

Appendix A

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

Product Name: Bluetooth Earphone

Trade Mark: N/A

Test Model: VK-1008

Environmental Conditions

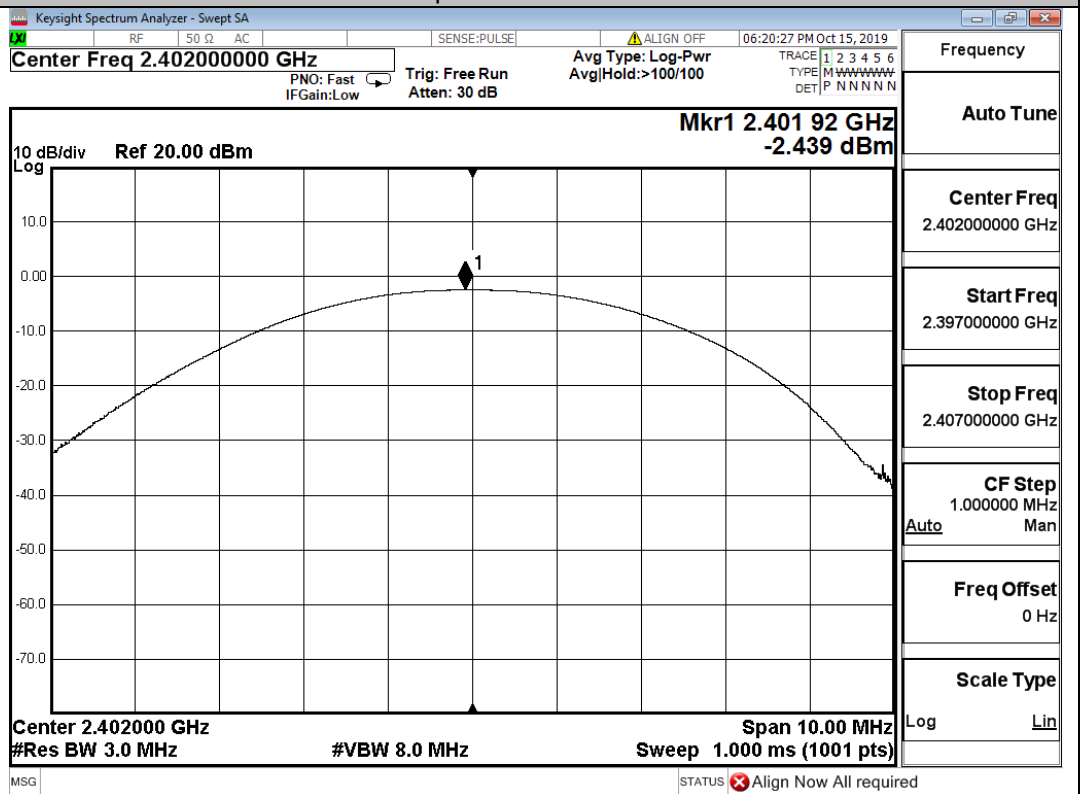
Temperature:	23.6 ° C
Relative Humidity:	57%
ATM Pressure:	100.0 kPa
Test Engineer:	CHUANG WANG
Supervised by:	JAYDEN ZHUO

A.1 Maximum Conducted Peak Output Power

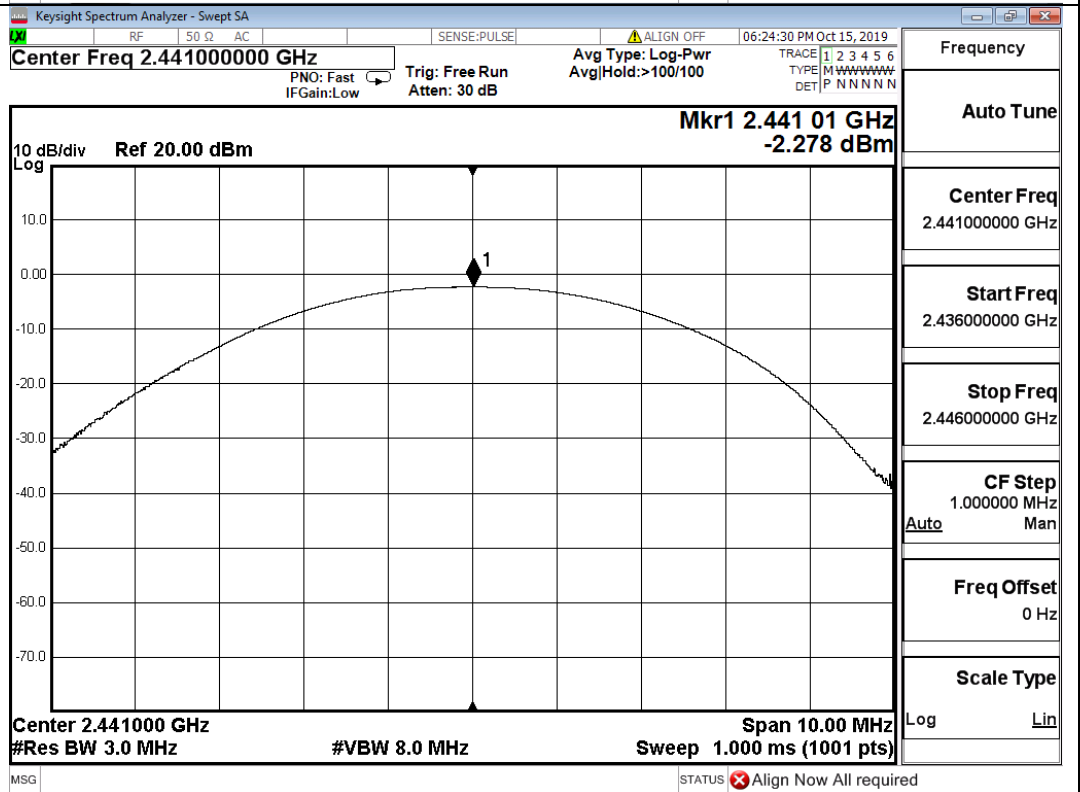
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.439	21	PASS
	MCH	-2.278	21	PASS
	HCH	-2.817	21	PASS
$\pi/4$ DQPSK	LCH	-1.566	21	PASS
	MCH	-1.373	21	PASS
	HCH	-1.928	21	PASS
8-DPSK	LCH	-1.040	21	PASS
	MCH	-0.848	21	PASS
	HCH	-1.406	21	PASS

Test Graphs

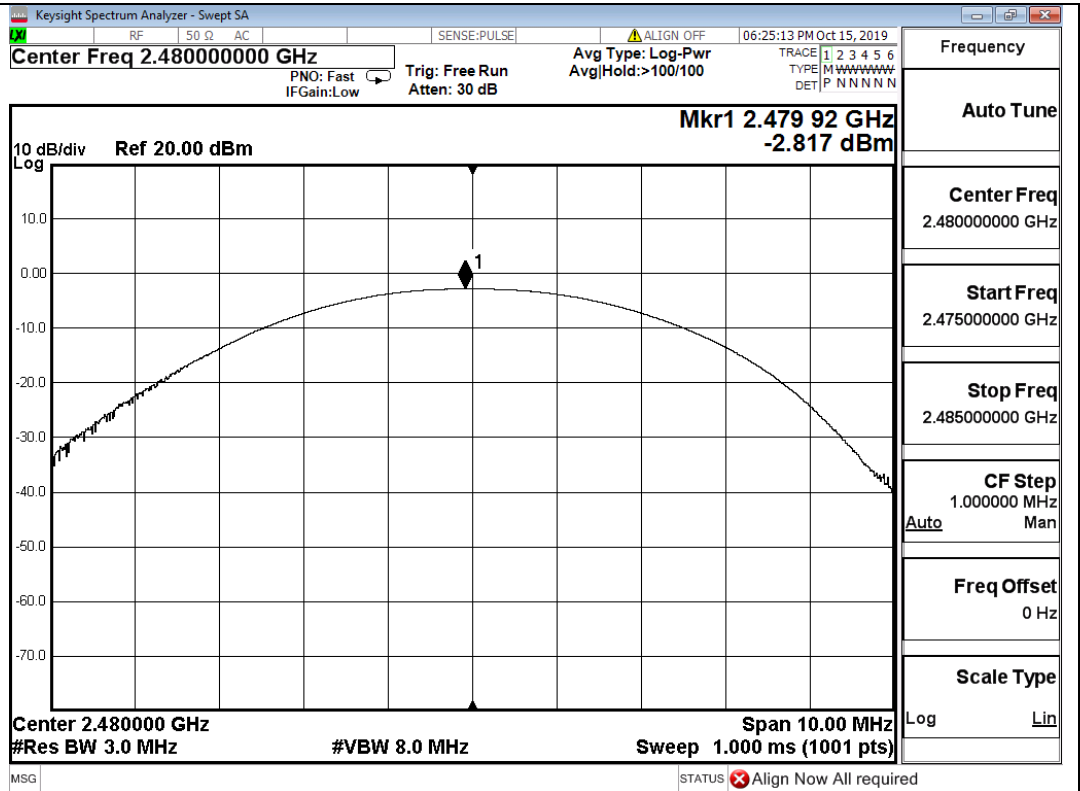
GFSK/LCH



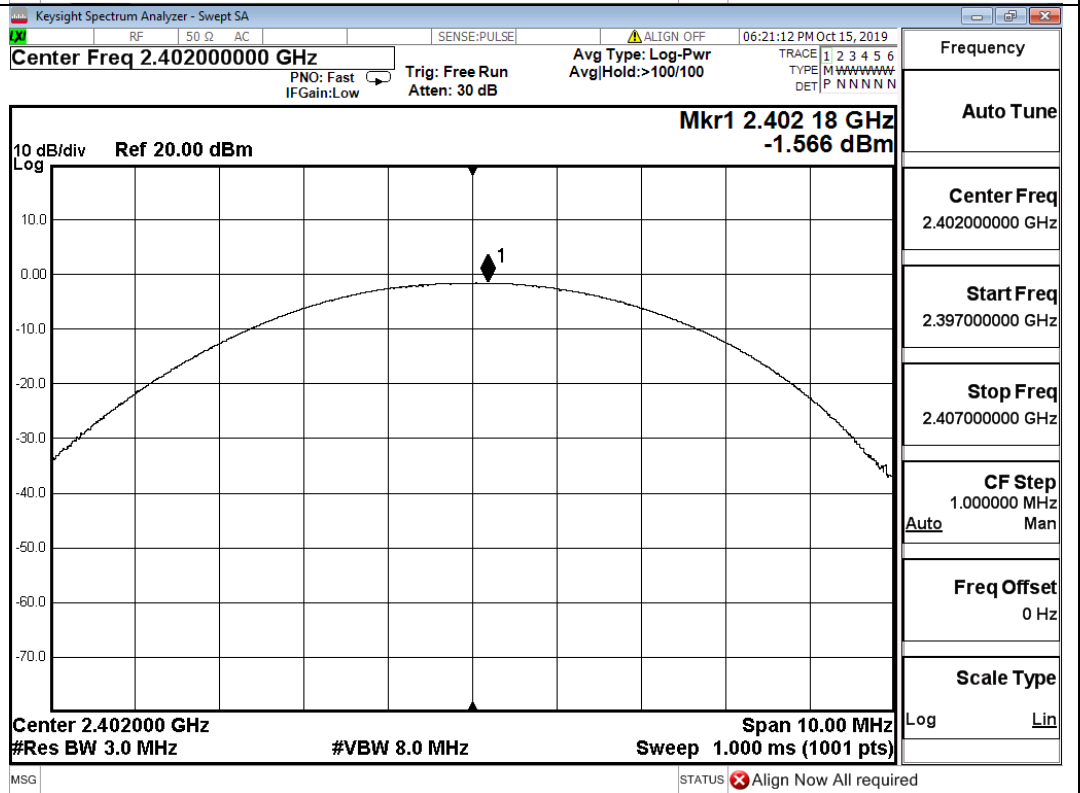
GFSK/MCH



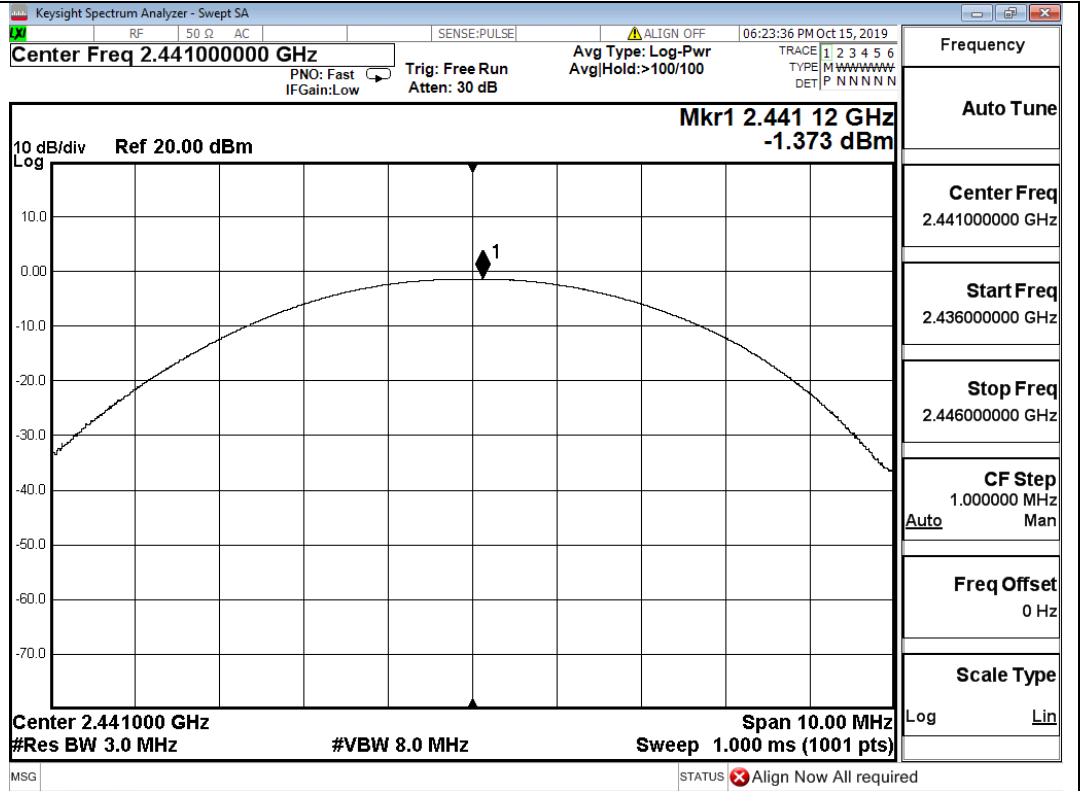
GFSK/HCH



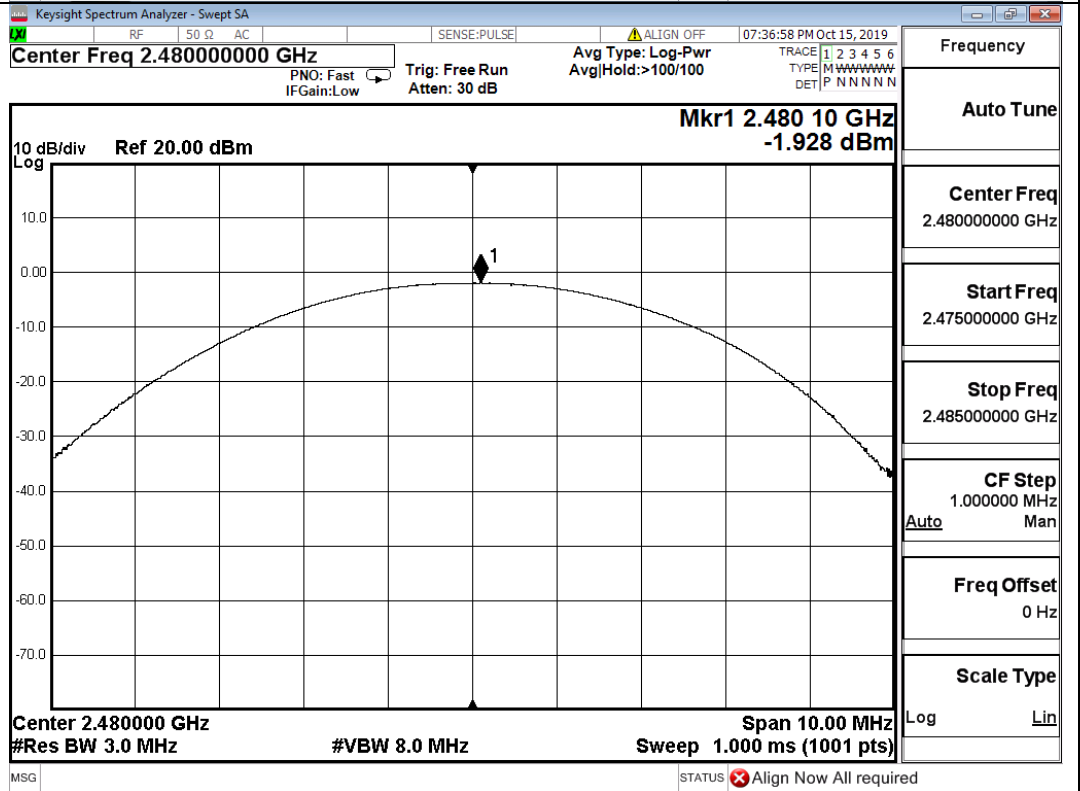
$\pi/4$ DQPSK/LCH



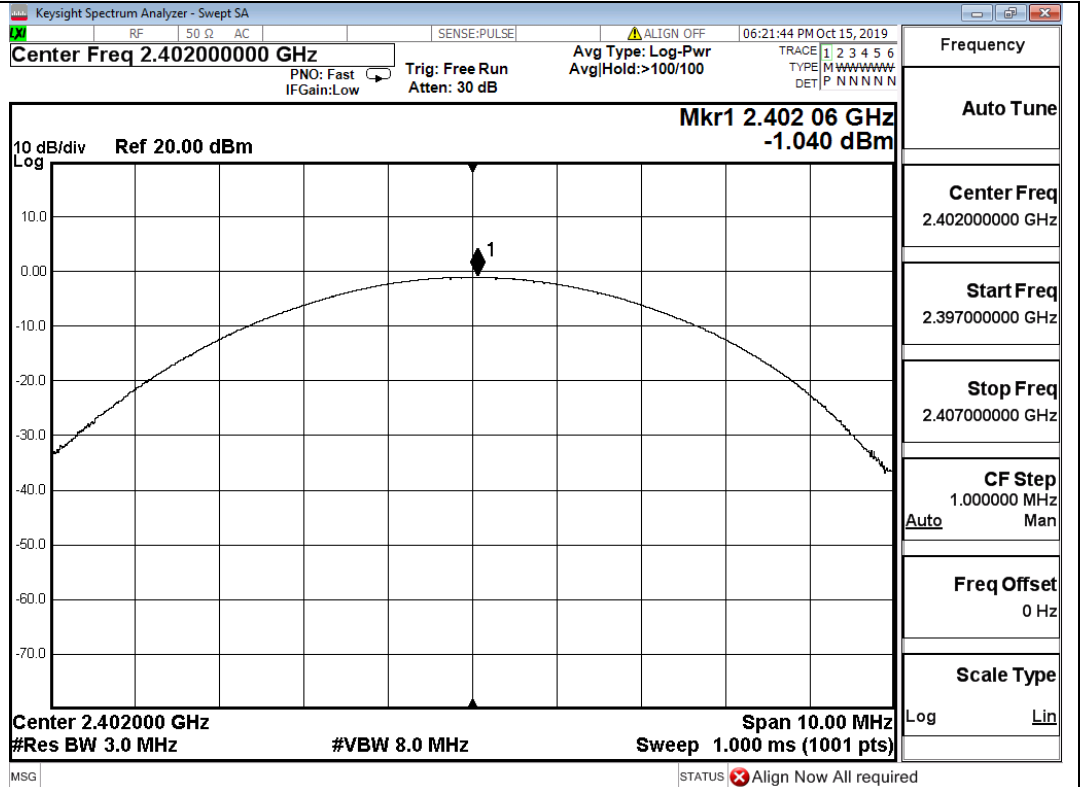
$\pi/4$ DQPSK/MCH



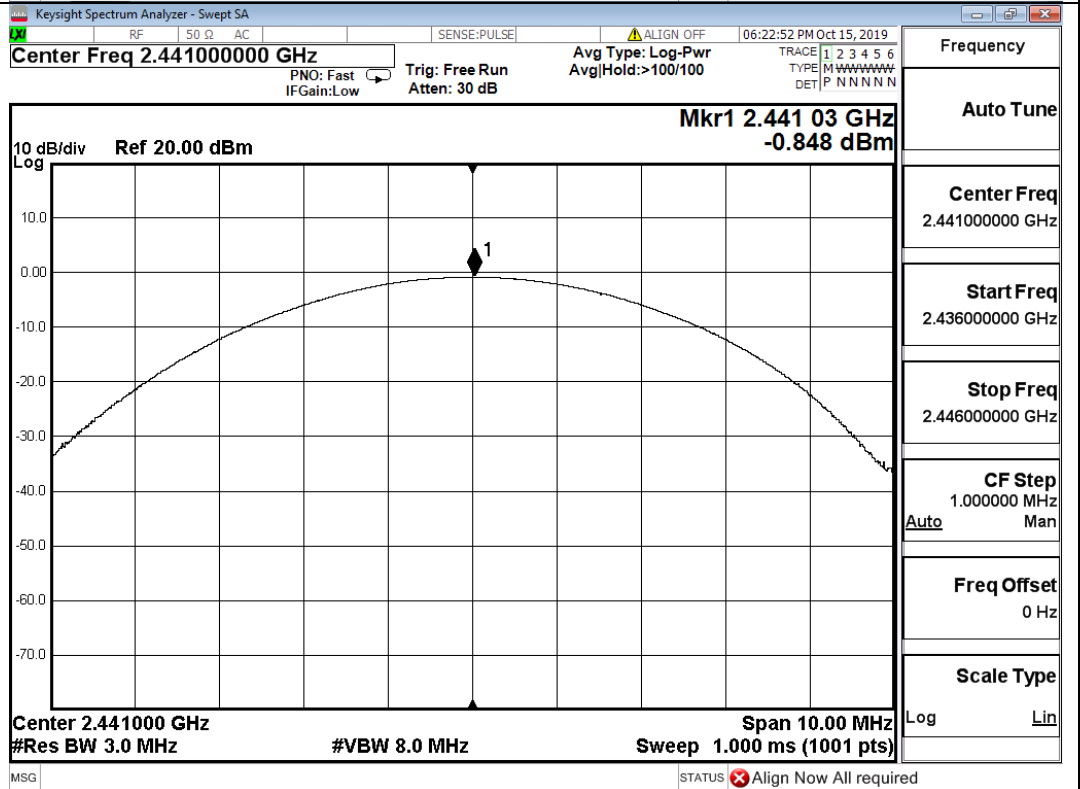
$\pi/4$ DQPSK/HCH



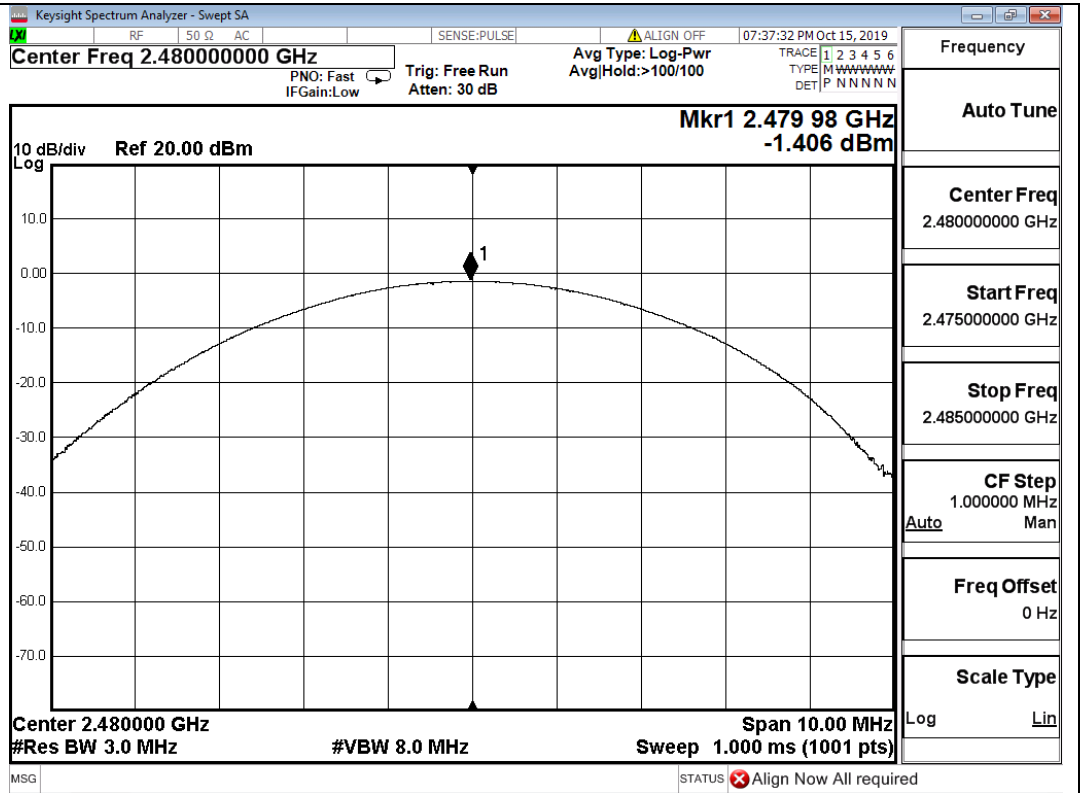
8-DPSK/LCH



8-DPSK/MCH

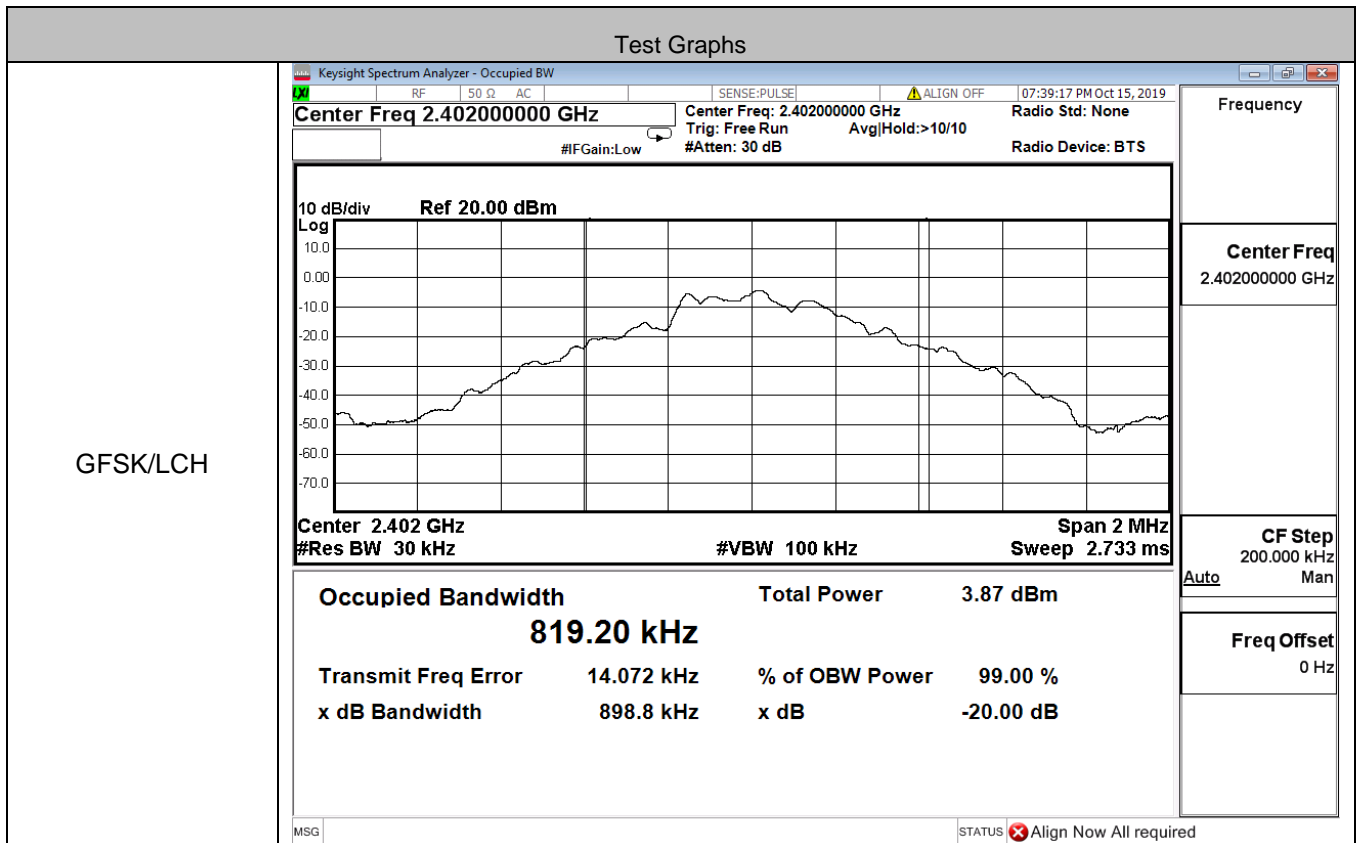


8-DPSK/HCH

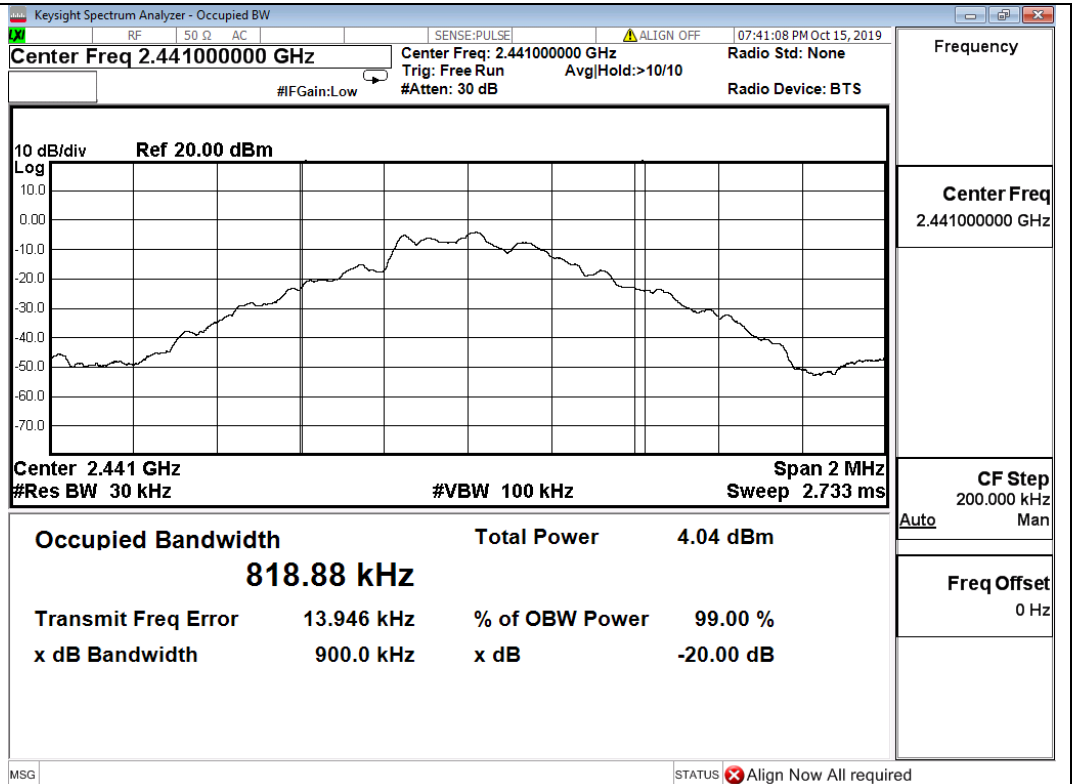


A.2 99% and 20dB Bandwidth

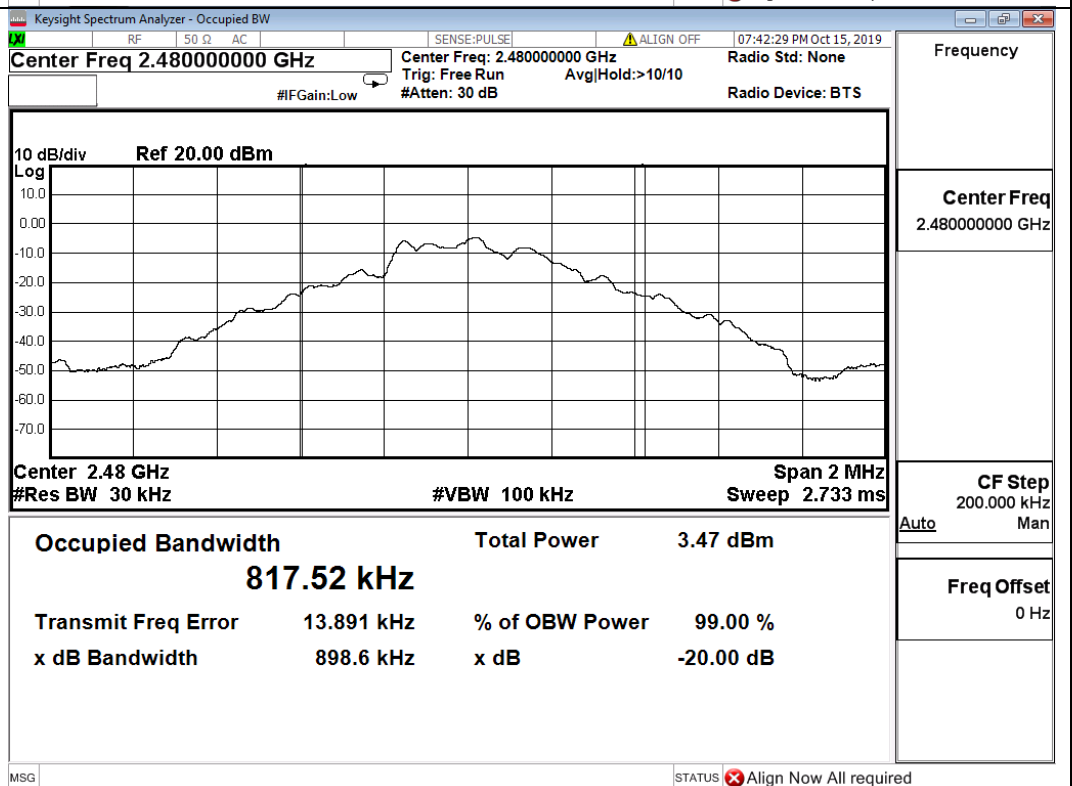
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.819	0.899	Not Specified	PASS
	MCH	0.819	0.900	Not Specified	PASS
	HCH	0.818	0.899	Not Specified	PASS
π/4DQPSK	LCH	1.142	1.228	Not Specified	PASS
	MCH	1.142	1.214	Not Specified	PASS
	HCH	1.143	1.231	Not Specified	PASS
8-DPSK	LCH	1.130	1.204	Not Specified	PASS
	MCH	1.131	1.206	Not Specified	PASS
	HCH	1.131	1.205	Not Specified	PASS



GFSK/MCH



GFSK/HCH



$\pi/4$ DQPSK/LCH

Keysight Spectrum Analyzer - Occupied BW

Center Freq **2.40200000 GHz** Center Freq: 2.40200000 GHz Radio Std: None
 #IFGain:Low #Atten: 30 dB Avg|Hold:>10/10 Radio Device: BTS

10 dB/div Ref 20.00 dBm

Center 2.402 GHz Span 2 MHz
 #Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms

Occupied Bandwidth	Total Power	3.78 dBm
1.1419 MHz		
Transmit Freq Error	7.612 kHz	% of OBW Power 99.00 %
x dB Bandwidth	1.228 MHz	x dB -20.00 dB

Trace/Detector
 Clear Write
 Average
 Max Hold
 Min Hold
 Detector Average
 Auto Man

MSG STATUS Align Now All required

$\pi/4$ DQPSK/MCH

Keysight Spectrum Analyzer - Occupied BW

Center Freq **2.44100000 GHz** Center Freq: 2.44100000 GHz Radio Std: None
 #IFGain:Low #Atten: 30 dB Avg|Hold:>10/10 Radio Device: BTS

10 dB/div Ref 20.00 dBm

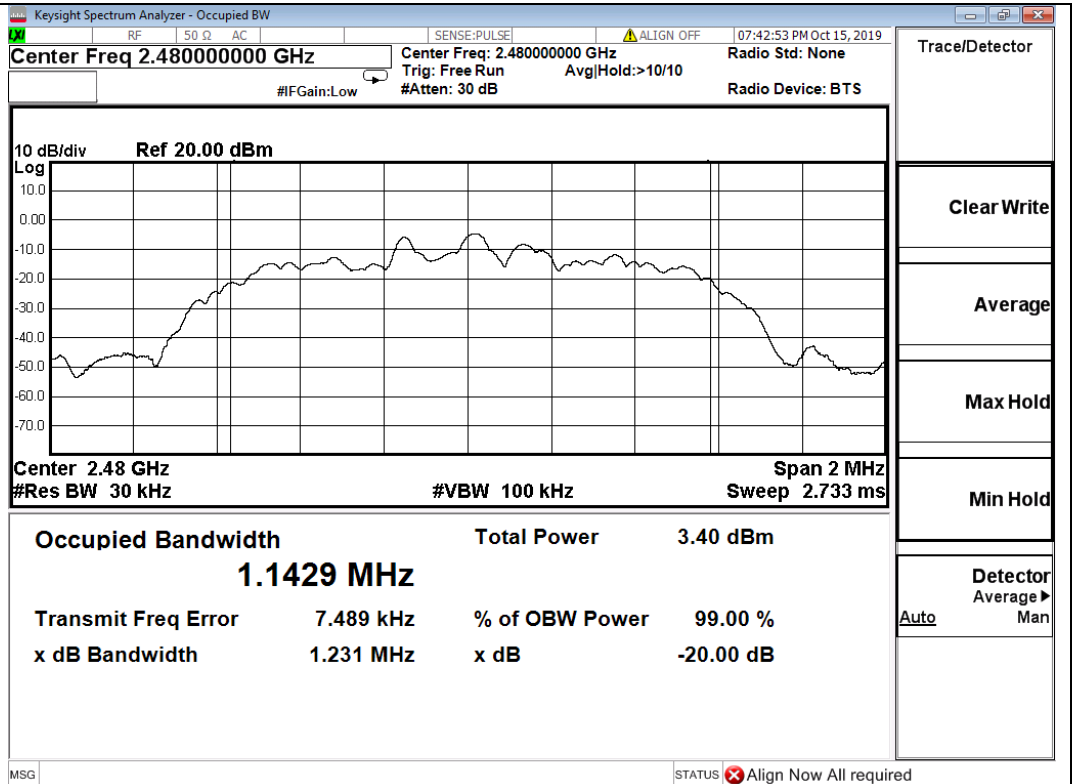
Center 2.441 GHz Span 2 MHz
 #Res BW 30 kHz #VBW 100 kHz Sweep 2.733 ms

Occupied Bandwidth	Total Power	3.95 dBm
1.1424 MHz		
Transmit Freq Error	7.735 kHz	% of OBW Power 99.00 %
x dB Bandwidth	1.214 MHz	x dB -20.00 dB

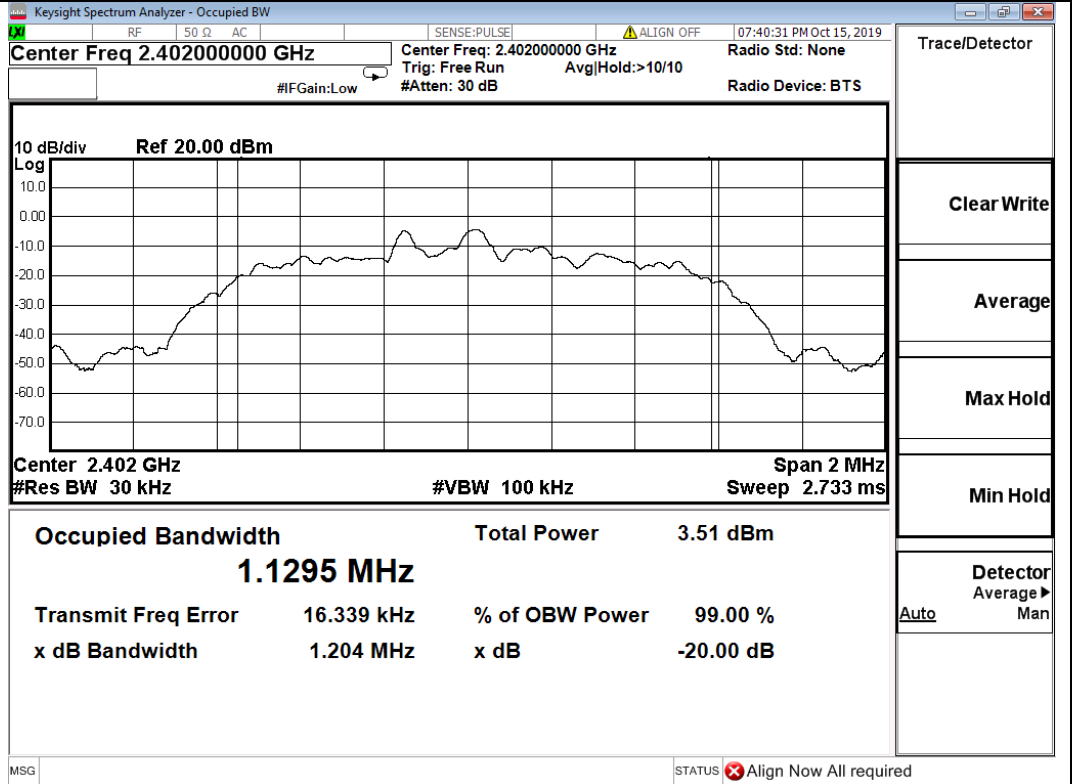
Frequency
 Center Freq
 2.44100000 GHz
 CF Step
 200.000 kHz
 Auto Man
 Freq Offset
 0 Hz

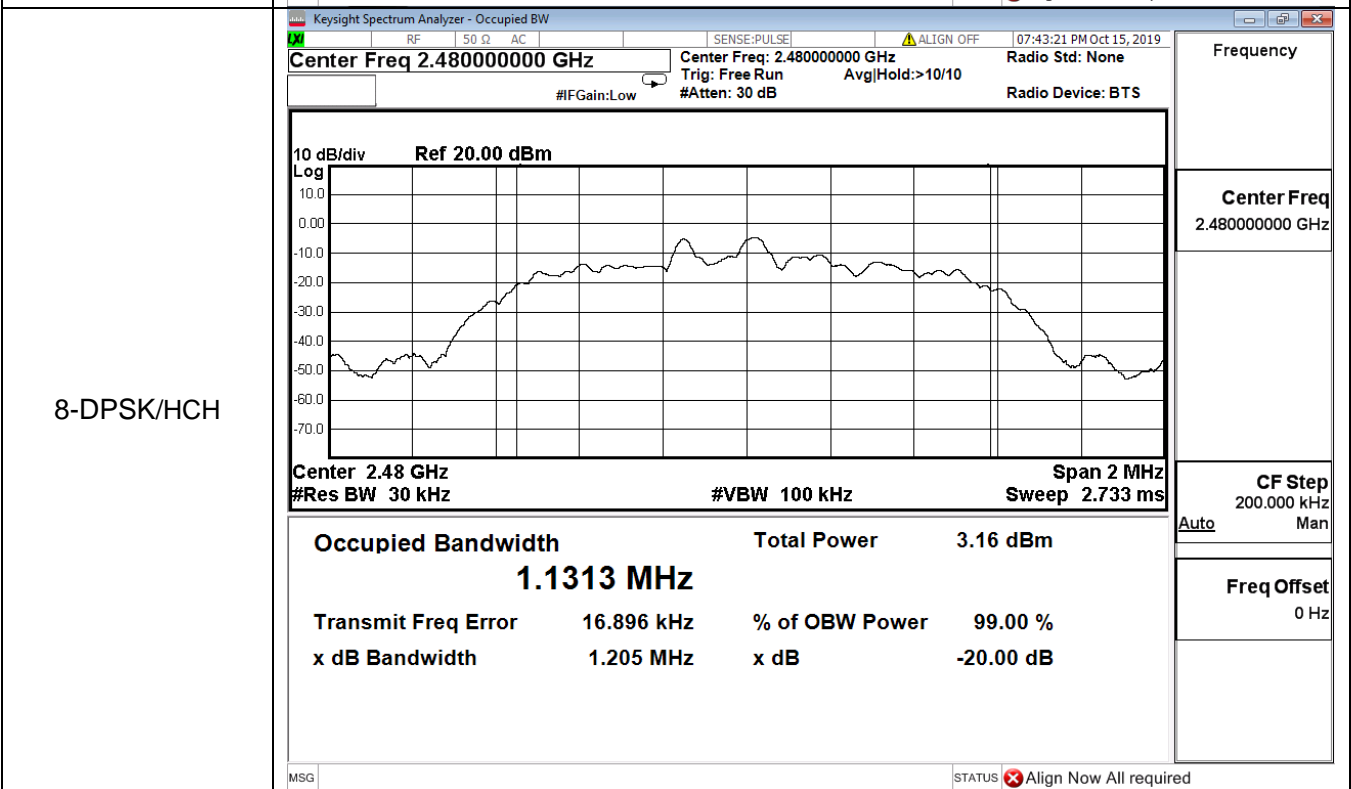
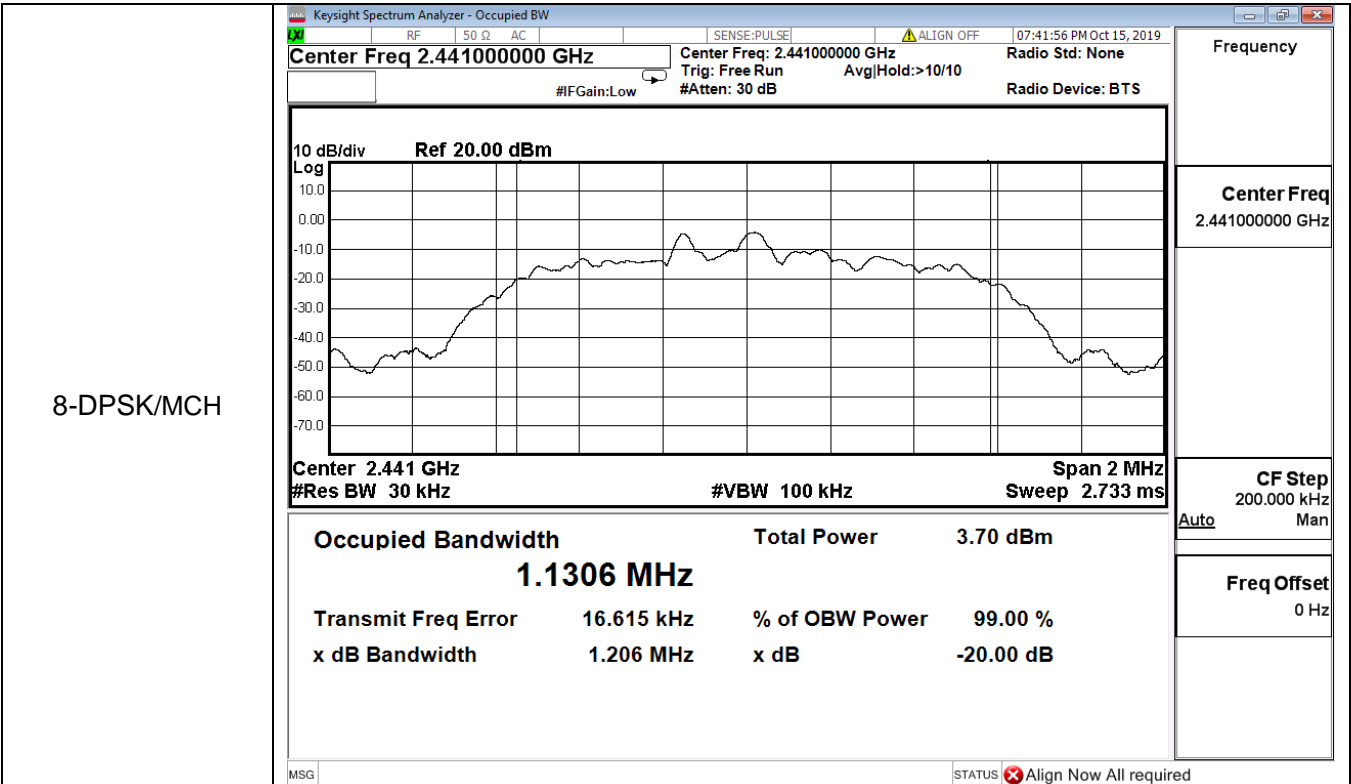
MSG STATUS Align Now All required

$\pi/4$ DQPSK/HCH



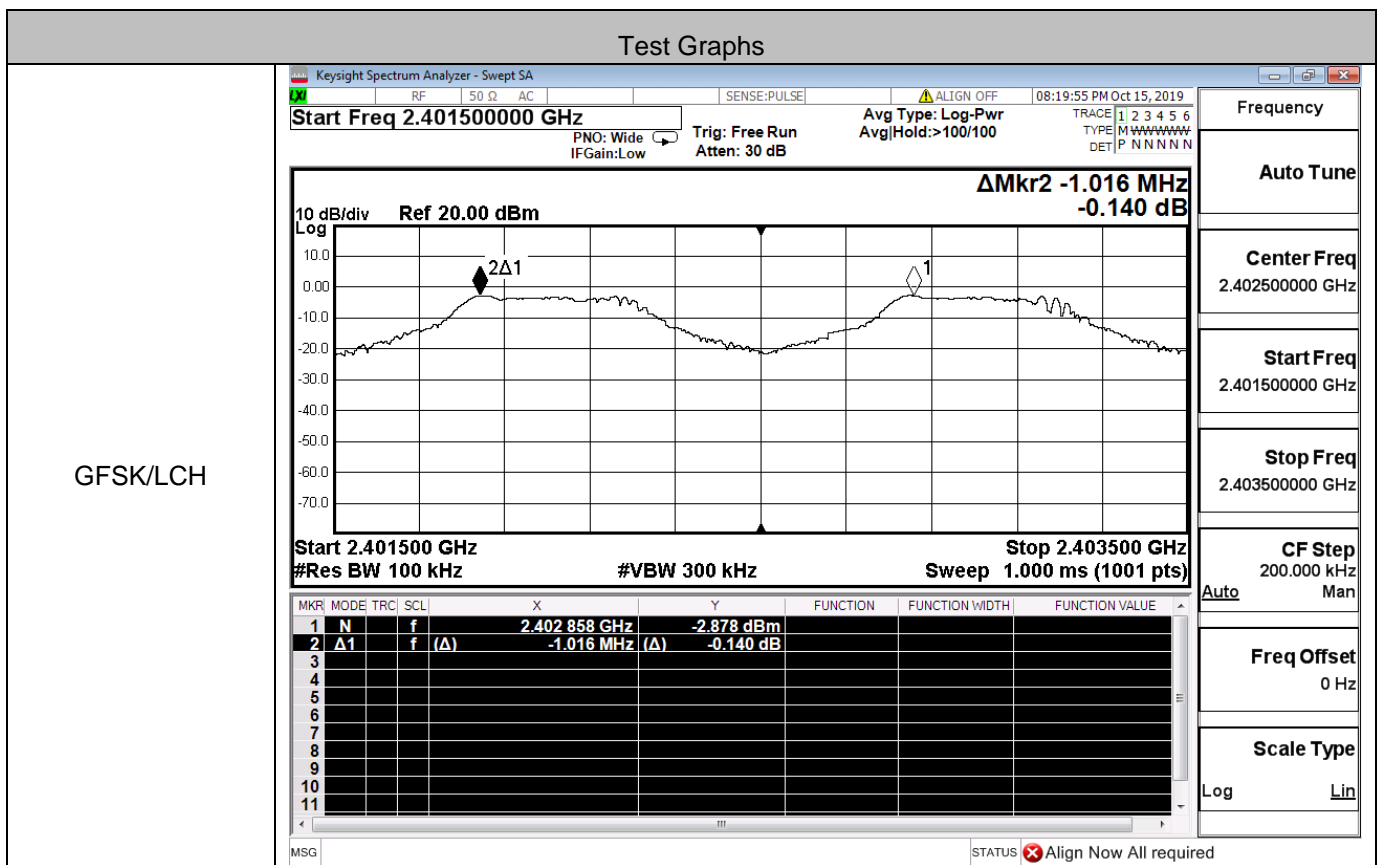
8-DPSK/LCH



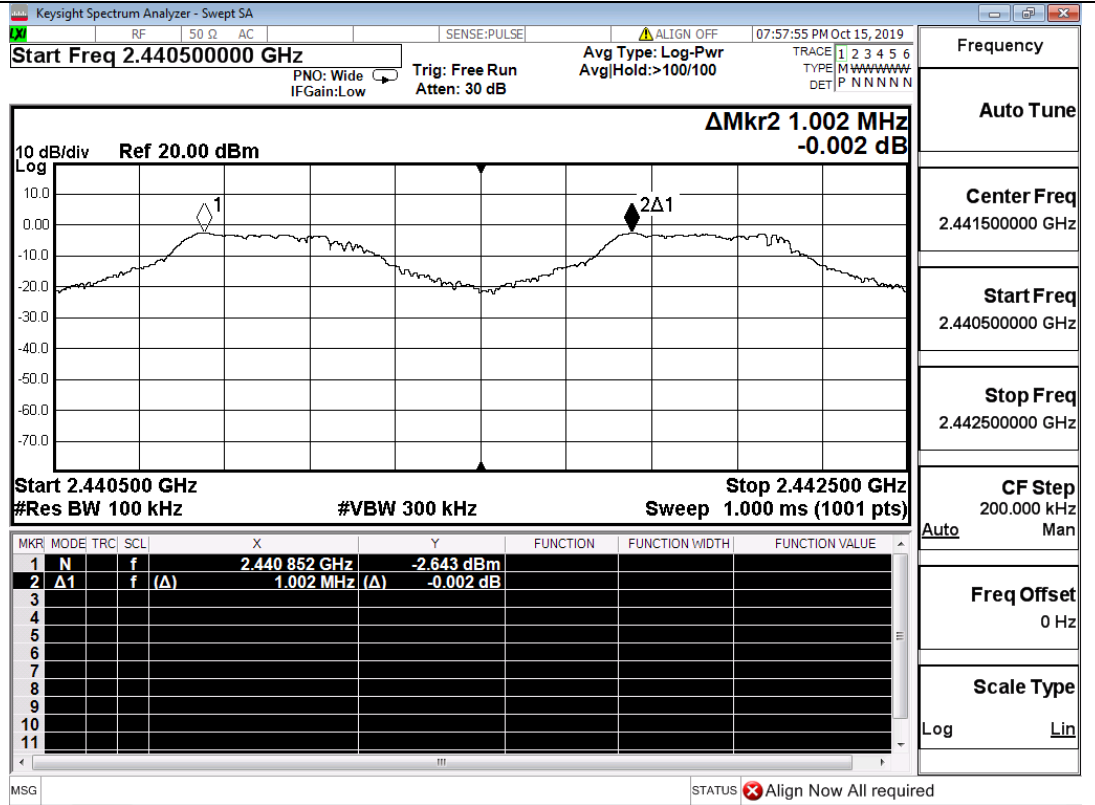


A.3 Carrier Frequency Separation

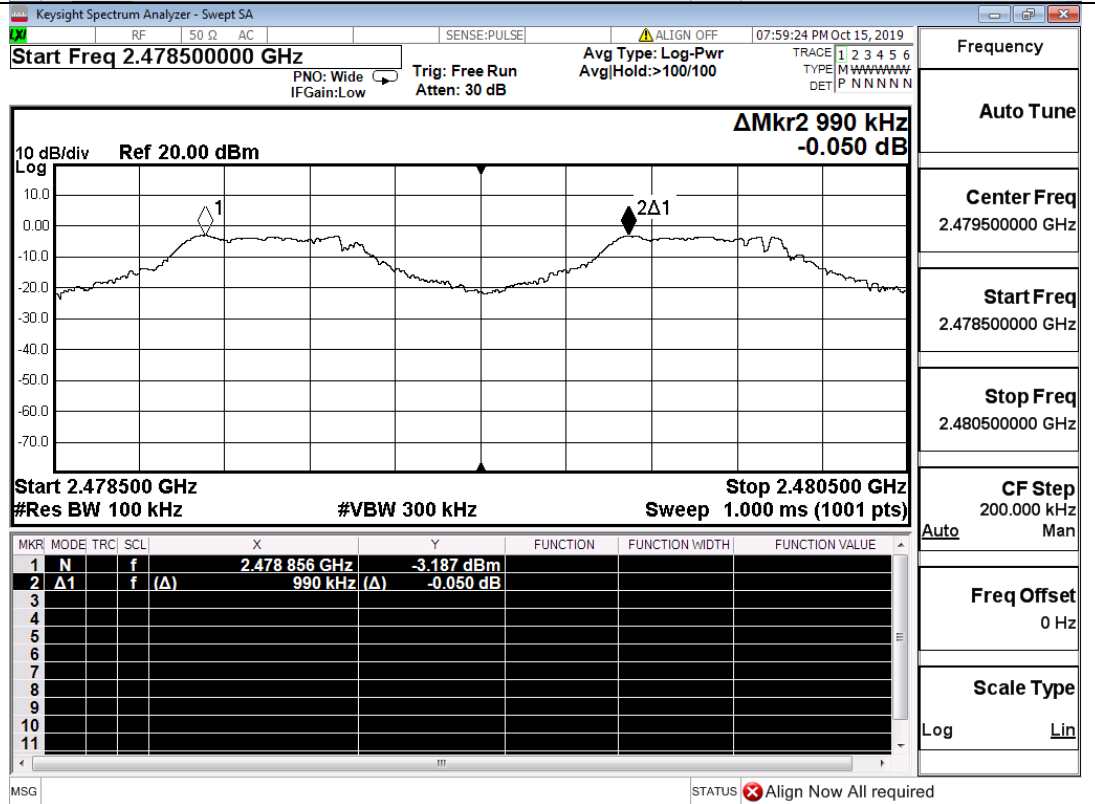
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz] 2/3*20dB Bandwidth	Verdict
GFSK	LCH	1.016	0.599	PASS
	MCH	1.002	0.600	PASS
	HCH	0.990	0.599	PASS
π/4DQPSK	LCH	0.996	0.819	PASS
	MCH	0.996	0.809	PASS
	HCH	0.992	0.821	PASS
8-DPSK	LCH	0.996	0.803	PASS
	MCH	1.008	0.804	PASS
	HCH	1.004	0.803	PASS



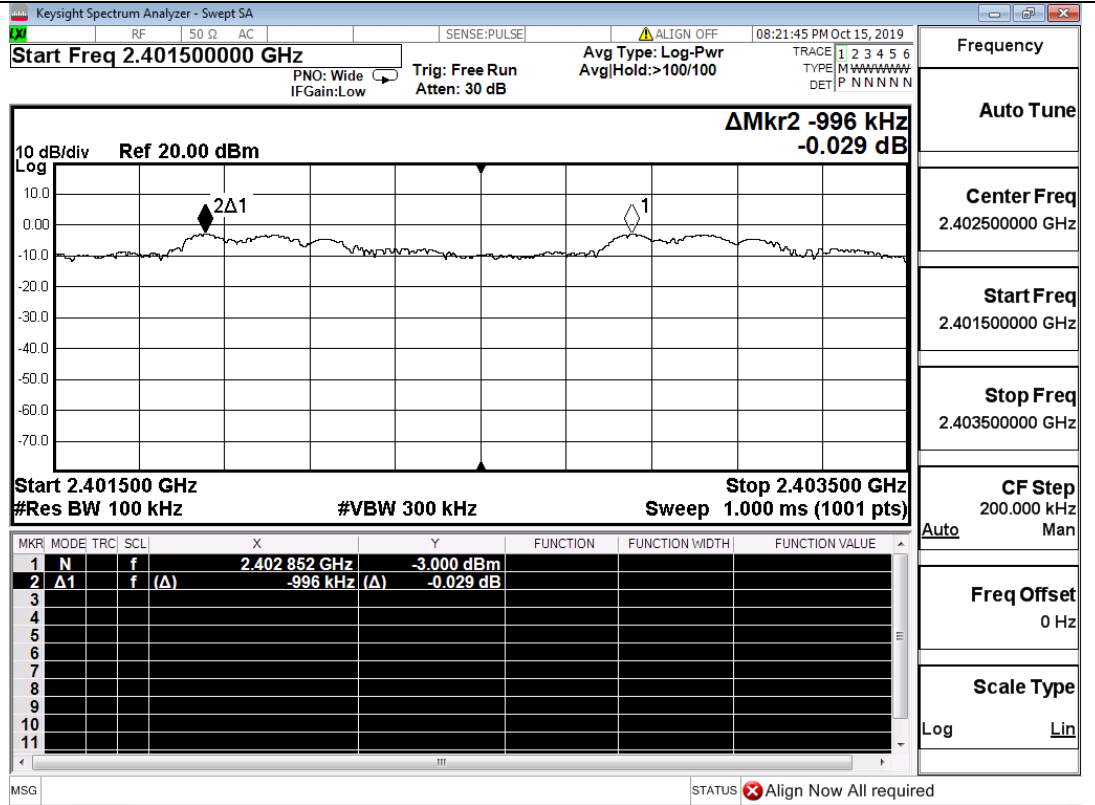
GFSK/MCH



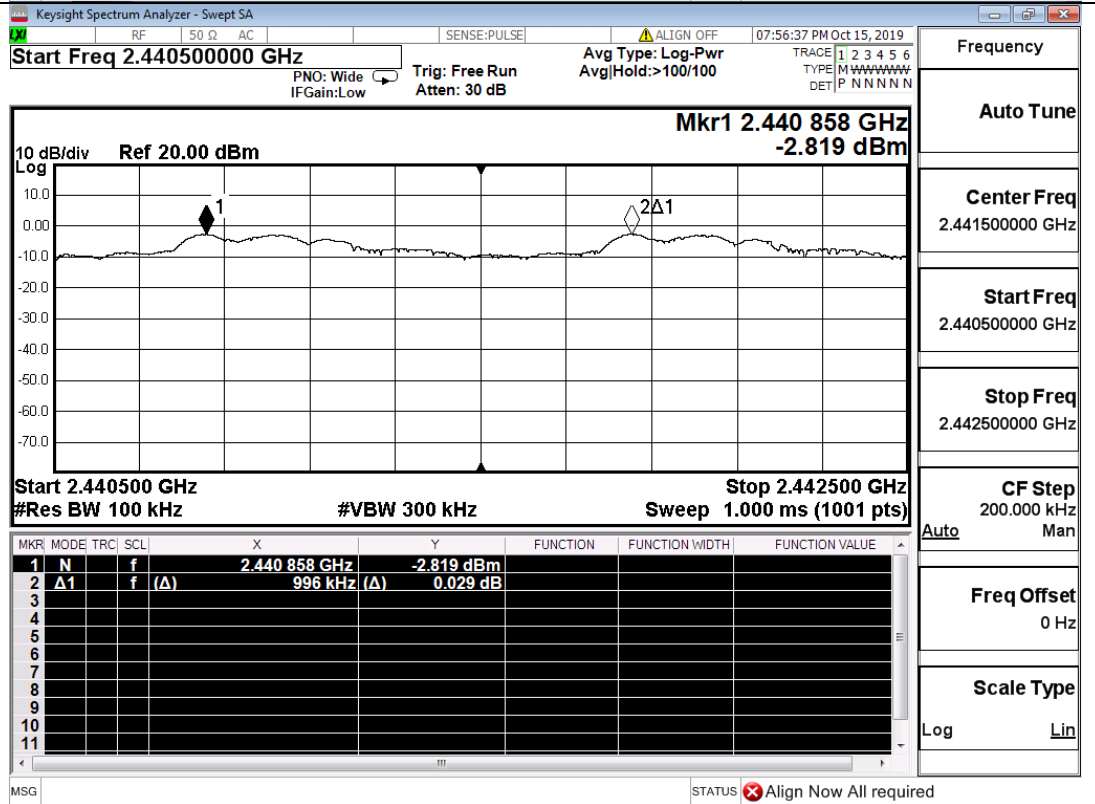
GFSK/HCH



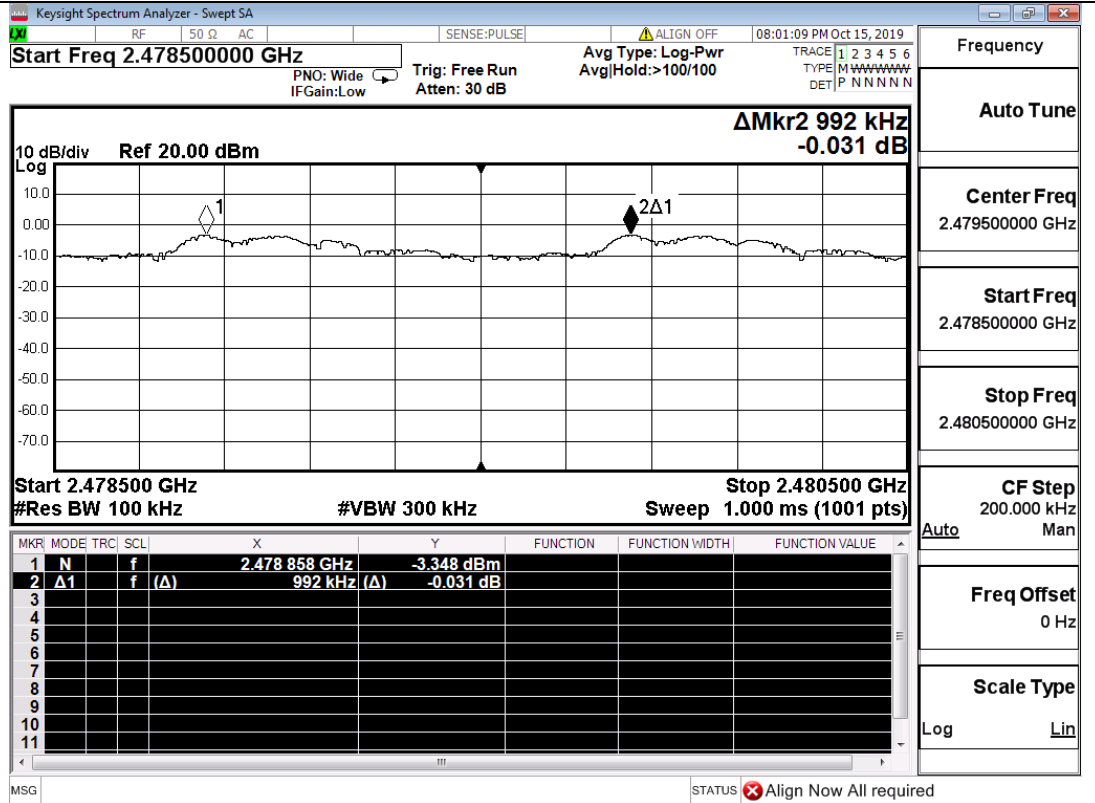
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

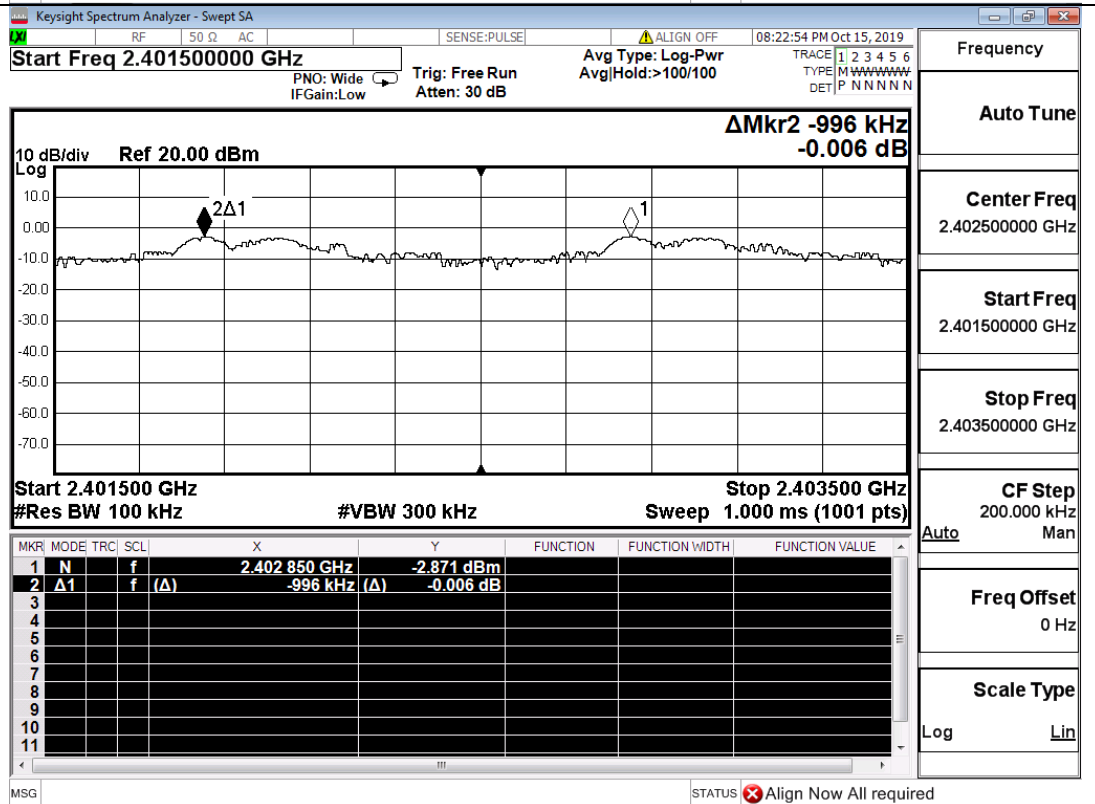


$\pi/4$ DQPSK/HCH



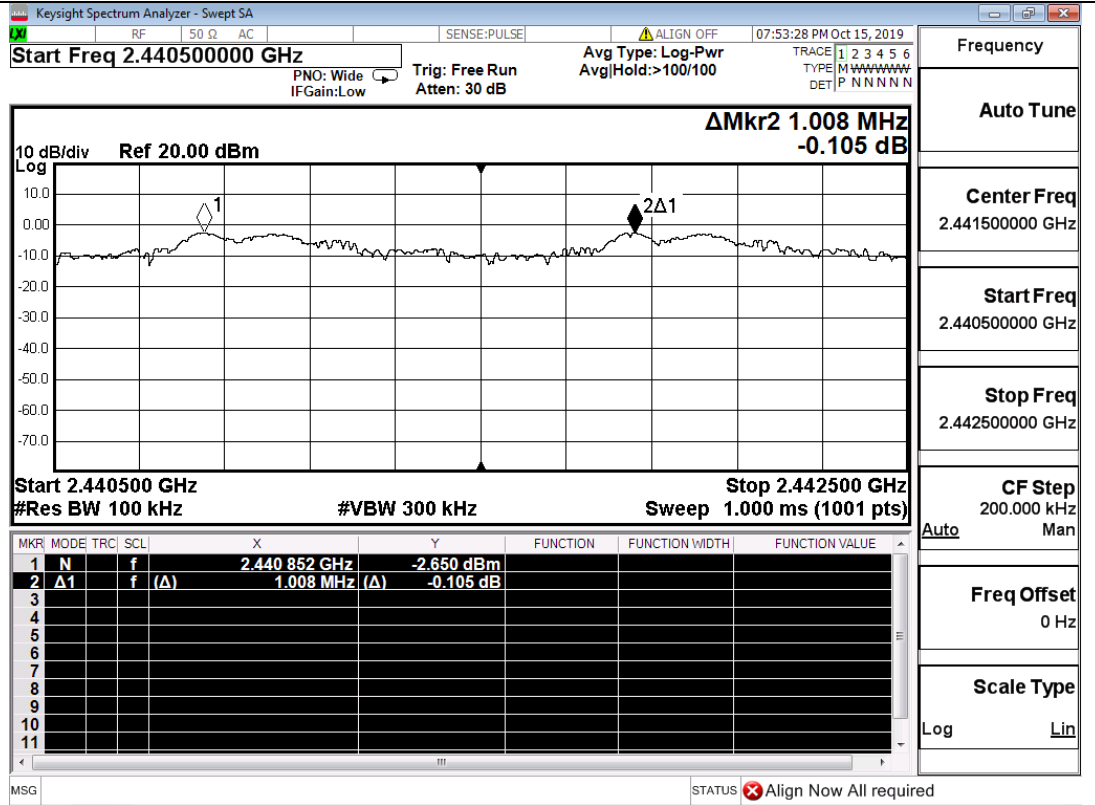
Frequency
Auto Tune
Center Freq 2.479500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.480500000 GHz
CF Step 200.000 kHz
Auto Man
Freq Offset 0 Hz
Scale Type Log Lin

8-DPSK/LCH

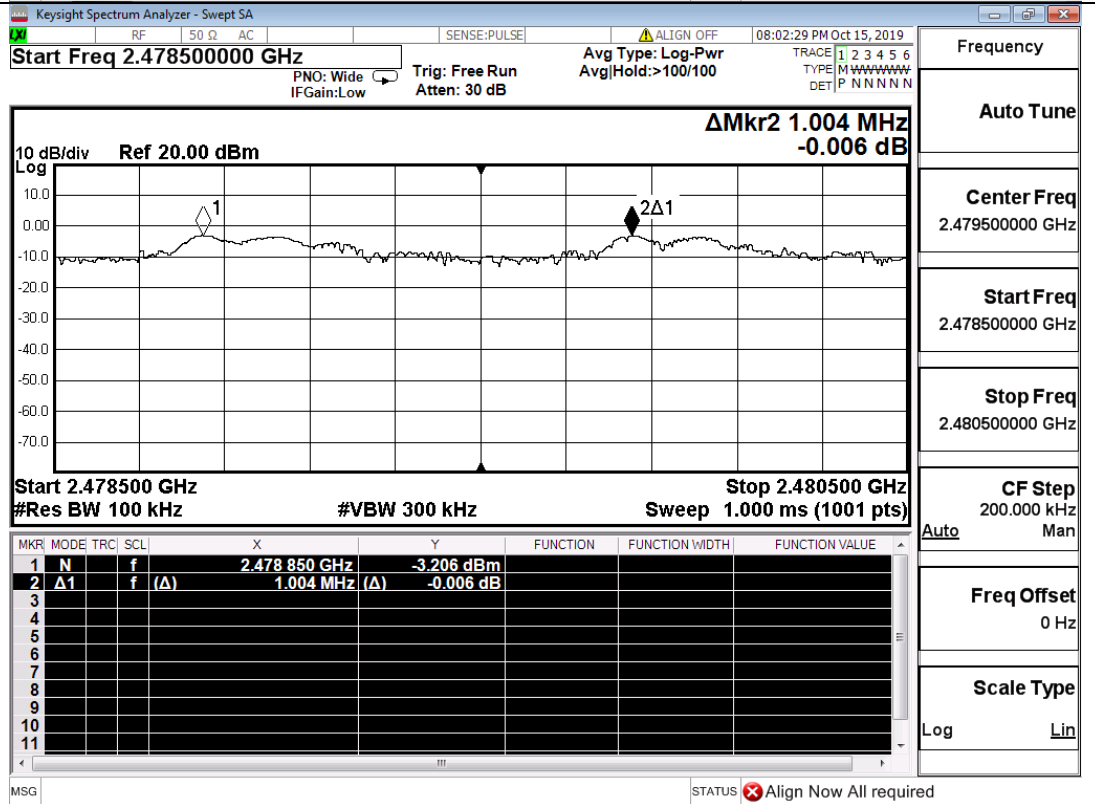


Frequency
Auto Tune
Center Freq 2.402500000 GHz
Start Freq 2.401500000 GHz
Stop Freq 2.403500000 GHz
CF Step 200.000 kHz
Auto Man
Freq Offset 0 Hz
Scale Type Log Lin

8-DPSK/MCH

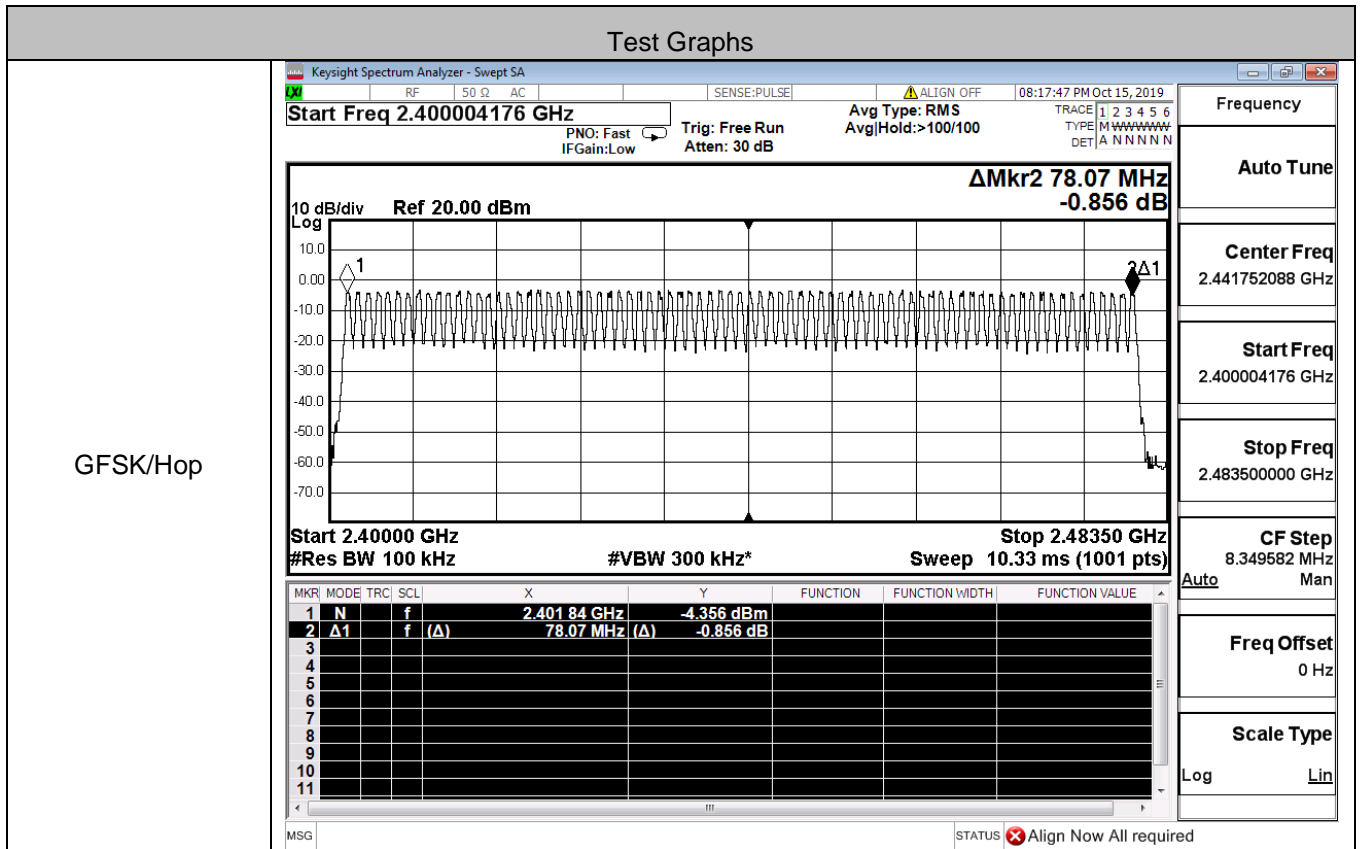


8-DPSK/HCH

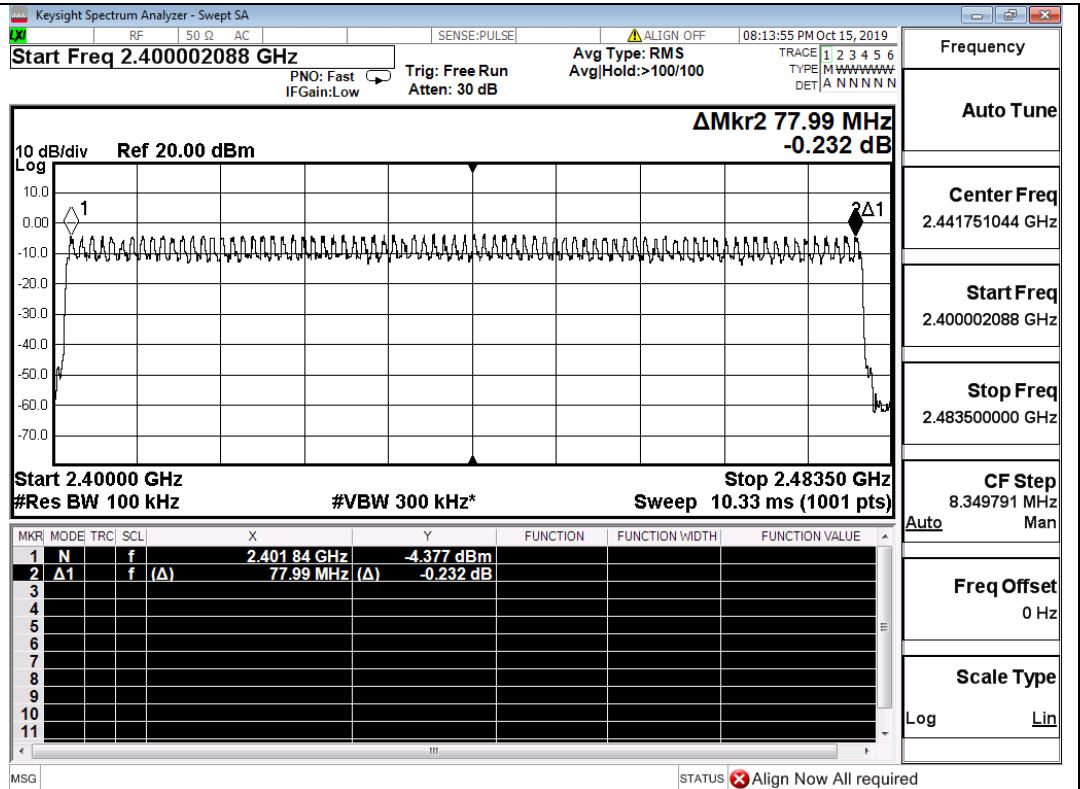


A.4 Hopping Channel Number

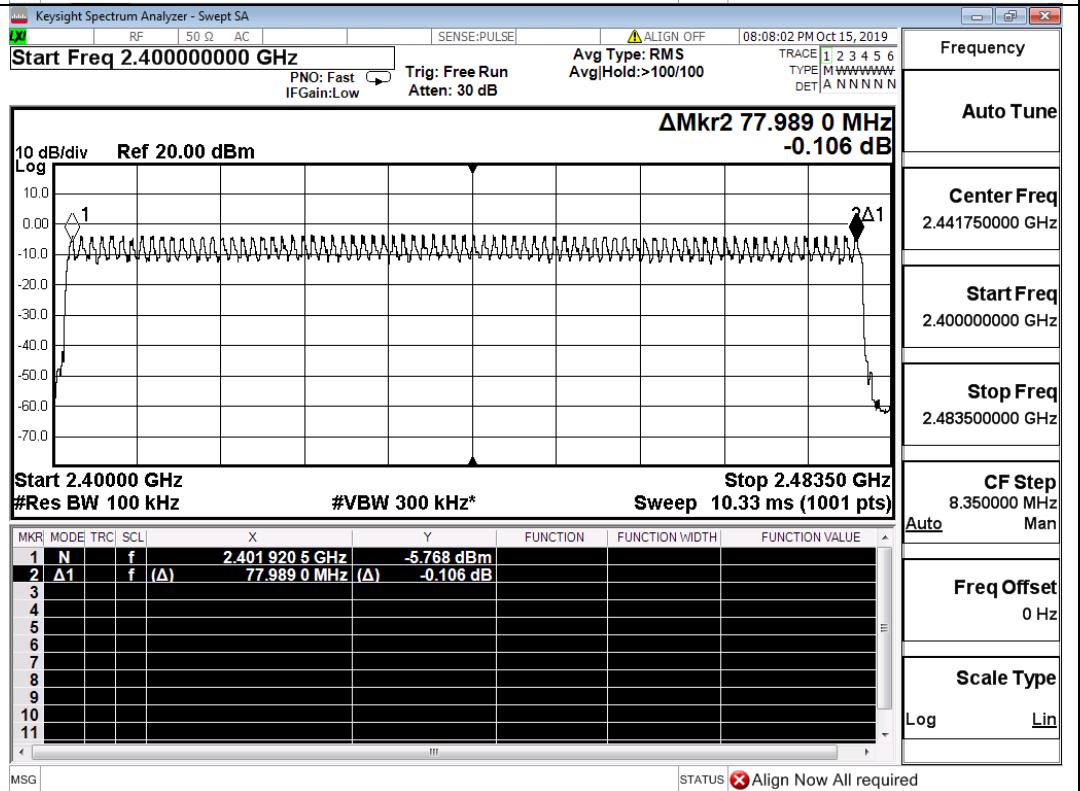
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8-DPSK	Hop	79	>=15	PASS



$\pi/4$ DQPSK/Hop

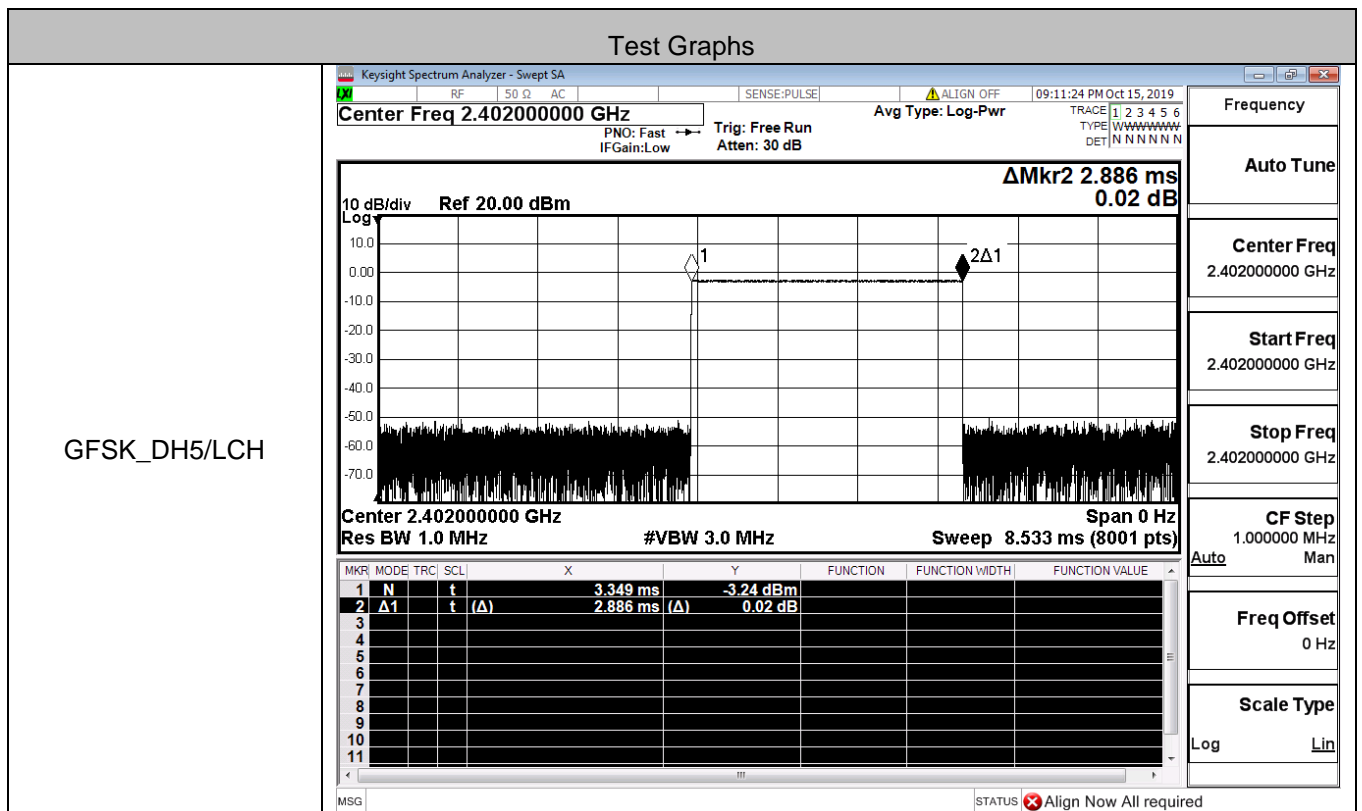


8-DPSK/Hop



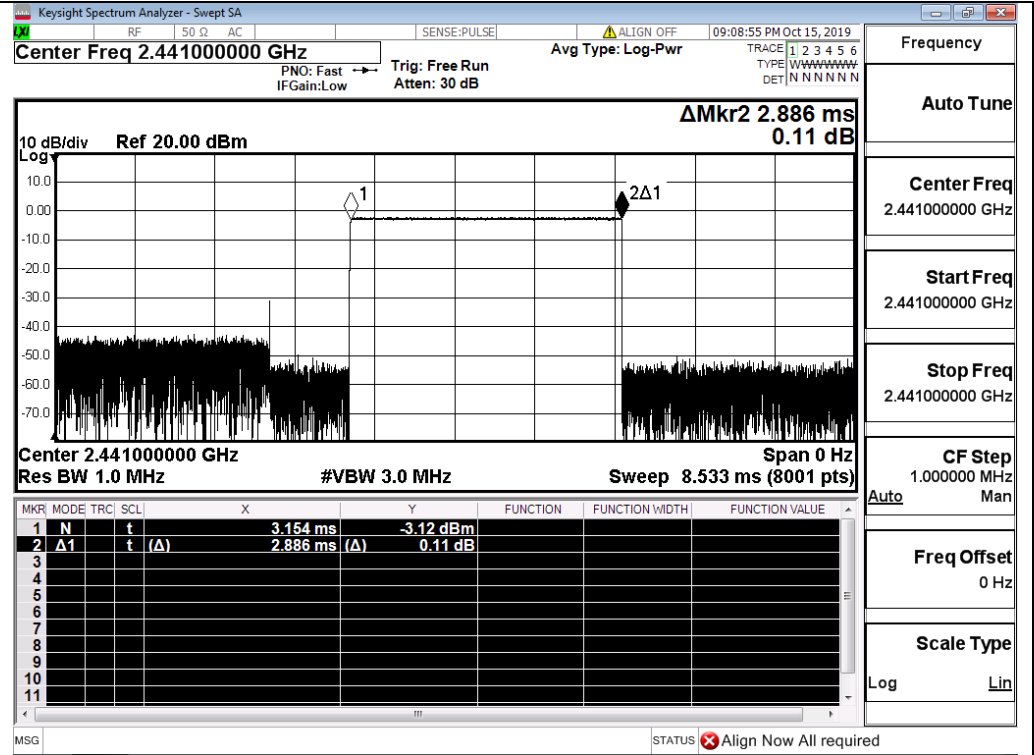
A.5 Dwell Time

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
π/4DQPSK	2DH5	LCH	2.86	106.7	0.305	0.4	PASS
	2DH5	MCH	2.86	106.7	0.305	0.4	PASS
	2DH5	HCH	2.89	106.7	0.308	0.4	PASS
8-DPSK	3DH5	LCH	2.85	106.7	0.304	0.4	PASS
	3DH5	MCH	2.84	106.7	0.303	0.4	PASS
	3DH5	HCH	2.86	106.7	0.305	0.4	PASS

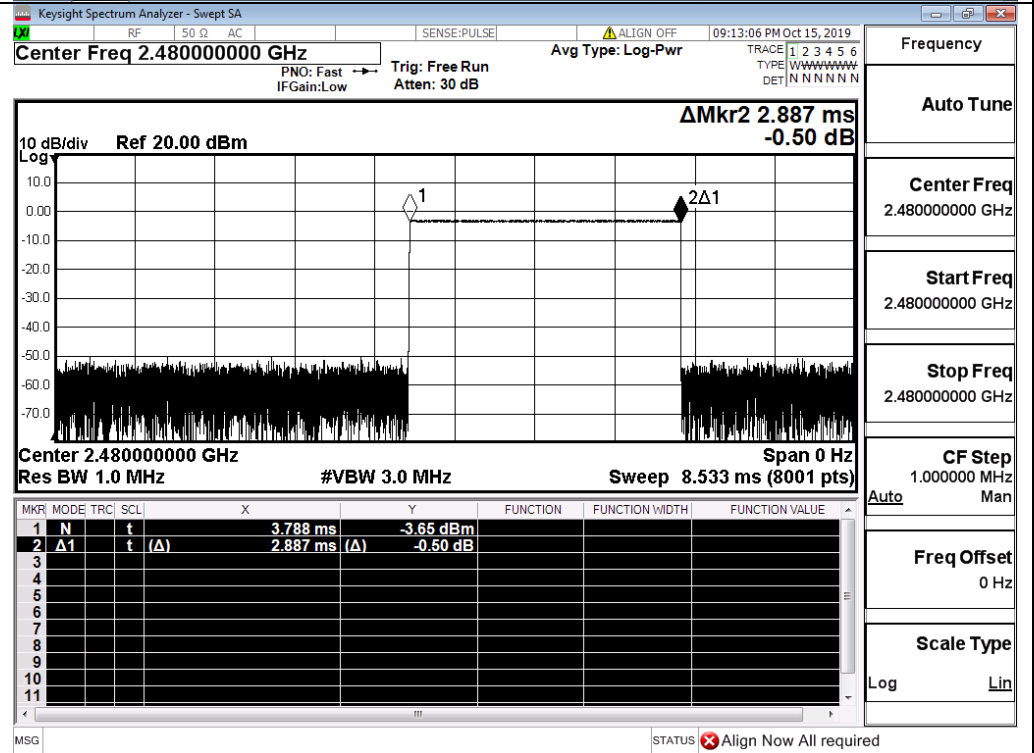


GFSK_DH5/LCH

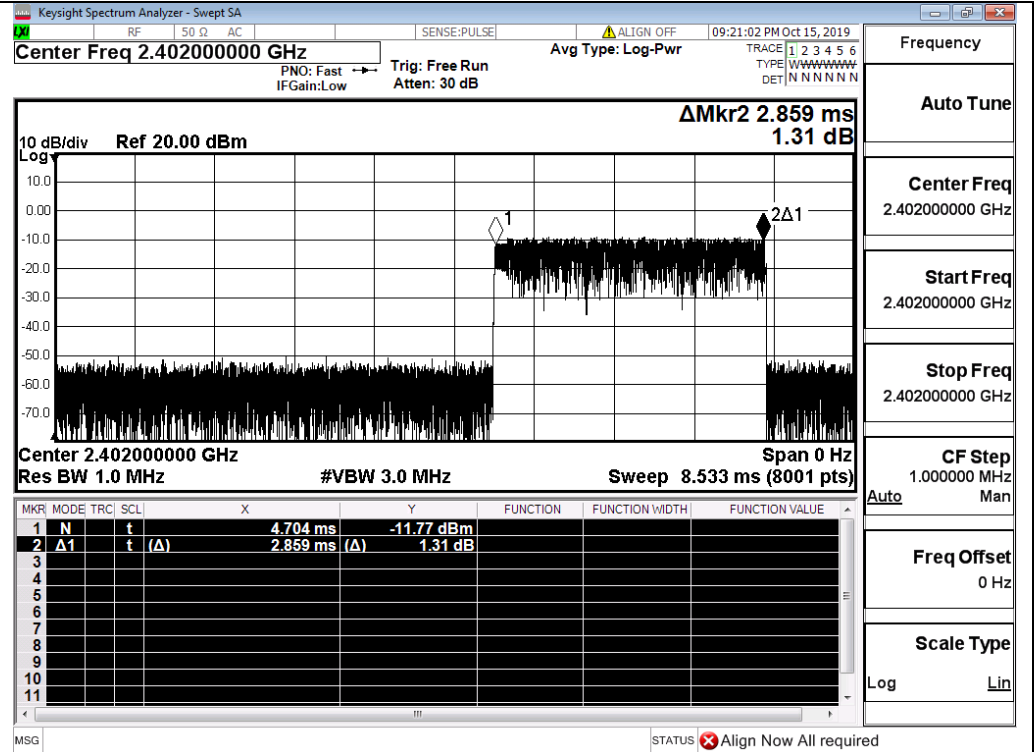
GFSK_DH5/MCH



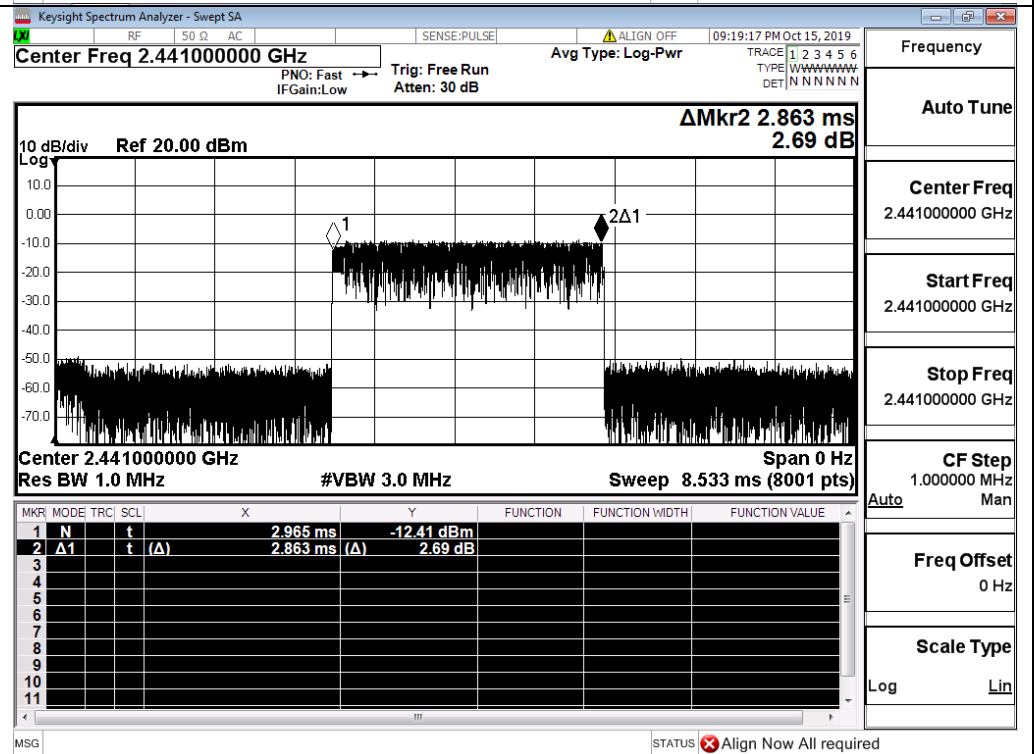
GFSK_DH5/HCH



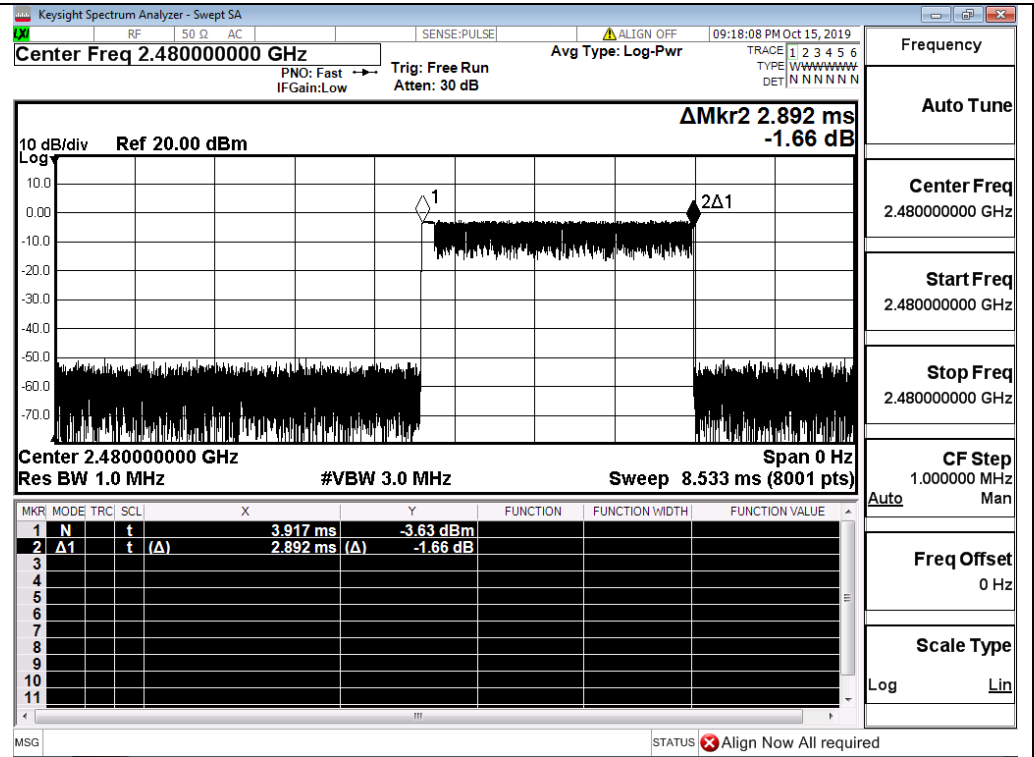
$\pi/4$ DQPSK
_2DH5/LCH



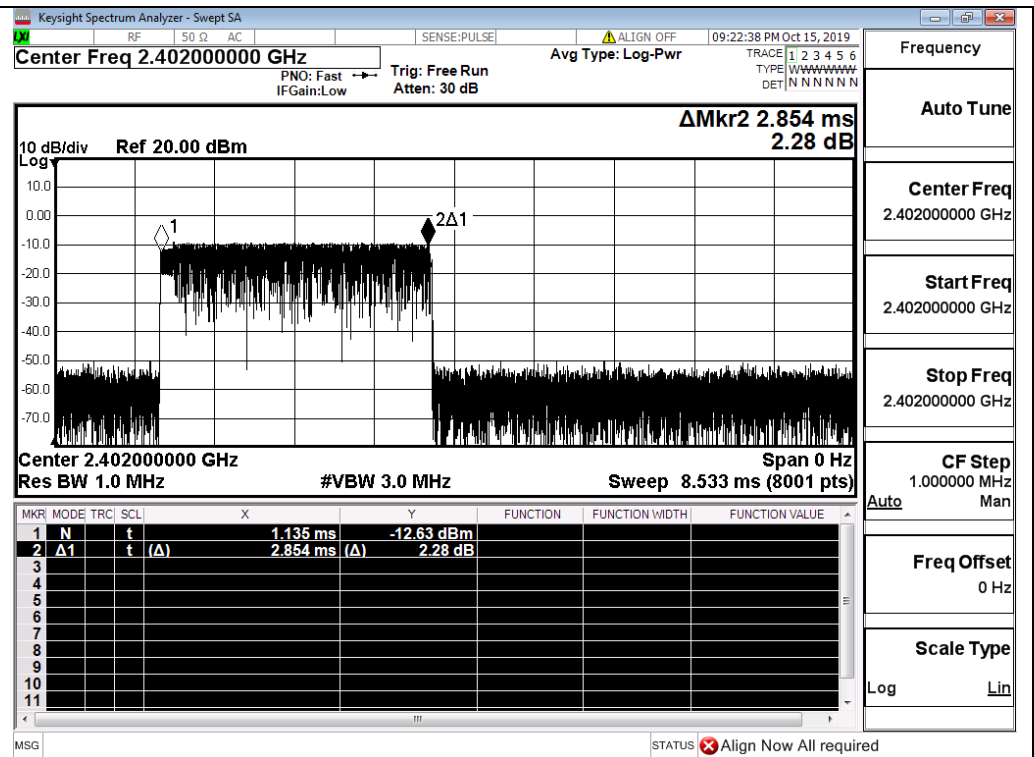
$\pi/4$ DQPSK
_2DH5/MCH



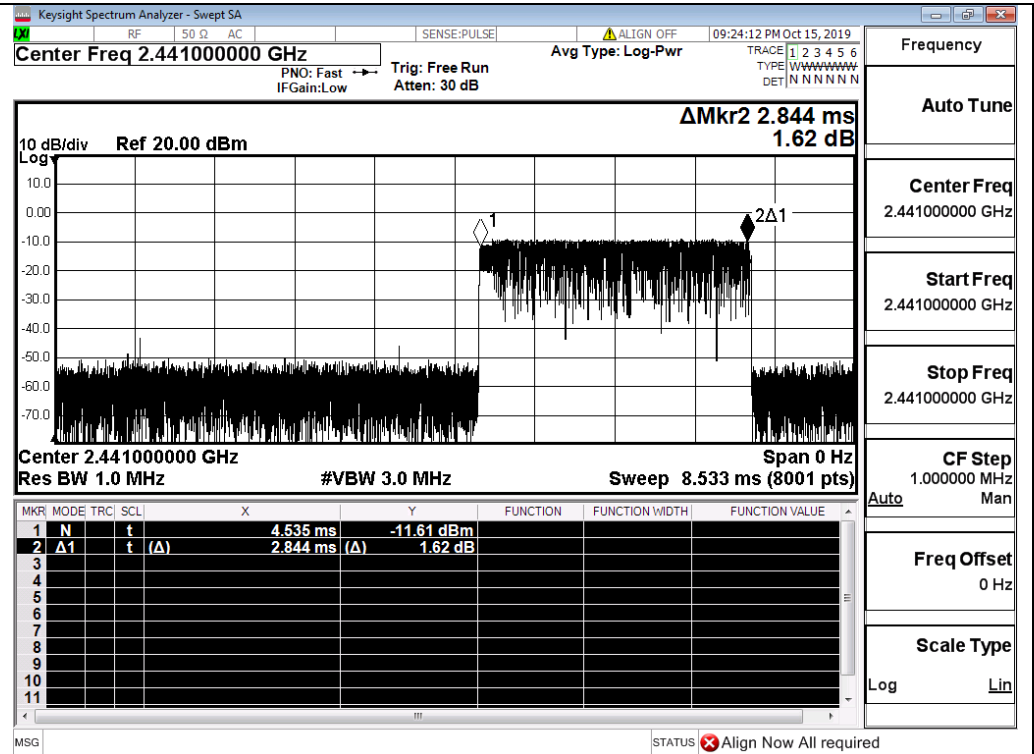
$\pi/4$ DQPSK
_2DH5/HCH



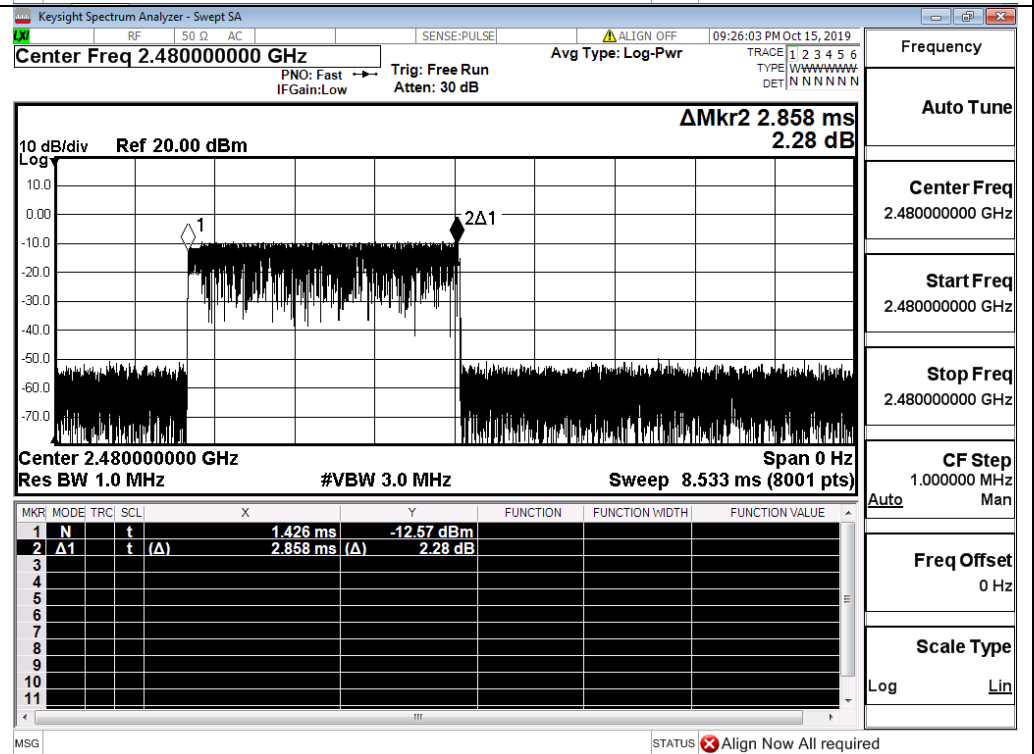
8-DPSK_3DH5/LCH



8-DPSK_3DH5/MCH



8-DPSK_3DH5/HCH

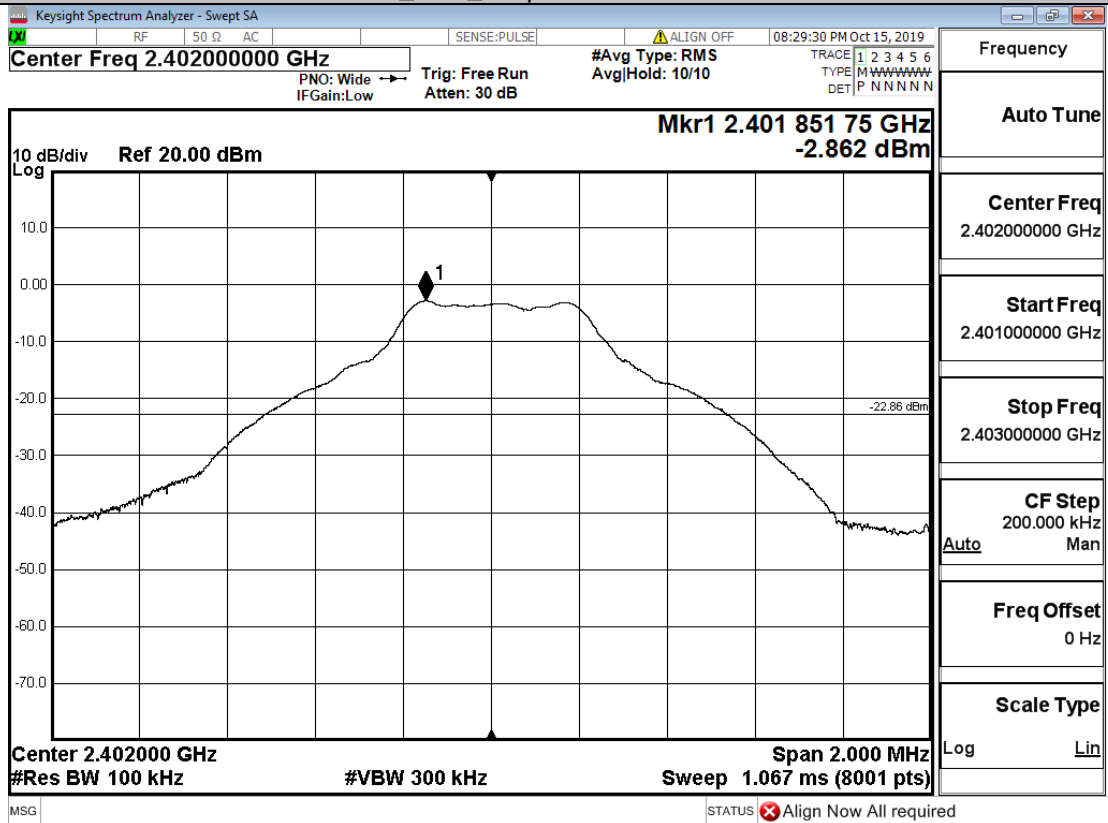


A.6 RF Conducted Spurious Emissions

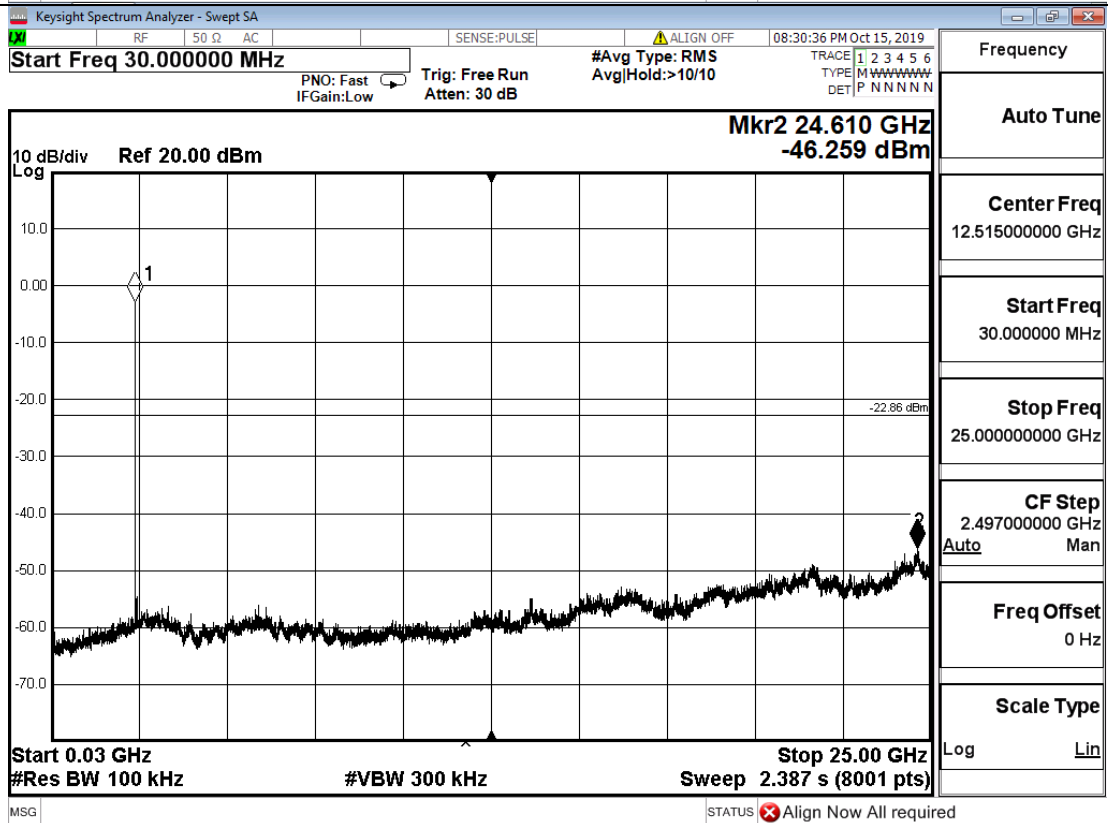
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.862	-46.259	-22.86	PASS
	MCH	-2.641	-48.809	-22.64	PASS
	HCH	-3.174	-49.155	-23.17	PASS
$\pi/4$ DQPSK	LCH	-2.973	-48.442	-22.97	PASS
	MCH	-2.801	-39.468	-22.80	PASS
	HCH	-3.369	-49.007	-23.37	PASS
8-DPSK	LCH	-2.890	-47.828	-22.89	PASS
	MCH	-2.673	-48.324	-22.67	PASS
	HCH	-3.195	-48.998	-23.20	PASS

GFSK_LCH_Graphs

Pref

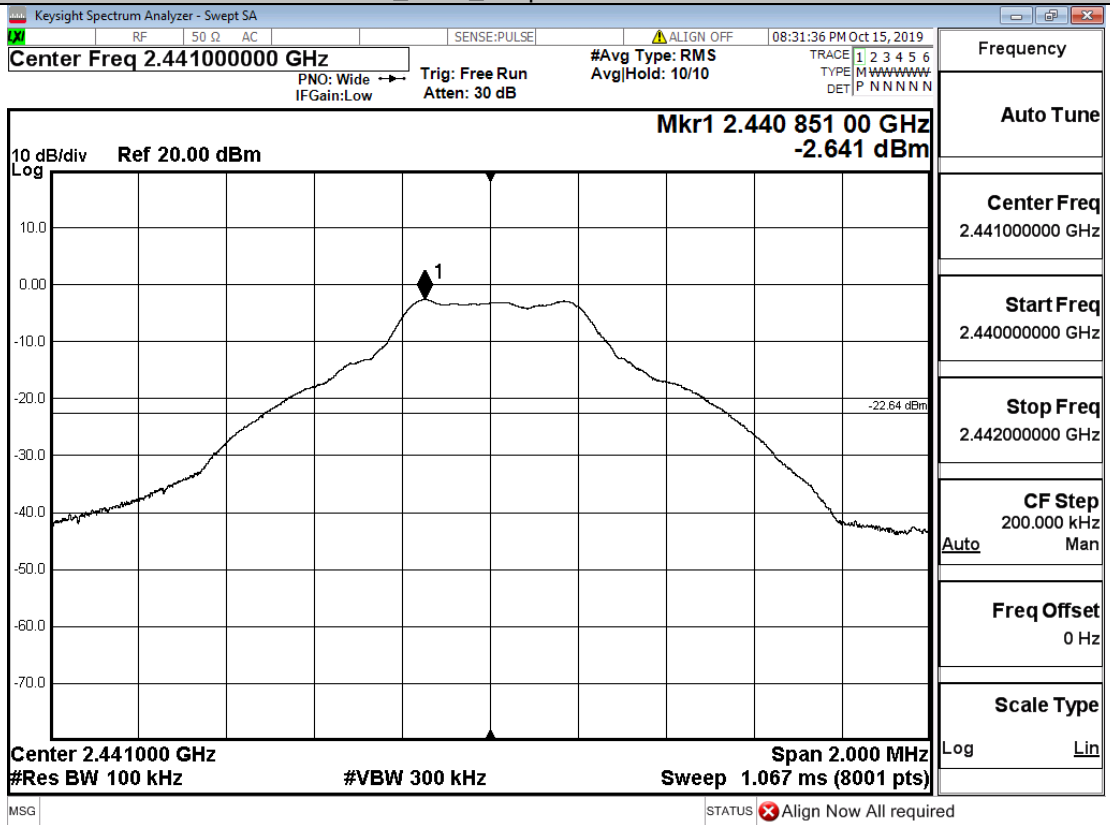


Puw

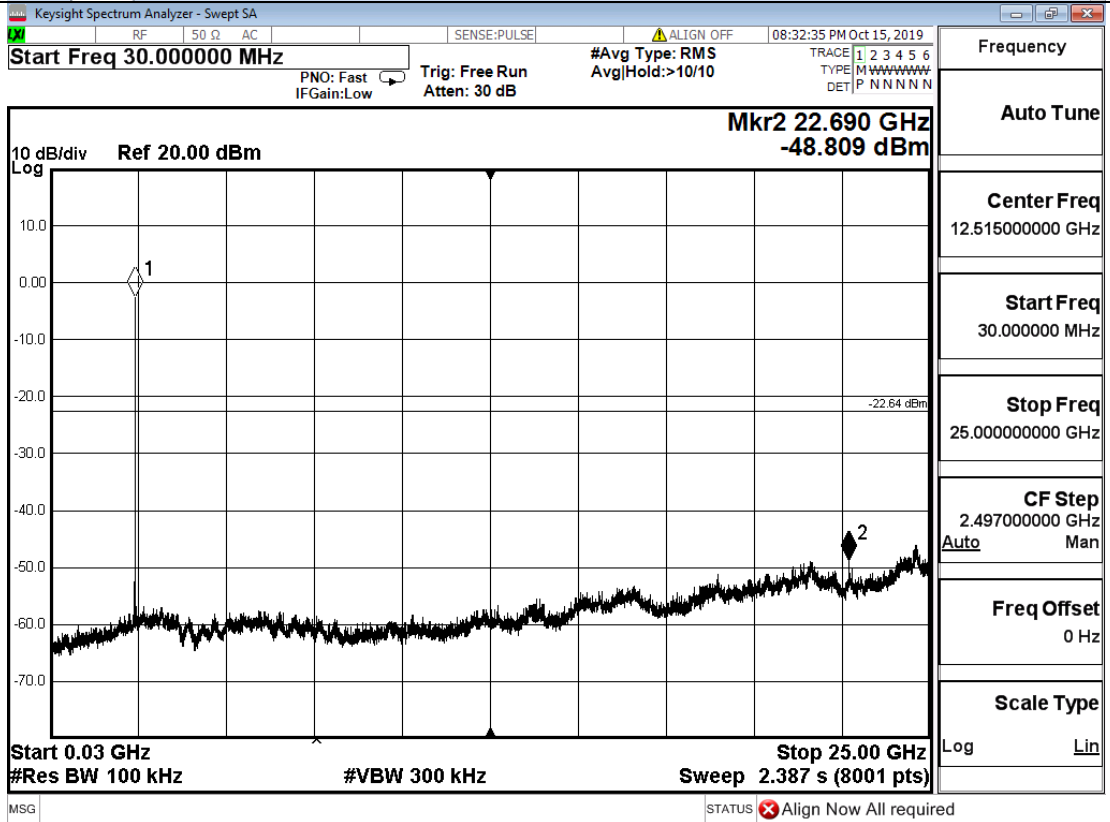


GFSK_MCH_Graphs

Pref

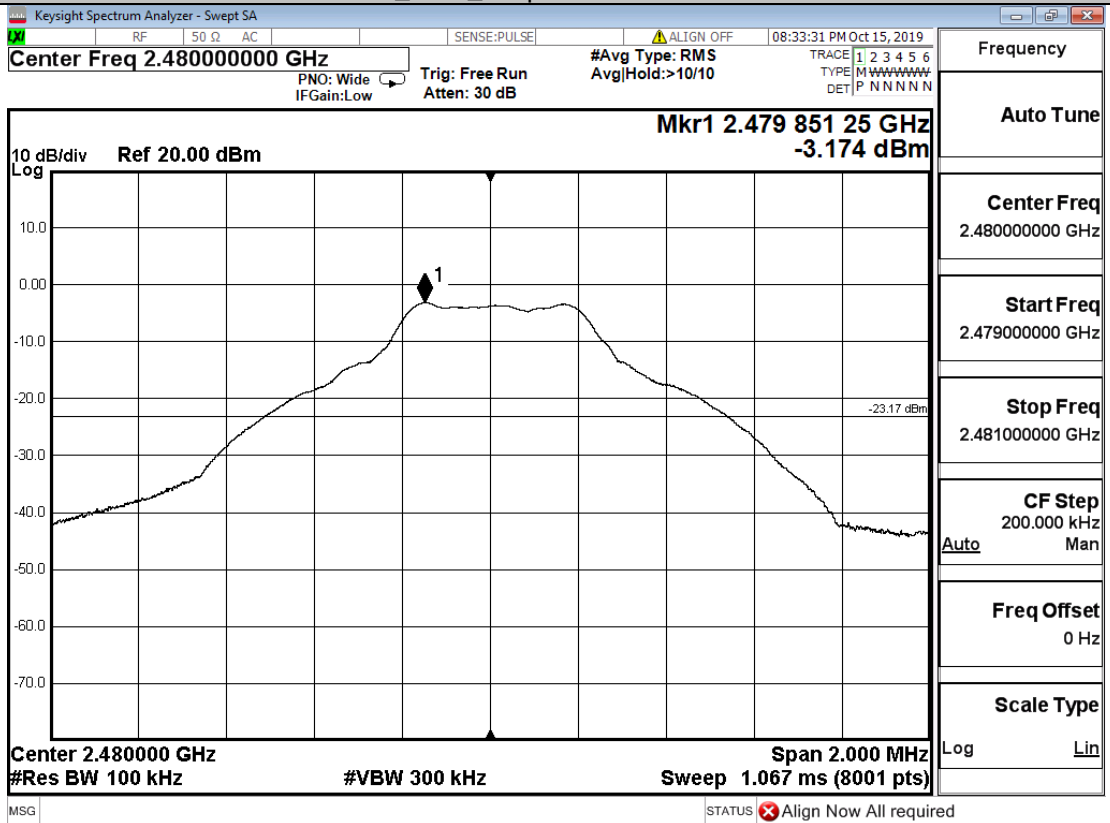


Puw

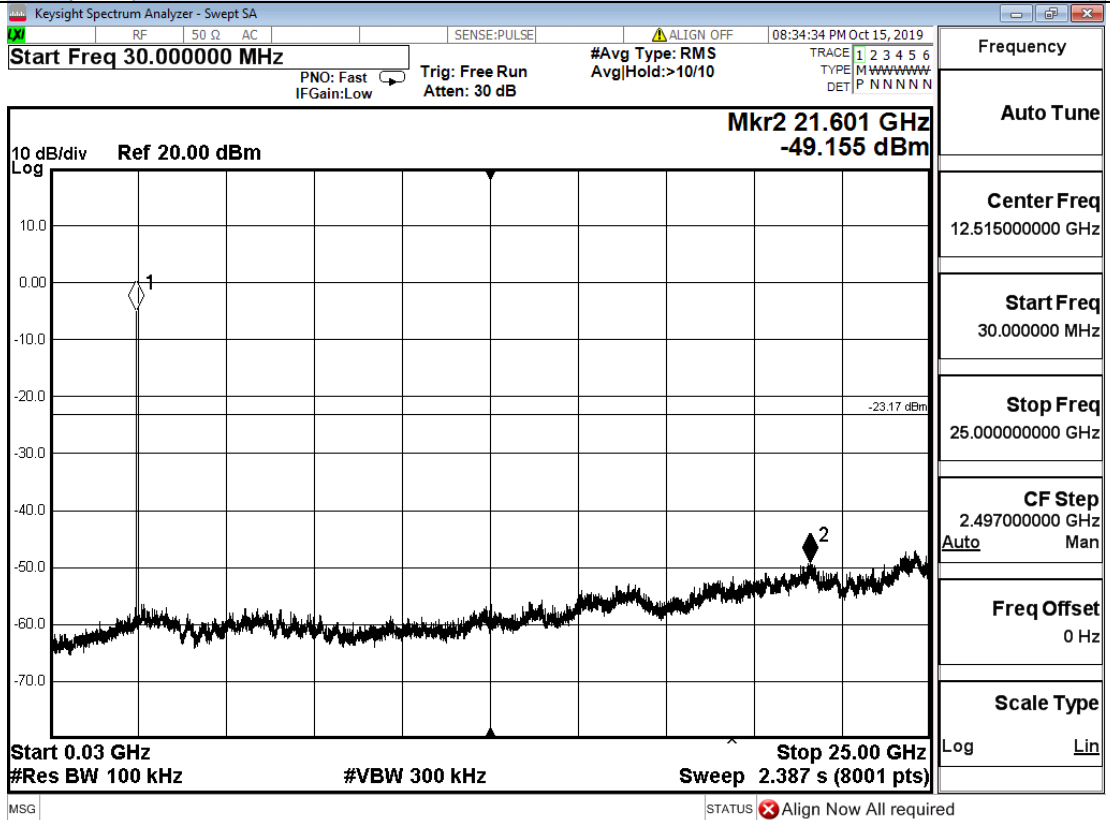


GFSK_HCH_Graphs

Pref

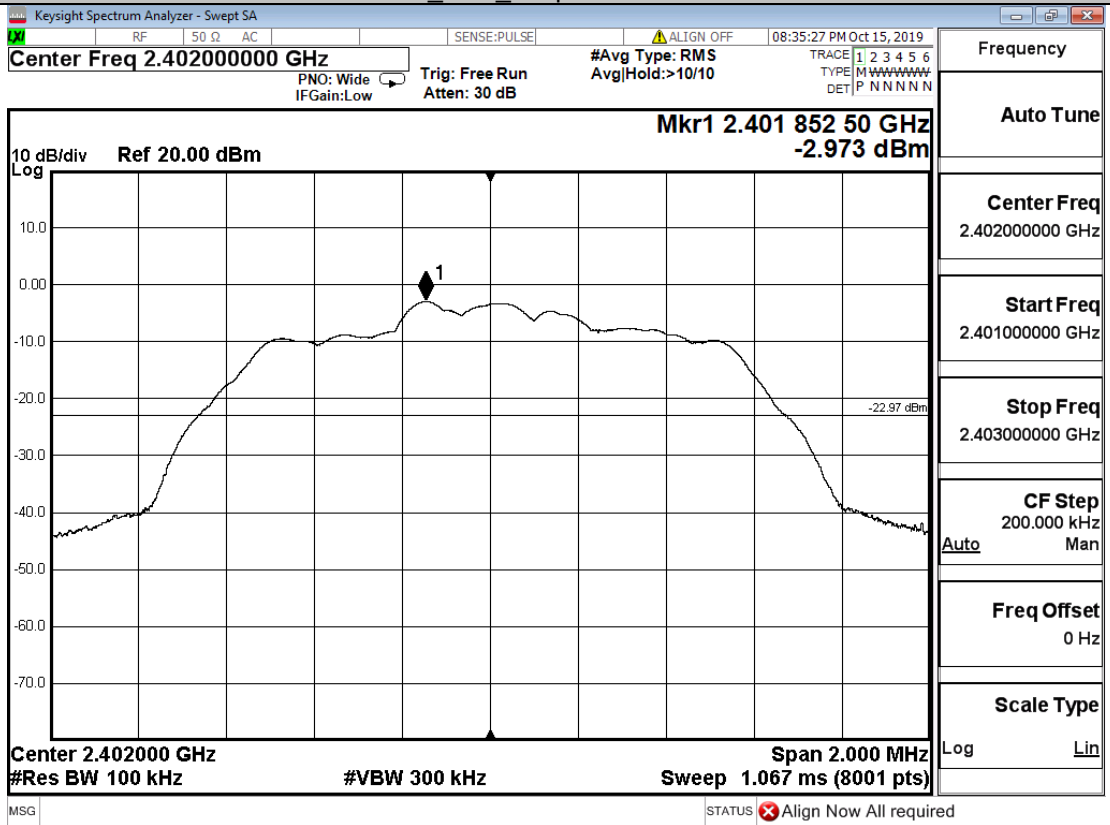


Puw

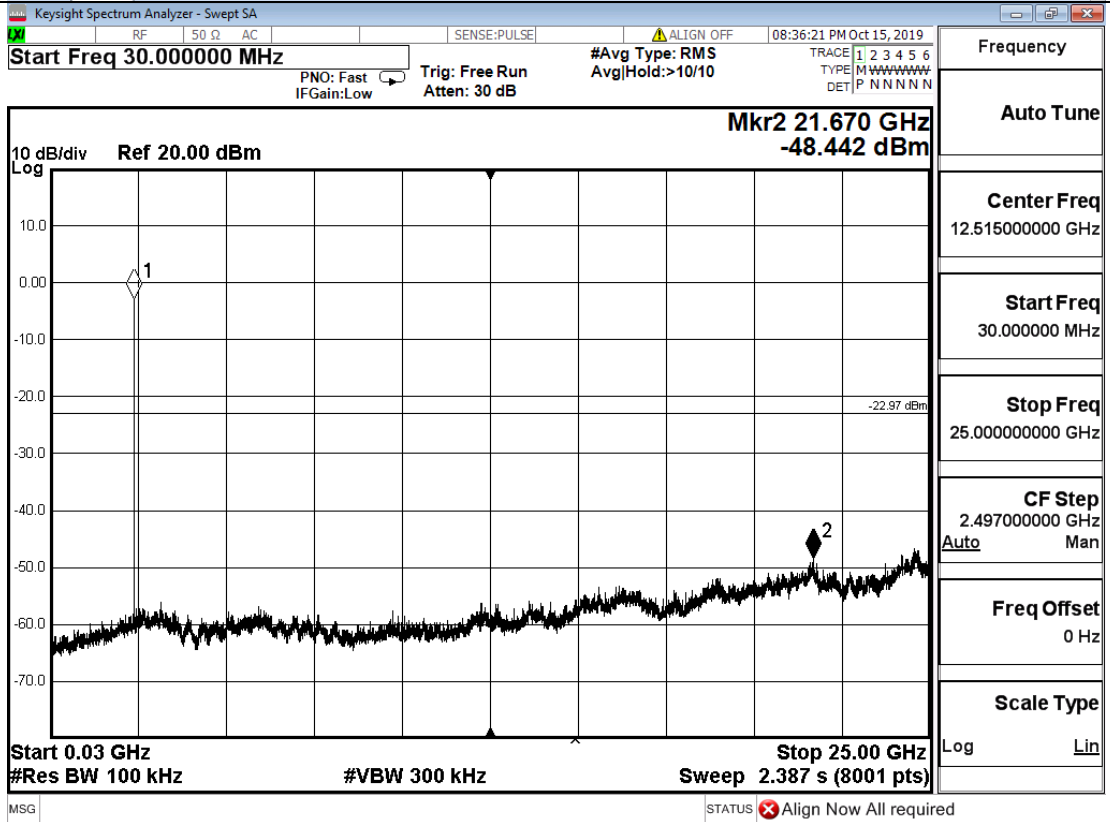


$\pi/4$ DQPSK_LCH_Graphs

Pref

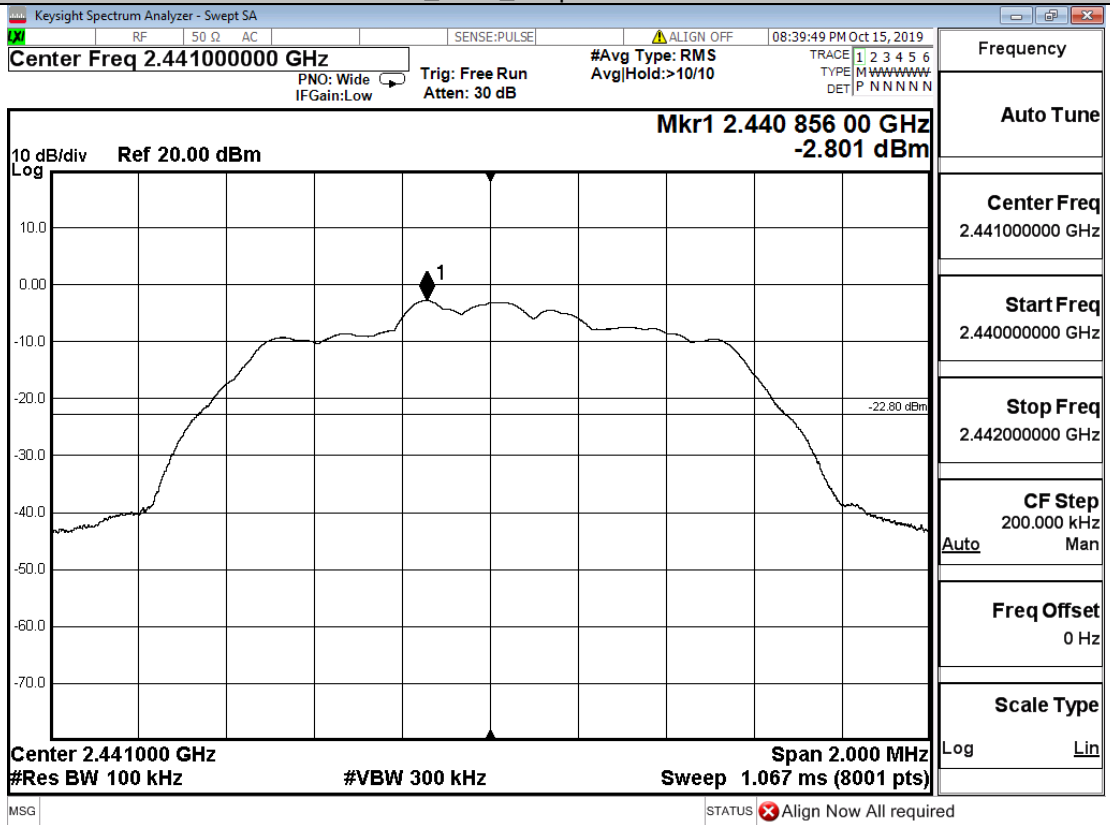


Puw

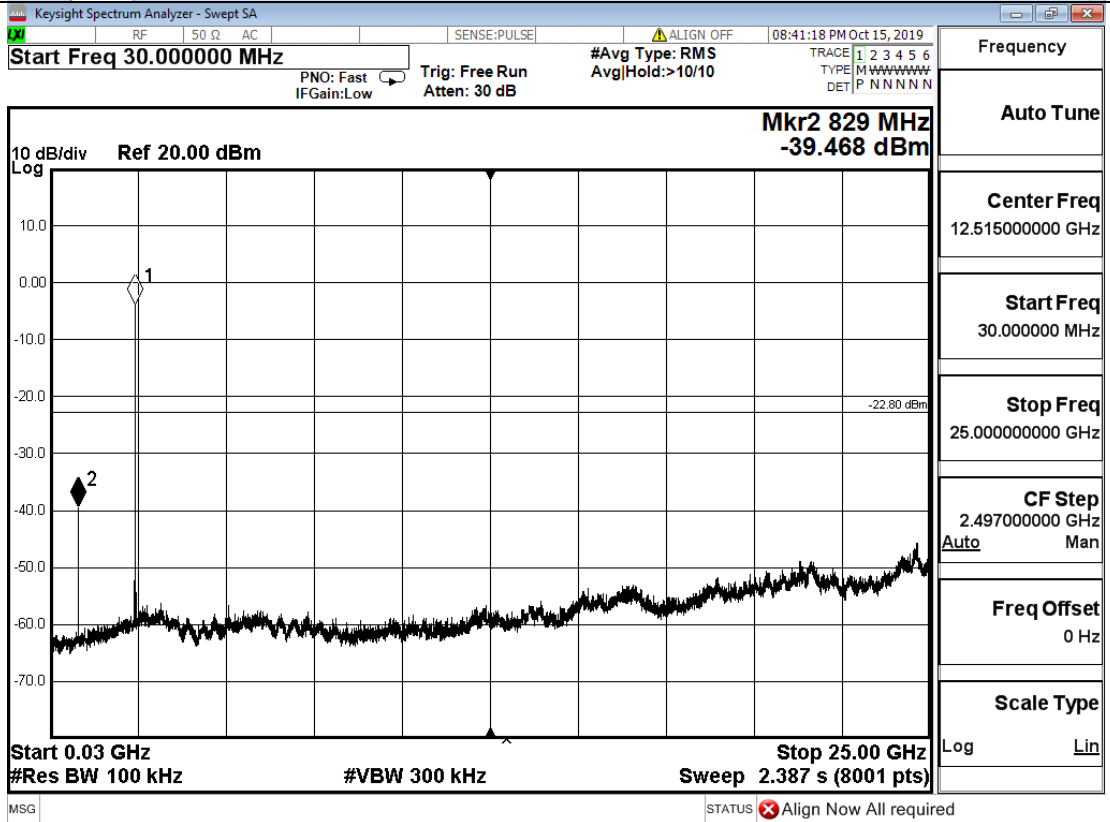


$\pi/4$ DQPSK_MCH_Graphs

Pref

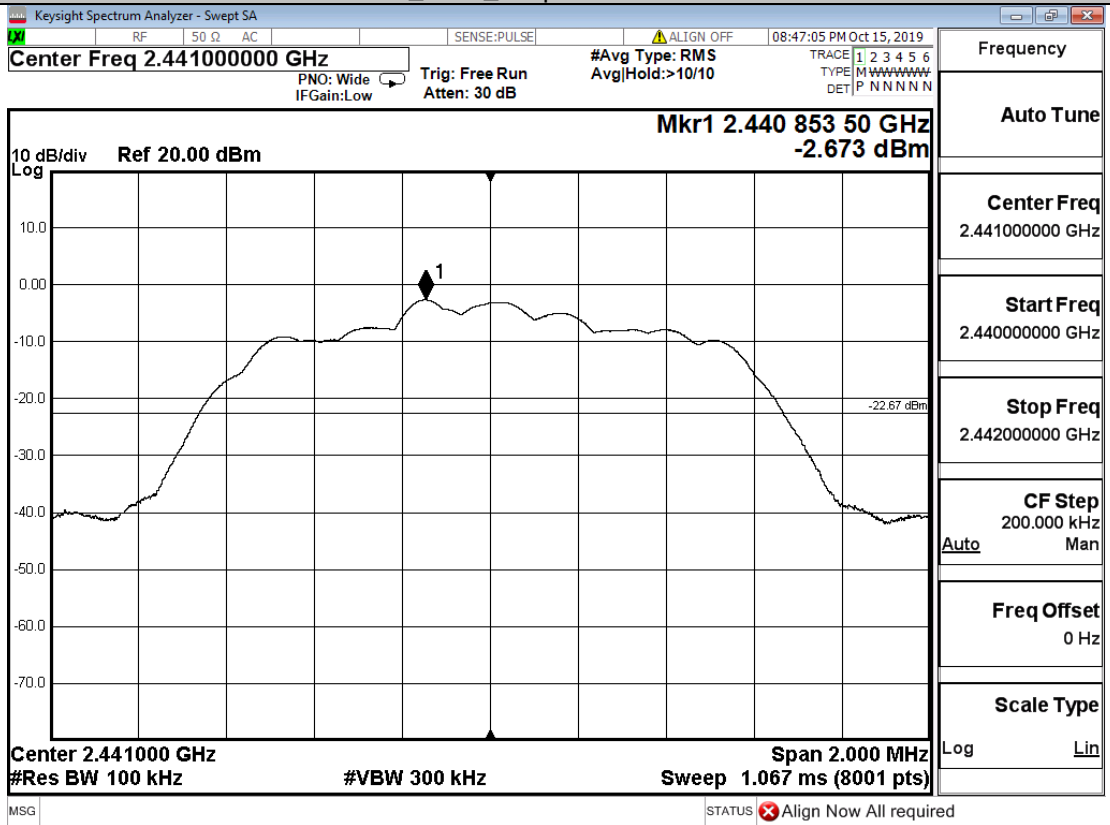


Puw

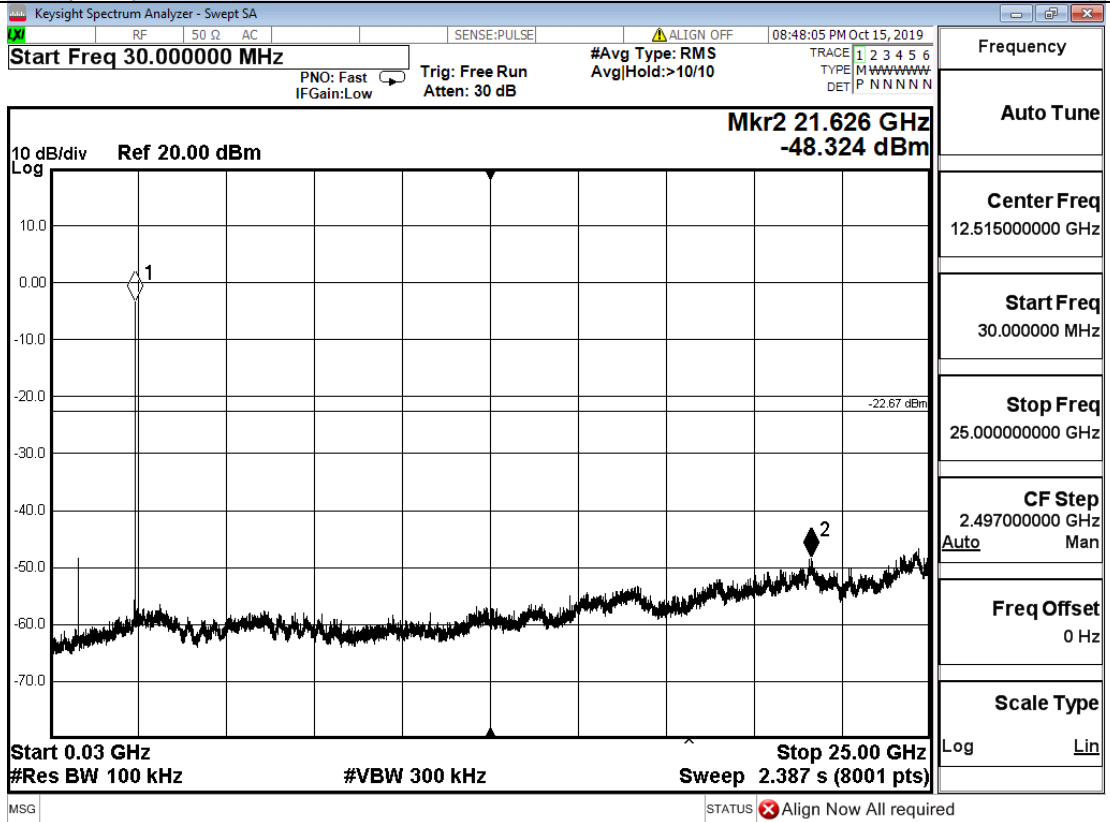


8-DPSK_MCH_Graphs

Pref

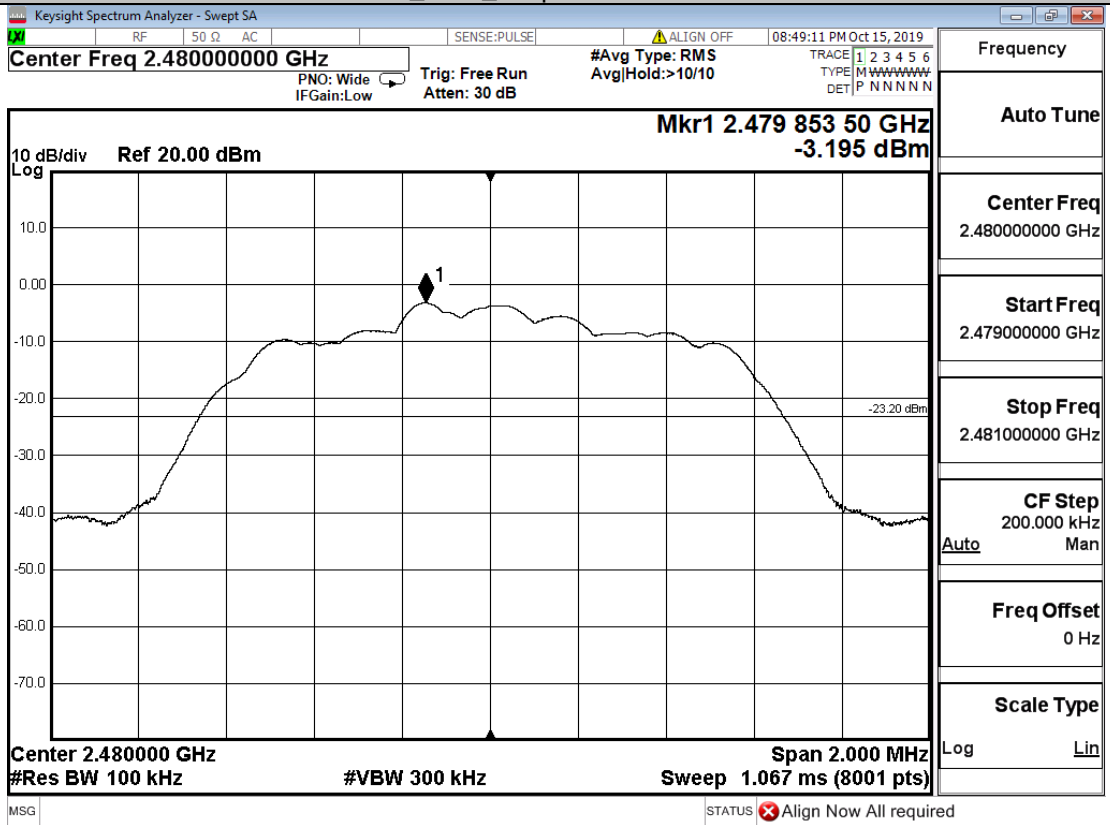


Puw

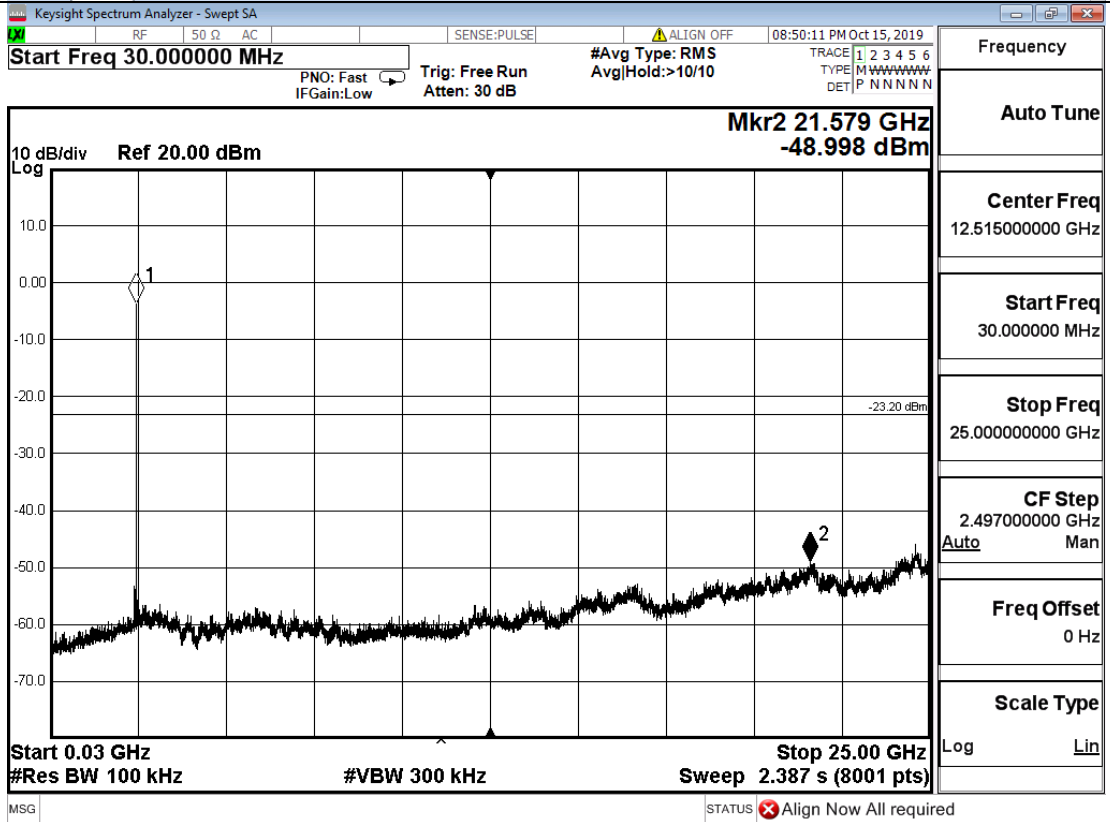


8-DPSK_HCH_Graphs

Pref



Puw

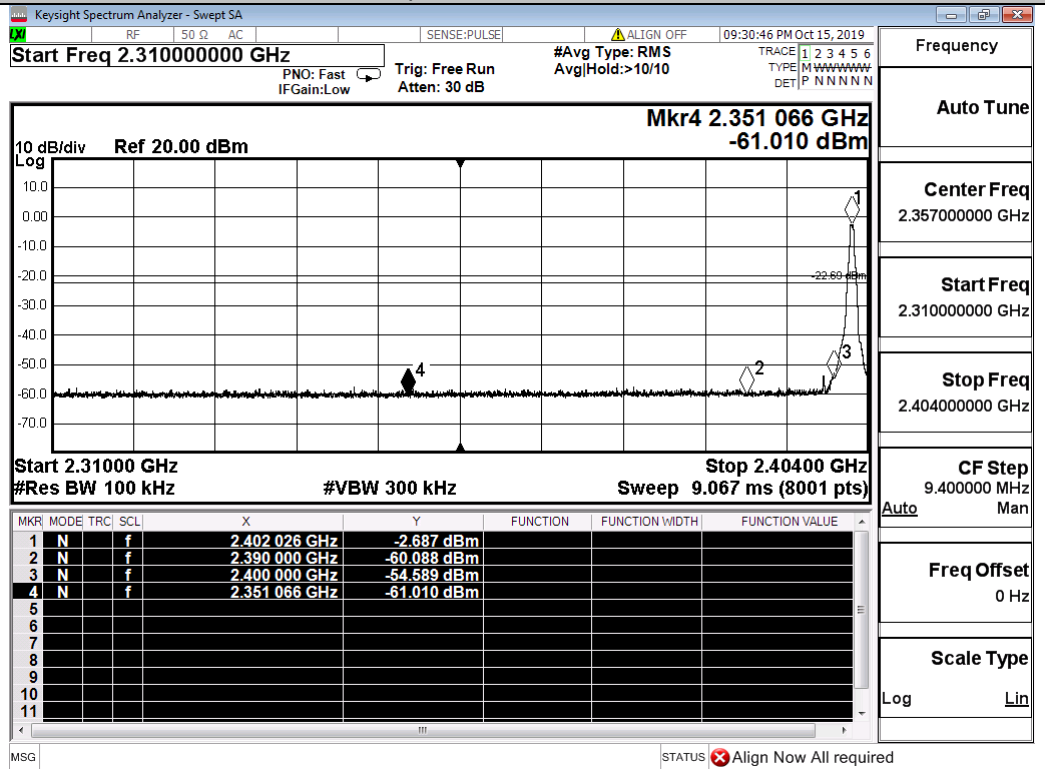


A.7 Band-edge for RF Conducted Emissions

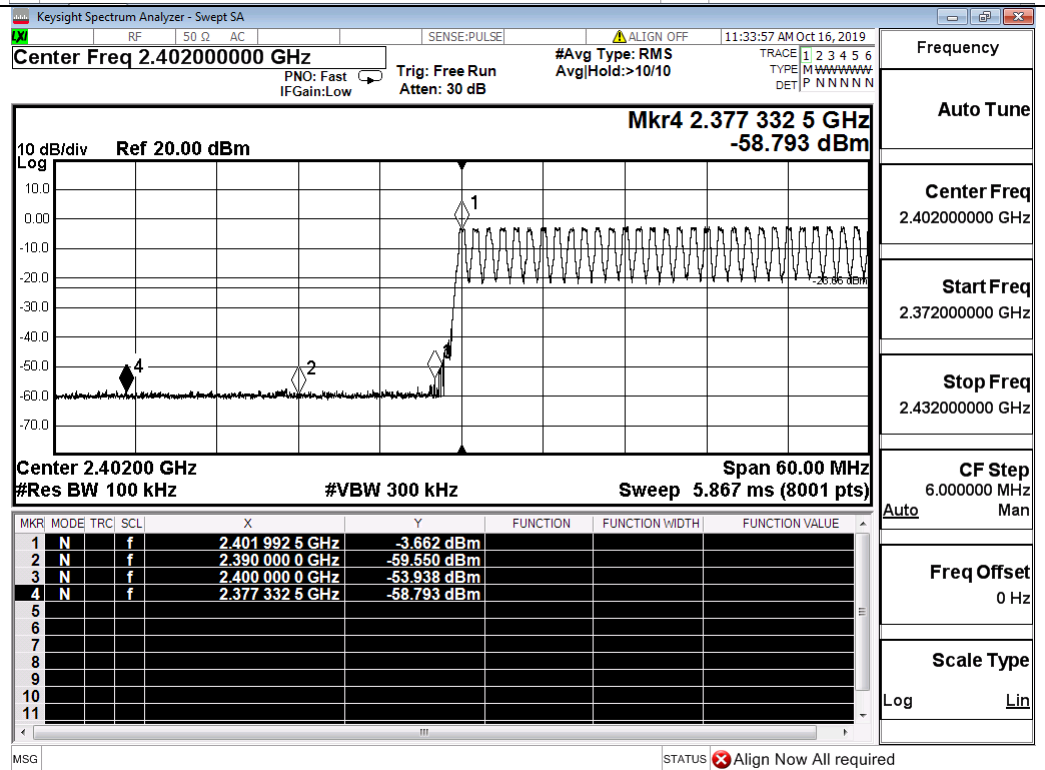
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.687	Off	-54.589	-22.69	PASS
			-3.662	On	-53.938	-23.66	PASS
	HCH	2480	-2.801	Off	-59.781	-22.80	PASS
			-3.032	On	-58.602	-23.03	PASS
$\pi/4$ DQPSK	LCH	2402	-2.768	Off	-54.216	-22.77	PASS
			-4.428	On	-55.992	-24.43	PASS
	HCH	2480	-2.844	Off	-59.811	-22.84	PASS
			-2.855	On	-59.268	-22.86	PASS
$\pi/4$ DQPSK	LCH	2402	-2.729	Off	-54.045	-22.73	PASS
			-4.012	On	-55.679	-24.01	PASS
	HCH	2480	-2.735	Off	-58.557	-22.74	PASS
			-4.021	On	-58.032	-24.02	PASS

Test Graphs

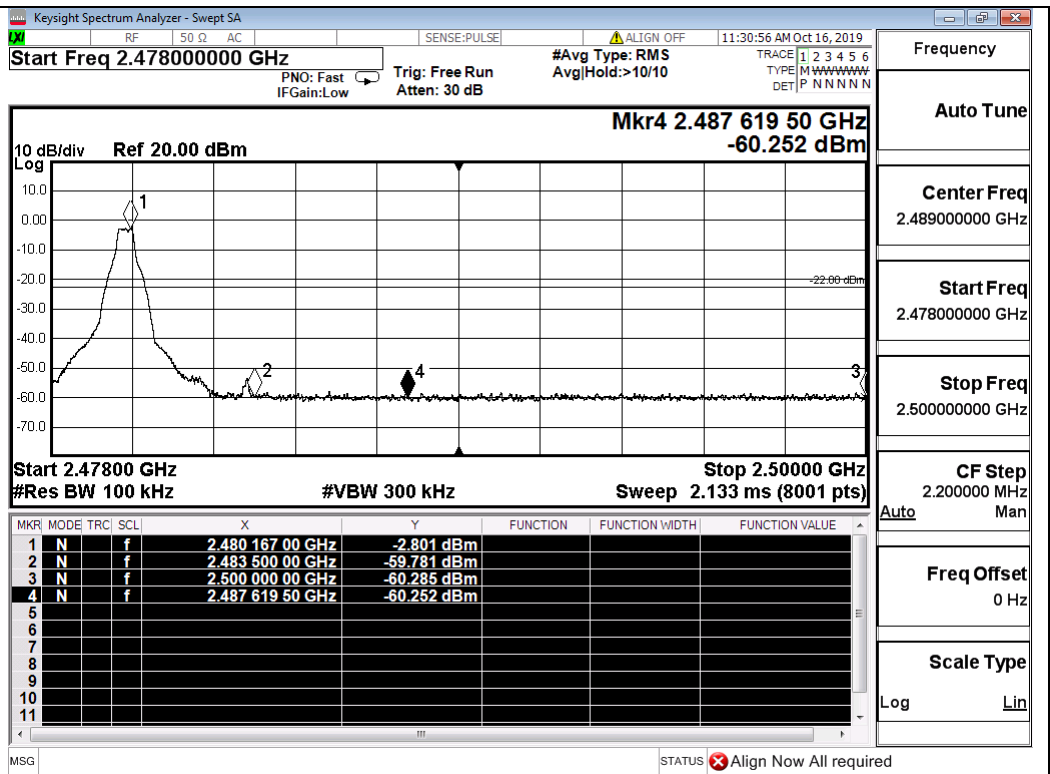
GFSK/LCH/No Hop



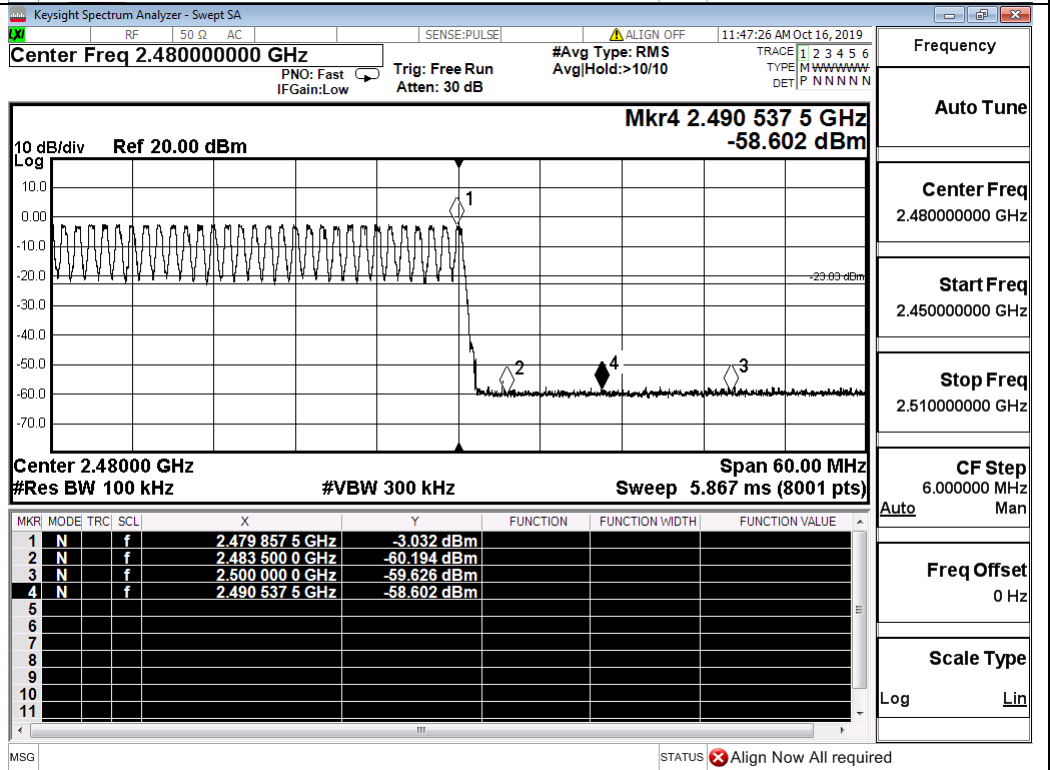
GFSK/LCH/Hop



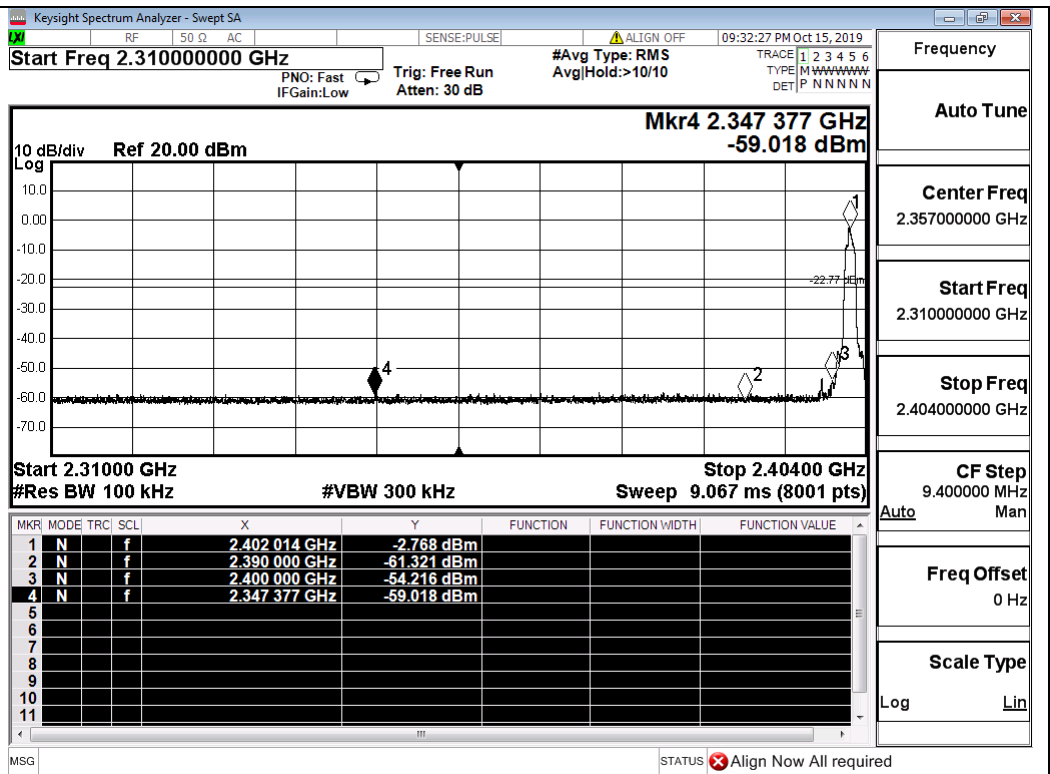
GFSK/HCH/No Hop



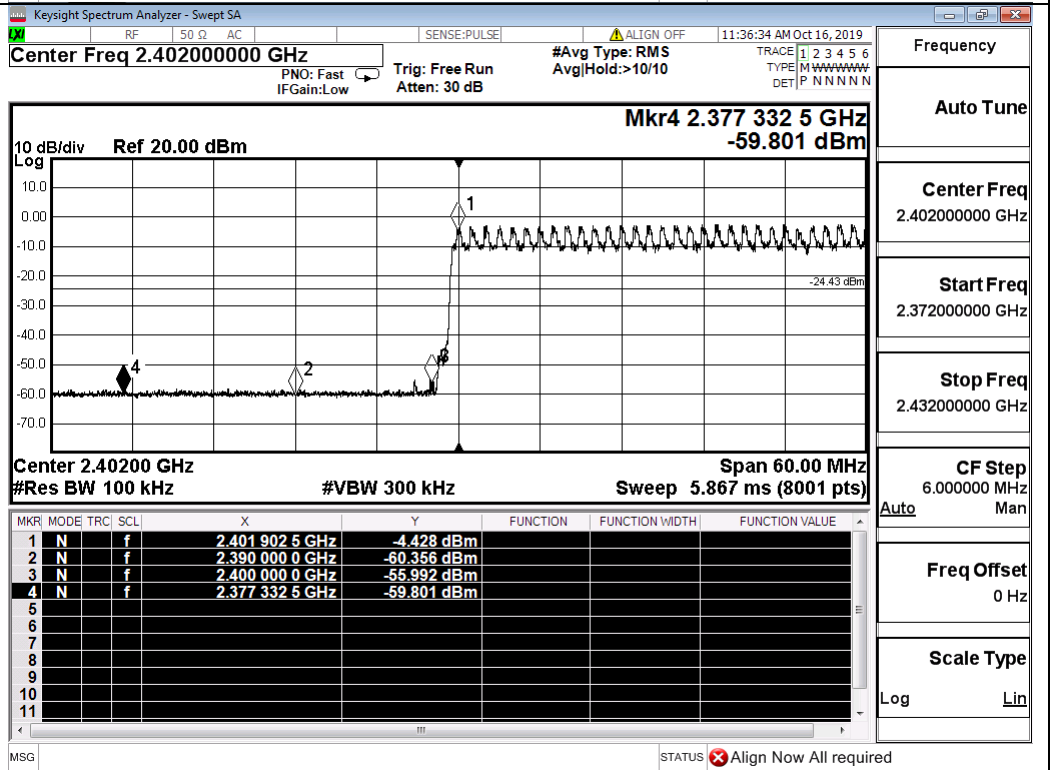
GFSK/HCH/Hop



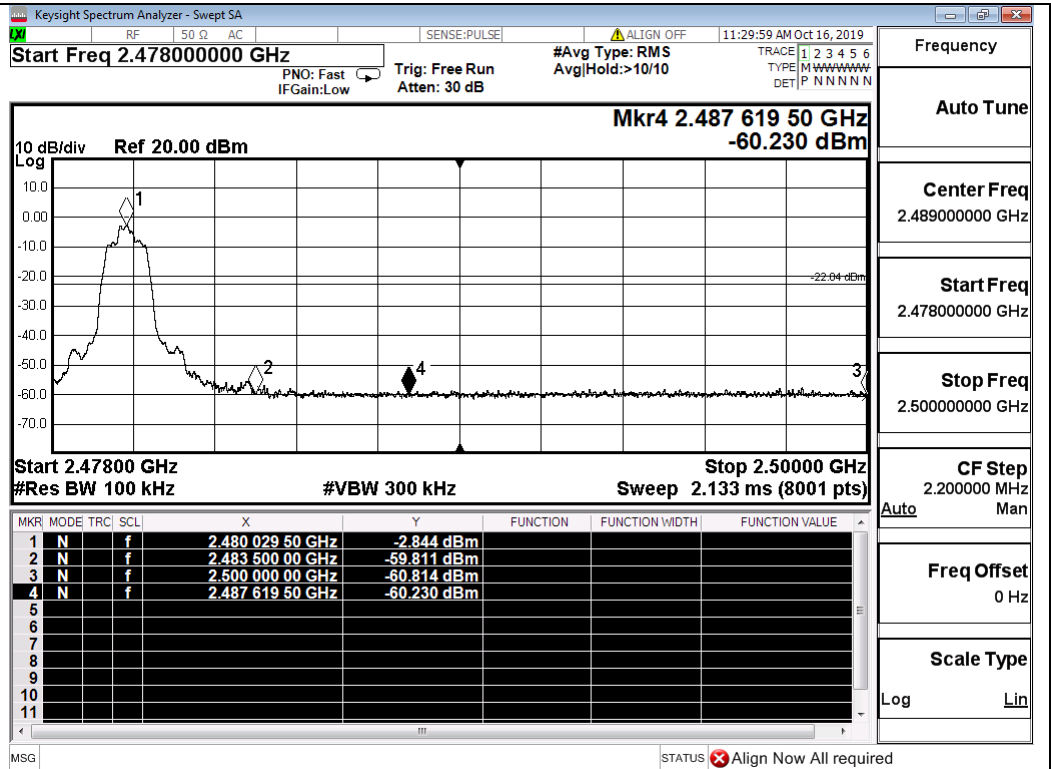
$\pi/4$ DQPSK/LCH/No Hop



$\pi/4$ DQPSK/LCH/Hop

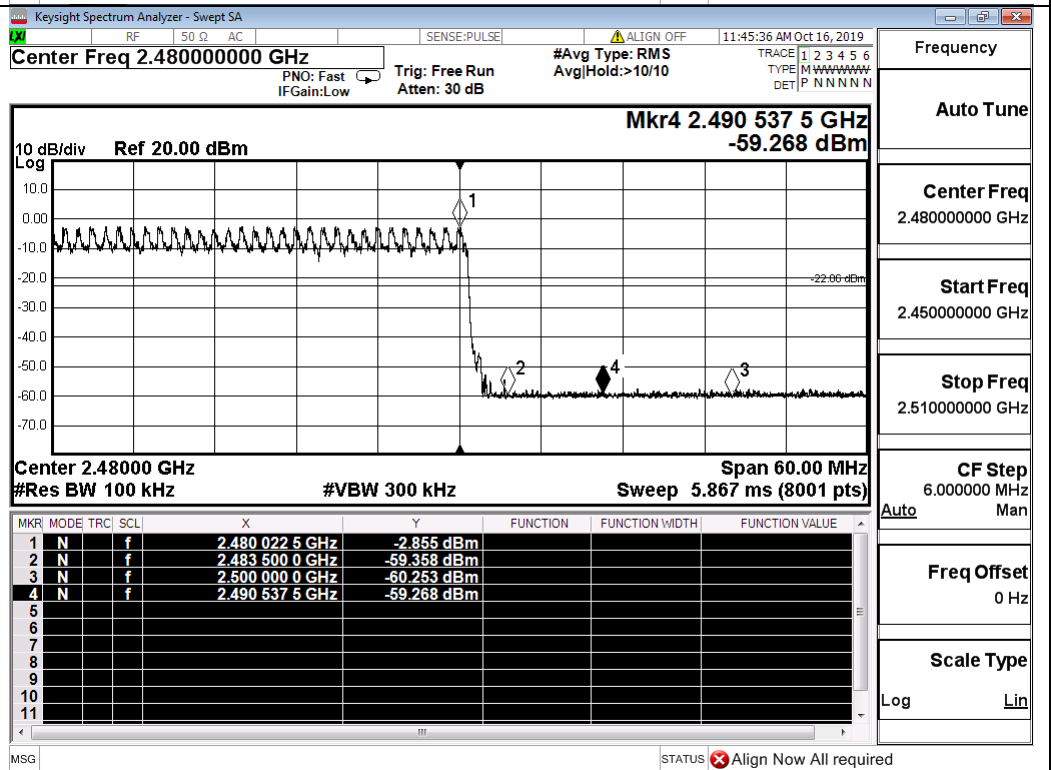


π /4DQPSK/HCH/No Hop



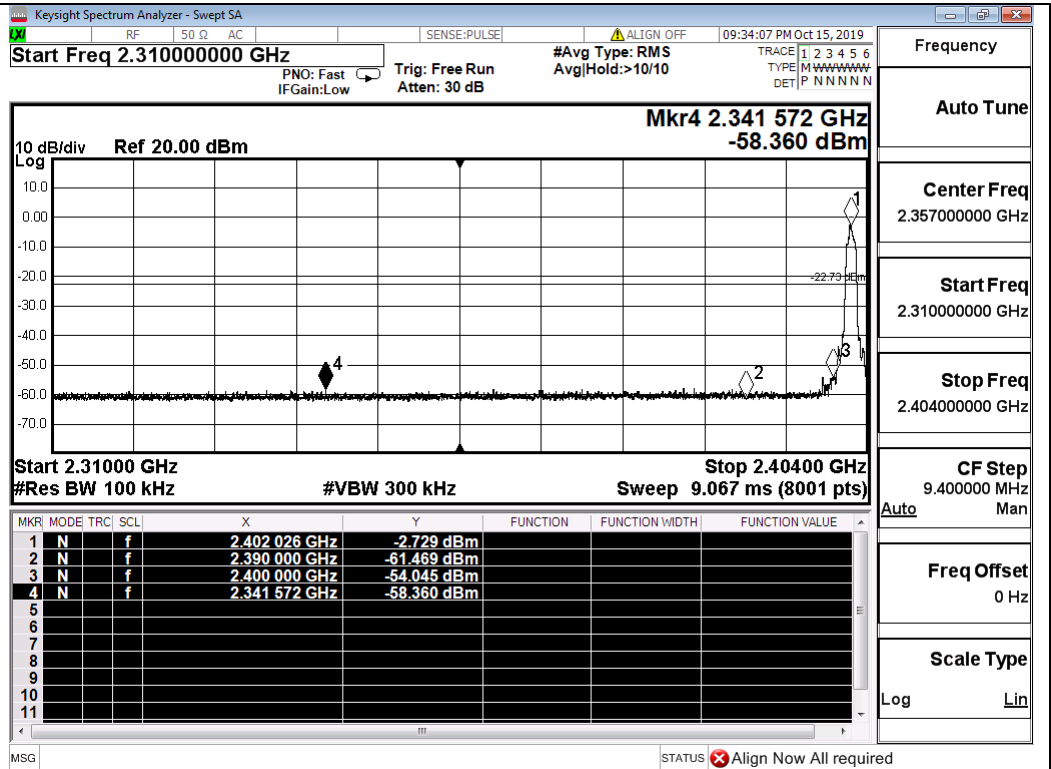
Frequency
Auto Tune
Center Freq
2.489000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.500000000 GHz
CF Step
2.200000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin

π /4DQPSK/HCH/Hop

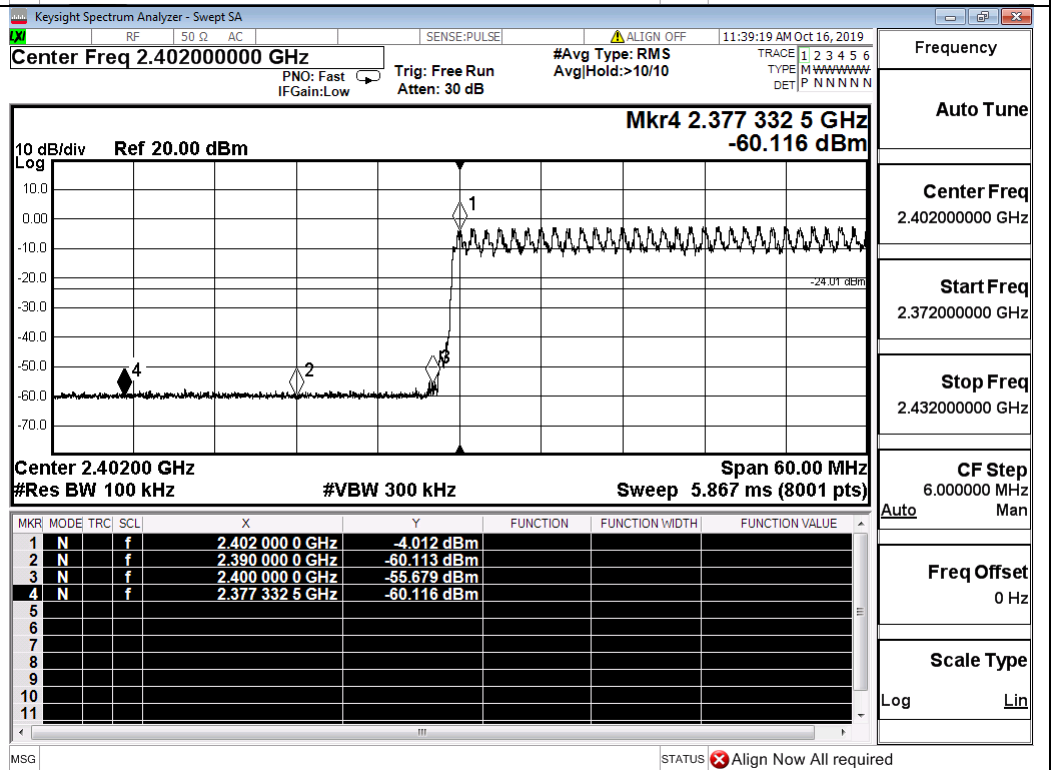


Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.450000000 GHz
Stop Freq
2.510000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin

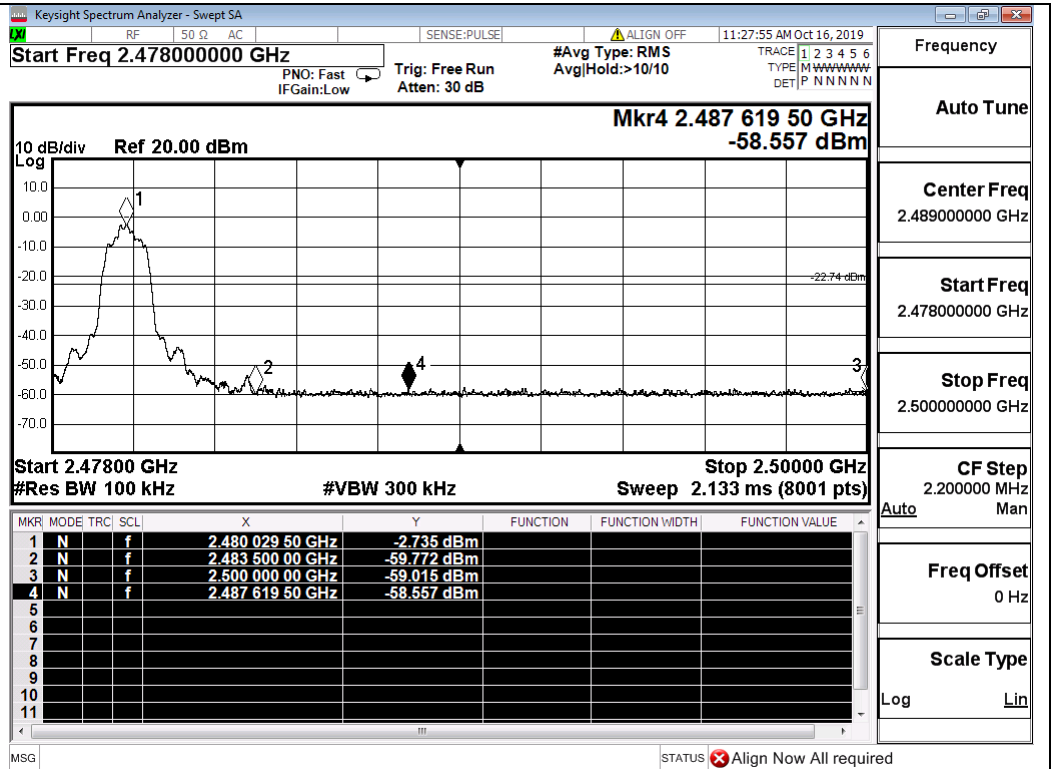
8-DPSK/LCH/No Hop



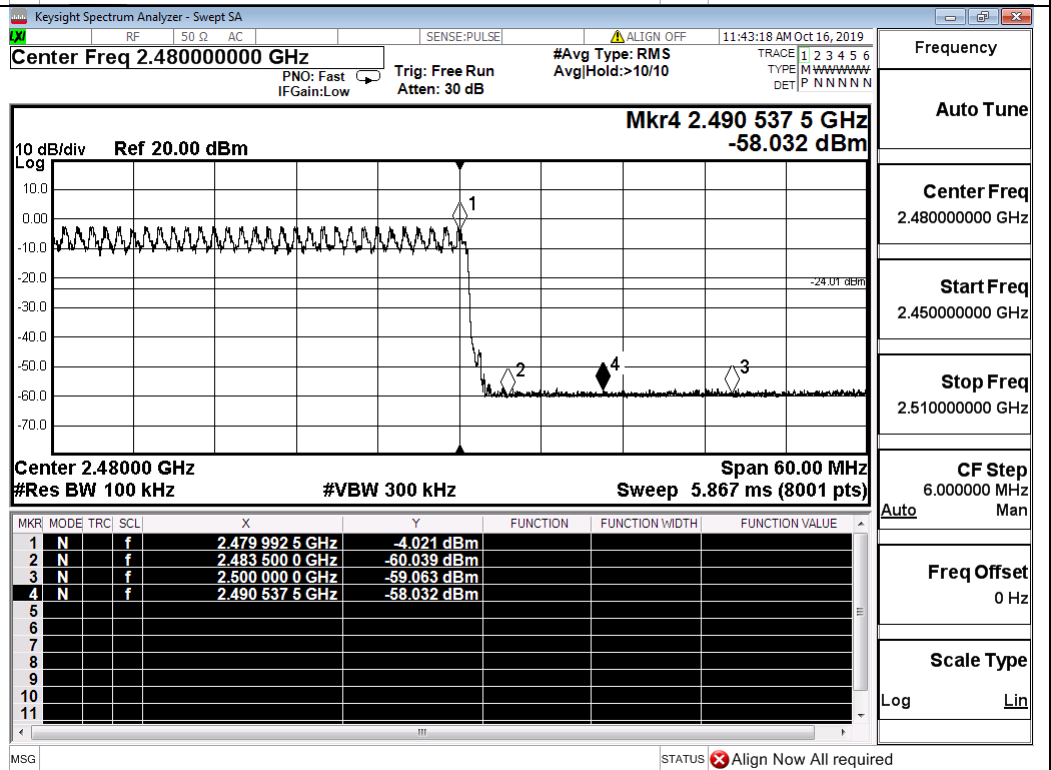
8-DPSK/LCH/Hop



8-DPSK/HCH/No Hop



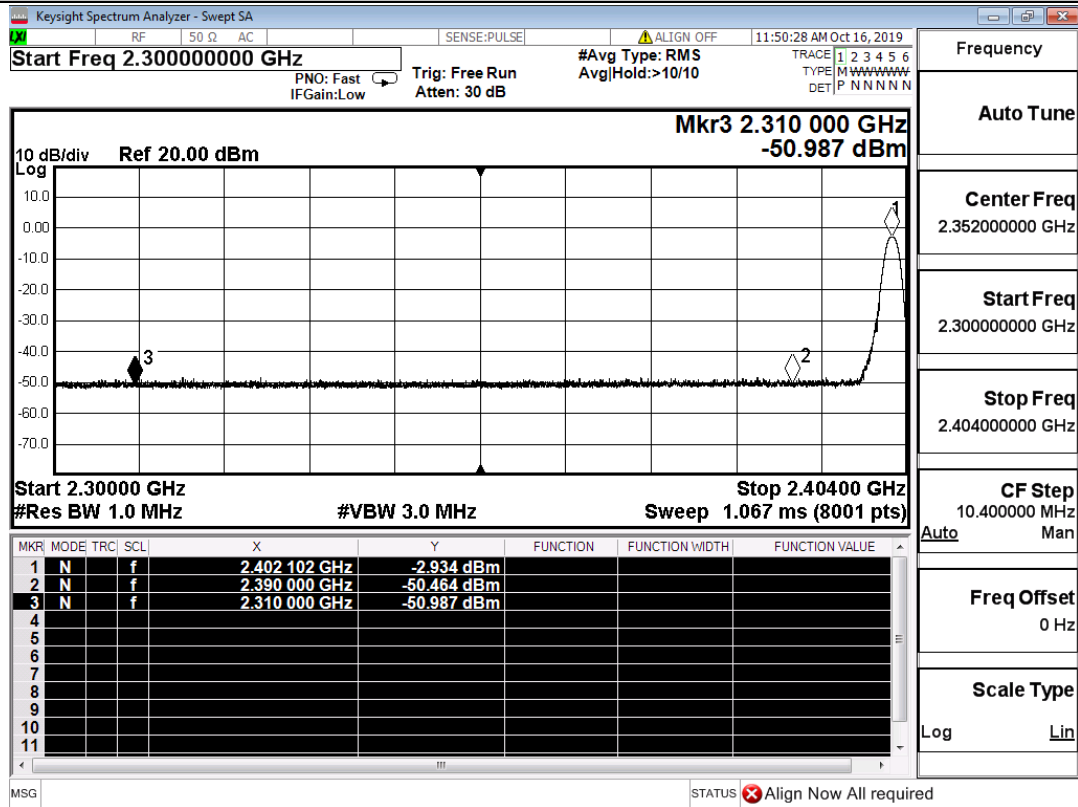
8-DPSK/HCH/Hop



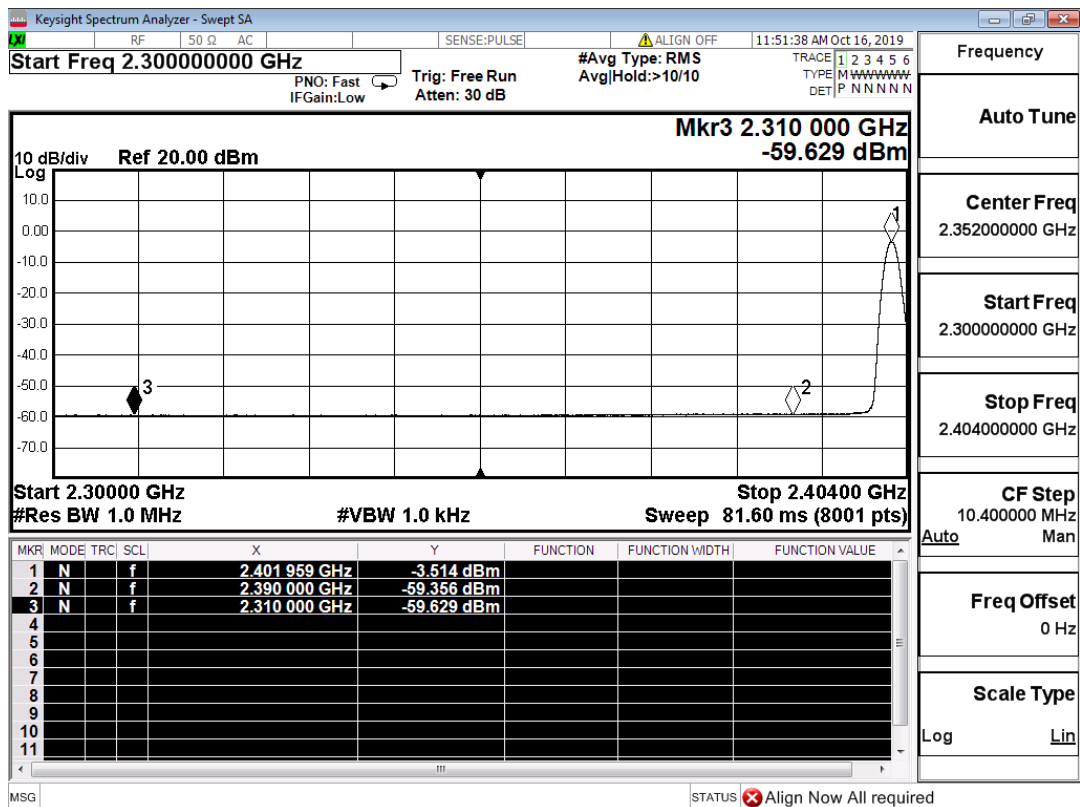
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-50.987	2.000	0	46.24	PEAK	74	PASS
	Off	2310.0	-59.629	2.000	0	37.60	AV	54	PASS
	Off	2390.0	-50.464	2.000	0	46.77	PEAK	74	PASS
	Off	2390.0	-59.356	2.000	0	37.87	AV	54	PASS
	Off	2483.5	-47.316	2.000	0	49.91	PEAK	74	PASS
	Off	2483.5	-58.261	2.000	0	38.97	AV	54	PASS
	Off	2500.0	-50.459	2.000	0	46.77	PEAK	74	PASS
	Off	2500.0	-58.818	2.000	0	38.41	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-52.160	2.000	0	45.07	PEAK	74	PASS
	Off	2310.0	-59.655	2.000	0	37.58	AV	54	PASS
	Off	2390.0	-51.412	2.000	0	45.82	PEAK	74	PASS
	Off	2390.0	-59.227	2.000	0	38.00	AV	54	PASS
	Off	2483.5	-44.997	2.000	0	52.23	PEAK	74	PASS
	Off	2483.5	-58.024	2.000	0	39.21	AV	54	PASS
	Off	2500.0	-50.835	2.000	0	46.40	PEAK	74	PASS
	Off	2500.0	-58.884	2.000	0	38.35	AV	54	PASS
8-DPSK	Off	2310.0	-50.682	2.000	0	46.55	PEAK	74	PASS
	Off	2310.0	-59.533	2.000	0	37.70	AV	54	PASS
	Off	2390.0	-50.860	2.000	0	46.37	PEAK	74	PASS
	Off	2390.0	-59.111	2.000	0	38.12	AV	54	PASS
	Off	2483.5	-45.652	2.000	0	51.58	PEAK	74	PASS
	Off	2483.5	-58.087	2.000	0	39.14	AV	54	PASS
	Off	2500.0	-50.976	2.000	0	46.25	PEAK	74	PASS
	Off	2500.0	-58.754	2.000	0	38.48	AV	54	PASS

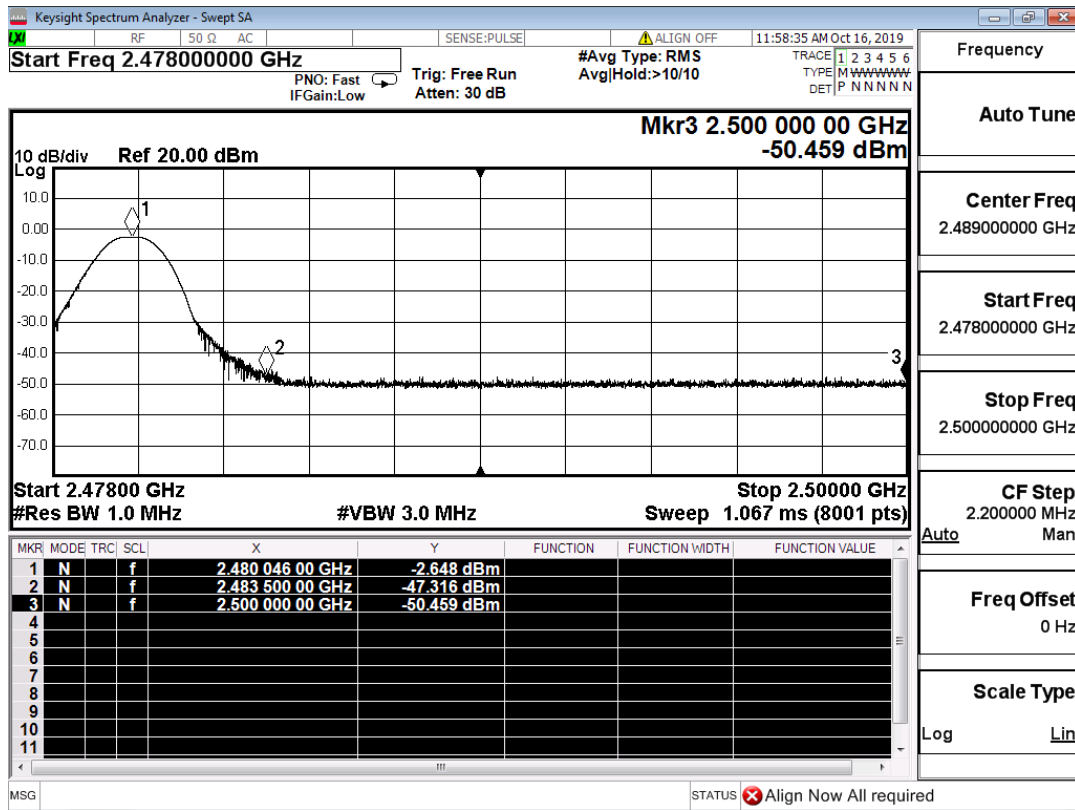
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



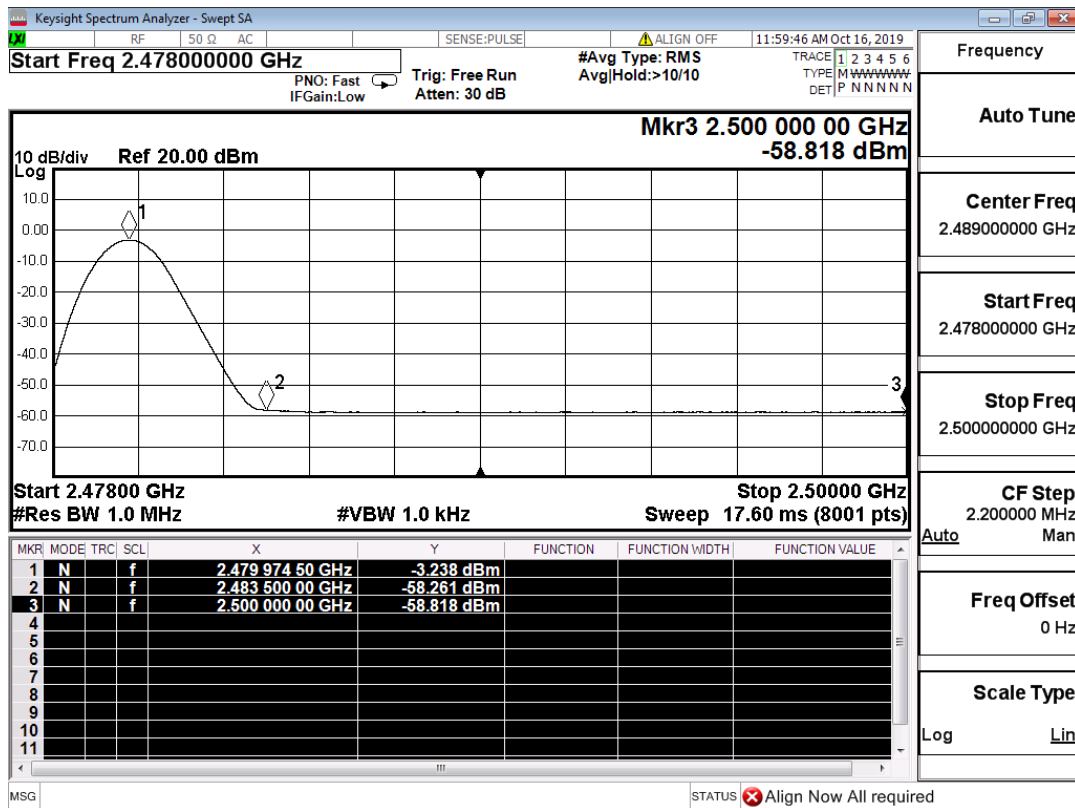
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



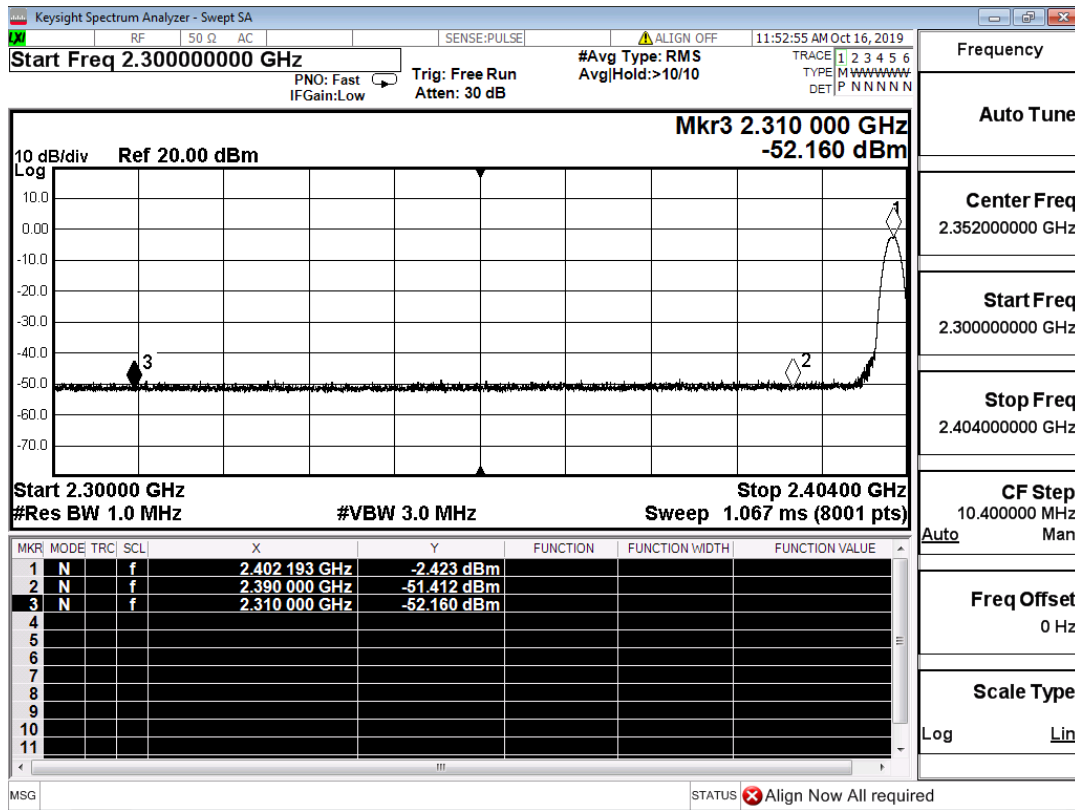
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



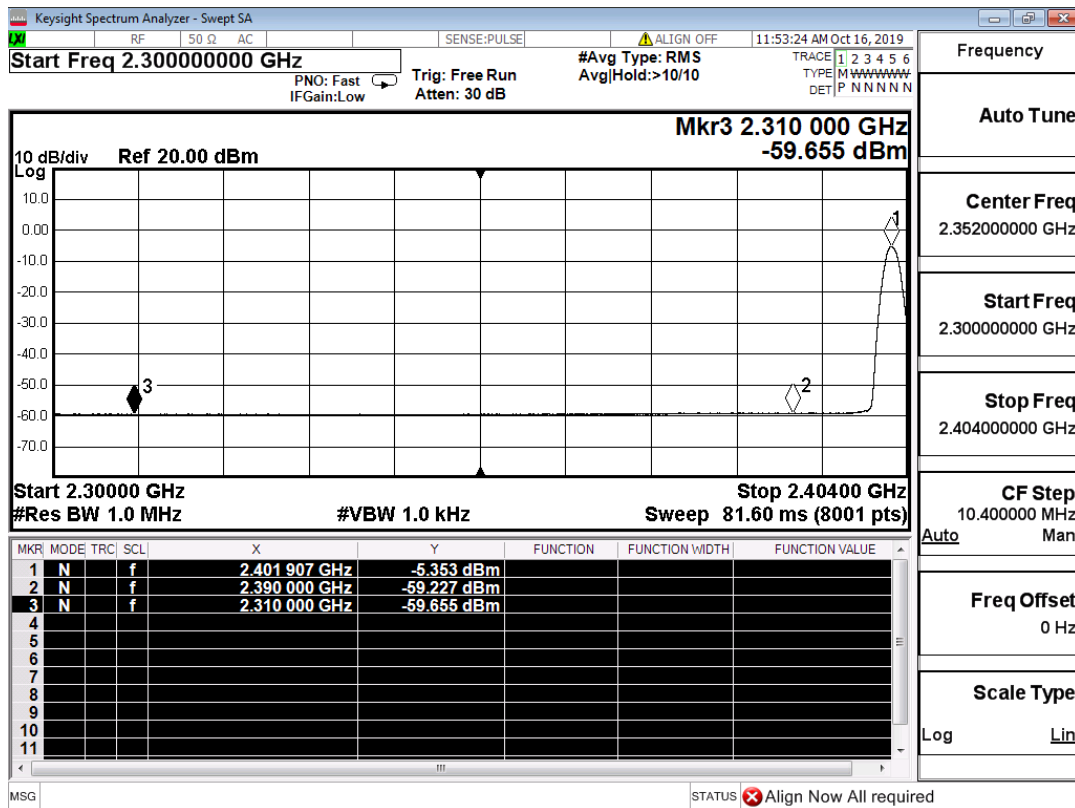
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



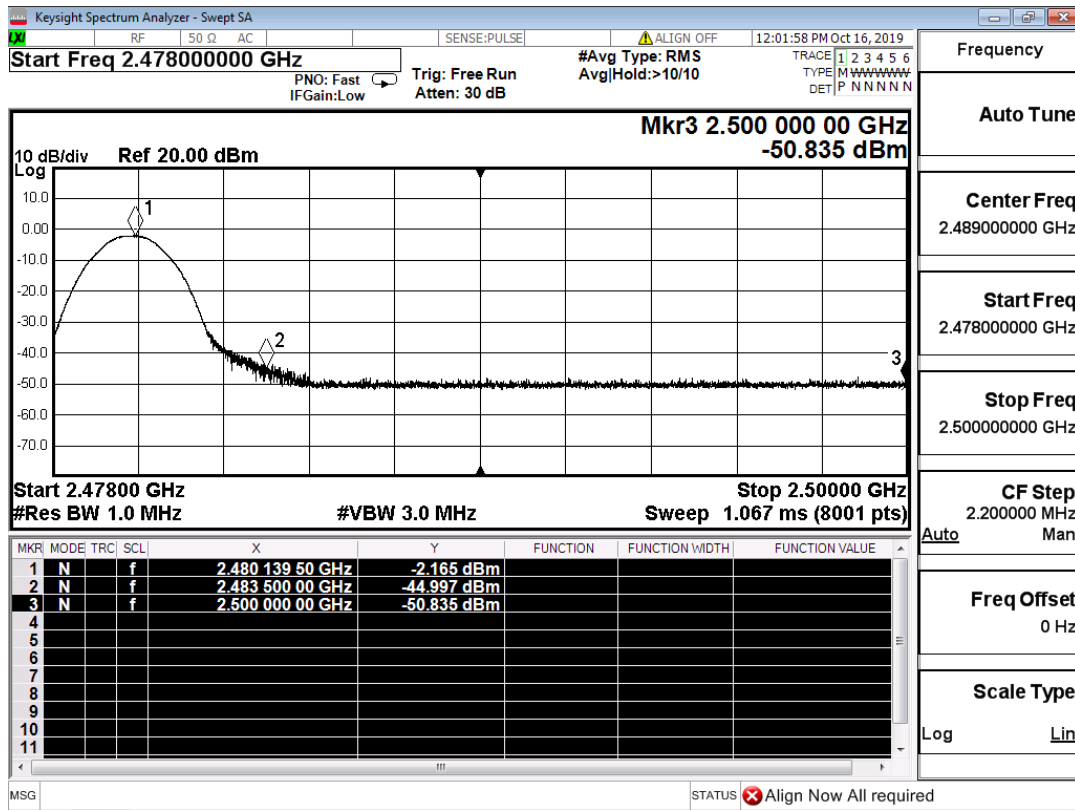
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



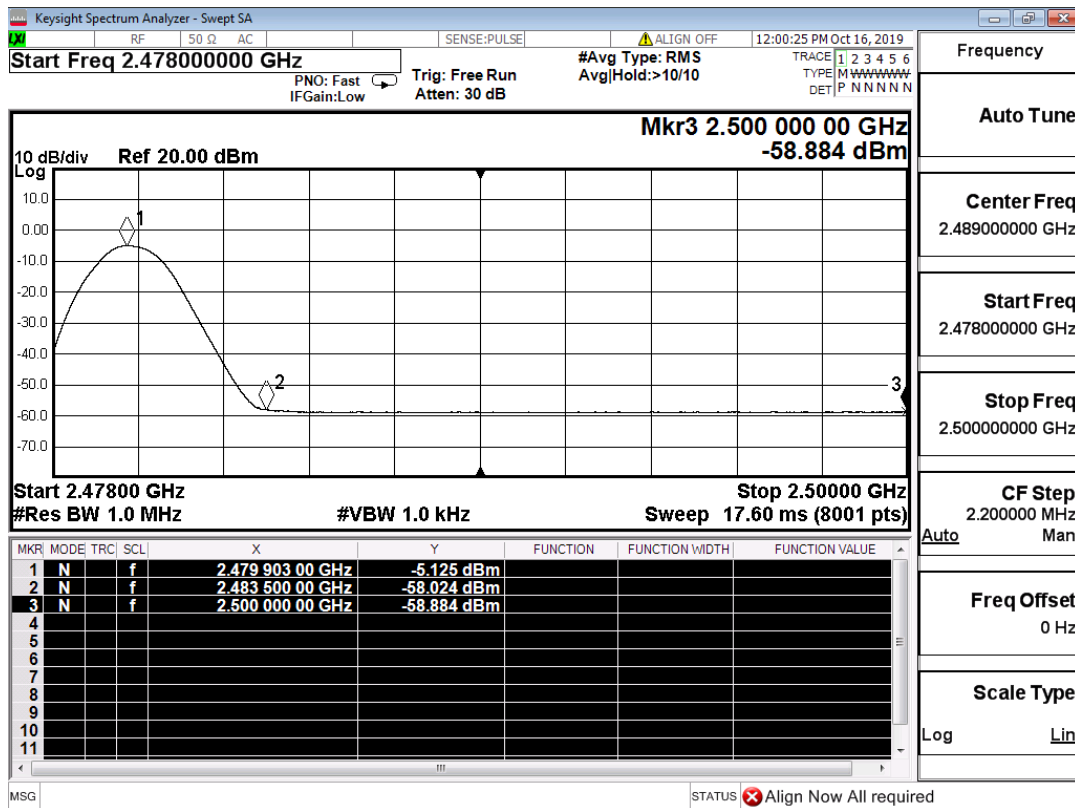
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



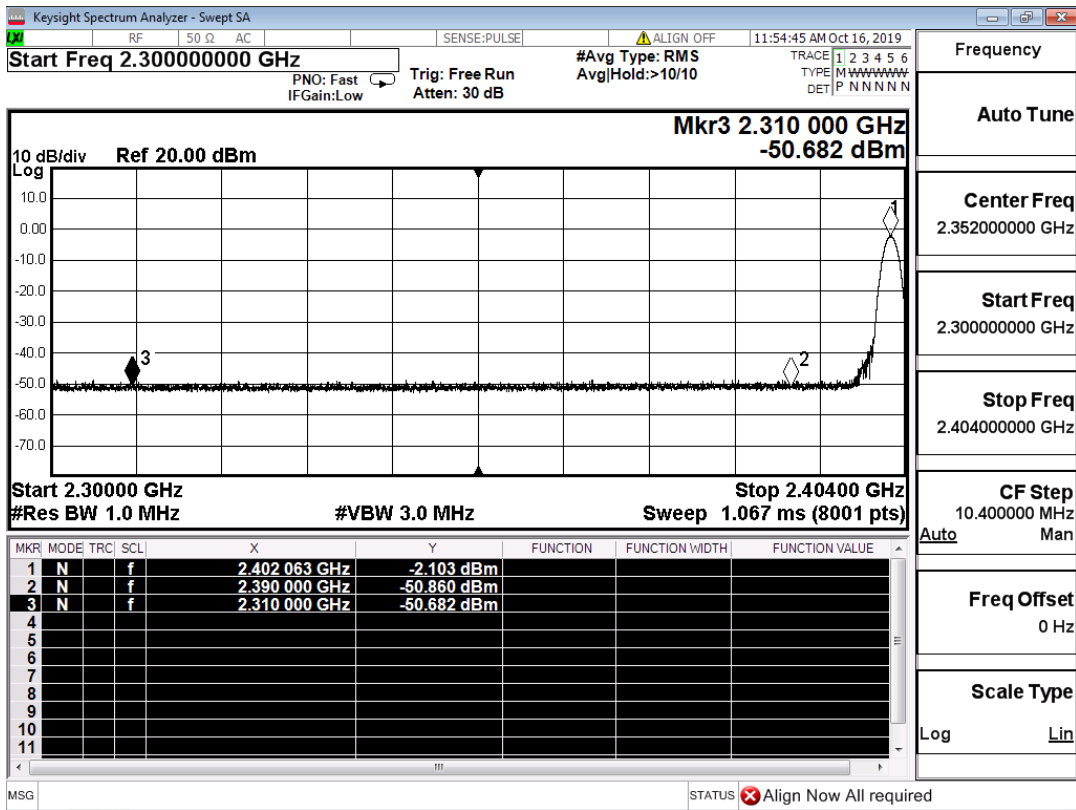
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



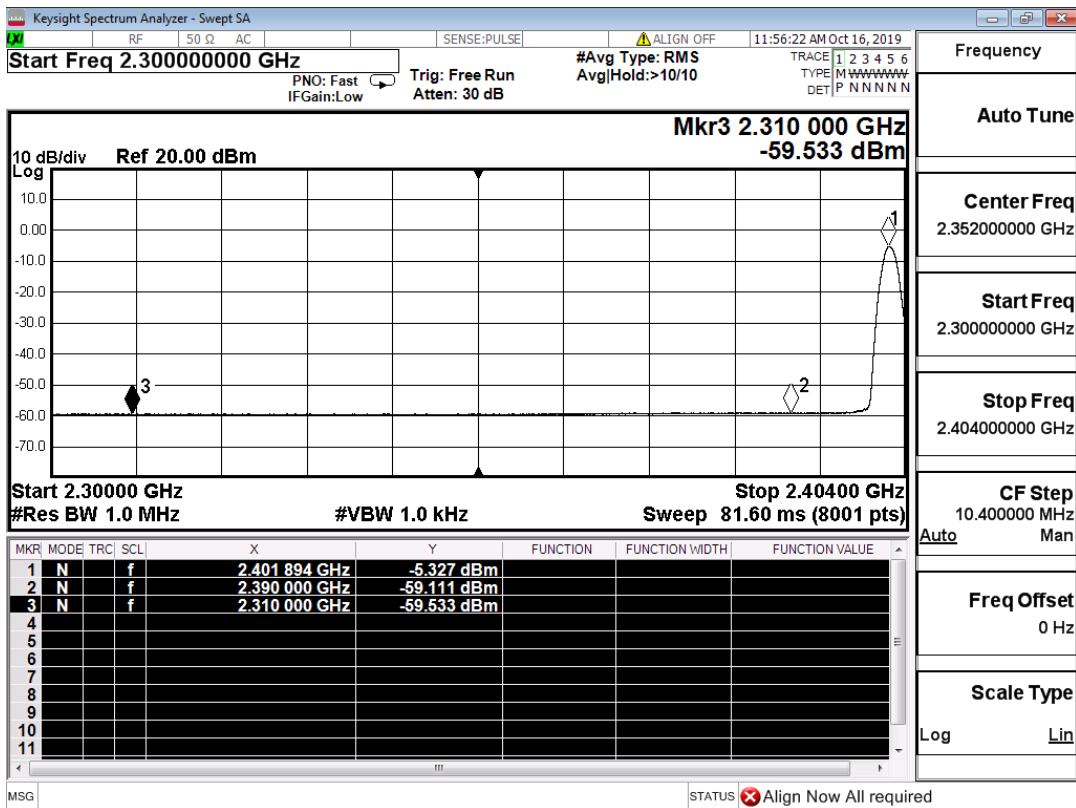
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



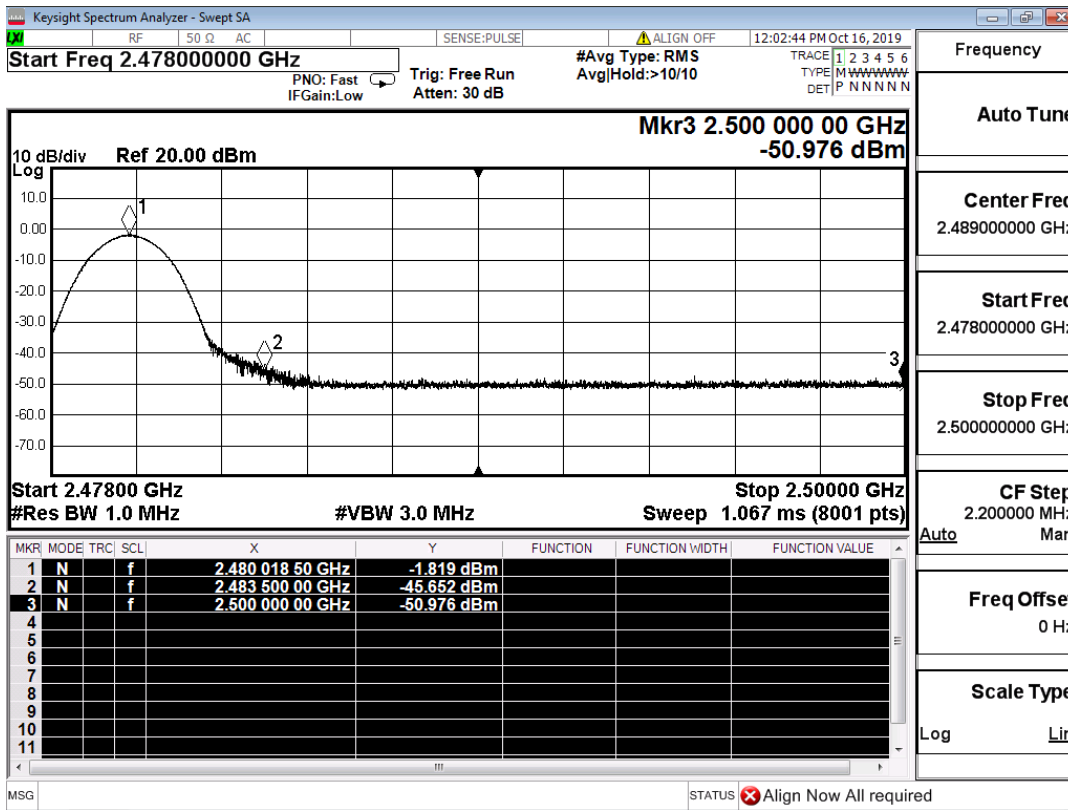
Restrict-band band-edge measurements_Hopping Off_8-DPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8-DPSK_Average (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8-DPSK_PEAK (High Channel)



Restrict-band band-edge measurements_Hopping Off_8-DPSK_Average (High Channel)

