Appendix A

RF Test Data for BT 2.0+EDR (Conducted Measurement)

Product Name: MULTIMEDIA SPEAKERS

Trade Mark: AXESS

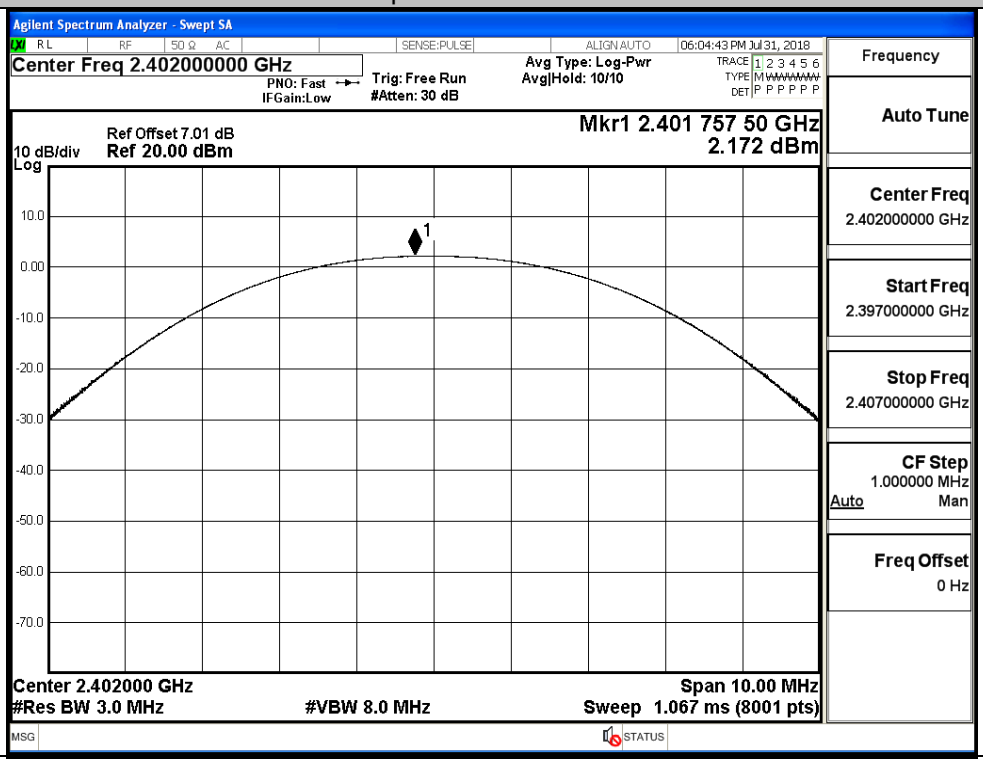
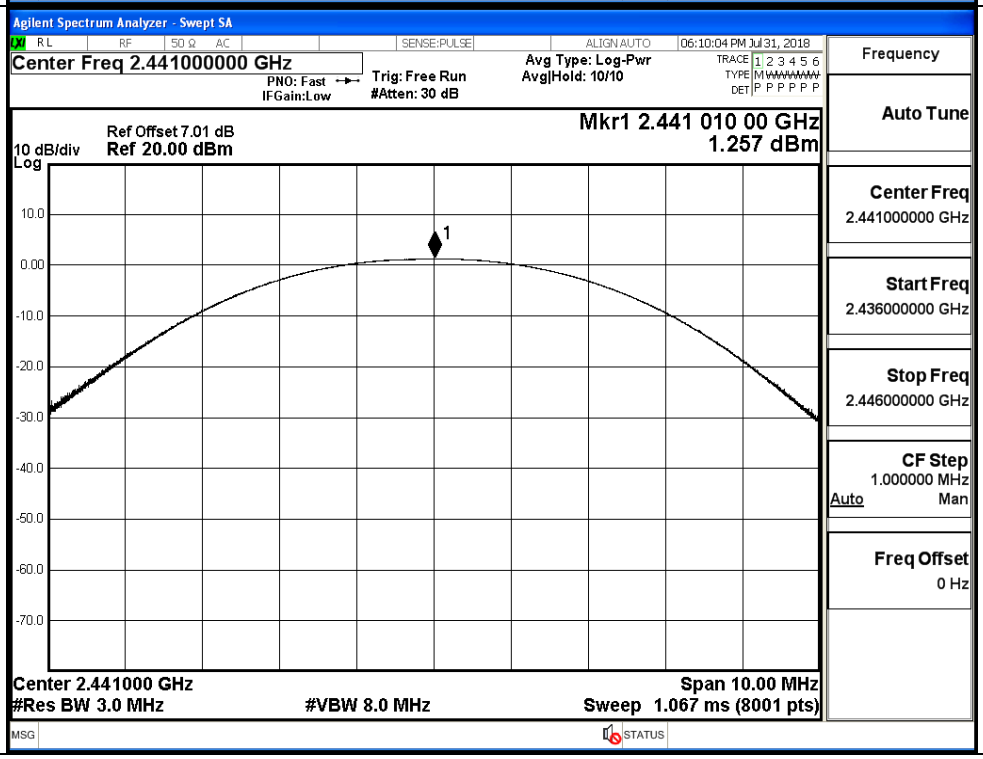
Test Model: MSBT3911

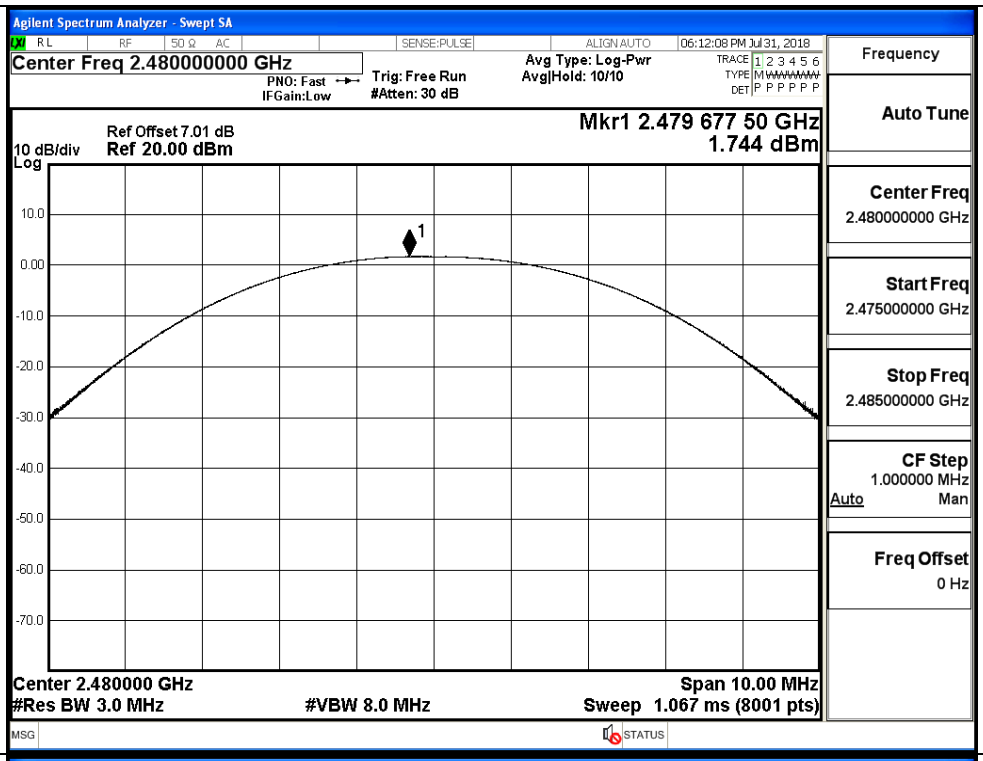
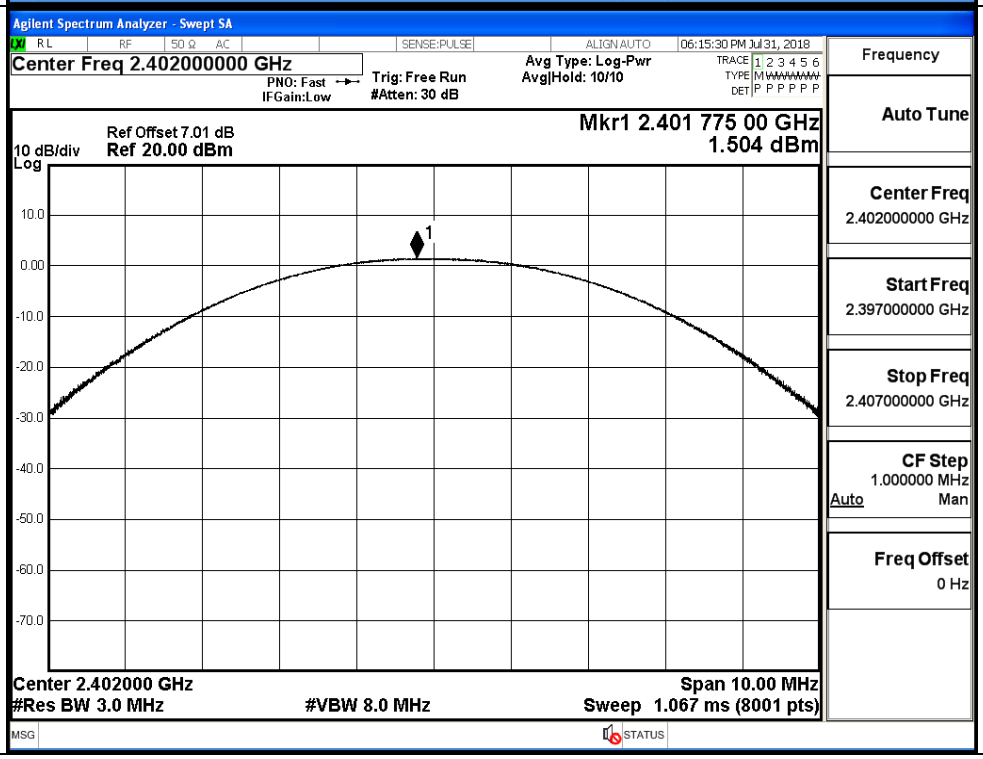
Environmental Conditions

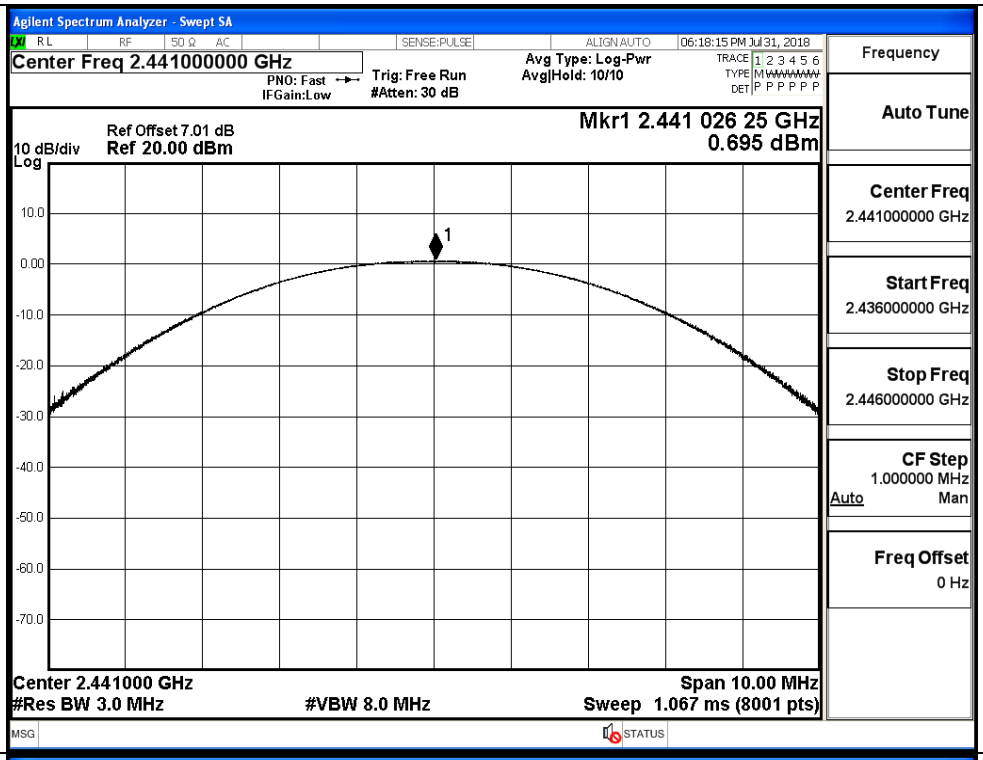
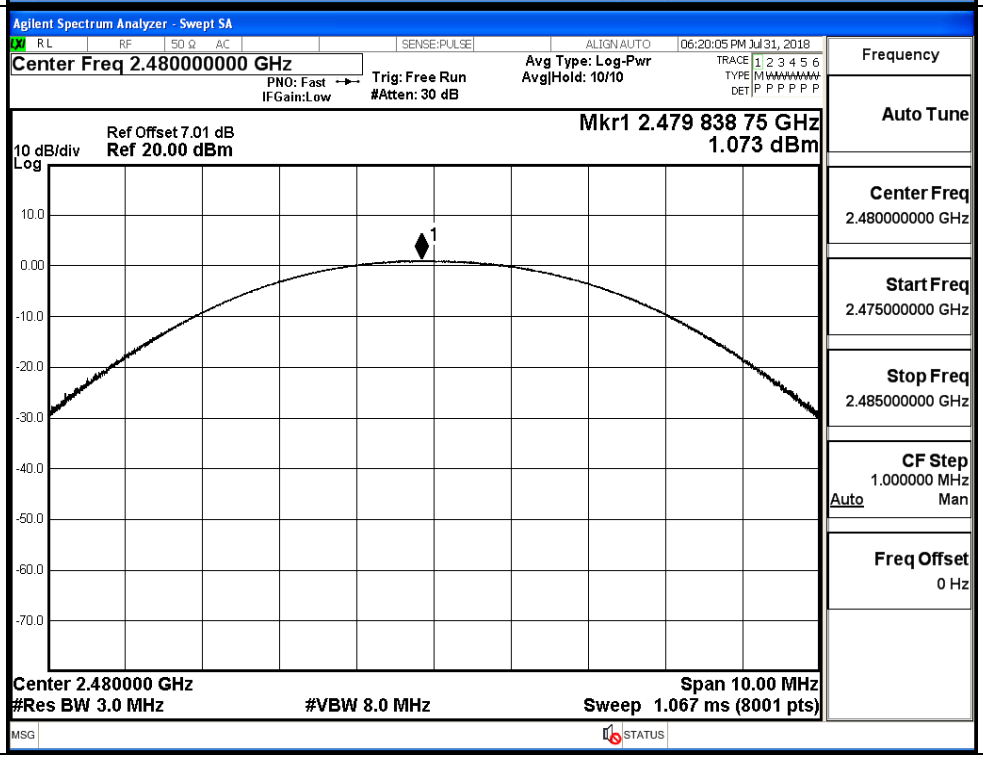
Temperature:	23.3 ° C
Relative Humidity:	52.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.172	30	PASS
	MCH	1.257	30	PASS
	HCH	1.744	30	PASS
π/4DQPSK	LCH	1.504	21	PASS
	MCH	0.695	21	PASS
	HCH	1.073	21	PASS

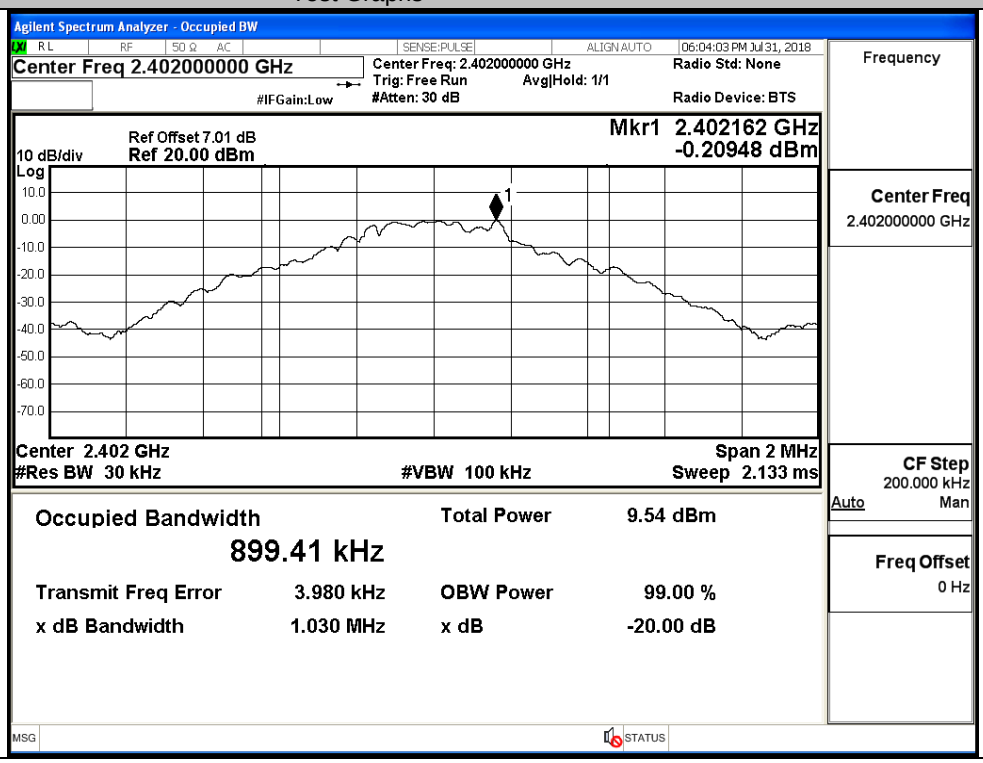
Test Graphs		
GFSK/LCH		
GFSK/MCH		

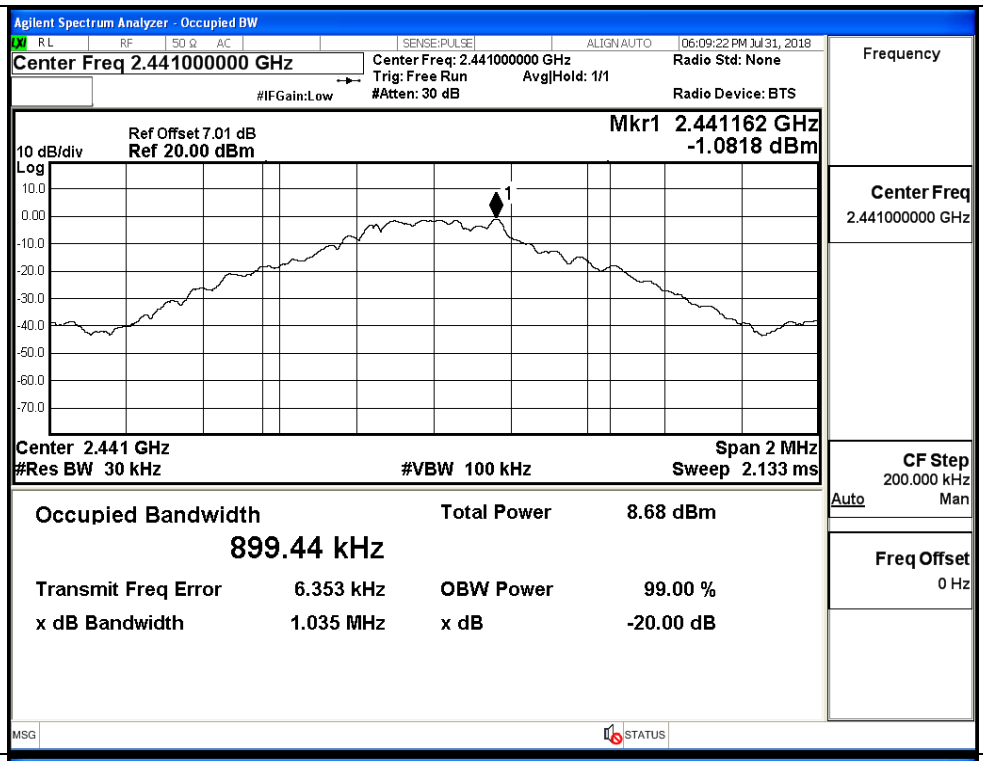
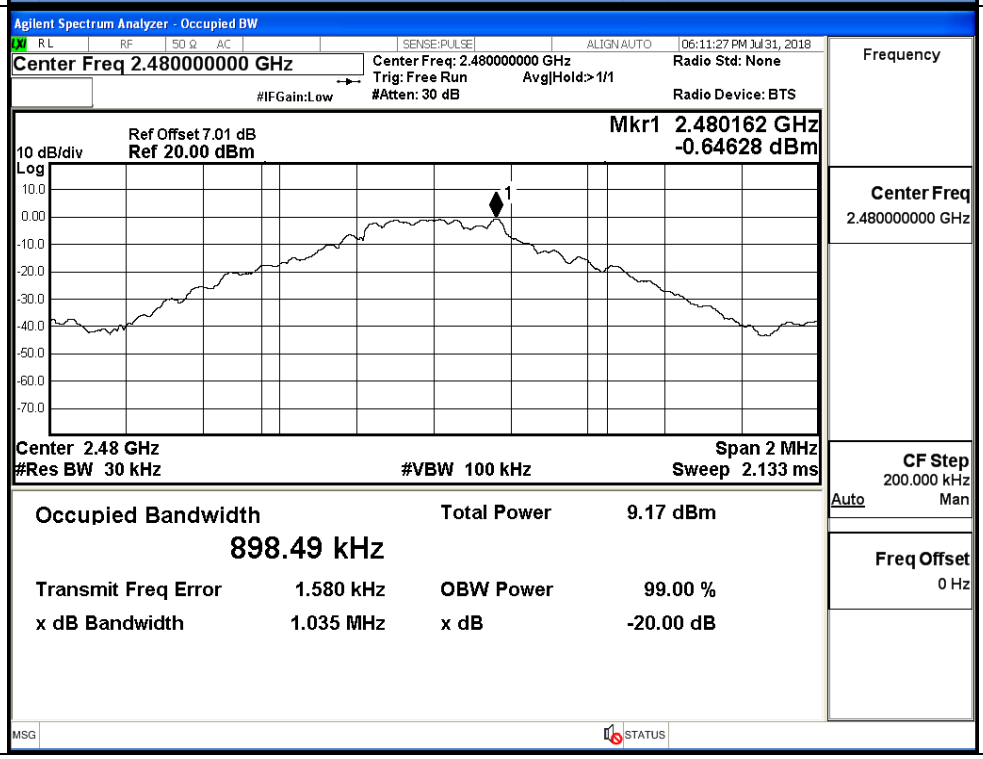
GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH		
π/4DQPSK/HCH		

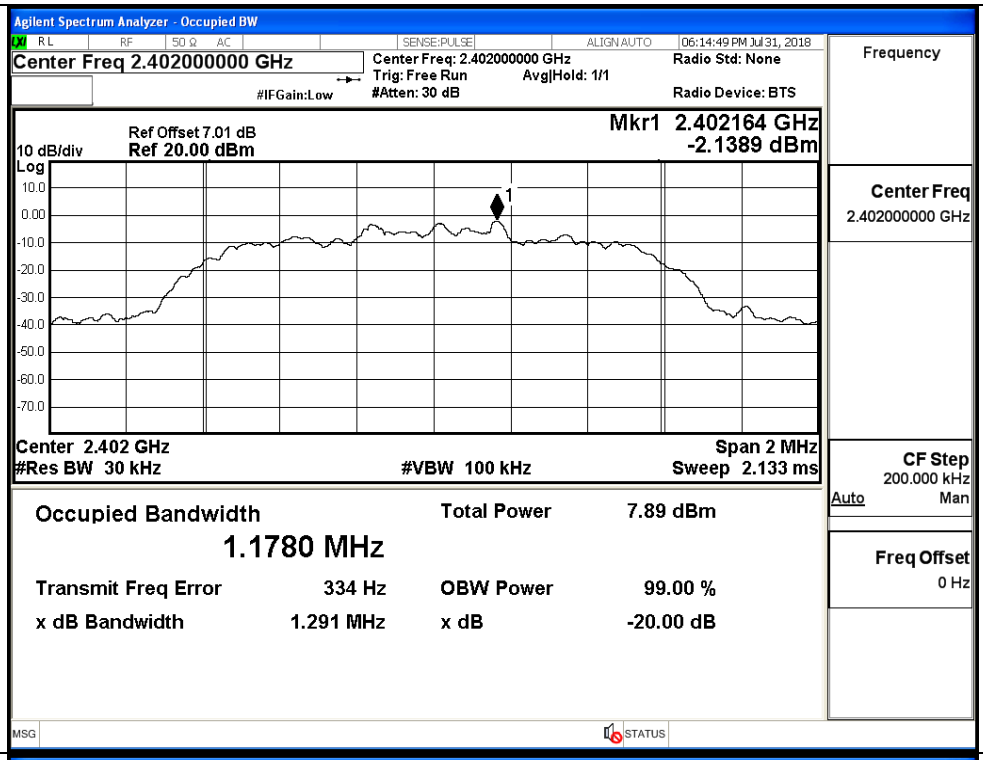
A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89941	1.030	Not Specified	PASS
	MCH	0.89944	1.035	Not Specified	PASS
	HCH	0.89849	1.035	Not Specified	PASS
π/4DQPSK	LCH	1.1780	1.291	Not Specified	PASS
	MCH	1.1876	1.319	Not Specified	PASS
	HCH	1.1781	1.316	Not Specified	PASS

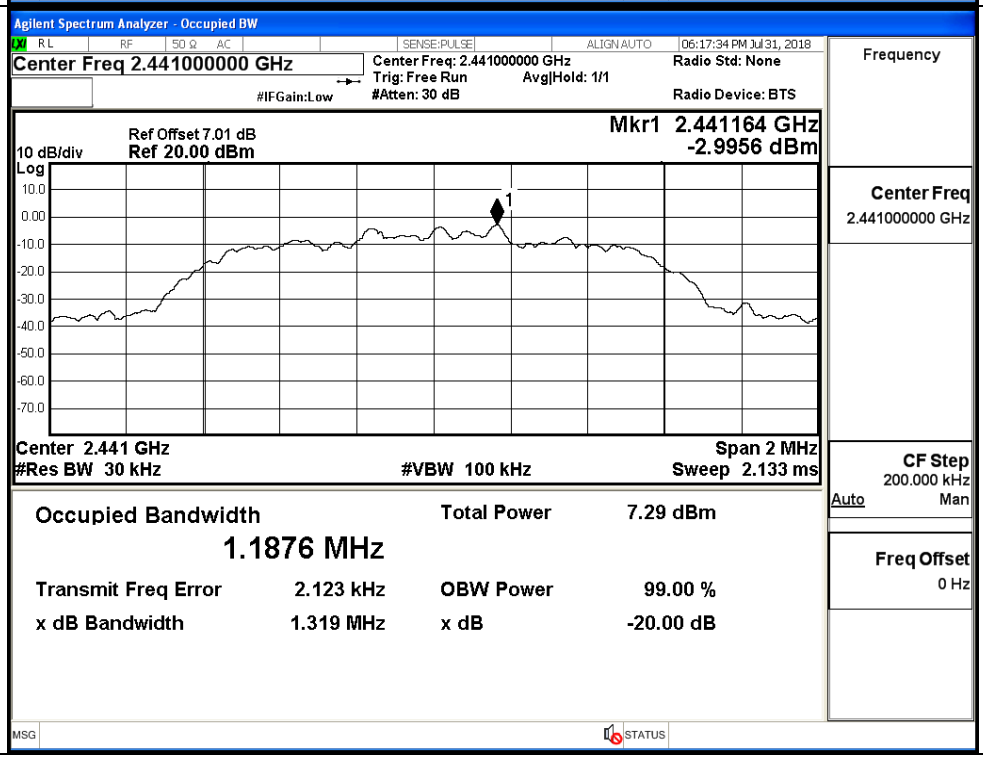
Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

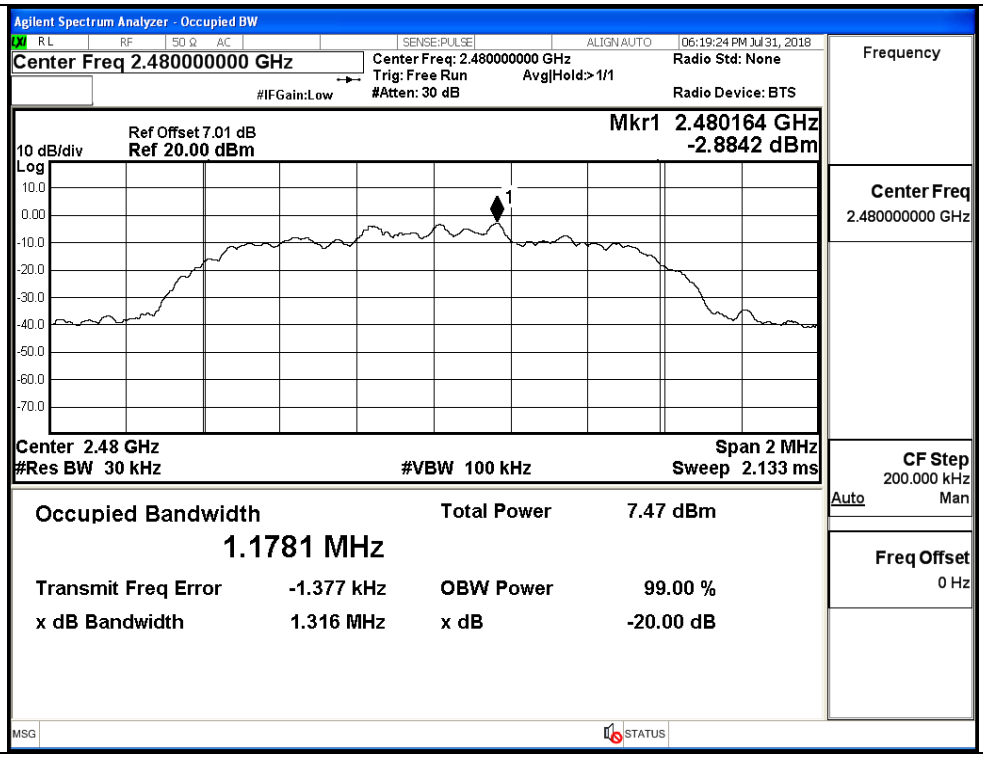
π/4DQPSK/LCH



π/4DQPSK/MCH

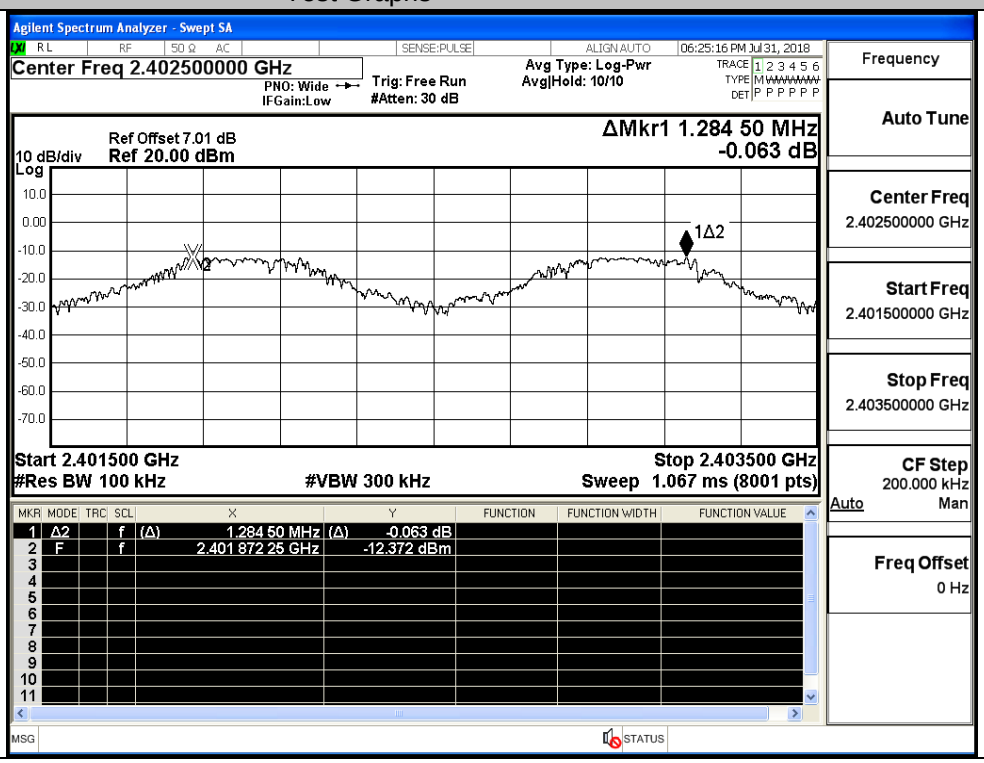


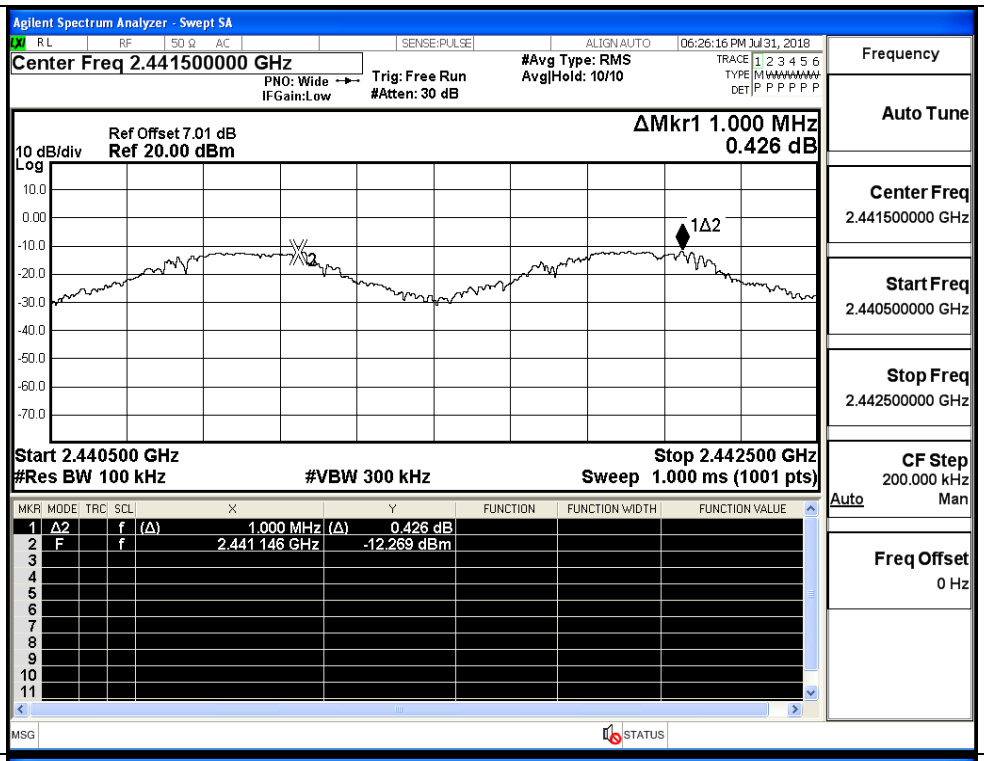
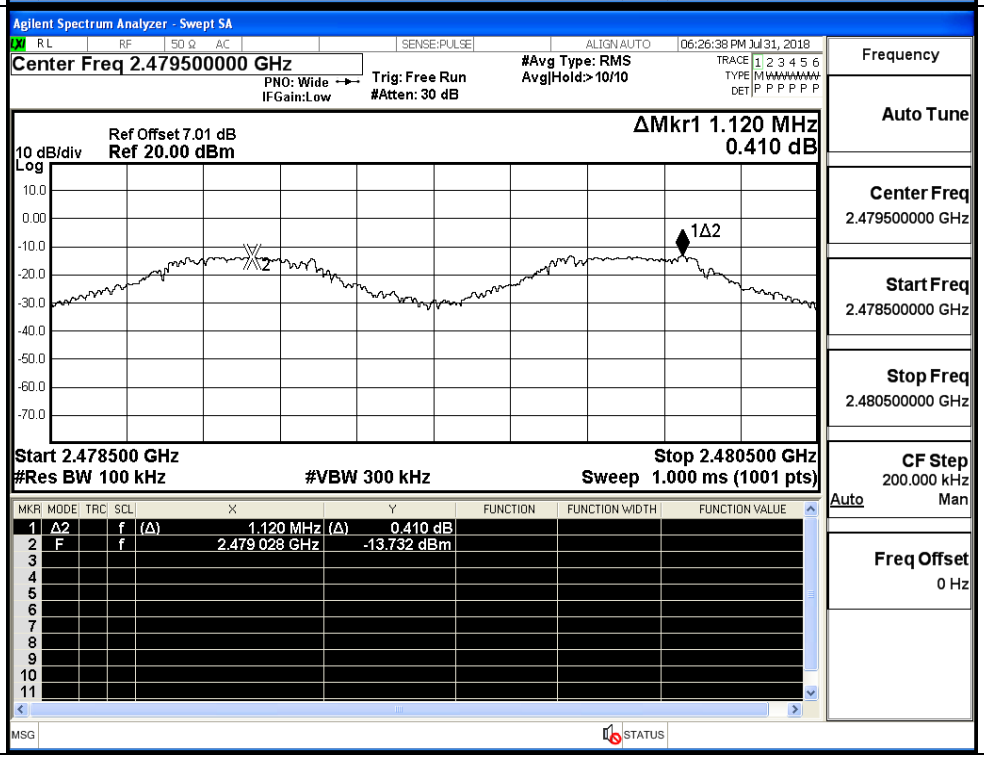
π/4DQPSK/HCH


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
06:19:24 PM Jul 31, 2018
Frequency
Ref Offset 7.01 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480164 GHz
-2.8842 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
1.1781 MHz
Total Power 7.47 dBm
Transmit Freq Error -1.377 kHz
OBW Power 99.00 %
x dB Bandwidth 1.316 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

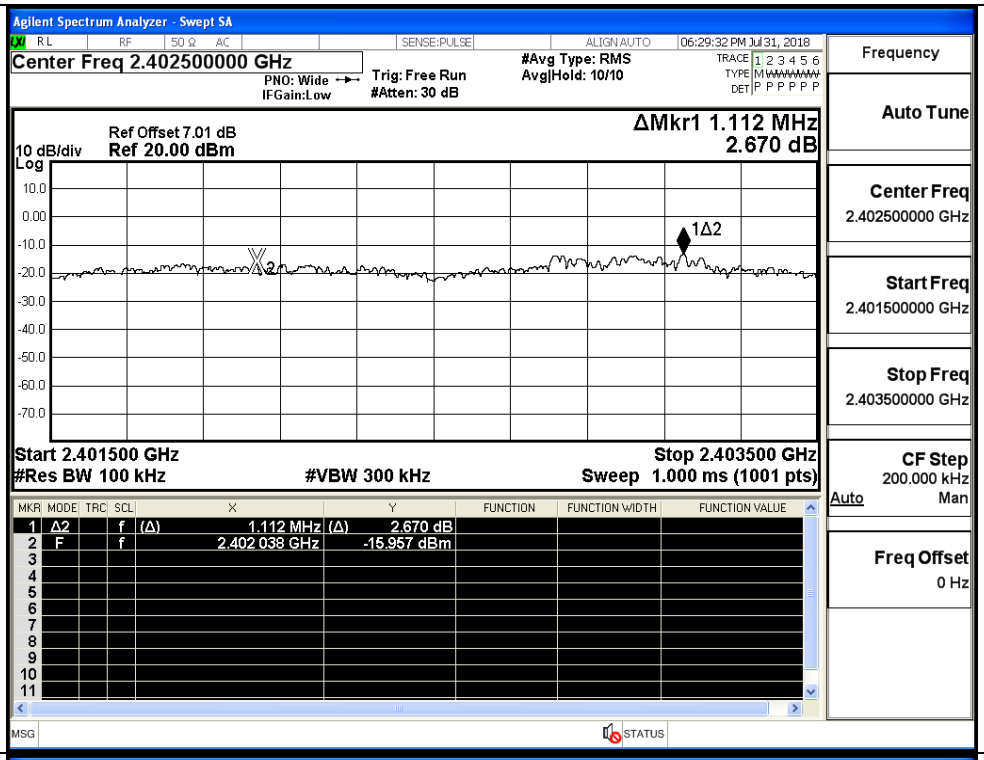
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.285	0.690	PASS
	MCH	1.000	0.690	PASS
	HCH	1.120	0.690	PASS
π/4DQPSK	LCH	1.112	0.879	PASS
	MCH	0.844	0.879	PASS
	HCH	0.932	0.879	PASS

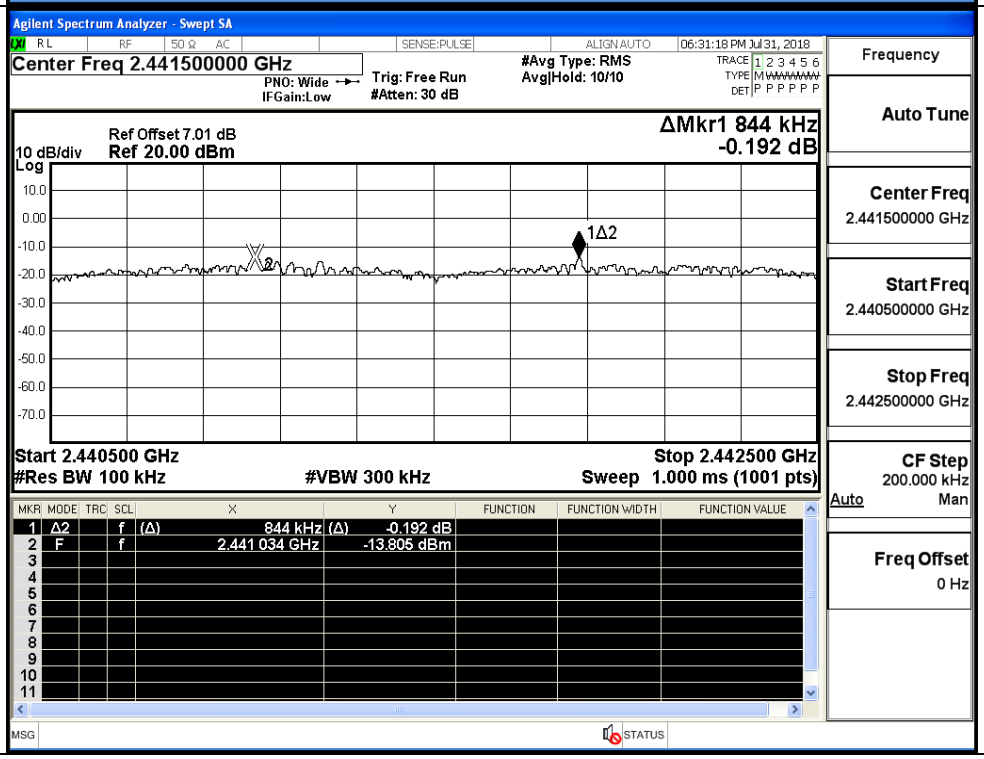
Test Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

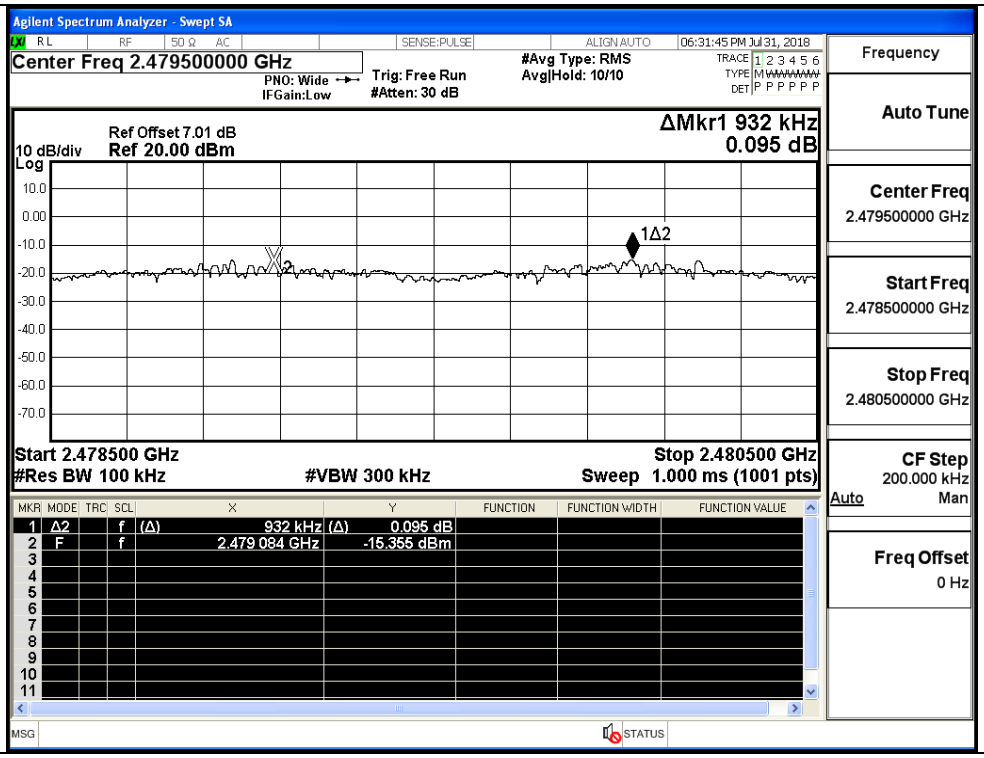
π/4DQPSK/LCH



π/4DQPSK/MCH

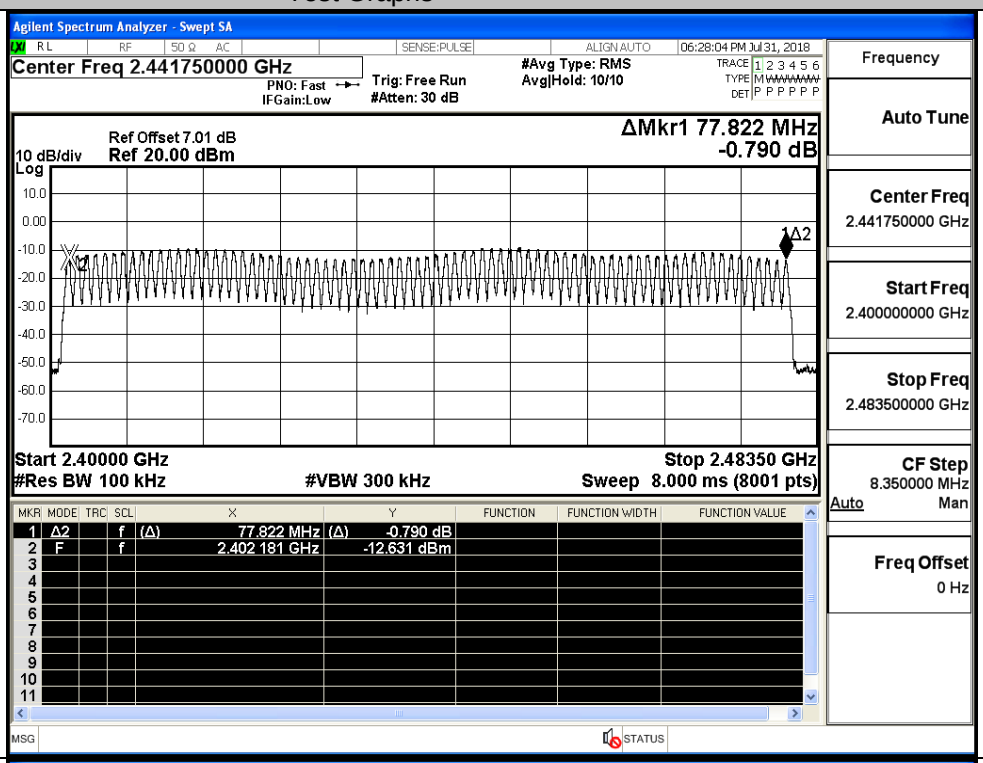
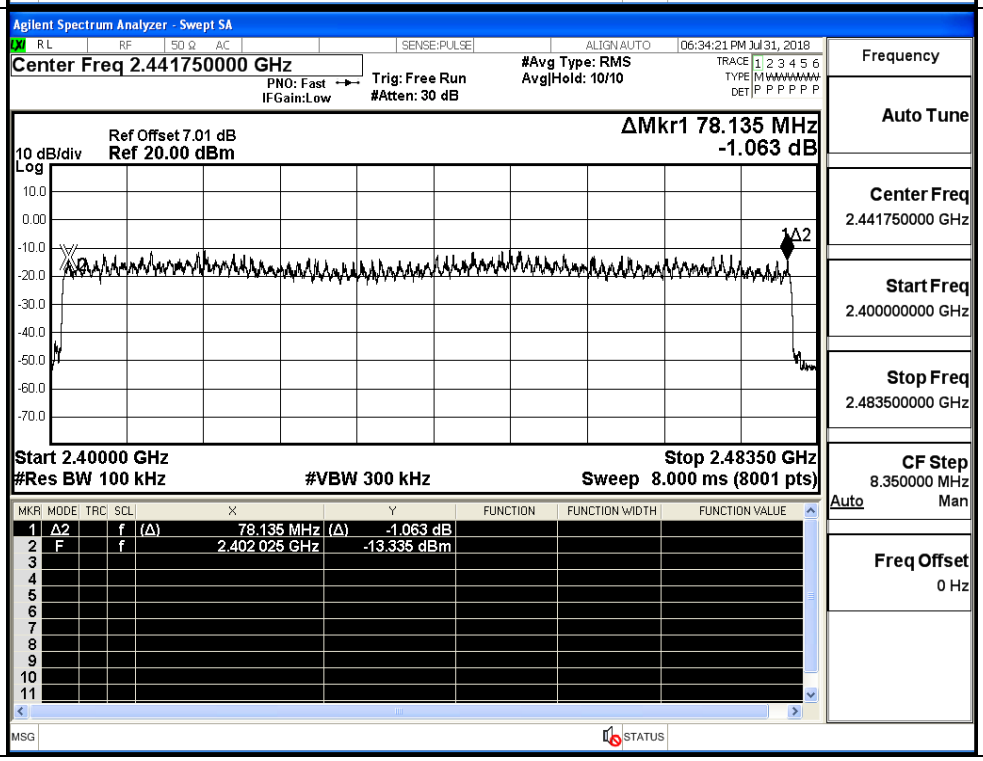


π/4DQPSK/HCH


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
06:31:45 PM Jul 31, 2018
Ref Offset 7.01 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 932 kHz
0.095 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) 932 kHz (Δ) 0.095 dB
2 F f 2.479 084 GHz -15.355 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

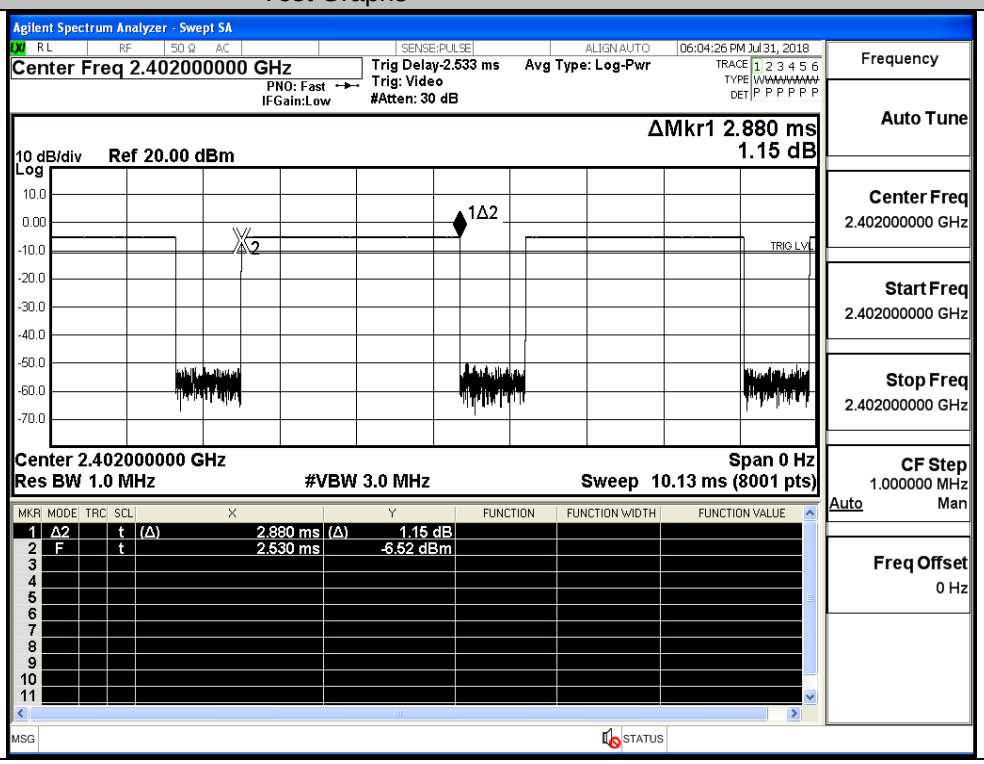
A.4 Hopping Channel Number

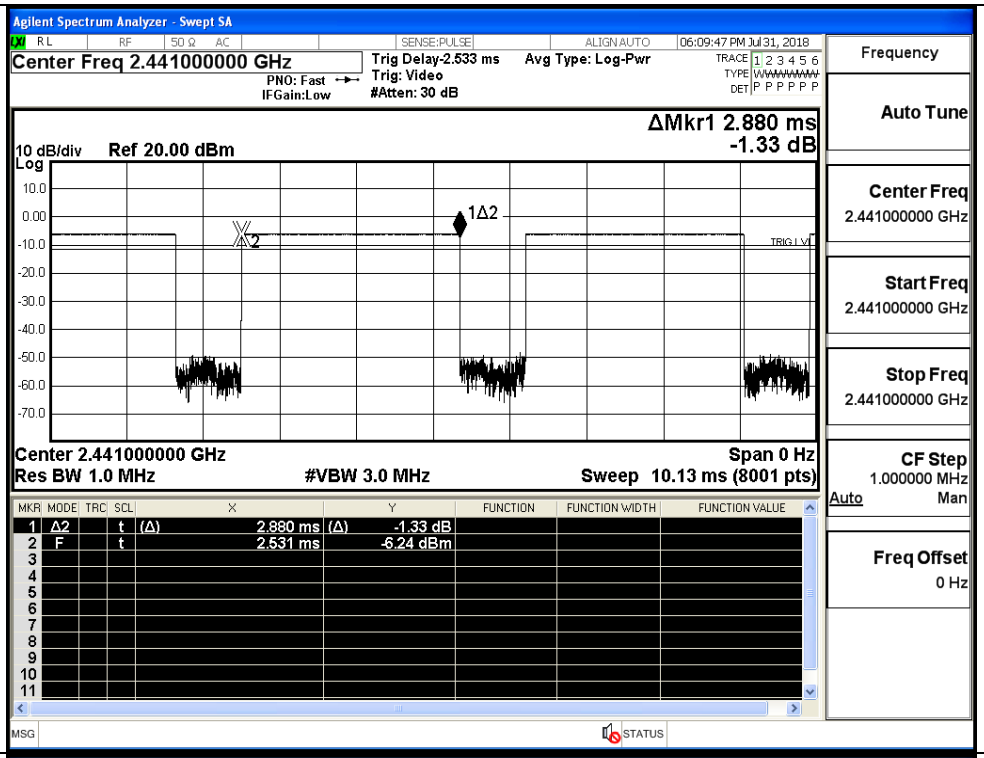
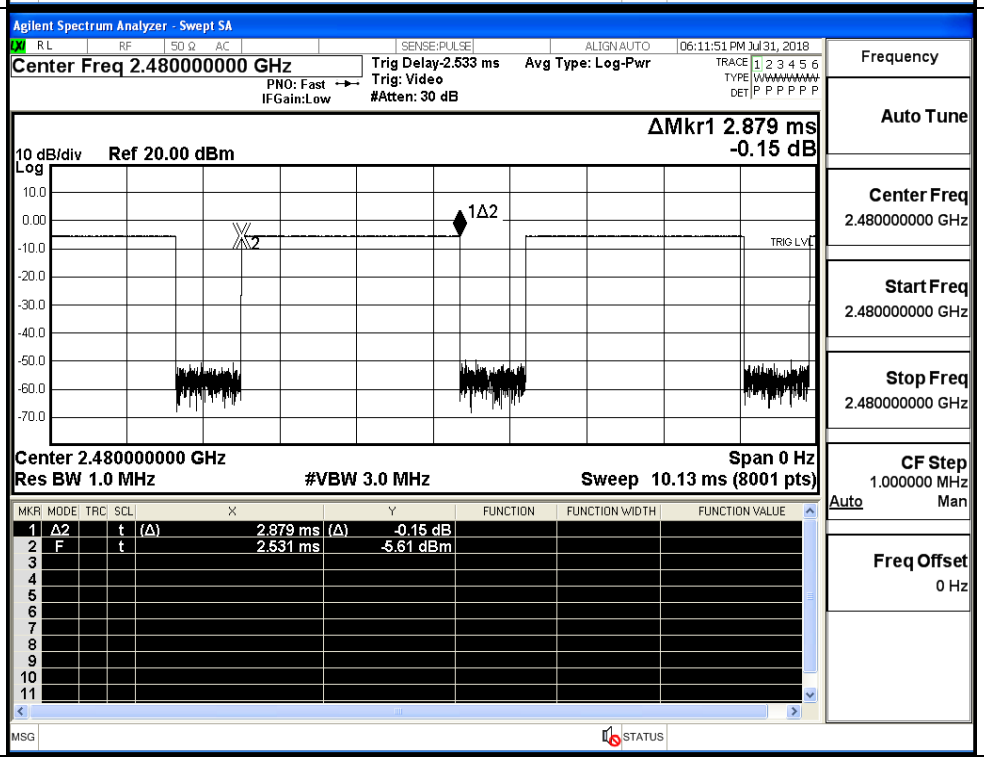
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS

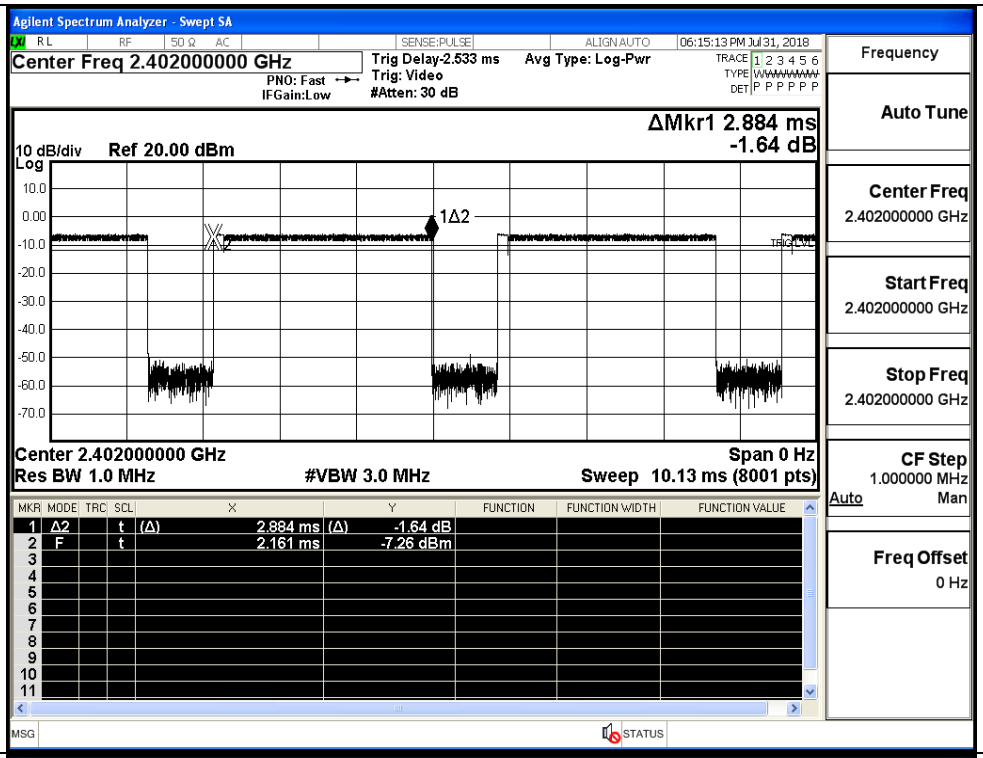
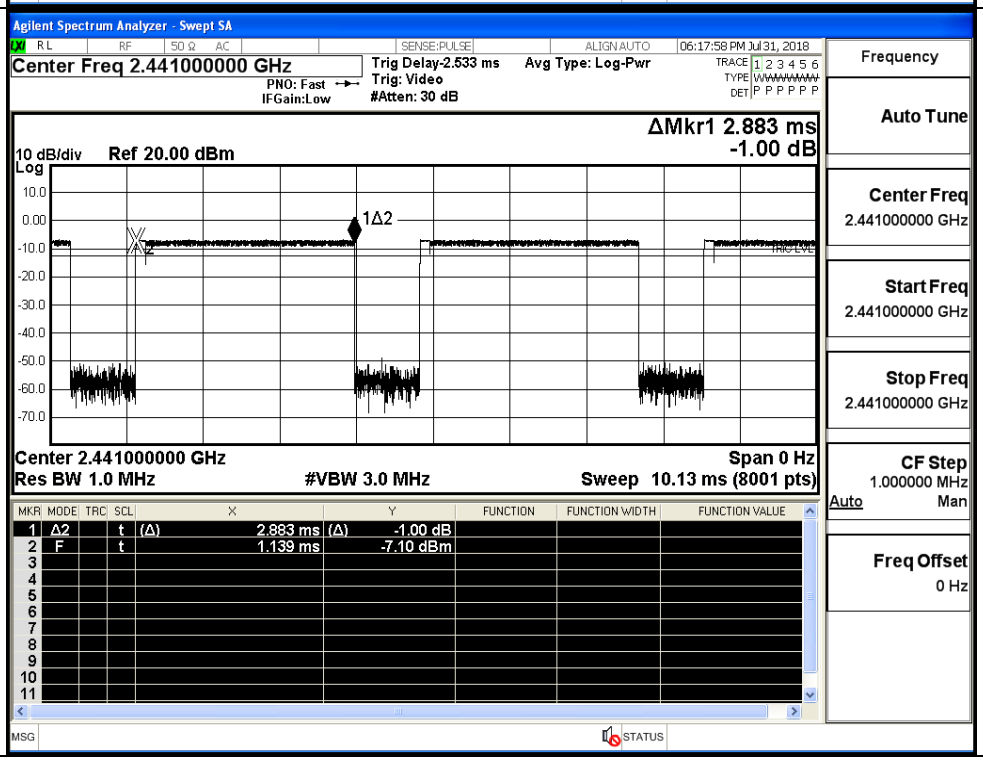
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

A.5 Dwell Time

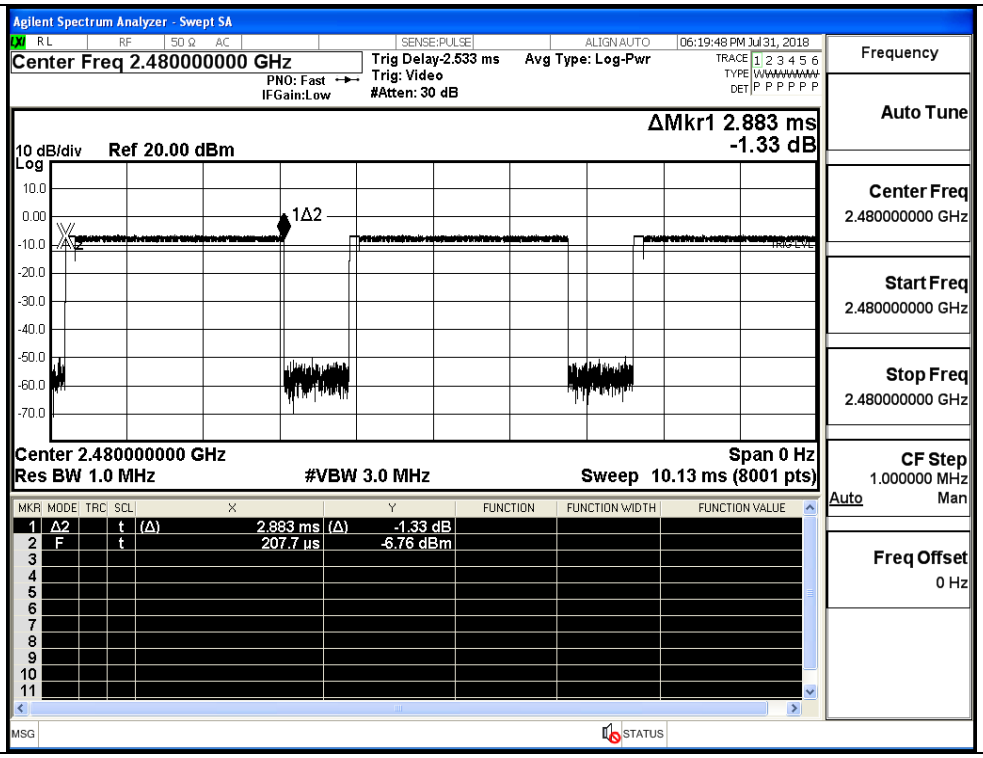
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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

Test Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

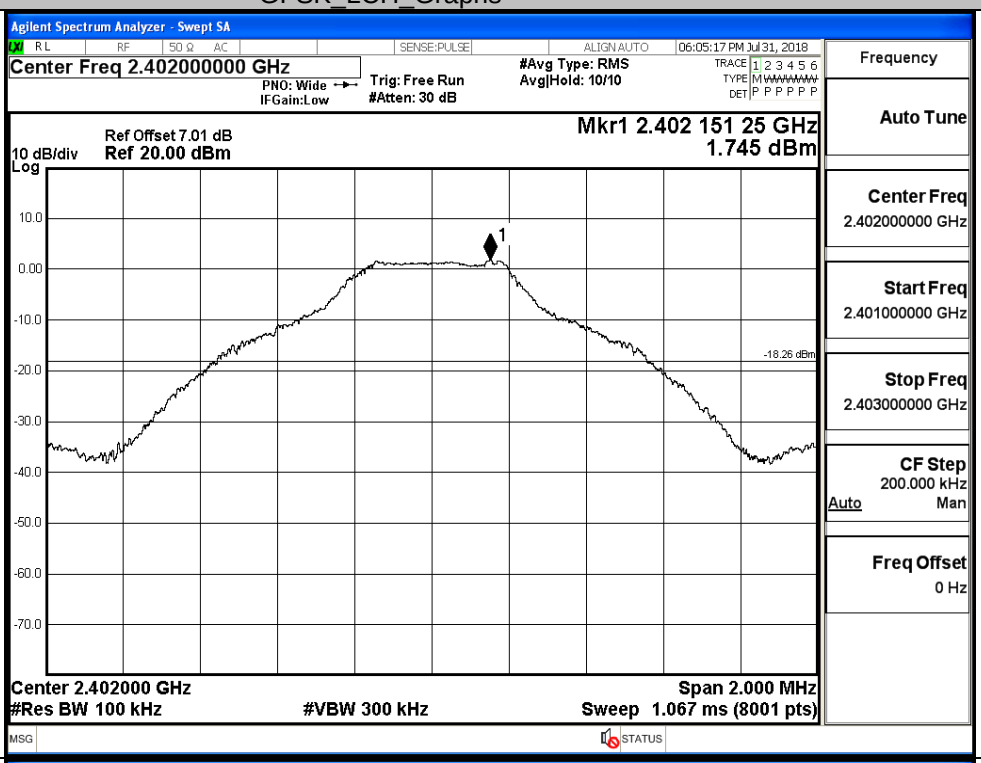
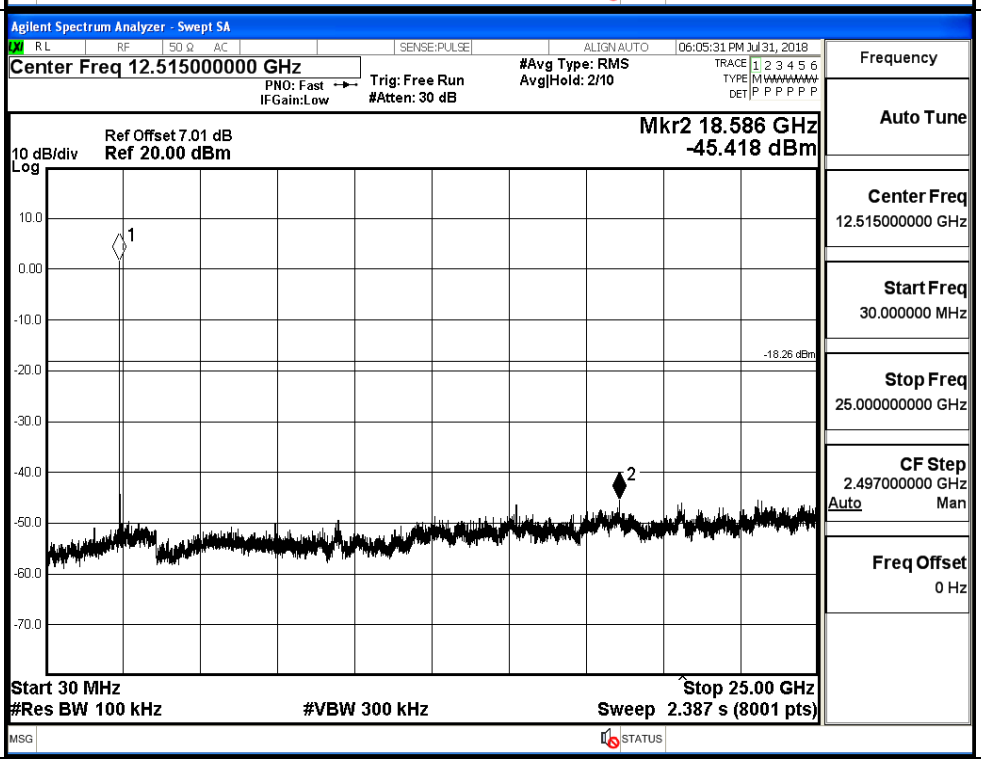
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

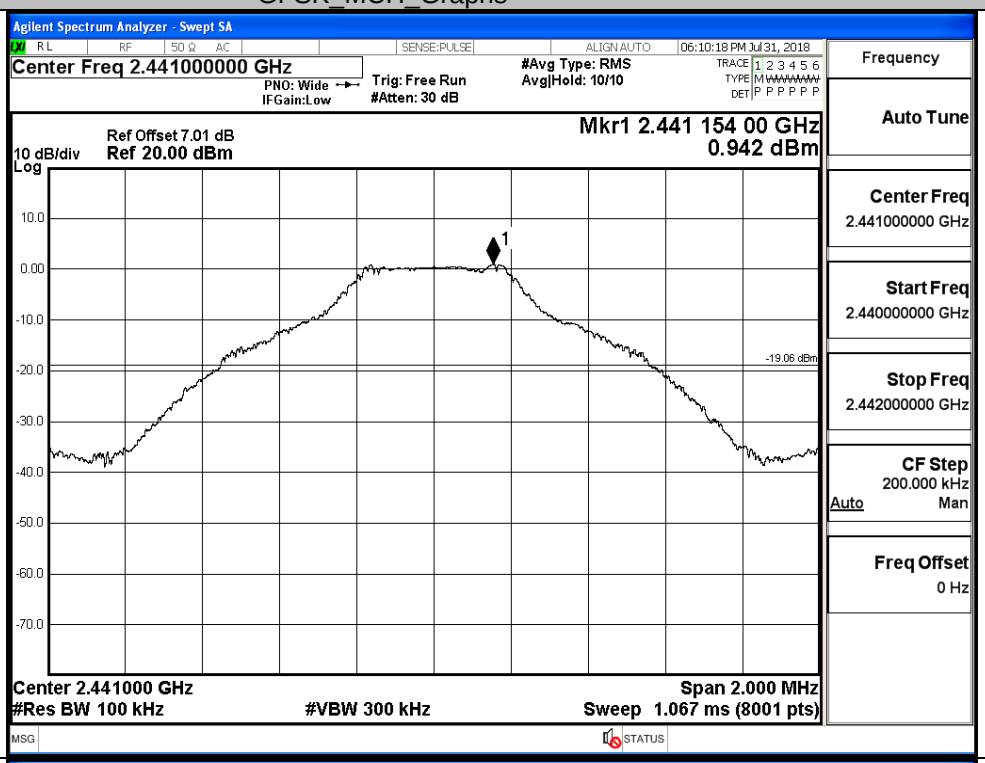
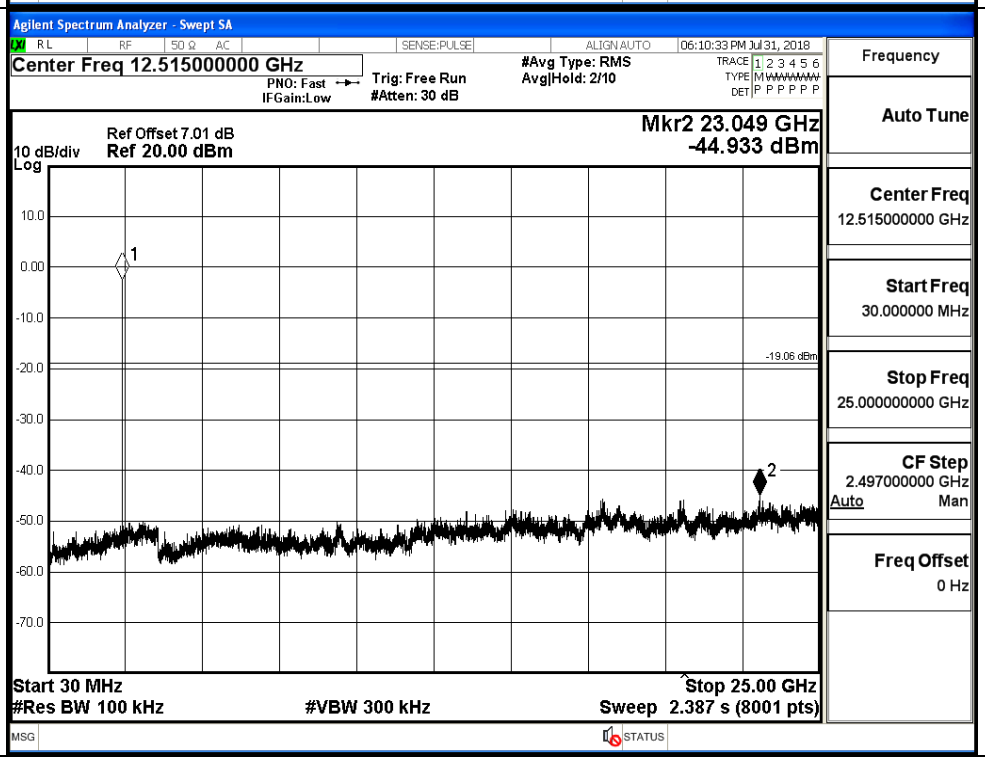
π/4DQPSK
_2DH5/HCH

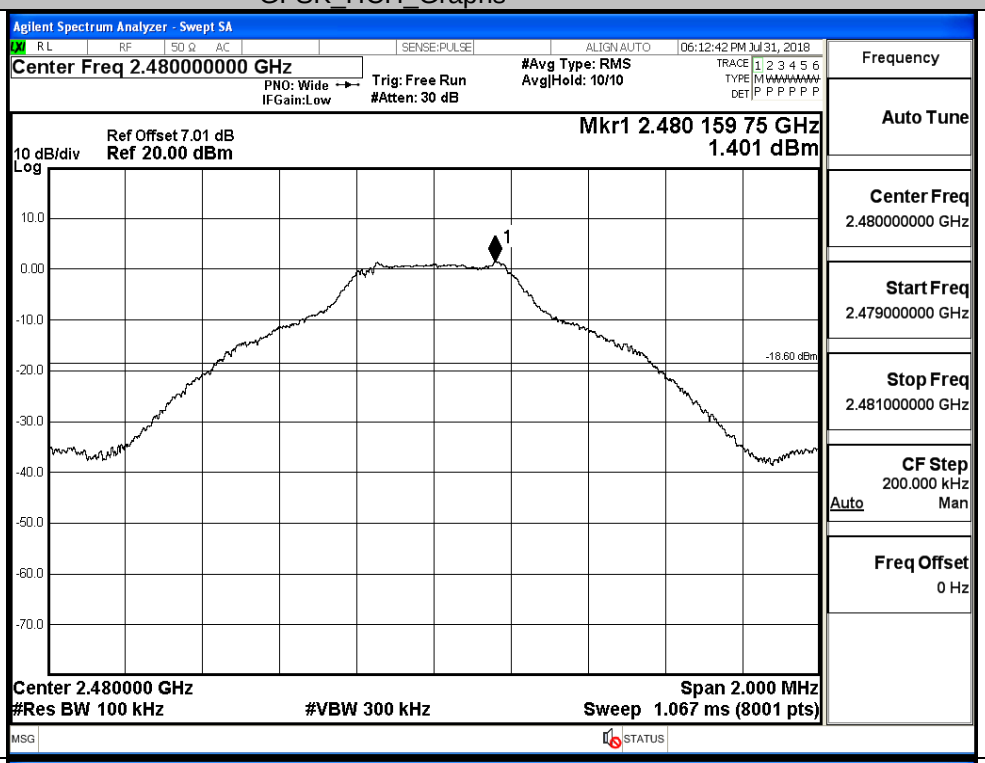
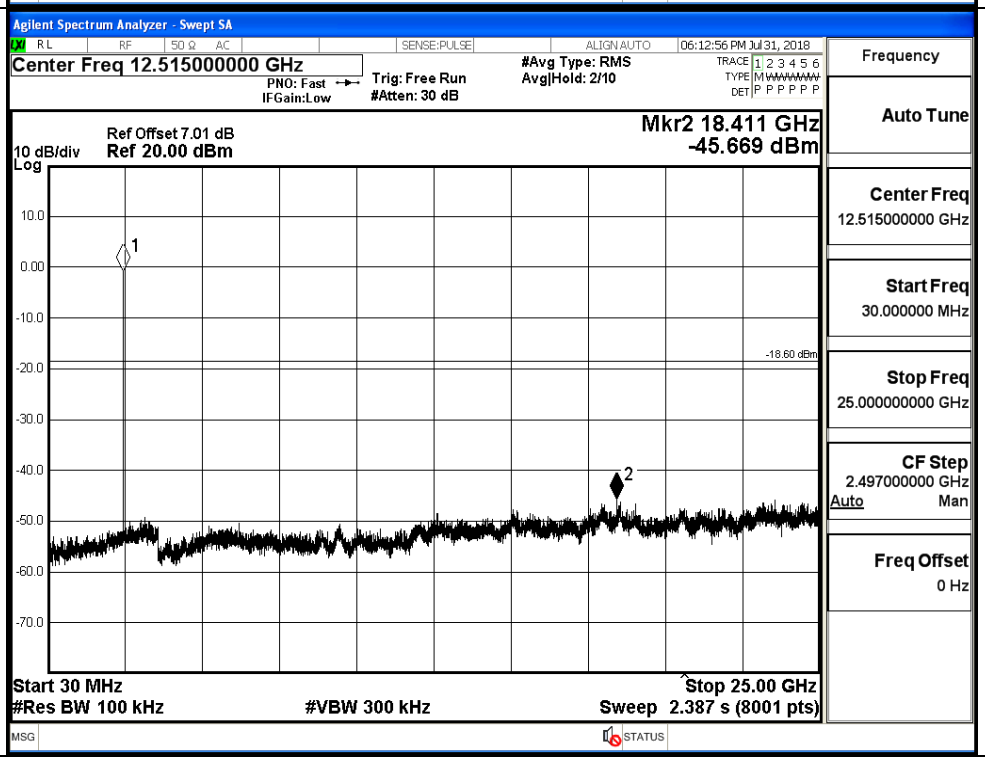


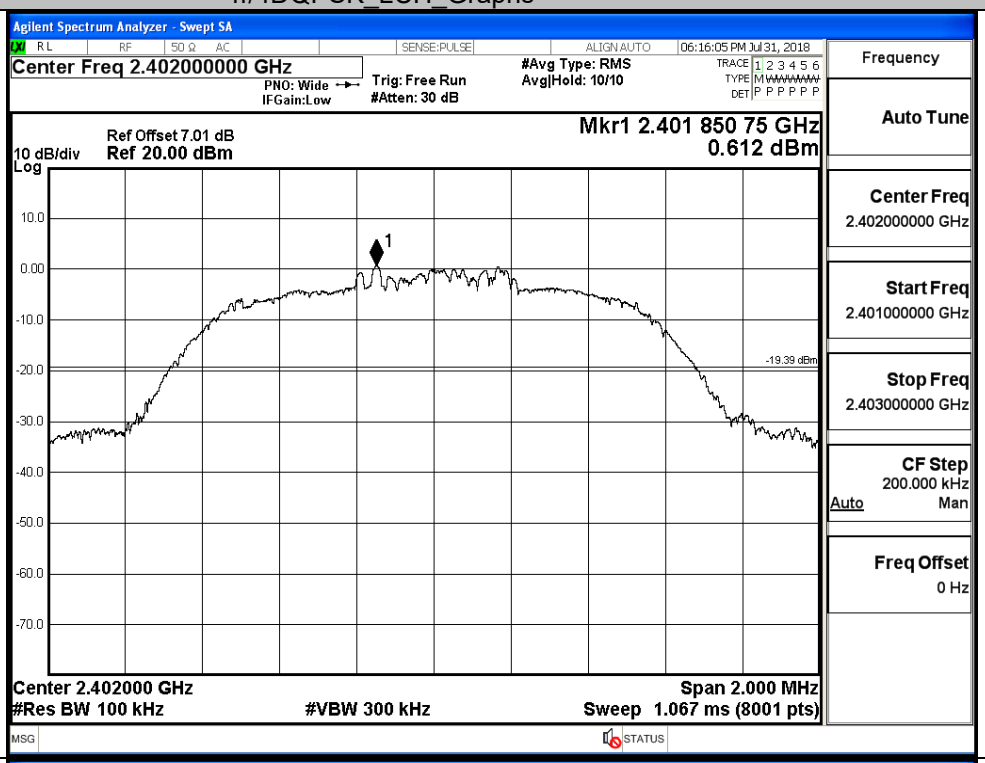
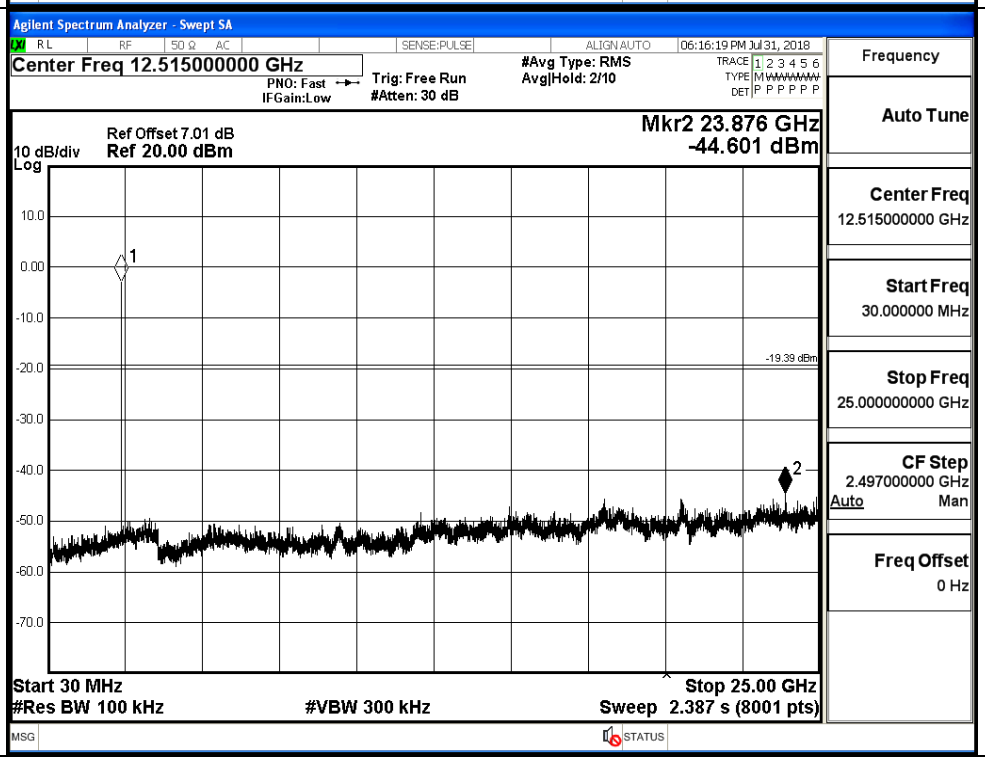
A.6 RF Conducted Spurious Emissions

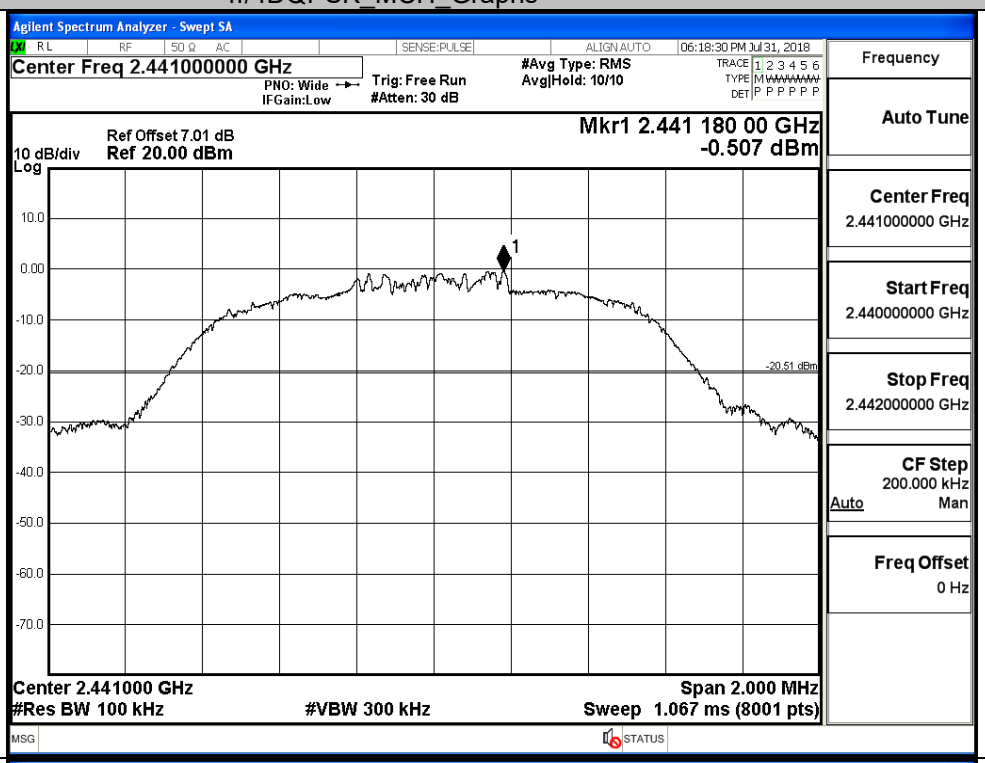
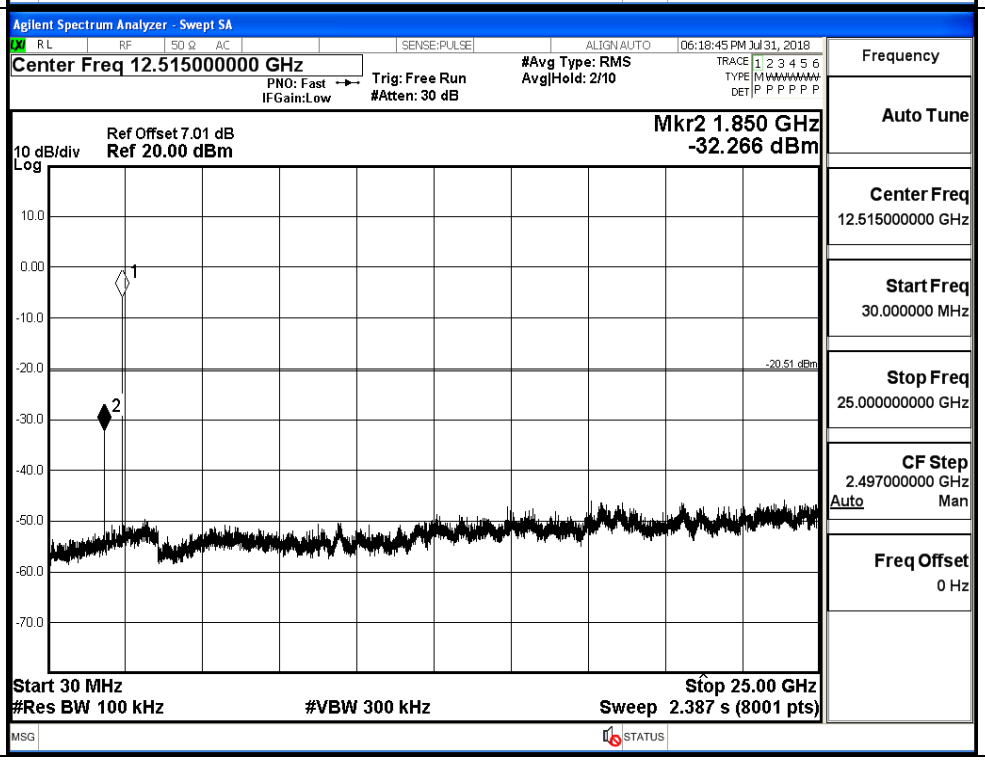
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.745	-45.418	-18.255	PASS
	MCH	0.942	-44.933	-19.058	PASS
	HCH	1.401	-45.669	-18.599	PASS
π/4DQPSK	LCH	0.612	-44.601	-19.388	PASS
	MCH	-0.507	-32.266	-20.507	PASS
	HCH	0.287	-25.654	-19.713	PASS

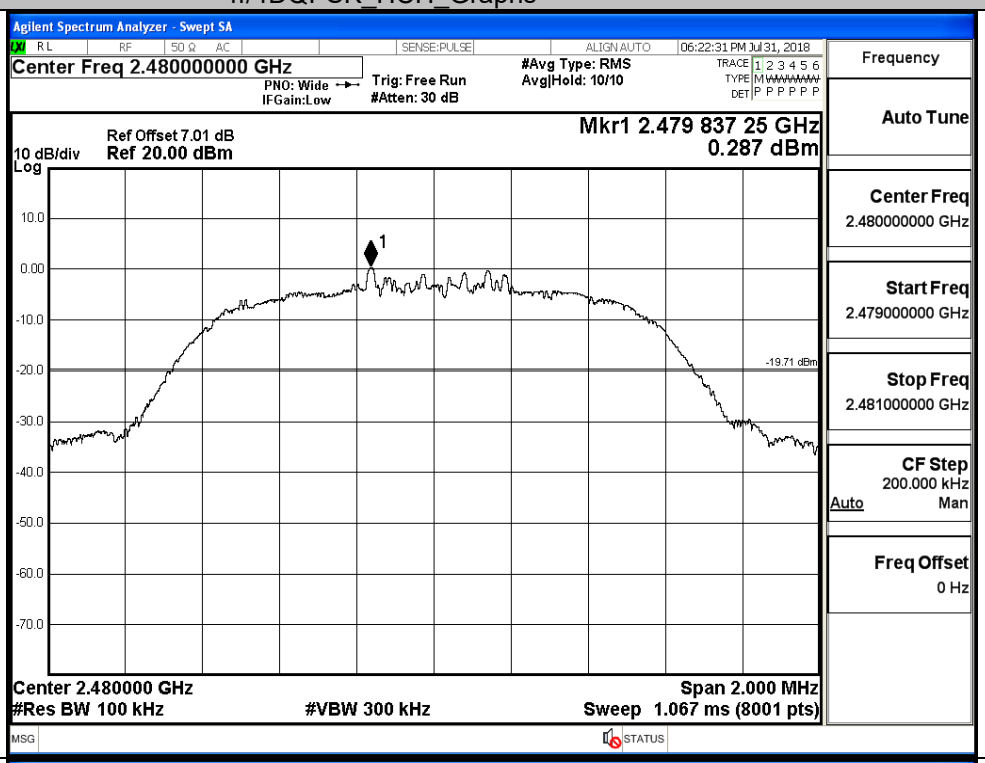
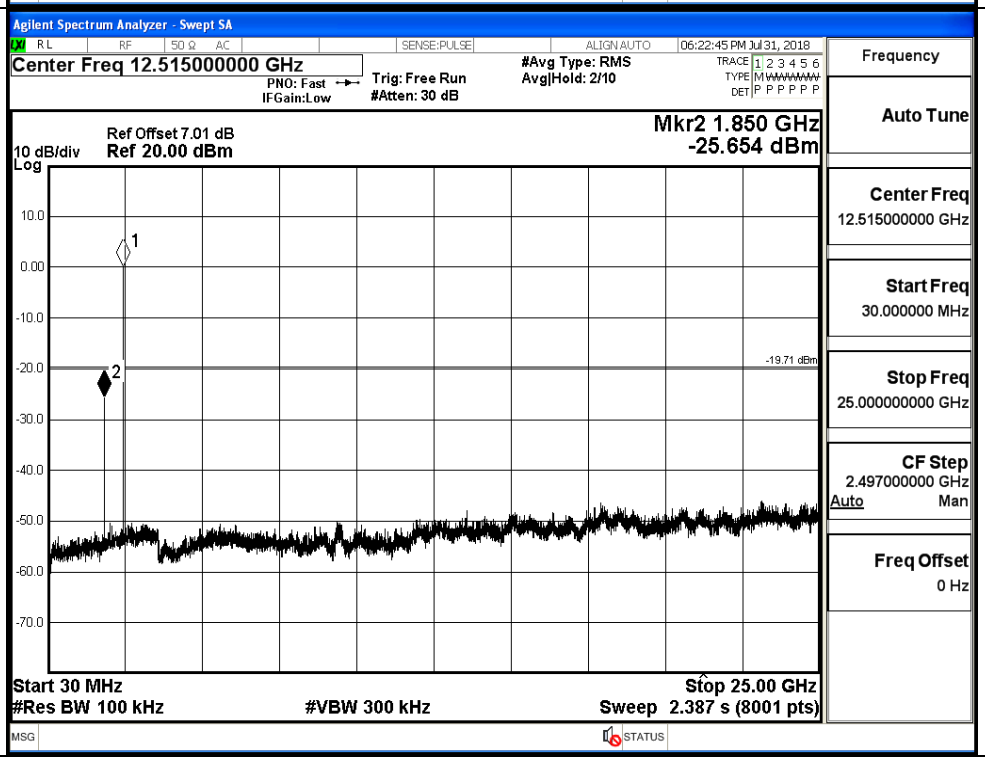
GFSK_LCH_Graphs		
Pref		
Puw		

GFSK_MCH_Graphs			
Pref			
Puw			

GFSK_HCH_Graphs		
Pref		
Puw		

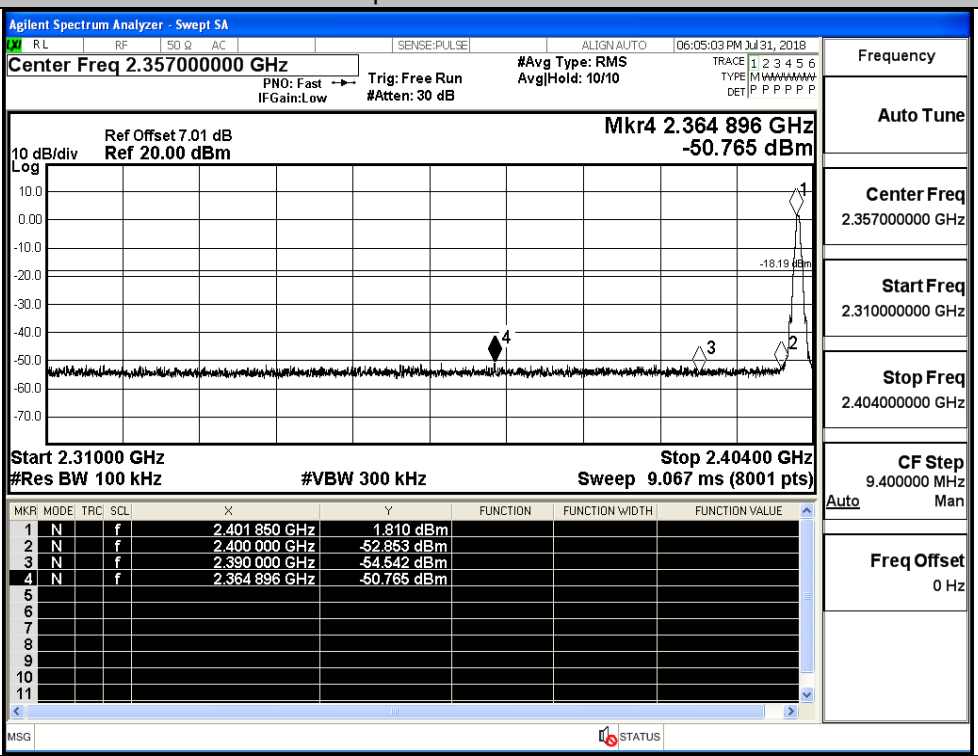
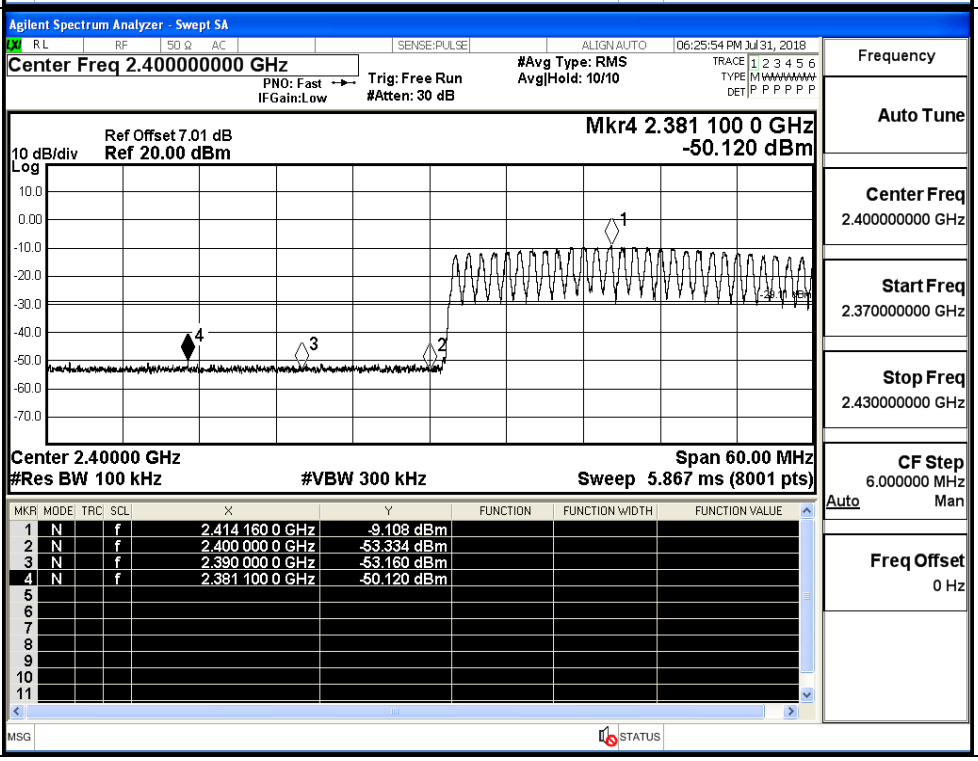
π/4DQPSK_LCH_Graphs		
Pref		
Puw		

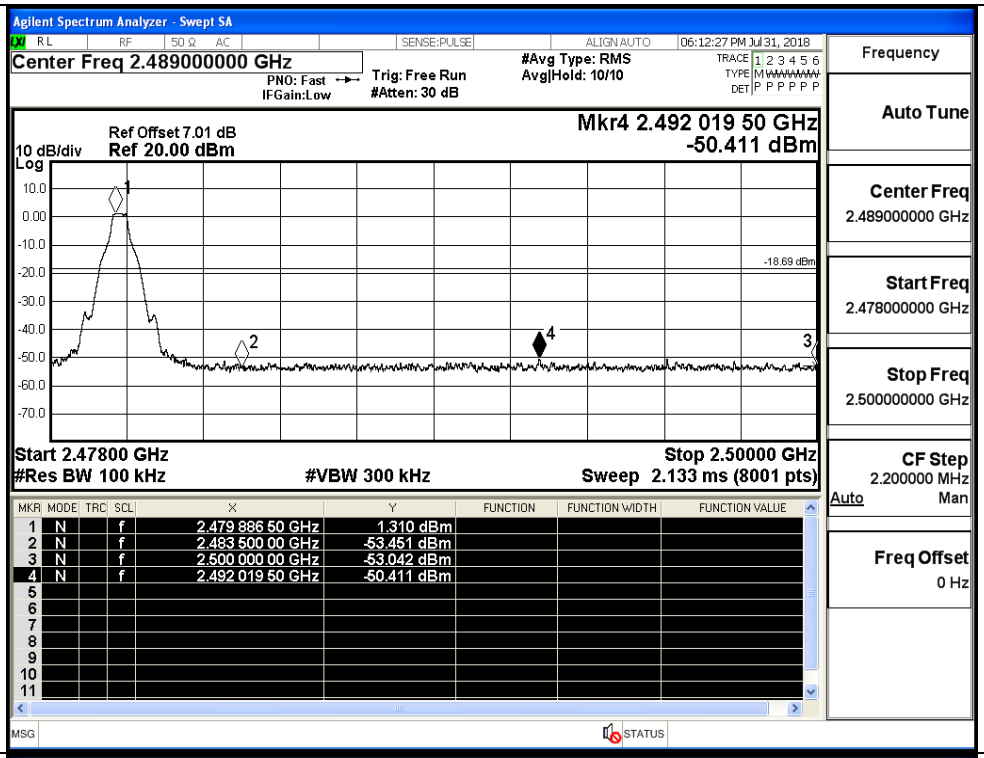
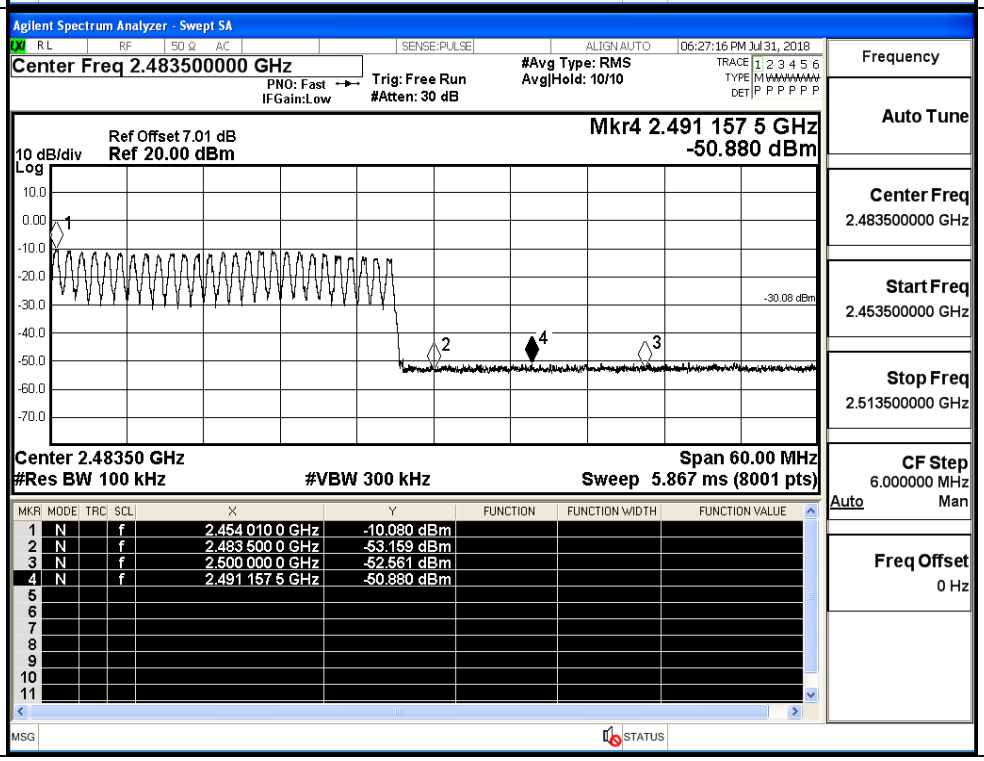
π/4DQPSK_MCH_Graphs		
Pref		
Puw		

π/4DQPSK_HCH_Graphs		
Pref		
Puw		

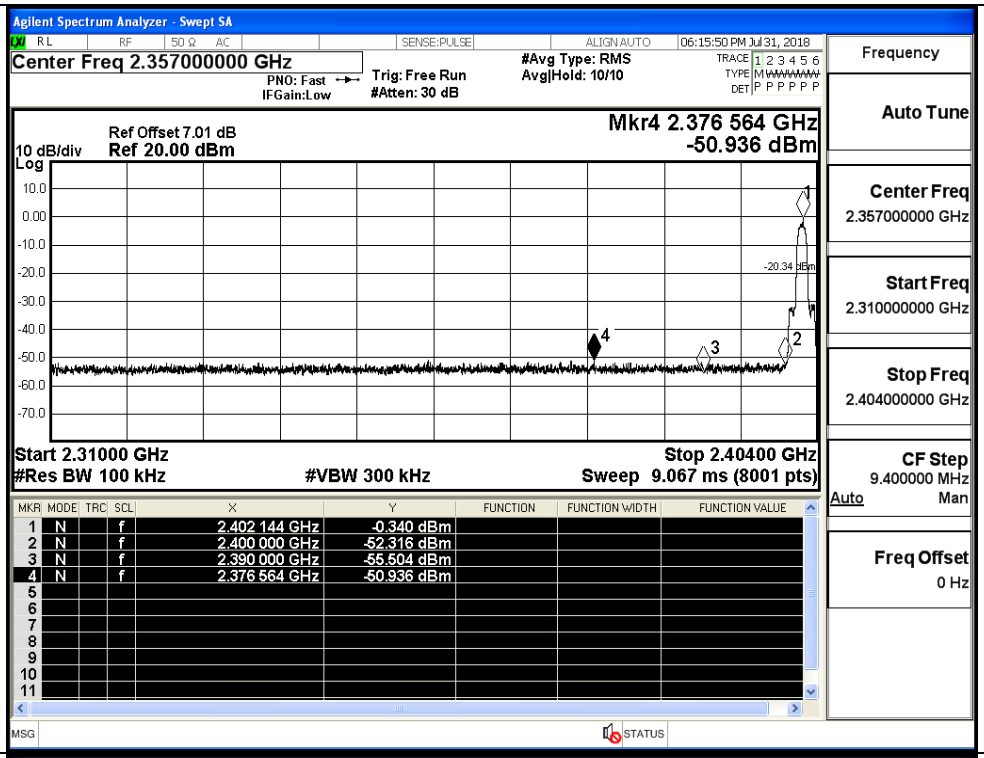
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	1.810	Off	-50.765	-18.19	PASS
			-9.108	On	-50.120	-29.11	PASS
	HCH	2480	1.310	Off	-50.411	-18.69	PASS
			-10.080	On	-50.880	-30.08	PASS
π/4DQPSK	LCH	2402	-0.340	Off	-50.936	-20.34	PASS
			-11.497	On	-49.865	-31.5	PASS
	HCH	2480	0.370	Off	-50.371	-19.63	PASS
			-12.440	On	-50.396	-32.44	PASS

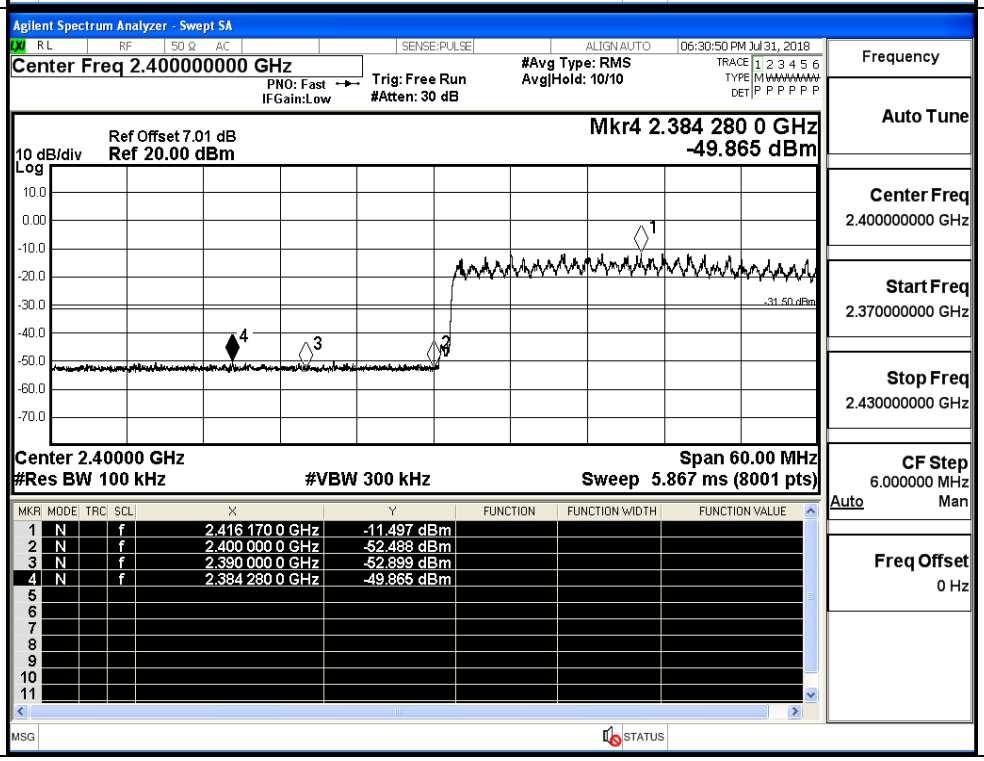
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

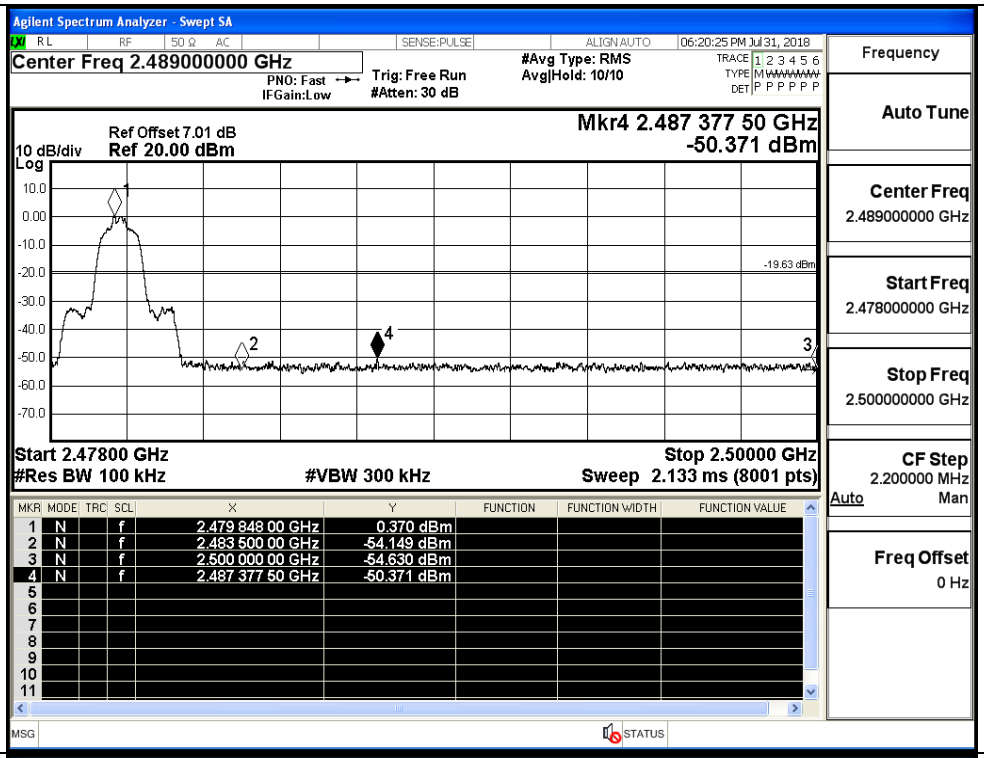
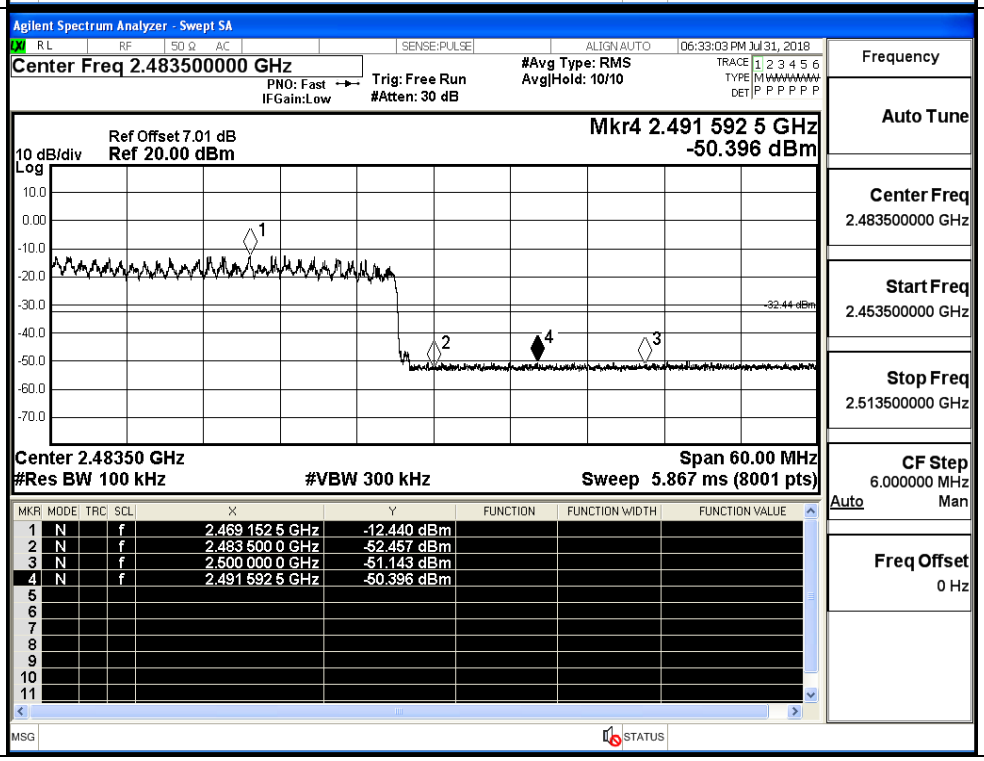
GFSK/HCH/No Hop	
GFSK/HCH/Hop	

π/4DQPSK/LCH/No Hop



π/4DQPSK/LCH/Hop

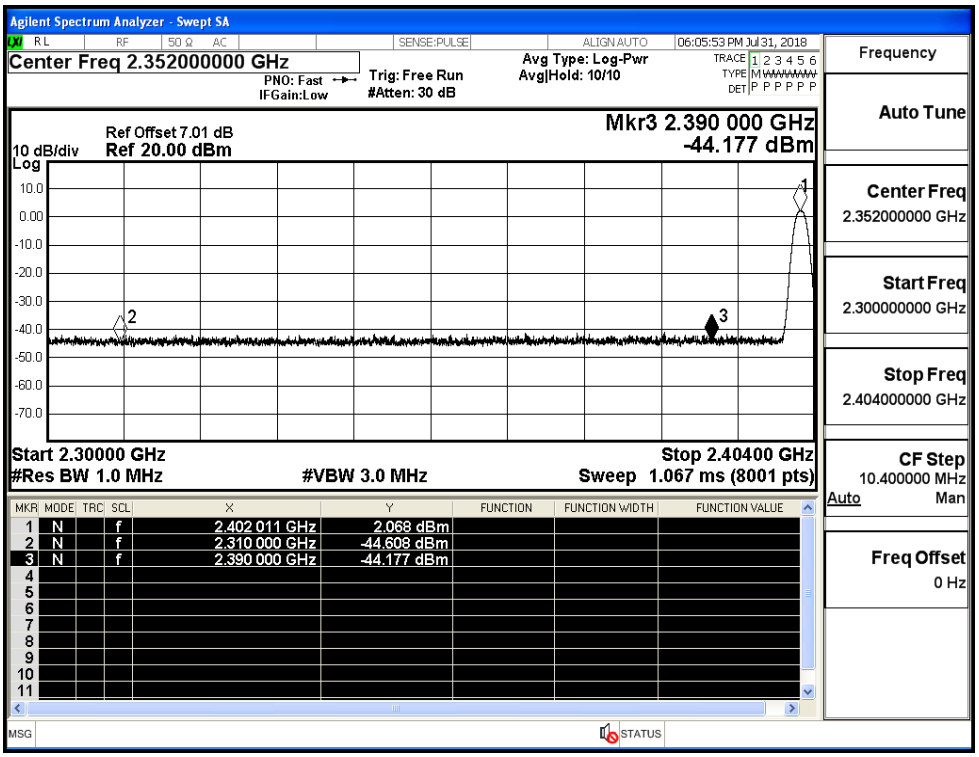


π/4DQPSK/HCH/No Hop	
π/4DQPSK/HCH/Hop	

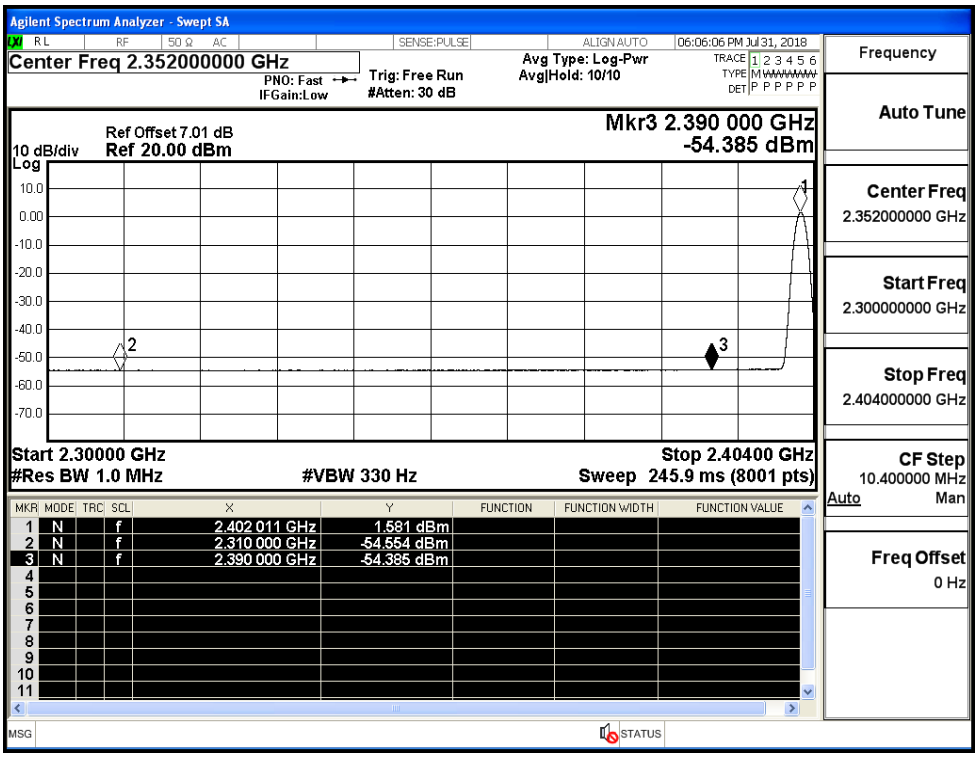
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.61	2.0	0	52.65	PEAK	74	PASS
	Off	2310.0	-54.55	2.0	0	42.70	AV	54	PASS
	Off	2390.0	-44.18	2.0	0	53.08	PEAK	74	PASS
	Off	2390.0	-54.39	2.0	0	42.87	AV	54	PASS
	Off	2483.5	-43.36	2.0	0	53.90	PEAK	74	PASS
	Off	2483.5	-53.95	2.0	0	43.31	AV	54	PASS
	Off	2500.0	-44.36	2.0	0	52.90	PEAK	74	PASS
	Off	2500.0	-53.94	2.0	0	43.32	AV	54	PASS
π/4DQPSK	Off	2310.0	-44.41	2.0	0	52.84	PEAK	74	PASS
	Off	2310.0	-54.58	2.0	0	42.68	AV	54	PASS
	Off	2390.0	-45.39	2.0	0	51.86	PEAK	74	PASS
	Off	2390.0	-54.37	2.0	0	42.89	AV	54	PASS
	Off	2483.5	-44.52	2.0	0	52.74	PEAK	74	PASS
	Off	2483.5	-53.99	2.0	0	43.27	AV	54	PASS
	Off	2500.0	-42.47	2.0	0	54.79	PEAK	74	PASS
	Off	2500.0	-53.92	2.0	0	43.34	AV	54	PASS

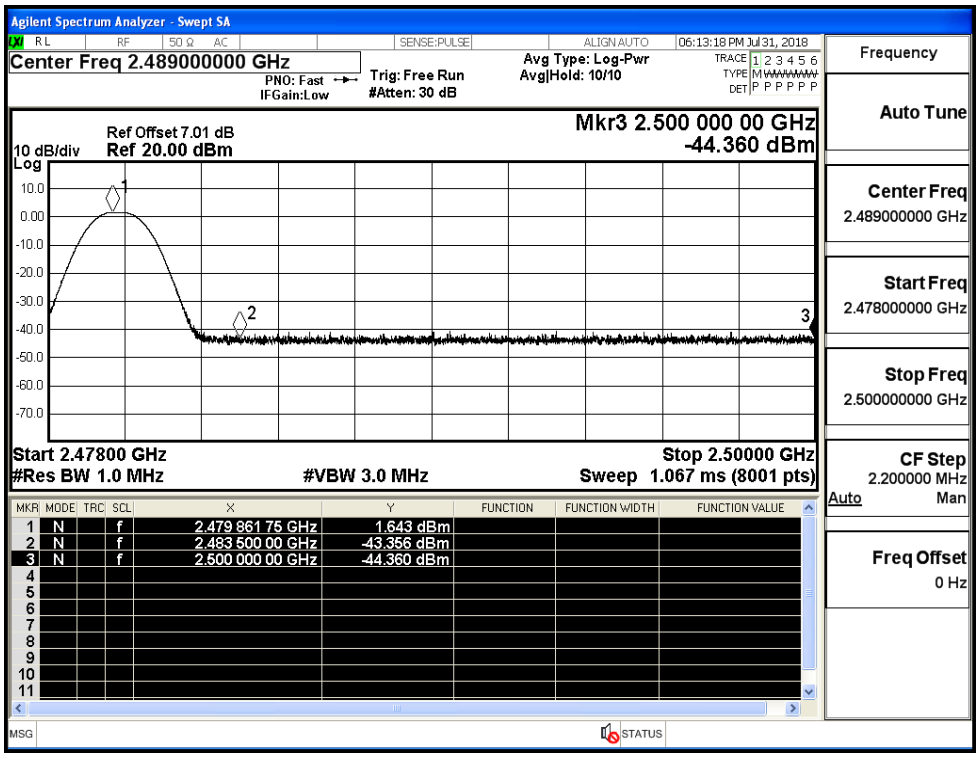
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



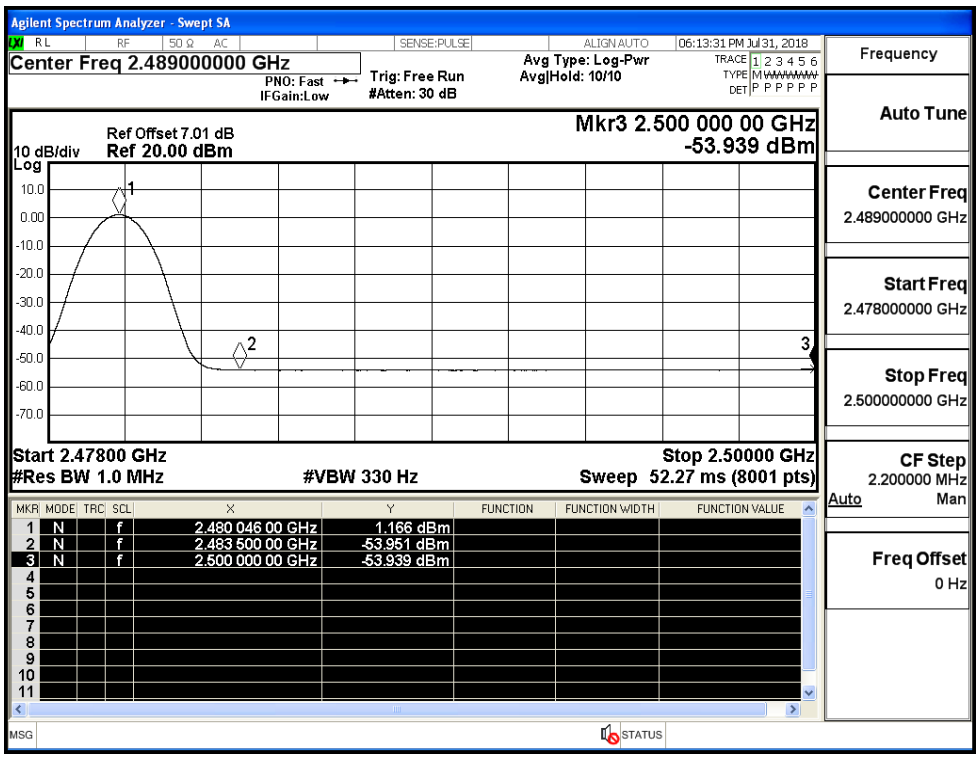
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



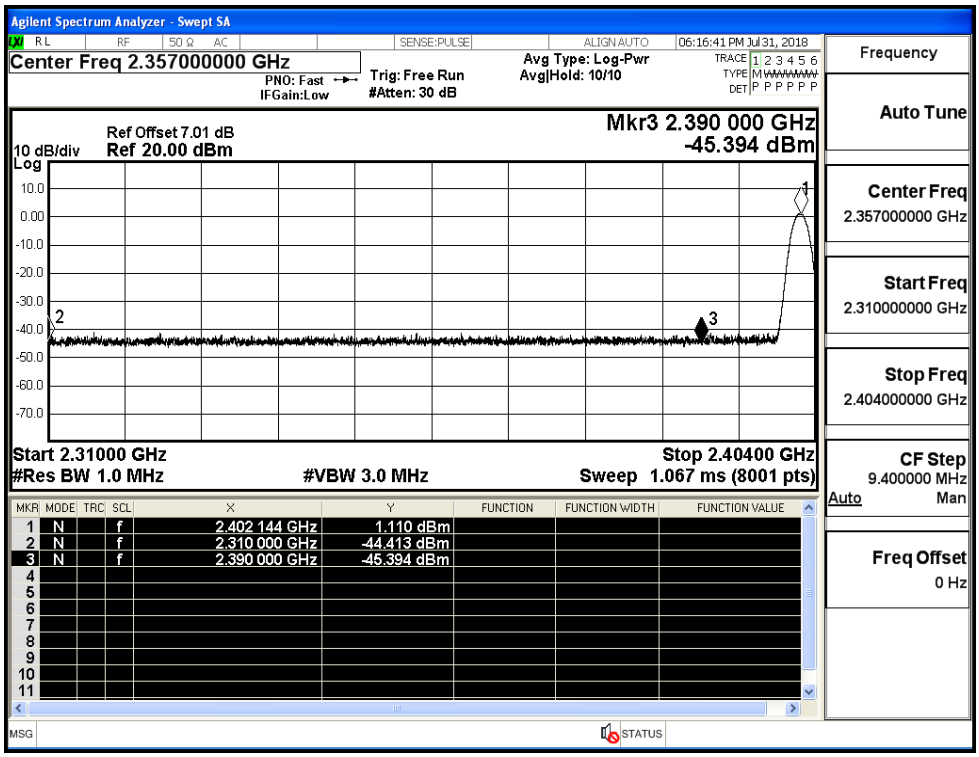
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



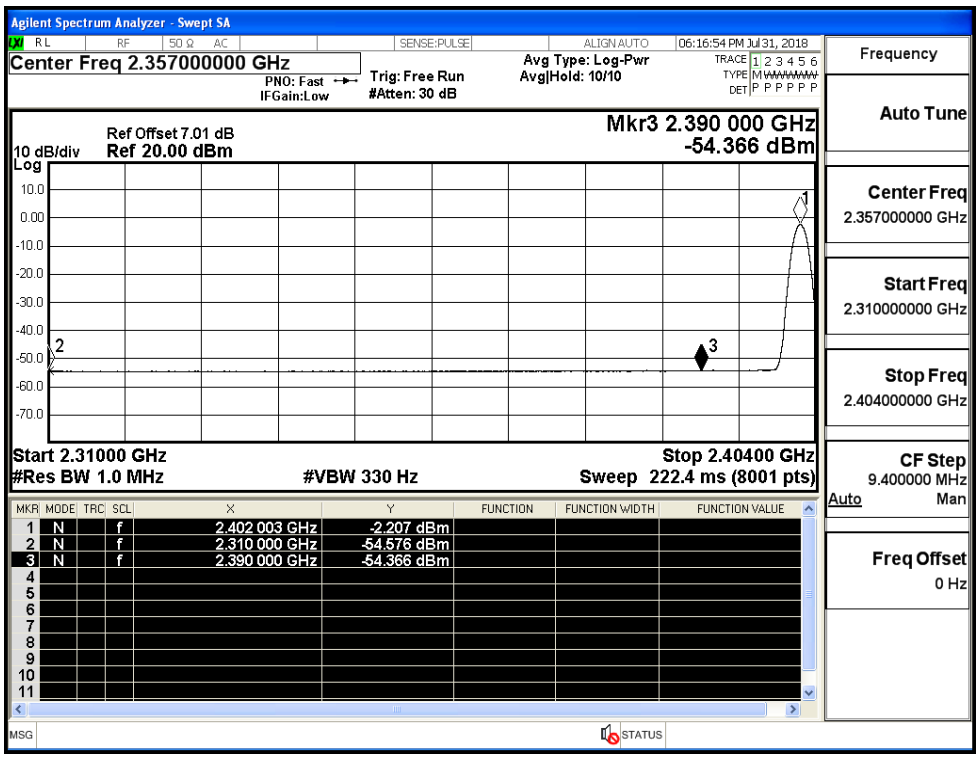
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



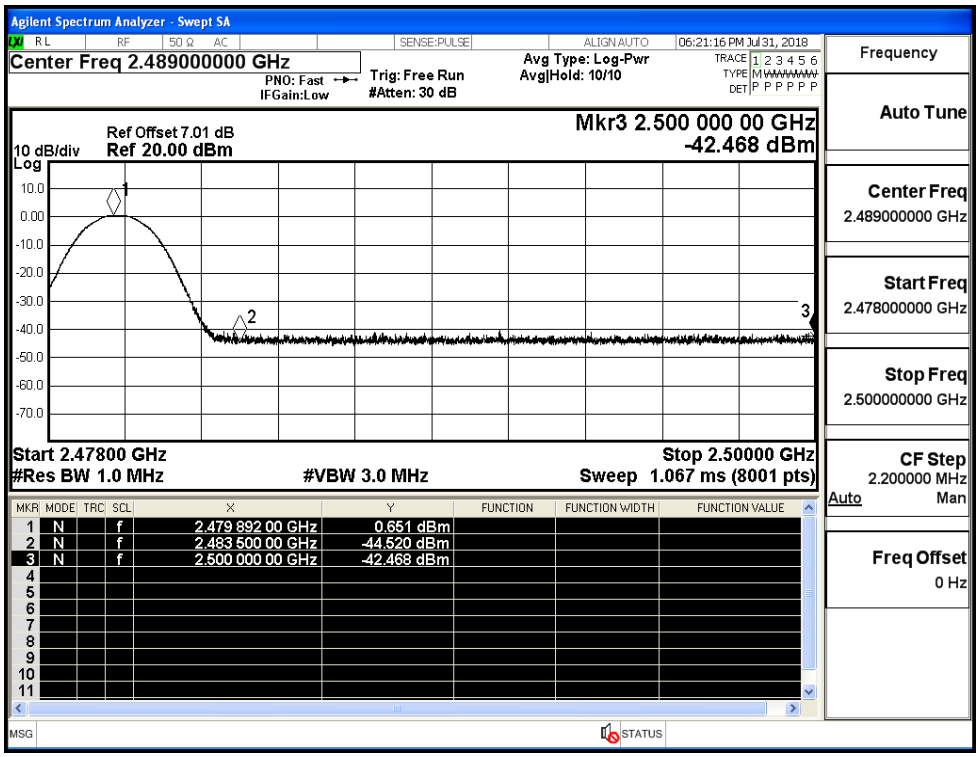
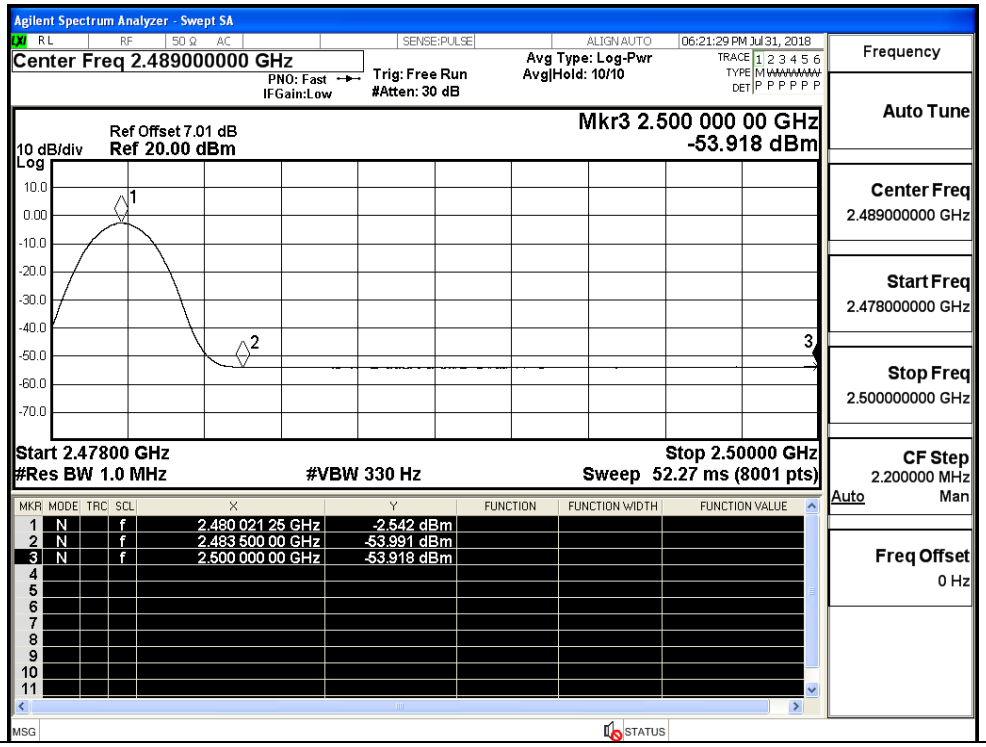
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)