Appendix A

RF Test Data for BT V5.1 (BDR/EDR) (Conducted Measurement)

Product Name: Portable Data Collector

Trade Mark: Newland

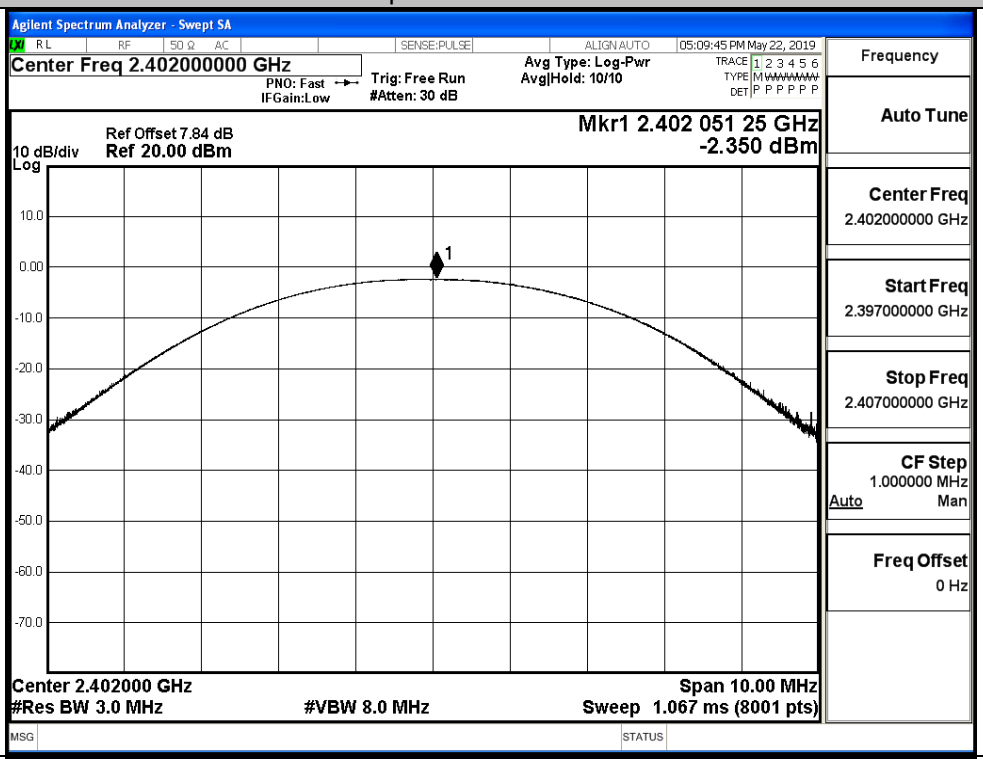
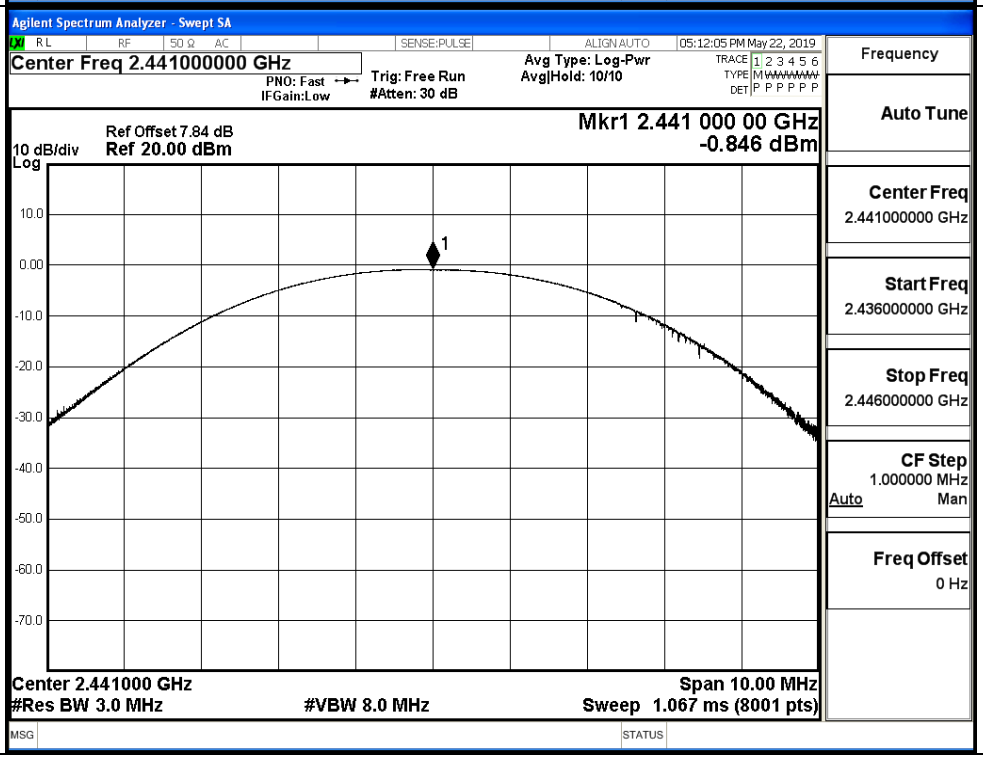
Test Model: NLS-NFT10

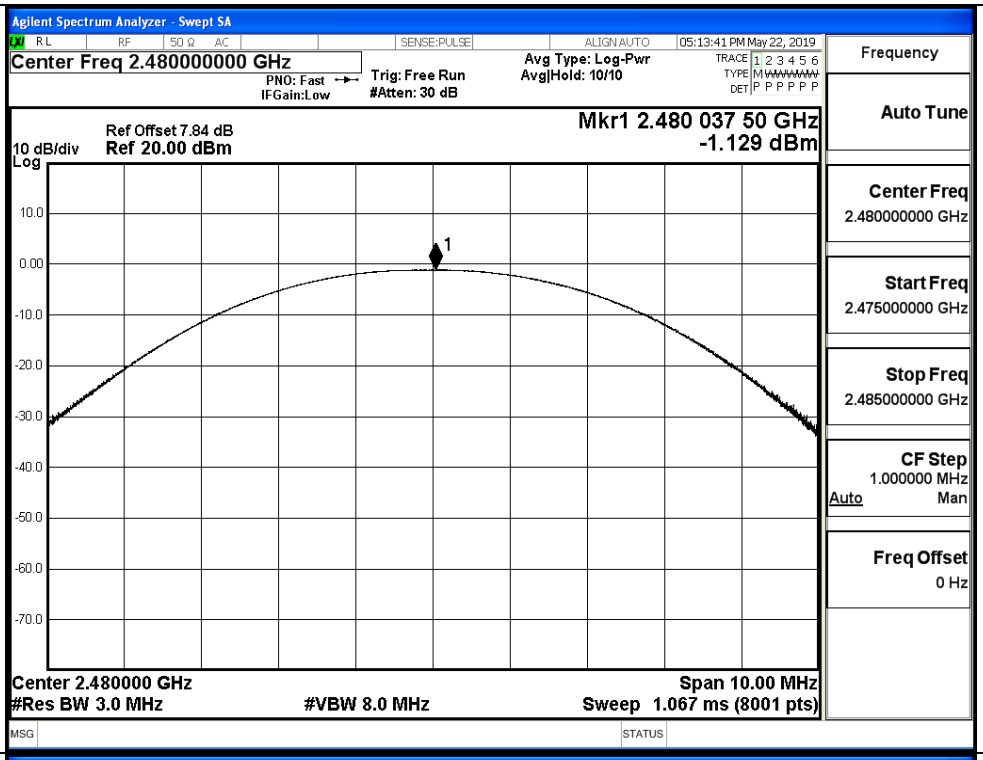
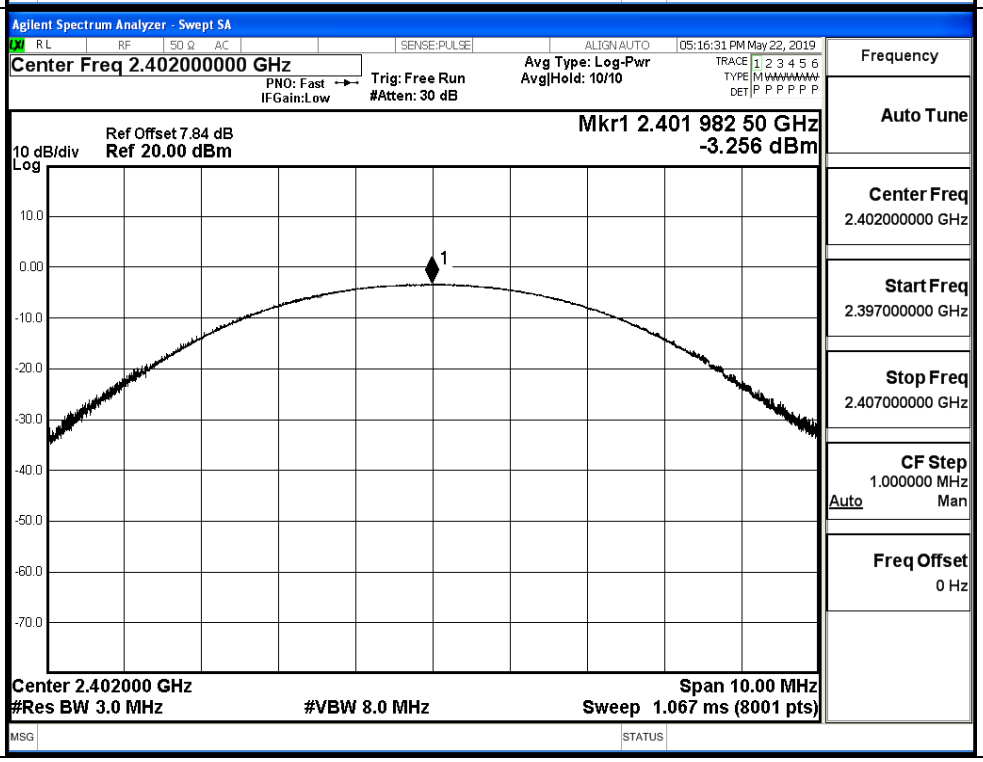
Environmental Conditions

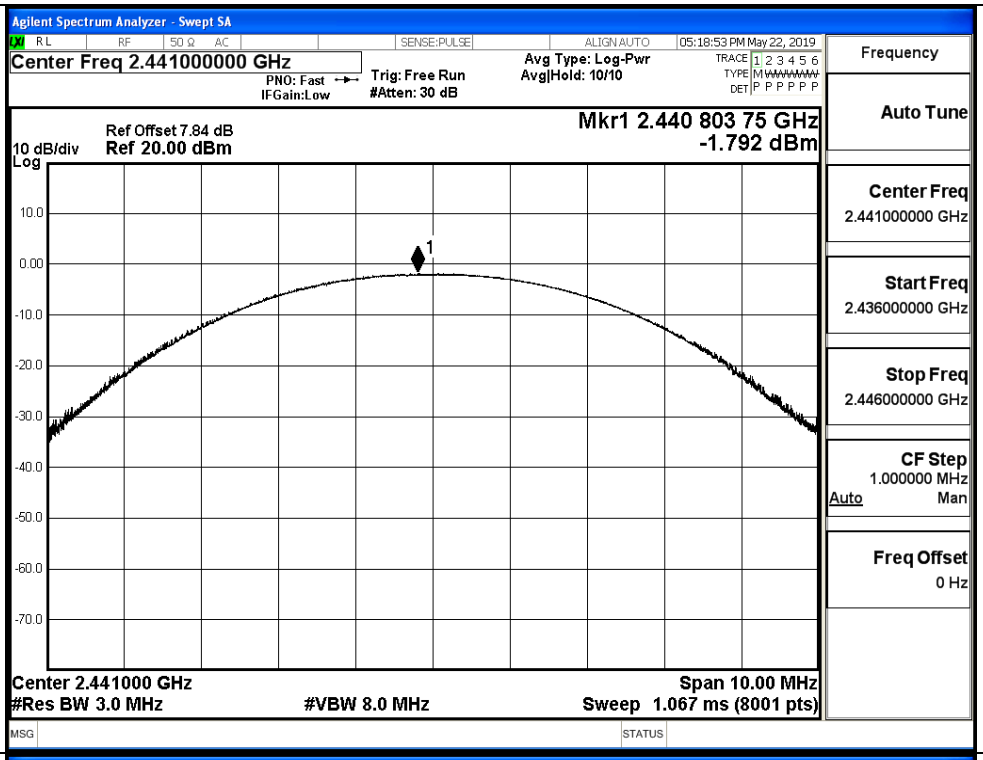
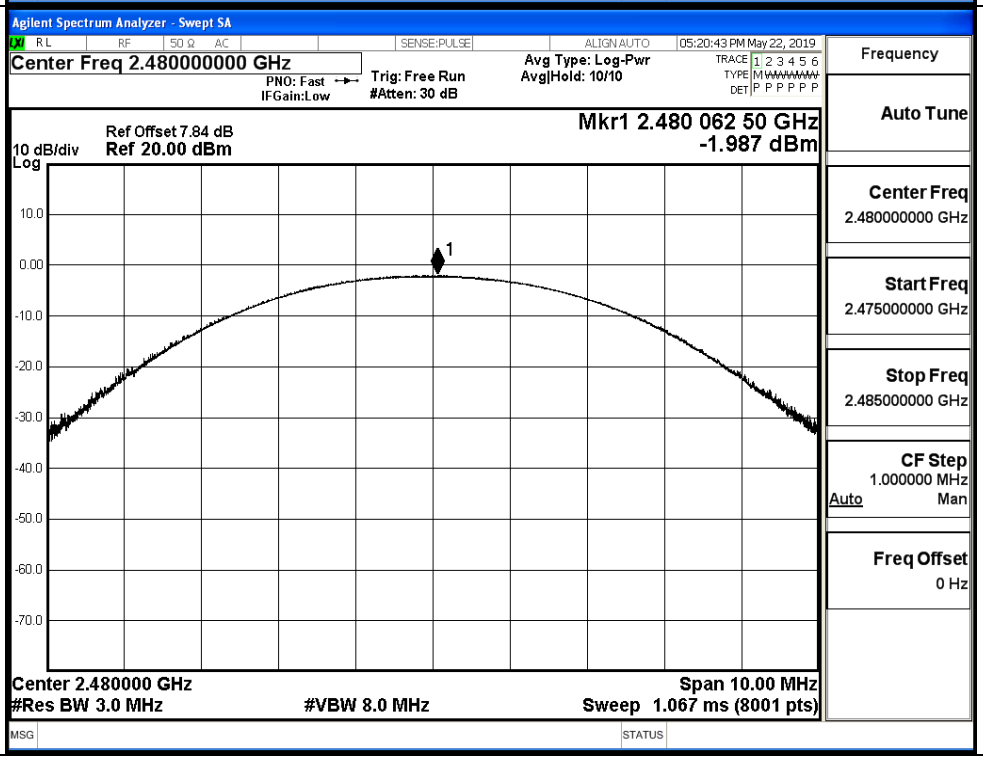
Temperature:	24.5 ° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	WANGCHUANG
Supervised by:	Tom.Liu

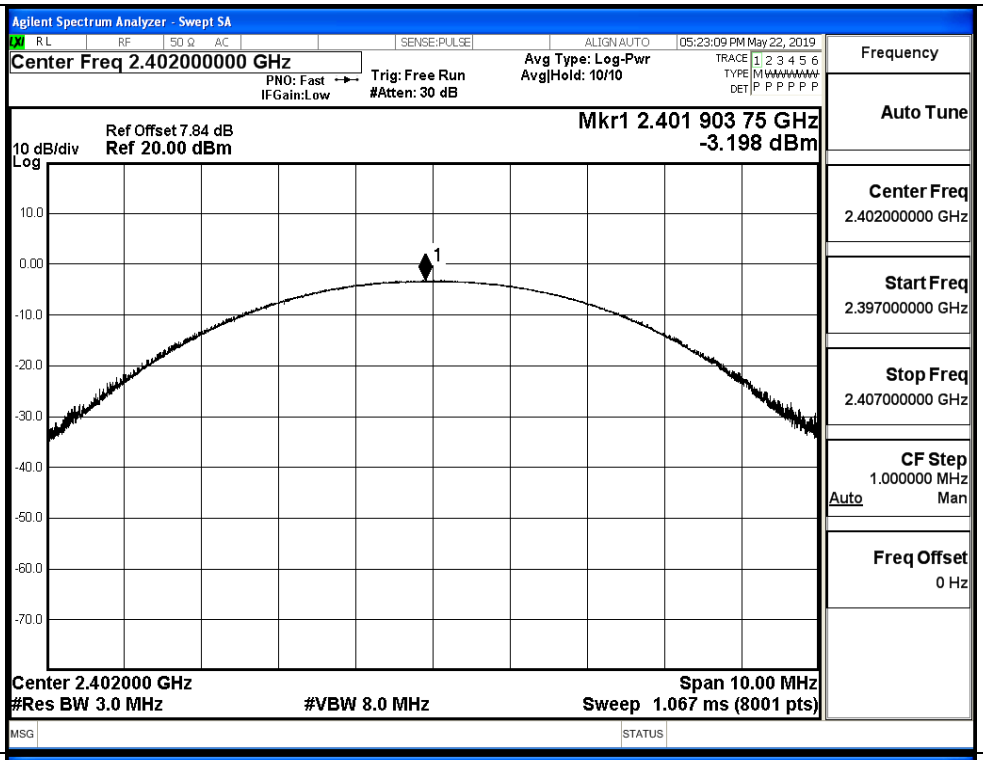
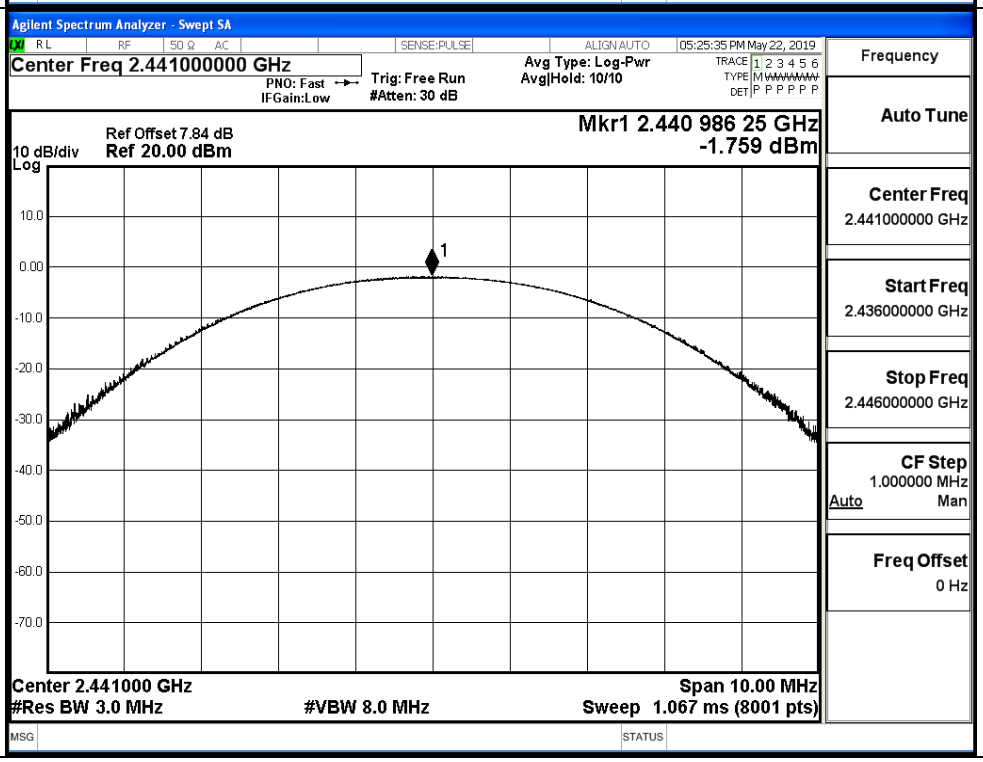
A.1 Maximum Conducted Peak Output Power

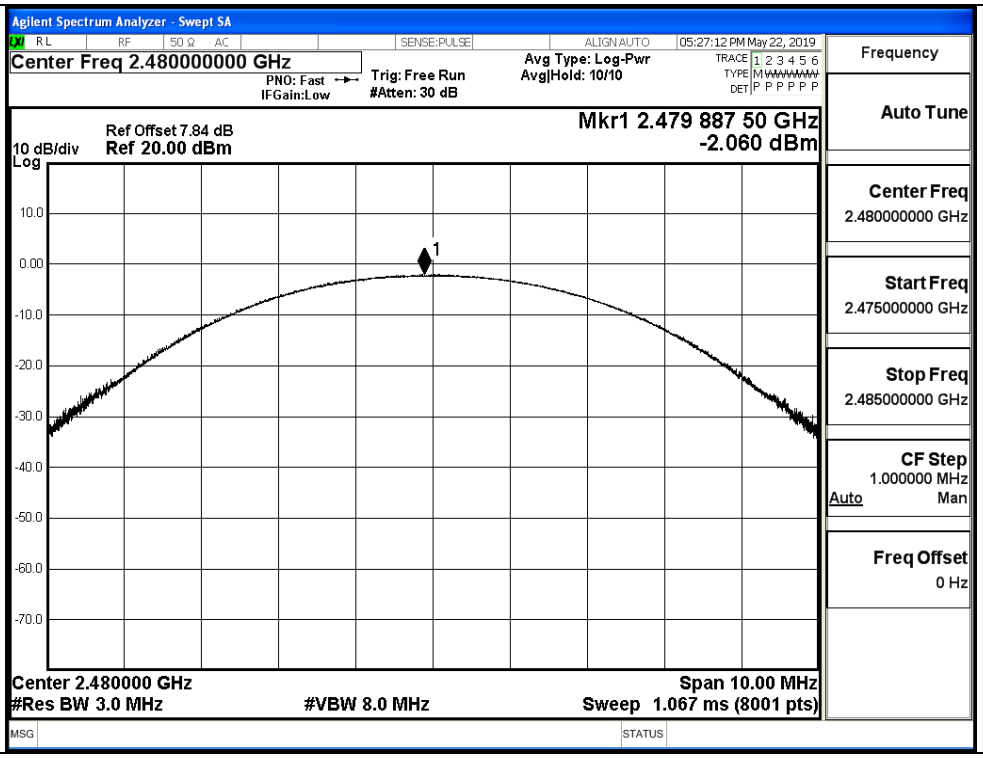
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.350	21	PASS
	MCH	-0.846	21	PASS
	HCH	-1.129	21	PASS
π/4DQPSK	LCH	-3.256	21	PASS
	MCH	-1.792	21	PASS
	HCH	-1.987	21	PASS
8DPSK	LCH	-3.198	21	PASS
	MCH	-1.759	21	PASS
	HCH	-2.060	21	PASS

Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

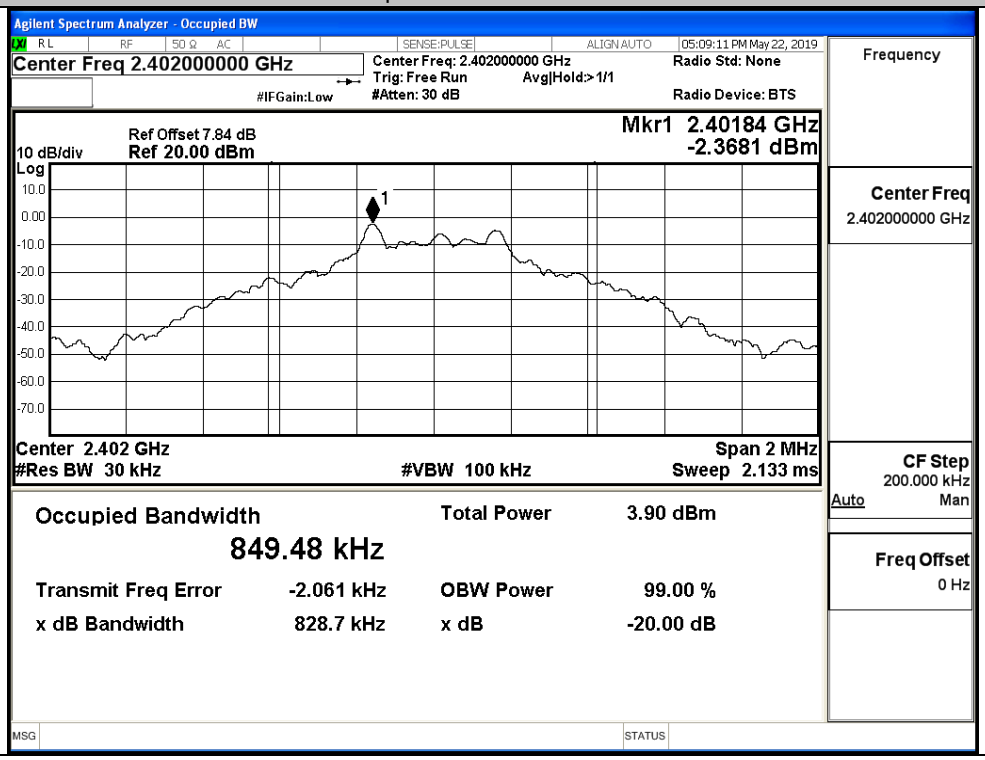
8DPSK/LCH		
8DPSK/MCH		

8DPSK/HCH		

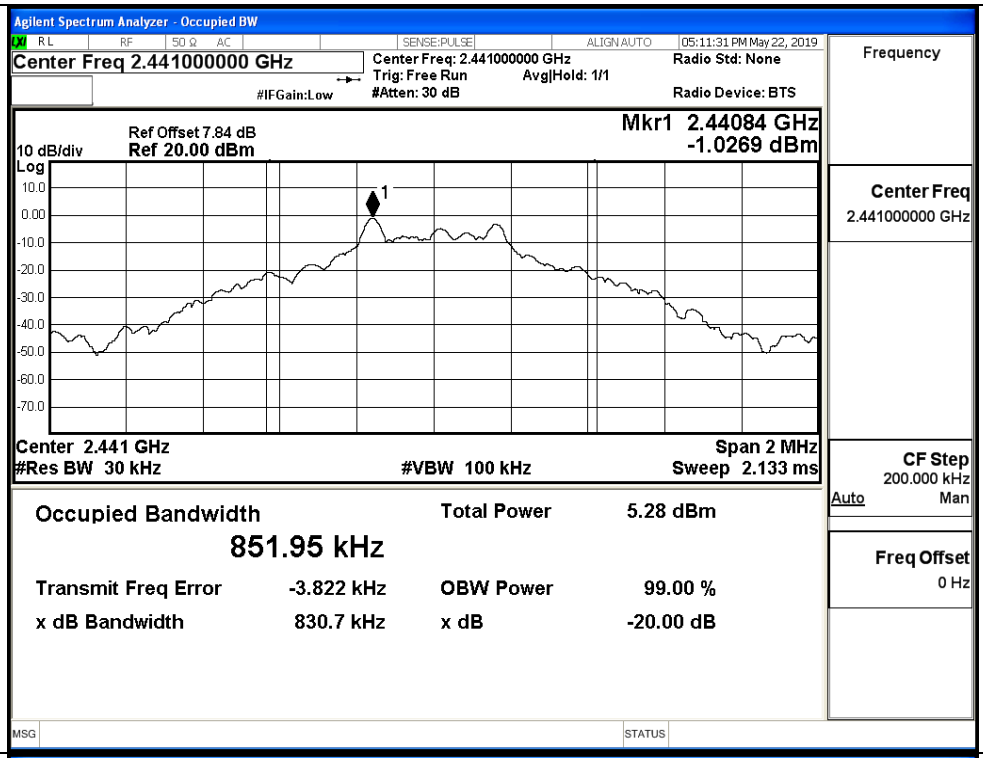
Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/10
05:27:12 PM May 22, 2019
Ref Offset 7.84 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 887 50 GHz
-2.060 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
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

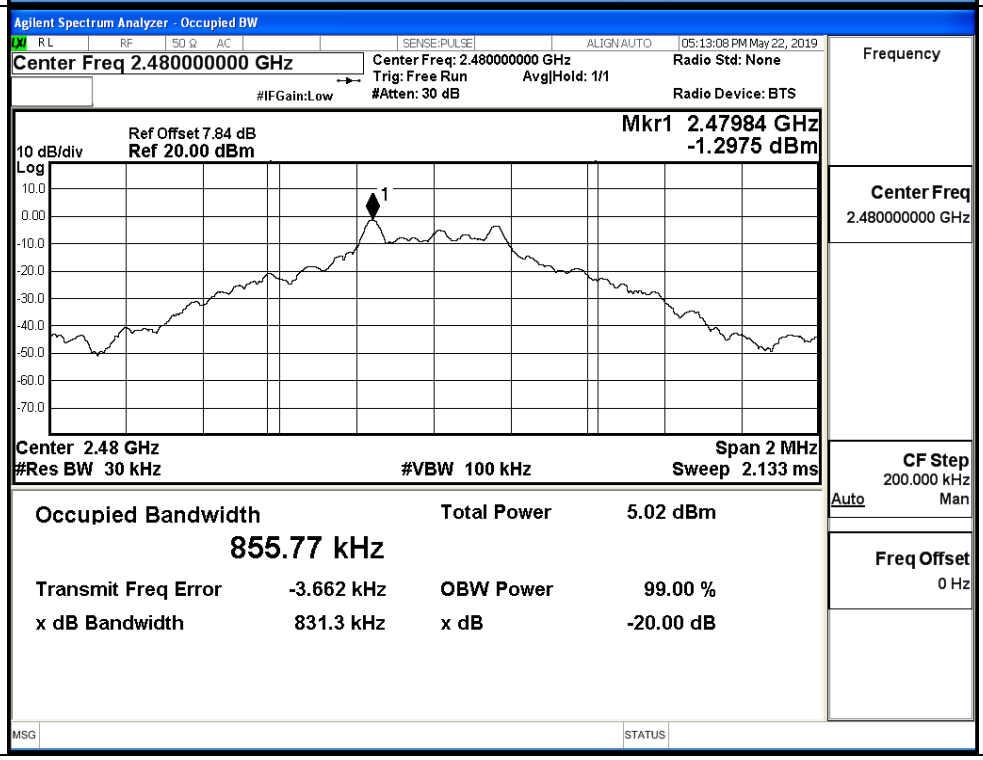
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.8287	Not Specified	PASS
	MCH	0.8307	Not Specified	PASS
	HCH	0.8313	Not Specified	PASS
π/4DQPSK	LCH	1.115	Not Specified	PASS
	MCH	1.117	Not Specified	PASS
	HCH	1.115	Not Specified	PASS
8DPSK	LCH	1.114	Not Specified	PASS
	MCH	1.121	Not Specified	PASS
	HCH	1.119	Not Specified	PASS

Test Graphs		
GFSK/LCH		

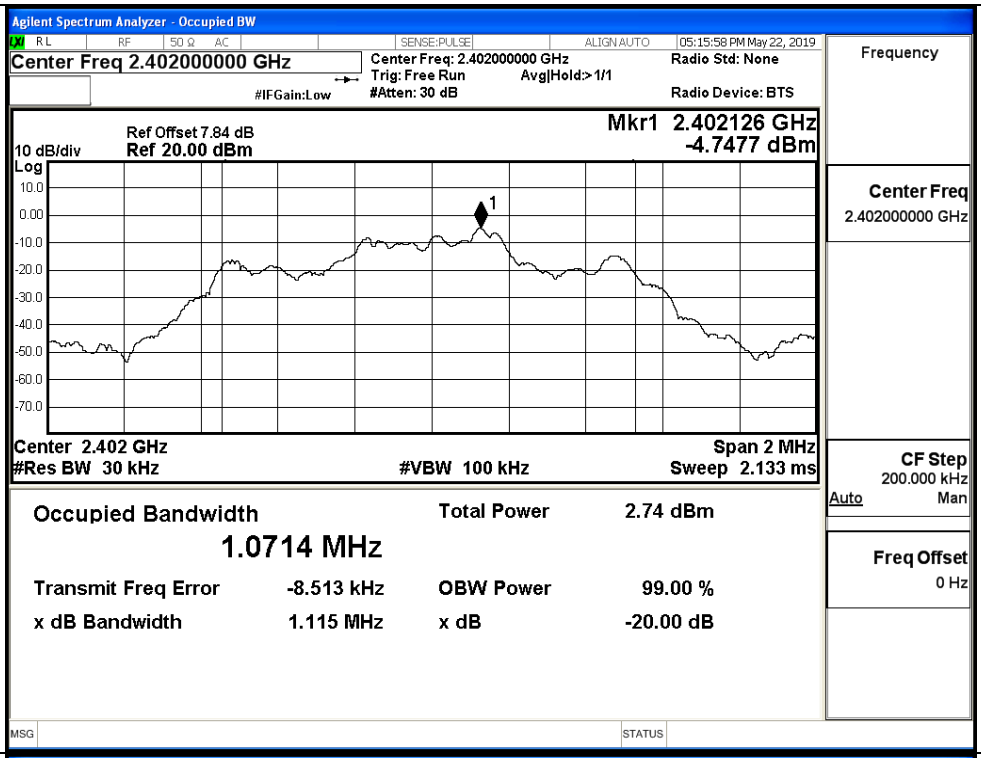
GFSK/MCH



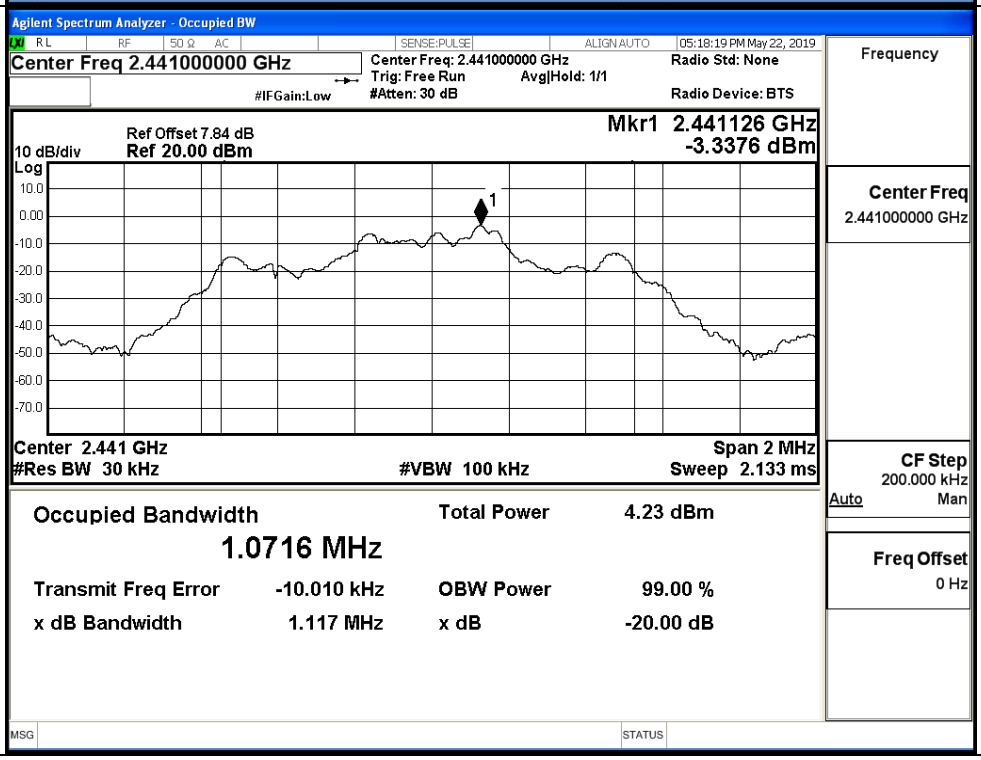
GFSK/HCH



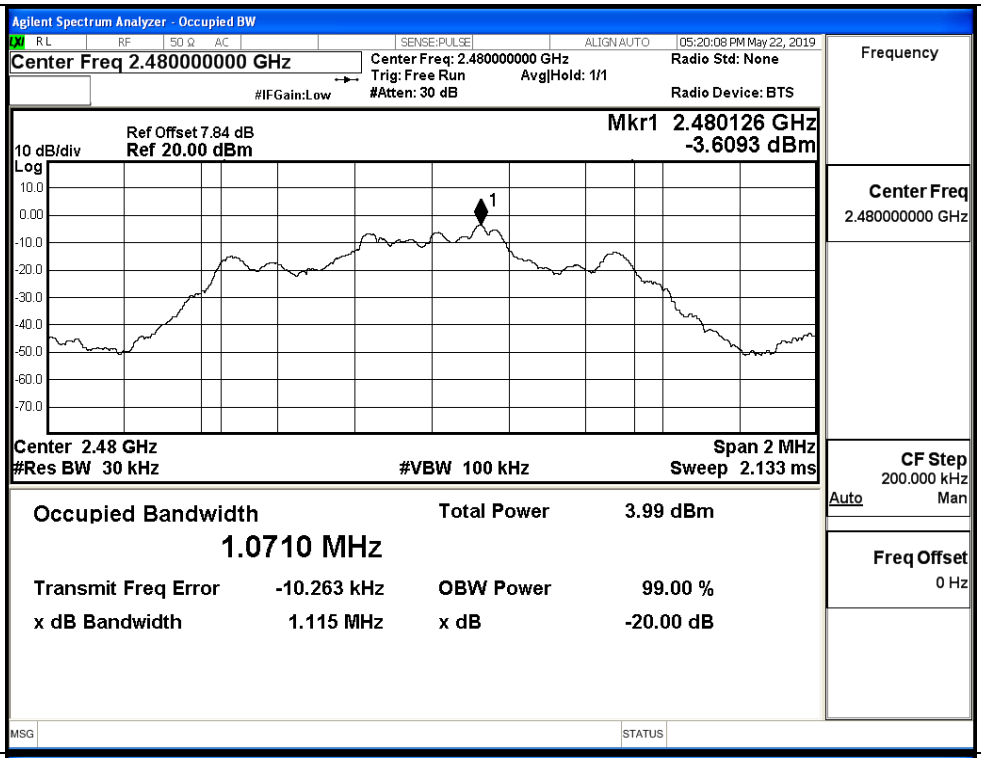
π/4DQPSK/LCH



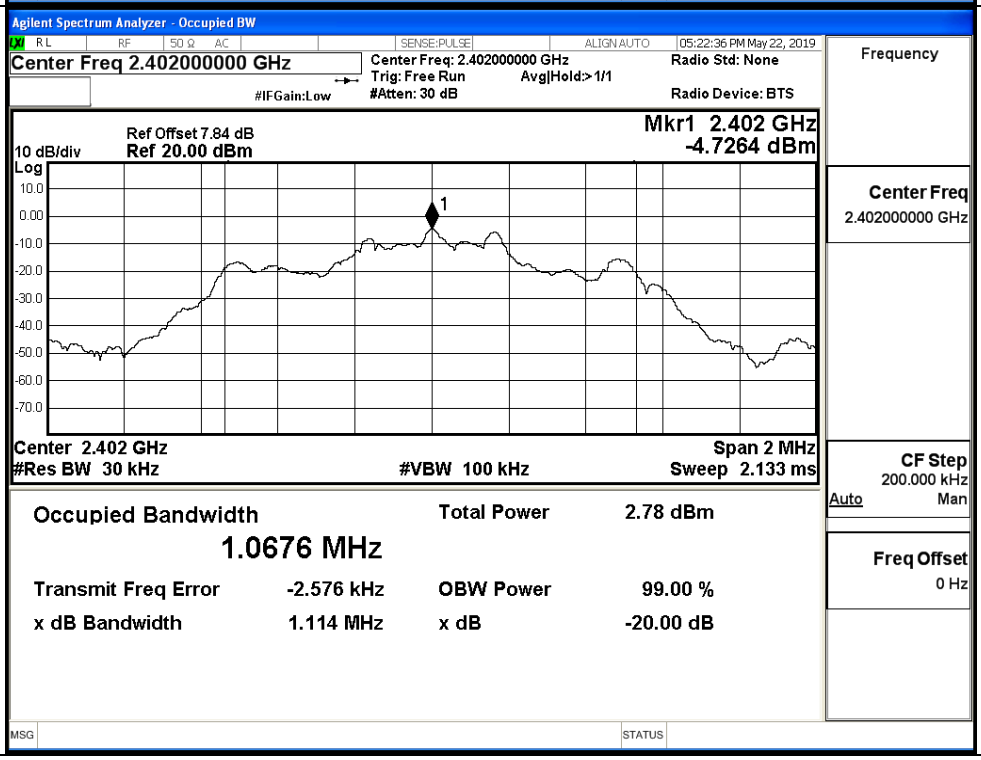
π/4DQPSK/MCH



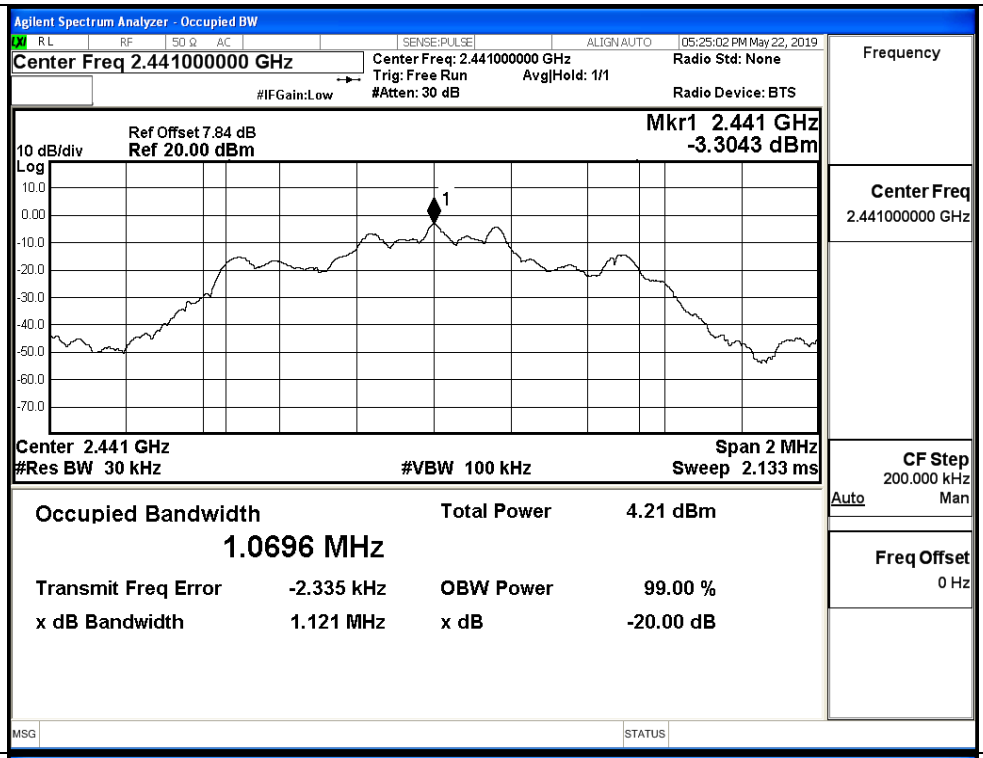
π/4DQPSK/HCH



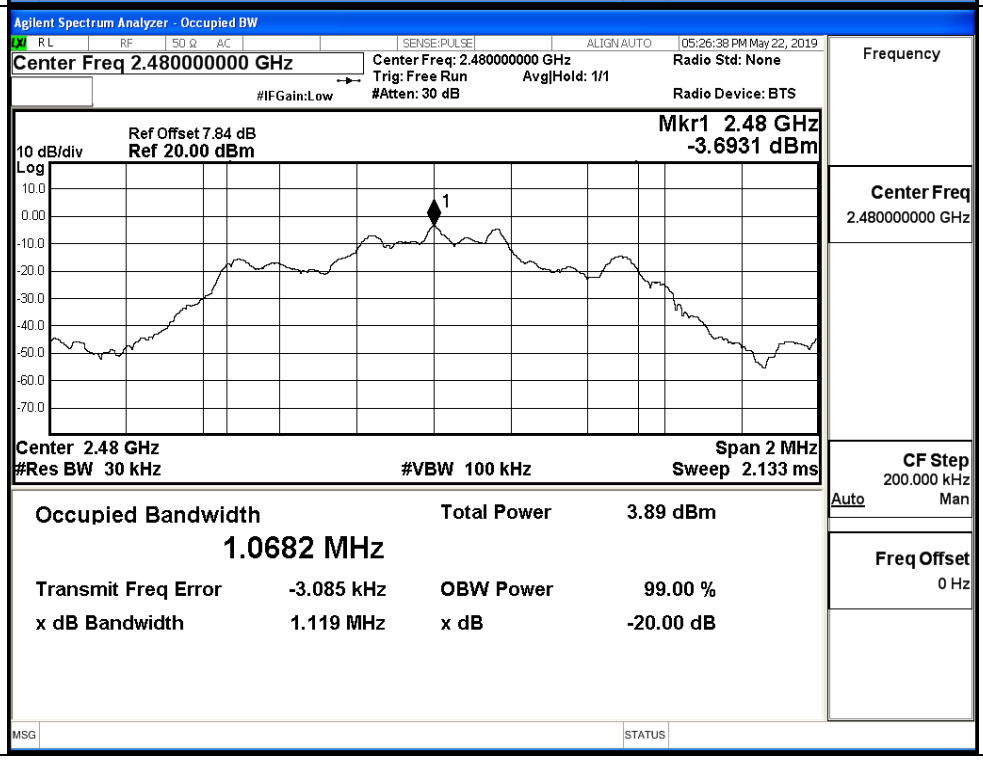
8DPSK/LCH



8DPSK/MCH

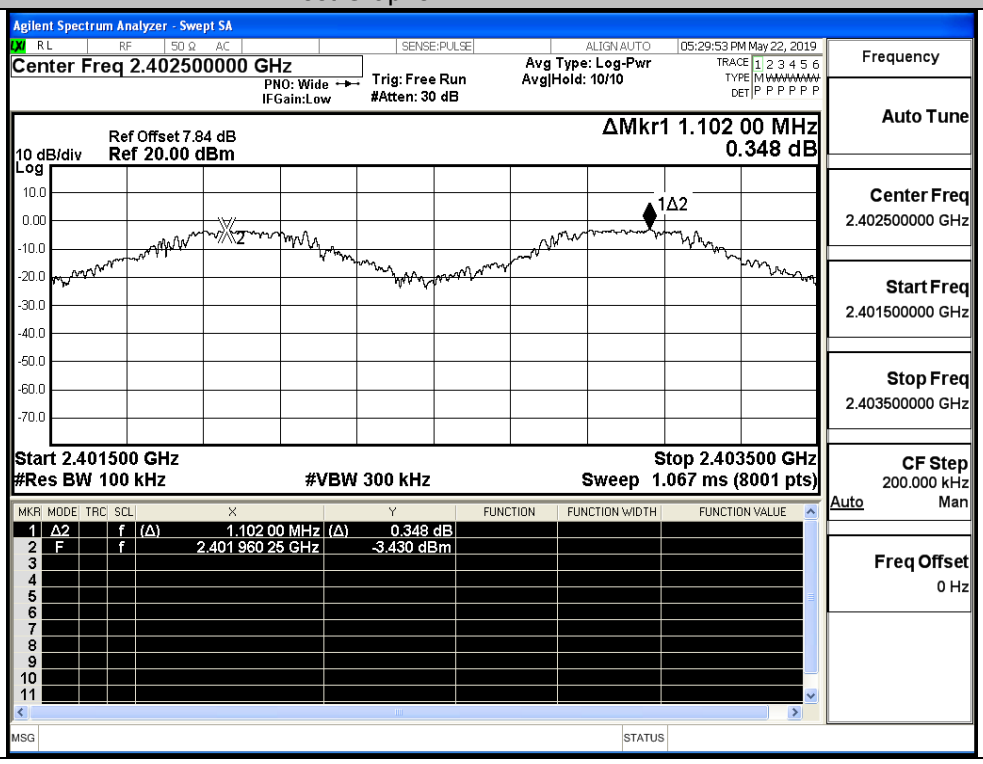


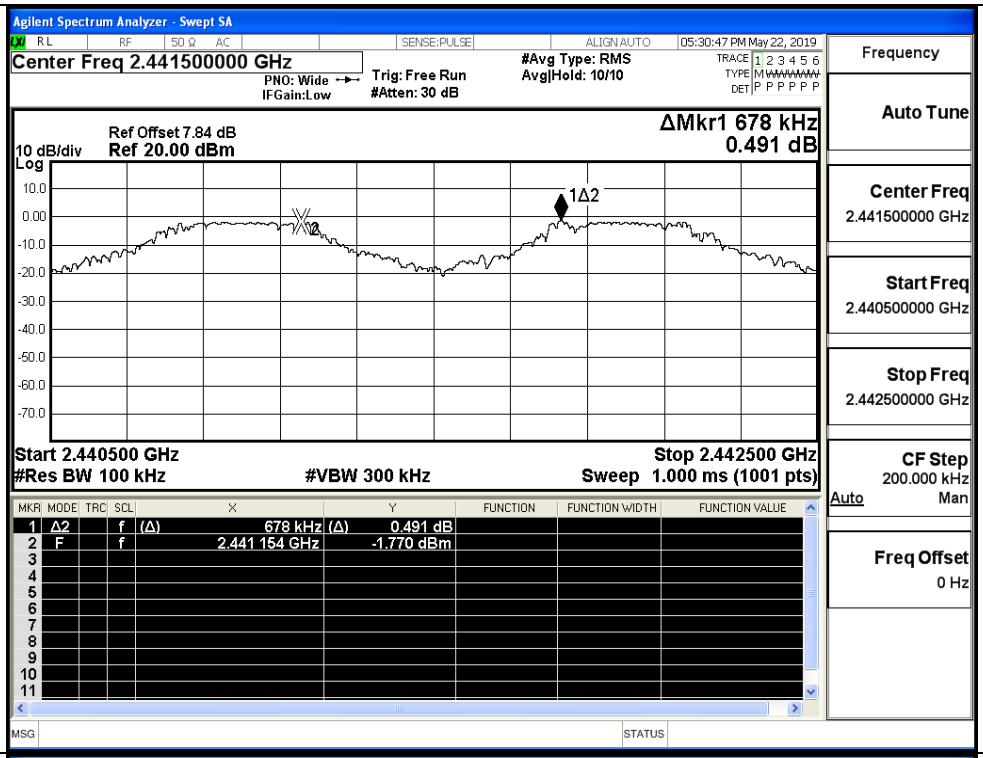
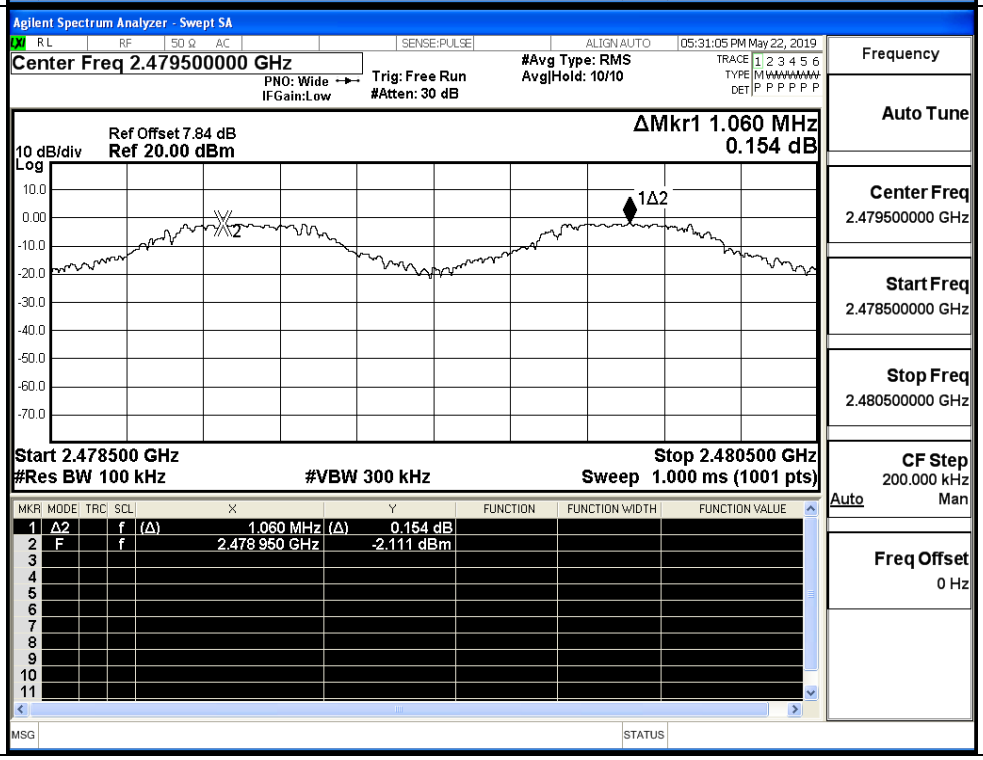
8DPSK/HCH



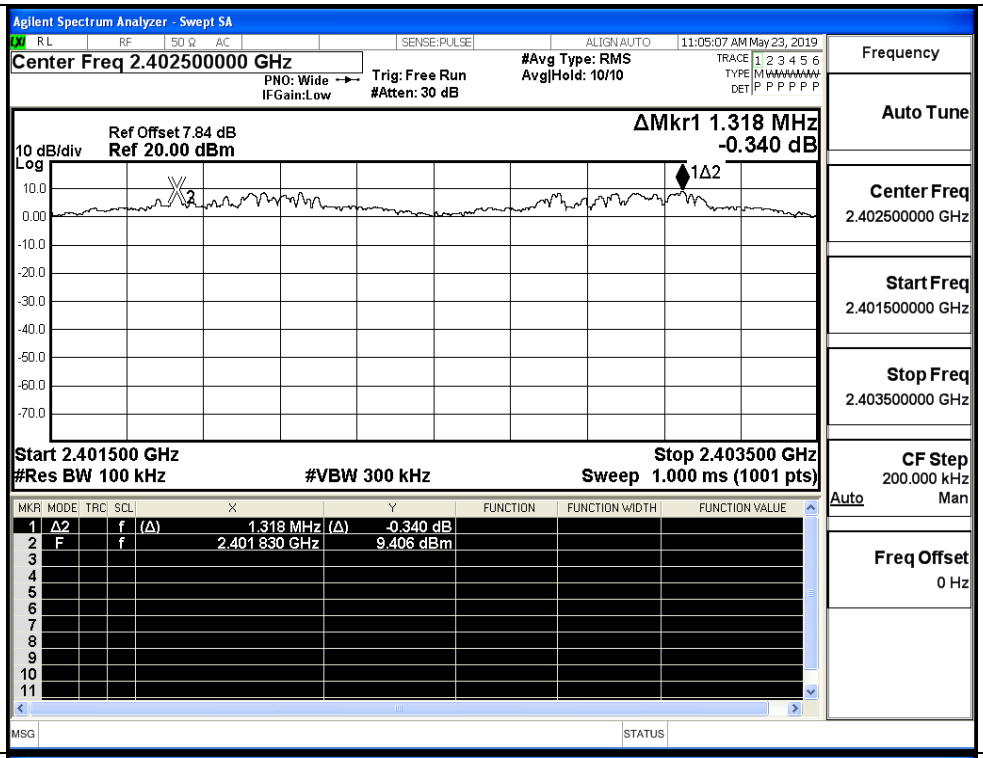
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.102	0.554	PASS
	MCH	0.678	0.554	PASS
	HCH	1.060	0.554	PASS
π/4DQPSK	LCH	1.318	0.745	PASS
	MCH	1.104	0.745	PASS
	HCH	0.666	0.745	PASS
8DPSK	LCH	0.994	0.747	PASS
	MCH	1.032	0.747	PASS
	HCH	0.968	0.747	PASS

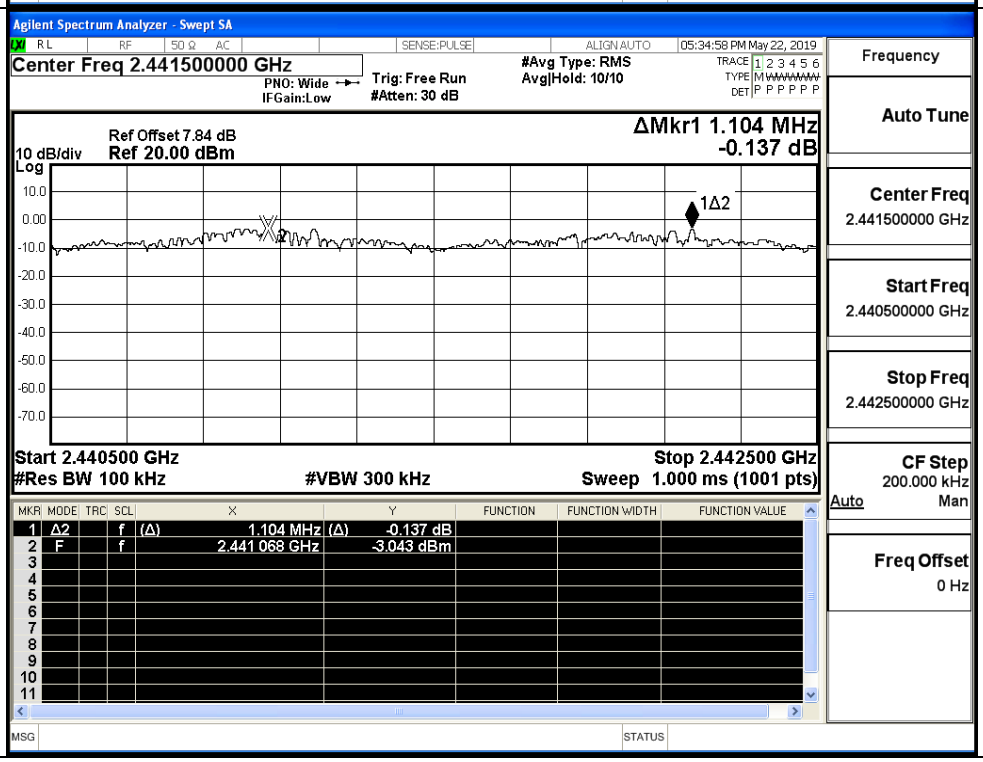
Test Graphs		
GFSK/LCH		

GFSK/MCH	
GFSK/HCH	

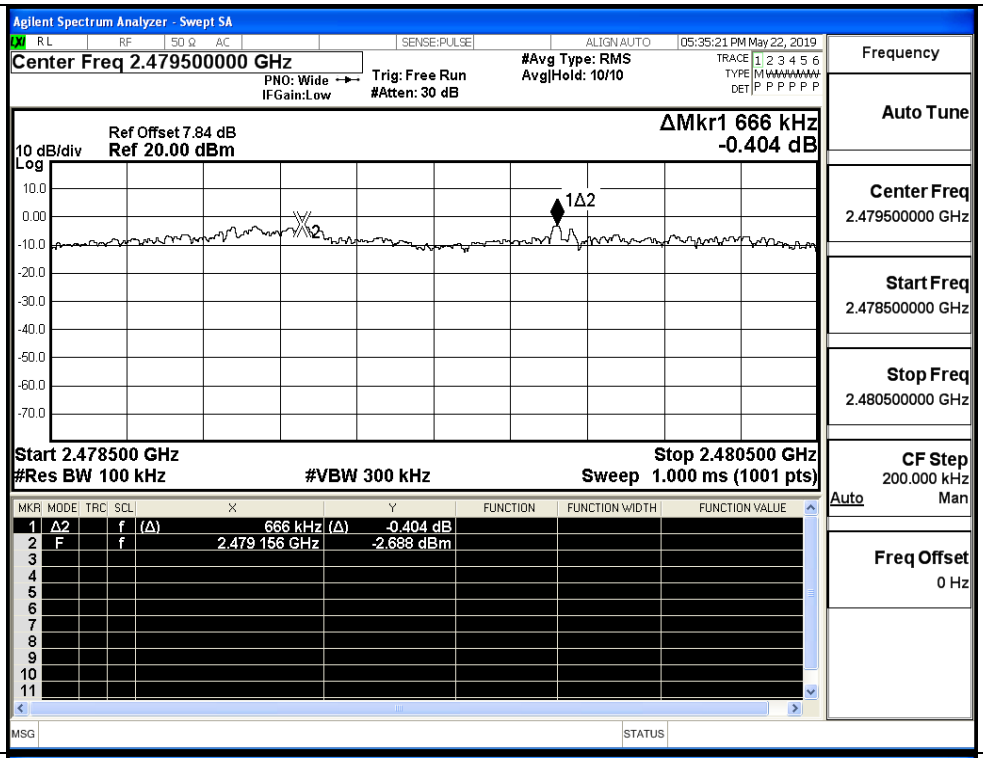
π/4DQPSK/LCH



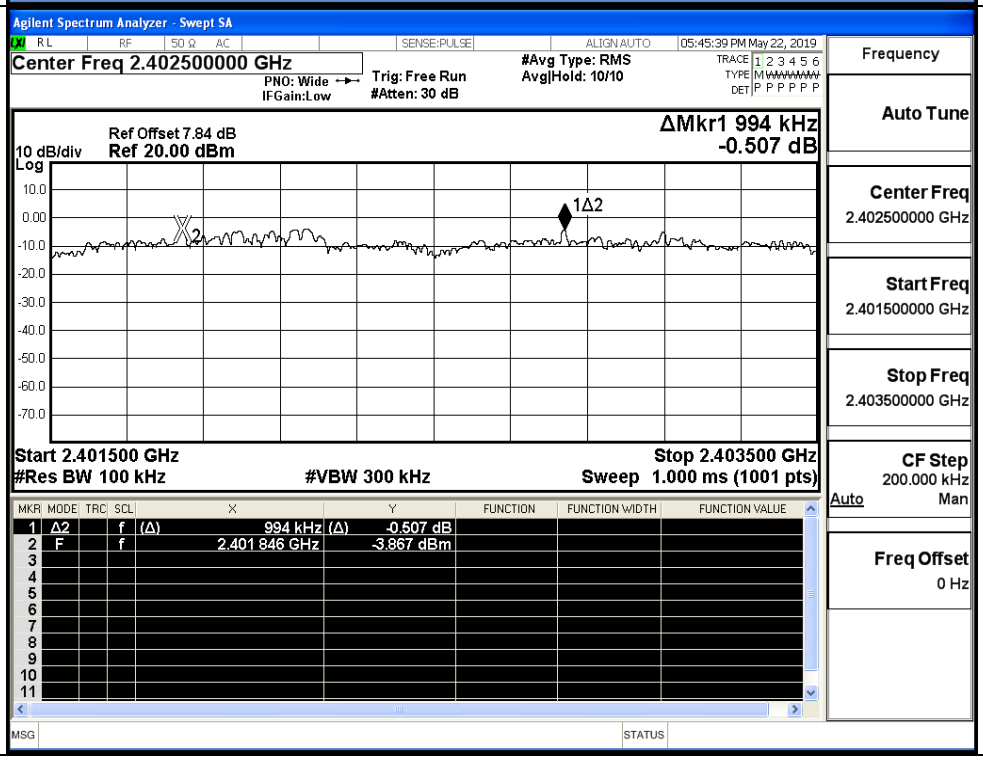
π/4DQPSK/MCH

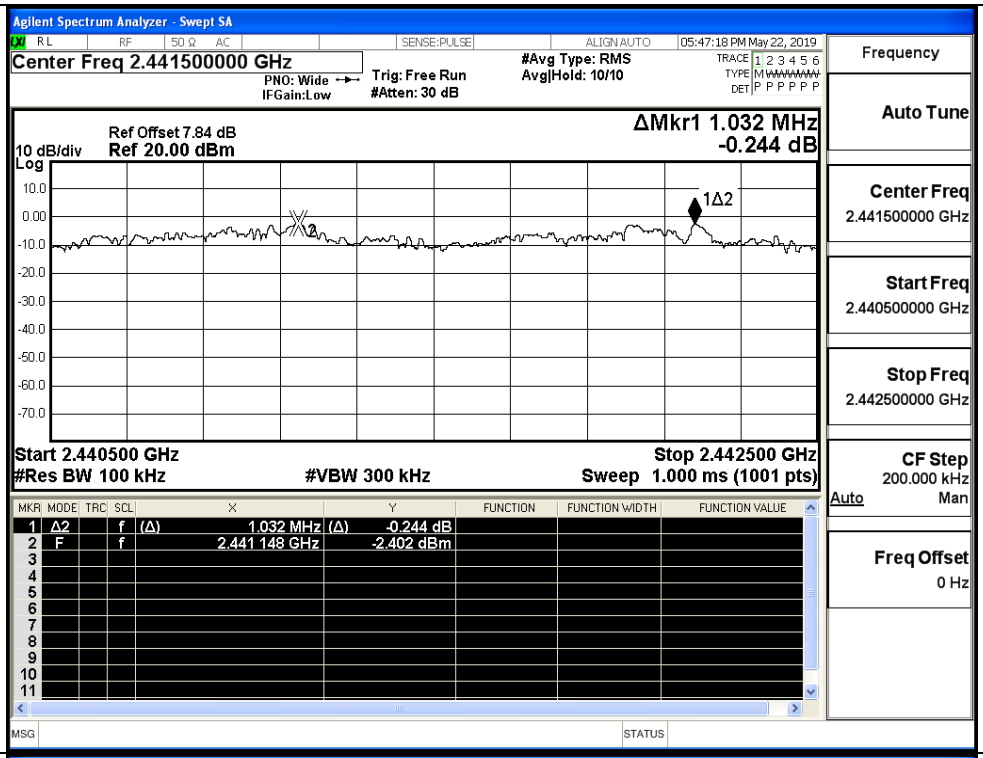
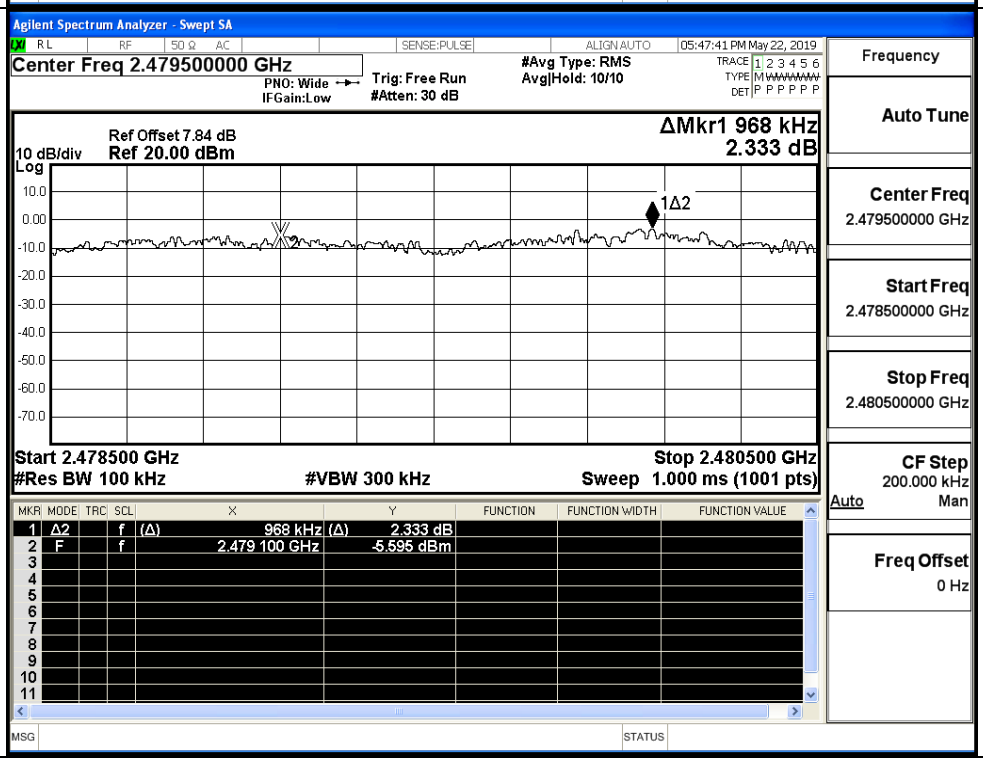


π/4DQPSK/HCH



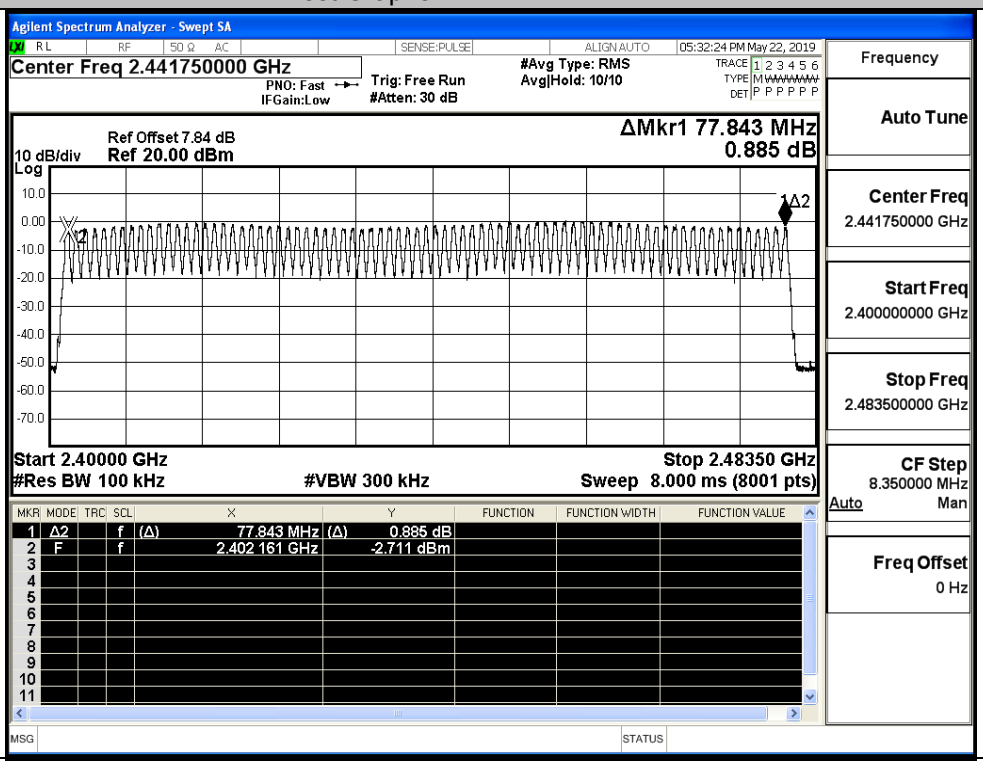
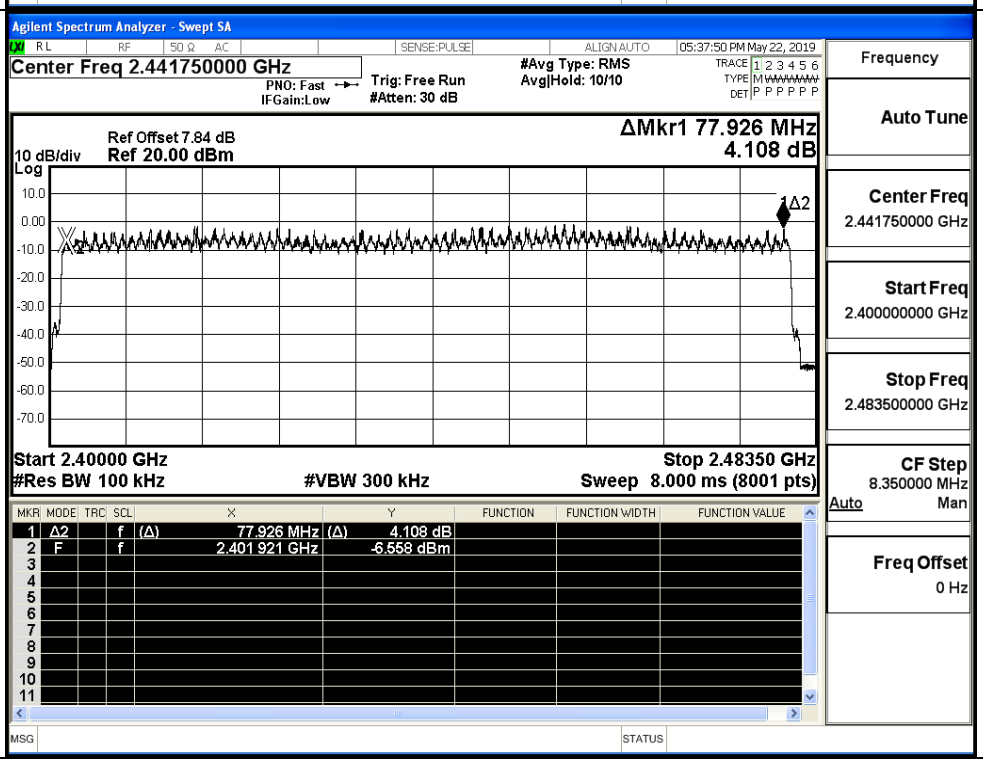
8DPSK/LCH

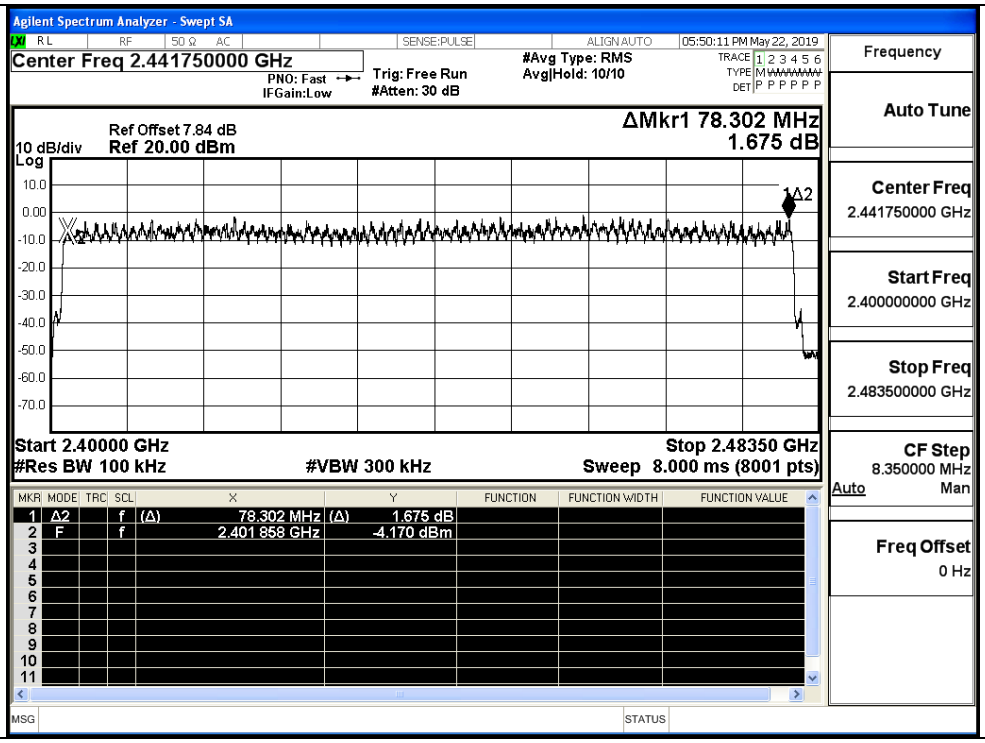


8DPSK/MCH		
8DPSK/HCH		

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

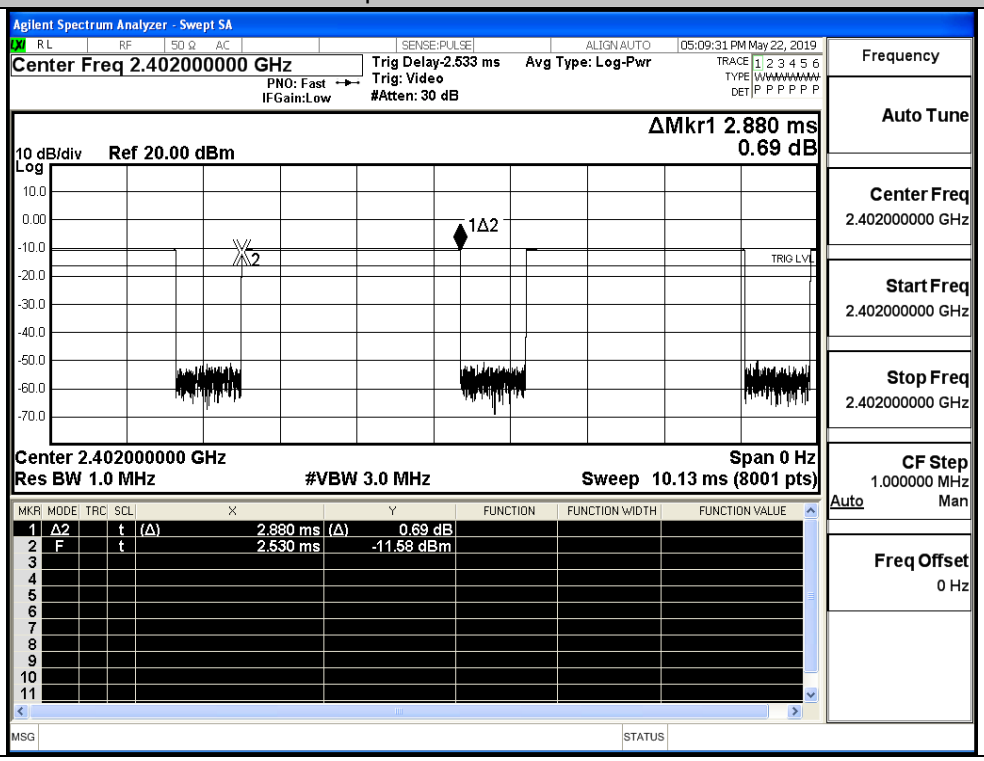
Test Graphs		
GFSK/Hop		
π/4DQPSK/Hop		

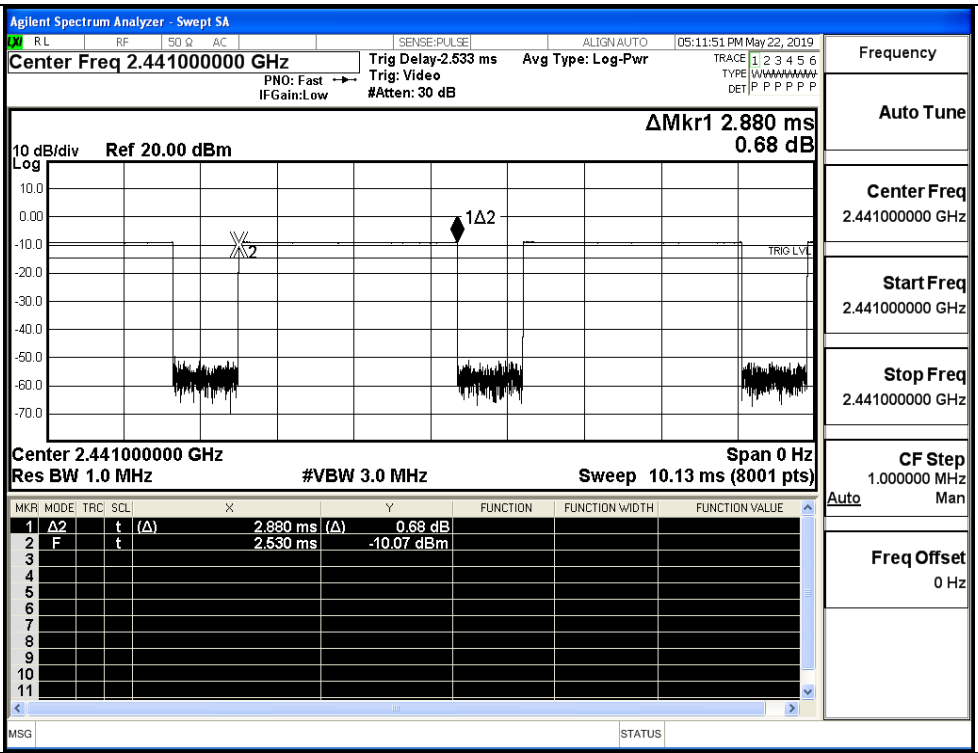
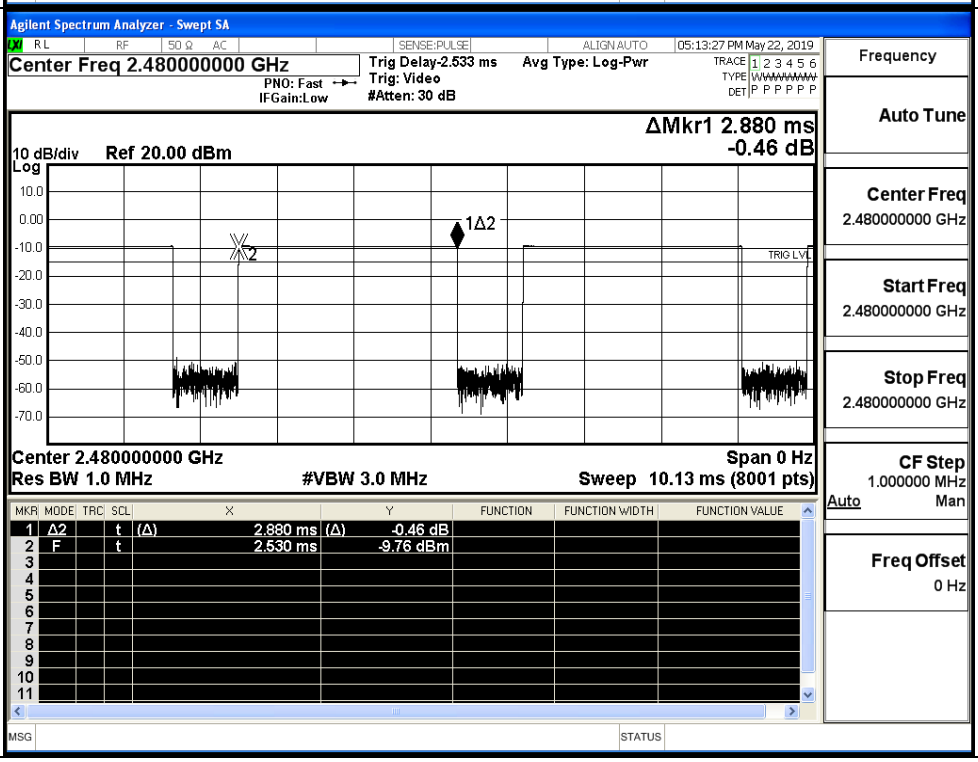
8DPSK/Hop		

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
05:50:11 PM May 22, 2019
Ref Offset 7.84 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 78.302 MHz
1.675 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) 78.302 MHz (Δ) 1.675 dB
2 F f 2.401 858 GHz -4.170 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

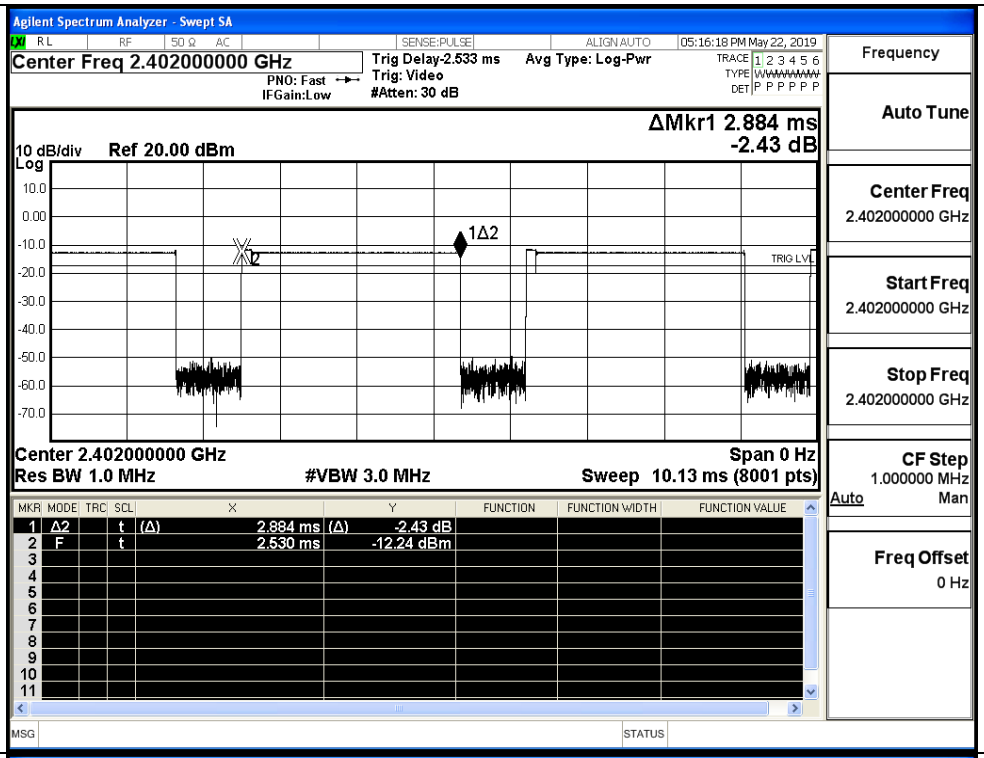
A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.308	0.4	PASS
	3DH5	MCH	2.88	106.7	0.308	0.4	PASS
	3DH5	HCH	2.88	106.7	0.308	0.4	PASS

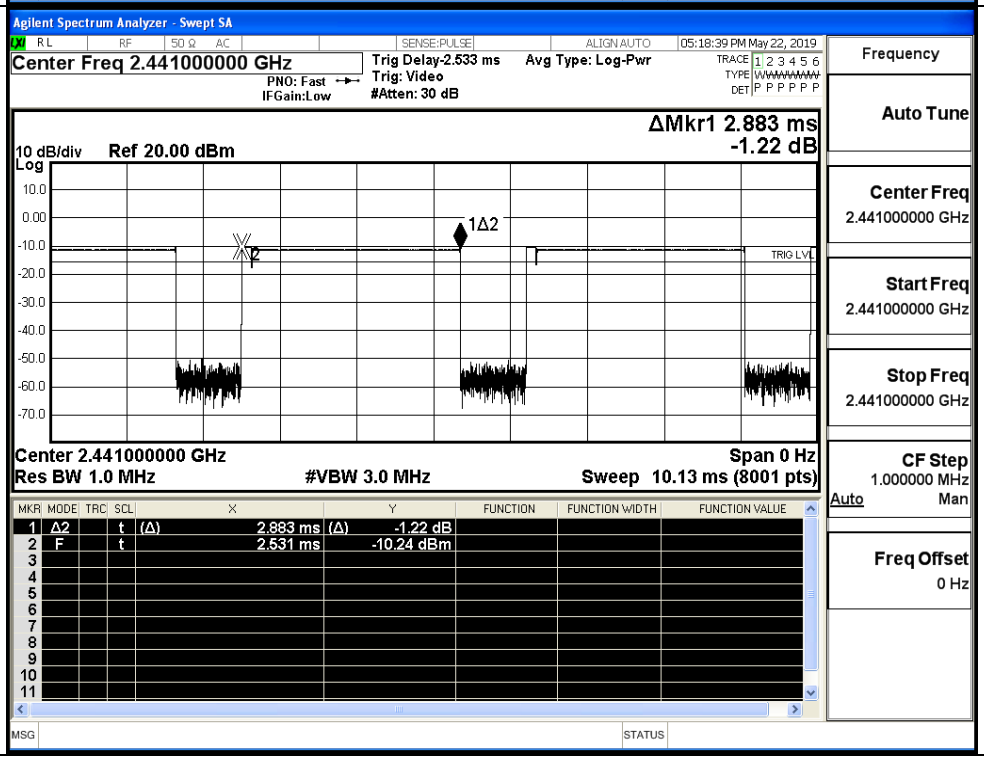
Test Graphs	
GFSK_DH5/LCH	

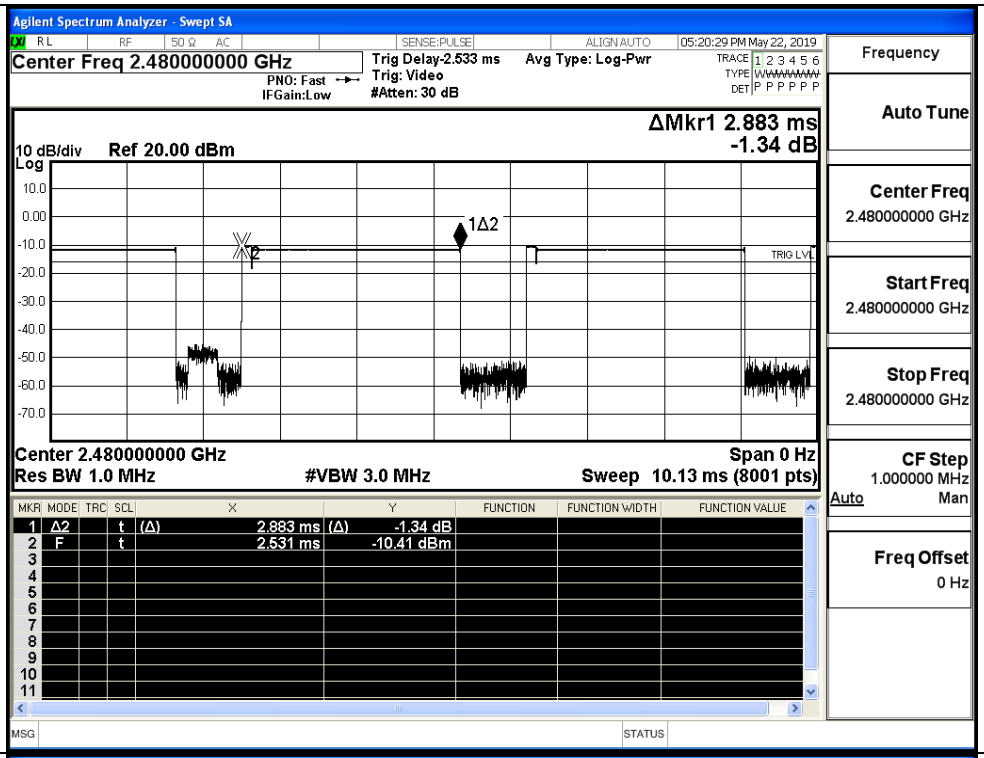
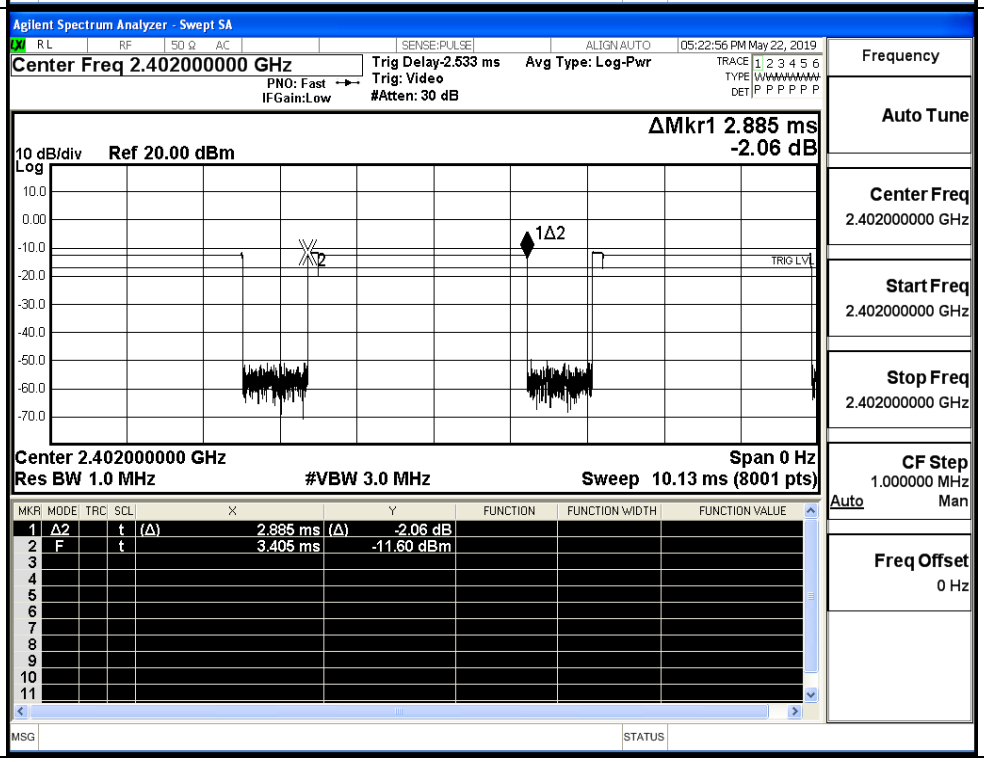
GFSK_DH5/MCH	
GFSK_DH5/HCH	

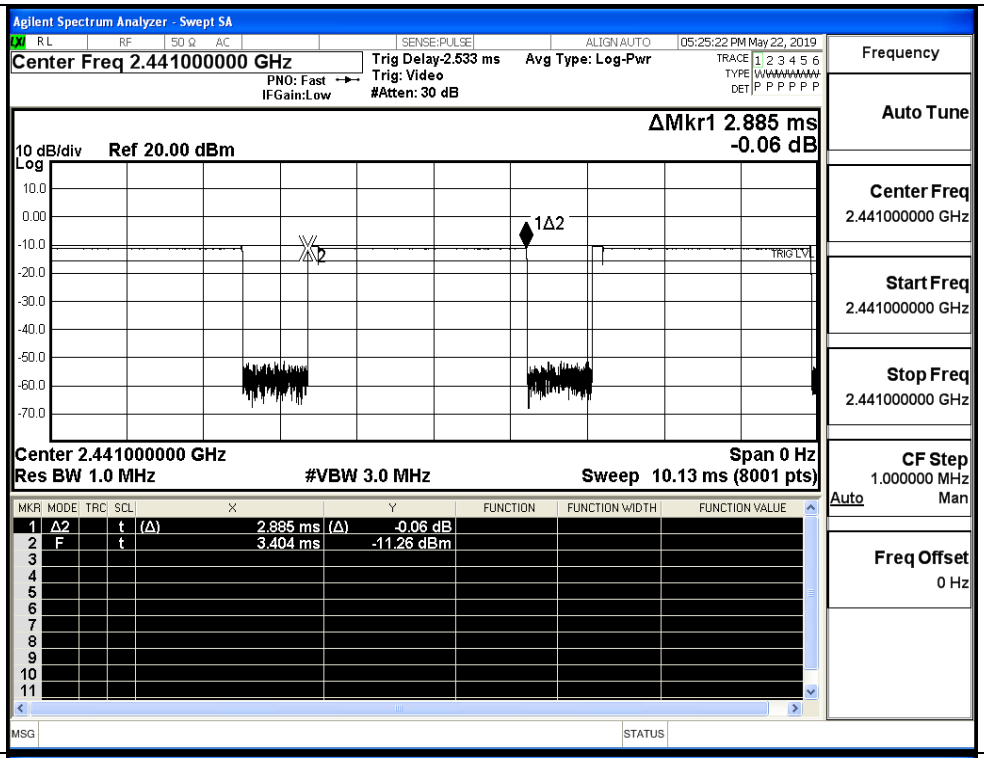
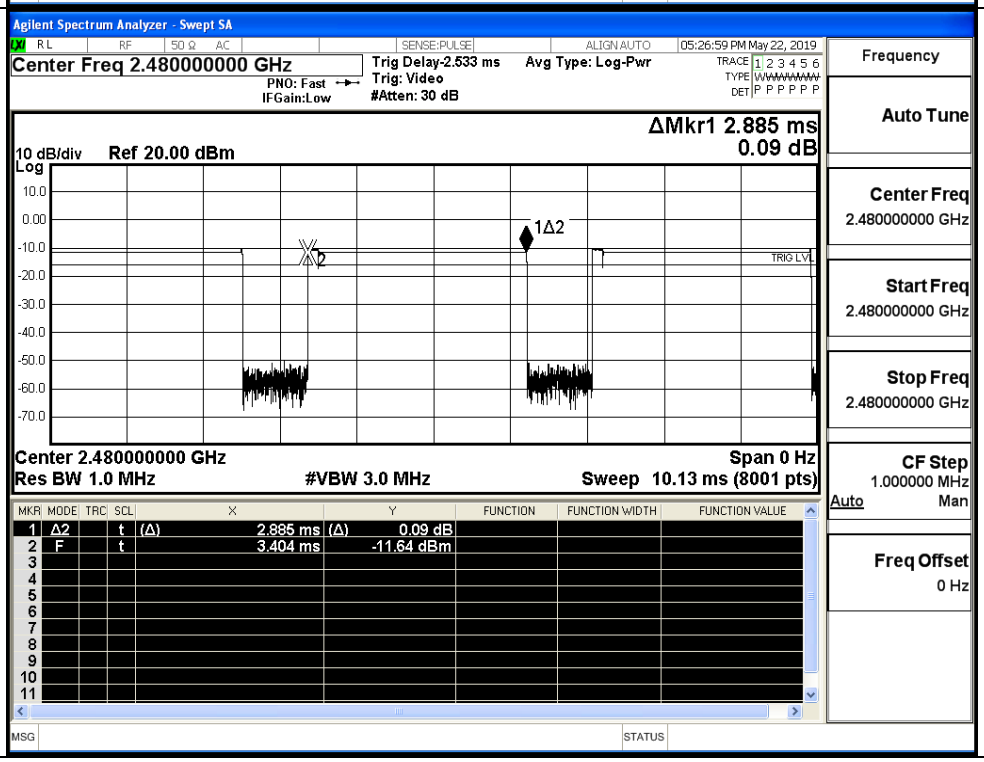
π/4DQPSK
_2DH5/LCH



π/4DQPSK
_2DH5/MCH

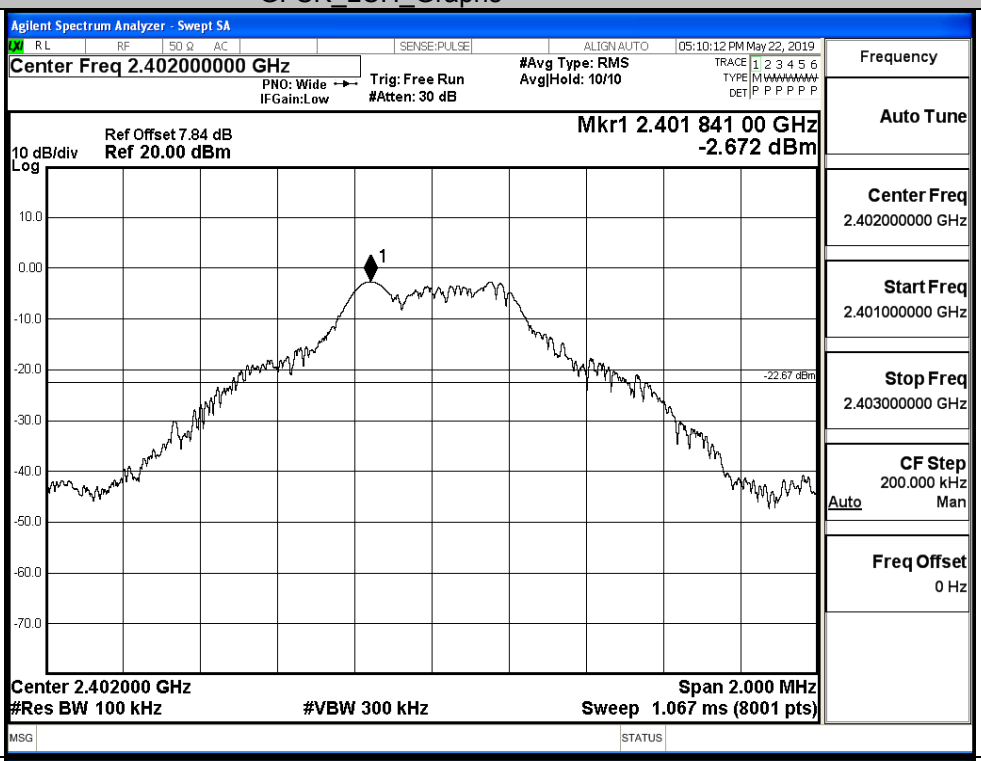
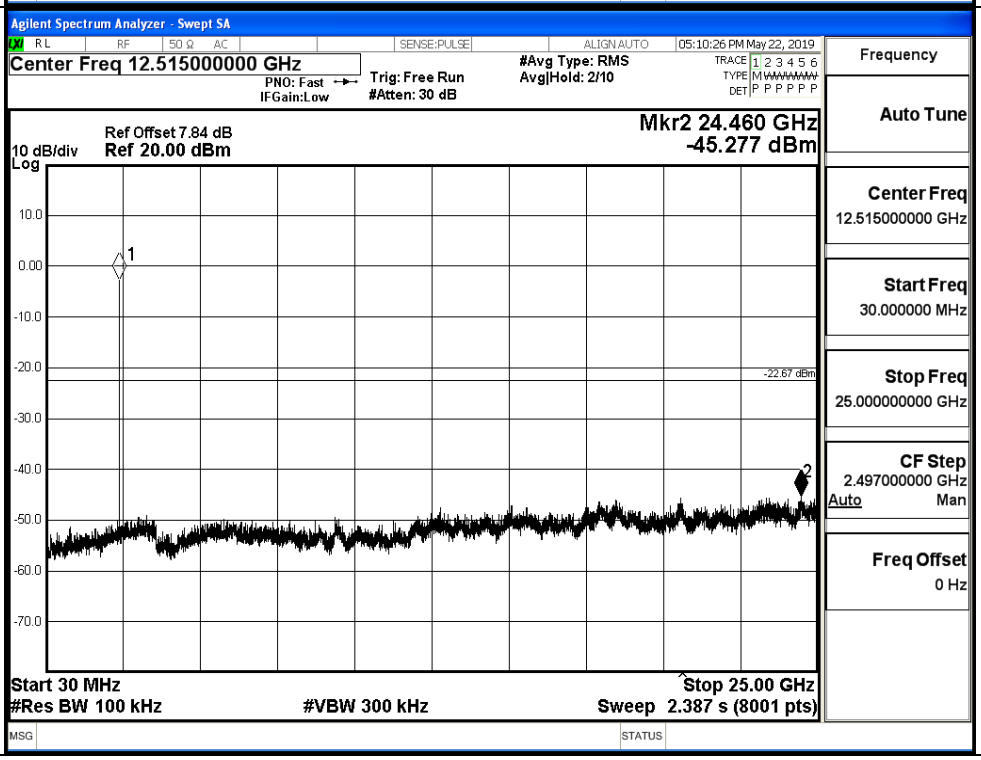


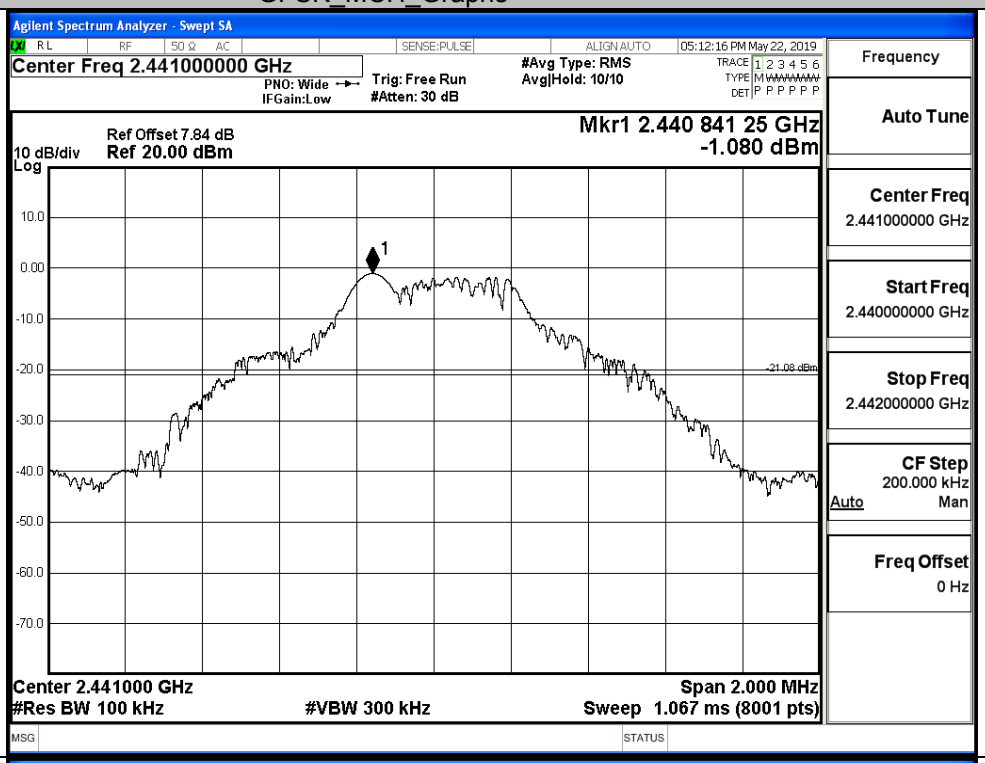
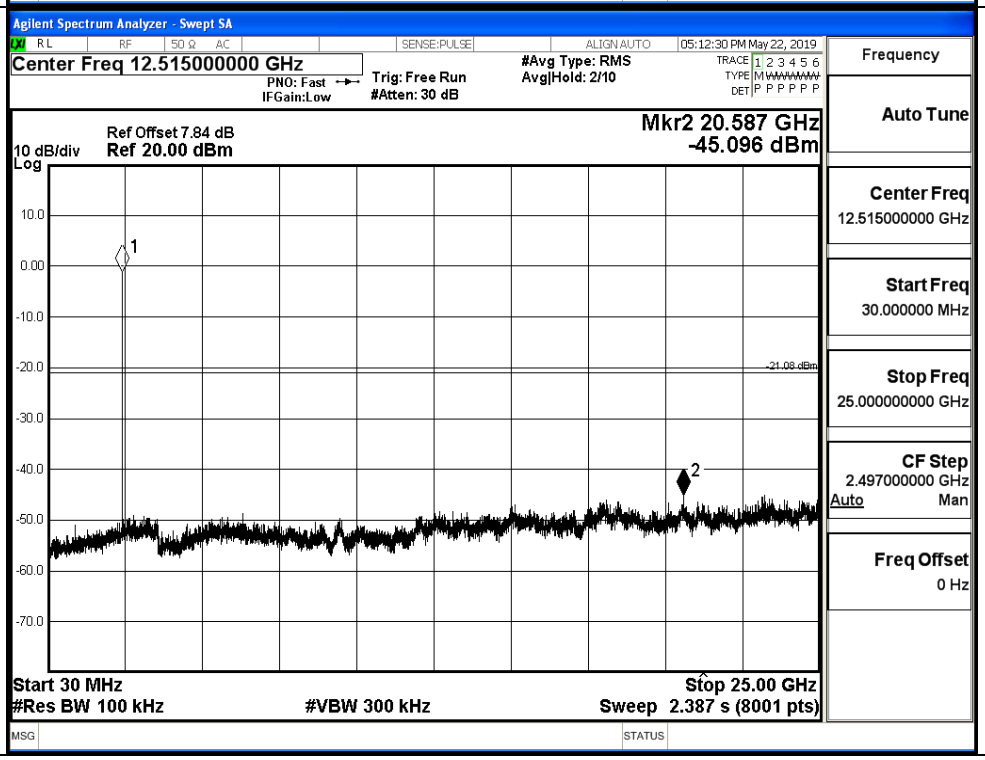
π/4DQPSK _2DH5/HCH	
8DPSK _3DH5/LCH	

8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.672	-45.277	-22.672	PASS
	MCH	-1.08	-45.096	-21.080	PASS
	HCH	-1.317	-45.460	-21.317	PASS
π/4DQPSK	LCH	-3.953	-45.189	-23.953	PASS
	MCH	-2.425	-45.292	-22.425	PASS
	HCH	-2.589	-44.785	-22.589	PASS
8DPSK	LCH	-3.705	-44.969	-23.705	PASS
	MCH	-2.295	-45.696	-22.295	PASS
	HCH	-2.606	-44.605	-22.606	PASS

GFSK_LCH_Graphs		
Pref		
Puw		

GFSK_MCH_Graphs			
Pref			
Puw			

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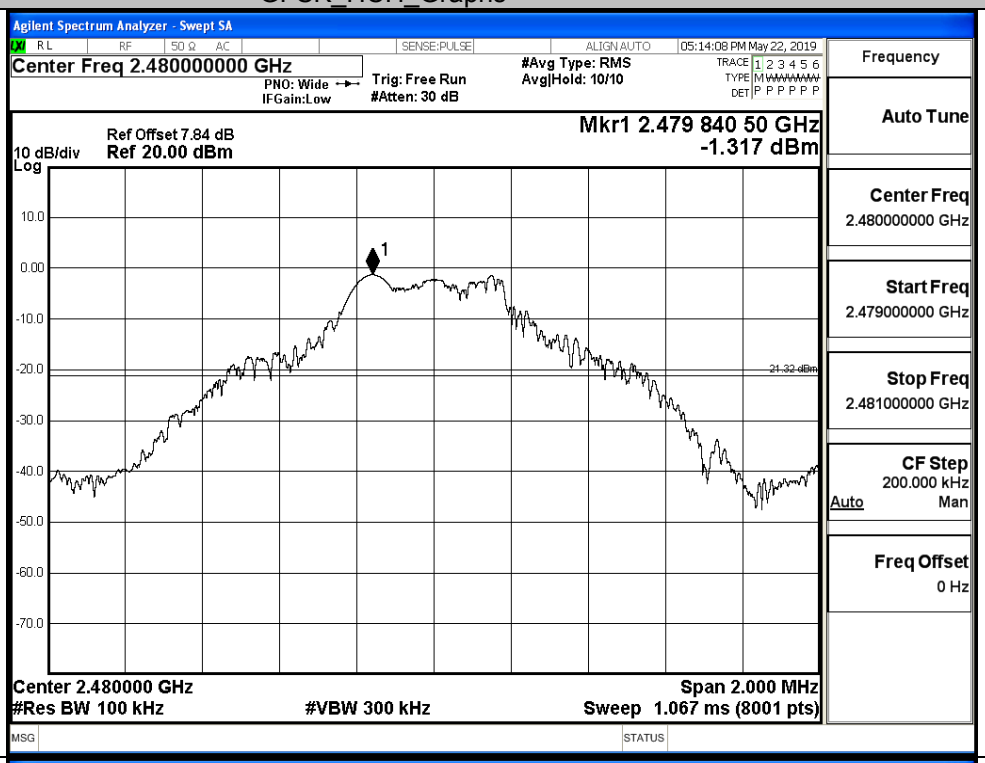
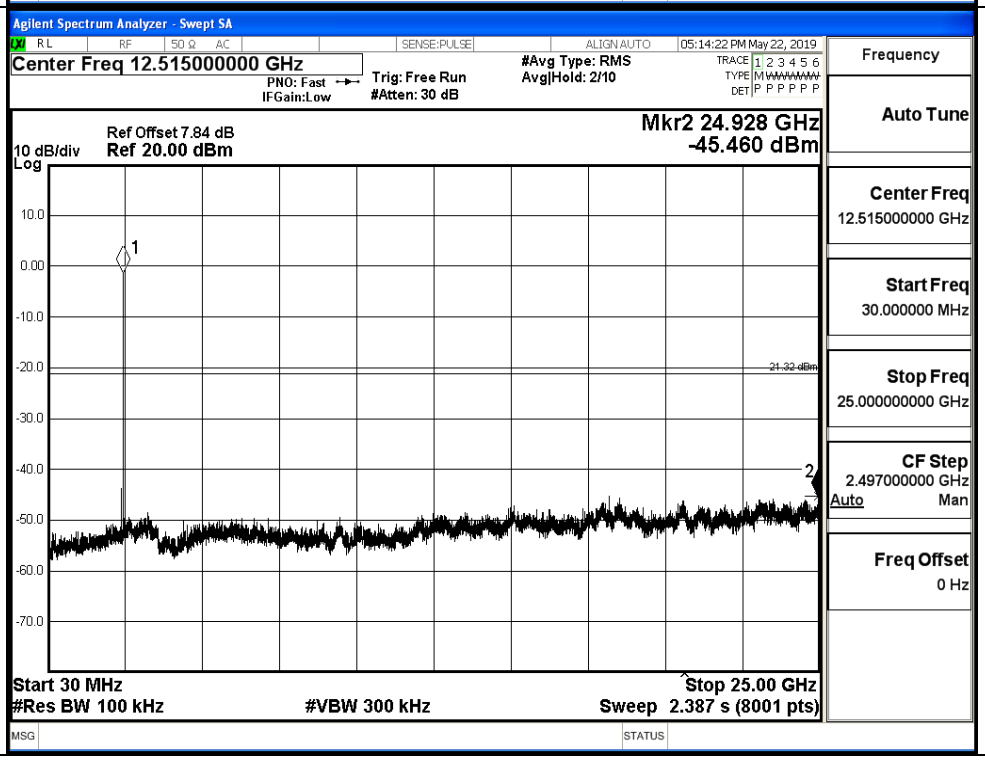
Pref			
Puw			

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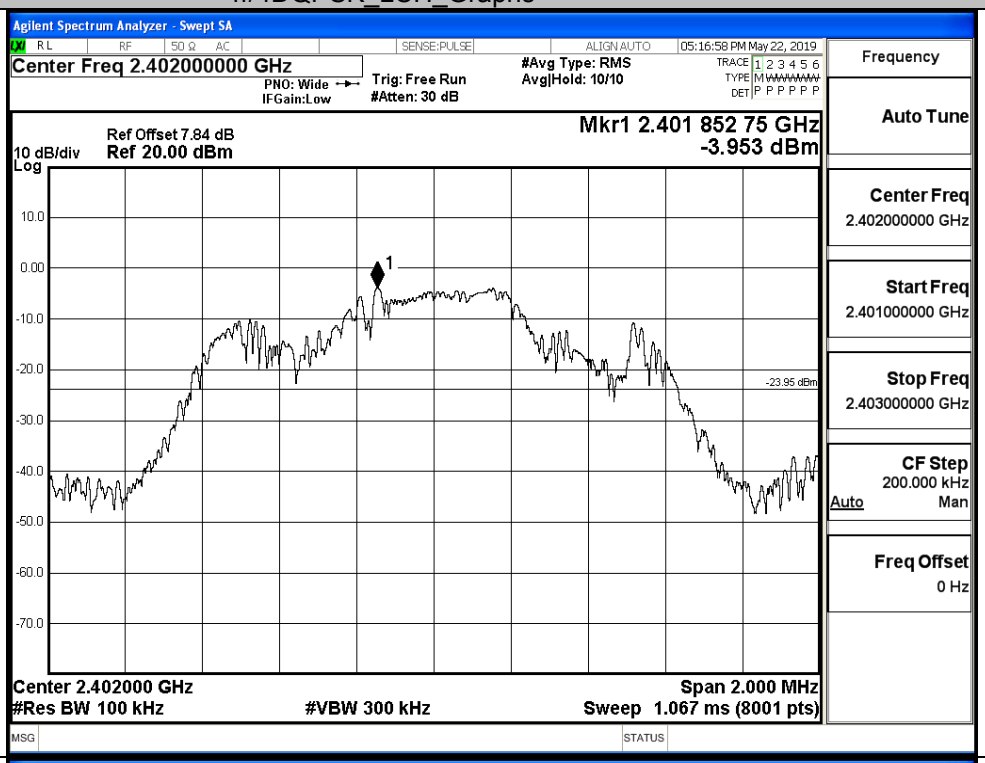
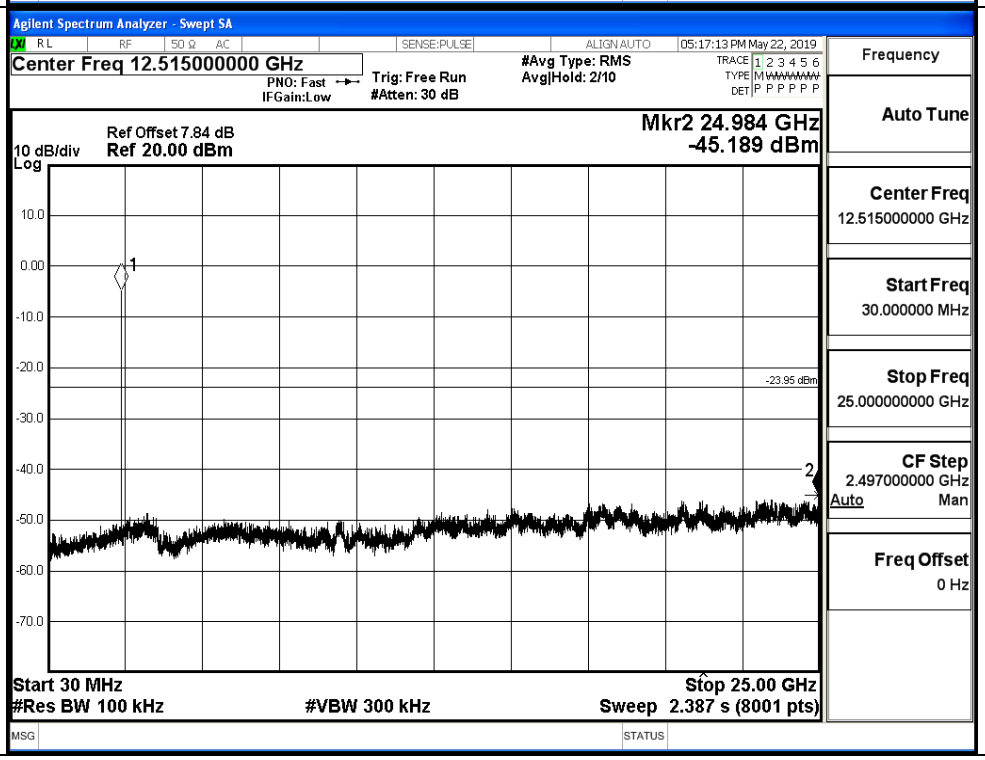
Pref		
Puw		

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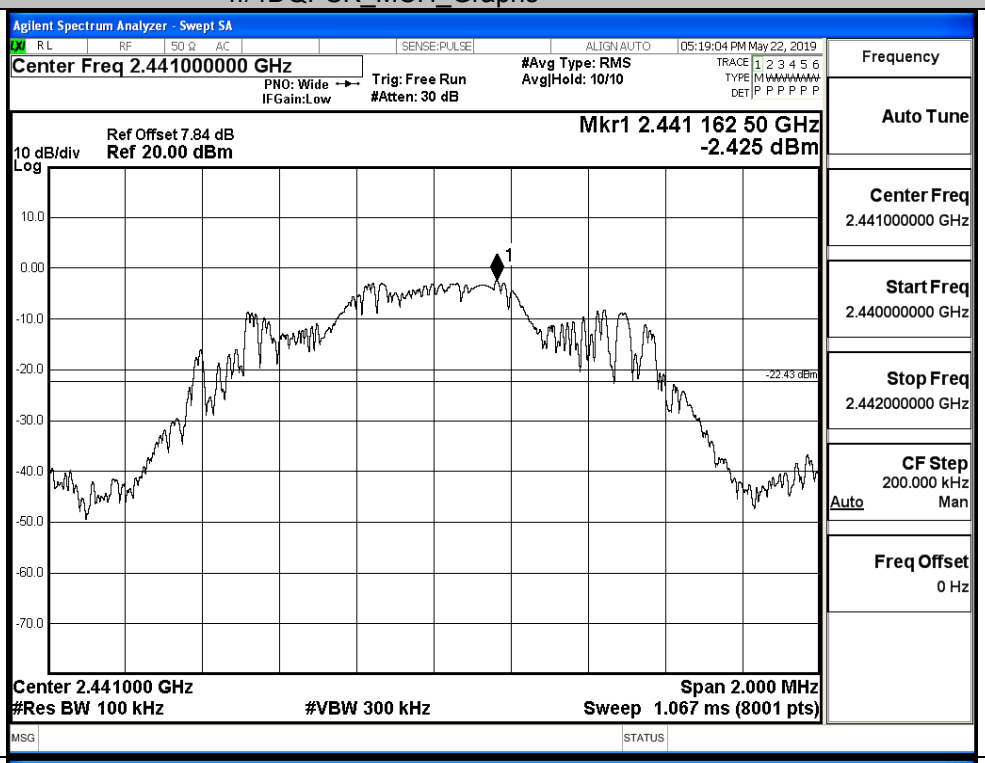
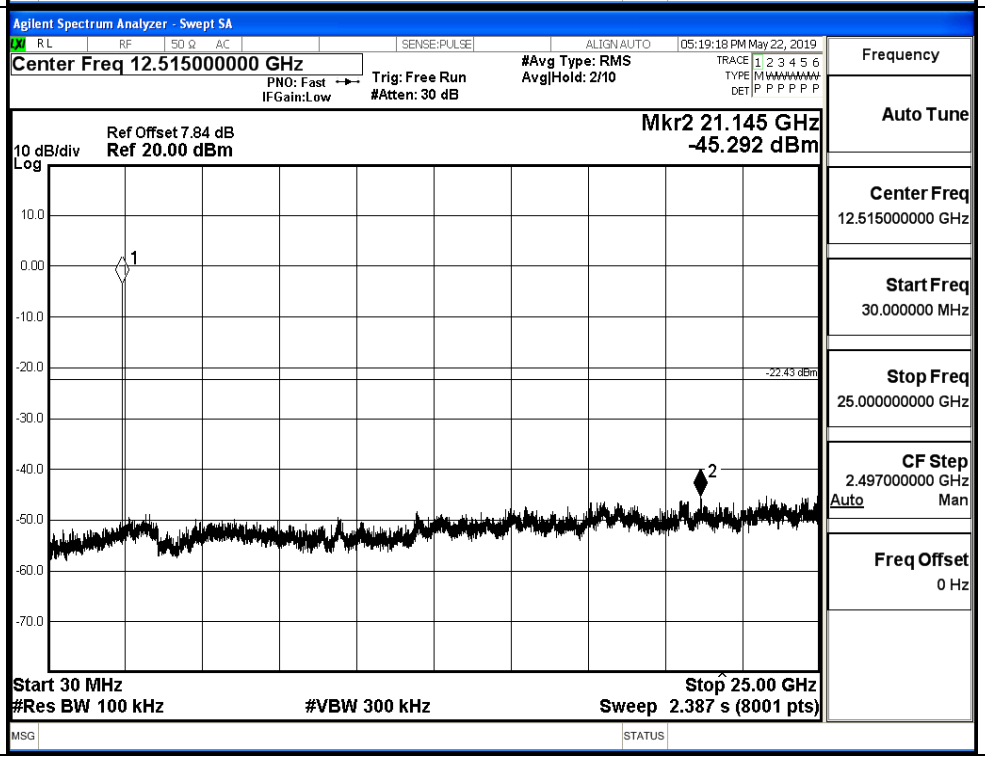
Pref		
Puw		

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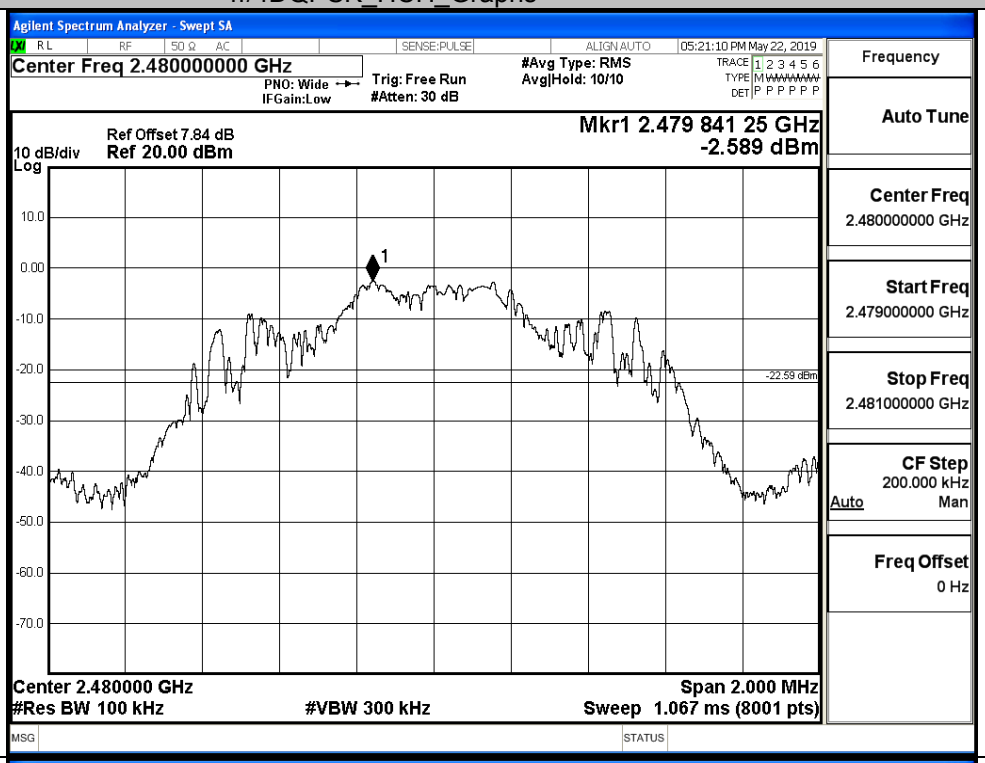
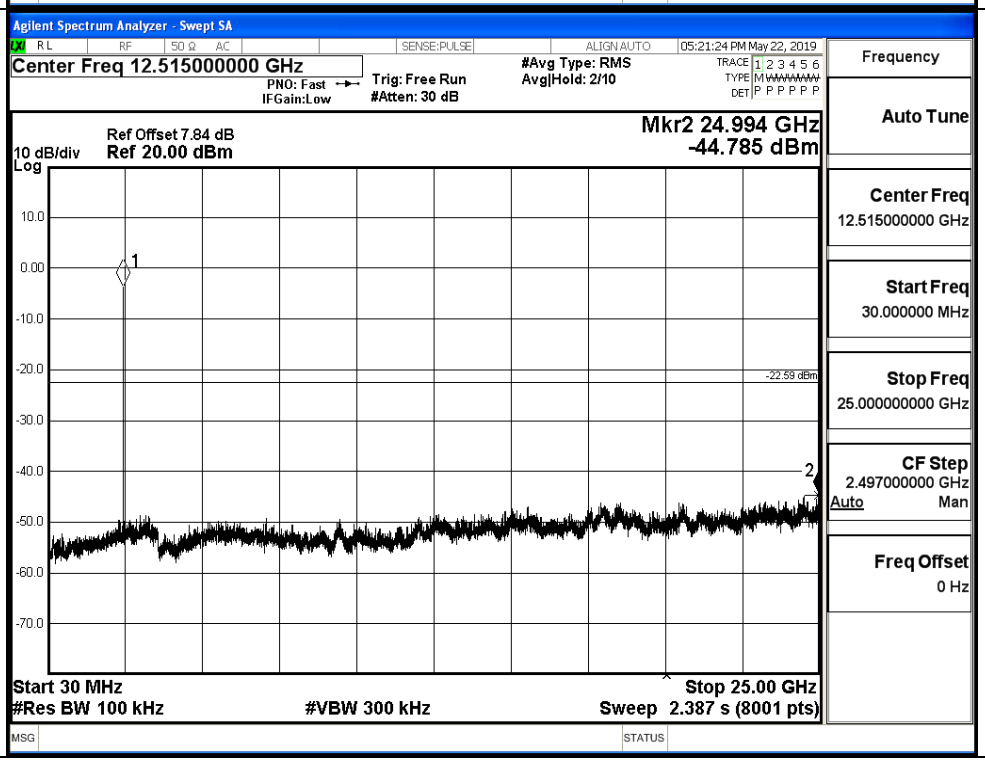
Pref			
Puw			

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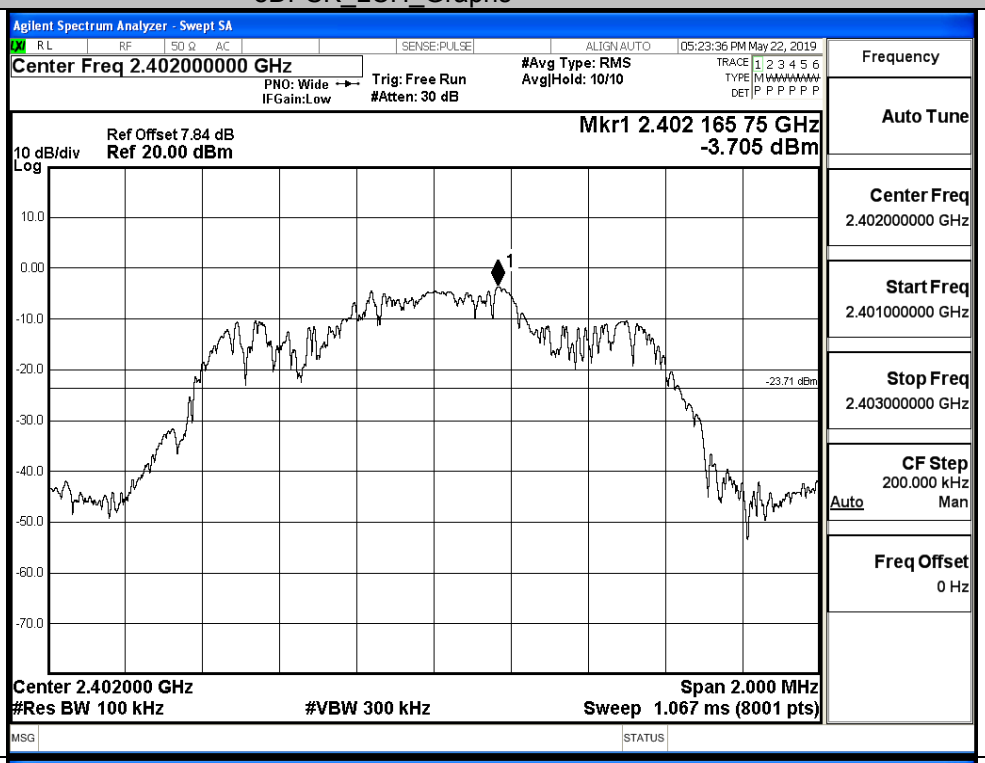
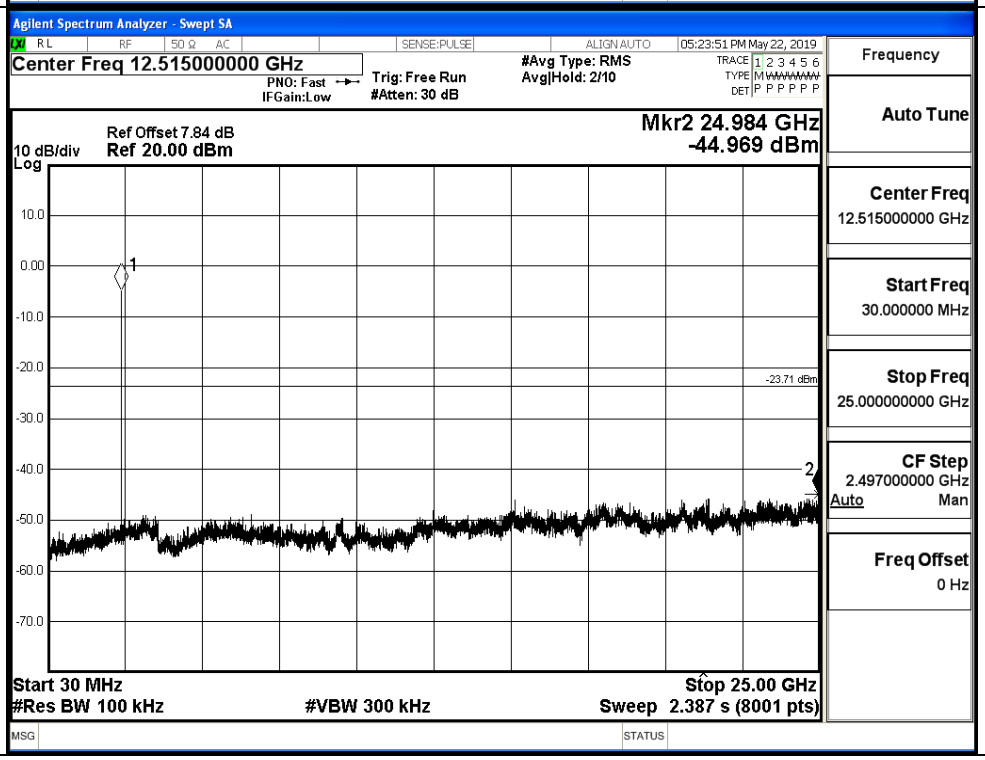
Pref		
Puw		

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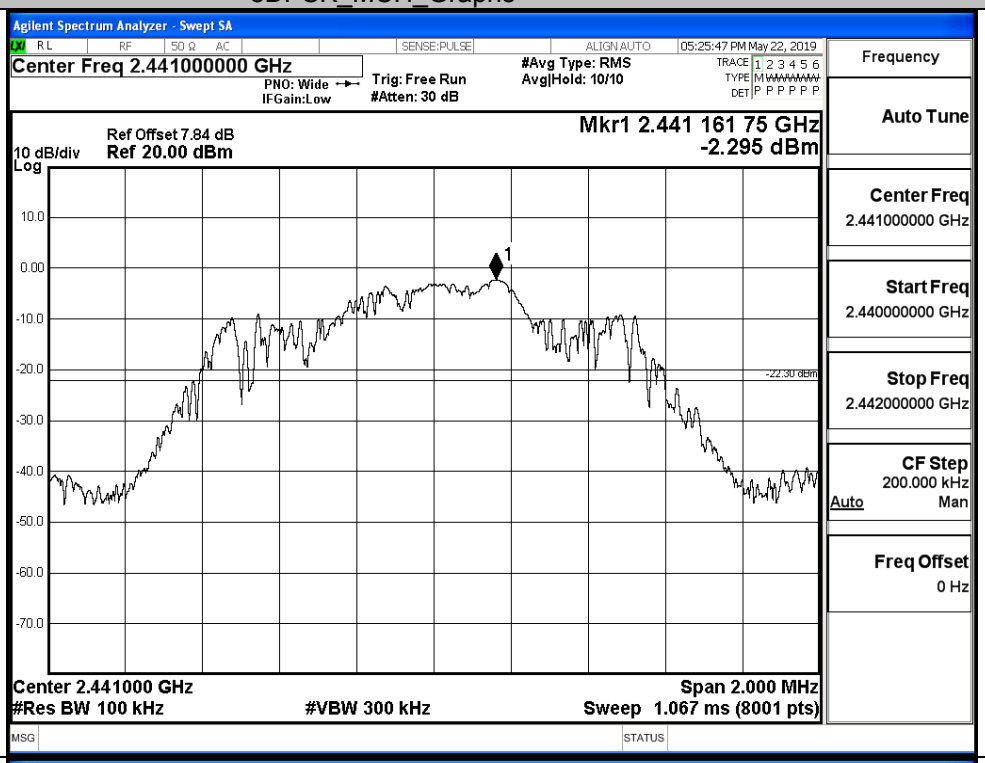
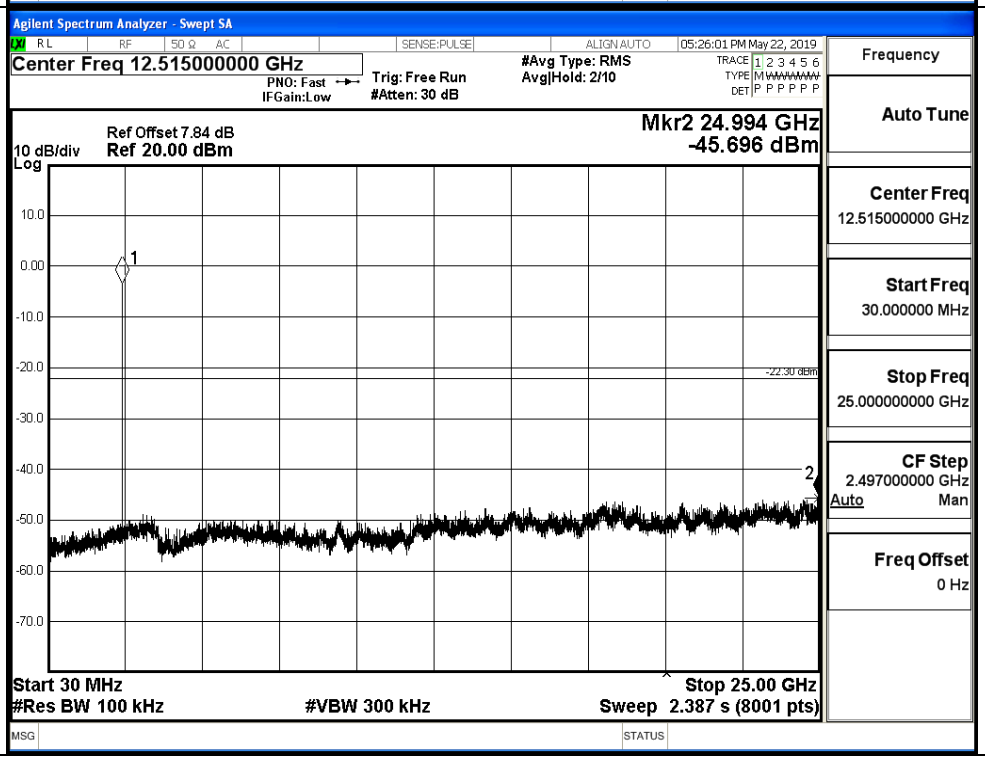
Pref		
Puw		

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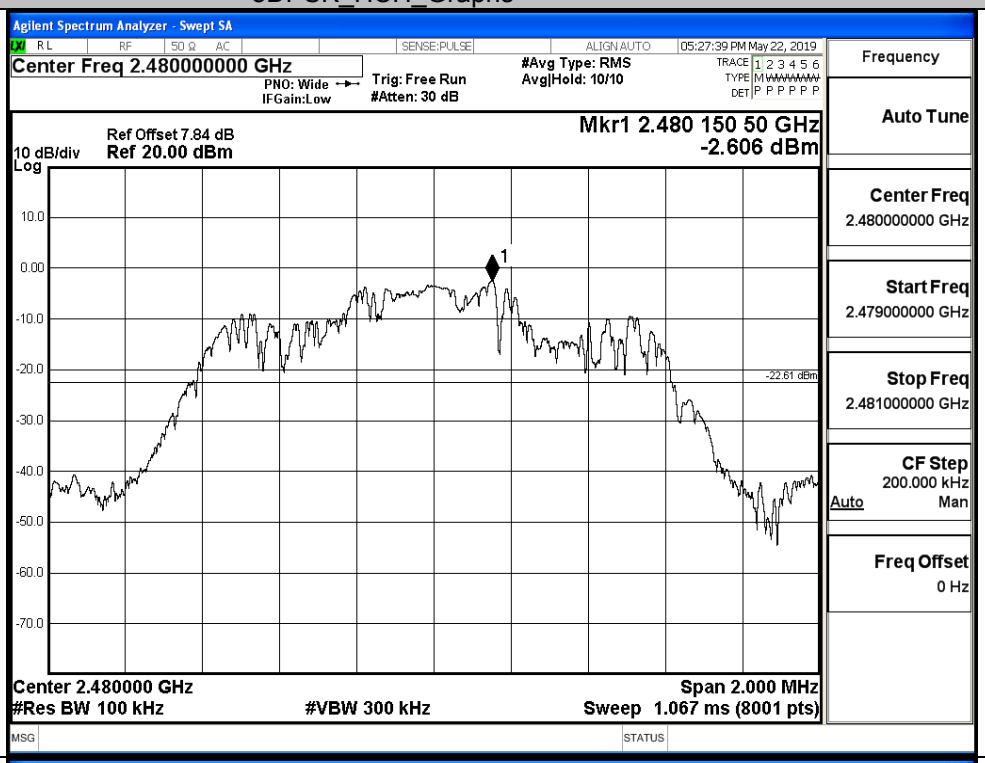
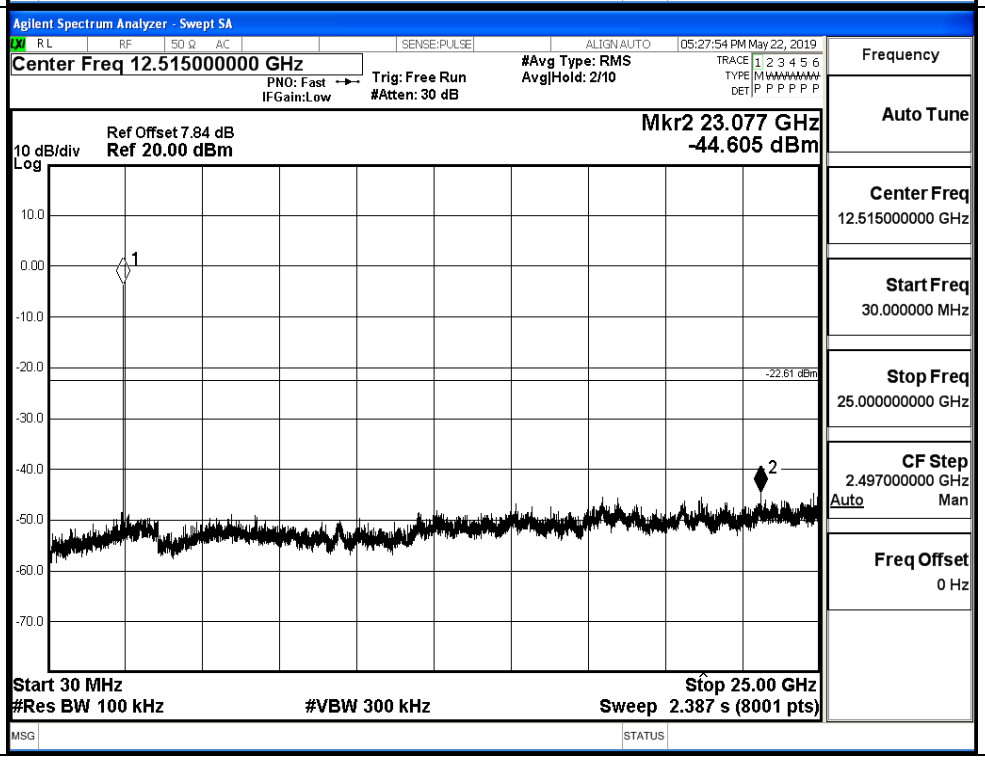
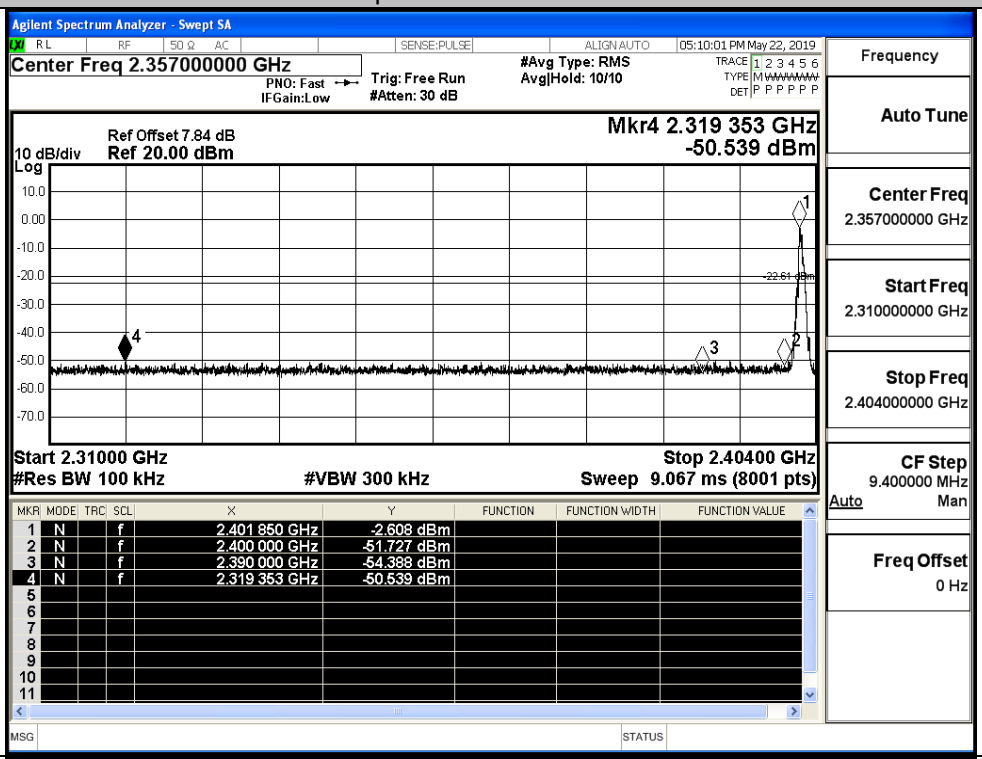
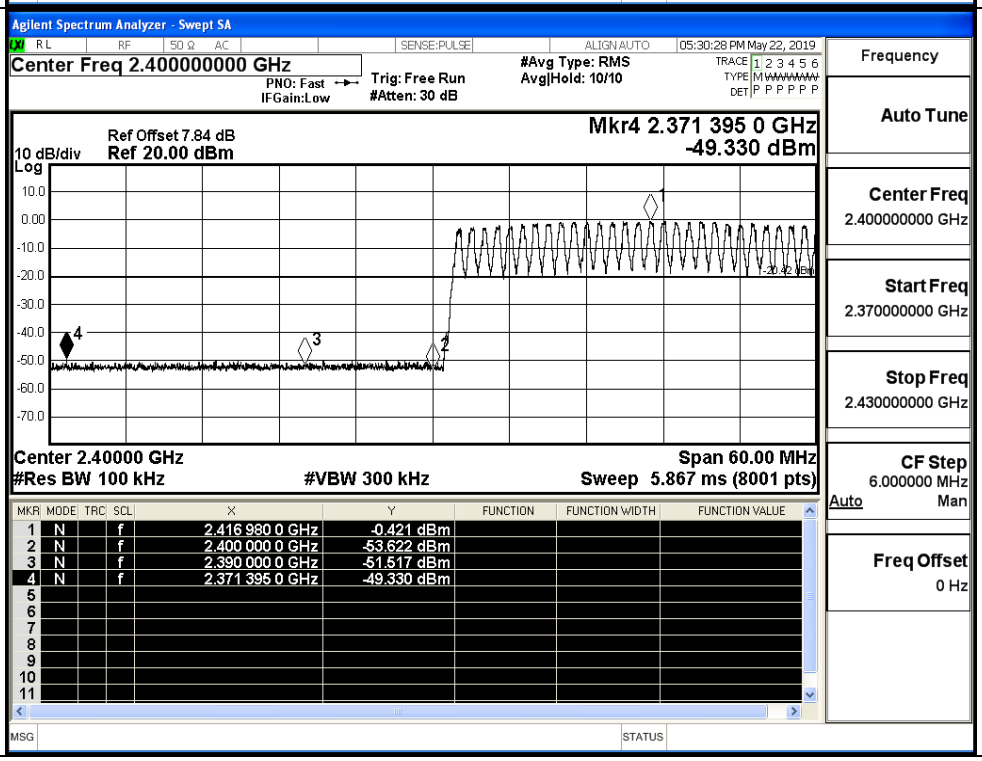
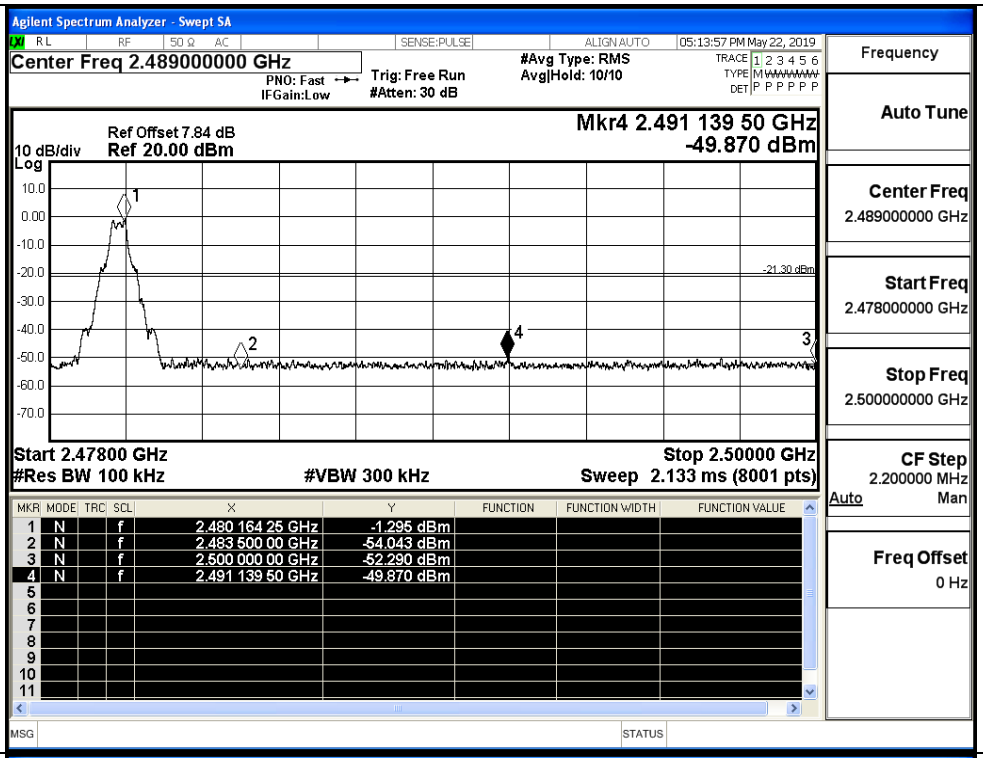
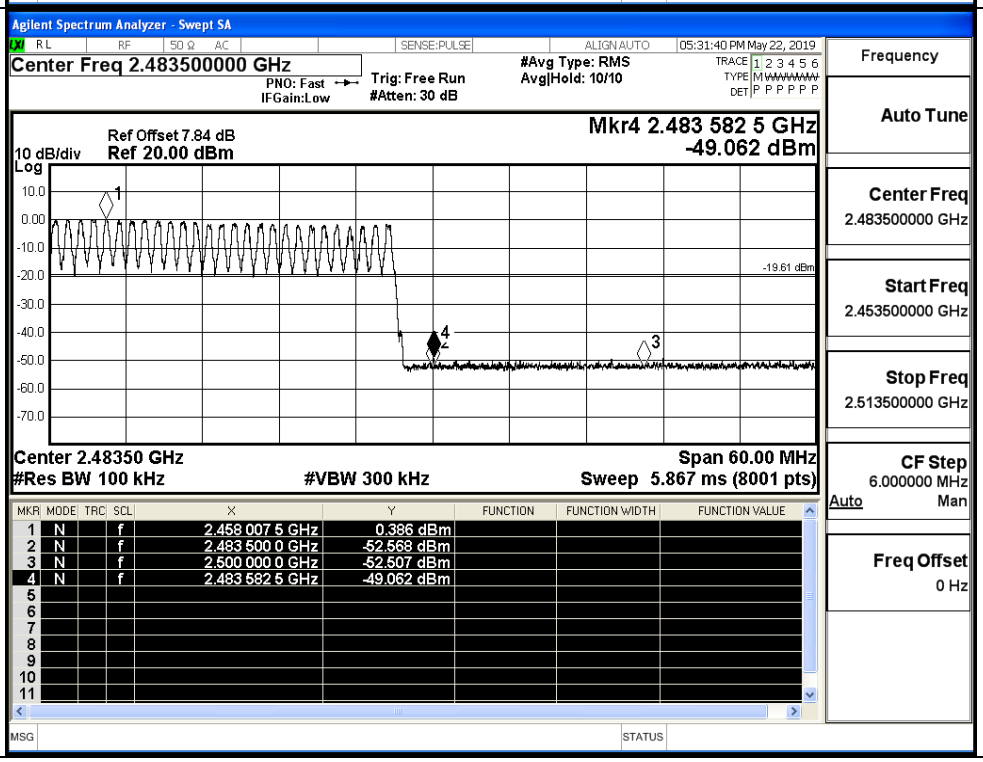
Pref			
Puw			

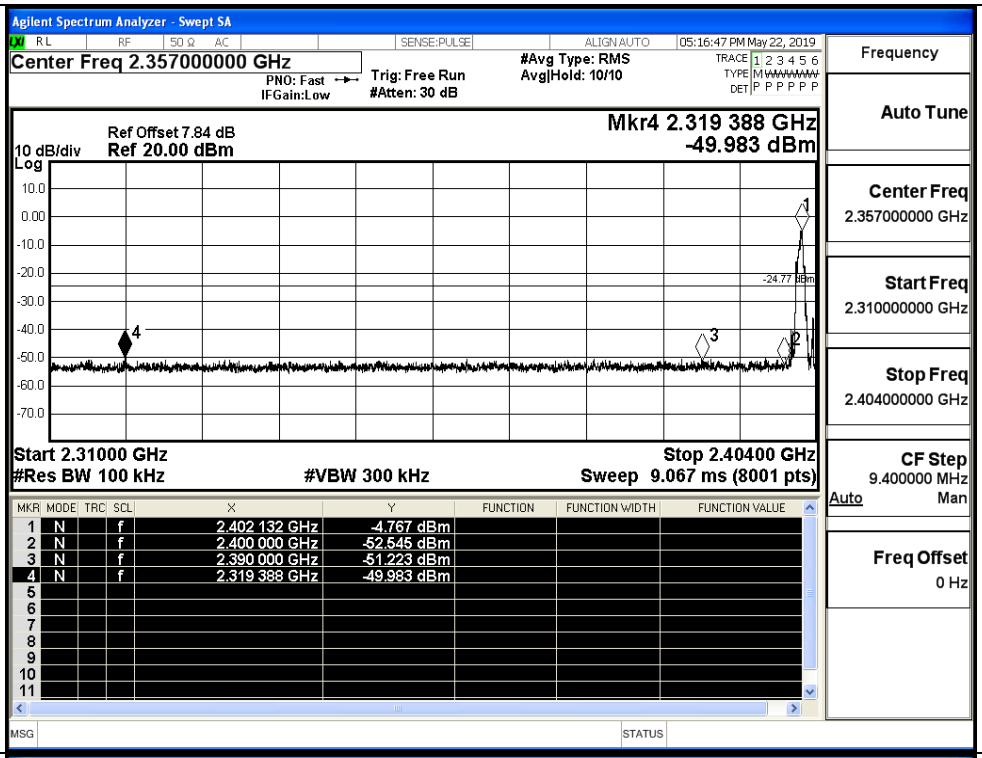
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.608	Off	-50.539	-22.61	PASS
			-0.421	On	-49.330	-20.42	PASS
	HCH	2480	-1.295	Off	-49.870	-21.3	PASS
			0.386	On	-49.062	-19.61	PASS
π/4DQPSK	LCH	2402	-4.767	Off	-49.983	-24.77	PASS
			-1.690	On	-49.189	-21.69	PASS
	HCH	2480	-2.566	Off	-50.121	-22.57	PASS
			-0.930	On	-49.337	-20.93	PASS
8DPSK	LCH	2402	-3.751	Off	-49.698	-23.75	PASS
			-1.719	On	-49.927	-21.72	PASS
	HCH	2480	-2.479	Off	-50.303	-22.48	PASS
			-0.867	On	-49.083	-20.87	PASS

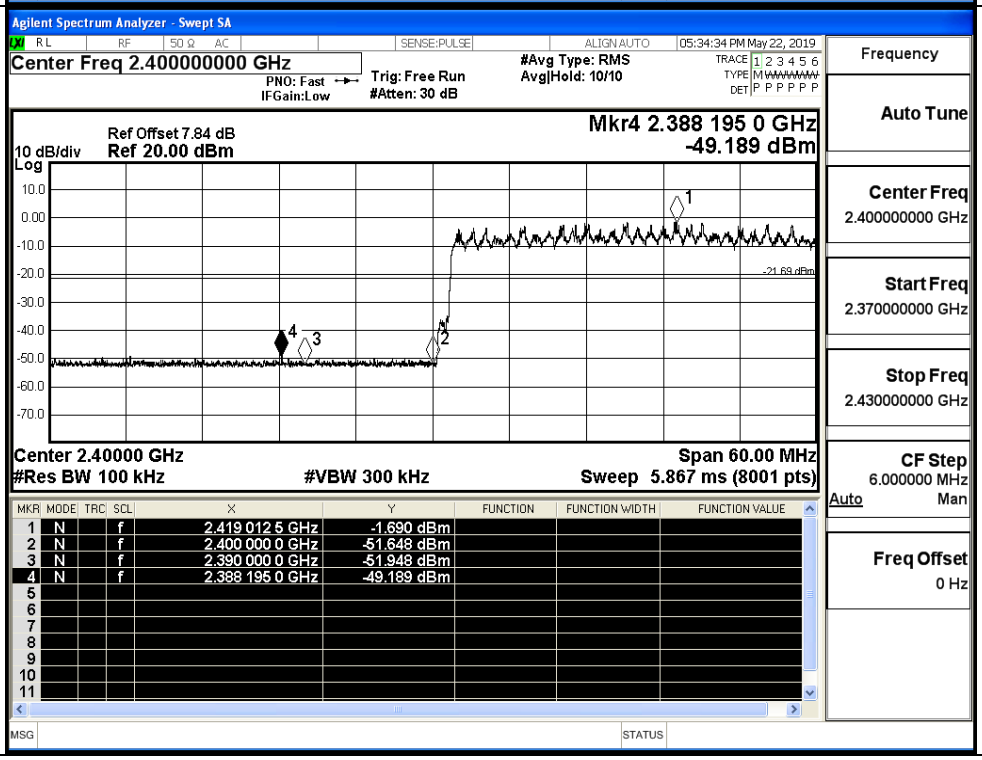
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

GFSK/HCH/No Hop	
GFSK/HCH/Hop	

π/4DQPSK/LCH/No Hop



π/4DQPSK/LCH/Hop



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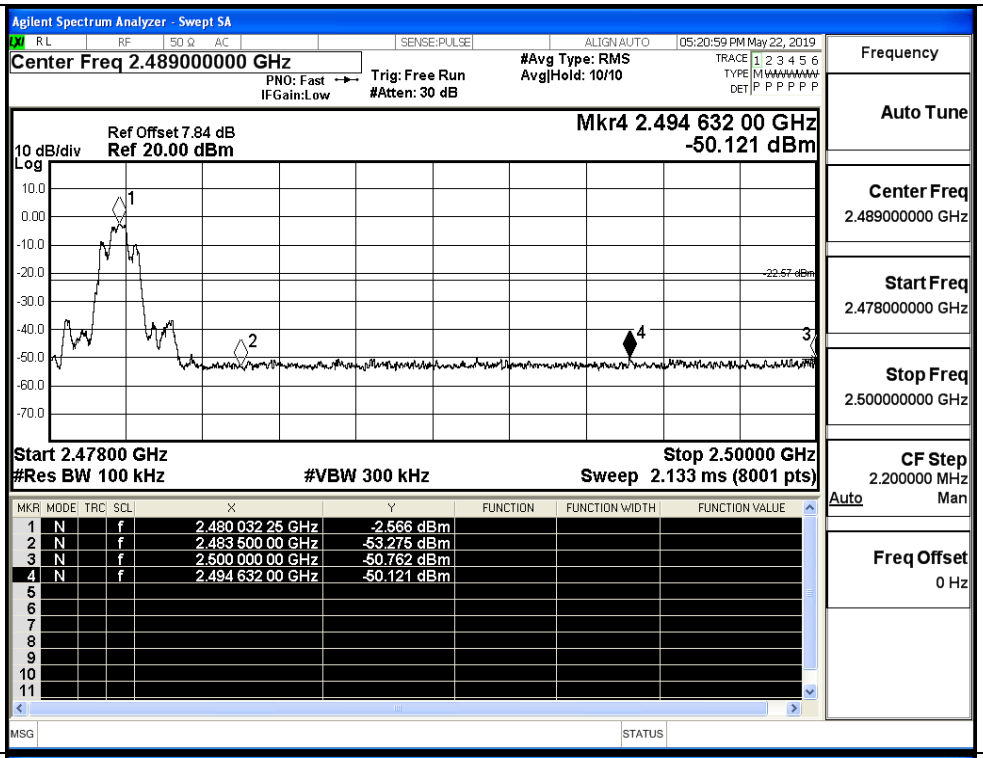

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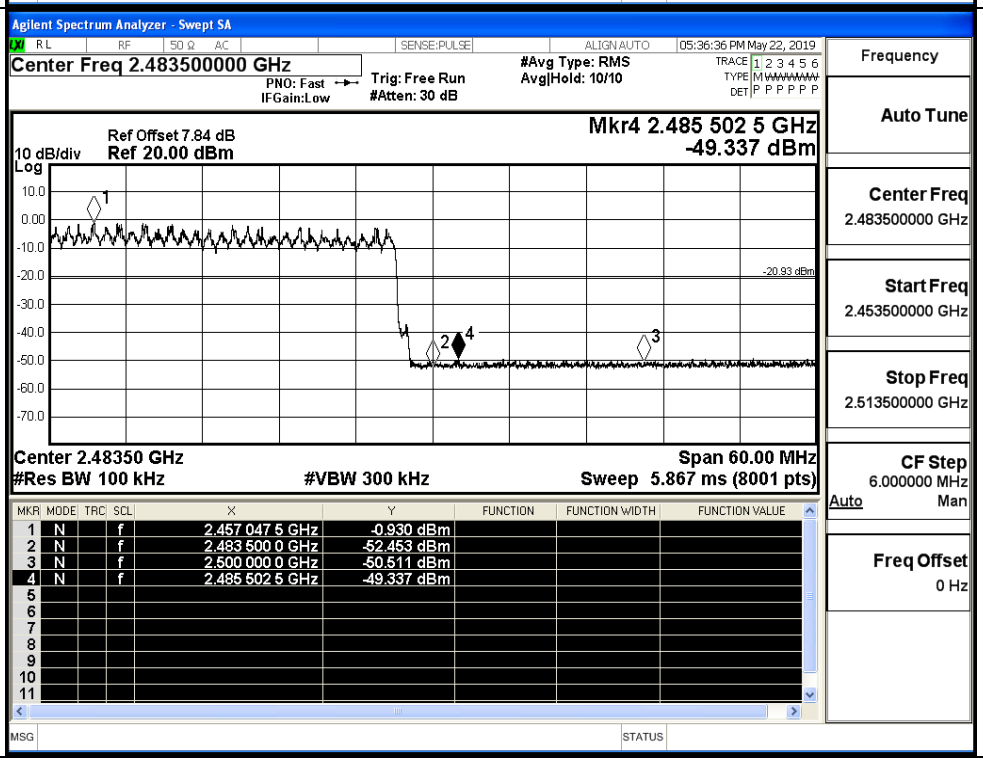
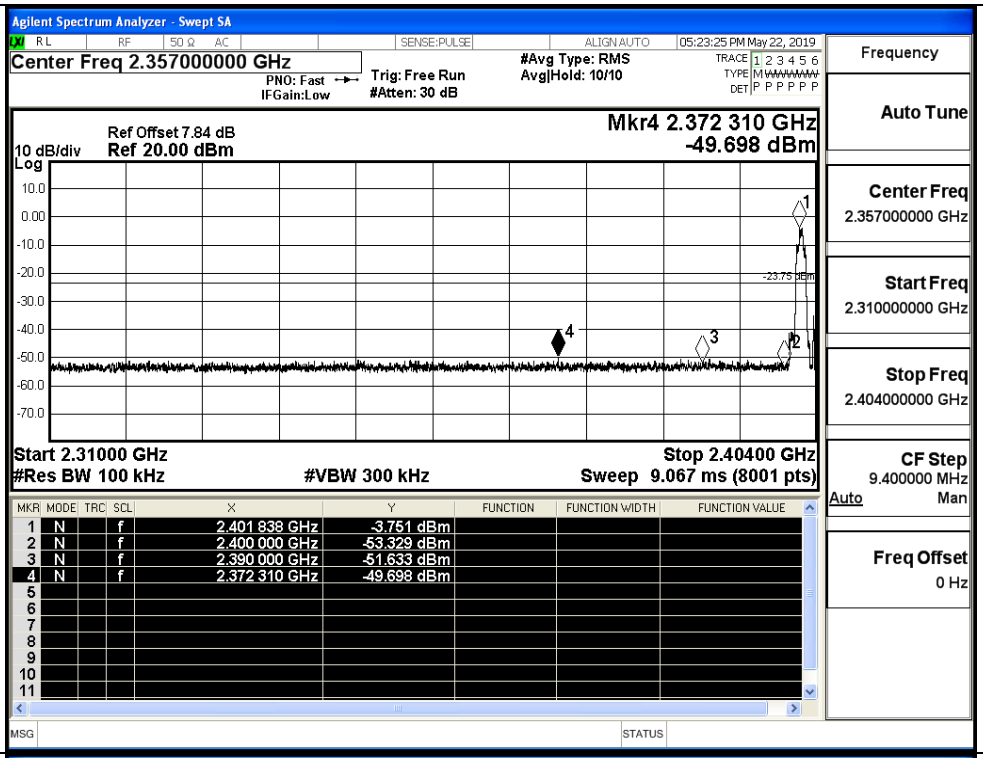
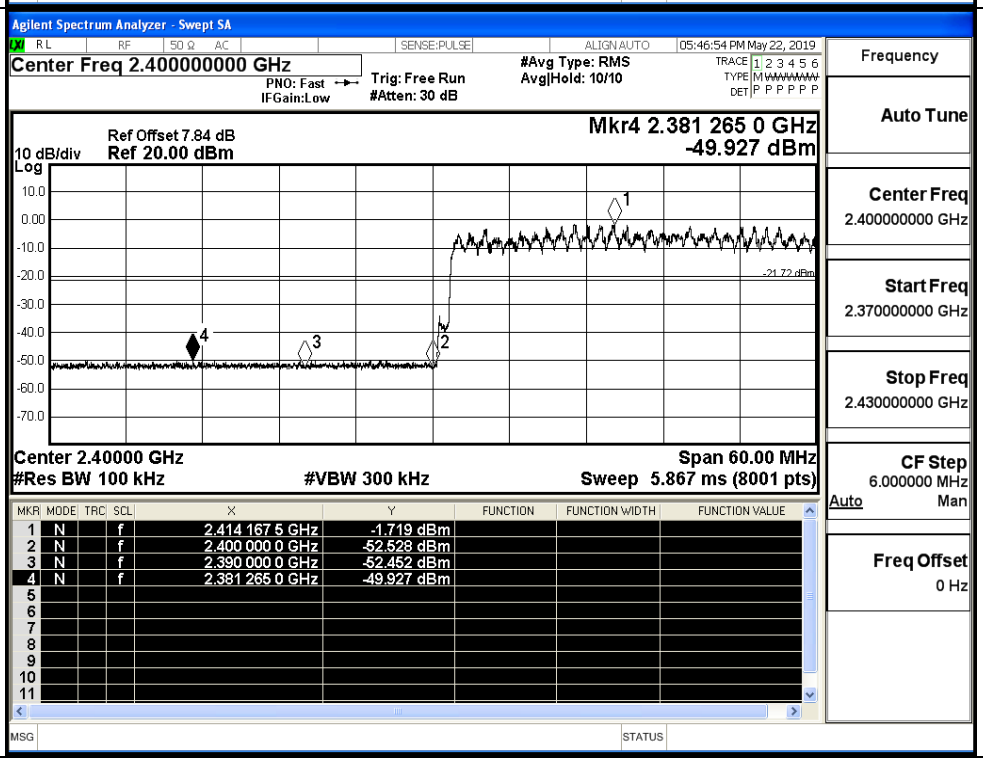
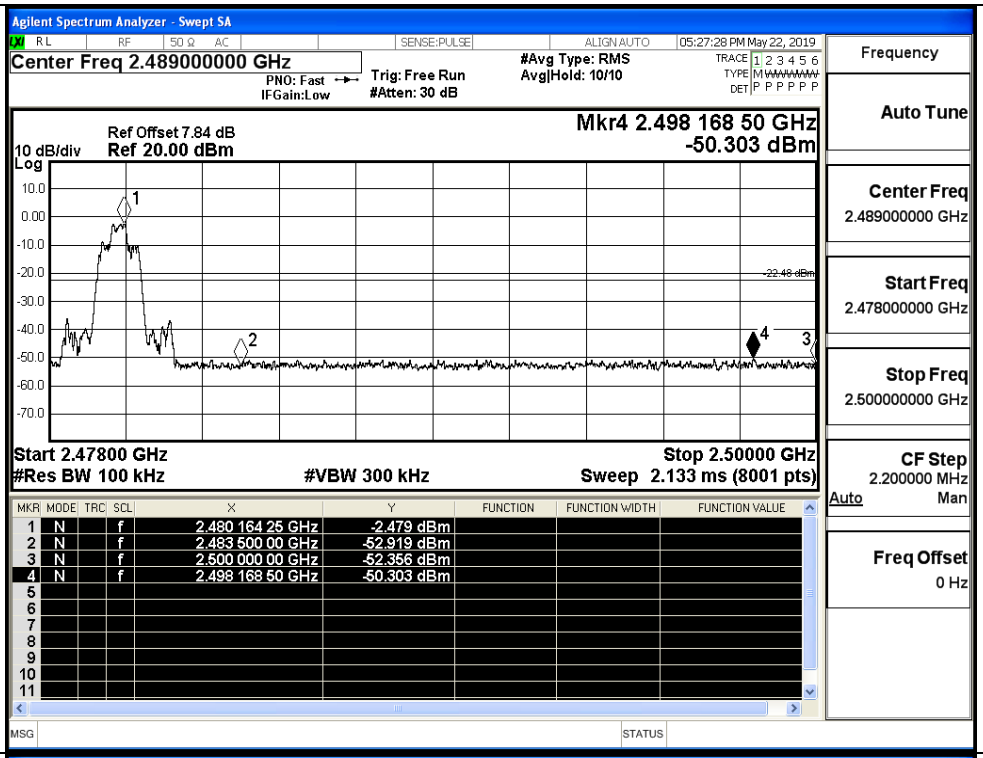
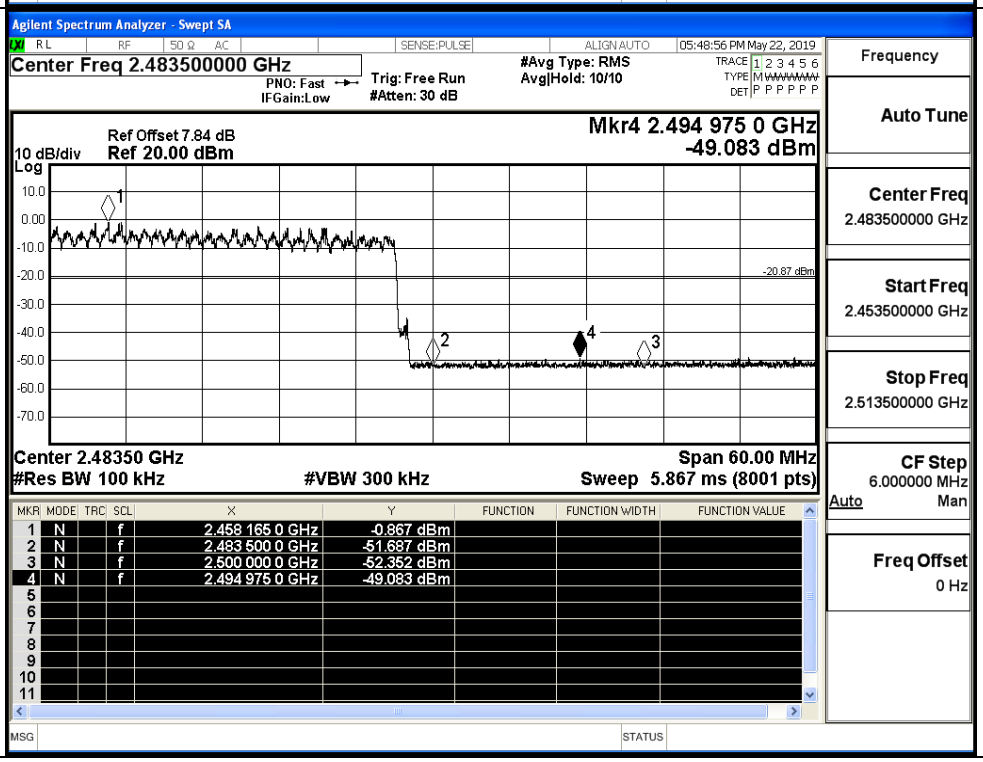


8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

8DPSK/HCH/No Hop



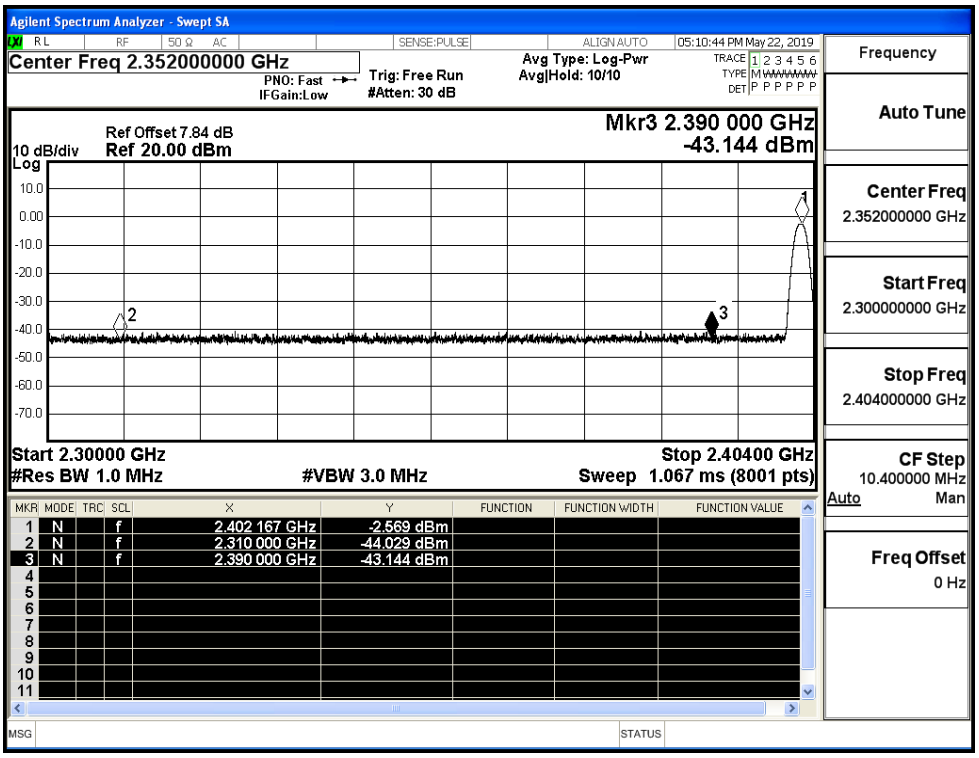
8DPSK/HCH/Hop



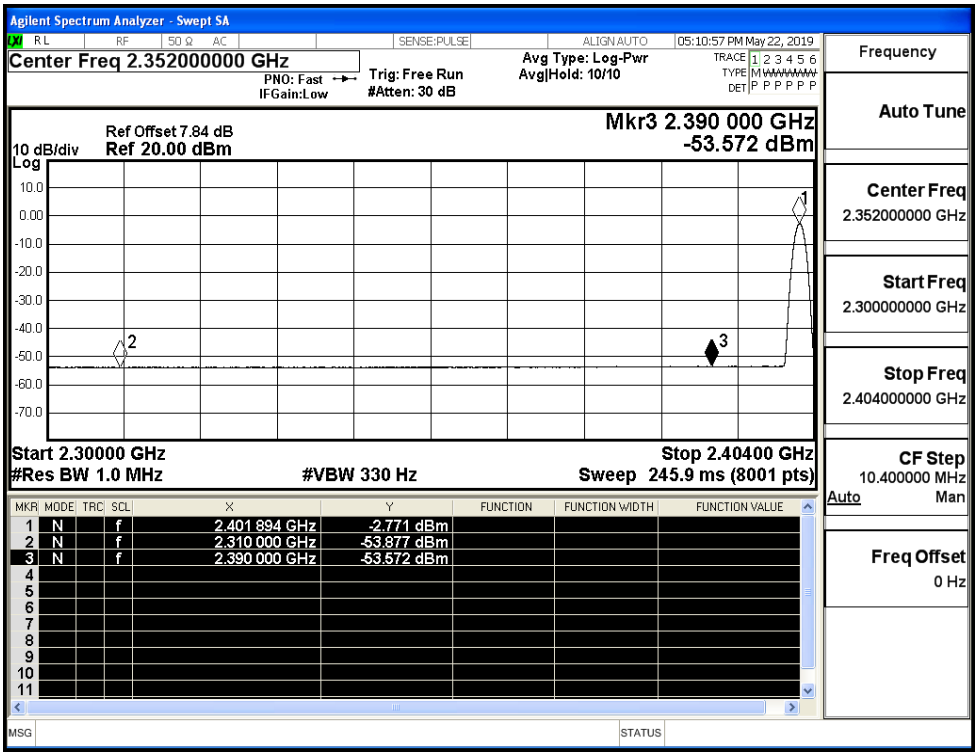
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.03	2.0	0	51.23	PEAK	74	PASS
	Off	2310.0	-53.88	2.0	0	41.38	AV	54	PASS
	Off	2390.0	-43.14	2.0	0	52.11	PEAK	74	PASS
	Off	2390.0	-53.57	2.0	0	41.69	AV	54	PASS
	Off	2483.5	-43.53	2.0	0	51.73	PEAK	74	PASS
	Off	2483.5	-53.31	2.0	0	41.95	AV	54	PASS
	Off	2500.0	-42.79	2.0	0	52.47	PEAK	74	PASS
	Off	2500.0	-53.28	2.0	0	41.98	AV	54	PASS
π/4DQPSK	Off	2310.0	-43.43	2.0	0	51.83	PEAK	74	PASS
	Off	2310.0	-53.99	2.0	0	41.27	AV	54	PASS
	Off	2390.0	-42.46	2.0	0	52.80	PEAK	74	PASS
	Off	2390.0	-53.61	2.0	0	41.65	AV	54	PASS
	Off	2483.5	-43.17	2.0	0	52.08	PEAK	74	PASS
	Off	2483.5	-53.39	2.0	0	41.87	AV	54	PASS
	Off	2500.0	-42.49	2.0	0	52.76	PEAK	74	PASS
	Off	2500.0	-53.21	2.0	0	42.05	AV	54	PASS
8DPSK	Off	2310.0	-44.06	2.0	0	51.20	PEAK	74	PASS
	Off	2310.0	-53.91	2.0	0	41.34	AV	54	PASS
	Off	2390.0	-44.21	2.0	0	51.05	PEAK	74	PASS
	Off	2390.0	-53.65	2.0	0	41.61	AV	54	PASS
	Off	2483.5	-43.68	2.0	0	51.58	PEAK	74	PASS
	Off	2483.5	-53.33	2.0	0	41.93	AV	54	PASS
	Off	2500.0	-43.15	2.0	0	52.10	PEAK	74	PASS
	Off	2500.0	-53.15	2.0	0	42.11	AV	54	PASS

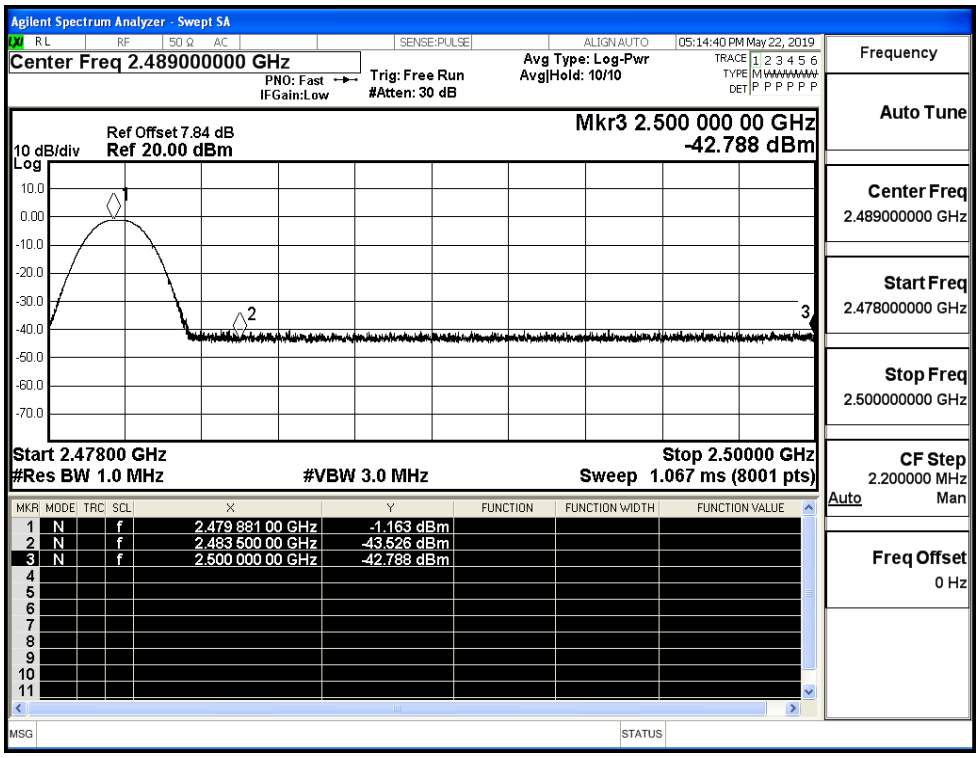
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



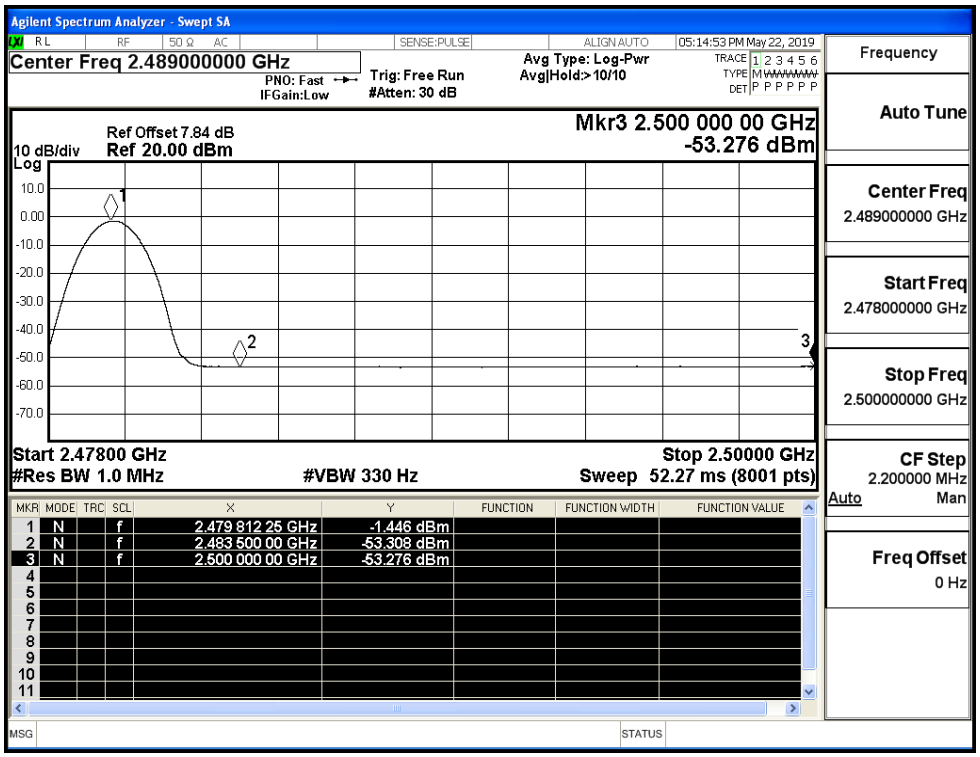
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



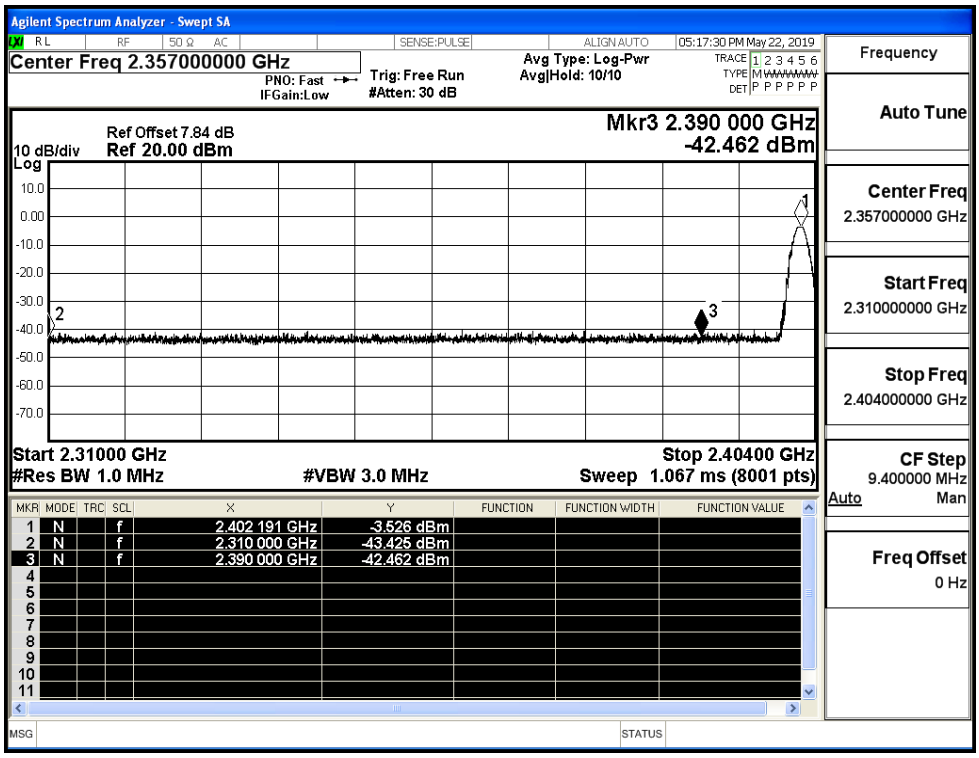
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



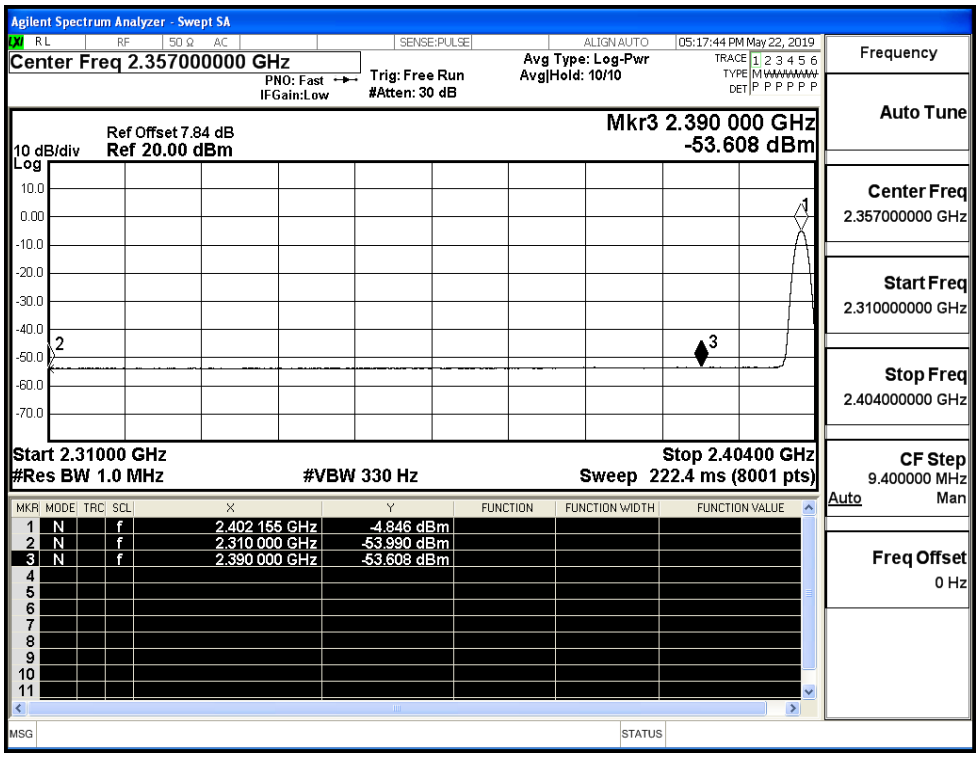
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



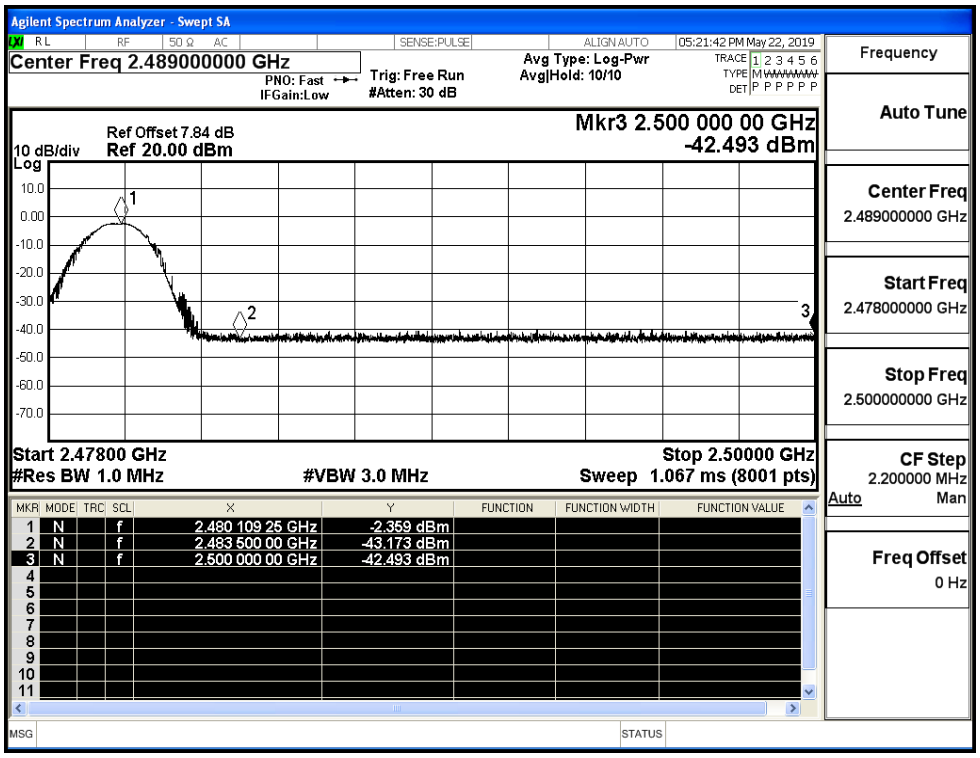
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



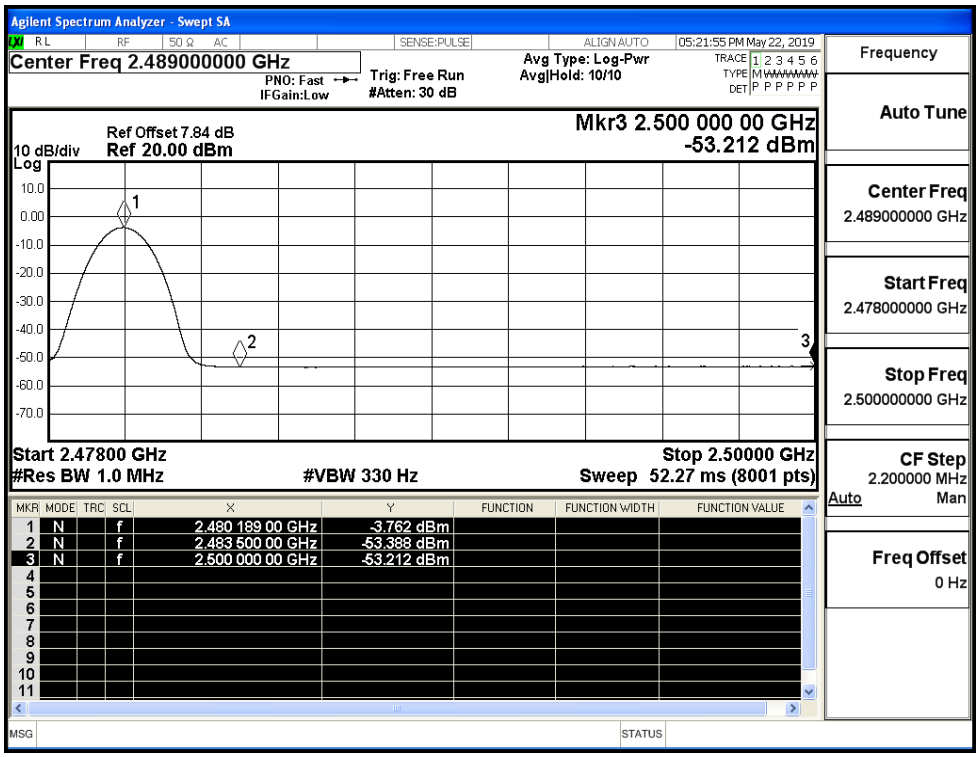
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



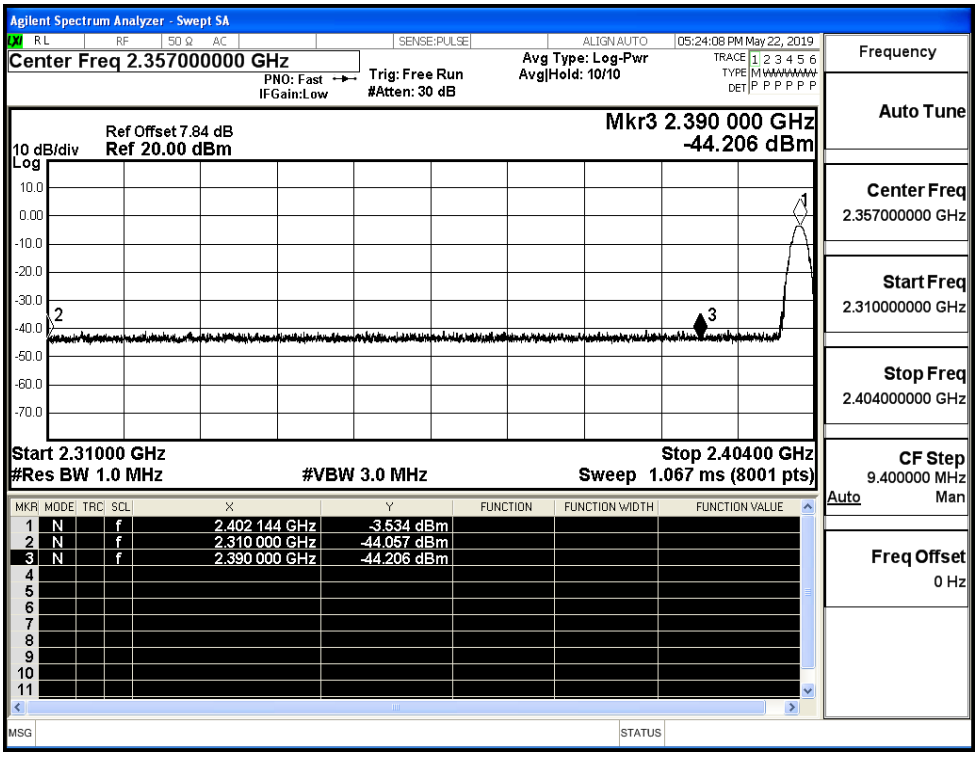
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



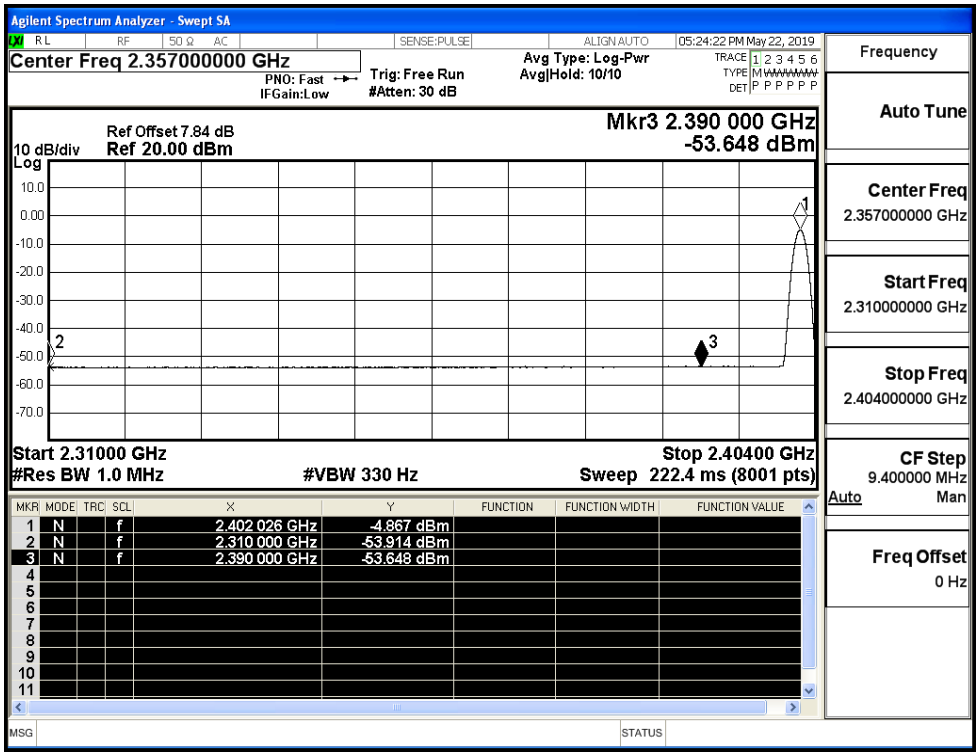
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



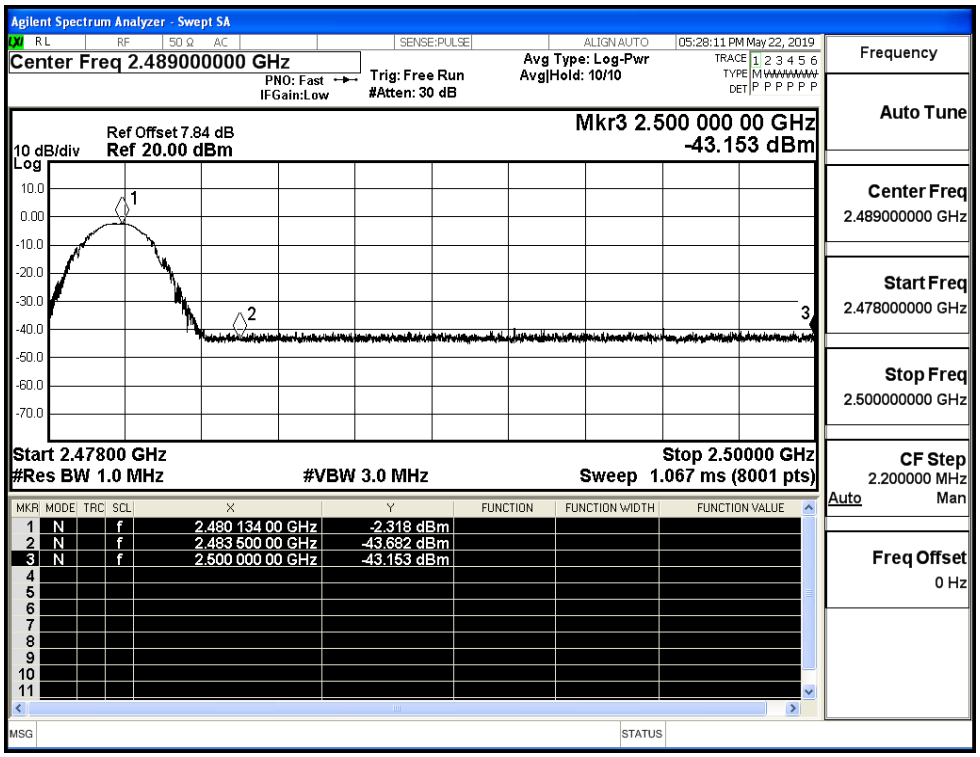
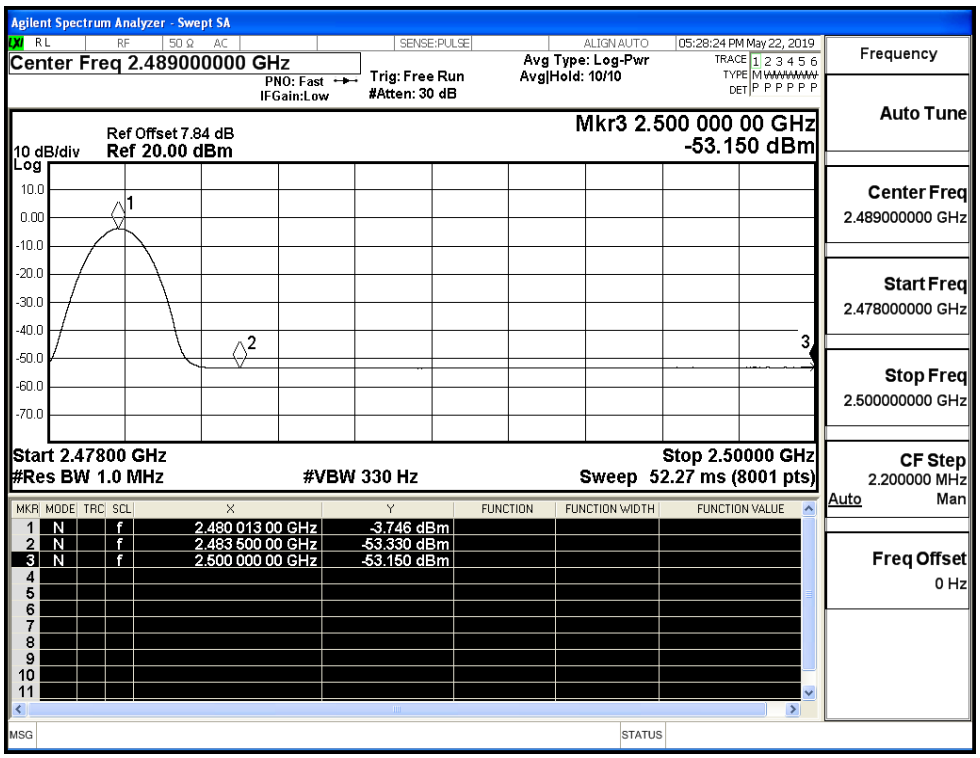
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)