

Appendix A

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

Product Name: atomi Shower Speaker

Trade Mark: atomi

Test Model: AT1219

Environmental Conditions

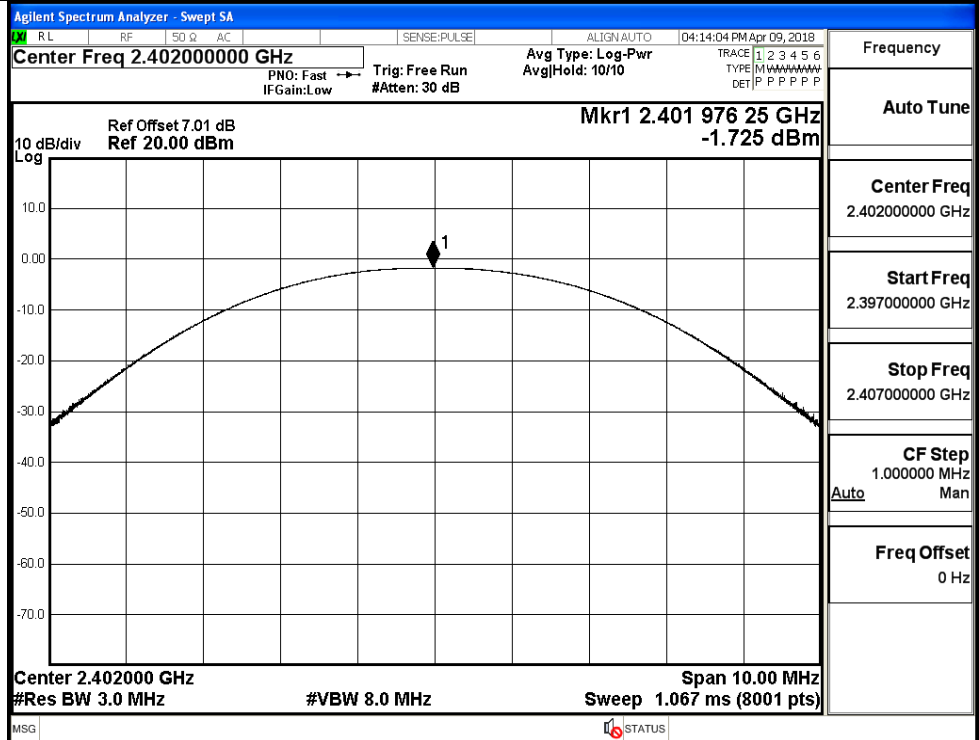
Temperature:	23.2 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Wangchuang
Supervised by:	Jayden Zhuo

A.1 Maximum Conducted Peak Output Power

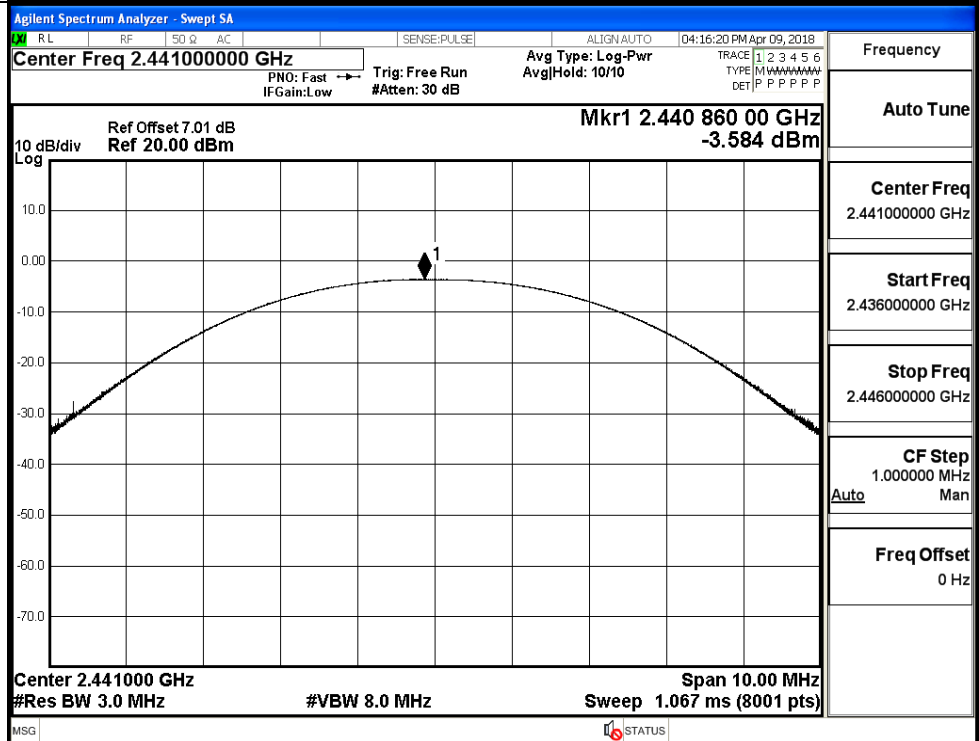
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.725	21	PASS
	MCH	-3.584	21	PASS
	HCH	-3.398	21	PASS
$\pi/4$ DQPSK	LCH	-2.537	21	PASS
	MCH	-1.501	21	PASS
	HCH	-1.737	21	PASS

Test Graphs

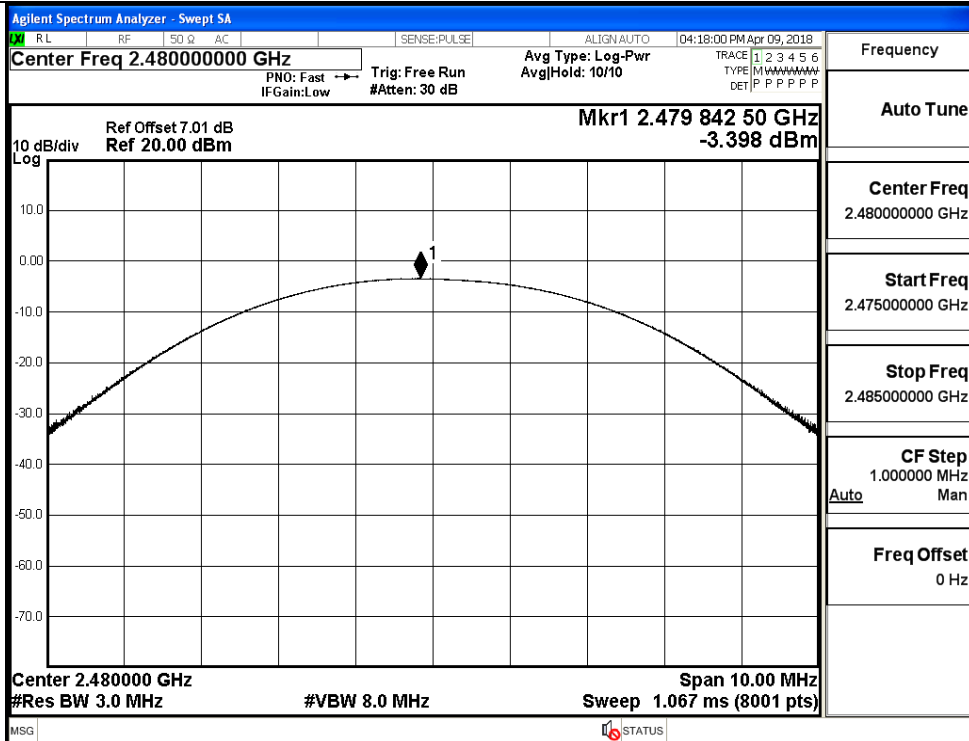
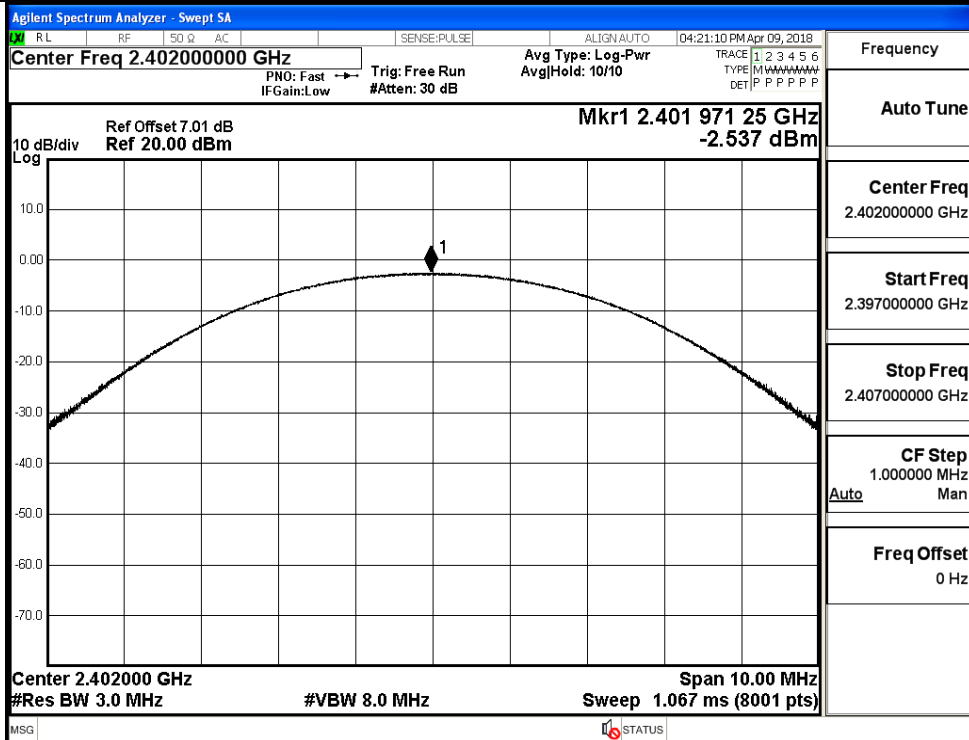
GFSK/LCH

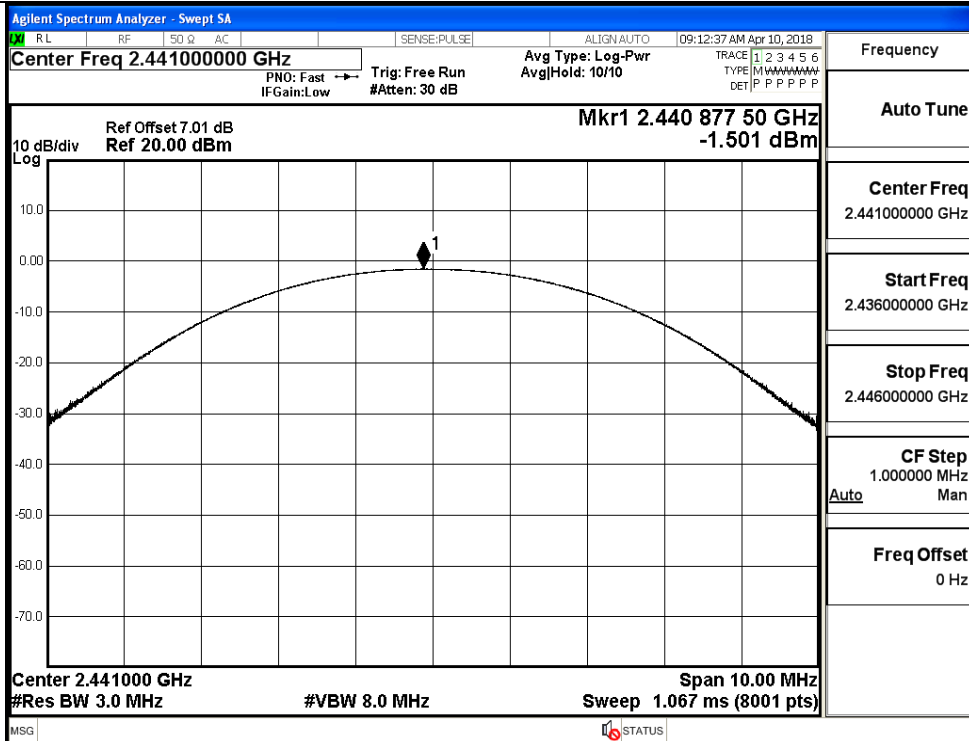
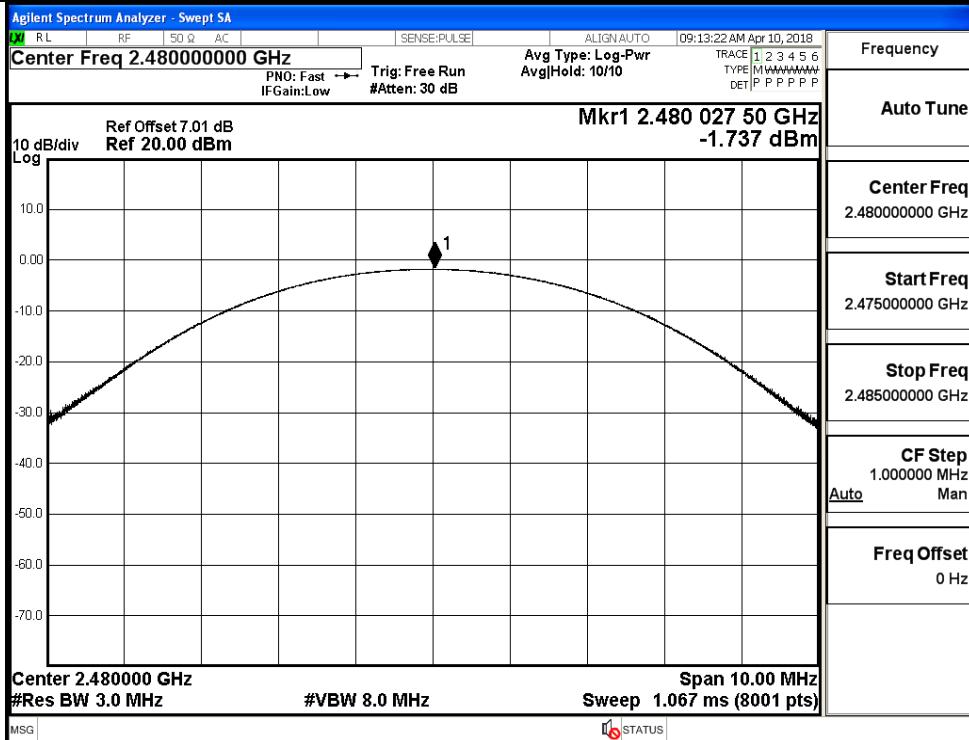


GFSK/MCH



GFSK/HCH

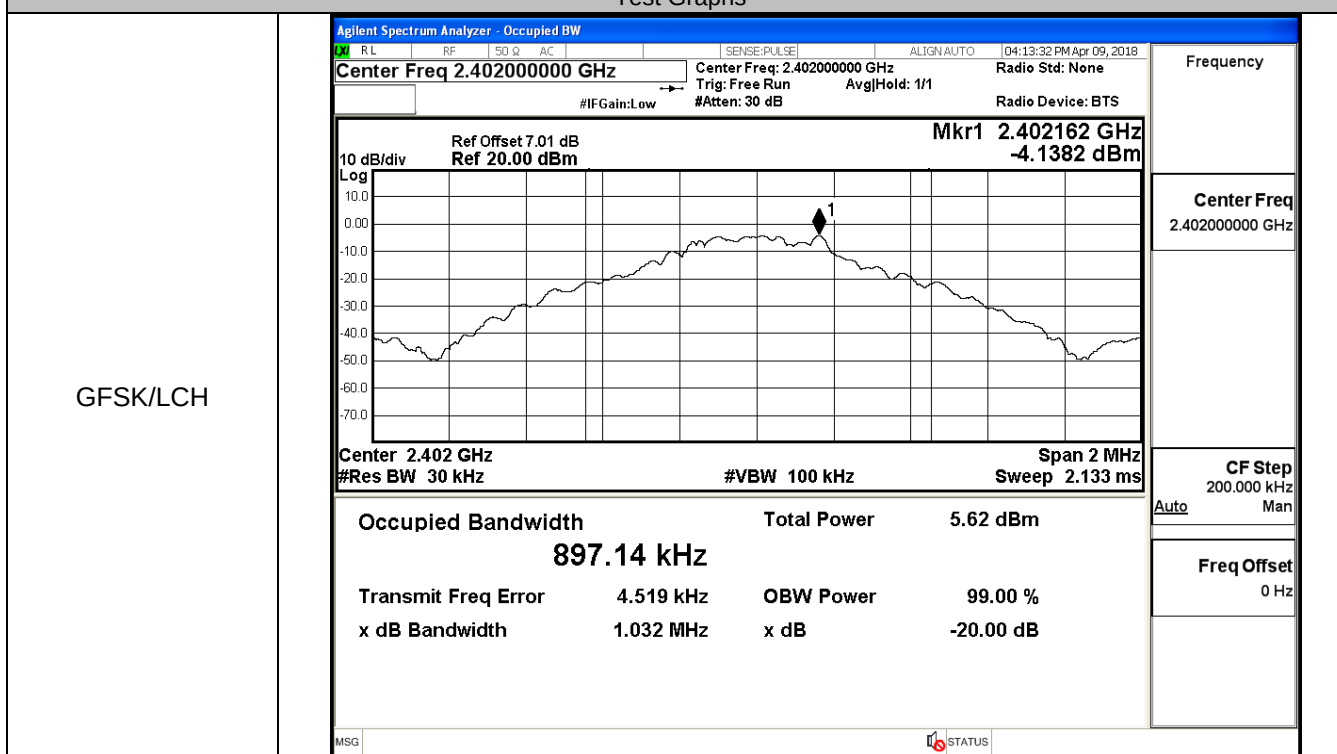
 π /4DQPSK/LCH

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

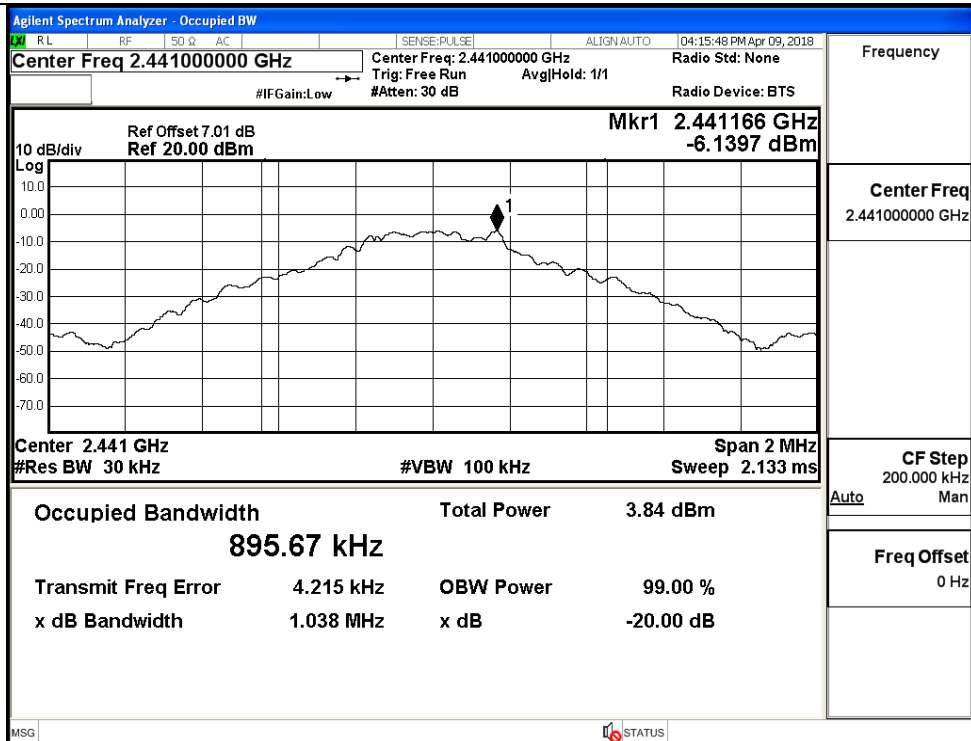
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.032	Not Specified	PASS
	MCH	1.038	Not Specified	PASS
	HCH	1.033	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.292	Not Specified	PASS
	MCH	1.309	Not Specified	PASS
	HCH	1.305	Not Specified	PASS

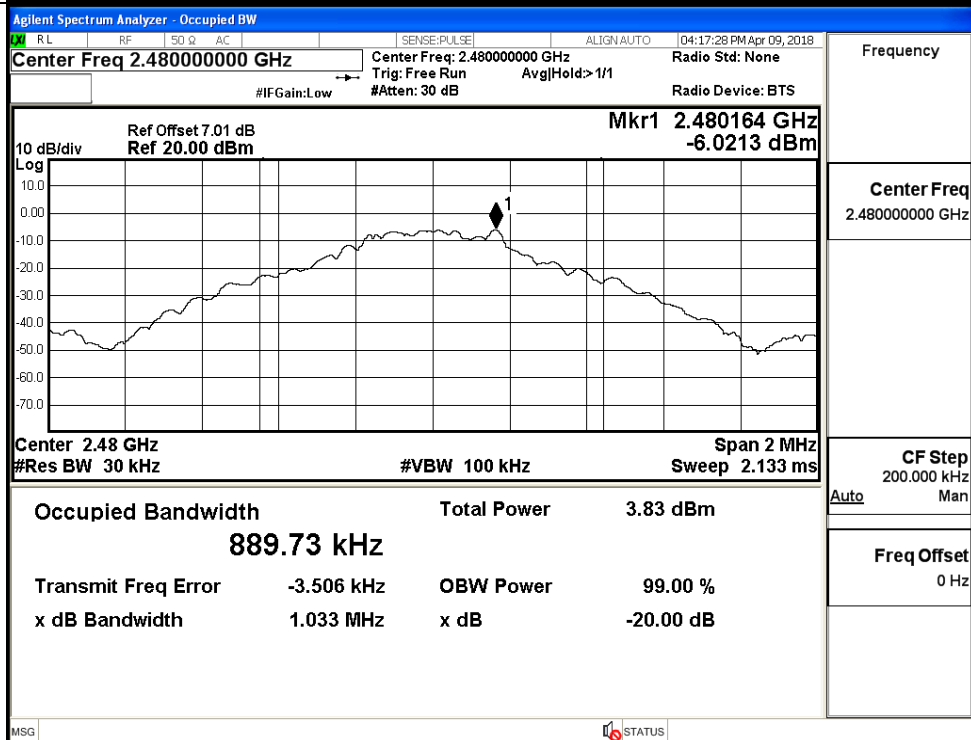
Test Graphs

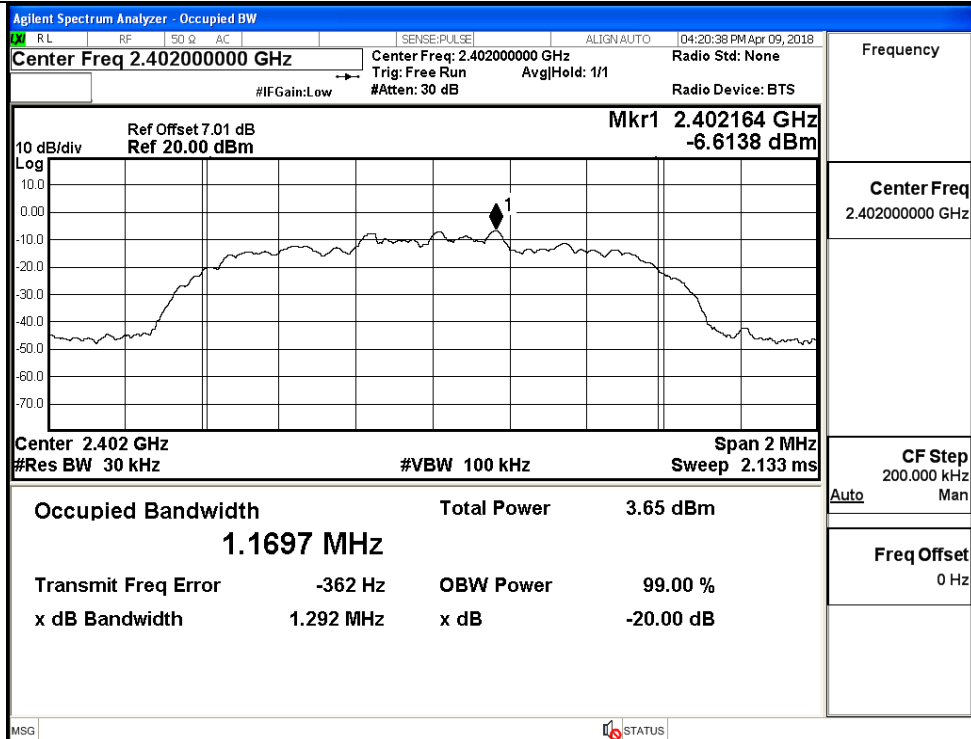
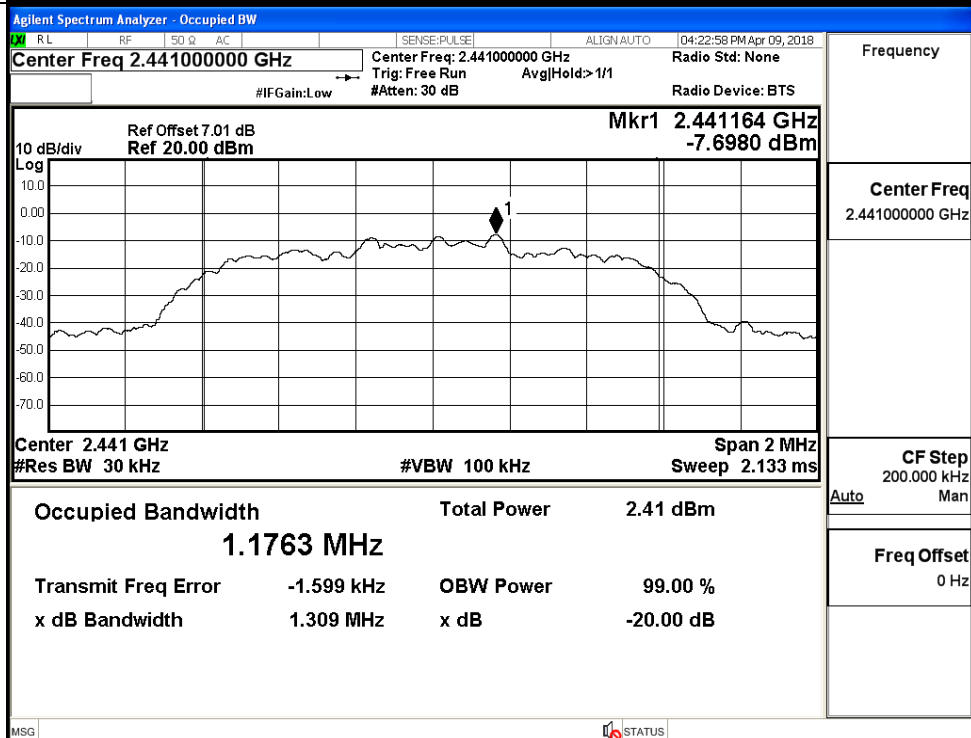


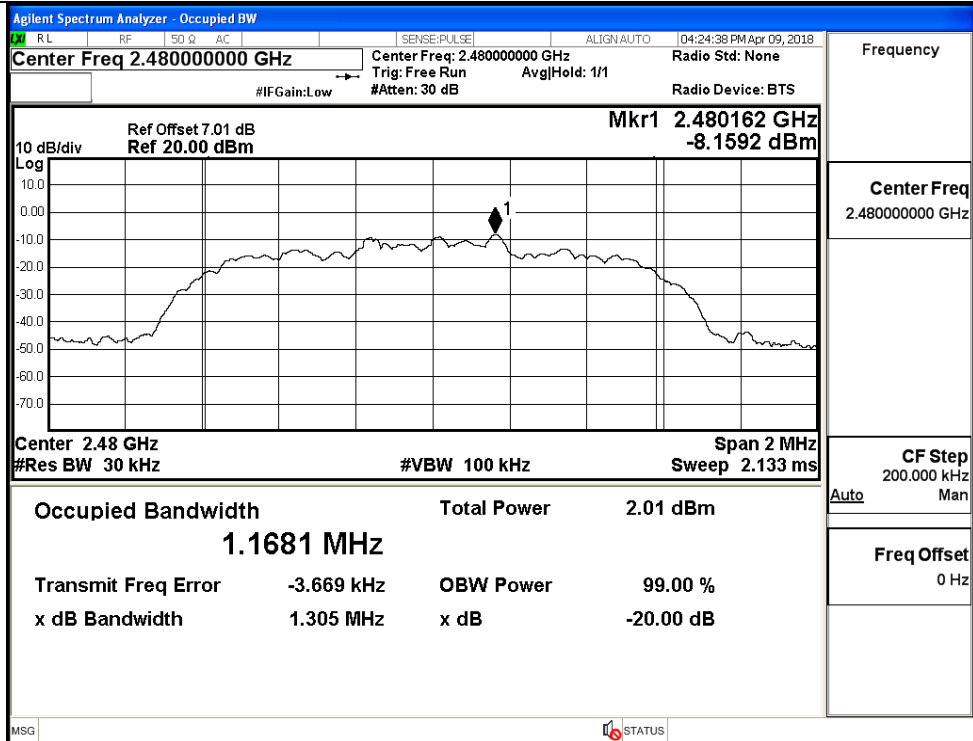
GFSK/MCH



GFSK/HCH



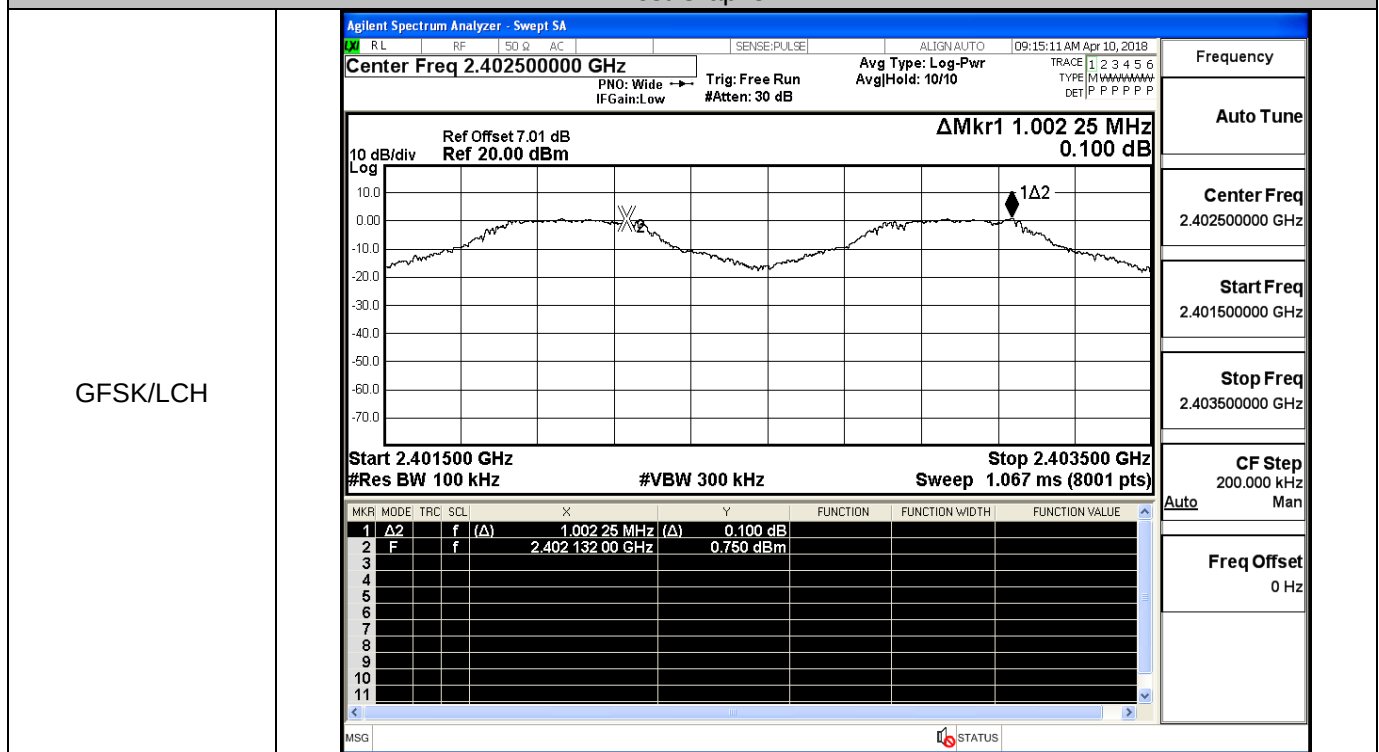
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

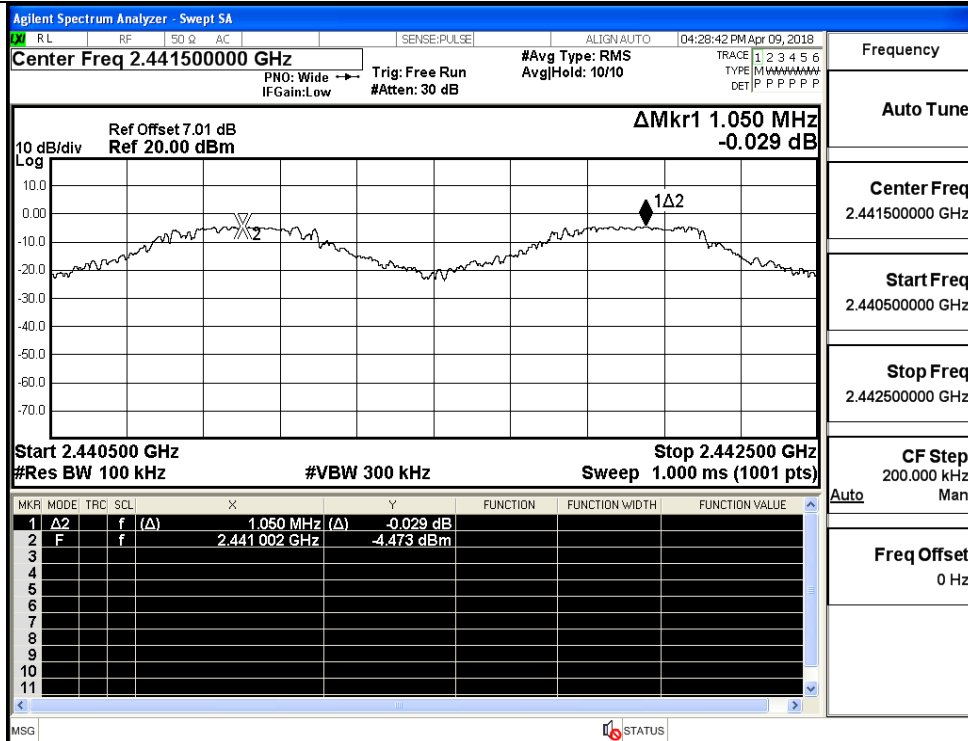
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.002	0.688	PASS
	MCH	1.050	0.692	PASS
	HCH	0.828	0.689	PASS
$\pi/4$ DQPSK	LCH	1.012	0.861	PASS
	MCH	1.016	0.873	PASS
	HCH	0.980	0.870	PASS

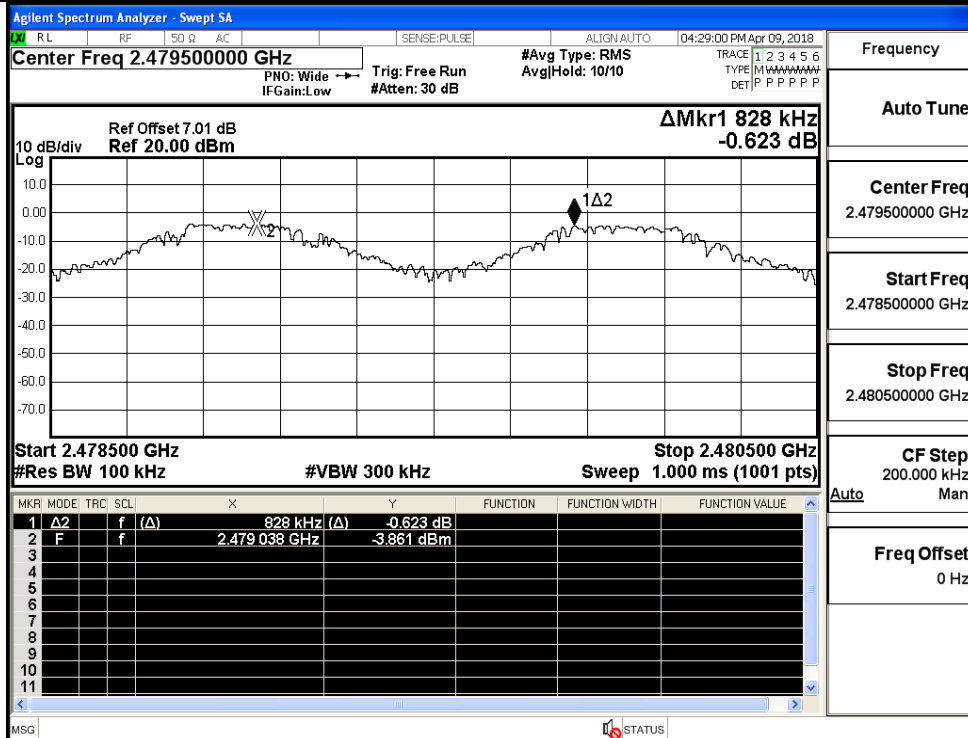
Test Graphs

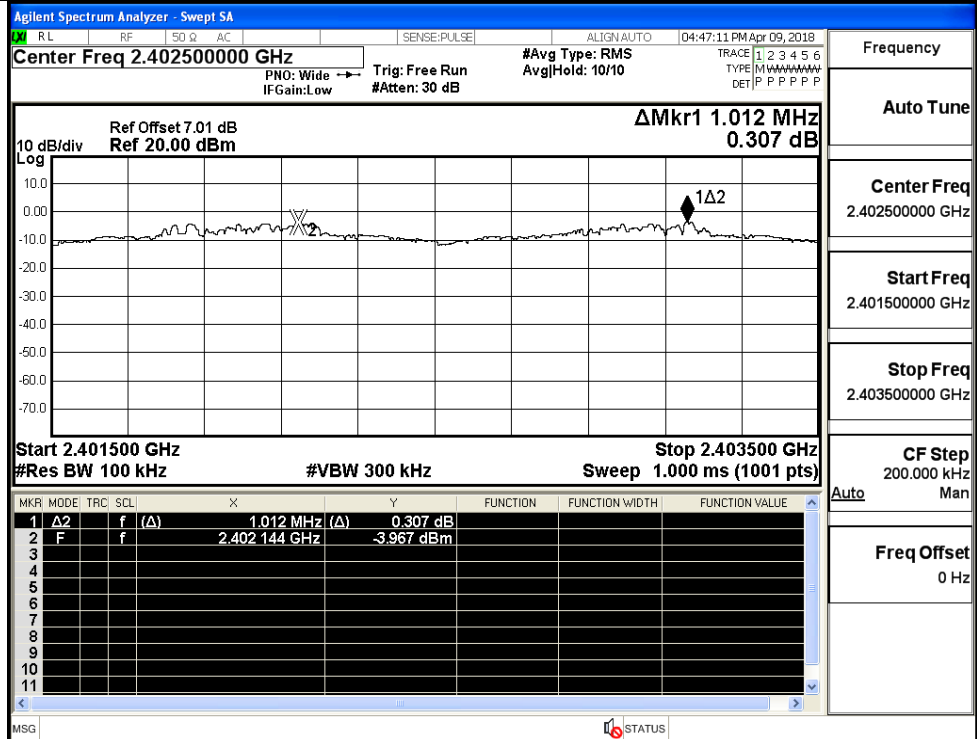
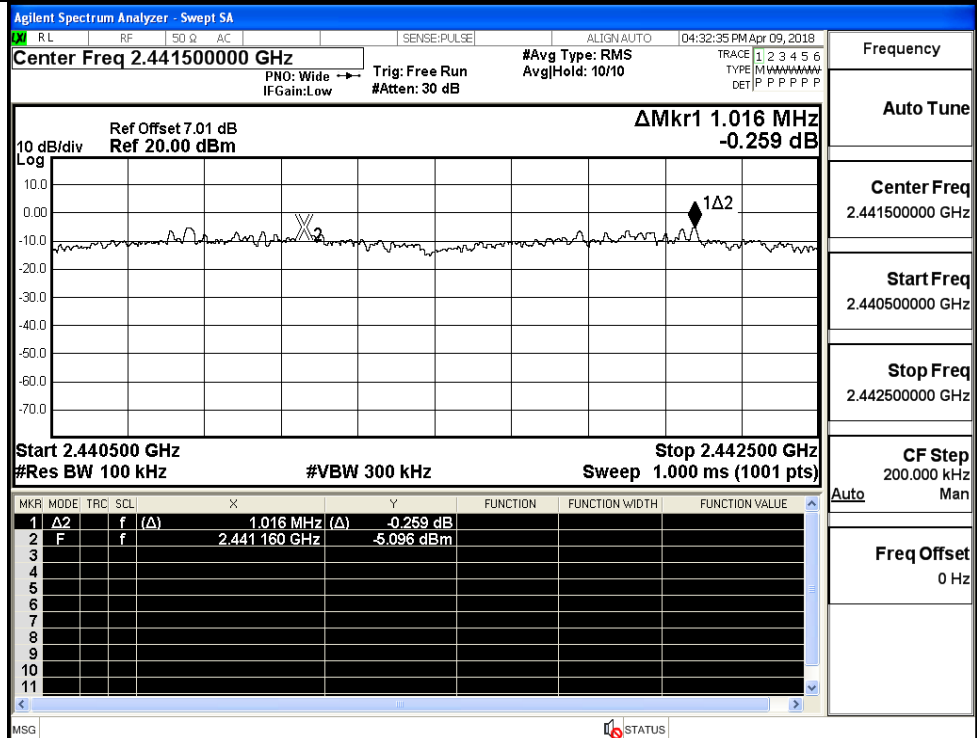


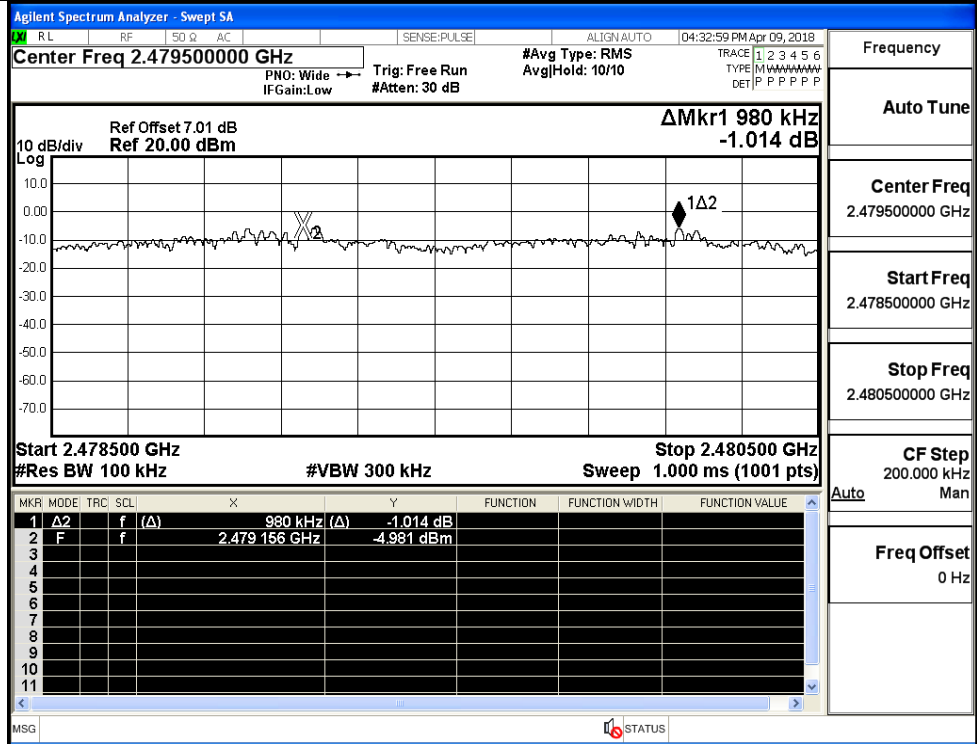
GFSK/MCH



GFSK/HCH



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

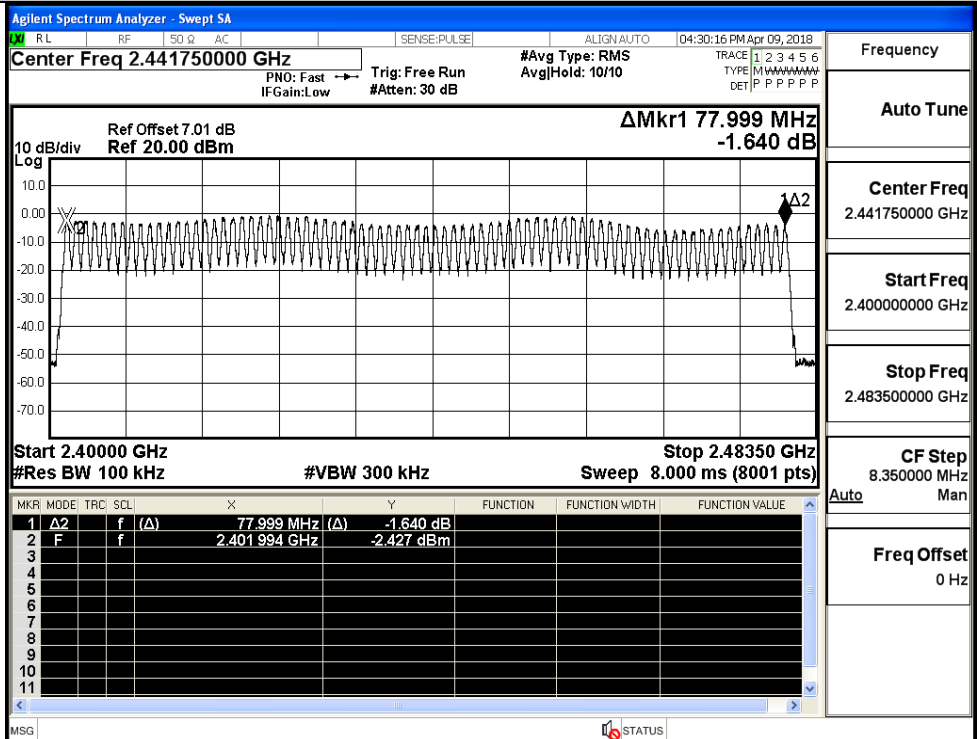
$\pi/4$ DQPSK/HCH

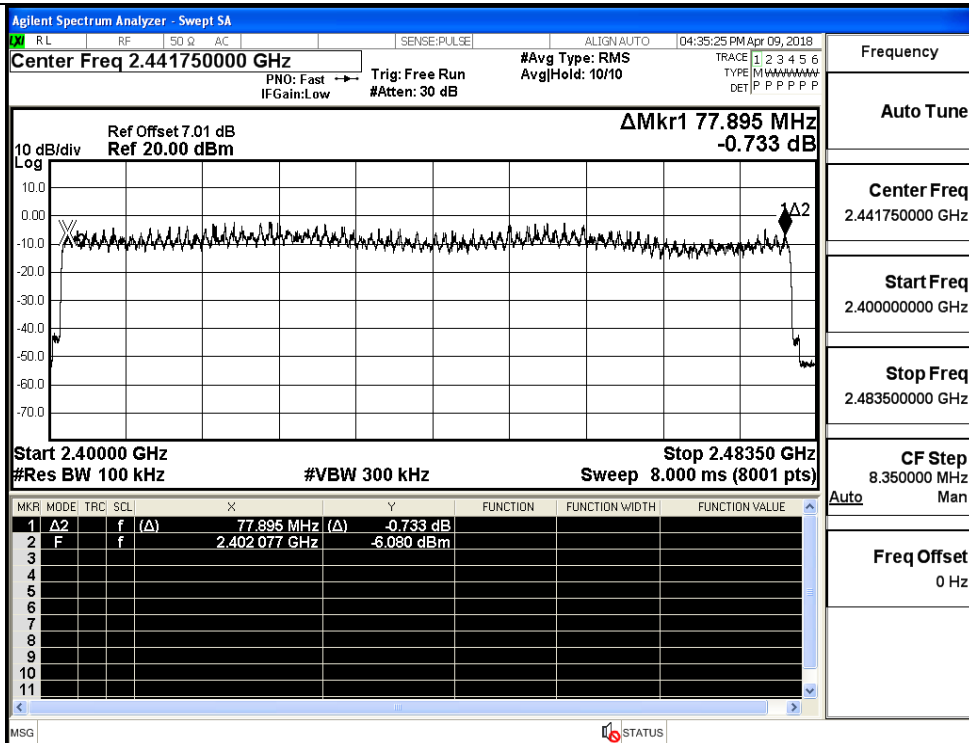
A.4 Hopping Channel Number

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

Test Graphs

GFSK/Hop



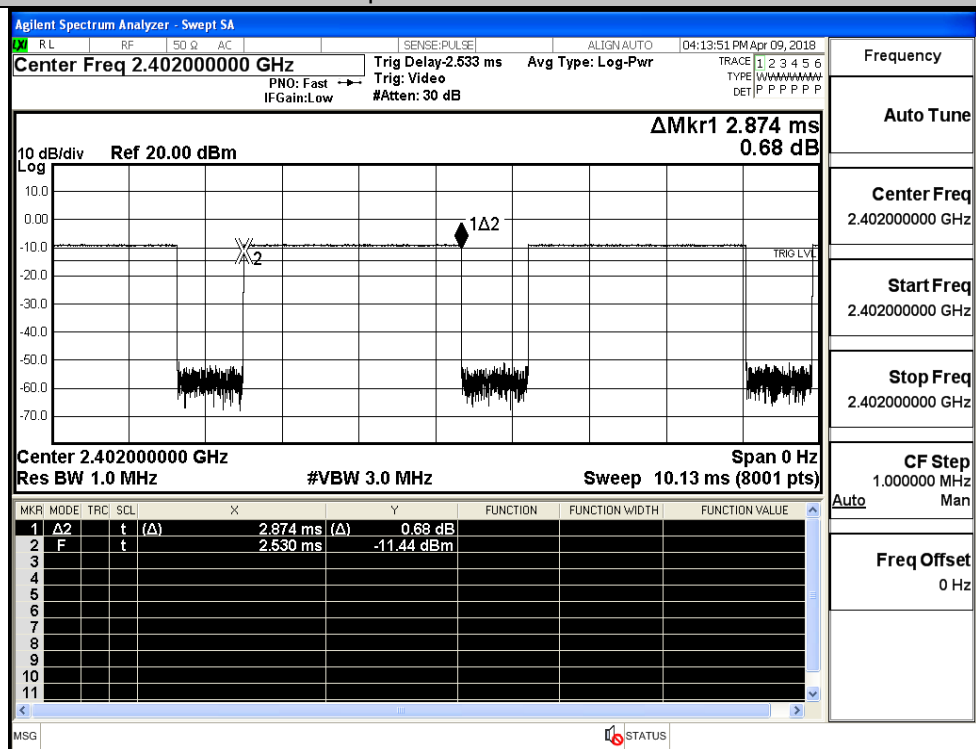
$\pi/4$ DQPSK/Hop

A.5 Dwell Time

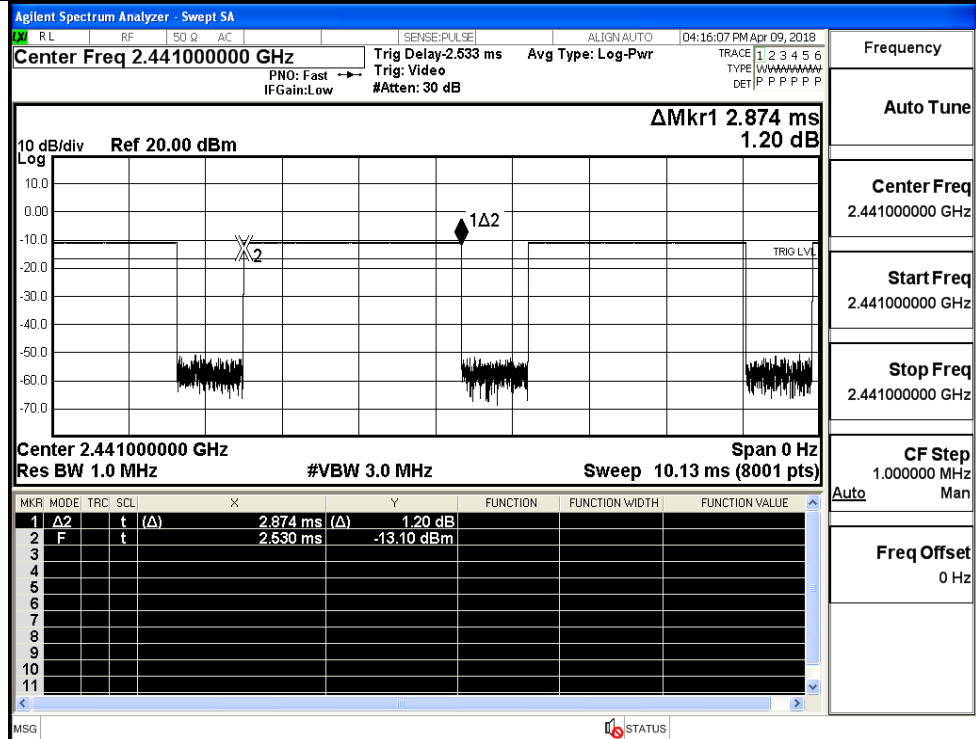
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.87	106.7	0.307	0.4	PASS
	2DH5	MCH	2.87	106.7	0.307	0.4	PASS
	2DH5	HCH	2.87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

Test Graphs

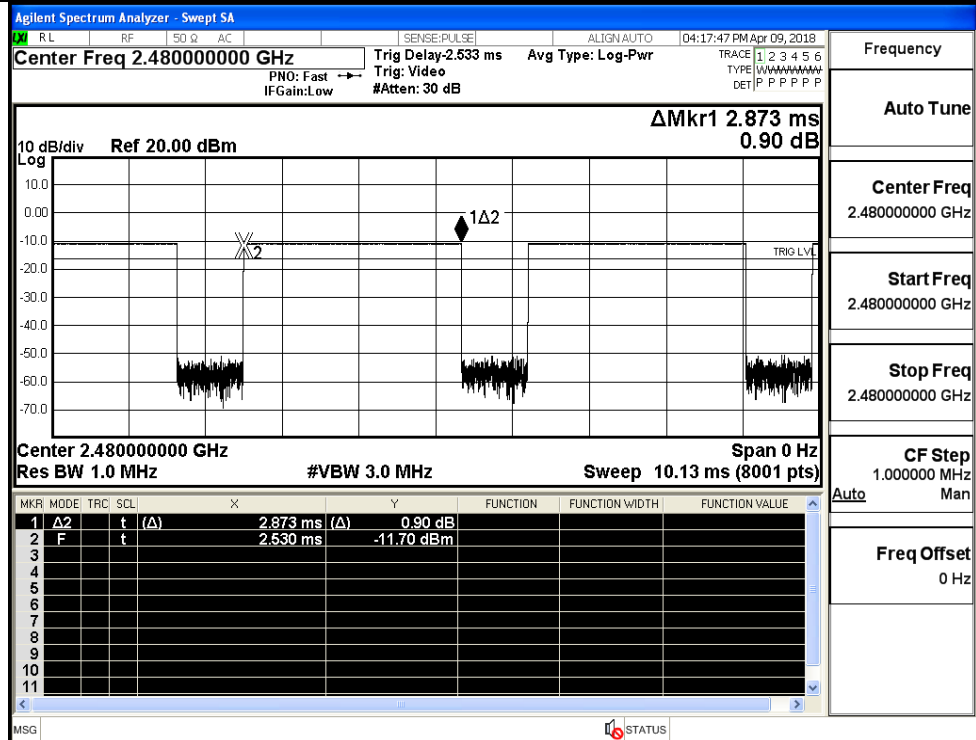
GFSK_DH5/LCH



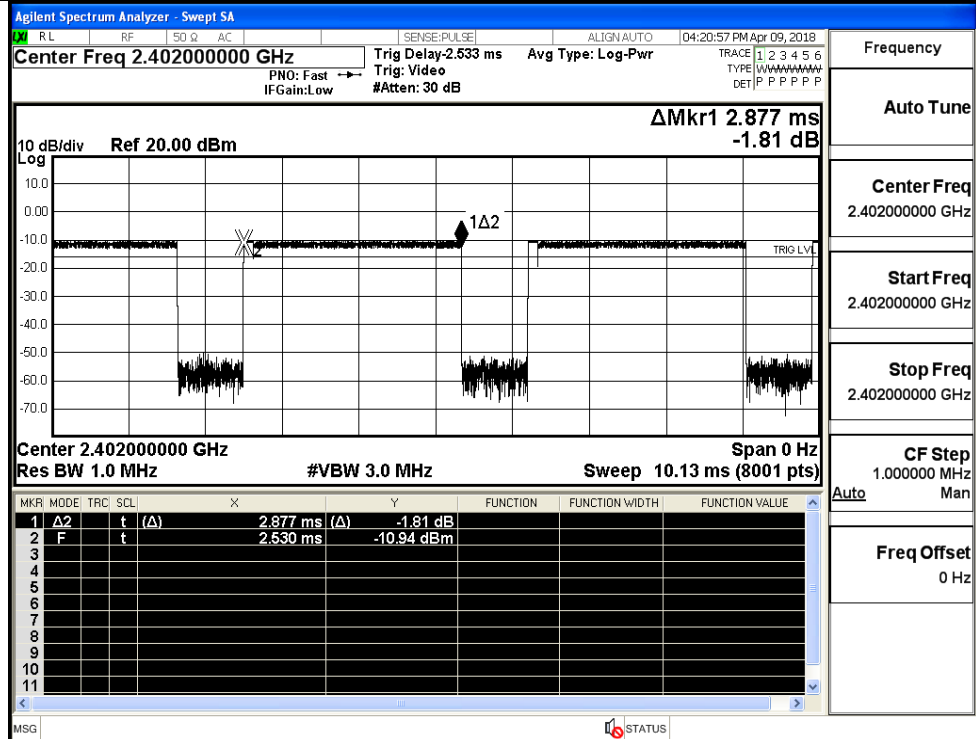
GFSK_DH5/MCH



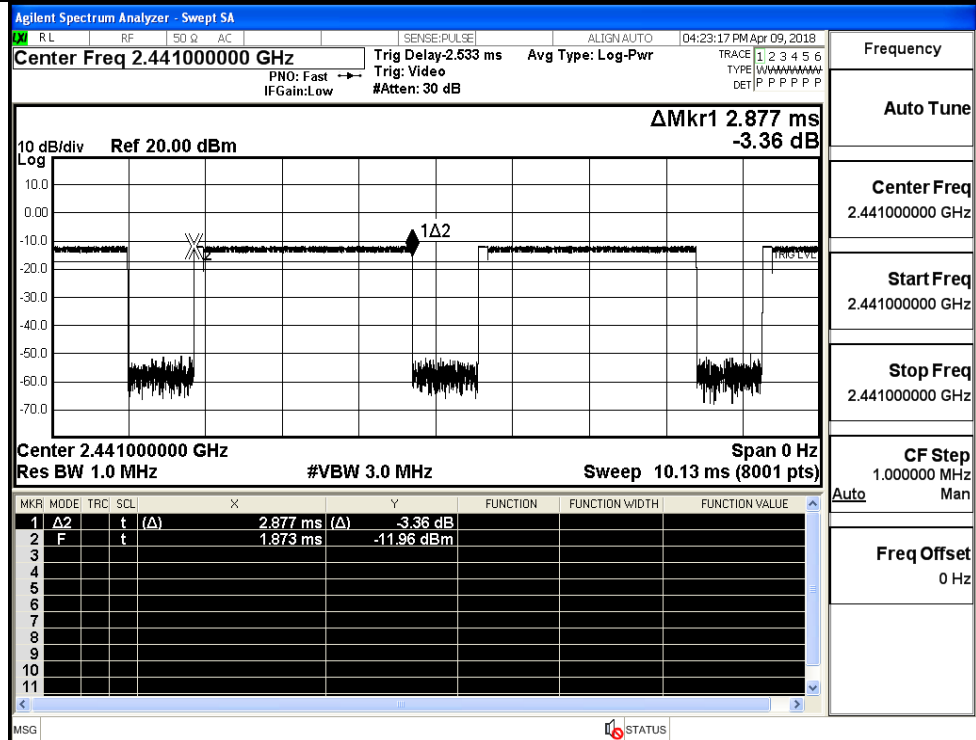
GFSK_DH5/HCH



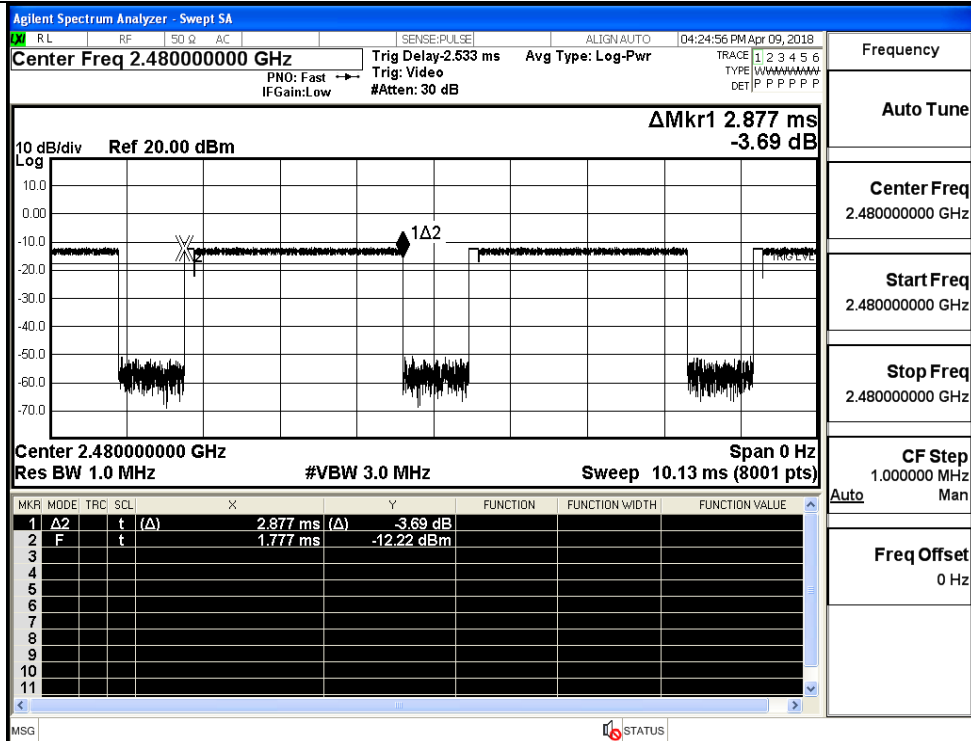
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



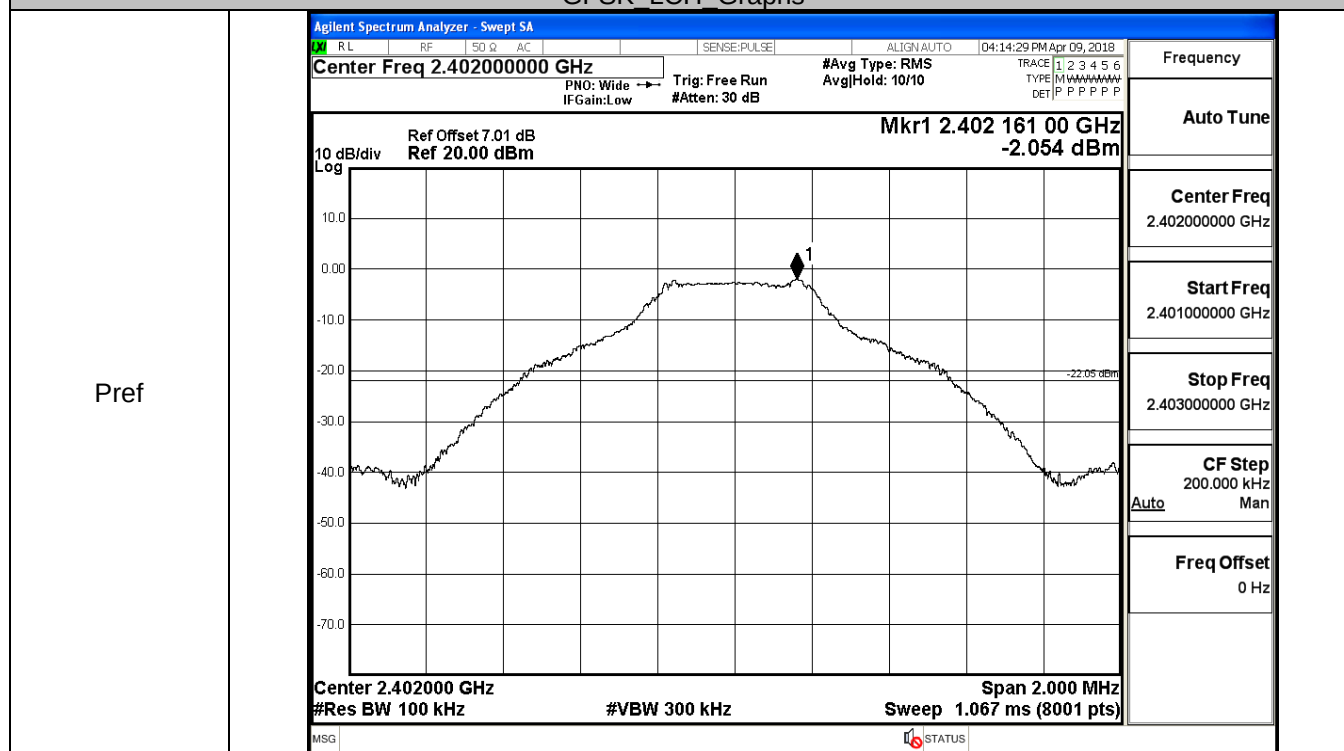
$\pi/4$ DQPSK
_2DH5/HCH

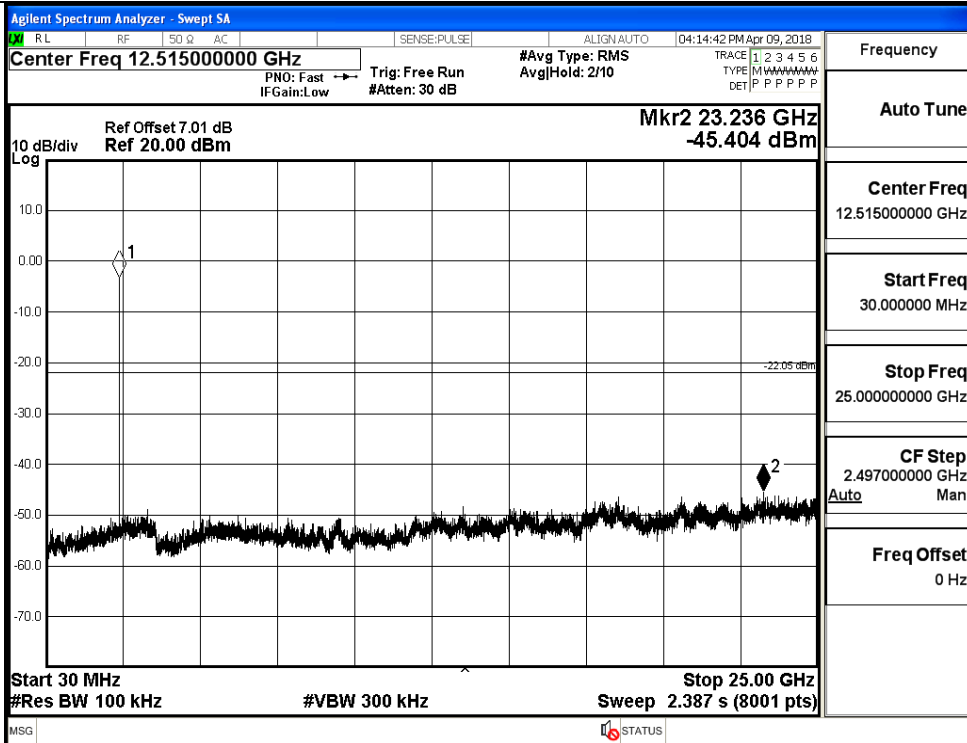


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.054	-45.404	-22.054	PASS
	MCH	-3.866	-45.955	-23.866	PASS
	HCH	-3.799	-45.663	-23.799	PASS
$\pi/4$ DQPSK	LCH	-3.667	-44.896	-23.667	PASS
	MCH	-4.92	-45.618	-24.920	PASS
	HCH	-5.843	-45.642	-25.843	PASS

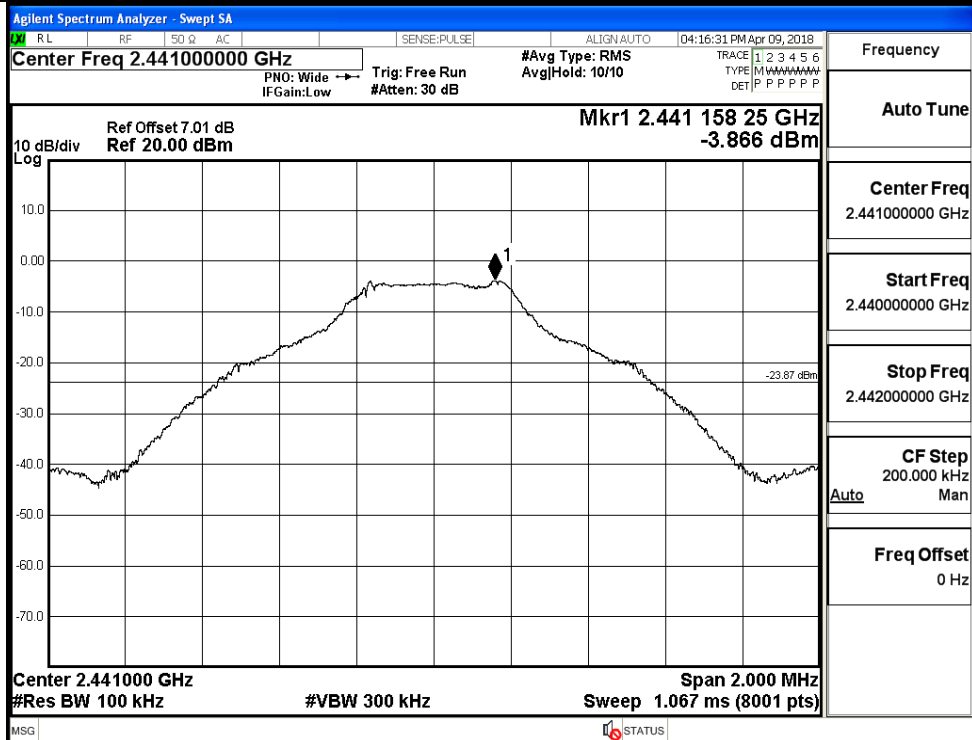
GFSK LCH Graphs



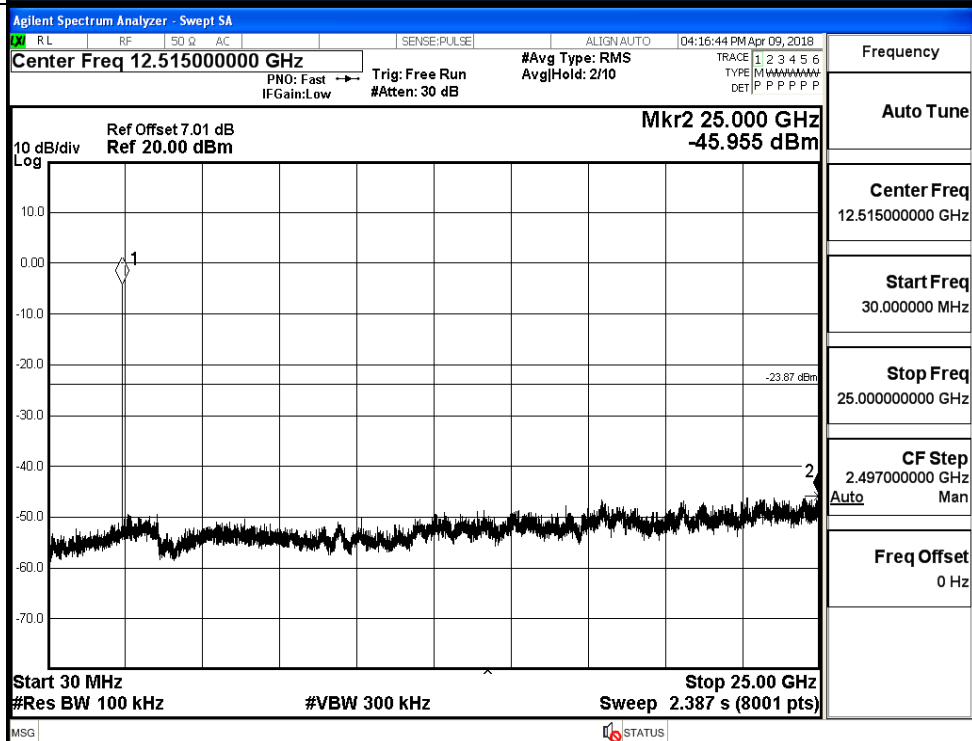
P_{uw}

GFSK MCH Graphs

Pref

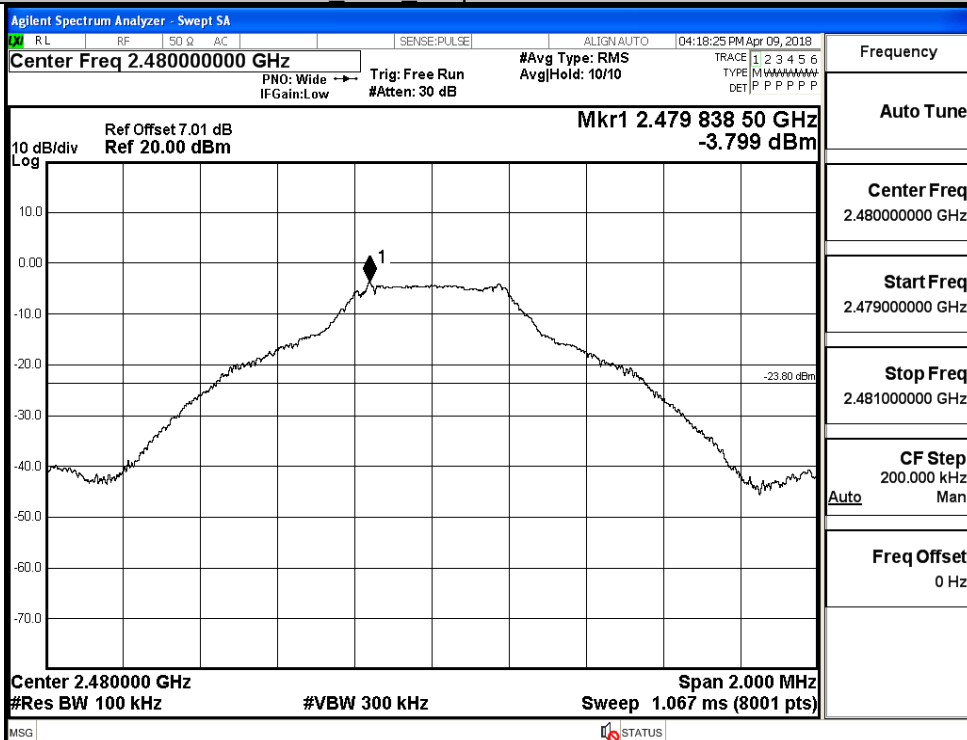


Puw

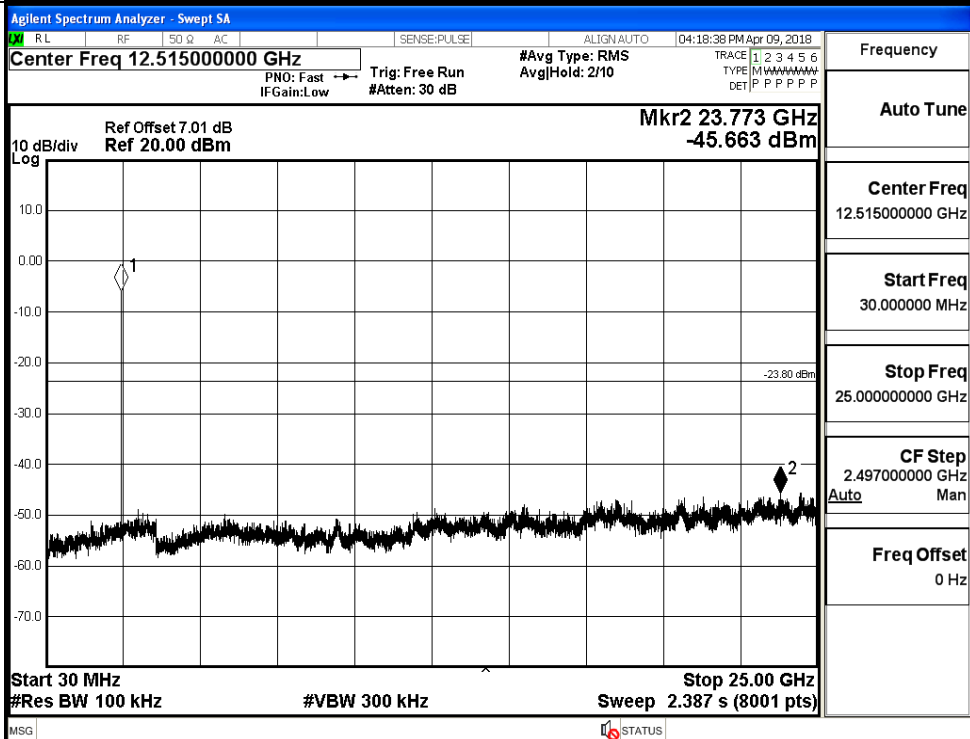


GFSK HCH Graphs

Pref

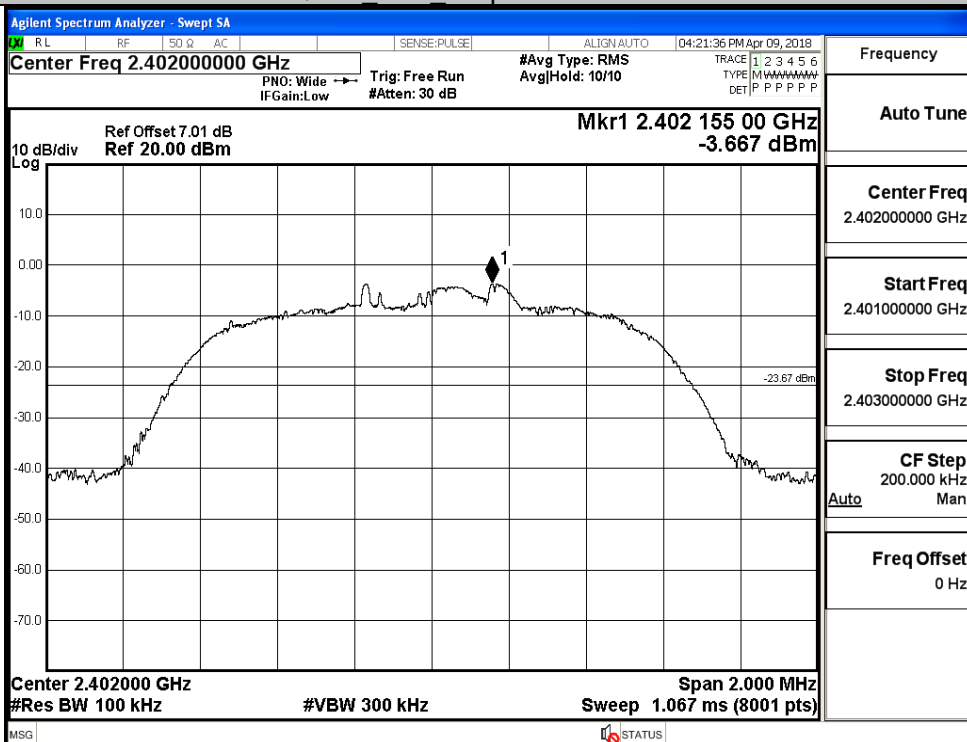


Puw

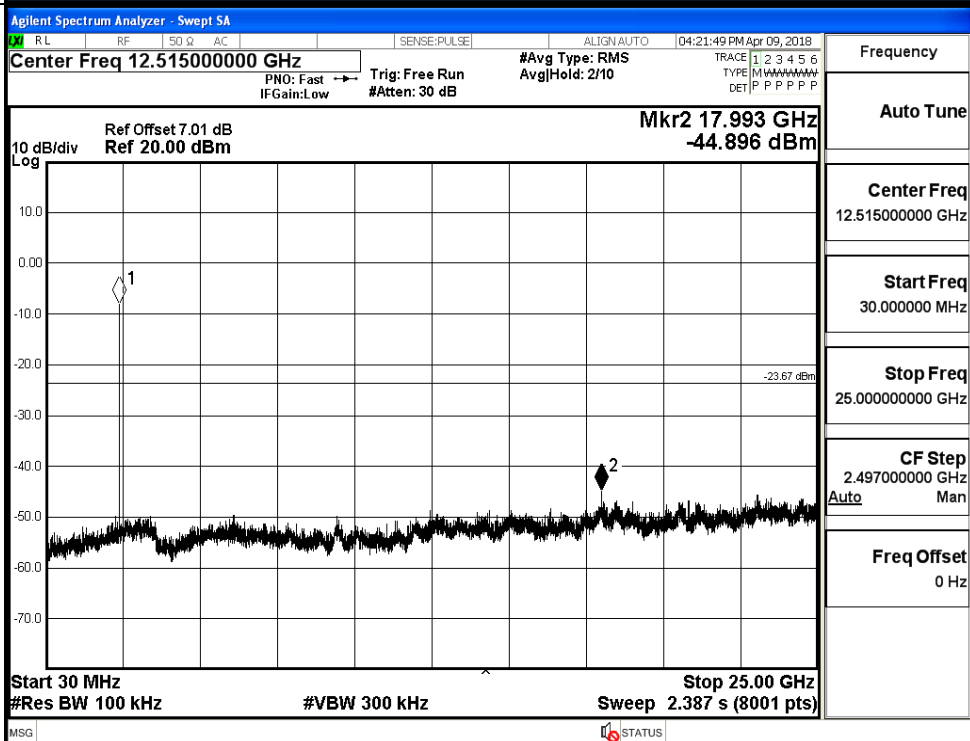


$\pi/4$ DQPSK LCH Graphs

Pref

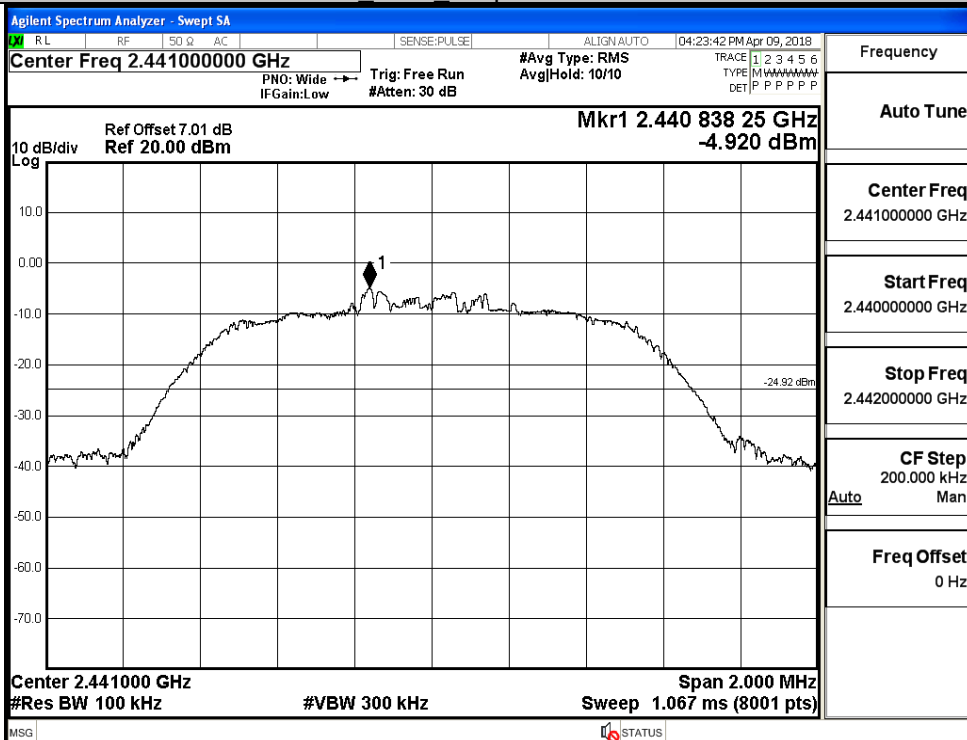


Puw

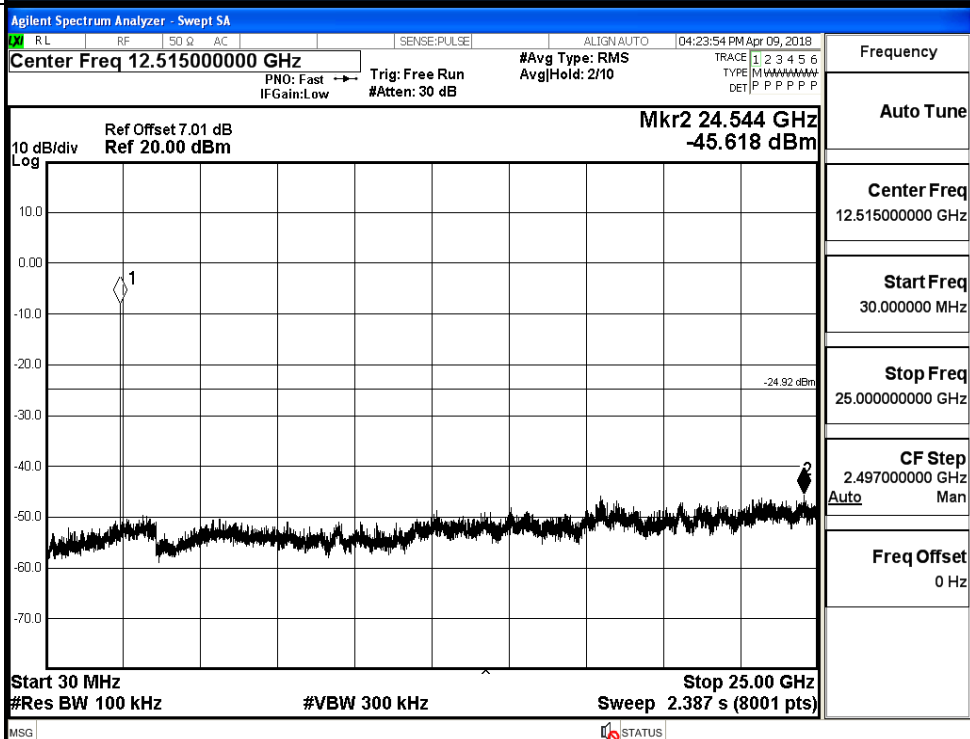


$\pi/4$ DQPSK MCH Graphs

Pref

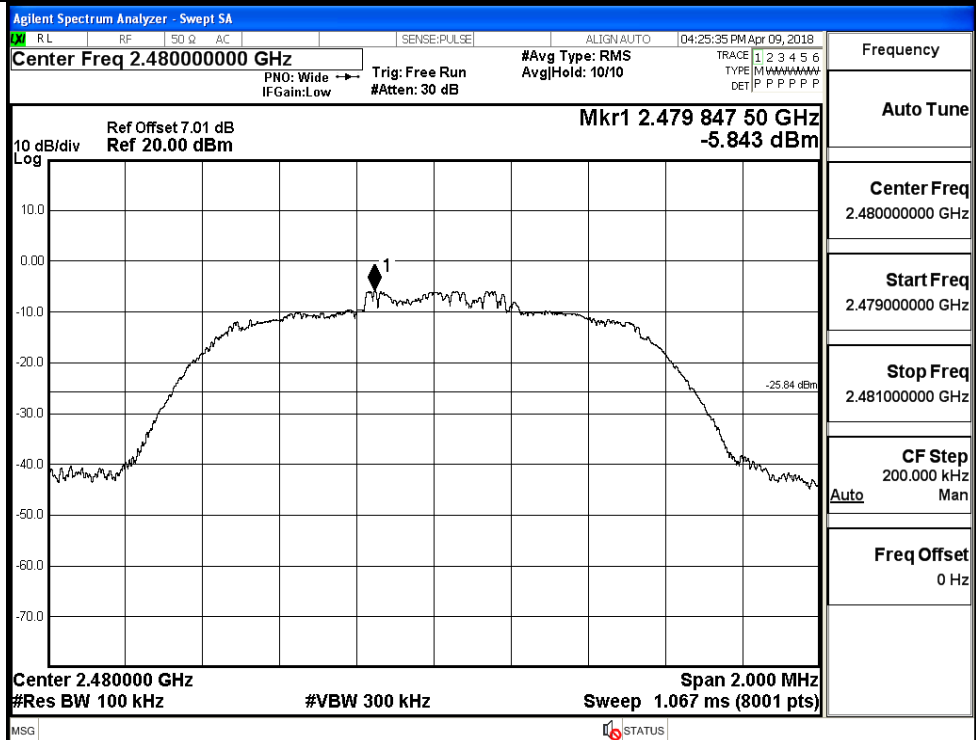


Puw

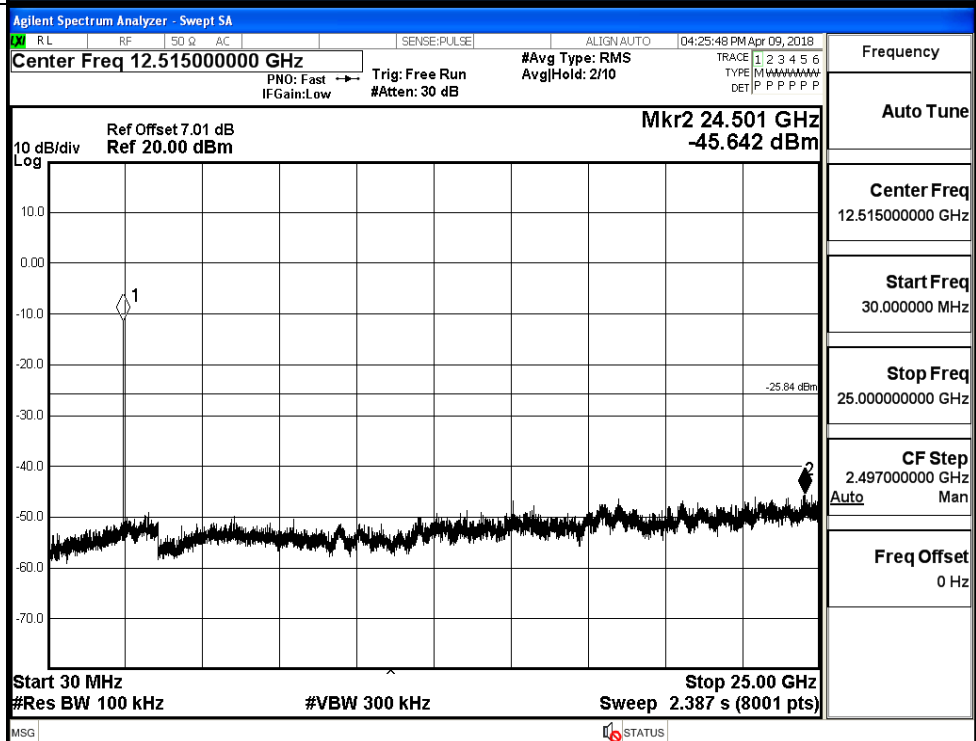


$\pi/4$ DQPSK HCH Graphs

Pref



Puw

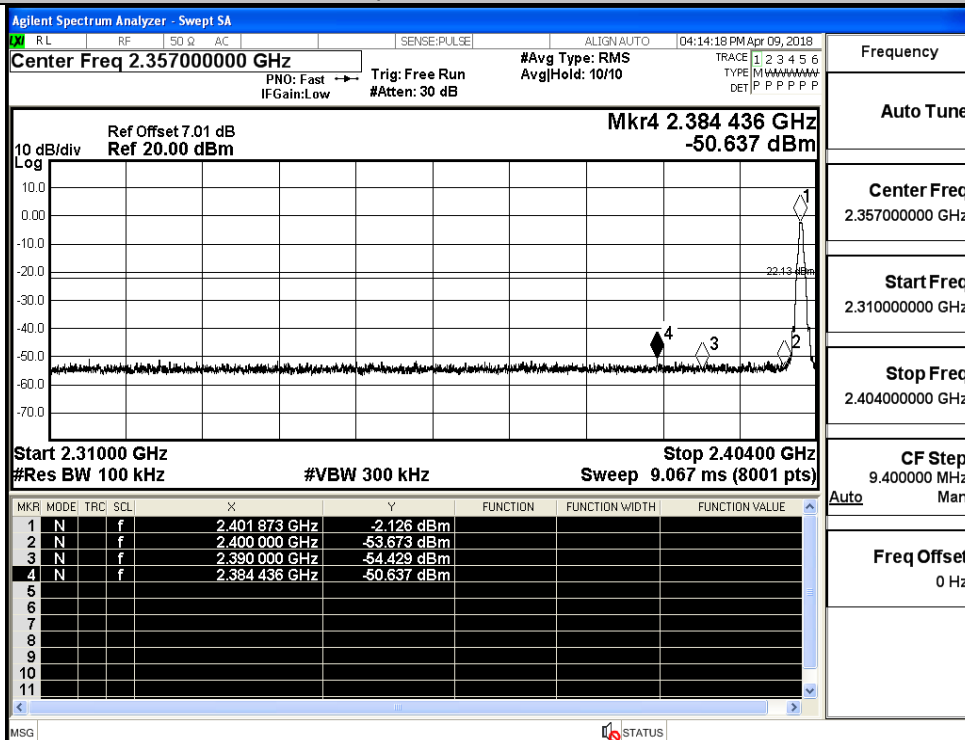


A.7 Band-edge for RF Conducted Emissions

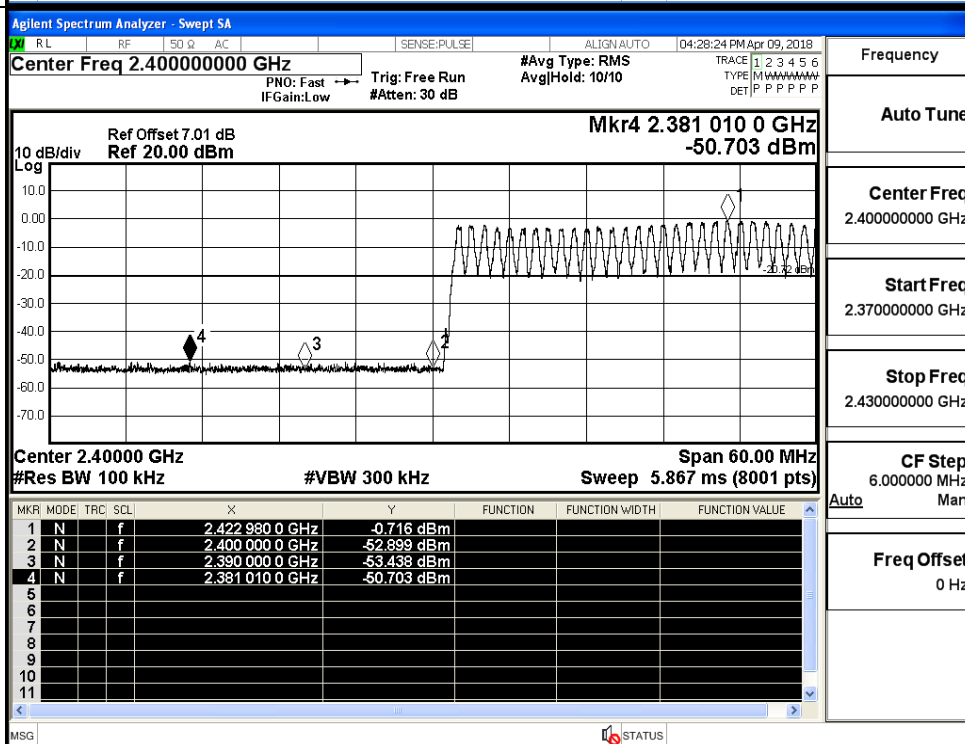
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.126	Off	-50.637	-22.13	PASS
			-0.716	On	-50.703	-20.72	PASS
	HCH	2480	-3.844	Off	-50.427	-23.84	PASS
			-0.981	On	-50.486	-20.98	PASS
$\pi/4$ DQPSK	LCH	2402	-4.168	Off	-50.683	-24.17	PASS
			-1.992	On	-50.253	-21.99	PASS
	HCH	2480	-5.445	Off	-51.080	-25.45	PASS
			-2.517	On	-50.285	-22.52	PASS

Test Graphs

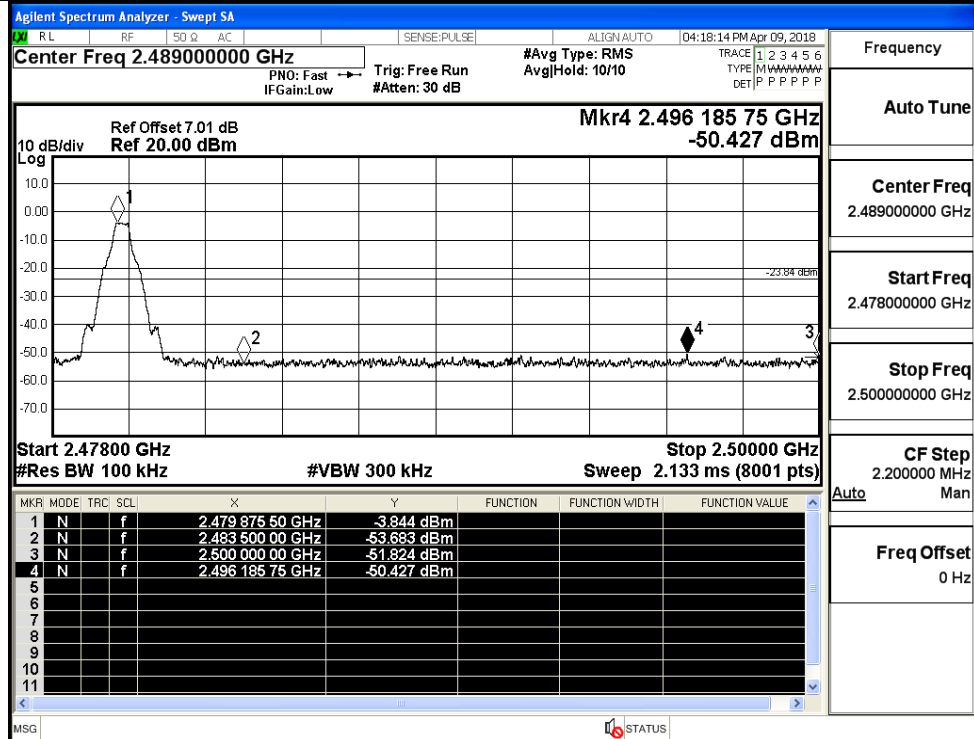
GFSK/LCH/No Hop



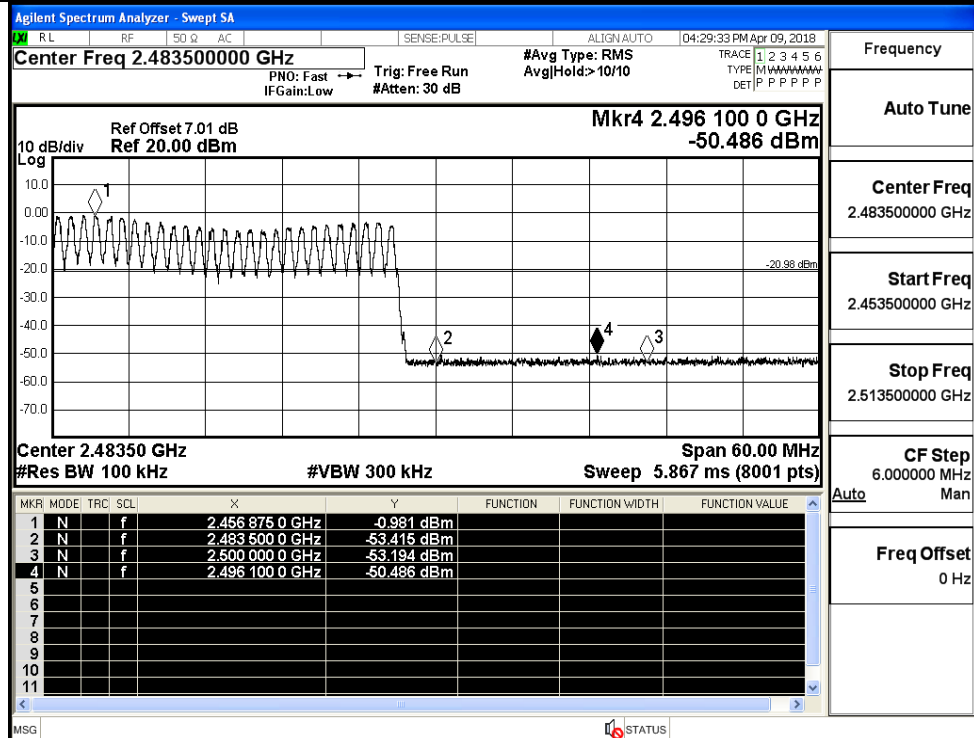
GFSK/LCH/Hop



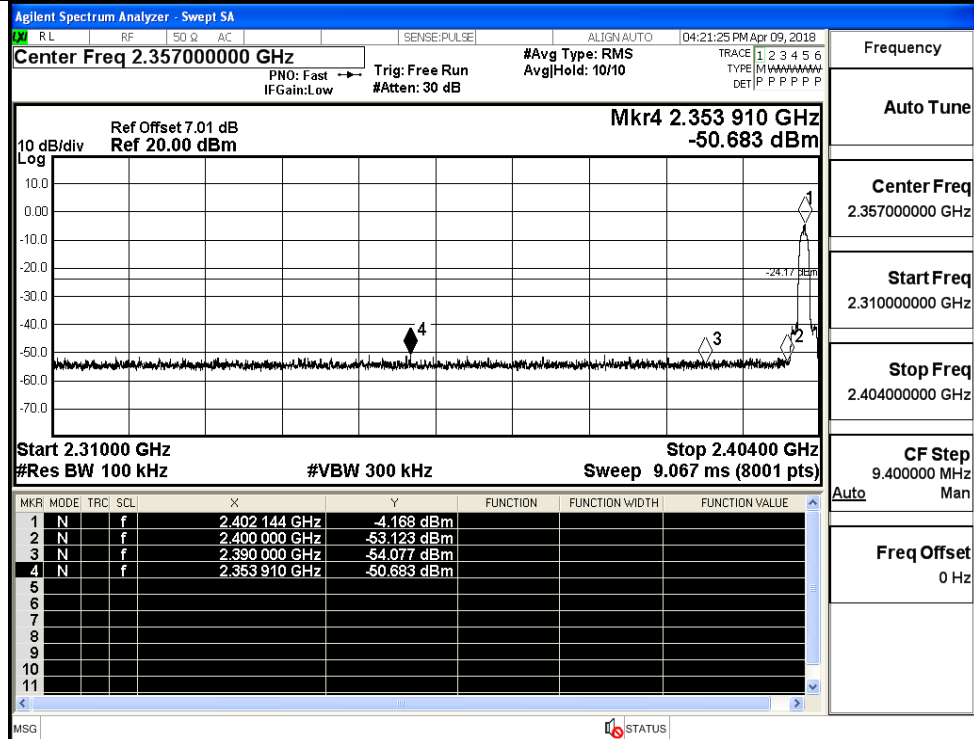
GFSK/HCH/No Hop



GFSK/HCH/Hop



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

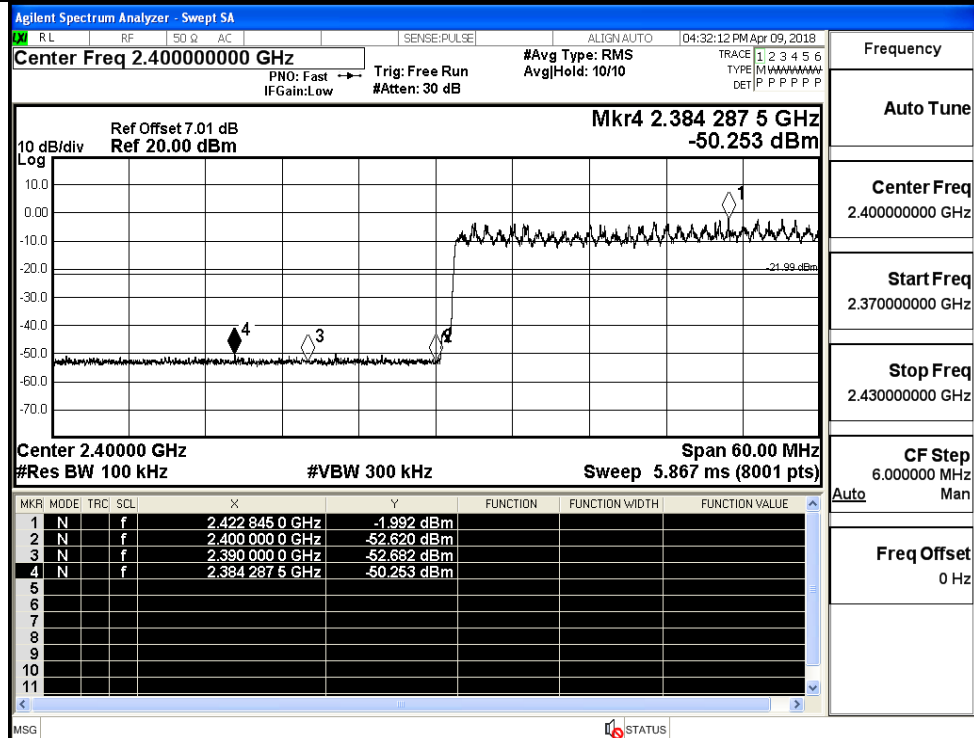


Frequency

Auto Tune

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

$\pi/4$ DQPSK/LCH/Hop

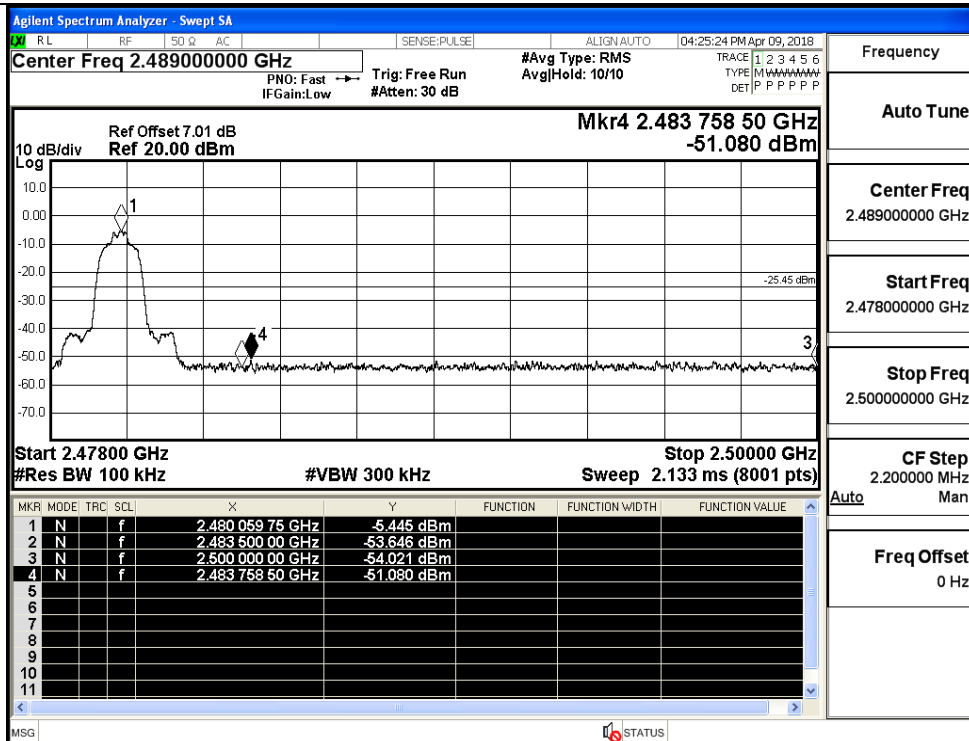


Frequency

Auto Tune

Center Freq
2.400000000 GHzStart Freq
2.370000000 GHzStop Freq
2.430000000 GHzCF Step
6.000000 MHz
Auto ManFreq Offset
0 Hz

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

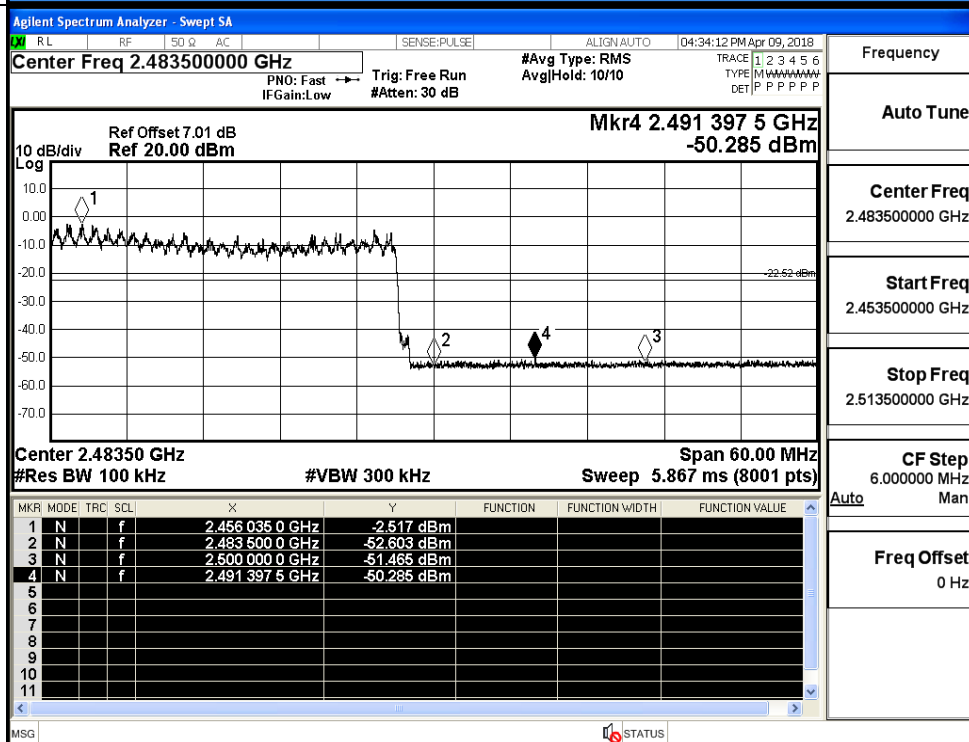


Frequency

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

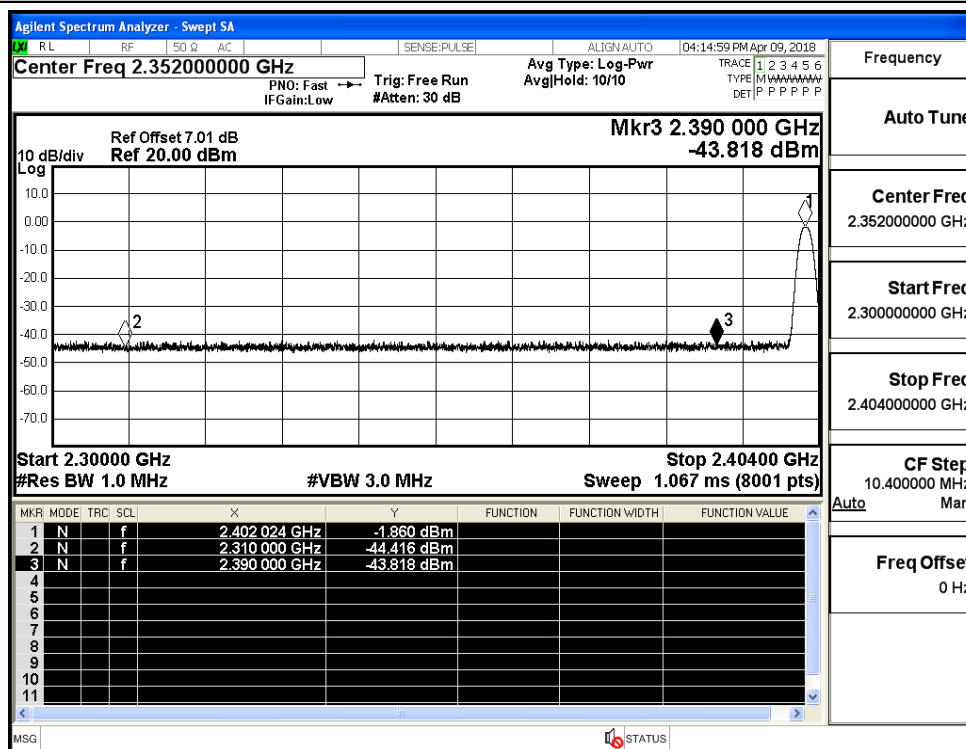
Auto Tune

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

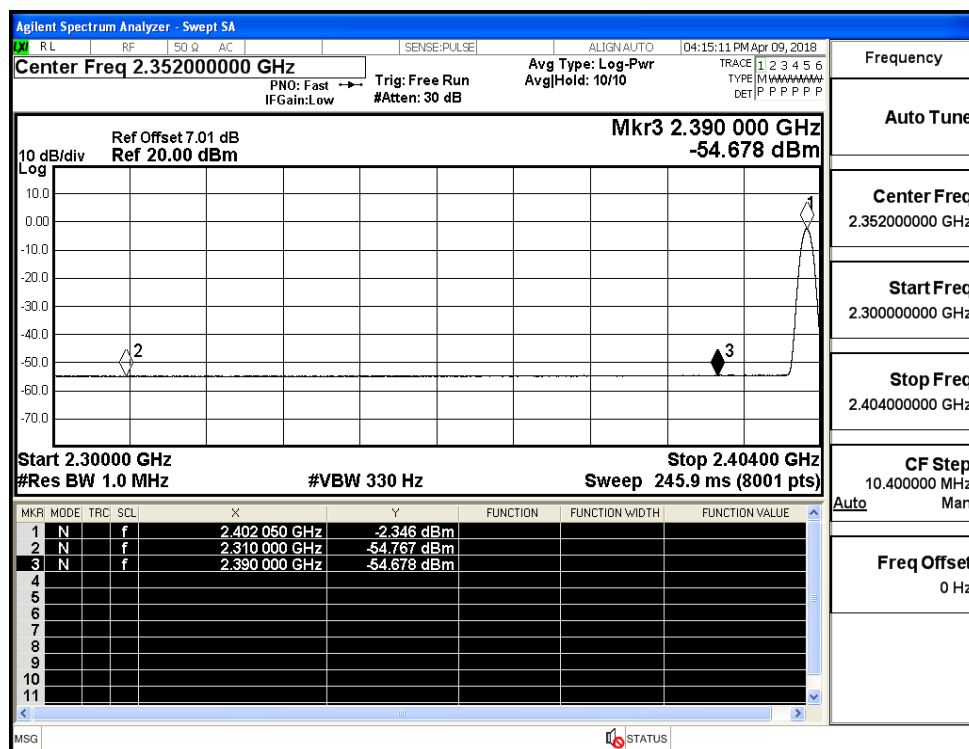
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.42	2.0	0	50.84	PEAK	74	PASS
	Off	2310.0	-54.77	2.0	0	40.49	AV	54	PASS
	Off	2390.0	-43.82	2.0	0	51.44	PEAK	74	PASS
	Off	2390.0	-54.68	2.0	0	40.58	AV	54	PASS
	Off	2483.5	-44.00	2.0	0	51.26	PEAK	74	PASS
	Off	2483.5	-54.24	2.0	0	41.02	AV	54	PASS
	Off	2500.0	-44.90	2.0	0	50.35	PEAK	74	PASS
	Off	2500.0	-54.24	2.0	0	41.02	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.31	2.0	0	51.95	PEAK	74	PASS
	Off	2310.0	-54.84	2.0	0	40.42	AV	54	PASS
	Off	2390.0	-43.35	2.0	0	51.91	PEAK	74	PASS
	Off	2390.0	-54.62	2.0	0	40.64	AV	54	PASS
	Off	2483.5	-44.90	2.0	0	50.36	PEAK	74	PASS
	Off	2483.5	-54.34	2.0	0	40.92	AV	54	PASS
	Off	2500.0	-44.35	2.0	0	50.91	PEAK	74	PASS
	Off	2500.0	-54.14	2.0	0	41.12	AV	54	PASS

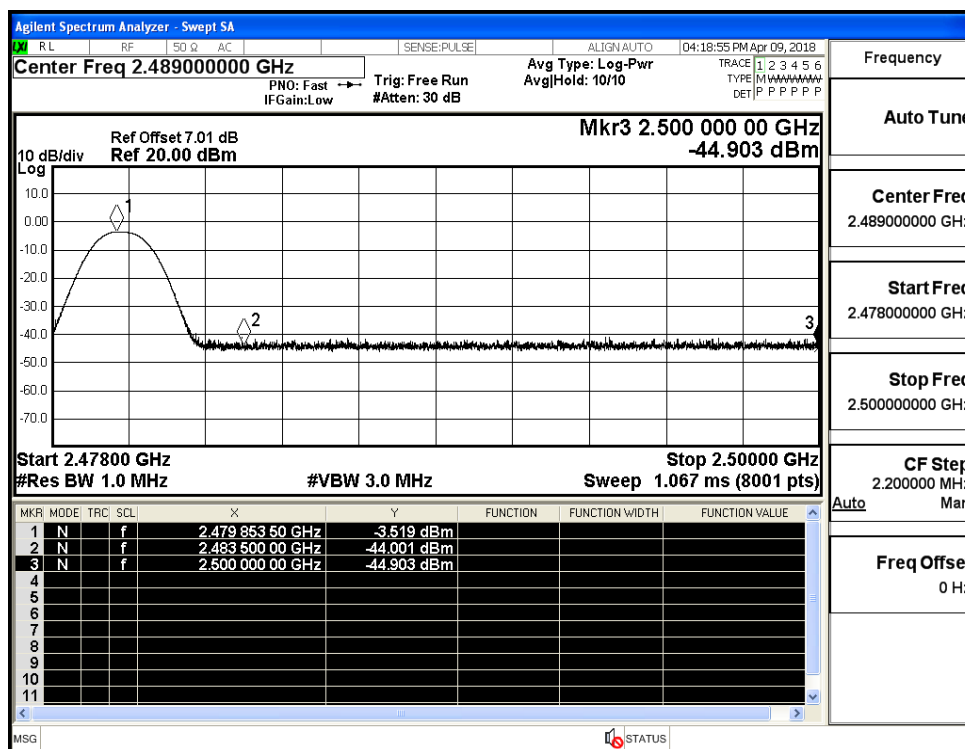
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



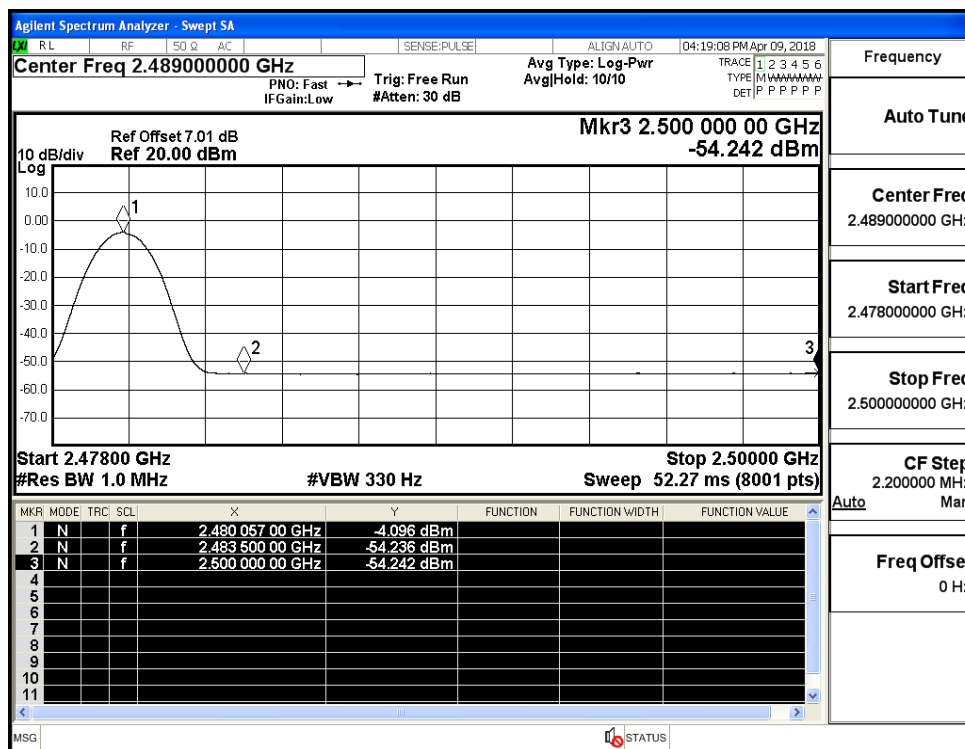
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

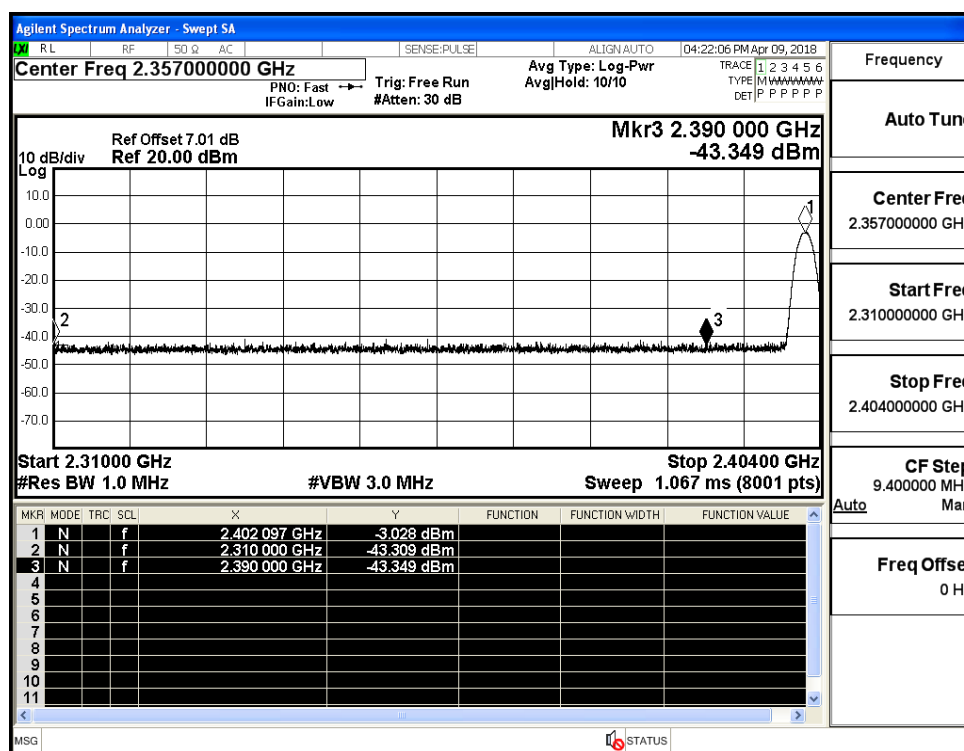
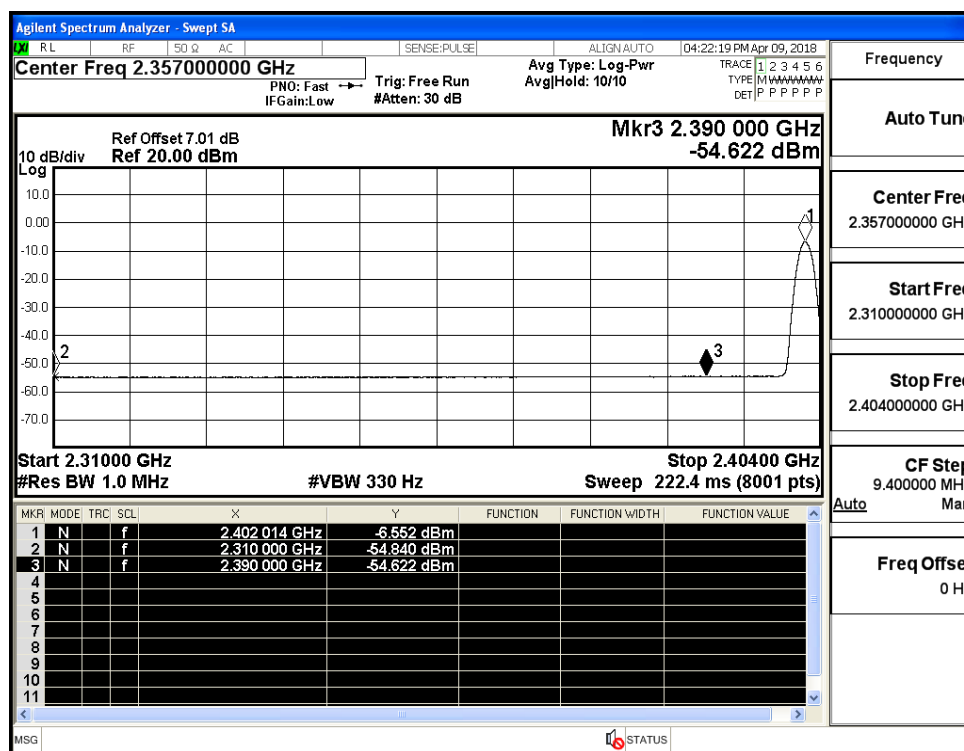


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

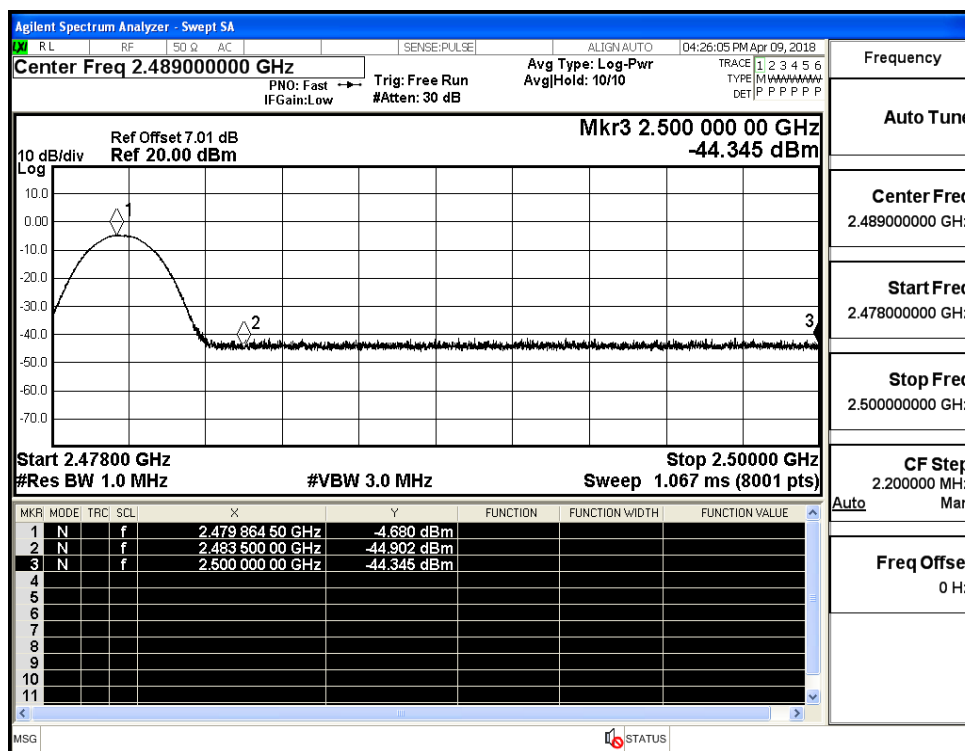


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



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_π/4-DQPSK_PEAK (High Channel)



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)

