

## Appendix A

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

Product Name: atomi Shower Speaker

Trade Mark: atomi

Test Model: AT1225

#### Environmental Conditions

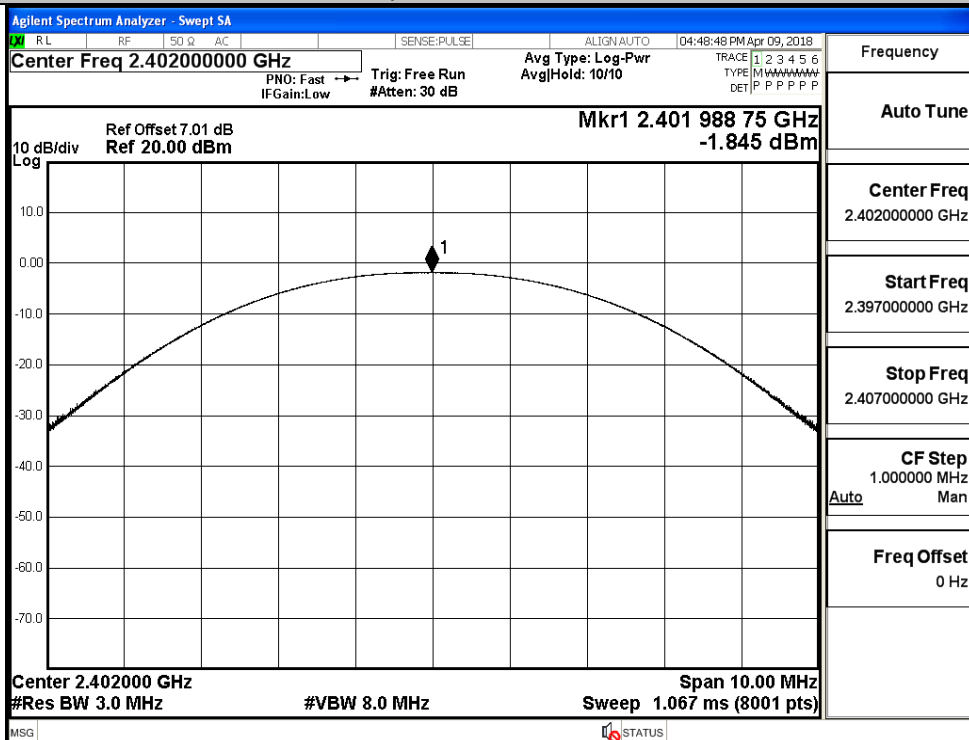
Temperature:	23.2 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Wangchuang
Supervised by:	Jayden Zhuo

#### A.1 Maxmum Conducted Peak Output Power

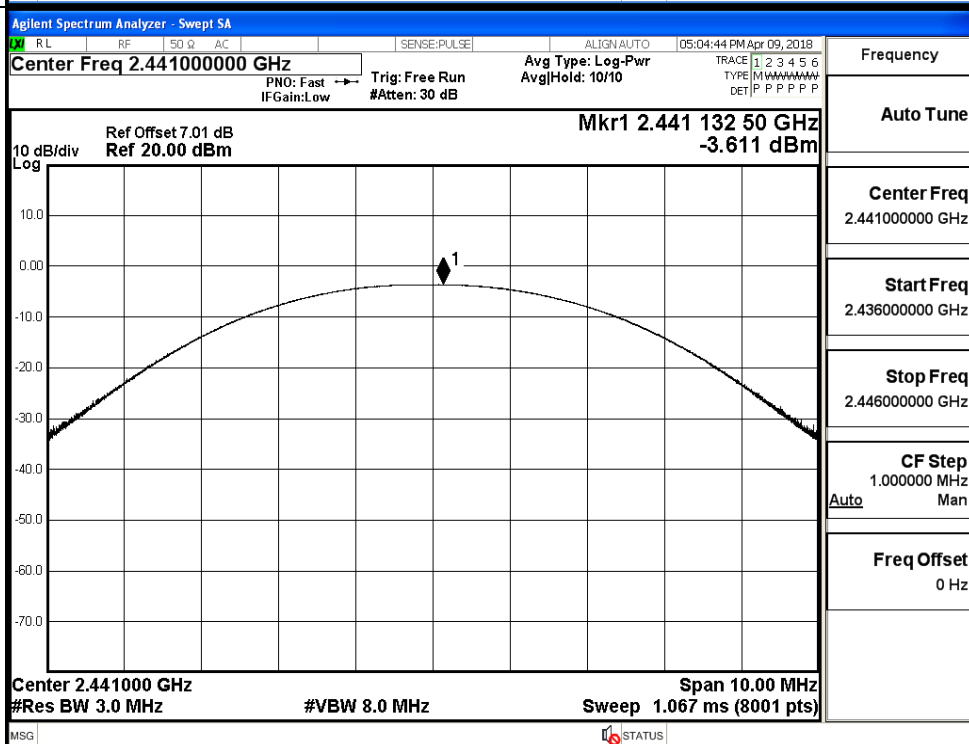
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.845	21	PASS
	MCH	-3.611	21	PASS
	HCH	-3.552	21	PASS
$\pi/4$ DQPSK	LCH	-2.552	21	PASS
	MCH	-1.468	21	PASS
	HCH	-1.695	21	PASS

## Test Graphs

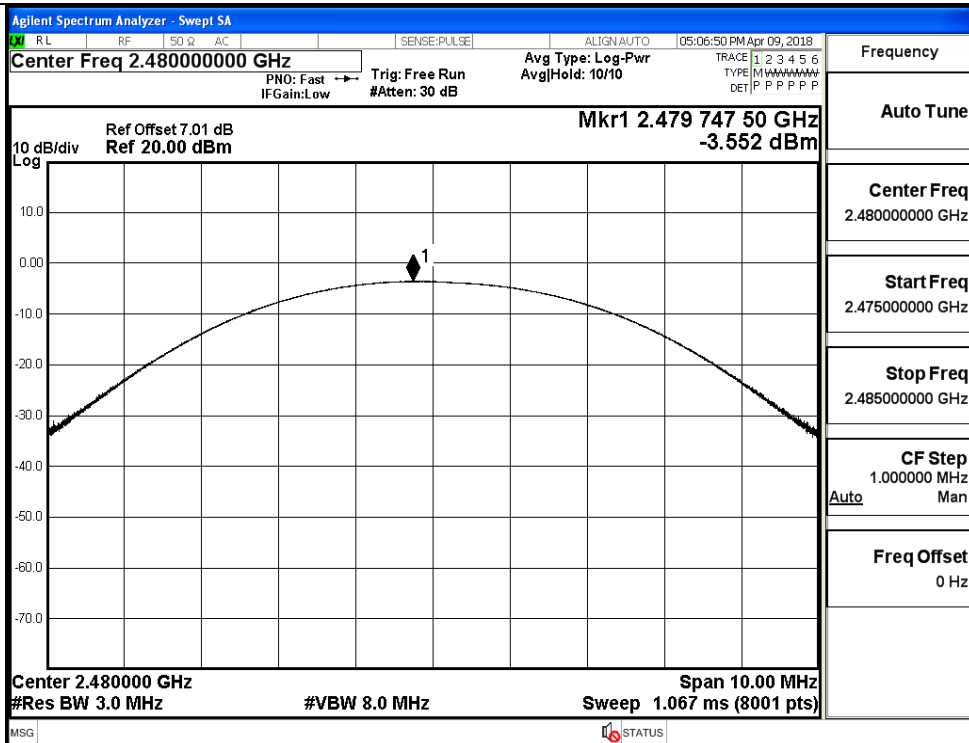
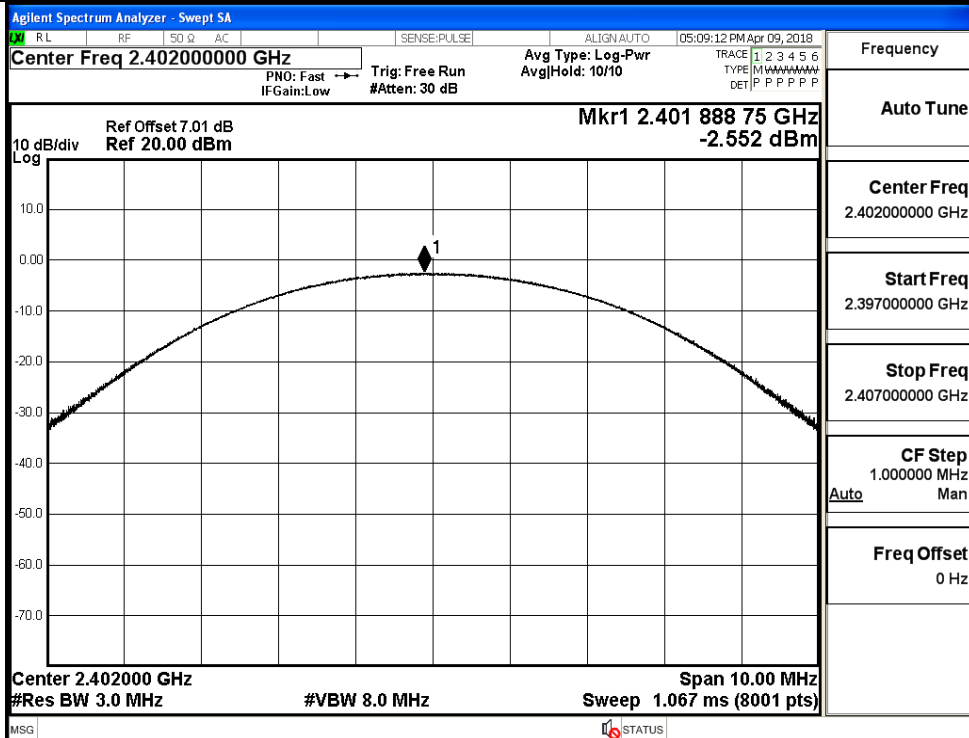
GFSK/LCH

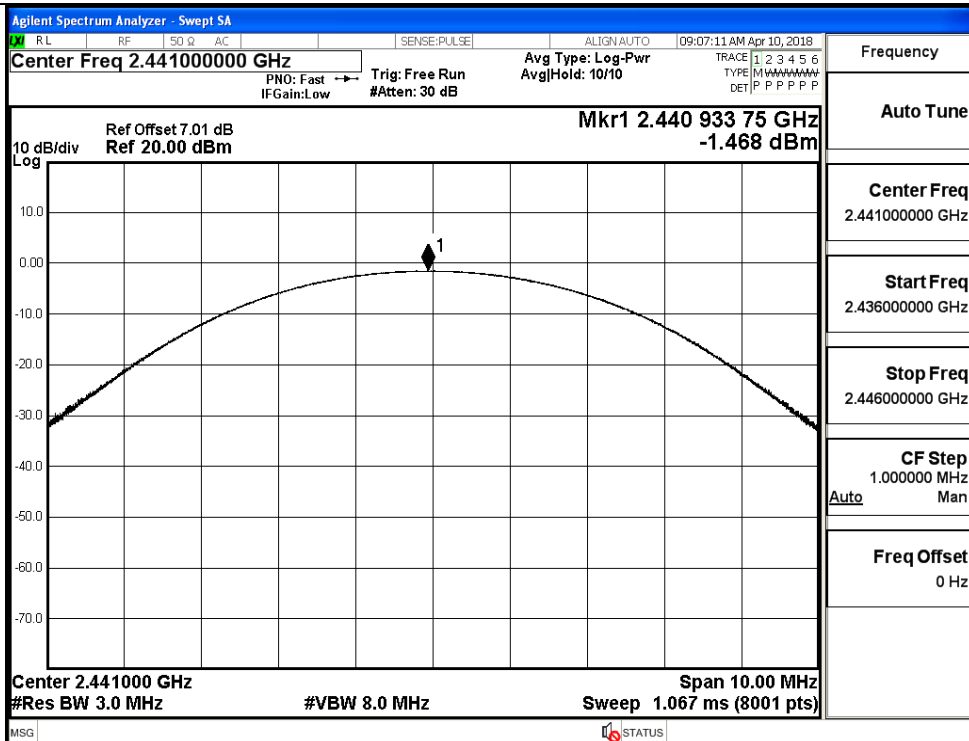
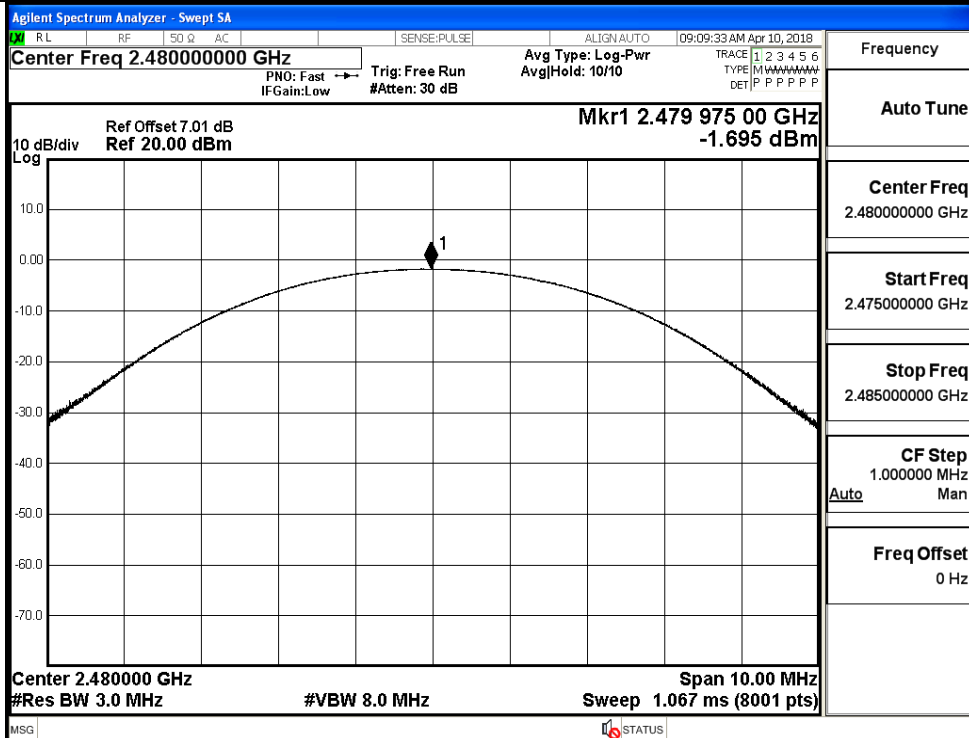


GFSK/MCH



GFSK/HCH

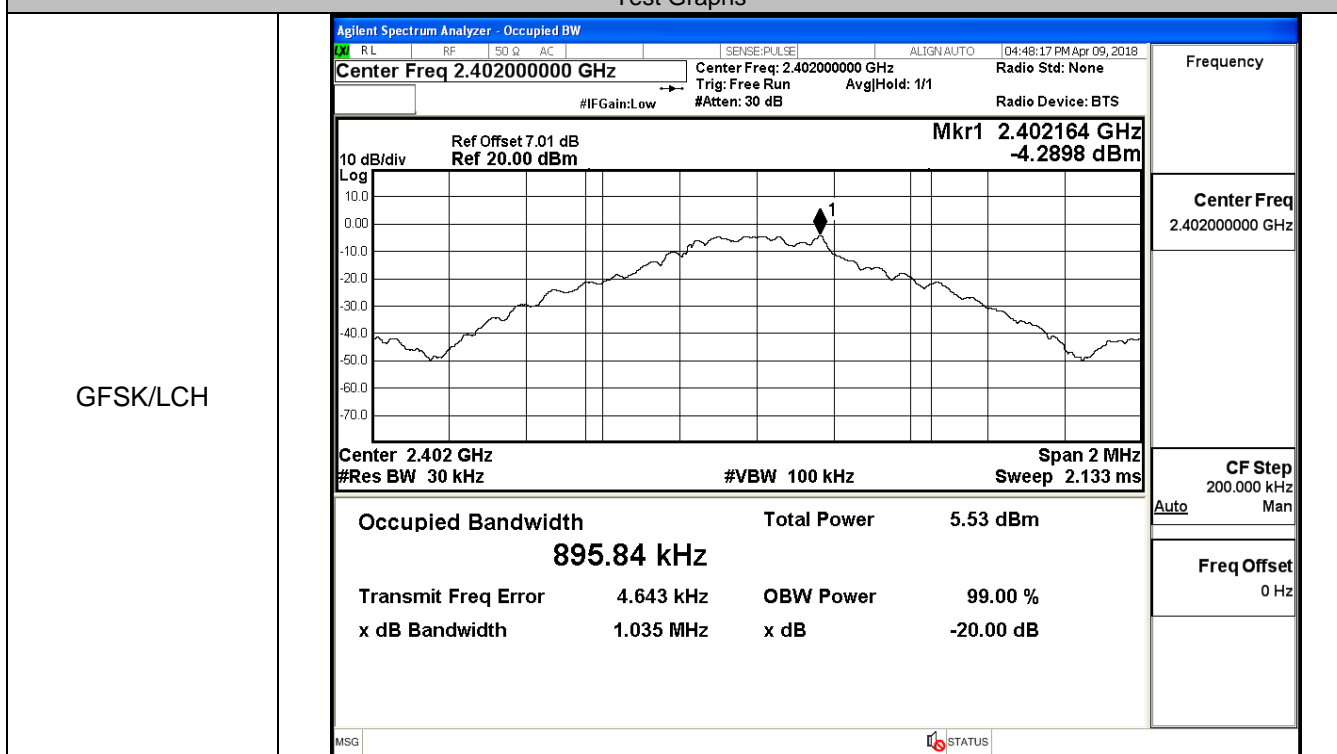
 $\pi$ /4DQPSK/LCH

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

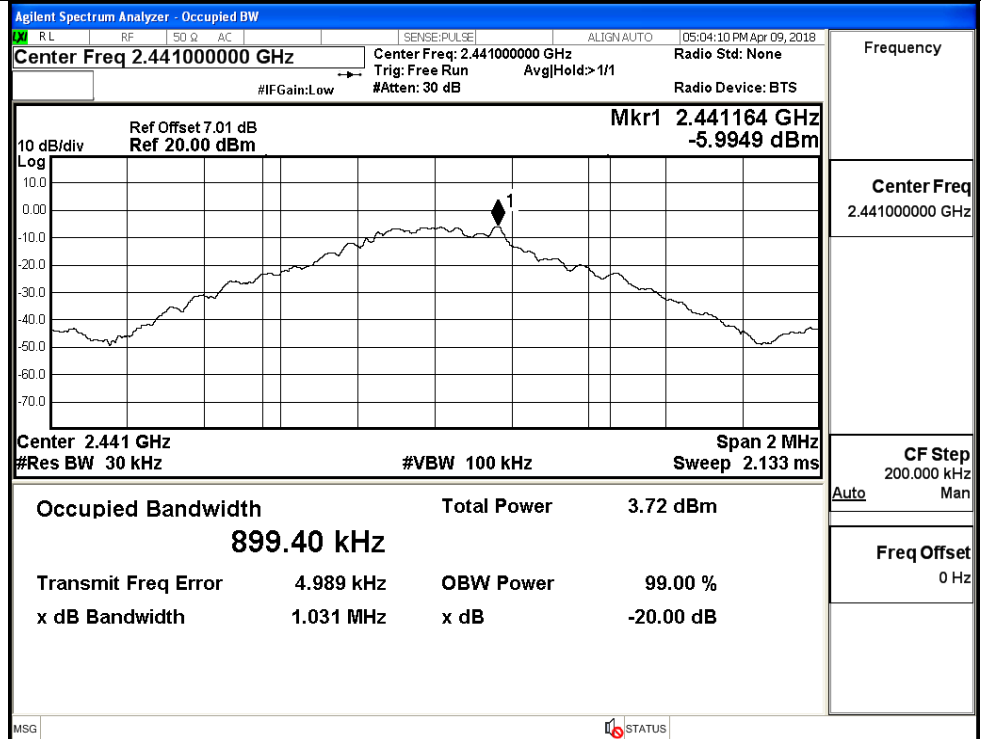
## A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.035	Not Specified	PASS
	MCH	1.031	Not Specified	PASS
	HCH	1.037	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.289	Not Specified	PASS
	MCH	1.311	Not Specified	PASS
	HCH	1.290	Not Specified	PASS

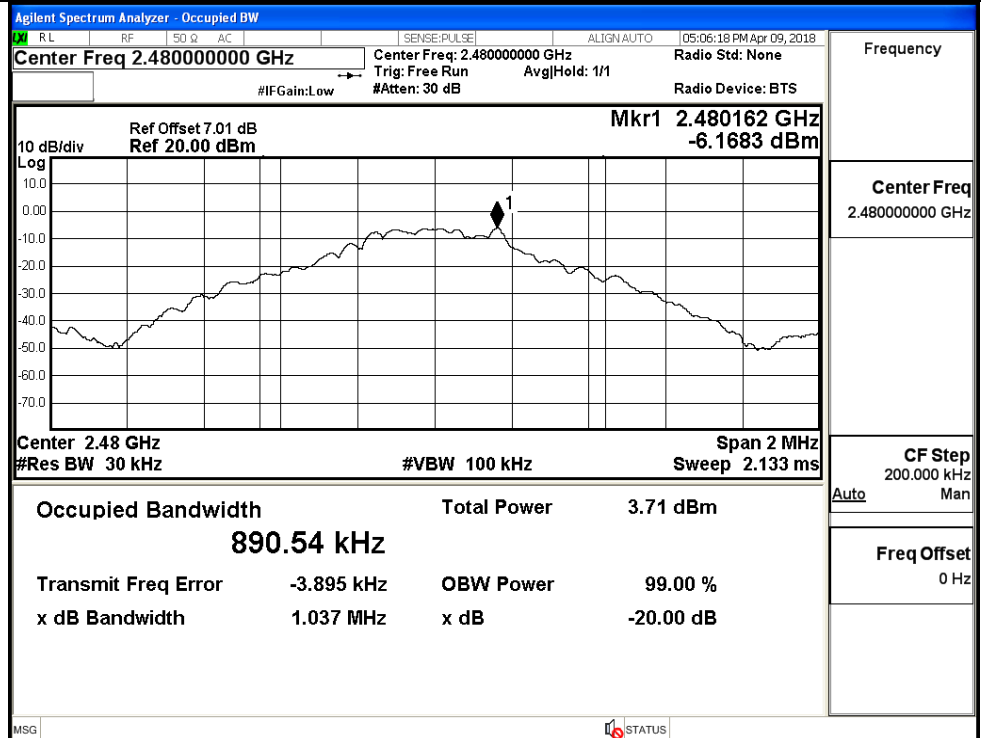
Test Graphs

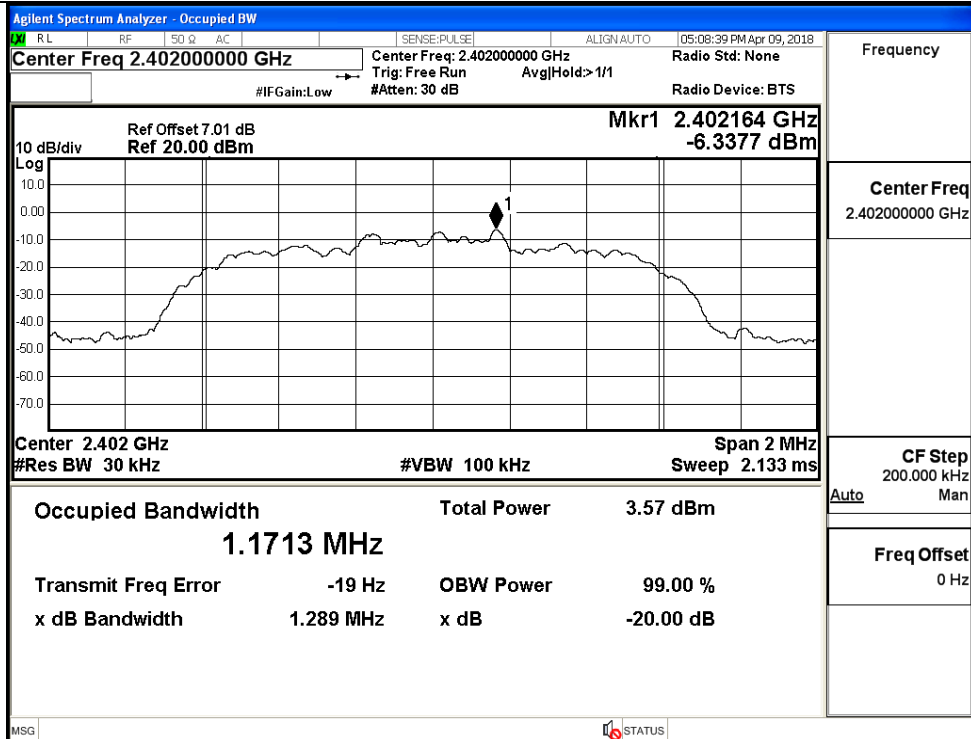
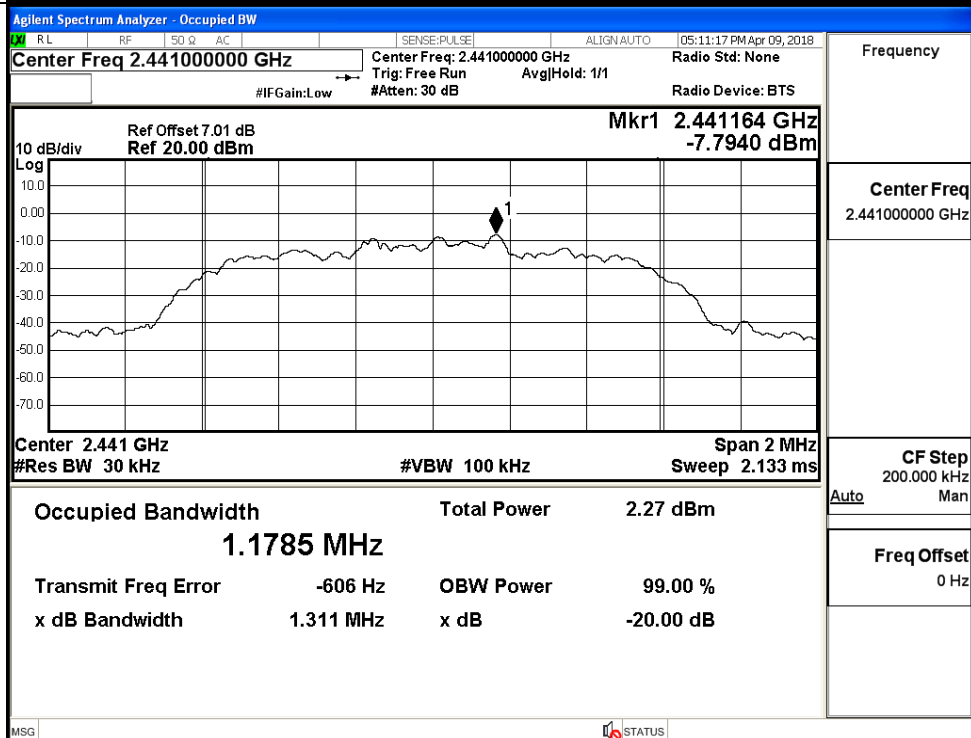


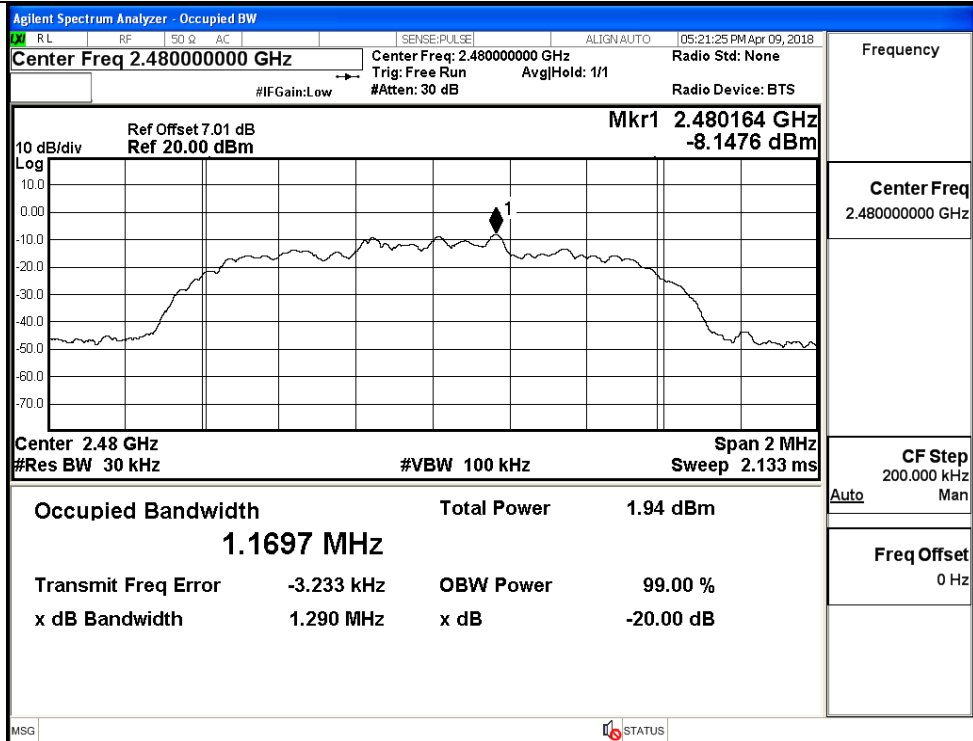
GFSK/MCH



GFSK/HCH



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

$\pi/4$ DQPSK/HCH

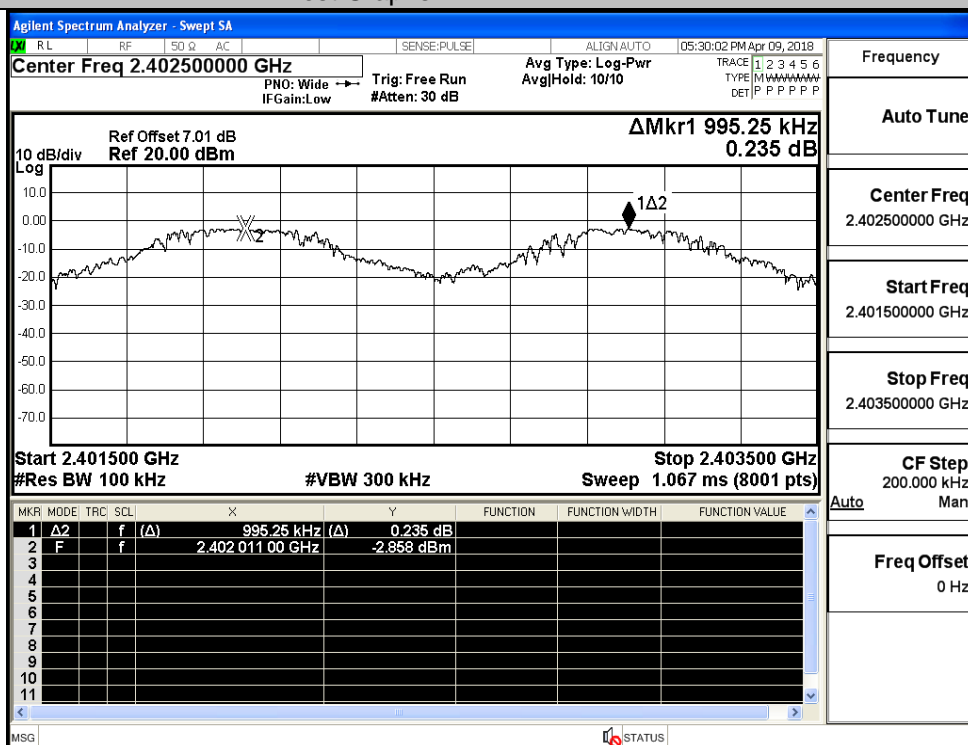


### A.3 Carrier Frequency Separation

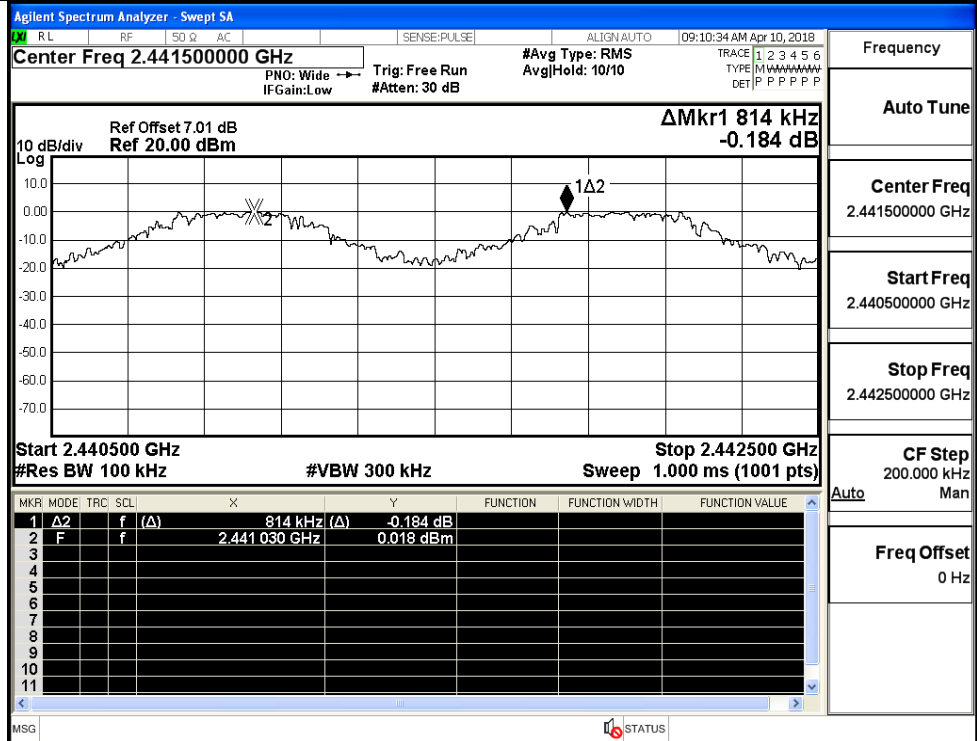
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.995	0.690	PASS
	MCH	0.814	0.687	PASS
	HCH	1.100	0.691	PASS
$\pi$ /4DQPSK	LCH	0.998	0.859	PASS
	MCH	1.200	0.874	PASS
	HCH	1.028	0.860	PASS

Test Graphs

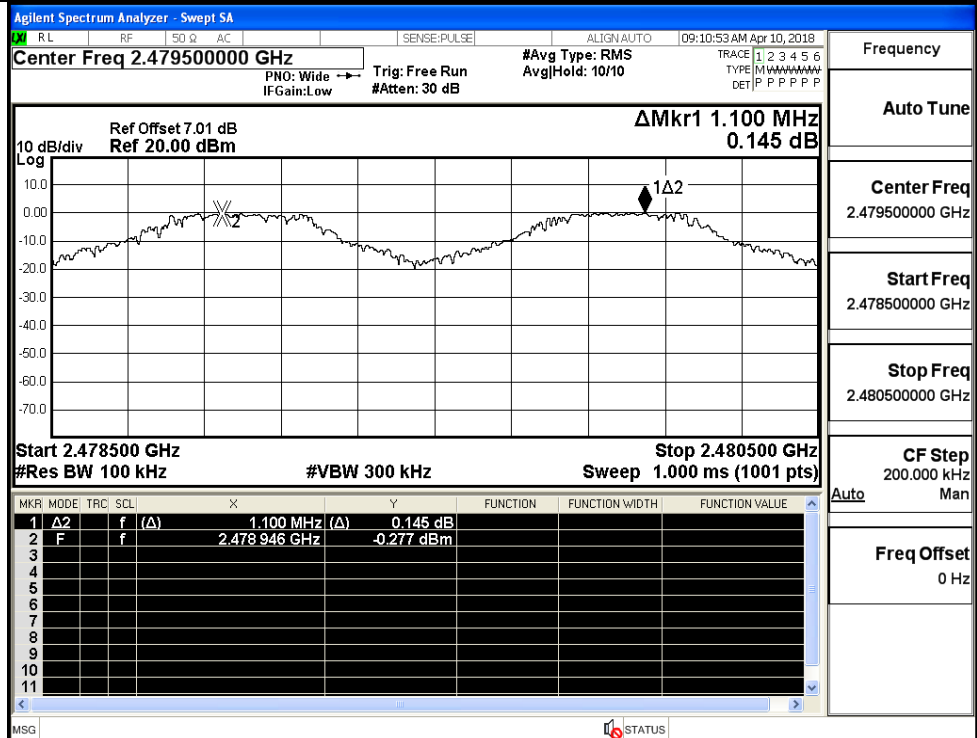
GFSK/LCH

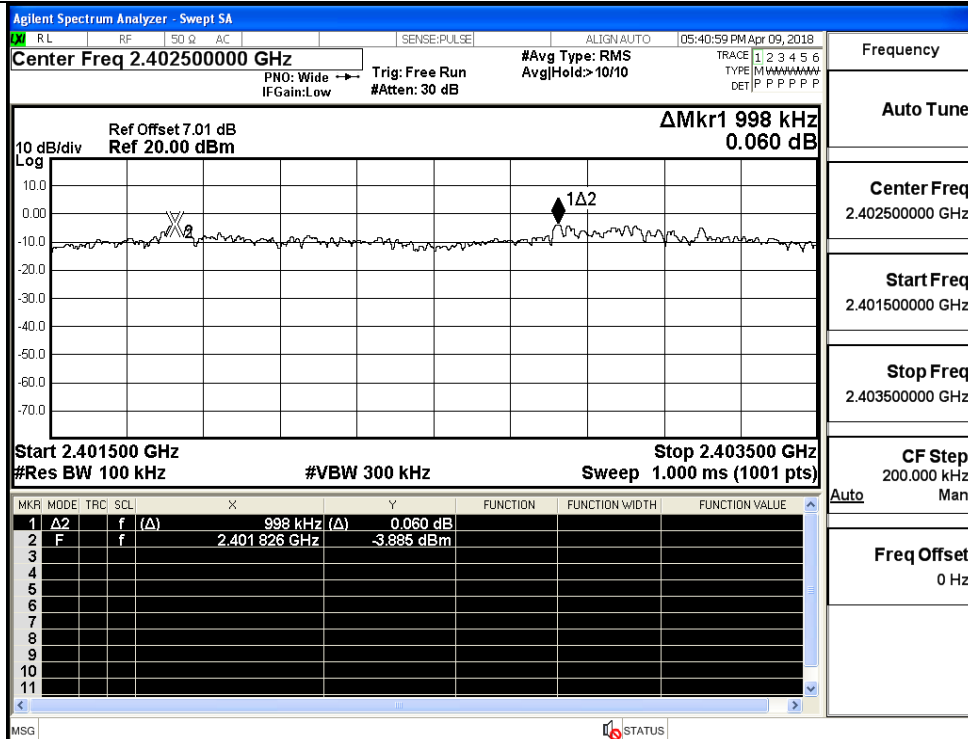
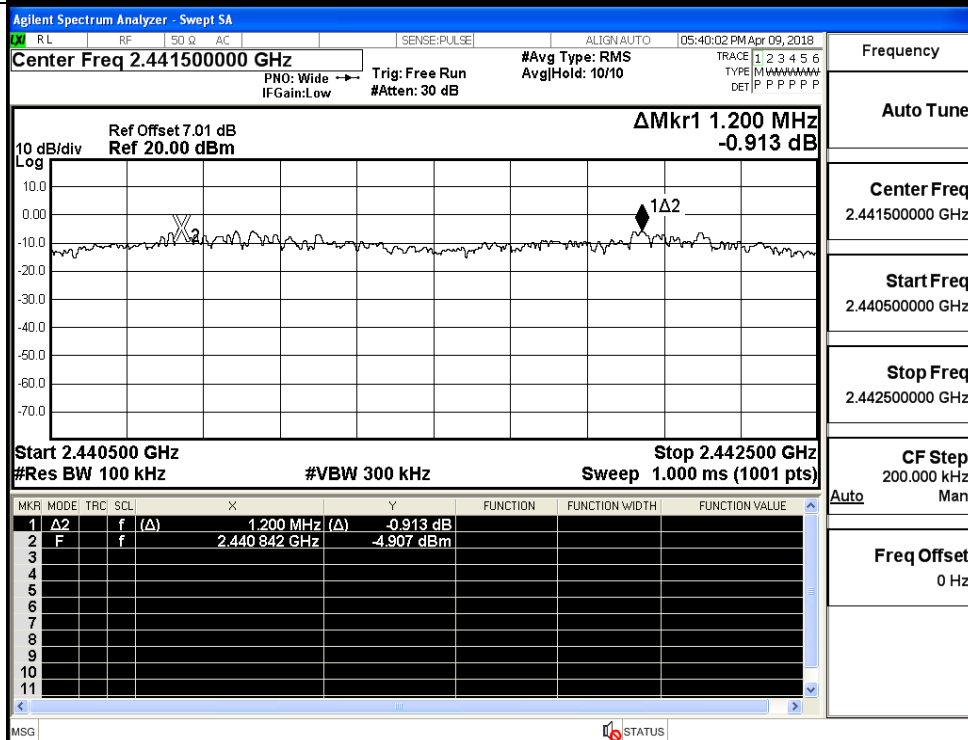


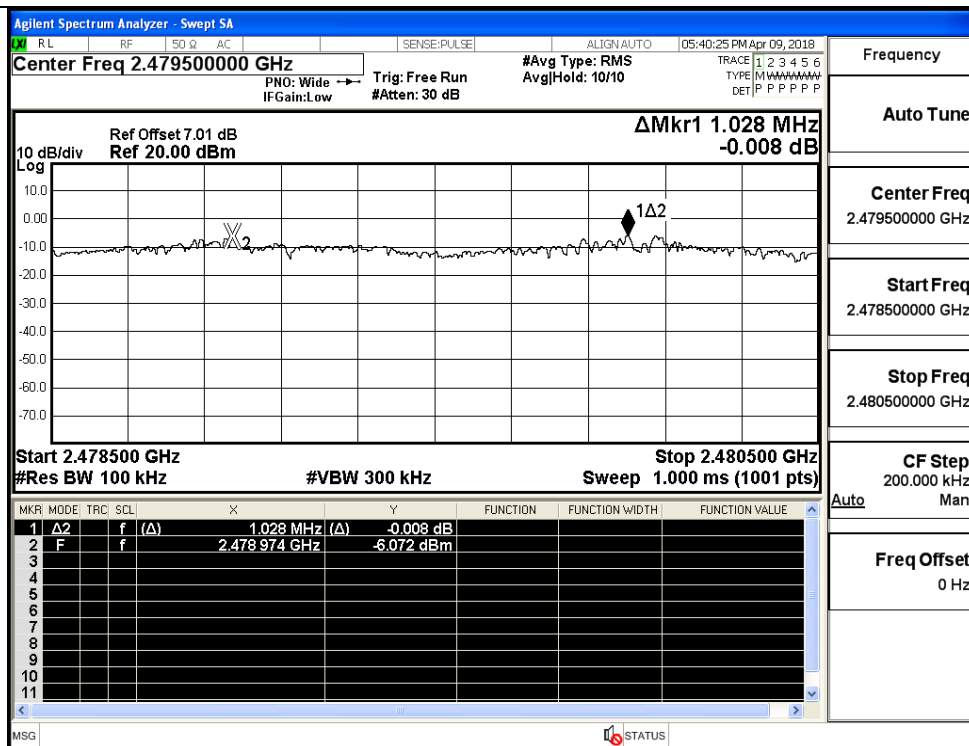
GFSK/MCH



GFSK/HCH



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

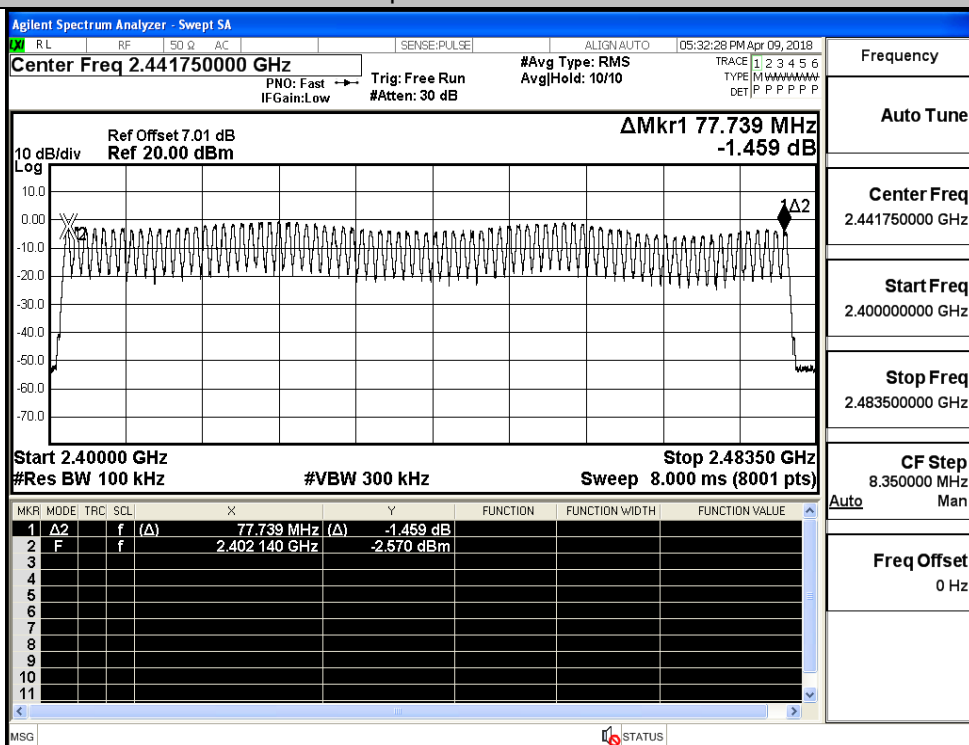
$\pi/4$ DQPSK/HCH

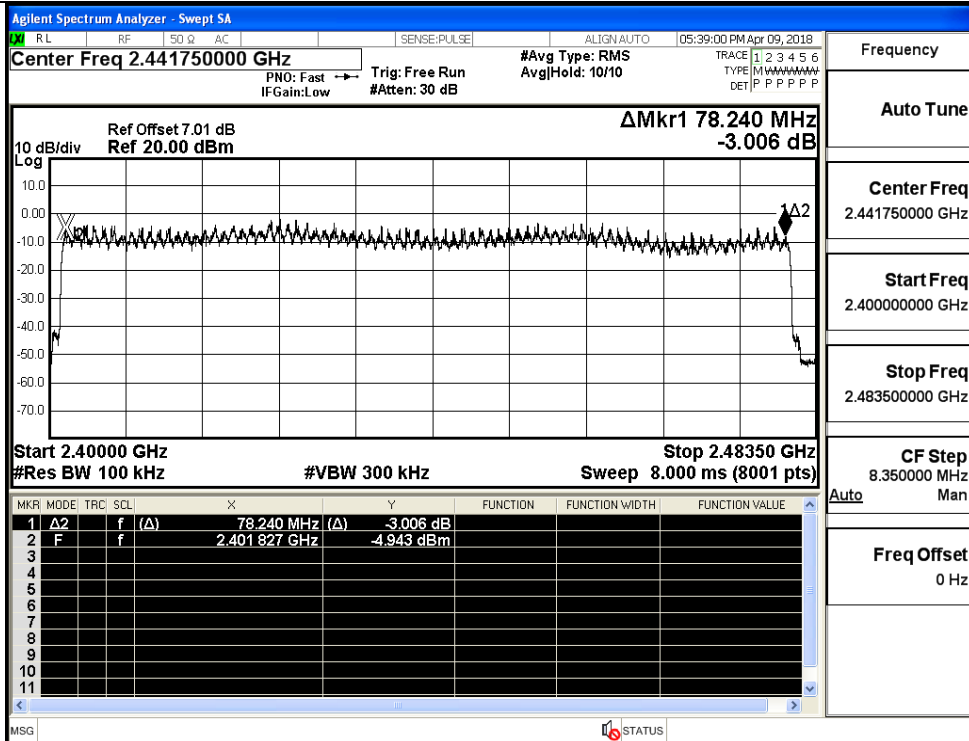
#### A.4 Hopping Channel Number

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

#### Test Graphs

GFSK/Hop



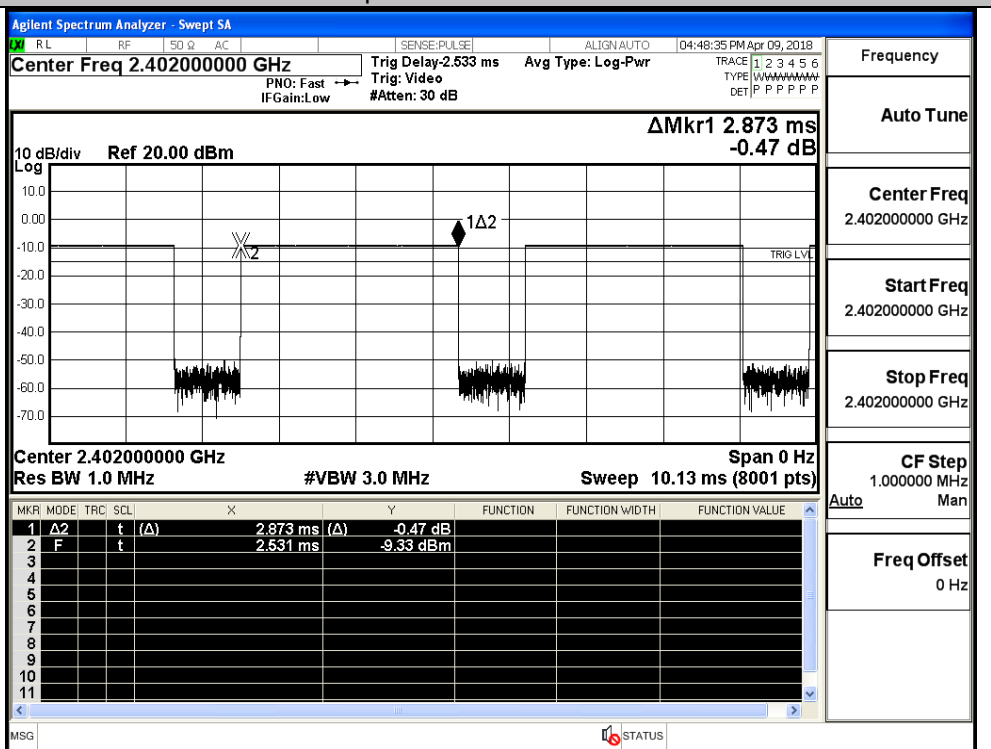
$\pi/4$ DQPSK/Hop

## A.5 Dwell Time

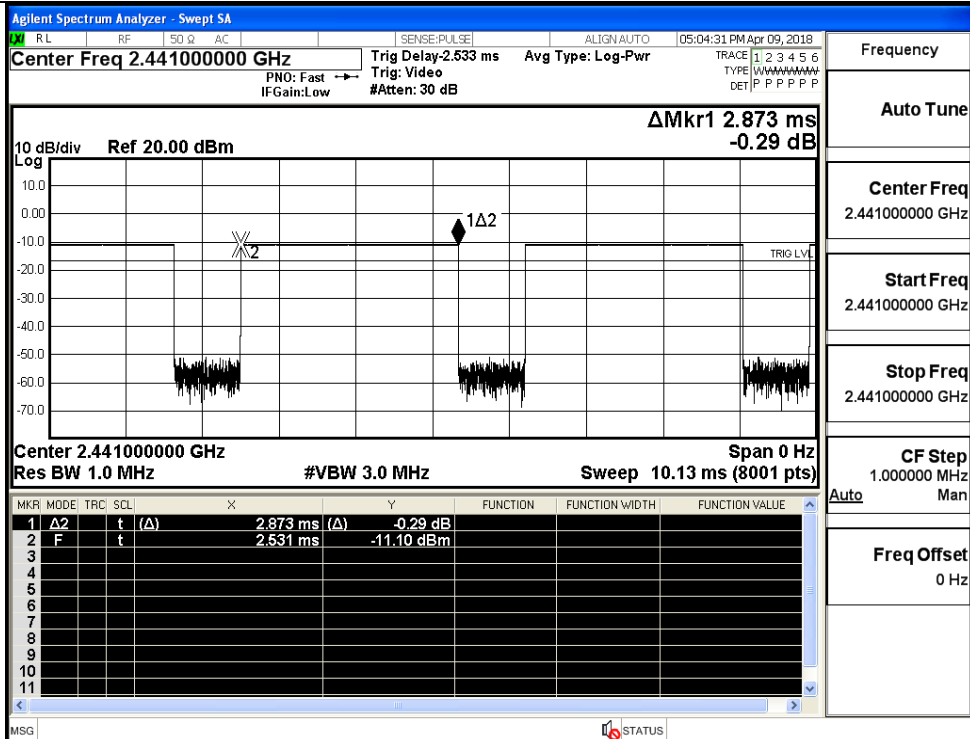
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.87	106.7	0.307	0.4	PASS
	2DH5	MCH	2.87	106.7	0.307	0.4	PASS
	2DH5	HCH	2.87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

### Test Graphs

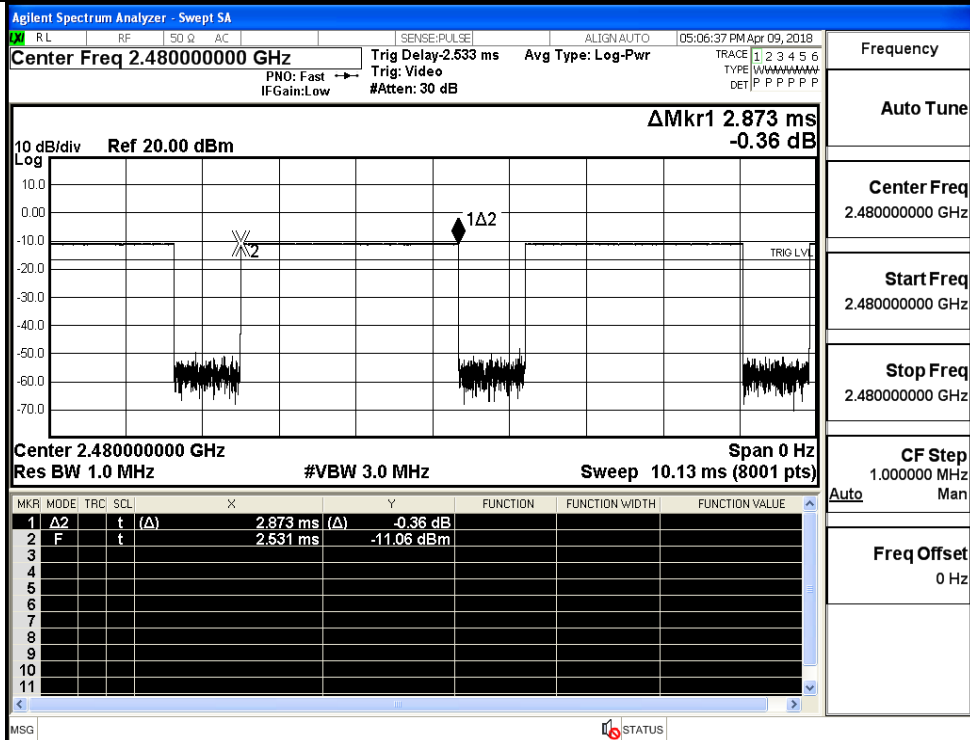
GFSK\_DH5/LCH



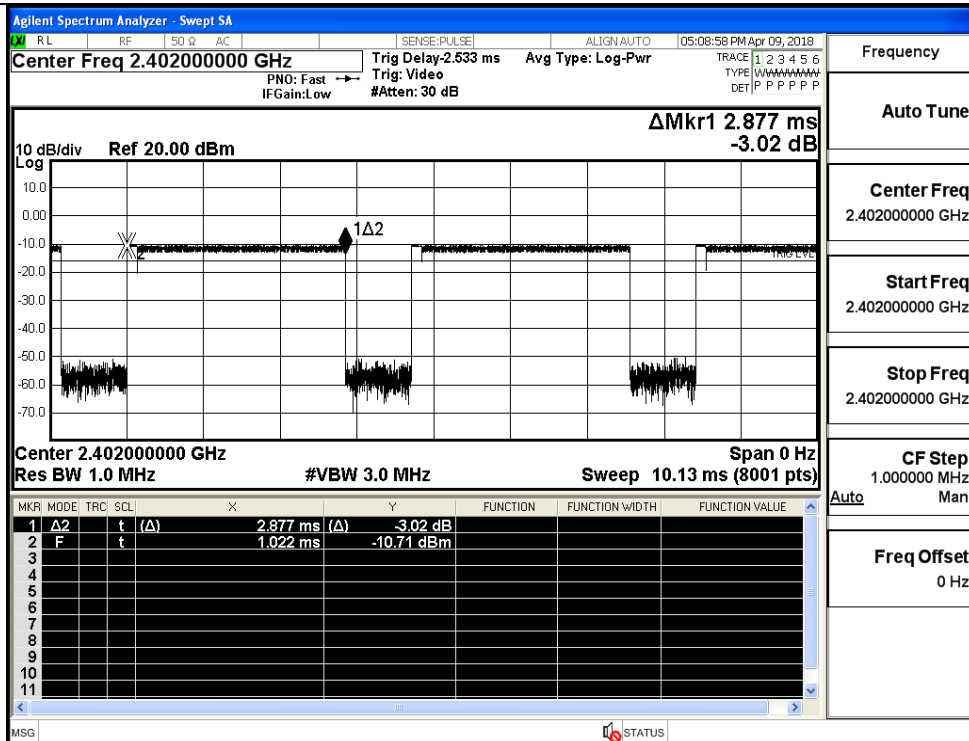
GFSK\_DH5/MCH



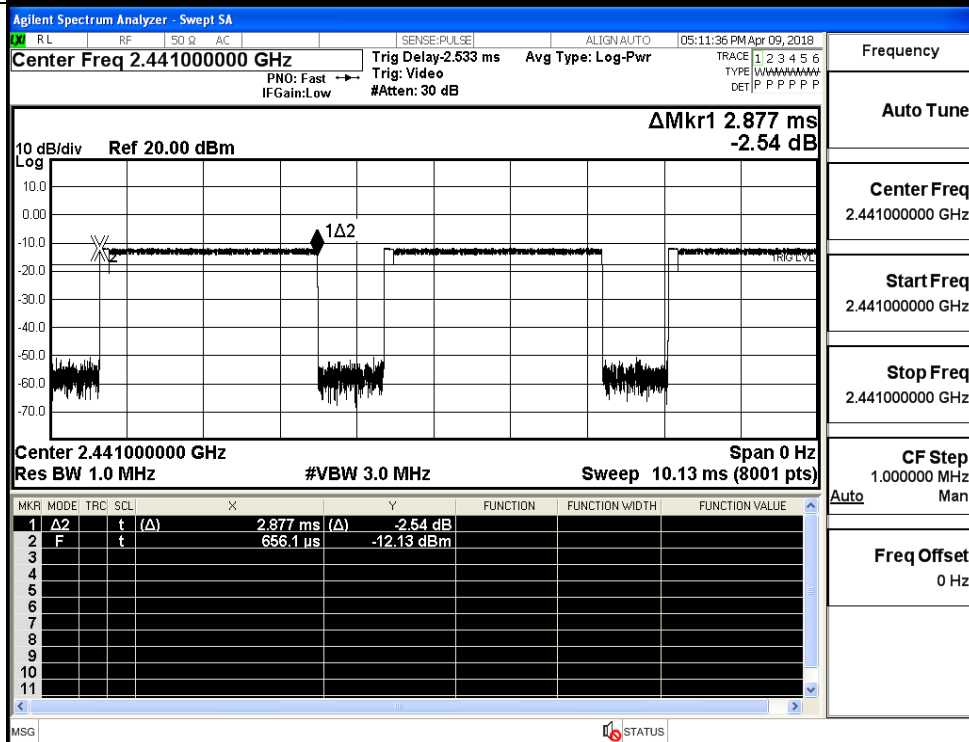
GFSK\_DH5/HCH



$\pi/4$ DQPSK  
\_2DH5/LCH

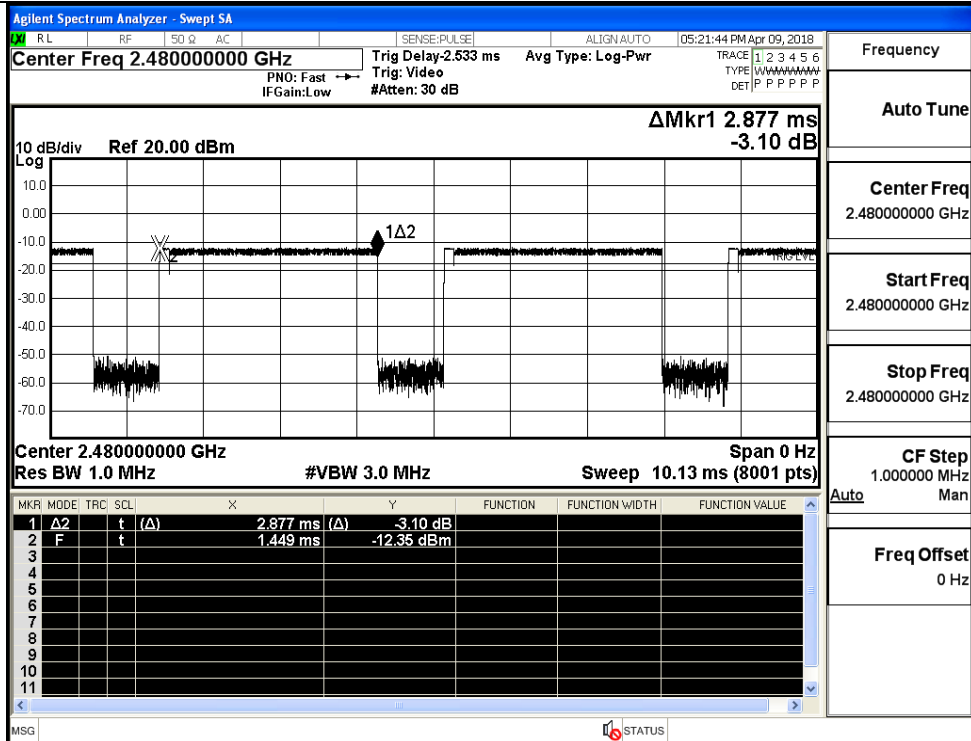


$\pi/4$ DQPSK  
\_2DH5/MCH





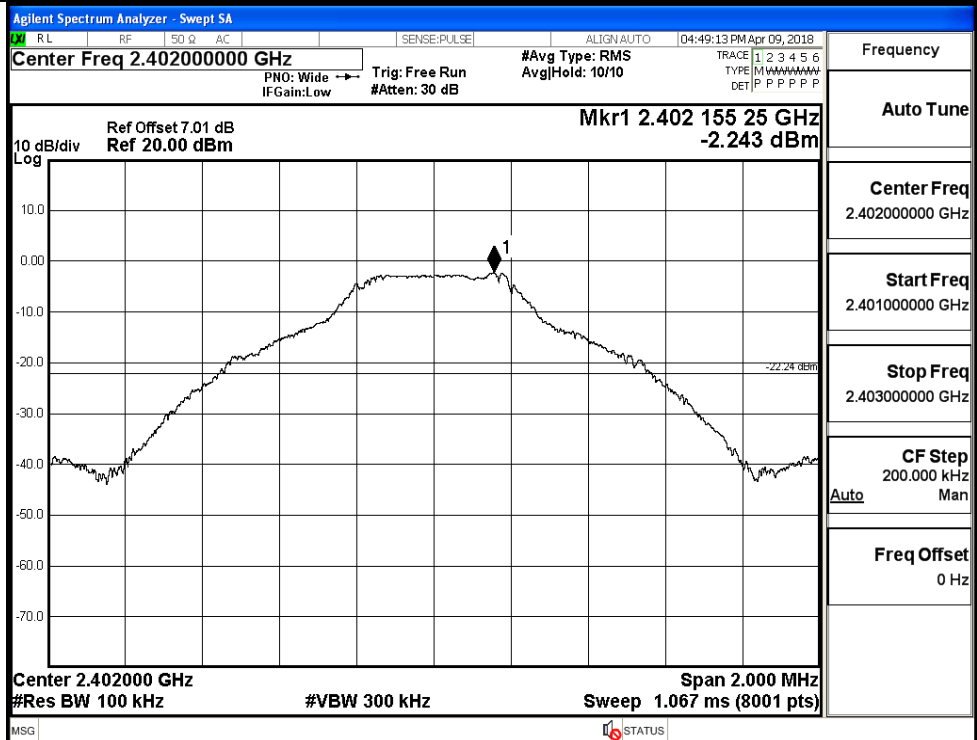
$\pi/4$ DQPSK  
\_2DH5/HCH



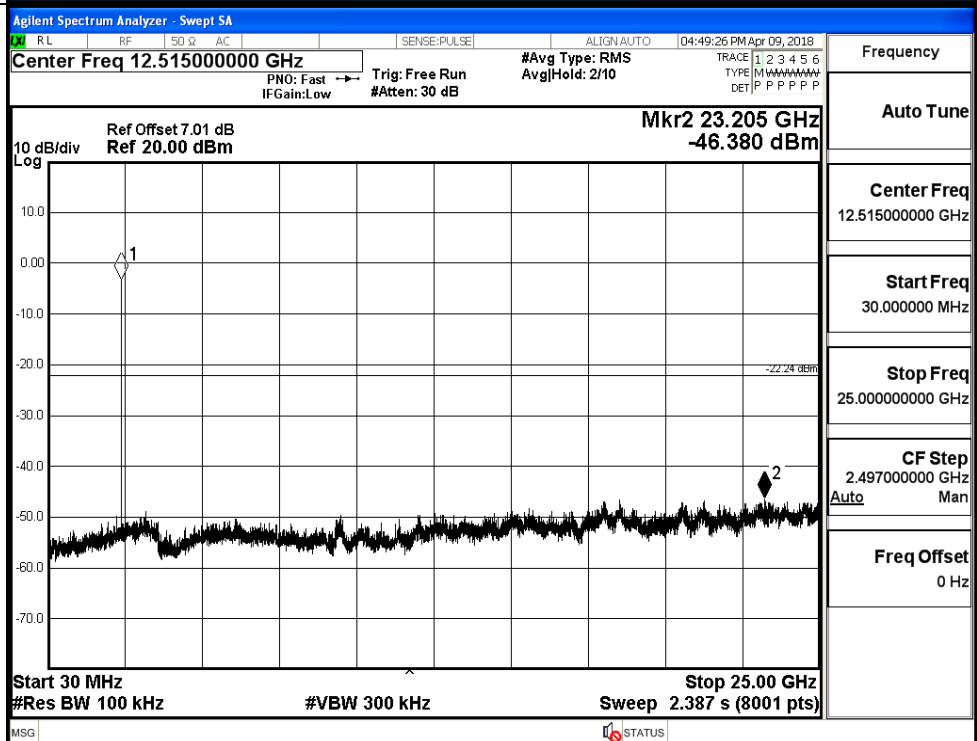
**A.6 RF Conducted Spurious Emissions**

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.243	-46.380	-22.243	PASS
	MCH	-4.373	-46.053	-24.373	PASS
	HCH	-4.013	-45.525	-24.013	PASS
$\pi/4$ DQPSK	LCH	-3.565	-45.696	-23.565	PASS
	MCH	-5.128	-46.129	-25.128	PASS
	HCH	-5.267	-46.267	-25.267	PASS

Pref

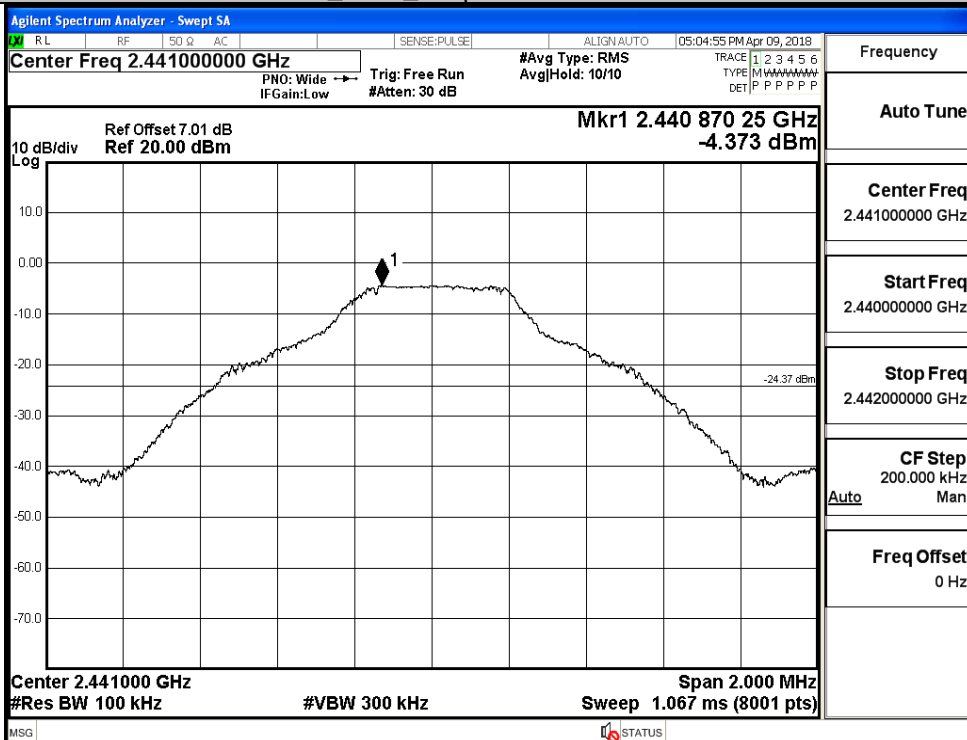


Puw

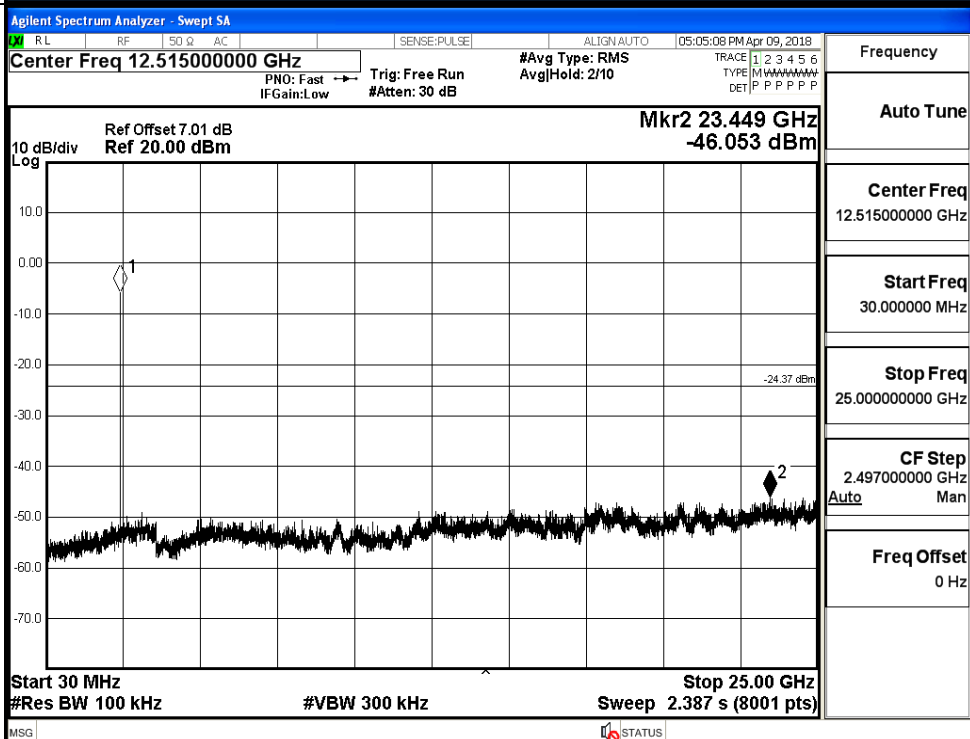


## GFSK\_MCH\_Graphs

Pref

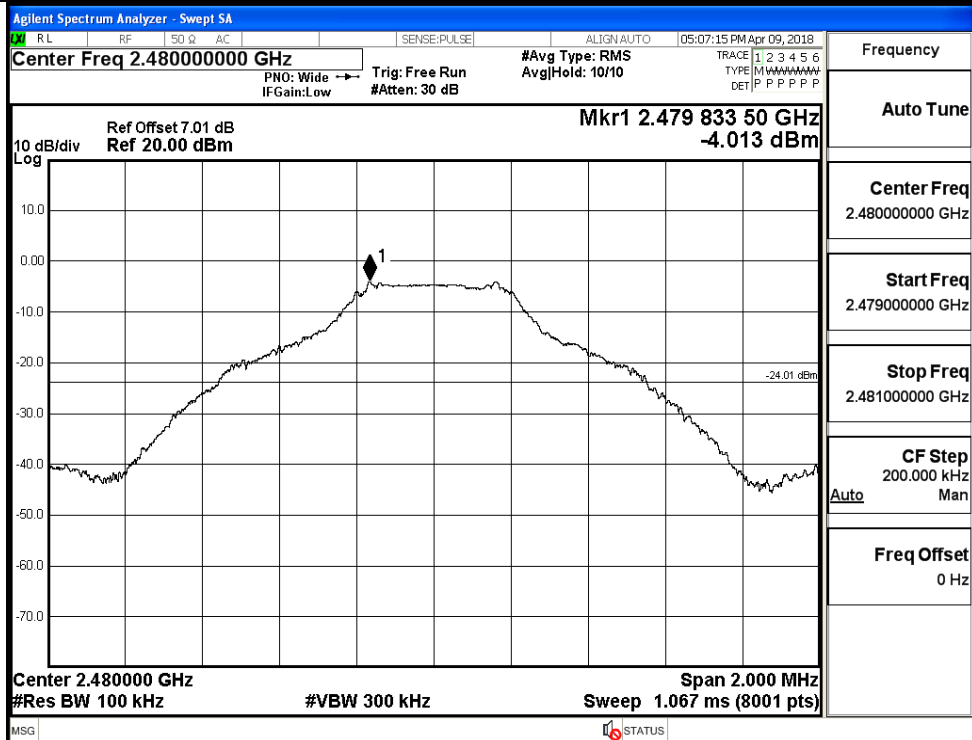


Puw

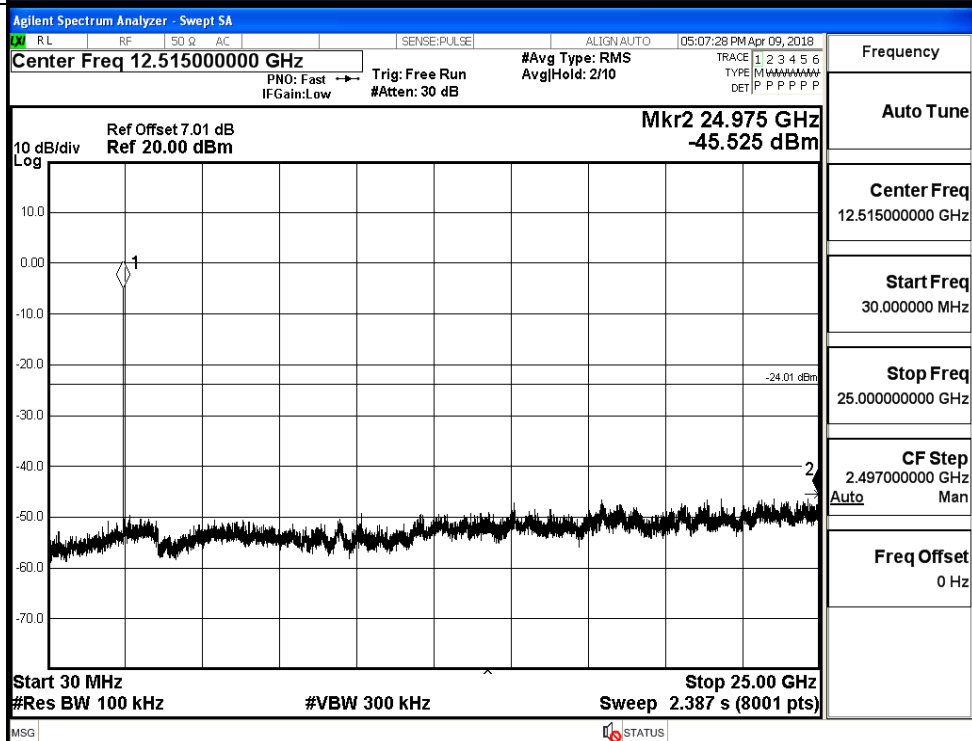


## GFSK\_HCH\_Graphs

Pref

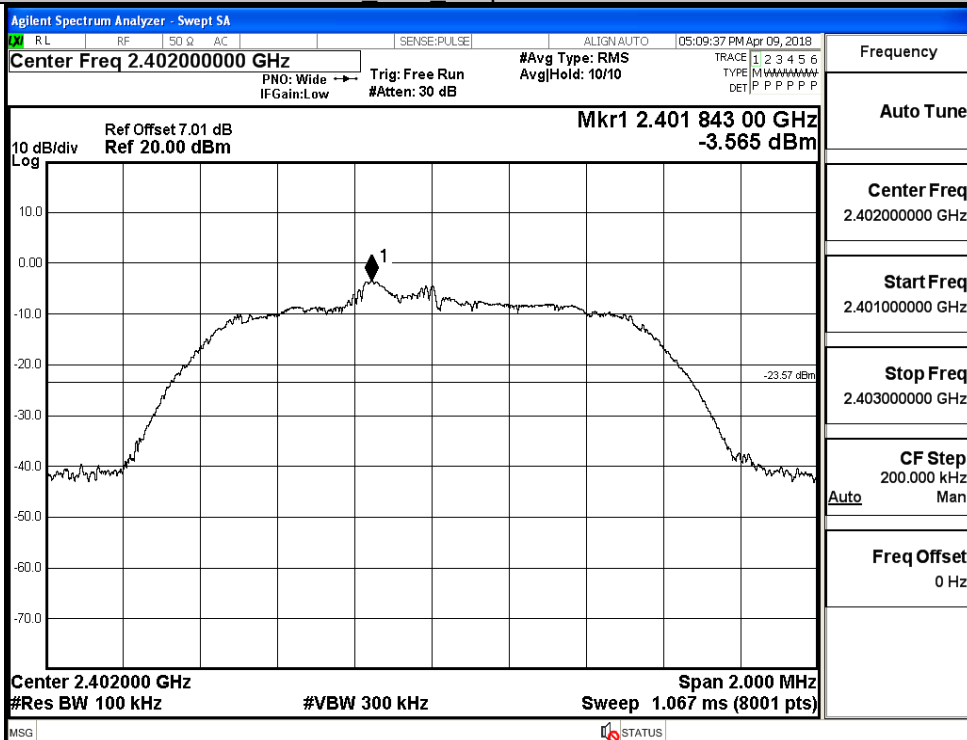


Puw

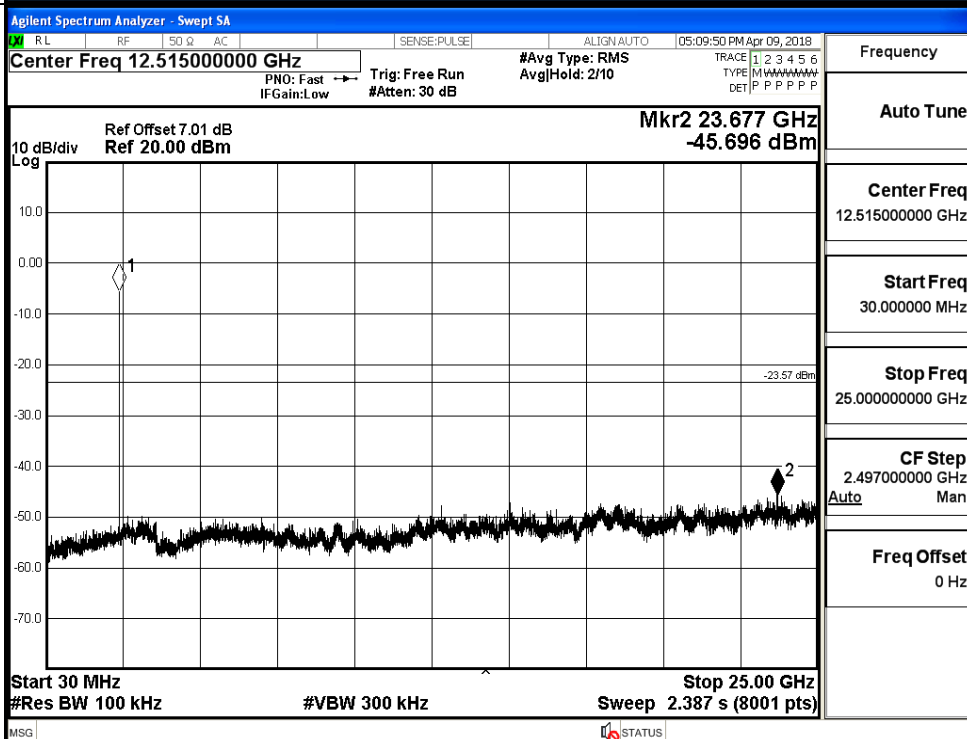


$\pi$ /4DQPSK LCH Graphs

Pref

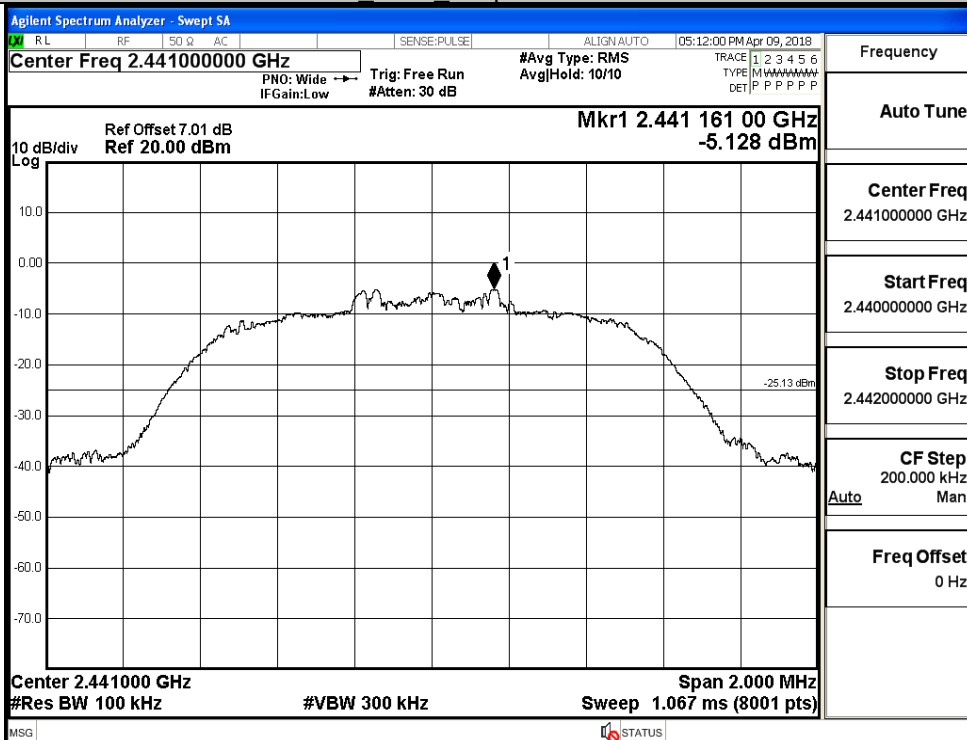


Puw

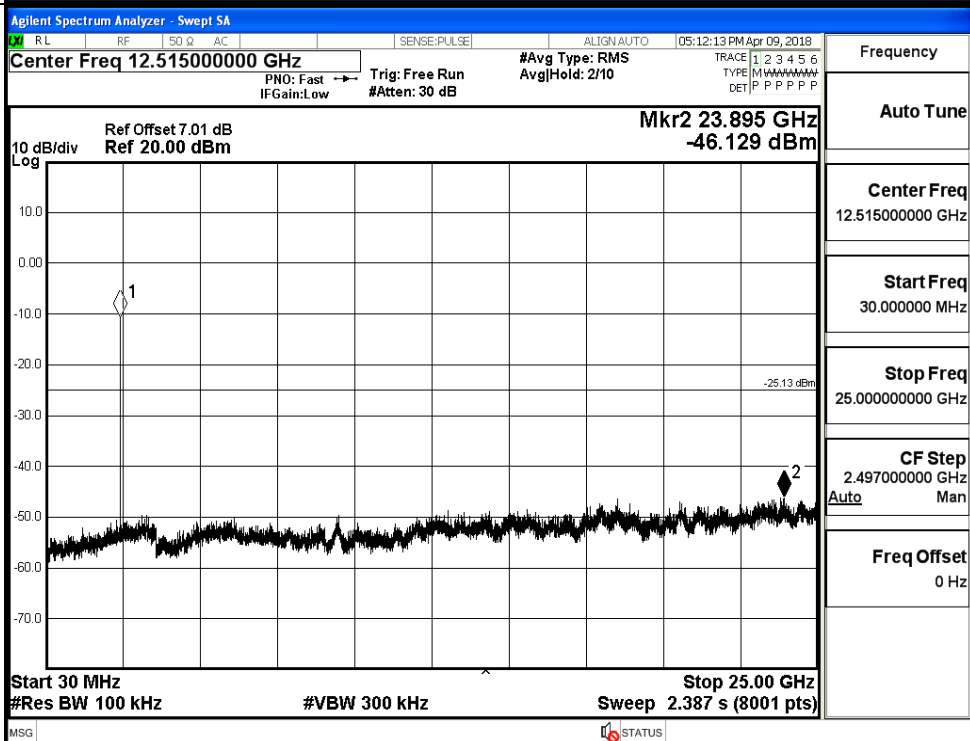


$\pi$ /4DQPSK MCH Graphs

Pref

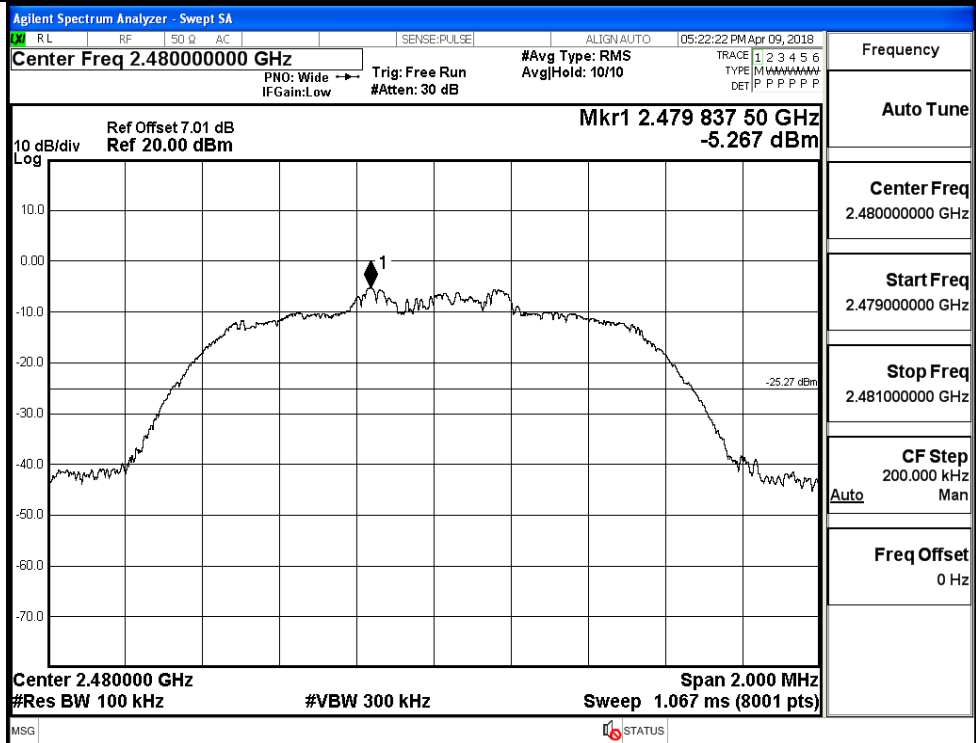


Puw

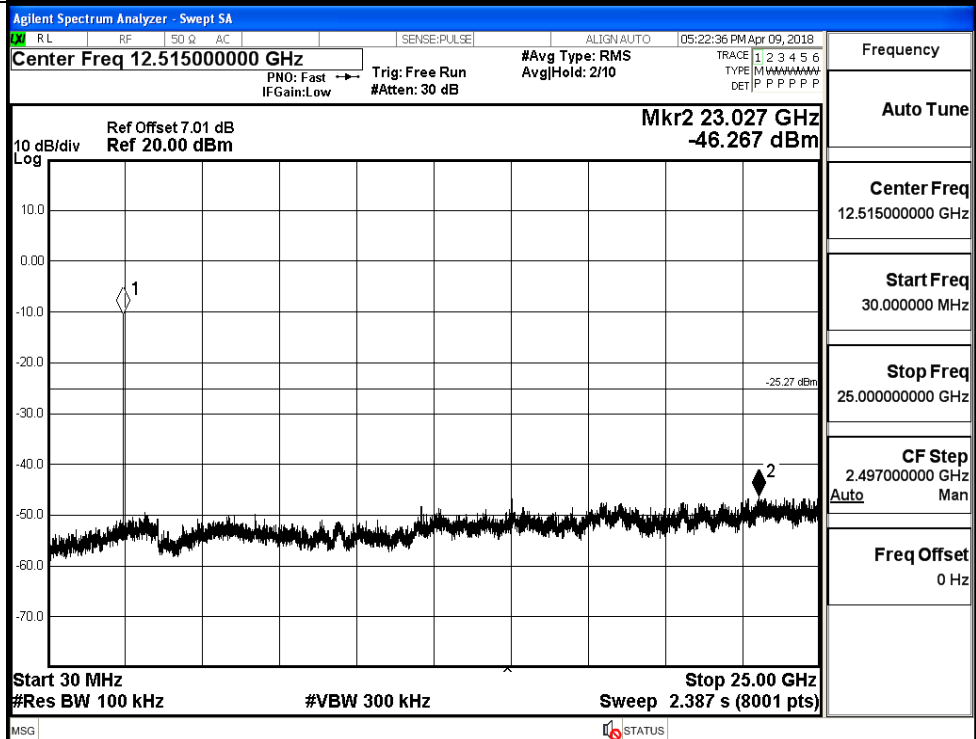


$\pi/4$ DQPSK HCH Graphs

Pref



Puw



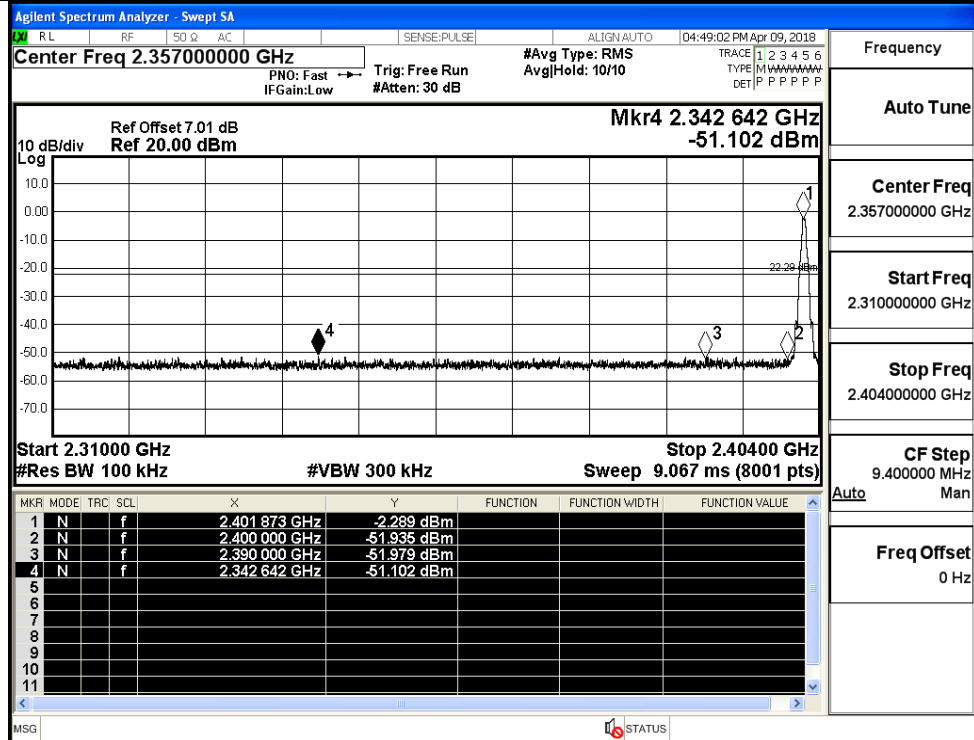


## A.7 Band-edge for RF Conducted Emissions

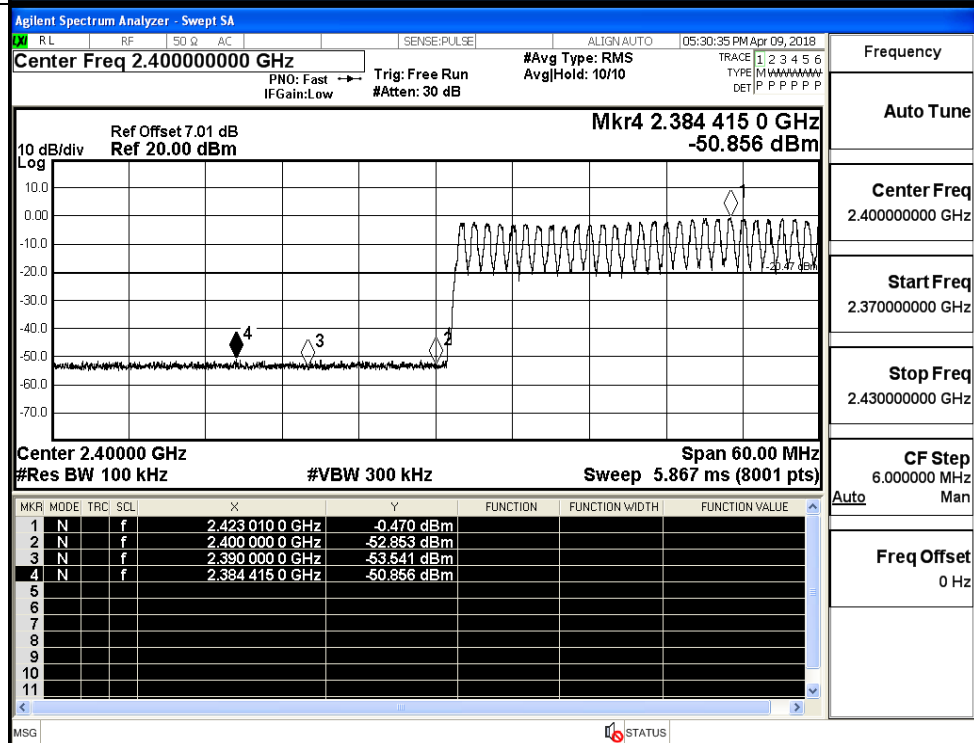
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.289	Off	-51.102	-22.29	PASS
			-0.470	On	-50.856	-20.47	PASS
	HCH	2480	-4.062	Off	-51.260	-24.06	PASS
			-1.027	On	-50.068	-21.03	PASS
$\pi/4$ DQPSK	LCH	2402	-3.578	Off	-50.894	-23.58	PASS
			-1.908	On	-50.178	-21.91	PASS
	HCH	2480	-5.161	Off	-51.225	-25.16	PASS
			-2.504	On	-50.312	-22.5	PASS

## Test Graphs

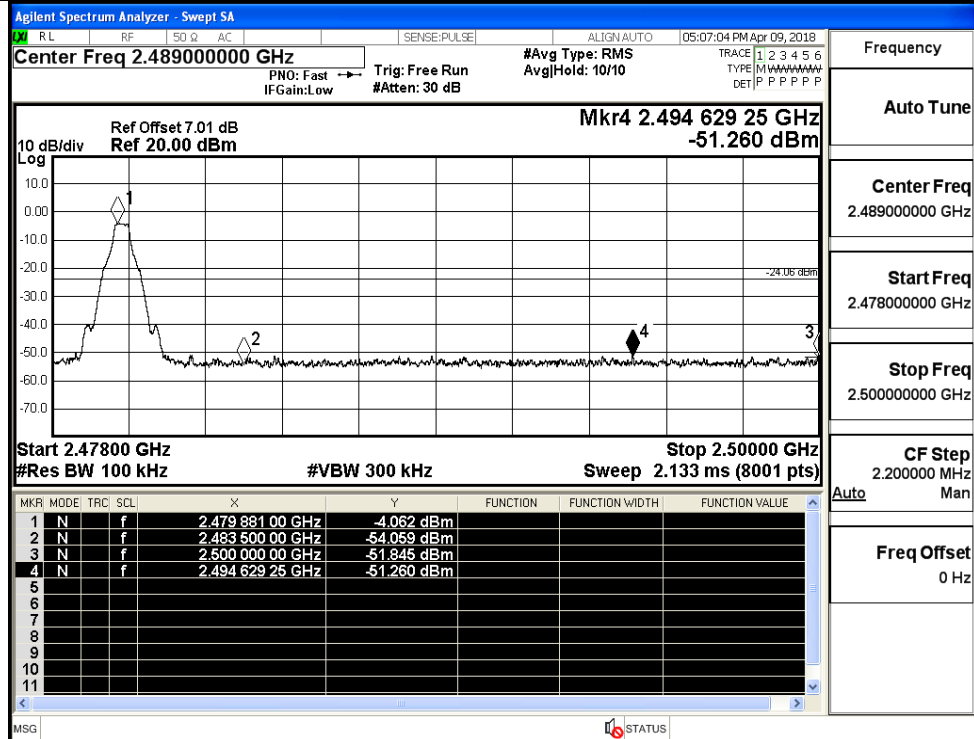
GFSK/LCH/No Hop



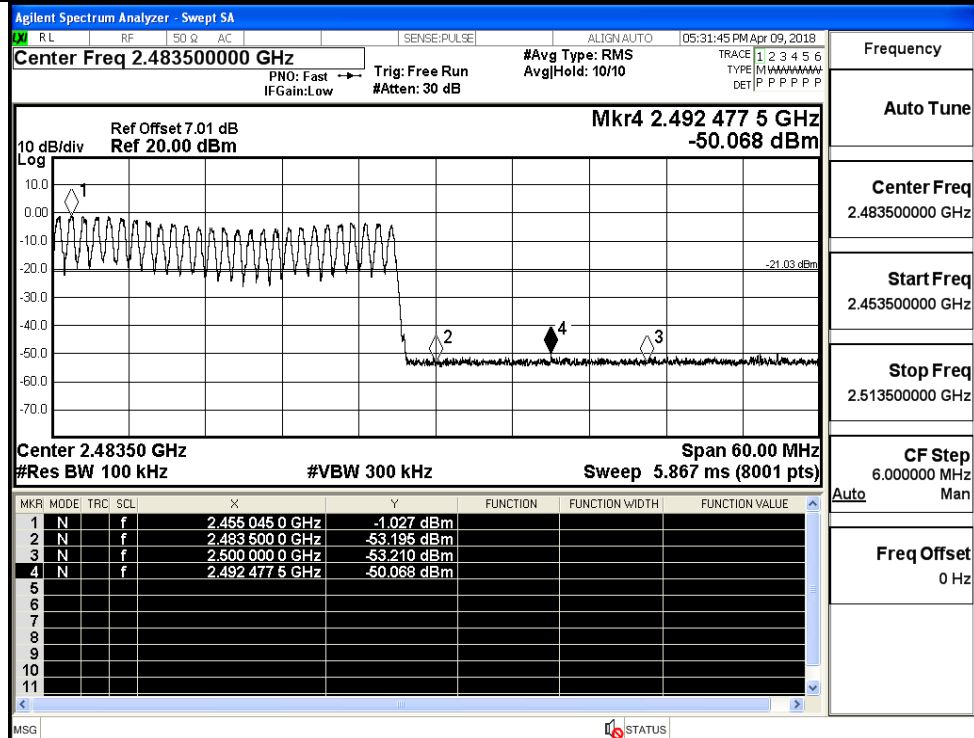
GFSK/LCH/Hop



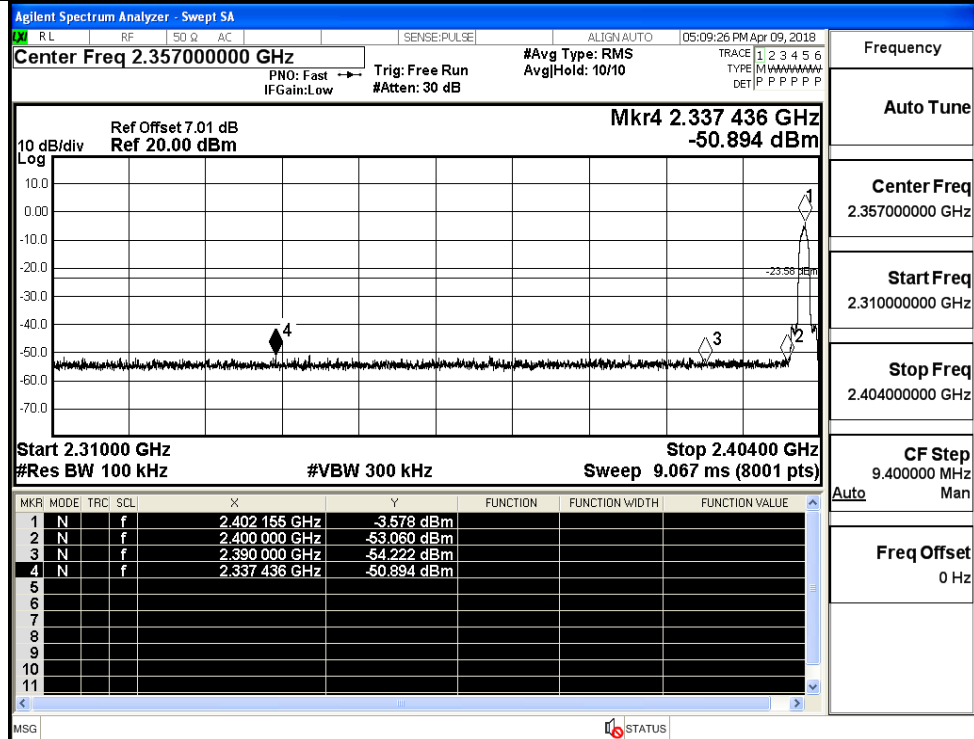
GFSK/HCH/No Hop



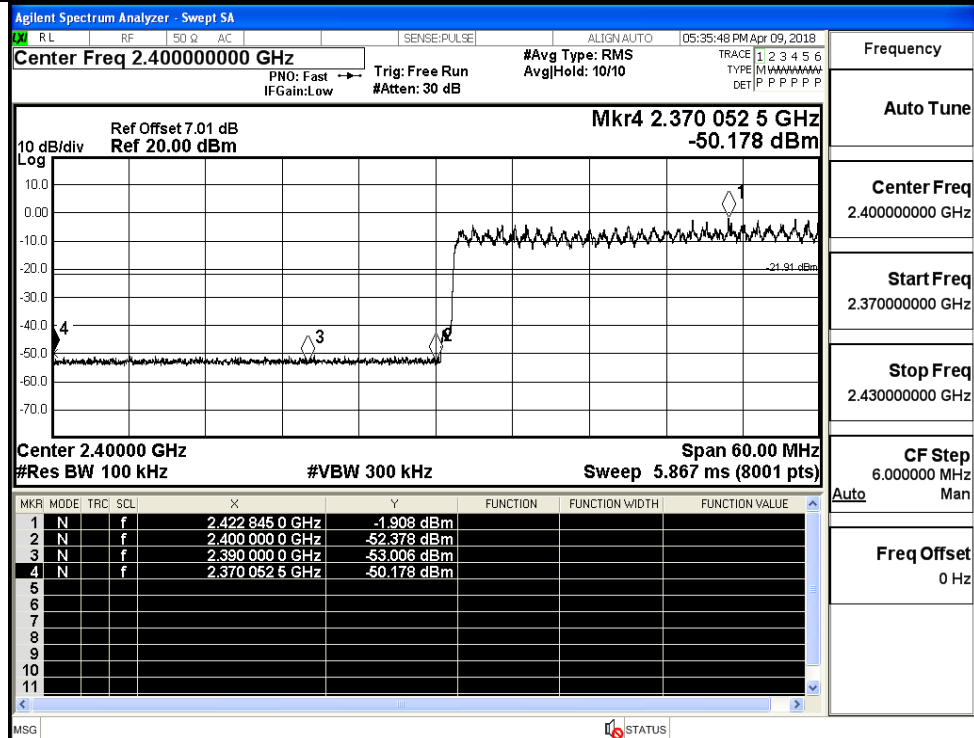
GFSK/HCH/Hop



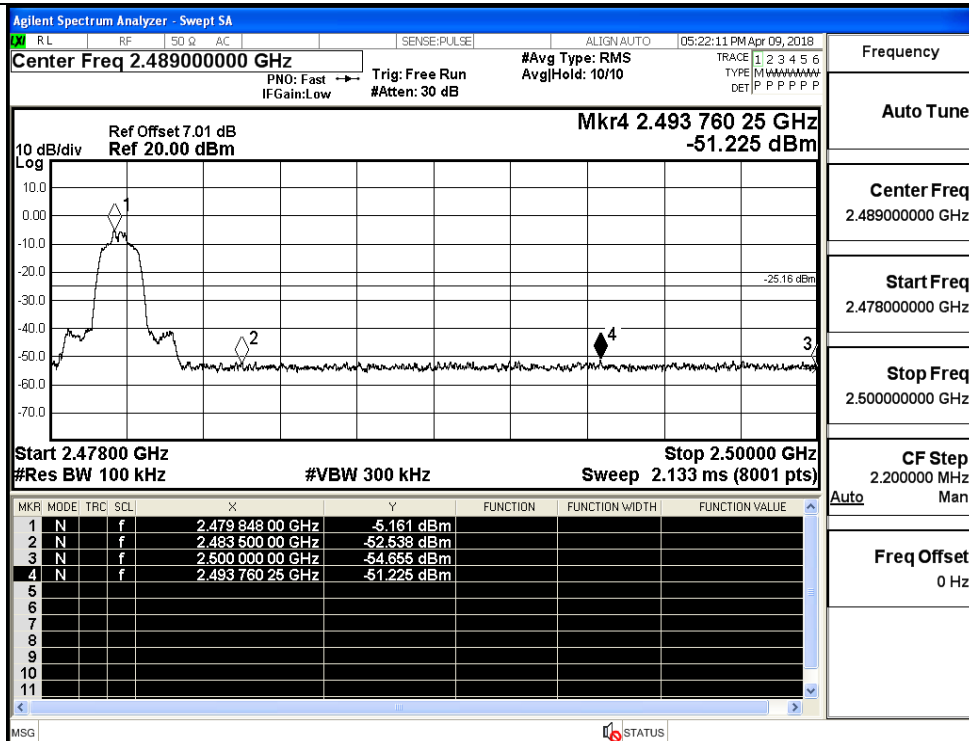
$\pi/4$ DQPSK/LCH/No  
Hop



$\pi/4$ DQPSK/LCH/Hop



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

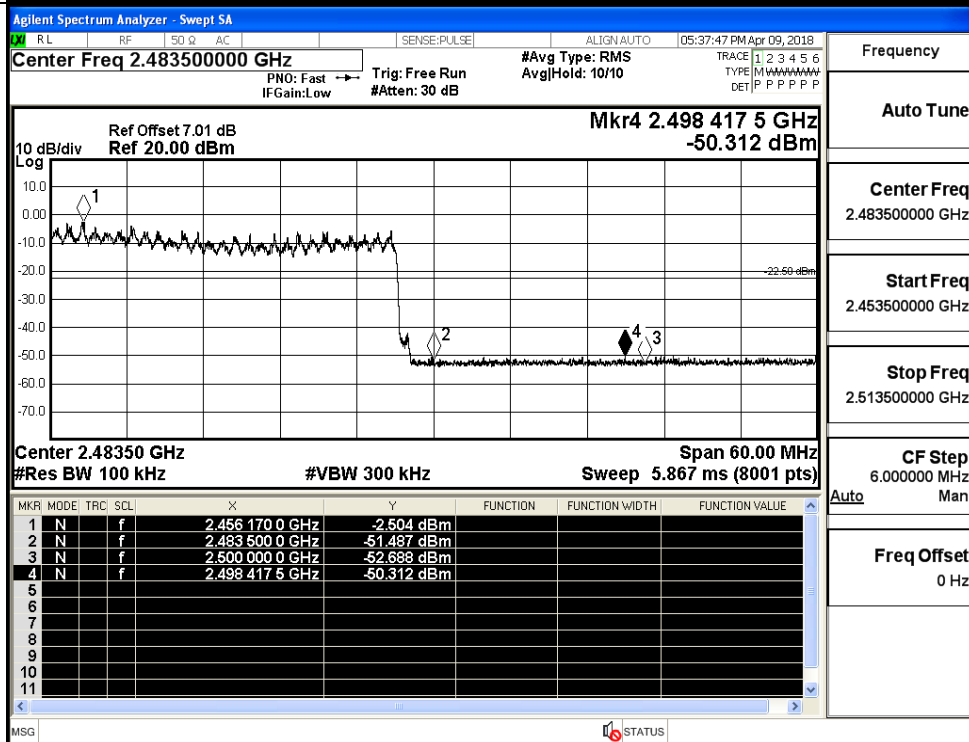


Frequency

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

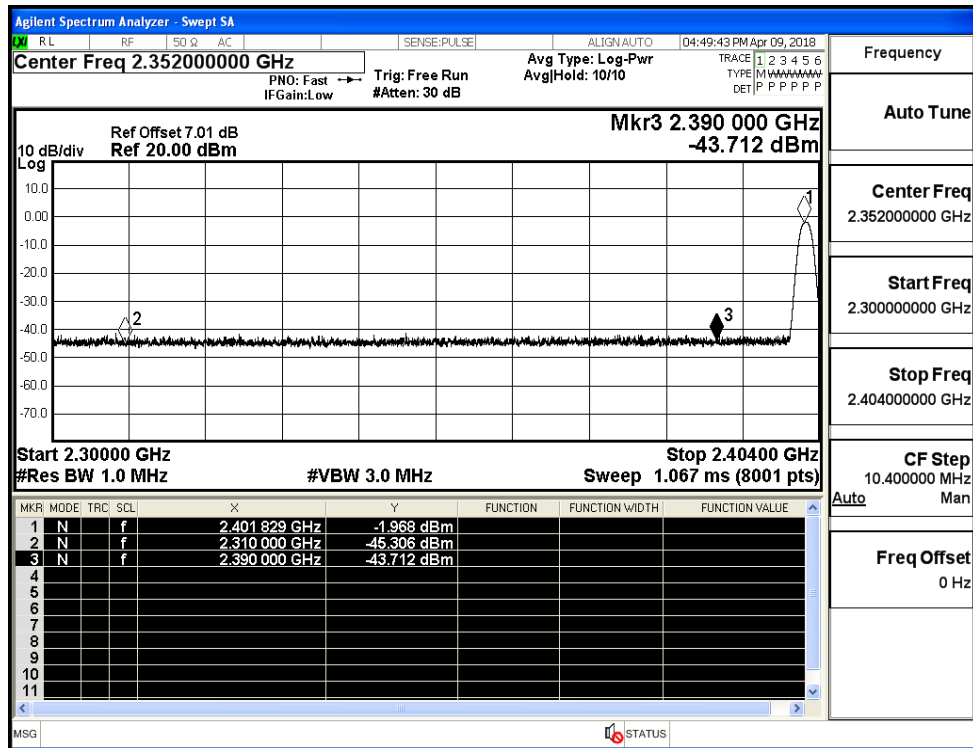
Auto Tune

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

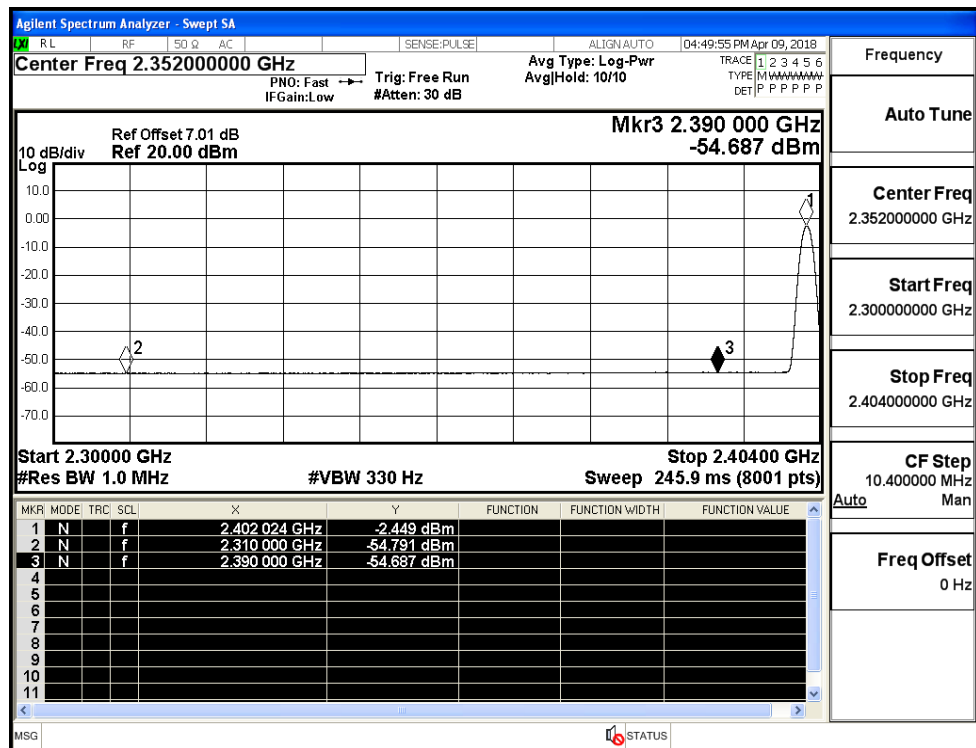
## A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-45.31	2.0	0	51.95	PEAK	74	PASS
	Off	2310.0	-54.79	2.0	0	42.47	AV	54	PASS
	Off	2390.0	-43.71	2.0	0	53.55	PEAK	74	PASS
	Off	2390.0	-54.69	2.0	0	42.57	AV	54	PASS
	Off	2483.5	-43.27	2.0	0	53.99	PEAK	74	PASS
	Off	2483.5	-54.32	2.0	0	42.94	AV	54	PASS
	Off	2500.0	-45.04	2.0	0	52.22	PEAK	74	PASS
	Off	2500.0	-54.14	2.0	0	43.12	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.88	2.0	0	53.38	PEAK	74	PASS
	Off	2310.0	-54.79	2.0	0	42.47	AV	54	PASS
	Off	2390.0	-43.44	2.0	0	53.82	PEAK	74	PASS
	Off	2390.0	-54.44	2.0	0	42.82	AV	54	PASS
	Off	2483.5	-45.31	2.0	0	51.95	PEAK	74	PASS
	Off	2483.5	-54.33	2.0	0	42.93	AV	54	PASS
	Off	2500.0	-44.54	2.0	0	52.72	PEAK	74	PASS
	Off	2500.0	-54.11	2.0	0	43.15	AV	54	PASS

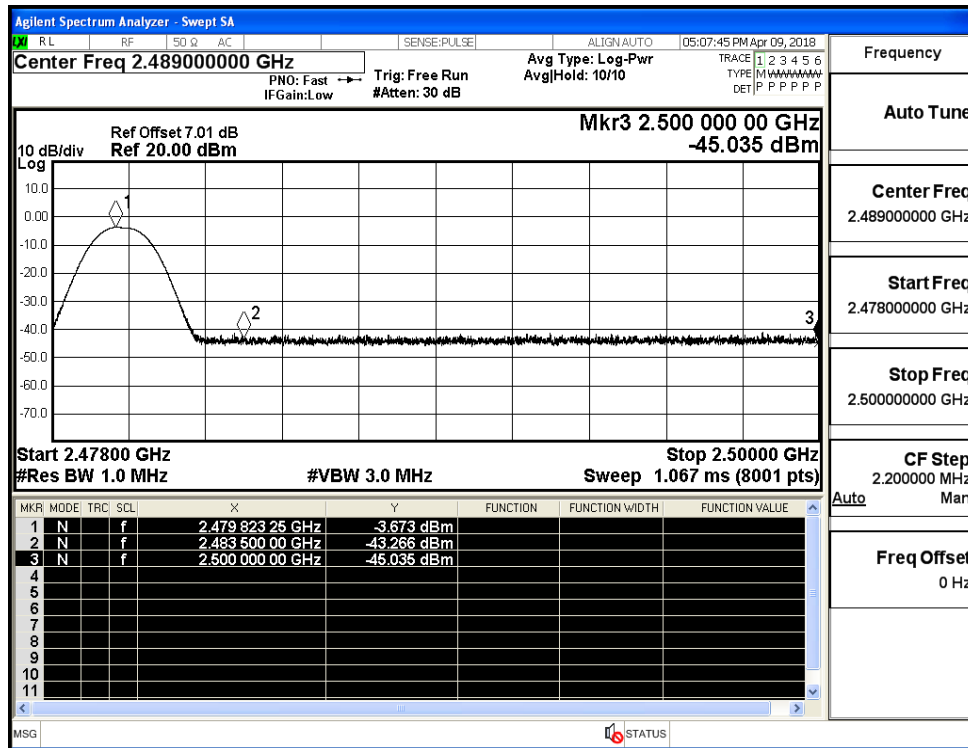
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (Low Channel)



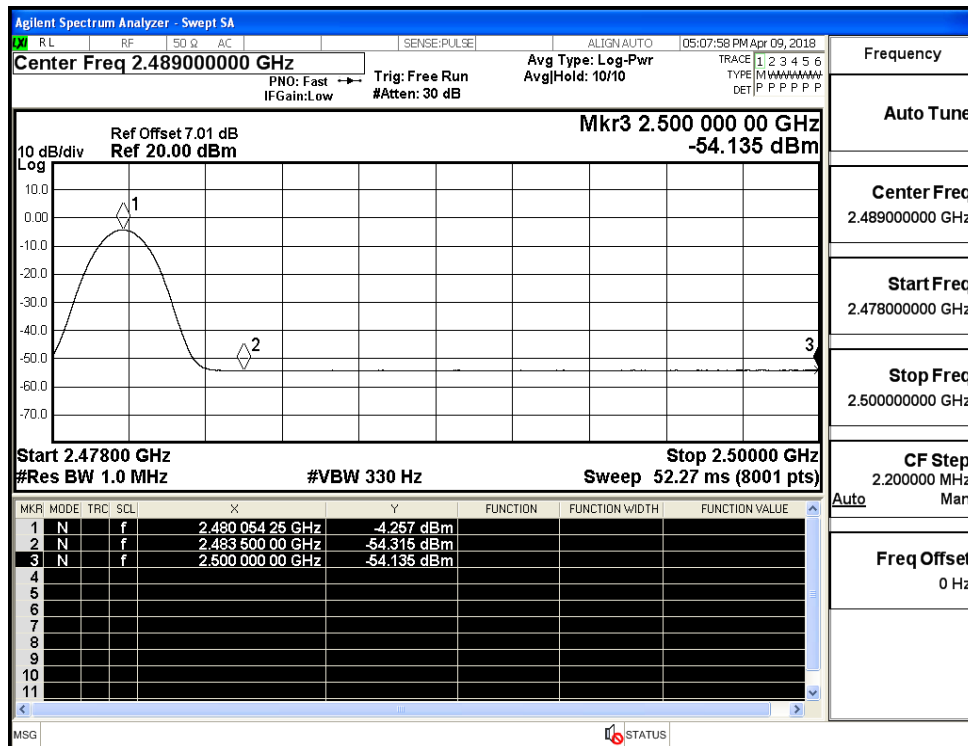
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (Low Channel)



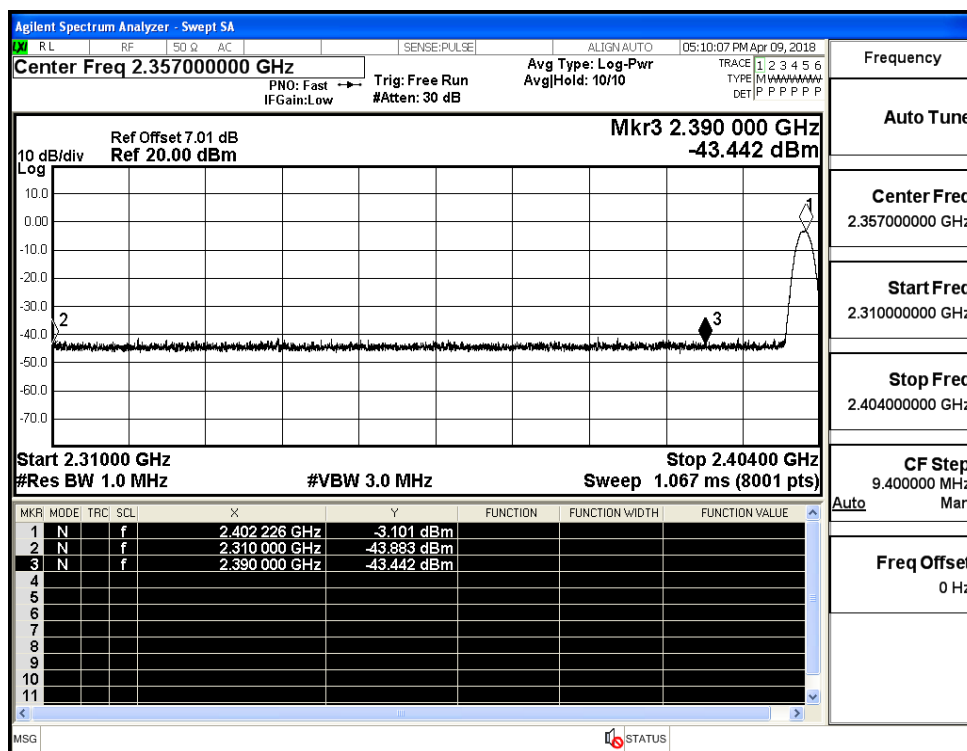
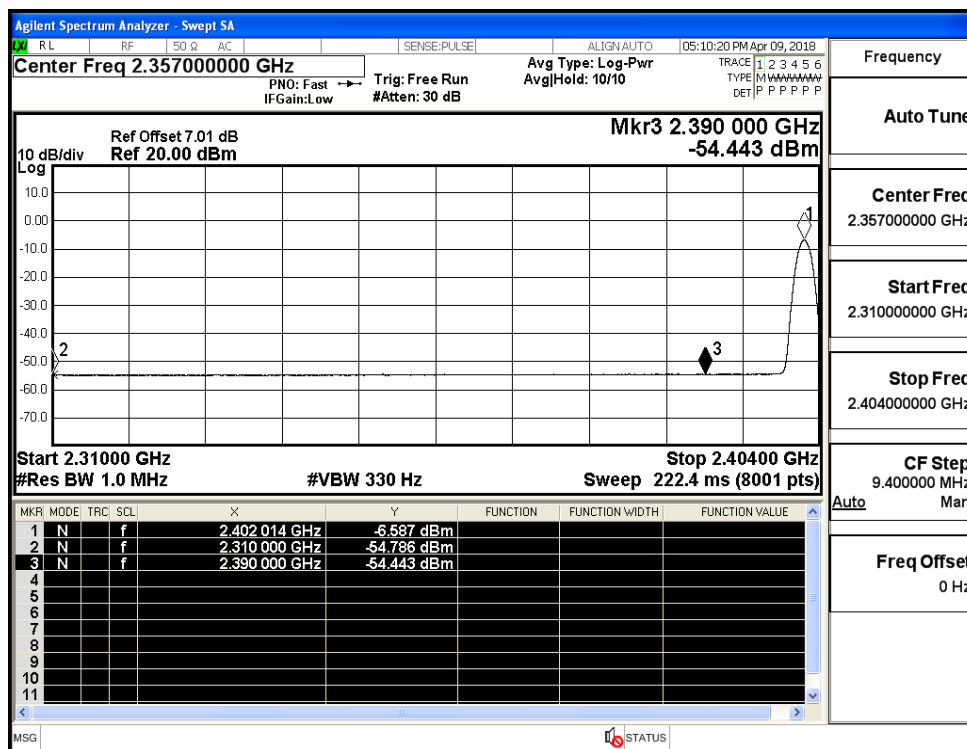
## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_PEAK (High Channel)

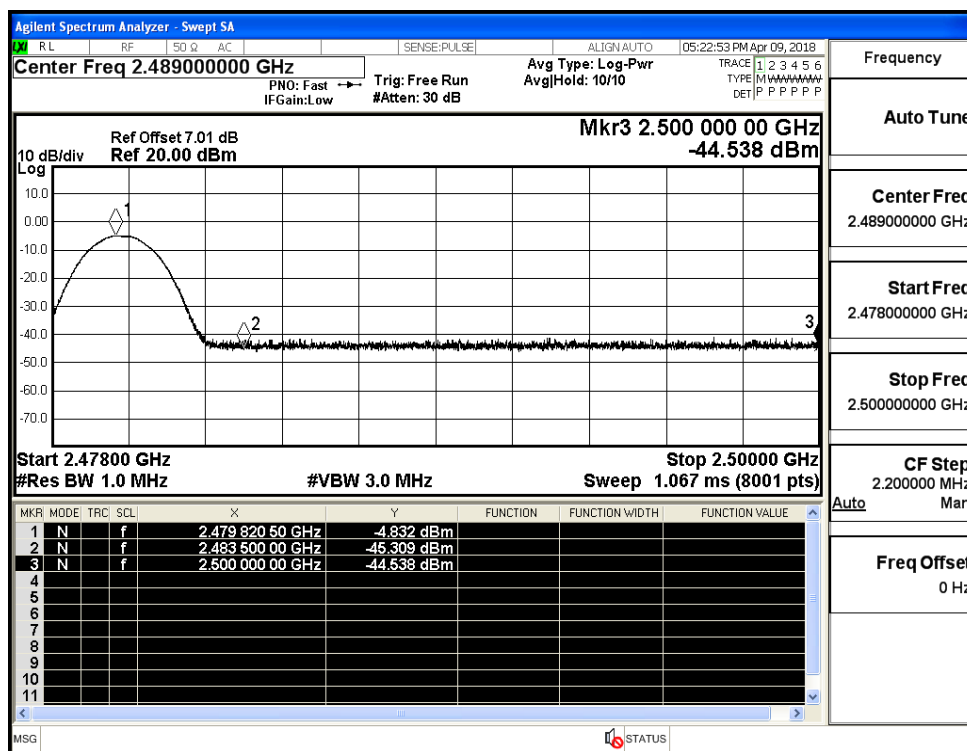


## Restrict-band band-edge measurements\_Hopping Off\_ GFSK\_Average (High Channel)





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)