Appendix A

RF Test Data for BT V4.2 (BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth earphone

Trade Mark: billboard

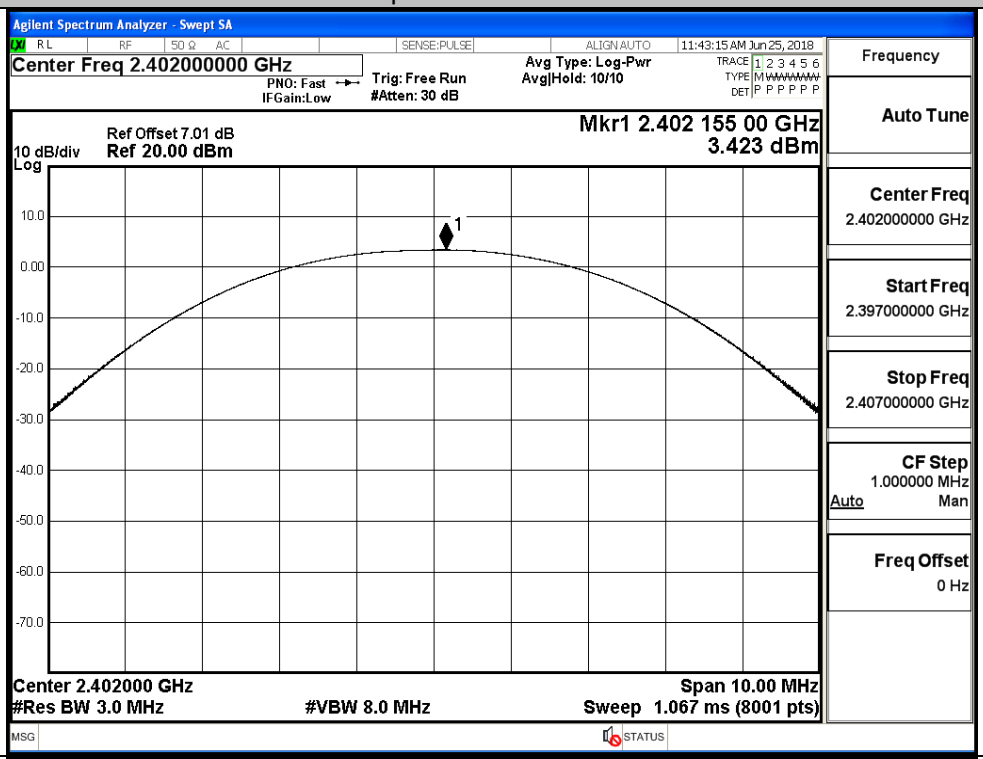
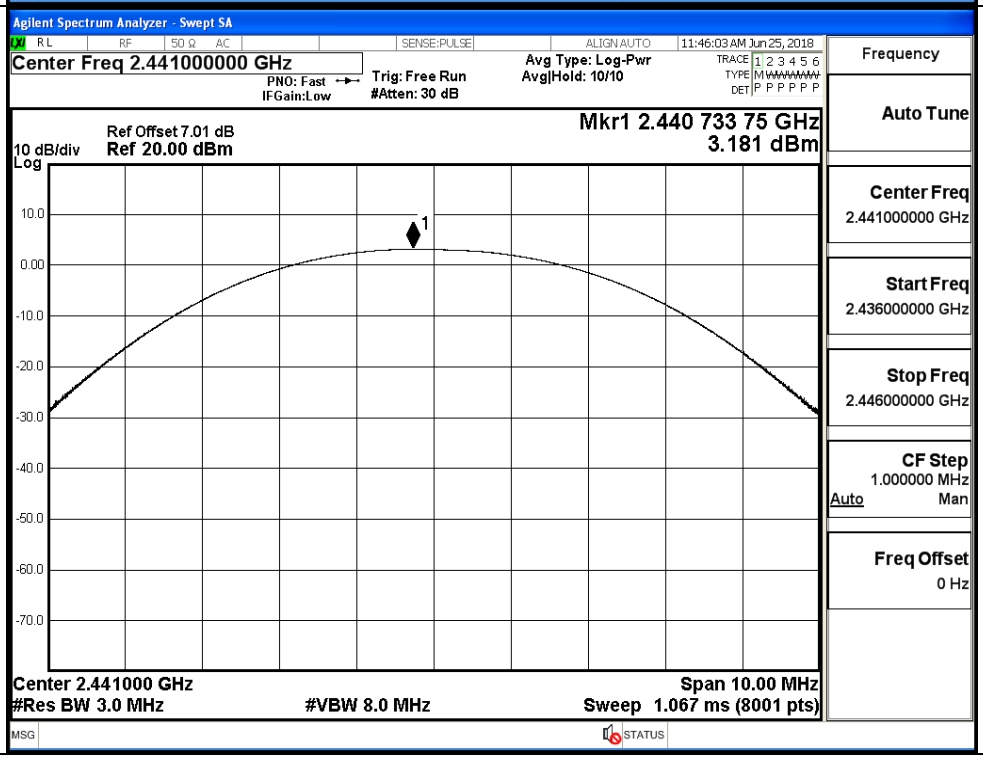
Test Model: MG508

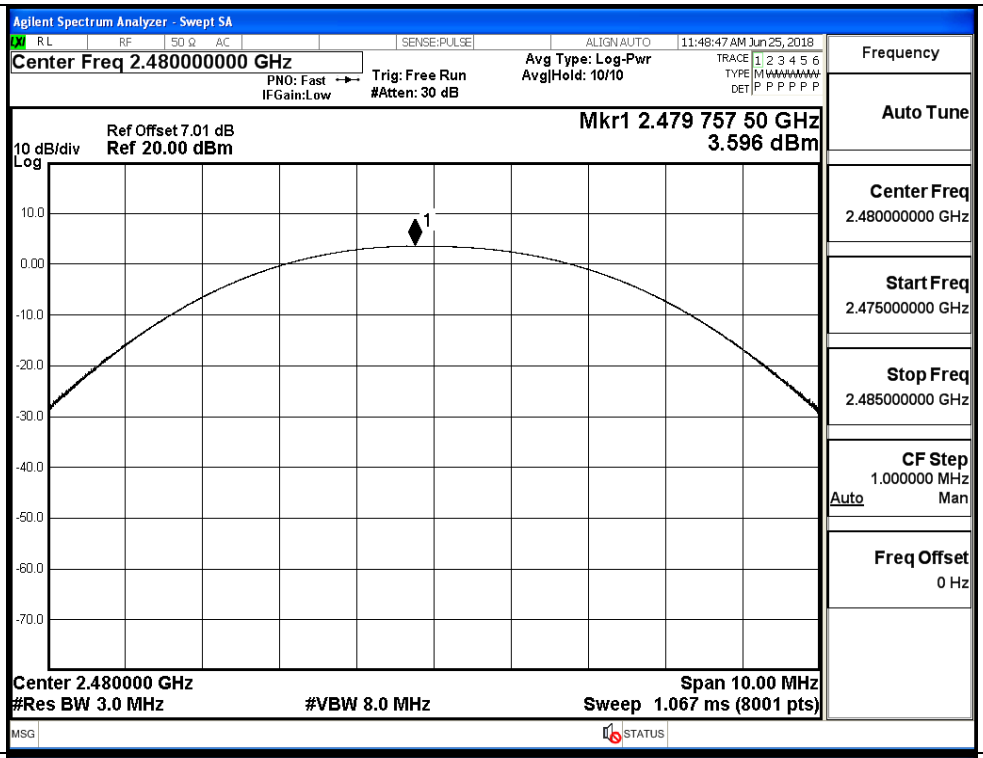
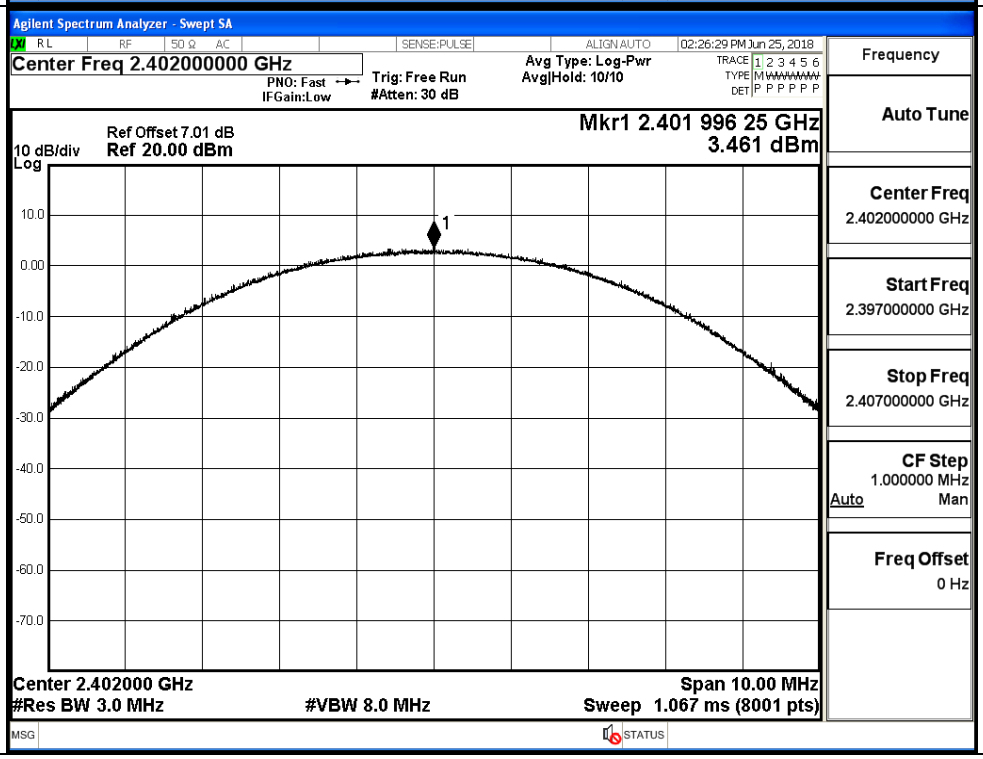
Environmental Conditions

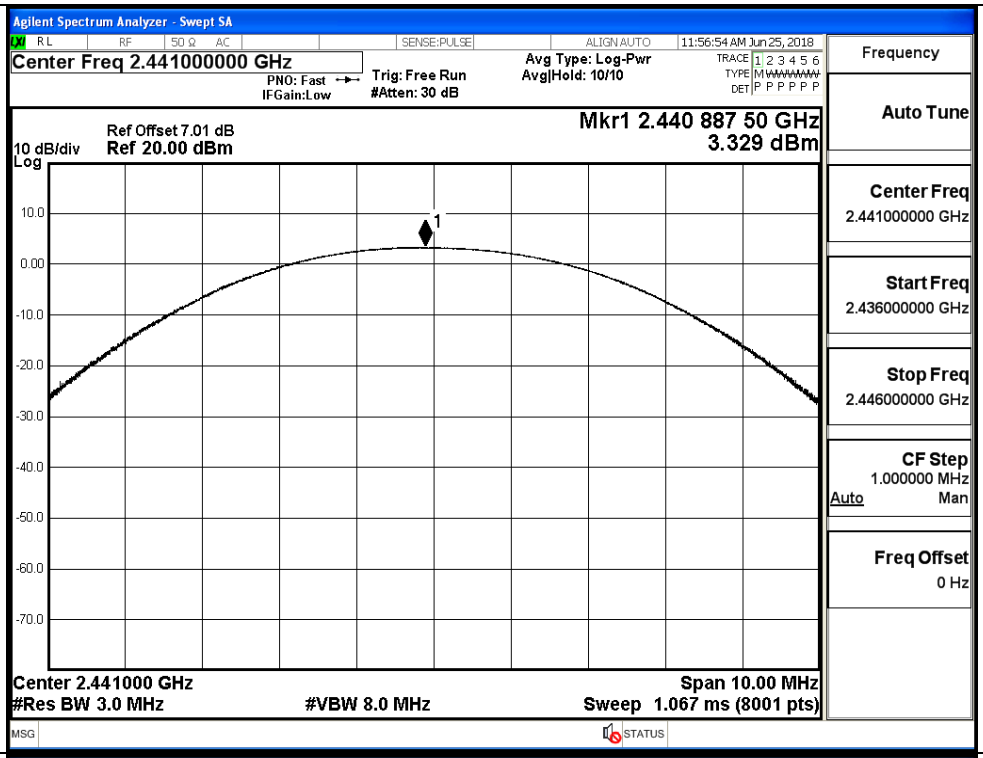
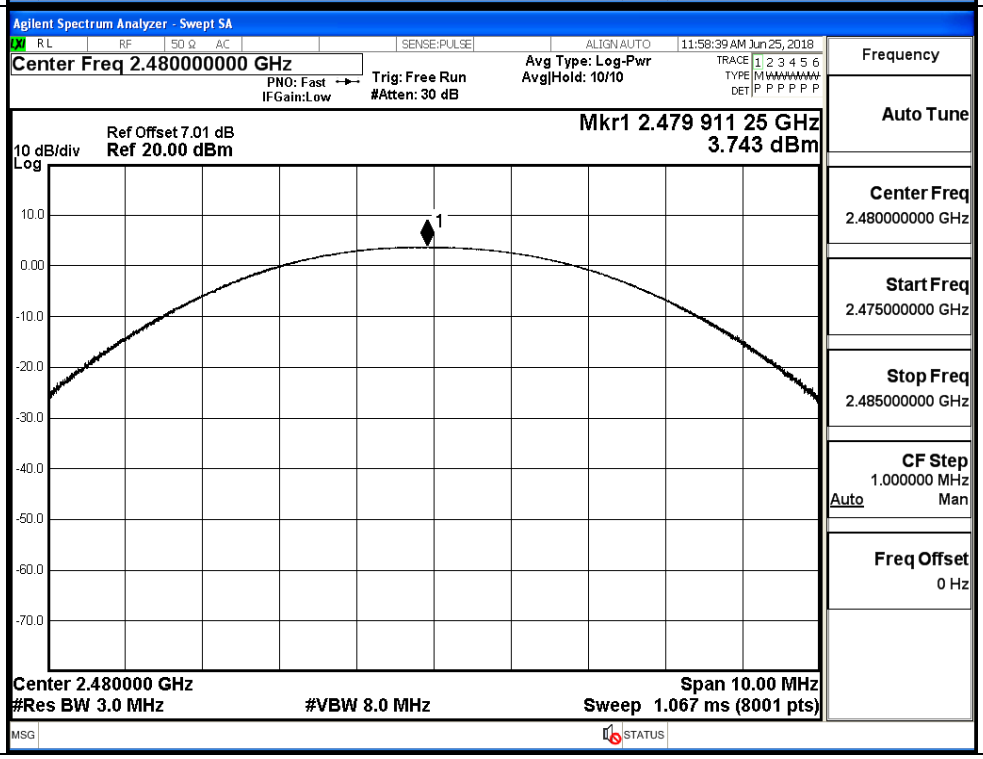
Temperature:	23.8 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Wilson.Hong
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.423	30	PASS
	MCH	3.181	30	PASS
	HCH	3.596	30	PASS
π/4DQPSK	LCH	3.461	21	PASS
	MCH	3.329	21	PASS
	HCH	3.743	21	PASS

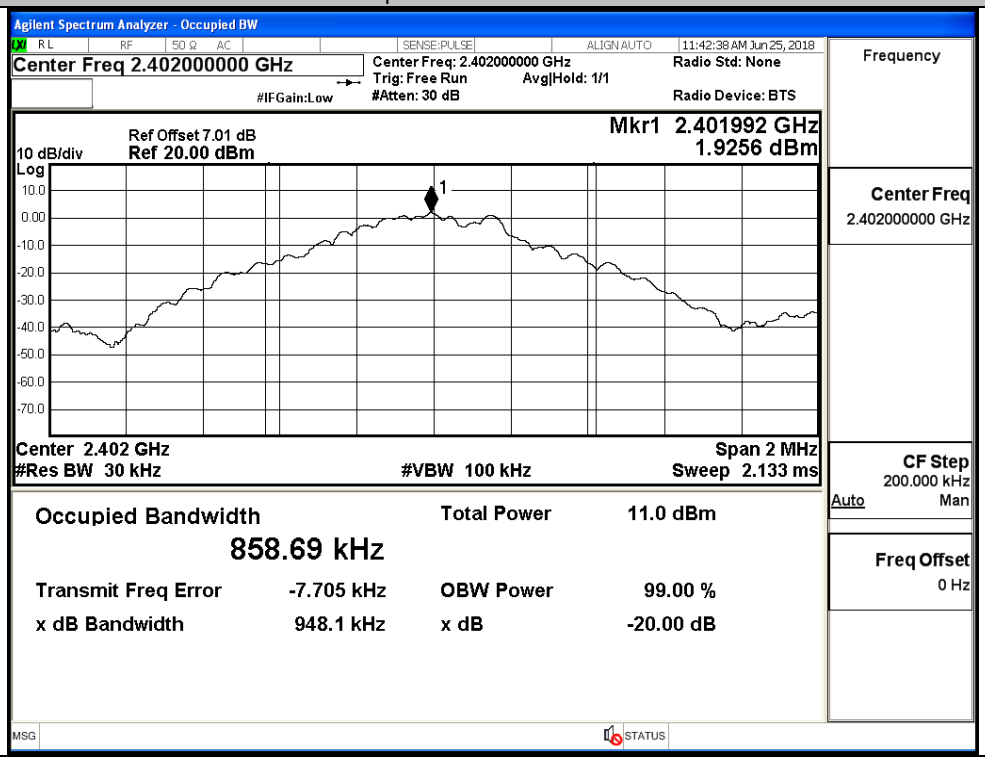
Test Graphs		
GFSK/LCH		
GFSK/MCH		

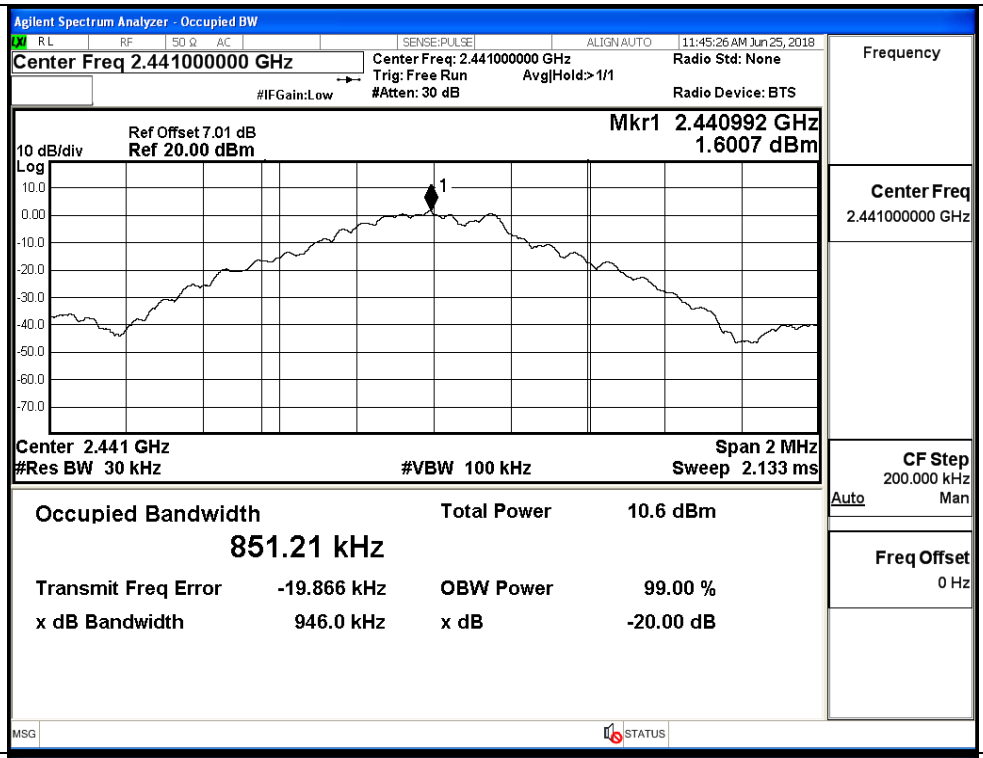
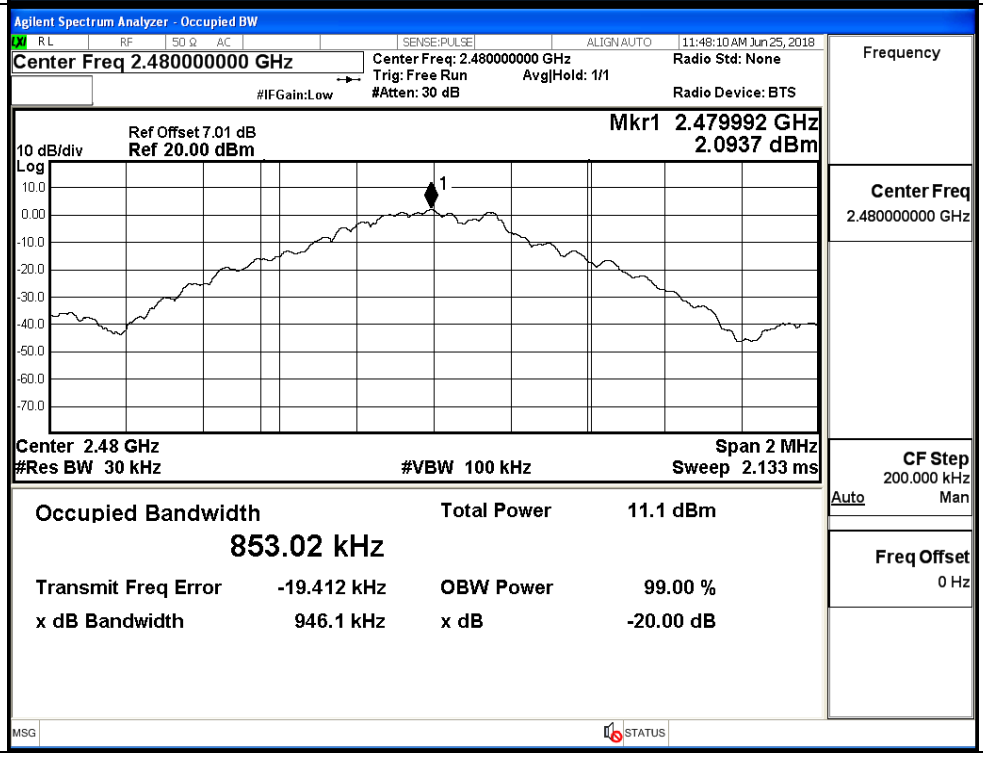
GFSK/HCH	
π/4DQPSK/LCH	

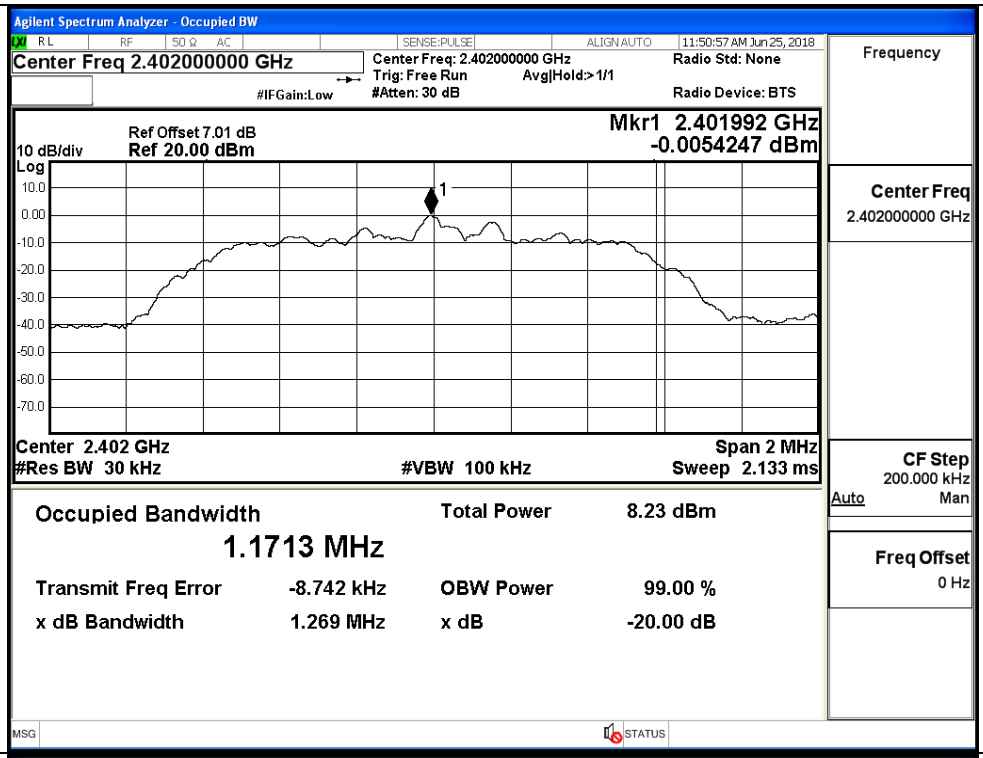
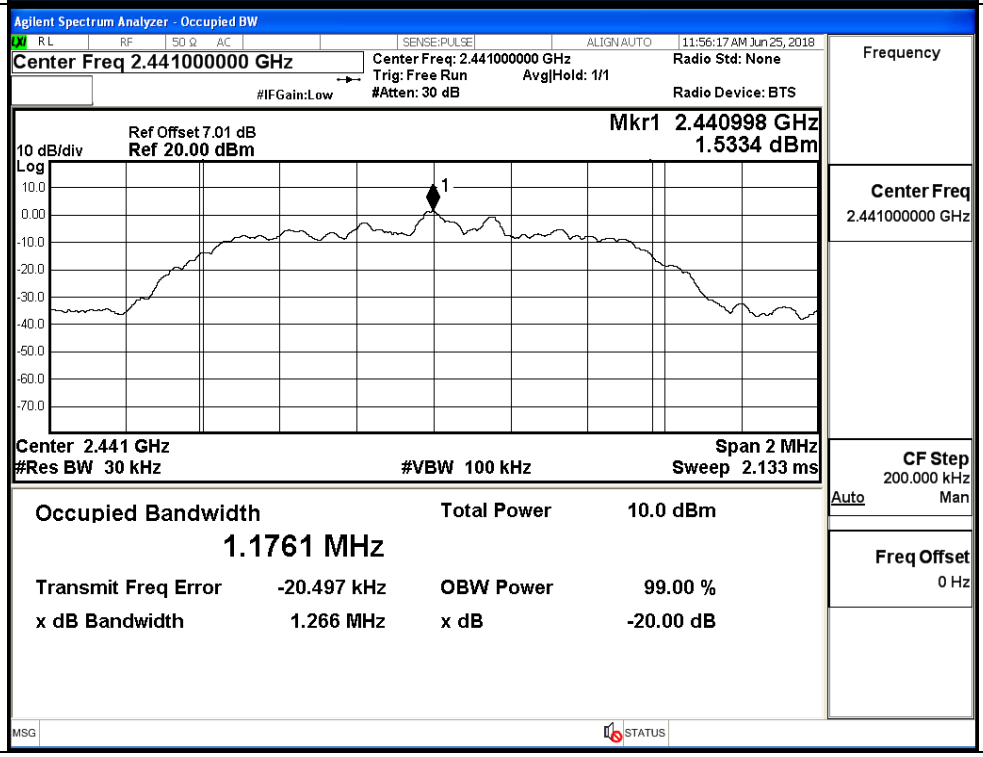
π/4DQPSK/MCH	
π/4DQPSK/HCH	

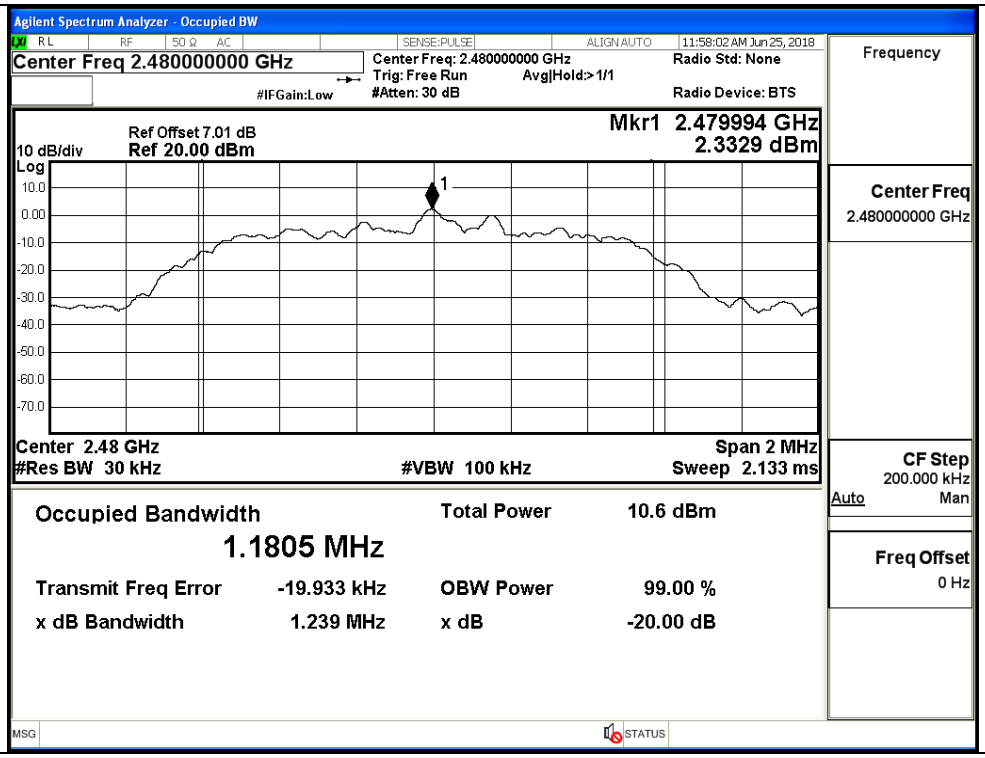
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9481	Not Specified	PASS
	MCH	0.9460	Not Specified	PASS
	HCH	0.9461	Not Specified	PASS
π/4DQPSK	LCH	1.269	Not Specified	PASS
	MCH	1.266	Not Specified	PASS
	HCH	1.239	Not Specified	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

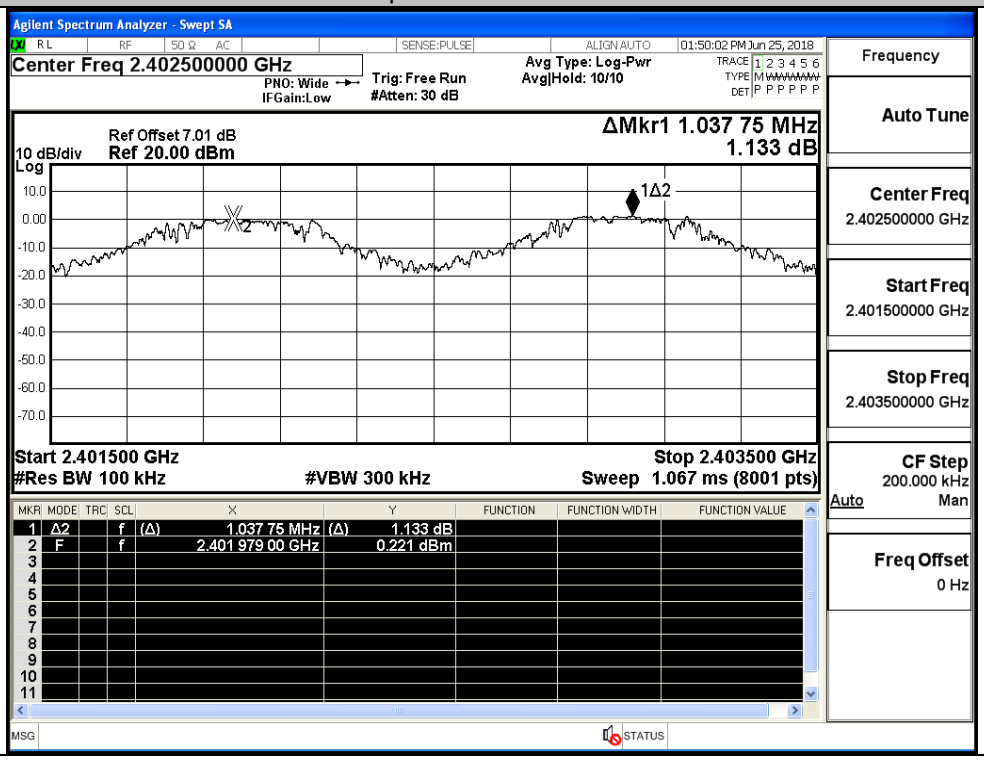
π/4DQPSK/LCH	
π/4DQPSK/MCH	

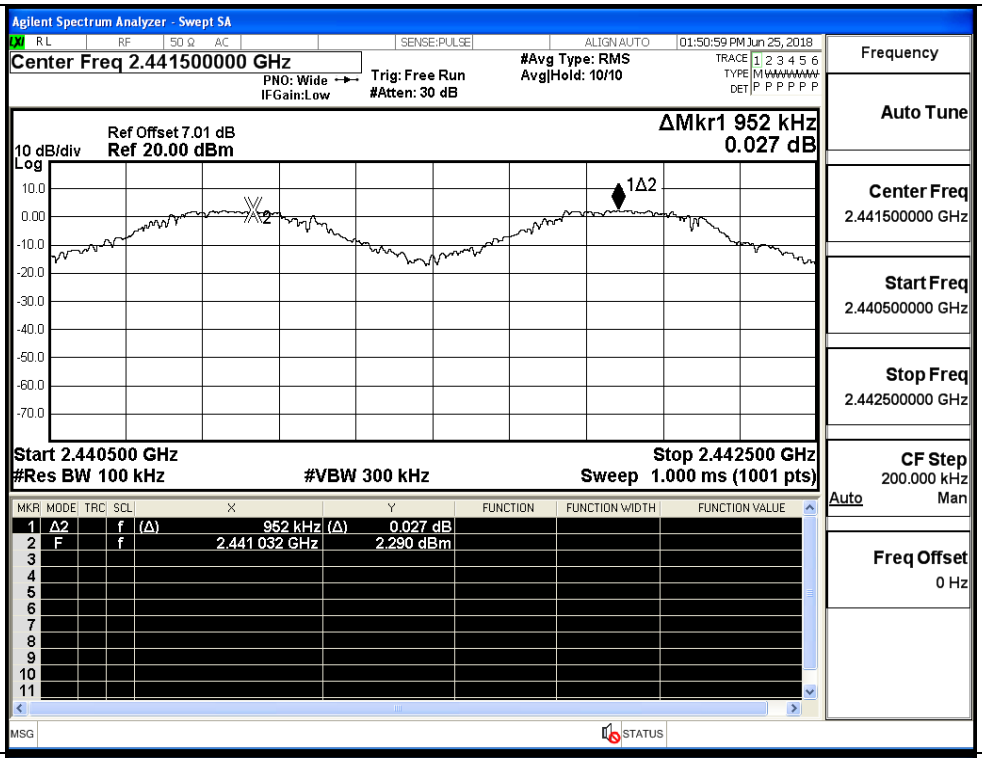
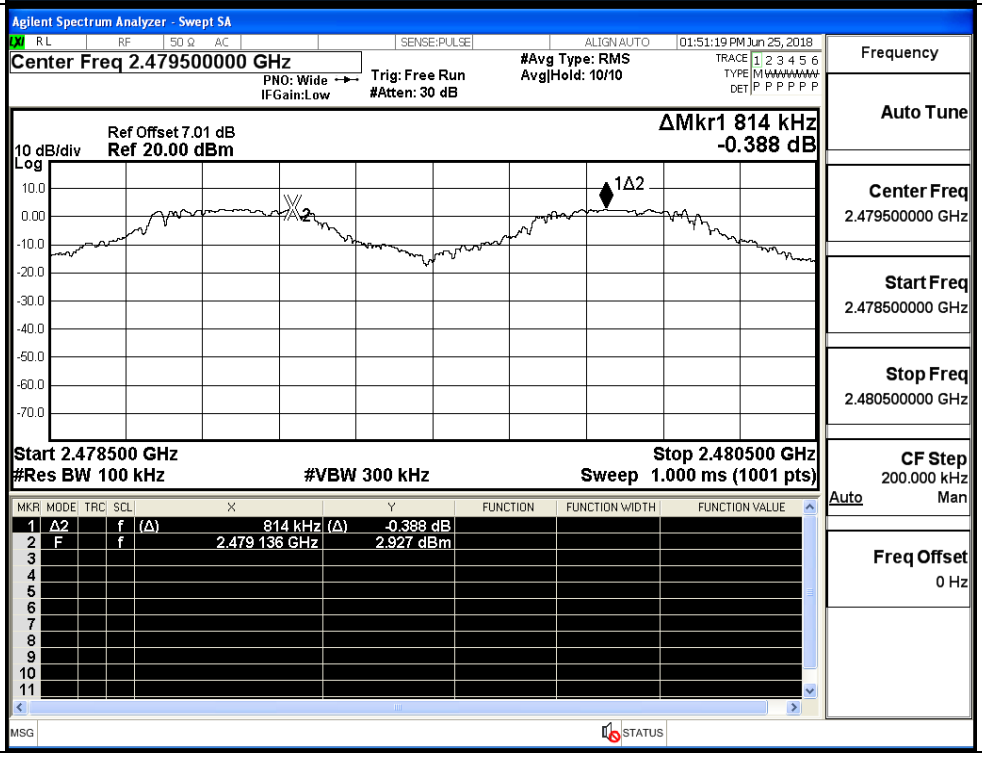
π/4DQPSK/HCH	

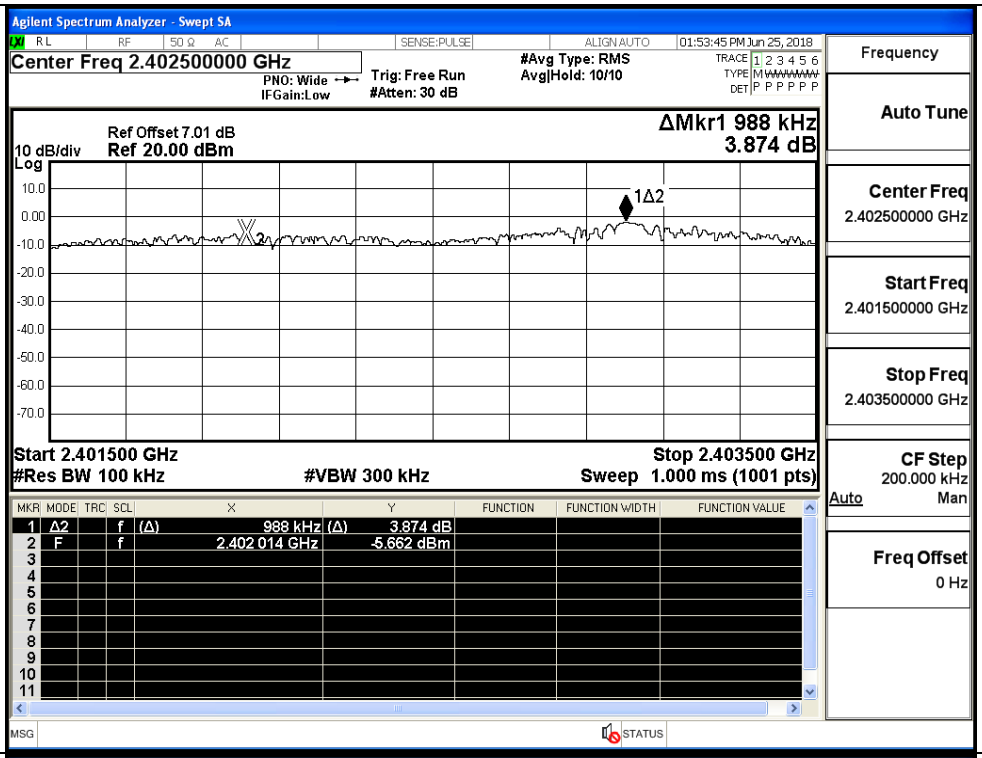
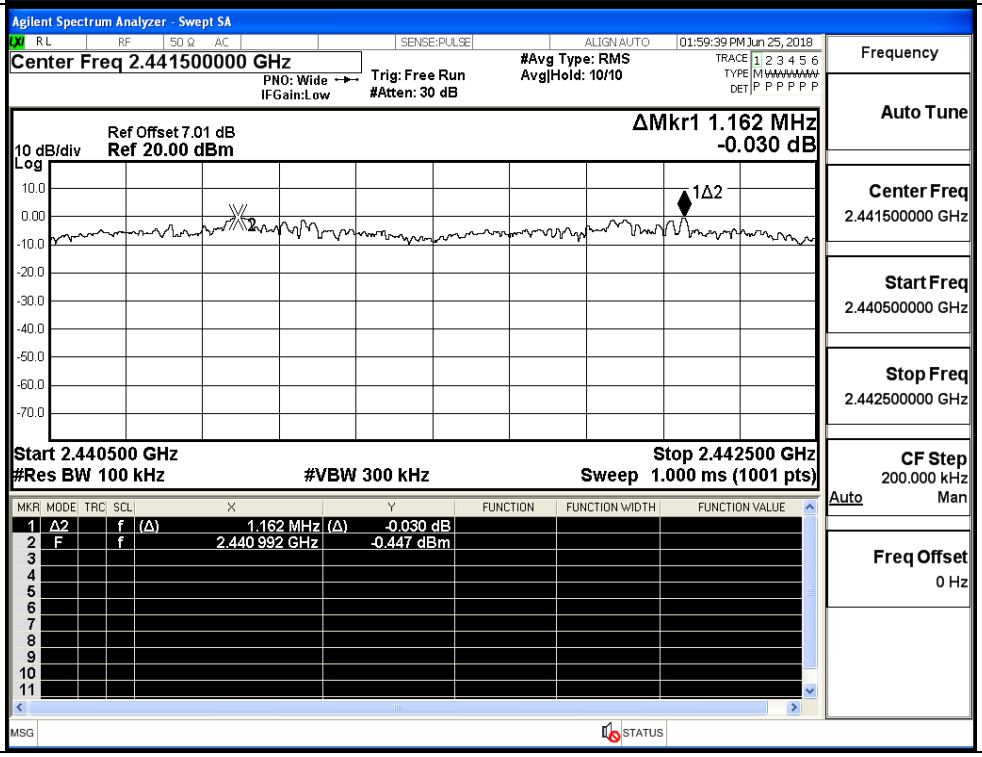
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
11:58:02 AM Jun 25, 2018
Center Freq 2.480000000 GHz
#IFGain:Low
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 7.01 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479994 GHz
2.3329 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.133 ms
Occupied Bandwidth
1.1805 MHz
Total Power 10.6 dBm
Transmit Freq Error -19.933 kHz
OBW Power 99.00 %
x dB Bandwidth 1.239 MHz
x dB -20.00 dB
Center Freq
2.480000000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

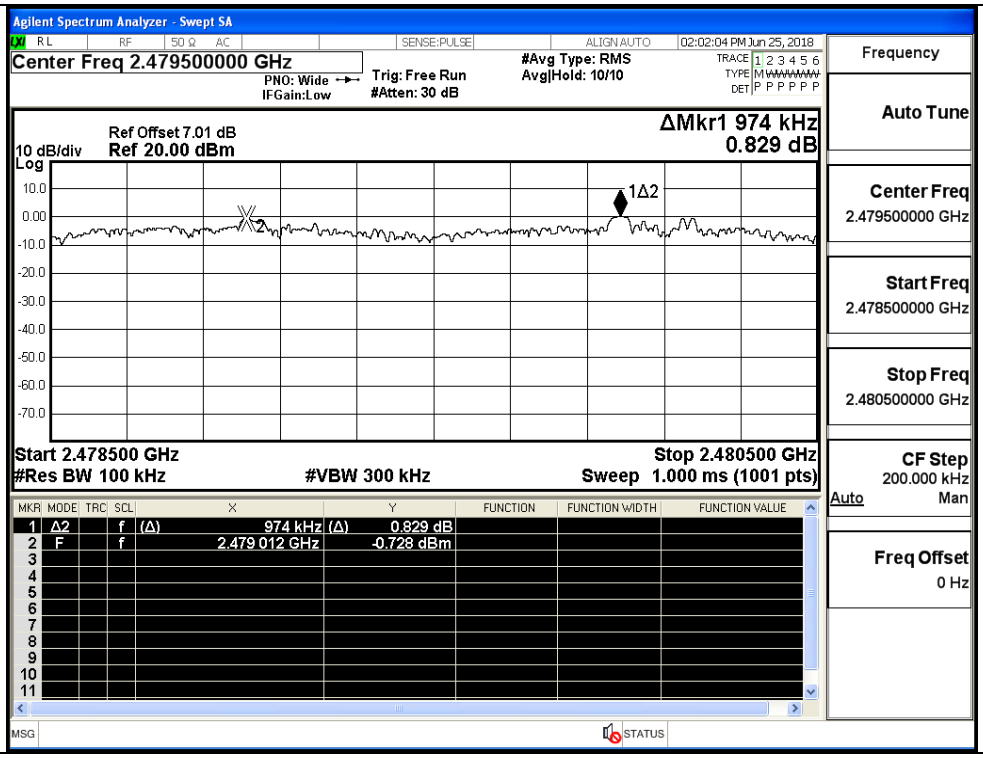
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.038	0.632	PASS
	MCH	0.952	0.632	PASS
	HCH	0.814	0.632	PASS
π/4DQPSK	LCH	0.988	0.846	PASS
	MCH	1.162	0.846	PASS
	HCH	0.974	0.846	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

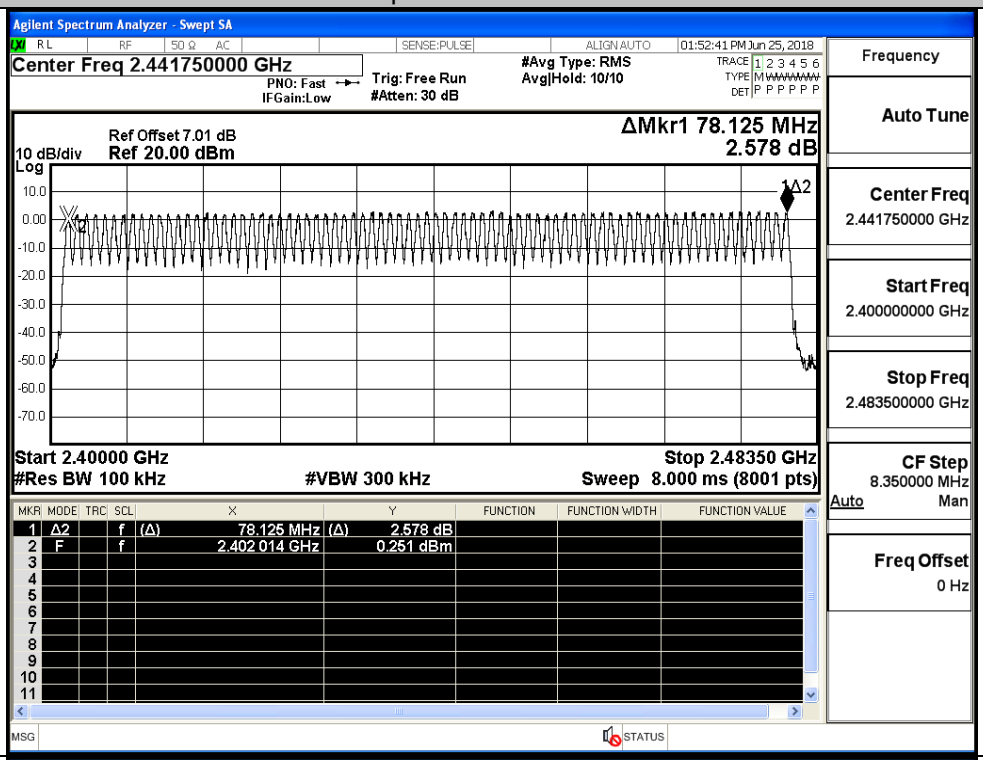
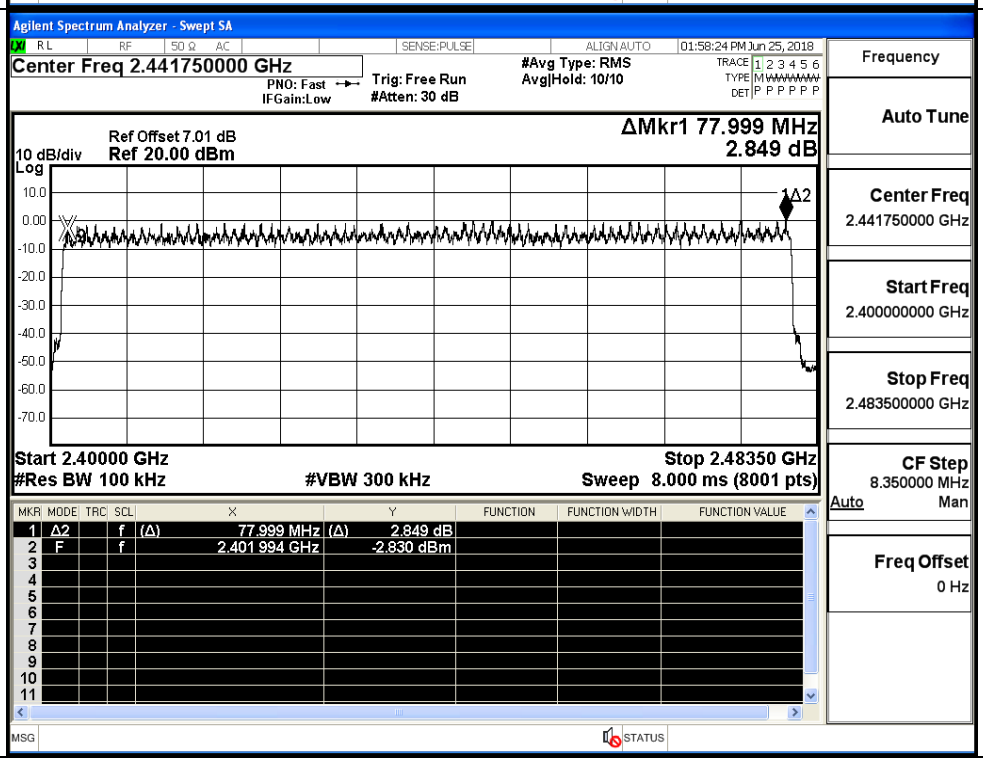
π/4DQPSK/LCH	
π/4DQPSK/MCH	

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
02:02:04 PM Jun 25, 2018
Ref Offset 7.01 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr1 974 kHz
0.829 dB
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.000 ms (1001 pts)
1 Δ2 974 kHz 0.829 dB
2 F 2.479 012 GHz -0.728 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

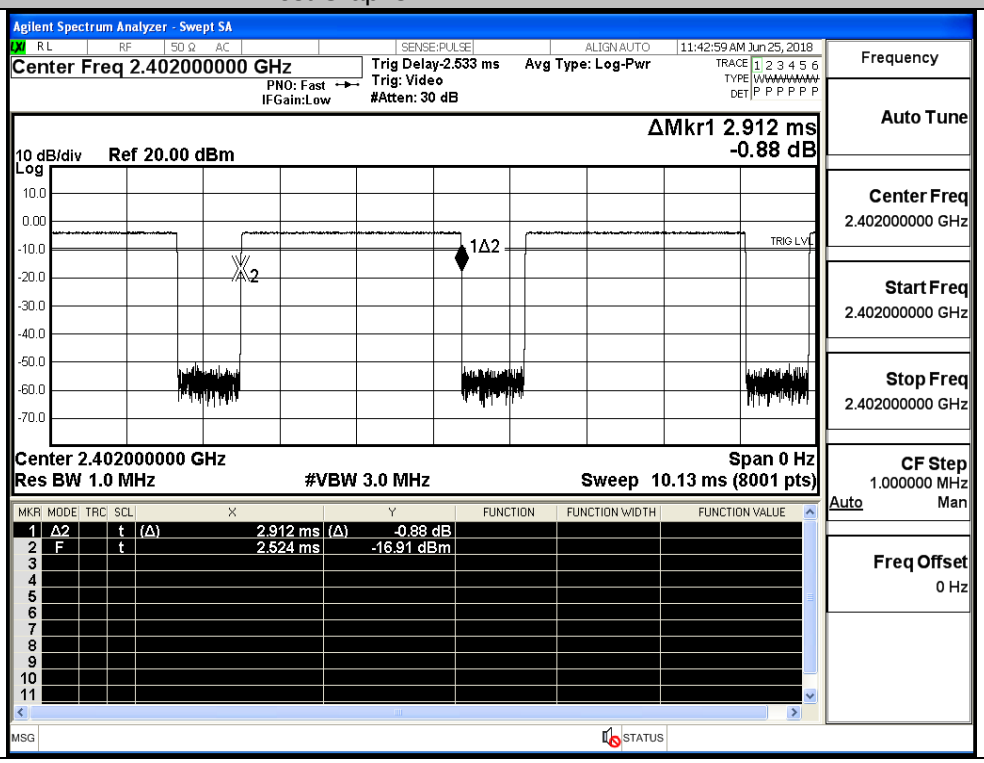
Test Graphs		
GFSK/Hop		
π/4DQPSK/Hop		

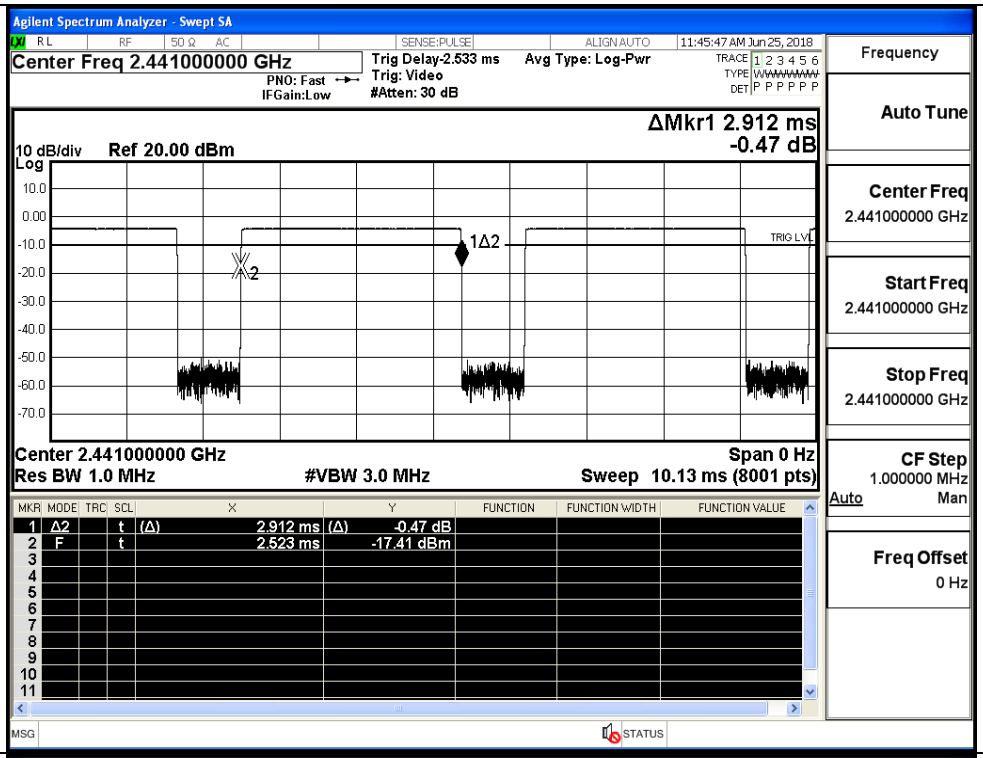
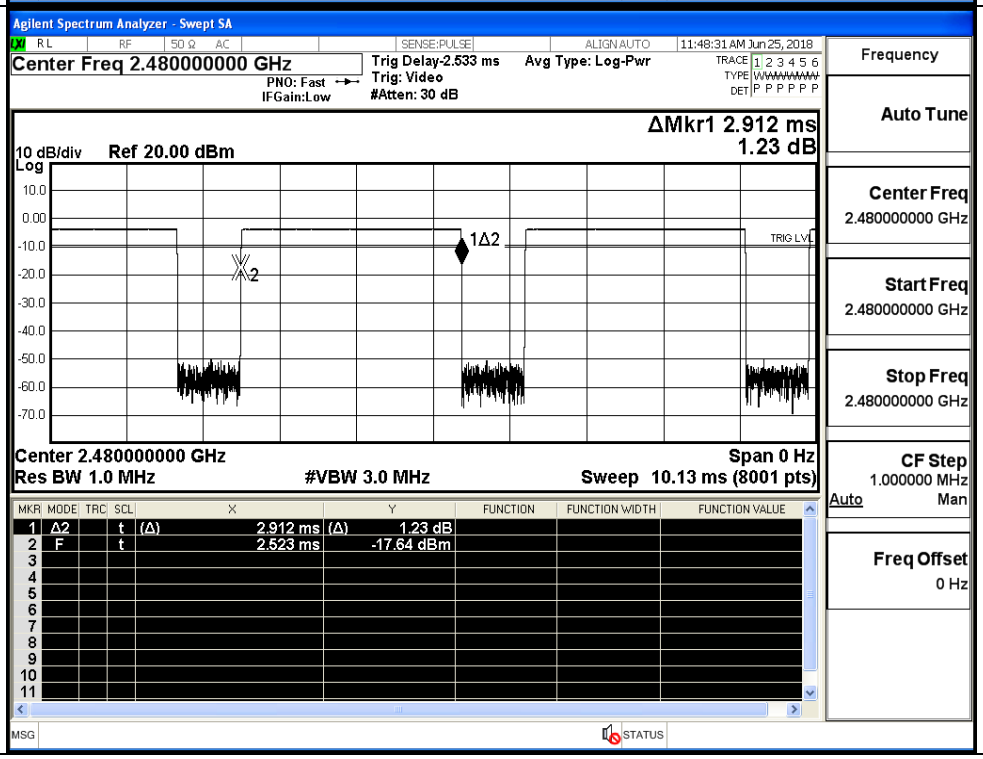
A.5 Dwell Time

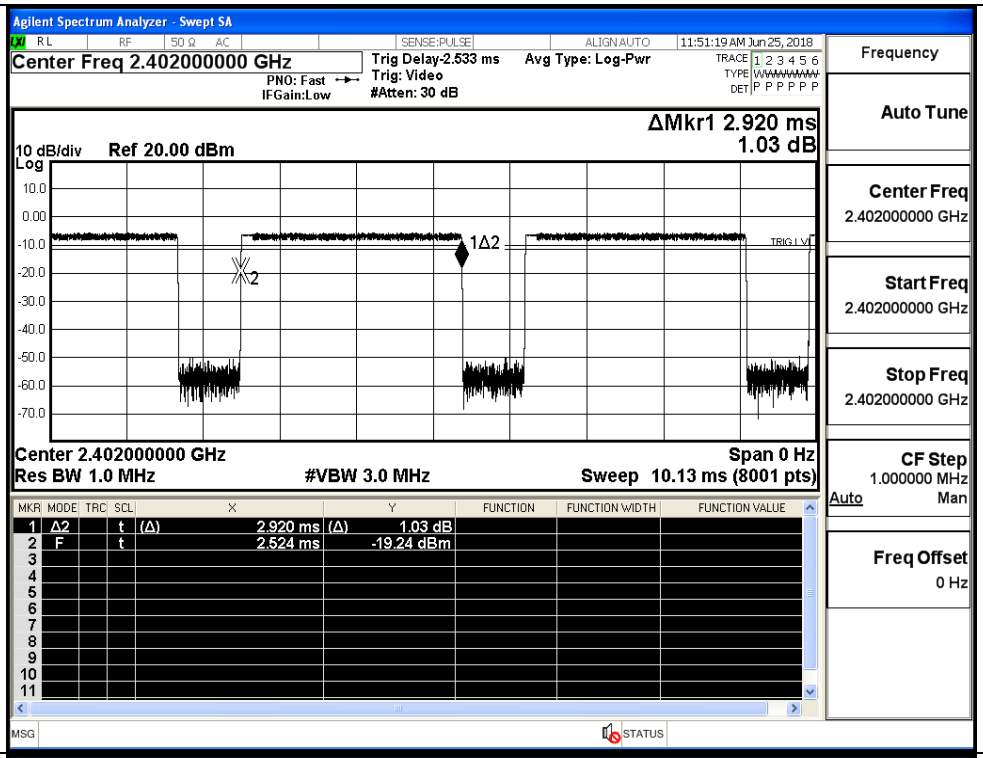
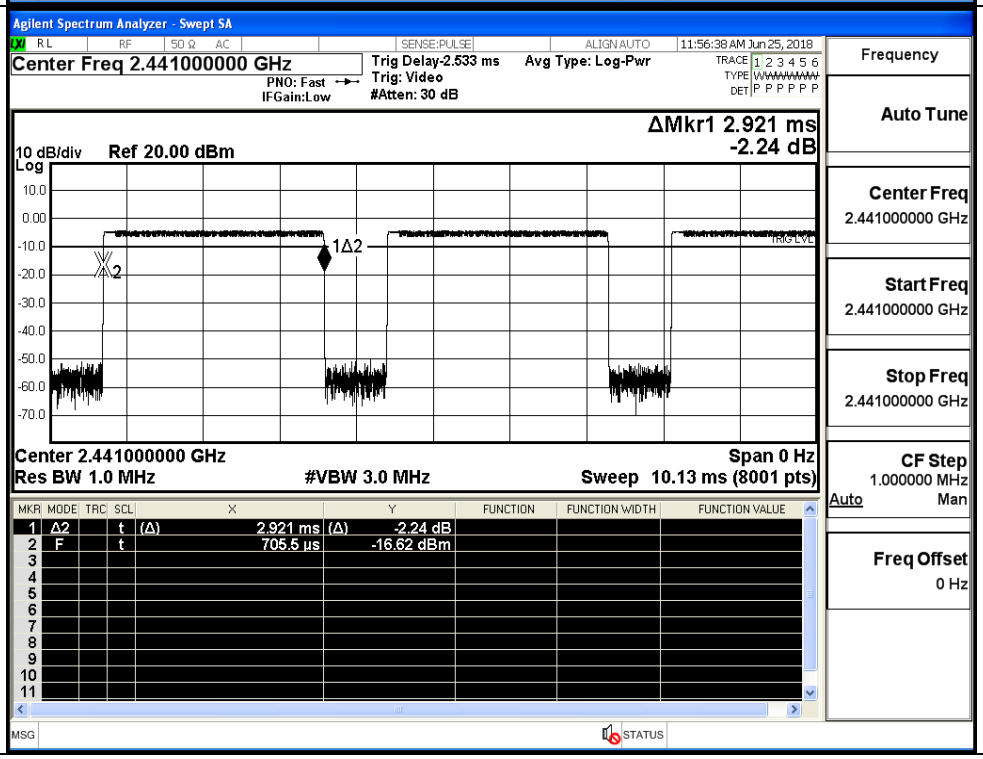
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.91	106.7	0.31	0.4	PASS
	DH5	MCH	2.91	106.7	0.31	0.4	PASS
	DH5	HCH	2.91	106.7	0.31	0.4	PASS
π/4DQPSK	2DH5	LCH	2.91	106.7	0.312	0.4	PASS
	2DH5	MCH	2.91	106.7	0.312	0.4	PASS
	2DH5	HCH	2.91	106.7	0.312	0.4	PASS

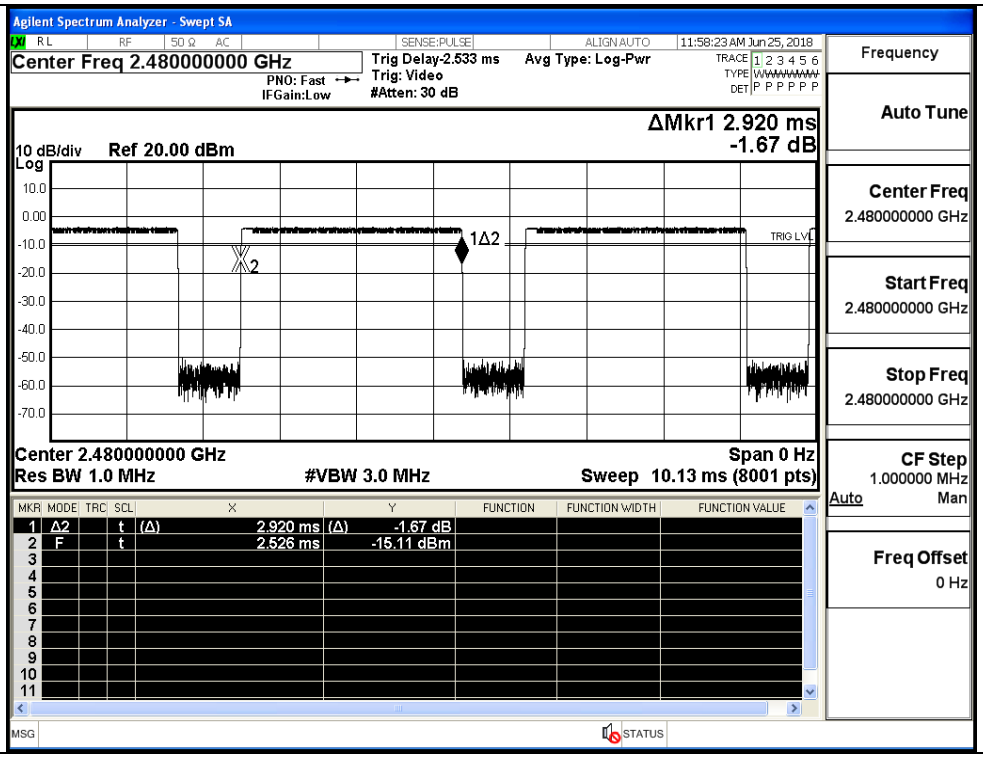
Test Graphs

GFSK_DH5/LCH



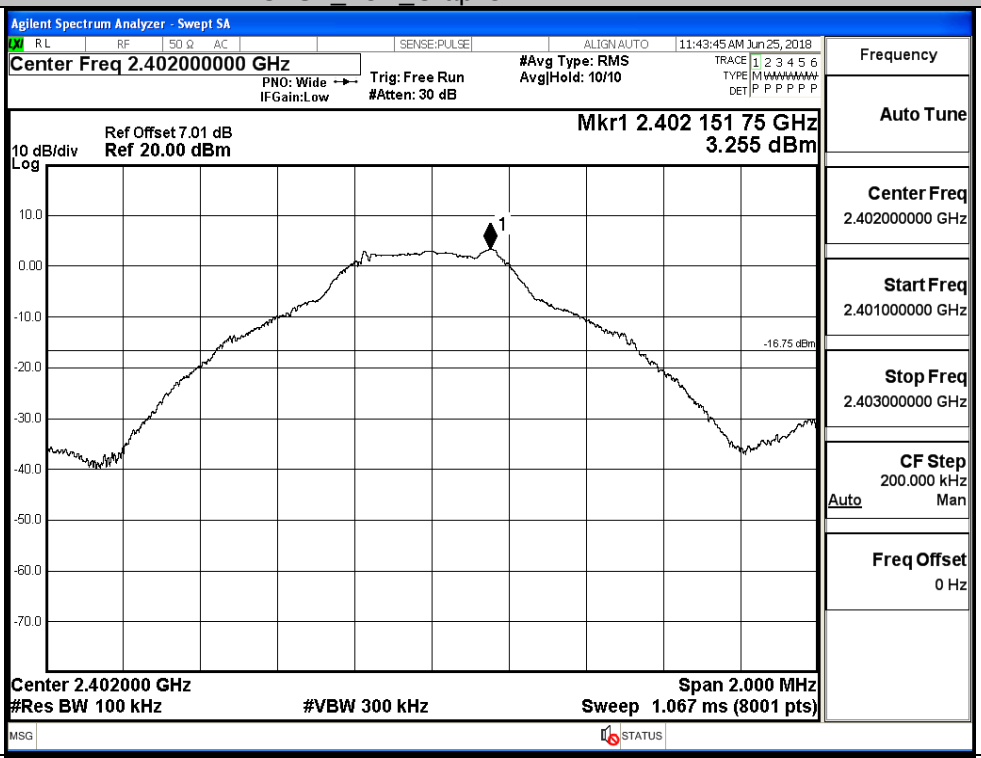
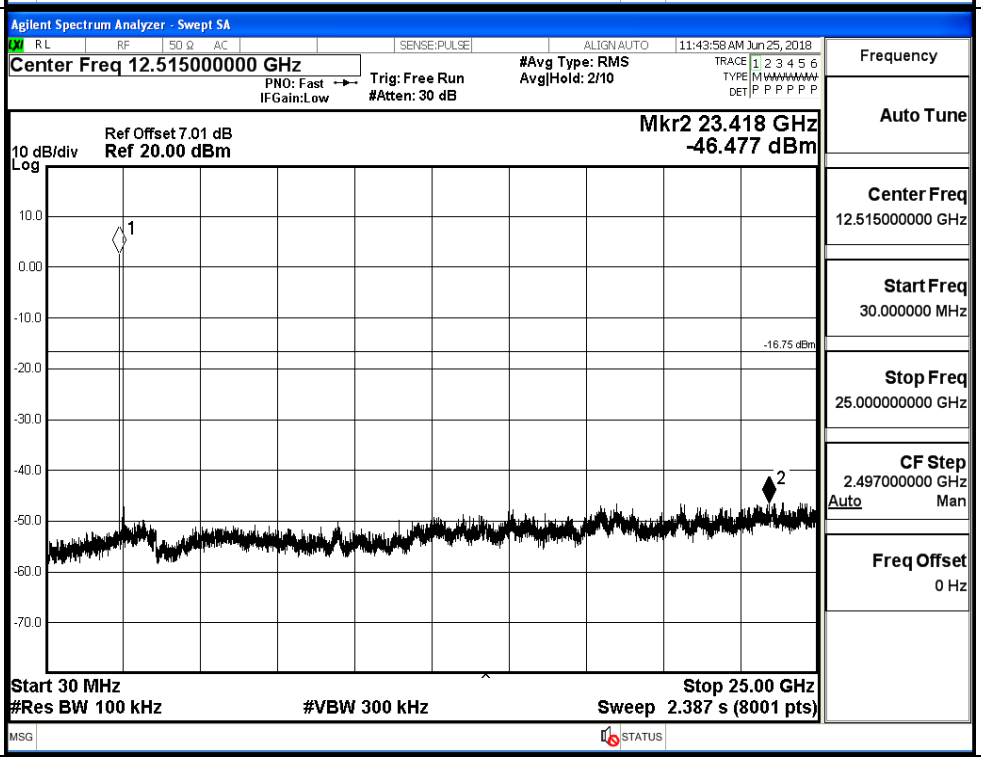
GFSK_DH5/MCH	
GFSK_DH5/HCH	

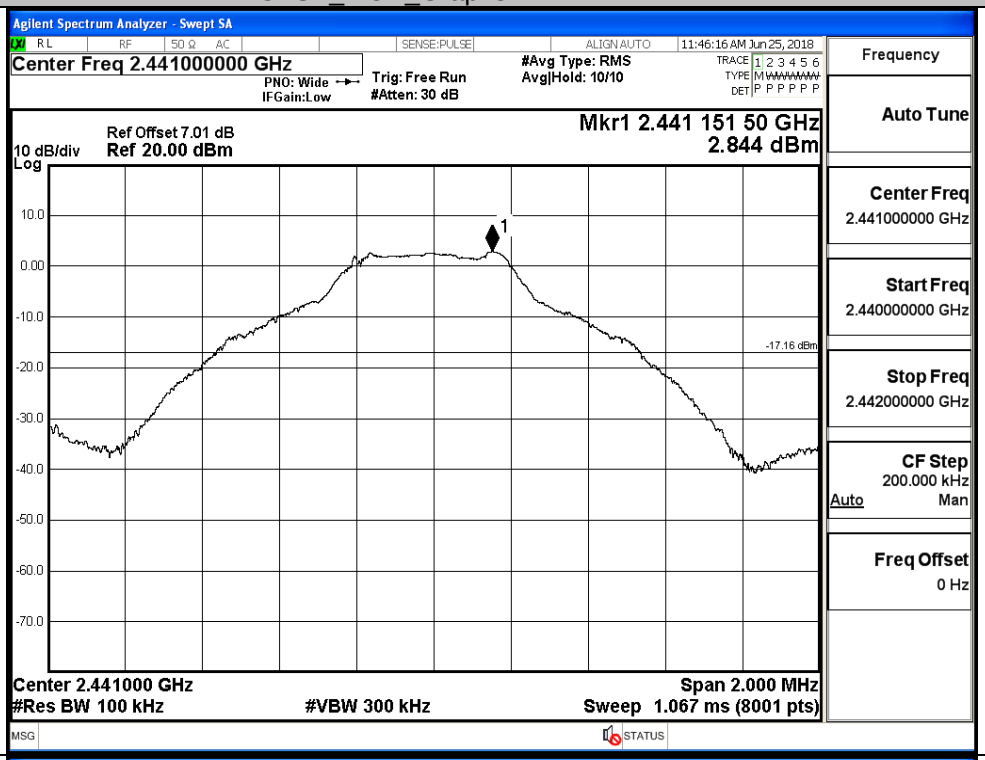
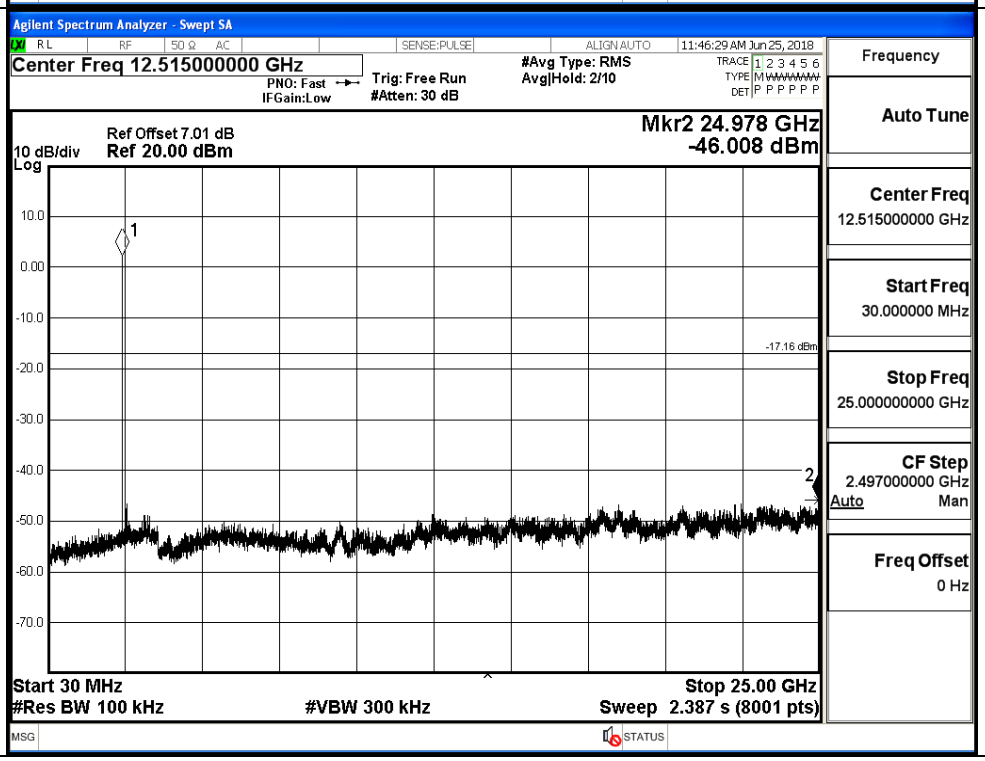
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

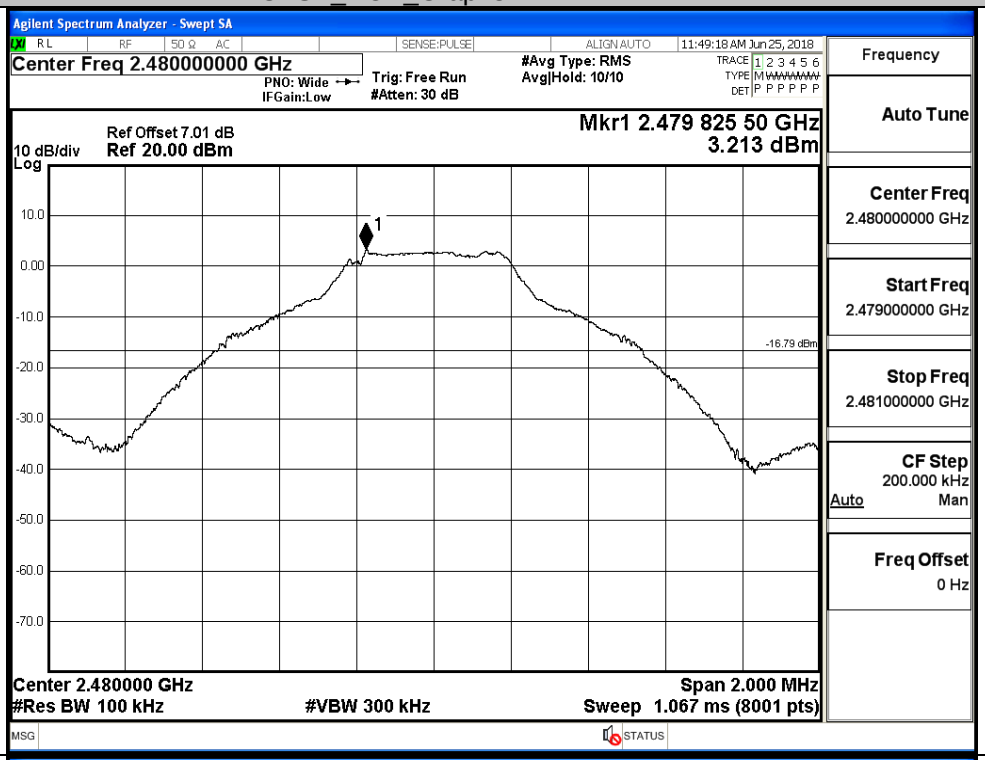
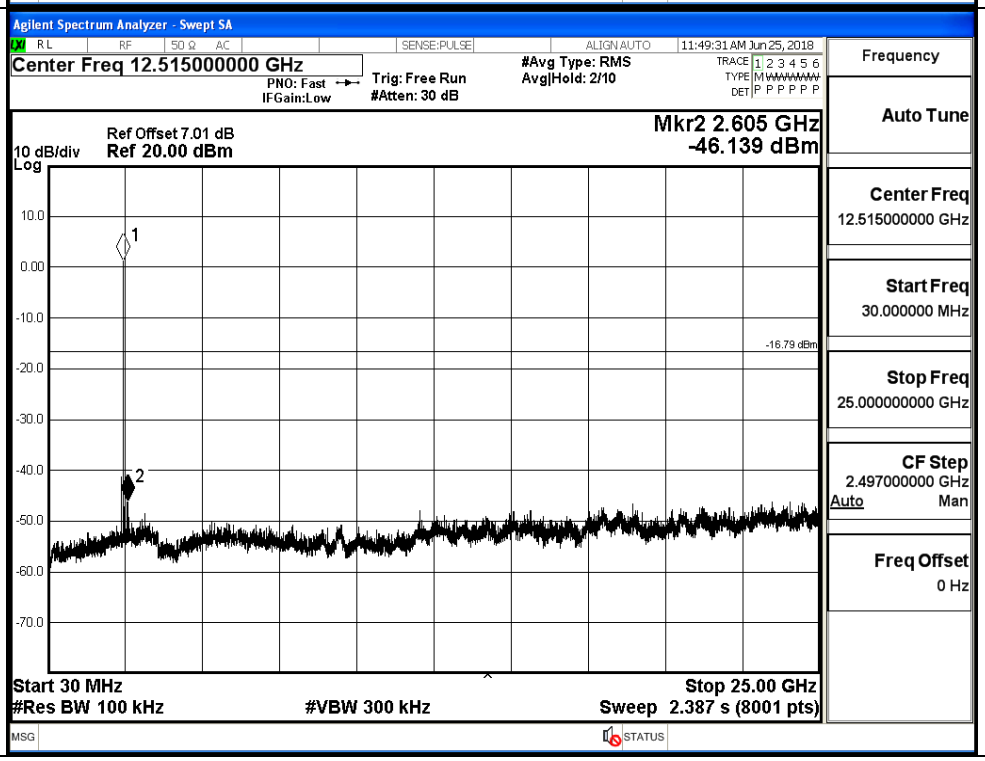
π/4DQPSK _2DH5/HCH	

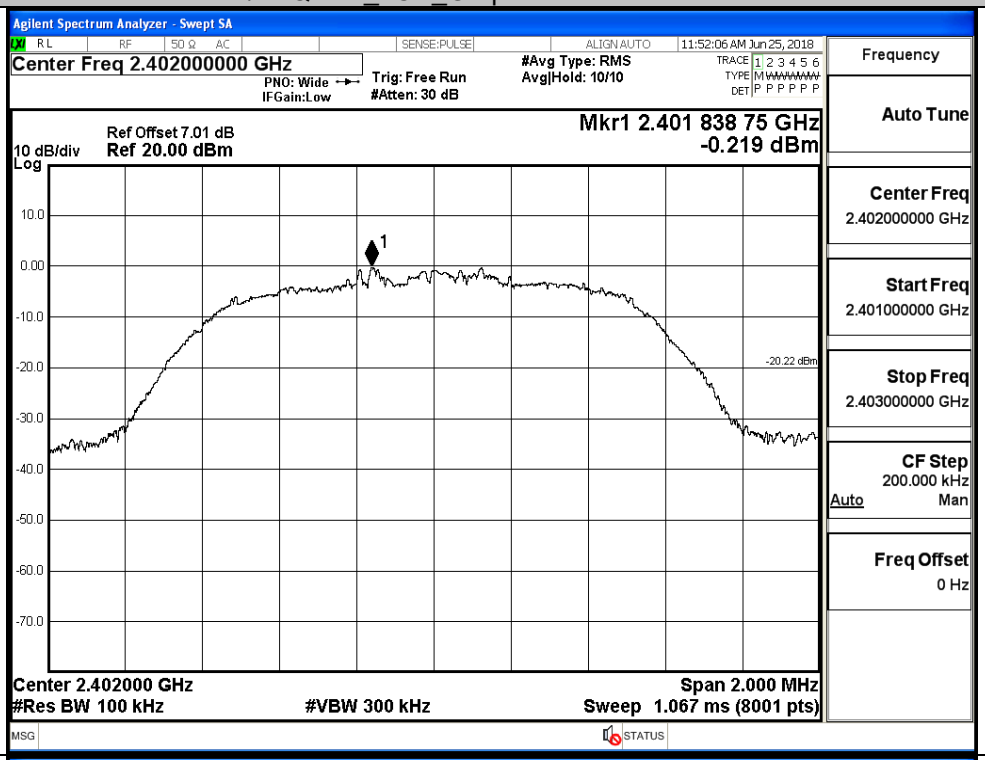
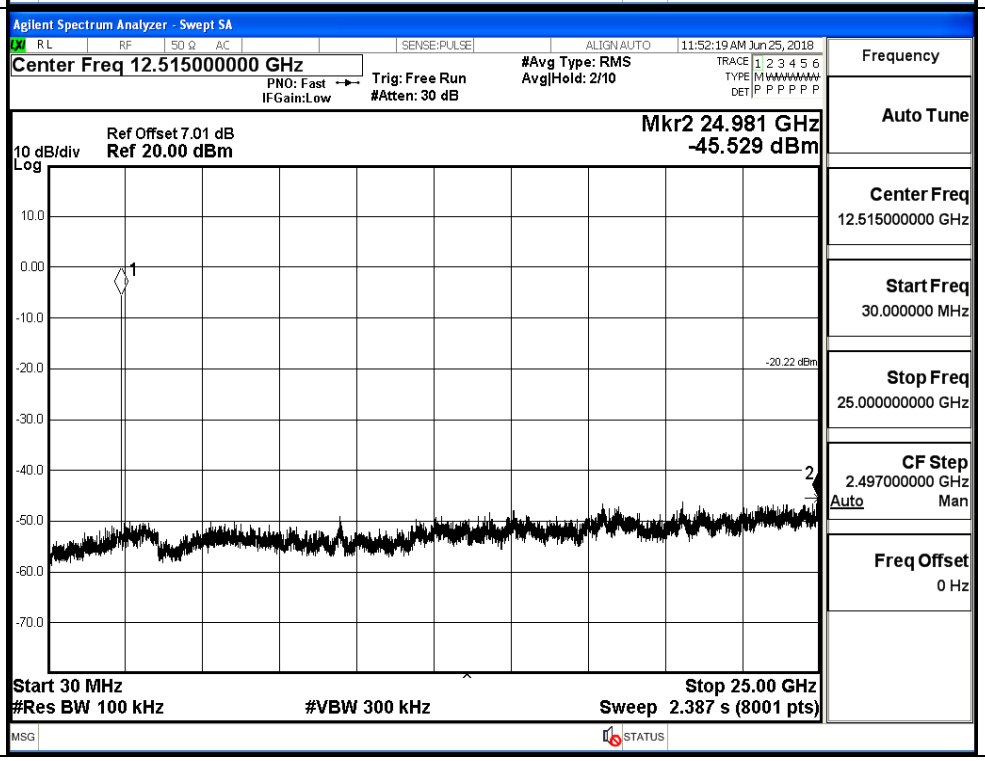
A.6 RF Conducted Spurious Emissions

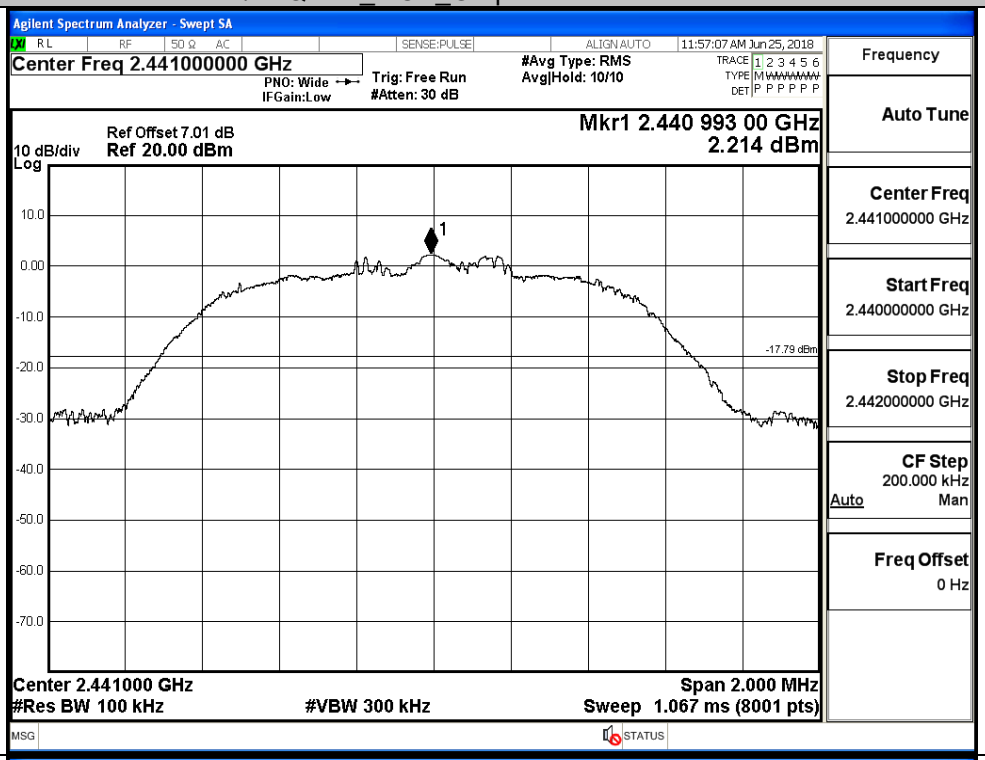
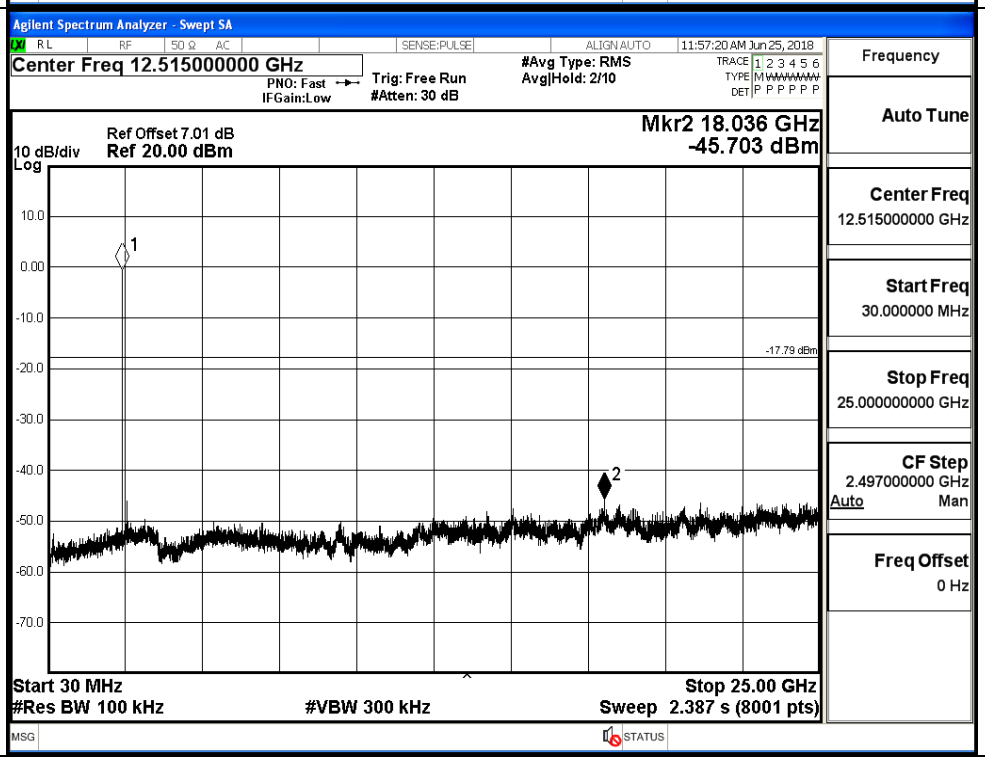
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.255	-46.477	-16.745	PASS
	MCH	2.844	-46.008	-17.156	PASS
	HCH	3.213	-46.139	-16.787	PASS
π/4DQPSK	LCH	-0.219	-45.529	-20.219	PASS
	MCH	2.214	-45.703	-17.786	PASS
	HCH	2.771	-45.176	-17.229	PASS

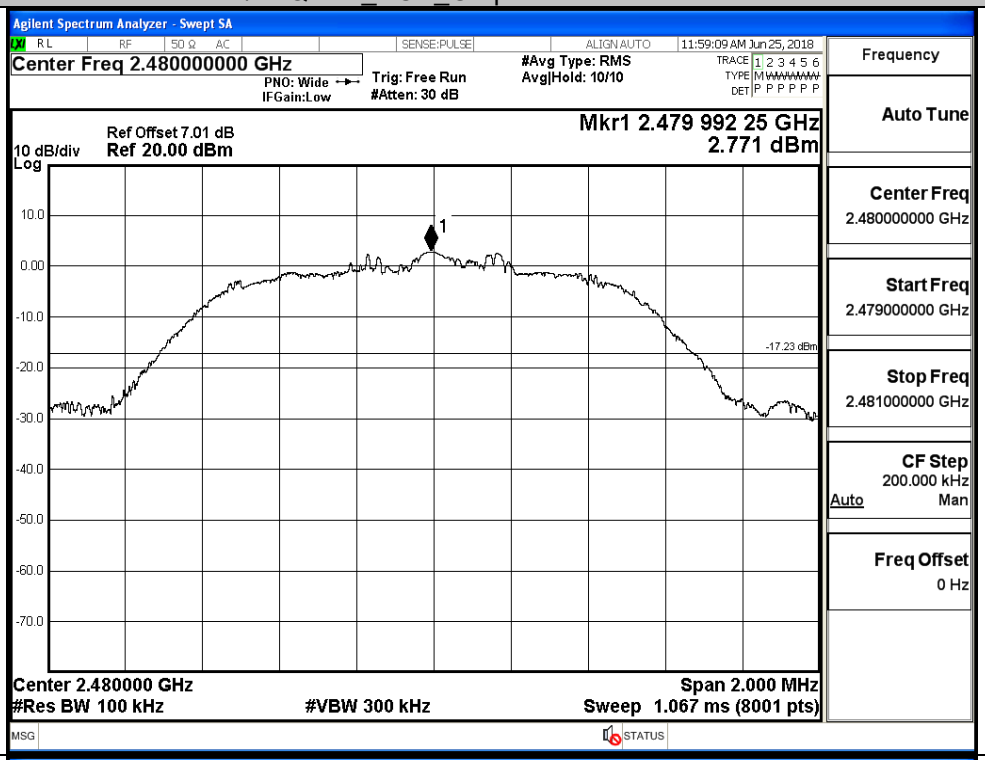
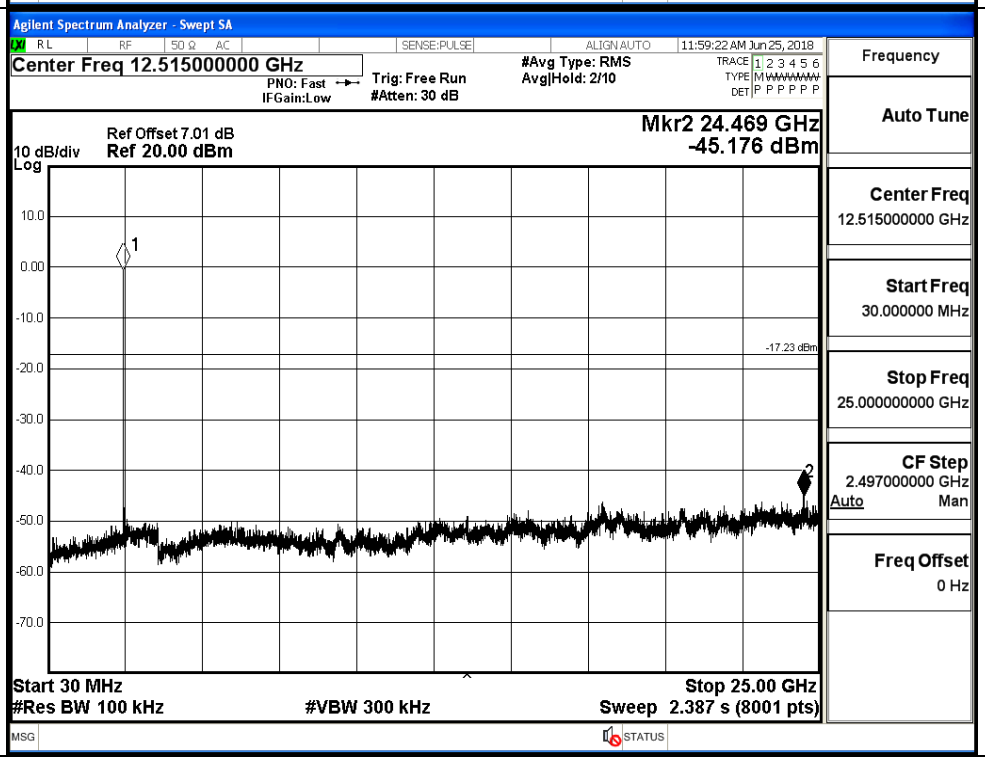
GFSK_LCH_Graphs			
Pref			
Puw			

GFSK_MCH_Graphs			
Pref			
Puw			

GFSK_HCH_Graphs			
Pref		
Puw		

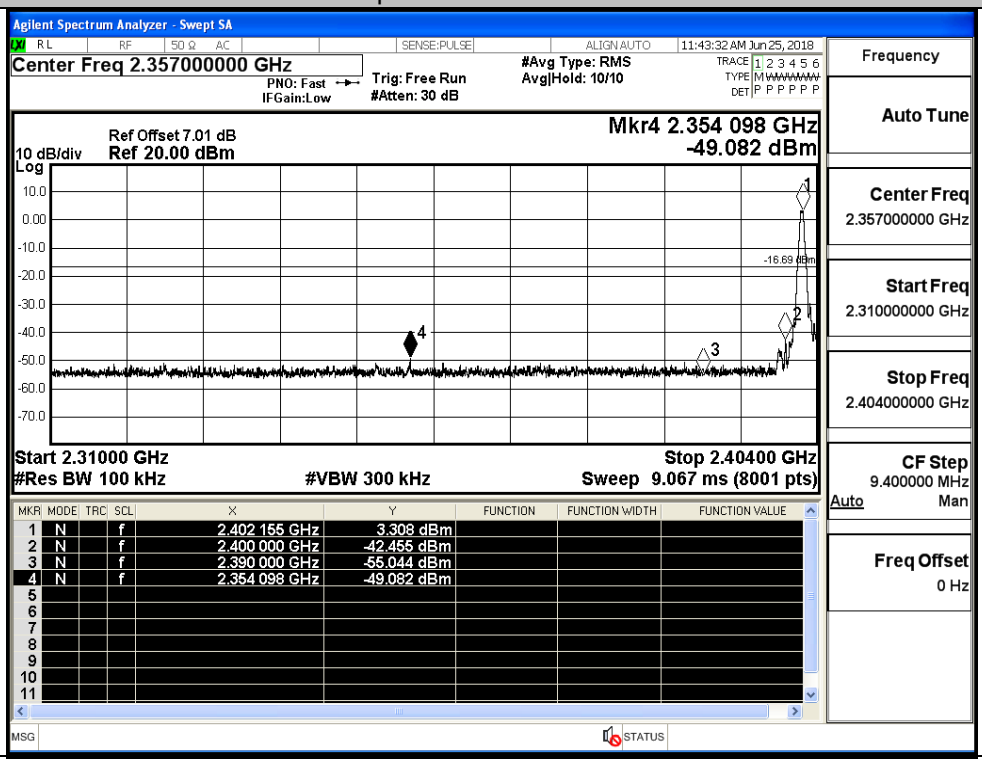
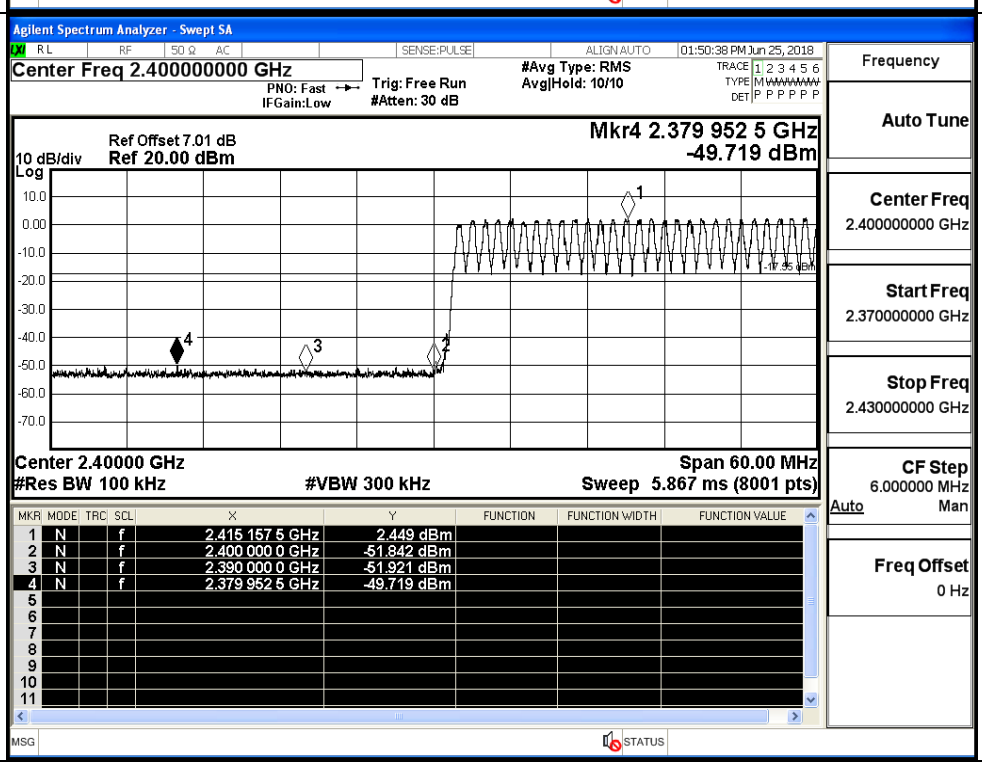
π/4DQPSK_LCH_Graphs		
Pref		
Puw		

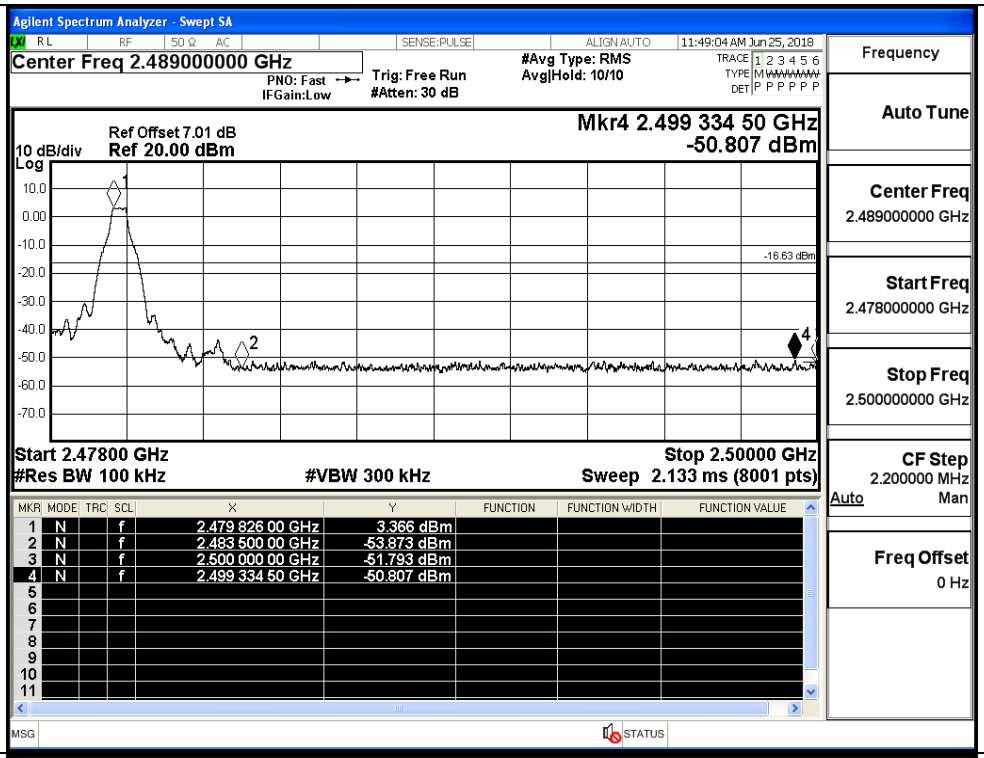
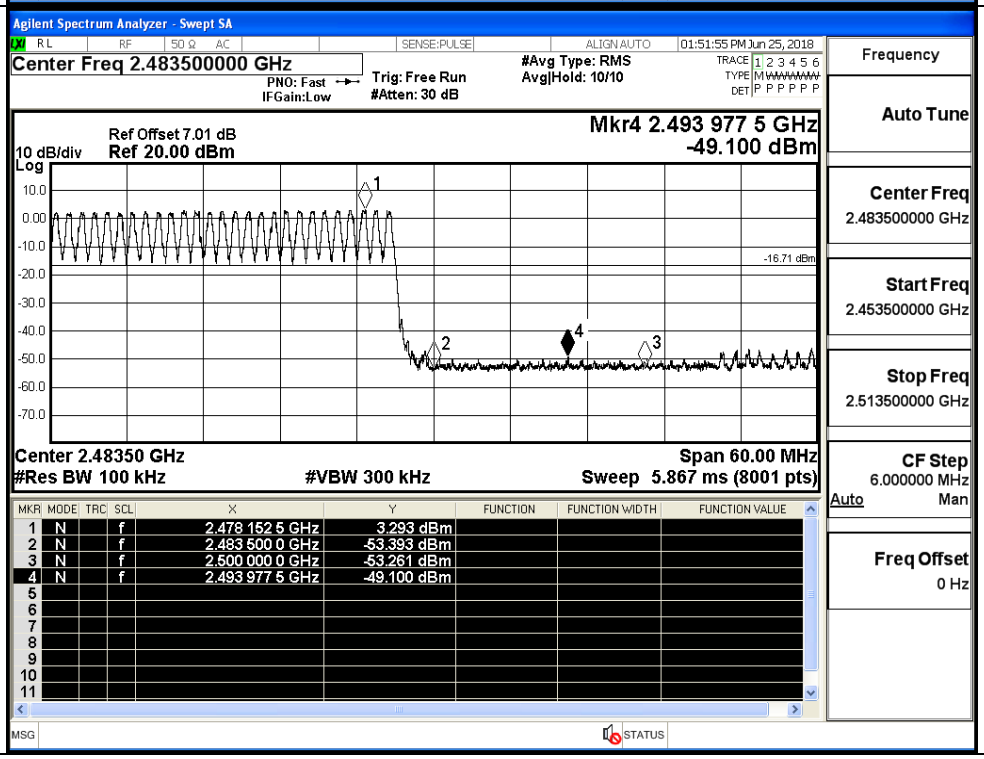
π/4DQPSK_MCH_Graphs		
Pref		
Puw		

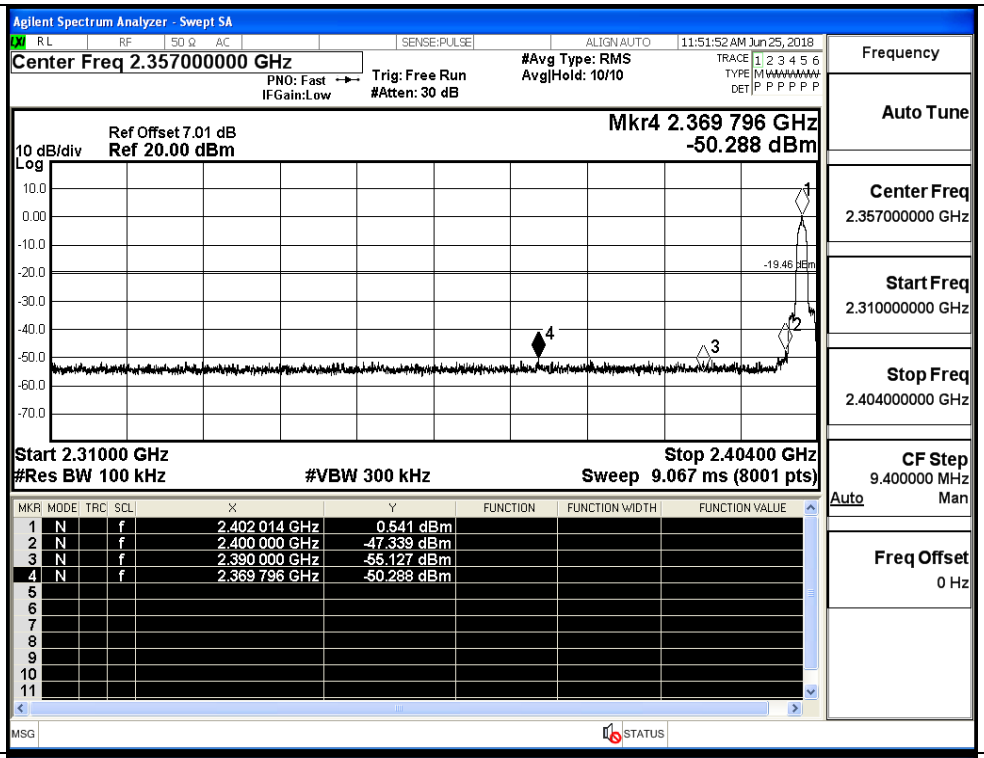
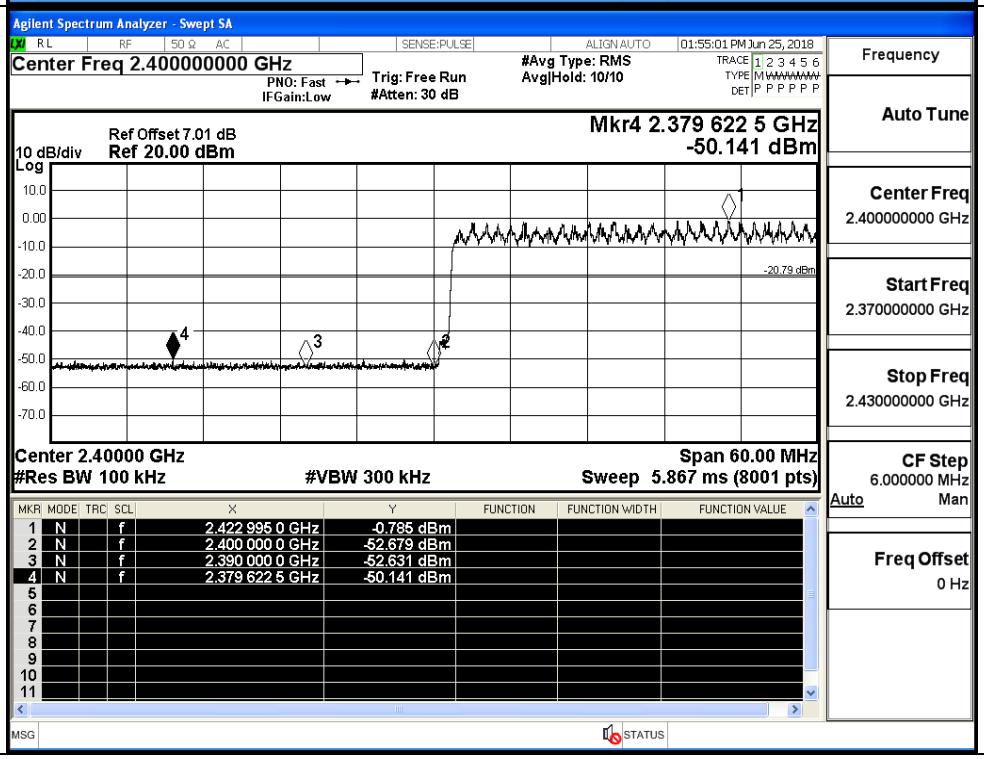
π/4DQPSK_HCH_Graphs		
Pref		
Puw		

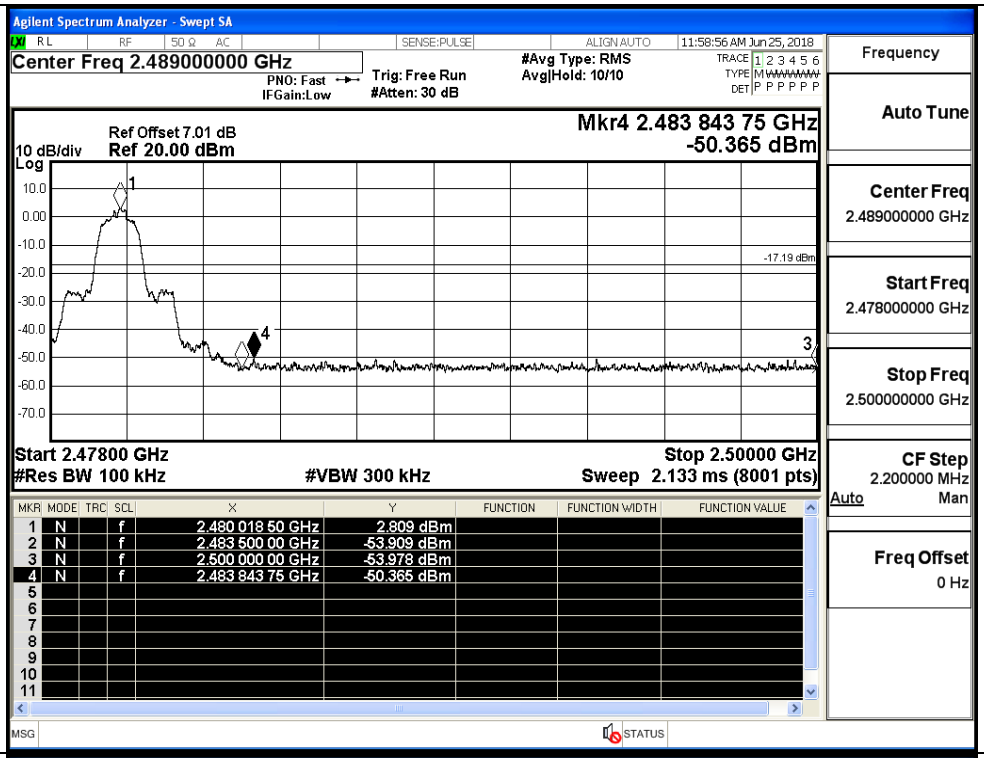
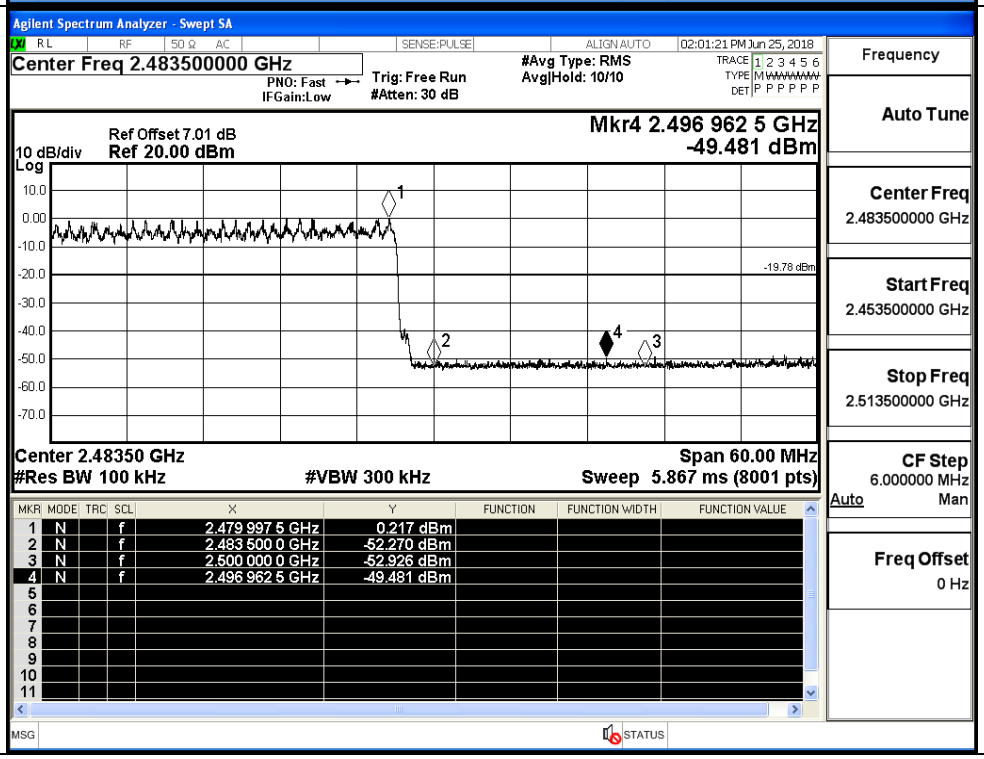
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.308	Off	-49.082	-16.69	PASS
			2.449	On	-49.719	-17.55	PASS
	HCH	2480	3.366	Off	-50.807	-16.63	PASS
			3.293	On	-49.100	-16.71	PASS
π/4DQPSK	LCH	2402	0.541	Off	-50.288	-19.46	PASS
			-0.785	On	-50.141	-20.79	PASS
	HCH	2480	2.809	Off	-50.365	-17.19	PASS
			0.217	On	-49.481	-19.78	PASS

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

GFSK/HCH/No Hop	
GFSK/HCH/Hop	

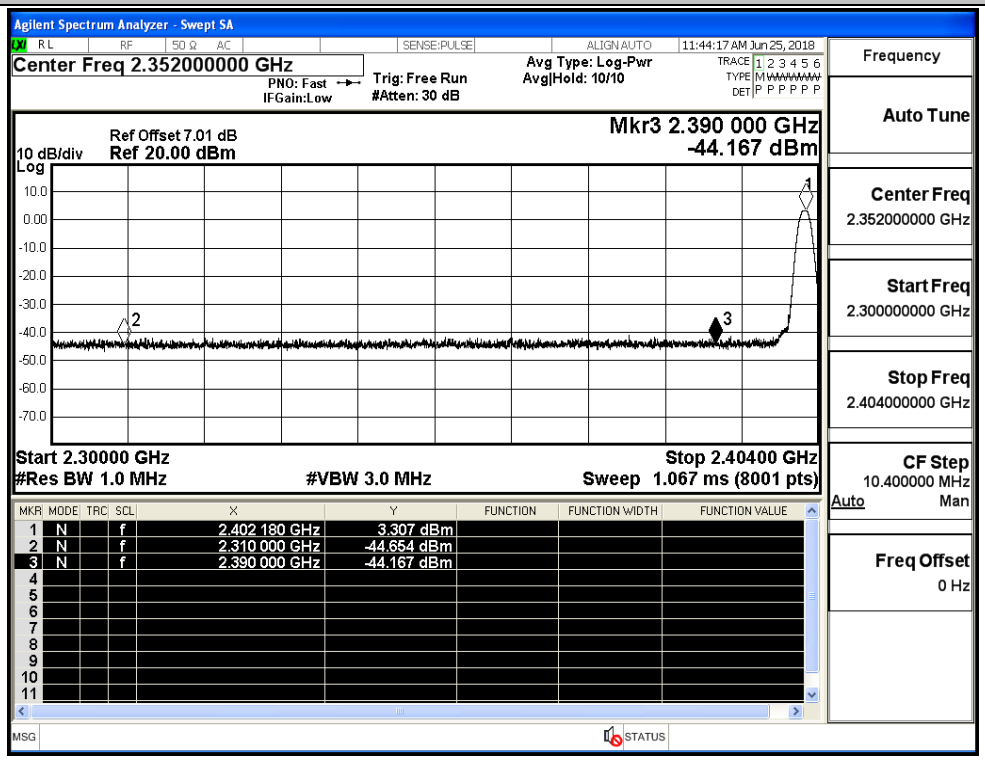
π/4DQPSK/LCH/No Hop	
π/4DQPSK/LCH/Hop	

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

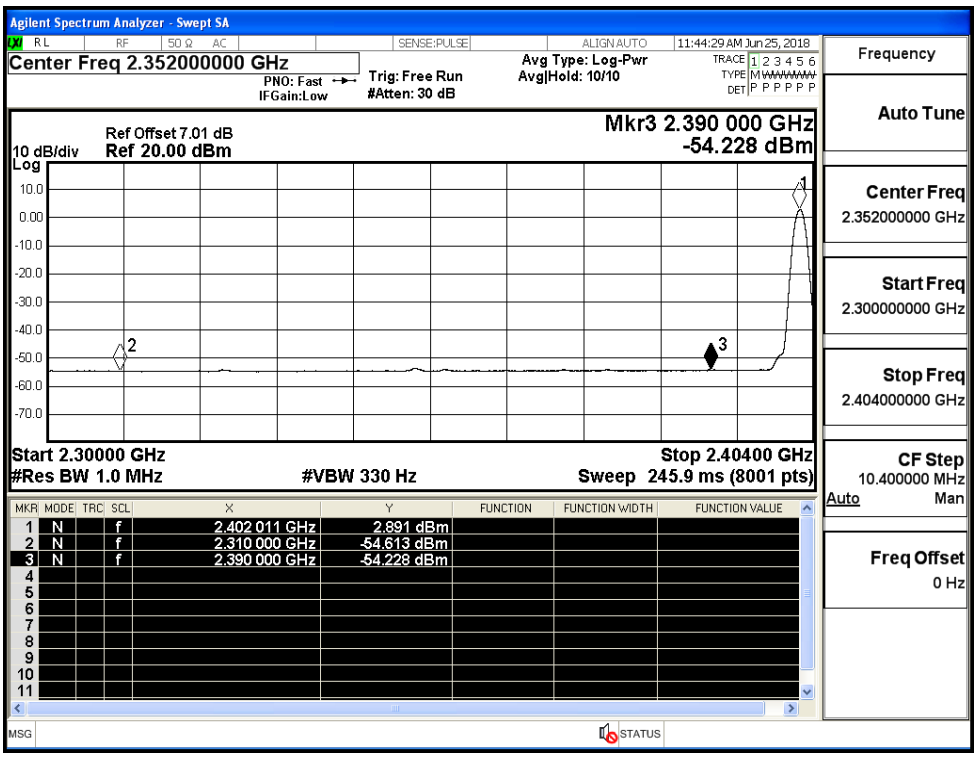
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.65	2.0	0	52.60	PEAK	74	PASS
	Off	2310.0	-54.61	2.0	0	42.64	AV	54	PASS
	Off	2390.0	-44.17	2.0	0	53.09	PEAK	74	PASS
	Off	2390.0	-54.23	2.0	0	43.03	AV	54	PASS
	Off	2483.5	-42.39	2.0	0	54.87	PEAK	74	PASS
	Off	2483.5	-52.47	2.0	0	44.79	AV	54	PASS
	Off	2500.0	-43.53	2.0	0	53.73	PEAK	74	PASS
	Off	2500.0	-53.93	2.0	0	43.33	AV	54	PASS
π/4DQPSK	Off	2310.0	-43.58	2.0	0	53.68	PEAK	74	PASS
	Off	2310.0	-54.54	2.0	0	42.71	AV	54	PASS
	Off	2390.0	-43.66	2.0	0	53.60	PEAK	74	PASS
	Off	2390.0	-54.41	2.0	0	42.85	AV	54	PASS
	Off	2483.5	-42.52	2.0	0	54.74	PEAK	74	PASS
	Off	2483.5	-52.82	2.0	0	44.44	AV	54	PASS
	Off	2500.0	-43.81	2.0	0	53.45	PEAK	74	PASS
	Off	2500.0	-53.93	2.0	0	43.33	AV	54	PASS

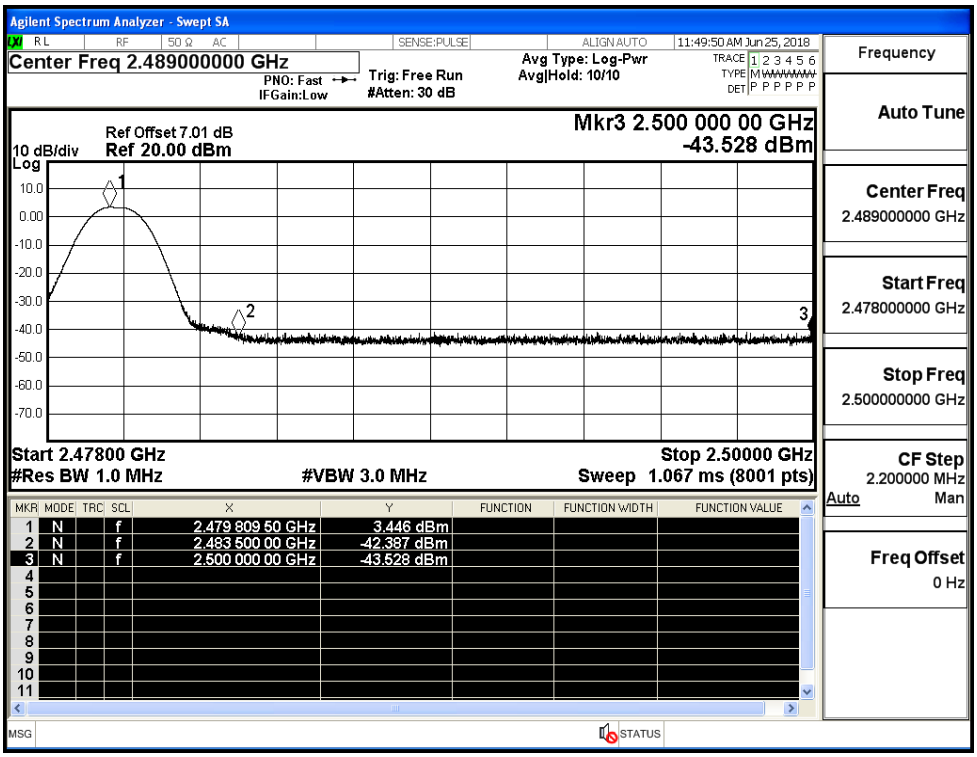
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



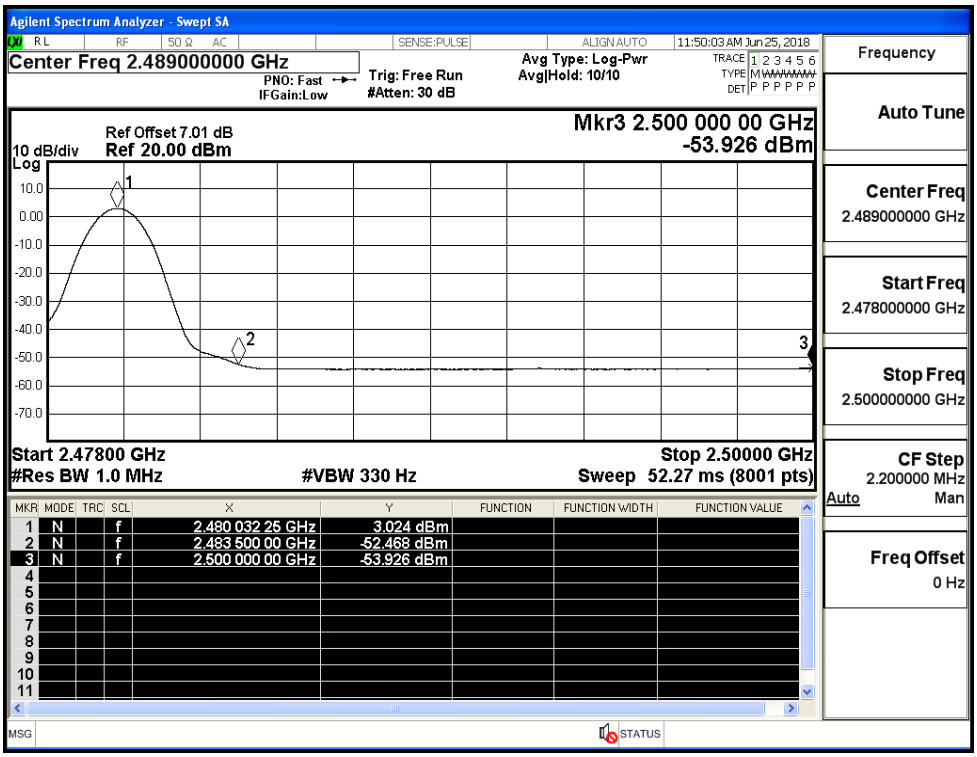
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



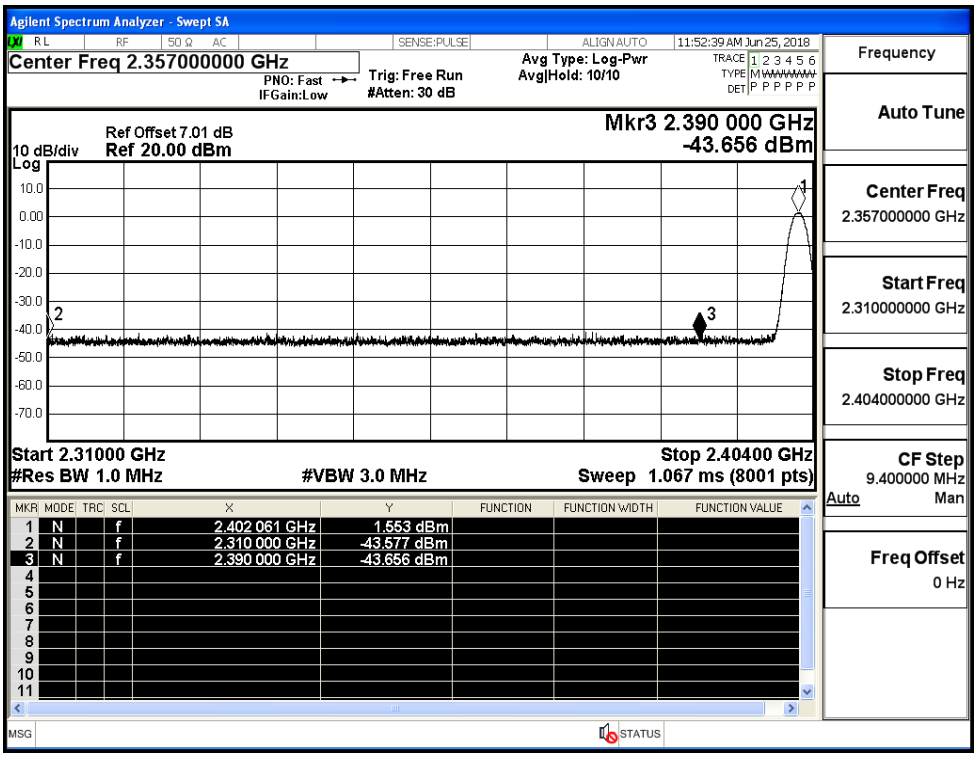
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



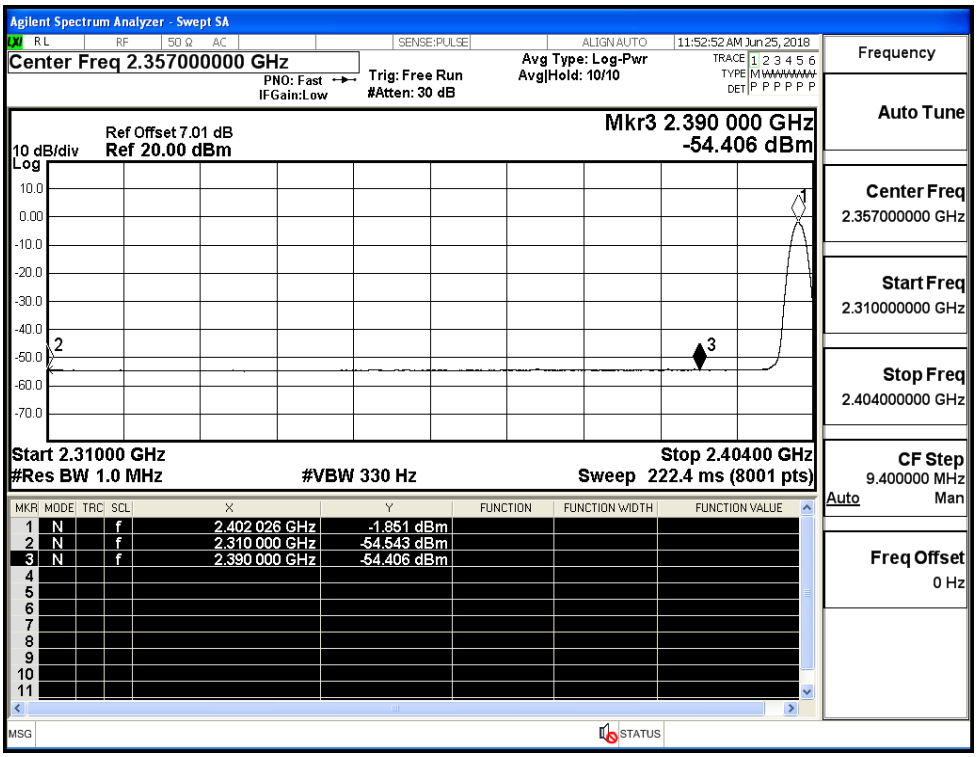
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



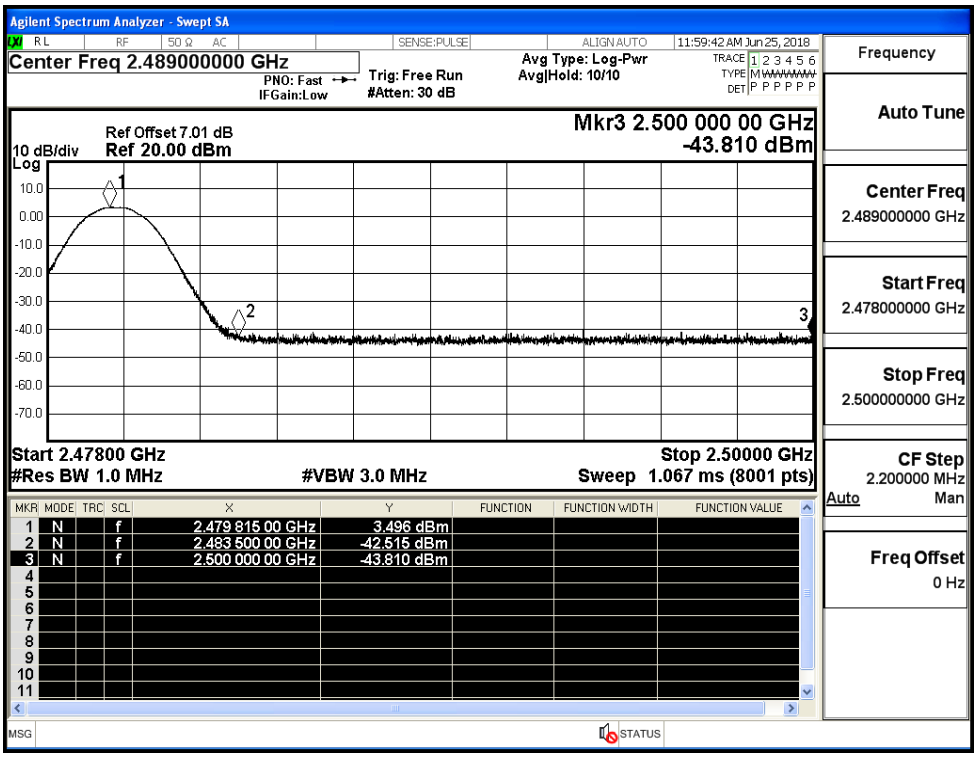
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)