

Appendix A

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

Product Name: Sitka Bluetooth® Outdoor Speaker

Trade Mark: Gemline

Test Model: 100242-001B

Environmental Conditions

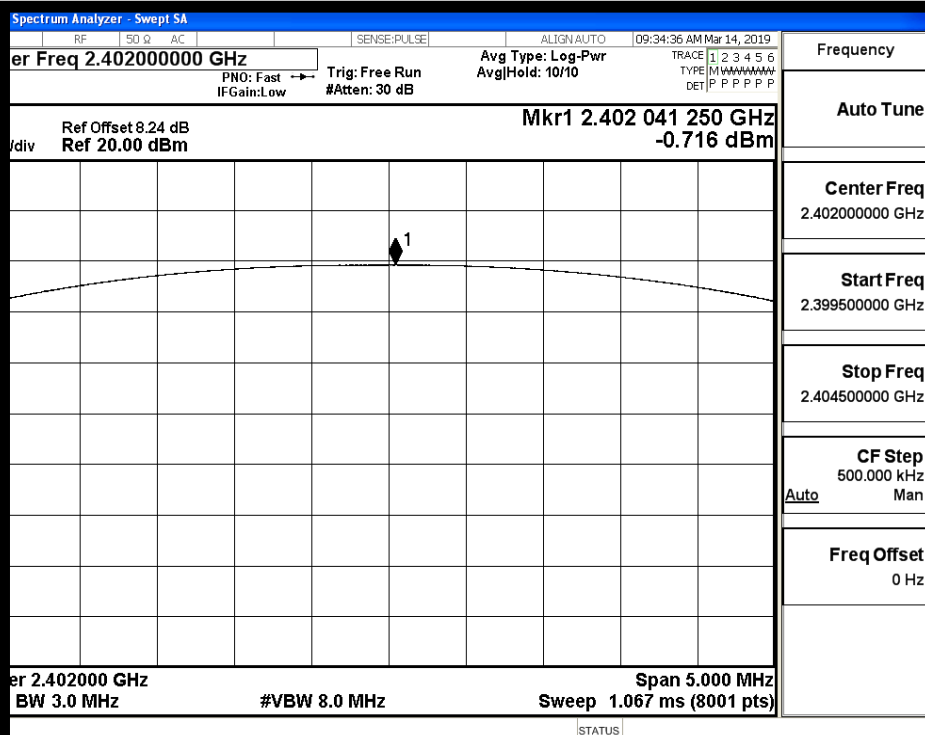
Temperature:	24.5 ° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.ZENG
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

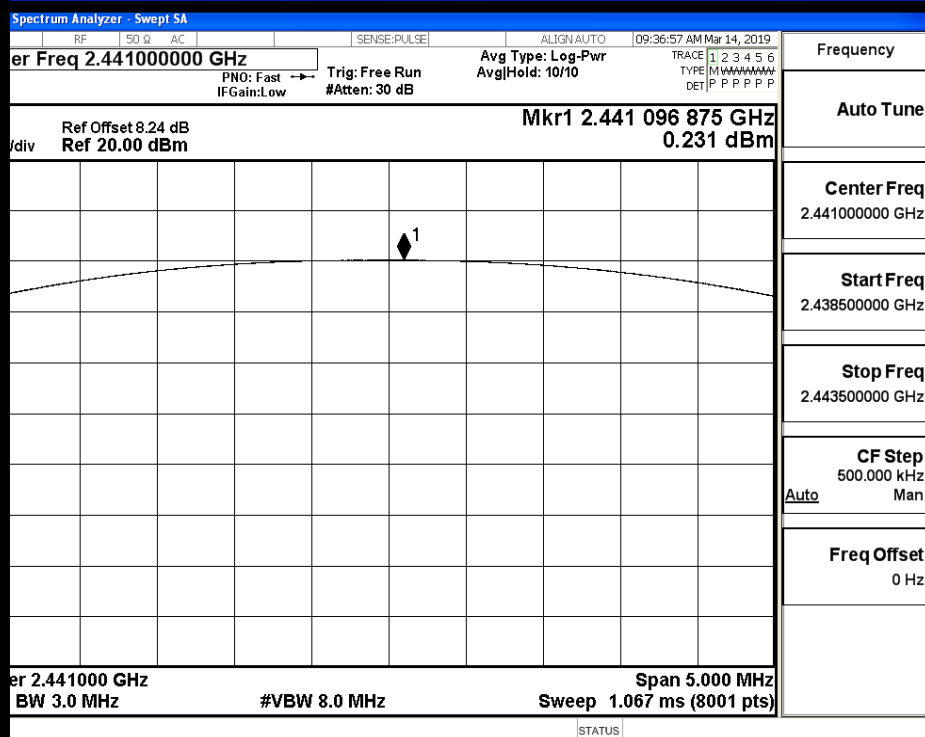
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.716	21	PASS
	MCH	0.231	21	PASS
	HCH	-0.830	21	PASS
$\pi/4$ DQPSK	LCH	-1.289	21	PASS
	MCH	-0.328	21	PASS
	HCH	-1.503	21	PASS
8DPSK	LCH	-1.156	21	PASS
	MCH	-0.136	21	PASS
	HCH	-1.344	21	PASS

Test Graphs

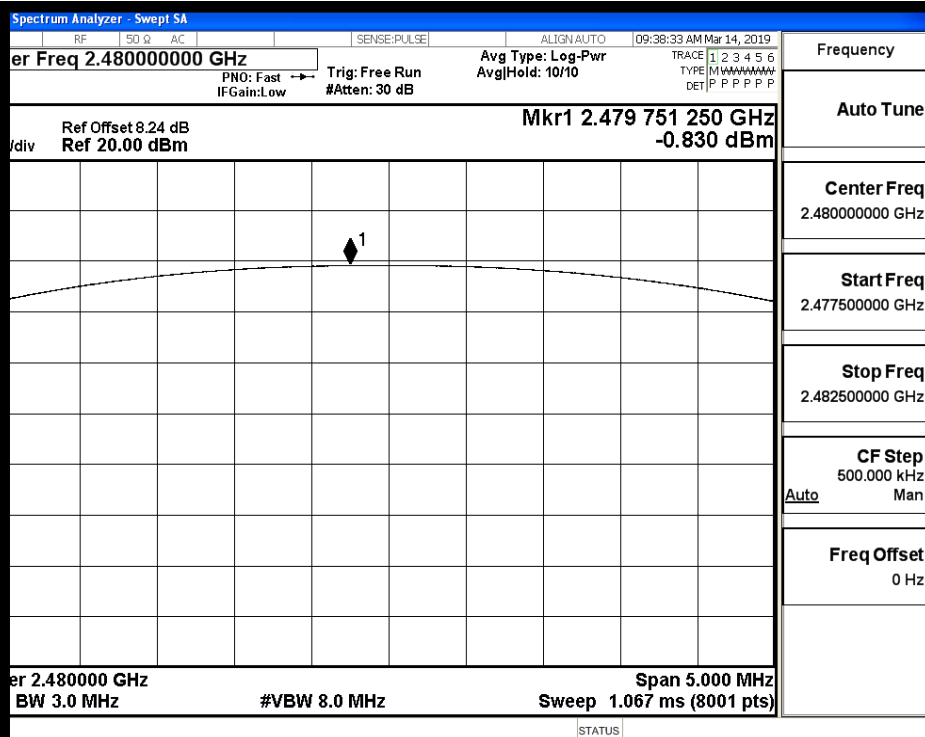
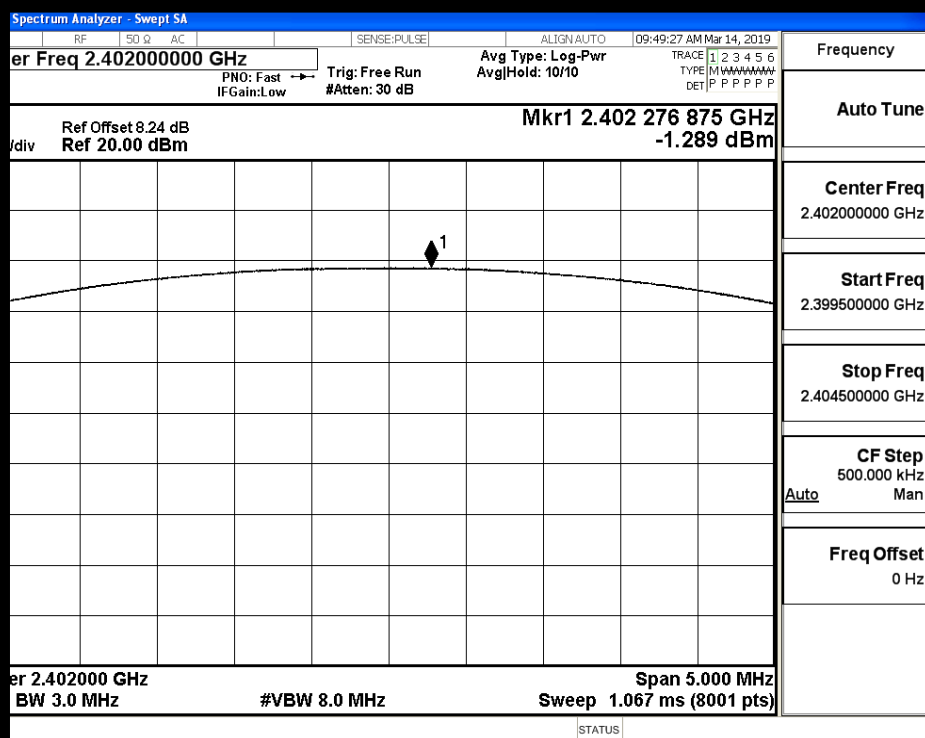
GFSK/LCH

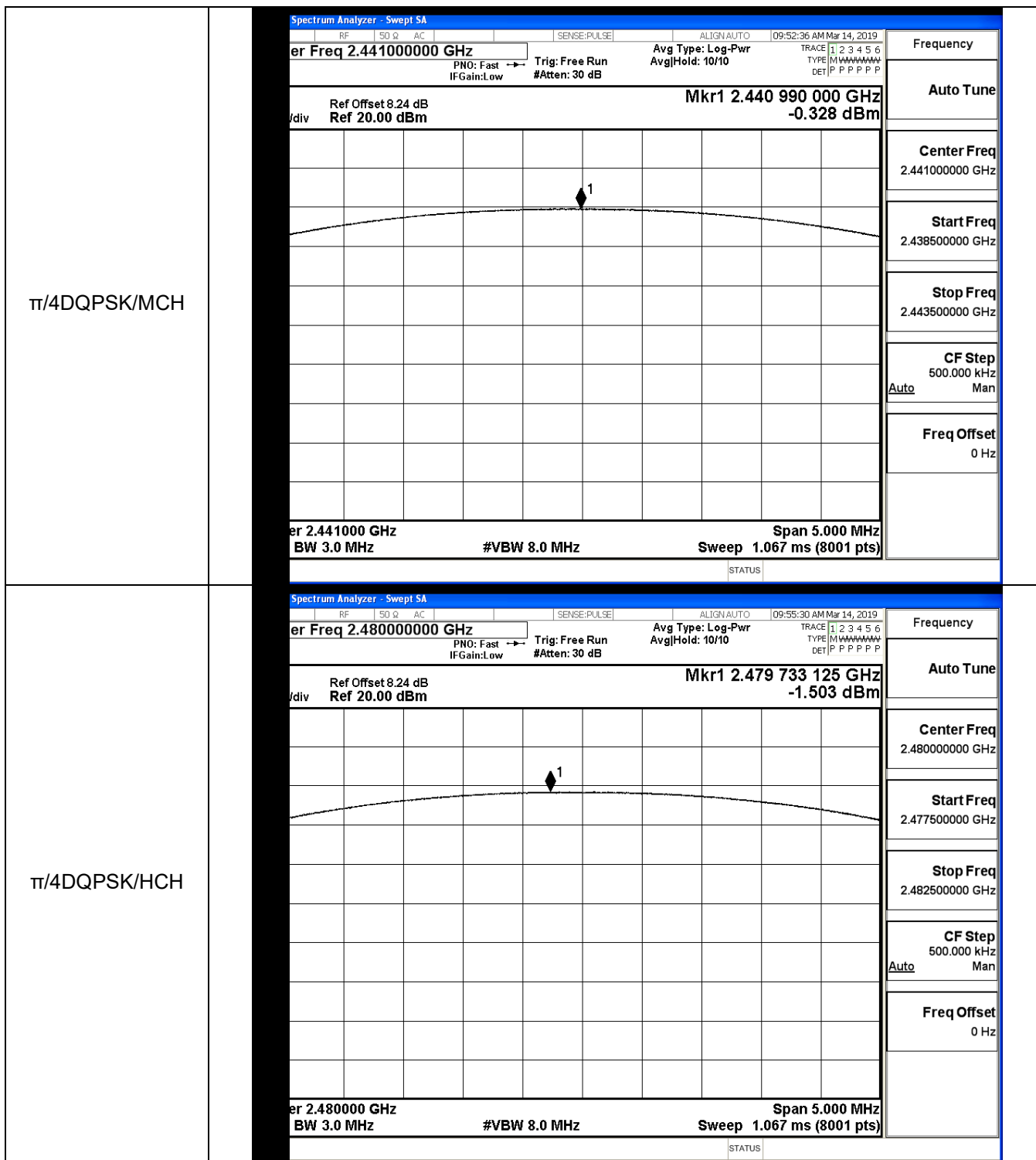


GFSK/MCH

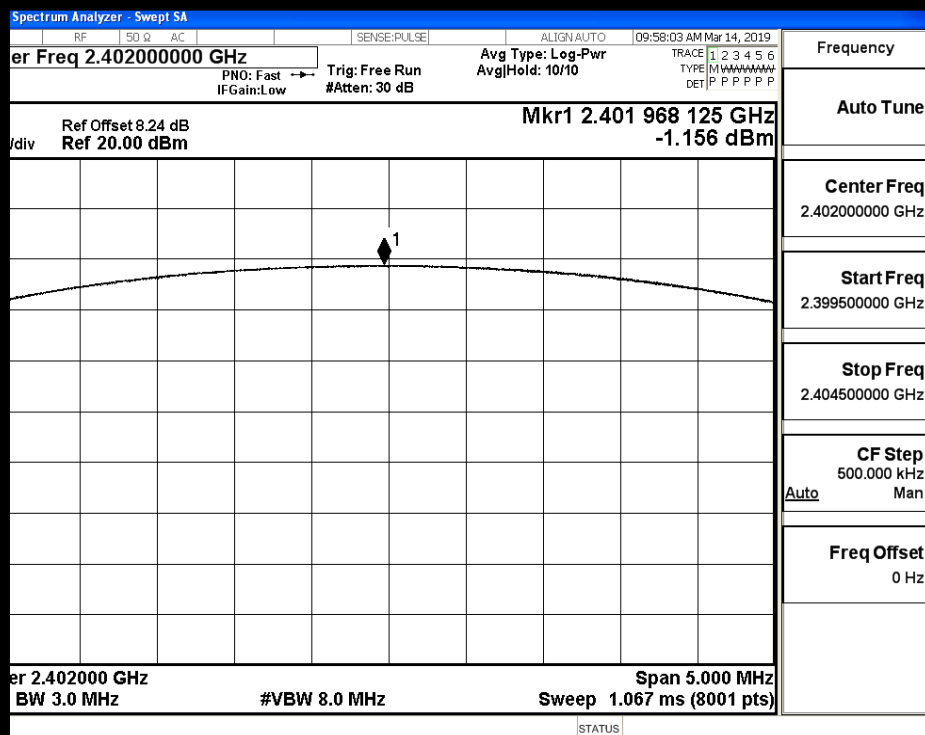


GFSK/HCH

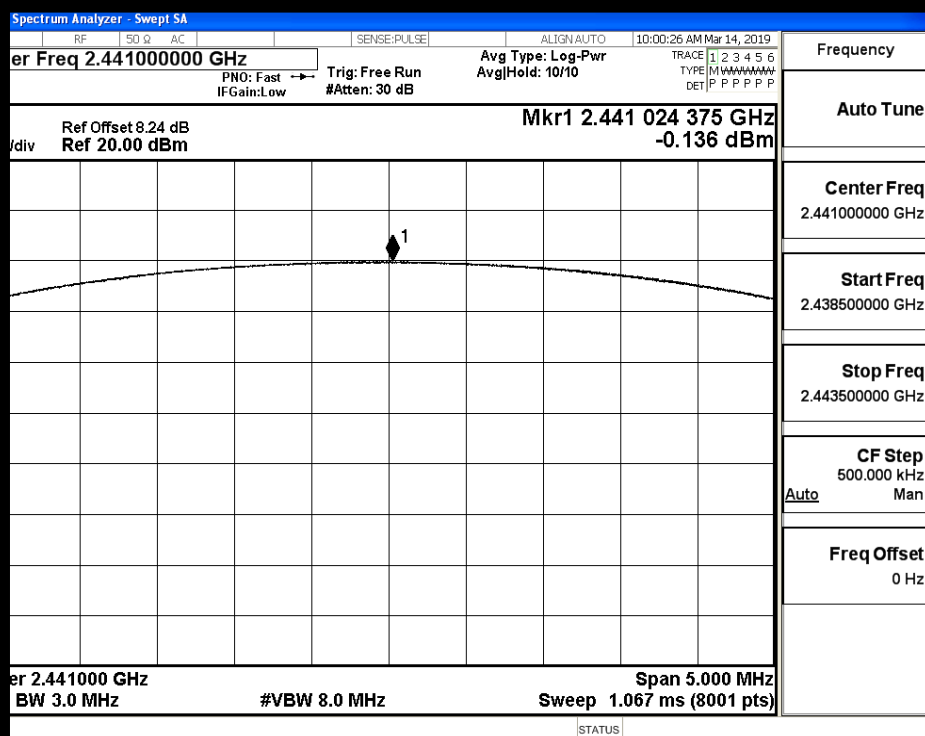
 π /4DQPSK/LCH



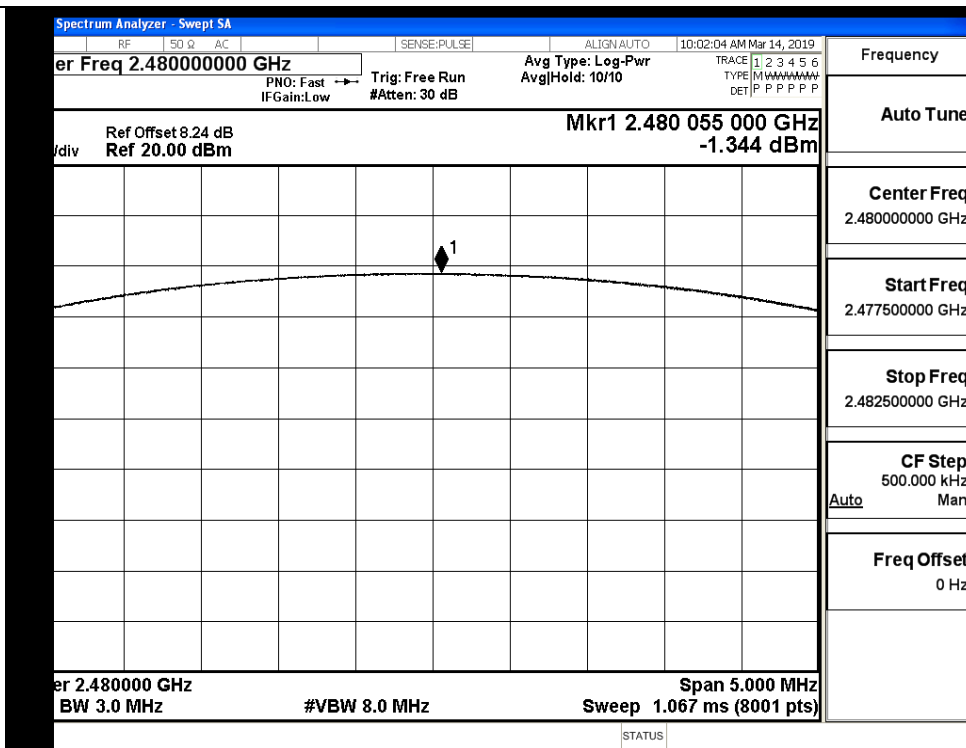
8DPSK/LCH



8DPSK/MCH



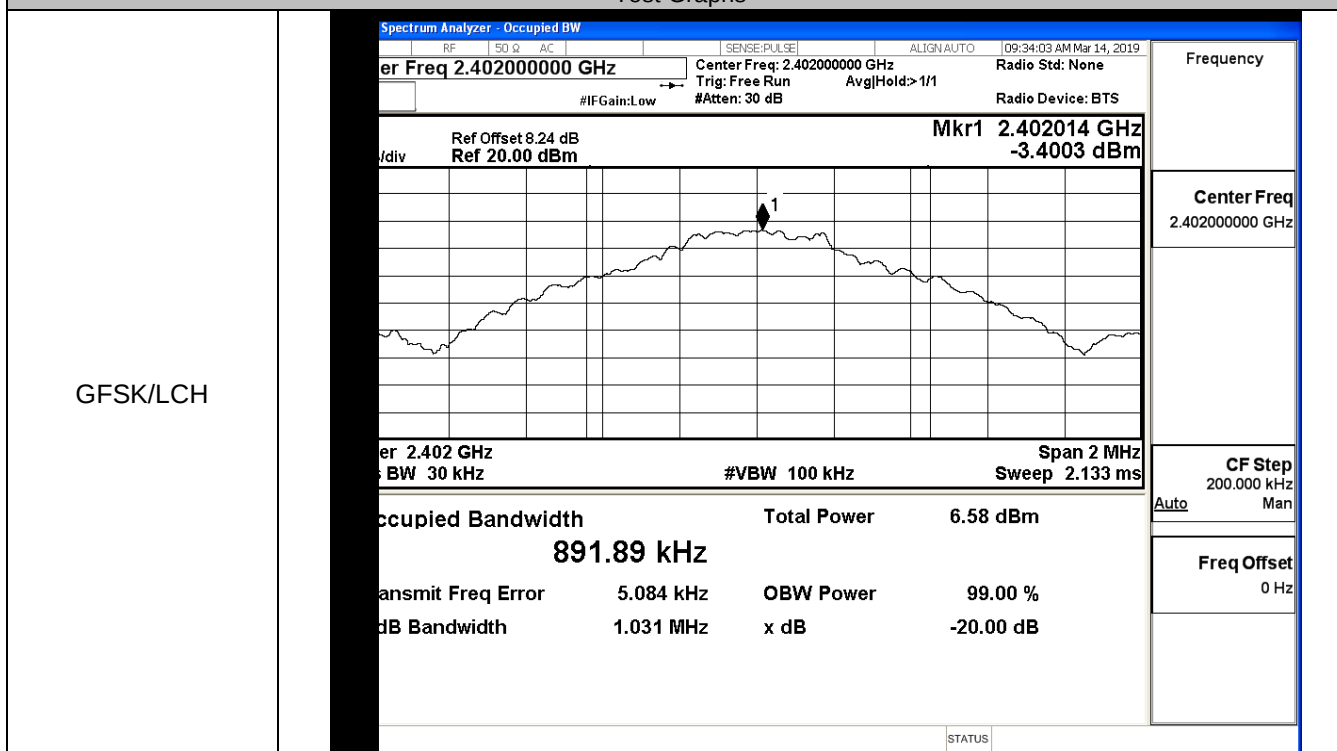
8DPSK/HCH



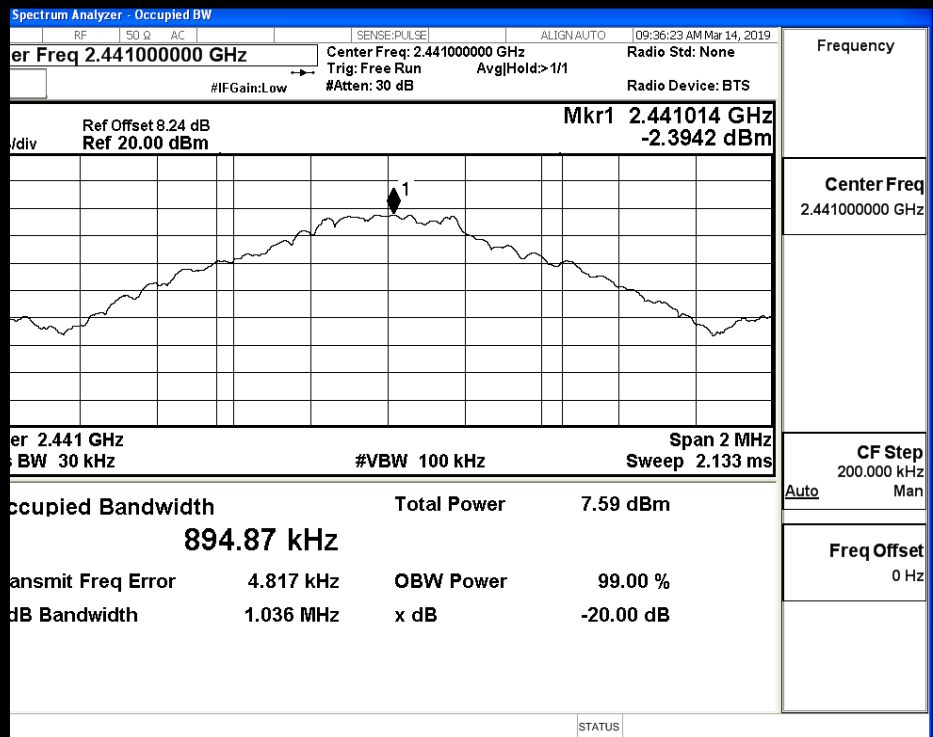
A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89189	1.031	Not Specified	PASS
	MCH	0.89487	1.036	Not Specified	PASS
	HCH	0.90027	1.035	Not Specified	PASS
π /4DQPSK	LCH	1.1766	1.293	Not Specified	PASS
	MCH	1.1748	1.308	Not Specified	PASS
	HCH	1.1756	1.305	Not Specified	PASS
8DPSK	LCH	1.1893	1.296	Not Specified	PASS
	MCH	1.1868	1.297	Not Specified	PASS
	HCH	1.1858	1.297	Not Specified	PASS

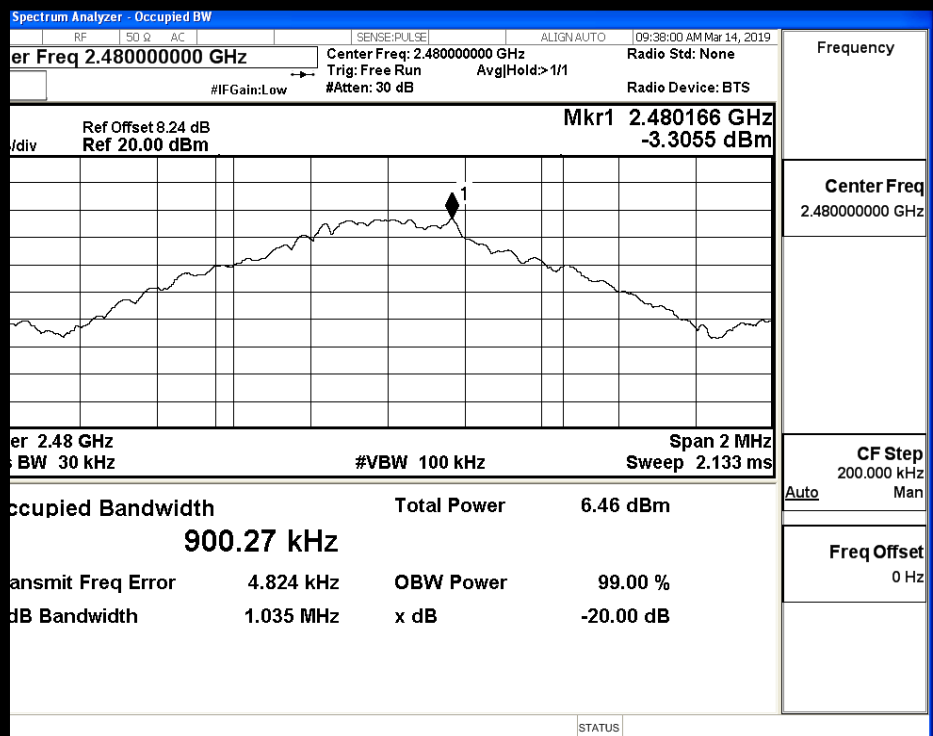
Test Graphs

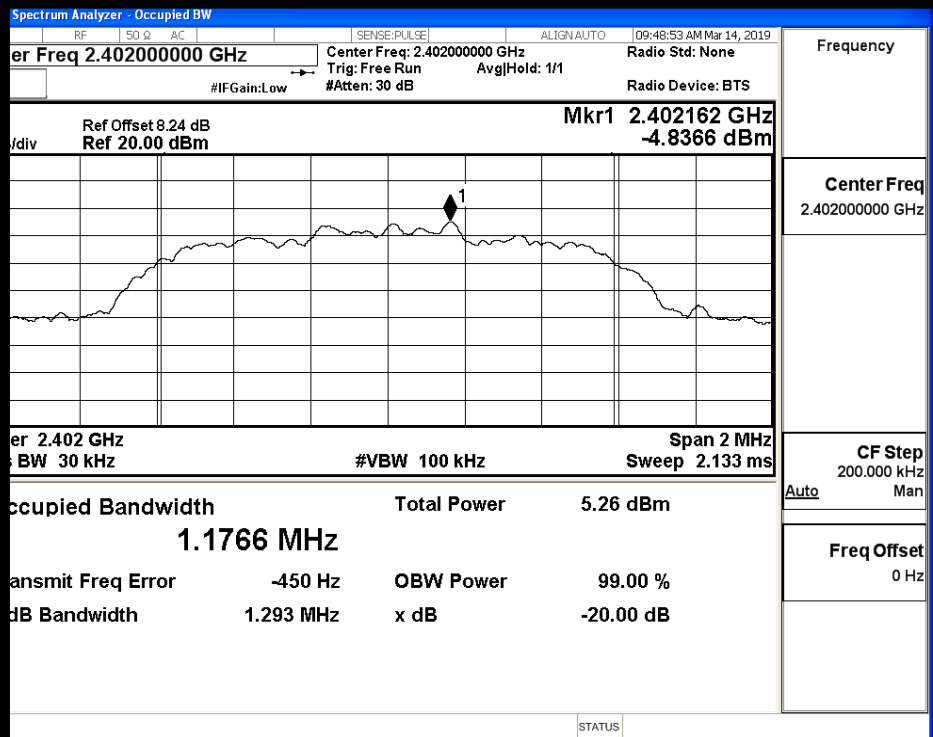
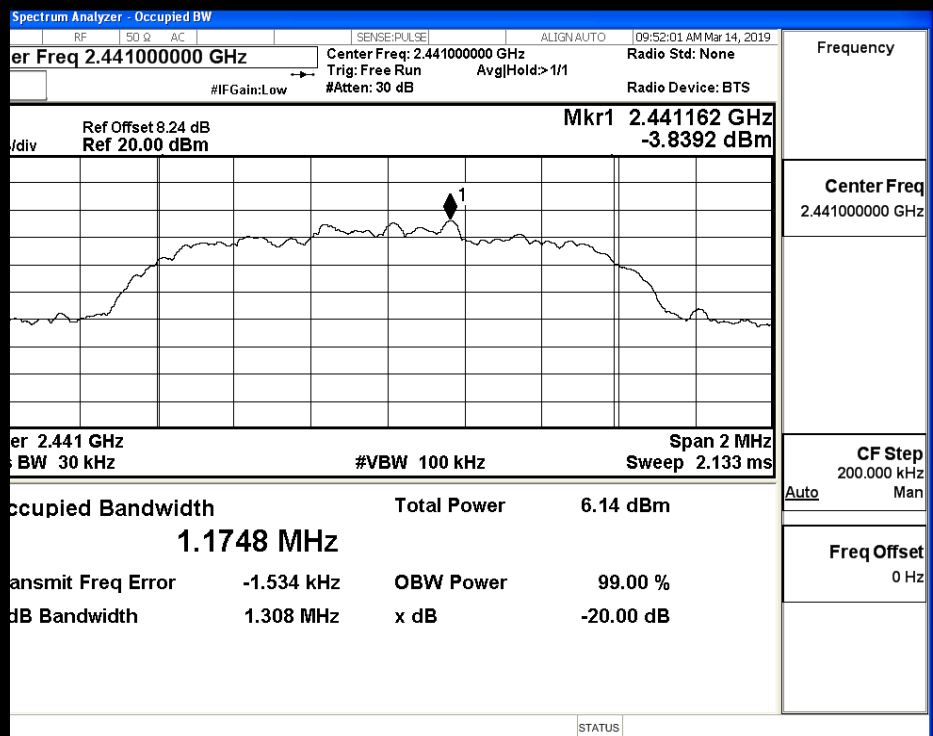


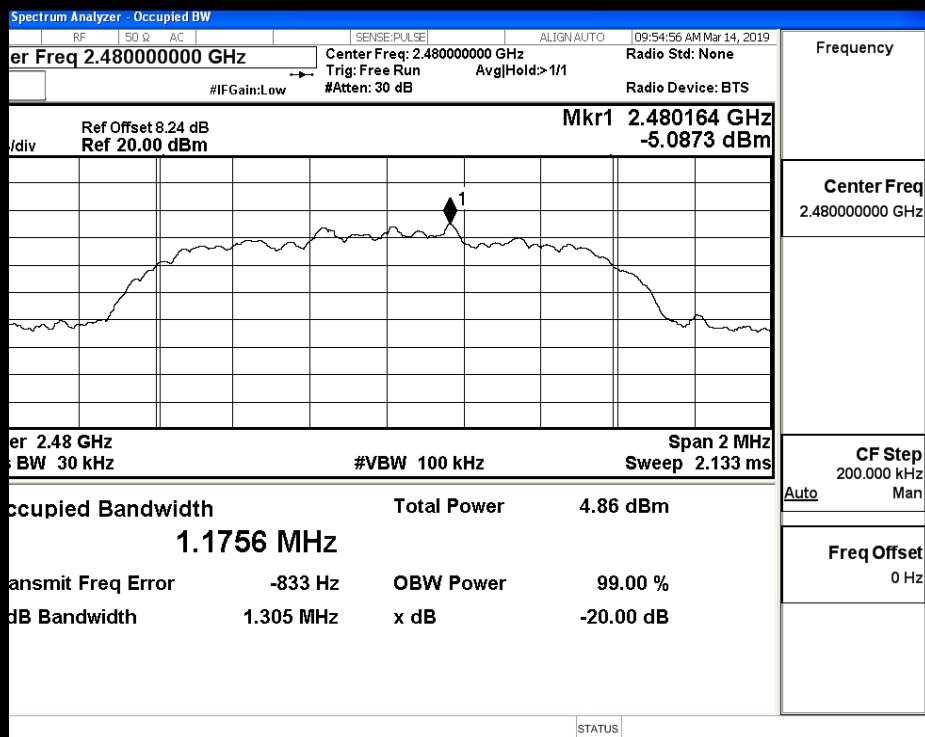
GFSK/MCH



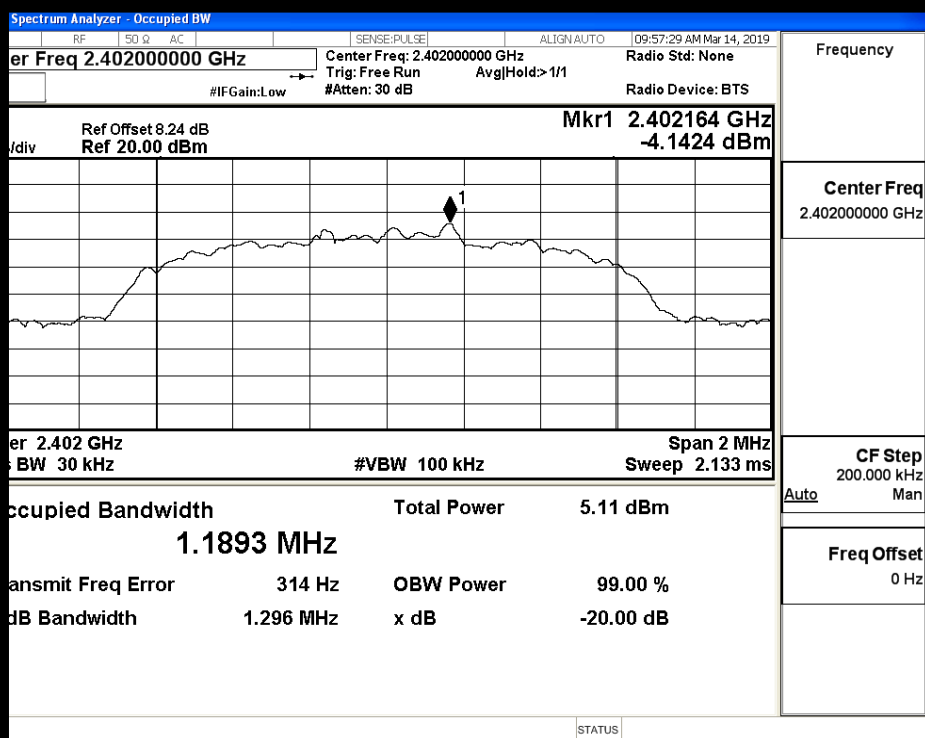
GFSK/HCH



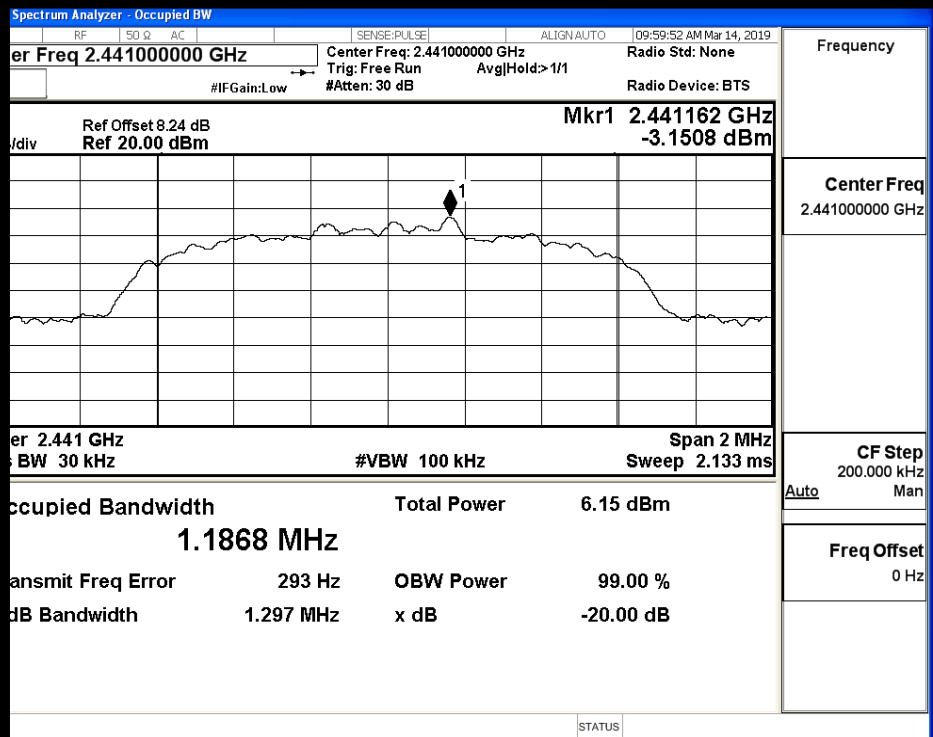
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

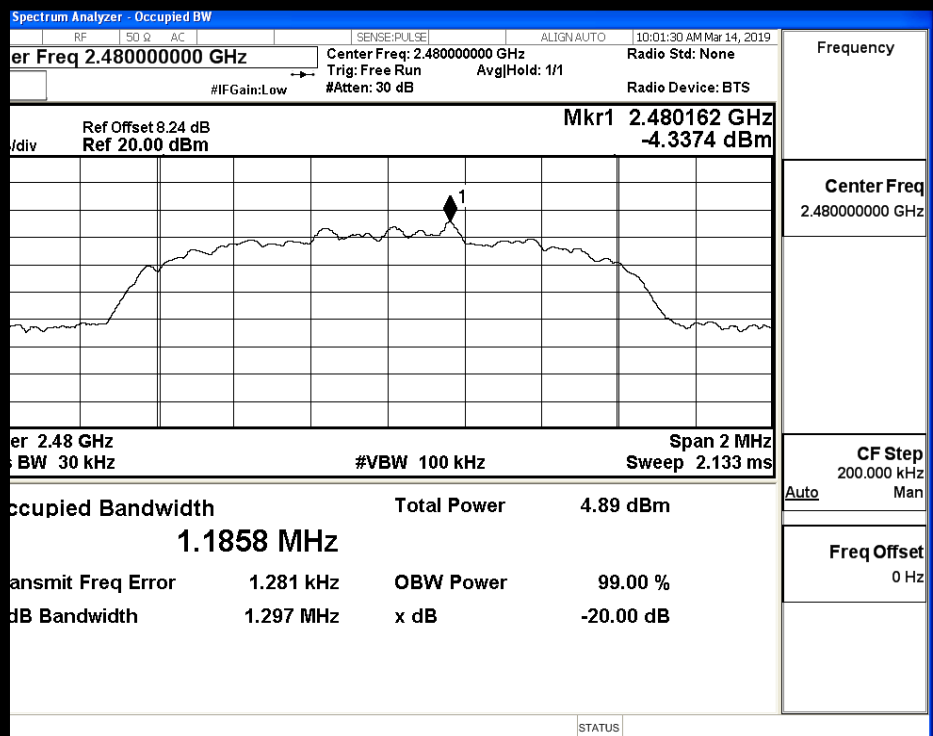
8DPSK/LCH



8DPSK/MCH



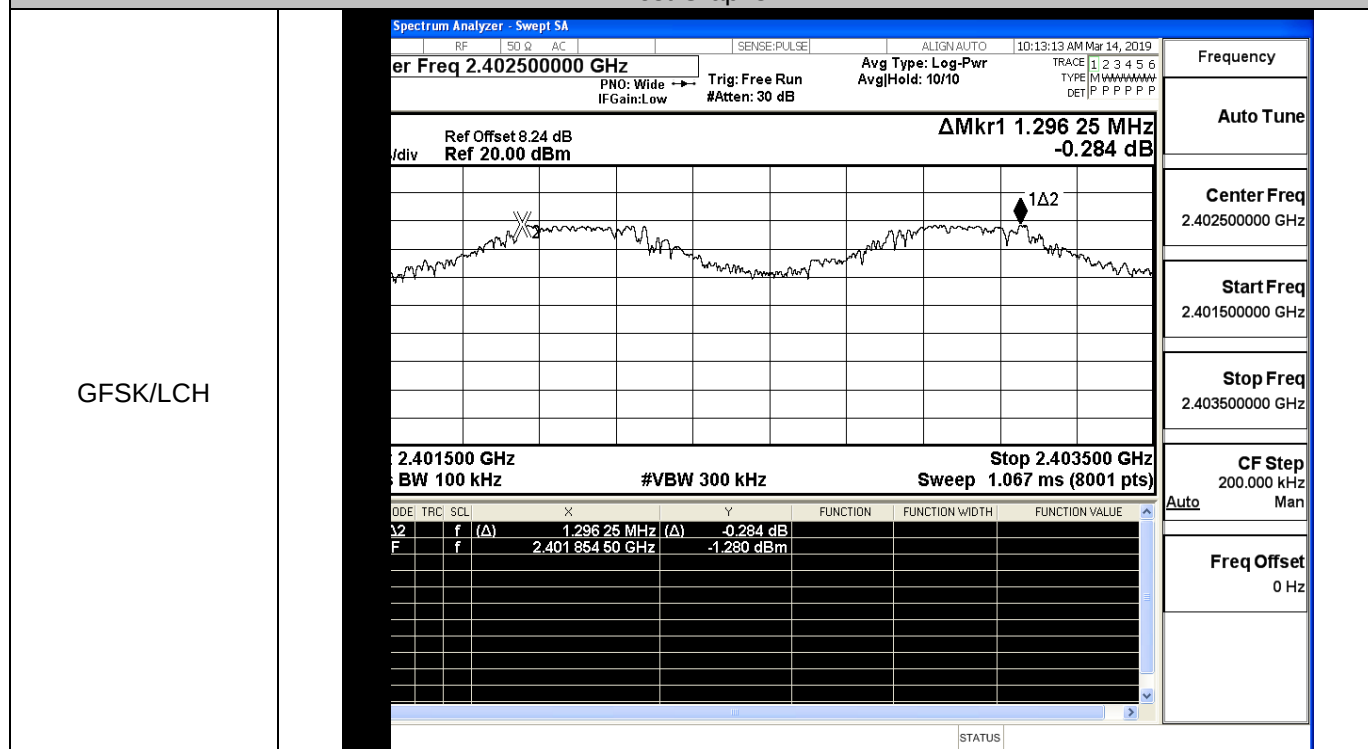
8DPSK/HCH



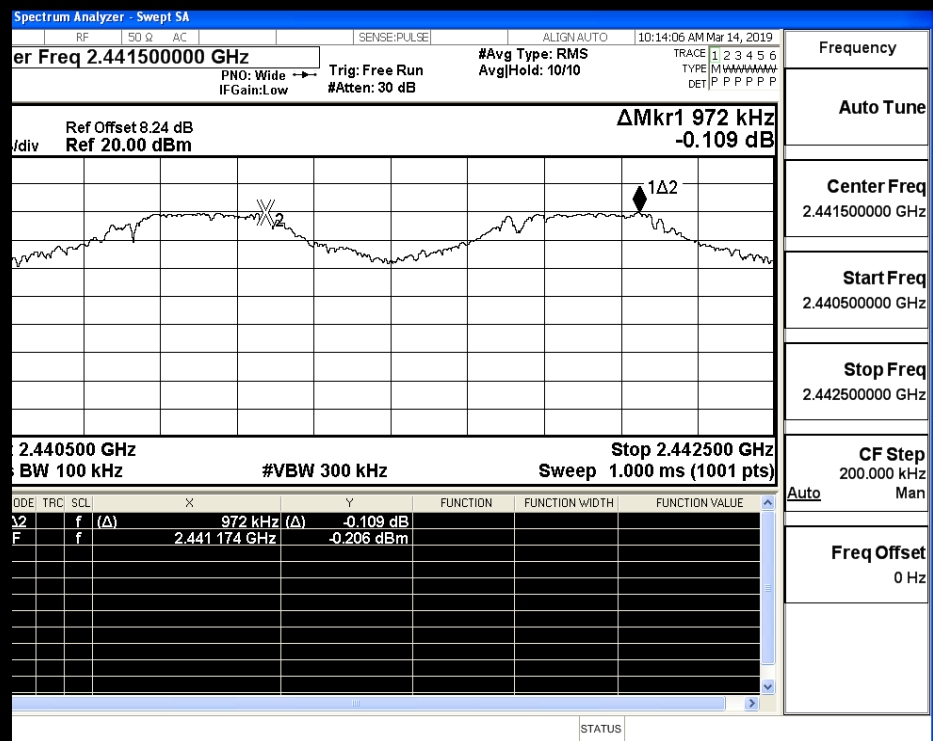
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.296	0.691	PASS
	MCH	0.972	0.691	PASS
	HCH	1.154	0.691	PASS
π /4DQPSK	LCH	1.068	0.872	PASS
	MCH	1.212	0.872	PASS
	HCH	1.176	0.872	PASS
8DPSK	LCH	1.130	0.865	PASS
	MCH	0.918	0.865	PASS
	HCH	1.176	0.865	PASS

Test Graphs



GFSK/MCH

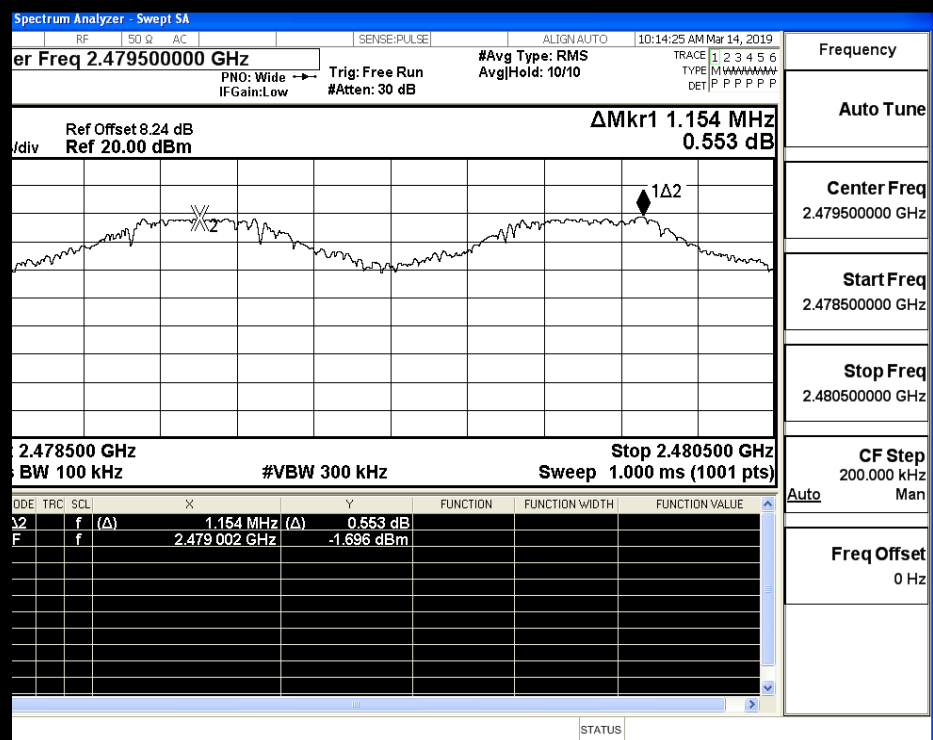


Frequency

Auto Tune

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

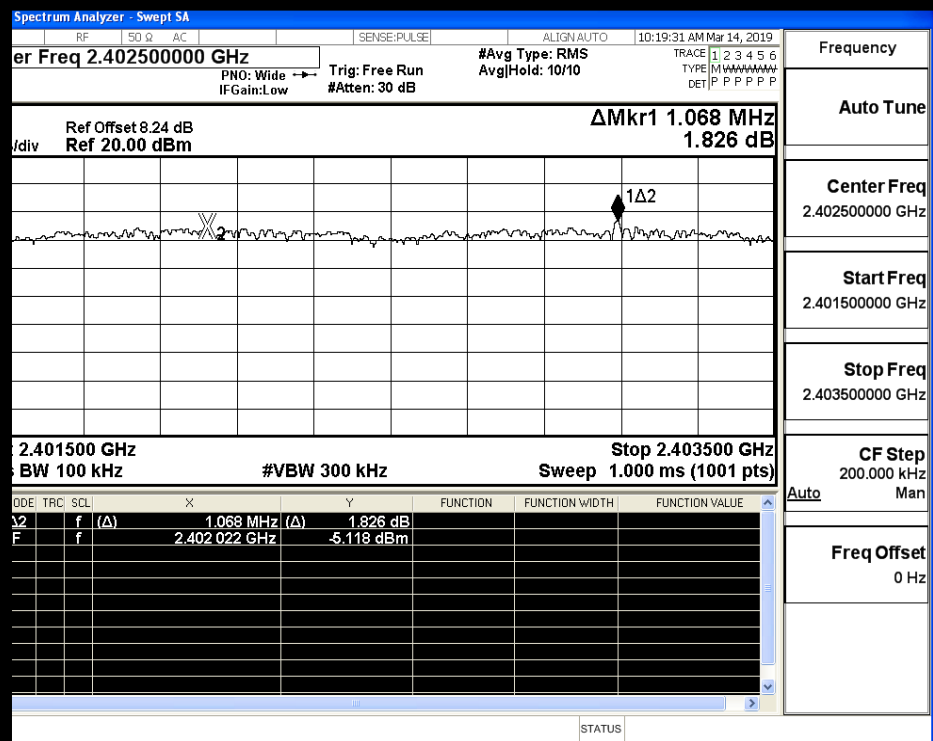
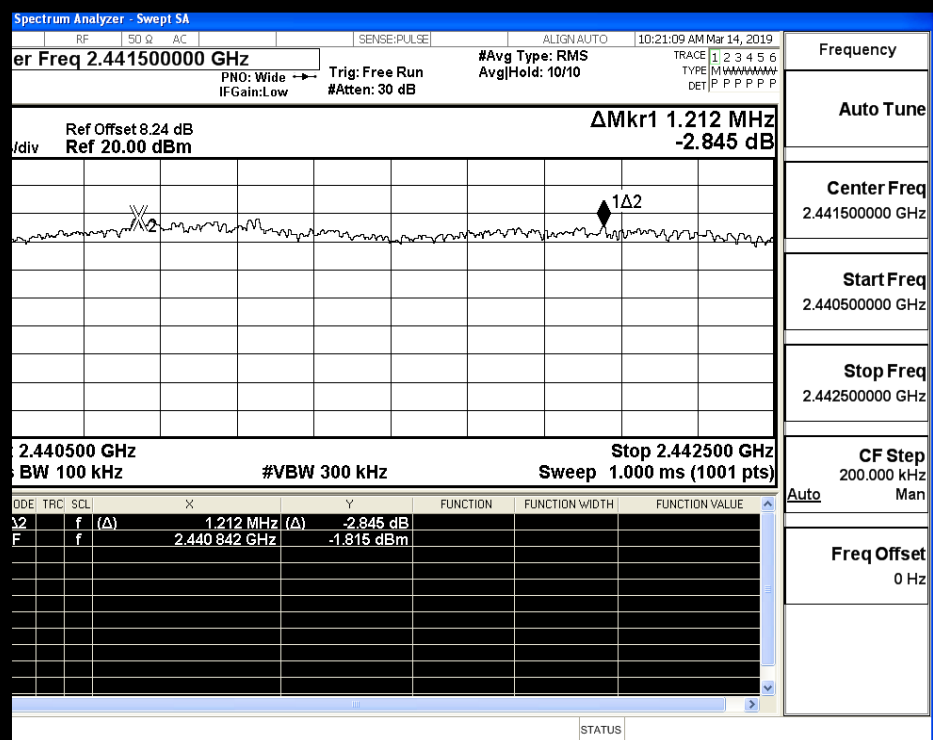
GFSK/HCH

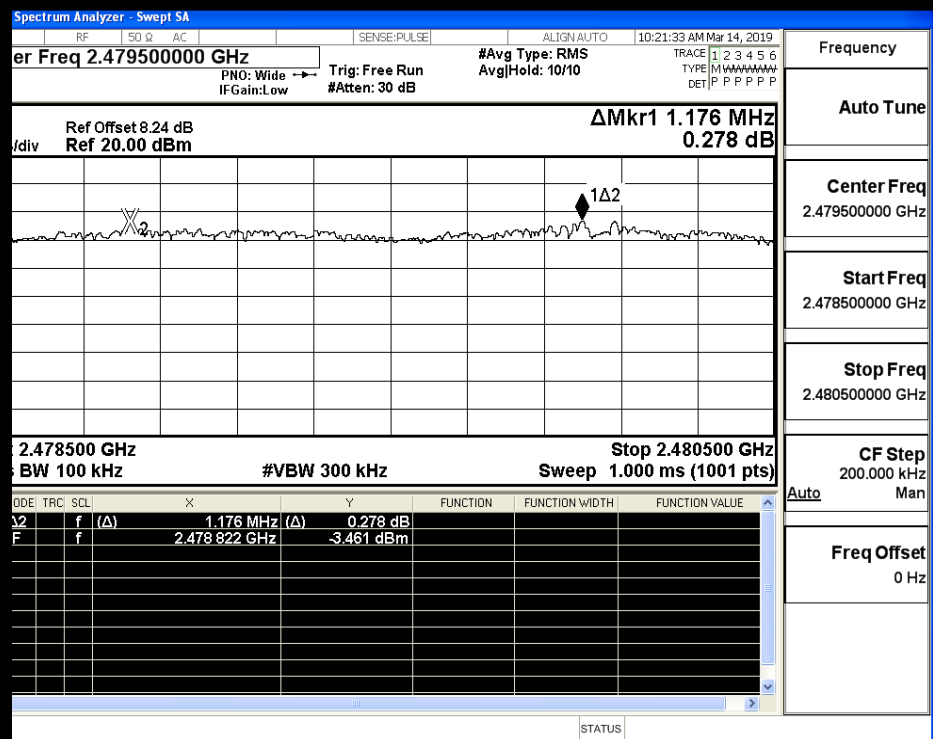


Frequency

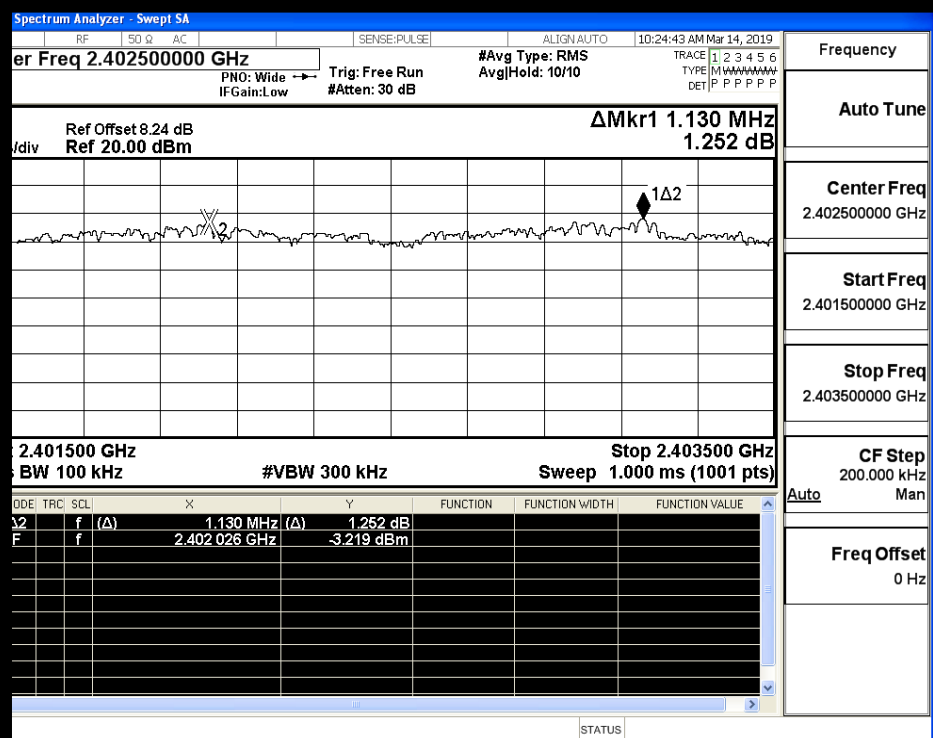
Auto Tune

Center Freq
2.479500000 GHzStart Freq
2.478500000 GHzStop Freq
2.480500000 GHzCF Step
200.000 kHz
ManFreq Offset
0 Hz

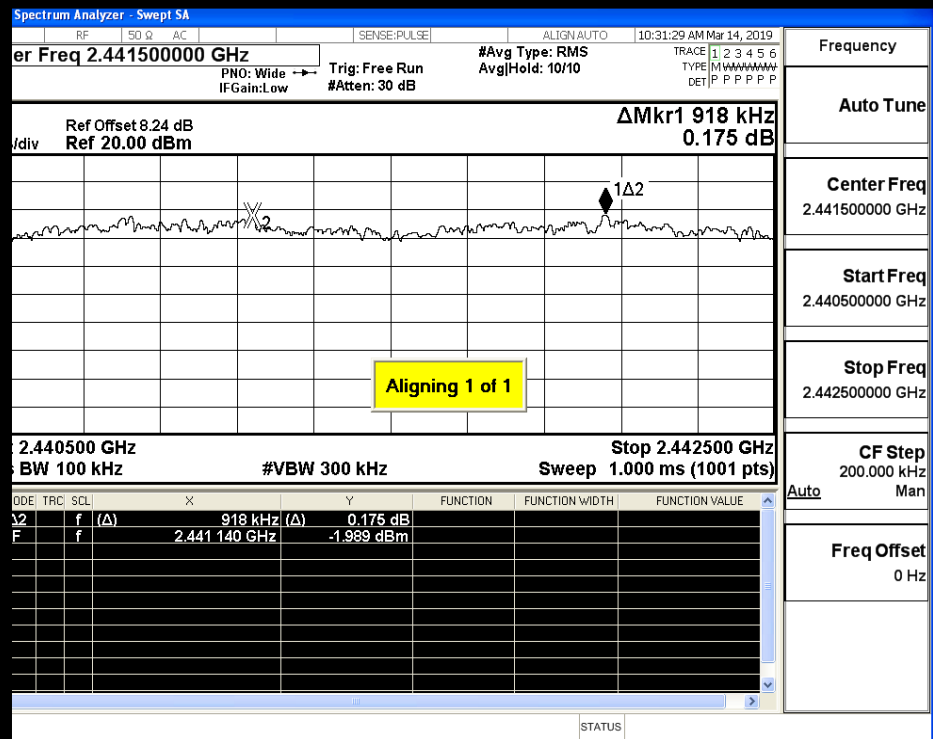
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

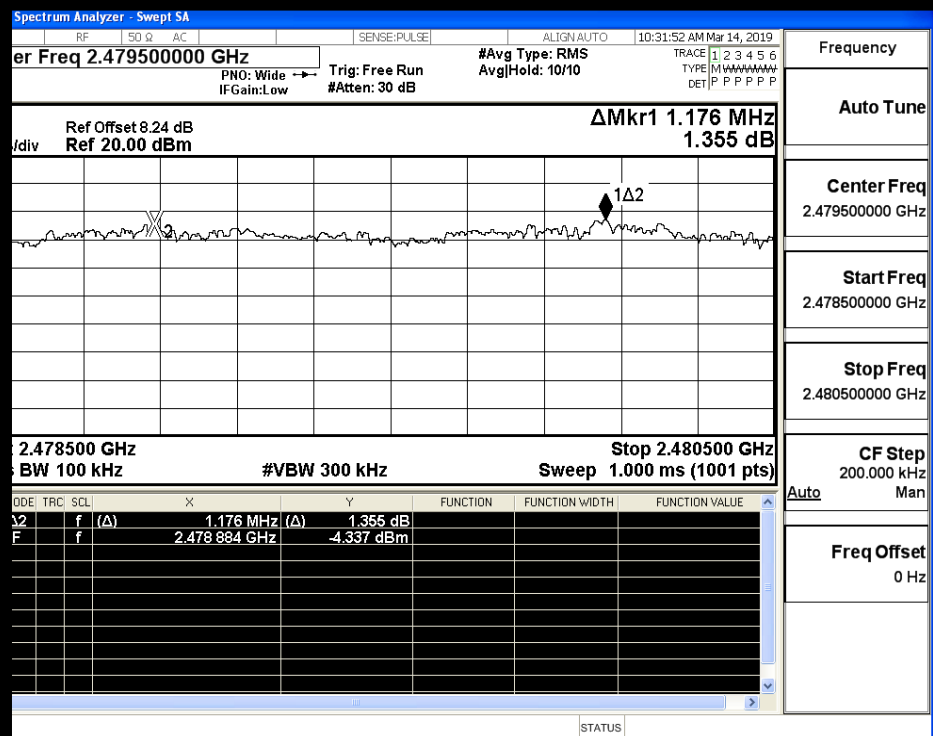
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

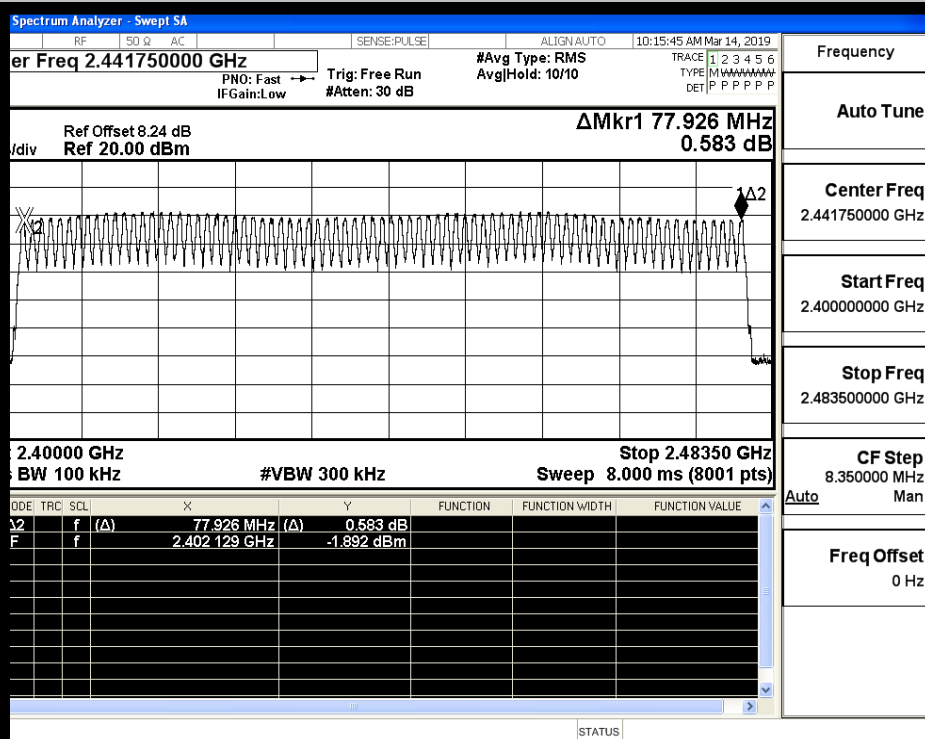
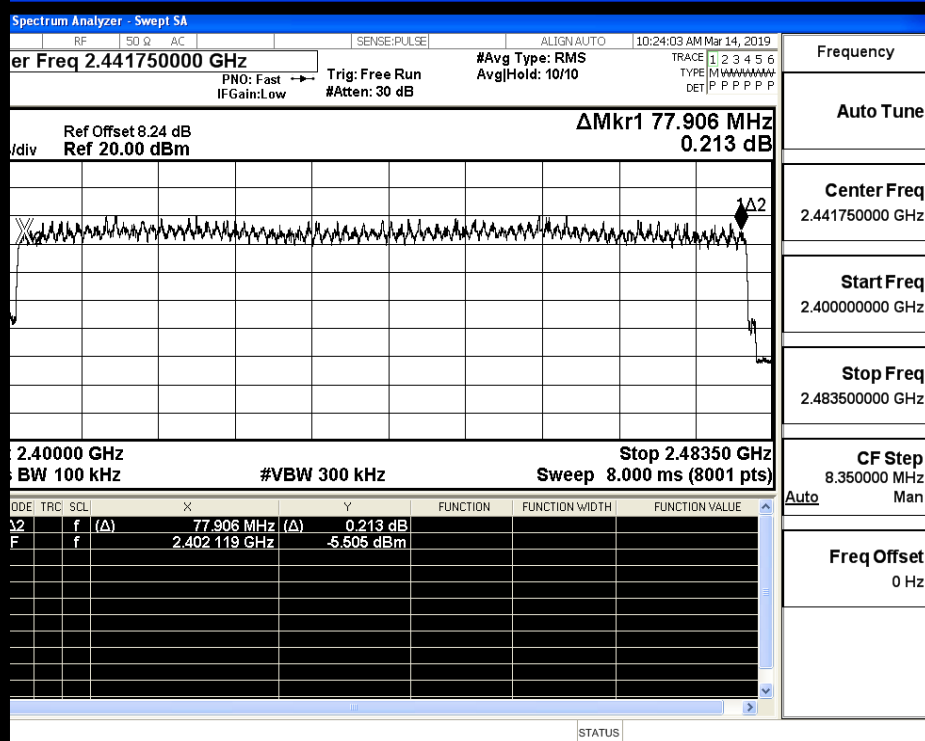


A.4 Hopping Channel Number

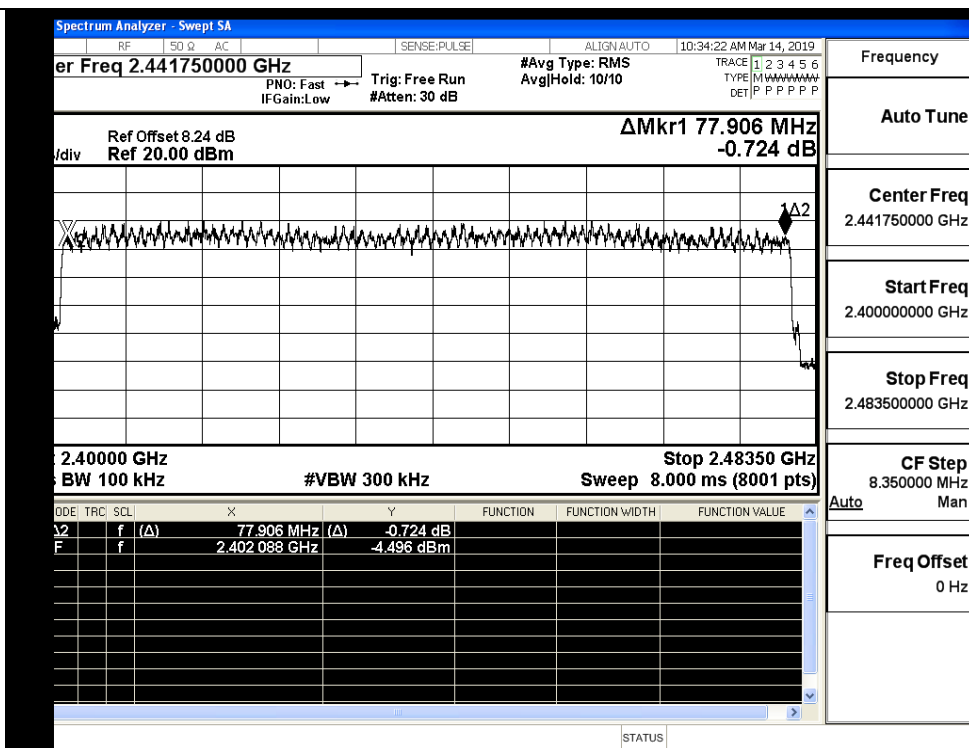
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

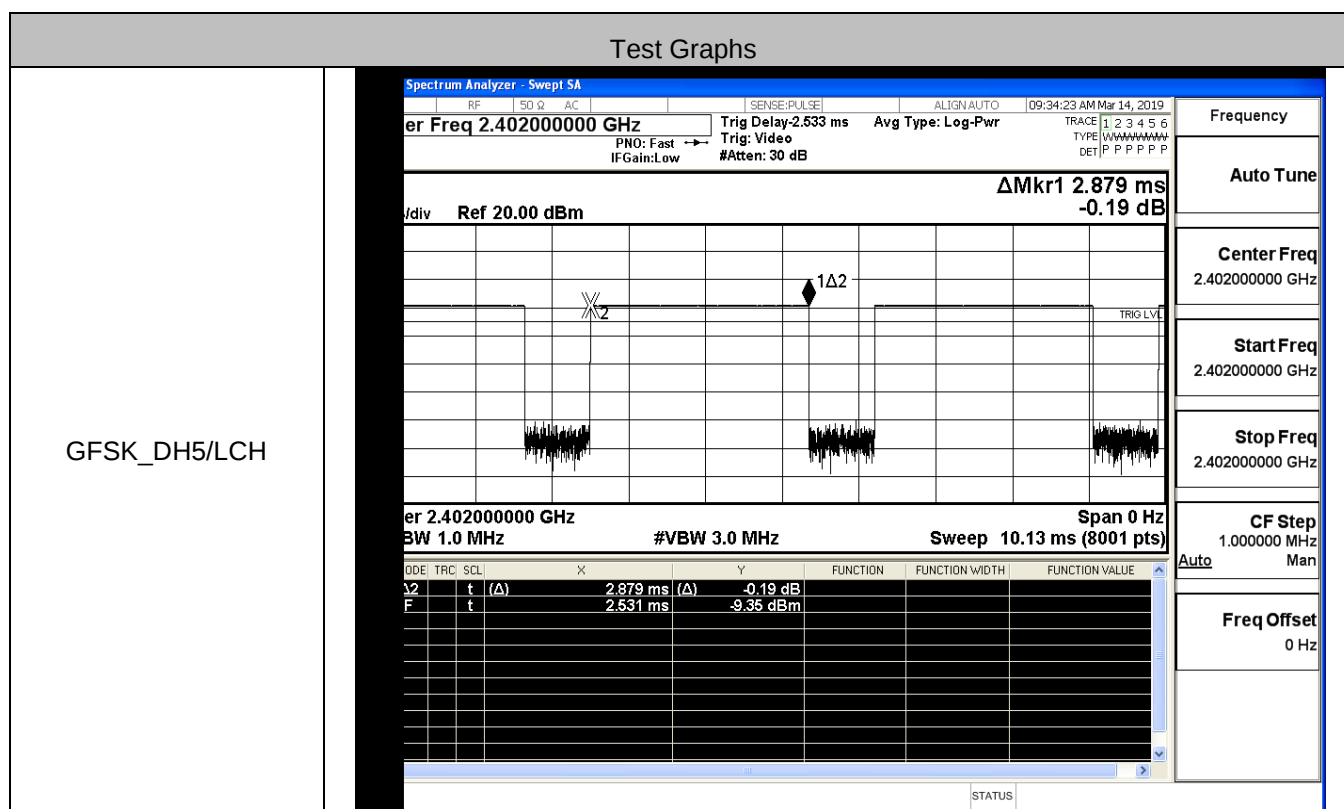
 $\pi/4$ DQPSK/Hop

8DPSK/Hop

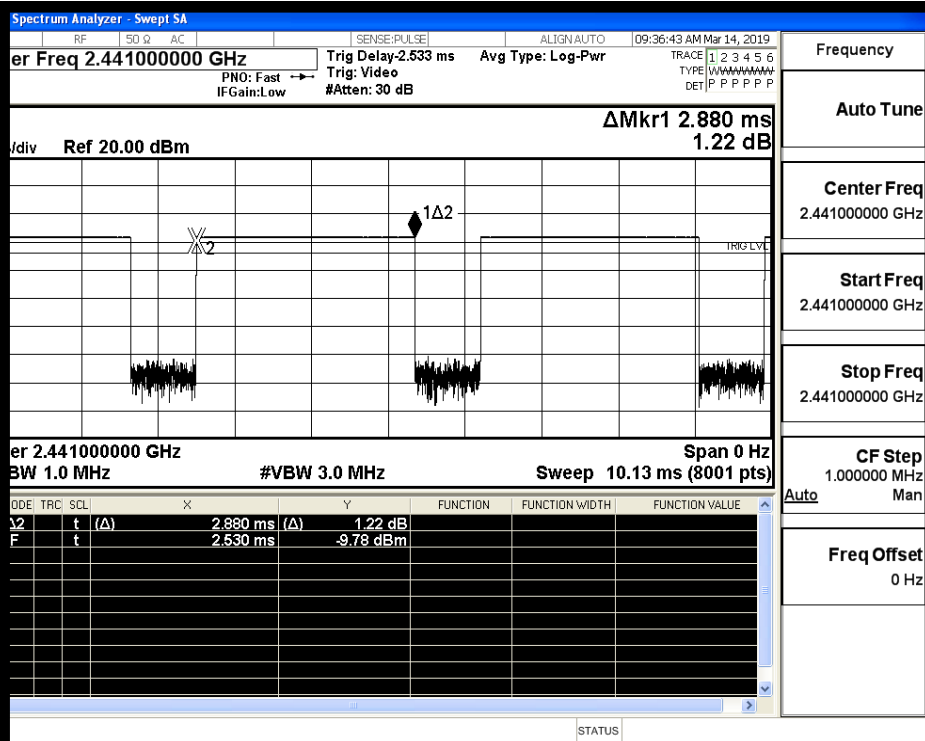


A.5 Dwell Time

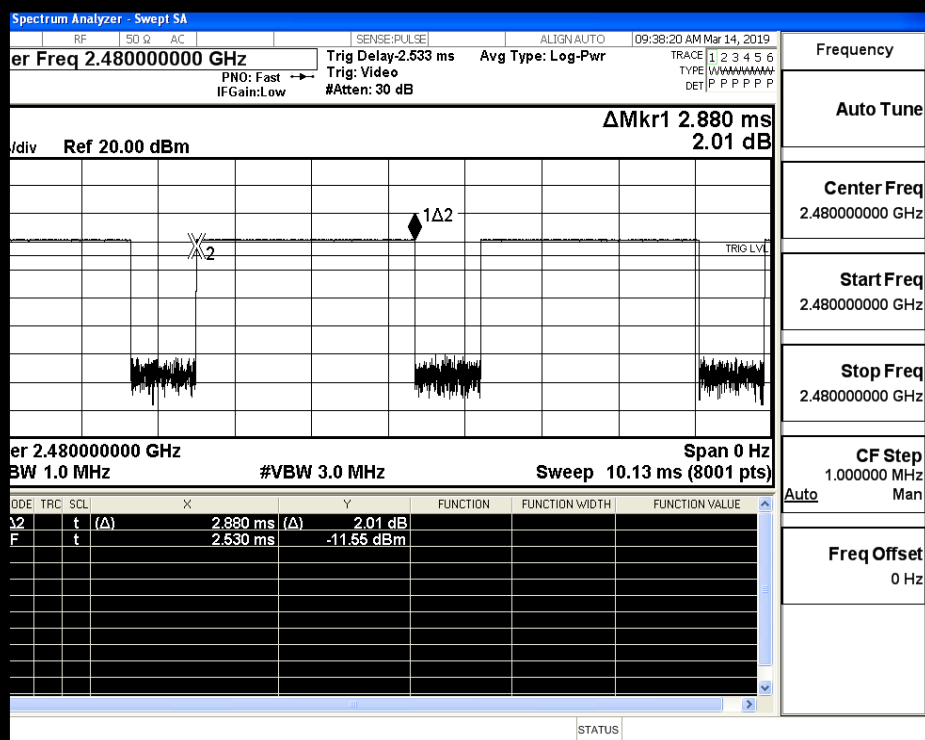
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88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



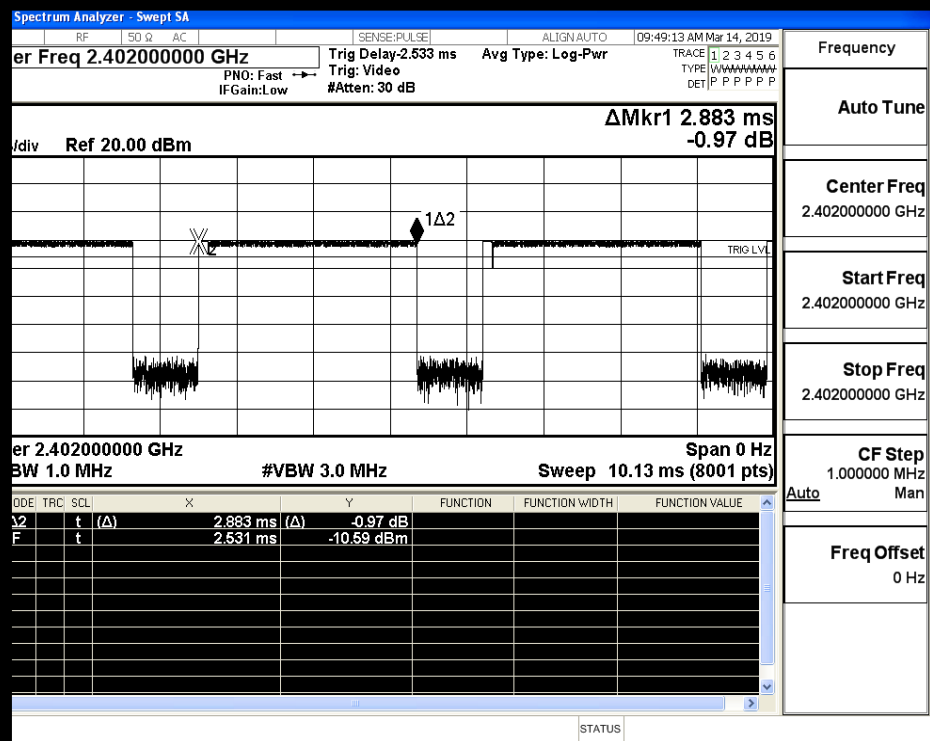
GFSK_DH5/MCH



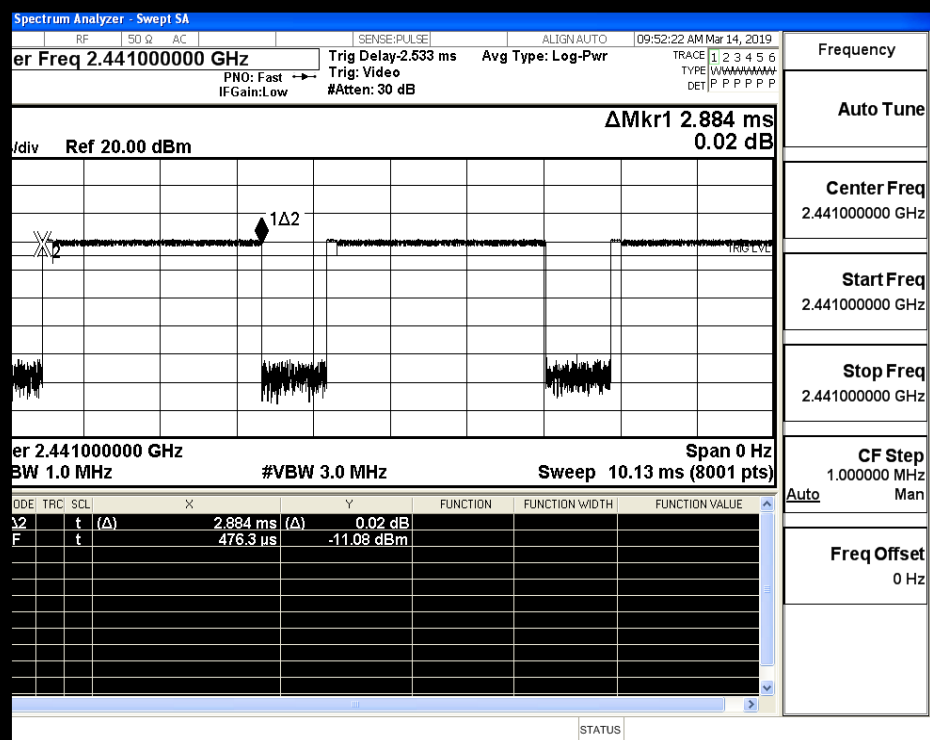
GFSK_DH5/HCH



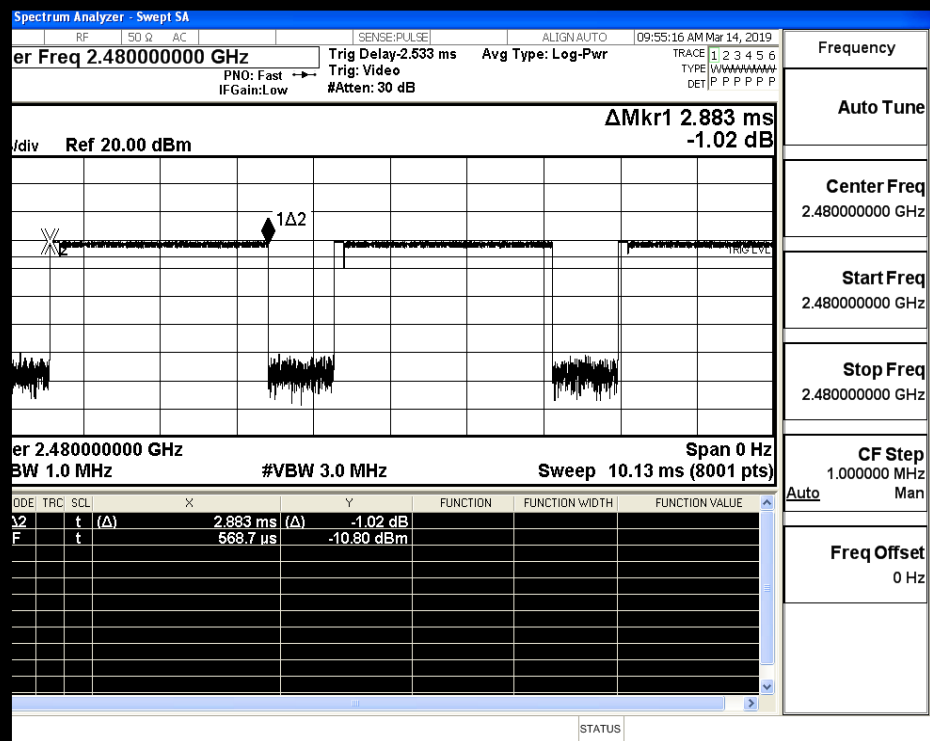
$\pi/4$ DQPSK
_2DH5/LCH



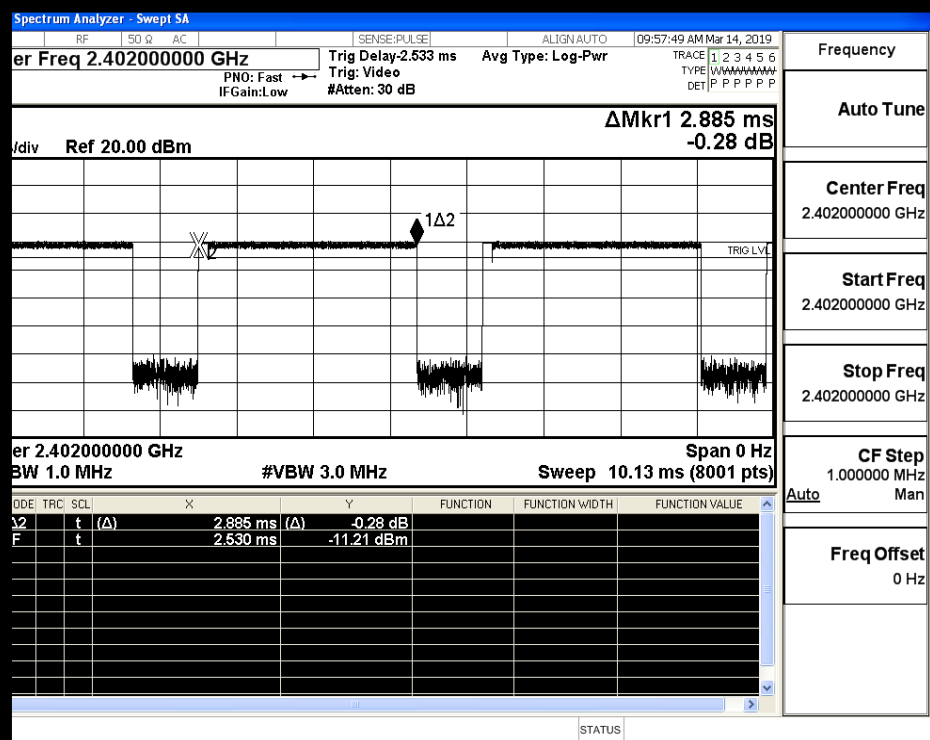
$\pi/4$ DQPSK
_2DH5/MCH



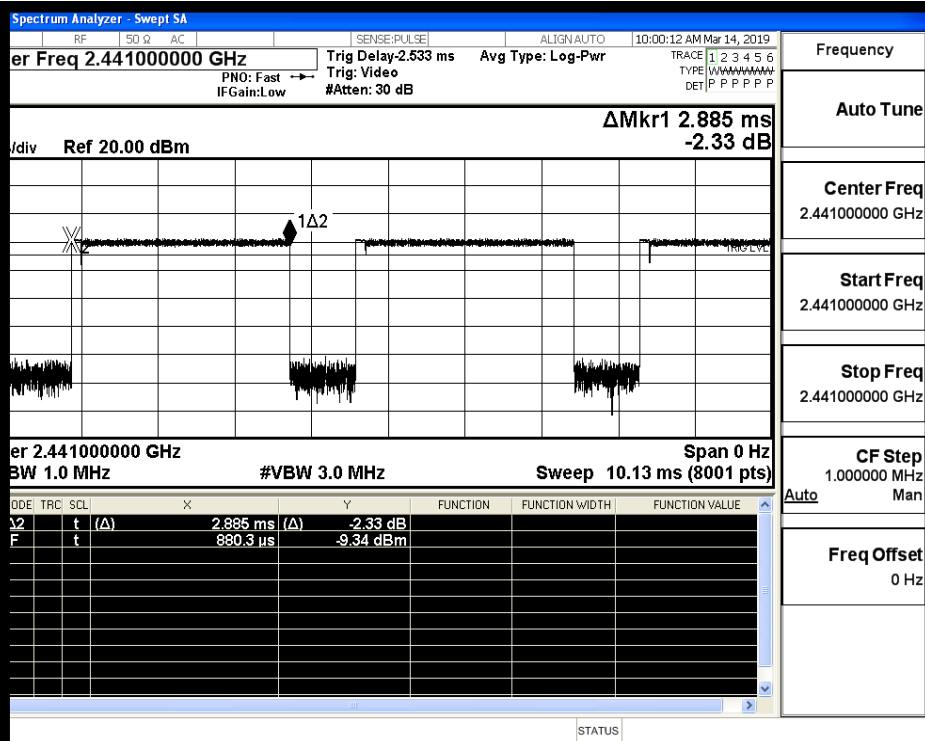
$\pi/4$ DQPSK
_2DH5/HCH



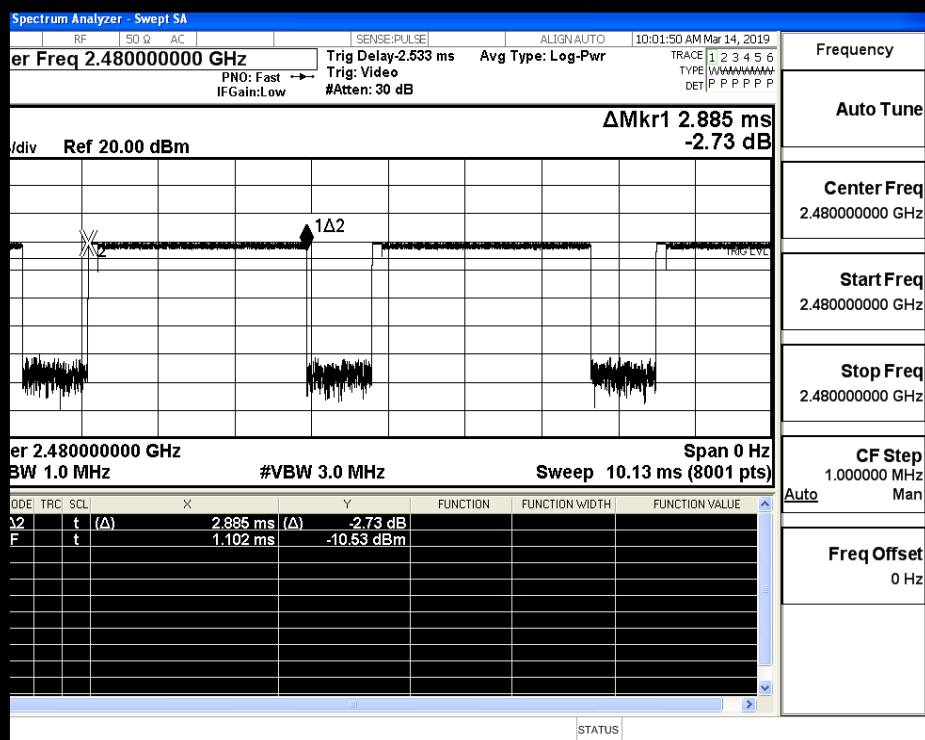
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH



A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.984	-44.542	-20.984	PASS
	MCH	0.099	-44.787	-19.901	PASS
	HCH	-1.36	-44.382	-21.360	PASS
$\pi/4$ DQPSK	LCH	-2.169	-41.336	-22.169	PASS
	MCH	-1.143	-42.668	-21.143	PASS
	HCH	-2.355	-44.554	-22.355	PASS
8DPSK	LCH	-2.715	-44.622	-22.715	PASS
	MCH	-1.052	-43.996	-21.052	PASS
	HCH	-2.335	-45.184	-22.335	PASS

GFSK_LCH_Graphs

Pref

Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE: PULSE ALIGN: AUTO 09:35:04 AM Mar 14, 2019

Center Freq **2.402000000 GHz** #Avg Type: RMS Avg/Hold: 10/10

PNO: Wide → Trig: Free Run #Atten: 30 dB

Ref Offset 8.24 dB Mkr1 **2.402 161 50 GHz**

/div Ref 20.00 dBm **-0.984 dBm**

er 2.402000 GHz Span 2.000 MHz

BW 100 kHz #VBW 300 kHz Sweep 1.067 ms (8001 pts)

STATUS

Frequency

Auto Tune

Center Freq
2.402000000 GHz

Start Freq
2.401000000 GHz

Stop Freq
2.403000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw

Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE: PULSE ALIGN: AUTO 09:35:18 AM Mar 14, 2019

Center Freq **12.515000000 GHz** #Avg Type: RMS Avg/Hold: 2/10

PNO: Fast → Trig: Free Run #Atten: 30 dB

Ref Offset 8.24 dB Mkr2 **24.516 GHz**

/div Ref 20.00 dBm **-44.542 dBm**

30 MHz Stop 25.00 GHz

BW 100 kHz #VBW 300 kHz Sweep 2.387 s (8001 pts)

STATUS

Frequency

Auto Tune

Center Freq
12.515000000 GHz

Start Freq
30.000000 MHz

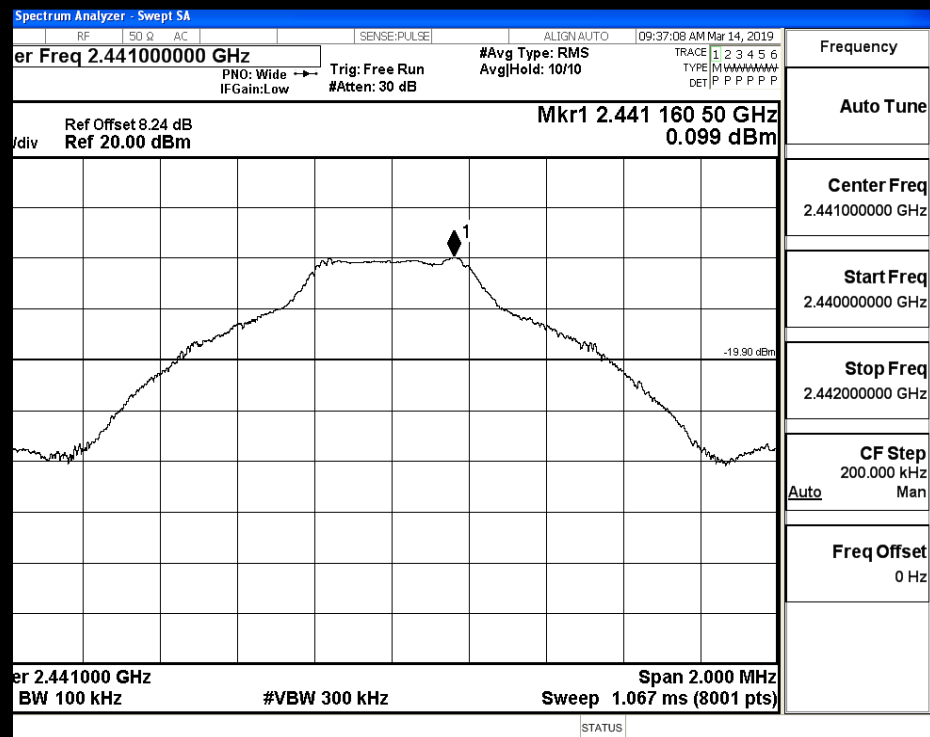
Stop Freq
25.000000000 GHz

CF Step
2.497000000 GHz
Auto Man

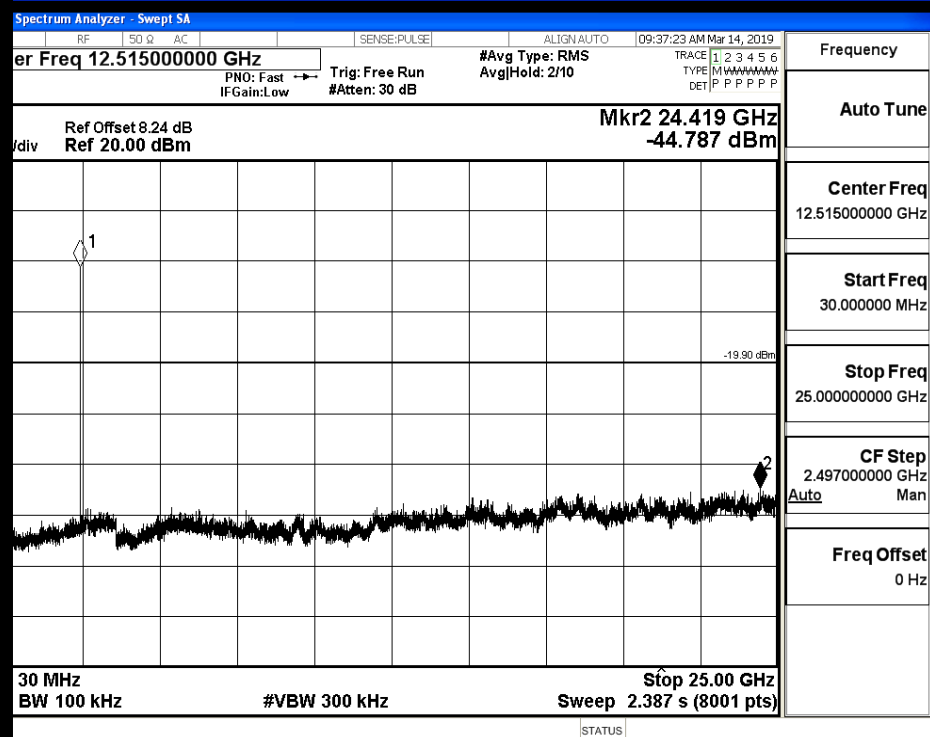
Freq Offset
0 Hz

GFSK_MCH_Graphs

Pref

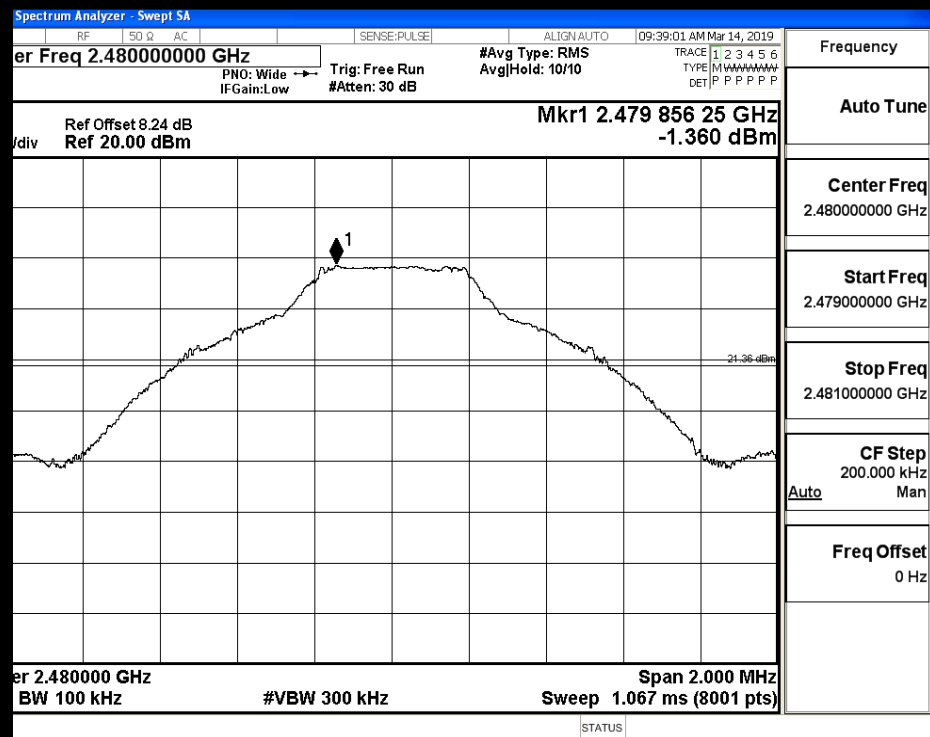


Puw

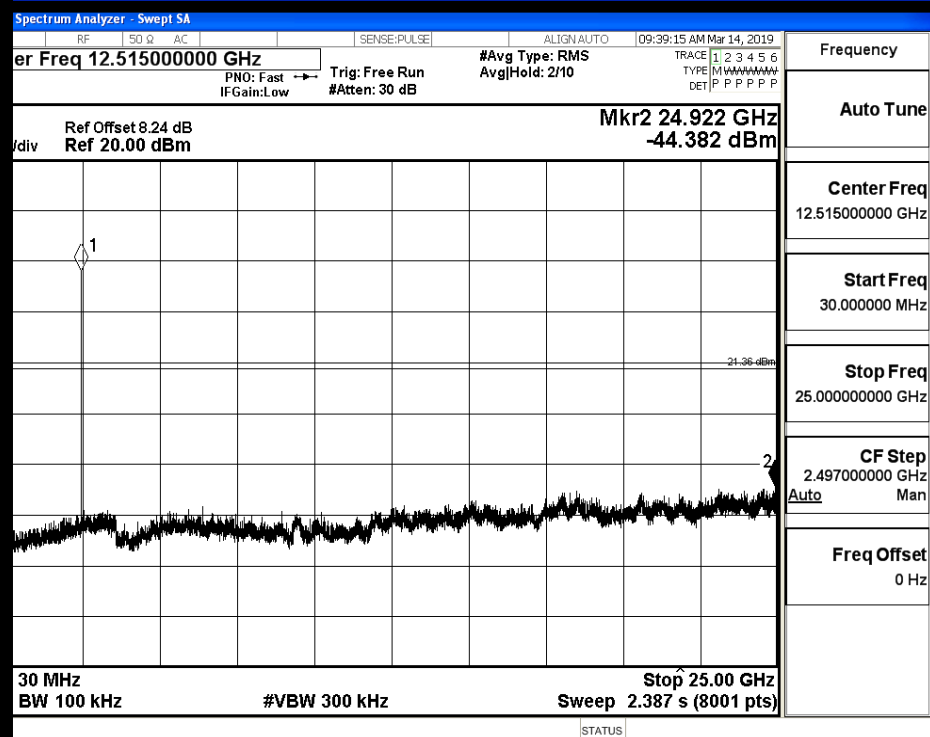


GFSK_HCH_Graphs

Pref

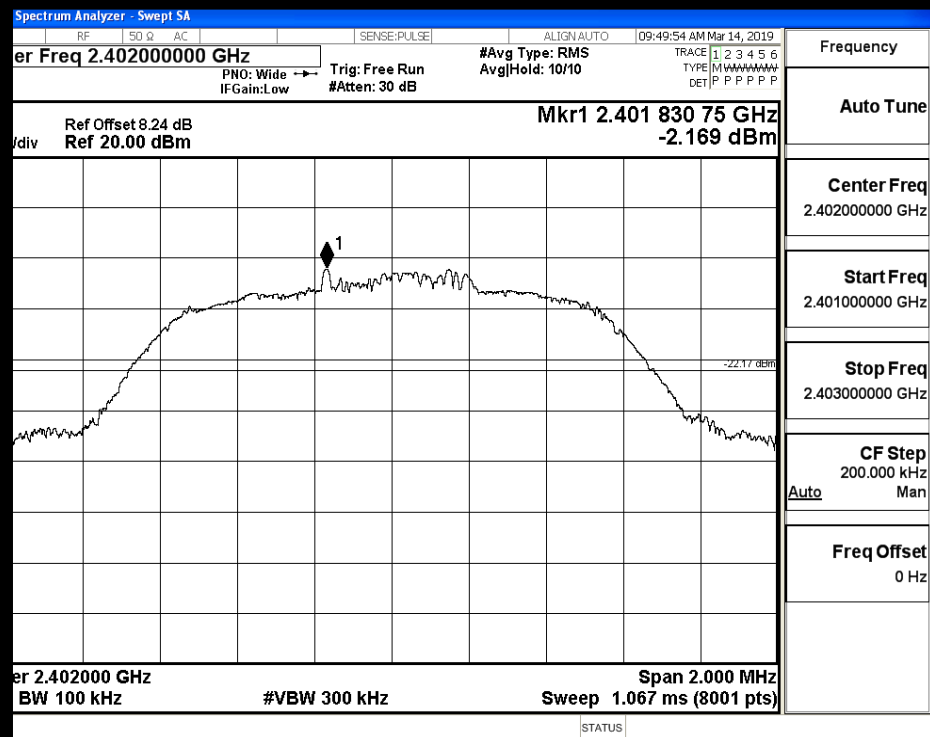


Puw

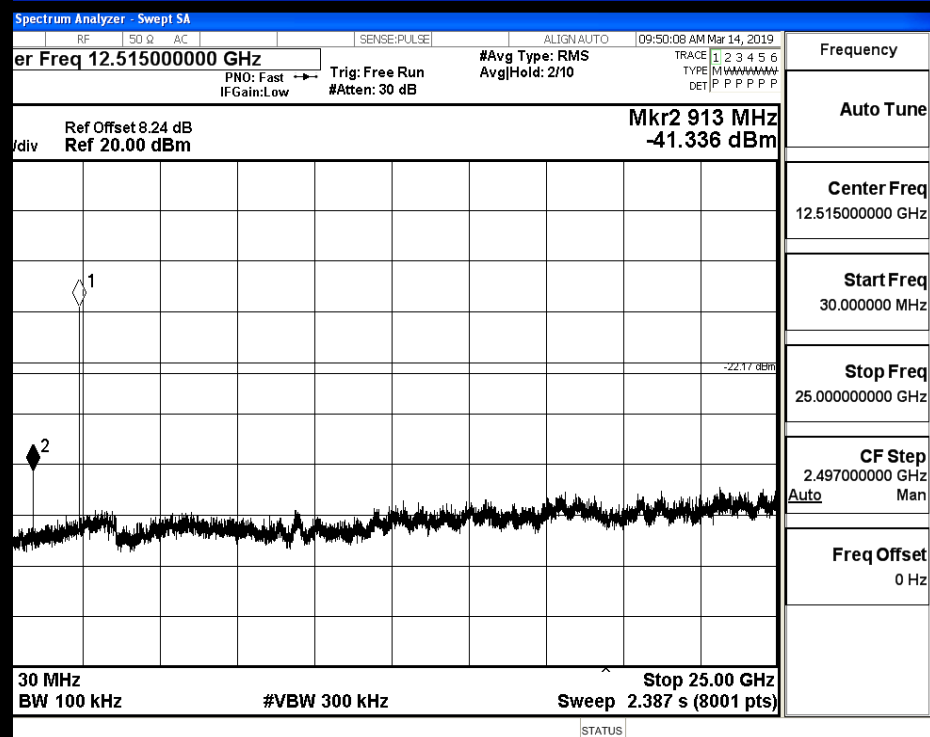


π /4DQPSK_LCH_Graphs

Pref

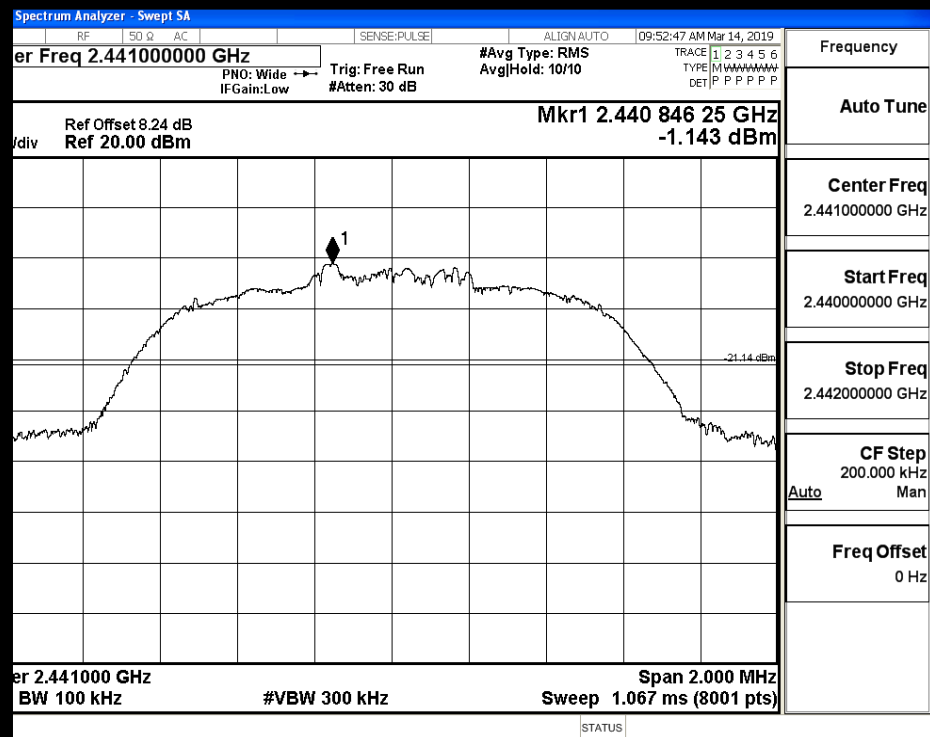


Puw

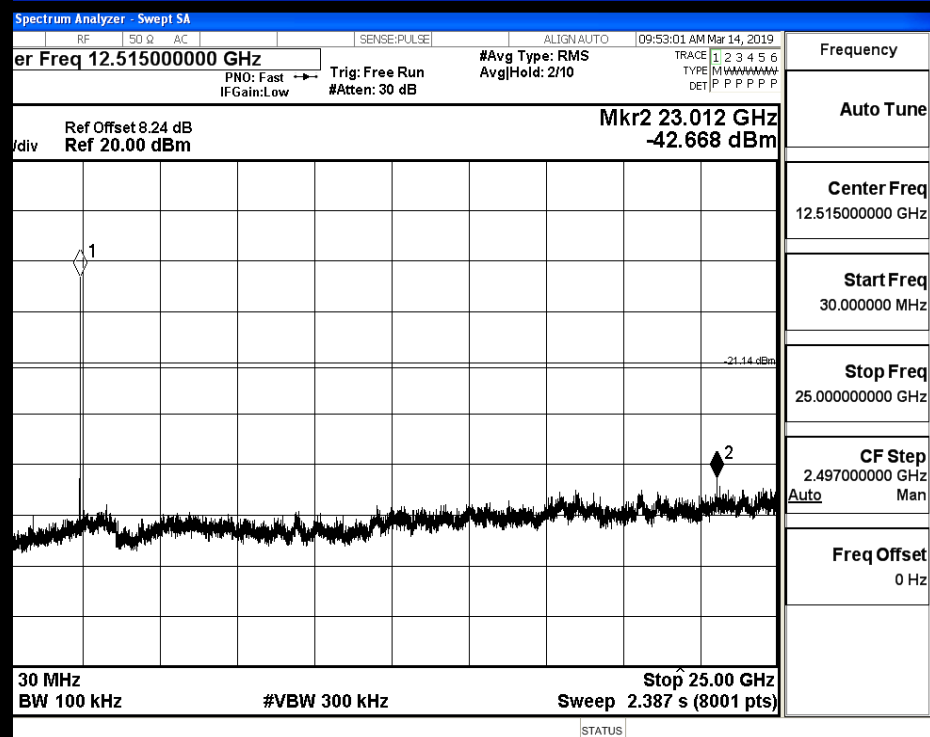


π /4DQPSK_MCH_Graphs

Pref

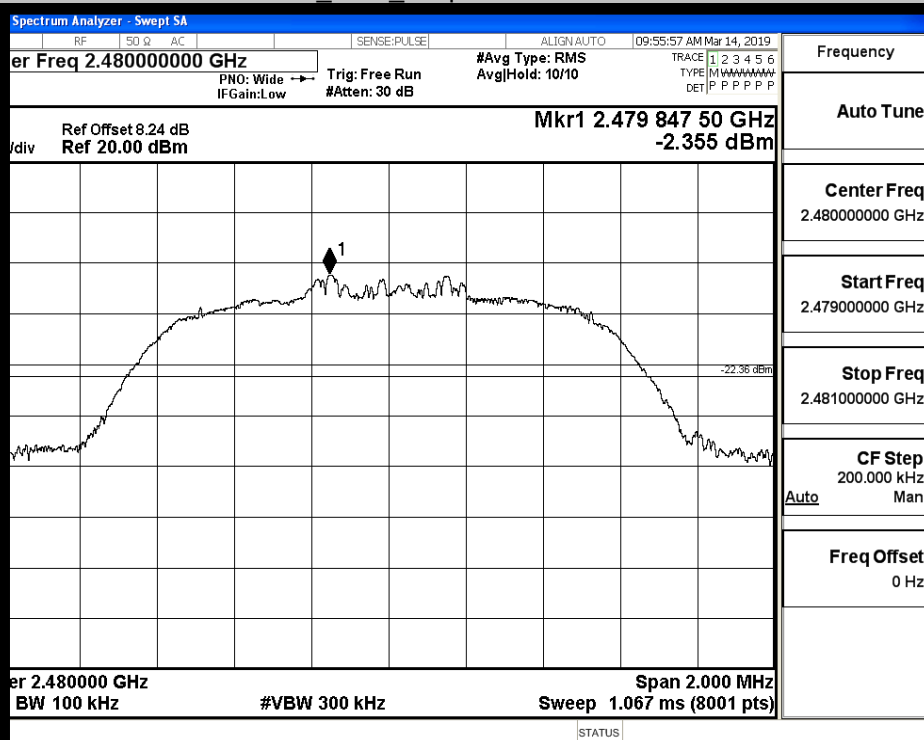


Puw

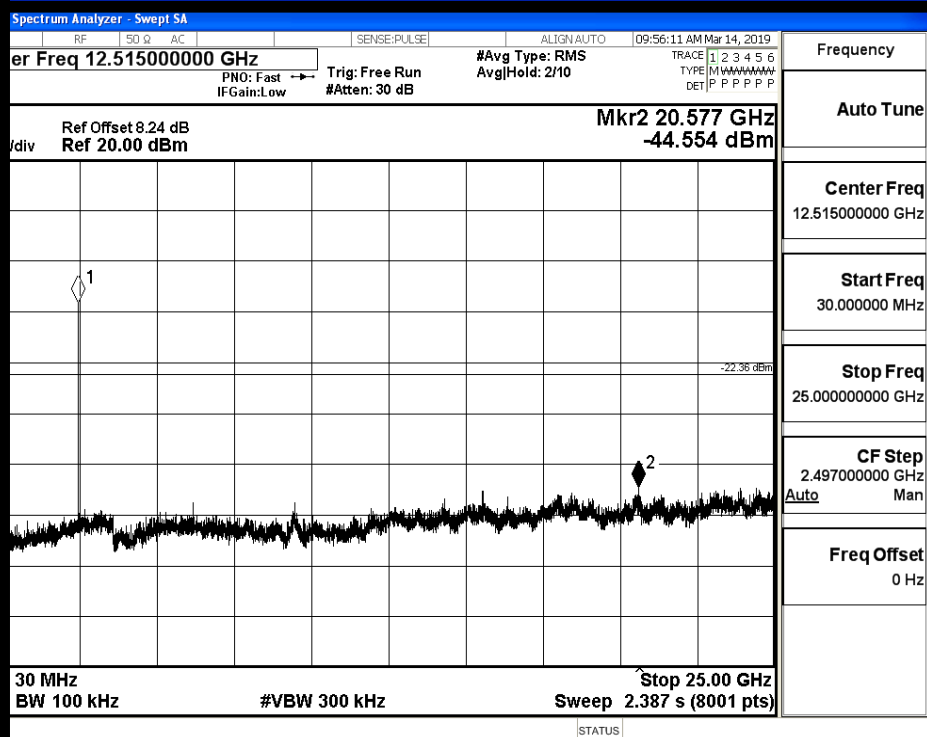


π /4DQPSK_HCH_Graphs

Pref

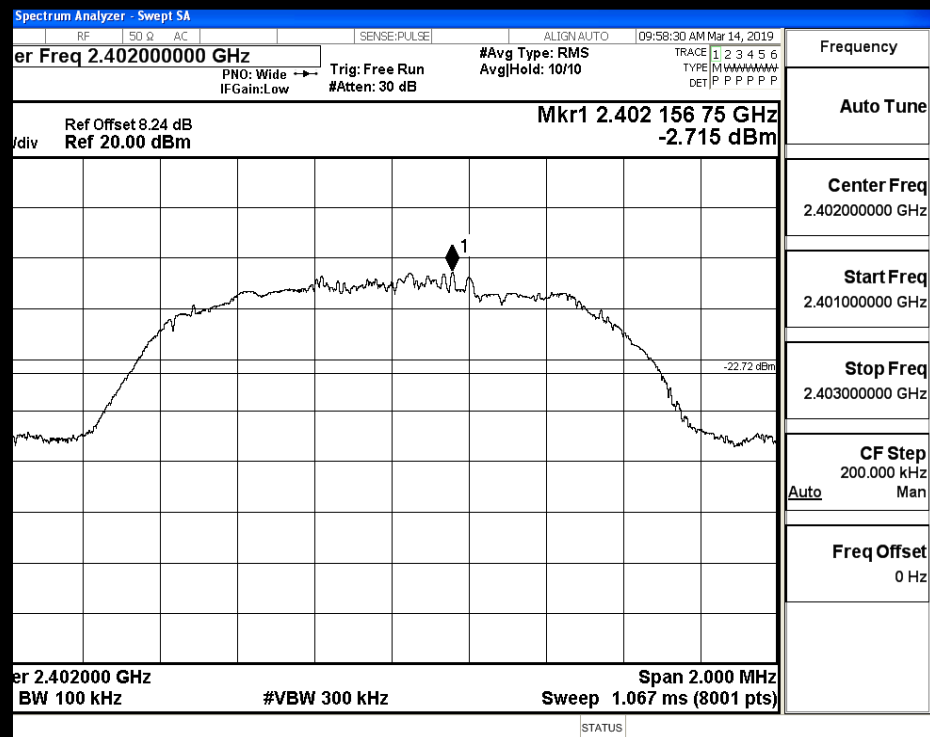


Puw

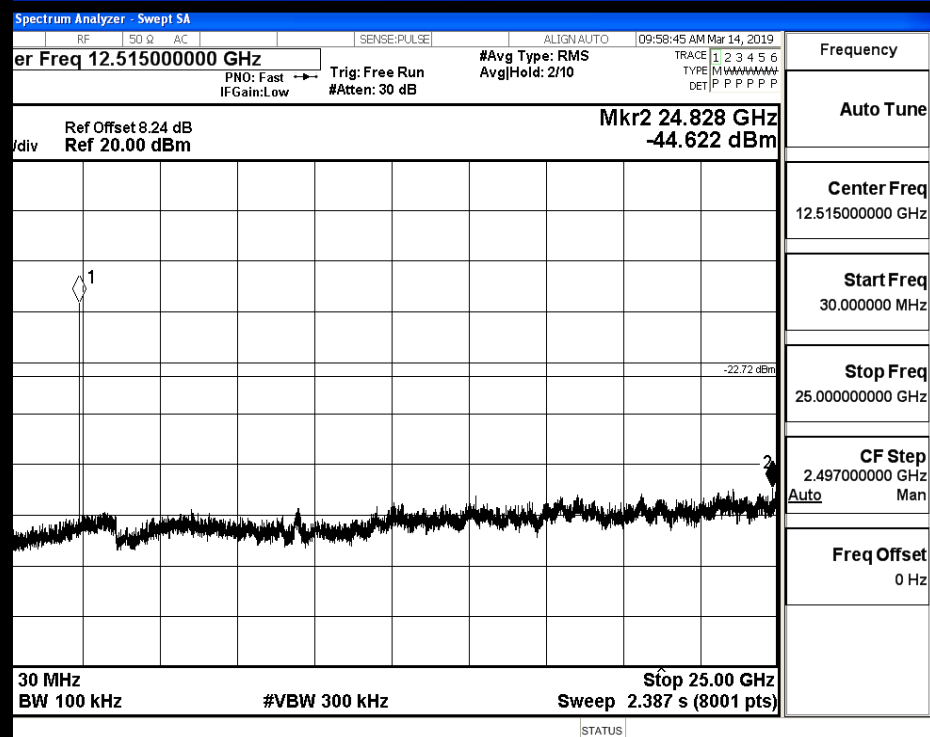


8DPSK_LCH_Graphs

Pref

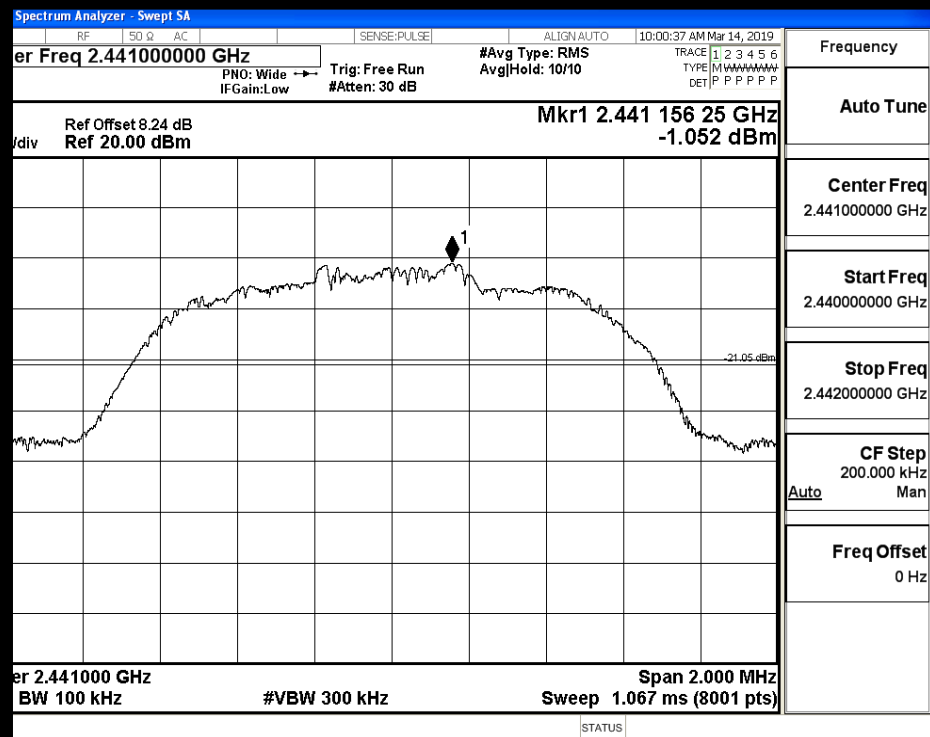


Puw

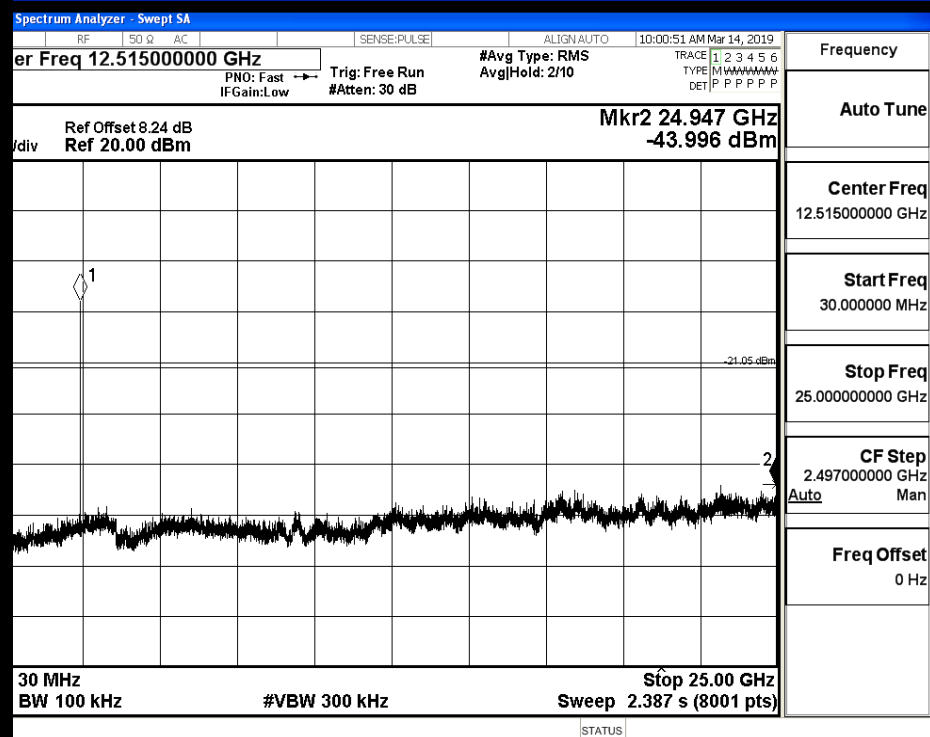


8DPSK_MCH_Graphs

Pref

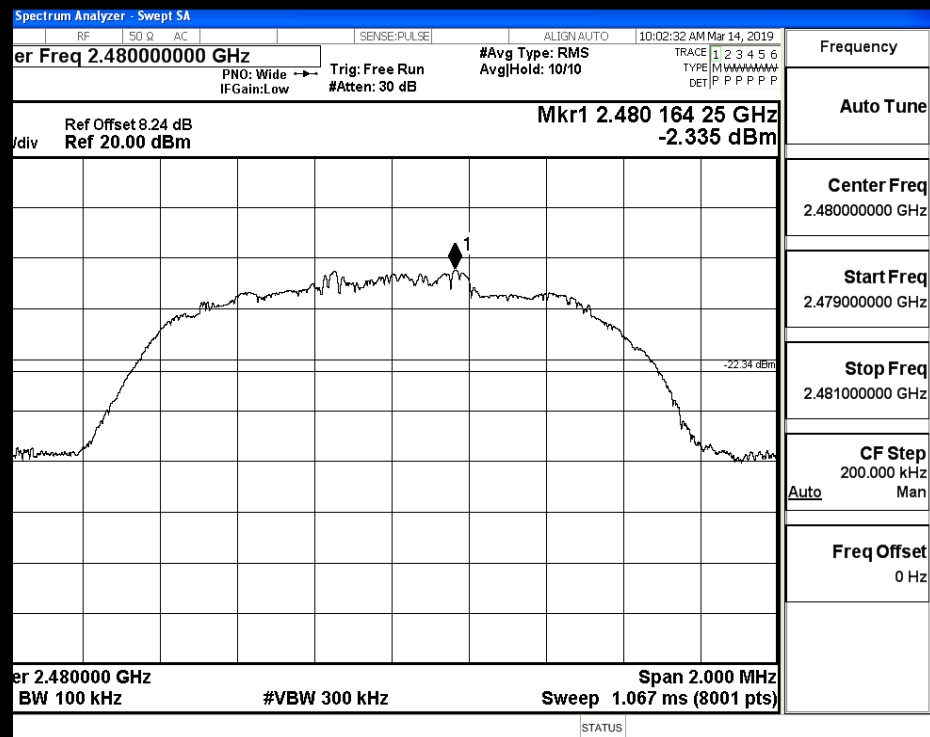


Puw

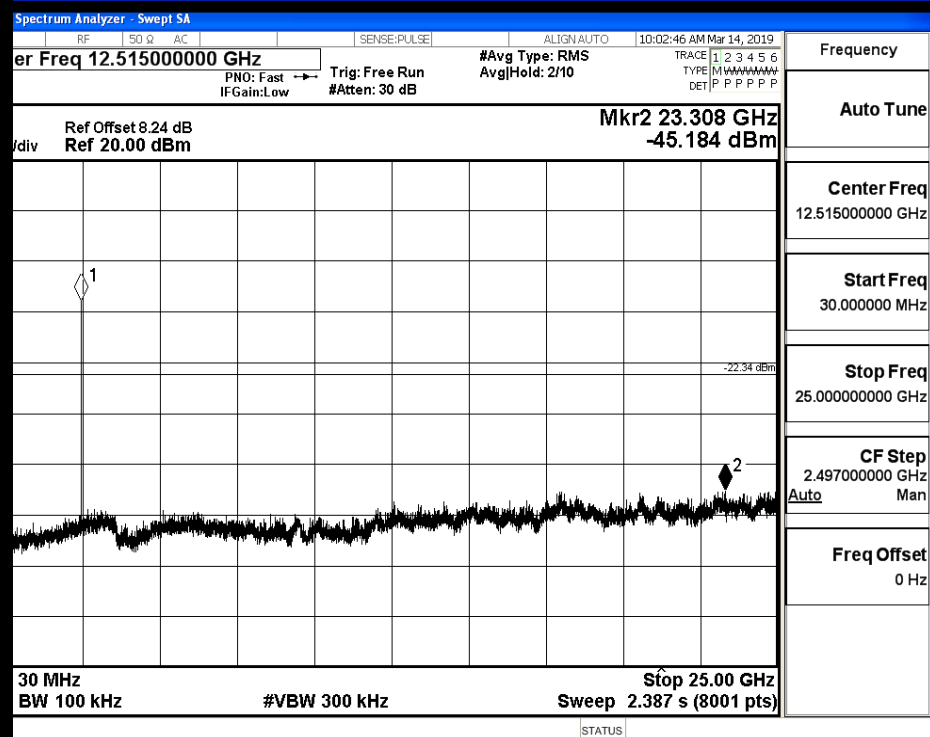


8DPSK_HCH_Graphs

Pref



Puw

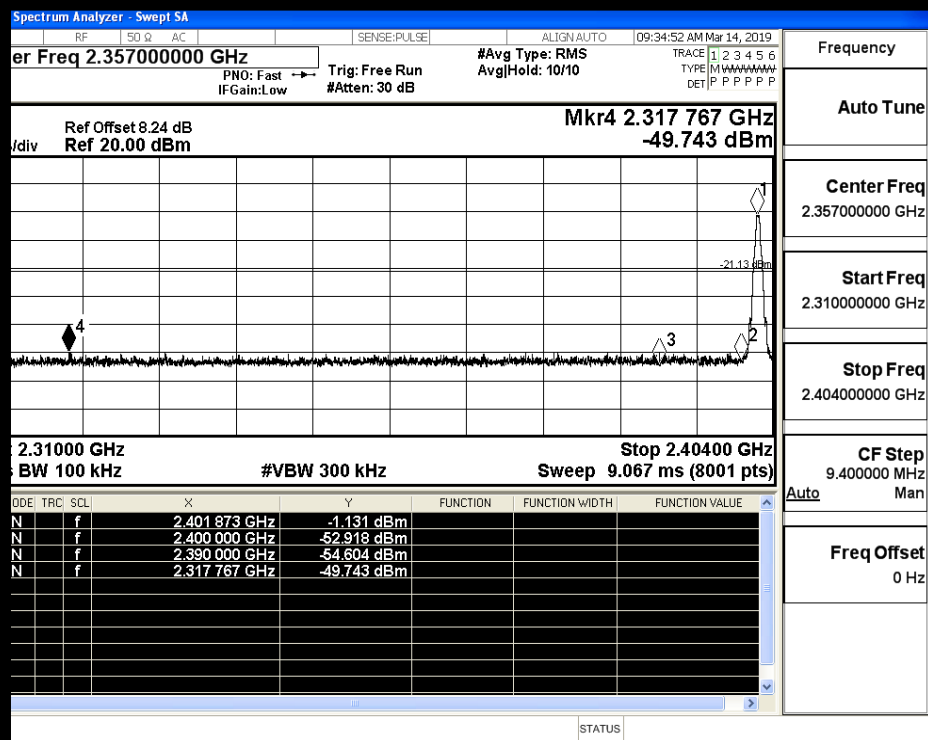


A.7 Band-edge for RF Conducted Emissions

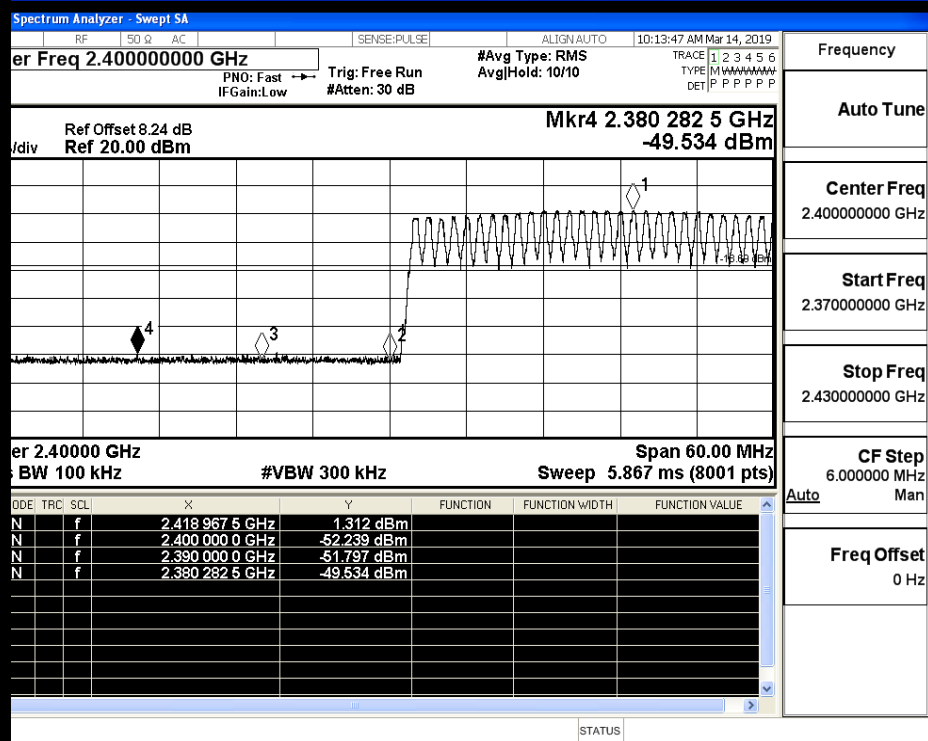
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.131	Off	-49.743	-21.13	PASS
			1.312	On	-49.534	-18.69	PASS
	HCH	2480	-0.990	Off	-49.755	-20.99	PASS
			1.568	On	-49.231	-18.43	PASS
$\pi/4$ DQPSK	LCH	2402	-2.323	Off	-49.967	-22.32	PASS
			0.220	On	-49.009	-19.78	PASS
	HCH	2480	-2.261	Off	-49.527	-22.26	PASS
			-0.115	On	-48.707	-20.12	PASS
8DPSK	LCH	2402	-2.130	Off	-49.901	-22.13	PASS
			0.224	On	-49.814	-19.78	PASS
	HCH	2480	-2.502	Off	-49.452	-22.5	PASS
			0.311	On	-48.661	-19.69	PASS

Test Graphs

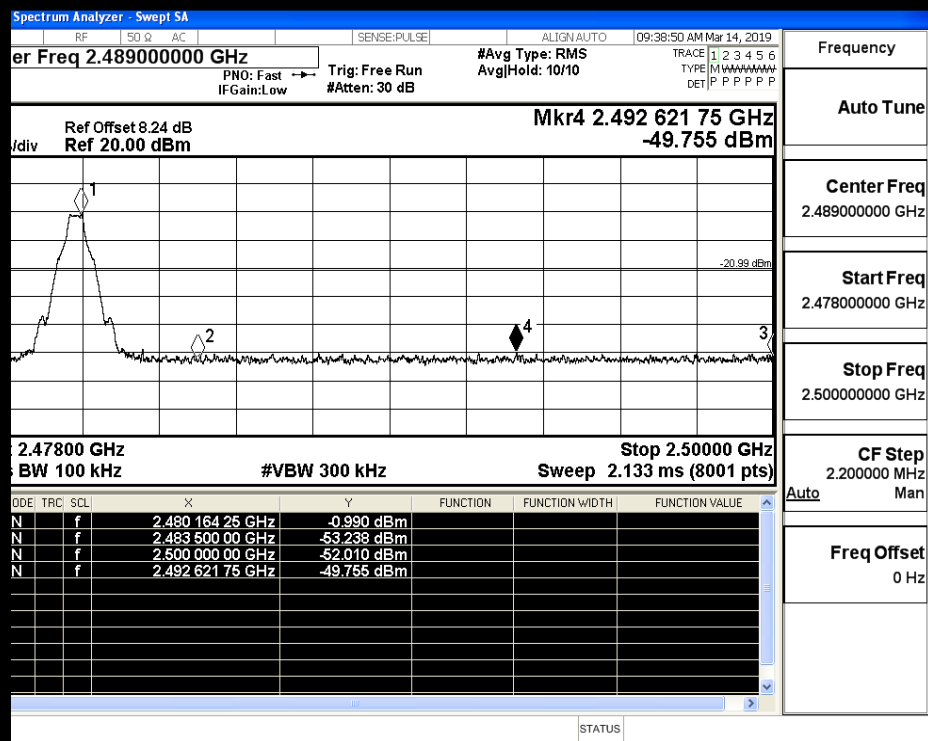
GFSK/LCH/No Hop



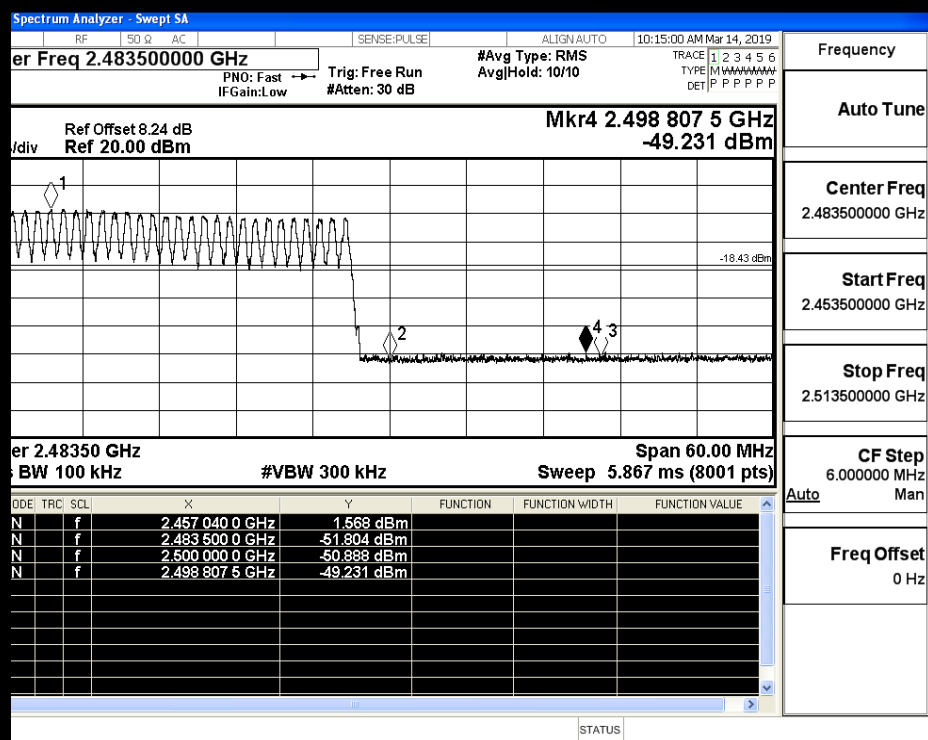
GFSK/LCH/Hop



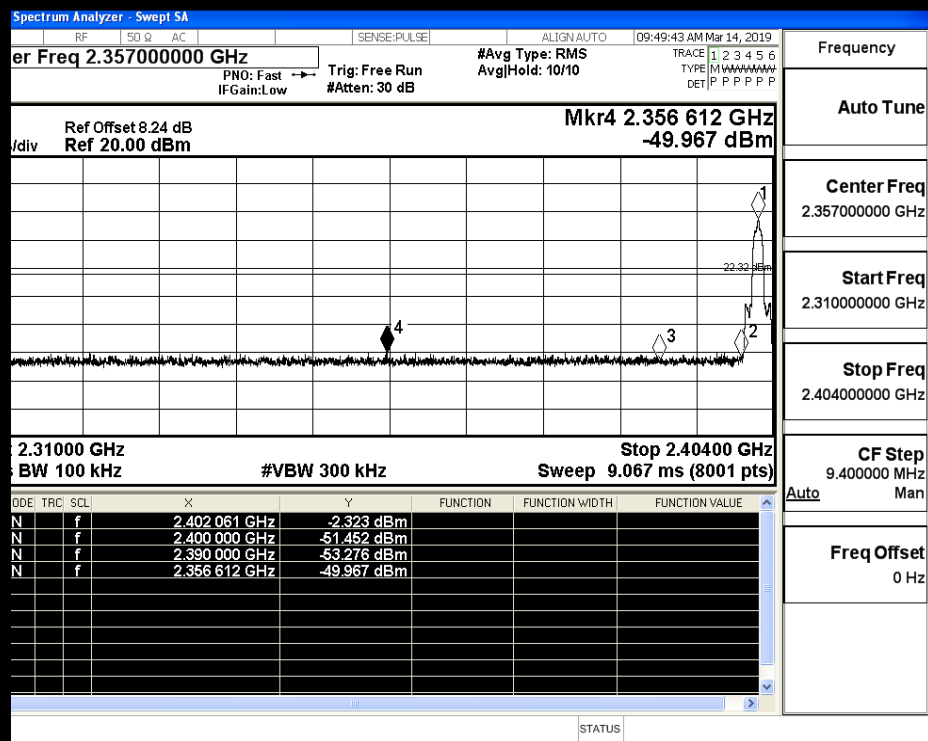
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

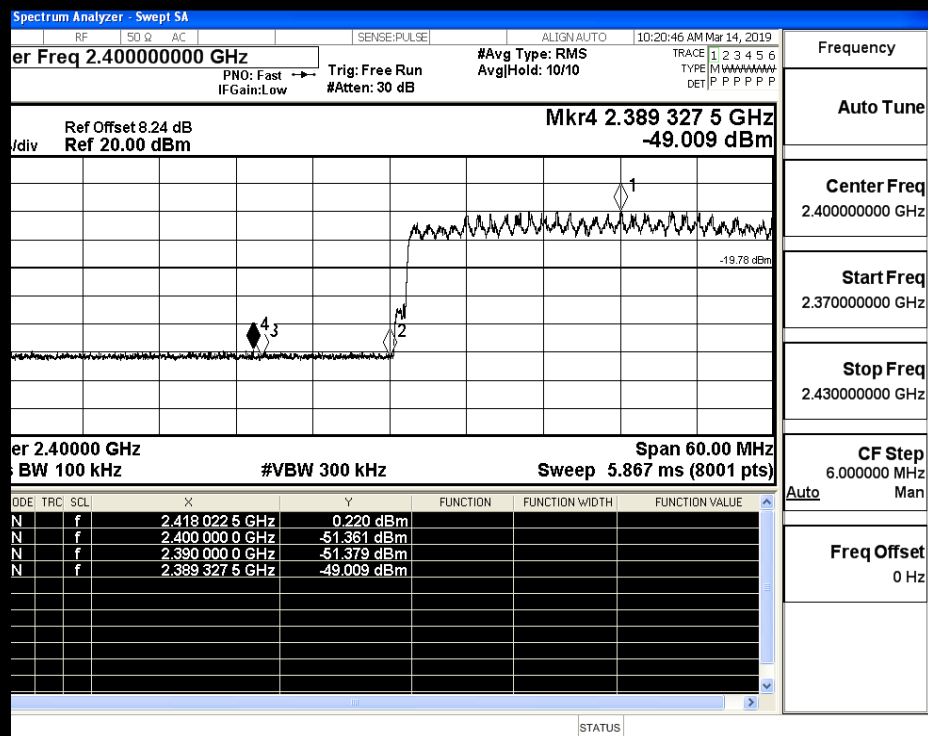
Start Freq
2.310000000 GHz

Stop Freq
2.404000000 GHz

CF Step
9.400000 MHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH/Hop



Frequency

Auto Tune

Center Freq
2.400000000 GHz

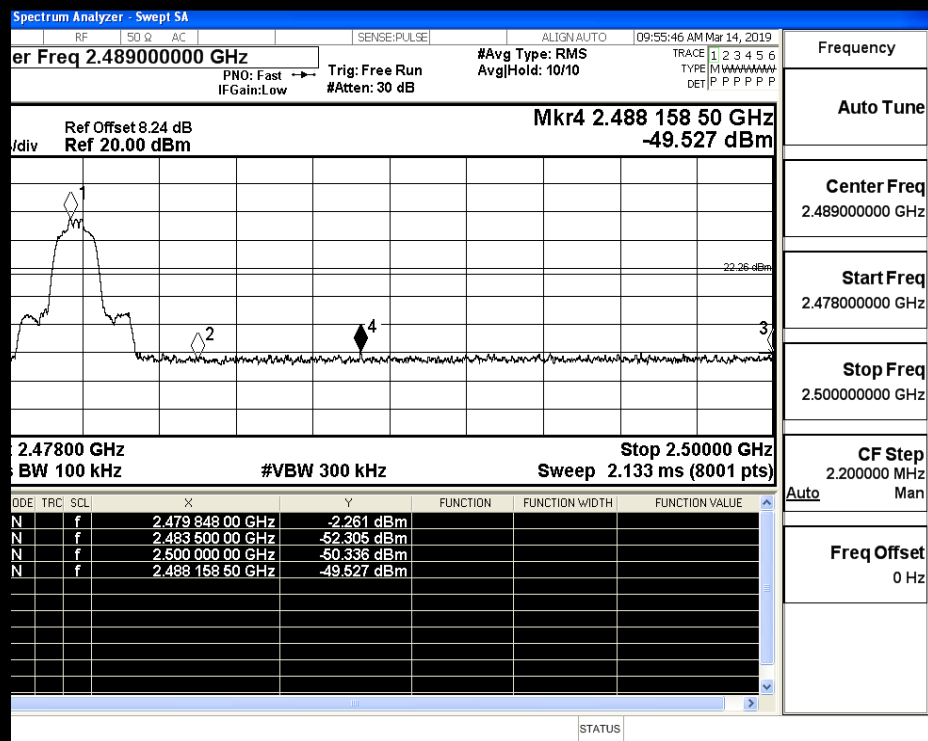
Start Freq
2.370000000 GHz

Stop Freq
2.430000000 GHz

CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

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



Frequency

Auto Tune

Center Freq
2.489000000 GHz

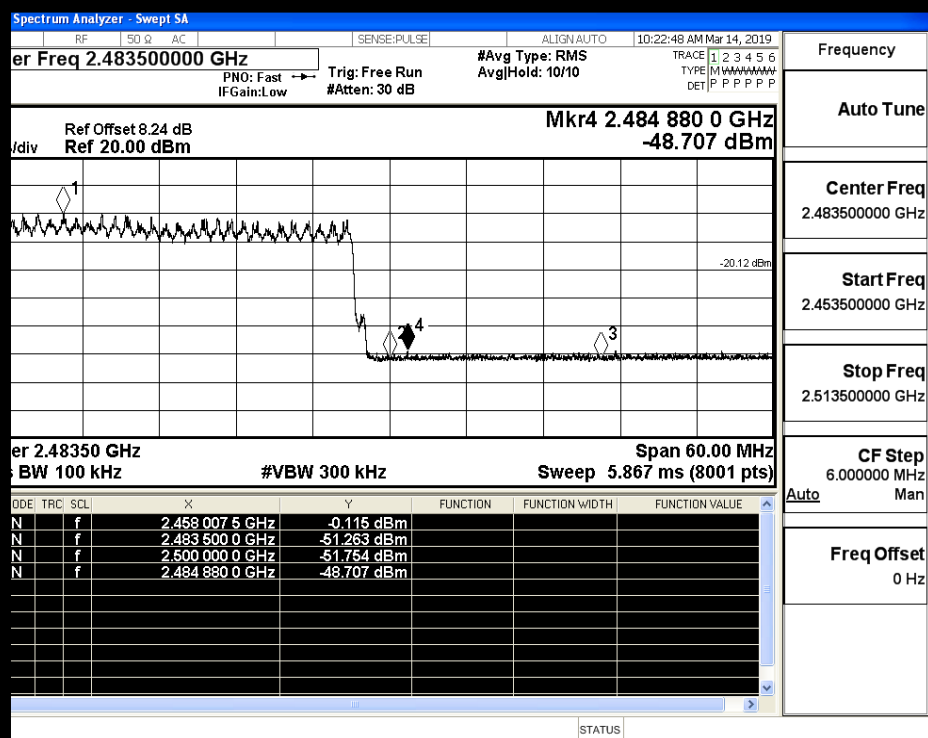
Start Freq
2.478000000 GHz

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

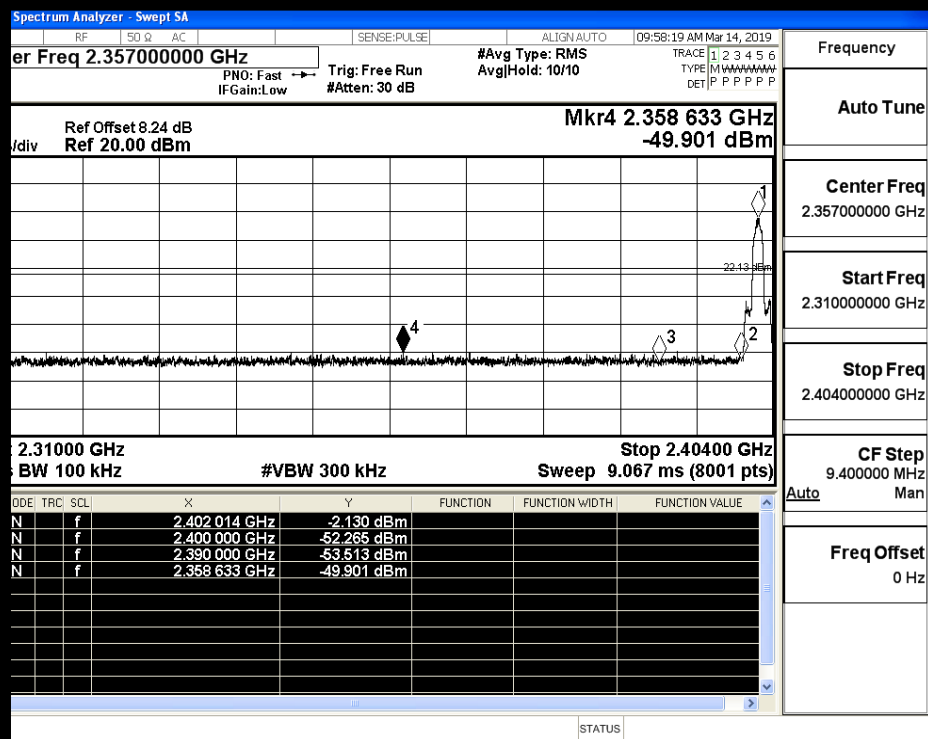
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

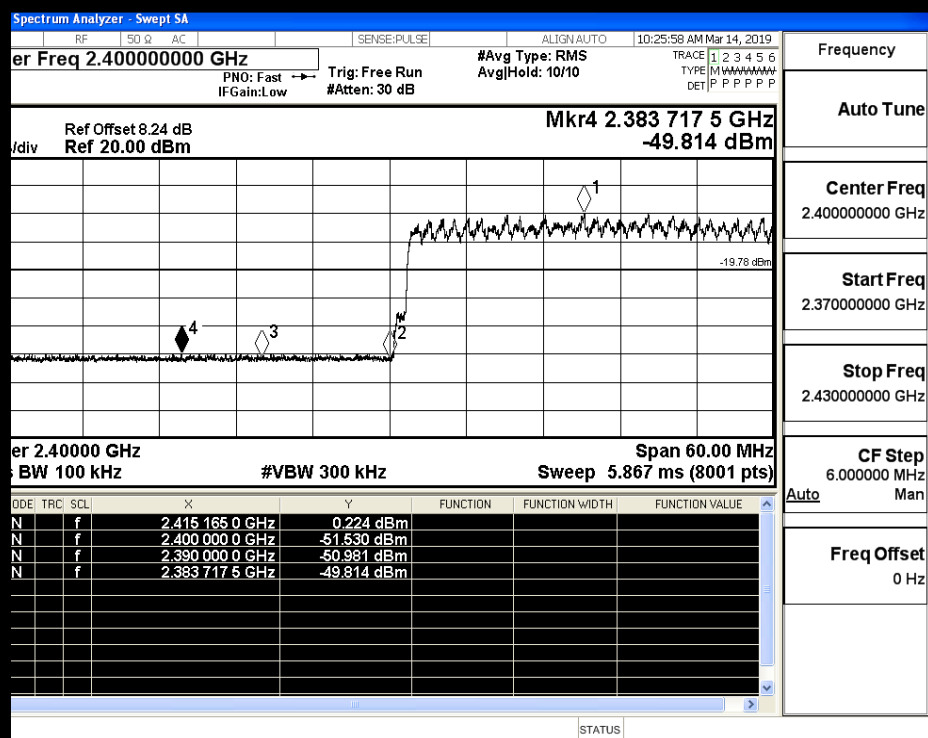
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

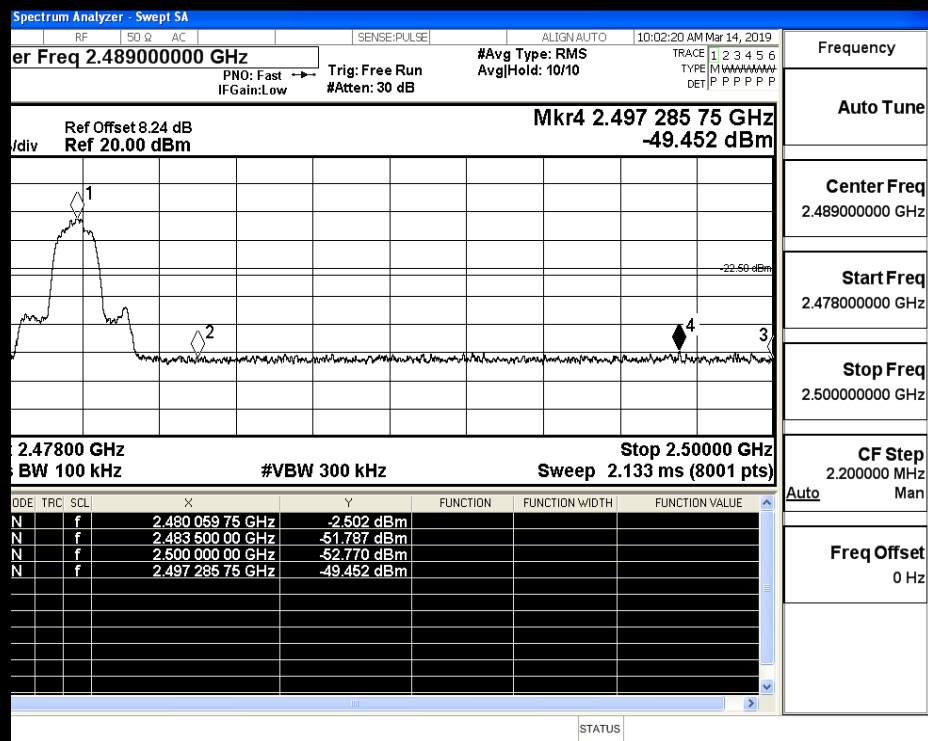
8DPSK/LCH/No Hop



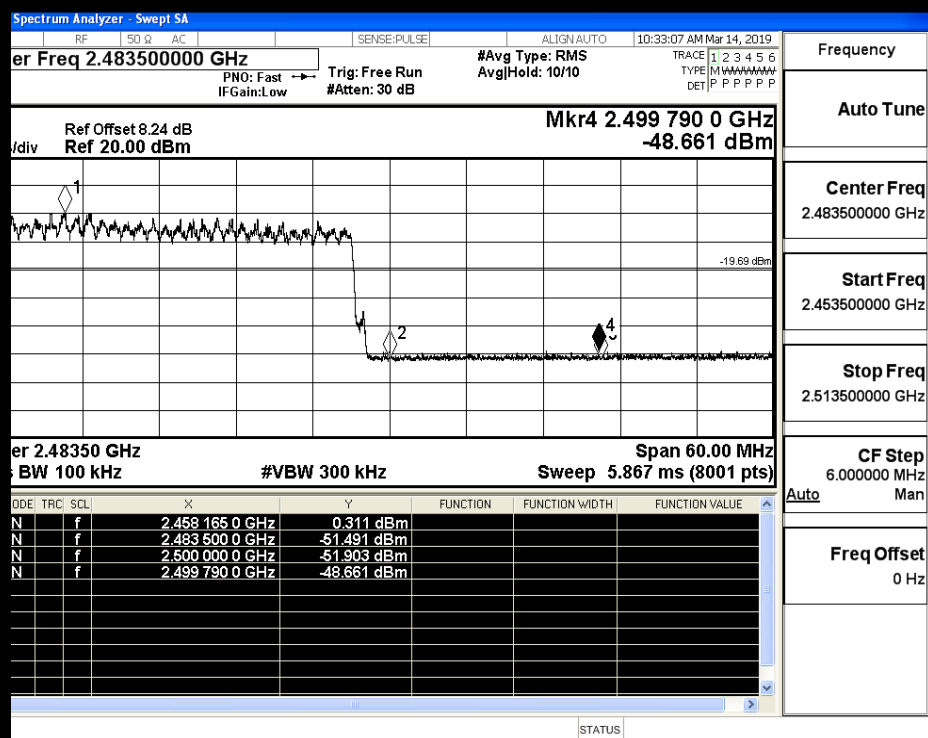
8DPSK/LCH/Hop



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	-43.55	2.0	0	53.71	PEAK	74	PASS
	Off	2310.0	-53.59	2.0	0	43.66	AV	54	PASS
	Off	2390.0	-42.41	2.0	0	54.85	PEAK	74	PASS
	Off	2390.0	-53.28	2.0	0	43.98	AV	54	PASS
	Off	2483.5	-41.26	2.0	0	56.00	PEAK	74	PASS
	Off	2483.5	-53.03	2.0	0	44.23	AV	54	PASS
	Off	2500.0	-42.52	2.0	0	54.74	PEAK	74	PASS
	Off	2500.0	-52.90	2.0	0	44.36	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.23	2.0	0	55.03	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	43.79	AV	54	PASS
	Off	2390.0	-43.35	2.0	0	53.91	PEAK	74	PASS
	Off	2390.0	-53.25	2.0	0	44.01	AV	54	PASS
	Off	2483.5	-42.35	2.0	0	54.91	PEAK	74	PASS
	Off	2483.5	-53.02	2.0	0	44.24	AV	54	PASS
	Off	2500.0	-41.90	2.0	0	55.35	PEAK	74	PASS
	Off	2500.0	-53.04	2.0	0	44.22	AV	54	PASS
8DPSK	Off	2310.0	-43.52	2.0	0	53.74	PEAK	74	PASS
	Off	2310.0	-53.56	2.0	0	43.70	AV	54	PASS
	Off	2390.0	-43.78	2.0	0	53.48	PEAK	74	PASS
	Off	2390.0	-53.18	2.0	0	44.08	AV	54	PASS
	Off	2483.5	-42.39	2.0	0	54.87	PEAK	74	PASS
	Off	2483.5	-52.89	2.0	0	44.37	AV	54	PASS
	Off	2500.0	-39.81	2.0	0	57.45	PEAK	74	PASS
	Off	2500.0	-52.96	2.0	0	44.30	AV	54	PASS

Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 09:35:36 AM Mar 14, 2019

er Freq 2.35200000 GHz

PNO: Fast → Trig: Free Run Avg Type: Log-Pwr
IFGain: Low #Atten: 30 dB AvgHld: 10/10

TRACE 1 2 3 4 5 6
TYPE M W X Y Z
DET P P P P P P

Frequency

Auto Tune

Center Freq
2.35200000 GHz

Start Freq
2.30000000 GHz

Stop Freq
2.40400000 GHz

CF Step
10.400000 MHz

Freq Offset
0 Hz

Ref Offset 8.24 dB
Ref 20.00 dBm

Mkr3 2.390 000 GHz
-42.407 dBm

2 3

2.30000 GHz
BW 1.0 MHz

#VBW 3.0 MHz

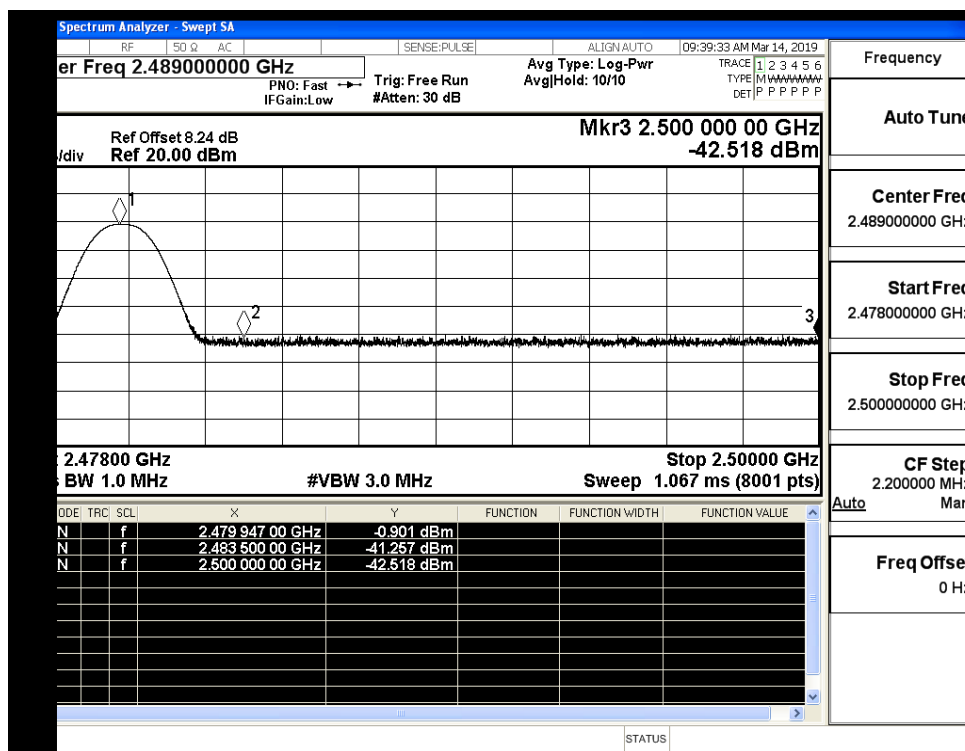
Stop 2.40400 GHz
Sweep 1.067 ms (8001 pts)

ODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
N	f		2.402 193 GHz	-0.862 dBm			
N	f		2.310 000 GHz	-43.550 dBm			
N	f		2.390 000 GHz	-42.407 dBm			

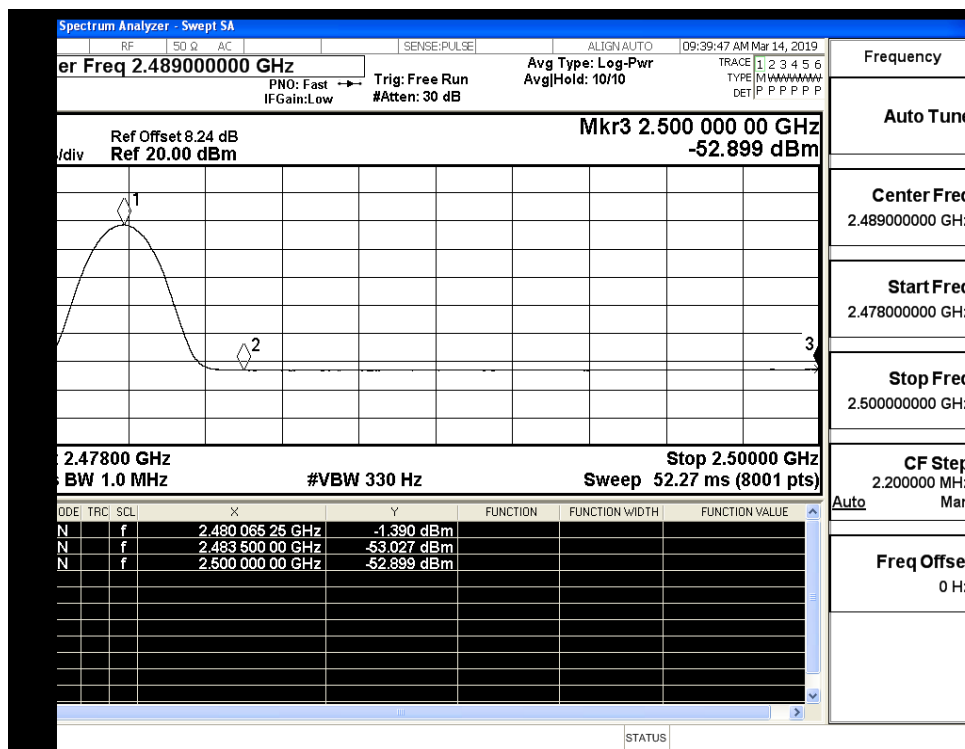
STATUS

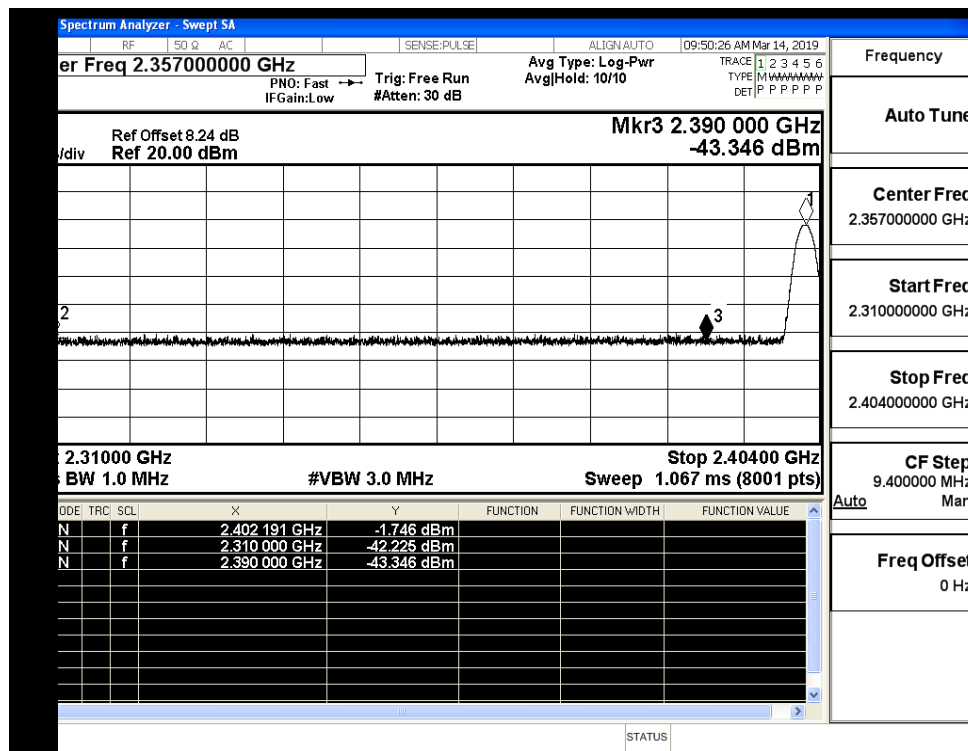
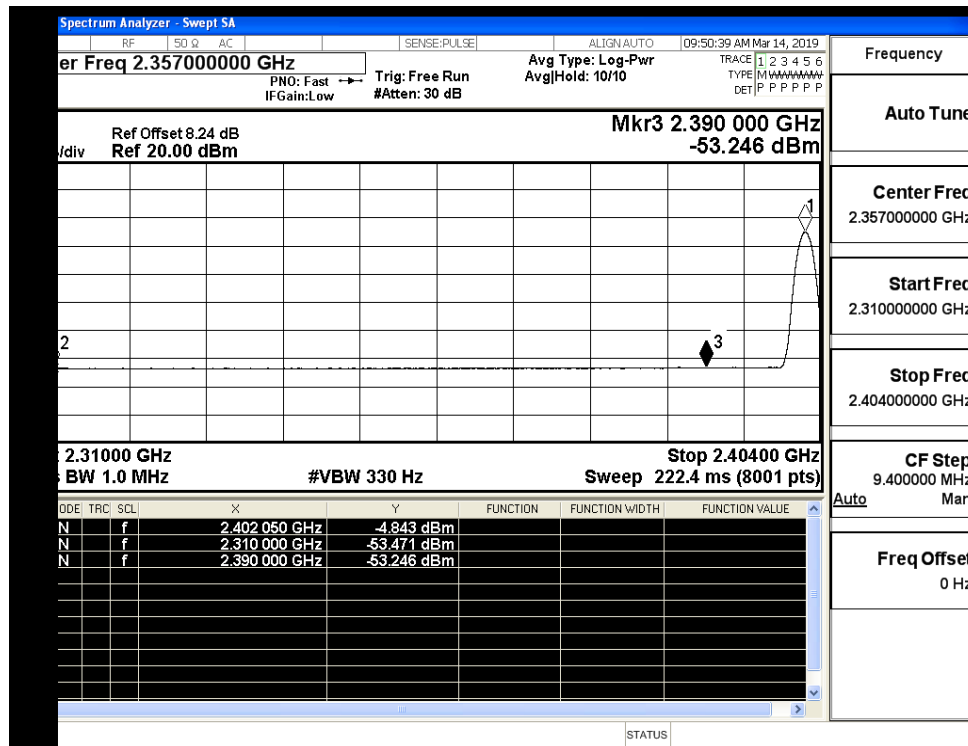
[illegible]

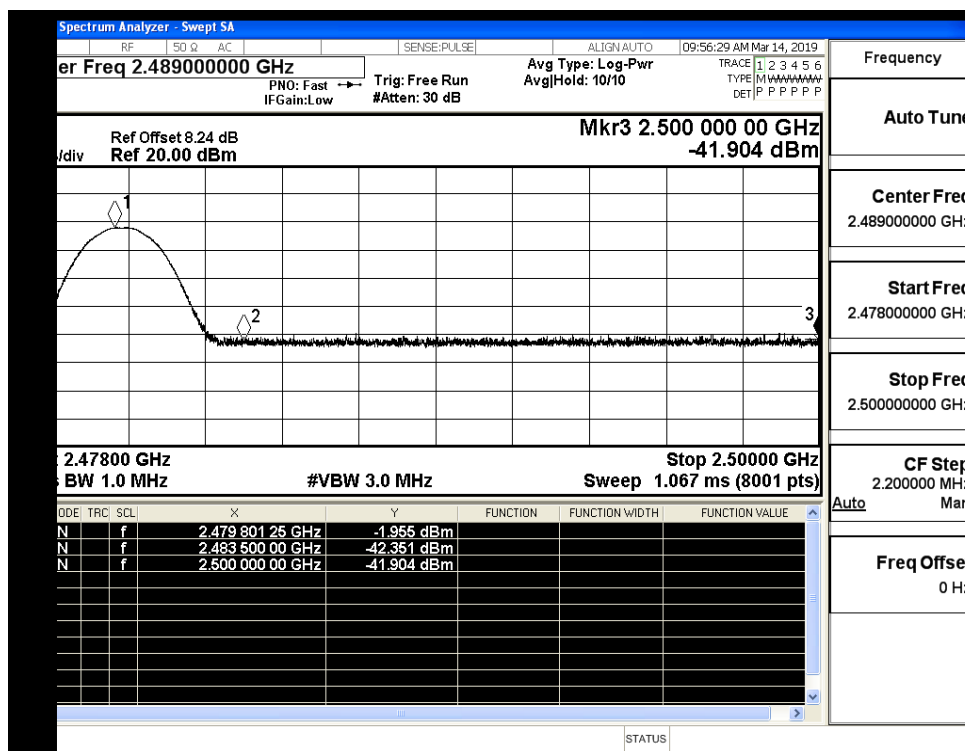
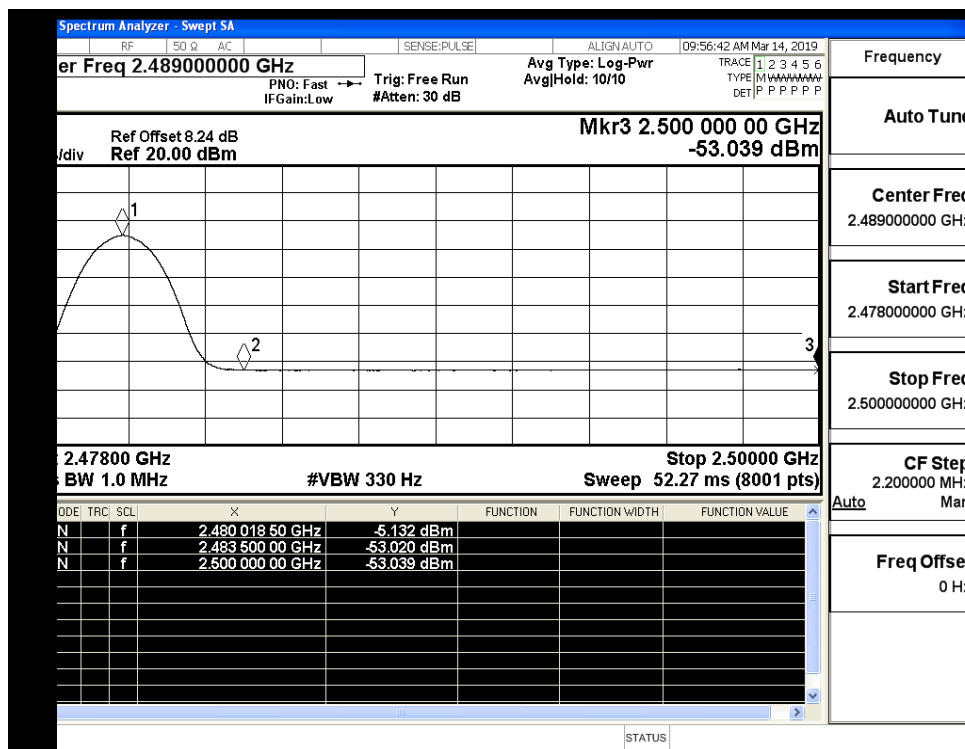
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



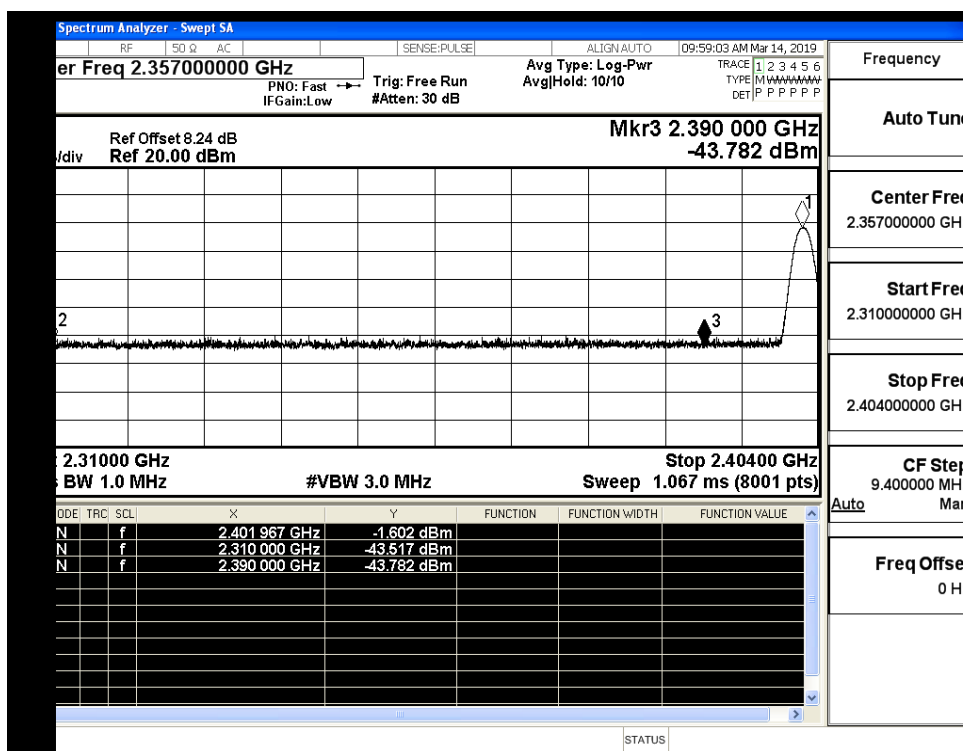
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



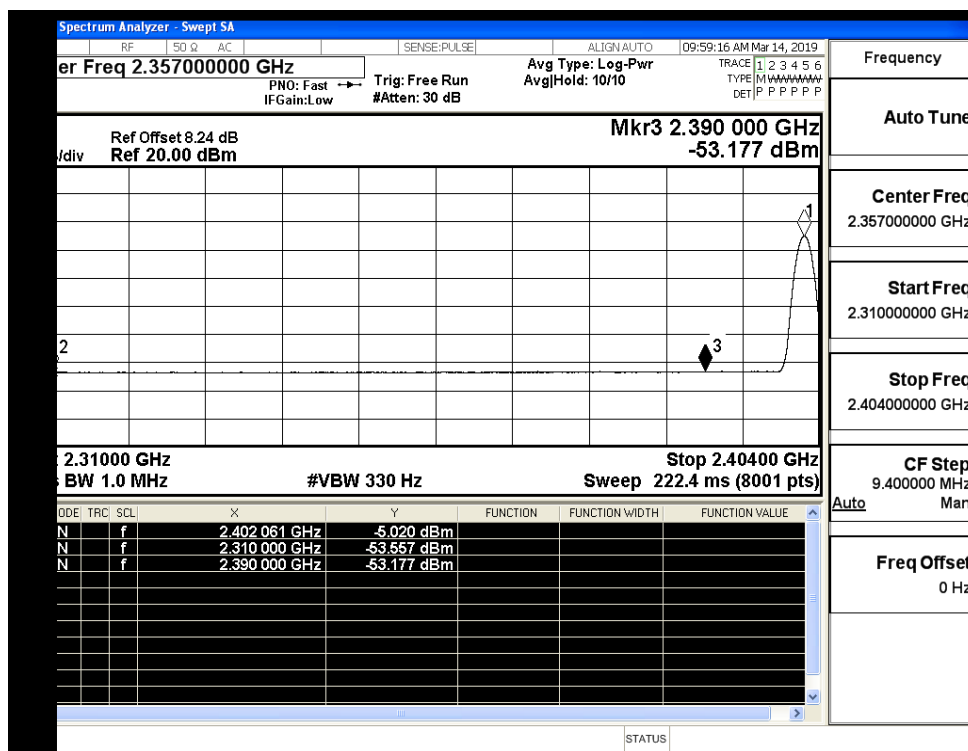
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

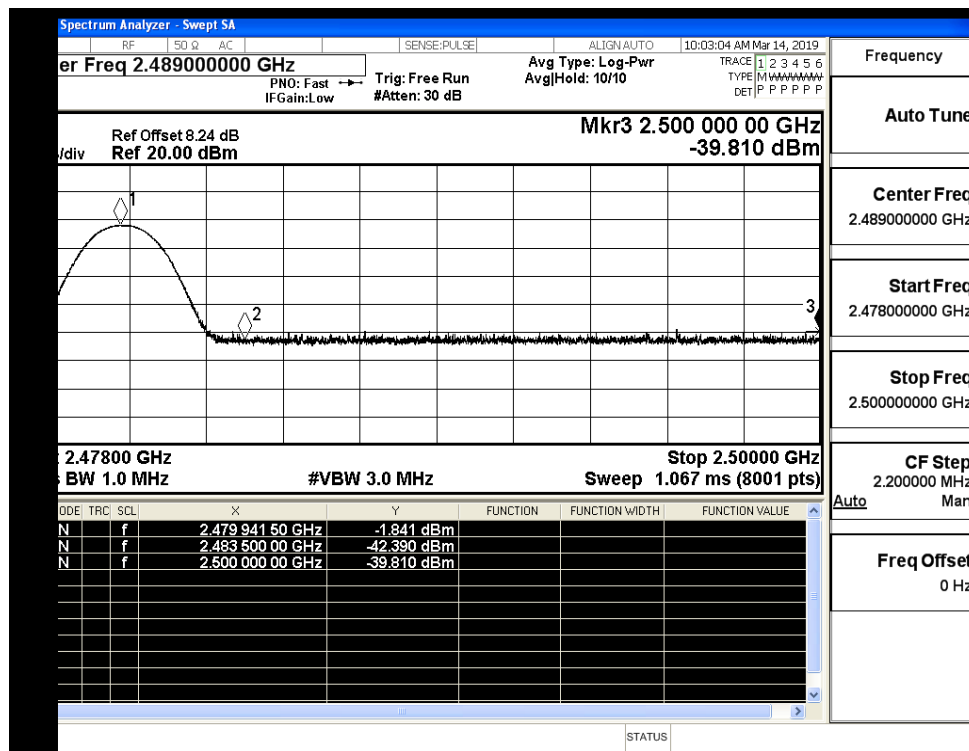
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

