

Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: Wireless Airbuds

Trade Mark: N/A

Test Model: Air Buds

Environmental Conditions

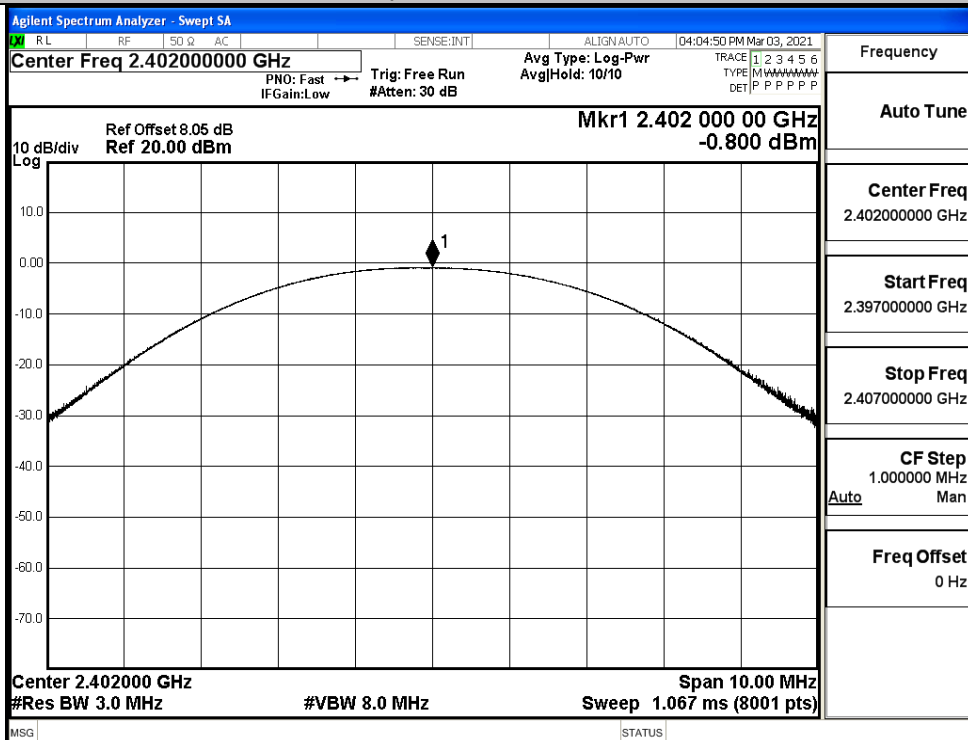
Temperature:	24.2° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

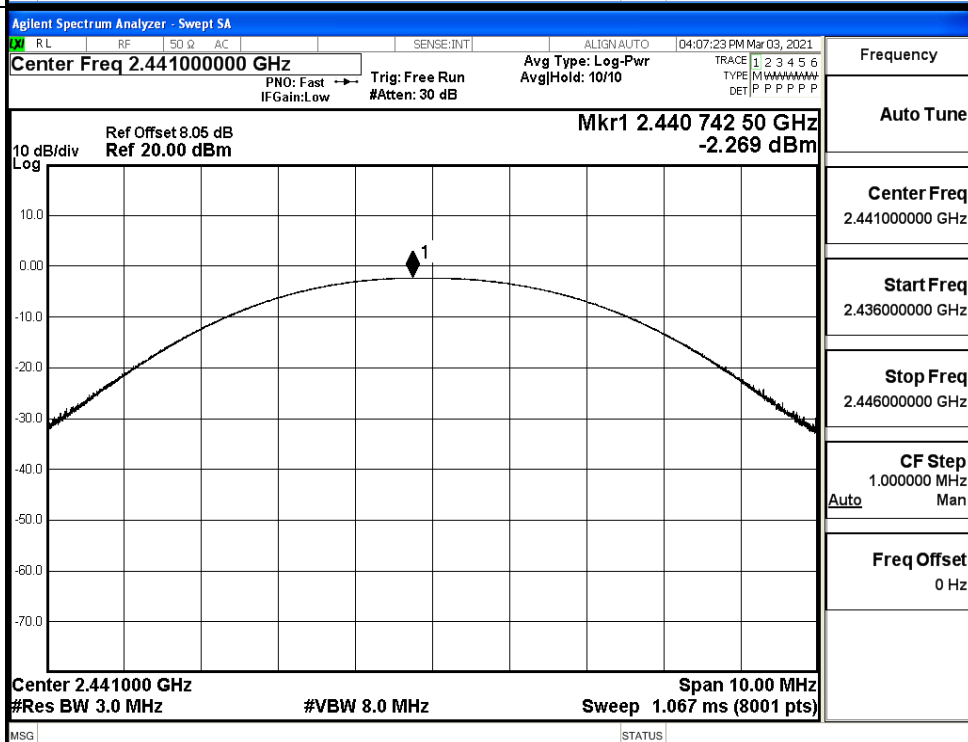
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.800	21	PASS
	MCH	-2.269	21	PASS
	HCH	-3.501	21	PASS
$\pi/4$ DQPSK	LCH	1.540	21	PASS
	MCH	0.210	21	PASS
	HCH	-1.035	21	PASS
8DPSK	LCH	1.928	21	PASS
	MCH	0.633	21	PASS
	HCH	-0.562	21	PASS

Test Graphs

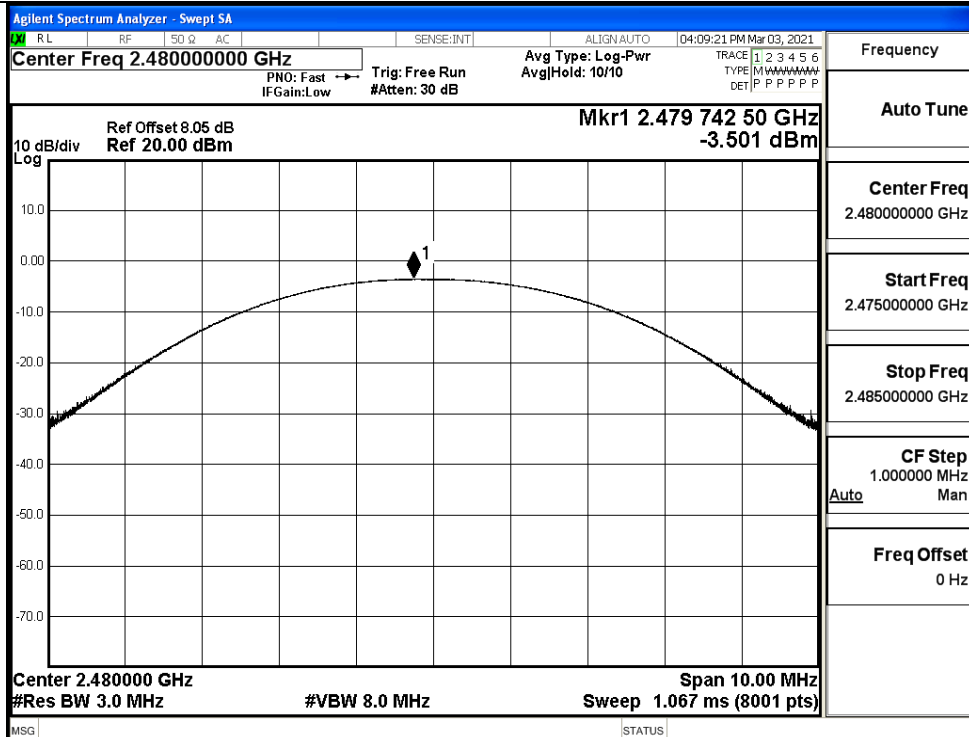
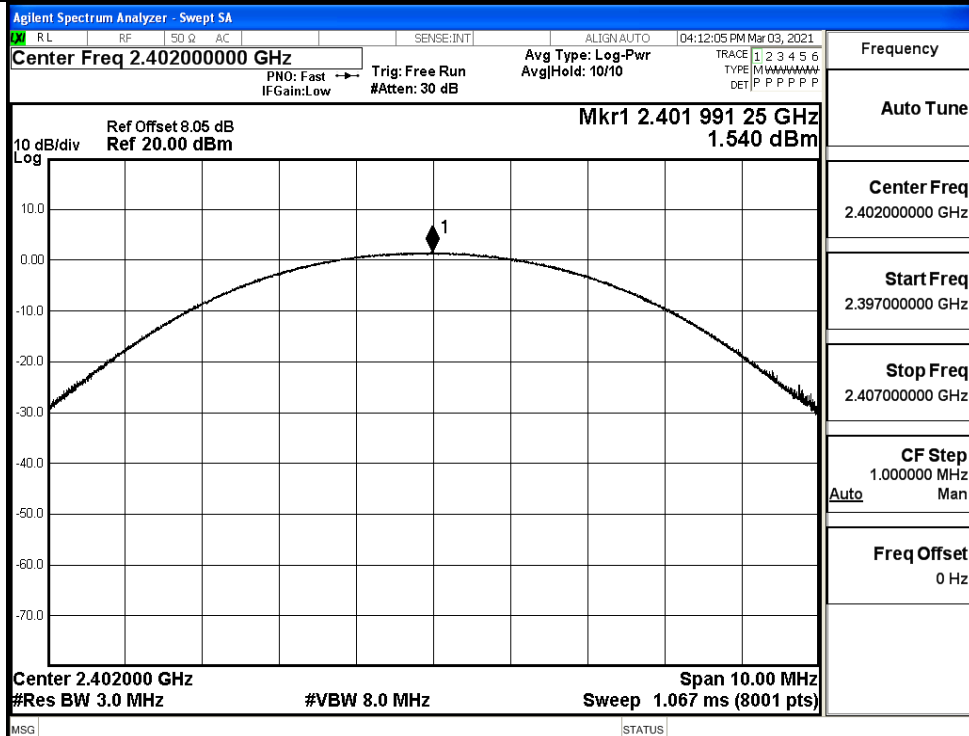
GFSK/LCH

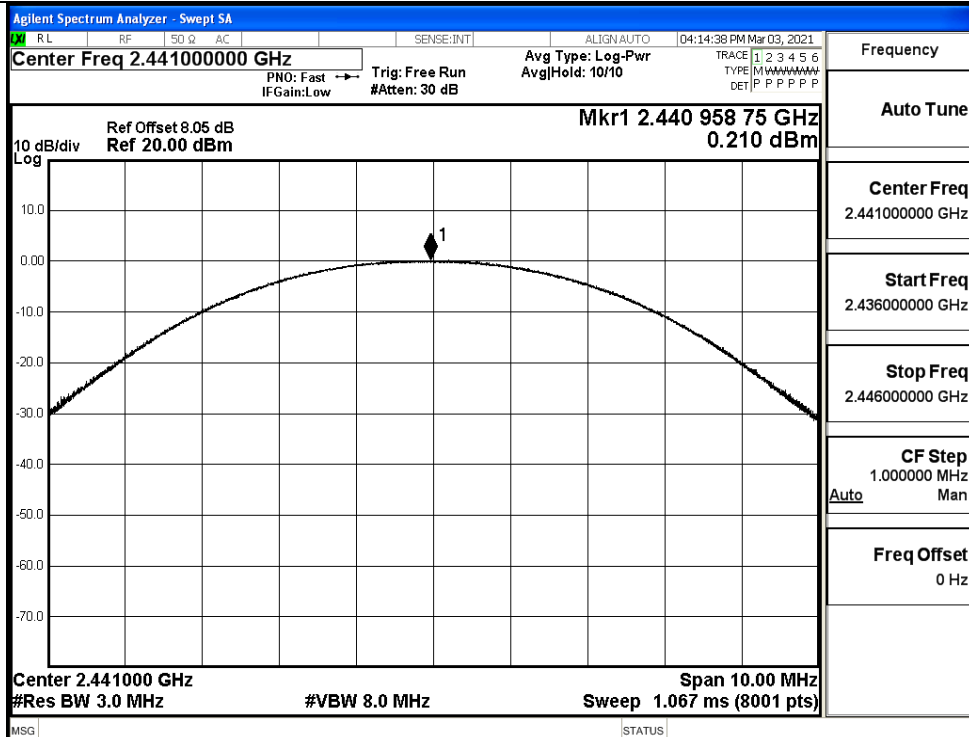
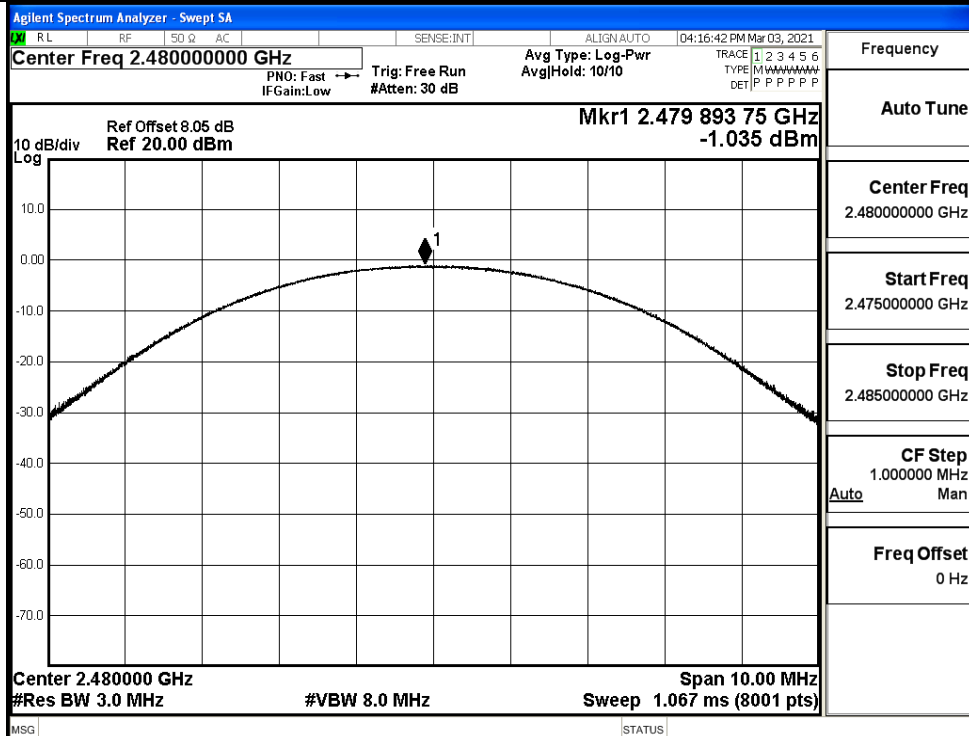


GFSK/MCH

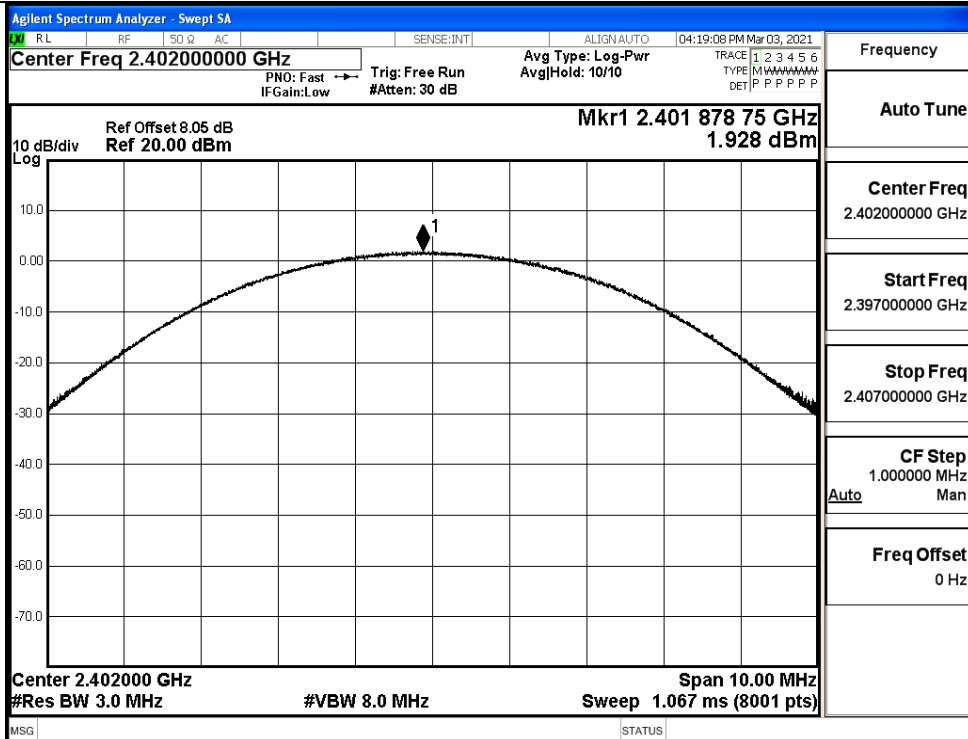


GFSK/HCH

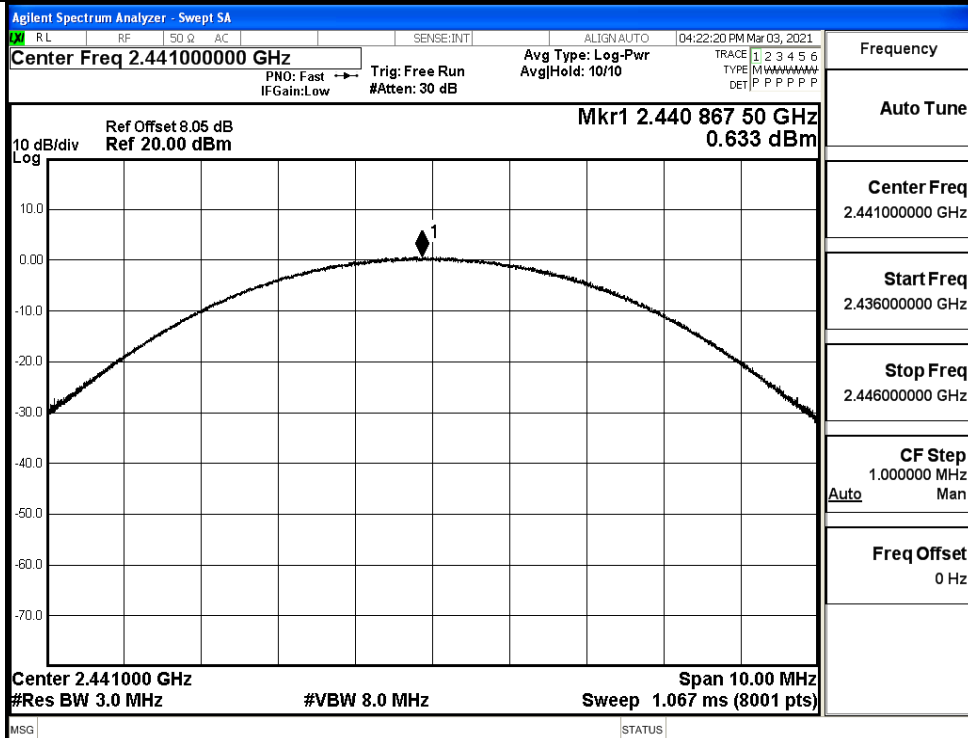
 π /4DQPSK/LCH

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

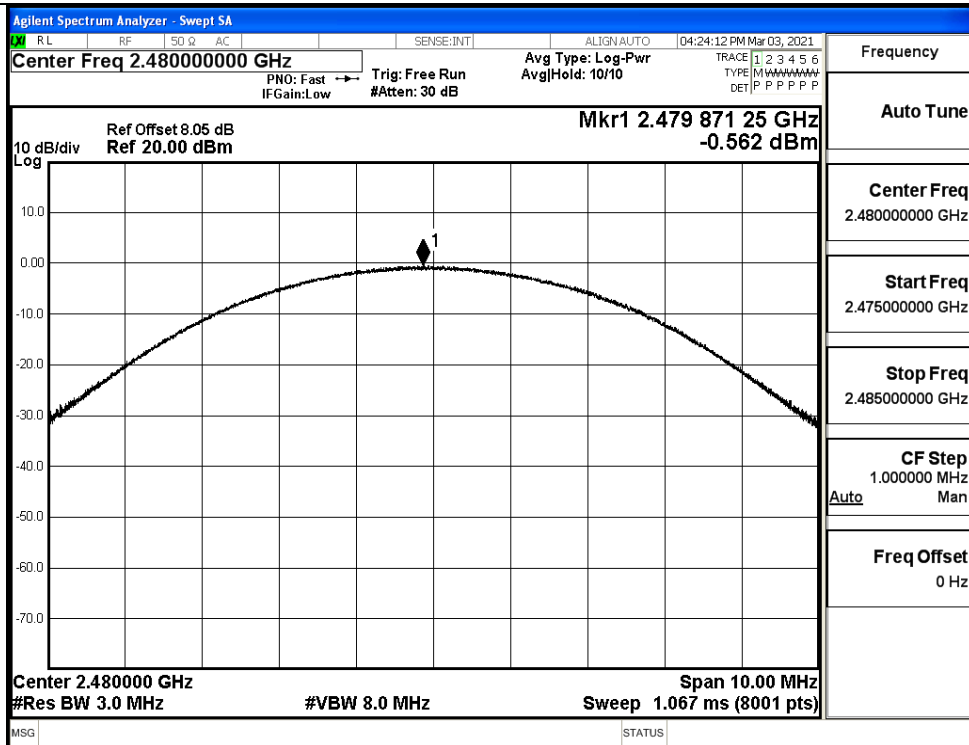
8DPSK/LCH



8DPSK/MCH



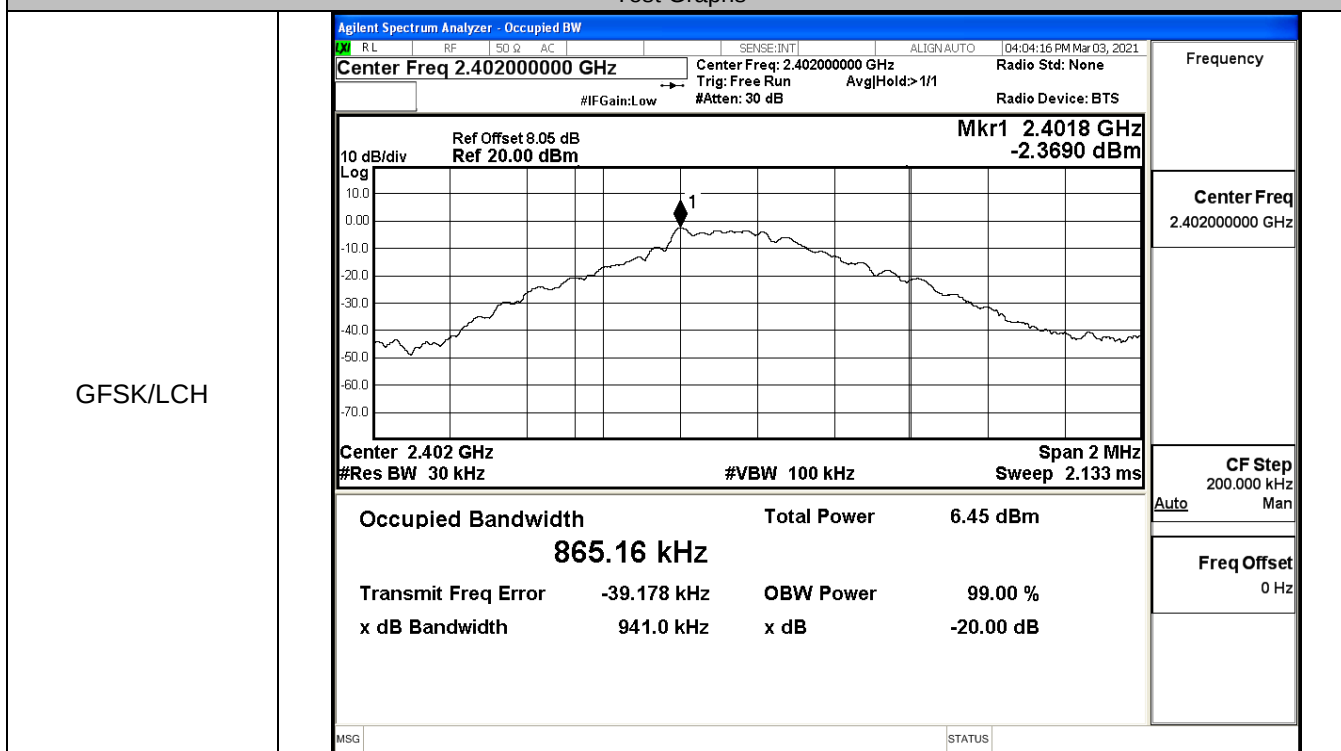
8DPSK/HCH



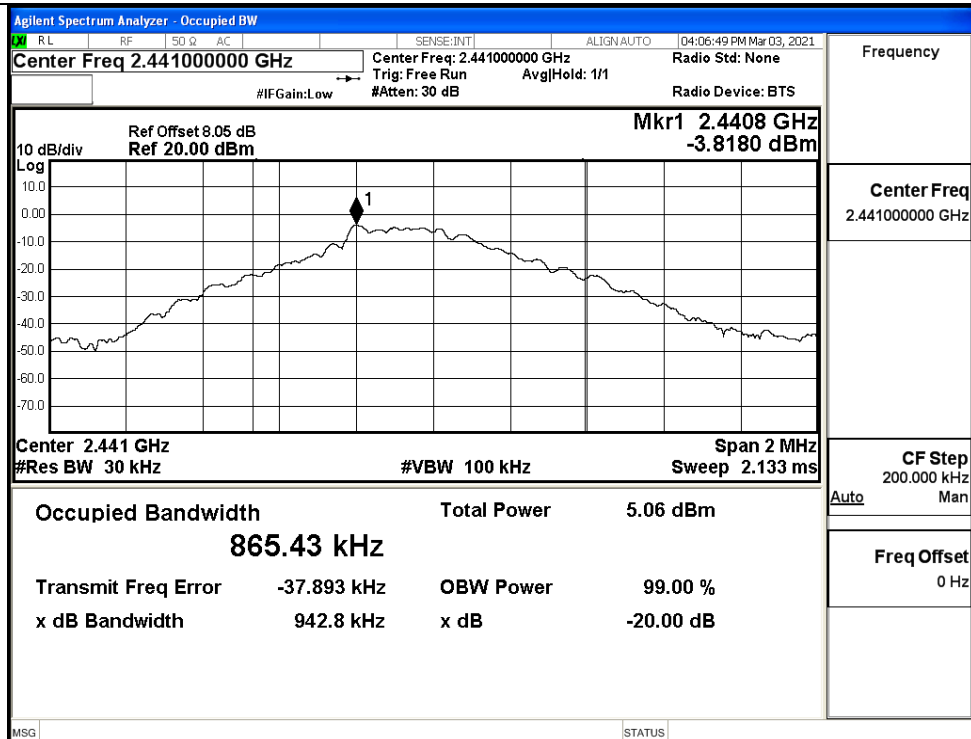
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9410	Not Specified	PASS
	MCH	0.9428	Not Specified	PASS
	HCH	0.9425	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.316	Not Specified	PASS
	MCH	1.316	Not Specified	PASS
	HCH	1.317	Not Specified	PASS
8DPSK	LCH	1.307	Not Specified	PASS
	MCH	1.308	Not Specified	PASS
	HCH	1.309	Not Specified	PASS

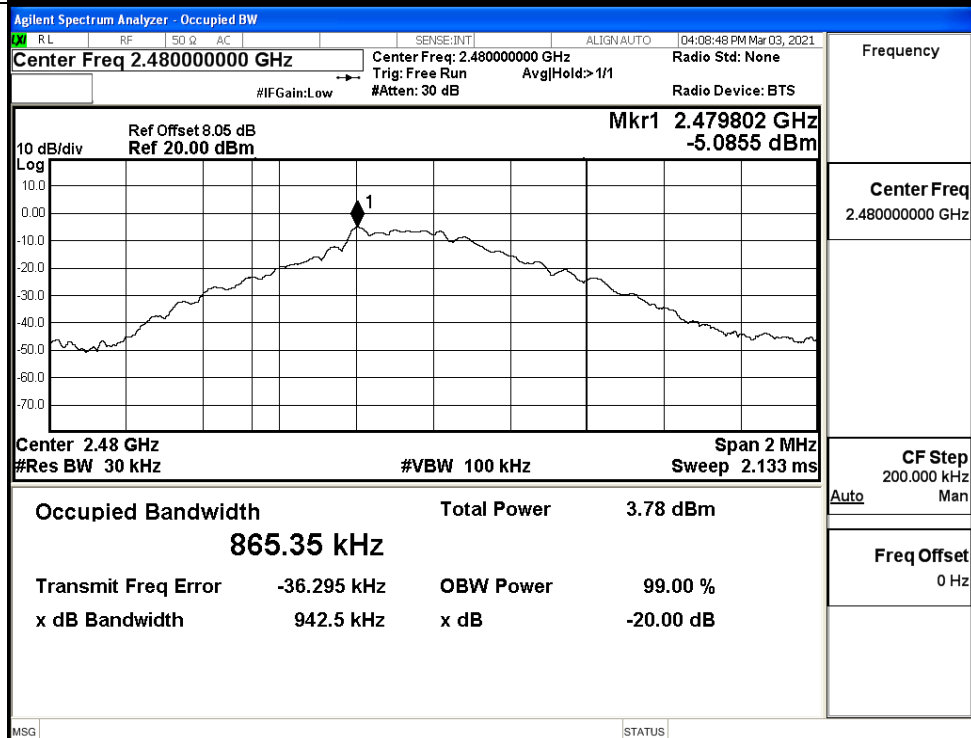
Test Graphs

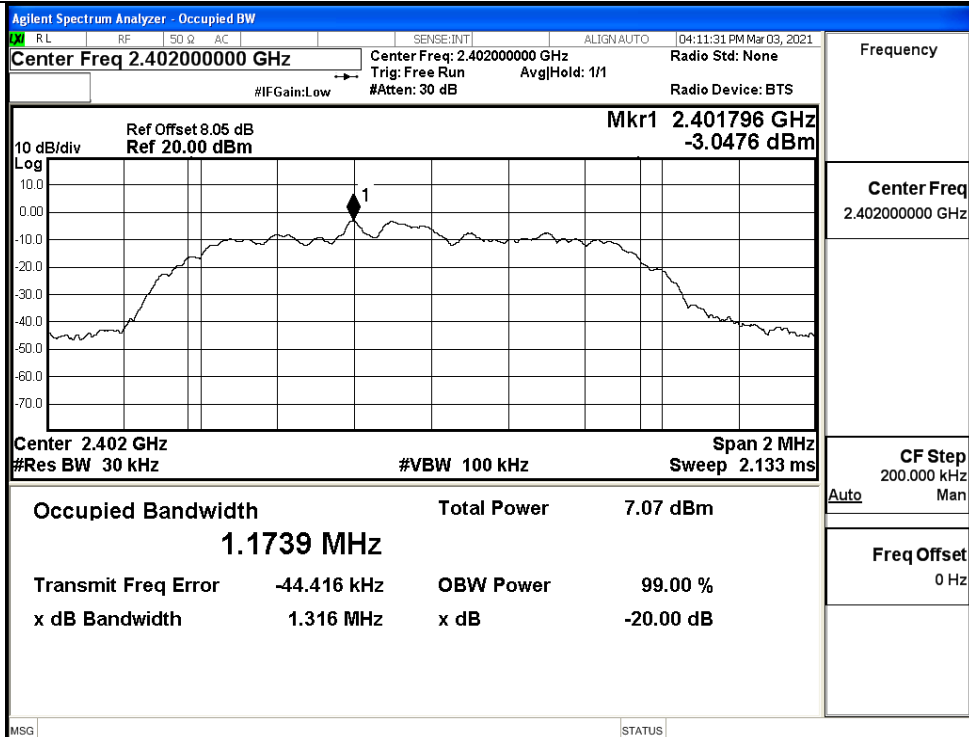
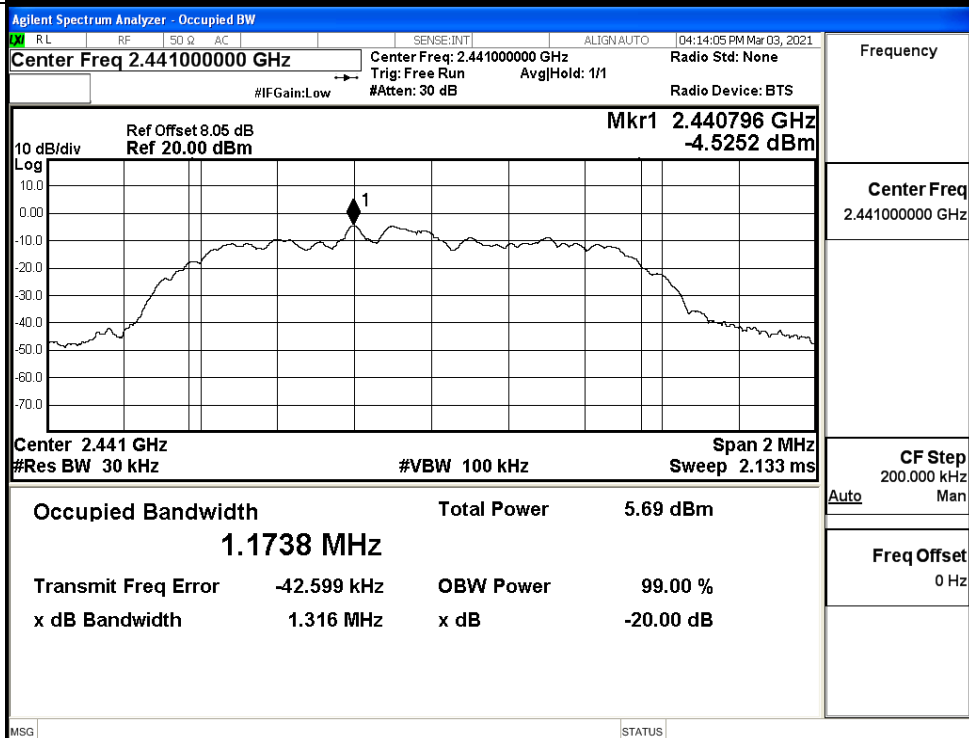


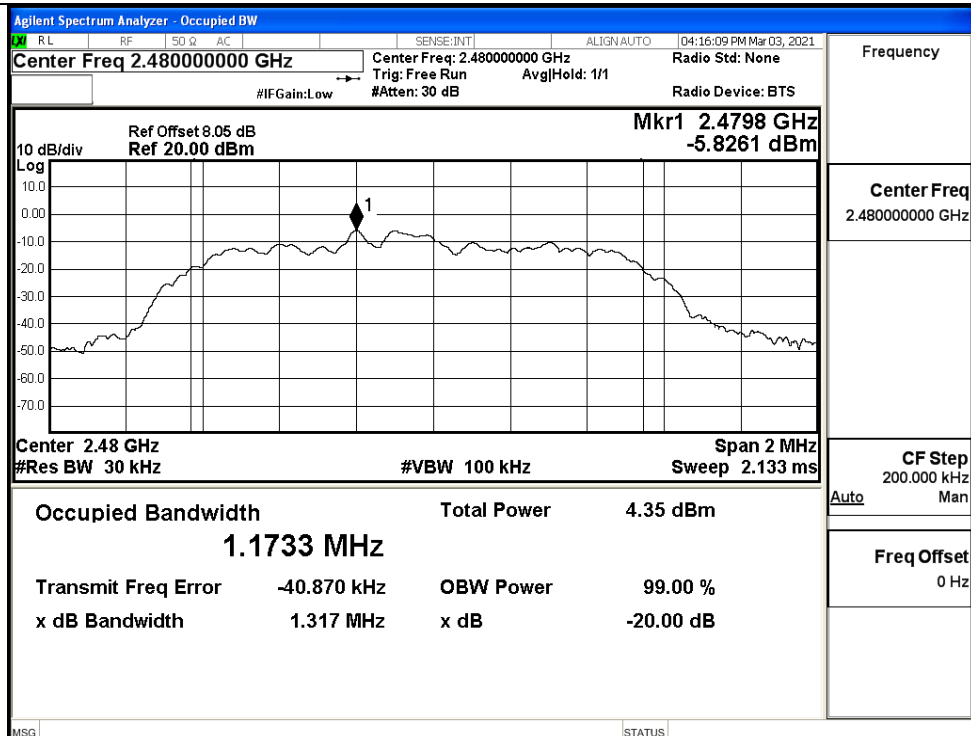
GFSK/MCH



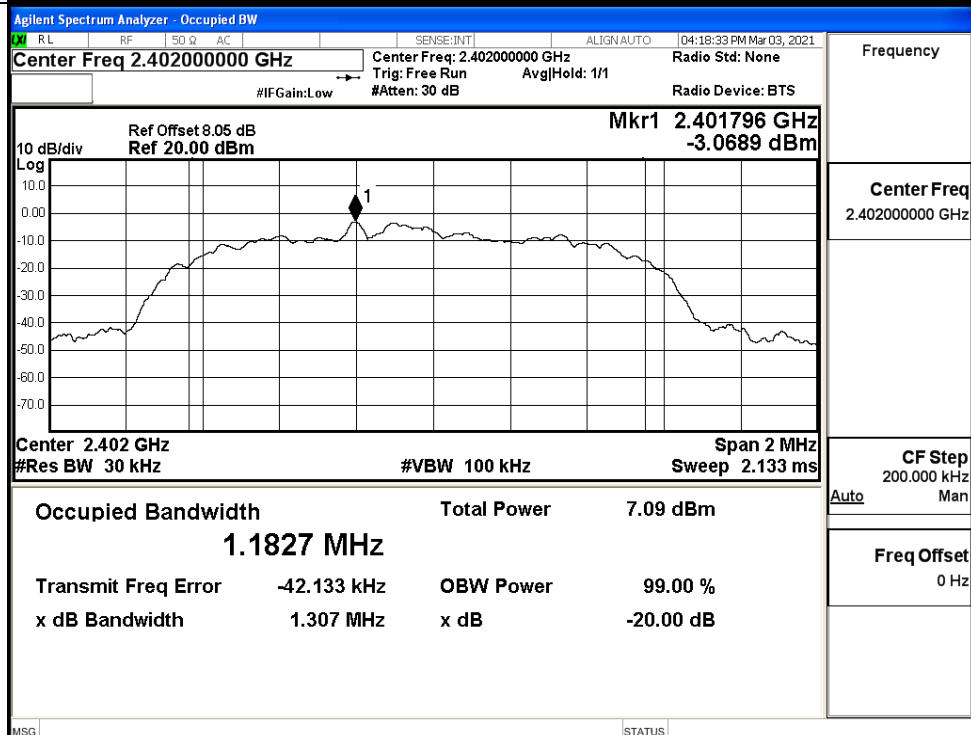
GFSK/HCH



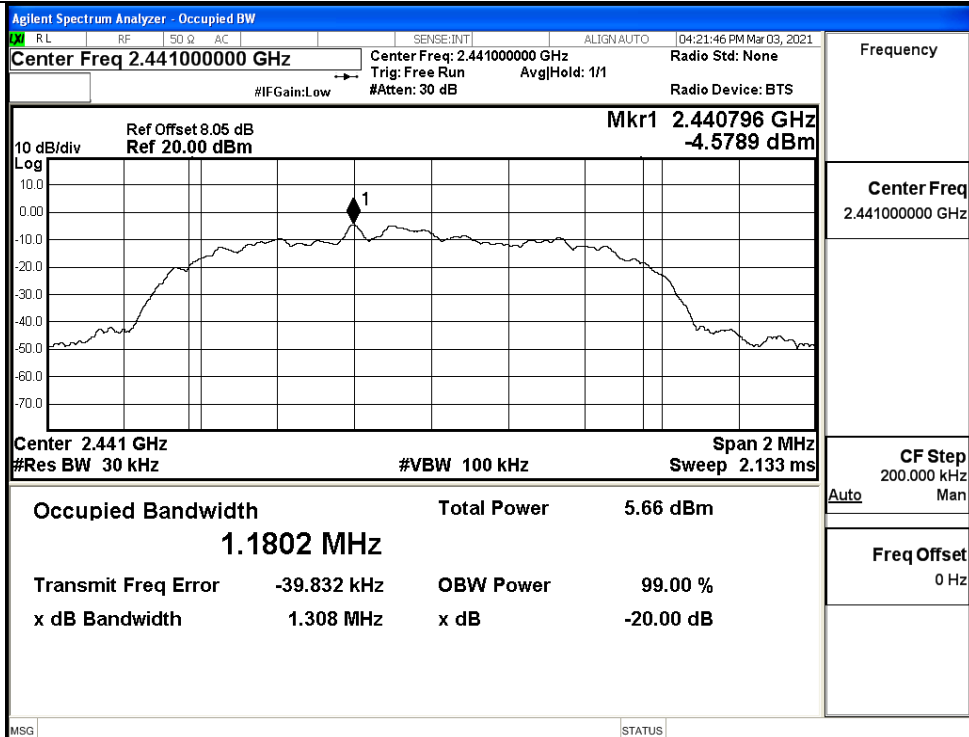
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

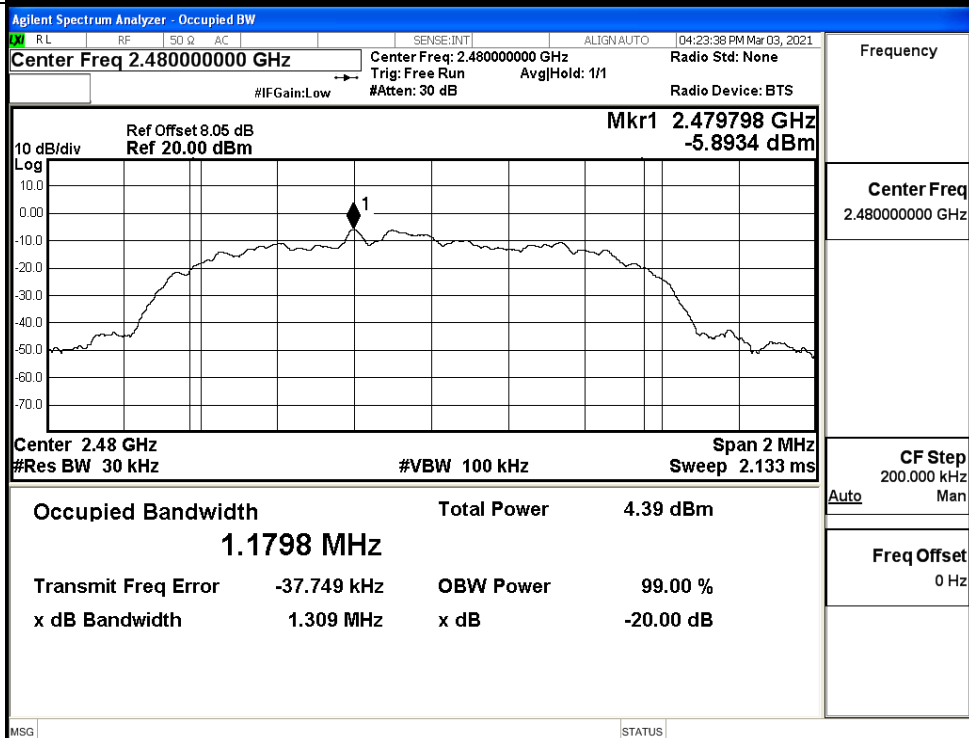
8DPSK/LCH



8DPSK/MCH



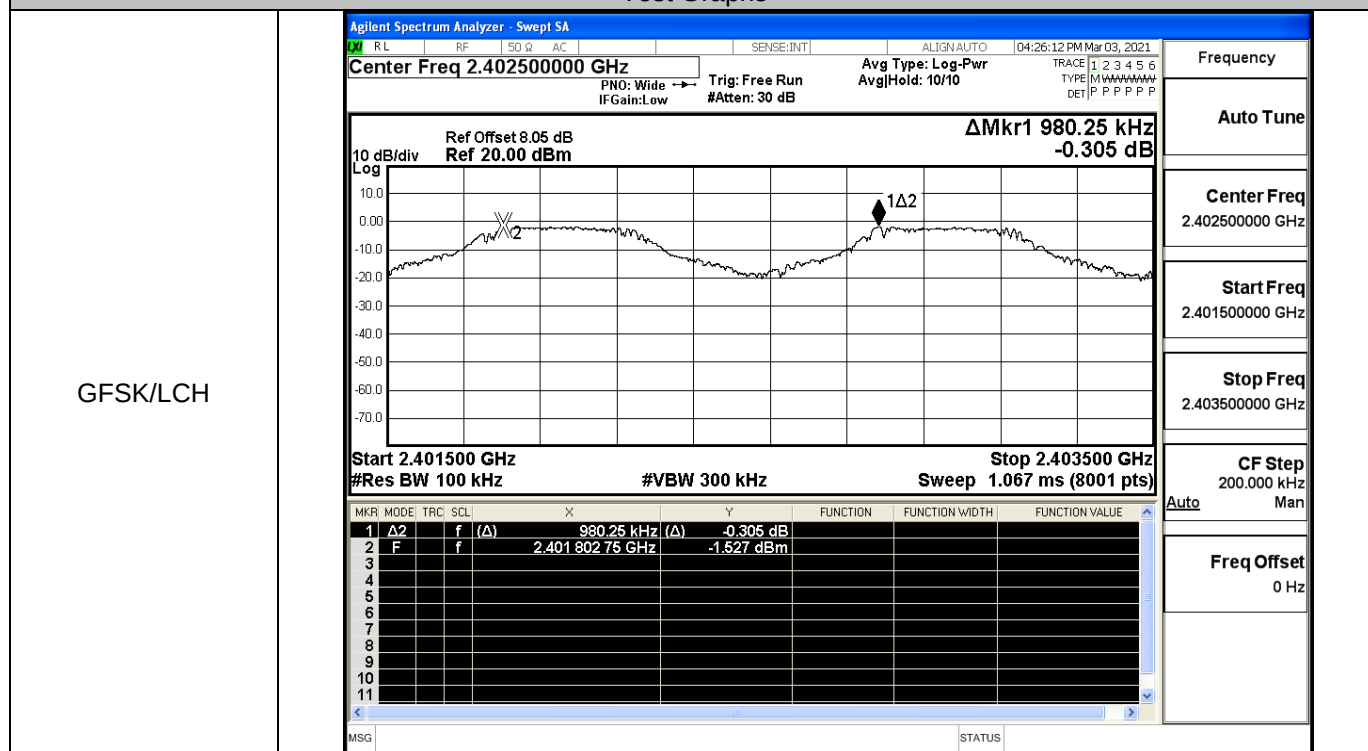
8DPSK/HCH



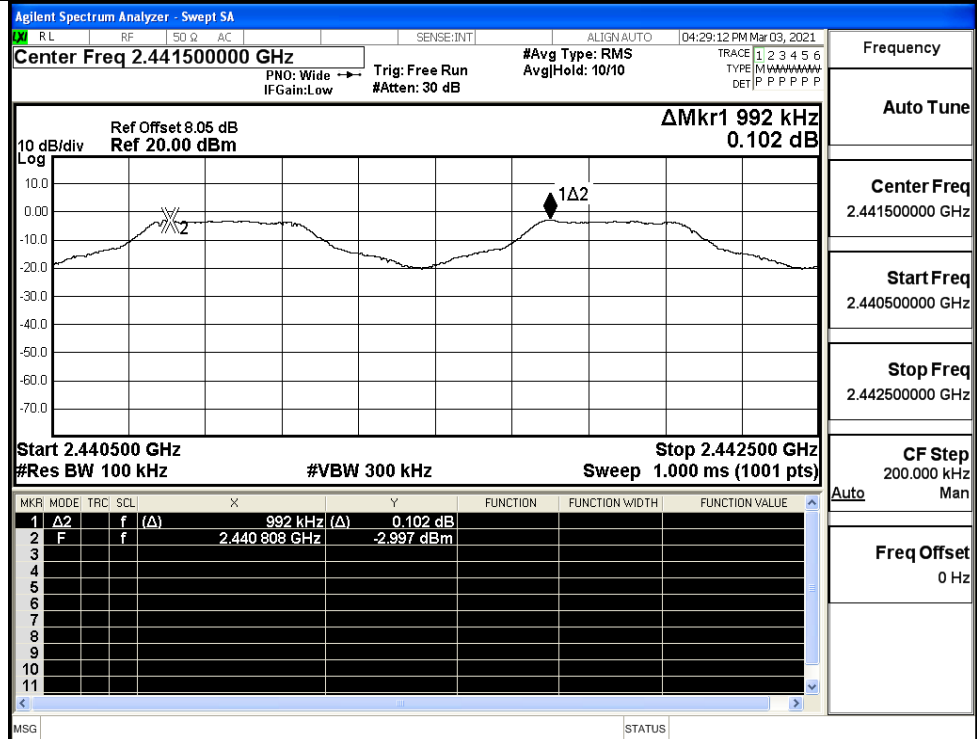
A.4 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.980	0.629	PASS
	MCH	0.992	0.629	PASS
	HCH	0.998	0.629	PASS
$\pi/4$ DQPSK	LCH	0.990	0.878	PASS
	MCH	1.138	0.878	PASS
	HCH	0.988	0.878	PASS
8DPSK	LCH	0.984	0.873	PASS
	MCH	1.086	0.873	PASS
	HCH	0.990	0.873	PASS

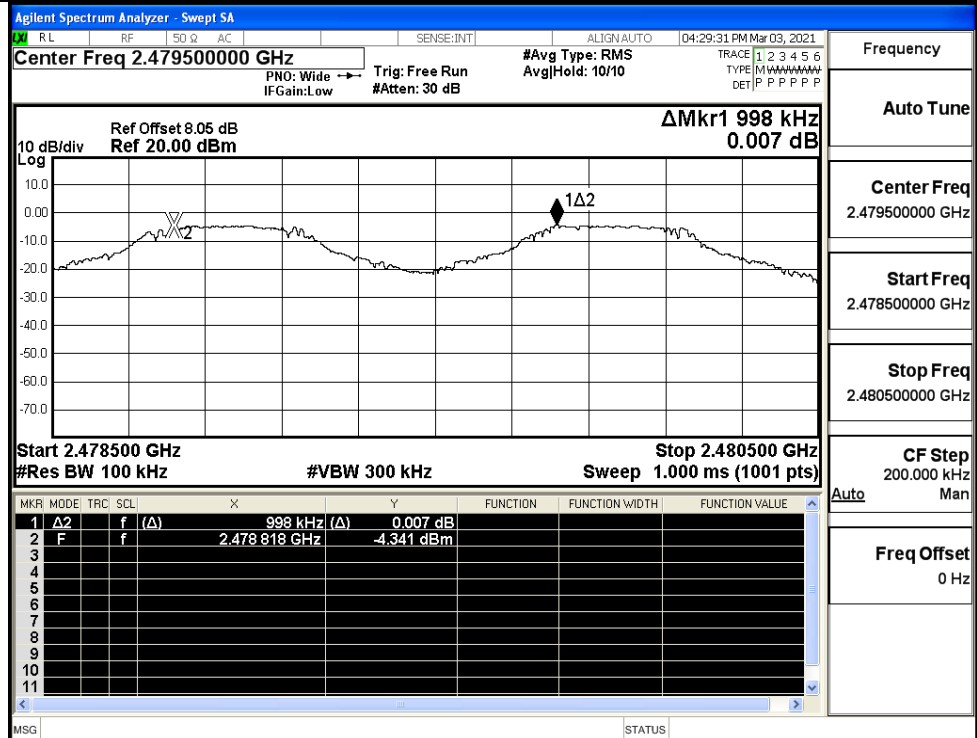
Test Graphs

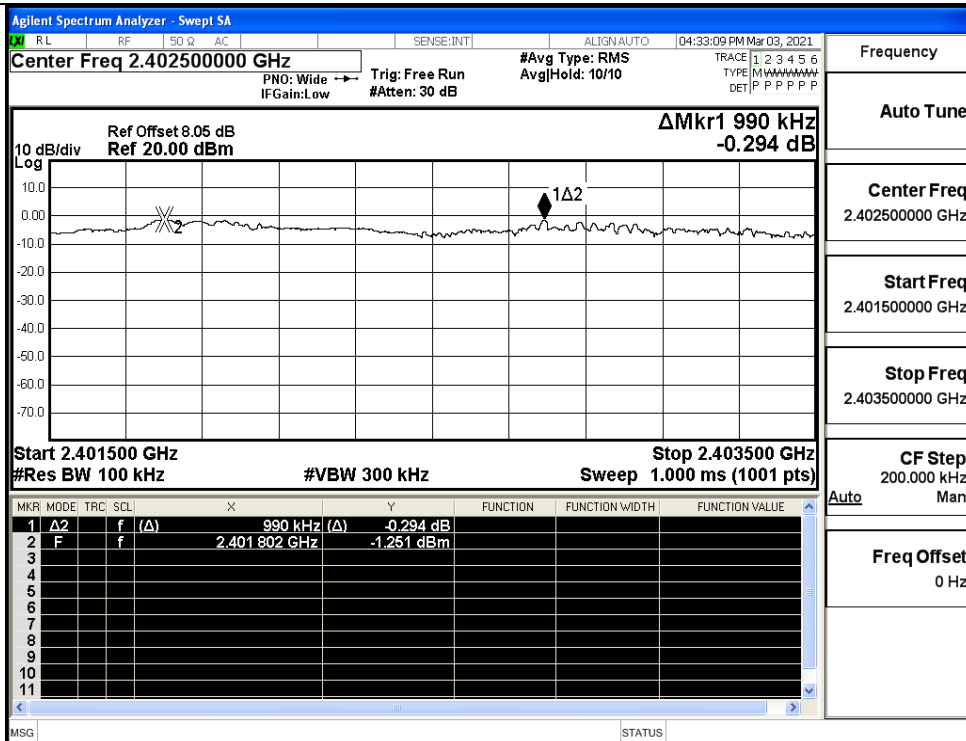
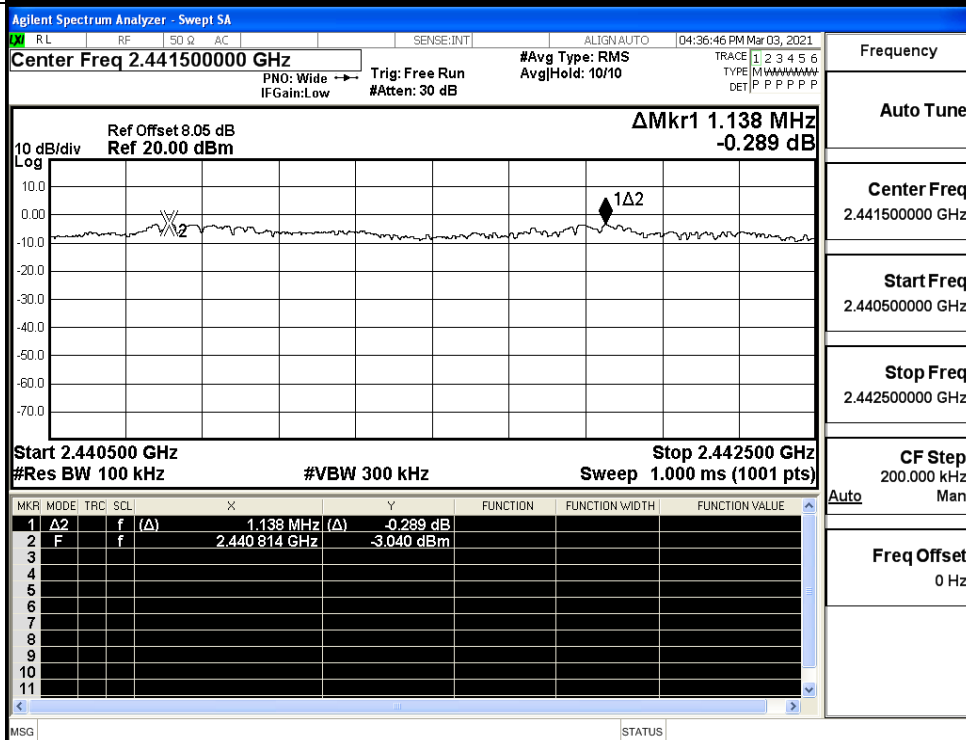


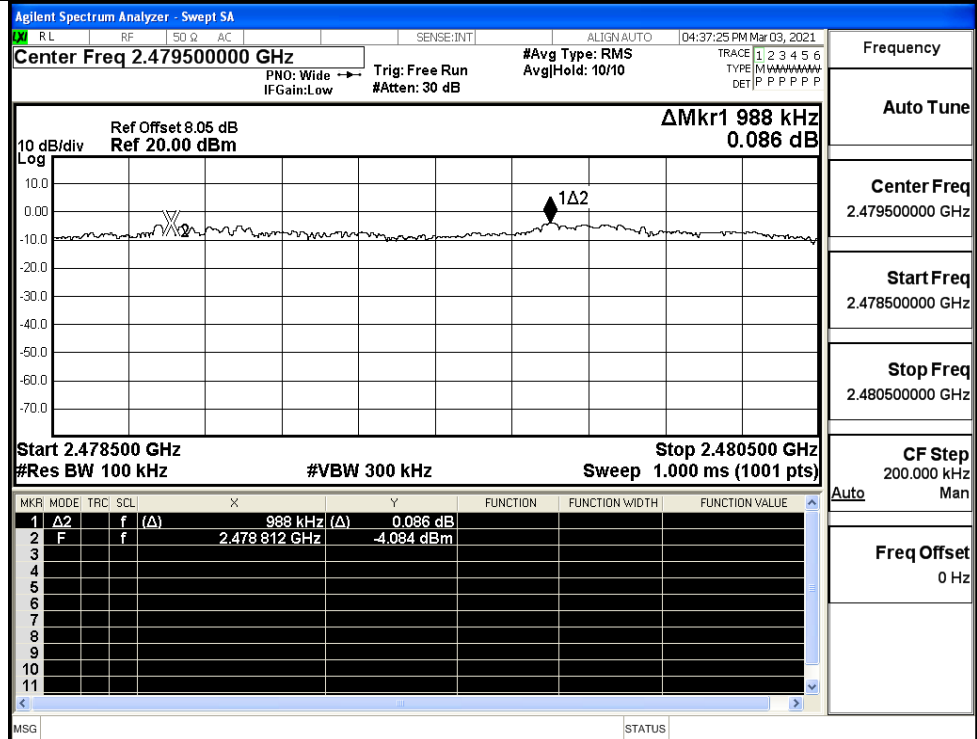
GFSK/MCH



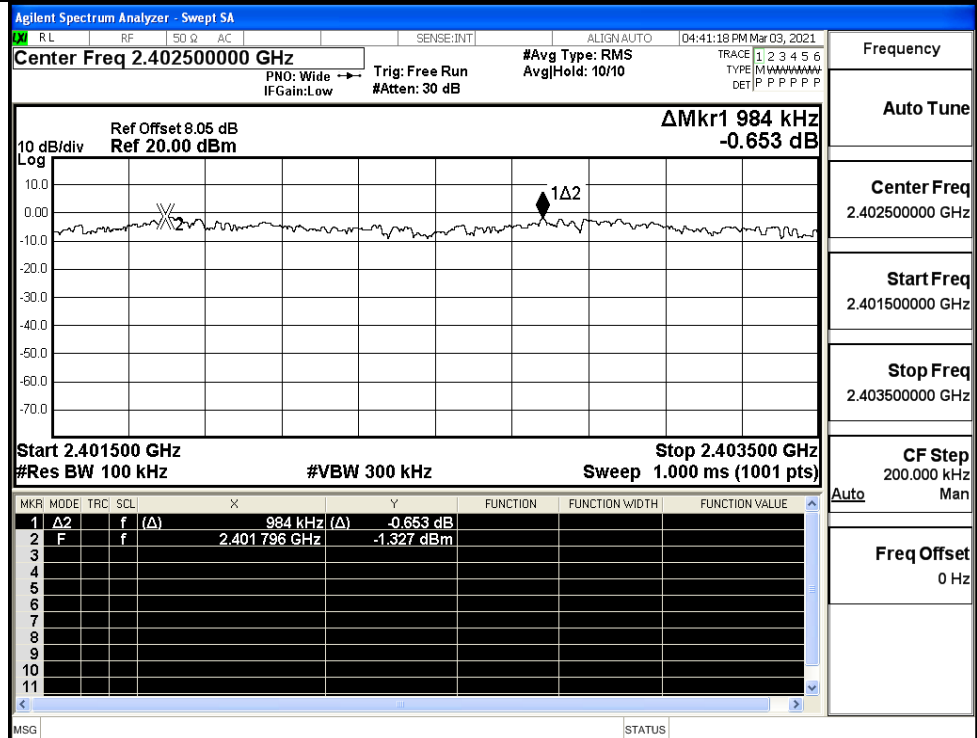
GFSK/HCH



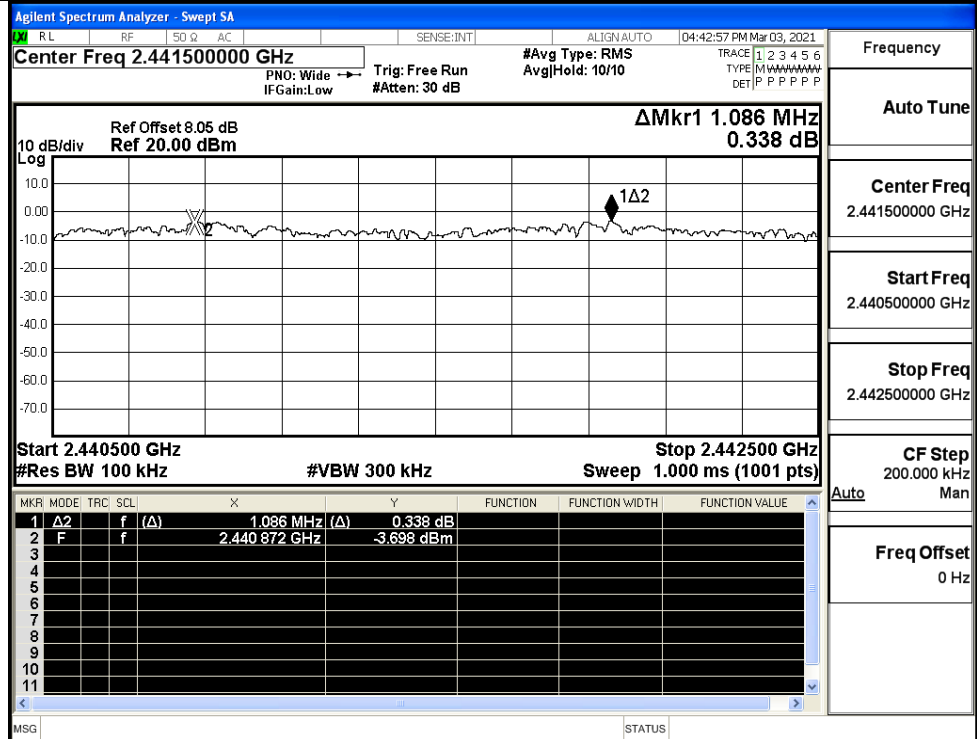
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

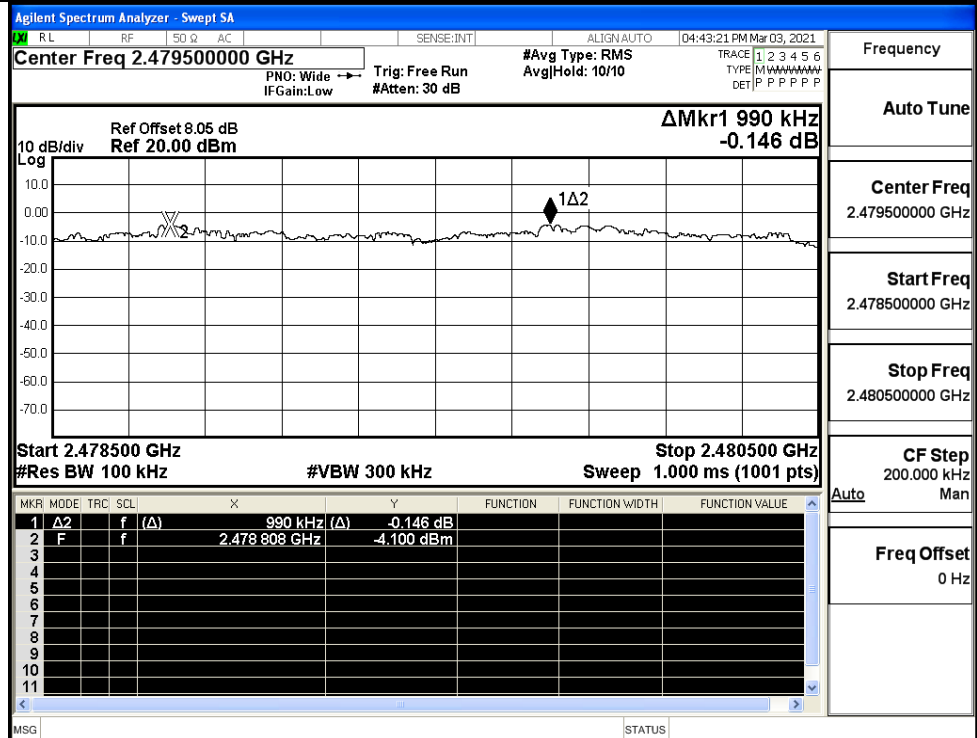
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

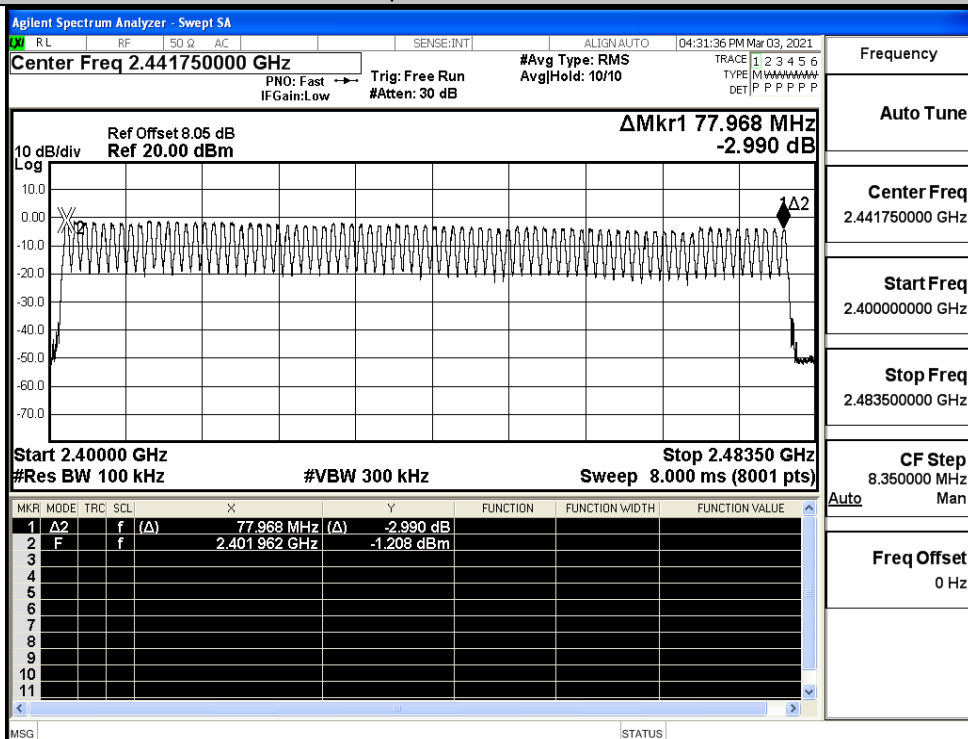
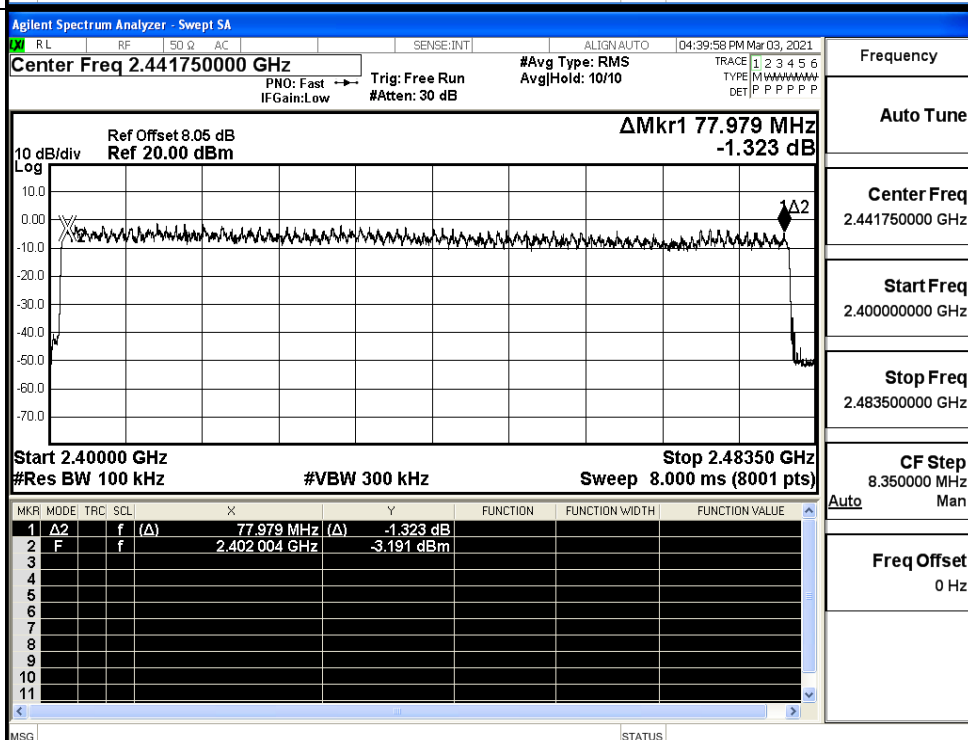


A.5 Hopping Channel Number

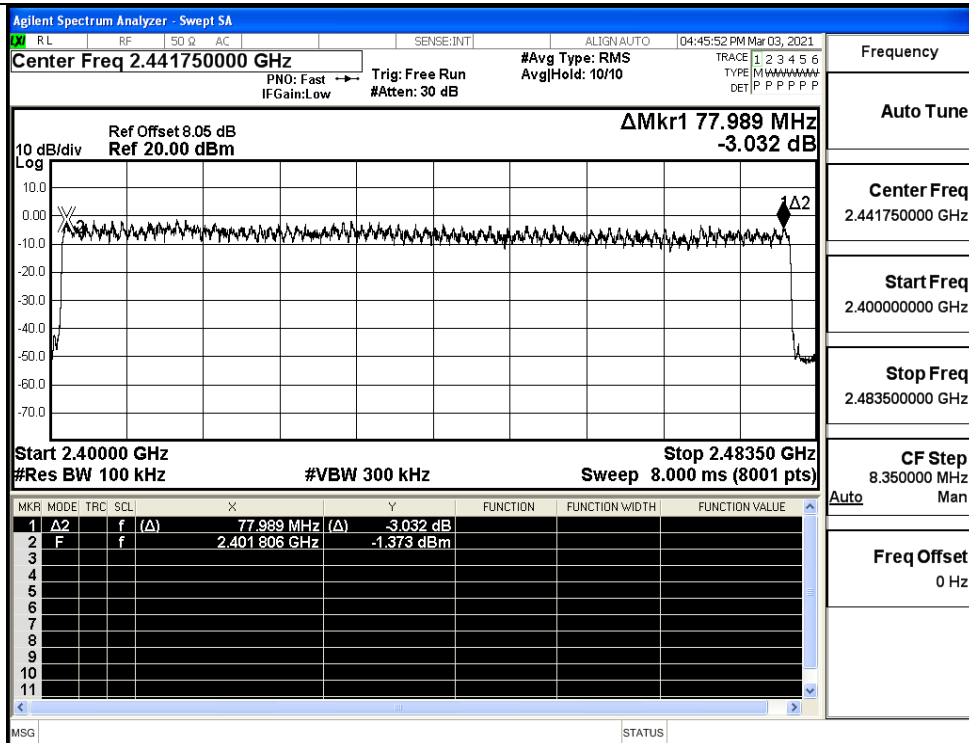
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

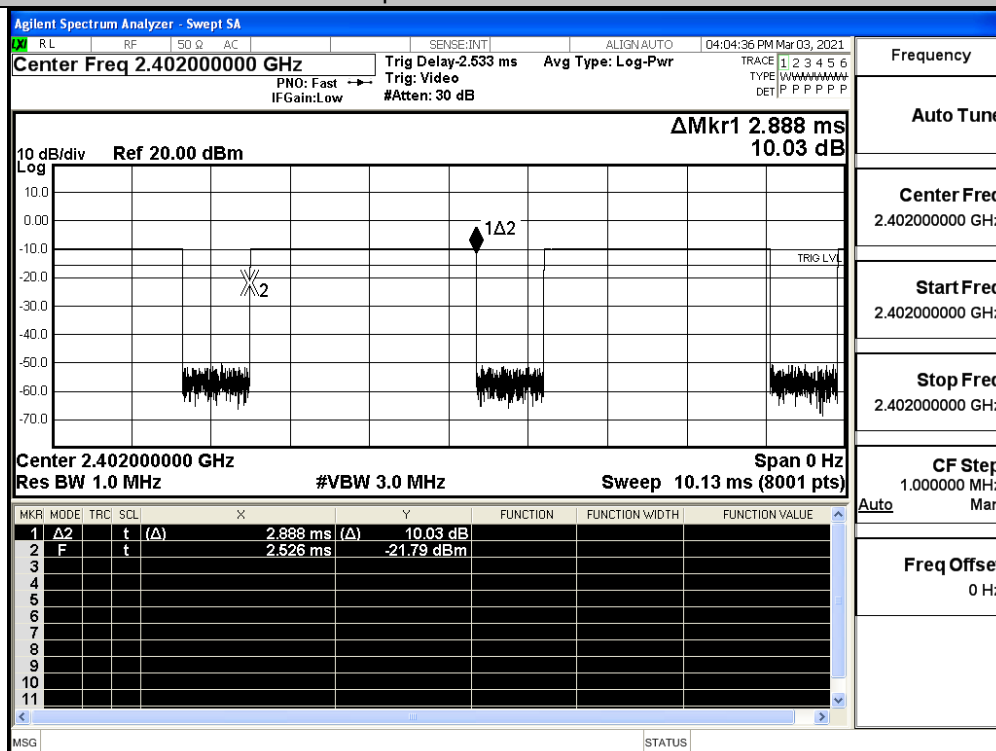


A.6 Dwell Time

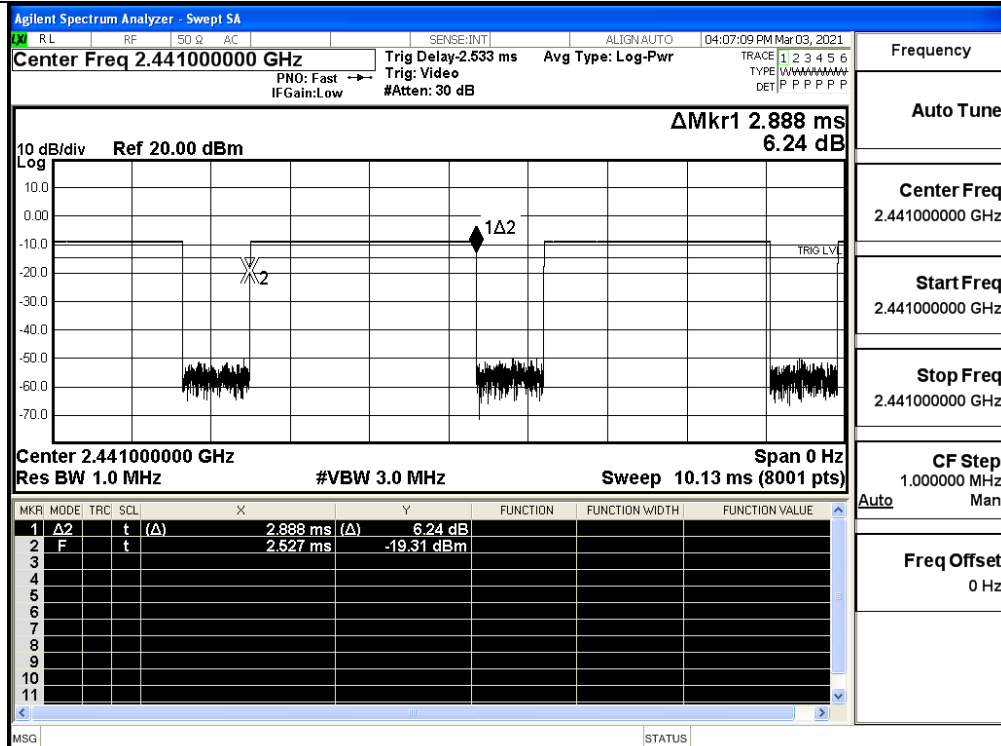
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.309	0.4	PASS
	3DH5	MCH	2.89	106.7	0.308	0.4	PASS
	3DH5	HCH	2.89	106.7	0.309	0.4	PASS

Test Graphs

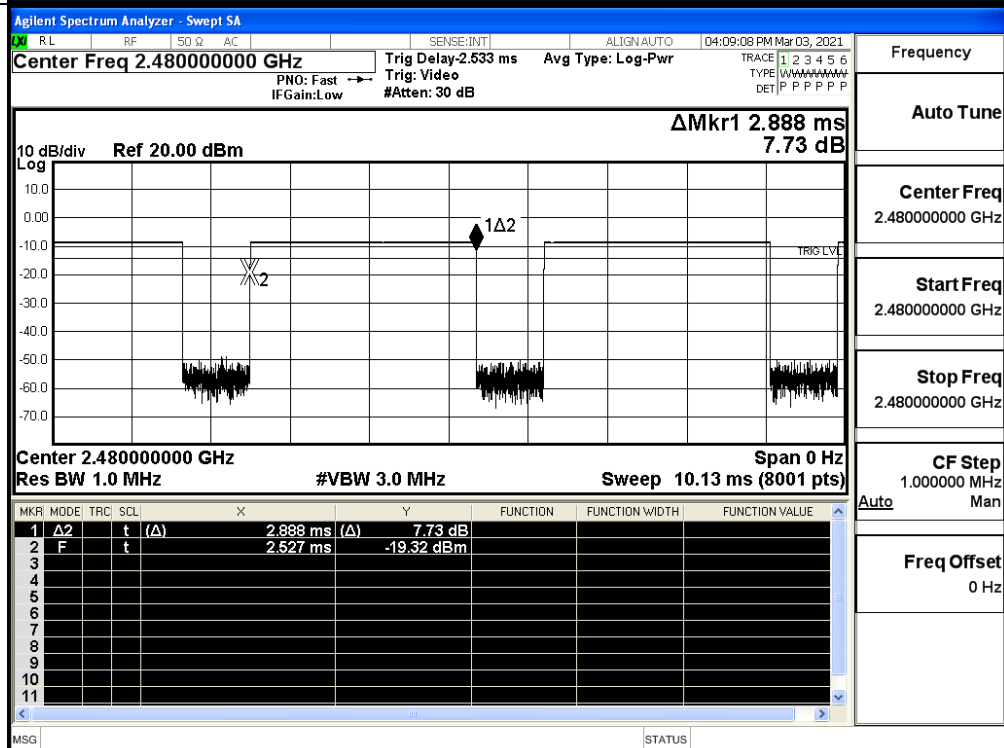
GFSK_DH5/LCH



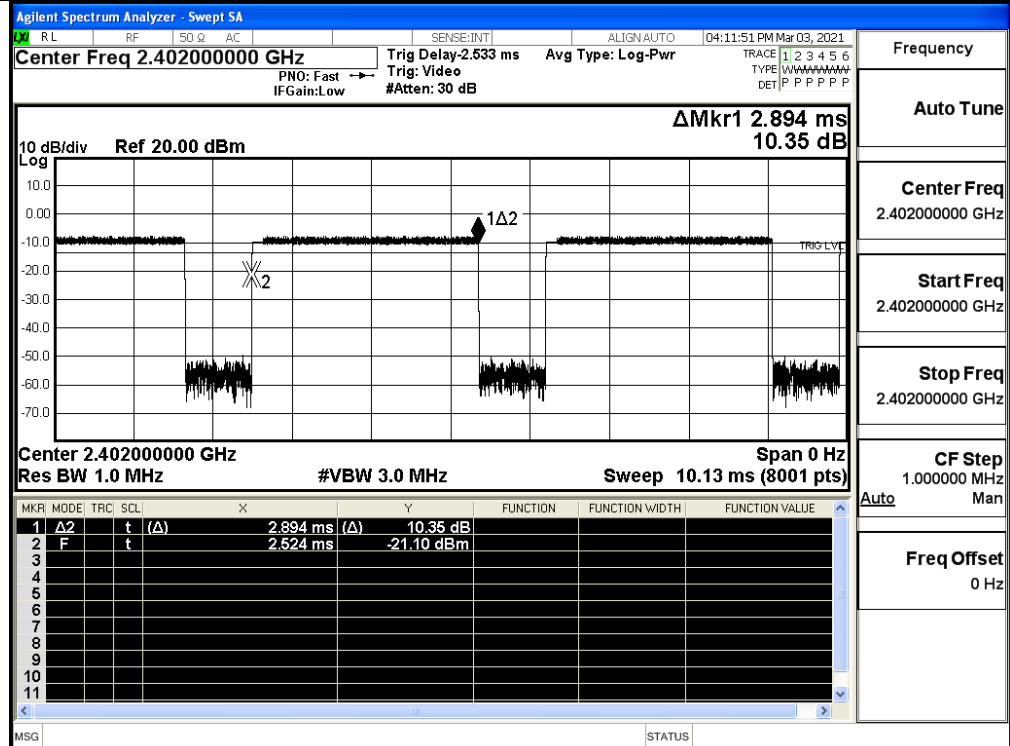
GFSK_DH5/MCH



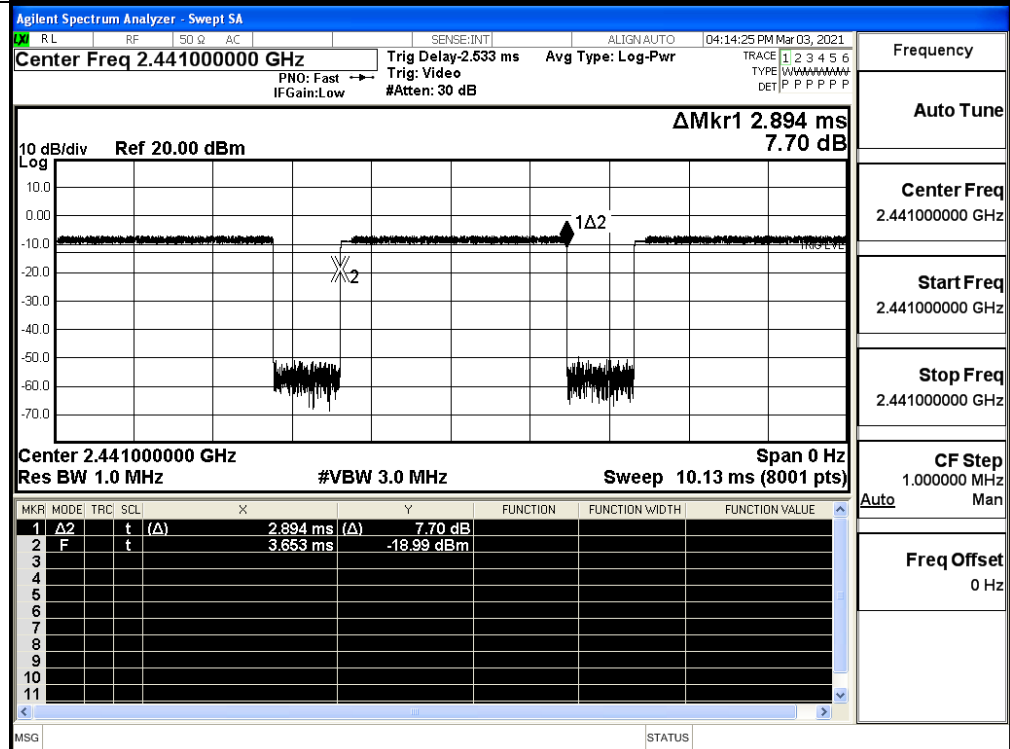
GFSK_DH5/HCH



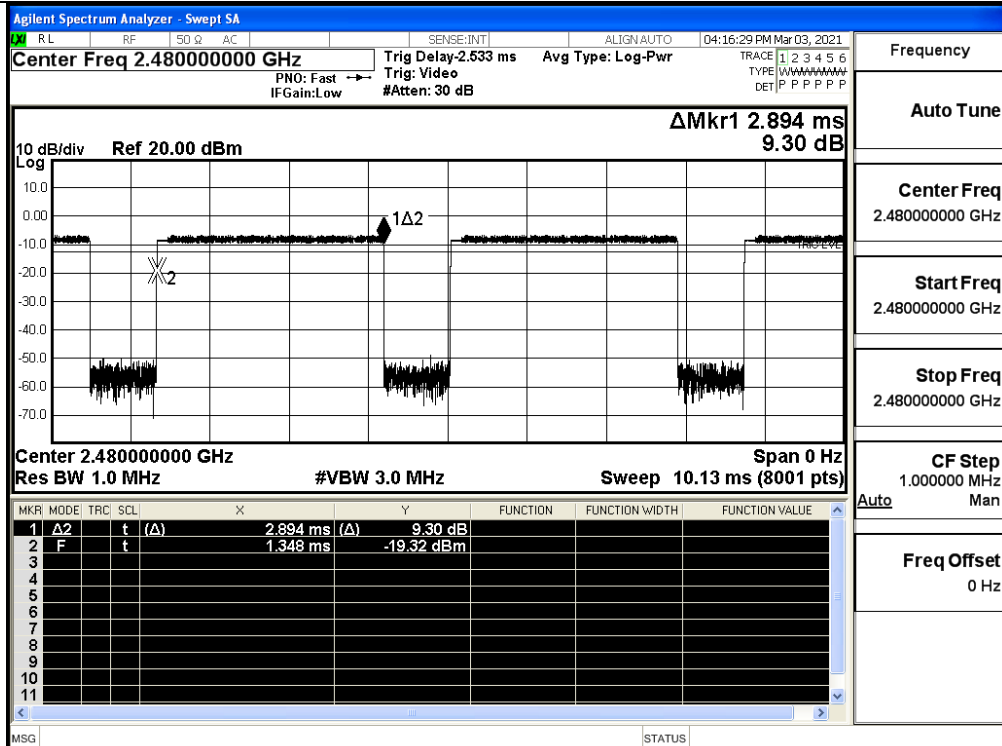
$\pi/4$ DQPSK
_2DH5/LCH



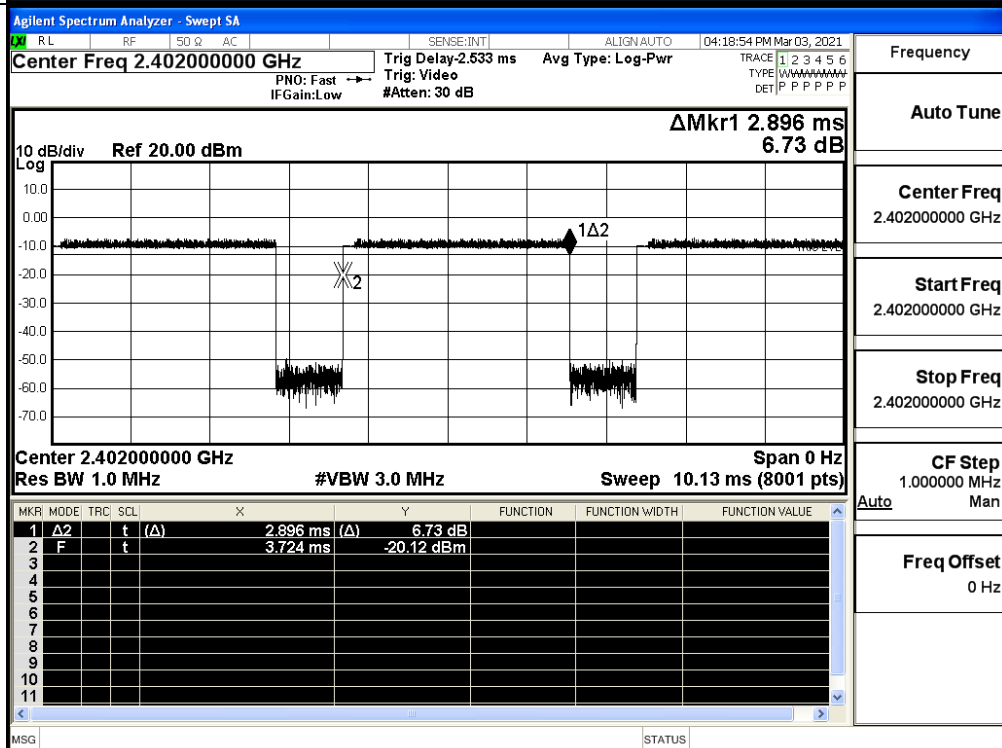
$\pi/4$ DQPSK
_2DH5/MCH



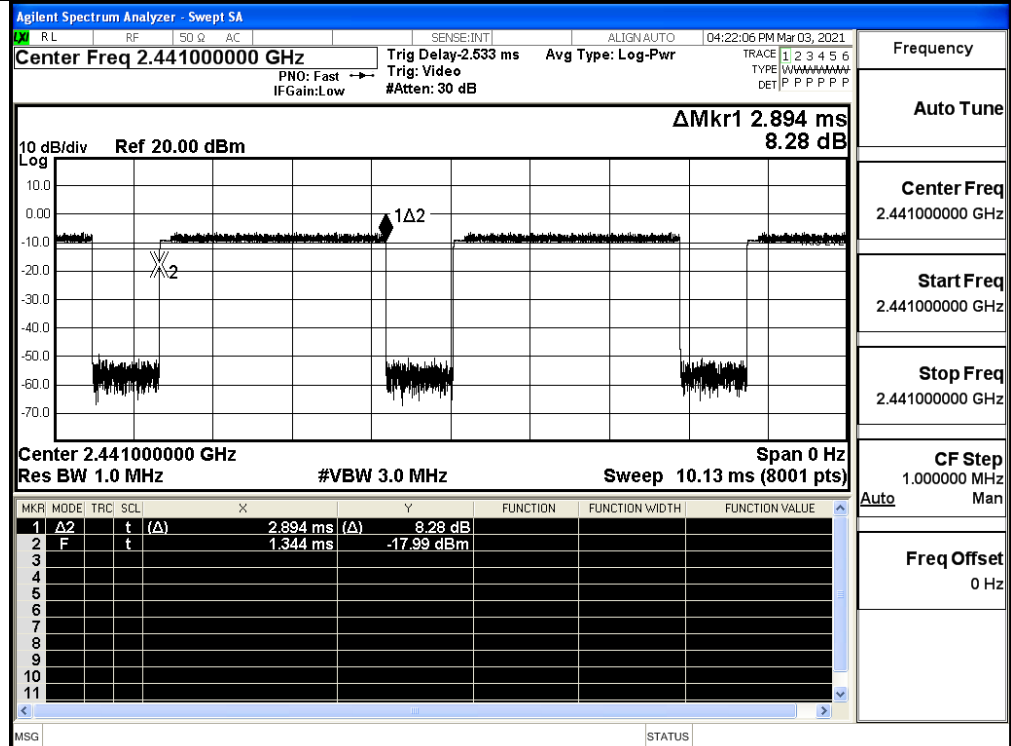
$\pi/4$ DQPSK
_2DH5/HCH



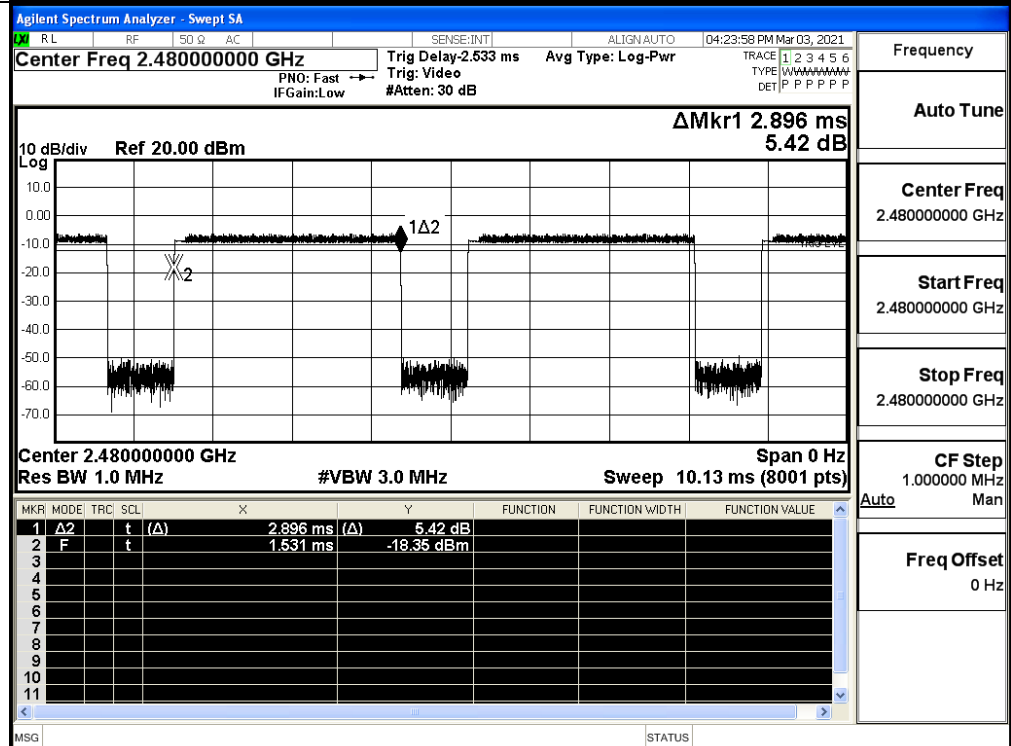
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

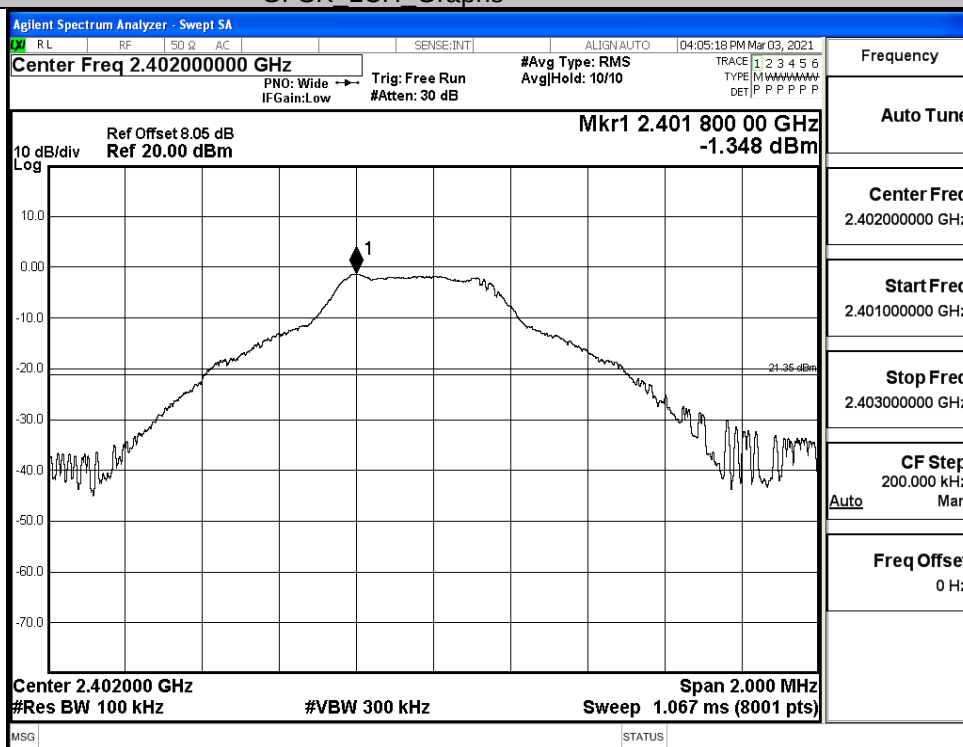


A.7 RF Conducted Spurious Emissions

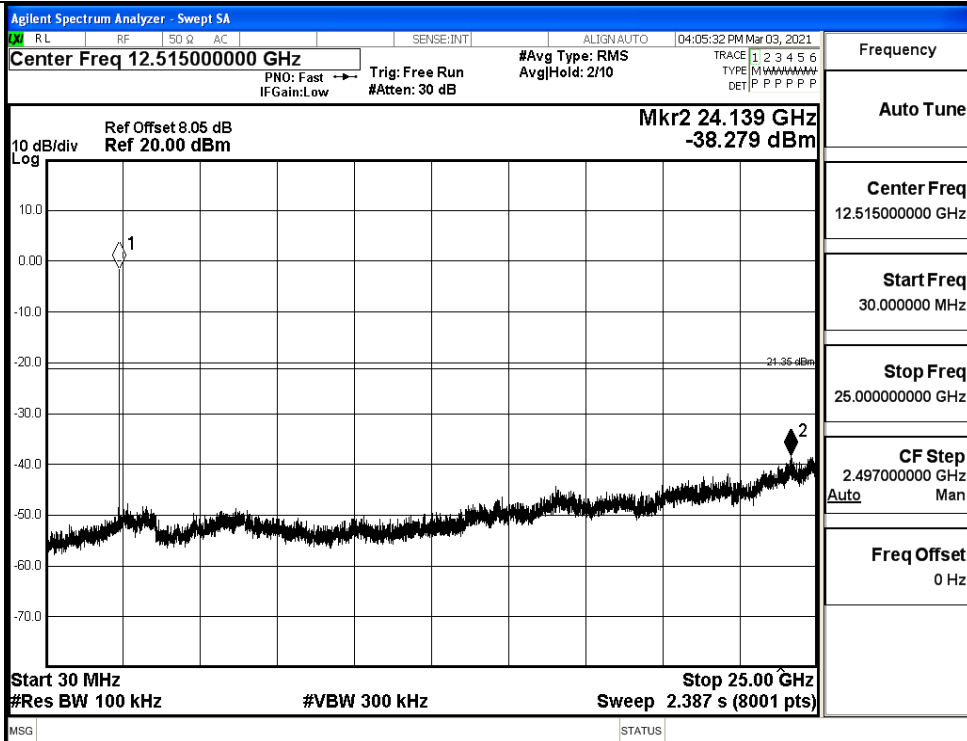
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.348	-38.279	-21.348	PASS
	MCH	-2.79	-38.055	-22.790	PASS
	HCH	-4.039	-37.567	-24.039	PASS
$\pi/4$ DQPSK	LCH	-1.395	-38.213	-21.395	PASS
	MCH	-2.798	-37.638	-22.798	PASS
	HCH	-4.047	-38.367	-24.047	PASS
8DPSK	LCH	-1.489	-37.388	-21.489	PASS
	MCH	-2.919	-38.130	-22.919	PASS
	HCH	-4.189	-37.945	-24.189	PASS

GFSK LCH Graphs

Pref

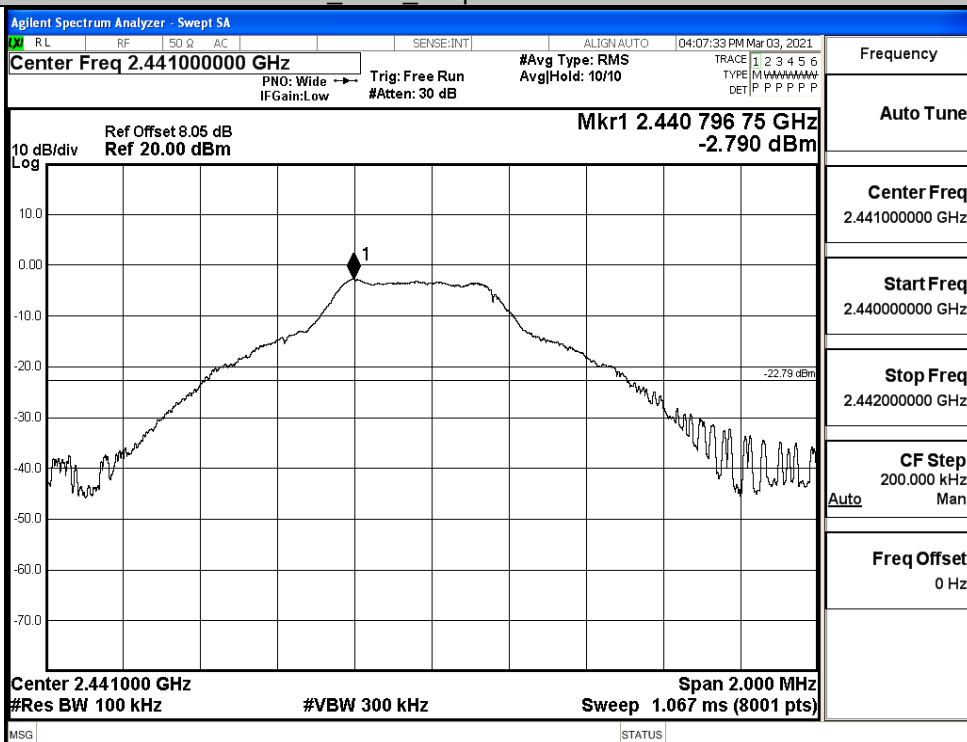


Puw

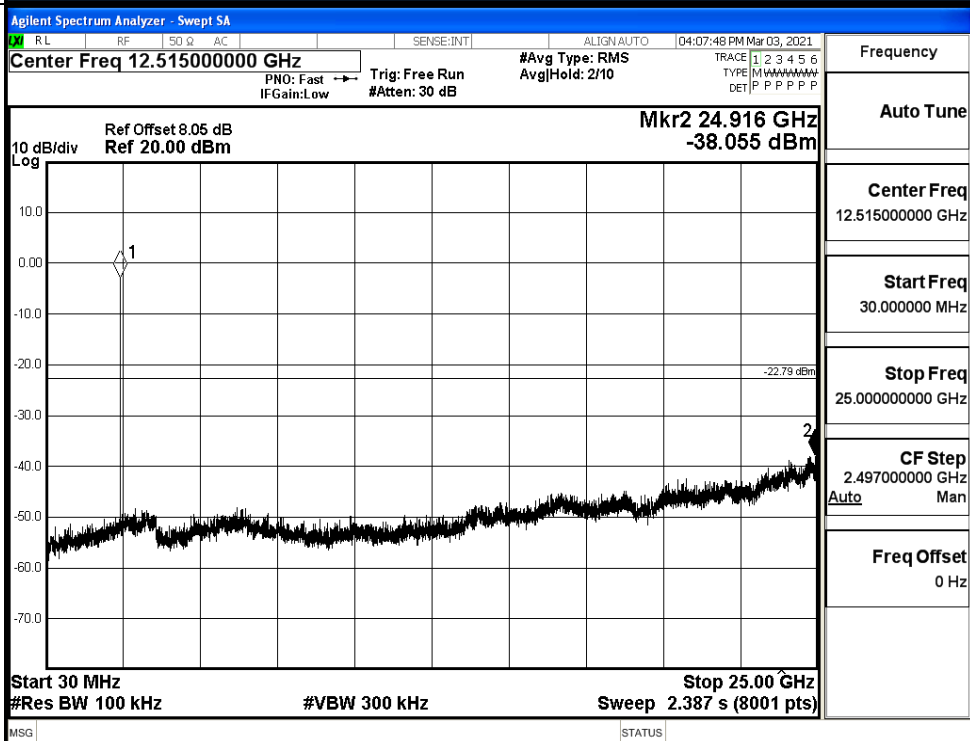


GFSK_MCH_Graphs

Pref

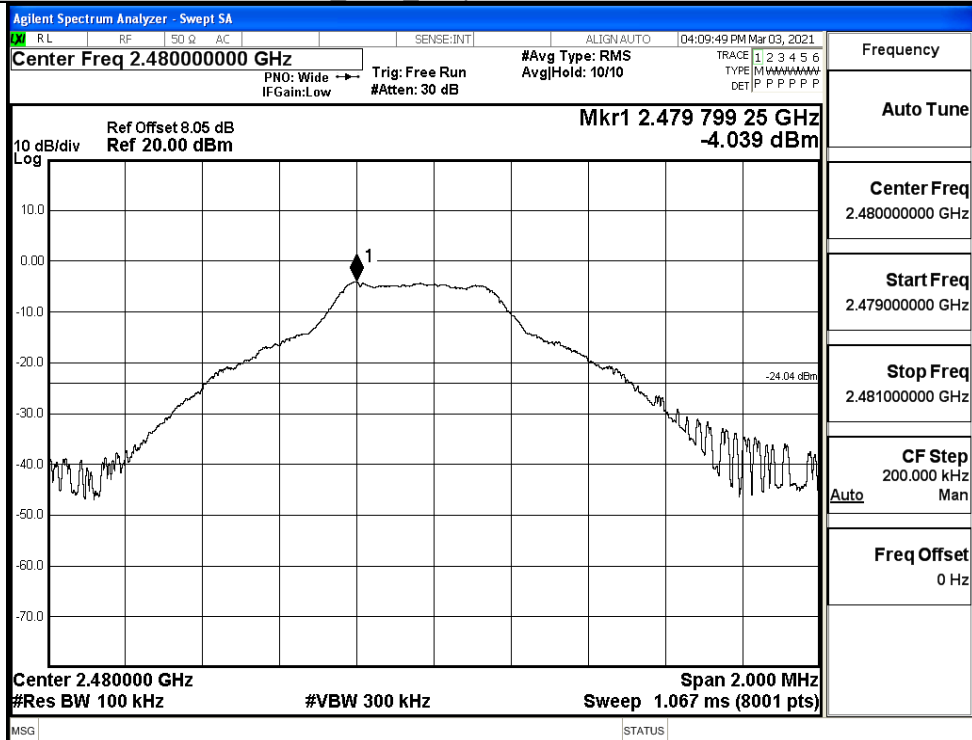


Puw

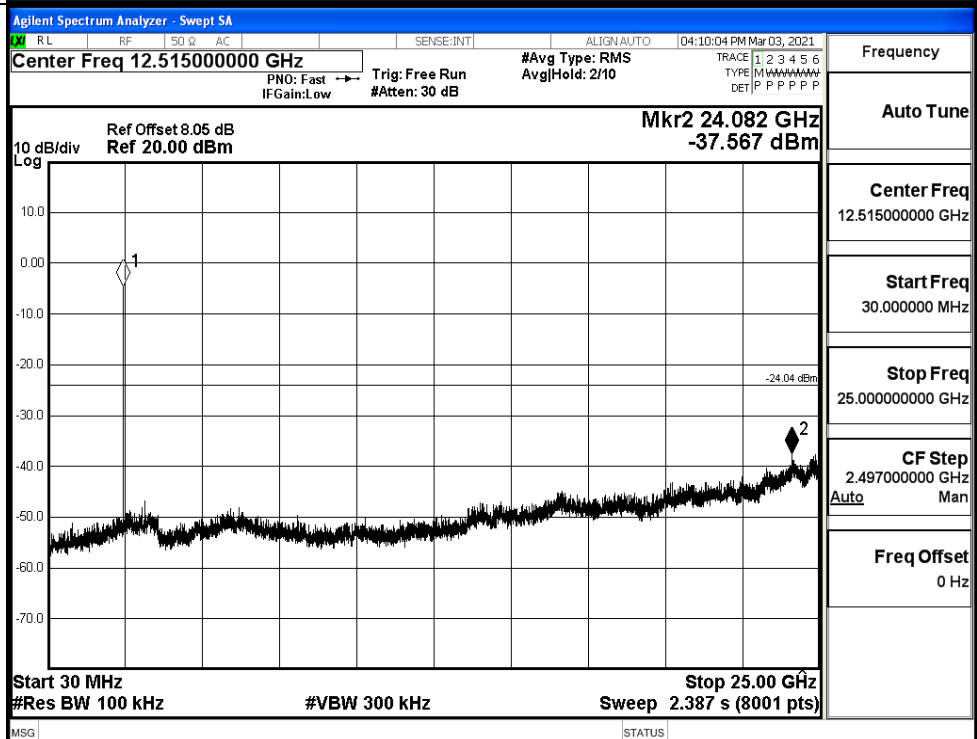


GFSK HCH_Graphs

Pref

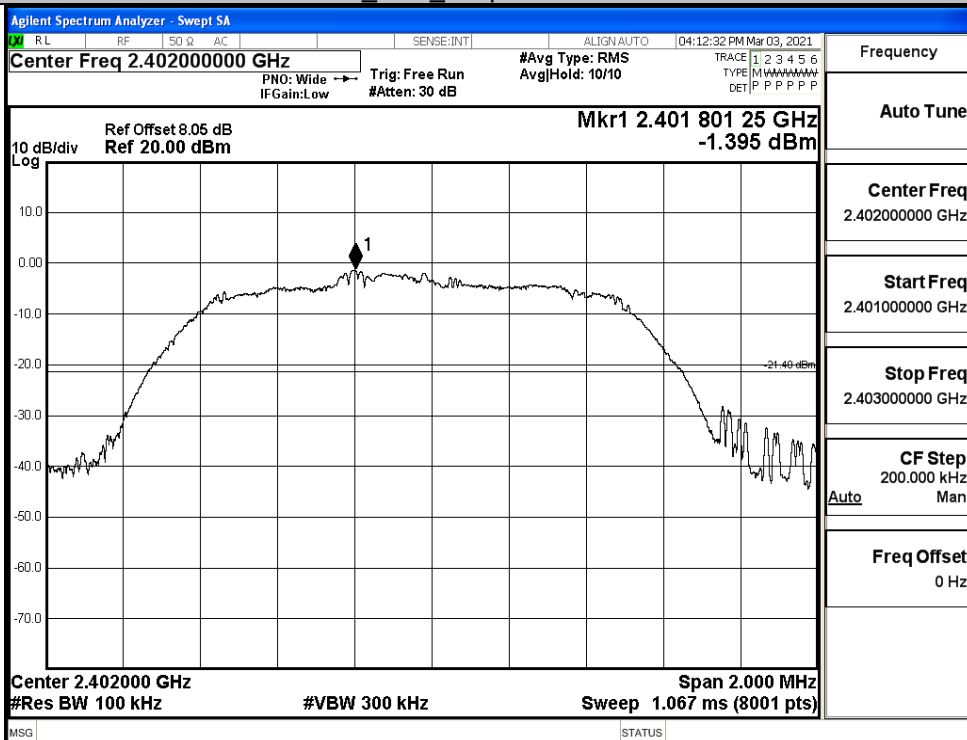


Puw

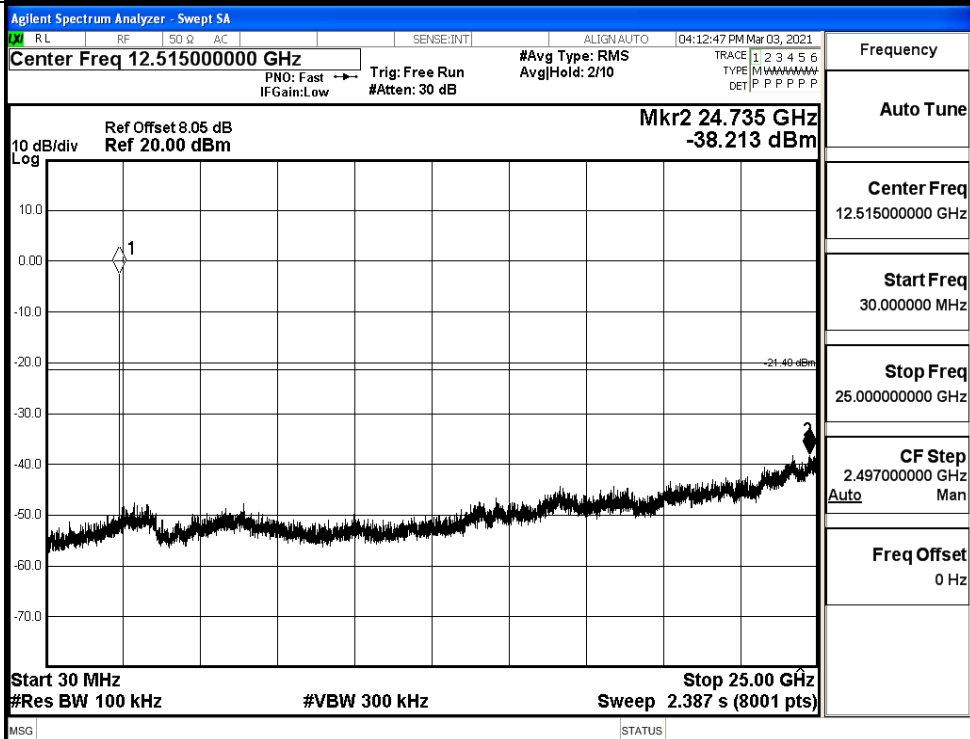


$\pi/4$ DQPSK_LCH_Graphs

Pref

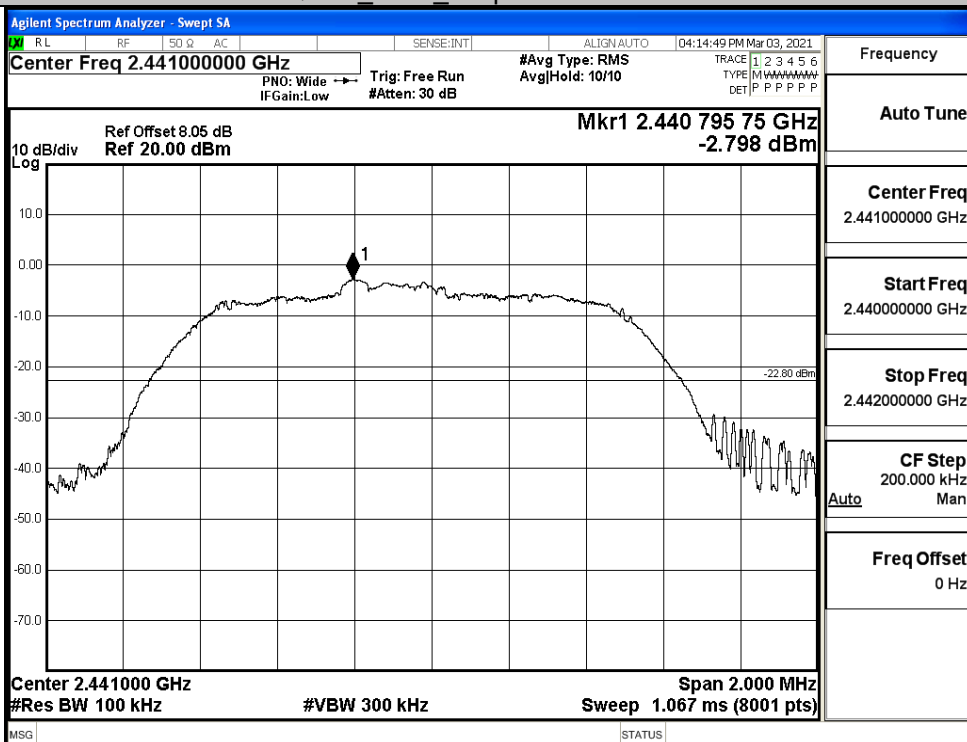


Puw

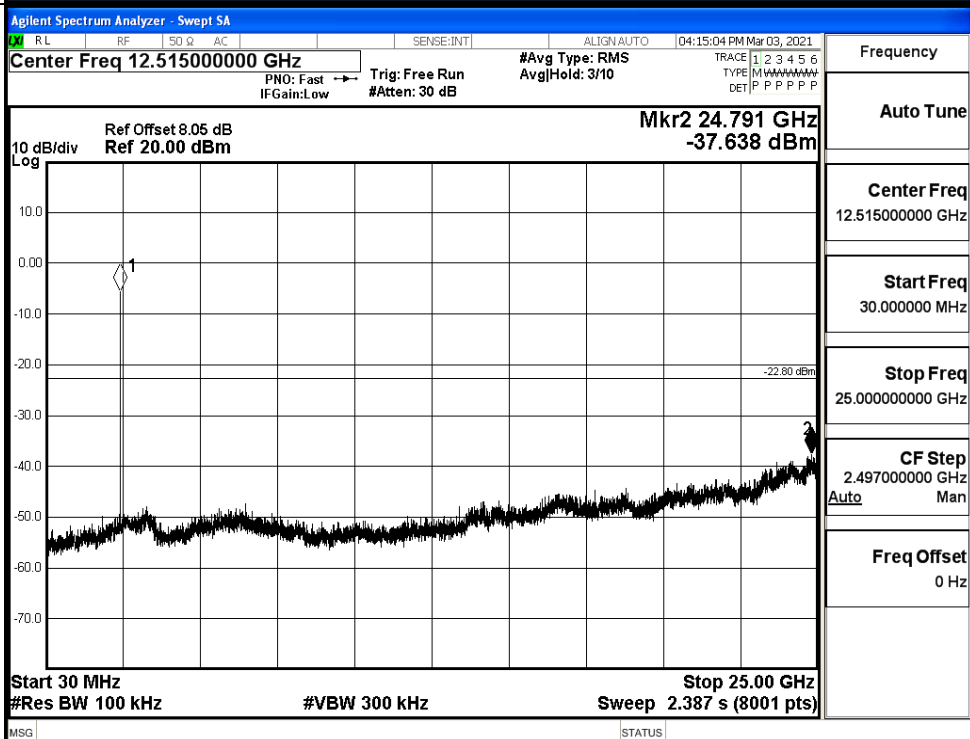


π /4DQPSK_MCH_Graphs

Pref

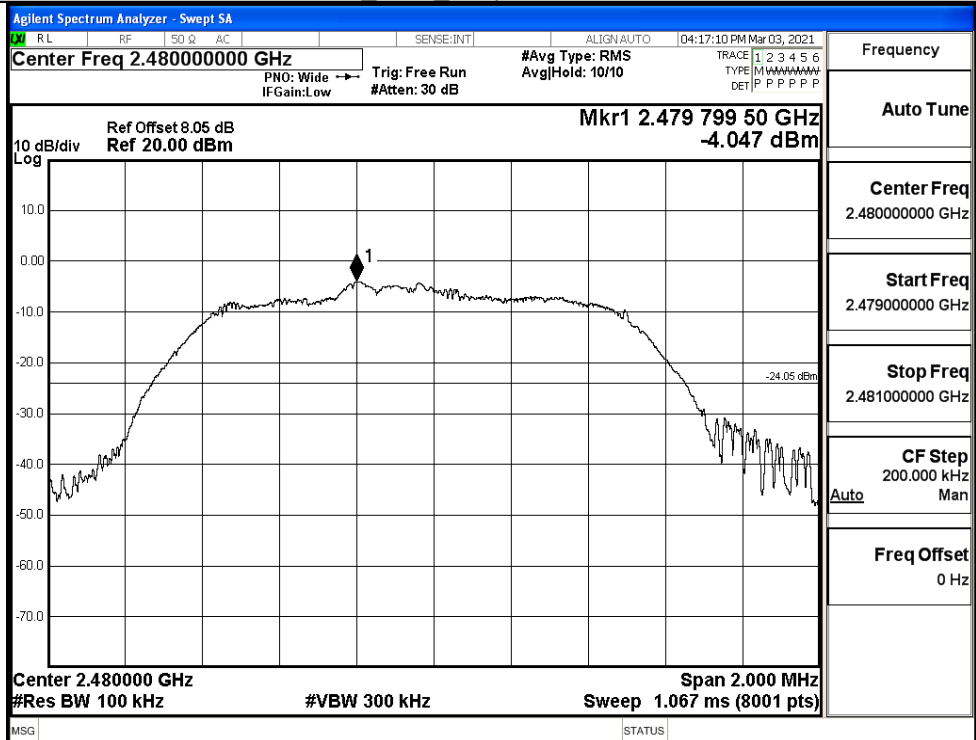


Puw

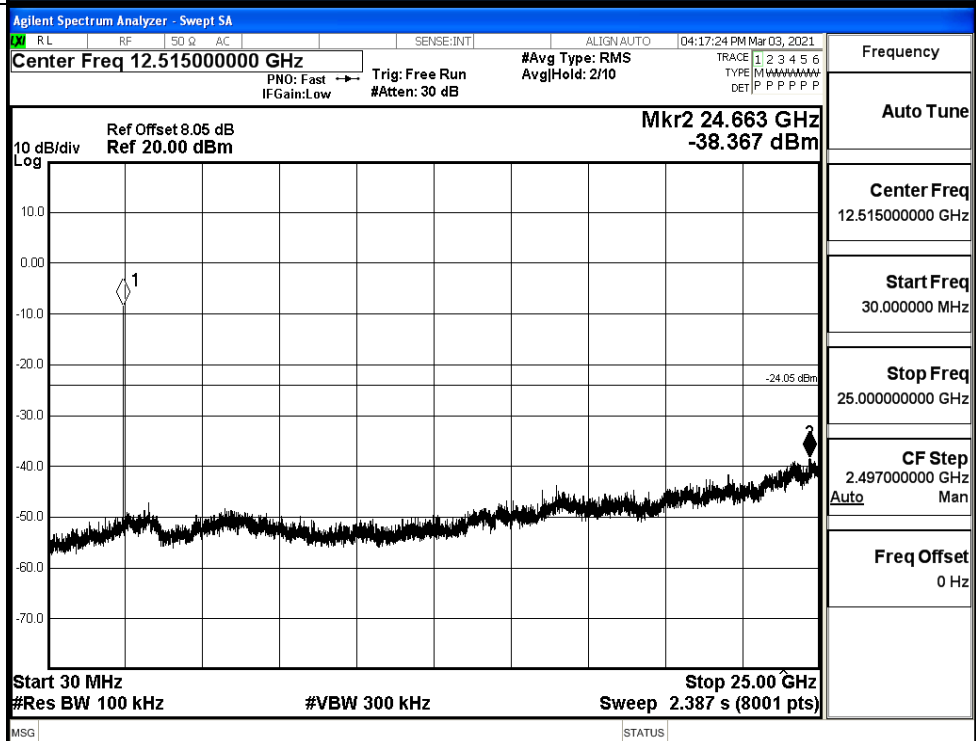


$\pi/4$ DQPSK_HCH_Graphs

Pref

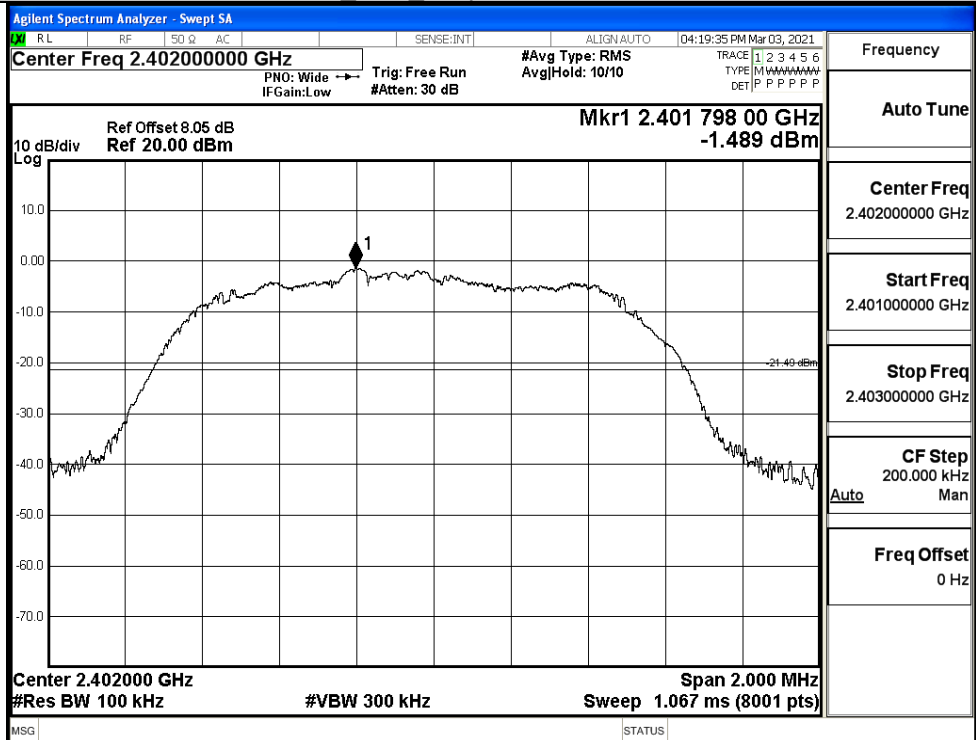


Puw

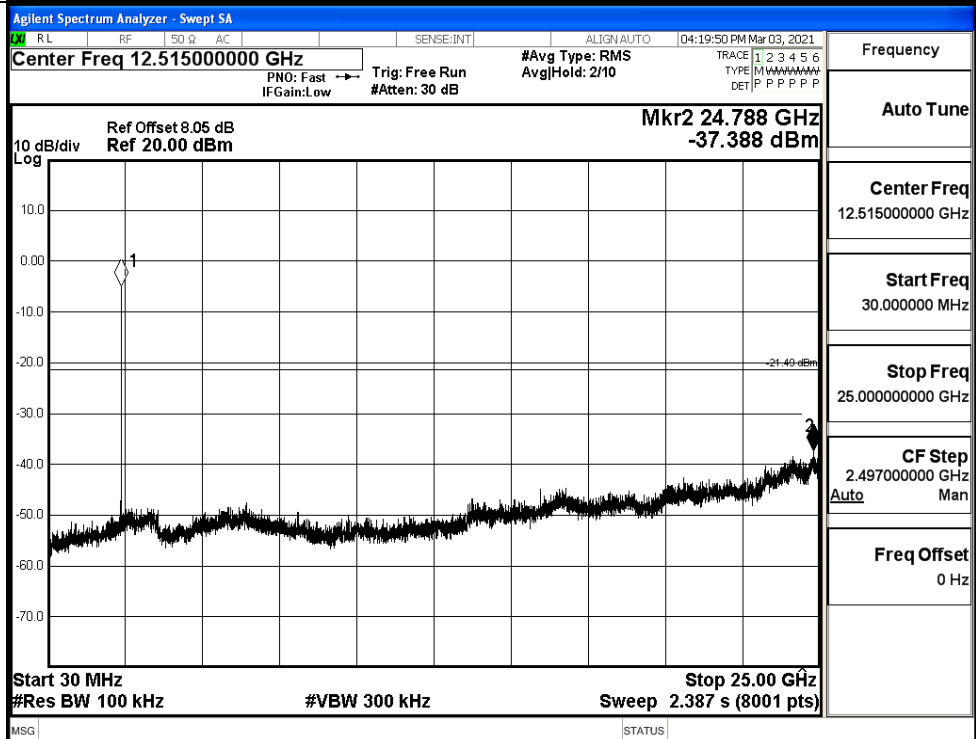


8DPSK_LCH_Graphs

Pref

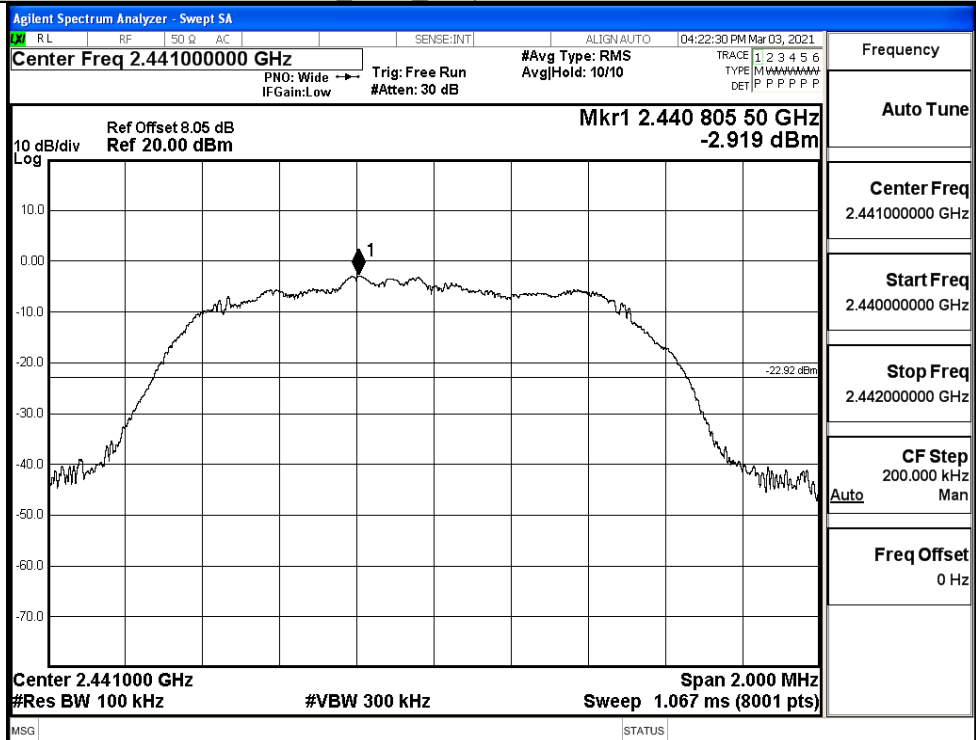


Puw

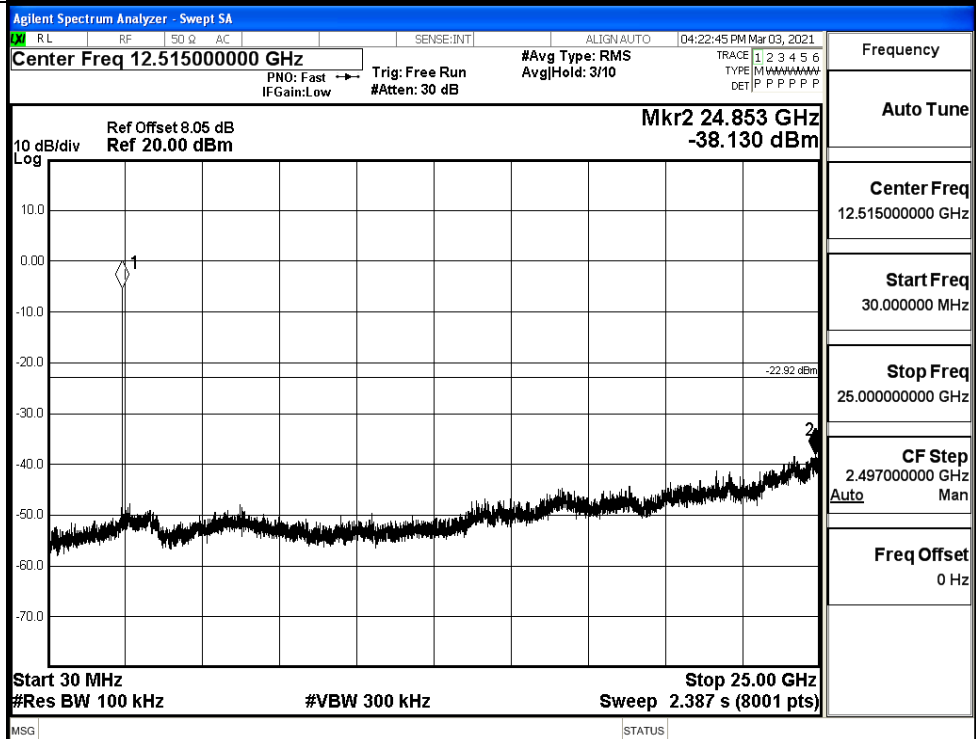


8DPSK_MCH_Graphs

Pref

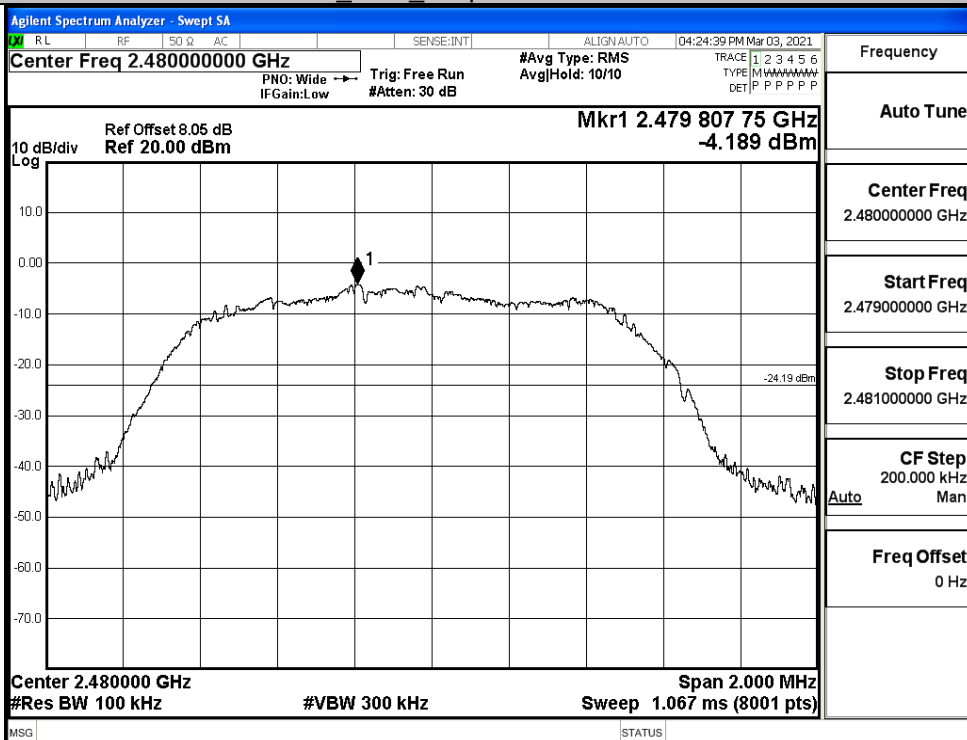


Puw

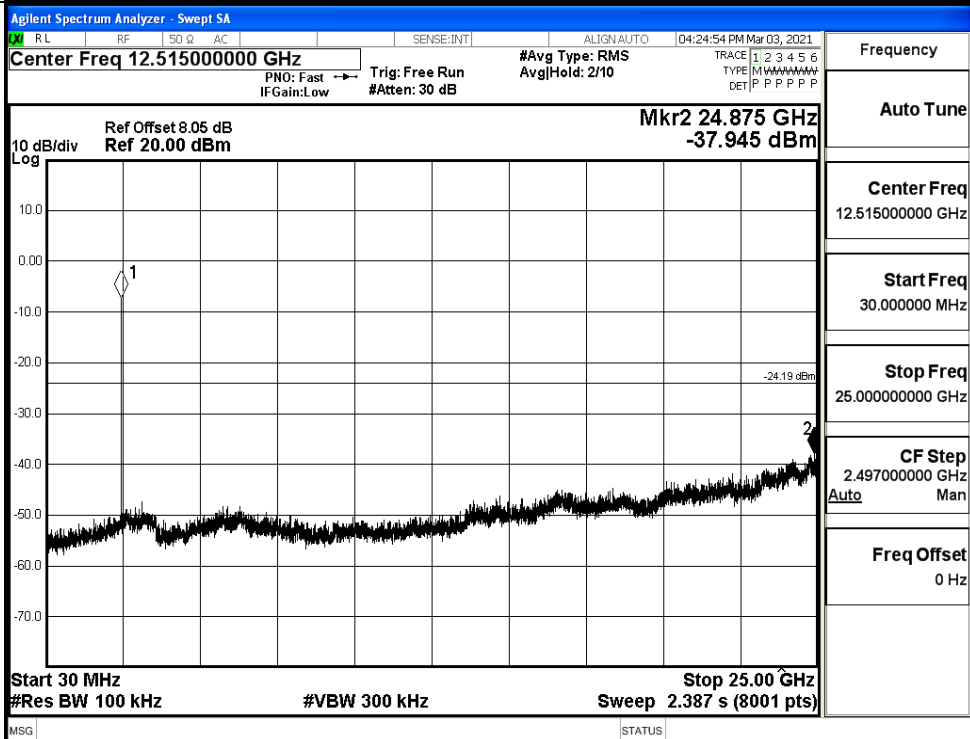


8DPSK_HCH_Graphs

Pref



Puw

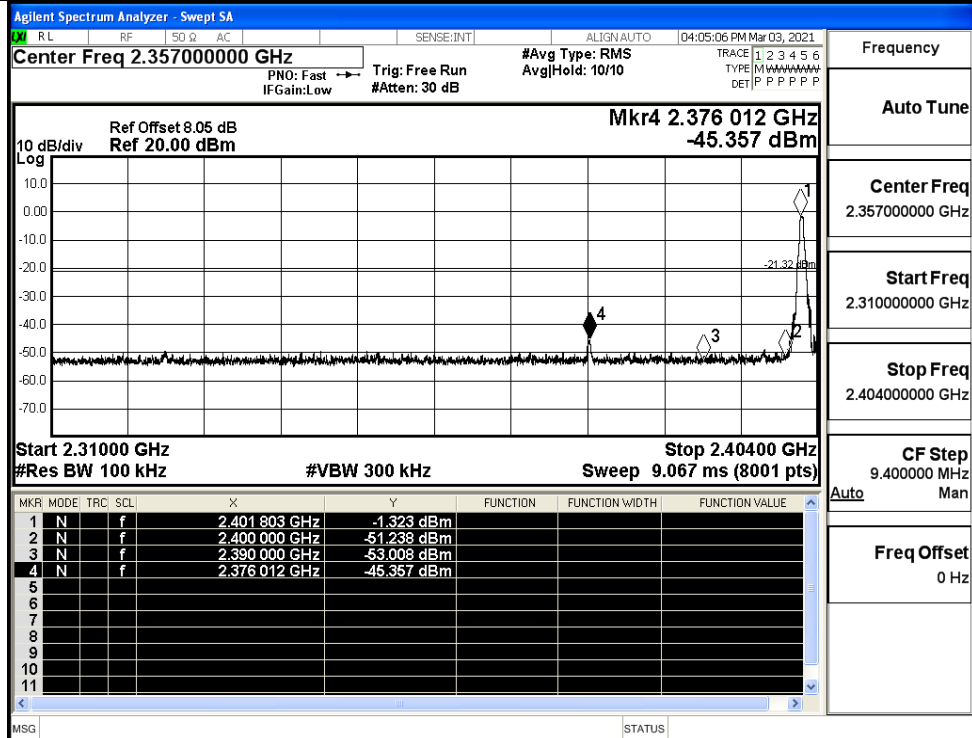


A.8 Band-edge for RF Conducted Emissions

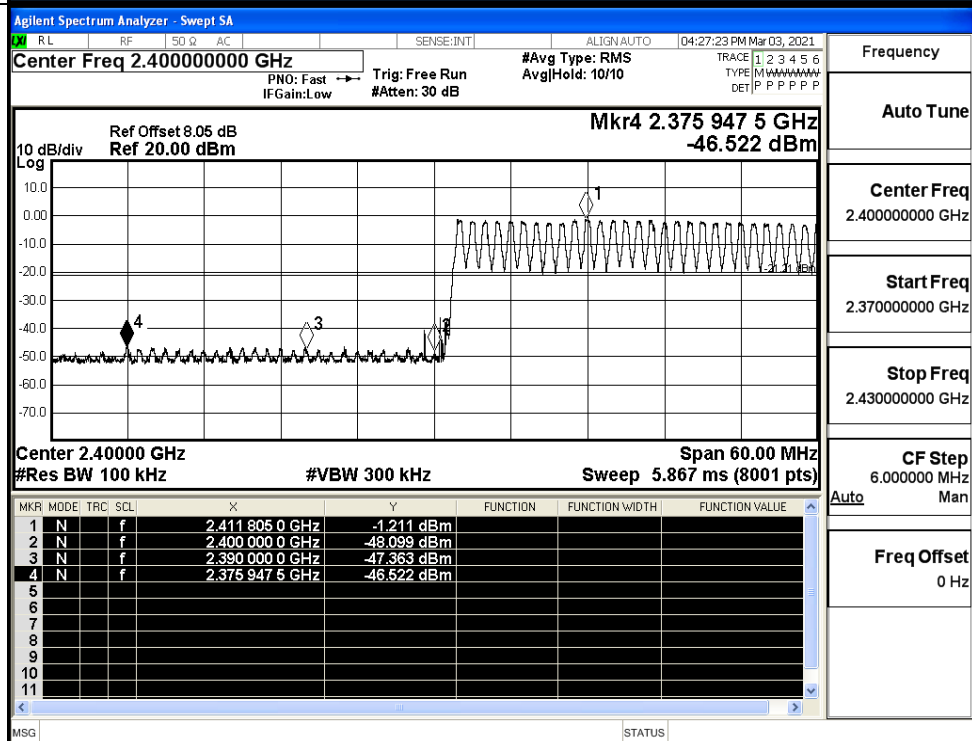
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.323	Off	-45.357	-21.32	PASS
			-1.211	On	-46.522	-21.21	PASS
	HCH	2480	-3.899	Off	-48.922	-23.9	PASS
			-3.487	On	-48.318	-23.49	PASS
$\pi/4$ DQPSK	LCH	2402	-1.228	Off	-46.596	-21.23	PASS
			-1.023	On	-46.095	-21.02	PASS
	HCH	2480	-3.842	Off	-49.141	-23.84	PASS
			-3.297	On	-48.840	-23.3	PASS
8DPSK	LCH	2402	-1.262	Off	-47.075	-21.26	PASS
			-1.420	On	-46.568	-21.42	PASS
	HCH	2480	-3.991	Off	-49.553	-23.99	PASS
			-3.467	On	-48.505	-23.47	PASS

Test Graphs

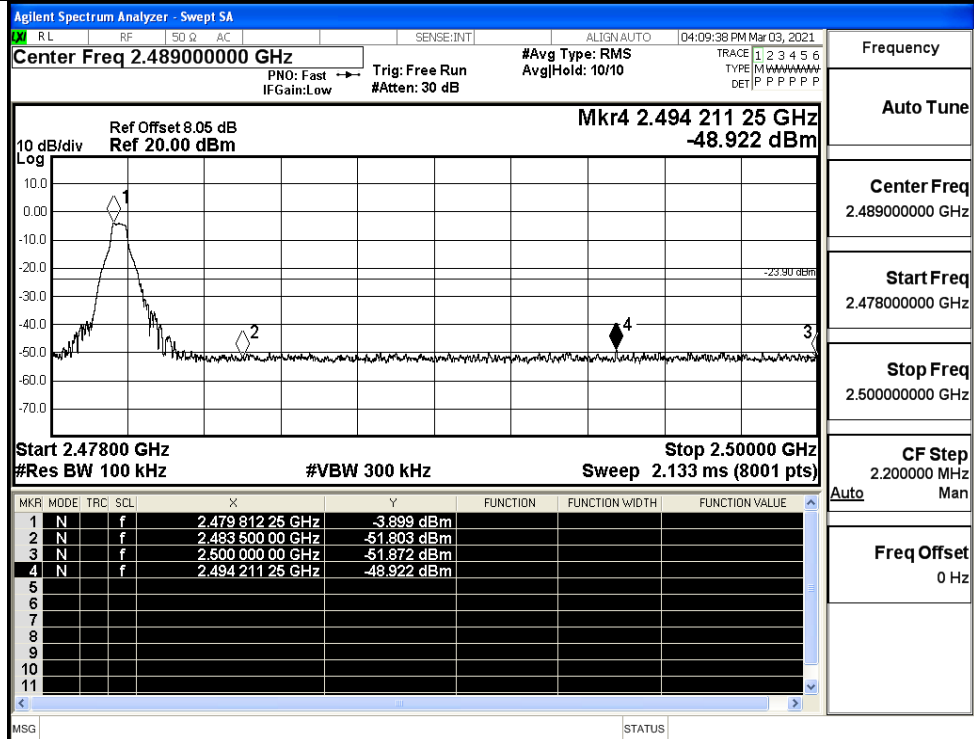
GFSK/LCH/No Hop



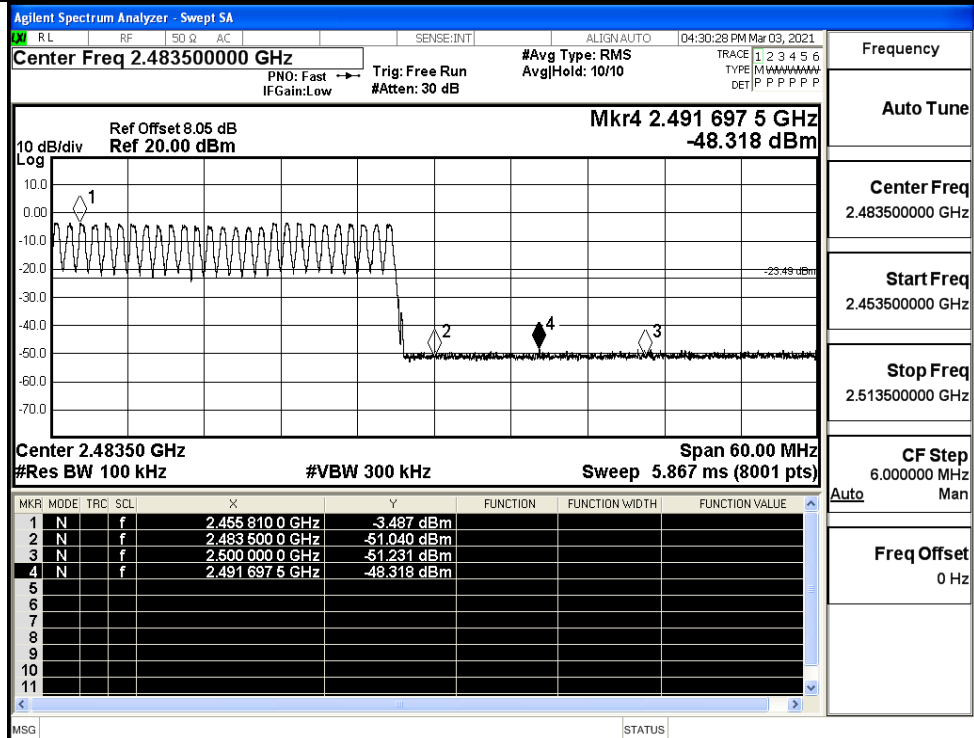
GFSK/LCH/Hop



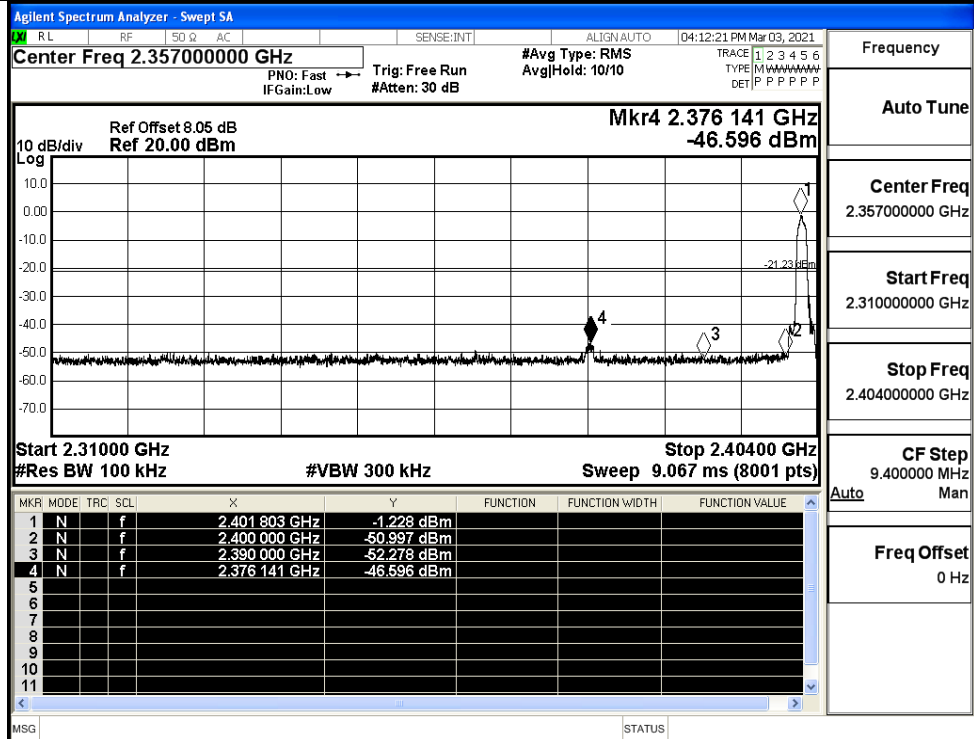
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

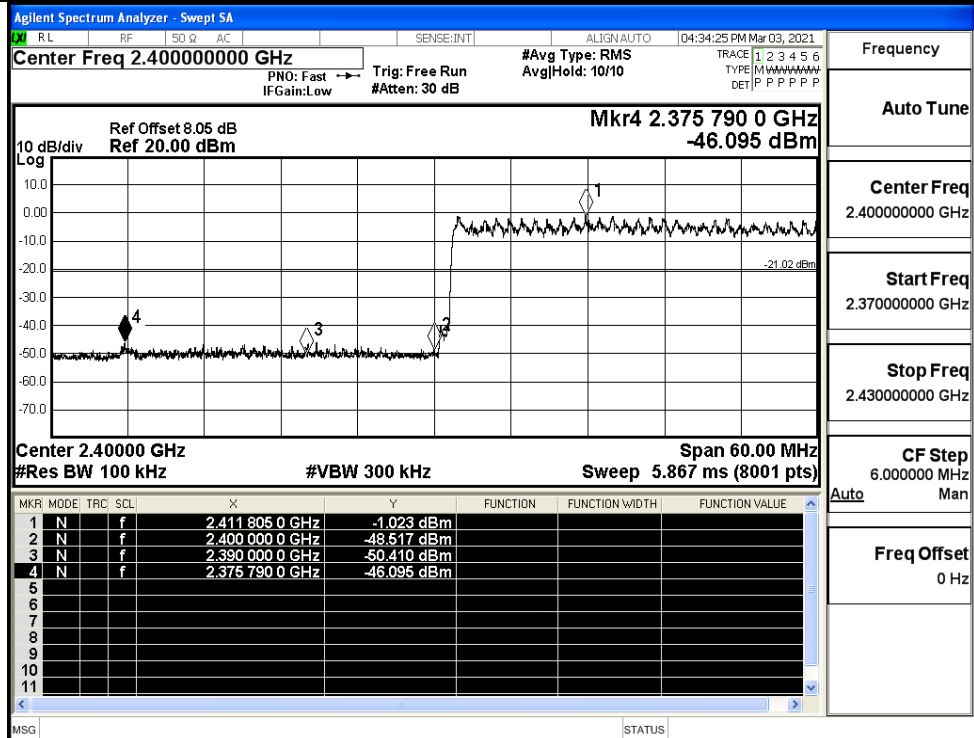
Start Freq
2.310000000 GHz

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

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE:INT ALIGN AUTO 04:16:58 PM Mar 03, 2021

Center Freq 2.48900000 GHz PNO: Fast → Trig: Free Run #Avg Type: RMS AvgHld: 10/10
IF Gain: Low #Atten: 30 dB

TRACE 1 2 3 4 5 6 TYPE M W U I D L DET P P P P P P

Mkr 4 2.497 338 00 GHz -49.141 dBm

The plot shows a spectrum from approximately 2.475 GHz to 2.505 GHz. A significant signal peak is visible at 2.478 GHz, reaching about -20 dBm. A second, much smaller peak is marked at 2.497 GHz (-49.141 dBm). The baseline noise floor is around -50 dBm.

MKR	FREQ (GHz)	POWER (dBm)
1	2.478 000 00	-20.00
2	2.497 338 00	-49.141

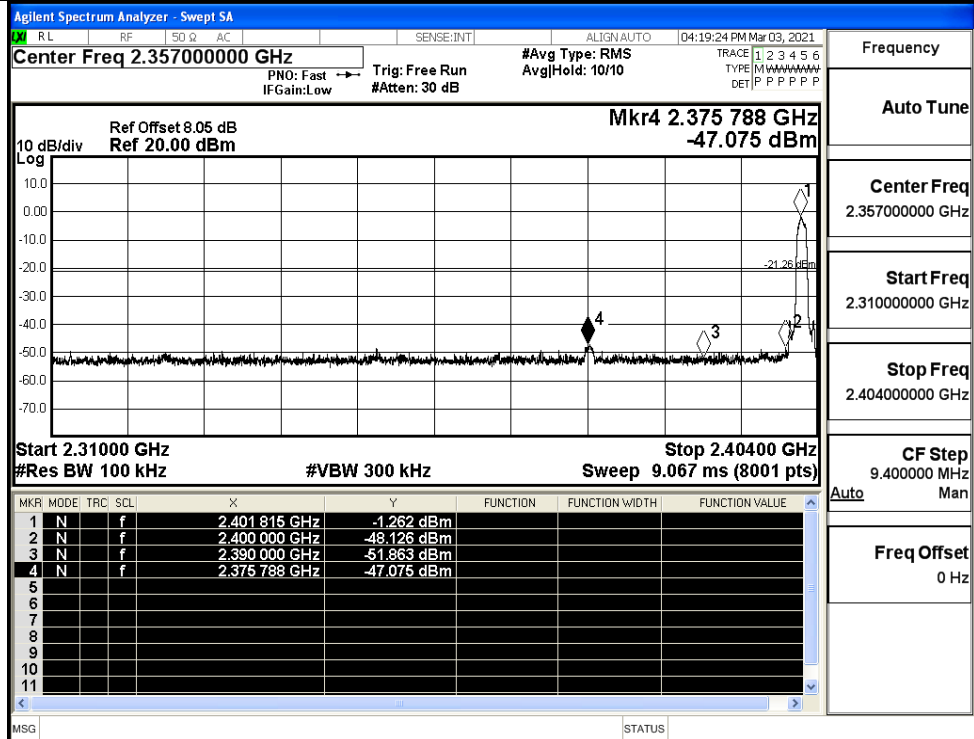
Start 2.47800 GHz #Res BW 100 kHz Stop 2.50000 GHz Sweep 2.133 ms (8001 pts) #VBW 300 kHz

MKR	MODE	TFC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N		f	2.479 815 00 GHz	-3.842 dBm			
2	N		f	2.483 500 00 GHz	-52.167 dBm			
3	N		f	2.500 000 00 GHz	-50.820 dBm			
4	N		f	2.497 338 00 GHz	-49.141 dBm			

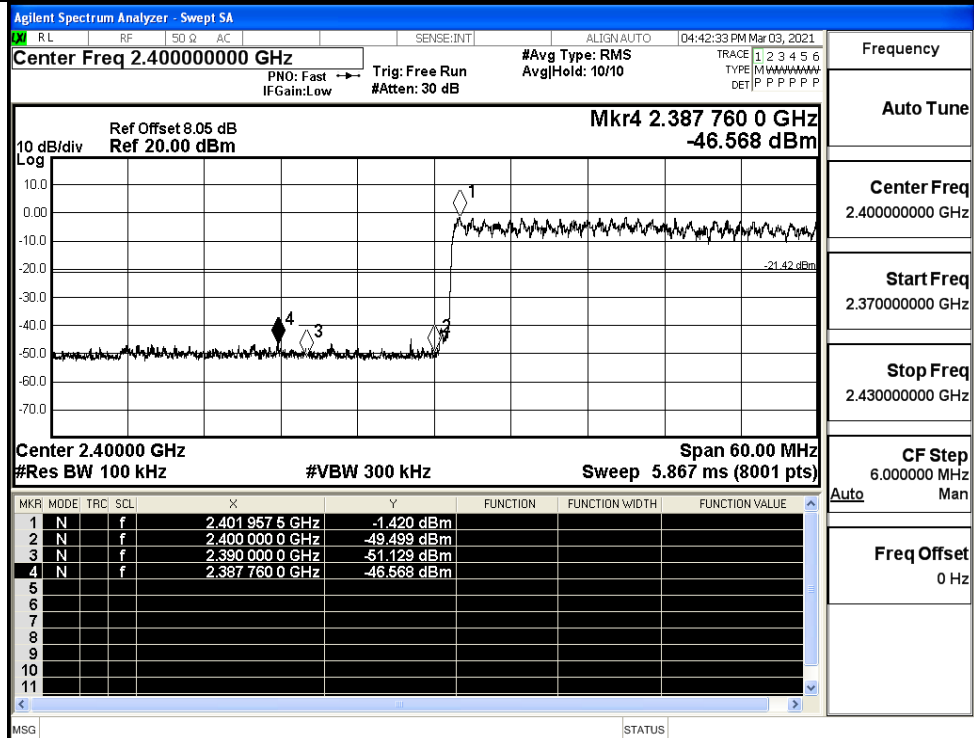
MSG STATUS

[illegible]

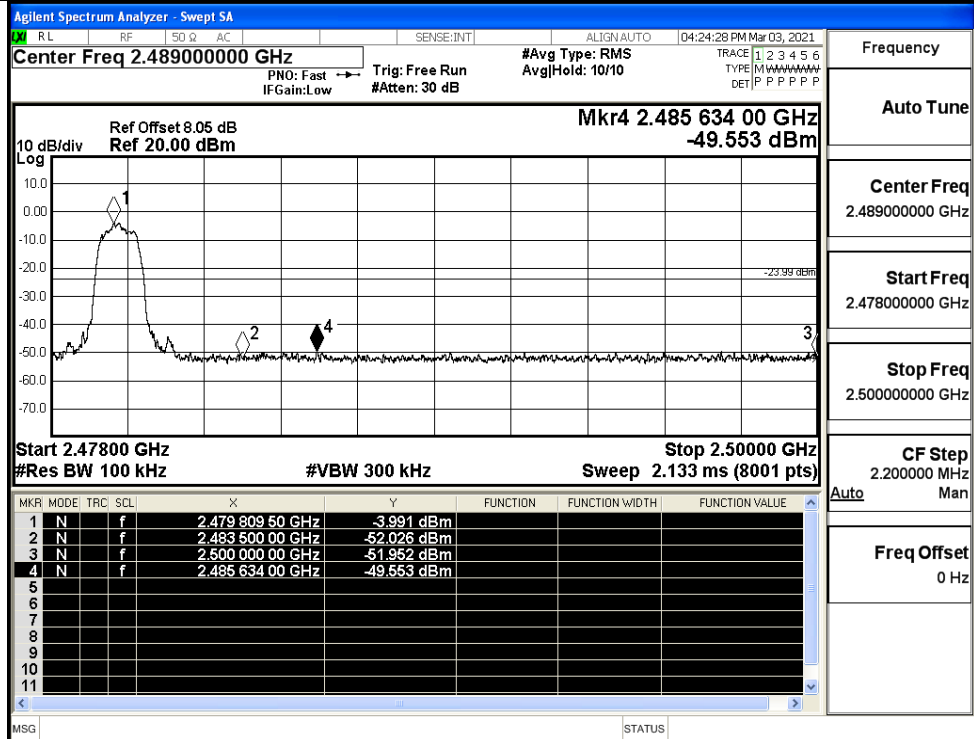
8DPSK/LCH/No Hop



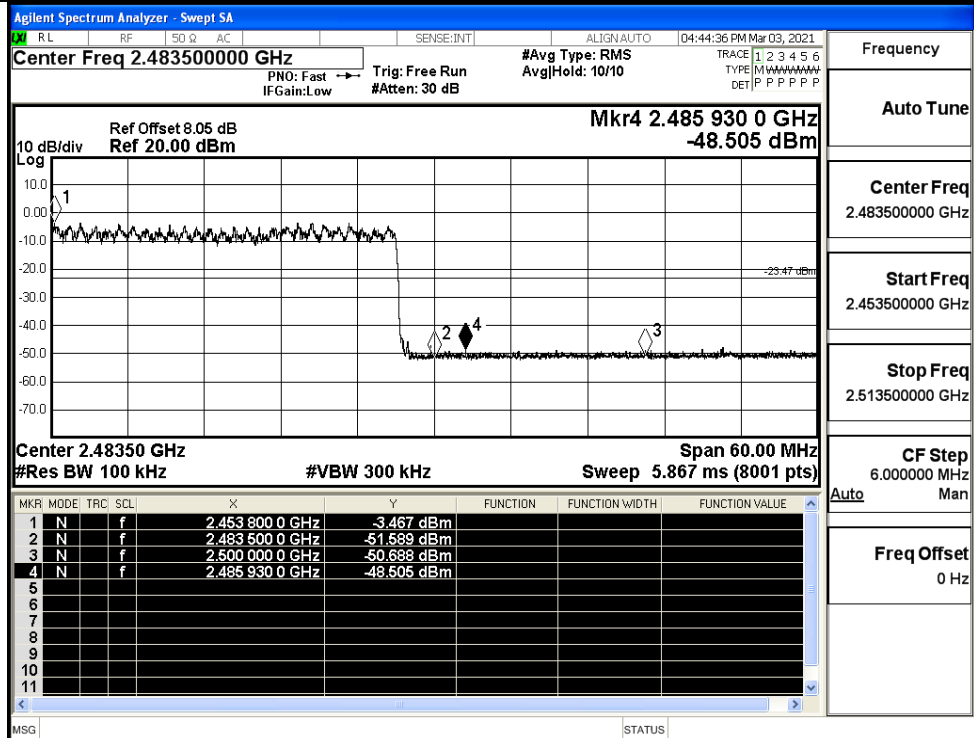
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



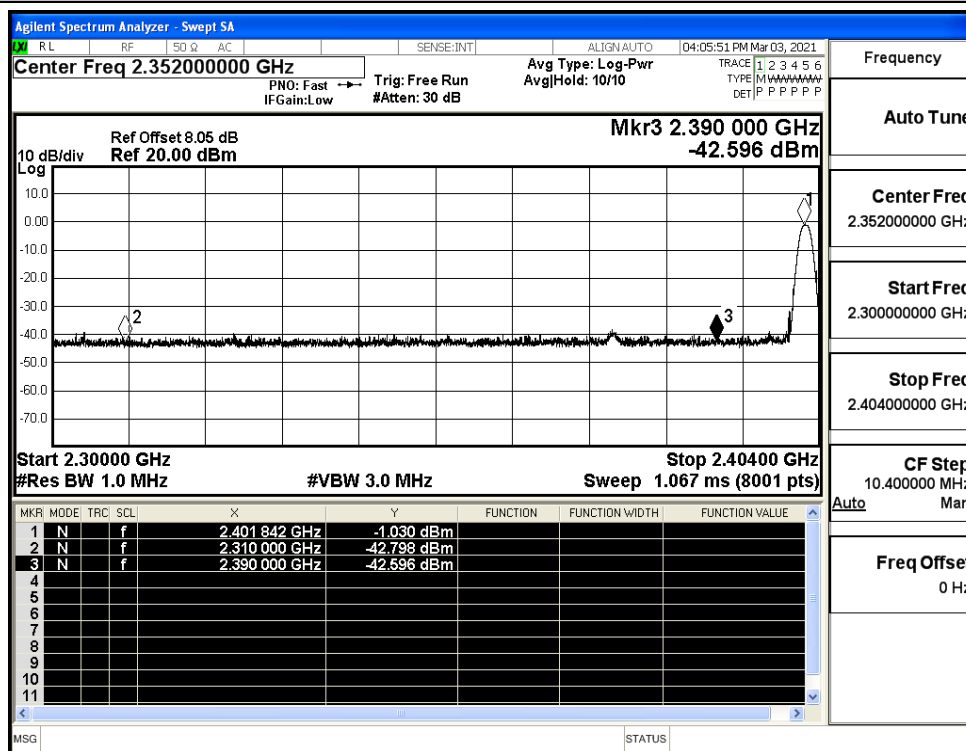
8DPSK/HCH/Hop



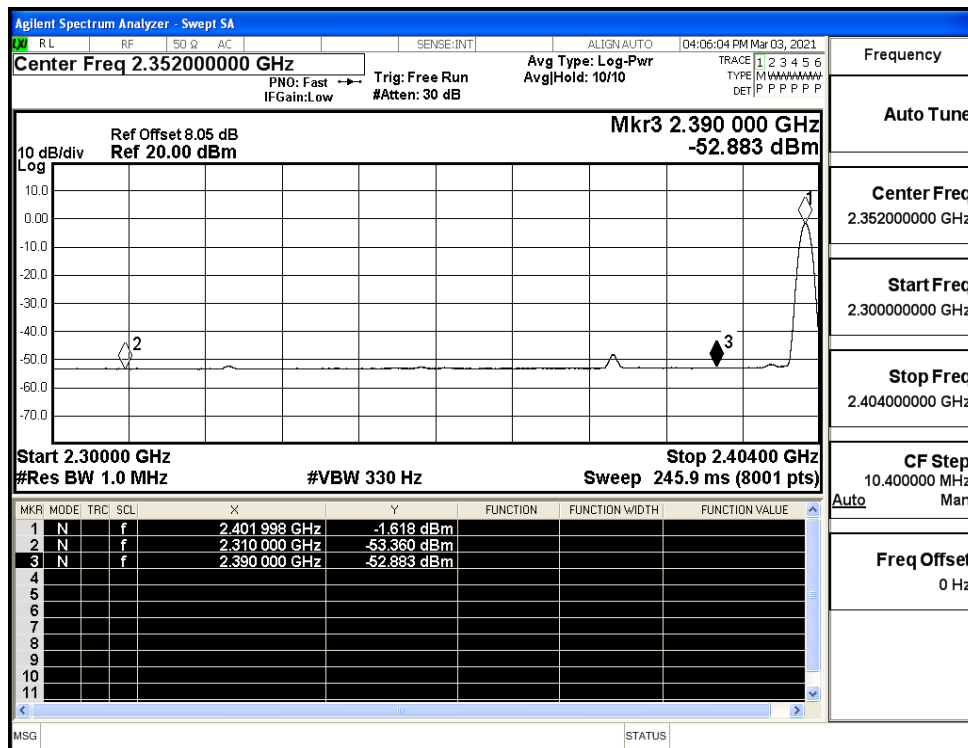
A.9 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.80	2.0	0	54.46	PEAK	74	PASS
	Off	2310.0	-53.36	2.0	0	43.90	AV	54	PASS
	Off	2390.0	-42.60	2.0	0	54.66	PEAK	74	PASS
	Off	2390.0	-52.88	2.0	0	44.37	AV	54	PASS
	Off	2483.5	-40.31	2.0	0	56.95	PEAK	74	PASS
	Off	2483.5	-52.45	2.0	0	44.80	AV	54	PASS
	Off	2500.0	-42.48	2.0	0	54.78	PEAK	74	PASS
	Off	2500.0	-52.41	2.0	0	44.84	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.00	2.0	0	53.25	PEAK	74	PASS
	Off	2310.0	-53.25	2.0	0	44.01	AV	54	PASS
	Off	2390.0	-42.20	2.0	0	55.05	PEAK	74	PASS
	Off	2390.0	-52.93	2.0	0	44.33	AV	54	PASS
	Off	2483.5	-42.53	2.0	0	54.72	PEAK	74	PASS
	Off	2483.5	-52.35	2.0	0	44.91	AV	54	PASS
	Off	2500.0	-40.63	2.0	0	56.63	PEAK	74	PASS
	Off	2500.0	-52.46	2.0	0	44.80	AV	54	PASS
8DPSK	Off	2310.0	-43.49	2.0	0	53.77	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	43.97	AV	54	PASS
	Off	2390.0	-41.91	2.0	0	55.34	PEAK	74	PASS
	Off	2390.0	-53.10	2.0	0	44.16	AV	54	PASS
	Off	2483.5	-41.54	2.0	0	55.72	PEAK	74	PASS
	Off	2483.5	-52.41	2.0	0	44.85	AV	54	PASS
	Off	2500.0	-43.18	2.0	0	54.08	PEAK	74	PASS
	Off	2500.0	-52.45	2.0	0	44.81	AV	54	PASS

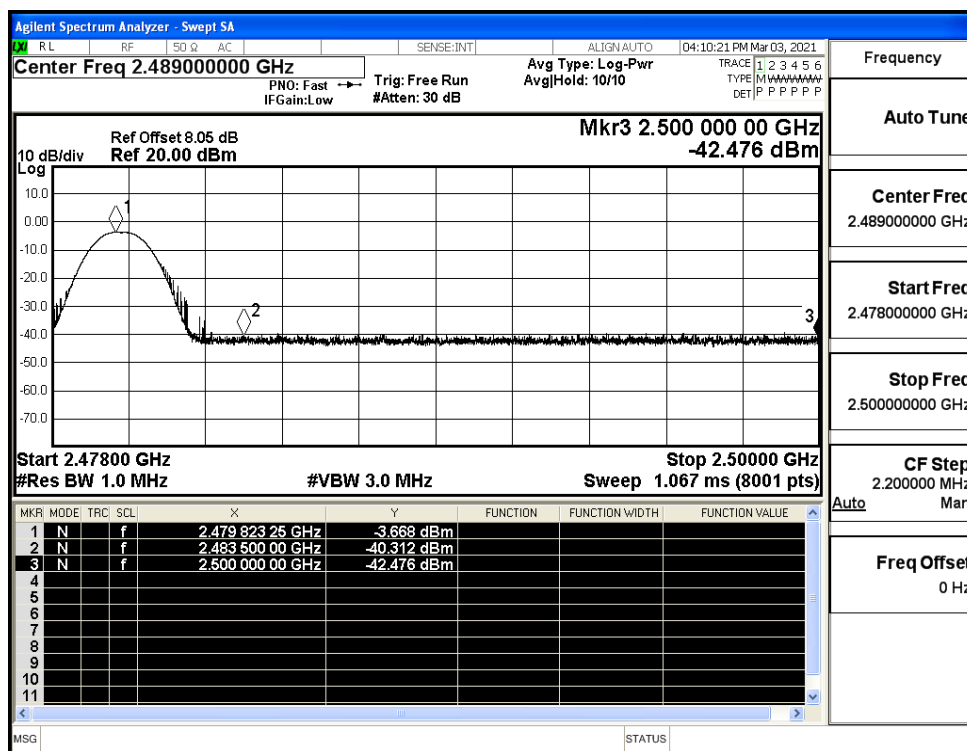
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



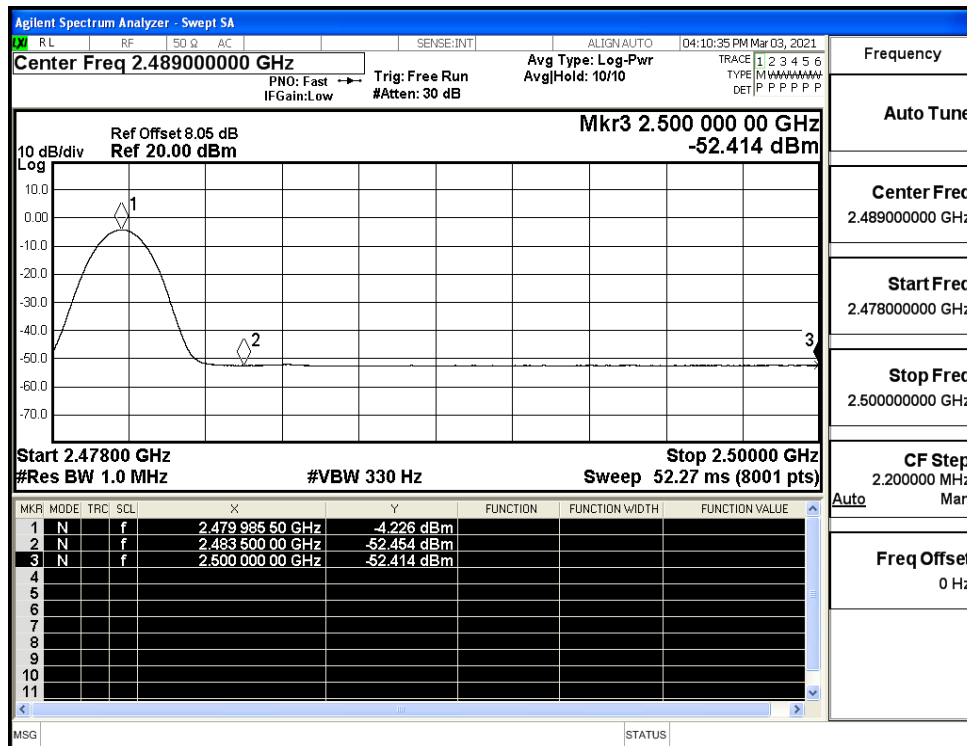
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

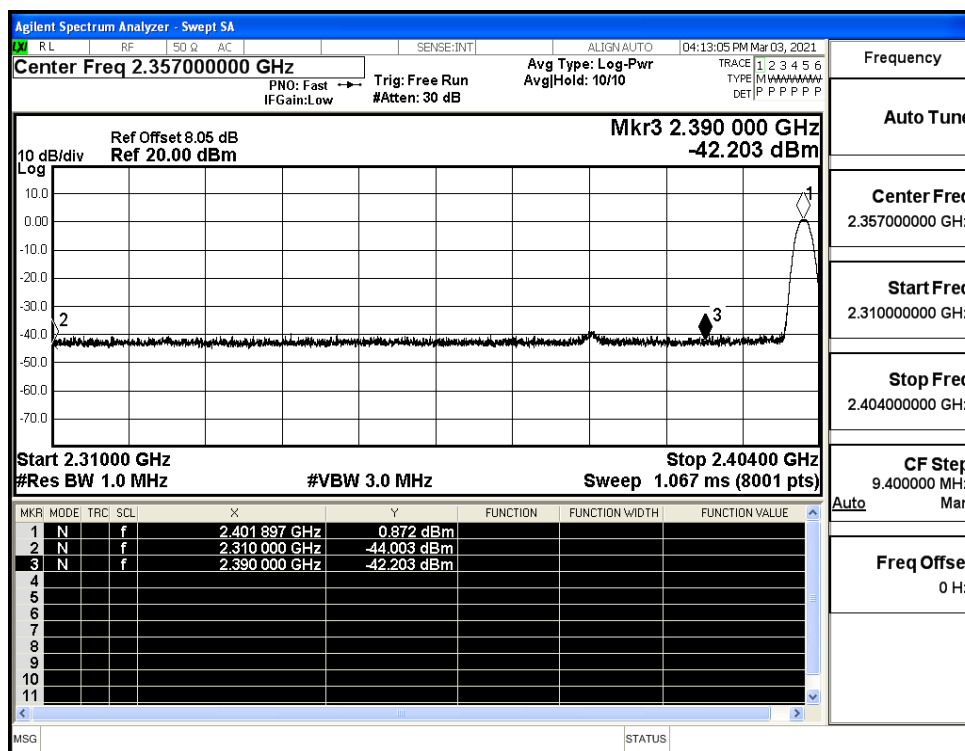
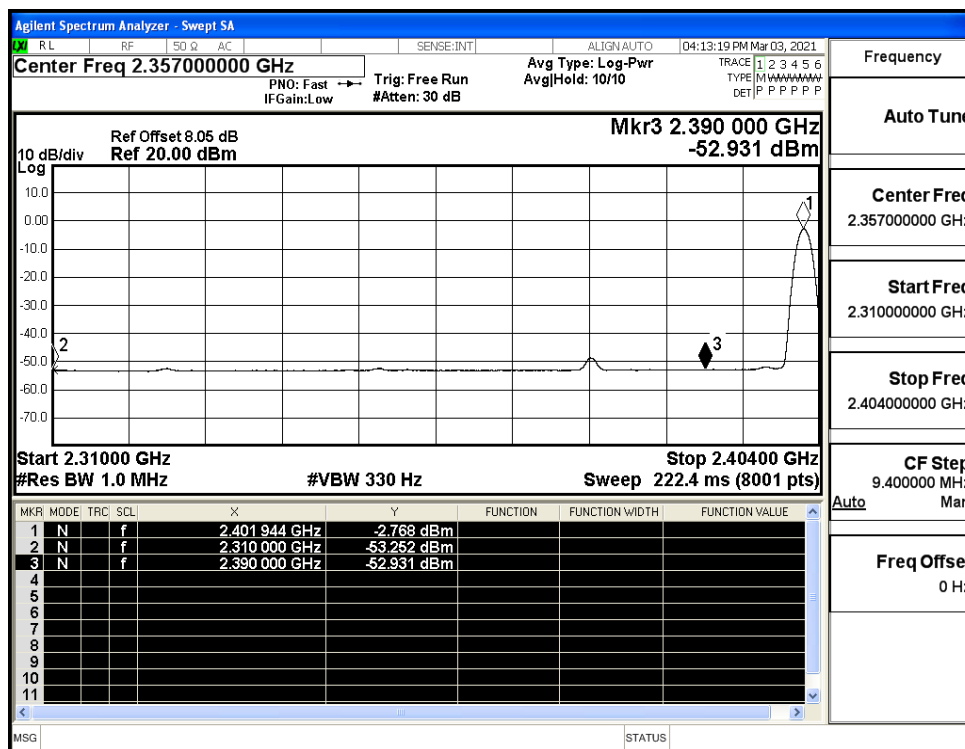


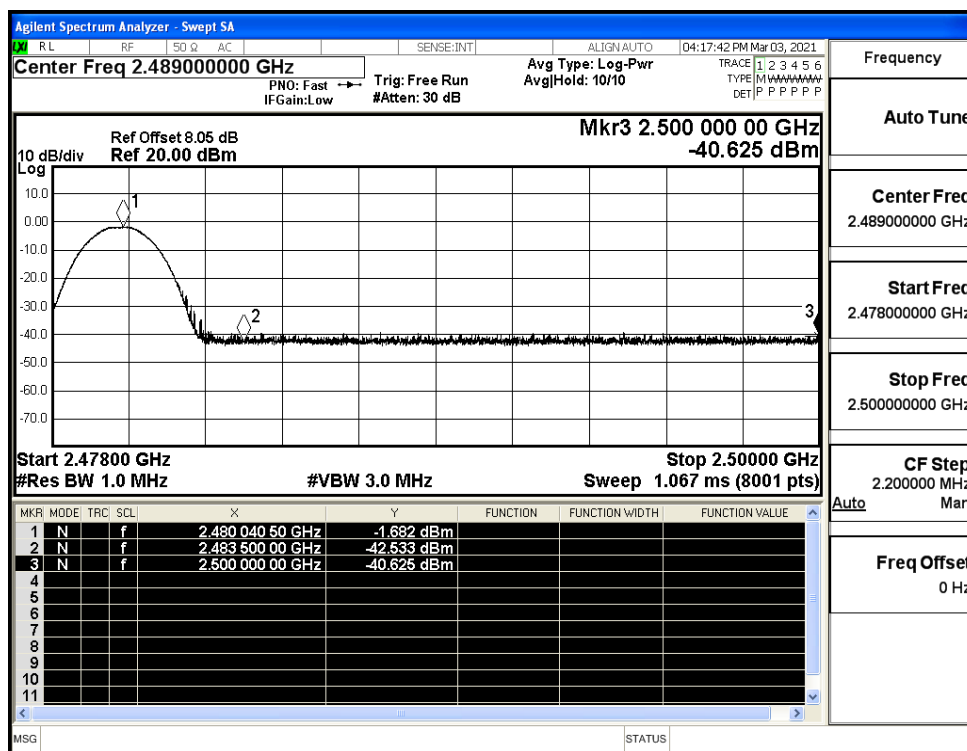
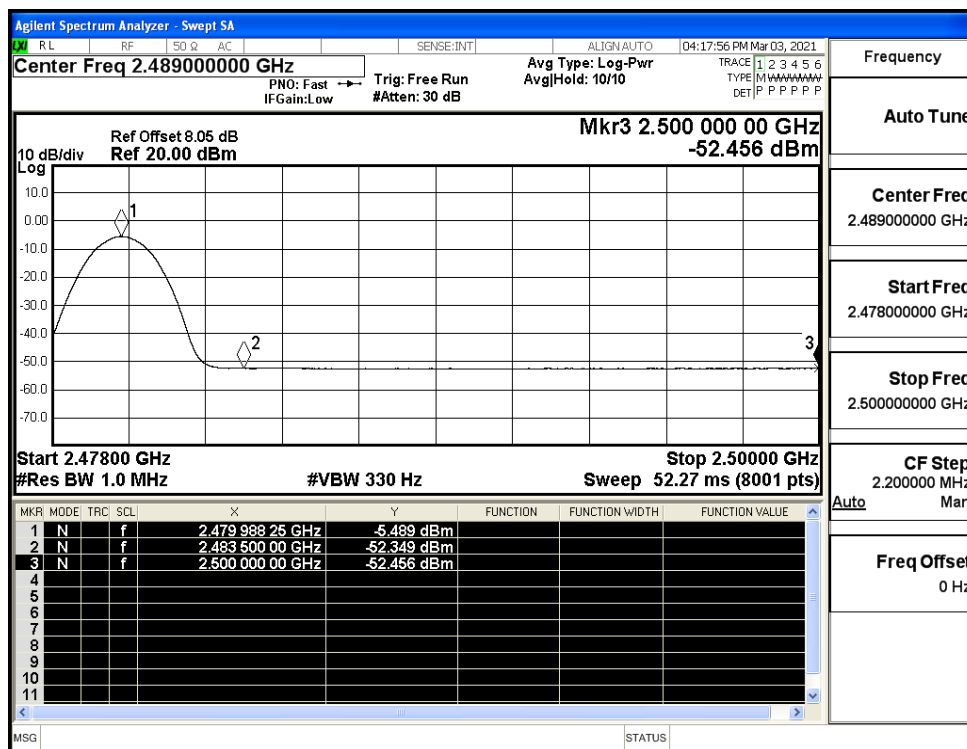
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



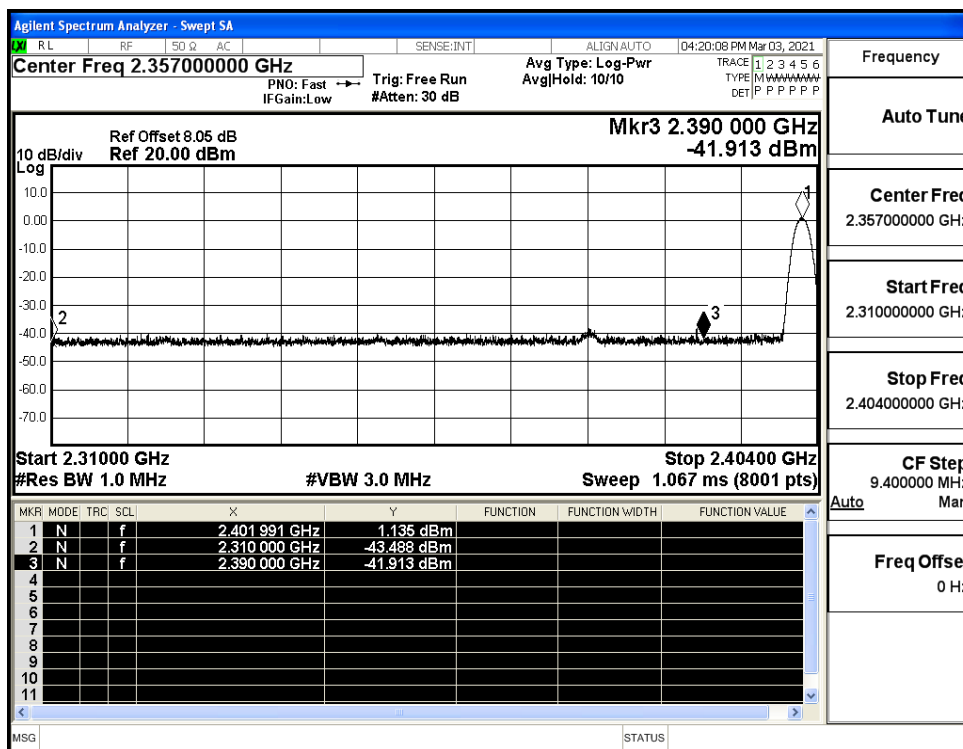
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



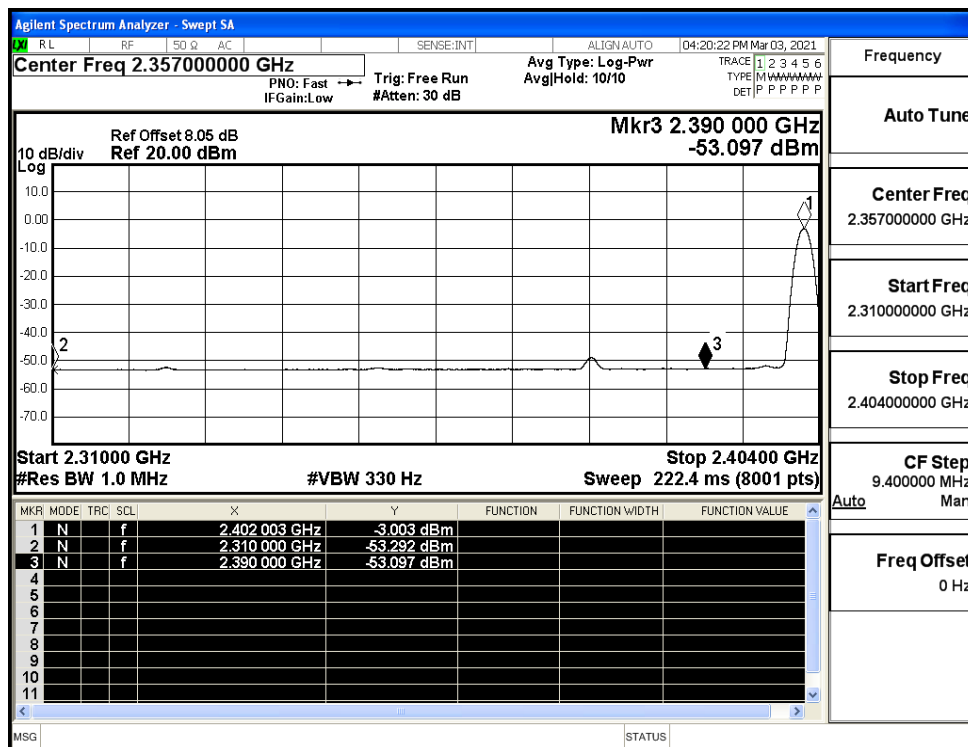
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

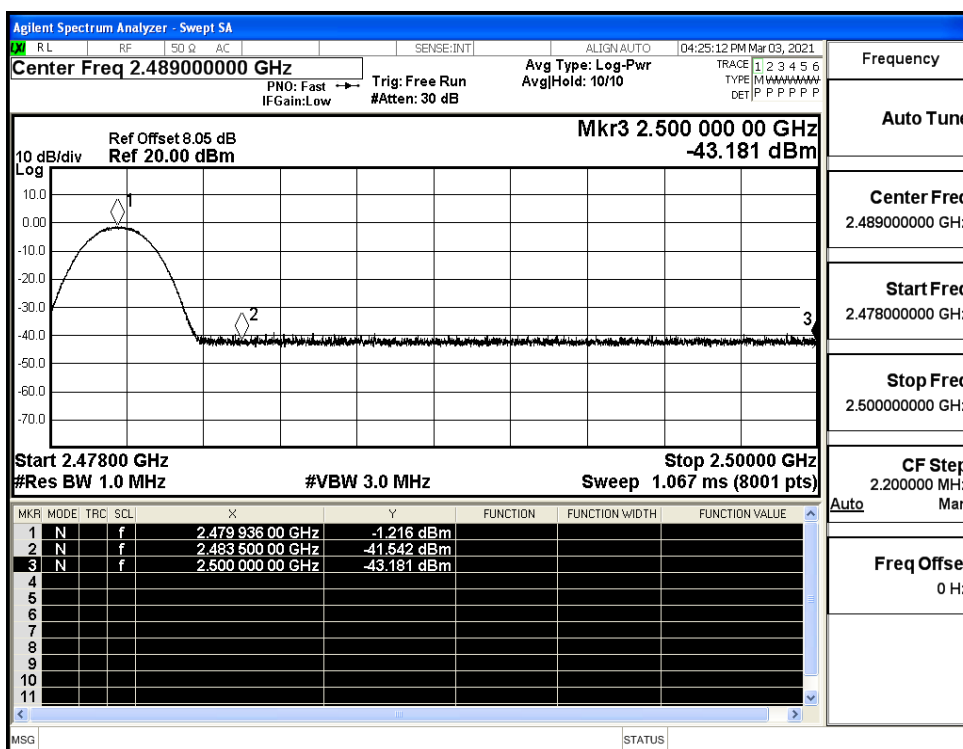
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

