Appendix A

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

Product Name: AMPLIFIER

Trade Mark: N/A

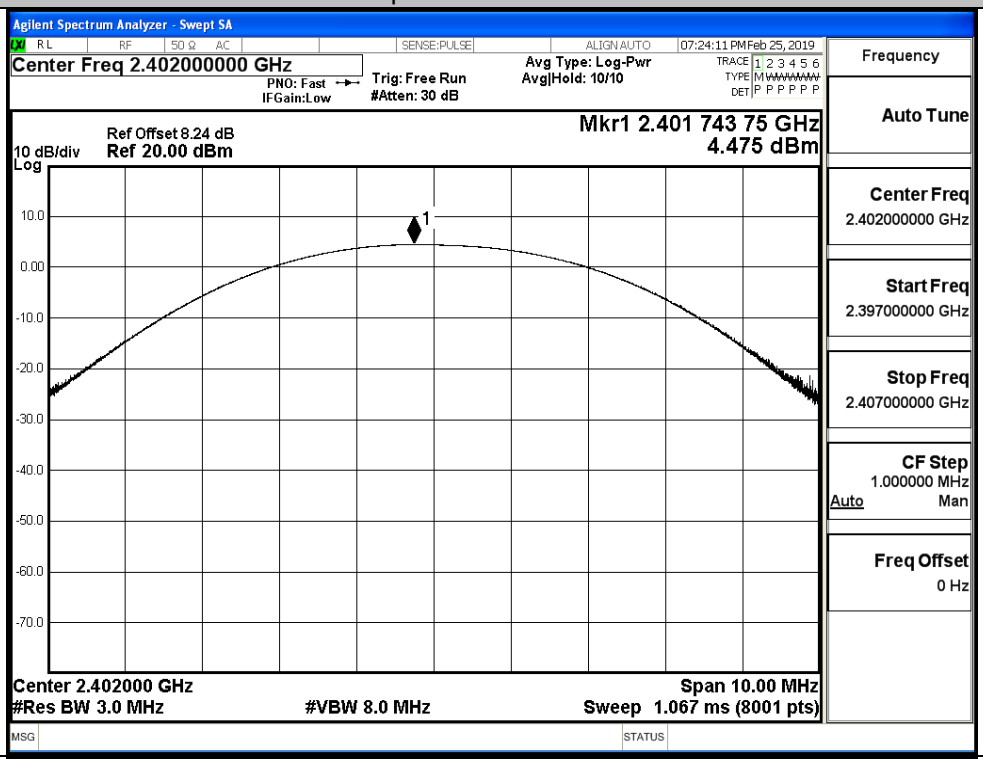
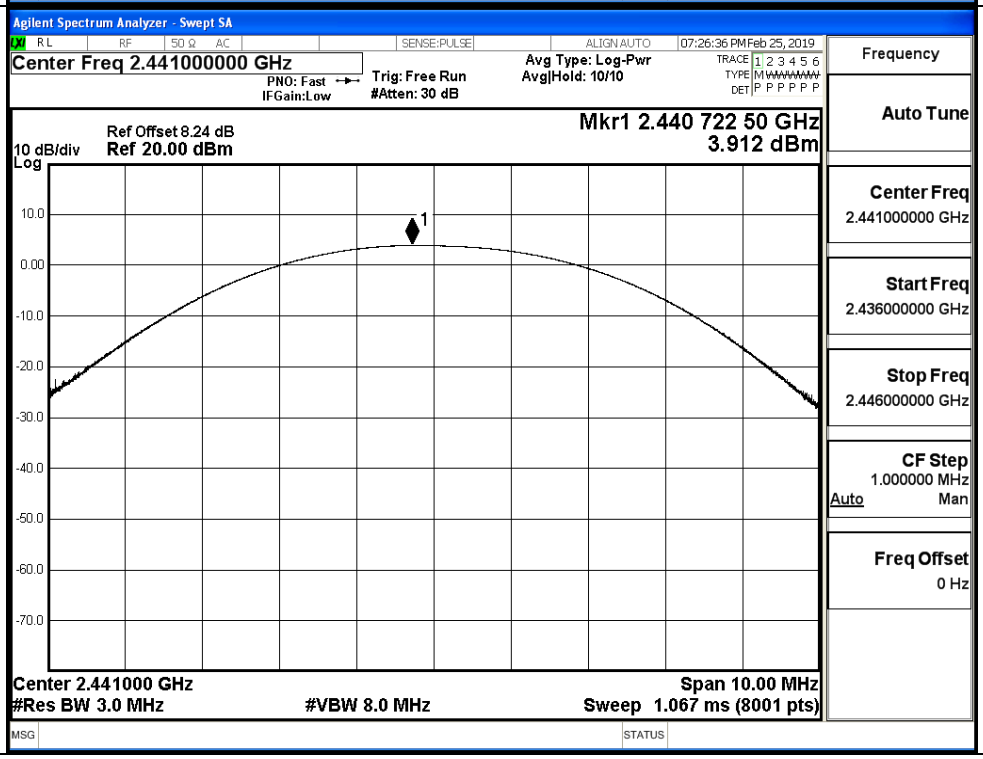
Test Model: MA-900

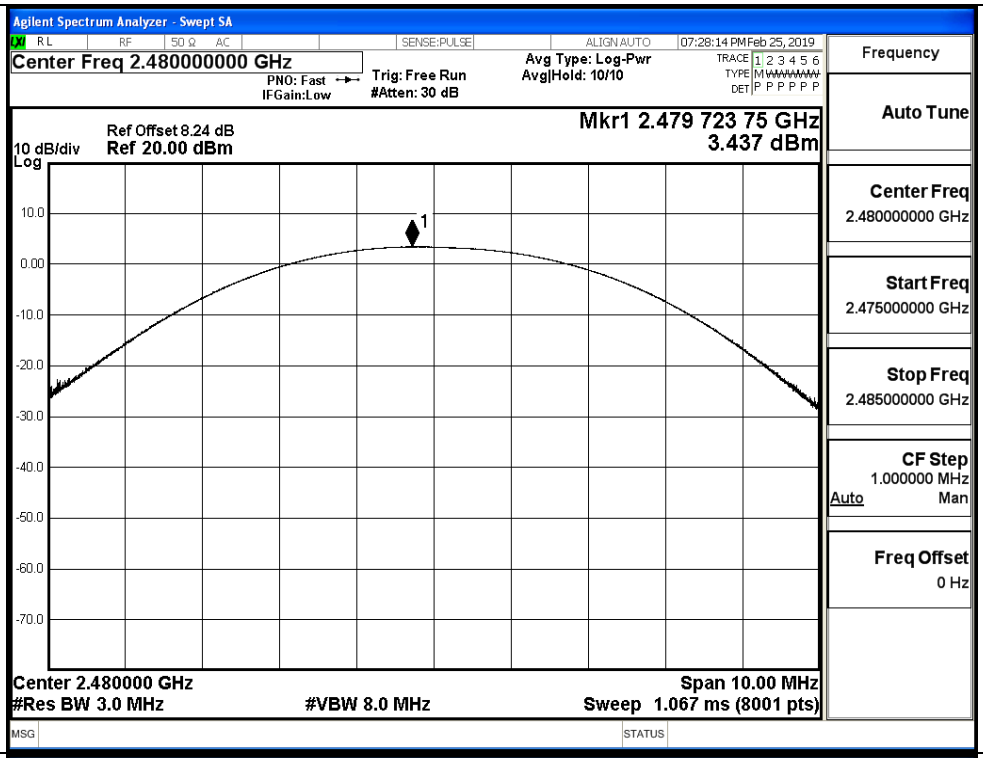
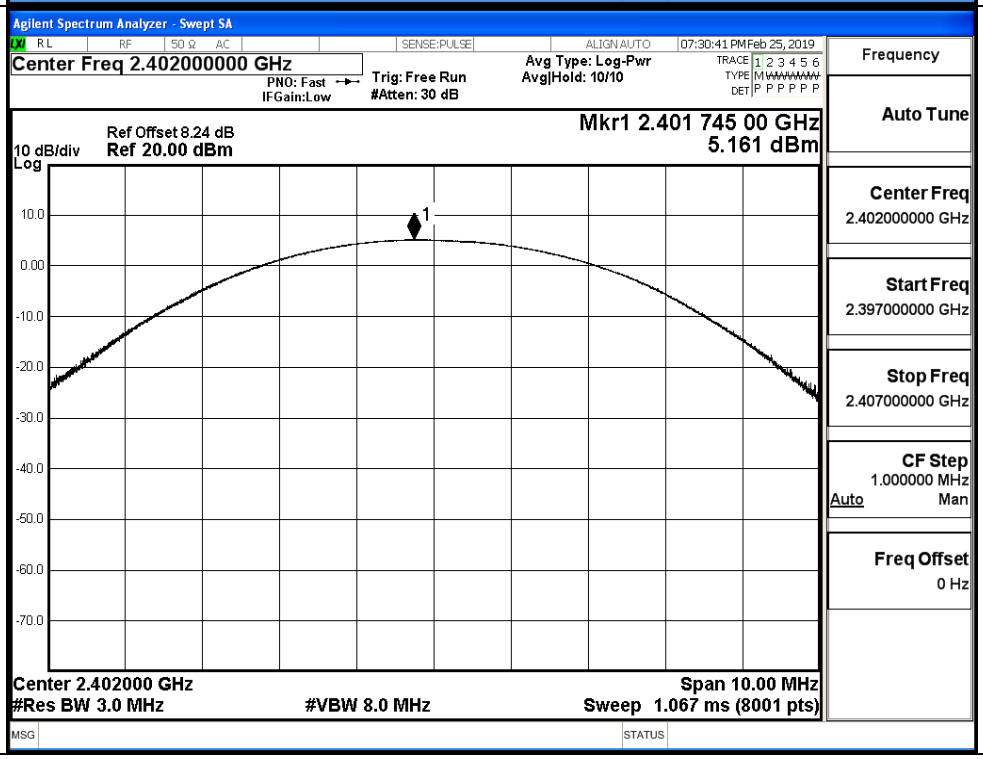
Environmental Conditions

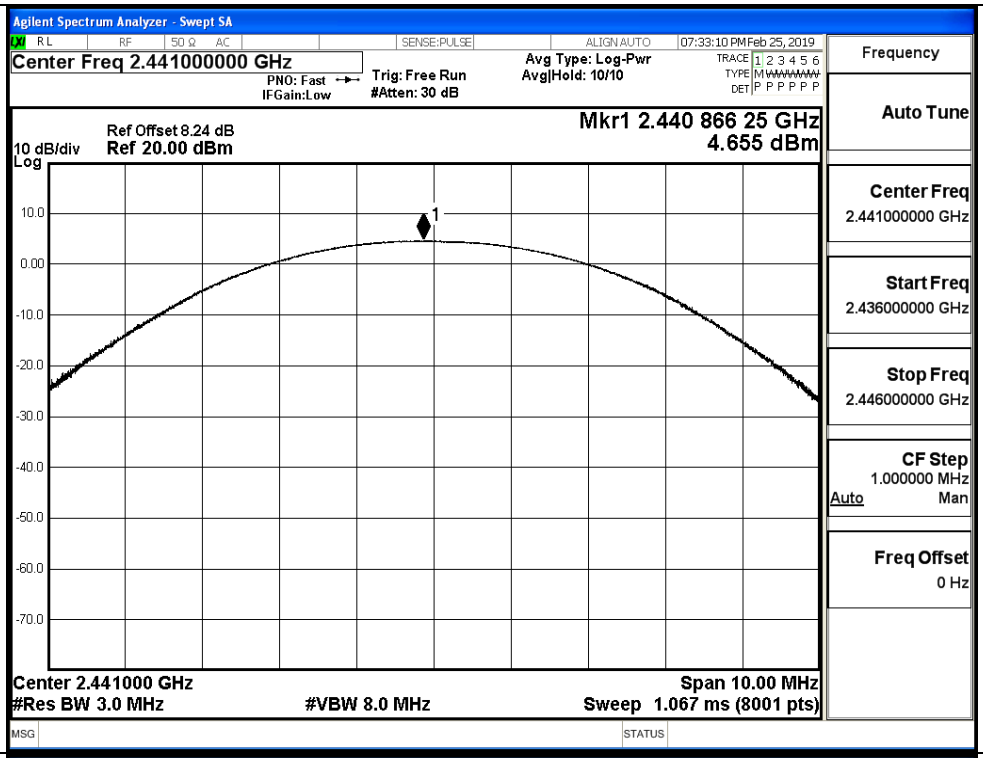
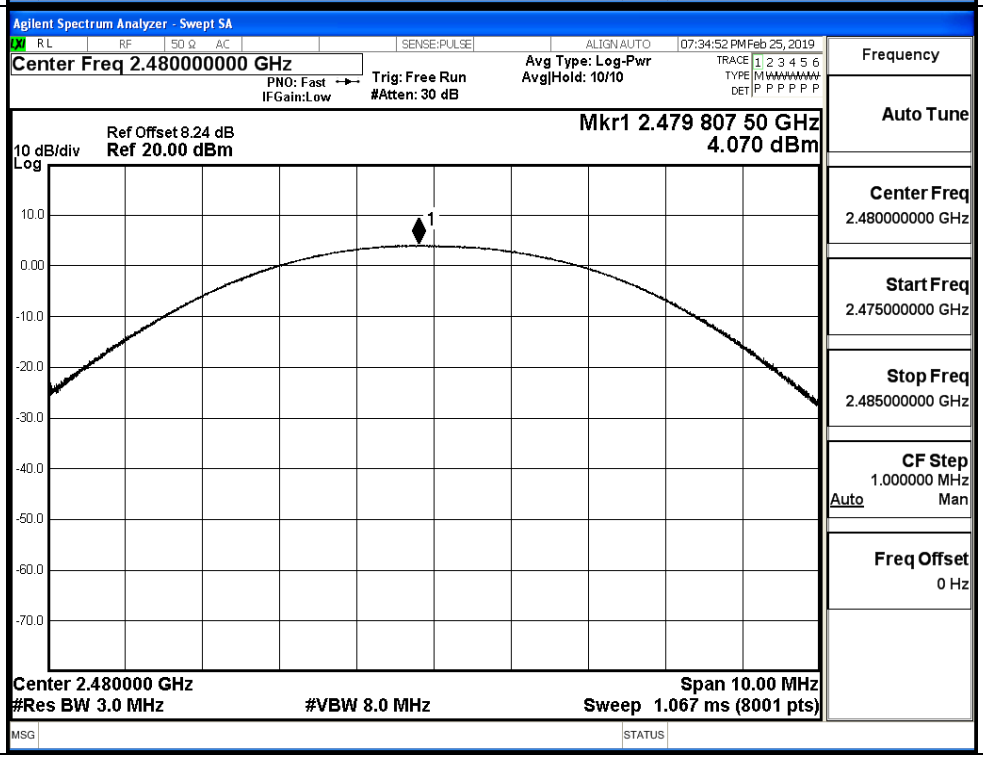
Temperature:	22.8 ° C
Relative Humidity:	53.3%
ATM Pressure:	100.0 kPa
Test Engineer:	David.Luo
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.475	21	PASS
	MCH	3.912	21	PASS
	HCH	3.437	21	PASS
π/4DQPSK	LCH	5.161	21	PASS
	MCH	4.655	21	PASS
	HCH	4.070	21	PASS

Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH	
π/4DQPSK/LCH	

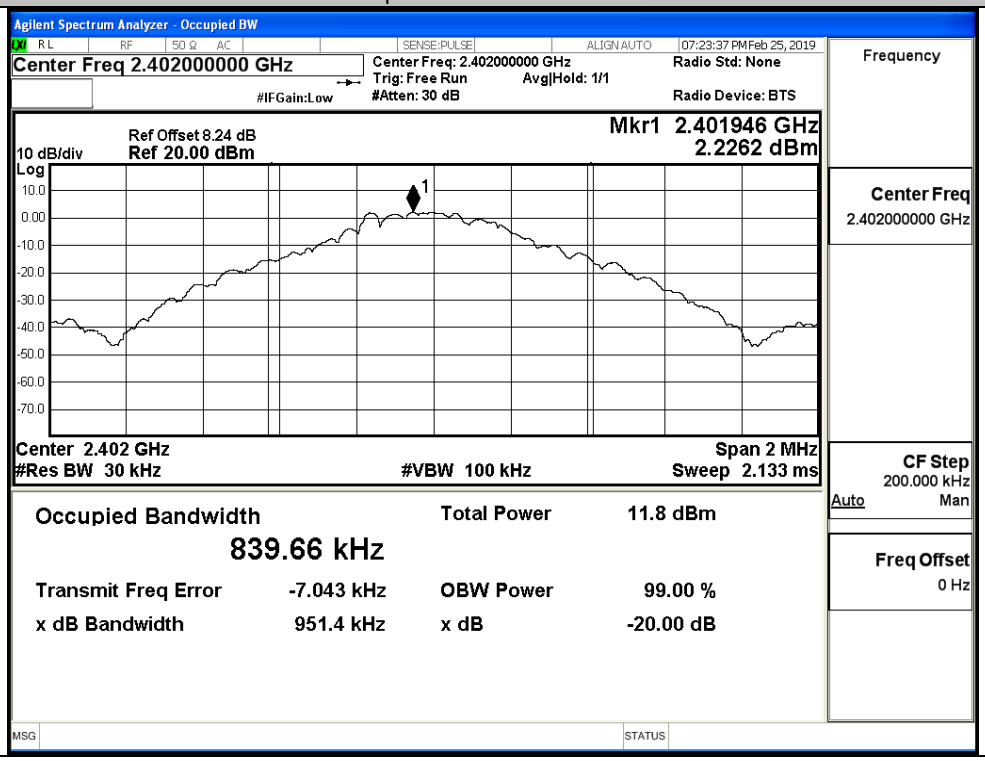
π/4DQPSK/MCH	
π/4DQPSK/HCH	

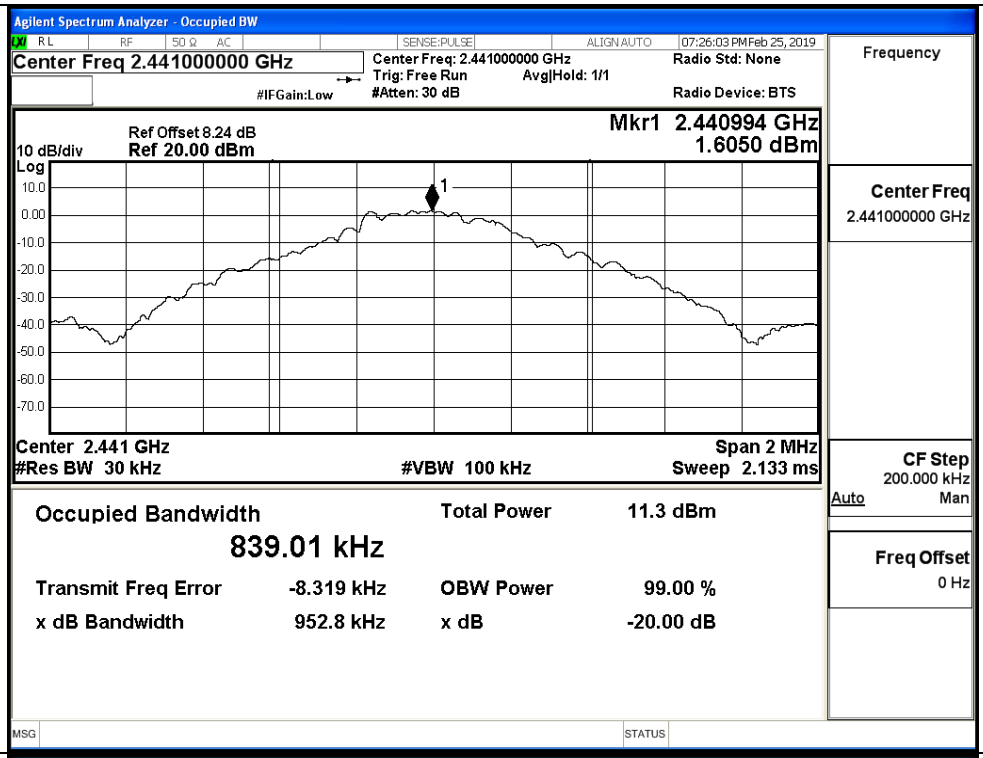
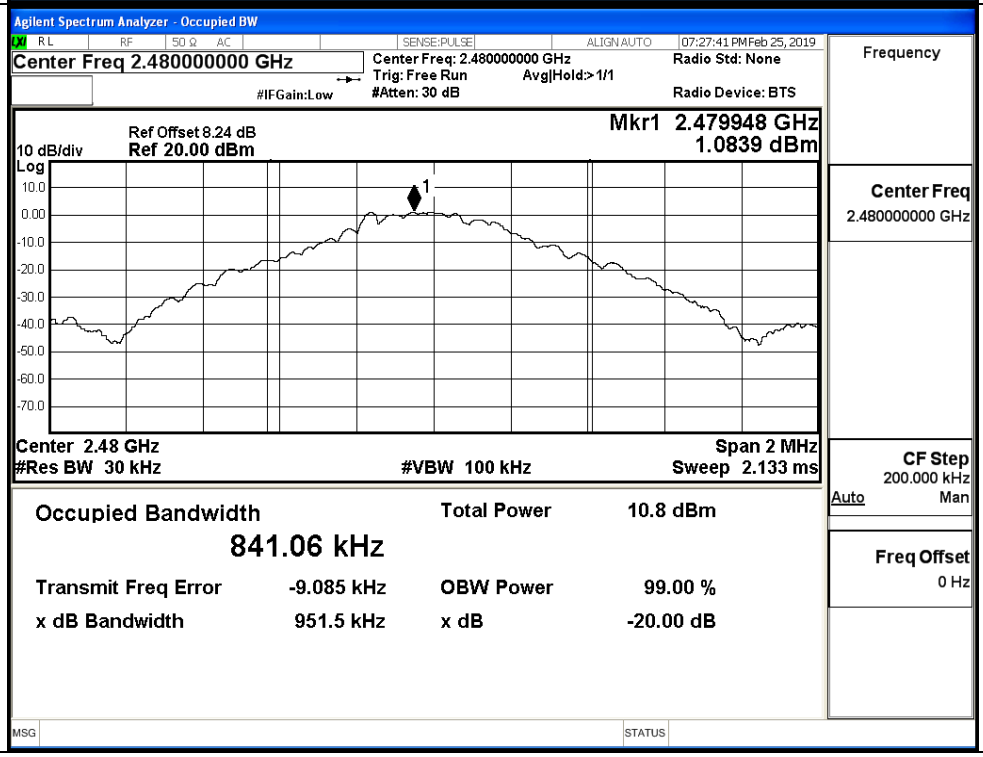
A.2 20dB Bandwidth

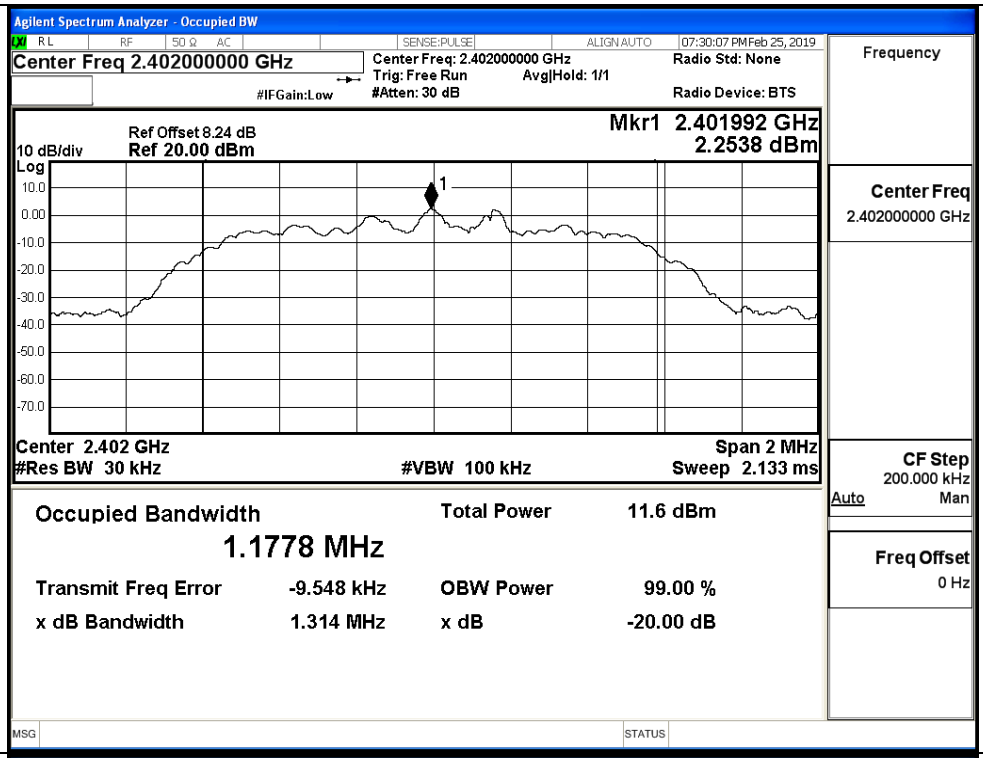
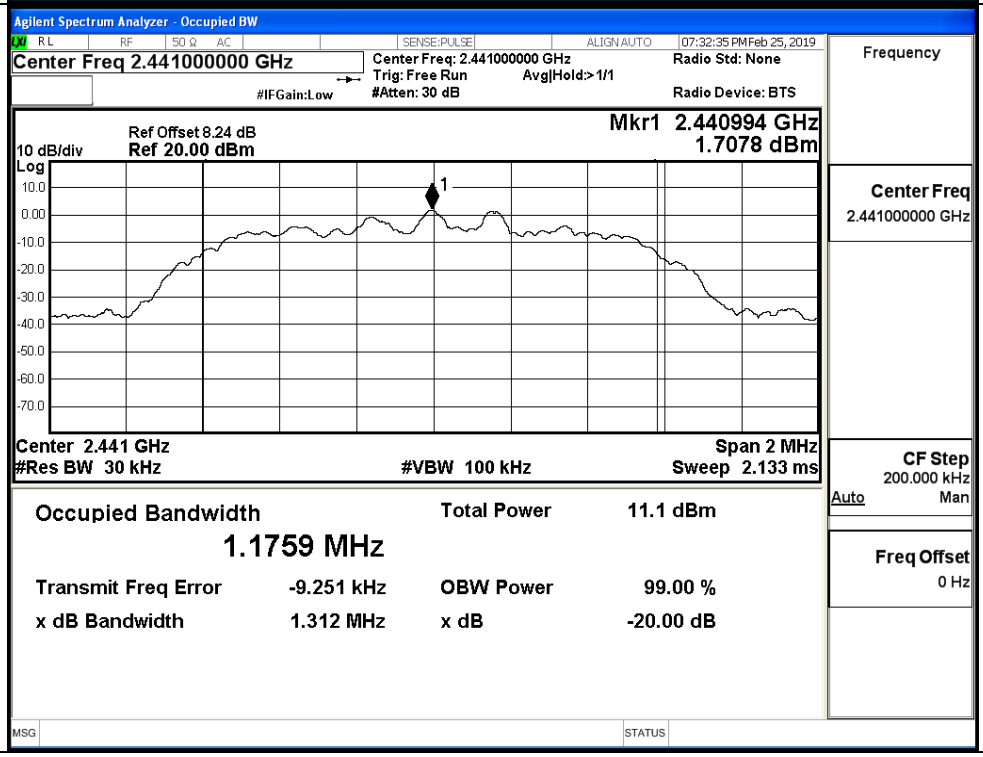
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.83966	0.9514	Not Specified	PASS
	MCH	0.83901	0.9528	Not Specified	PASS
	HCH	0.84106	0.9515	Not Specified	PASS
π/4DQPSK	LCH	1.1778	1.314	Not Specified	PASS
	MCH	1.1759	1.312	Not Specified	PASS
	HCH	1.1767	1.311	Not Specified	PASS

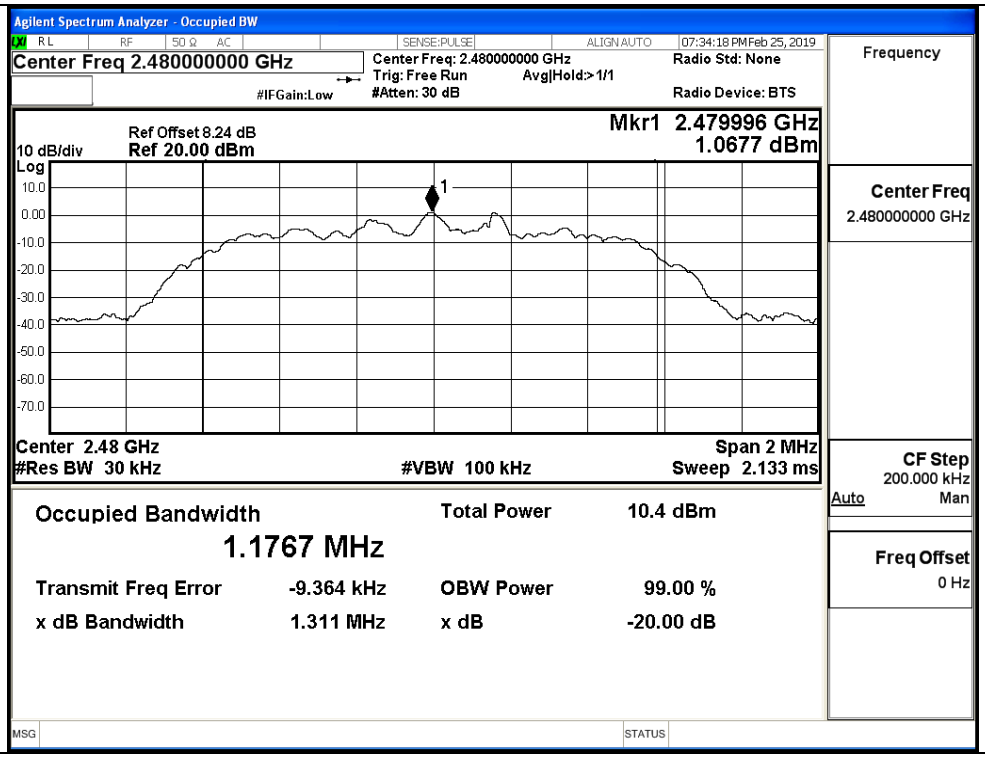
Test Graphs

GFSK/LCH



GFSK/MCH	
GFSK/HCH	

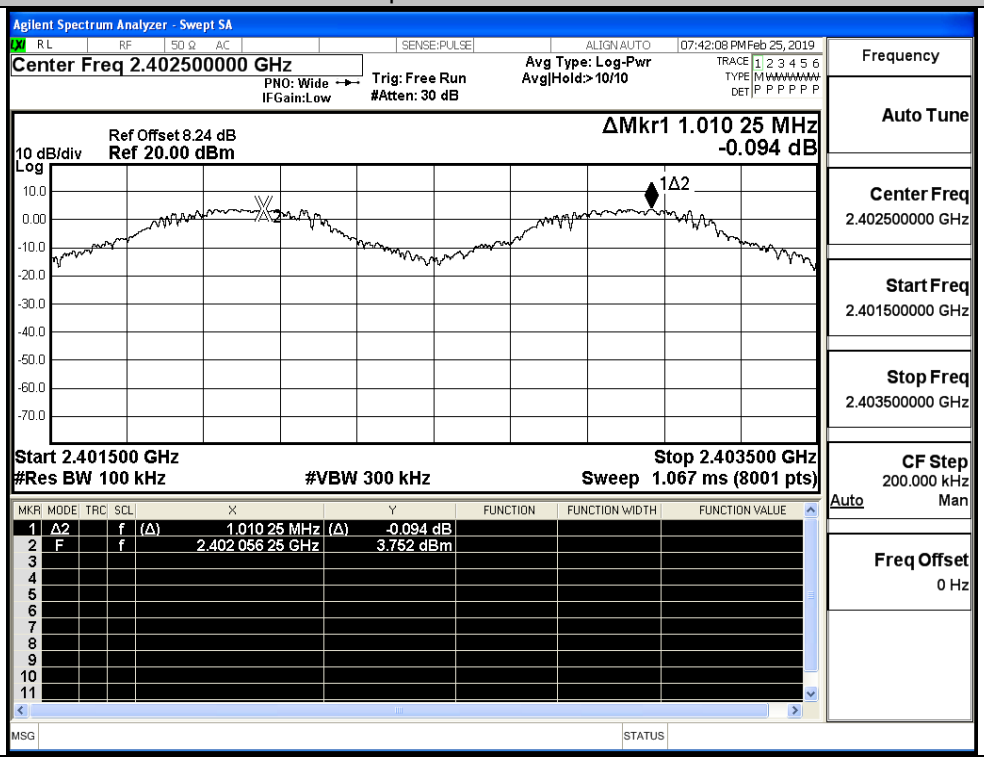
π/4DQPSK/LCH	
π/4DQPSK/MCH	

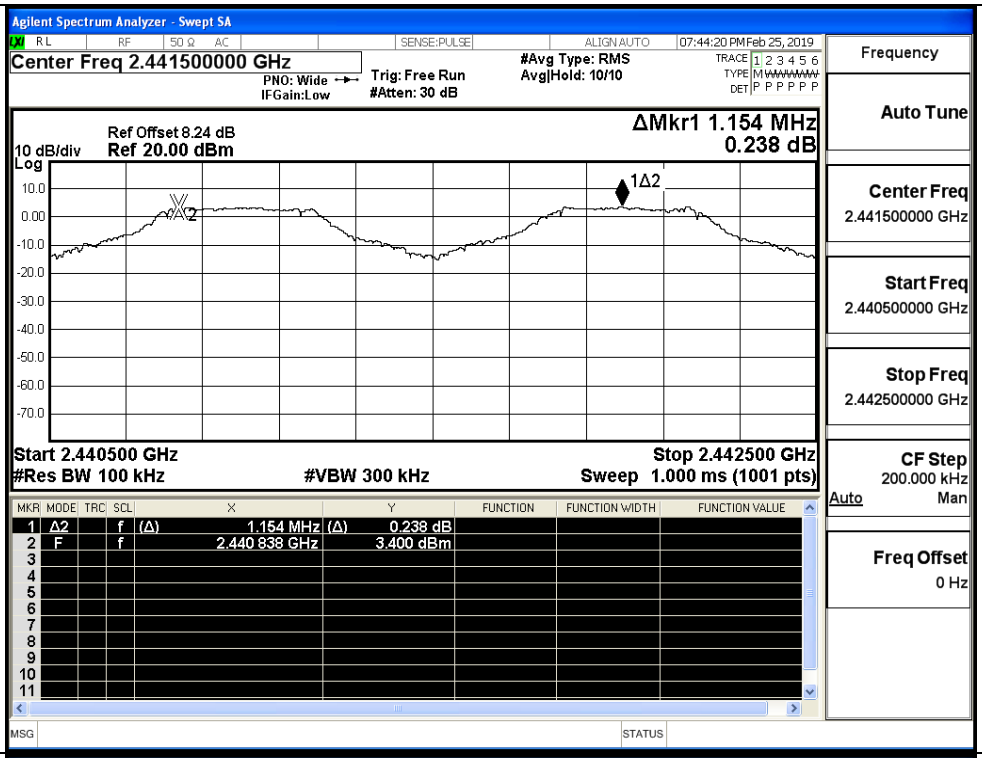
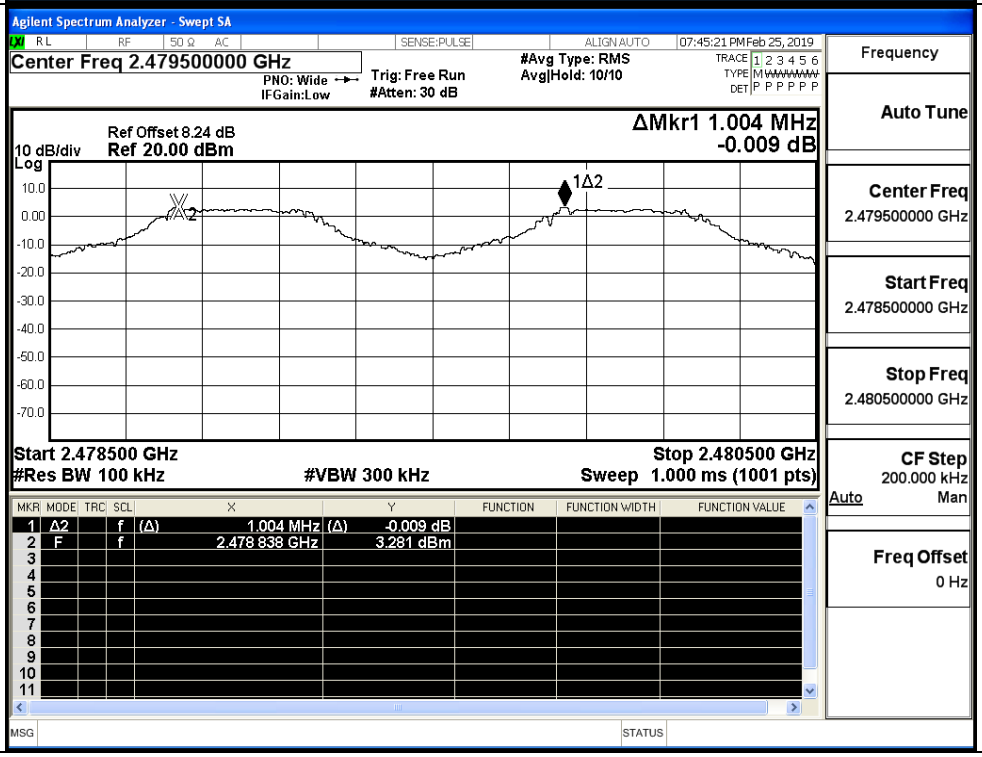
π/4DQPSK/HCH	

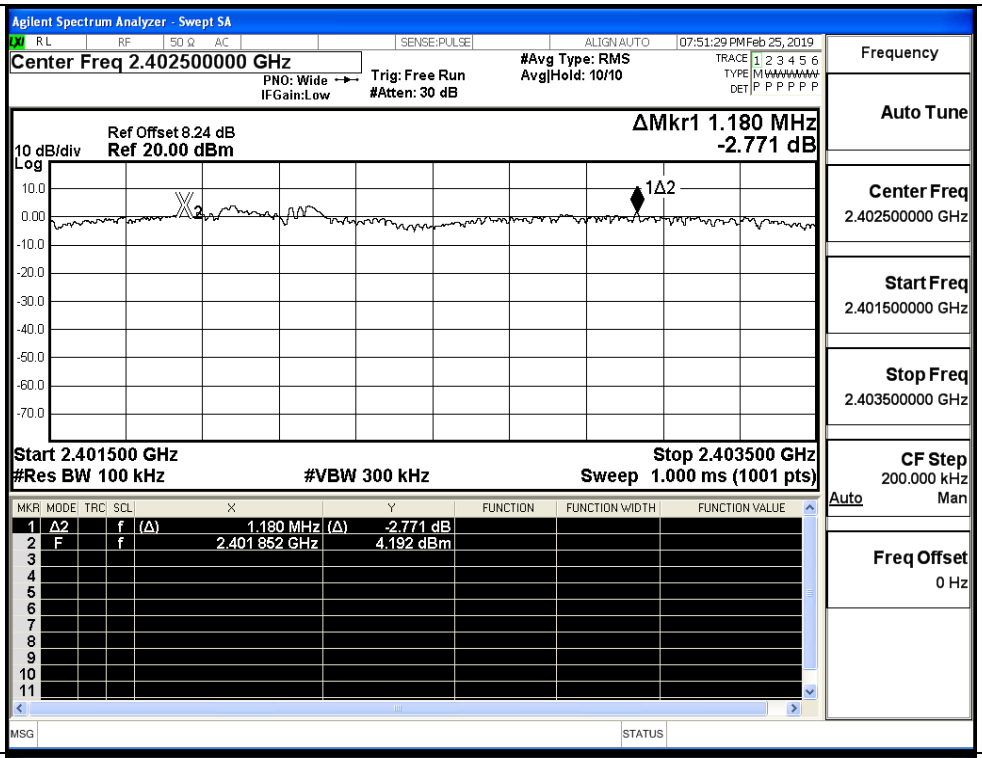
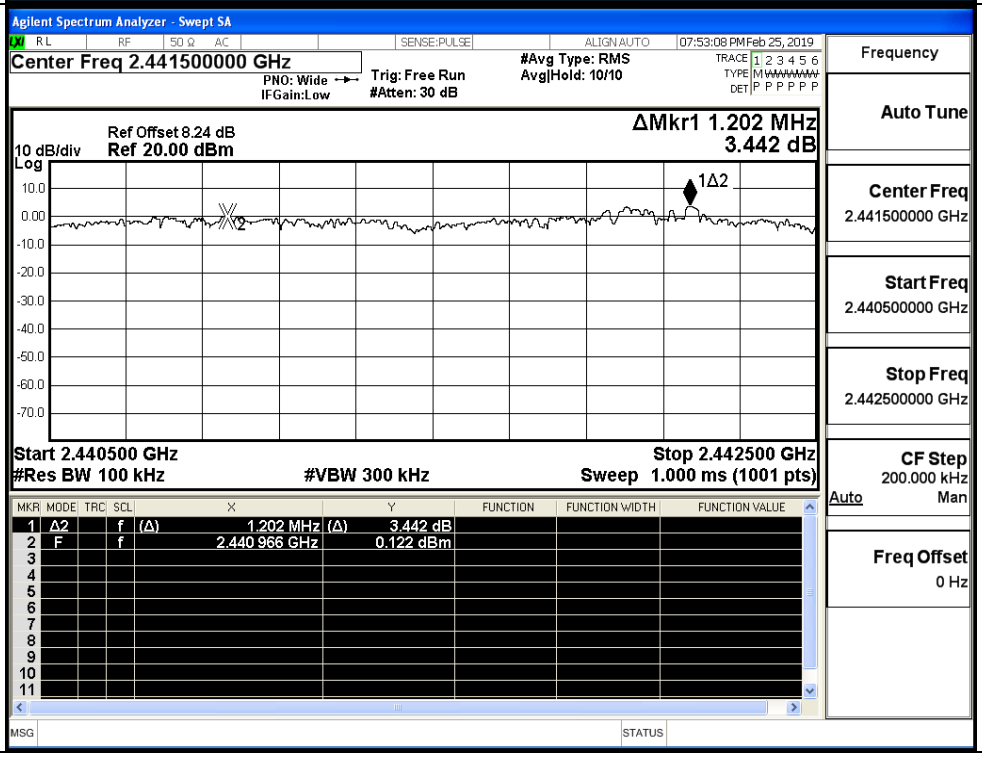
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
07:34:18 PM Feb 25, 2019
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479996 GHz
1.0677 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.133 ms
CF Step
200.000 kHz
Auto
Man
Occupied Bandwidth
1.1767 MHz
Total Power 10.4 dBm
Transmit Freq Error -9.364 kHz
OBW Power 99.00 %
x dB Bandwidth 1.311 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

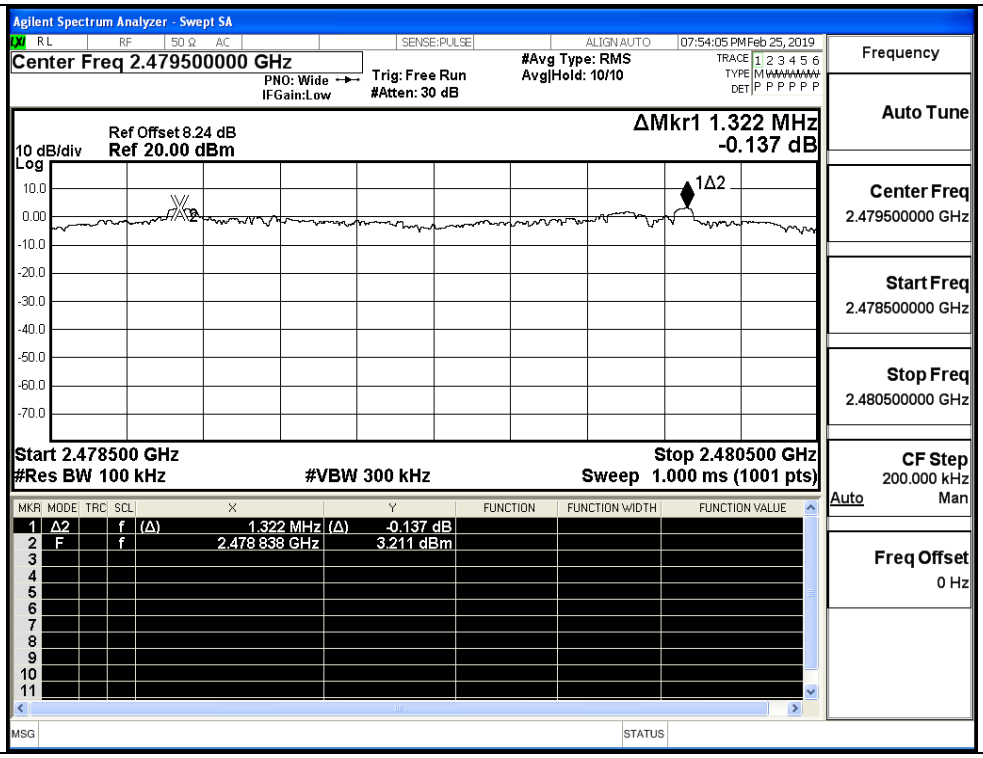
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.010	0.635	PASS
	MCH	1.154	0.635	PASS
	HCH	1.004	0.635	PASS
π/4DQPSK	LCH	1.180	0.876	PASS
	MCH	1.202	0.876	PASS
	HCH	1.322	0.876	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

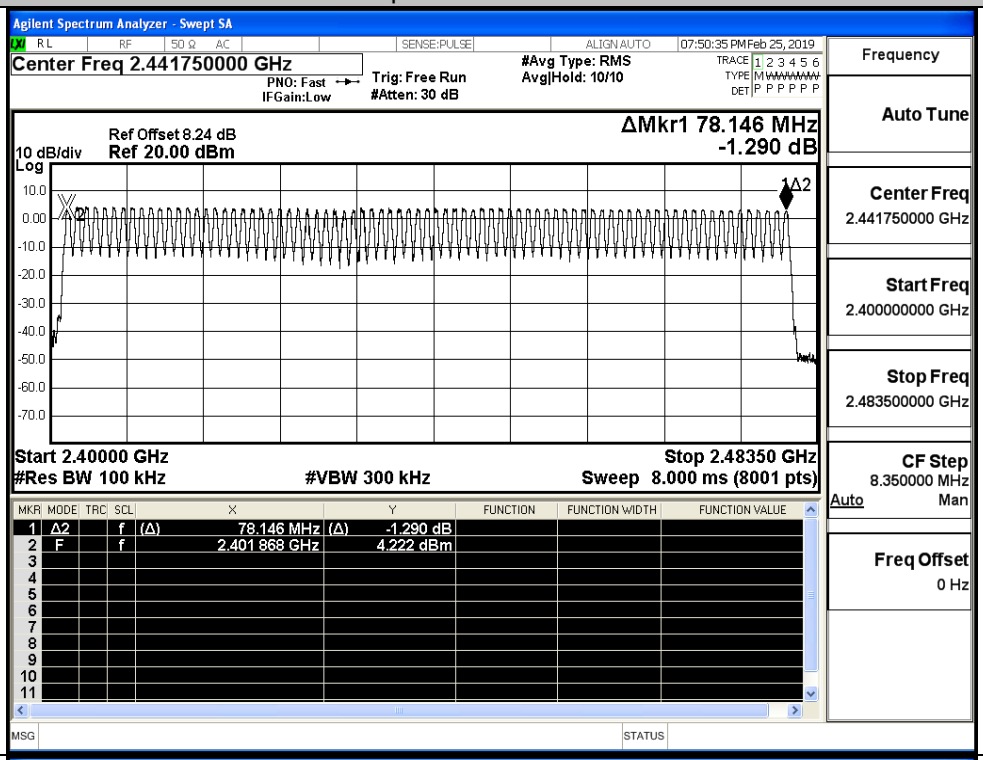
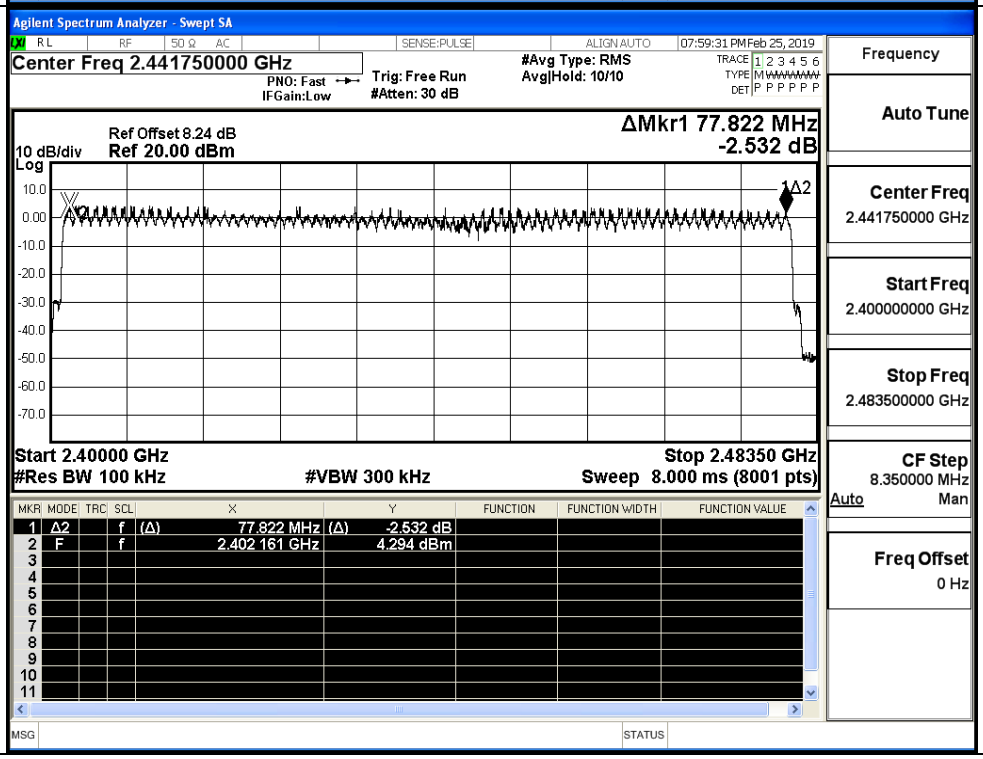
π/4DQPSK/LCH	
π/4DQPSK/MCH	

π/4DQPSK/HCH	

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.479500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
07:54:05 PM Feb 25, 2019
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr1 1.322 MHz
-0.137 dB
1Δ2
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.000 ms (1001 pts)
1 Δ2 f (Δ) 1.322 MHz (Δ) -0.137 dB
2 F f 2.478 838 GHz 3.211 dBm
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

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

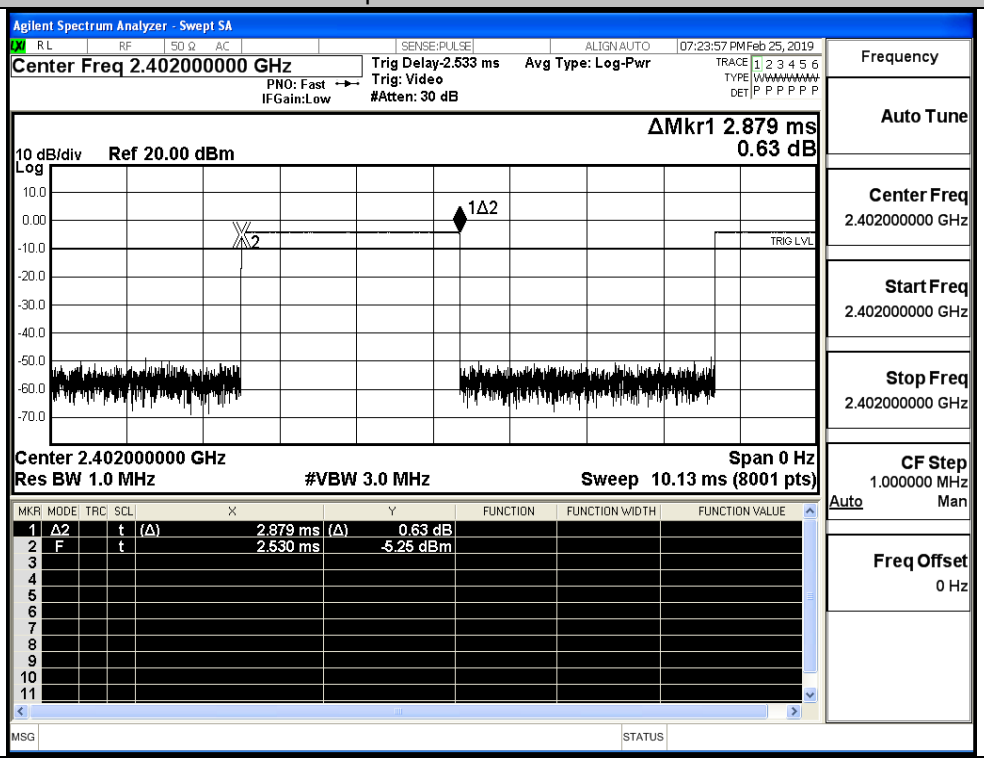
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

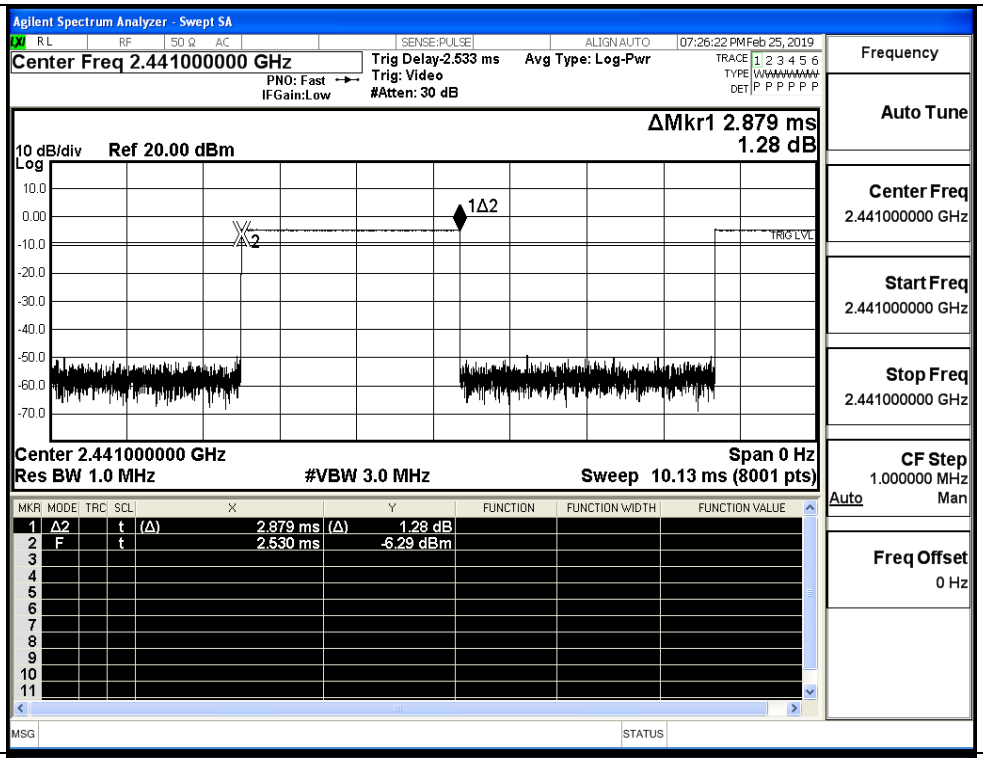
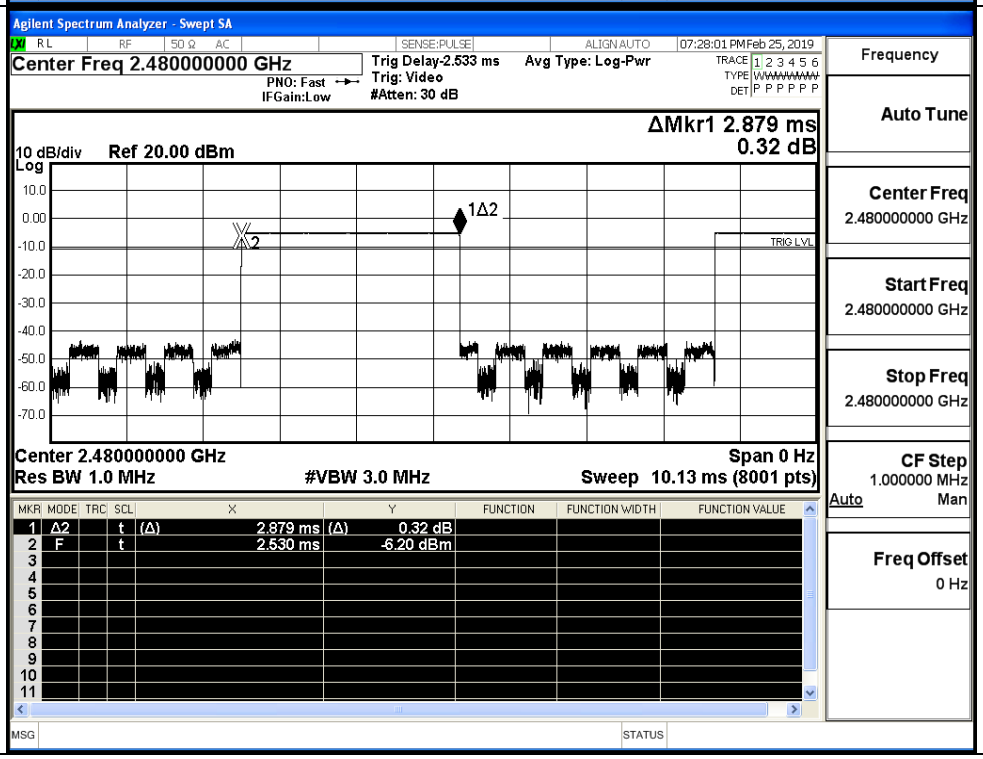
A.5 Dwell Time

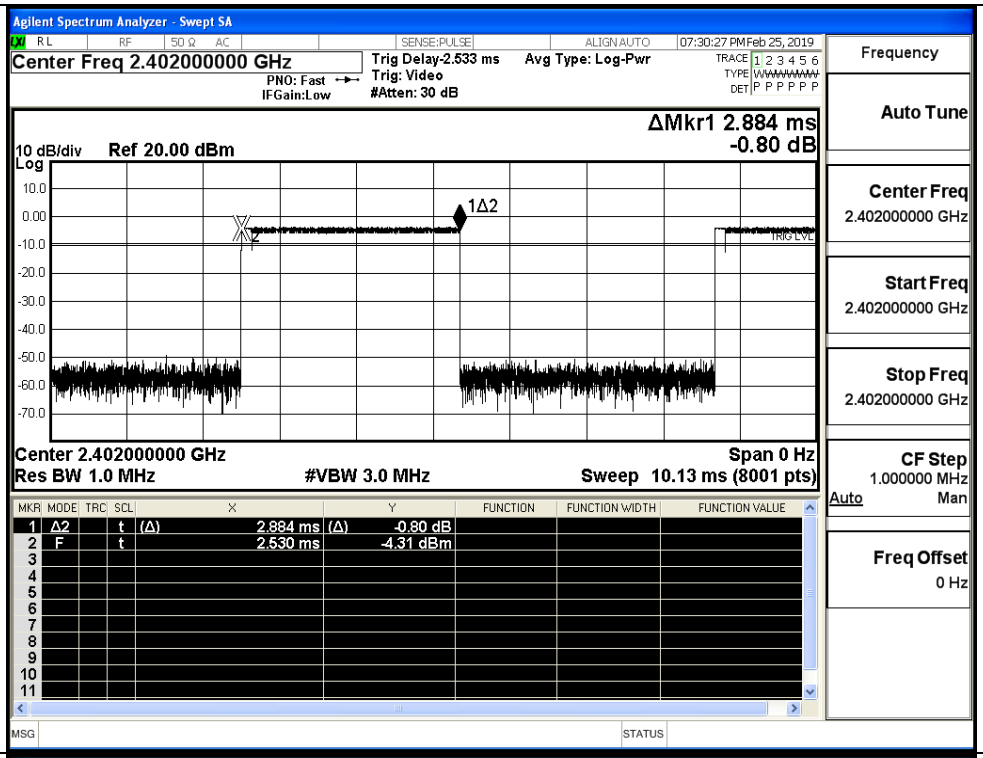
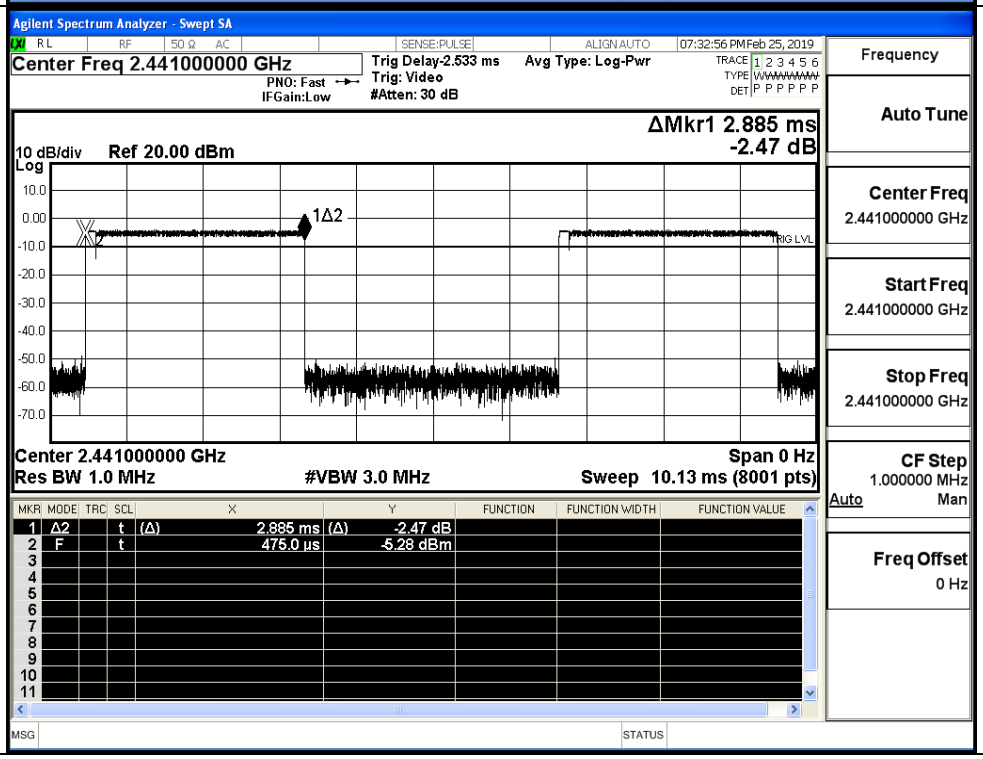
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.89	106.7	0.308	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS

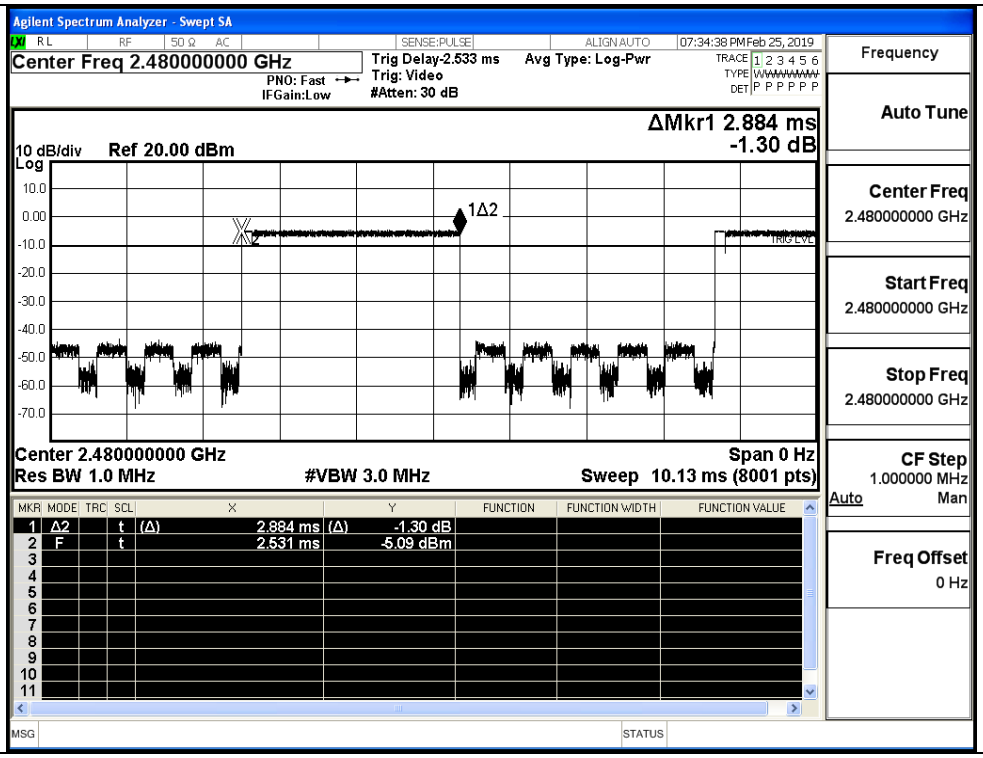
Test Graphs

GFSK_DH5/LCH



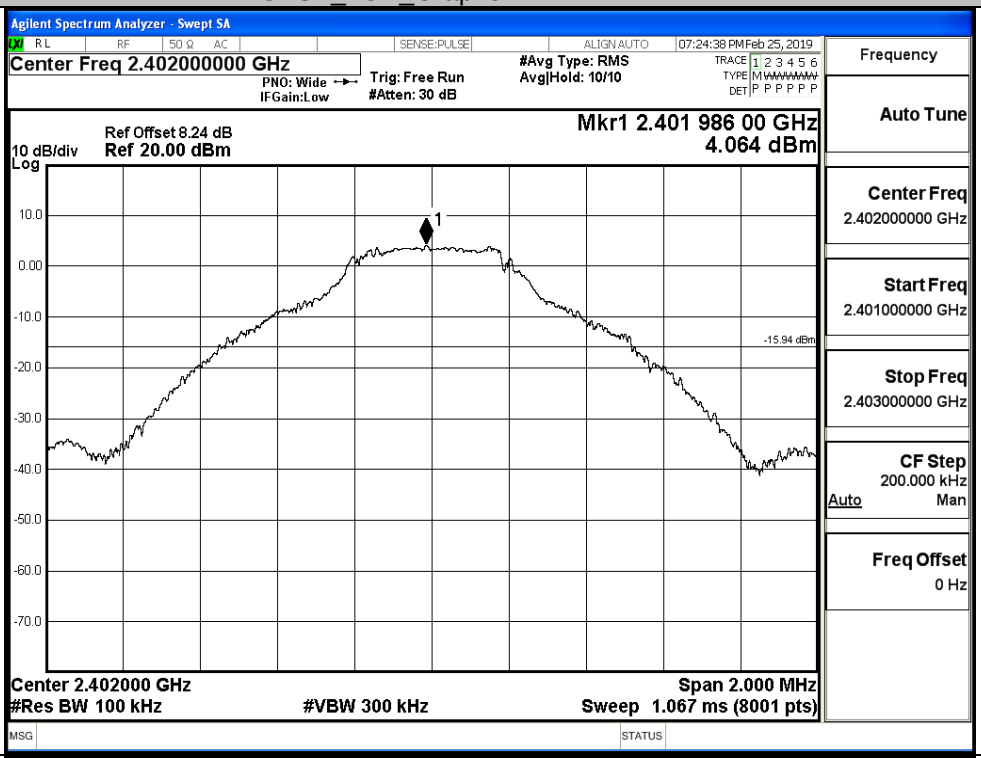
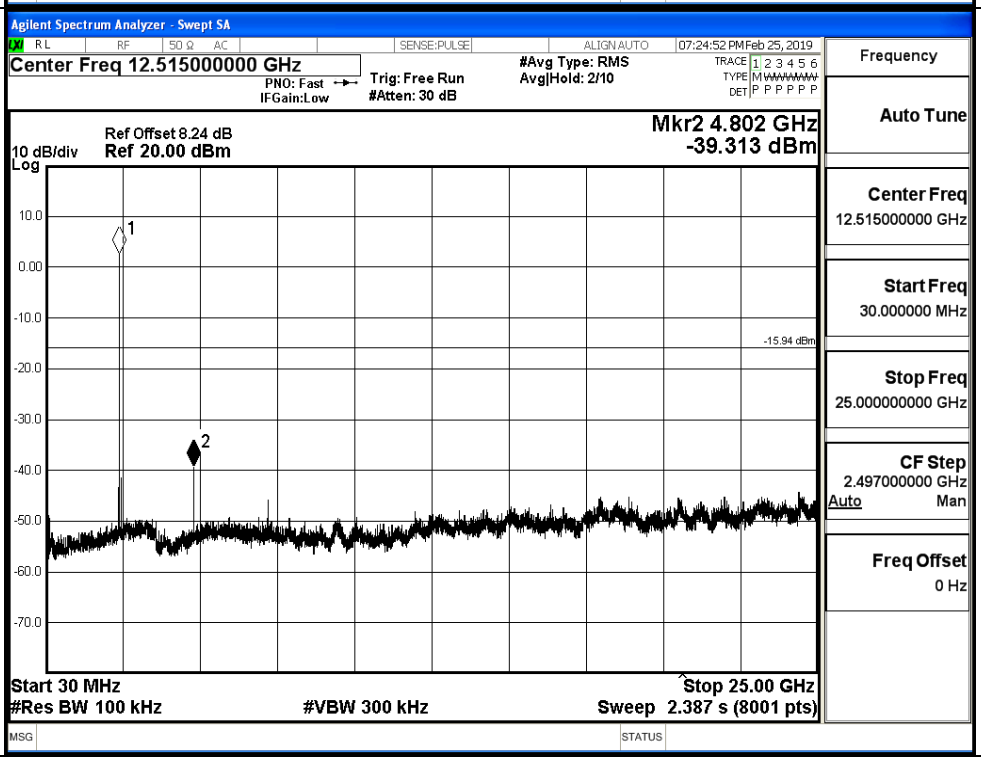
GFSK_DH5/MCH	
GFSK_DH5/HCH	

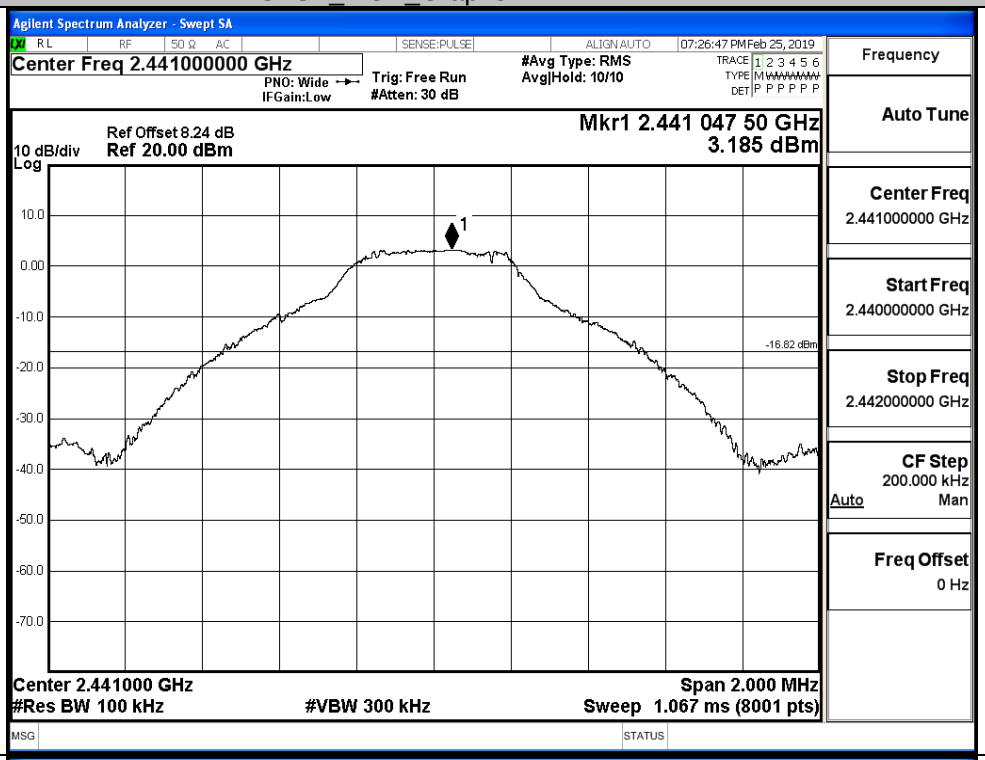
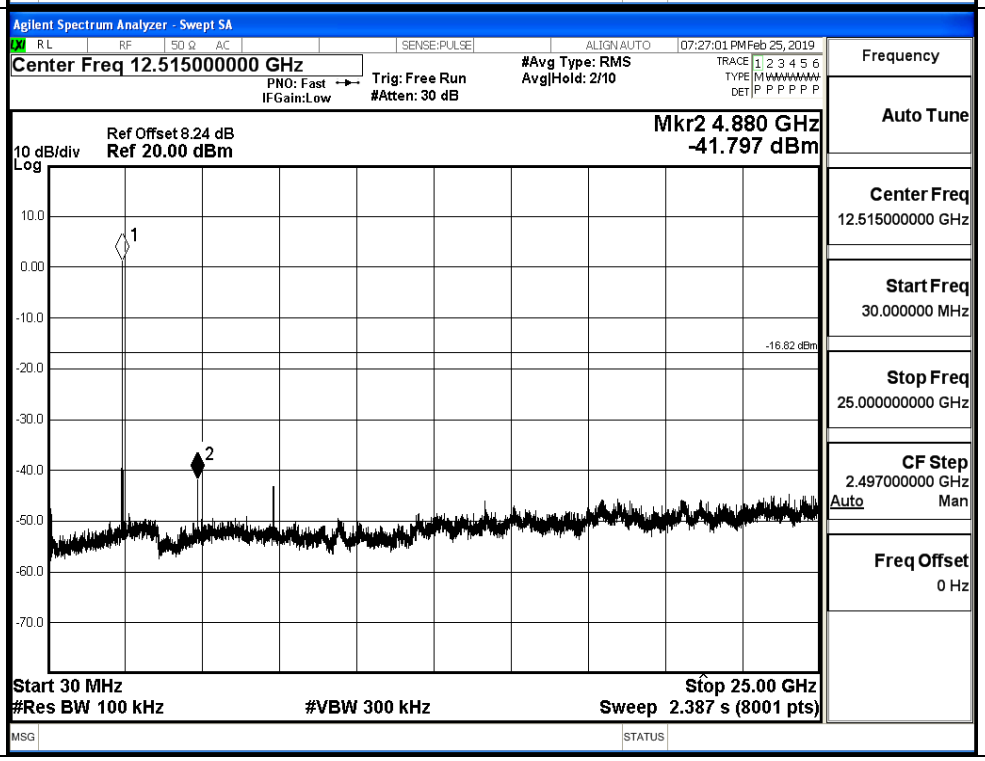
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

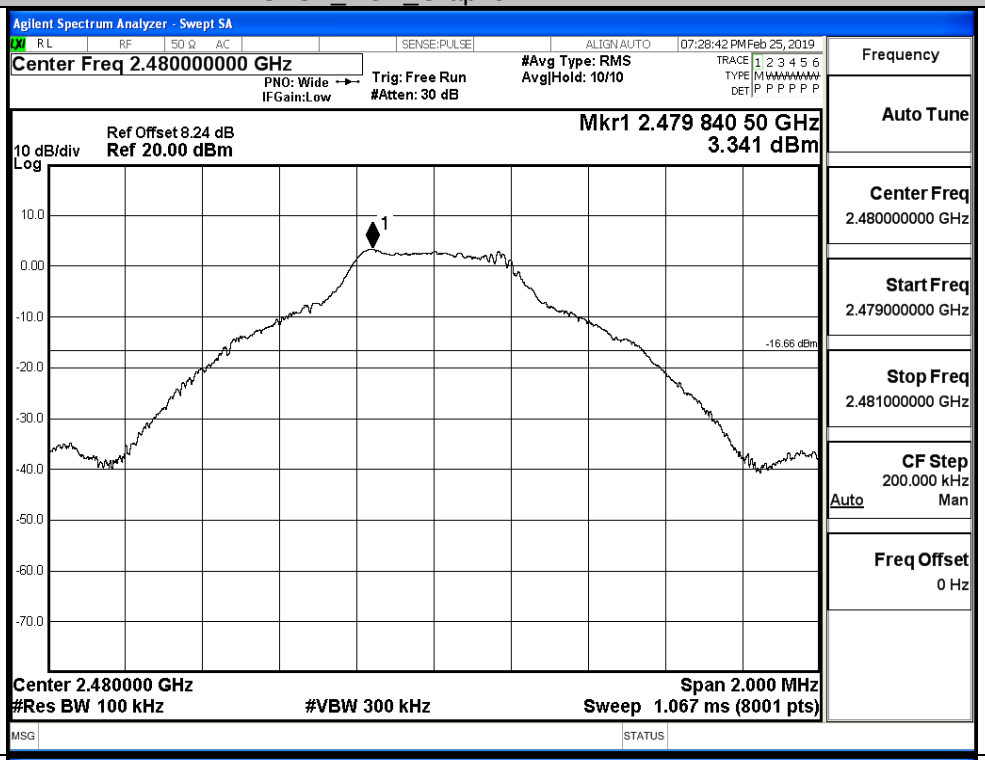
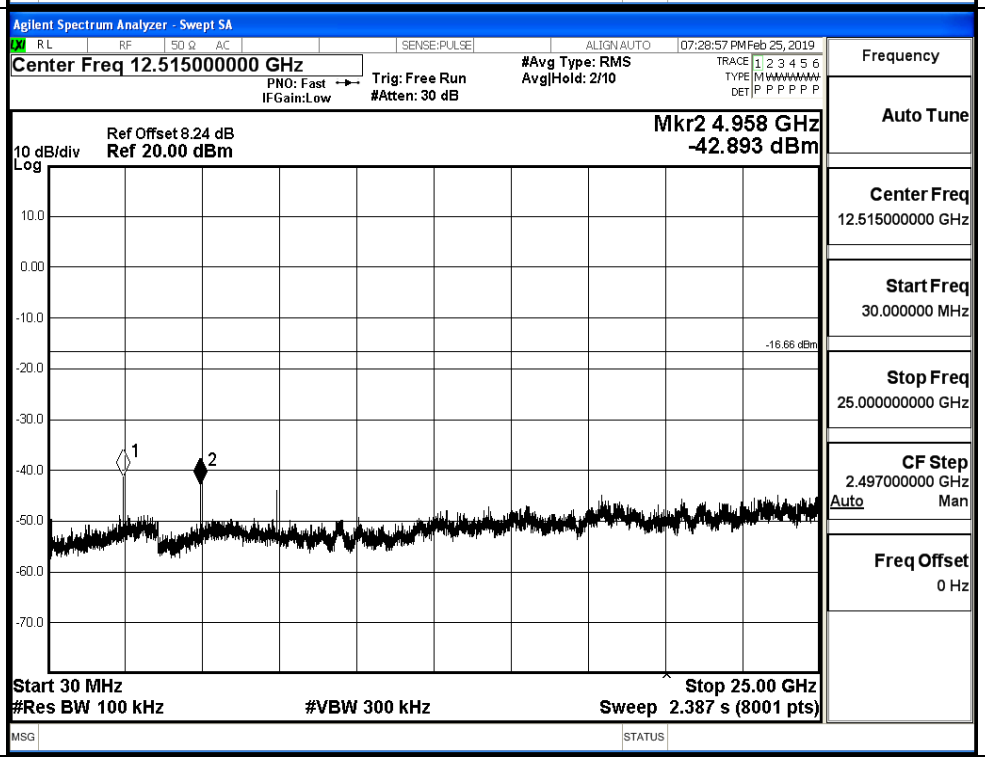
π/4DQPSK _2DH5/HCH	

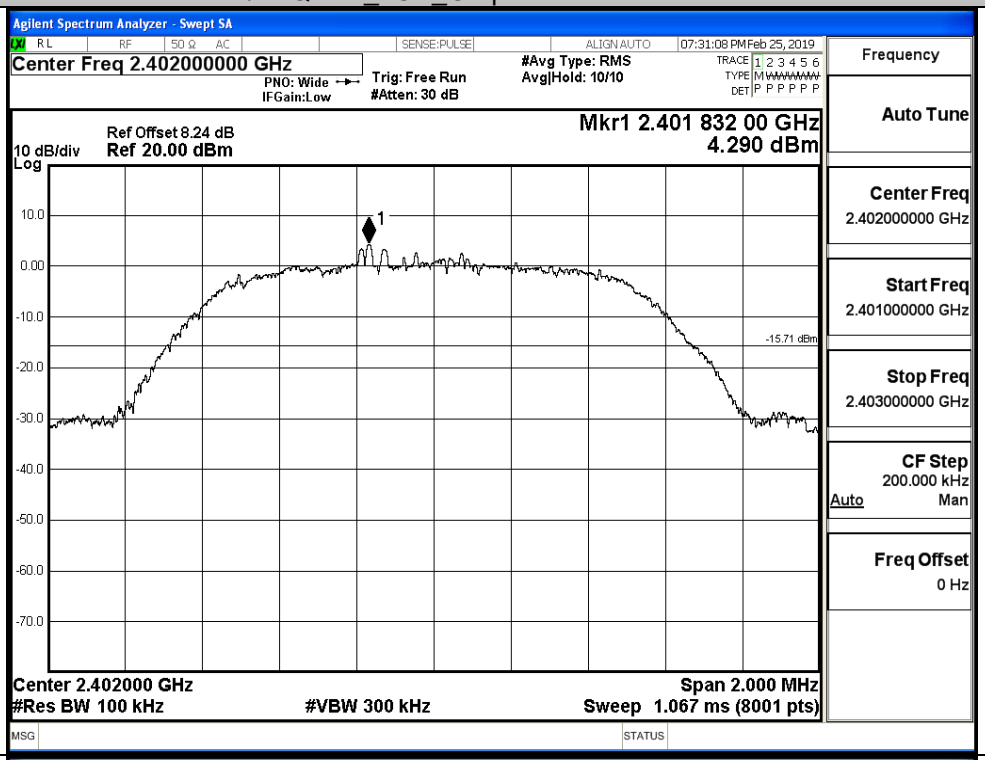
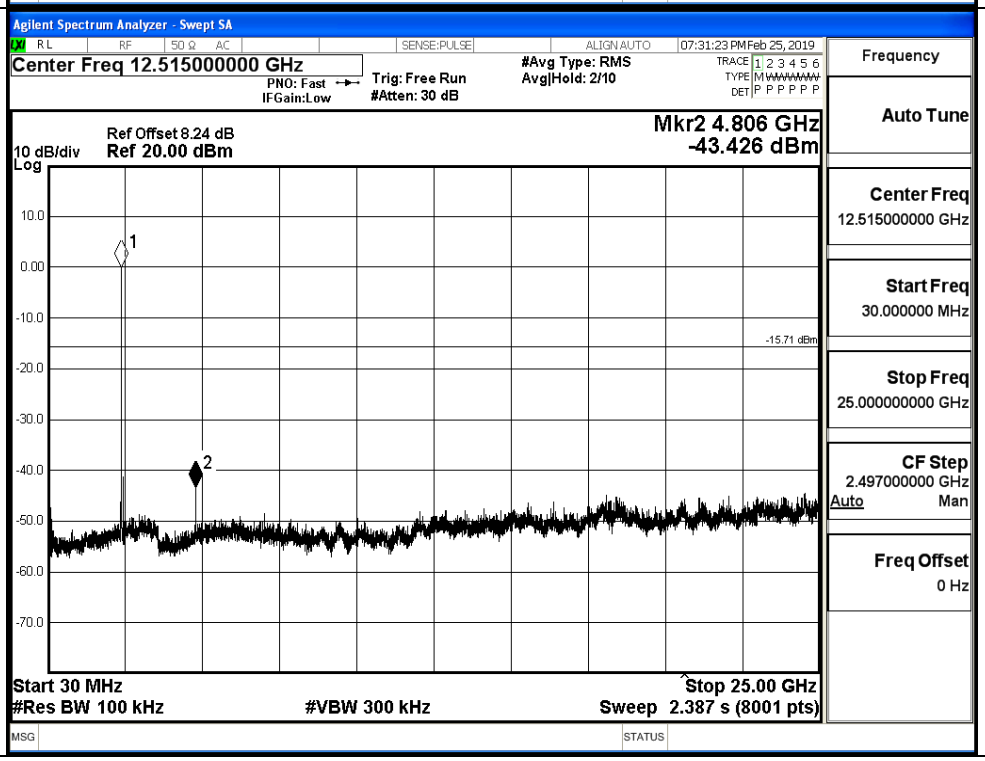
A.6 RF Conducted Spurious Emissions

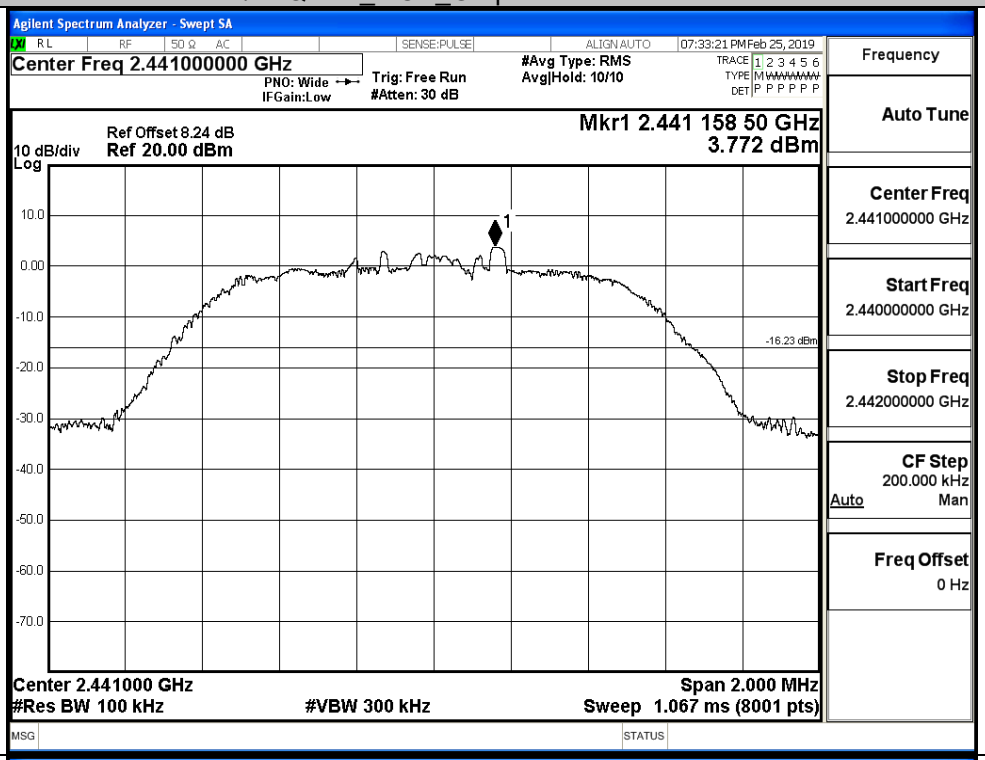
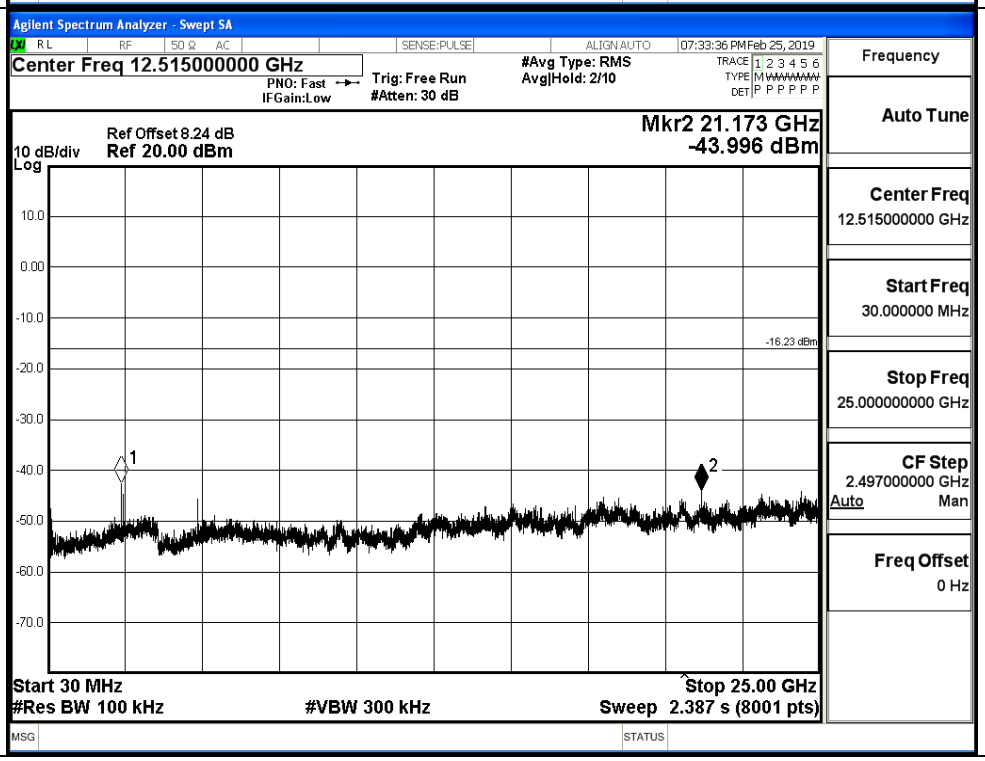
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.064	-39.313	-15.936	PASS
	MCH	3.185	-41.797	-16.815	PASS
	HCH	3.341	-42.893	-16.659	PASS
π/4DQPSK	LCH	4.29	-43.426	-15.710	PASS
	MCH	3.772	-43.996	-16.228	PASS
	HCH	2.336	-44.259	-17.664	PASS

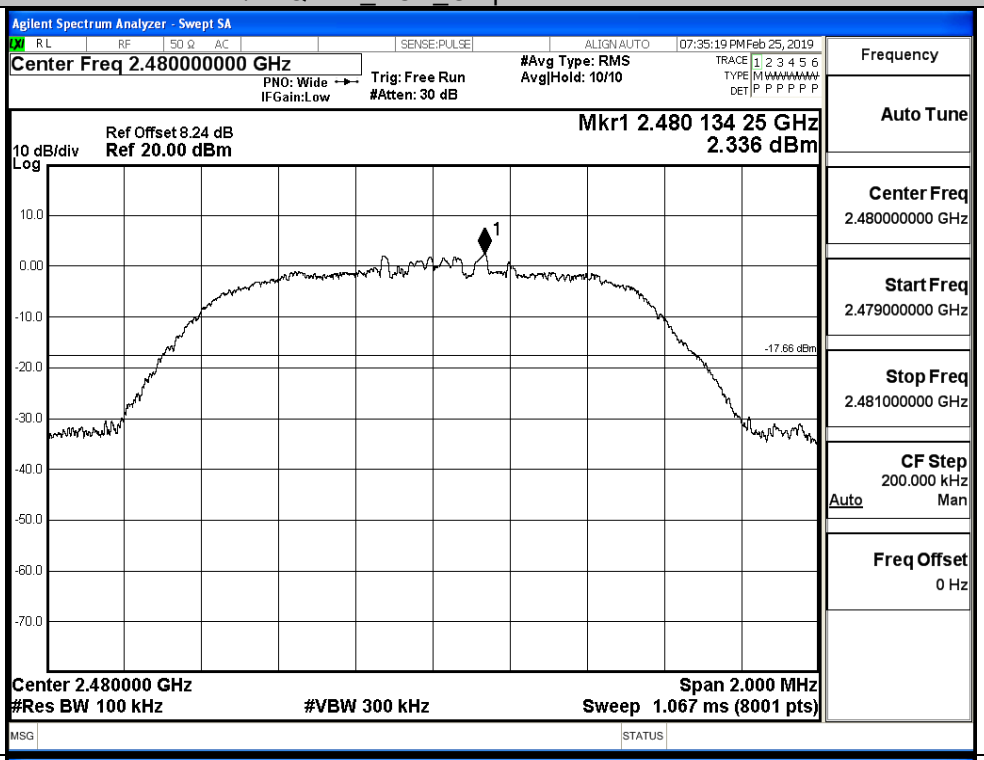
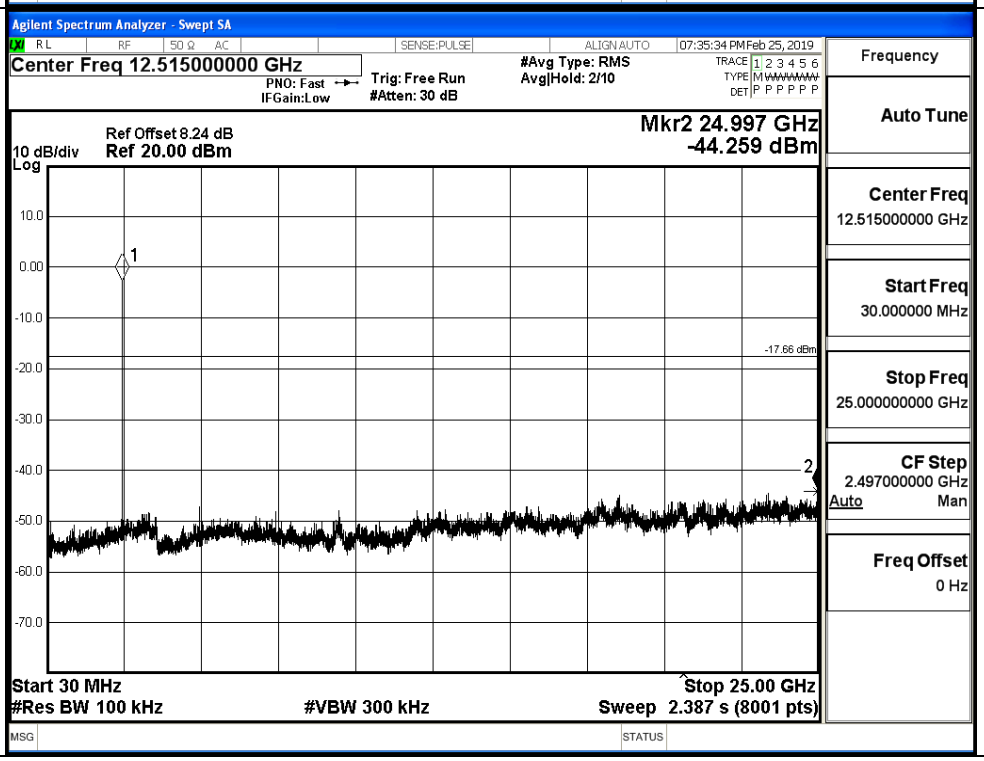
GFSK_LCH_Graphs			
Pref			
Puw			

GFSK_MCH_Graphs			
Pref			
Puw			

GFSK_HCH_Graphs			
Pref		
Puw			

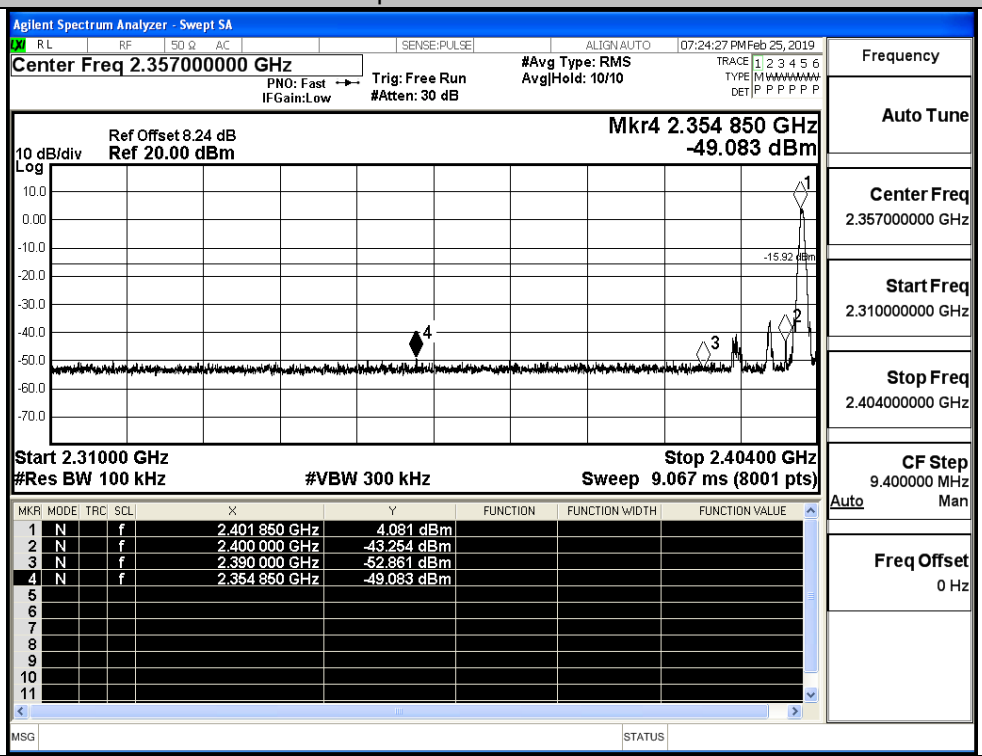
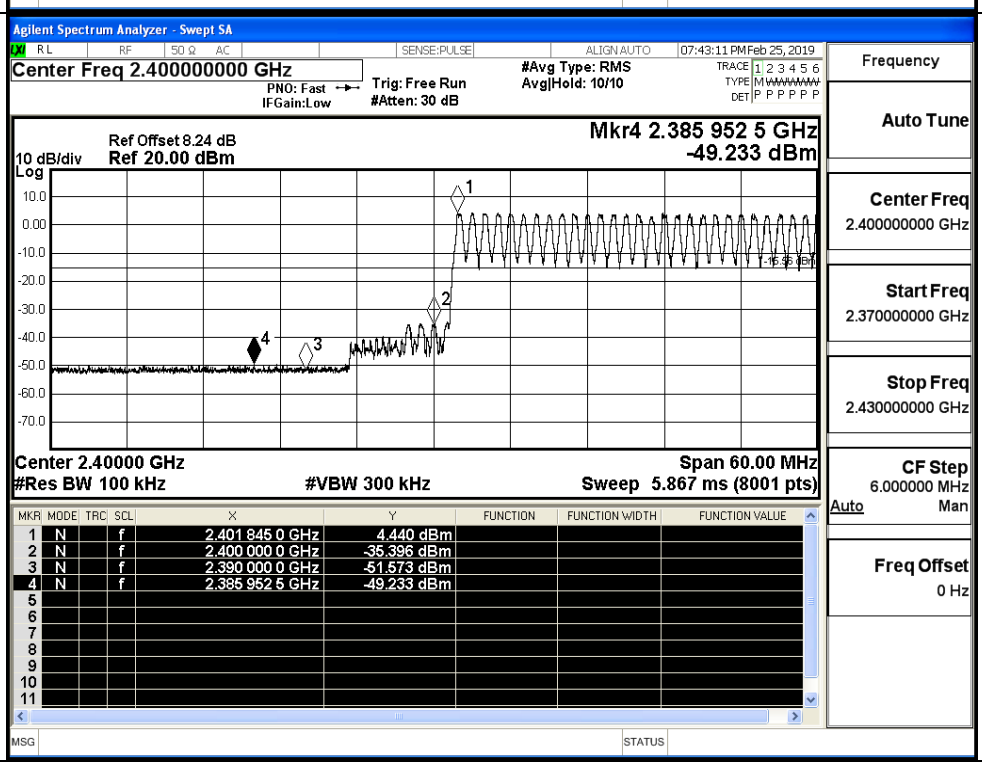
π/4DQPSK_LCH_Graphs			
Pref			
Puw			

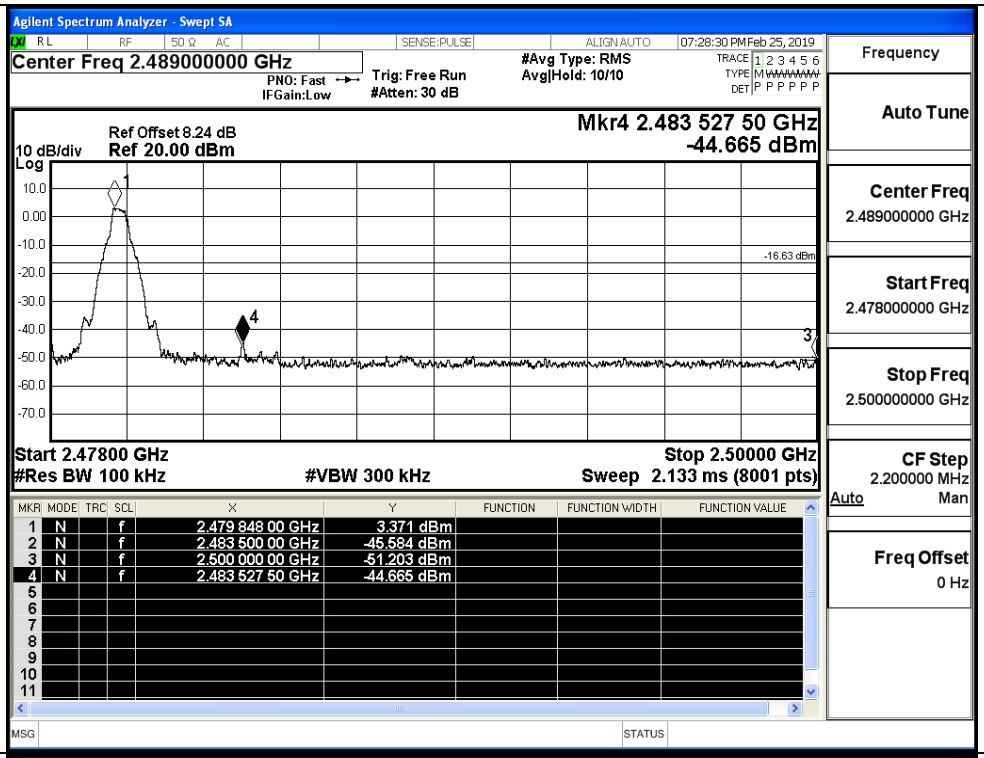
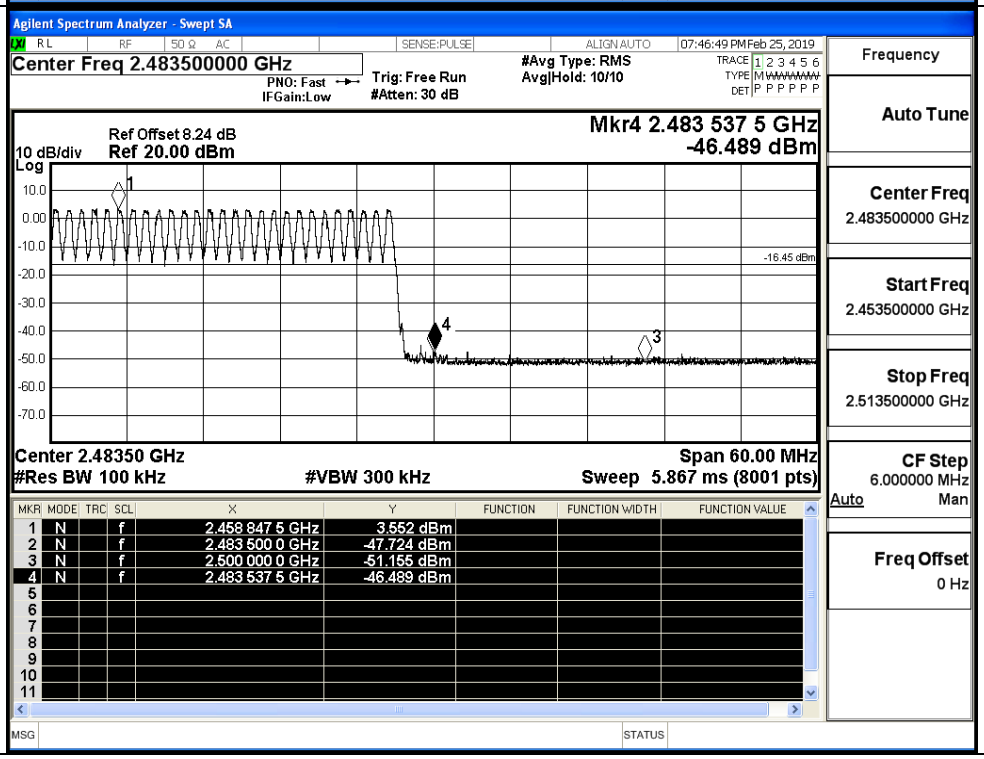
π/4DQPSK_MCH_Graphs		
Pref		
Puw		

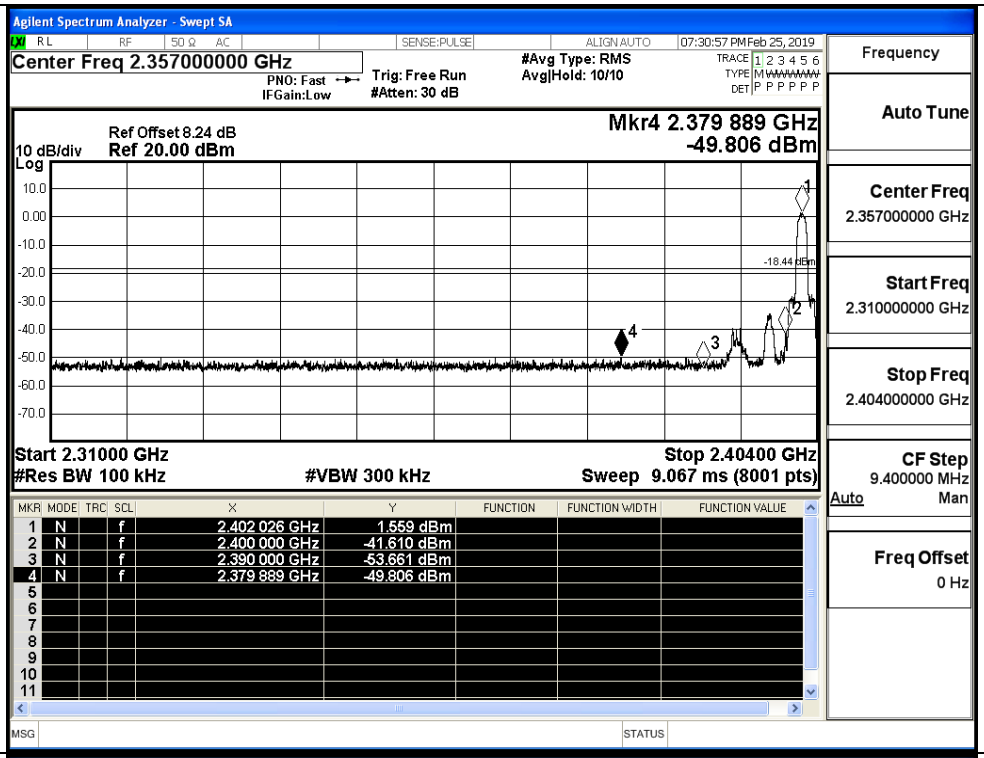
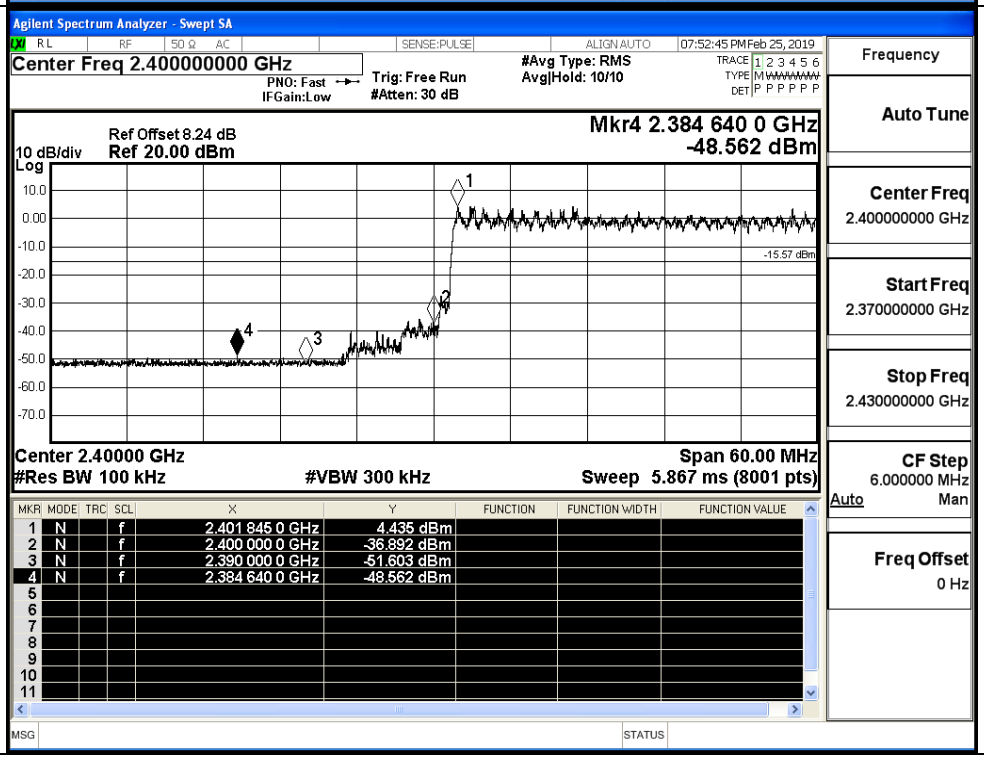
π/4DQPSK_HCH_Graphs		
Pref		
Puw		

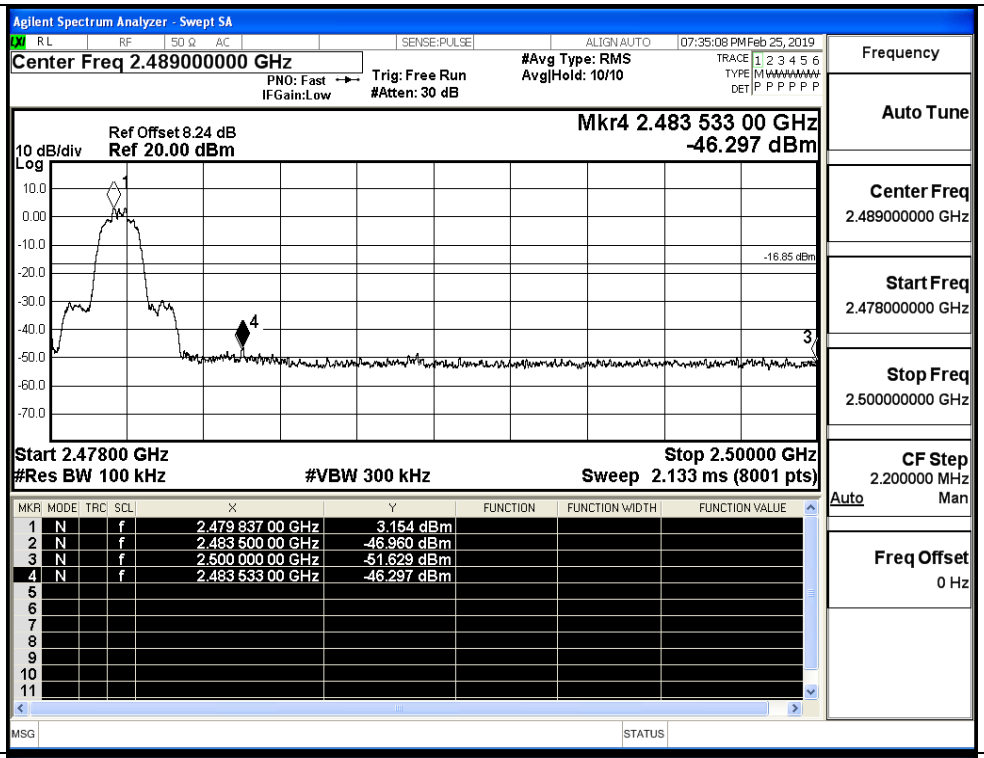
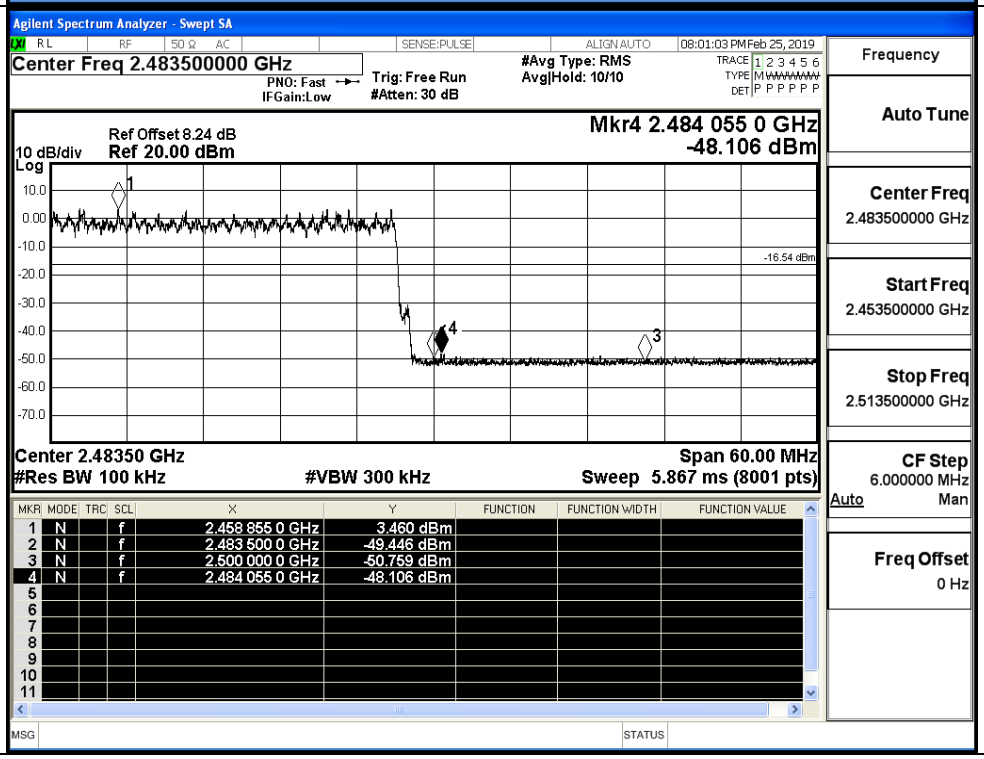
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.081	Off	-49.083	-15.92	PASS
			4.440	On	-49.233	-15.56	PASS
	HCH	2480	3.371	Off	-44.665	-16.63	PASS
			3.552	On	-46.489	-16.45	PASS
π/4DQPSK	LCH	2402	1.559	Off	-49.806	-18.44	PASS
			4.435	On	-48.562	-15.57	PASS
	HCH	2480	3.154	Off	-46.297	-16.85	PASS
			3.460	On	-48.106	-16.54	PASS

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

GFSK/HCH/No Hop	
GFSK/HCH/Hop	

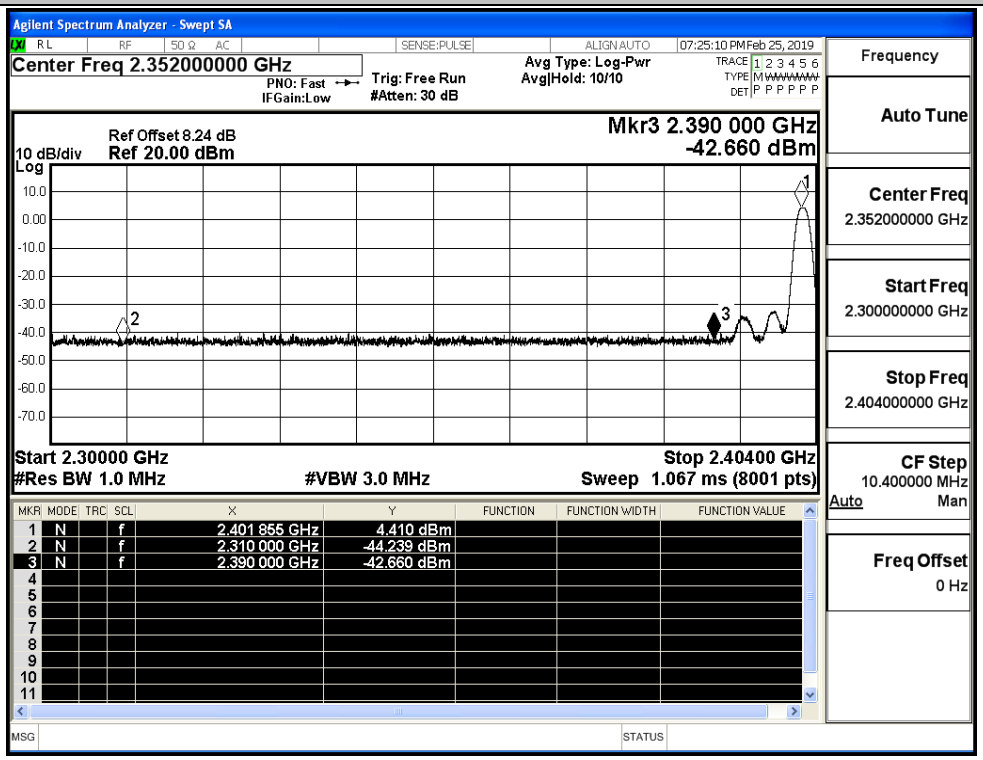
π/4DQPSK/LCH/No Hop	
π/4DQPSK/LCH/Hop	

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

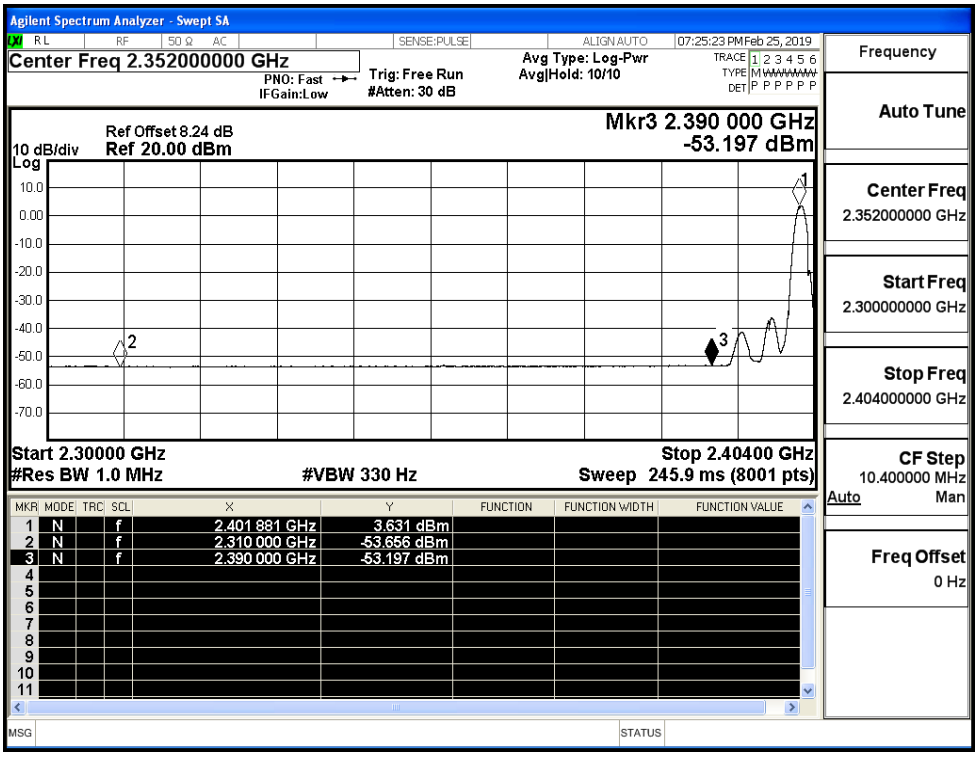
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.24	2.0	0	53.02	PEAK	74	PASS
	Off	2310.0	-53.66	2.0	0	43.60	AV	54	PASS
	Off	2390.0	-42.66	2.0	0	54.60	PEAK	74	PASS
	Off	2390.0	-53.20	2.0	0	44.06	AV	54	PASS
	Off	2483.5	-40.13	2.0	0	57.13	PEAK	74	PASS
	Off	2483.5	-49.30	2.0	0	47.96	AV	54	PASS
	Off	2500.0	-41.78	2.0	0	55.48	PEAK	74	PASS
	Off	2500.0	-52.87	2.0	0	44.39	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.48	2.0	0	54.77	PEAK	74	PASS
	Off	2310.0	-53.51	2.0	0	43.74	AV	54	PASS
	Off	2390.0	-42.60	2.0	0	54.66	PEAK	74	PASS
	Off	2390.0	-53.09	2.0	0	44.17	AV	54	PASS
	Off	2483.5	-40.24	2.0	0	57.02	PEAK	74	PASS
	Off	2483.5	-49.99	2.0	0	47.27	AV	54	PASS
	Off	2500.0	-41.94	2.0	0	55.32	PEAK	74	PASS
	Off	2500.0	-52.83	2.0	0	44.42	AV	54	PASS

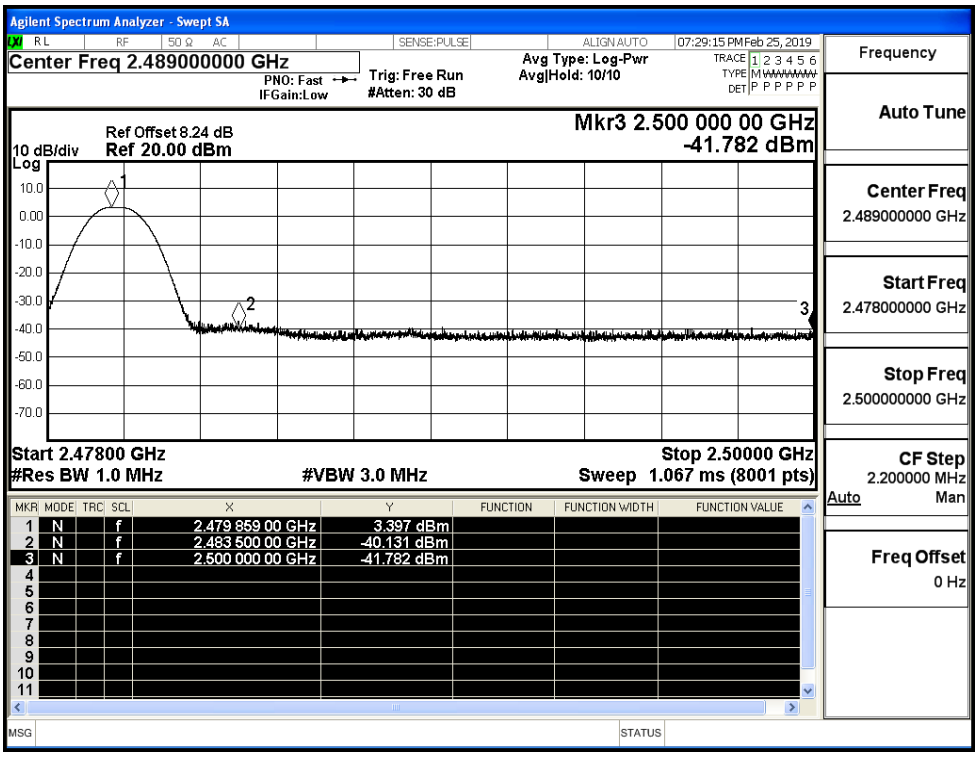
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



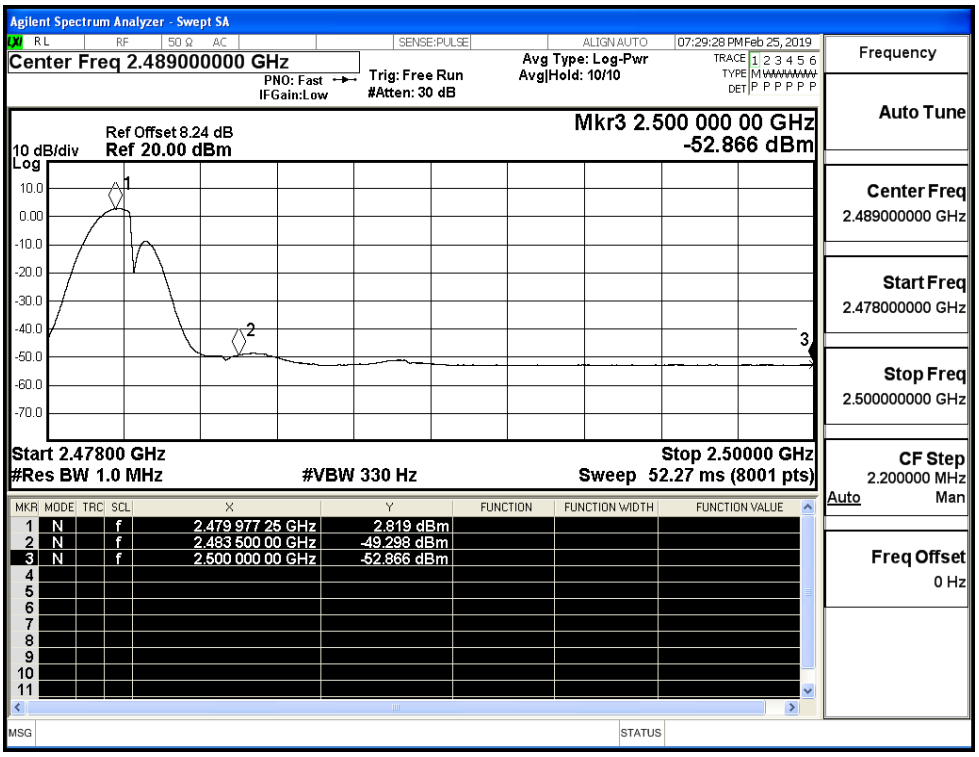
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



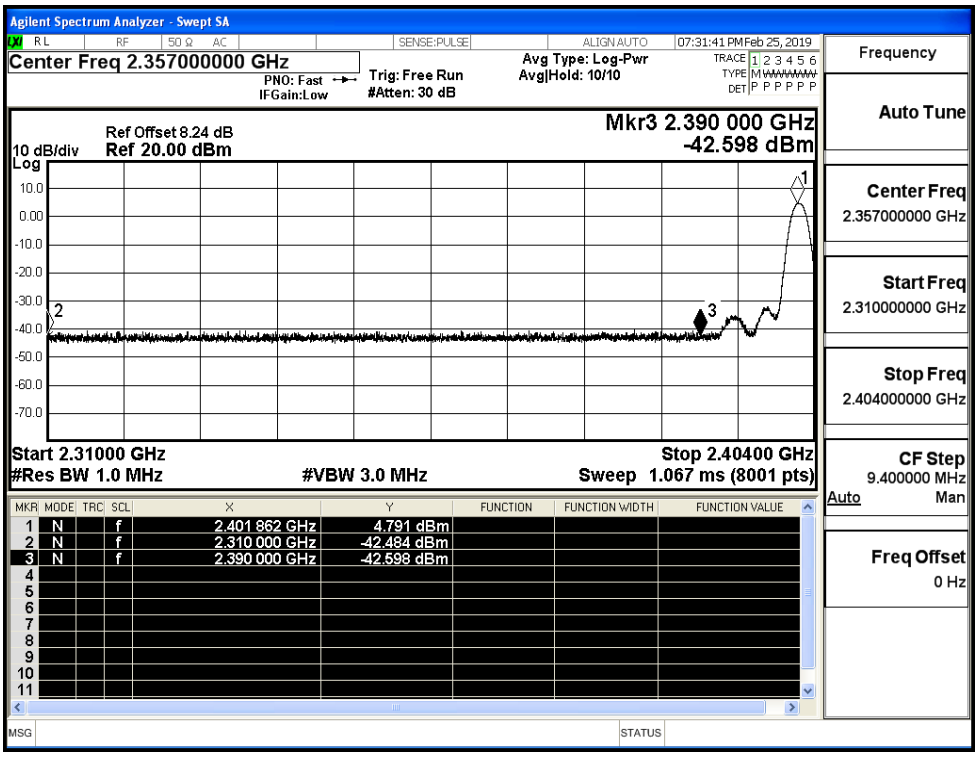
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



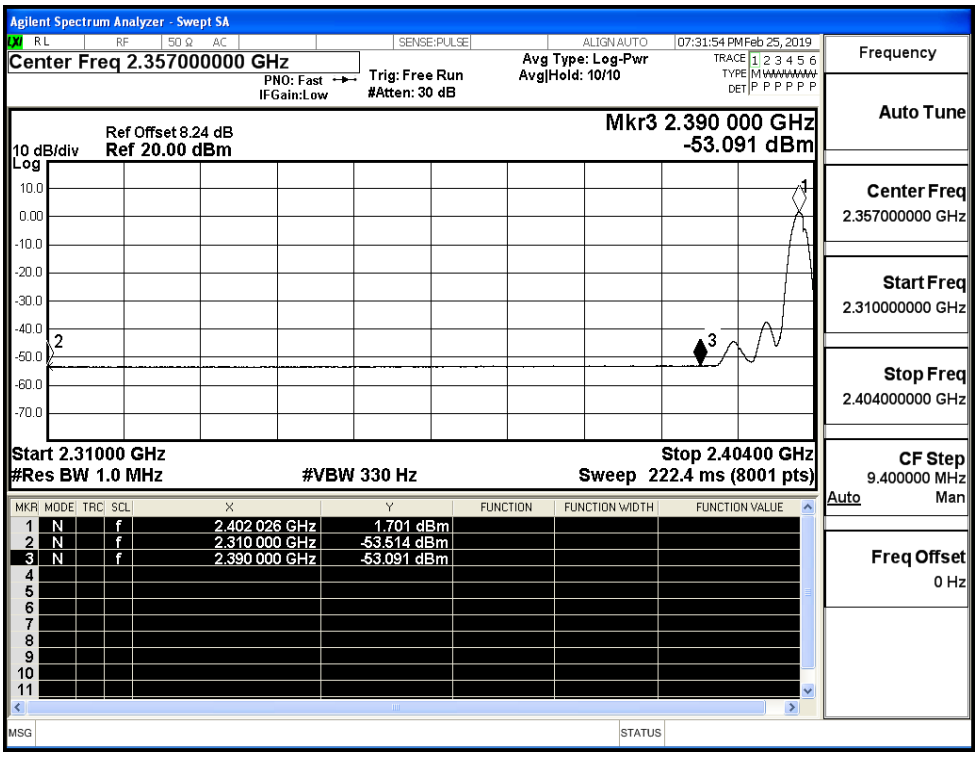
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



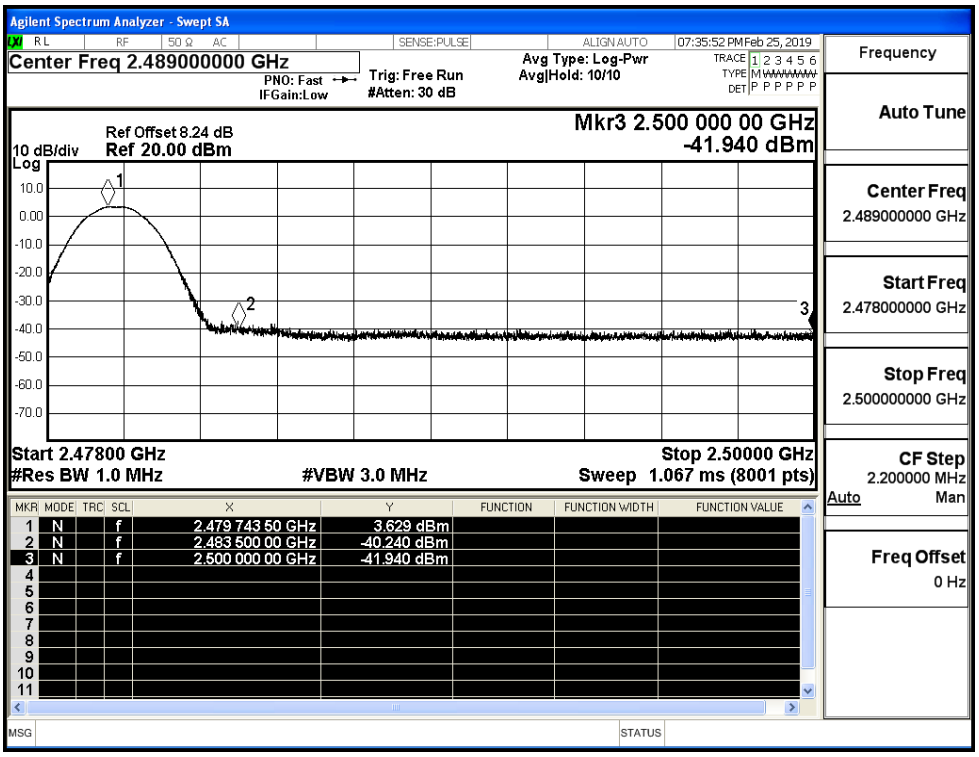
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)