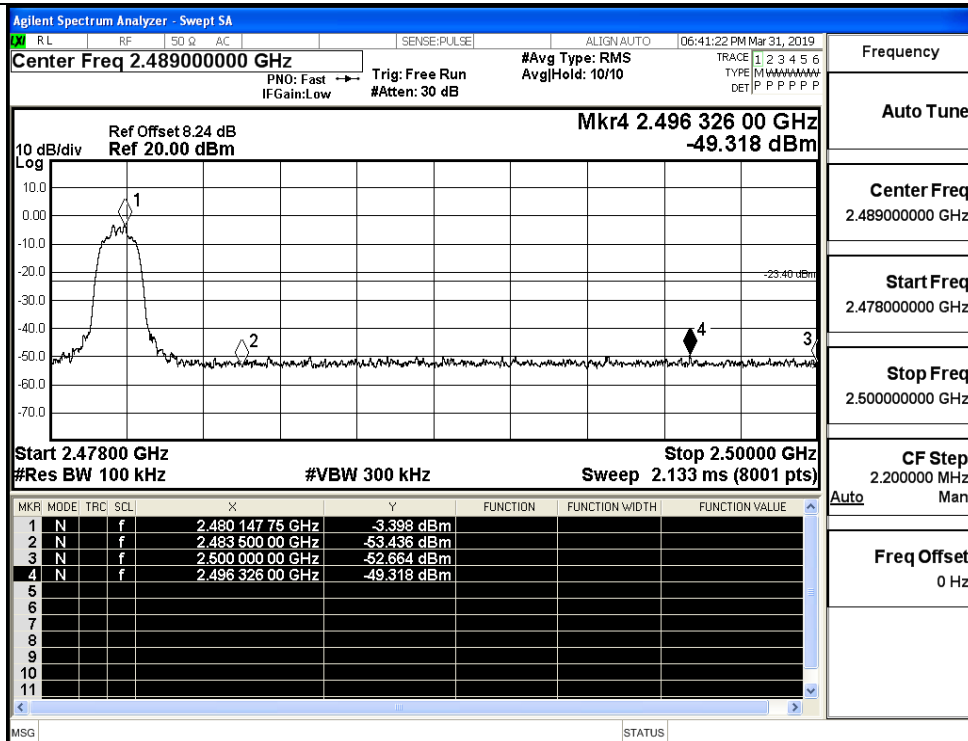
$\pi/4$ DQPSK/LCH/No
Hop



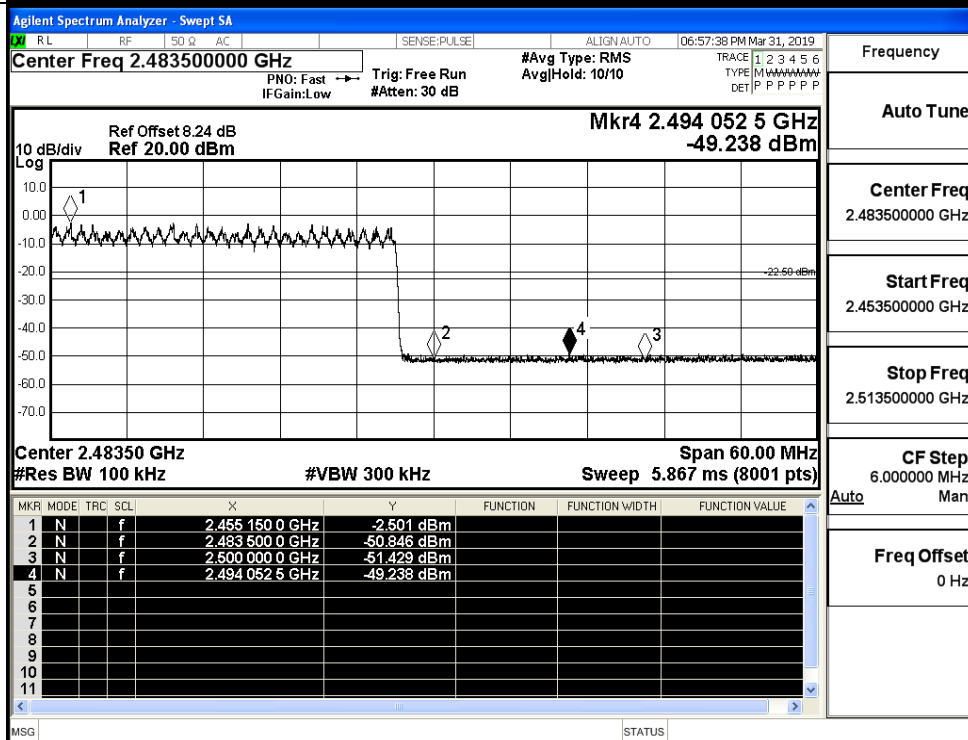
$\pi/4$ DQPSK/LCH/Hop



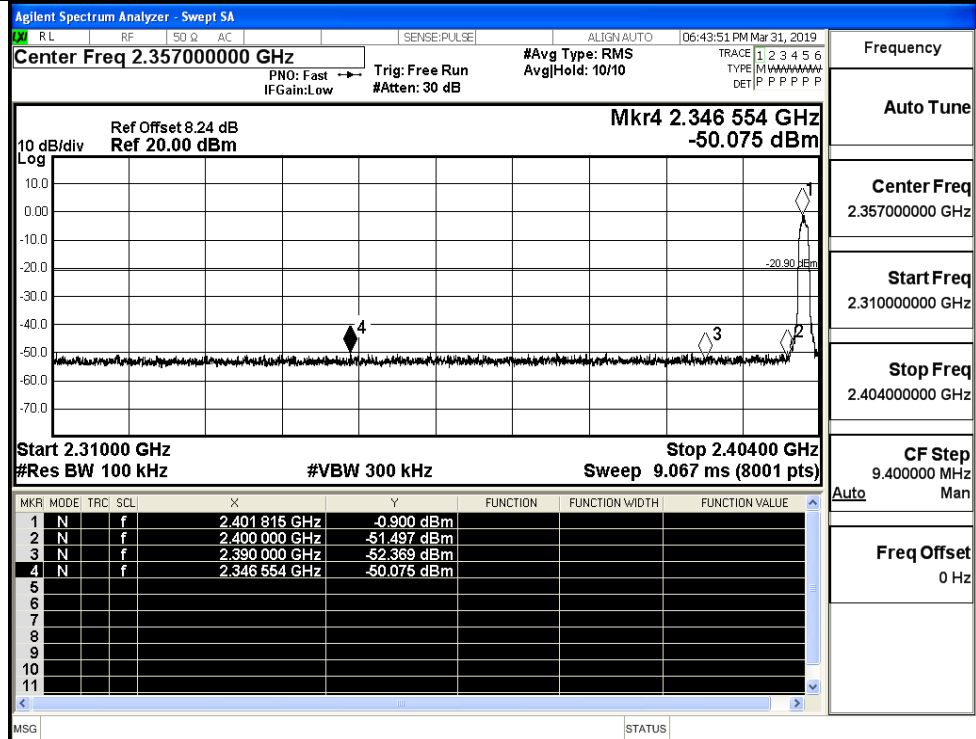
$\pi/4$ DQPSK/HCH/No
Hop



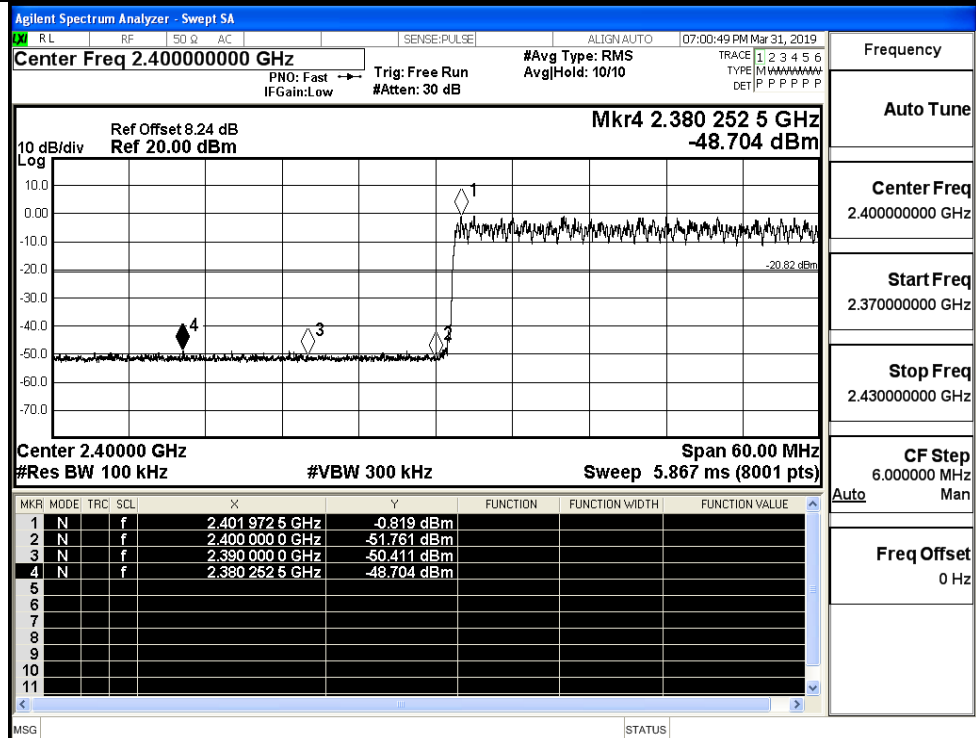
$\pi/4$ DQPSK/HCH/Hop



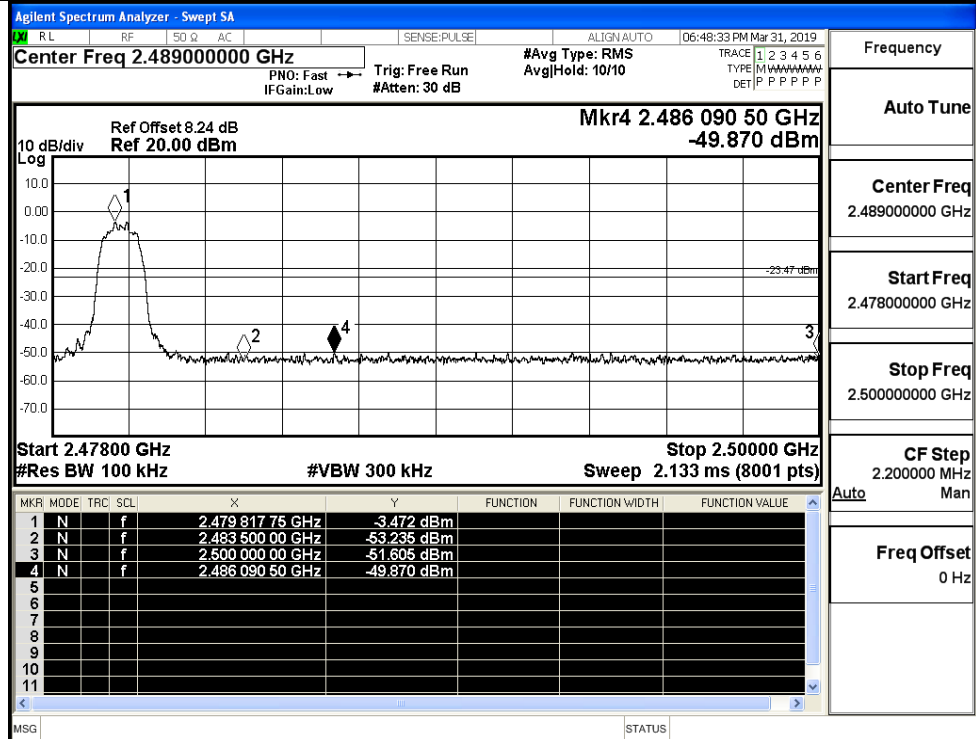
8DPSK/LCH/No Hop



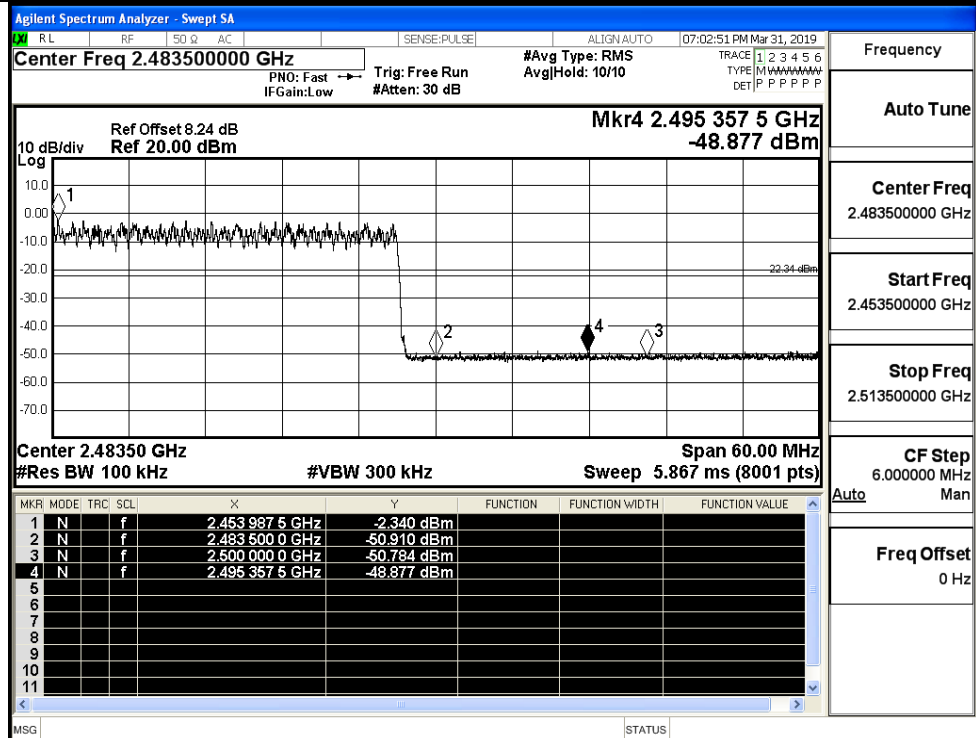
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



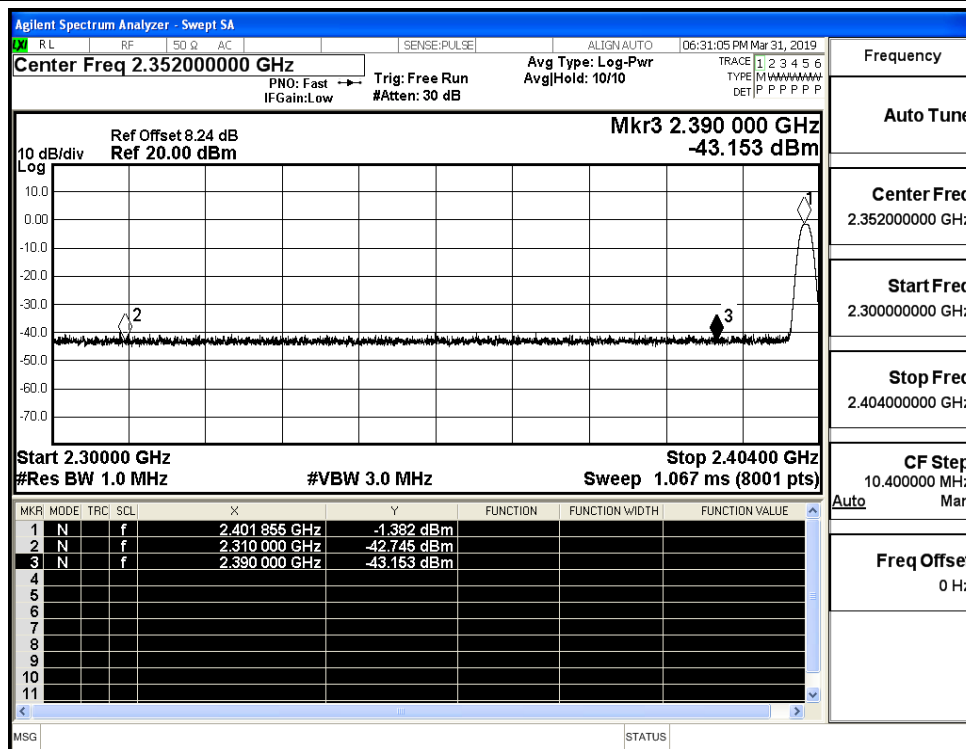
8DPSK/HCH/Hop



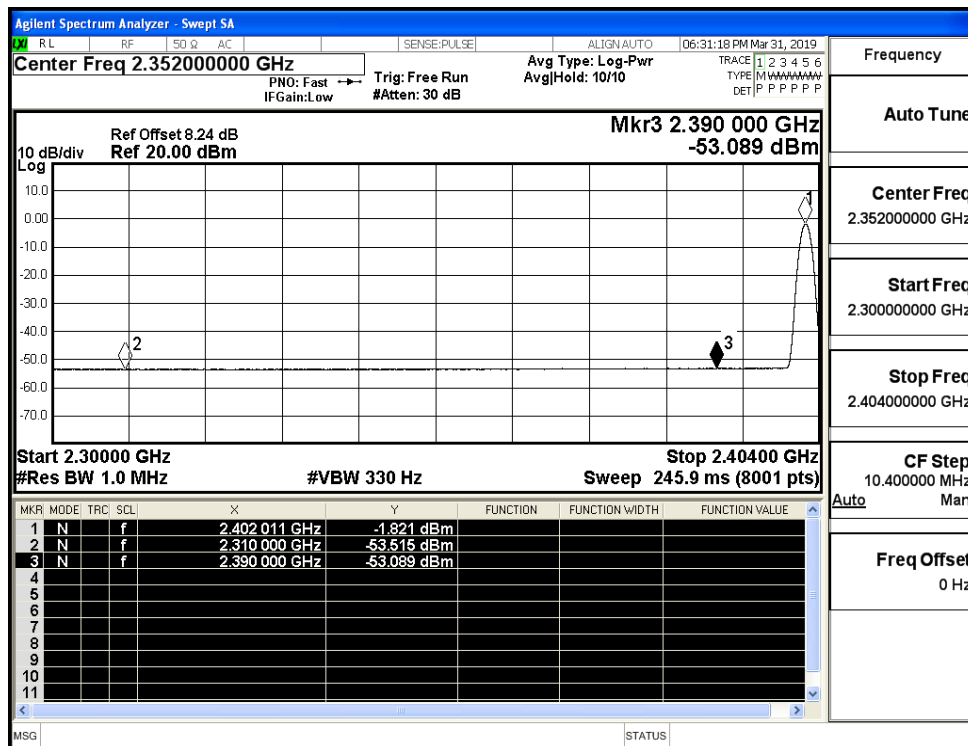
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.745	4.00	0	56.483	PEAK	74	PASS
	Off	2310.0	-53.515	4.00	0	45.713	AV	54	PASS
	Off	2390.0	-43.153	4.00	0	56.075	PEAK	74	PASS
	Off	2390.0	-53.089	4.00	0	46.139	AV	54	PASS
	Off	2483.5	-42.969	4.00	0	56.259	PEAK	74	PASS
	Off	2483.5	-52.931	4.00	0	46.297	AV	54	PASS
	Off	2500.0	-43.196	4.00	0	56.032	PEAK	74	PASS
	Off	2500.0	-52.871	4.00	0	46.357	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.732	4.00	0	56.496	PEAK	74	PASS
	Off	2310.0	-53.500	4.00	0	45.728	AV	54	PASS
	Off	2390.0	-43.554	4.00	0	55.674	PEAK	74	PASS
	Off	2390.0	-53.183	4.00	0	46.045	AV	54	PASS
	Off	2483.5	-41.483	4.00	0	57.745	PEAK	74	PASS
	Off	2483.5	-52.976	4.00	0	46.252	AV	54	PASS
	Off	2500.0	-42.386	4.00	0	56.842	PEAK	74	PASS
	Off	2500.0	-52.758	4.00	0	46.470	AV	54	PASS
8DPSK	Off	2310.0	-43.836	4.00	0	55.392	PEAK	74	PASS
	Off	2310.0	-53.419	4.00	0	45.809	AV	54	PASS
	Off	2390.0	-42.546	4.00	0	56.682	PEAK	74	PASS
	Off	2390.0	-53.261	4.00	0	45.967	AV	54	PASS
	Off	2483.5	-41.300	4.00	0	57.928	PEAK	74	PASS
	Off	2483.5	-52.925	4.00	0	46.303	AV	54	PASS
	Off	2500.0	-42.427	4.00	0	56.801	PEAK	74	PASS
	Off	2500.0	-52.801	4.00	0	46.427	AV	54	PASS

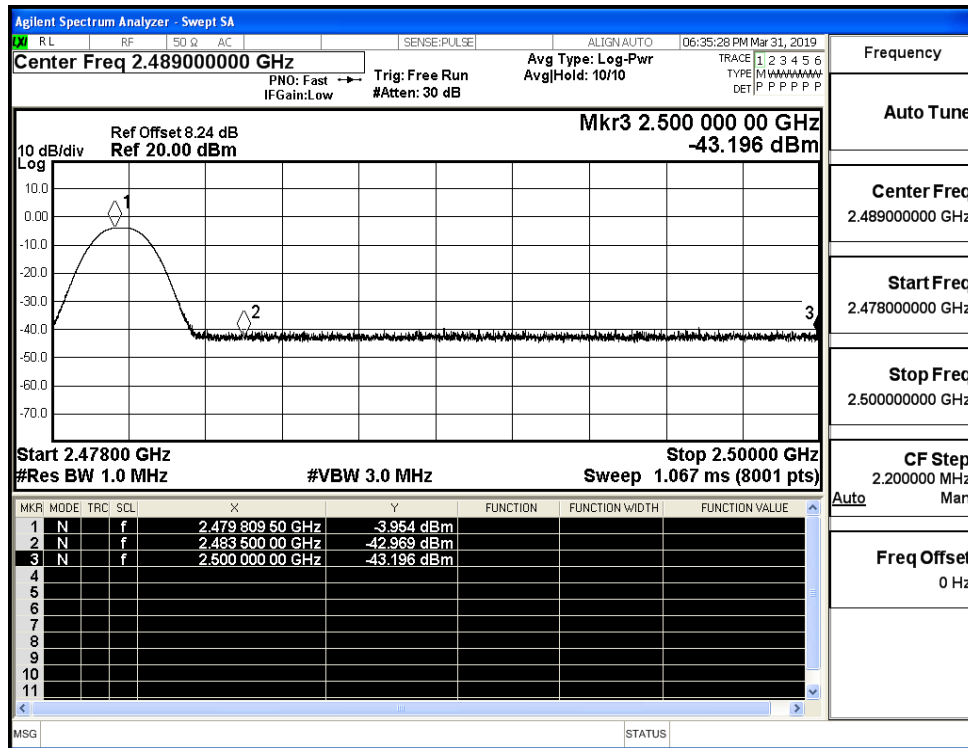
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



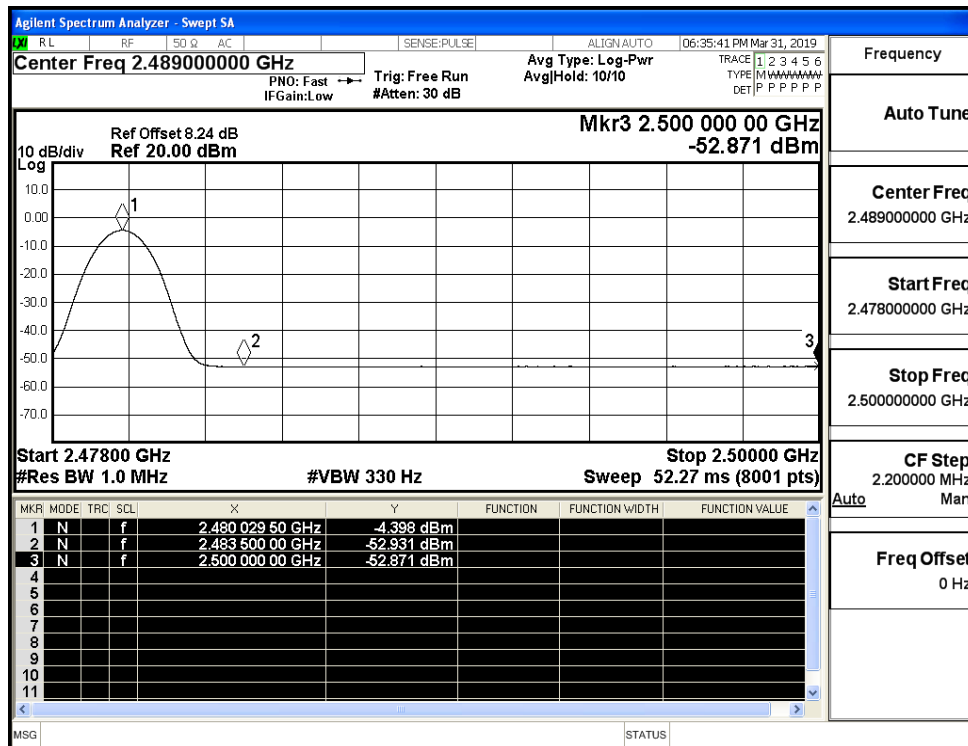
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

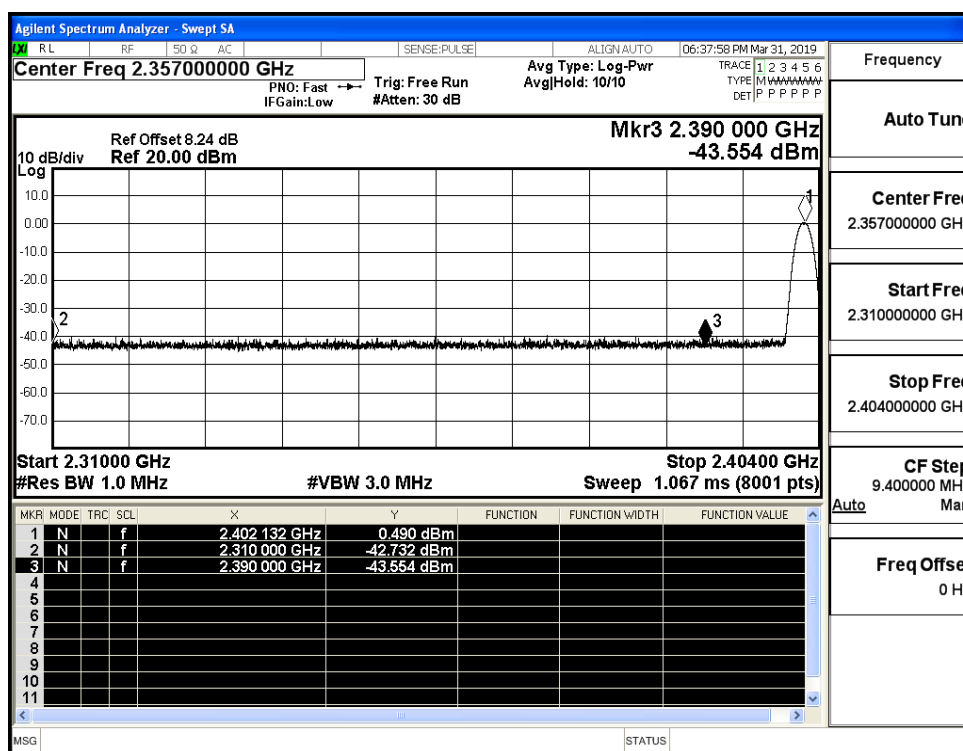
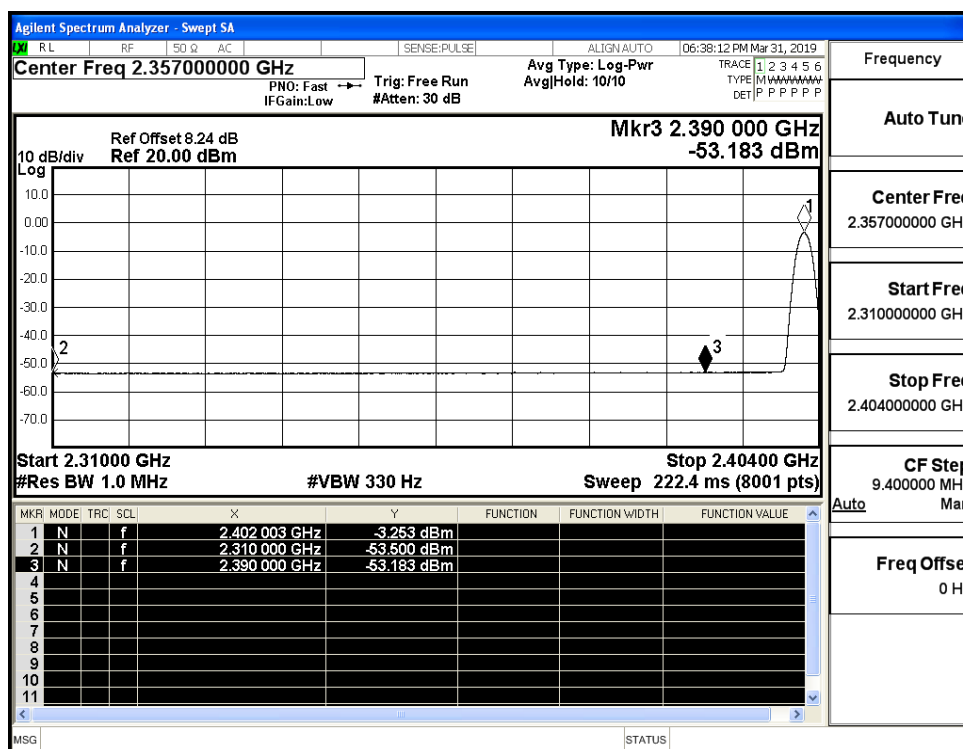


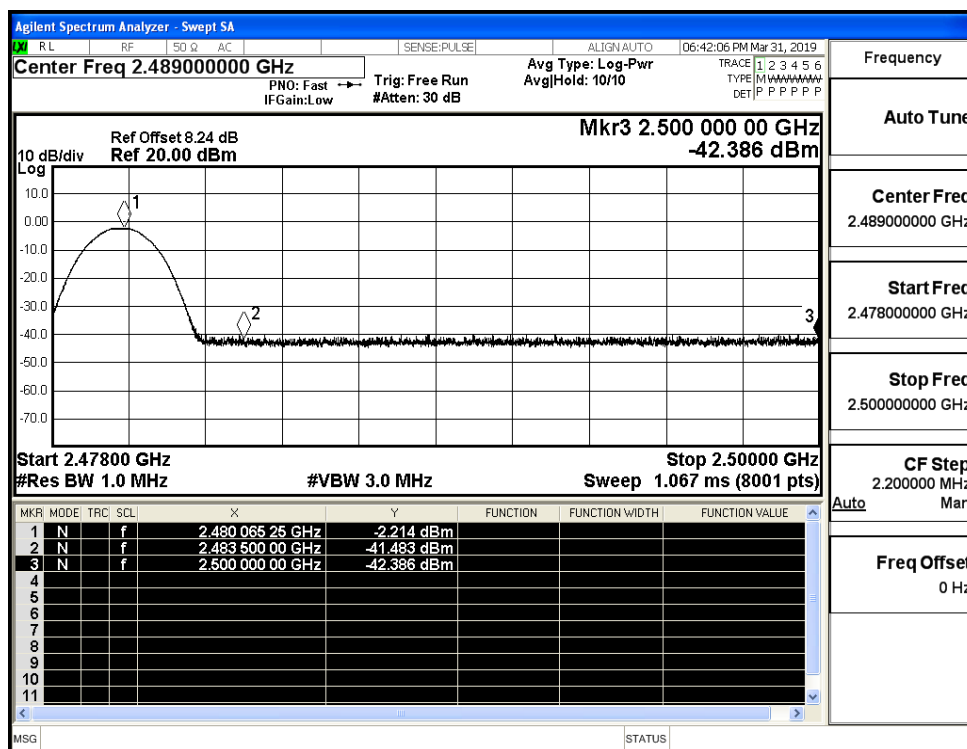
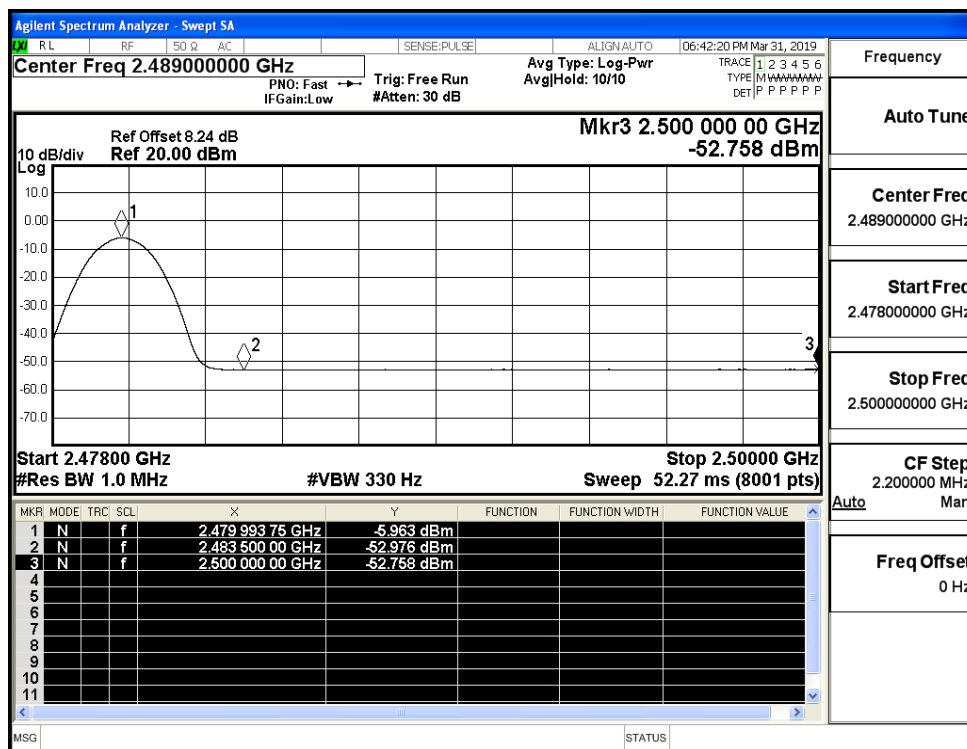
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



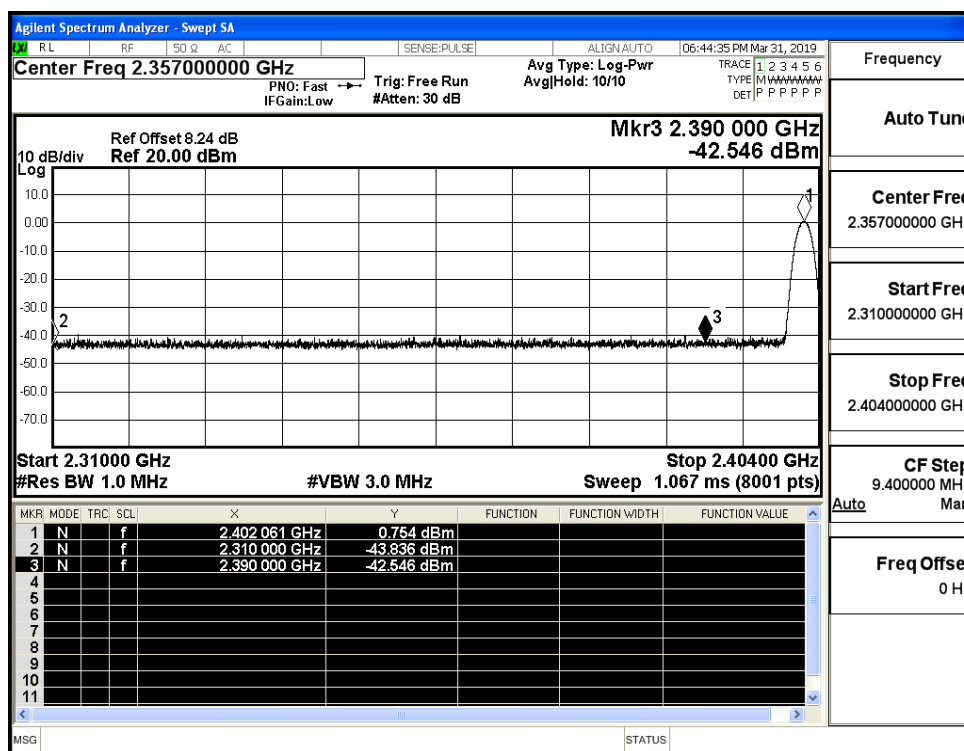
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



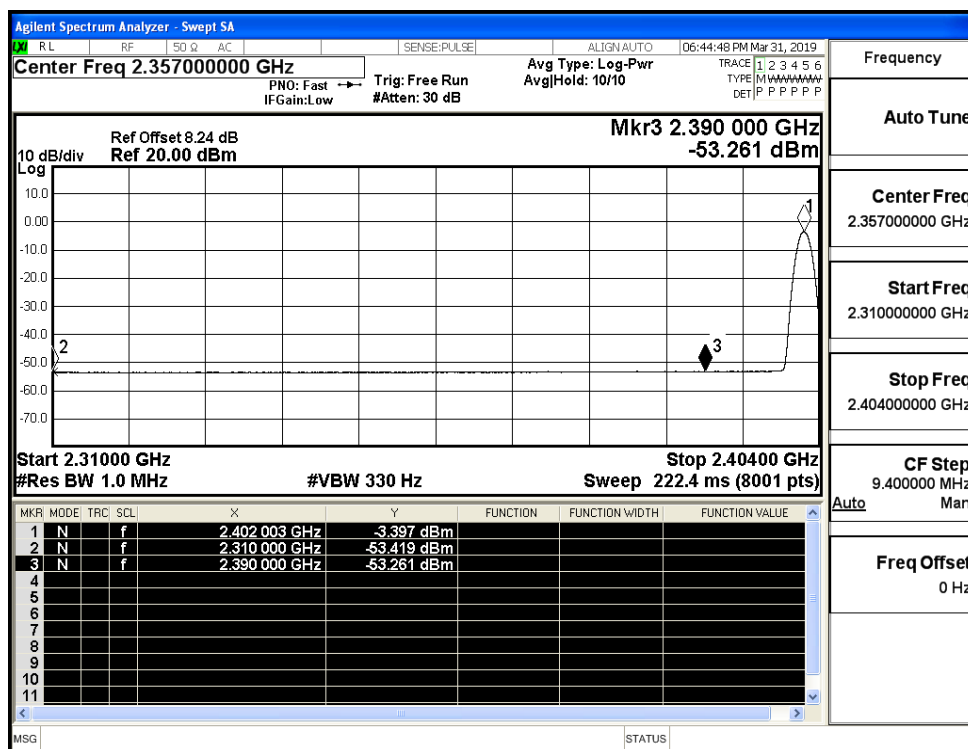
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

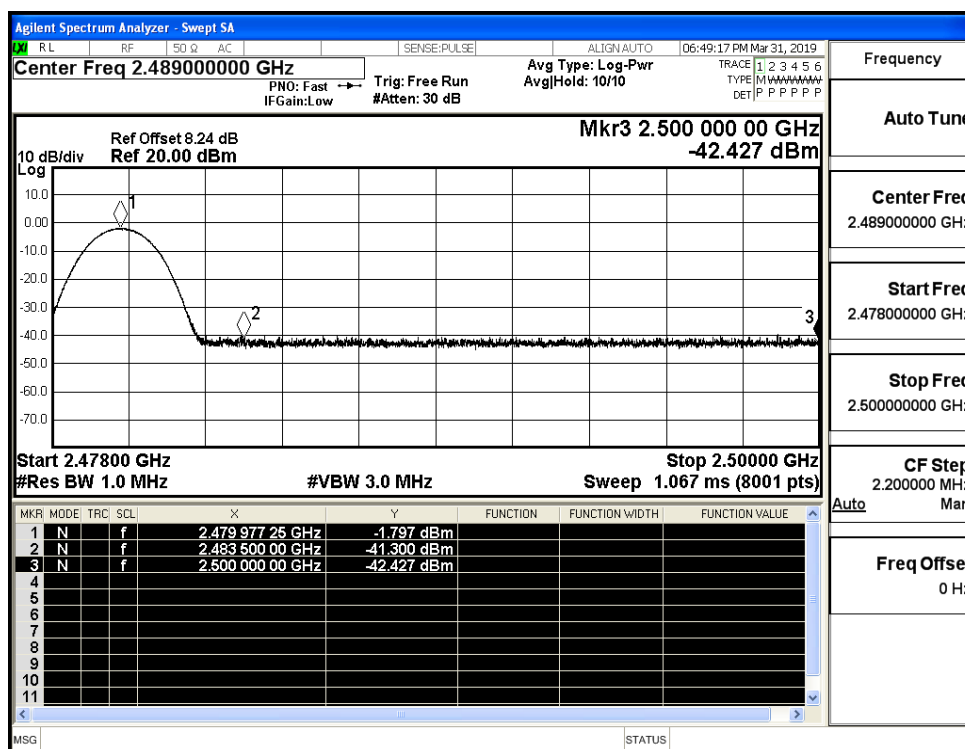
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

