Appendix A

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

Product Name: Bluetooth Speaker

Trade Mark: Origaudio

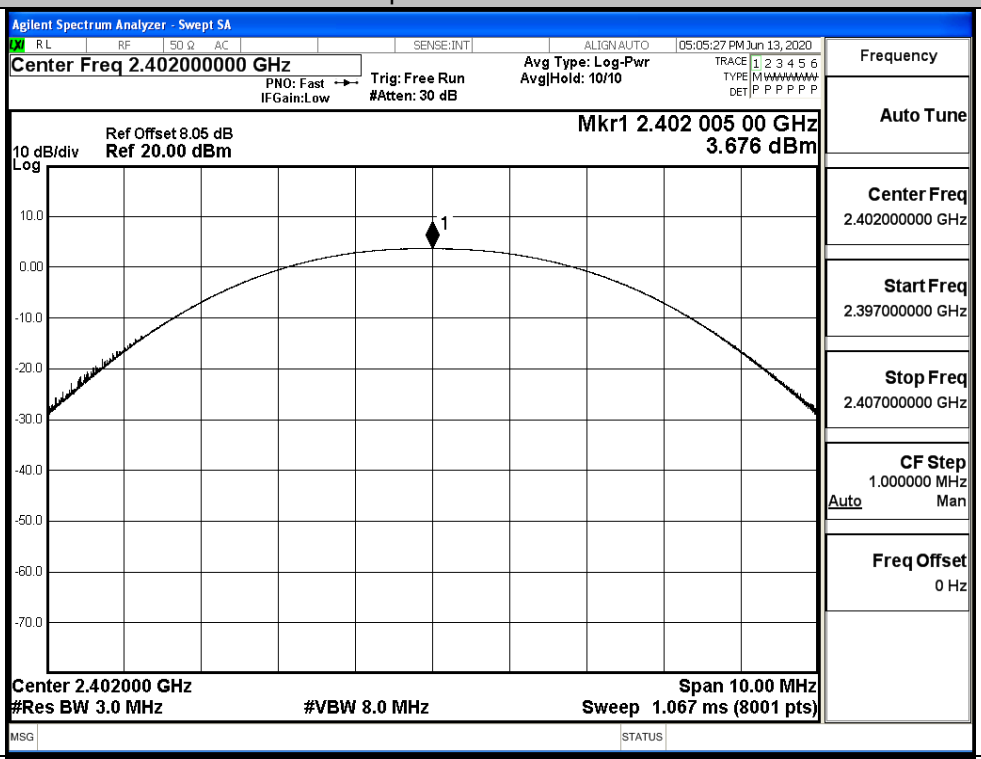
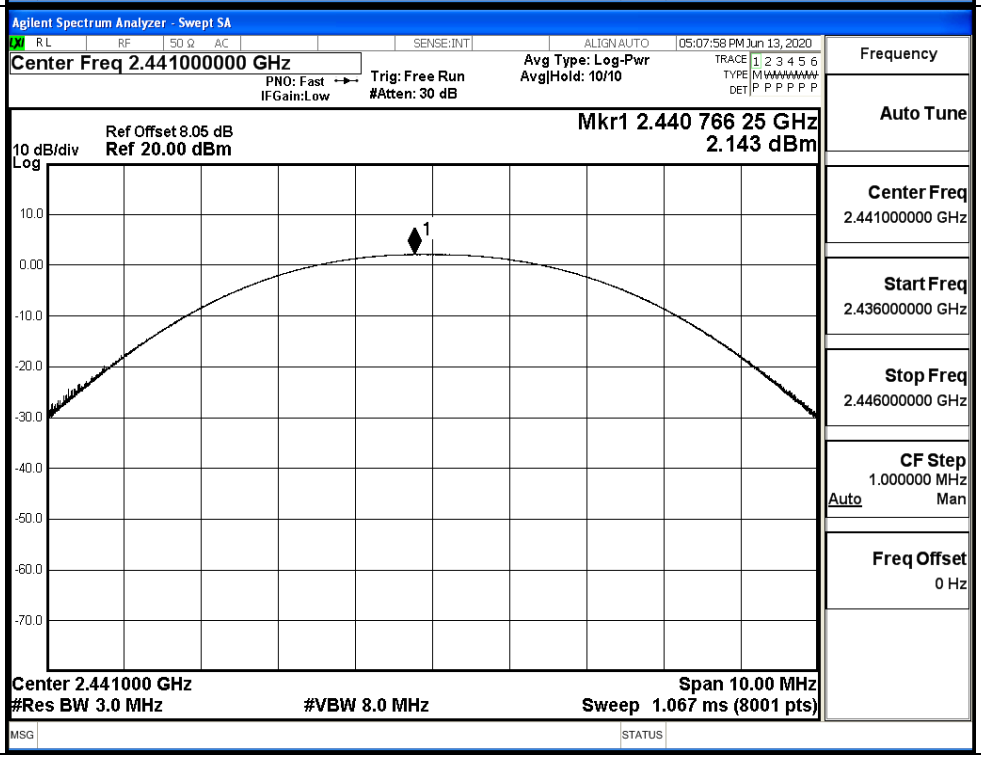
Test Model: Hydrobump

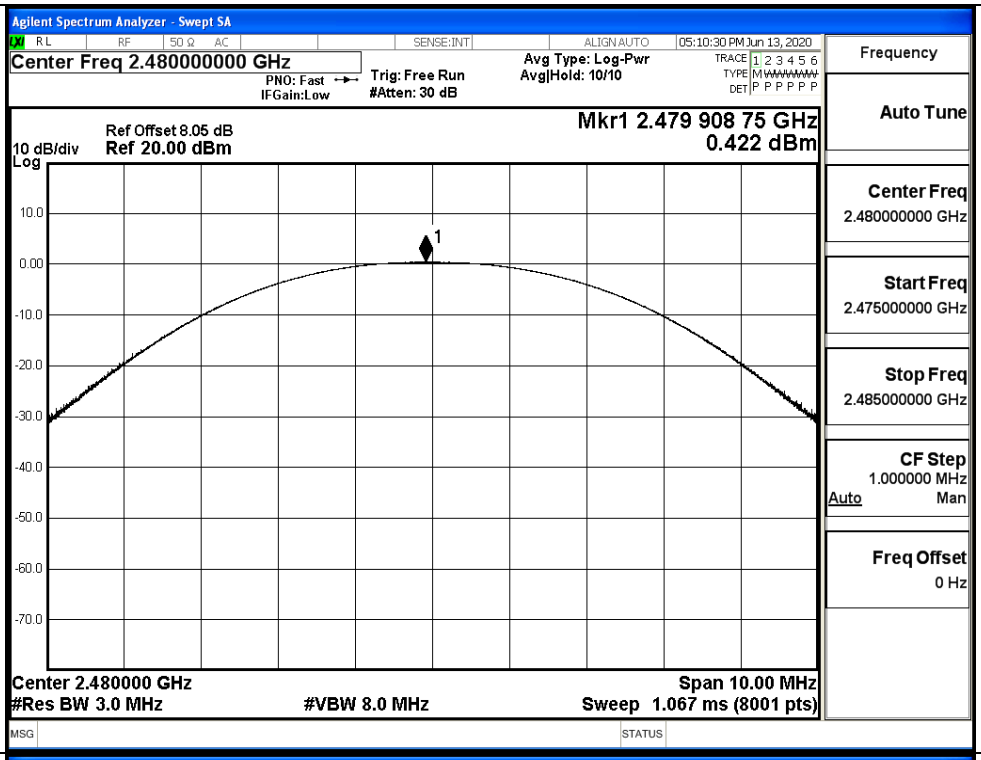
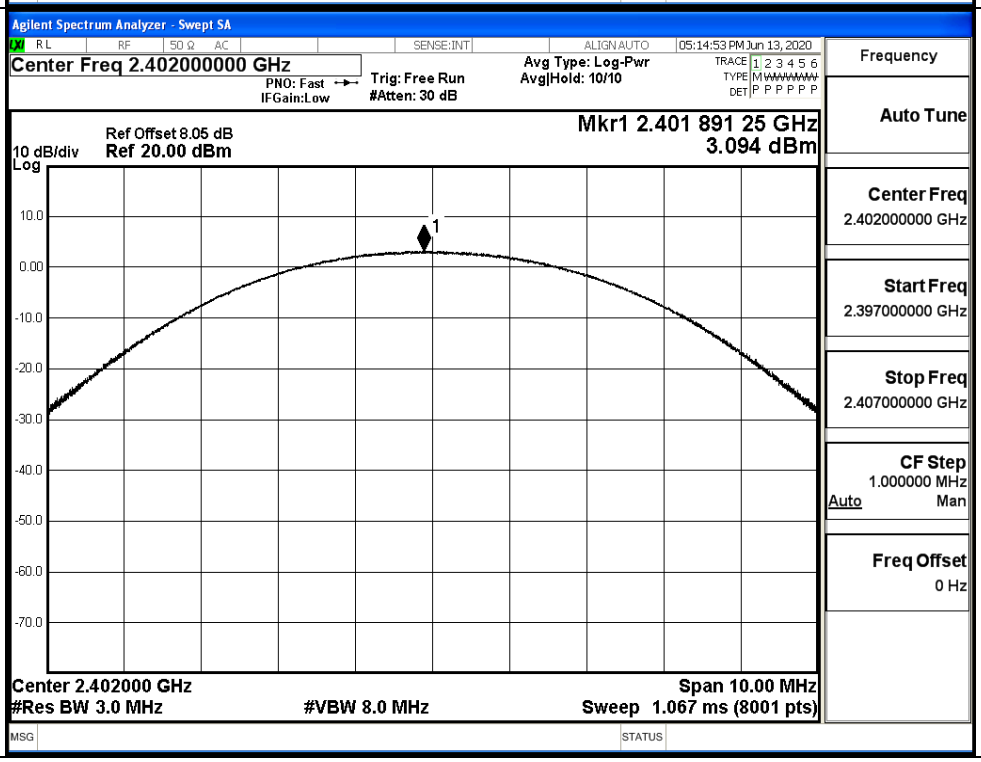
Environmental Conditions

Temperature:	23.5 ° C
Relative Humidity:	53.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Scout Wu
Supervised by:	Li Huan

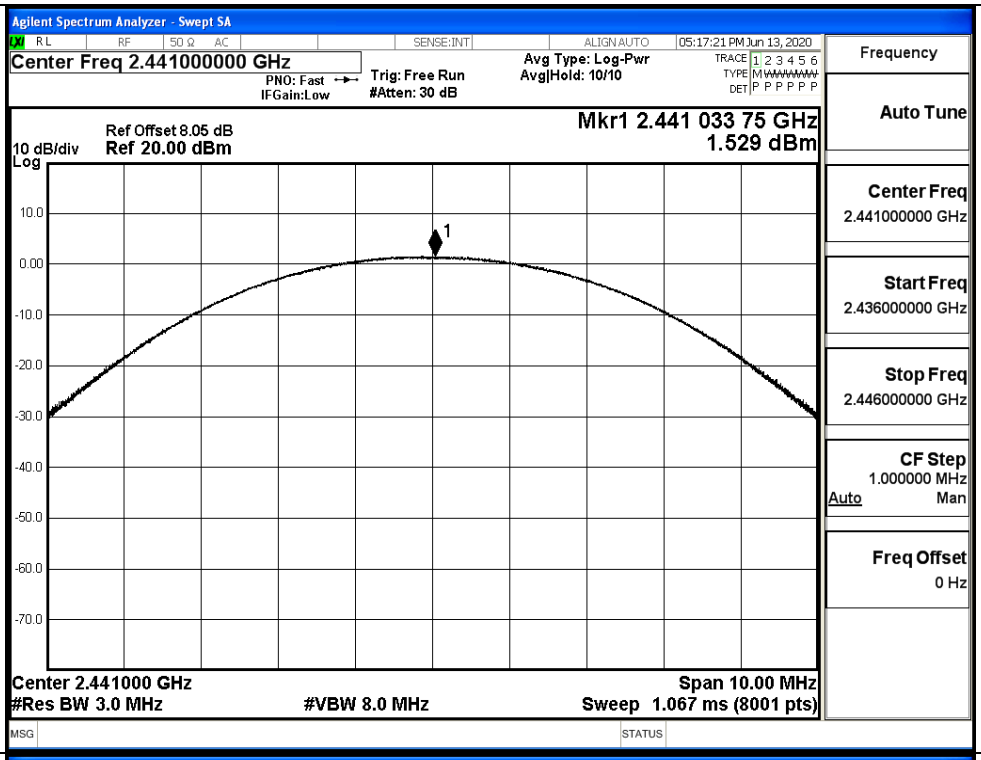
A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.676	30	PASS
	MCH	2.143	30	PASS
	HCH	0.422	30	PASS
π/4DQPSK	LCH	3.094	30	PASS
	MCH	1.529	30	PASS
	HCH	-0.247	30	PASS
8DPSK	LCH	3.479	30	PASS
	MCH	1.932	30	PASS
	HCH	0.189	30	PASS

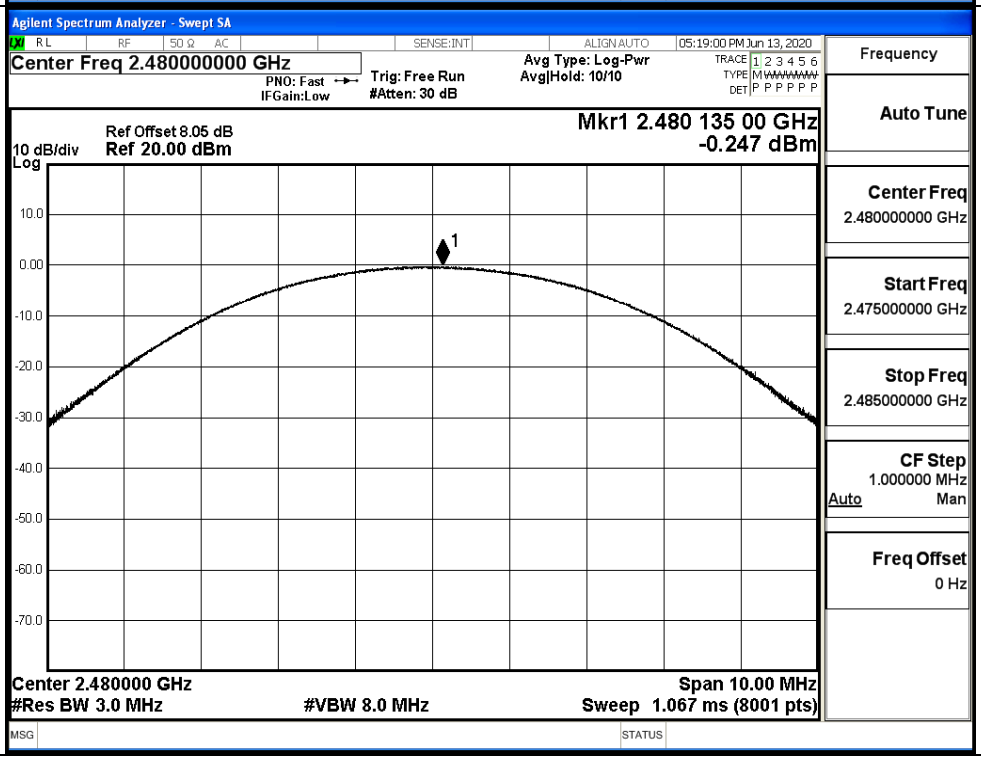
Test Graphs	
GFSK/LCH	
GFSK/MCH	

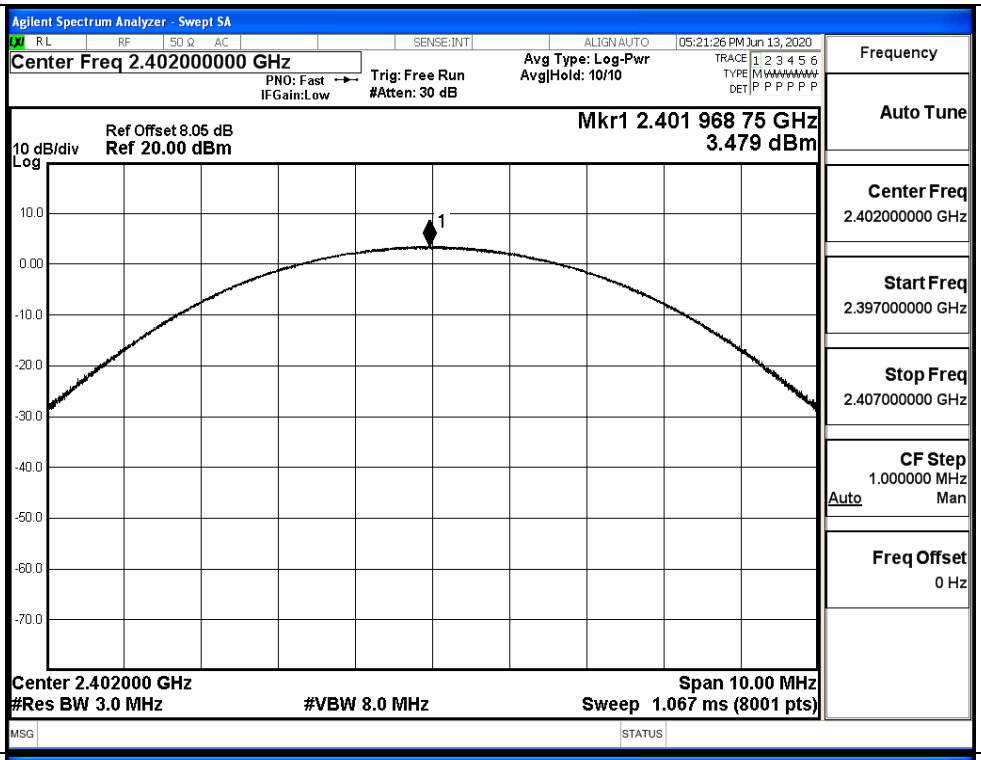
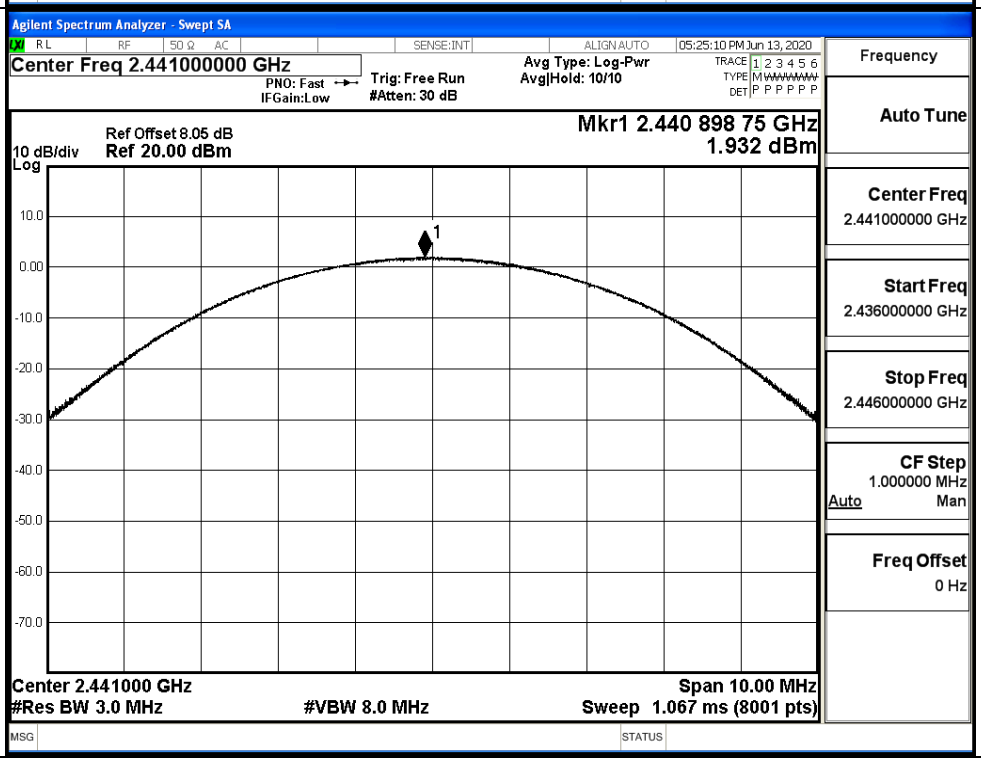
GFSK/HCH		
π/4DQPSK/LCH		

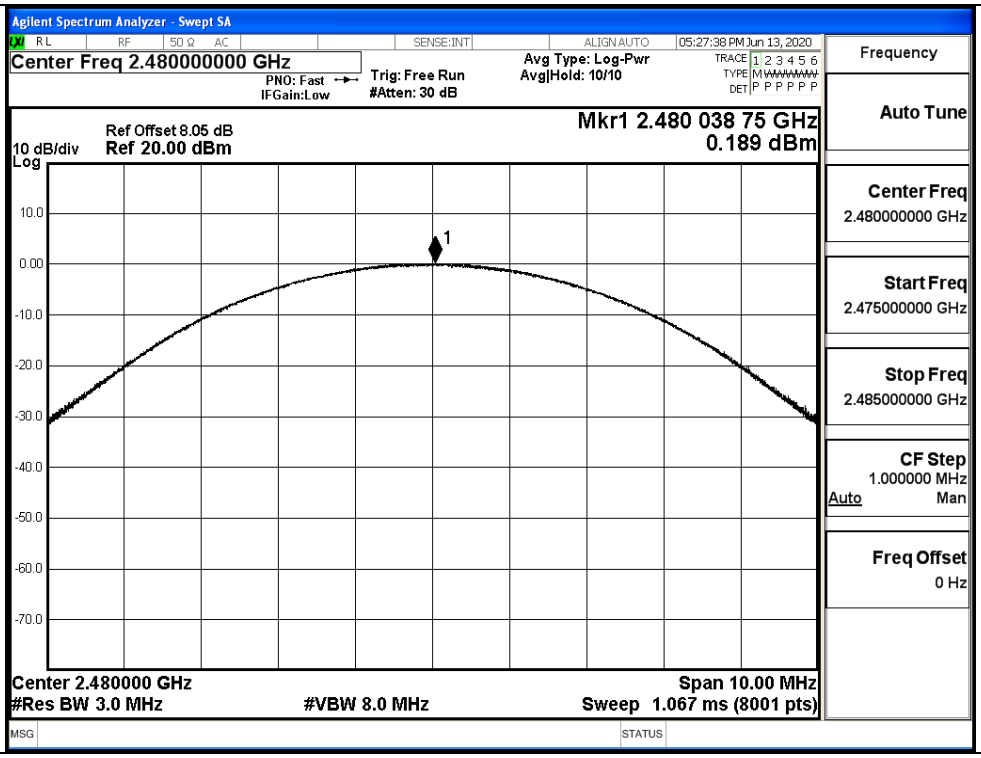
π/4DQPSK/MCH



π/4DQPSK/HCH



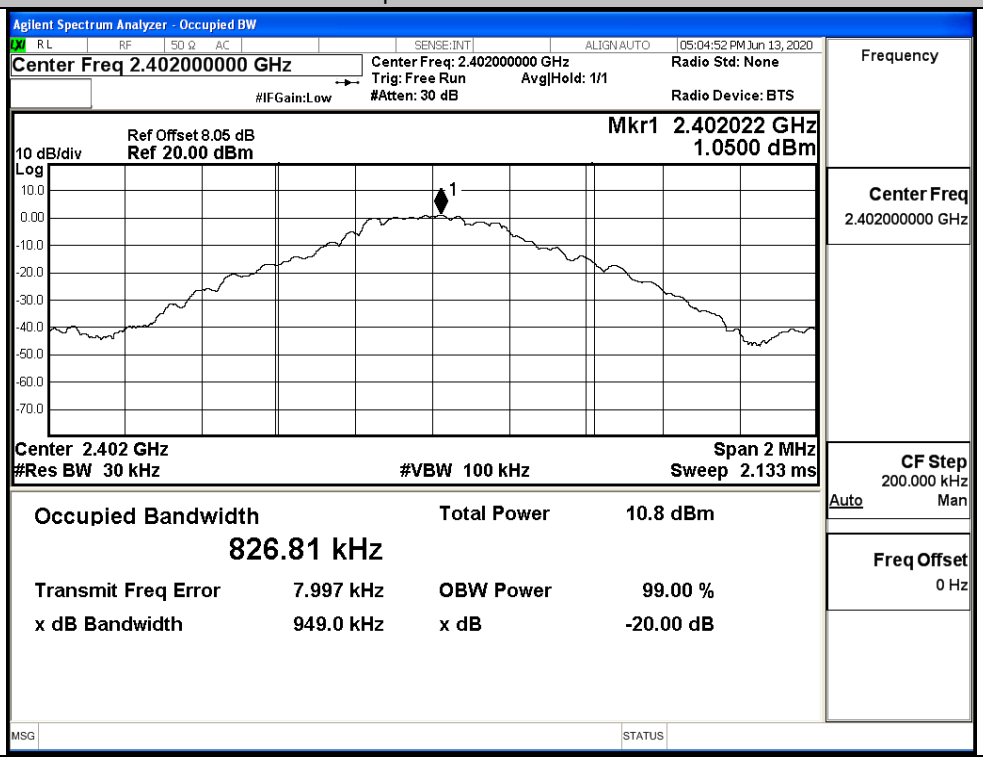
8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH		

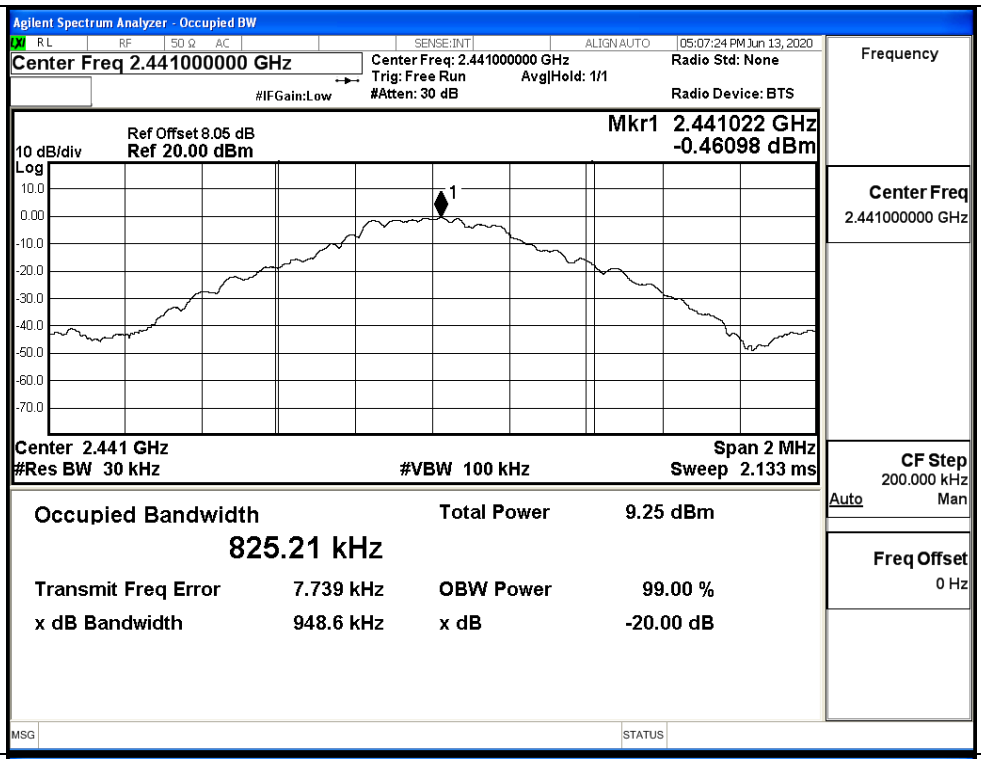
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
05:27:38 PM Jun 13, 2020
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480 038 75 GHz
0.189 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 10.00 MHz
Sweep 1.067 ms (8001 pts)
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

A.2 20dB Bandwidth

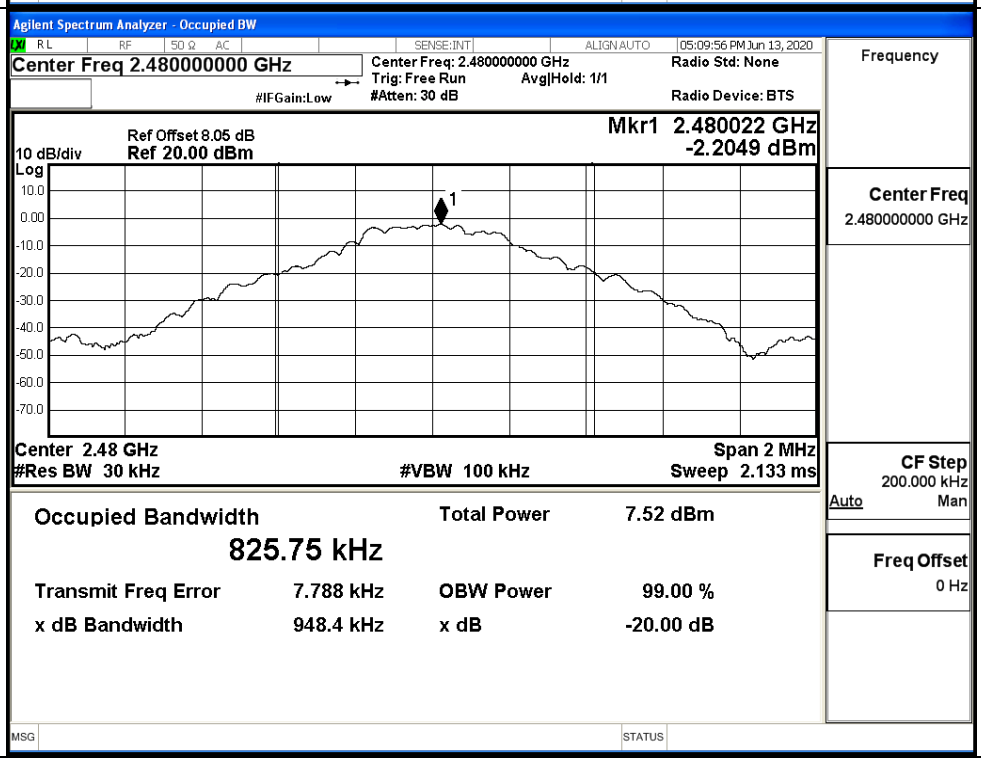
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9490	Not Specified	PASS
	MCH	0.9486	Not Specified	PASS
	HCH	0.9484	Not Specified	PASS
π/4DQPSK	LCH	1.324	Not Specified	PASS
	MCH	1.324	Not Specified	PASS
	HCH	1.324	Not Specified	PASS
8DPSK	LCH	1.313	Not Specified	PASS
	MCH	1.313	Not Specified	PASS
	HCH	1.322	Not Specified	PASS

Test Graphs		
GFSK/LCH		

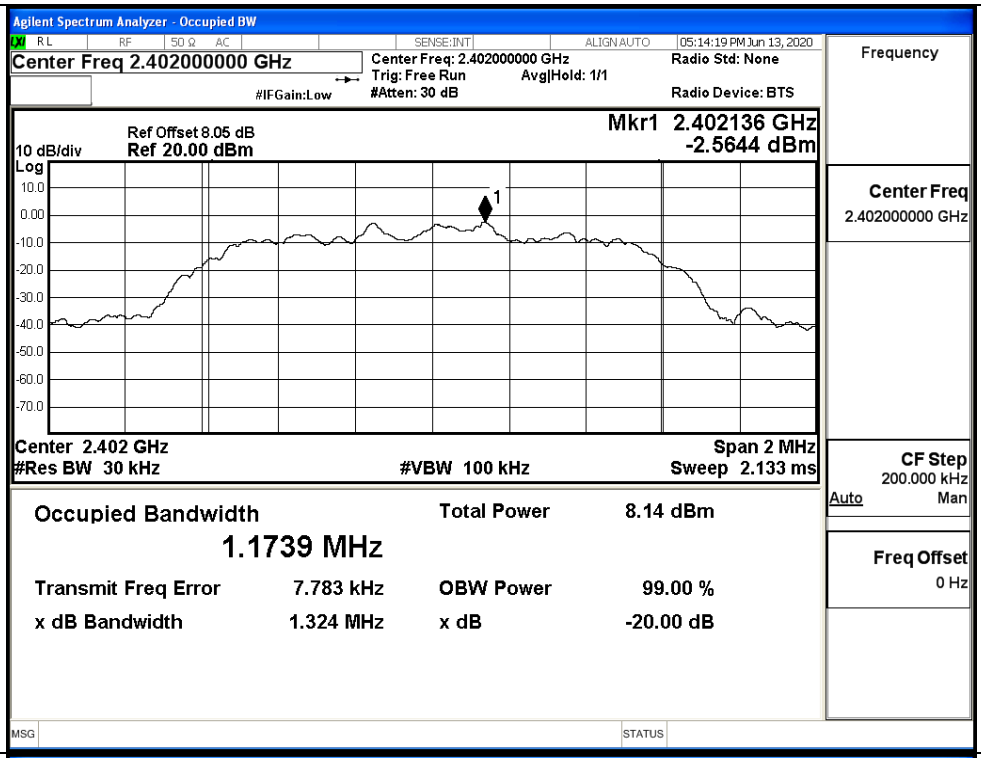
GFSK/MCH



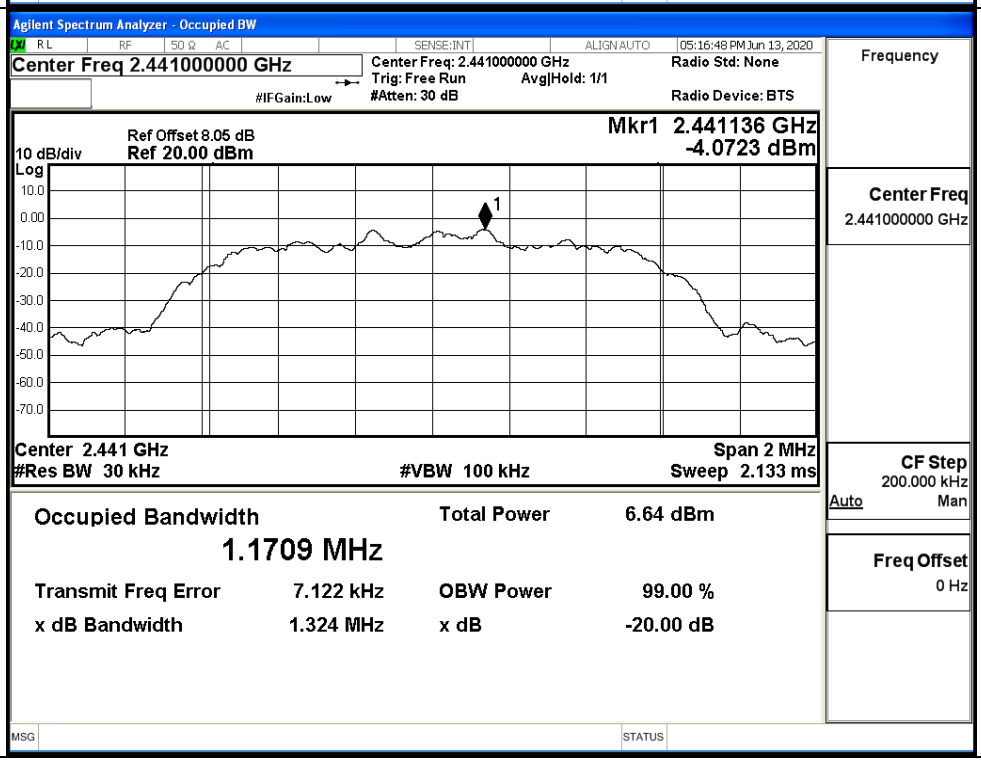
GFSK/HCH



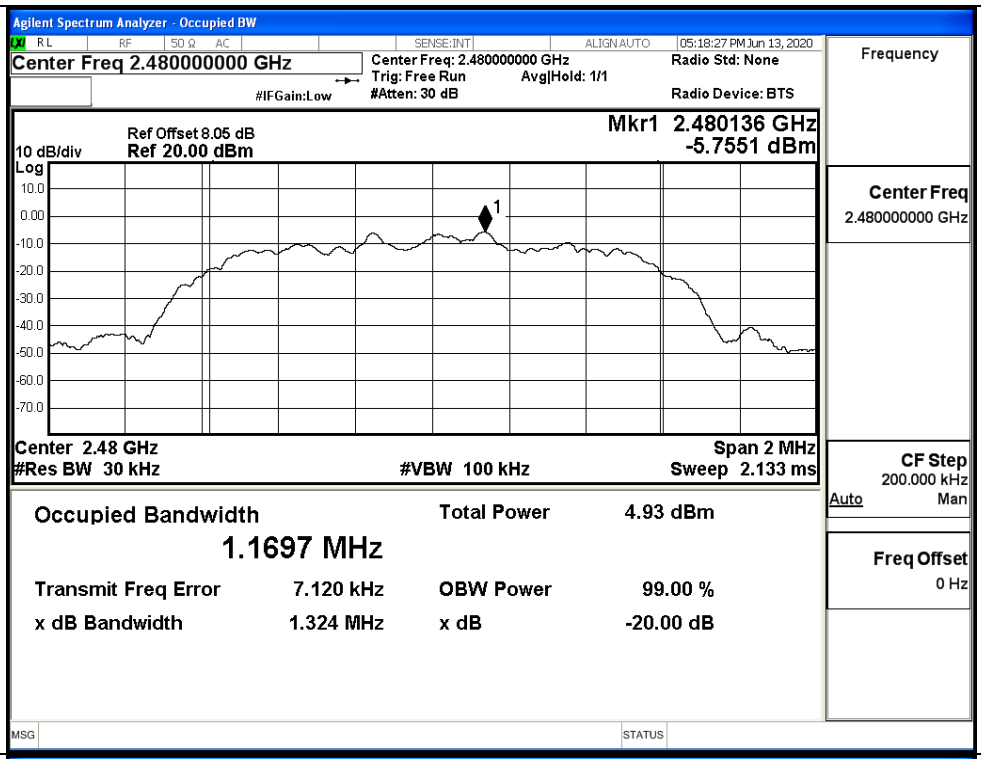
π/4DQPSK/LCH



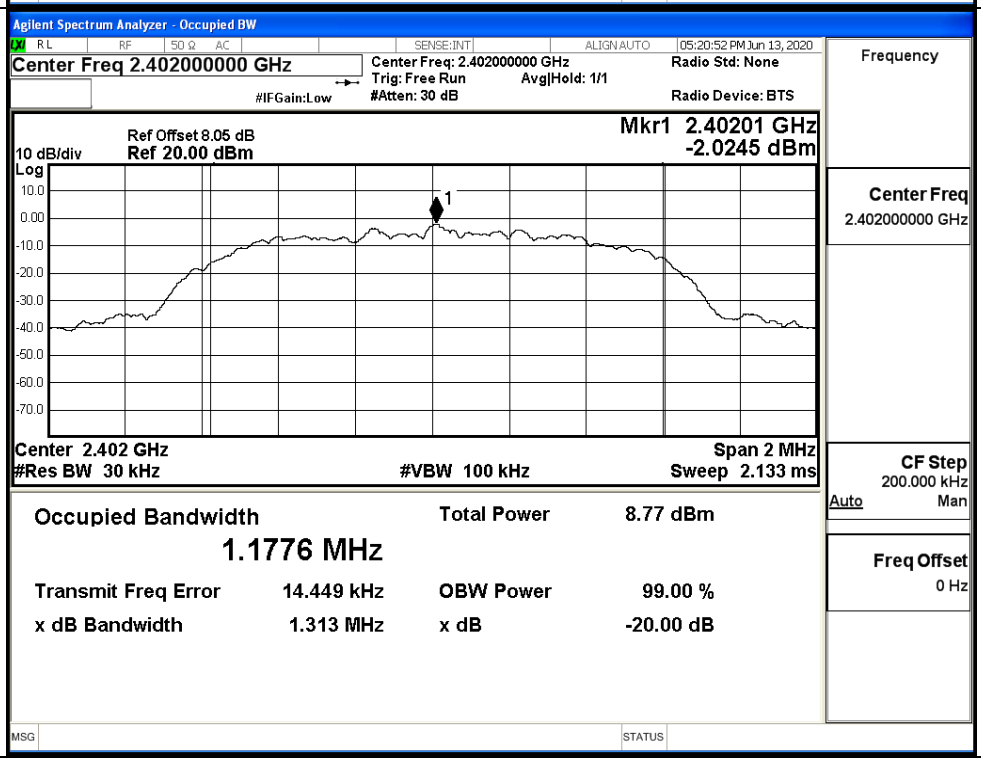
π/4DQPSK/MCH



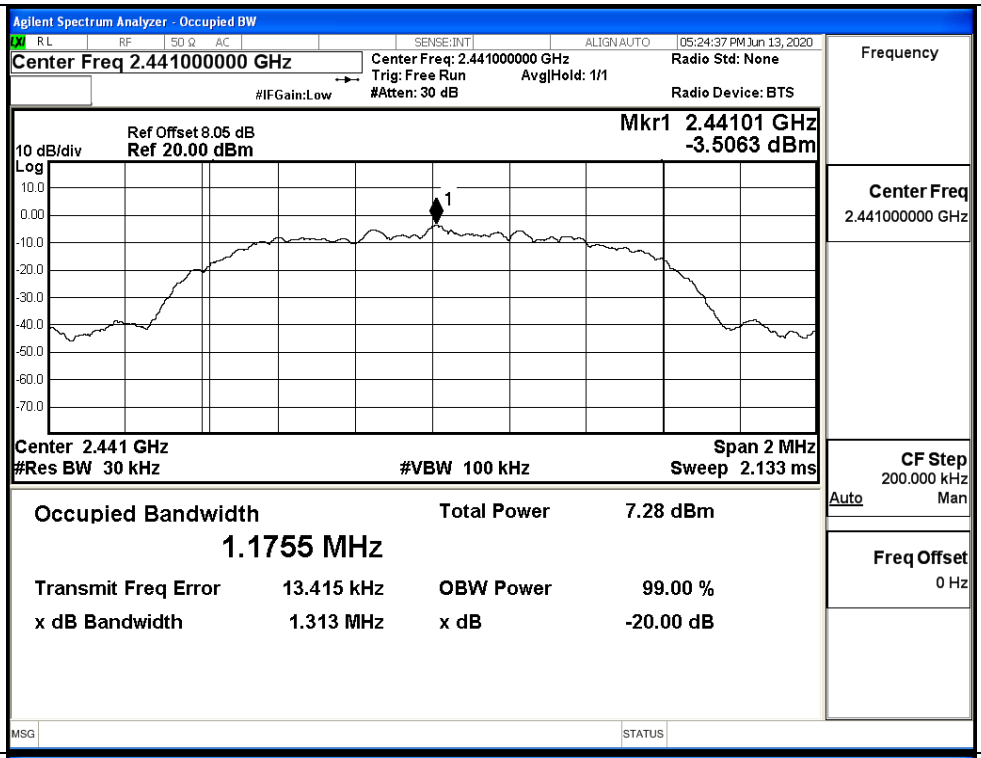
π/4DQPSK/HCH



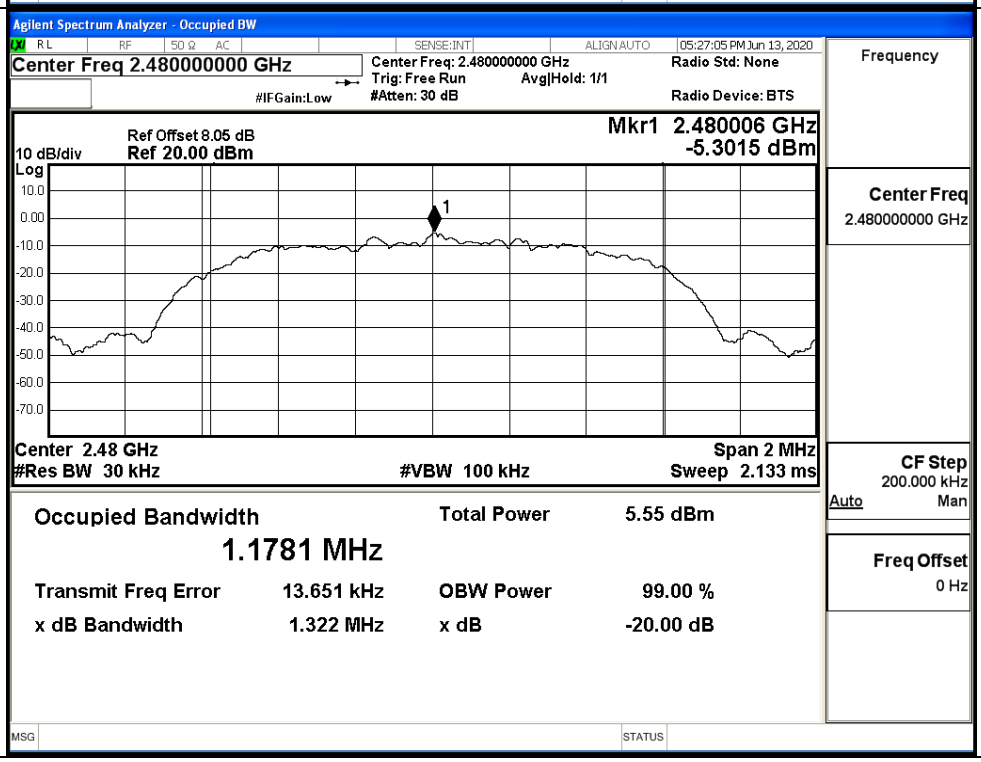
8DPSK/LCH



8DPSK/MCH

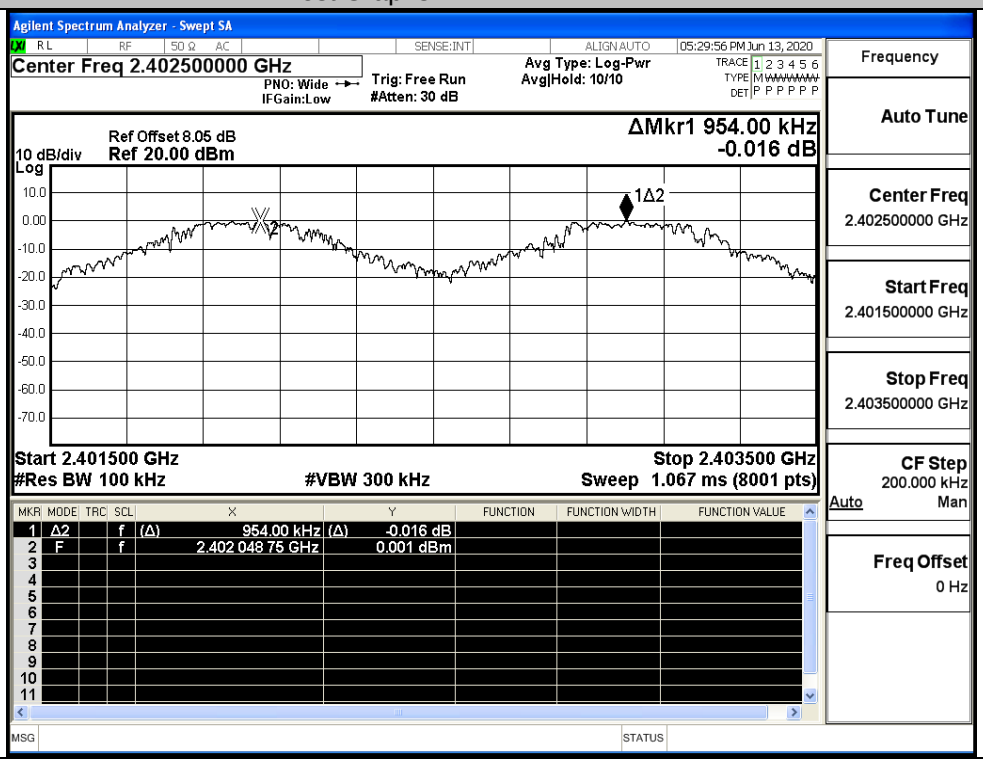


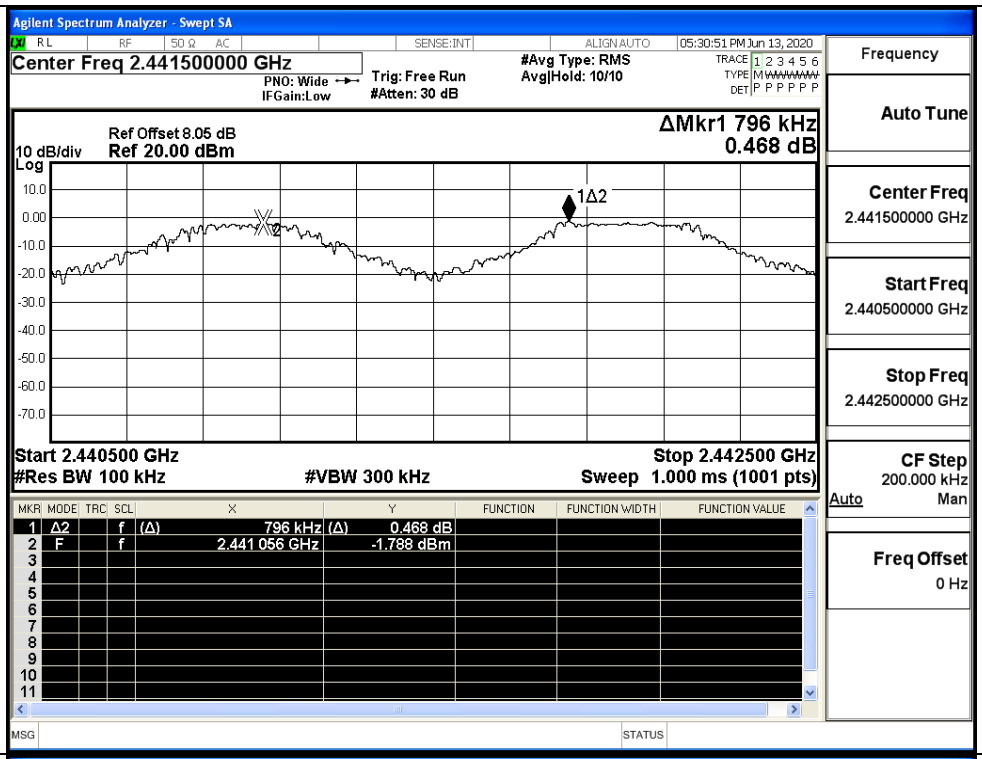
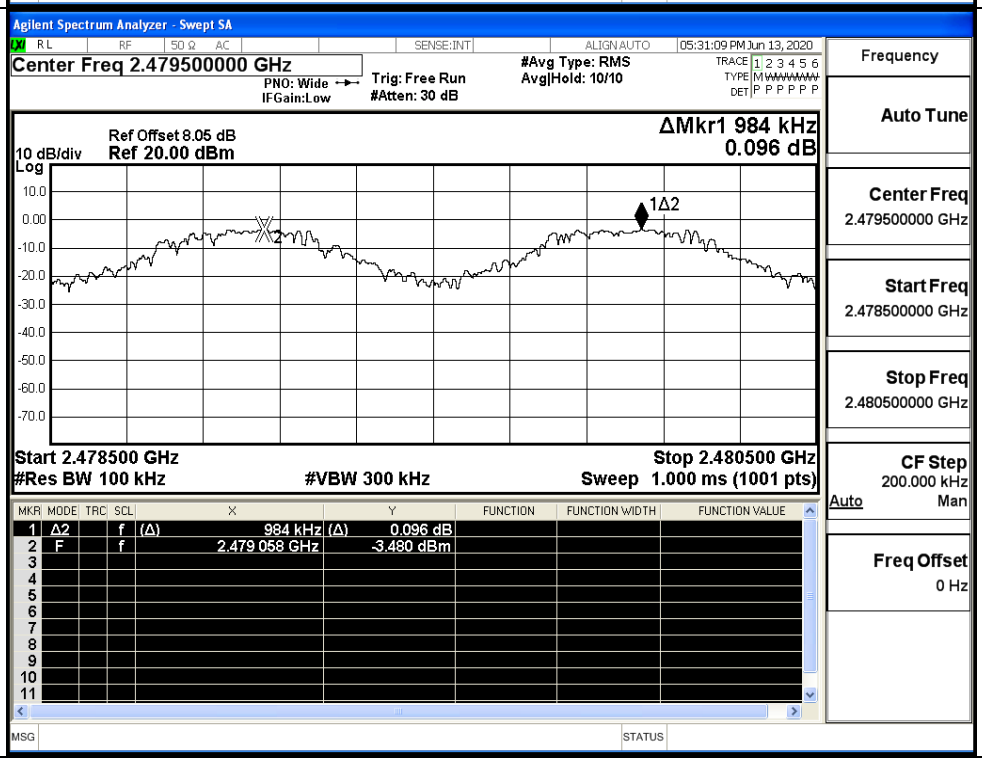
8DPSK/HCH



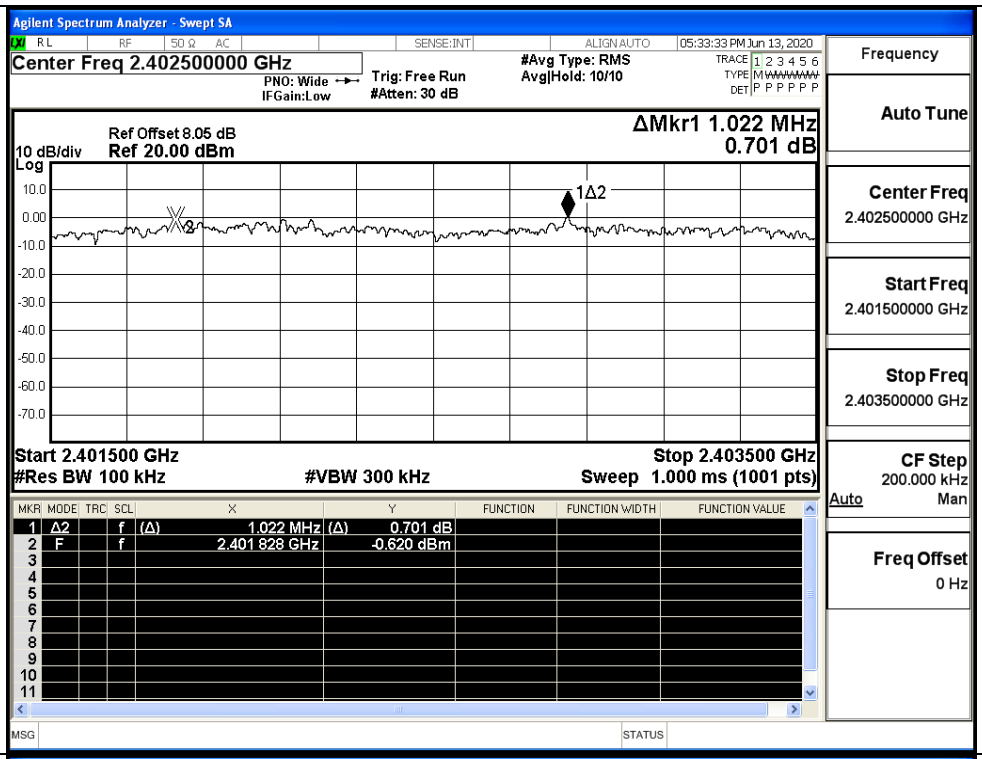
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.954	0.633	PASS
	MCH	0.796	0.633	PASS
	HCH	0.984	0.633	PASS
π/4DQPSK	LCH	1.022	0.883	PASS
	MCH	1.166	0.883	PASS
	HCH	1.016	0.883	PASS
8DPSK	LCH	0.914	0.881	PASS
	MCH	1.022	0.881	PASS
	HCH	1.136	0.881	PASS

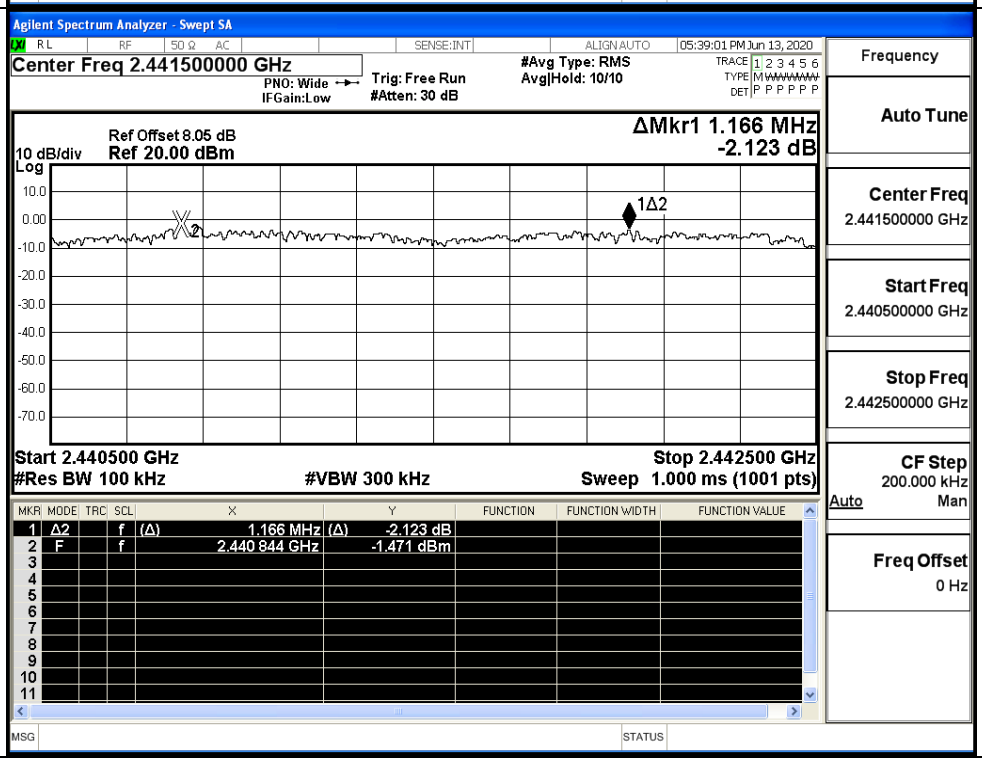
Test Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

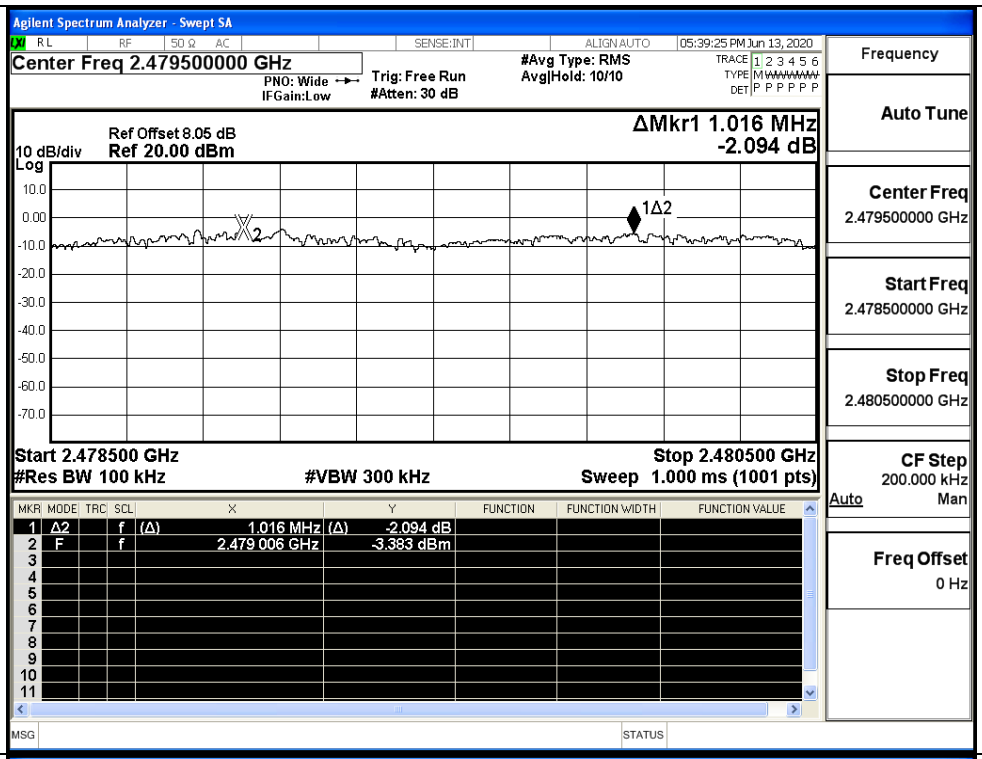
π/4DQPSK/LCH



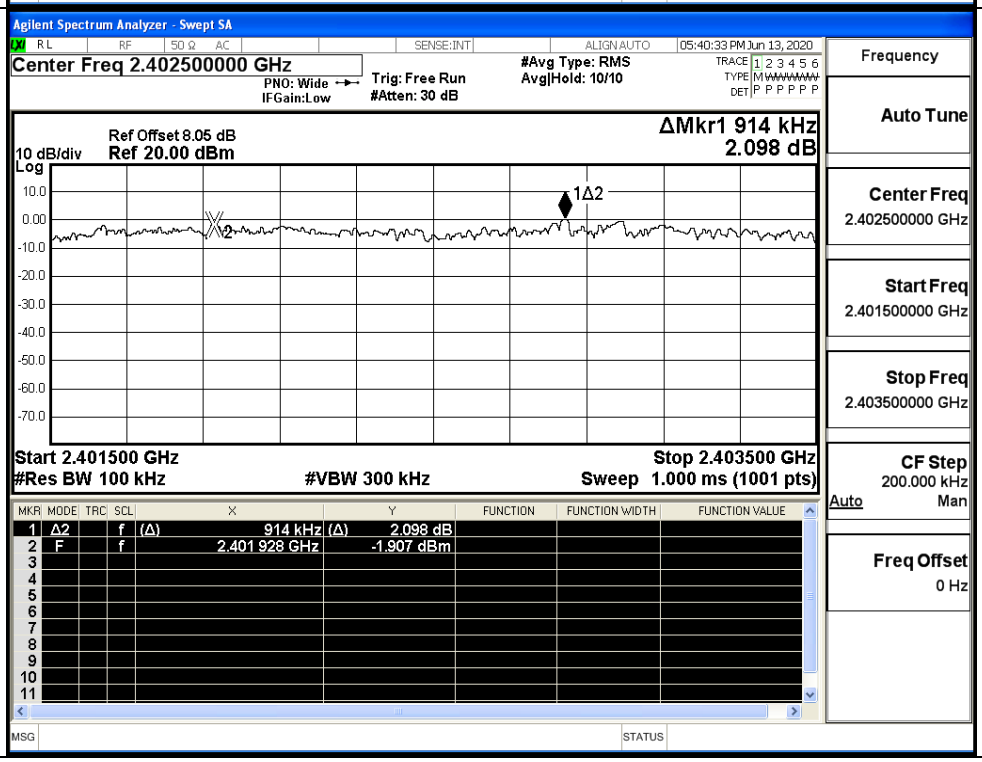
π/4DQPSK/MCH

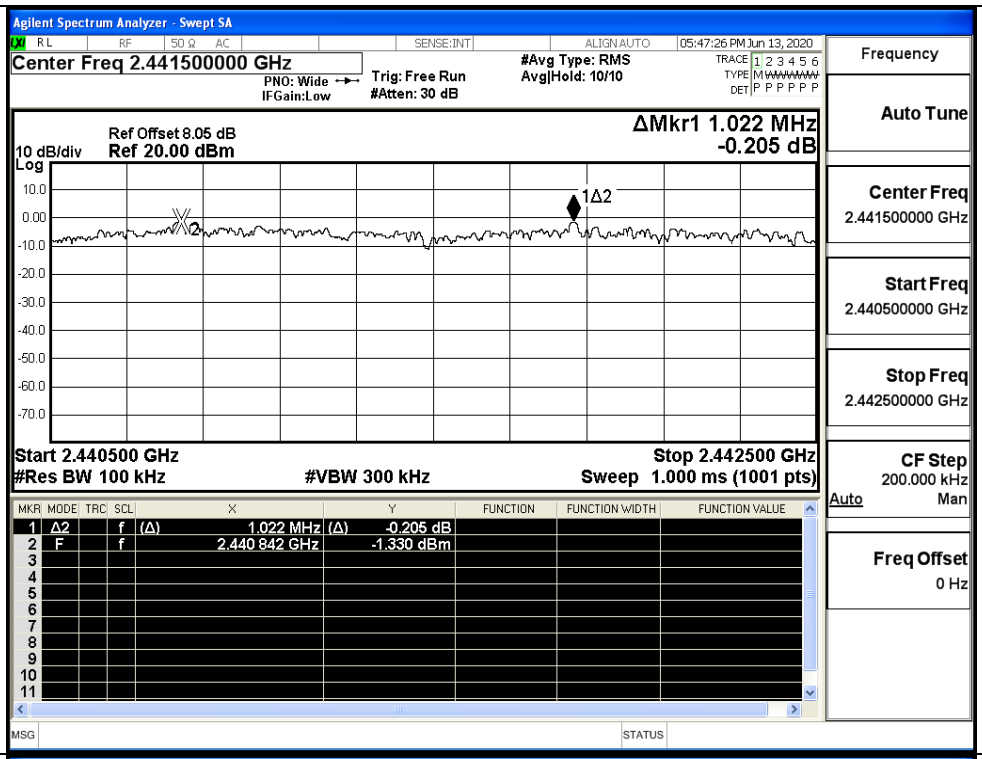
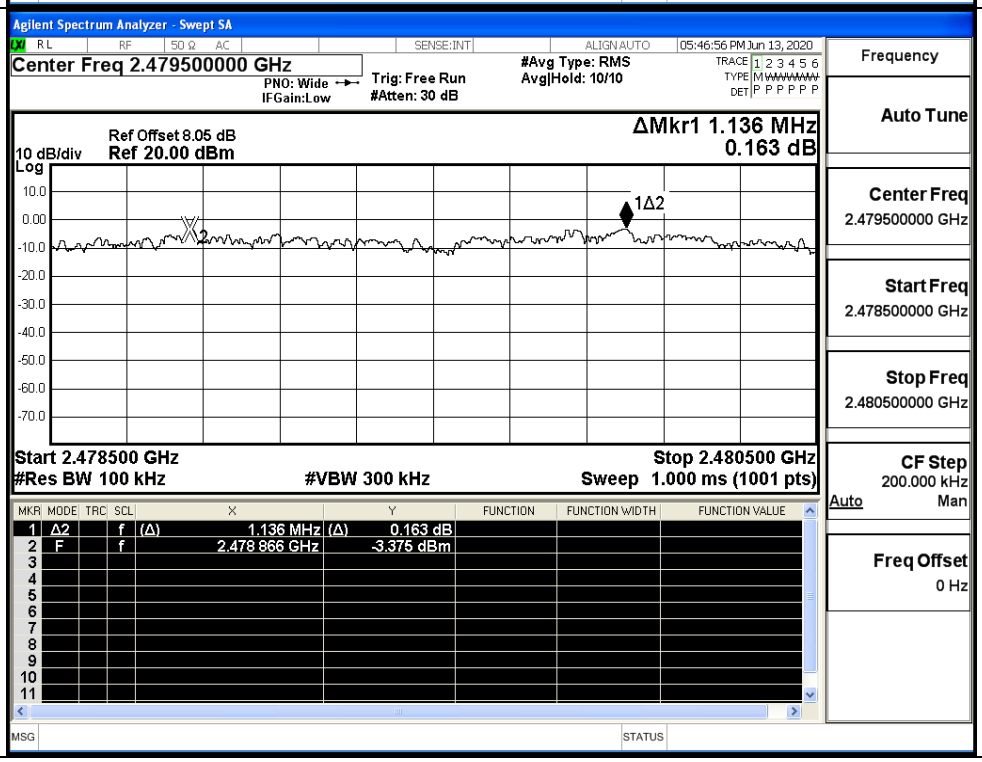


π/4DQPSK/HCH



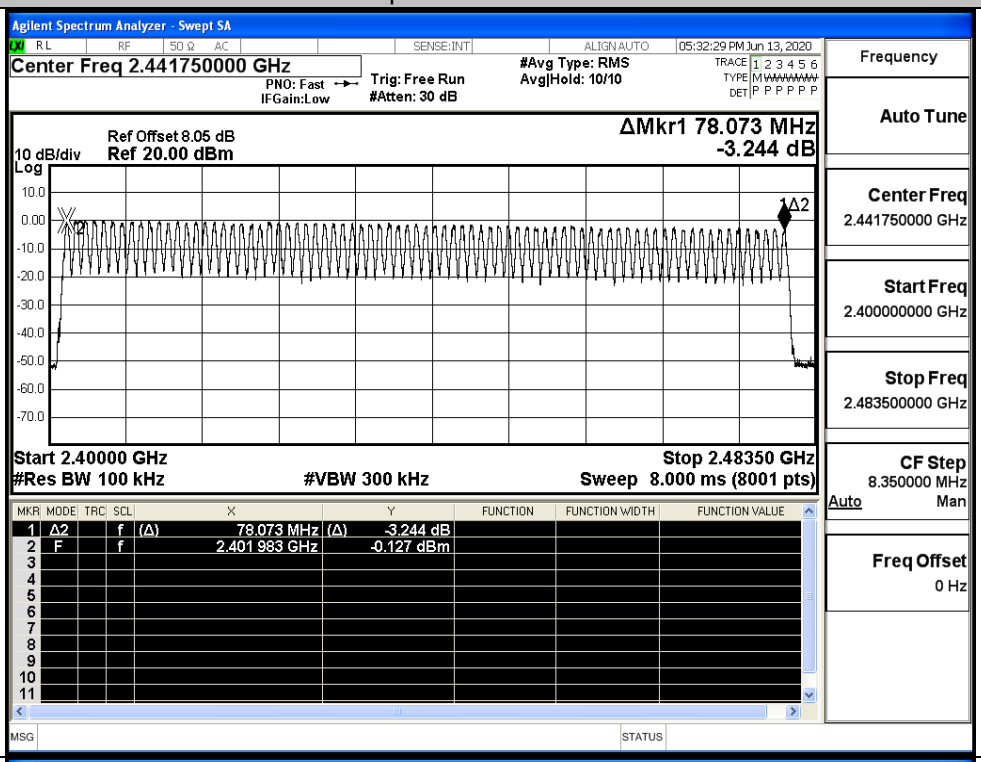
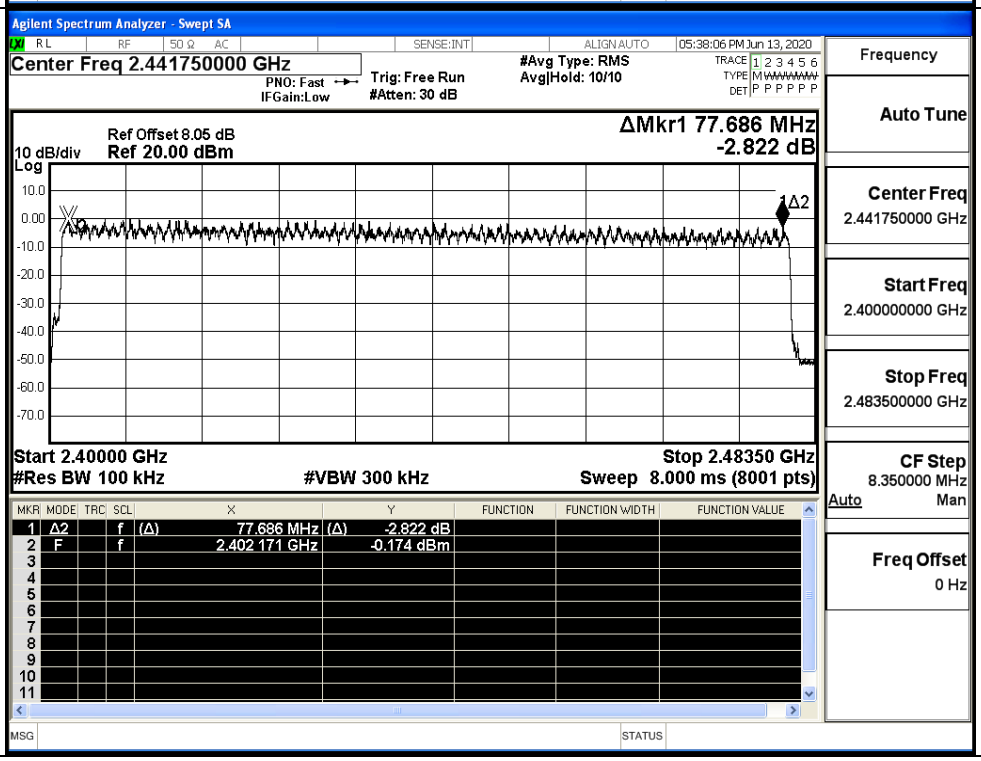
8DPSK/LCH

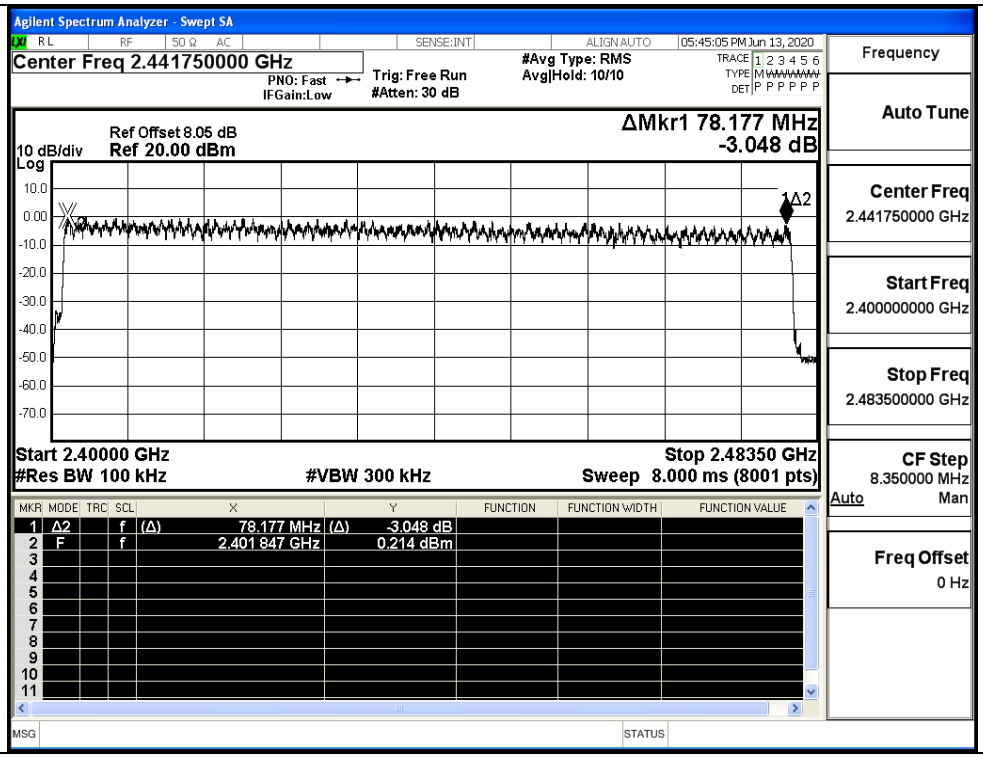


8DPSK/MCH		
8DPSK/HCH		

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

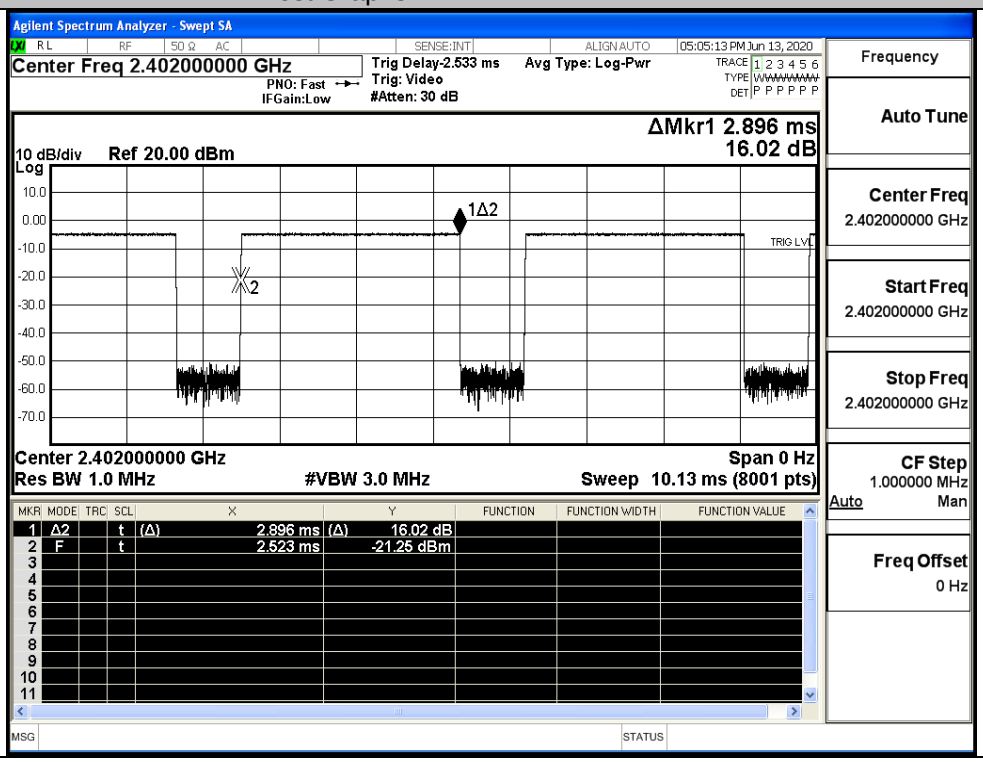
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

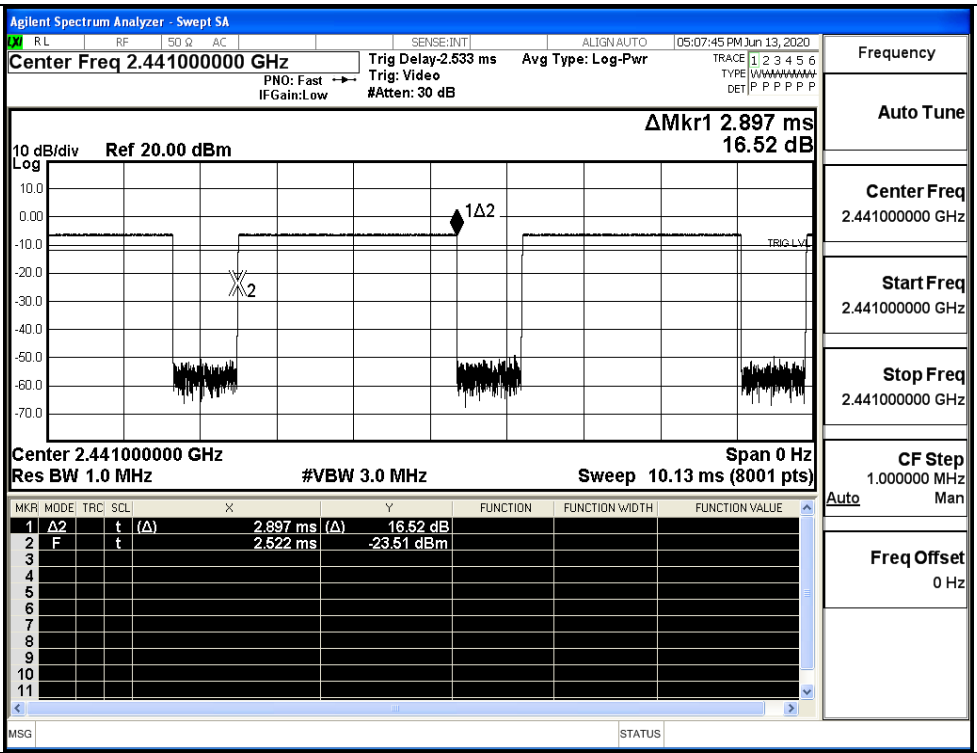
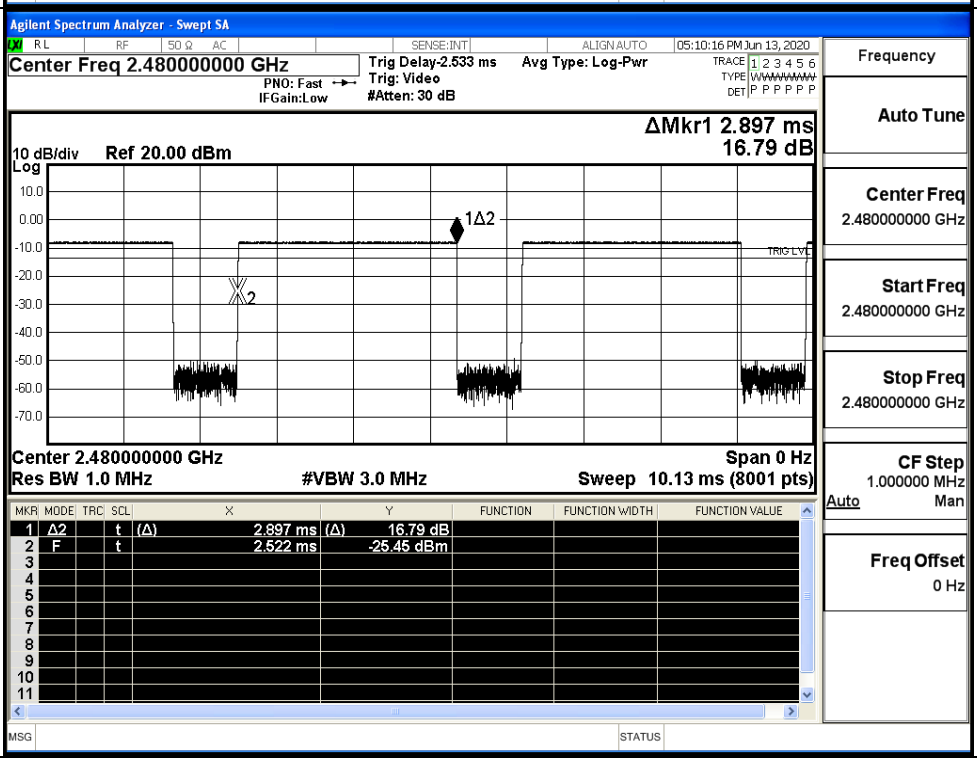
8DPSK/Hop	

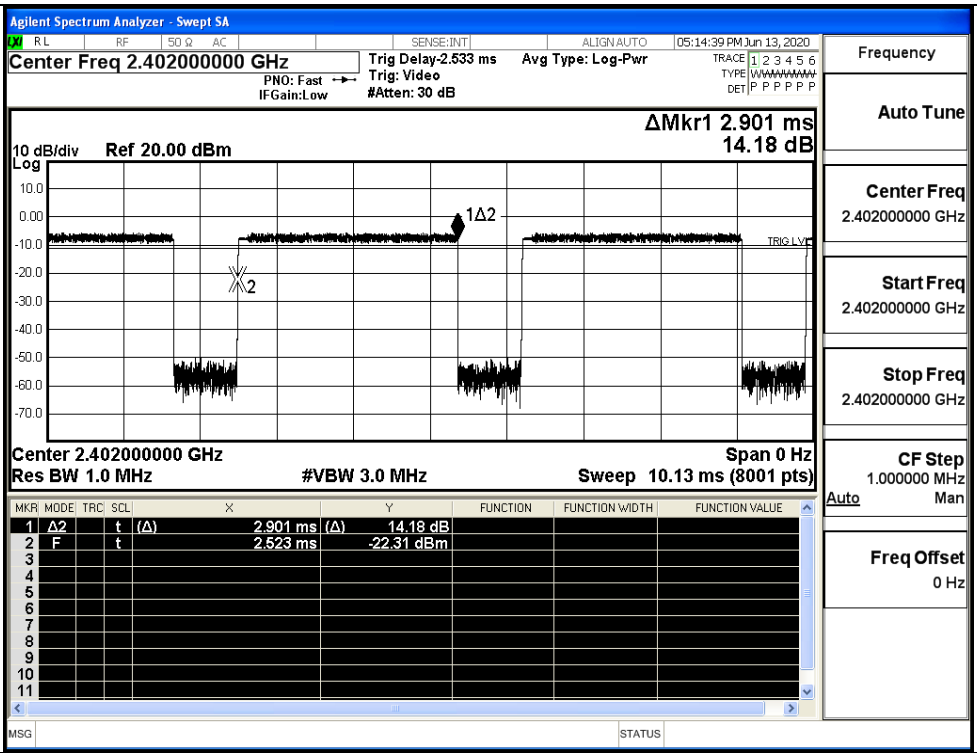
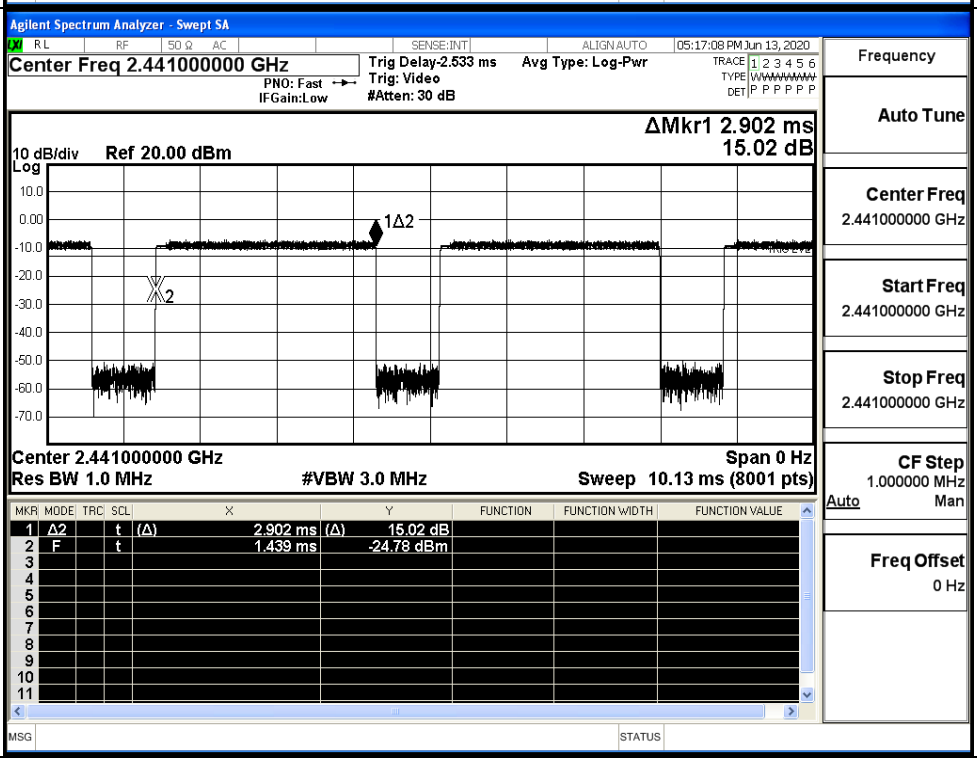
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
05:45:05 PM Jun 13, 2020
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 78.177 MHz
-3.048 dB
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (8001 pts)
1 Δ2 f (Δ) 78.177 MHz (Δ) -3.048 dB
2 F f 2.401 847 GHz 0.214 dBm
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

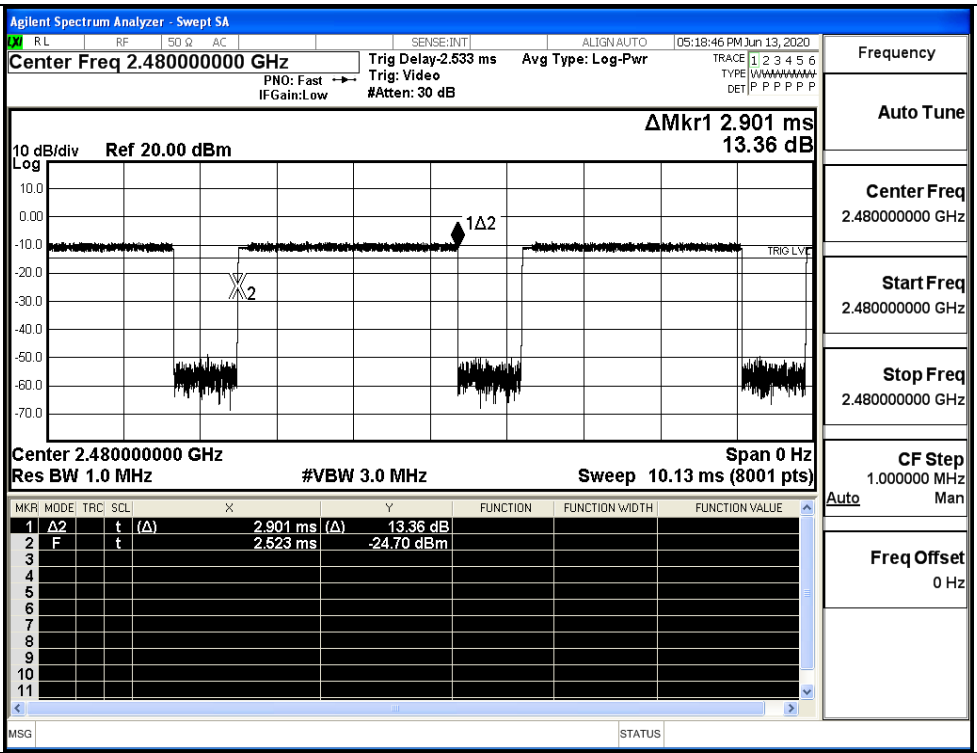
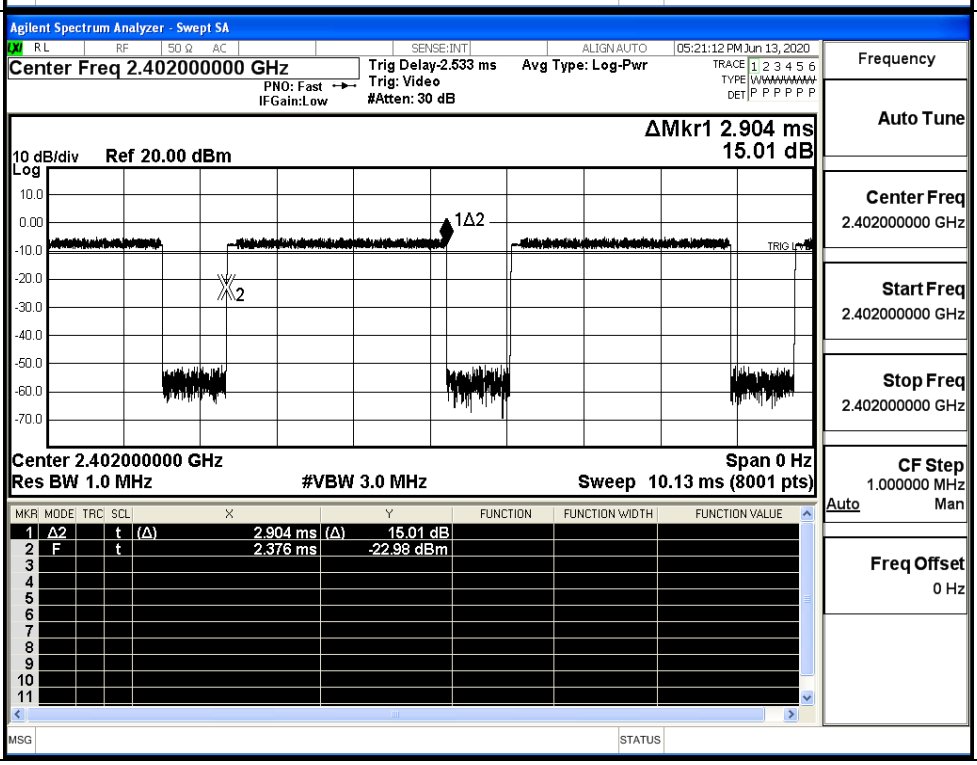
A.5 Dwell Time

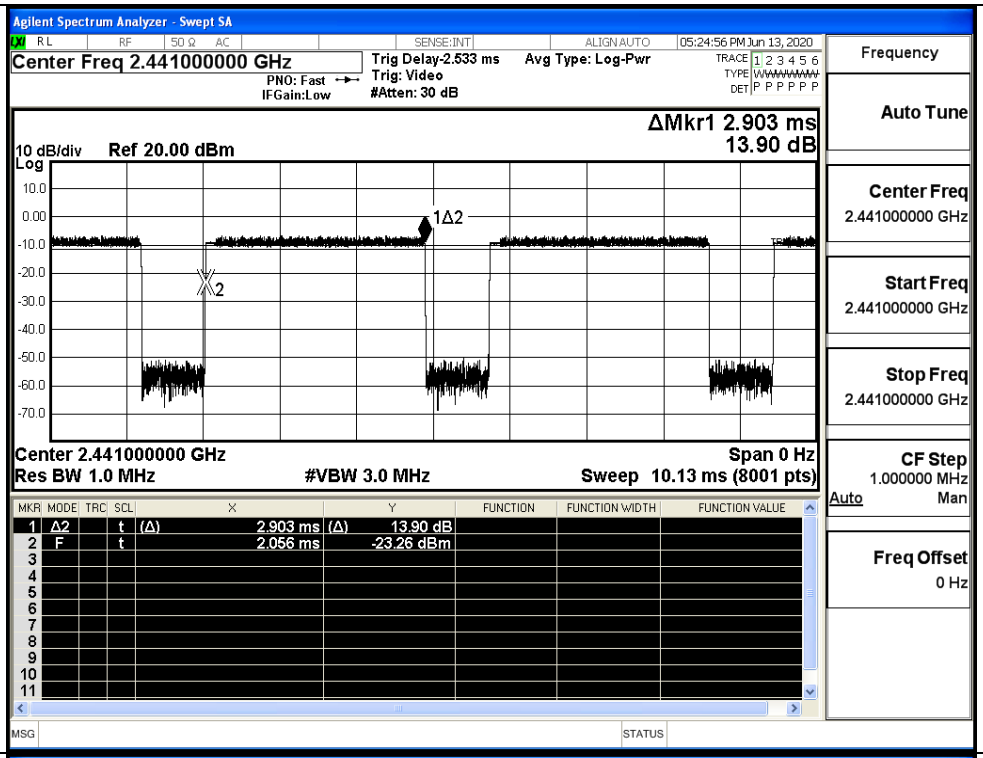
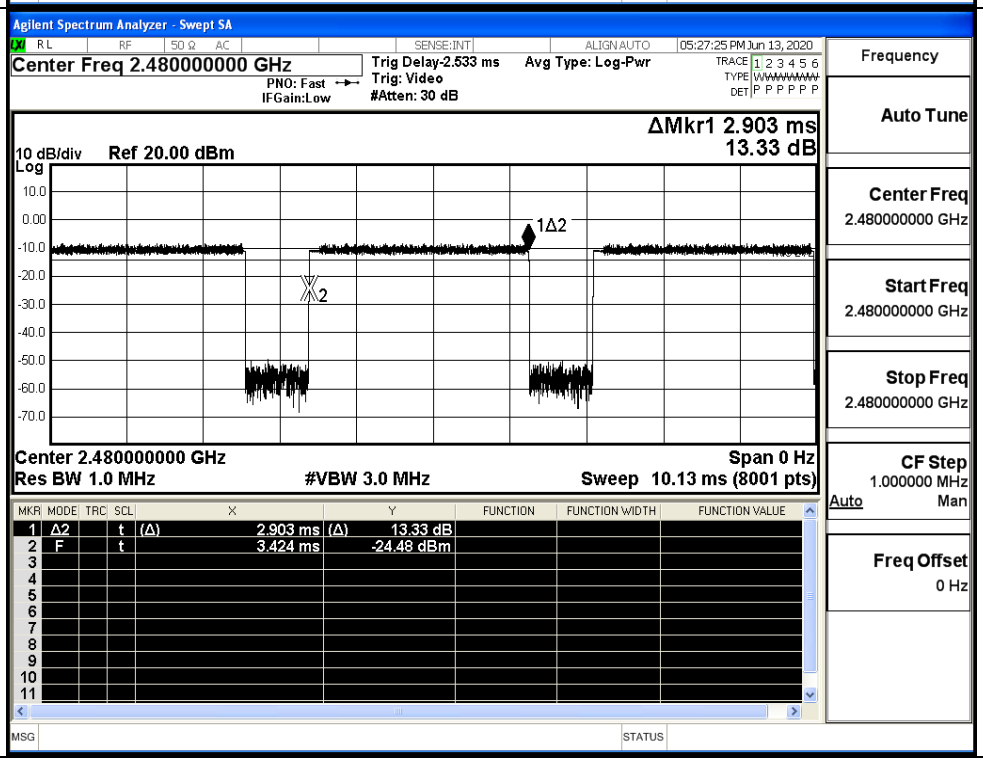
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
π/4DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS

Test Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

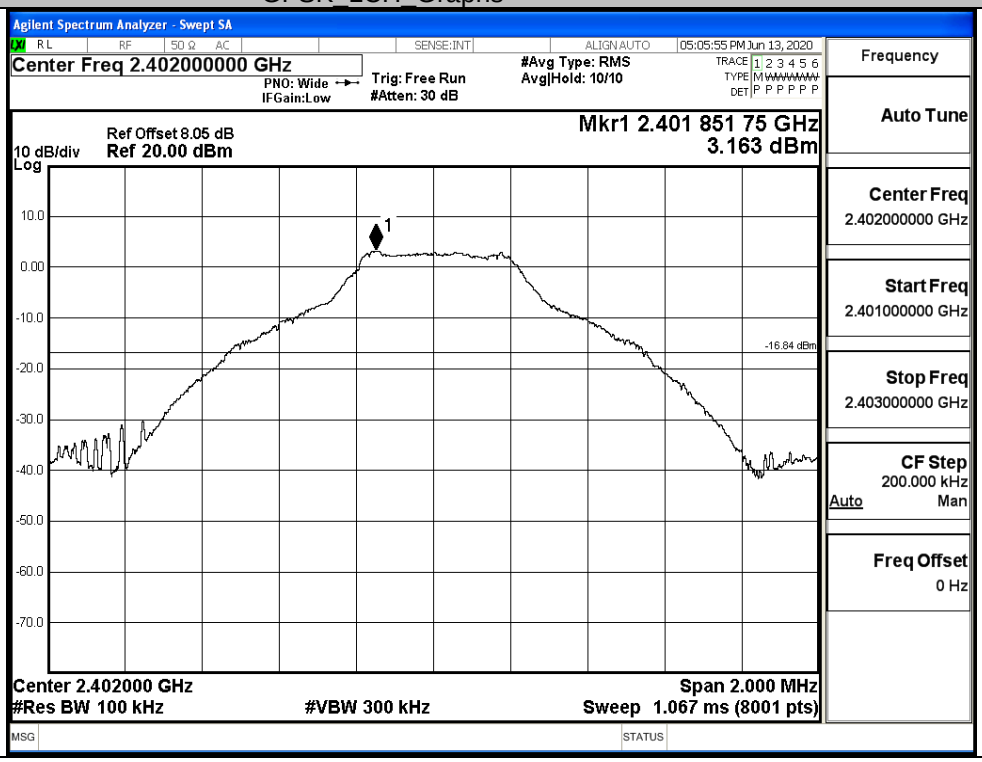
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

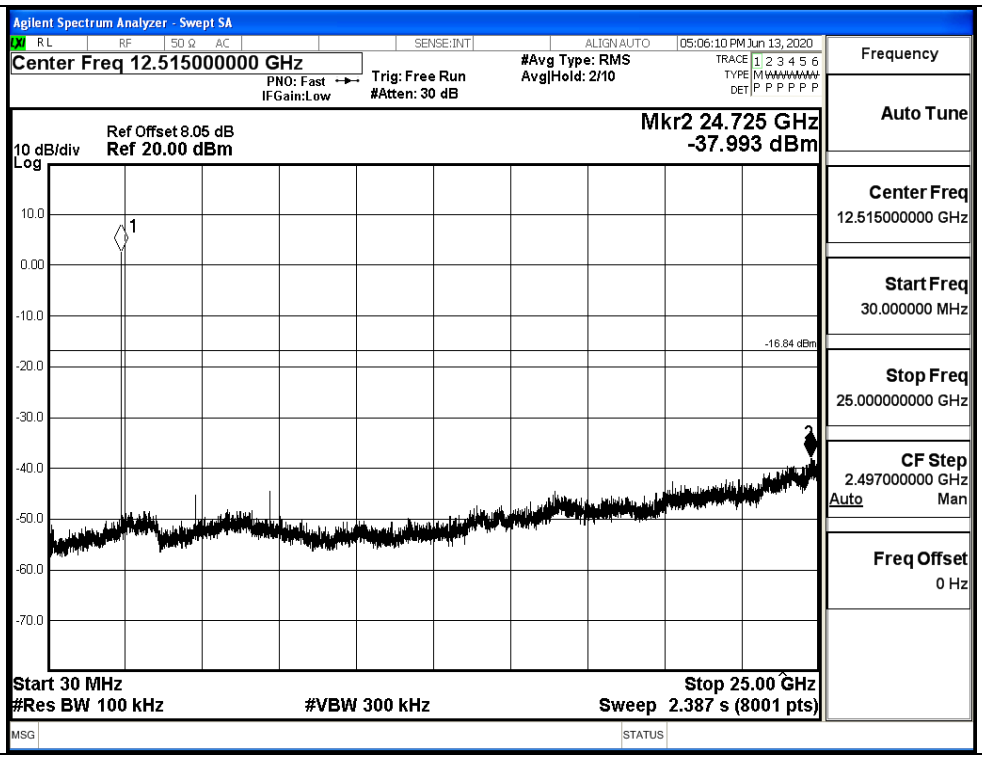
π/4DQPSK _2DH5/HCH	
8DPSK _3DH5/LCH	

8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

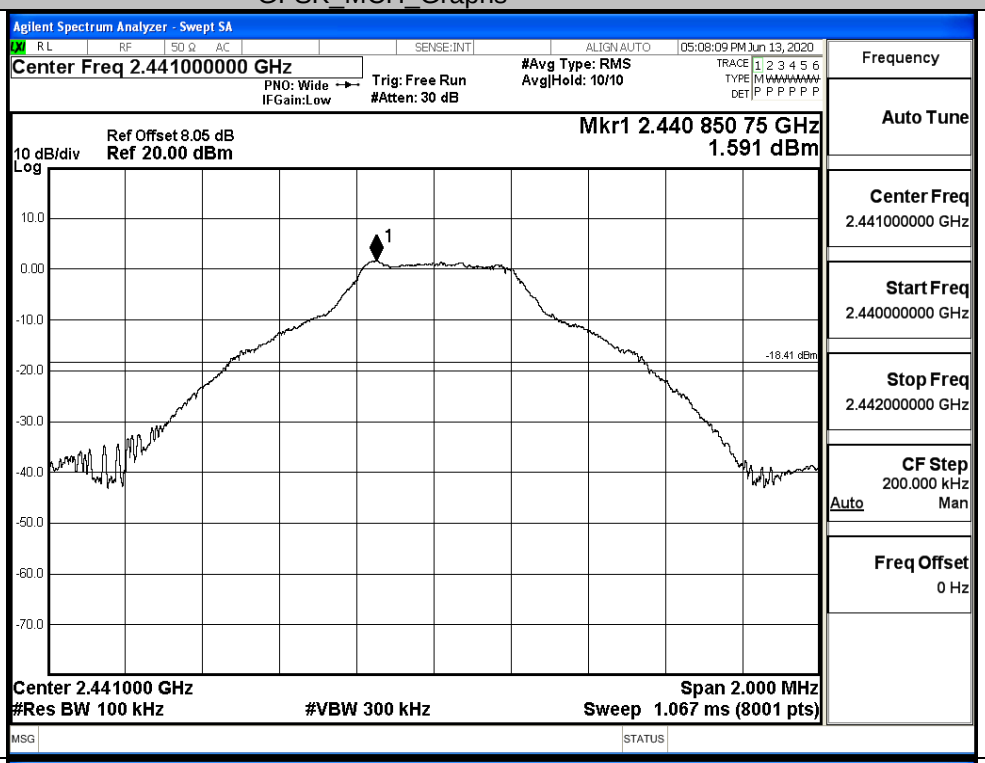
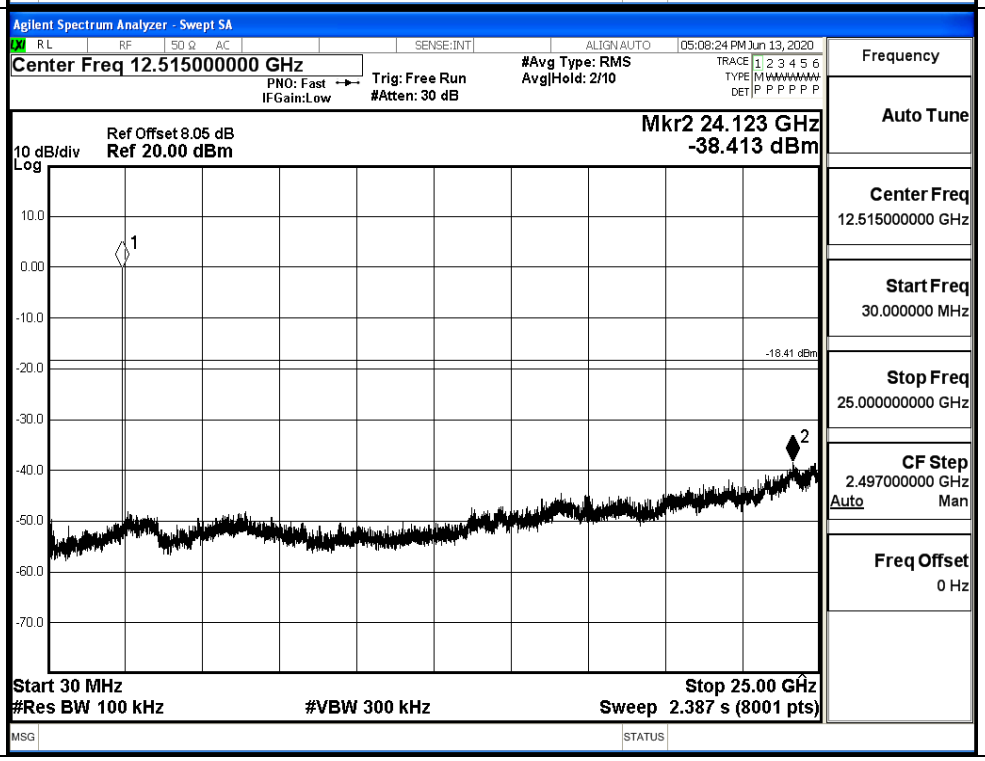
A.6 RF Conducted Spurious Emissions

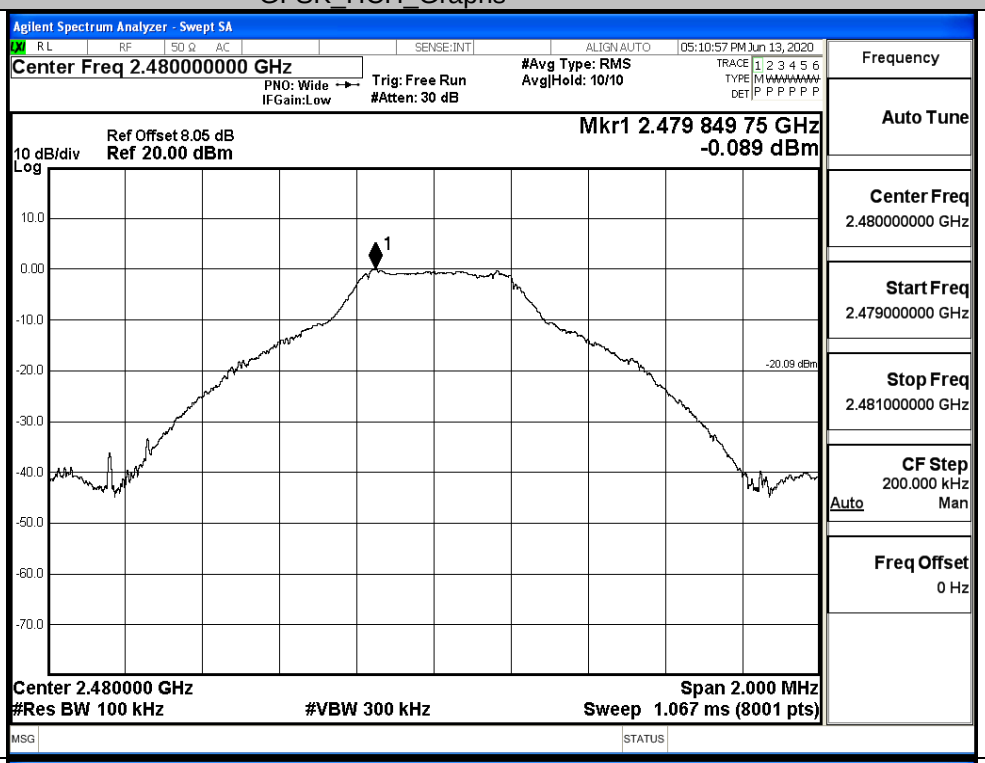
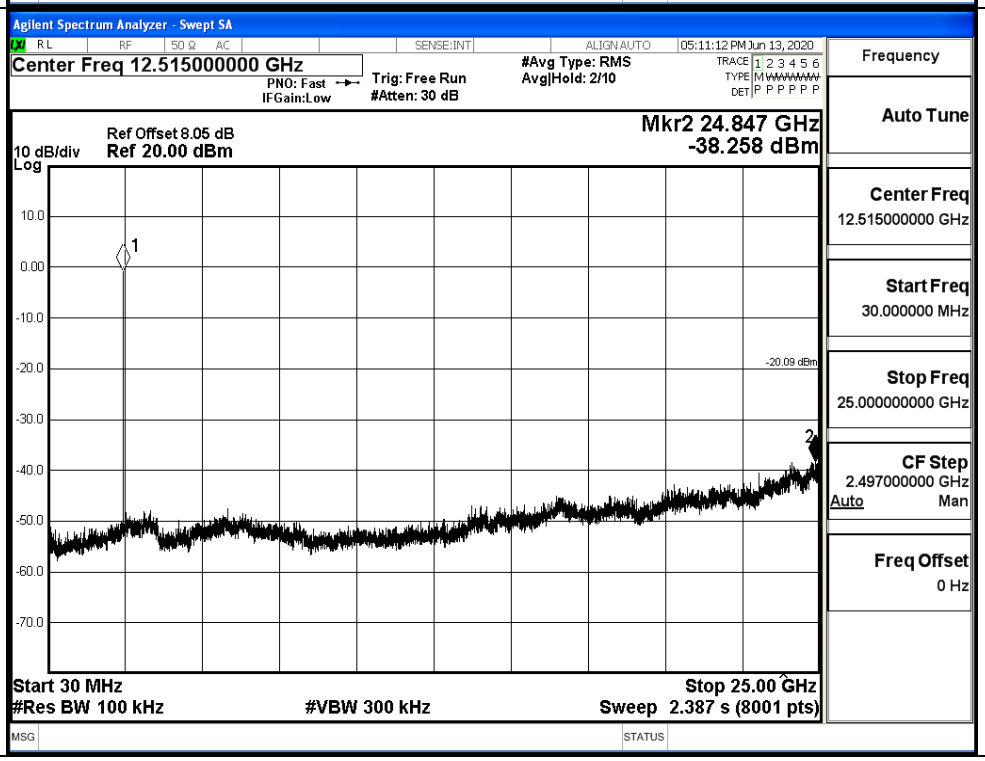
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.163	-37.993	-16.837	PASS
	MCH	1.591	-38.413	-18.409	PASS
	HCH	-0.089	-38.258	-20.089	PASS
π/4DQPSK	LCH	0.07	-38.112	-19.930	PASS
	MCH	-1.496	-37.175	-21.496	PASS
	HCH	-3.177	-38.639	-23.177	PASS
8DPSK	LCH	0.25	-37.021	-19.750	PASS
	MCH	-1.27	-37.616	-21.270	PASS
	HCH	-3.043	-36.814	-23.043	PASS

GFSK_LCH_Graphs		
Pref		

Puw		

Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
05:06:10 PM Jun 13, 2020
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr2 24.725 GHz
-37.993 dBm
-16.84 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

GFSK_MCH_Graphs		
Pref		
Puw		

GFSK_HCH_Graphs		
Pref		
Puw		

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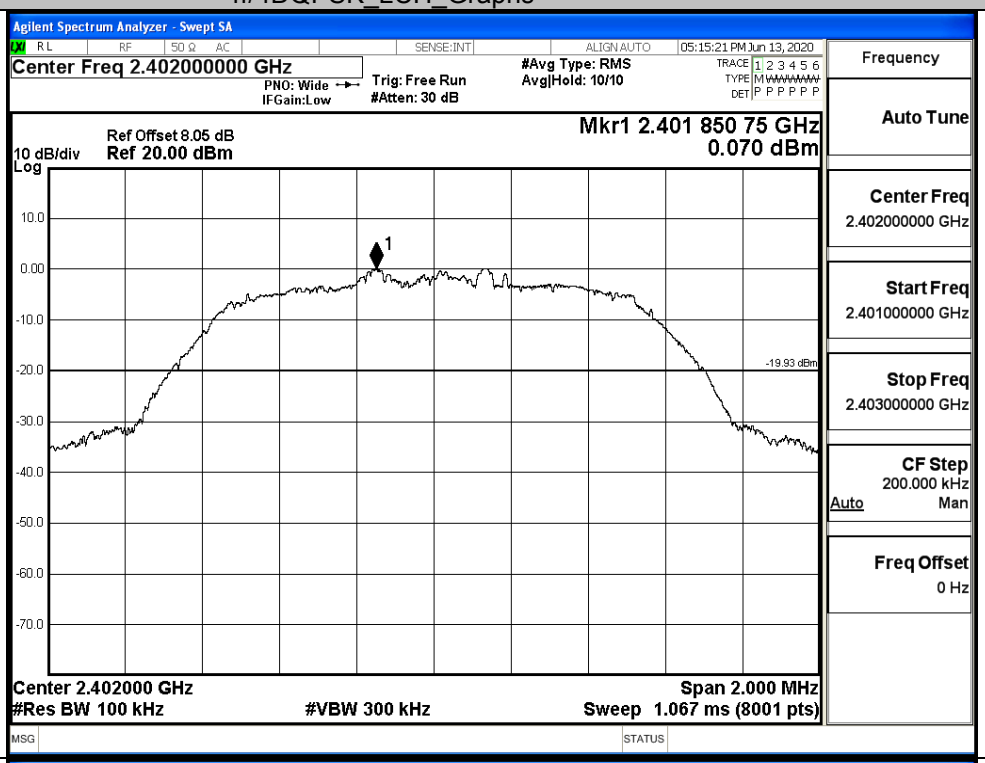
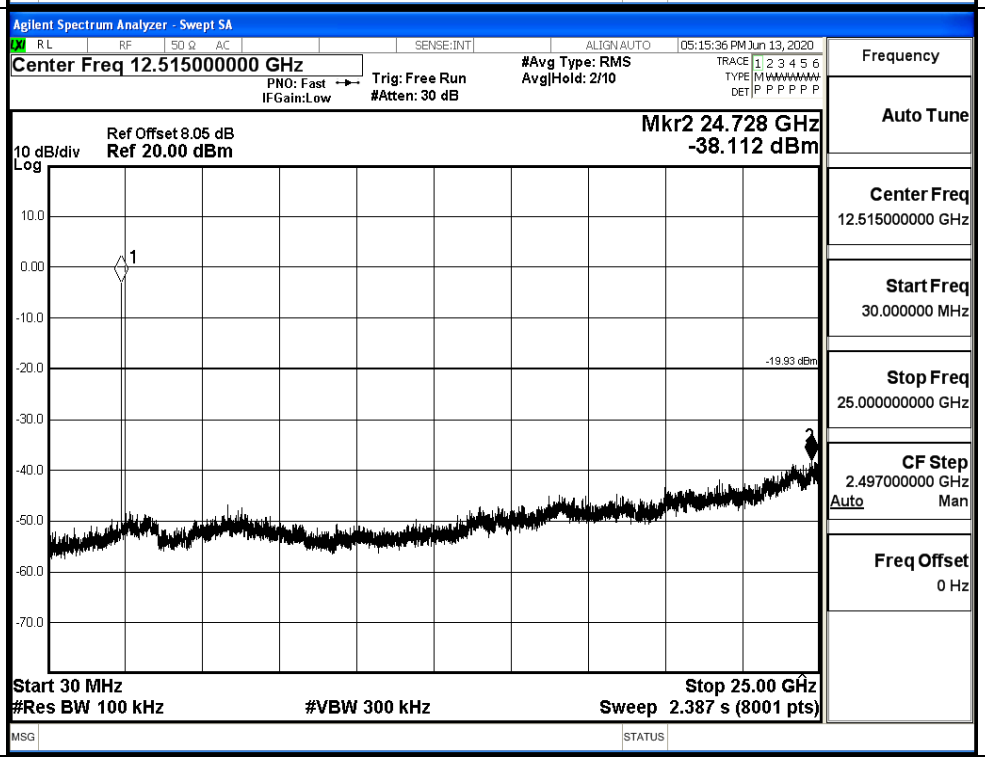
Pref		
Puw		

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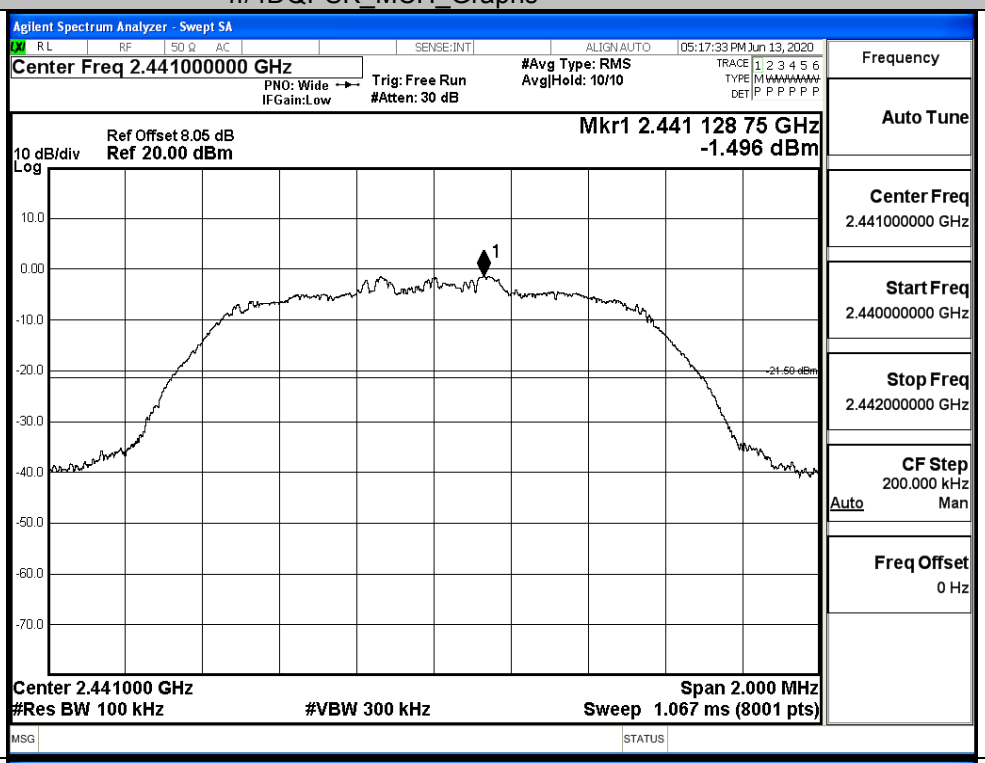
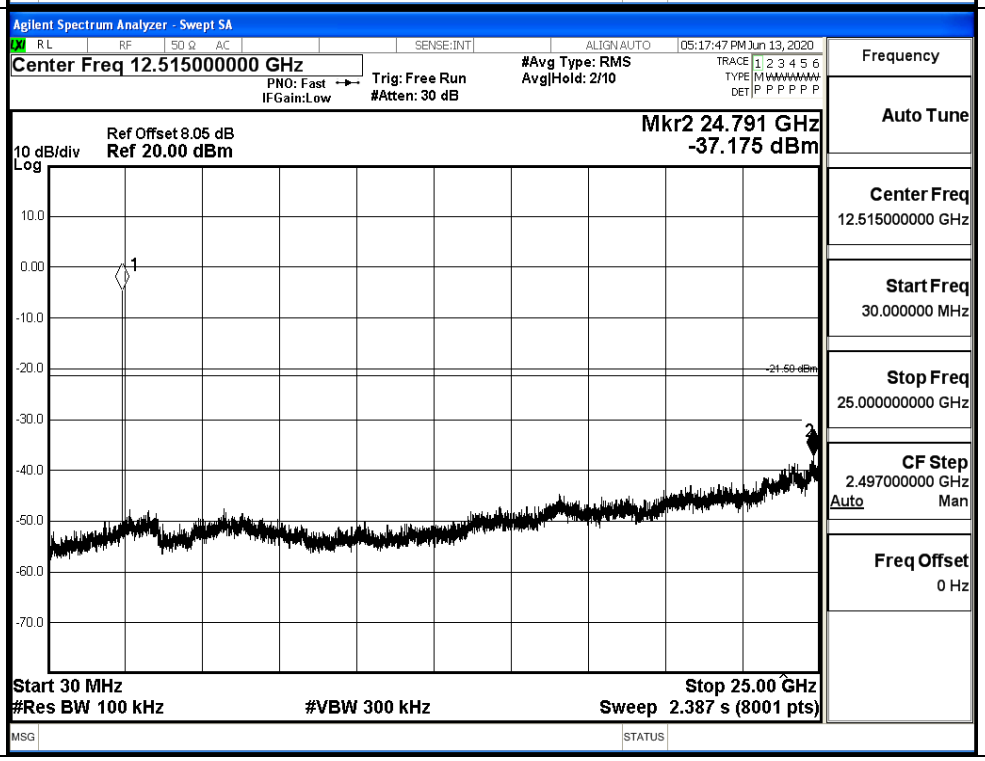
Pref		
Puw		

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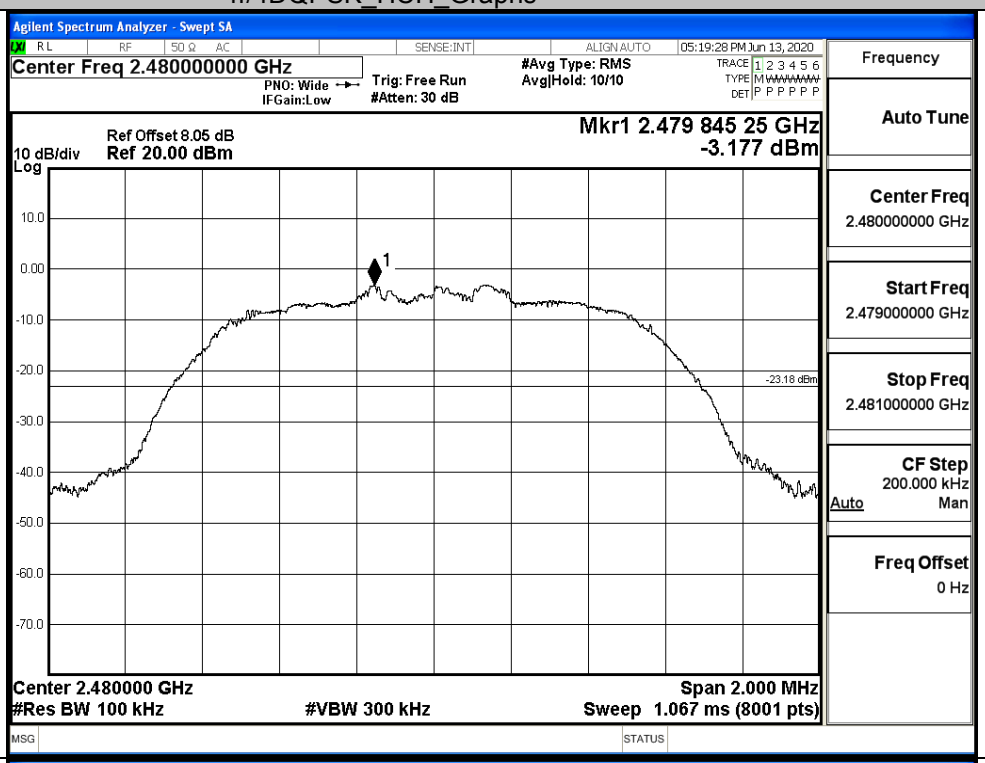
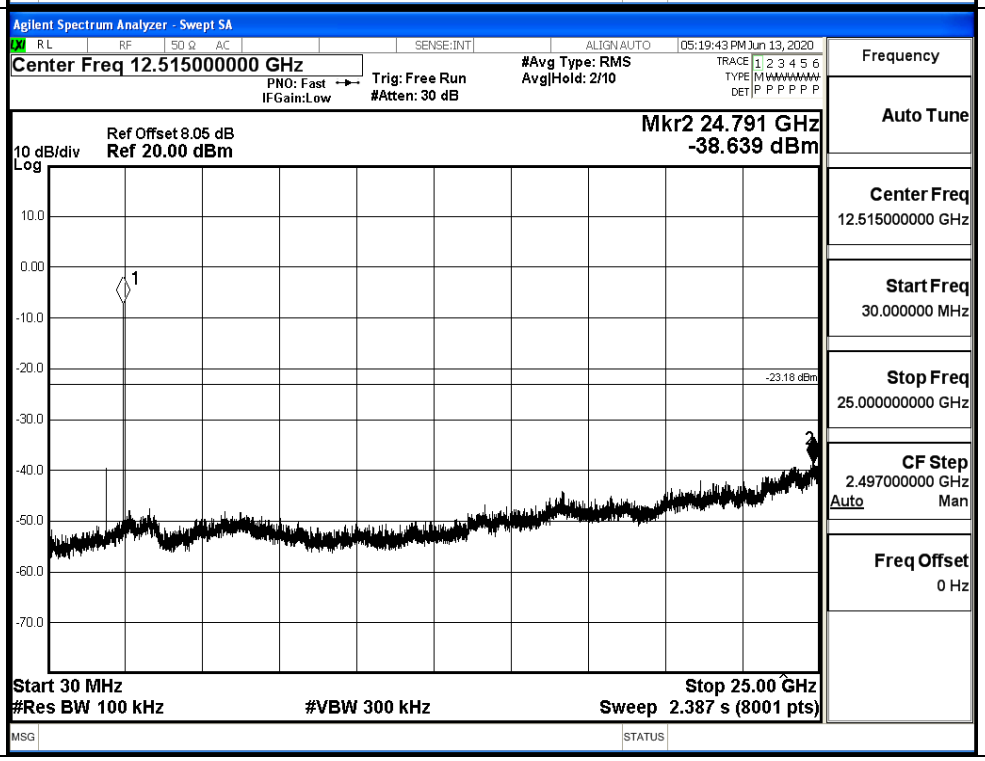
Pref		
Puw		

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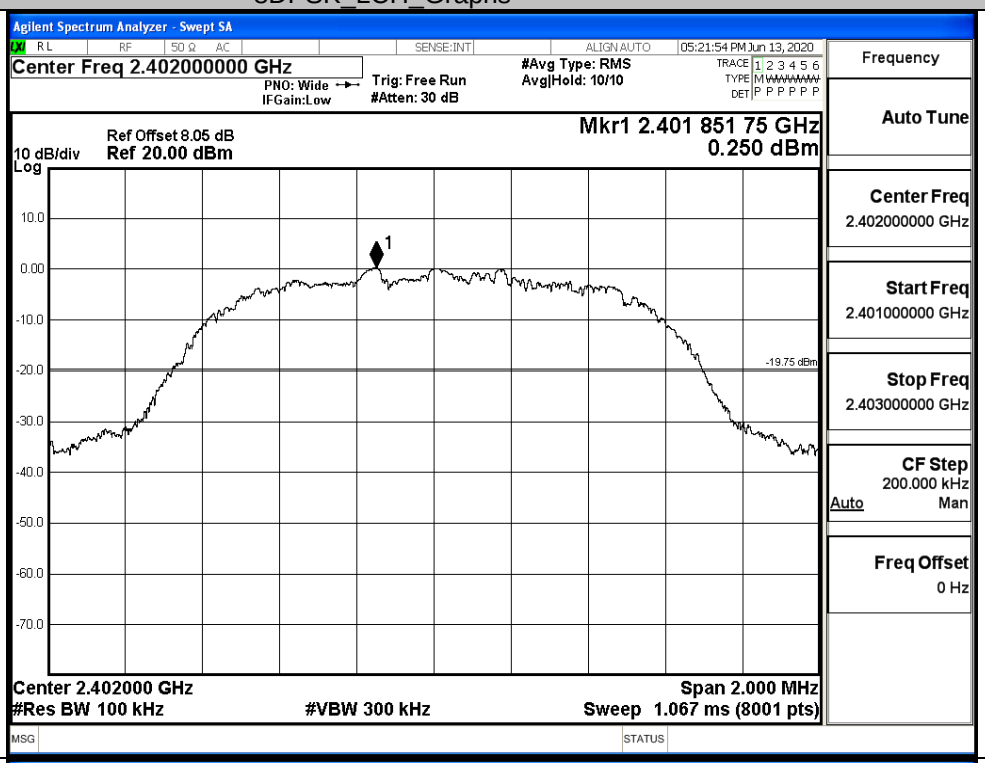
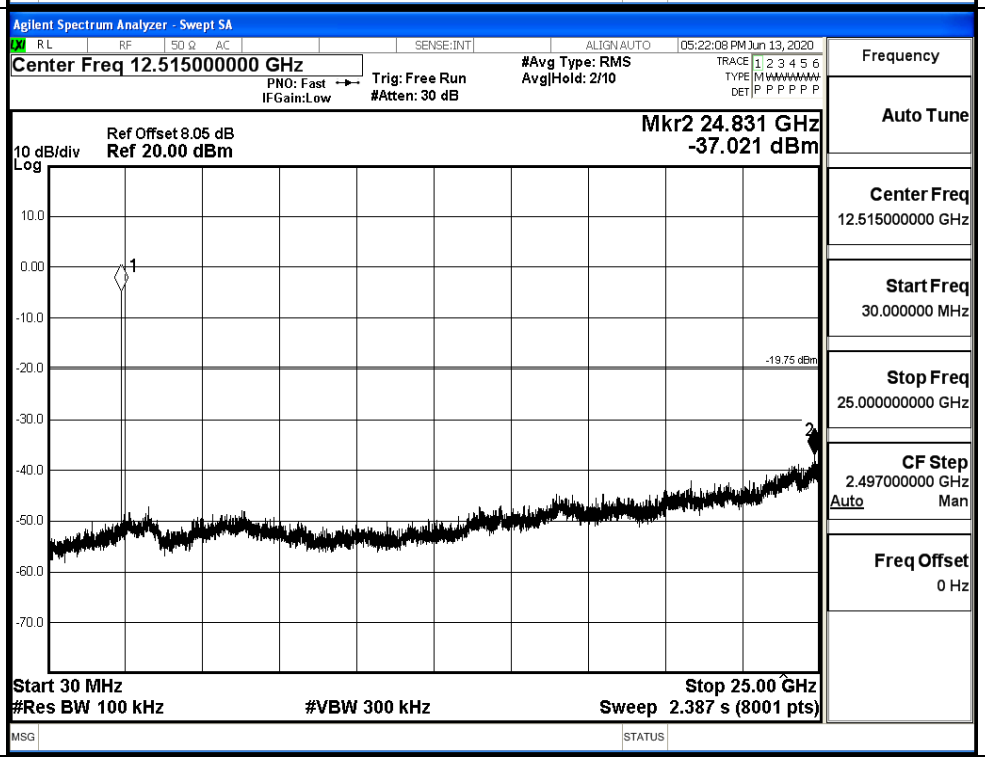
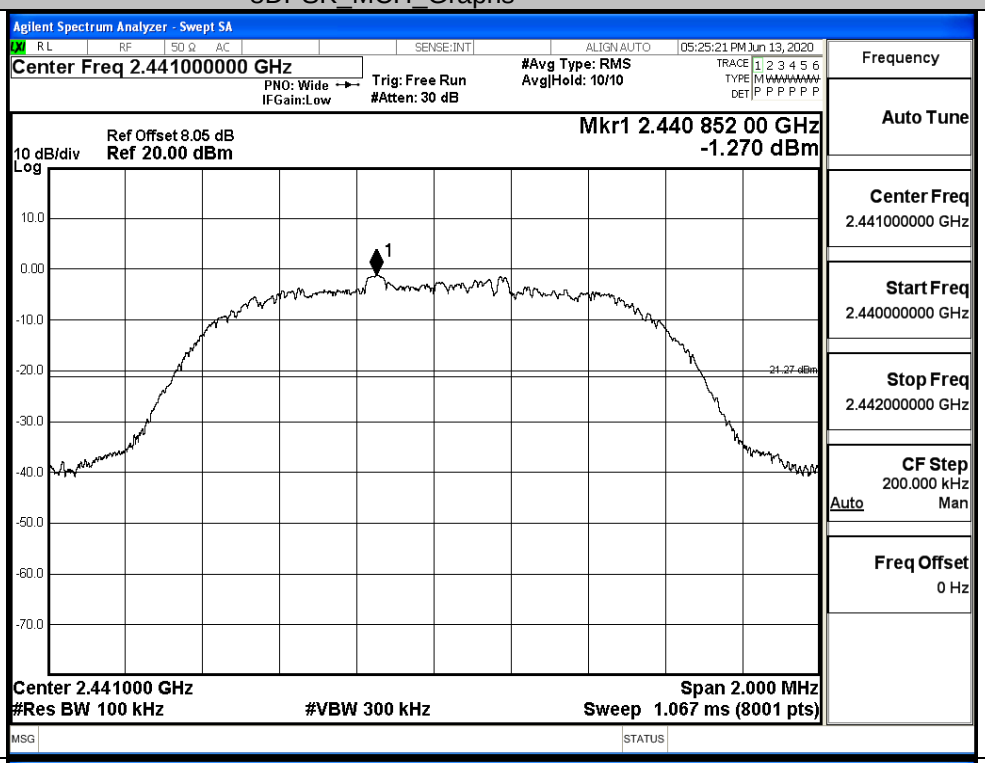
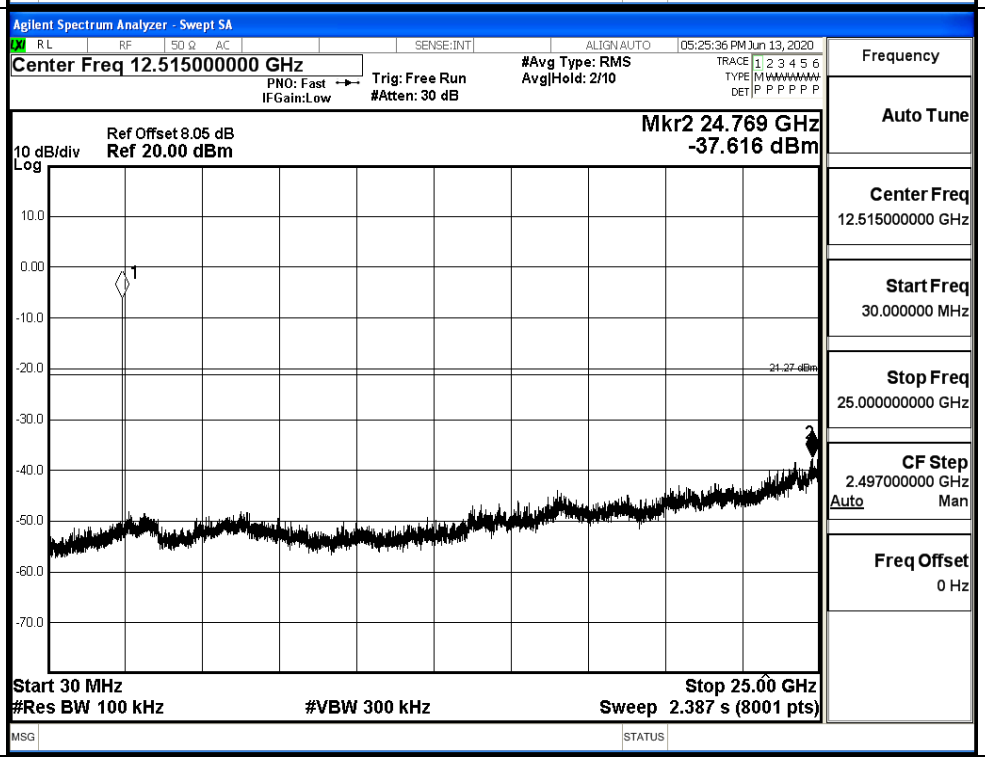
Pref		
Puw		

8DPSK_MCH_Graphs		
Pref		
Puw		

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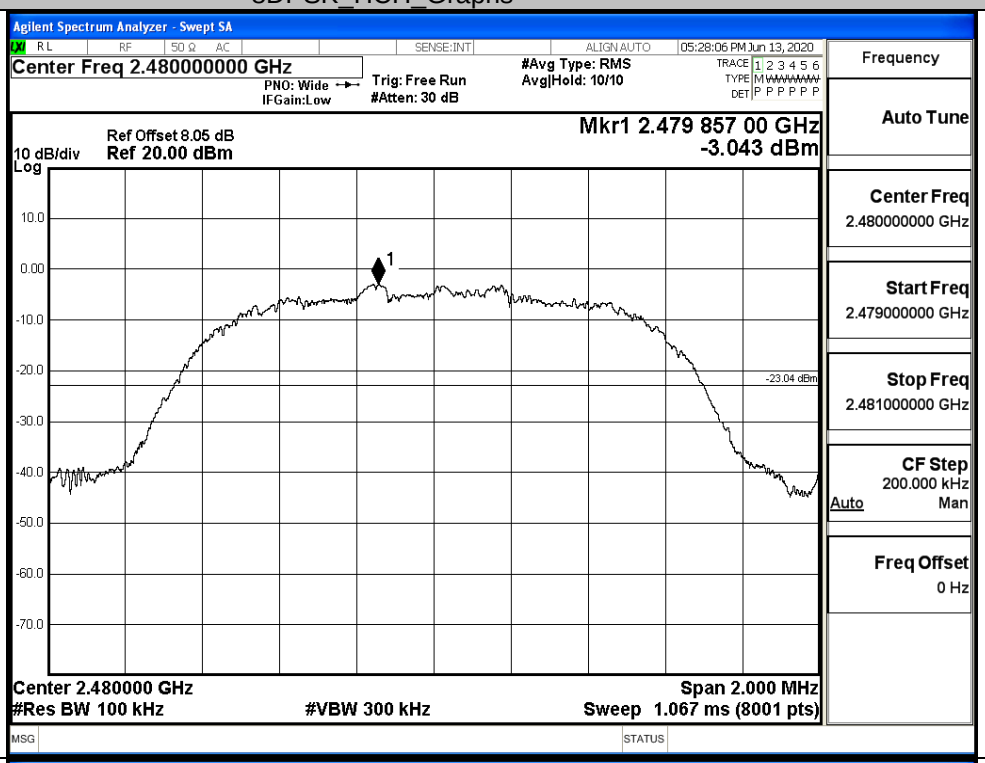
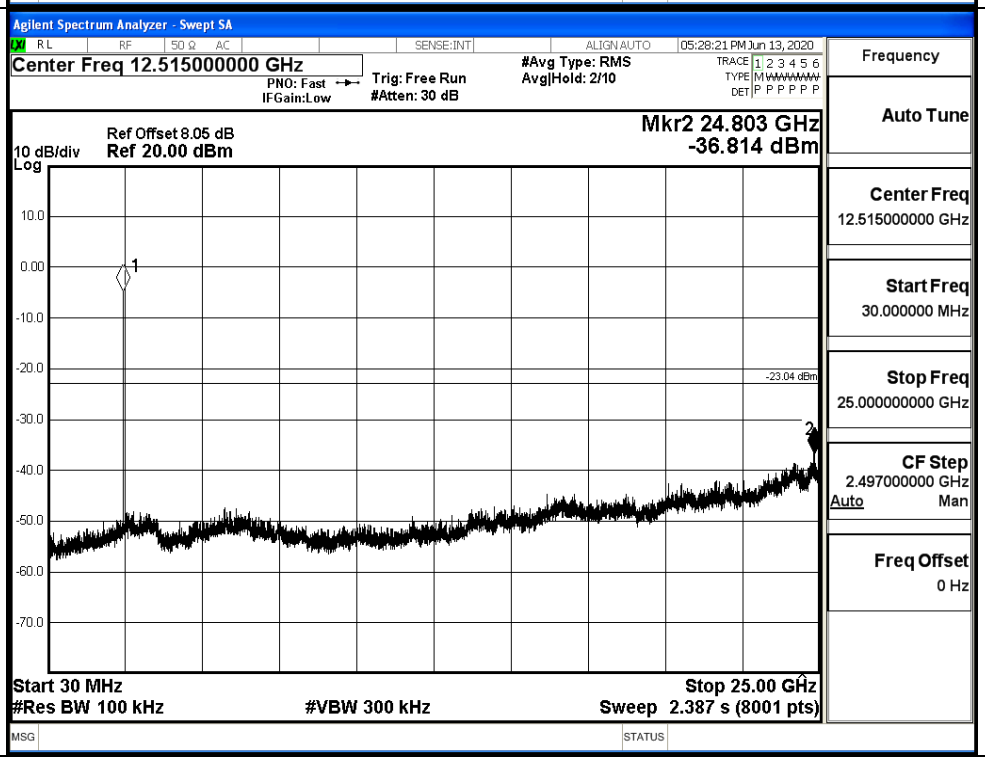
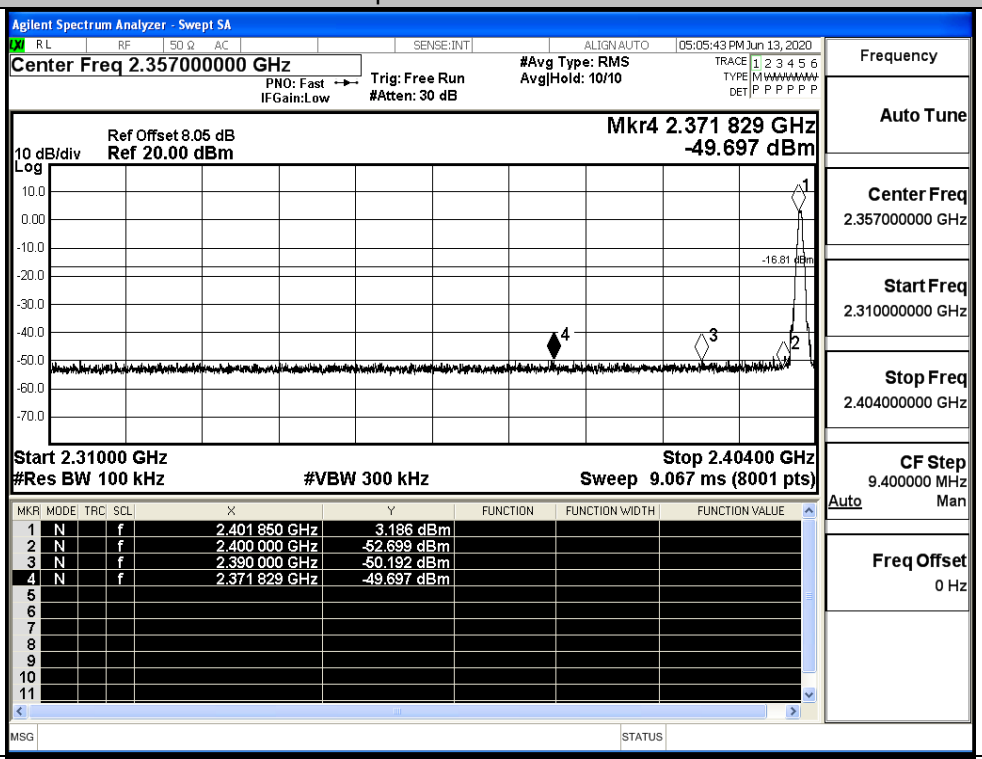
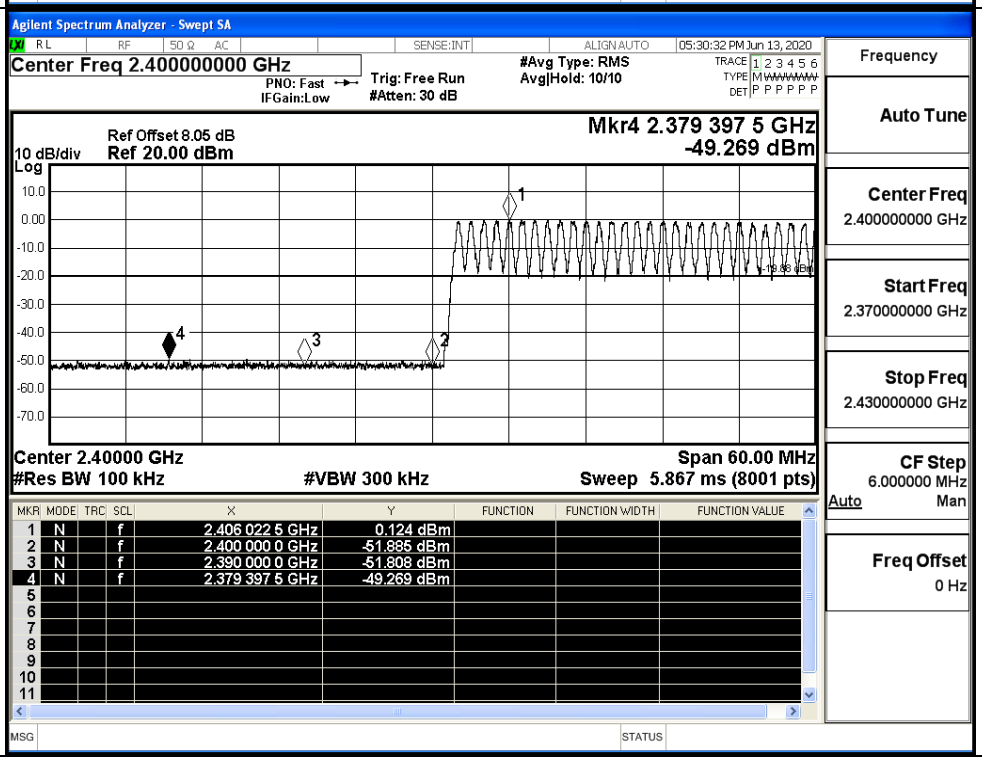
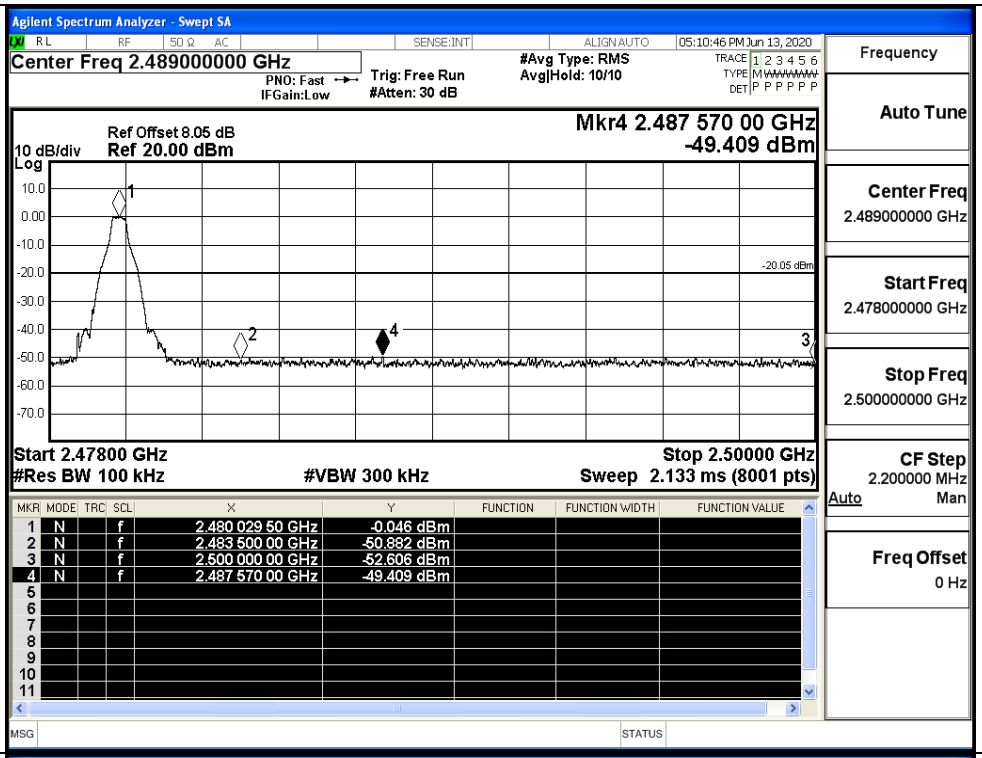
Pref		
Puw		

A.7 Band-edge for RF Conducted Emissions

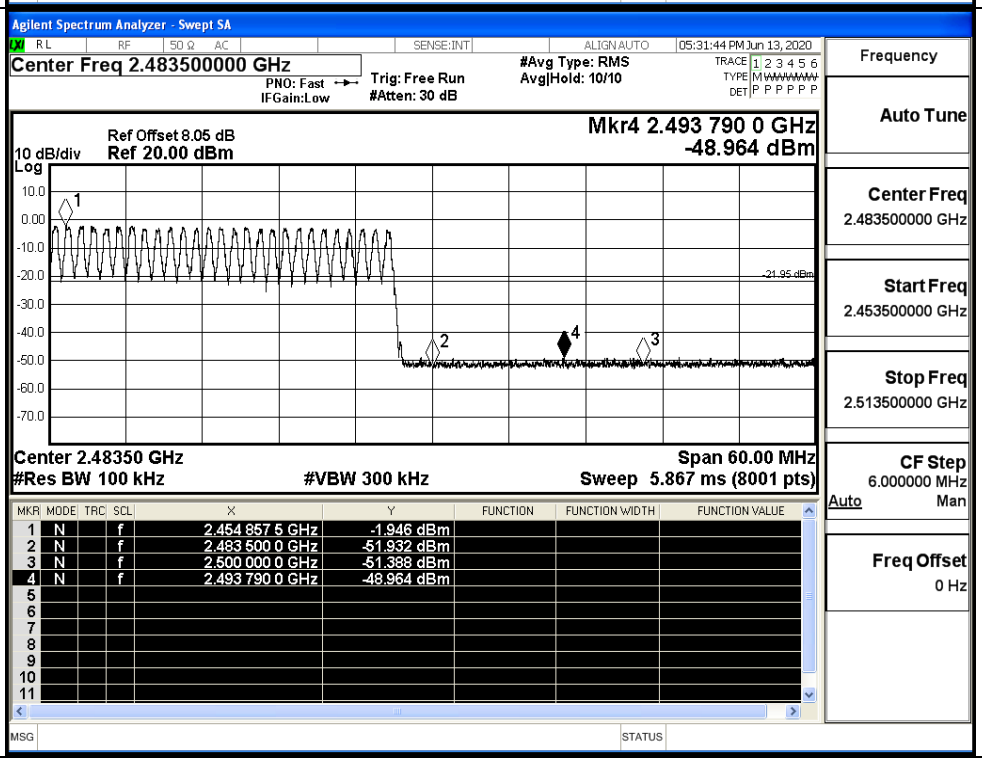
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.186	Off	-49.697	-16.81	PASS
			0.124	On	-49.269	-19.88	PASS
	HCH	2480	-0.046	Off	-49.409	-20.05	PASS
			-1.946	On	-48.964	-21.95	PASS
π/4DQPSK	LCH	2402	0.340	Off	-49.172	-19.66	PASS
			0.074	On	-47.881	-19.93	PASS
	HCH	2480	-2.969	Off	-49.149	-22.97	PASS
			-1.988	On	-48.355	-21.99	PASS
8DPSK	LCH	2402	0.082	Off	-49.372	-19.92	PASS
			0.095	On	-48.962	-19.91	PASS
	HCH	2480	-2.879	Off	-49.226	-22.88	PASS
			-2.077	On	-48.334	-22.08	PASS

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

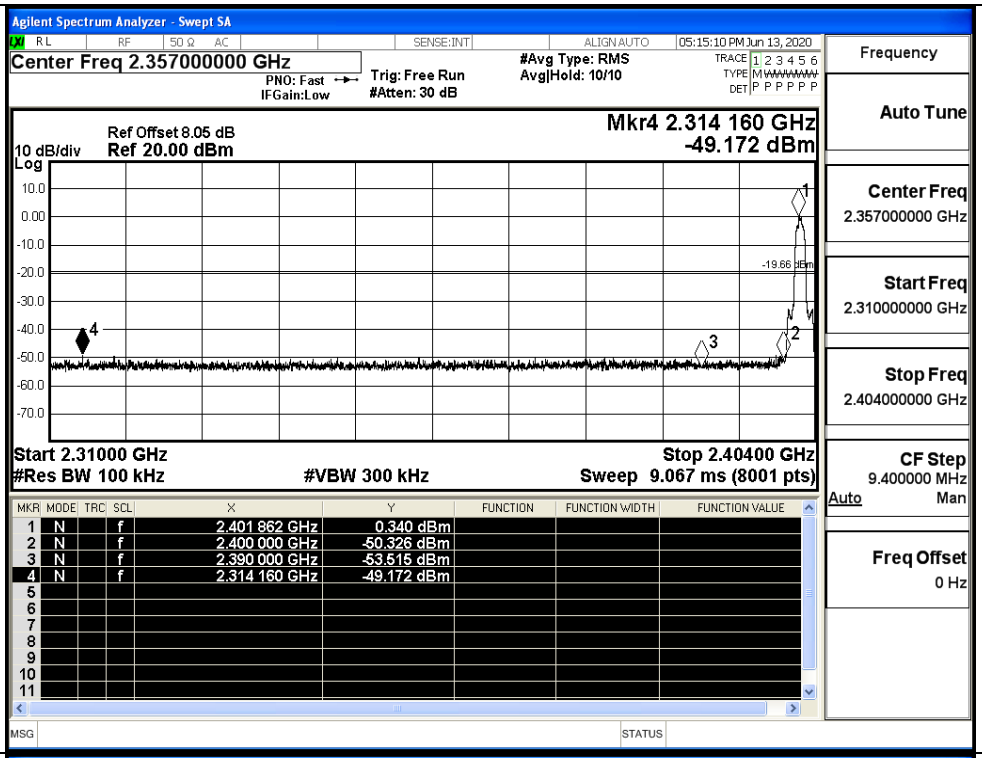
GFSK/HCH/No Hop



GFSK/HCH/Hop



π/4DQPSK/LCH/No Hop



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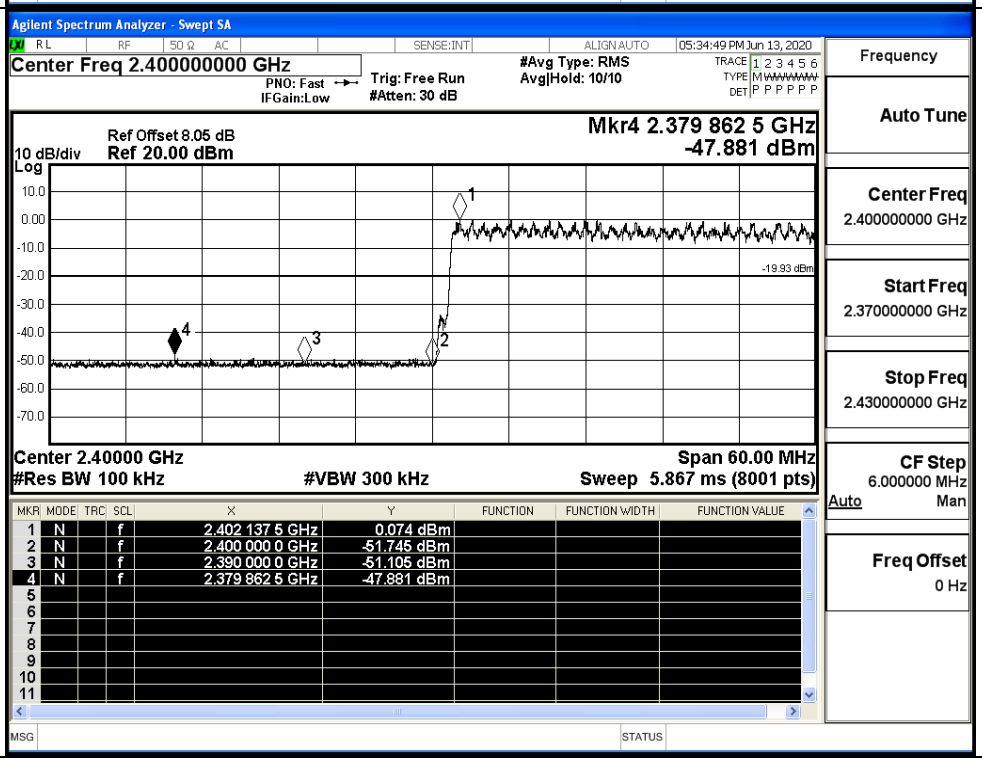
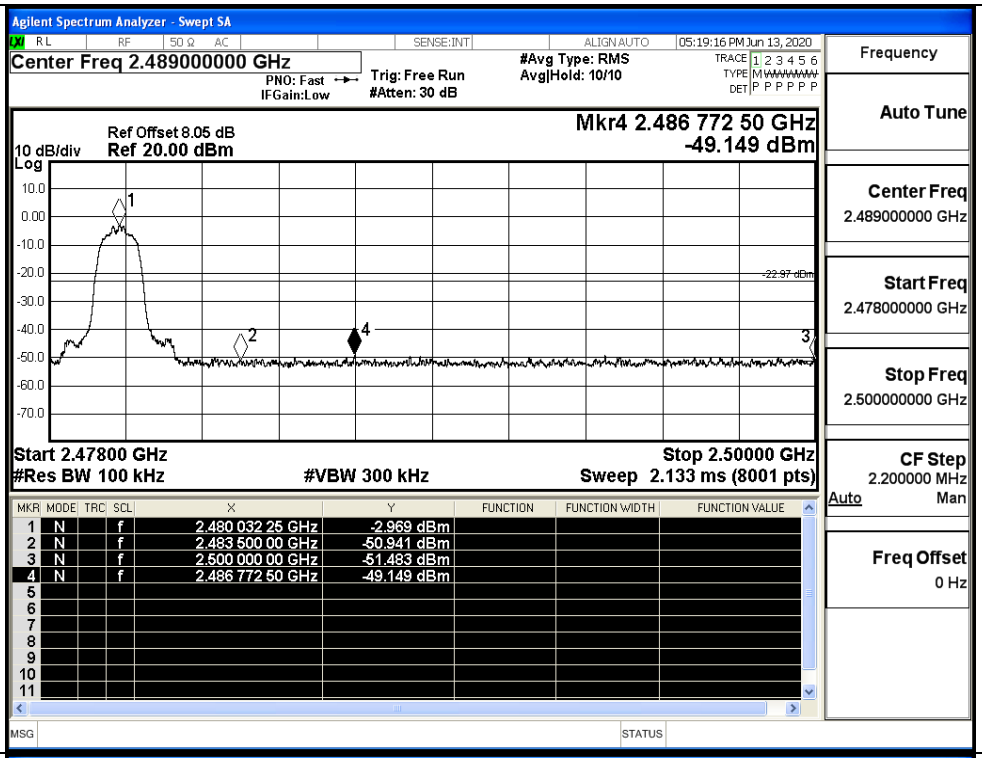
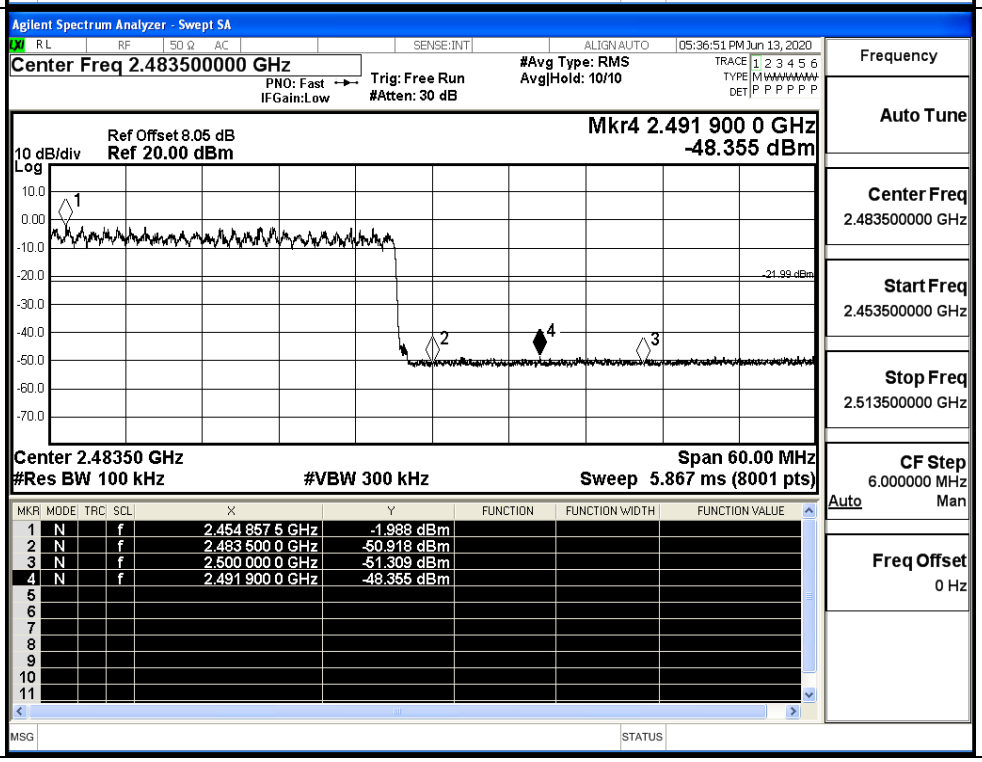
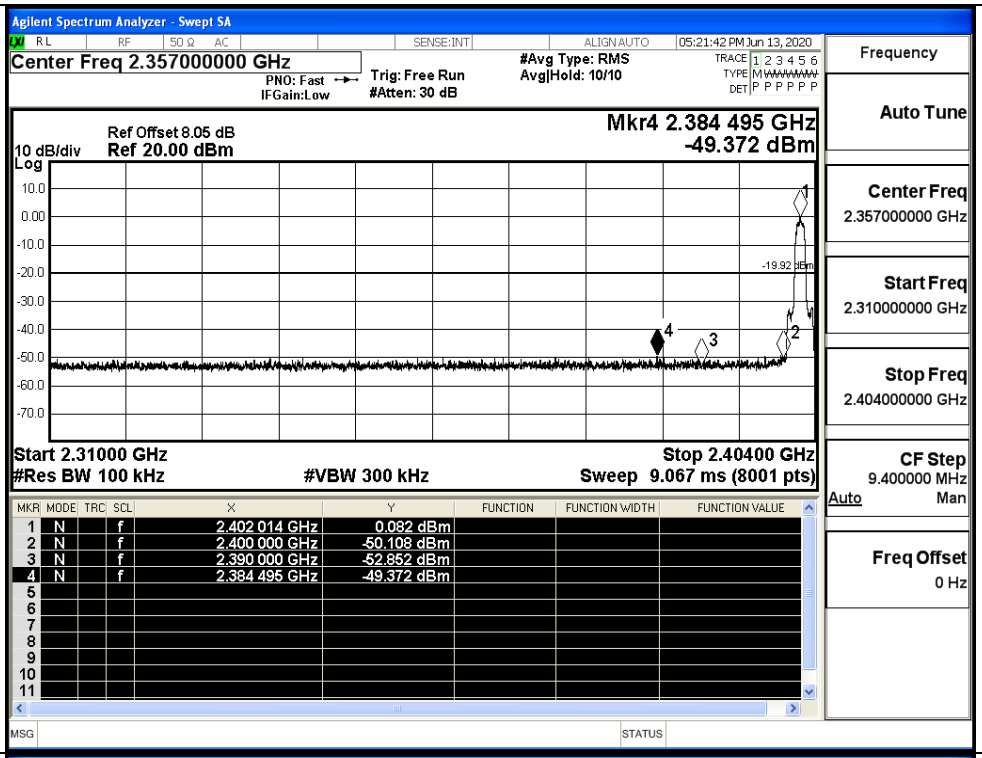
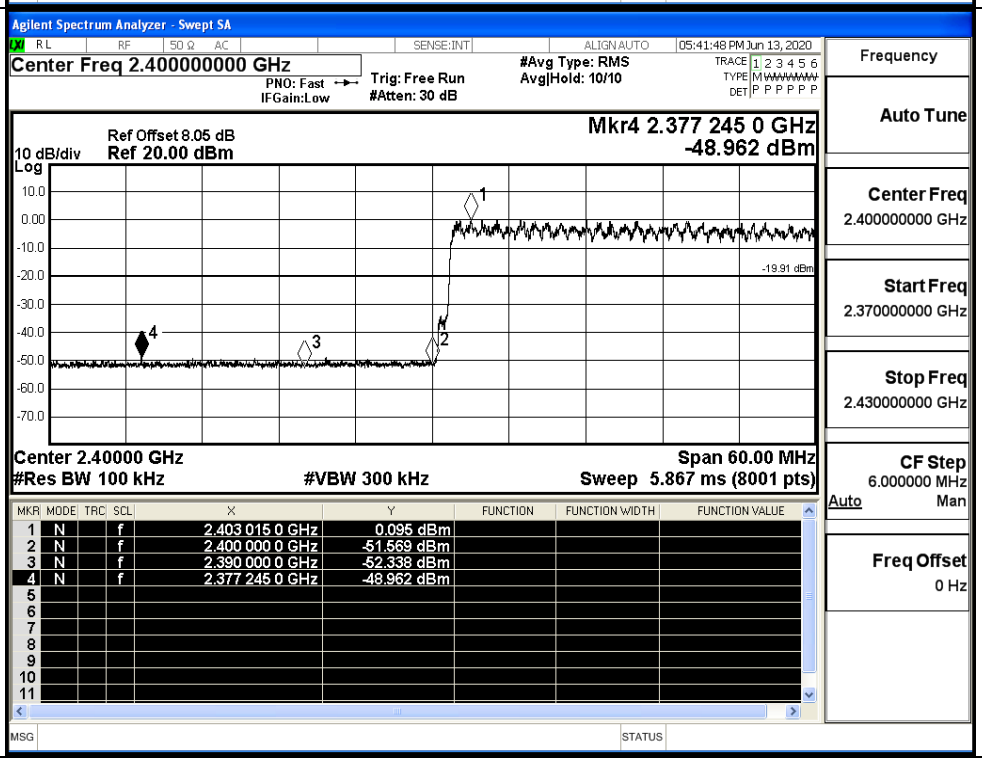
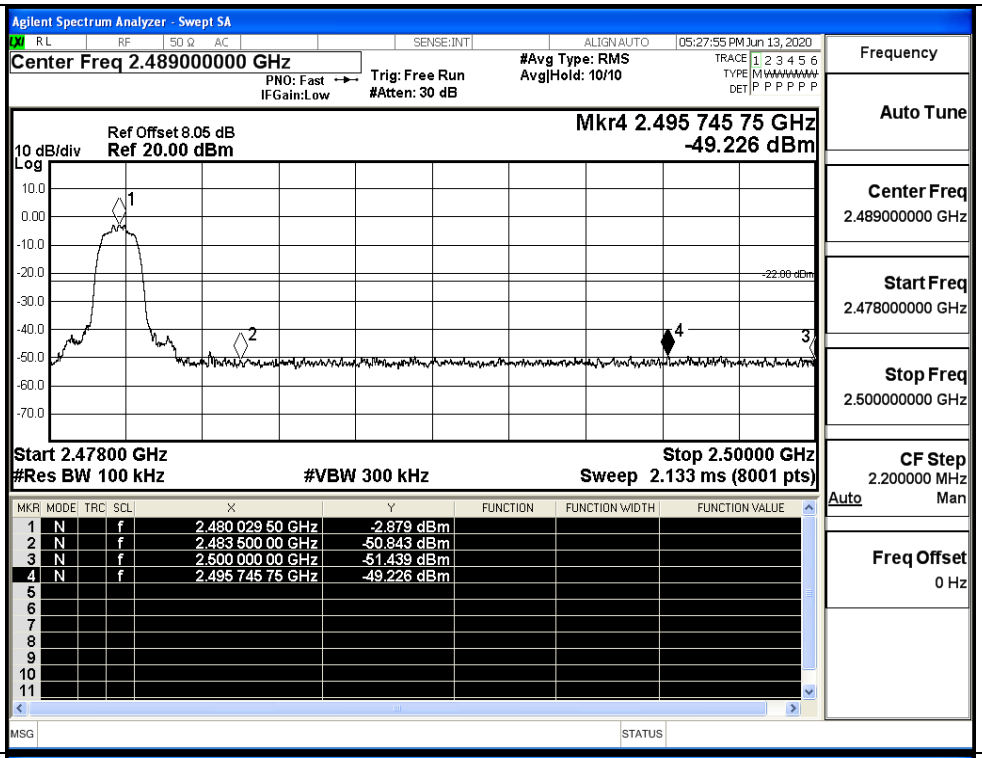
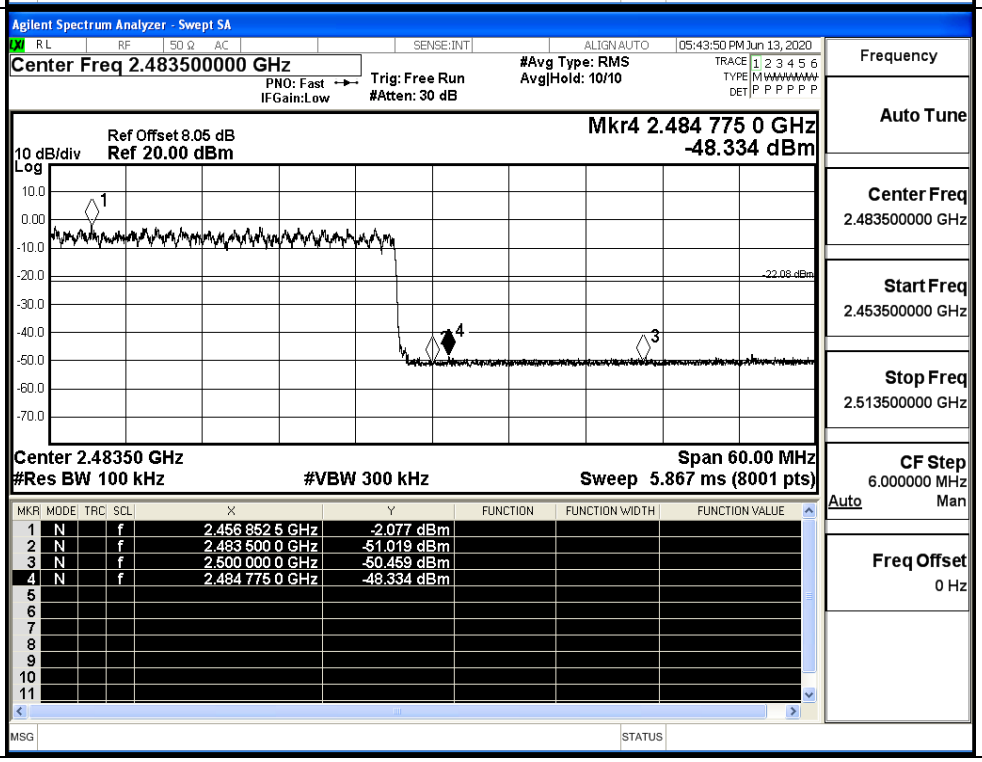


π/4DQPSK/HCH/No Hop	
π/4DQPSK/HCH/Hop	

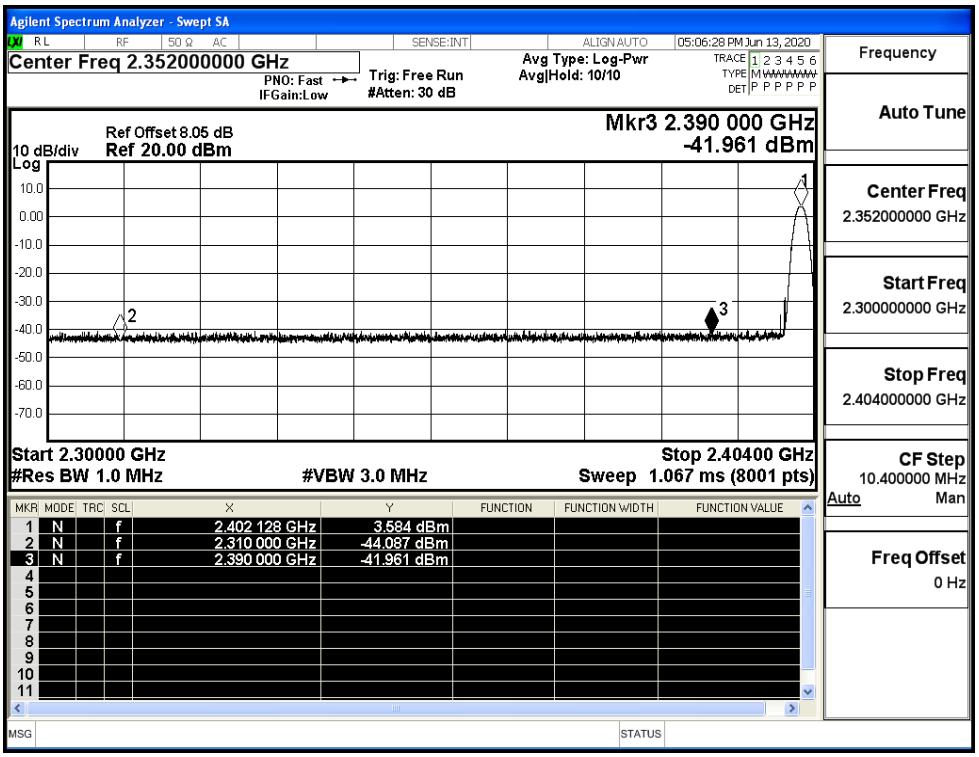
8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

8DPSK/HCH/No Hop	
8DPSK/HCH/Hop	

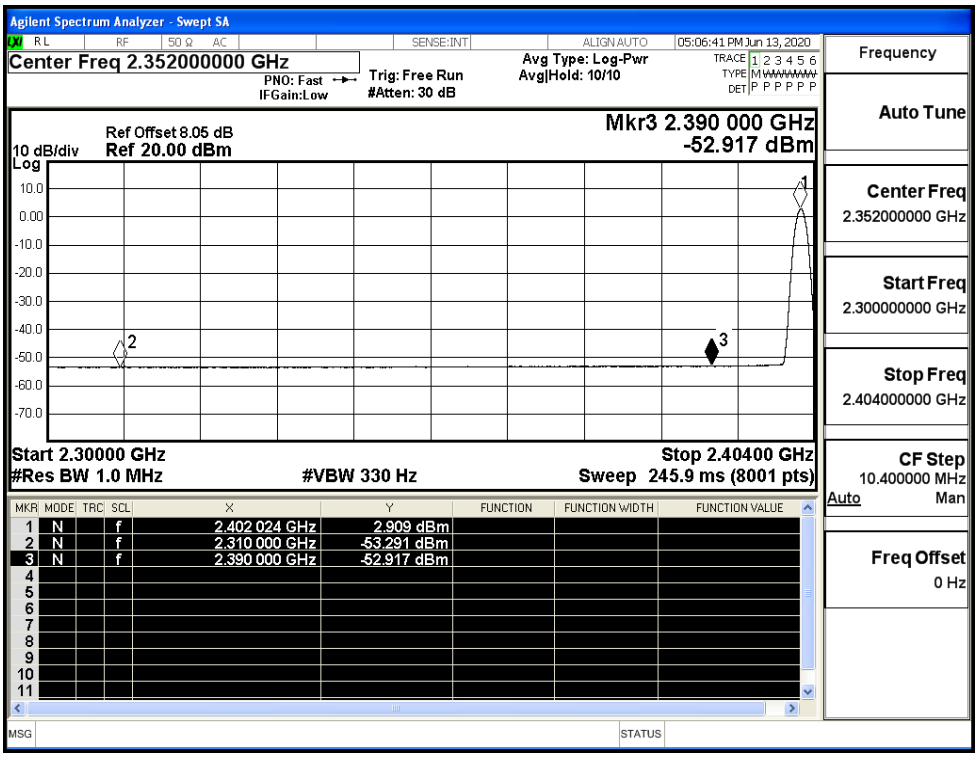
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.09	2.0	0	53.17	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	43.97	AV	54	PASS
	Off	2390.0	-41.96	2.0	0	55.3	PEAK	74	PASS
	Off	2390.0	-52.92	2.0	0	44.34	AV	54	PASS
	Off	2483.5	-42.27	2.0	0	54.99	PEAK	74	PASS
	Off	2483.5	-52.46	2.0	0	44.8	AV	54	PASS
	Off	2500.0	-42.31	2.0	0	54.95	PEAK	74	PASS
	Off	2500.0	-52.37	2.0	0	44.89	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.38	2.0	0	54.88	PEAK	74	PASS
	Off	2310.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2390.0	-42.84	2.0	0	54.42	PEAK	74	PASS
	Off	2390.0	-53.00	2.0	0	44.26	AV	54	PASS
	Off	2483.5	-42.48	2.0	0	54.78	PEAK	74	PASS
	Off	2483.5	-52.56	2.0	0	44.7	AV	54	PASS
	Off	2500.0	-42.62	2.0	0	54.64	PEAK	74	PASS
	Off	2500.0	-52.34	2.0	0	44.92	AV	54	PASS
8DPSK	Off	2310.0	-43.70	2.0	0	53.56	PEAK	74	PASS
	Off	2310.0	-53.36	2.0	0	43.9	AV	54	PASS
	Off	2390.0	-42.36	2.0	0	54.9	PEAK	74	PASS
	Off	2390.0	-52.98	2.0	0	44.28	AV	54	PASS
	Off	2483.5	-41.46	2.0	0	55.8	PEAK	74	PASS
	Off	2483.5	-52.57	2.0	0	44.69	AV	54	PASS
	Off	2500.0	-41.99	2.0	0	55.27	PEAK	74	PASS
	Off	2500.0	-52.39	2.0	0	44.87	AV	54	PASS

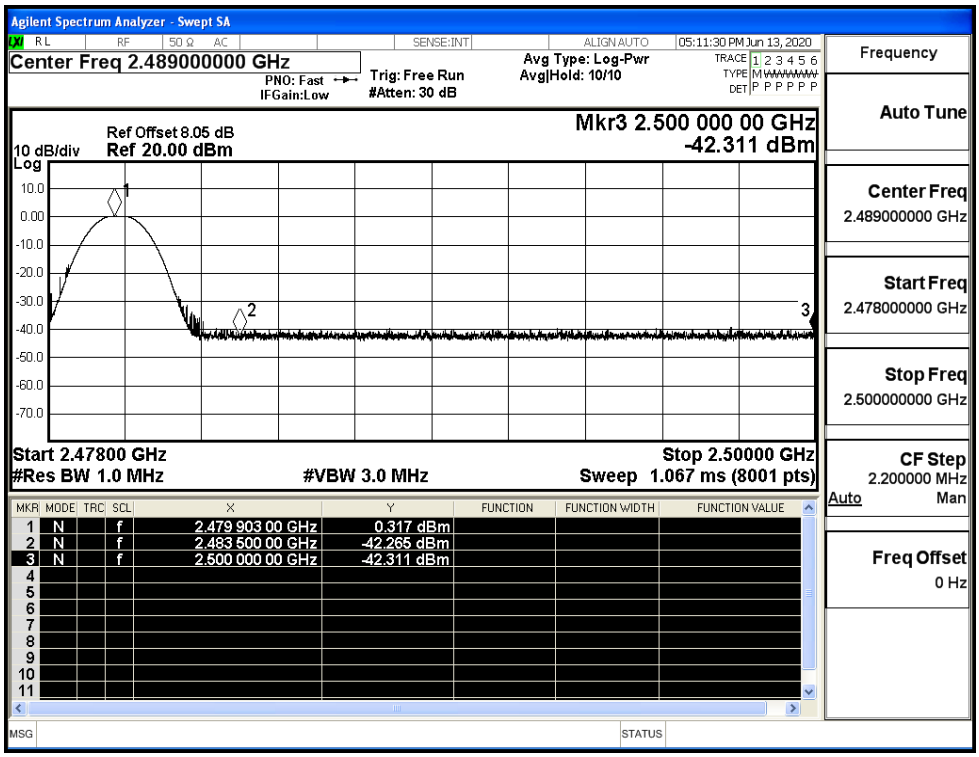
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



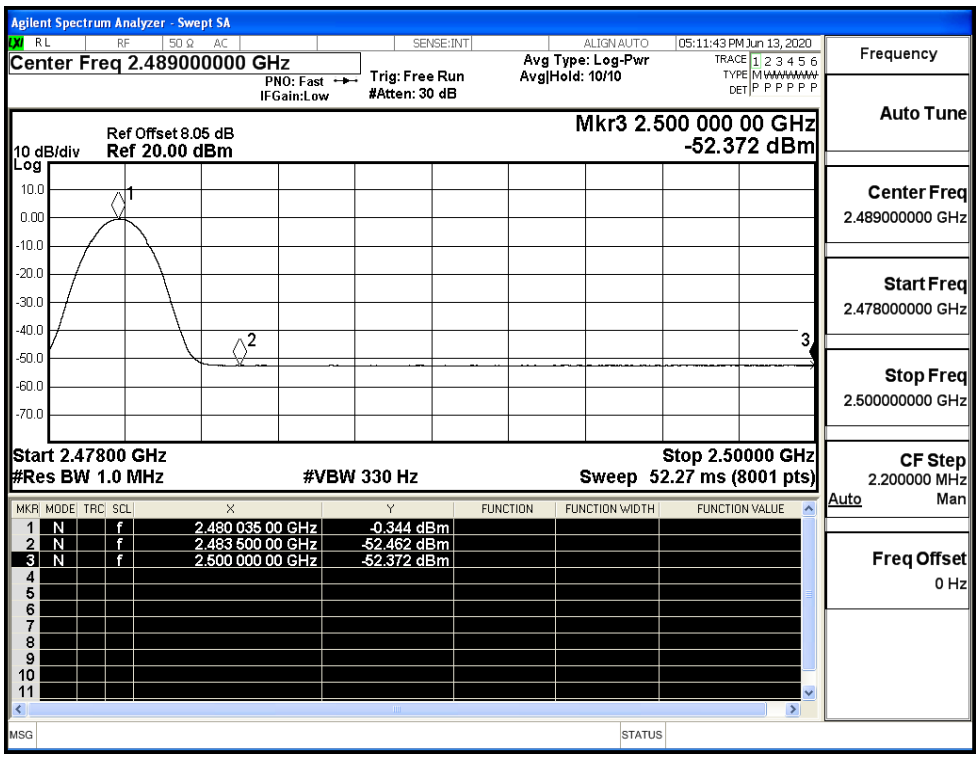
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



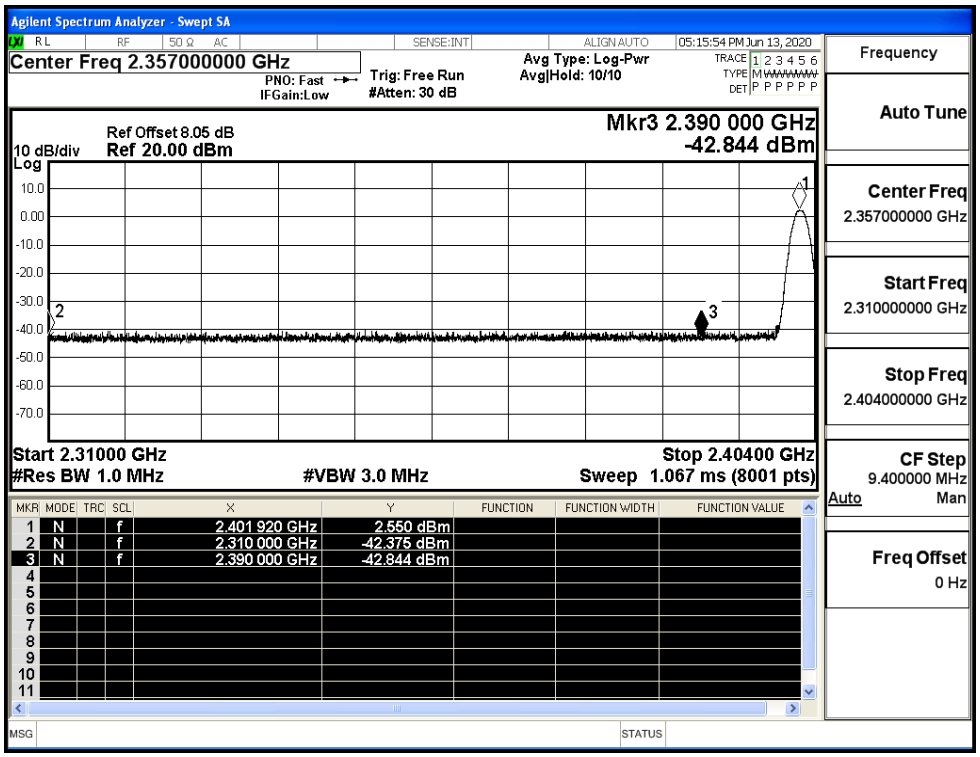
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



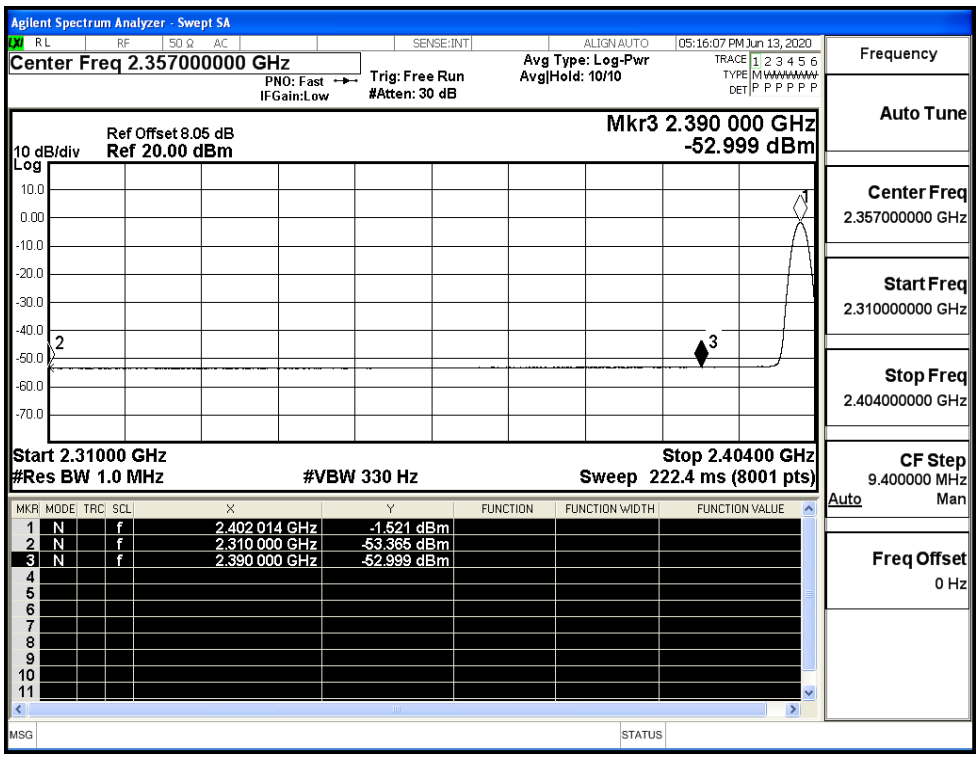
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



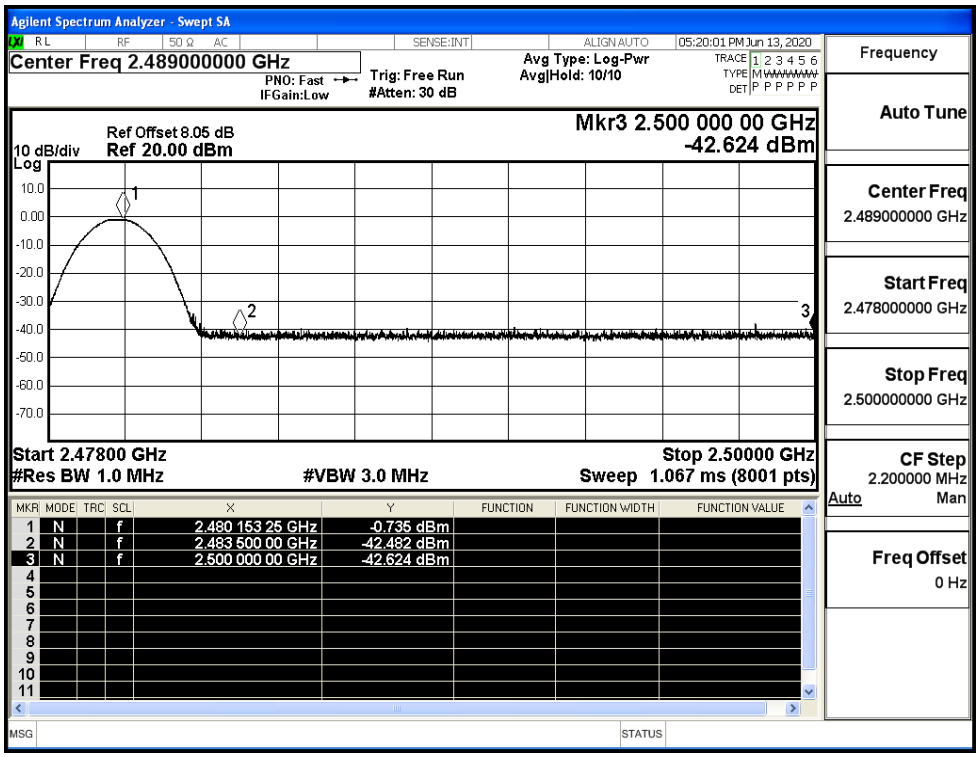
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



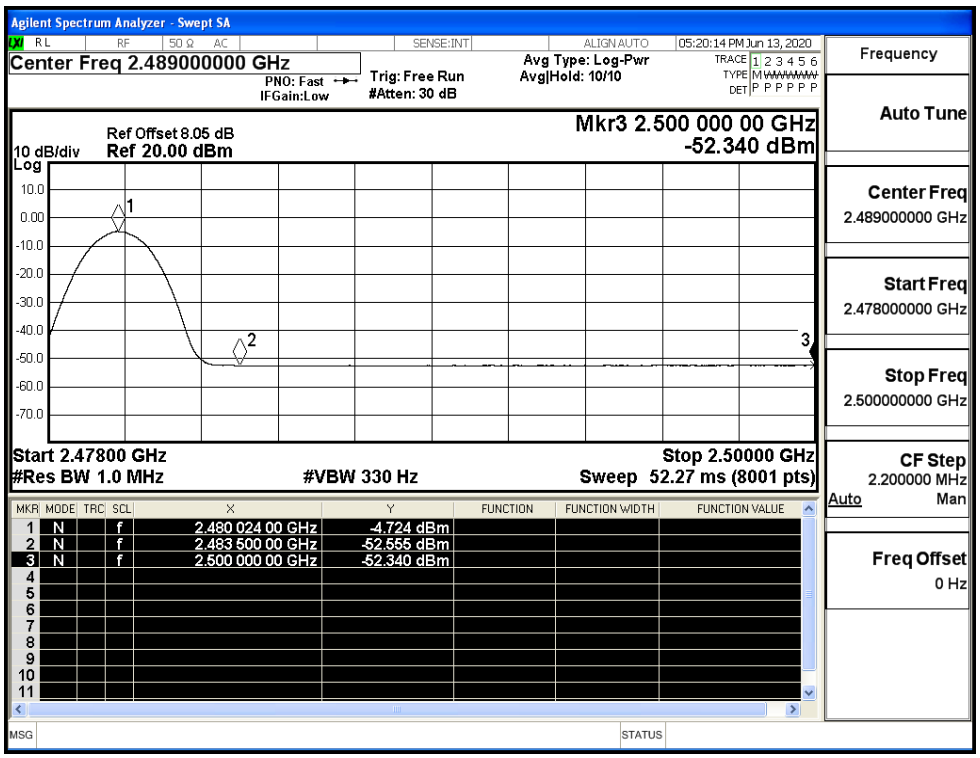
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



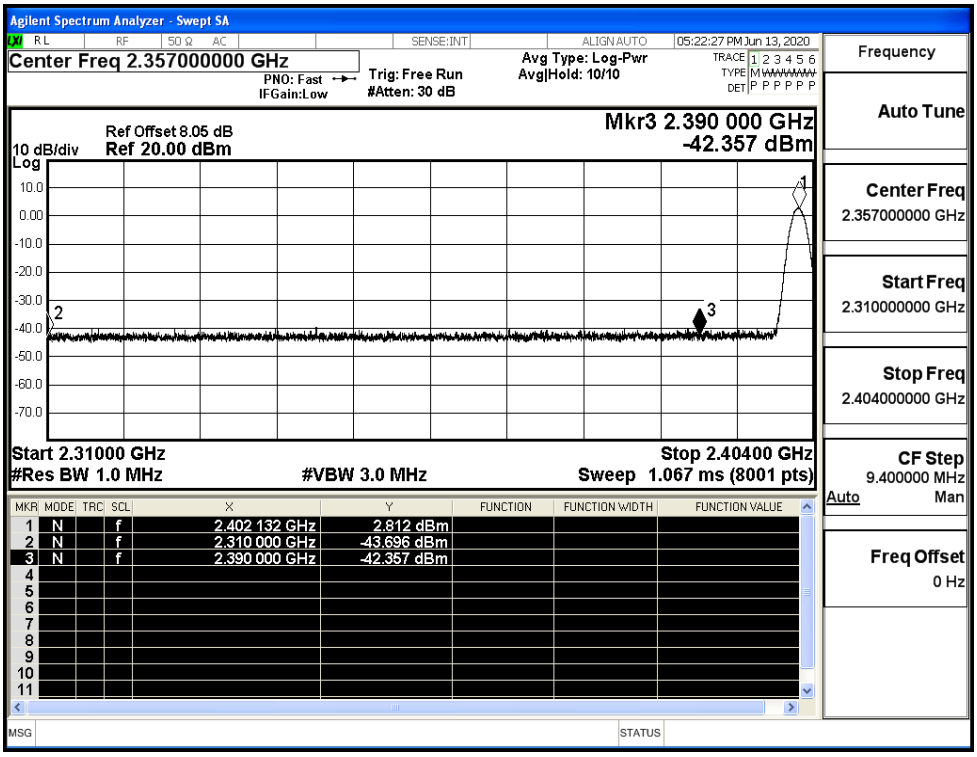
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



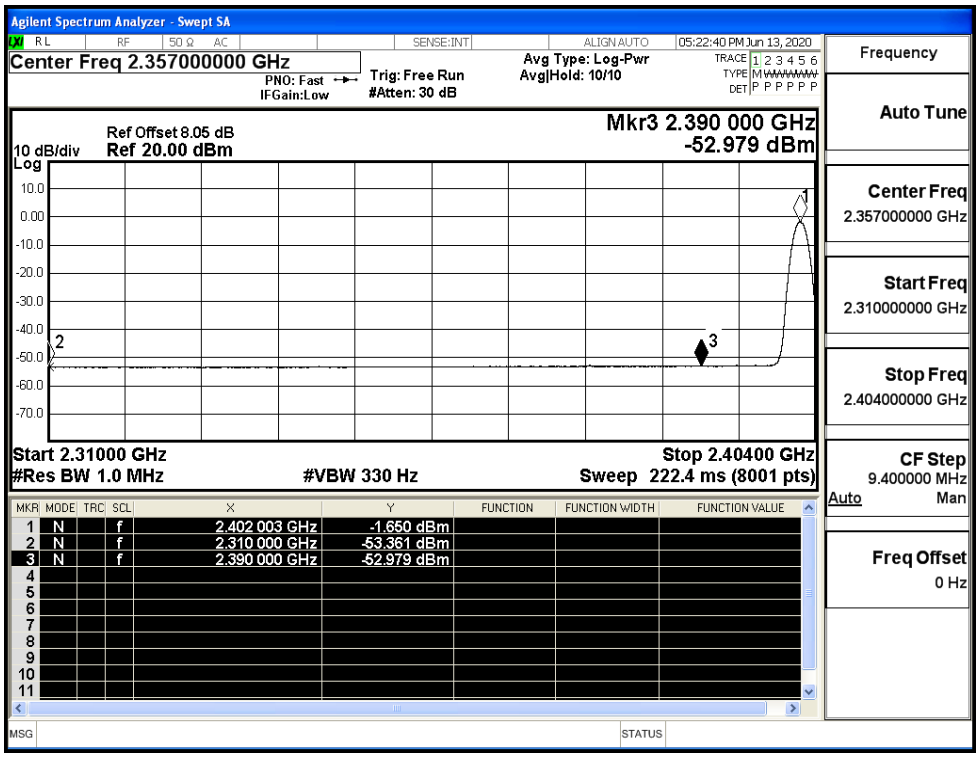
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



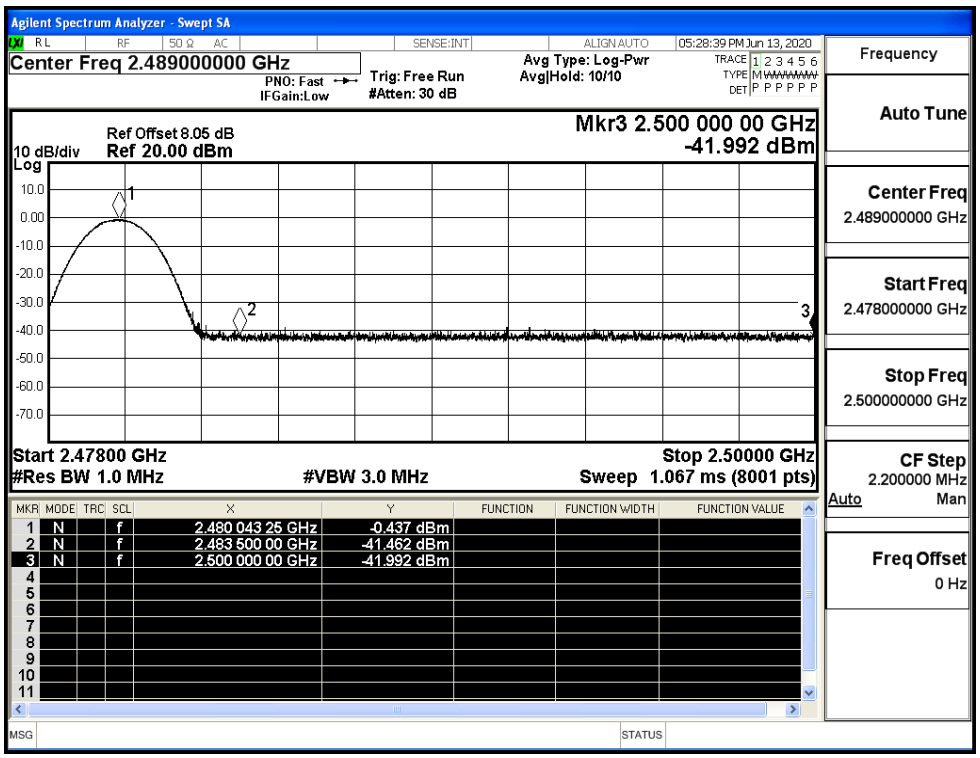
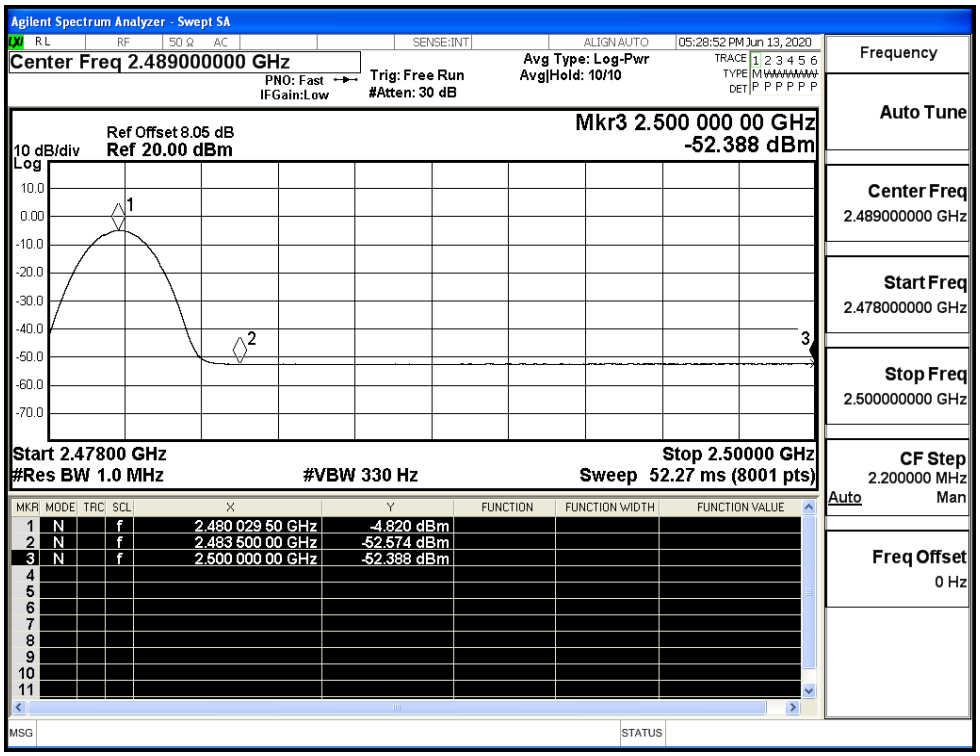
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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



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



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