

Appendix A

RF Test Data for BT V4.0(BDR/EDR) (Conducted Measurement)

Product Name: Projector

Trade Mark: N/A

Test Model: F-701

Environmental Conditions

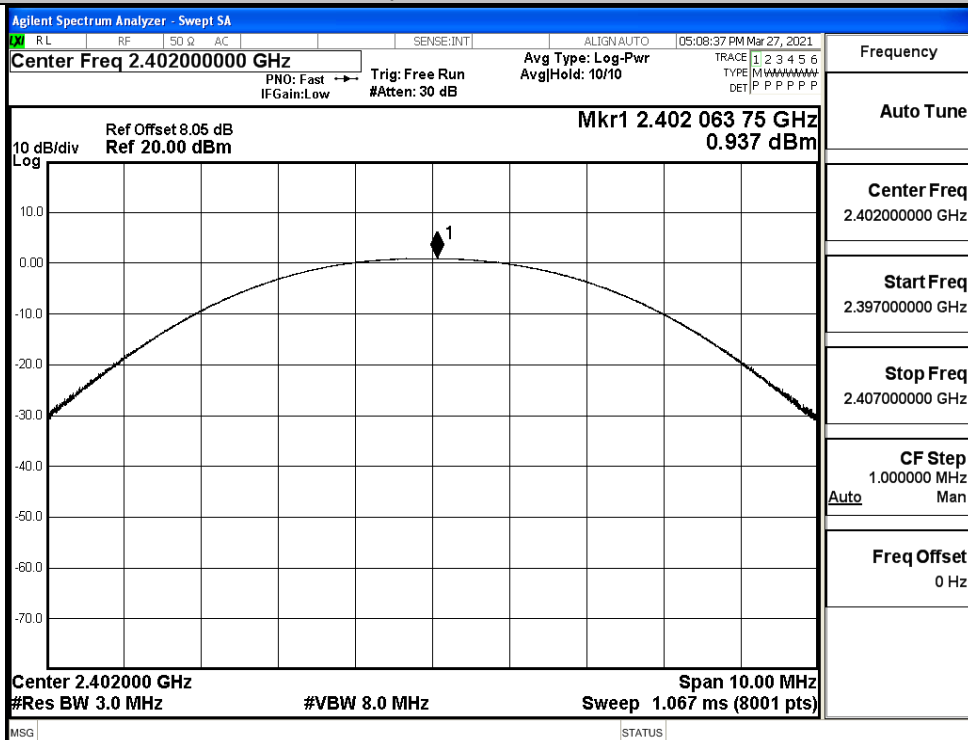
Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond Lu
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

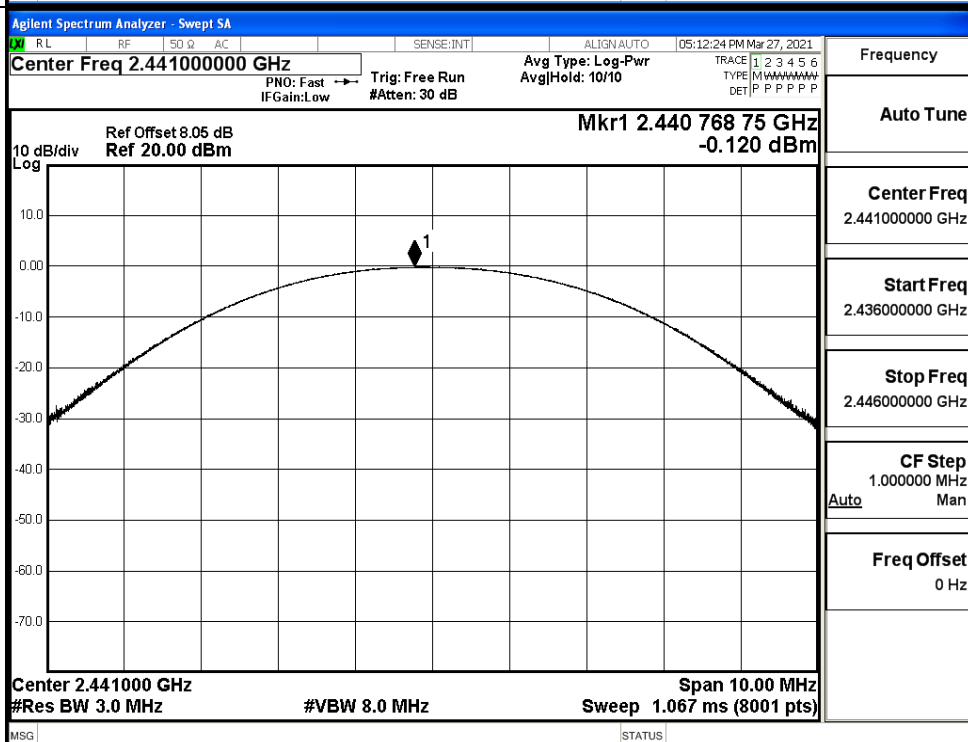
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.937	21	PASS
	MCH	-0.120	21	PASS
	HCH	-0.247	21	PASS
$\pi/4$ DQPSK	LCH	0.073	21	PASS
	MCH	1.979	21	PASS
	HCH	2.006	21	PASS
8DPSK	LCH	0.579	21	PASS
	MCH	2.460	21	PASS
	HCH	2.354	21	PASS

Test Graphs

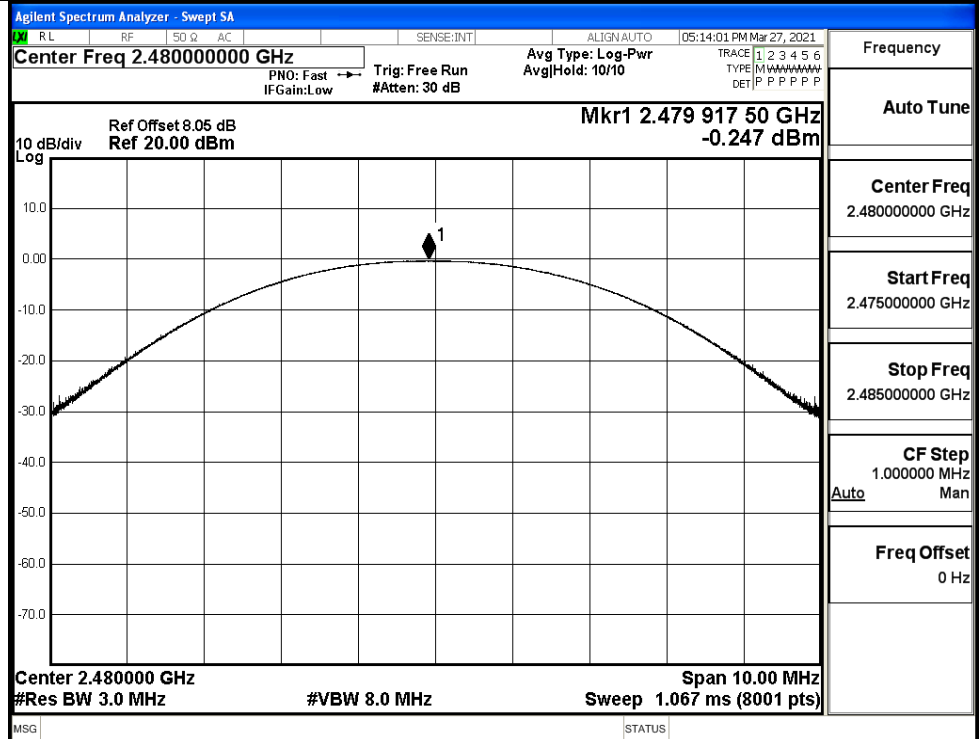
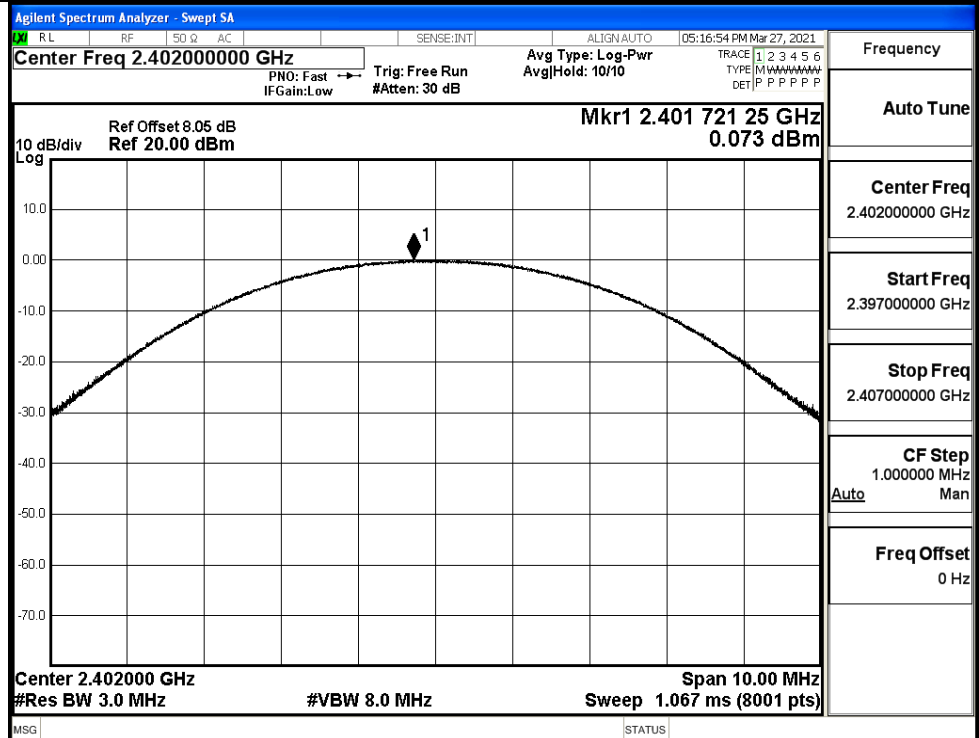
GFSK/LCH

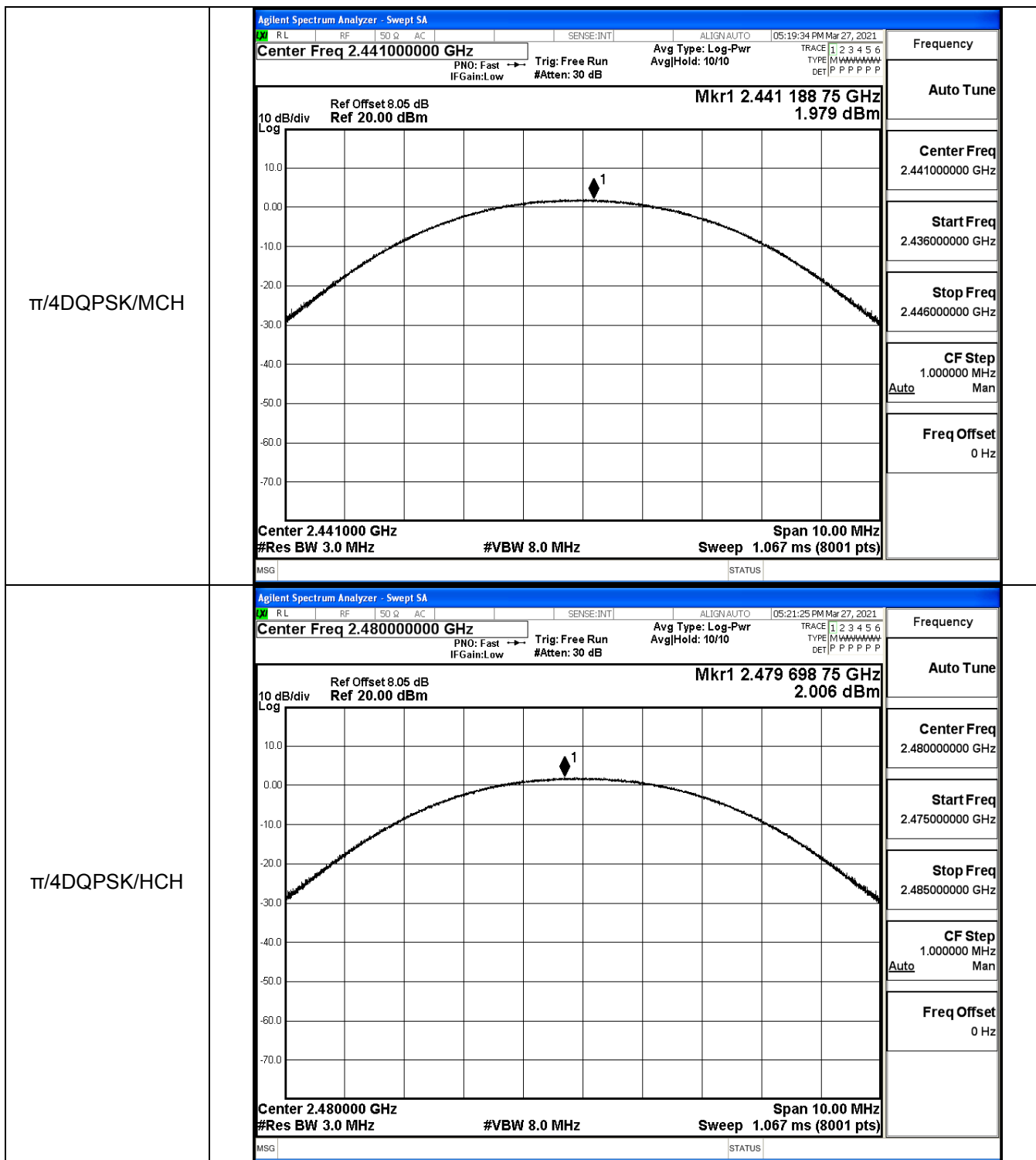


GFSK/MCH

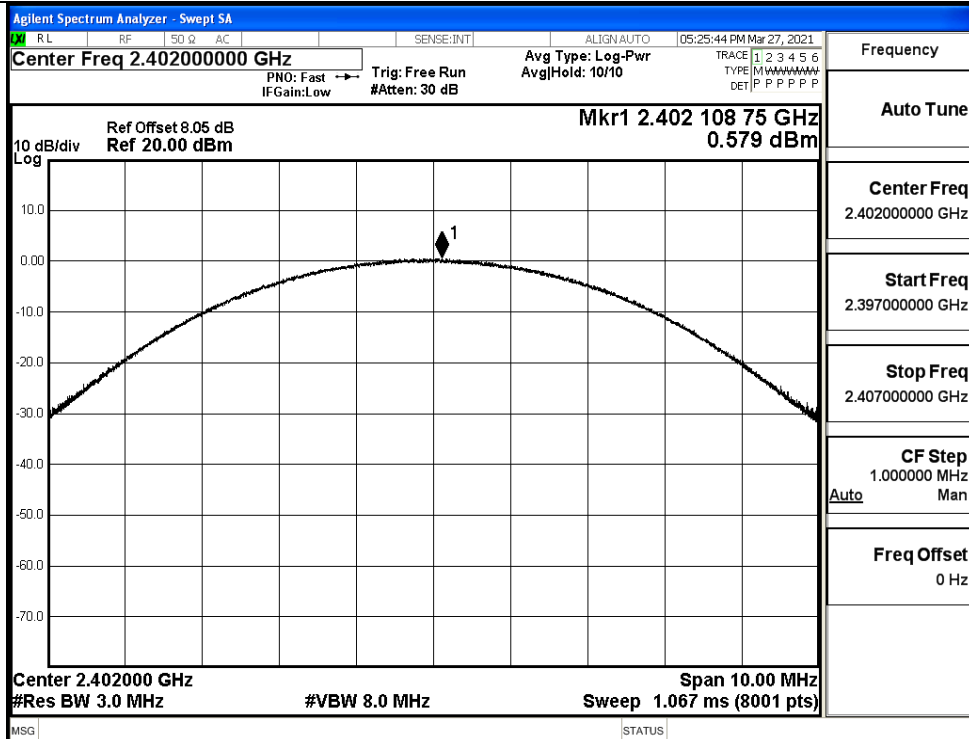


GFSK/HCH

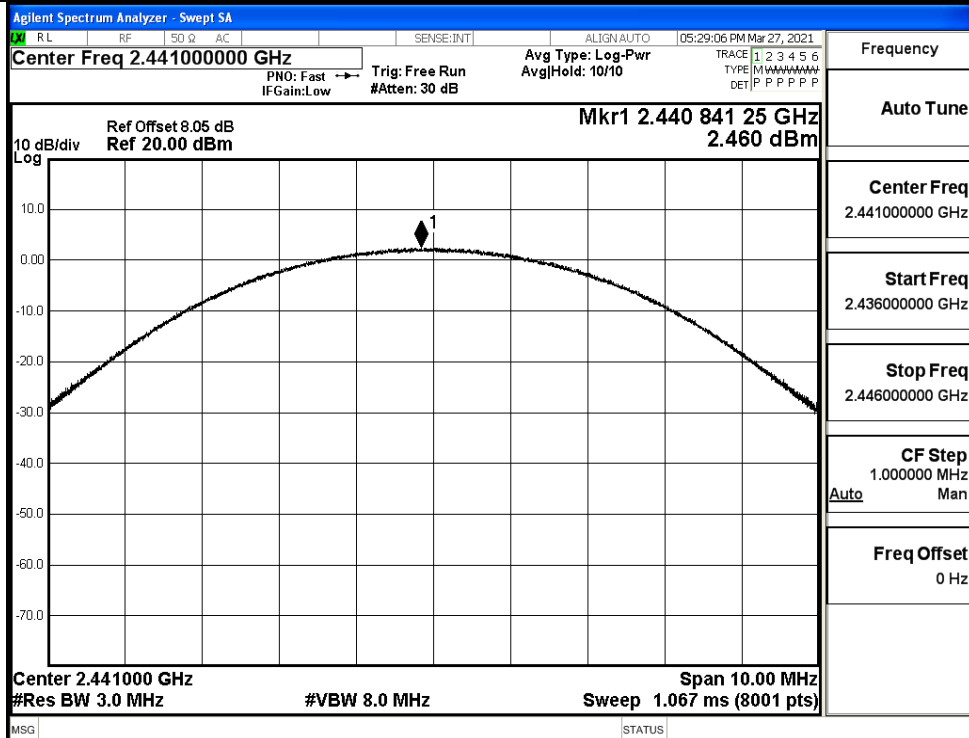
 $\pi/4$ DQPSK/LCH



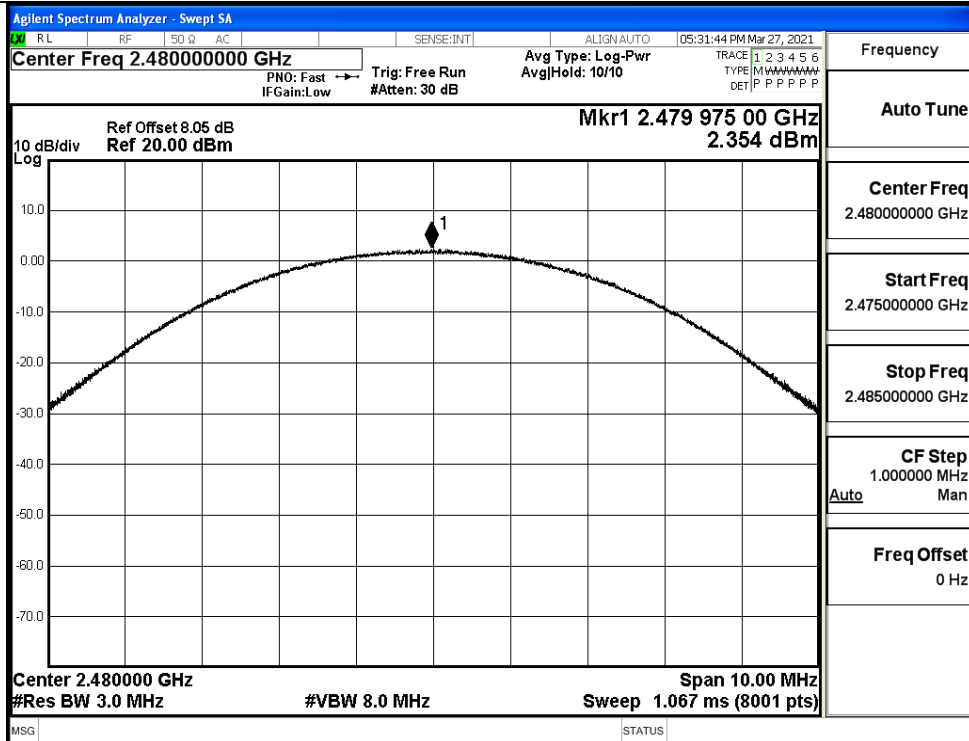
8DPSK/LCH



8DPSK/MCH



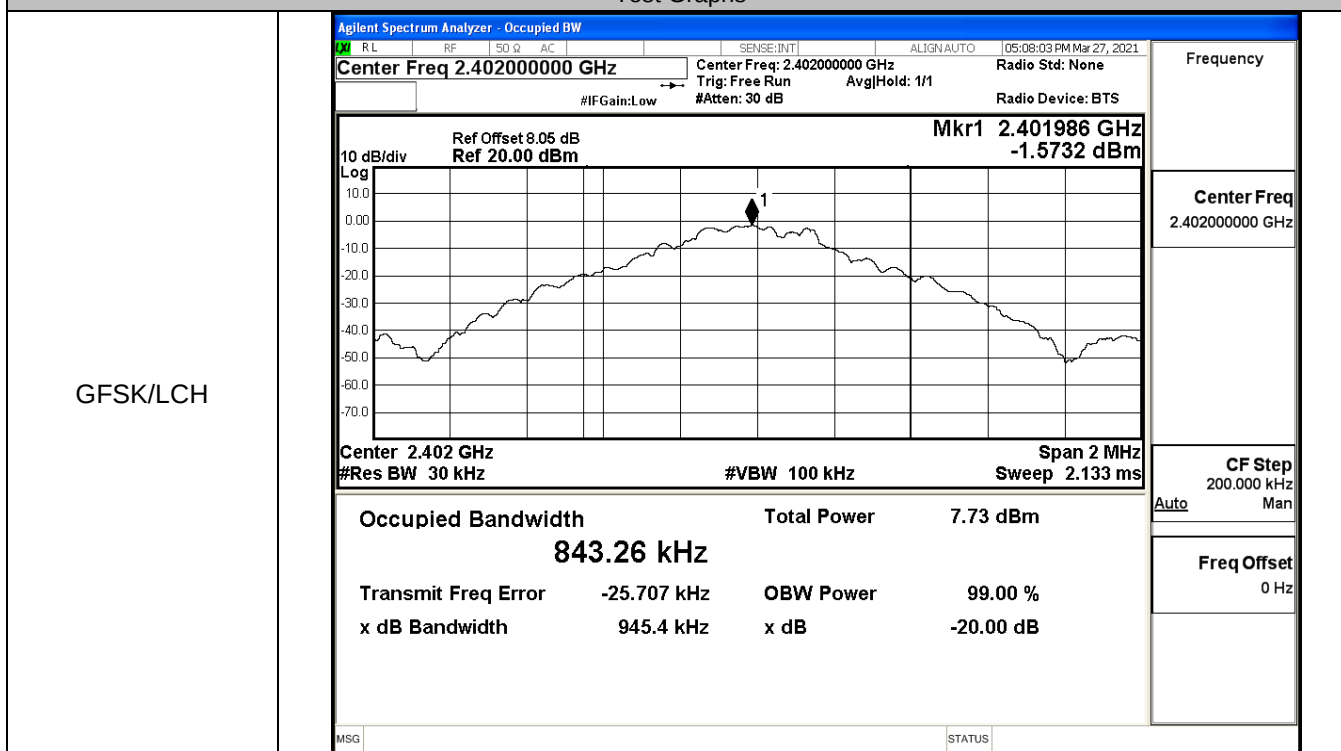
8DPSK/HCH



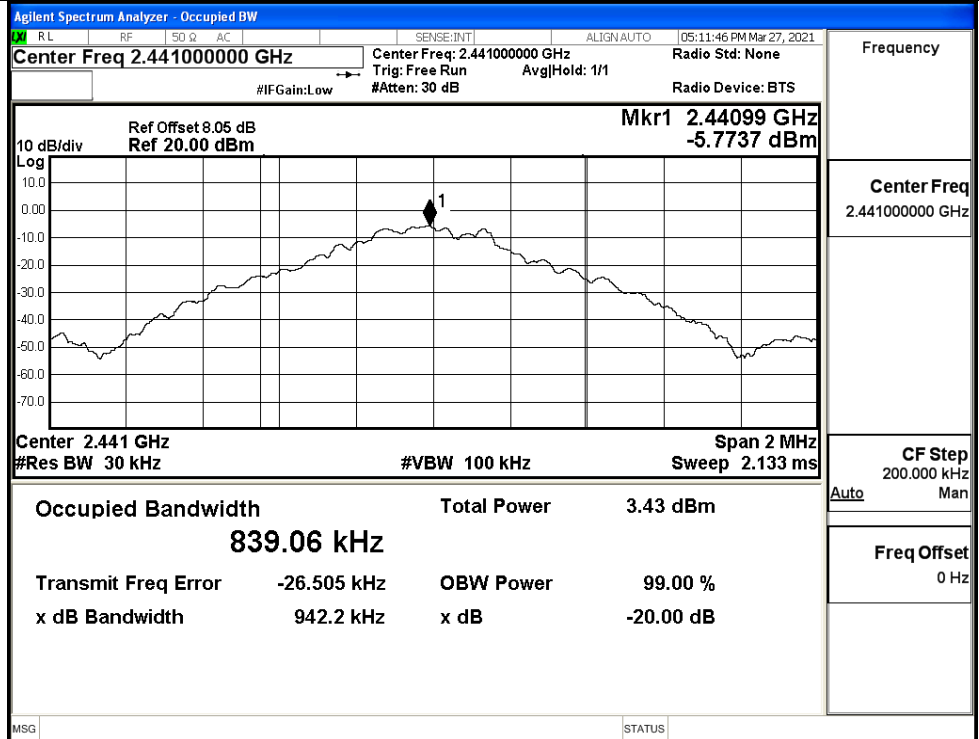
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9454	Not Specified	PASS
	MCH	0.9422	Not Specified	PASS
	HCH	0.9389	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.319	Not Specified	PASS
	MCH	1.315	Not Specified	PASS
	HCH	1.315	Not Specified	PASS
8DPSK	LCH	1.314	Not Specified	PASS
	MCH	1.313	Not Specified	PASS
	HCH	1.311	Not Specified	PASS

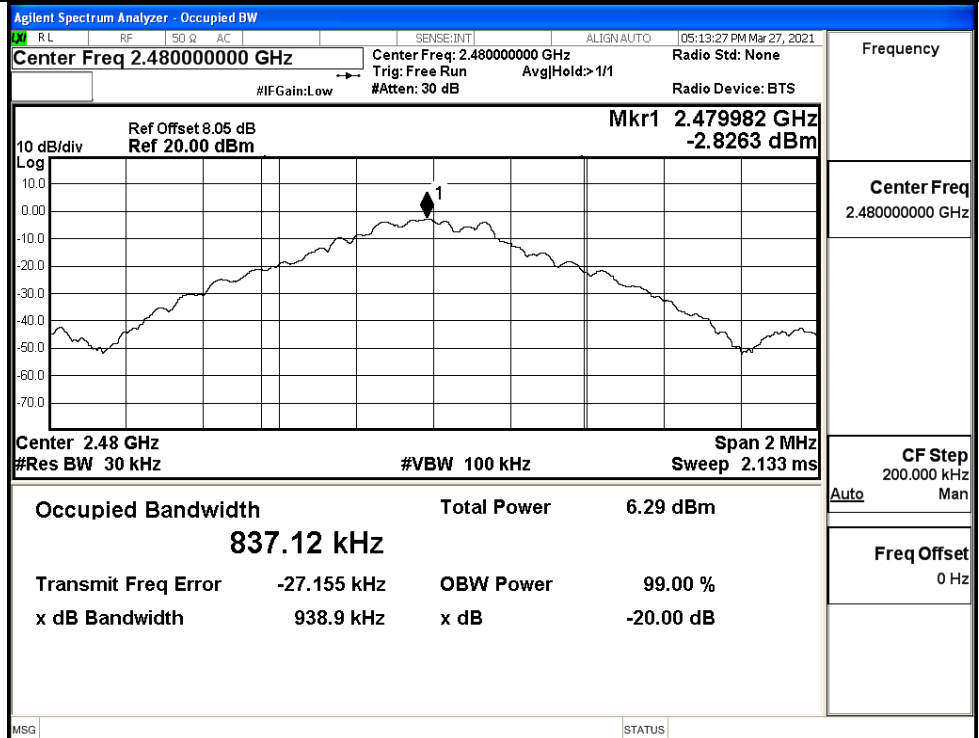
Test Graphs

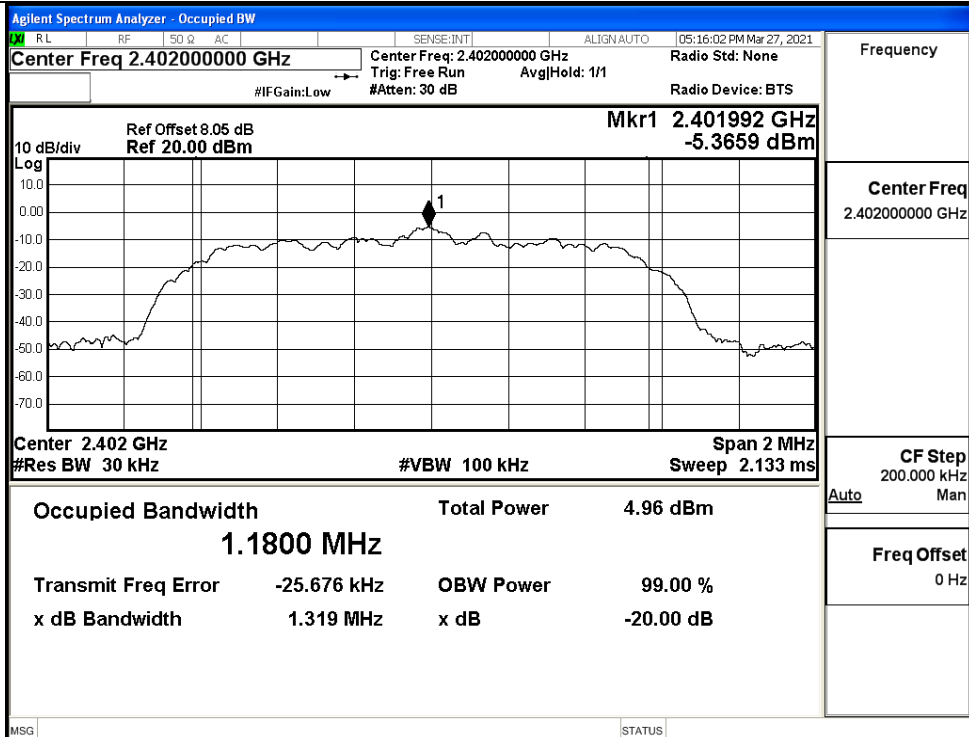


GFSK/MCH



GFSK/HCH

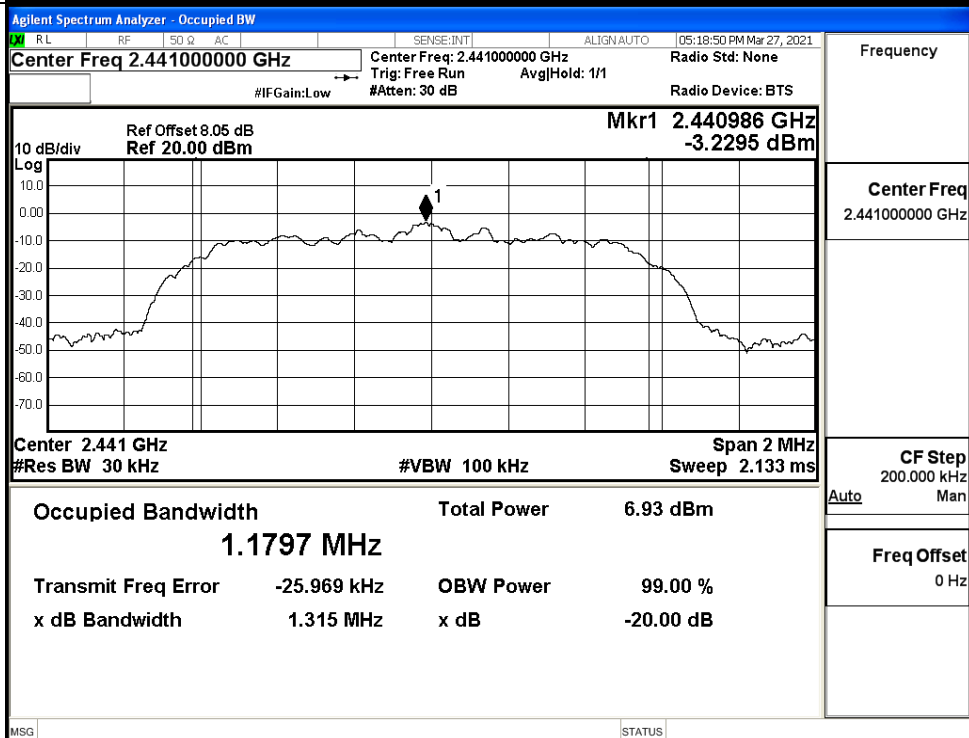


$\pi/4$ DQPSK/LCH

Frequency

Center Freq
2.40200000 GHzCF Step
200.000 kHz
Man

Auto

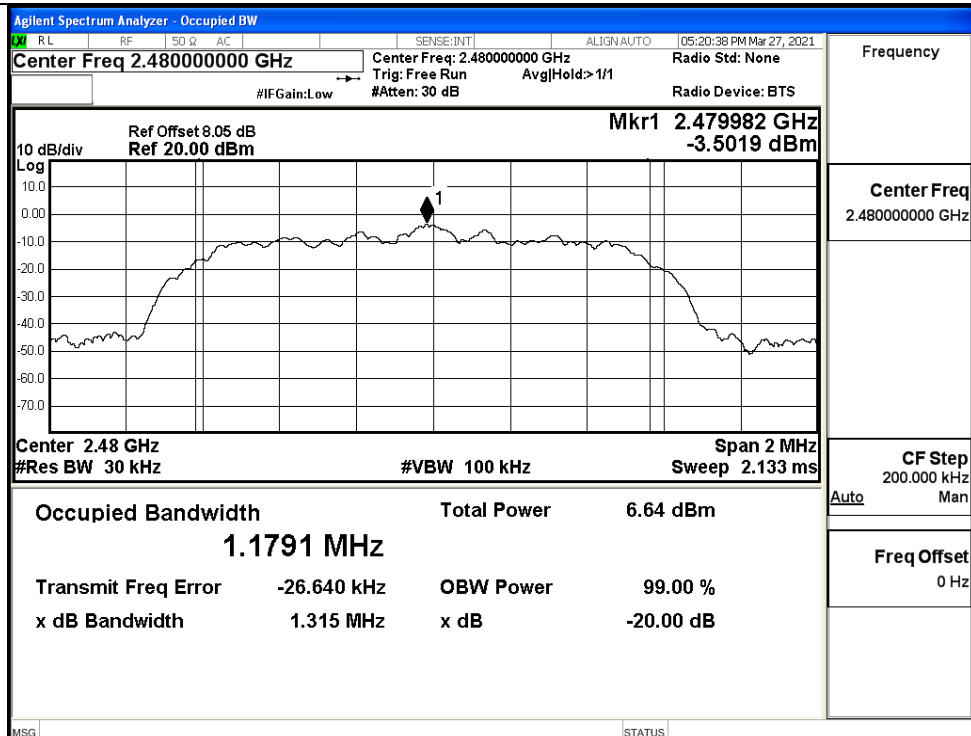
Freq Offset
0 Hz $\pi/4$ DQPSK/MCH

Frequency

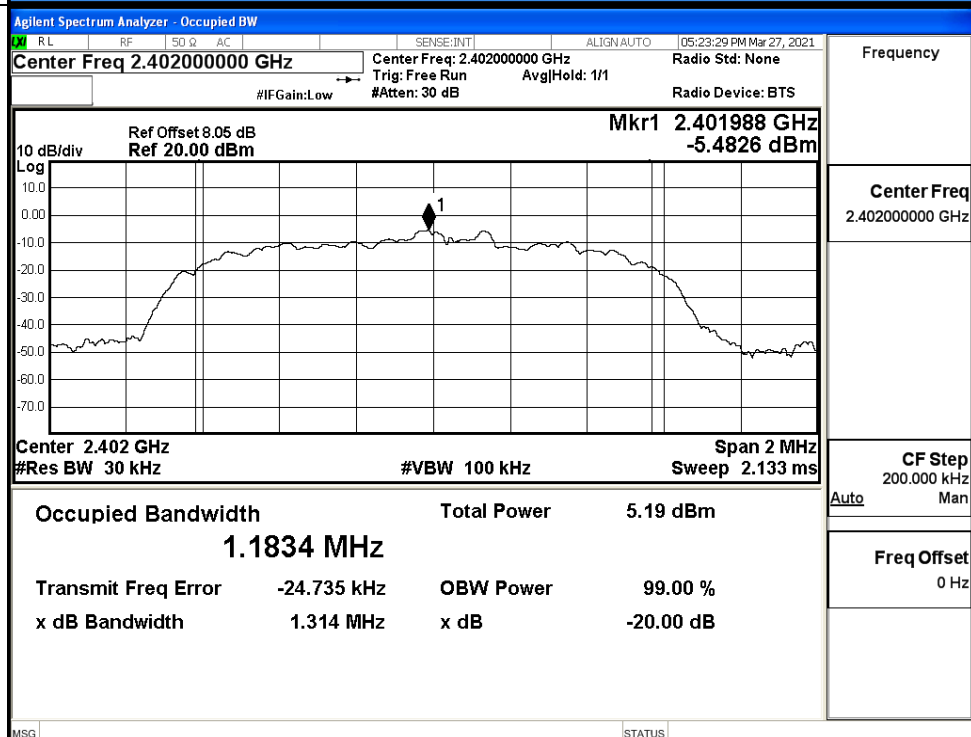
Center Freq
2.44100000 GHzCF Step
200.000 kHz
Man

Auto

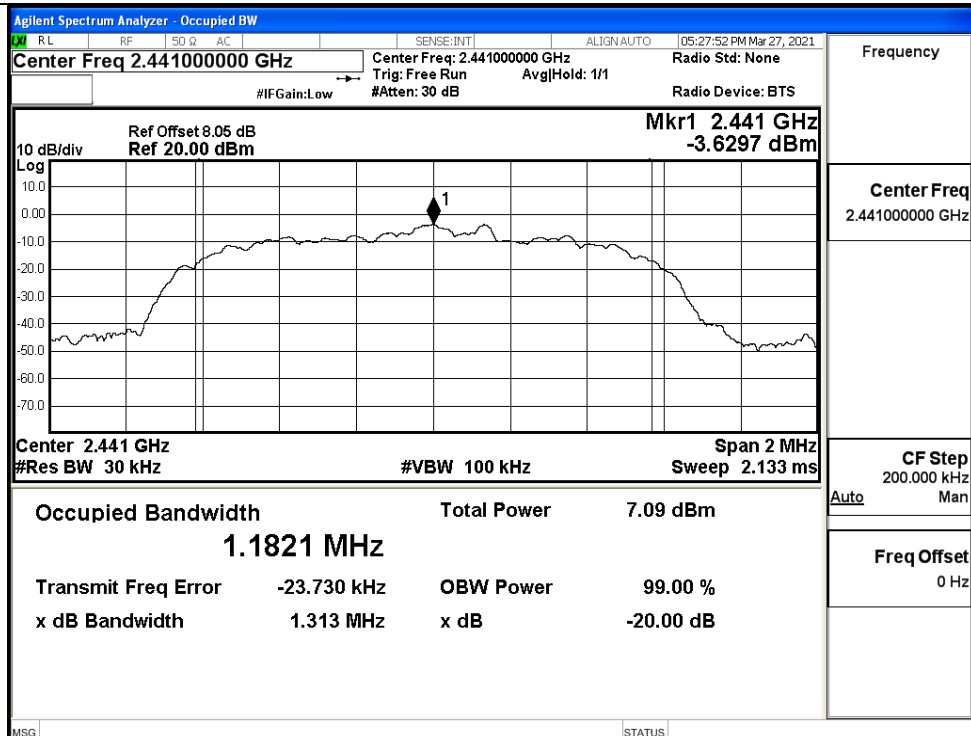
Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH

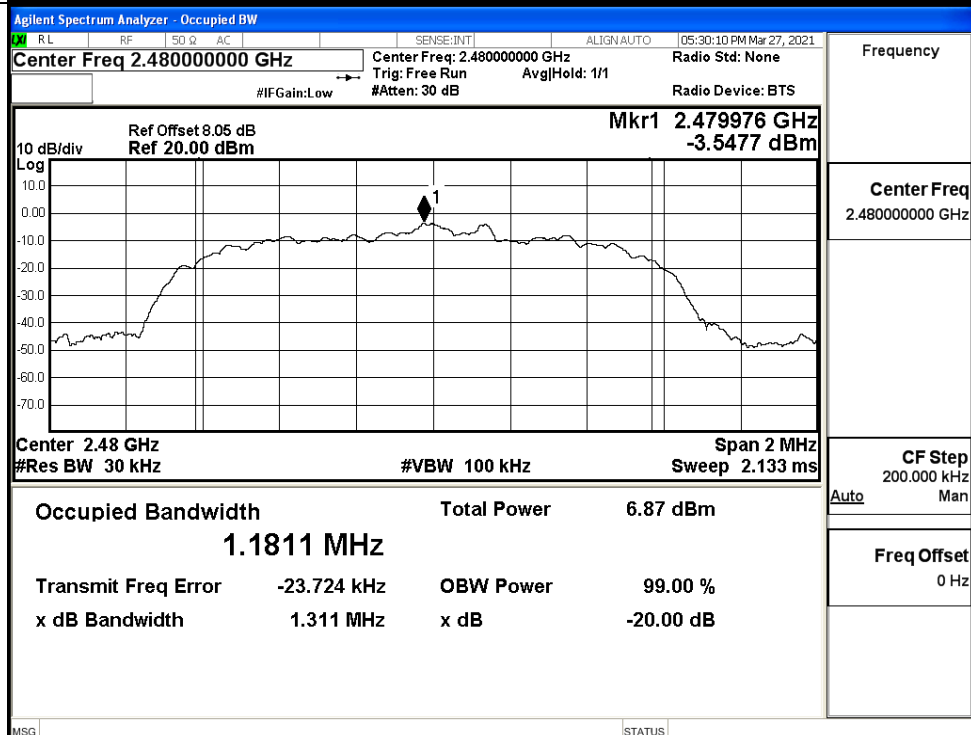
8DPSK/LCH



8DPSK/MCH



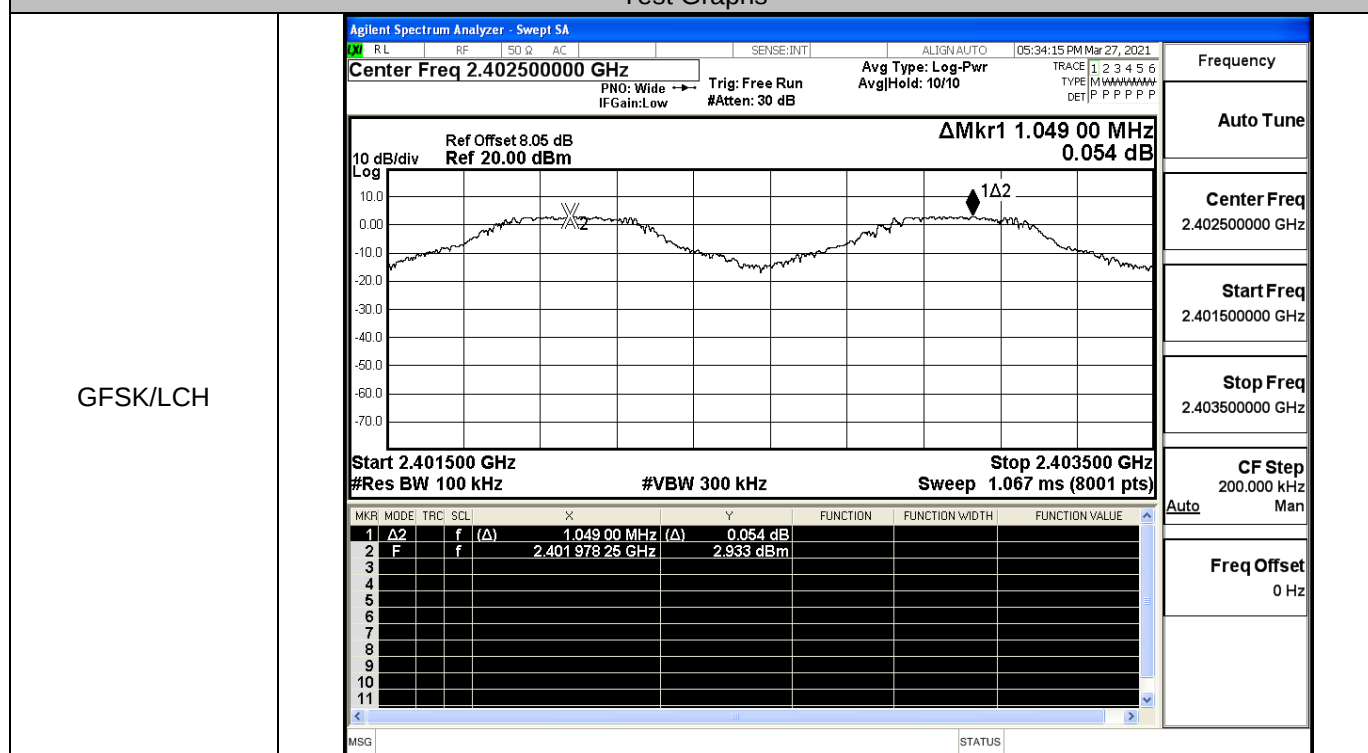
8DPSK/HCH



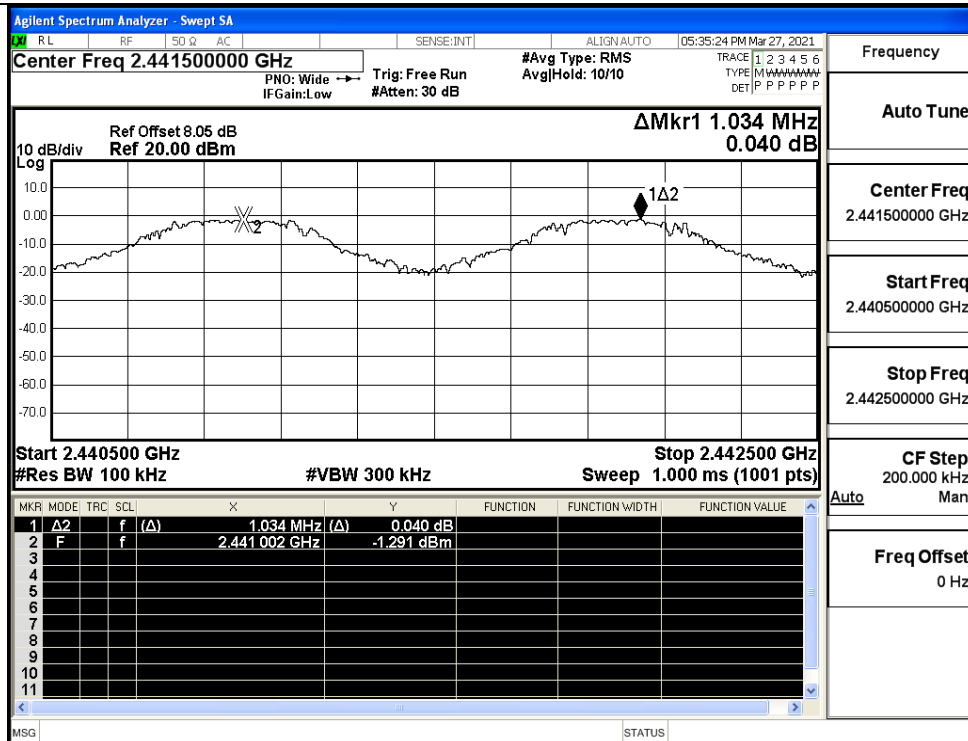
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.049	0.630	PASS
	MCH	1.034	0.630	PASS
	HCH	1.014	0.630	PASS
$\pi/4$ DQPSK	LCH	0.998	0.879	PASS
	MCH	1.114	0.879	PASS
	HCH	0.962	0.879	PASS
8DPSK	LCH	0.940	0.876	PASS
	MCH	0.990	0.876	PASS
	HCH	0.888	0.876	PASS

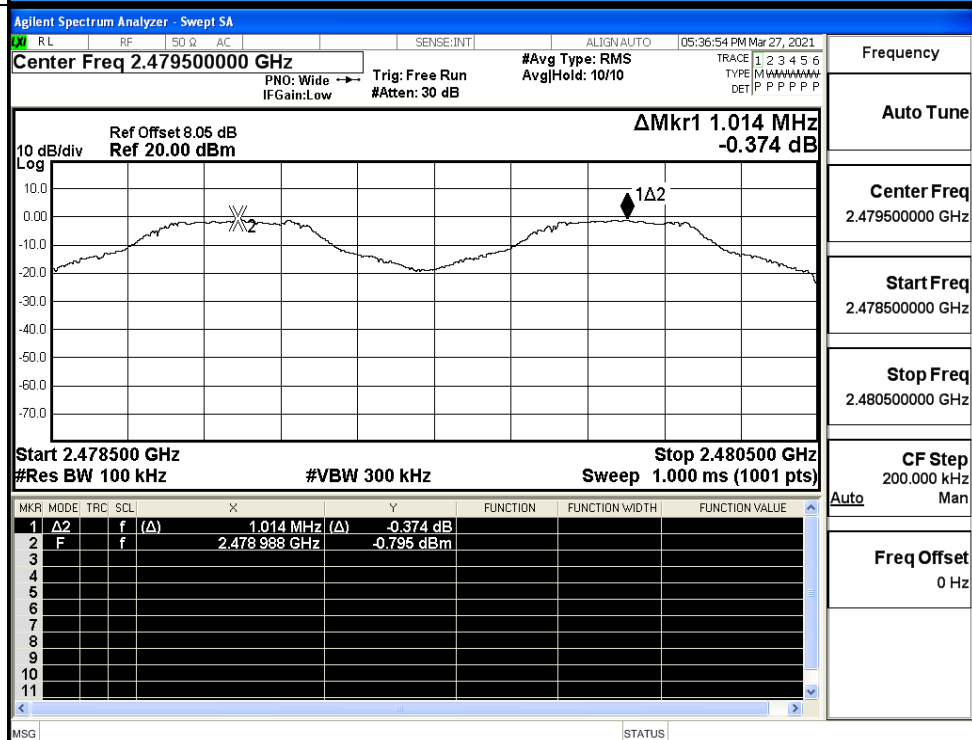
Test Graphs

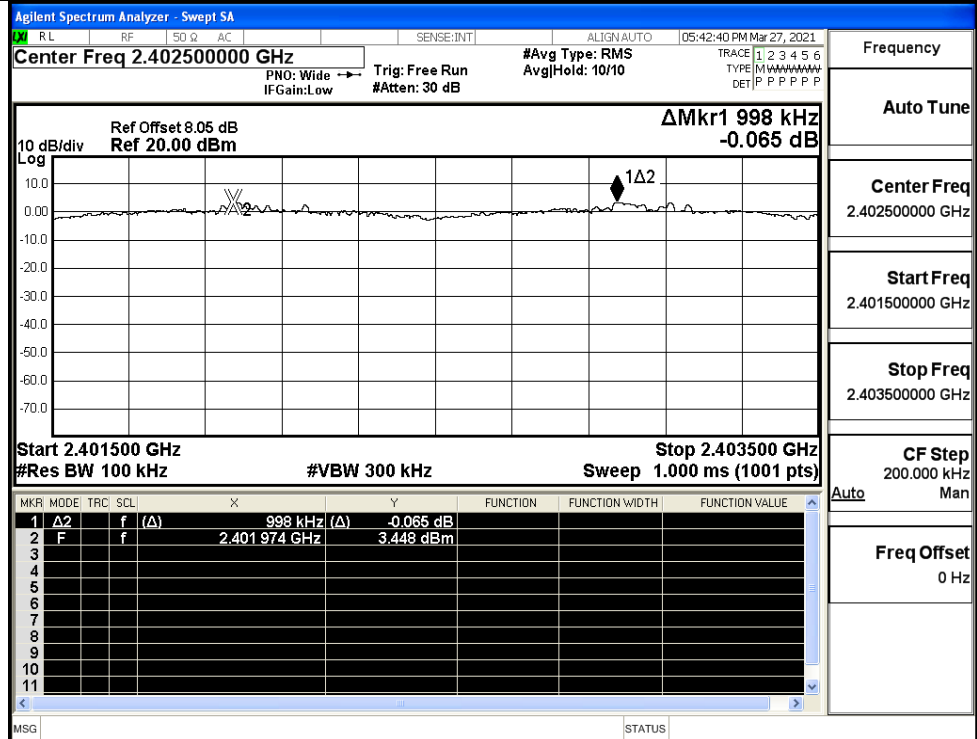
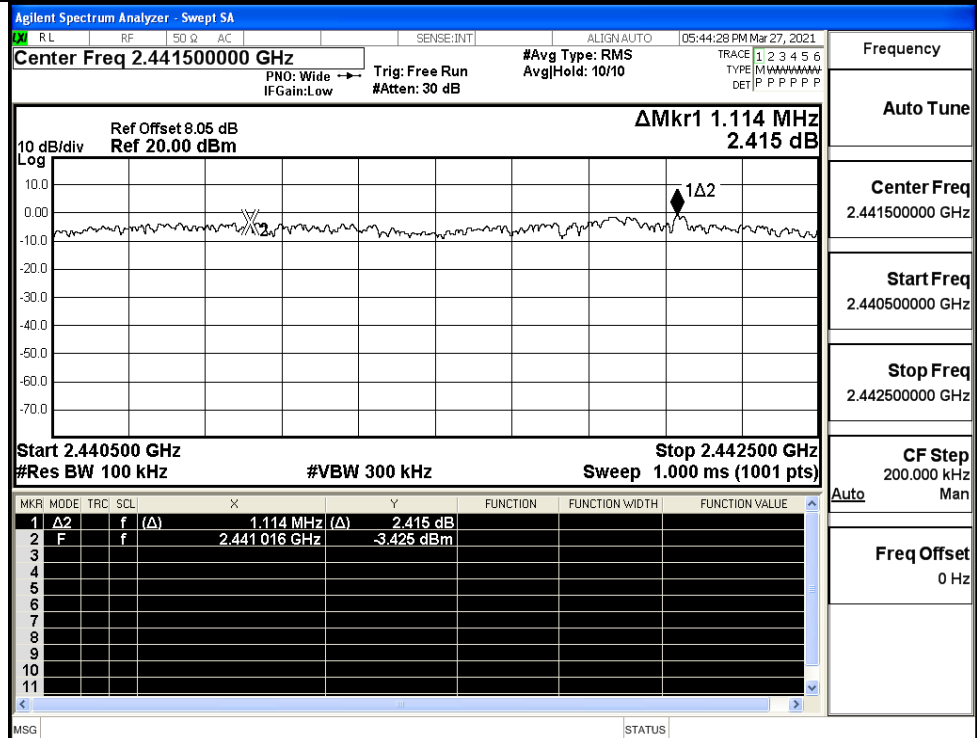


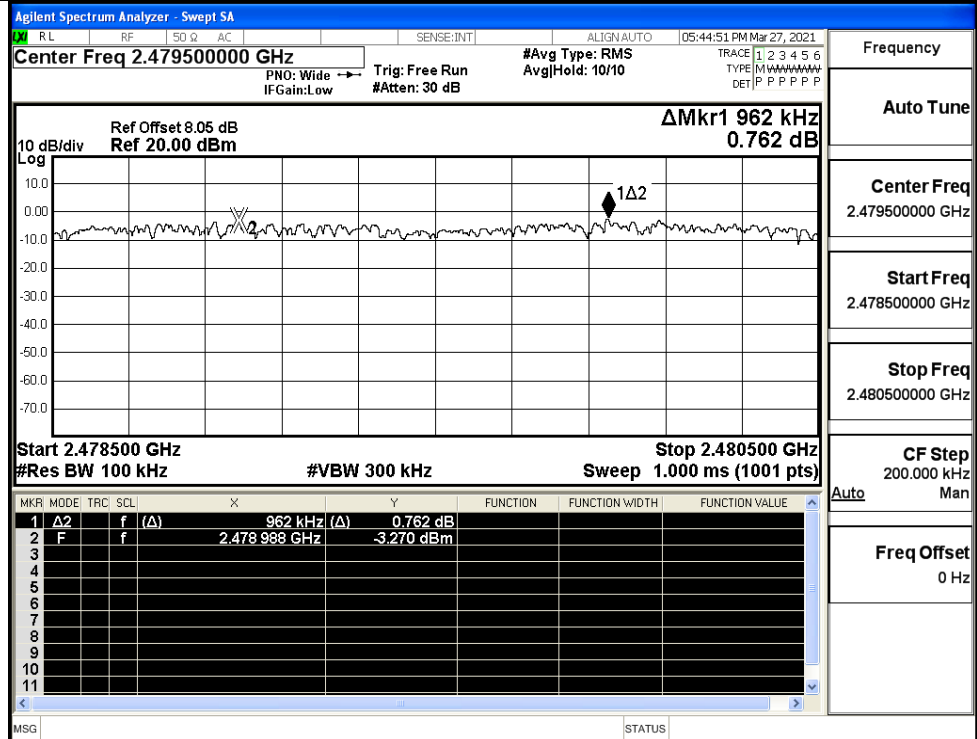
GFSK/MCH



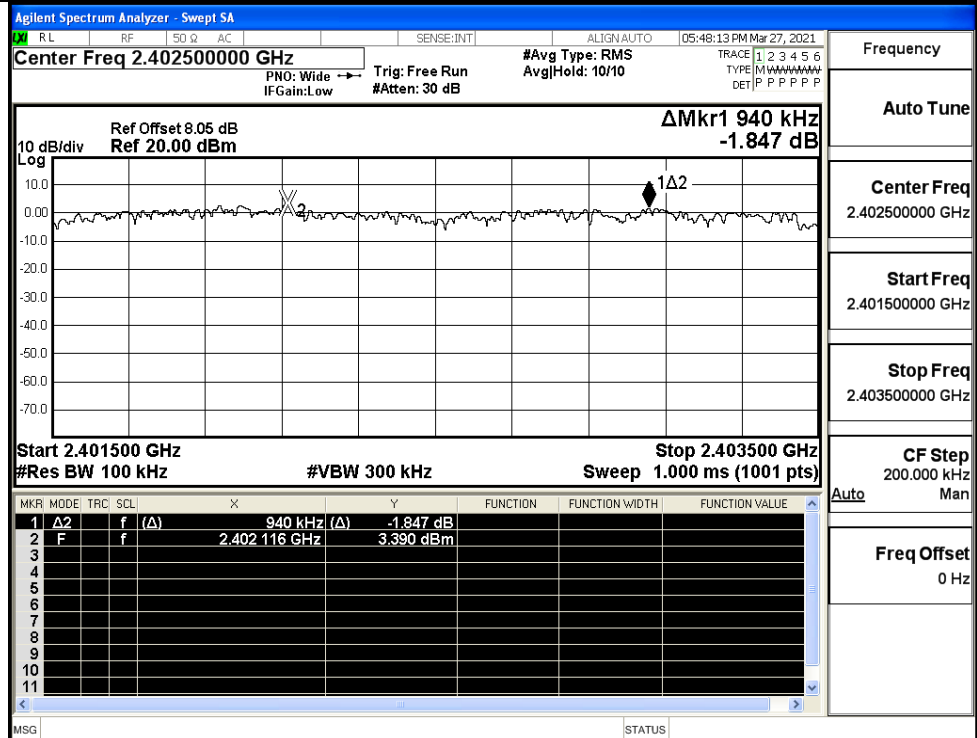
GFSK/HCH



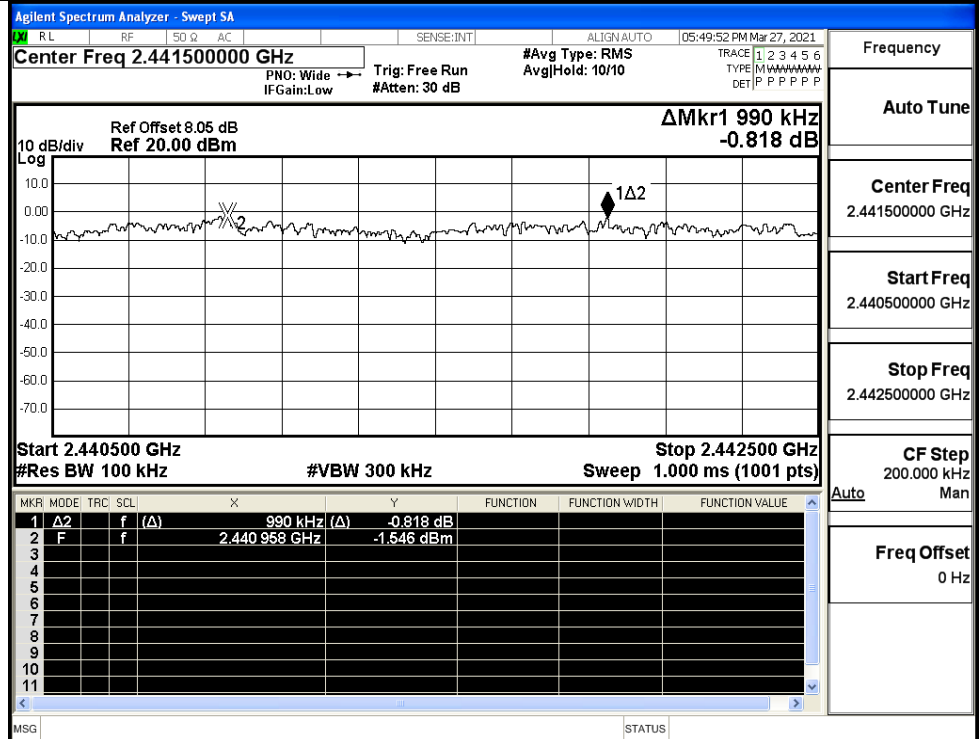
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

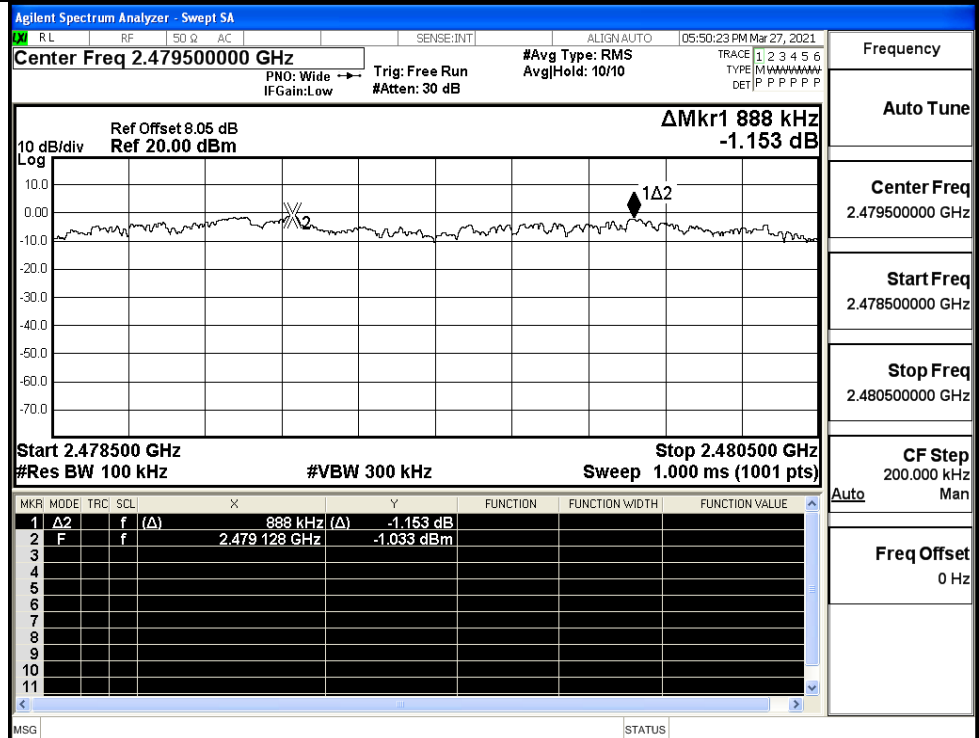
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

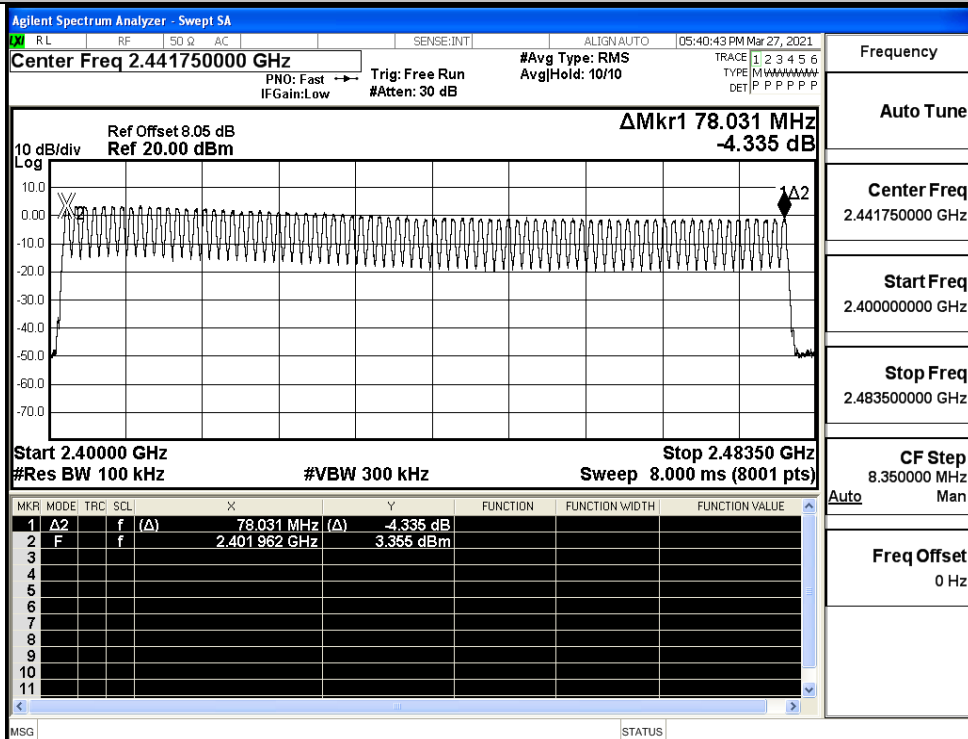
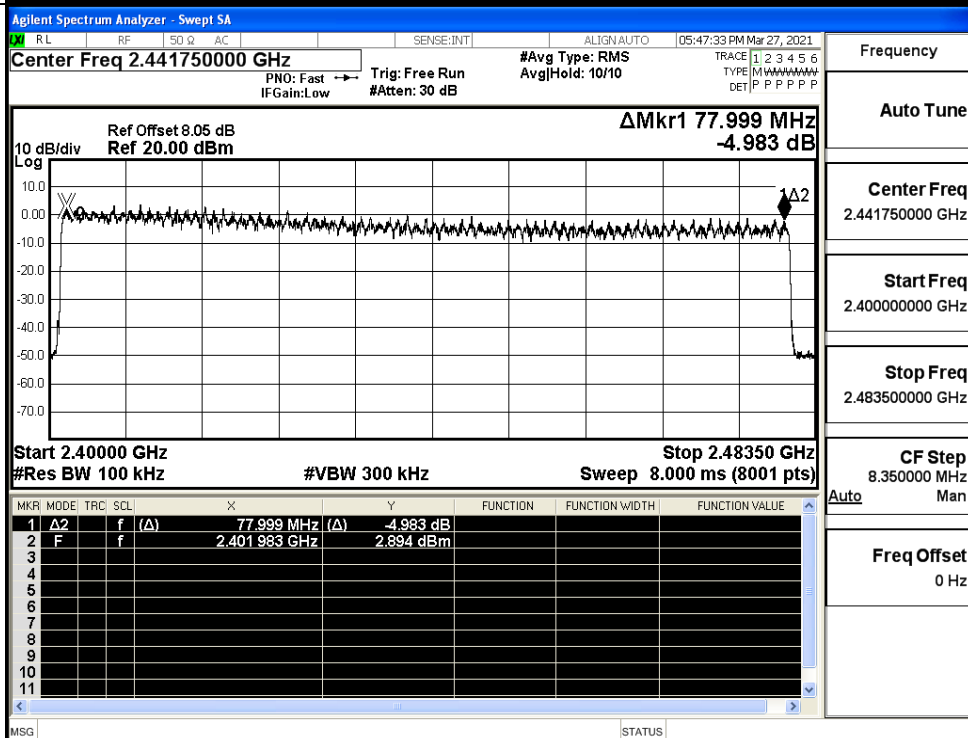


A.4 Hopping Channel Number

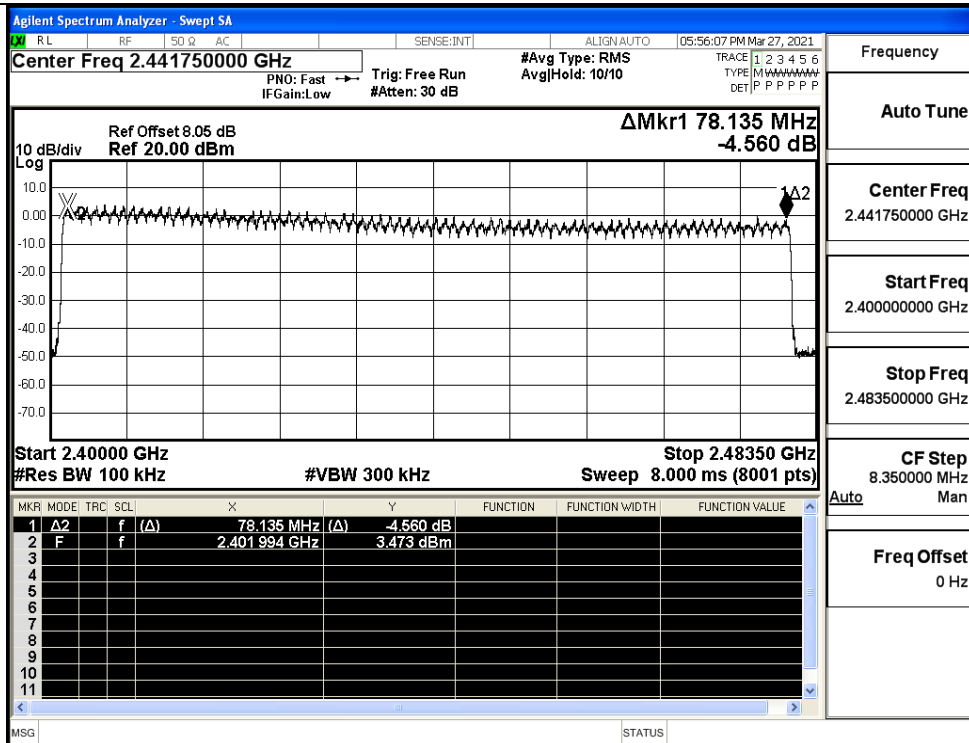
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

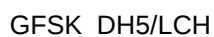
GFSK/Hop

 $\pi/4$ DQPSK/Hop

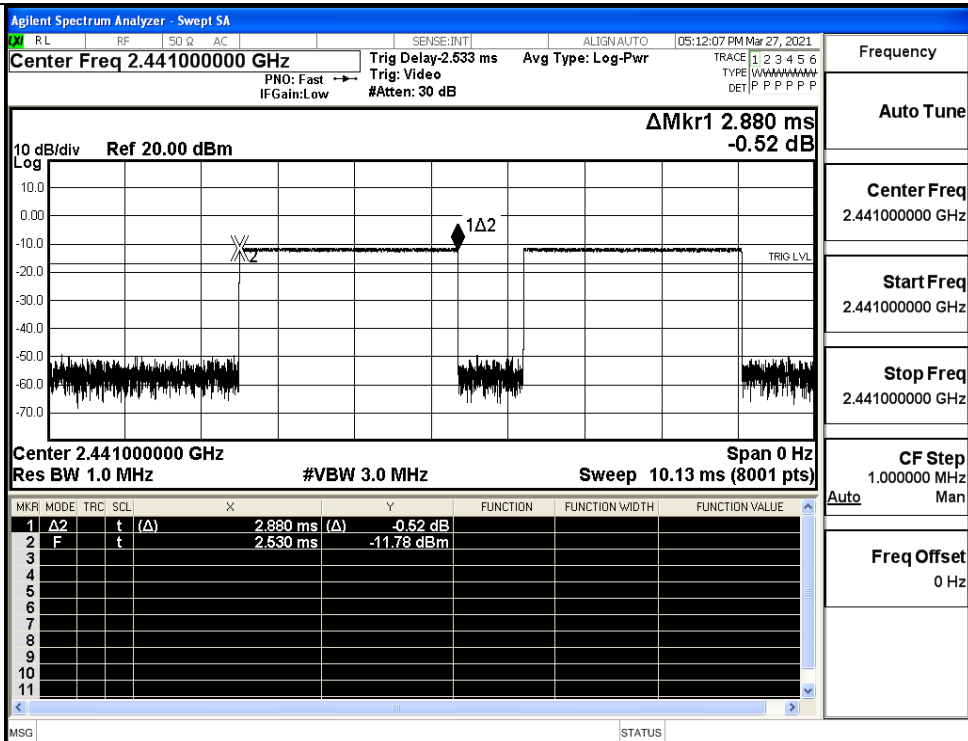
8DPSK/Hop



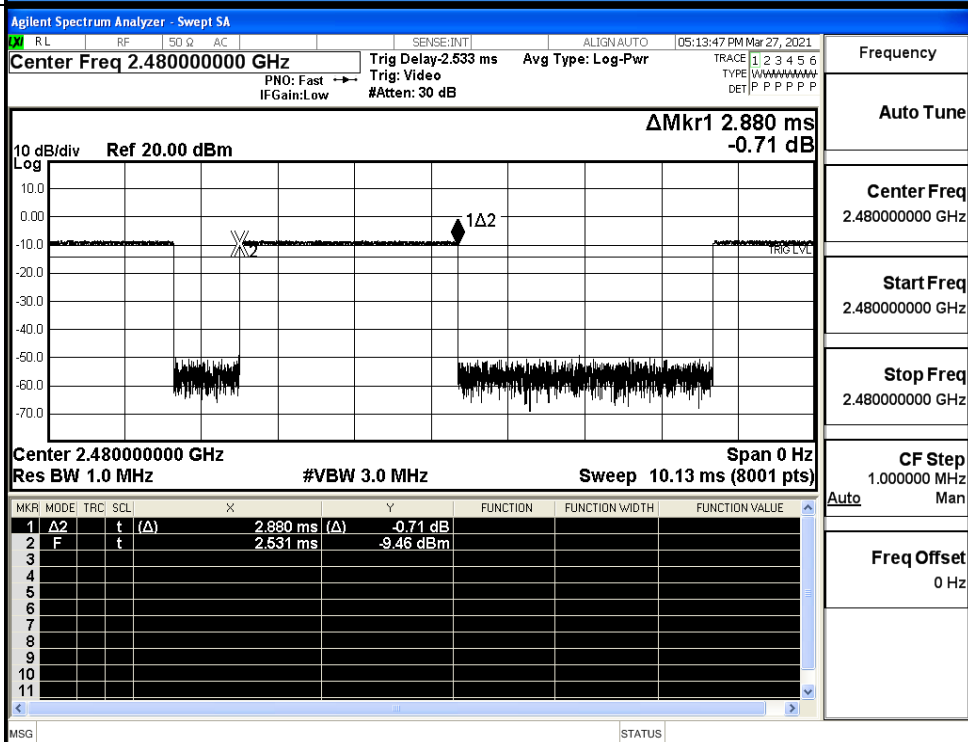
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.307	0.4	PASS
	3DH5	MCH	2.88	106.7	0.307	0.4	PASS
	3DH5	HCH	2.88	106.7	0.307	0.4	PASS



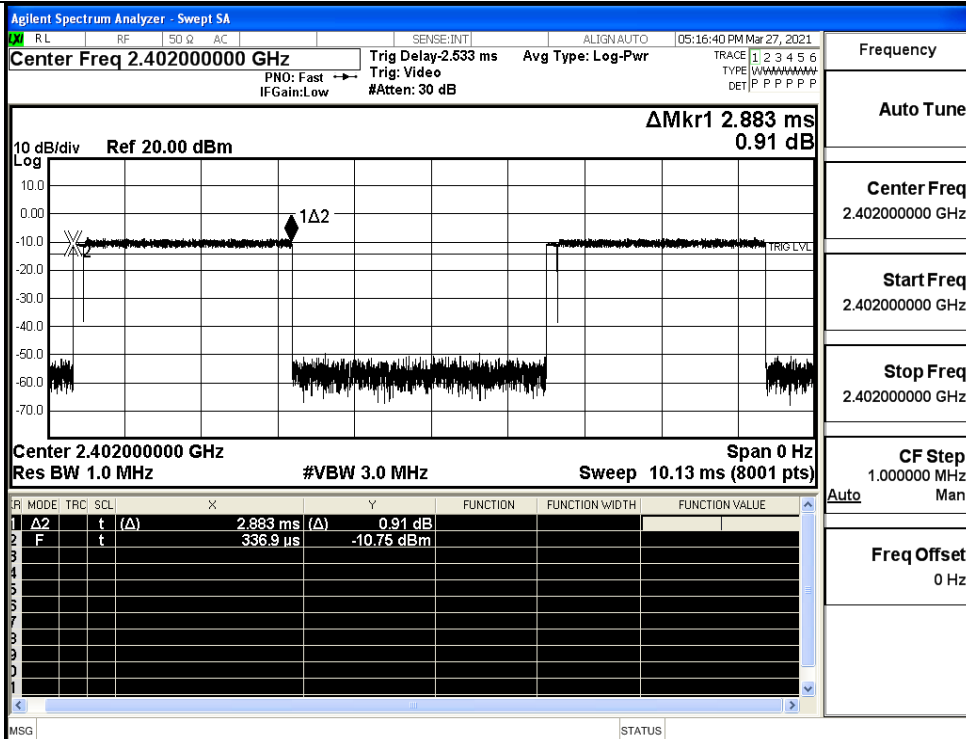
GFSK_DH5/MCH



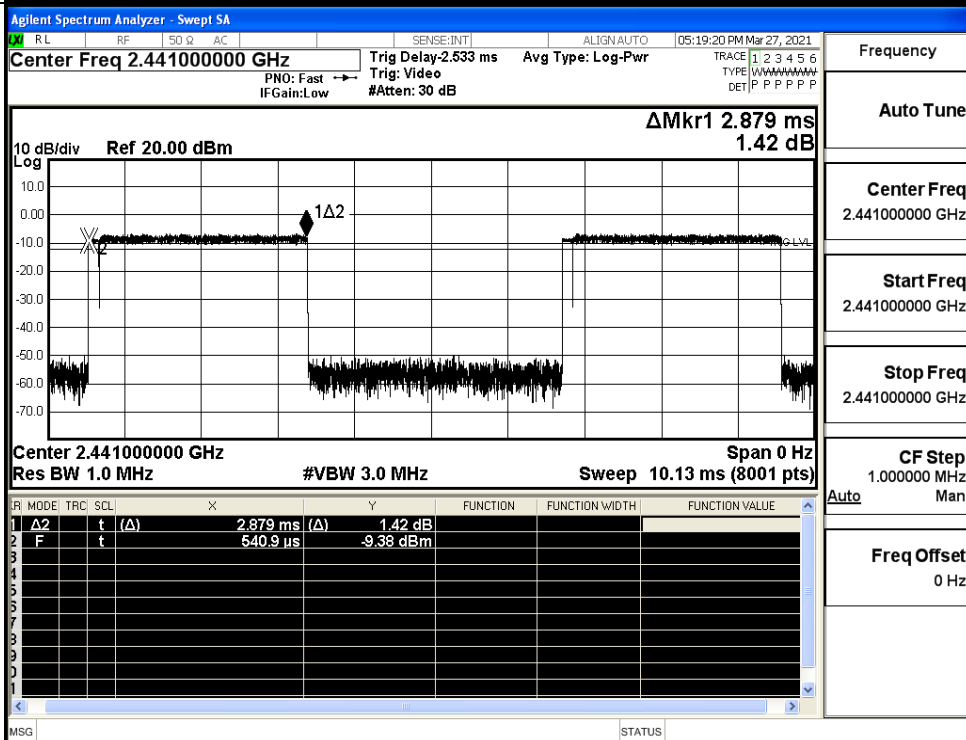
GFSK_DH5/HCH



$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



Agilent Spectrum Analyzer - Swept SA

MW	R/L	RF	50 Ω	AC	SENSE:INT	ALIGN:AUTO	05:21:11 PM Mar 27, 2021
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Center Freq 2.480000000 GHz		Trig Delay-2.533 ms	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
PNO: Fast →	IF Gain: Low	Trig: Video	#Atten: 30 dB	TYPE: WAAAAAAAAA	Auto Tune
				DET: P P P P P P	Center Freq 2.480000000 GHz

**ΔMkr1 2.879 ms
1.06 dB**

Log

10 dB/div Ref 20.00 dBm

-10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

TRIG LVL

Center 2.480000000 GHz Span 0 Hz

Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)

IR MODE	TRE SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	t (Δ)	2.879 ms (Δ) 1.06 dB			
2	F	t	2.531 ms -9.44 dBm			

MSG STATUS

Agilent Spectrum Analyzer - Swept SA

UN RL RF 50 Ω AC SENSE:INT ALIGN AUTO 05:25:30 PM Mar 27, 2021
Center Freq 2.402000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr
 PNO: Fast IF Gain: Low Trig: Video TYPE: P P P P P P P
 #Atten: 30 dB DET: P P P P P P P

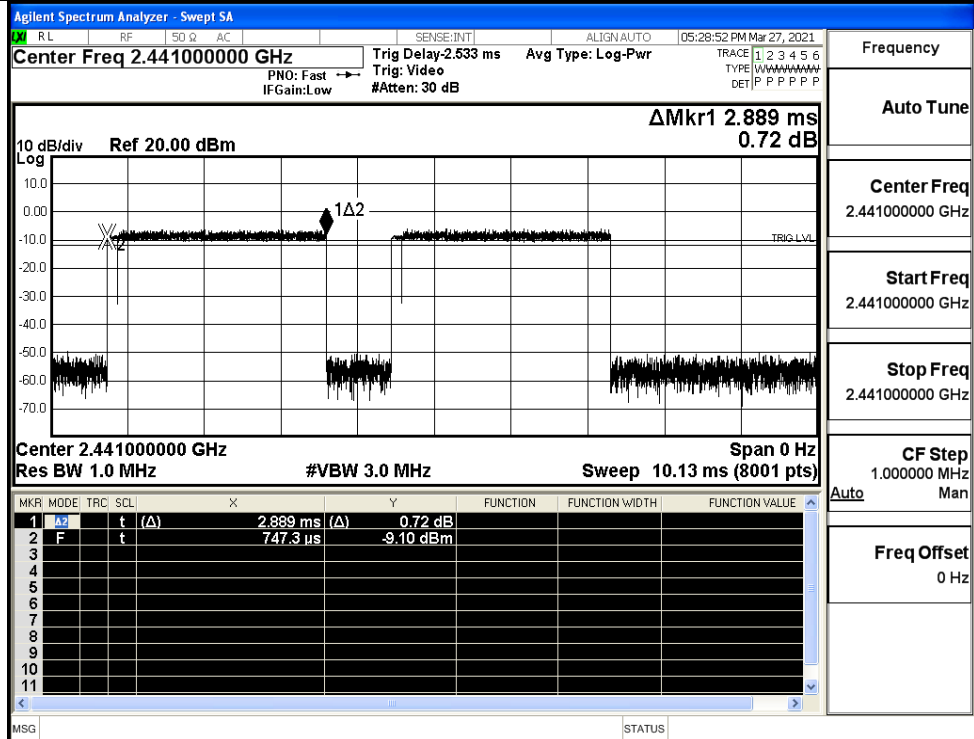
10 dB/div Ref 20.00 dBm **ΔMkr1 2.889 ms**
 Log 1.16 dB

Center 2.402000000 GHz Span 0 Hz
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)

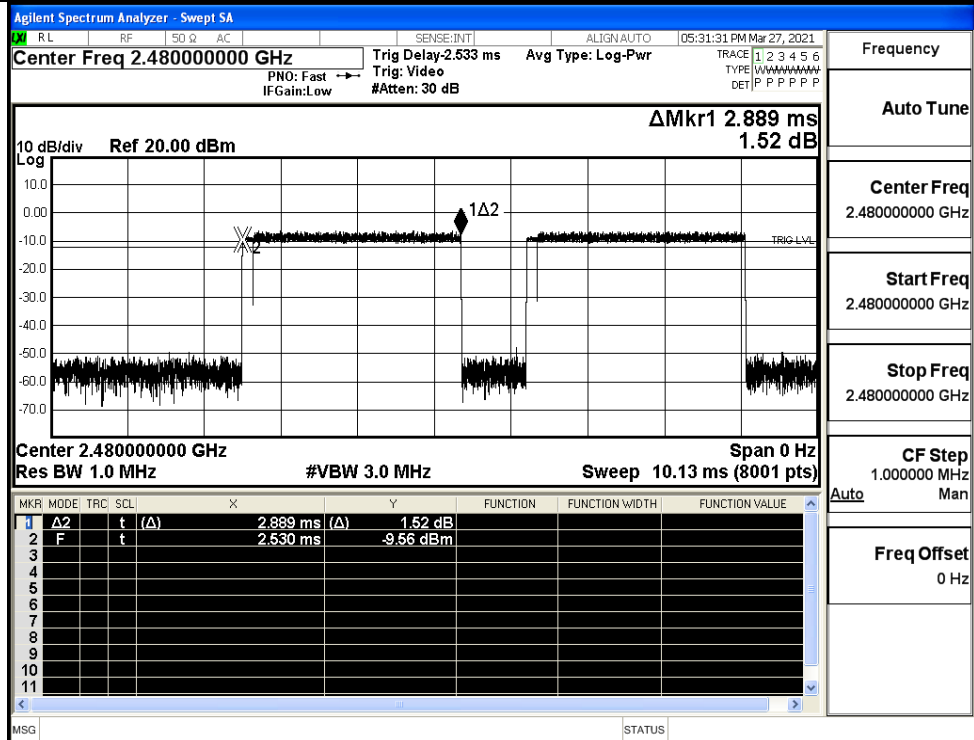
IR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	Δ2	t	(Δ)	2.889 ms	(Δ)	1.16 dB		
2	F	t		2.141 ms		-11.05 dBm		

MSG STATUS

8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

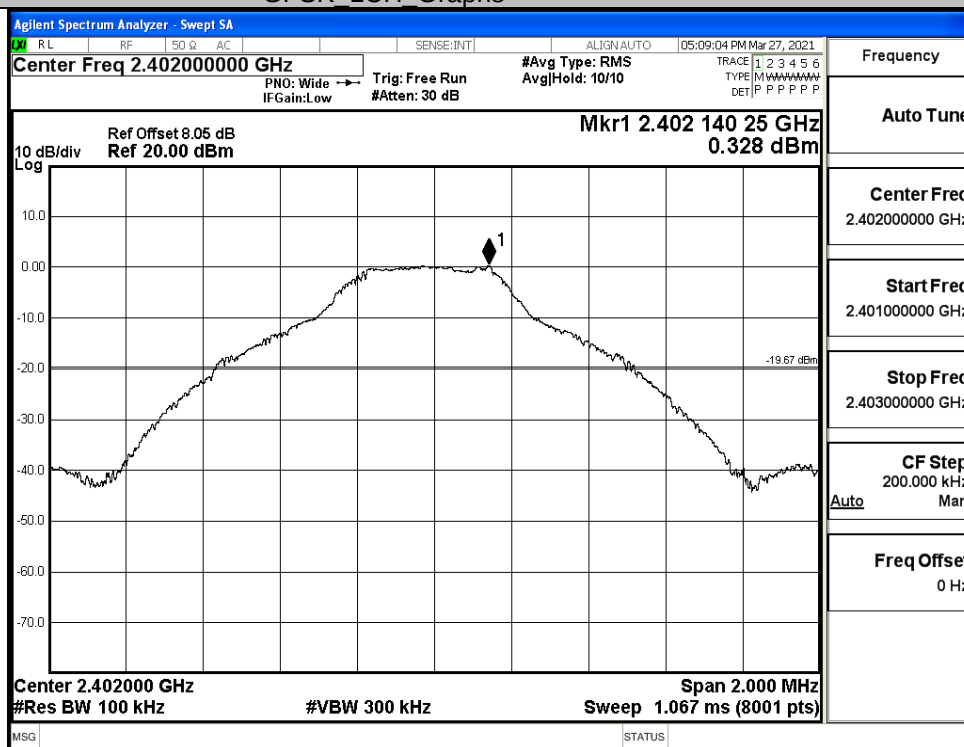


A.6 RF Conducted Spurious Emissions

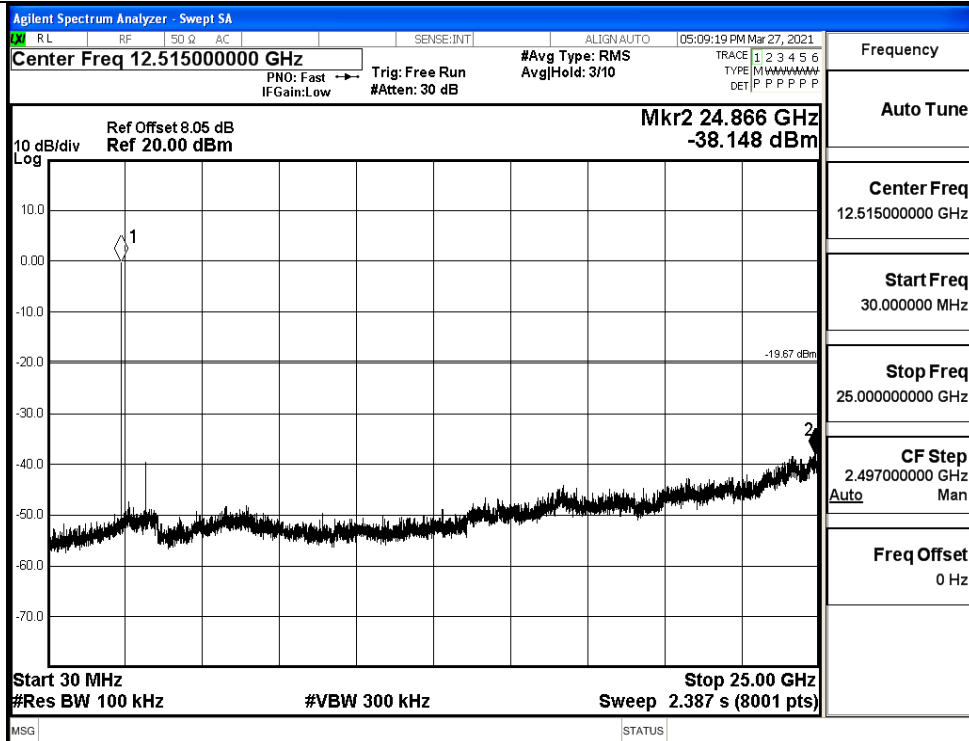
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.328	-38.148	-19.672	PASS
	MCH	-0.863	-38.251	-20.863	PASS
	HCH	-0.843	-37.966	-20.843	PASS
$\pi/4$ DQPSK	LCH	-2.673	-37.636	-22.673	PASS
	MCH	-0.953	-37.052	-20.953	PASS
	HCH	-1.782	-38.460	-21.782	PASS
8DPSK	LCH	-2.811	-37.160	-22.811	PASS
	MCH	-1.372	-38.149	-21.372	PASS
	HCH	-1.44	-38.081	-21.440	PASS

GFSK LCH Graphs

Pref

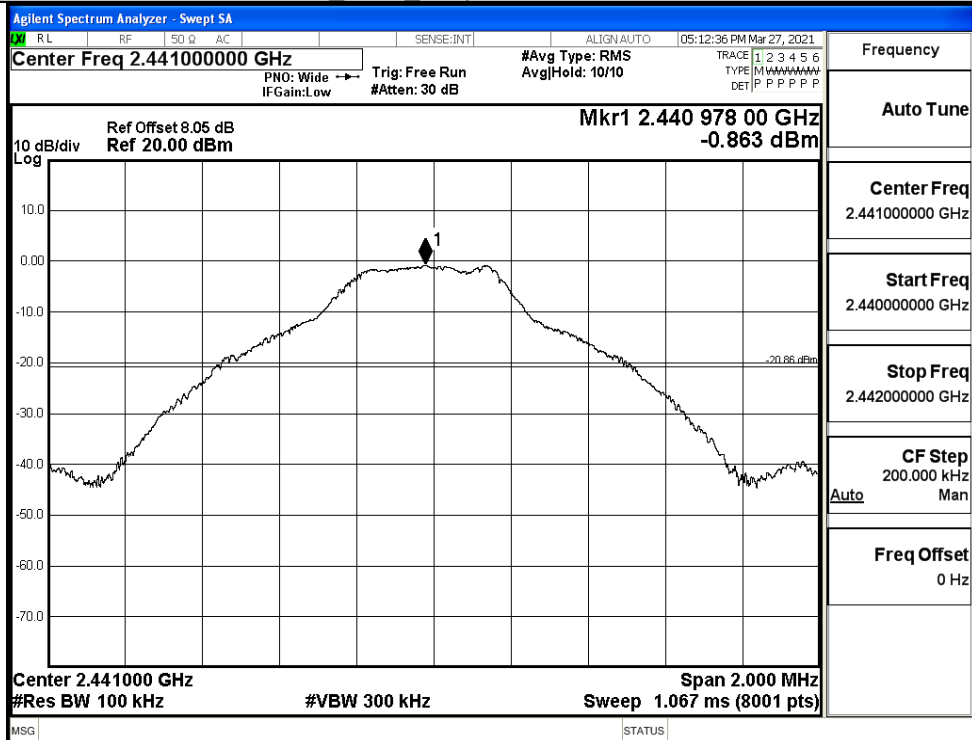


Puw

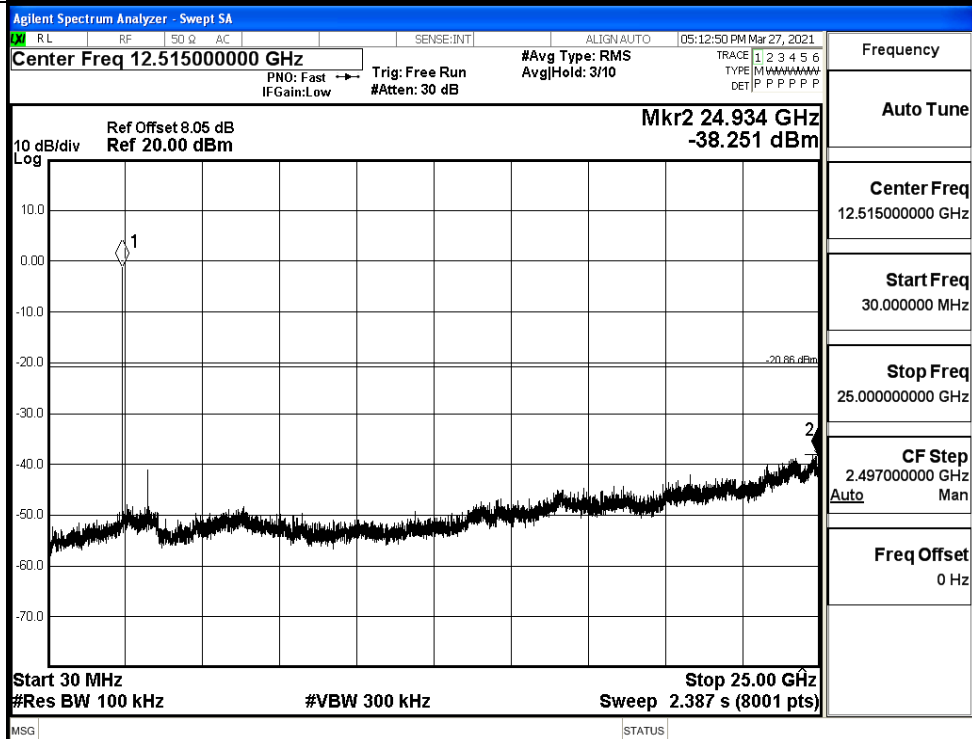


GFSK_MCH_Graphs

Pref

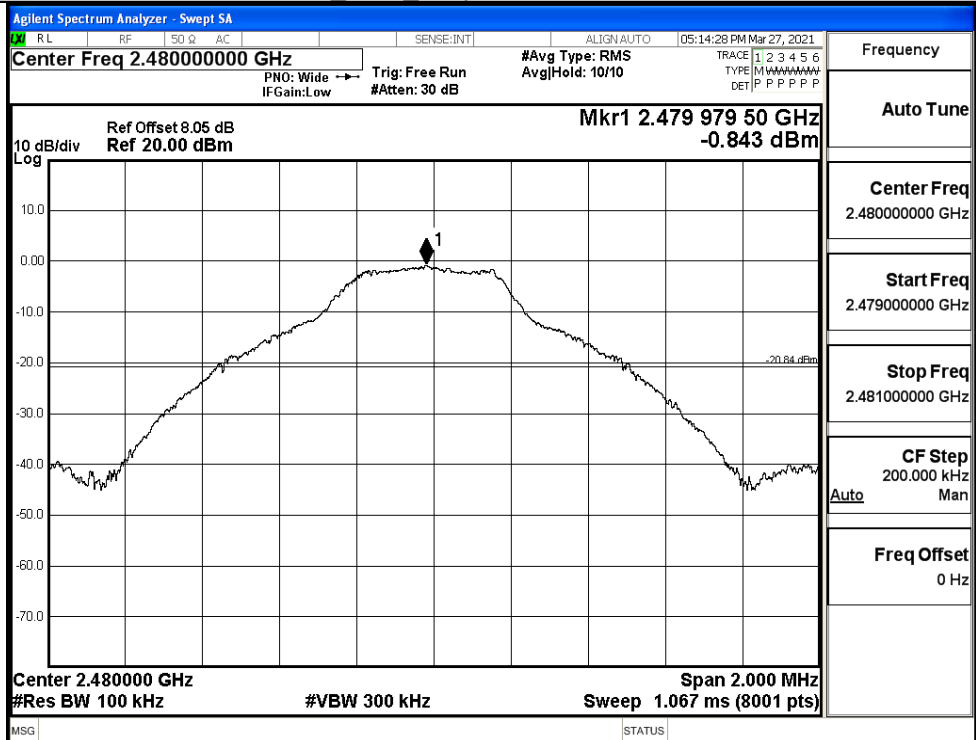


Puw

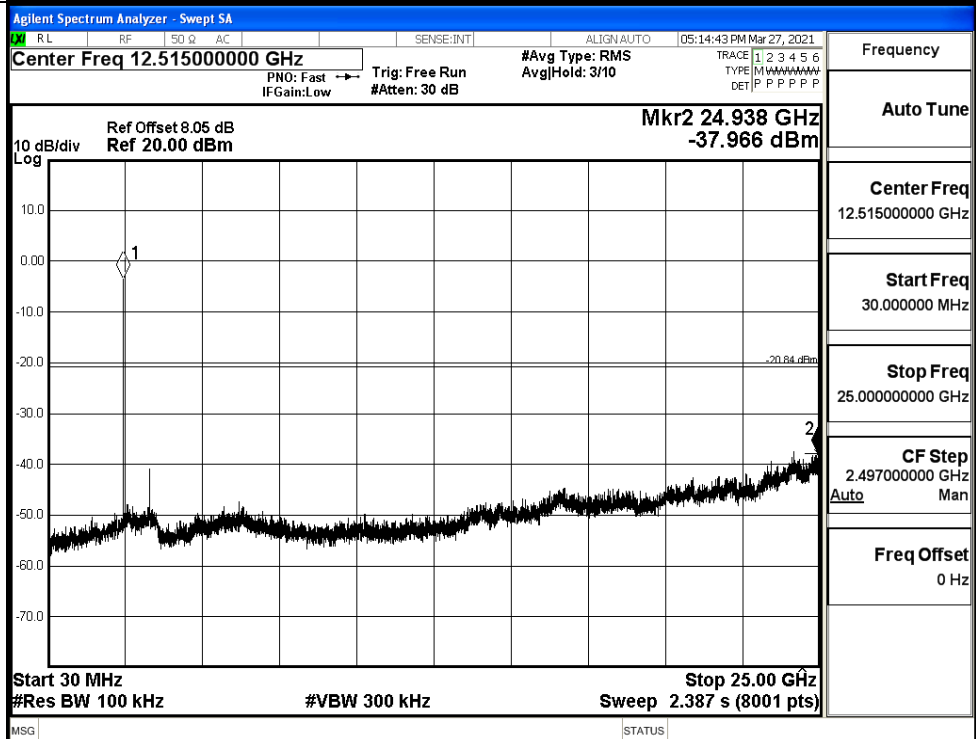


GFSK HCH Graphs

Pref

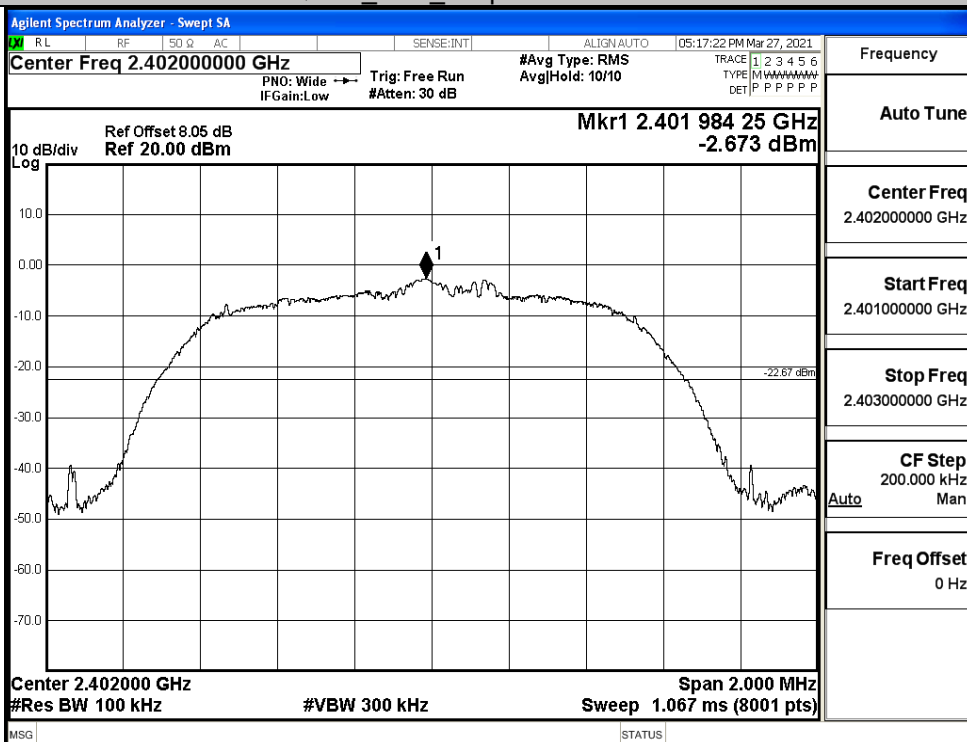


Puw

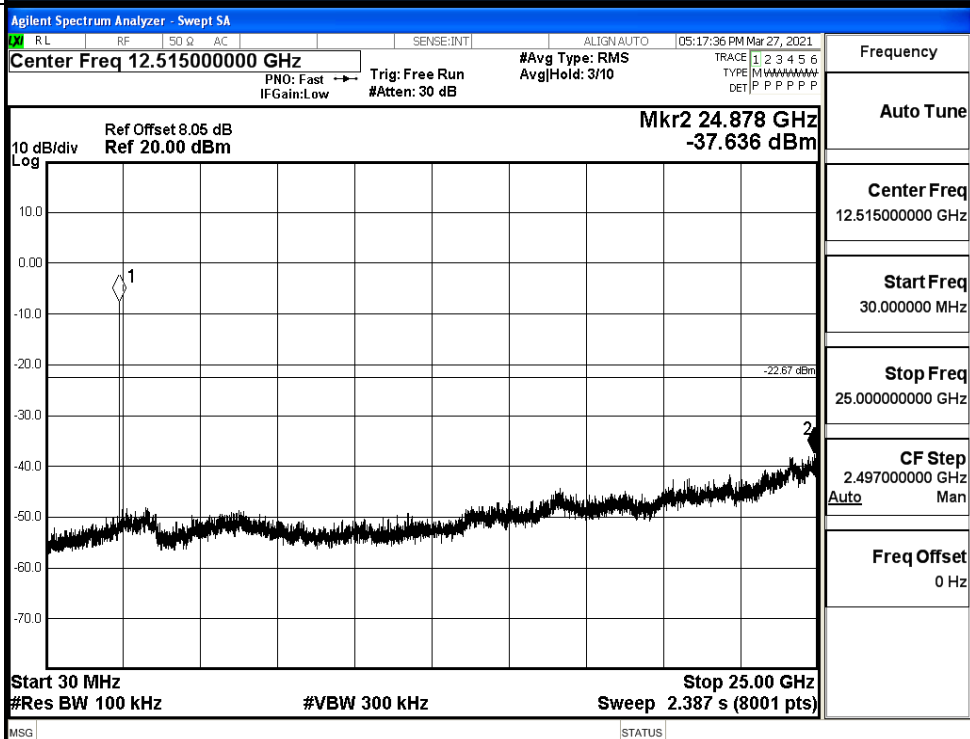


$\pi/4$ DQPSK_LCH_Graphs

Pref

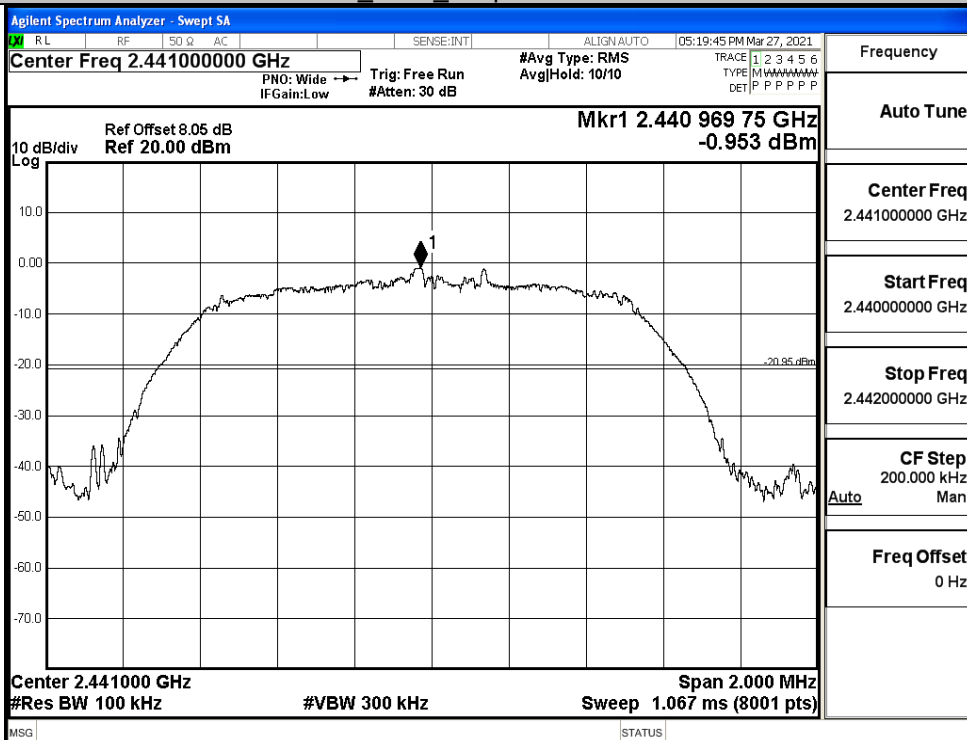


Puw

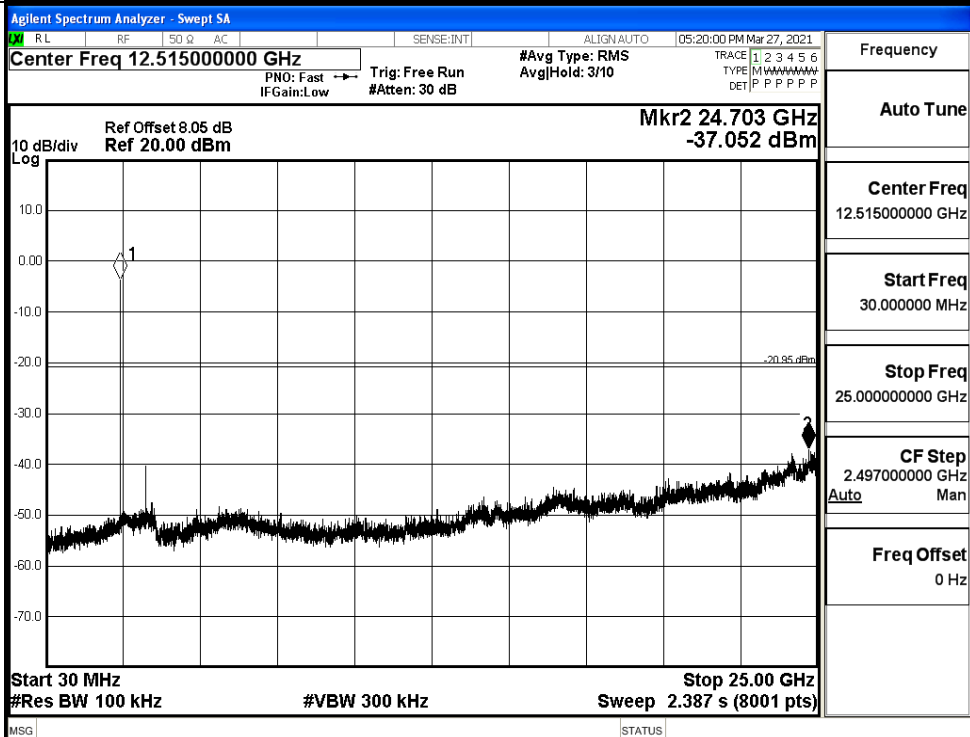


$\pi/4$ DQPSK_MCH_Graphs

Pref

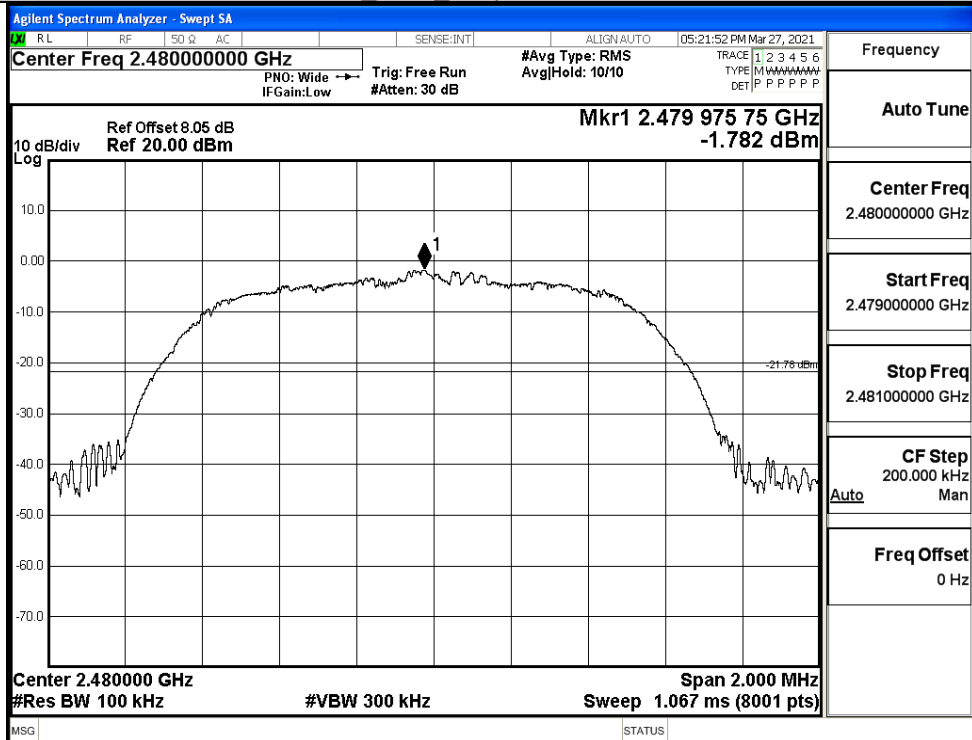


Puw

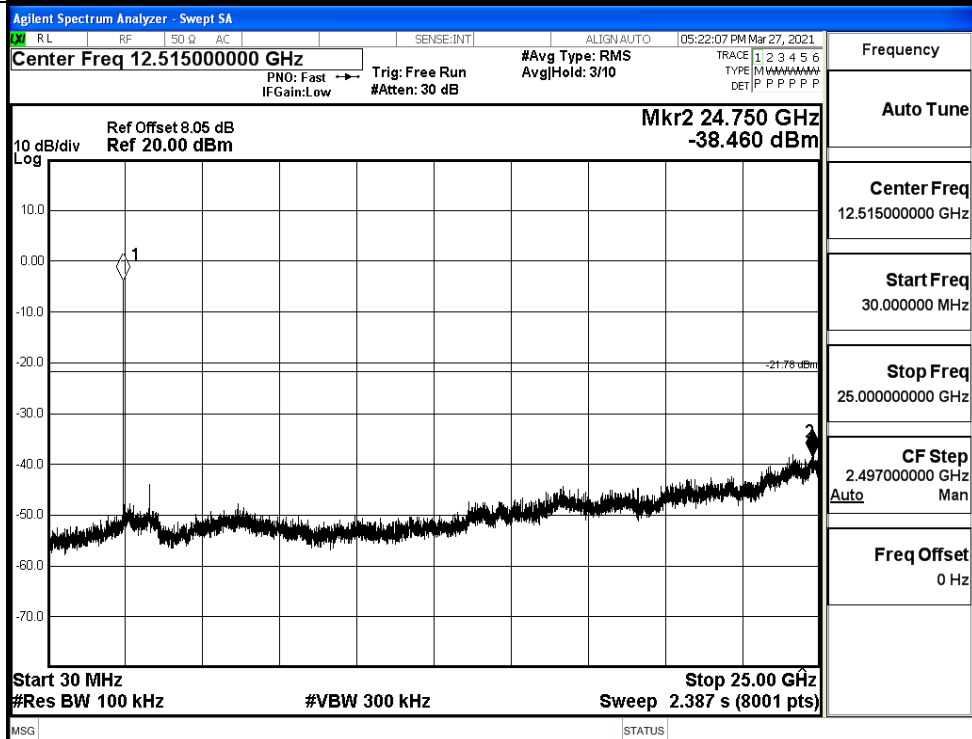


$\pi/4$ DQPSK_HCH_Graphs

Pref

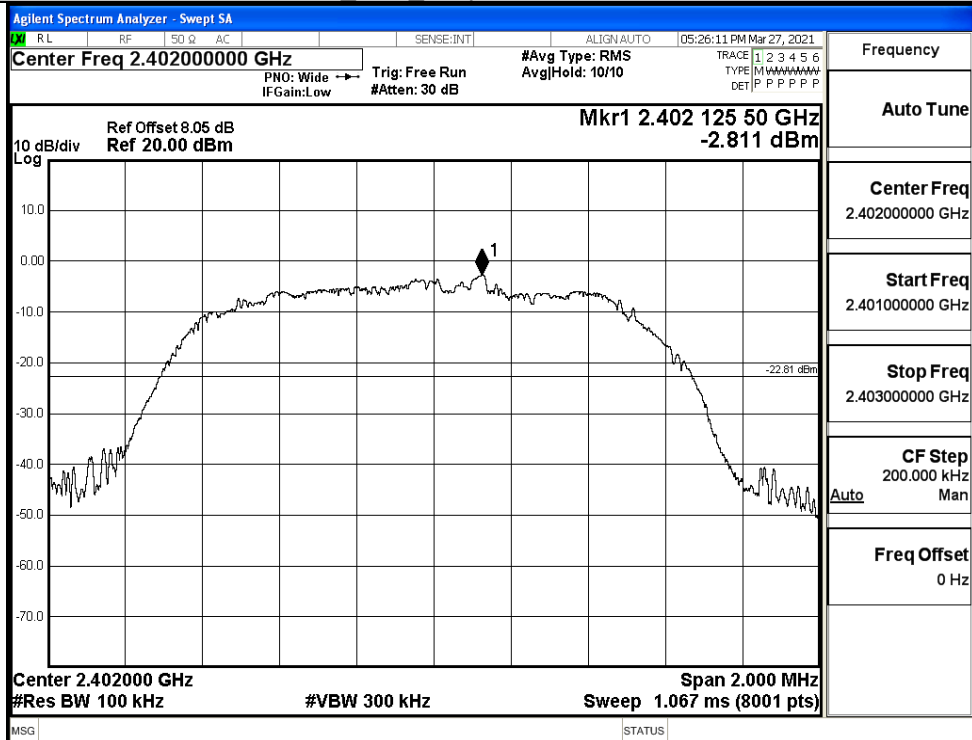


Puw

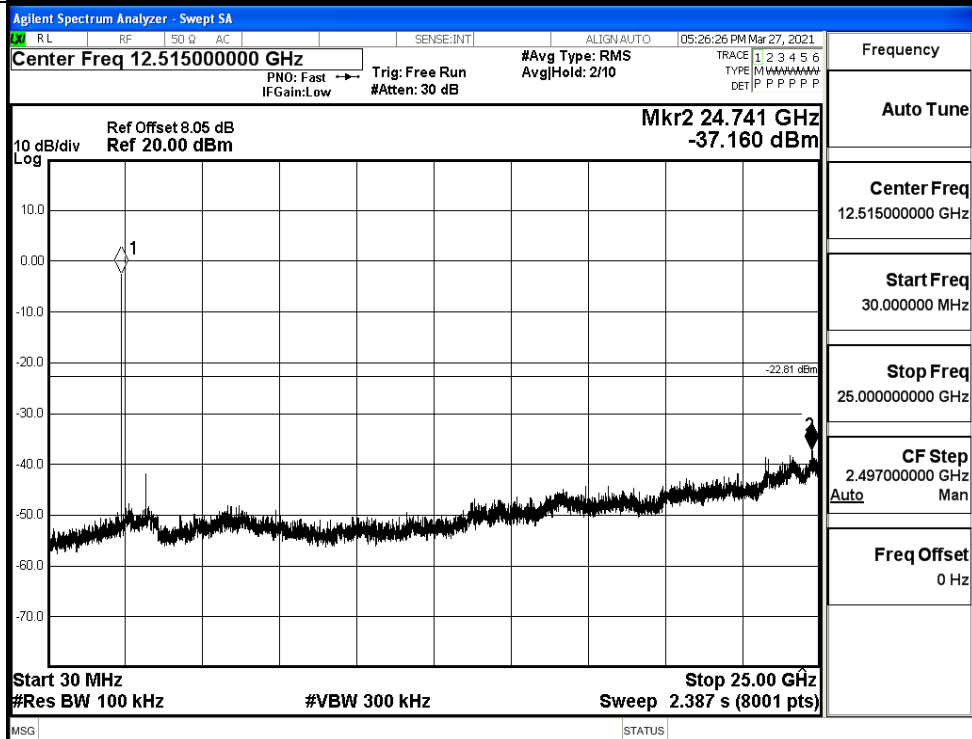


8DPSK_LCH_Graphs

Pref

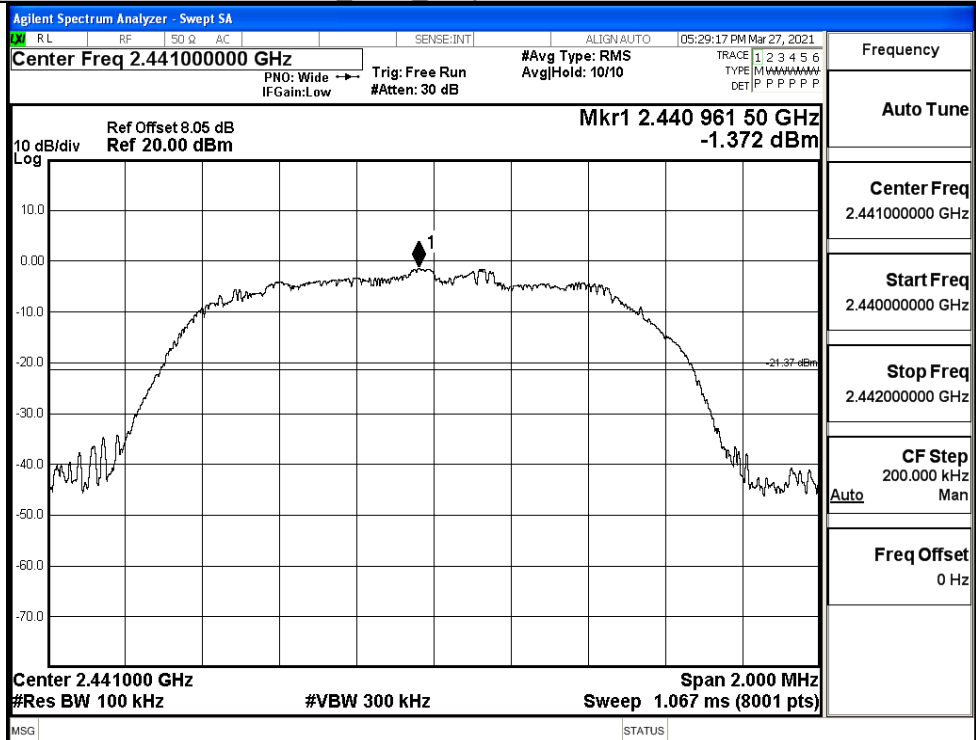


Puw

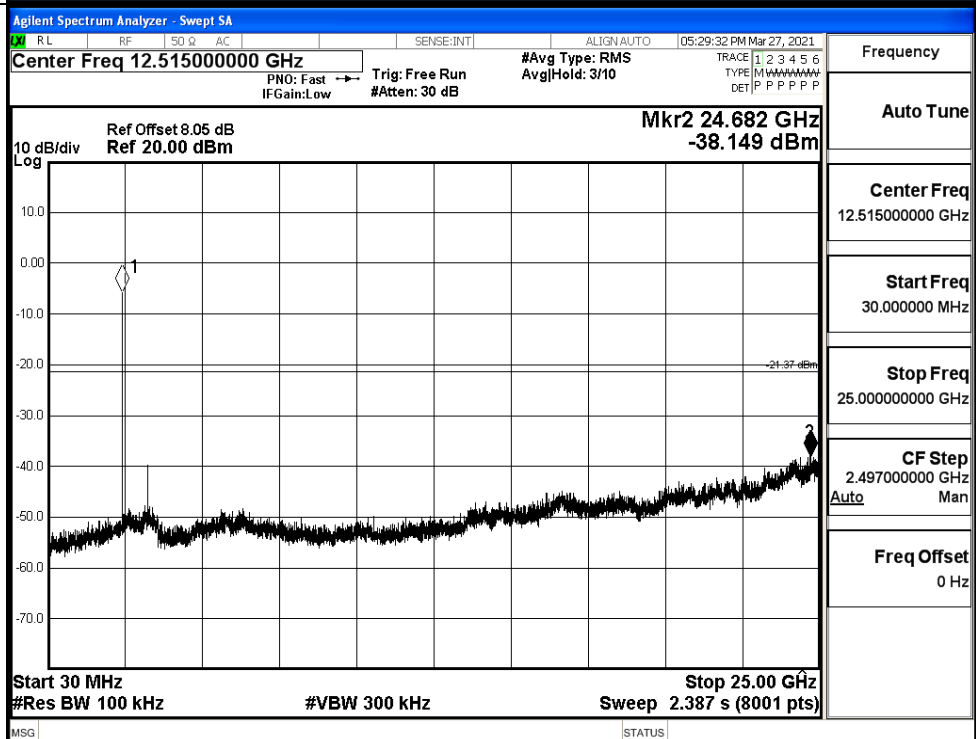


8DPSK_MCH_Graphs

Pref

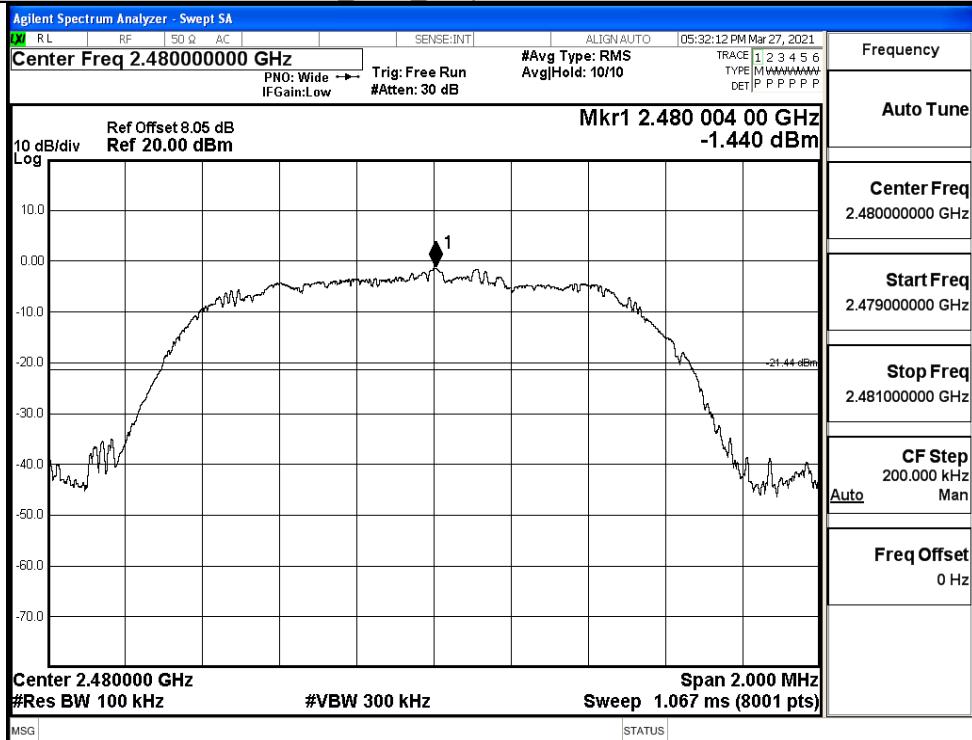


Puw

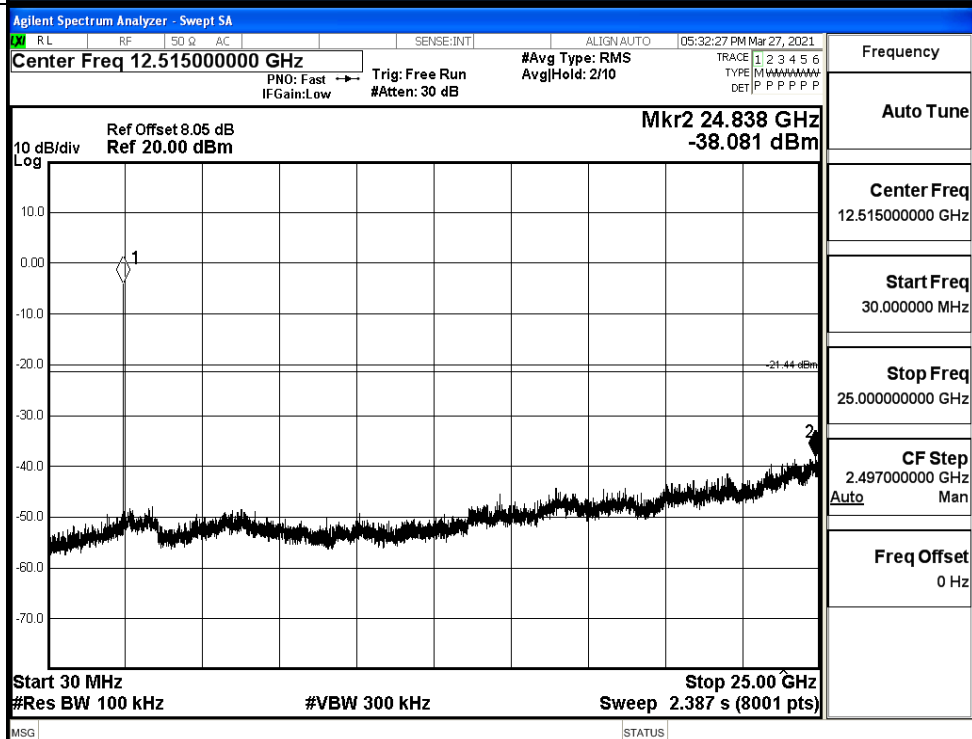


8DPSK_HCH_Graphs

Pref



Puw

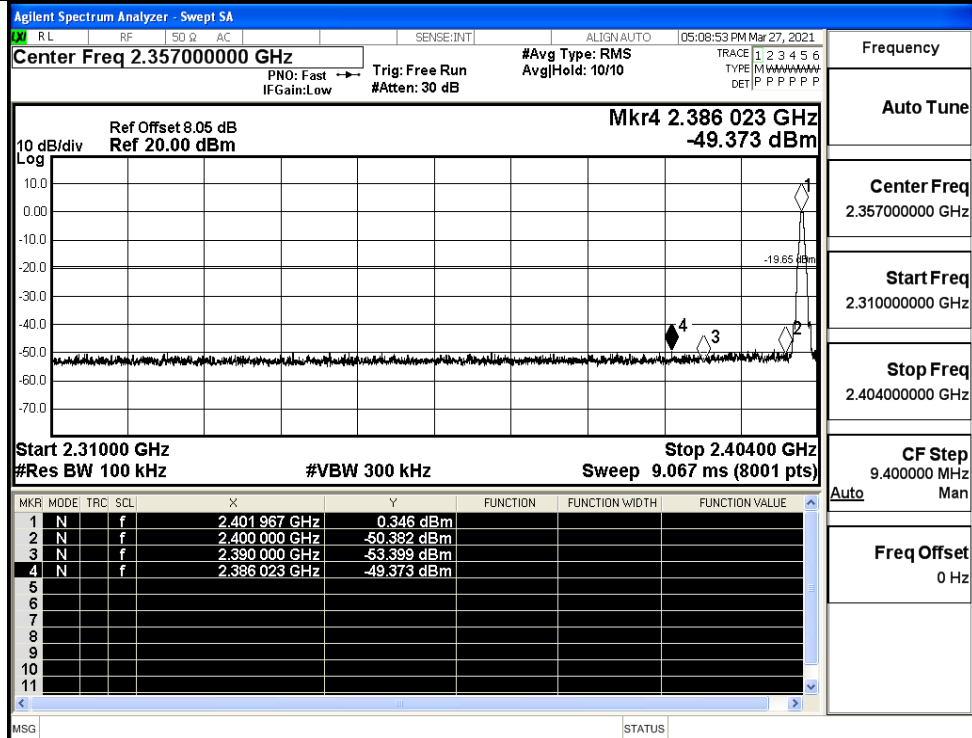


A.7 Band-edge for RF Conducted Emissions

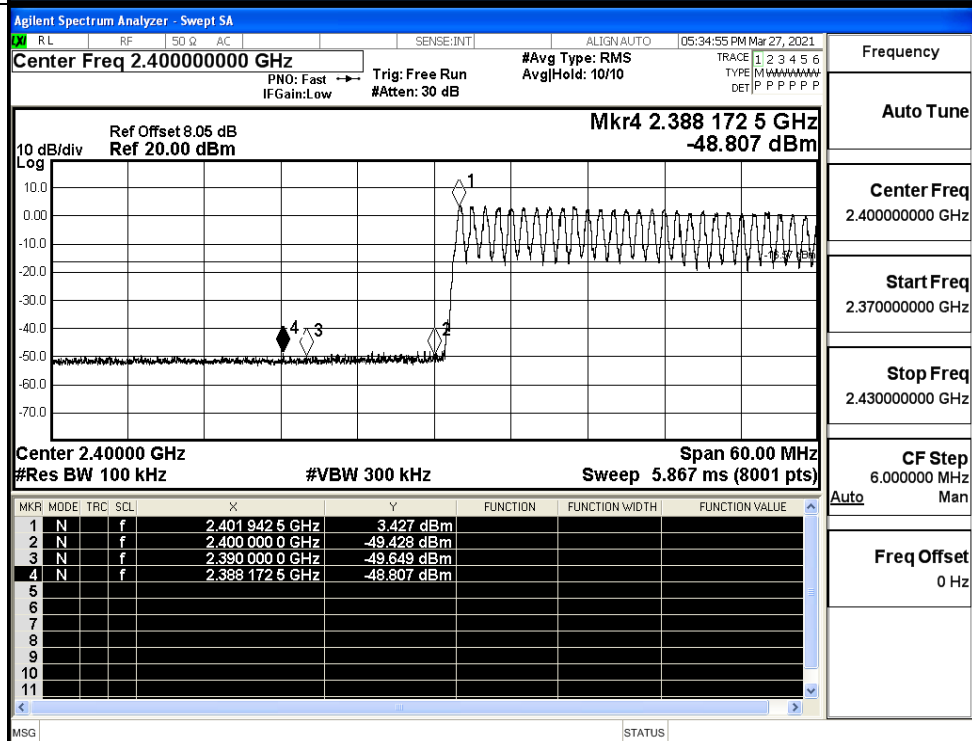
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.346	Off	-49.373	-19.65	PASS
			3.427	On	-48.807	-16.57	PASS
	HCH	2480	-0.501	Off	-46.691	-20.5	PASS
			-1.061	On	-47.722	-21.06	PASS
$\pi/4$ DQPSK	LCH	2402	-2.972	Off	-49.841	-22.97	PASS
			3.707	On	-49.155	-16.29	PASS
	HCH	2480	-1.149	Off	-47.255	-21.15	PASS
			-1.489	On	-46.830	-21.49	PASS
8DPSK	LCH	2402	-2.546	Off	-49.619	-22.55	PASS
			3.163	On	-49.297	-16.84	PASS
	HCH	2480	-0.839	Off	-47.103	-20.84	PASS
			-1.063	On	-47.430	-21.06	PASS

Test Graphs

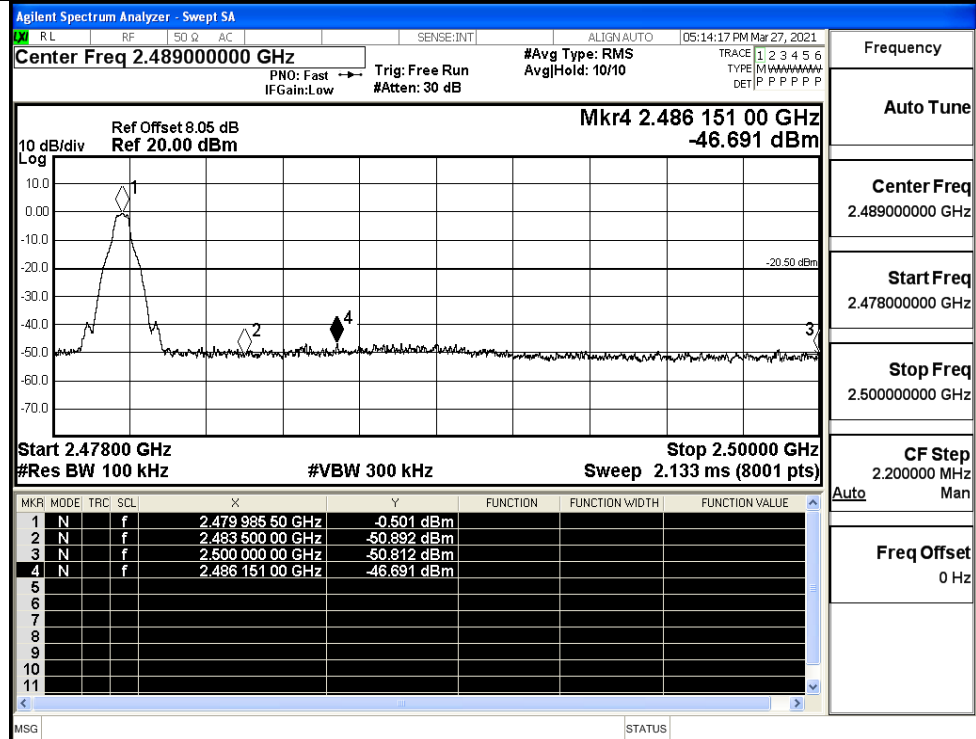
GFSK/LCH/No Hop



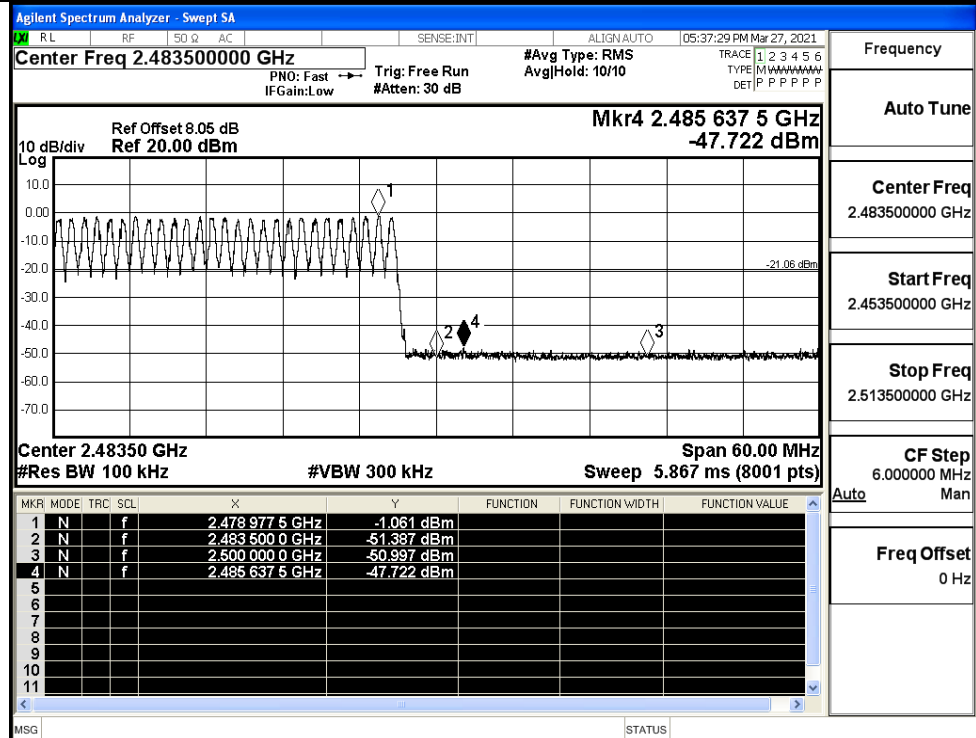
GFSK/LCH/Hop



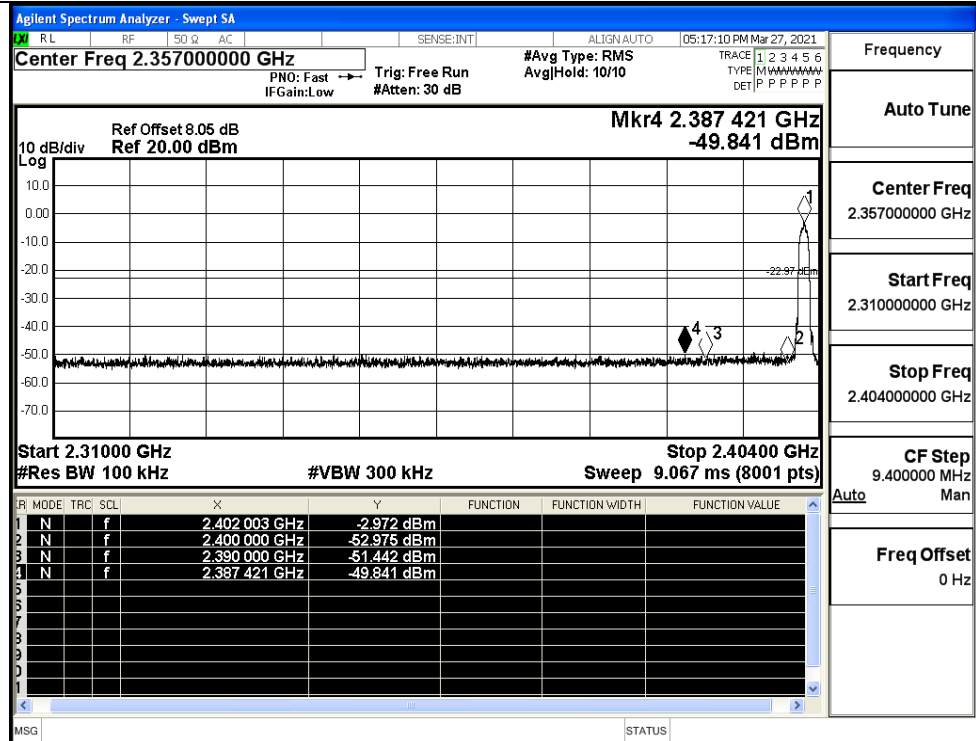
GFSK/HCH/No Hop



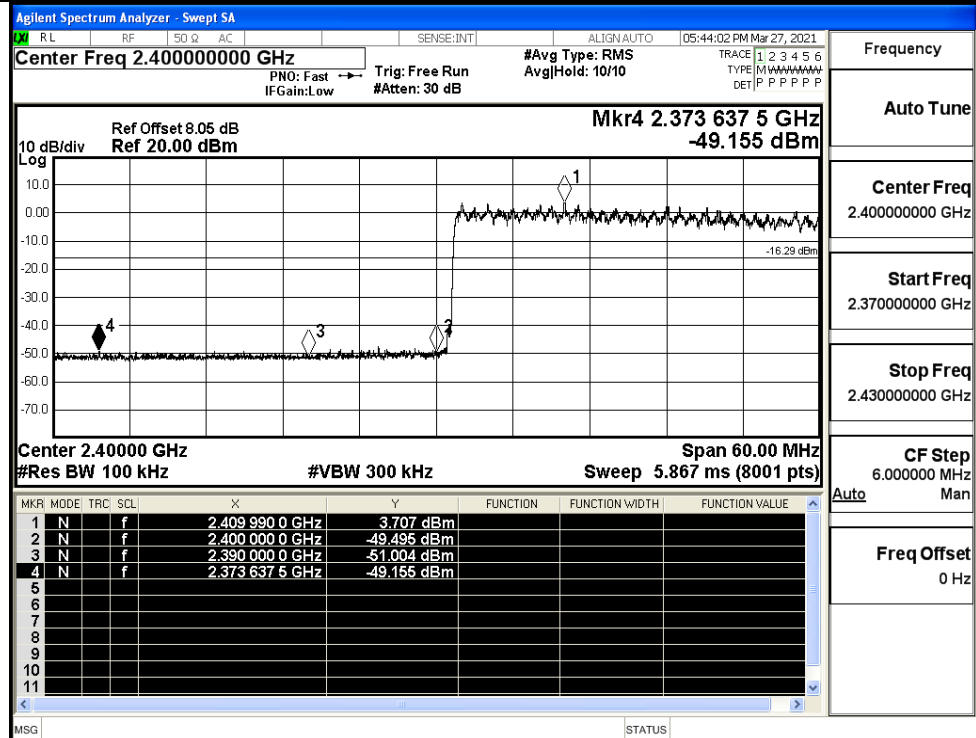
GFSK/HCH/Hop



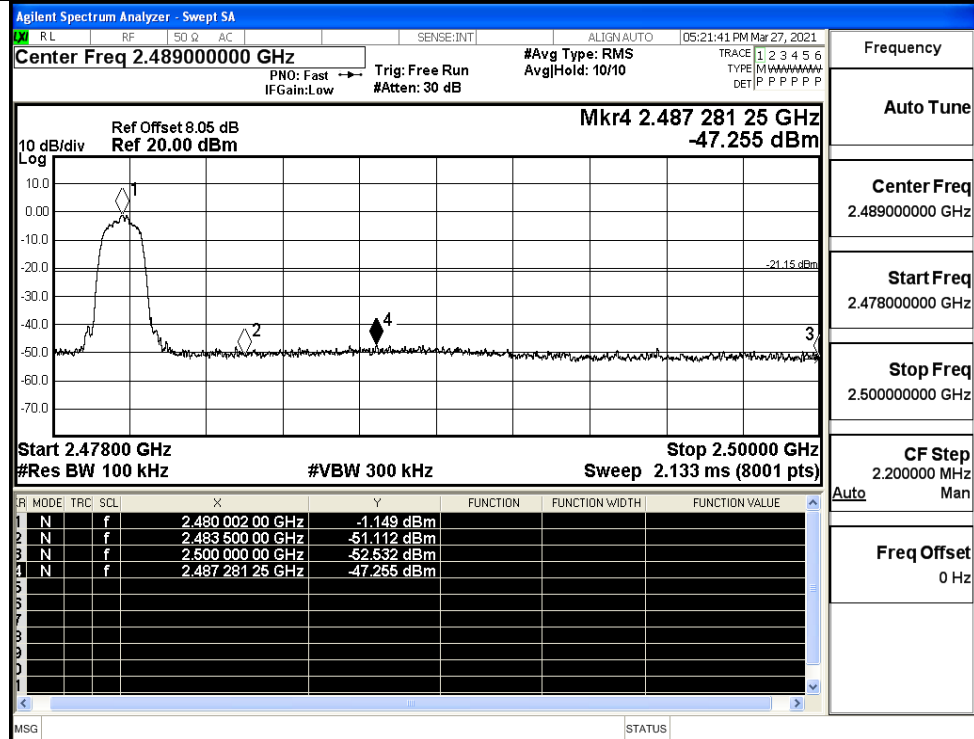
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



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



Frequency

Auto Tune

Center Freq

2.489000000 GHz

Start Freq

2.478000000 GHz

Stop Freq

2.500000000 GHz

CF Step

2.200000 MHz

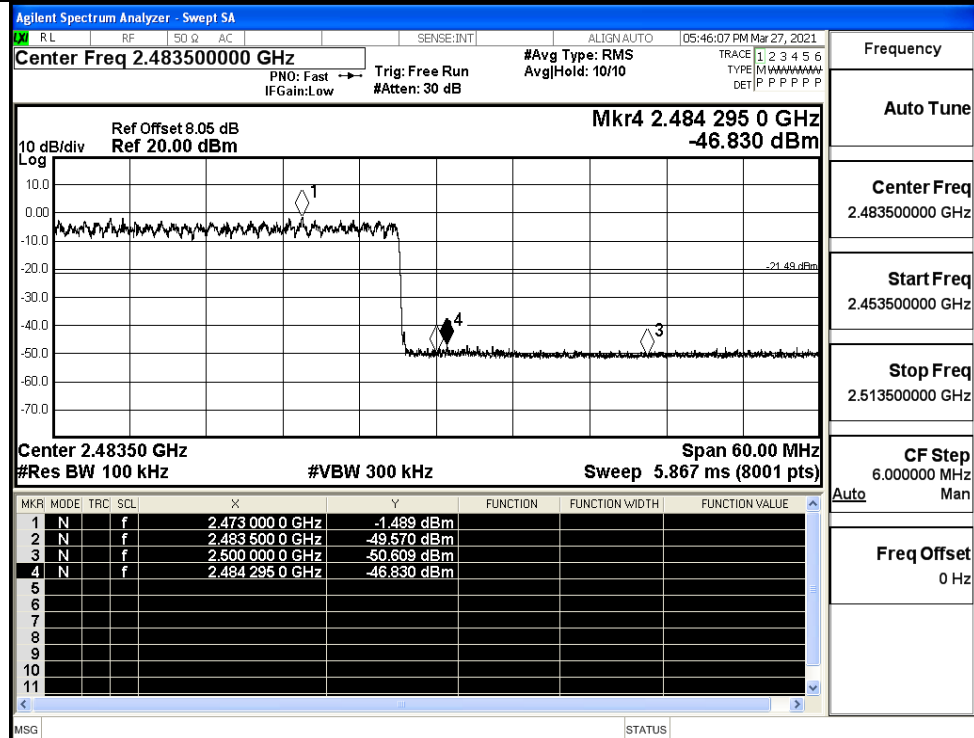
Auto

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

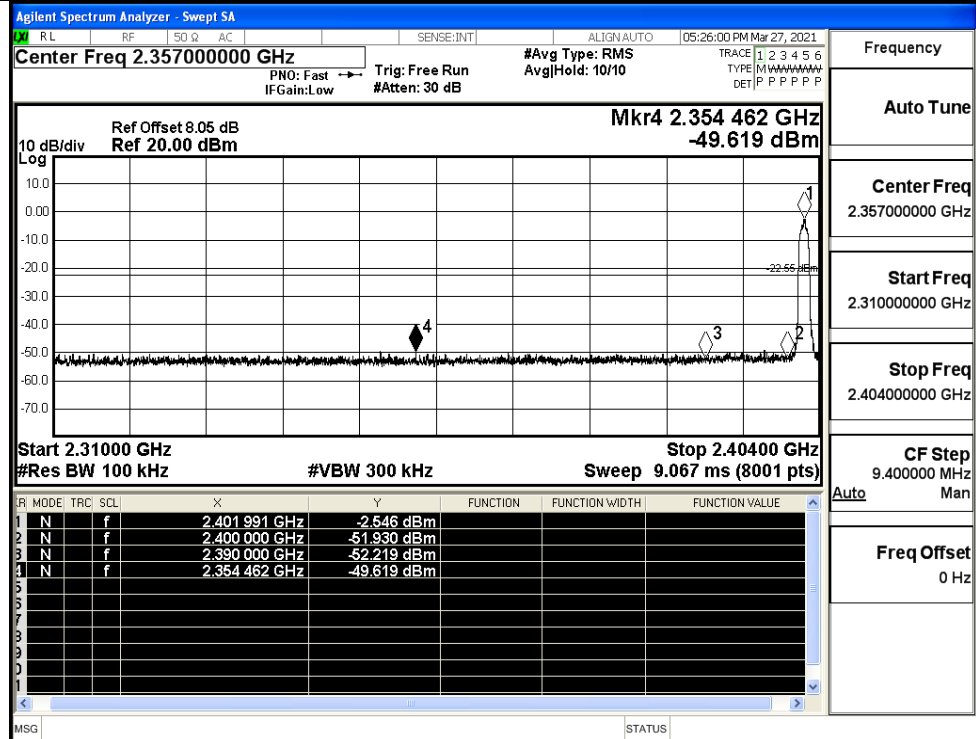
Auto

Man

Freq Offset

0 Hz

8DPSK/LCH/No Hop

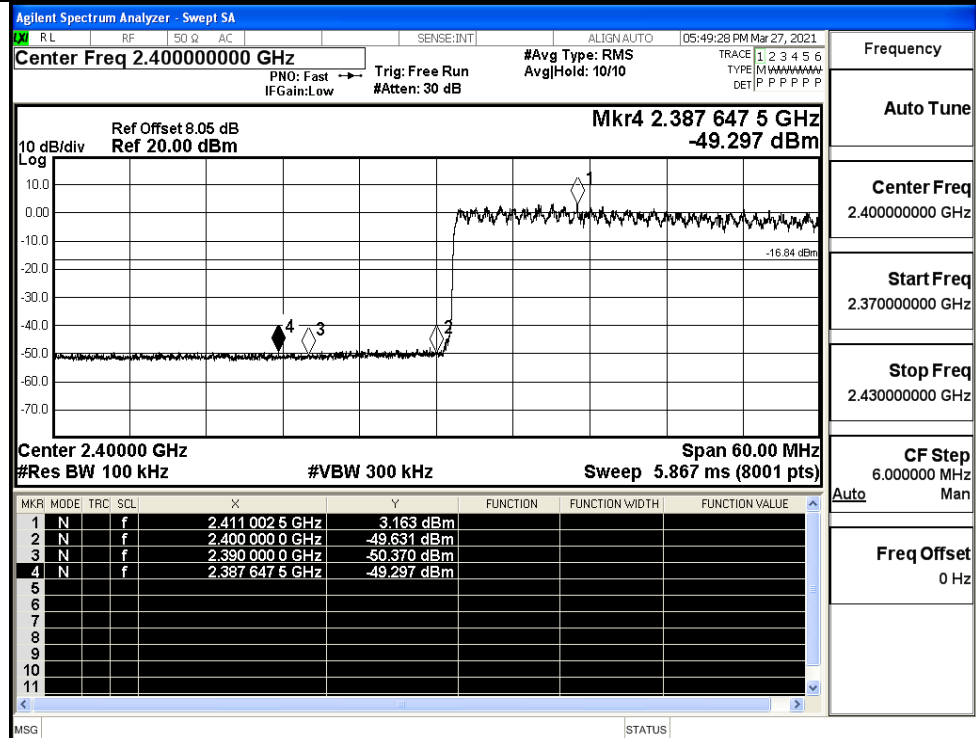


Frequency

Auto Tune

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

8DPSK/LCH/Hop

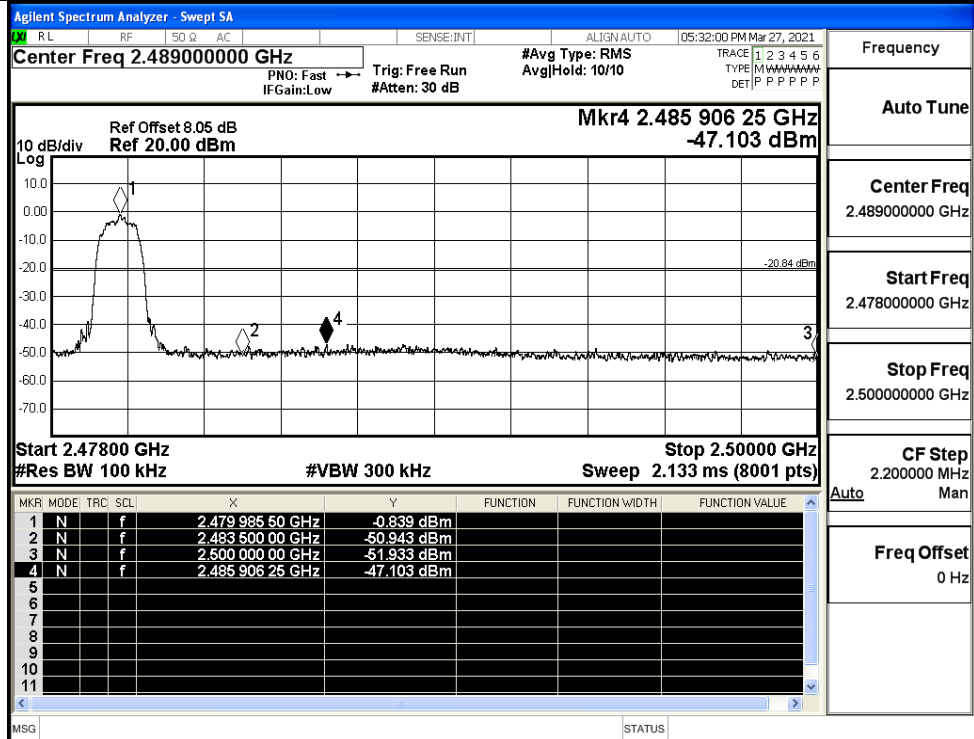


Frequency

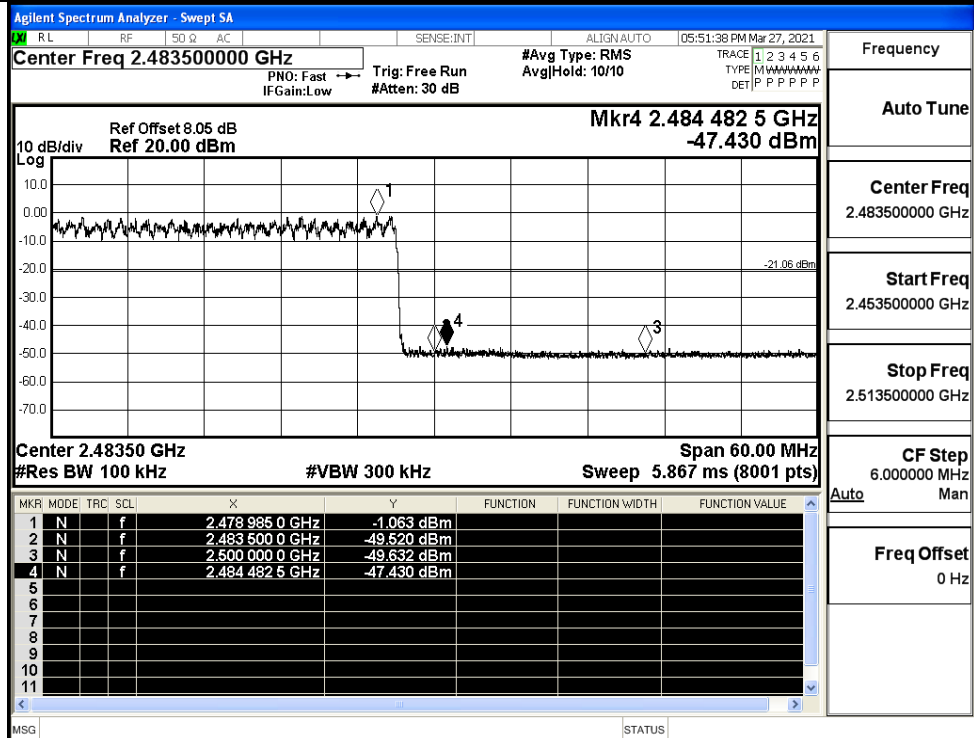
Auto Tune

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

8DPSK/HCH/No Hop



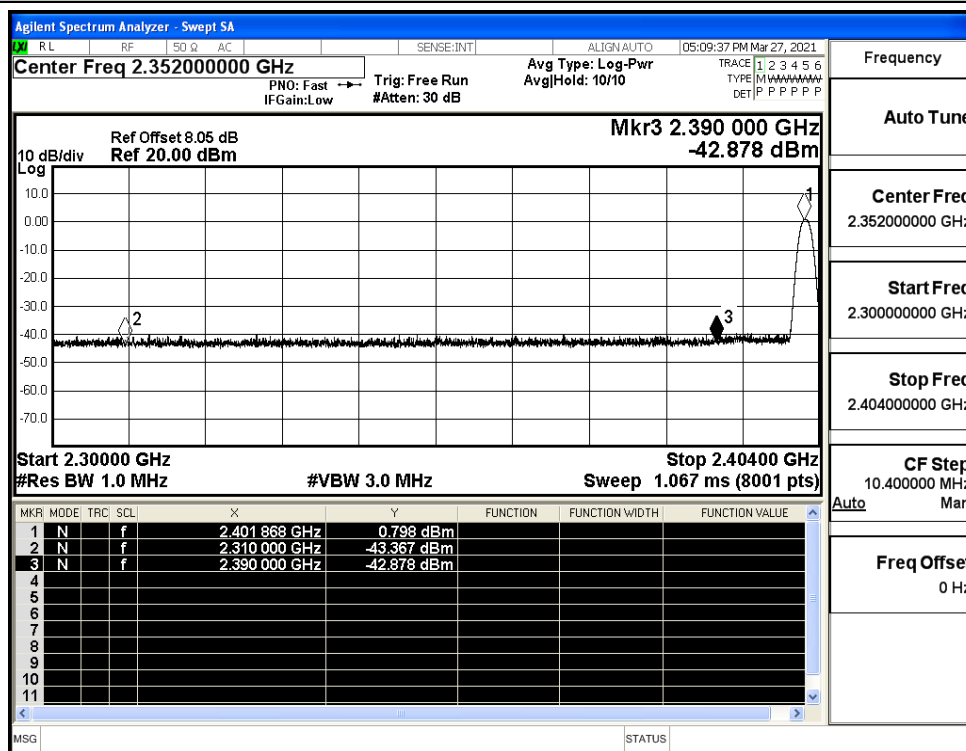
8DPSK/HCH/Hop



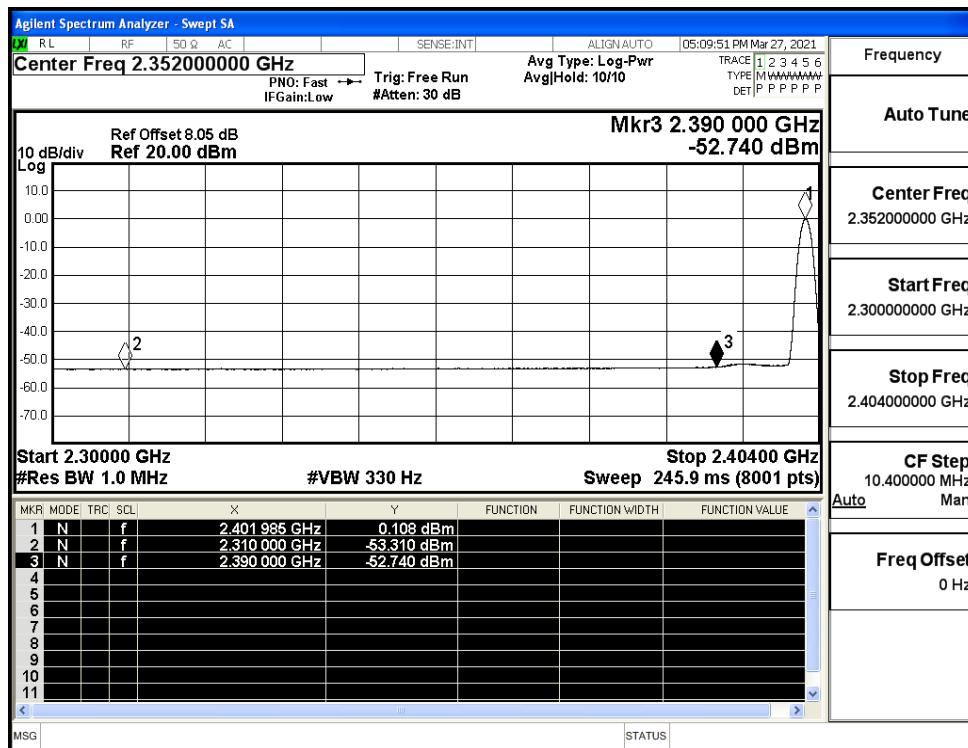
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.37	2.0	0	53.89	PEAK	74	PASS
	Off	2310.0	-53.31	2.0	0	43.95	AV	54	PASS
	Off	2390.0	-42.88	2.0	0	54.38	PEAK	74	PASS
	Off	2390.0	-52.74	2.0	0	44.52	AV	54	PASS
	Off	2483.5	-40.74	2.0	0	56.52	PEAK	74	PASS
	Off	2483.5	-50.77	2.0	0	46.49	AV	54	PASS
	Off	2500.0	-40.33	2.0	0	56.93	PEAK	74	PASS
	Off	2500.0	-52.17	2.0	0	45.09	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.32	2.0	0	53.94	PEAK	74	PASS
	Off	2310.0	-53.32	2.0	0	43.94	AV	54	PASS
	Off	2390.0	-42.50	2.0	0	54.76	PEAK	74	PASS
	Off	2390.0	-52.63	2.0	0	44.63	AV	54	PASS
	Off	2483.5	-41.47	2.0	0	55.79	PEAK	74	PASS
	Off	2483.5	-50.66	2.0	0	46.6	AV	54	PASS
	Off	2500.0	-40.66	2.0	0	56.6	PEAK	74	PASS
	Off	2500.0	-52.17	2.0	0	45.09	AV	54	PASS
8DPSK	Off	2310.0	-41.96	2.0	0	55.3	PEAK	74	PASS
	Off	2310.0	-53.38	2.0	0	43.88	AV	54	PASS
	Off	2390.0	-43.32	2.0	0	53.94	PEAK	74	PASS
	Off	2390.0	-52.90	2.0	0	44.36	AV	54	PASS
	Off	2483.5	-40.72	2.0	0	56.54	PEAK	74	PASS
	Off	2483.5	-50.55	2.0	0	46.71	AV	54	PASS
	Off	2500.0	-40.01	2.0	0	57.25	PEAK	74	PASS
	Off	2500.0	-52.08	2.0	0	45.18	AV	54	PASS

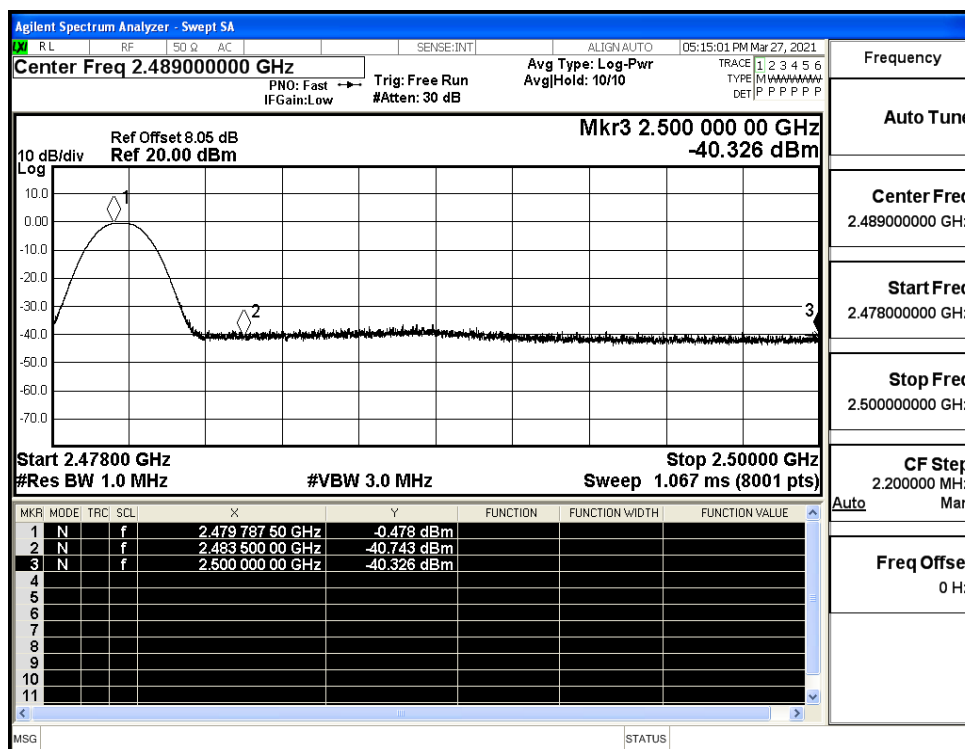
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



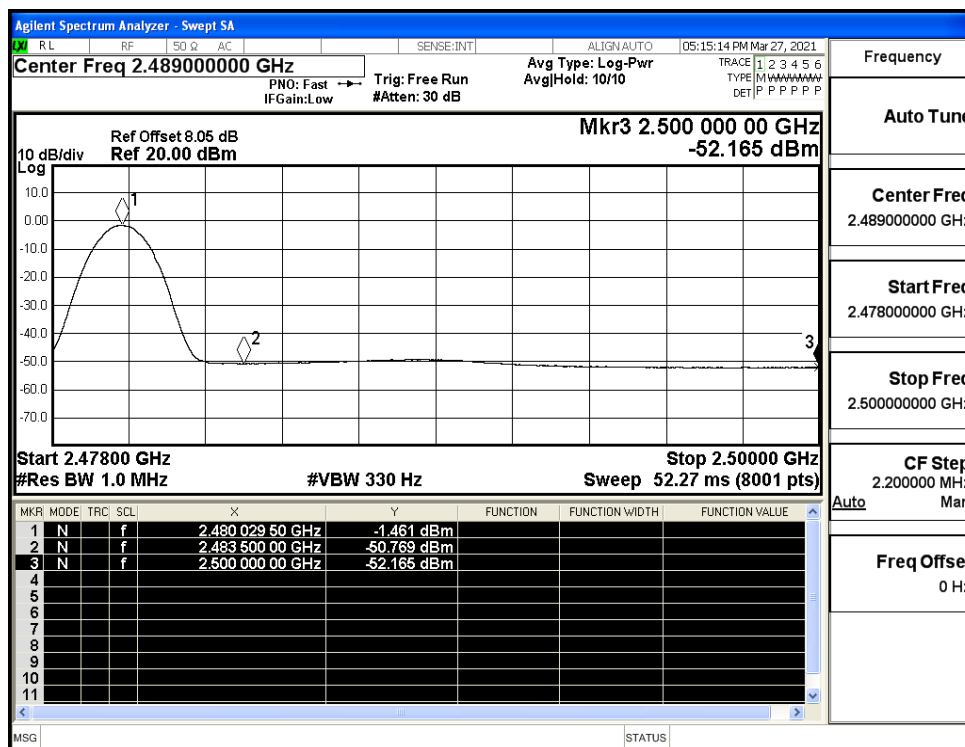
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

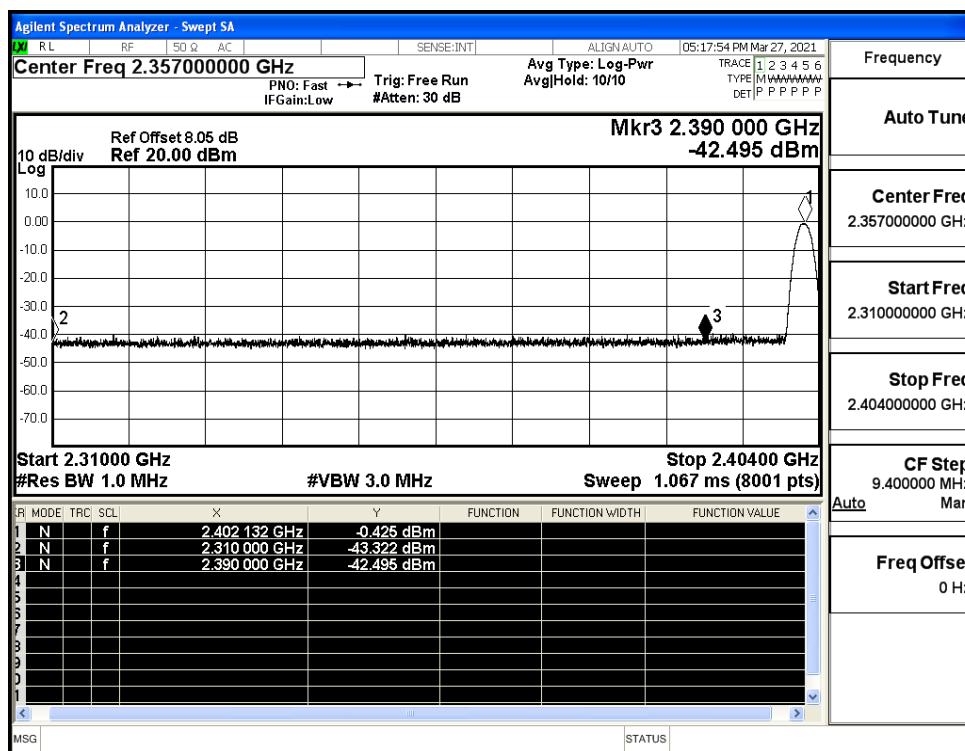
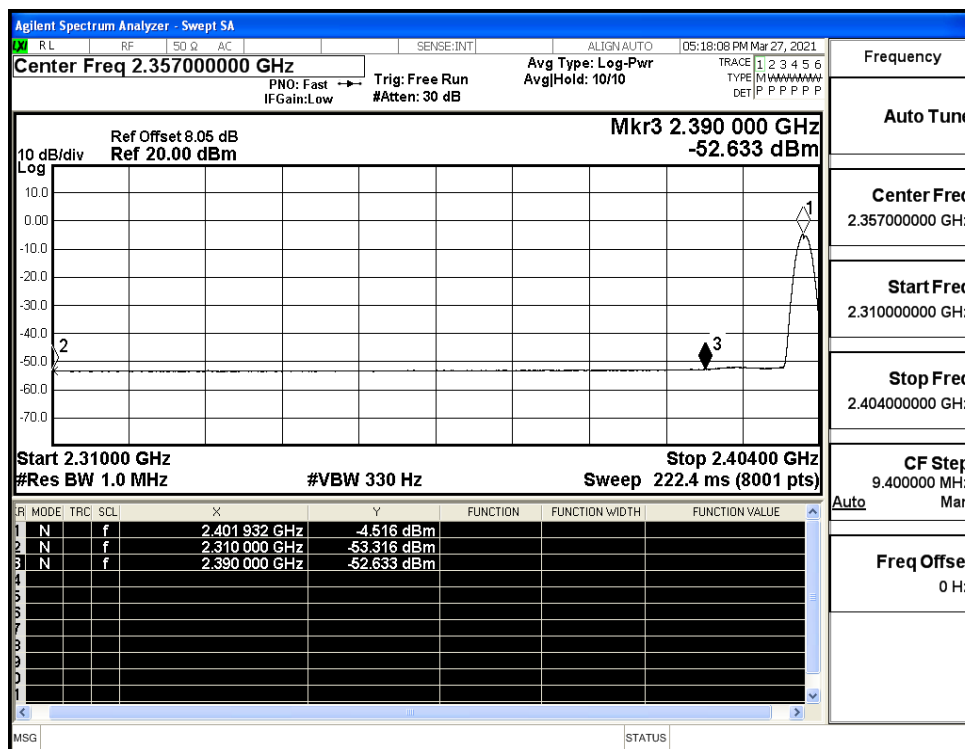


Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)

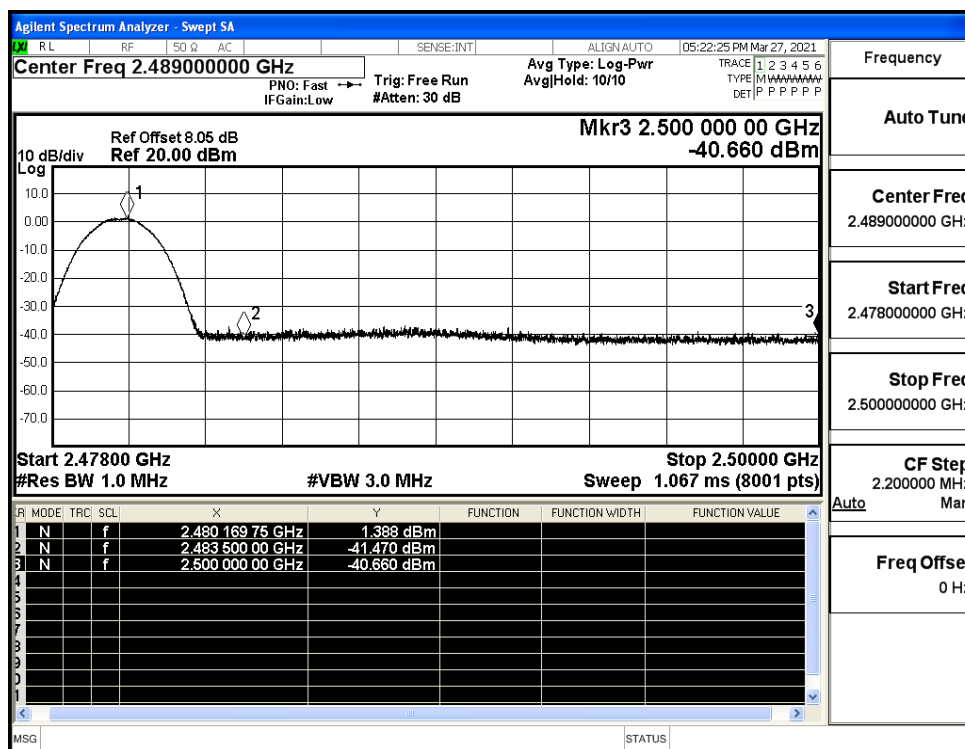


Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)

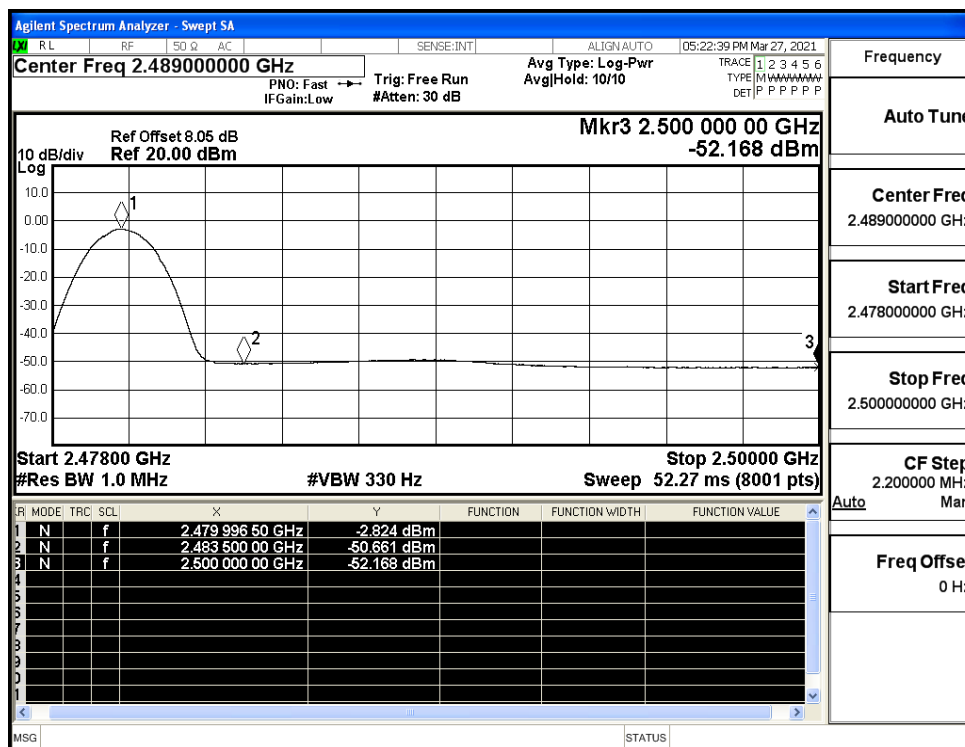


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

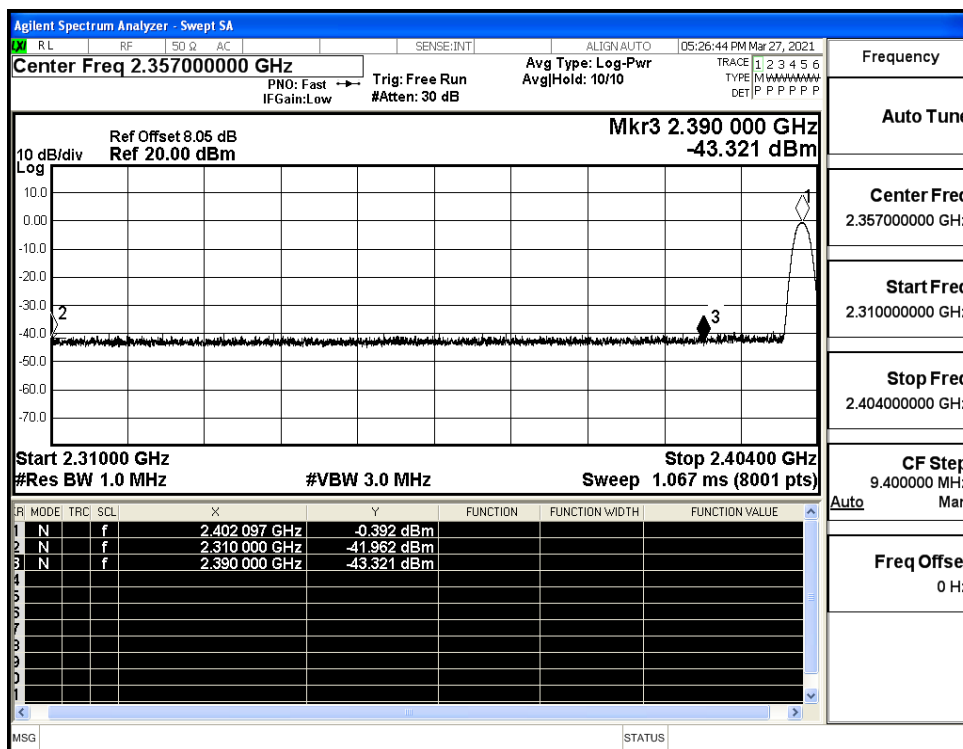
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



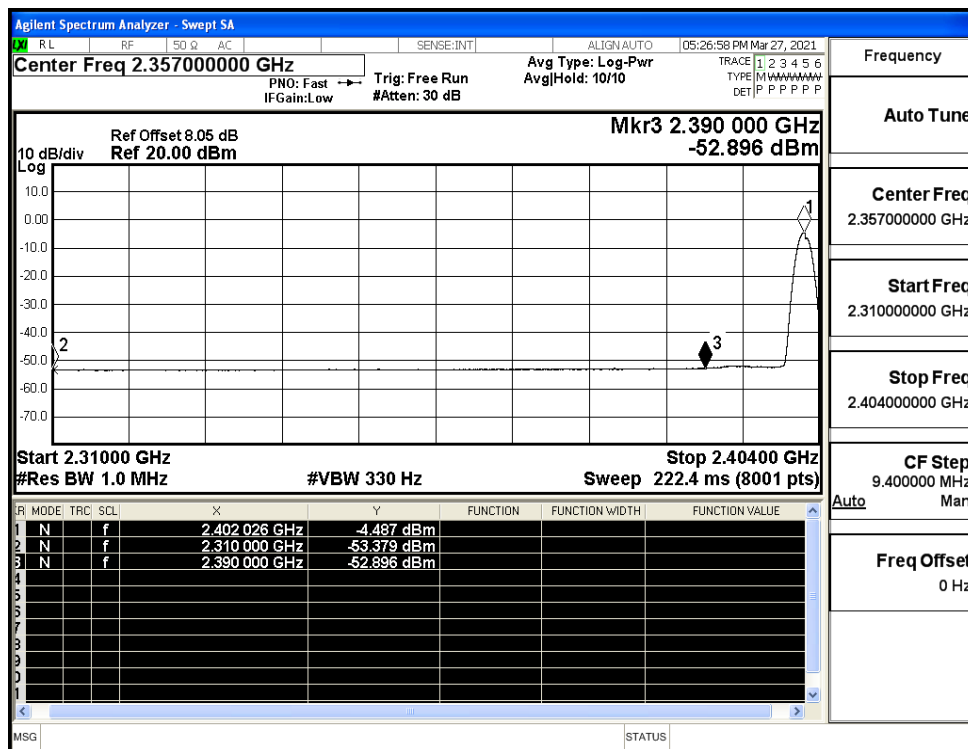
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



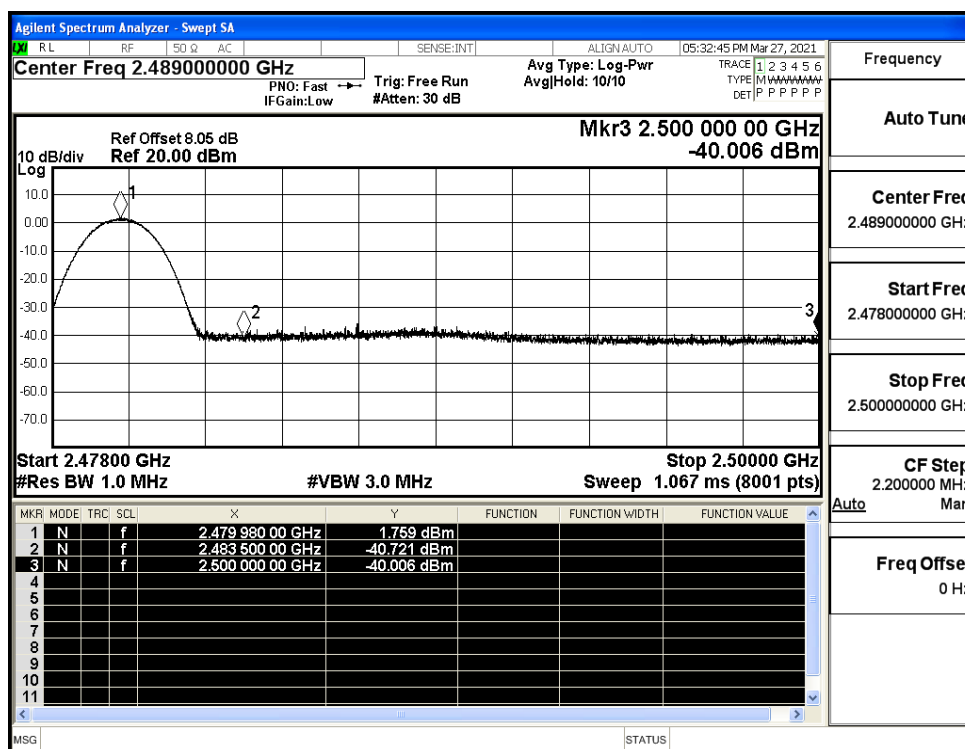
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

