Appendix A

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

Product Name: Bluetooth speaker

Trade Mark: HLX

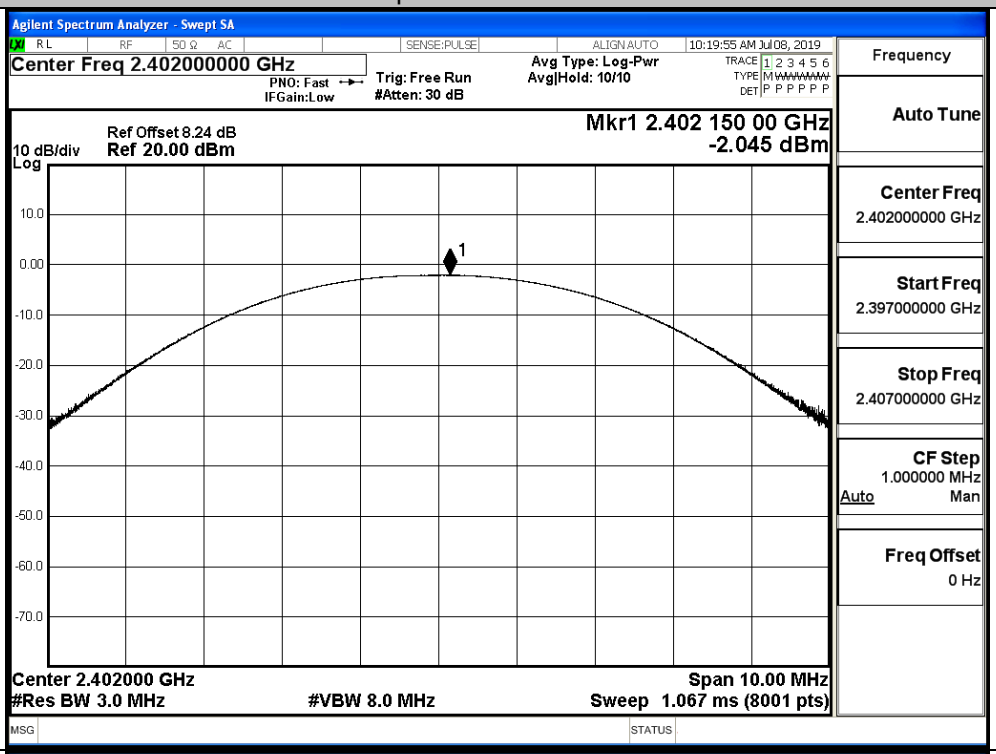
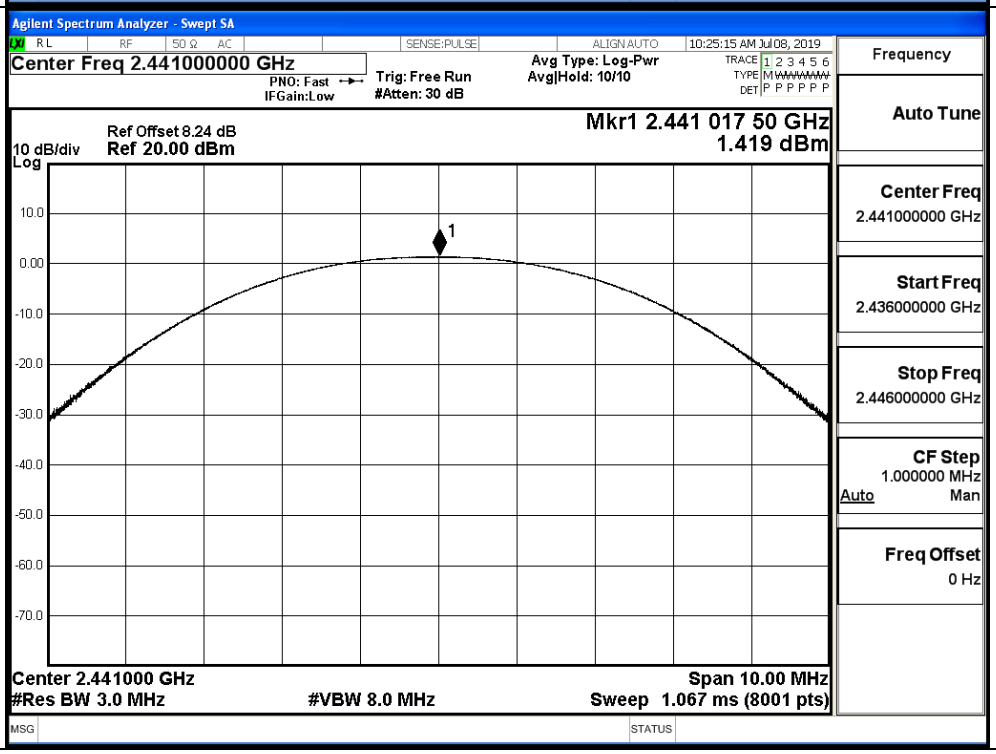
Test Model: L01SW

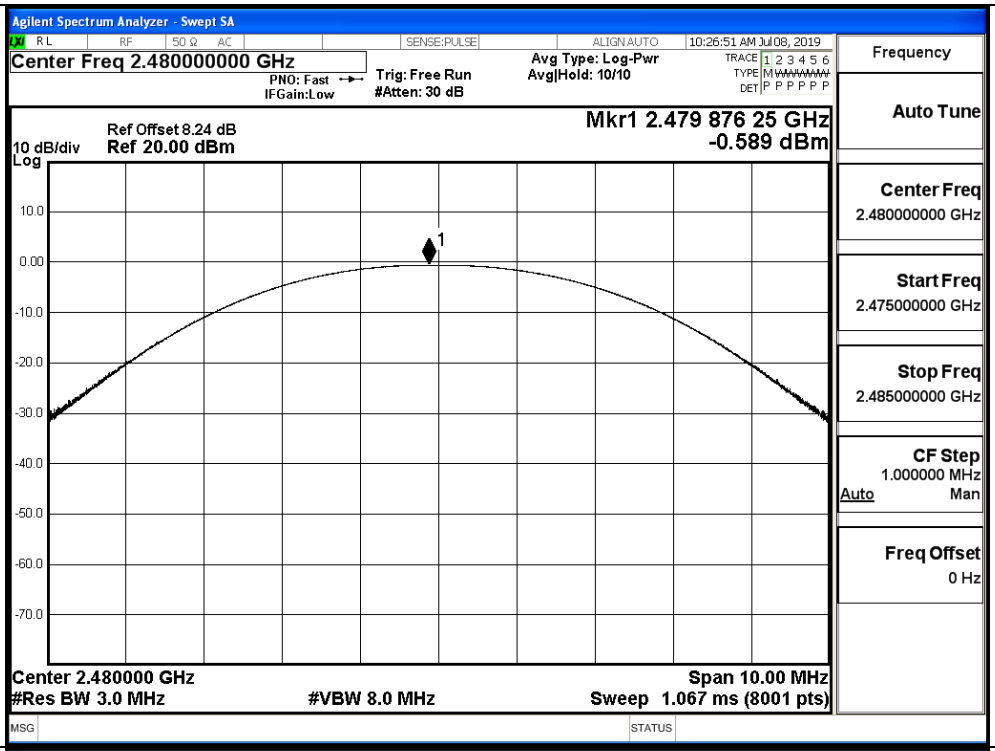
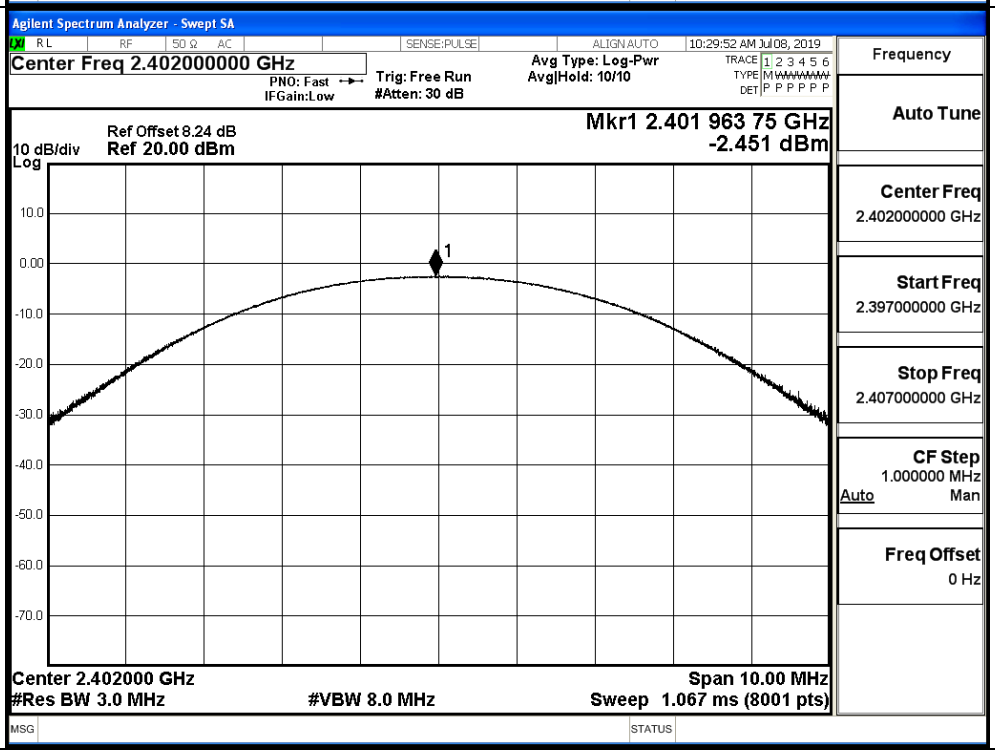
Environmental Conditions

Temperature:	24.1° C
Relative Humidity:	53.8%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond.Lu
Supervised by:	Wang.Chuang

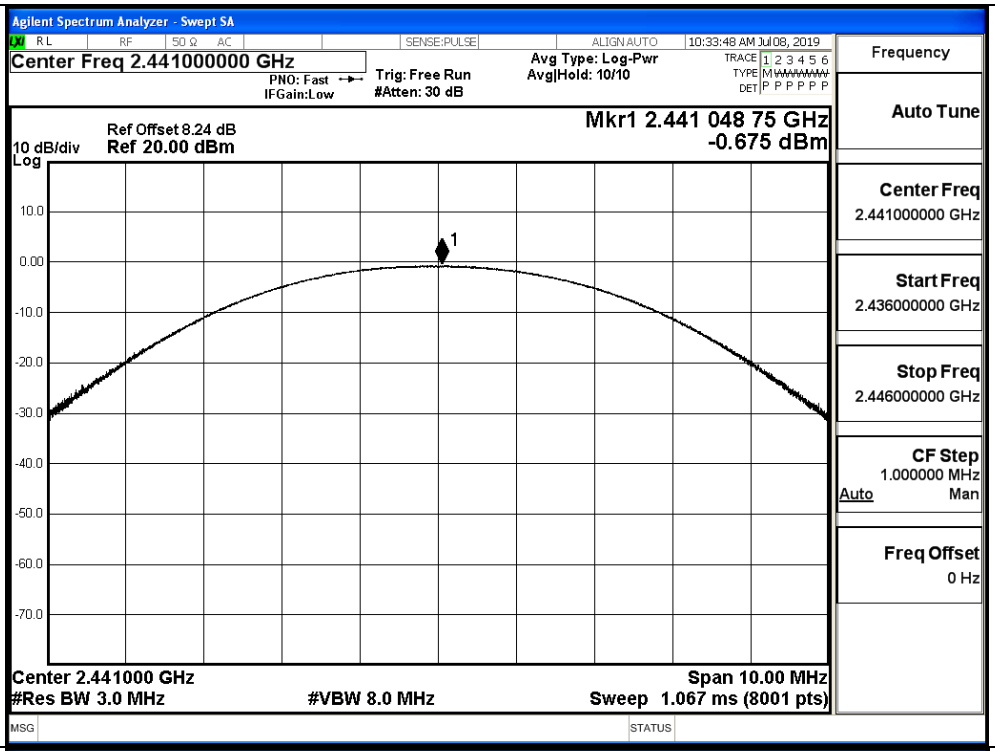
A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.045	21	PASS
	MCH	1.419	21	PASS
	HCH	-0.589	21	PASS
π/4DQPSK	LCH	-2.451	21	PASS
	MCH	-0.675	21	PASS
	HCH	-1.139	21	PASS

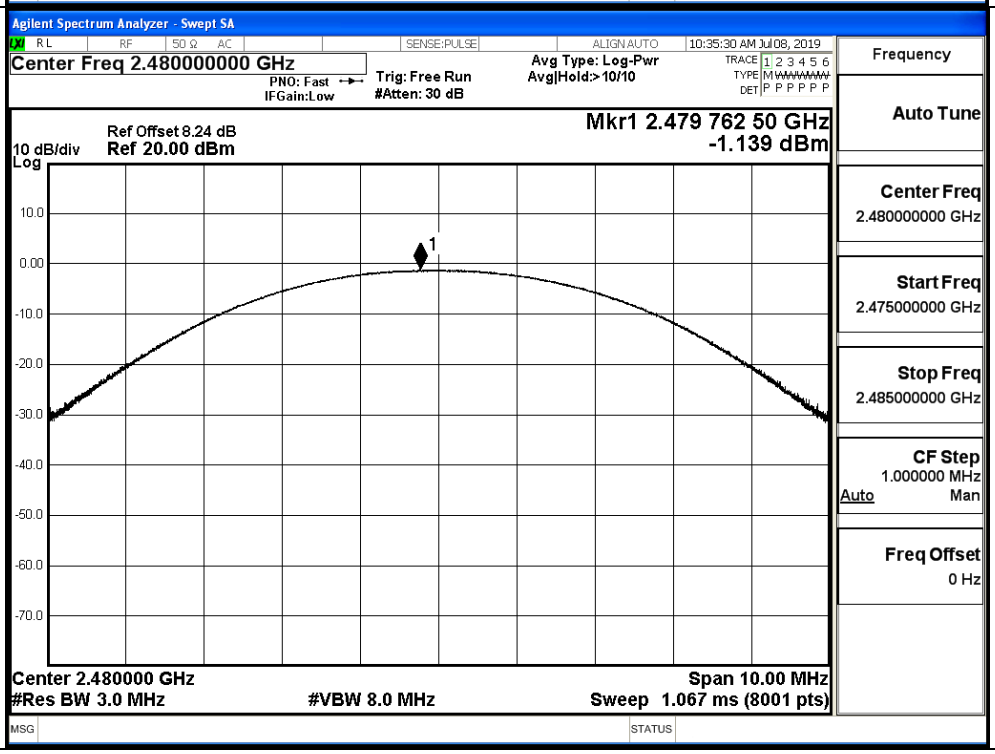
Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH		
π/4DQPSK/LCH		

π/4DQPSK/MCH

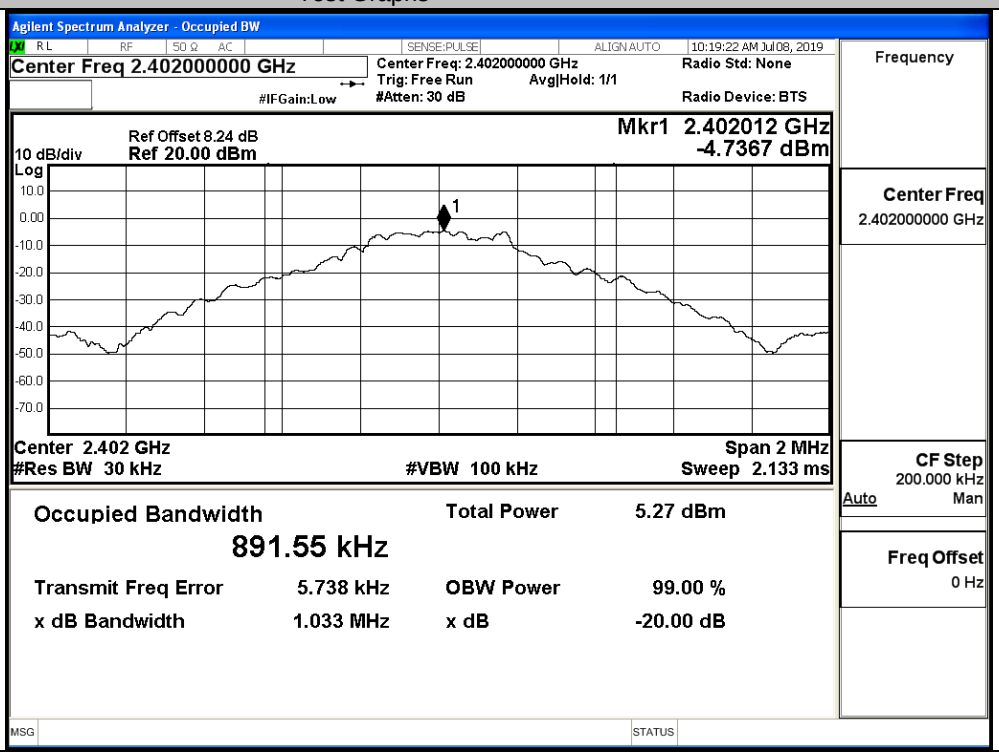


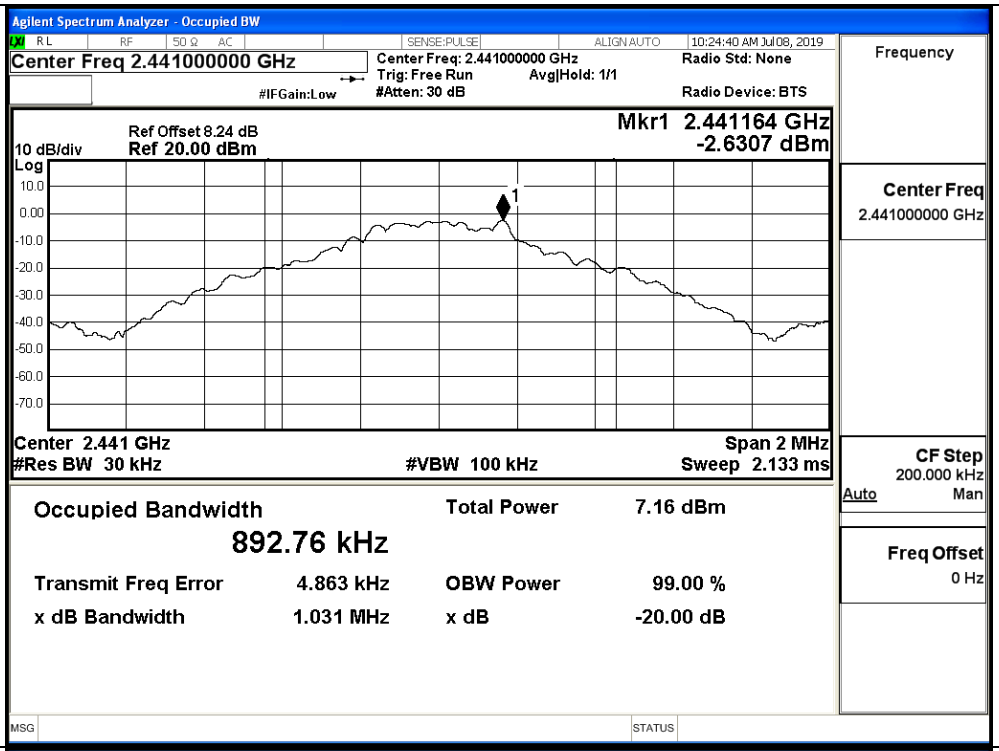
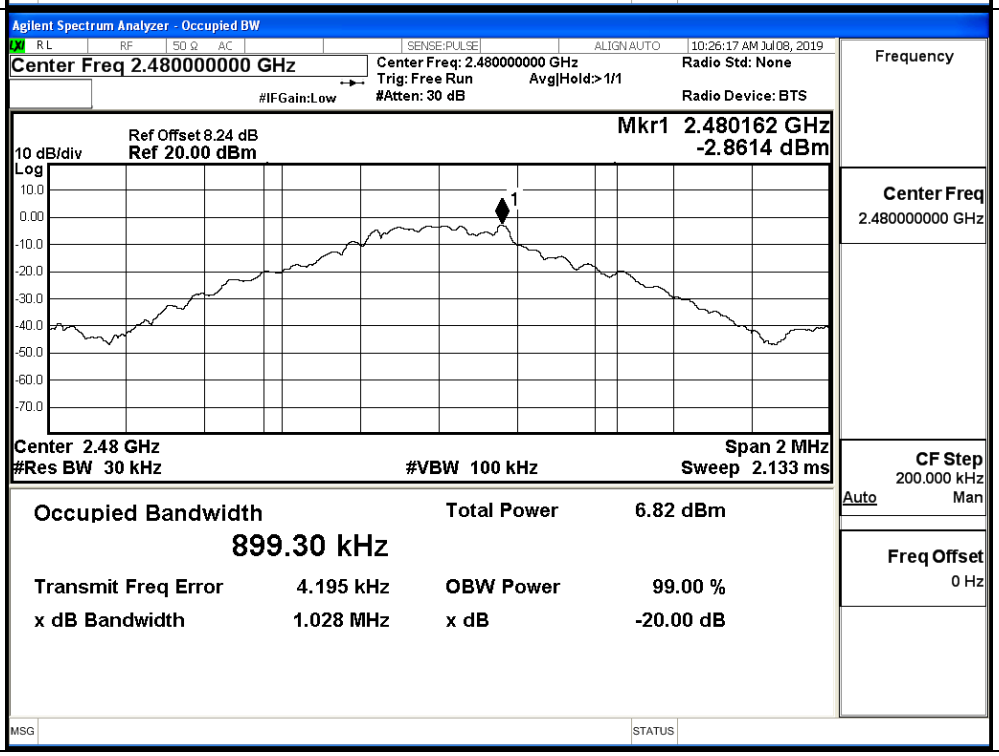
π/4DQPSK/HCH



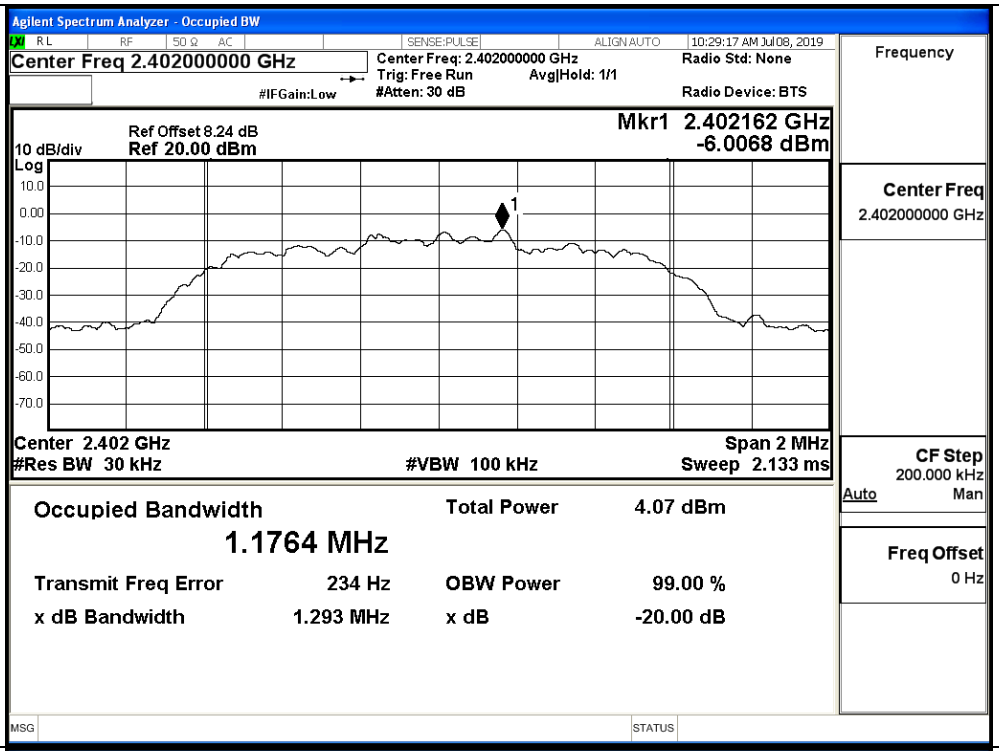
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.033	Not Specified	PASS
	MCH	1.031	Not Specified	PASS
	HCH	1.028	Not Specified	PASS
π/4DQPSK	LCH	1.293	Not Specified	PASS
	MCH	1.291	Not Specified	PASS
	HCH	1.291	Not Specified	PASS

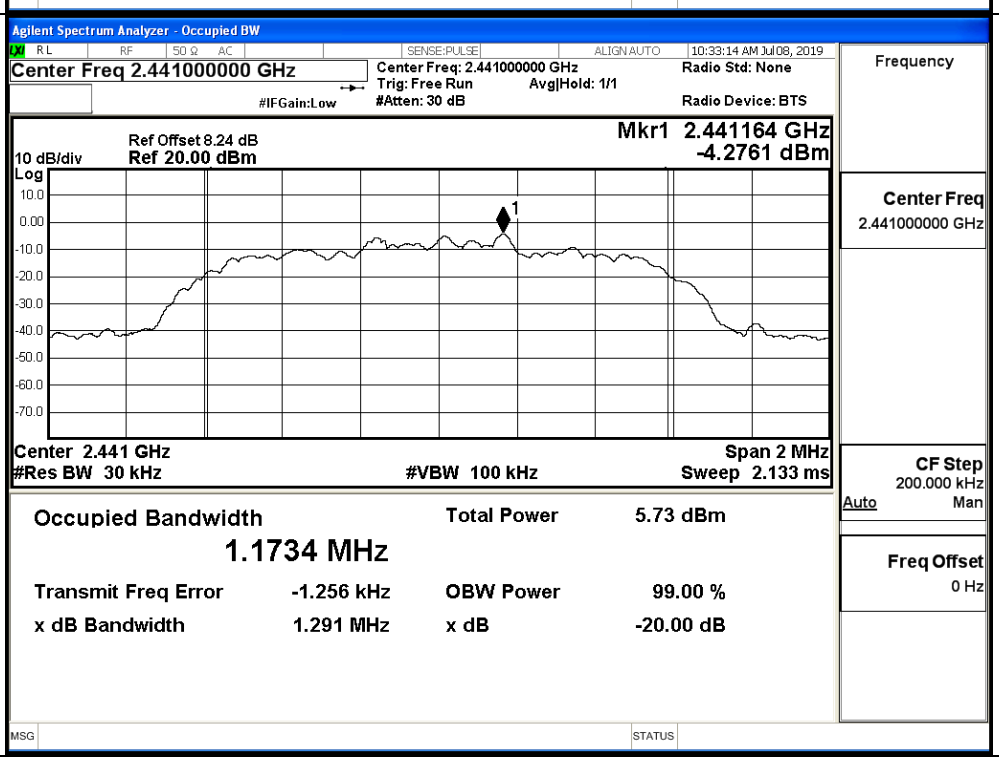
Test Graphs	
GFSK/LCH	

GFSK/MCH		
GFSK/HCH		

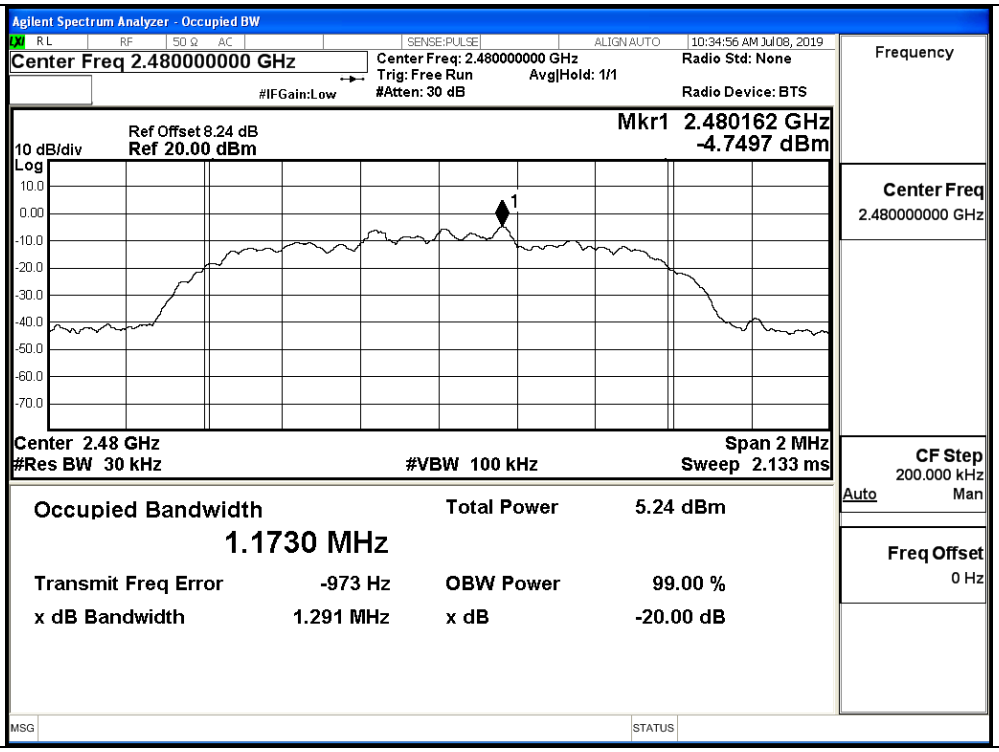
π/4DQPSK/LCH



π/4DQPSK/MCH

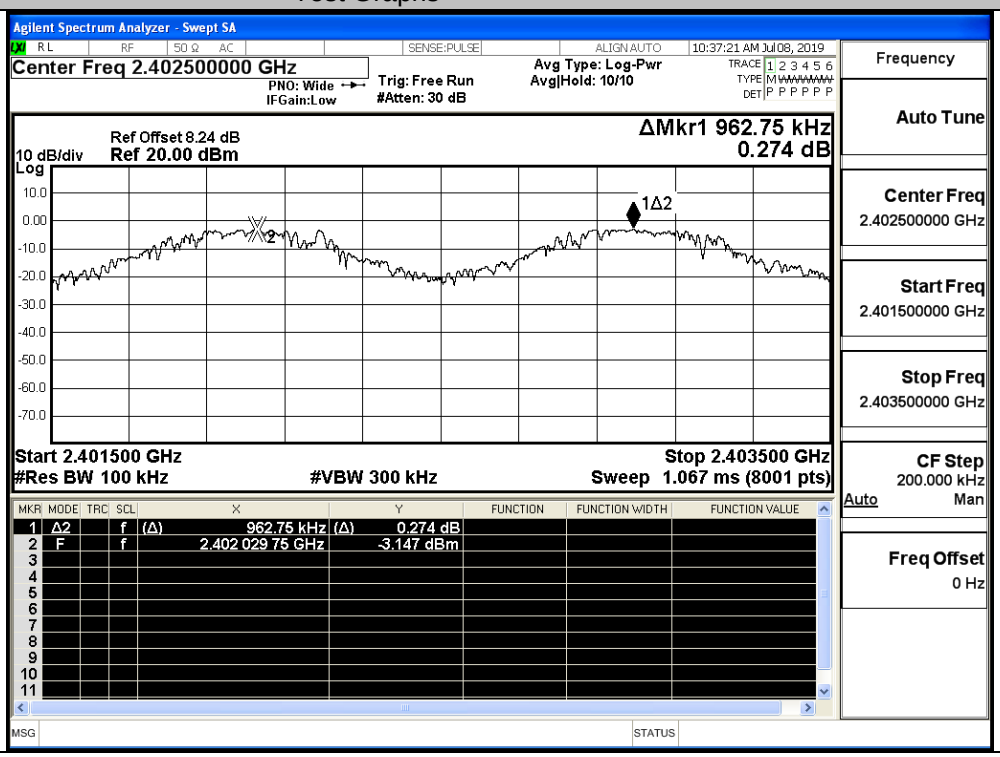


π/4DQPSK/HCH

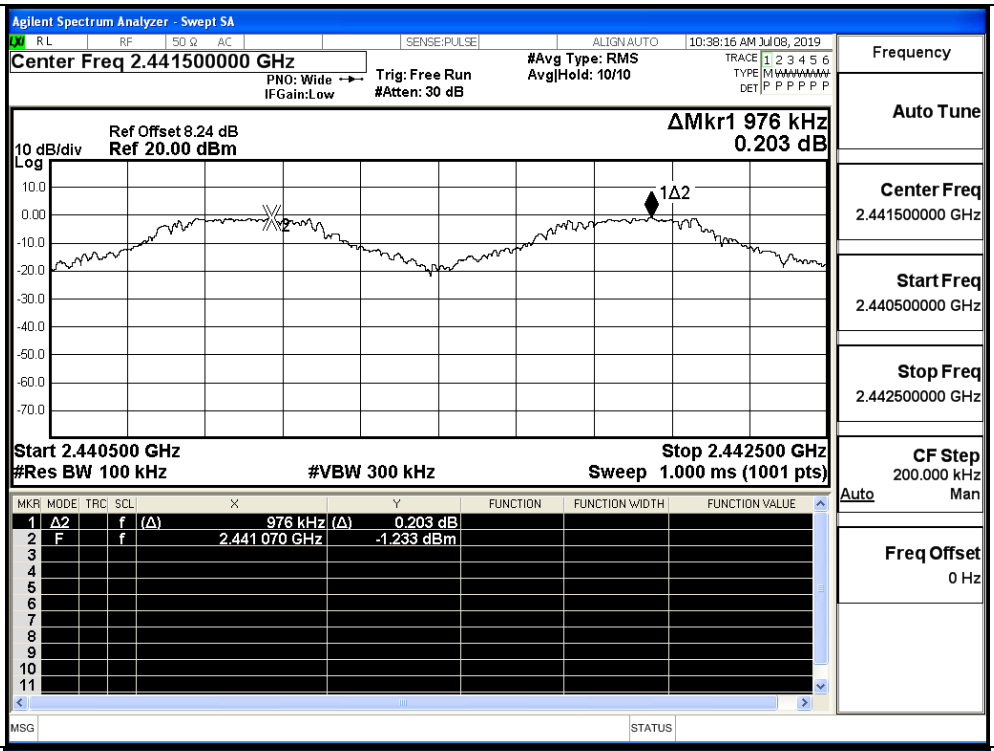

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10:34:56 AM Jul 08, 2019
Frequency
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.480162 GHz
-4.7497 dBm
Center 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
1.1730 MHz
Total Power 5.24 dBm
Transmit Freq Error -973 Hz
OBW Power 99.00 %
x dB Bandwidth 1.291 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

A.3 Carrier Frequency Separation

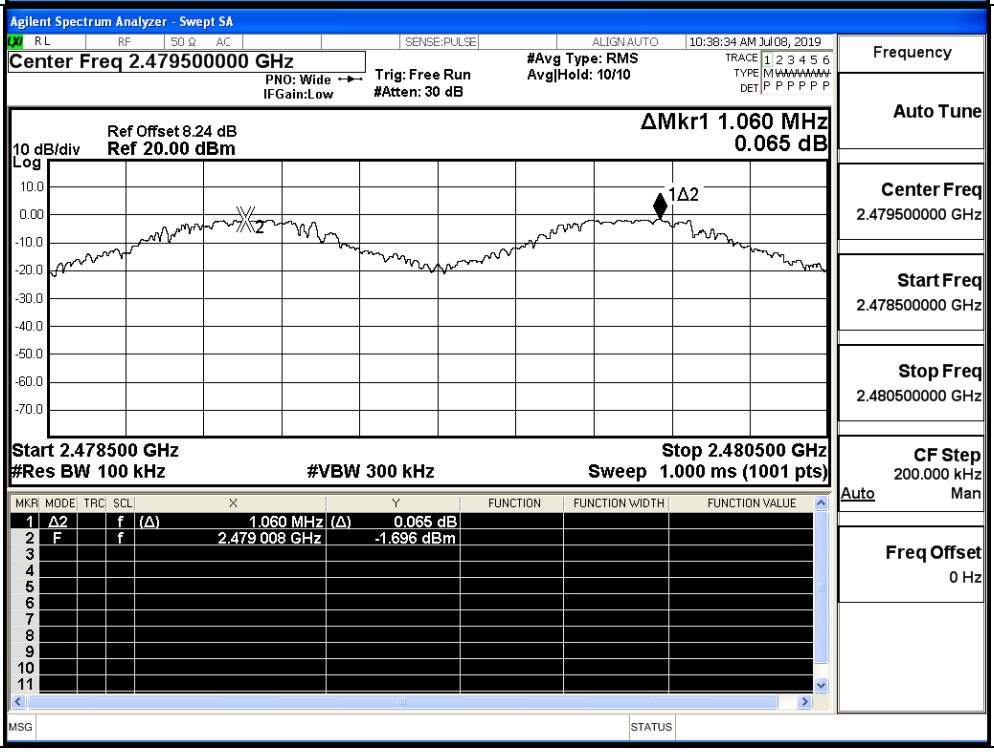
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.963	0.689	PASS
	MCH	0.976	0.689	PASS
	HCH	1.060	0.689	PASS
π/4DQPSK	LCH	0.894	0.862	PASS
	MCH	1.004	0.862	PASS
	HCH	1.136	0.862	PASS

Test Graphs		
GFSK/LCH		

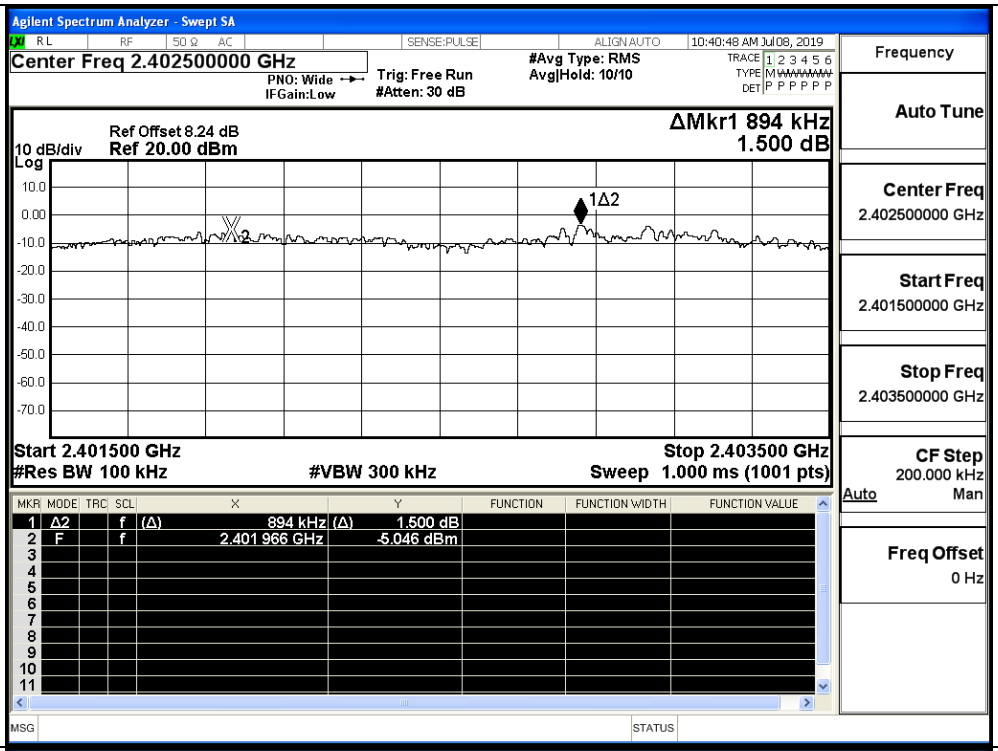
GFSK/MCH



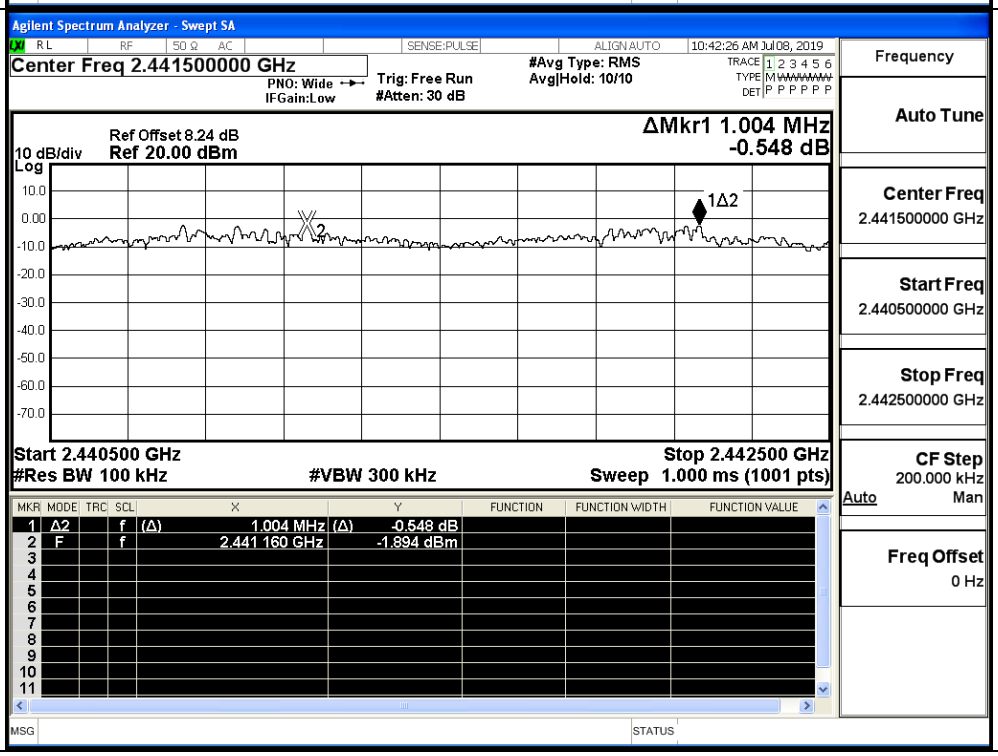
GFSK/HCH



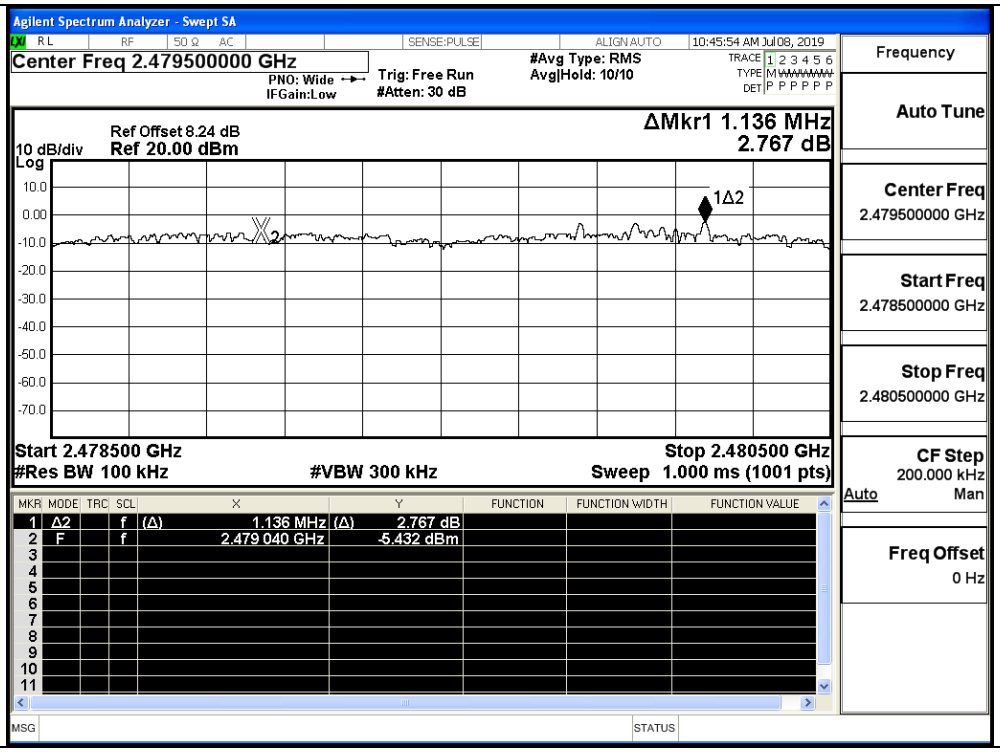
π/4DQPSK/LCH



π/4DQPSK/MCH

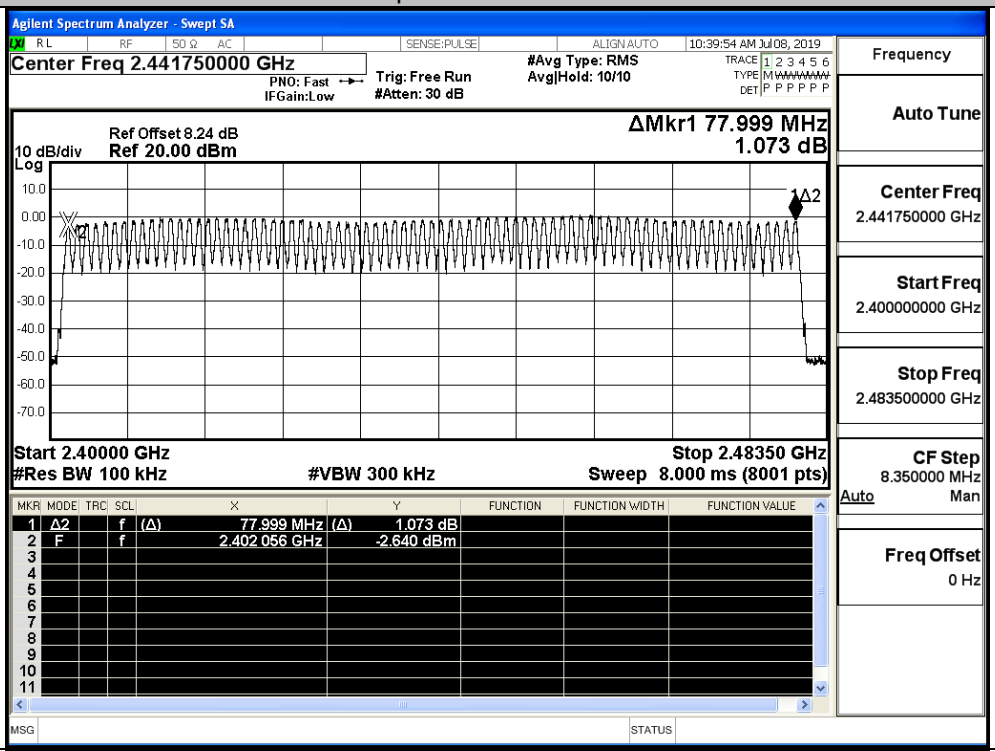
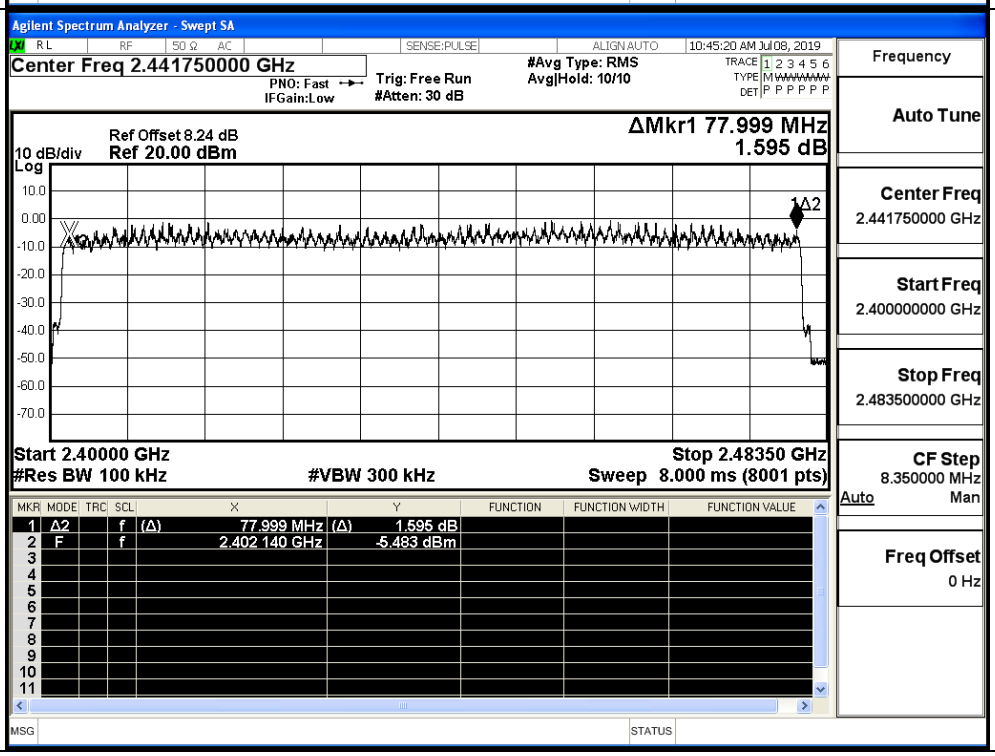


π/4DQPSK/HCH


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
10:45:54 AM Jul 08, 2019
Ref Offset 8.24 dB
10 dB/div
Ref 20.00 dBm
Log
ΔMkr1 1.136 MHz
2.767 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) 1.136 MHz (Δ) 2.767 dB
2 F f 2.479 040 GHz -5.432 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

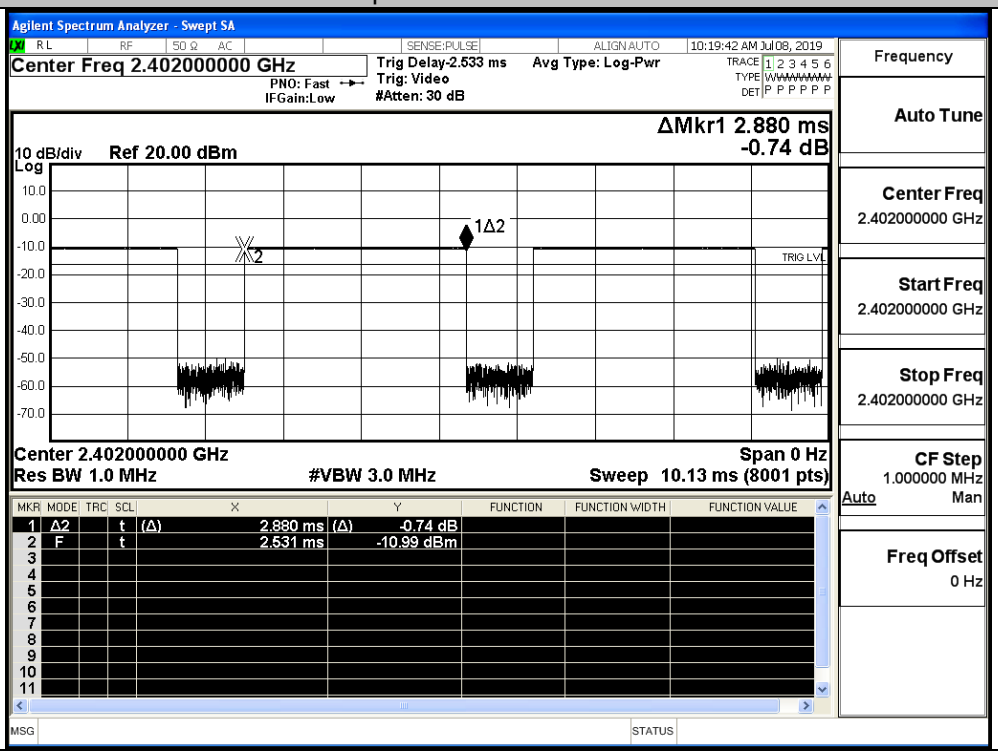
A.4 Hopping Channel Number

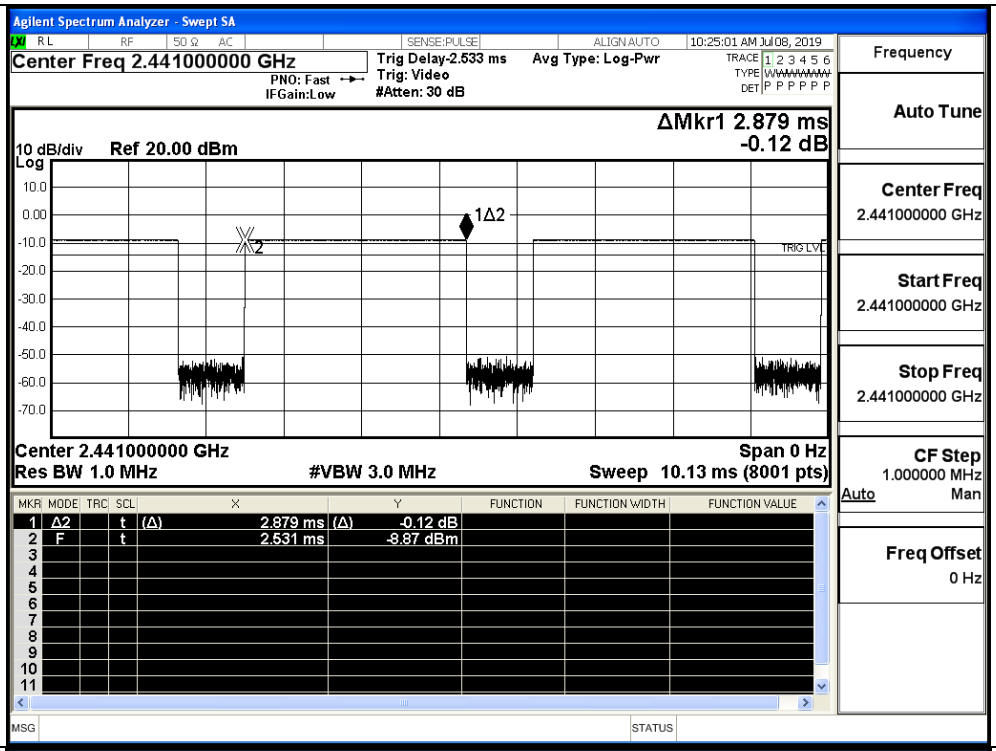
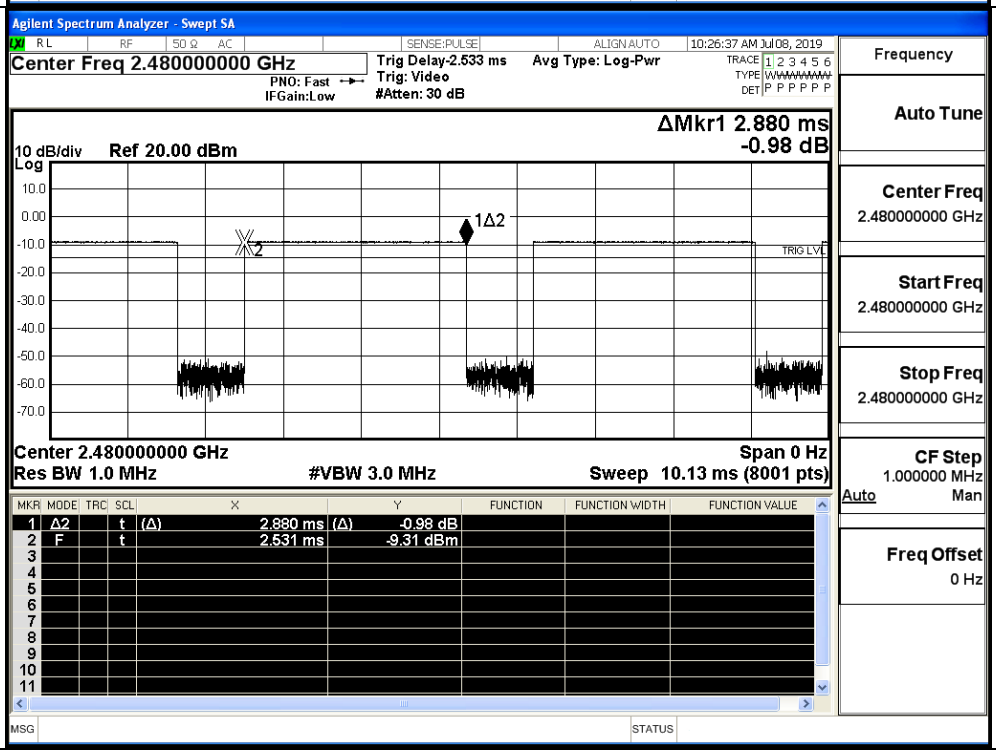
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS

Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

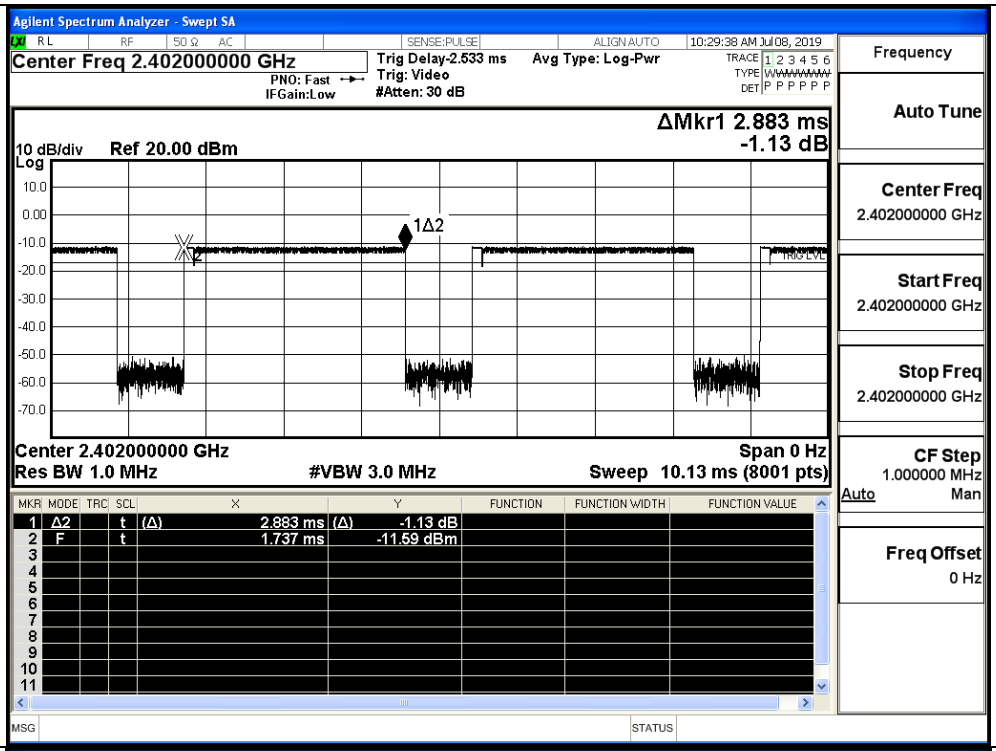
A.5 Dwell Time

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

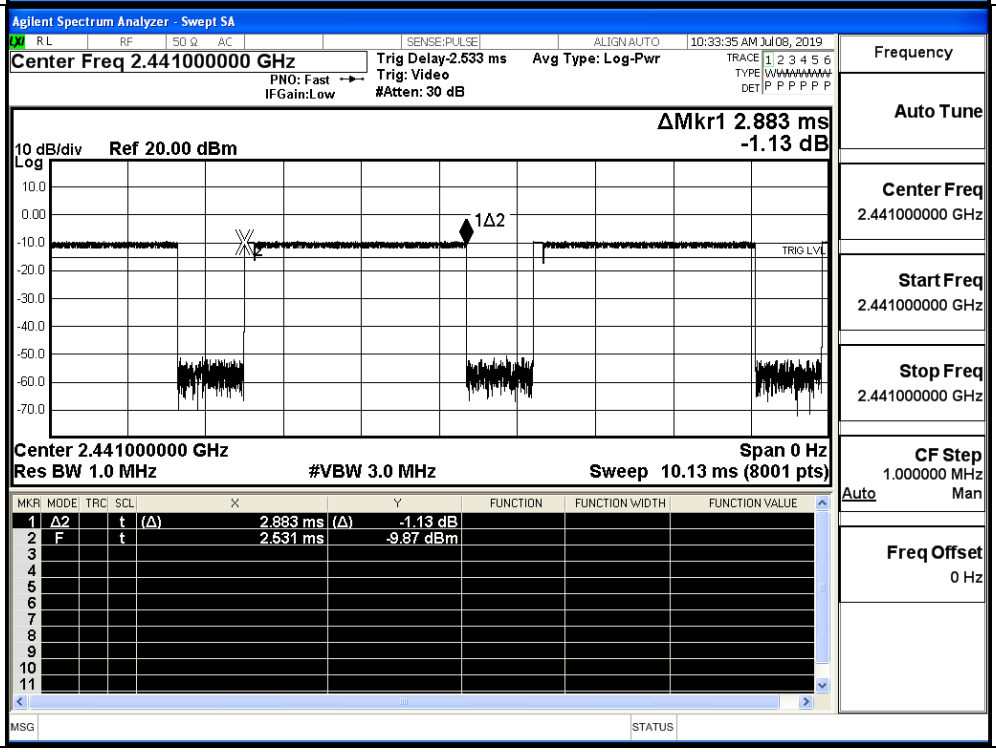
Test Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

π/4DQPSK
_2DH5/LCH

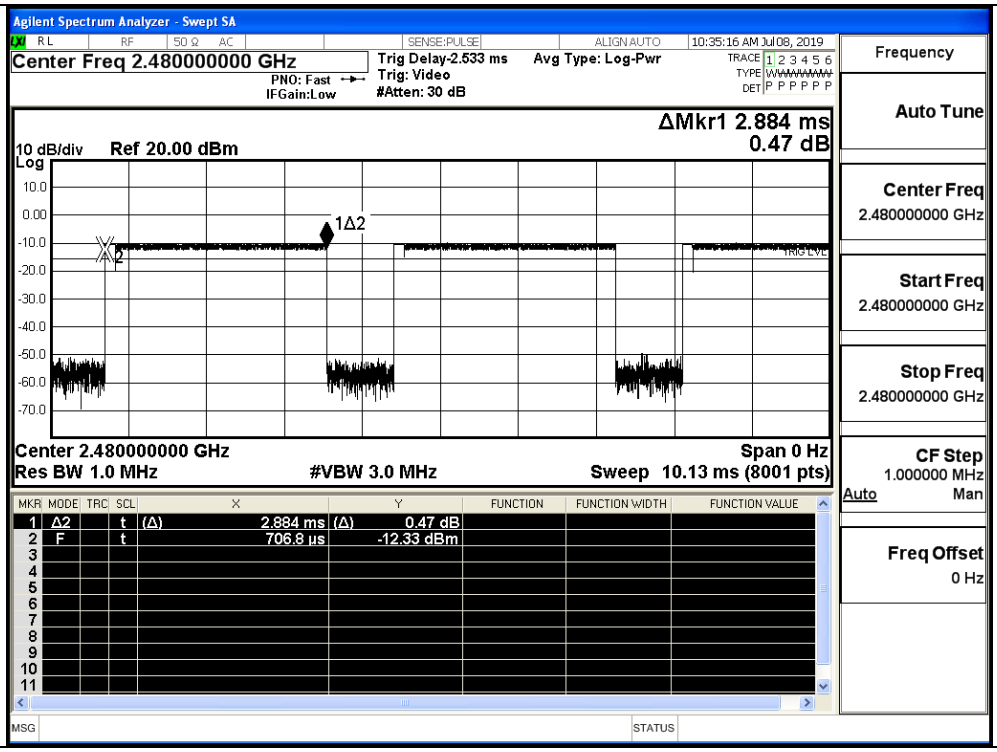


π/4DQPSK
_2DH5/MCH



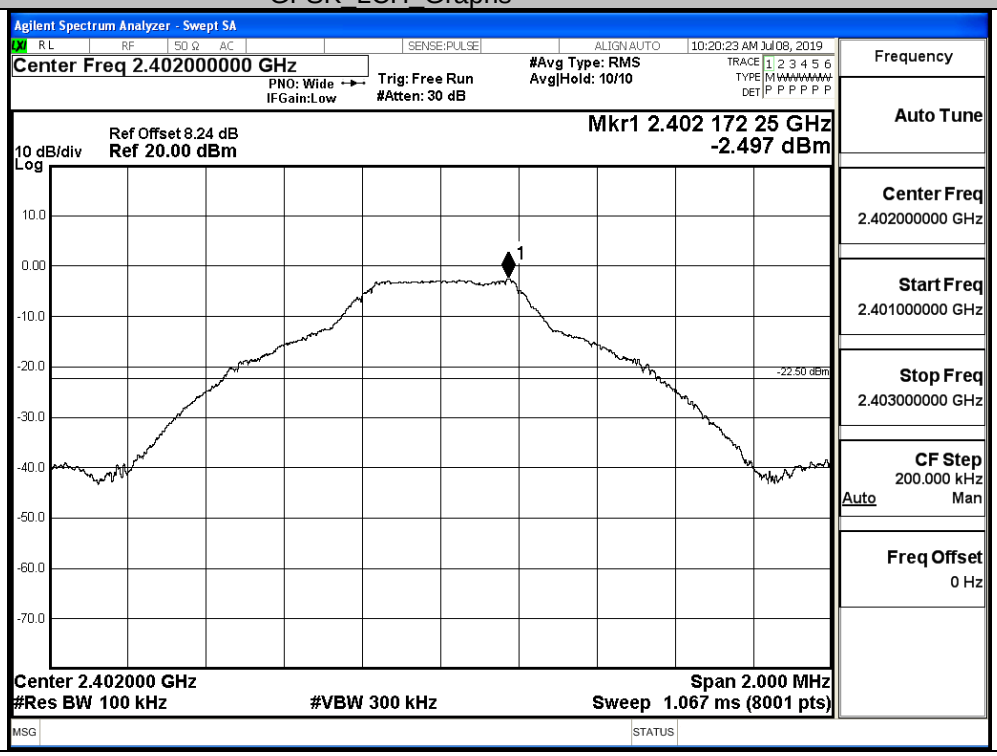
π/4DQPSK

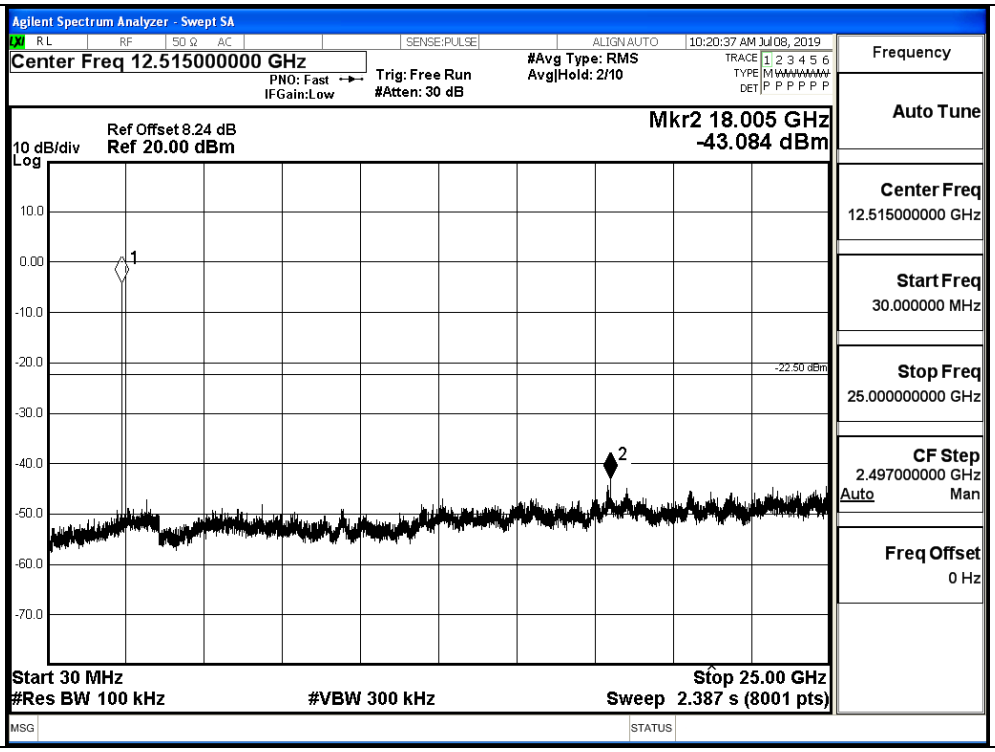
_2DH5/HCH



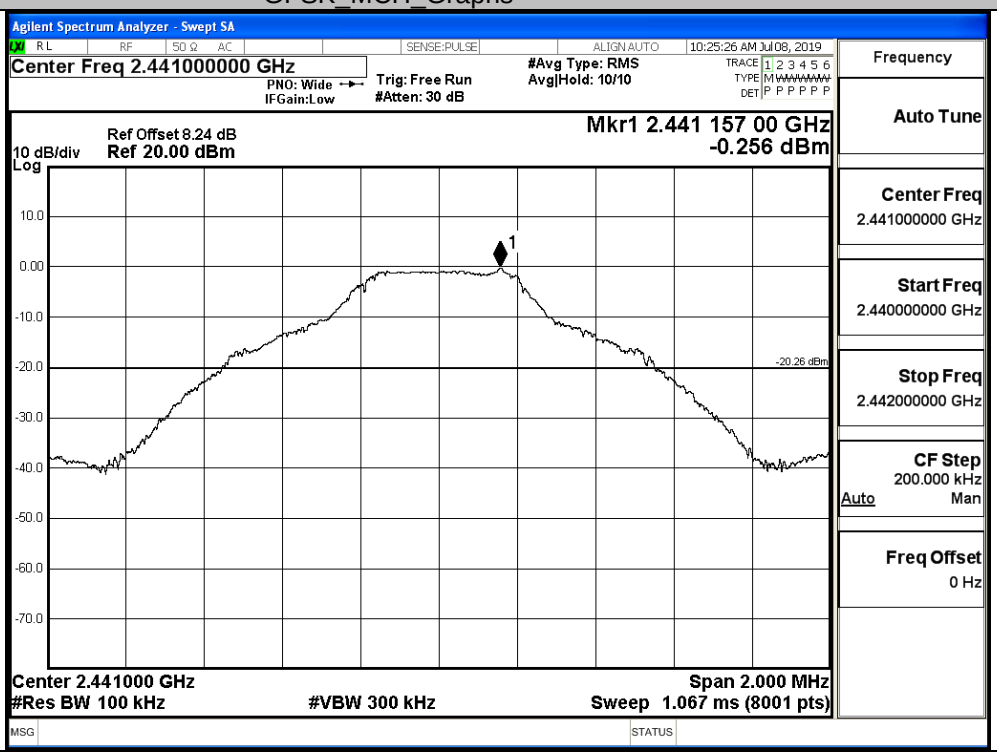
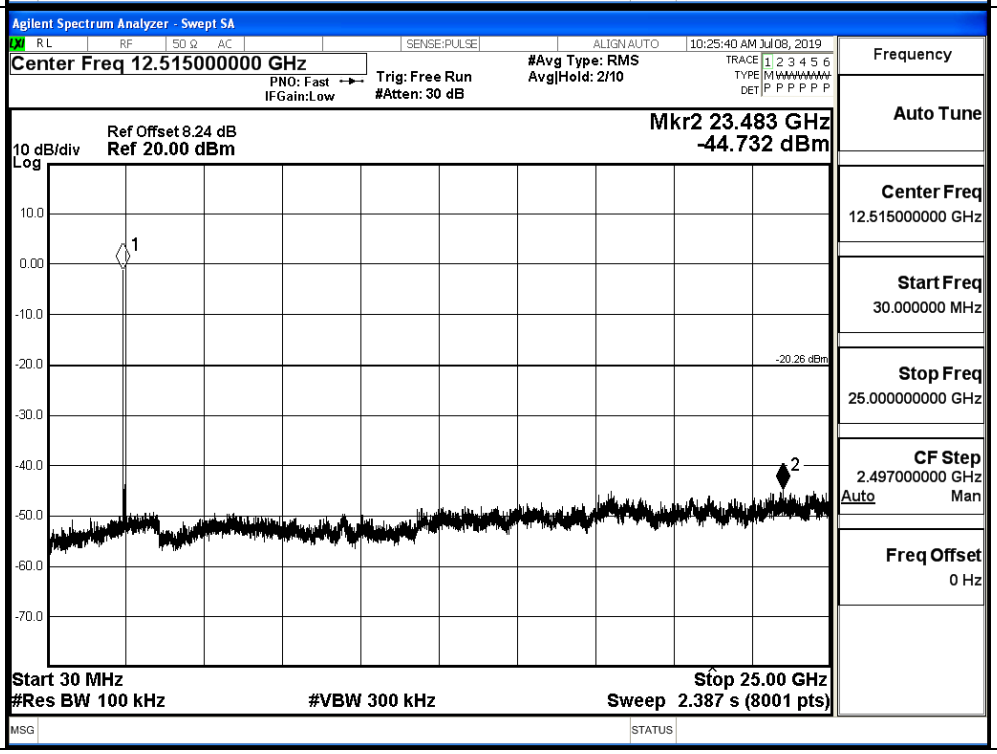
A.6 RF Conducted Spurious Emissions

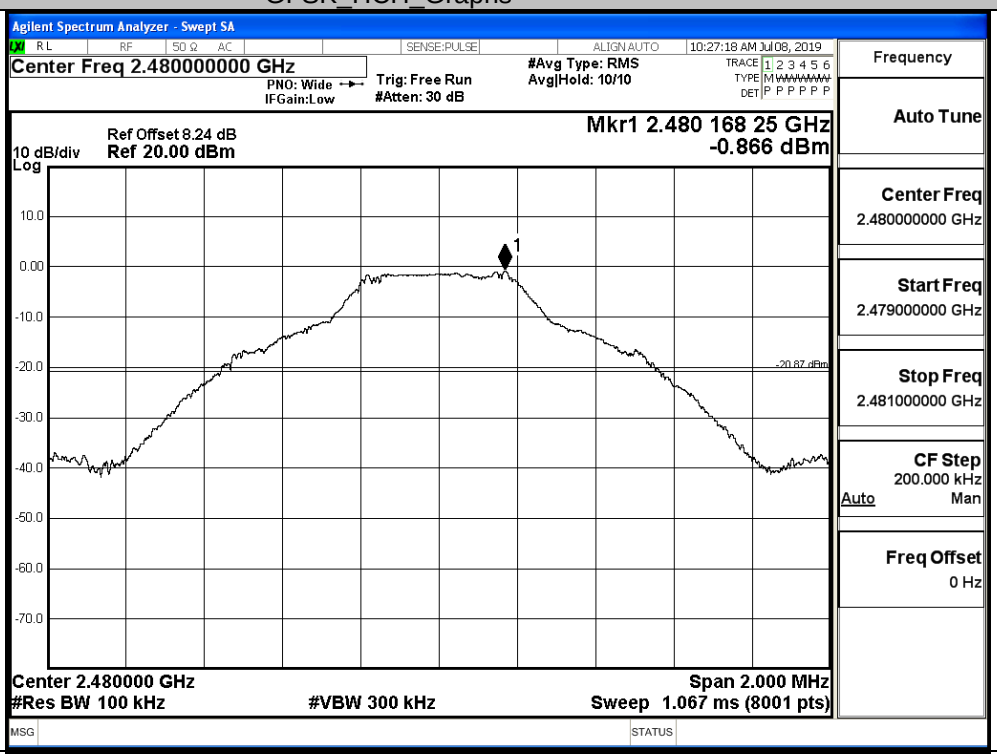
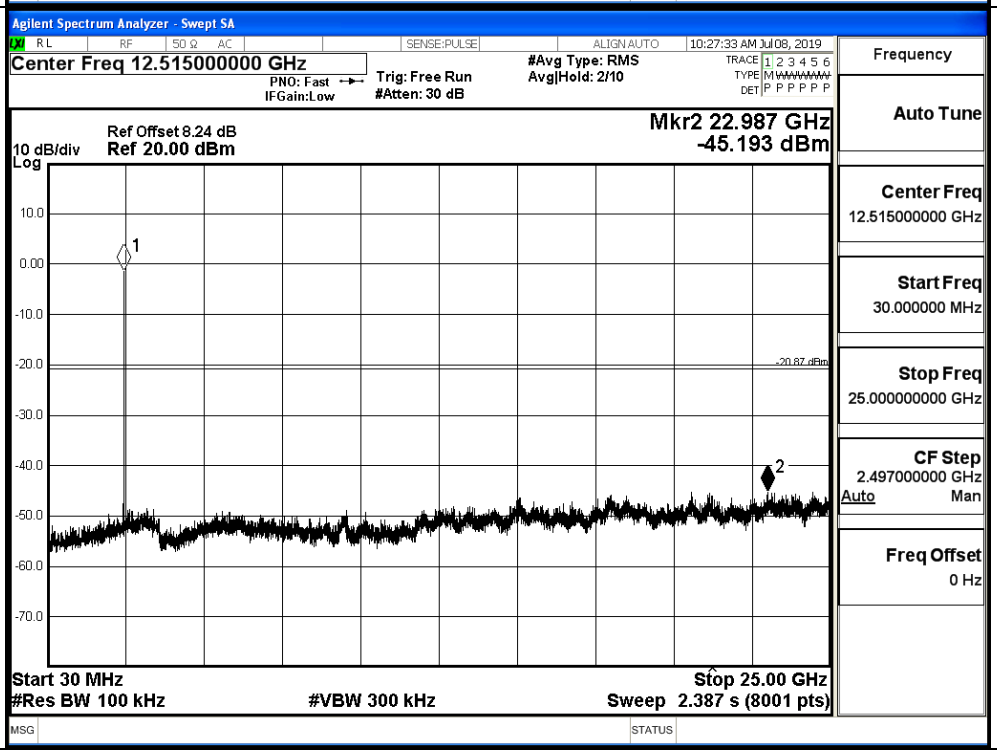
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.497	-43.084	-22.497	PASS
	MCH	-0.256	-44.732	-20.256	PASS
	HCH	-0.866	-45.193	-20.866	PASS
π/4DQPSK	LCH	-3.246	-44.580	-23.246	PASS
	MCH	-1.601	-44.803	-21.601	PASS
	HCH	-2.273	-45.078	-22.273	PASS

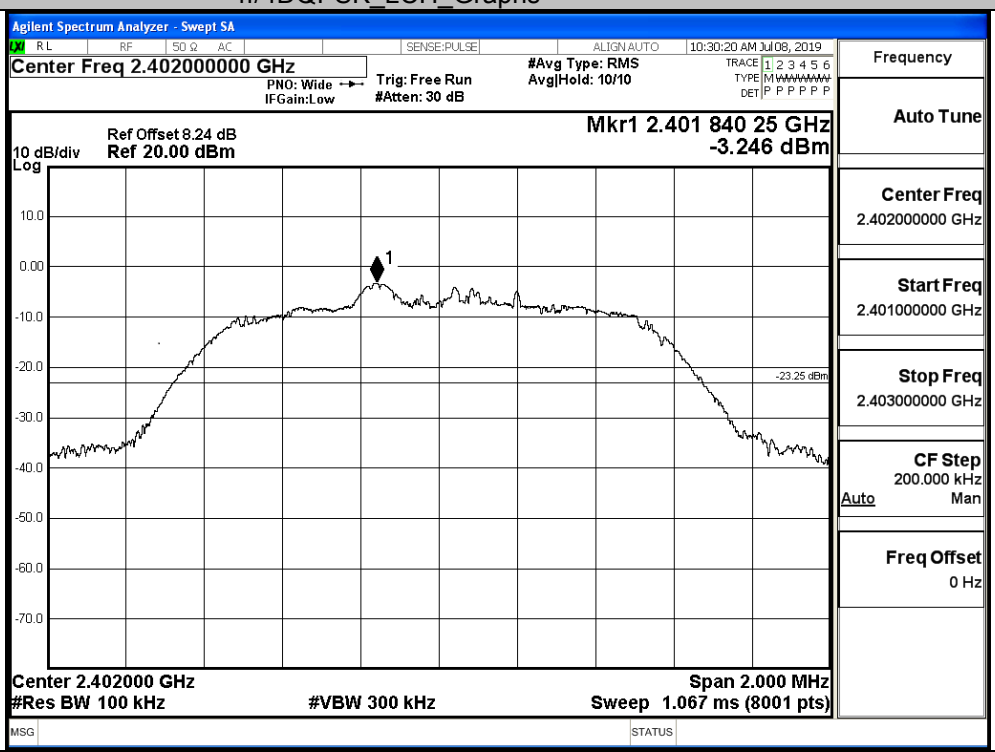
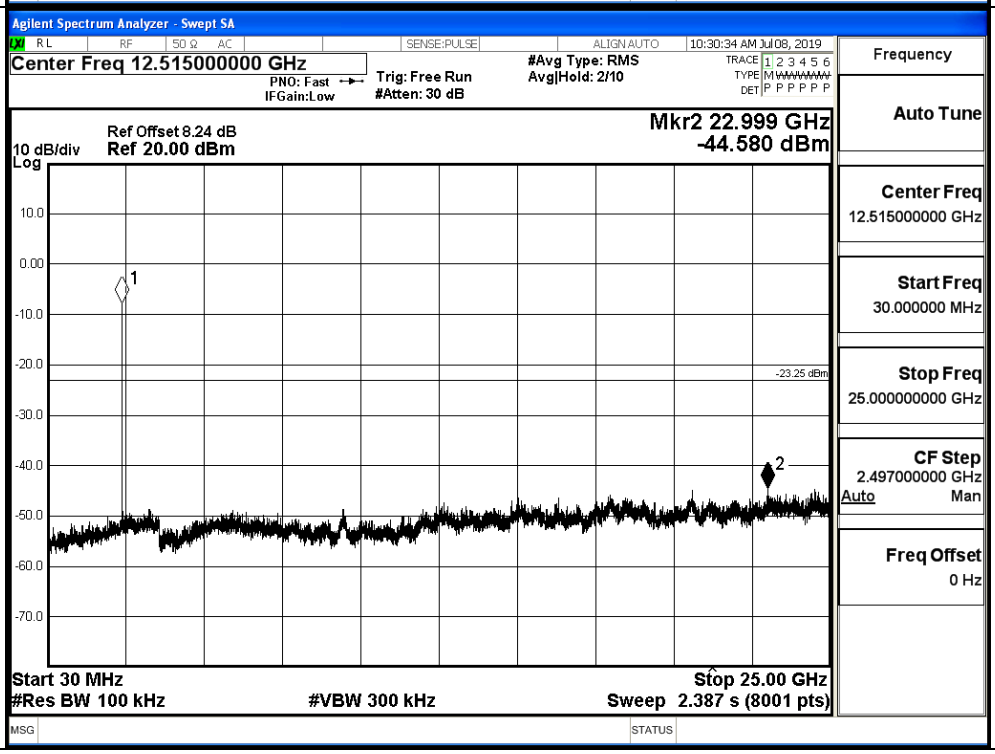
GFSK_LCH_Graphs		
Pref		

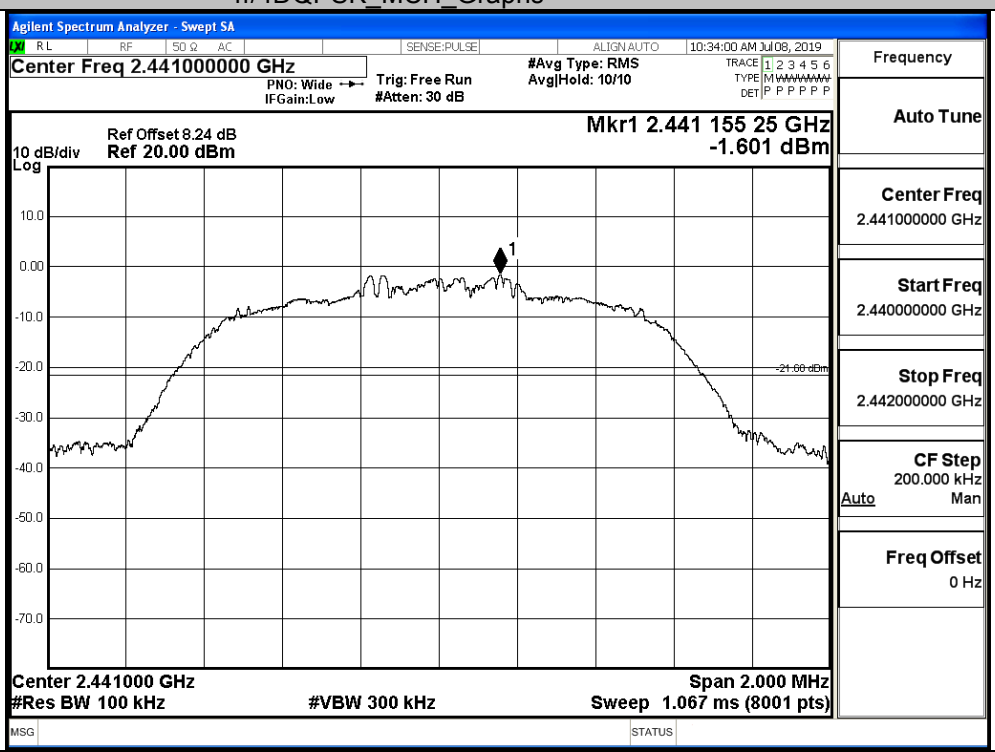
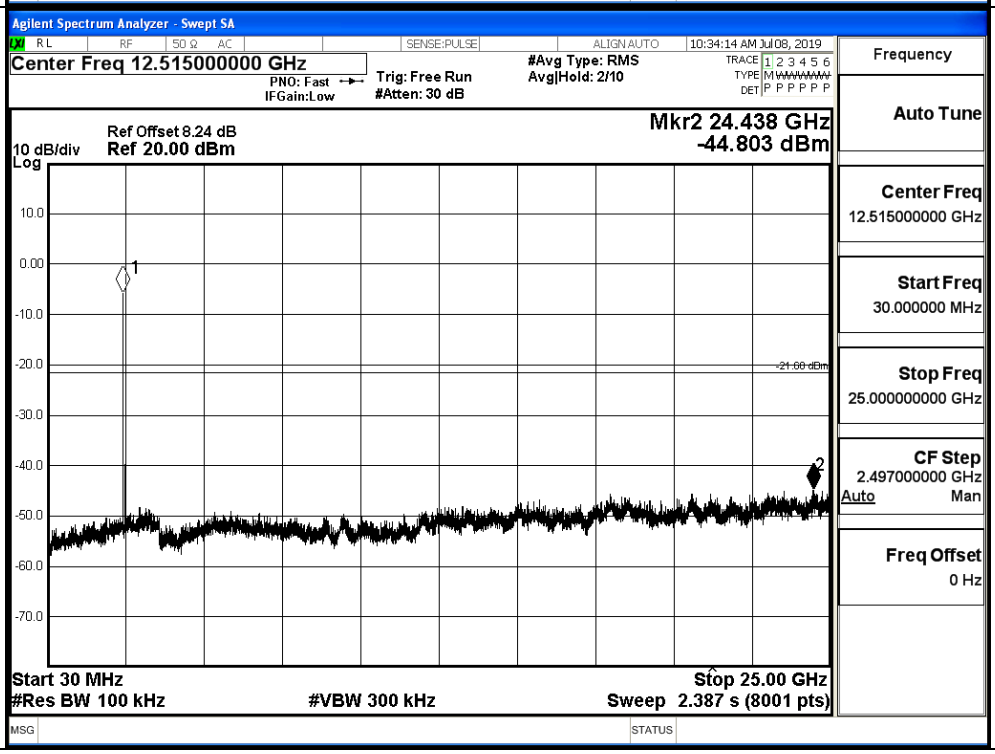
Puw		

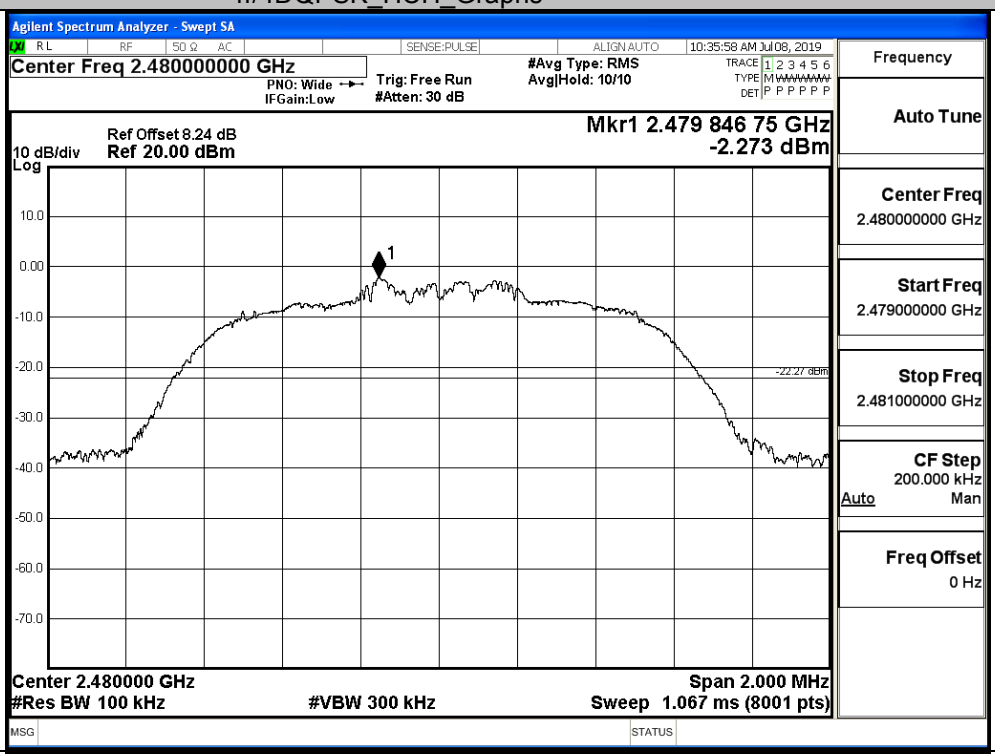
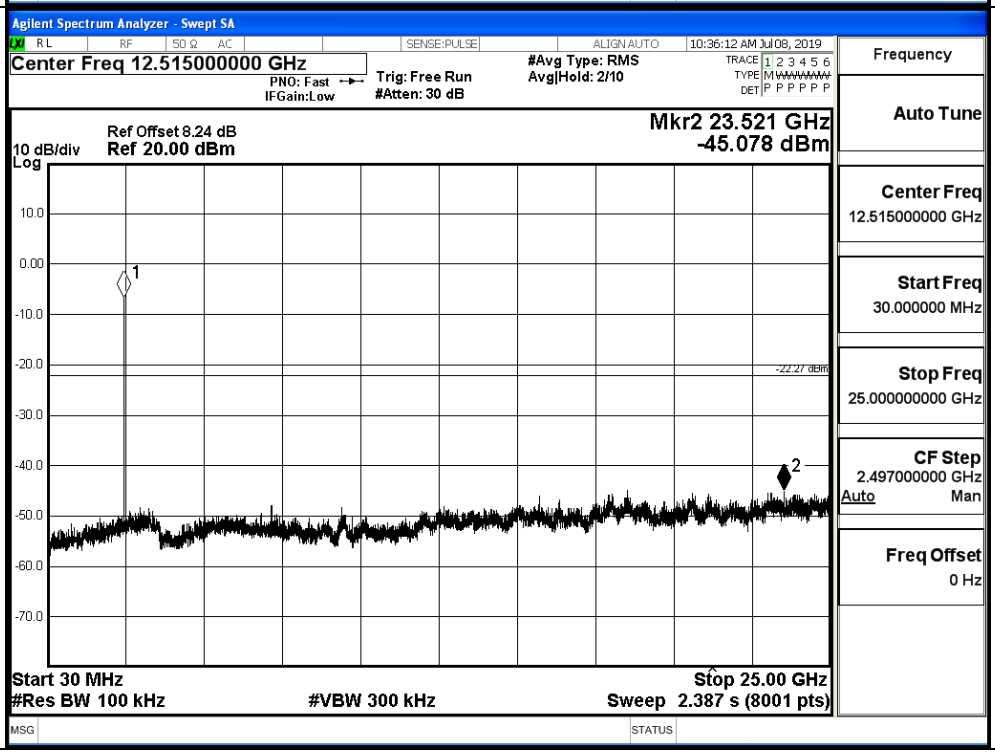
Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
10:20:37 AM Jul 08, 2019
Ref Offset 8.24 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 18.005 GHz
-43.084 dBm
-22.50 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 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		

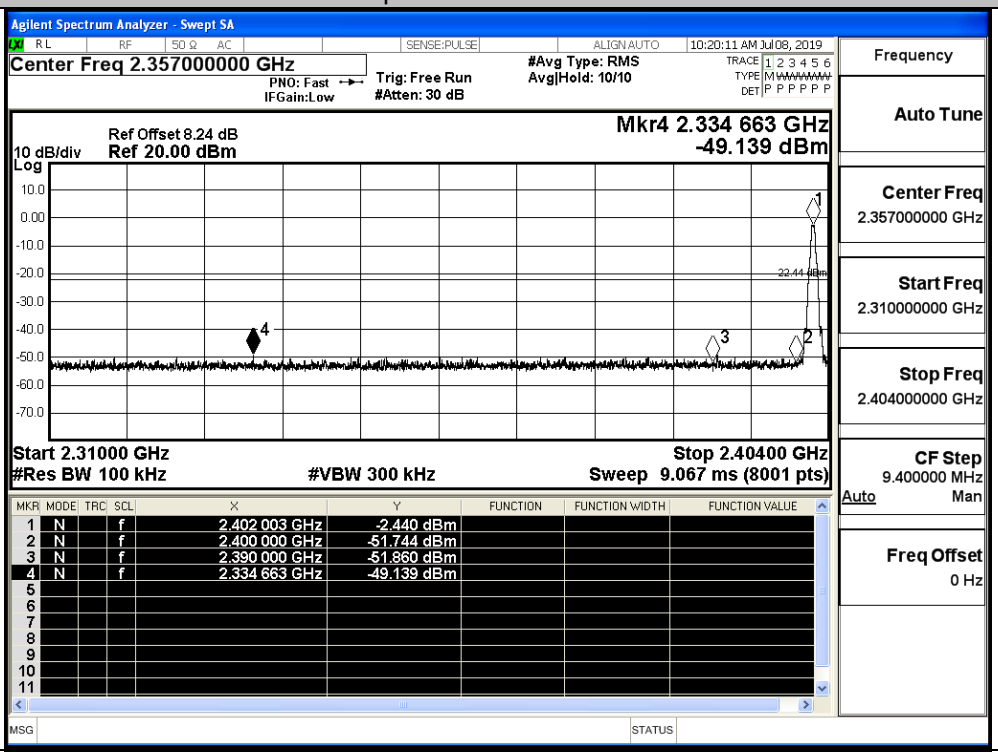
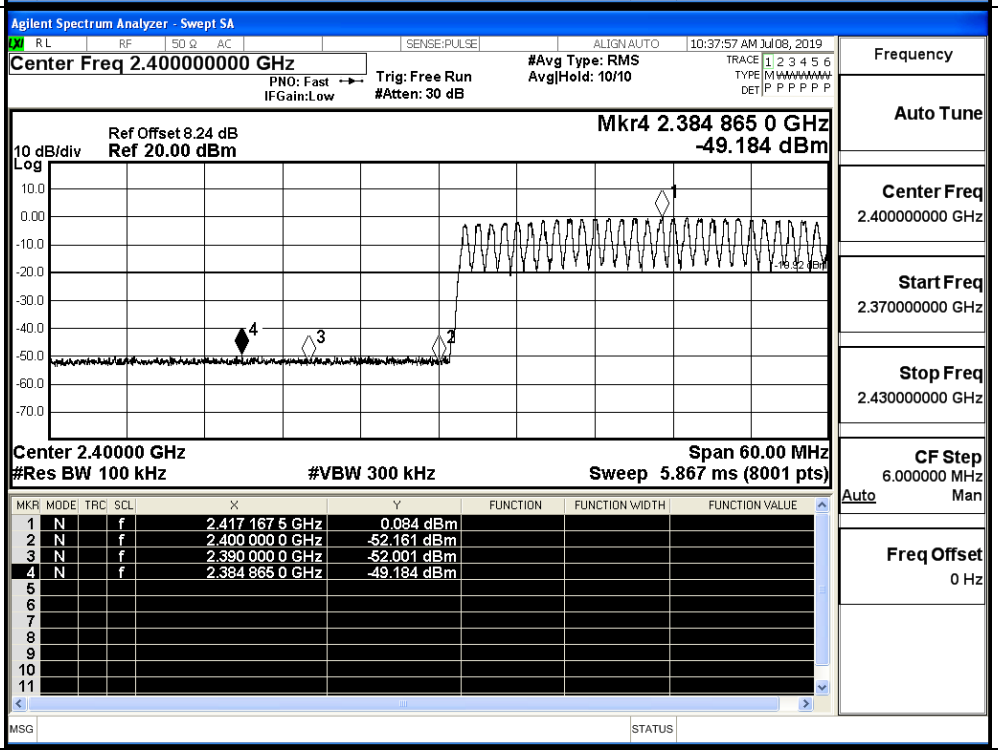
π/4DQPSK_LCH_Graphs		
Pref		
Puw		

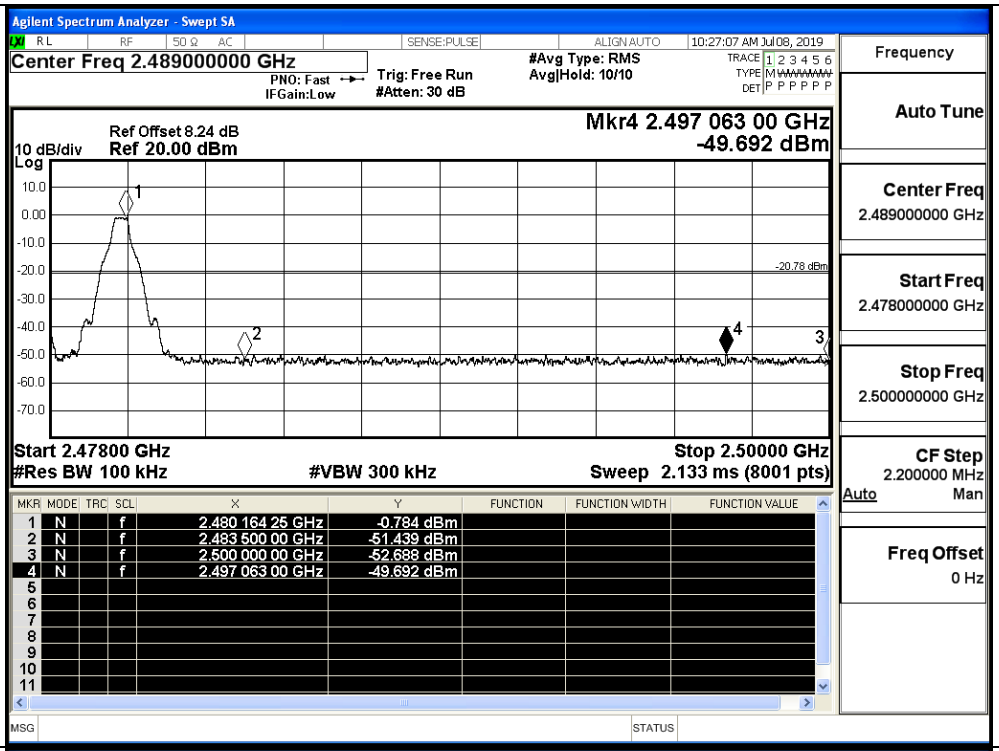
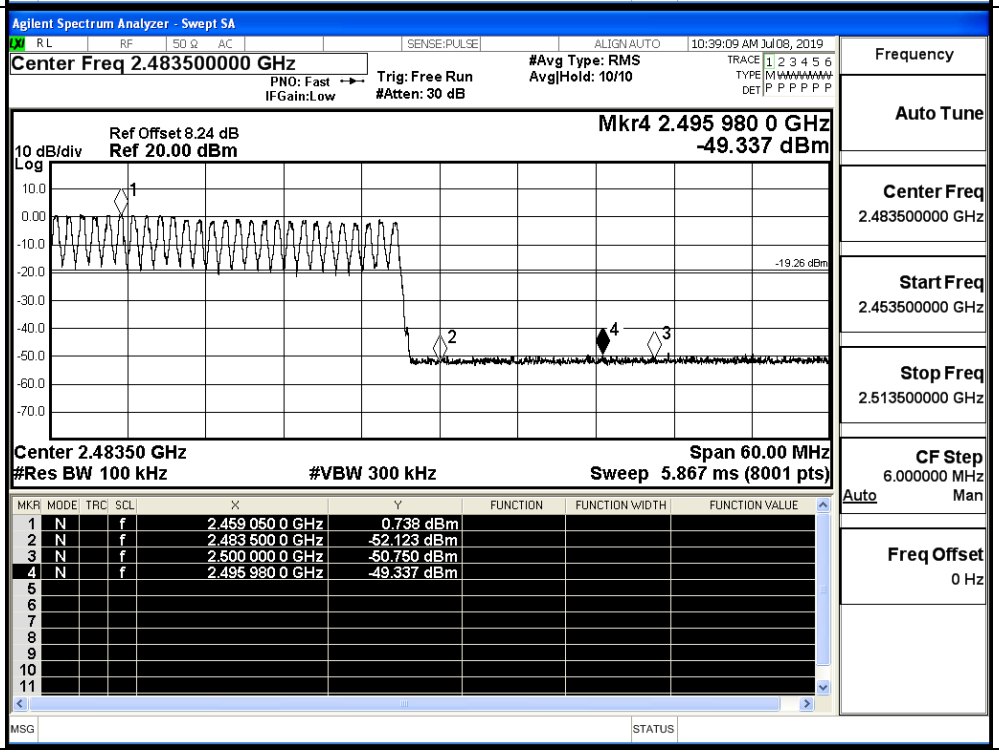
π/4DQPSK_MCH_Graphs		
Pref		
Puw		

π/4DQPSK_HCH_Graphs		
Pref		
Puw		

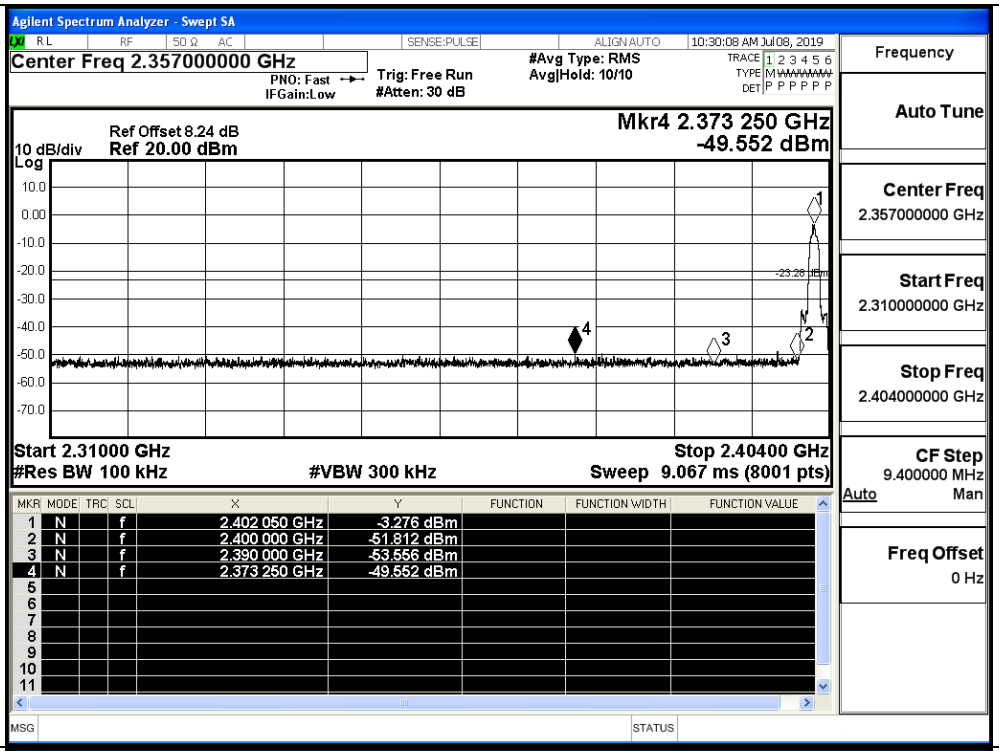
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.440	Off	-49.139	-22.44	PASS
			0.084	On	-49.184	-19.92	PASS
	HCH	2480	-0.784	Off	-49.692	-20.78	PASS
			0.738	On	-49.337	-19.26	PASS
π/4DQPSK	LCH	2402	-3.276	Off	-49.552	-23.28	PASS
			-1.115	On	-49.253	-21.12	PASS
	HCH	2480	-0.277	Off	-49.220	-20.28	PASS
			-0.438	On	-49.034	-20.44	PASS

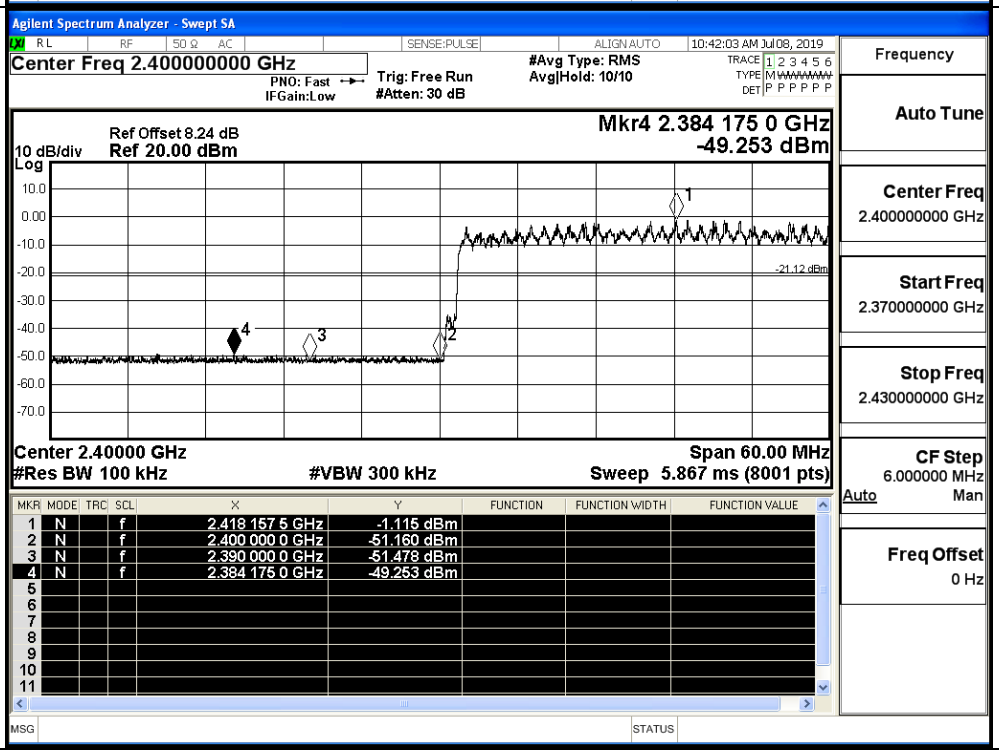
Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

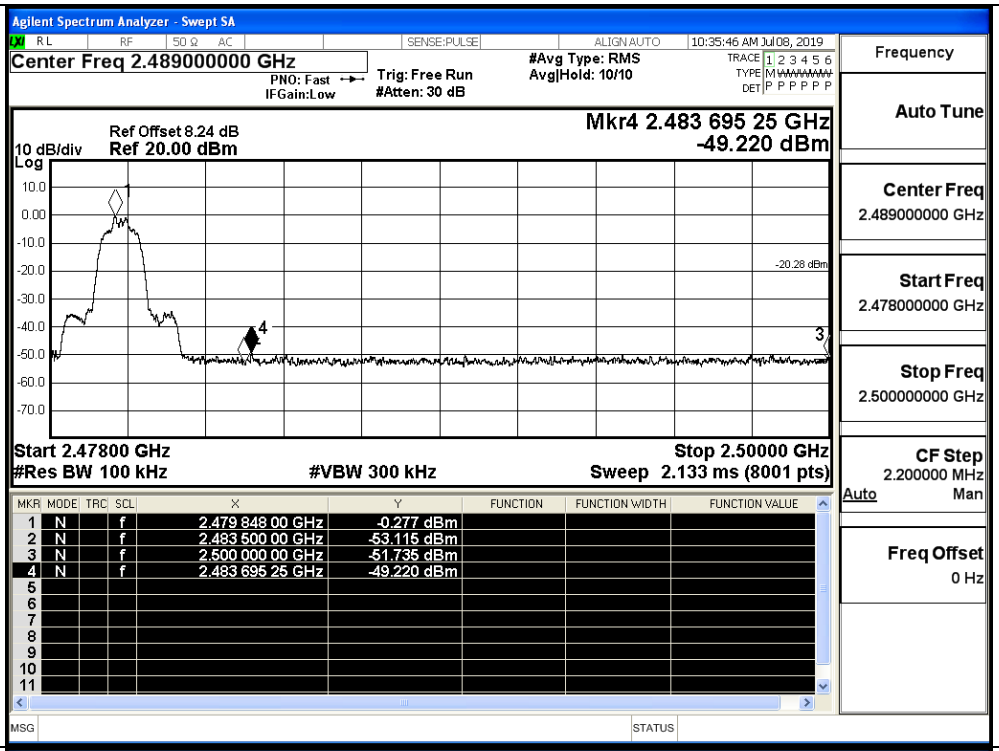
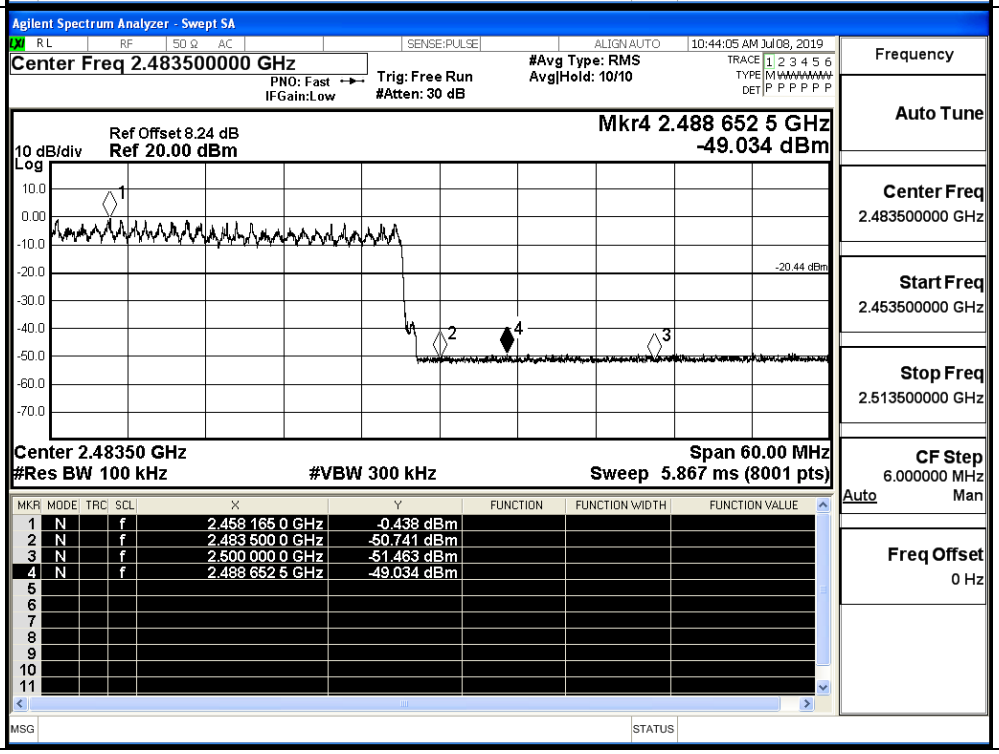
GFSK/HCH/No Hop	
GFSK/HCH/Hop	

π/4DQPSK/LCH/No Hop



π/4DQPSK/LCH/Hop

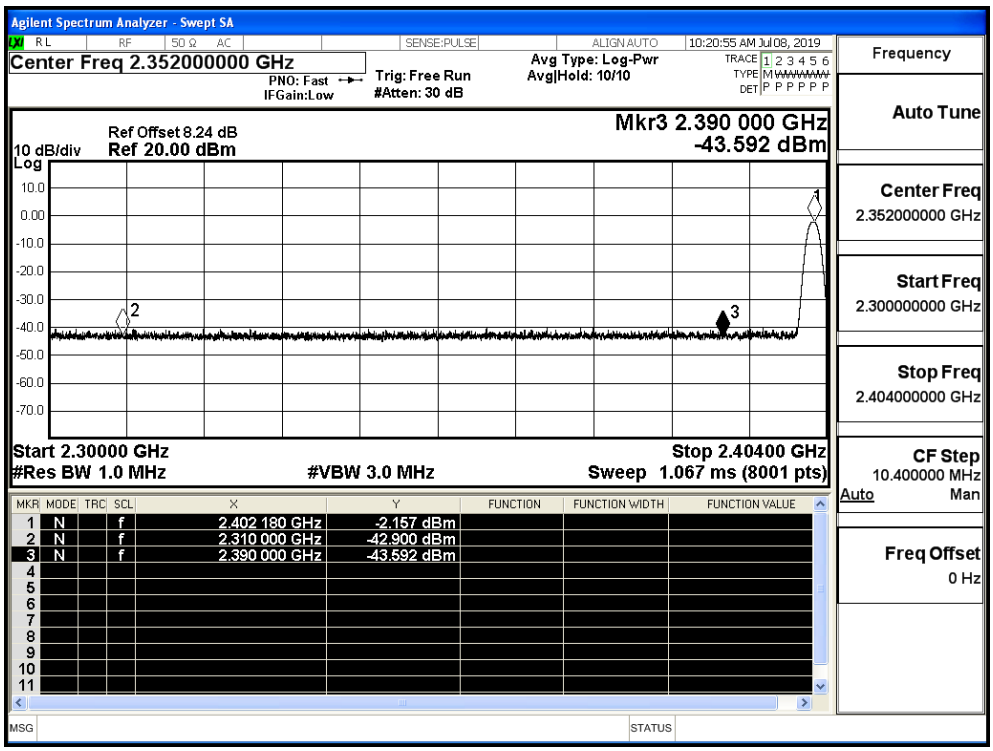


π/4DQPSK/HCH/No Hop	
π/4DQPSK/HCH/Hop	

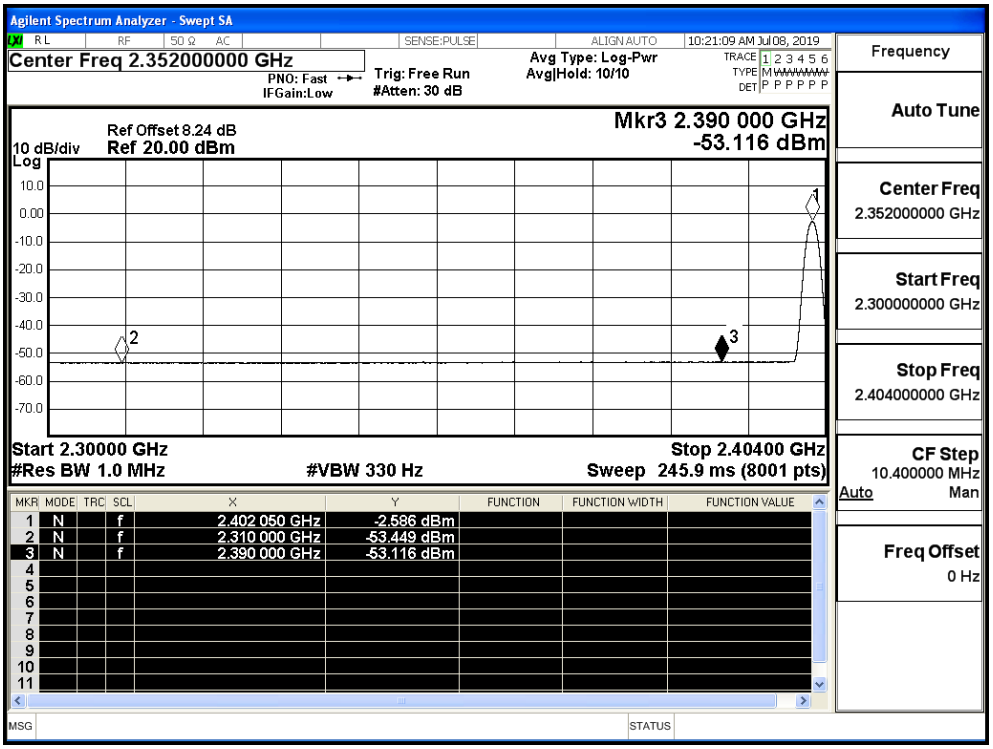
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.90	2.0	0	52.36	PEAK	74	PASS
	Off	2310.0	-53.45	2.0	0	41.81	AV	54	PASS
	Off	2390.0	-43.59	2.0	0	51.67	PEAK	74	PASS
	Off	2390.0	-53.12	2.0	0	42.14	AV	54	PASS
	Off	2483.5	-42.29	2.0	0	52.97	PEAK	74	PASS
	Off	2483.5	-52.86	2.0	0	42.40	AV	54	PASS
	Off	2500.0	-43.91	2.0	0	51.35	PEAK	74	PASS
	Off	2500.0	-52.72	2.0	0	42.54	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.39	2.0	0	52.87	PEAK	74	PASS
	Off	2310.0	-53.47	2.0	0	41.79	AV	54	PASS
	Off	2390.0	-43.45	2.0	0	51.81	PEAK	74	PASS
	Off	2390.0	-53.22	2.0	0	42.04	AV	54	PASS
	Off	2483.5	-43.44	2.0	0	51.82	PEAK	74	PASS
	Off	2483.5	-52.82	2.0	0	42.43	AV	54	PASS
	Off	2500.0	-43.02	2.0	0	52.24	PEAK	74	PASS
	Off	2500.0	-52.78	2.0	0	42.48	AV	54	PASS

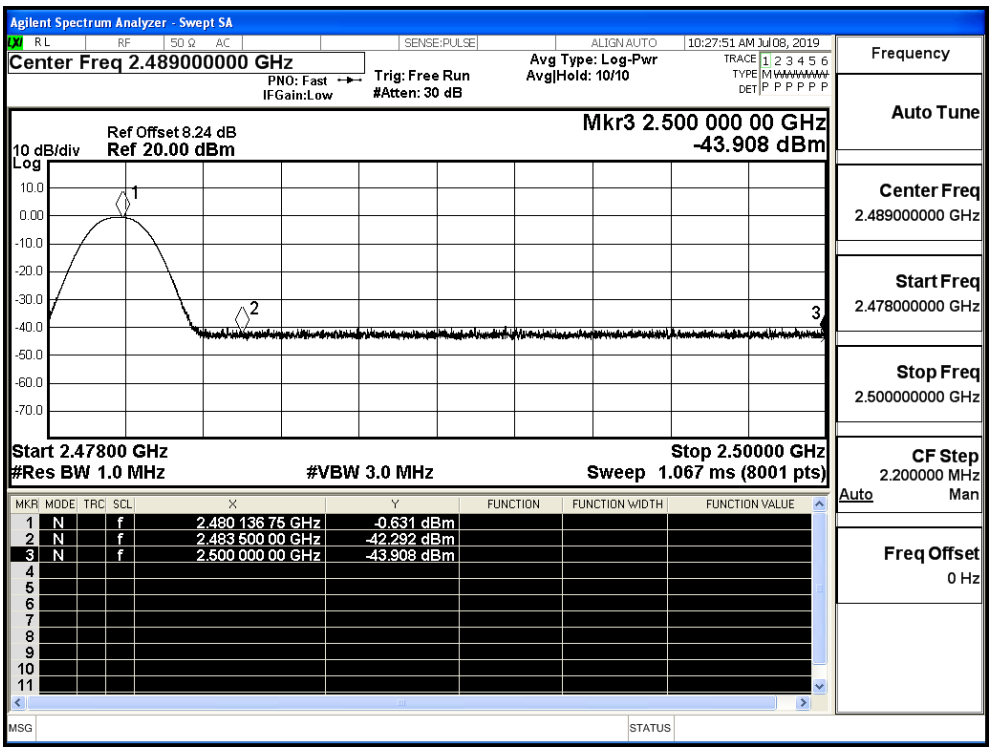
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



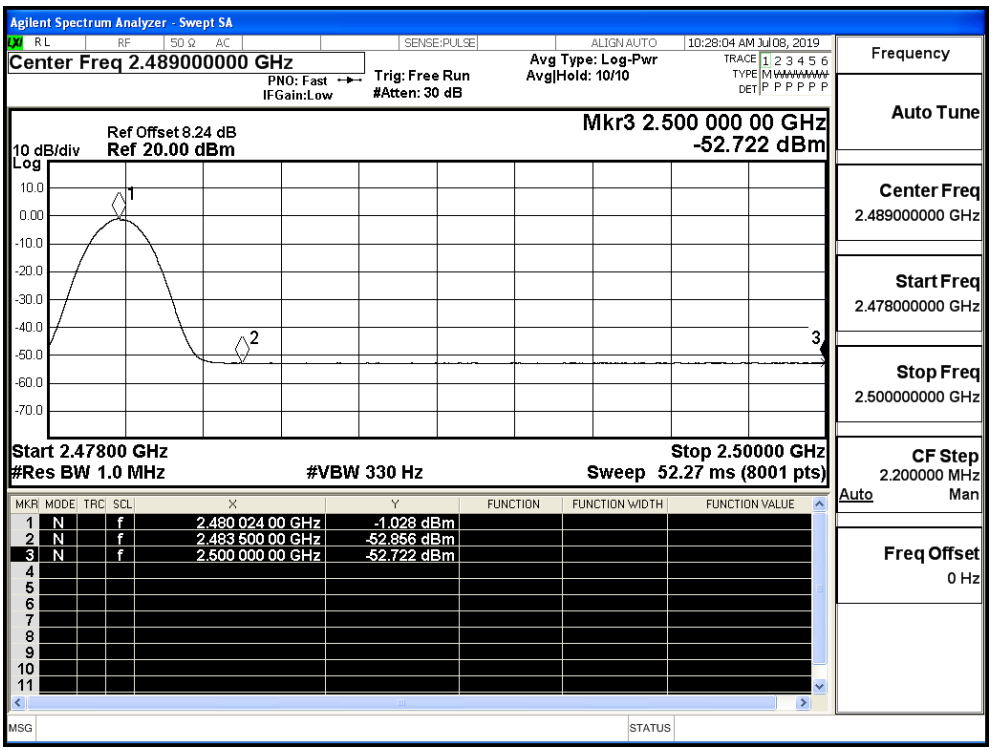
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



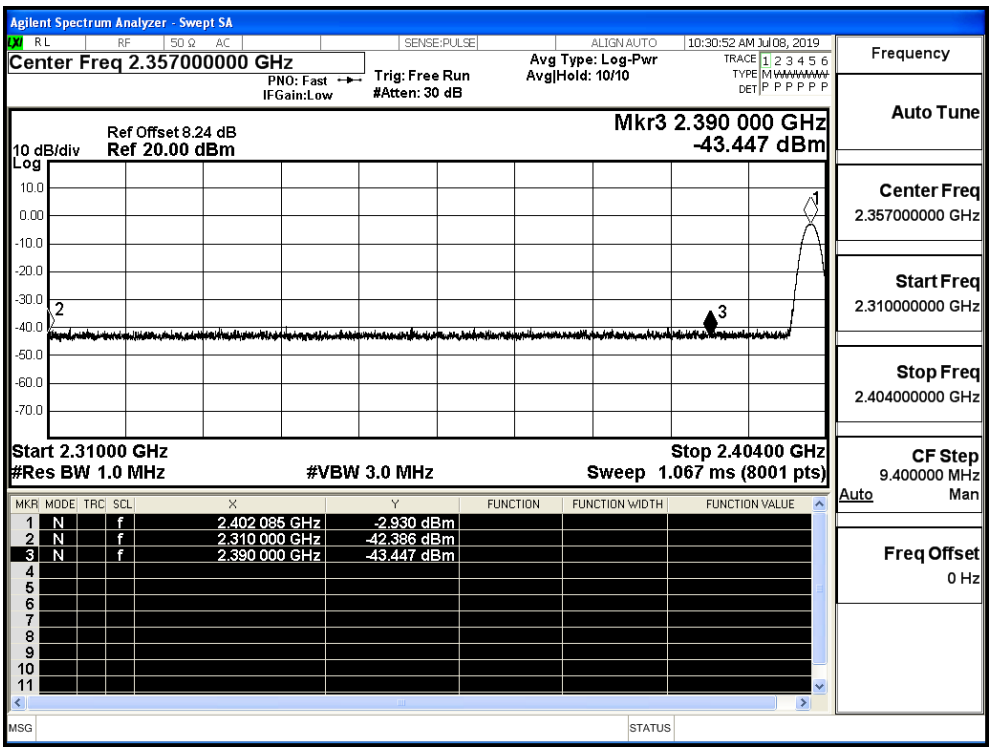
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



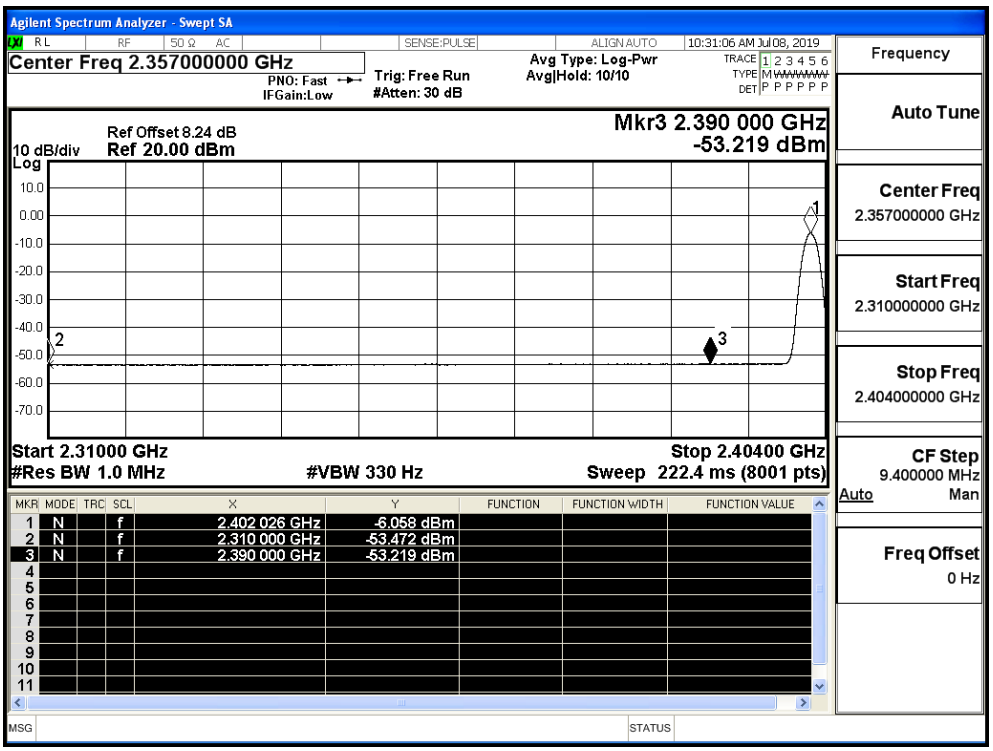
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



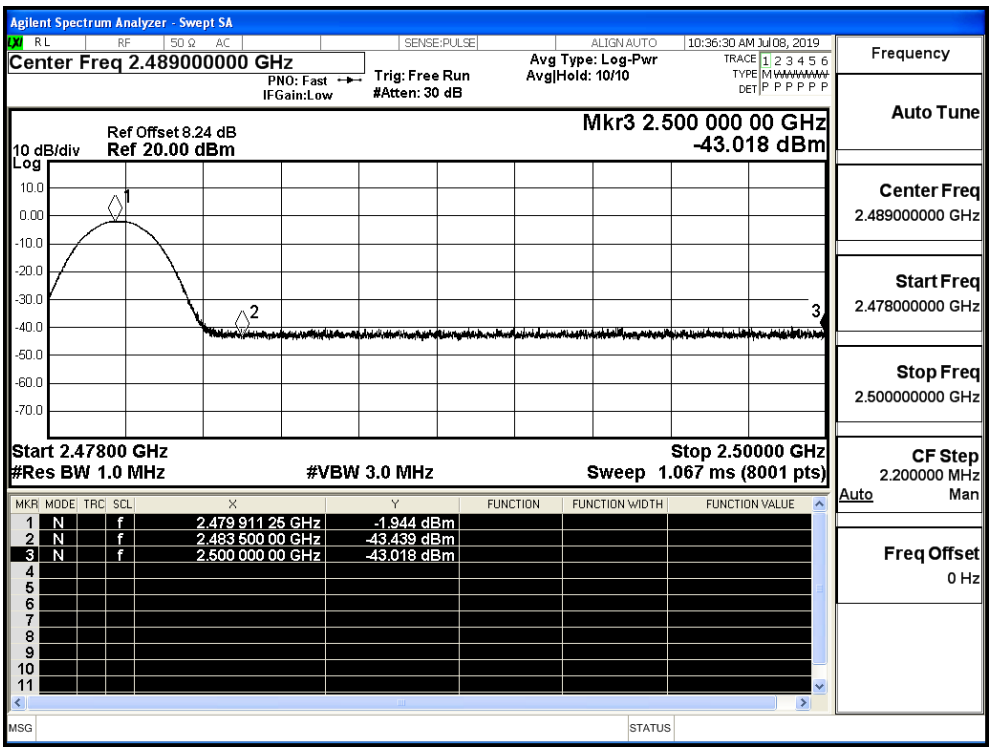
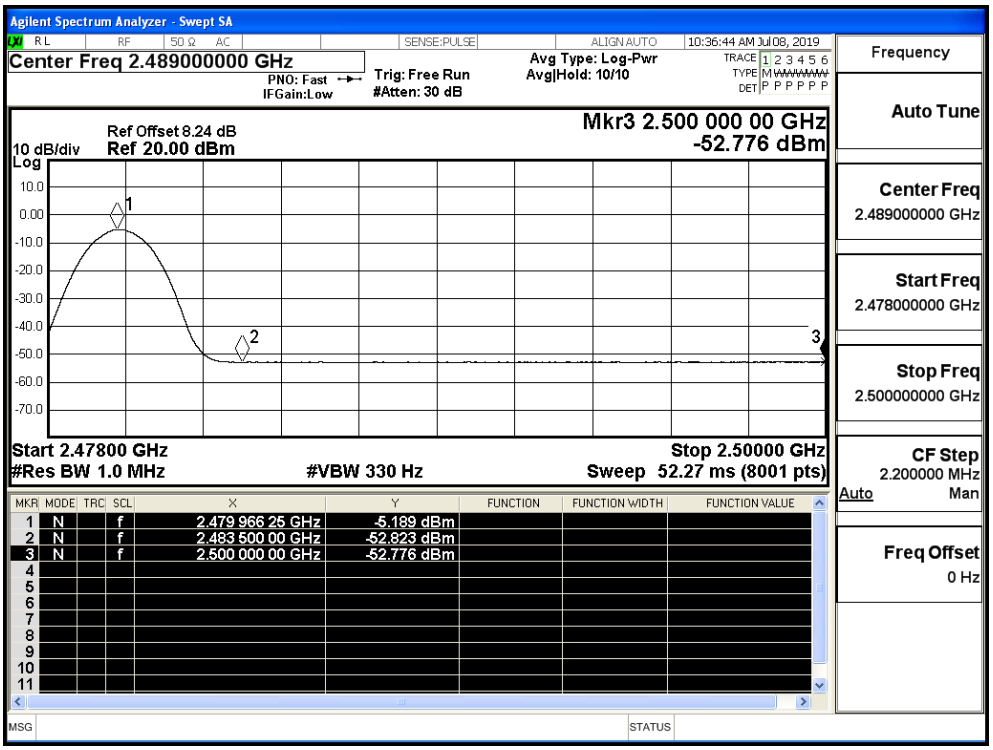
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)