

Appendix A

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

Product Name: GNSS RECEIVER

Trade Mark: SOUTH, KOLIDA, SANDING, RUIDE, TIANYU

Test Model: NET S9

Environmental Conditions

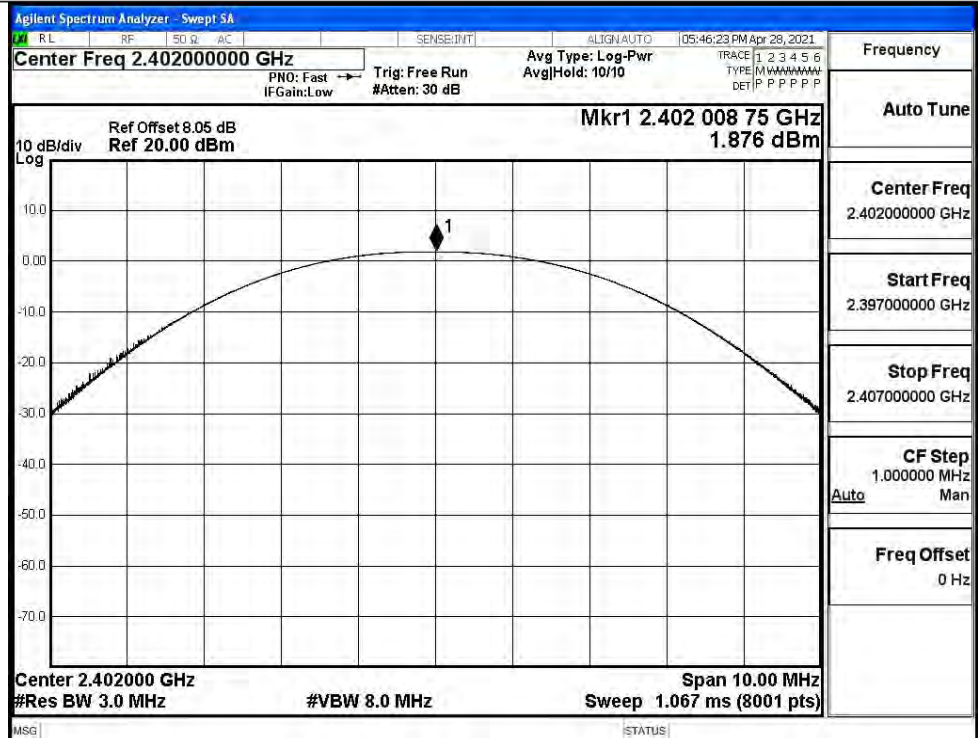
Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Ken He
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

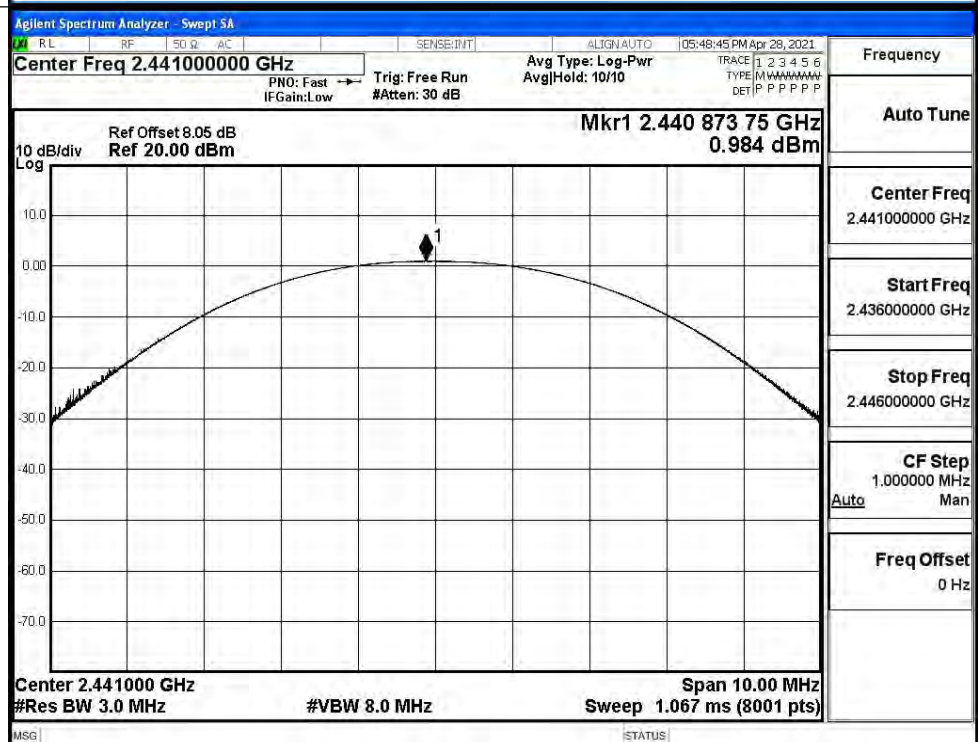
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.876	21	PASS
	MCH	0.984	21	PASS
	HCH	-0.240	21	PASS
$\pi/4$ DQPSK	LCH	4.133	21	PASS
	MCH	3.227	21	PASS
	HCH	1.966	21	PASS
8DPSK	LCH	4.587	21	PASS
	MCH	3.708	21	PASS
	HCH	2.427	21	PASS

Test Graphs

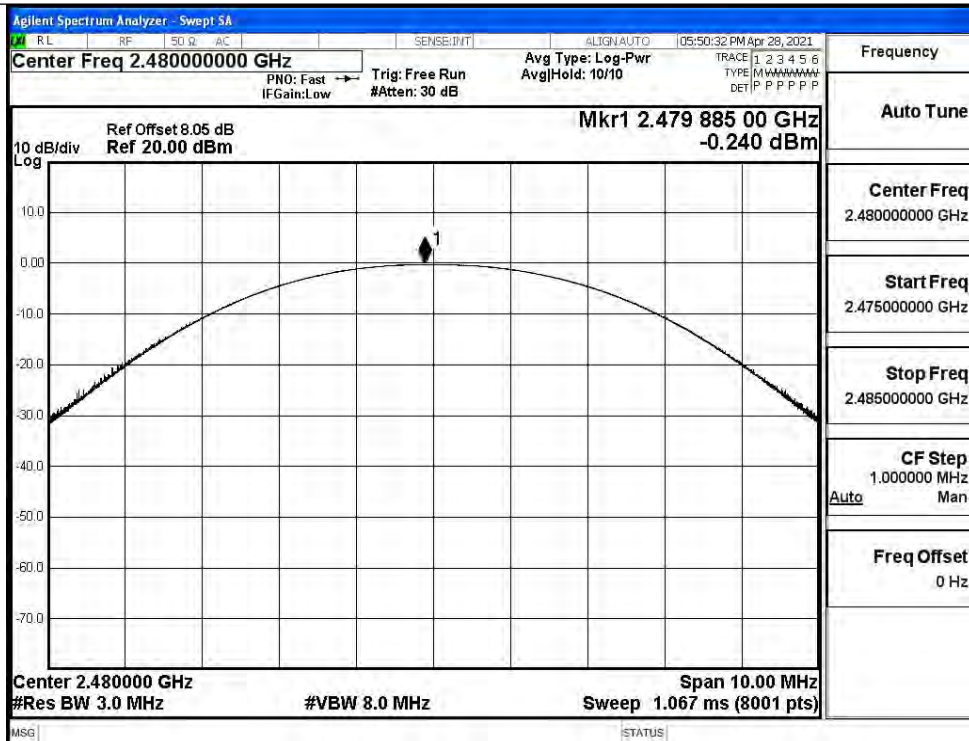
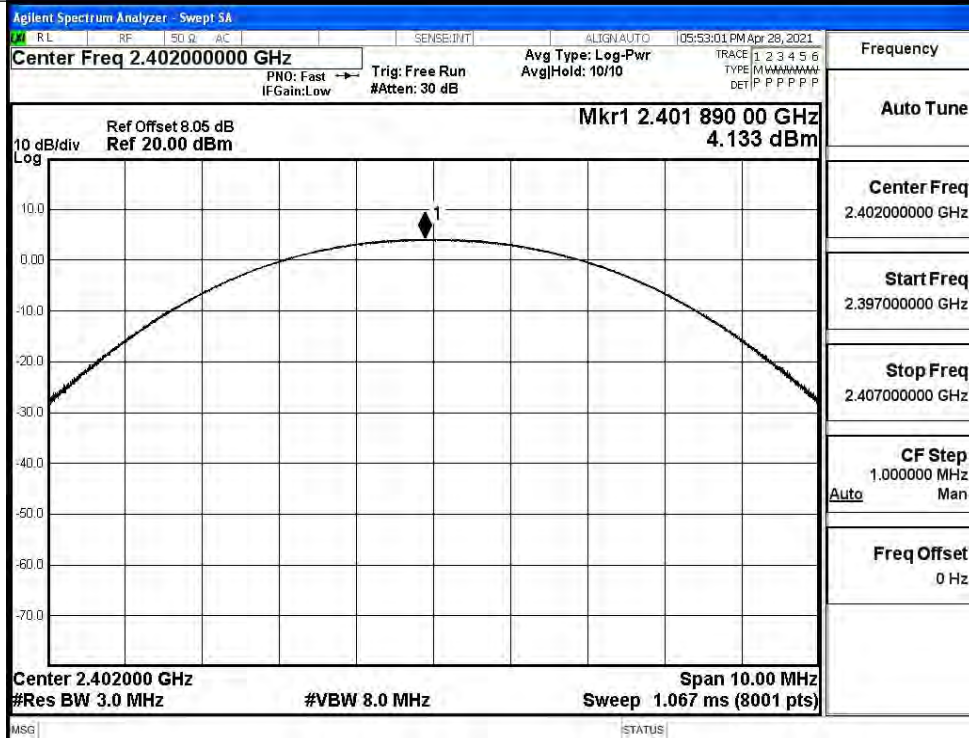
GFSK/LCH

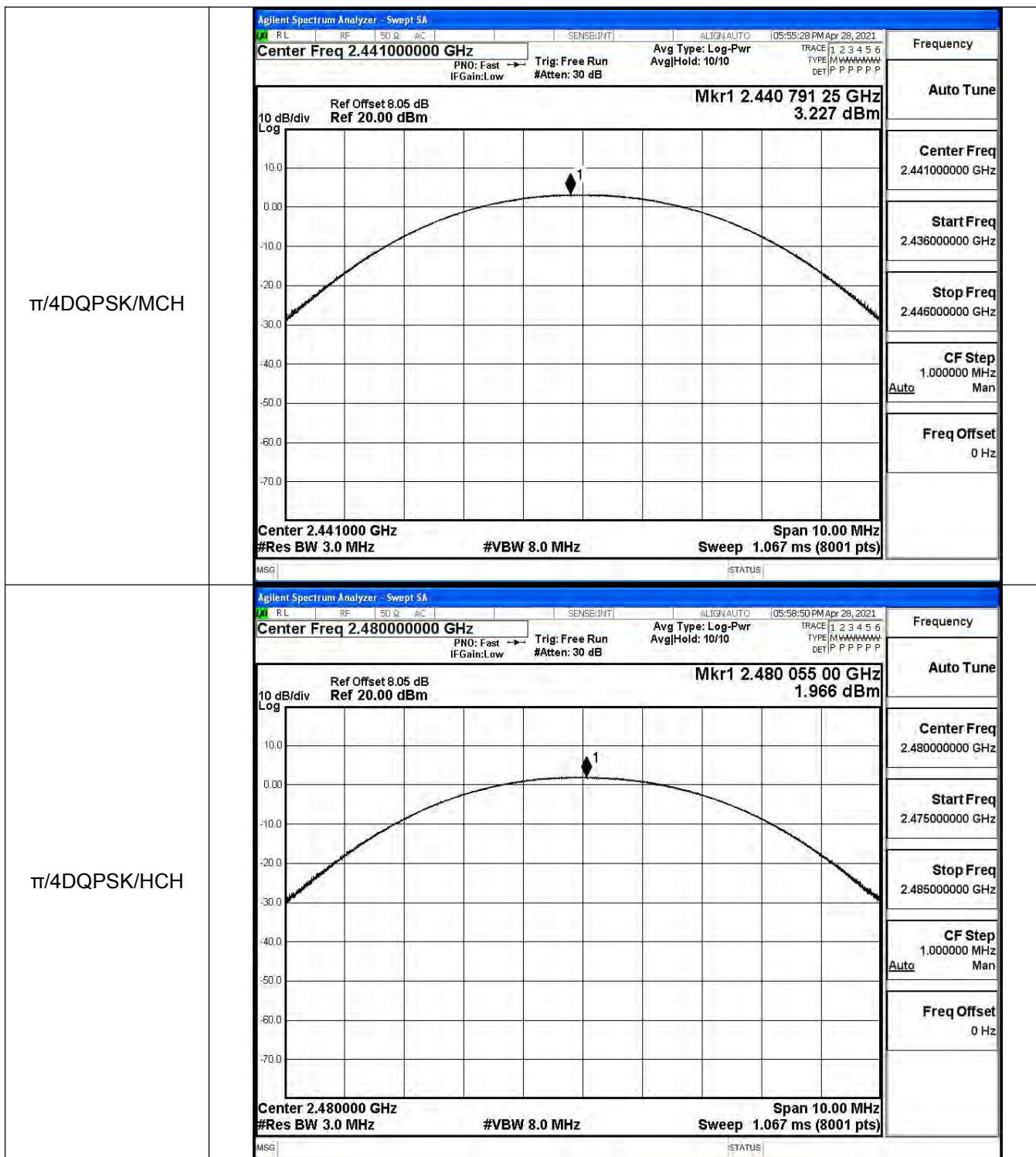


GFSK/MCH

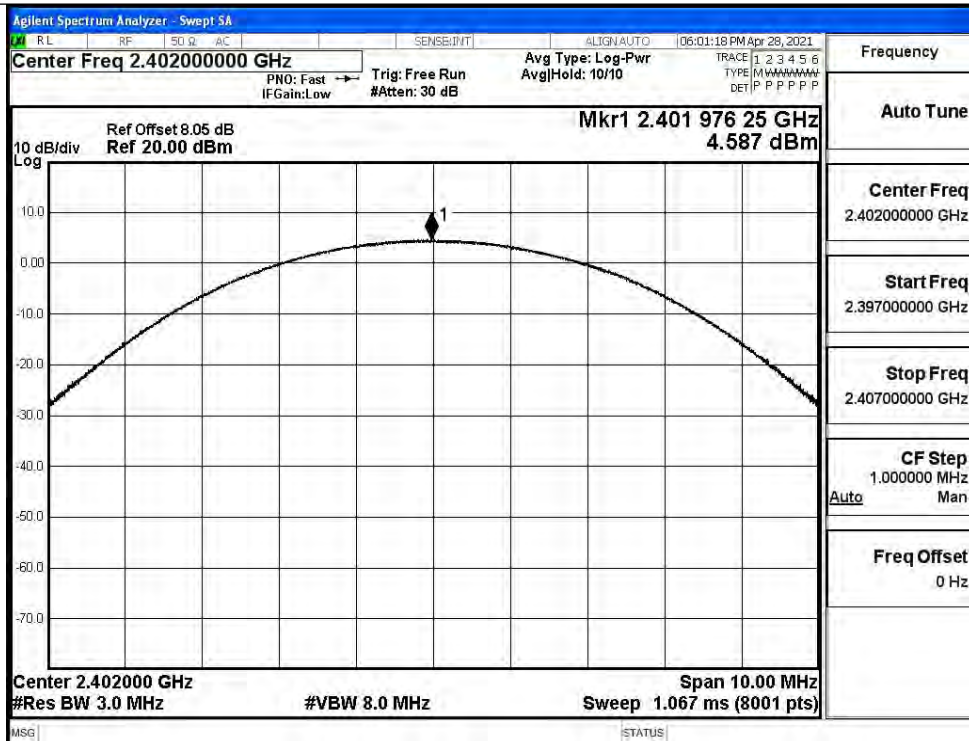


GFSK/HCH

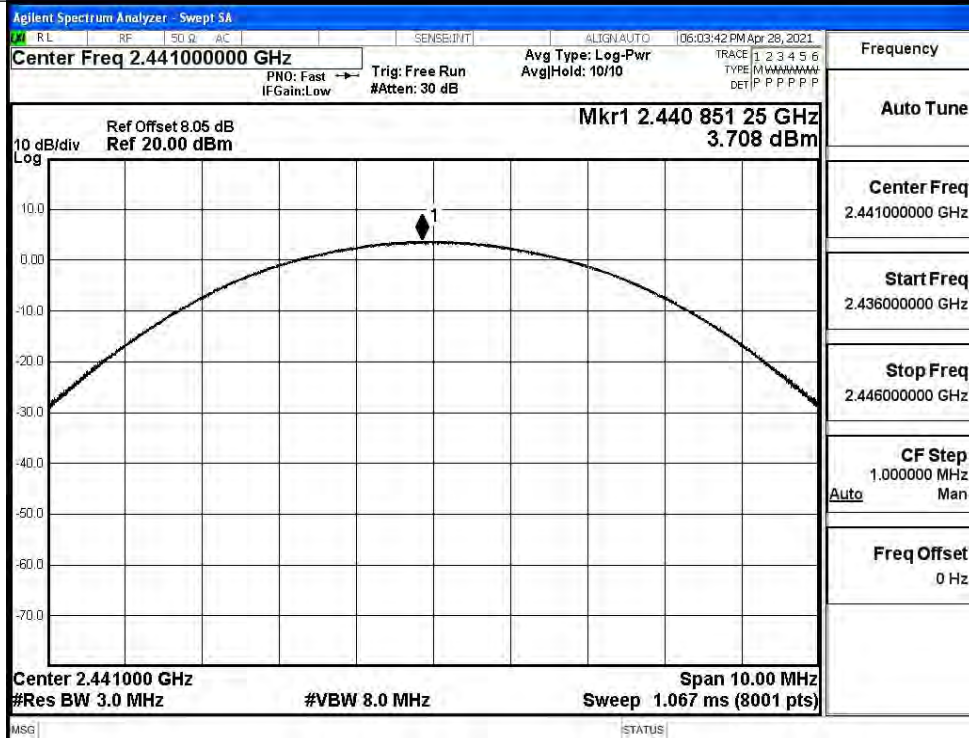
 $\pi/4$ DQPSK/LCH



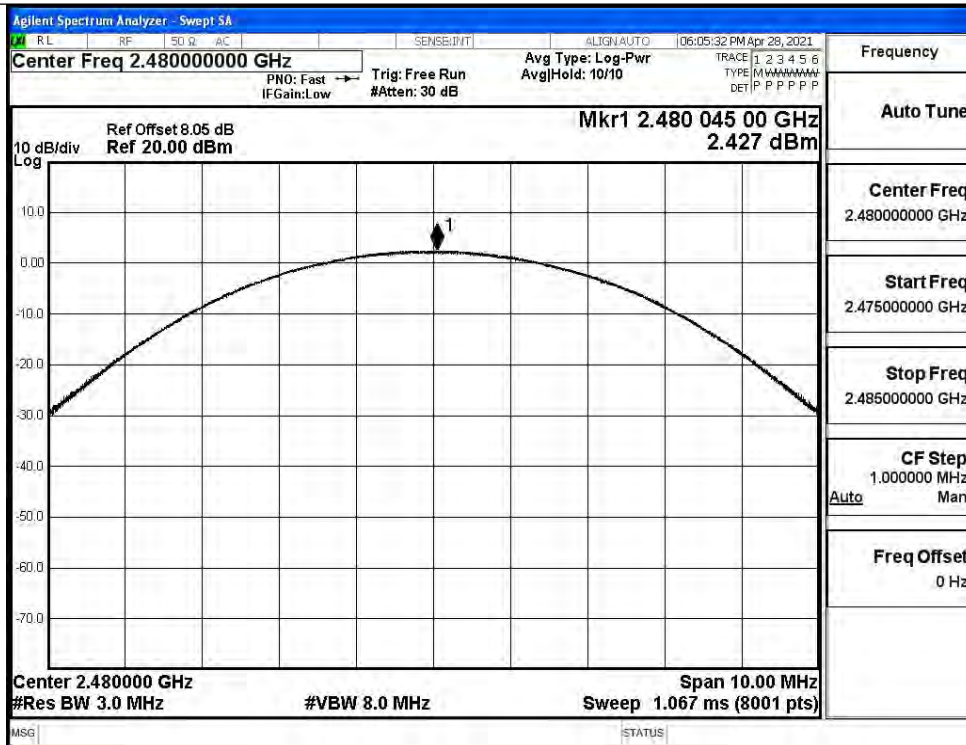
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

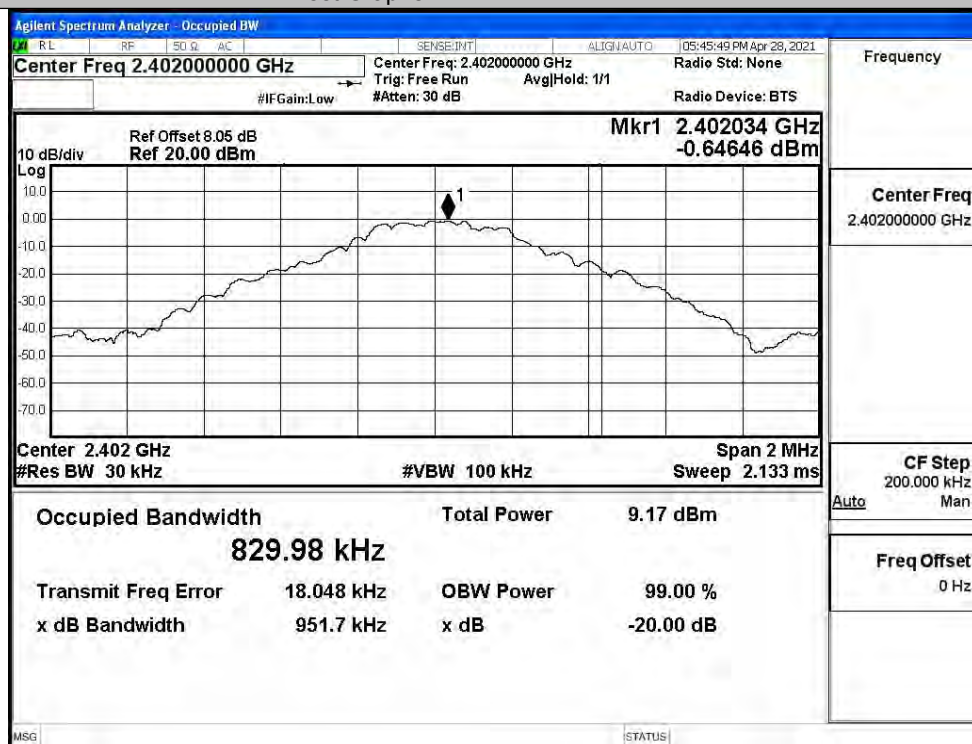


A.2 20dB Bandwidth

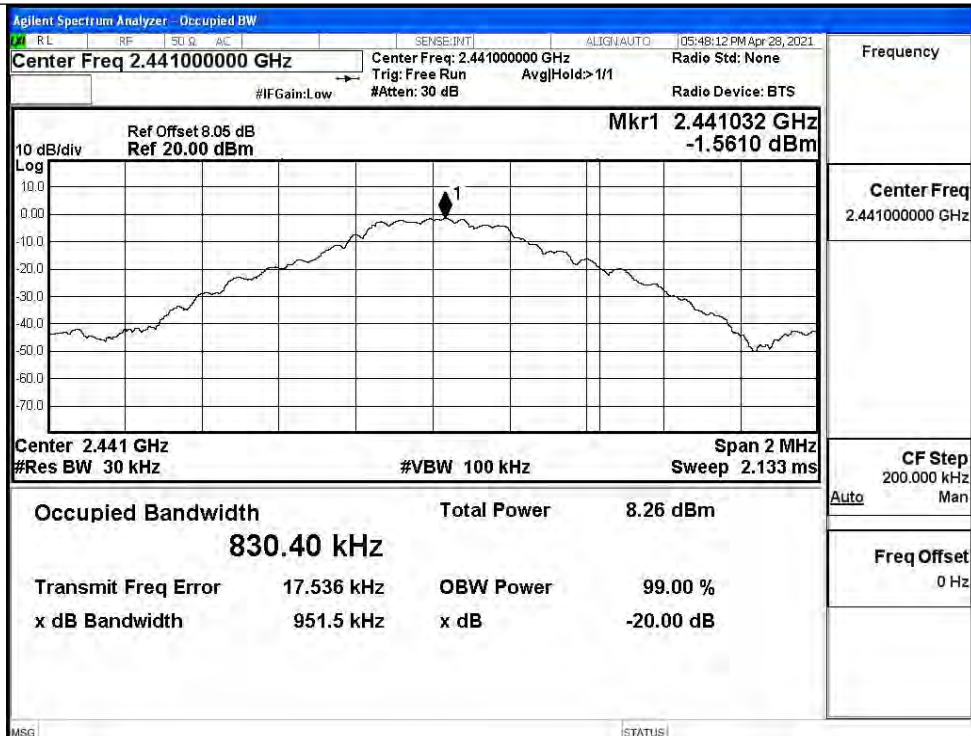
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9517	Not Specified	PASS
	MCH	0.9515	Not Specified	PASS
	HCH	0.9527	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.333	Not Specified	PASS
	MCH	1.332	Not Specified	PASS
	HCH	1.333	Not Specified	PASS
8DPSK	LCH	1.301	Not Specified	PASS
	MCH	1.300	Not Specified	PASS
	HCH	1.299	Not Specified	PASS

Test Graphs

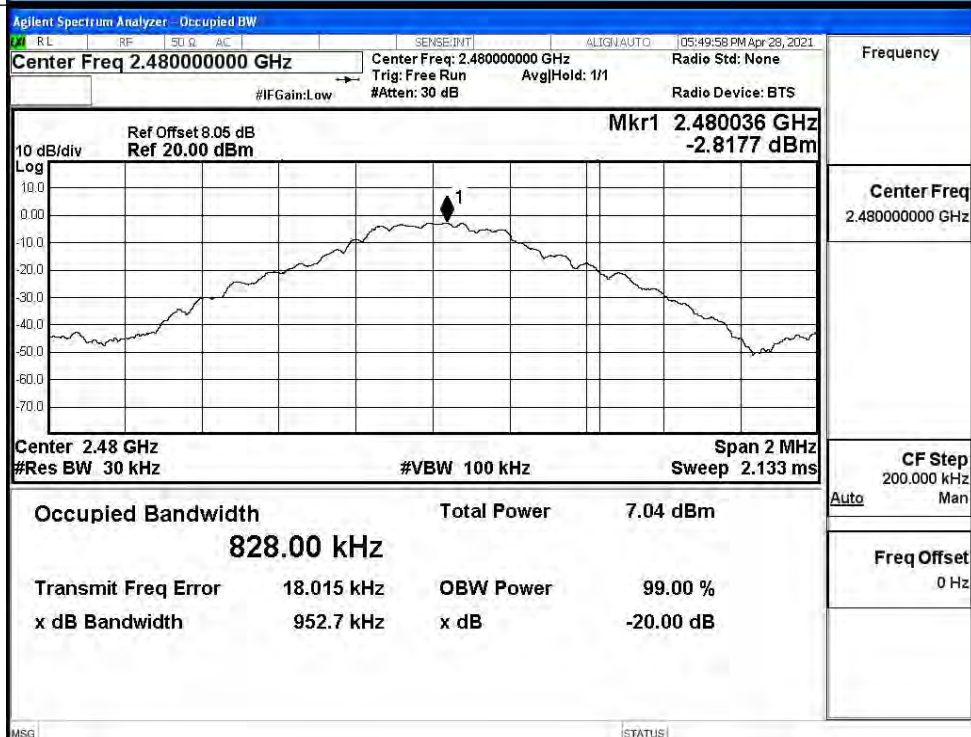
GFSK/LCH

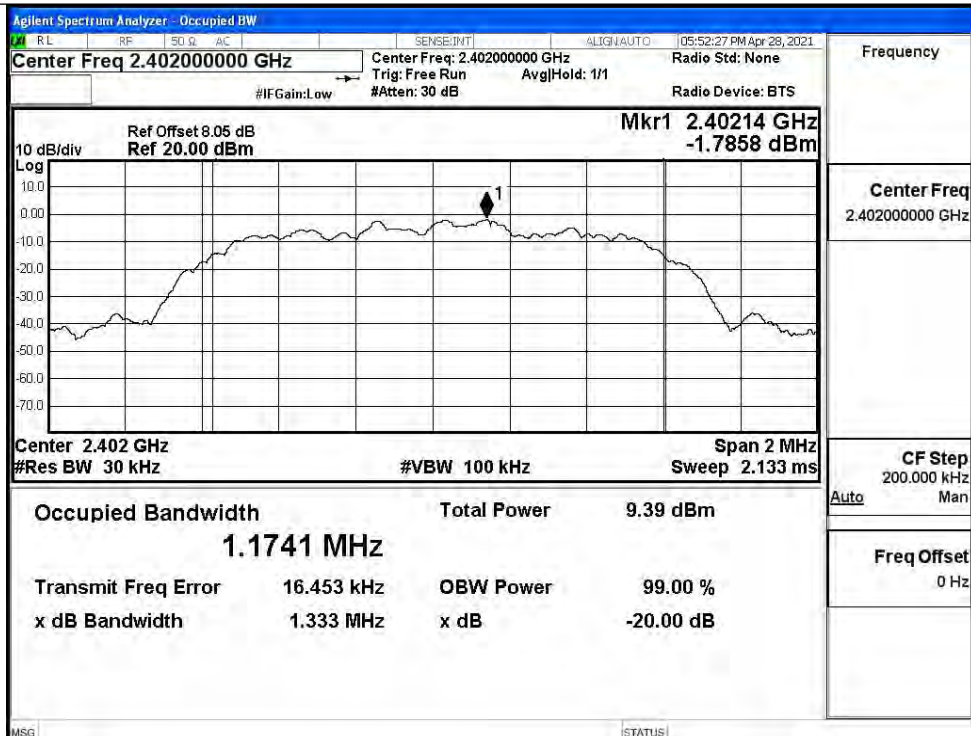
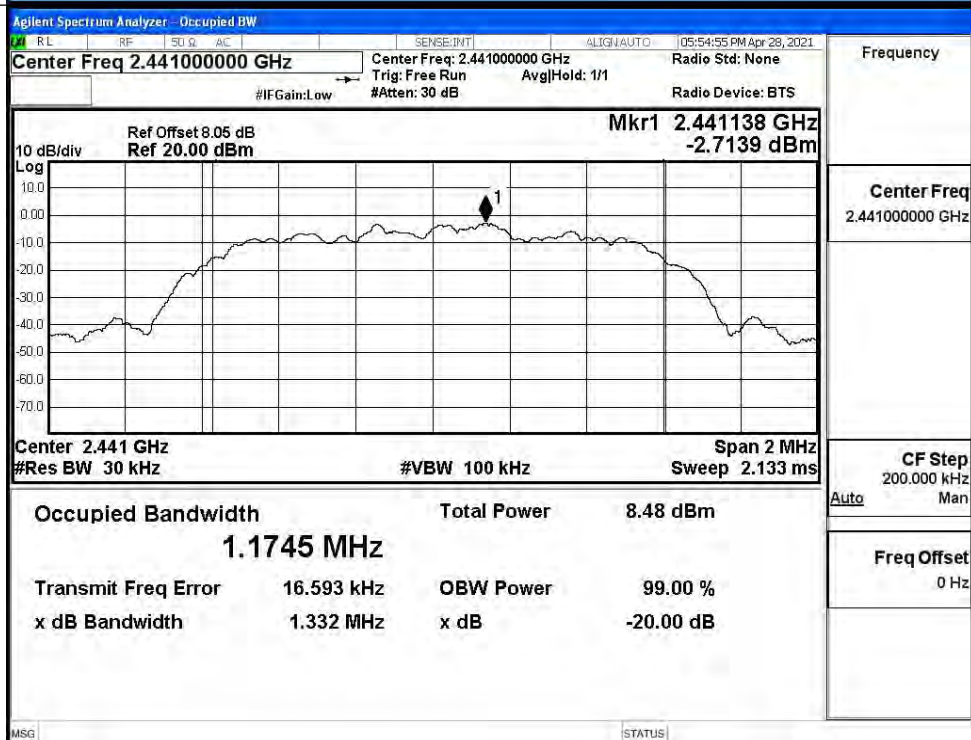


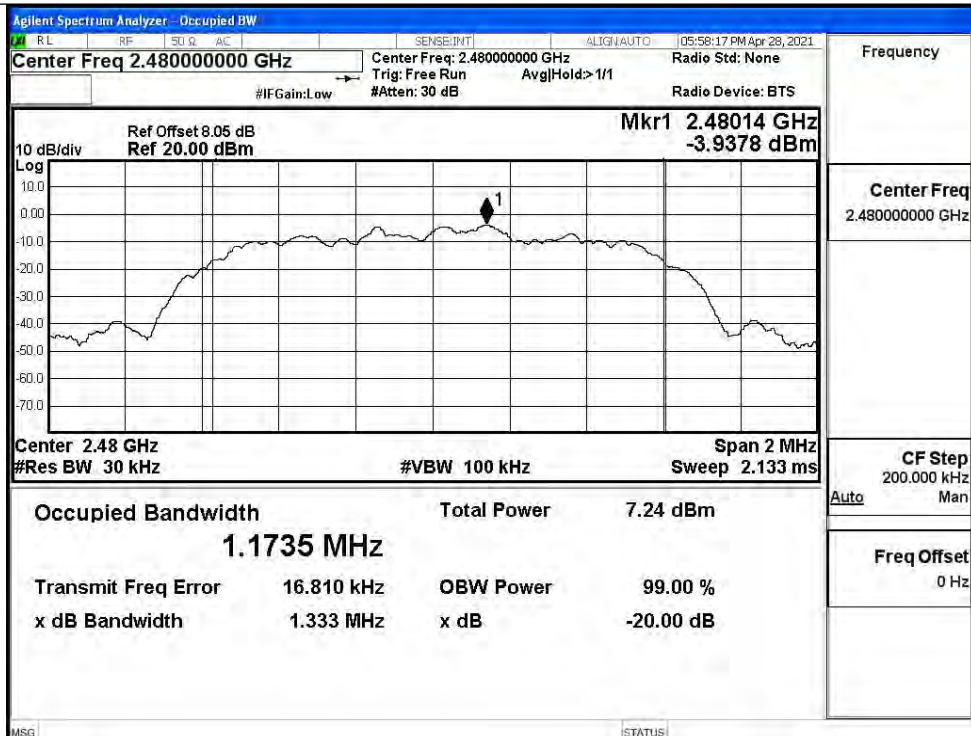
GFSK/MCH



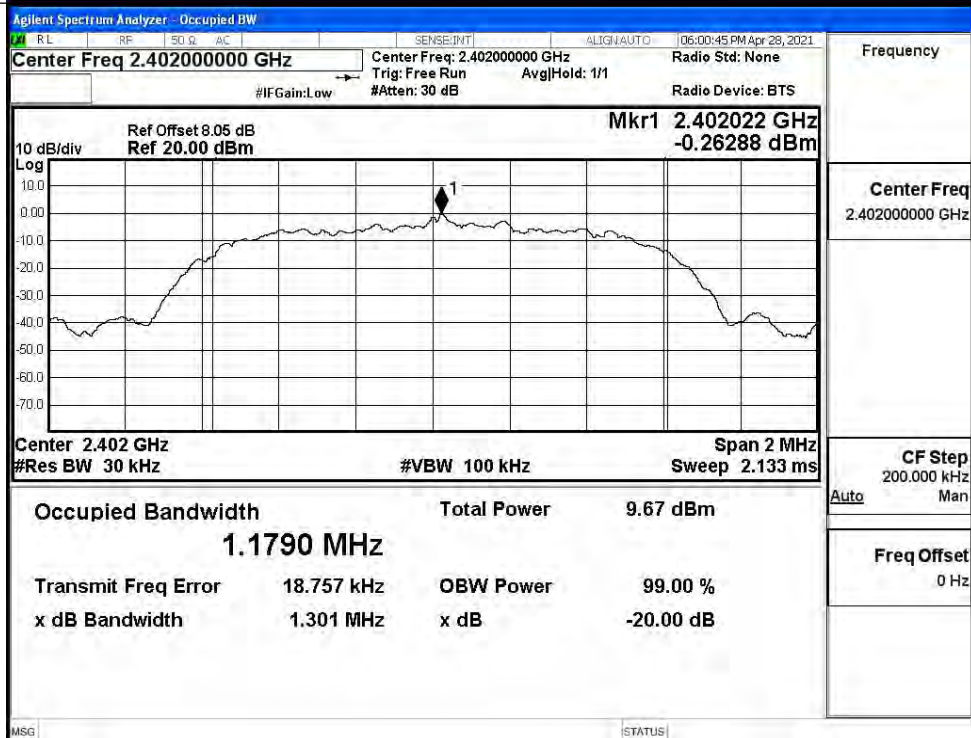
GFSK/HCH



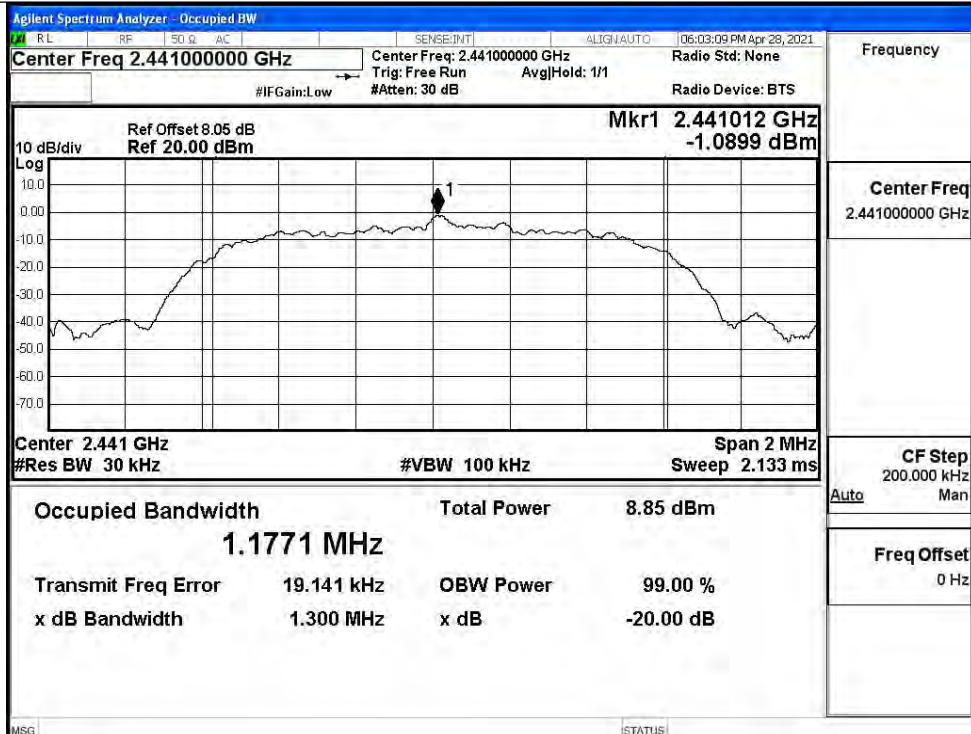
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

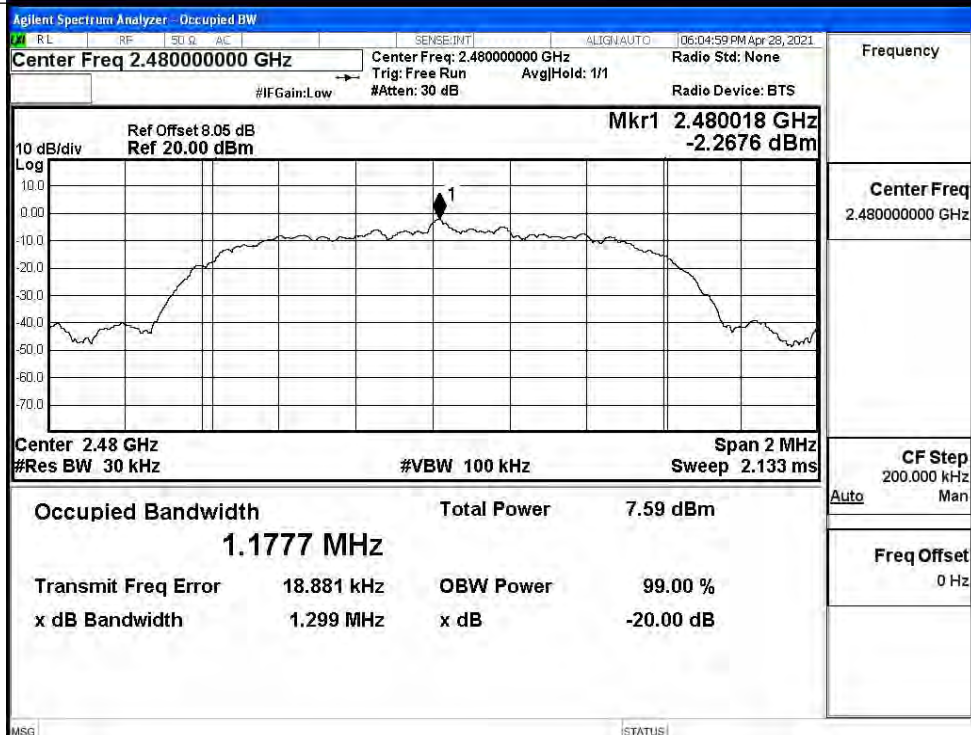
8DPSK/LCH



8DPSK/MCH



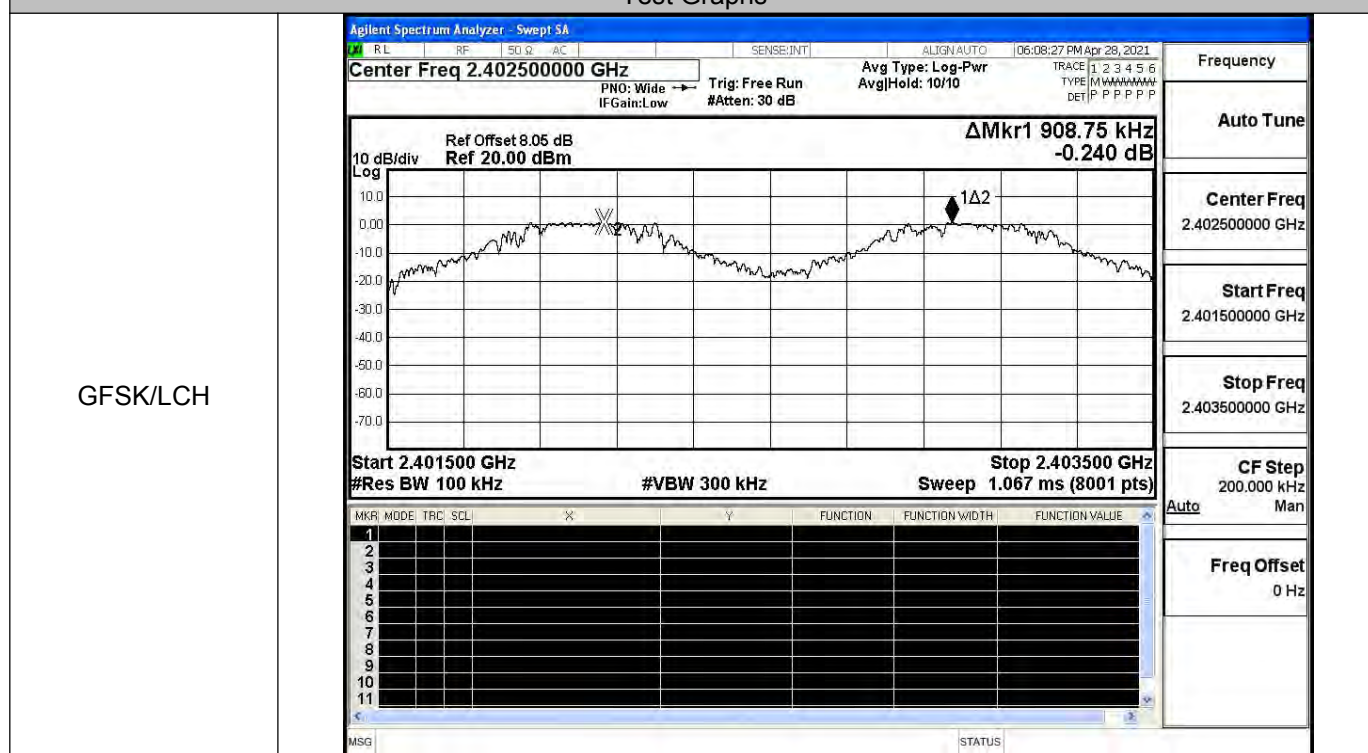
8DPSK/HCH



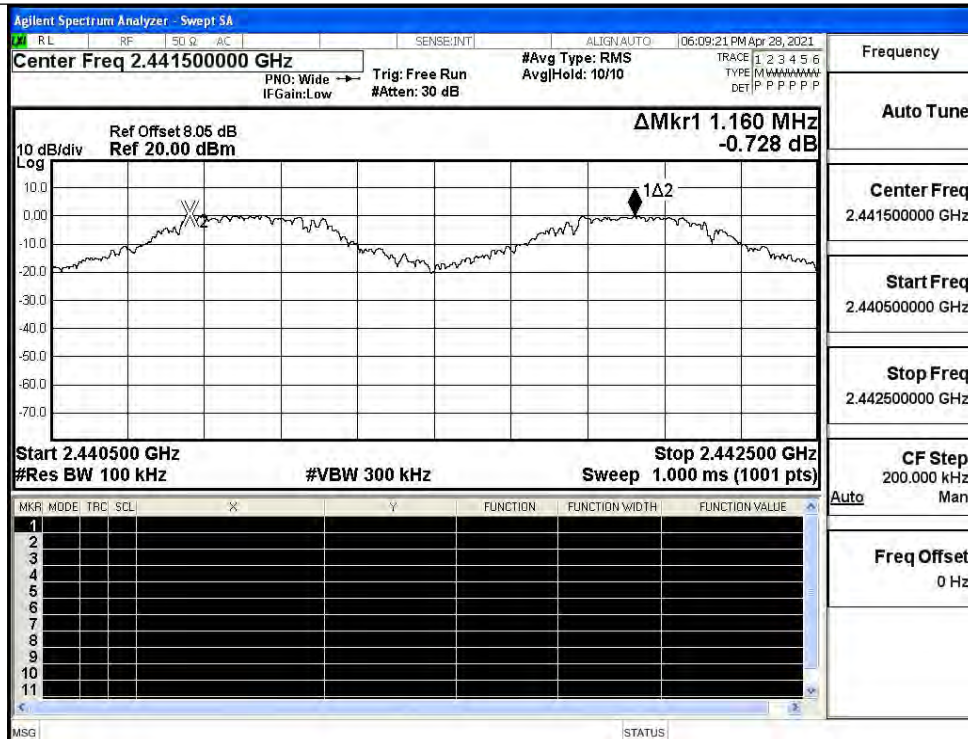
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.909	0.635	PASS
	MCH	1.160	0.634	PASS
	HCH	1.046	0.635	PASS
$\pi/4$ DQPSK	LCH	0.816	0.889	PASS
	MCH	1.064	0.888	PASS
	HCH	1.290	0.889	PASS
8DPSK	LCH	1.070	0.867	PASS
	MCH	1.050	0.867	PASS
	HCH	1.058	0.866	PASS

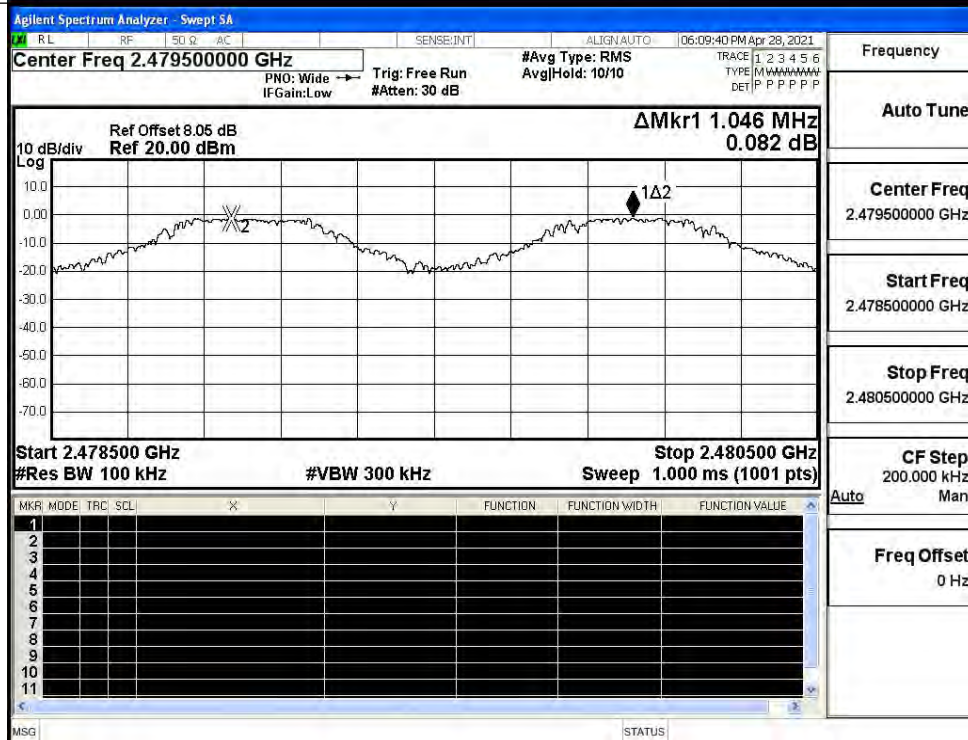
Test Graphs

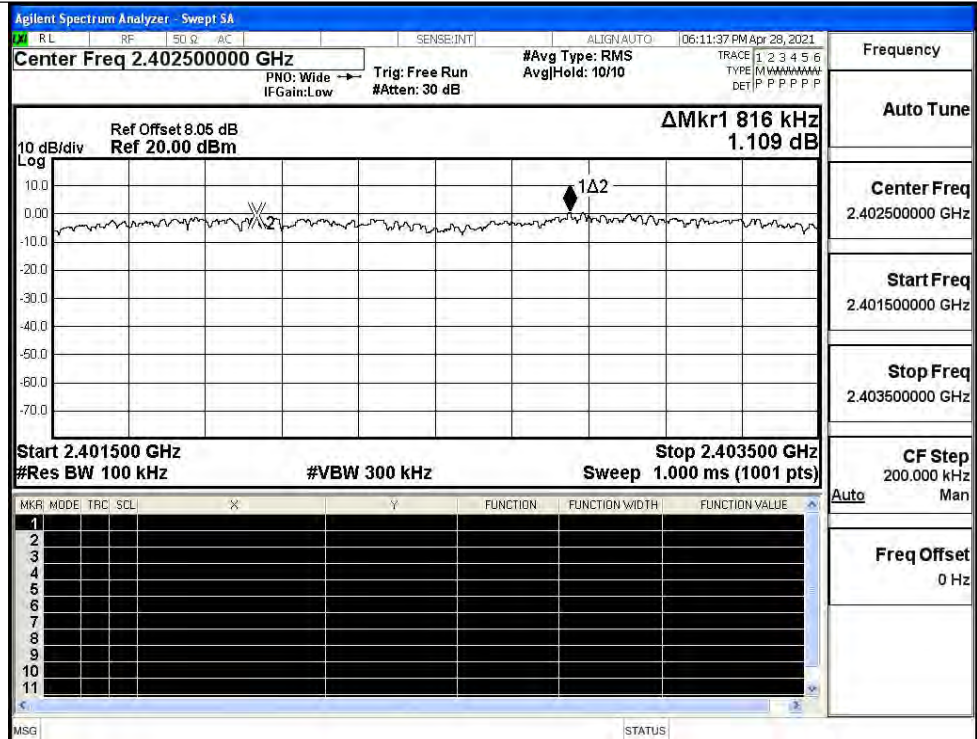
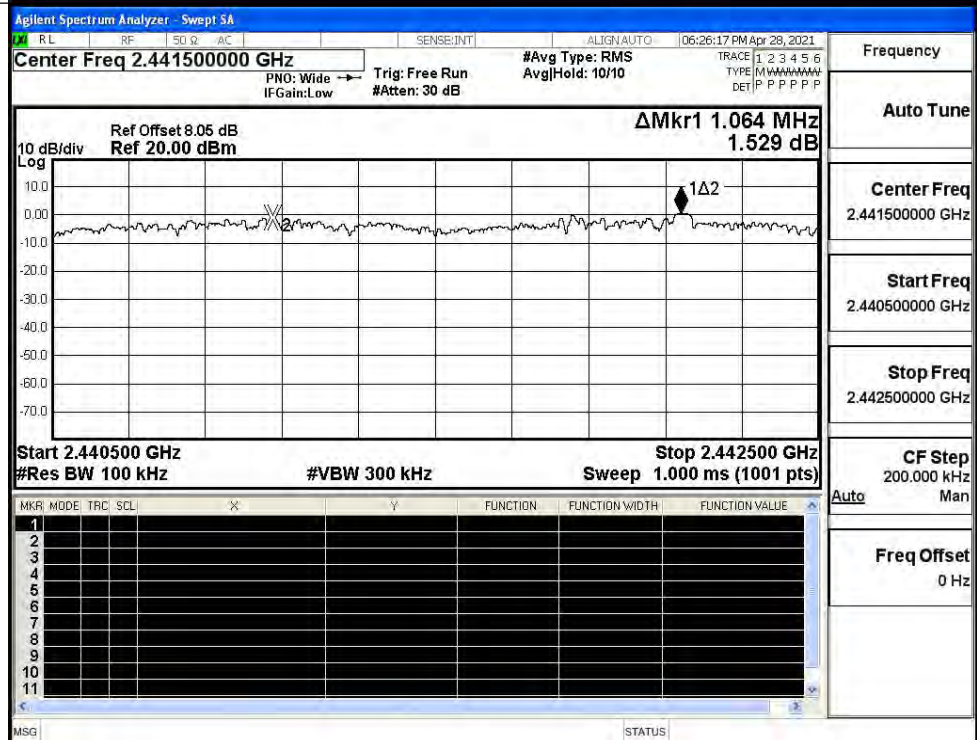


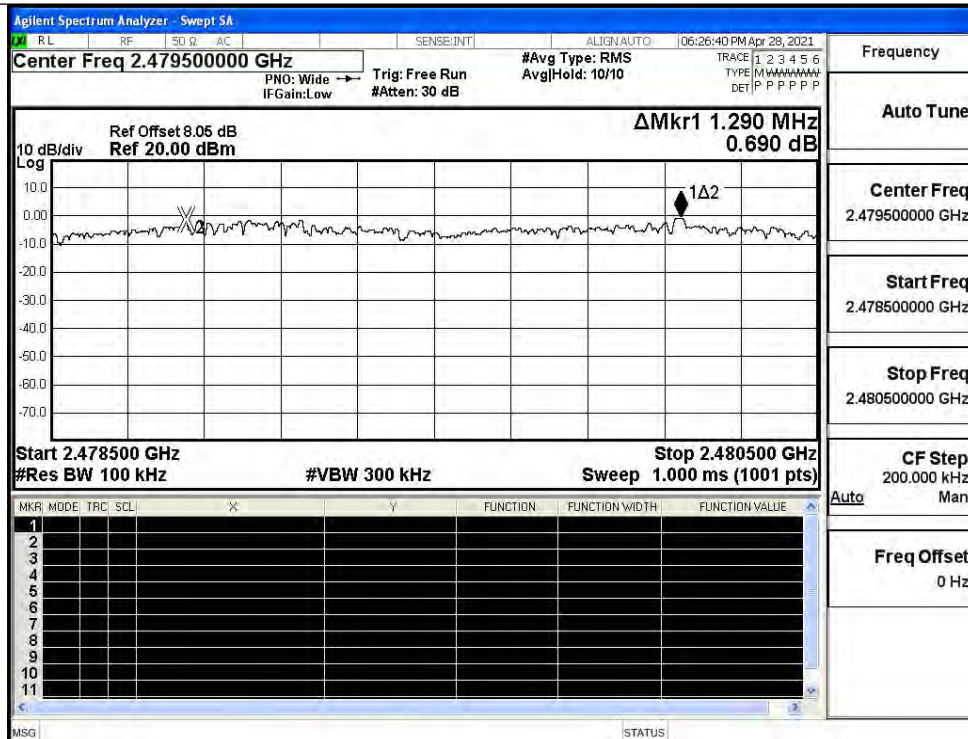
GFSK/MCH



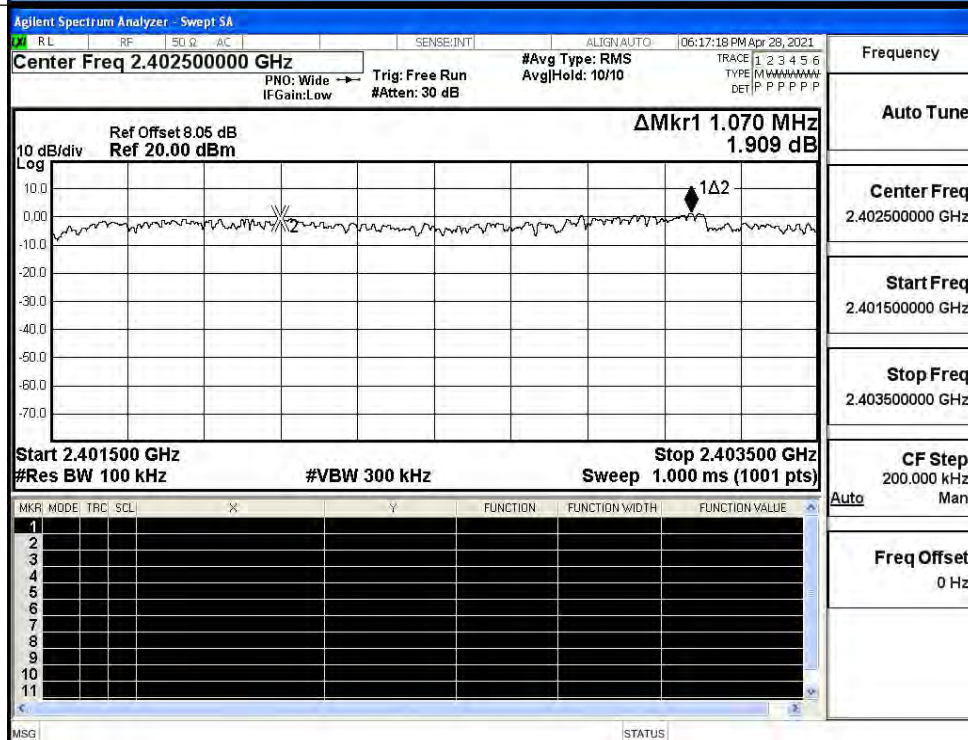
GFSK/HCH



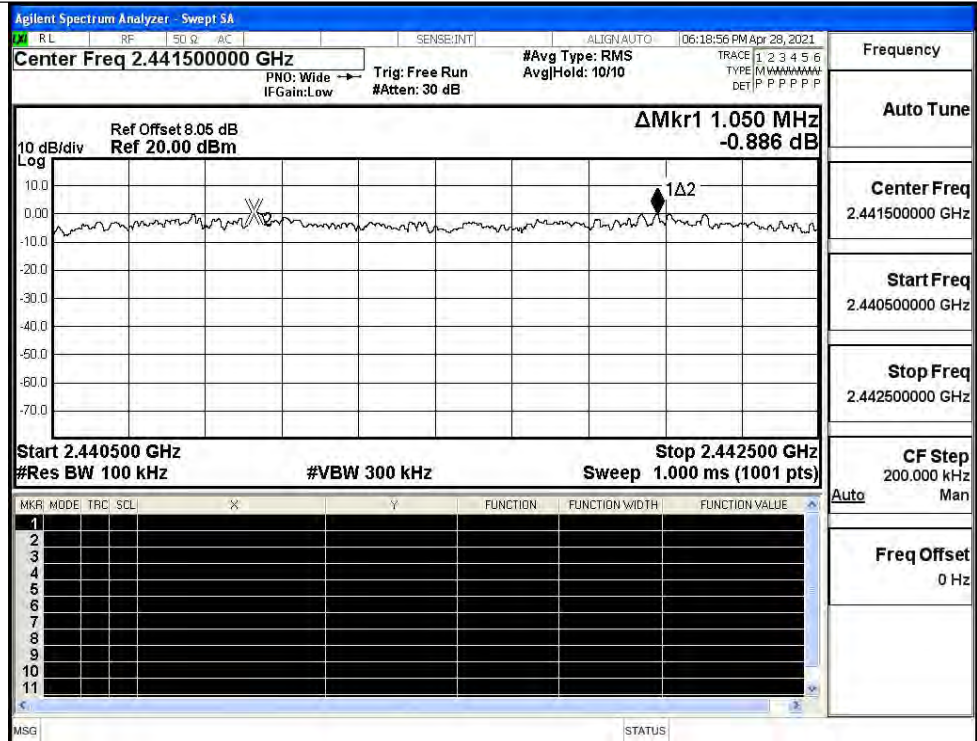
$\pi/4$ DQPSK/LCH $\pi/4$ DQPSK/MCH

$\pi/4$ DQPSK/HCH

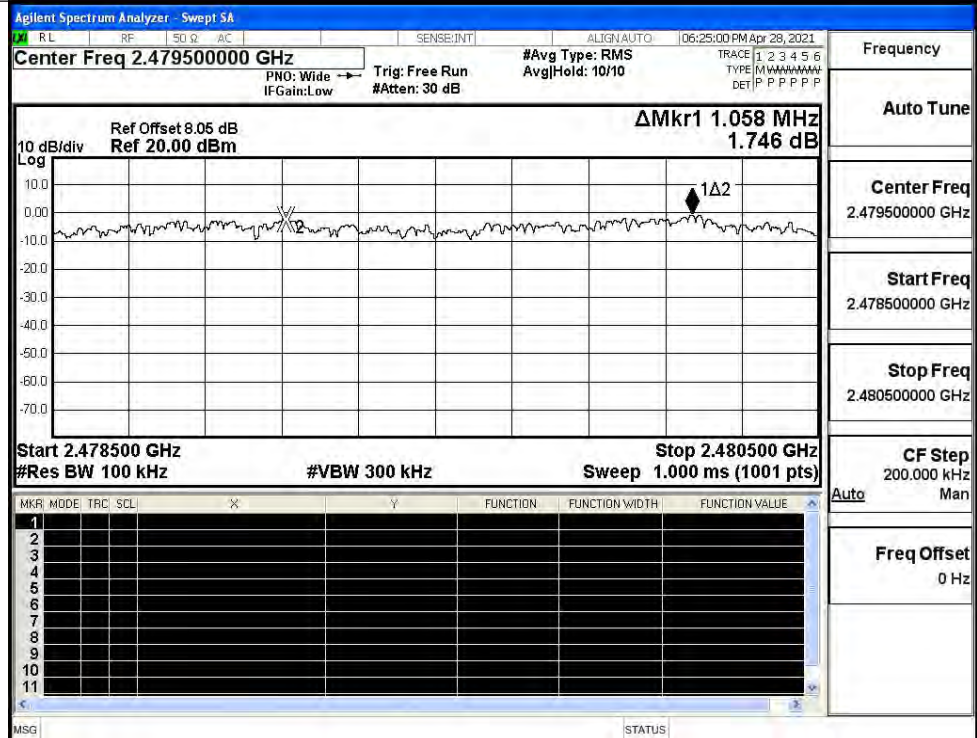
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

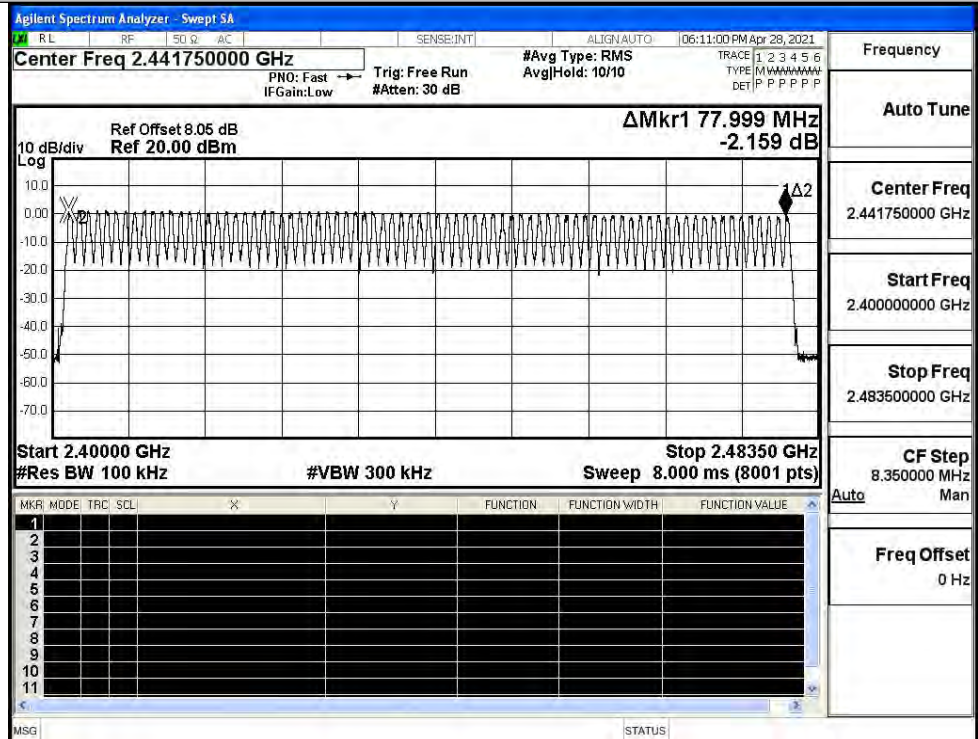
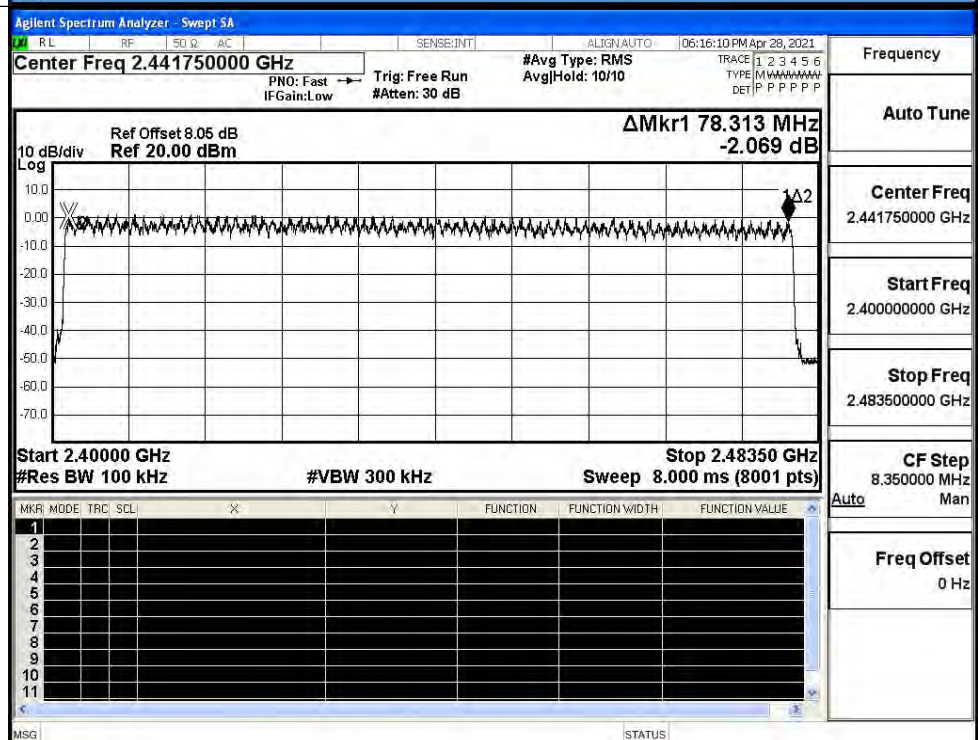


A.4 Hopping Channel Number

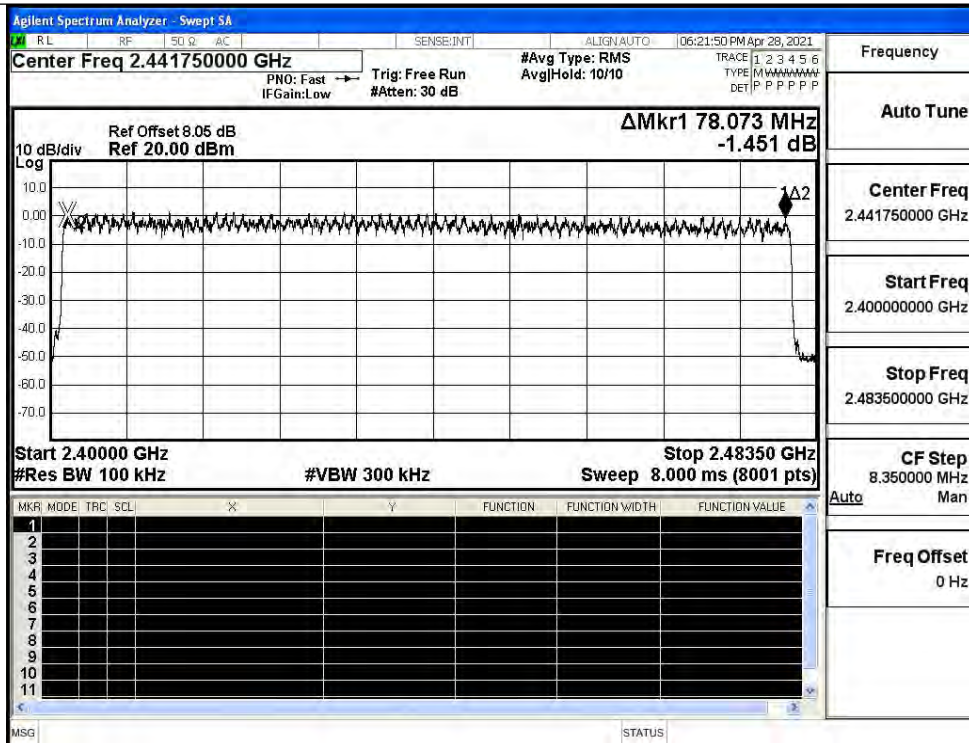
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

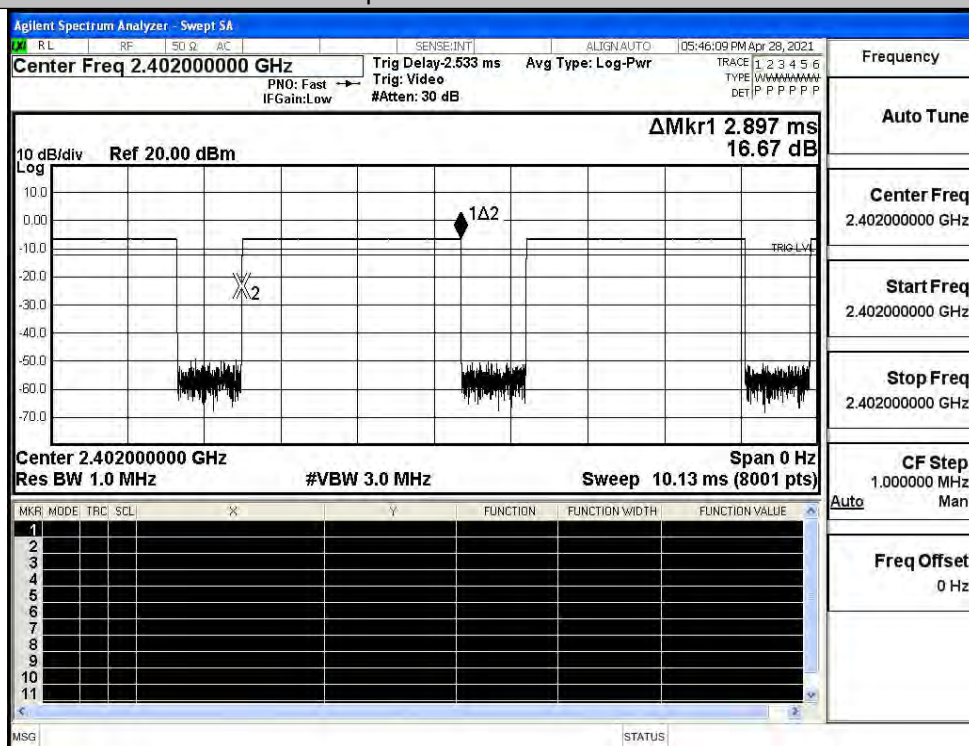


A.5 Dwell Time

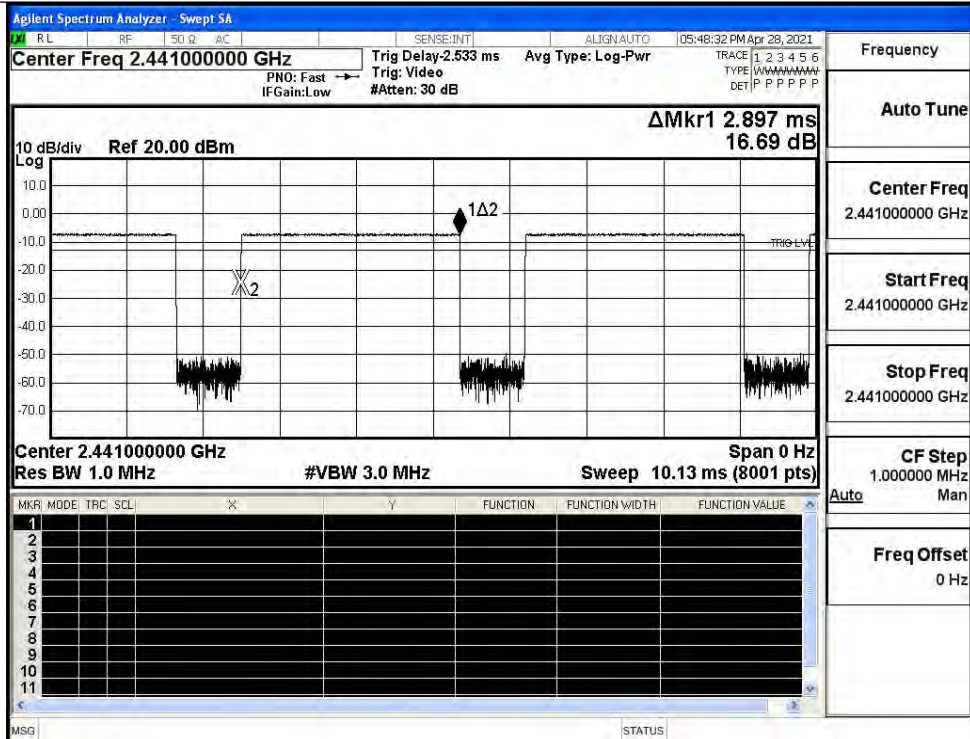
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS

Test Graphs

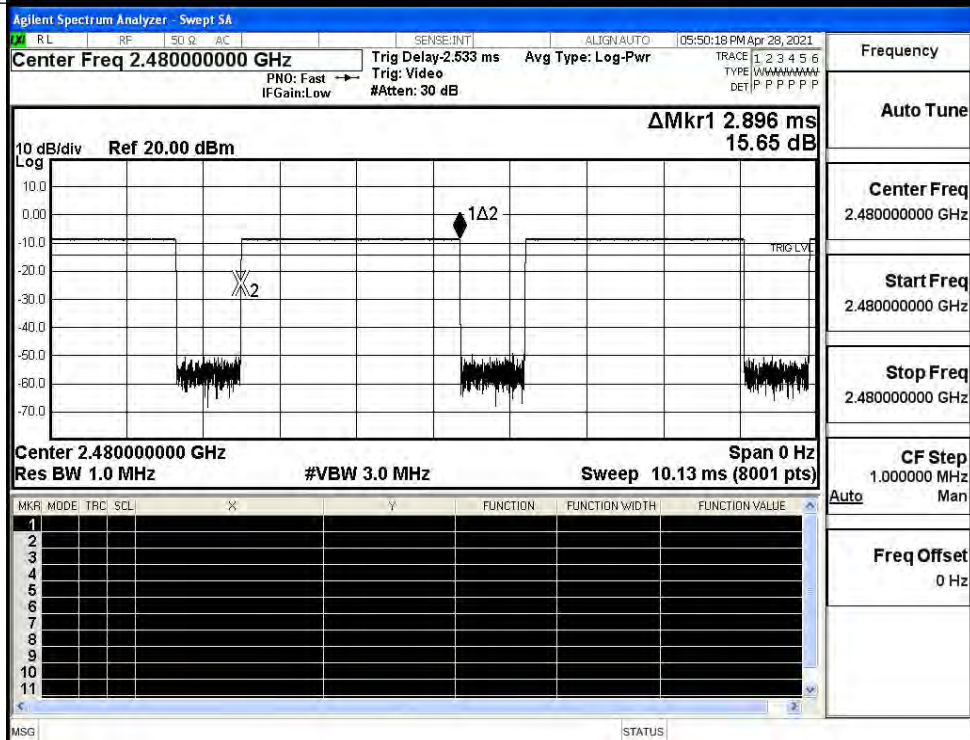
GFSK_DH5/LCH



GFSK_DH5/MCH



GFSK_DH5/HCH



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC SENSE: INT ALIGN: AUTO 05:52:48 PM Apr 28, 2021

Center Freq 2.402000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr PNO: Fast IF Gain: Low Trig: Video #Atten: 30 dB TRACE 1 2 3 4 5 6 TYPE: W W W W W W W W DET: P P P P P P P

10 dB/div Ref 20.00 dBm ΔMkr1 2.902 ms 14.55 dB

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

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Frequency Auto Tune Center Freq 2.402000000 GHz Start Freq 2.402000000 GHz Stop Freq 2.402000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz

Agilent Spectrum Analyzer - Swept SA

RL RF SO Q AC SENSE:INT ALIGN:AUTO 05:55:15 PM Apr 28, 2021

Center Freq 2.441000000 GHz Trig Delay: 2.533 ms Avg Type: Log-Pwr
 PNO: Fast IF Gain: Low Trig: Video #Atten: 30 dB TRACE 1 2 3 4 5 6
 TYPE WXXXXXXXXX
 DET P P P P P P P

Auto Tune

Frequency

ΔMkr1 2.901 ms
13.88 dB

10 dB/div Ref 20.00 dBm

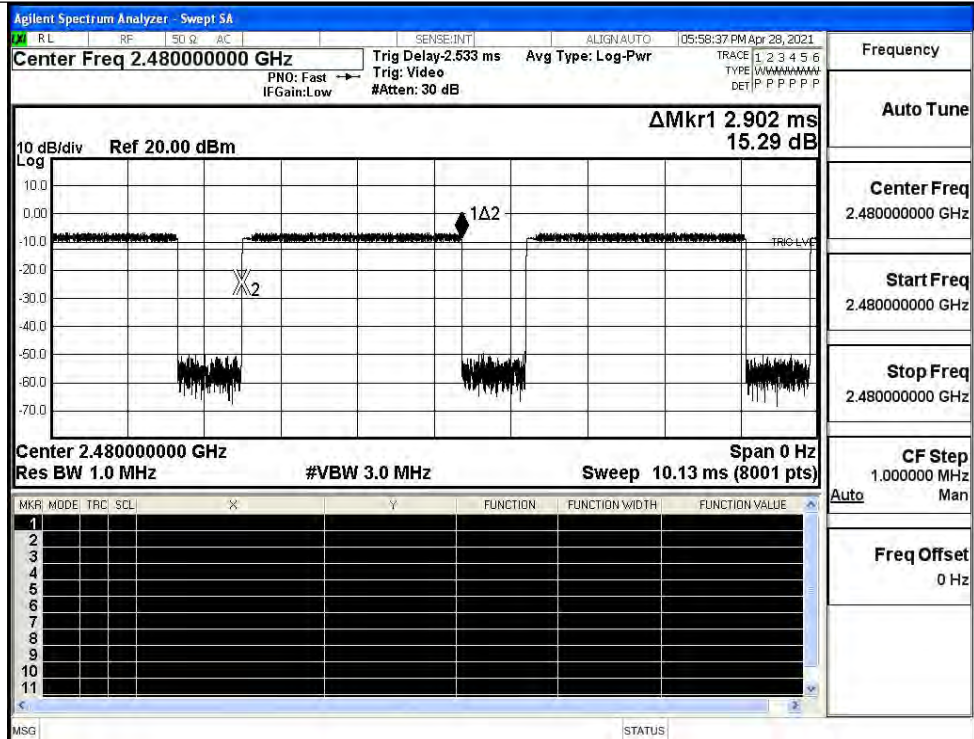
Log

Center Freq 2.441000000 GHz Span 0 Hz
 Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8001 pts)

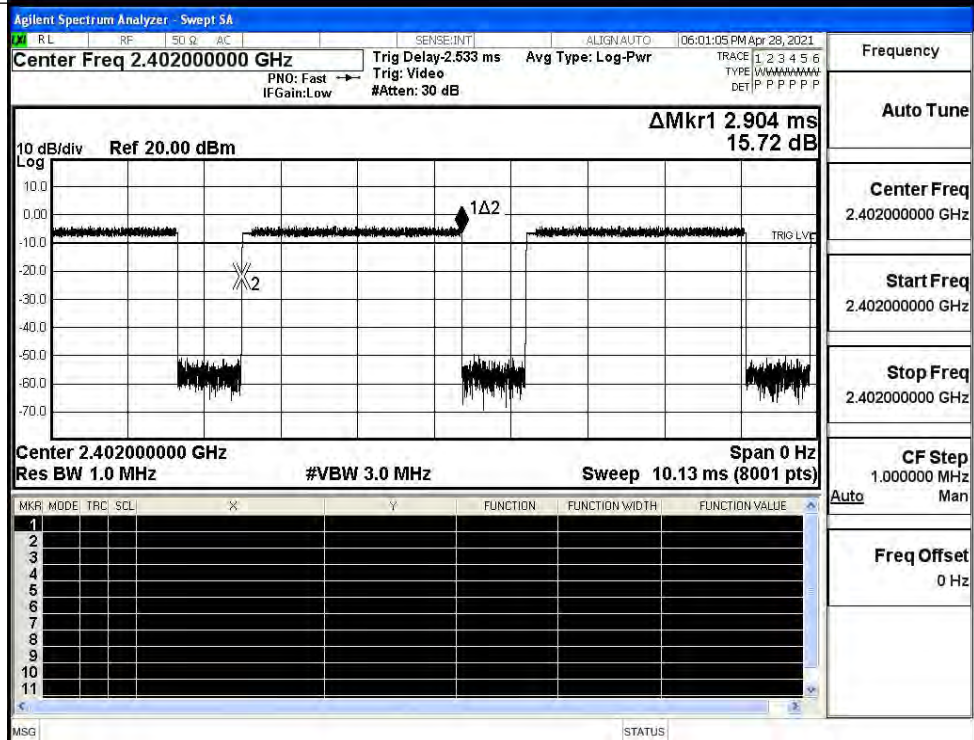
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Freq Offset
0 Hz

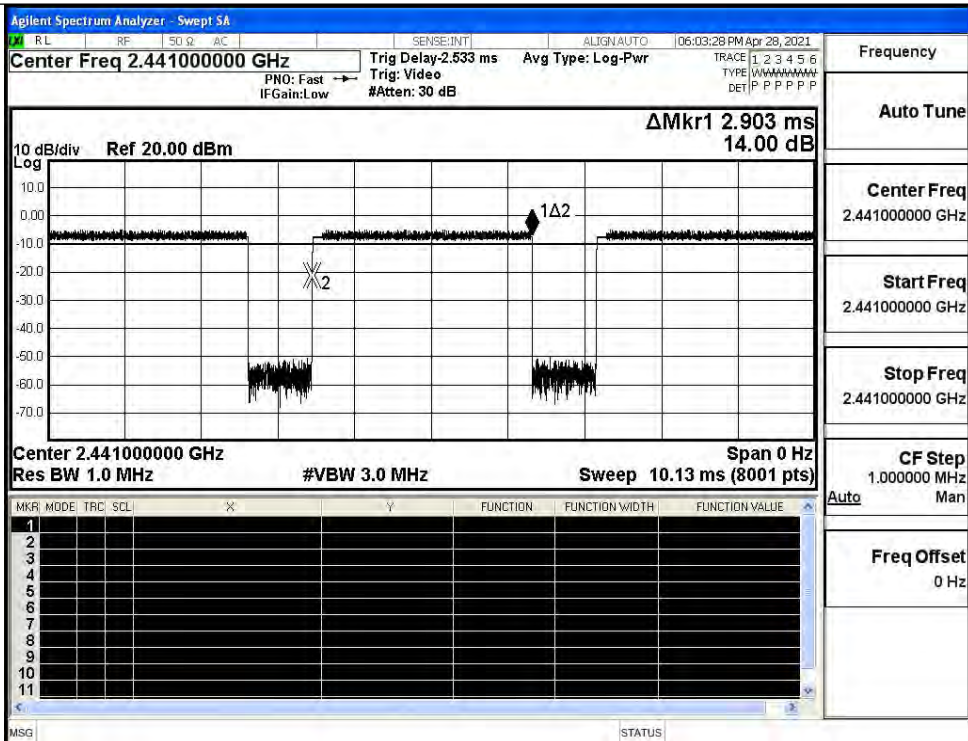
$\pi/4$ DQPSK
_2DH5/HCH



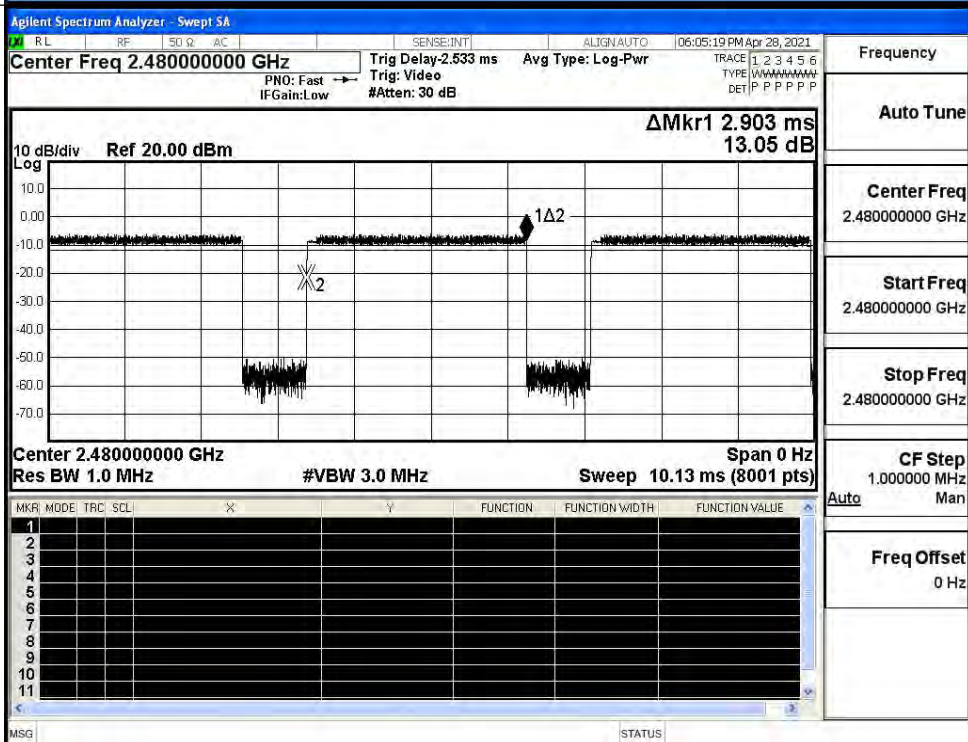
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

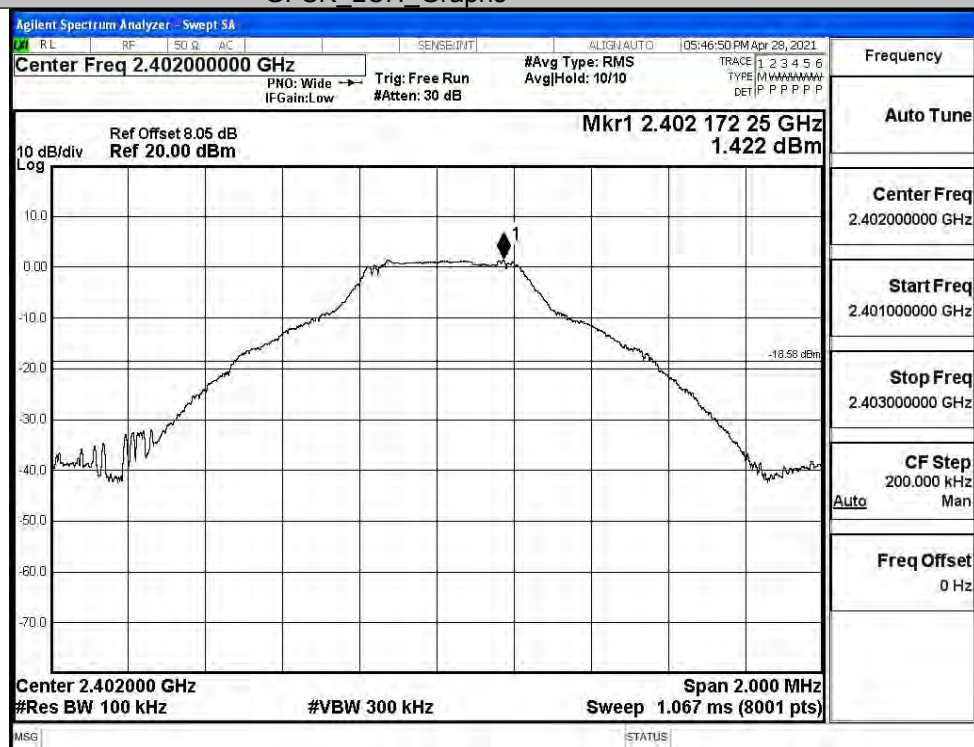


A.6 RF Conducted Spurious Emissions

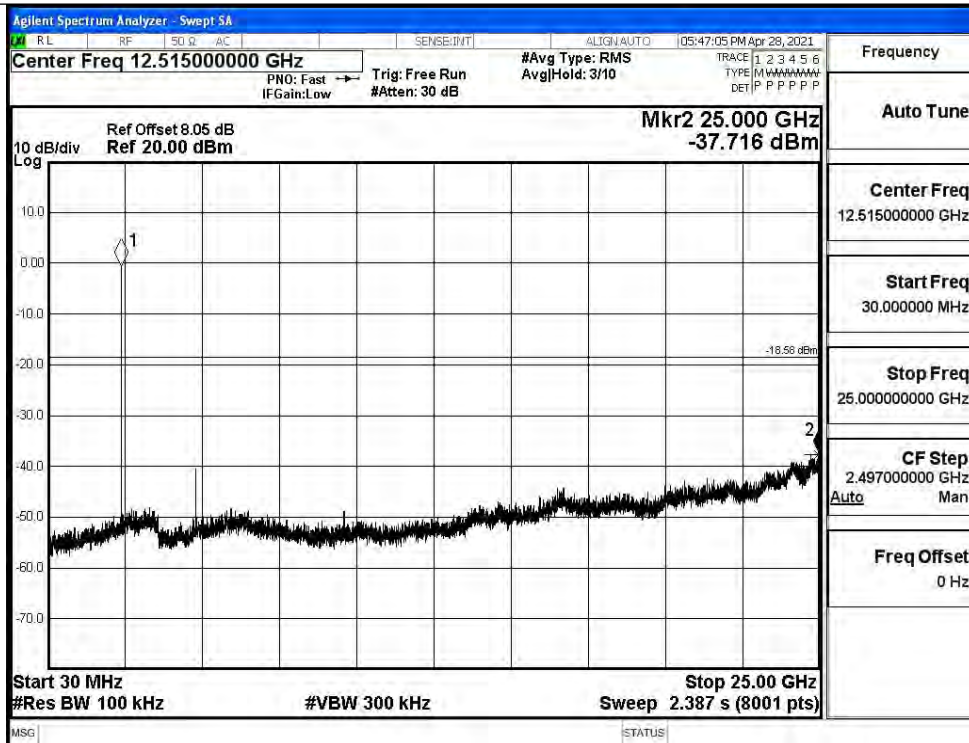
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.422	-37.716	-18.578	PASS
	MCH	0.736	-37.593	-19.264	PASS
	HCH	-0.534	-37.460	-20.534	PASS
$\pi/4$ DQPSK	LCH	0.832	-37.665	-19.168	PASS
	MCH	-0.051	-37.865	-20.051	PASS
	HCH	-0.771	-36.592	-20.771	PASS
8DPSK	LCH	1.596	-38.238	-18.404	PASS
	MCH	0.402	-36.777	-19.598	PASS
	HCH	-0.548	-37.183	-20.548	PASS

GFSK LCH Graphs

Pref

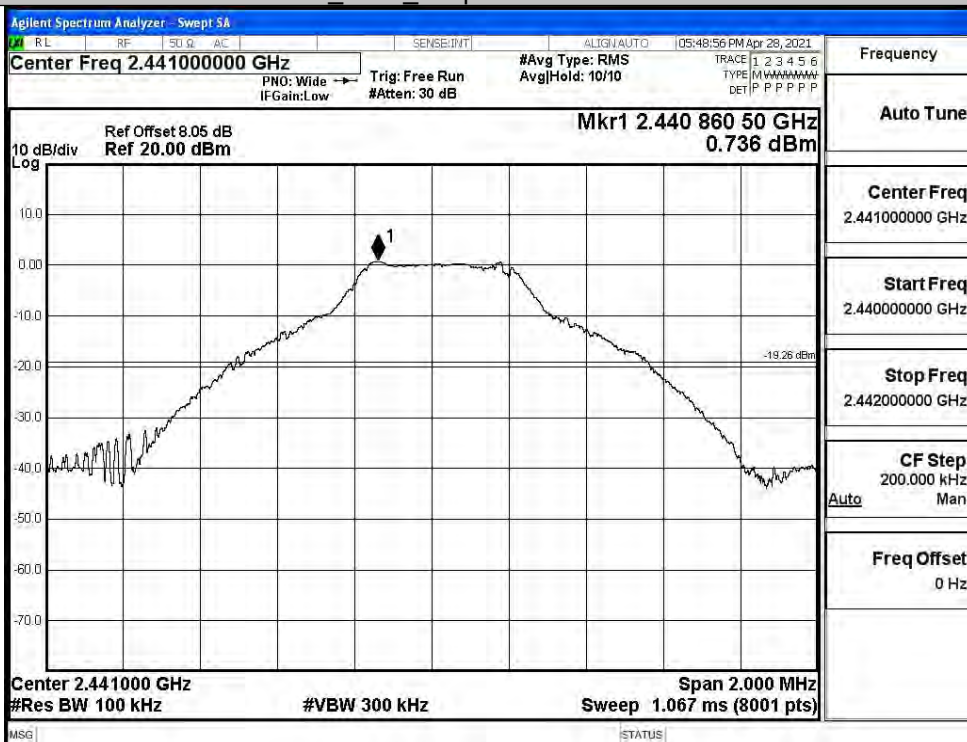


Puw

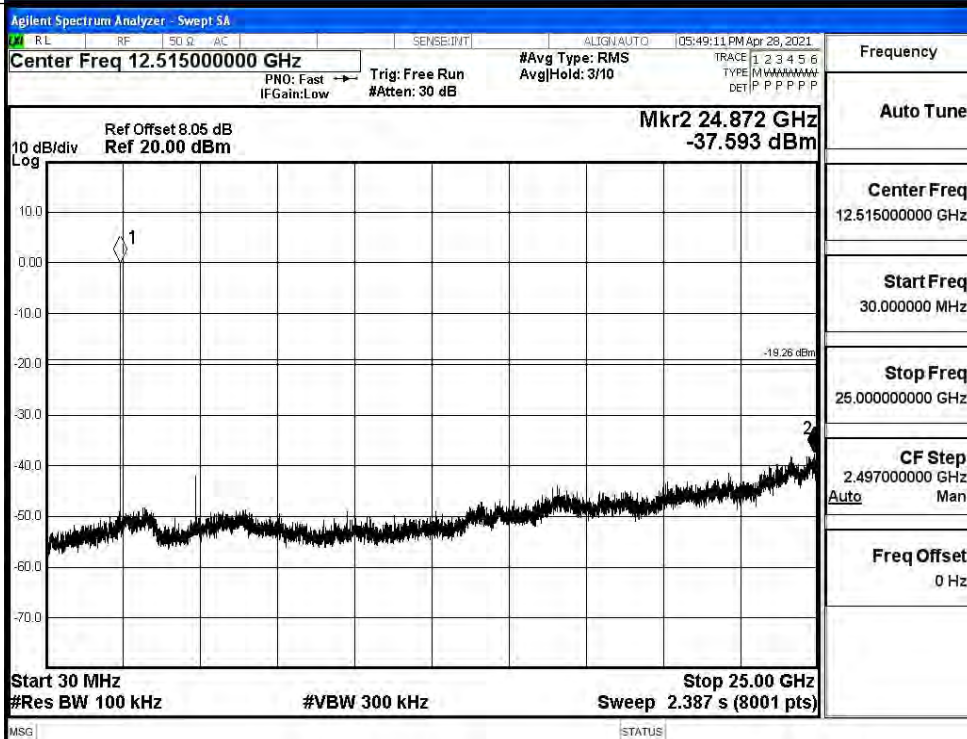


GFSK_MCH_Graphs

Pref

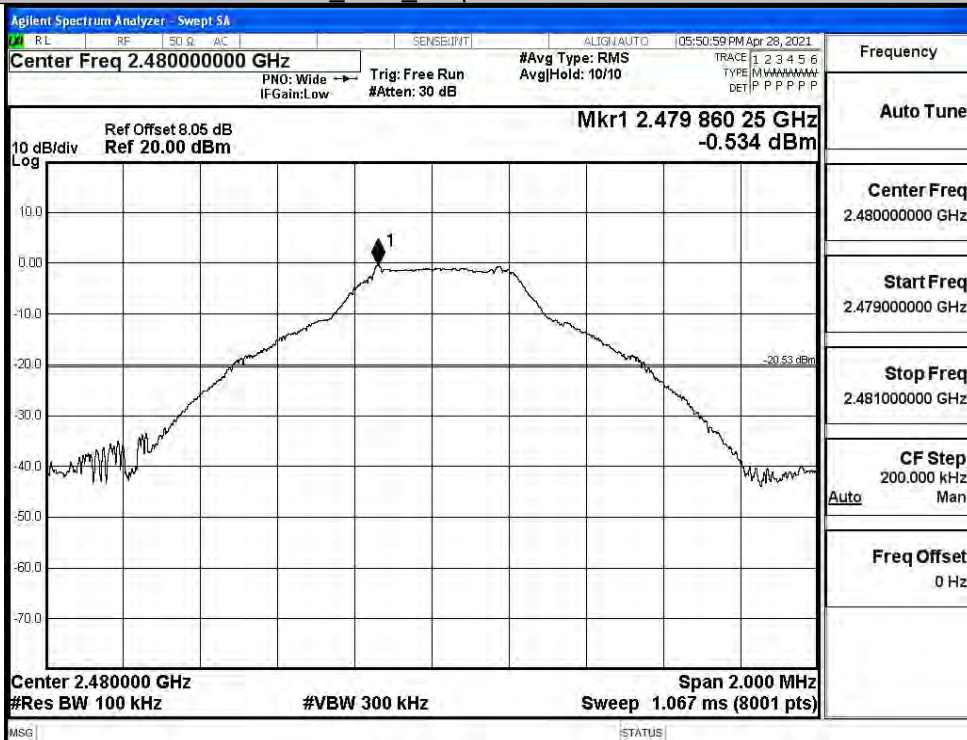


Puw

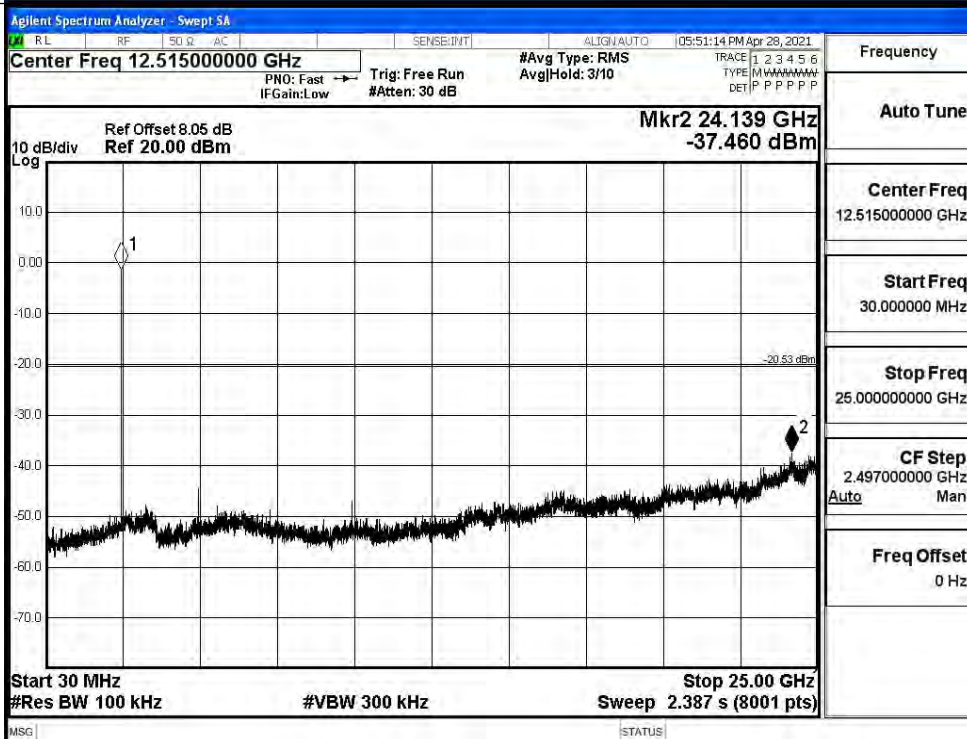


GFSK_HCH_Graphs

Pref

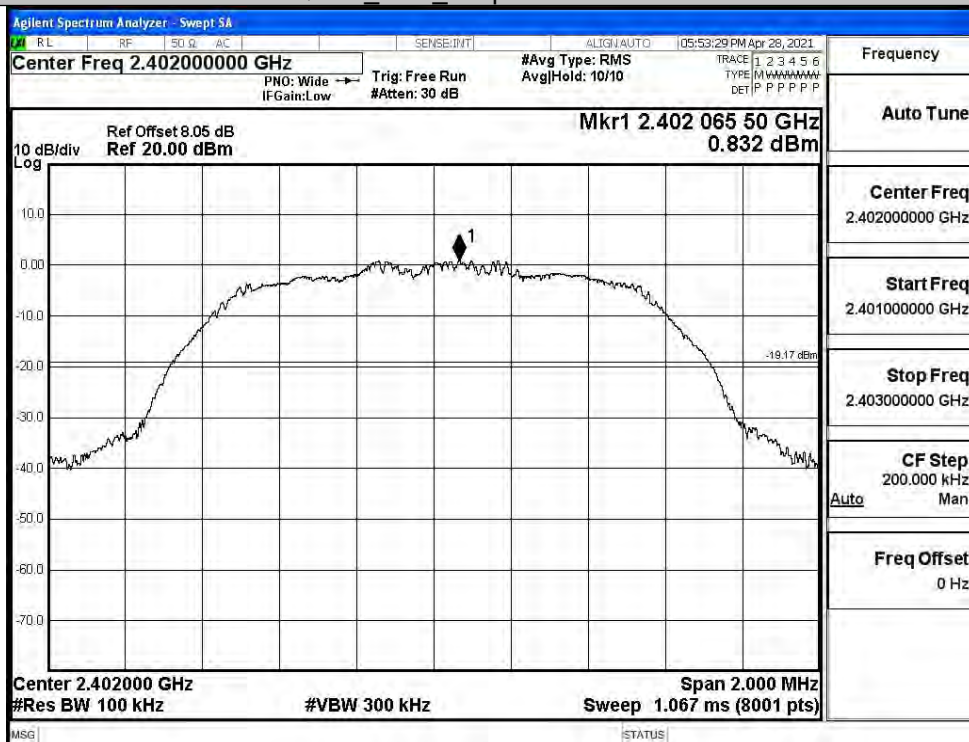


Puw

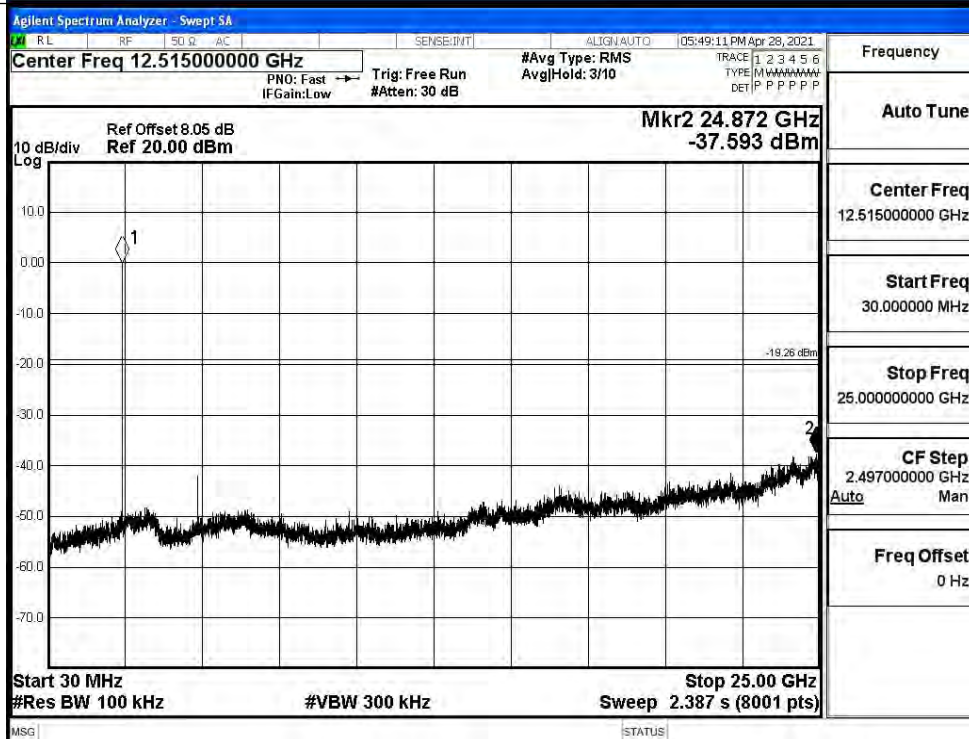


$\pi/4$ DQPSK_LCH_Graphs

Pref

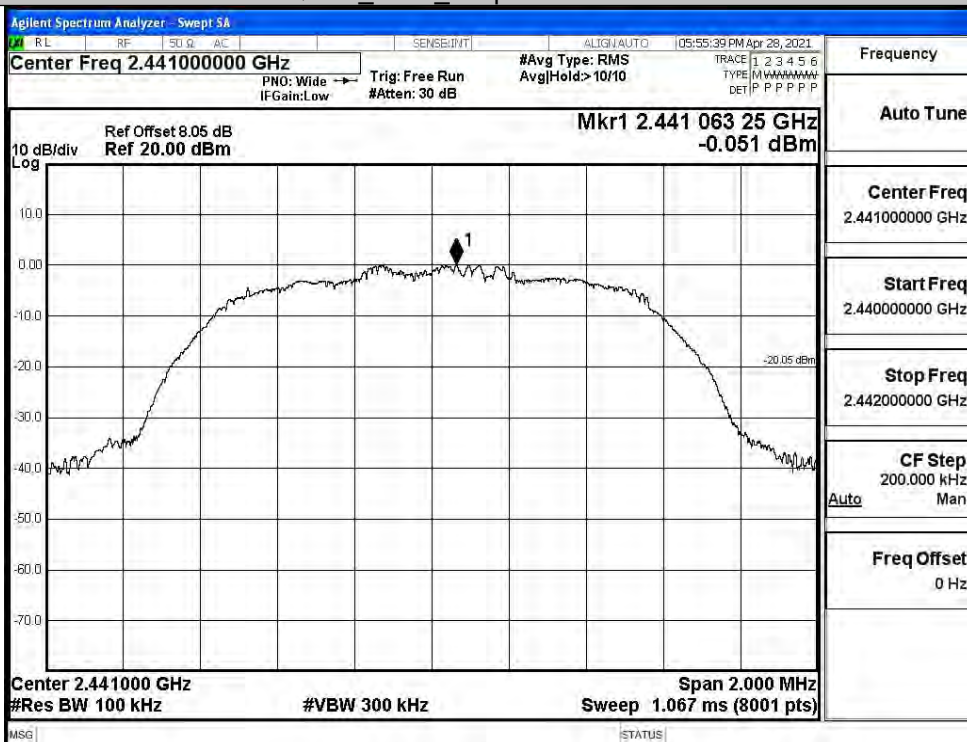


Puw

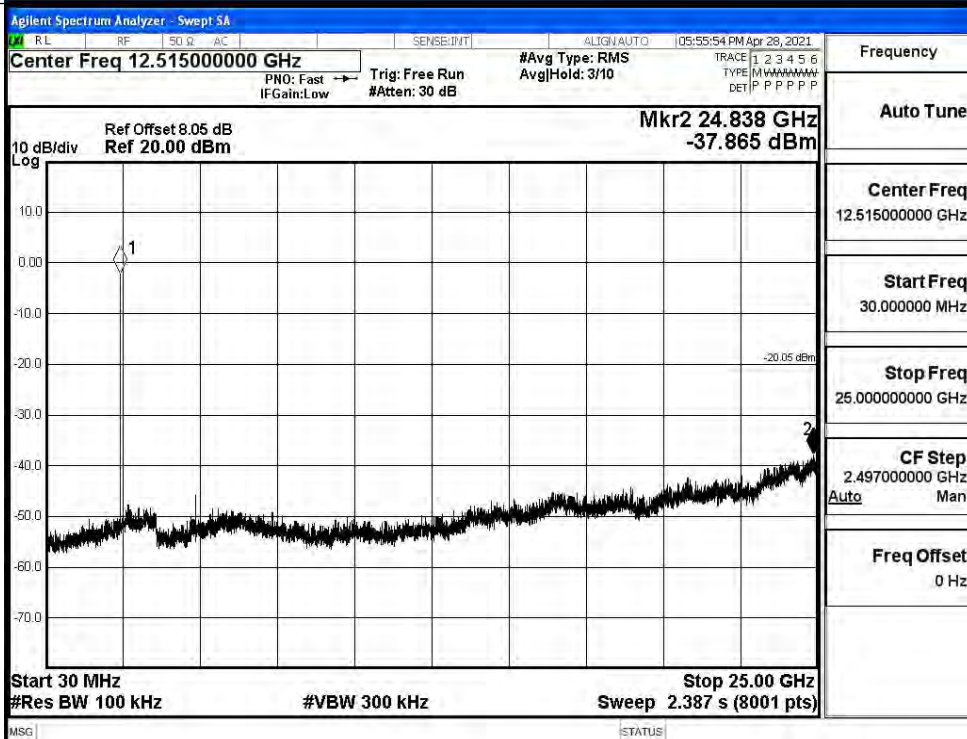


$\pi/4$ DQPSK_MCH_Graphs

Pref

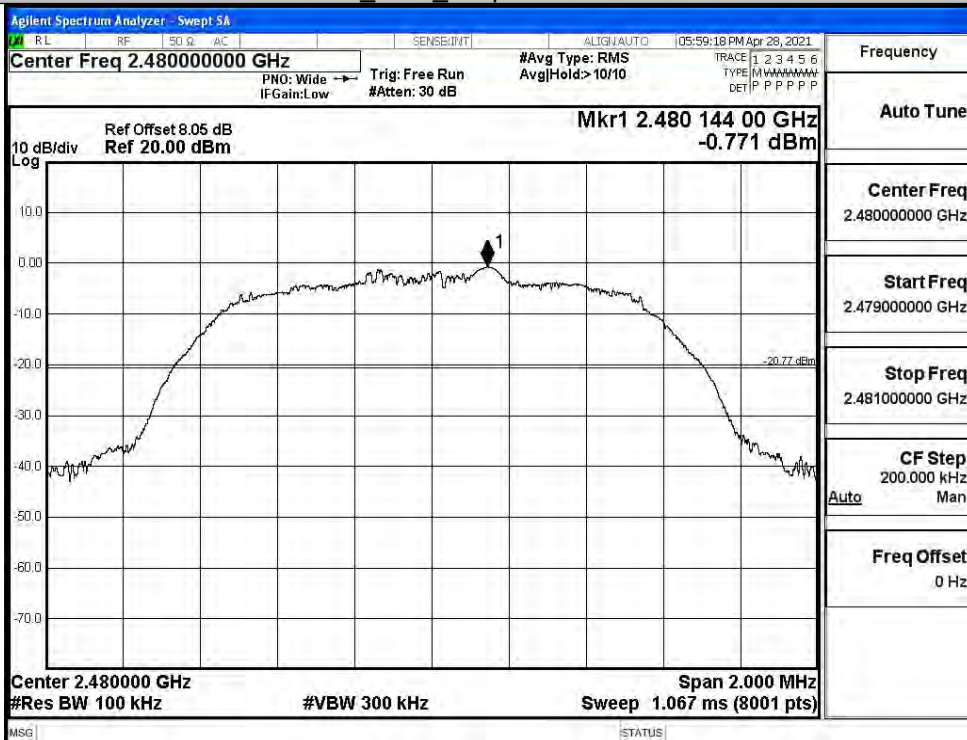


Puw

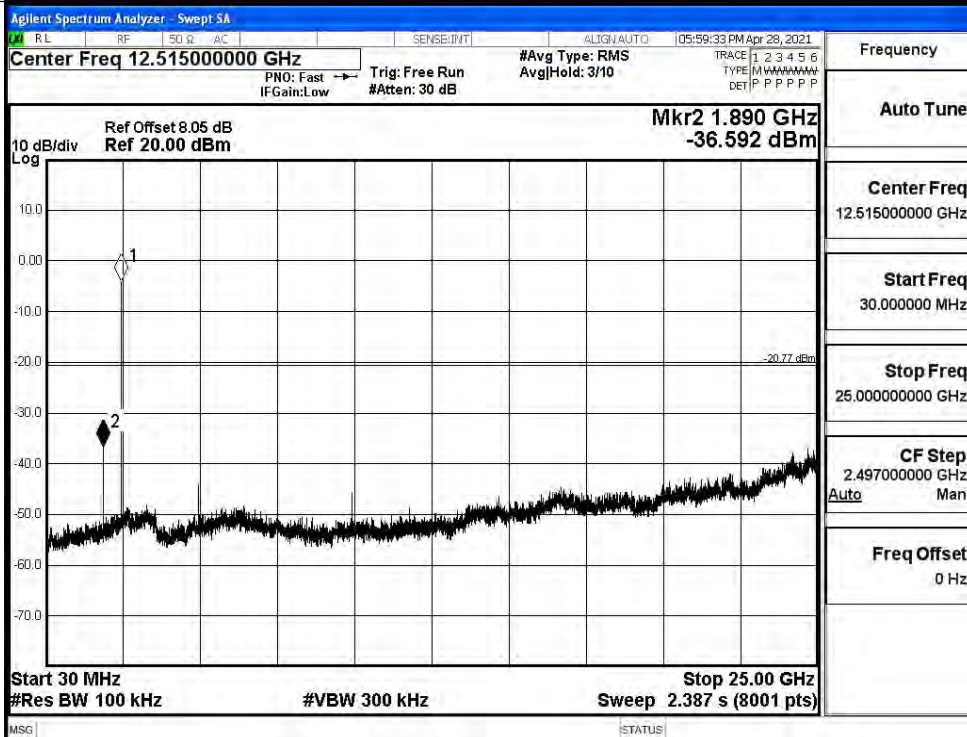


$\pi/4$ DQPSK_HCH_Graphs

Pref

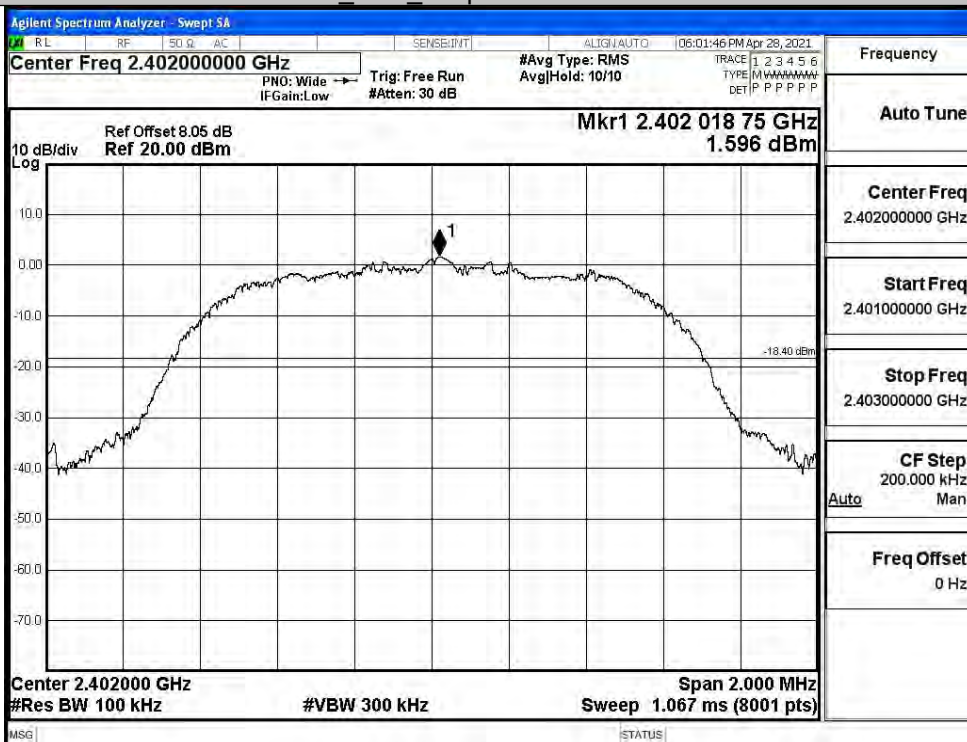


Puw

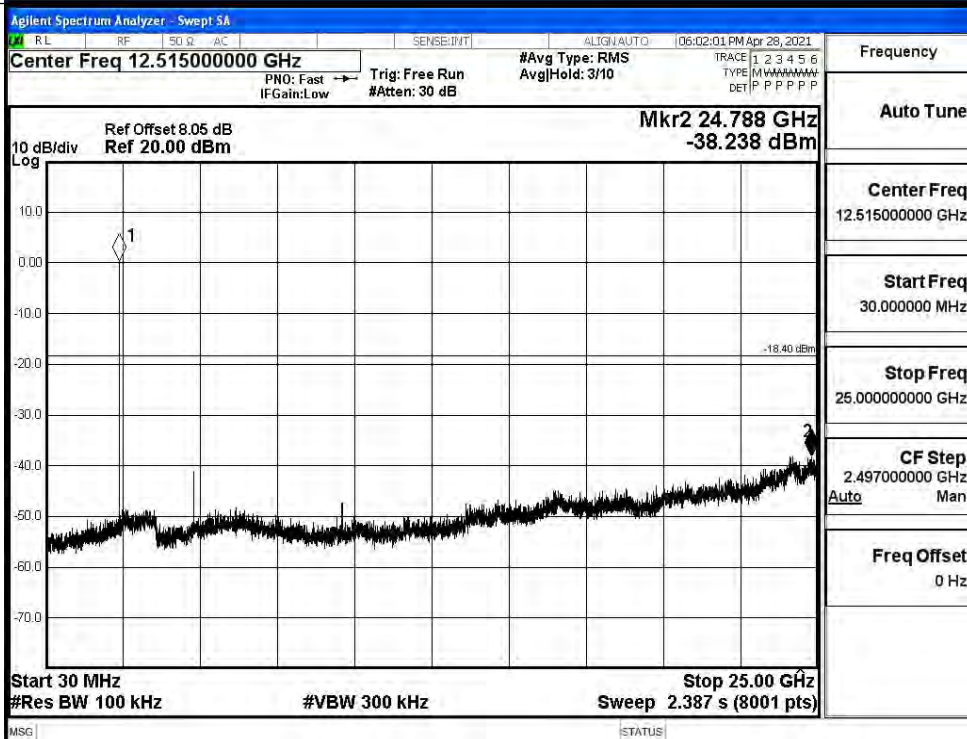


8DPSK_LCH_Graphs

Pref

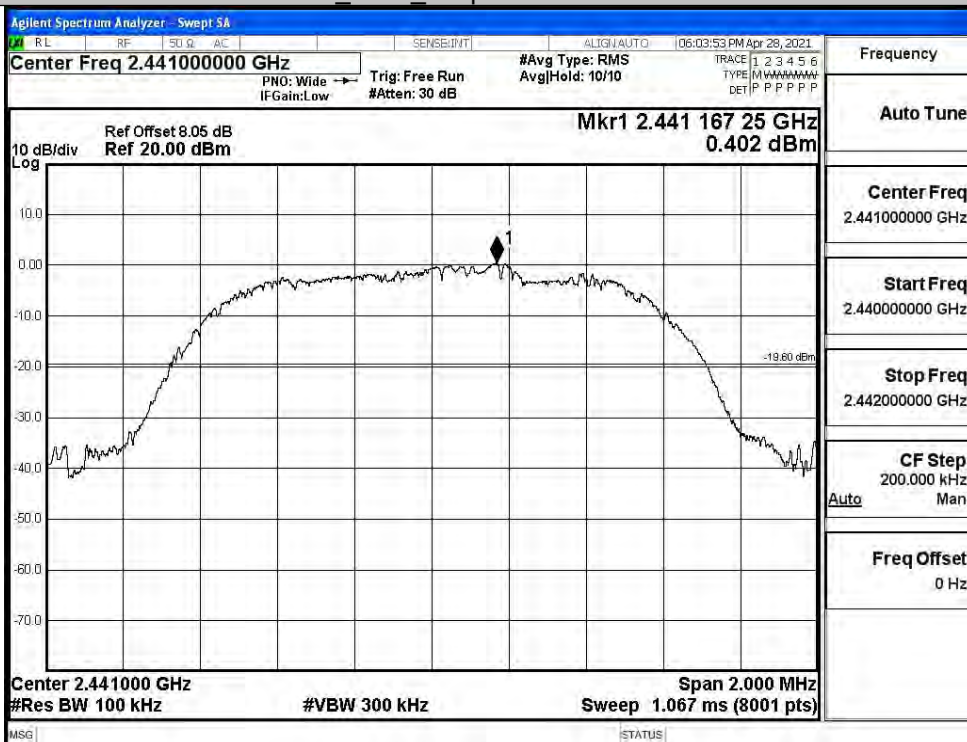


Puw

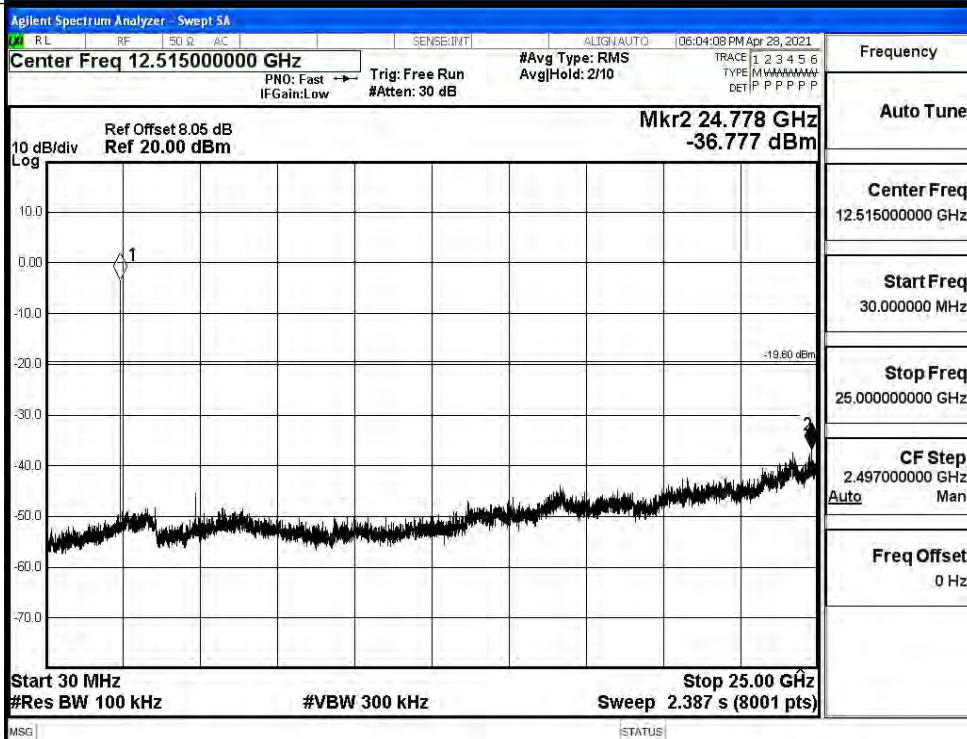


8DPSK_MCH_Graphs

Pref

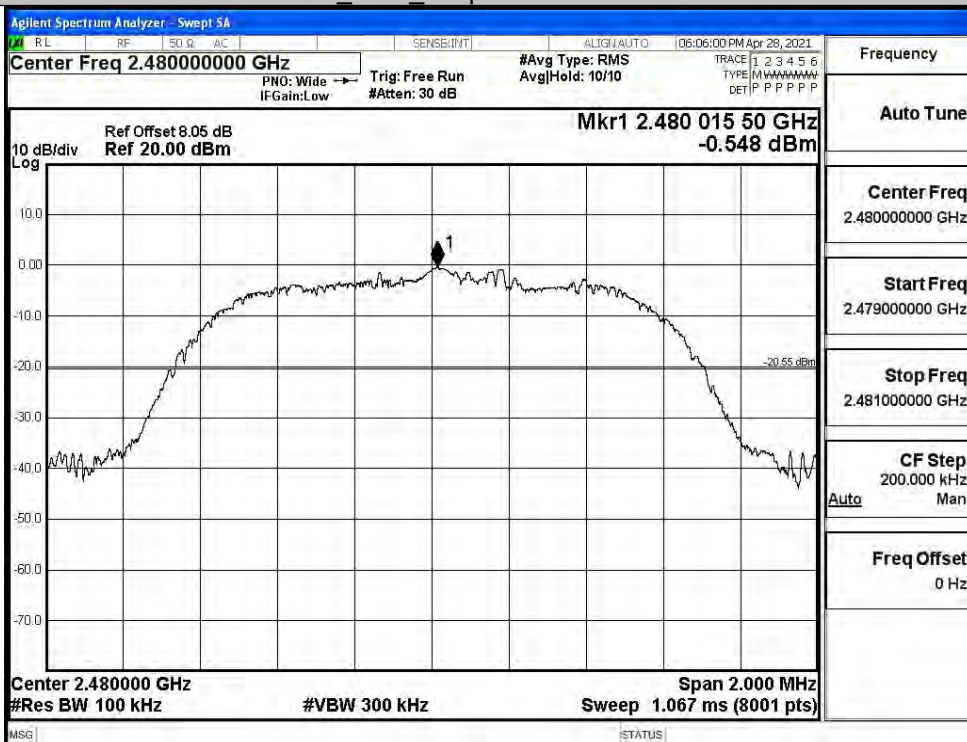


Puw

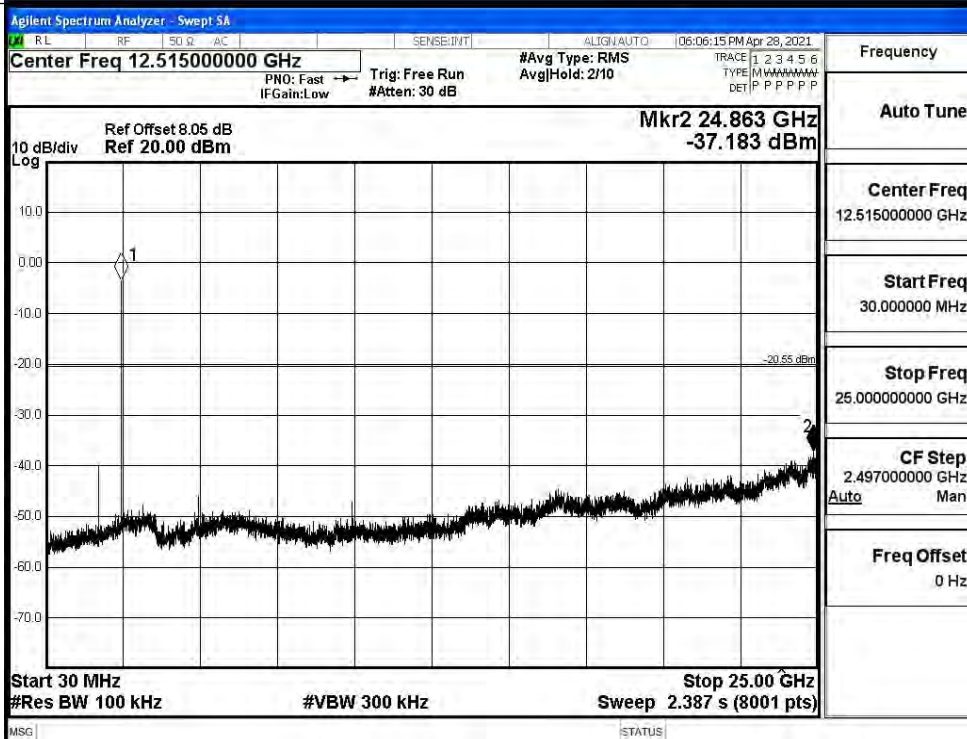


8DPSK_HCH_Graphs

Pref



Puw

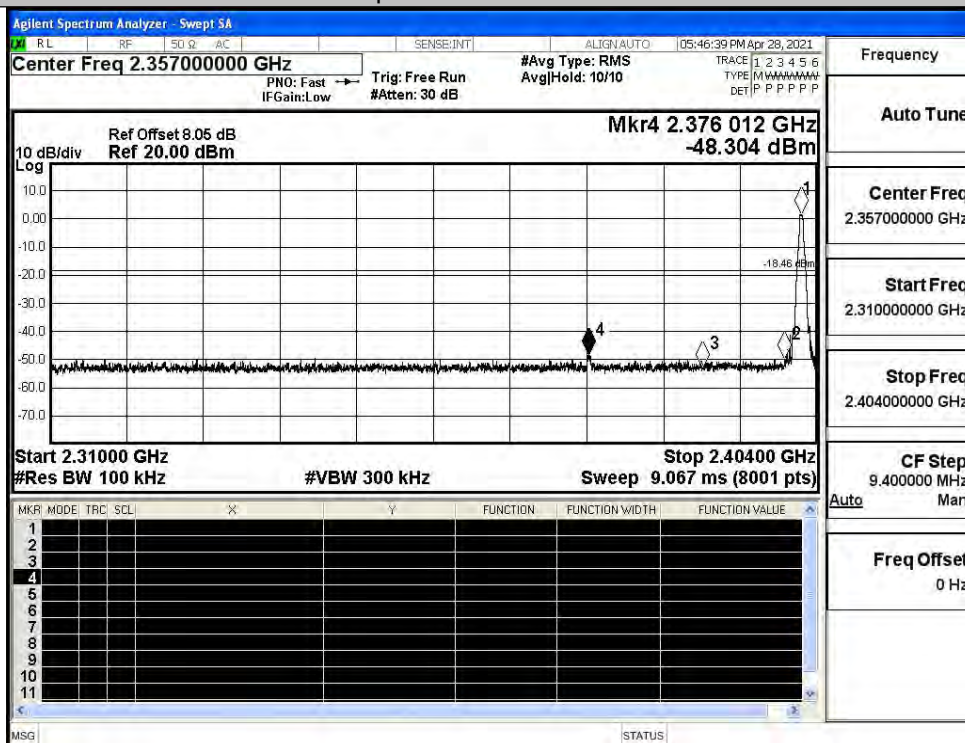


A.7 Band-edge for RF Conducted Emissions

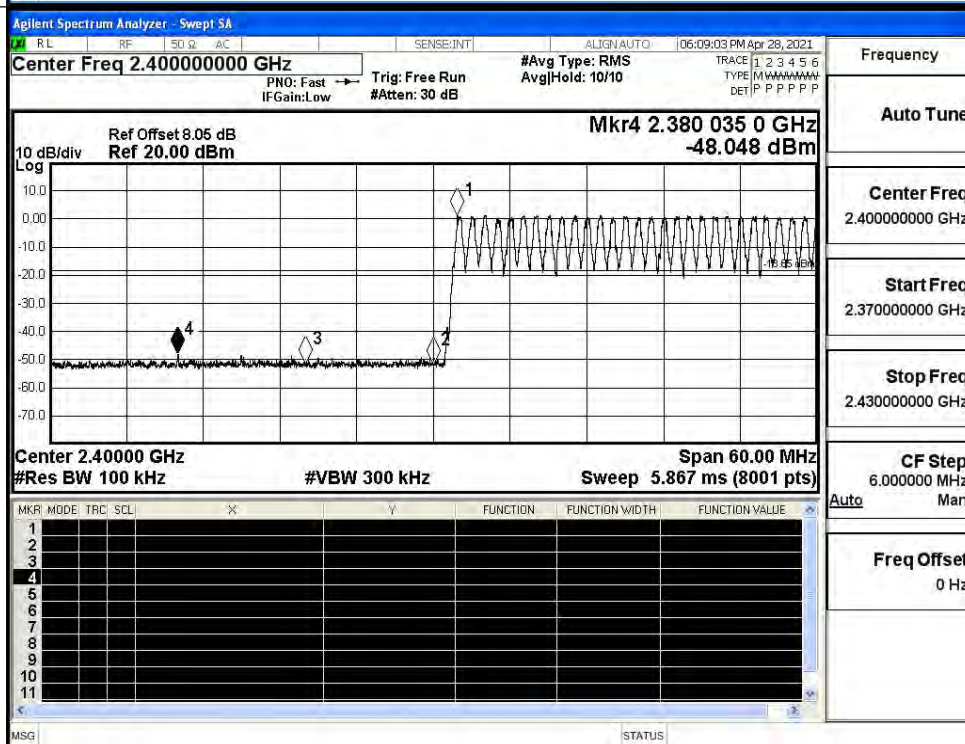
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.537	Off	-48.304	-18.46	PASS
			1.347	On	-48.048	-18.65	PASS
	HCH	2480	-0.520	Off	-47.819	-20.52	PASS
			-0.217	On	-48.343	-20.22	PASS
$\pi/4$ DQPSK	LCH	2402	1.366	Off	-49.534	-18.63	PASS
			1.155	On	-48.660	-18.85	PASS
	HCH	2480	-0.977	Off	-49.663	-20.98	PASS
			-0.134	On	-48.869	-20.13	PASS
8DPSK	LCH	2402	0.634	Off	-46.989	-19.37	PASS
			1.430	On	-48.468	-18.57	PASS
	HCH	2480	-0.523	Off	-48.768	-20.52	PASS
			0.097	On	-48.072	-19.9	PASS

Test Graphs

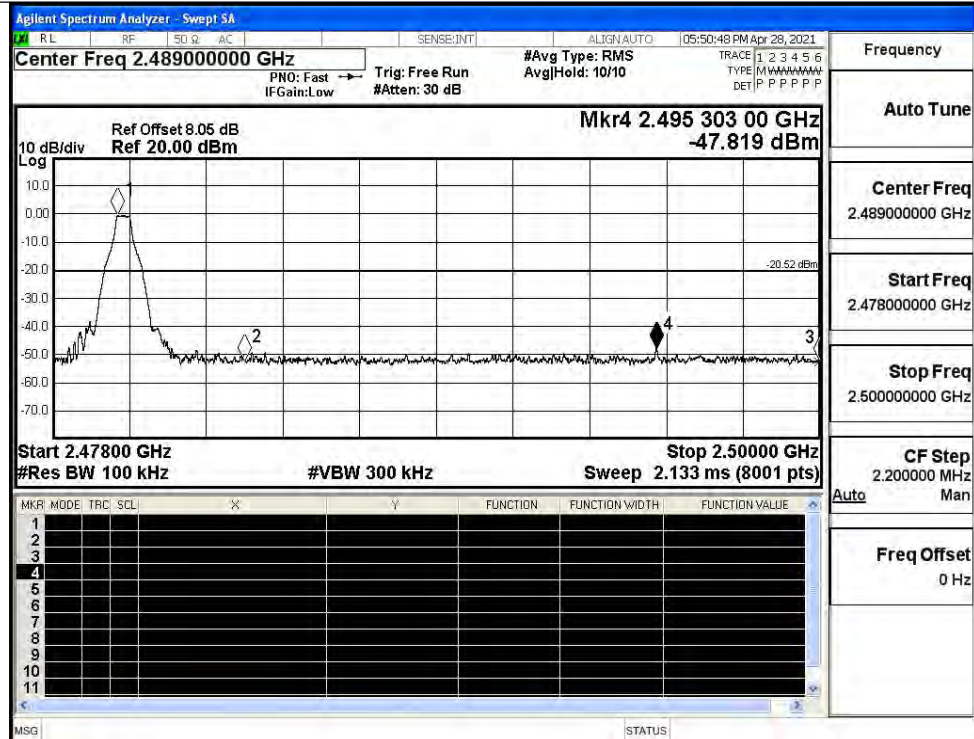
GFSK/LCH/No Hop



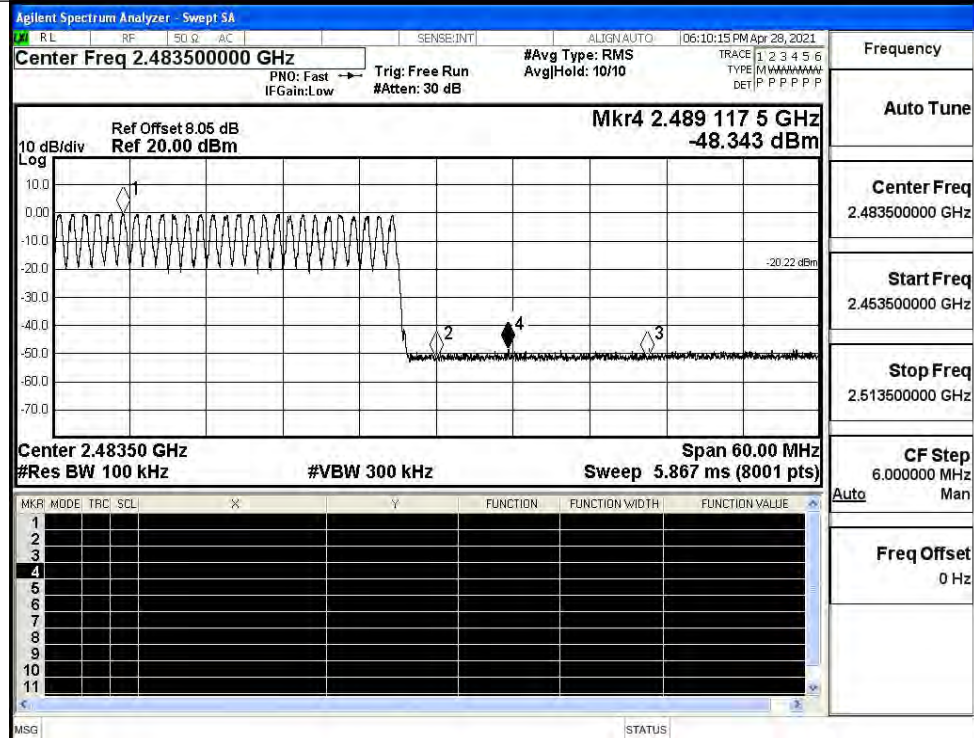
GFSK/LCH/Hop



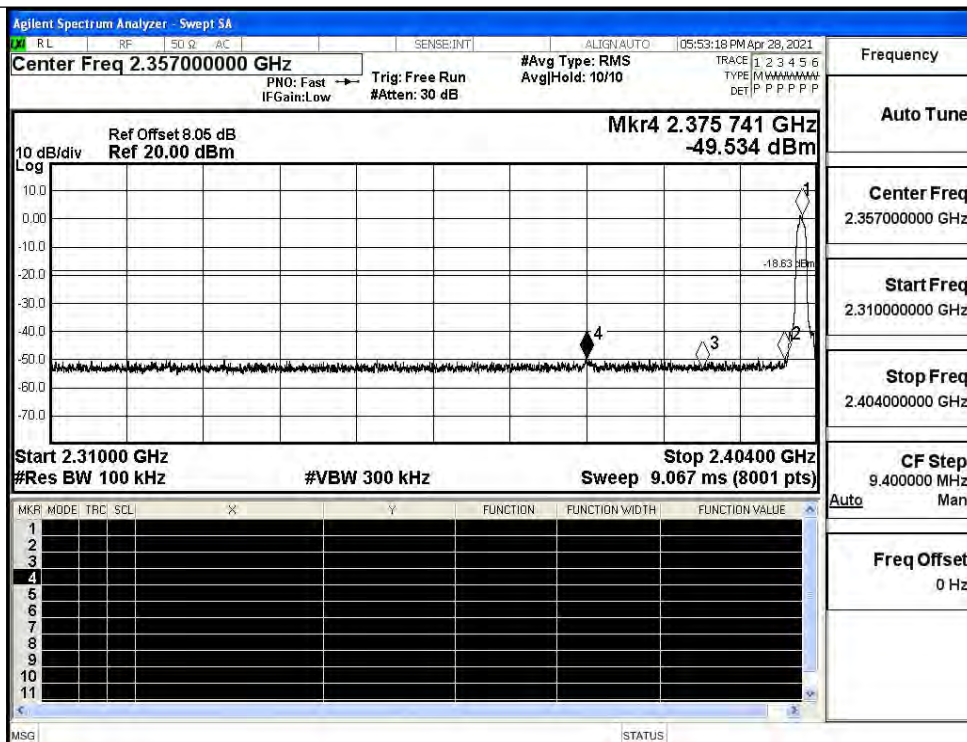
GFSK/HCH/No Hop



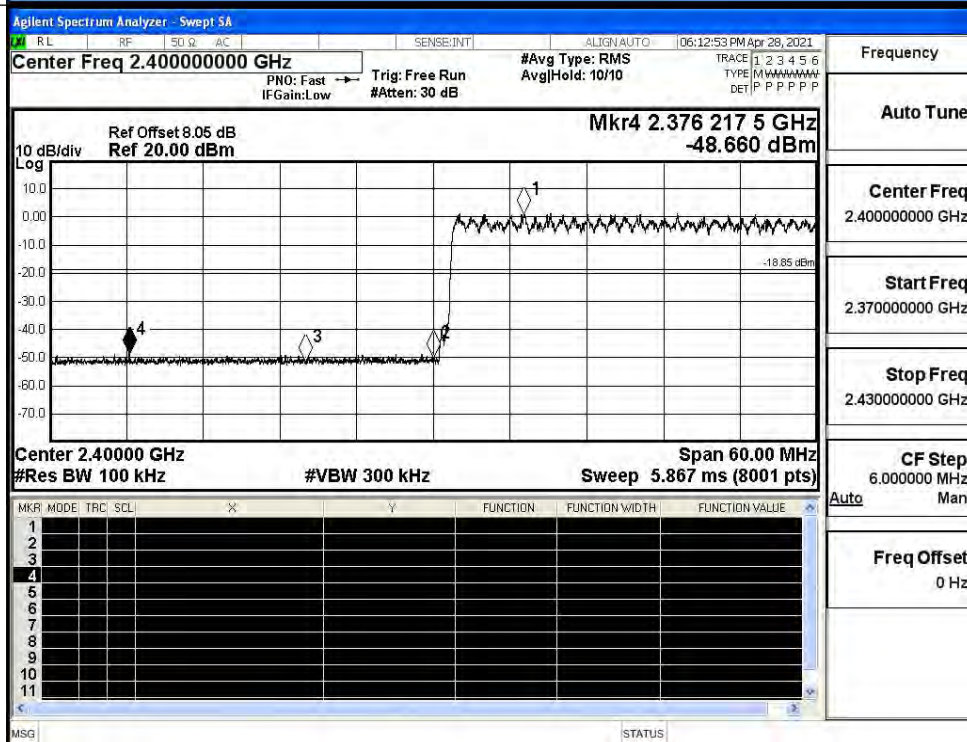
GFSK/HCH/Hop



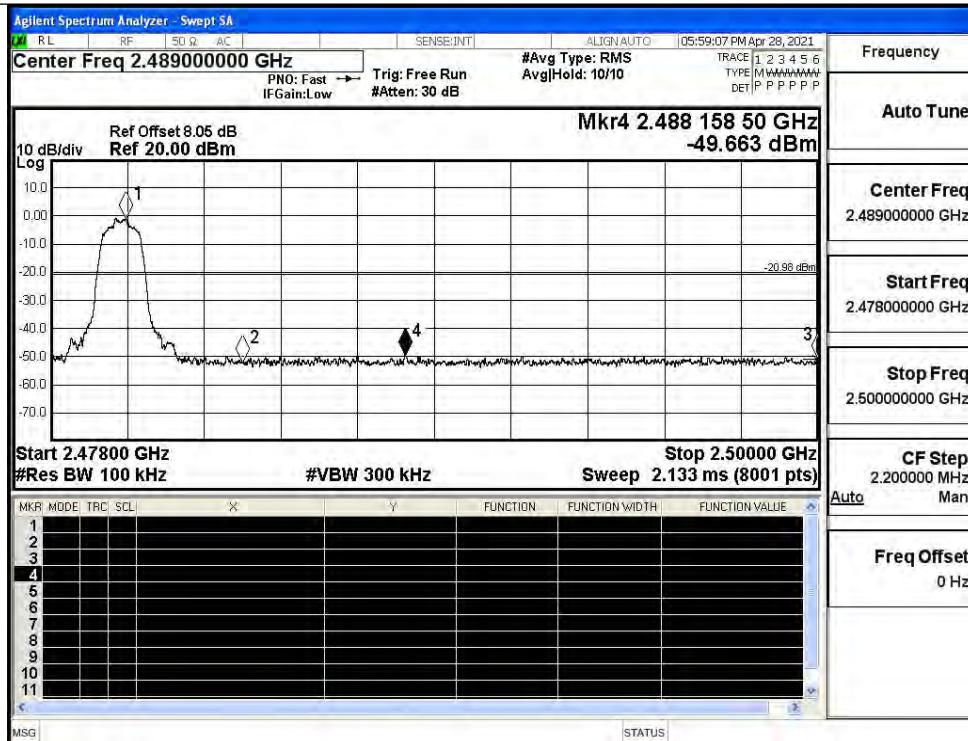
$\pi/4$ DQPSK/LCH/No
Hop



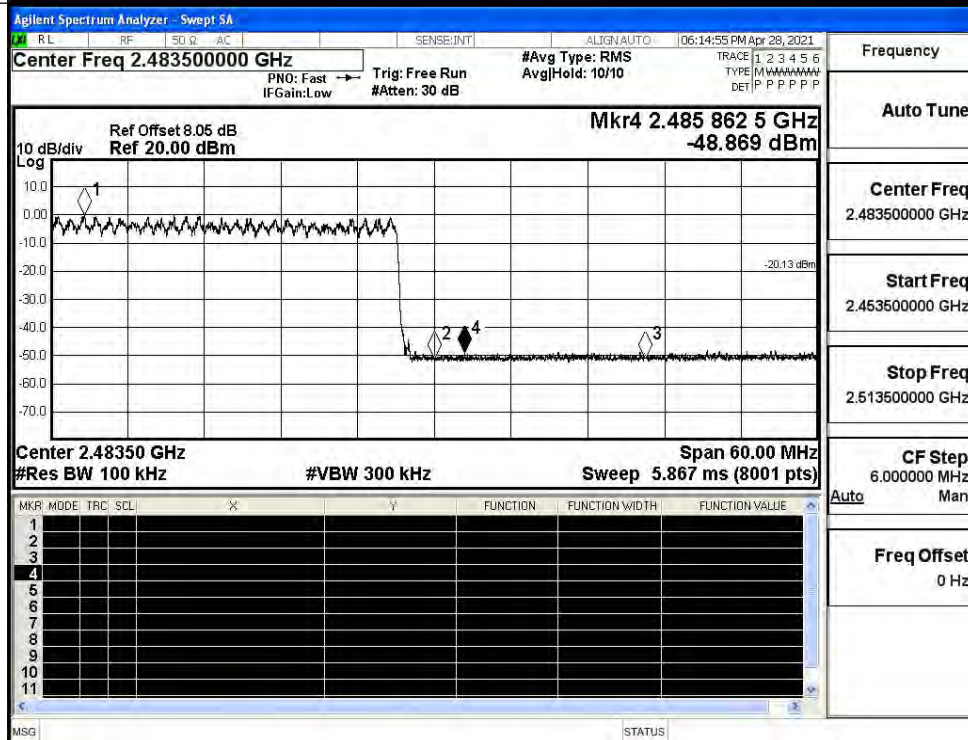
$\pi/4$ DQPSK/LCH/Hop



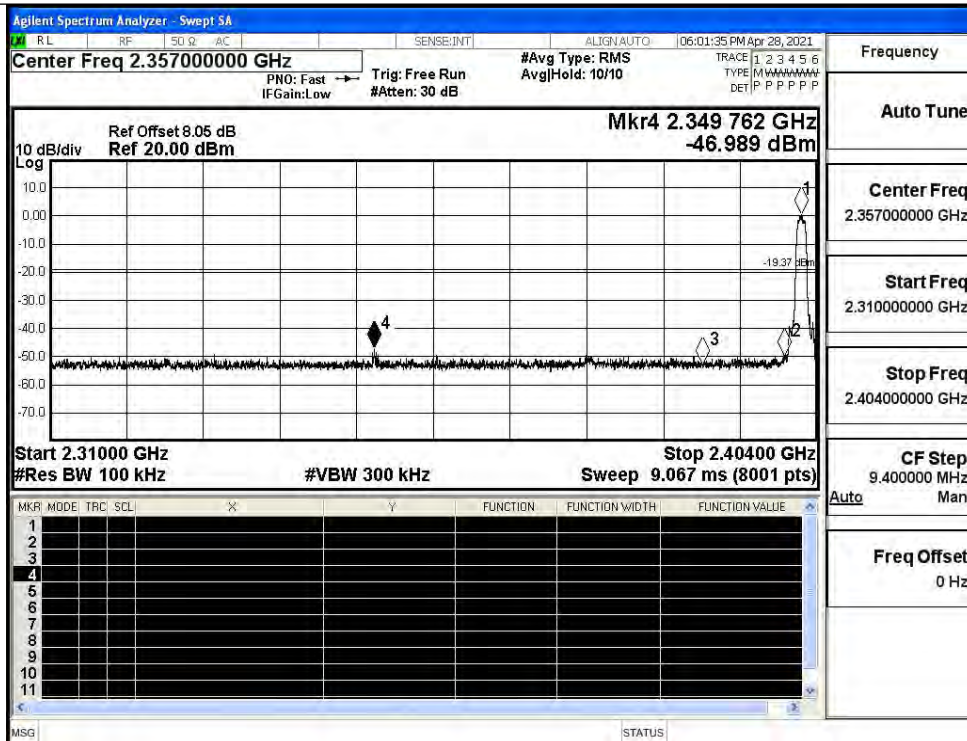
$\pi/4$ DQPSK/HCH/No
Hop



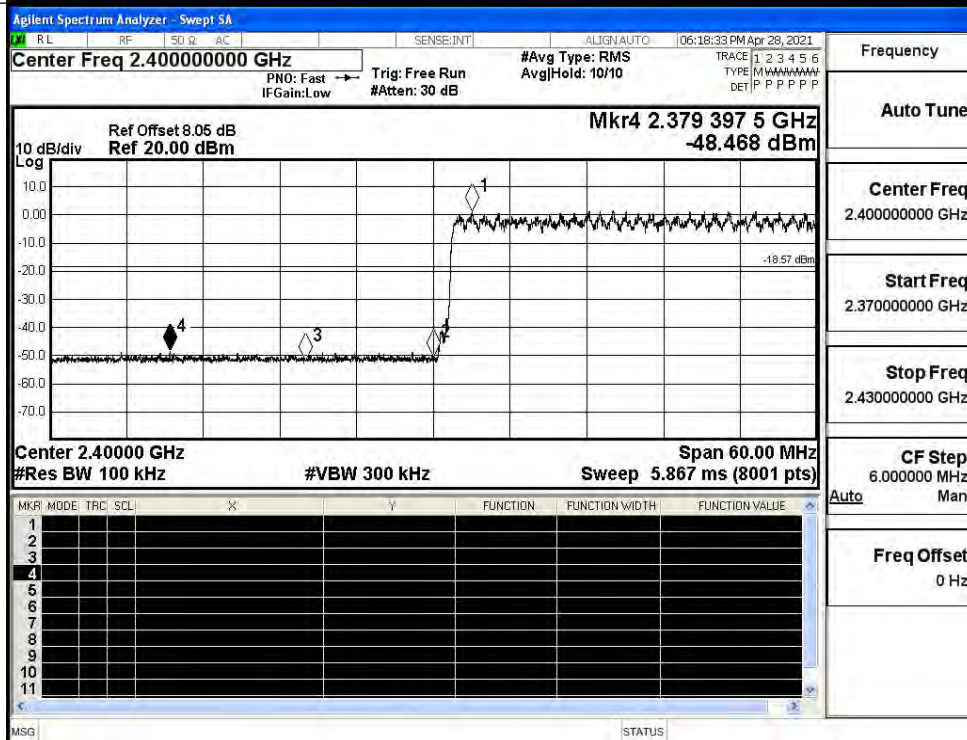
$\pi/4$ DQPSK/HCH/Hop



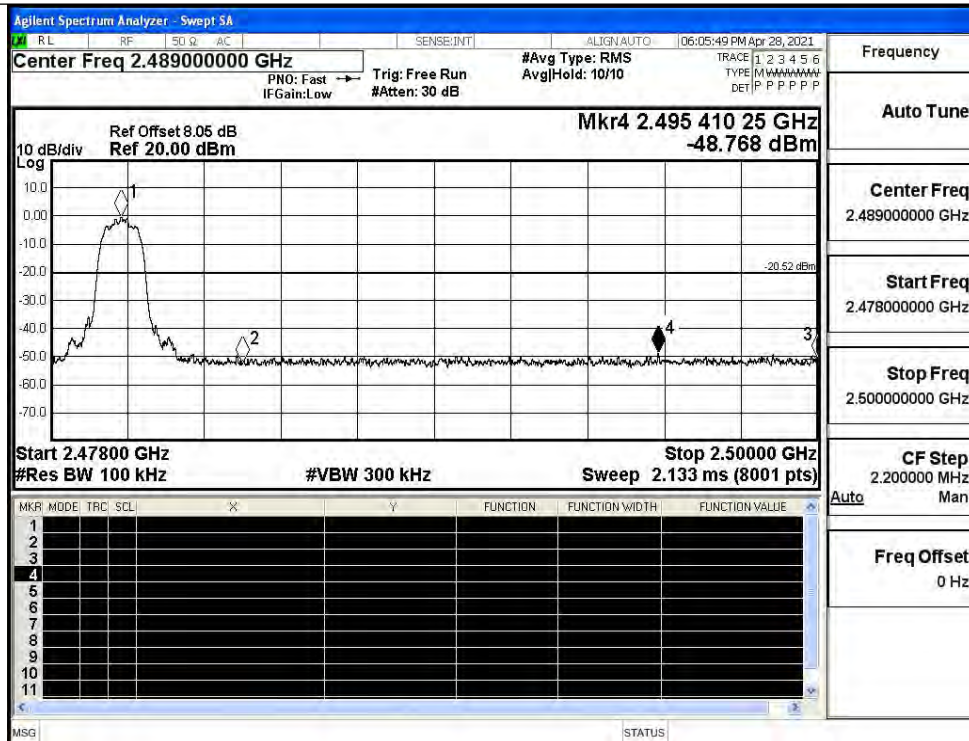
8DPSK/LCH/No Hop



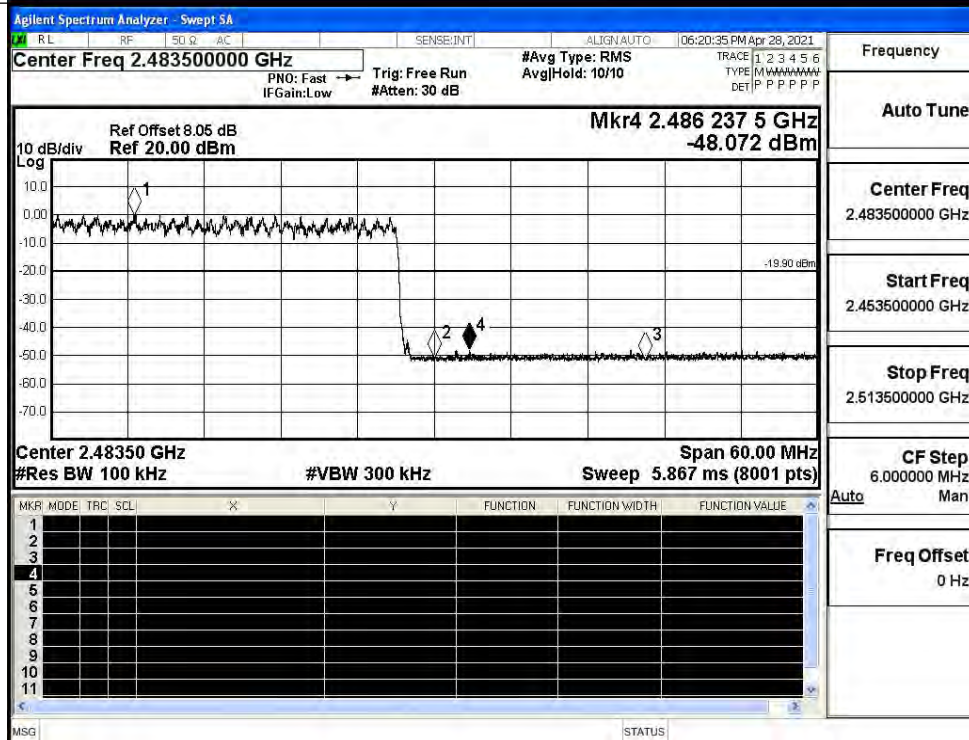
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



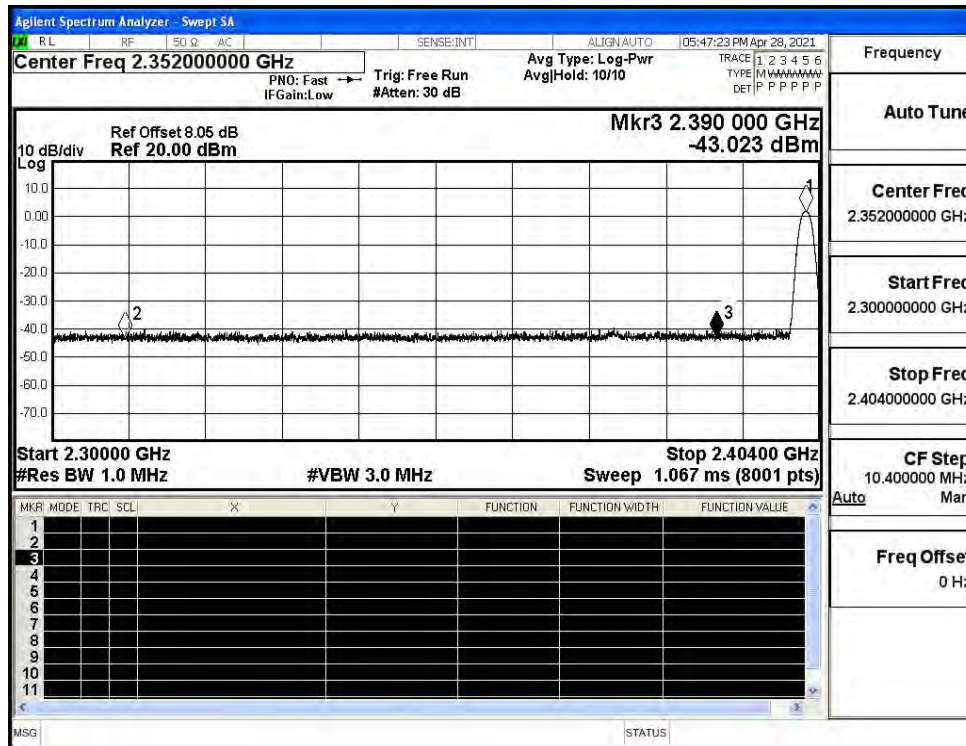
8DPSK/HCH/Hop



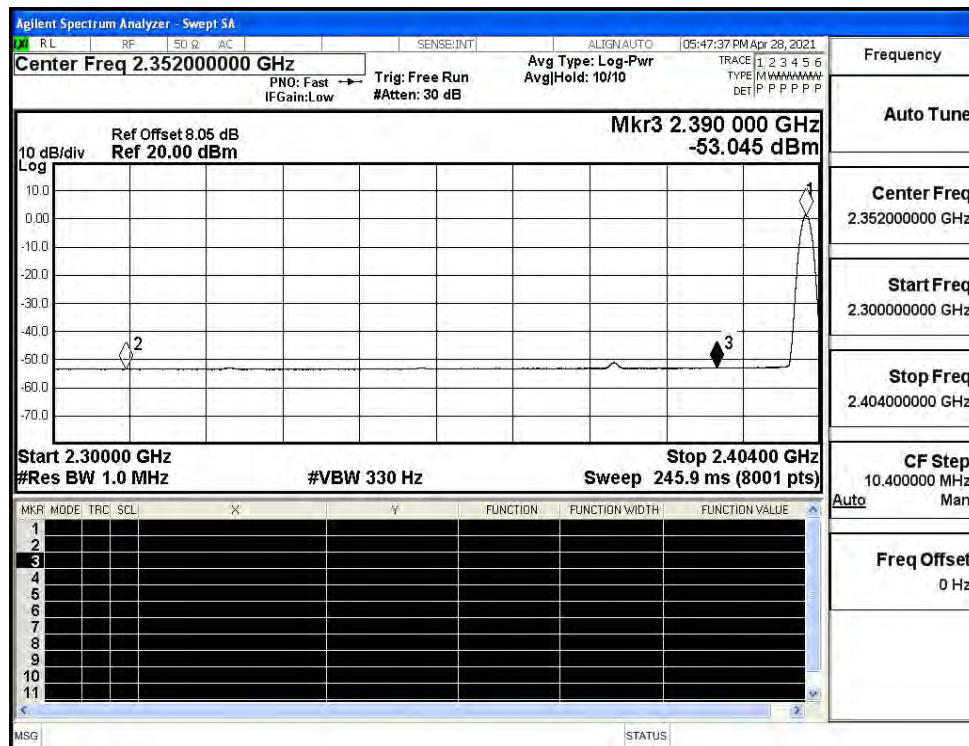
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.37	2.0	0	53.86	PEAK	74	PASS
	Off	2310.0	-53.34	2.0	0	43.89	AV	54	PASS
	Off	2390.0	-43.02	2.0	0	54.21	PEAK	74	PASS
	Off	2390.0	-53.05	2.0	0	44.18	AV	54	PASS
	Off	2483.5	-42.47	2.0	0	54.76	PEAK	74	PASS
	Off	2483.5	-52.38	2.0	0	44.85	AV	54	PASS
	Off	2500.0	-42.61	2.0	0	54.62	PEAK	74	PASS
	Off	2500.0	-52.33	2.0	0	44.90	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.35	2.0	0	54.88	PEAK	74	PASS
	Off	2310.0	-53.36	2.0	0	43.87	AV	54	PASS
	Off	2390.0	-42.18	2.0	0	55.05	PEAK	74	PASS
	Off	2390.0	-53.00	2.0	0	44.23	AV	54	PASS
	Off	2483.5	-41.95	2.0	0	55.28	PEAK	74	PASS
	Off	2483.5	-52.41	2.0	0	44.82	AV	54	PASS
	Off	2500.0	-42.99	2.0	0	54.24	PEAK	74	PASS
	Off	2500.0	-52.34	2.0	0	44.89	AV	54	PASS
8DPSK	Off	2310.0	-44.35	2.0	0	52.88	PEAK	74	PASS
	Off	2310.0	-53.34	2.0	0	43.89	AV	54	PASS
	Off	2390.0	-43.62	2.0	0	53.61	PEAK	74	PASS
	Off	2390.0	-52.97	2.0	0	44.26	AV	54	PASS
	Off	2483.5	-41.94	2.0	0	55.29	PEAK	74	PASS
	Off	2483.5	-52.46	2.0	0	44.77	AV	54	PASS
	Off	2500.0	-41.37	2.0	0	55.86	PEAK	74	PASS
	Off	2500.0	-52.34	2.0	0	44.89	AV	54	PASS

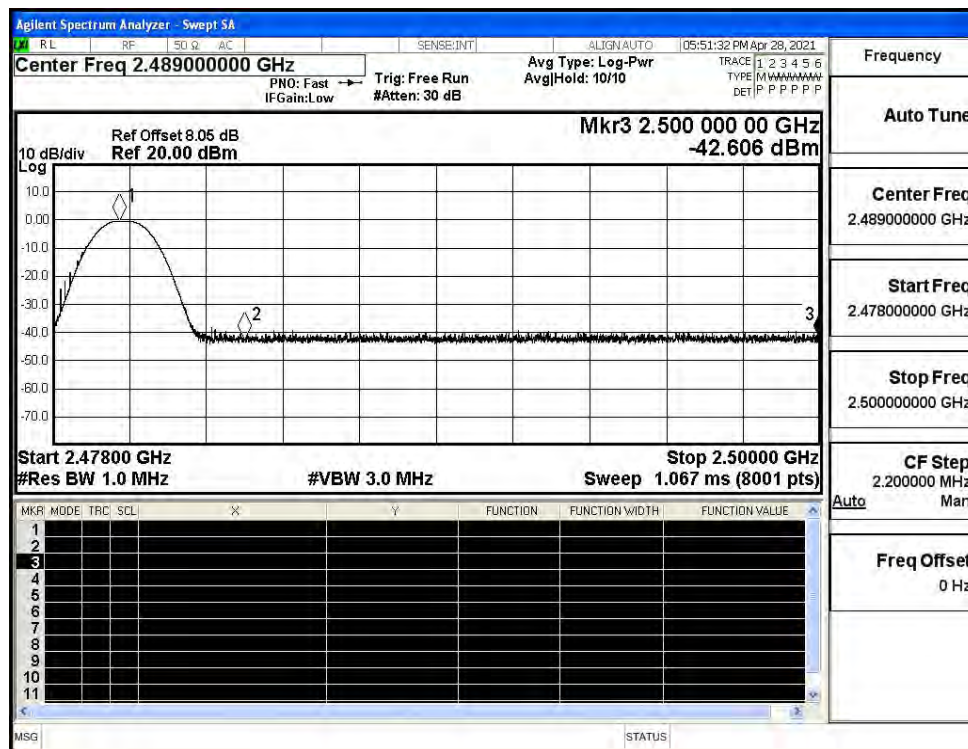
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



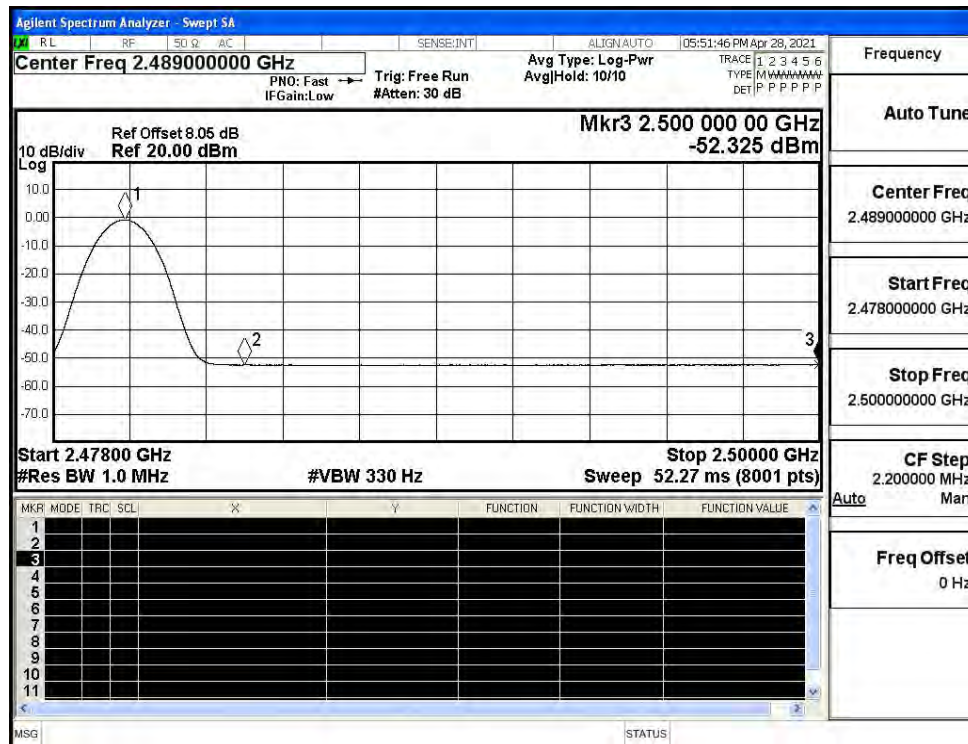
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)

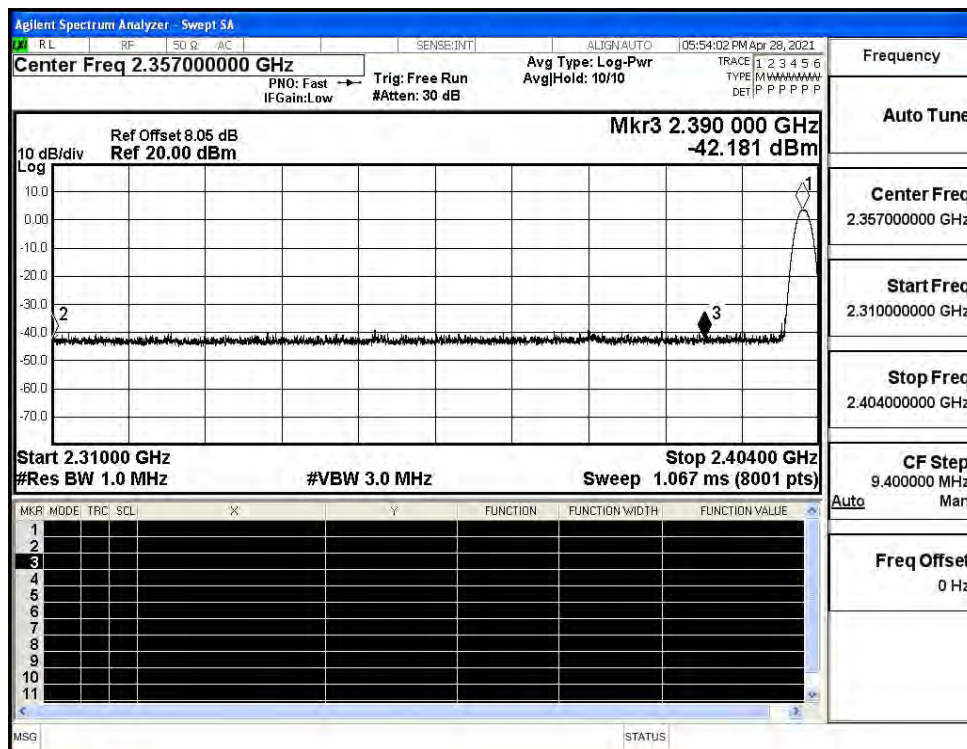
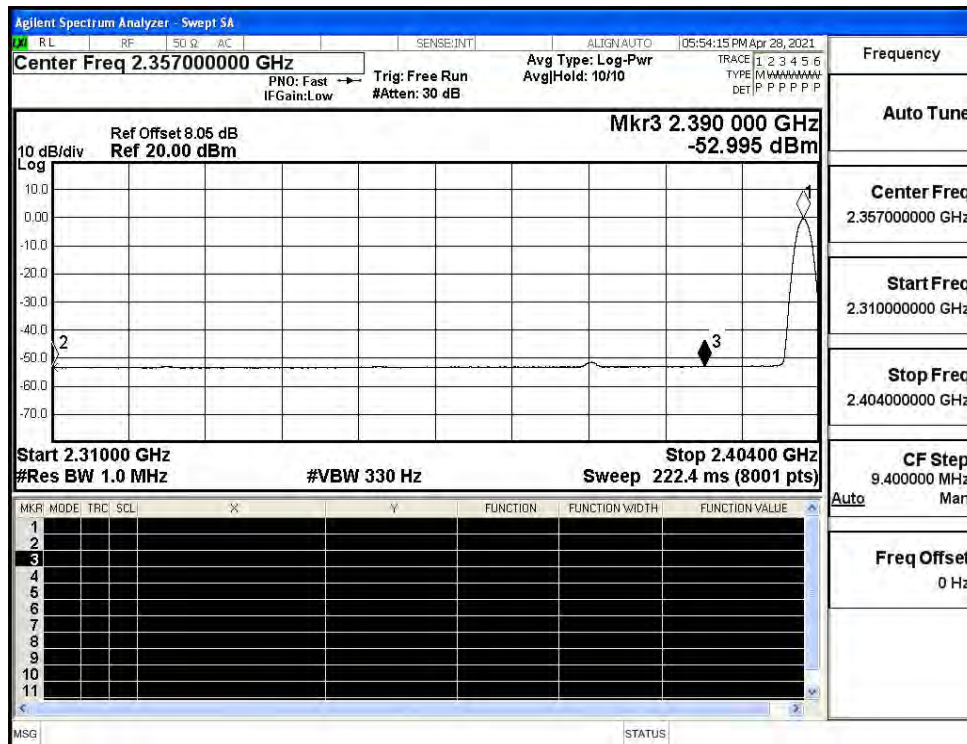


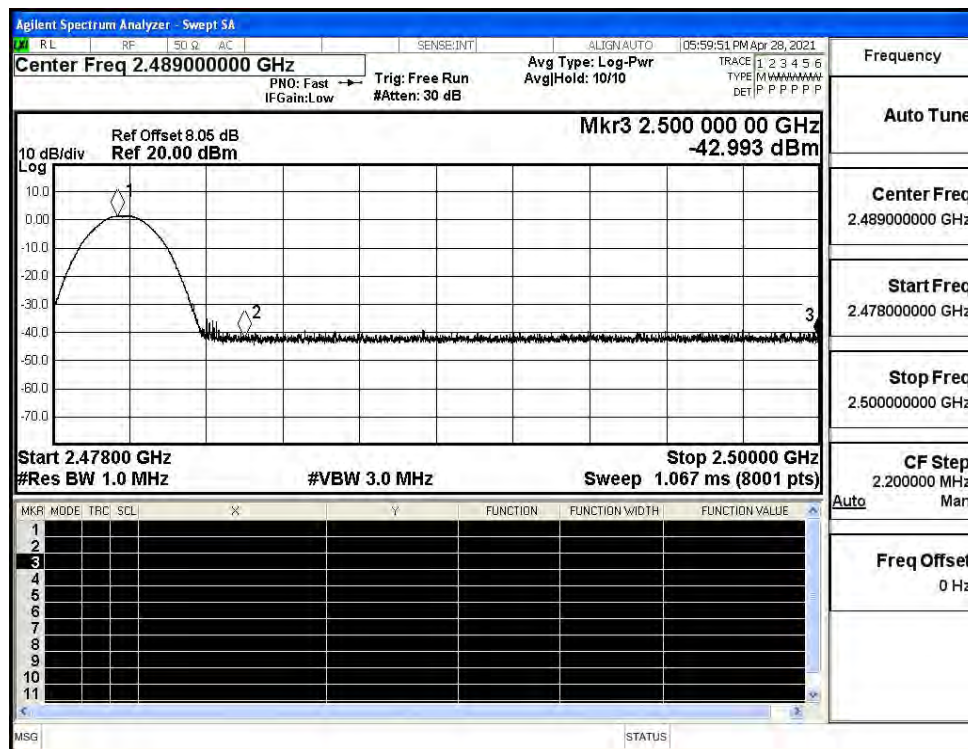
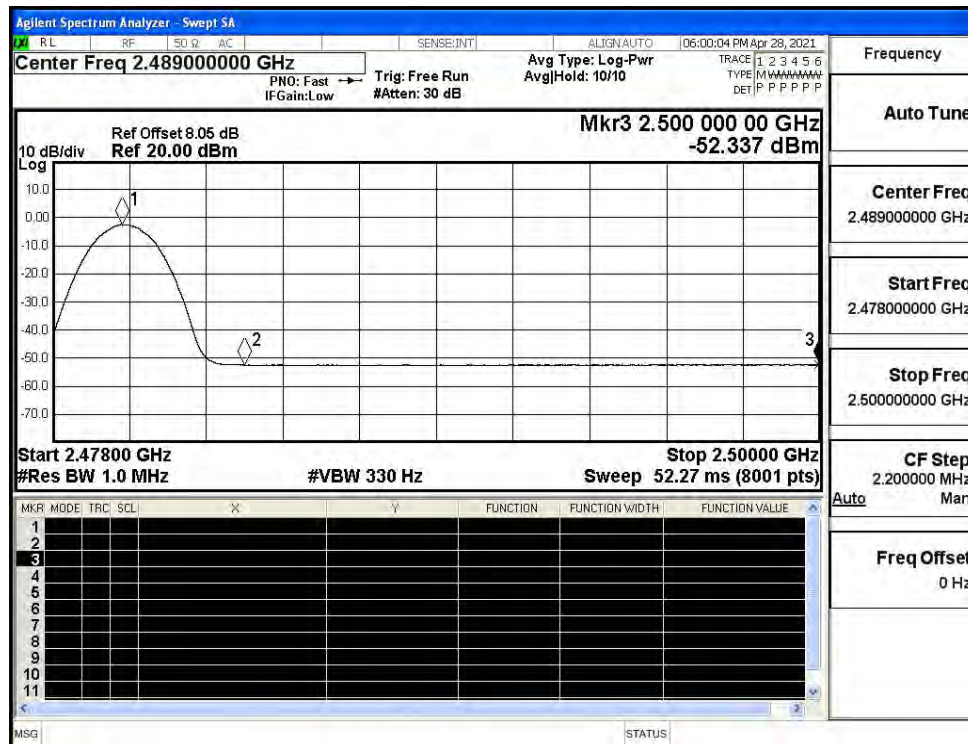
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



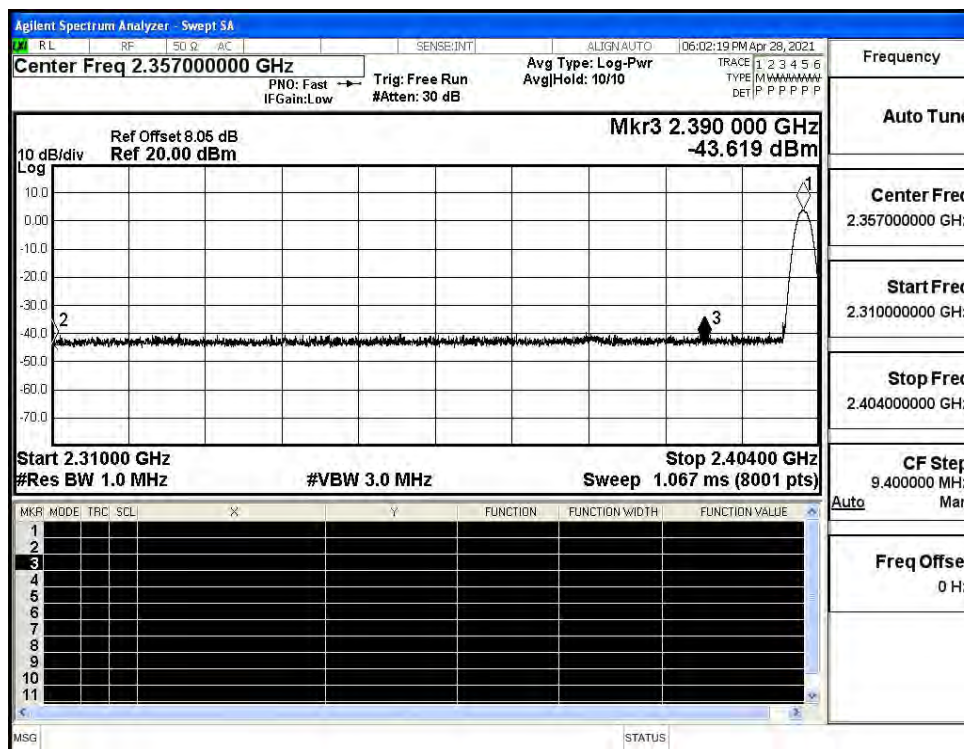
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



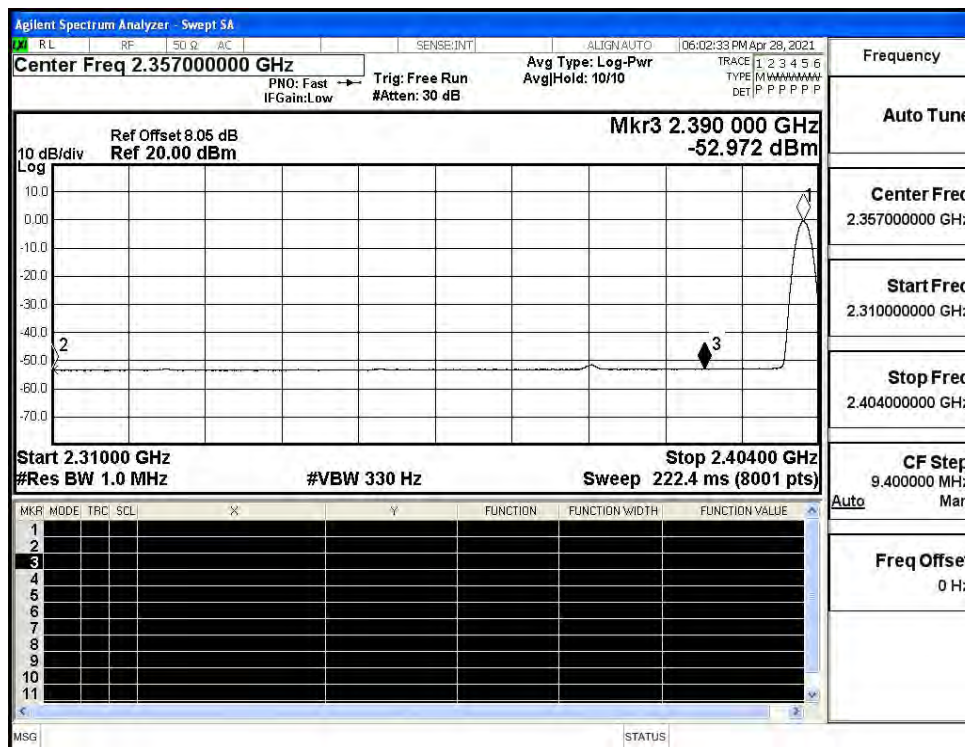
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

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)

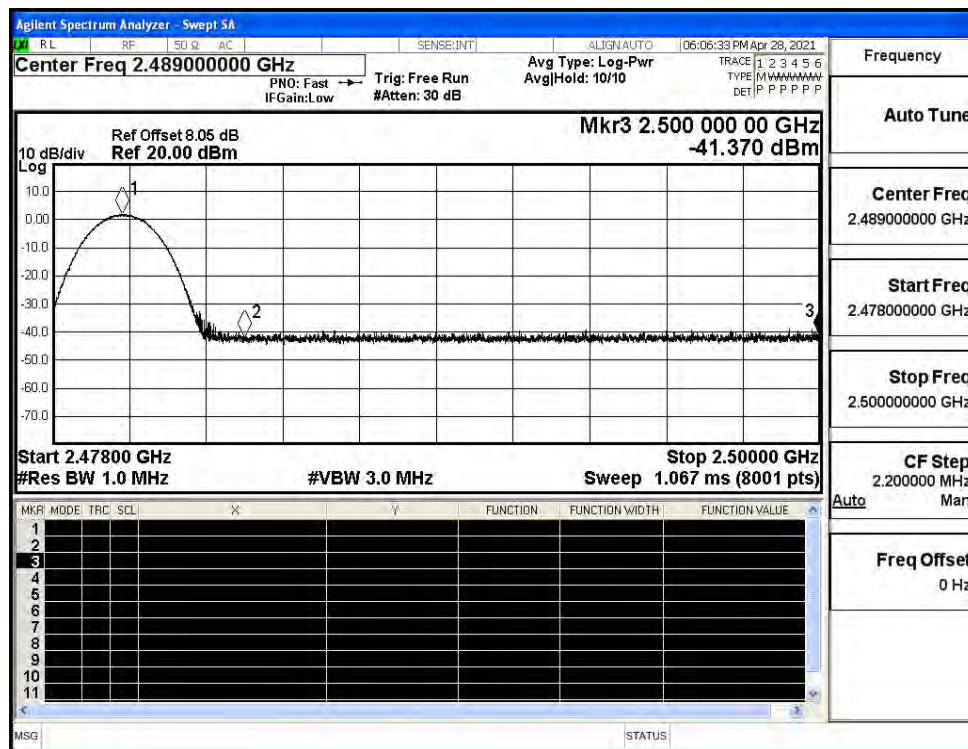
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

