Appendix A

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

Product Name: Bluetooth Speaker

Trade Mark: N/A

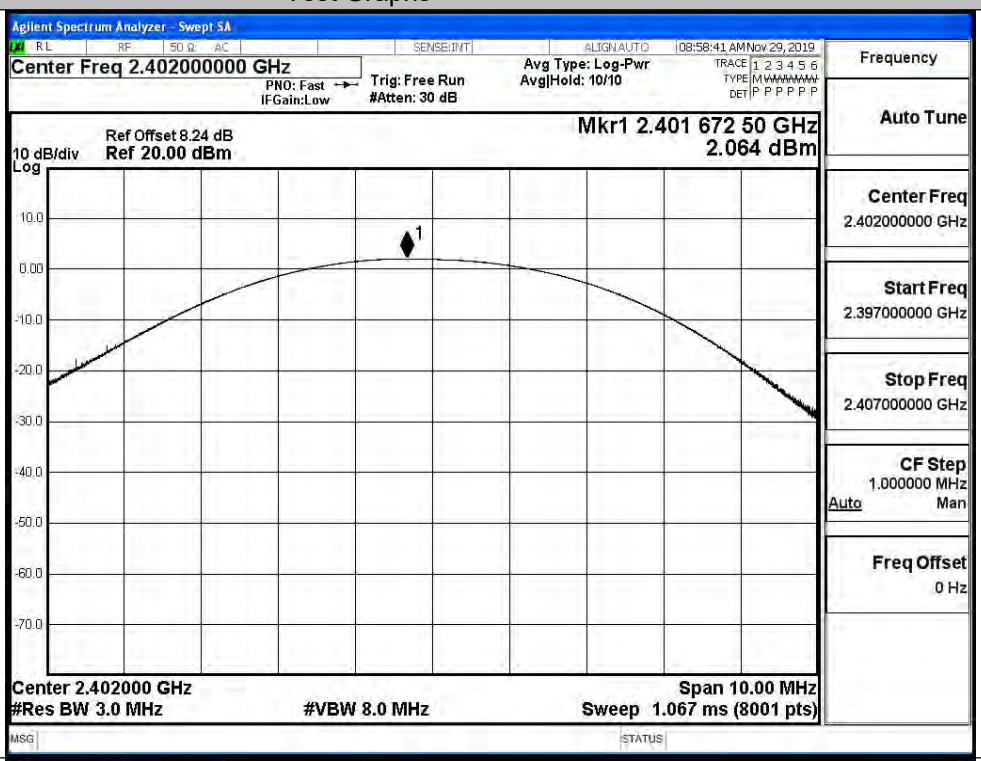
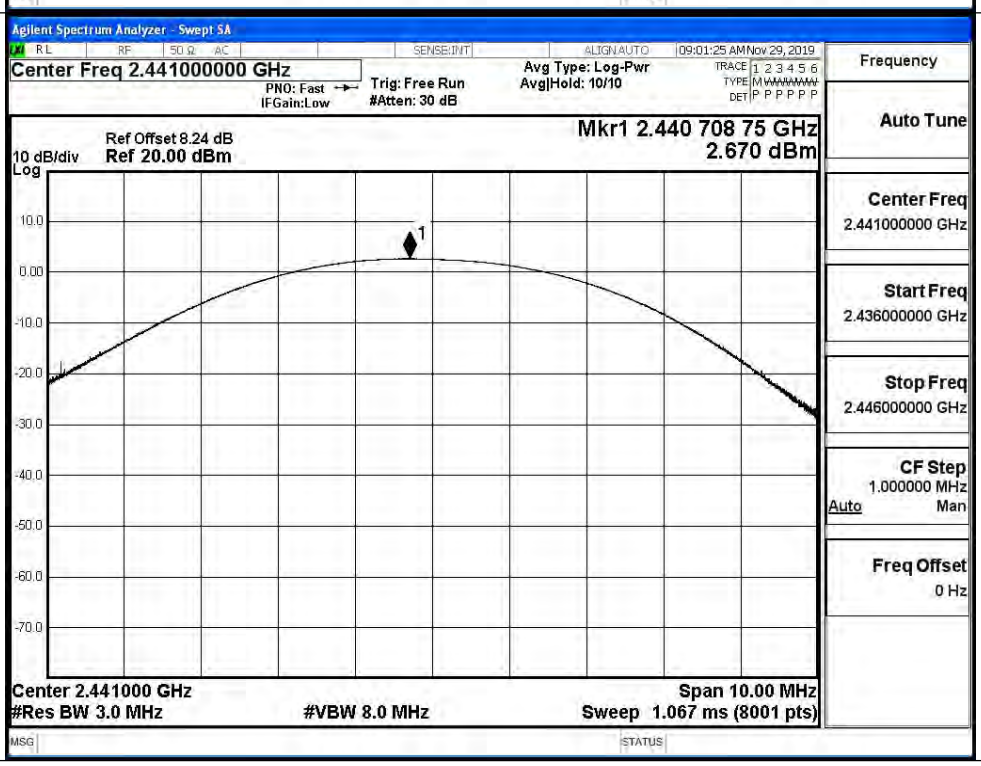
Test Model: ZQS-6201

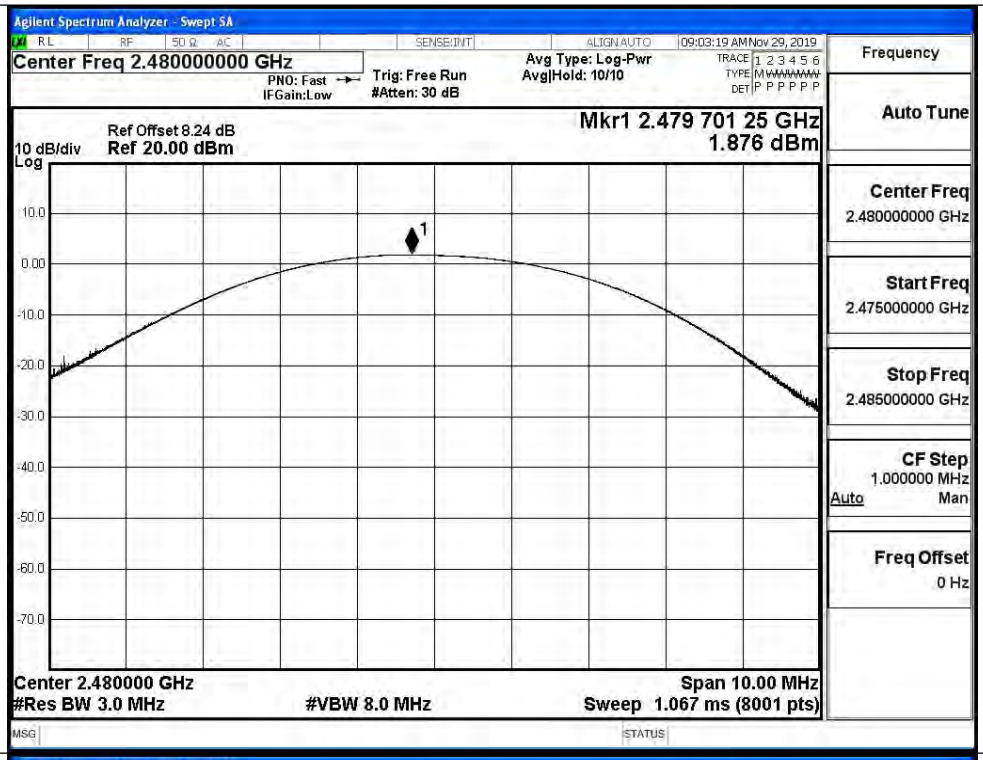
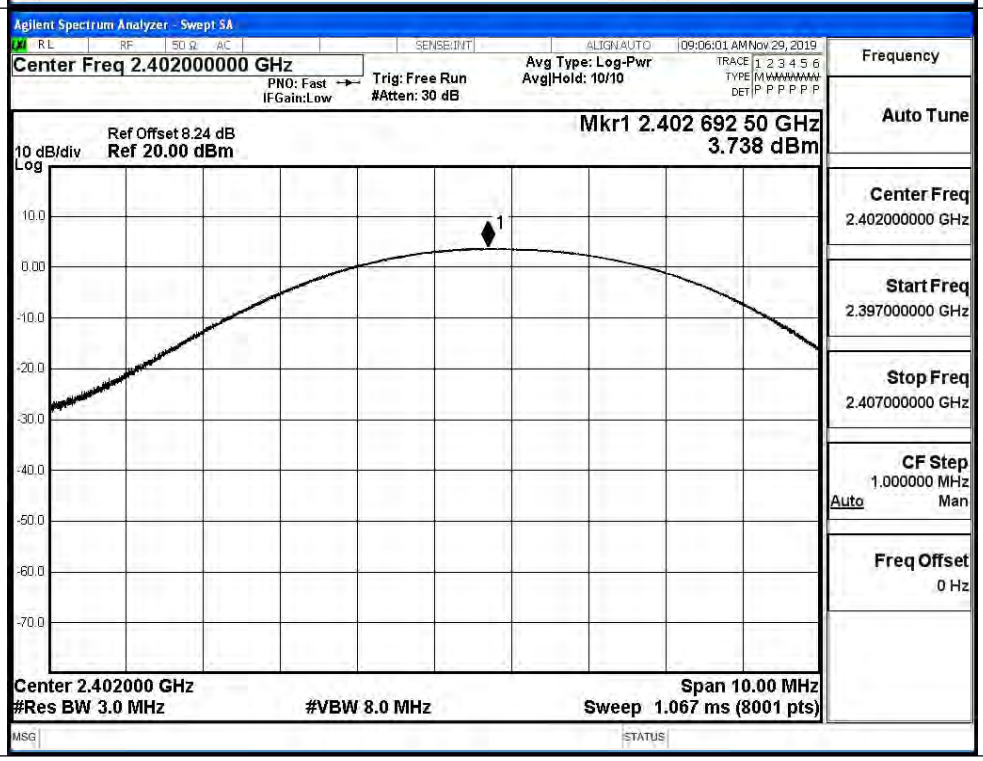
Environmental Conditions

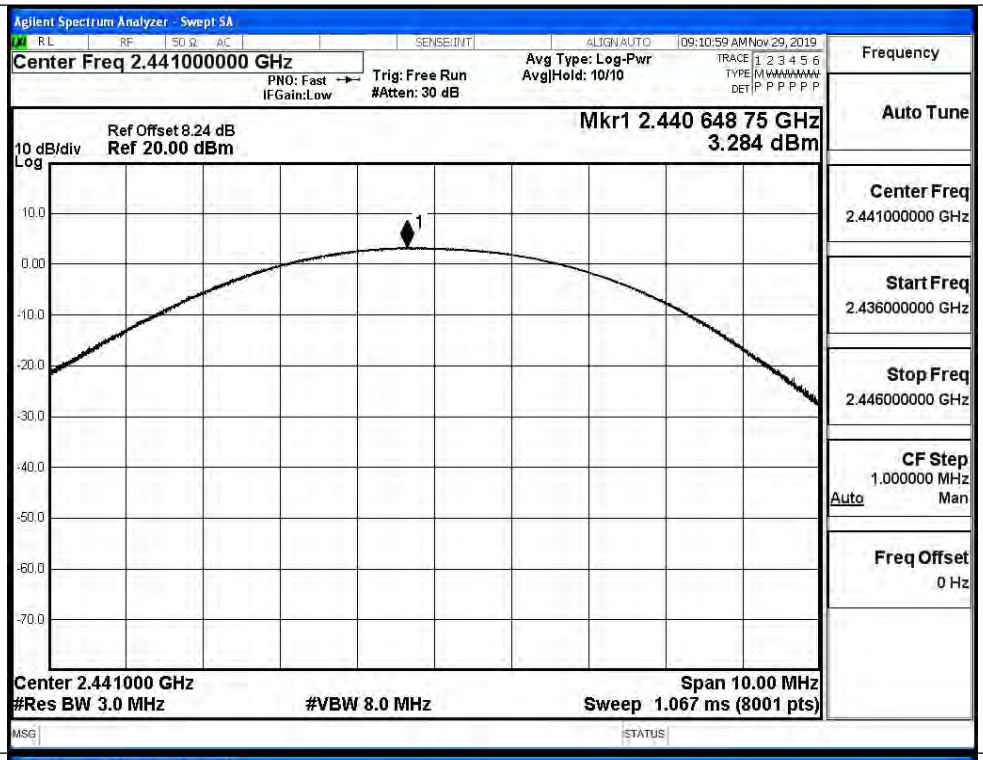
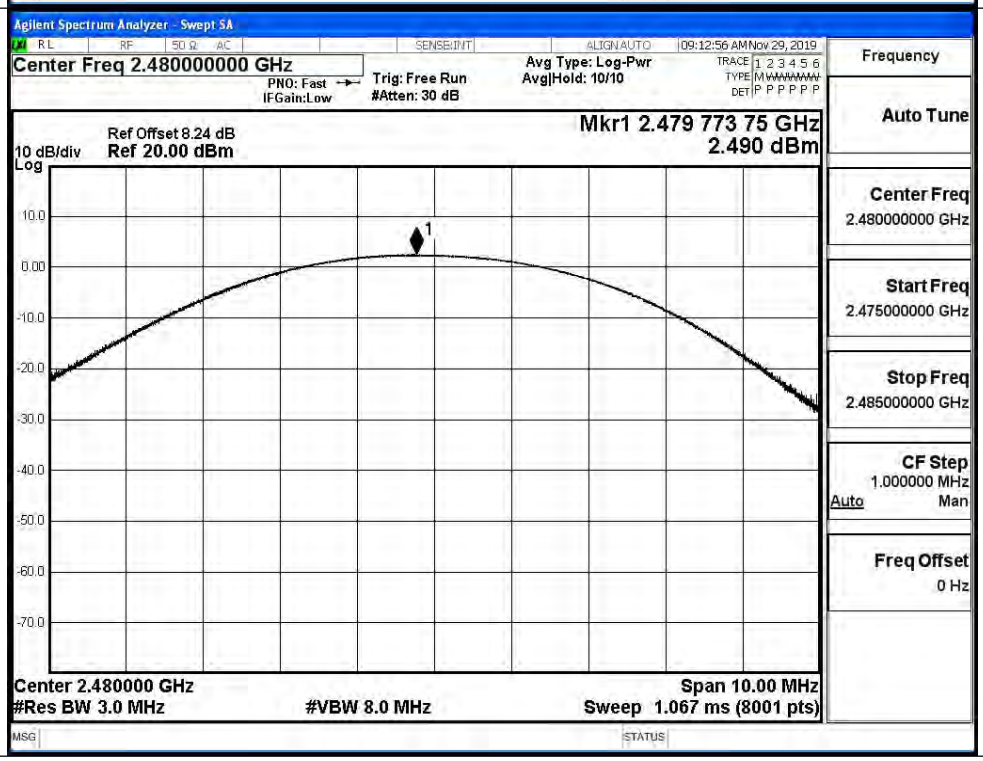
Temperature:	22.6 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Scout Wu
Supervised by:	Tom.Liu

A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.064	30	PASS
	MCH	2.670	30	PASS
	HCH	1.876	30	PASS
π/4DQPSK	LCH	3.738	21	PASS
	MCH	3.284	21	PASS
	HCH	2.490	21	PASS

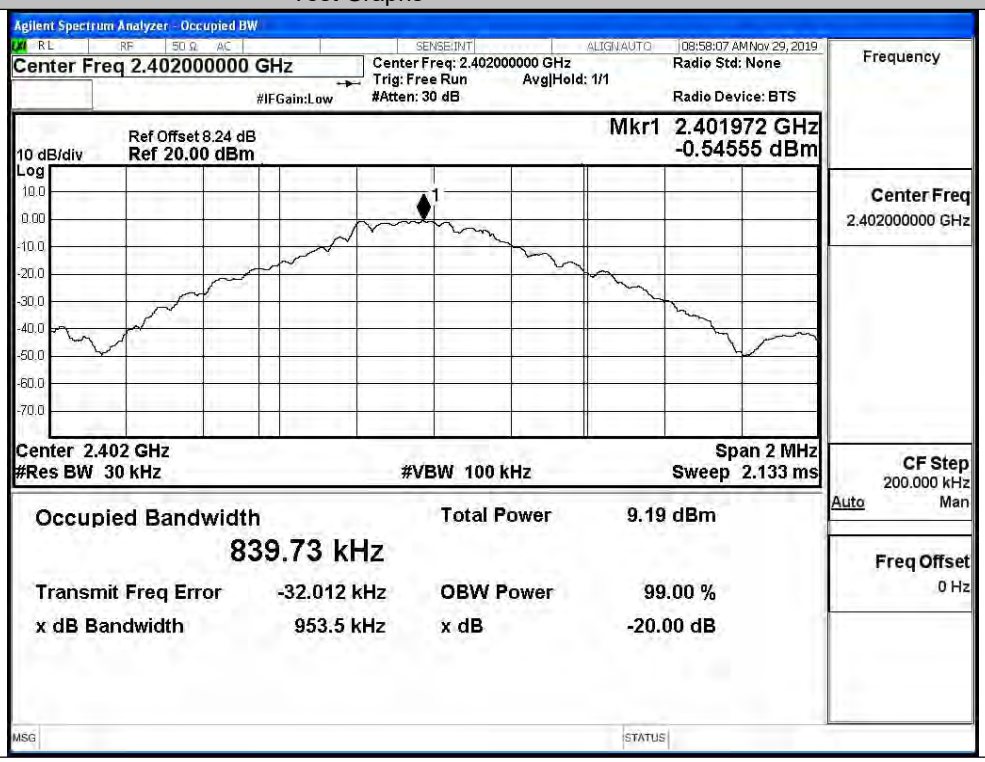
Test Graphs		
GFSK/LCH		
GFSK/MCH		

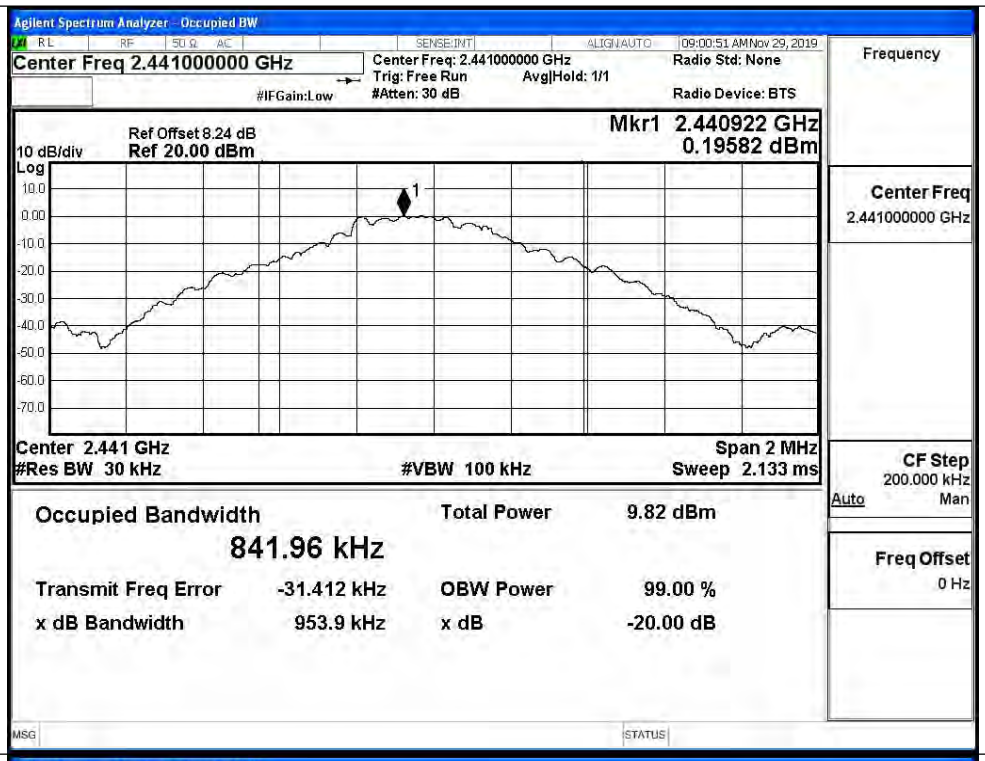
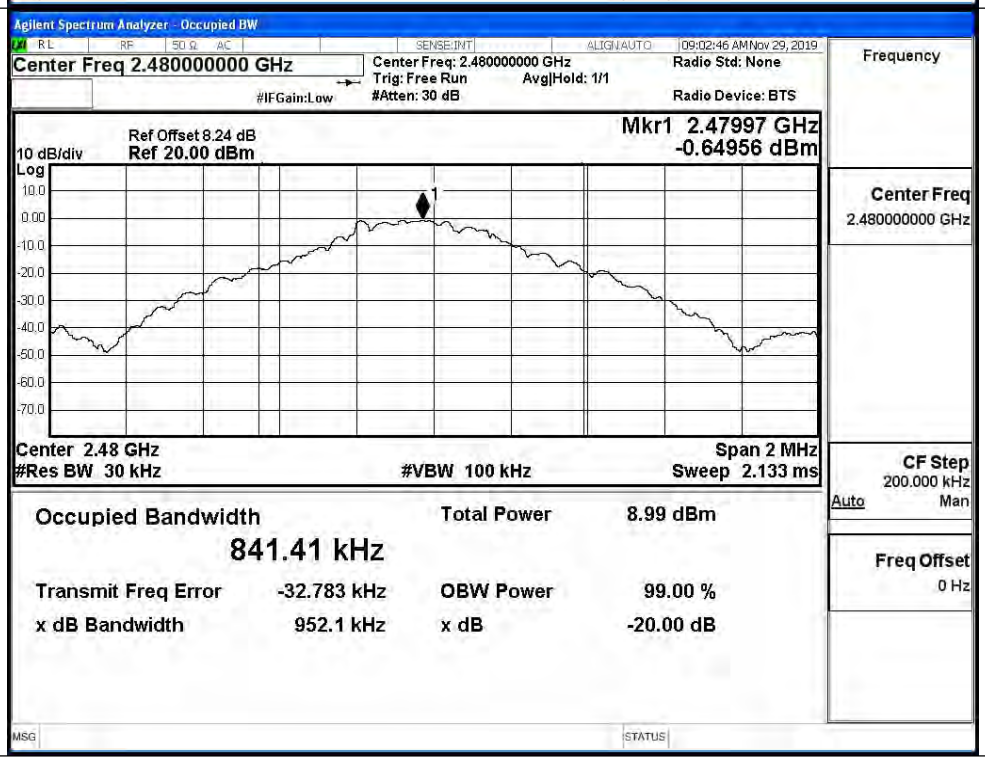
GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

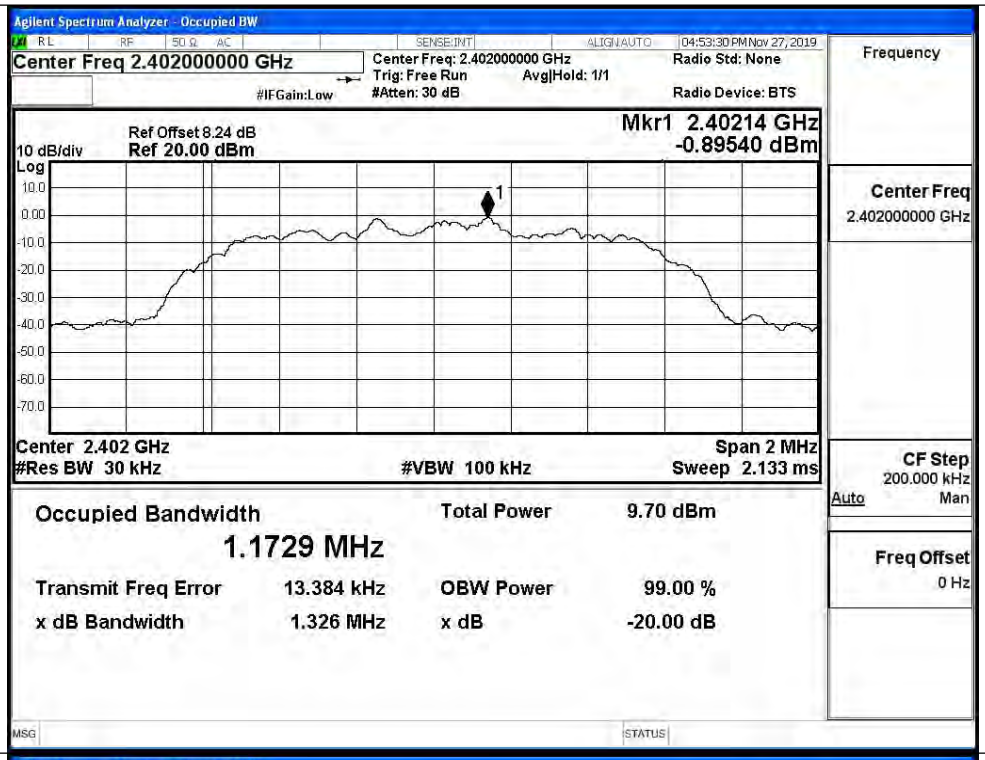
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9535	Not Specified	PASS
	MCH	0.9539	Not Specified	PASS
	HCH	0.9521	Not Specified	PASS
π/4DQPSK	LCH	1.326	Not Specified	PASS
	MCH	1.313	Not Specified	PASS
	HCH	1.312	Not Specified	PASS

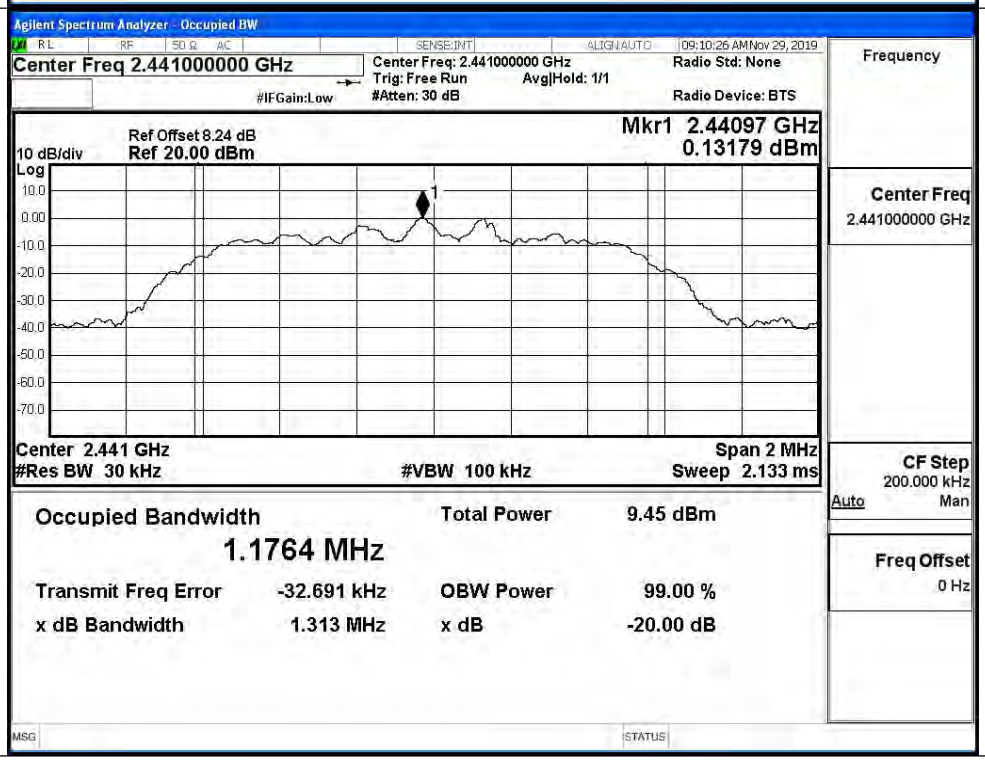
Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

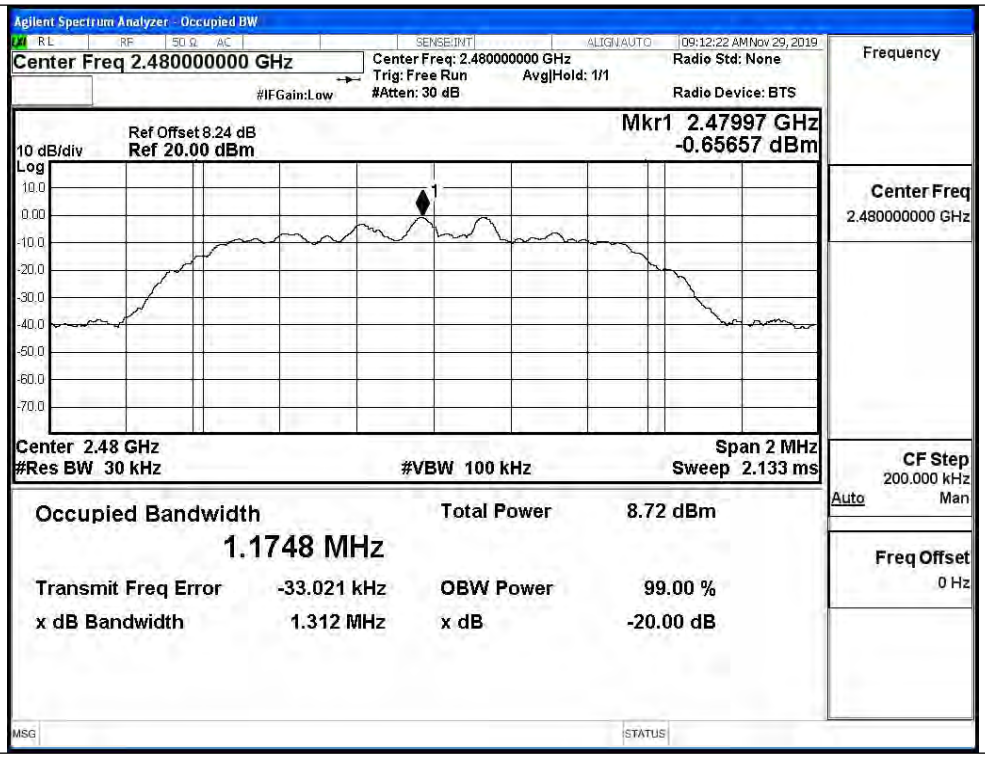
π/4DQPSK/LCH



π/4DQPSK/MCH

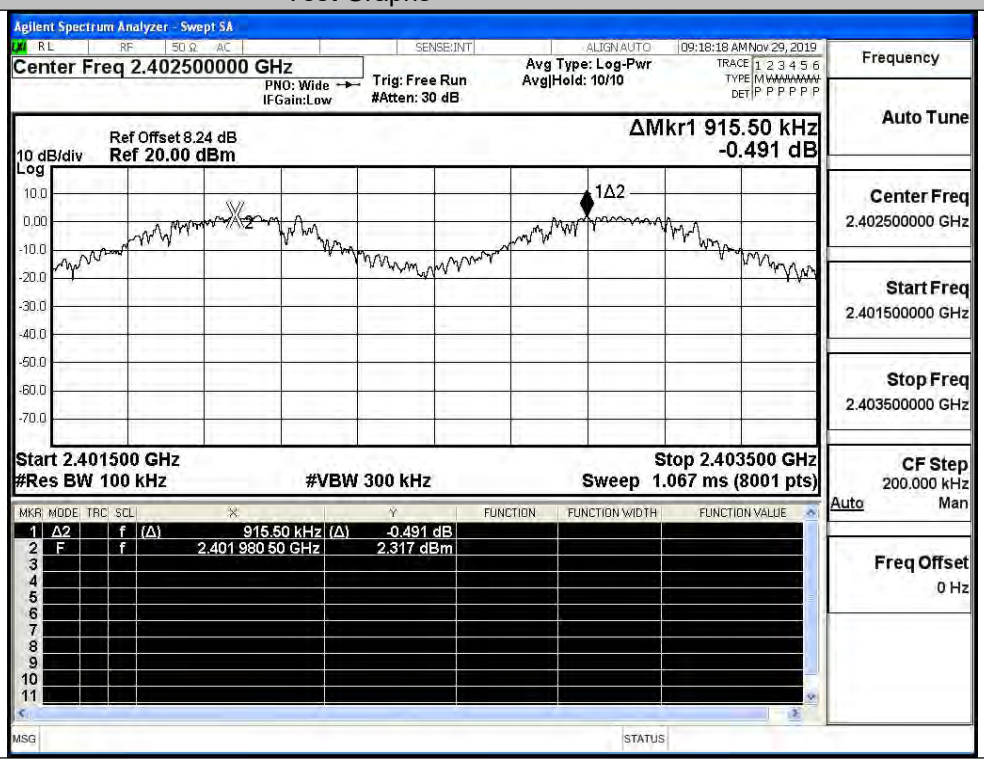


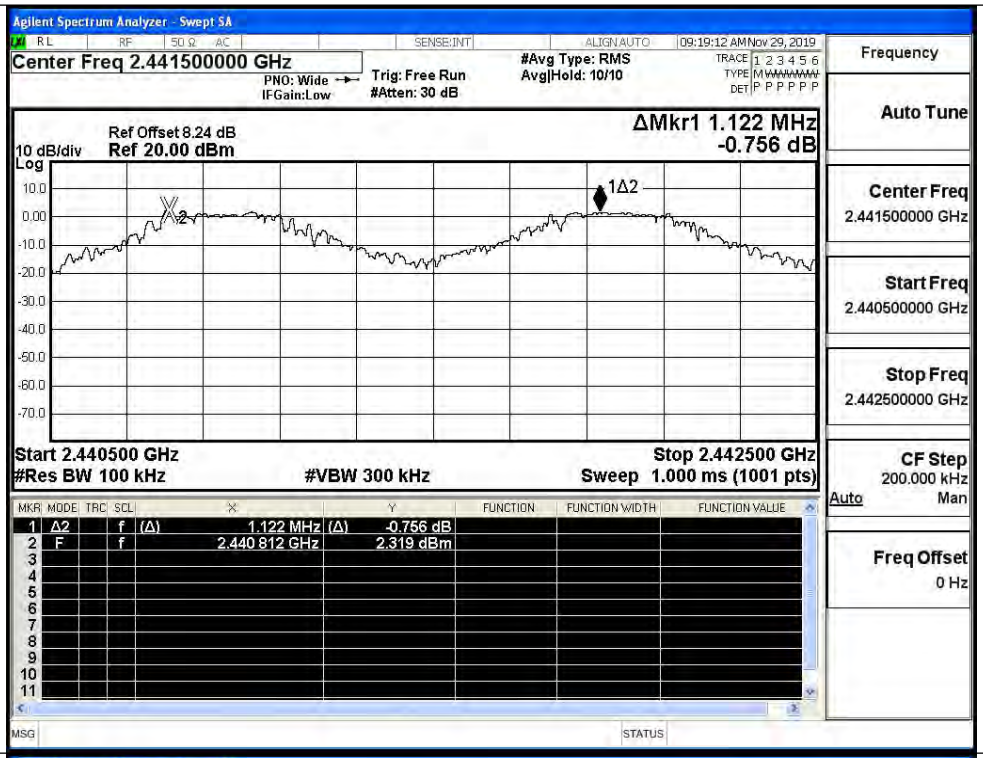
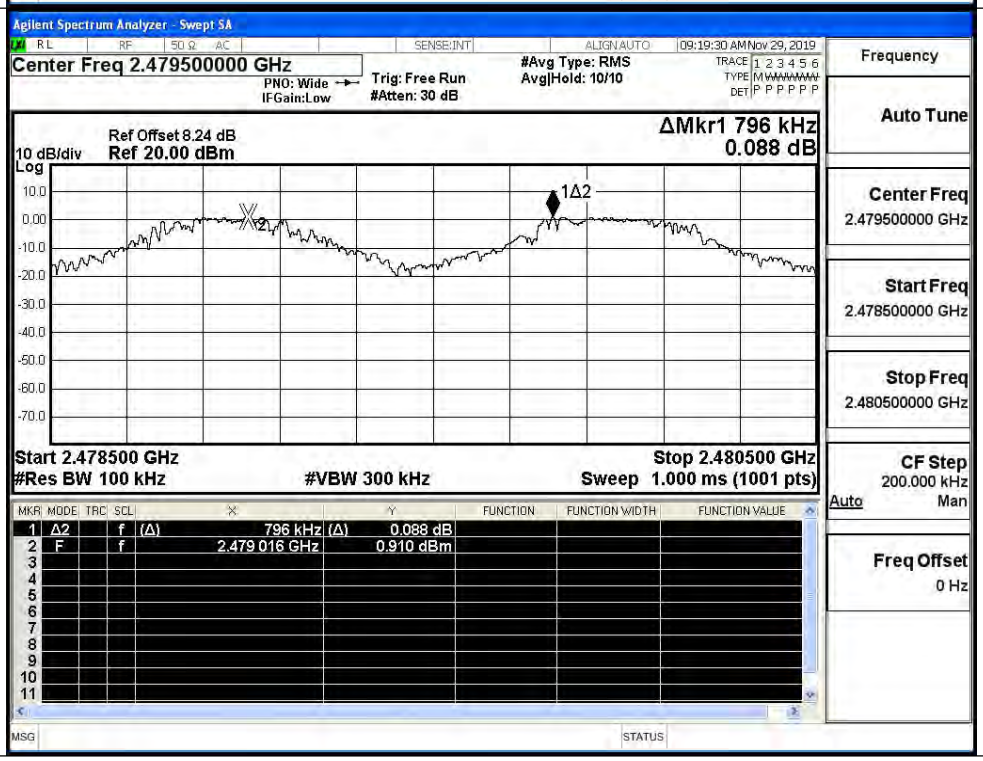
π/4DQPSK/HCH

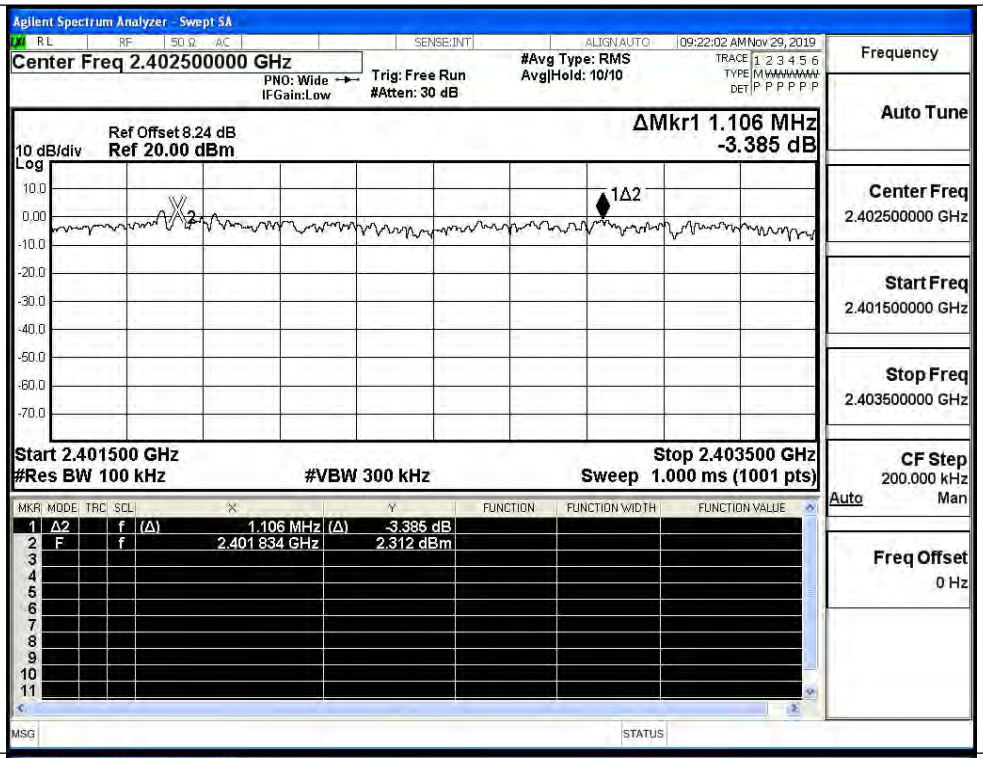
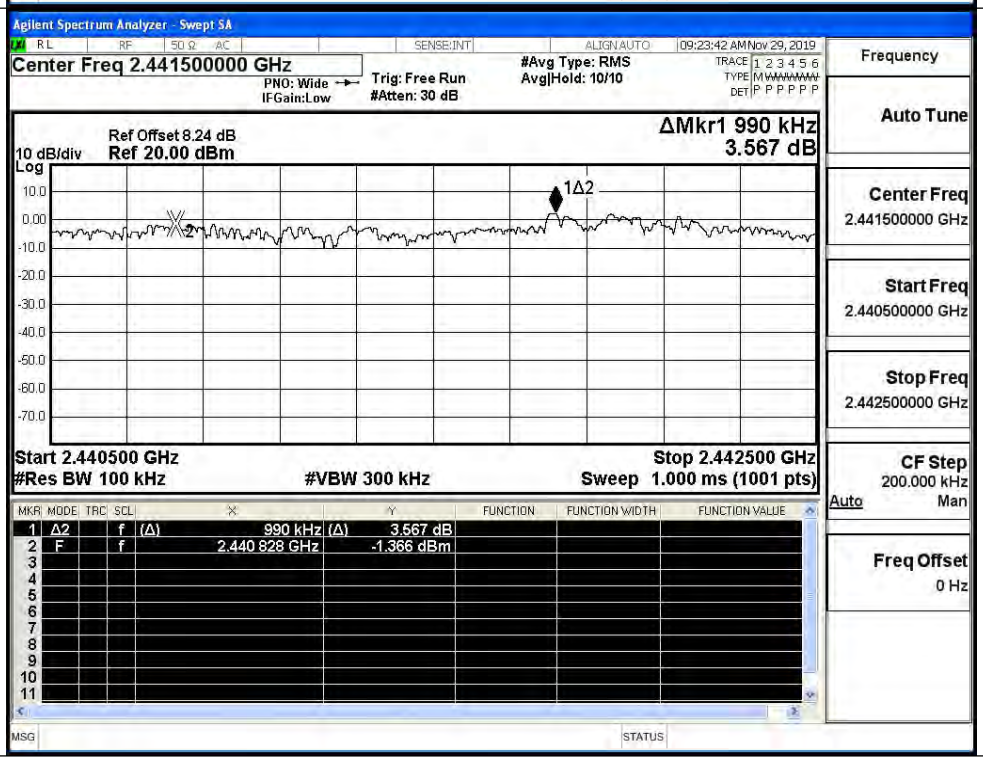

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
09:12:22 AM Nov 29, 2019
Frequency
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.47997 GHz
-0.65657 dBm
Center 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
1.1748 MHz
Total Power 8.72 dBm
Transmit Freq Error -33.021 kHz
OBW Power 99.00 %
x dB Bandwidth 1.312 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

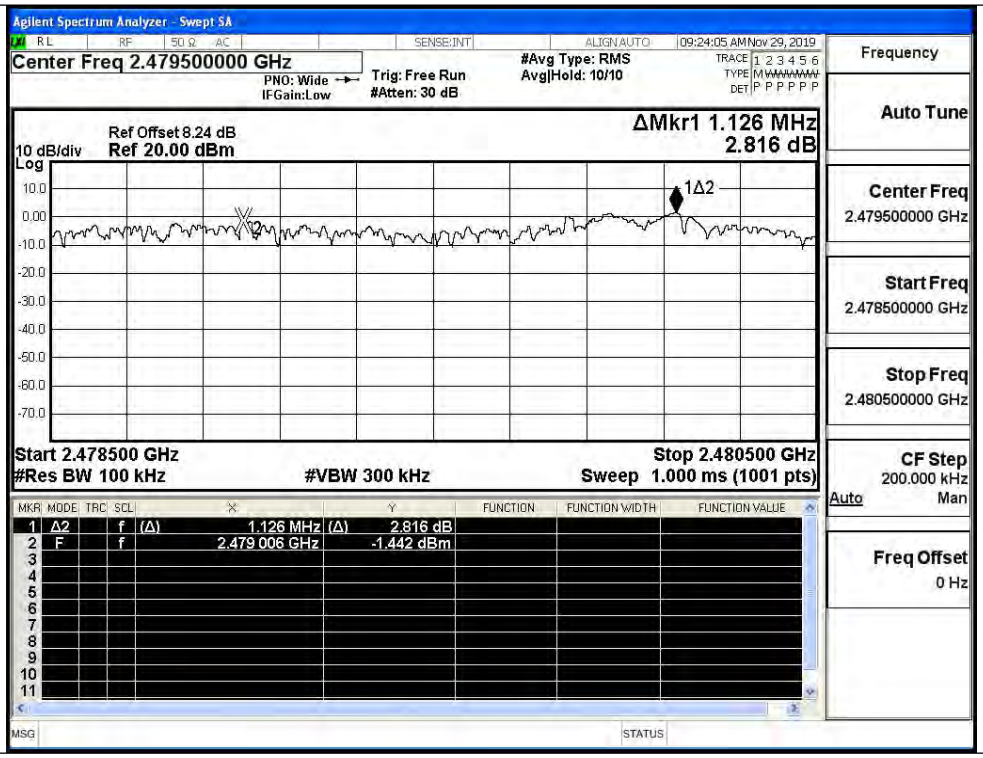
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.916	0.636	PASS
	MCH	1.122	0.636	PASS
	HCH	0.796	0.636	PASS
π/4DQPSK	LCH	1.106	0.875	PASS
	MCH	0.990	0.875	PASS
	HCH	1.126	0.875	PASS

Test Graphs		
GFSK/LCH		

GFSK/MCH		
GFSK/HCH		

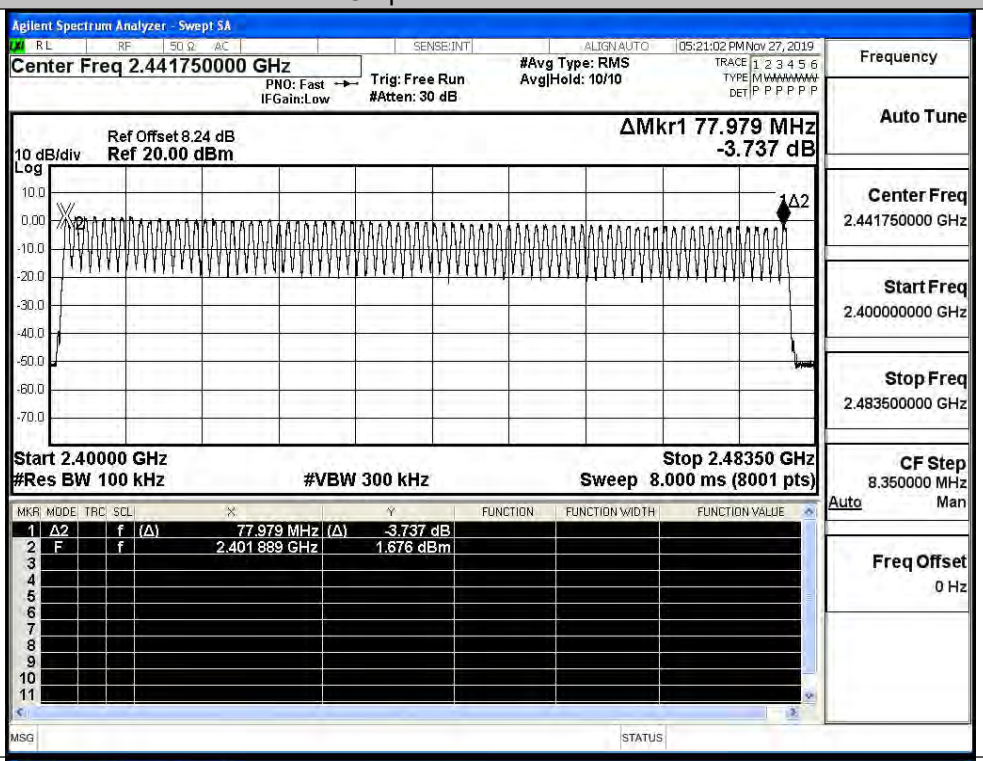
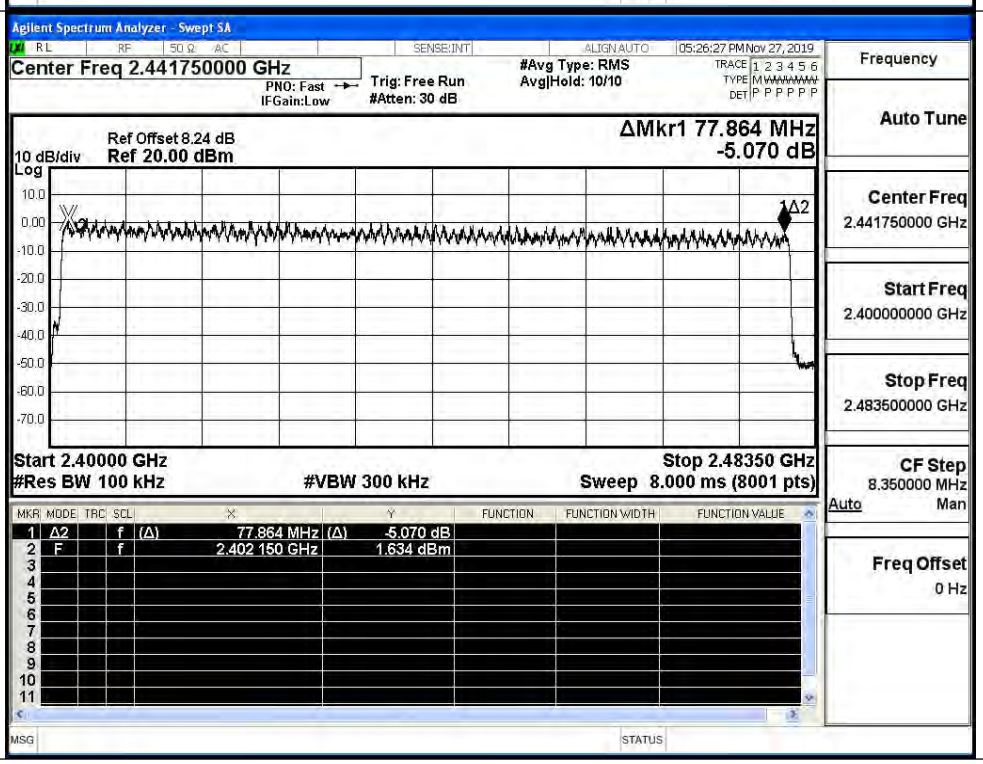
π/4DQPSK/LCH		
π/4DQPSK/MCH		

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
09:24:05 AM Nov 29, 2019
Ref Offset 8.24 dB
10 dB/div Ref 20.00 dBm
ΔMkr1 1.126 MHz
2.816 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) 1.126 MHz (Δ) 2.816 dB
2 F f 2.479 006 GHz -1.442 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

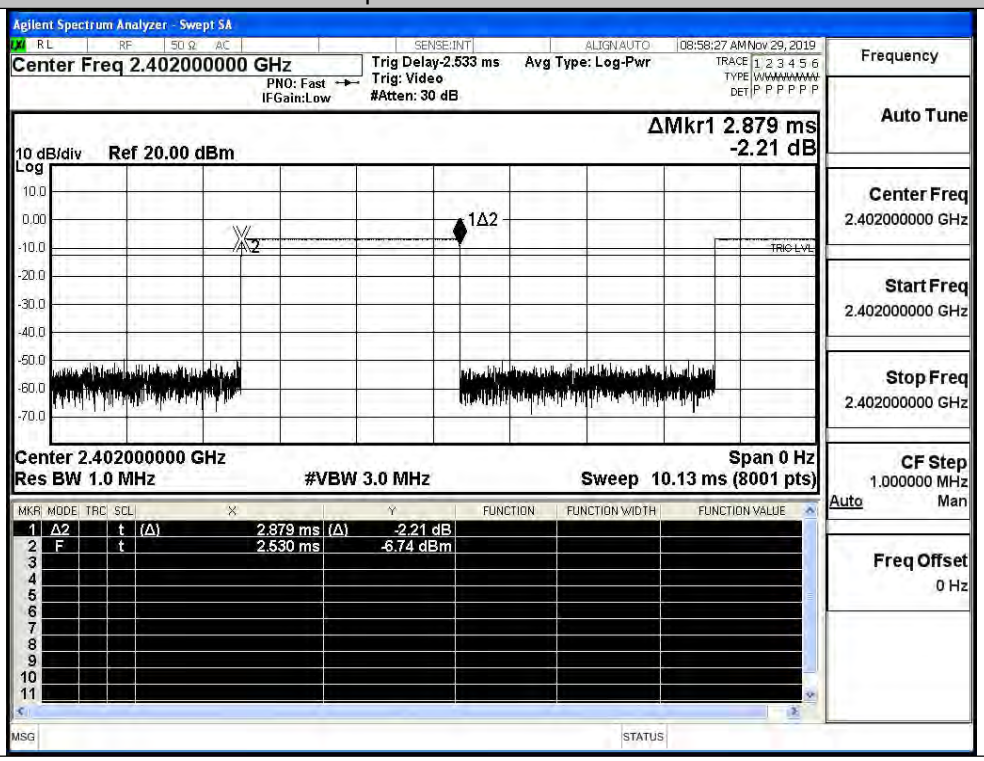
A.4 Hopping Channel Number

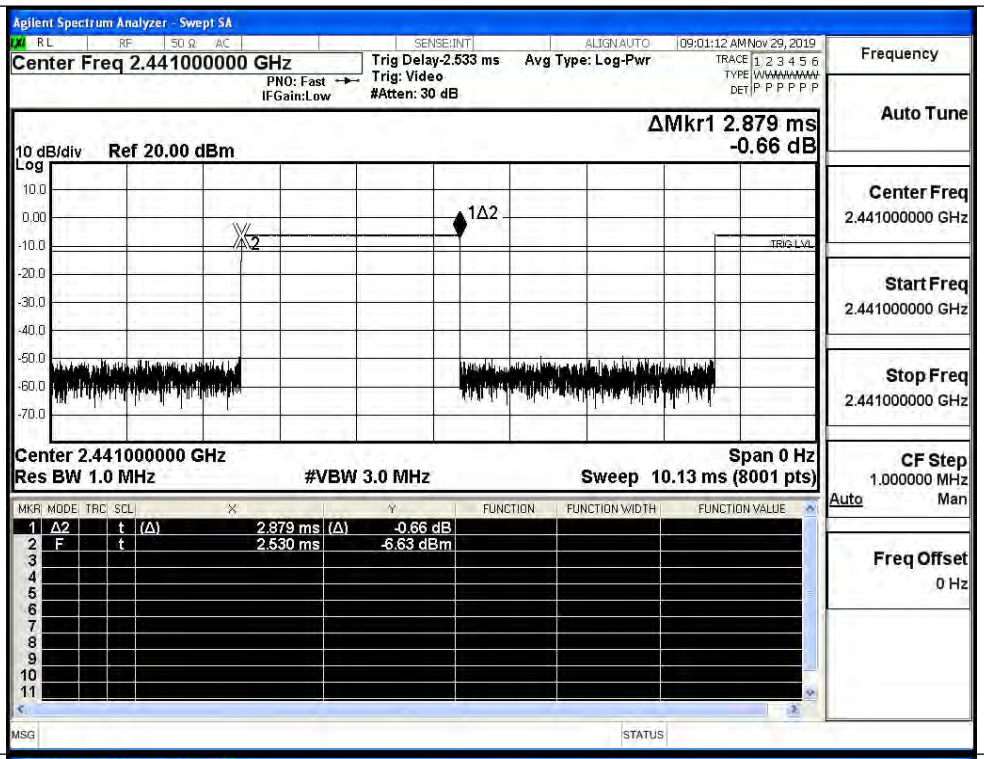
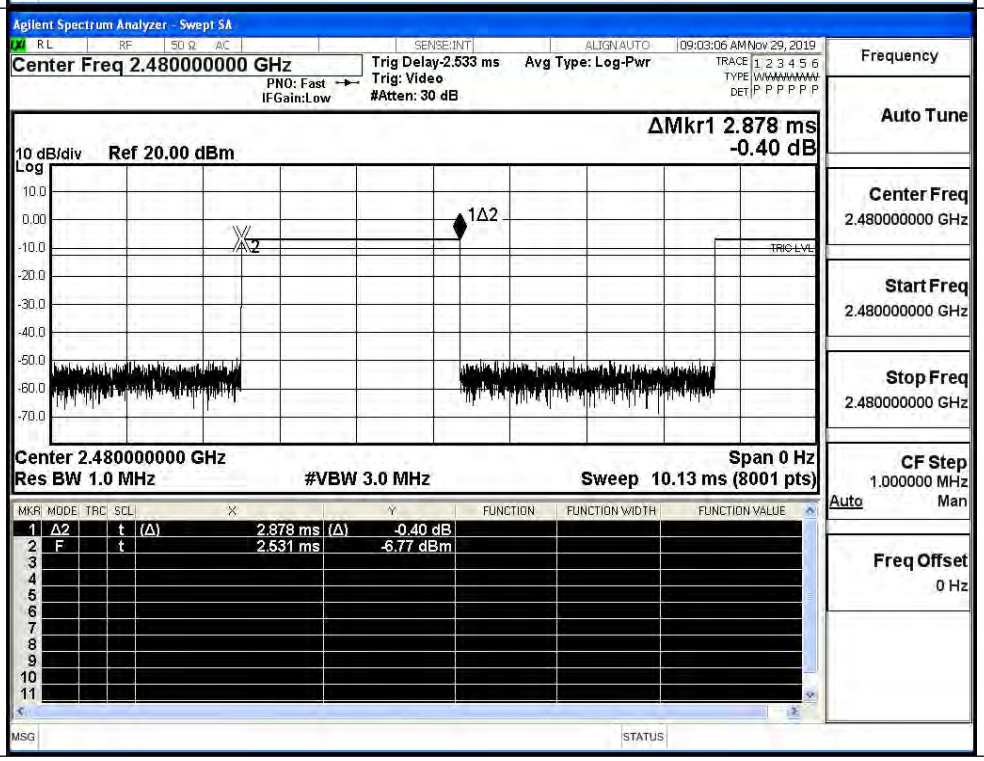
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS

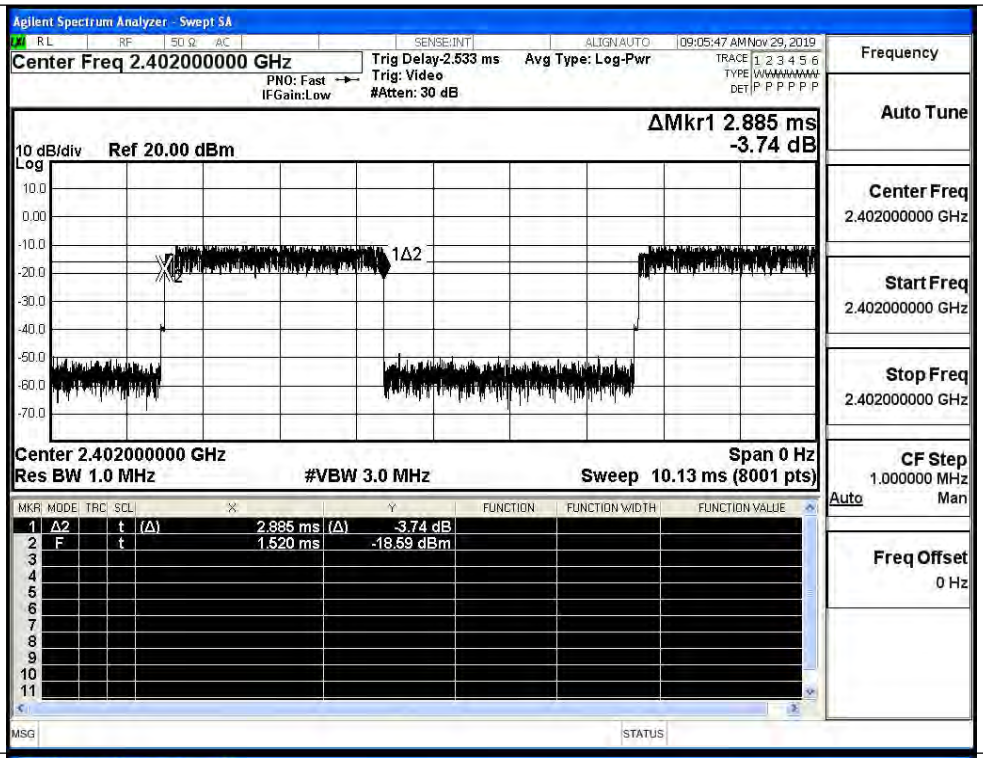
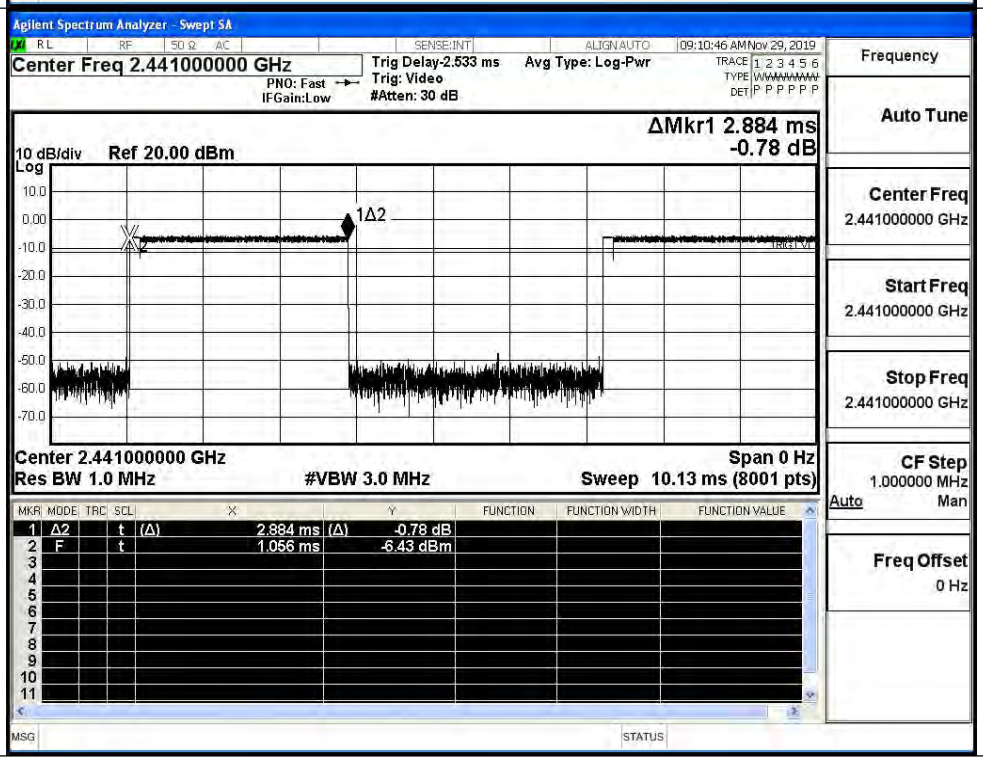
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

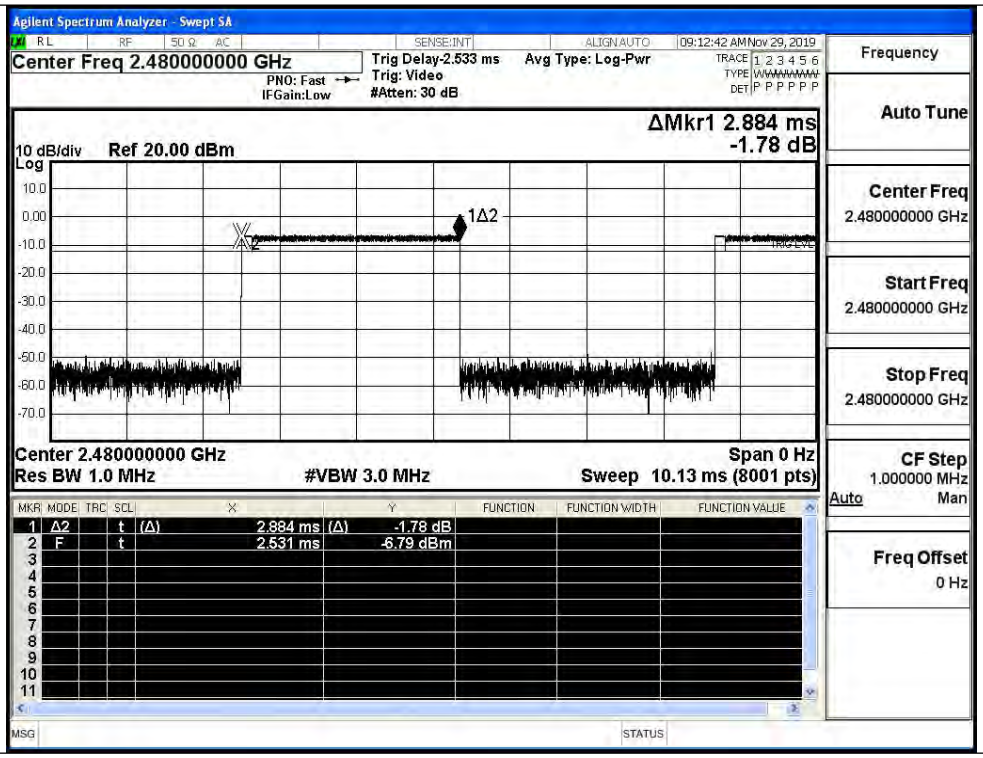
A.5 Dwell Time

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	0.308	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

Test Graphs	
GFSK_DH5/LCH	

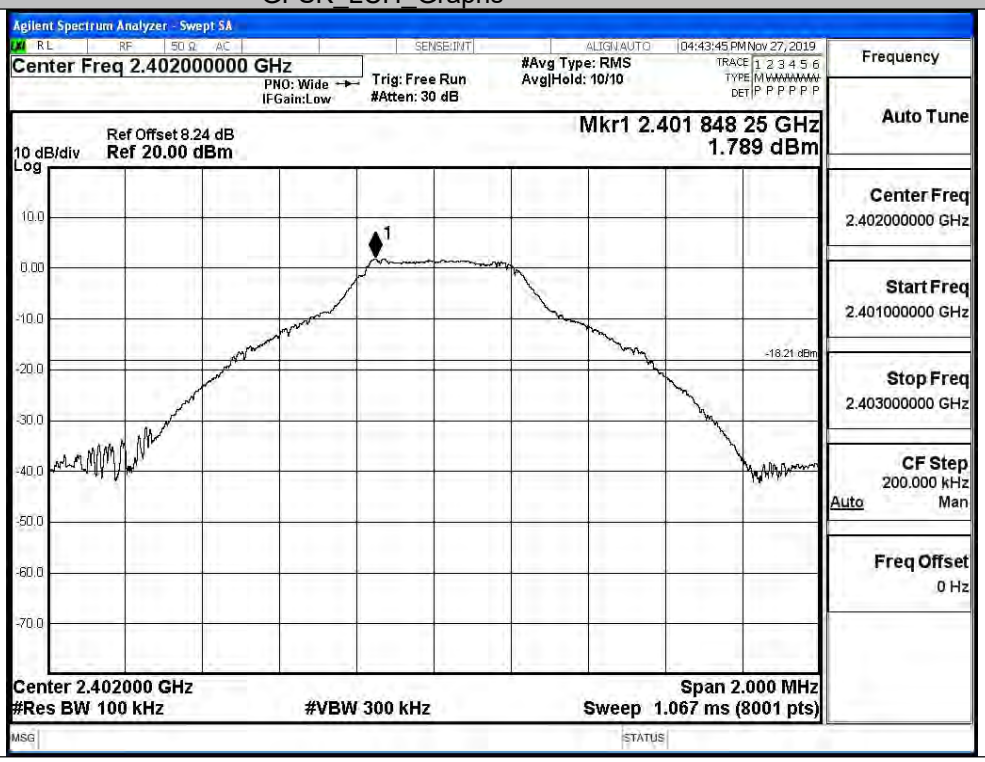
GFSK_DH5/MCH	
GFSK_DH5/HCH	

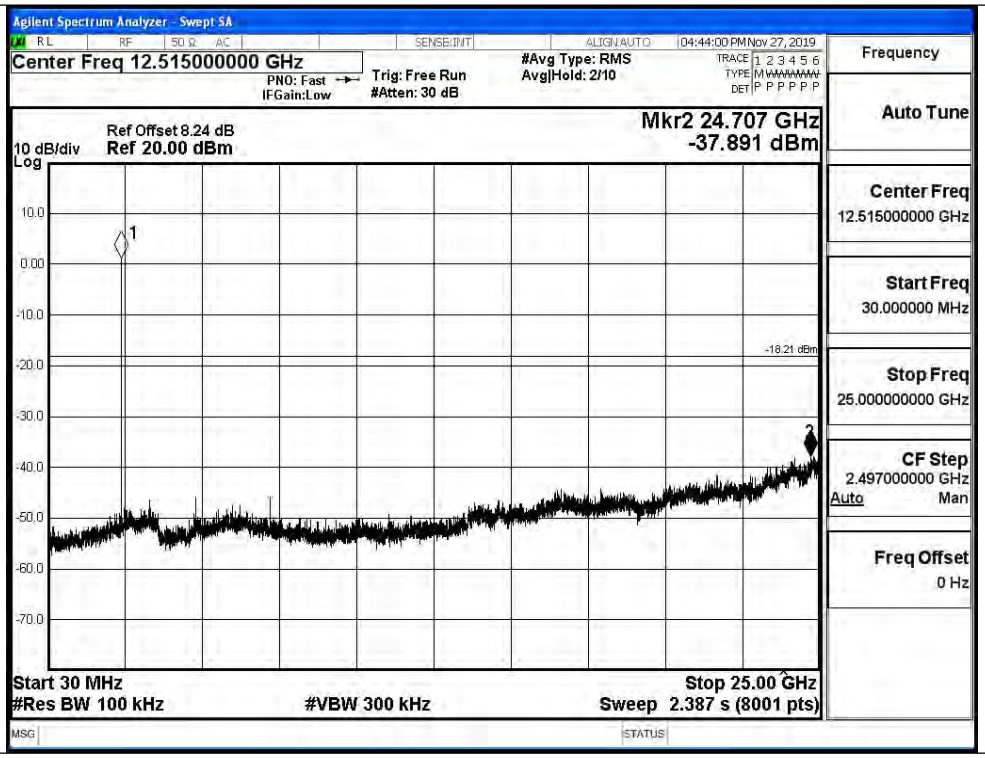
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

π/4DQPSK _2DH5/HCH	

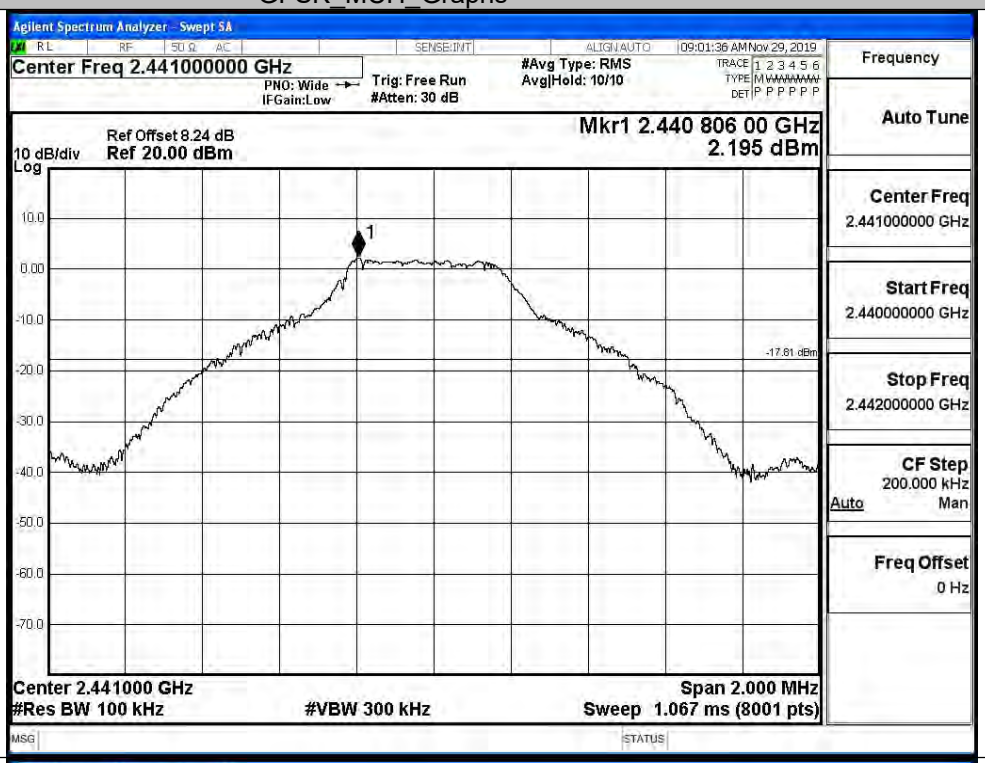
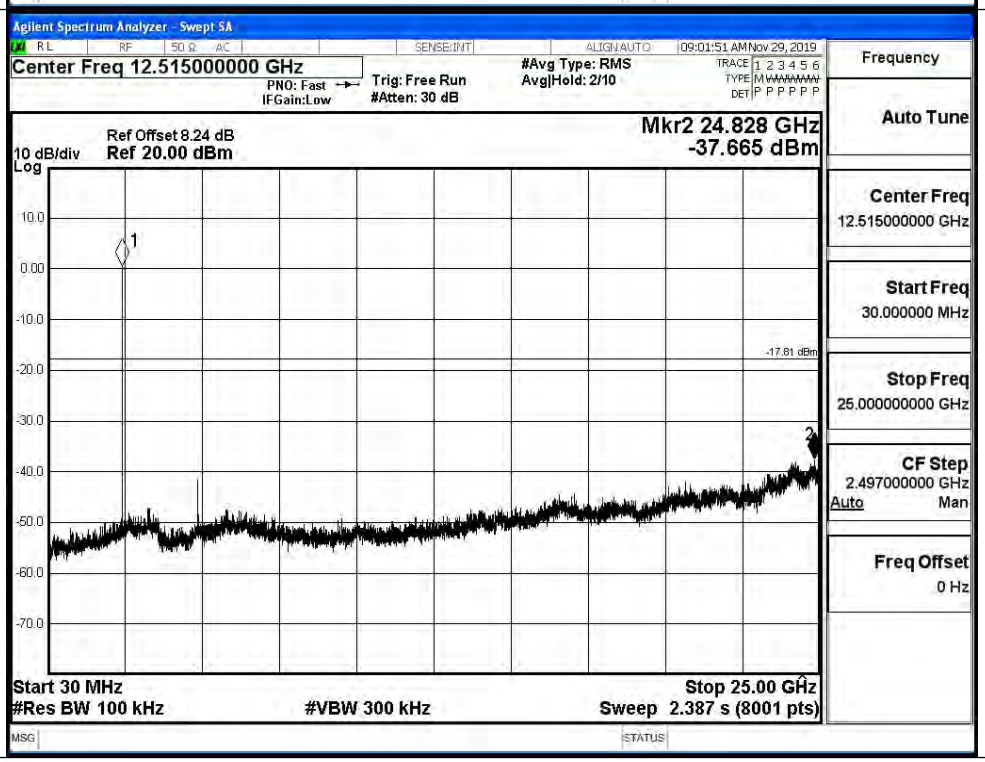
A.6 RF Conducted Spurious Emissions

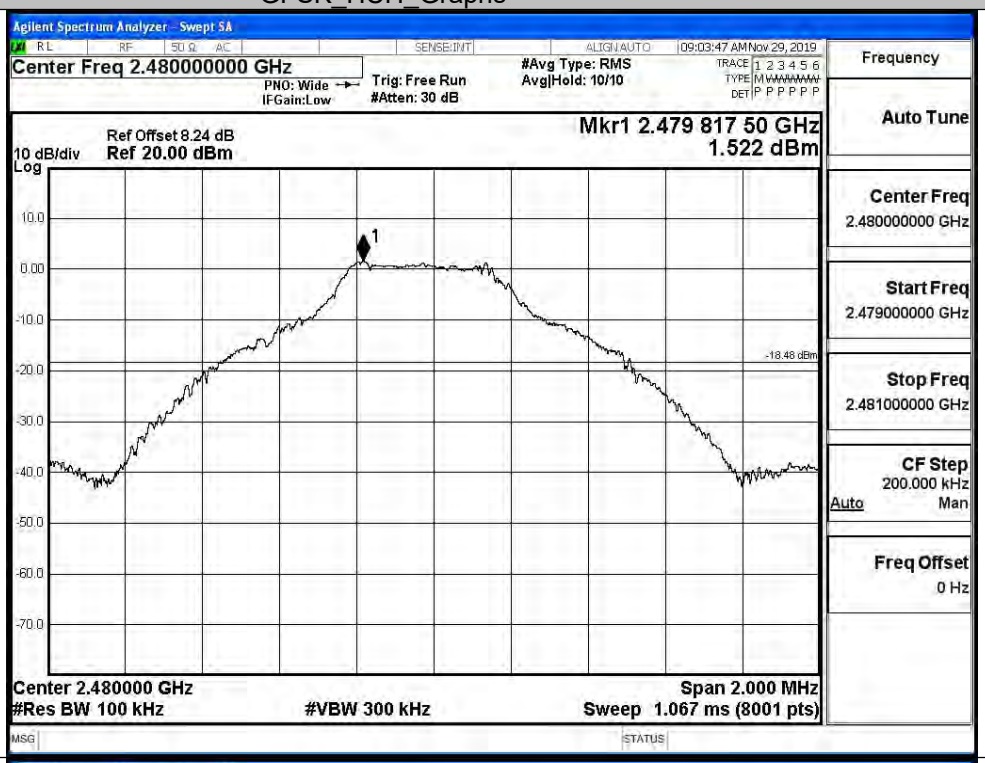
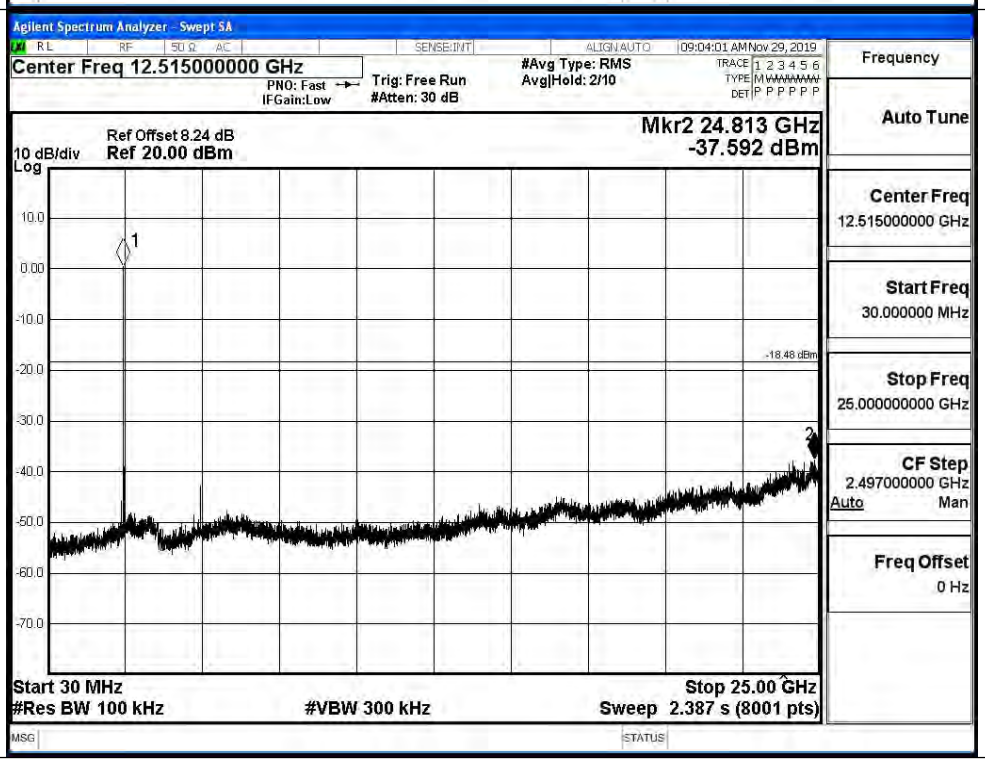
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.789	-37.891	-18.211	PASS
	MCH	2.195	-37.665	-17.805	PASS
	HCH	1.522	-37.592	-18.478	PASS
π/4DQPSK	LCH	2.35	-38.349	-17.650	PASS
	MCH	1.892	-37.242	-18.108	PASS
	HCH	1.358	-37.741	-18.642	PASS

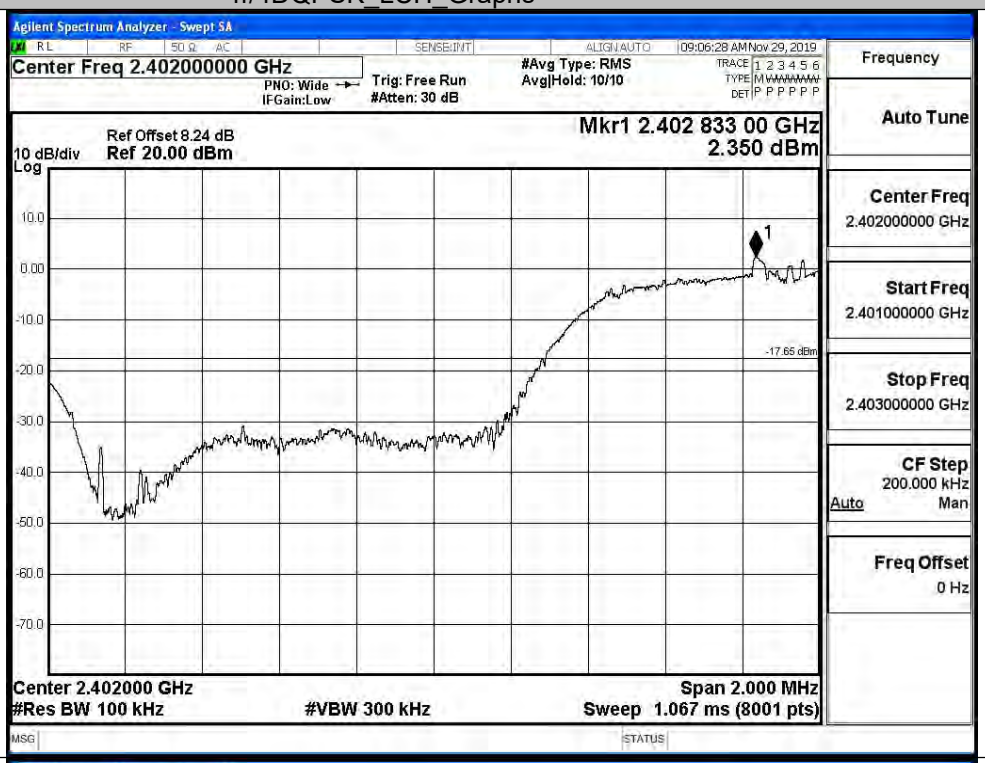
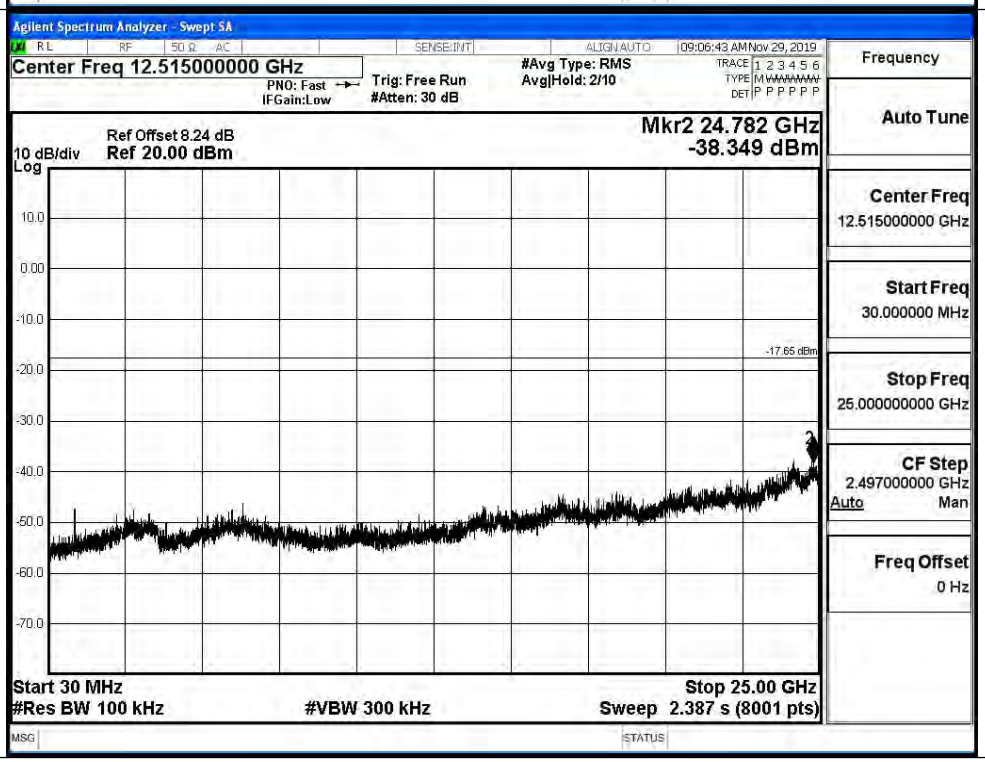
GFSK_LCH_Graphs		
Pref		

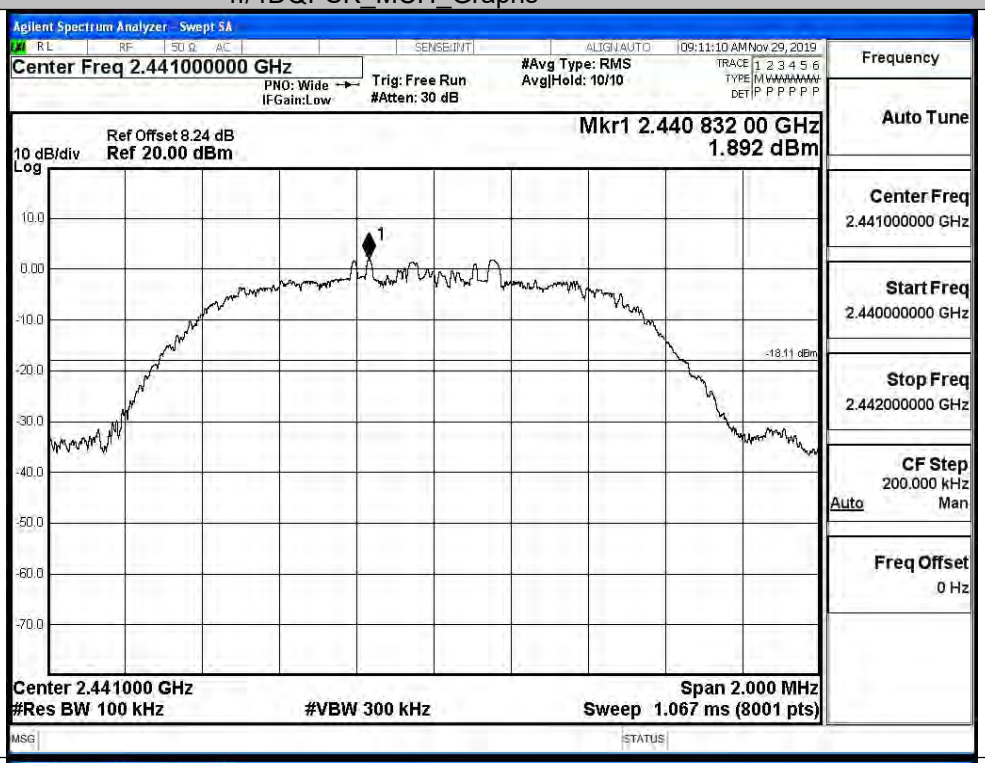
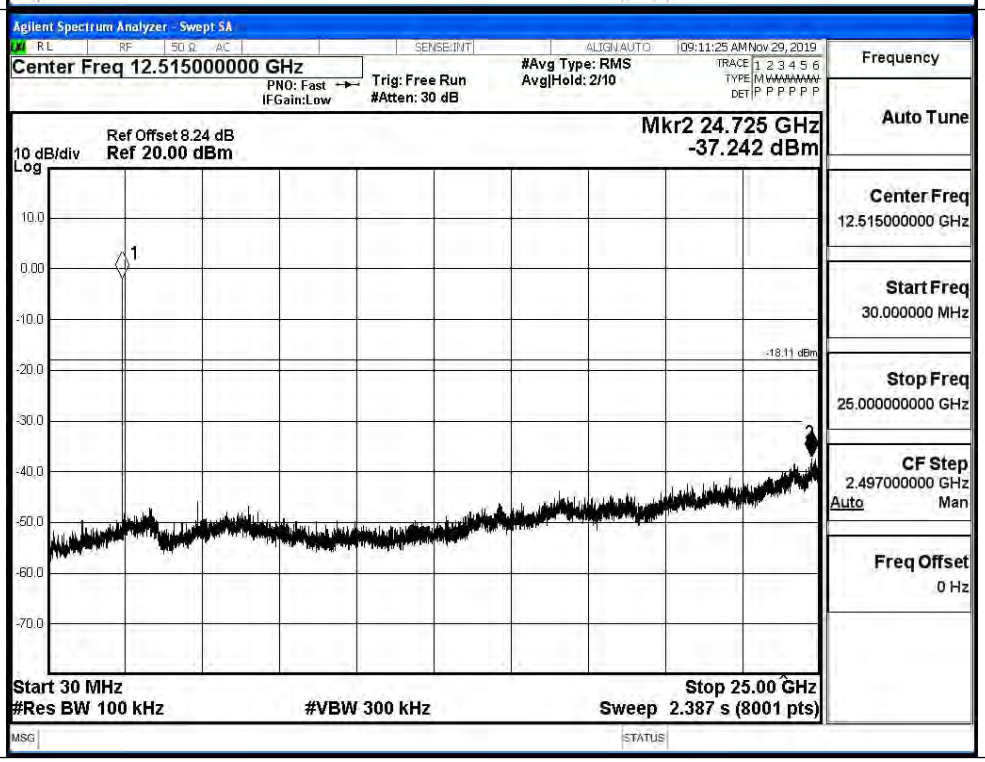
Puw		

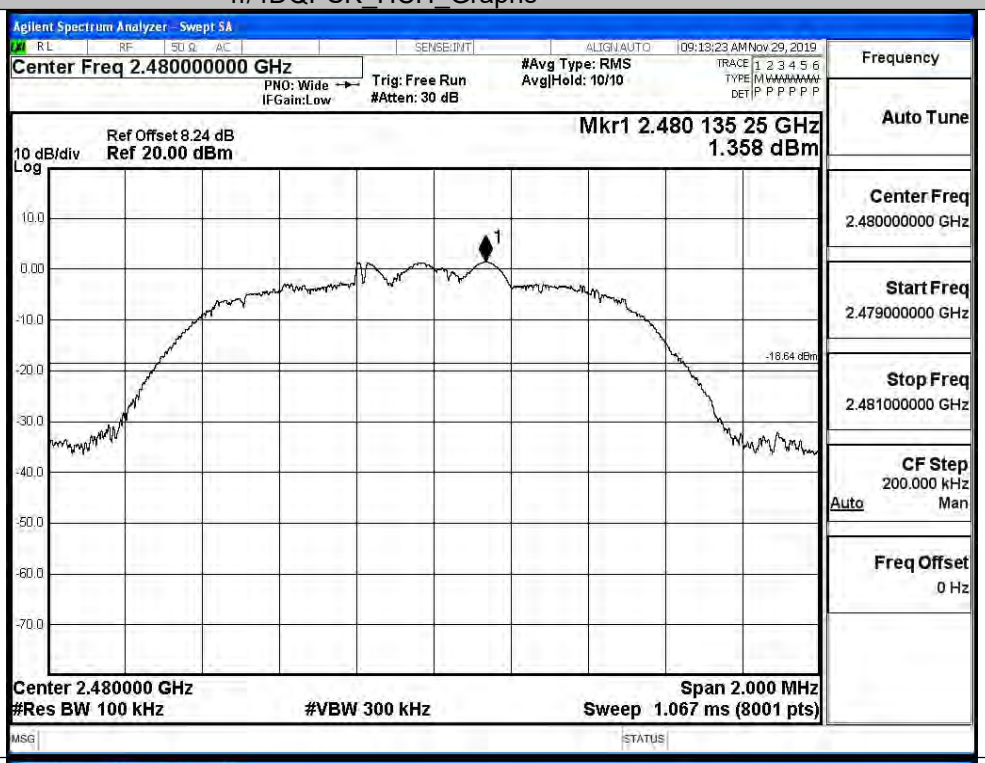
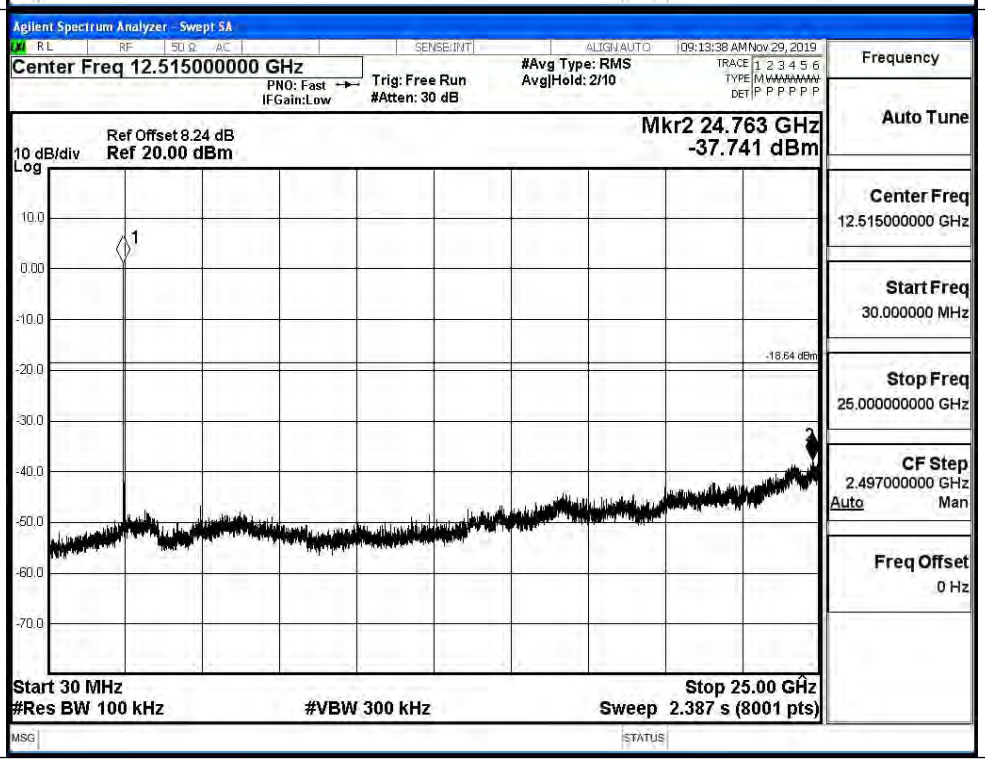
Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
04:44:00 PM Nov 27, 2019
Ref Offset 8.24 dB
10 dB/div Ref 20.00 dBm
Log
Mkr2 24.707 GHz
-37.891 dBm
-18.21 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 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		

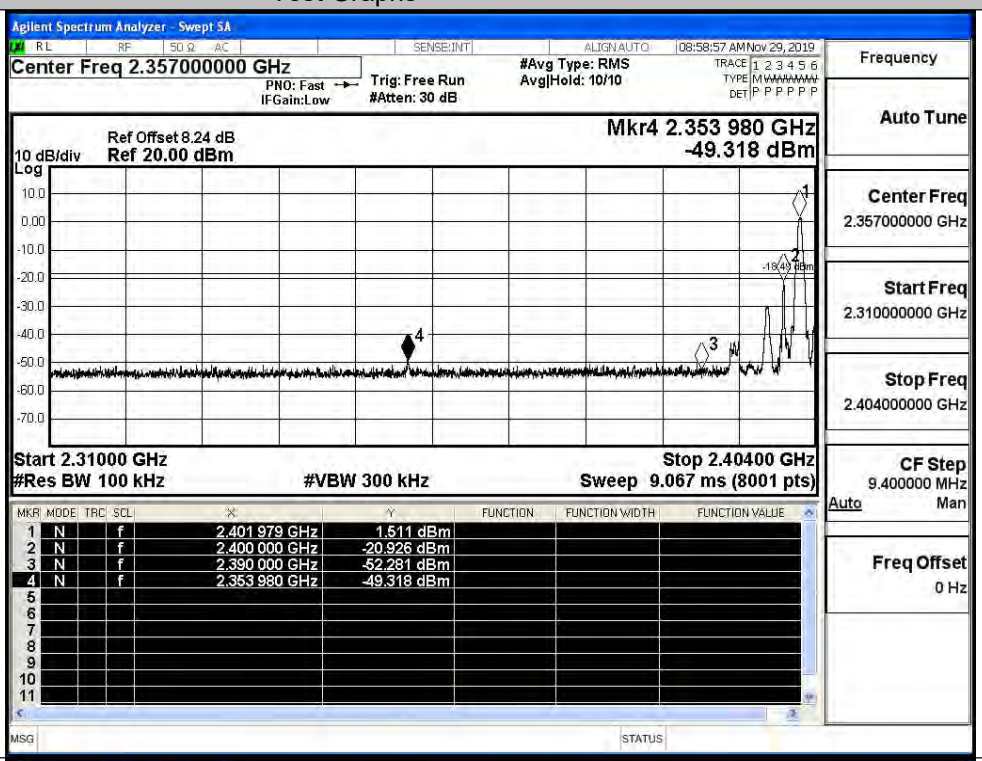
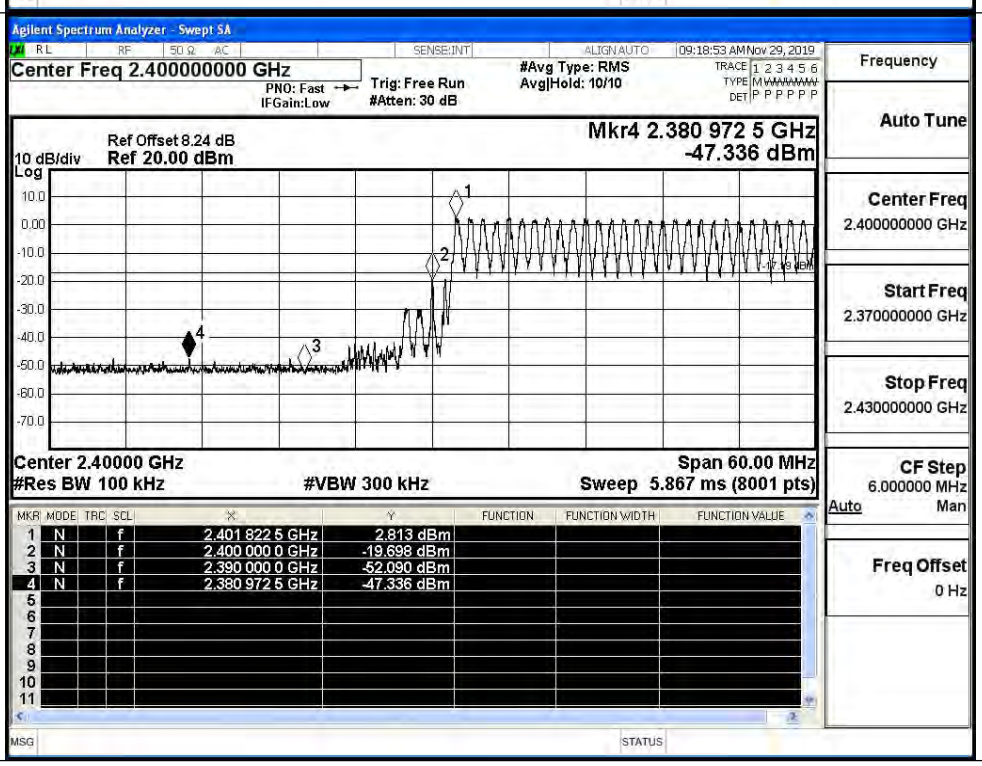
π/4DQPSK_LCH_Graphs		
Pref		
Puw		

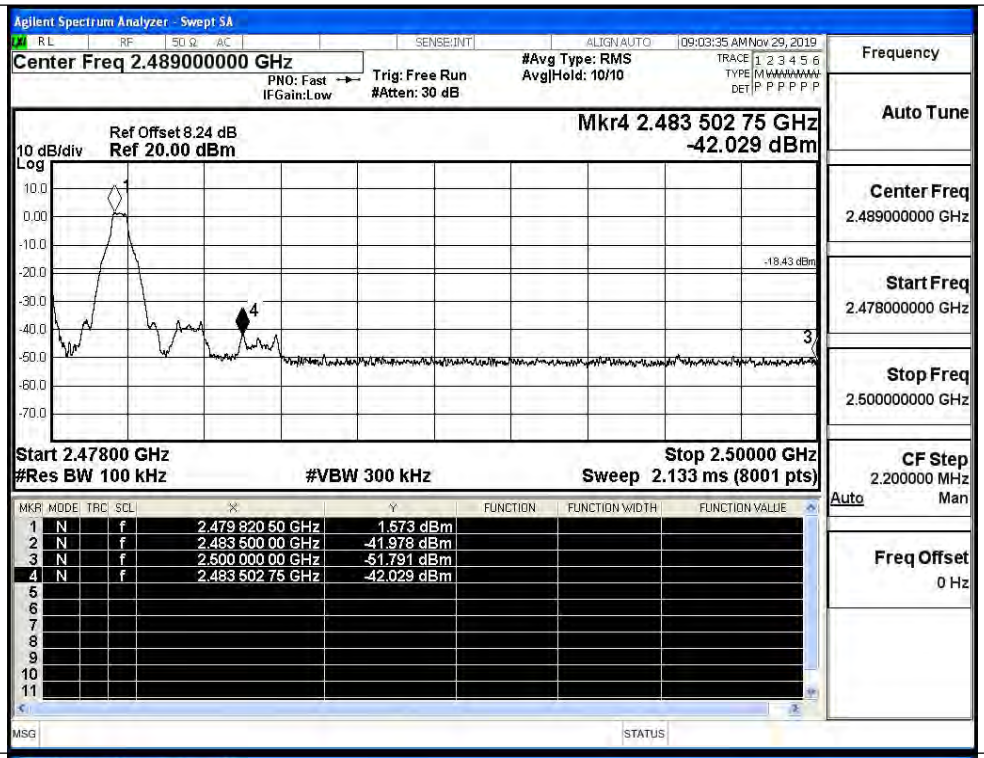
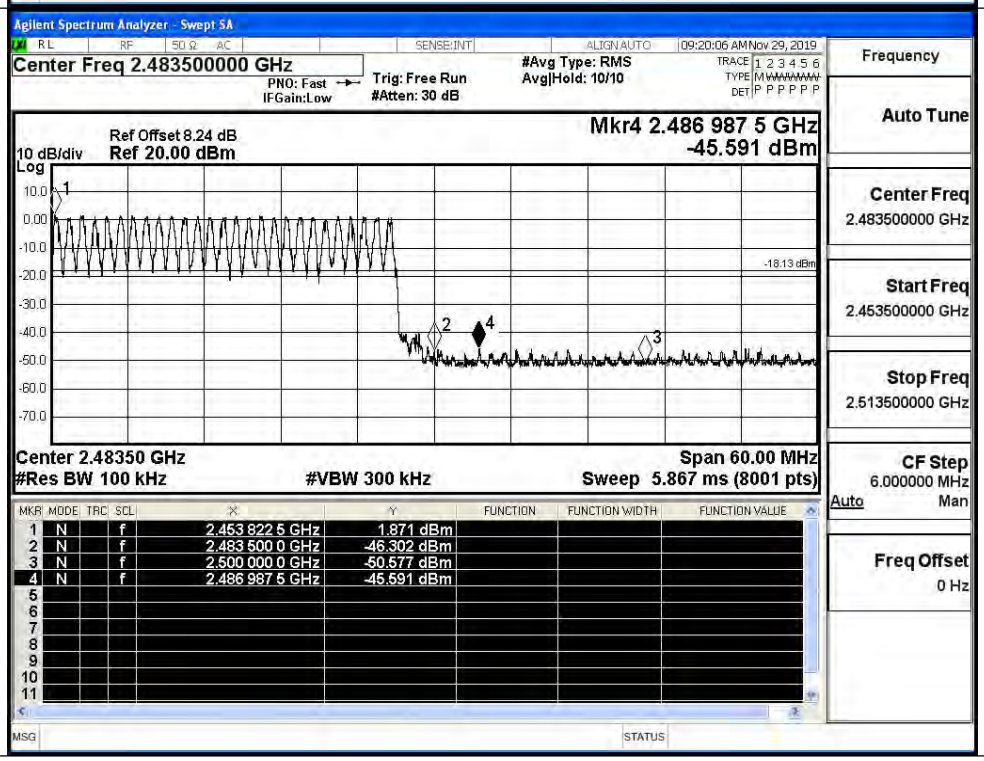
π/4DQPSK_MCH_Graphs			
Pref			
Puw			

π/4DQPSK_HCH_Graphs			
Pref			
Puw			

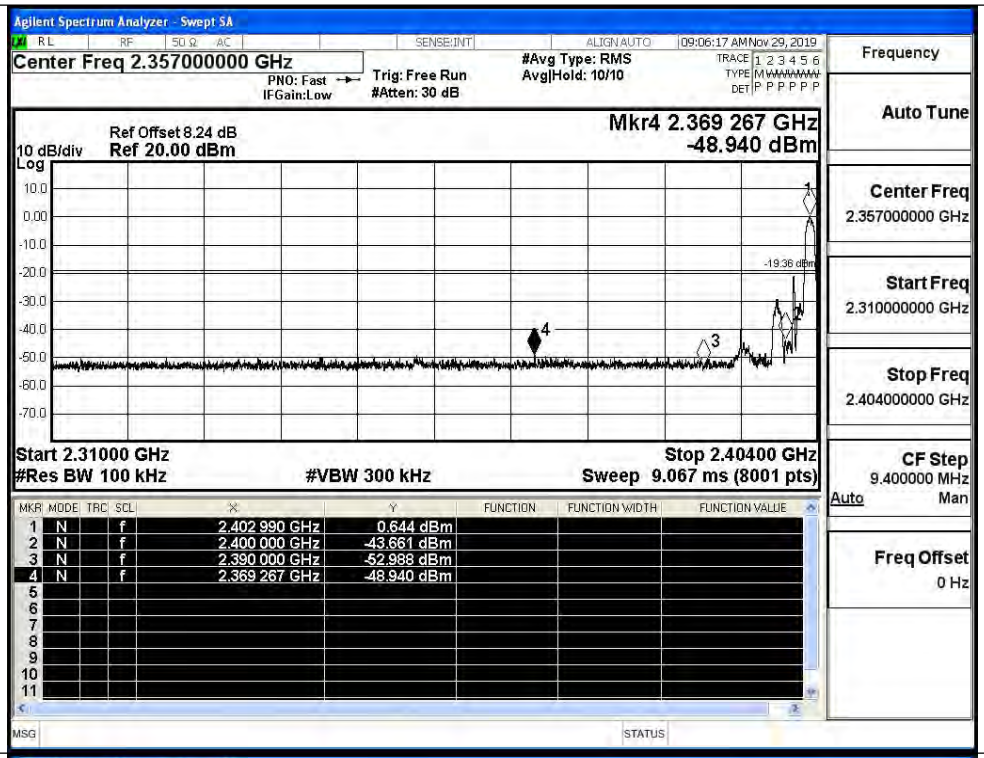
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.511	Off	-49.318	-18.49	PASS
			2.813	On	-47.336	-17.19	PASS
	HCH	2480	1.573	Off	-42.029	-18.43	PASS
			1.871	On	-45.591	-18.13	PASS
π/4DQPSK	LCH	2402	0.644	Off	-48.940	-19.36	PASS
			2.551	On	-46.962	-17.45	PASS
	HCH	2480	1.506	Off	-44.831	-18.49	PASS
			1.841	On	-46.107	-18.16	PASS

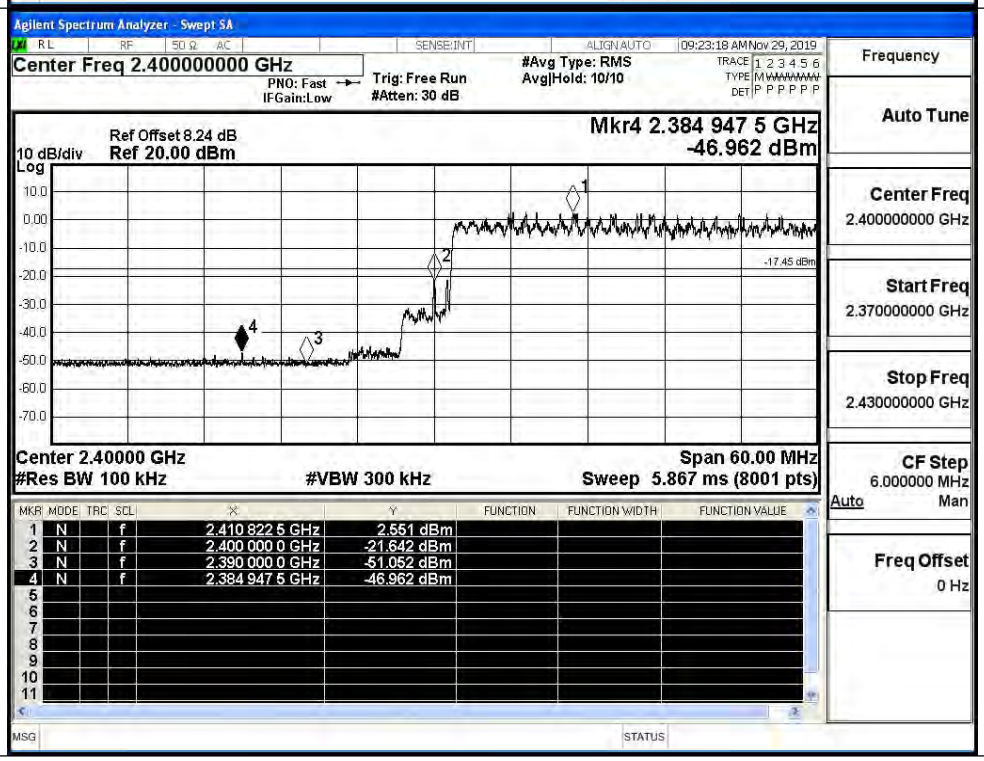
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

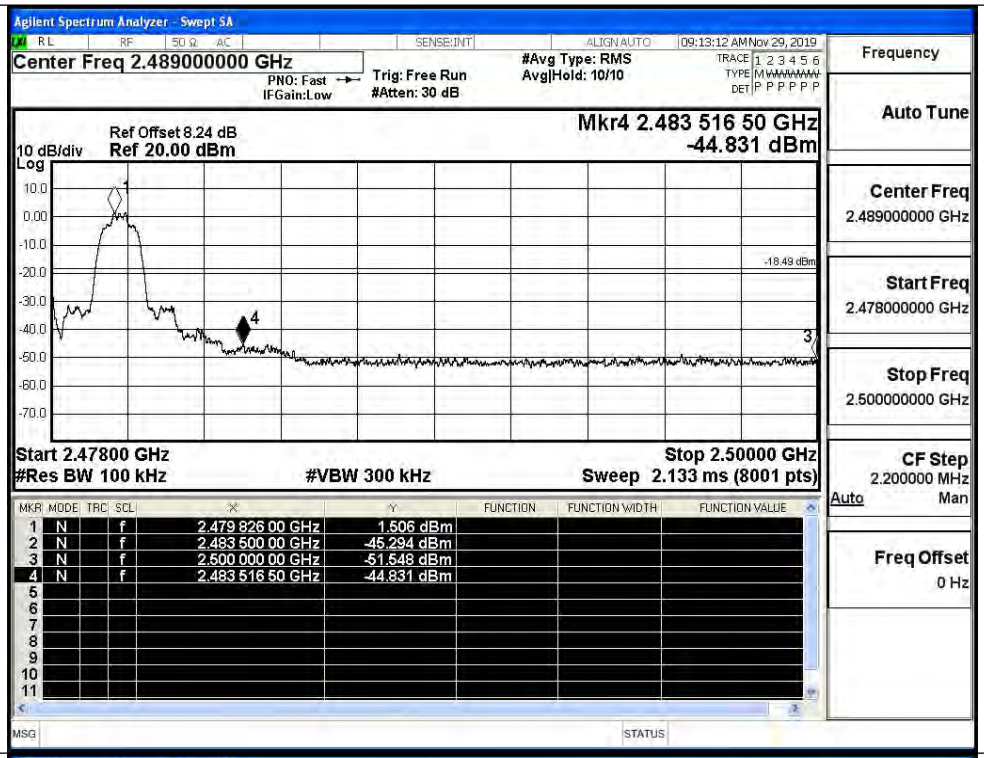
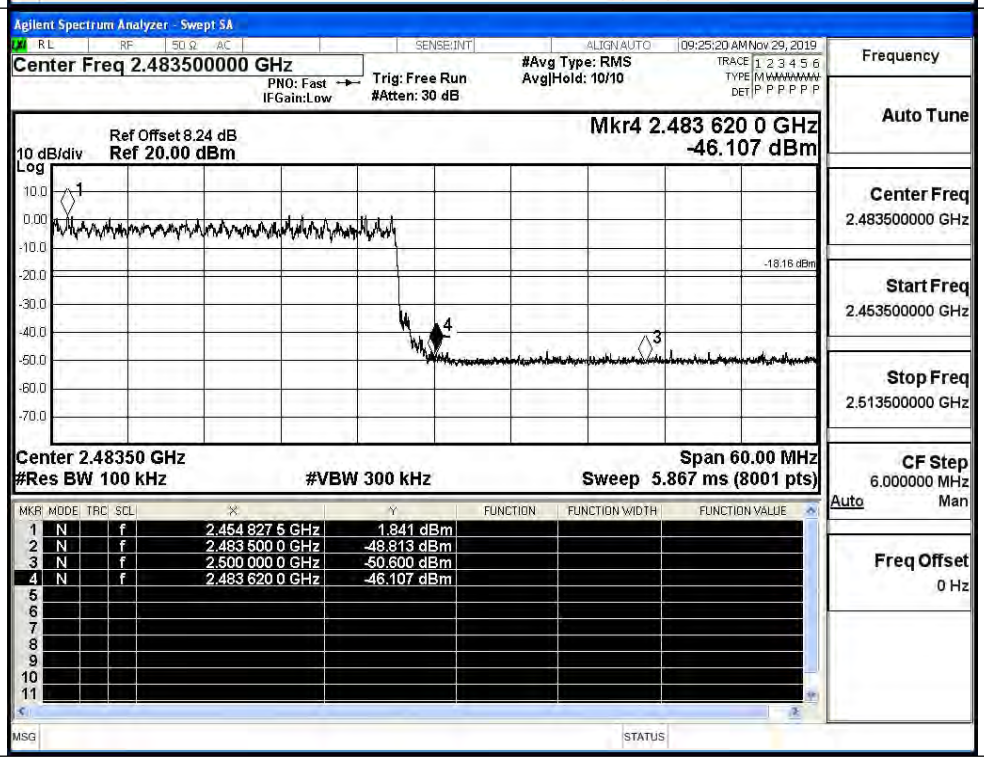
GFSK/HCH/No Hop	
GFSK/HCH/Hop	

π/4DQPSK/LCH/No Hop



π/4DQPSK/LCH/Hop

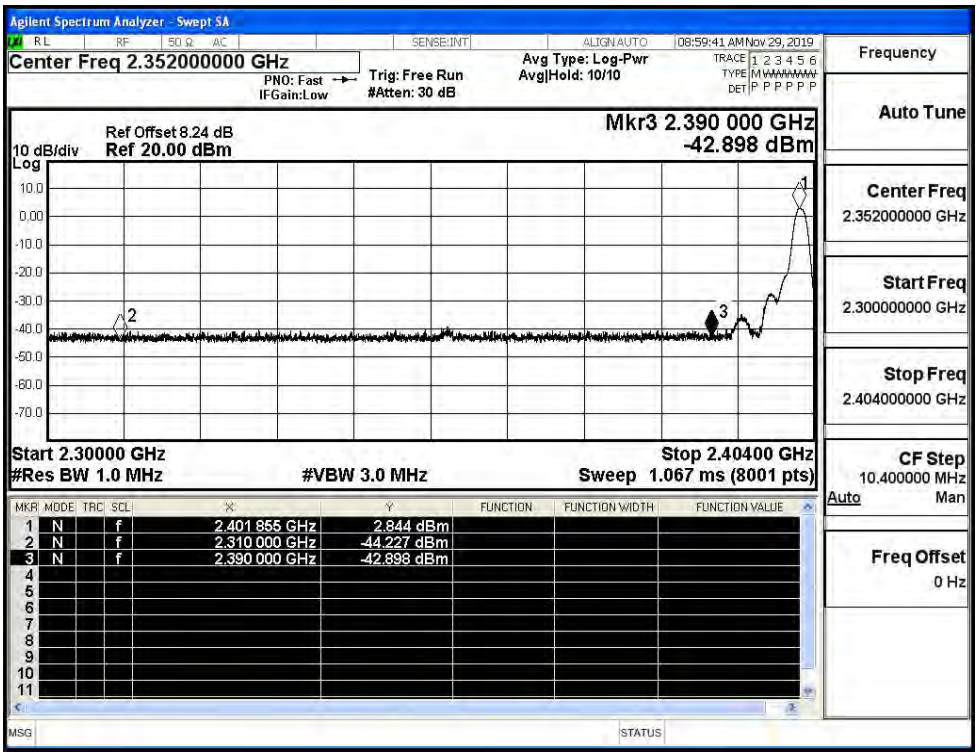


π/4DQPSK/HCH/No Hop	
π/4DQPSK/HCH/Hop	

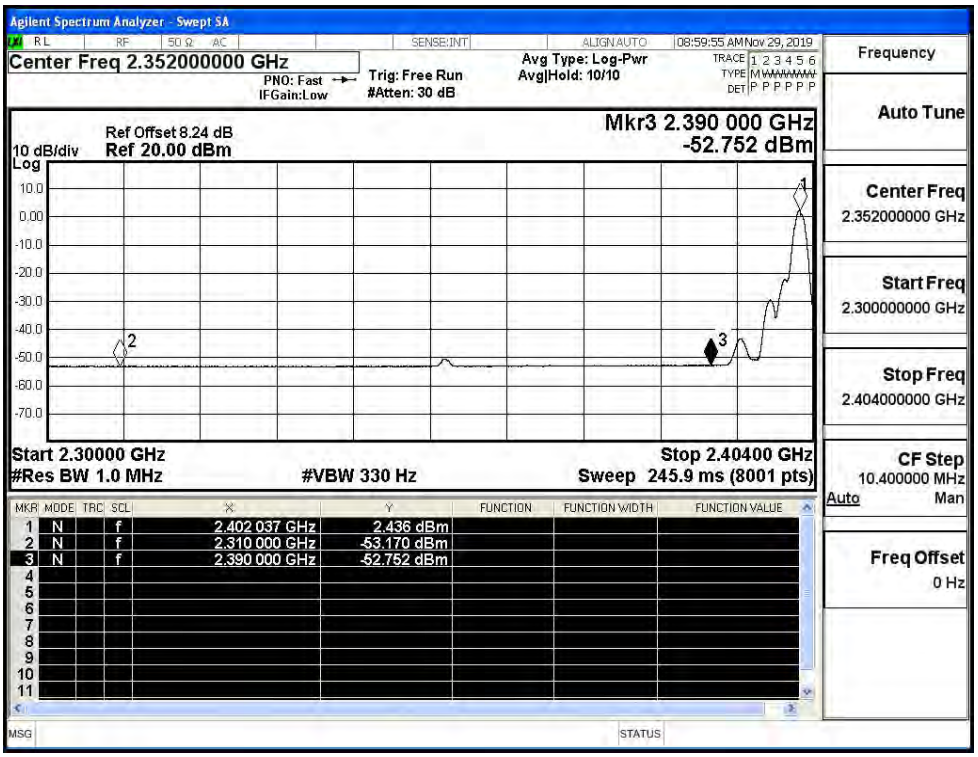
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.23	2.0	0	51.03	PEAK	74	PASS
	Off	2310.0	-53.17	2.0	0	42.09	AV	54	PASS
	Off	2390.0	-42.90	2.0	0	52.36	PEAK	74	PASS
	Off	2390.0	-52.75	2.0	0	42.51	AV	54	PASS
	Off	2483.5	-37.27	2.0	0	57.99	PEAK	74	PASS
	Off	2483.5	-45.83	2.0	0	49.42	AV	54	PASS
	Off	2500.0	-41.46	2.0	0	53.80	PEAK	74	PASS
	Off	2500.0	-52.12	2.0	0	43.14	AV	54	PASS
π/4DQPSK	Off	2310.0	-41.29	2.0	0	53.97	PEAK	74	PASS
	Off	2310.0	-53.18	2.0	0	42.07	AV	54	PASS
	Off	2390.0	-42.78	2.0	0	52.47	PEAK	74	PASS
	Off	2390.0	-52.78	2.0	0	42.48	AV	54	PASS
	Off	2483.5	-37.78	2.0	0	57.48	PEAK	74	PASS
	Off	2483.5	-47.23	2.0	0	48.03	AV	54	PASS
	Off	2500.0	-41.66	2.0	0	53.59	PEAK	74	PASS
	Off	2500.0	-52.13	2.0	0	43.13	AV	54	PASS

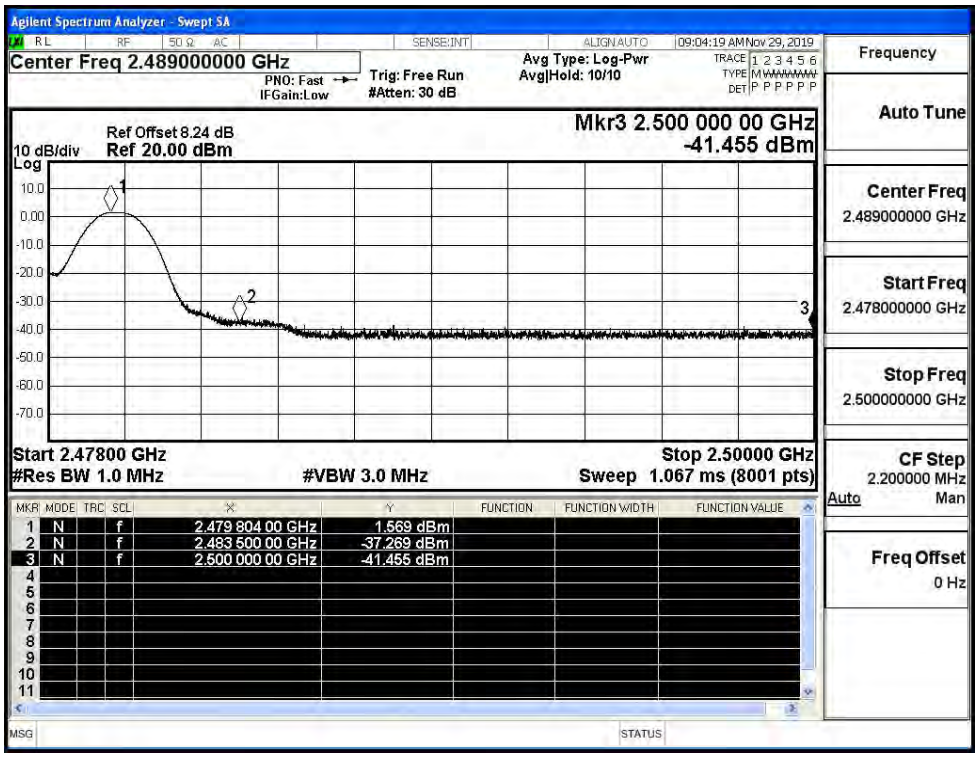
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



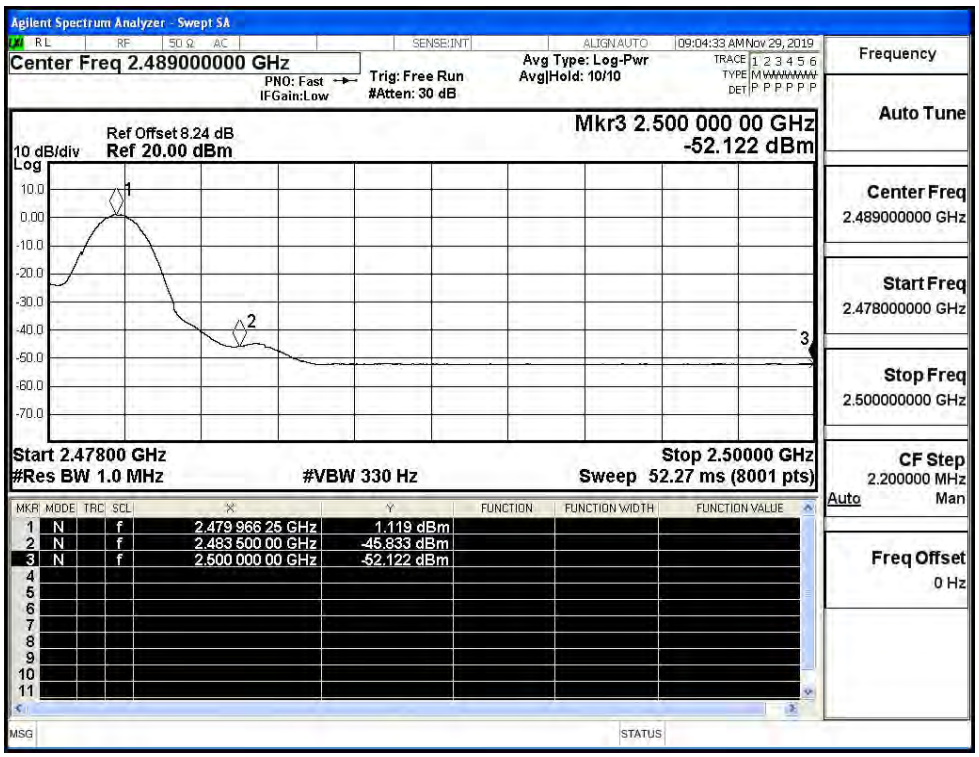
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



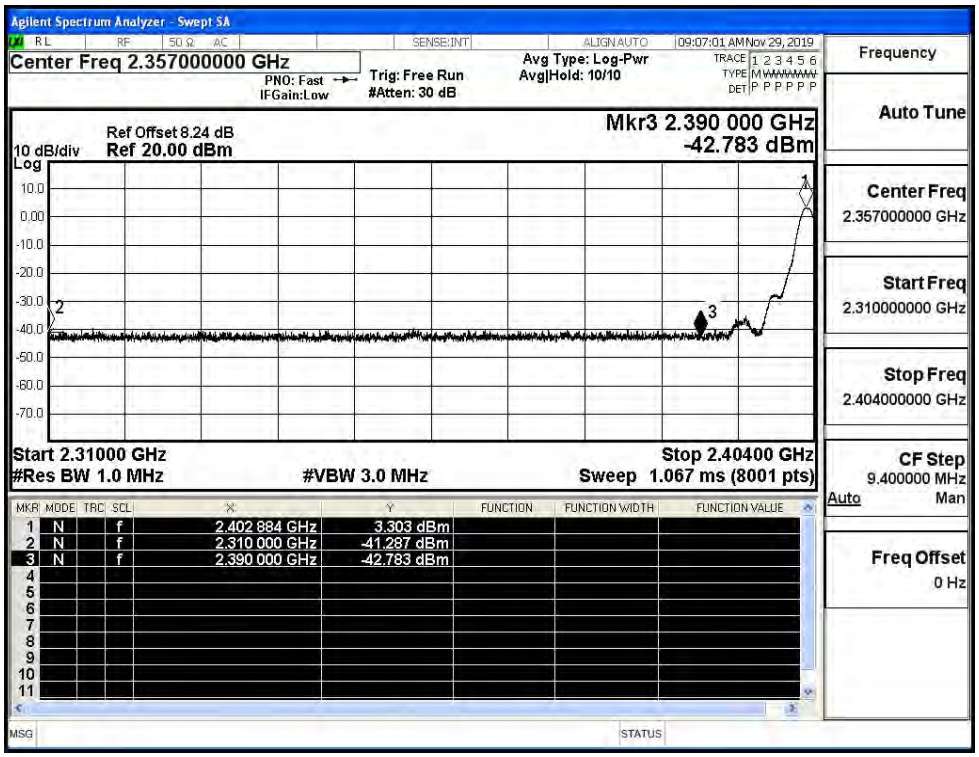
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



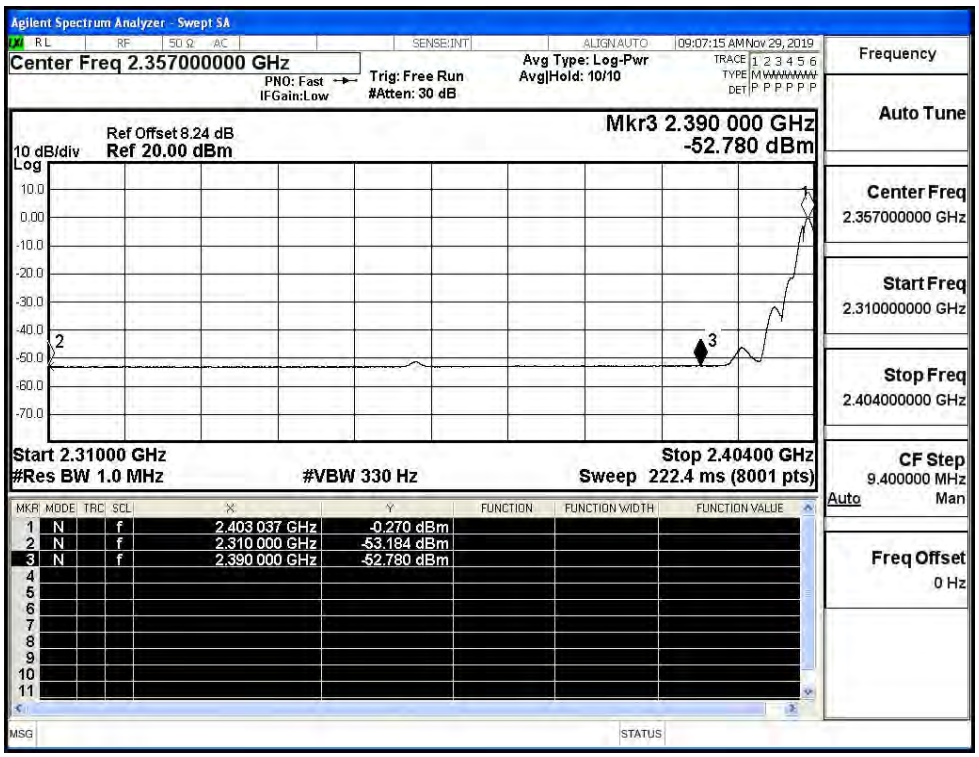
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



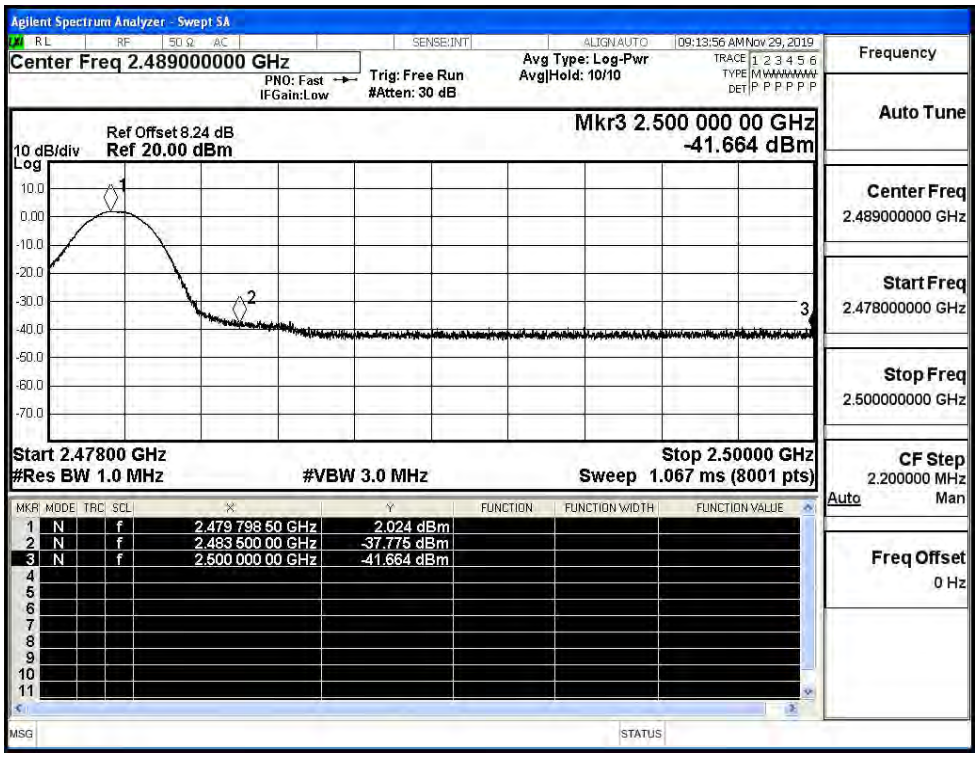
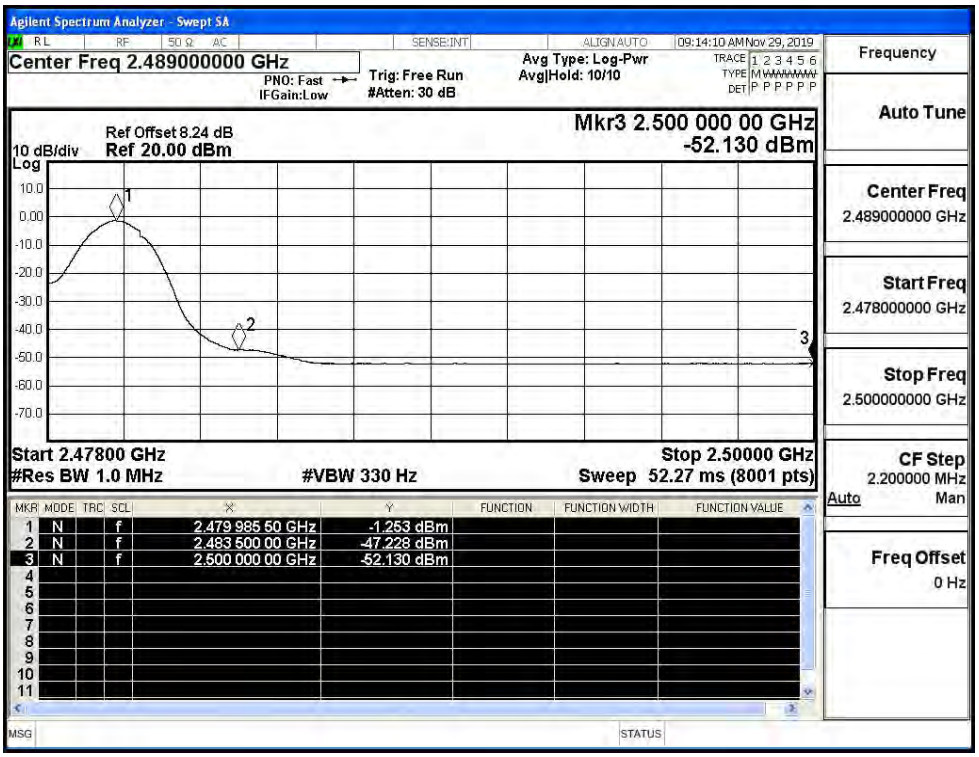
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)