

Appendix A

RF Test Data for BT V4.2(BDR/EDR) (Conducted Measurement)

Product Name: Shower Speaker

Trade Mark: atomi

Test Model: AT1225

Environmental Conditions

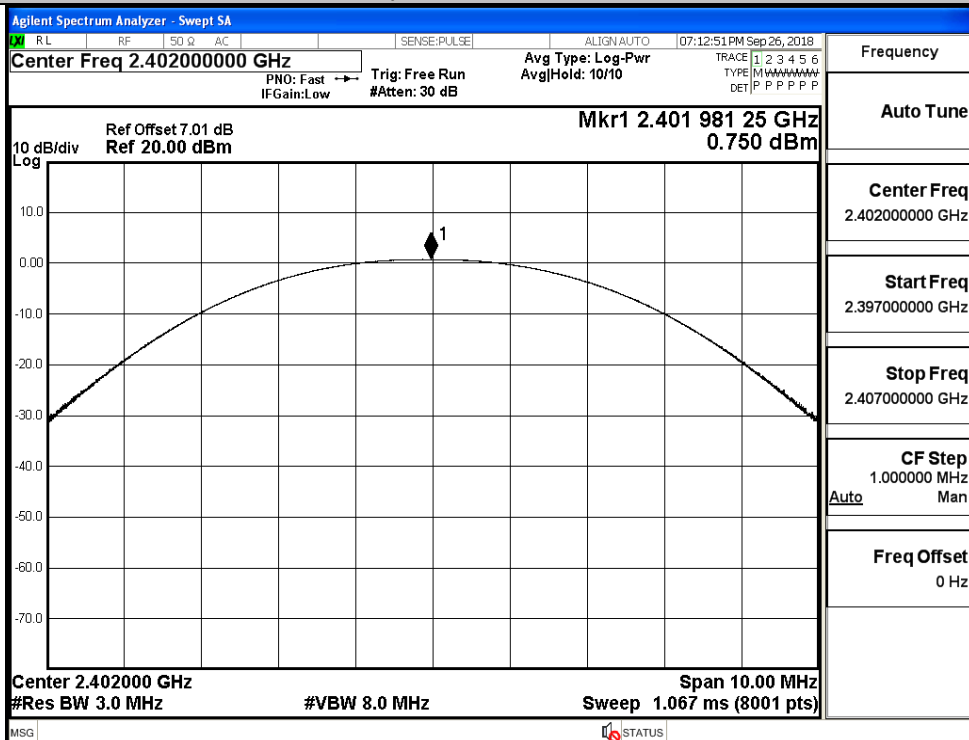
Temperature:	24.3 ° C
Relative Humidity:	53.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.Xu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

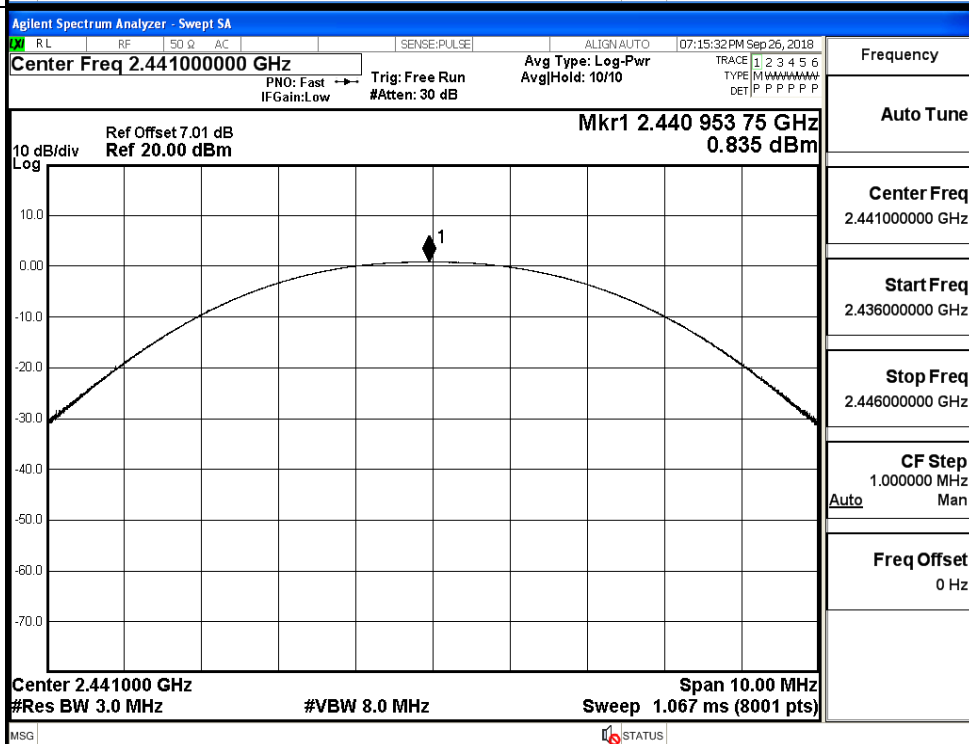
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.750	21	PASS
	MCH	0.835	21	PASS
	HCH	0.406	21	PASS
$\pi/4$ DQPSK	LCH	0.553	21	PASS
	MCH	0.644	21	PASS
	HCH	0.220	21	PASS

Test Graphs

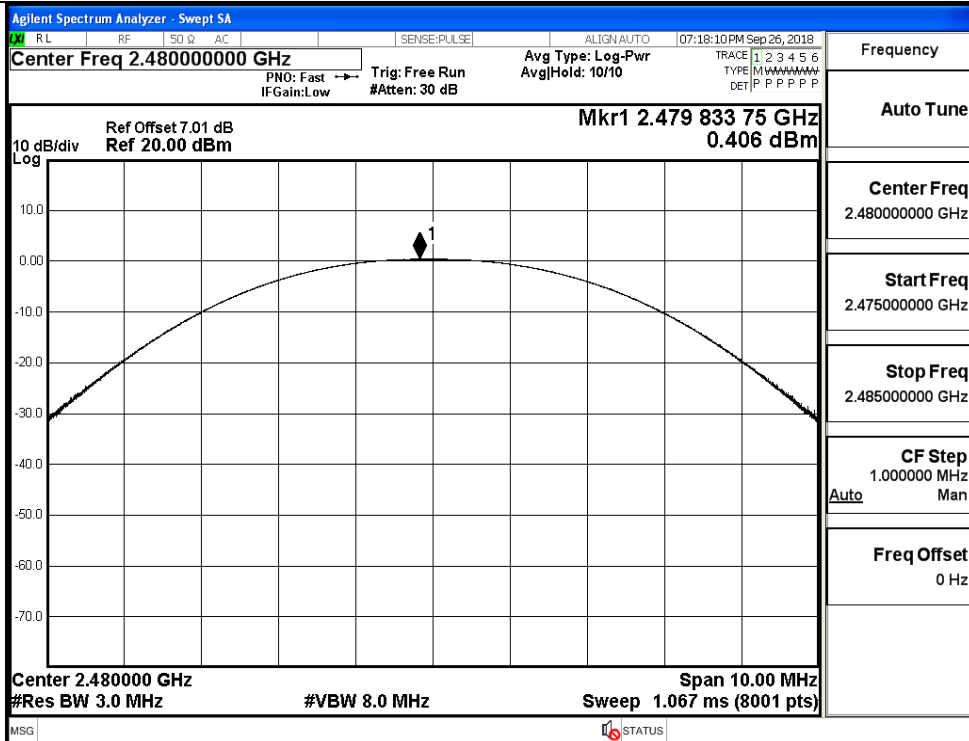
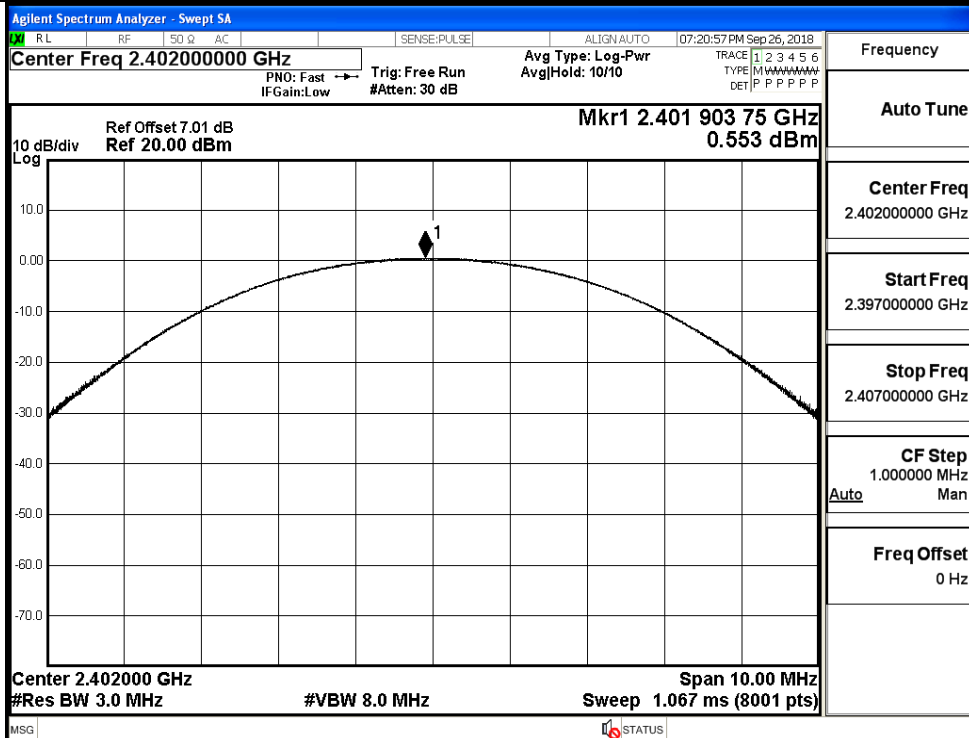
GFSK/LCH

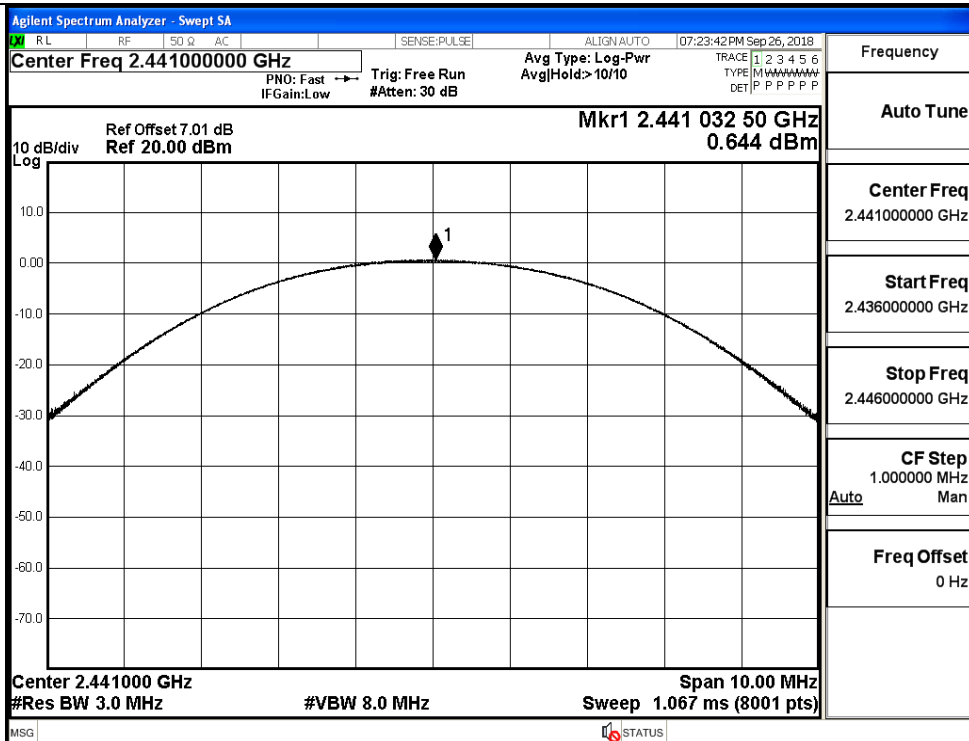
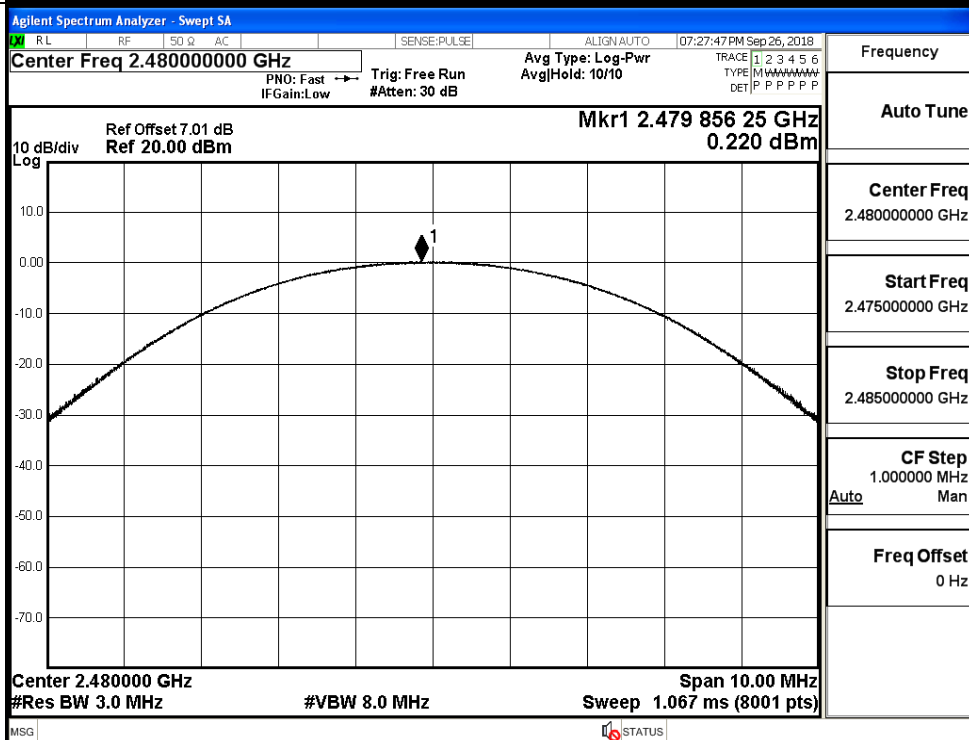


GFSK/MCH



GFSK/HCH

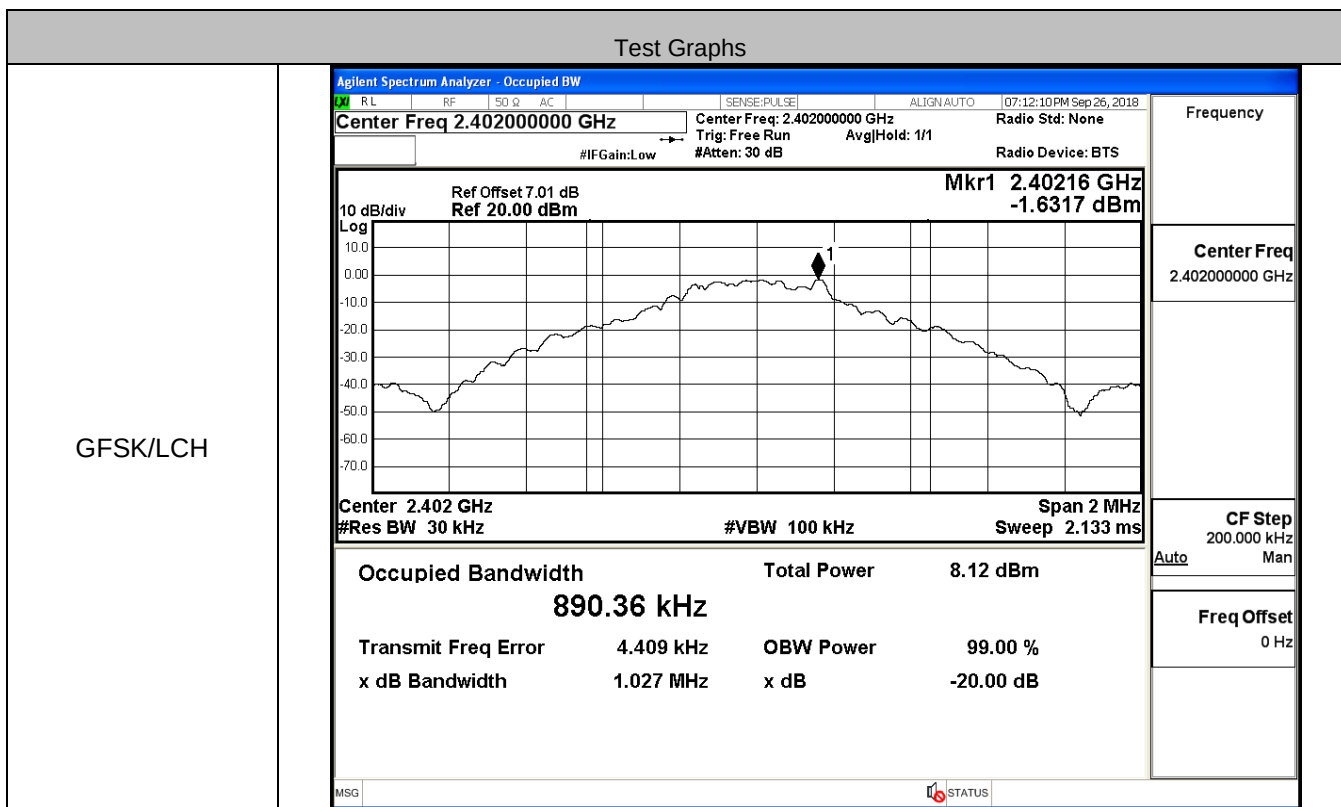
 π /4DQPSK/LCH

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

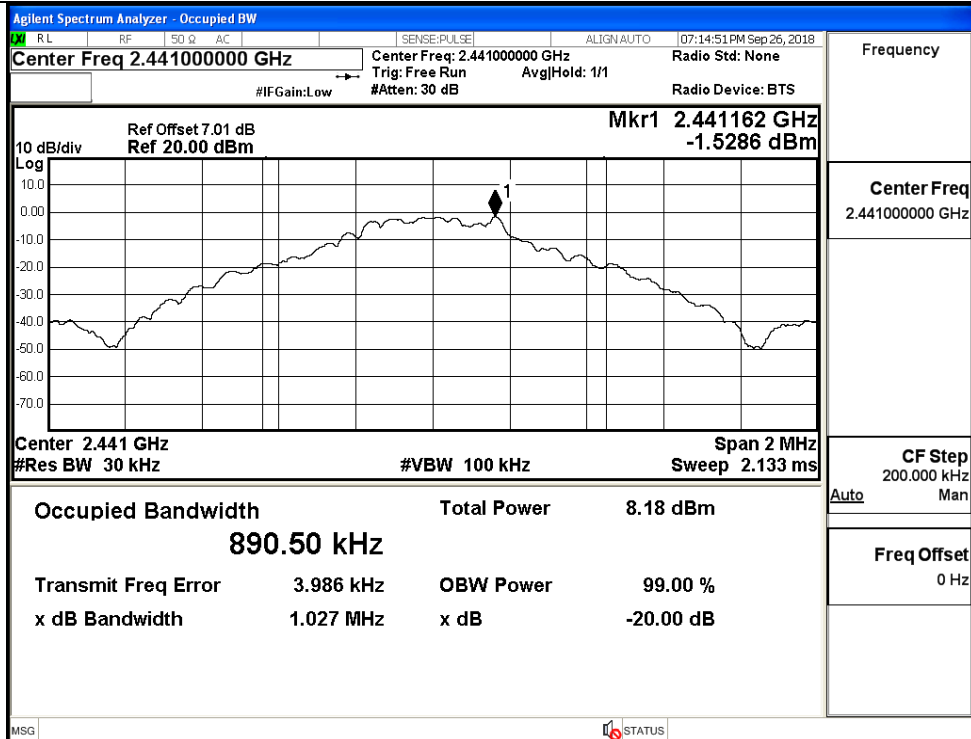
A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89036	1.027	Not Specified	PASS
	MCH	0.89050	1.027	Not Specified	PASS
	HCH	0.89113	1.031	Not Specified	PASS
π /4DQPSK	LCH	1.1683	1.288	Not Specified	PASS
	MCH	1.1689	1.286	Not Specified	PASS
	HCH	1.1682	1.286	Not Specified	PASS

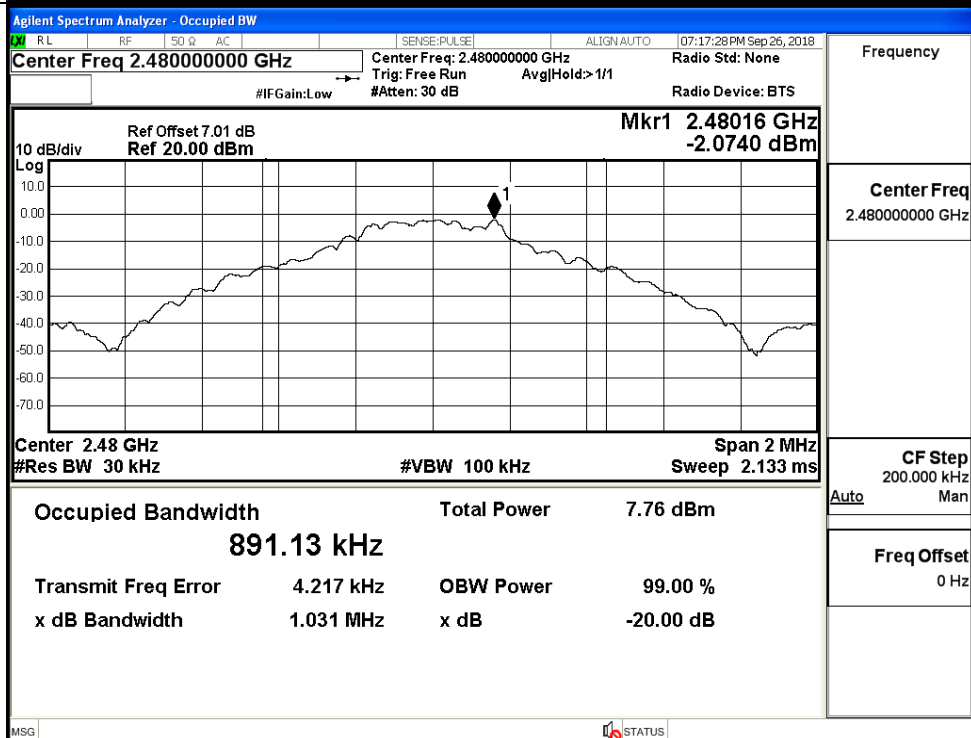
Test Graphs

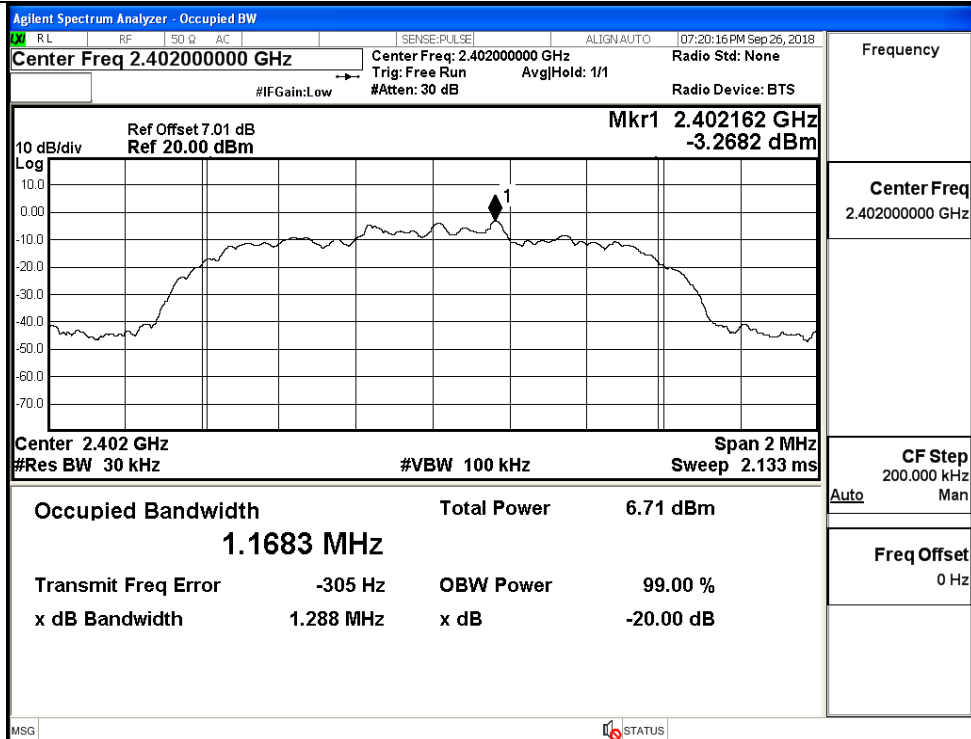
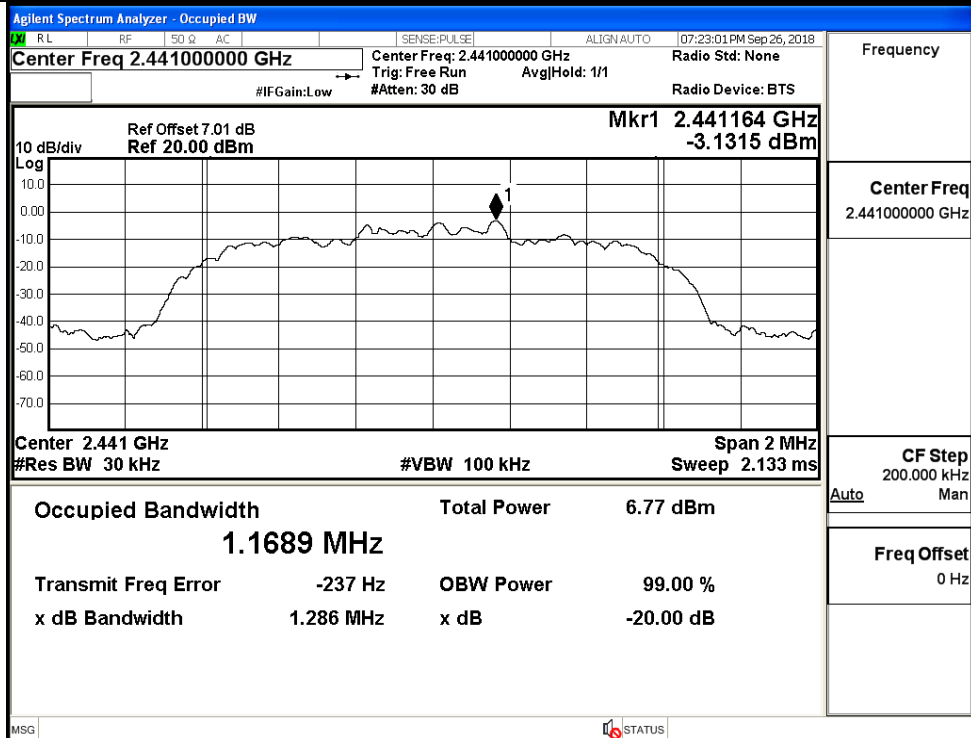


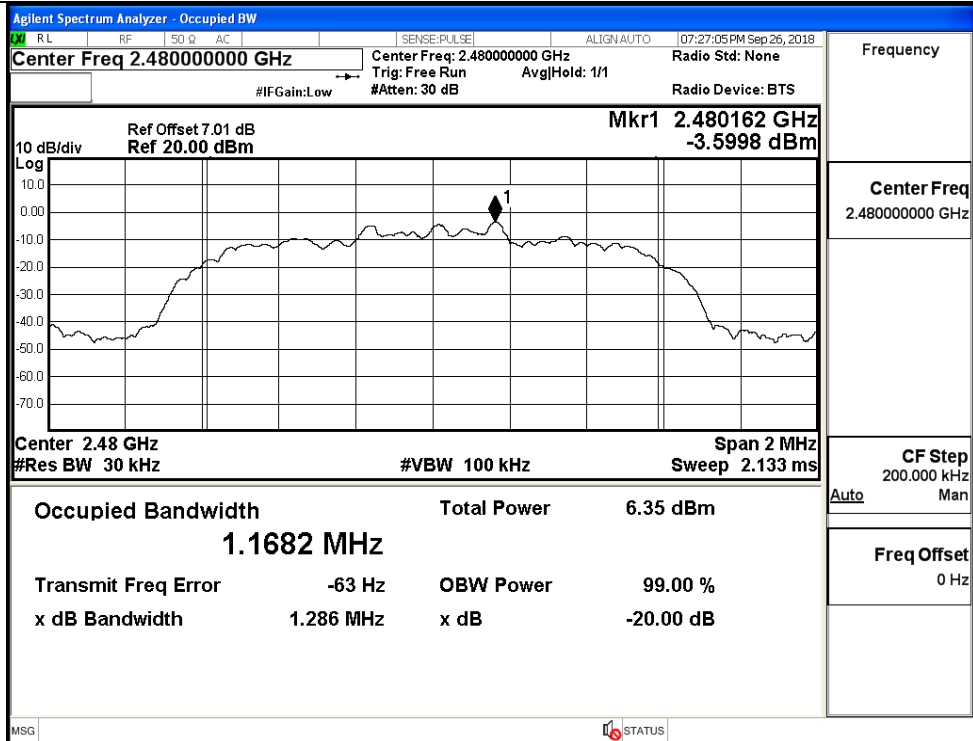
GFSK/MCH



GFSK/HCH



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

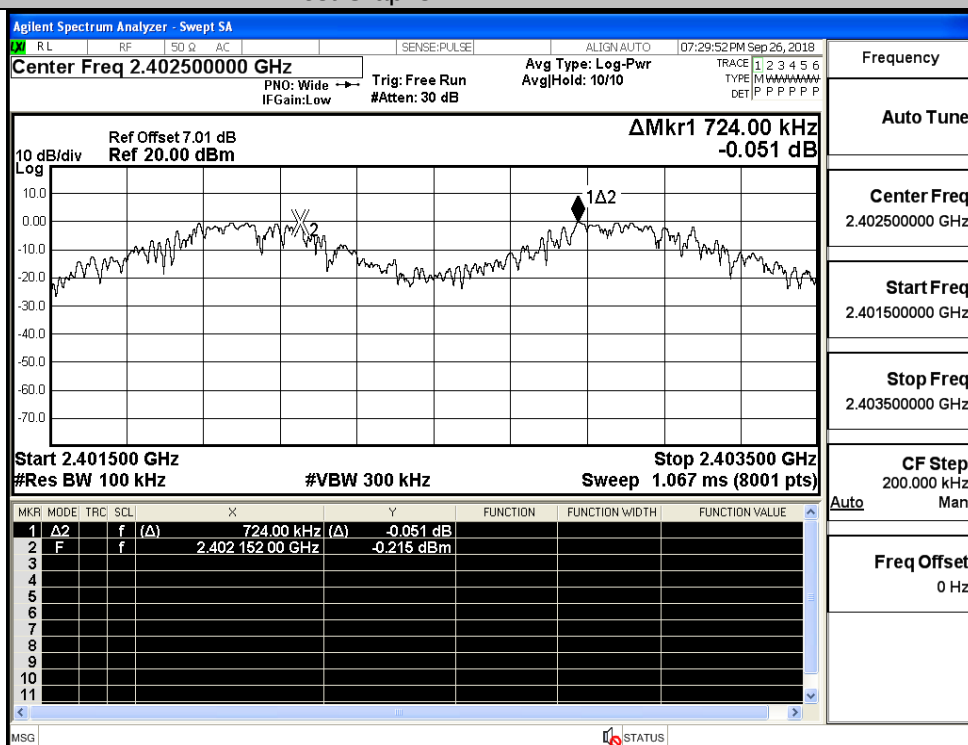
$\pi/4$ DQPSK/HCH

A.3 Carrier Frequency Separation

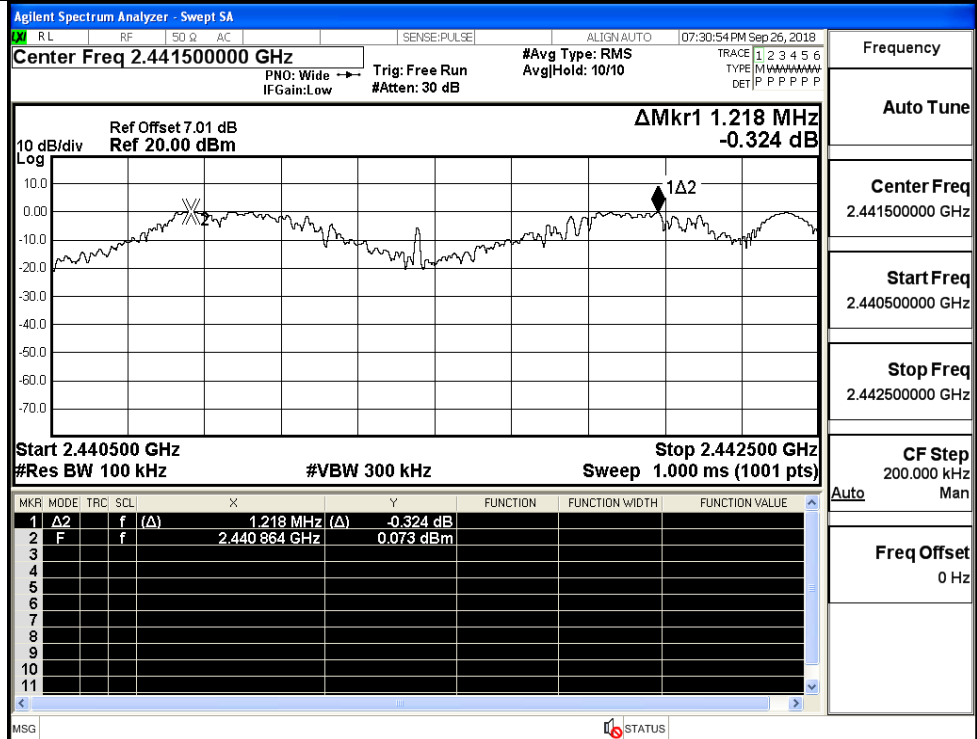
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.724	0.687	PASS
	MCH	1.218	0.687	PASS
	HCH	1.618	0.687	PASS
π /4DQPSK	LCH	1.134	0.859	PASS
	MCH	0.974	0.859	PASS
	HCH	1.146	0.859	PASS

Test Graphs

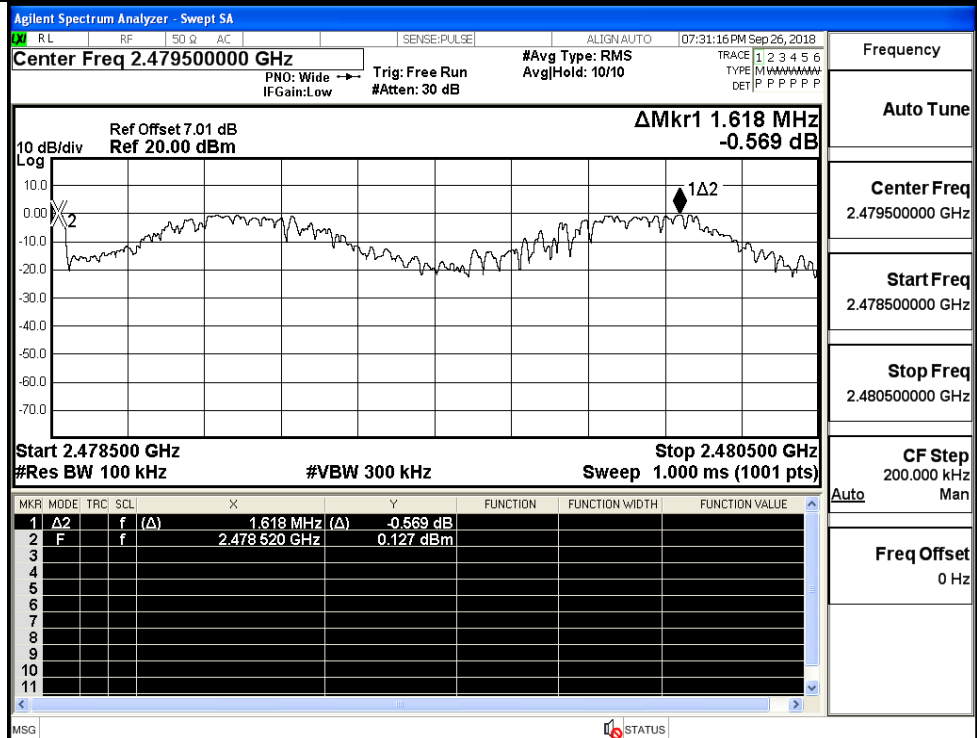
GFSK/LCH

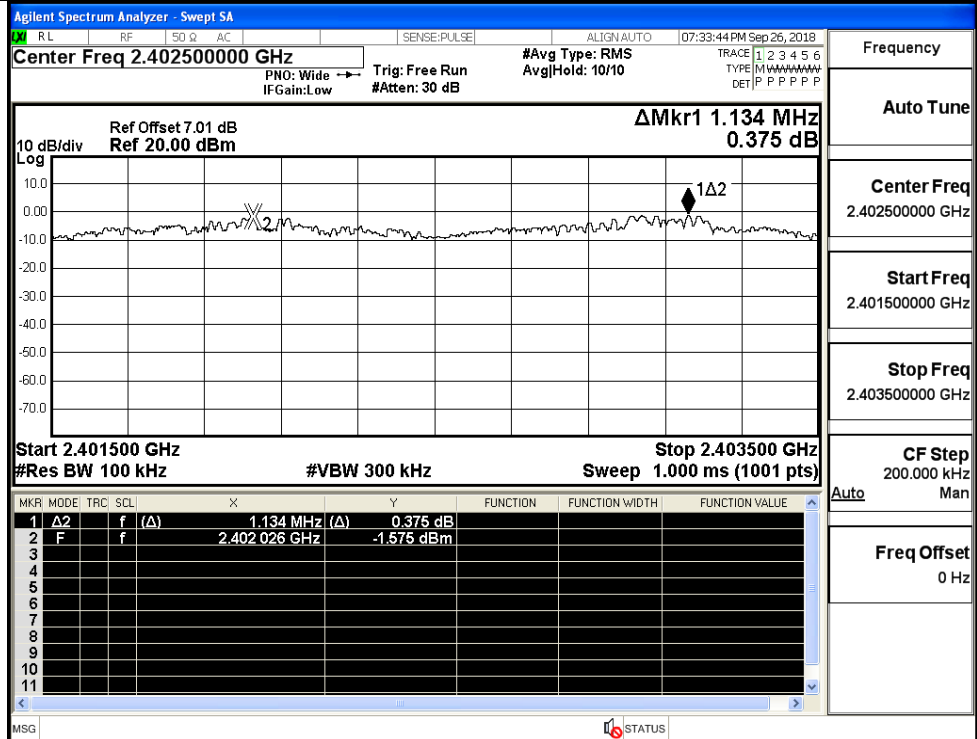
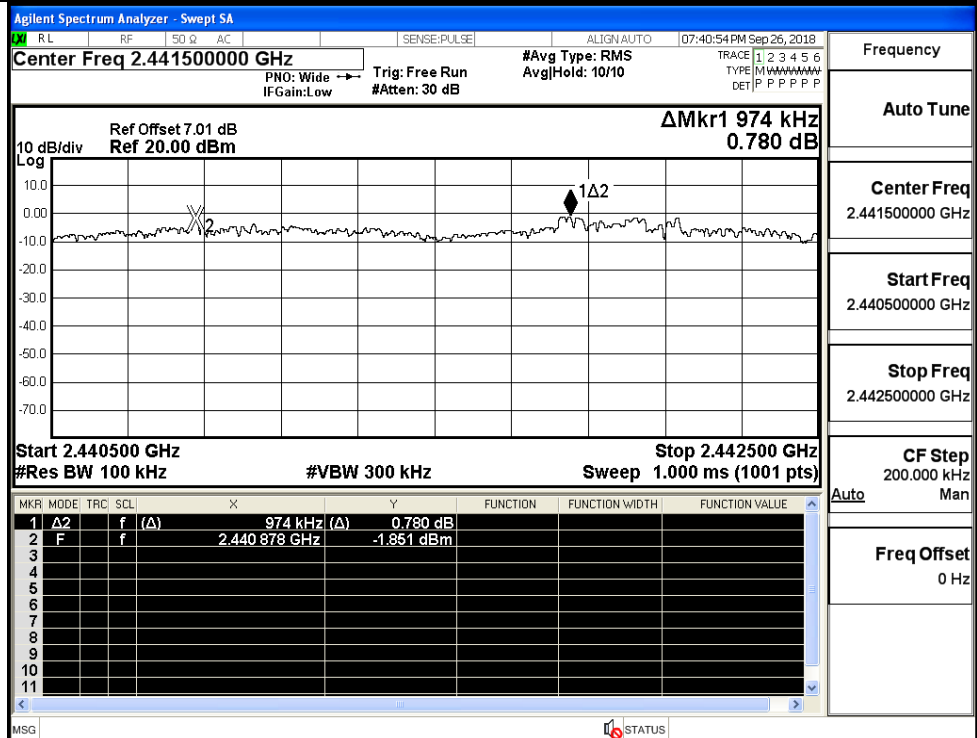


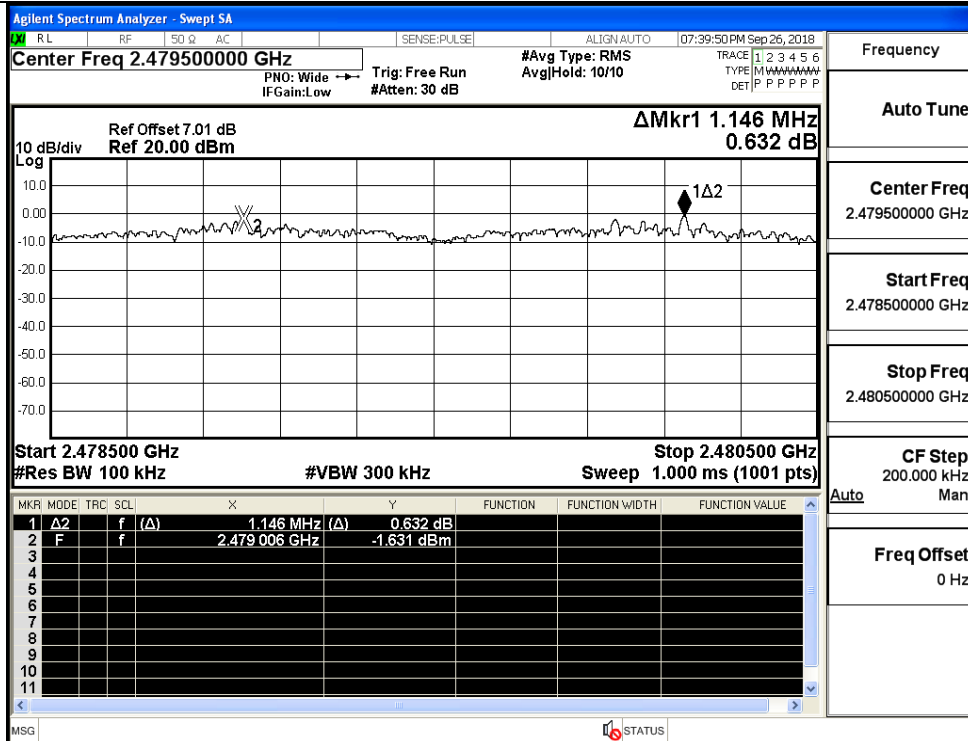
GFSK/MCH



GFSK/HCH



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

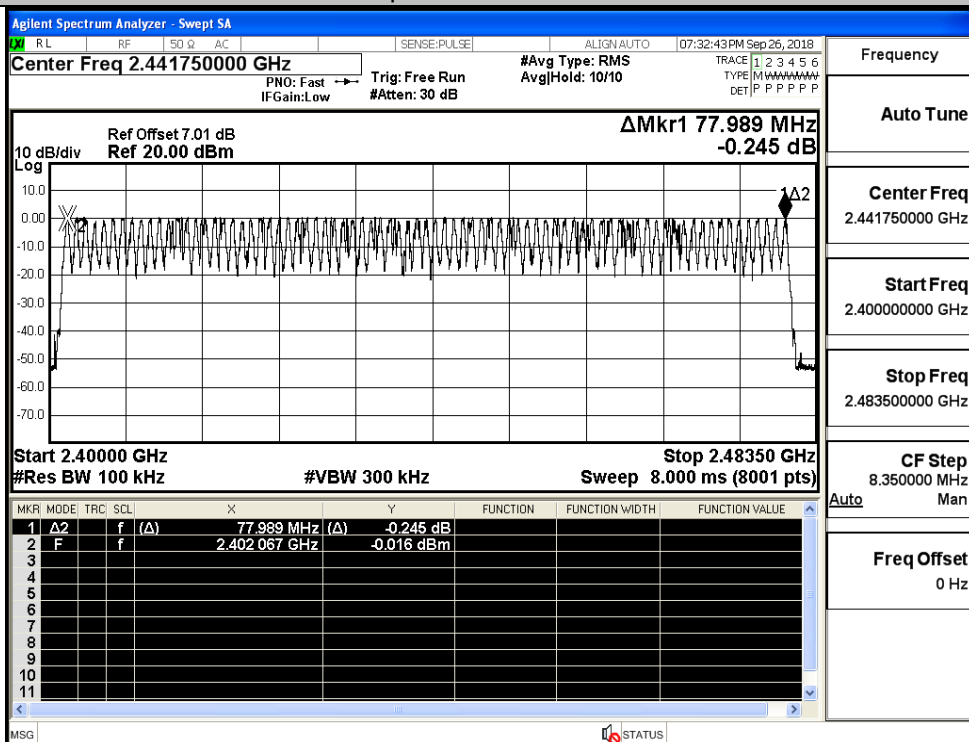
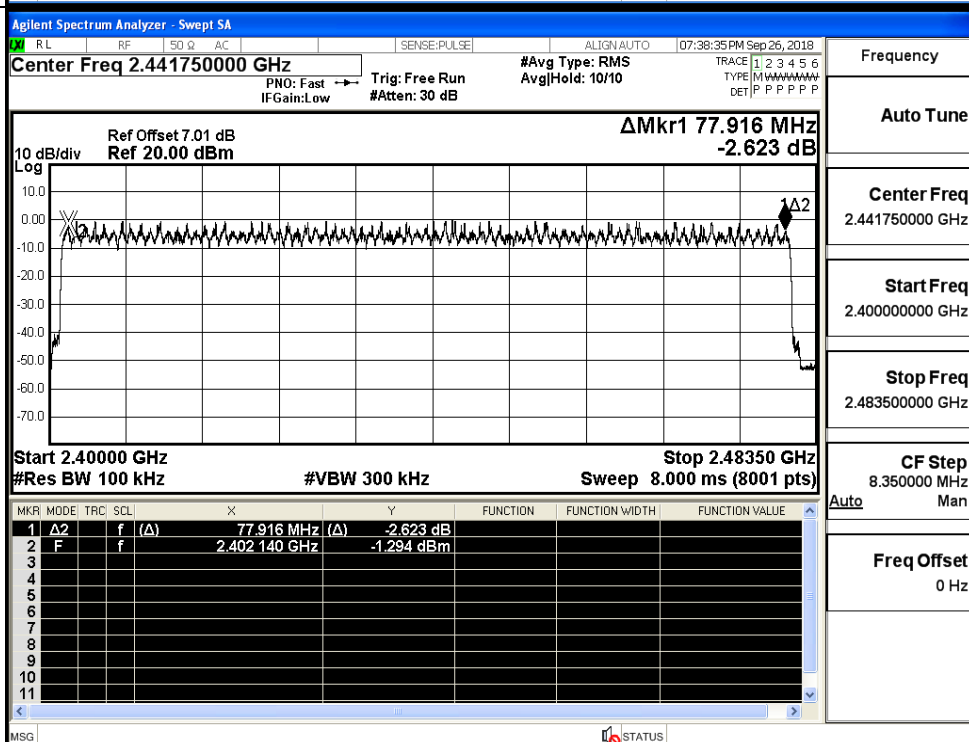
$\pi/4$ DQPSK/HCH

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

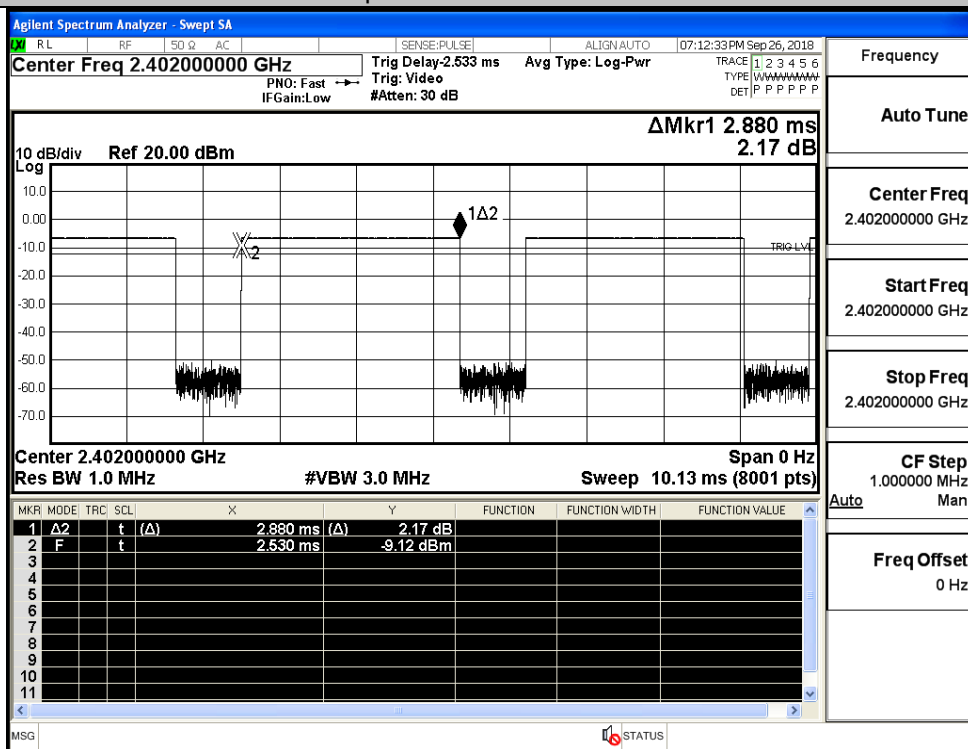
 $\pi/4$ DQPSK/Hop

A.5 Dwell Time

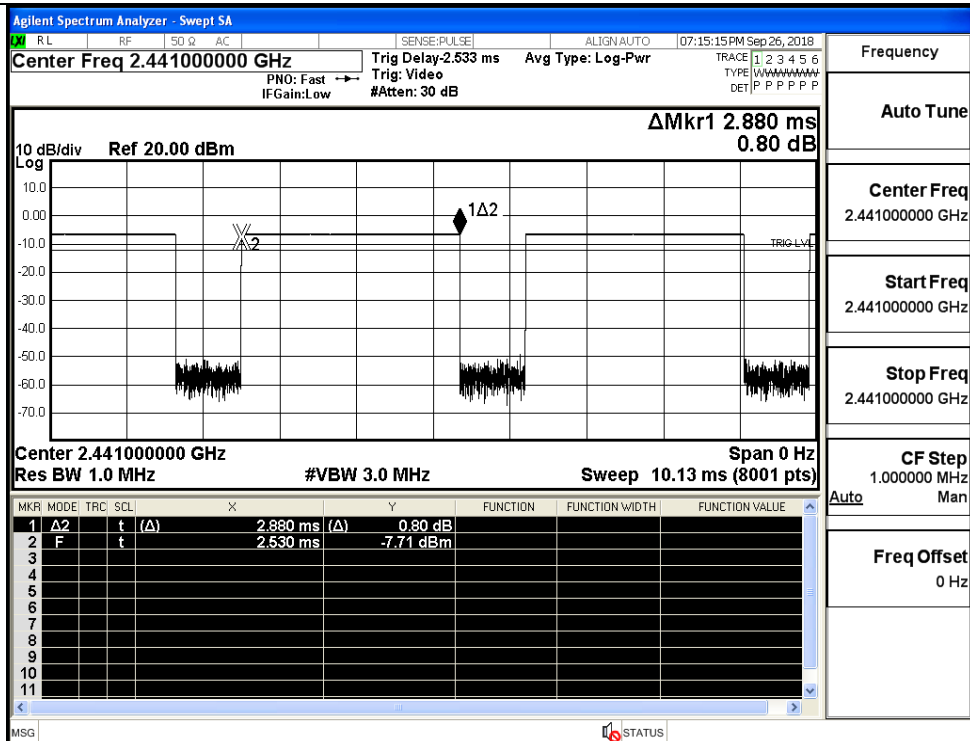
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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

Test Graphs

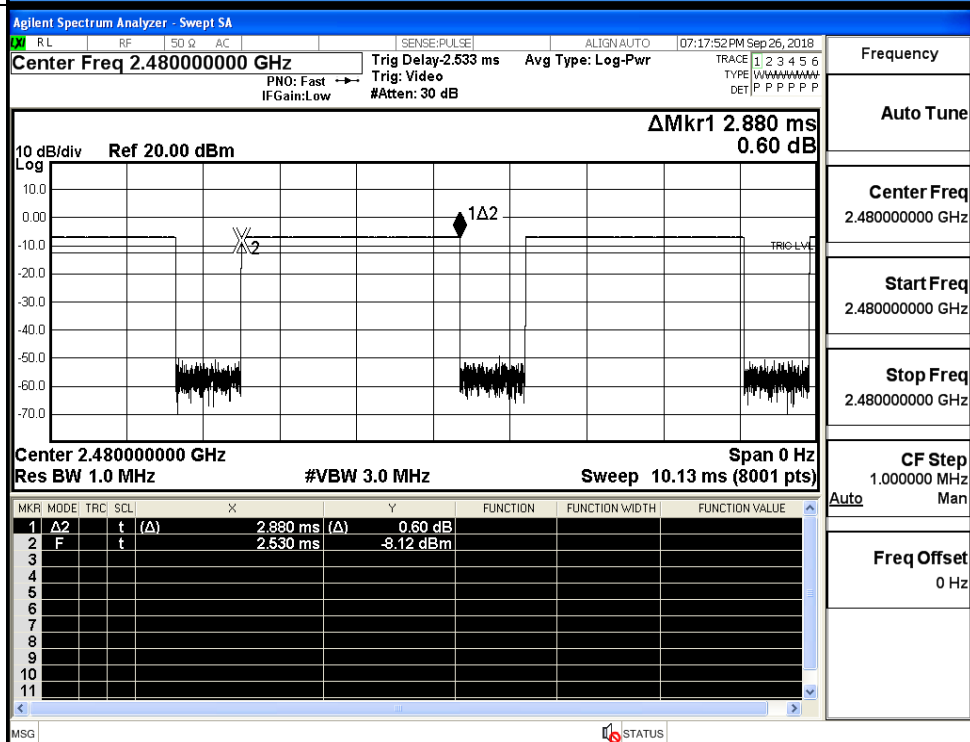
GFSK_DH5/LCH



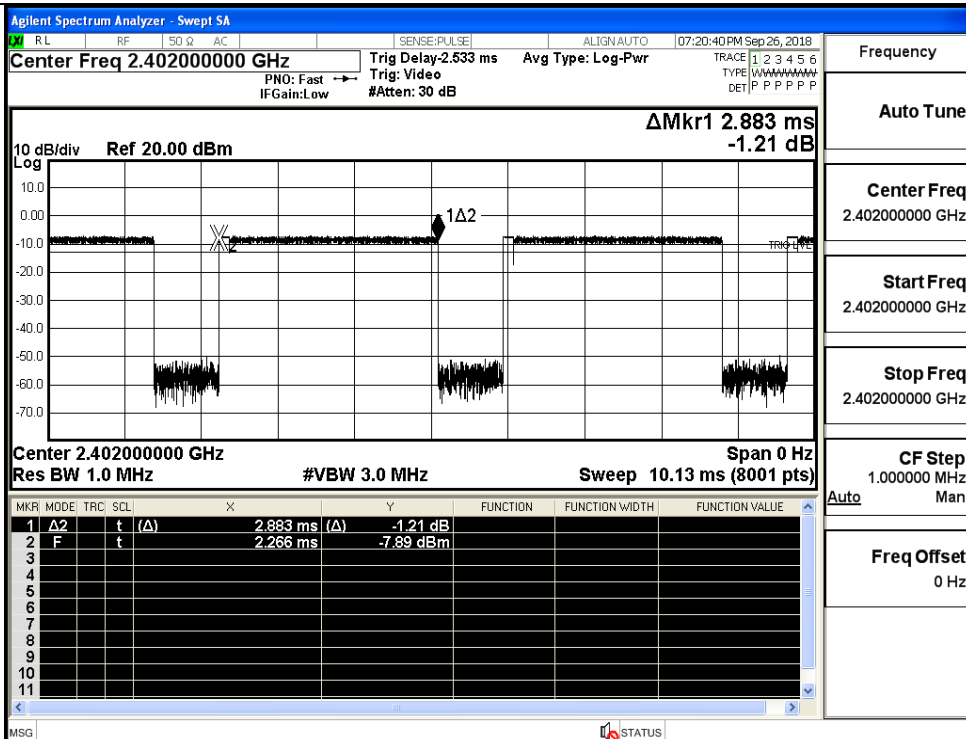
GFSK_DH5/MCH



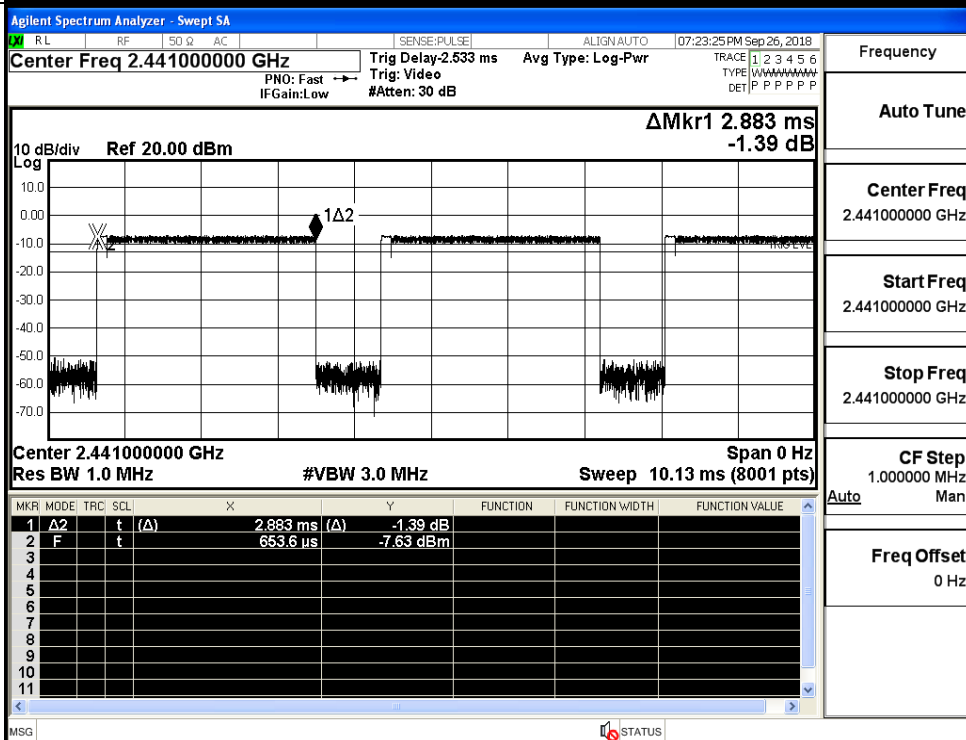
GFSK_DH5/HCH



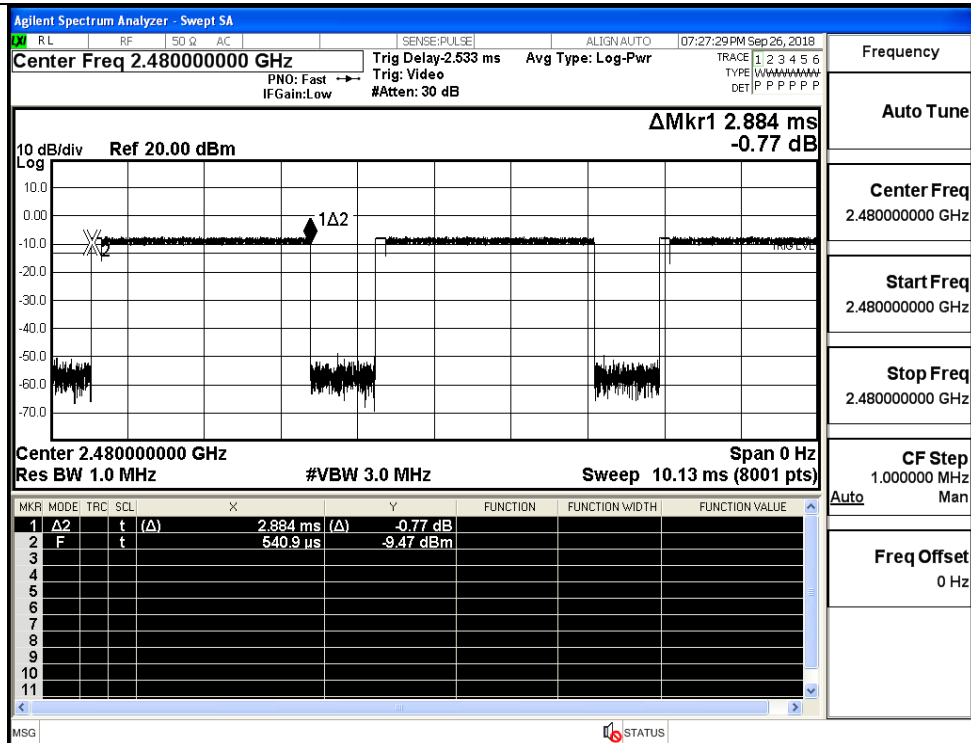
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



π/4DQPSK
_2DH5/HCH

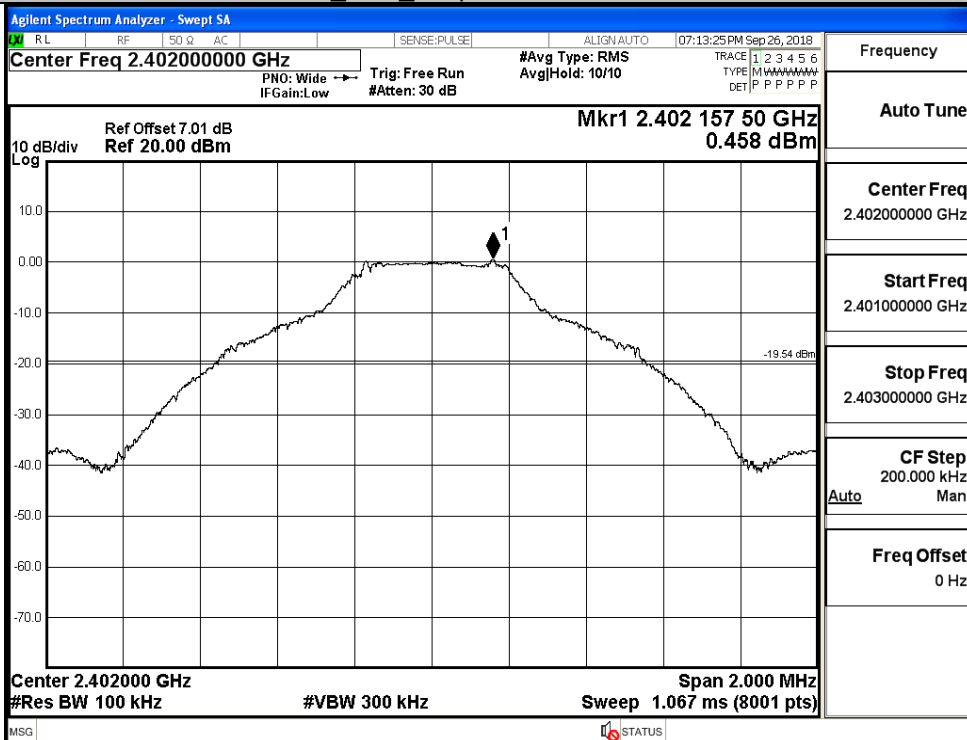


A.6 RF Conducted Spurious Emissions

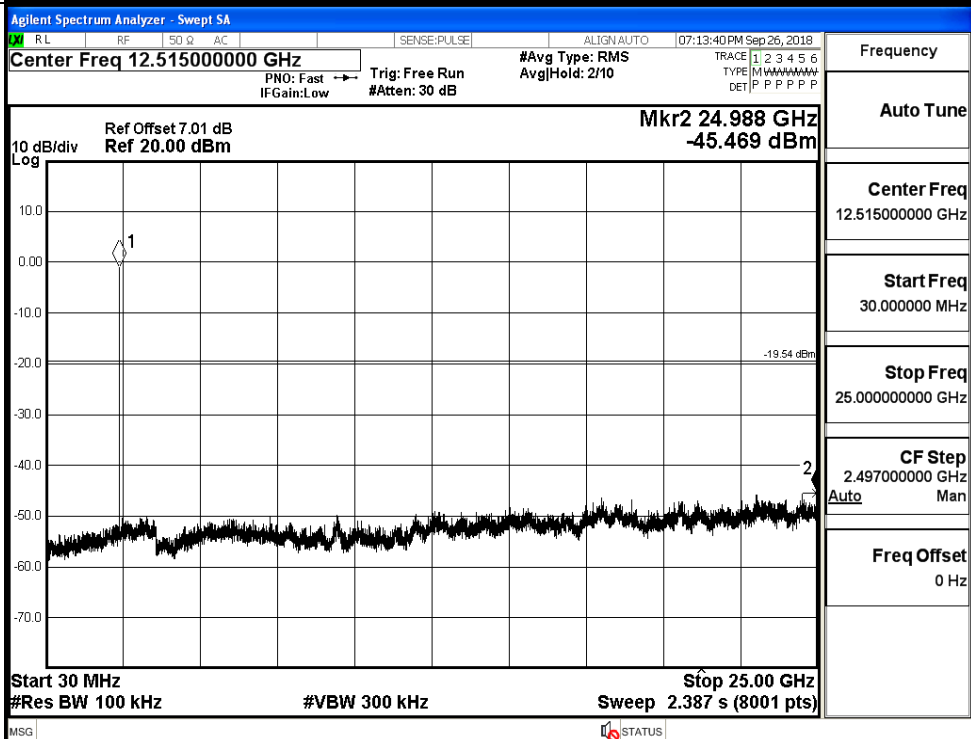
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.458	-45.469	-19.542	PASS
	MCH	0.554	-45.957	-19.446	PASS
	HCH	0.083	-45.878	-19.917	PASS
$\pi/4$ DQPSK	LCH	-1.12	-45.935	-21.120	PASS
	MCH	-0.651	-45.448	-20.651	PASS
	HCH	-0.793	-45.363	-20.793	PASS

GFSK_LCH_Graphs

Pref

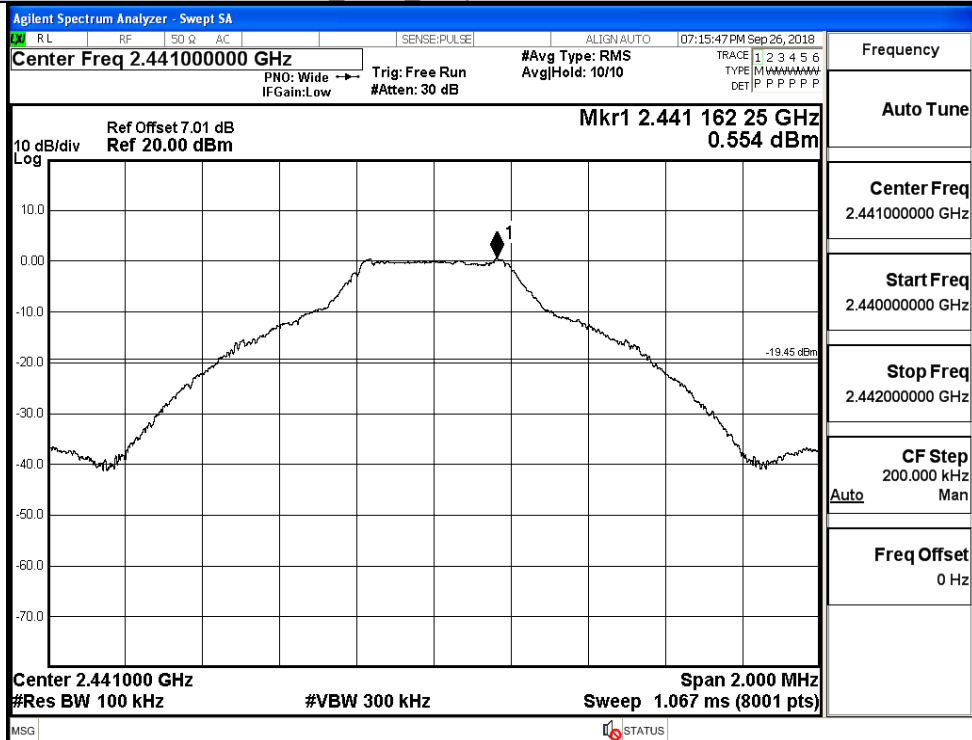


Puw

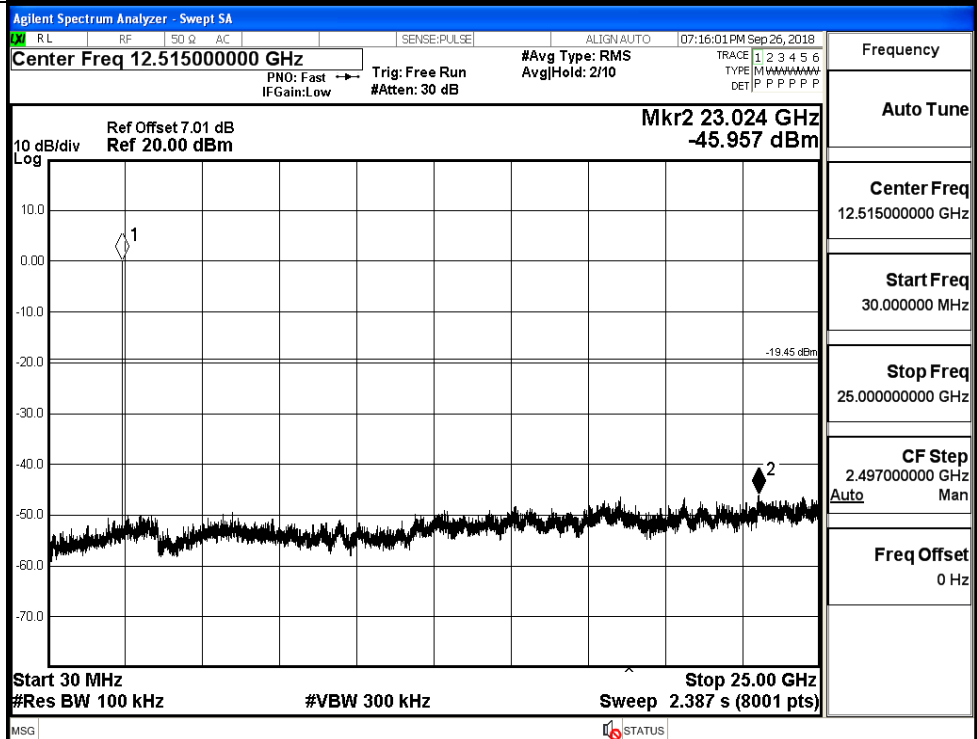


GFSK_MCH_Graphs

Pref

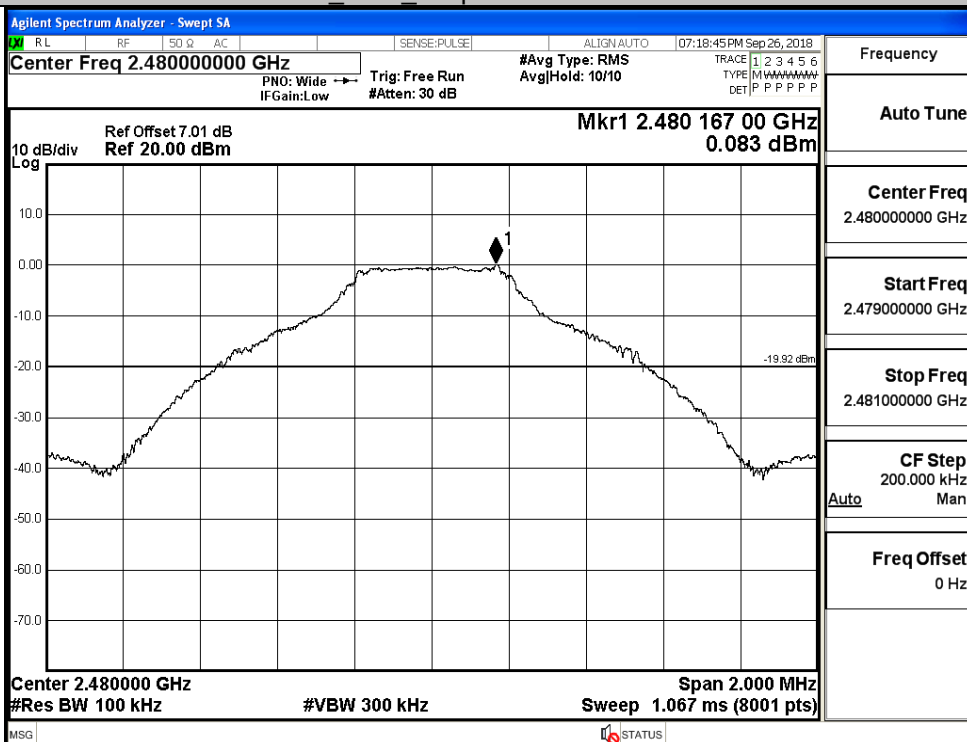


Puw

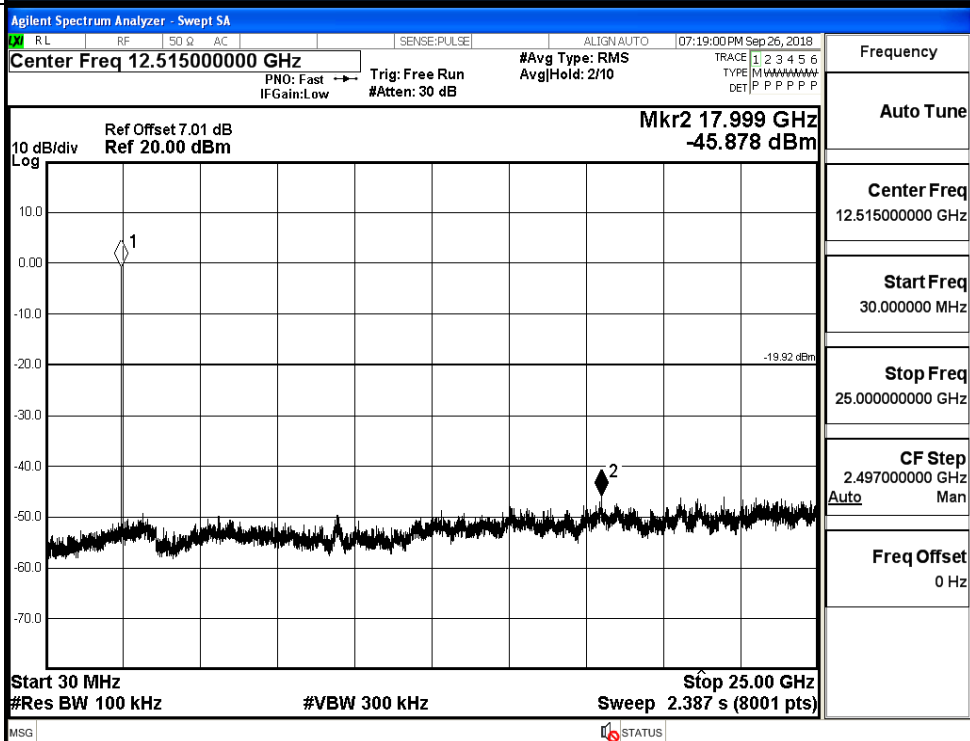


GFSK_HCH_Graphs

Pref

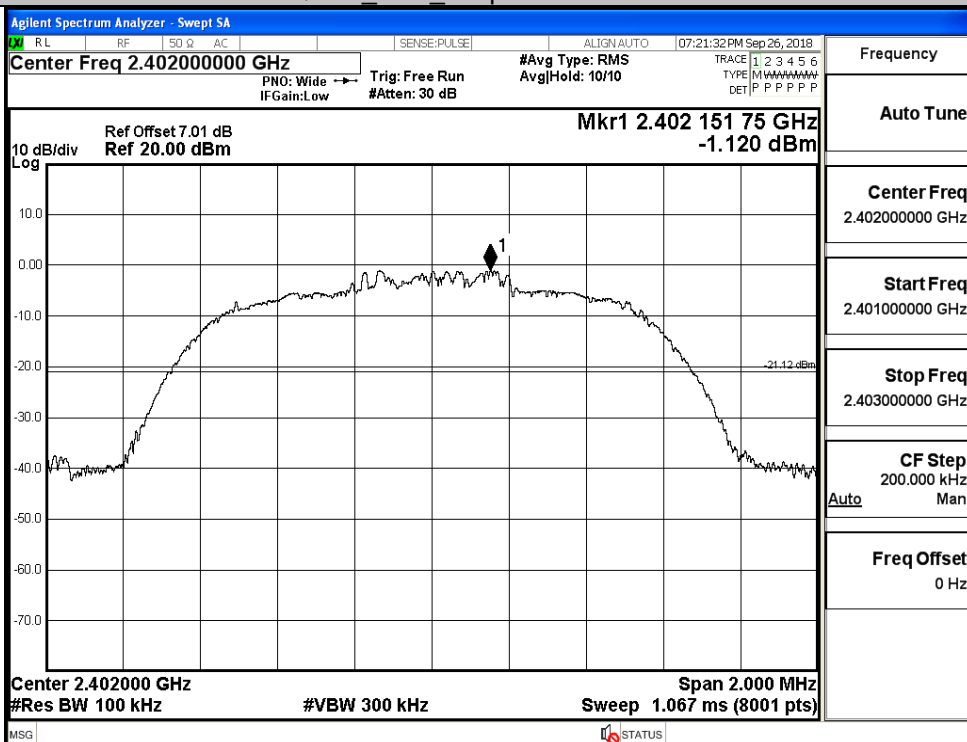


Puw

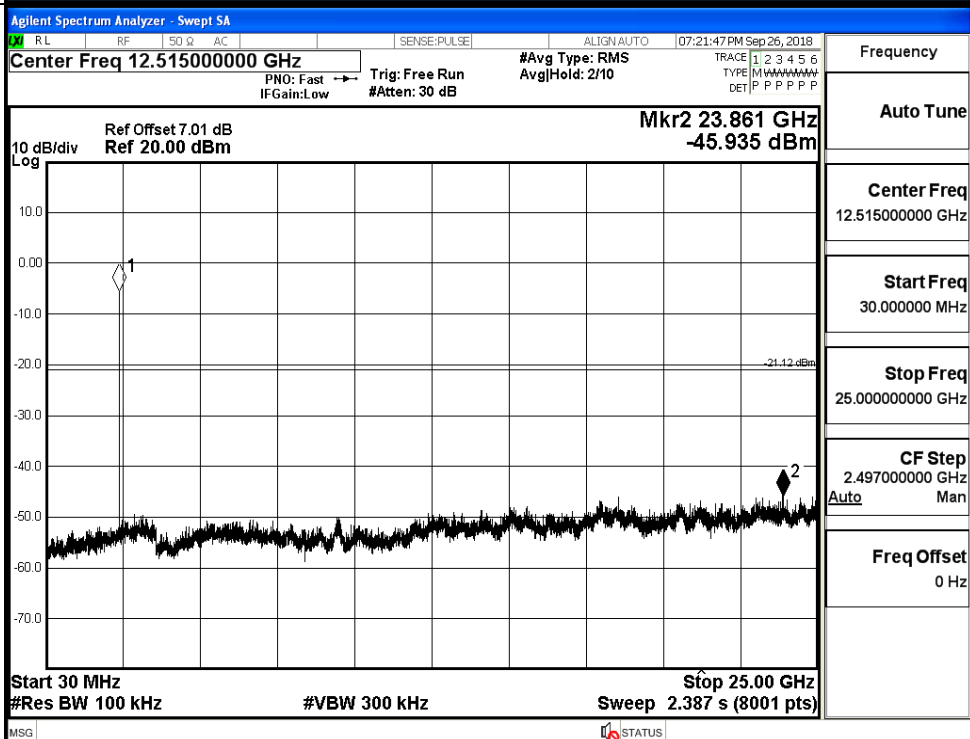


$\pi/4$ DQPSK LCH_Graphs

Pref

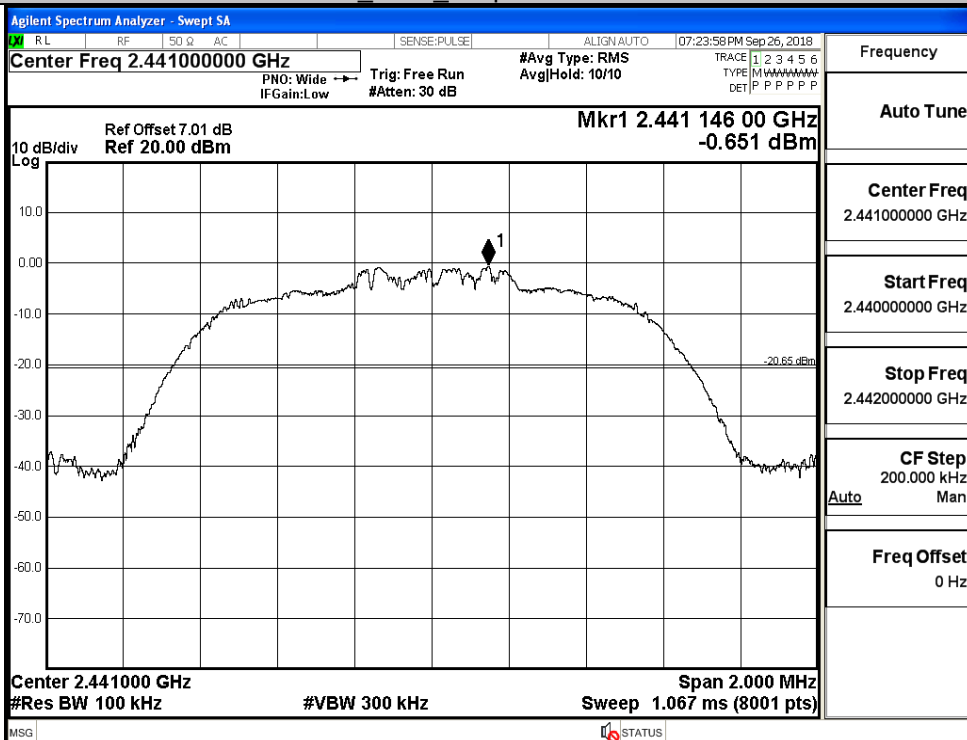


Puw

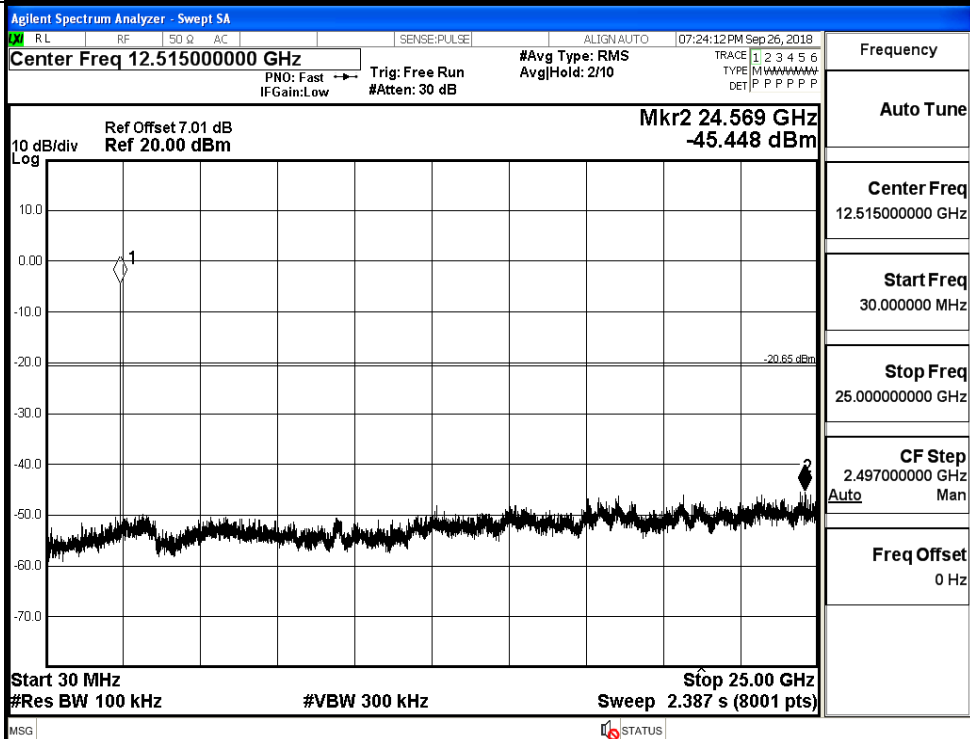


π /4DQPSK_MCH_Graphs

Pref

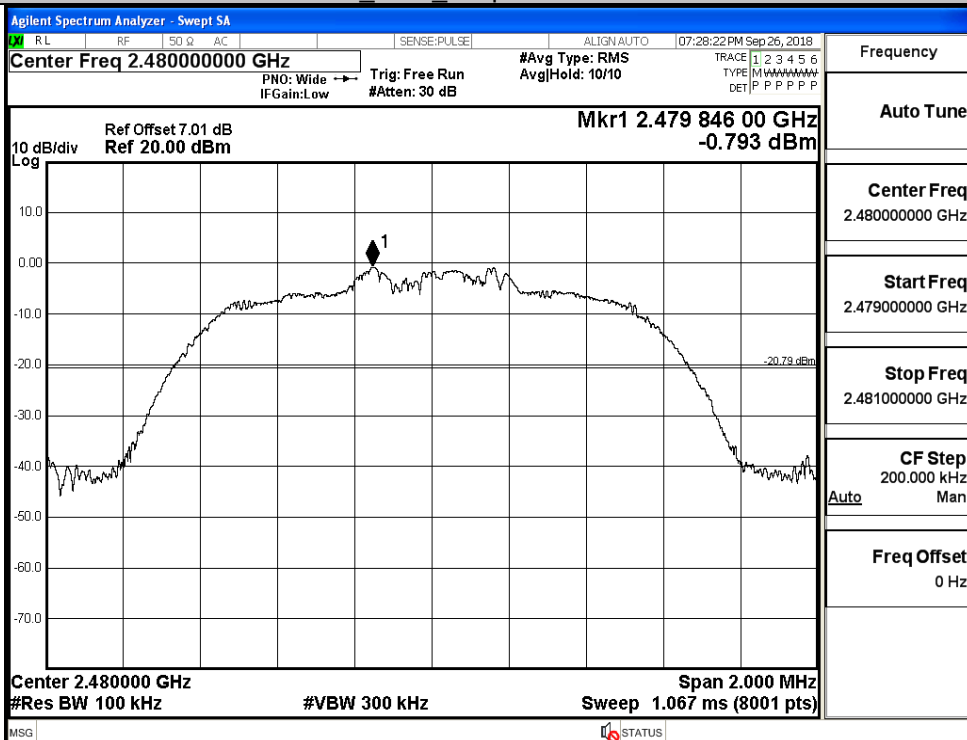


Puw

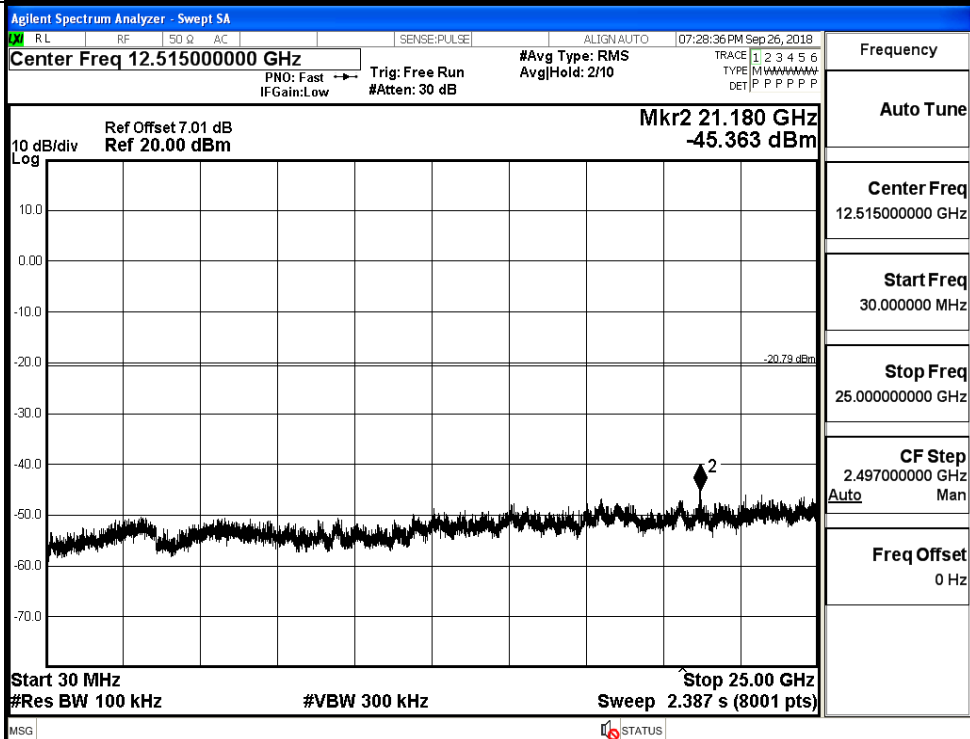


$\pi/4$ DQPSK_HCH_Graphs

Pref



Puw

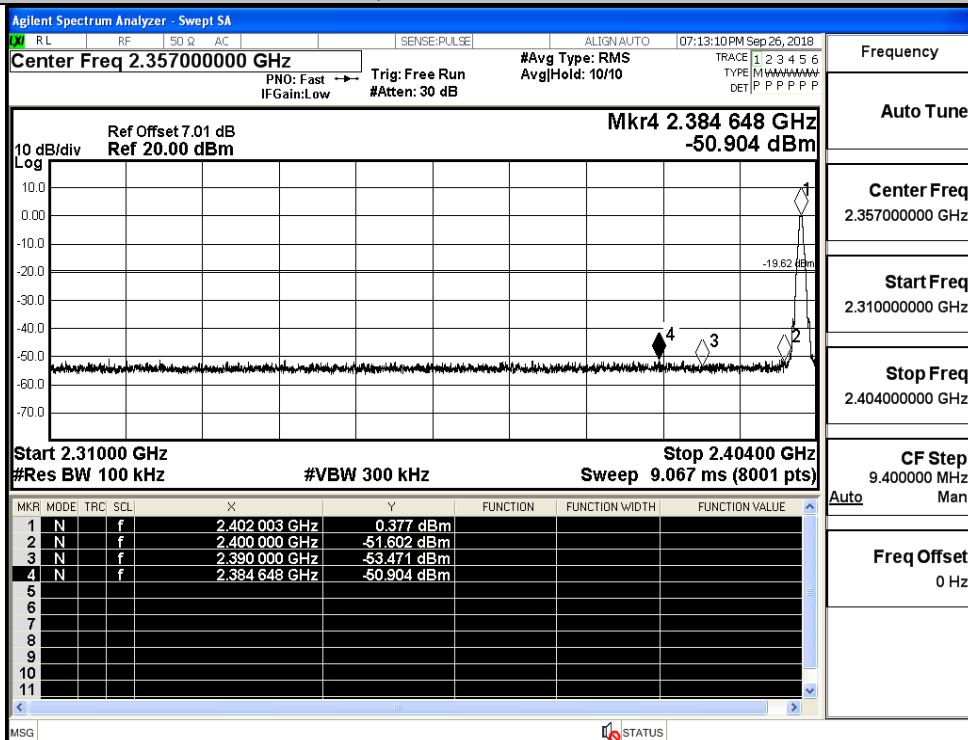


A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.377	Off	-50.904	-19.62	PASS
			0.419	On	-50.990	-19.58	PASS
	HCH	2480	0.024	Off	-50.637	-19.98	PASS
			0.323	On	-46.804	-19.68	PASS
$\pi/4$ DQPSK	LCH	2402	-2.920	Off	-51.017	-22.92	PASS
			-0.631	On	-50.727	-20.63	PASS
	HCH	2480	-0.793	Off	-49.955	-20.79	PASS
			-0.800	On	-49.843	-20.8	PASS

Test Graphs

GFSK/LCH/No Hop



Frequency

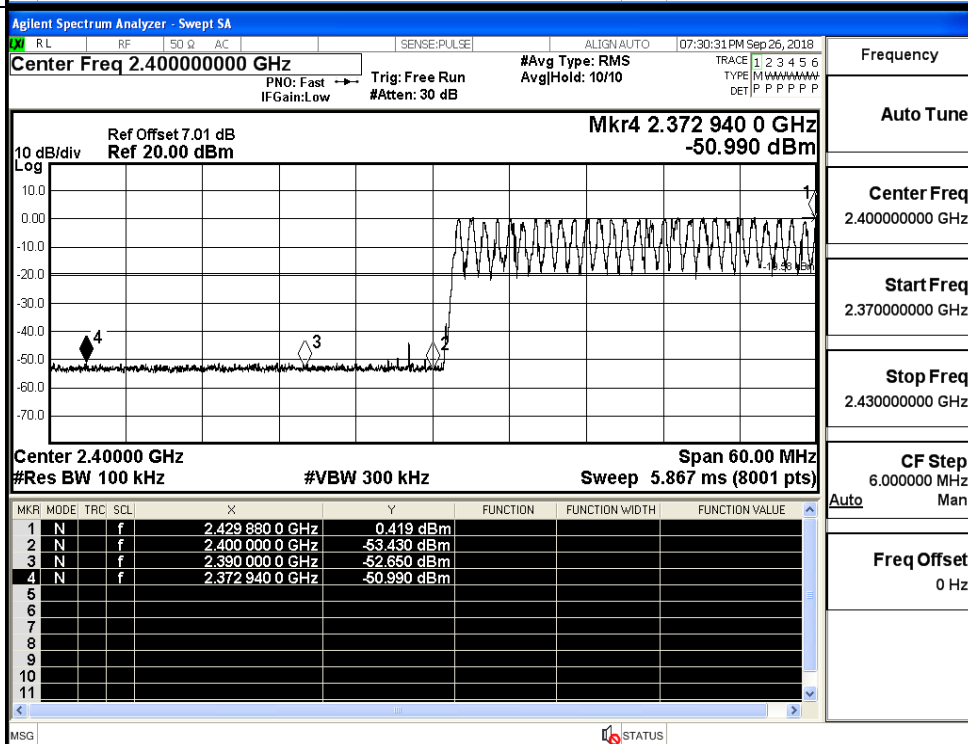
Auto Tune

Center Freq
2.357000000 GHzStart Freq
2.310000000 GHzStop Freq
2.404000000 GHzCF Step
9.400000 MHz

Auto

Freq Offset
0 Hz

GFSK/LCH/Hop



Frequency

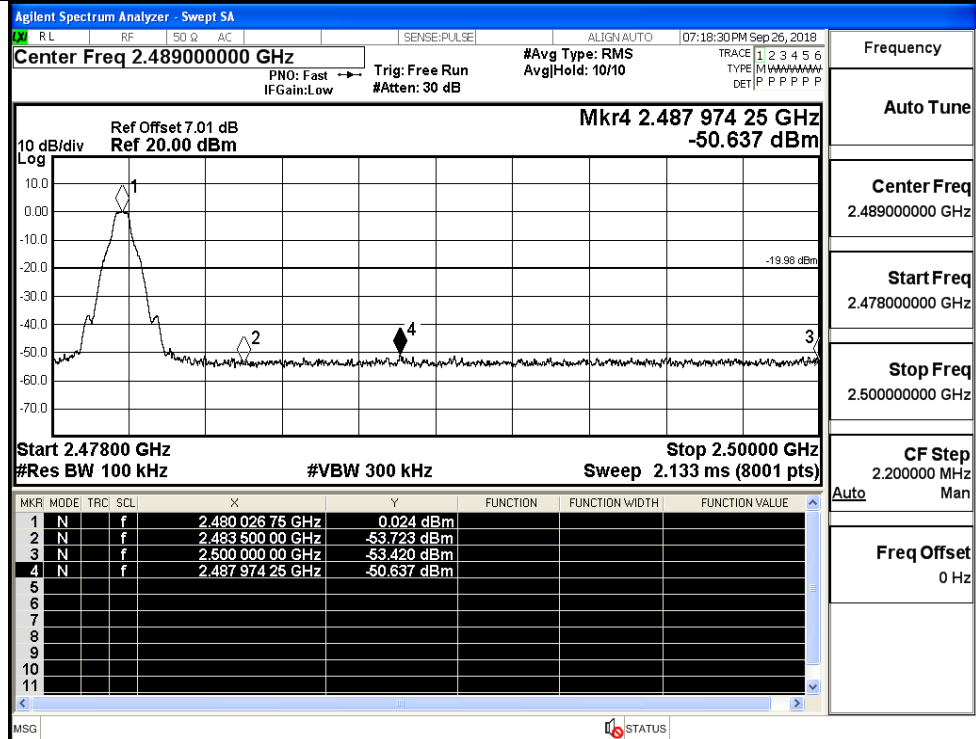
Auto Tune

Center Freq
2.400000000 GHzStart Freq
2.370000000 GHzStop Freq
2.430000000 GHzCF Step
6.000000 MHz

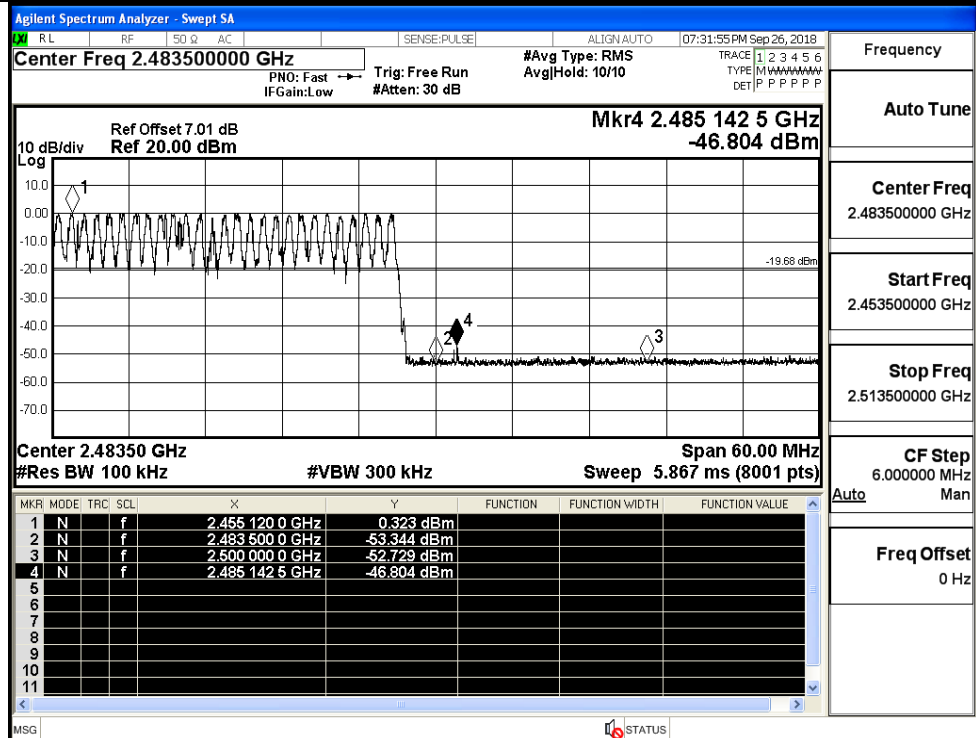
Auto

Freq Offset
0 Hz

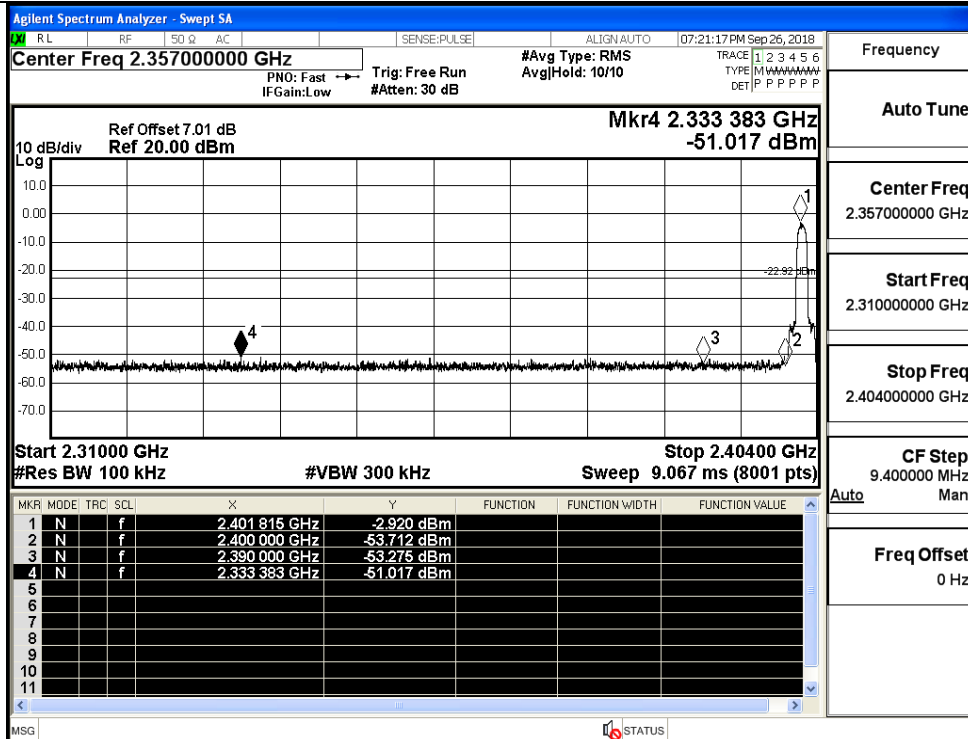
GFSK/HCH/No Hop



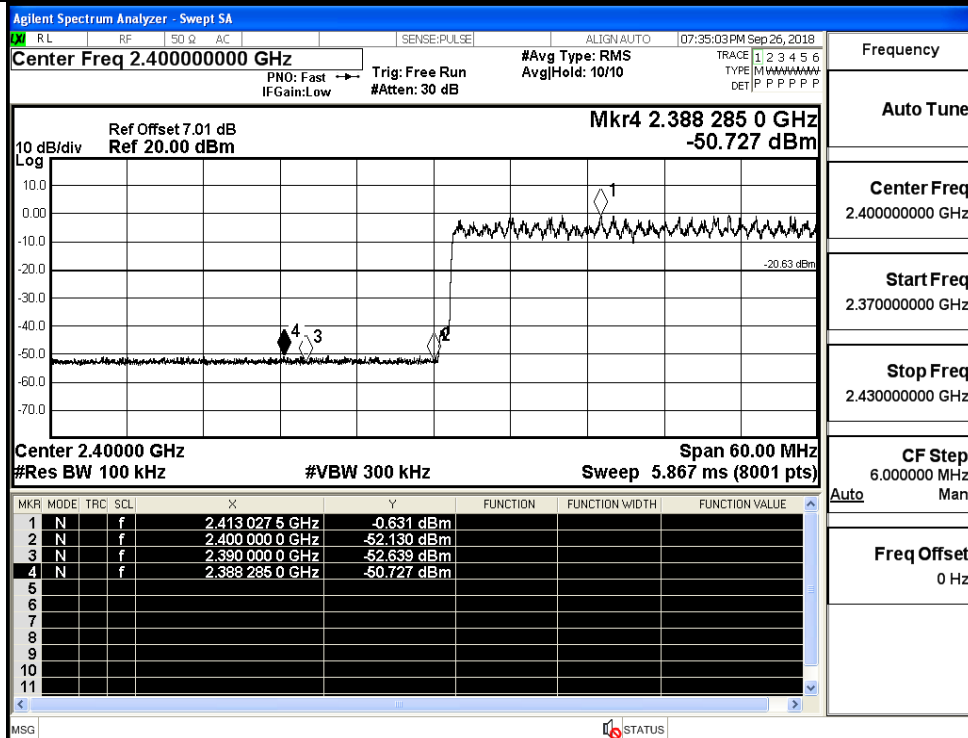
GFSK/HCH/Hop



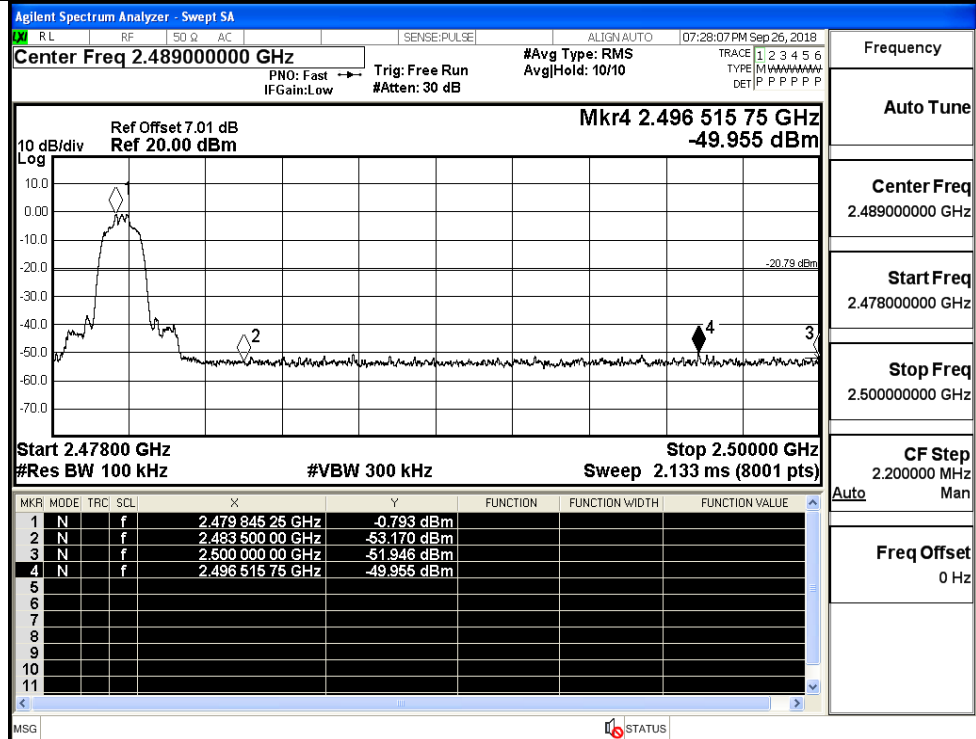
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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



Frequency

Auto Tune

Center Freq
2.489000000 GHz

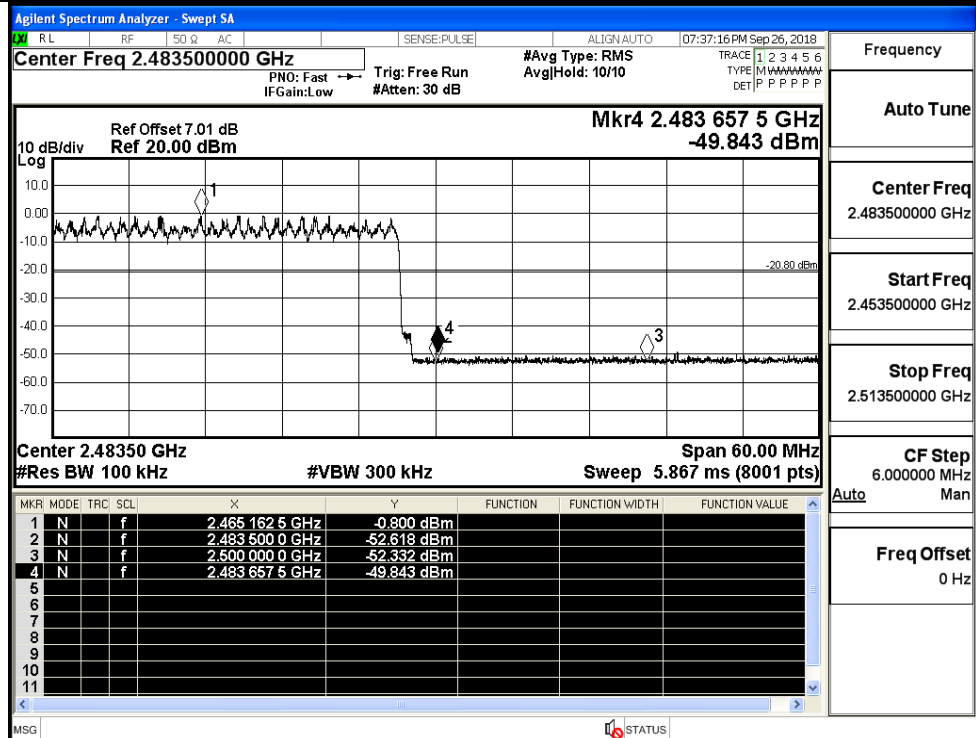
Start Freq
2.478000000 GHz

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

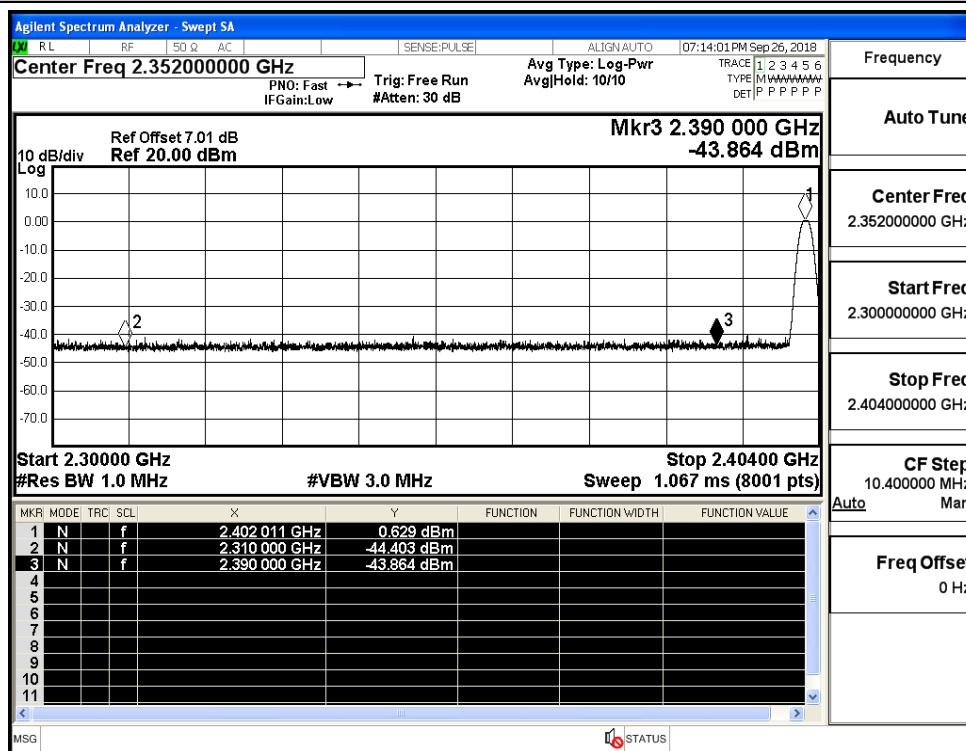
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

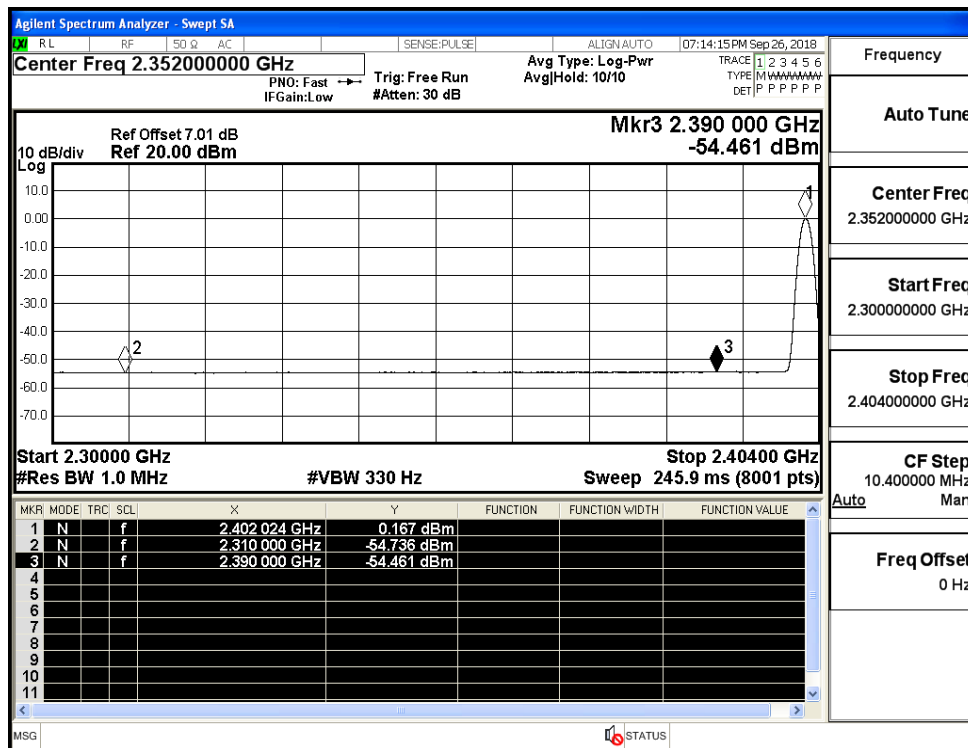
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.40	2.0	0	52.85	PEAK	74	PASS
	Off	2310.0	-54.74	2.0	0	42.52	AV	54	PASS
	Off	2390.0	-43.86	2.0	0	53.39	PEAK	74	PASS
	Off	2390.0	-54.46	2.0	0	42.80	AV	54	PASS
	Off	2483.5	-44.84	2.0	0	52.42	PEAK	74	PASS
	Off	2483.5	-54.15	2.0	0	43.11	AV	54	PASS
	Off	2500.0	-43.16	2.0	0	54.10	PEAK	74	PASS
	Off	2500.0	-54.01	2.0	0	43.24	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.77	2.0	0	52.49	PEAK	74	PASS
	Off	2310.0	-54.71	2.0	0	42.54	AV	54	PASS
	Off	2390.0	-44.61	2.0	0	52.65	PEAK	74	PASS
	Off	2390.0	-54.36	2.0	0	42.89	AV	54	PASS
	Off	2483.5	-44.10	2.0	0	53.16	PEAK	74	PASS
	Off	2483.5	-54.19	2.0	0	43.07	AV	54	PASS
	Off	2500.0	-44.48	2.0	0	52.78	PEAK	74	PASS
	Off	2500.0	-54.00	2.0	0	43.26	AV	54	PASS

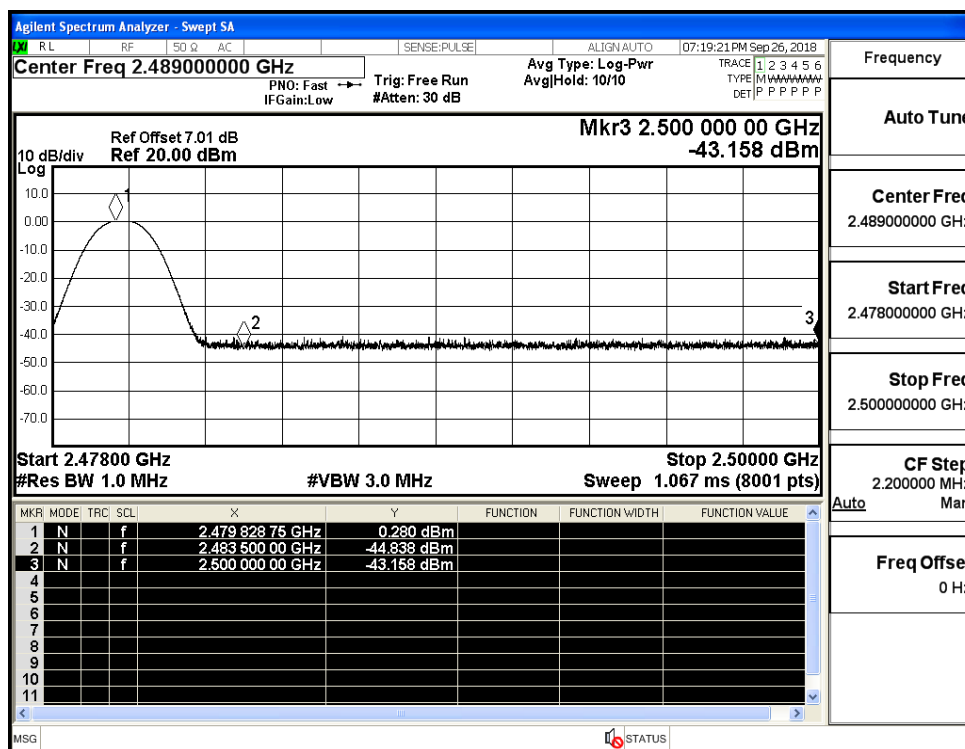
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



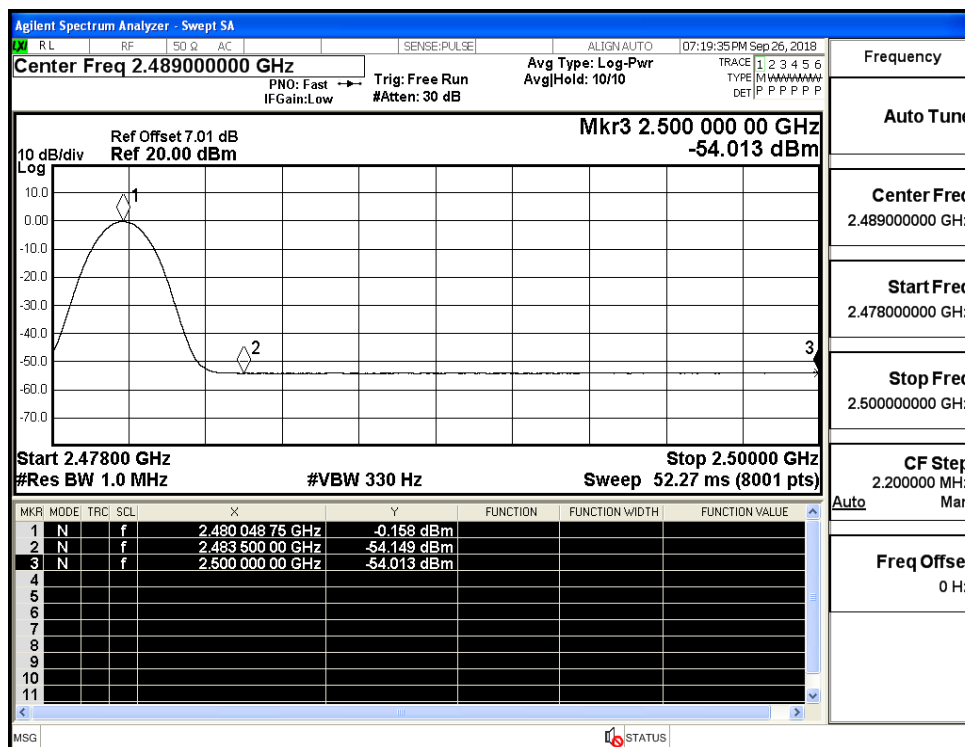
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

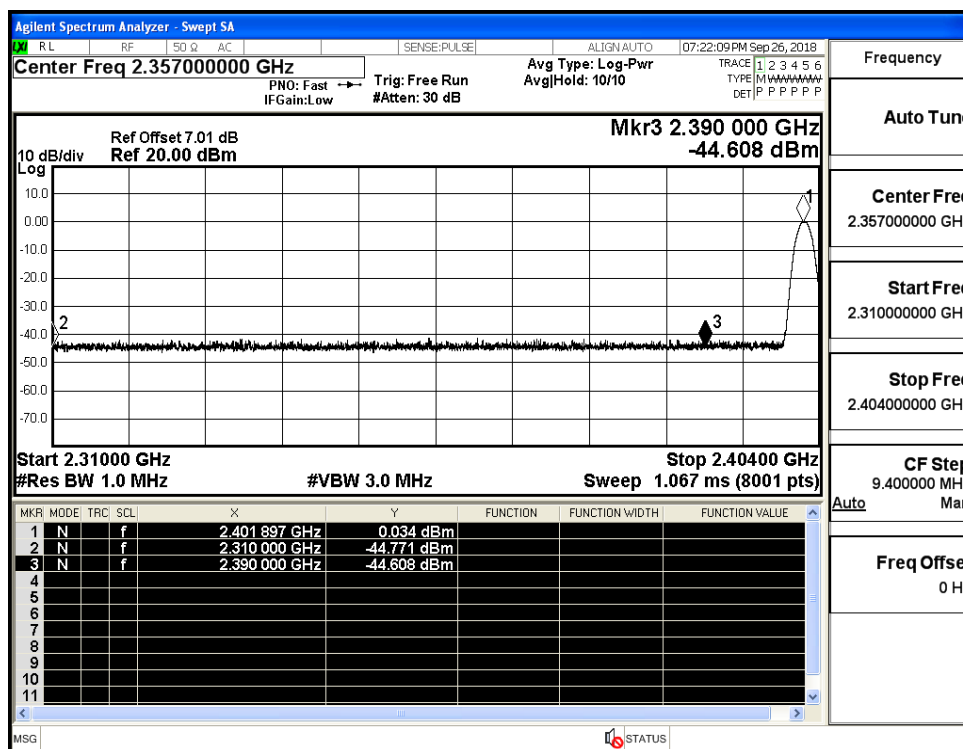
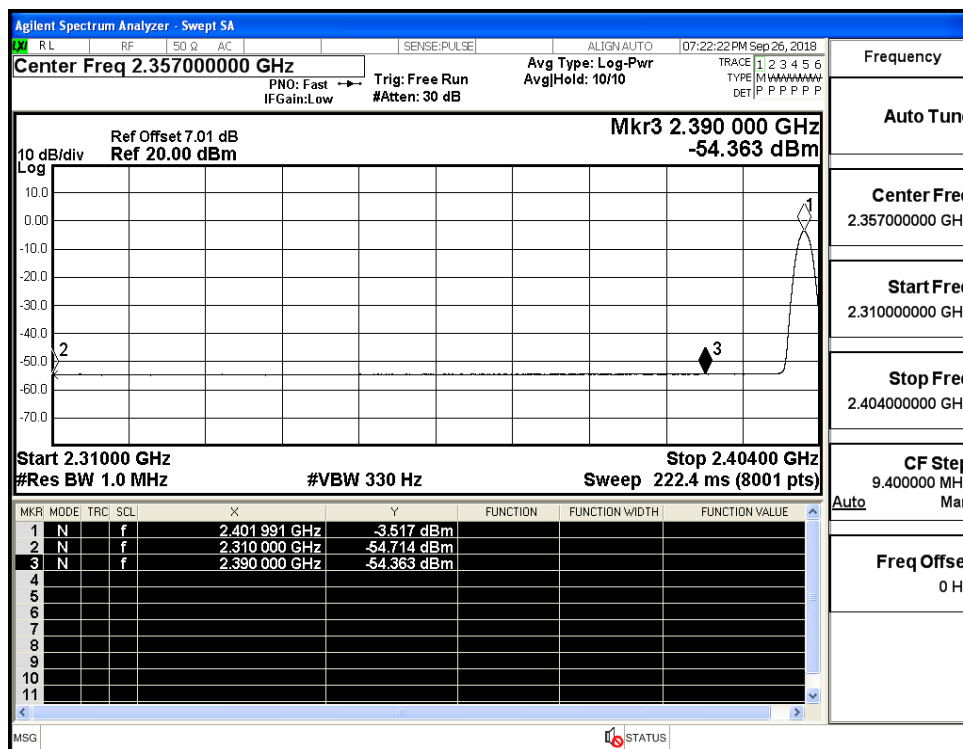


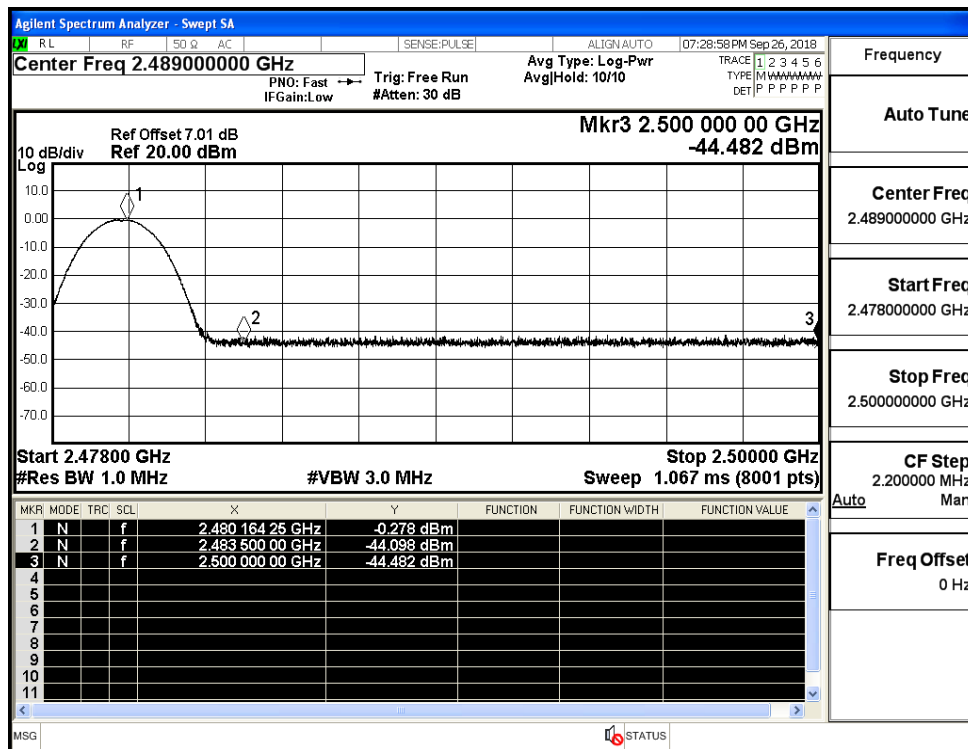
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



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)