Appendix A

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

Product Name: Womb Music Bluetooth Controller by Wusic
Trade Mark: WUSIC
Test Model: WMBTCTL

Environmental Conditions

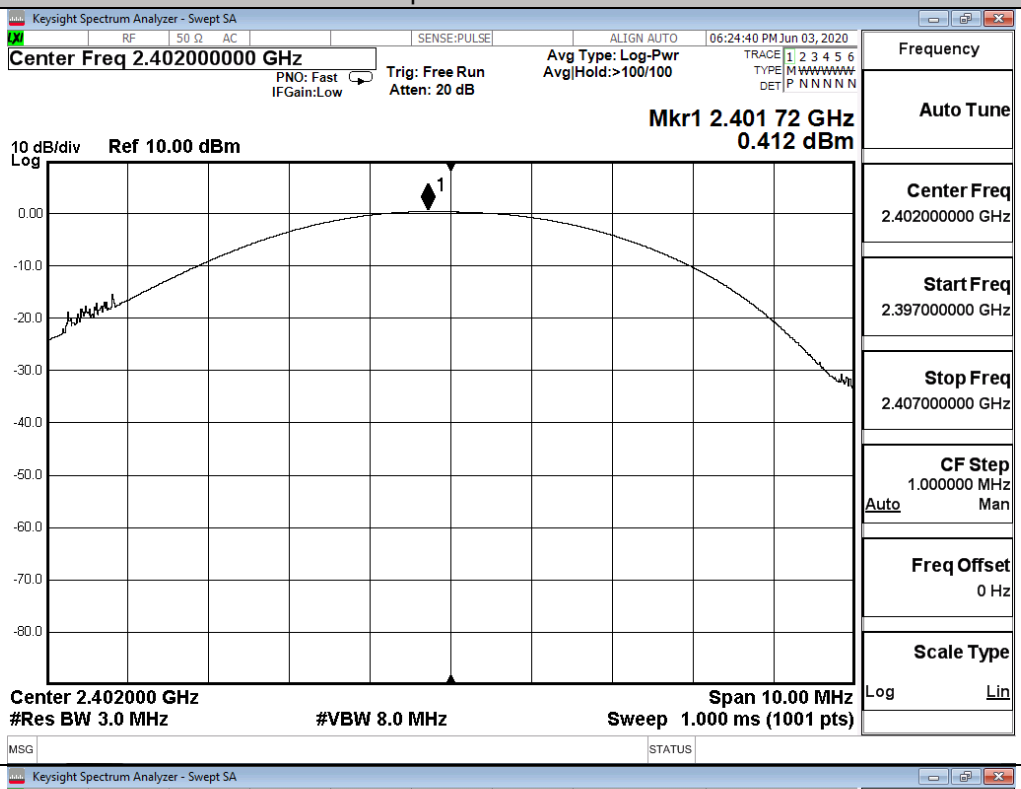
Temperature:	23.5 °C
Relative Humidity:	55%
ATM Pressure:	100.0 kPa
Test Engineer:	Tom Liu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

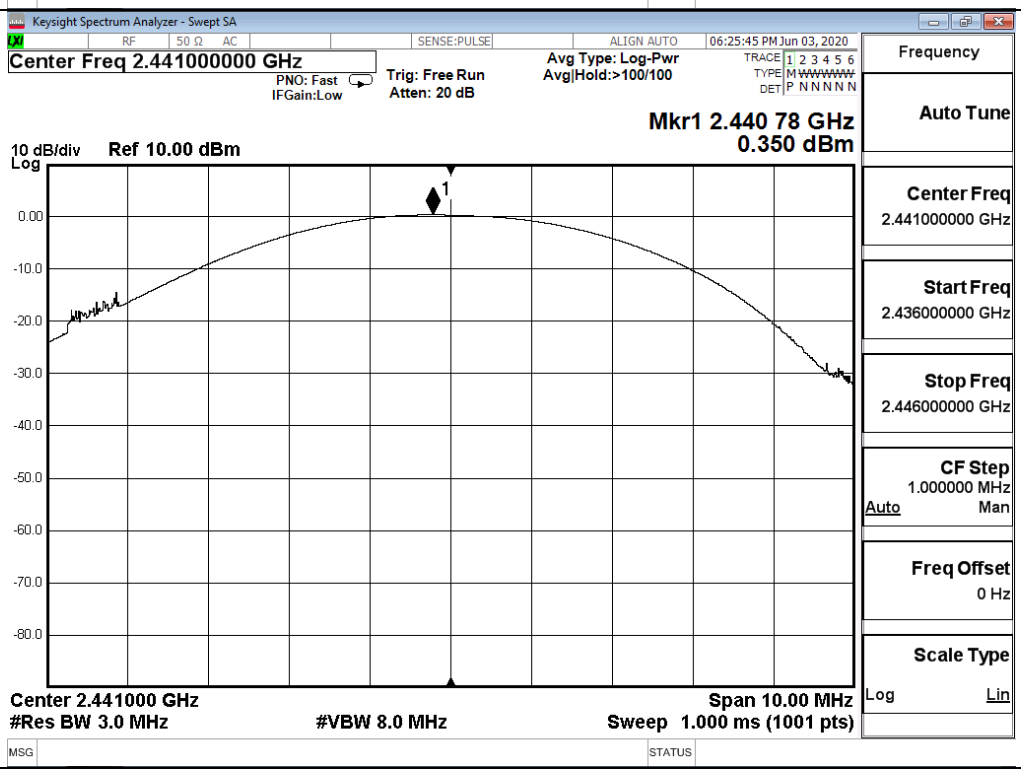
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.412	21	PASS
	MCH	0.350	21	PASS
	HCH	0.220	21	PASS
π/4DQPSK	LCH	0.976	21	PASS
	MCH	0.914	21	PASS
	HCH	0.813	21	PASS

Test Graphs

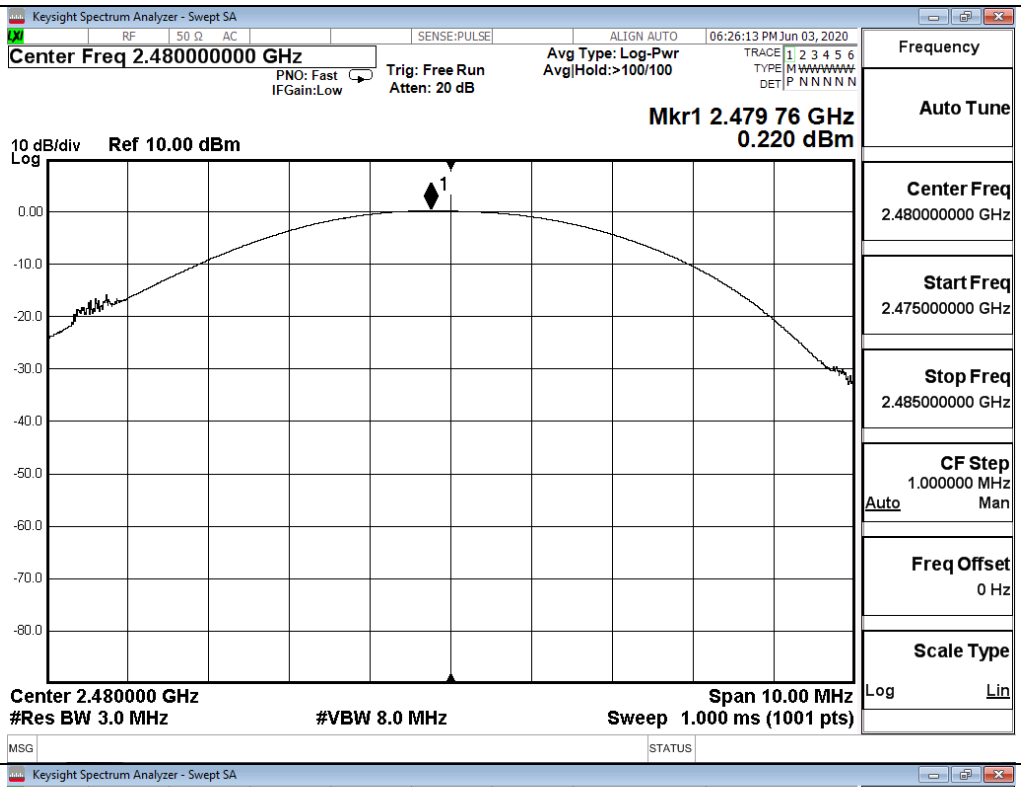
GFSK/LCH



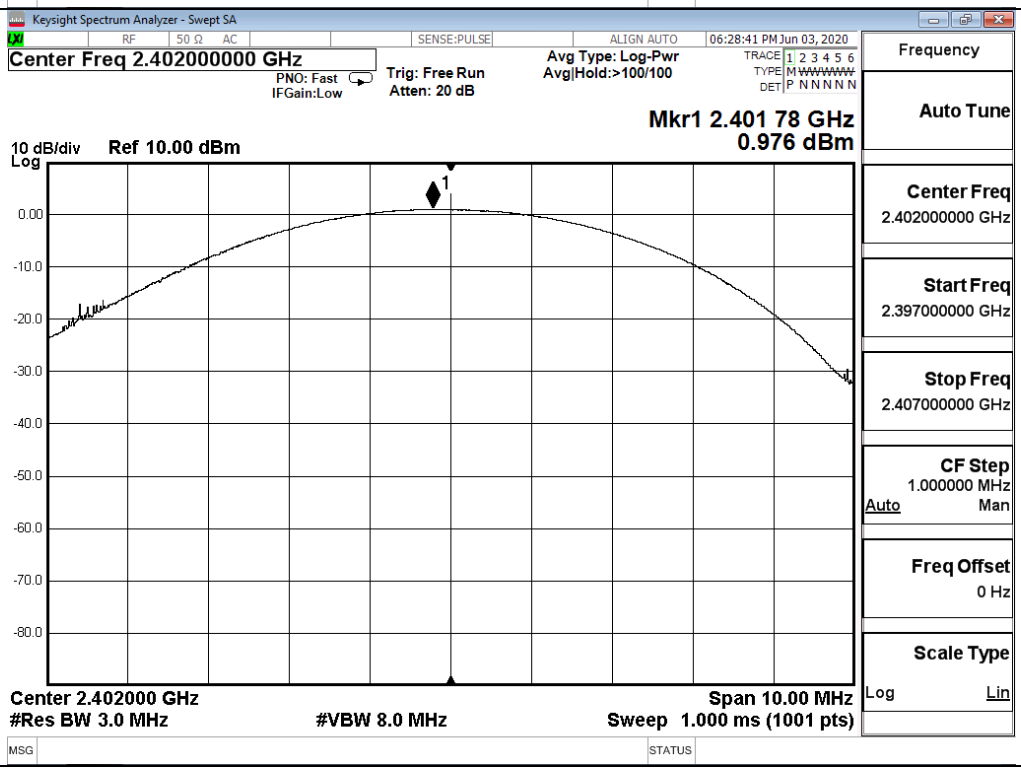
GFSK/MCH



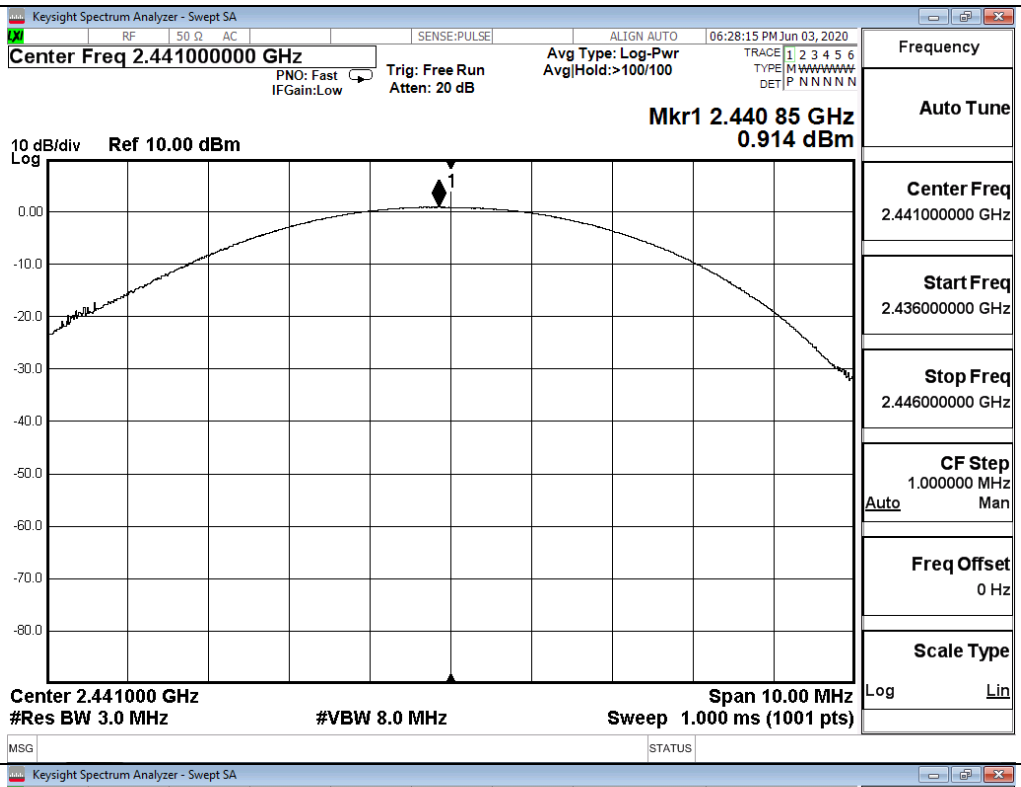
GFSK/HCH



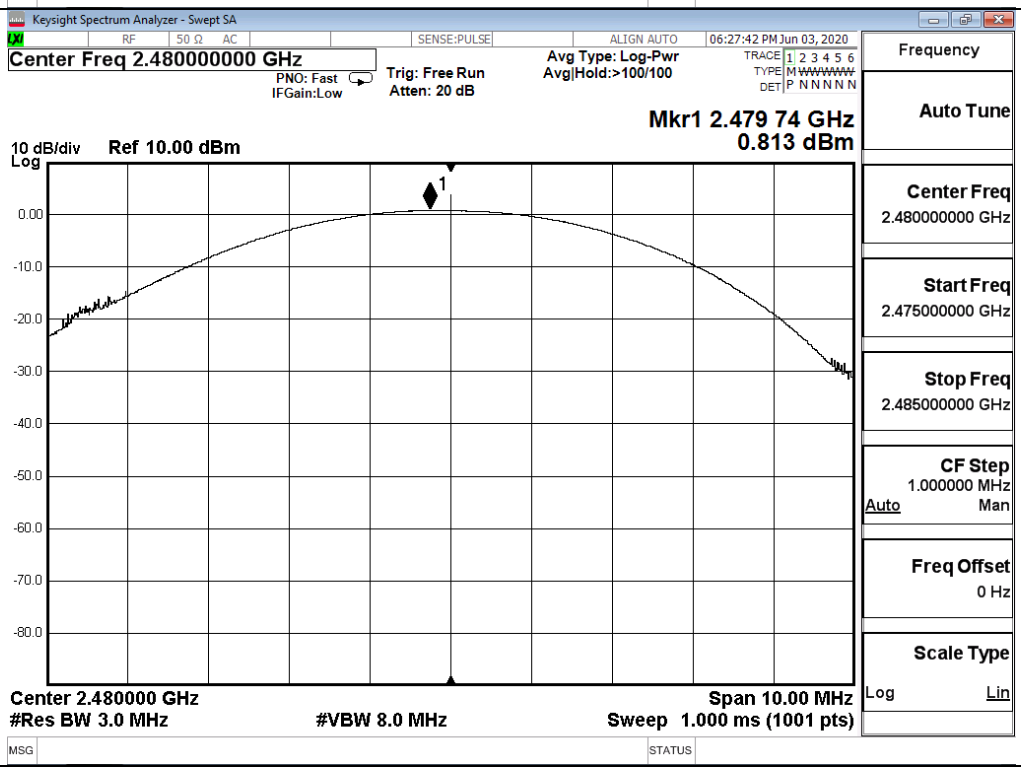
π/4DQPSK/LCH



π/4DQPSK/MCH

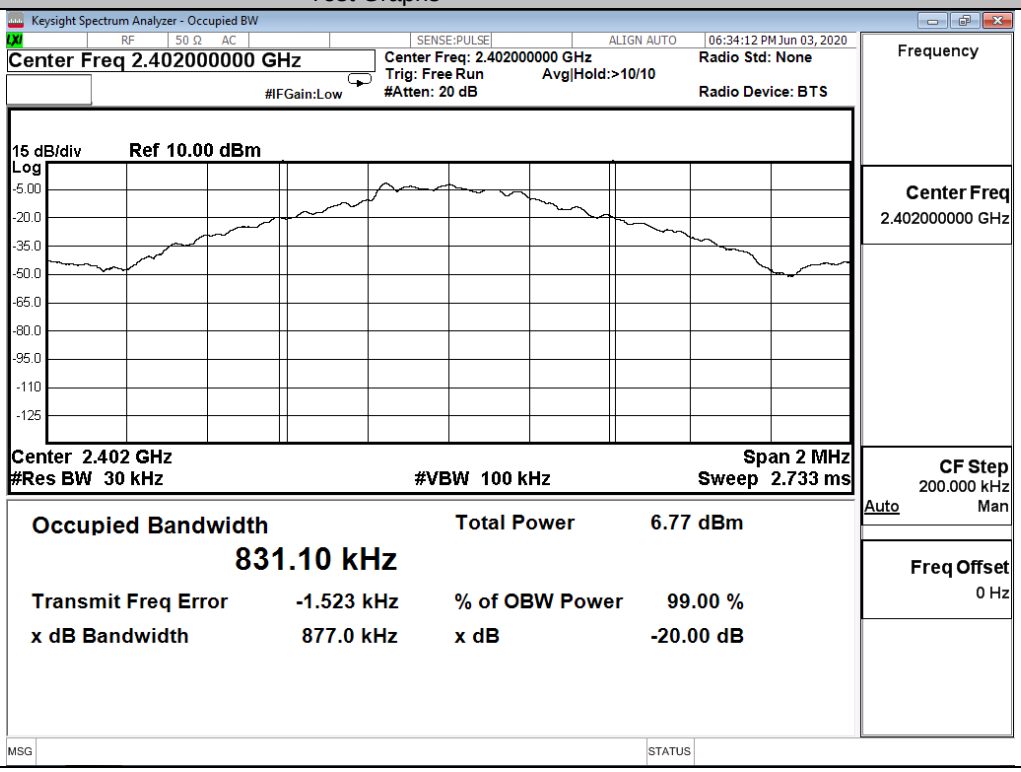


π/4DQPSK/HCH

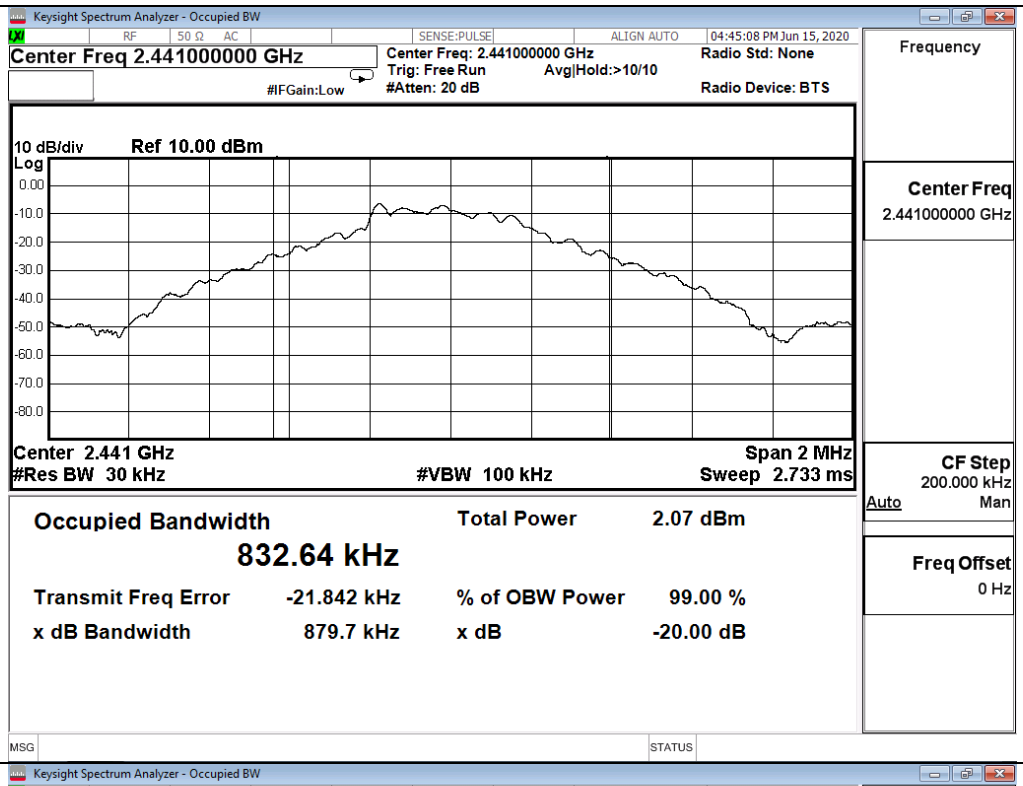


A.2 99% and 20dB Bandwidth

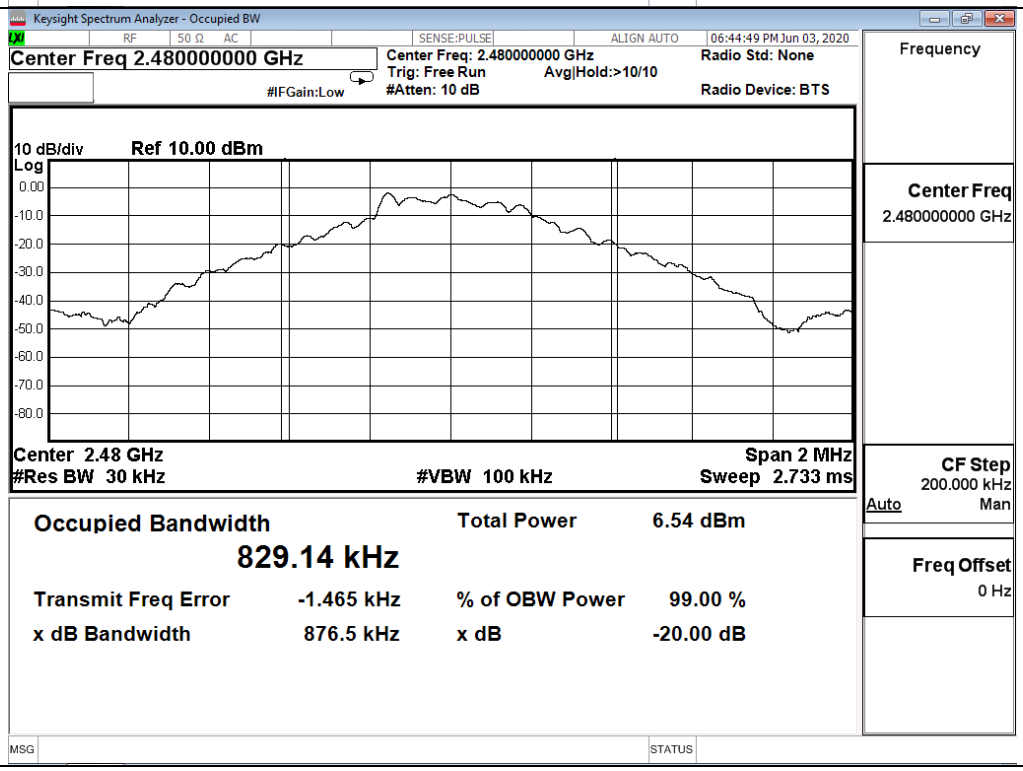
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.83110	0.8770	Not Specified	PASS
	MCH	0.83264	0.8797	Not Specified	PASS
	HCH	0.82914	0.8765	Not Specified	PASS
π/4DQPSK	LCH	1.1697	1.256	Not Specified	PASS
	MCH	1.1712	1.257	Not Specified	PASS
	HCH	1.1728	1.260	Not Specified	PASS

Test Graphs	
GFSK/LCH	

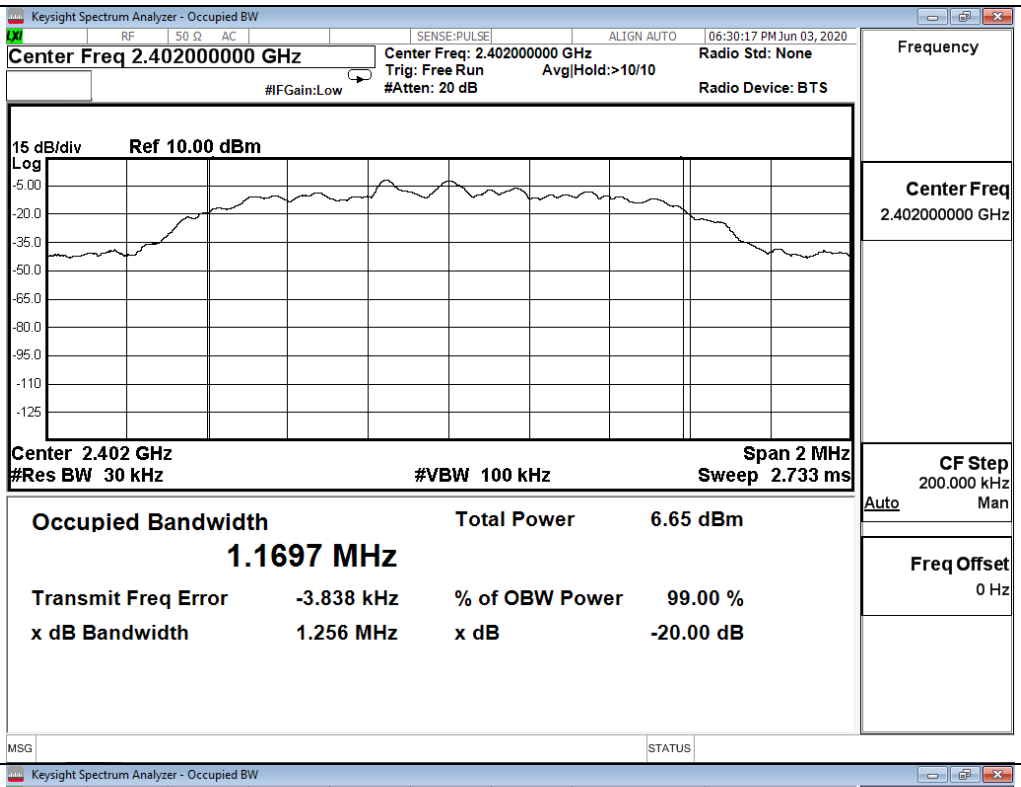
GFSK/MCH



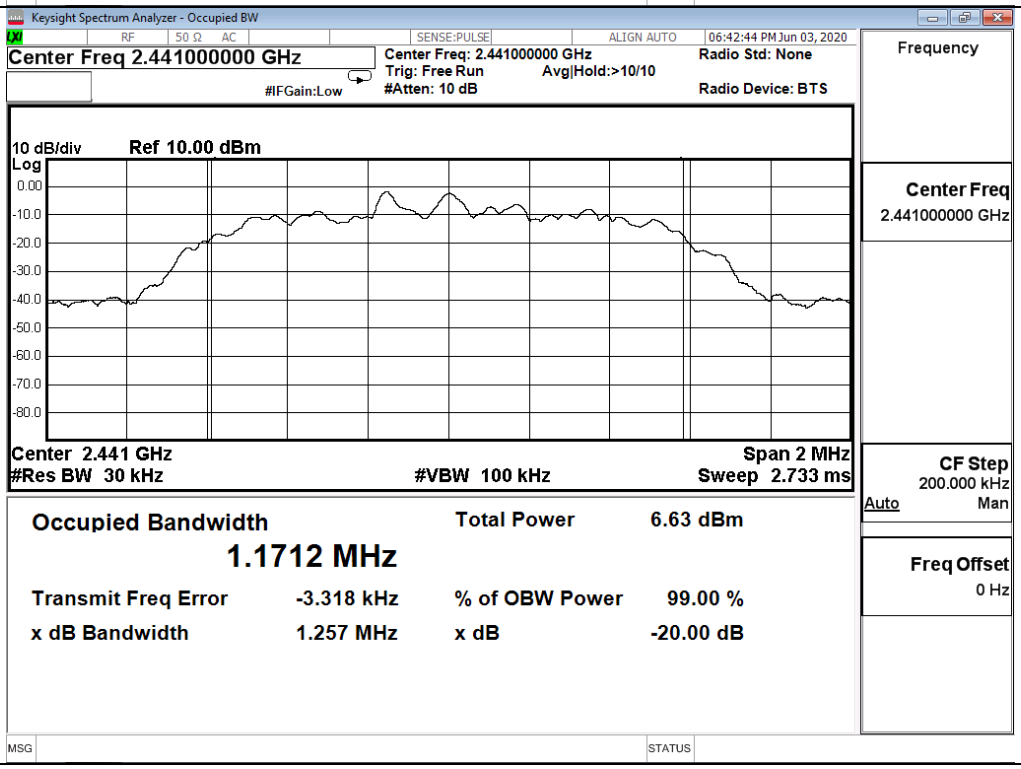
GFSK/HCH



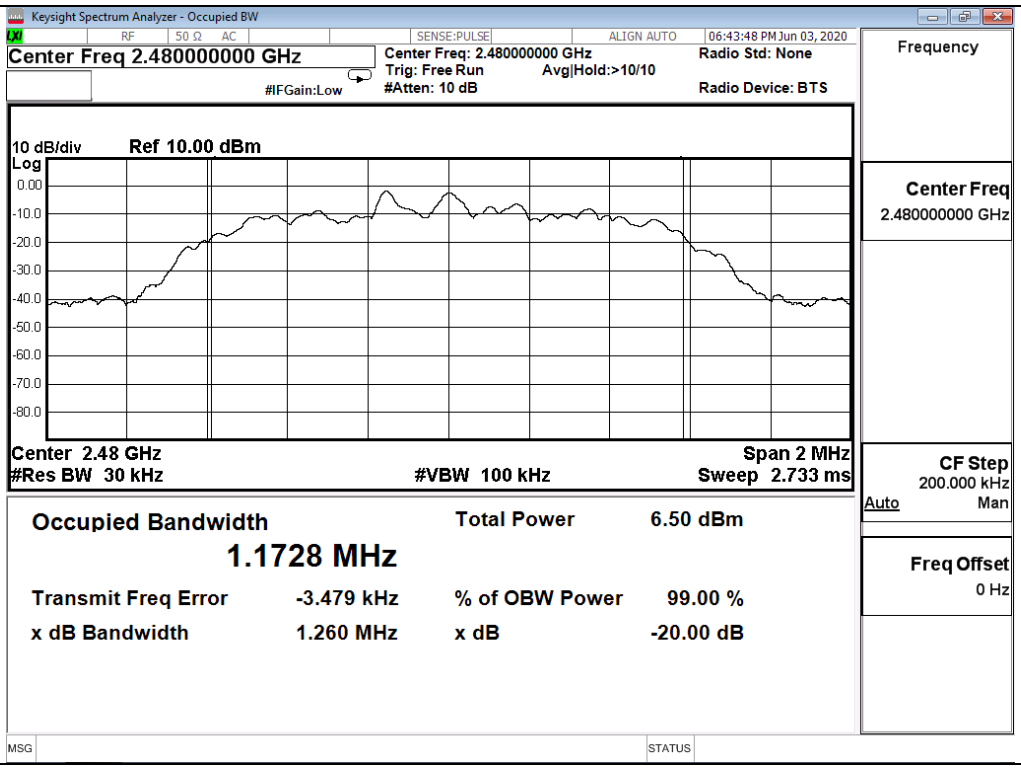
π/4DQPSK/LCH



π/4DQPSK/MCH

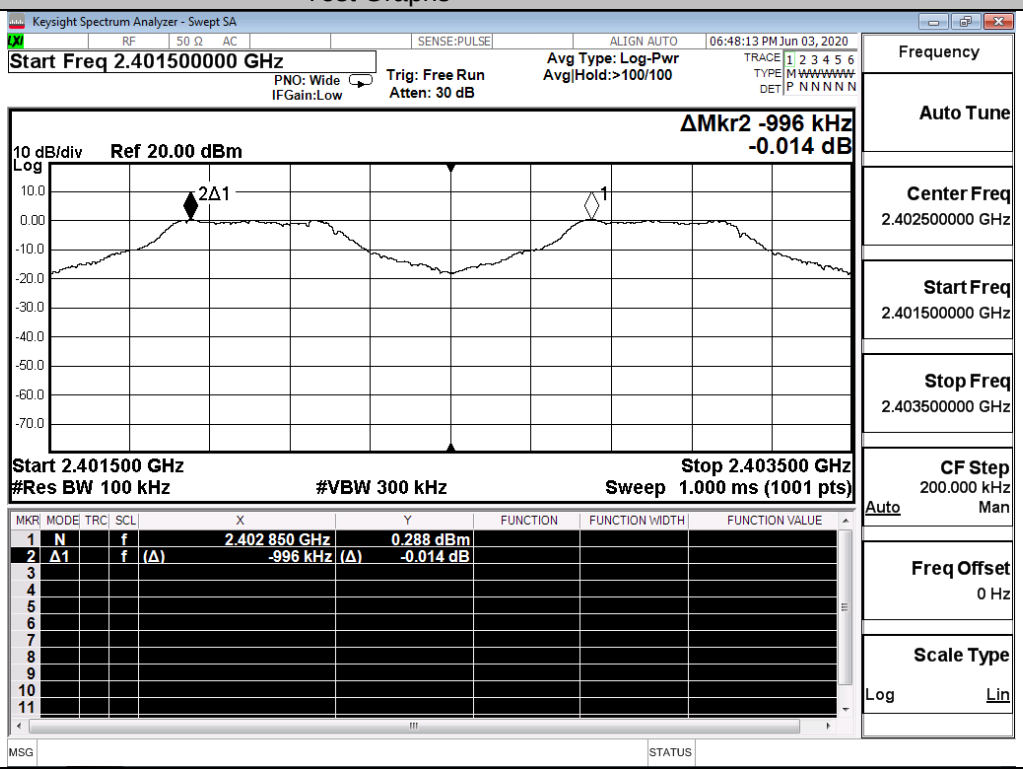


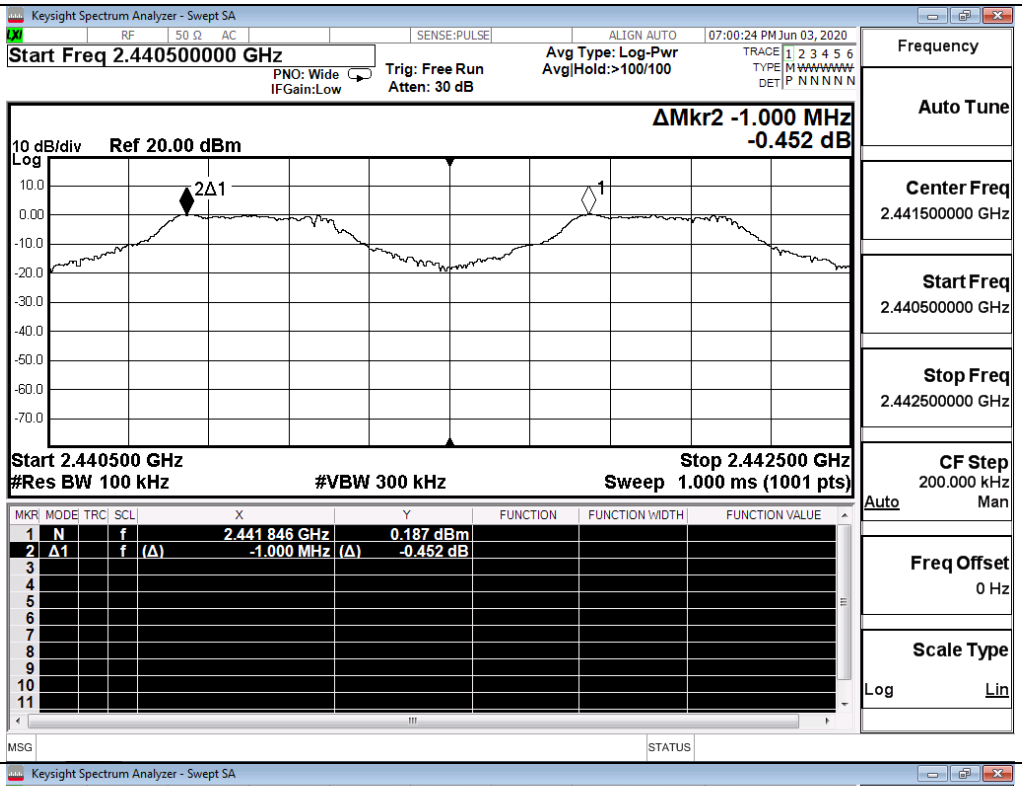
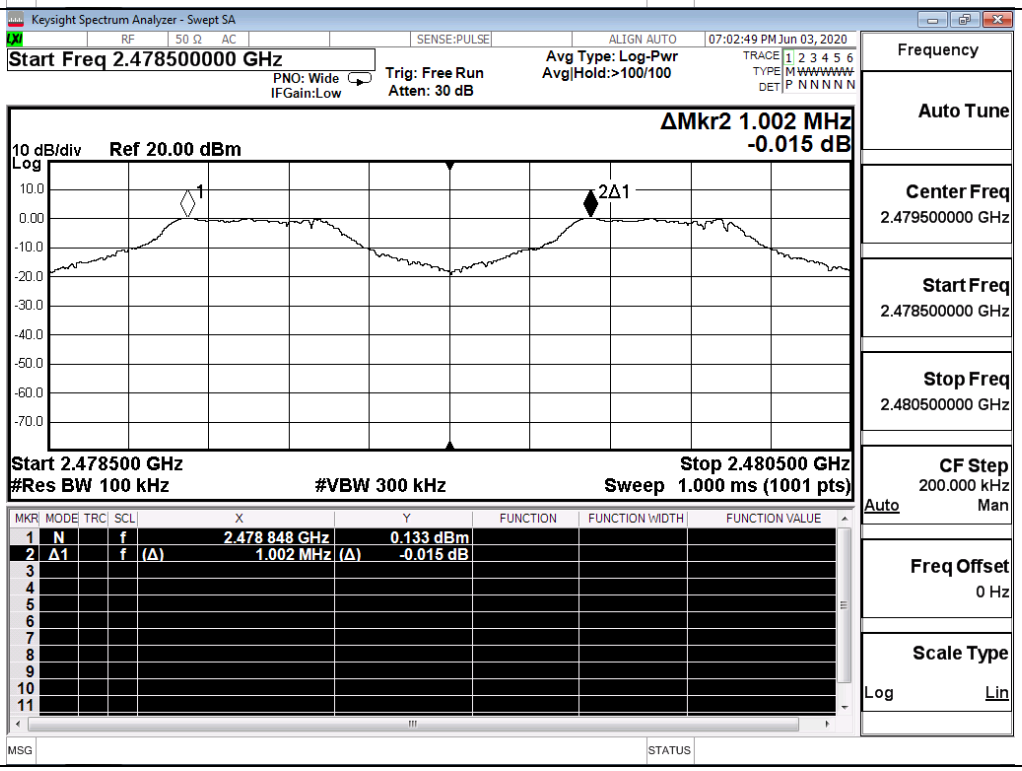
π/4DQPSK/HCH


Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:PULSE
ALIGN AUTO
06:43:48 PM Jun 03, 2020
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.733 ms
CF Step
200.000 kHz
Auto
Man
Occupied Bandwidth
1.1728 MHz
Total Power 6.50 dBm
Transmit Freq Error -3.479 kHz
% of OBW Power 99.00 %
x dB Bandwidth 1.260 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

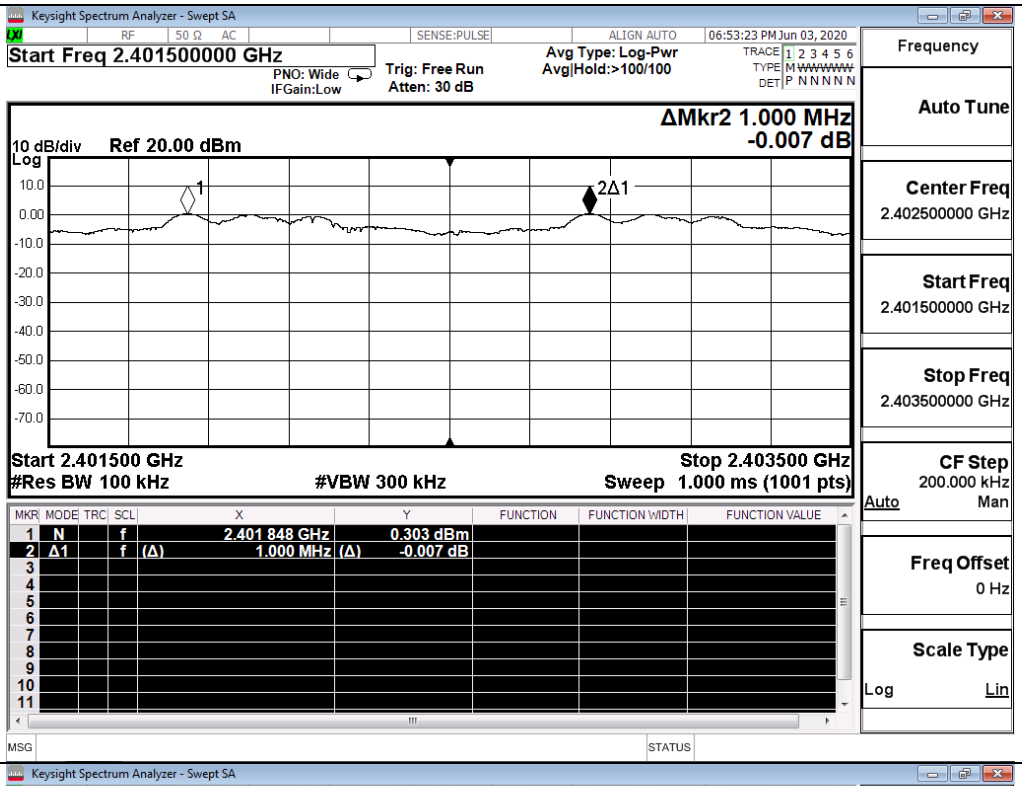
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.996	0.58	PASS
	MCH	1.000	0.59	PASS
	HCH	1.002	0.58	PASS
π/4DQPSK	LCH	1.000	0.84	PASS
	MCH	1.000	0.84	PASS
	HCH	1.000	0.84	PASS

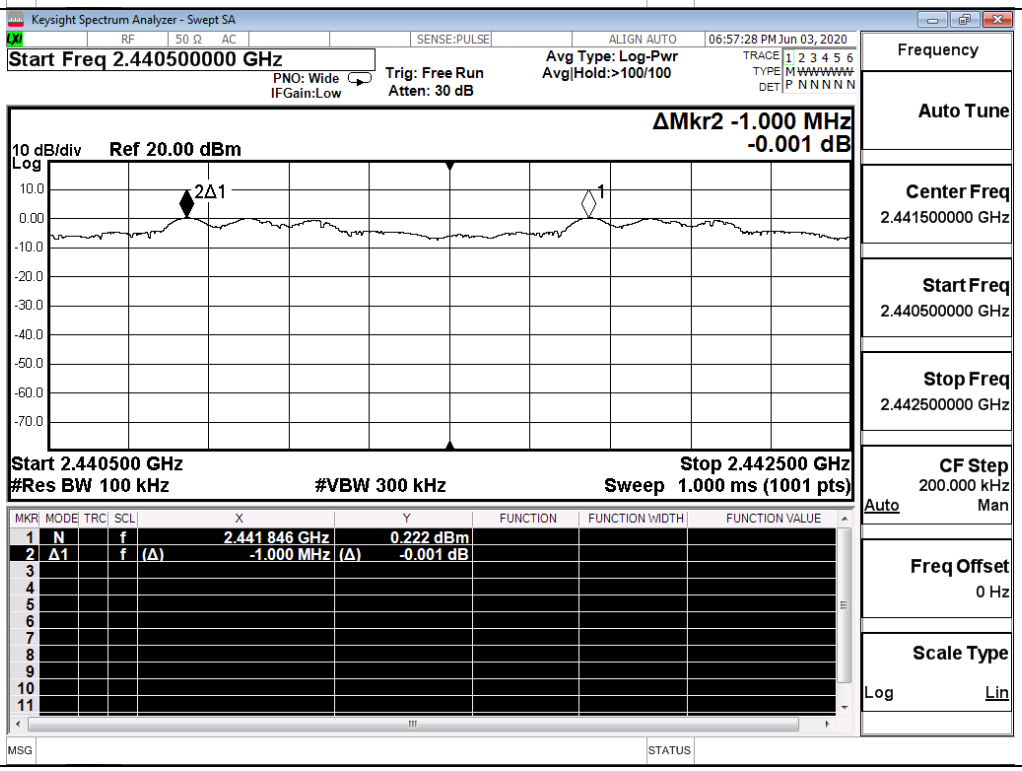
Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

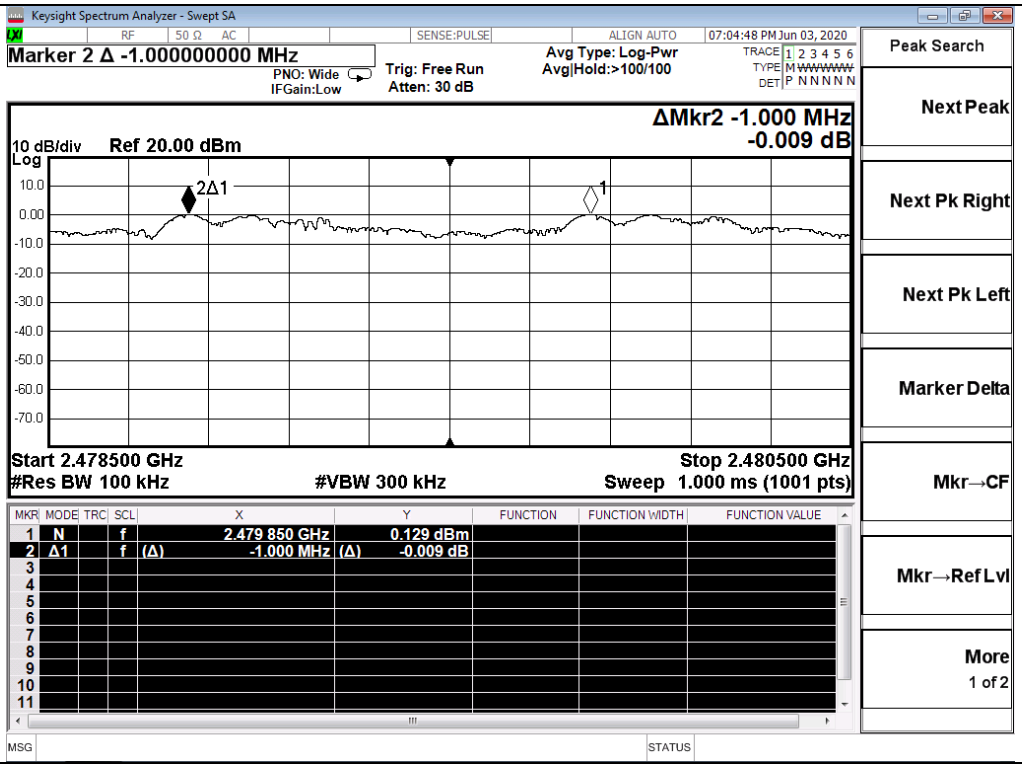
π/4DQPSK/LCH



π/4DQPSK/MCH

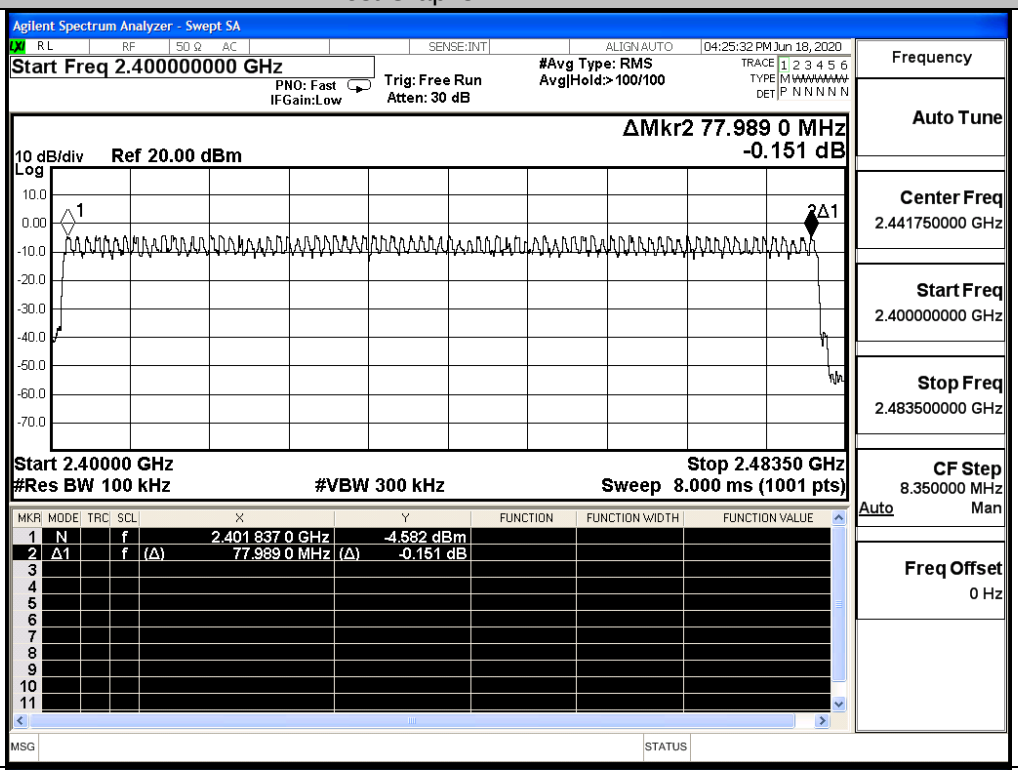
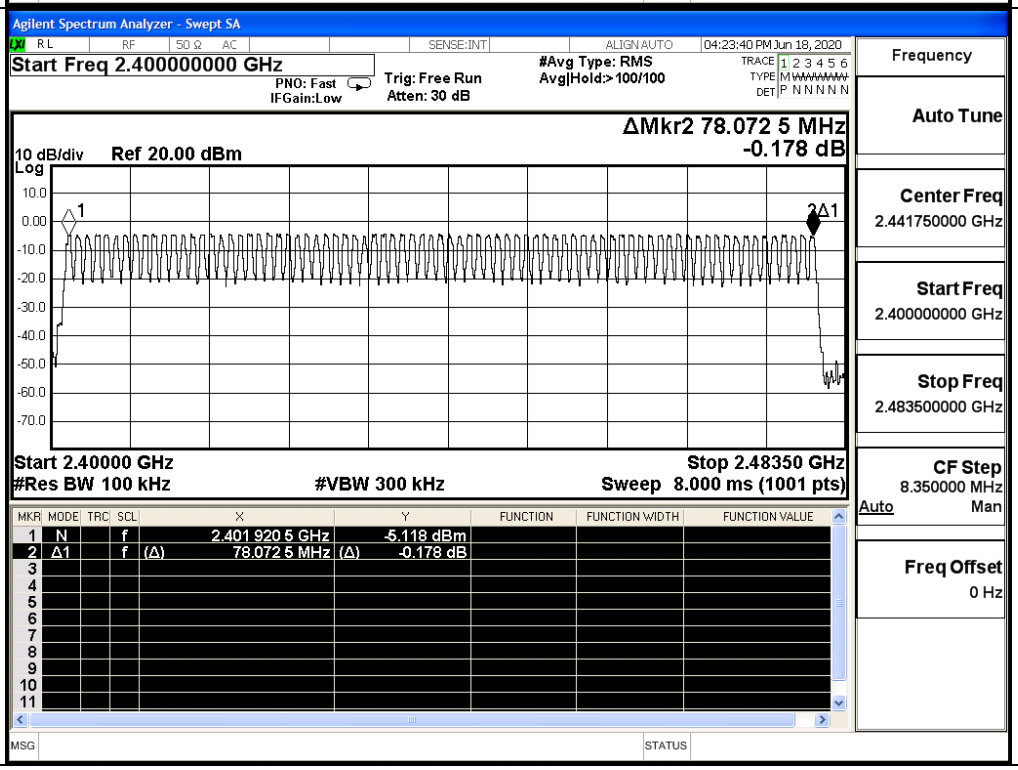


π/4DQPSK/HCH


Keysight Spectrum Analyzer - Swept SA
Marker 2 Δ -1.000000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
07:04:48 PM Jun 03, 2020
ΔMkr2 -1.000 MHz
-0.009 dB
10 dB/div Ref 20.00 dBm
Log
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.000 ms (1001 pts)
1 N f 2.479 850 GHz 0.129 dBm
2 Δ1 f (Δ) -1.000 MHz (Δ) -0.009 dB
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

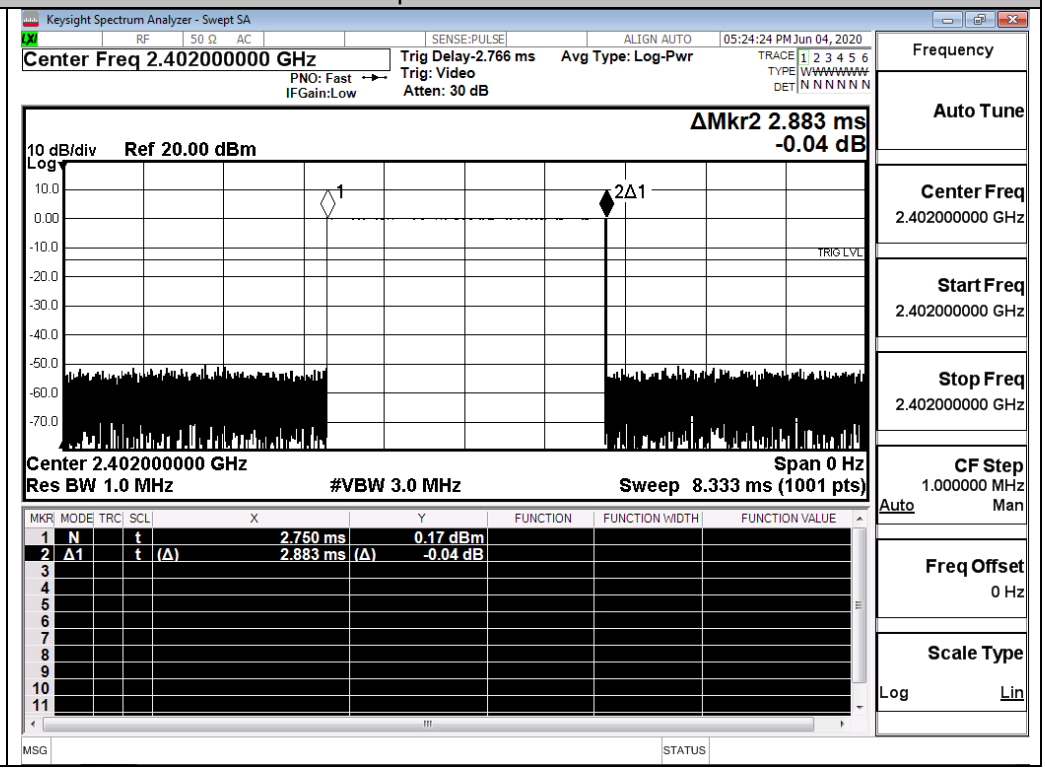
A.4 Hopping Channel Number

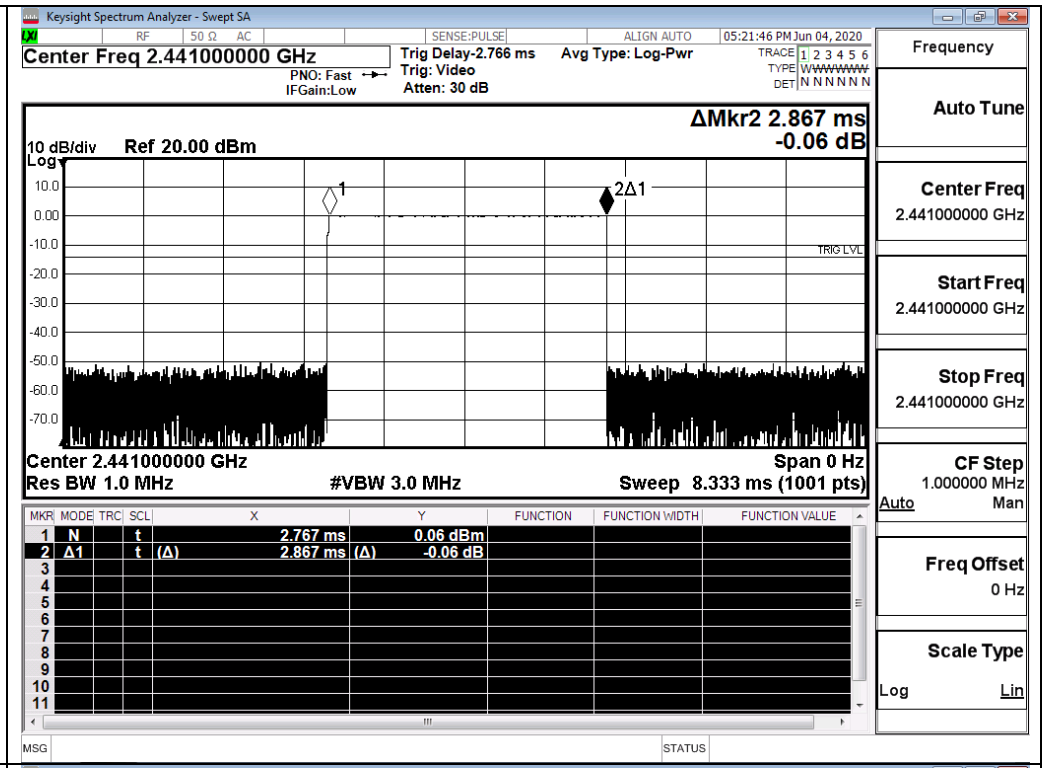
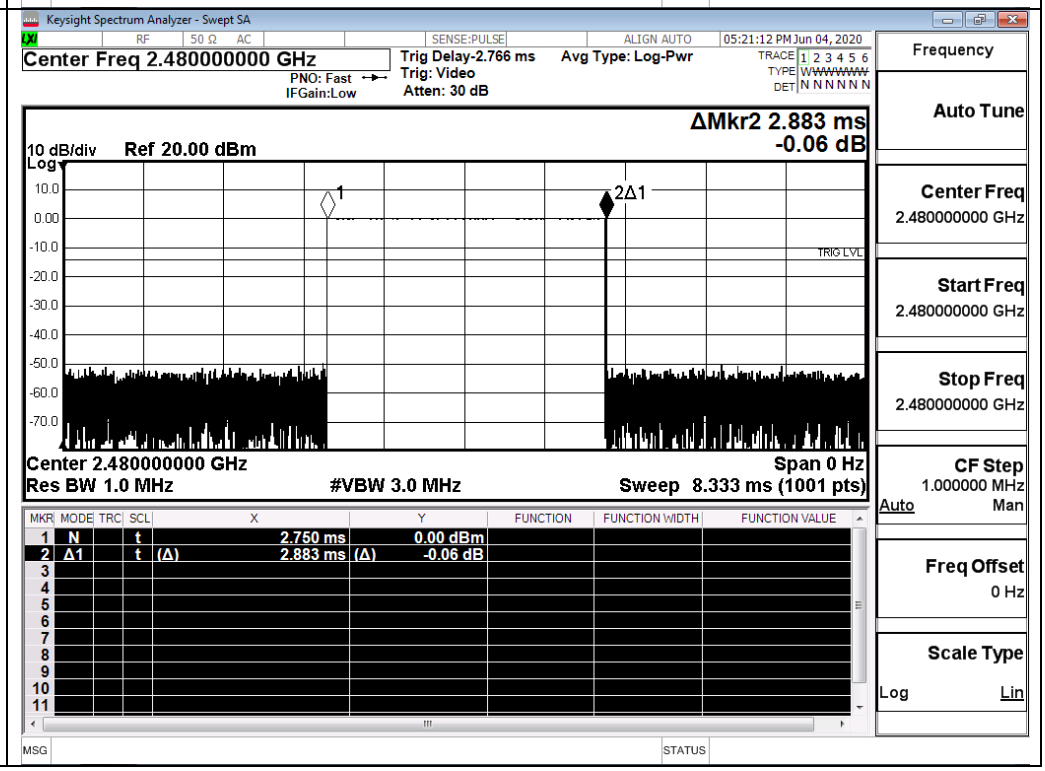
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS

Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

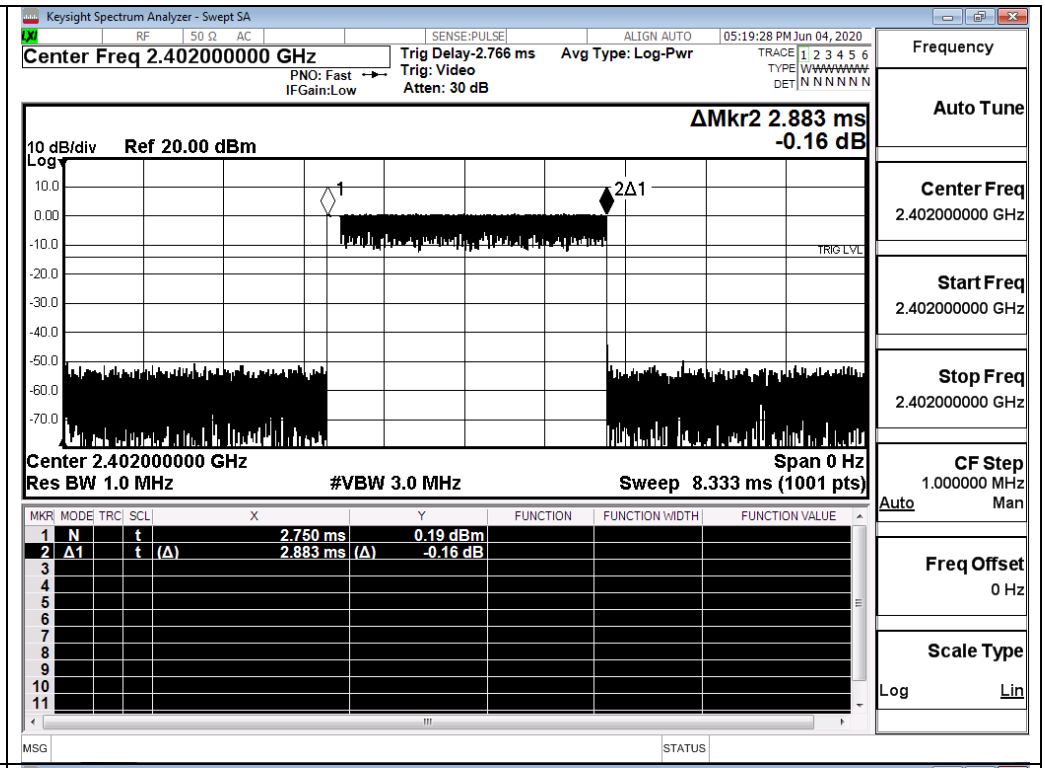
A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.883	106.7	0.31	0.4	PASS
	DH5	MCH	2.867	106.7	0.31	0.4	PASS
	DH5	HCH	2.883	106.7	0.31	0.4	PASS
π/4DQPSK	2DH5	LCH	2.883	106.7	0.31	0.4	PASS
	2DH5	MCH	2.883	106.7	0.31	0.4	PASS
	2DH5	HCH	2.883	106.7	0.31	0.4	PASS

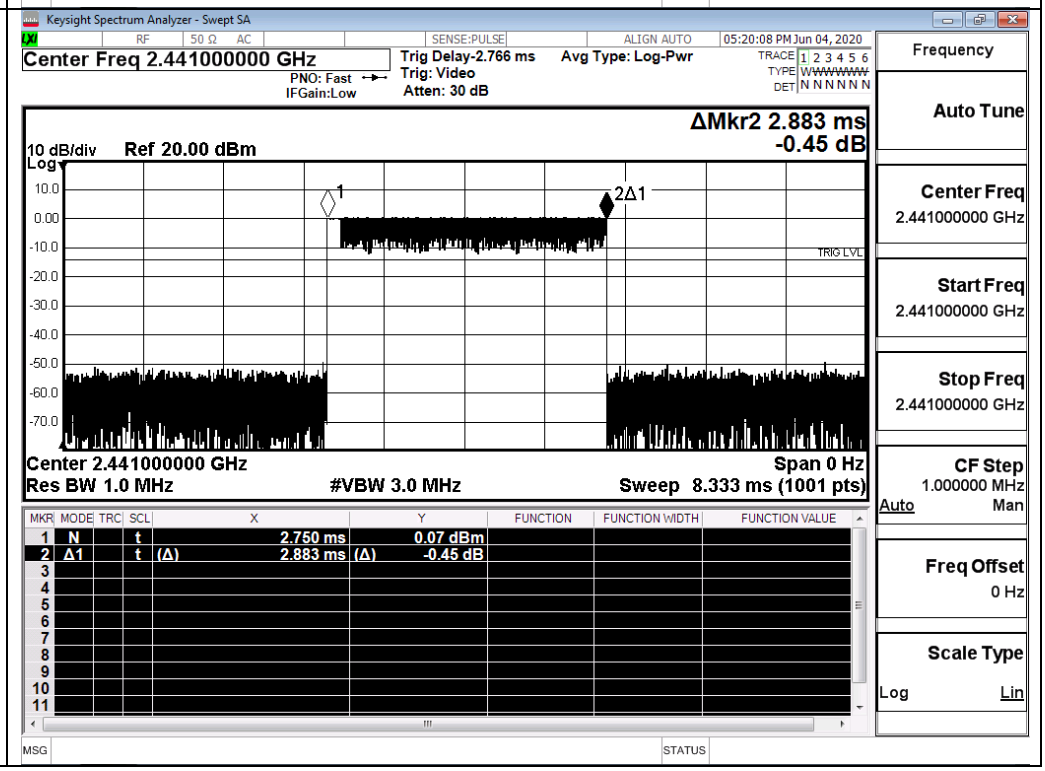
Test Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

π/4DQPSK
_2DH5/LCH

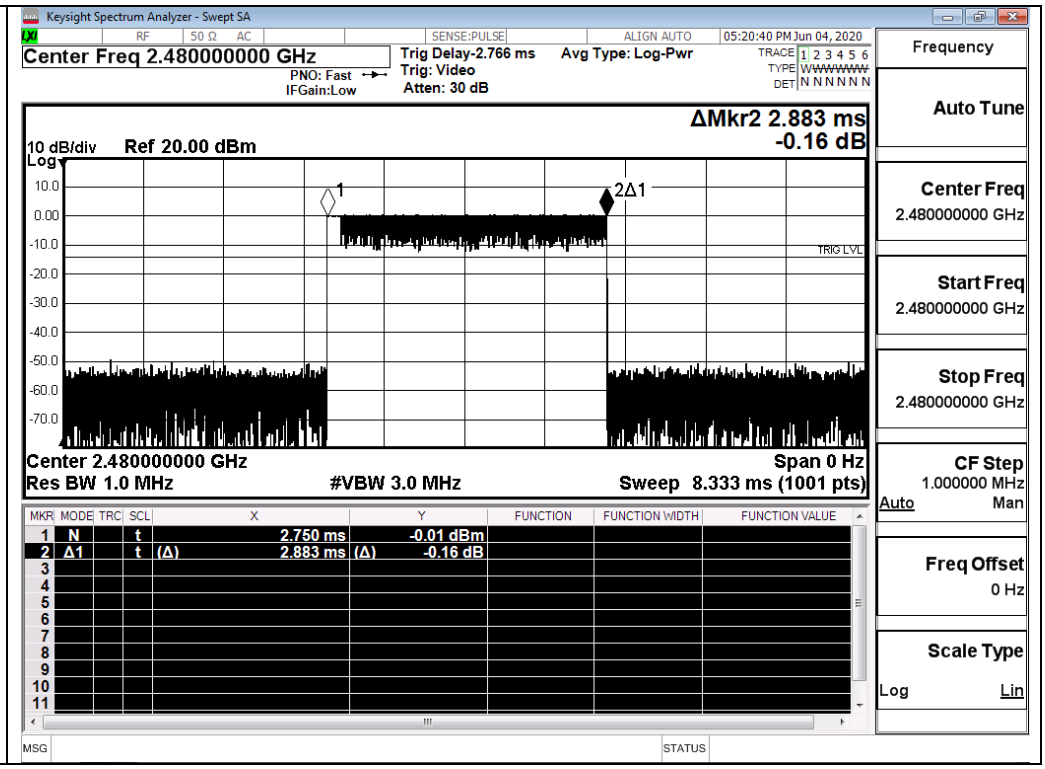


π/4DQPSK
_2DH5/MCH



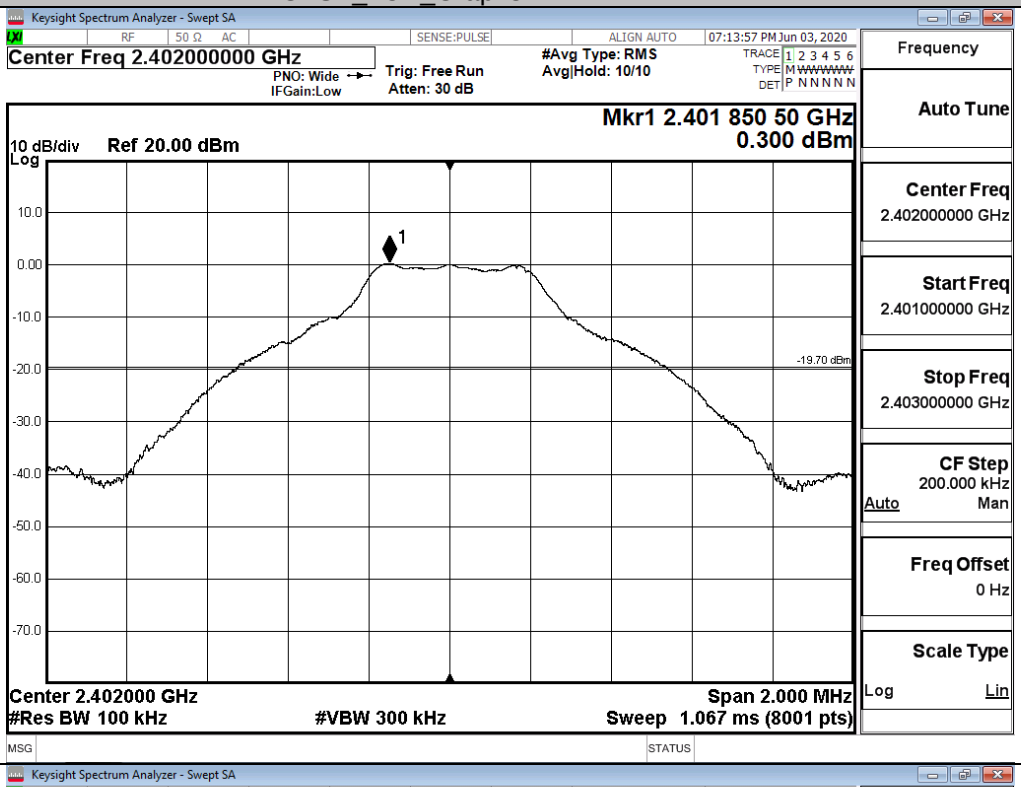
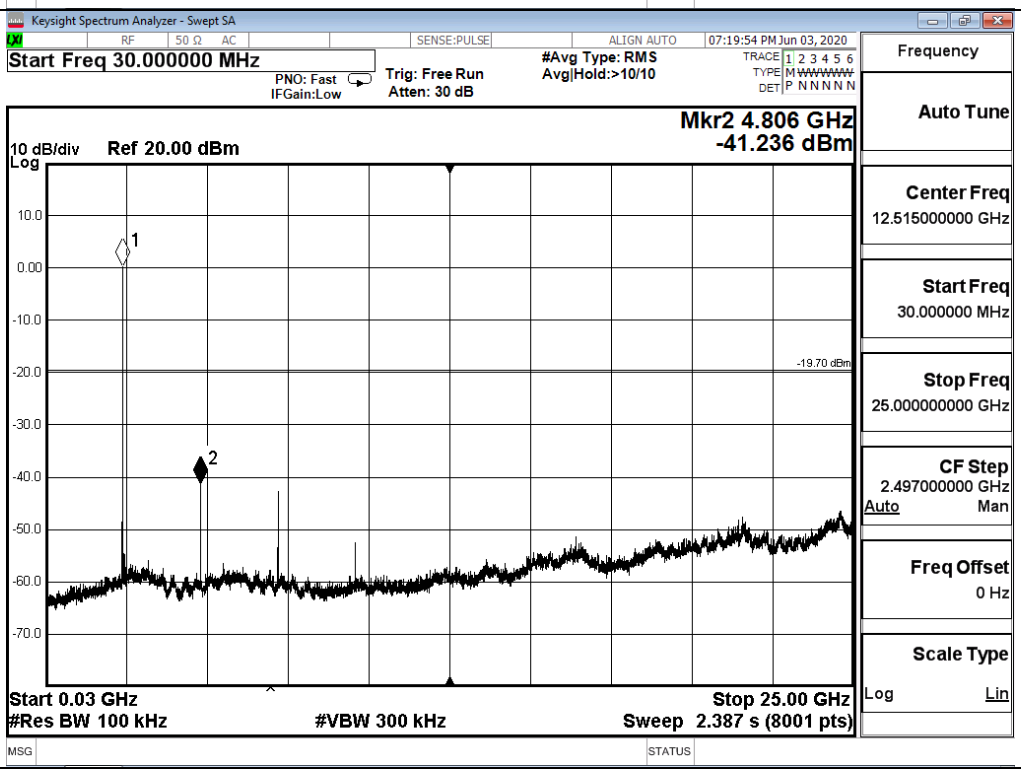
π/4DQPSK

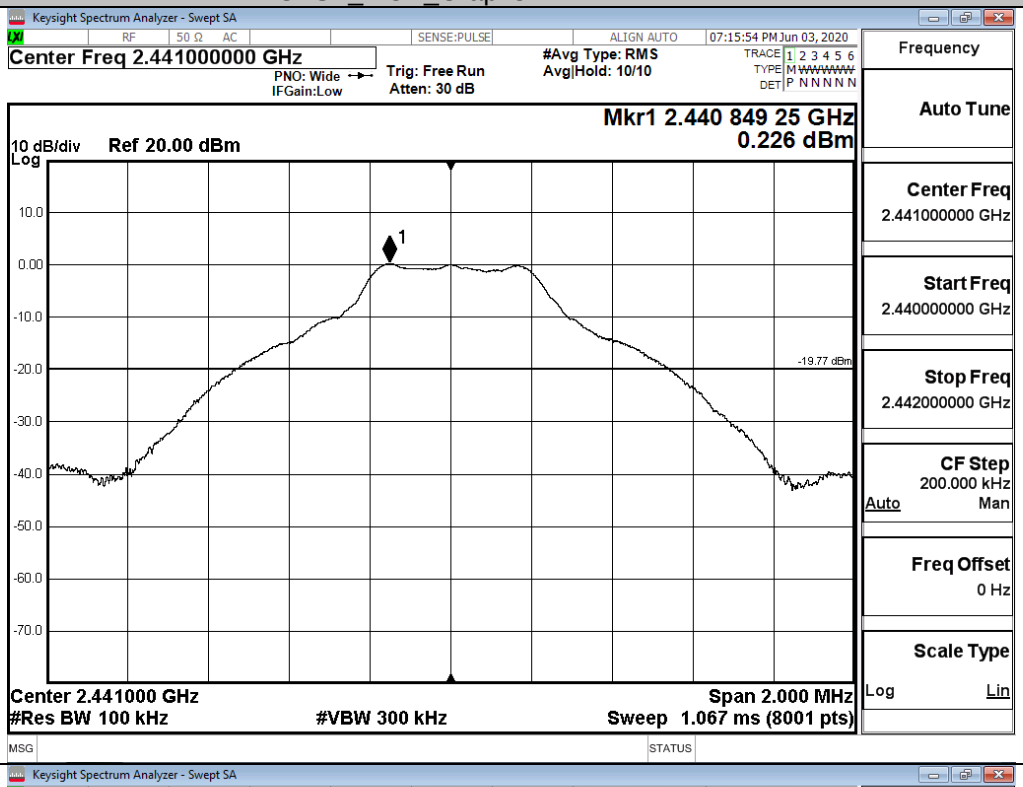
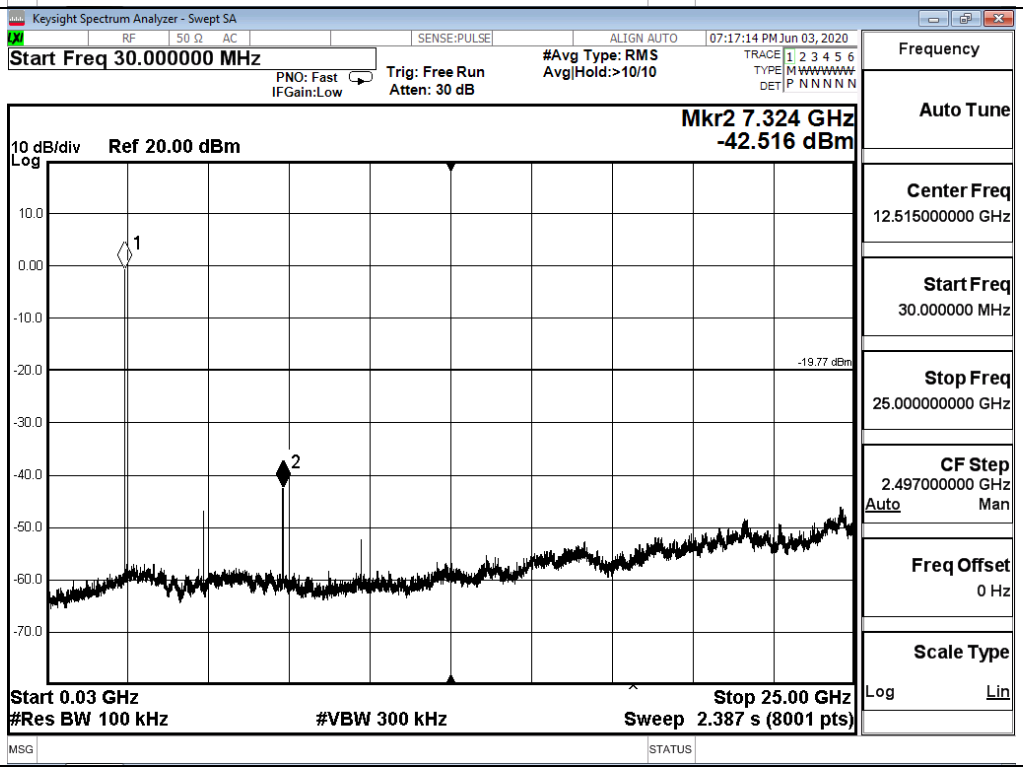
_2DH5/HCH

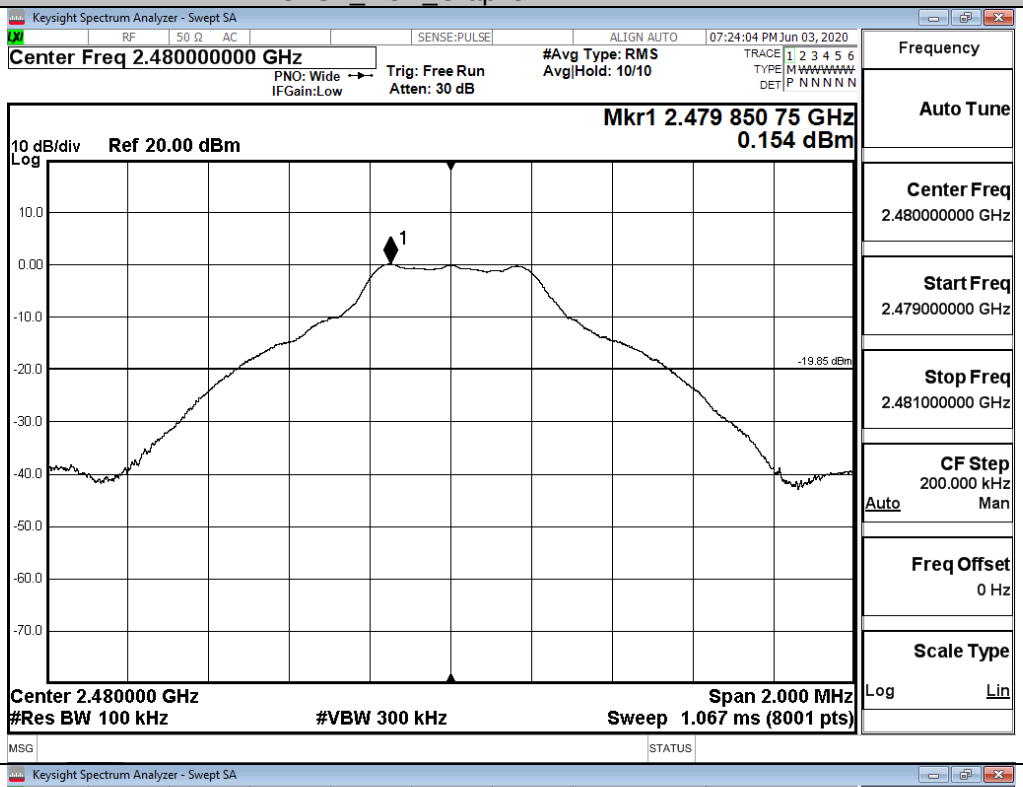
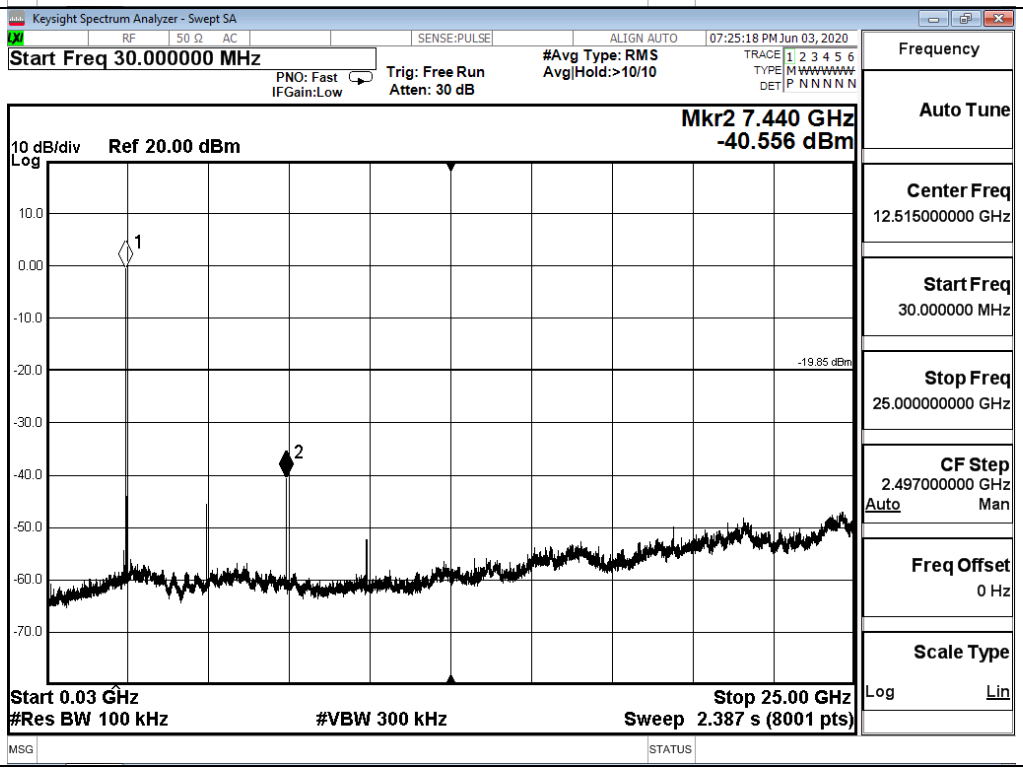


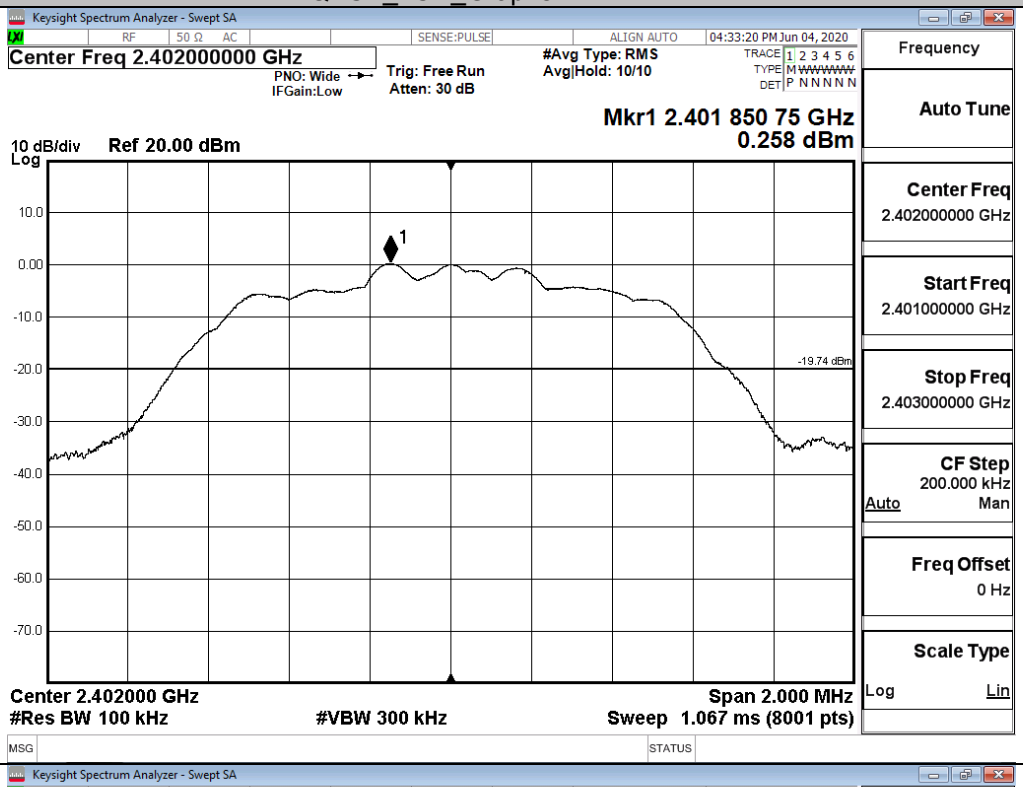
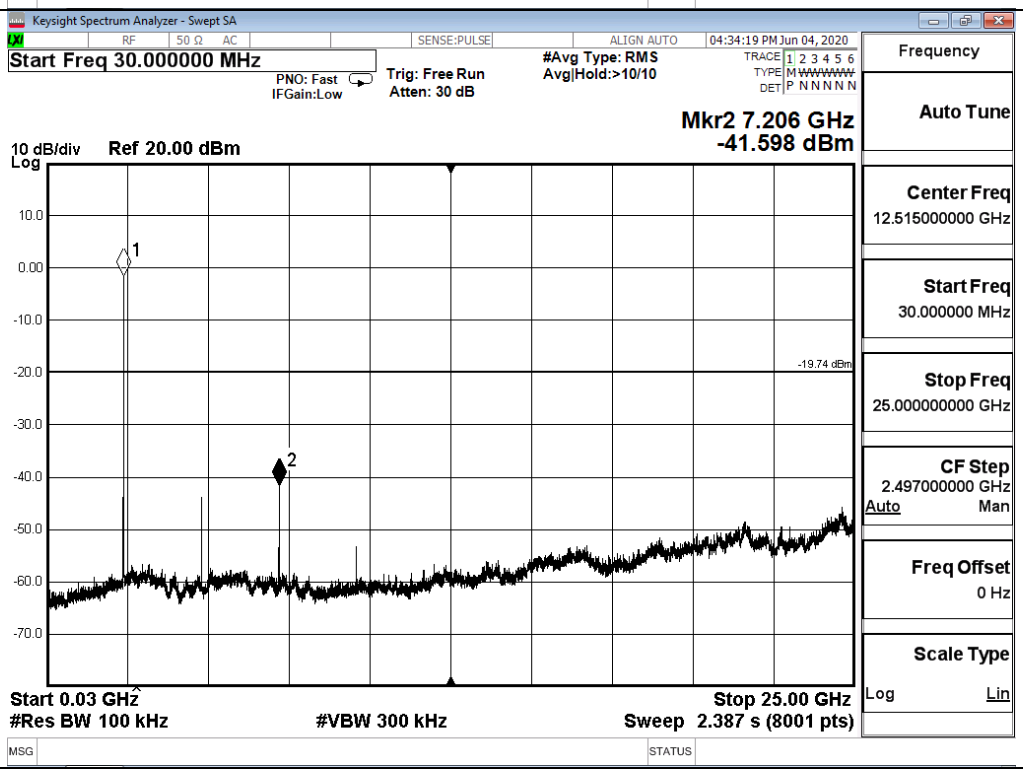
A.6 RF Conducted Spurious Emissions

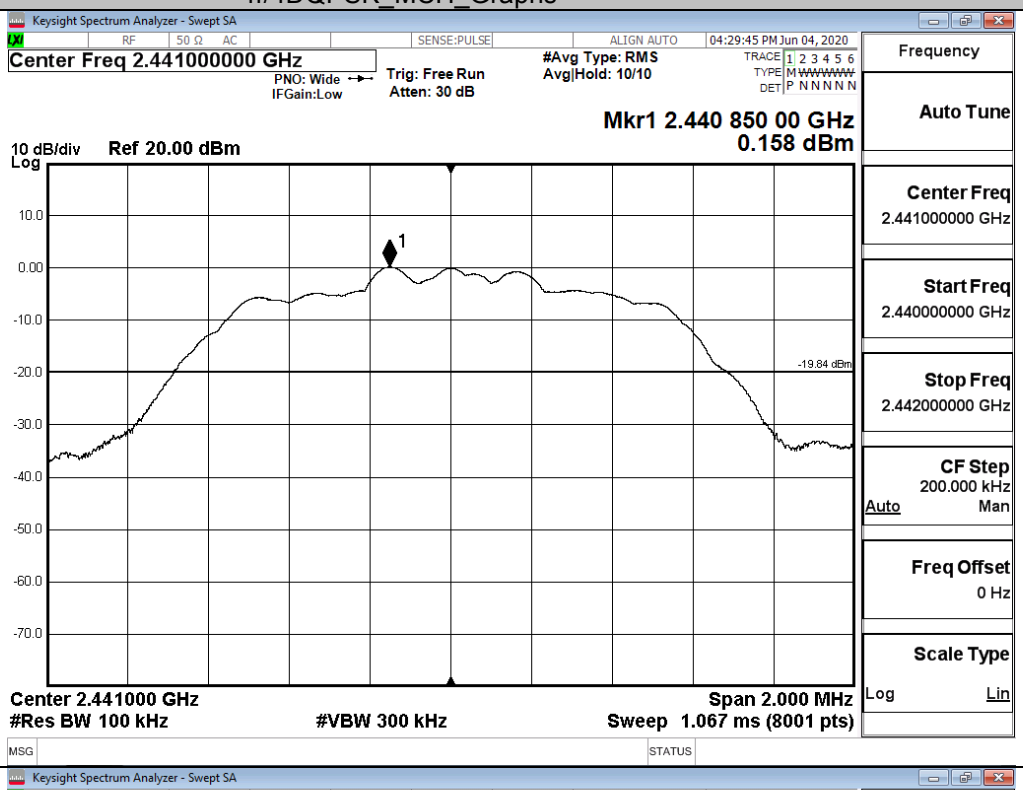
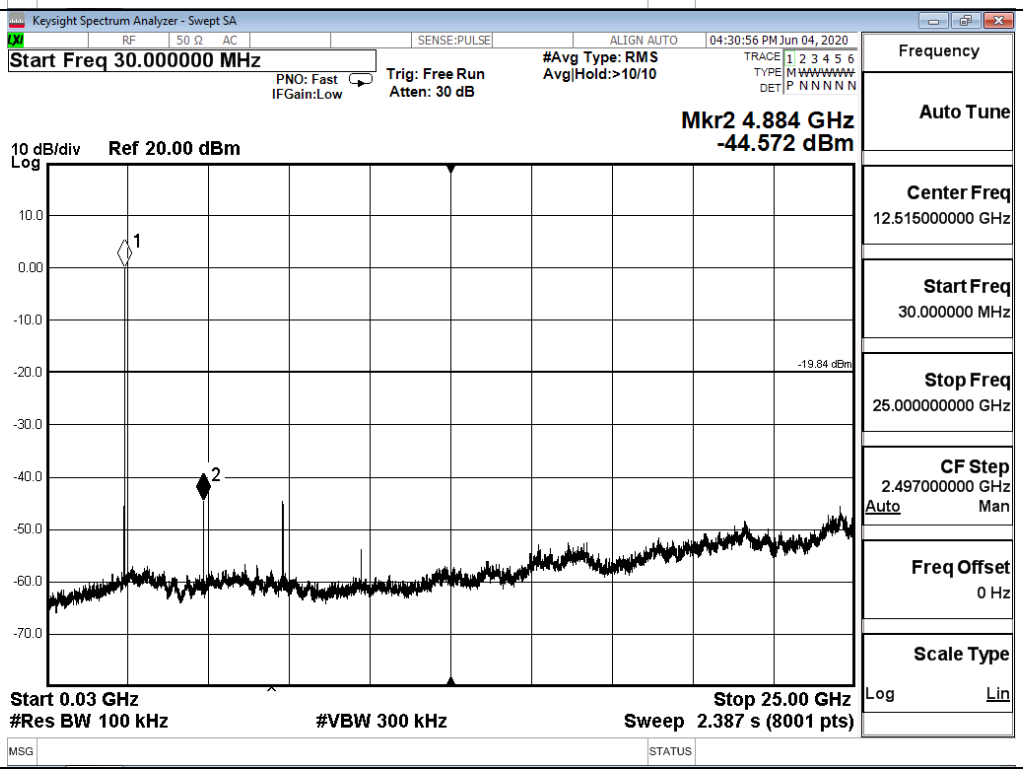
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.300	-41.236	-19.70	PASS
	MCH	0.226	-42.516	-19.77	PASS
	HCH	0.154	-40.556	-19.85	PASS
π/4DQPSK	LCH	0.258	-41.598	-19.74	PASS
	MCH	0.158	-44.572	-19.84	PASS
	HCH	0.155	-39.612	-19.84	PASS

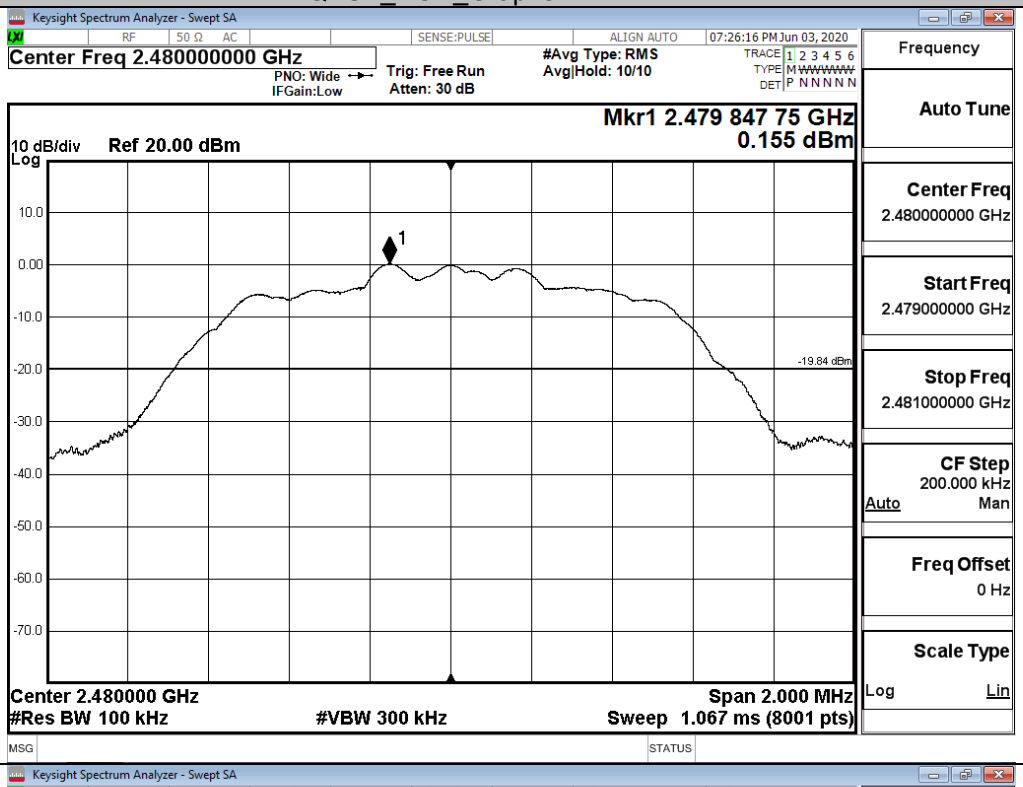
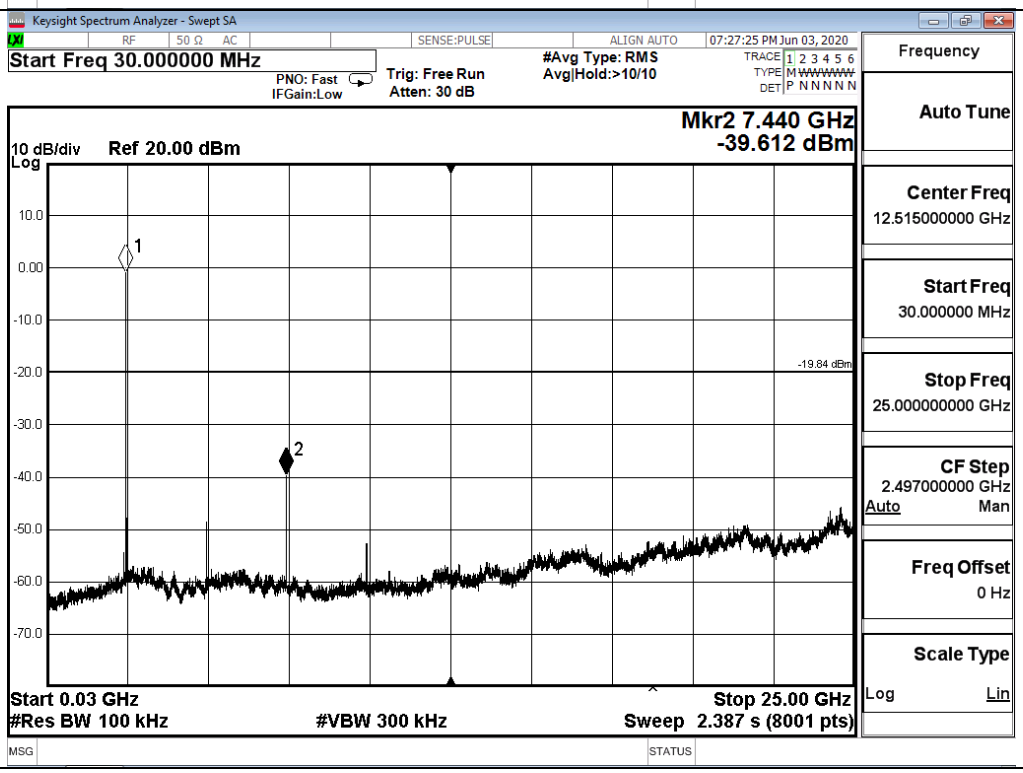
GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

GFSK_HCH_Graphs	
Pref	
Puw	

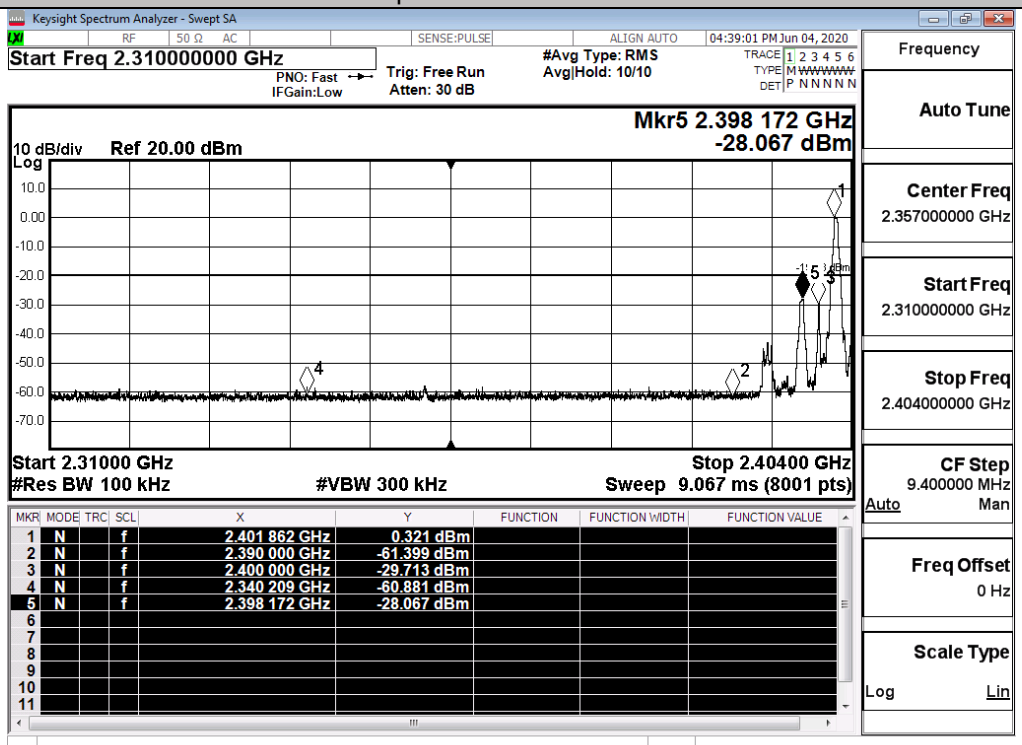
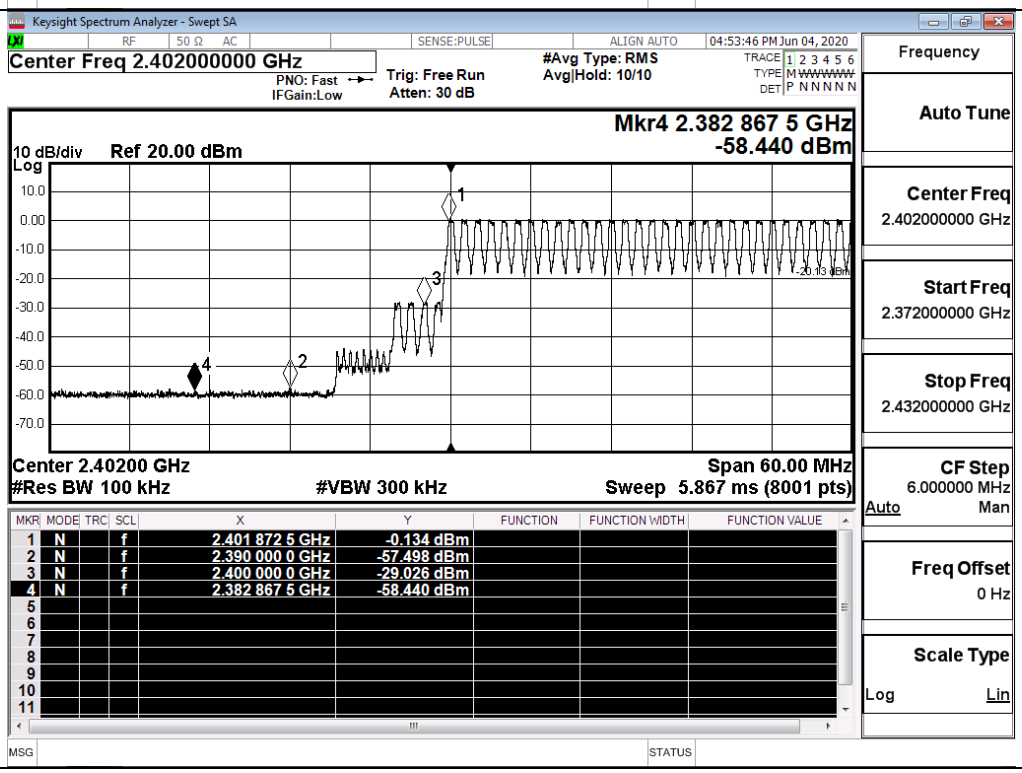
π/4DQPSK_LCH_Graphs	
Pref	
Puw	

π/4DQPSK_MCH_Graphs	
Pref	
Puw	

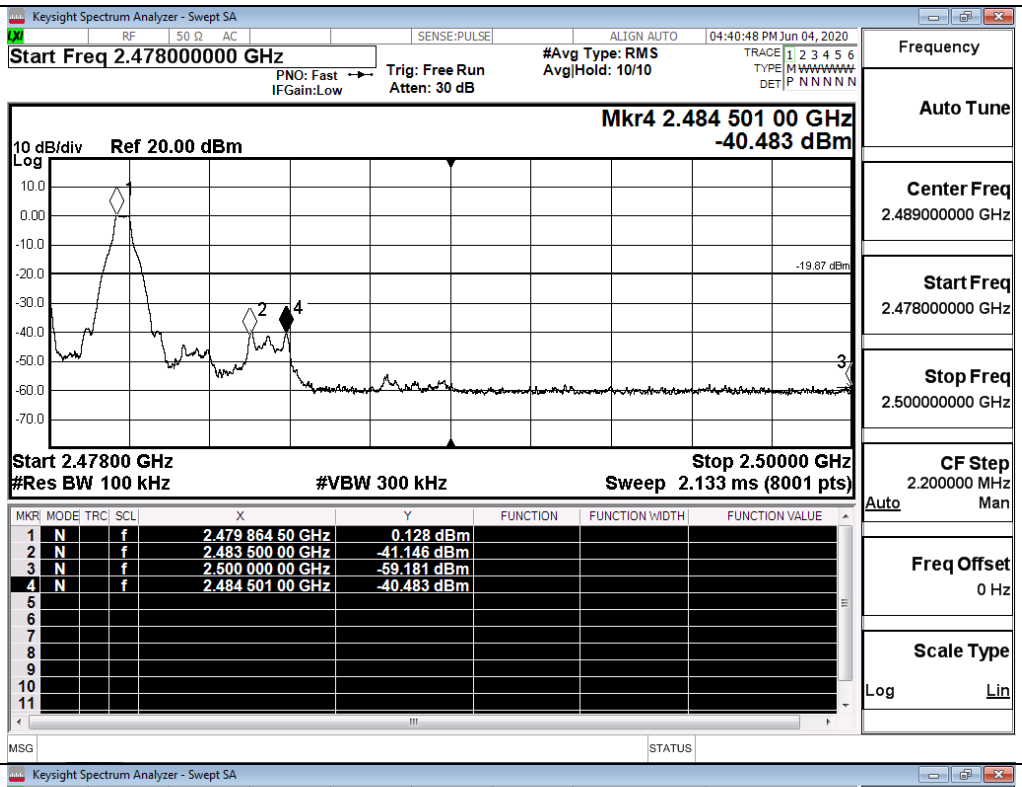
π/4DQPSK_HCH_Graphs	
Pref	
Puw	

A.7 Band-edge for RF Conducted Emissions

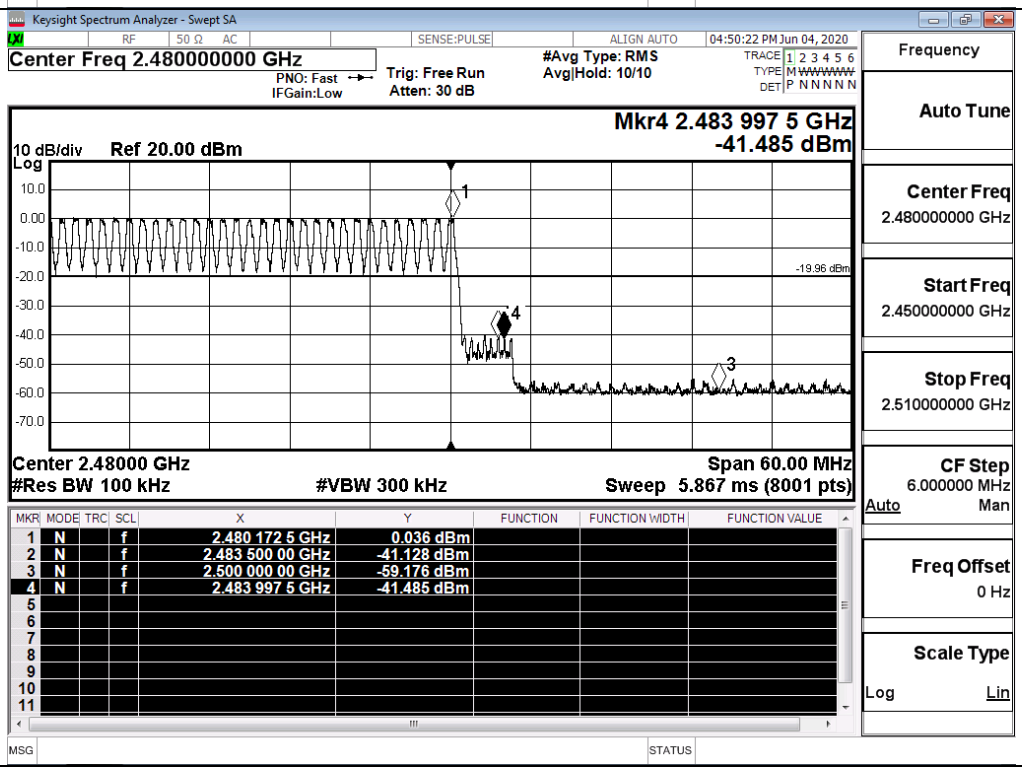
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.321	Off	-28.067	-19.78	PASS
			-0.134	On	-58.440	-20.13	PASS
	HCH	2480	0.128	Off	-40.483	-19.88	PASS
			0.036	On	-41.485	-19.96	PASS
π/4DQPSK	LCH	2402	0.328	Off	-27.961	-19.67	PASS
			0.353	On	-57.517	-19.65	PASS
	HCH	2480	0.135	Off	-40.509	-19.86	PASS
			0.094	On	-41.516	-19.91	PASS

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

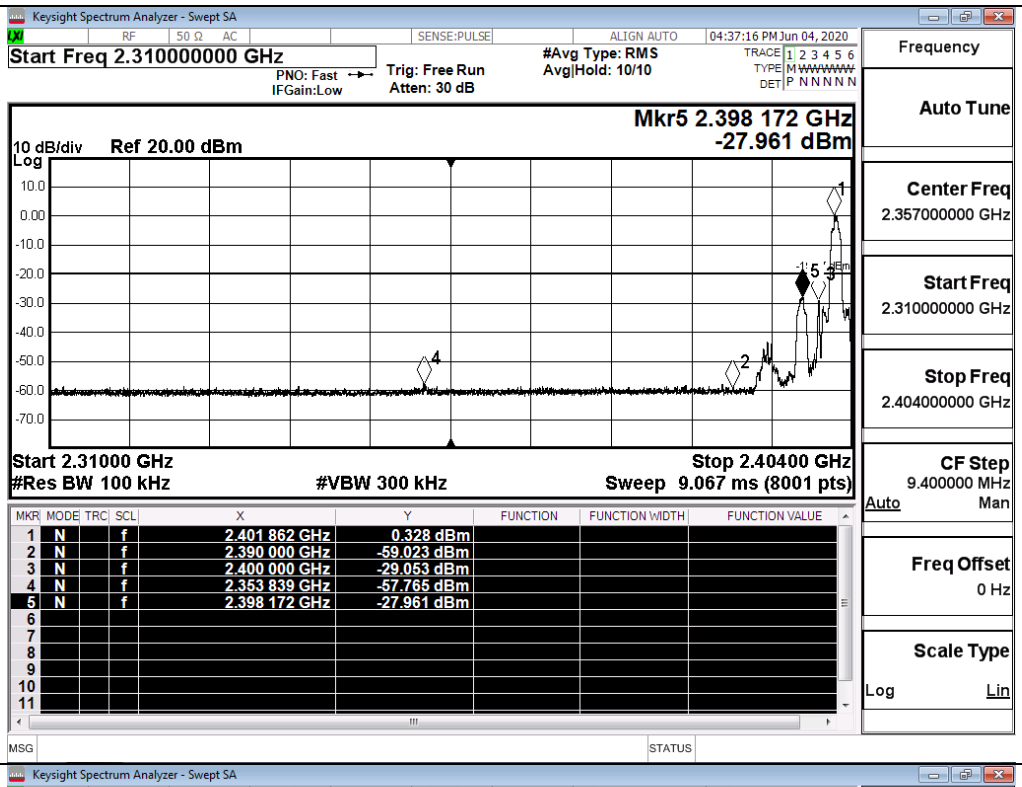
GFSK/HCH/No Hop



GFSK/HCH/Hop



π/4DQPSK/LCH/No Hop



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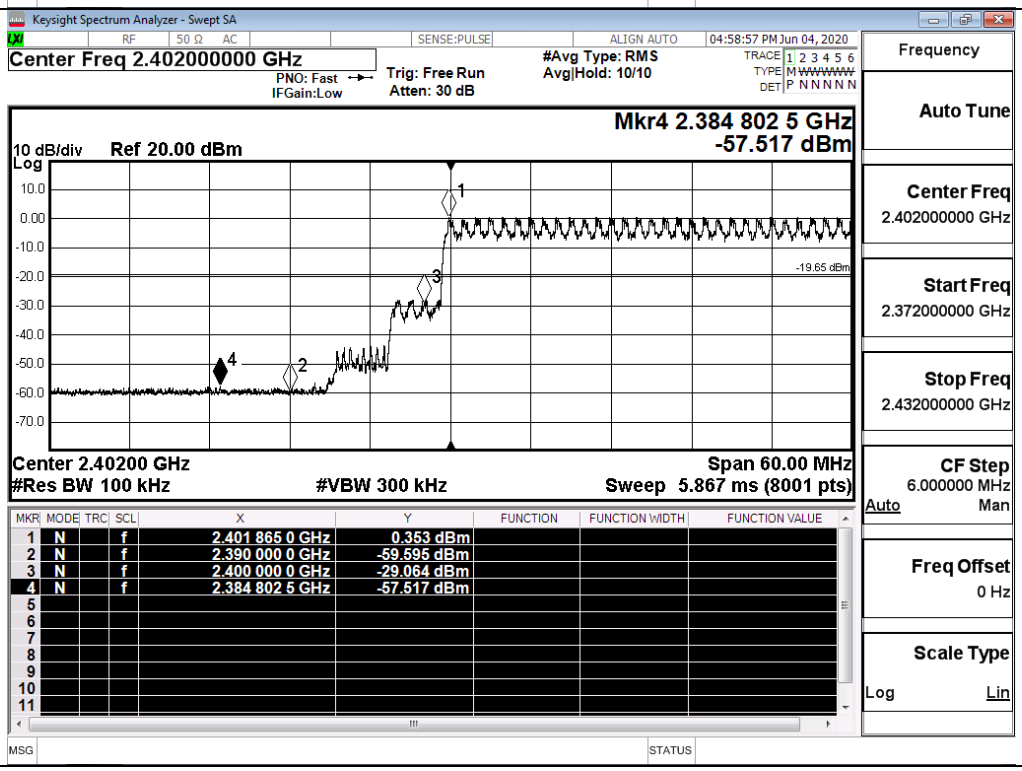

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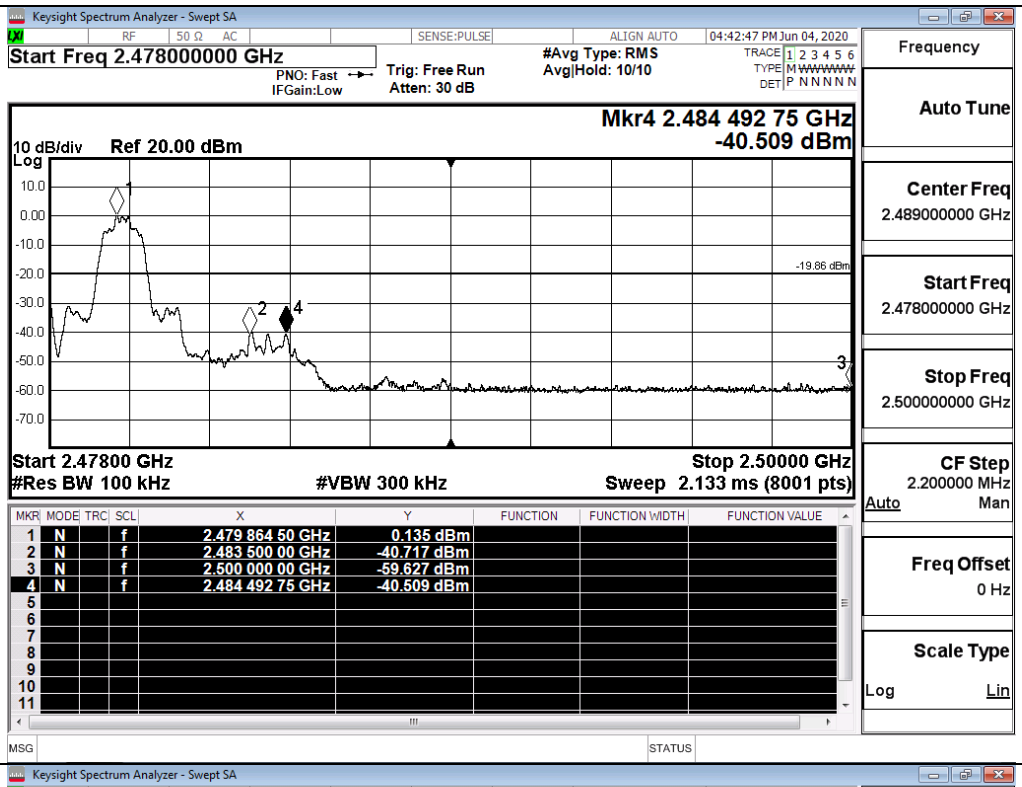

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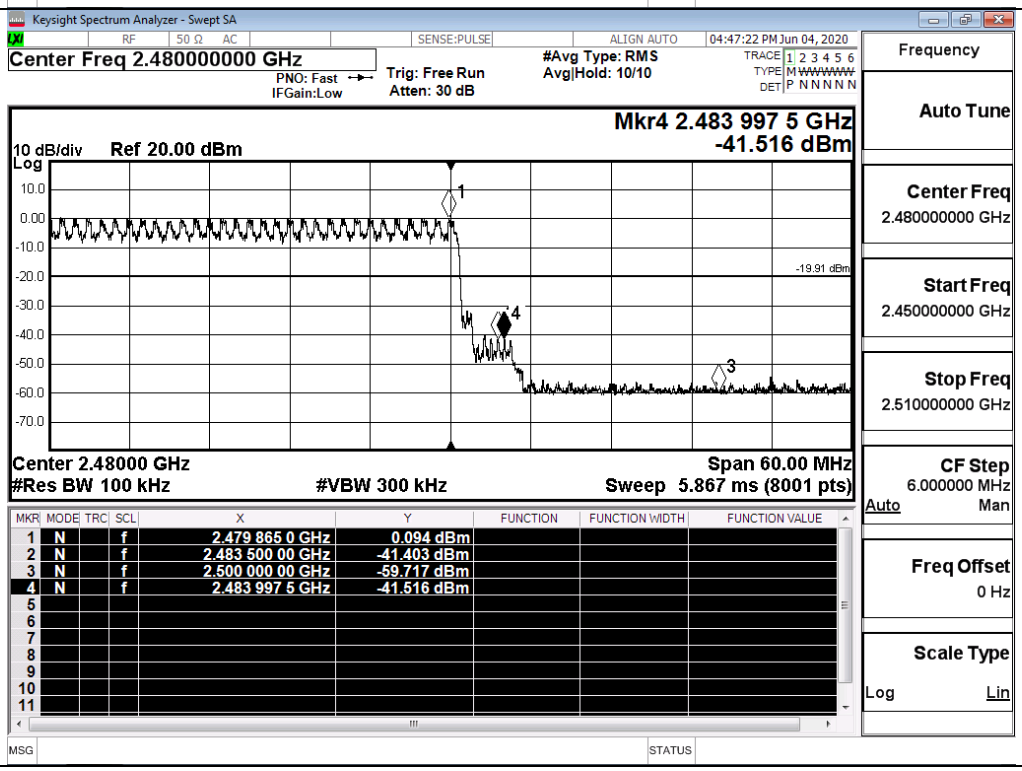
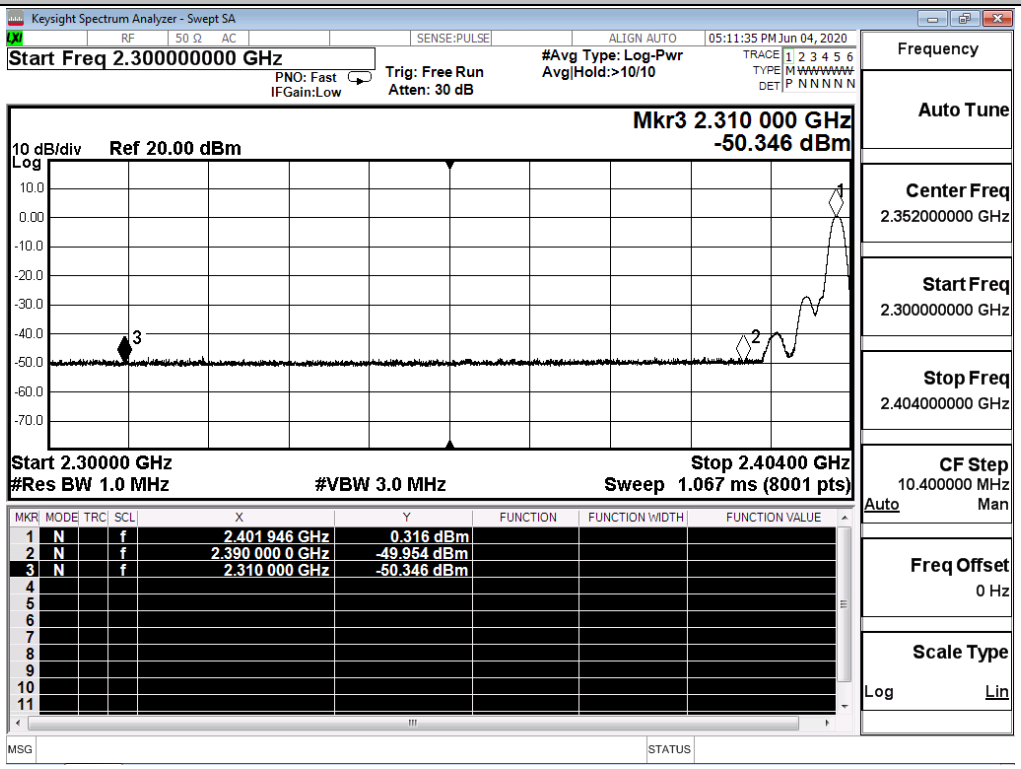


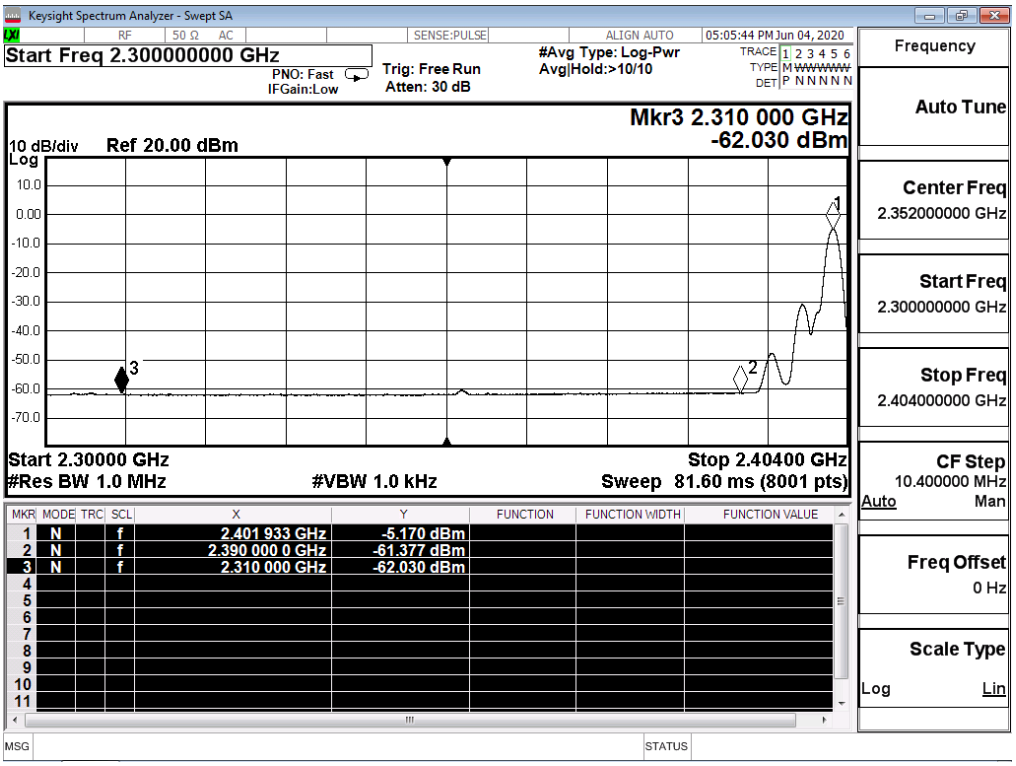
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-50.346	2	0	46.91	PEAK	74	PASS
	Off	2310.0	-62.030	2	0	35.23	AV	54	PASS
	Off	2390.0	-49.954	2	0	47.31	PEAK	74	PASS
	Off	2390.0	-61.377	2	0	35.88	AV	54	PASS
	Off	2483.5	-37.653	2	0	59.61	PEAK	74	PASS
	Off	2483.5	-45.745	2	0	51.52	AV	54	PASS
	Off	2500.0	-50.090	2	0	47.17	PEAK	74	PASS
	Off	2500.0	-61.128	2	0	36.13	AV	54	PASS
π/4DQPSK	Off	2310.0	-50.757	2	0	46.50	PEAK	74	PASS
	Off	2310.0	-61.969	2	0	35.29	AV	54	PASS
	Off	2390.0	-51.354	2	0	45.91	PEAK	74	PASS
	Off	2390.0	-61.353	2	0	35.91	AV	54	PASS
	Off	2483.5	-37.422	2	0	59.84	PEAK	74	PASS
	Off	2483.5	-48.510	2	0	48.75	AV	54	PASS
	Off	2500.0	-50.706	2	0	46.55	PEAK	74	PASS
	Off	2500.0	-61.208	2	0	36.05	AV	54	PASS

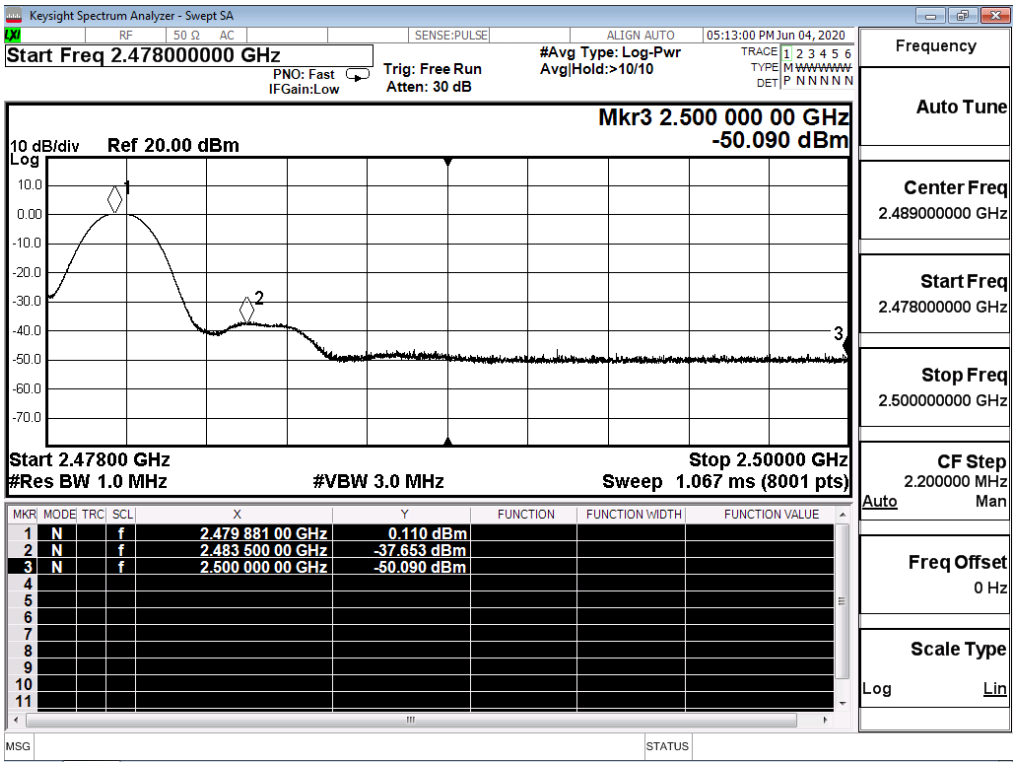
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



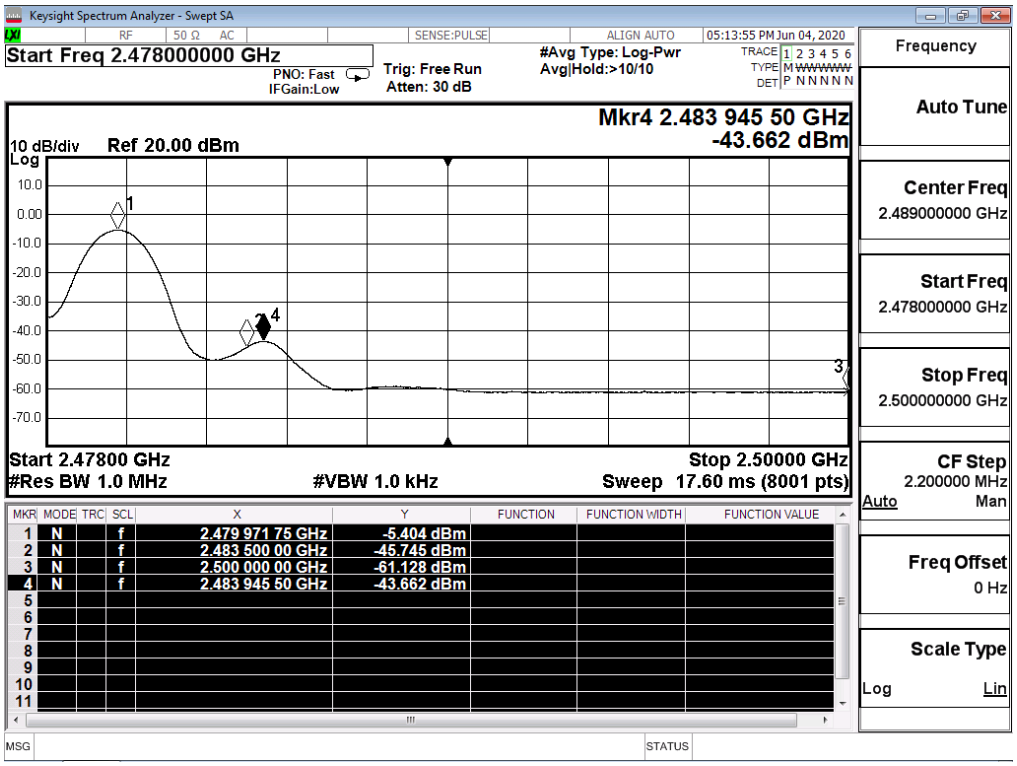
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



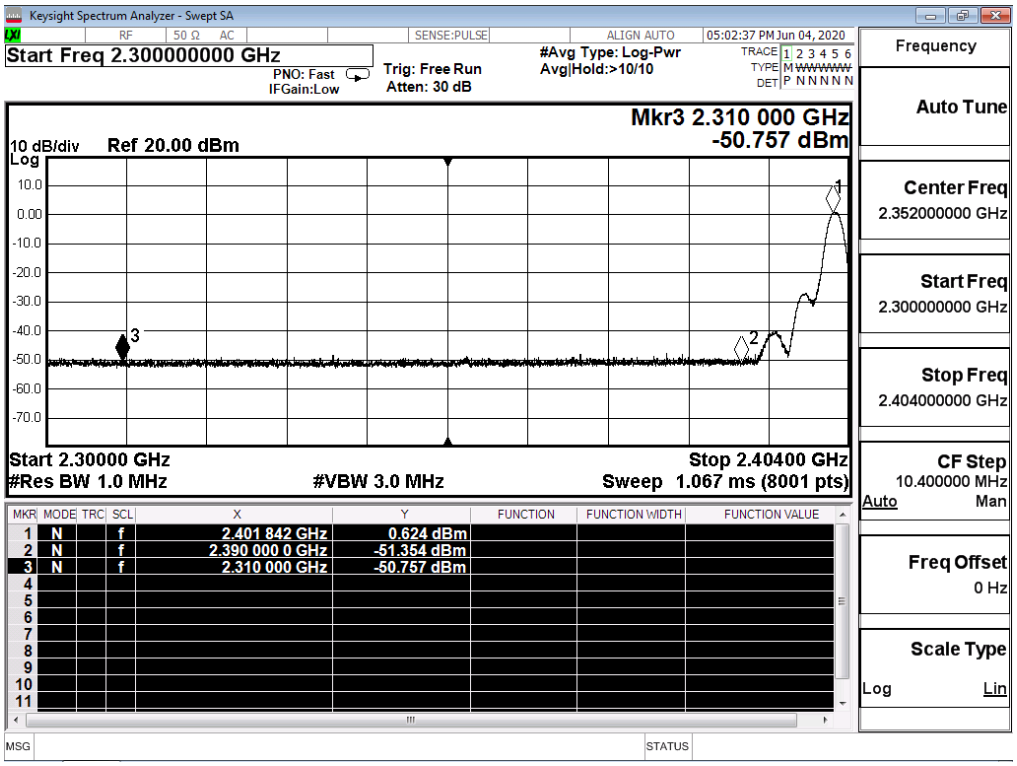
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



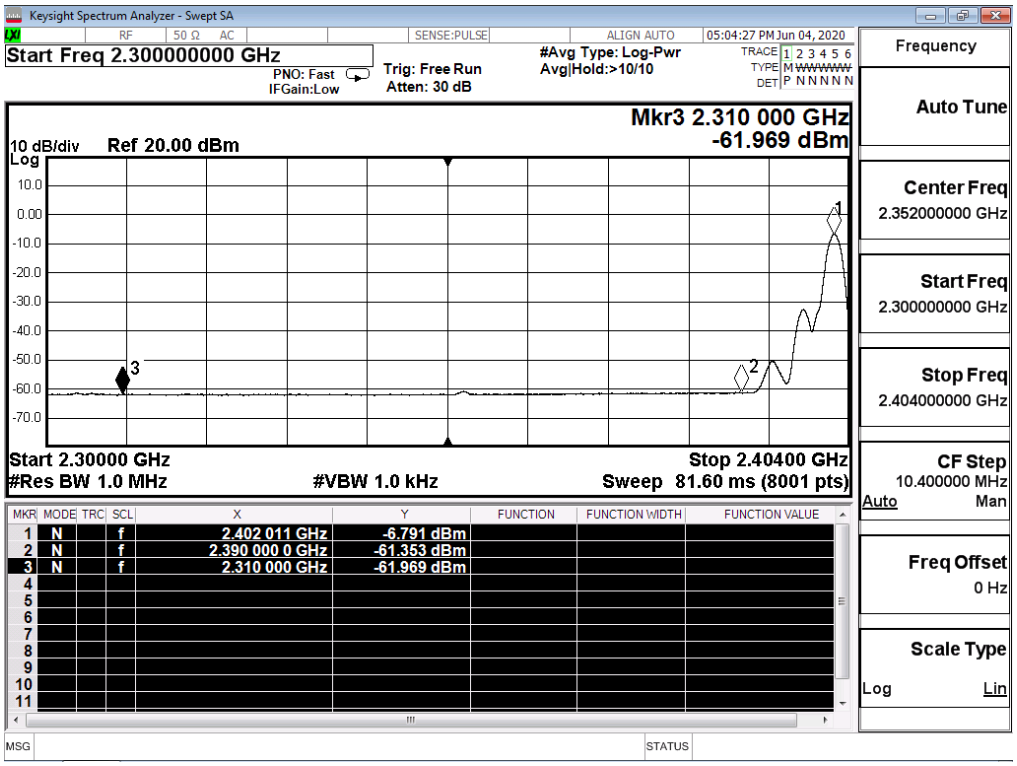
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



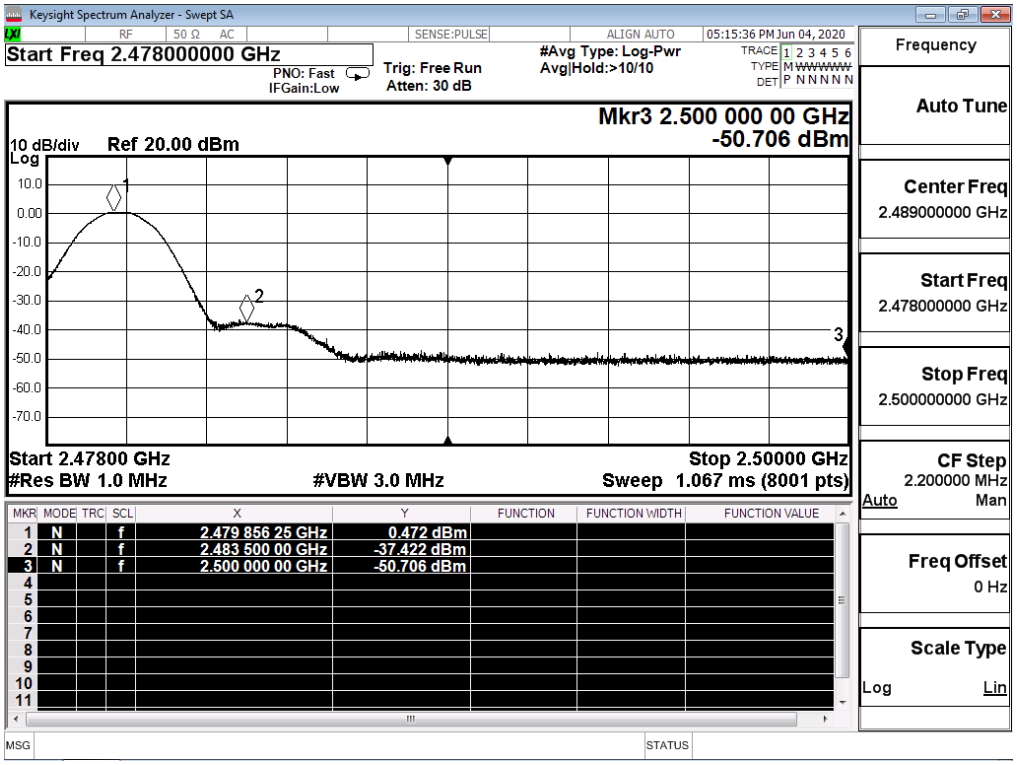
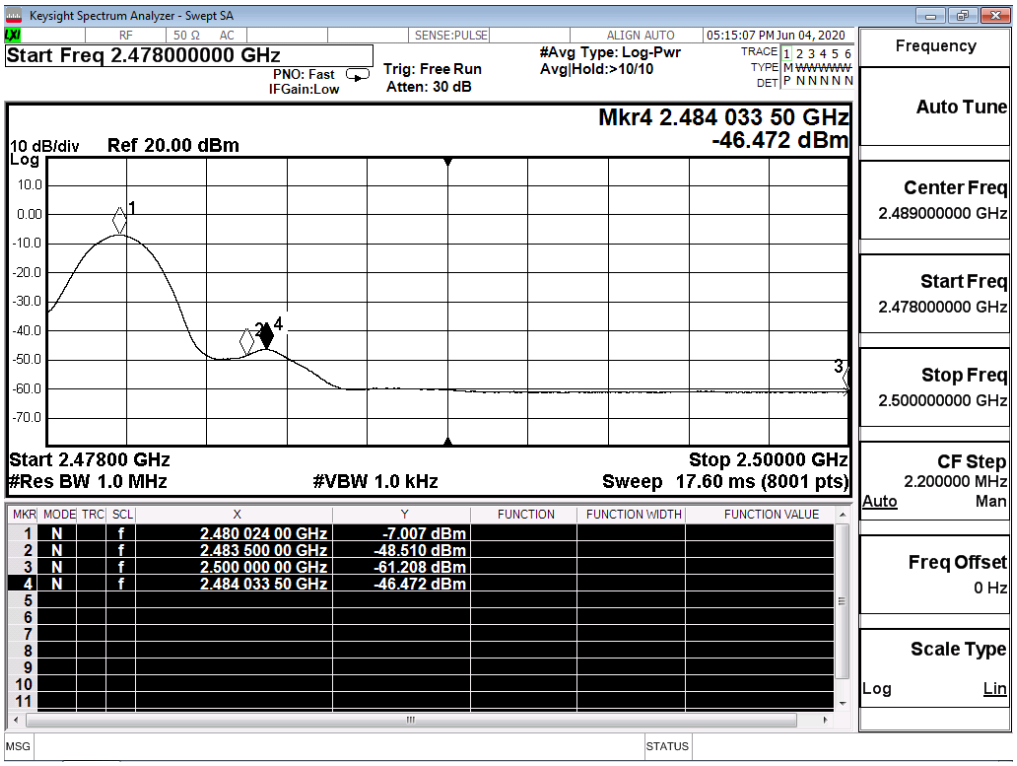
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)