

Appendix A

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

Product Name: Wireless Stereo Earbuds

Trade Mark: ABKO

Test Model: EC10

Environmental Conditions

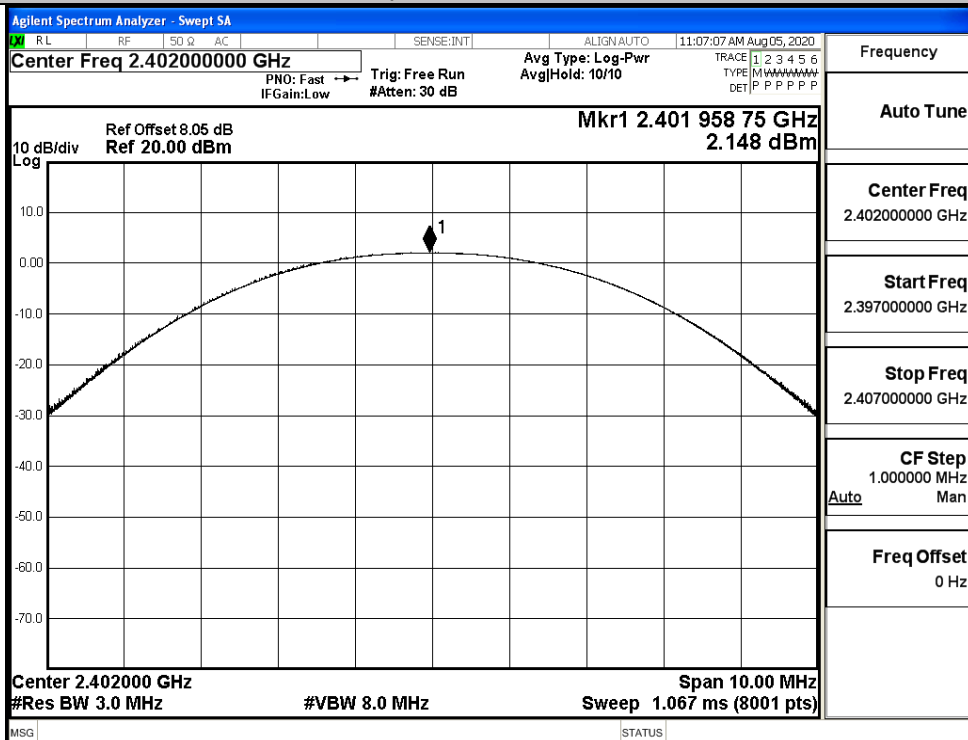
Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Li Huan
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

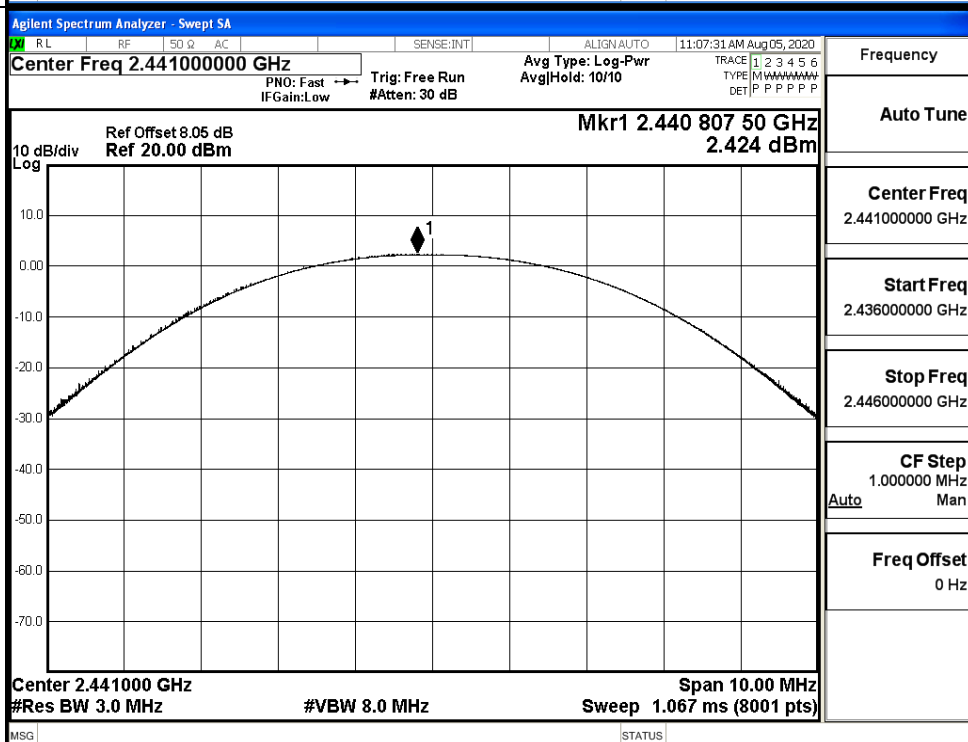
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.148	21	PASS
	MCH	2.424	21	PASS
	HCH	1.319	21	PASS
$\pi/4$ DQPSK	LCH	2.580	21	PASS
	MCH	2.879	21	PASS
	HCH	1.651	21	PASS
8DPSK	LCH	2.854	21	PASS
	MCH	3.254	21	PASS
	HCH	1.999	21	PASS

Test Graphs

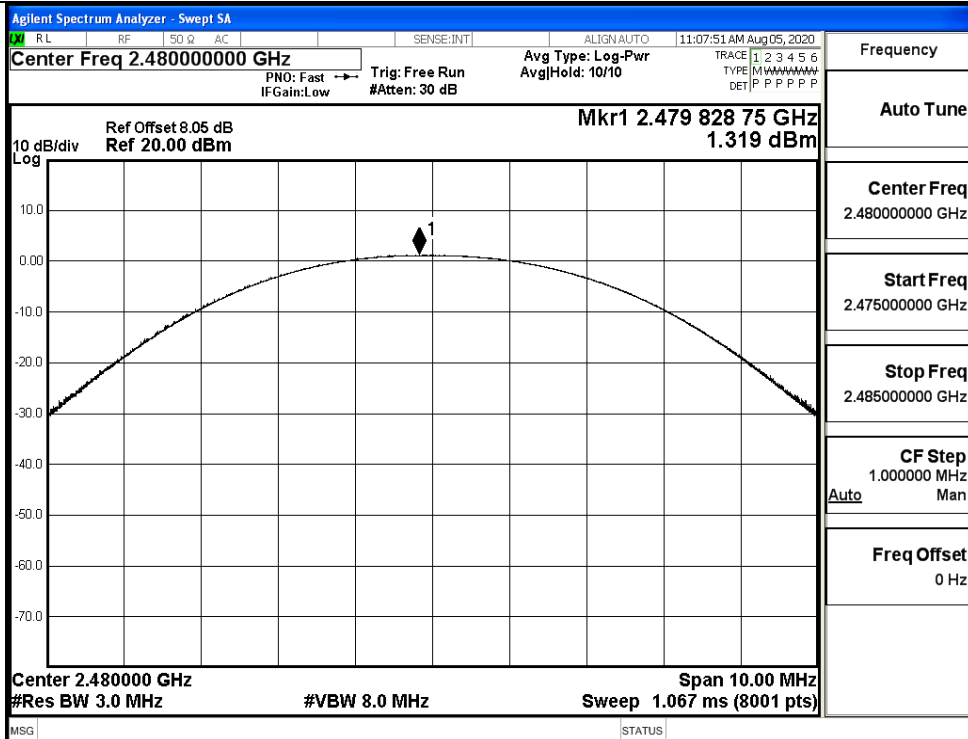
GFSK/LCH



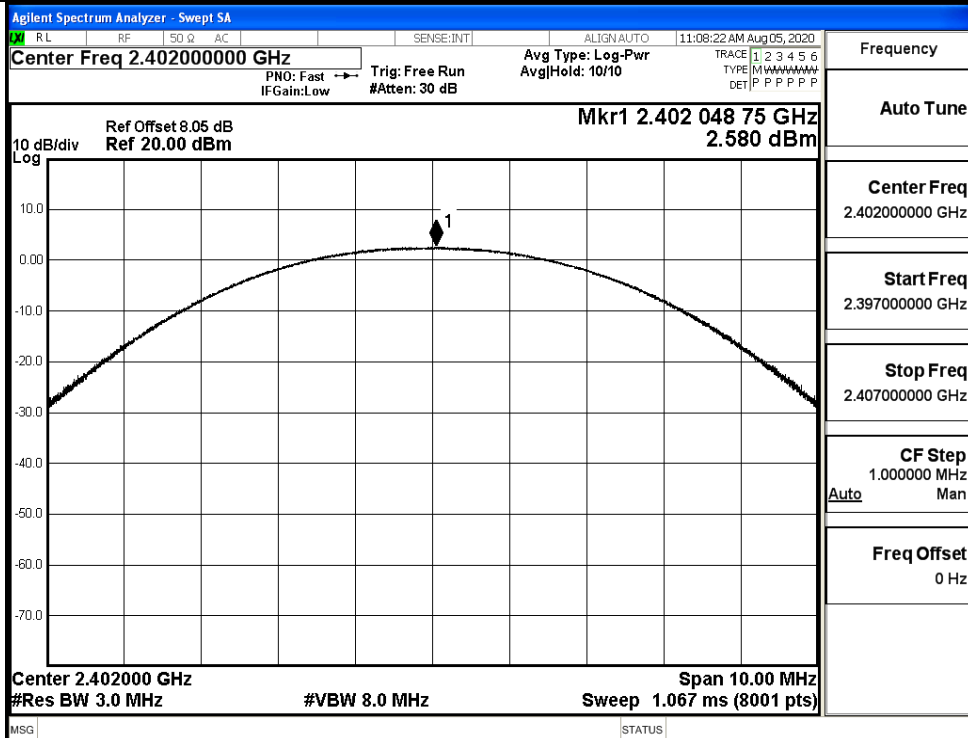
GFSK/MCH

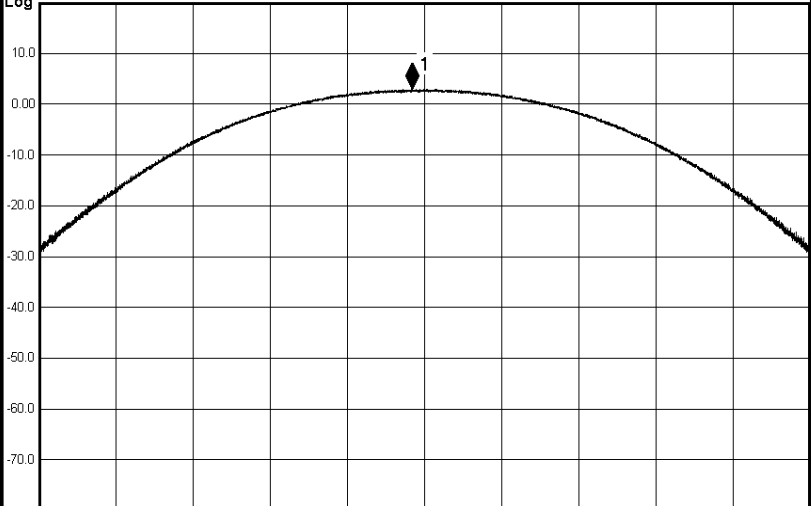
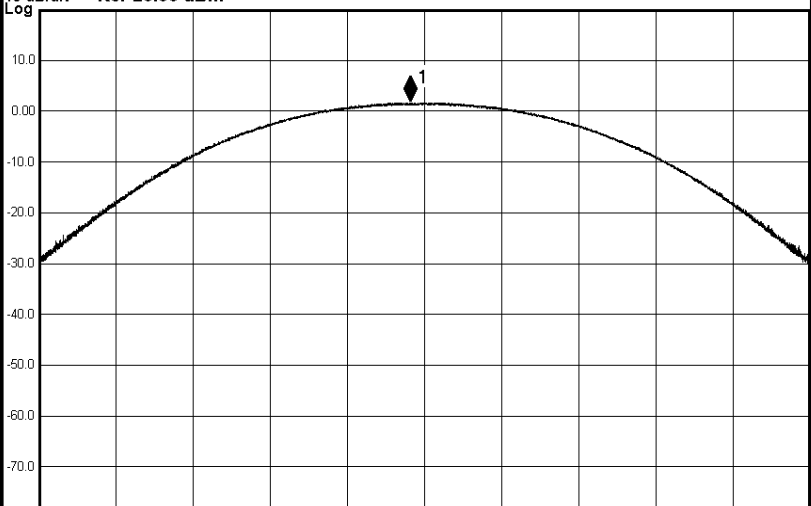


GFSK/HCH

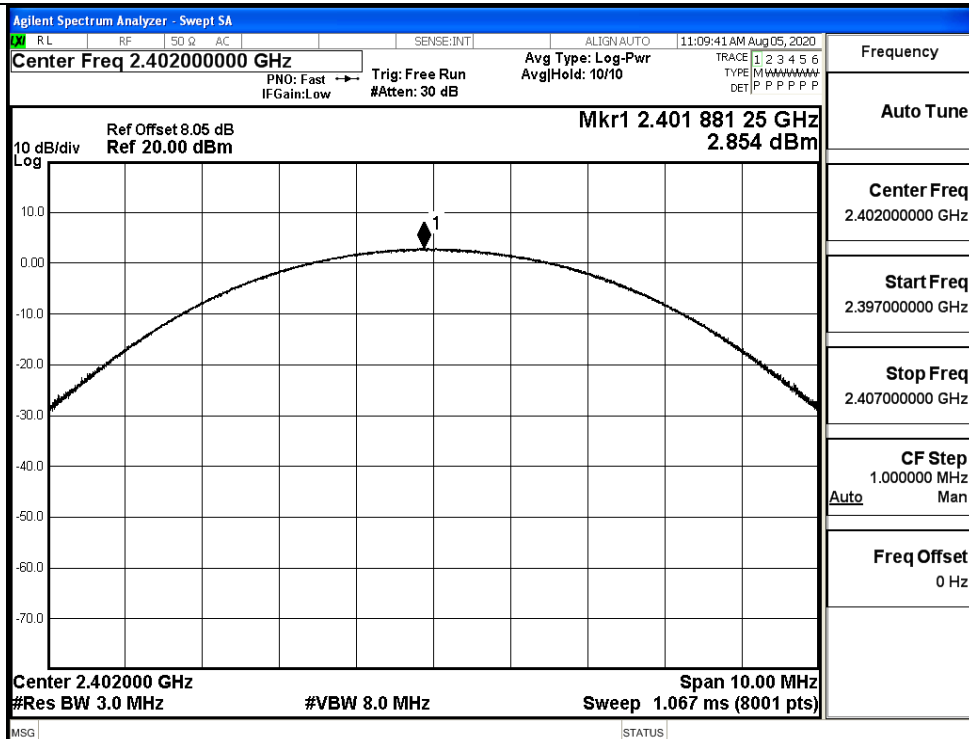


$\pi/4$ DQPSK/LCH

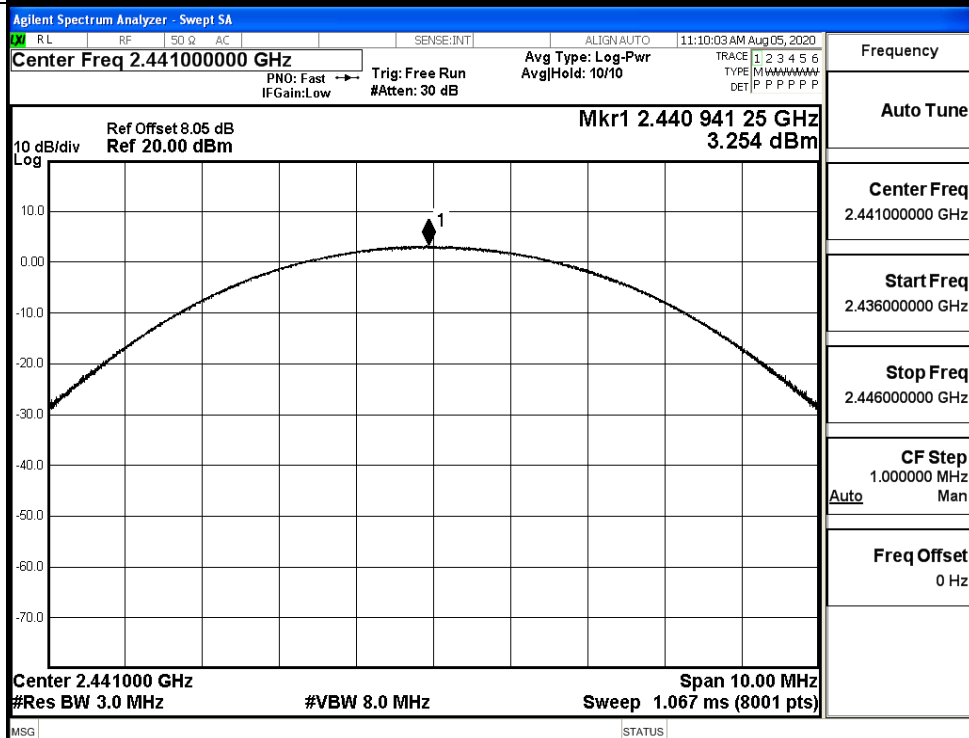


$\pi/4$DQPSK/MCH	Agilent Spectrum Analyzer - Swept SA RL RF 50 Q AC SENSE:INT ALIGN:AUTO 11:08:43 AM Aug 05, 2020 Center Freq 2.441000000 GHz PNO: Fast IF Gain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 10/10 Mkr1 2.440 840 00 GHz 10 dB/div Ref Offset 8.05 dB Ref 20.00 dBm Log  Center 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 11:09:03 AM Aug 05, 2020 Center Freq 2.480000000 GHz PNO: Fast IF Gain:Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr AvgHold: 10/10 Mkr1 2.479 817 50 GHz 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

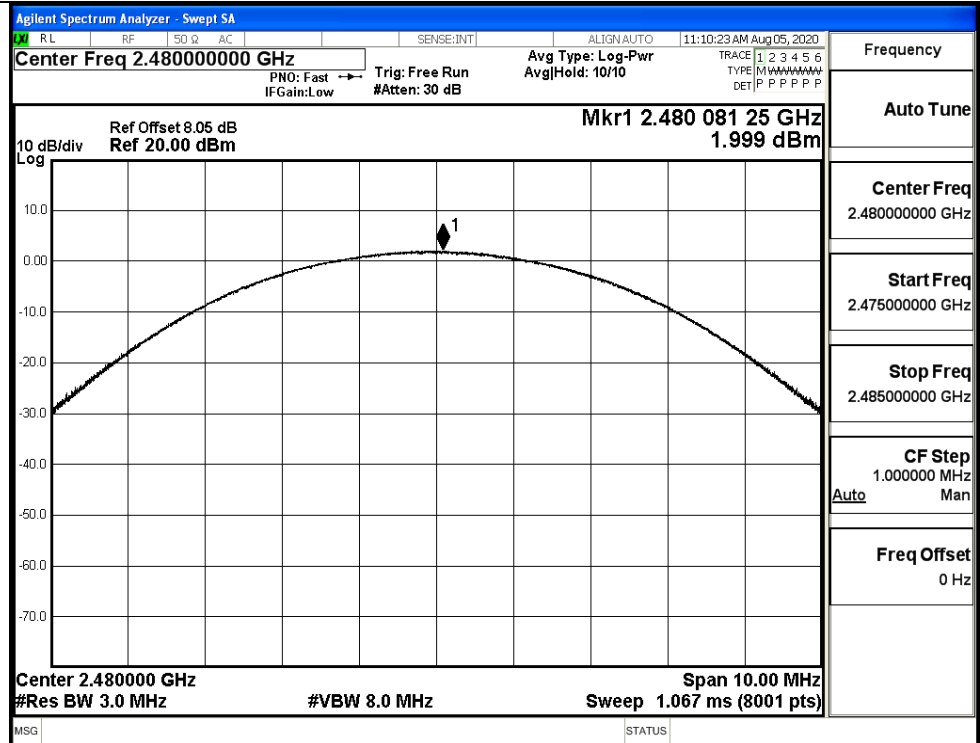
8DPSK/LCH



8DPSK/MCH



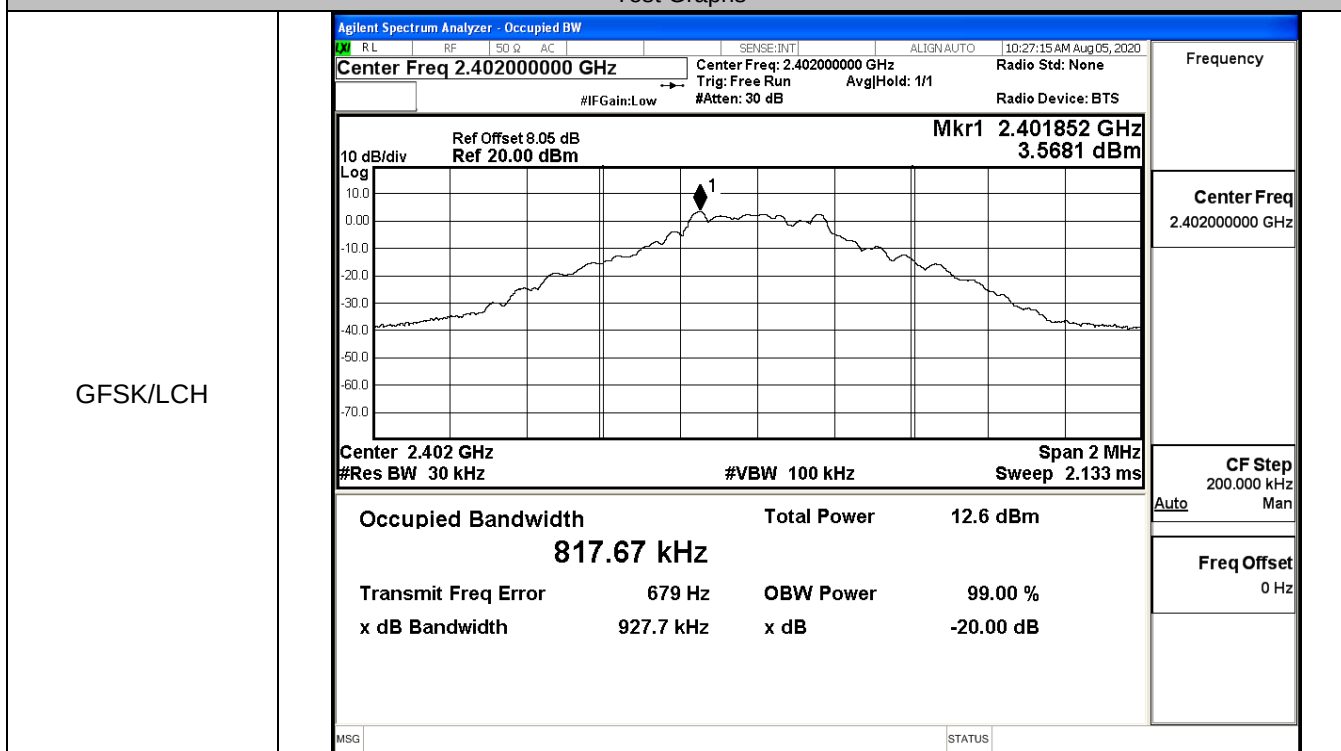
8DPSK/HCH



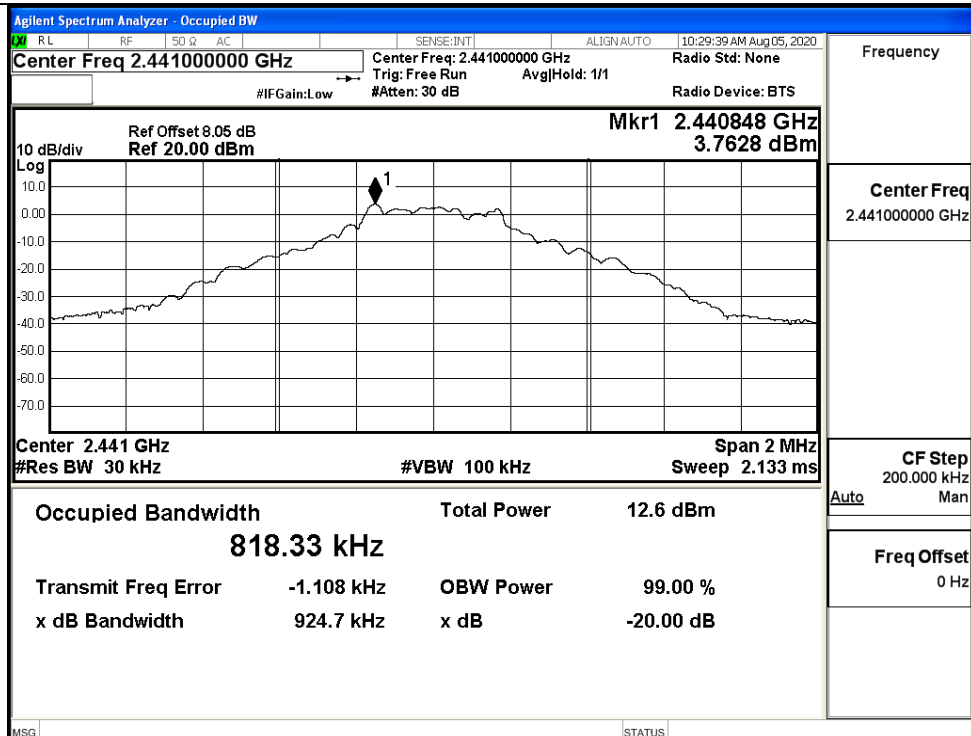
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9277	Not Specified	PASS
	MCH	0.9247	Not Specified	PASS
	HCH	0.9284	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.280	Not Specified	PASS
	MCH	1.280	Not Specified	PASS
	HCH	1.280	Not Specified	PASS
8DPSK	LCH	1.286	Not Specified	PASS
	MCH	1.289	Not Specified	PASS
	HCH	1.290	Not Specified	PASS

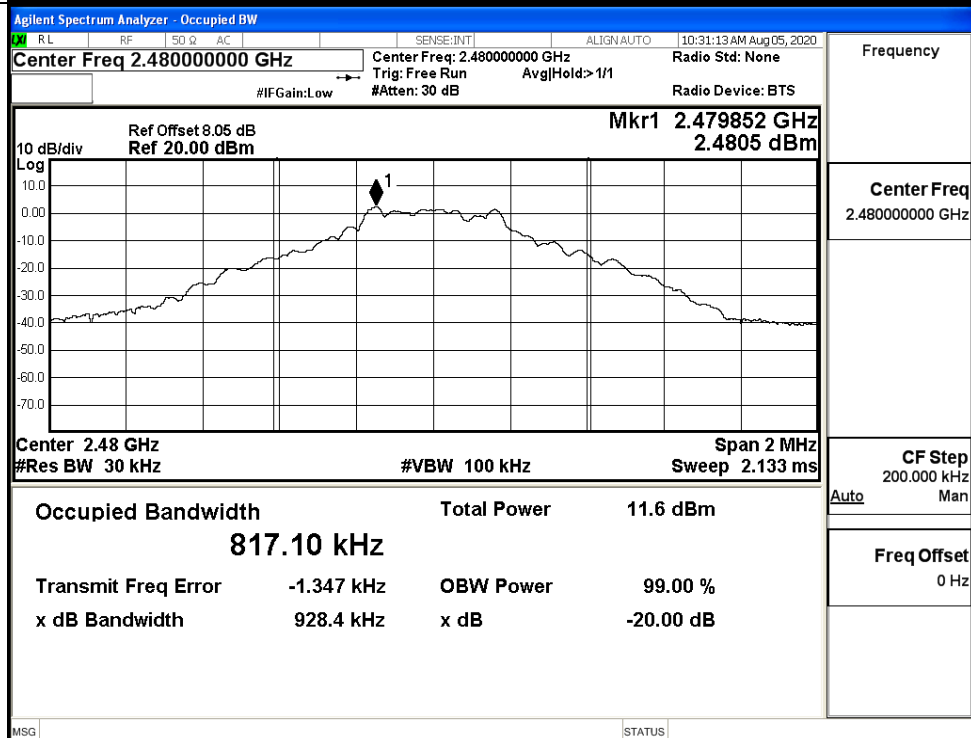
Test Graphs



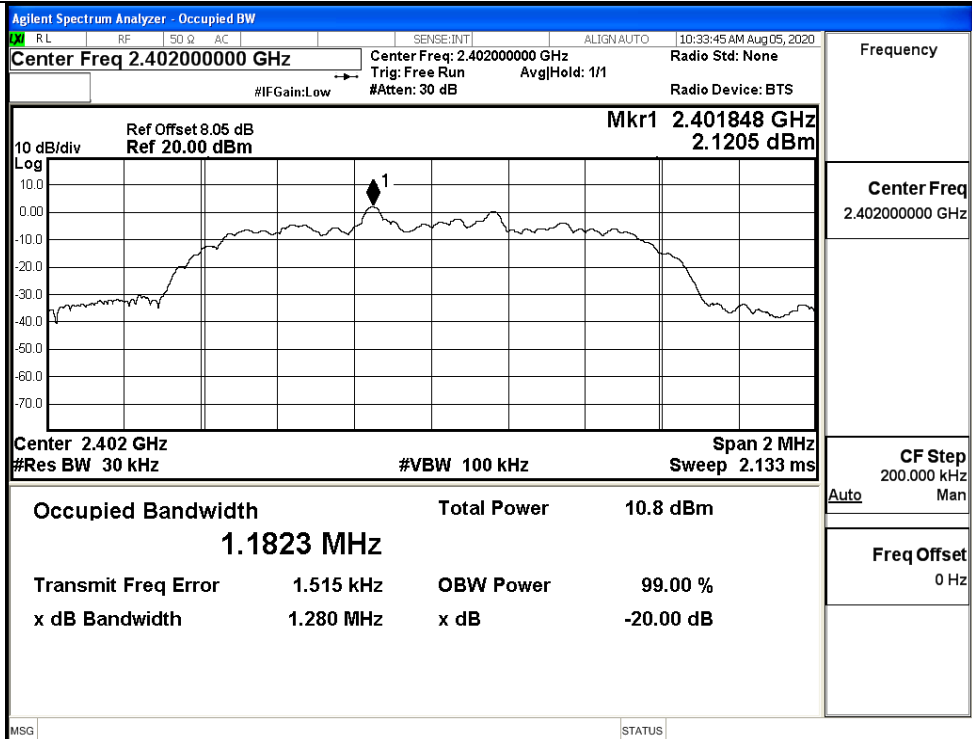
GFSK/MCH



GFSK/HCH



$\pi/4$ DQPSK/LCH



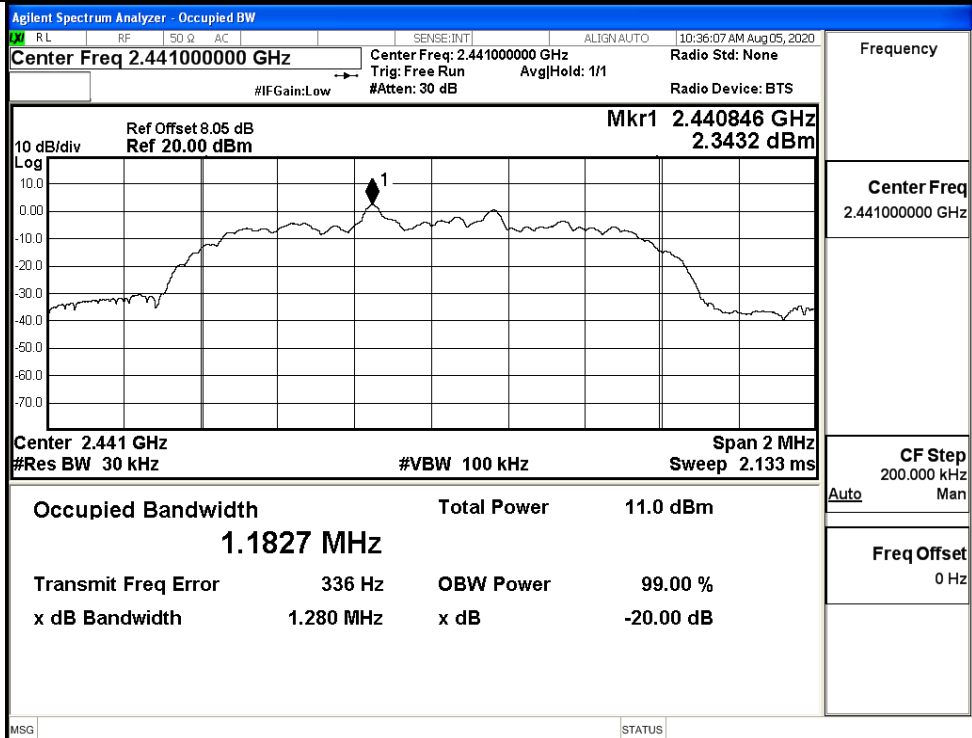
Frequency

Center Freq
2.40200000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/MCH



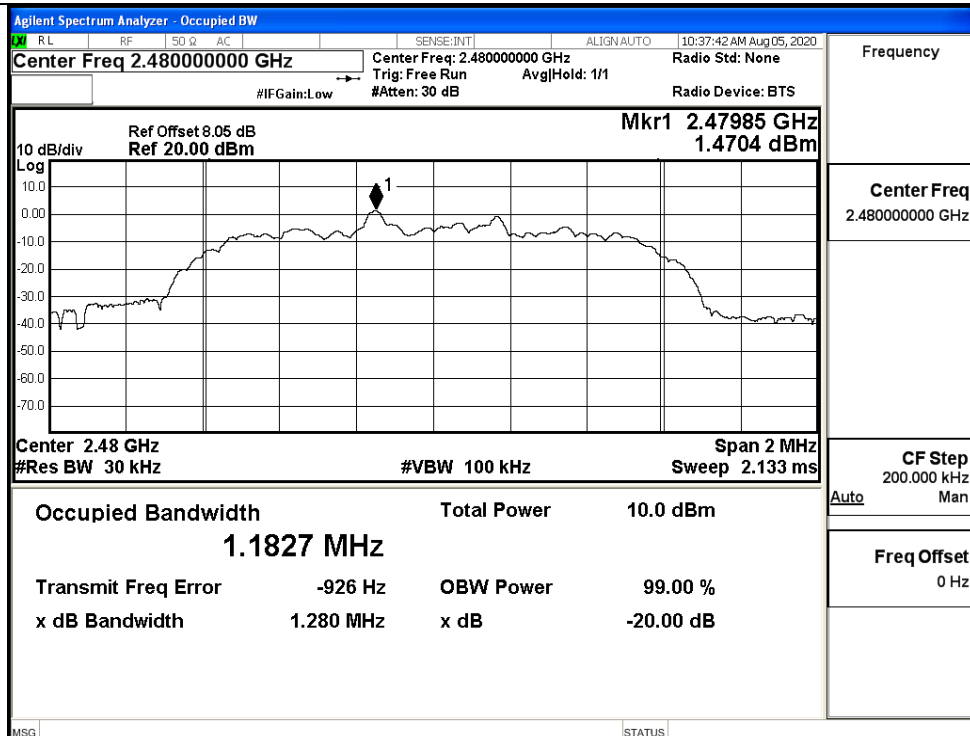
Frequency

Center Freq
2.44100000 GHz

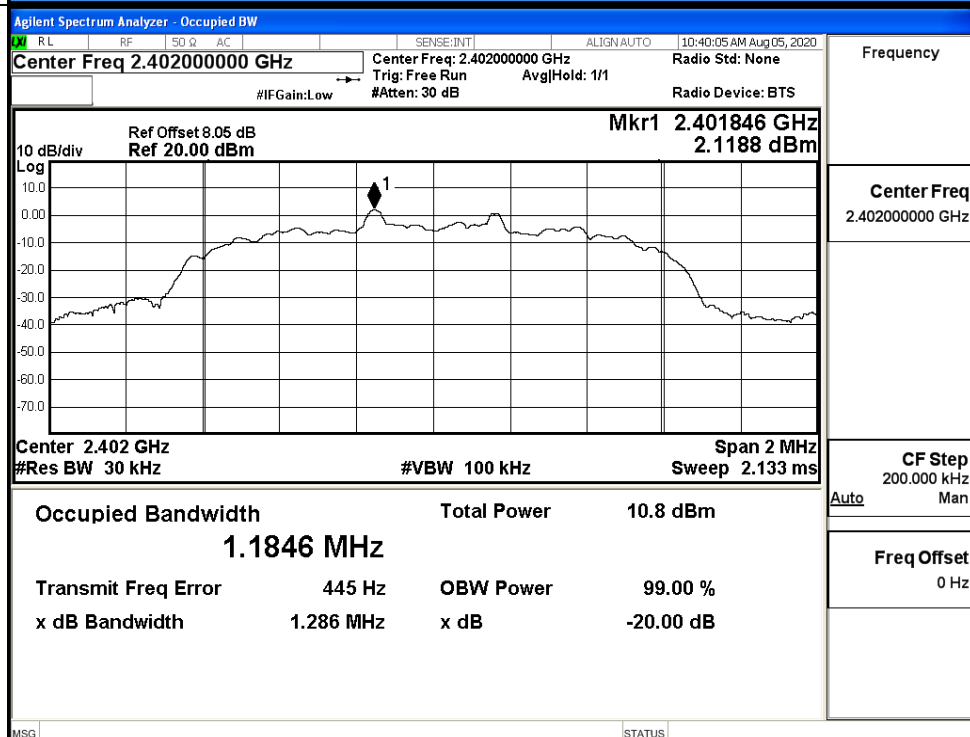
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

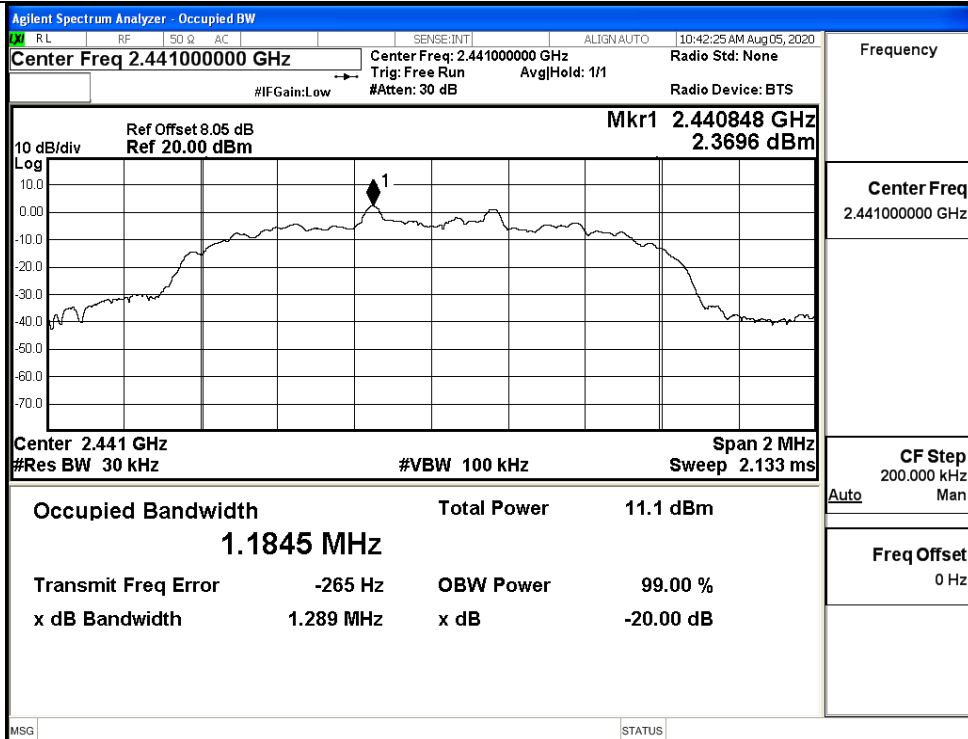
$\pi/4$ DQPSK/HCH



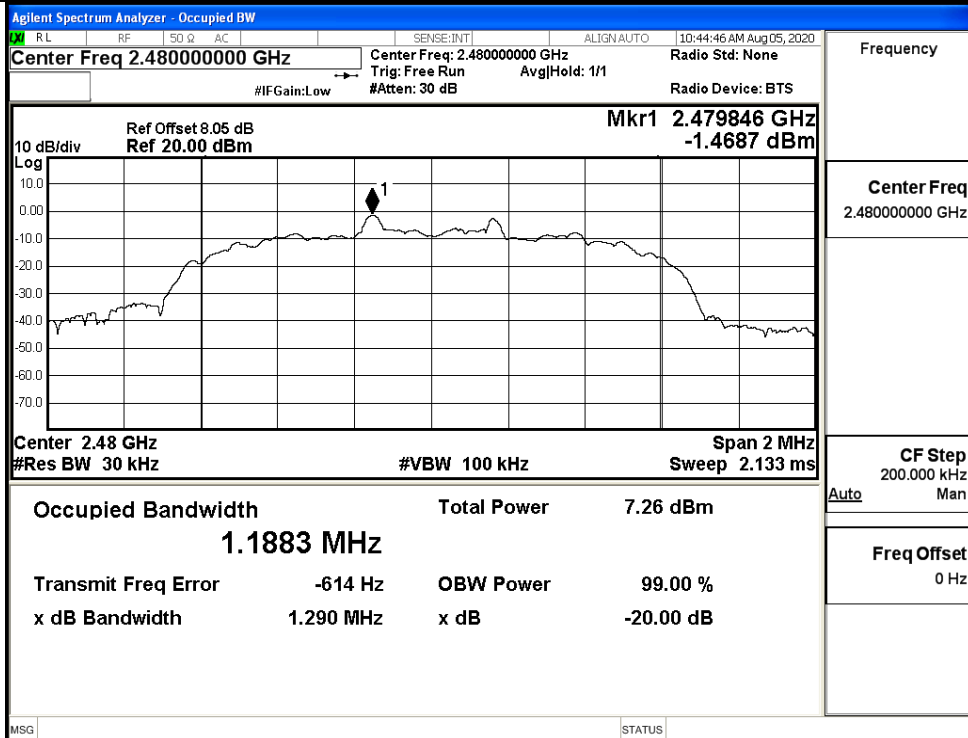
8DPSK/LCH



8DPSK/MCH



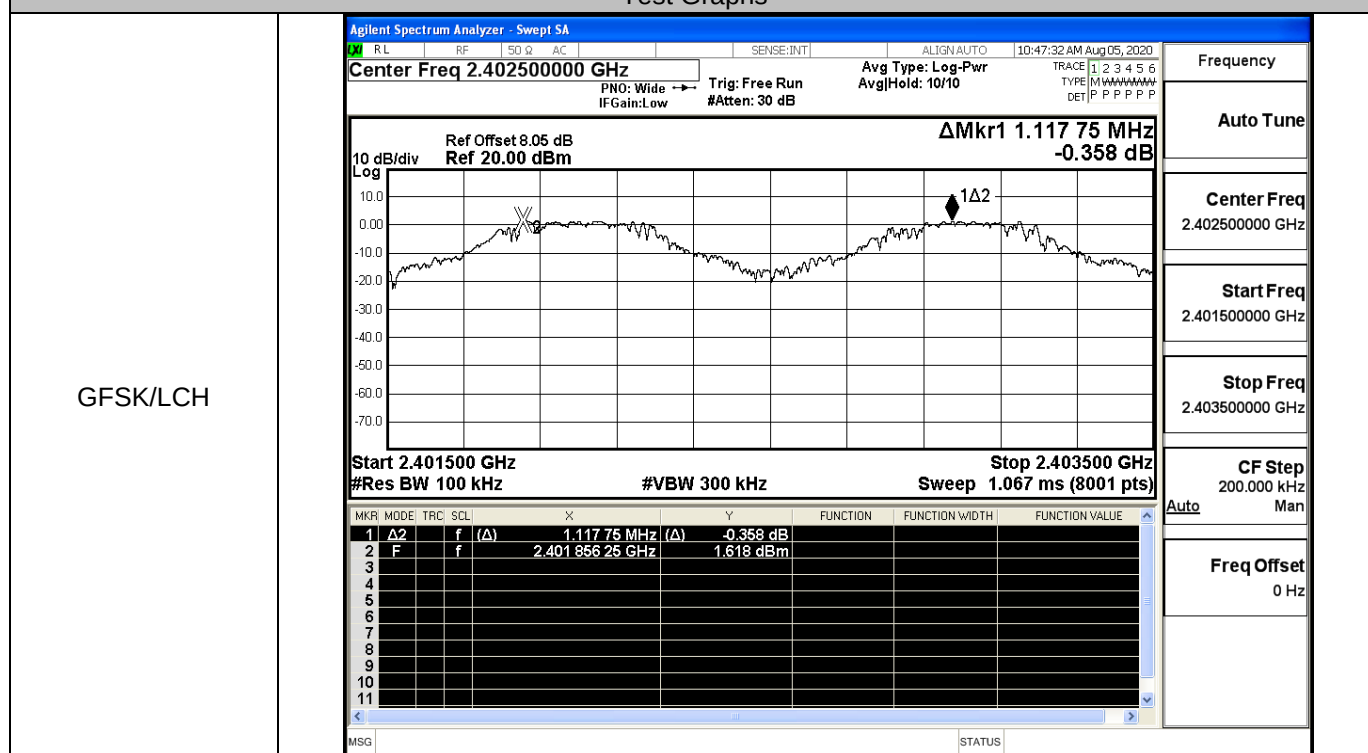
8DPSK/HCH



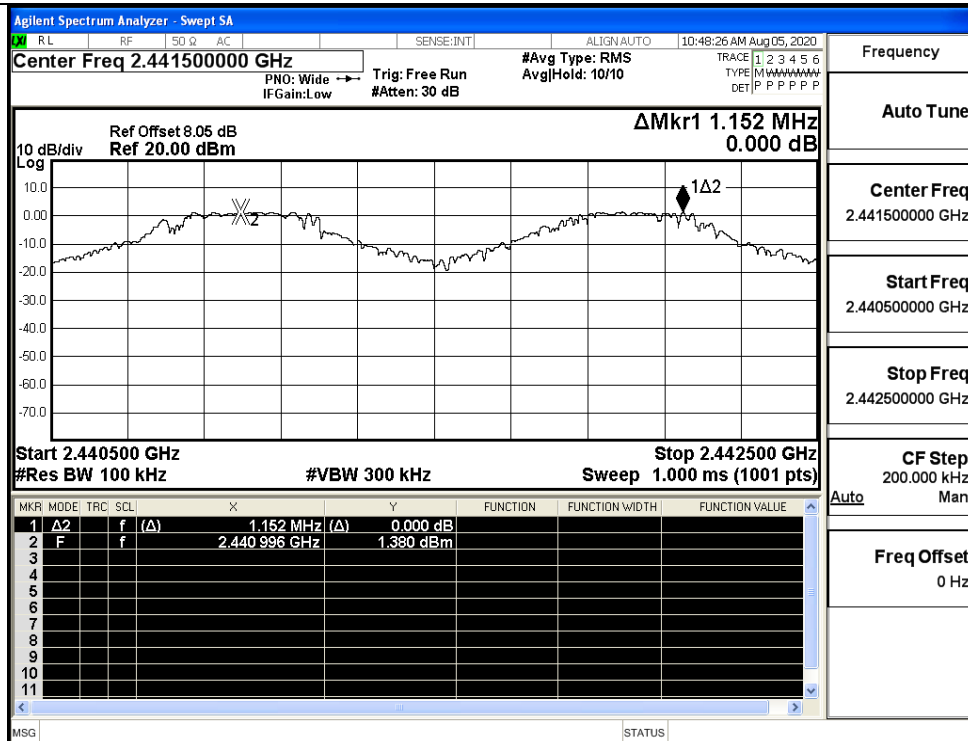
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.118	0.619	PASS
	MCH	1.152	0.619	PASS
	HCH	1.324	0.619	PASS
$\pi/4$ DQPSK	LCH	1.338	0.853	PASS
	MCH	1.334	0.853	PASS
	HCH	1.072	0.853	PASS
8DPSK	LCH	1.338	0.860	PASS
	MCH	1.282	0.860	PASS
	HCH	0.930	0.860	PASS

Test Graphs



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

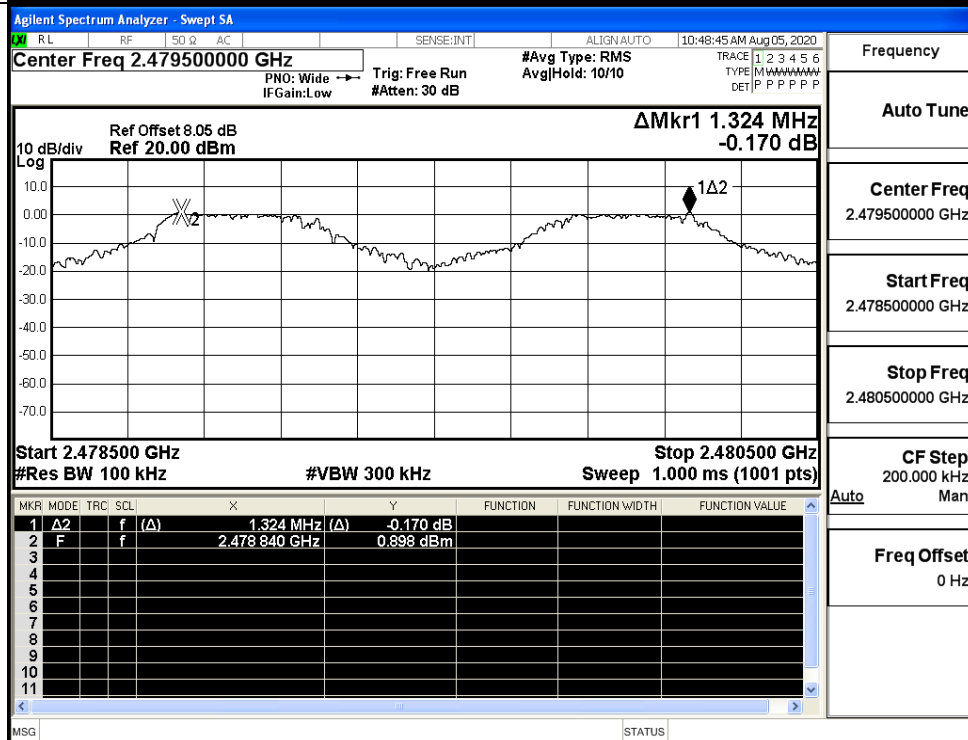
Start Freq
2.440500000 GHz

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

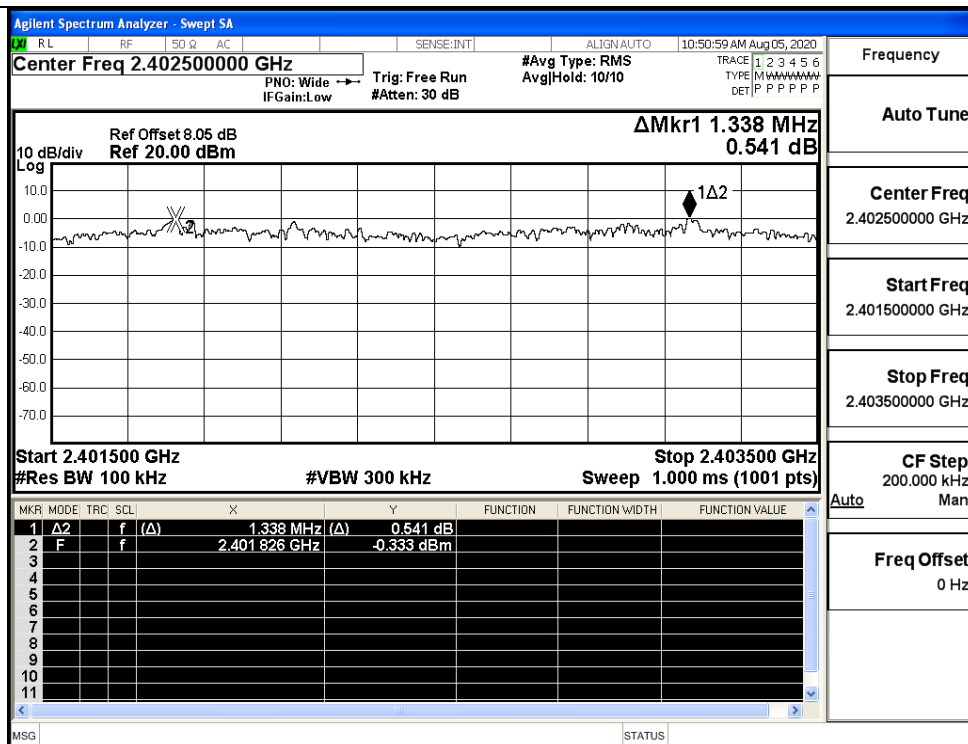
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH



Frequency

Auto Tune

Center Freq
2.402500000 GHz

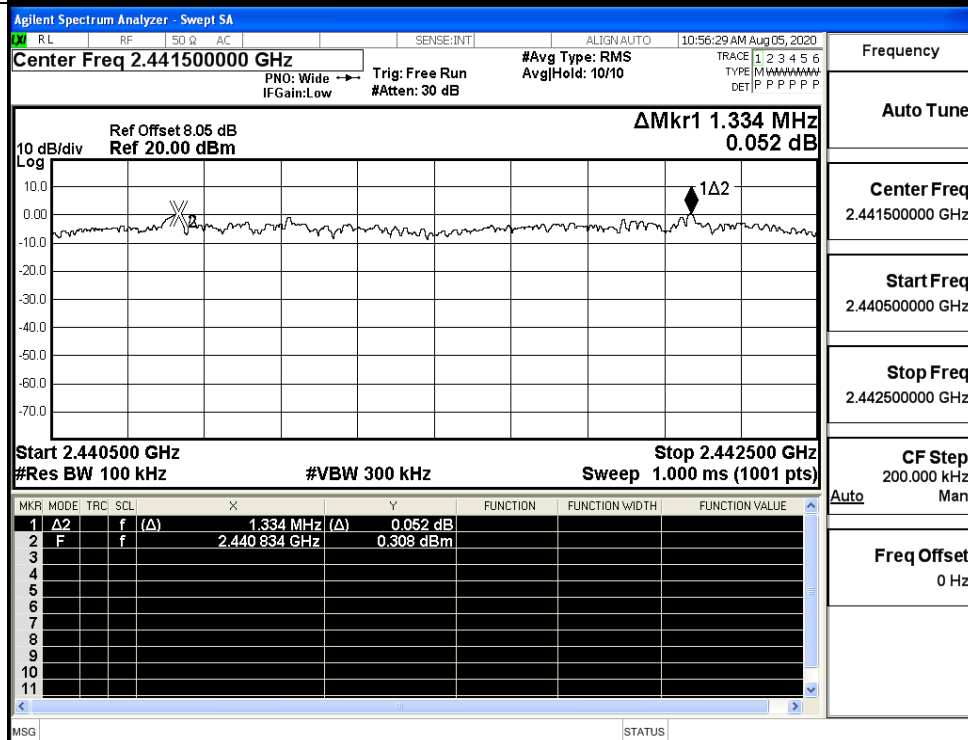
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/MCH



Frequency

Auto Tune

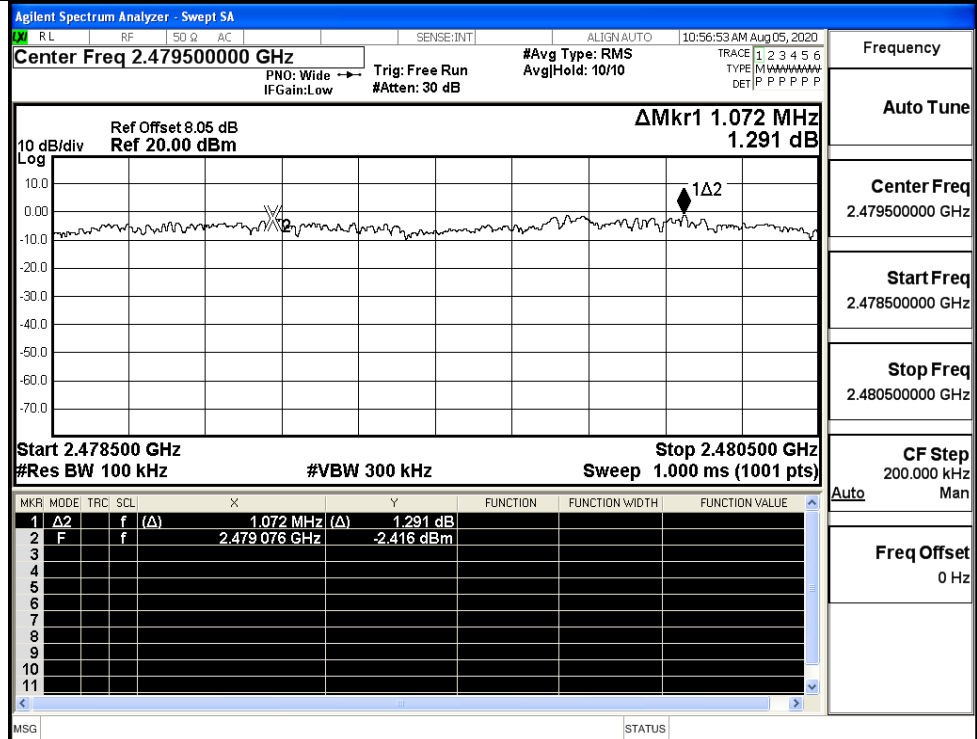
Center Freq
2.441500000 GHz

Start Freq
2.440500000 GHz

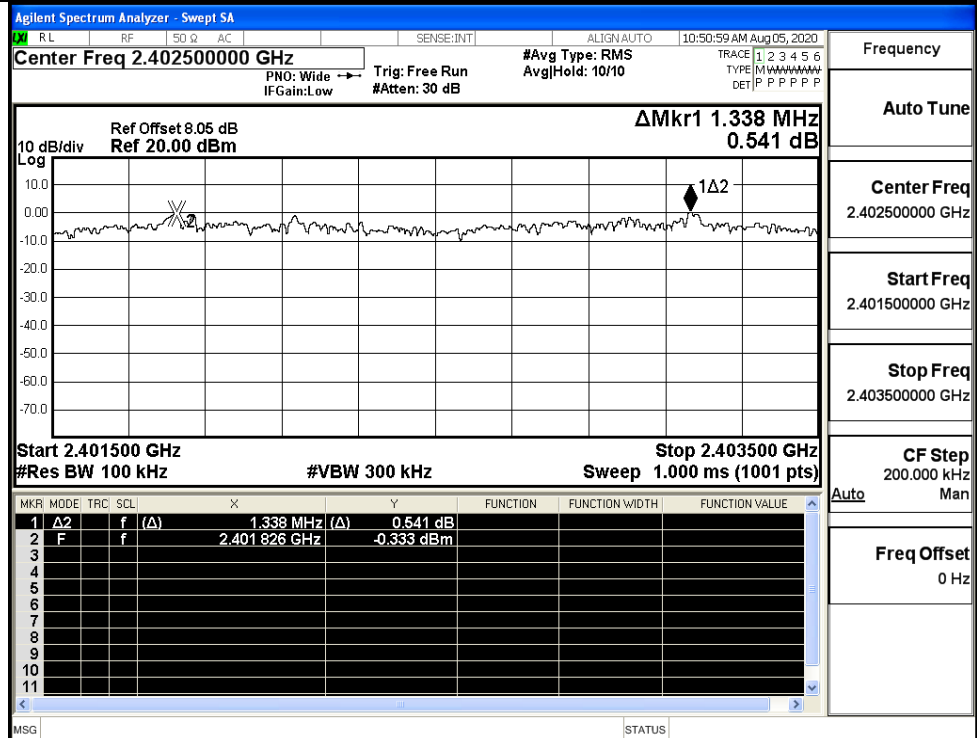
Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Man

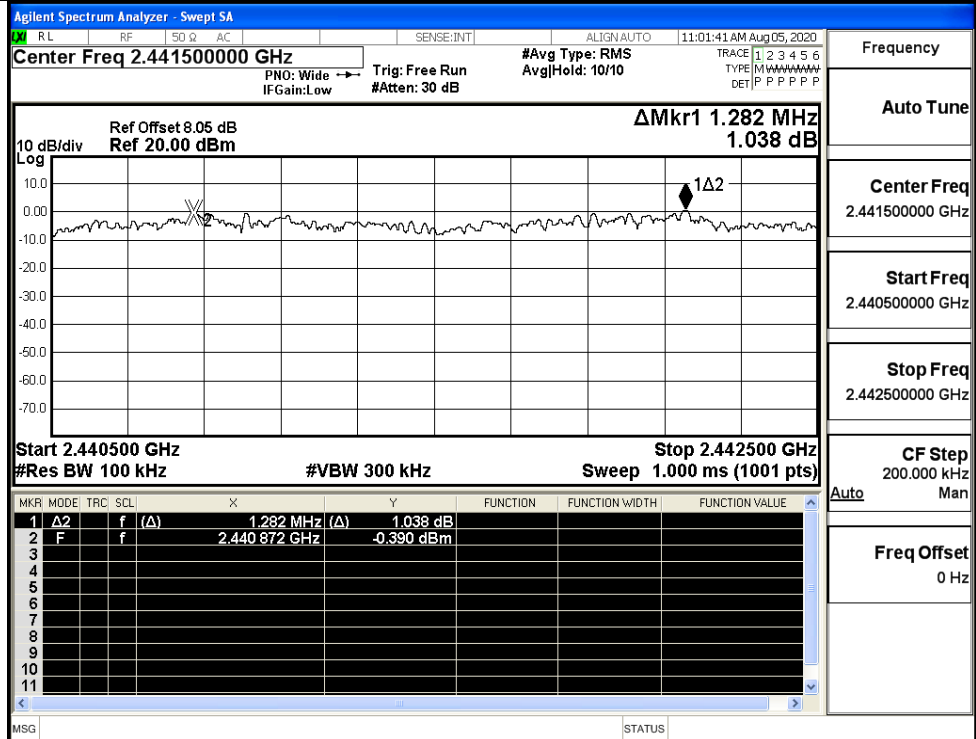
Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH

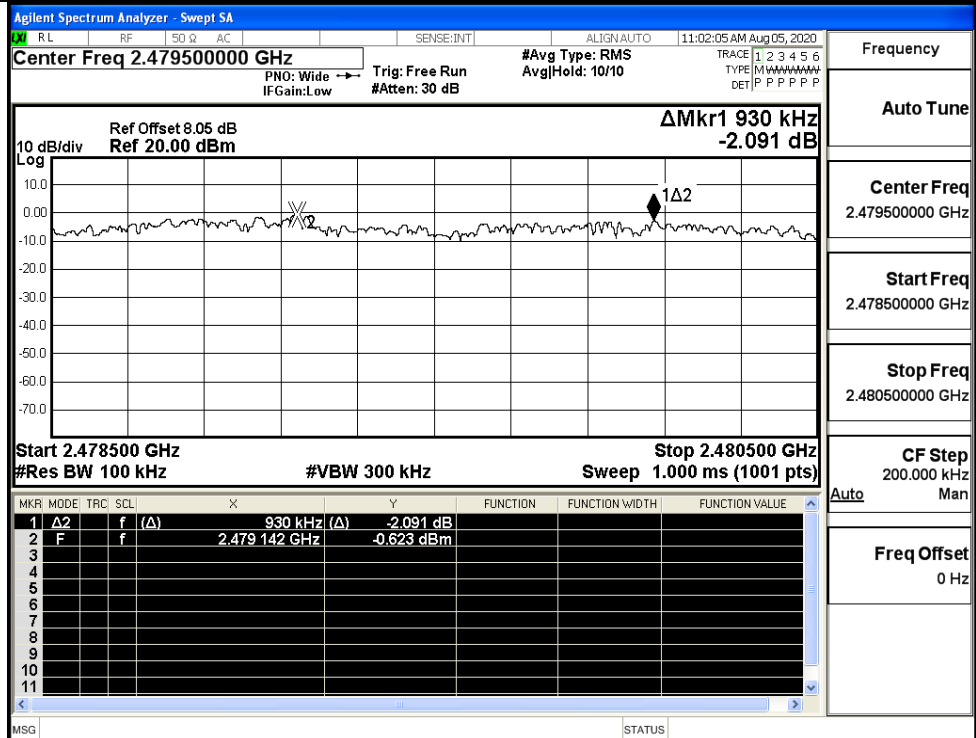
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH

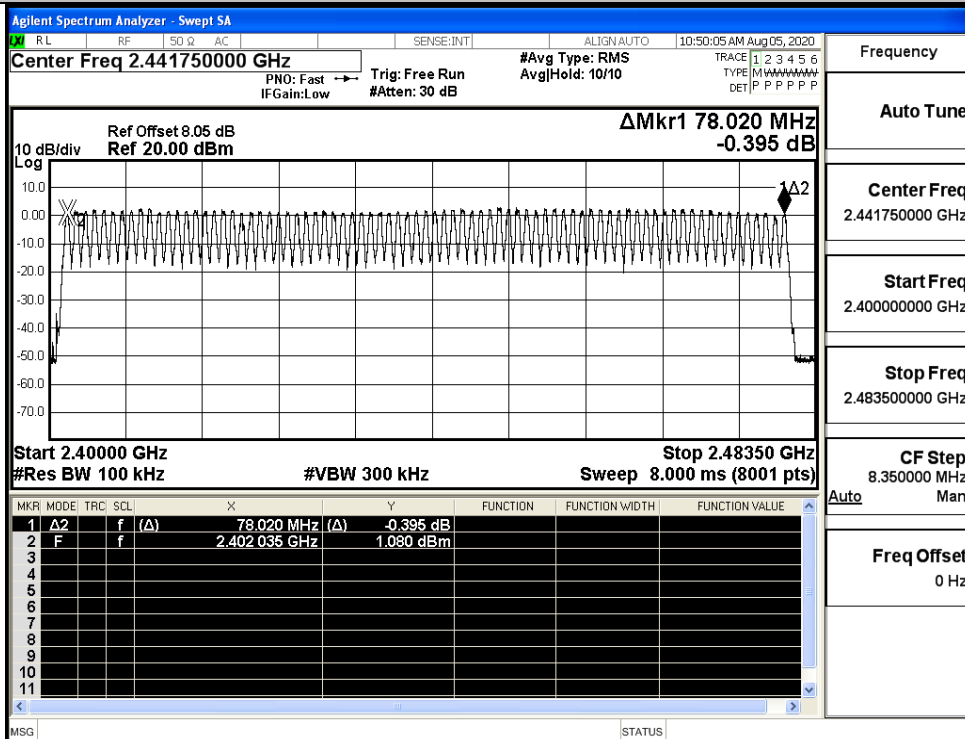


A.4 Hopping Channel Number

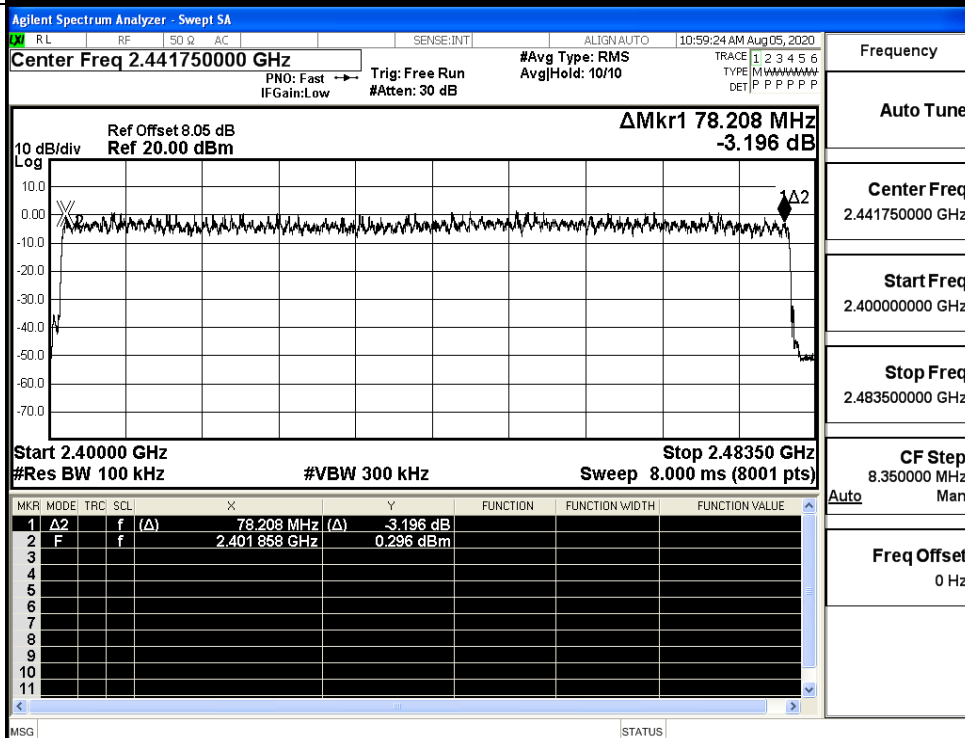
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

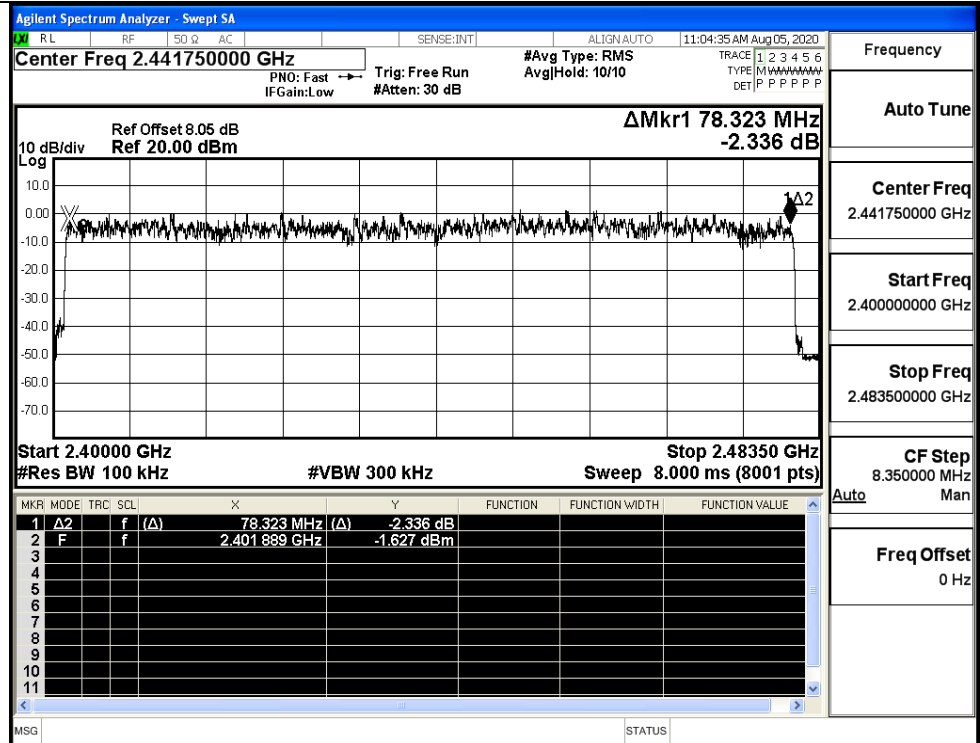
GFSK/Hop



$\pi/4$ DQPSK/Hop



8DPSK/Hop

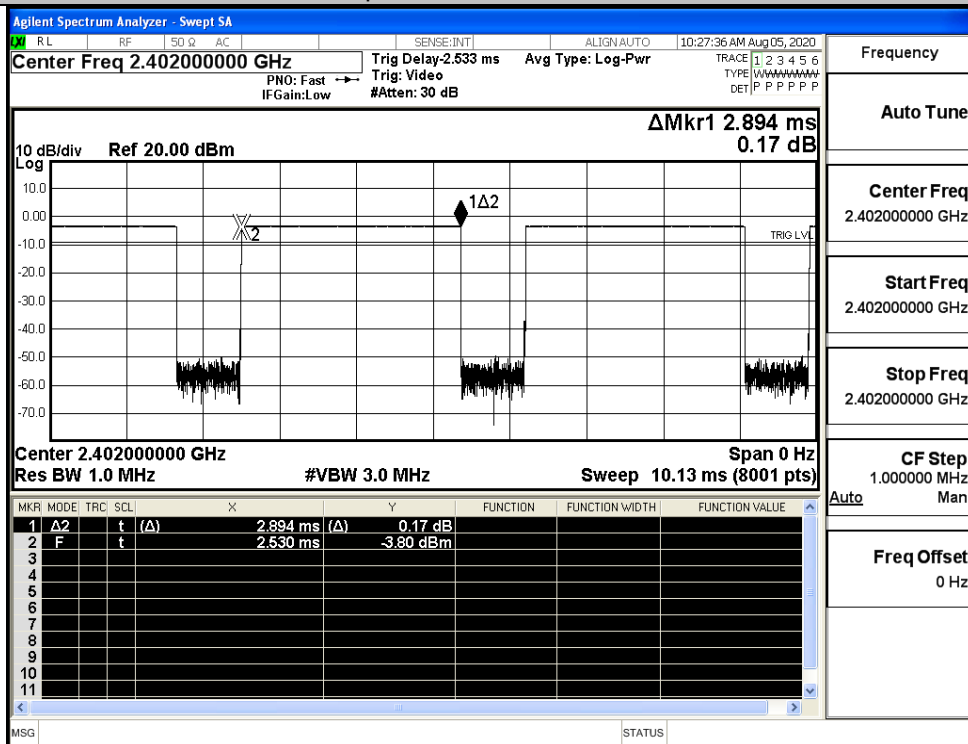


A.5 Dwell Time

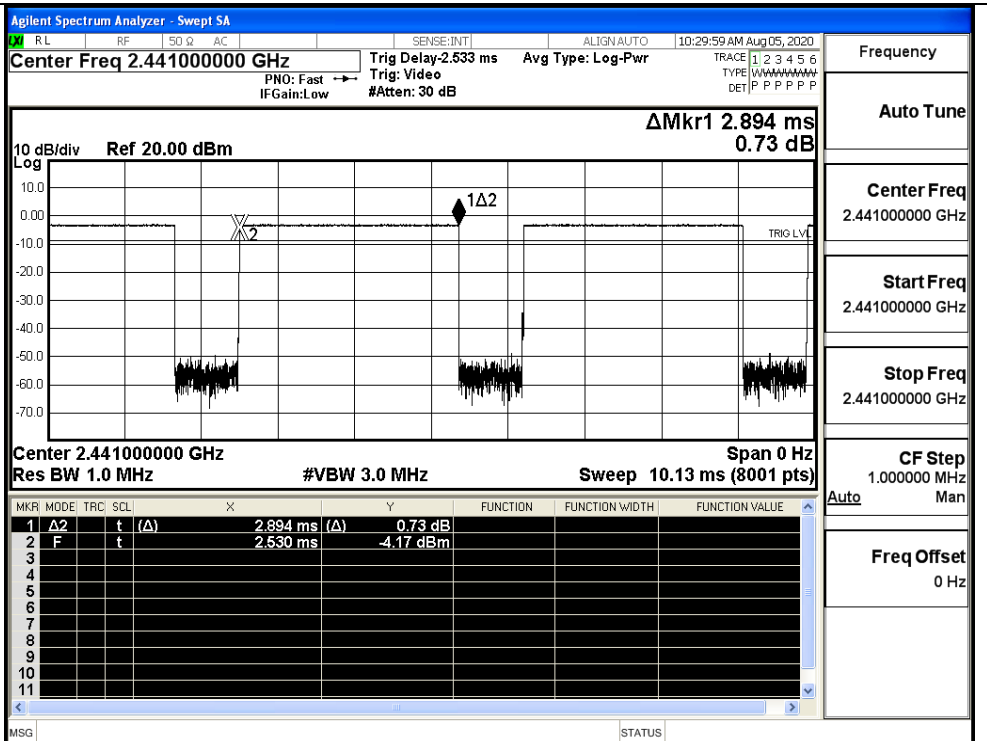
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	2.89	106.7	0.307	0.4	PASS
	2DH5	MCH	2.89	106.7	0.307	0.4	PASS
	2DH5	HCH	2.89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

Test Graphs

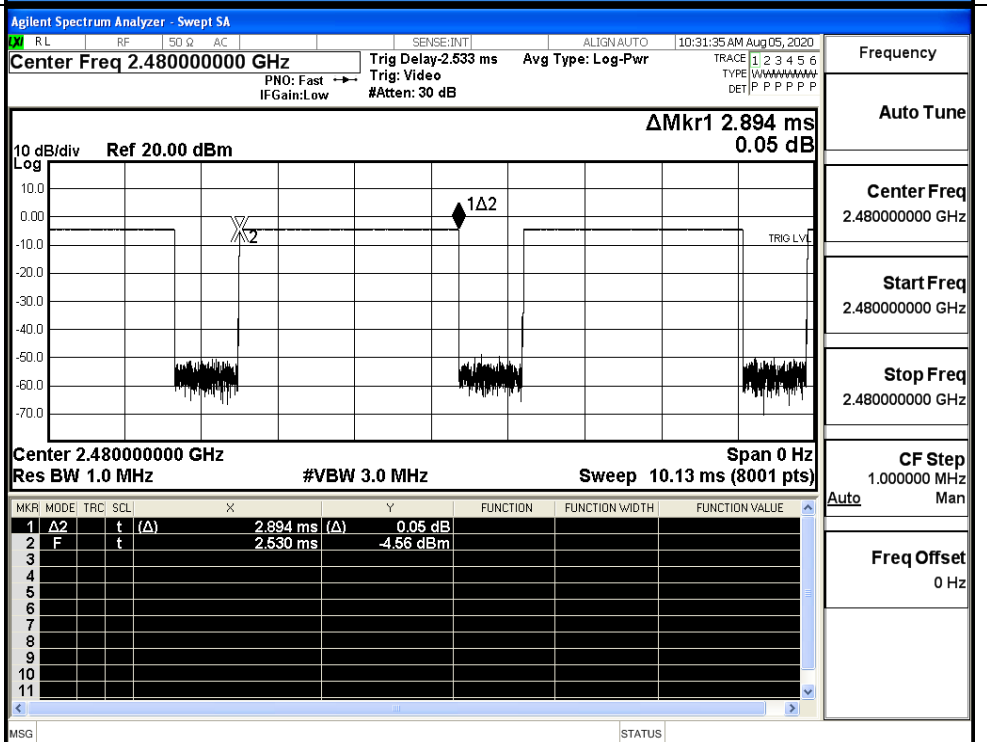
GFSK_DH5/LCH



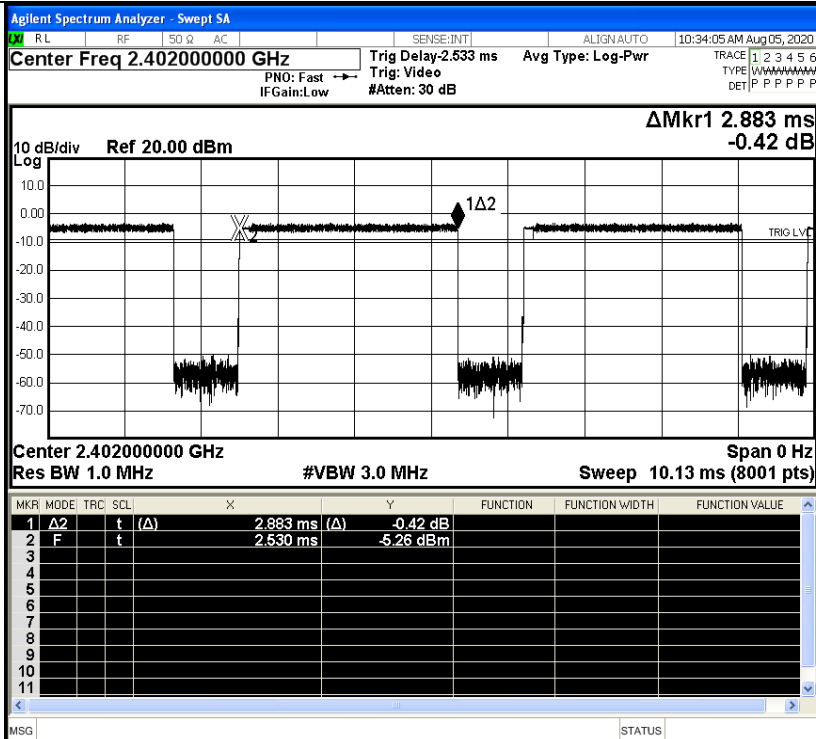
GFSK_DH5/MCH



GFSK_DH5/HCH



$\pi/4$ DQPSK
_2DH5/LCH

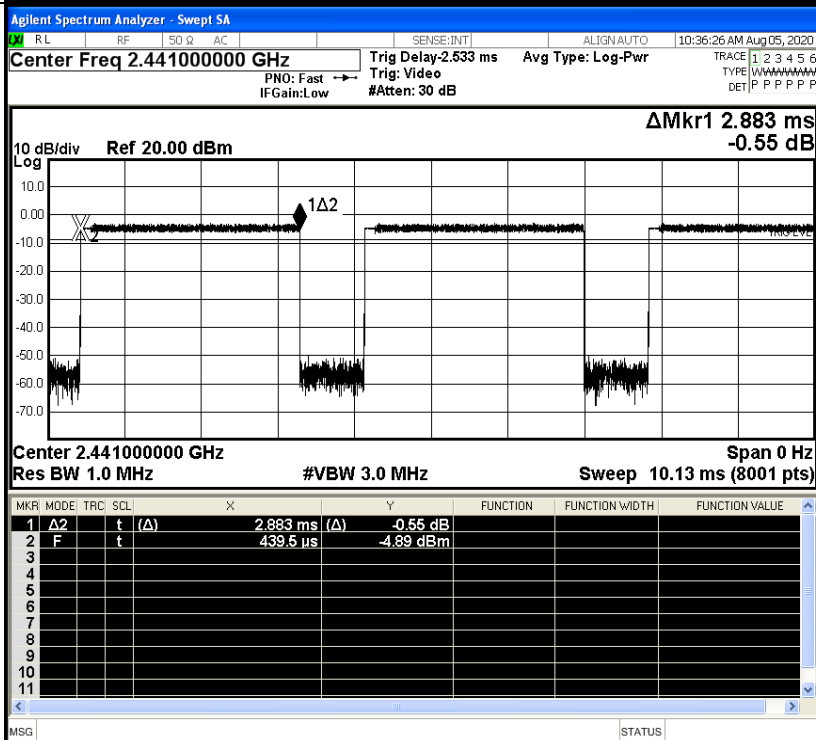


Frequency

Auto Tune

Center Freq
2.402000000 GHzStart Freq
2.402000000 GHzStop Freq
2.402000000 GHzCF Step
1.000000 MHz
Auto ManFreq Offset
0 Hz

$\pi/4$ DQPSK
_2DH5/MCH

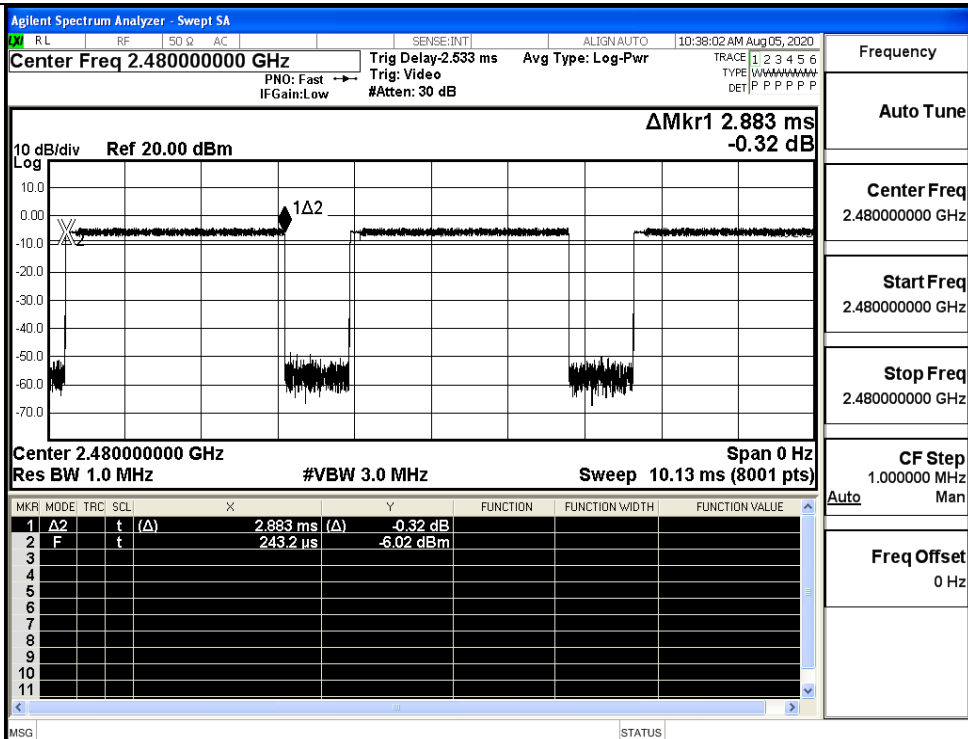


Frequency

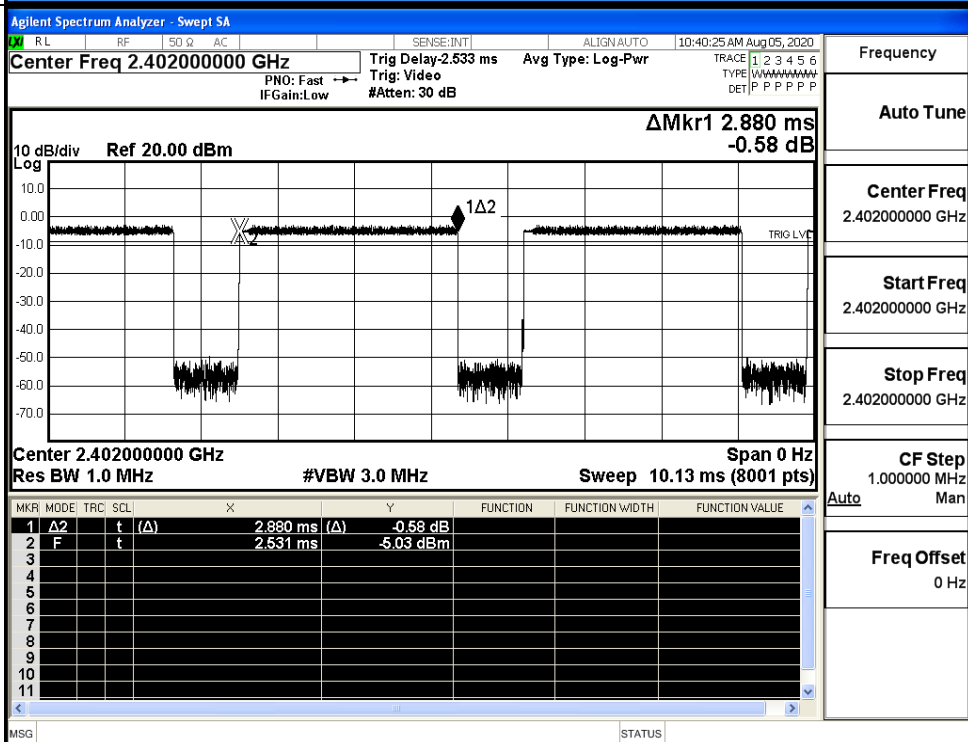
Auto Tune

Center Freq
2.441000000 GHzStart Freq
2.441000000 GHzStop Freq
2.441000000 GHzCF Step
1.000000 MHz
Auto ManFreq Offset
0 Hz

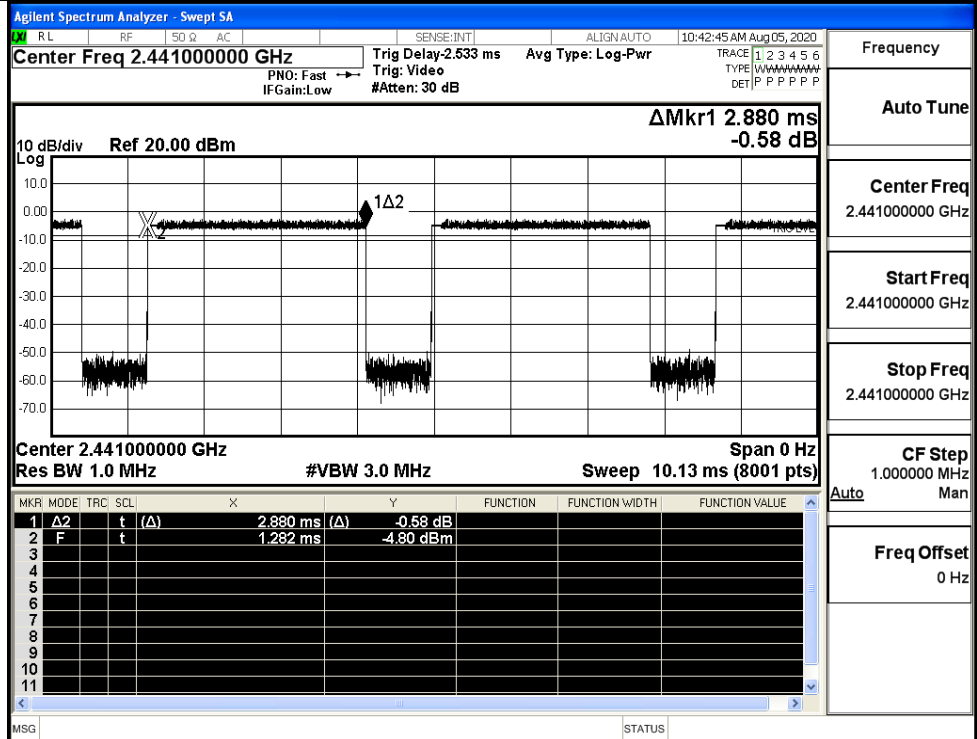
$\pi/4$ DQPSK
_2DH5/HCH



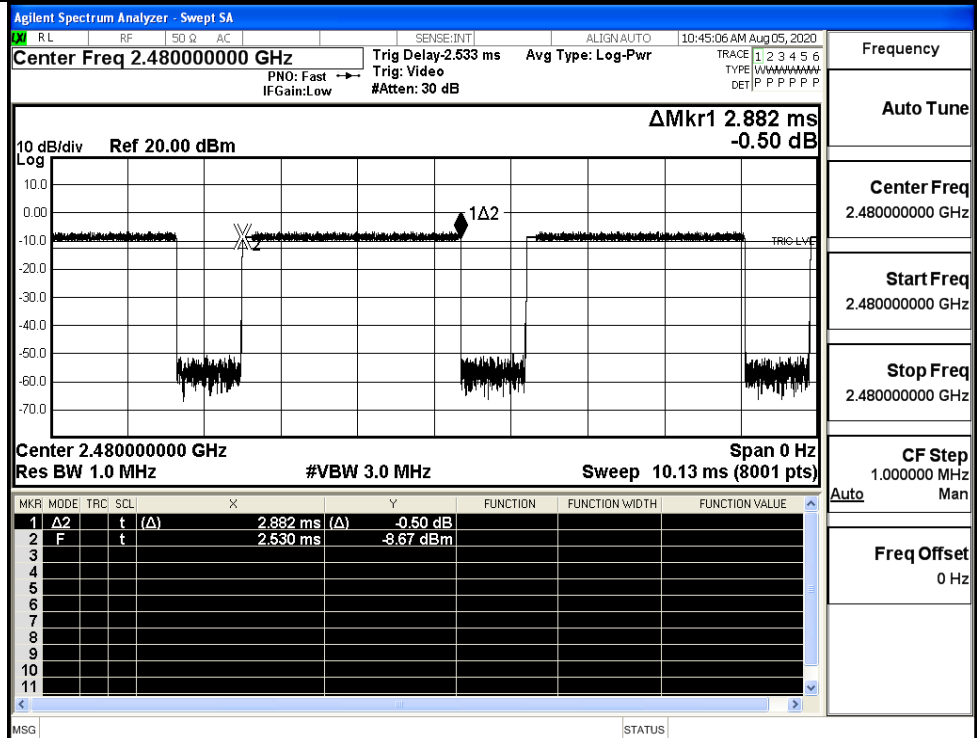
8DPSK _3DH5/LCH



8DPSK_3DH5/MCH



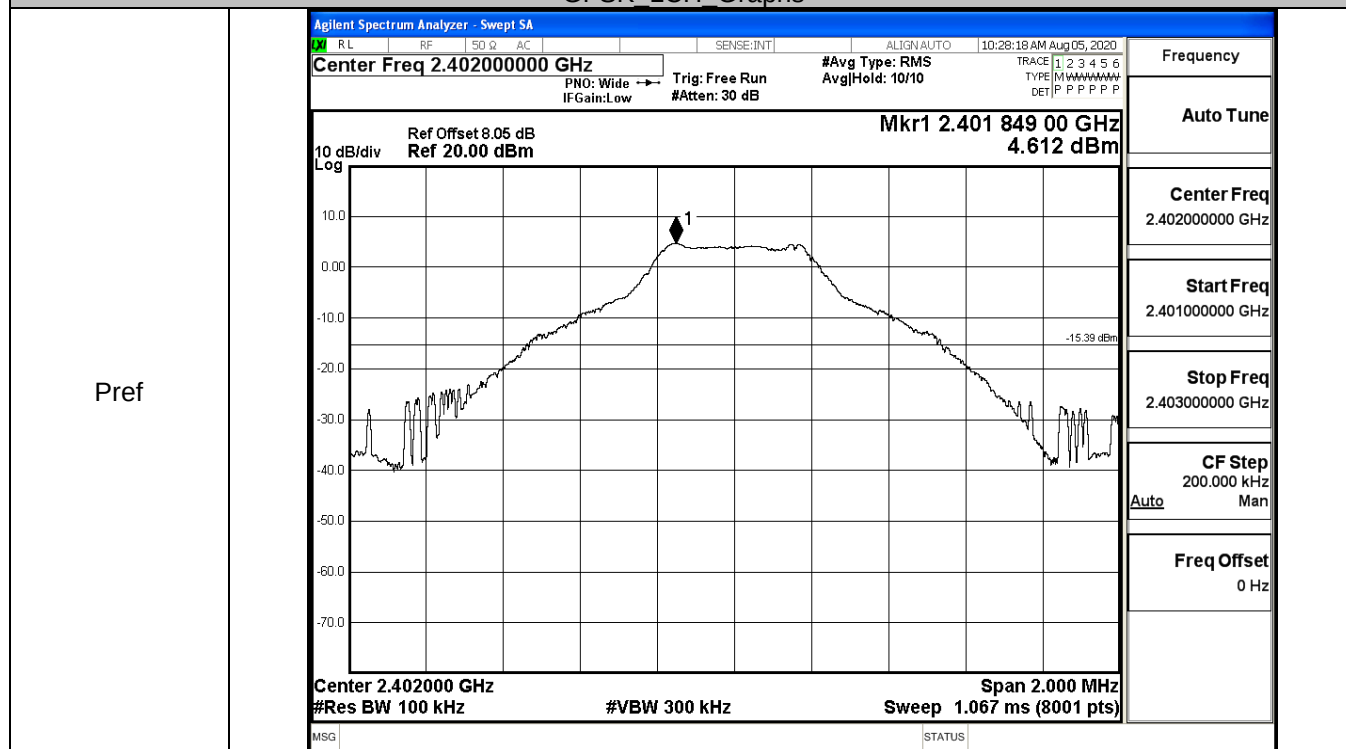
8DPSK_3DH5/HCH



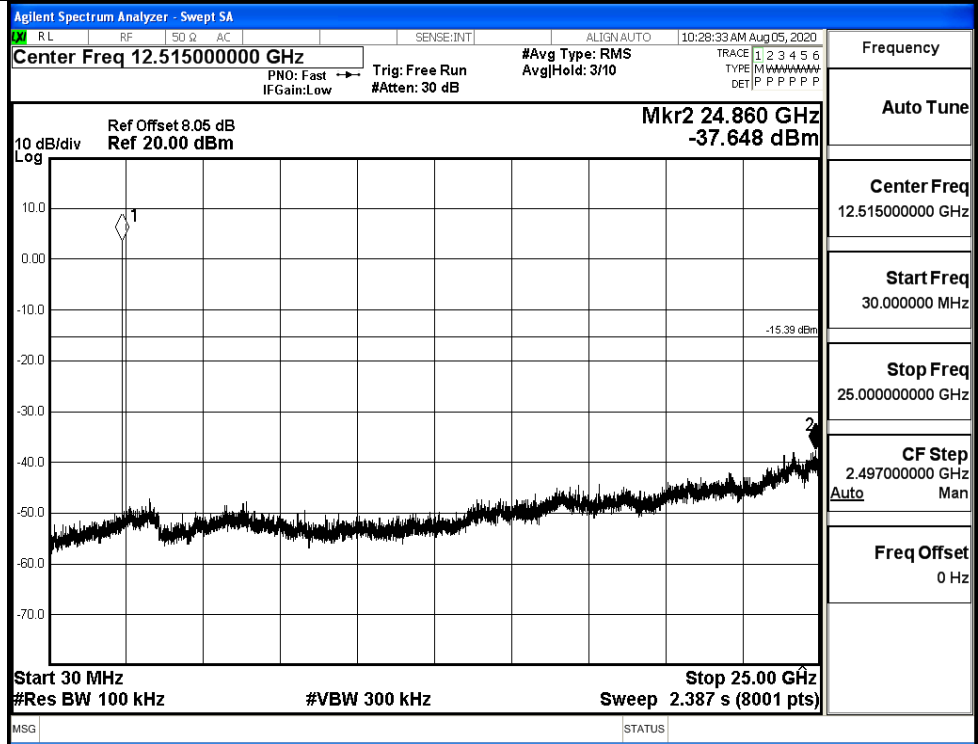
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.612	-37.648	-15.388	PASS
	MCH	4.808	-36.731	-15.192	PASS
	HCH	3.761	-37.714	-16.239	PASS
$\pi/4$ DQPSK	LCH	3.028	-36.951	-16.972	PASS
	MCH	3.428	-37.292	-16.572	PASS
	HCH	2.342	-38.003	-17.658	PASS
8DPSK	LCH	3.155	-37.959	-16.845	PASS
	MCH	3.404	-37.989	-16.596	PASS
	HCH	-0.385	-37.233	-20.385	PASS

GFSK LCH Graphs

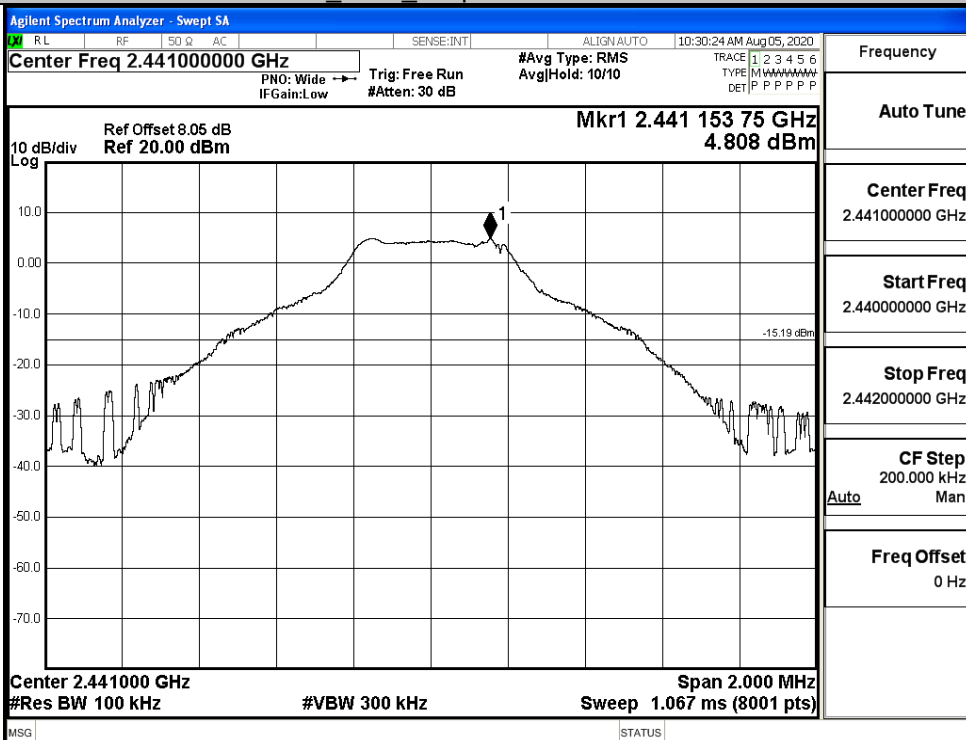


Puw

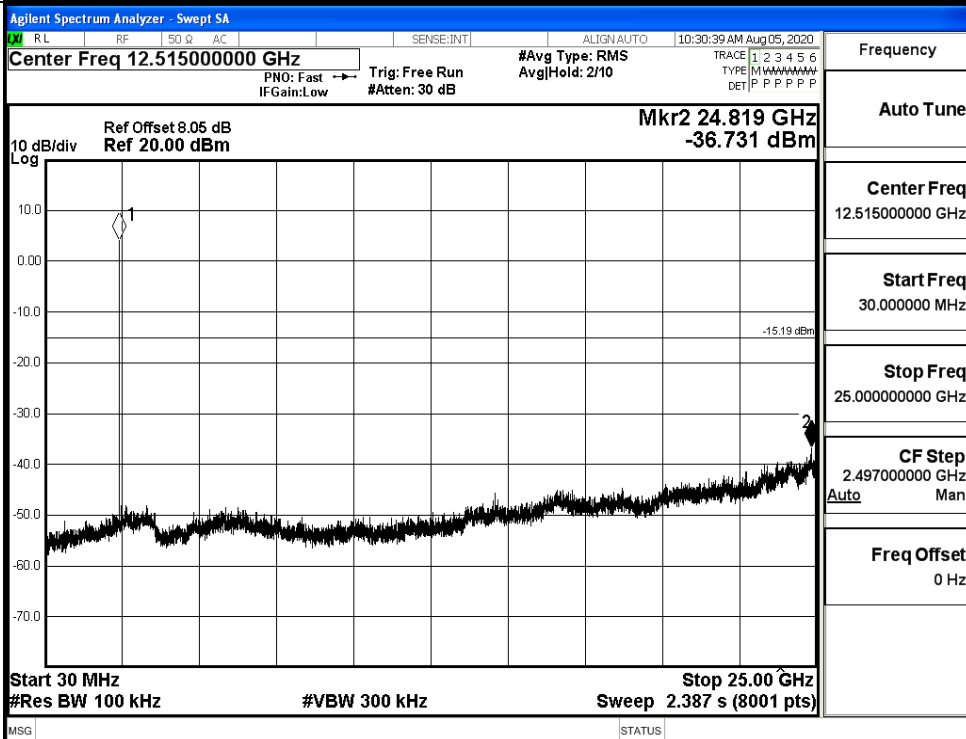


GFSK_MCH_Graphs

Pref

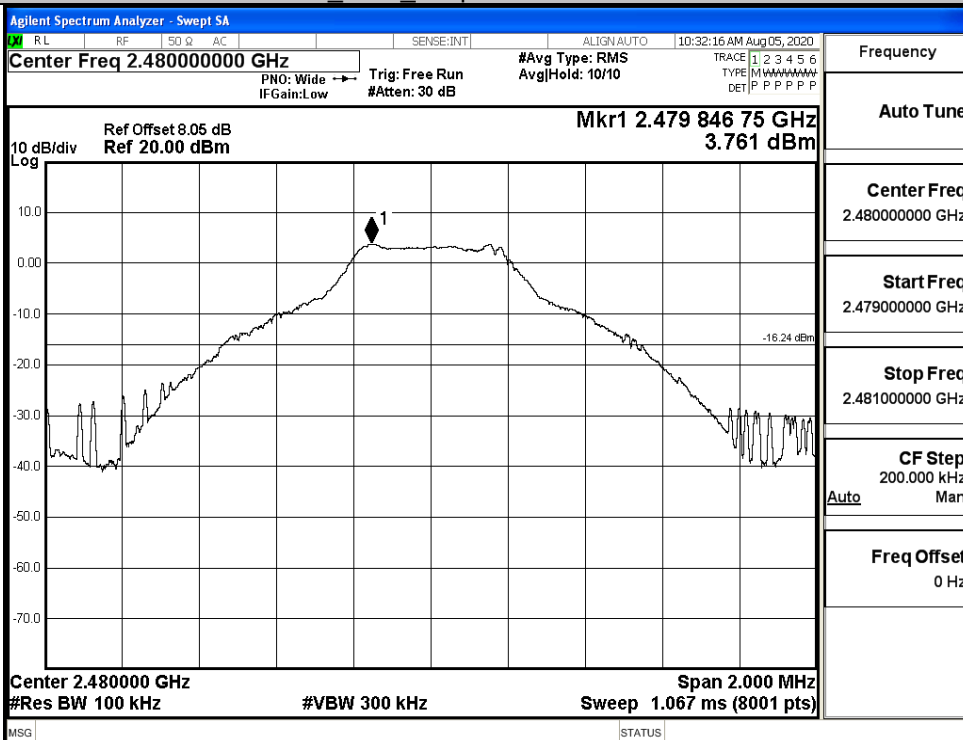


Puw

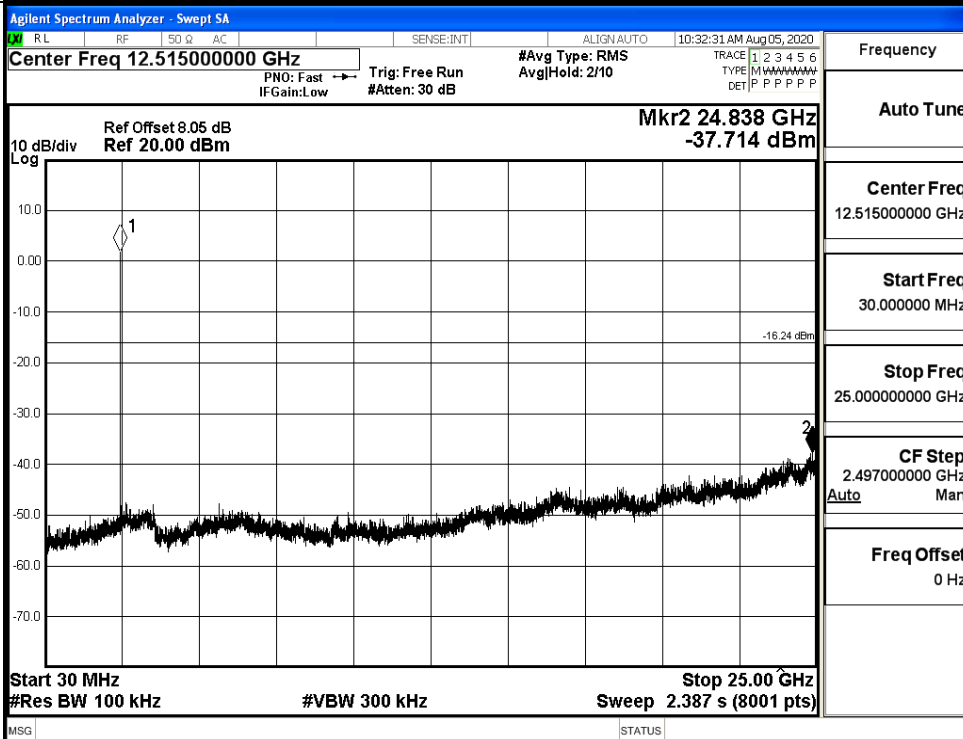


GFSK HCH Graphs

Pref

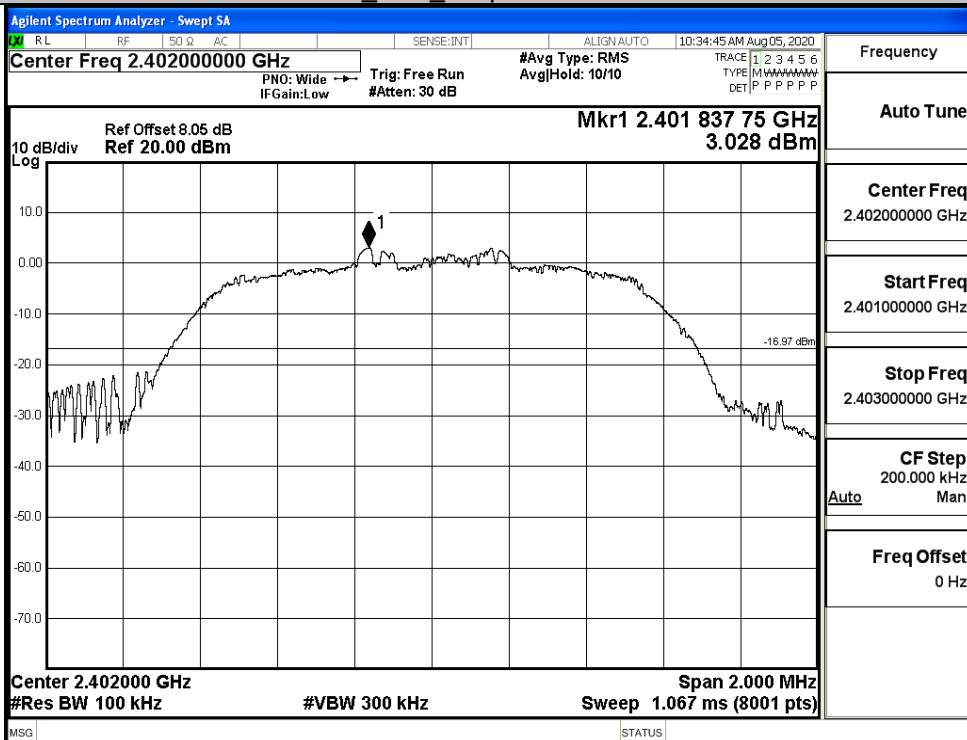


Puw

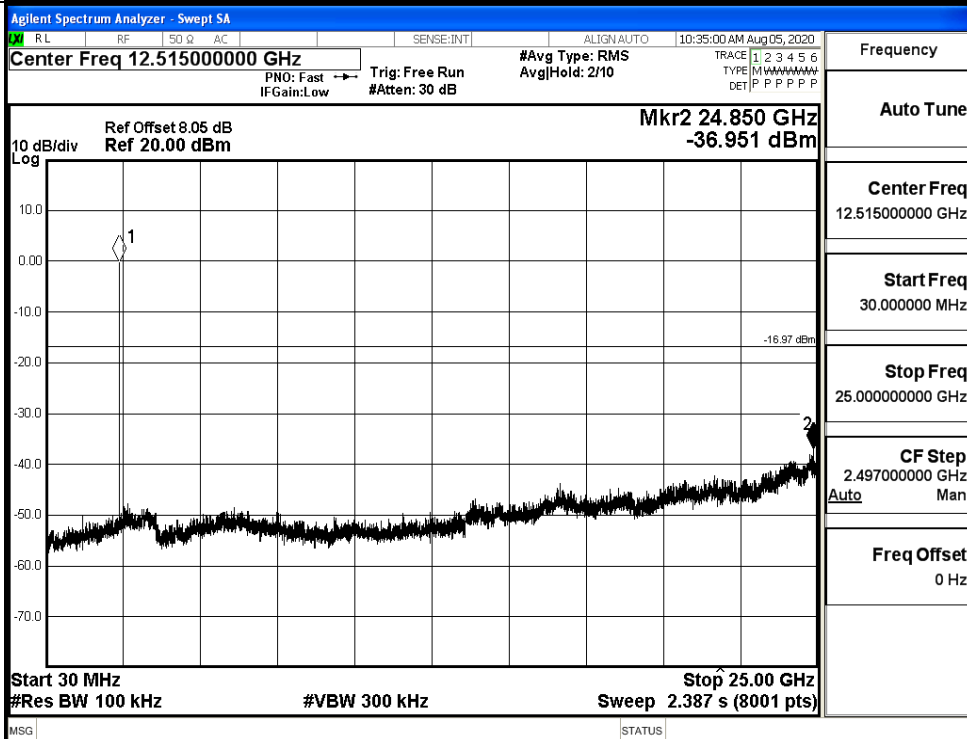


$\pi/4$ DQPSK_LCH_Graphs

Pref

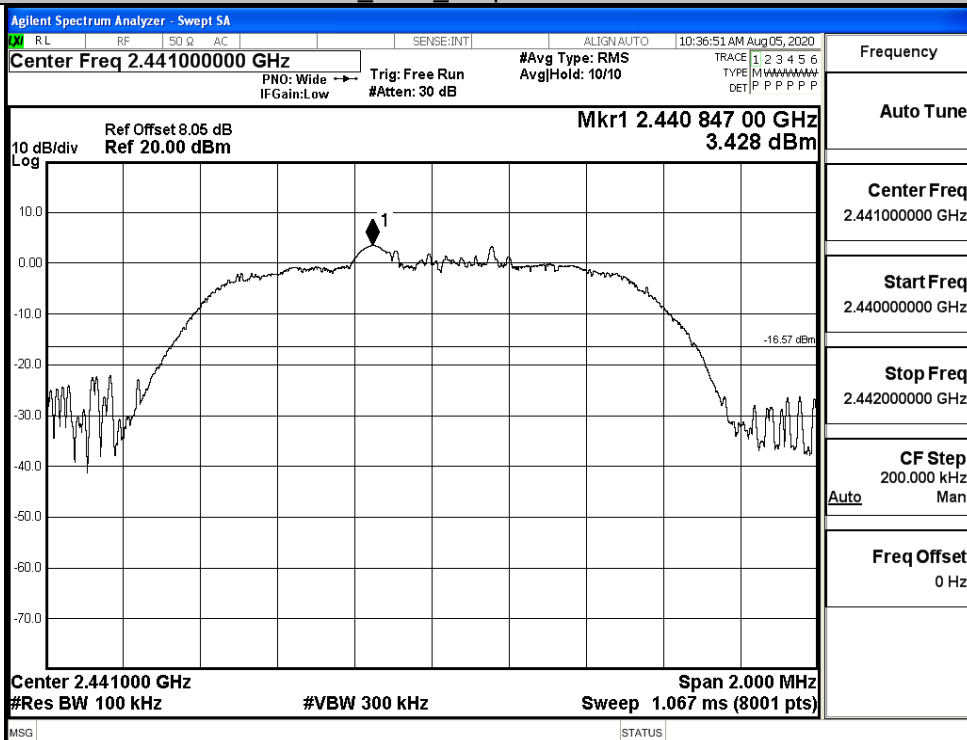


Puw

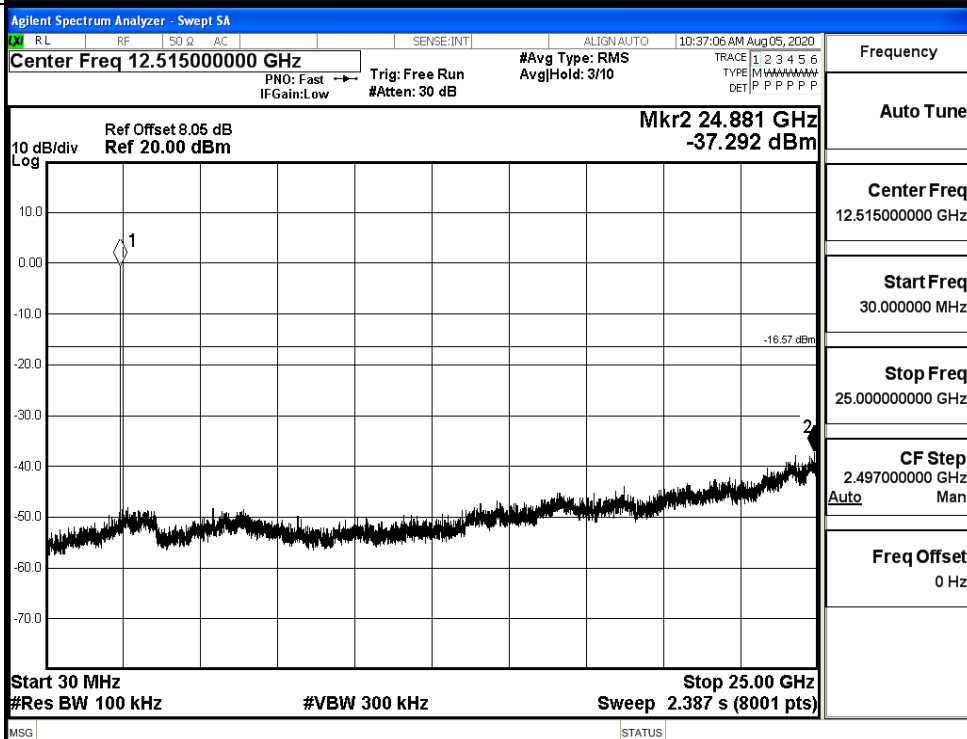


π /4DQPSK_MCH_Graphs

Pref

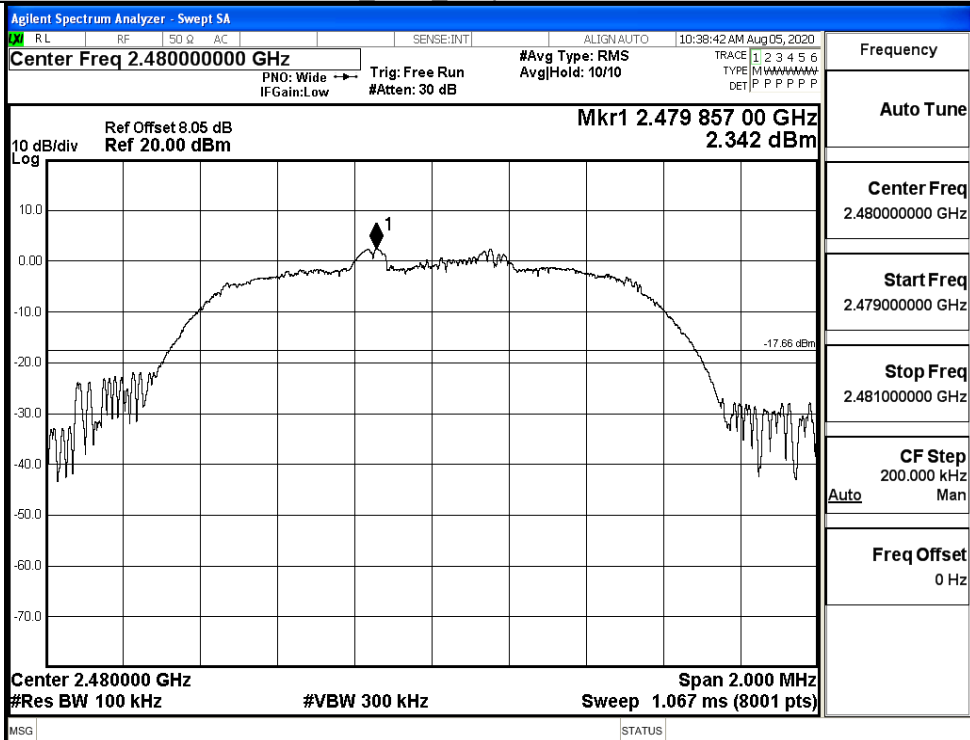


Puw

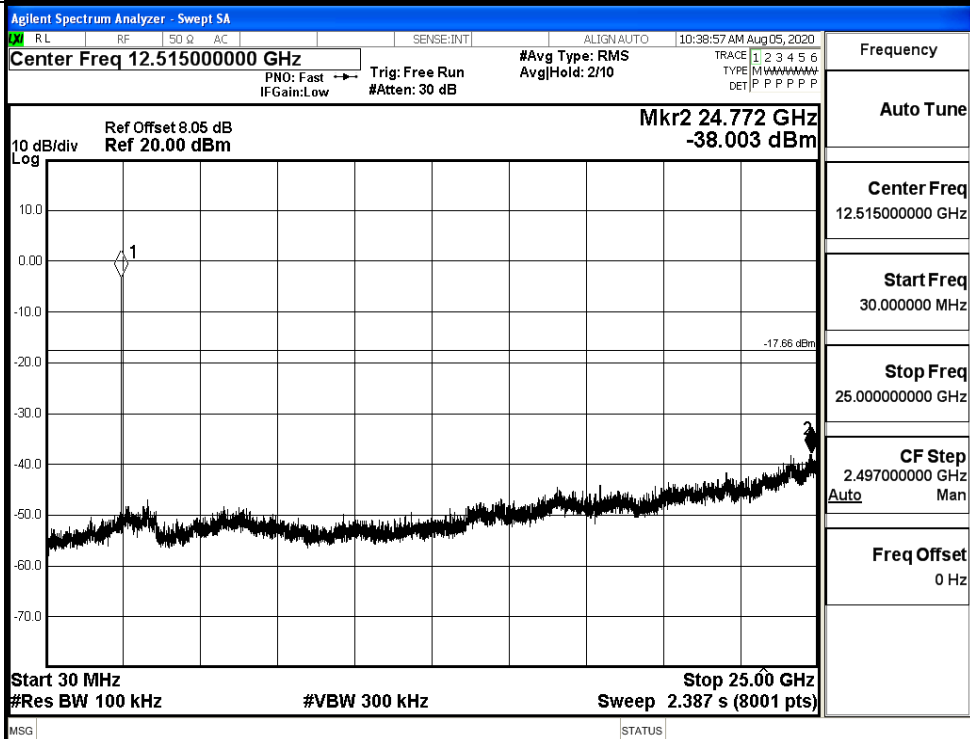


$\pi/4$ DQPSK_HCH_Graphs

Pref

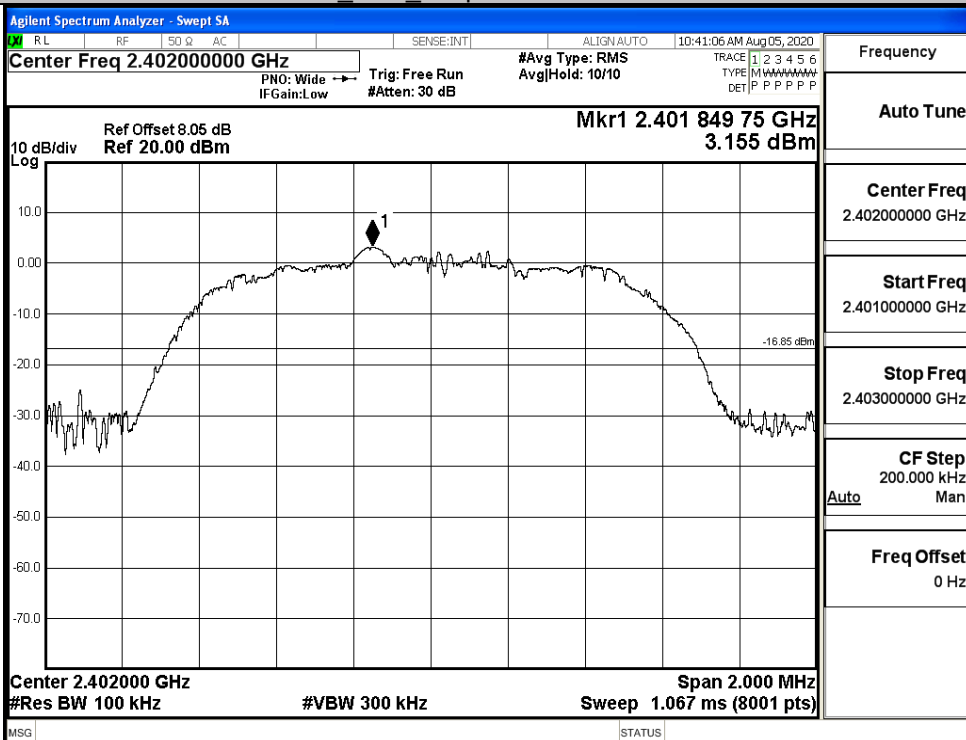


Puw

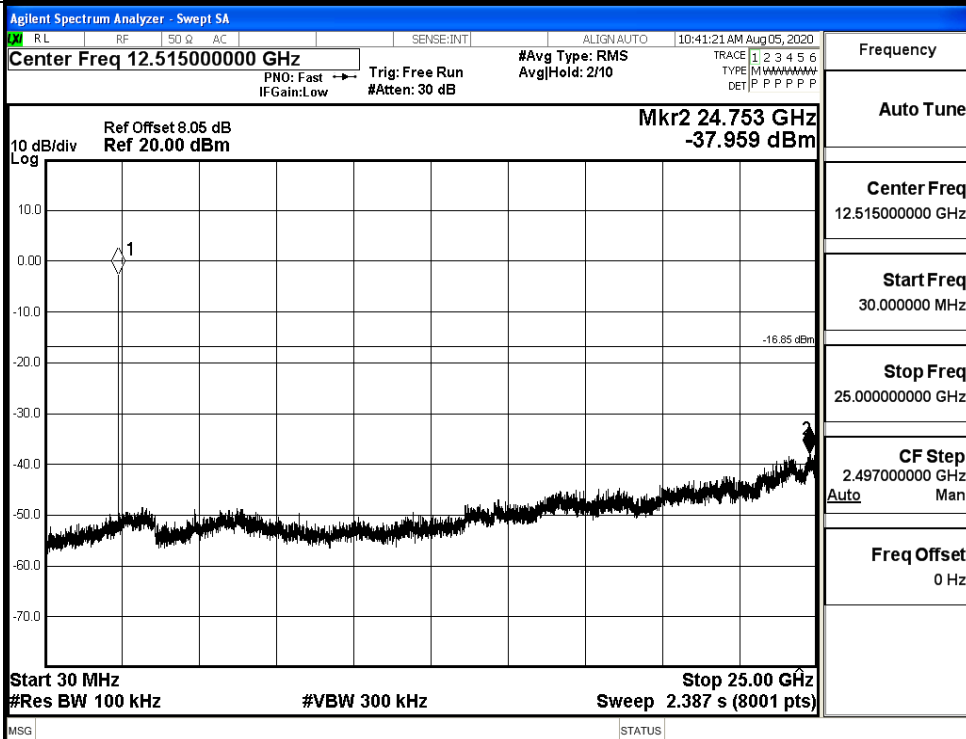


8DPSK_LCH_Graphs

Pref

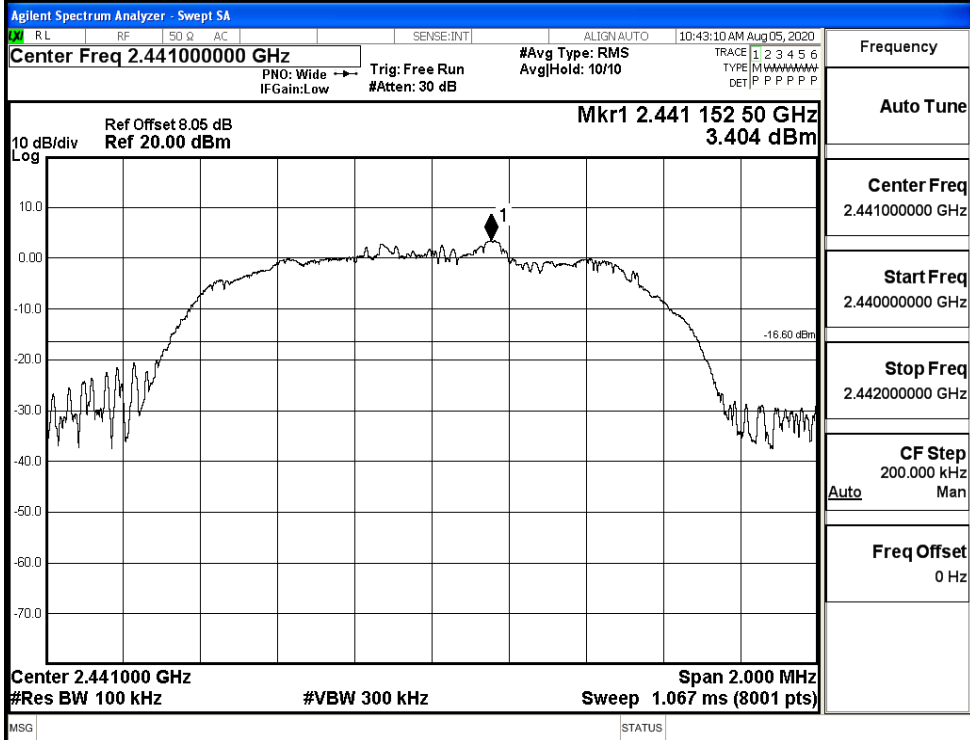


Puw

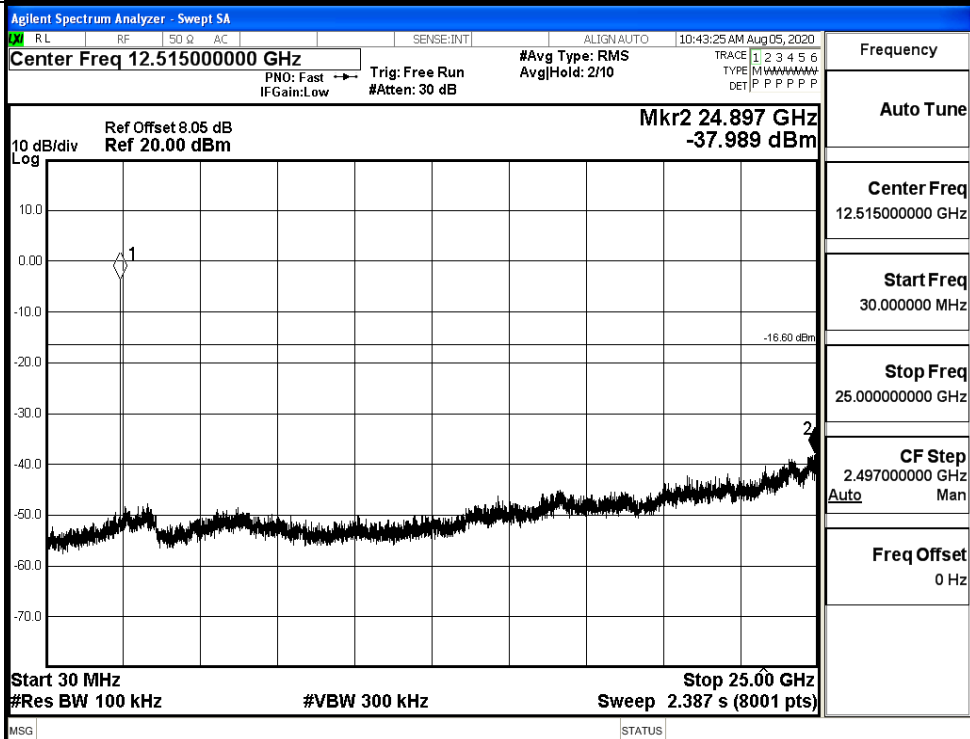


8DPSK_MCH_Graphs

Pref

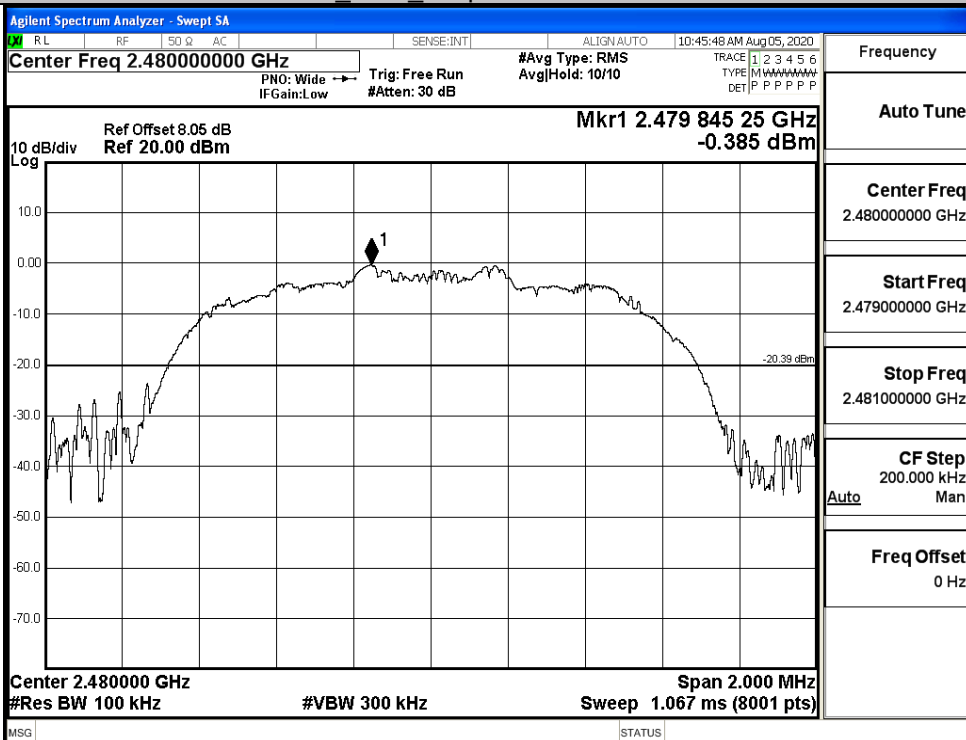


Puw

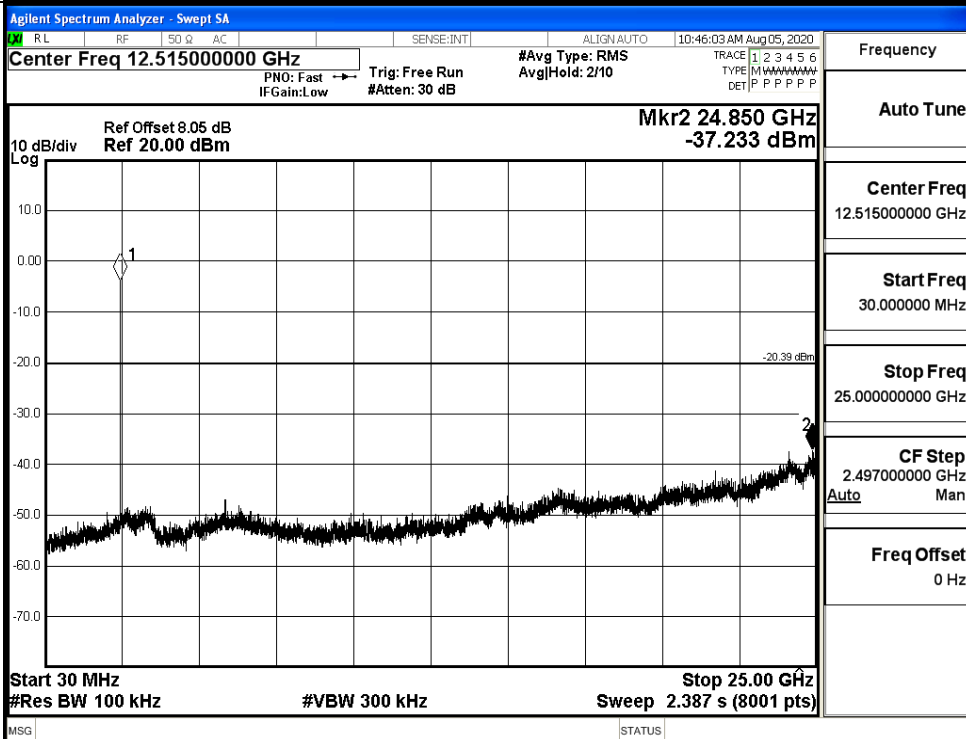


8DPSK_HCH_Graphs

Pref



Puw

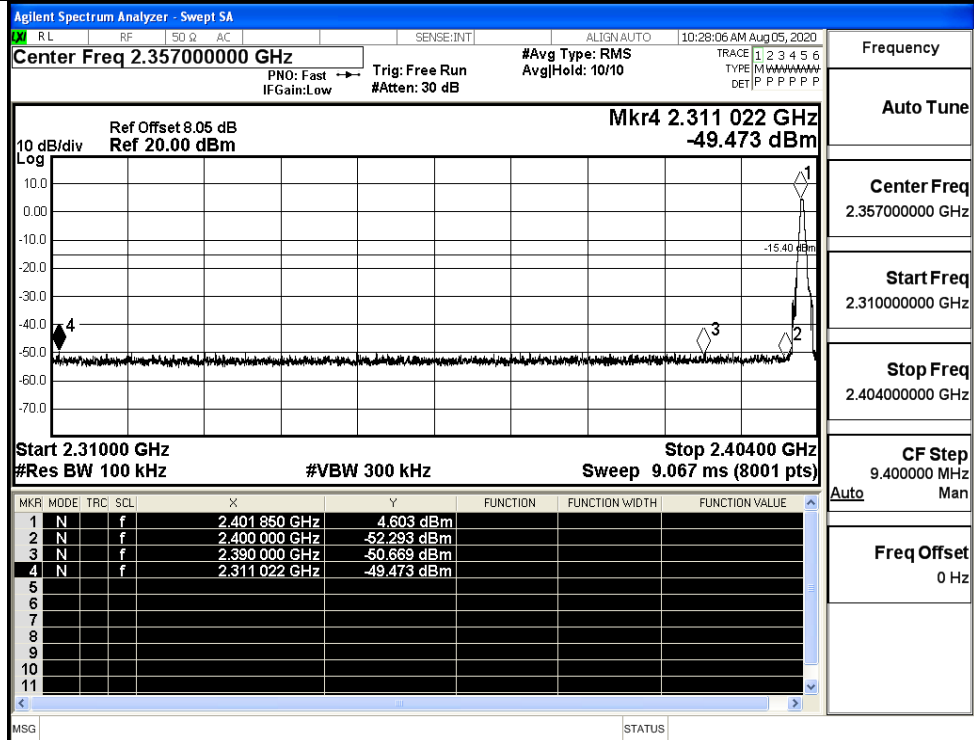


A.7 Band-edge for RF Conducted Emissions

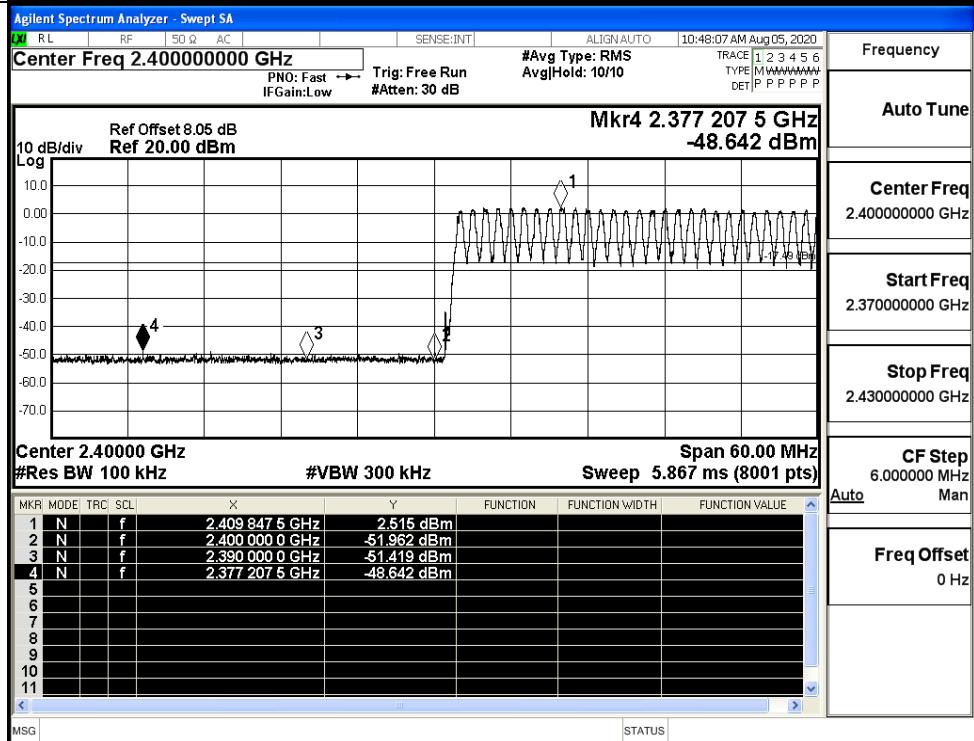
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.603	Off	-49.473	-15.40	PASS
			2.515	On	-48.642	-17.49	PASS
	HCH	2480	3.736	Off	-49.032	-16.26	PASS
			2.470	On	-48.748	-17.53	PASS
$\pi/4$ DQPSK	LCH	2402	3.106	Off	-49.723	-16.89	PASS
			1.189	On	-48.590	-18.81	PASS
	HCH	2480	2.314	Off	-49.253	-17.69	PASS
			1.069	On	-48.602	-18.93	PASS
8DPSK	LCH	2402	3.287	Off	-49.010	-16.71	PASS
			0.976	On	-48.472	-19.02	PASS
	HCH	2480	-0.358	Off	-48.856	-20.36	PASS
			1.301	On	-48.638	-18.7	PASS

Test Graphs

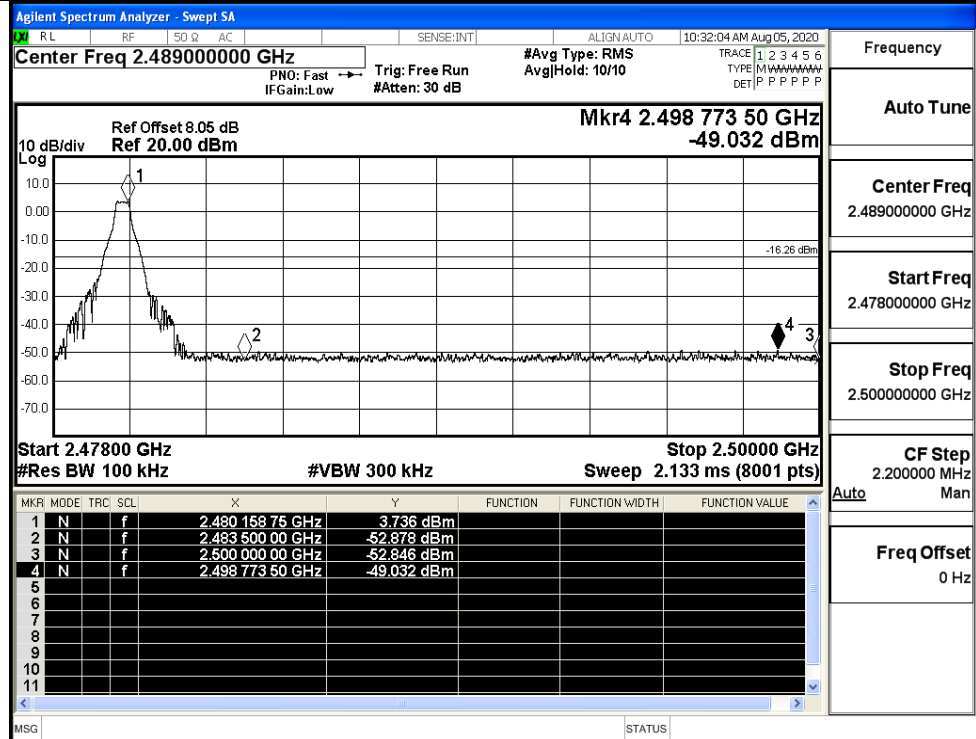
GFSK/LCH/No Hop



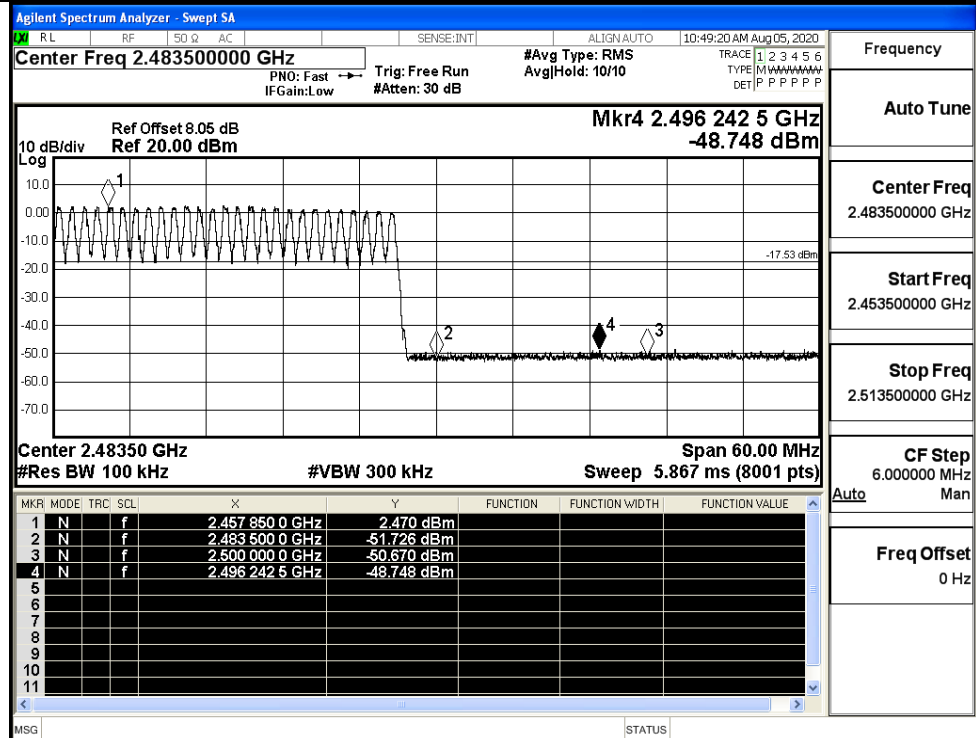
GFSK/LCH/Hop



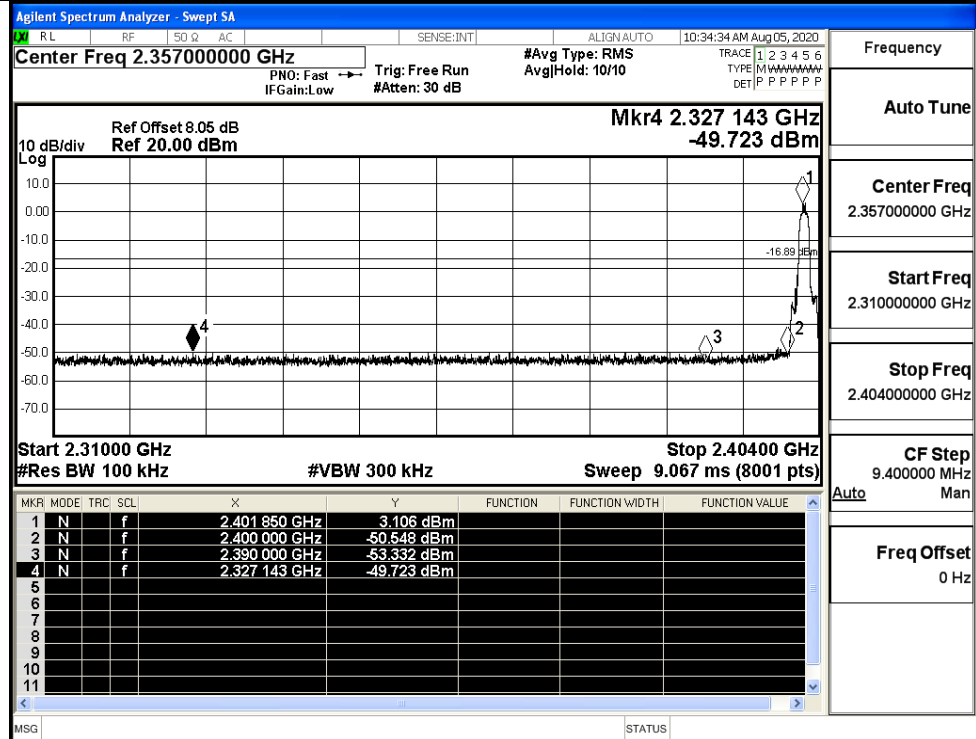
GFSK/HCH/No Hop



GFSK/HCH/Hop



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



Frequency

Auto Tune

Center Freq
2.357000000 GHz

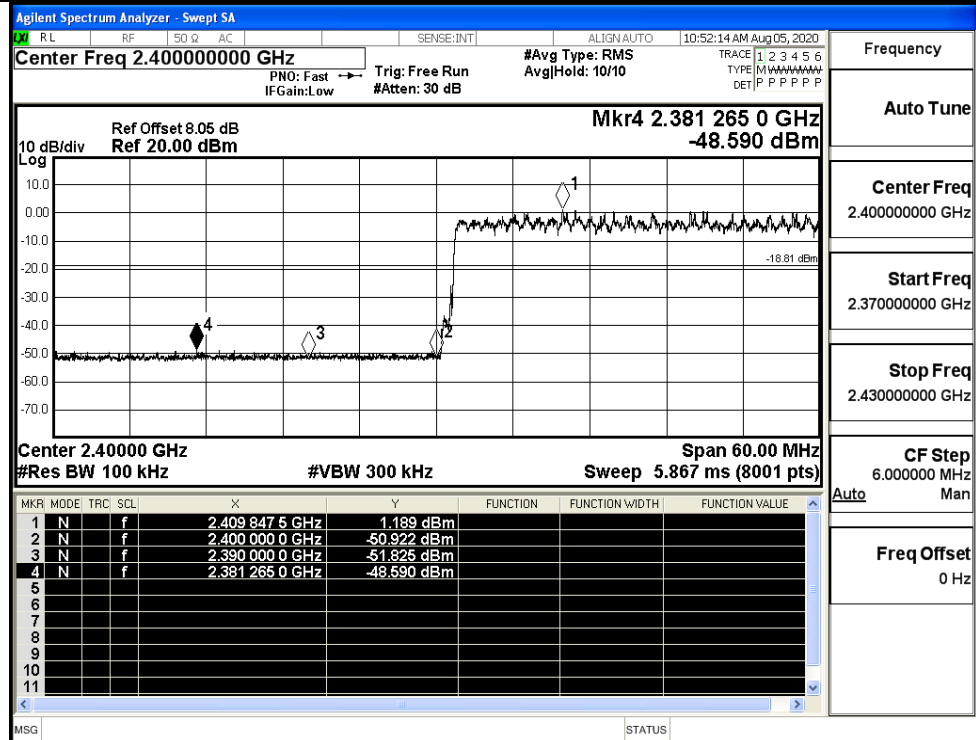
Start Freq
2.310000000 GHz

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

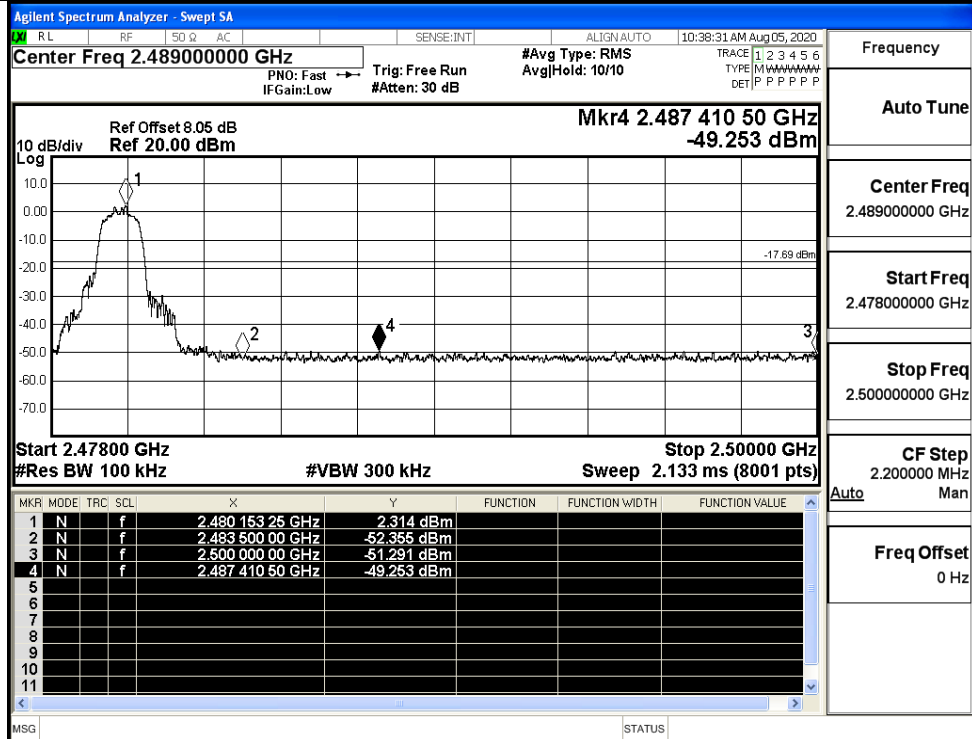
Start Freq
2.370000000 GHz

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

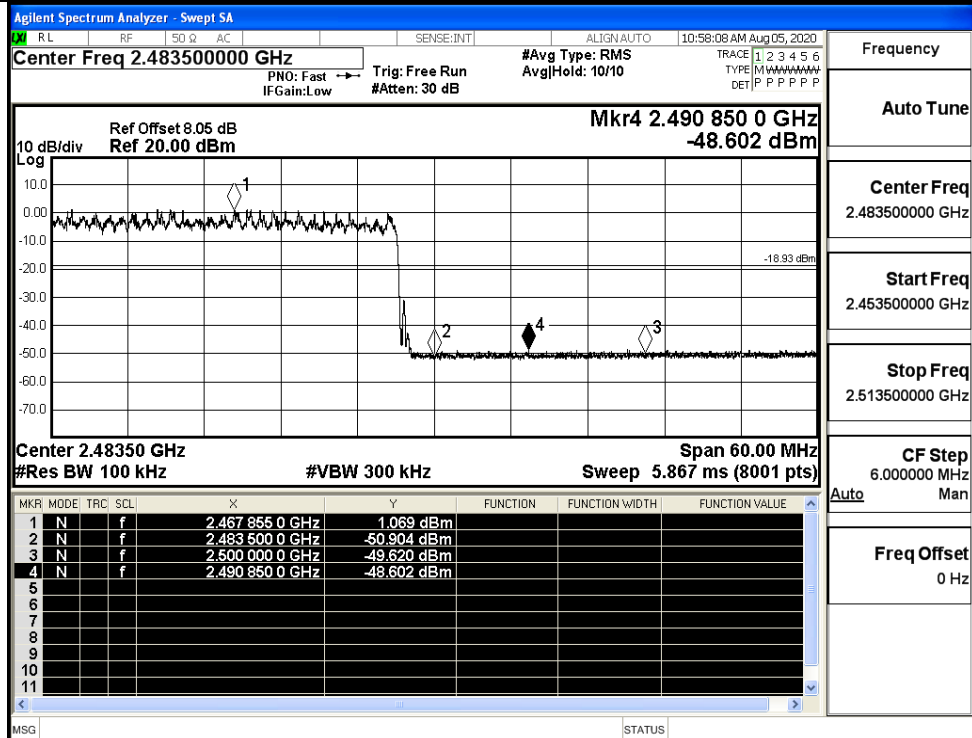
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz

Freq Offset
0 Hz

$\pi/4$ DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

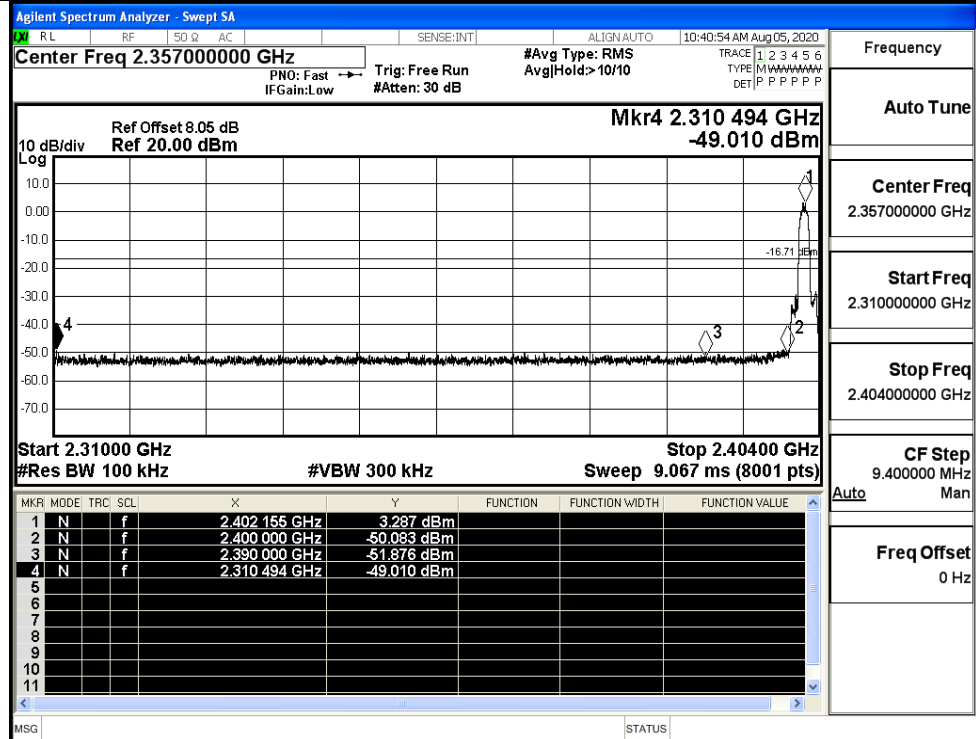
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

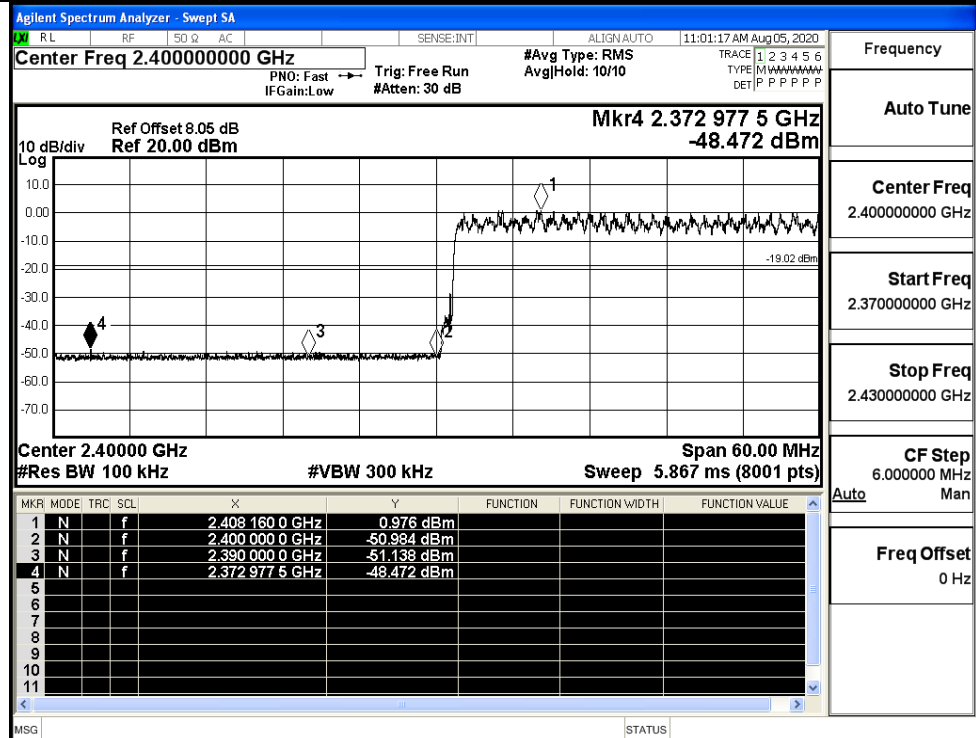
CF Step
6.000000 MHz

Freq Offset
0 Hz

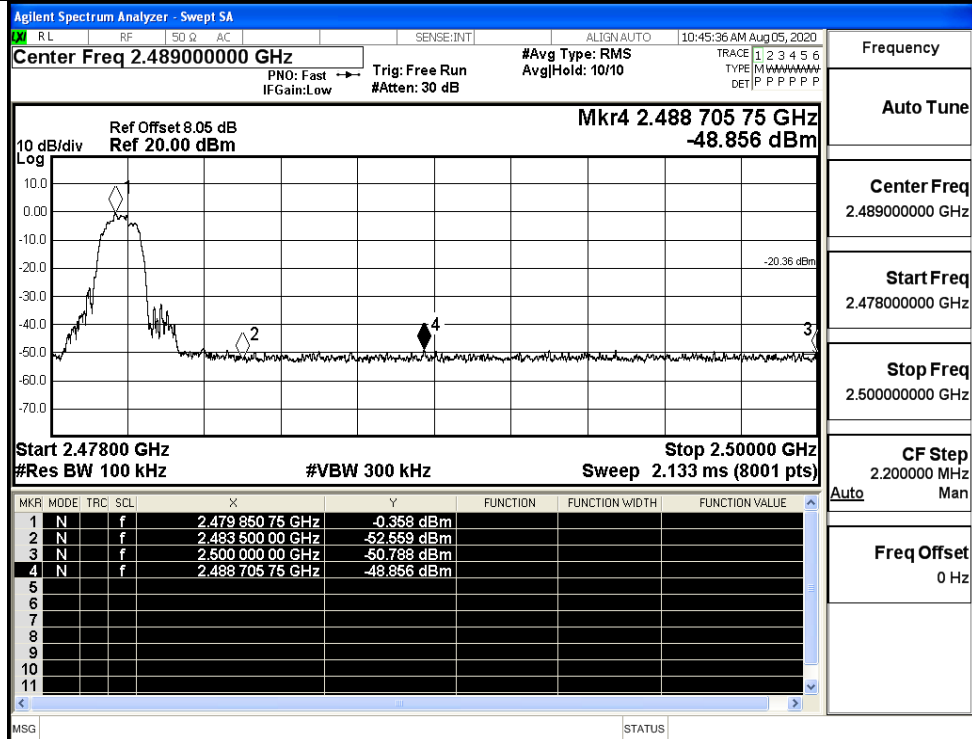
8DPSK/LCH/No Hop



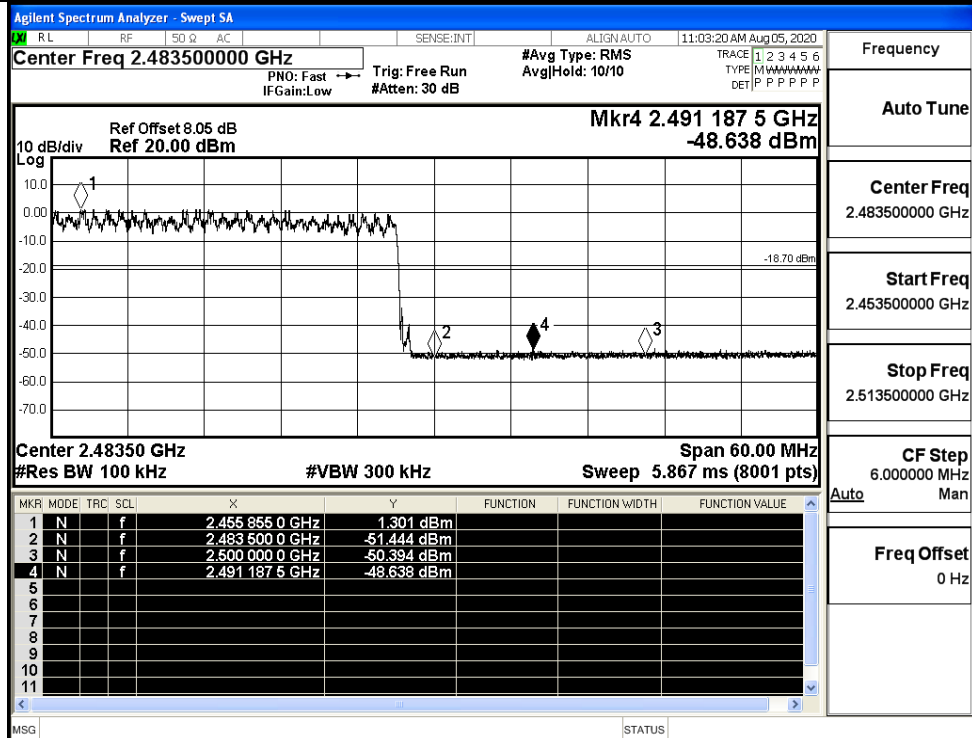
8DPSK/LCH/Hop



8DPSK/HCH/No Hop



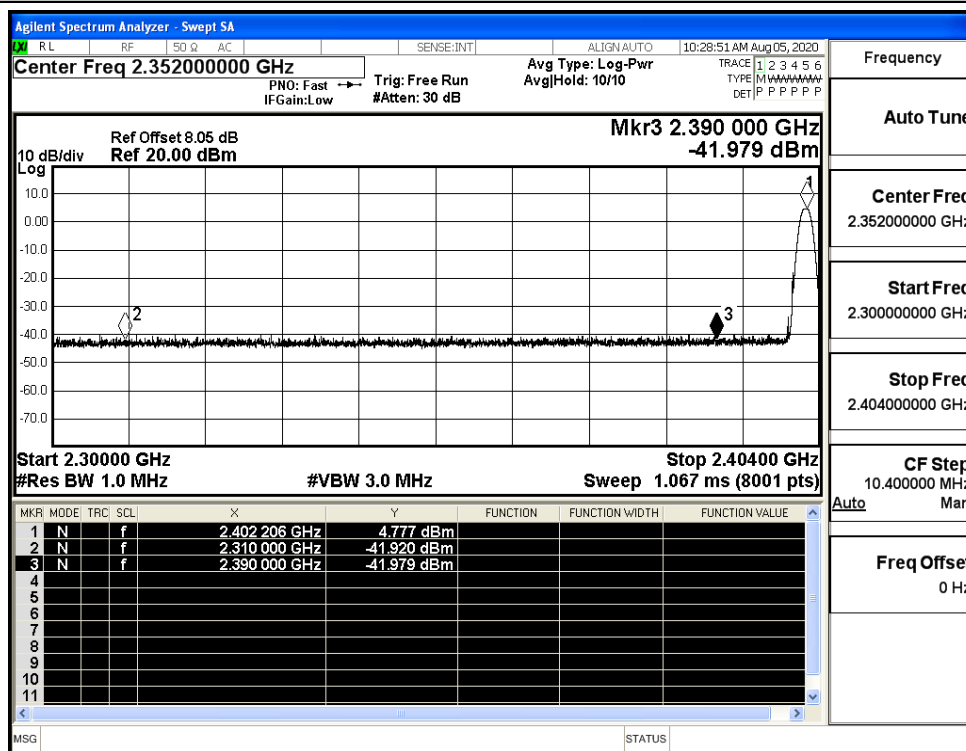
8DPSK/HCH/Hop



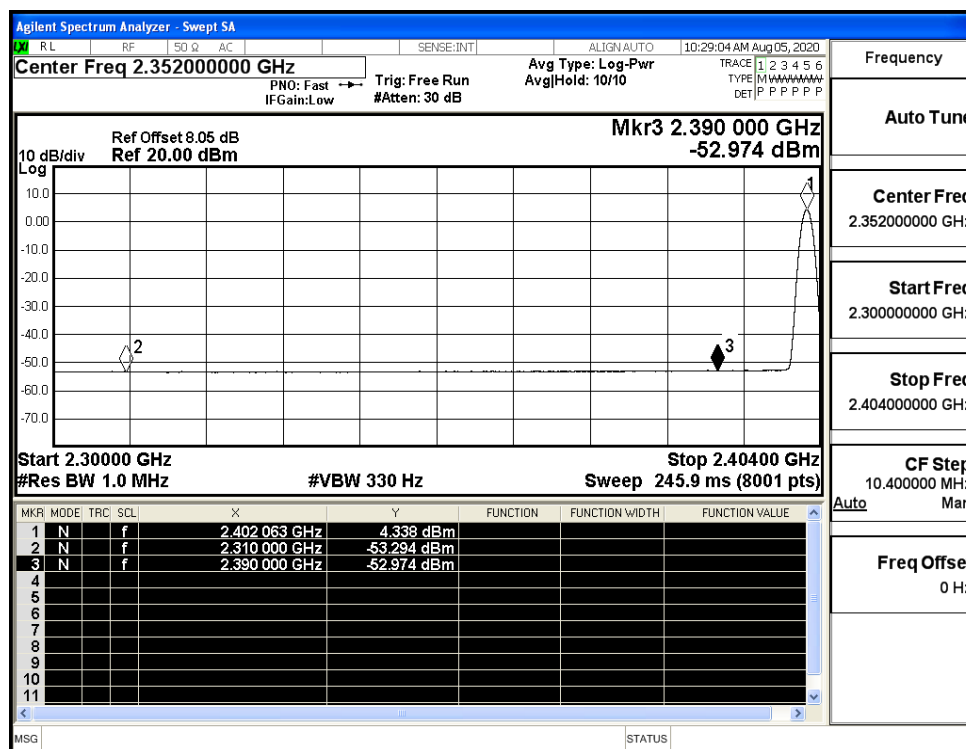
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.92	2.0	0	53.34	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	41.96	AV	54	PASS
	Off	2390.0	-41.98	2.0	0	53.28	PEAK	74	PASS
	Off	2390.0	-52.97	2.0	0	42.28	AV	54	PASS
	Off	2483.5	-41.45	2.0	0	53.80	PEAK	74	PASS
	Off	2483.5	-52.28	2.0	0	42.97	AV	54	PASS
	Off	2500.0	-42.01	2.0	0	53.24	PEAK	74	PASS
	Off	2500.0	-52.28	2.0	0	42.97	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.32	2.0	0	52.94	PEAK	74	PASS
	Off	2310.0	-53.34	2.0	0	41.92	AV	54	PASS
	Off	2390.0	-41.99	2.0	0	53.27	PEAK	74	PASS
	Off	2390.0	-52.85	2.0	0	42.40	AV	54	PASS
	Off	2483.5	-42.59	2.0	0	52.67	PEAK	74	PASS
	Off	2483.5	-52.06	2.0	0	43.20	AV	54	PASS
	Off	2500.0	-41.69	2.0	0	53.57	PEAK	74	PASS
	Off	2500.0	-52.30	2.0	0	42.96	AV	54	PASS
8DPSK	Off	2310.0	-43.18	2.0	0	52.07	PEAK	74	PASS
	Off	2310.0	-53.40	2.0	0	41.86	AV	54	PASS
	Off	2390.0	-42.81	2.0	0	52.45	PEAK	74	PASS
	Off	2390.0	-52.96	2.0	0	42.30	AV	54	PASS
	Off	2483.5	-42.15	2.0	0	53.11	PEAK	74	PASS
	Off	2483.5	-52.31	2.0	0	42.95	AV	54	PASS
	Off	2500.0	-42.46	2.0	0	52.79	PEAK	74	PASS
	Off	2500.0	-52.28	2.0	0	42.97	AV	54	PASS

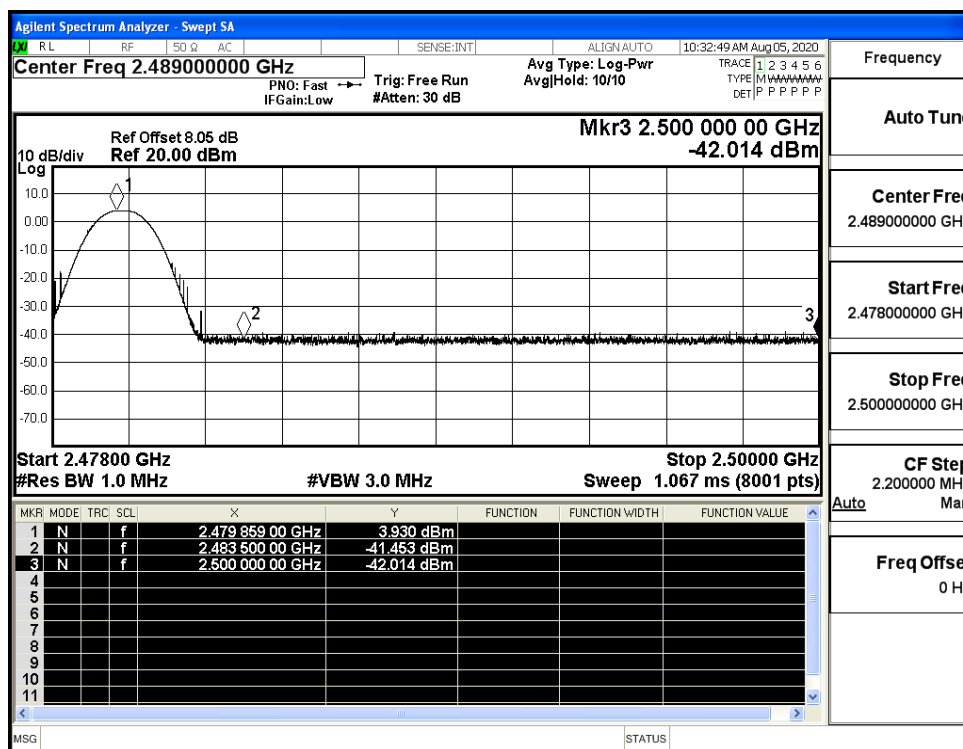
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



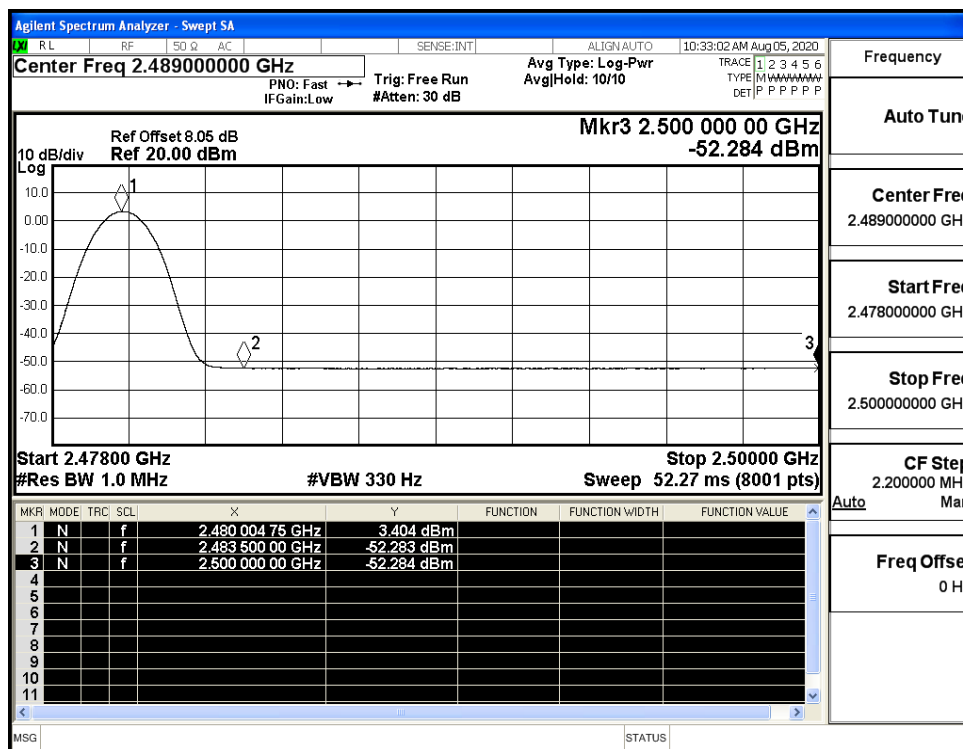
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



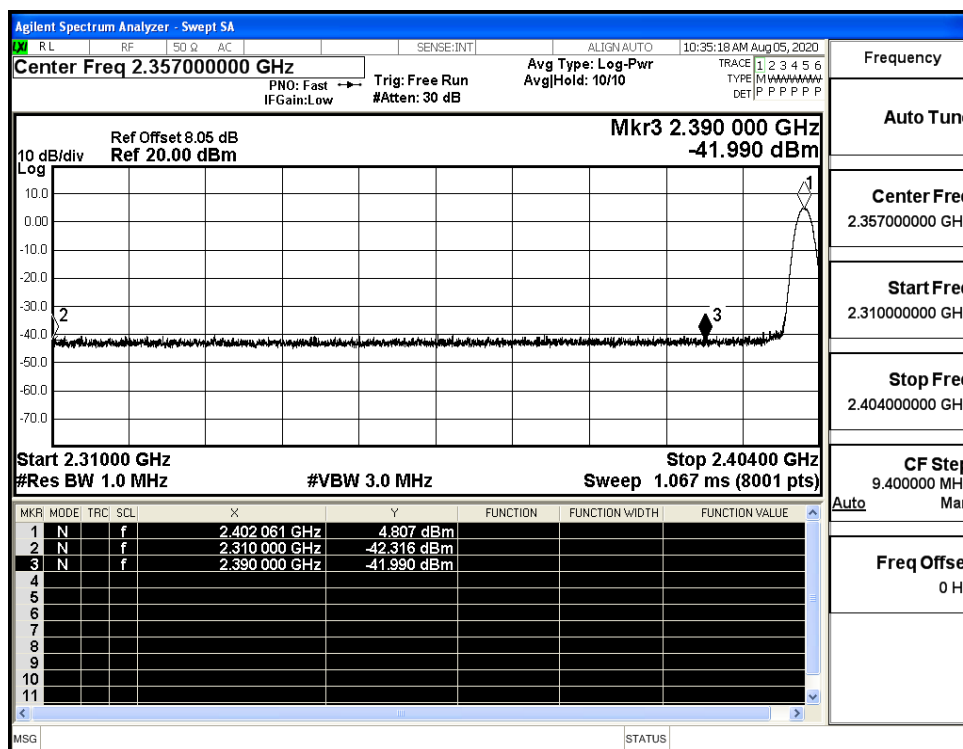
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



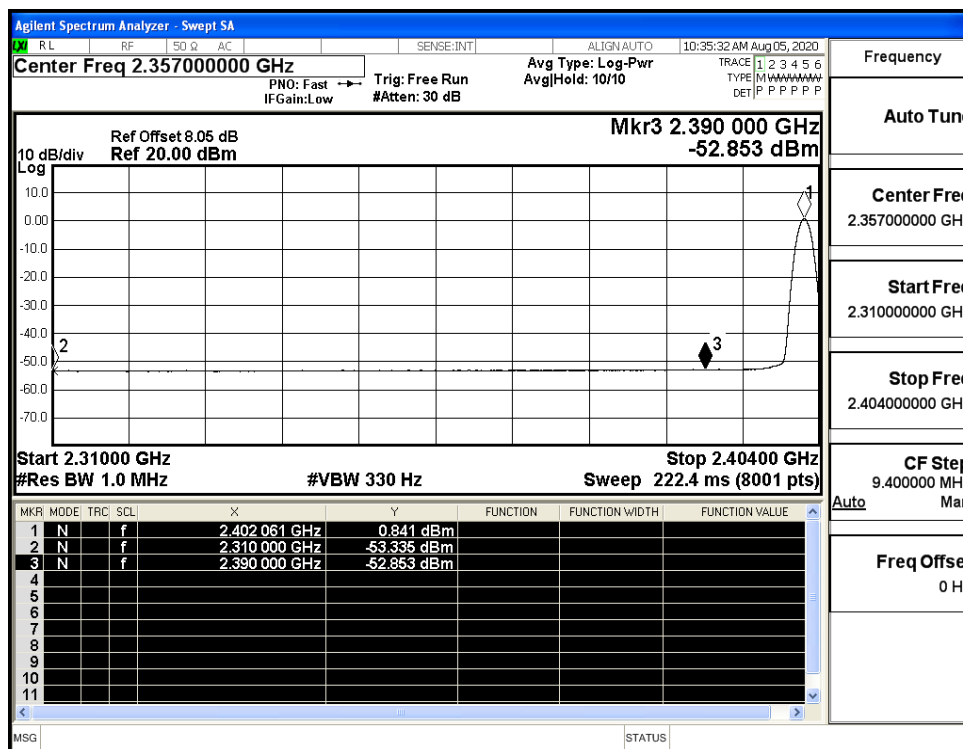
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



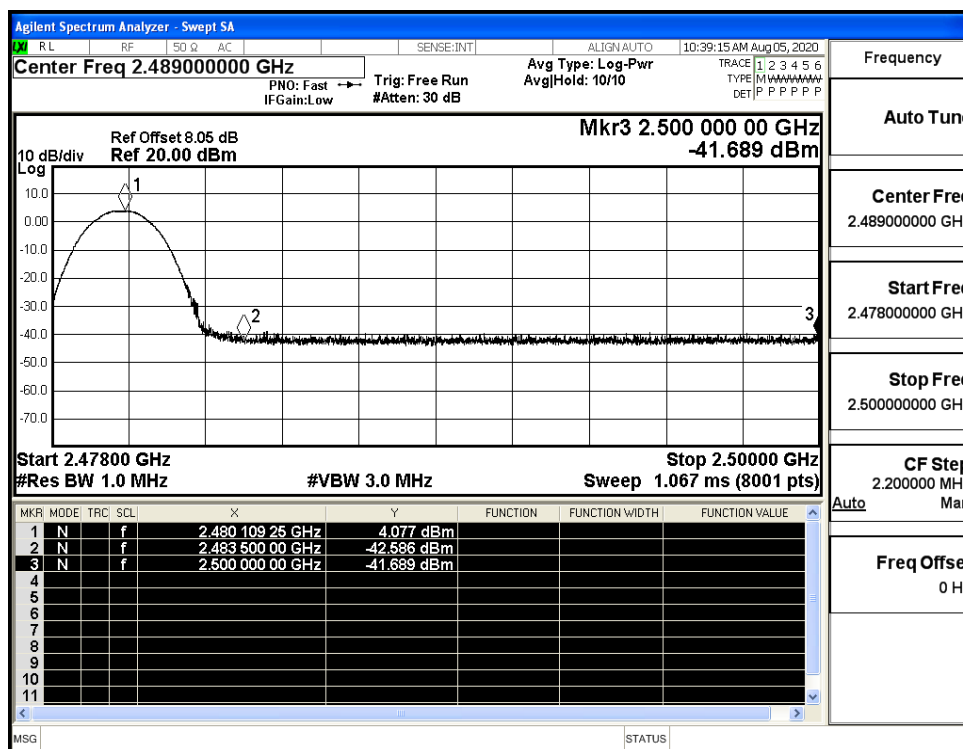
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



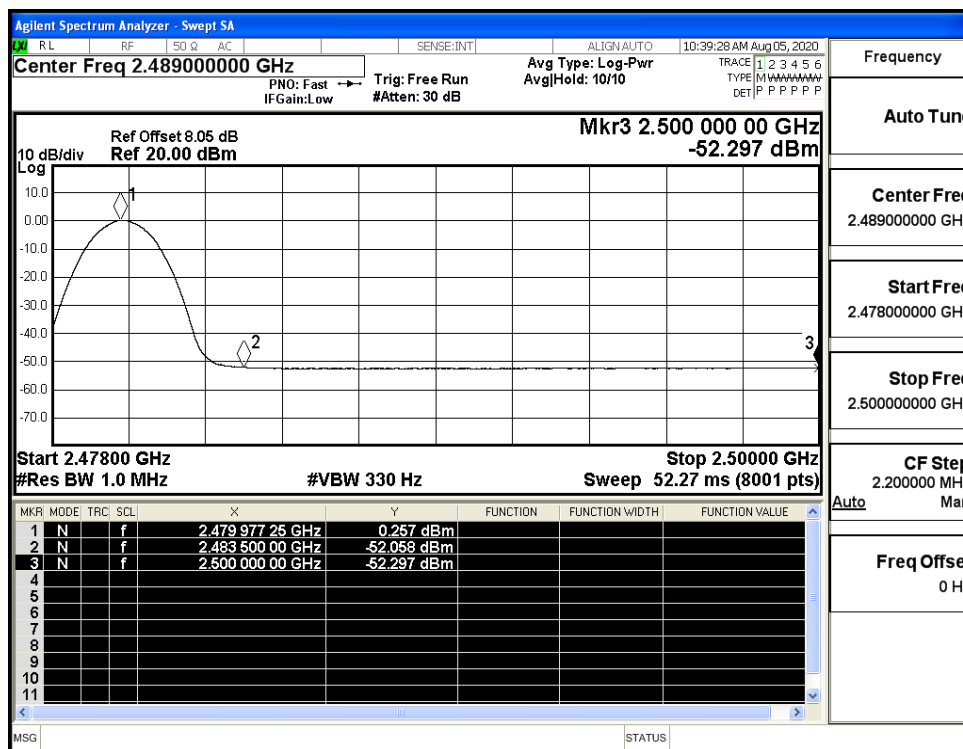
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



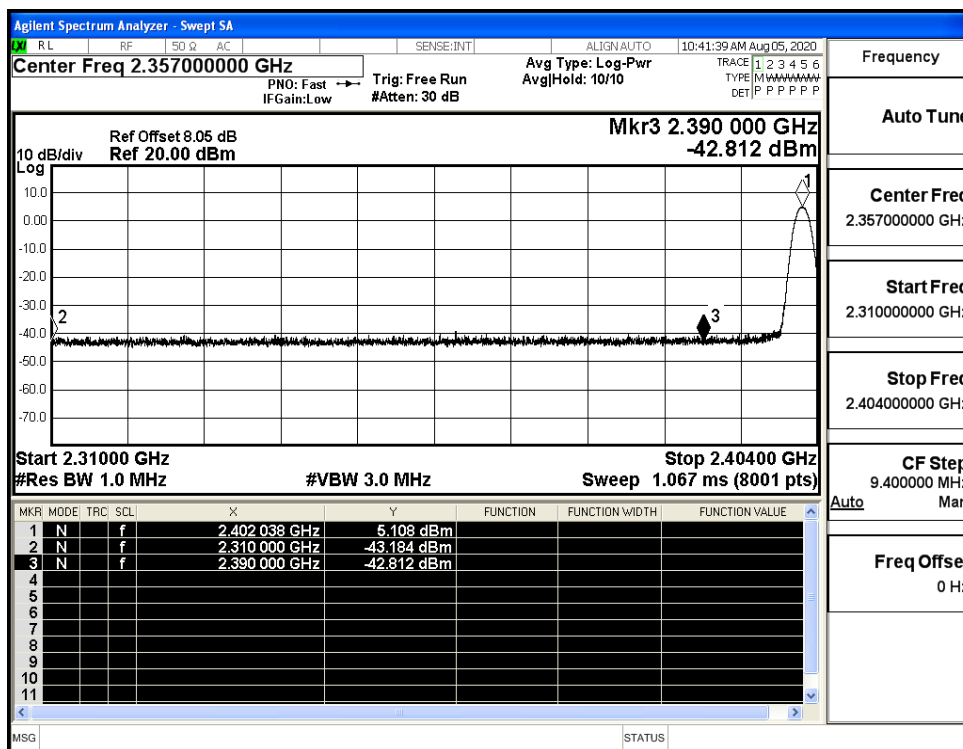
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



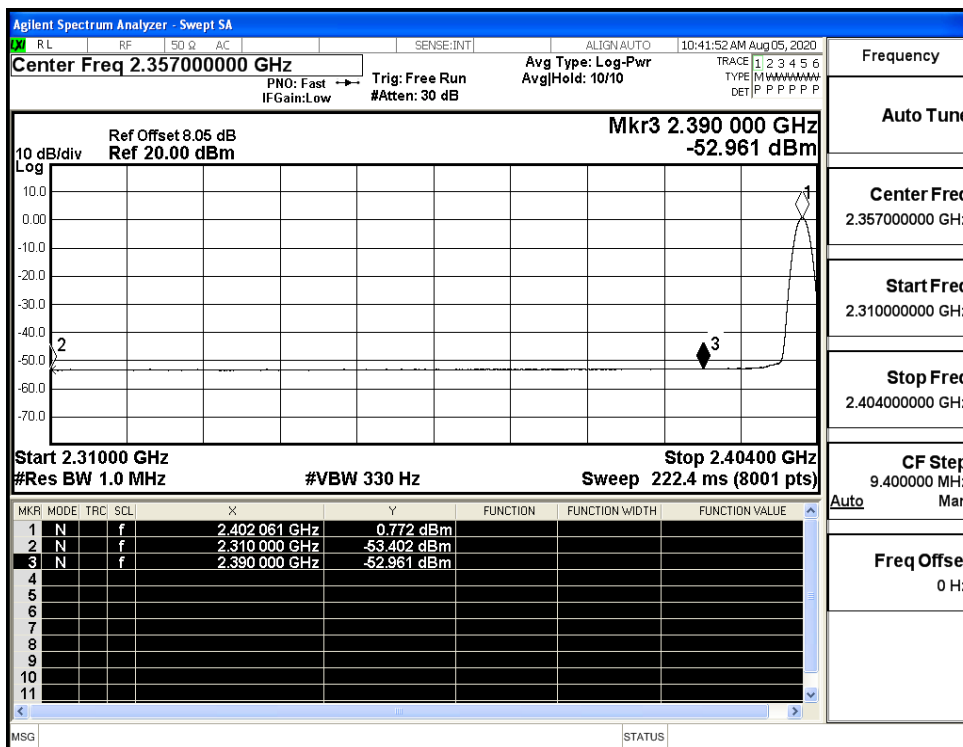
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



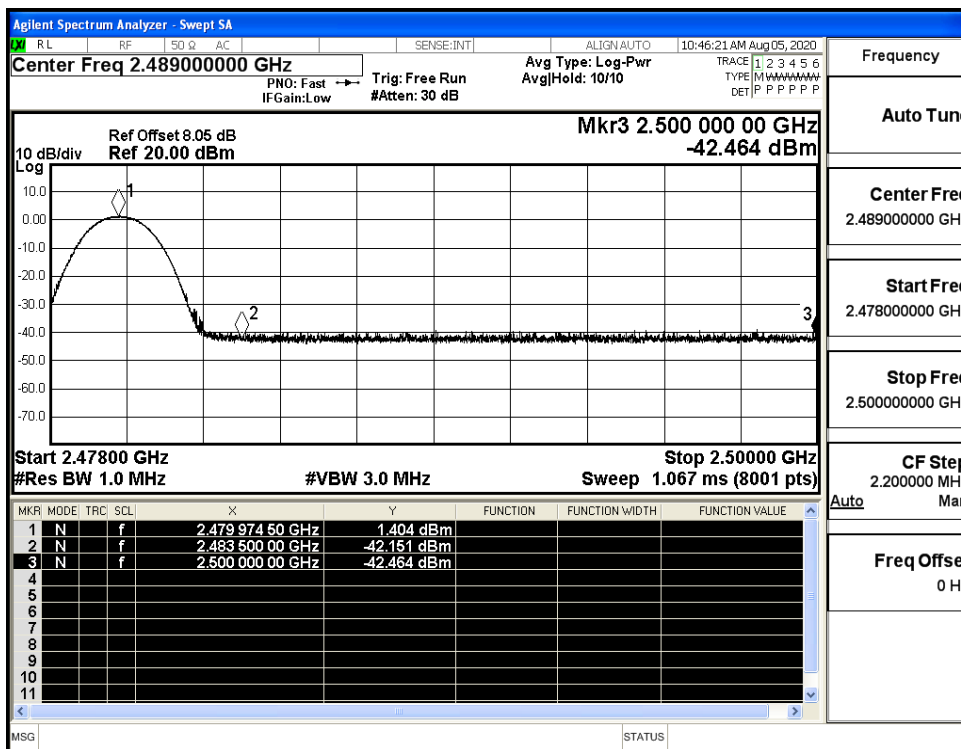
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

