

Appendix A

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

Product Name: HyBook Plus

Trade Mark: Hyundai

Test Model: HT14CBI581SG

Environmental Conditions

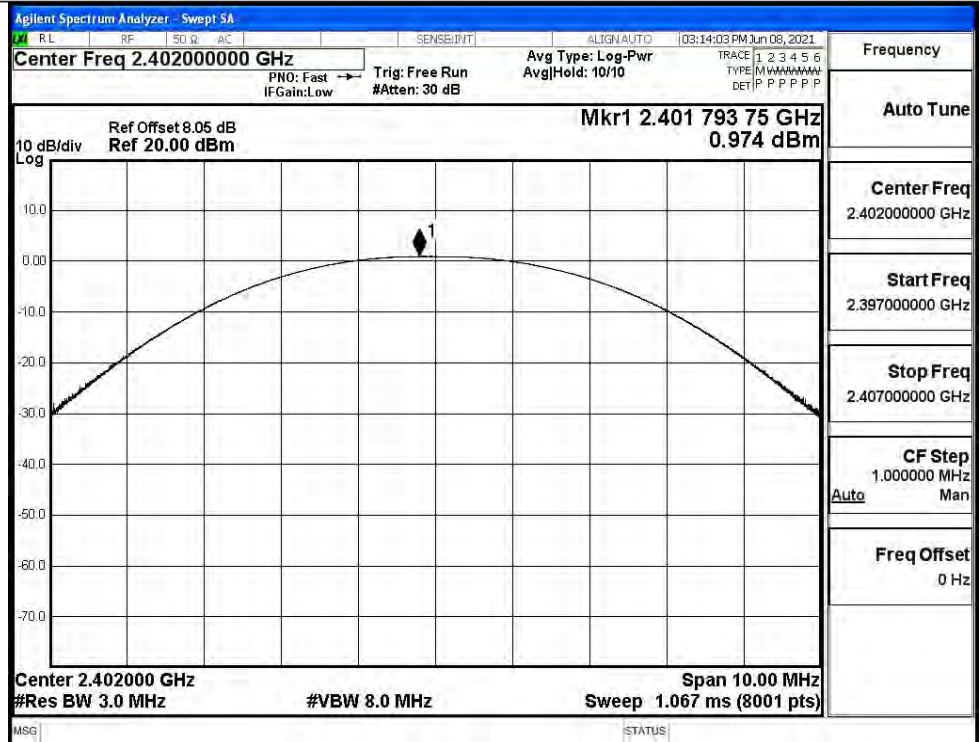
Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Ken He
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

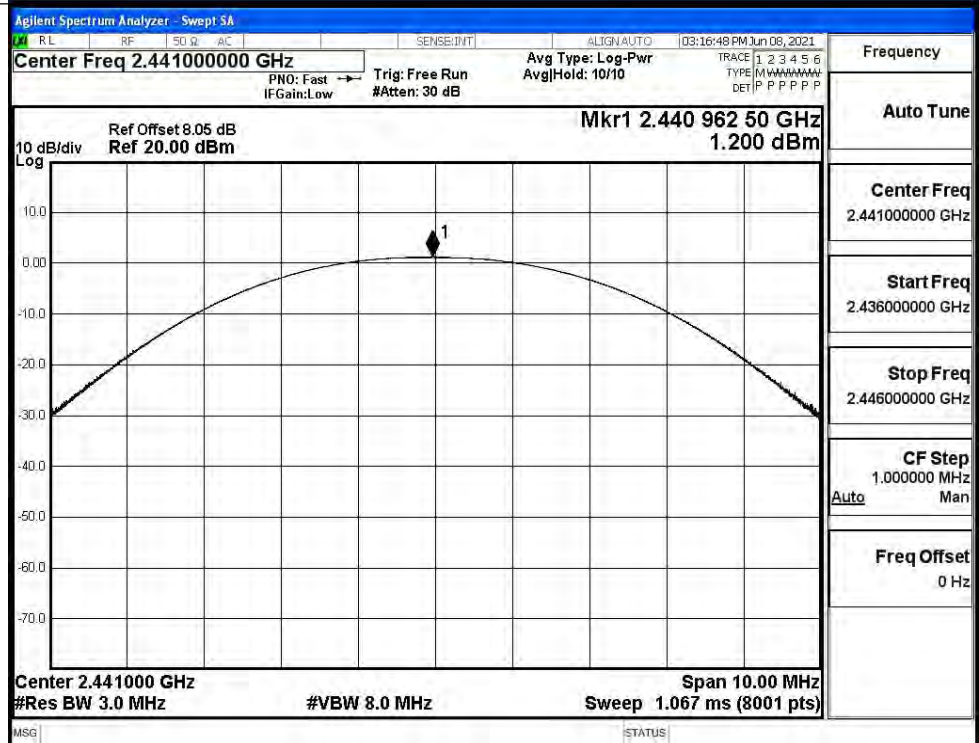
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.974	21	PASS
	MCH	1.200	21	PASS
	HCH	1.526	21	PASS
$\pi/4$ DQPSK	LCH	3.283	21	PASS
	MCH	3.478	21	PASS
	HCH	4.098	21	PASS
8DPSK	LCH	3.750	21	PASS
	MCH	3.945	21	PASS
	HCH	5.031	21	PASS

Test Graphs

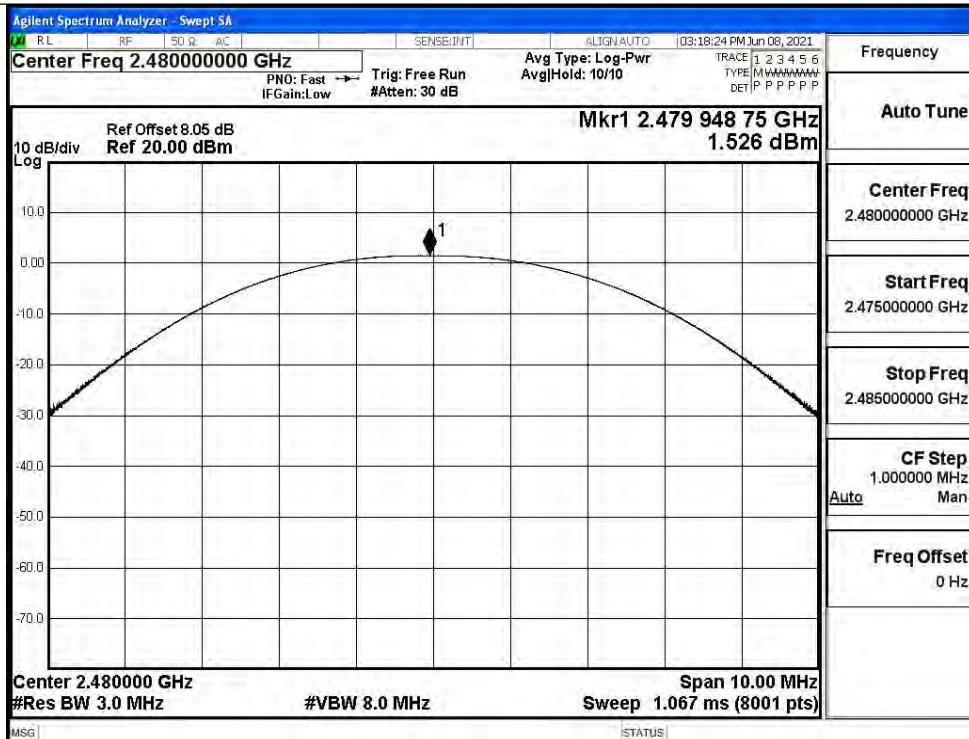
GFSK/LCH



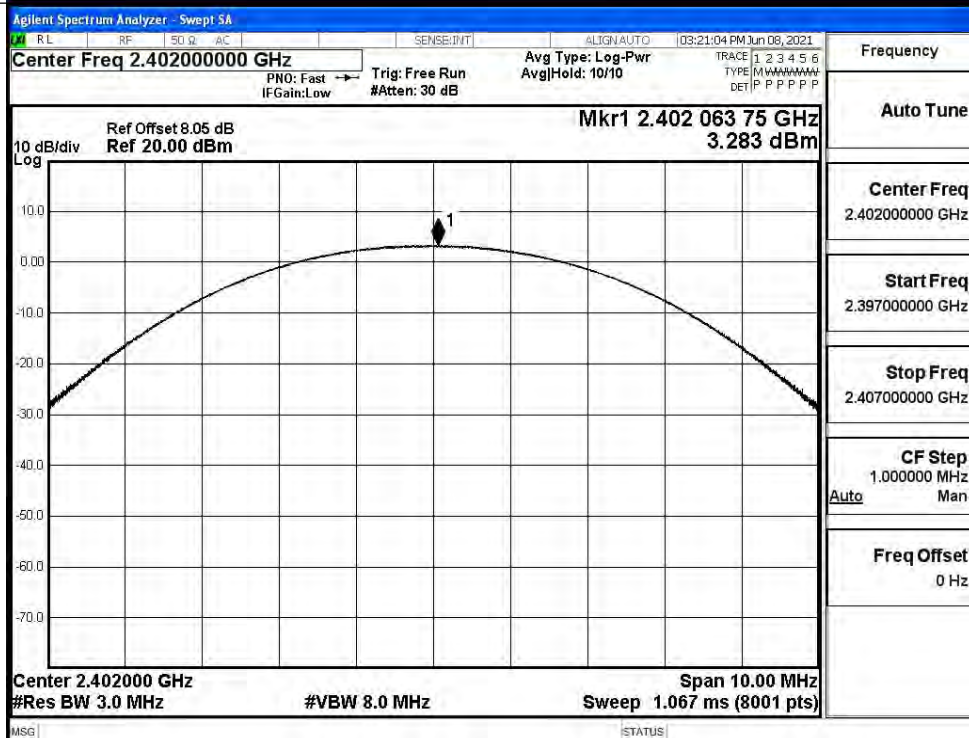
GFSK/MCH

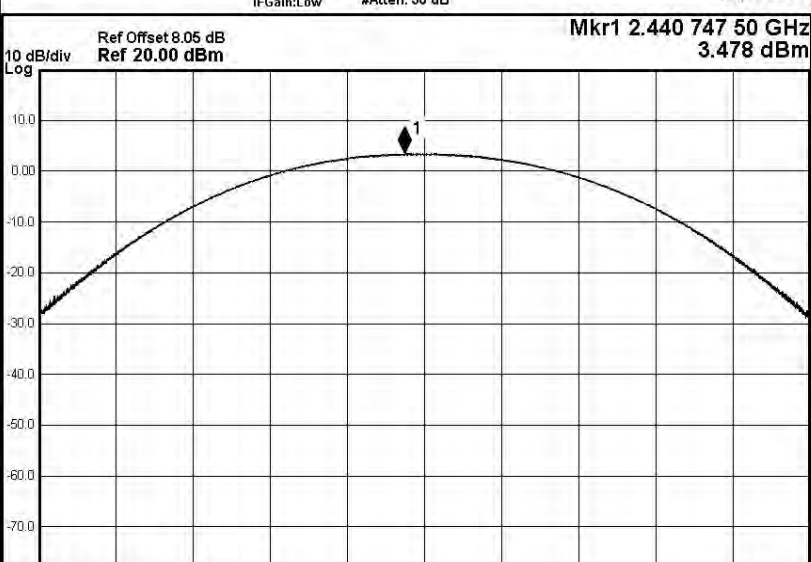
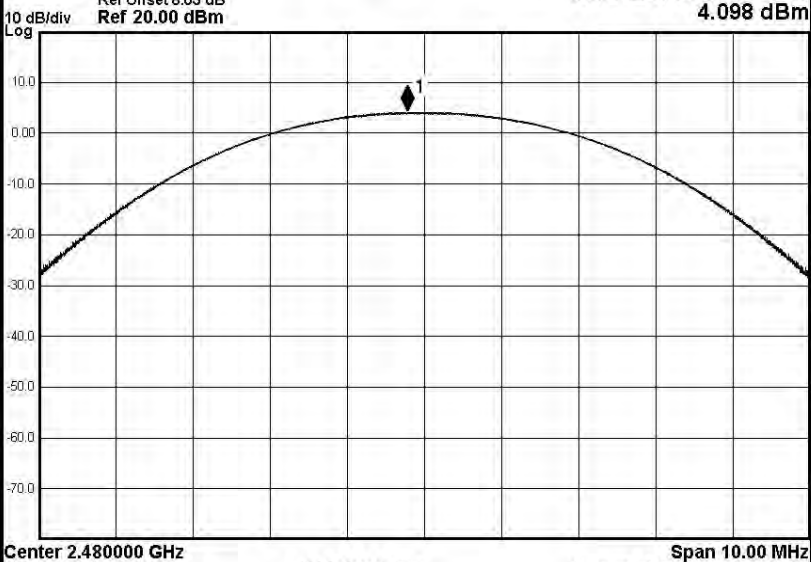


GFSK/HCH

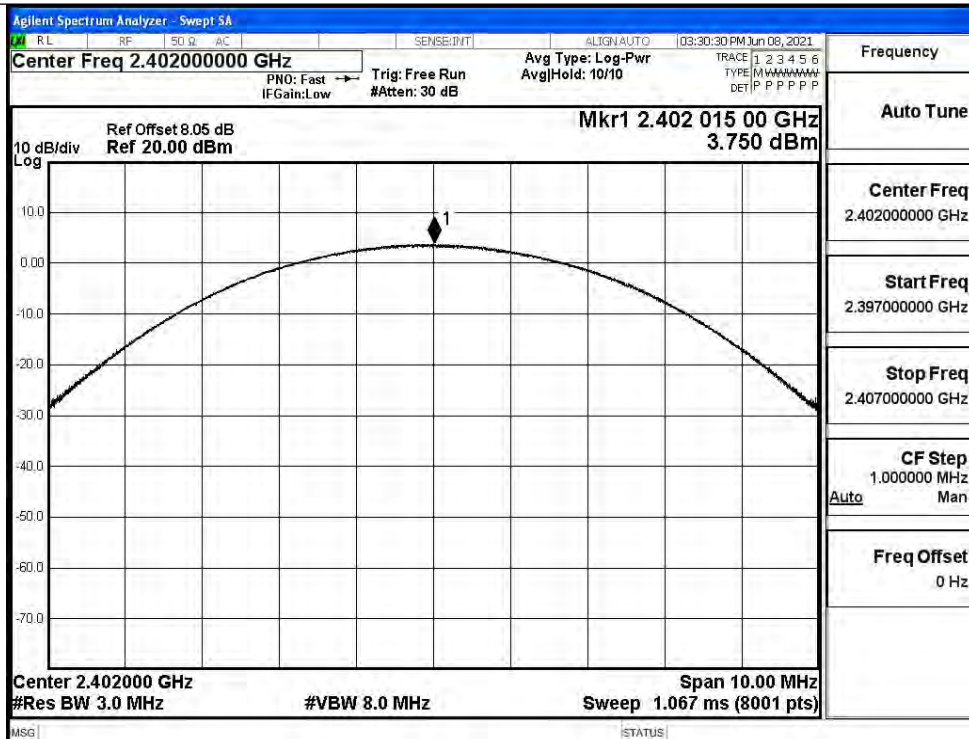


$\pi/4$ DQPSK/LCH

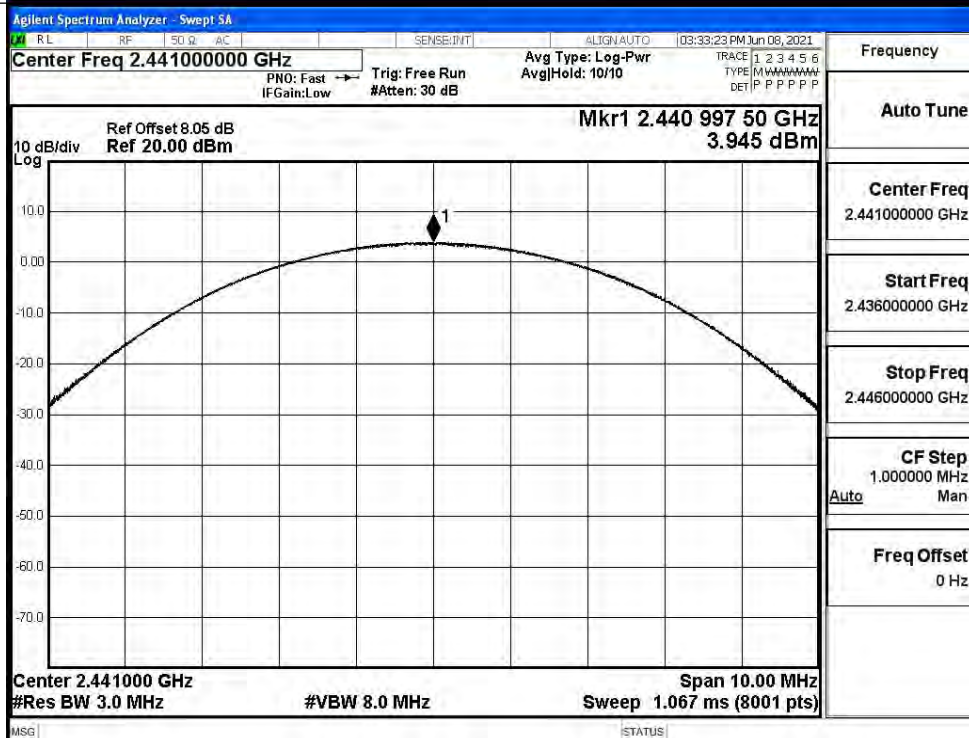


$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN: AUTO 03:24:43 PM Jun 08, 2021 Center Freq 2.441000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 10/10 Mkr1 2.440 747 50 GHz 3.478 dBm 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  Center 2.441000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Span 10.00 MHz Sweep 1.067 ms (8001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.436000000 GHz Stop Freq 2.446000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz
$\pi/4$DQPSK/HCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN: AUTO 03:26:45 PM Jun 08, 2021 Center Freq 2.480000000 GHz PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 10/10 Mkr1 2.479 782 50 GHz 4.098 dBm 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  Center 2.480000 GHz #Res BW 3.0 MHz #VBW 8.0 MHz Span 10.00 MHz Sweep 1.067 ms (8001 pts) MSG STATUS Frequency Auto Tune Center Freq 2.480000000 GHz Start Freq 2.475000000 GHz Stop Freq 2.485000000 GHz CF Step 1.000000 MHz Auto Man Freq Offset 0 Hz

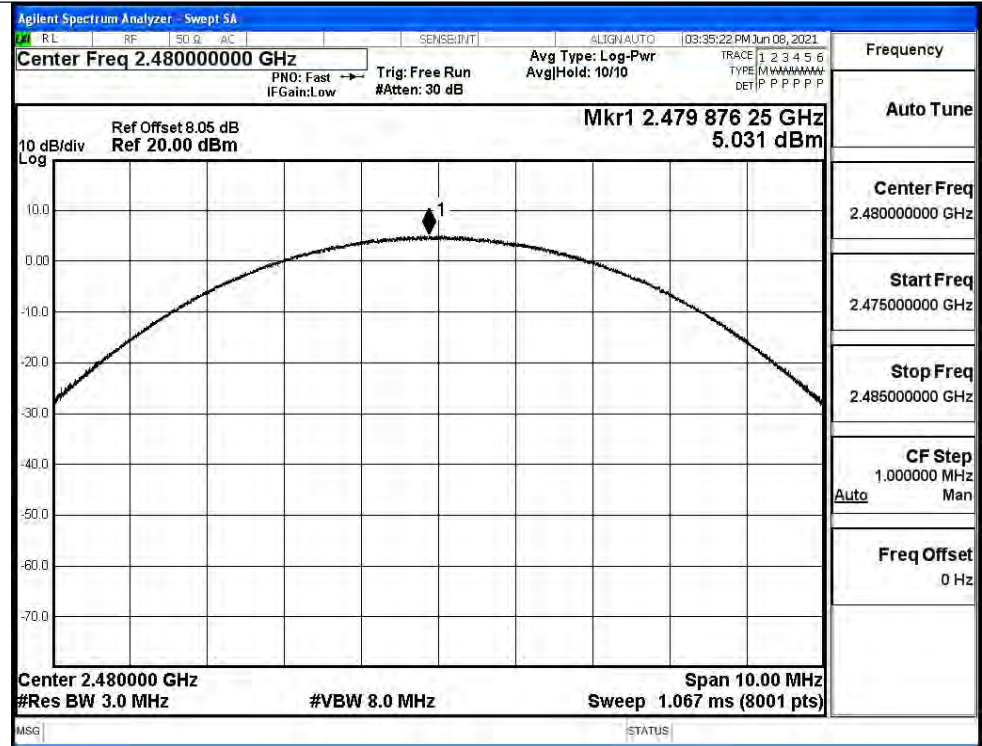
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



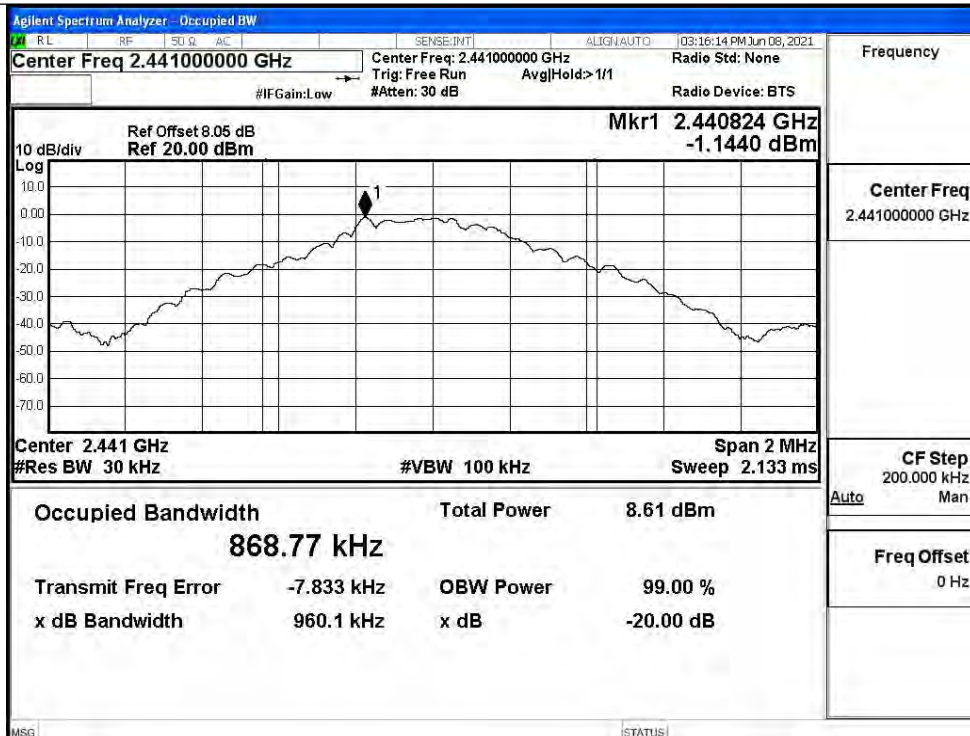
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9620	Not Specified	PASS
	MCH	0.9601	Not Specified	PASS
	HCH	0.9624	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.281	Not Specified	PASS
	MCH	1.282	Not Specified	PASS
	HCH	1.281	Not Specified	PASS
8DPSK	LCH	1.300	Not Specified	PASS
	MCH	1.301	Not Specified	PASS
	HCH	1.301	Not Specified	PASS

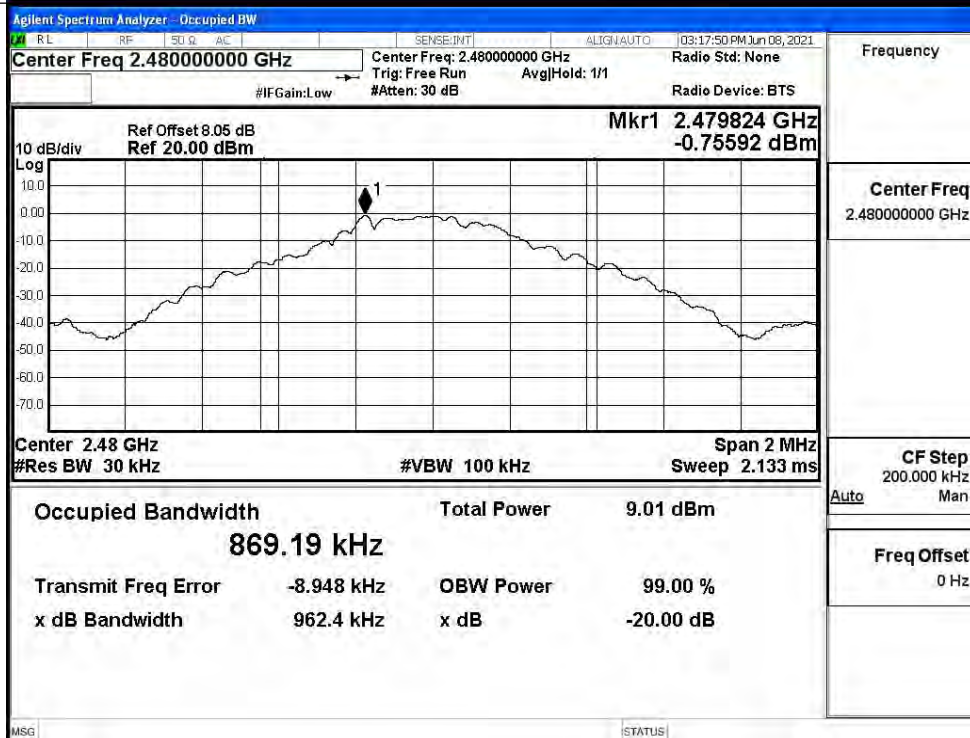
Test Graphs



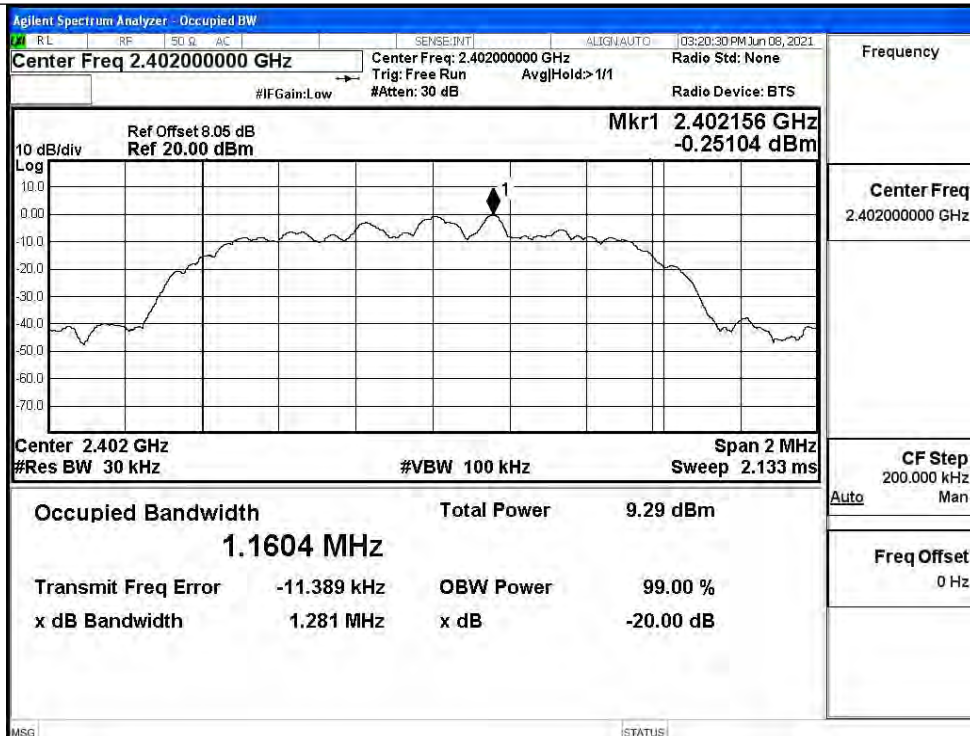
GFSK/MCH



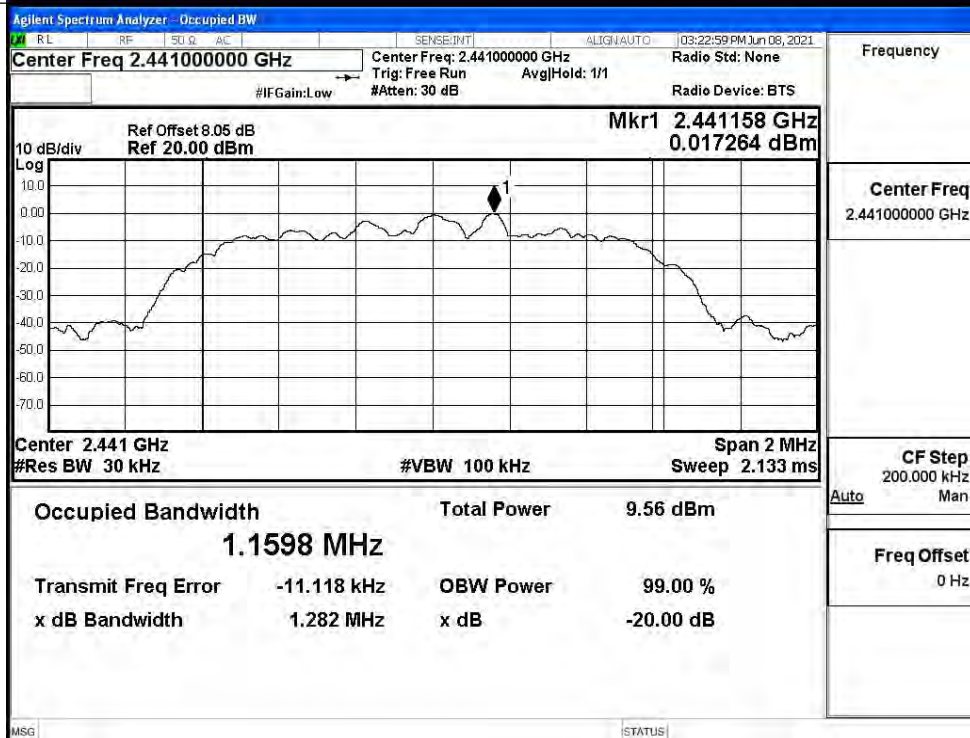
GFSK/HCH



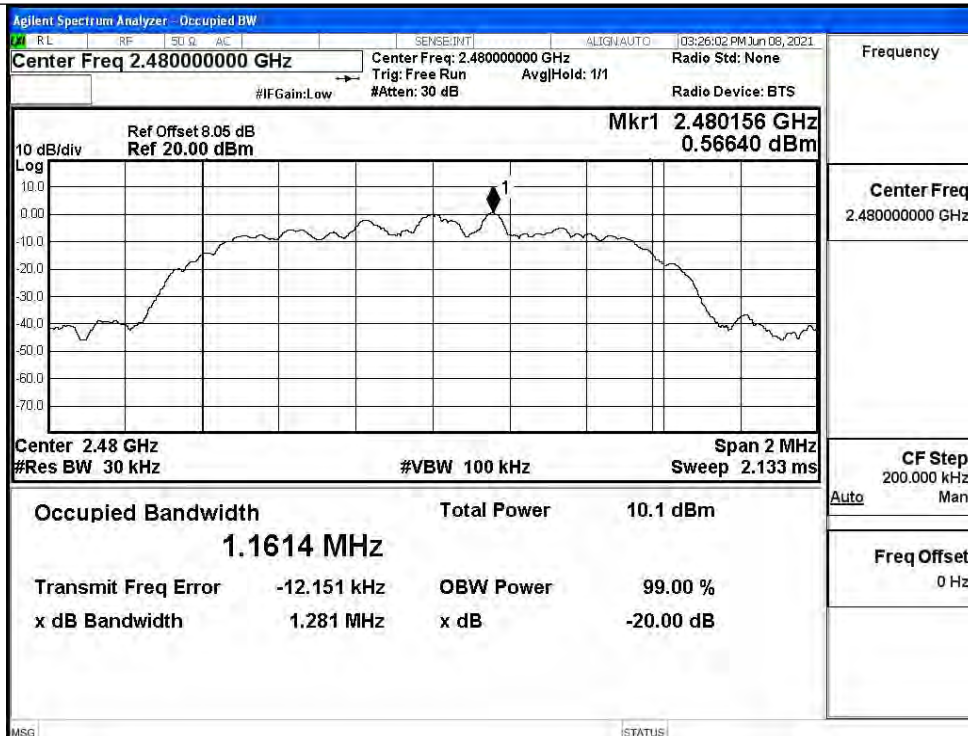
$\pi/4$ DQPSK/LCH



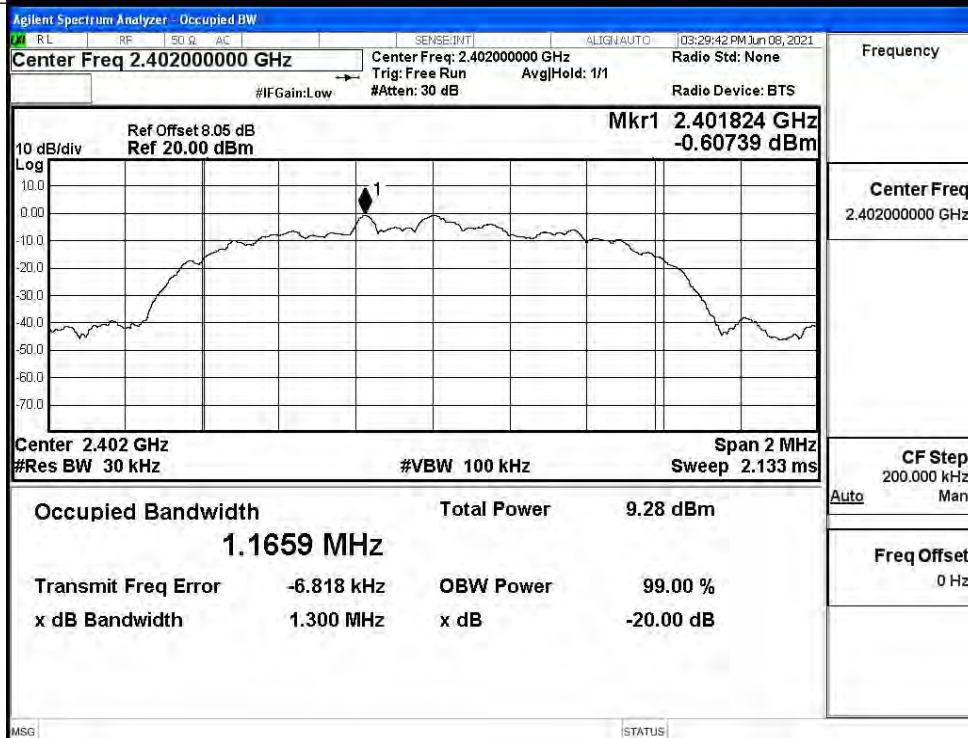
$\pi/4$ DQPSK/MCH



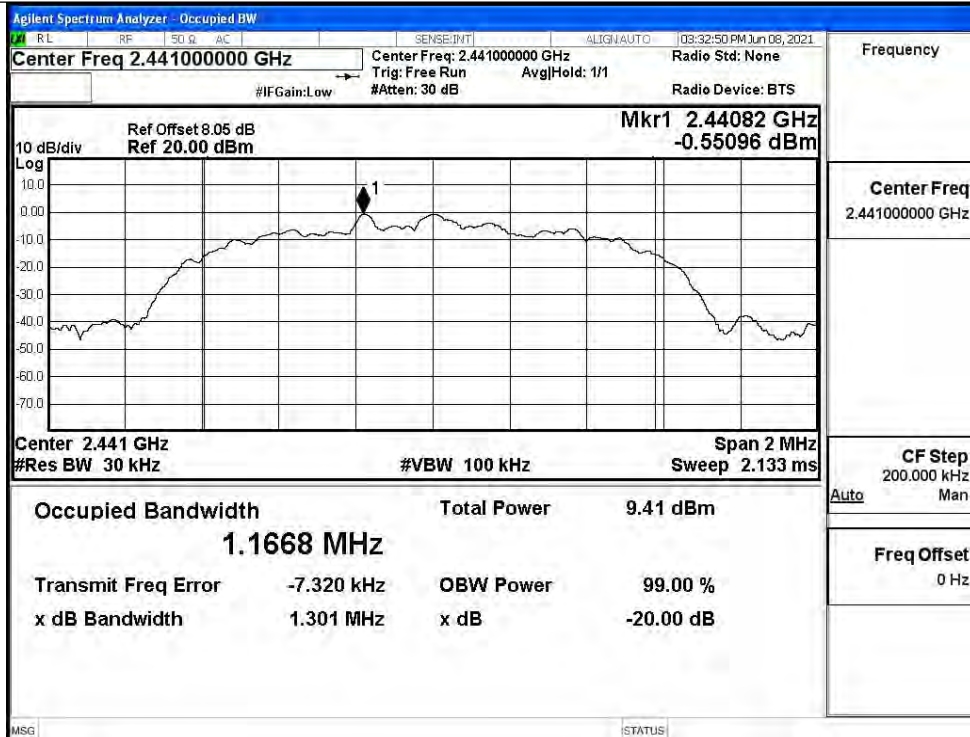
$\pi/4$ DQPSK/HCH



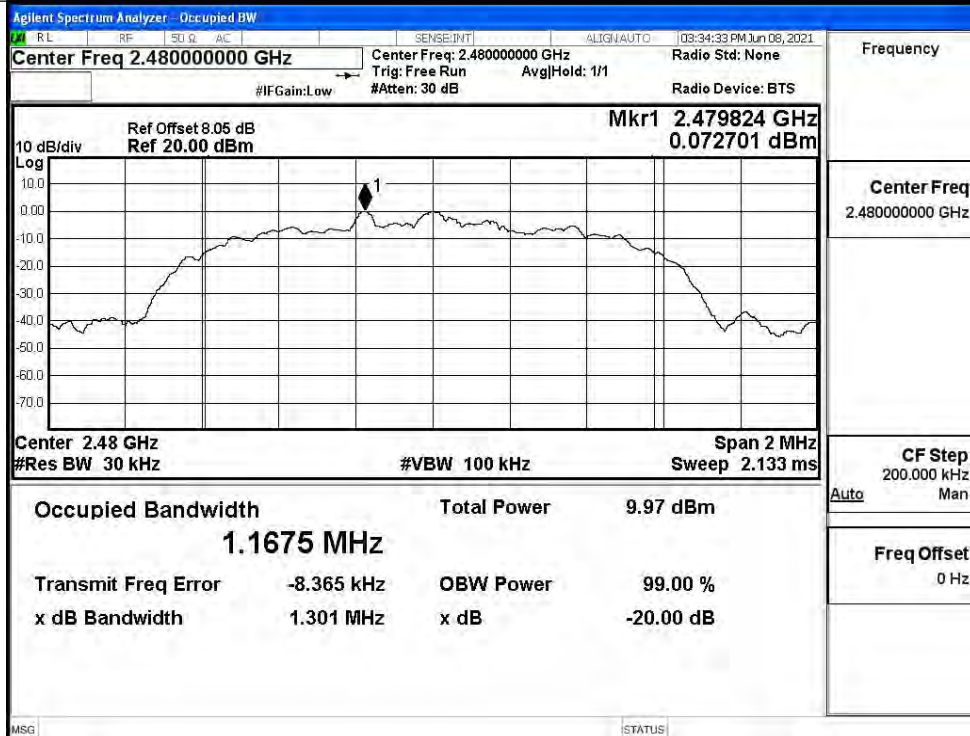
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

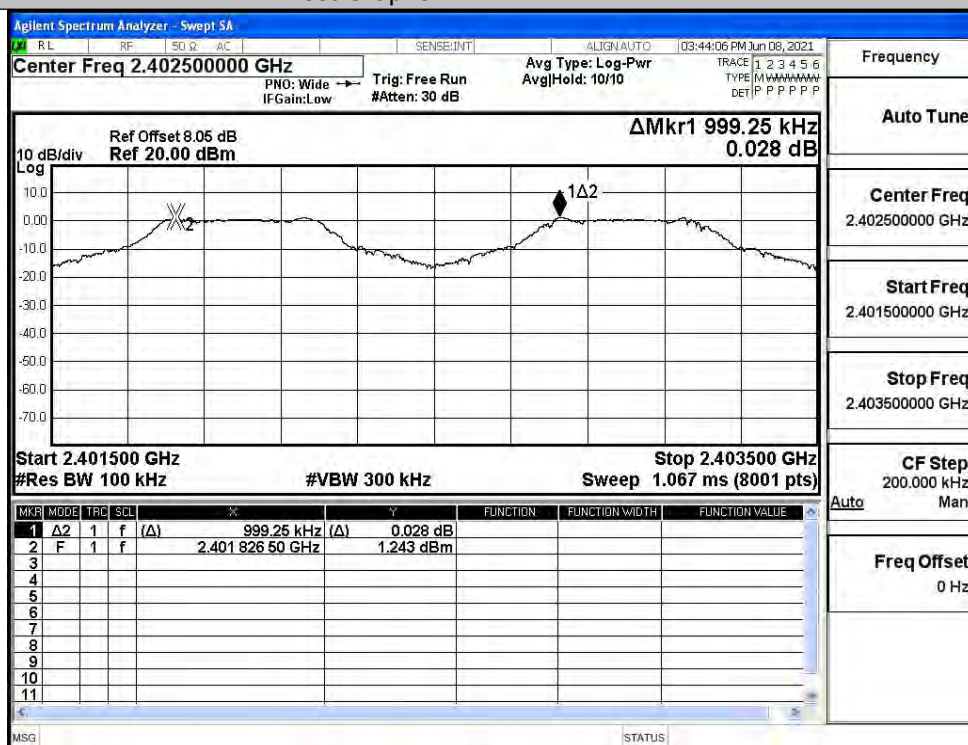


A.3 Carrier Frequency Separation

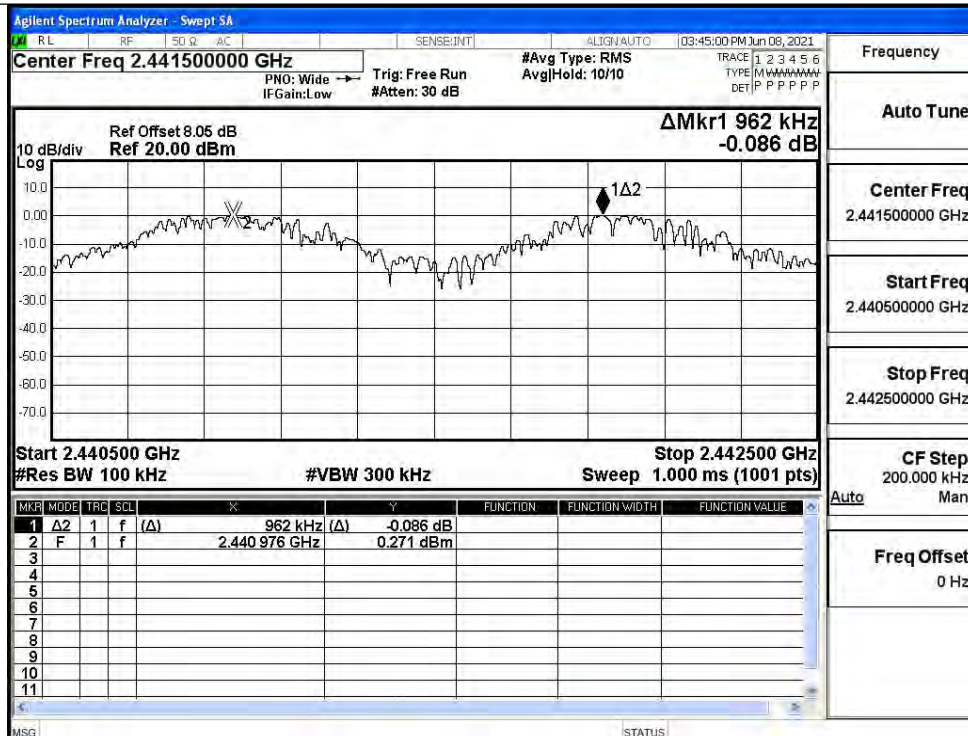
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.641	PASS
	MCH	0.962	0.640	PASS
	HCH	0.646	0.642	PASS
$\pi/4$ DQPSK	LCH	0.976	0.854	PASS
	MCH	1.022	0.855	PASS
	HCH	1.008	0.854	PASS
8DPSK	LCH	0.930	0.867	PASS
	MCH	1.348	0.867	PASS
	HCH	1.154	0.867	PASS

Test Graphs

GFSK/LCH



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

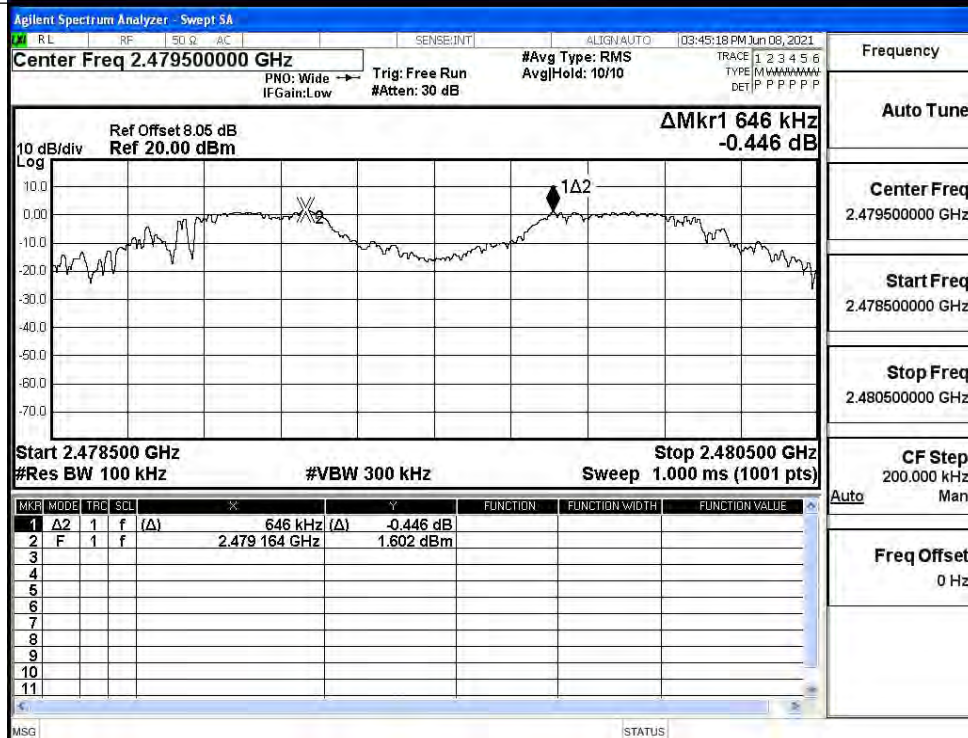
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

GFSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

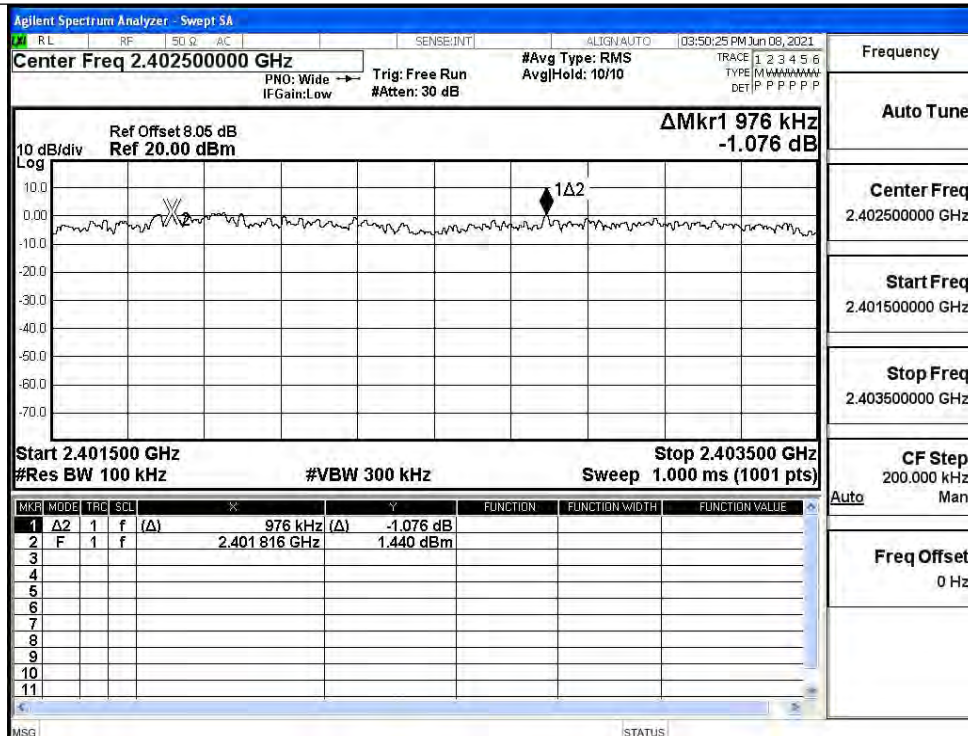
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

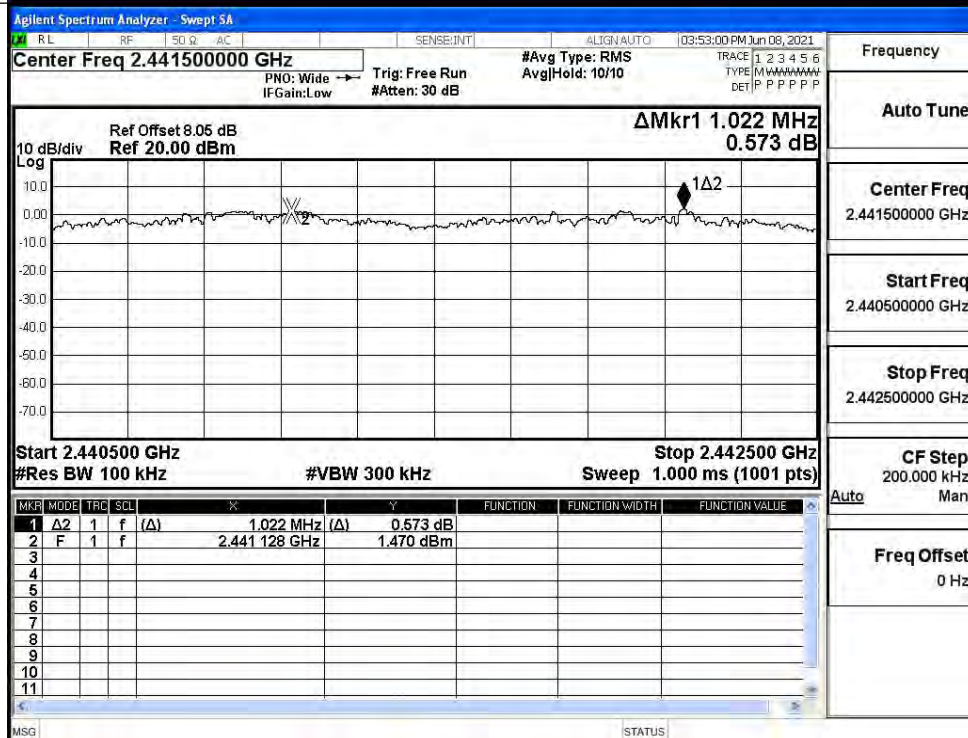
CF Step
200.000 kHz
Man

Freq Offset
0 Hz

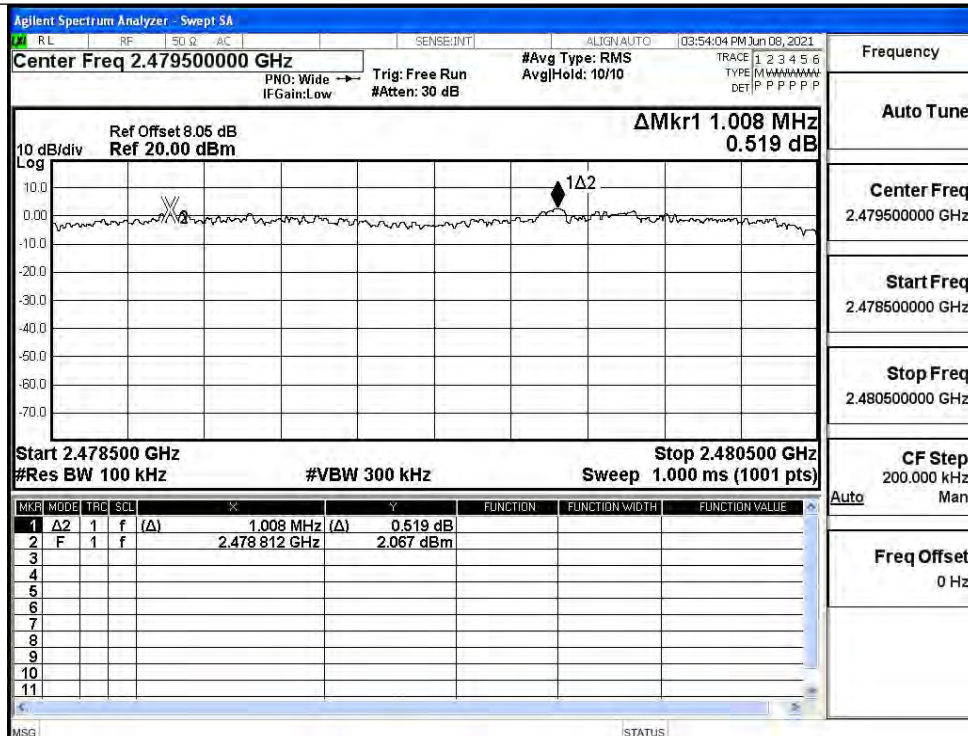
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



$\pi/4$ DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

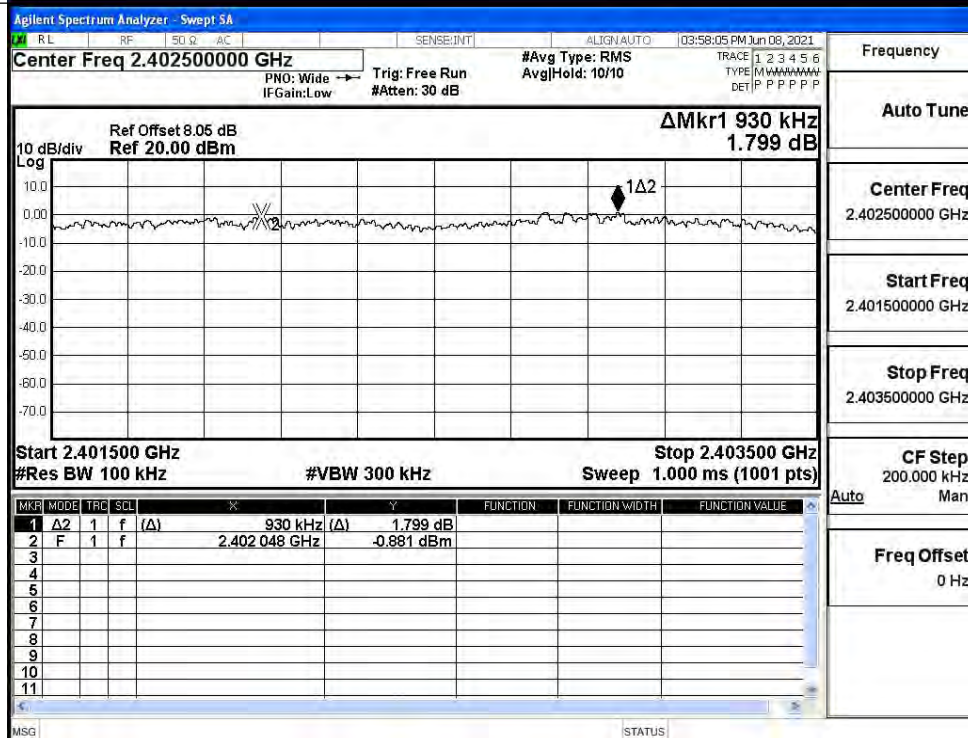
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

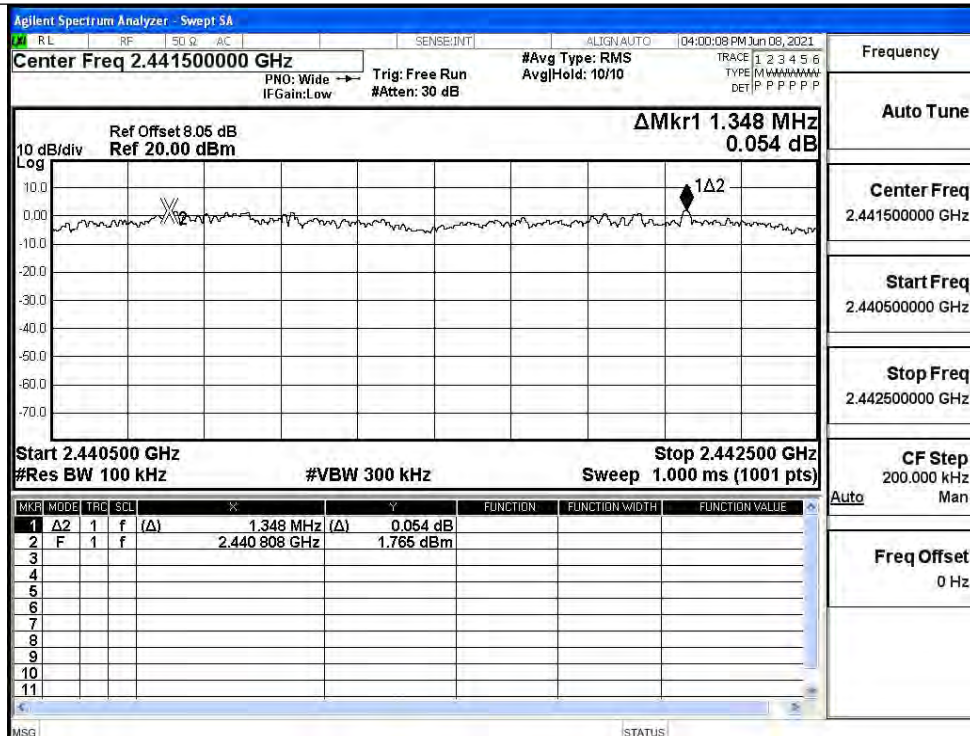
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

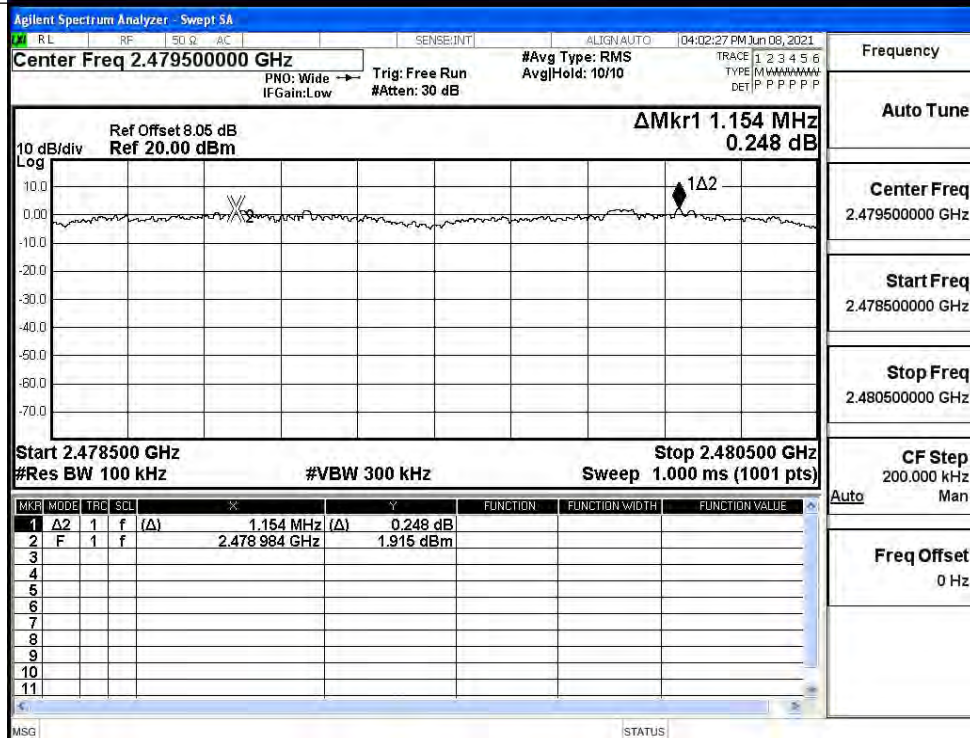
CF Step
200.000 kHz
Man

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH

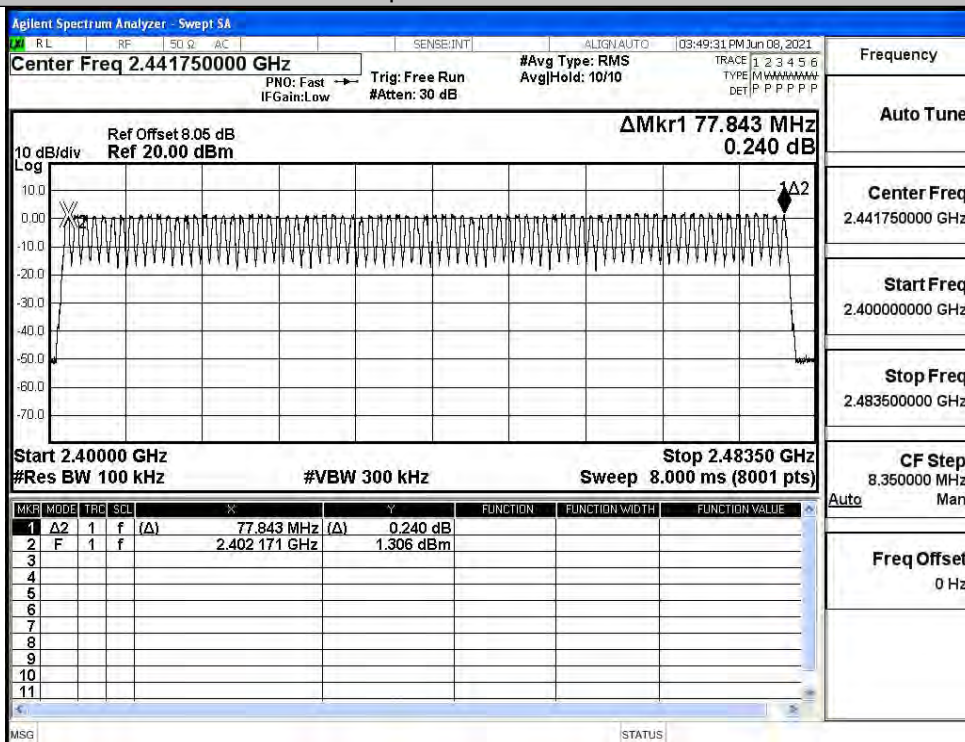
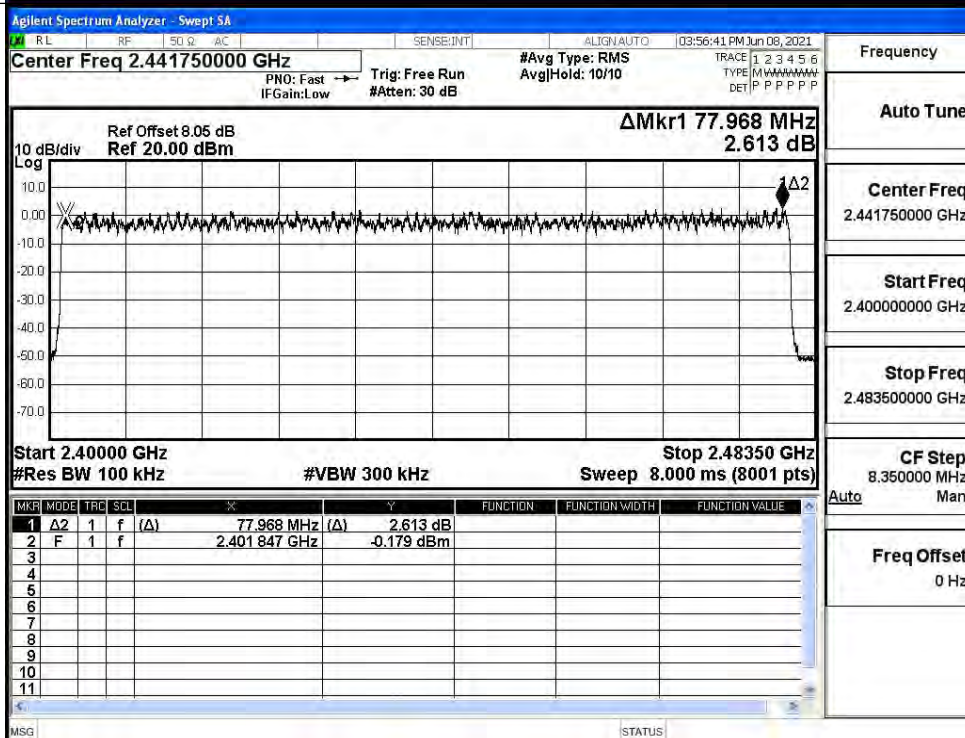


A.4 Hopping Channel Number

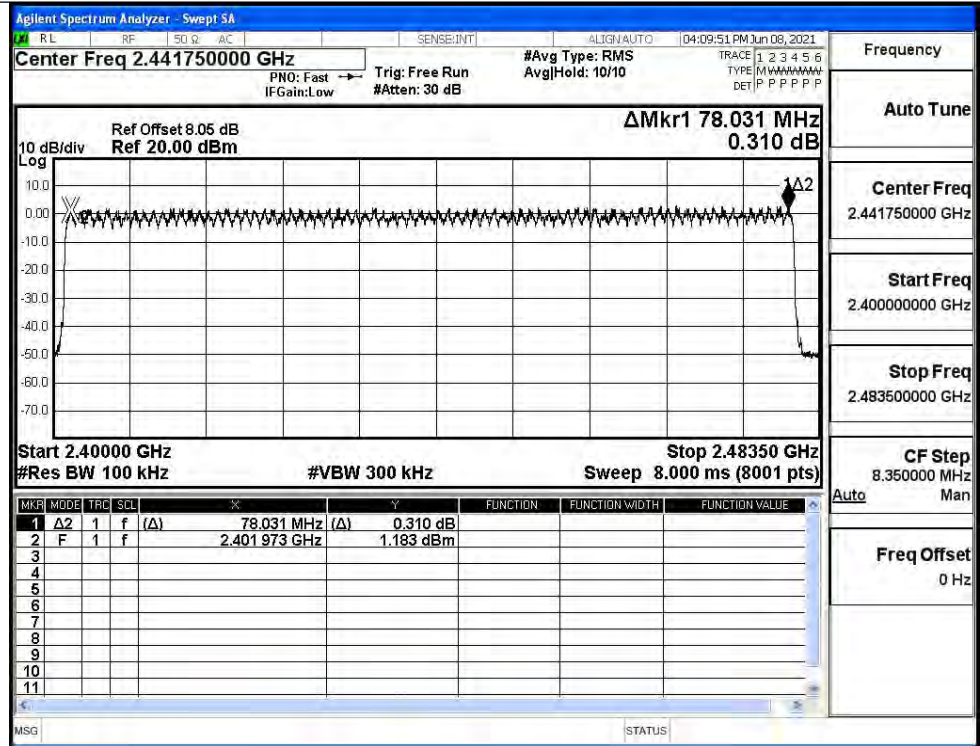
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

Test Graphs

GFSK/Hop

 $\pi/4$ DQPSK/Hop

8DPSK/Hop

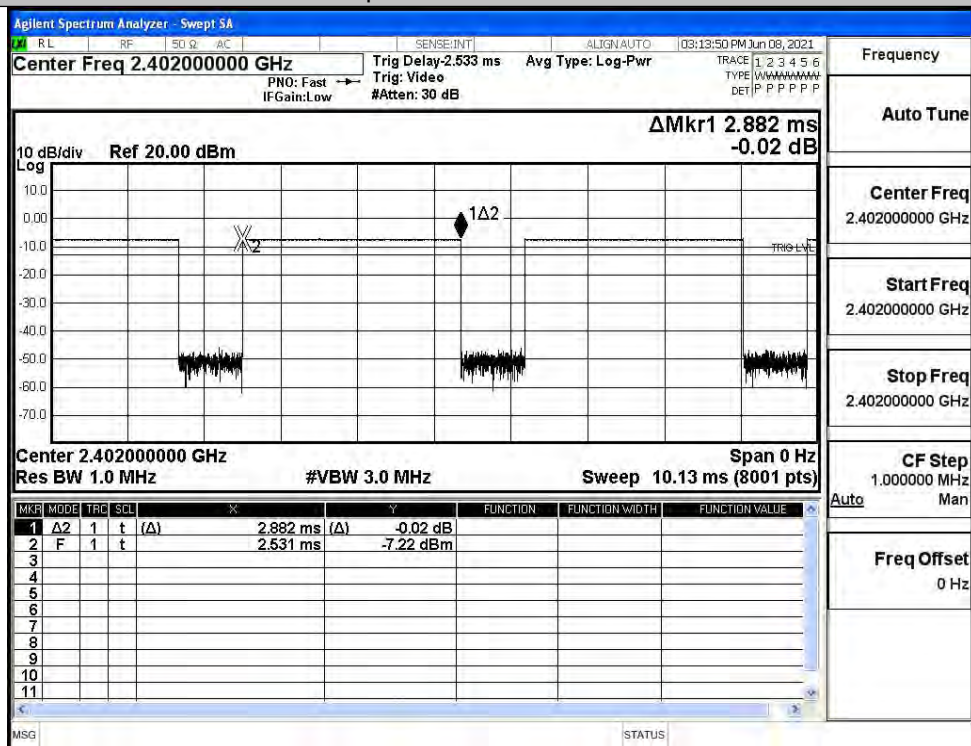


A.5 Dwell Time

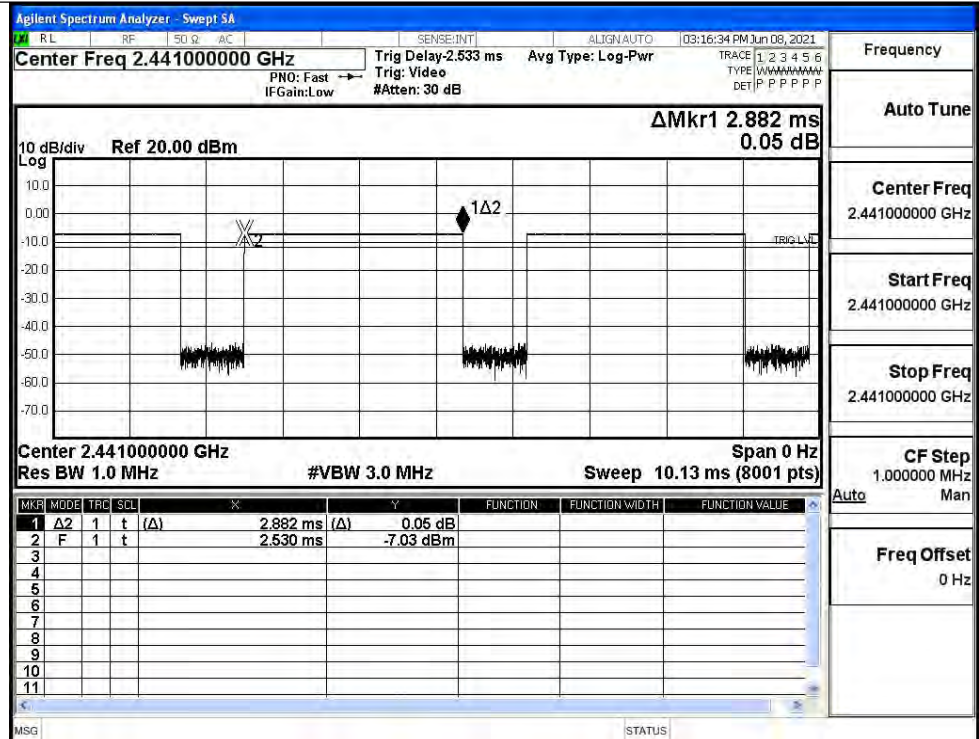
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.308	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.308	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

Test Graphs

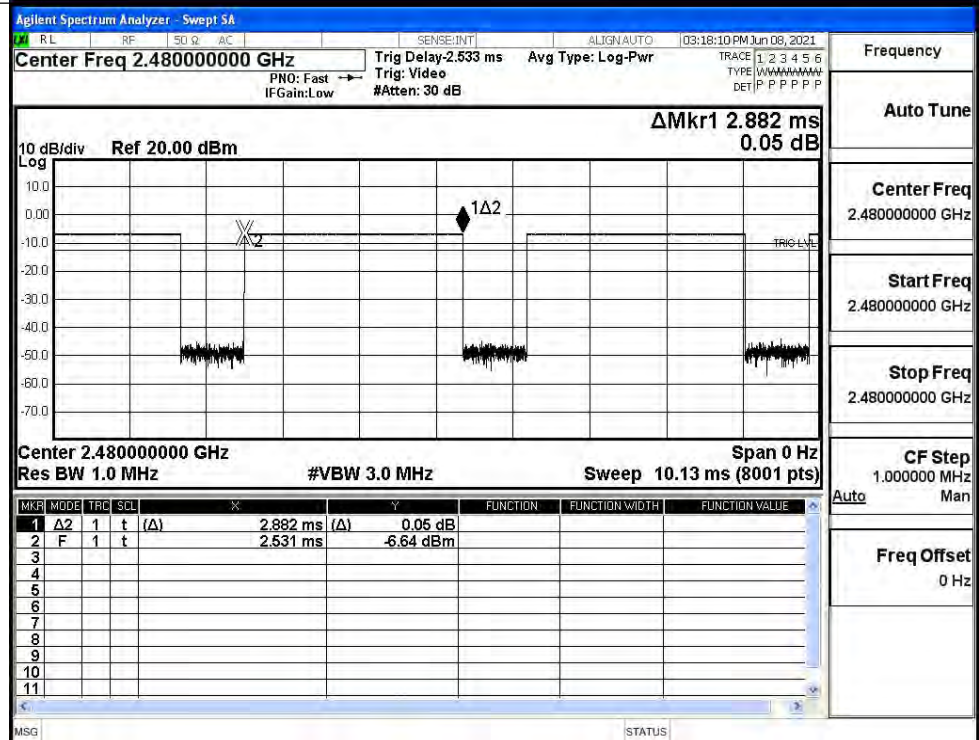
GFSK_DH5/LCH



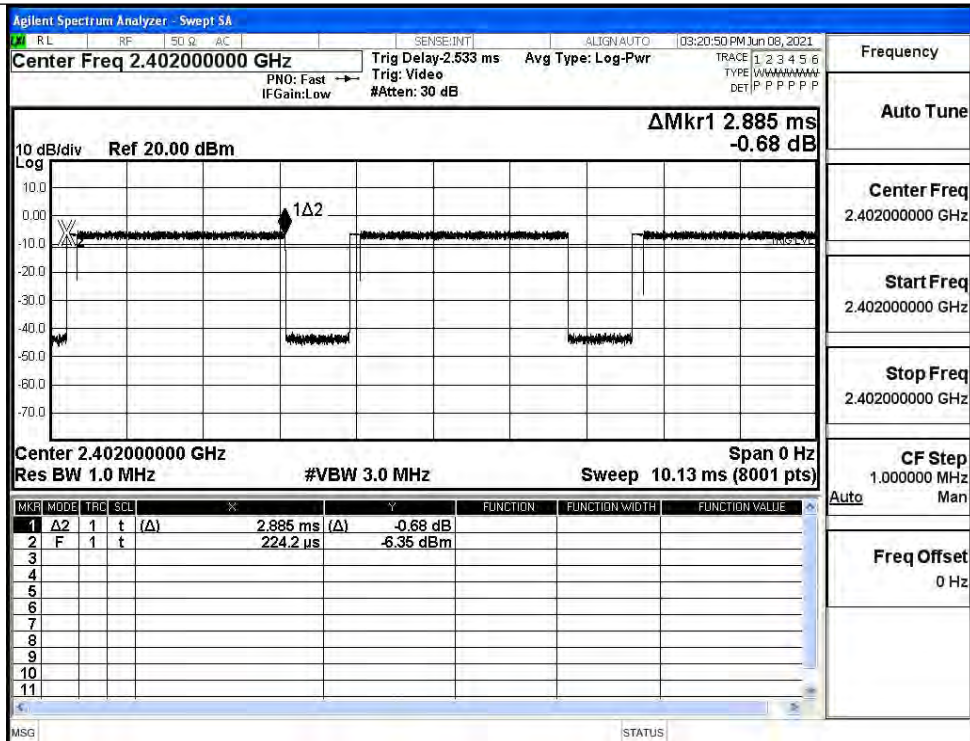
GFSK_DH5/MCH



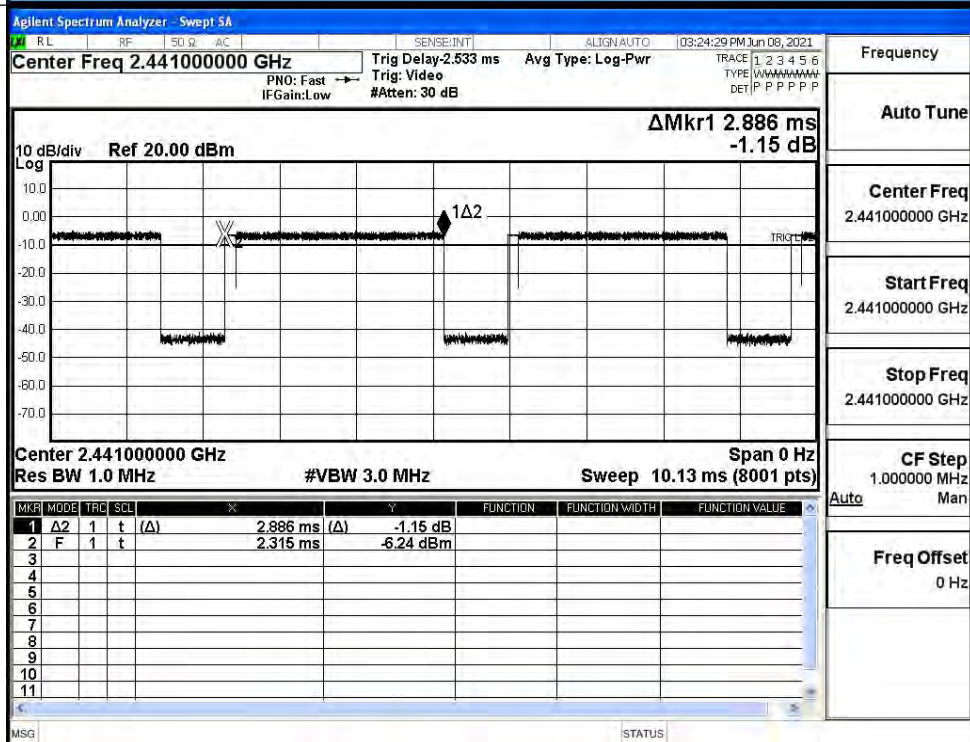
GFSK_DH5/HCH



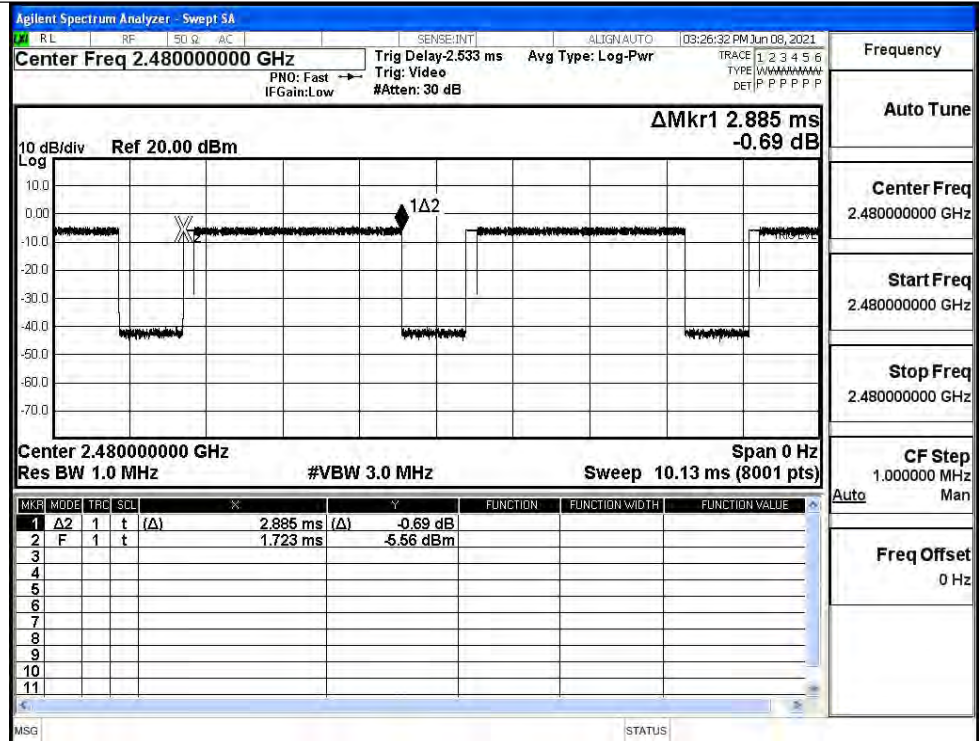
$\pi/4$ DQPSK
_2DH5/LCH



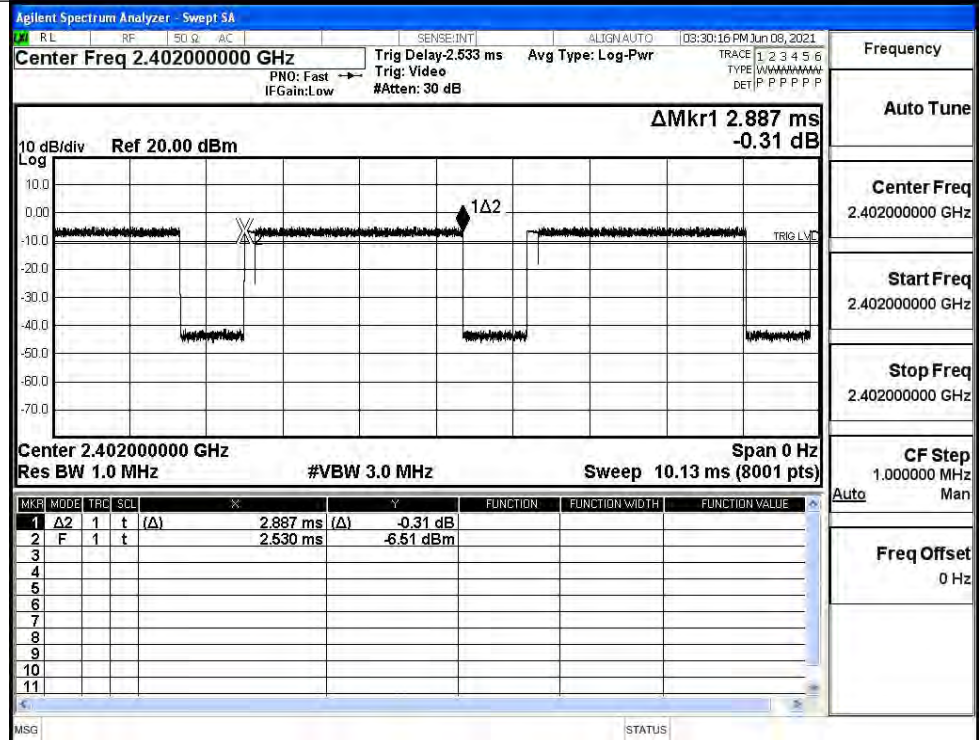
$\pi/4$ DQPSK
_2DH5/MCH



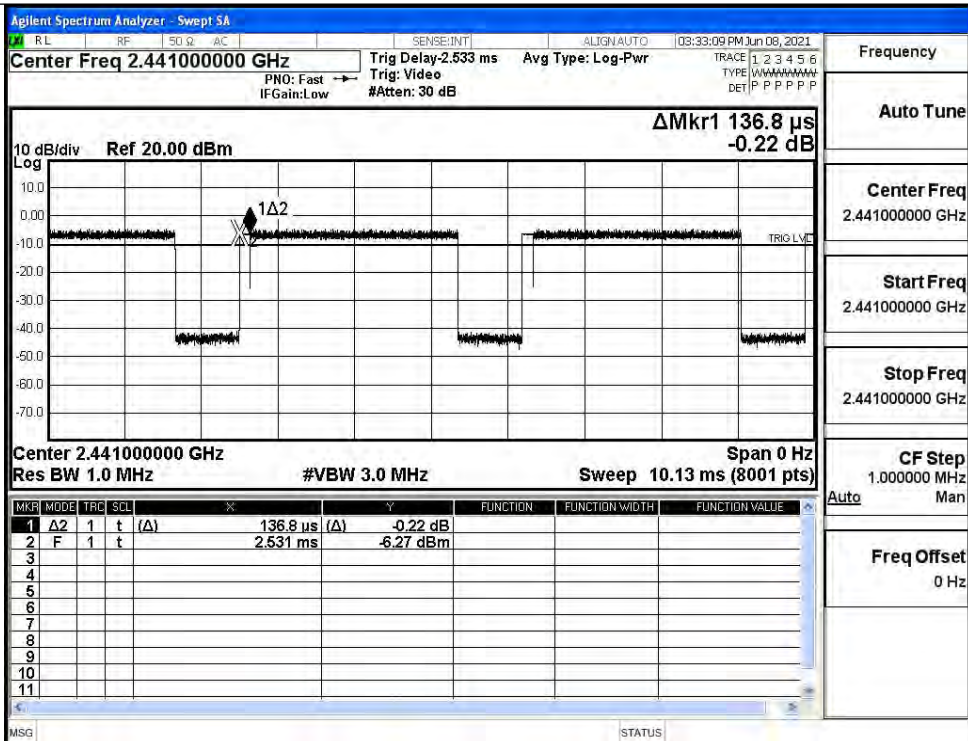
$\pi/4$ DQPSK
_2DH5/HCH



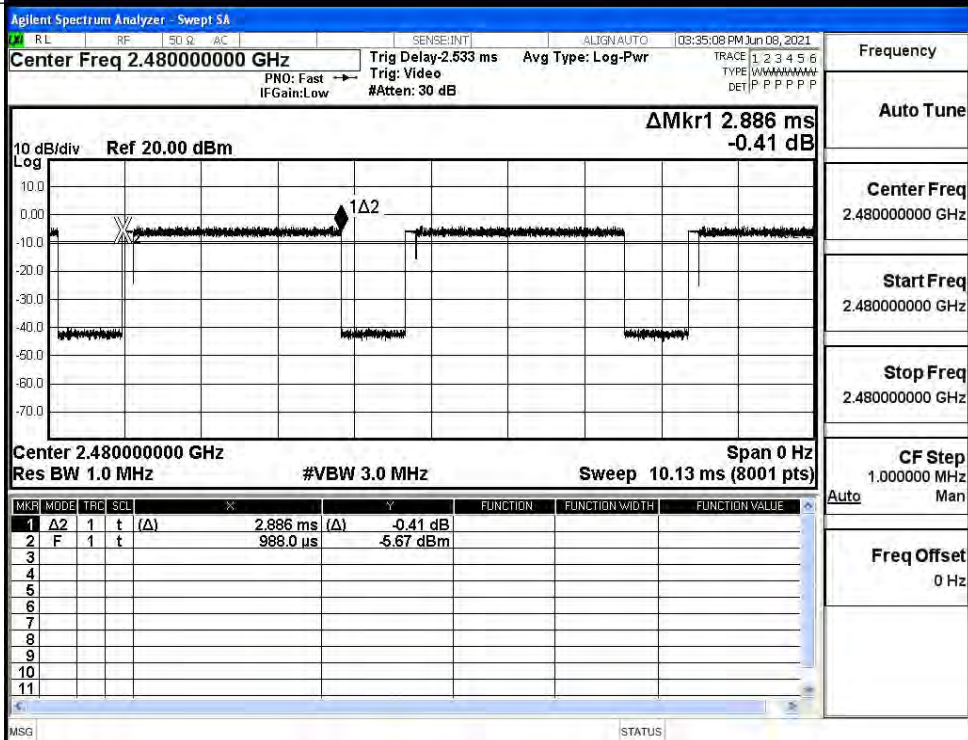
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

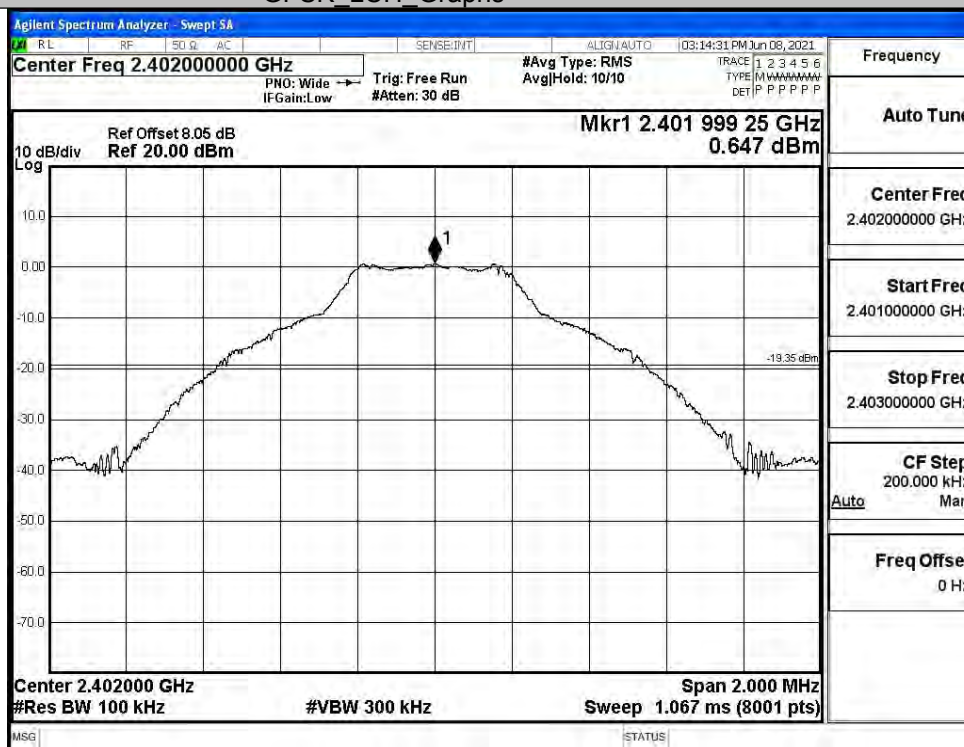


A.6 RF Conducted Spurious Emissions

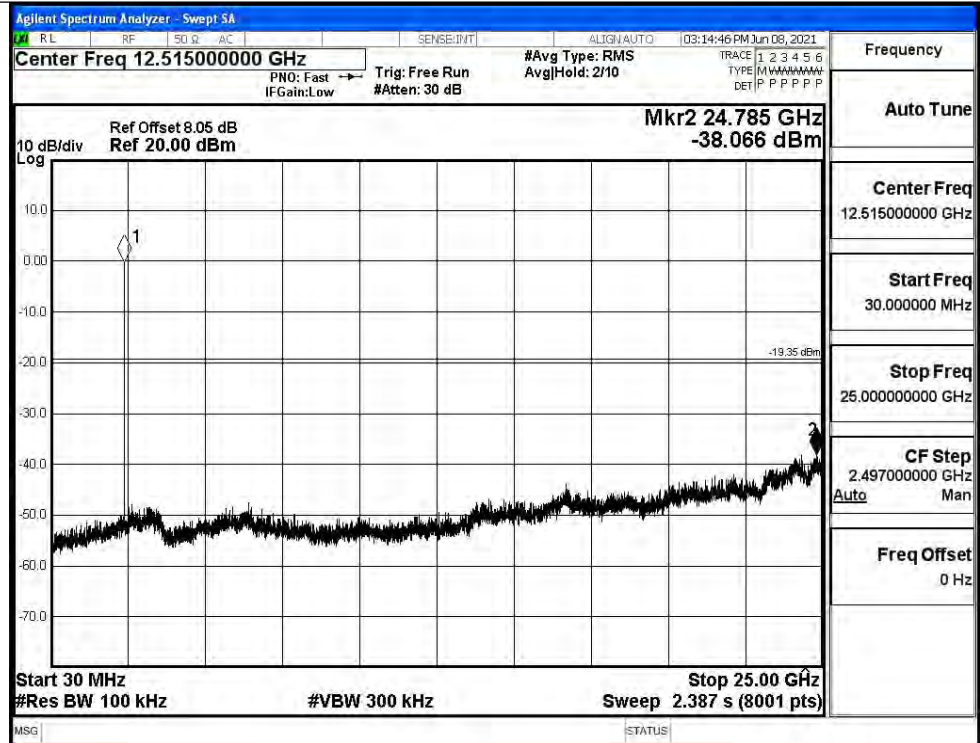
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.647	-38.066	-19.353	PASS
	MCH	0.917	-37.653	-19.083	PASS
	HCH	1.249	-36.369	-18.751	PASS
$\pi/4$ DQPSK	LCH	1.529	-37.852	-18.471	PASS
	MCH	1.727	-37.173	-18.273	PASS
	HCH	2.369	-37.023	-17.631	PASS
8DPSK	LCH	1.467	-36.642	-18.533	PASS
	MCH	2.135	-38.304	-17.865	PASS
	HCH	2.713	-37.825	-17.287	PASS

GFSK LCH Graphs

Pref

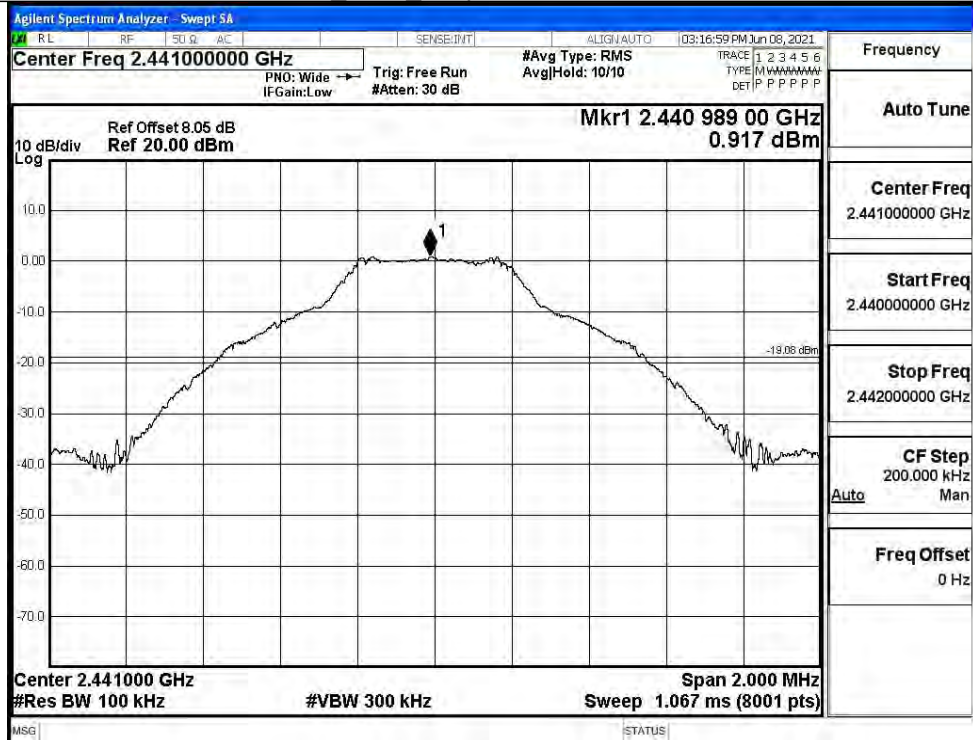


Puw

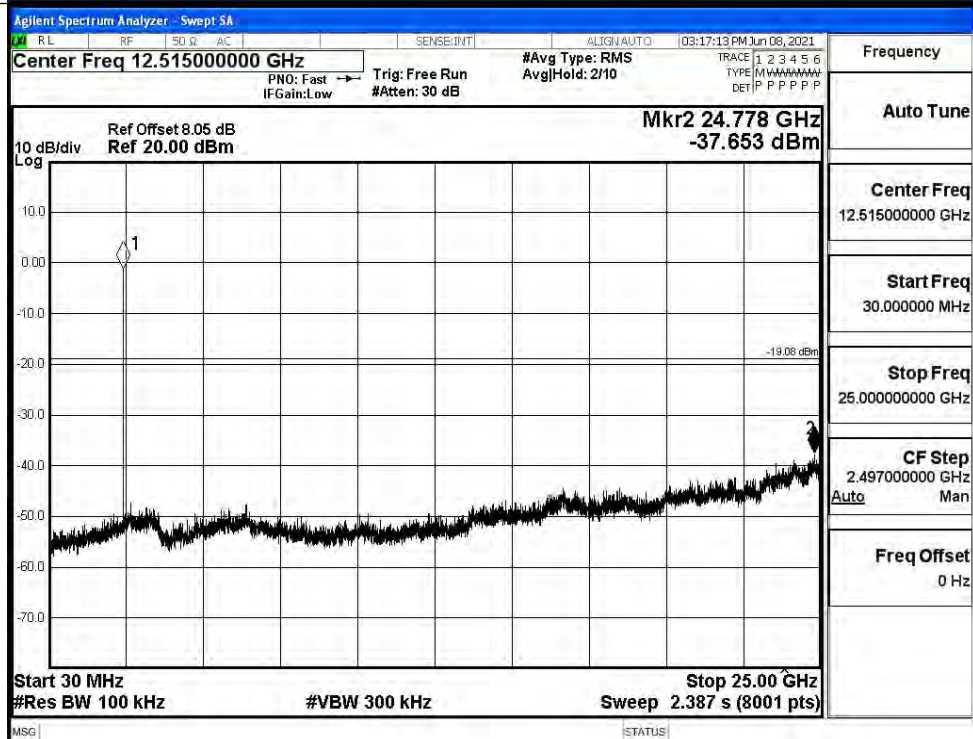


GFSK_MCH_Graphs

Pref

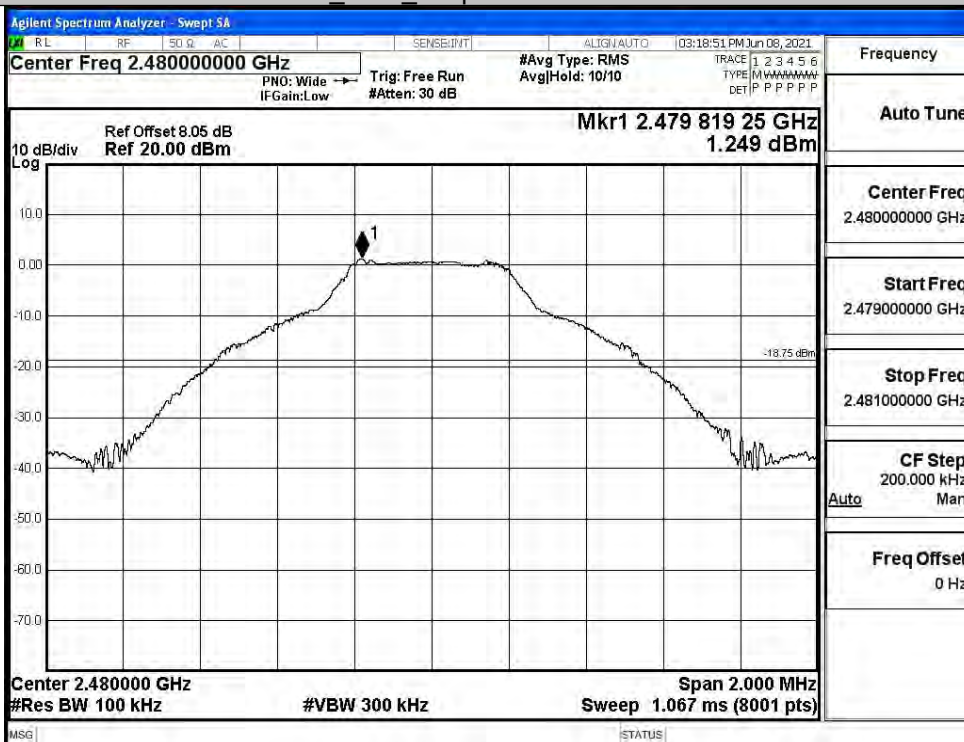


Puw

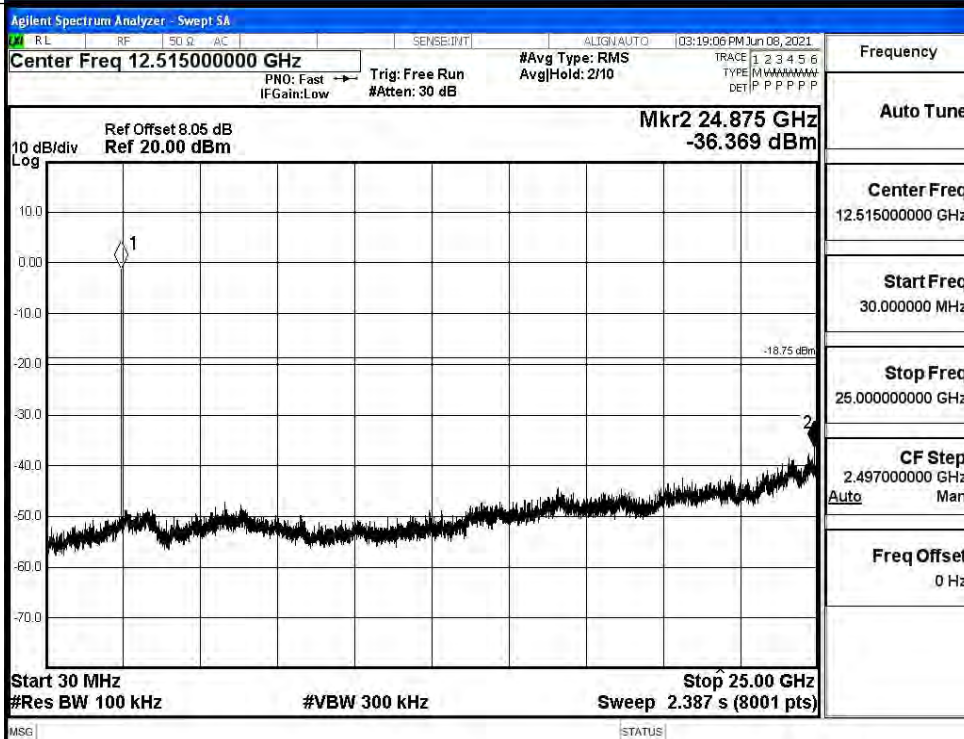


GFSK_HCH_Graphs

Pref

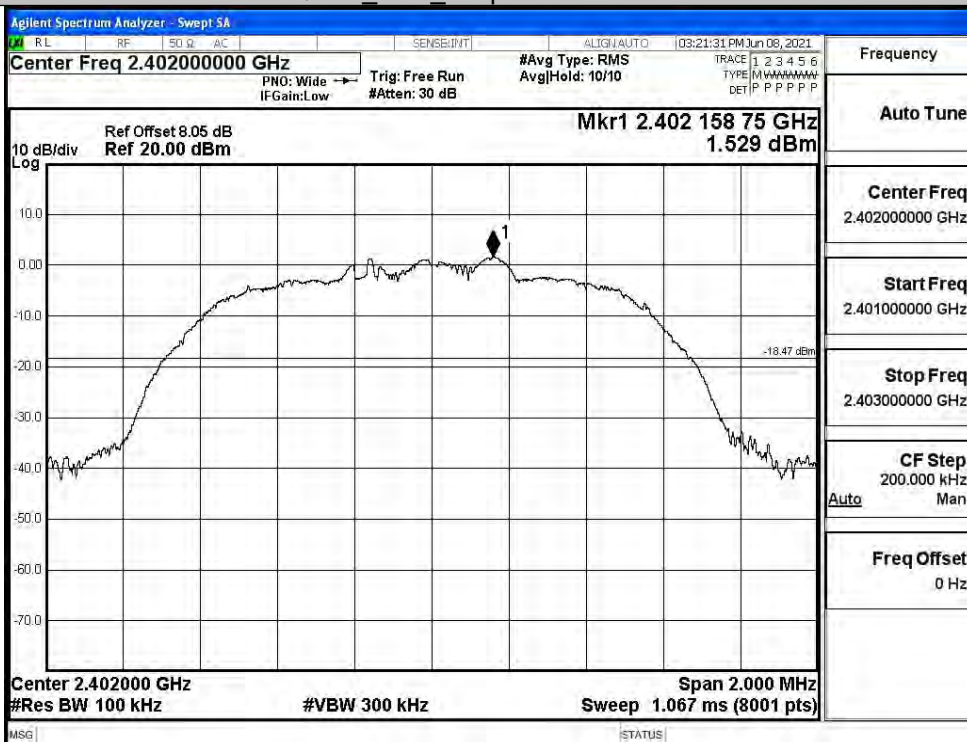


Puw

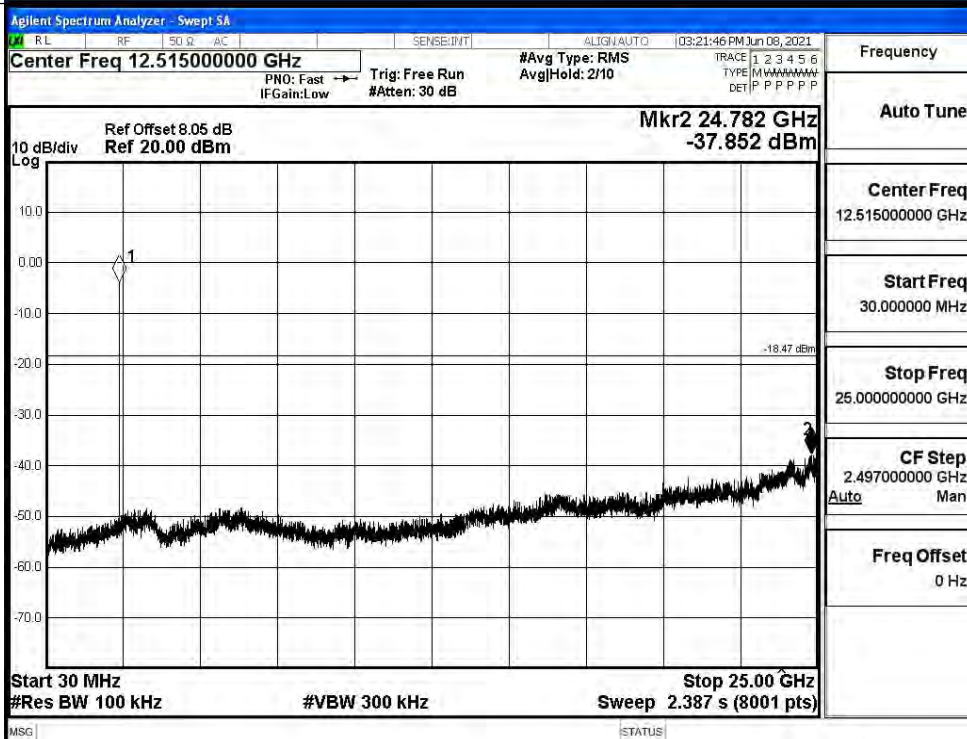


$\pi/4$ DQPSK_LCH_Graphs

Pref

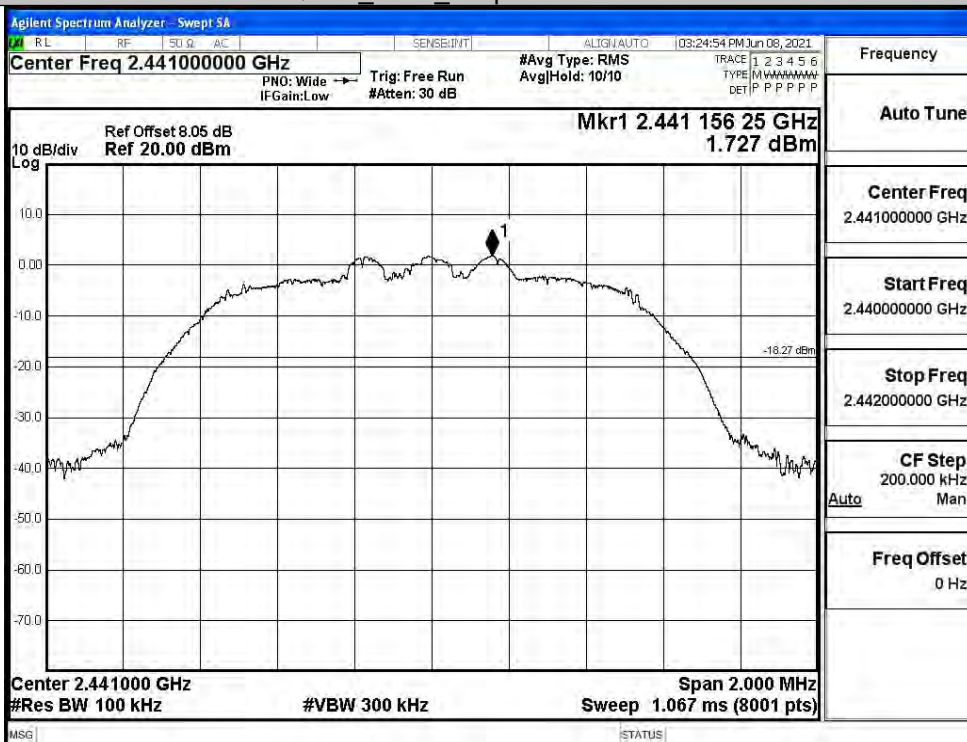


Puw

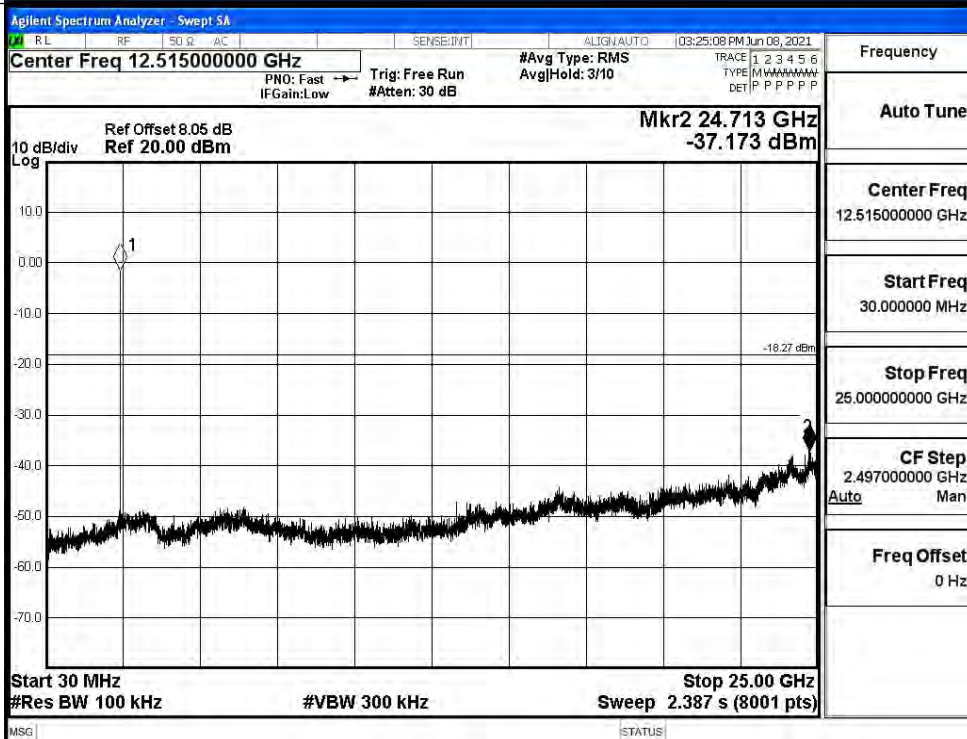


$\pi/4$ DQPSK_MCH_Graphs

Pref

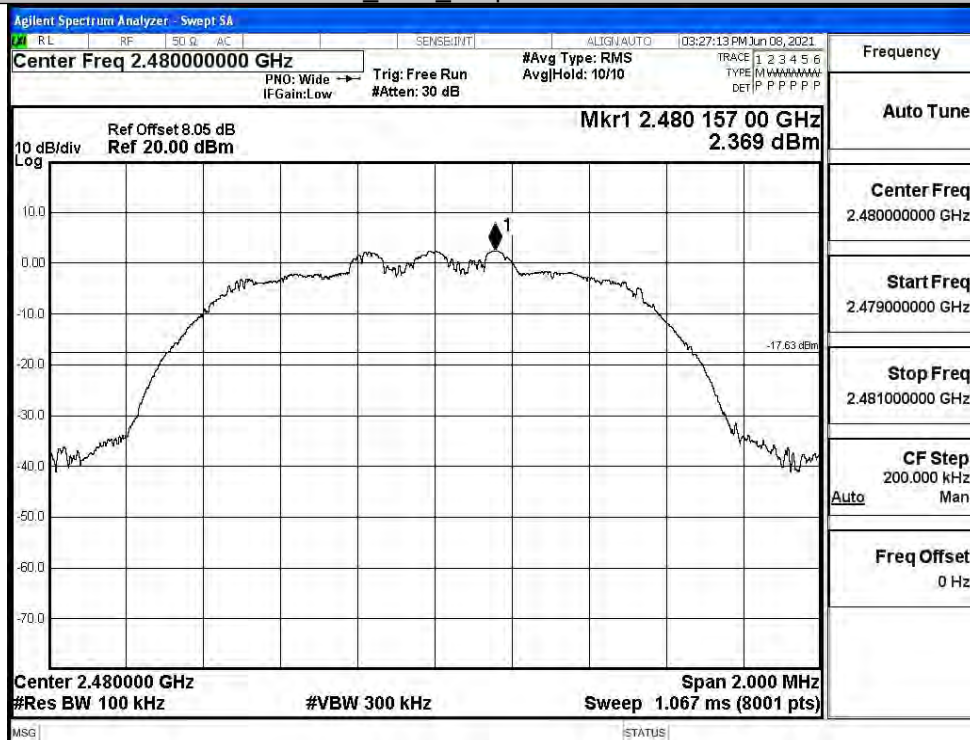


Puw

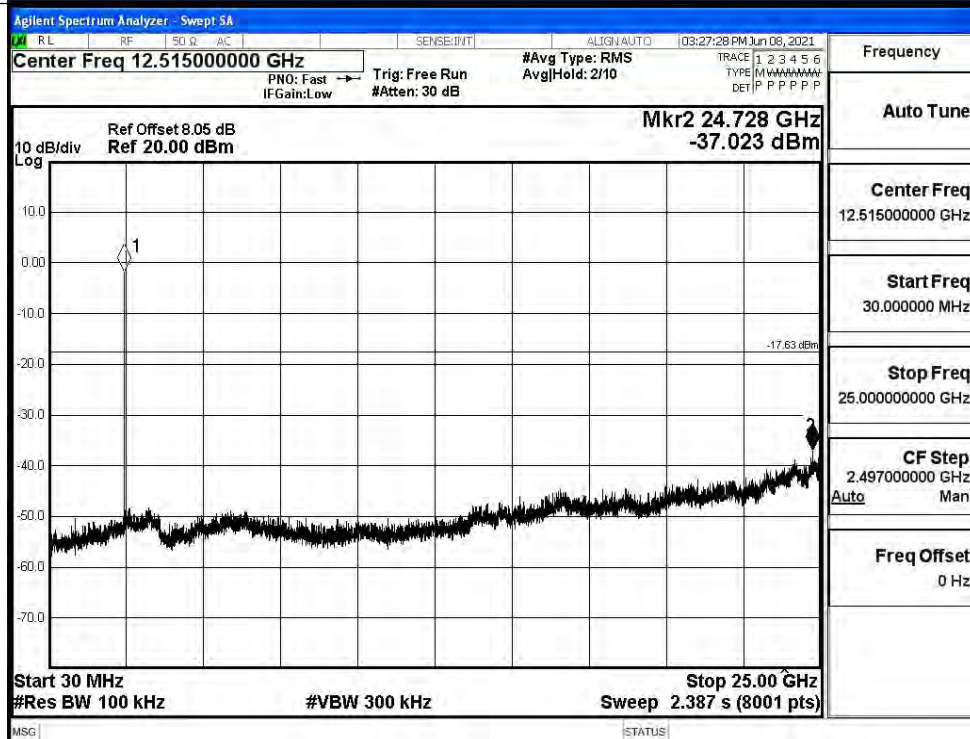


$\pi/4$ DQPSK_HCH_Graphs

Pref

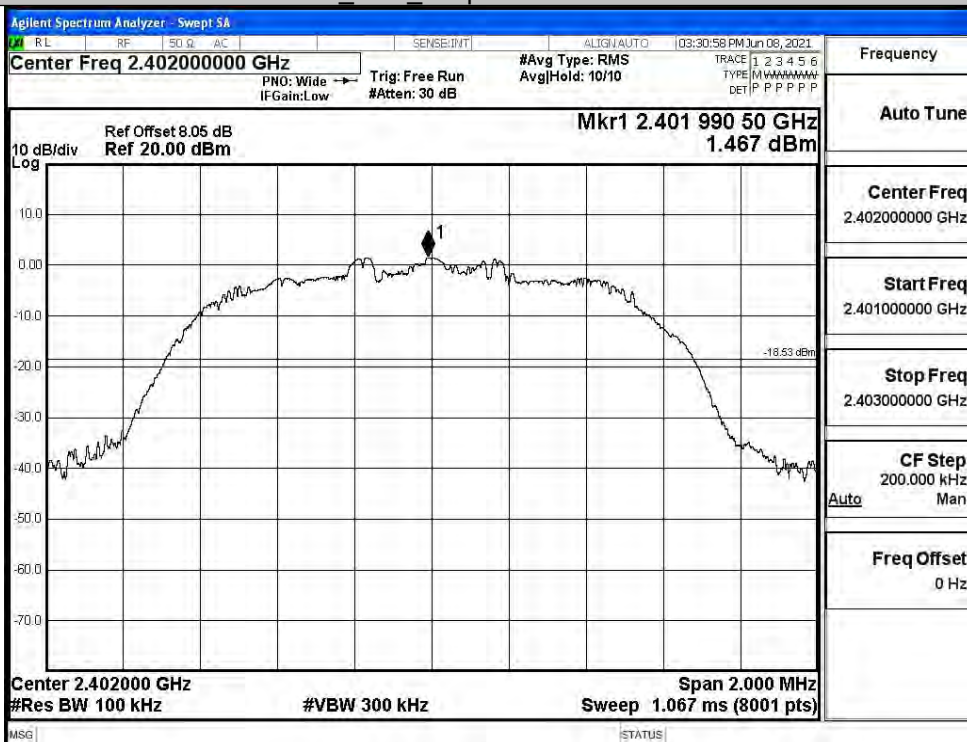


Puw

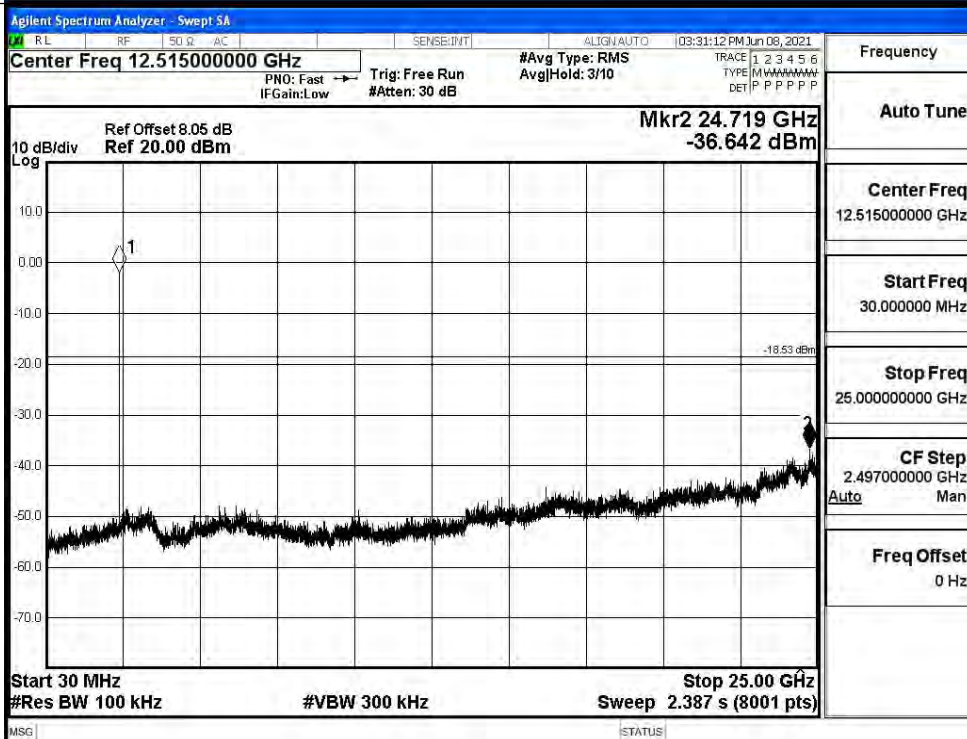


8DPSK_LCH_Graphs

Pref

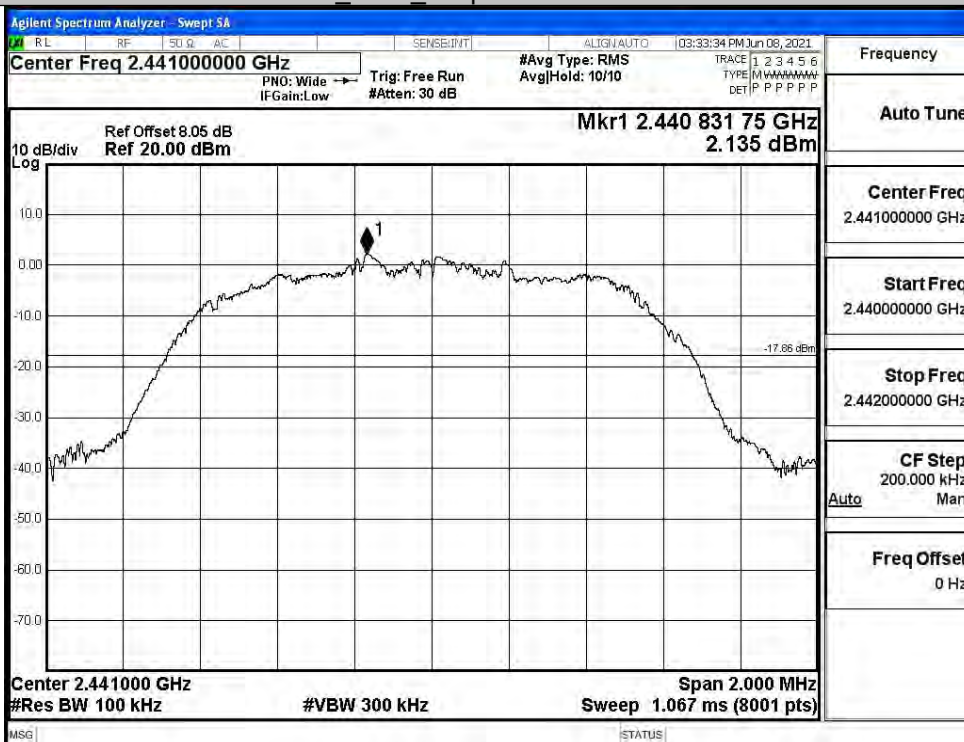


Puw



8DPSK_MCH_Graphs

Pref

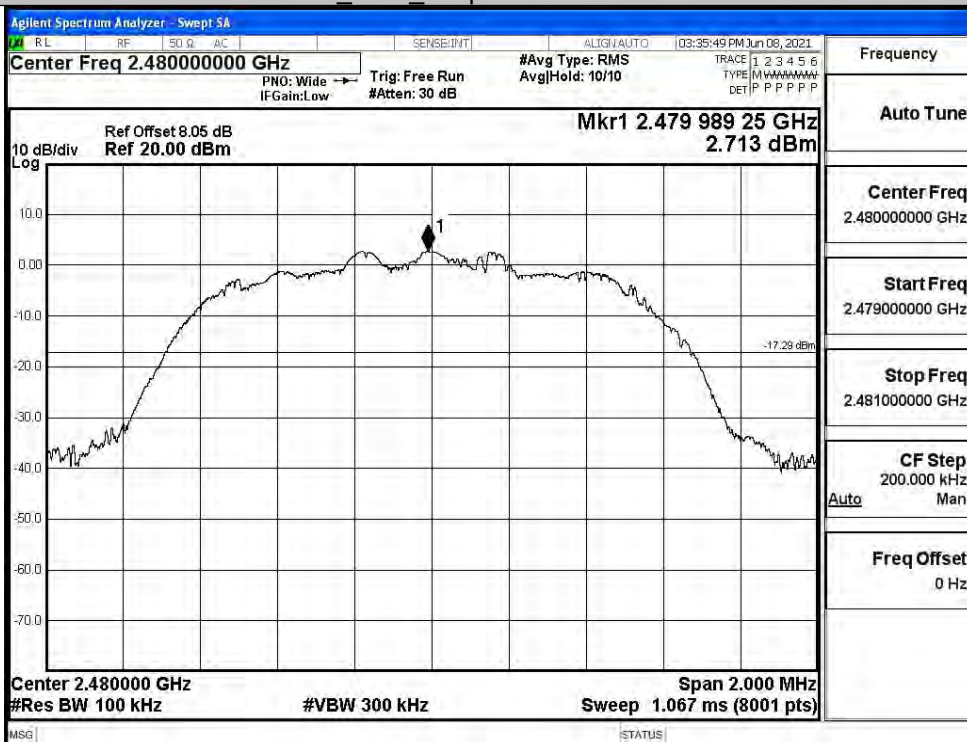


Puw

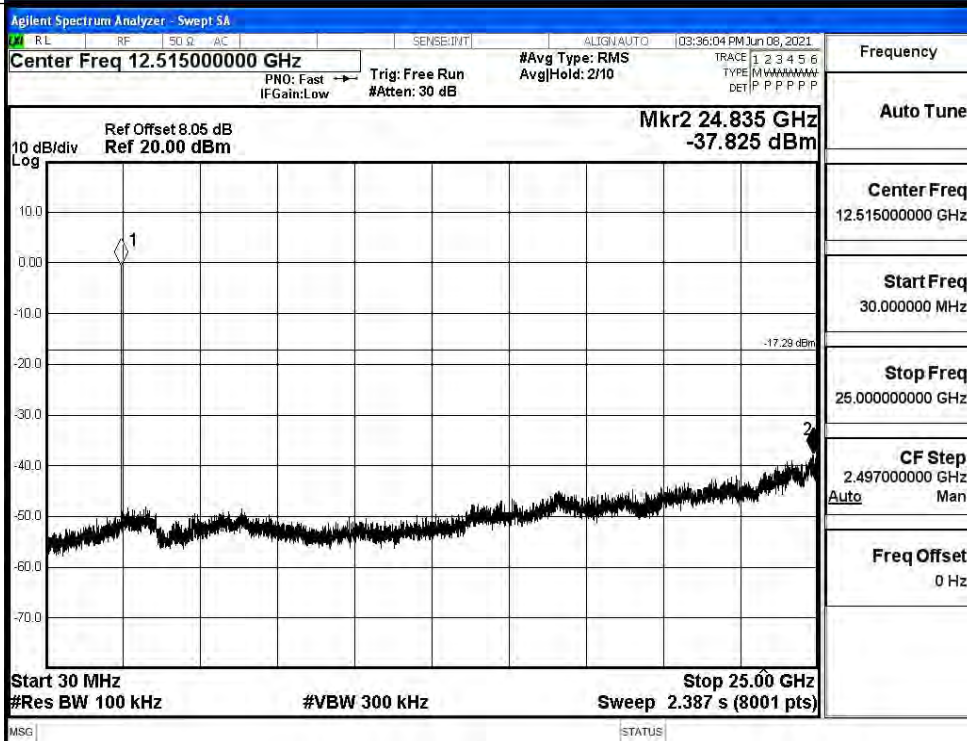


8DPSK_HCH_Graphs

Pref



Puw

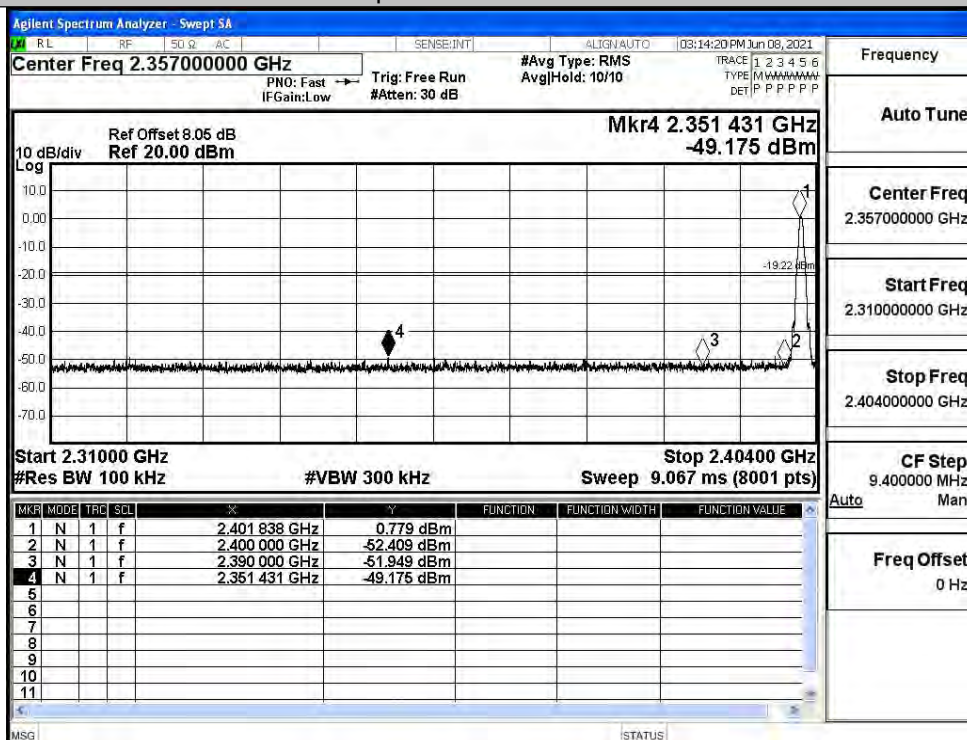


A.7 Band-edge for RF Conducted Emissions

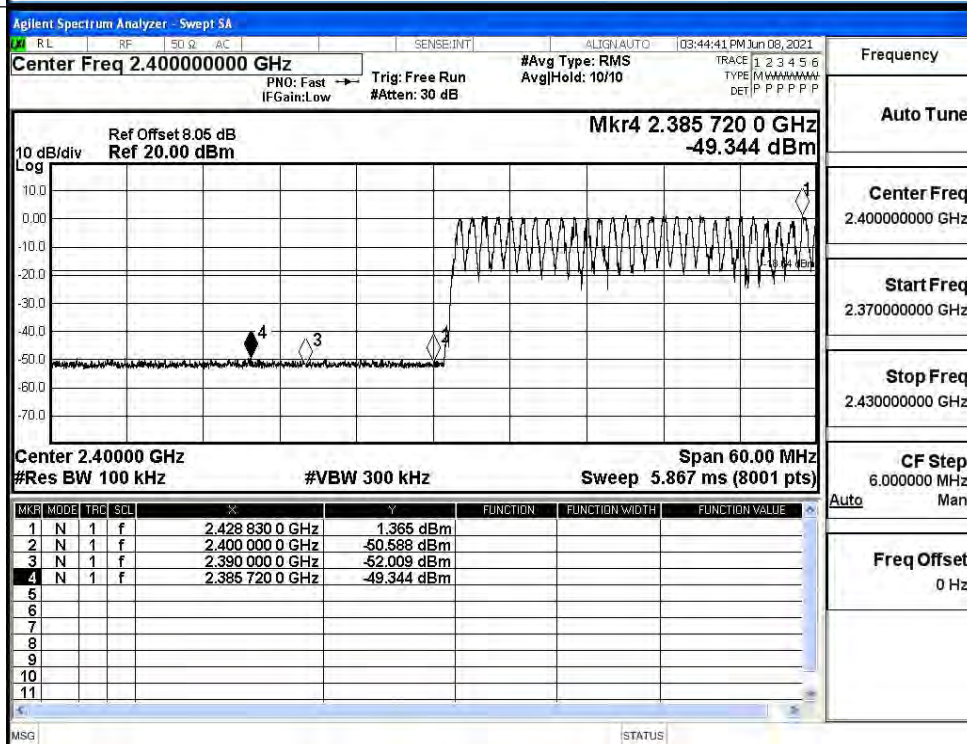
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.779	Off	-49.175	-19.22	PASS
			1.365	On	-49.344	-18.64	PASS
	HCH	2480	1.417	Off	-49.221	-18.58	PASS
			1.948	On	-48.623	-18.05	PASS
$\pi/4$ DQPSK	LCH	2402	1.620	Off	-49.720	-18.38	PASS
			1.968	On	-49.225	-18.03	PASS
	HCH	2480	2.374	Off	-48.664	-17.63	PASS
			2.509	On	-48.241	-17.49	PASS
8DPSK	LCH	2402	1.504	Off	-49.446	-18.5	PASS
			1.834	On	-49.180	-18.17	PASS
	HCH	2480	2.806	Off	-48.915	-17.19	PASS
			2.659	On	-47.956	-17.34	PASS

Test Graphs

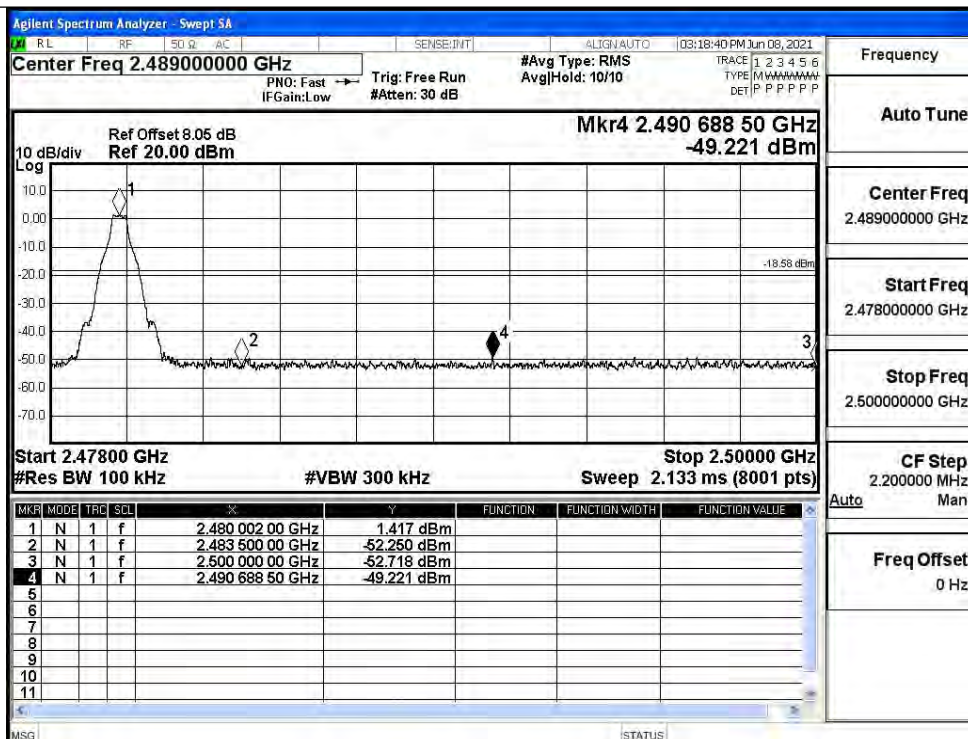
GFSK/LCH/No Hop



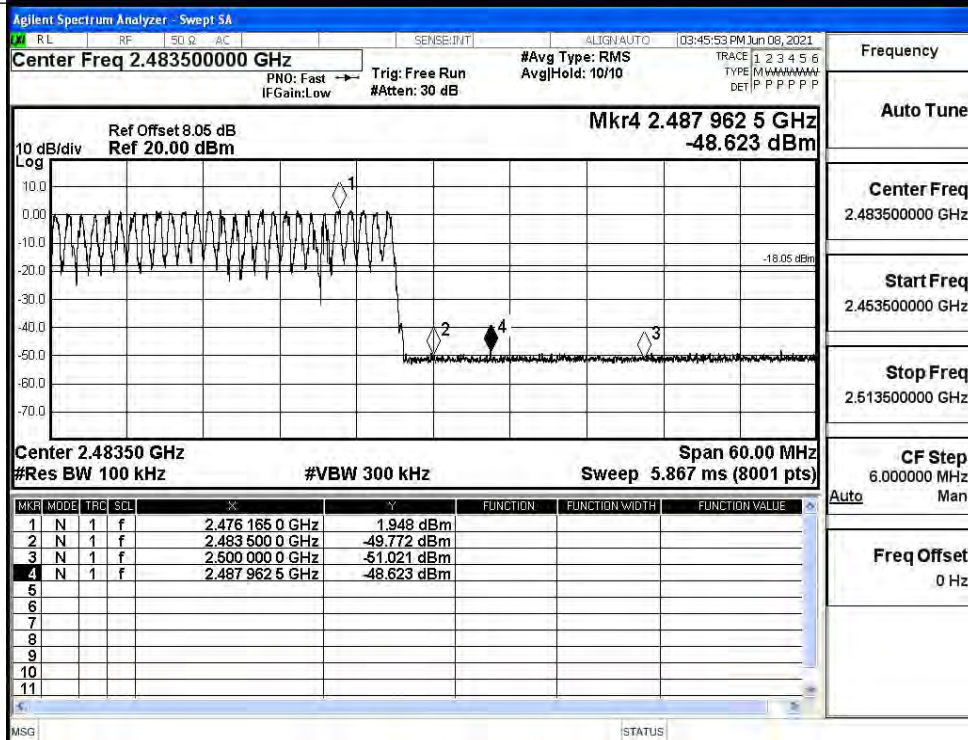
GFSK/LCH/Hop



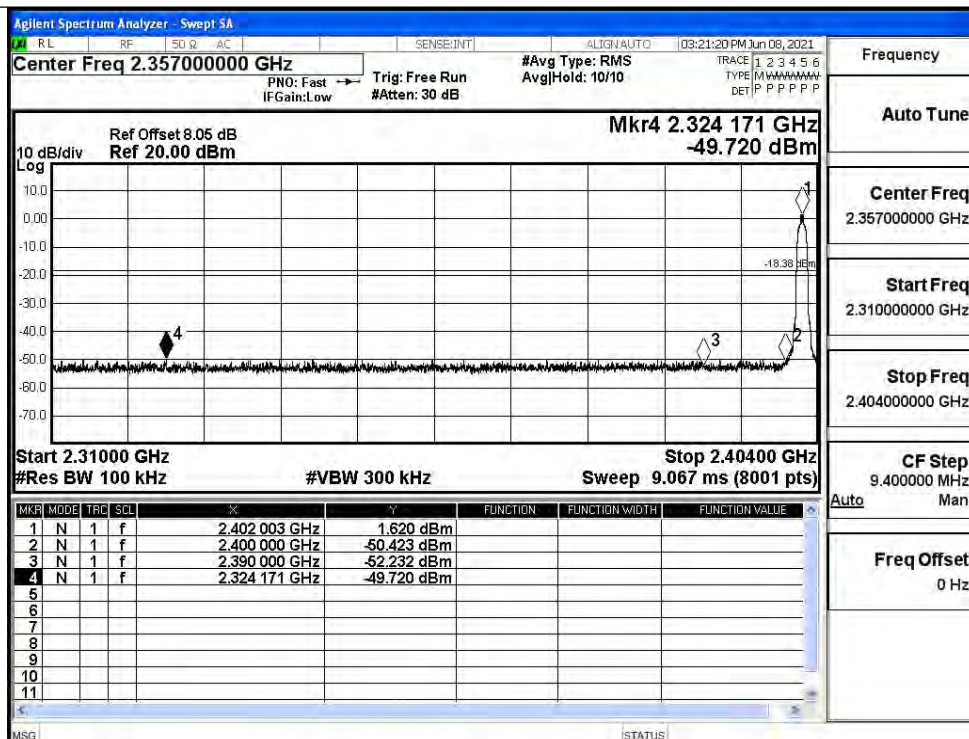
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

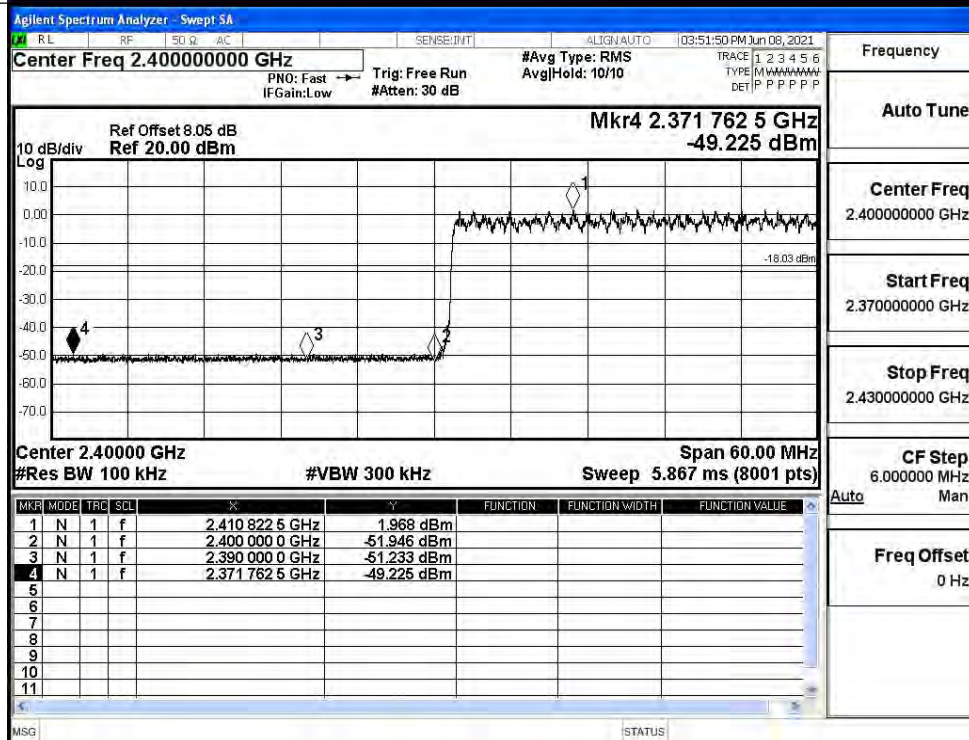
Start Freq
2.310000000 GHz

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

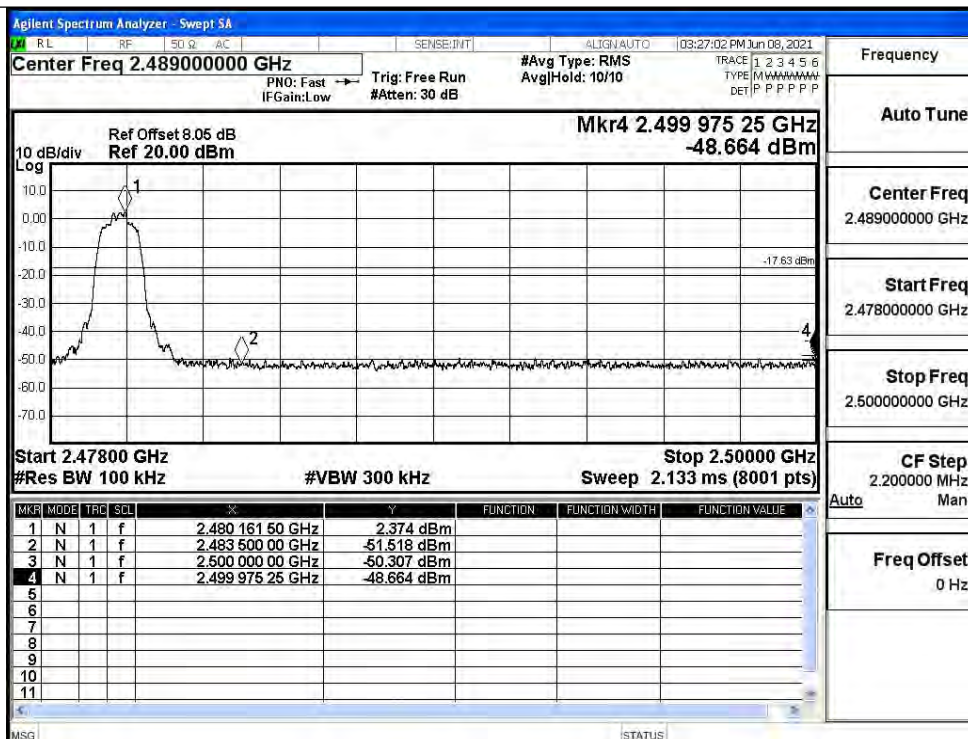
Start Freq
2.370000000 GHz

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

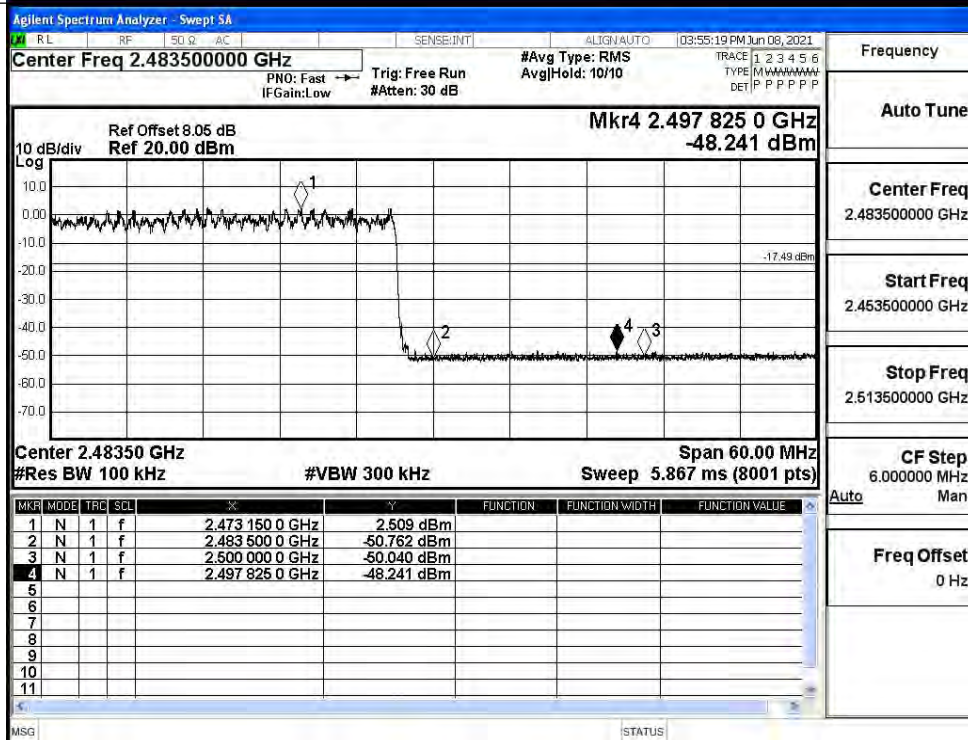
Start Freq
2.478000000 GHz

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

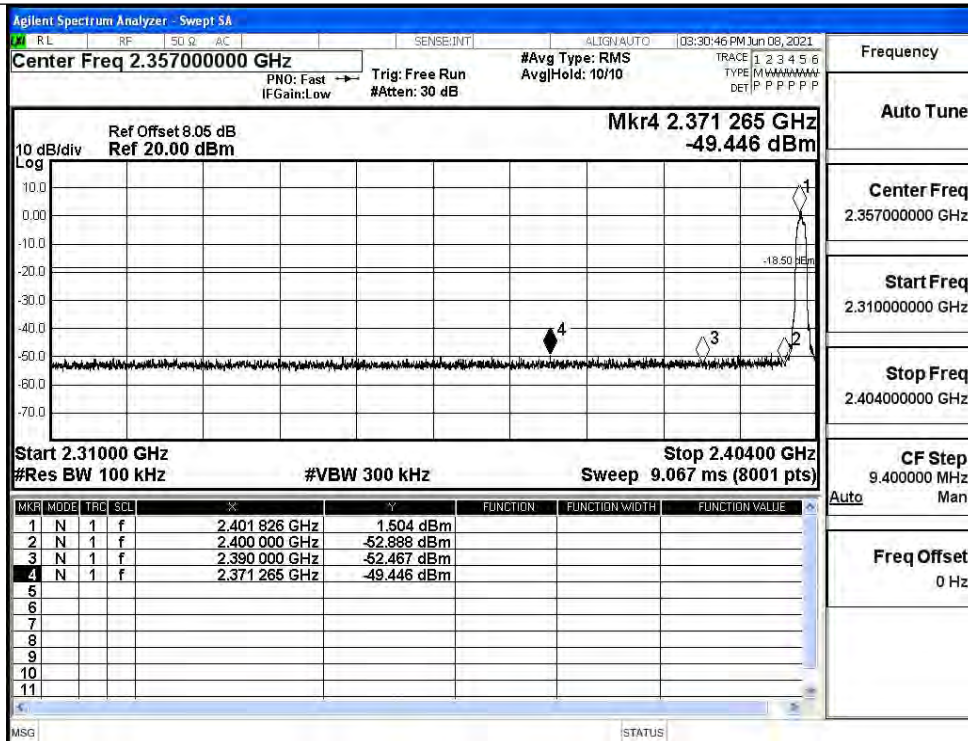
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

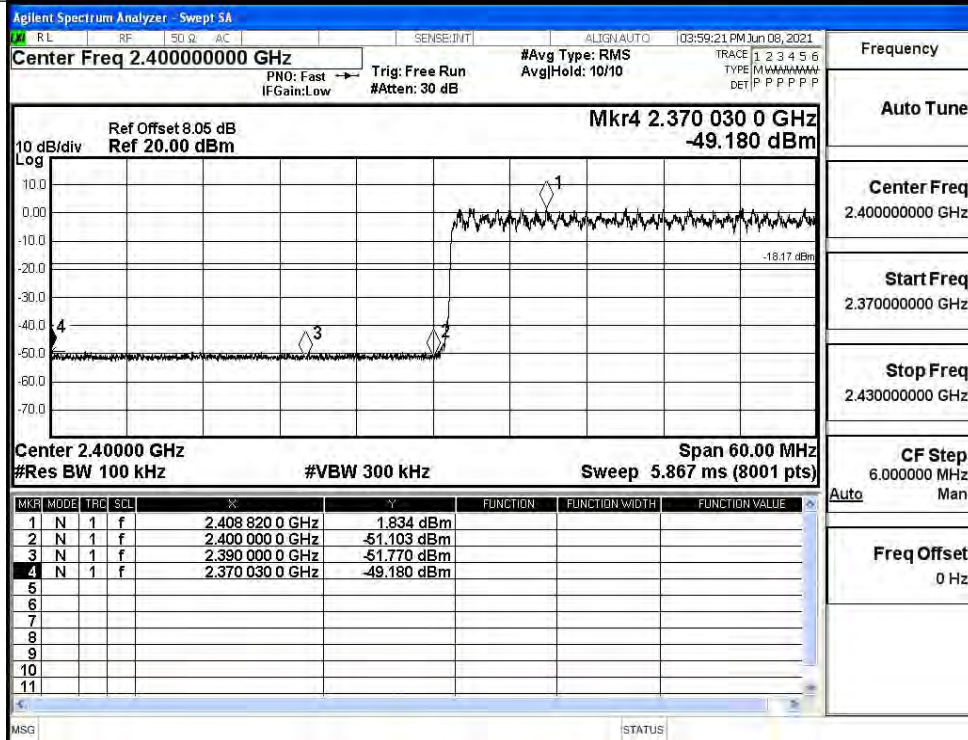
CF Step
6.000000 MHz
Auto Man

Freq Offset
0 Hz

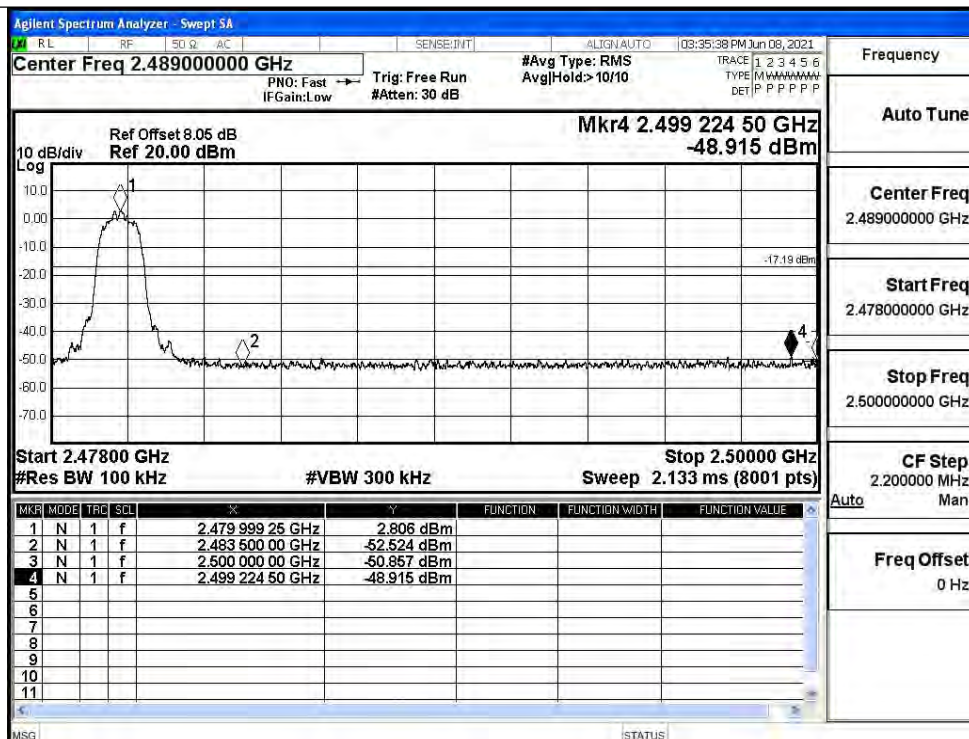
8DPSK/LCH/No Hop



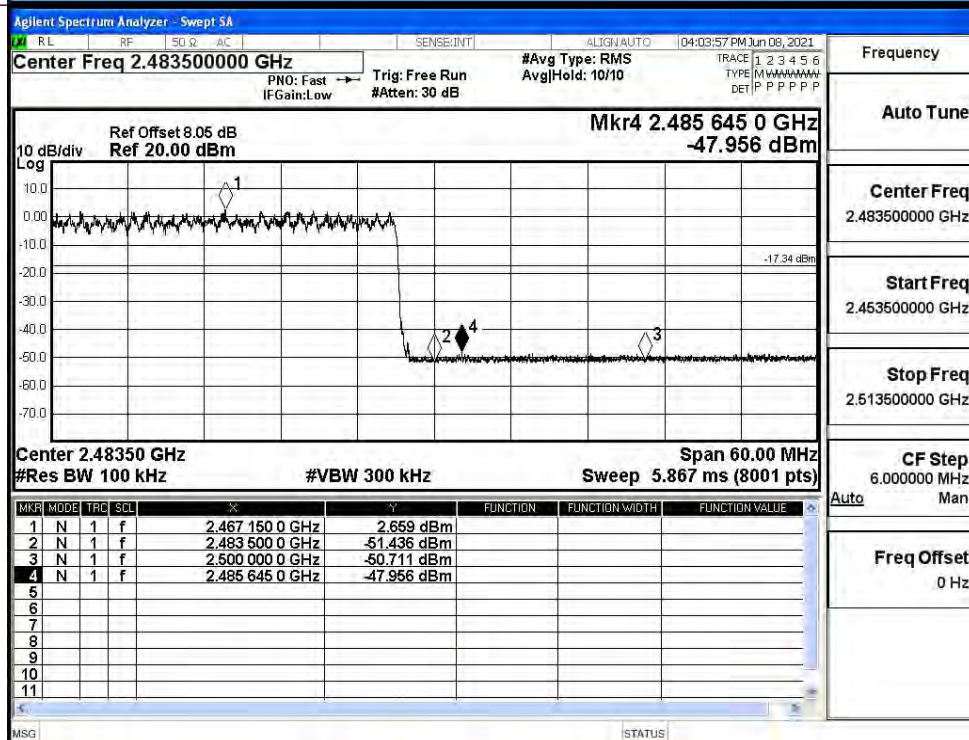
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



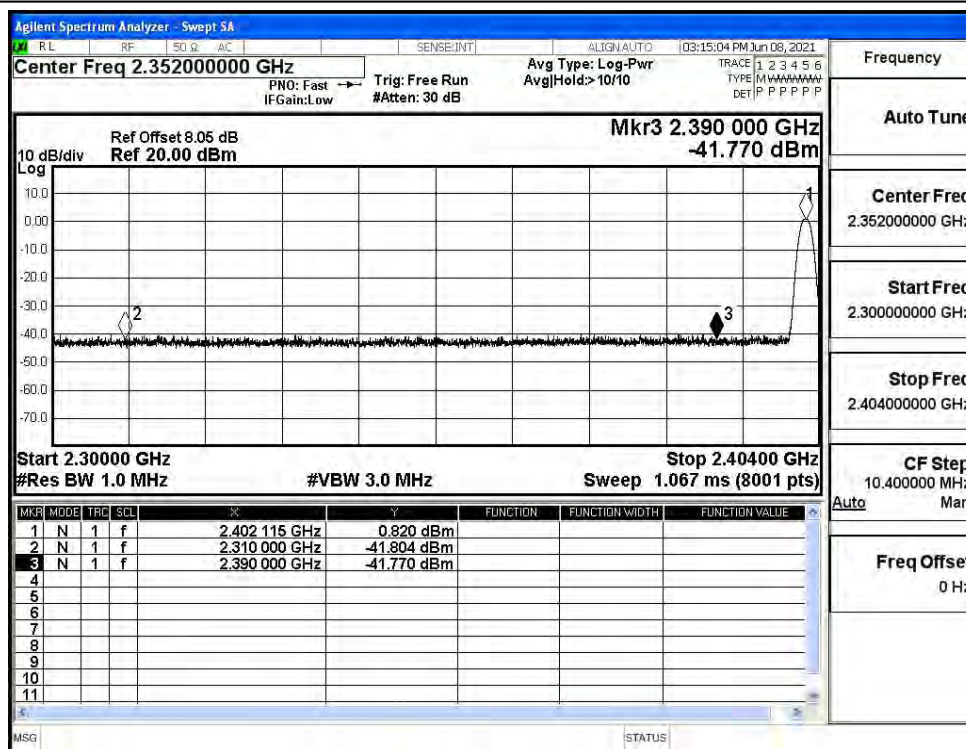
8DPSK/HCH/Hop



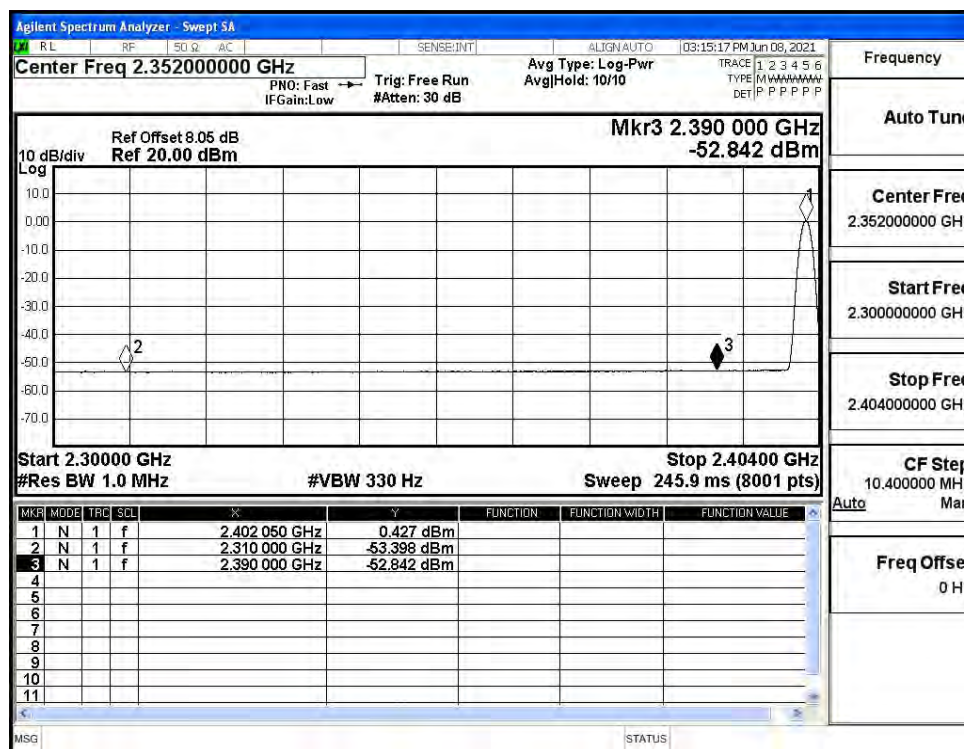
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.80	2.0	0	55.43	PEAK	74	PASS
	Off	2310.0	-53.40	2.0	0	43.83	AV	54	PASS
	Off	2390.0	-41.77	2.0	0	55.46	PEAK	74	PASS
	Off	2390.0	-52.84	2.0	0	44.39	AV	54	PASS
	Off	2483.5	-42.56	2.0	0	54.67	PEAK	74	PASS
	Off	2483.5	-52.55	2.0	0	44.68	AV	54	PASS
	Off	2500.0	-41.46	2.0	0	55.77	PEAK	74	PASS
	Off	2500.0	-52.41	2.0	0	44.82	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.72	2.0	0	54.51	PEAK	74	PASS
	Off	2310.0	-53.45	2.0	0	43.78	AV	54	PASS
	Off	2390.0	-42.72	2.0	0	54.51	PEAK	74	PASS
	Off	2390.0	-53.00	2.0	0	44.23	AV	54	PASS
	Off	2483.5	-42.63	2.0	0	54.60	PEAK	74	PASS
	Off	2483.5	-52.41	2.0	0	44.82	AV	54	PASS
	Off	2500.0	-42.21	2.0	0	55.02	PEAK	74	PASS
	Off	2500.0	-52.40	2.0	0	44.83	AV	54	PASS
8DPSK	Off	2310.0	-42.03	2.0	0	55.20	PEAK	74	PASS
	Off	2310.0	-53.39	2.0	0	43.84	AV	54	PASS
	Off	2390.0	-43.56	2.0	0	53.67	PEAK	74	PASS
	Off	2390.0	-53.13	2.0	0	44.10	AV	54	PASS
	Off	2483.5	-42.78	2.0	0	54.45	PEAK	74	PASS
	Off	2483.5	-52.42	2.0	0	44.81	AV	54	PASS
	Off	2500.0	-42.14	2.0	0	55.09	PEAK	74	PASS
	Off	2500.0	-52.39	2.0	0	44.84	AV	54	PASS

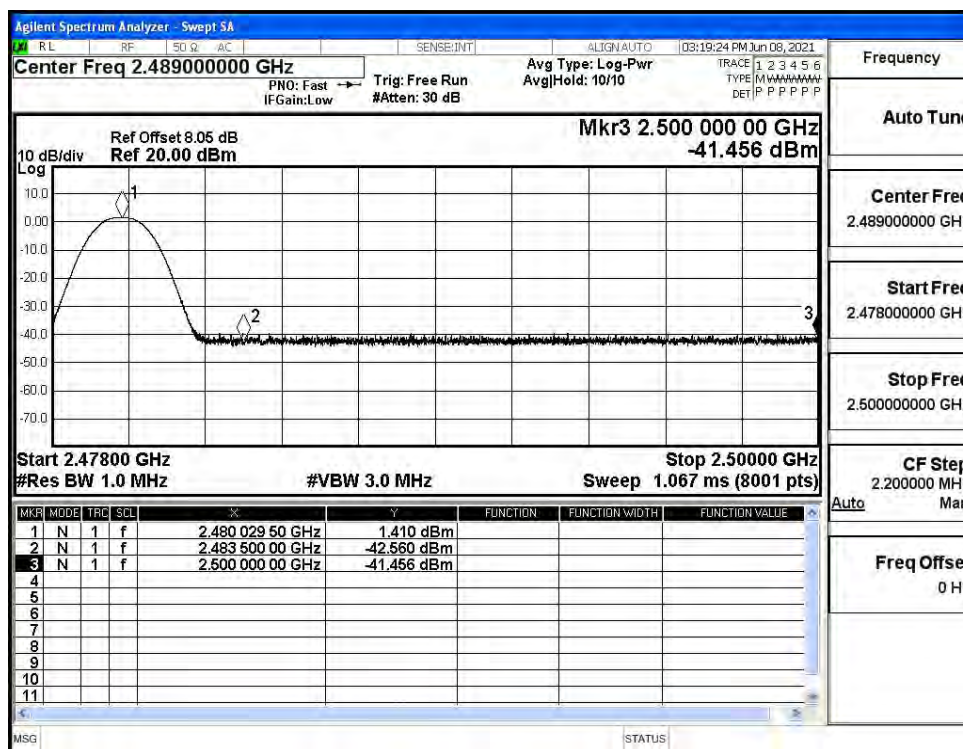
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



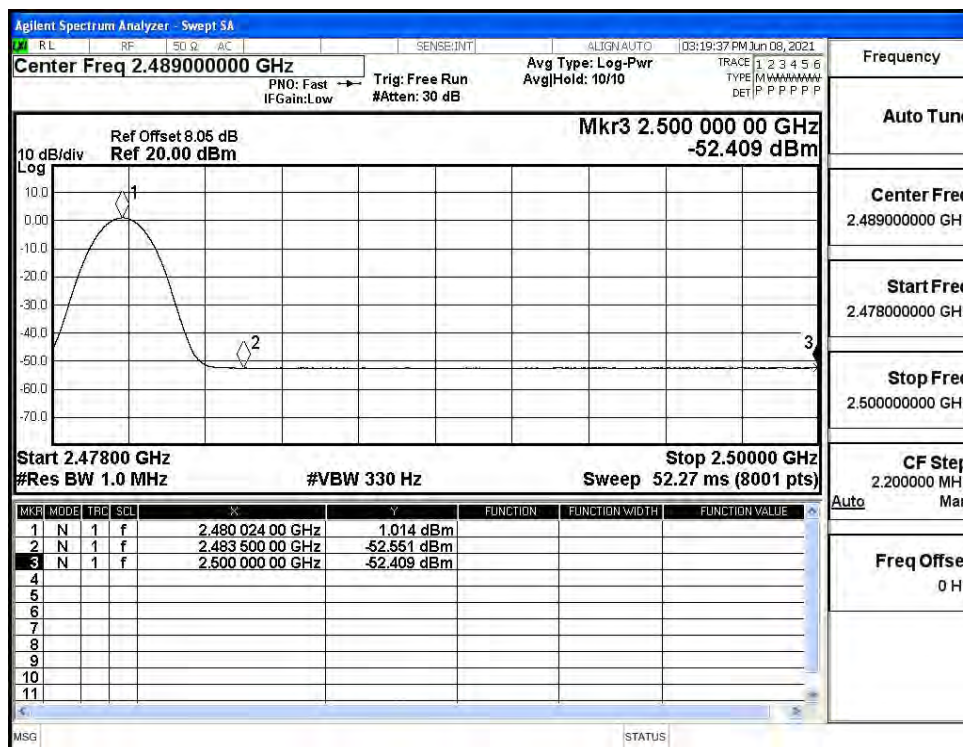
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



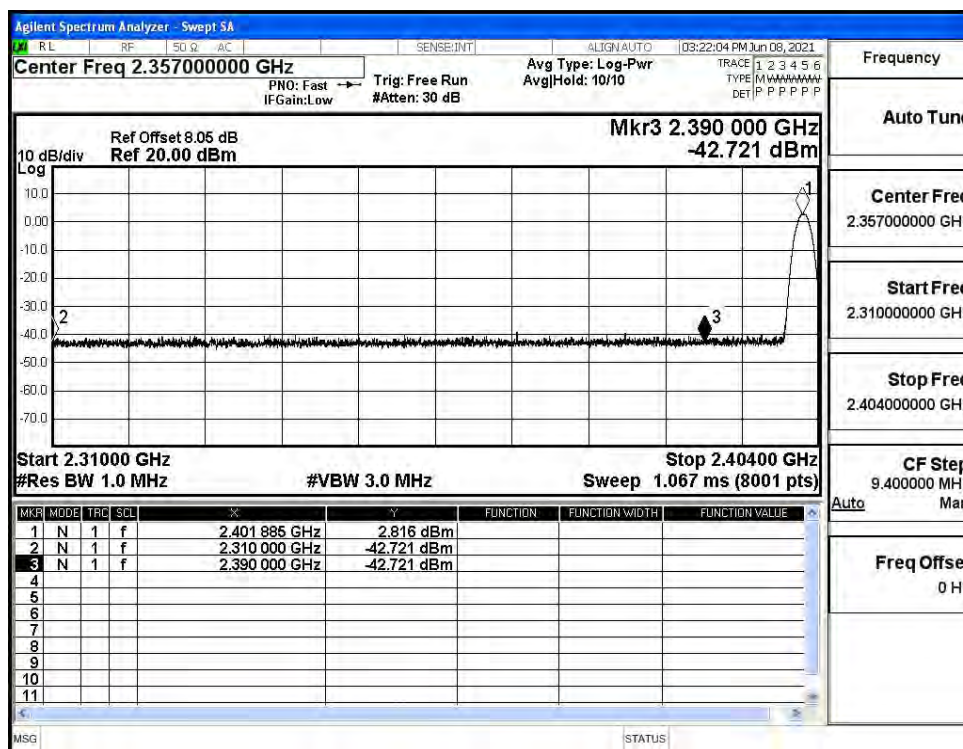
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



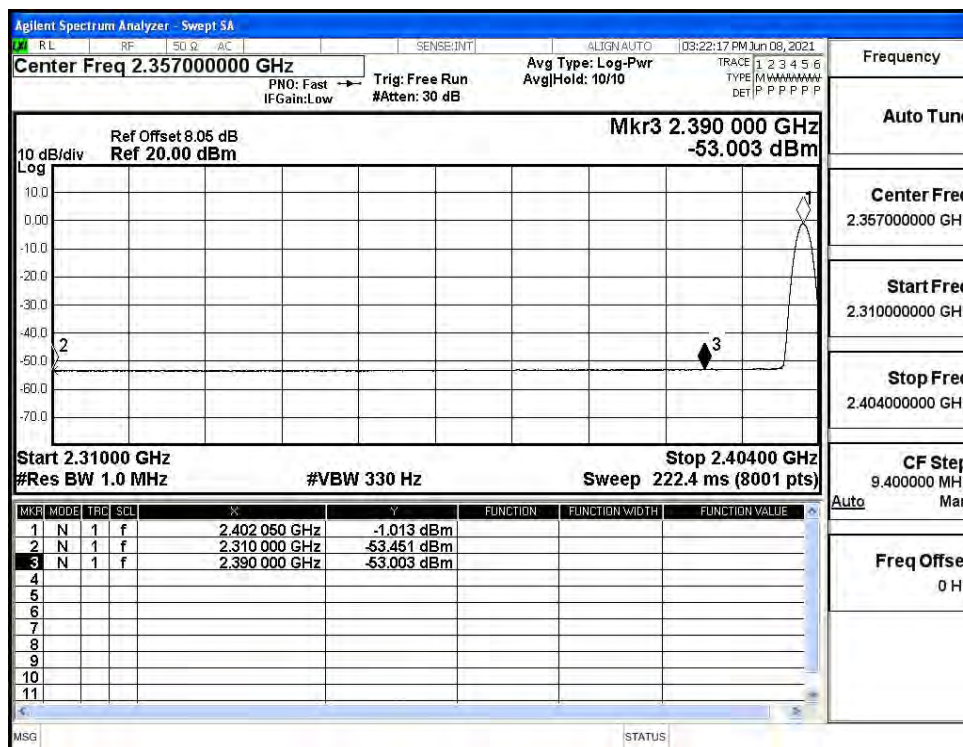
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)

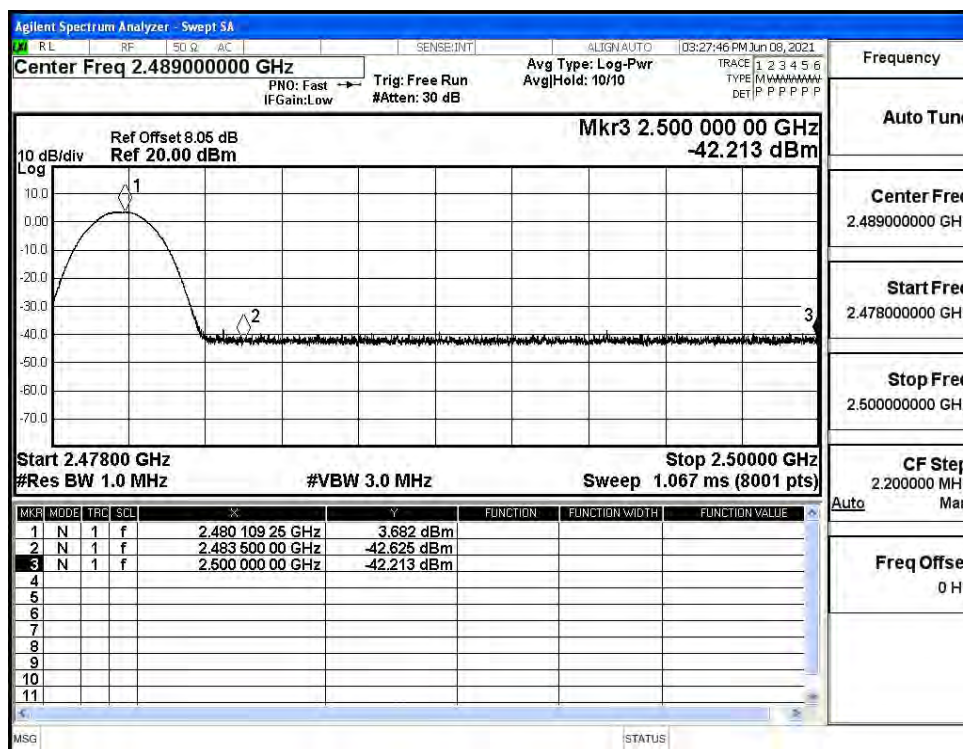
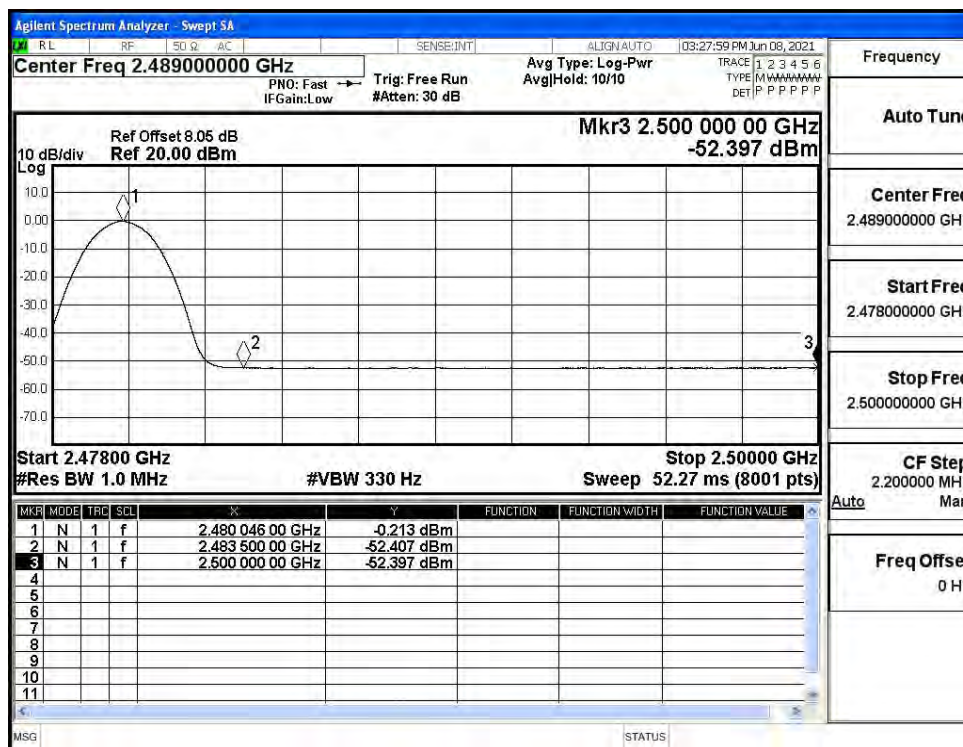


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)

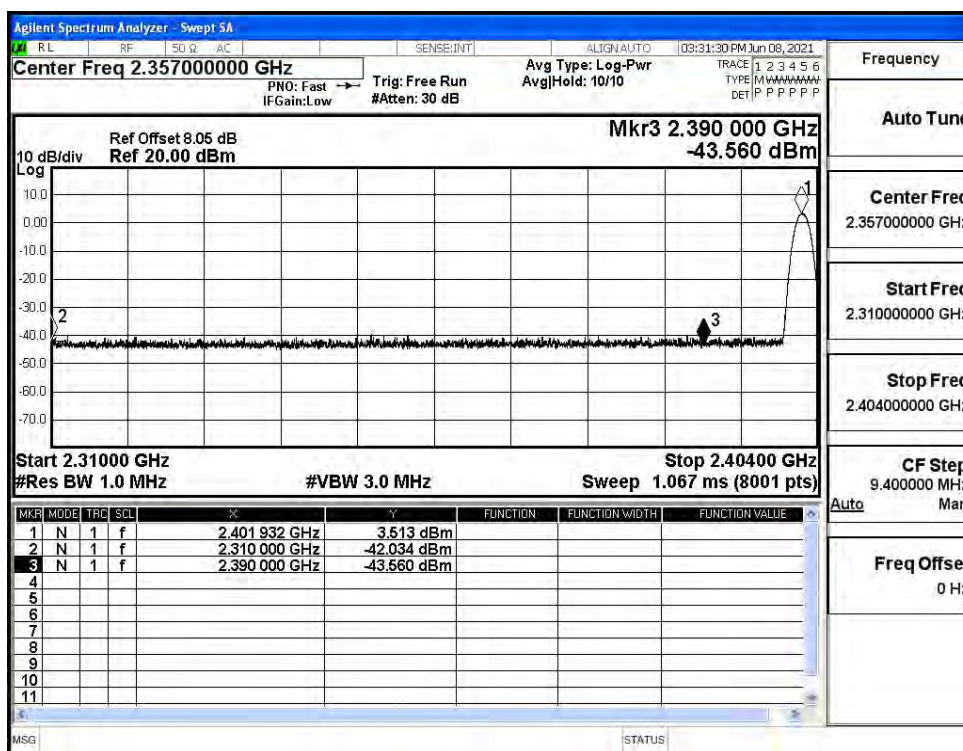


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)

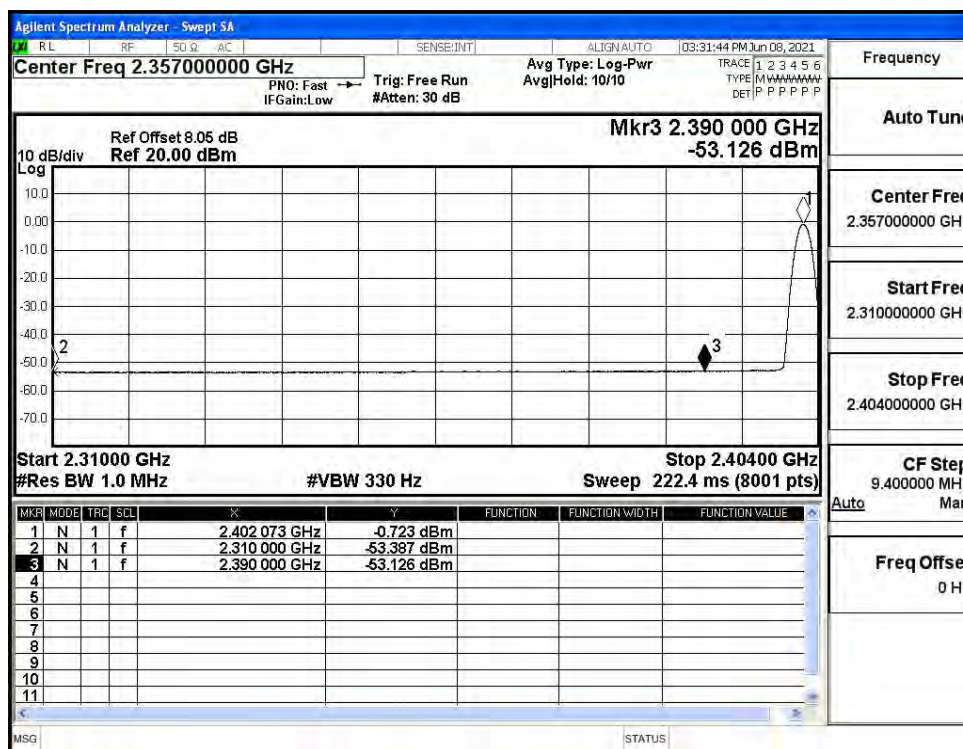


Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)

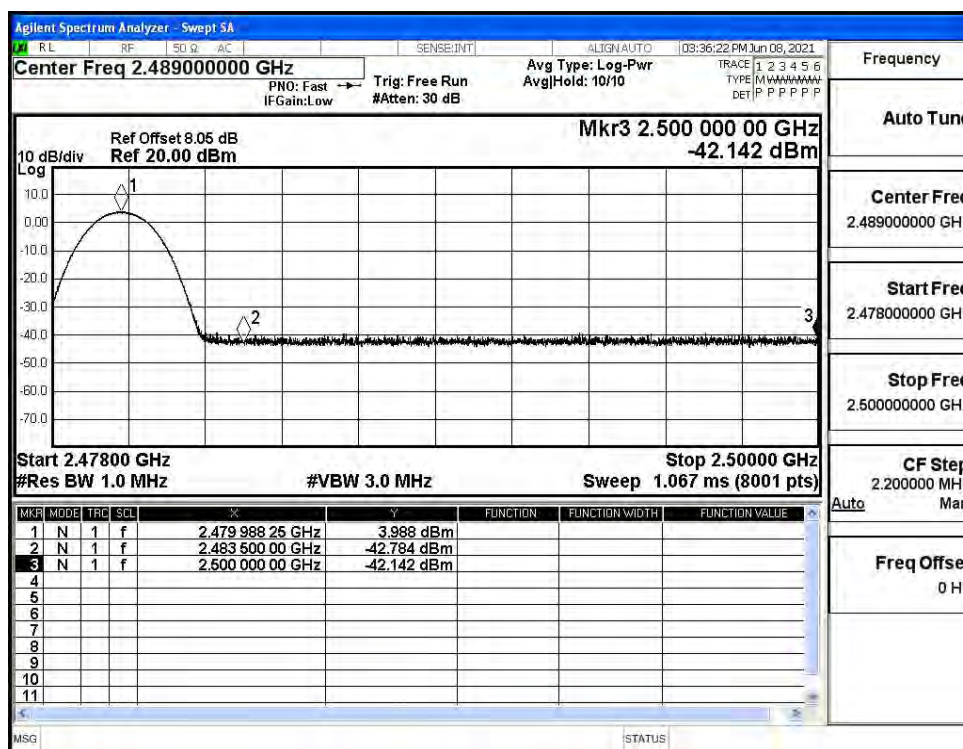
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

