Appendix A

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

Product Name: DEMERBOX

Trade Mark: DEMERBOX

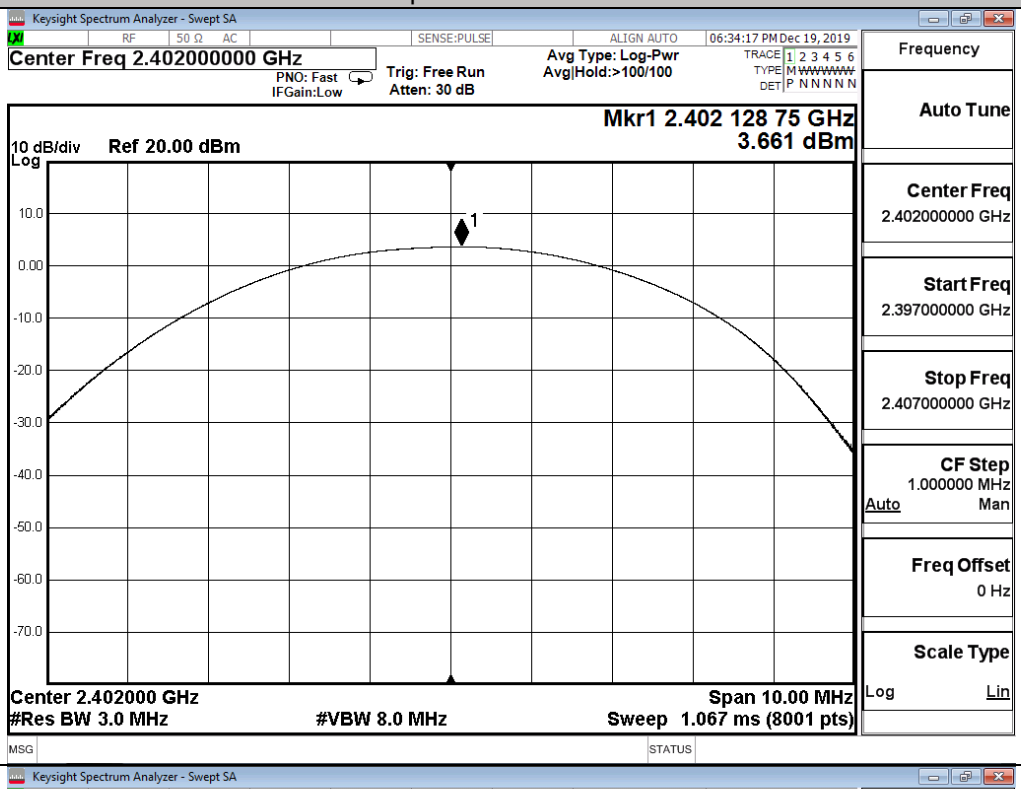
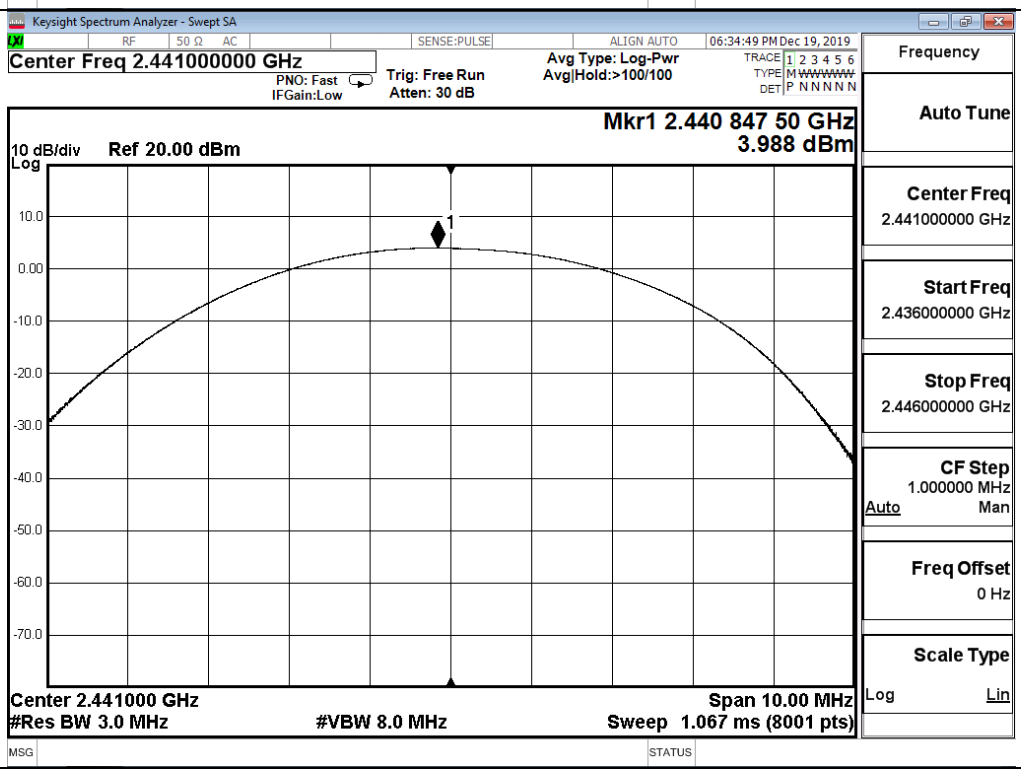
Test Model: DB1

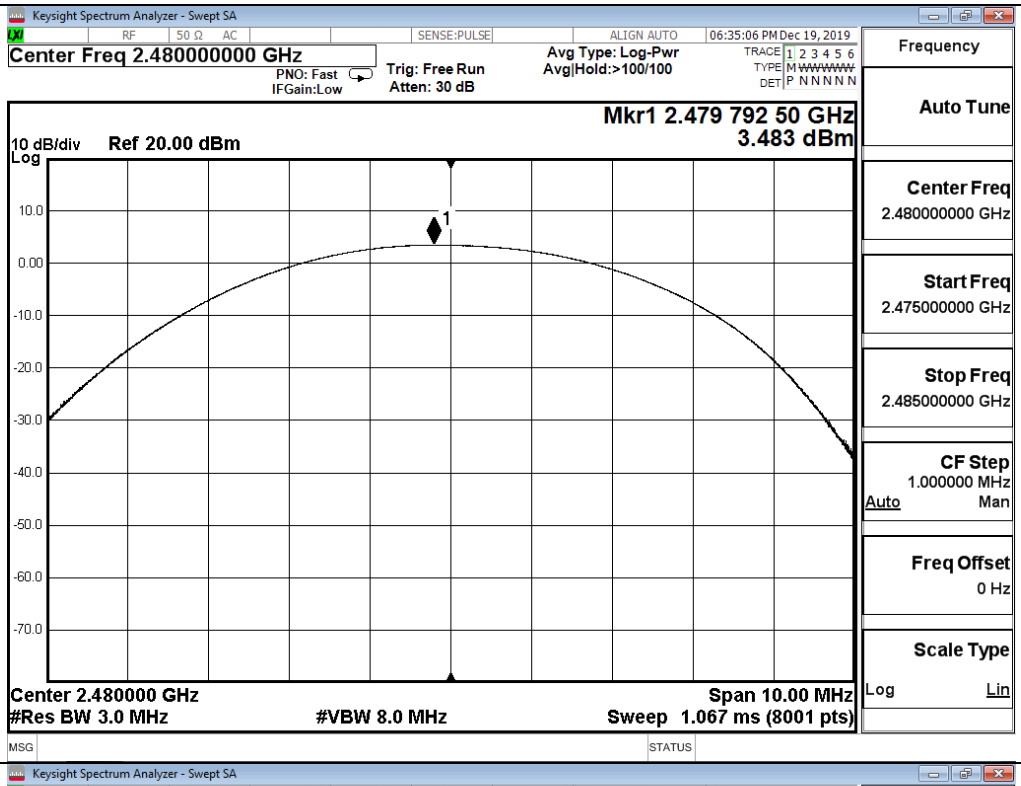
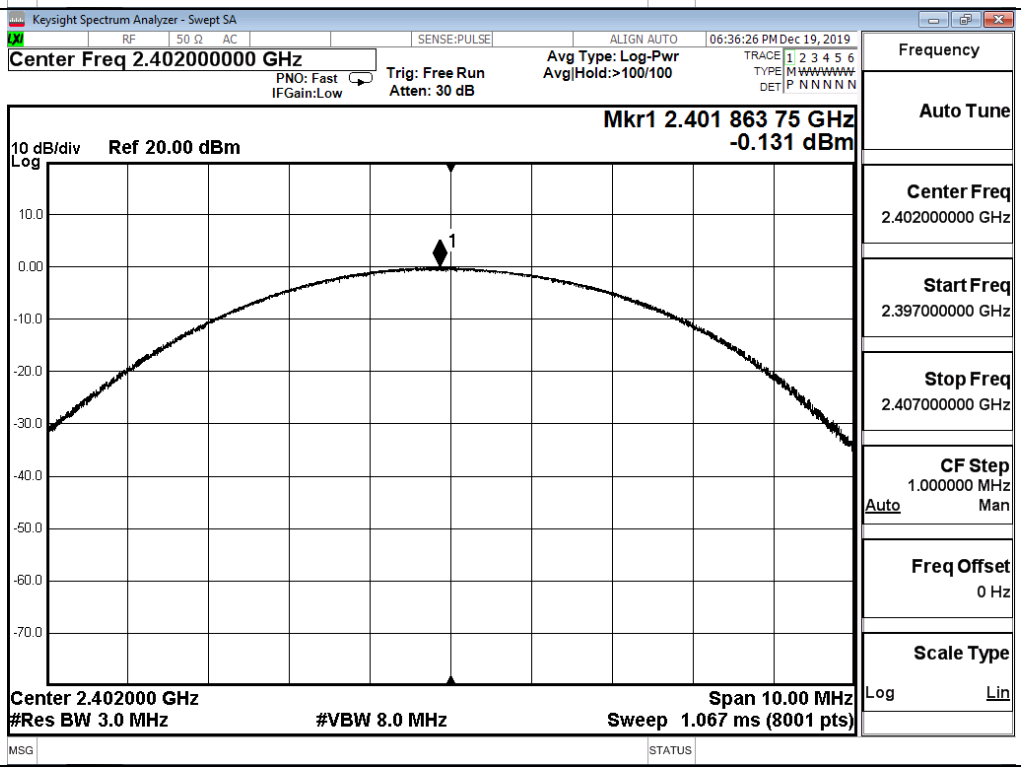
Environmental Conditions

Temperature:	23.1 ° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Tom.Liu

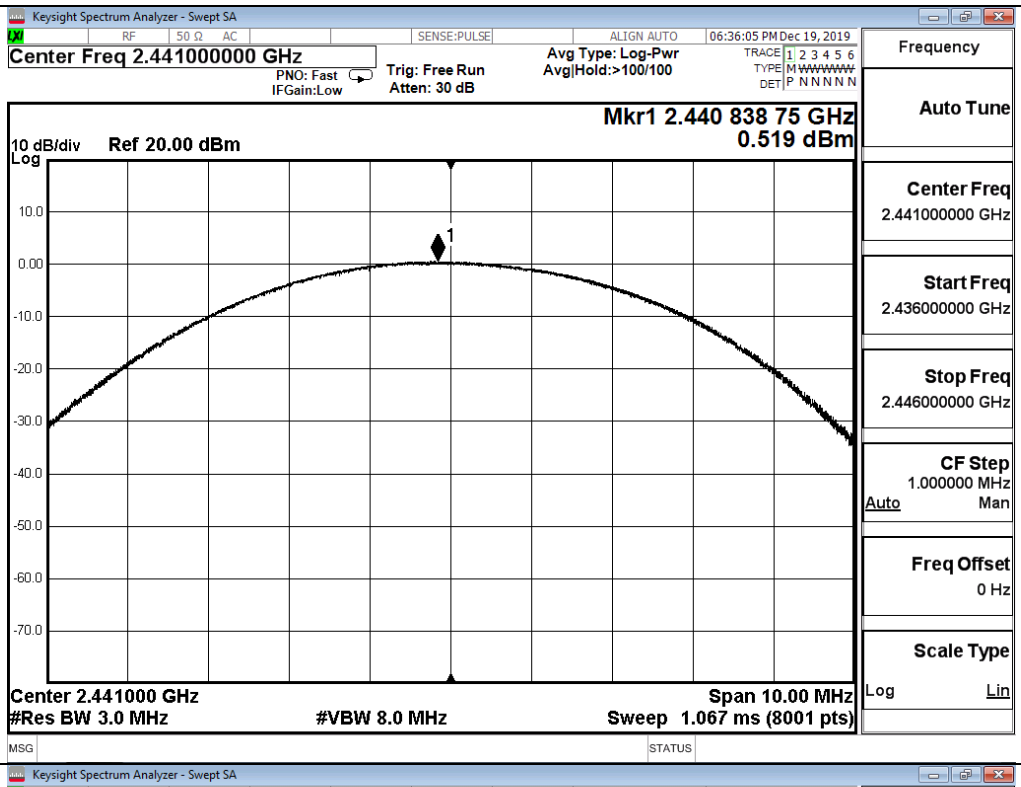
A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.661	21	PASS
	MCH	3.988	21	PASS
	HCH	3.483	21	PASS
π/4DQPSK	LCH	-0.131	21	PASS
	MCH	0.519	21	PASS
	HCH	-0.336	21	PASS
8DPSK	LCH	0.704	21	PASS
	MCH	1.327	21	PASS
	HCH	0.591	21	PASS

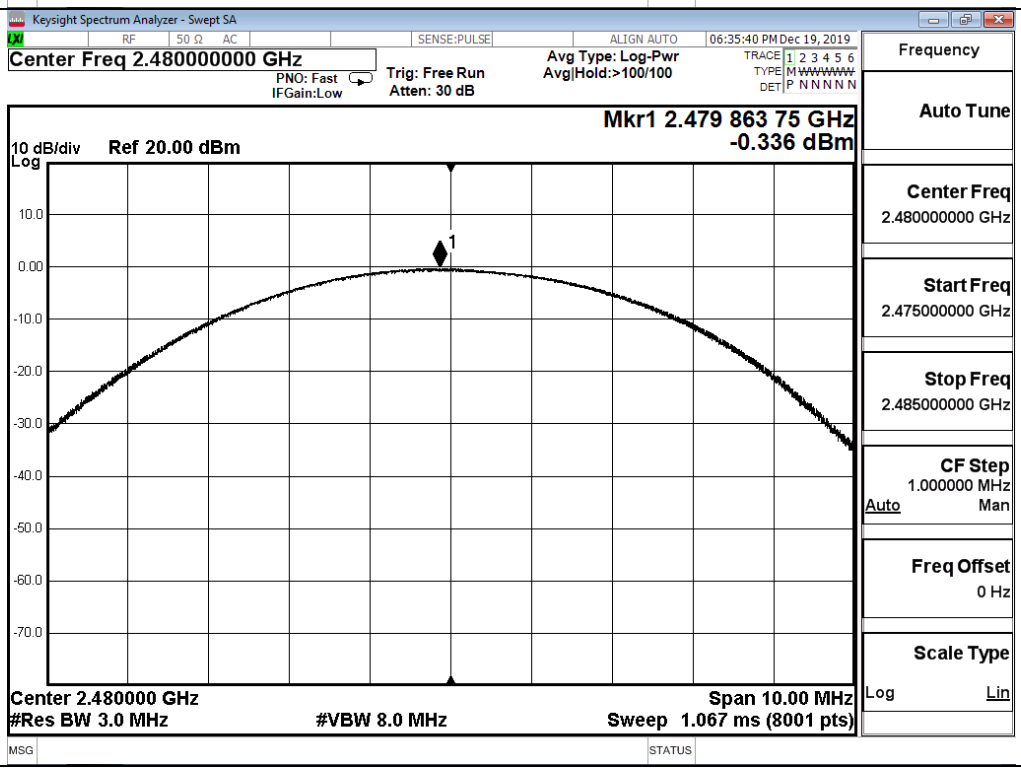
Test Graphs	
GFSK/LCH	
GFSK/MCH	

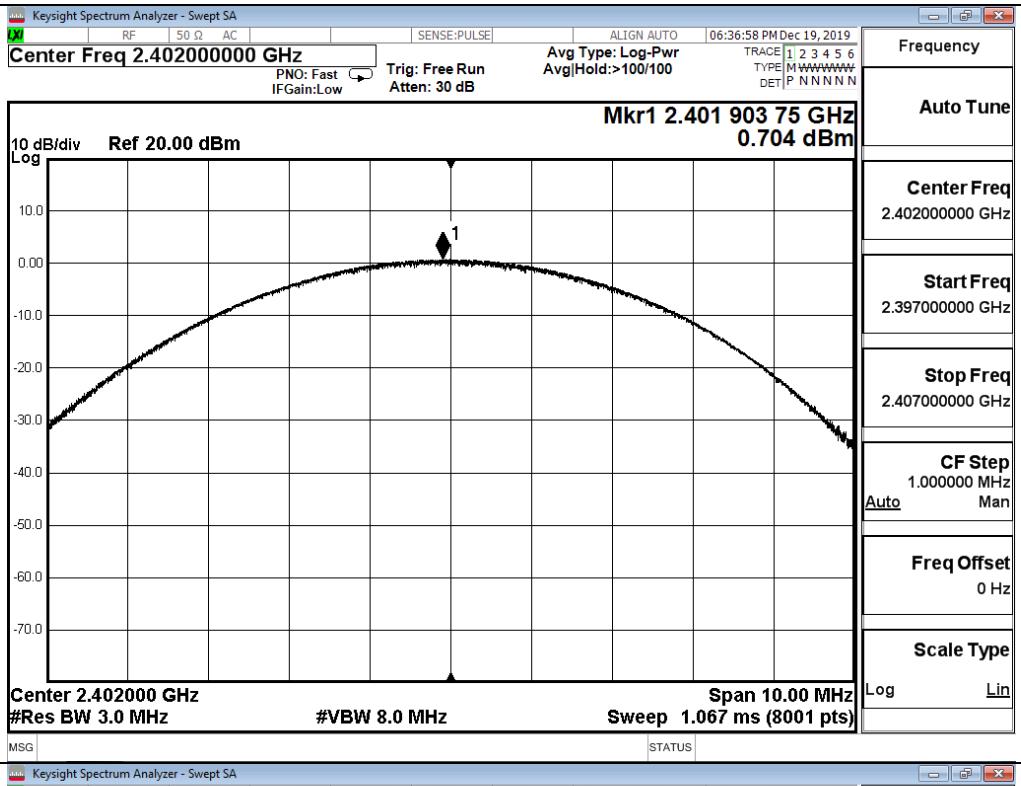
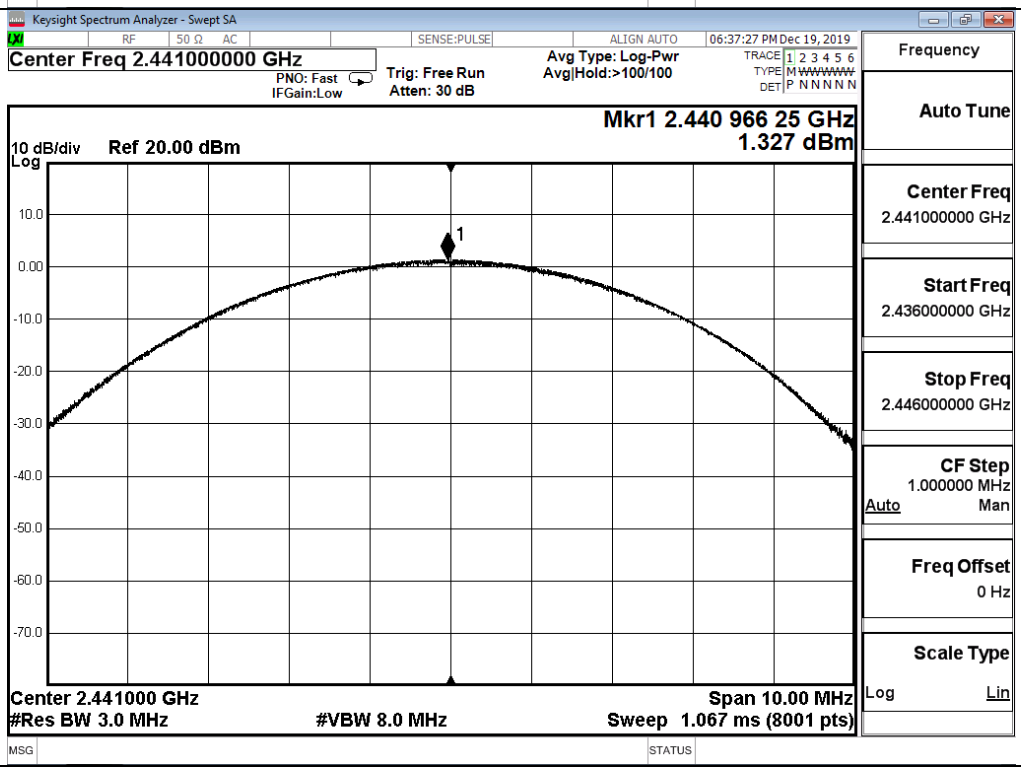
GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH

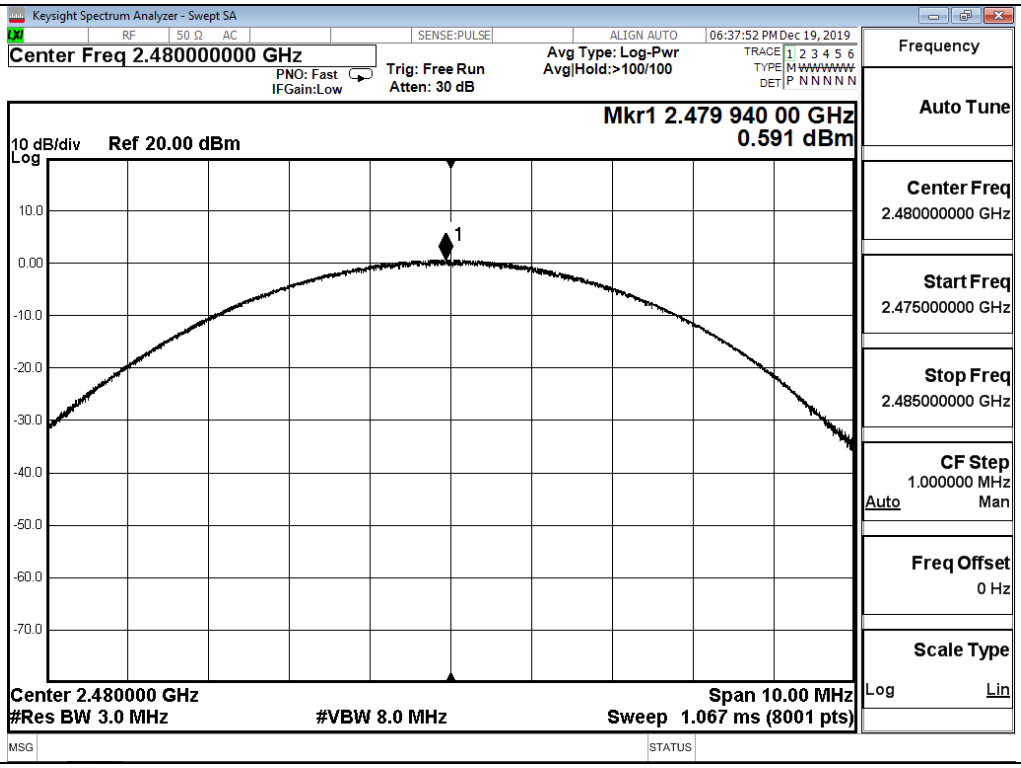


π/4DQPSK/HCH



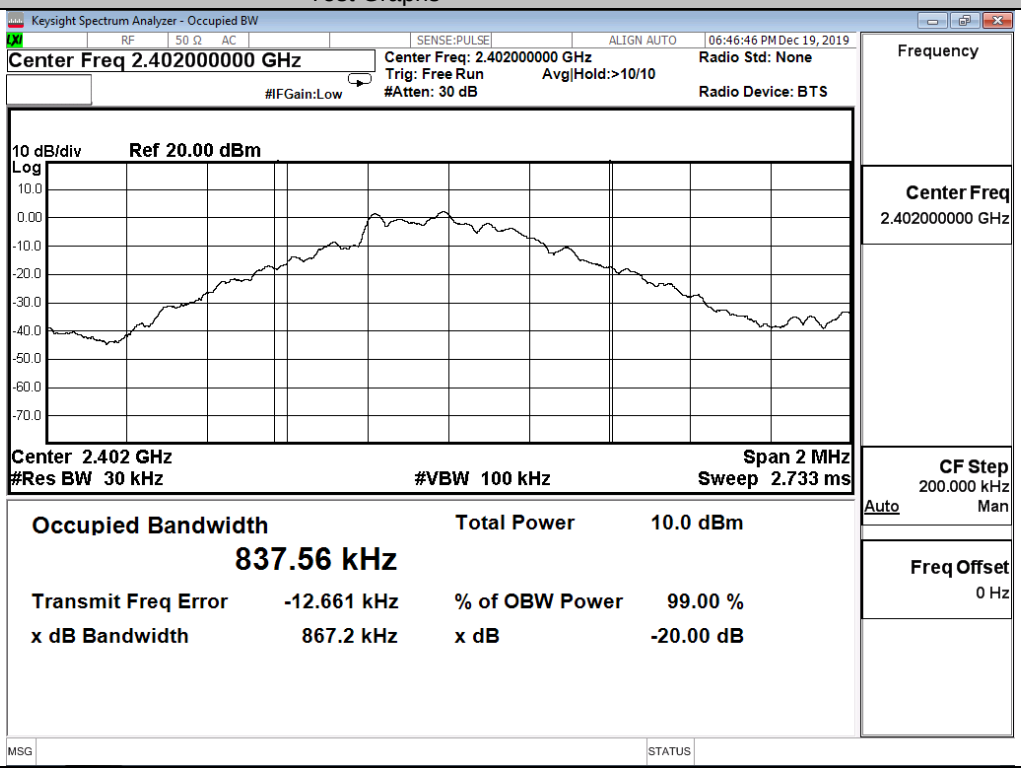
8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH

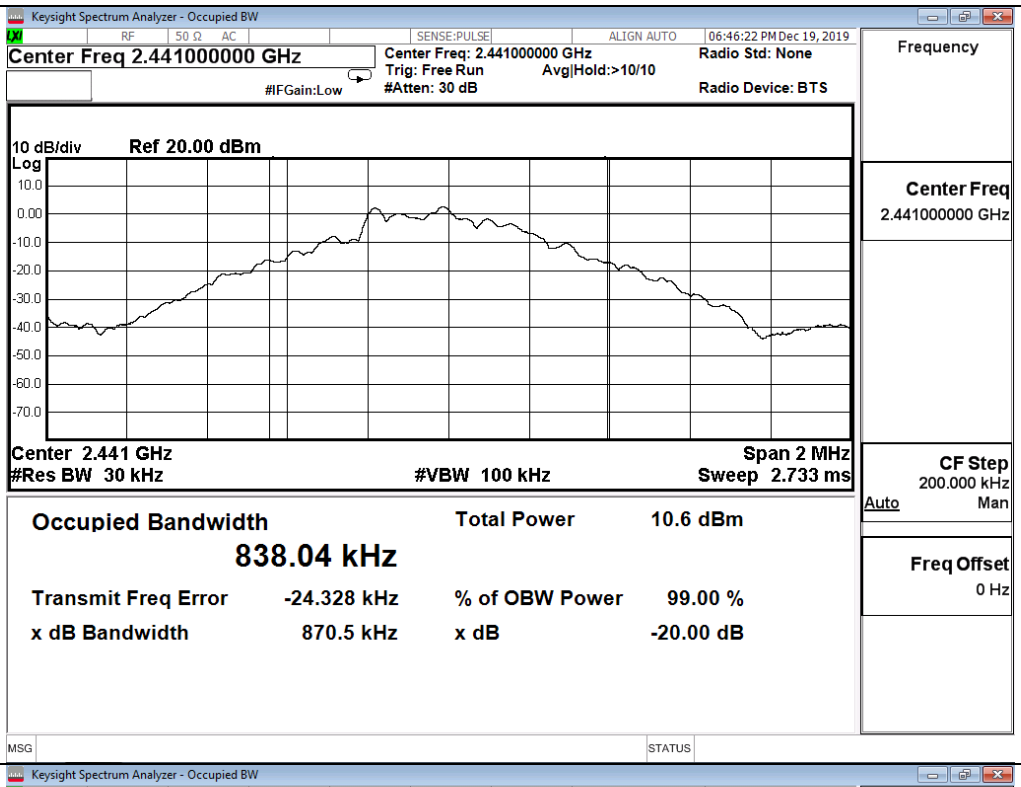

Keysight Spectrum Analyzer - Swept SA
RF 50 Ω AC
SENSE:PULSE
ALIGN AUTO
06:37:52 PM Dec 19, 2019
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M WWWWWW
DET P N N N N N
Mkr1 2.479 940 00 GHz
0.591 dBm
10 dB/div Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
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
Scale Type
Log Lin

A.2 99% and 20dB Bandwidth

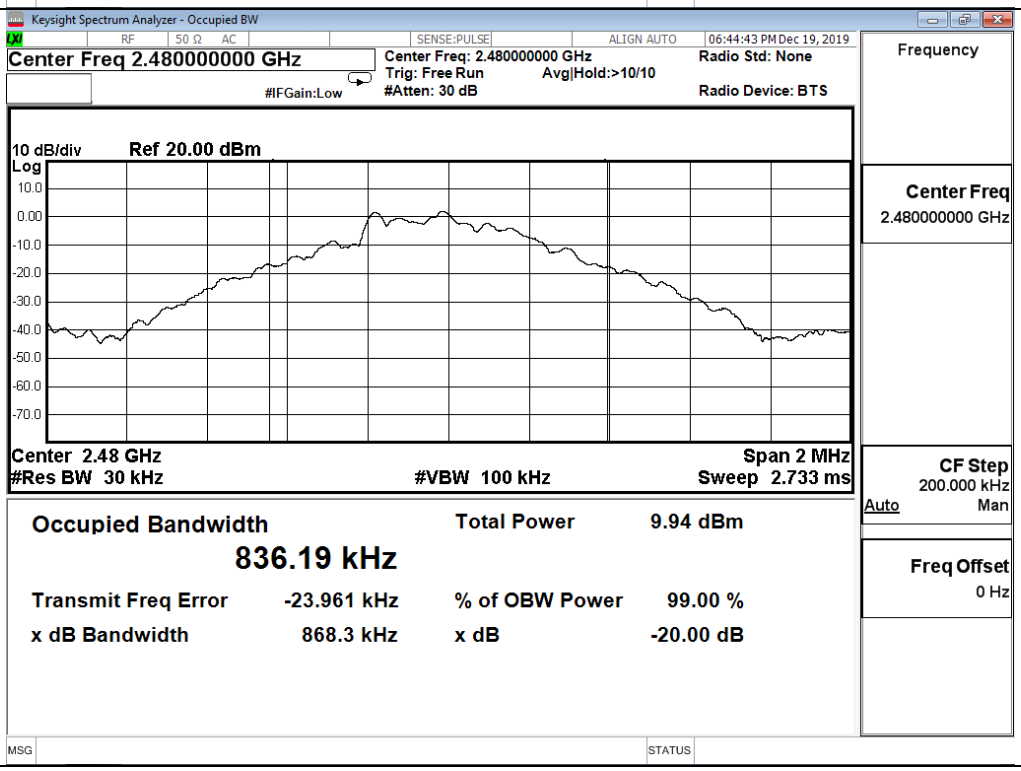
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.83756	0.8672	Not Specified	PASS
	MCH	0.83804	0.8705	Not Specified	PASS
	HCH	0.83319	0.8683	Not Specified	PASS
π/4DQPSK	LCH	1.2027	1.209	Not Specified	PASS
	MCH	1.1959	1.208	Not Specified	PASS
	HCH	1.1990	1.209	Not Specified	PASS
8DPSK	LCH	1.1726	1.204	Not Specified	PASS
	MCH	1.1690	1.222	Not Specified	PASS
	HCH	1.1700	1.203	Not Specified	PASS

Test Graphs	
GFSK/LCH	

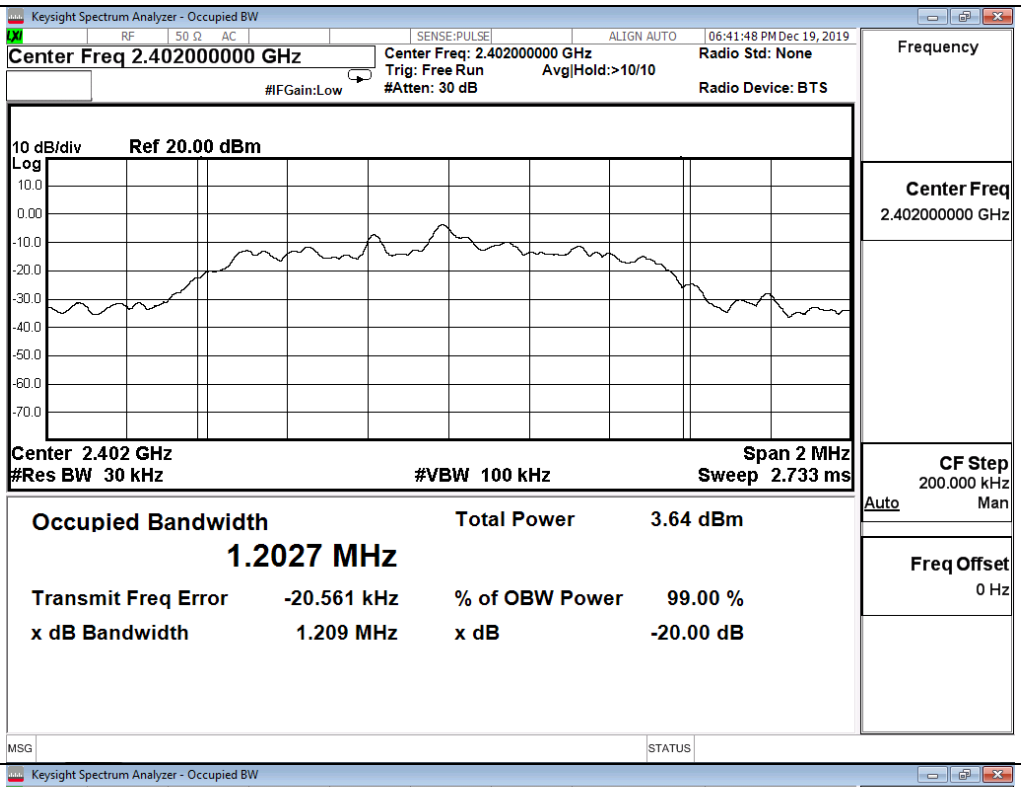
GFSK/MCH



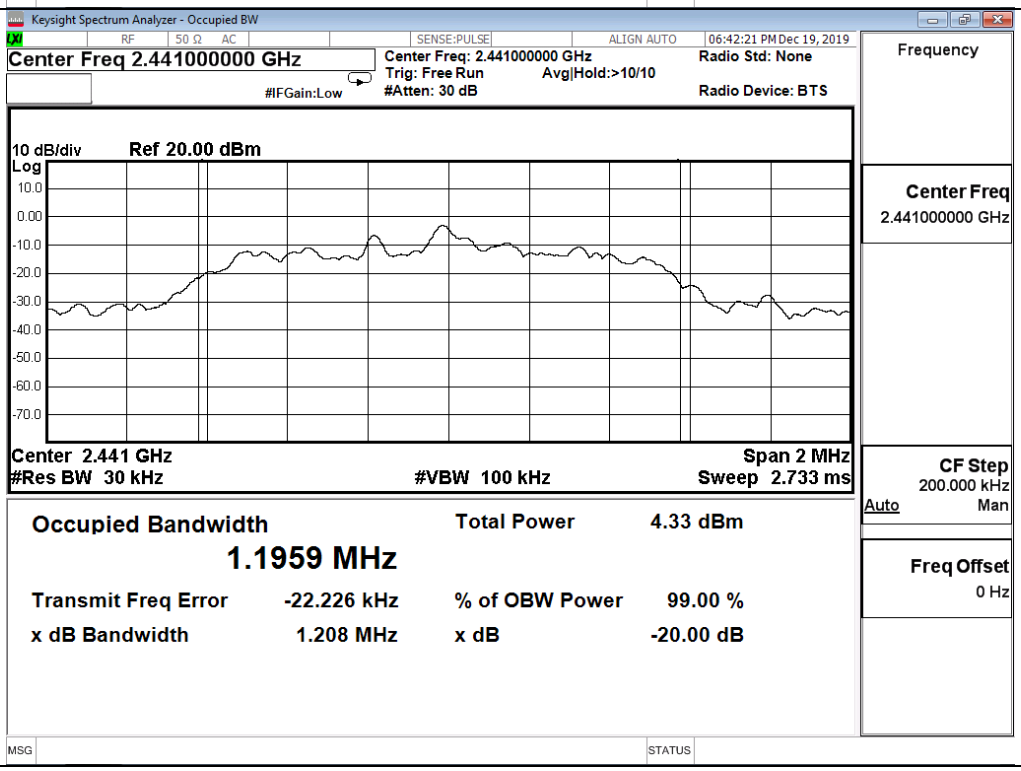
GFSK/HCH



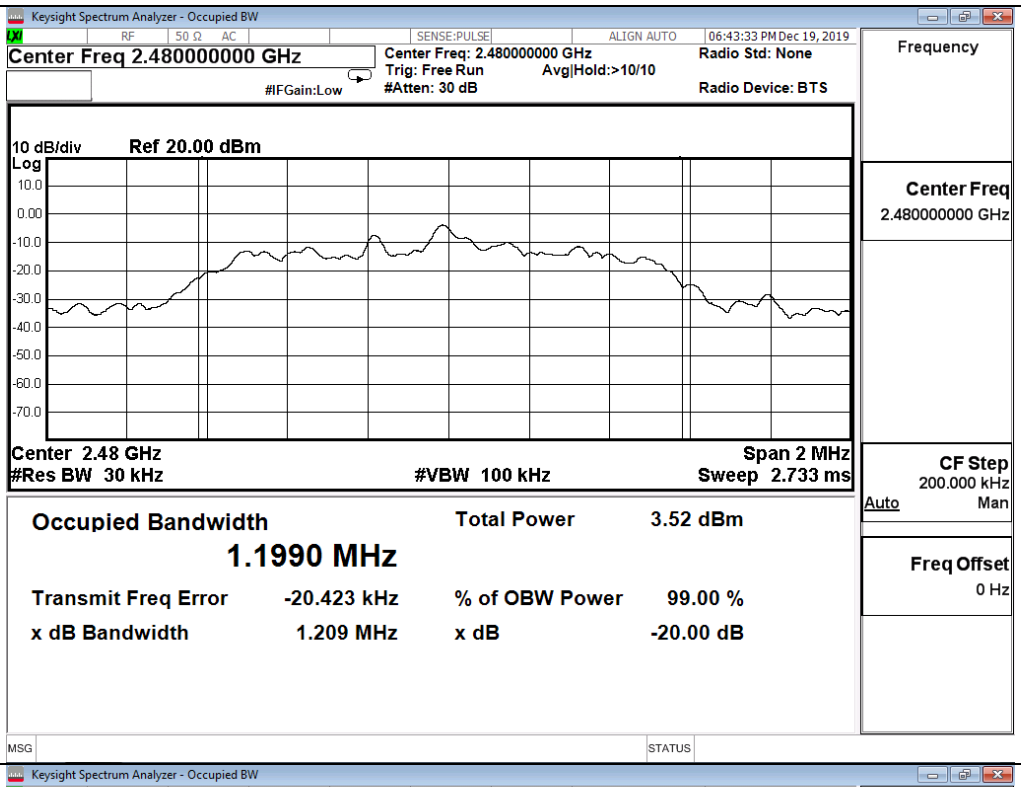
π/4DQPSK/LCH



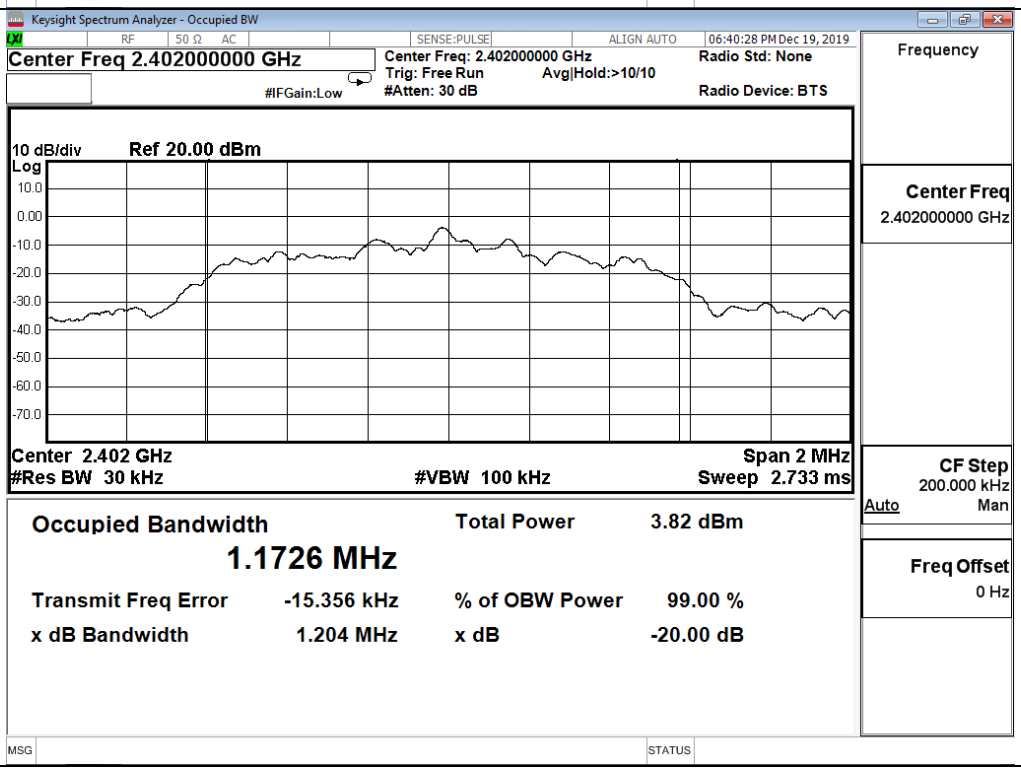
π/4DQPSK/MCH



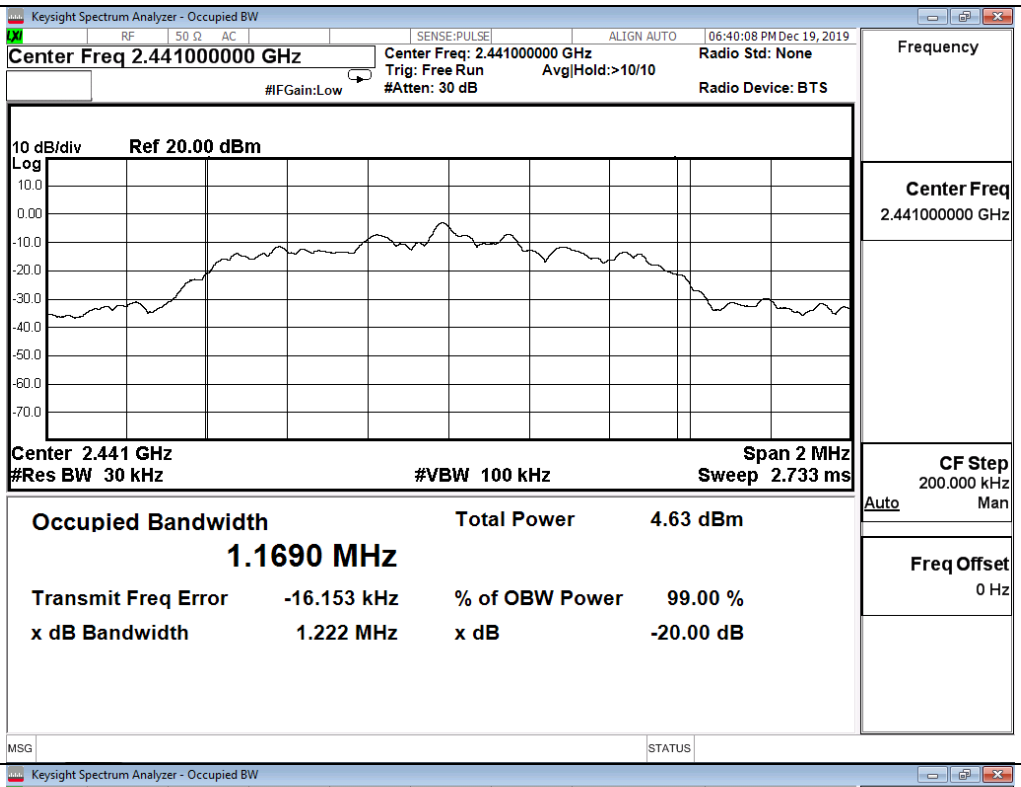
π/4DQPSK/HCH



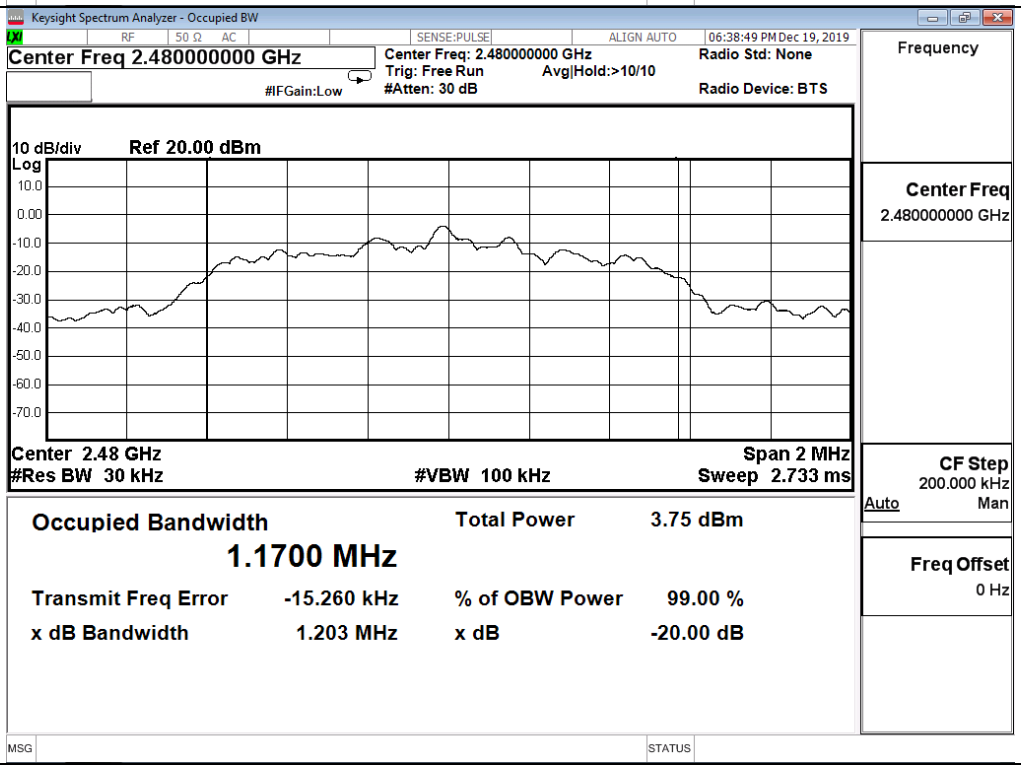
8DPSK/LCH



8DPSK/MCH

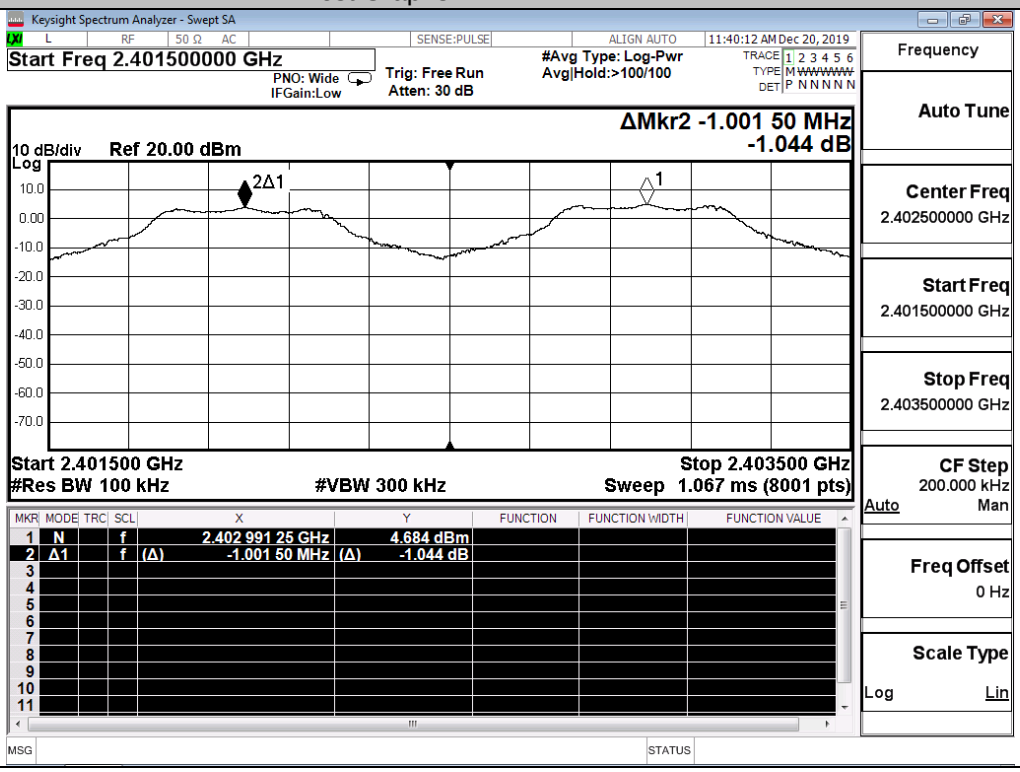


8DPSK/HCH

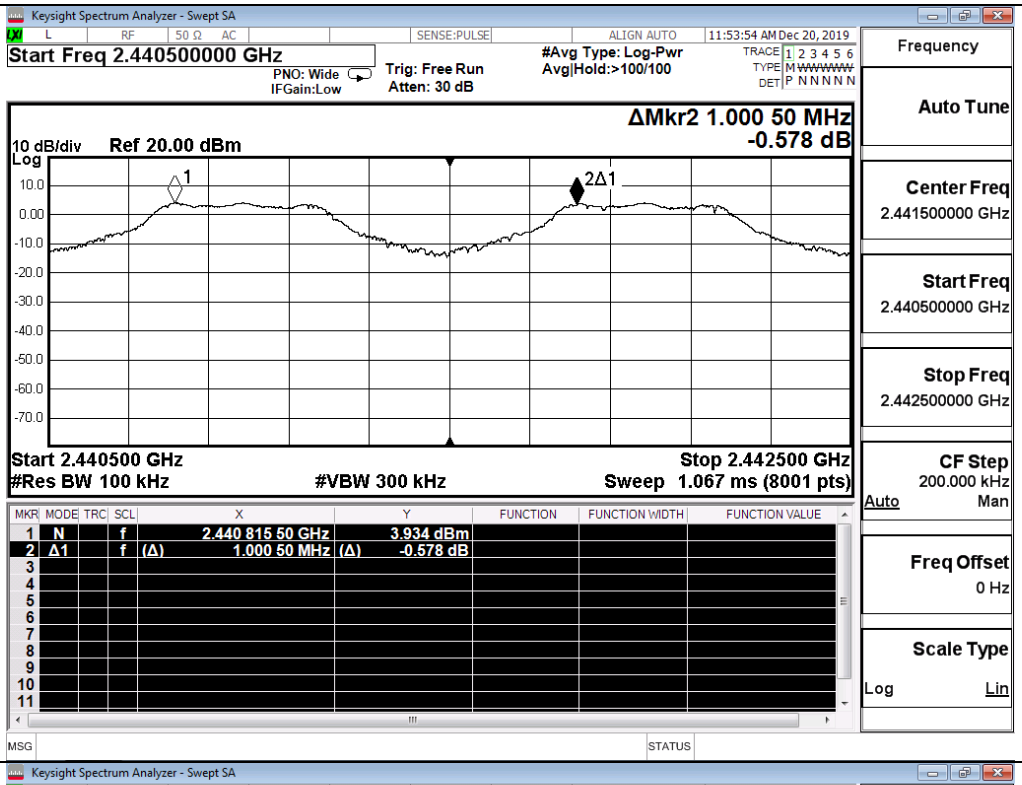


A.3 Carrier Frequency Separation

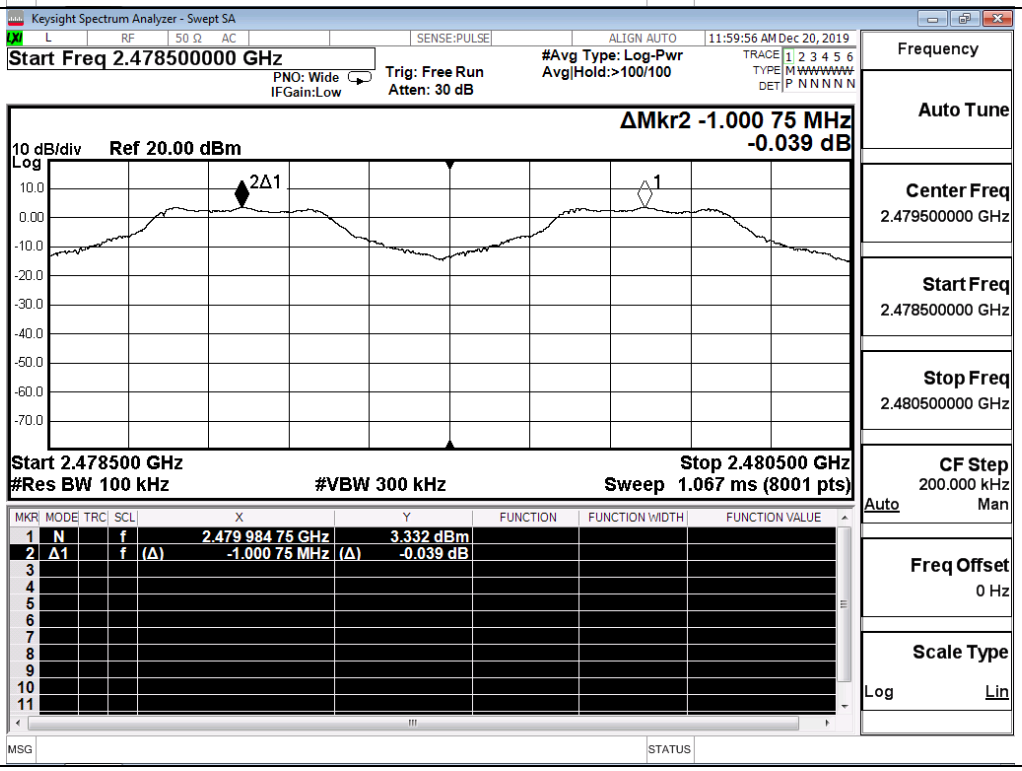
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.00150	0.58	PASS
	MCH	1.00050	0.58	PASS
	HCH	1.00075	0.58	PASS
π/4DQPSK	LCH	1.00425	0.81	PASS
	MCH	1.00000	0.81	PASS
	HCH	1.00225	0.81	PASS
8DPSK	LCH	0.99950	0.80	PASS
	MCH	1.00650	0.81	PASS
	HCH	1.00000	0.80	PASS

Test Graphs	
GFSK/LCH	

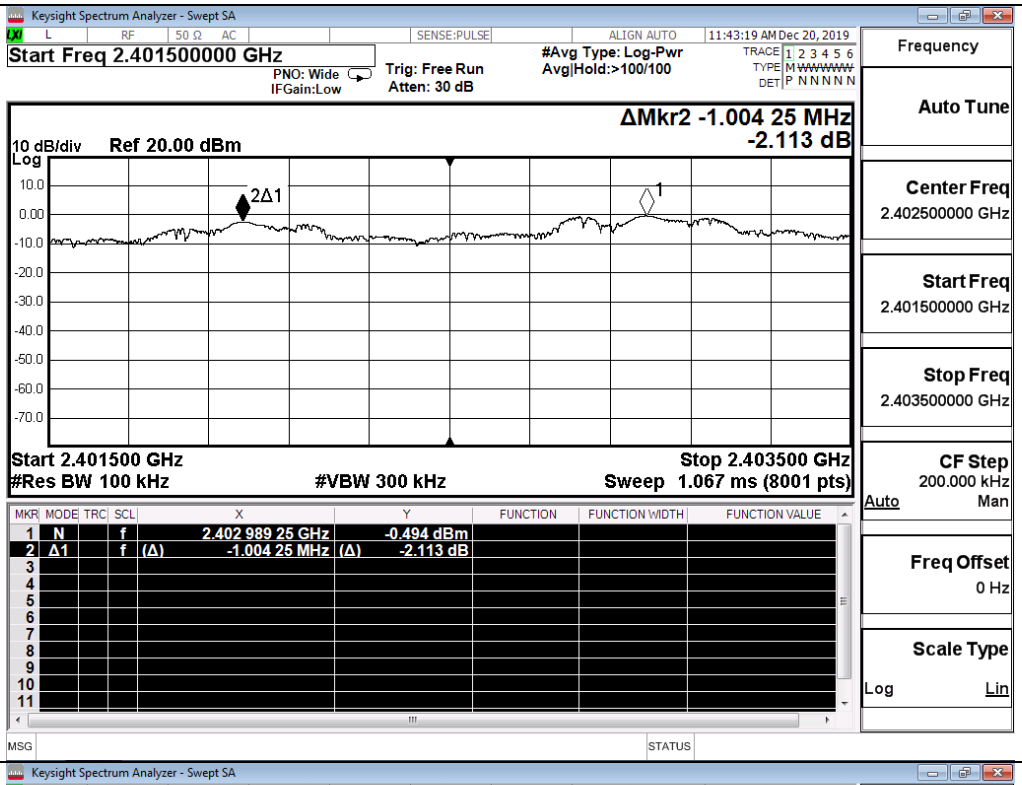
GFSK/MCH



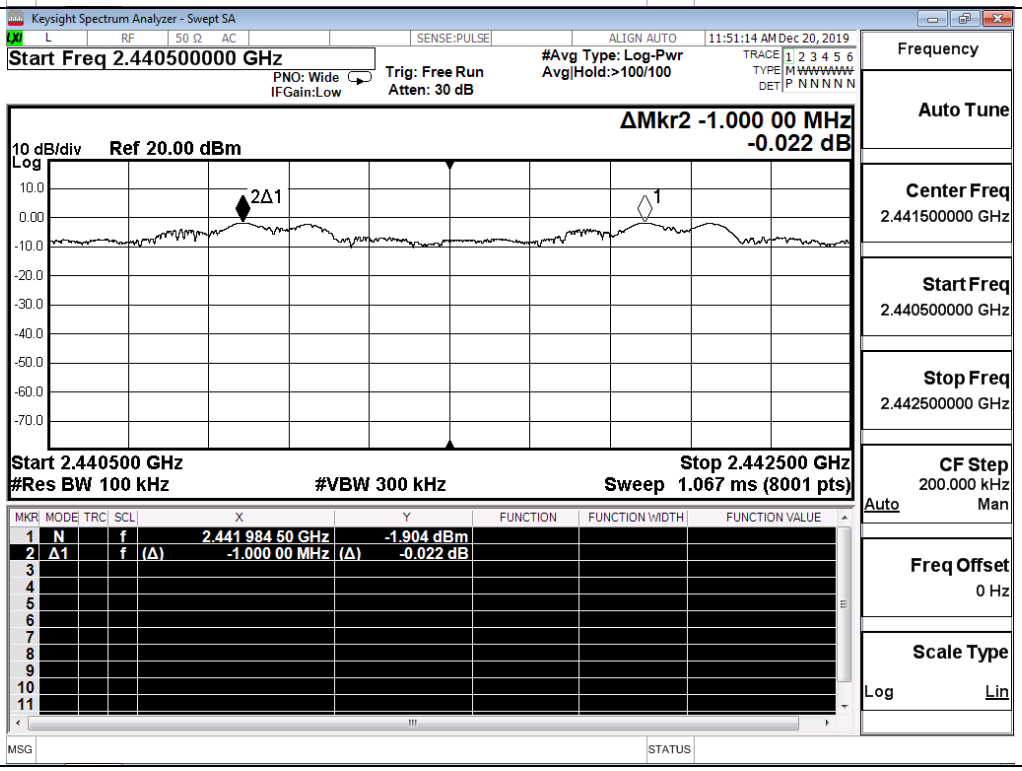
GFSK/HCH



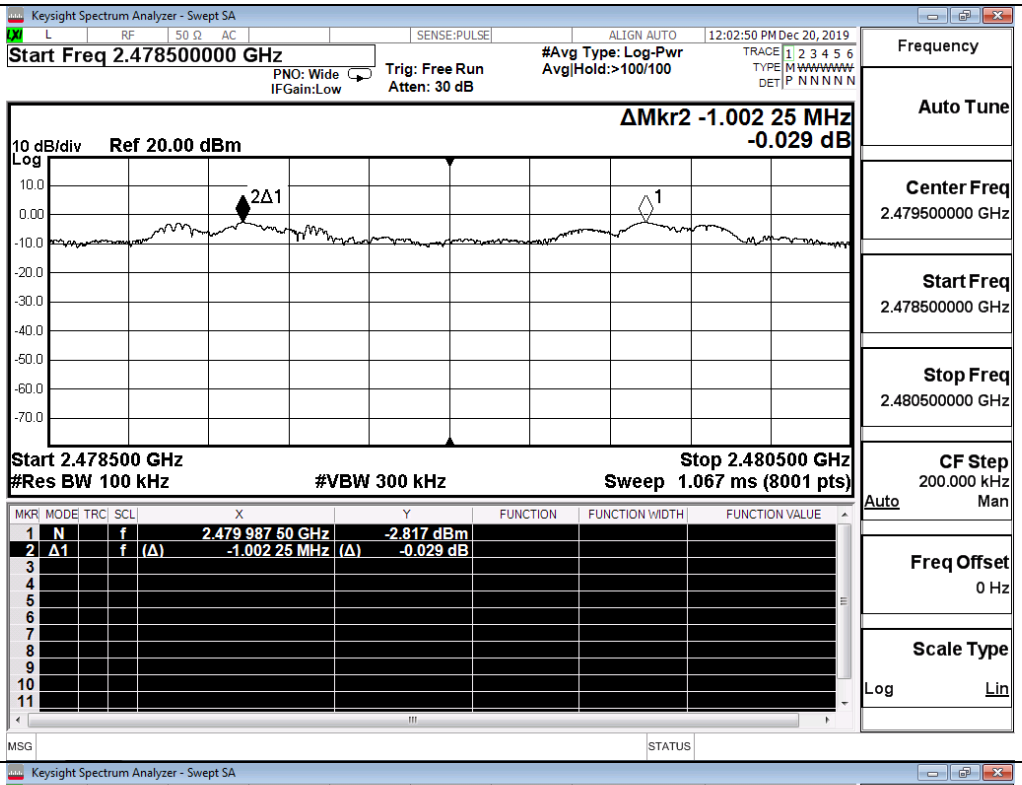
π/4DQPSK/LCH



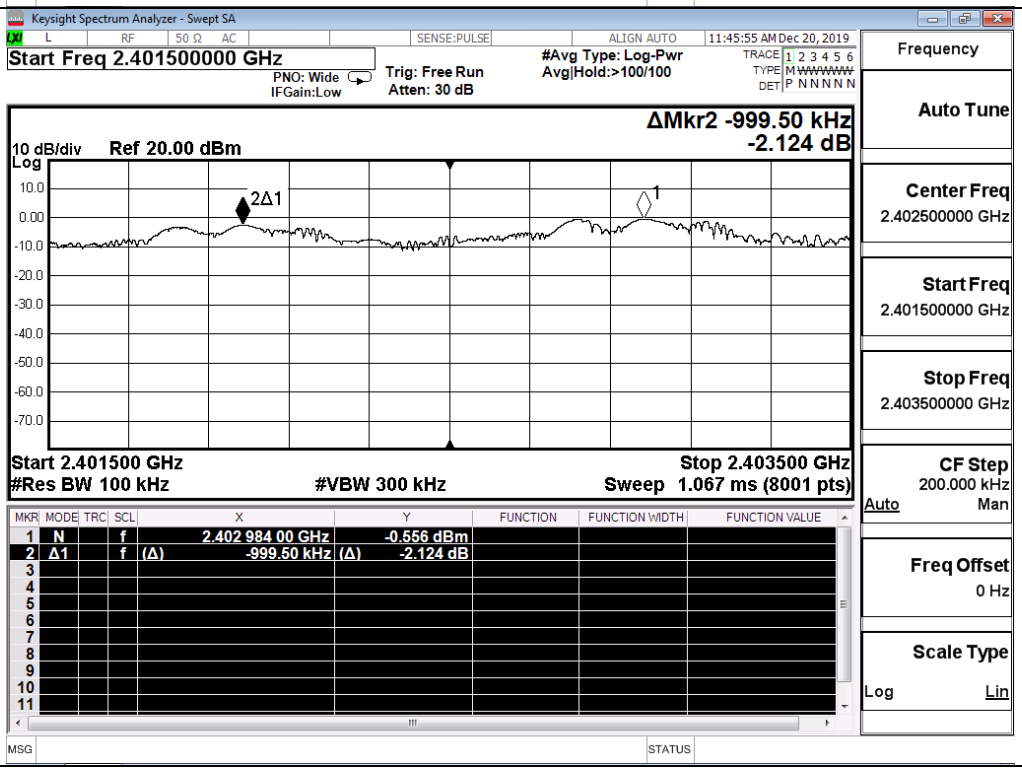
π/4DQPSK/MCH

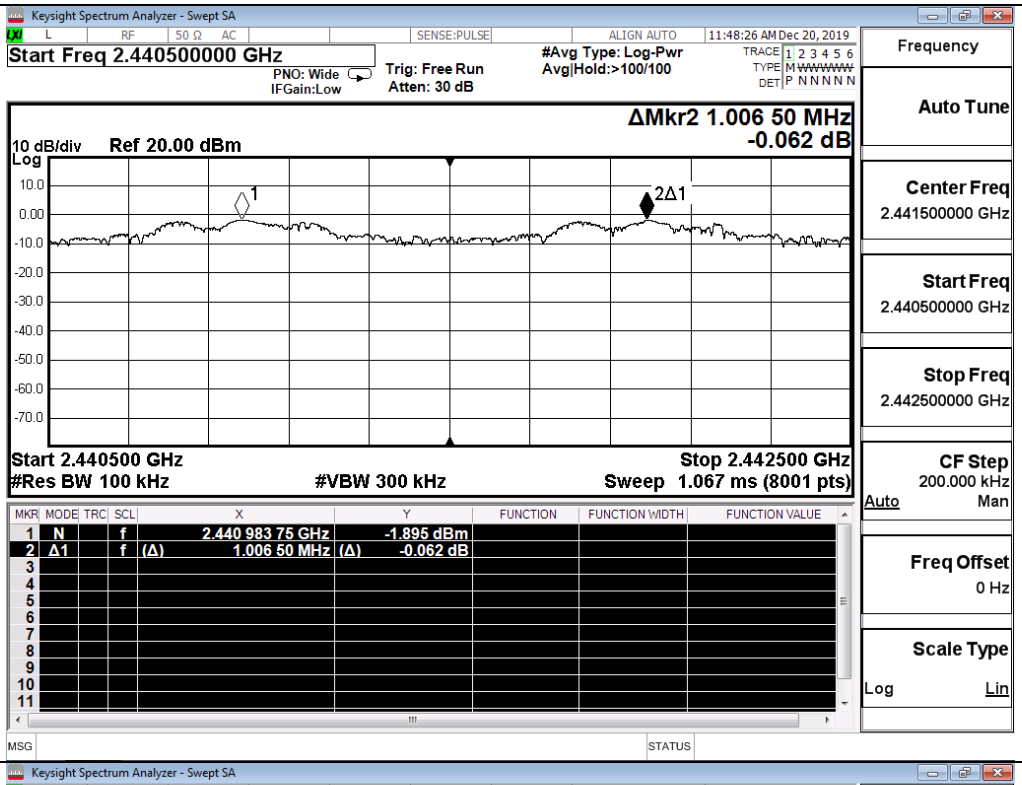
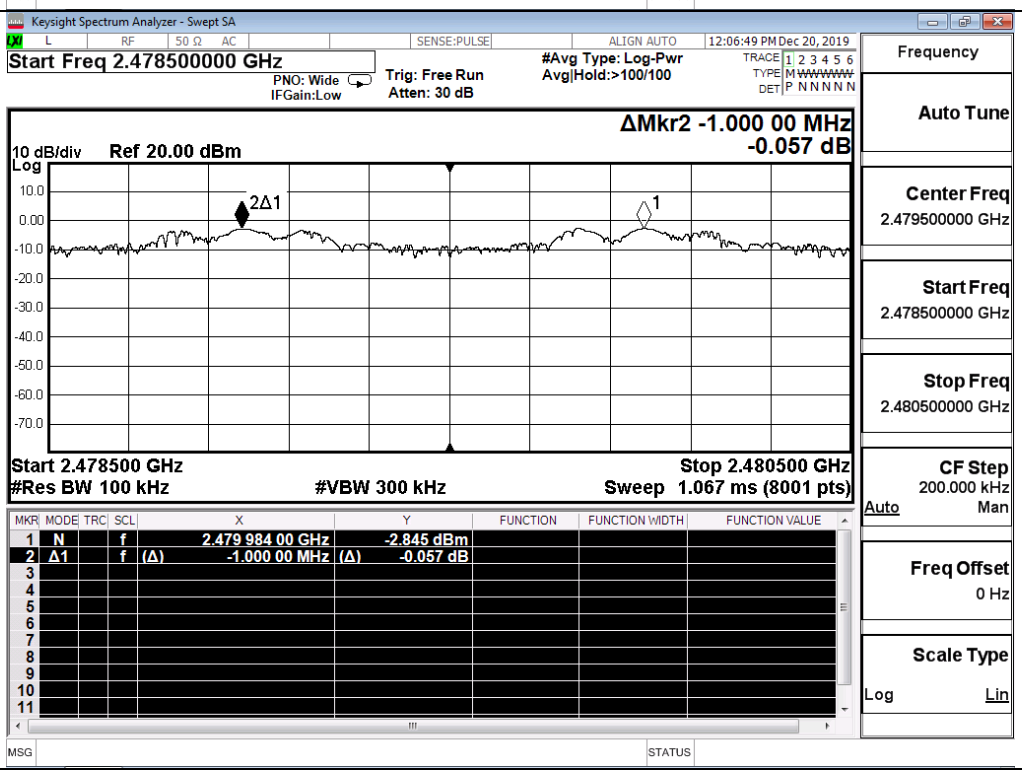


π/4DQPSK/HCH



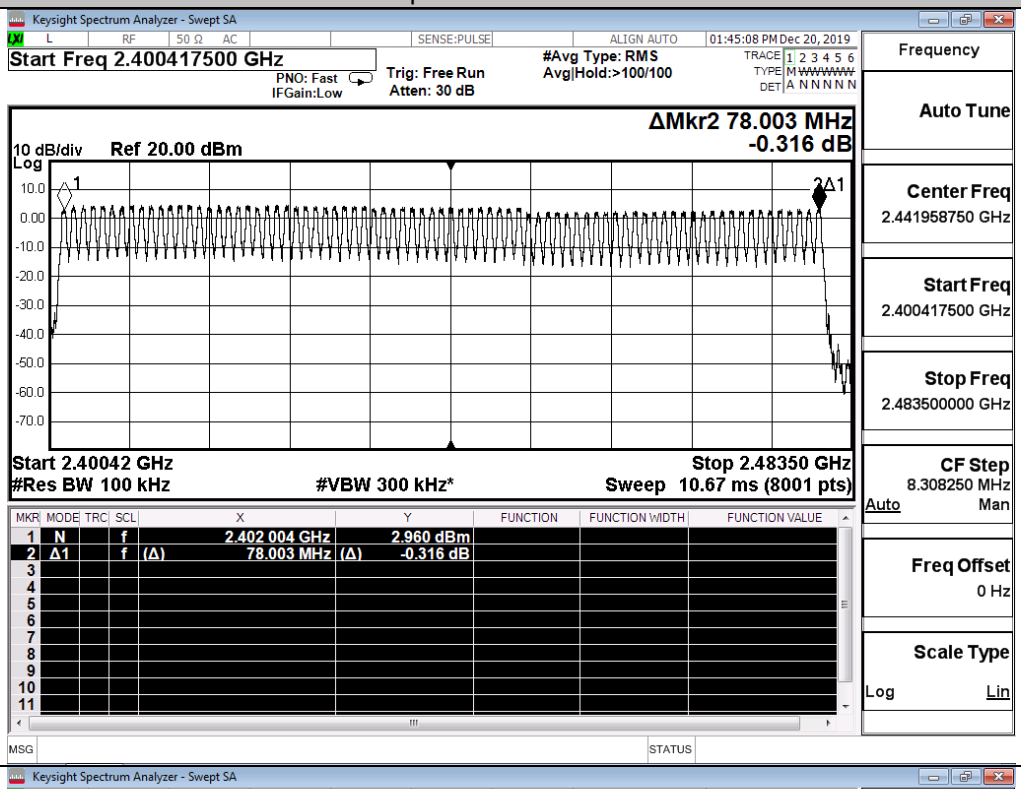
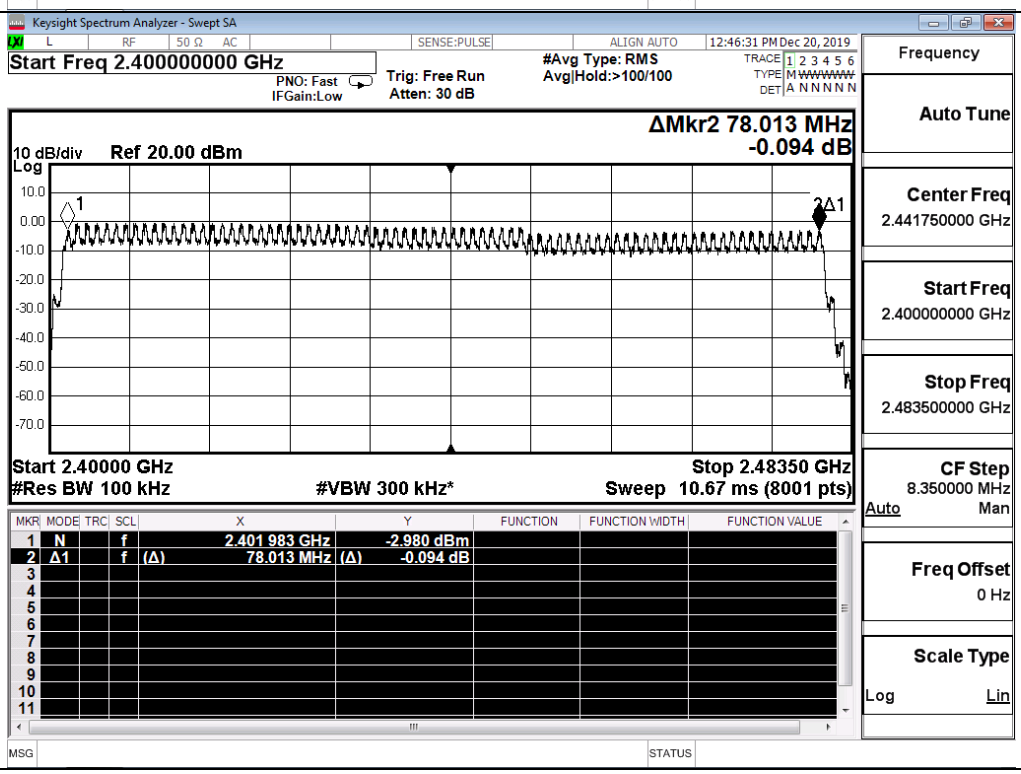
8DPSK/LCH



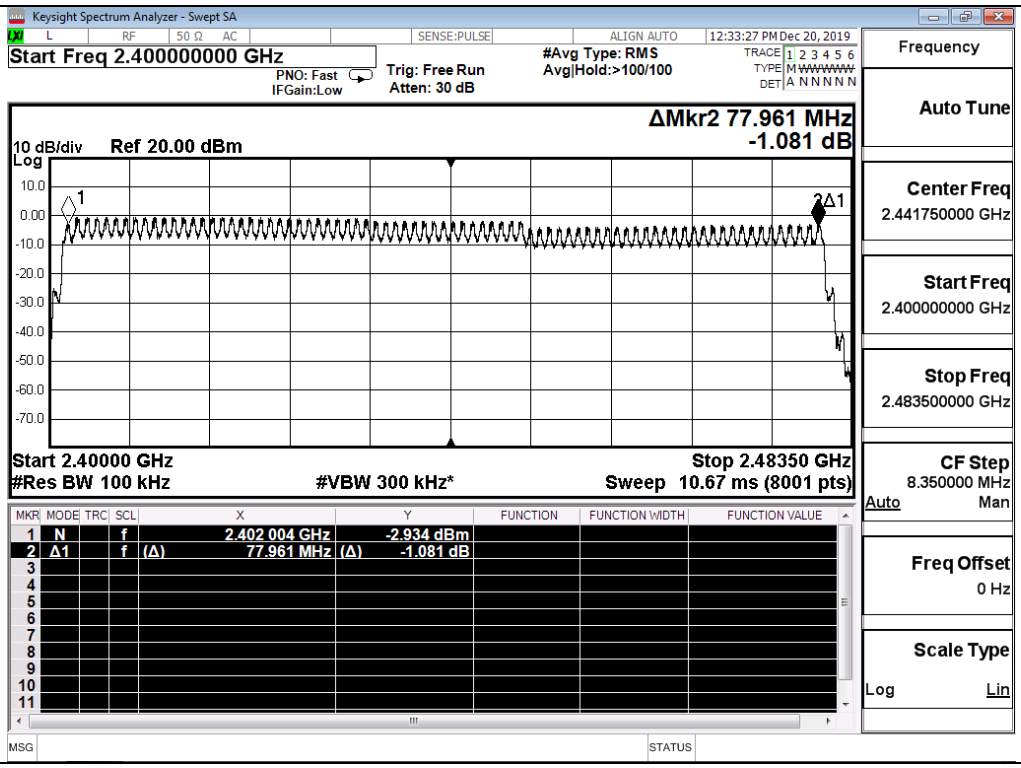
8DPSK/MCH	
8DPSK/HCH	

A.4 Hopping Channel Number

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

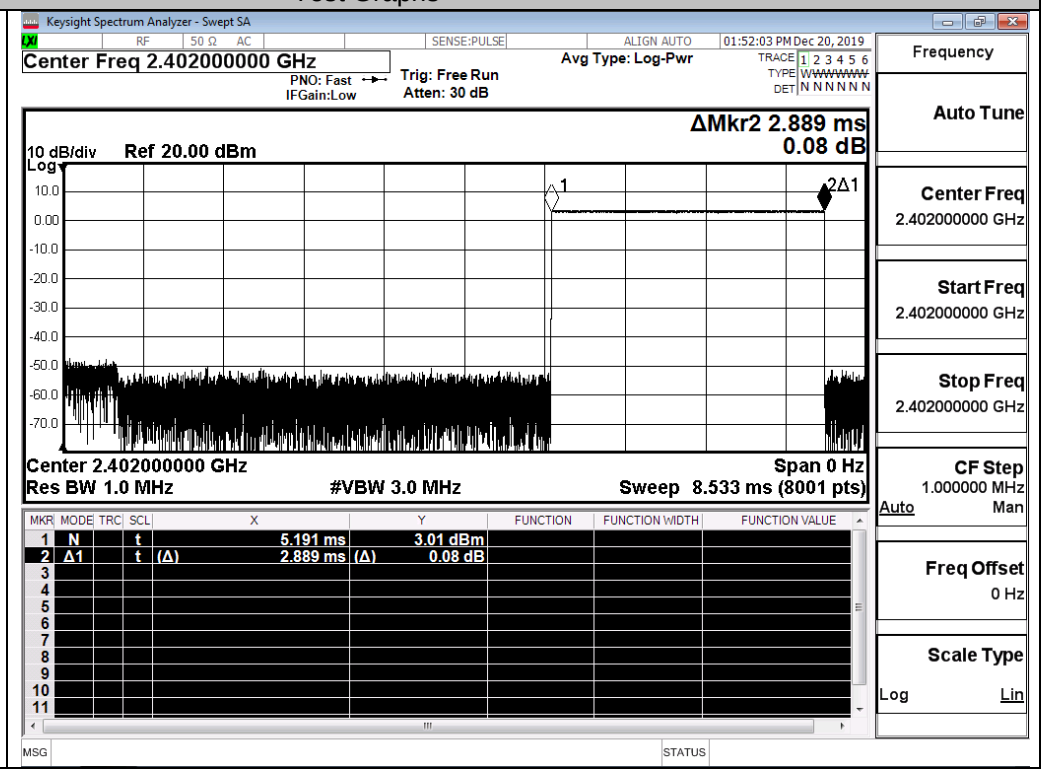
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

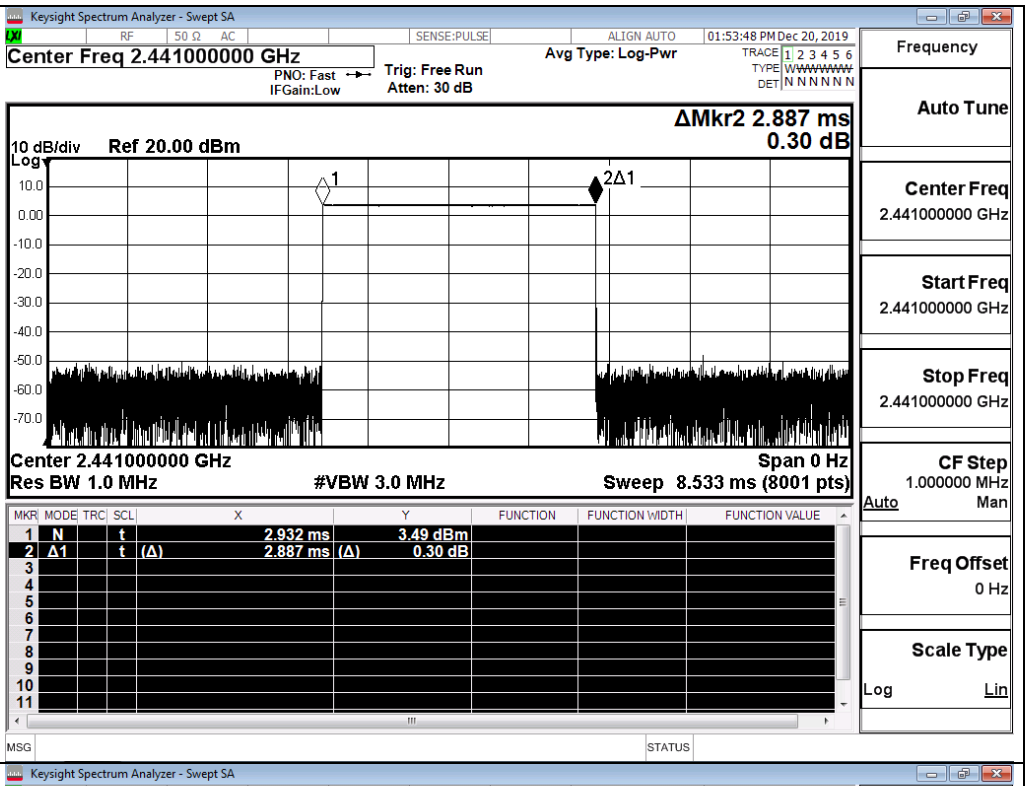
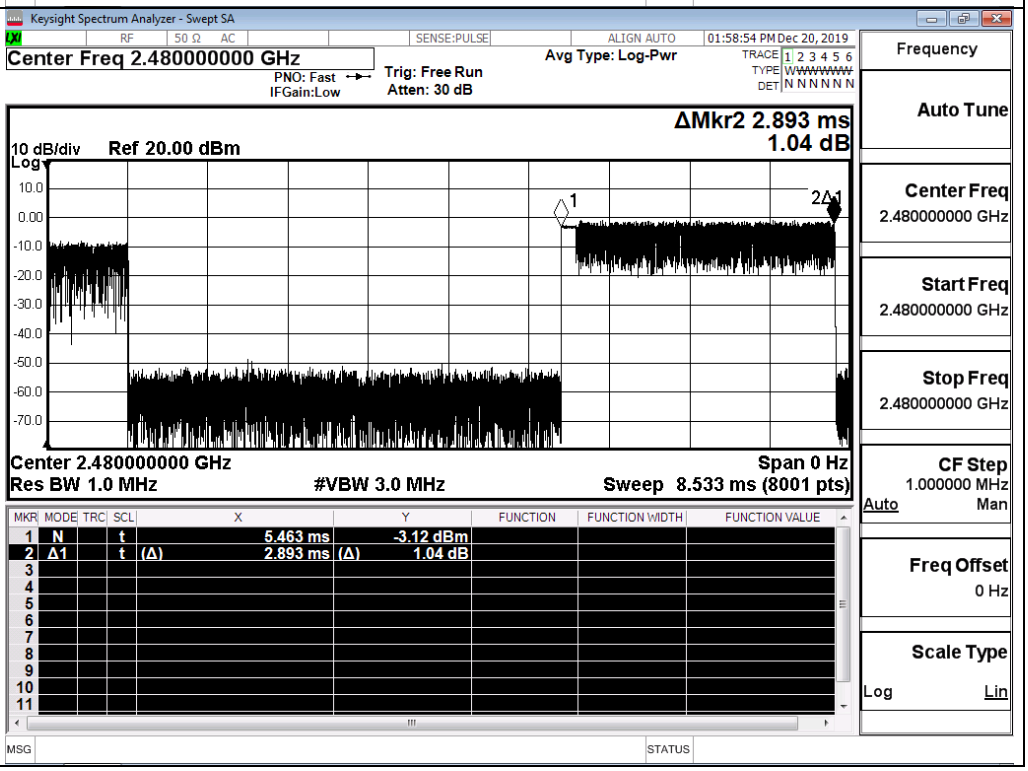
8DPSK/Hop


Keysight Spectrum Analyzer - Swept SA
Start Freq 2.400000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>100/100
12:33:27 PM Dec 20, 2019
ΔMkr2 77.961 MHz
-1.081 dB
10 dB/div Ref 20.00 dBm
Log
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz*
Stop 2.48350 GHz
Sweep 10.67 ms (8001 pts)
1 N f 2.402 004 GHz -2.934 dBm
2 Δ1 f (Δ) 77.961 MHz (Δ) -1.081 dB
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin

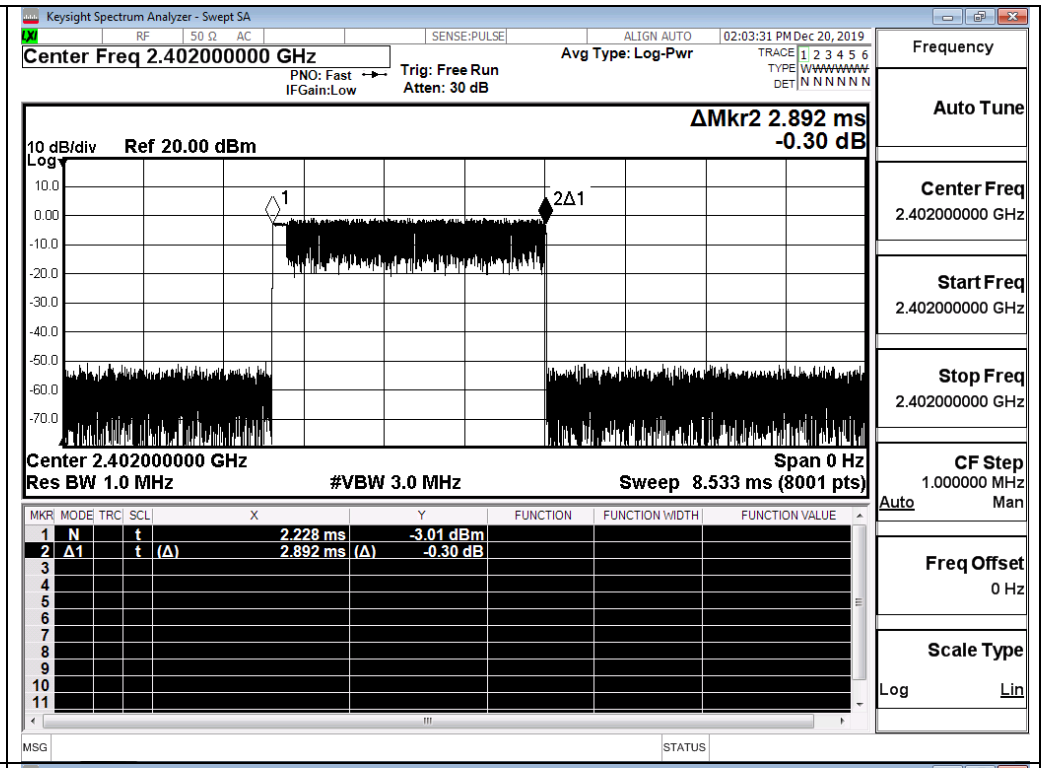
A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.889	106.7	0.31	0.4	PASS
	DH5	MCH	2.887	106.7	0.31	0.4	PASS
	DH5	HCH	2.893	106.7	0.31	0.4	PASS
π/4DQPSK	2DH5	LCH	2.892	106.7	0.31	0.4	PASS
	2DH5	MCH	2.894	106.7	0.31	0.4	PASS
	2DH5	HCH	2.899	106.7	0.31	0.4	PASS
8DPSK	3DH5	LCH	2.867	106.7	0.31	0.4	PASS
	3DH5	MCH	2.892	106.7	0.31	0.4	PASS
	3DH5	HCH	2.895	106.7	0.31	0.4	PASS

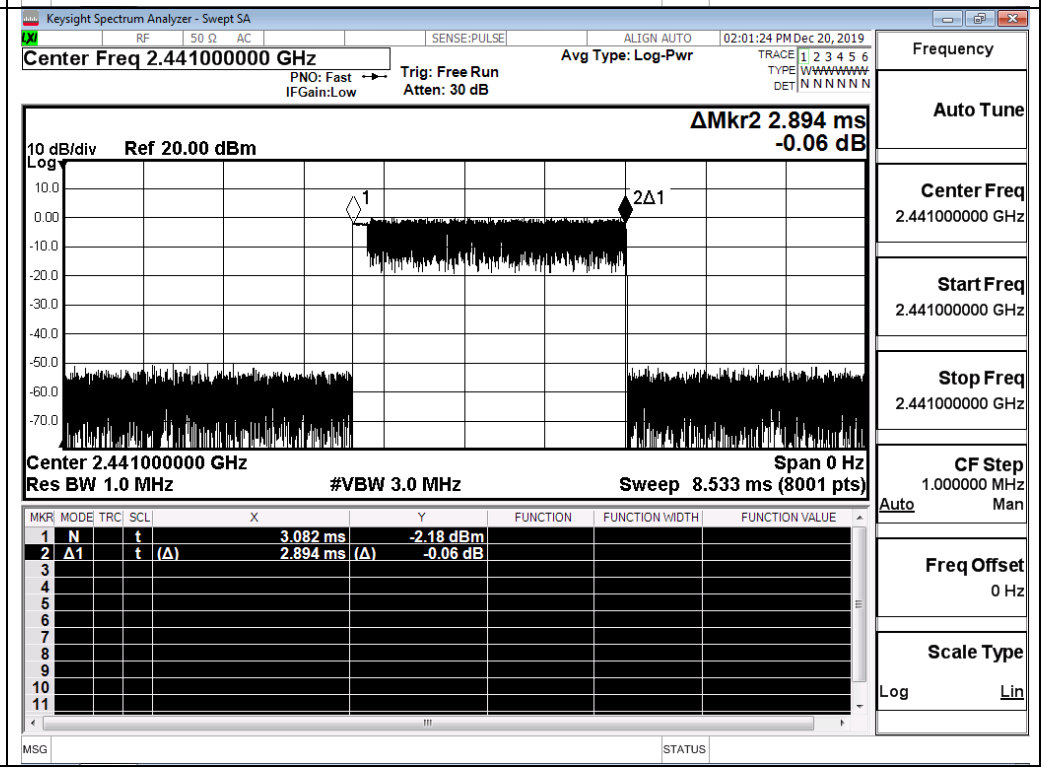
Test Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

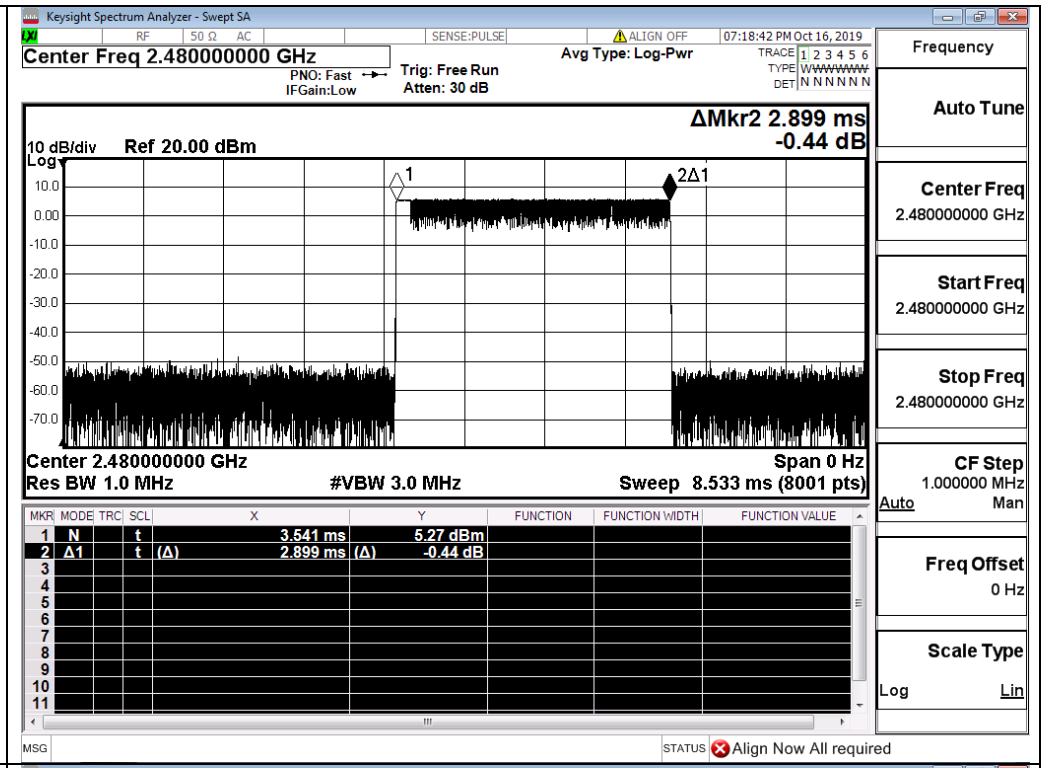
π/4DQPSK
_2DH5/LCH



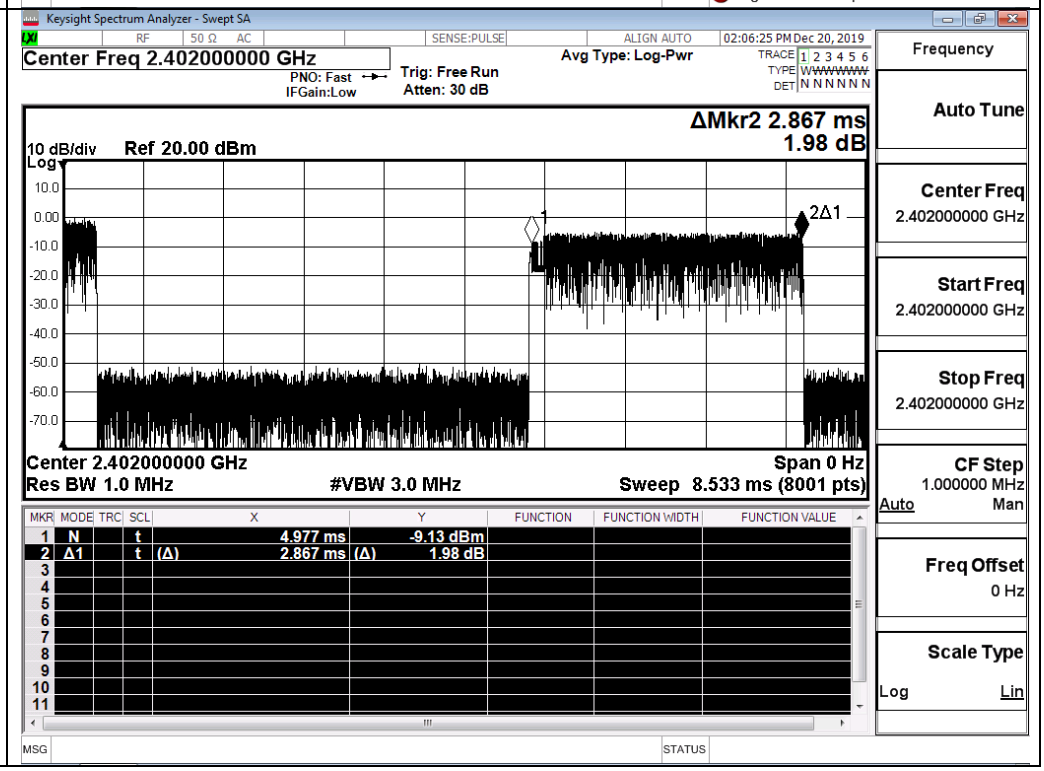
π/4DQPSK
_2DH5/MCH



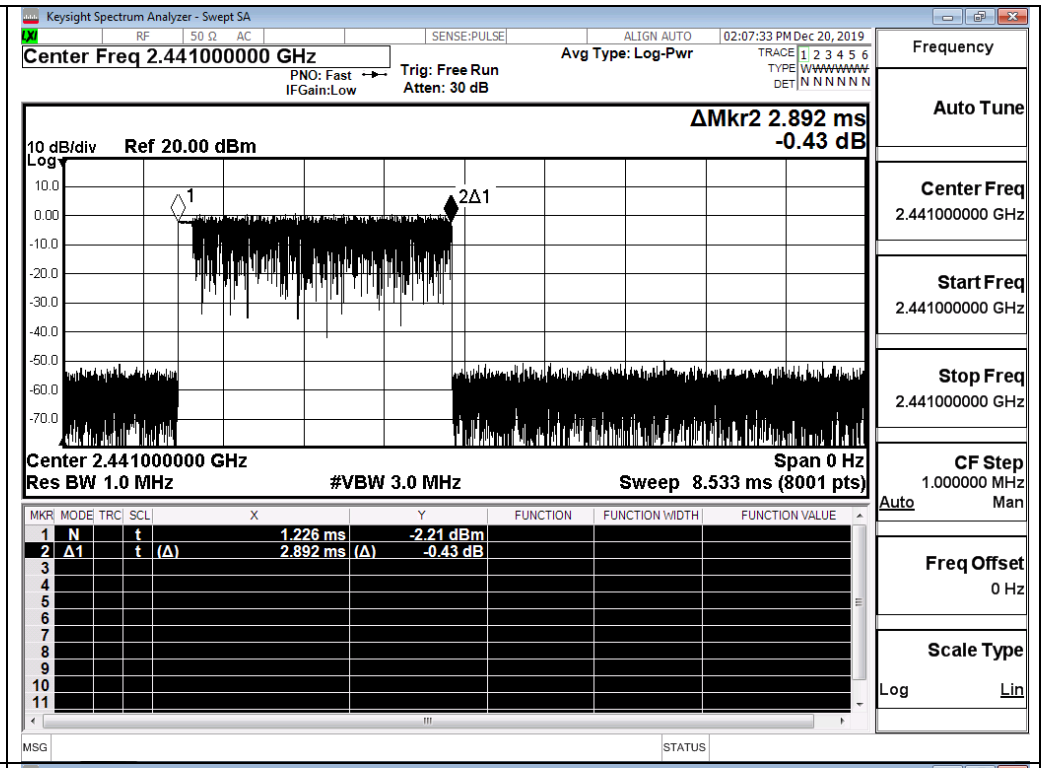
π/4DQPSK _2DH5/HCH



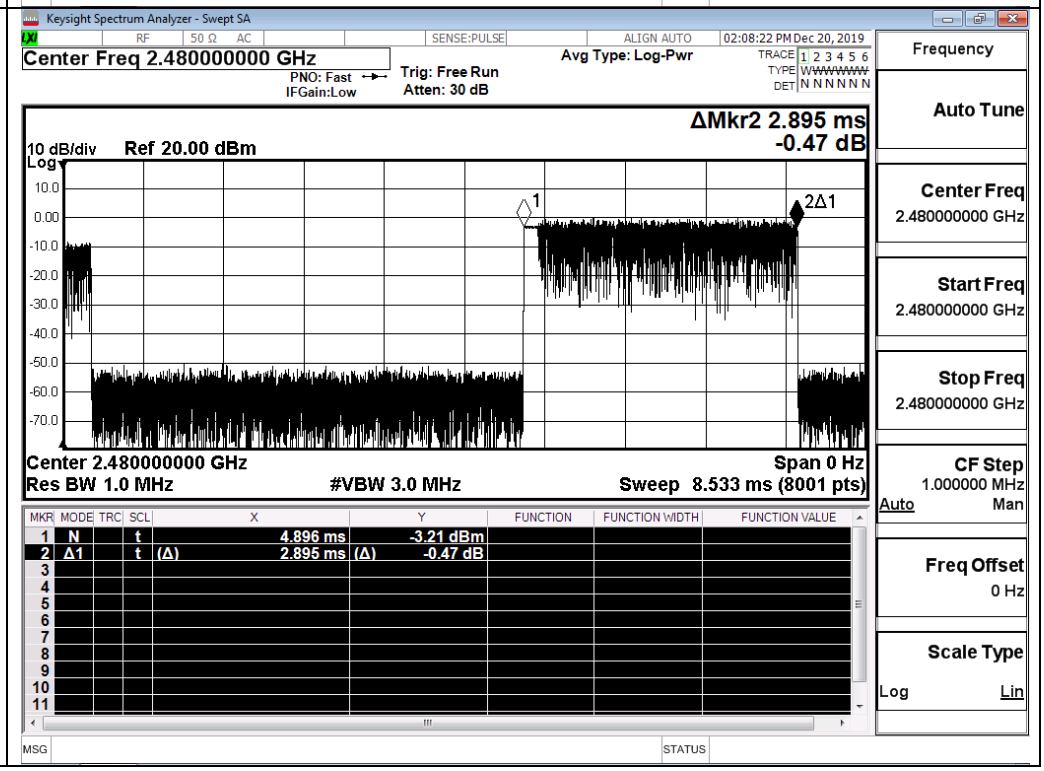
8DPSK _3DH5/LCH



8DPSK _3DH5/MCH

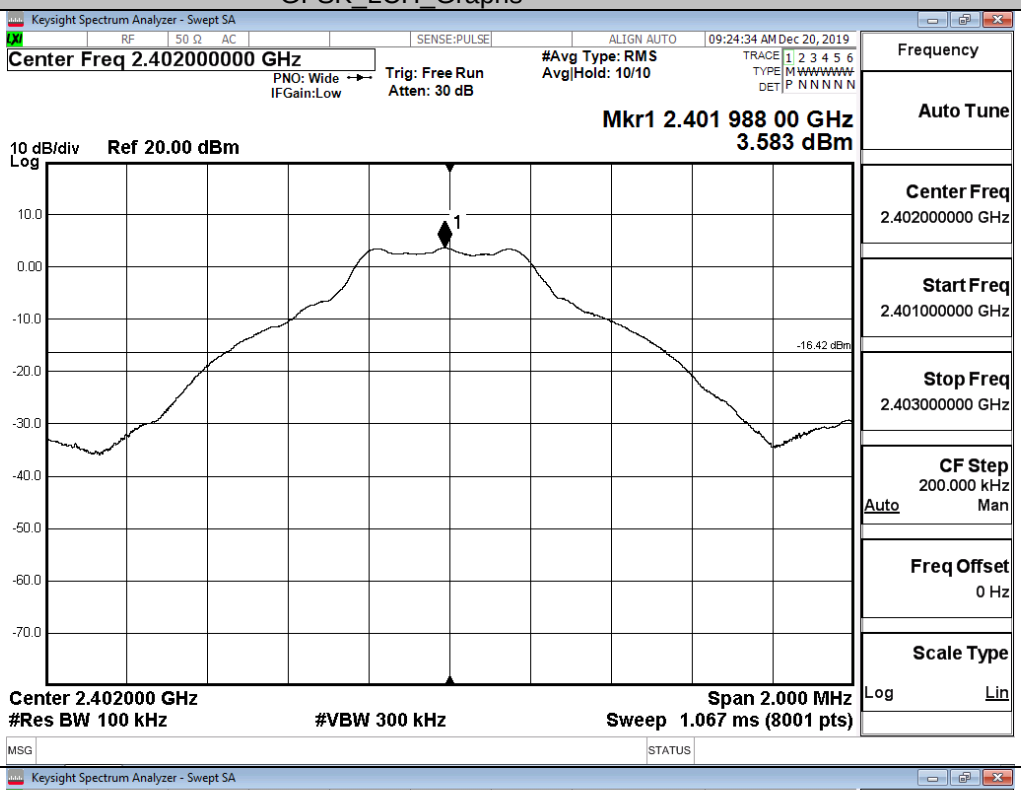
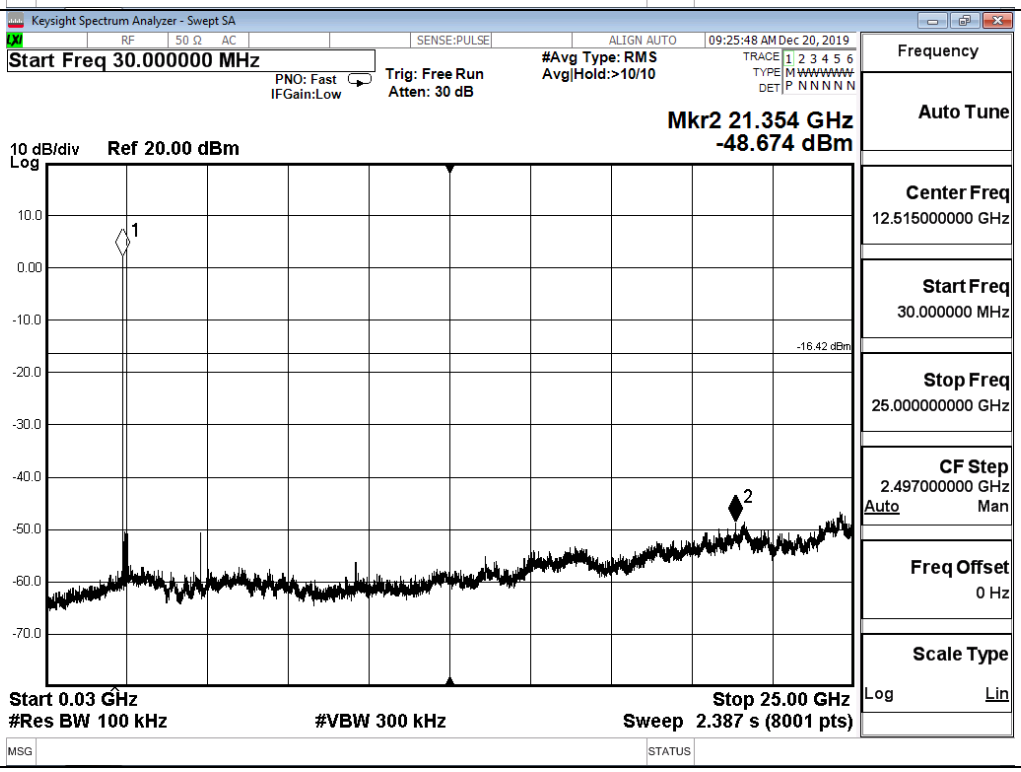


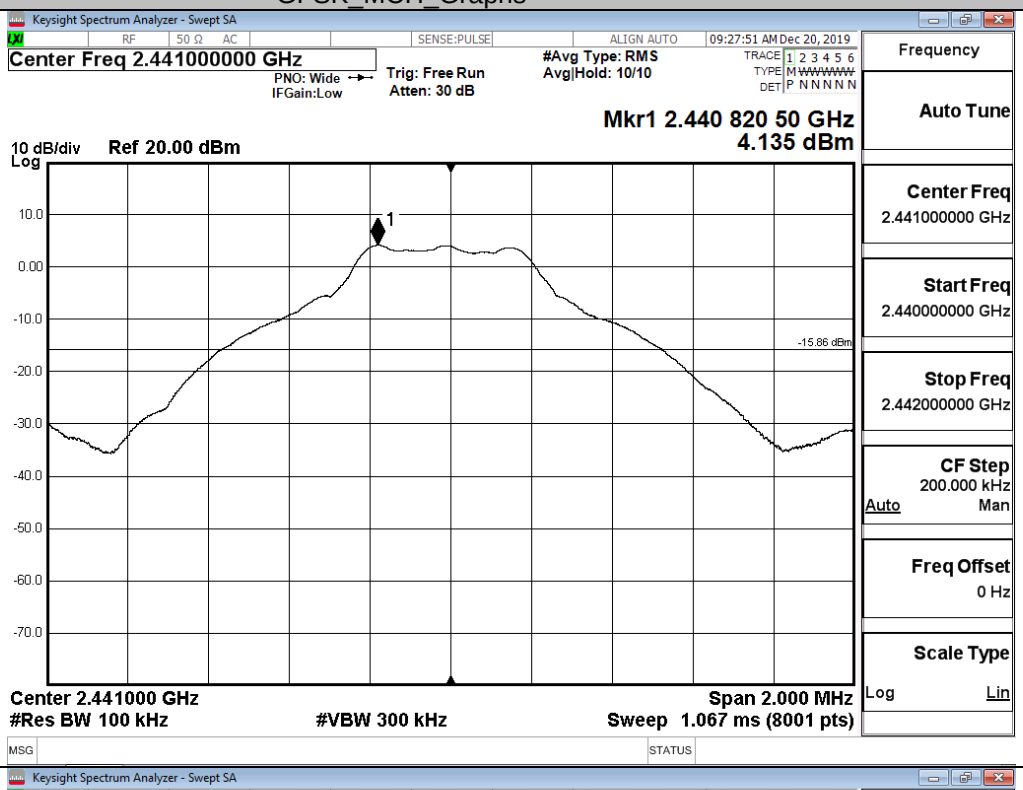
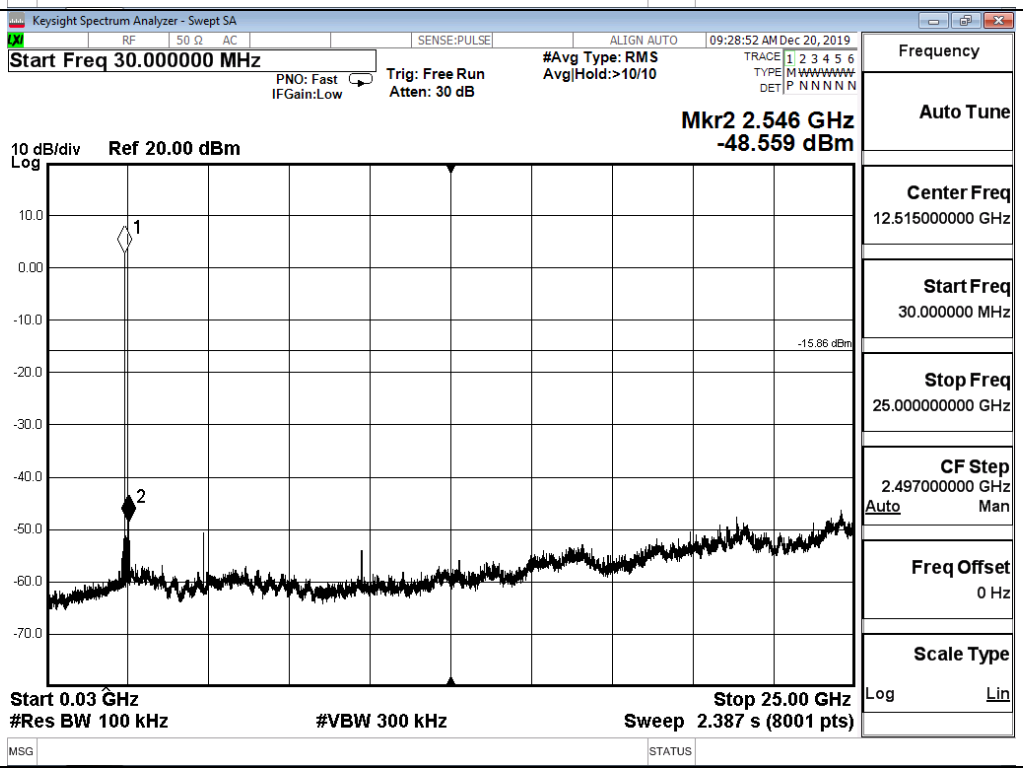
8DPSK _3DH5/HCH



A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.583	-48.674	-16.42	PASS
	MCH	-15.86	-48.559	-15.86	PASS
	HCH	3.395	-47.992	-16.60	PASS
π/4DQPSK	LCH	-2.620	-48.169	-22.62	PASS
	MCH	-1.813	-48.239	-21.81	PASS
	HCH	-2.817	-49.283	-22.82	PASS
8DPSK	LCH	-2.570	-49.111	-22.57	PASS
	MCH	-1.706	-48.206	-21.71	PASS
	HCH	-2.725	-45.635	-22.73	PASS

GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

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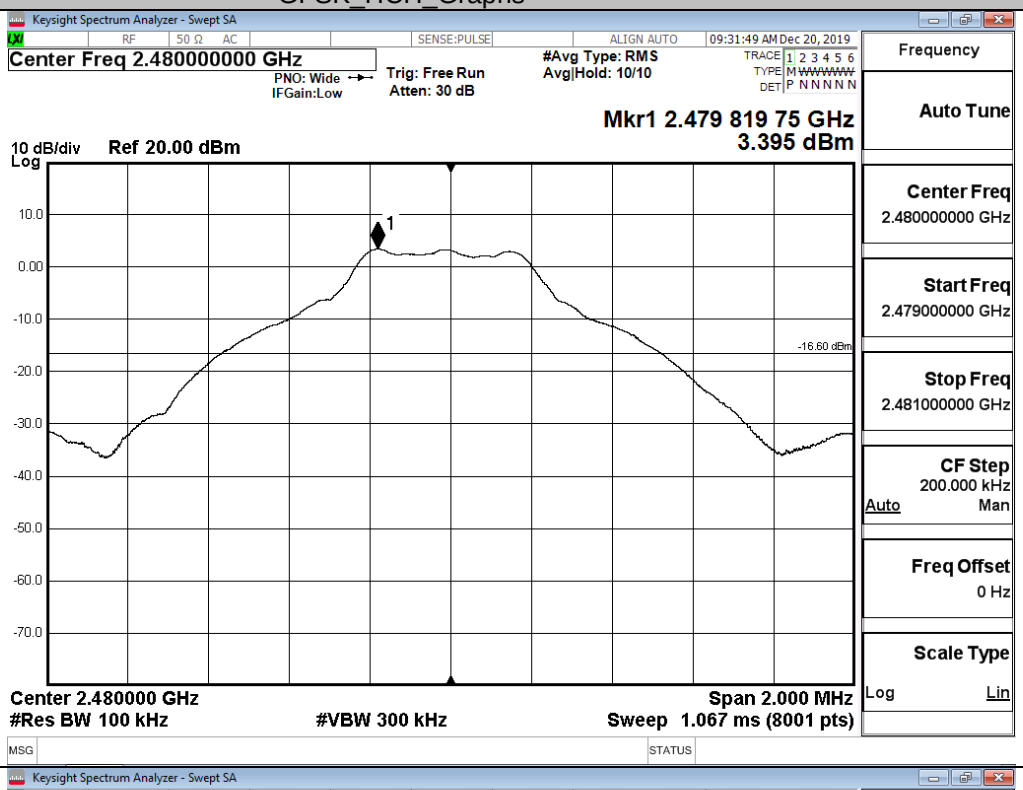
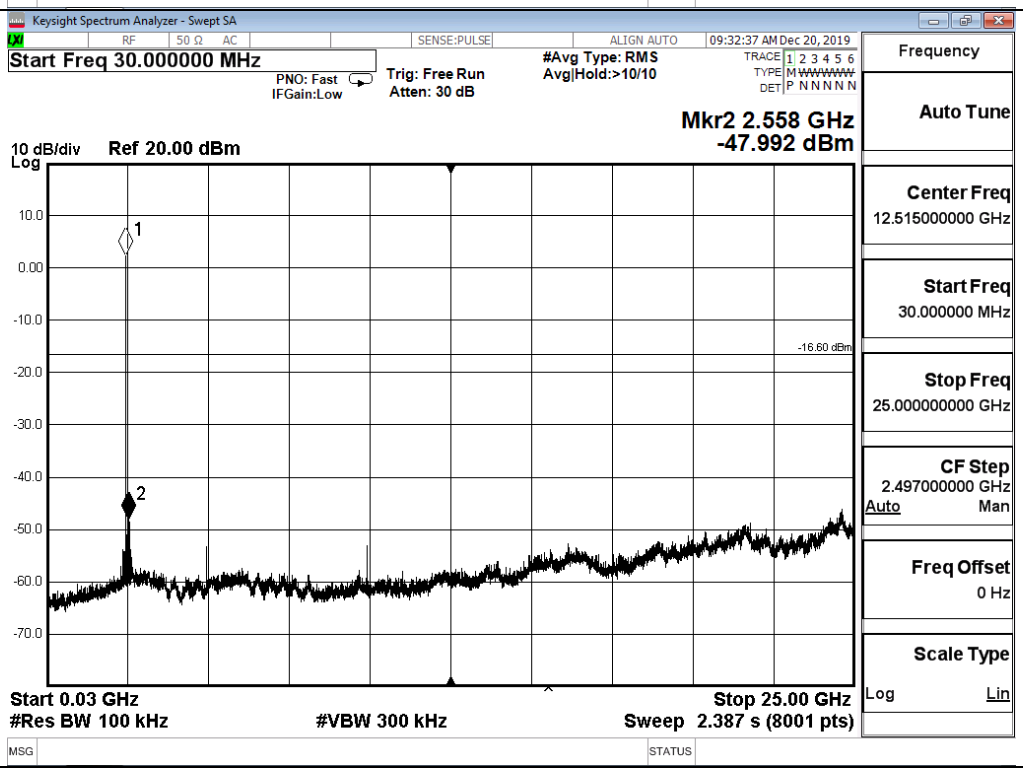
Pref	
Puw	

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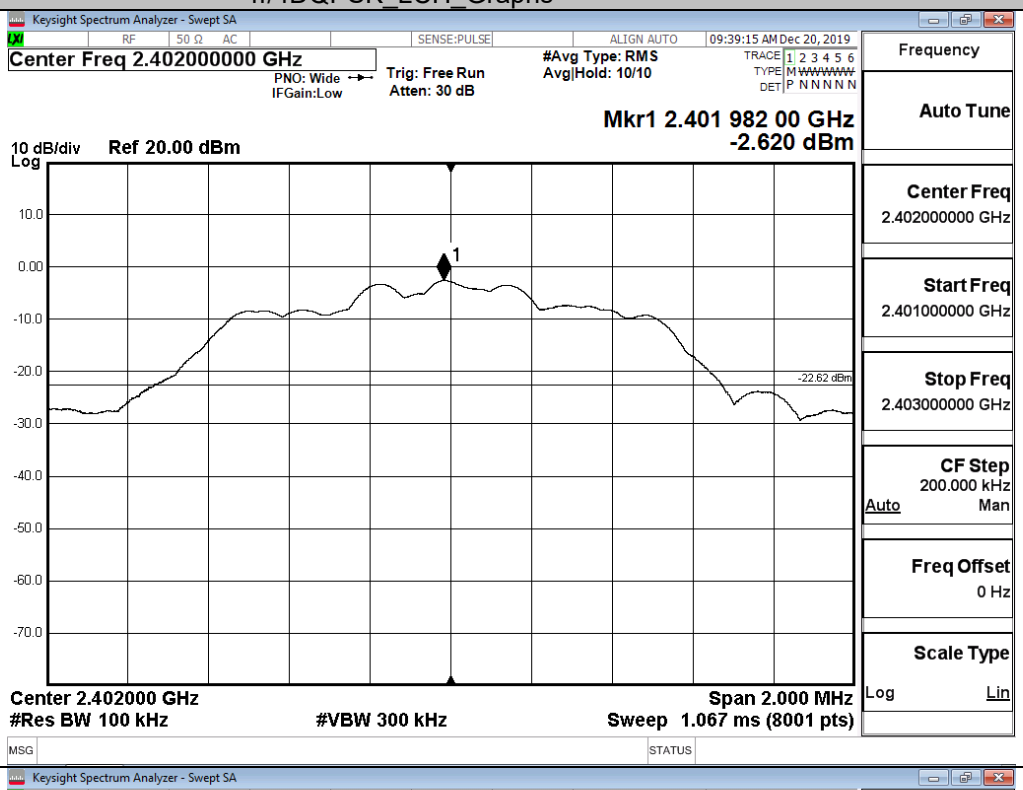
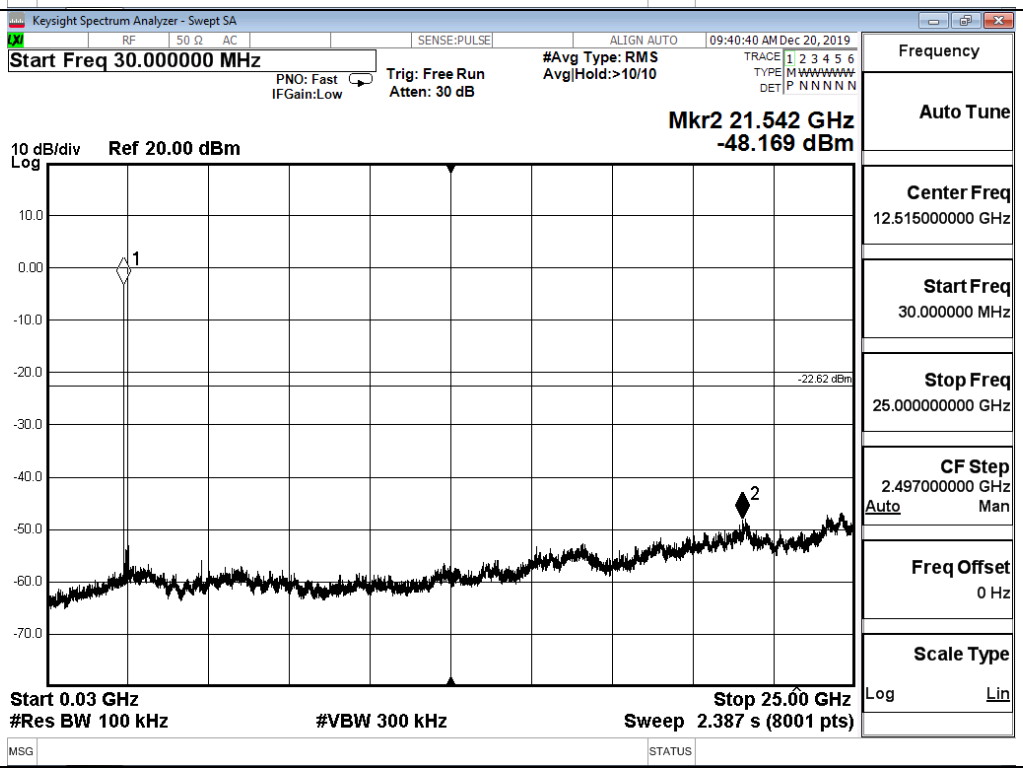
Pref	
Puw	

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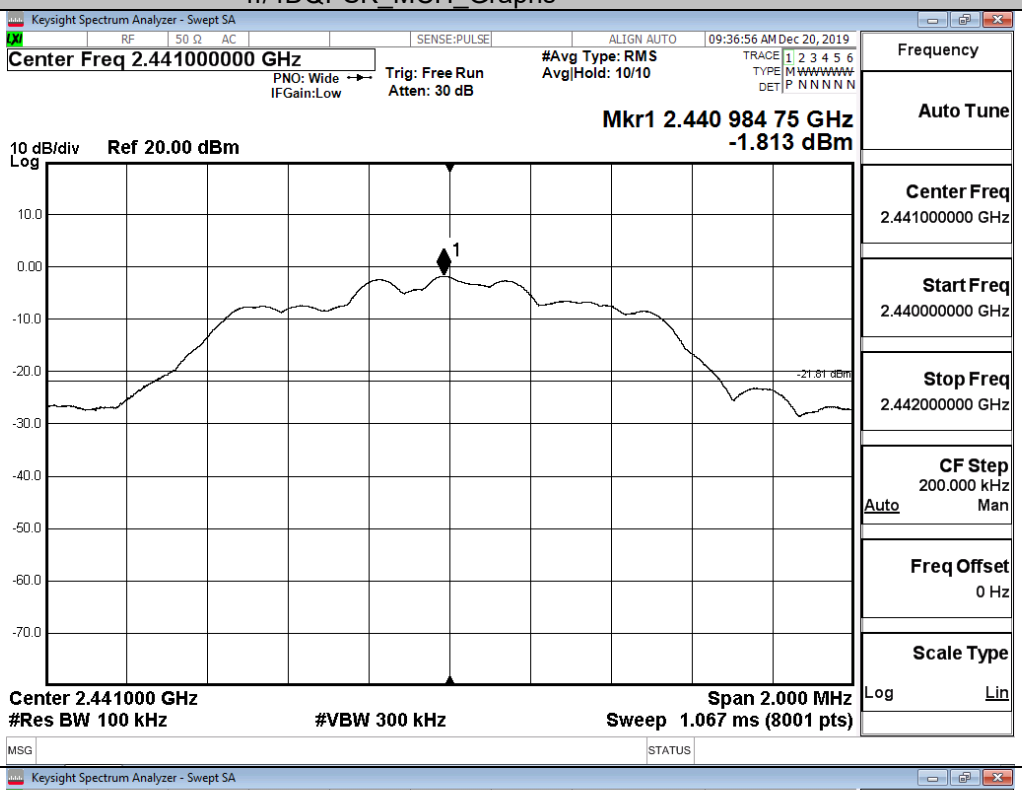
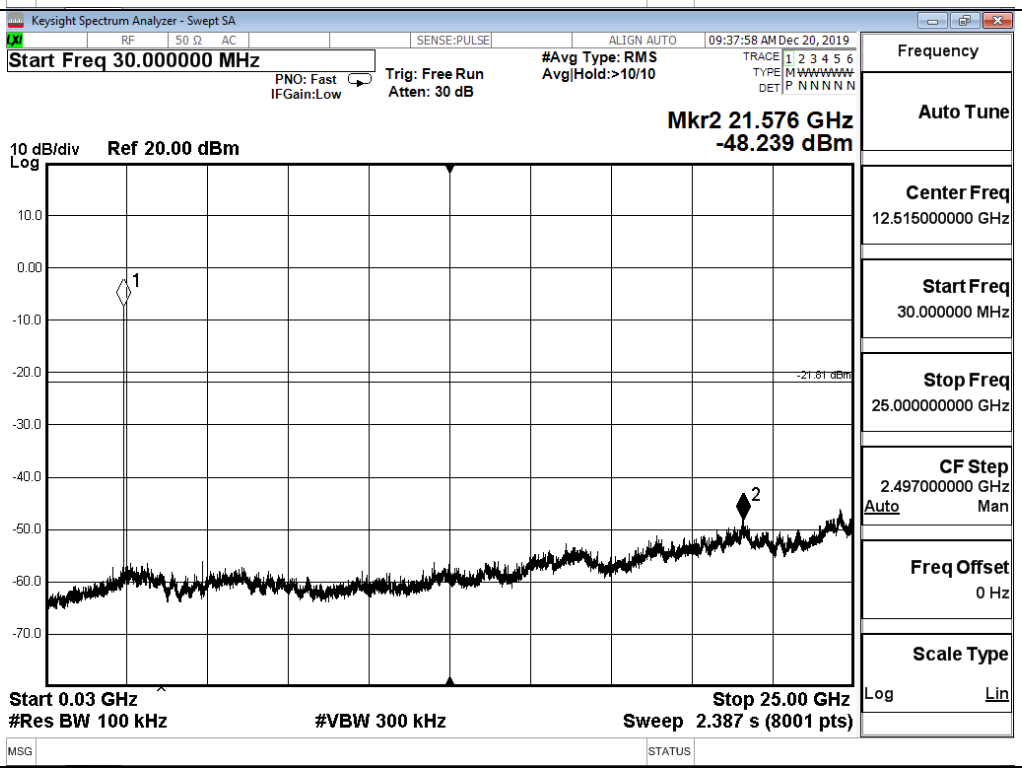
Pref	
Puw	

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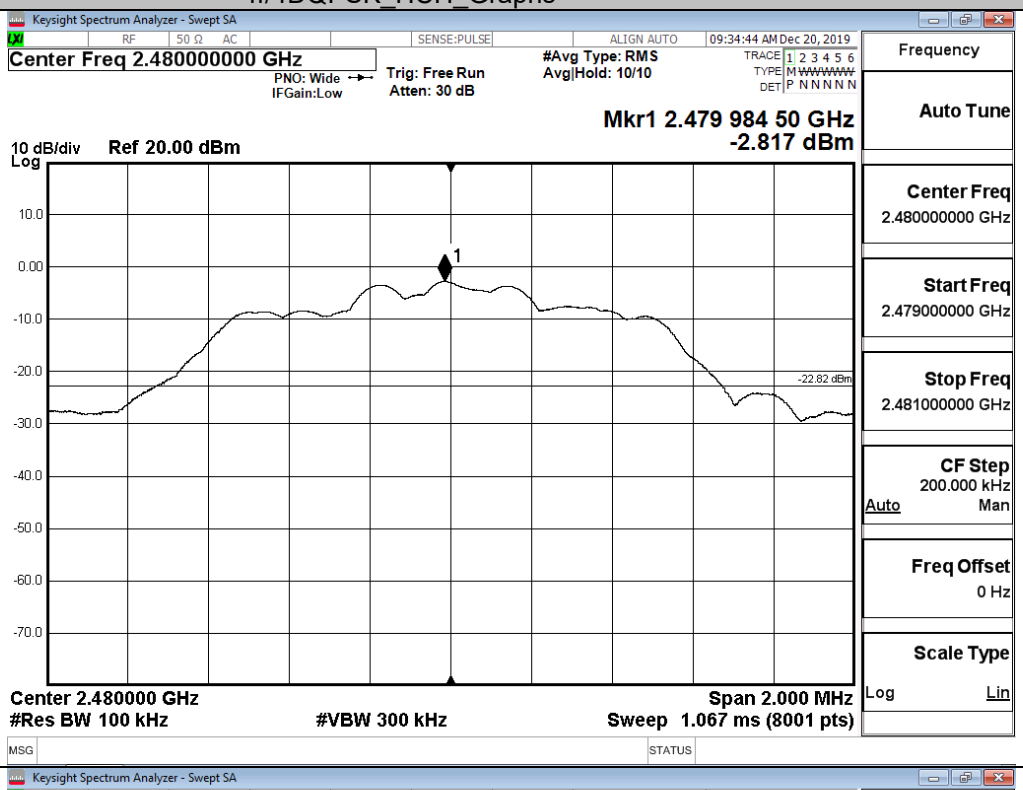
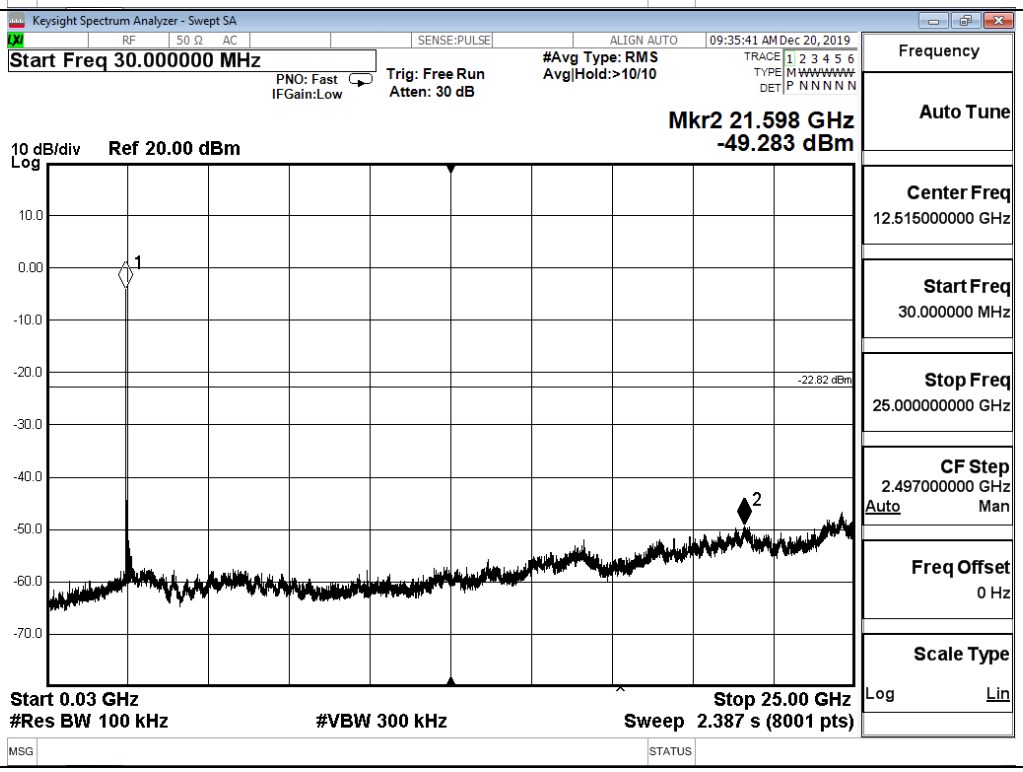
Pref	
Puw	

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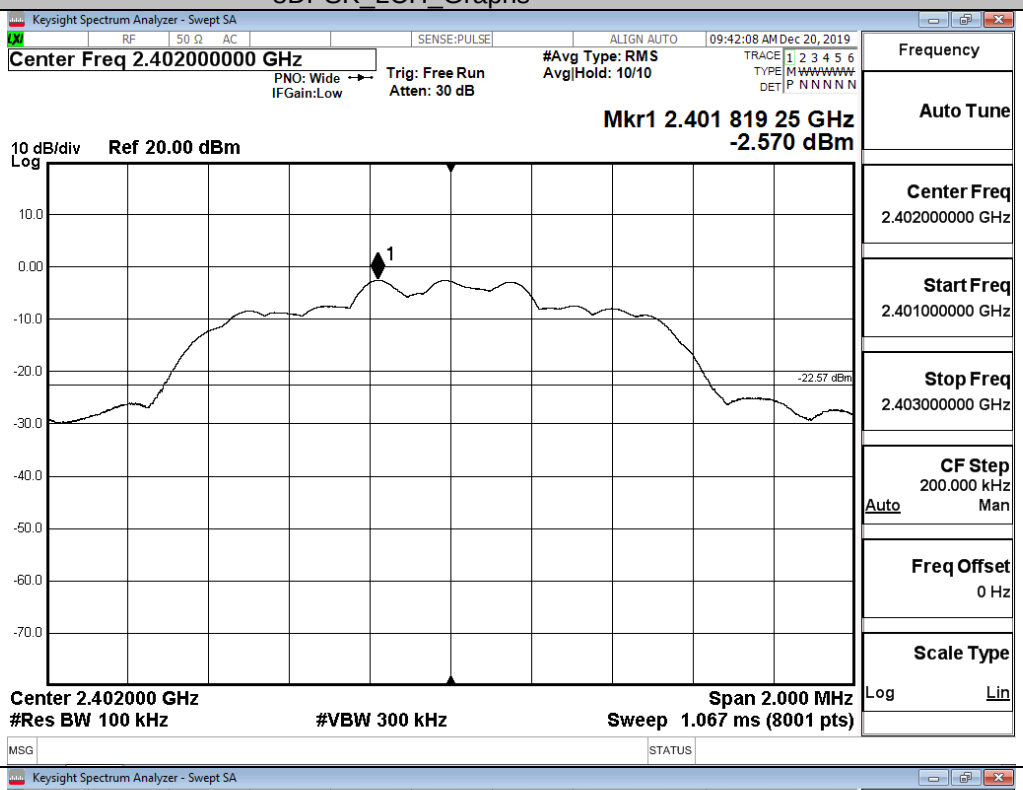
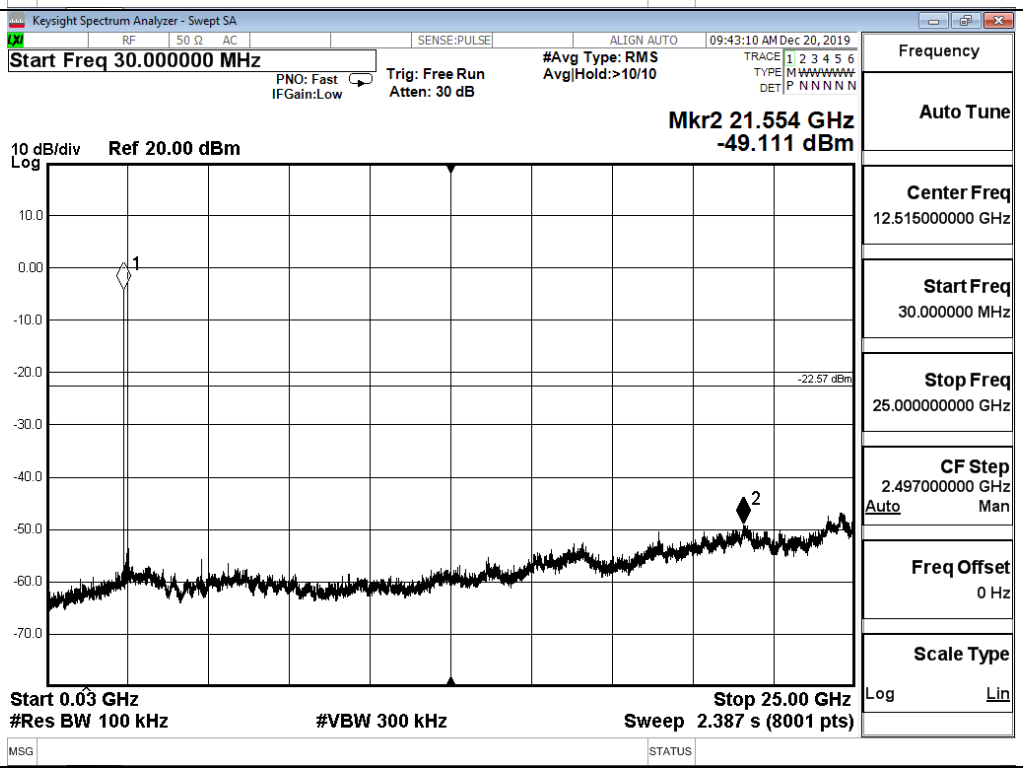
Pref	
Puw	

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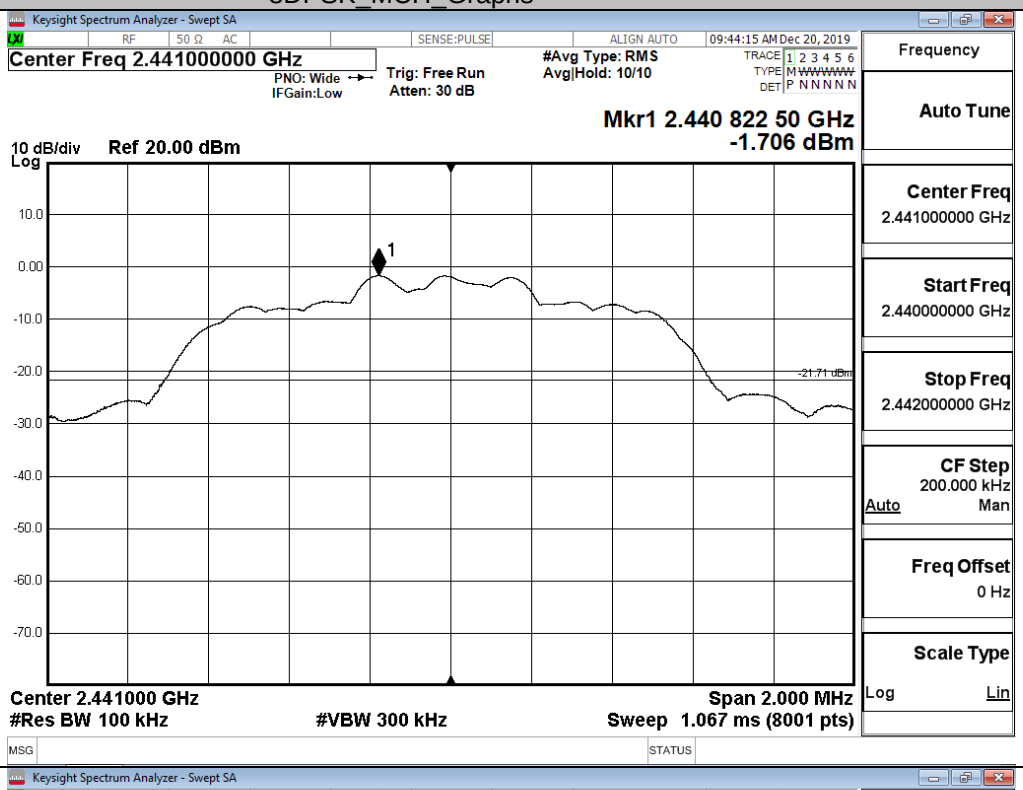
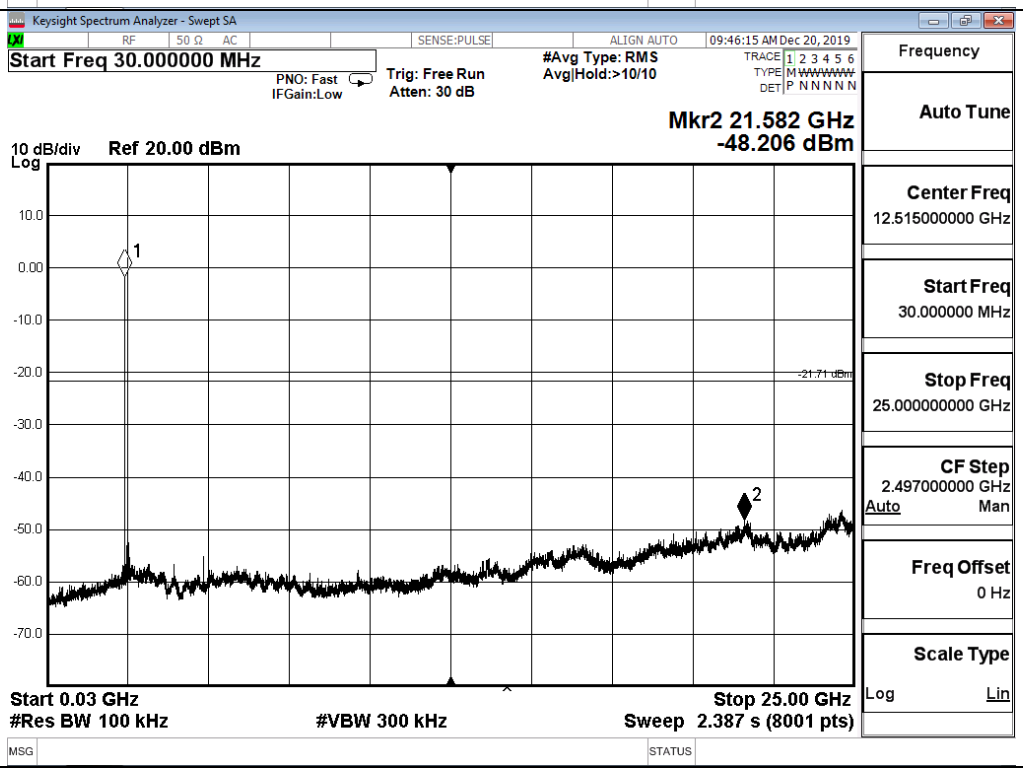
Pref	
Puw	

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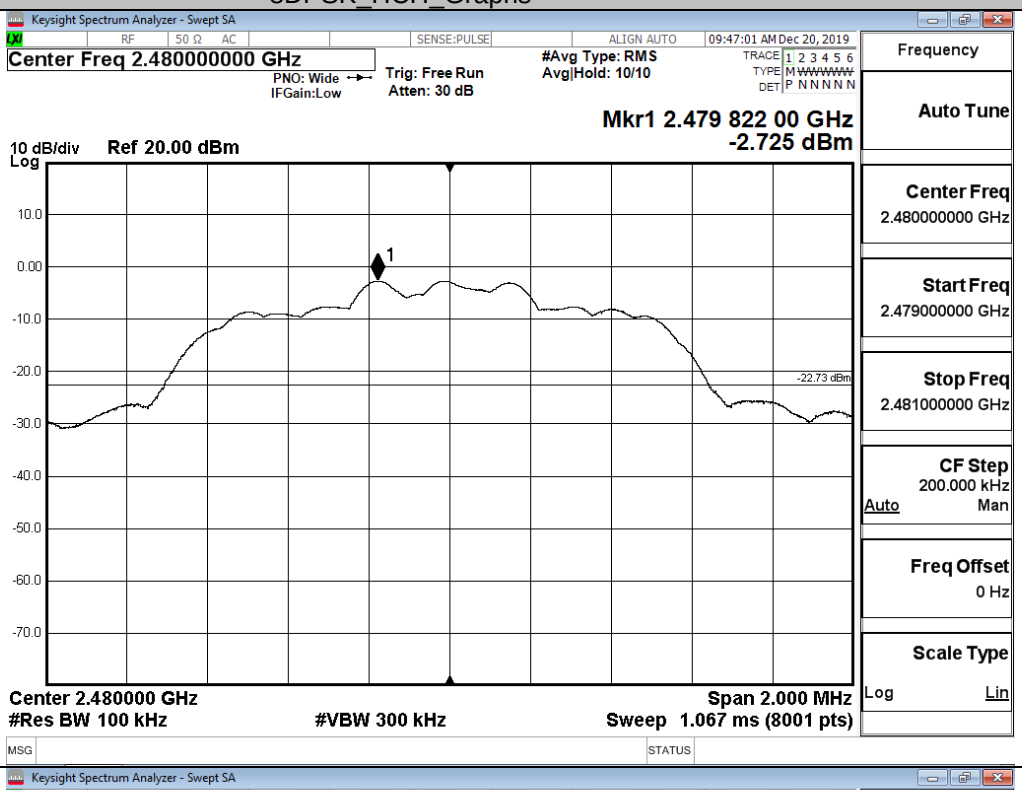
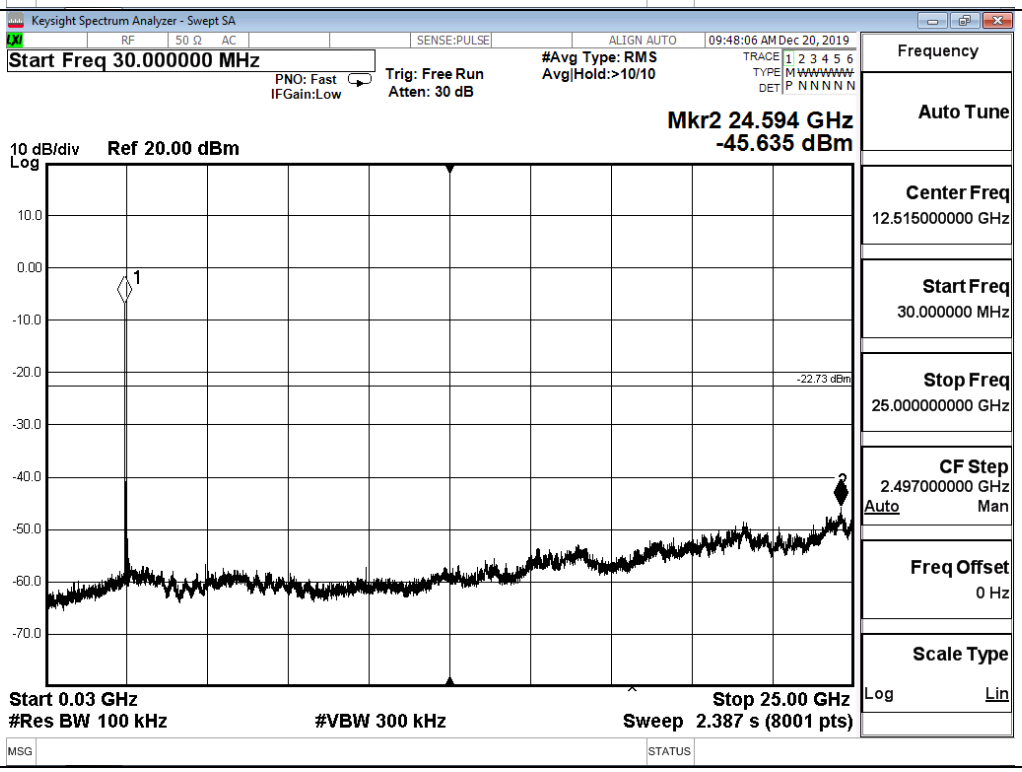
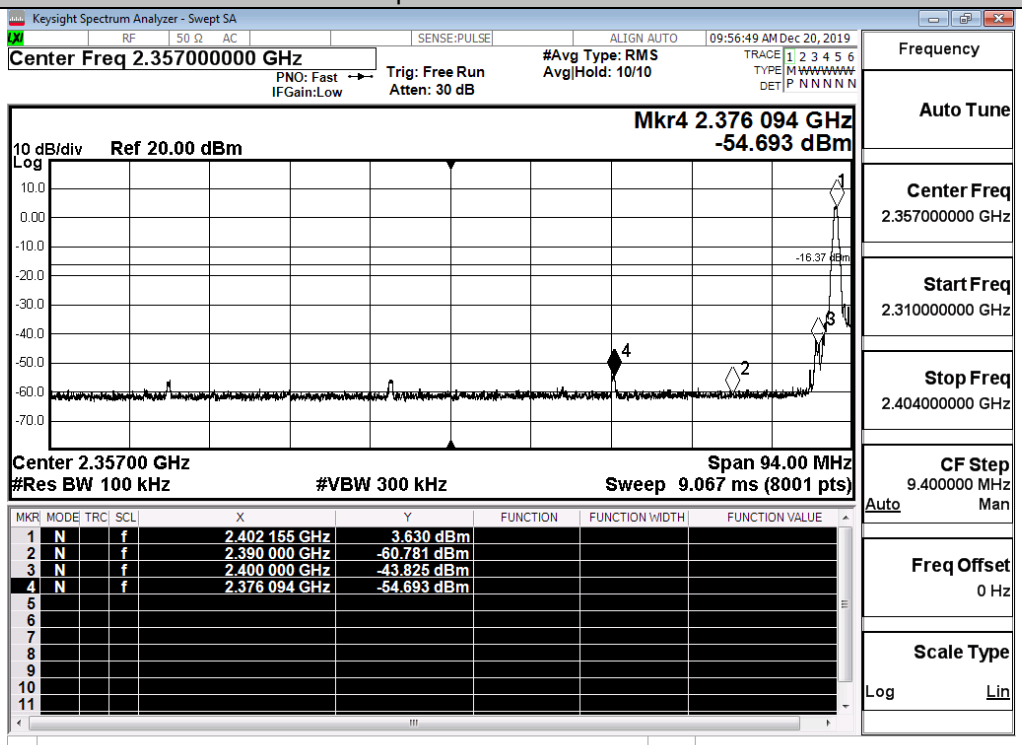
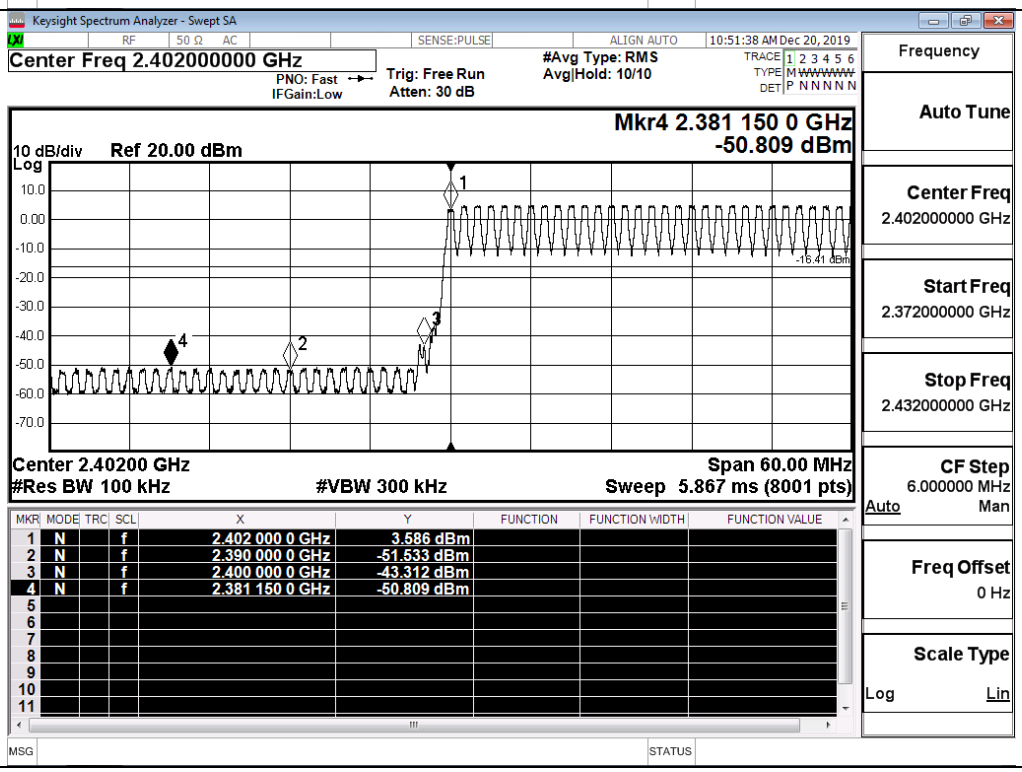
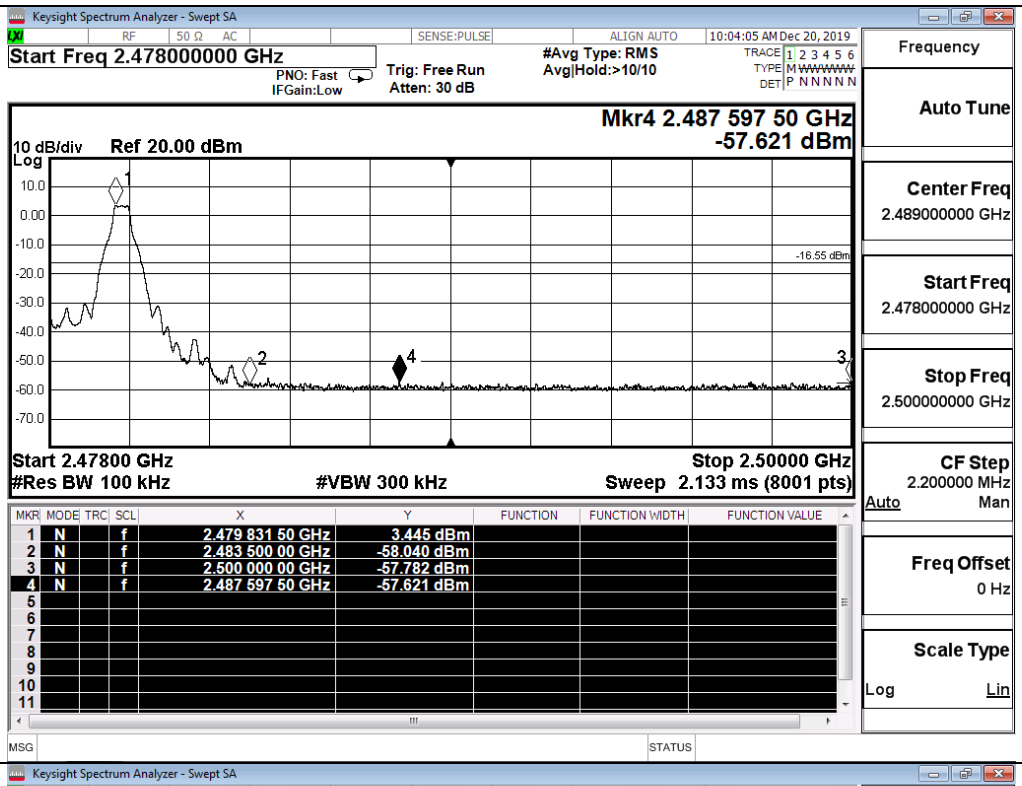
Pref	
Puw	

A.7 Band-edge for RF Conducted Emissions

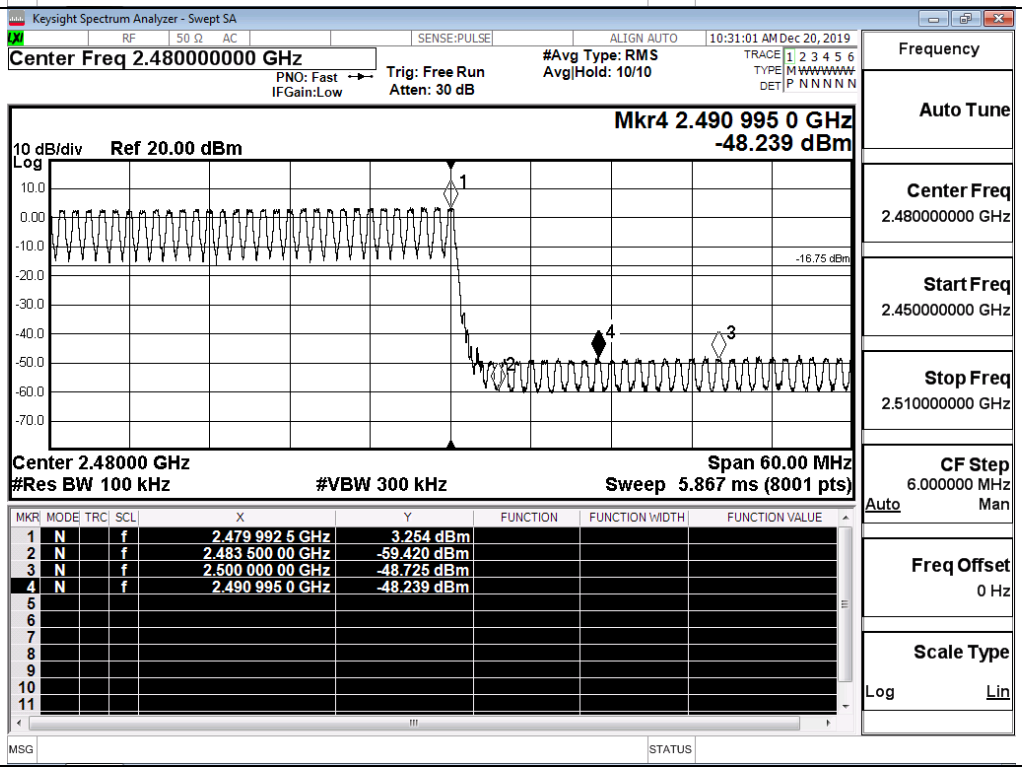
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.630	Off	-54.693	-16.37	PASS
			3.586	On	-50.809	-16.41	PASS
	HCH	2480	3.445	Off	-57.621	-16.55	PASS
			3.254	On	-48.239	-16.75	PASS
π/4DQPSK	LCH	2402	-2.437	Off	-57.736	-22.44	PASS
			-2.591	On	-55.775	-22.59	PASS
	HCH	2480	-2.735	Off	-57.700	-22.74	PASS
			-2.824	On	-51.902	-22.02	PASS
8DPSK	LCH	2402	-2.410	Off	-59.252	-22.41	PASS
			-2.556	On	-55.909	-22.59	PASS
	HCH	2480	-2.595	Off	-58.244	-22.60	PASS
			-2.683	On	-50.732	-22.68	PASS

Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

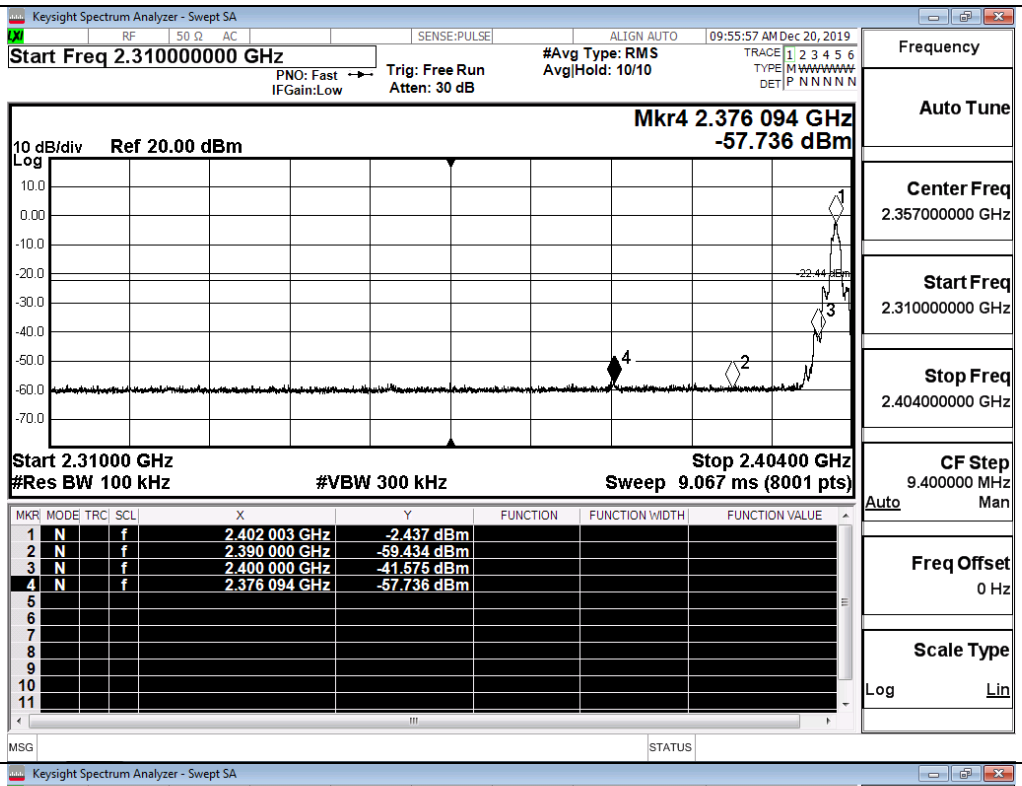
GFSK/HCH/No Hop



GFSK/HCH/Hop



π/4DQPSK/LCH/No Hop



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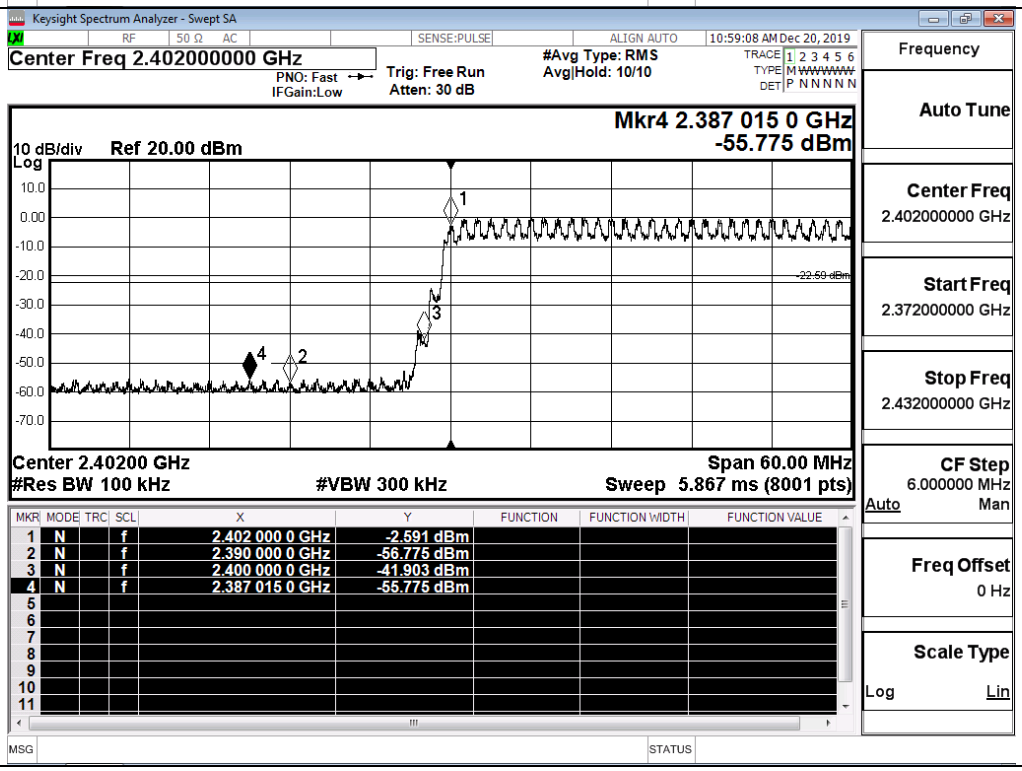

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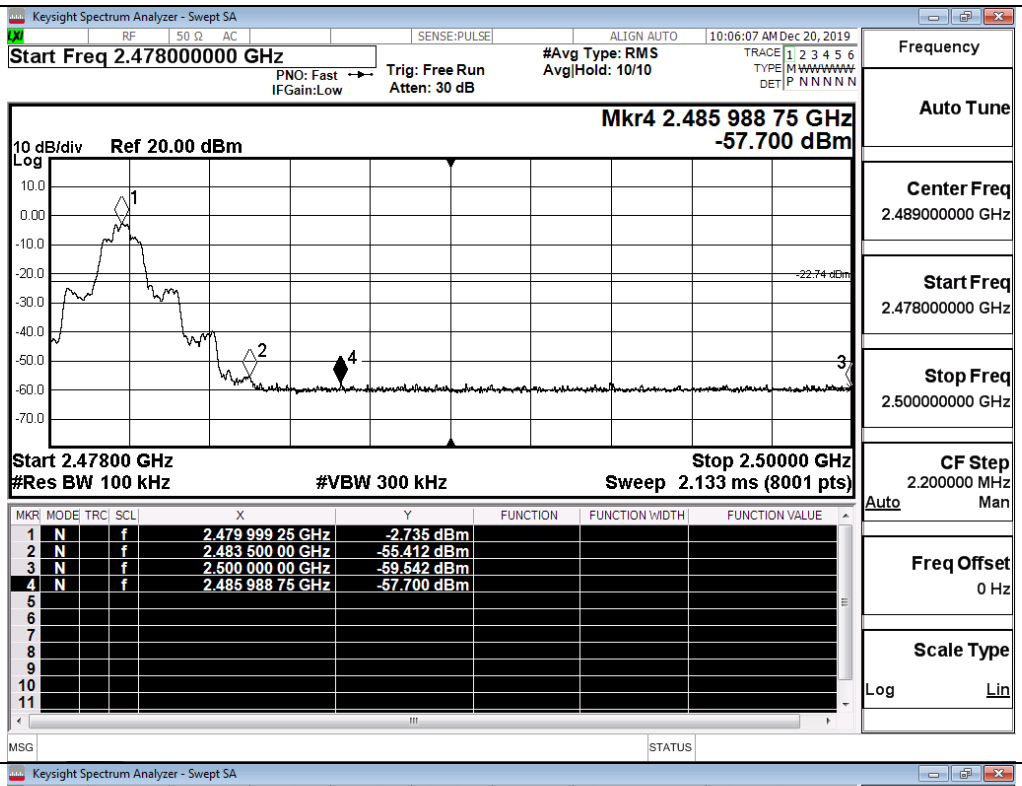

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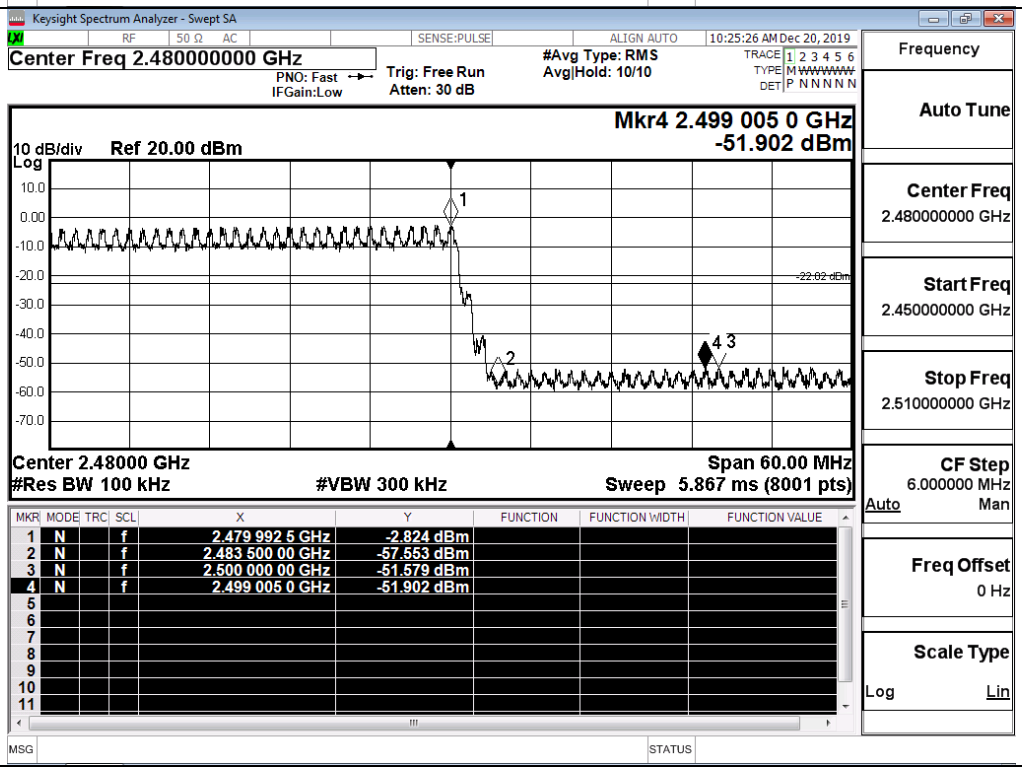
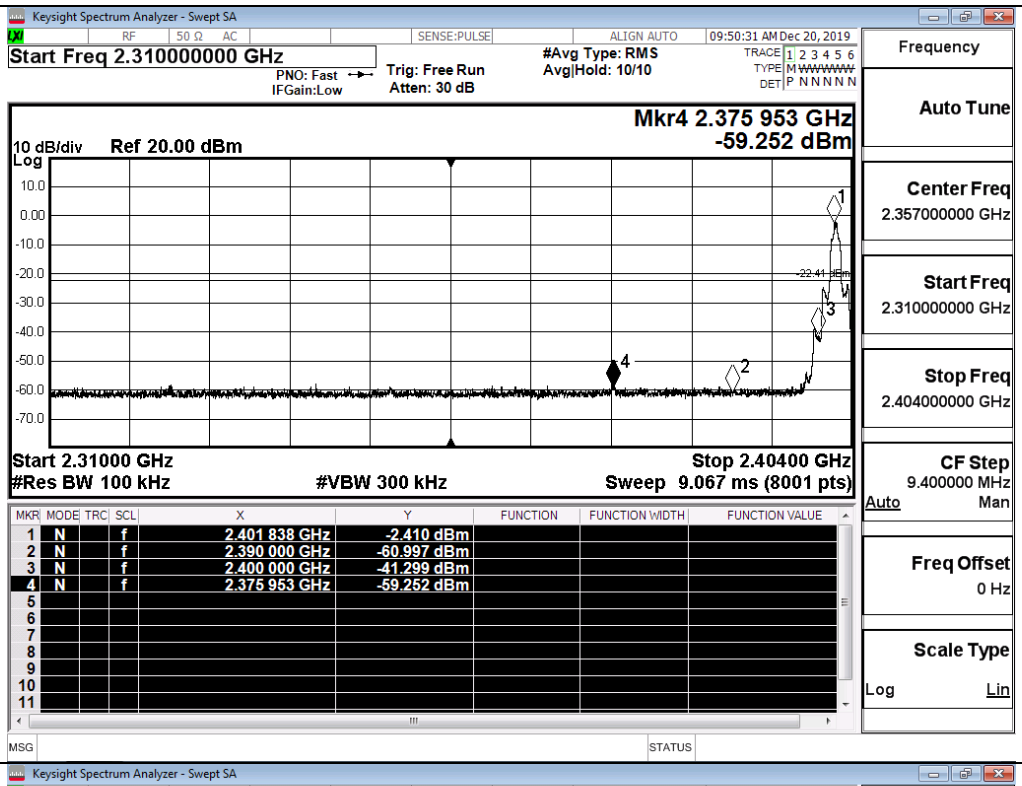
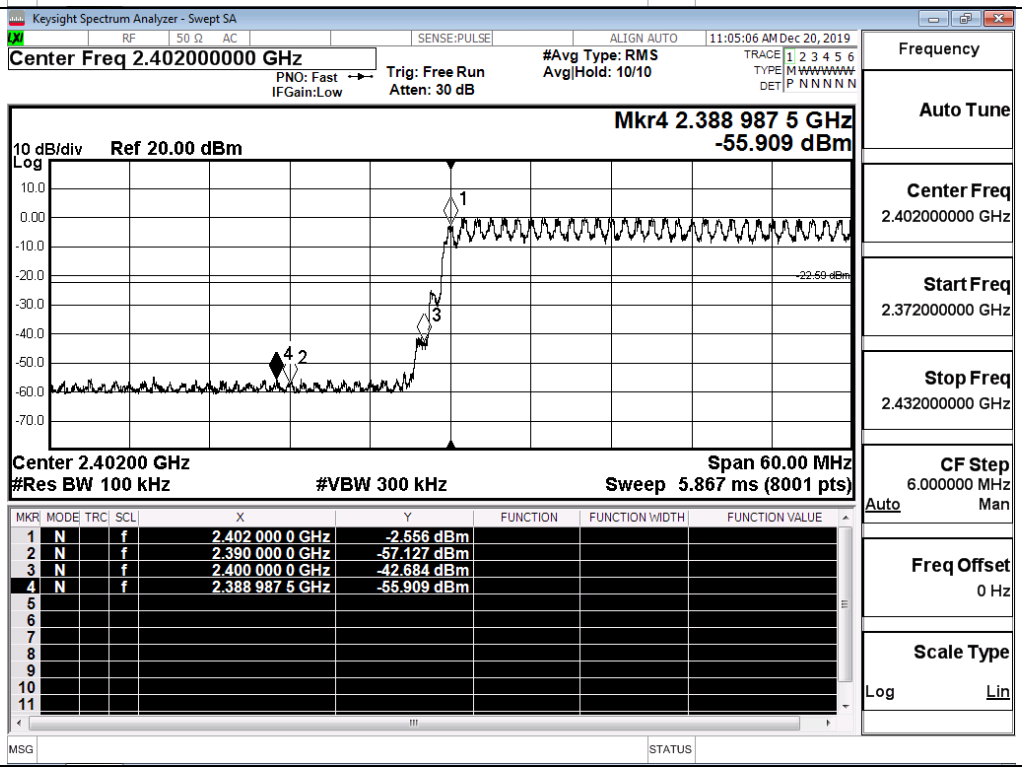


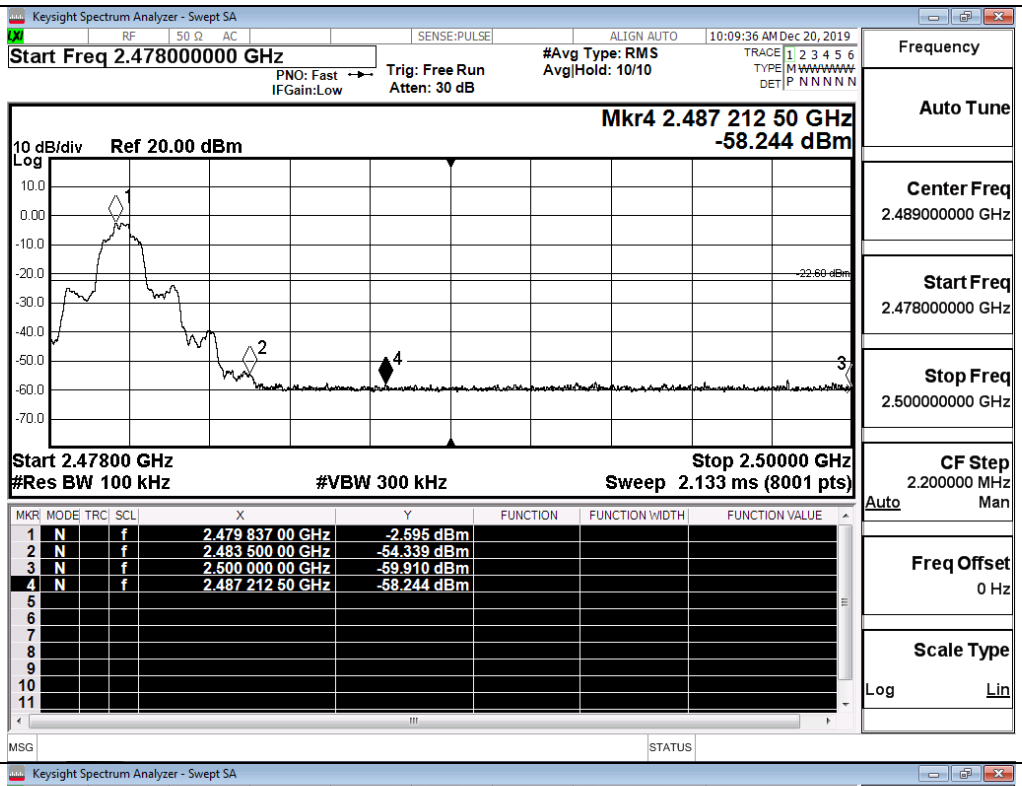
8DPSK/LCH/No Hop



8DPSK/LCH/Hop



8DPSK/HCH/No Hop



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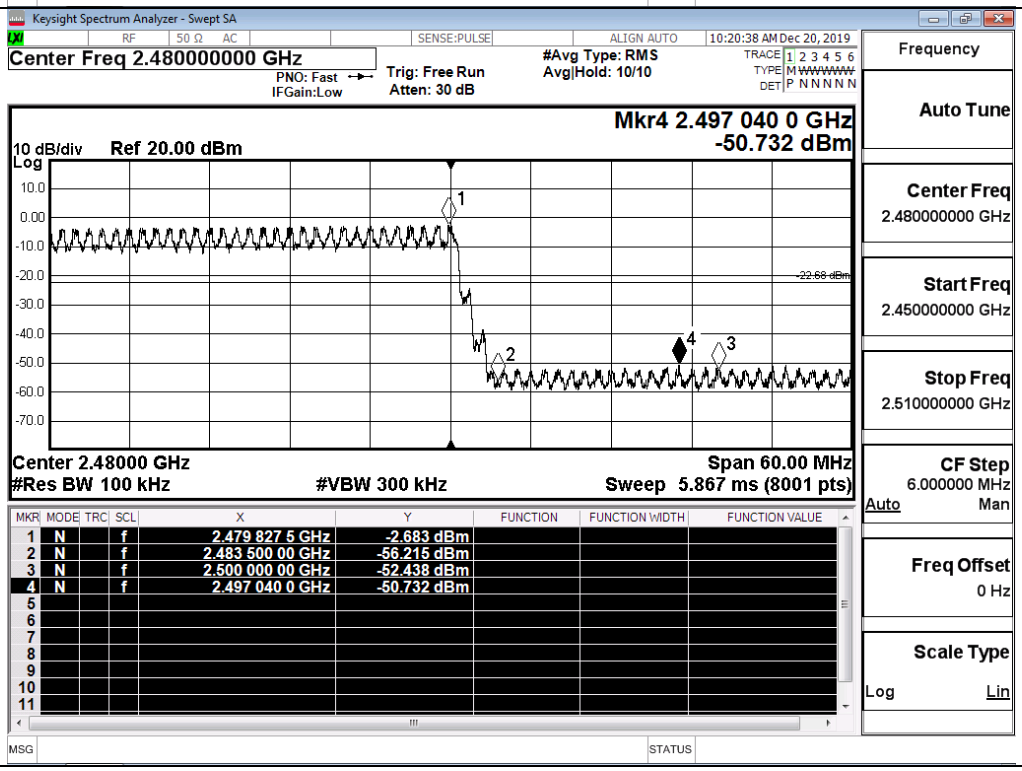
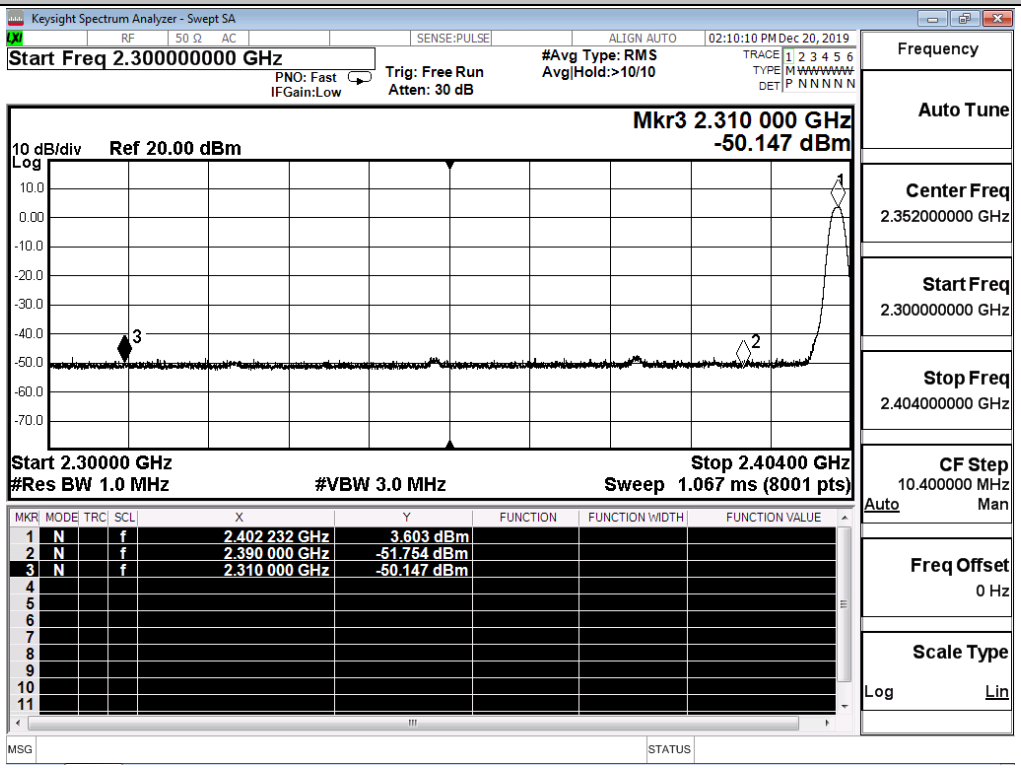


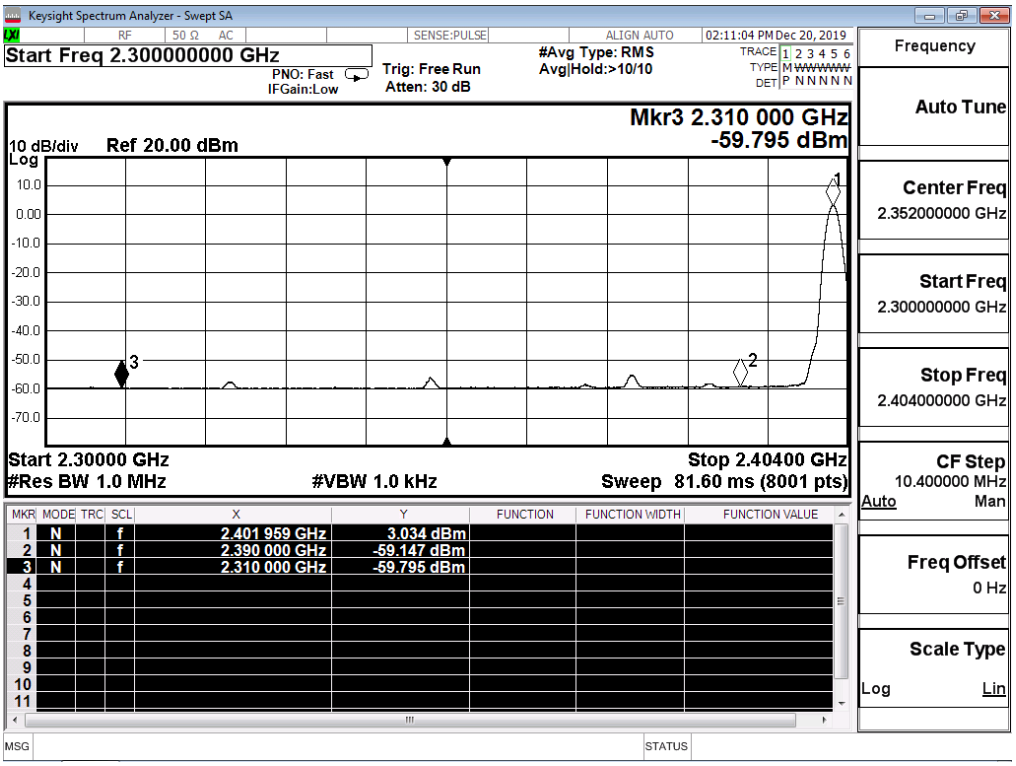
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-50.147	2.0	0	47.11	PEAK	74	PASS
	Off	2310.0	-59.795	2.0	0	37.47	AV	54	PASS
	Off	2390.0	-51.754	2.0	0	45.51	PEAK	74	PASS
	Off	2390.0	-59.147	2.0	0	38.11	AV	54	PASS
	Off	2483.5	-49.723	2.0	0	47.54	PEAK	74	PASS
	Off	2483.5	-56.831	2.0	0	40.43	AV	54	PASS
	Off	2500.0	-50.607	2.0	0	46.65	PEAK	74	PASS
	Off	2500.0	-58.617	2.0	0	38.64	AV	54	PASS
π/4DQPSK	Off	2310.0	-51.054	2.0	0	46.21	PEAK	74	PASS
	Off	2310.0	-59.898	2.0	0	37.36	AV	54	PASS
	Off	2390.0	-51.577	2.0	0	45.68	PEAK	74	PASS
	Off	2390.0	-59.361	2.0	0	37.90	AV	54	PASS
	Off	2483.5	-44.173	2.0	0	53.09	PEAK	74	PASS
	Off	2483.5	-54.816	2.0	0	42.44	AV	54	PASS
	Off	2500.0	-50.671	2.0	0	46.59	PEAK	74	PASS
	Off	2500.0	-58.899	2.0	0	38.36	AV	54	PASS
8DPSK	Off	2310.0	-52.504	2.0	0	44.76	PEAK	74	PASS
	Off	2310.0	-59.830	2.0	0	37.43	AV	54	PASS
	Off	2390.0	-51.219	2.0	0	46.04	PEAK	74	PASS
	Off	2390.0	-59.274	2.0	0	37.99	AV	54	PASS
	Off	2483.5	-44.222	2.0	0	53.04	PEAK	74	PASS
	Off	2483.5	-54.927	2.0	0	42.33	AV	54	PASS
	Off	2500.0	-50.245	2.0	0	47.02	PEAK	74	PASS
	Off	2500.0	-58.681	2.0	0	38.58	AV	54	PASS

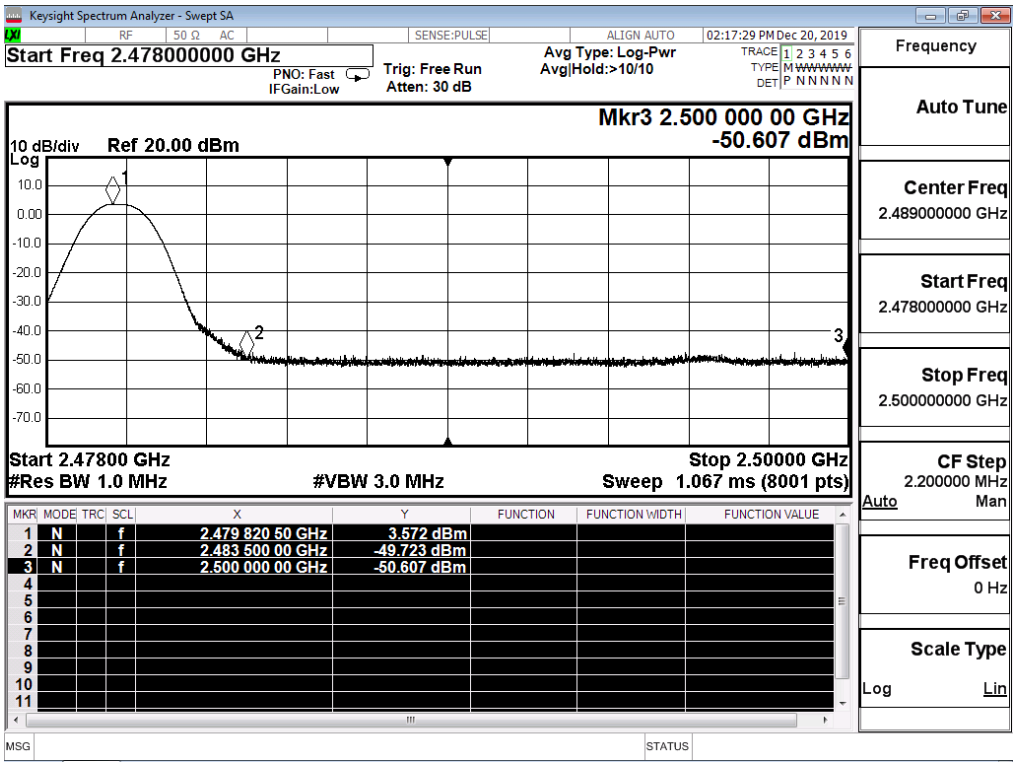
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



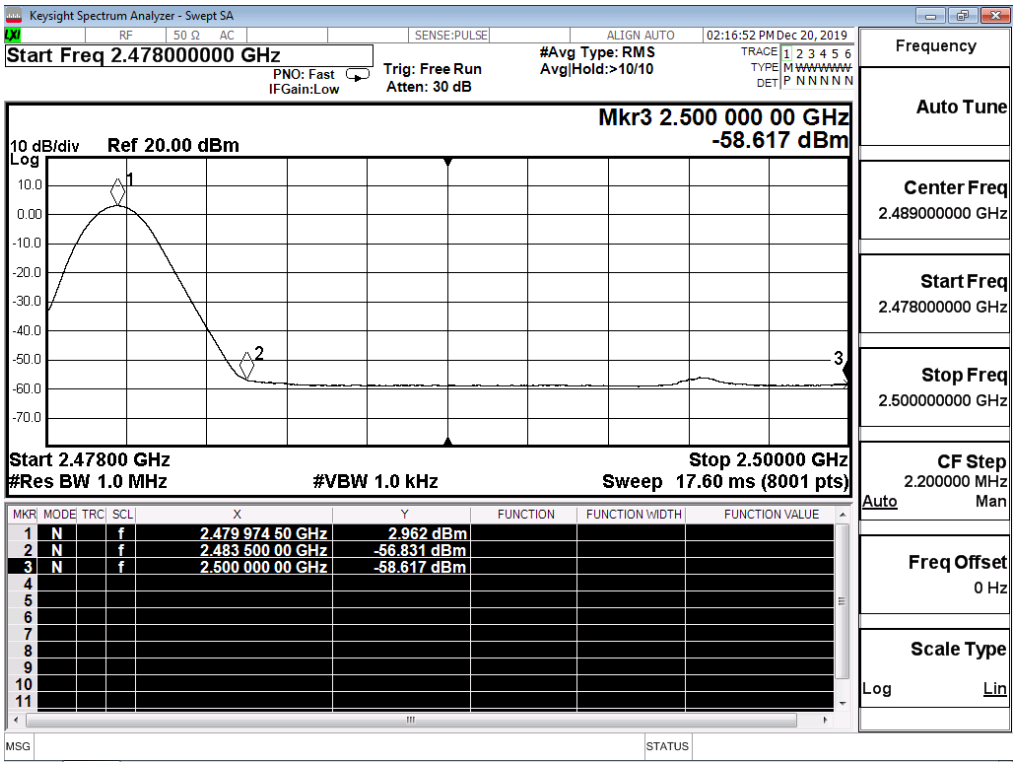
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



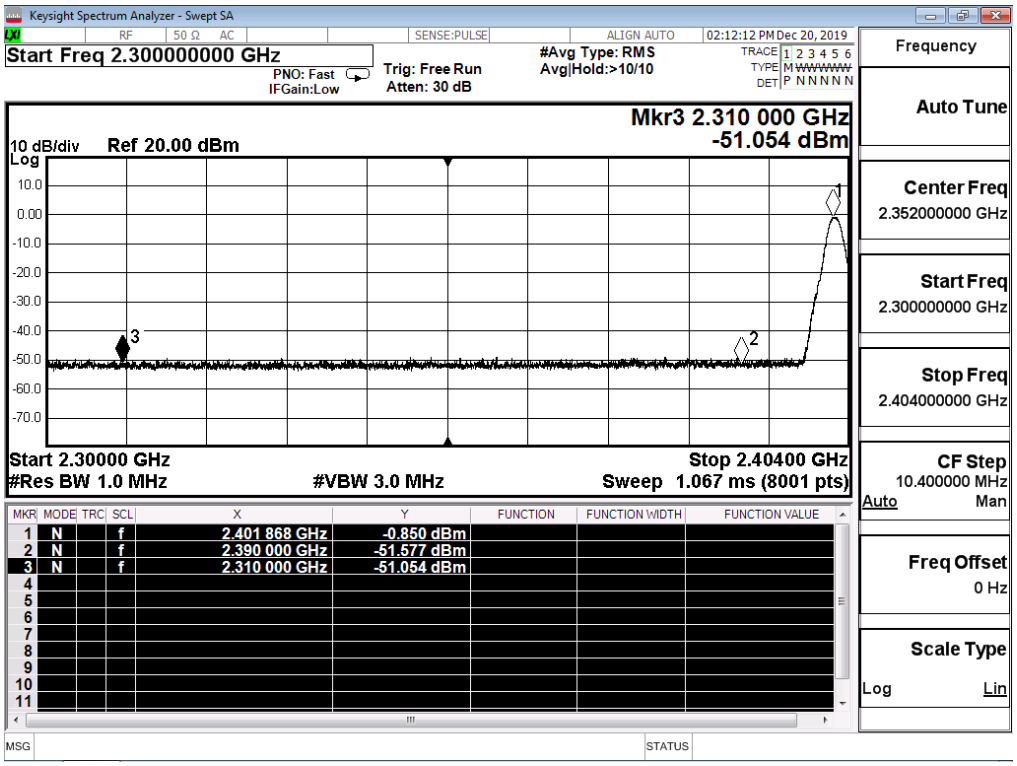
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



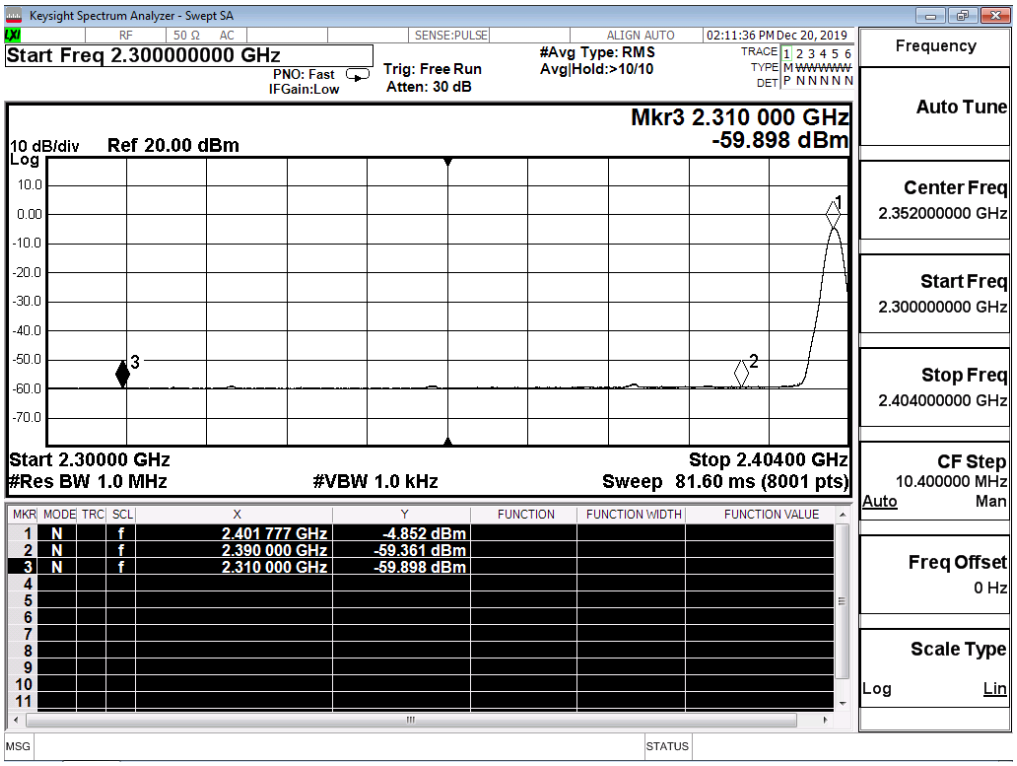
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



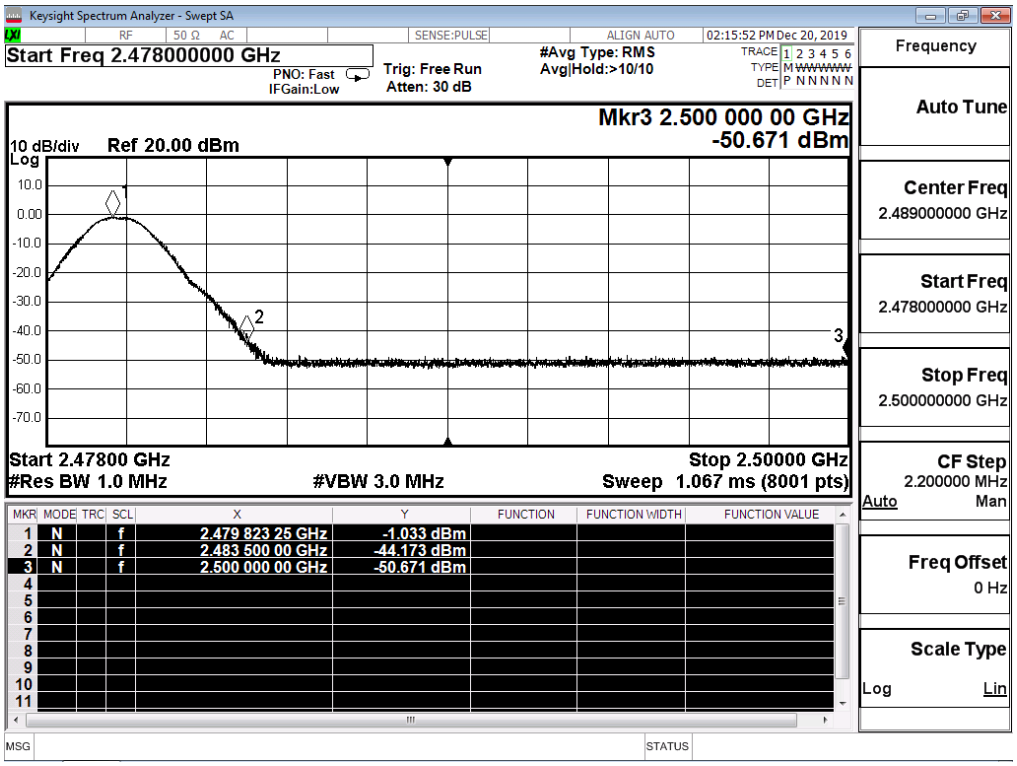
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



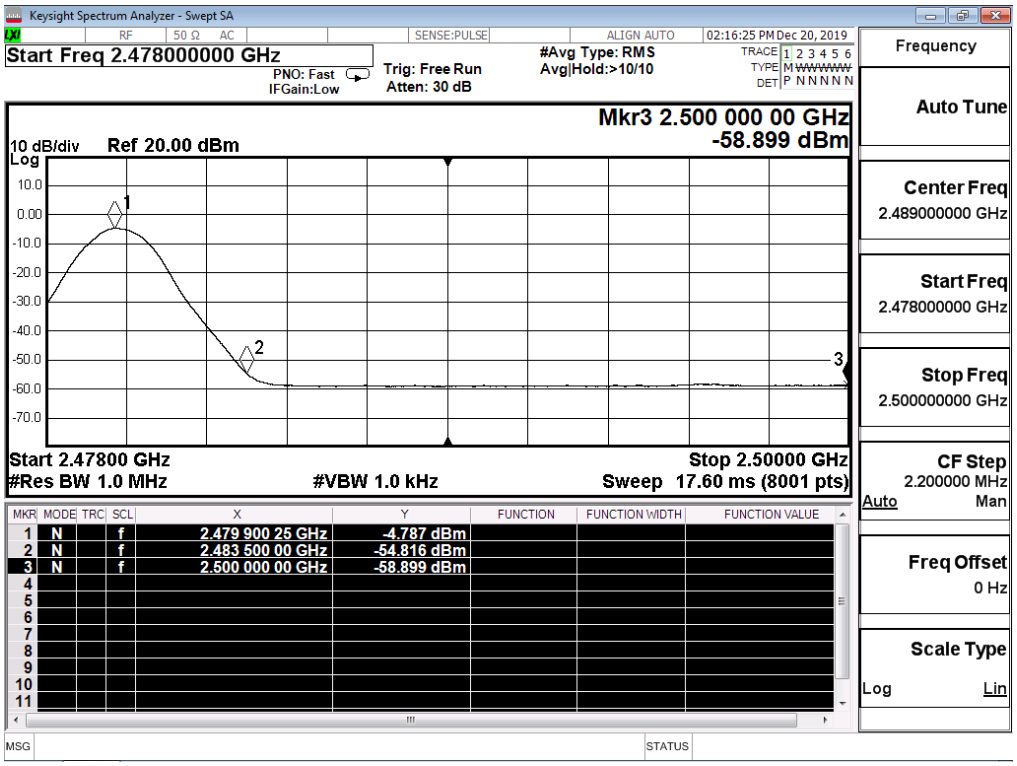
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



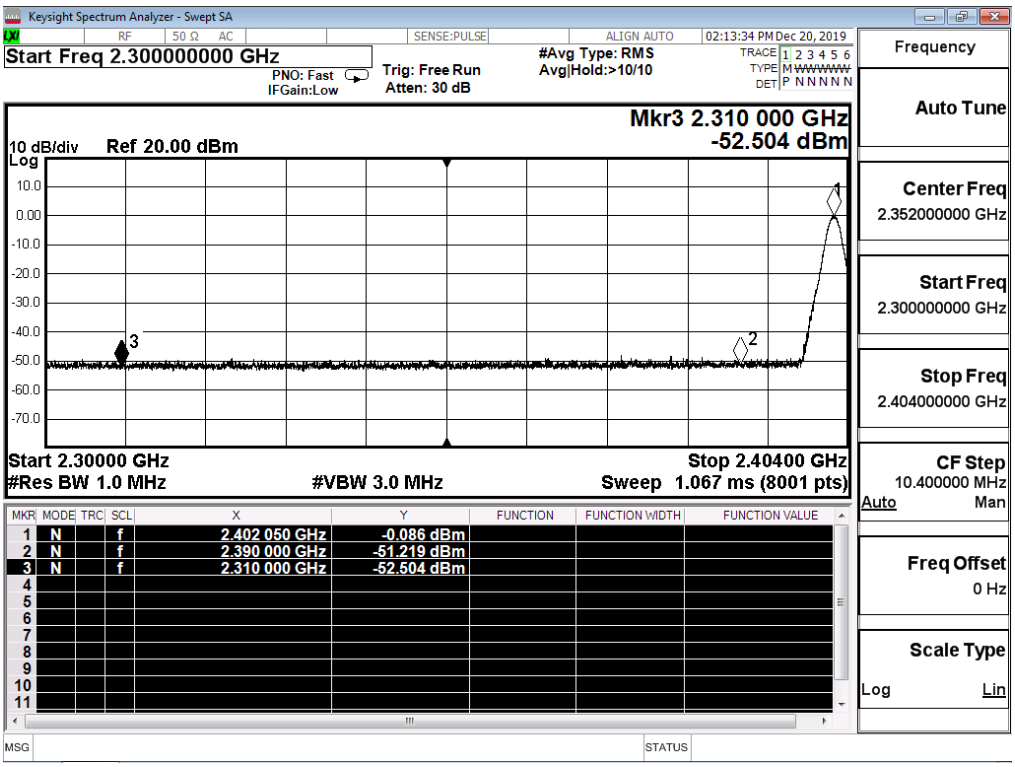
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



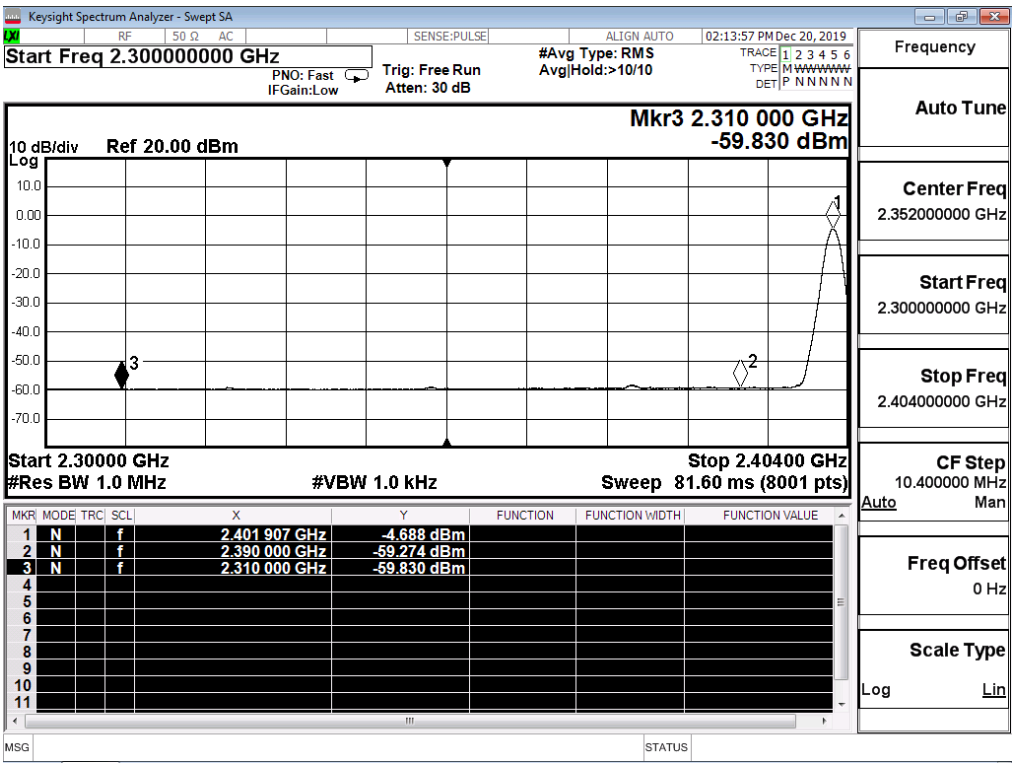
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



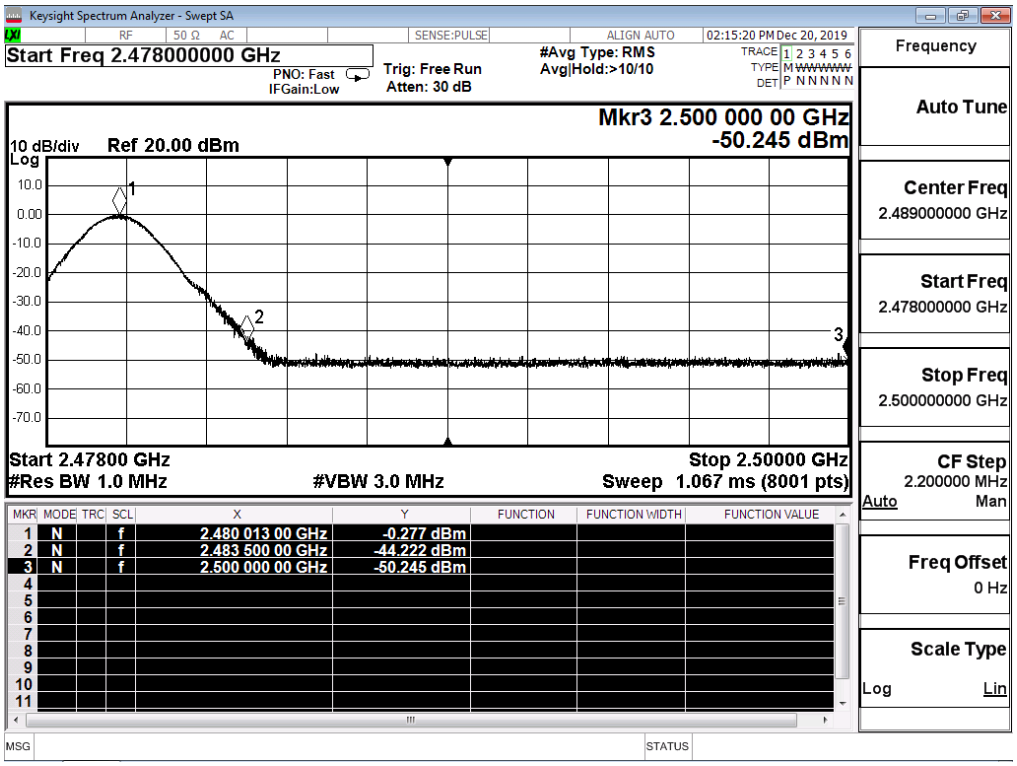
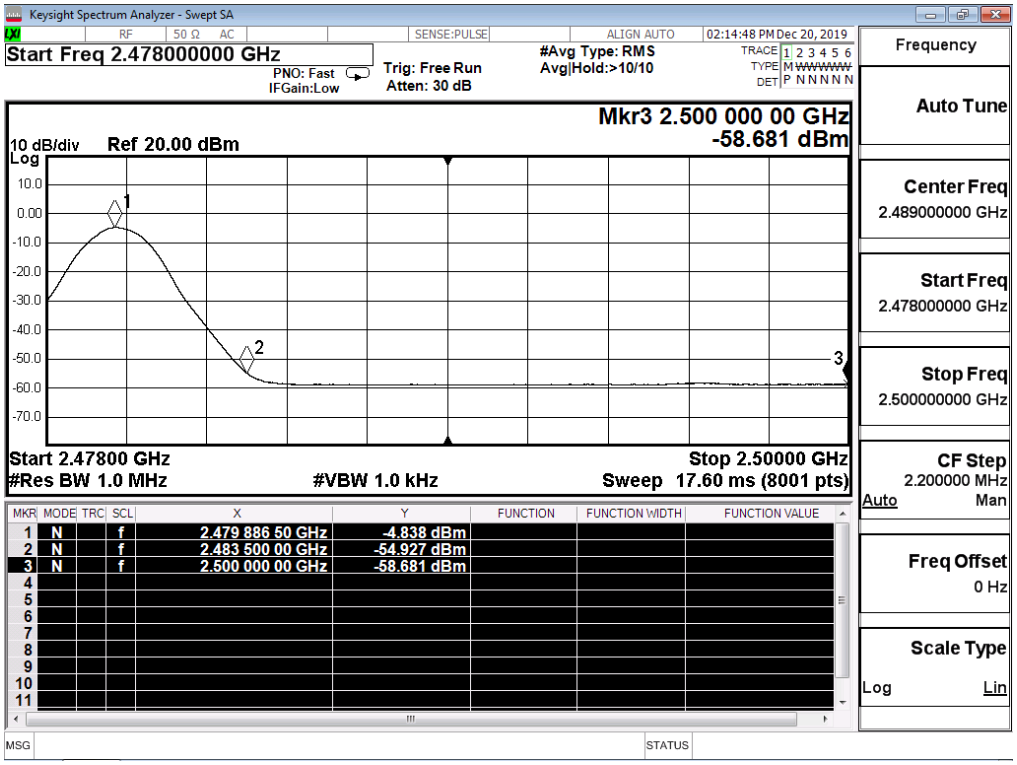
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



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