Appendix A

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

Product Name: USB Bluetooth adapter
Trade Mark: INNOTRIK, AUCTOPUS

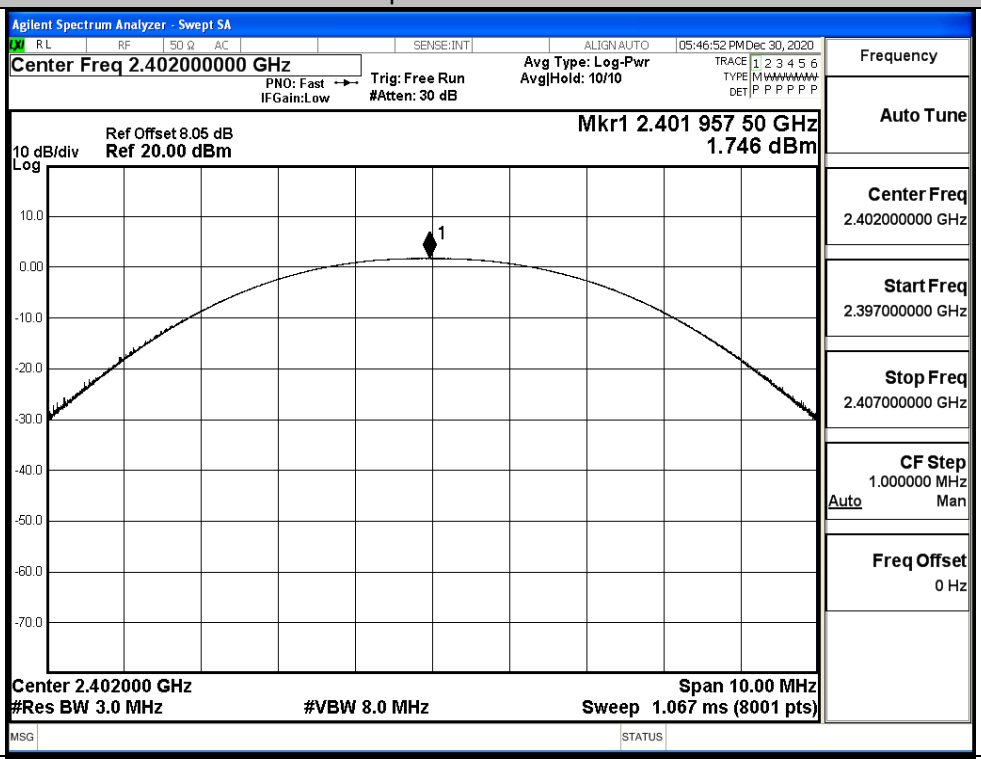
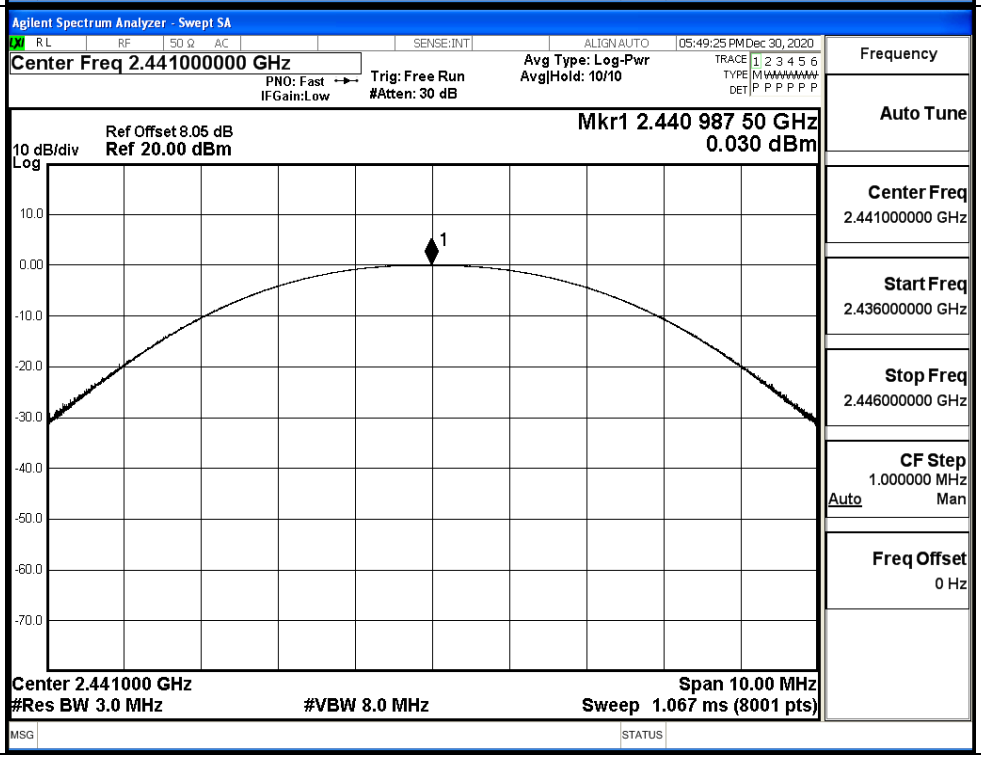
Test Model: BT-31D

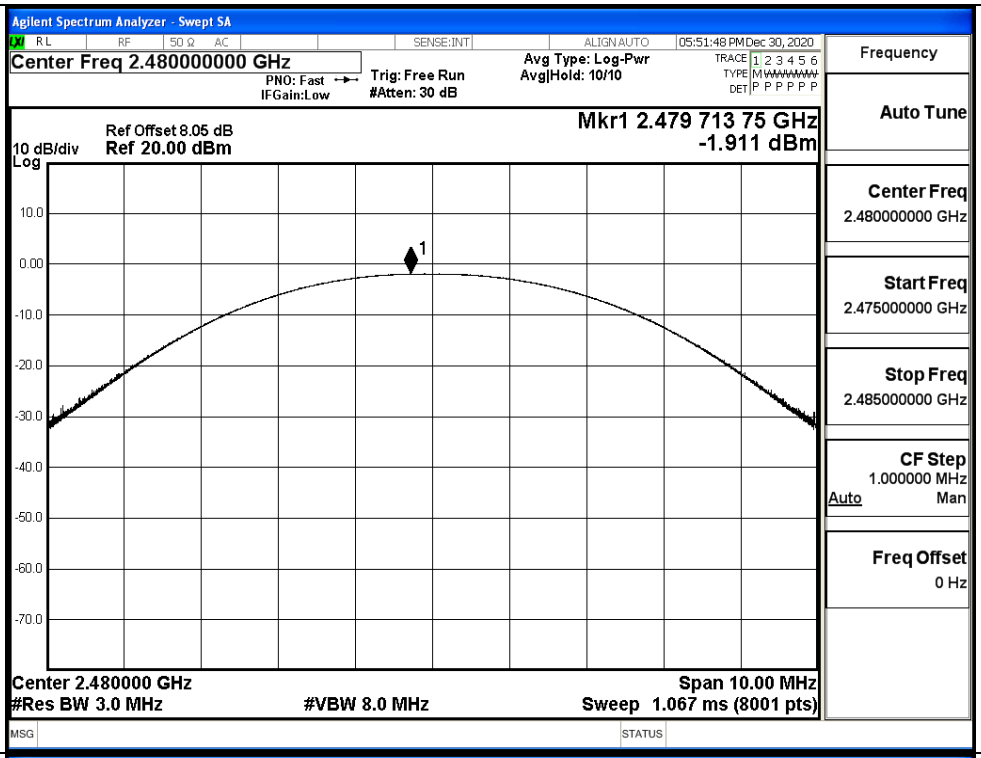
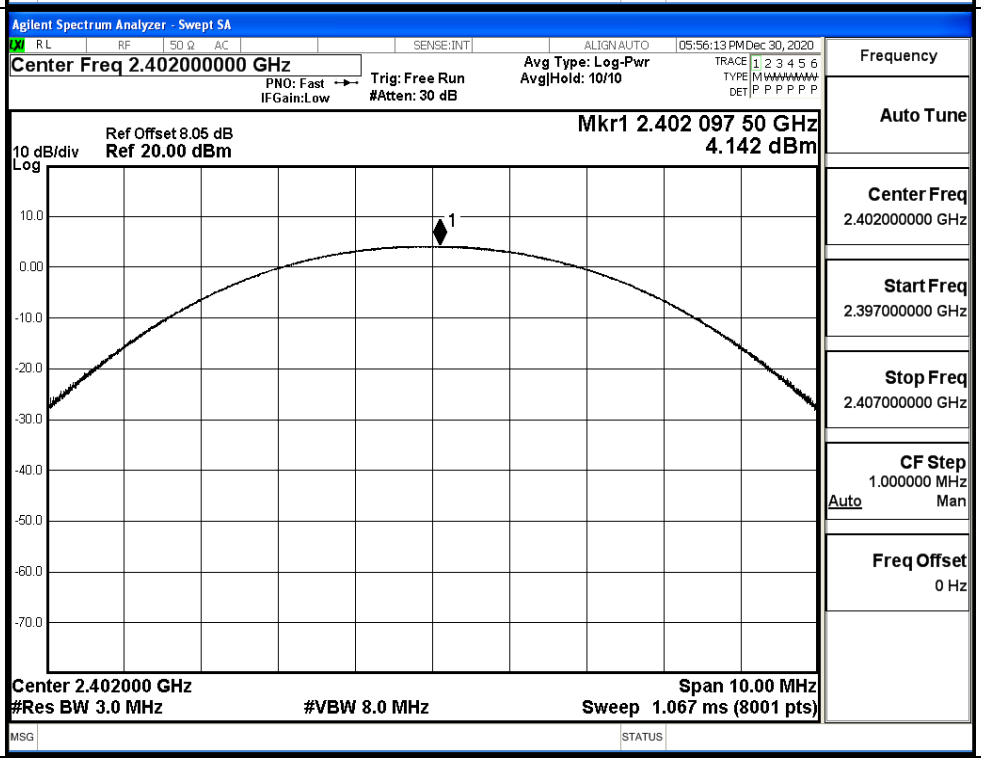
Environmental Conditions

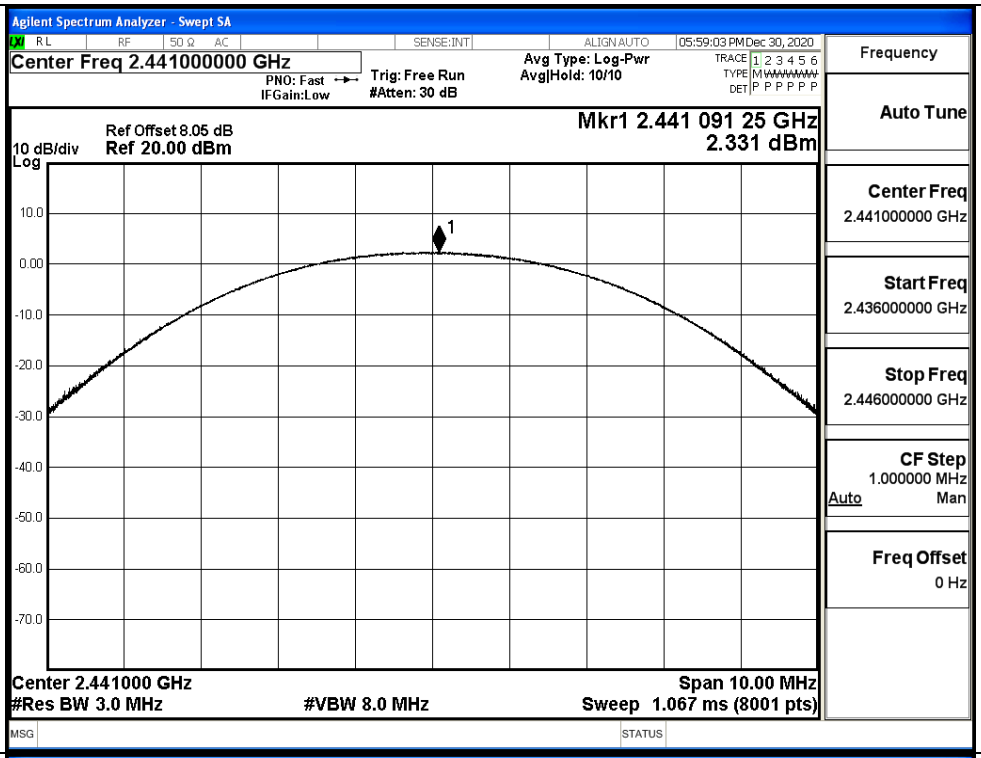
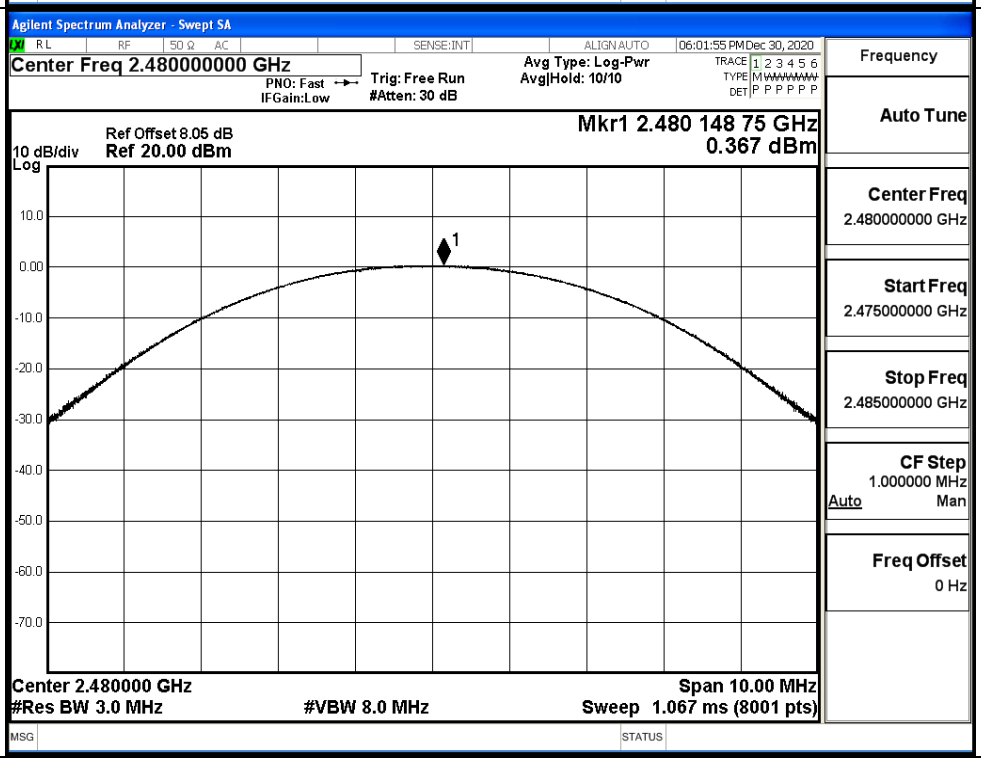
Temperature:	21.3° C
Relative Humidity:	49.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Carl Fu
Supervised by:	Li Huan

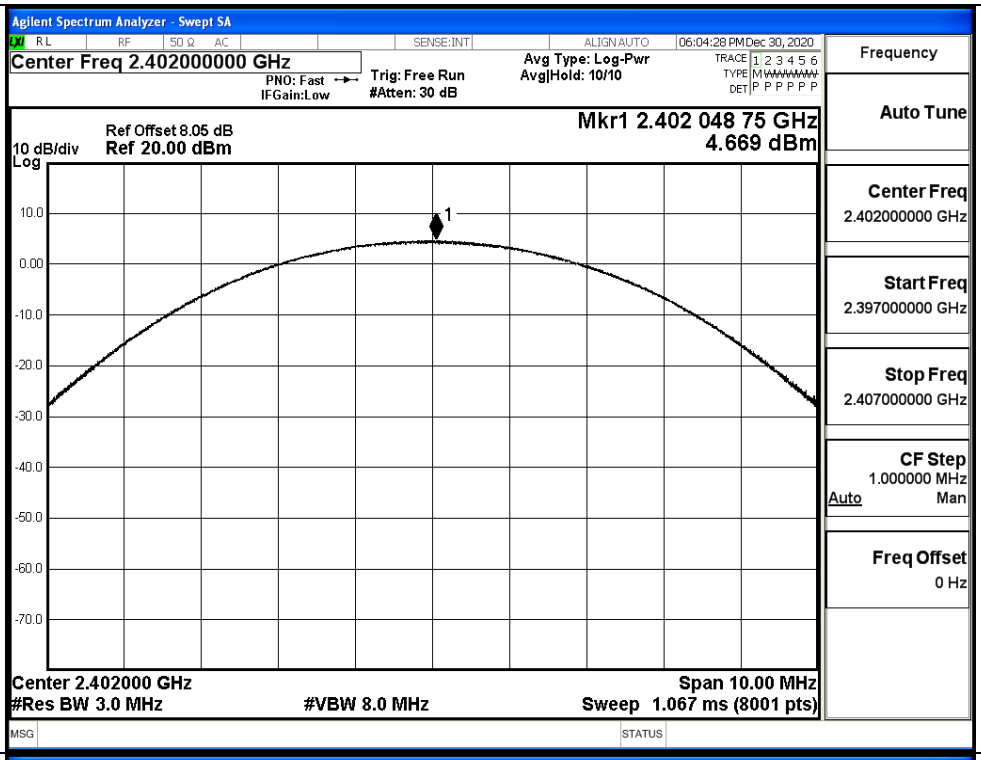
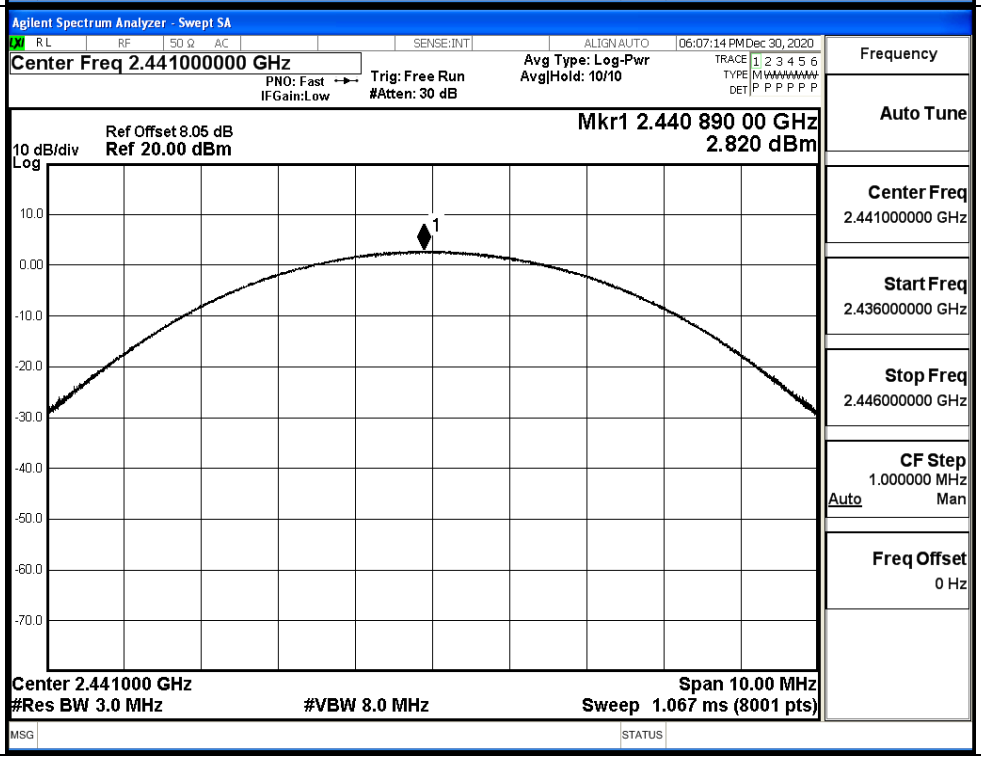
B.1 Maxmum Conducted Peak Output Power

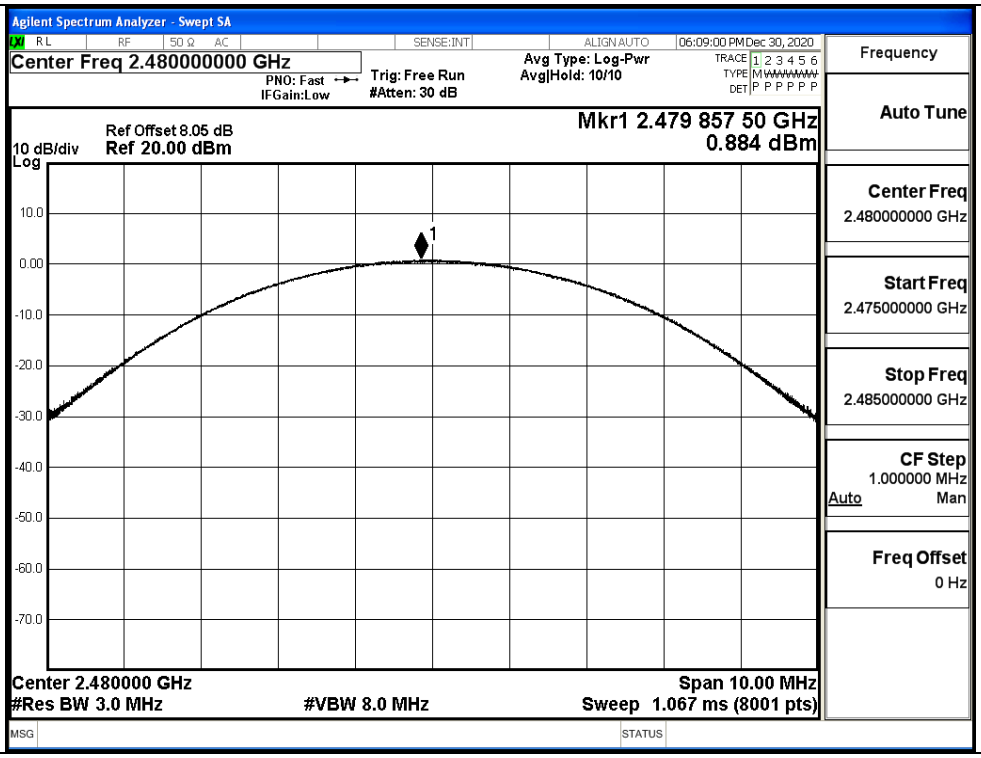
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.746	21	PASS
	MCH	0.030	21	PASS
	HCH	-1.911	21	PASS
π/4DQPSK	LCH	4.142	21	PASS
	MCH	2.331	21	PASS
	HCH	0.367	21	PASS
8DPSK	LCH	4.669	21	PASS
	MCH	2.820	21	PASS
	HCH	0.884	21	PASS

Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH		
π/4DQPSK/HCH		

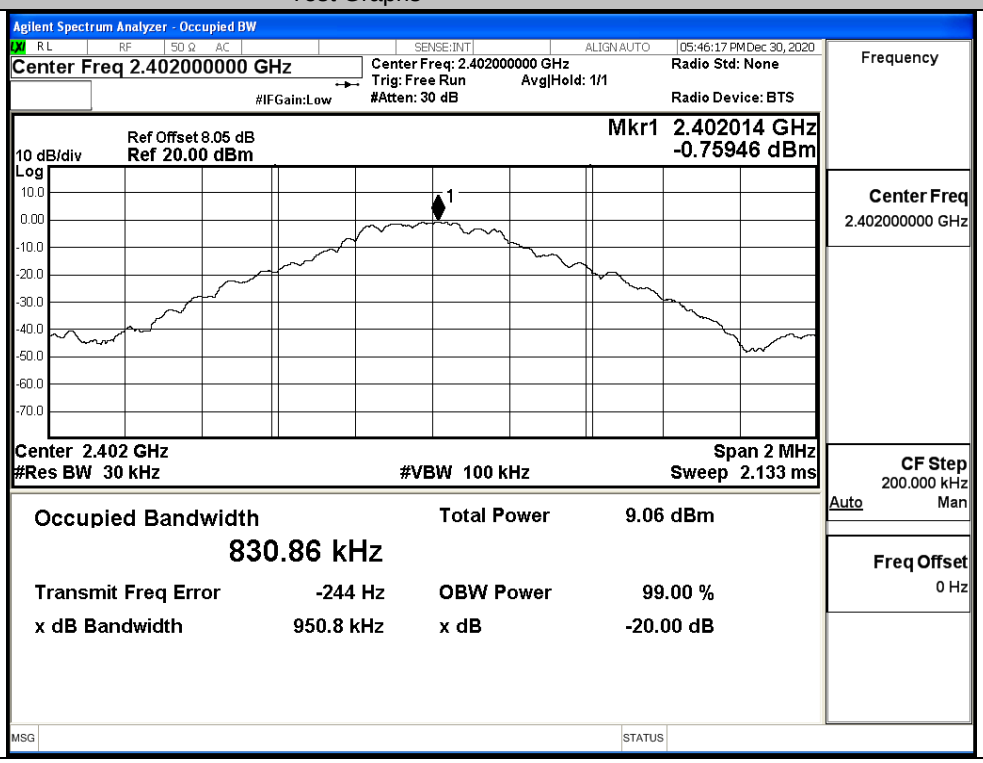
8DPSK/LCH	
8DPSK/MCH	

8DPSK/HCH		

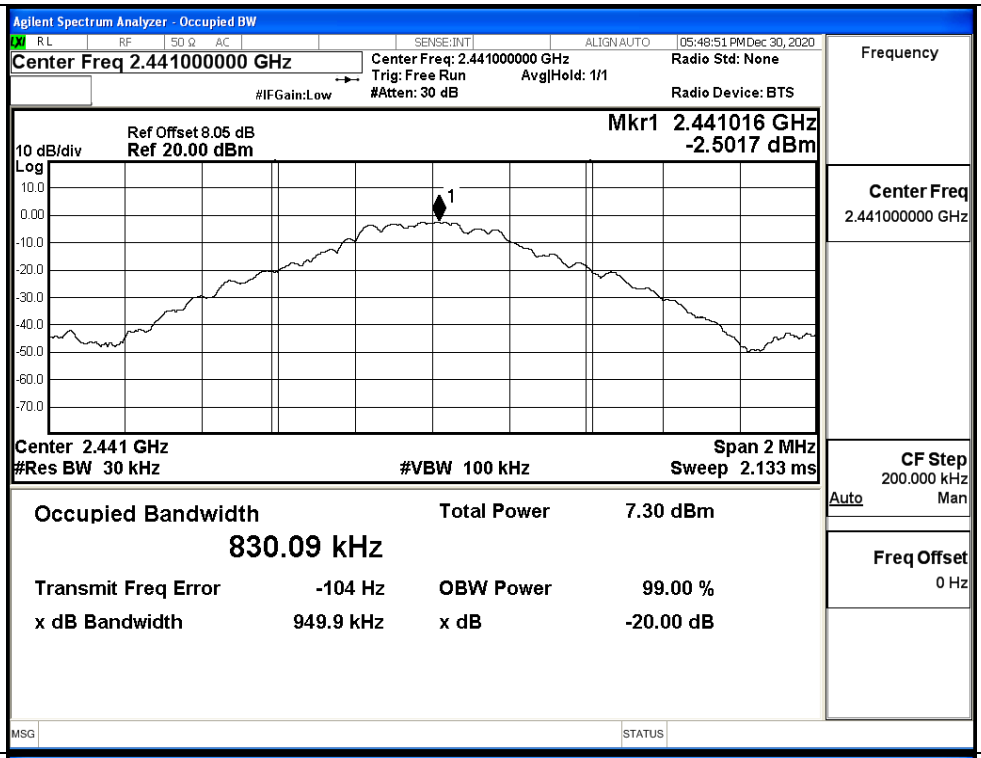
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
06:09:00 PM Dec 30, 2020
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 857 50 GHz
0.884 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
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

B.2 20dB Bandwidth

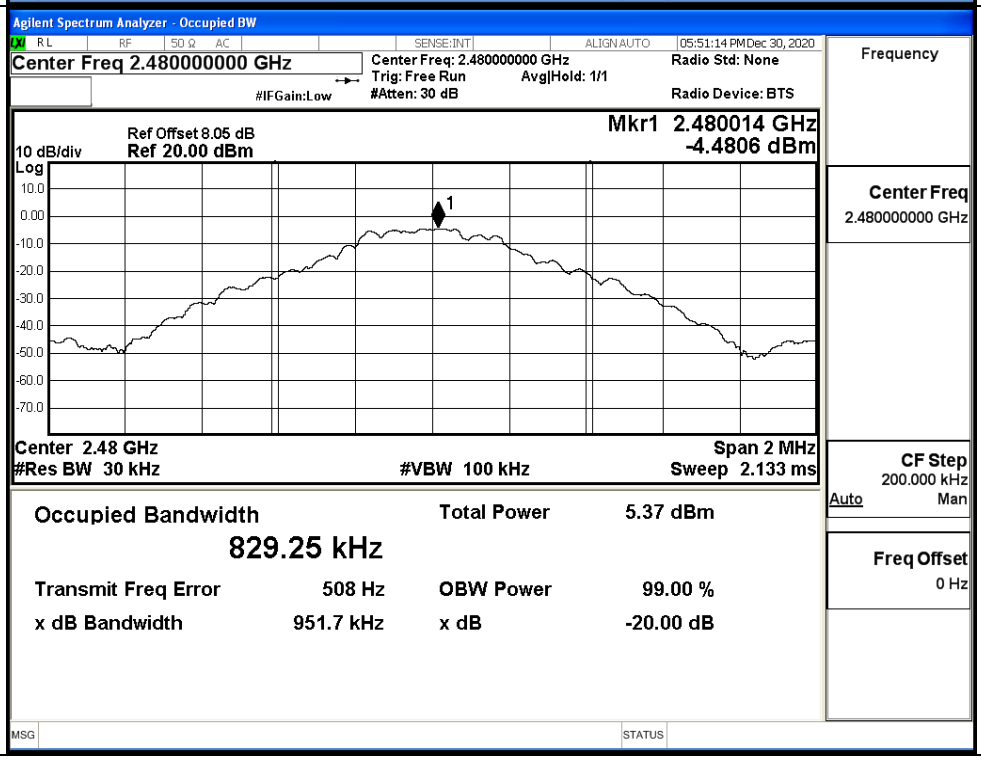
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9508	Not Specified	PASS
	MCH	0.9499	Not Specified	PASS
	HCH	0.9517	Not Specified	PASS
π/4DQPSK	LCH	1.318	Not Specified	PASS
	MCH	1.320	Not Specified	PASS
	HCH	1.319	Not Specified	PASS
8DPSK	LCH	1.321	Not Specified	PASS
	MCH	1.317	Not Specified	PASS
	HCH	1.322	Not Specified	PASS

Test Graphs		
GFSK/LCH		

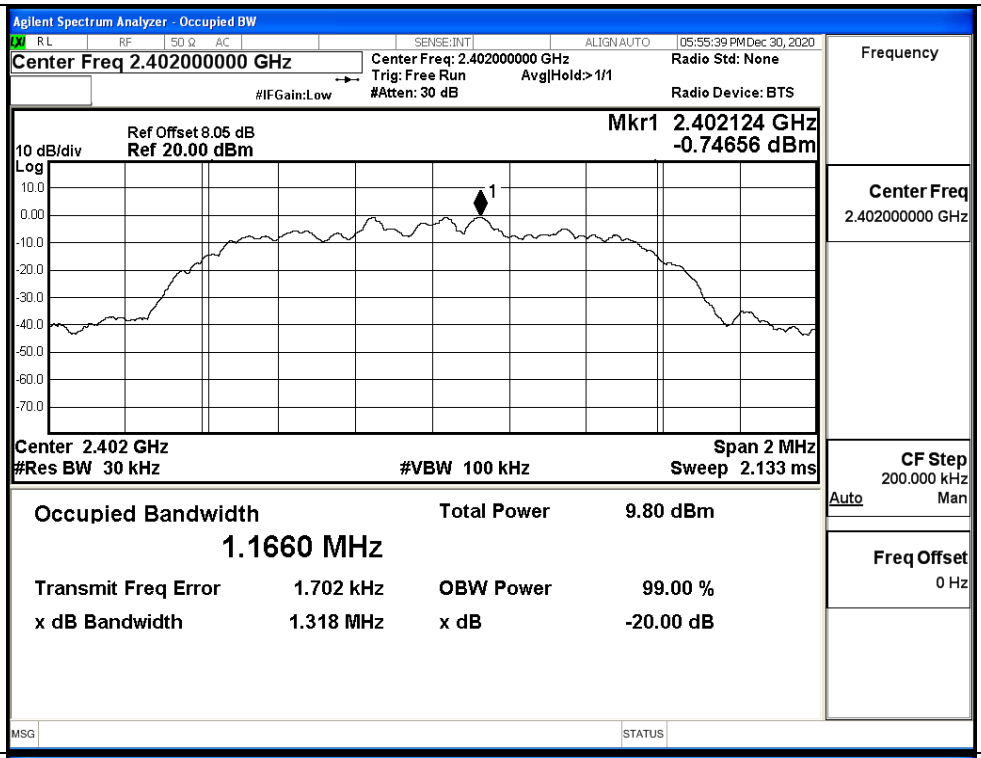
GFSK/MCH



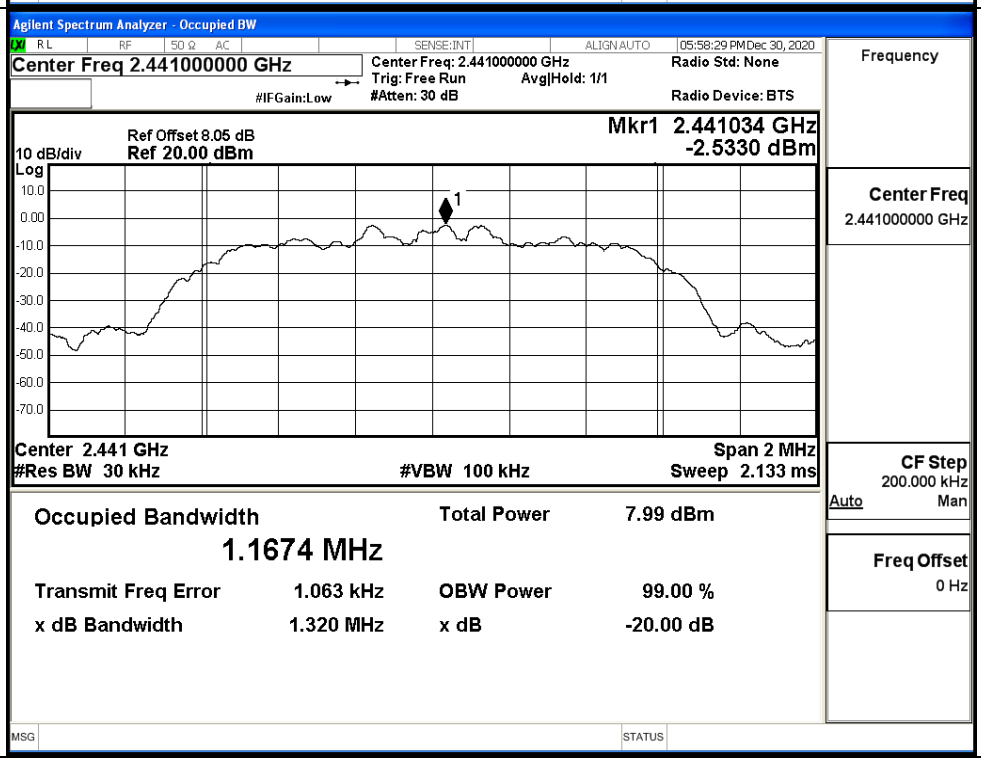
GFSK/HCH



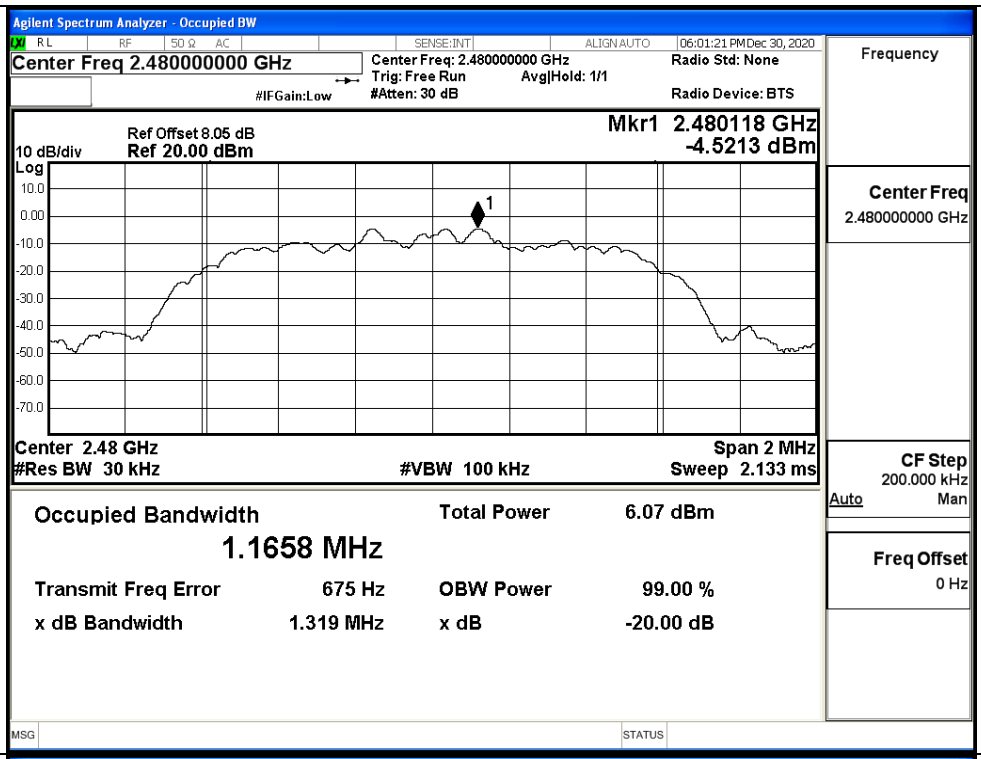
π/4DQPSK/LCH



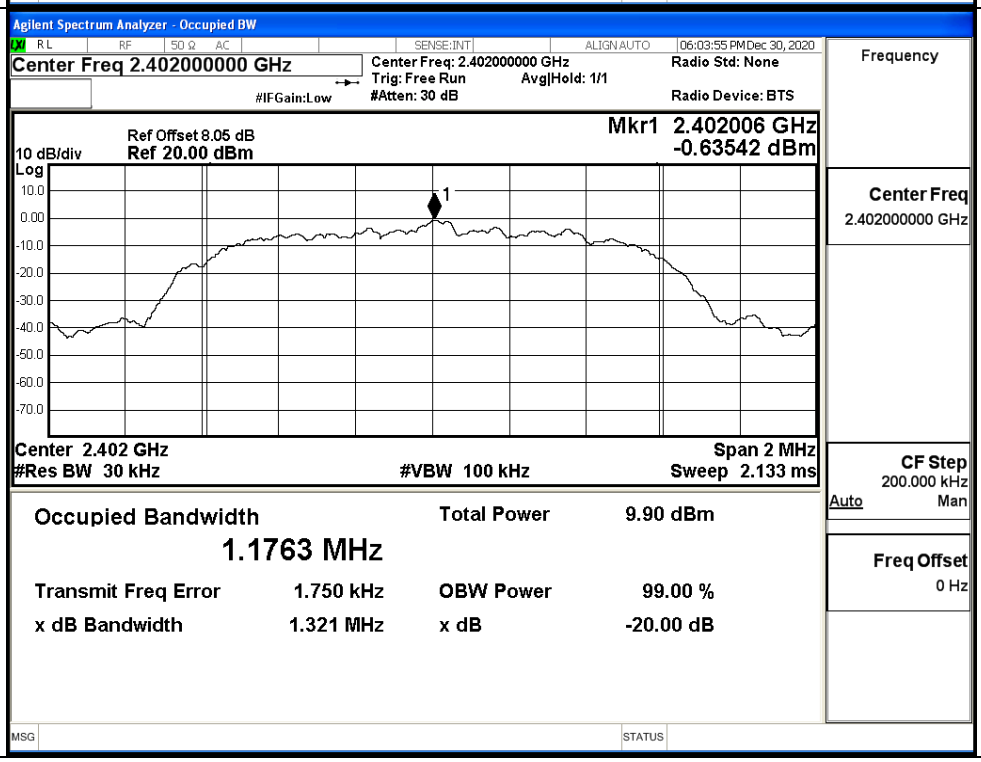
π/4DQPSK/MCH



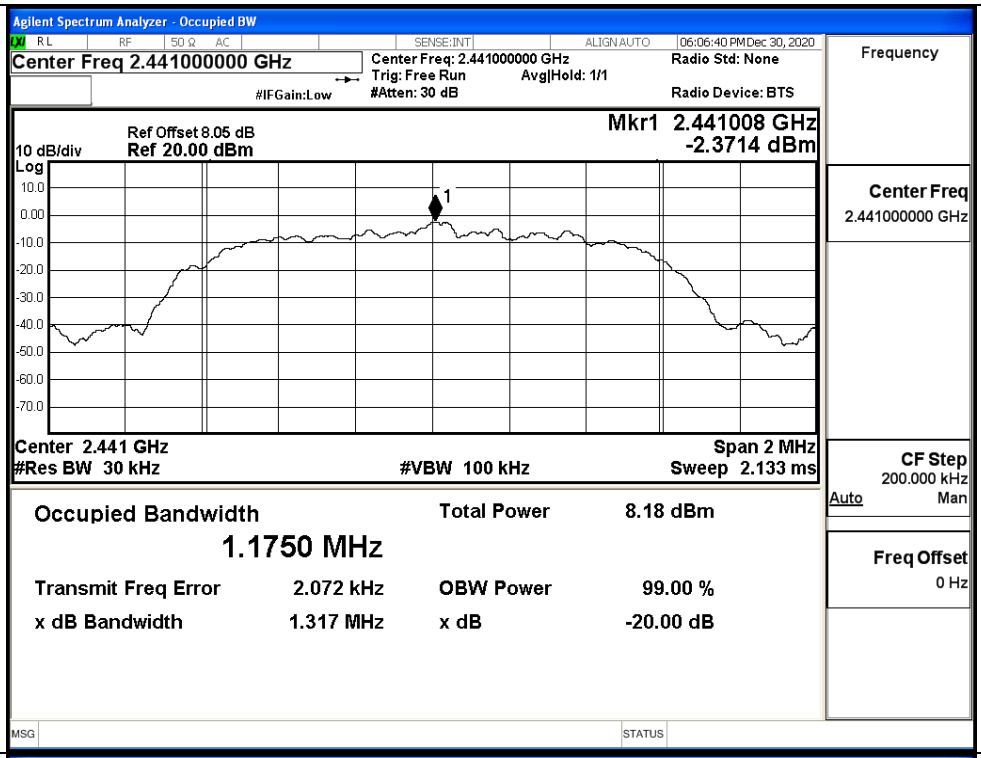
π/4DQPSK/HCH



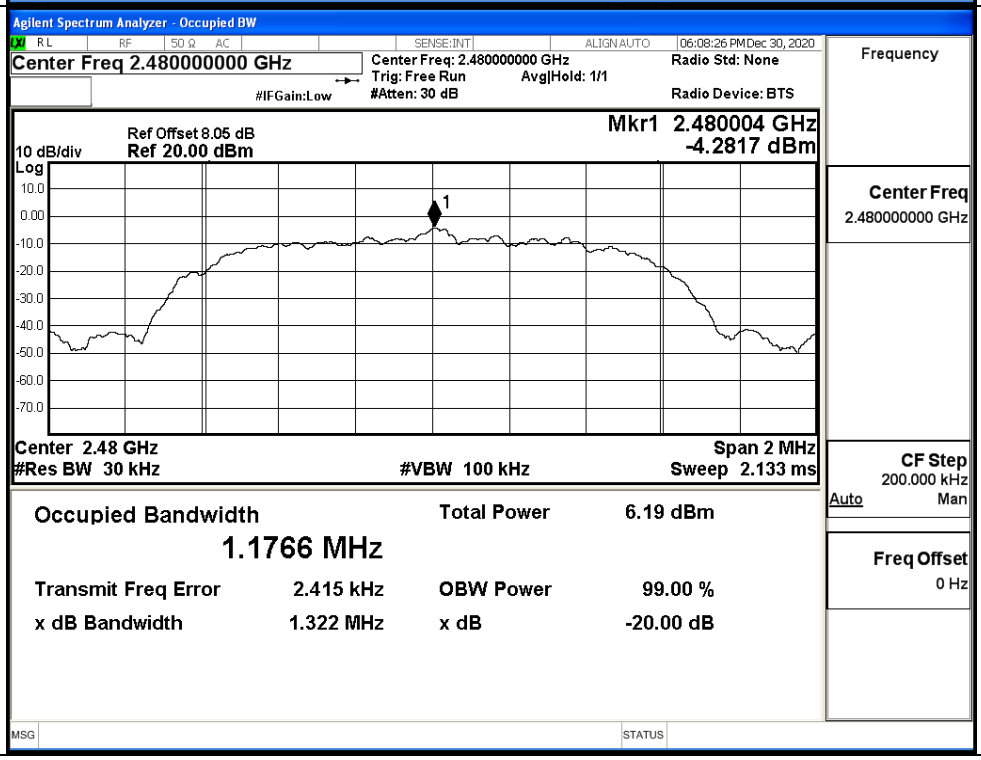
8DPSK/LCH



8DPSK/MCH

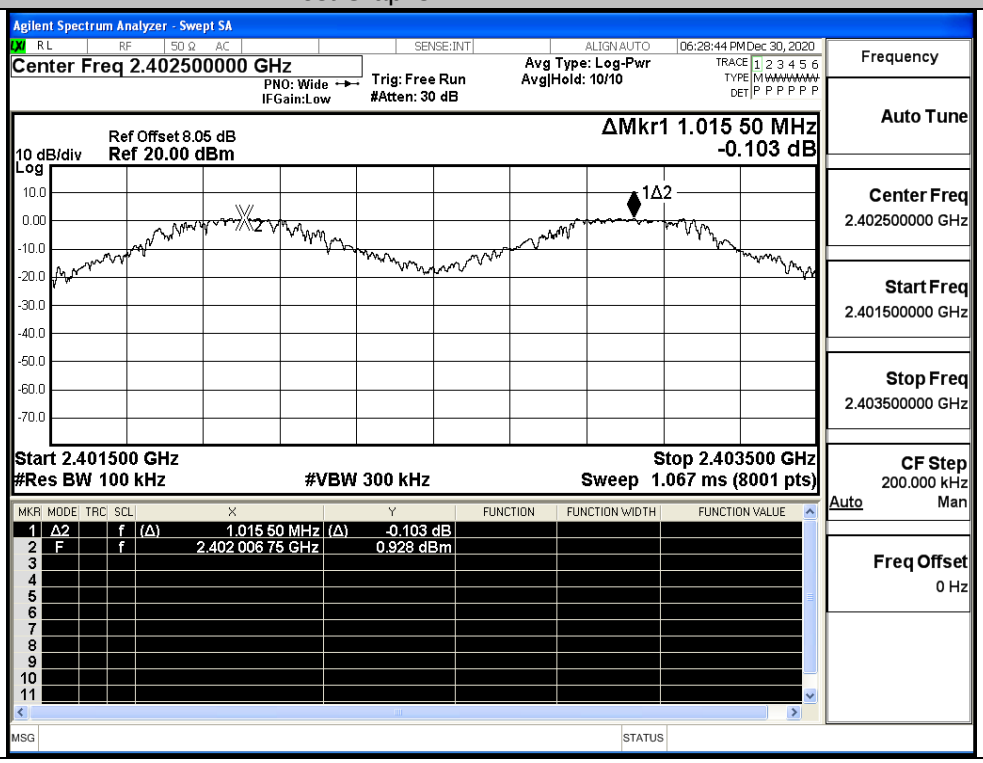


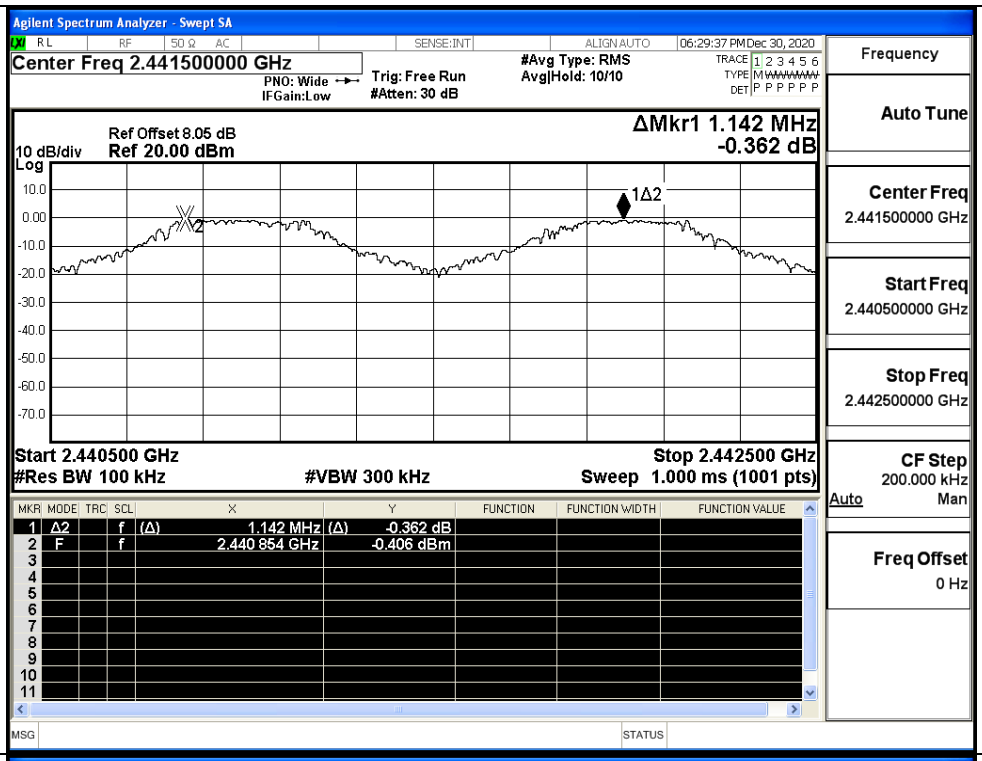
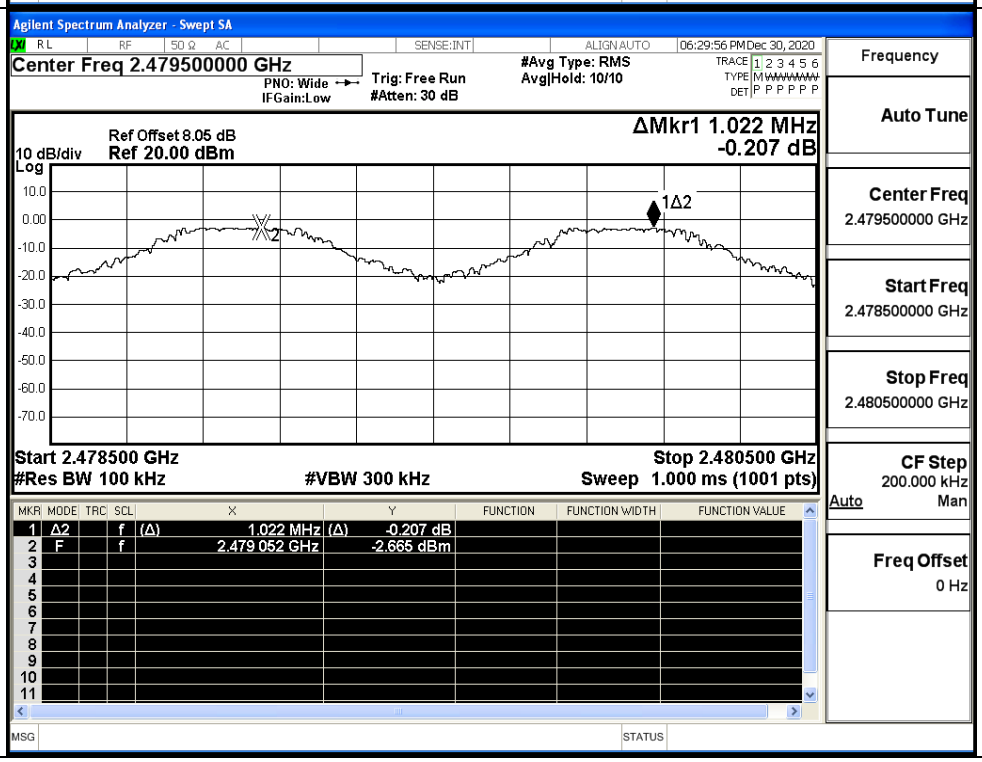
8DPSK/HCH



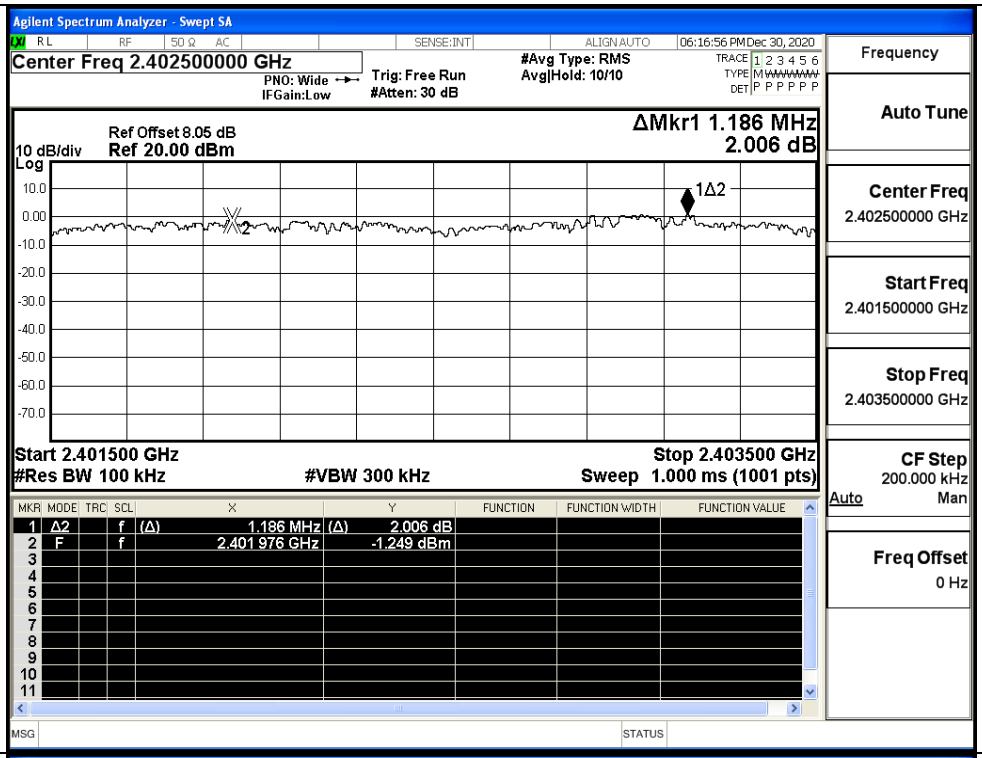
B.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.015	0.634	PASS
	MCH	1.142	0.634	PASS
	HCH	1.022	0.634	PASS
π/4DQPSK	LCH	1.186	0.880	PASS
	MCH	1.062	0.880	PASS
	HCH	0.982	0.880	PASS
8DPSK	LCH	1.004	0.881	PASS
	MCH	0.998	0.881	PASS
	HCH	1.086	0.881	PASS

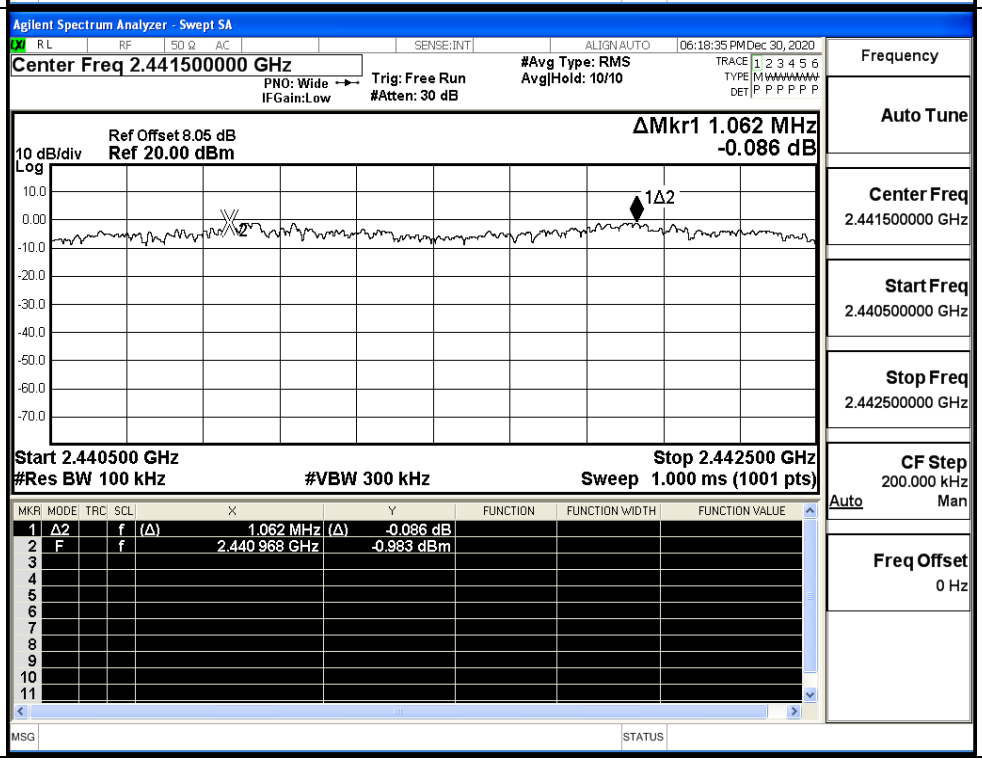
Test Graphs		
GFSK/LCH		

GFSK/MCH		
GFSK/HCH		

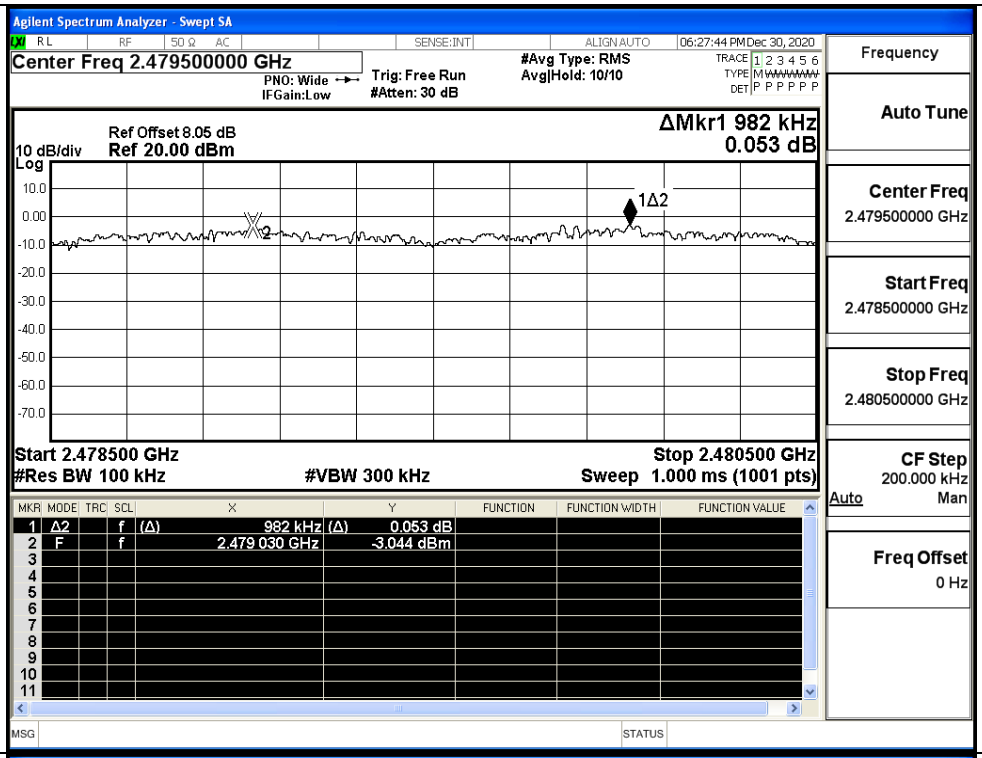
π/4DQPSK/LCH



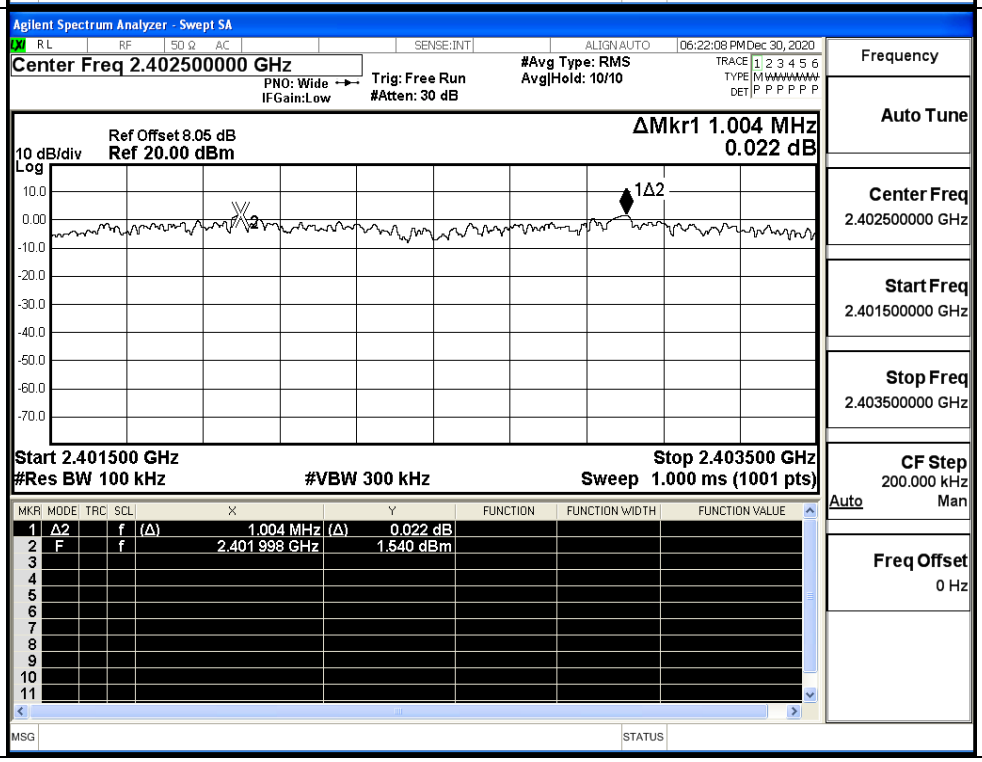
π/4DQPSK/MCH

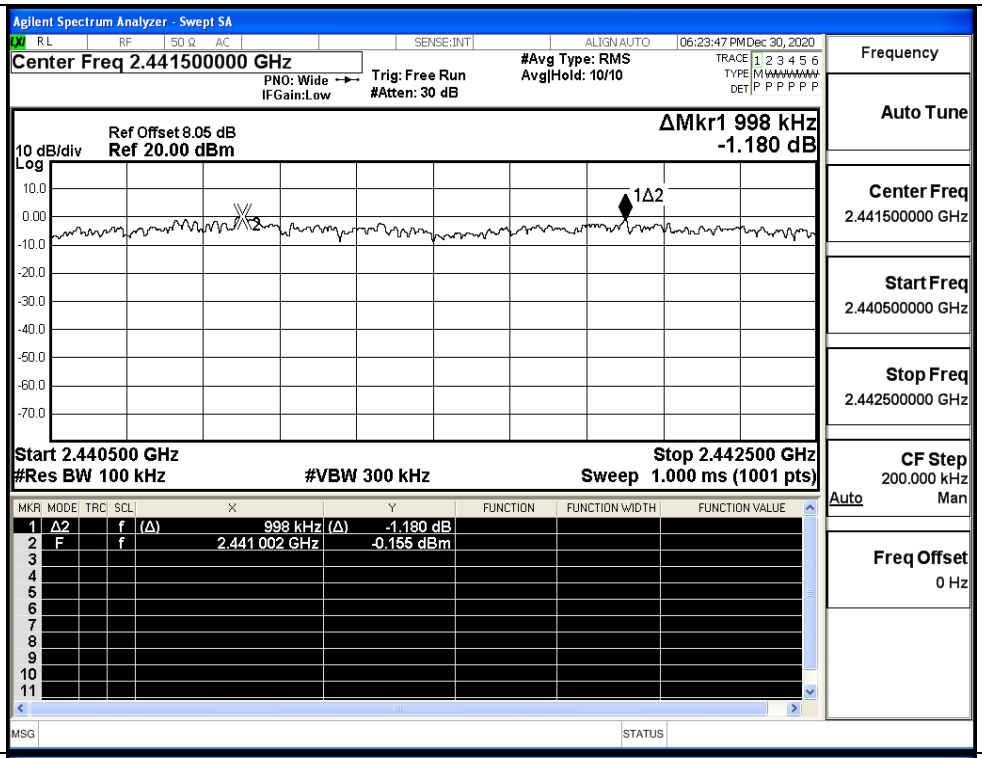
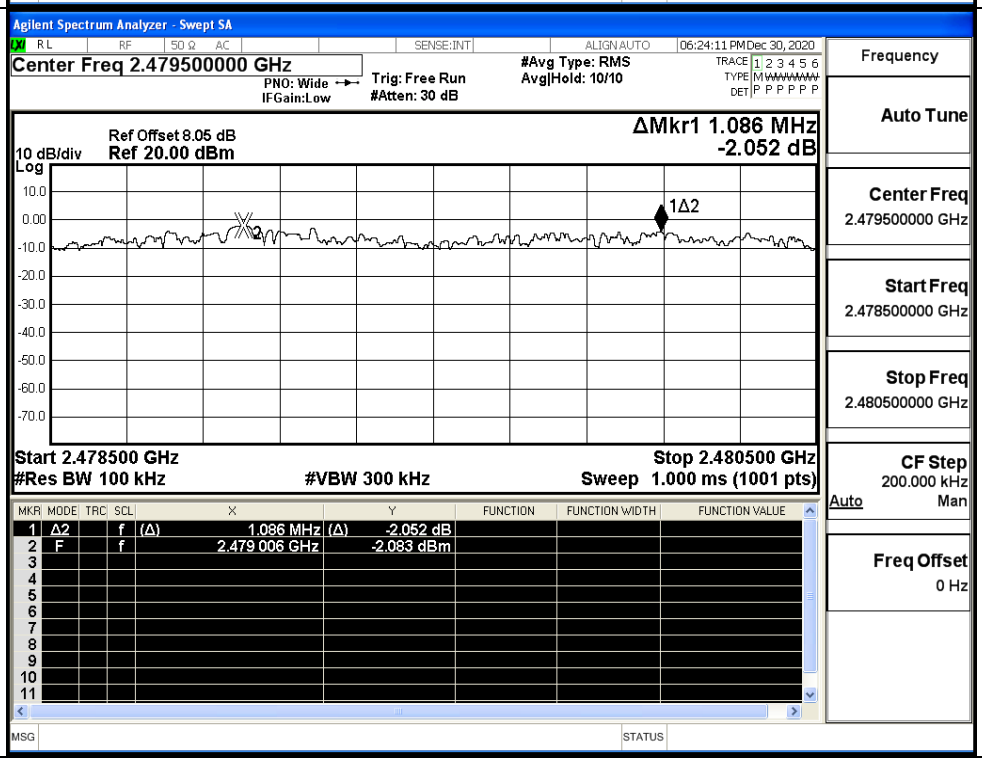


π/4DQPSK/HCH



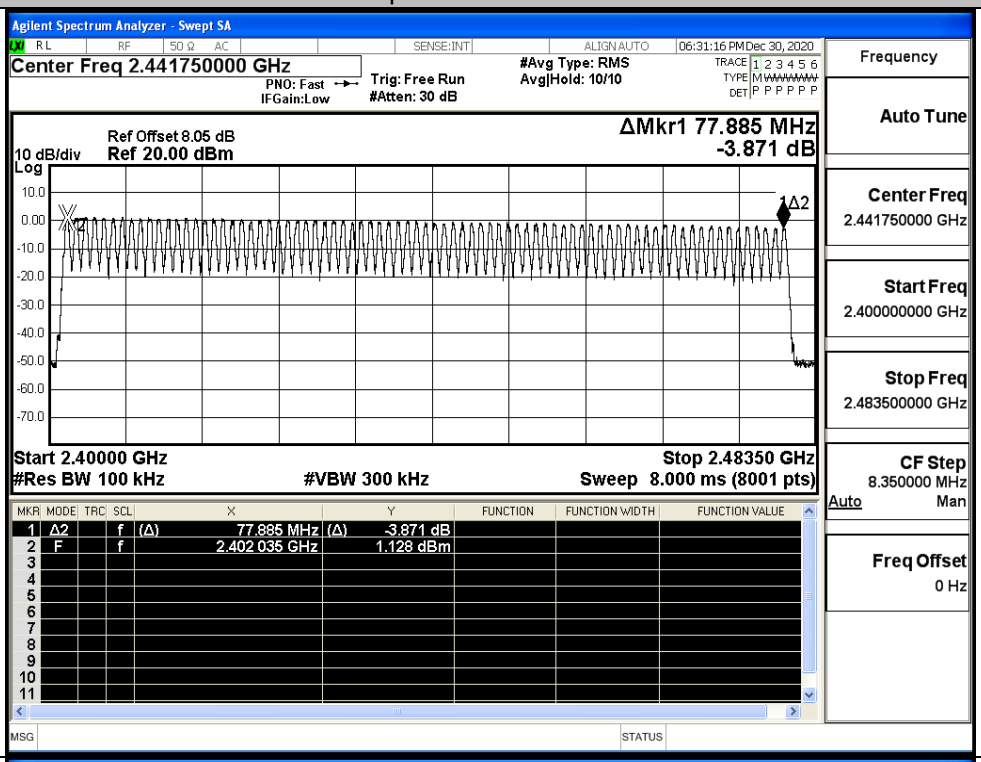
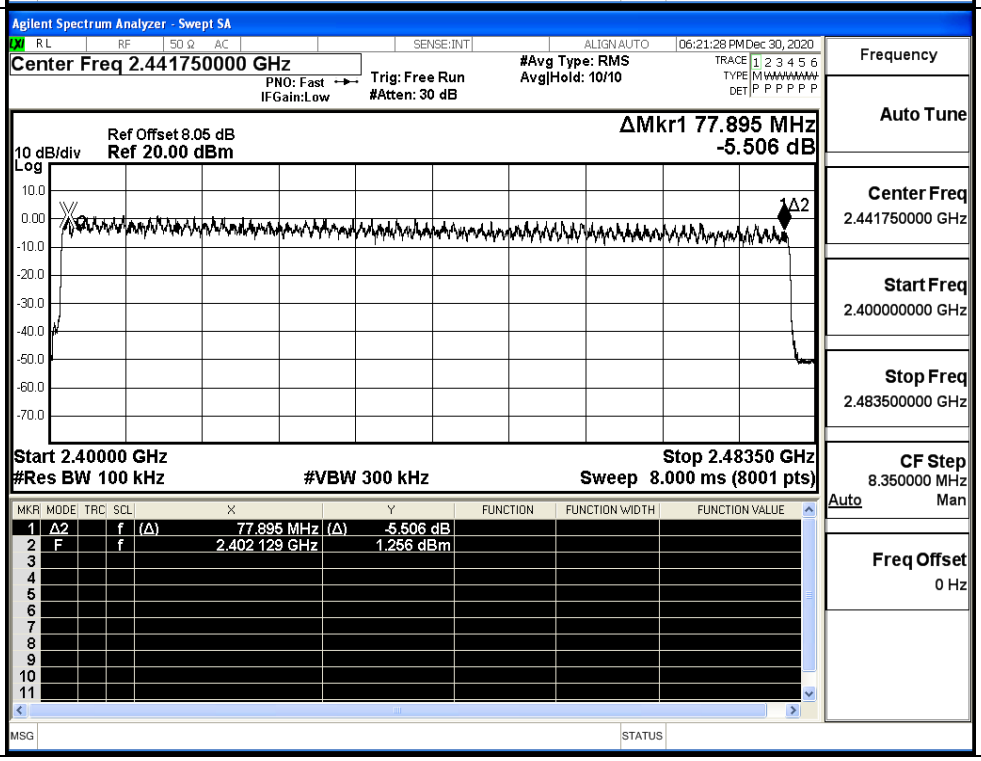
8DPSK/LCH

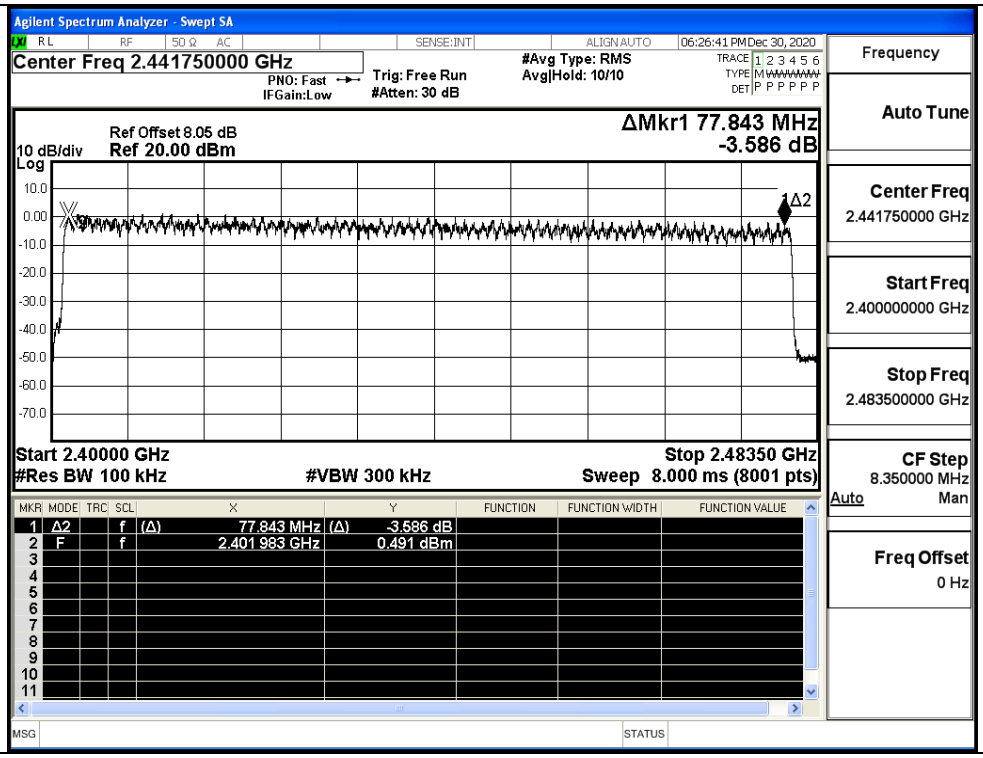


8DPSK/MCH		
8DPSK/HCH		

B.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

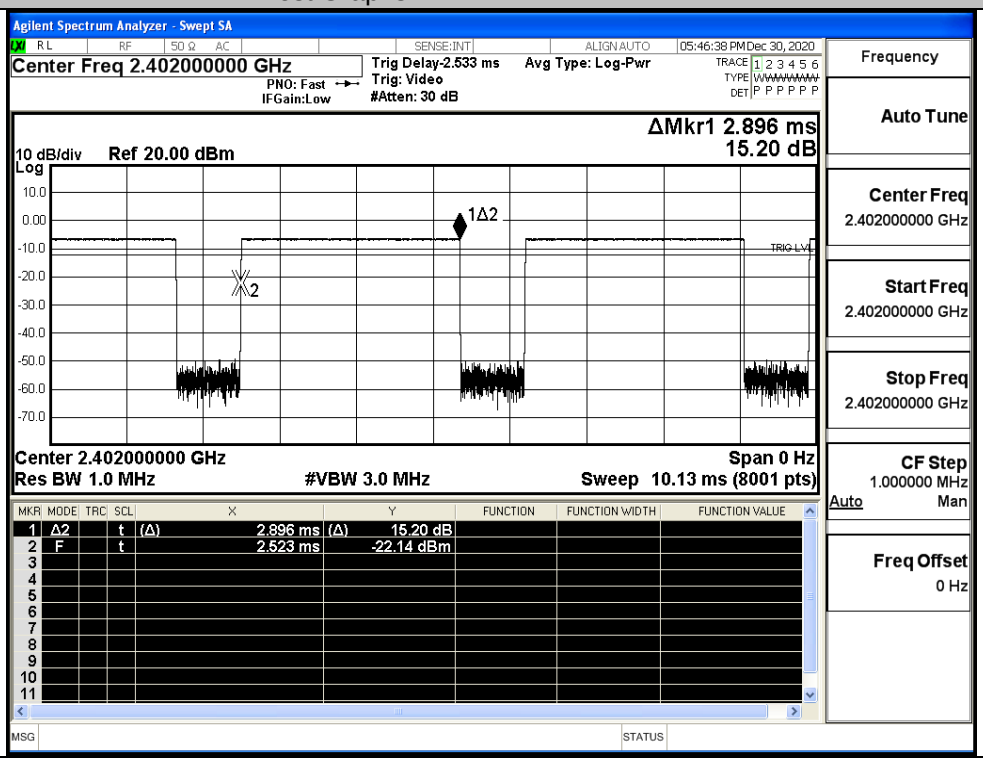
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

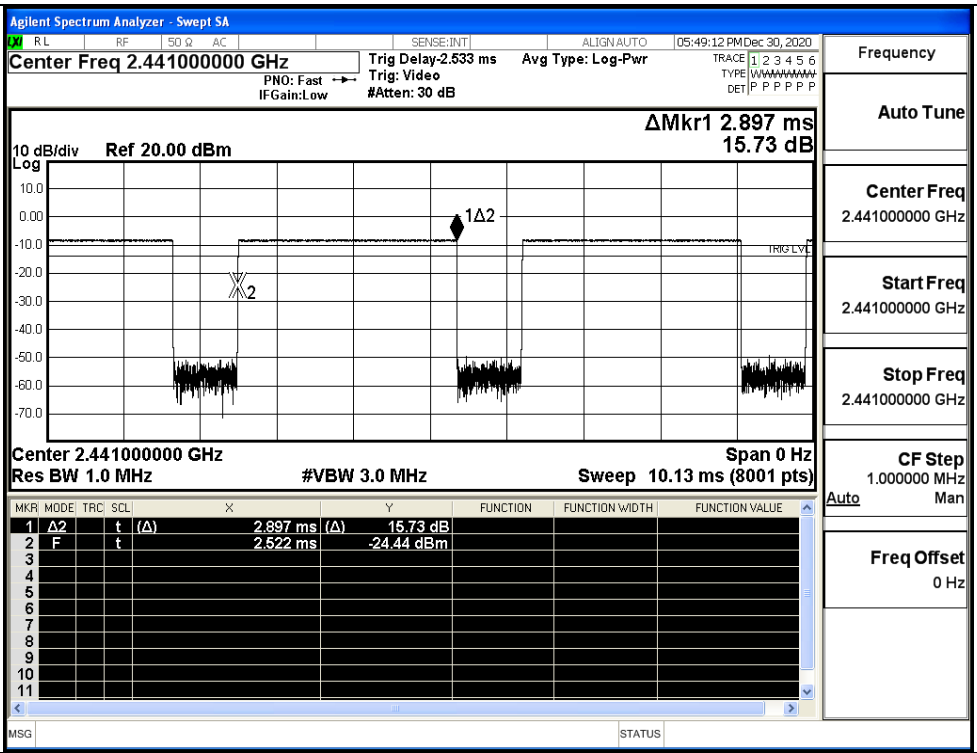
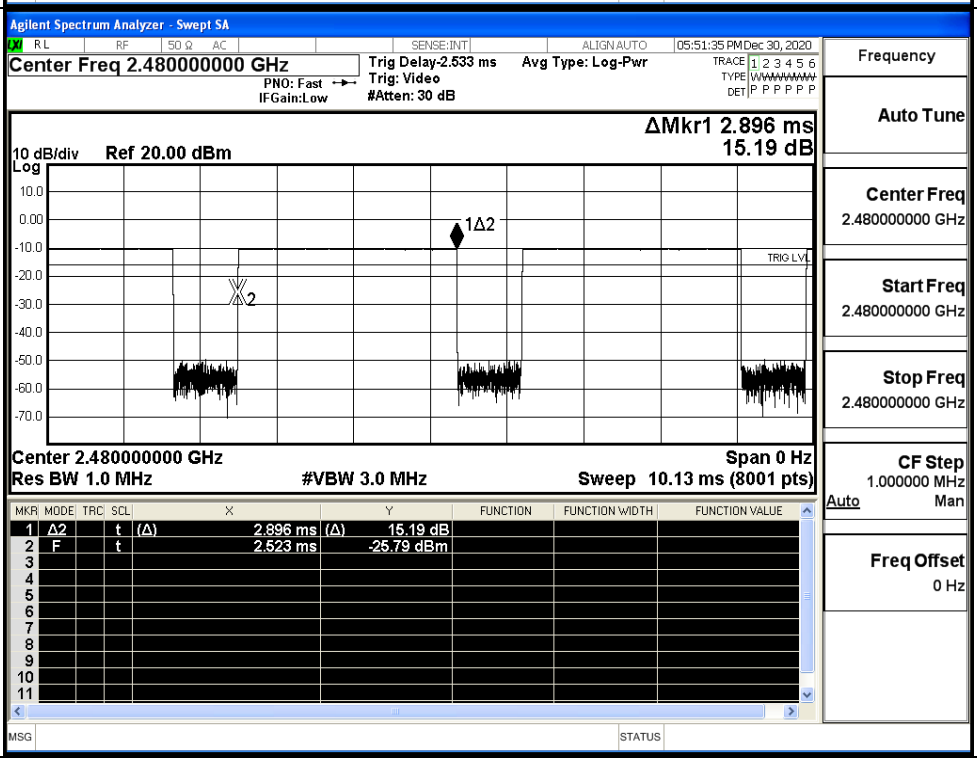
8DPSK/Hop	

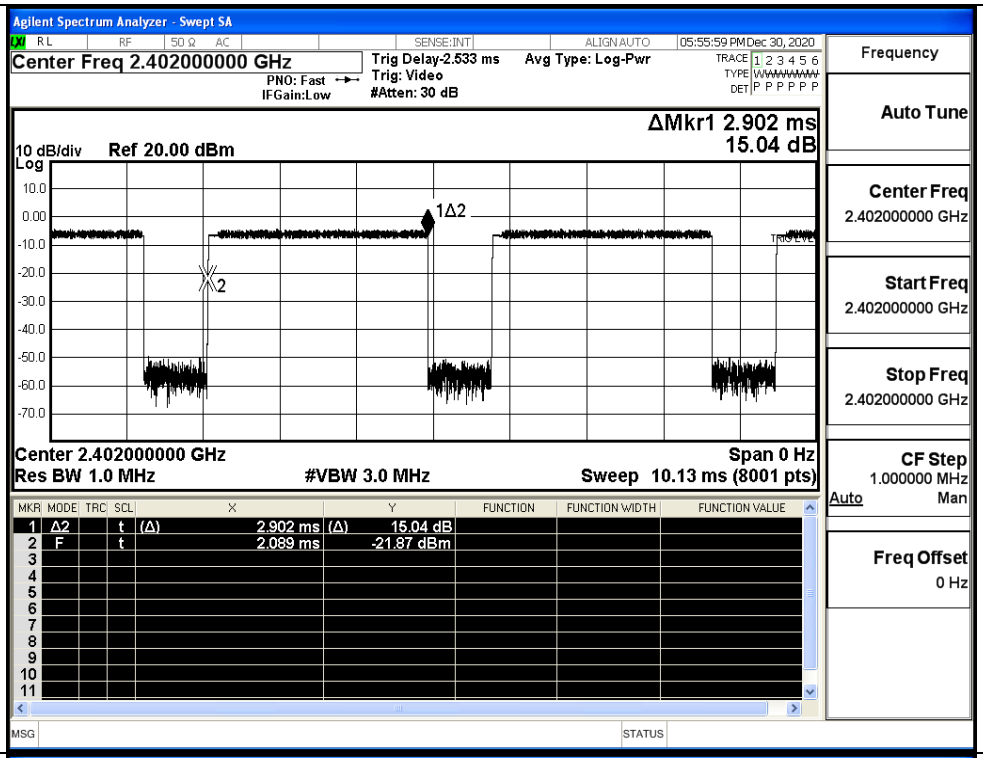
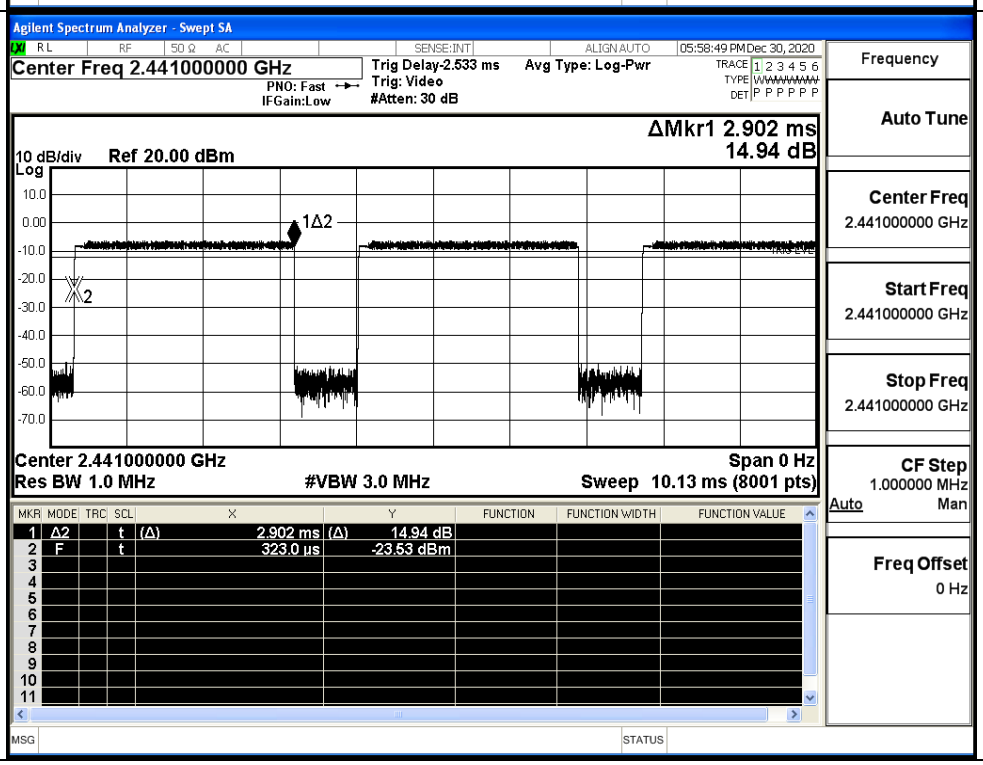
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
06:26:41 PM Dec 30, 2020
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 77.843 MHz
-3.586 dB
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (8001 pts)
1 Δ2 f (Δ) 77.843 MHz (Δ) -3.586 dB
2 F f 2.401 983 GHz 0.491 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

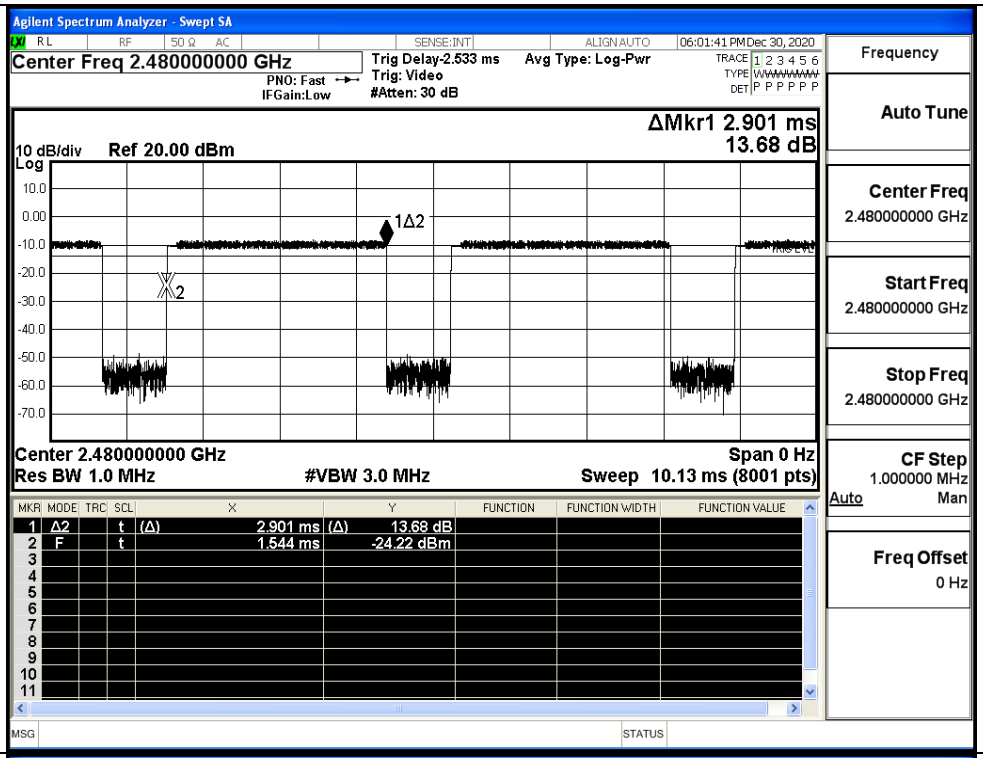
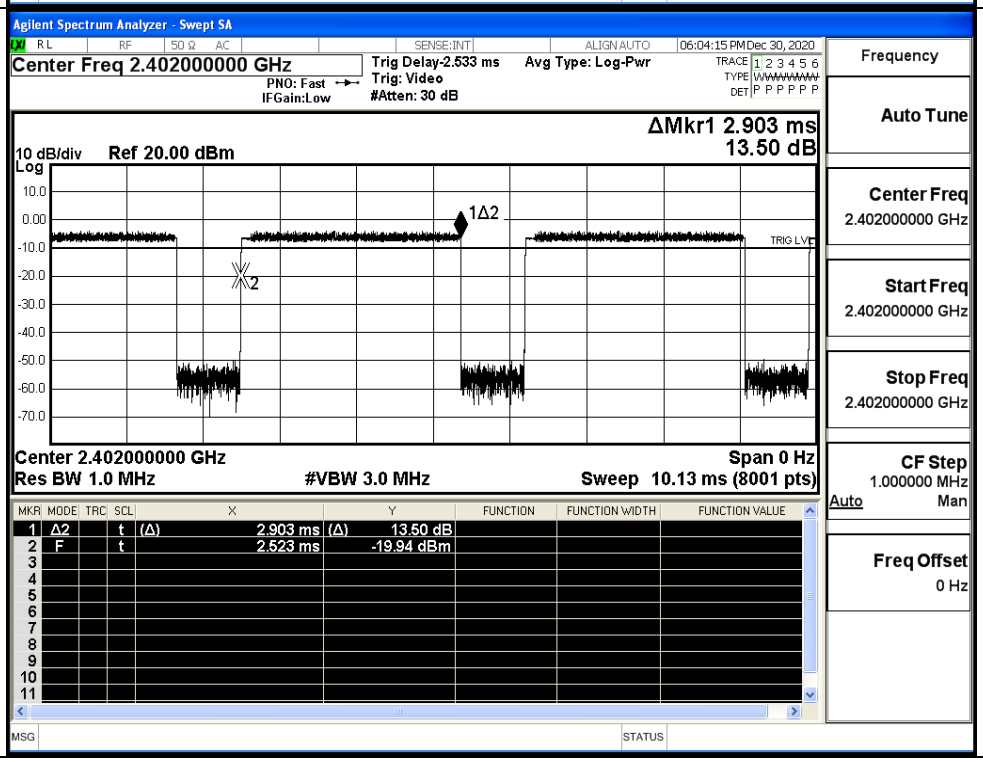
B.5 Dwell Time

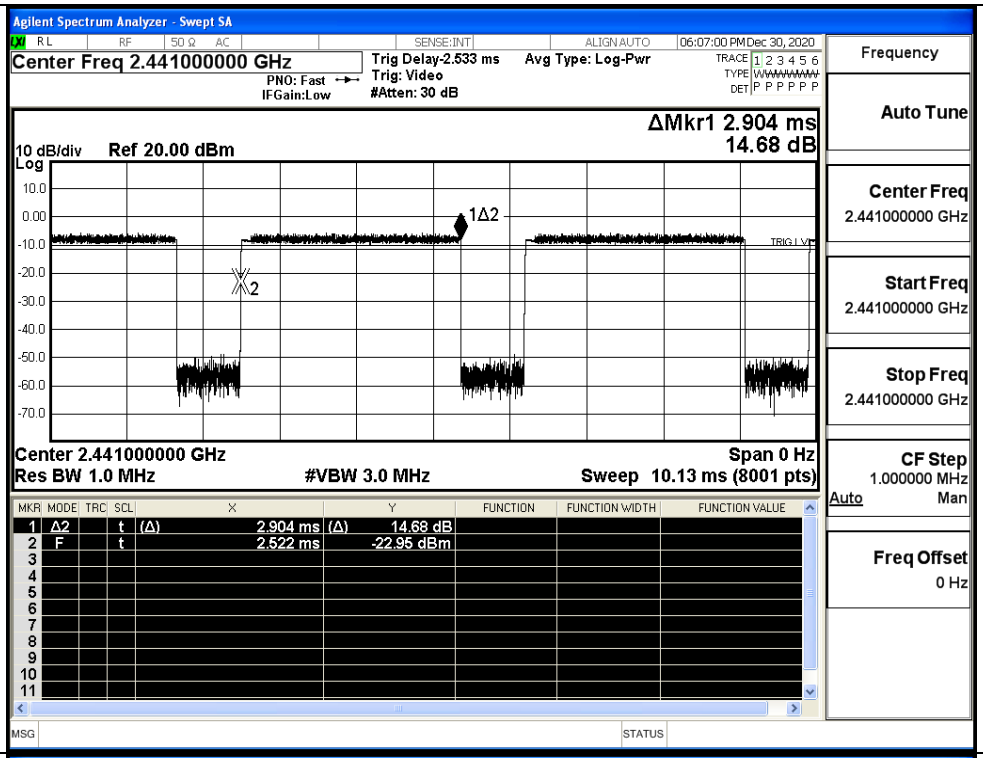
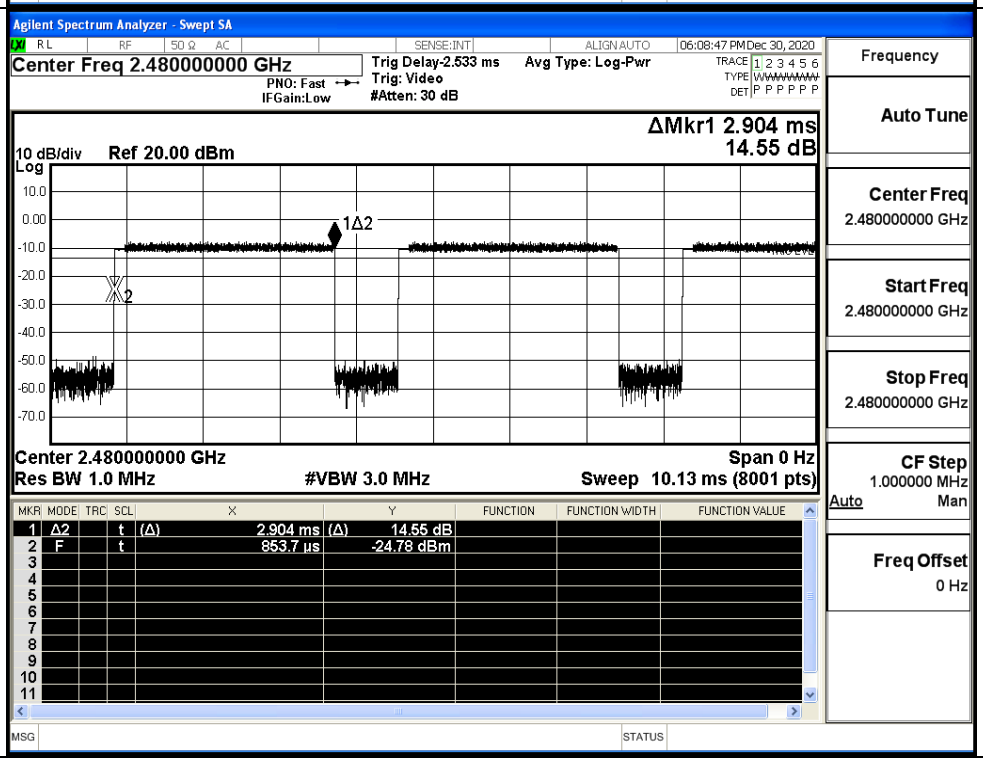
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
π/4DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309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

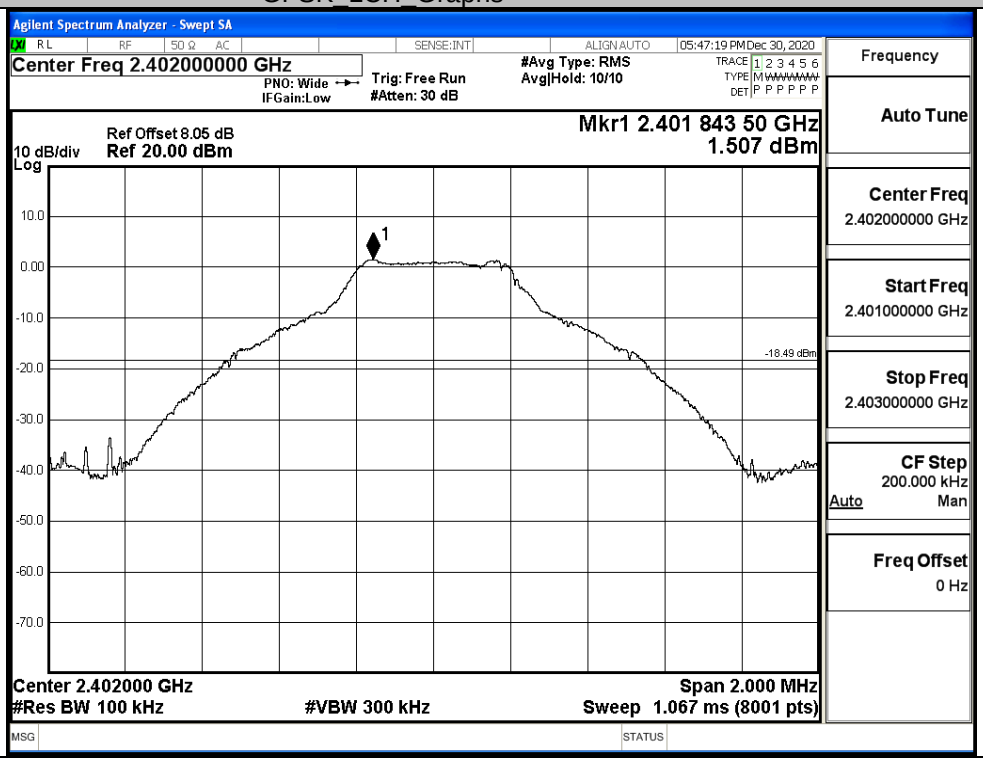
8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

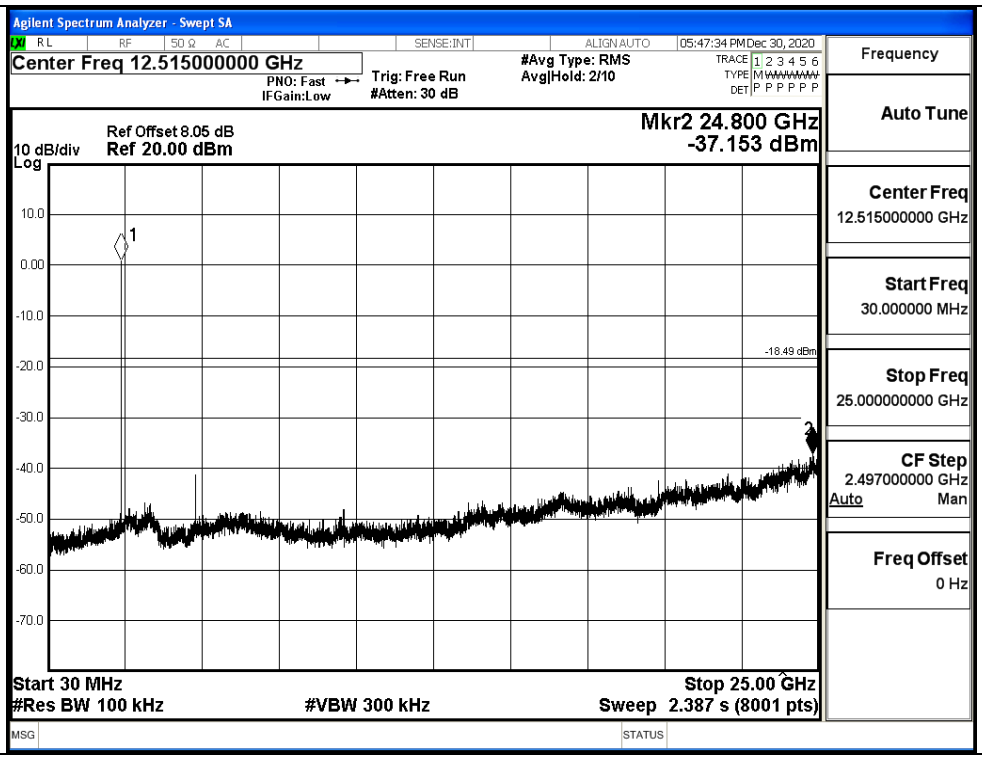
B.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.507	-37.153	-18.493	PASS
	MCH	-0.316	-37.666	-20.316	PASS
	HCH	-2.299	-36.735	-22.299	PASS
π/4DQPSK	LCH	1.558	-37.194	-18.442	PASS
	MCH	-0.385	-36.771	-20.385	PASS
	HCH	-2.391	-36.829	-22.391	PASS
8DPSK	LCH	1.2	-37.402	-18.800	PASS
	MCH	-0.198	-36.783	-20.198	PASS
	HCH	-2.328	-37.171	-22.328	PASS

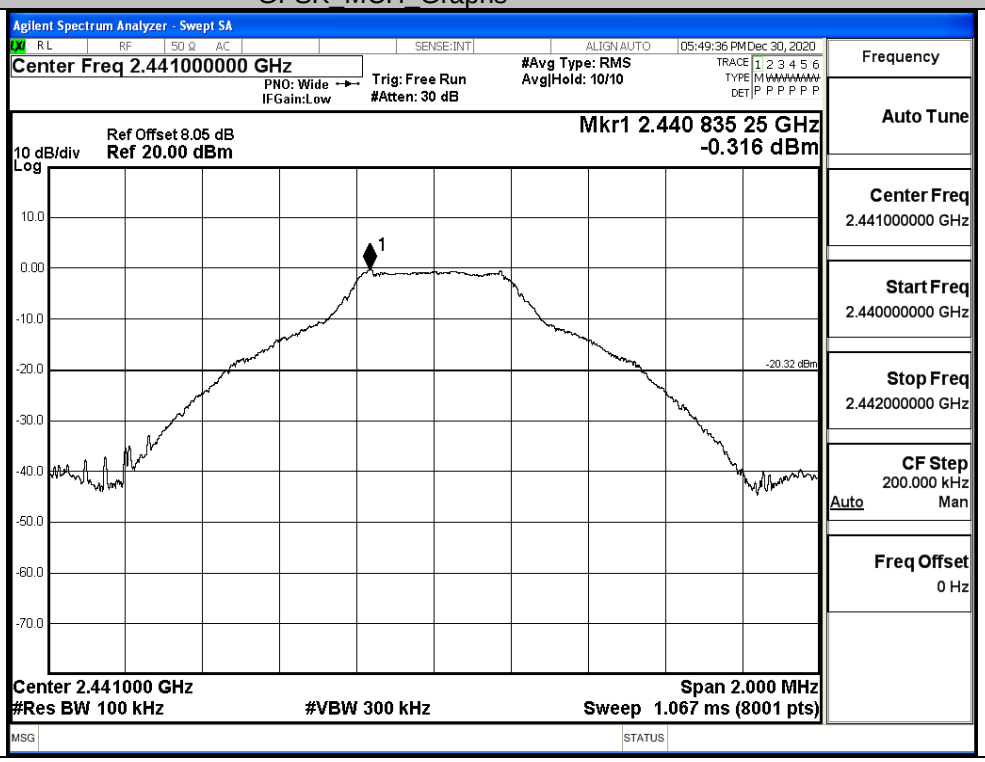
GFSK_LCH_Graphs

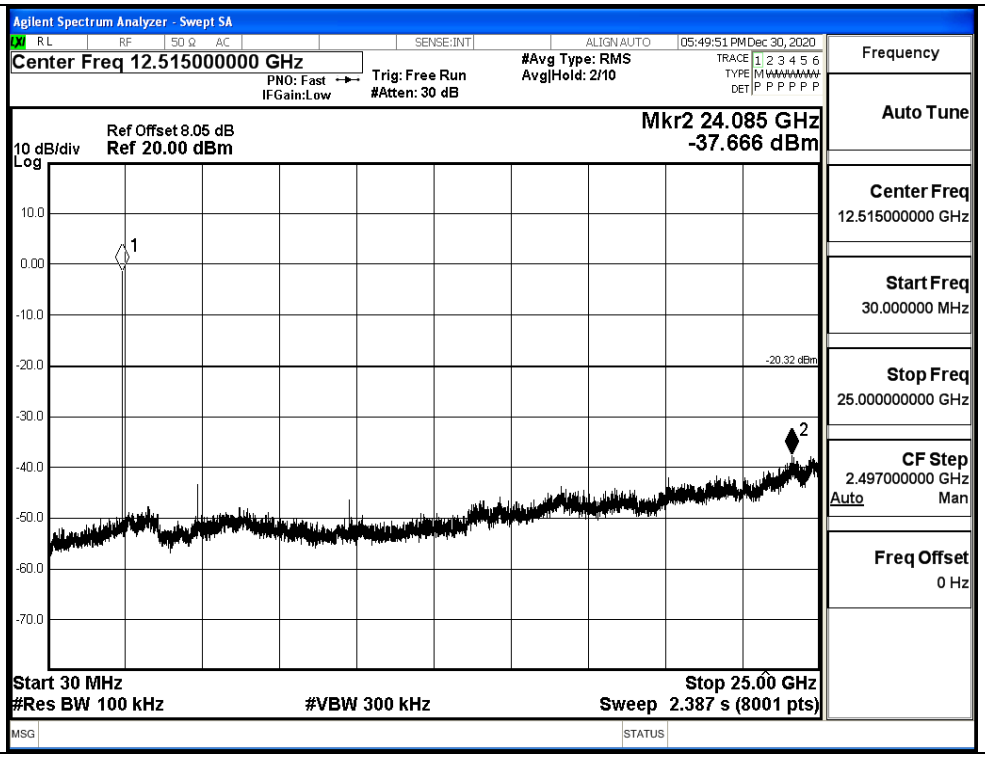
Pref



Puw		

GFSK_MCH_Graphs

Pref		

Puw		

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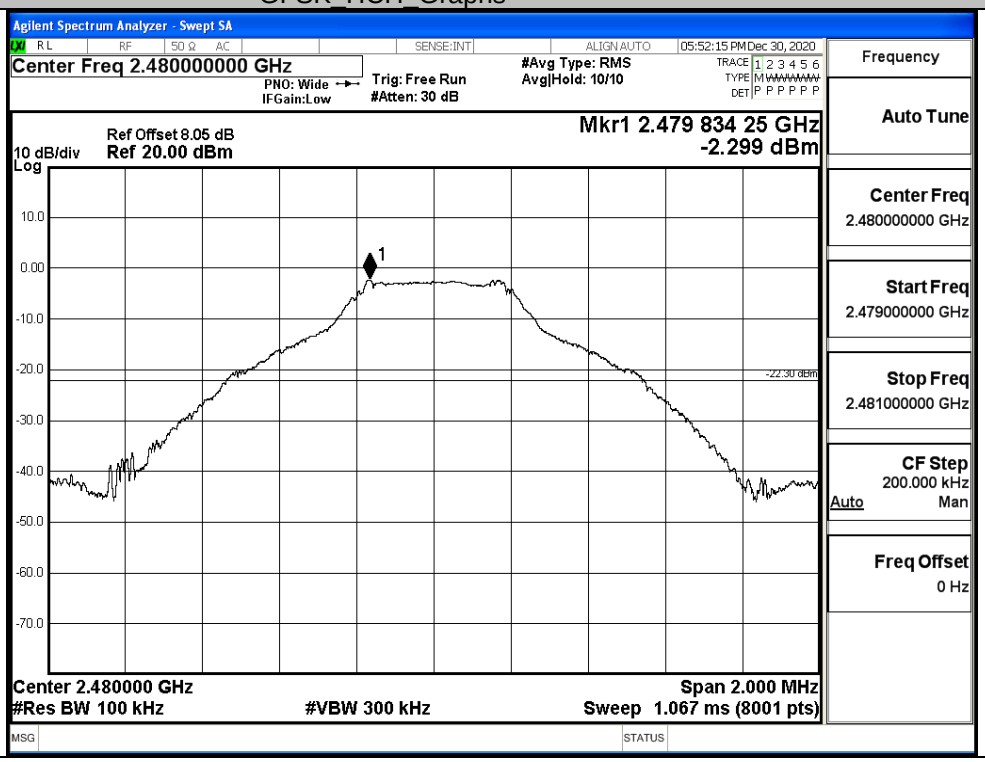
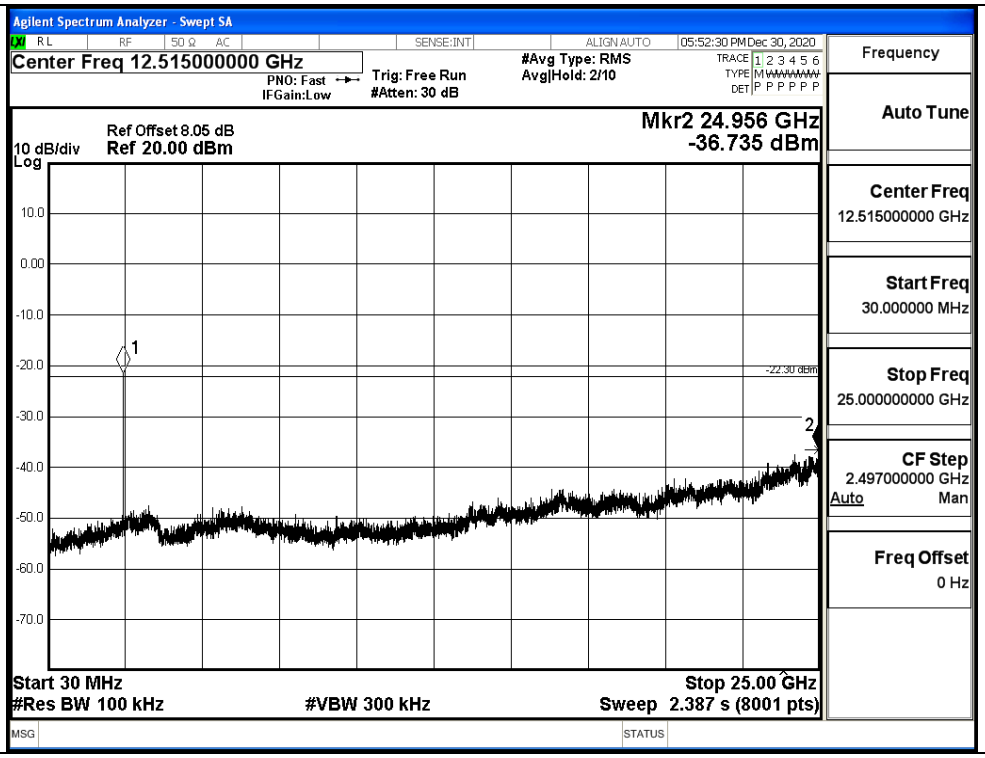
Pref		

Puw		

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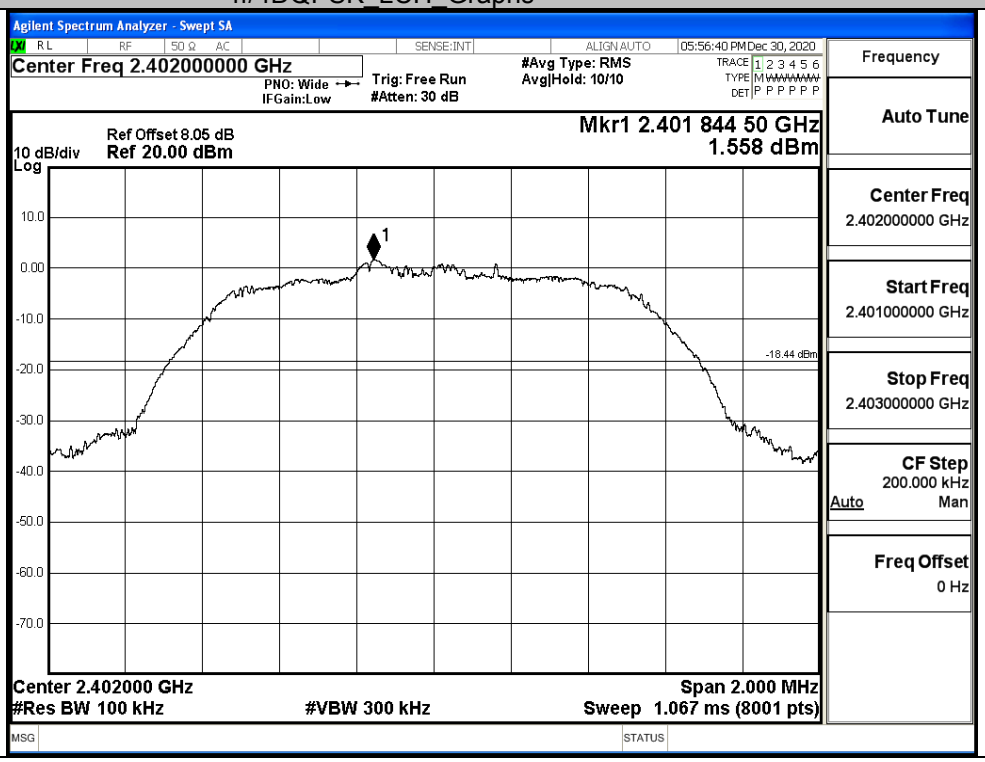
Pref		

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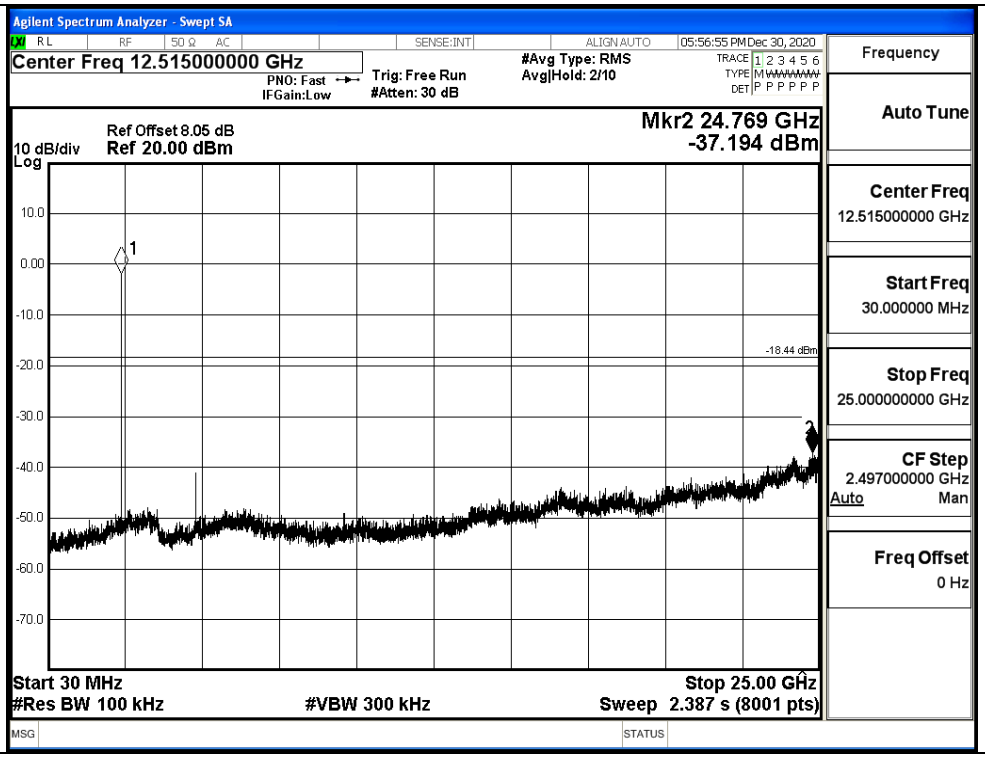

π/4DQPSK_MCH_Graphs

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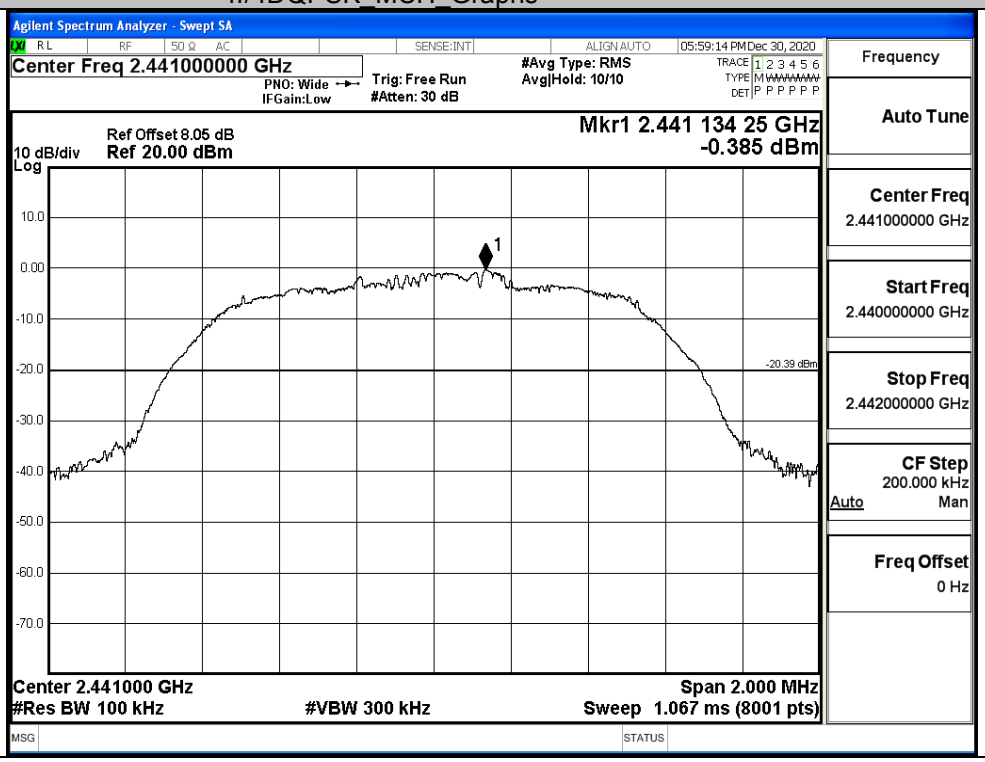

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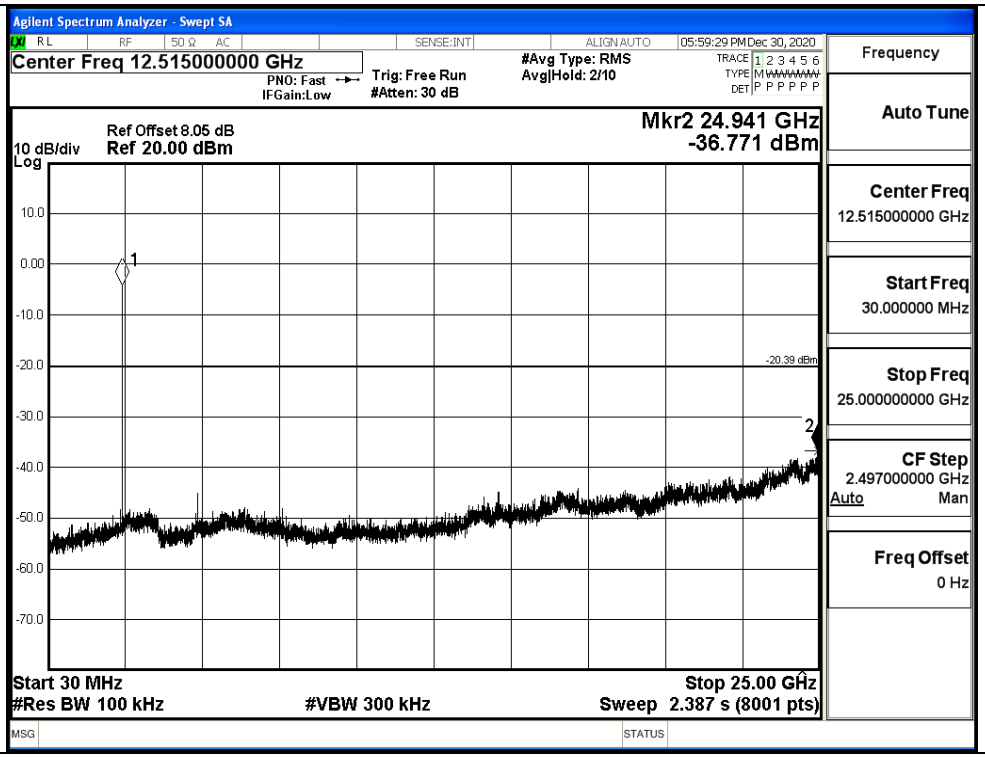

π/4DQPSK_HCH_Graphs

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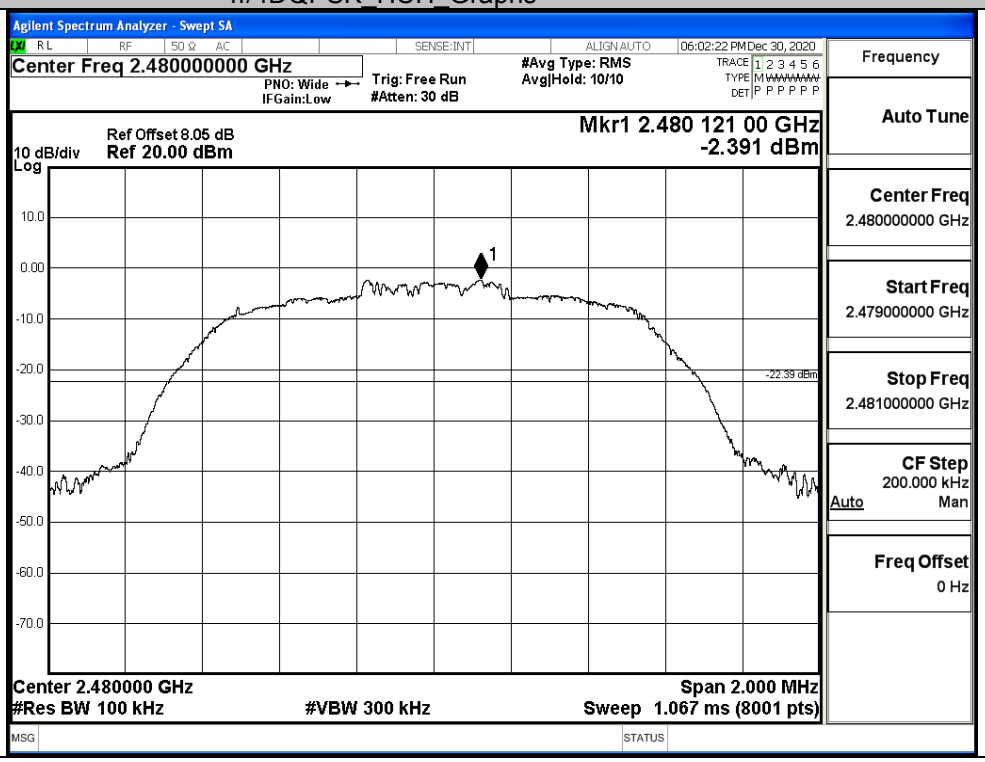

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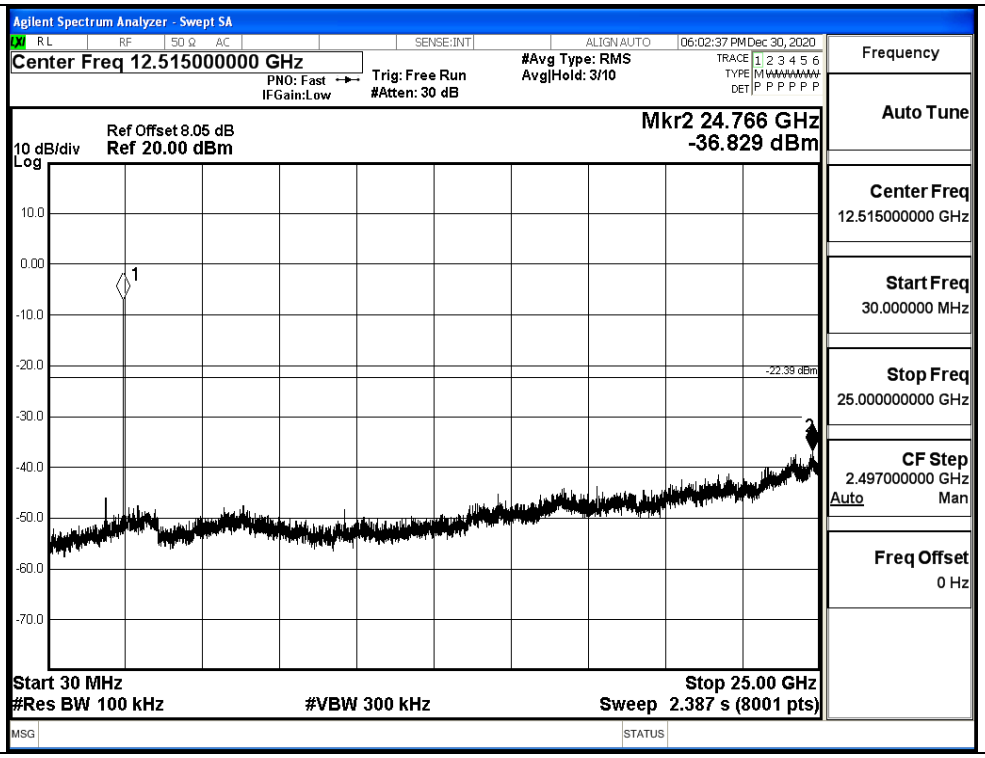

8DPSK_LCH_Graphs

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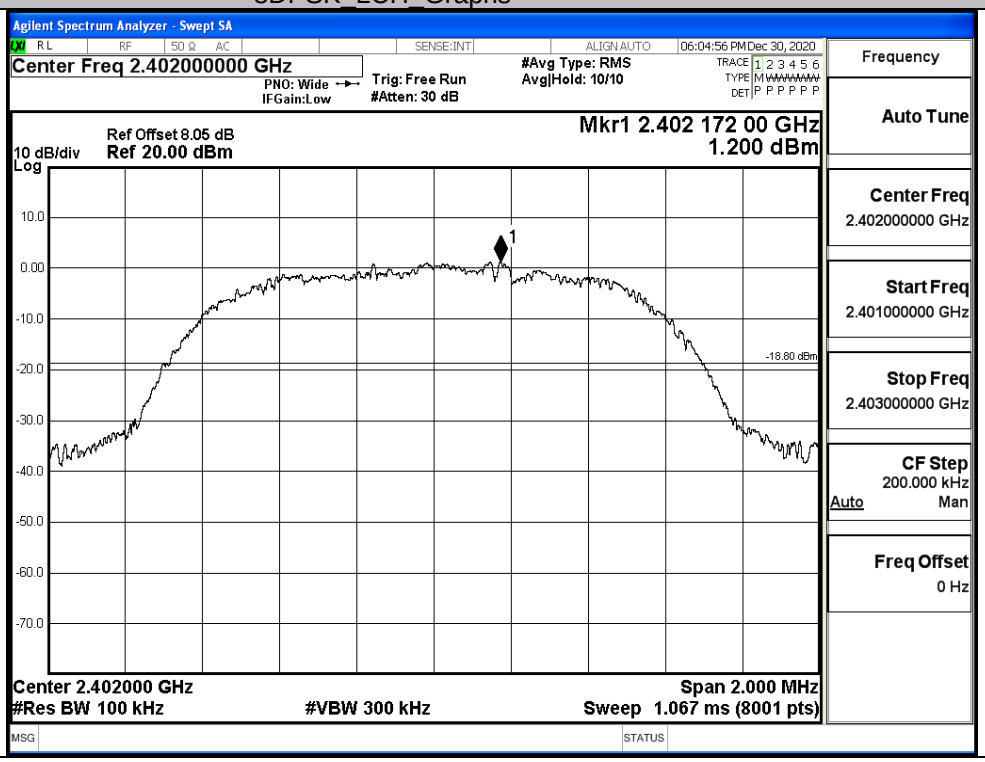

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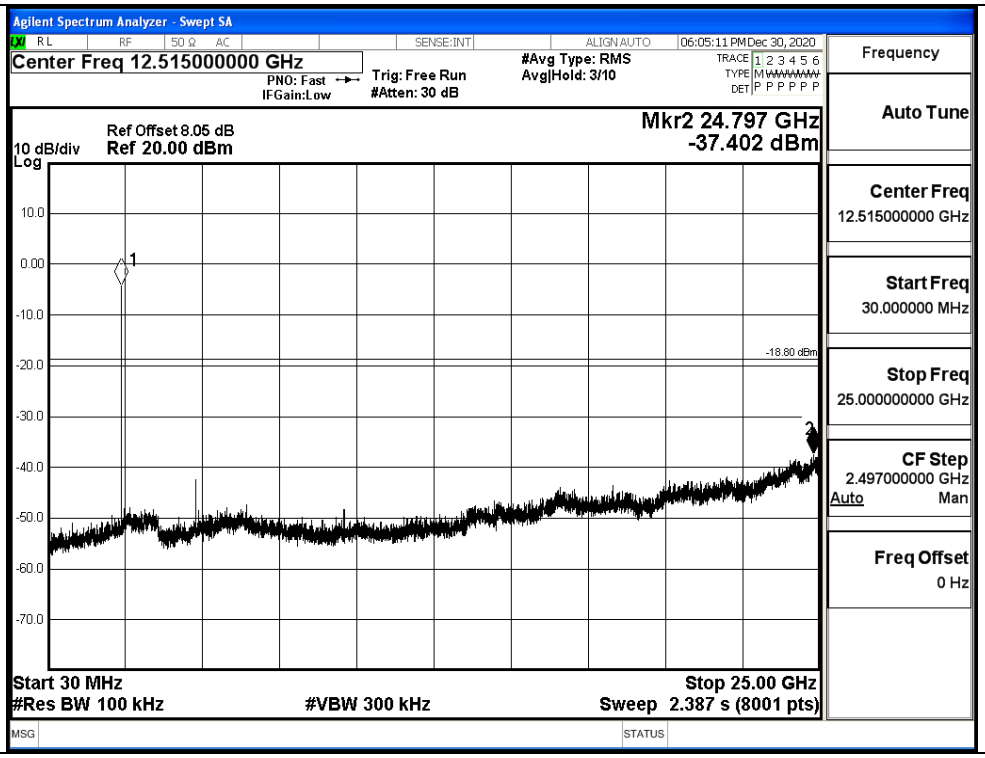

8DPSK_MCH_Graphs

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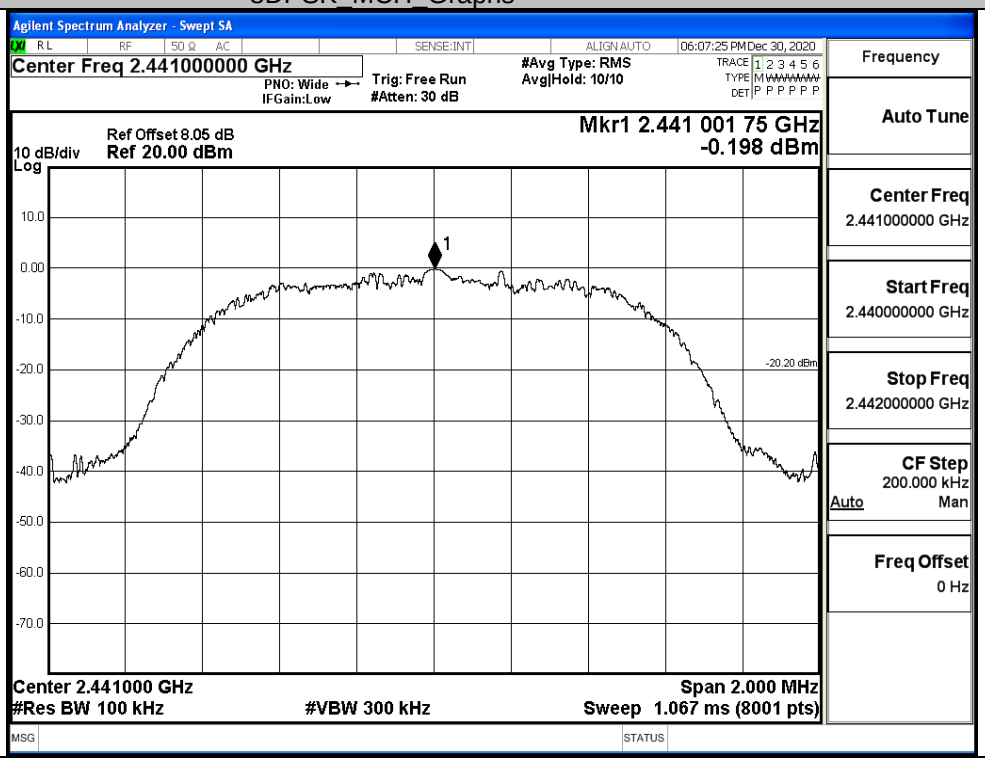
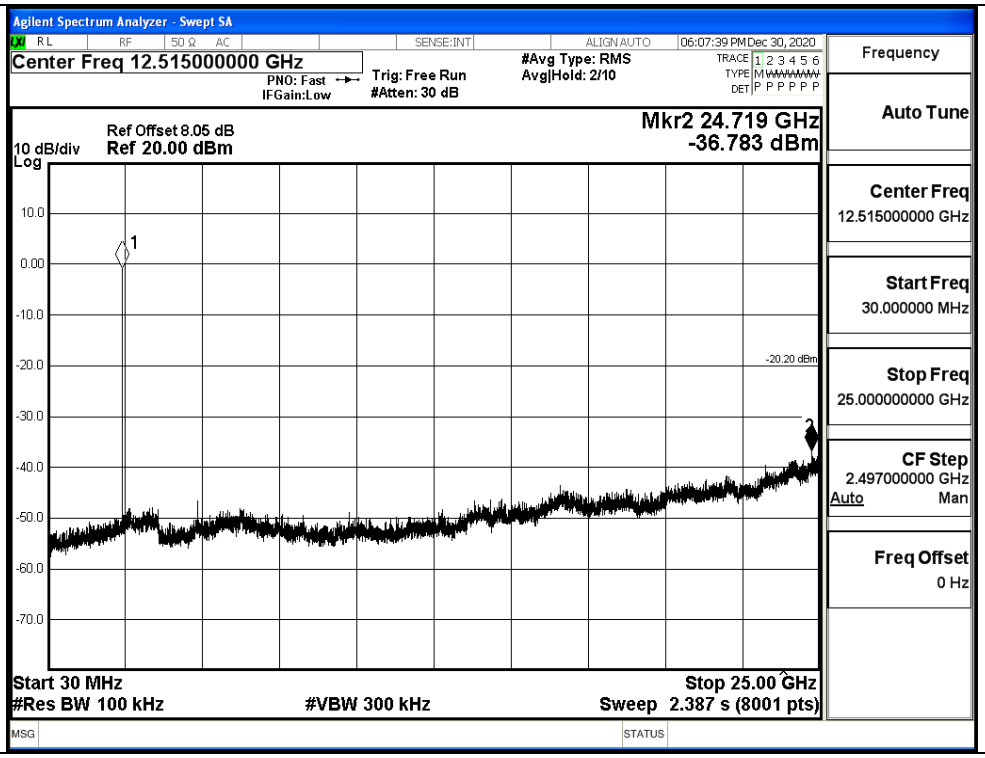
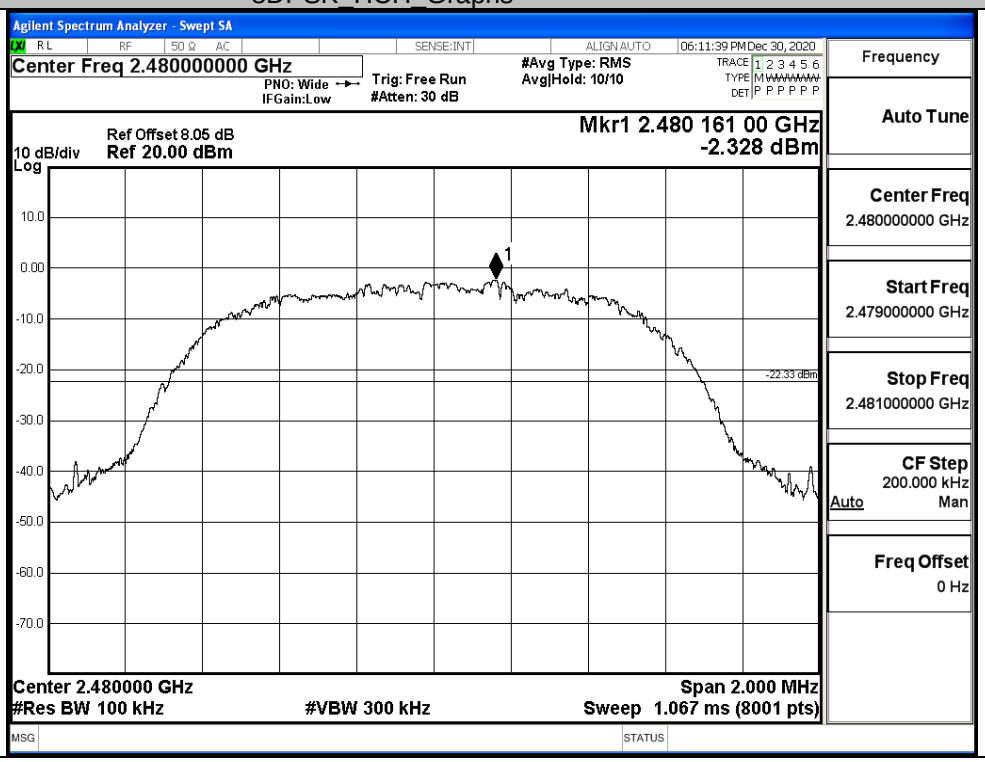
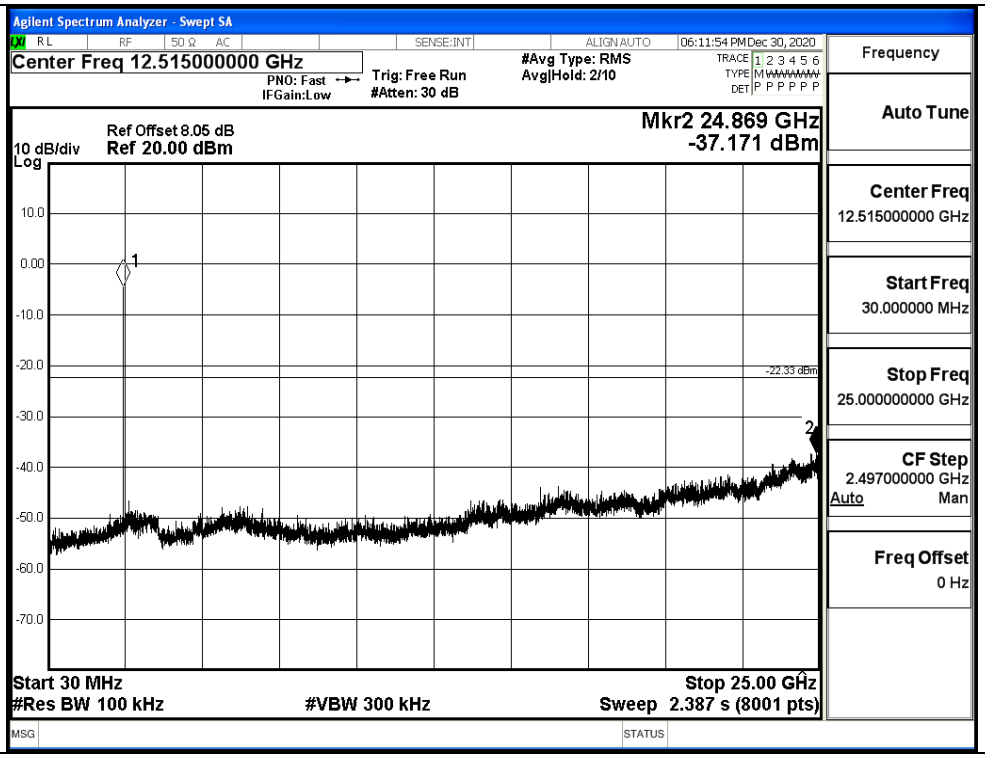


Puw		

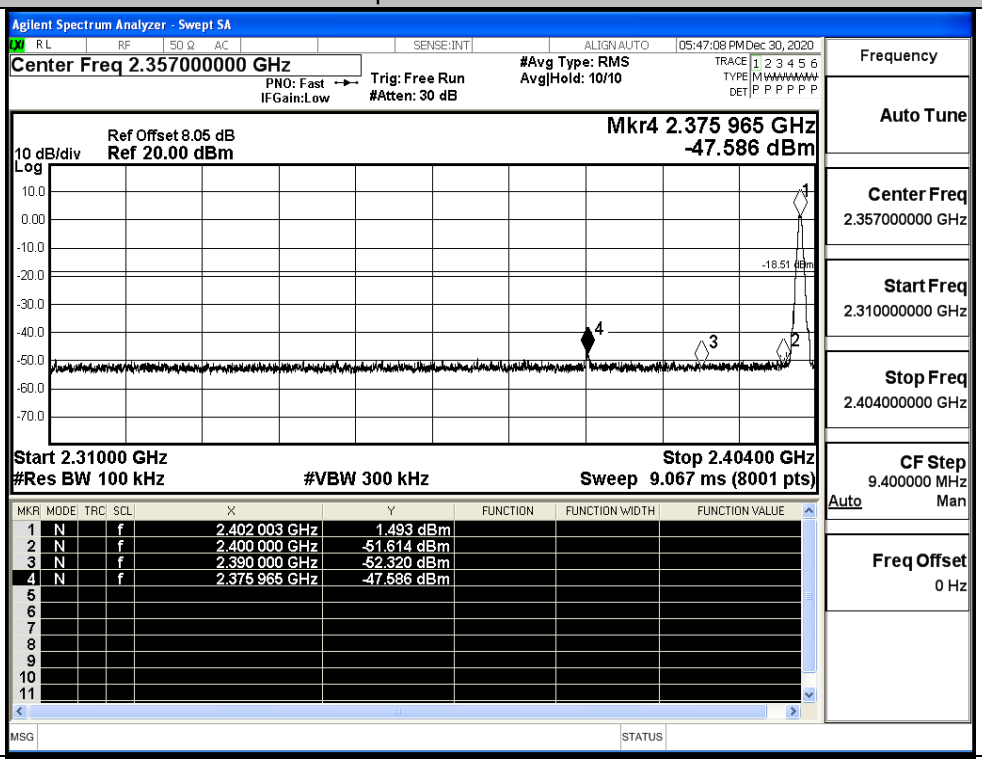
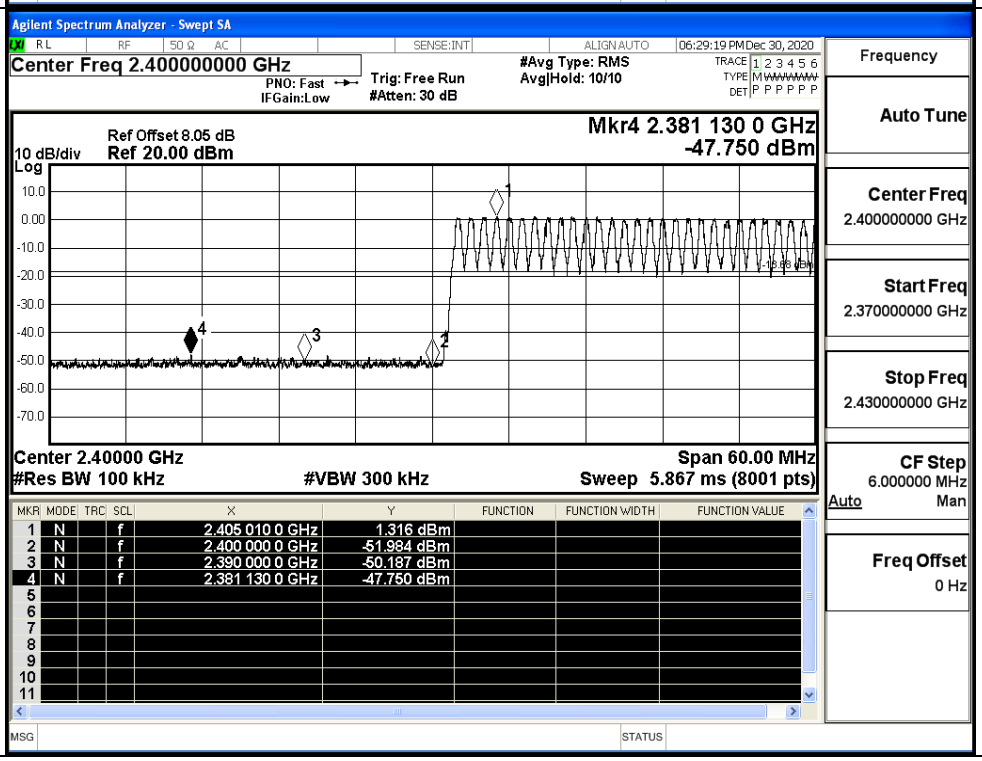
8DPSK_HCH_Graphs		
Pref		

Puw		

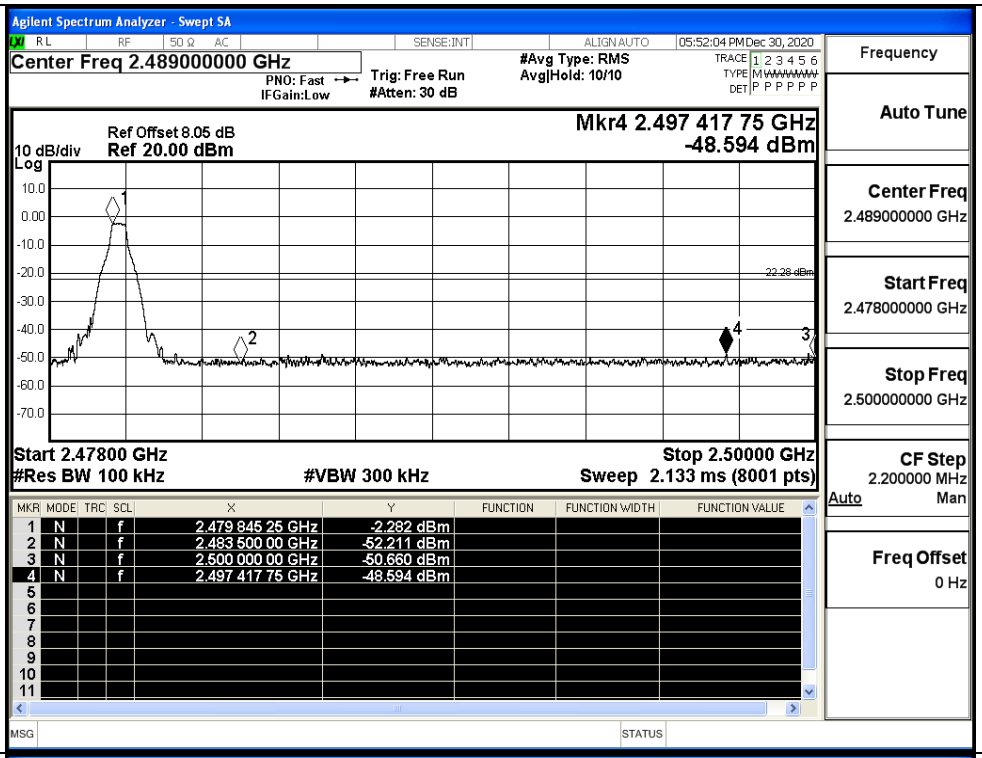
Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
06:11:54 PM Dec 30, 2020
Ref Offset 8.05 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 24.869 GHz
-37.171 dBm
-22.33 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 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

B.7 Band-edge for RF Conducted Emissions

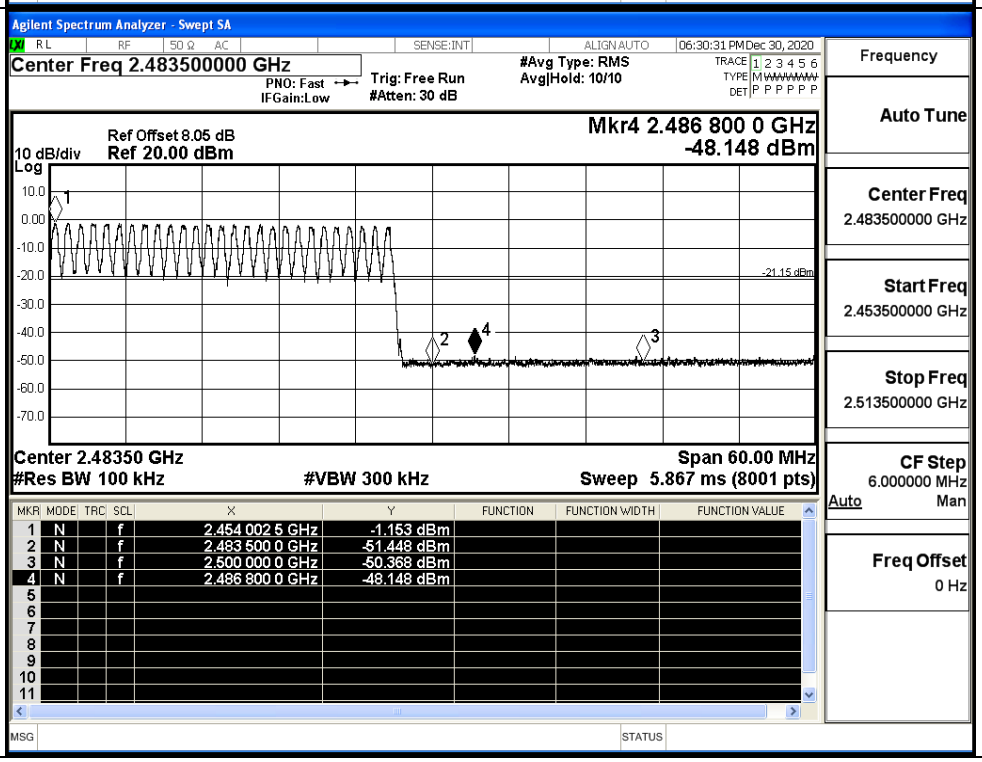
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.493	Off	-47.586	-18.51	PASS
			1.316	On	-47.750	-18.68	PASS
	HCH	2480	-2.282	Off	-48.594	-22.28	PASS
			-1.153	On	-48.148	-21.15	PASS
π/4DQPSK	LCH	2402	1.686	Off	-48.278	-18.31	PASS
			1.397	On	-47.394	-18.6	PASS
	HCH	2480	-2.221	Off	-48.590	-22.22	PASS
			-0.836	On	-47.938	-20.84	PASS
8DPSK	LCH	2402	1.593	Off	-47.720	-18.41	PASS
			1.602	On	-48.455	-18.4	PASS
	HCH	2480	-2.156	Off	-48.627	-22.16	PASS
			-0.916	On	-46.120	-20.92	PASS

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

GFSK/HCH/No Hop



GFSK/HCH/Hop



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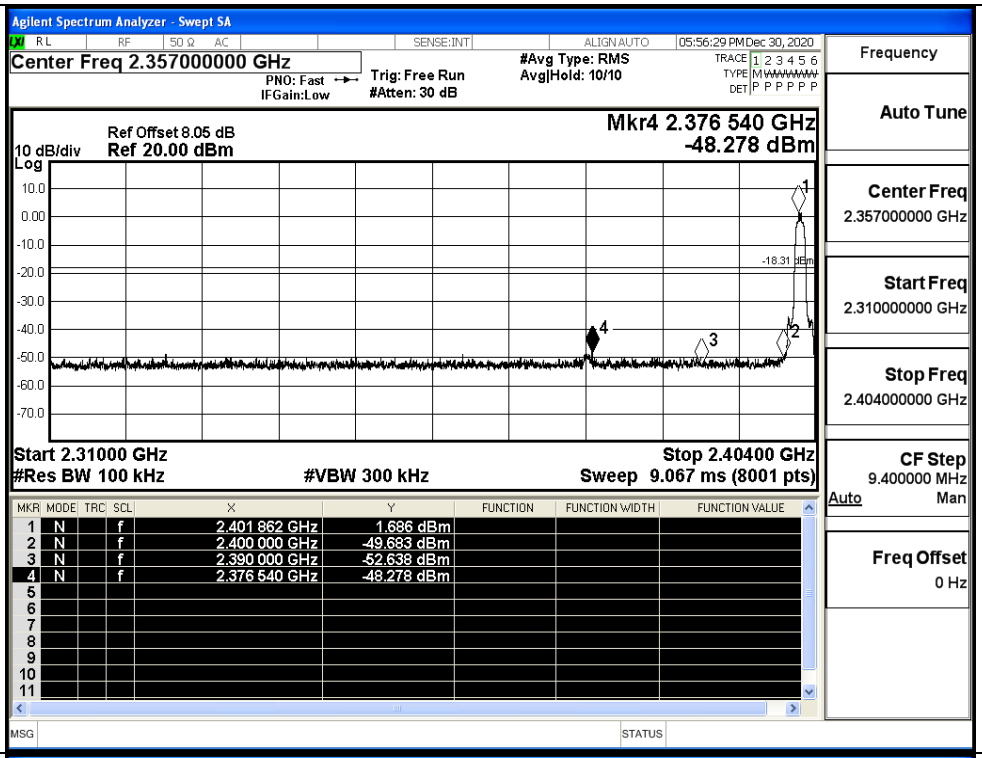
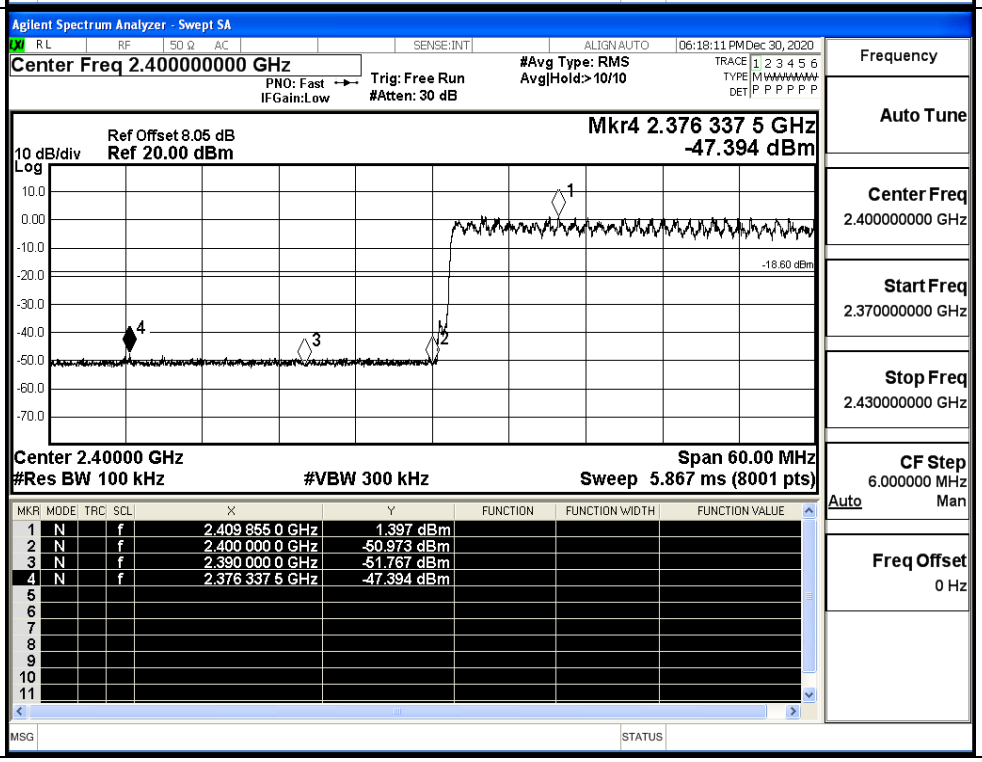
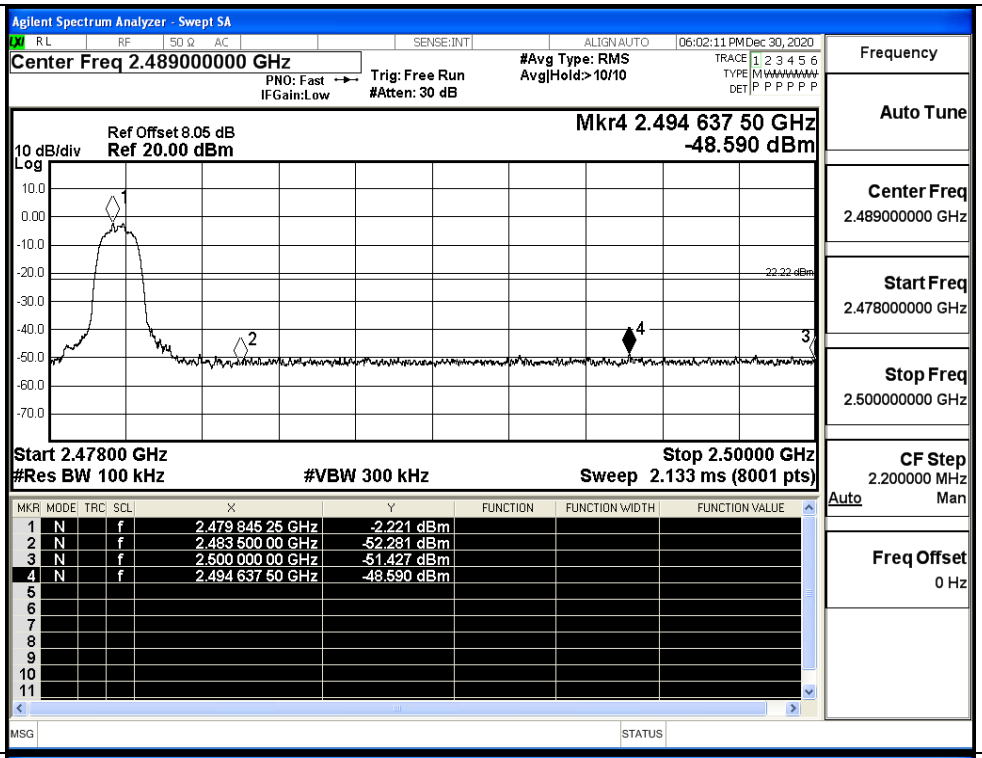


π/4DQPSK/LCH/Hop



π/4DQPSK/HCH/No Hop



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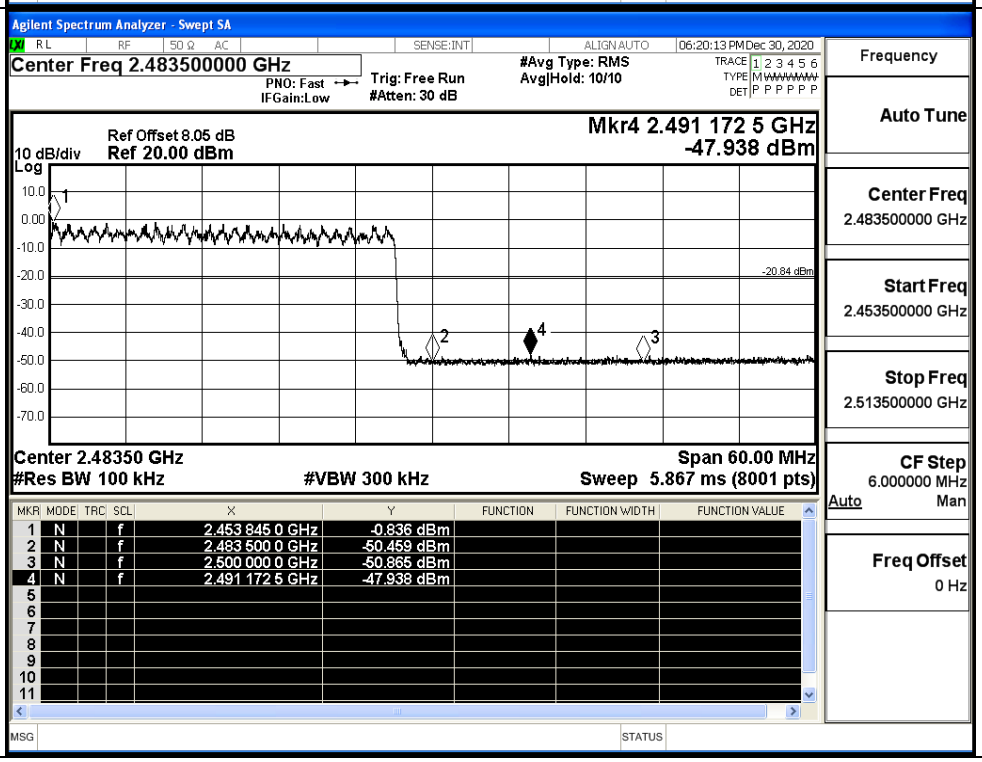
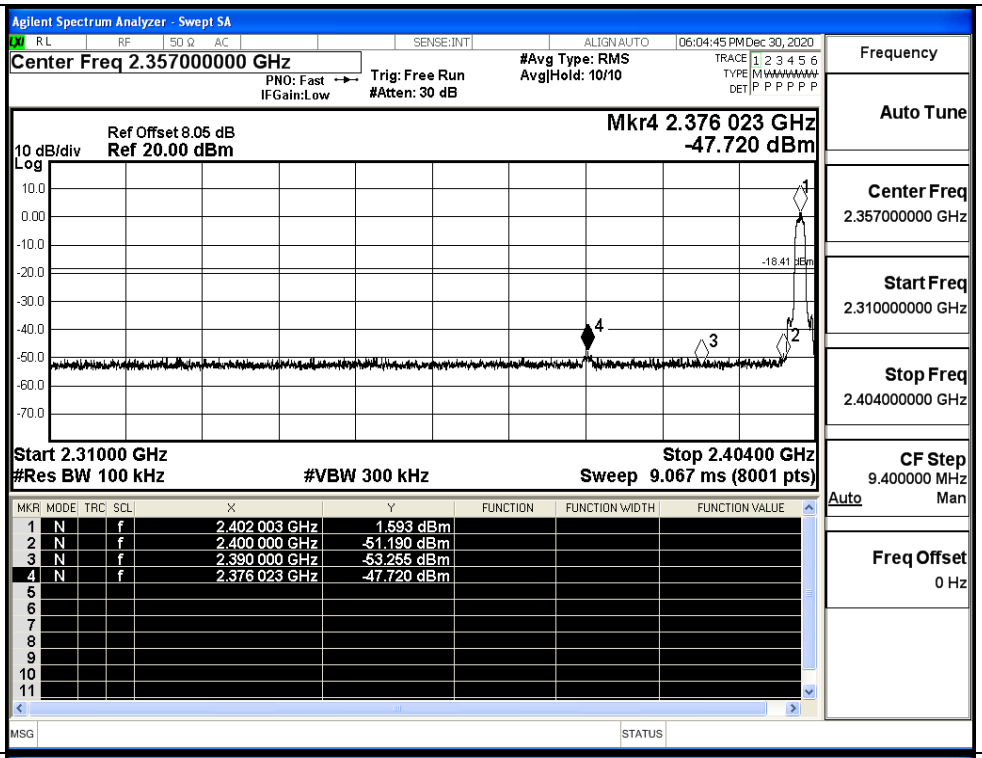
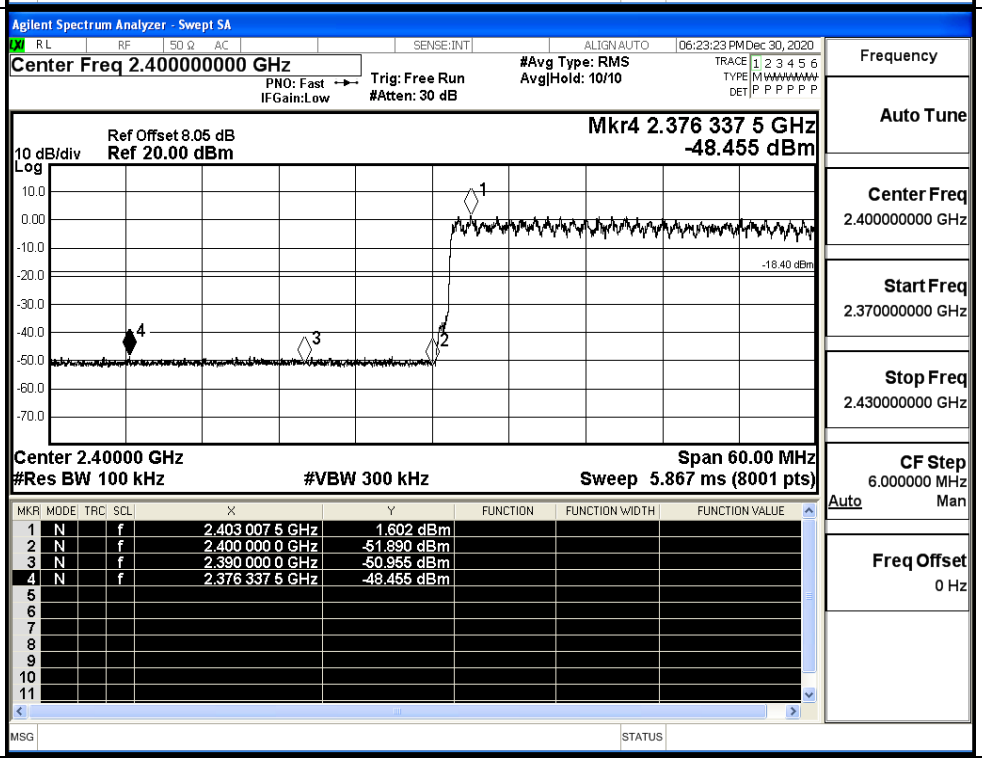
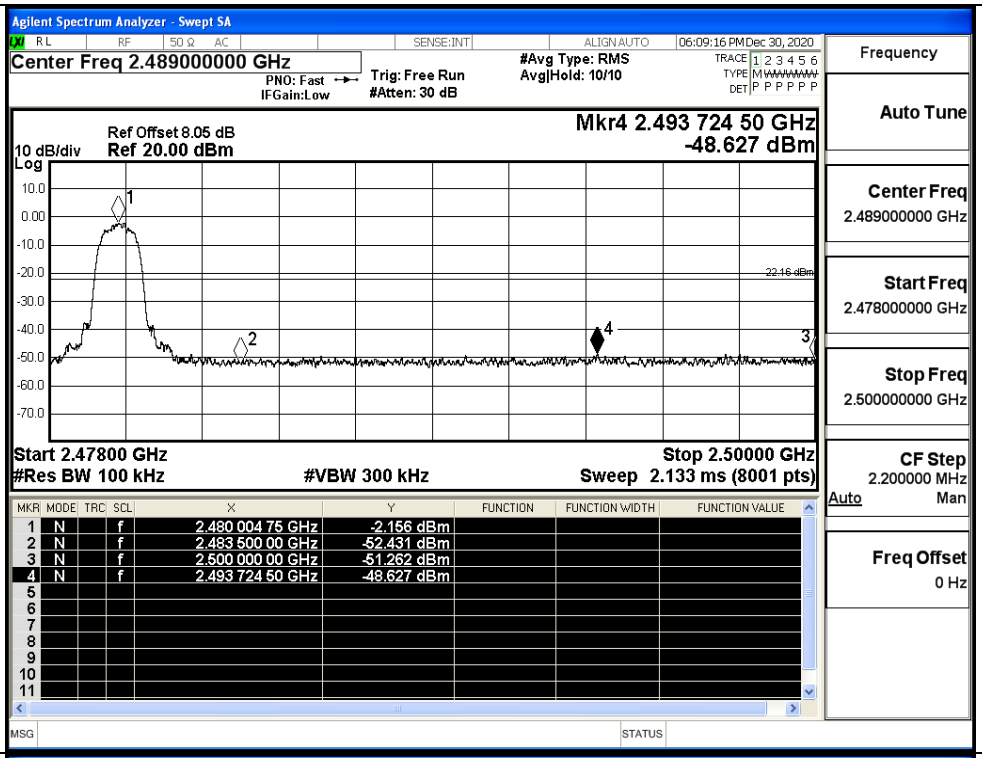
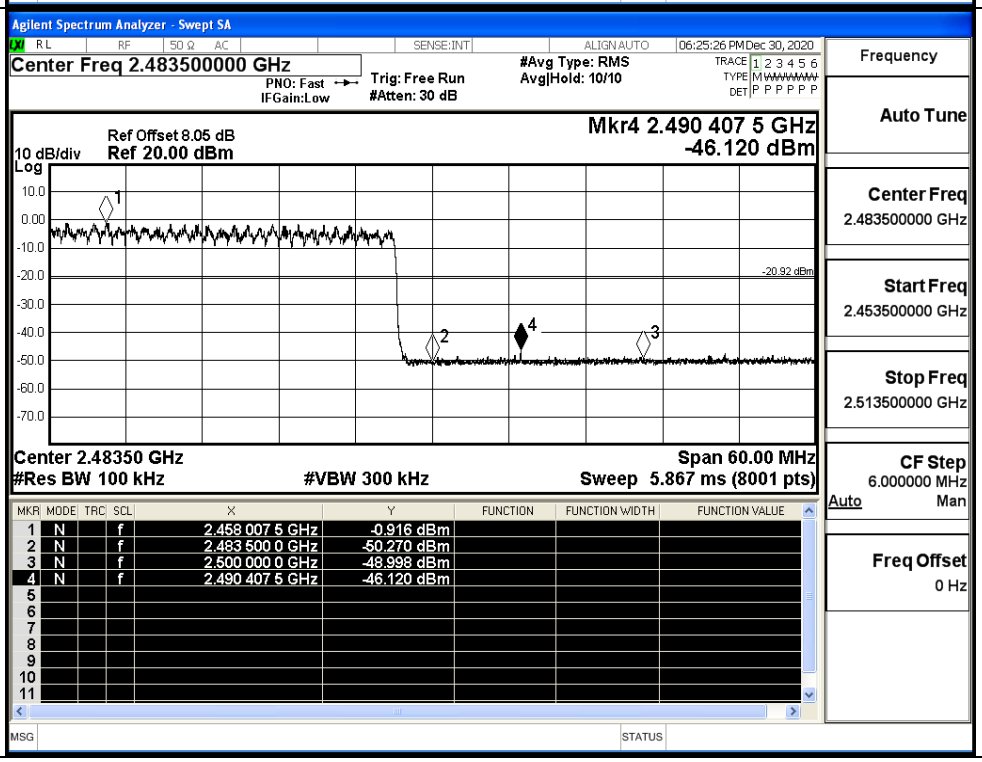


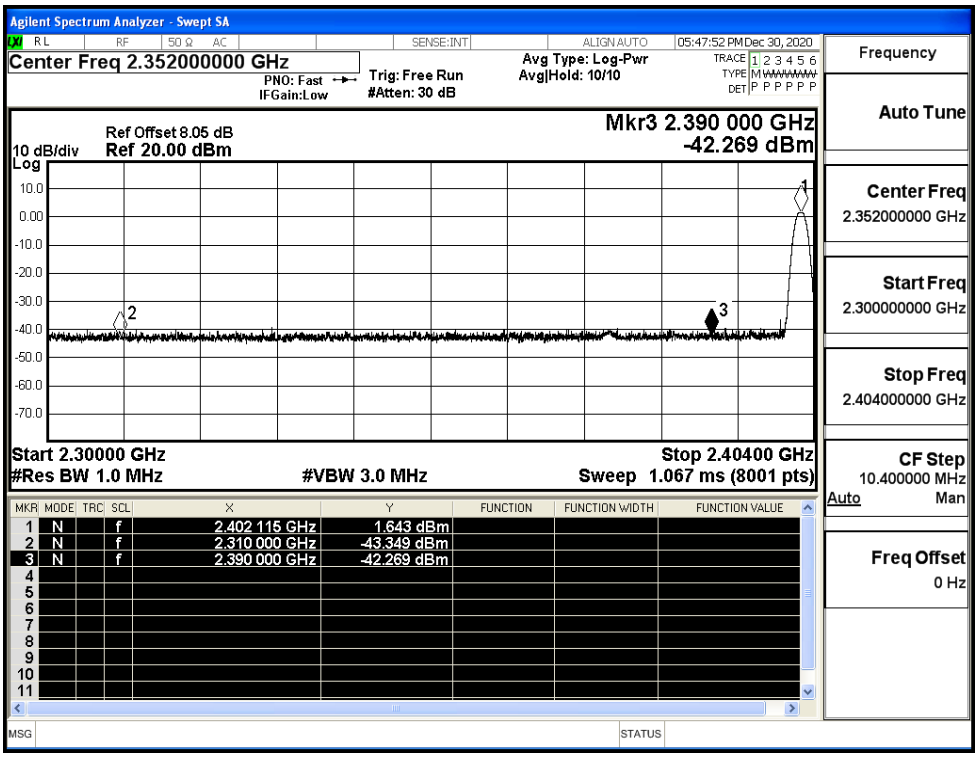
8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

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

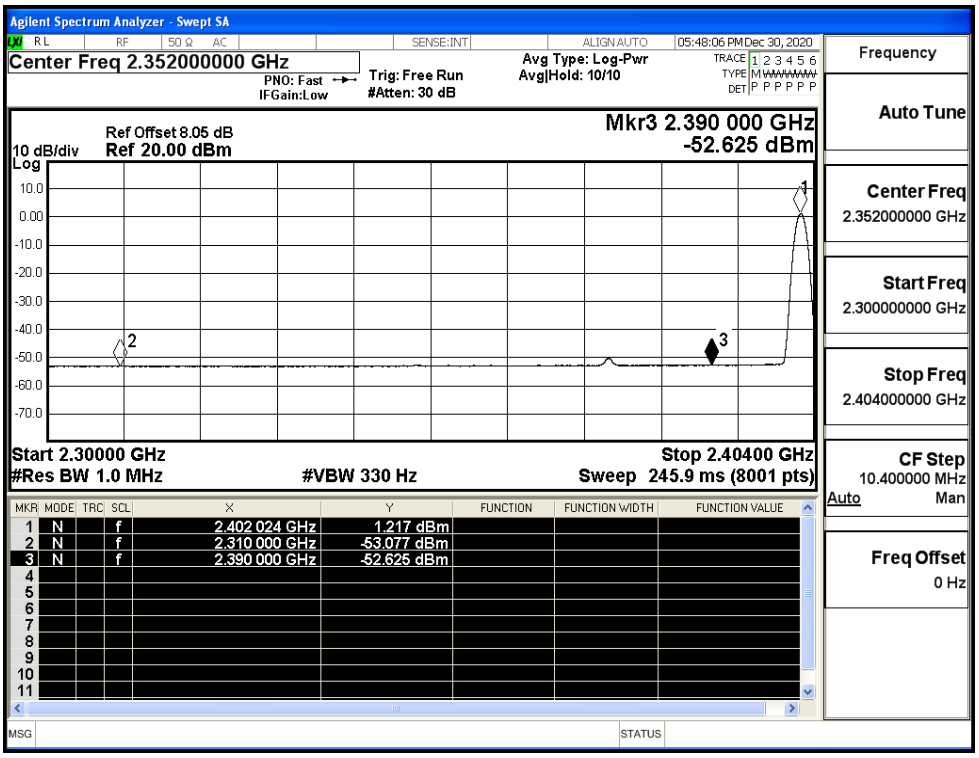
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.35	2.0	0	53.91	PEAK	74	PASS
	Off	2310.0	-53.08	2.0	0	44.18	AV	54	PASS
	Off	2390.0	-42.27	2.0	0	54.99	PEAK	74	PASS
	Off	2390.0	-52.63	2.0	0	44.63	AV	54	PASS
	Off	2483.5	-42.78	2.0	0	54.48	PEAK	74	PASS
	Off	2483.5	-52.18	2.0	0	45.08	AV	54	PASS
	Off	2500.0	-39.91	2.0	0	57.35	PEAK	74	PASS
	Off	2500.0	-51.99	2.0	0	45.27	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.14	2.0	0	55.12	PEAK	74	PASS
	Off	2310.0	-53.07	2.0	0	44.18	AV	54	PASS
	Off	2390.0	-41.50	2.0	0	55.76	PEAK	74	PASS
	Off	2390.0	-52.68	2.0	0	44.58	AV	54	PASS
	Off	2483.5	-42.40	2.0	0	54.86	PEAK	74	PASS
	Off	2483.5	-52.14	2.0	0	45.12	AV	54	PASS
	Off	2500.0	-41.84	2.0	0	55.42	PEAK	74	PASS
	Off	2500.0	-52.00	2.0	0	45.26	AV	54	PASS
8DPSK	Off	2310.0	-43.09	2.0	0	54.16	PEAK	74	PASS
	Off	2310.0	-52.98	2.0	0	44.27	AV	54	PASS
	Off	2390.0	-43.17	2.0	0	54.09	PEAK	74	PASS
	Off	2390.0	-52.75	2.0	0	44.51	AV	54	PASS
	Off	2483.5	-42.00	2.0	0	55.26	PEAK	74	PASS
	Off	2483.5	-52.19	2.0	0	45.07	AV	54	PASS
	Off	2500.0	-41.45	2.0	0	55.81	PEAK	74	PASS
	Off	2500.0	-52.05	2.0	0	45.21	AV	54	PASS

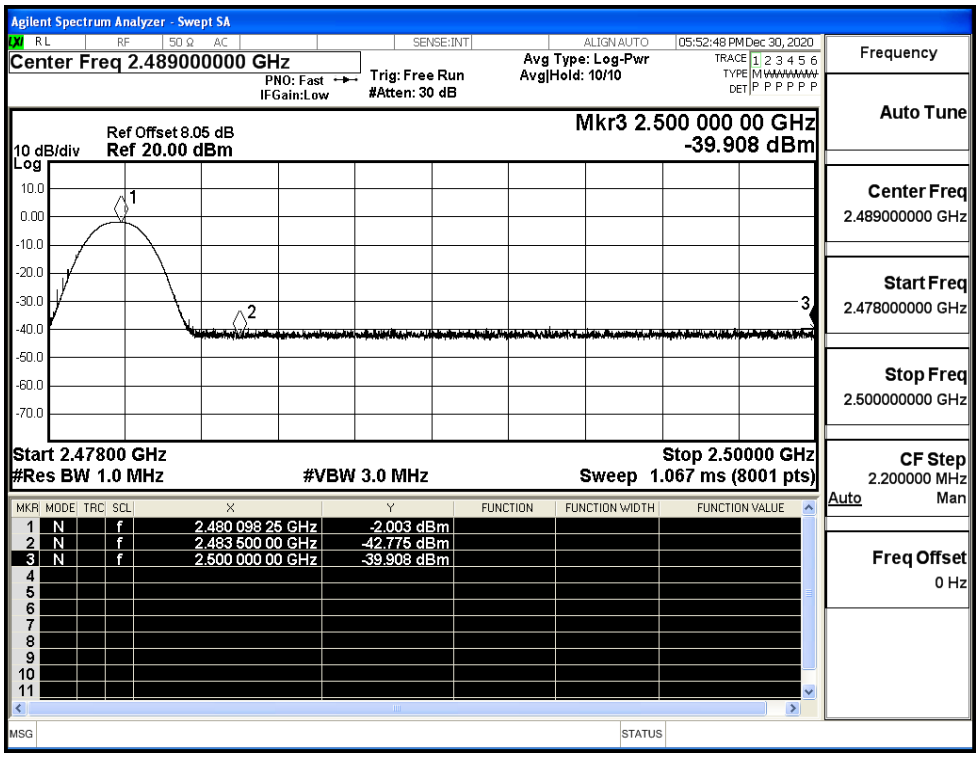
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



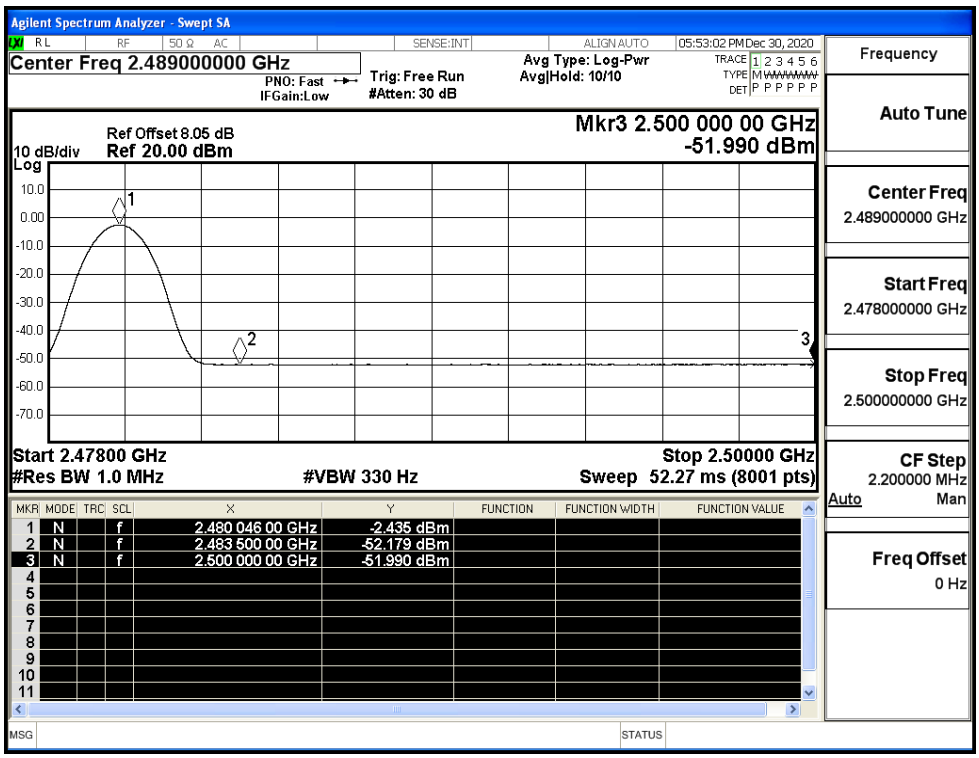
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



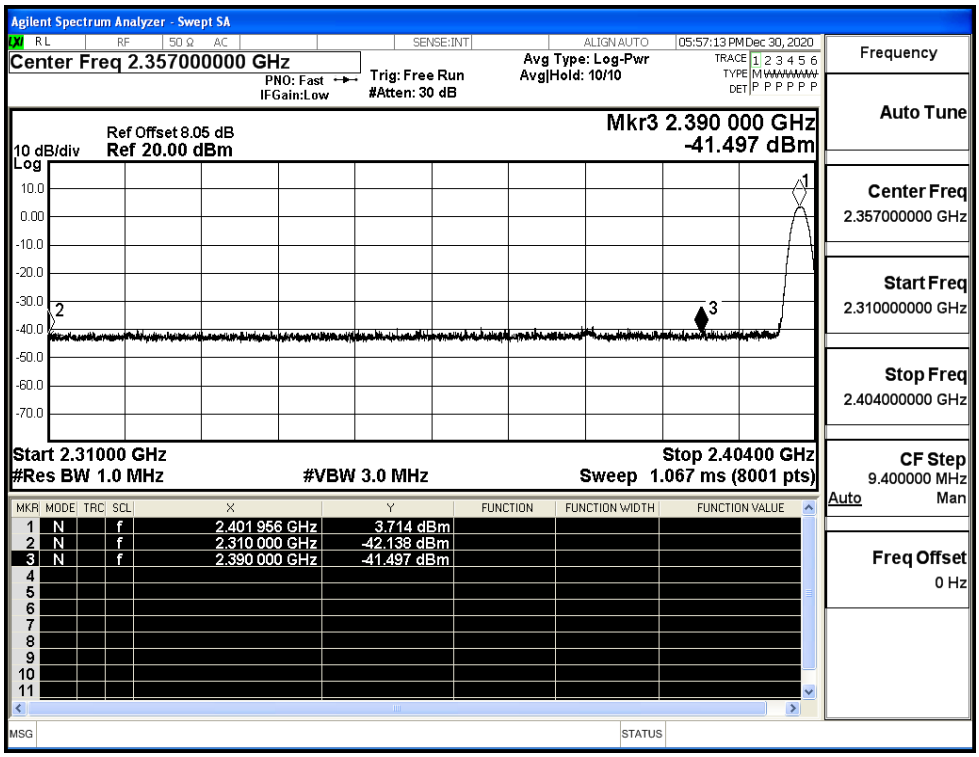
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



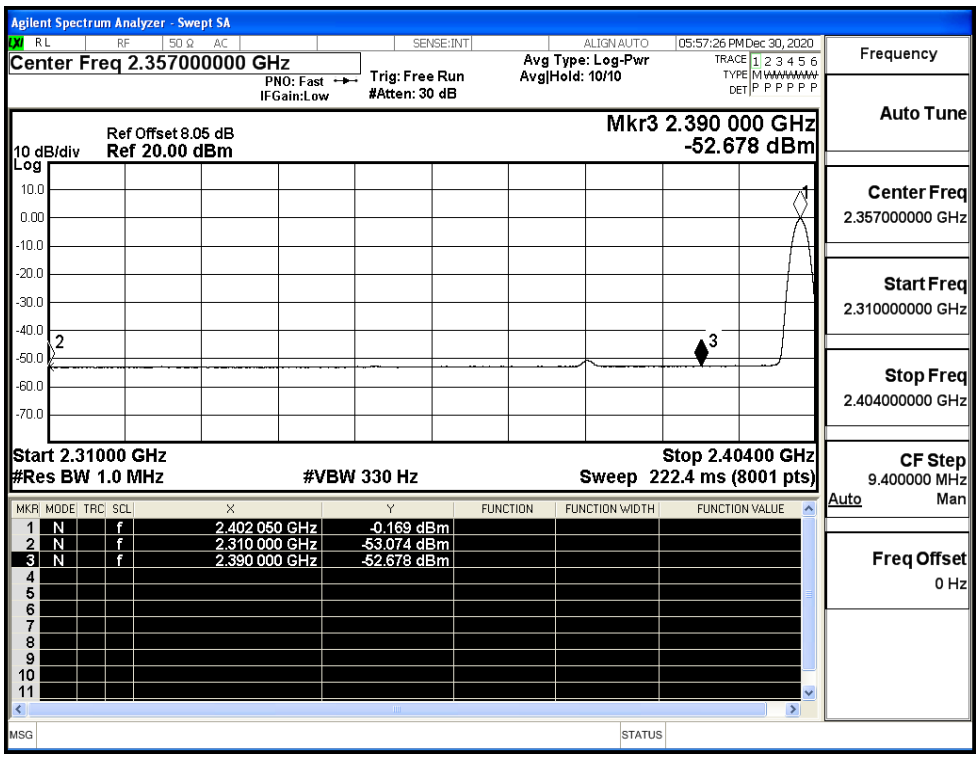
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



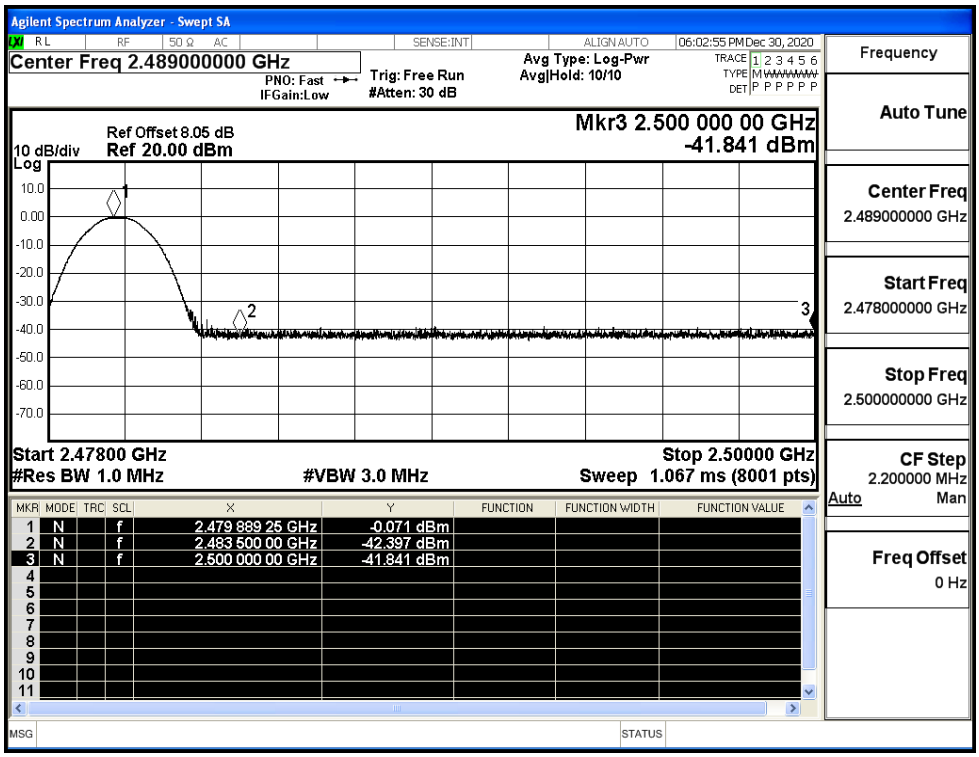
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



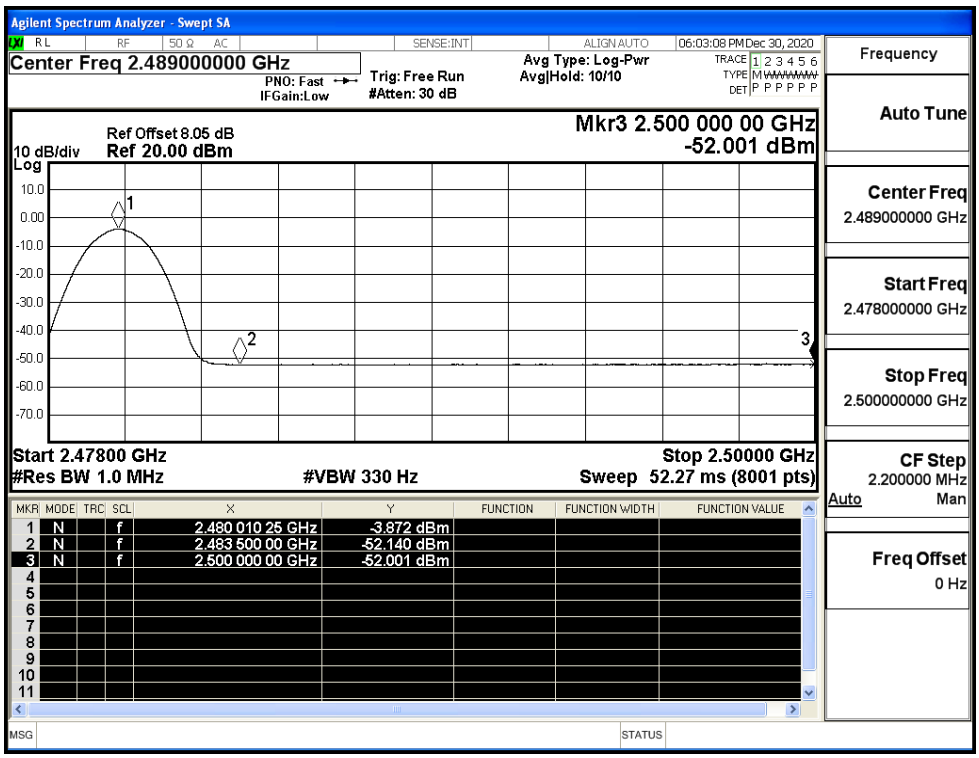
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



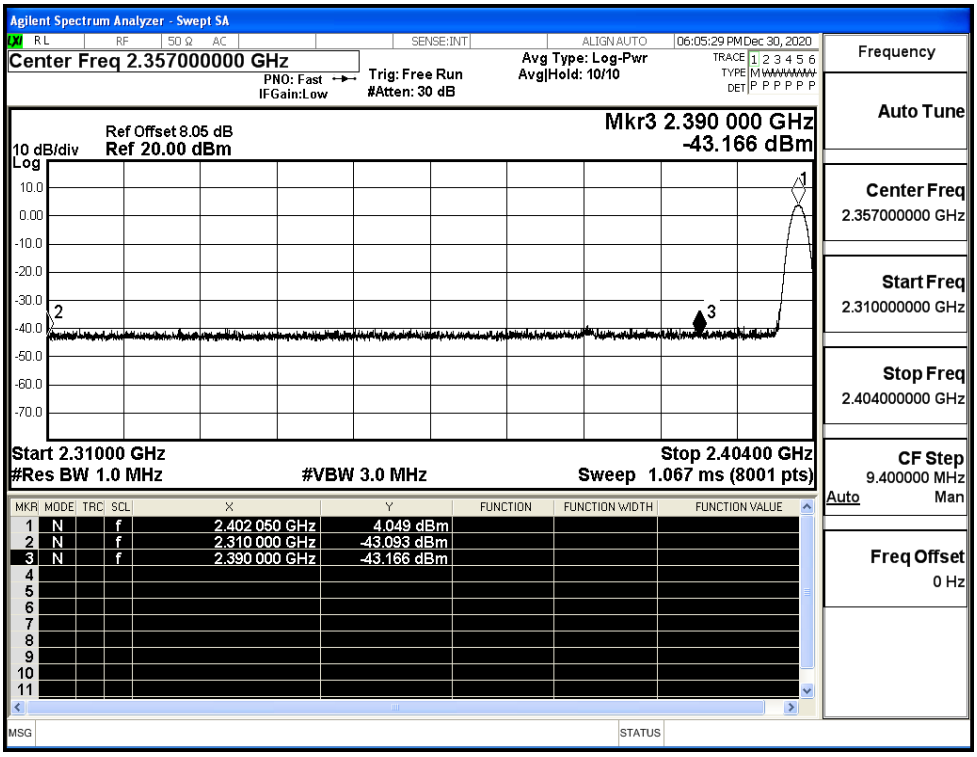
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



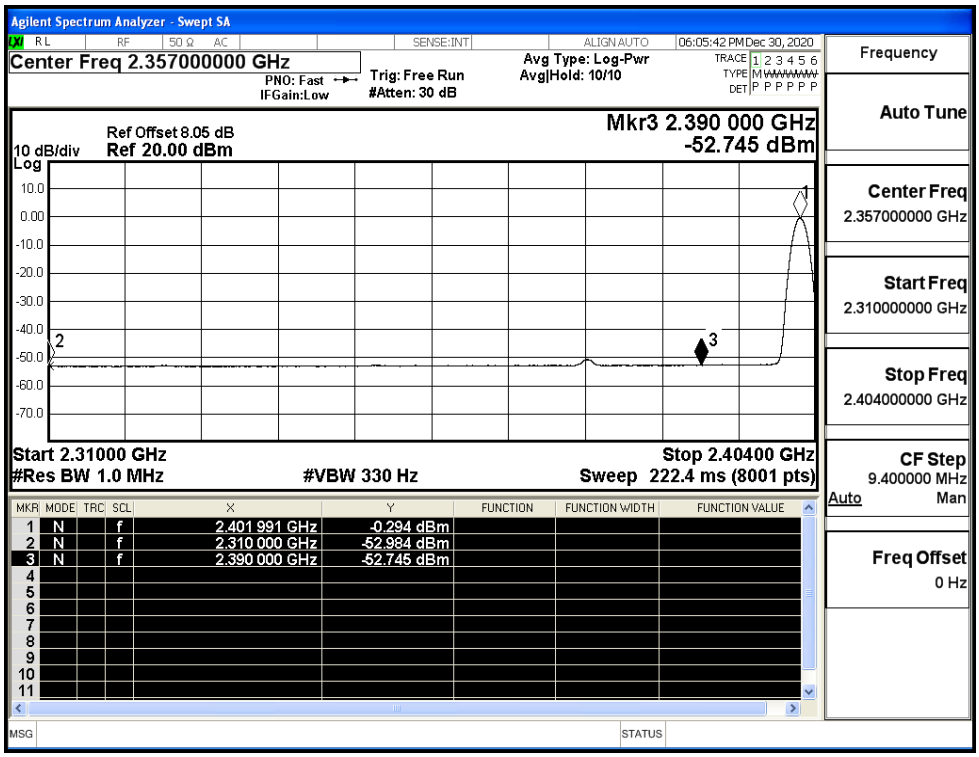
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



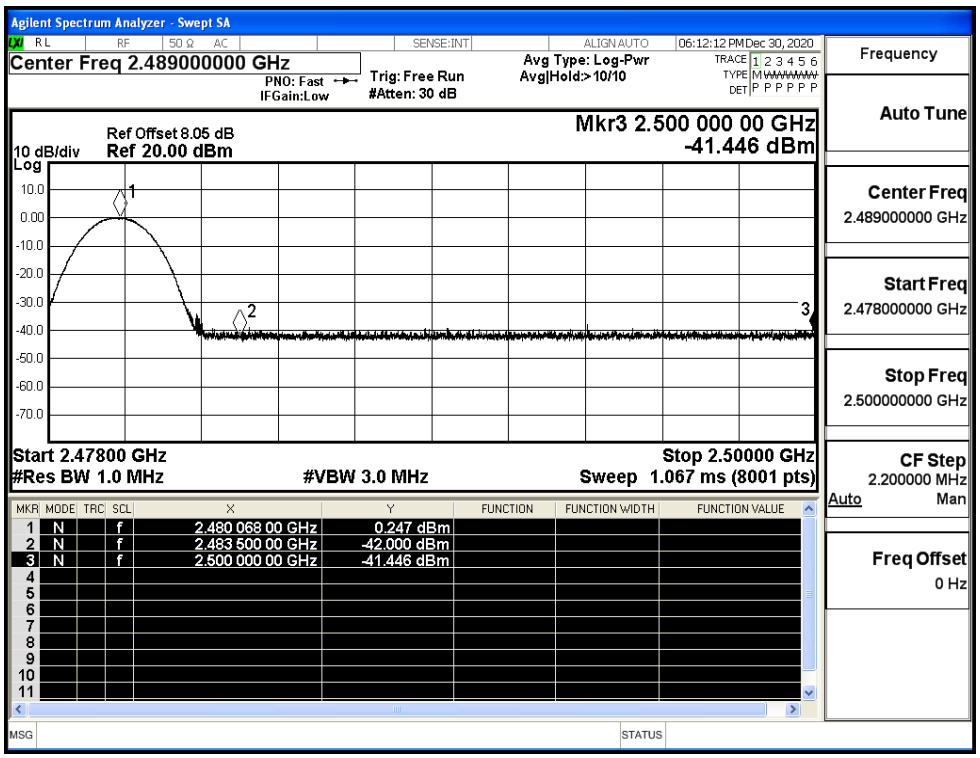
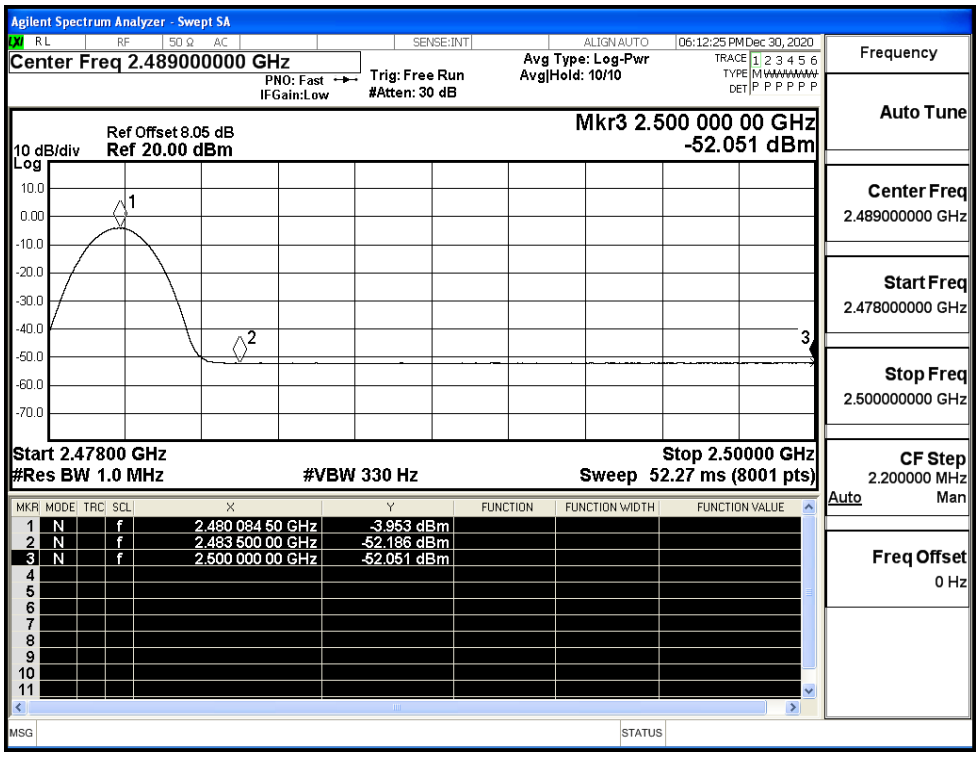
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)