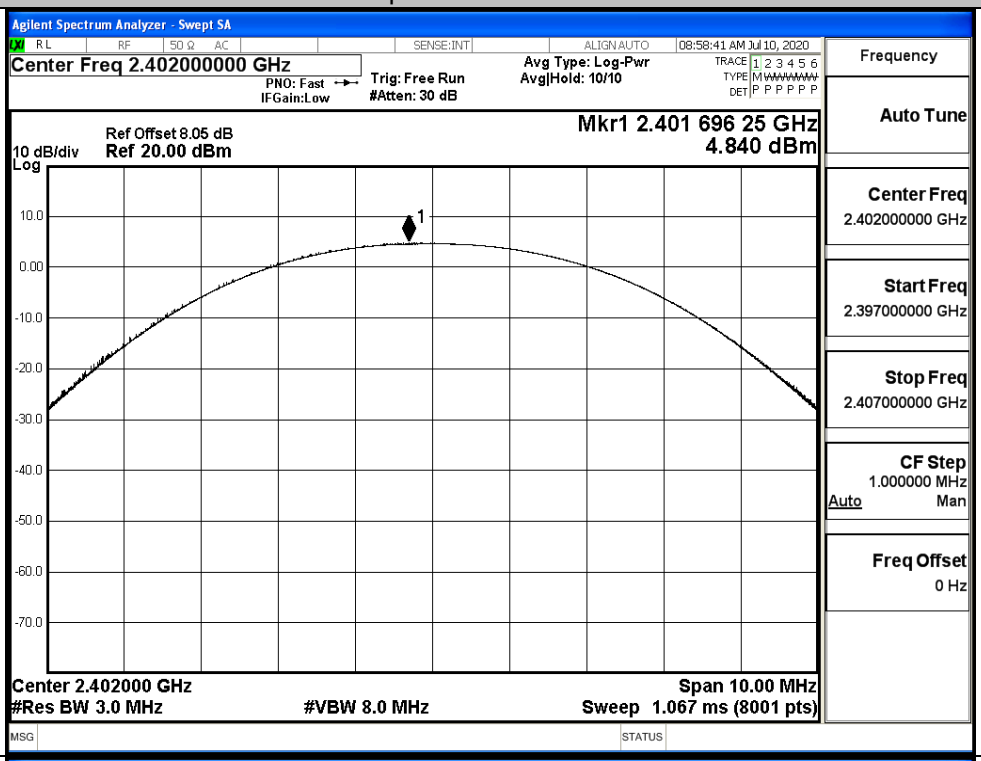
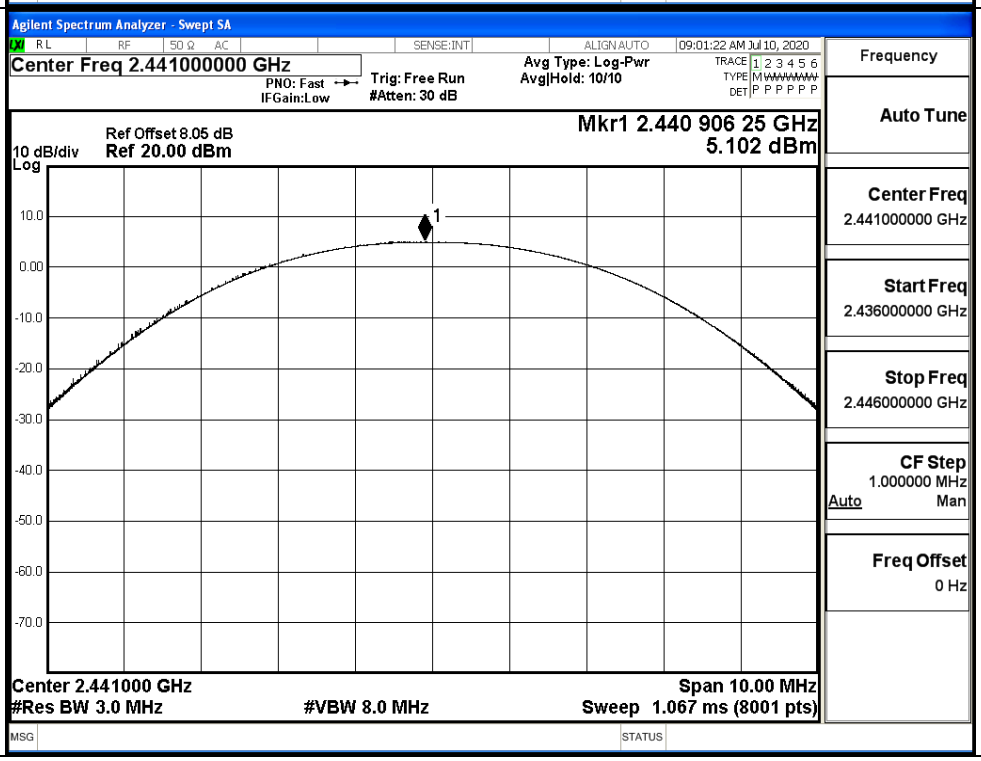
Appendix A
RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)
Product Name: Bluetooth Speaker
Trade Mark: MVMT, Ground
Test Model: SP3418

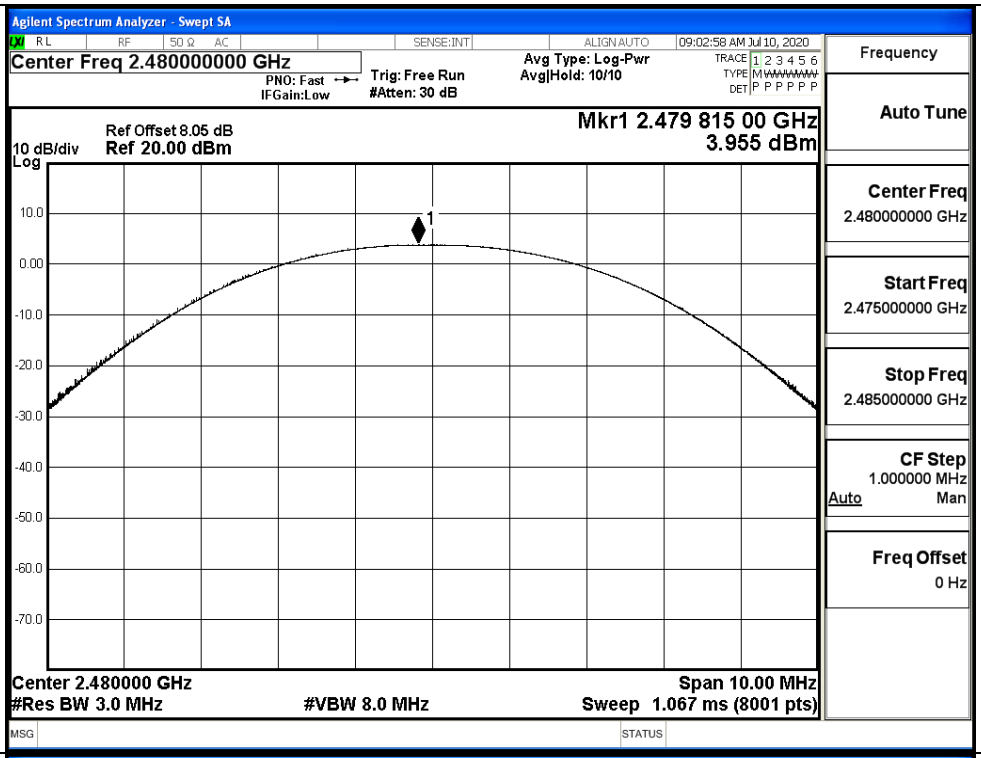
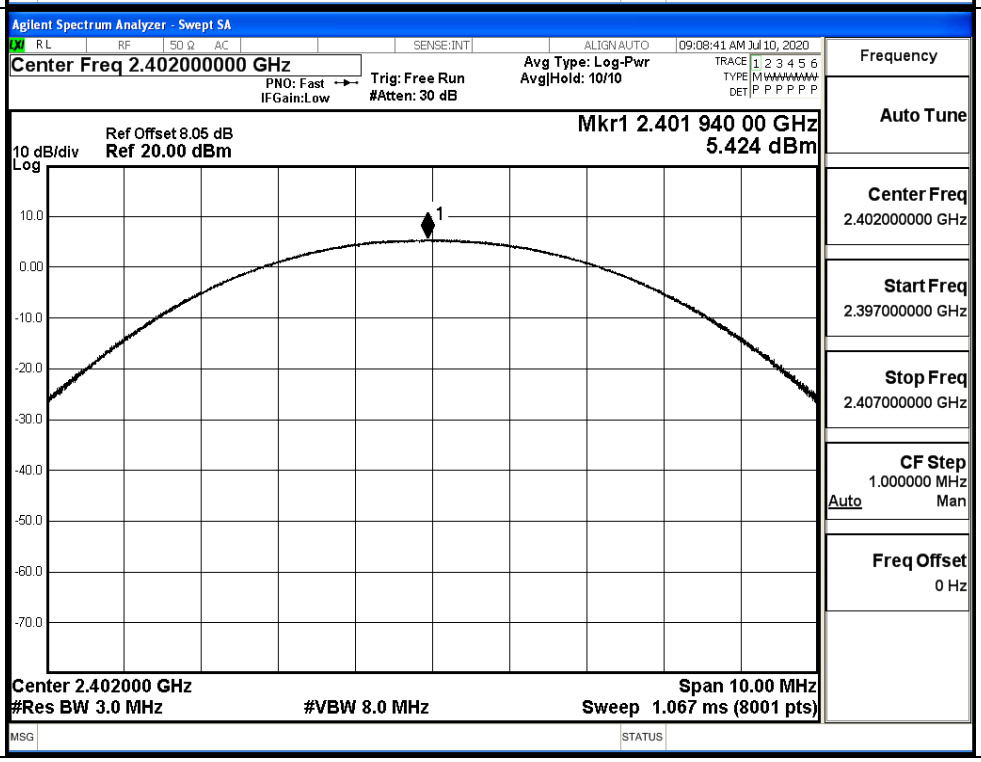
Environmental Conditions

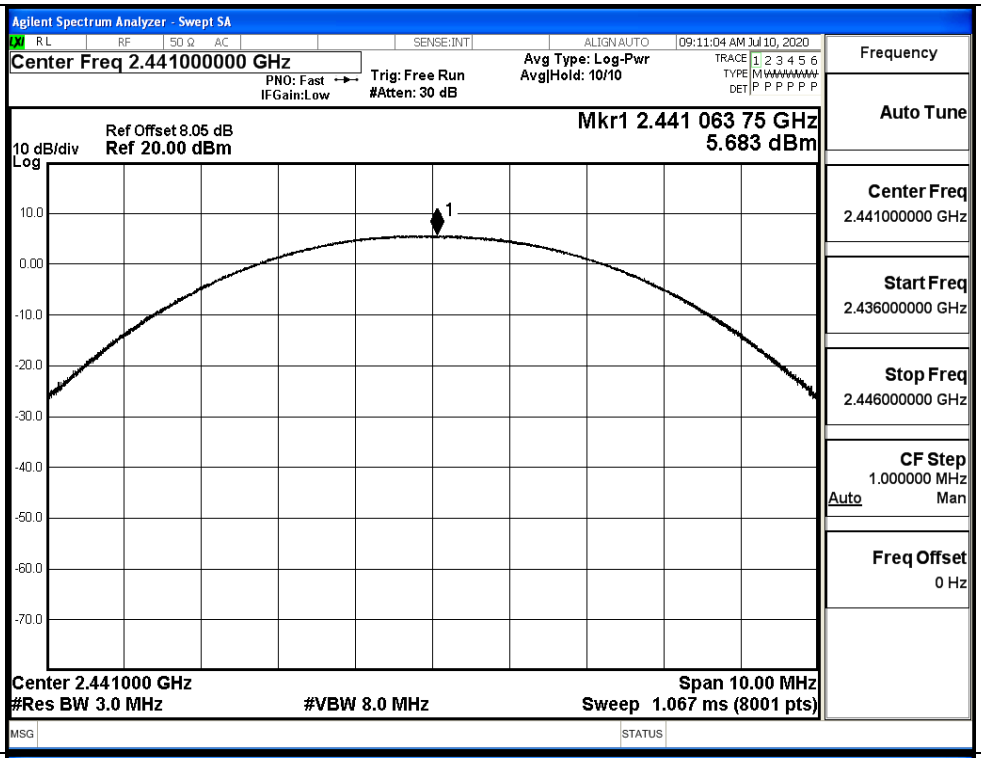
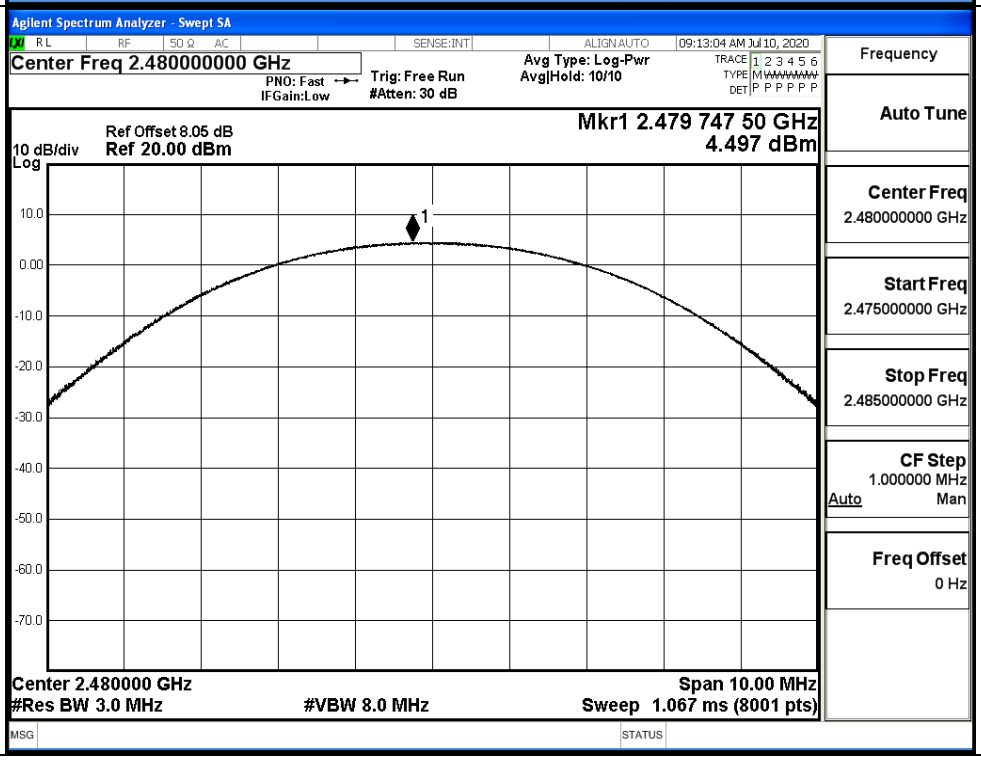
Temperature:	25.3 ° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Li Huan
Supervised by:	Tom Liu

A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.840	21	PASS
	MCH	5.102	21	PASS
	HCH	3.955	21	PASS
π/4DQPSK	LCH	5.424	21	PASS
	MCH	5.683	21	PASS
	HCH	4.497	21	PASS

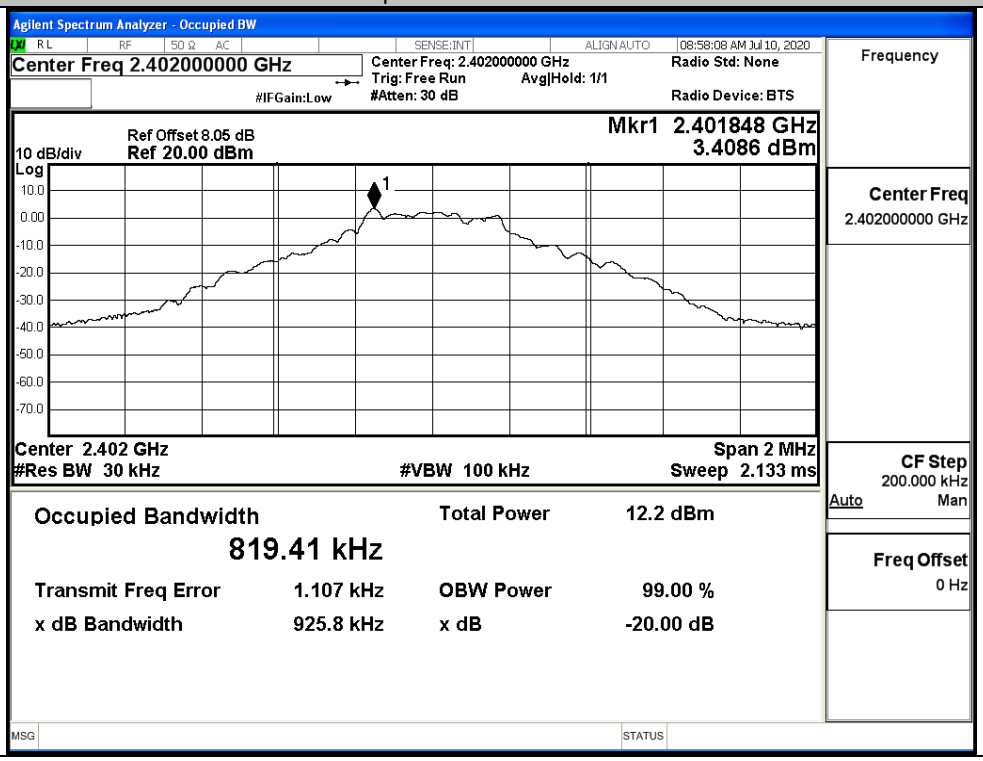
Test Graphs	
GFSK/LCH	
GFSK/MCH	

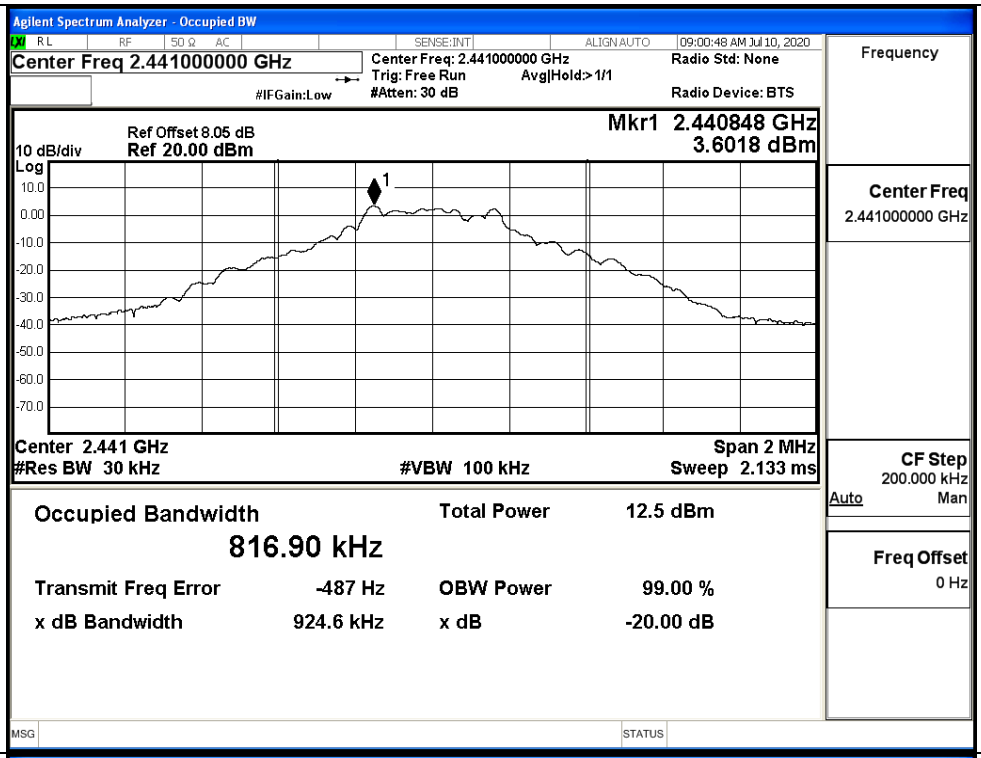
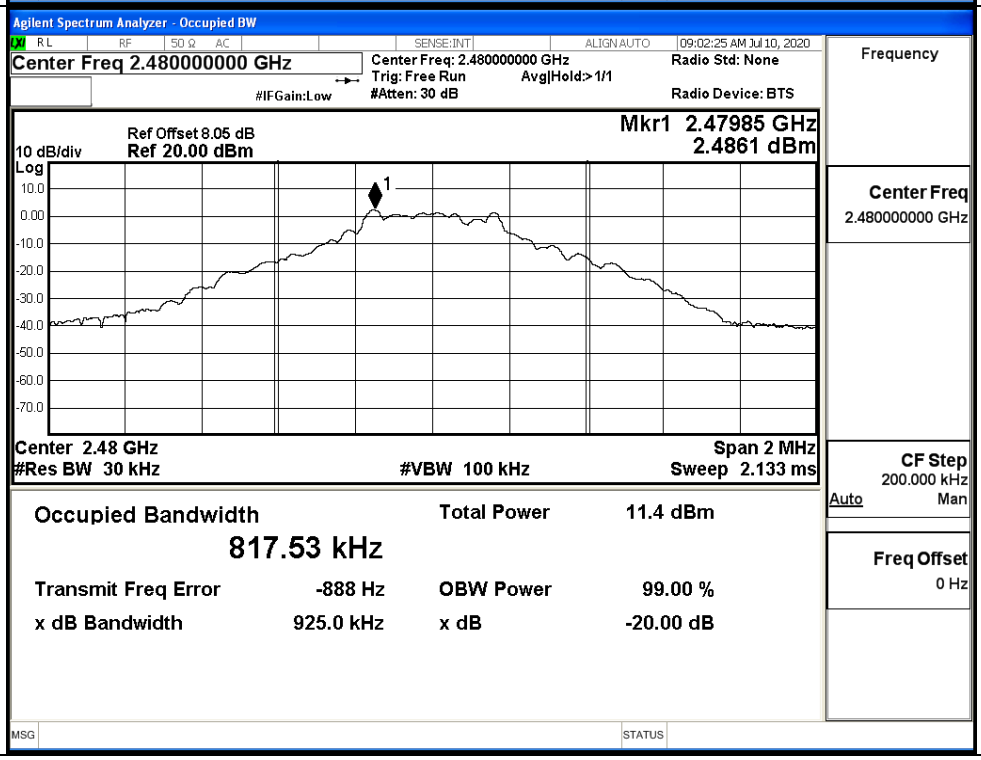
GFSK/HCH	
π/4DQPSK/LCH	

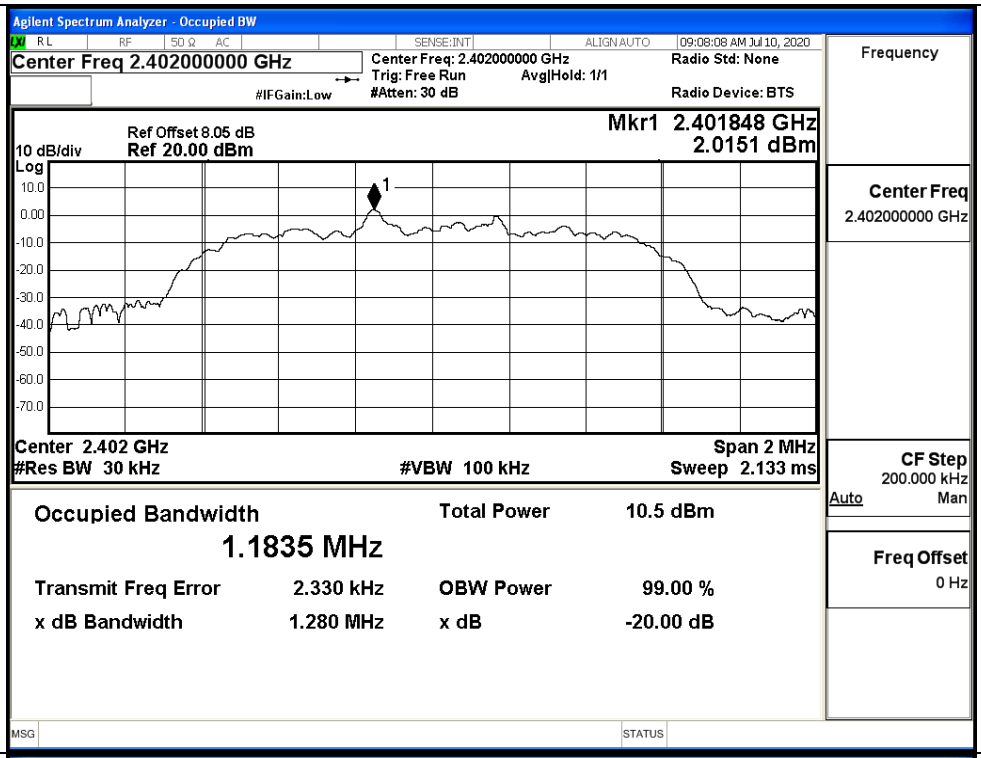
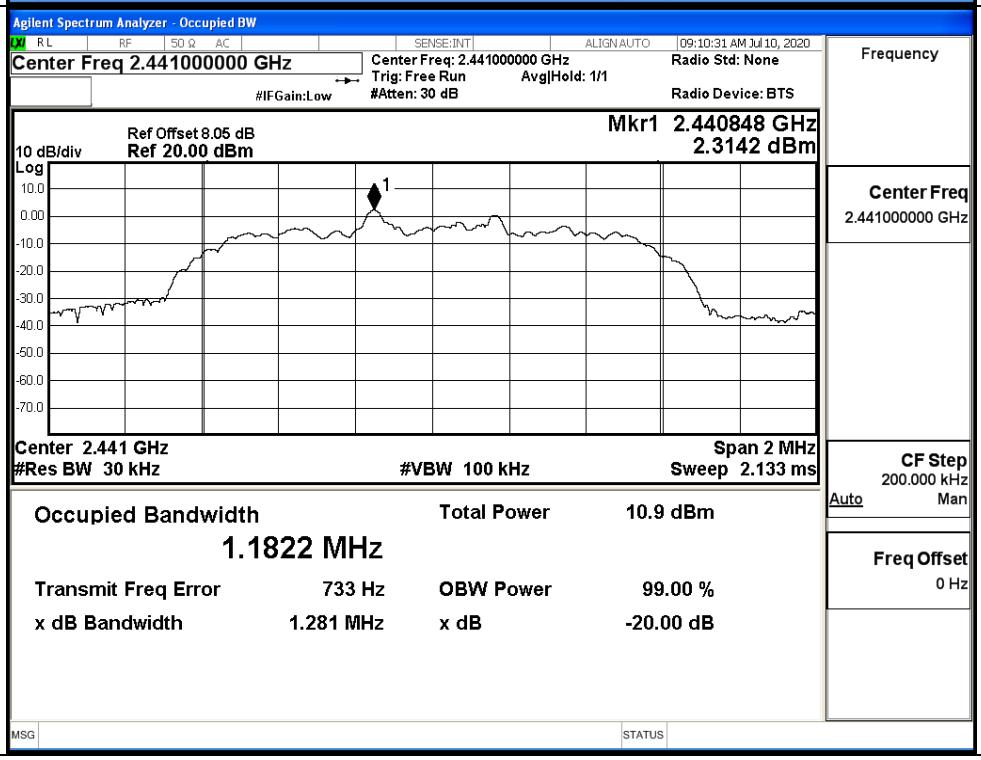
π/4DQPSK/MCH		
π/4DQPSK/HCH		

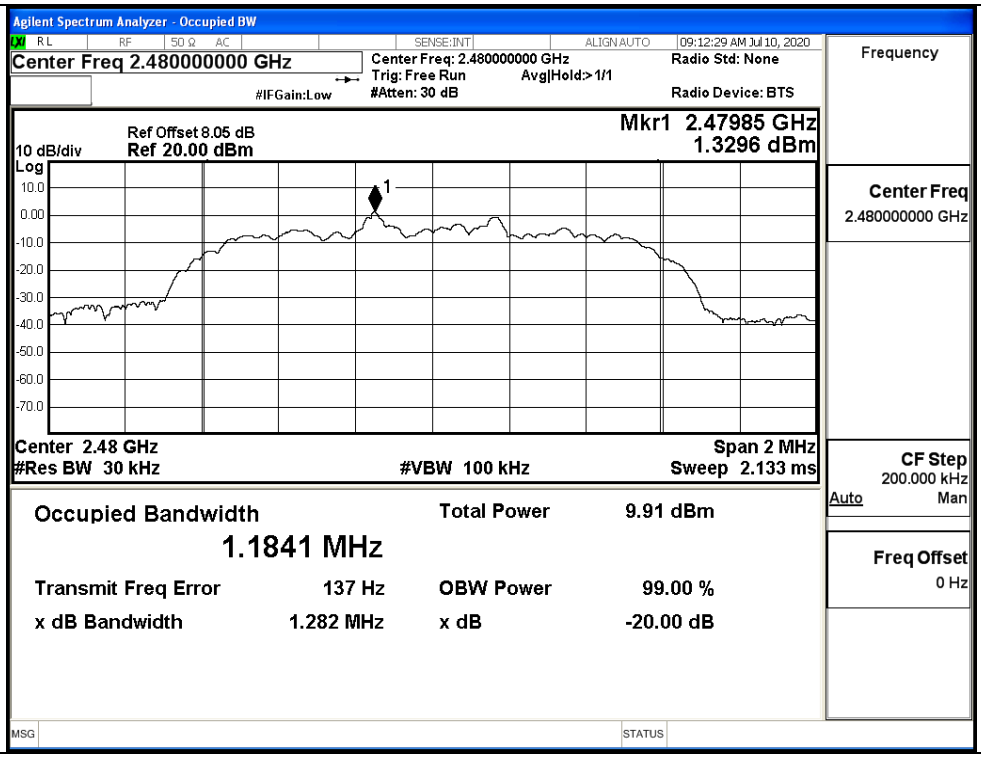
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9258	Not Specified	PASS
	MCH	0.9246	Not Specified	PASS
	HCH	0.9250	Not Specified	PASS
π/4DQPSK	LCH	0.0000	Not Specified	PASS
	MCH	1.281	Not Specified	PASS
	HCH	1.282	Not Specified	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

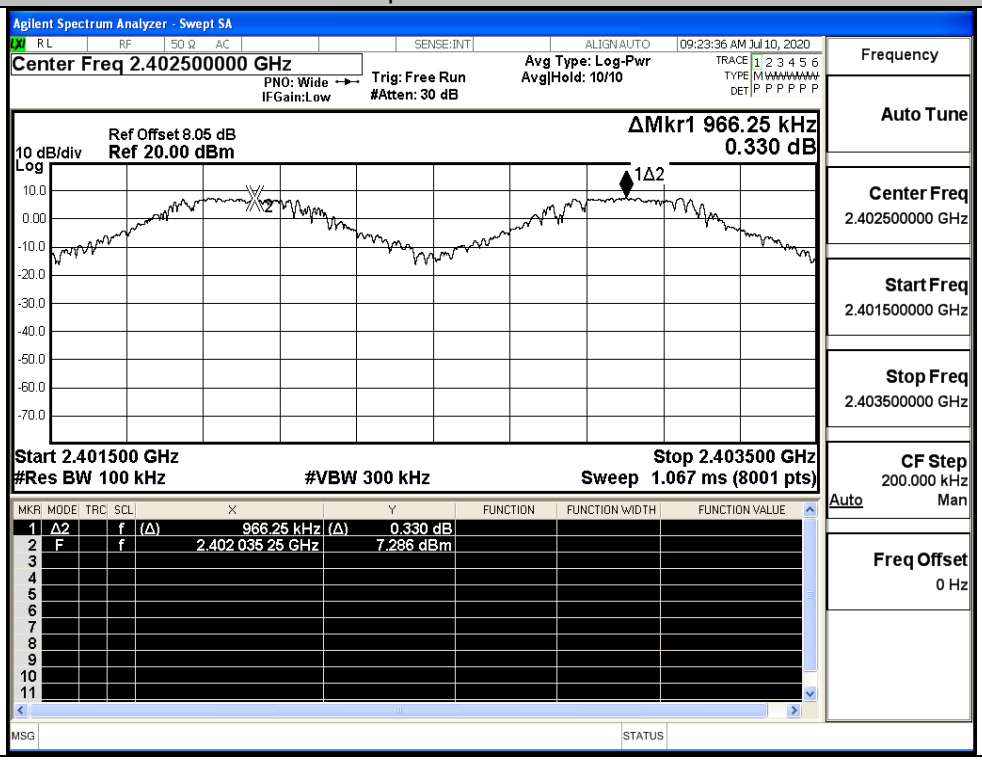
π/4DQPSK/LCH	
π/4DQPSK/MCH	

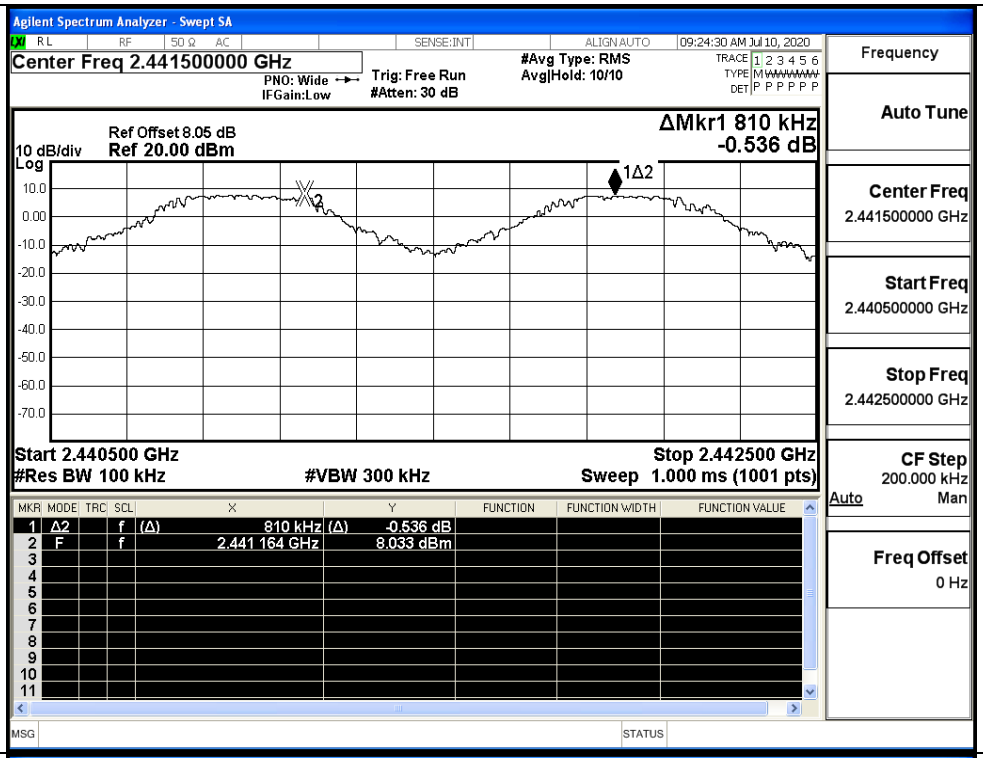
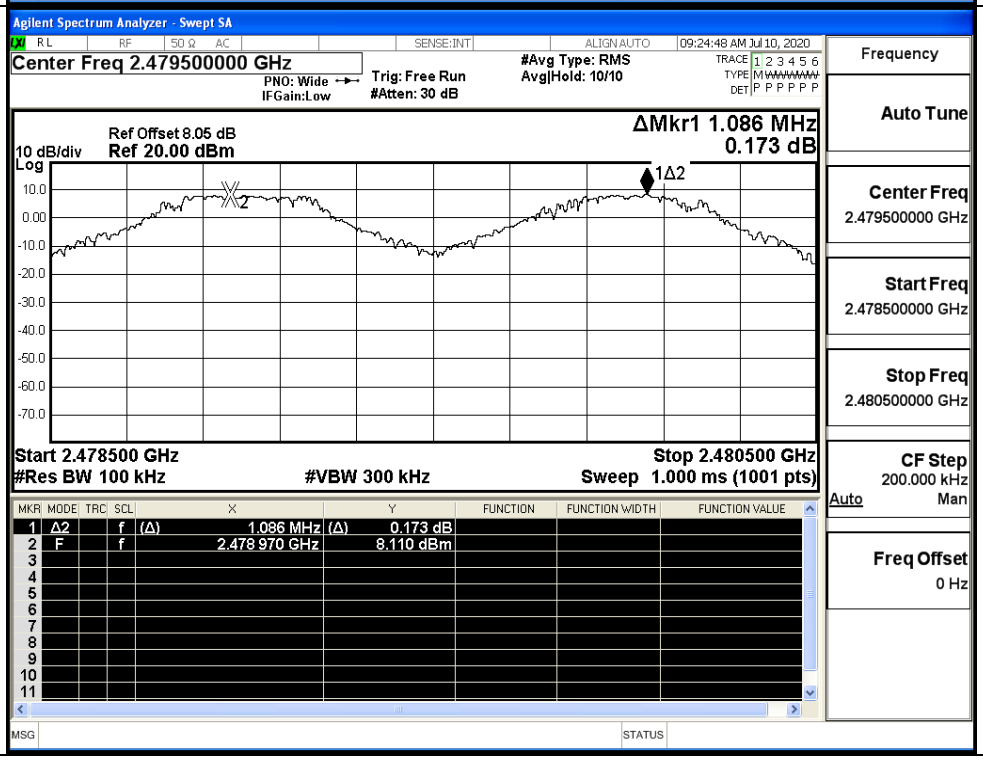
π/4DQPSK/HCH	

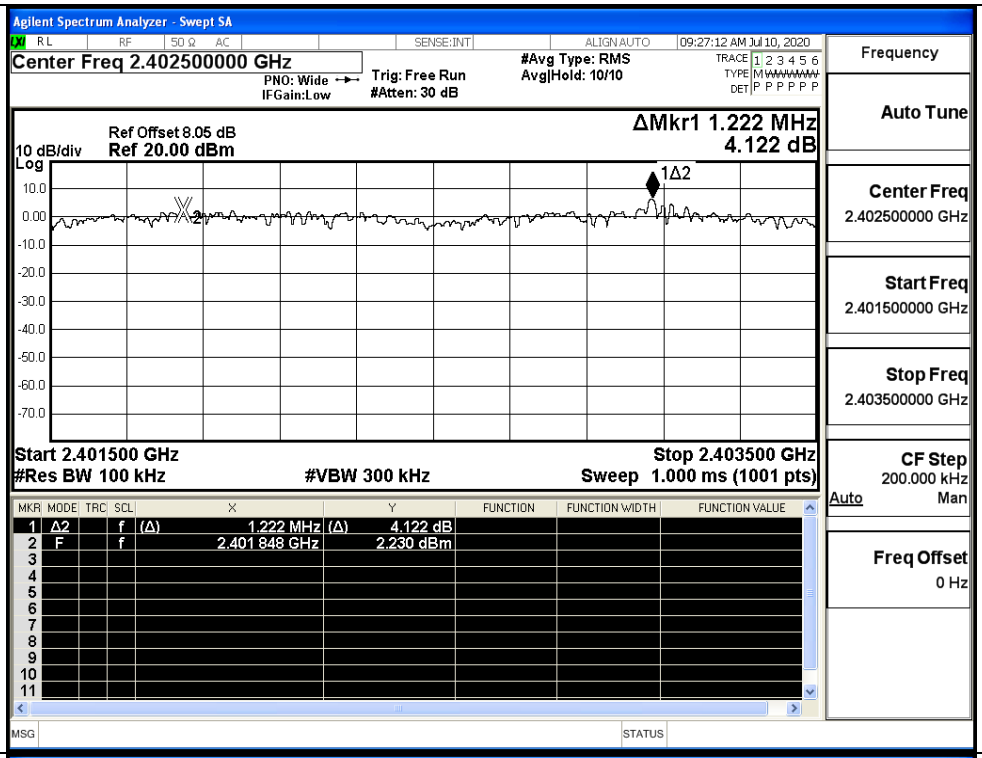
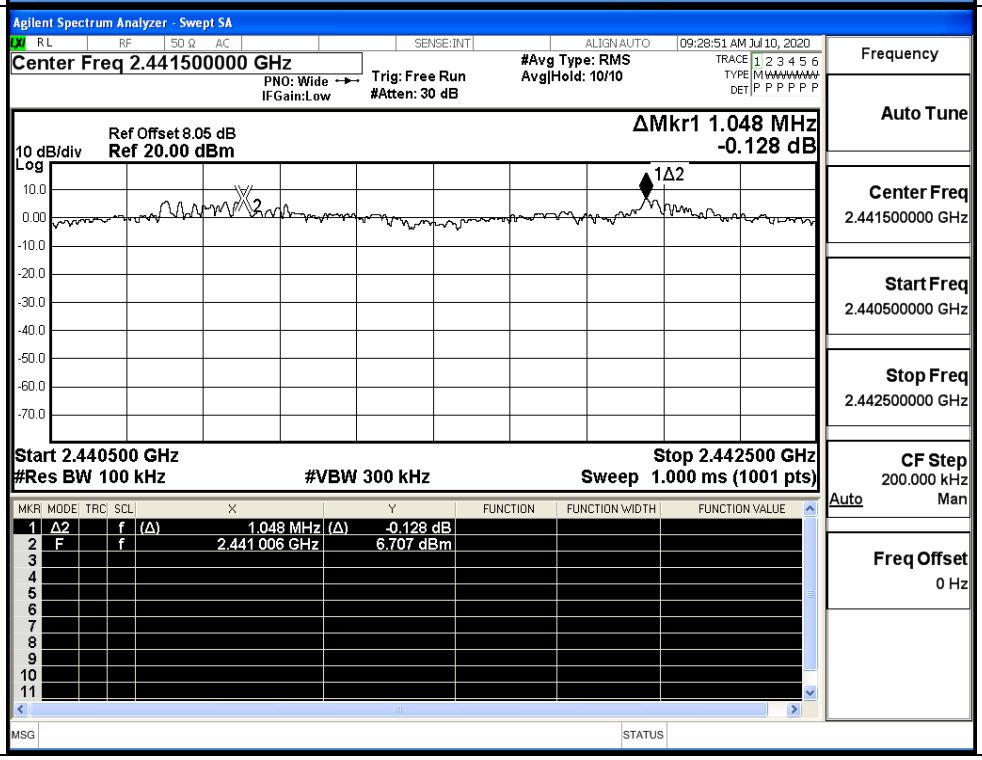
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:12:29 AM Jul 10, 2020
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.47985 GHz
1.3296 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
1.1841 MHz
Total Power 9.91 dBm
Transmit Freq Error 137 Hz
OBW Power 99.00 %
x dB Bandwidth 1.282 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

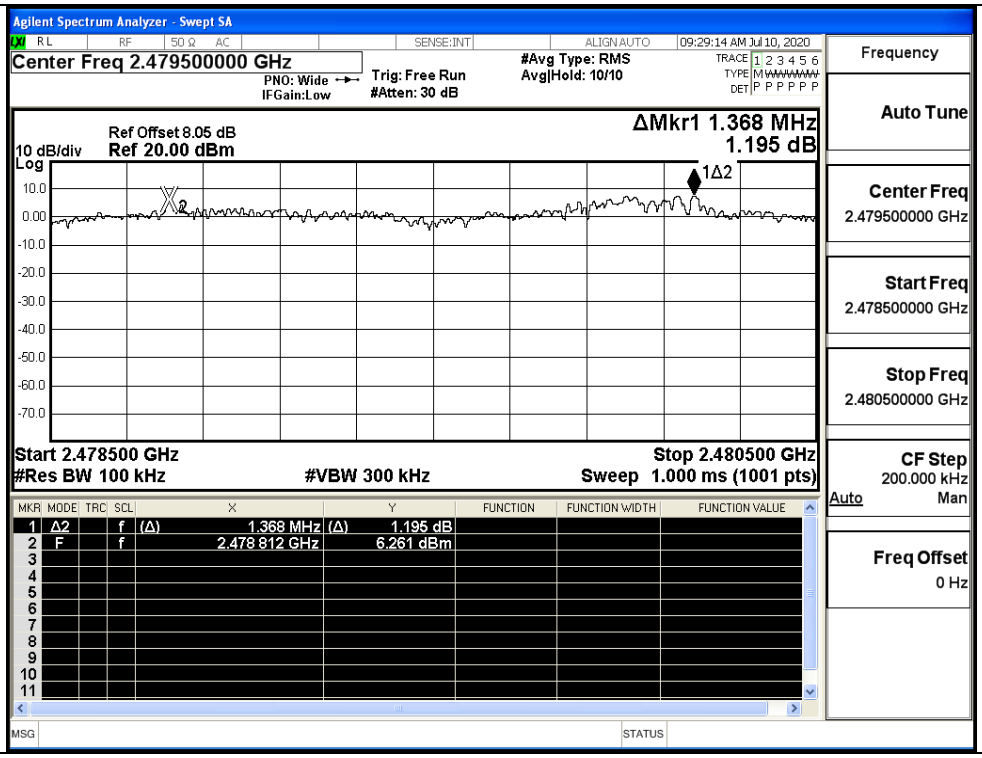
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.966	0.617	PASS
	MCH	0.810	0.617	PASS
	HCH	1.086	0.617	PASS
π/4DQPSK	LCH	1.222	0.855	PASS
	MCH	1.048	0.855	PASS
	HCH	1.368	0.855	PASS

Test Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

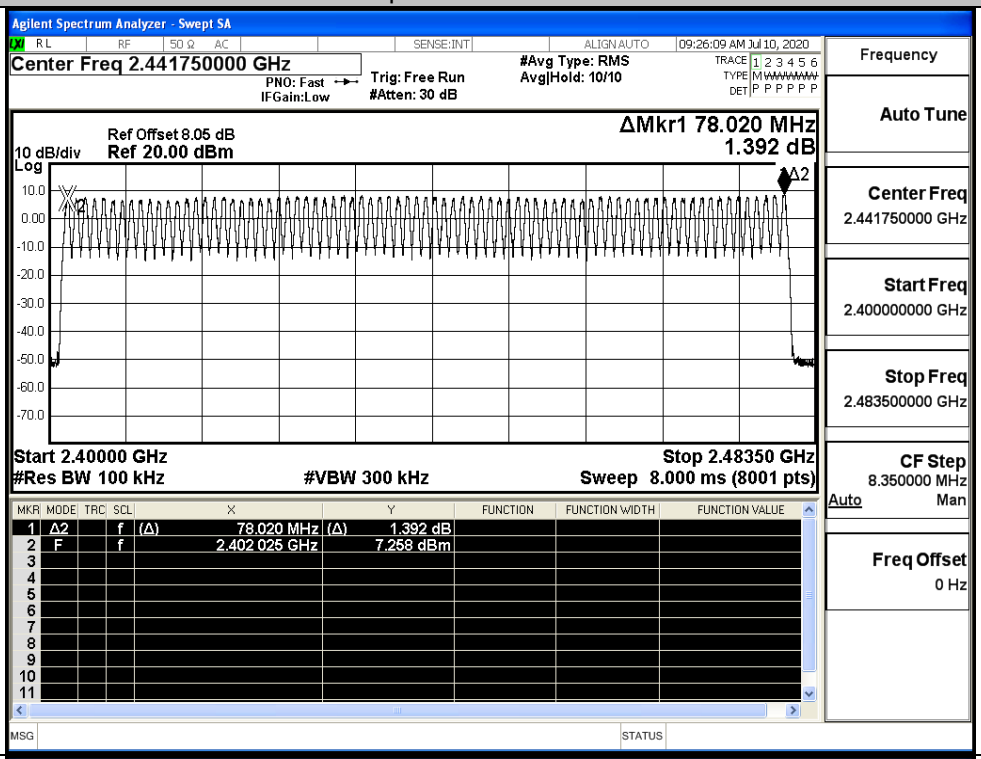
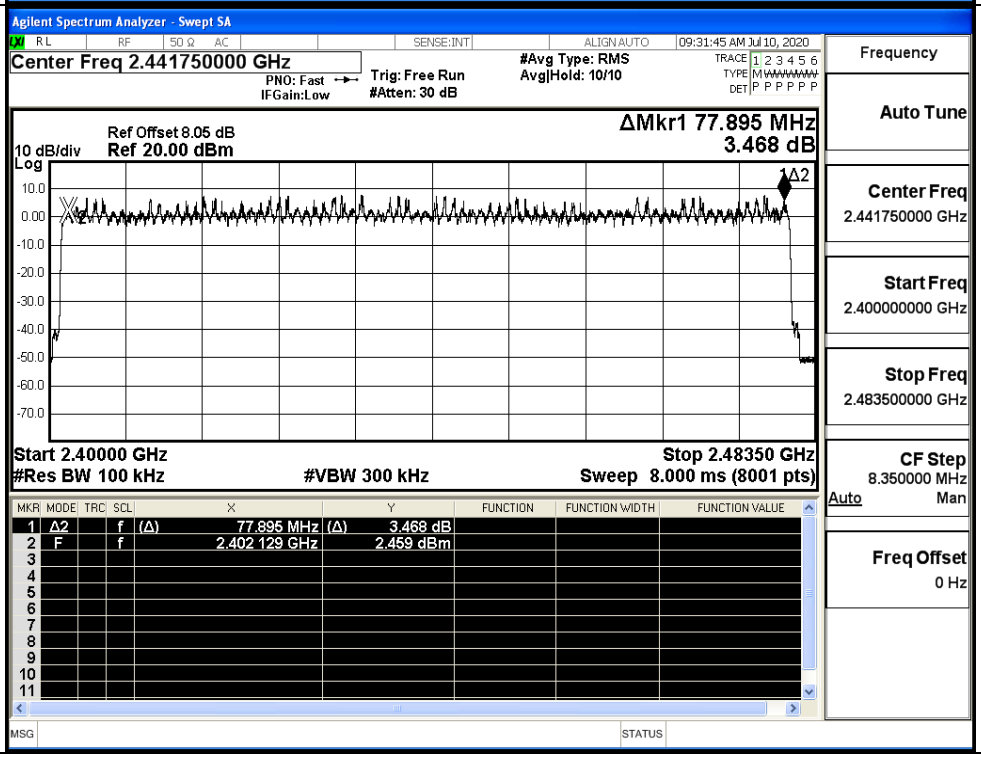
π/4DQPSK/LCH	
π/4DQPSK/MCH	

π/4DQPSK/HCH	

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
09:29:14 AM Jul 10, 2020
Center Freq 2.479500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 8.05 dB
10 dB/div
Log
Ref 20.00 dBm
ΔMkr1 1.368 MHz
1.195 dB
1Δ2
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.000 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 f (Δ) 1.368 MHz (Δ) 1.195 dB
2 F f 2.478 812 GHz 6.261 dBm
3
4
5
6
7
8
9
10
11
MSG
STATUS
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

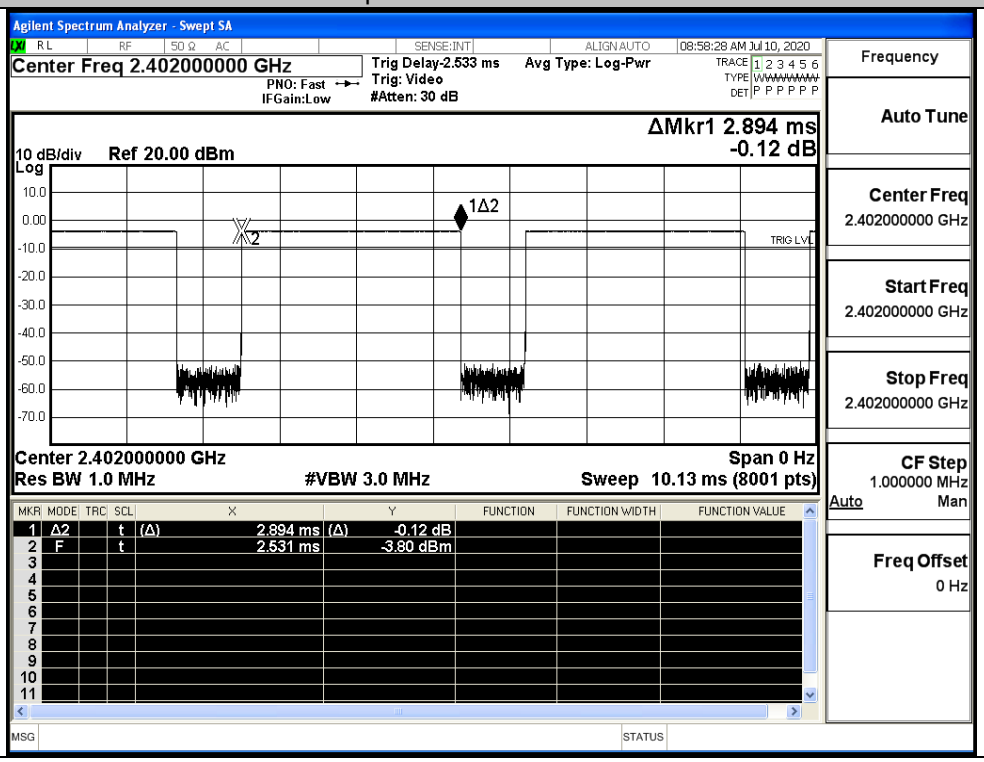
Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

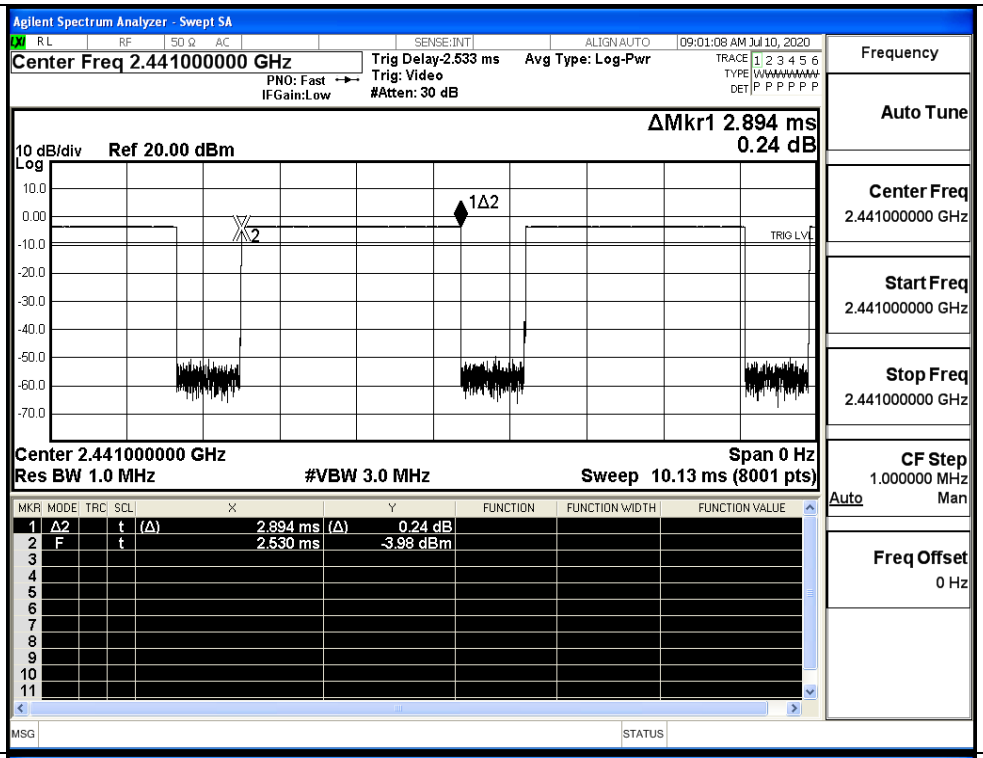
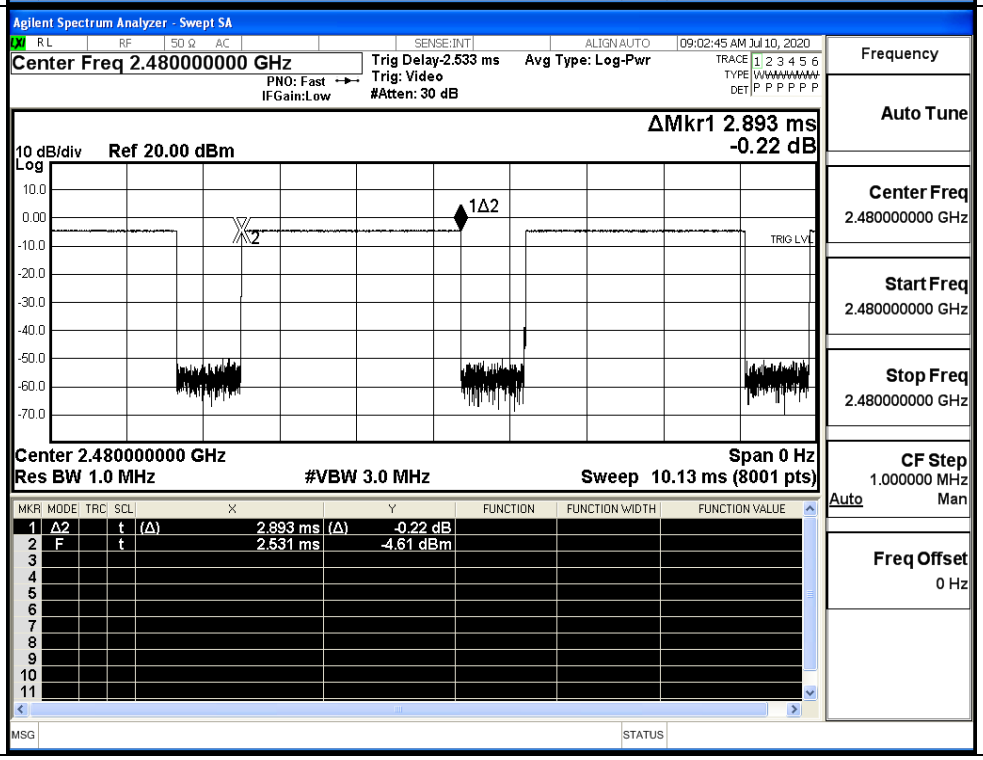
A.5 Dwell Time

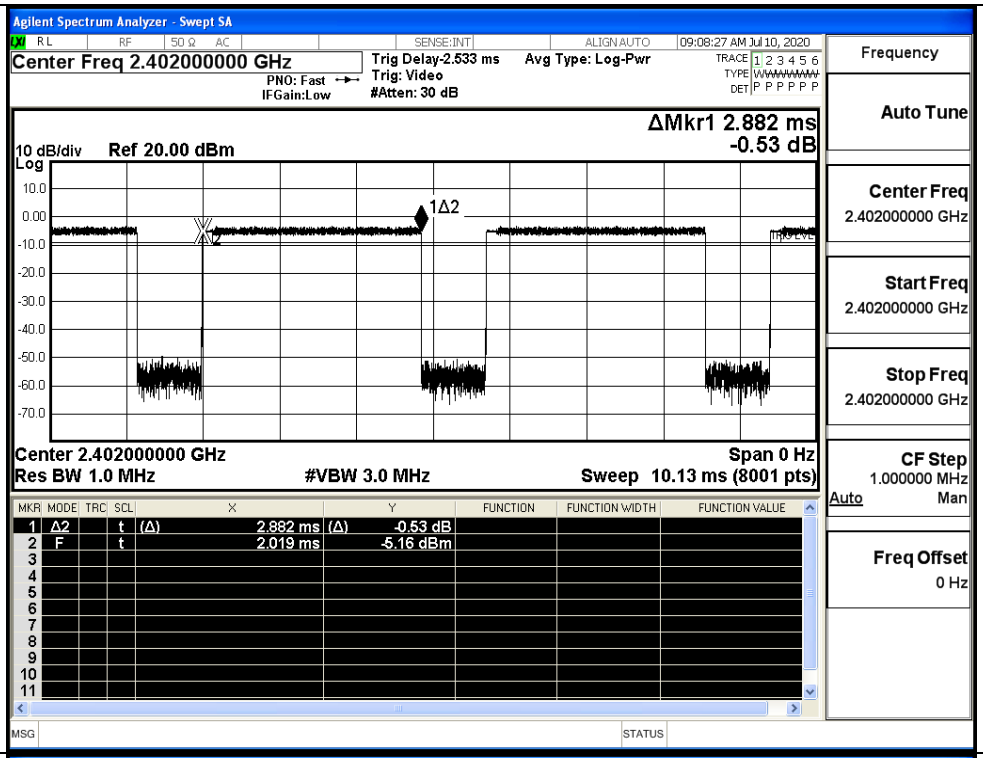
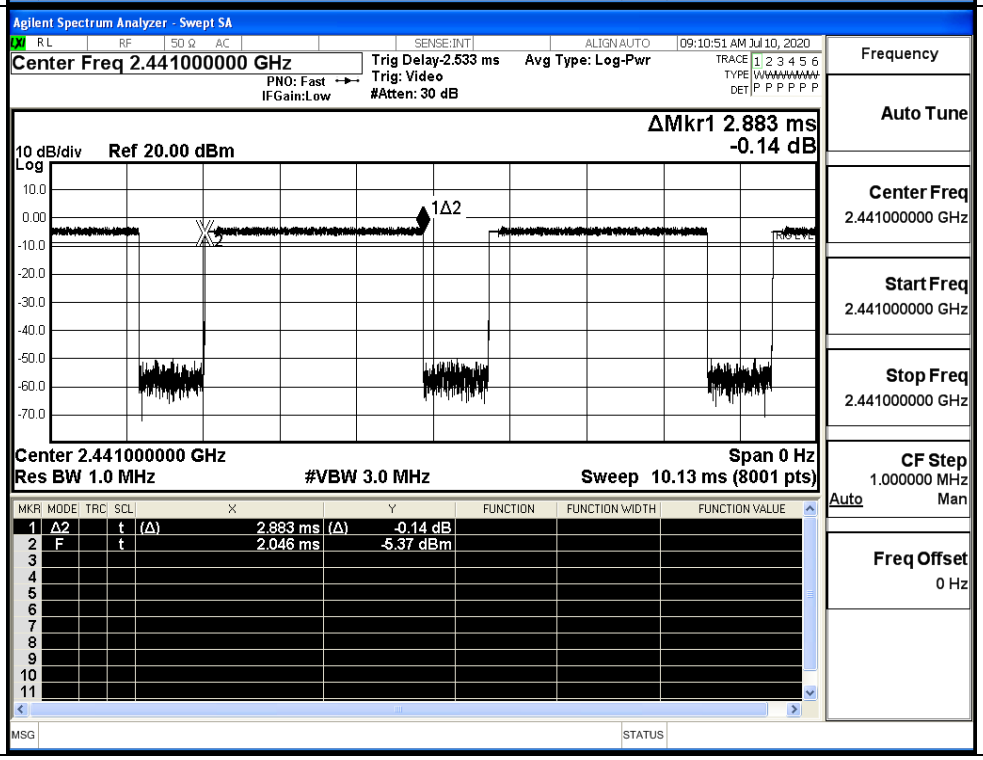
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
π/4DQPSK	2DH5	LCH	2.89	106.7	0.307	0.4	PASS
	2DH5	MCH	2.89	106.7	0.307	0.4	PASS
	2DH5	HCH	2.89	106.7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

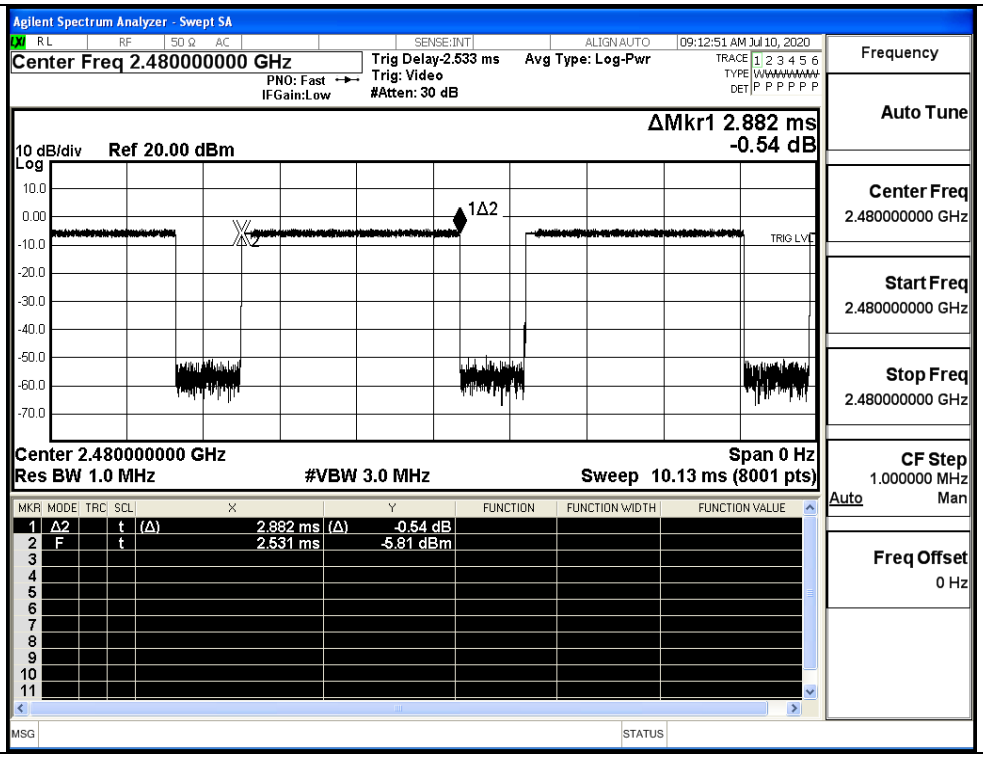
Test Graphs

GFSK_DH5/LCH



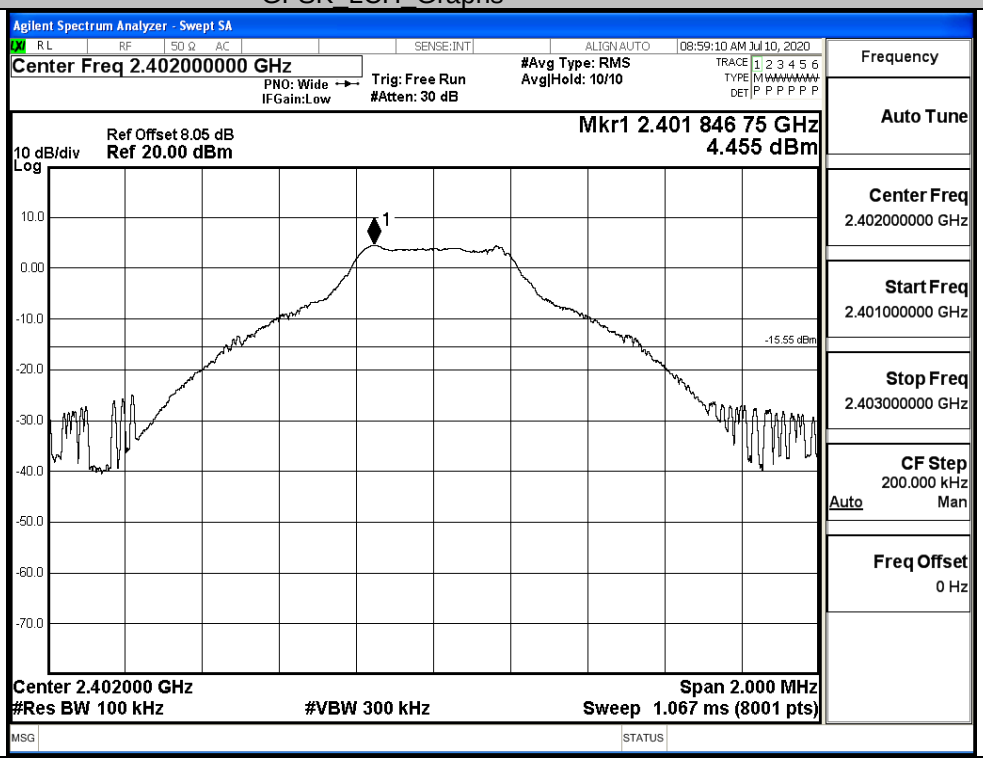
GFSK_DH5/MCH	
GFSK_DH5/HCH	

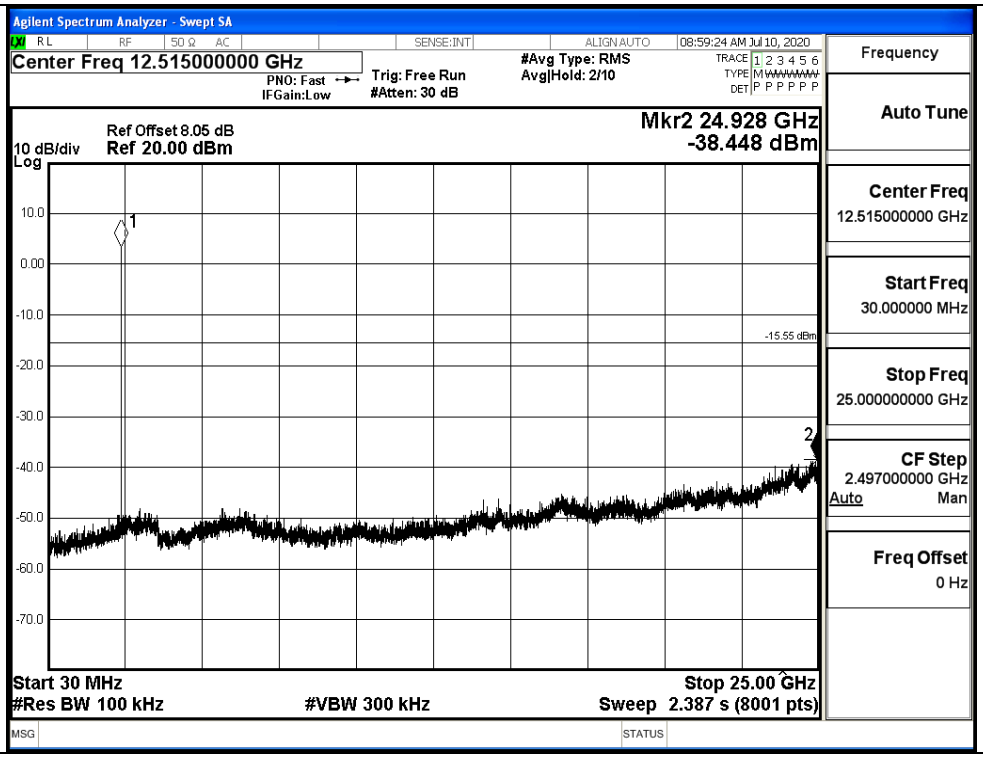
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

π/4DQPSK _2DH5/HCH	

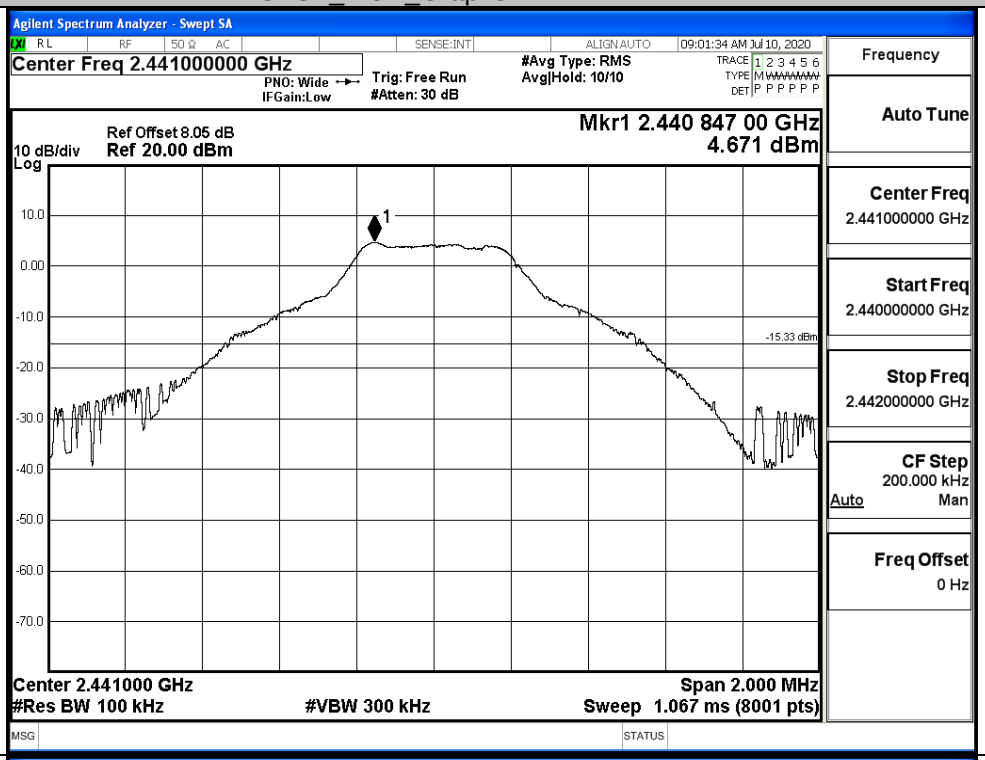
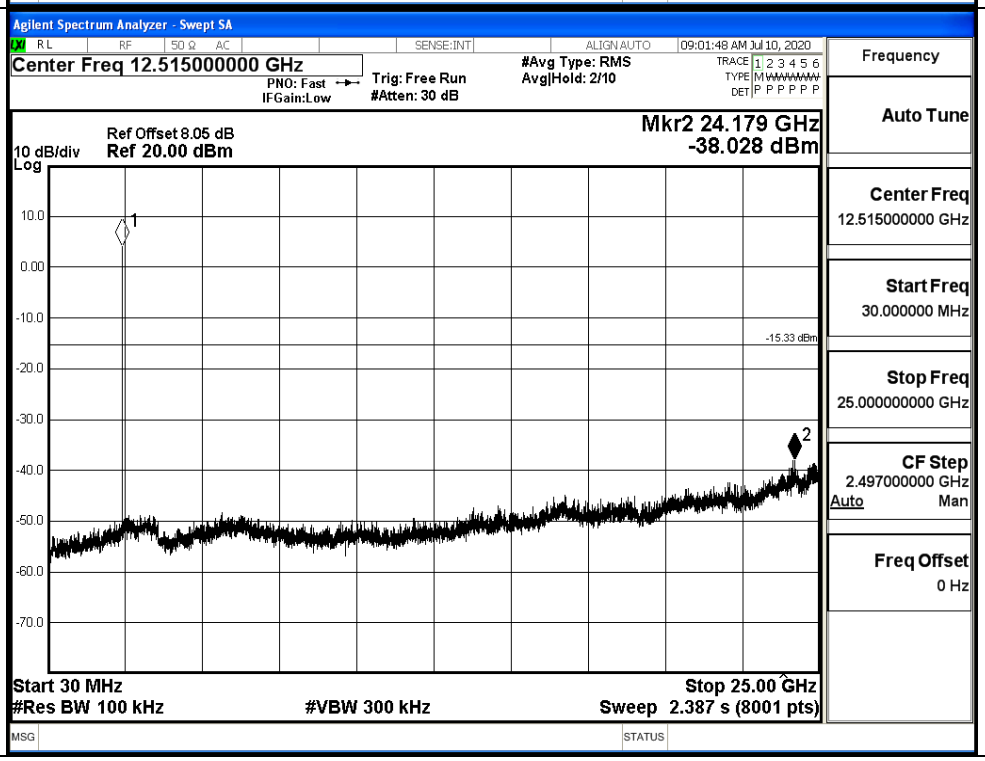
A.6 RF Conducted Spurious Emissions

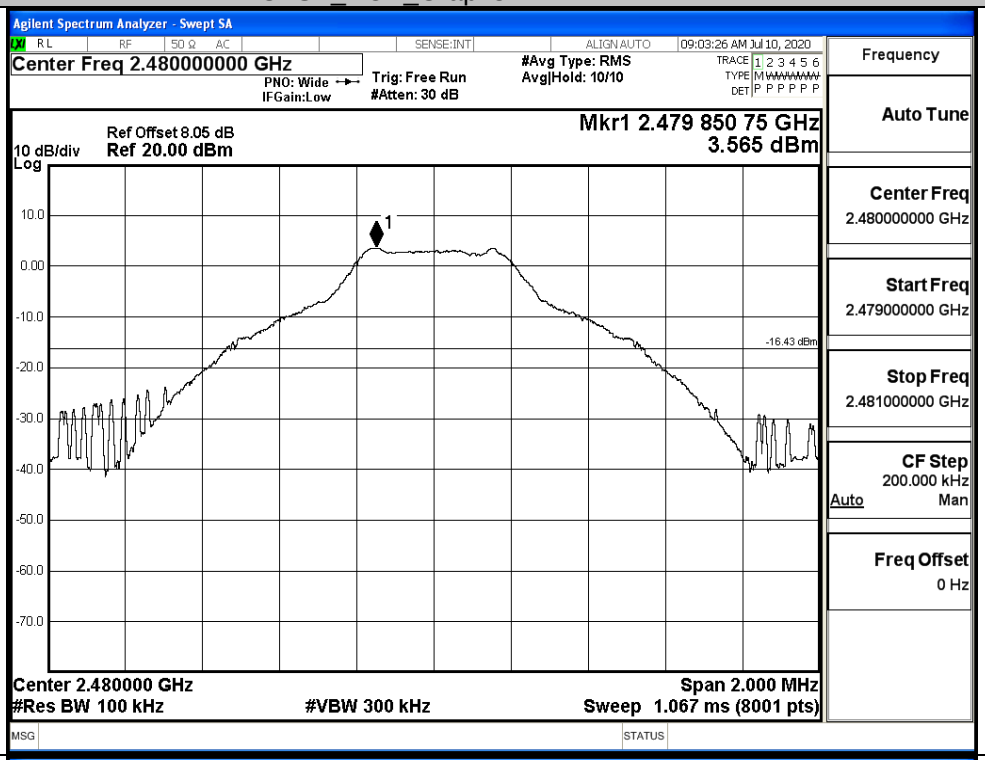
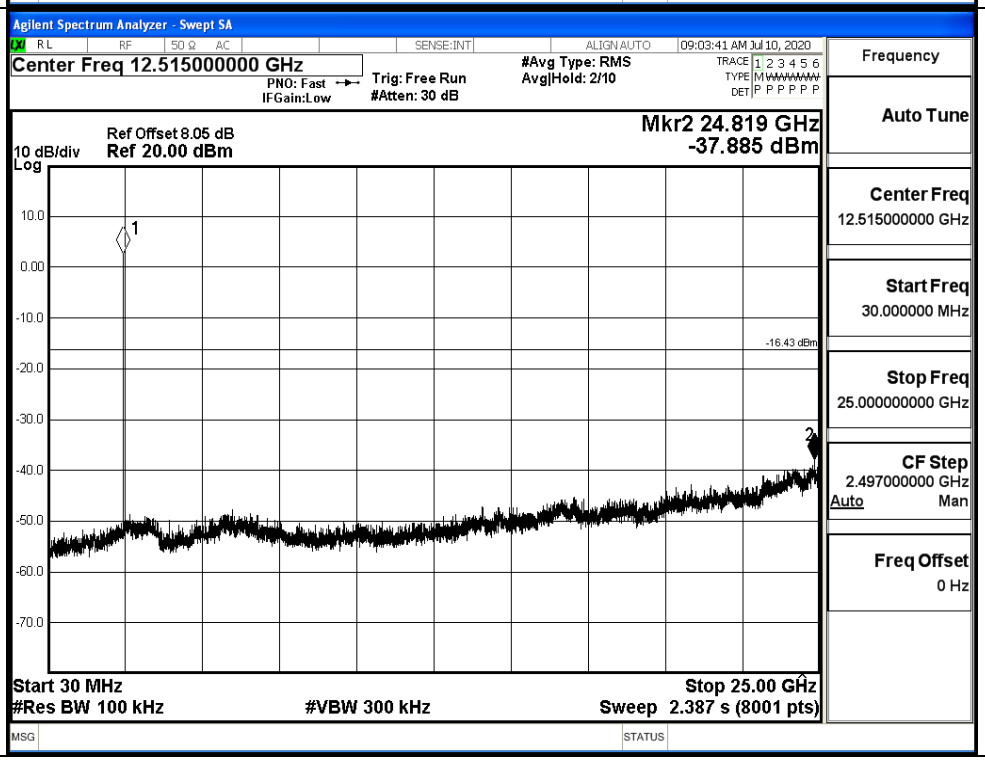
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.455	-38.448	-15.545	PASS
	MCH	4.671	-38.028	-15.329	PASS
	HCH	3.565	-37.885	-16.435	PASS
π/4DQPSK	LCH	3.165	-37.363	-16.835	PASS
	MCH	3.088	-38.497	-16.912	PASS
	HCH	2.44	-37.686	-17.560	PASS

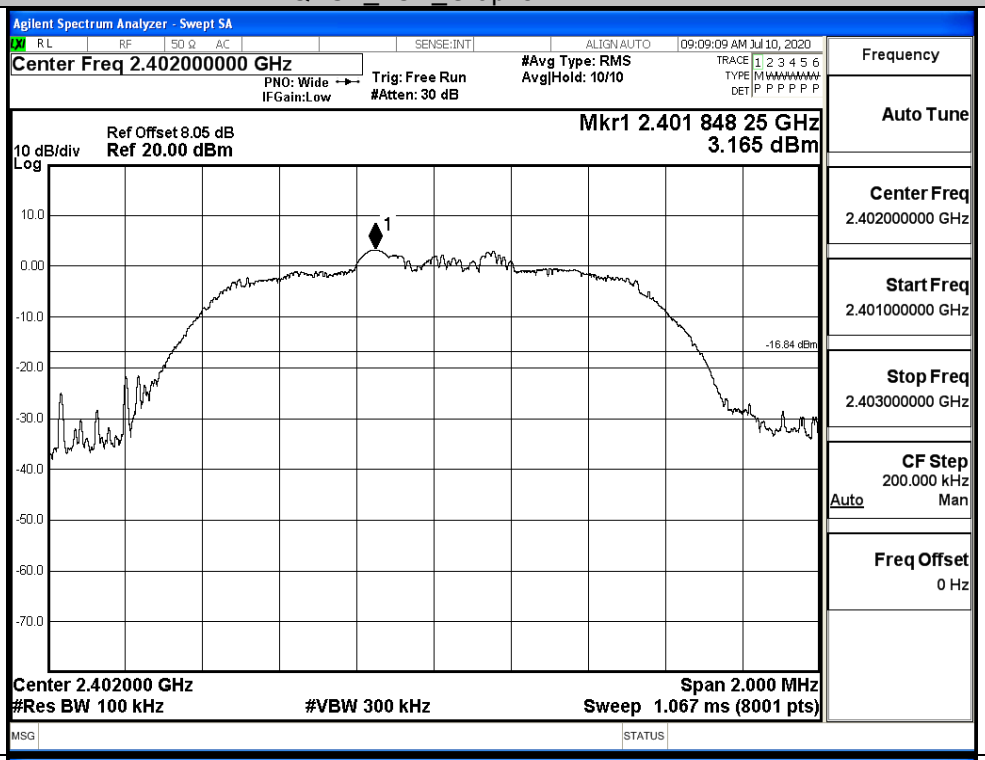
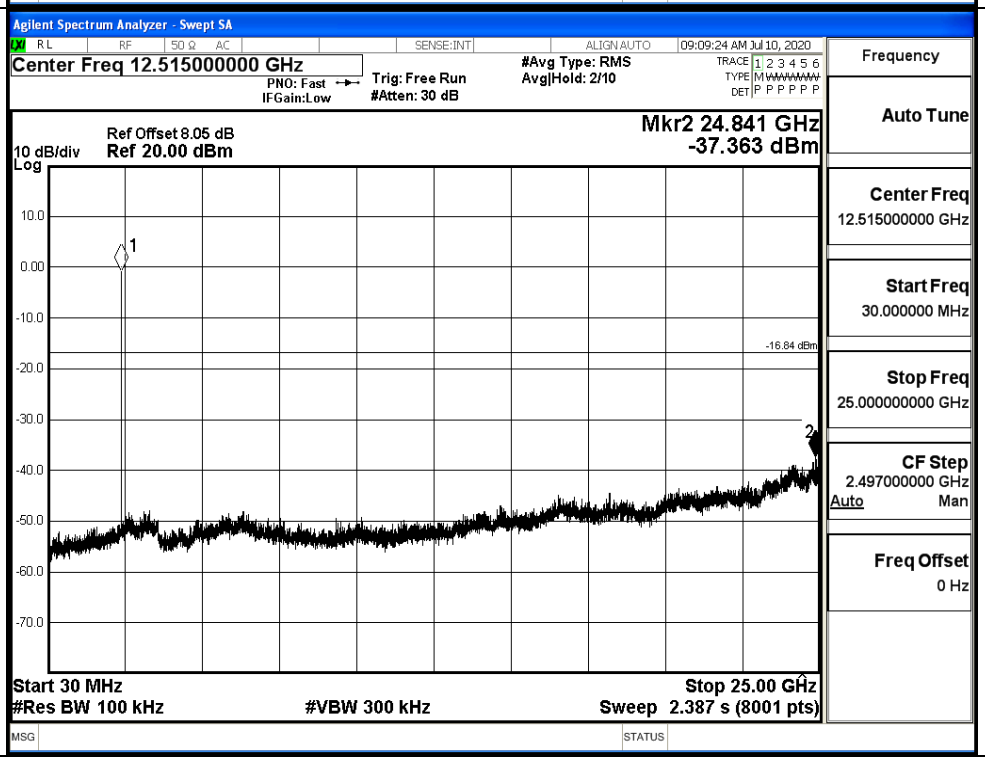
GFSK_LCH_Graphs	
Pref	

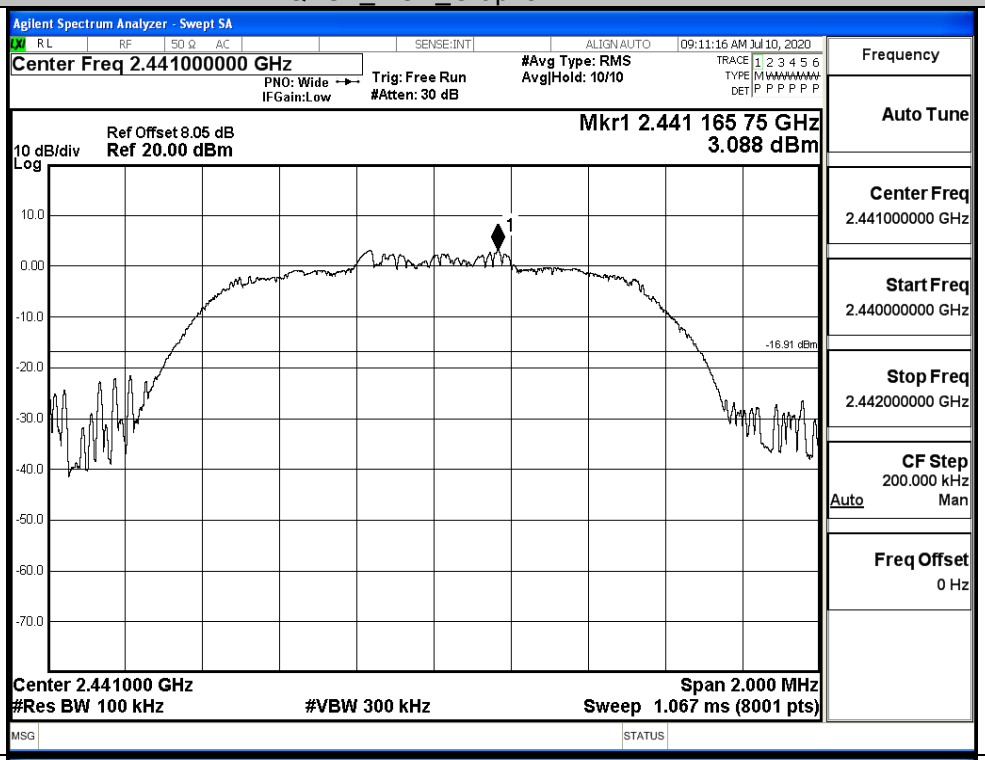
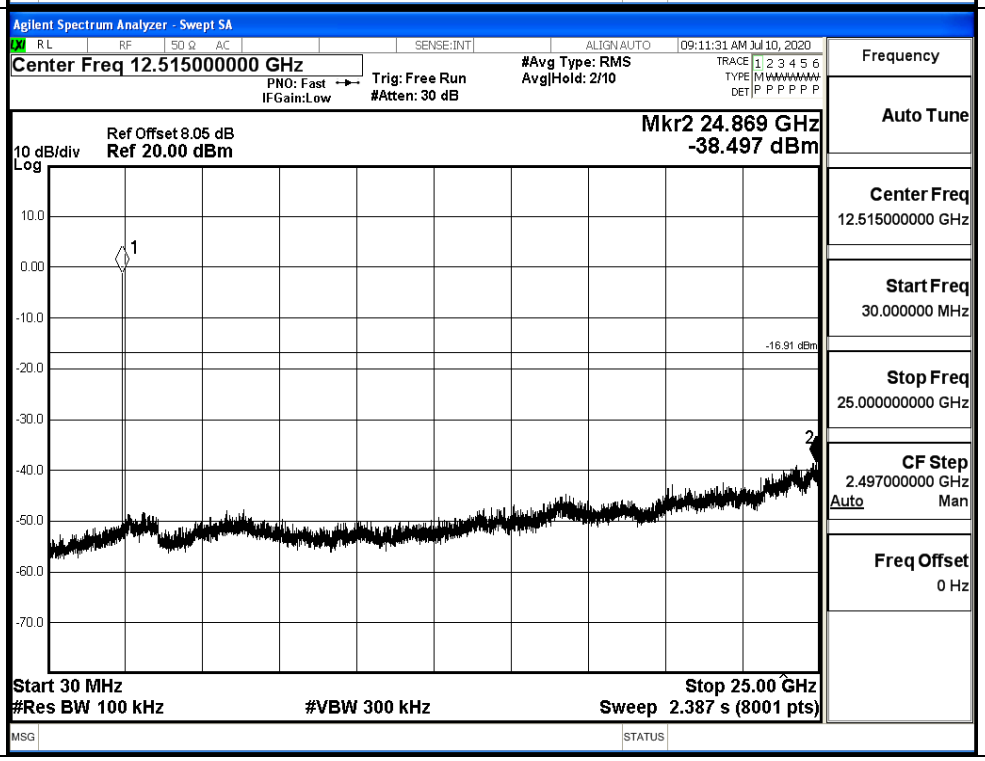
Puw		

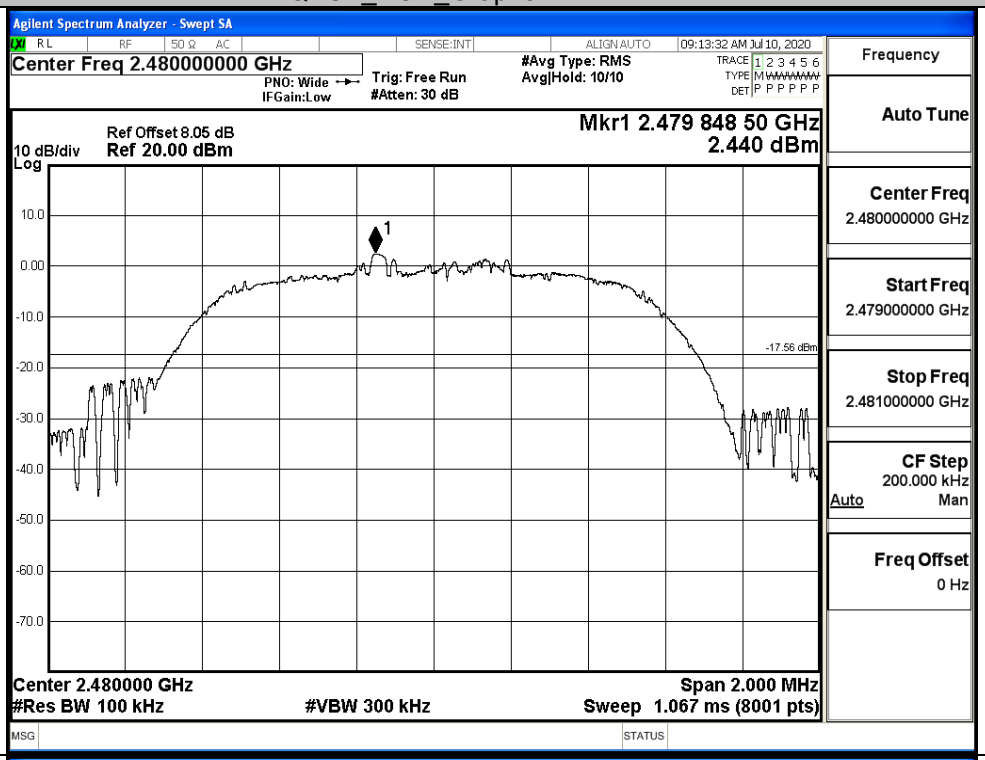
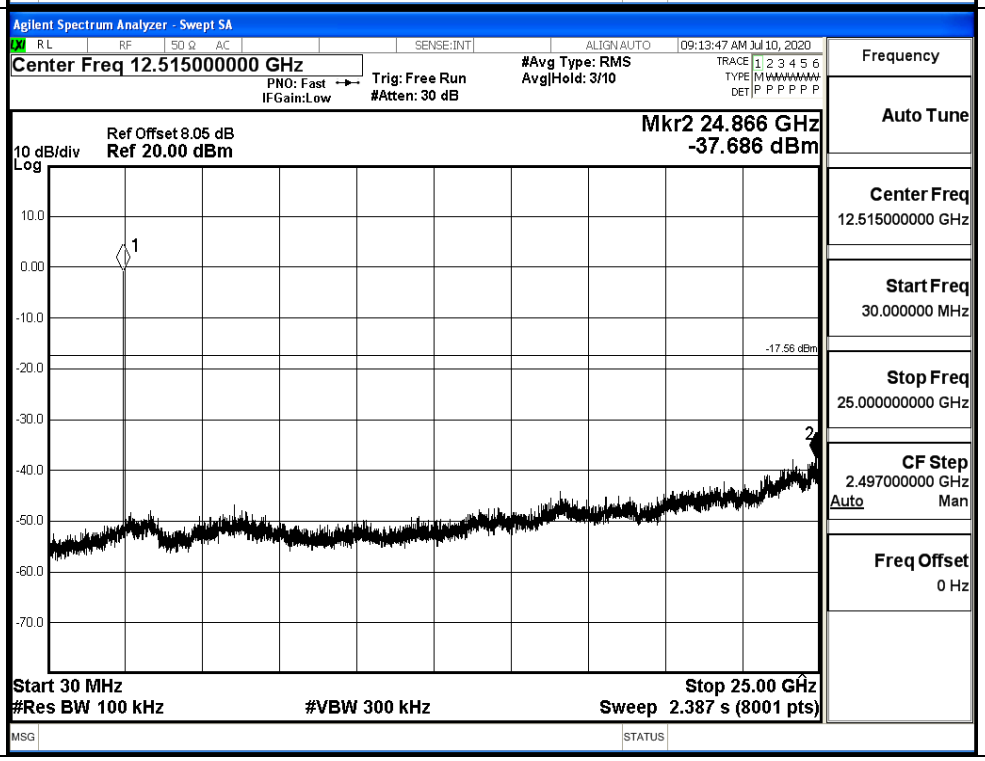
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
08:59:24 AM Jul 10, 2020
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 2/10
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 8.05 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr2 24.928 GHz
-38.448 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-15.55 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
MSG
STATUS
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			

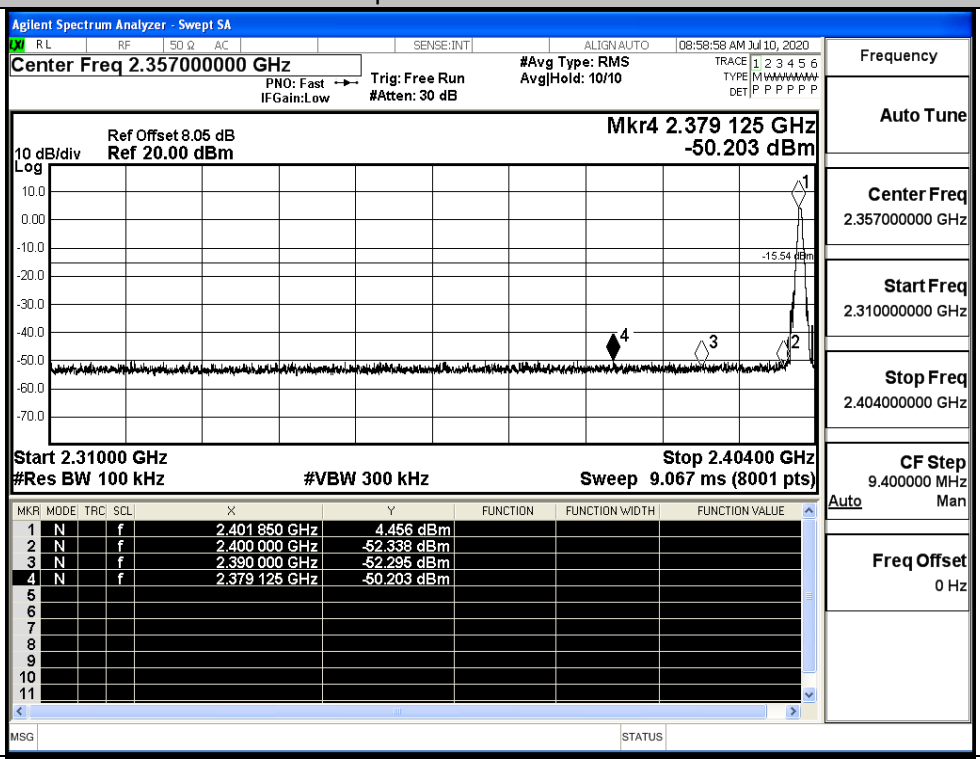
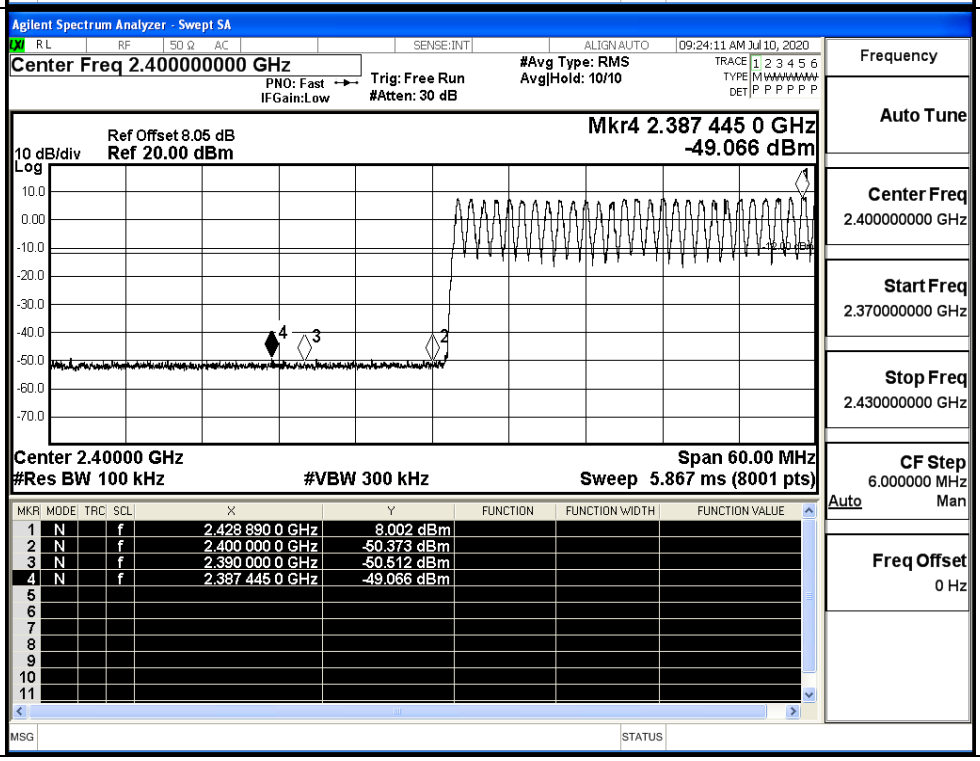
π/4DQPSK_LCH_Graphs			
Pref			
Puw			

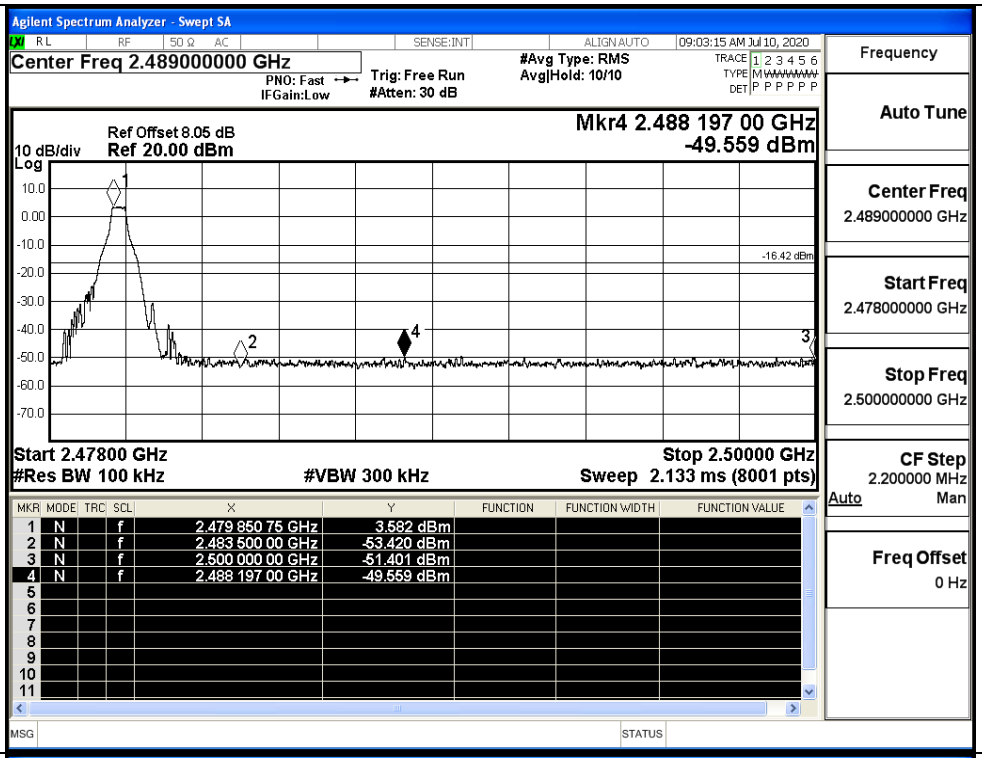
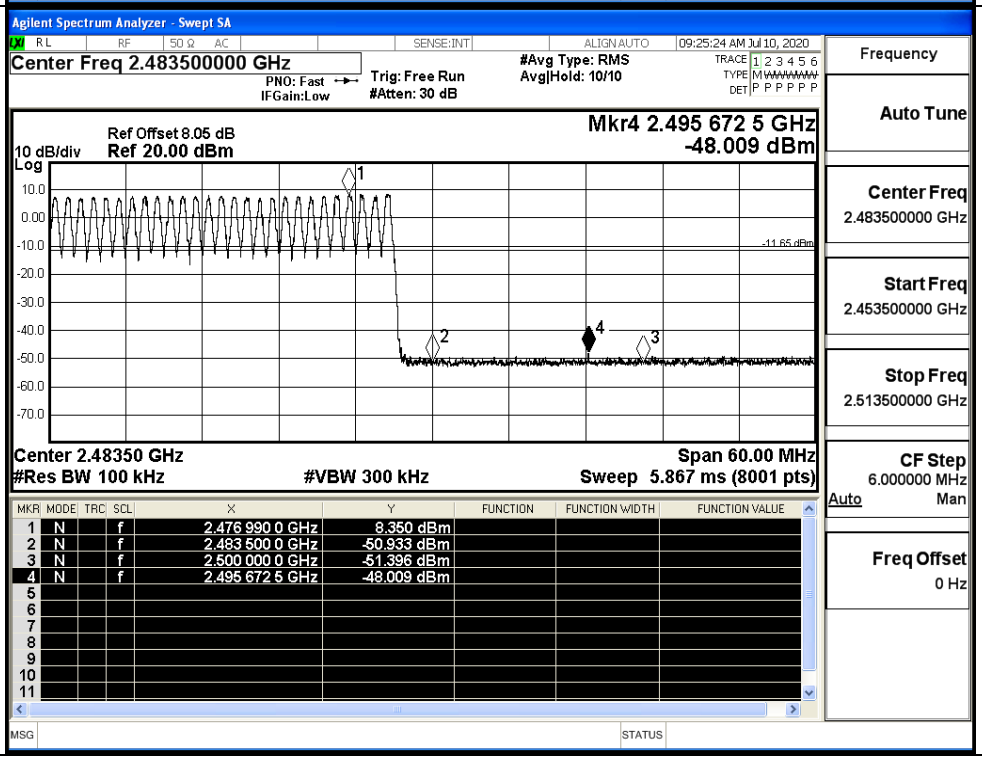
π/4DQPSK_MCH_Graphs			
Pref			
Puw			

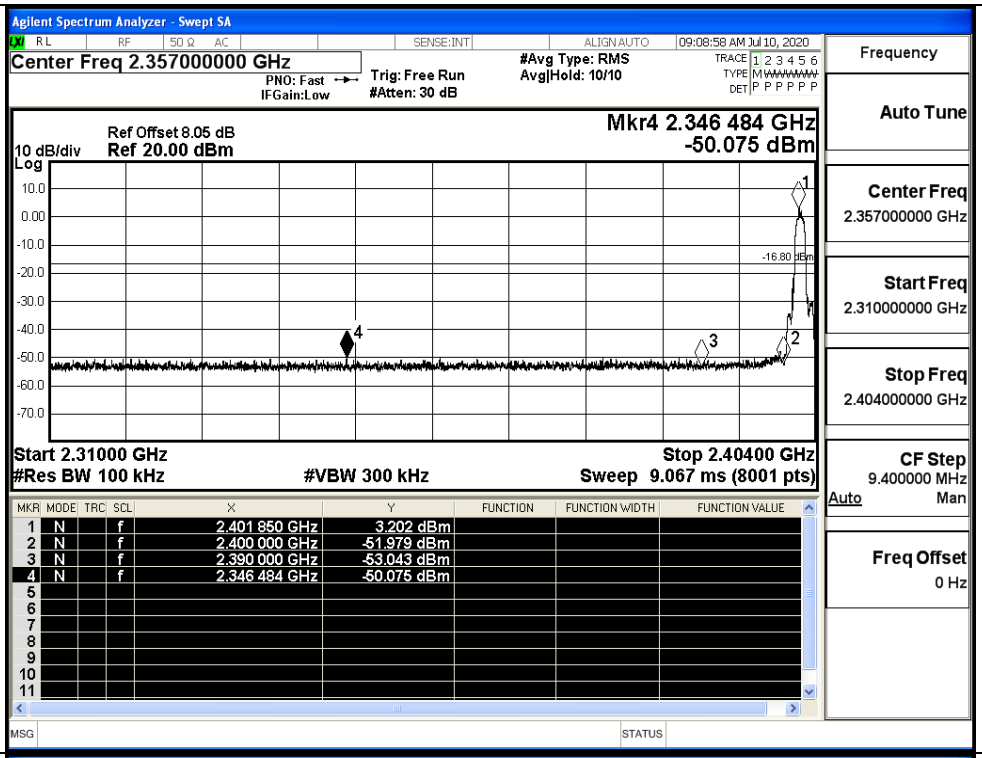
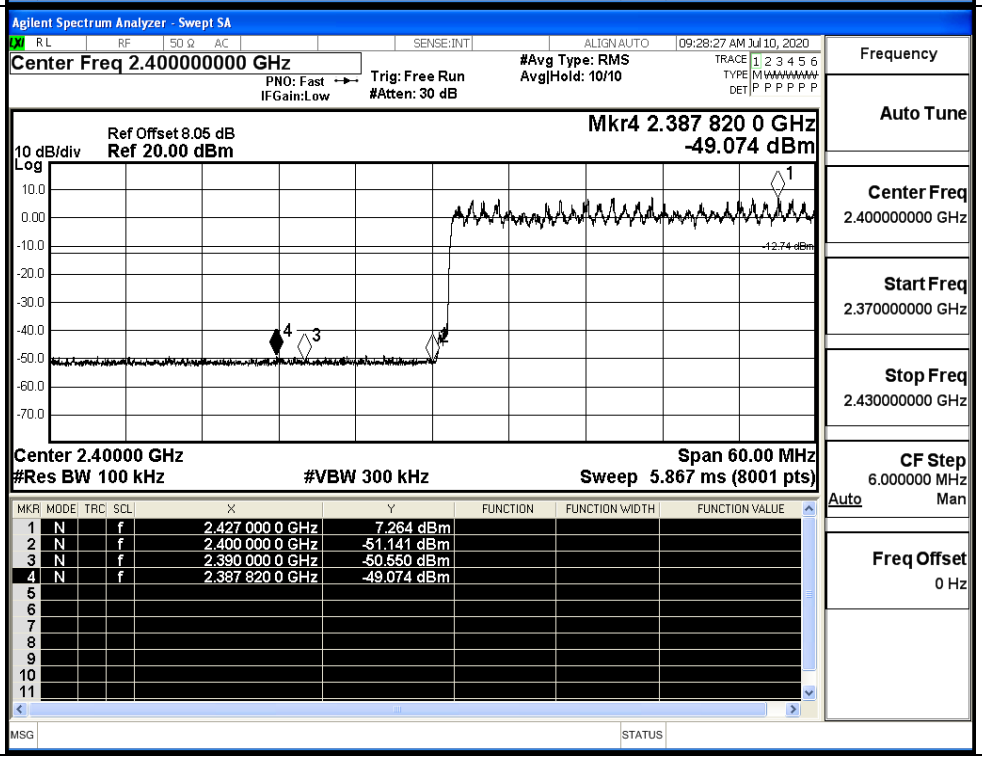
π/4DQPSK_HCH_Graphs			
Pref			
Puw			

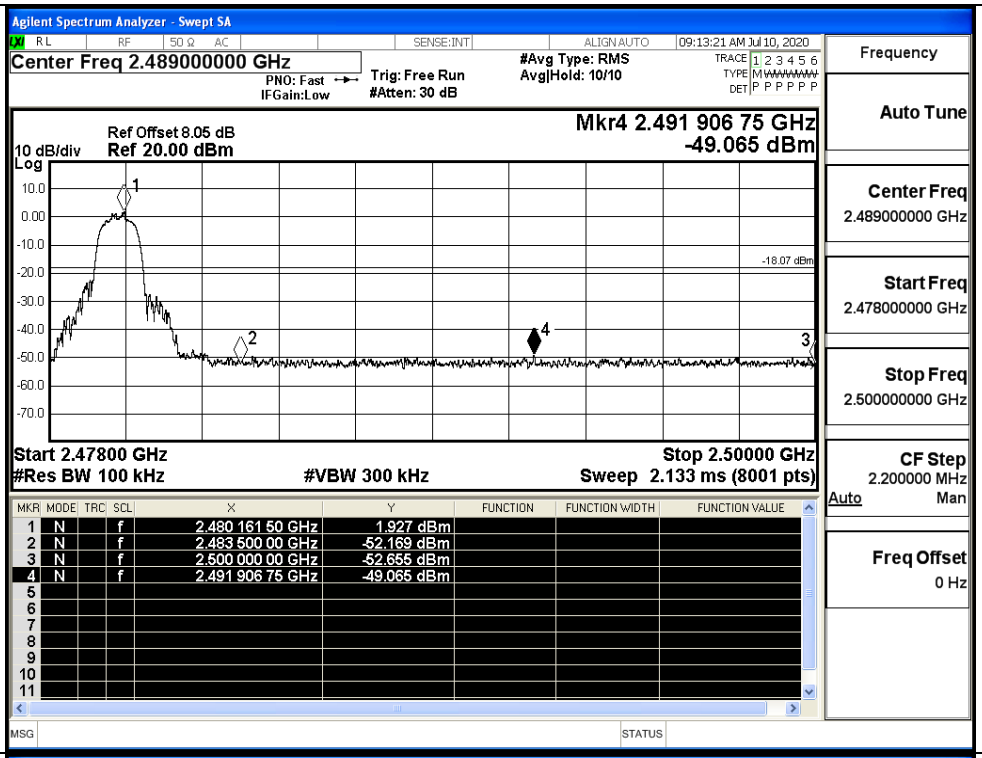
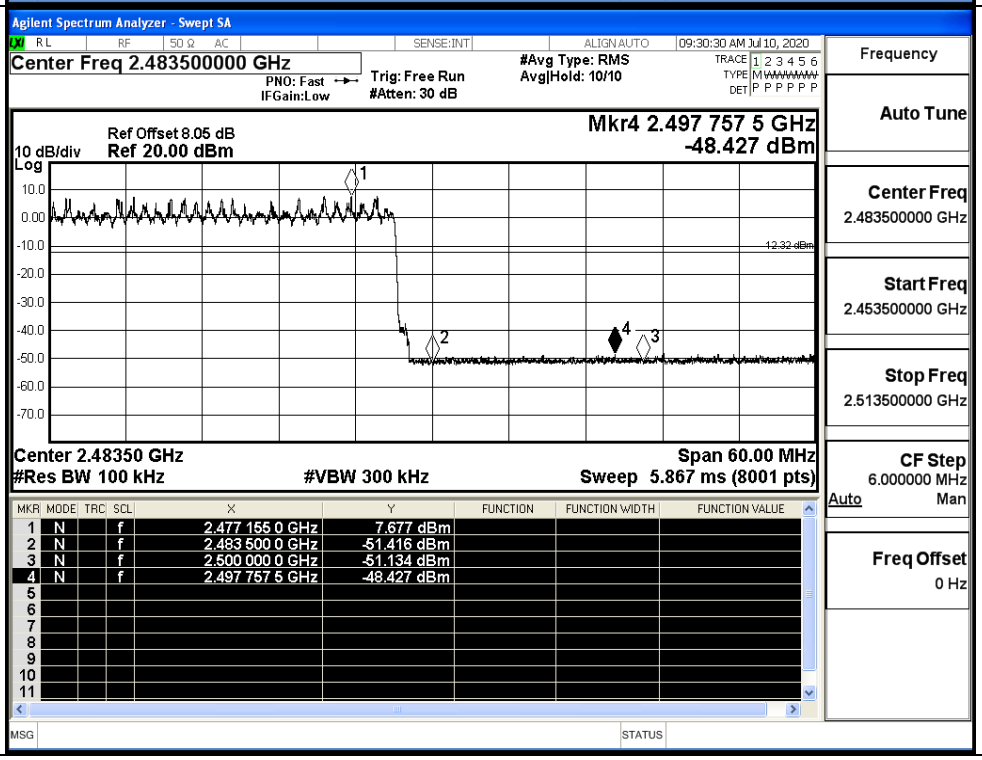
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.456	Off	-50.203	-15.54	PASS
			8.002	On	-49.066	-12	PASS
	HCH	2480	3.582	Off	-49.559	-16.42	PASS
			8.350	On	-48.009	-11.65	PASS
π/4DQPSK	LCH	2402	3.202	Off	-50.075	-16.8	PASS
			7.264	On	-49.074	-12.74	PASS
	HCH	2480	1.927	Off	-49.065	-18.07	PASS
			7.677	On	-48.427	-12.32	PASS

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

GFSK/HCH/No Hop	
GFSK/HCH/Hop	

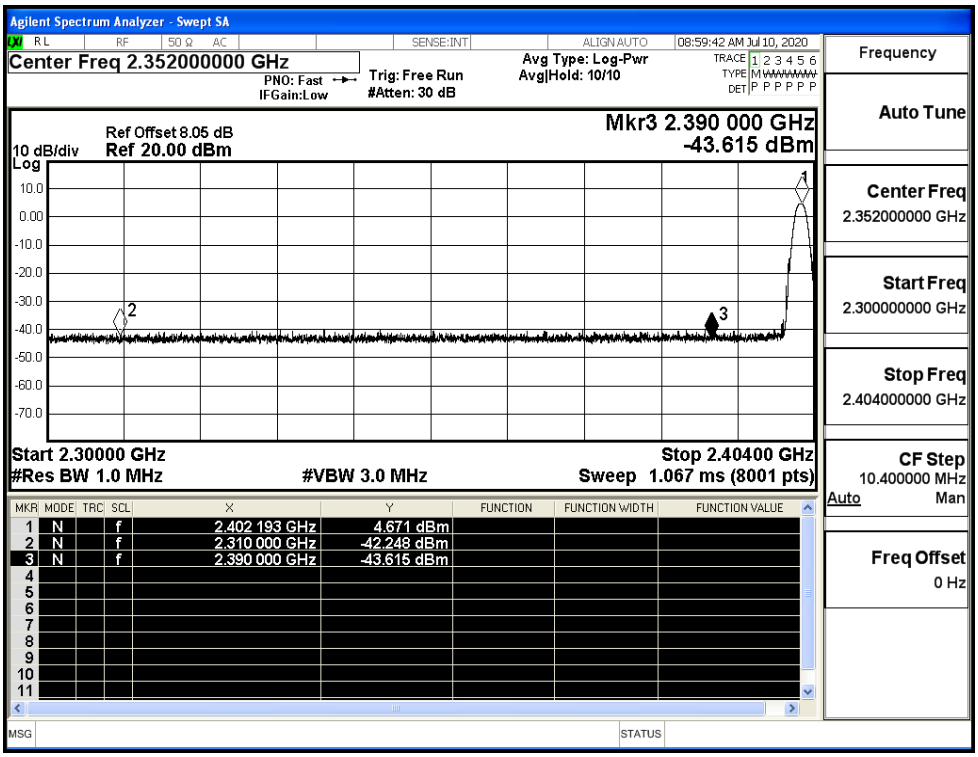
π/4DQPSK/LCH/No Hop	
π/4DQPSK/LCH/Hop	

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

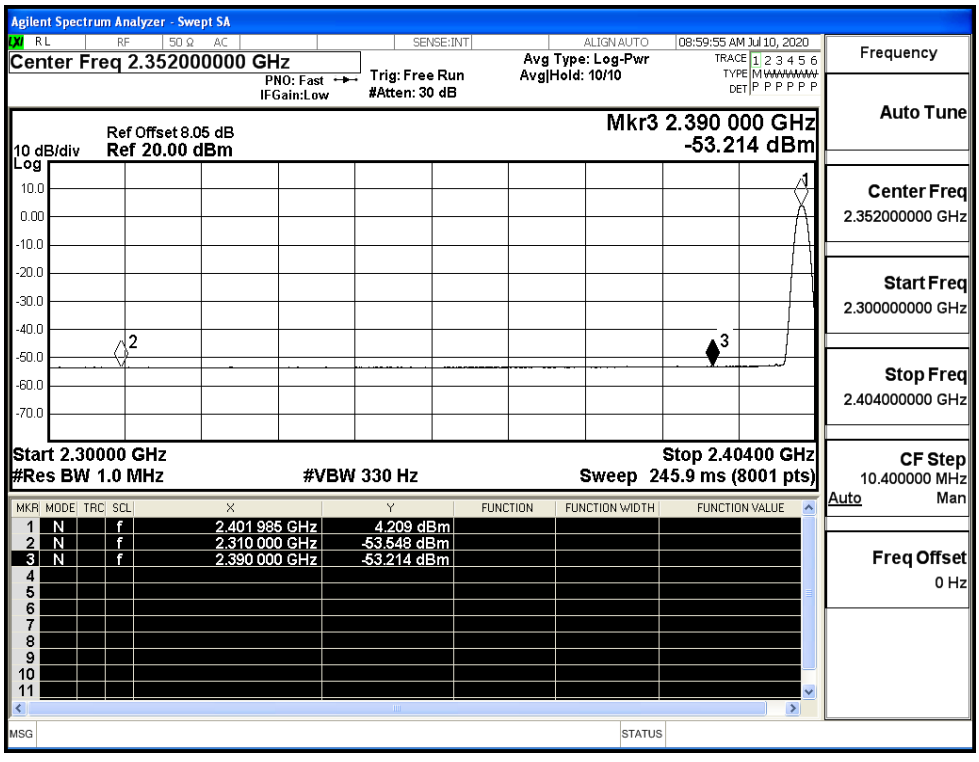
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.25	2.0	0	54.98	PEAK	74	PASS
	Off	2310.0	-53.55	2.0	0	43.68	AV	54	PASS
	Off	2390.0	-43.62	2.0	0	53.61	PEAK	74	PASS
	Off	2390.0	-53.21	2.0	0	44.02	AV	54	PASS
	Off	2483.5	-41.97	2.0	0	55.26	PEAK	74	PASS
	Off	2483.5	-52.57	2.0	0	44.66	AV	54	PASS
	Off	2500.0	-42.81	2.0	0	54.42	PEAK	74	PASS
	Off	2500.0	-52.57	2.0	0	44.66	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.77	2.0	0	54.46	PEAK	74	PASS
	Off	2310.0	-53.37	2.0	0	43.86	AV	54	PASS
	Off	2390.0	-42.31	2.0	0	54.92	PEAK	74	PASS
	Off	2390.0	-53.17	2.0	0	44.06	AV	54	PASS
	Off	2483.5	-42.80	2.0	0	54.43	PEAK	74	PASS
	Off	2483.5	-52.09	2.0	0	45.14	AV	54	PASS
	Off	2500.0	-41.79	2.0	0	55.44	PEAK	74	PASS
	Off	2500.0	-52.44	2.0	0	44.79	AV	54	PASS

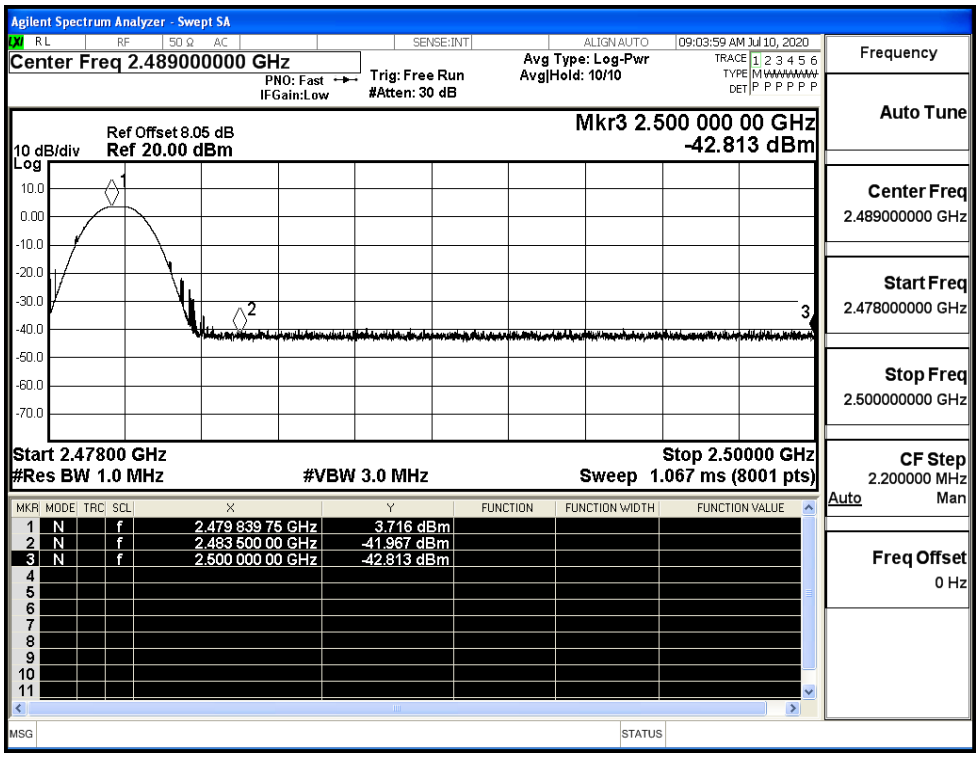
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



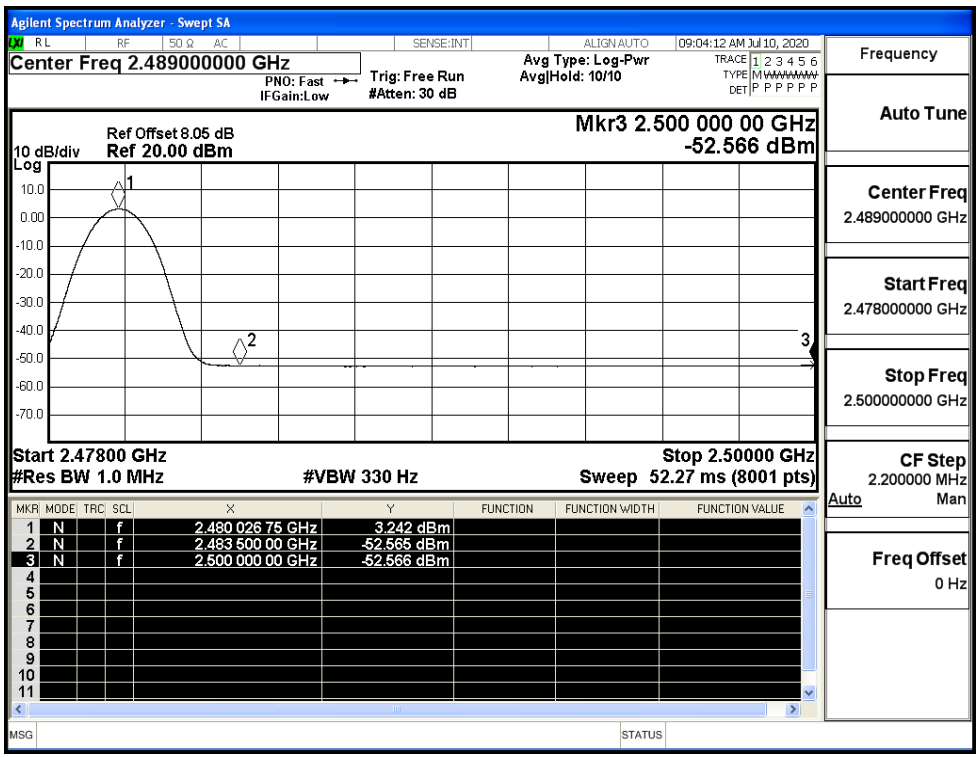
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



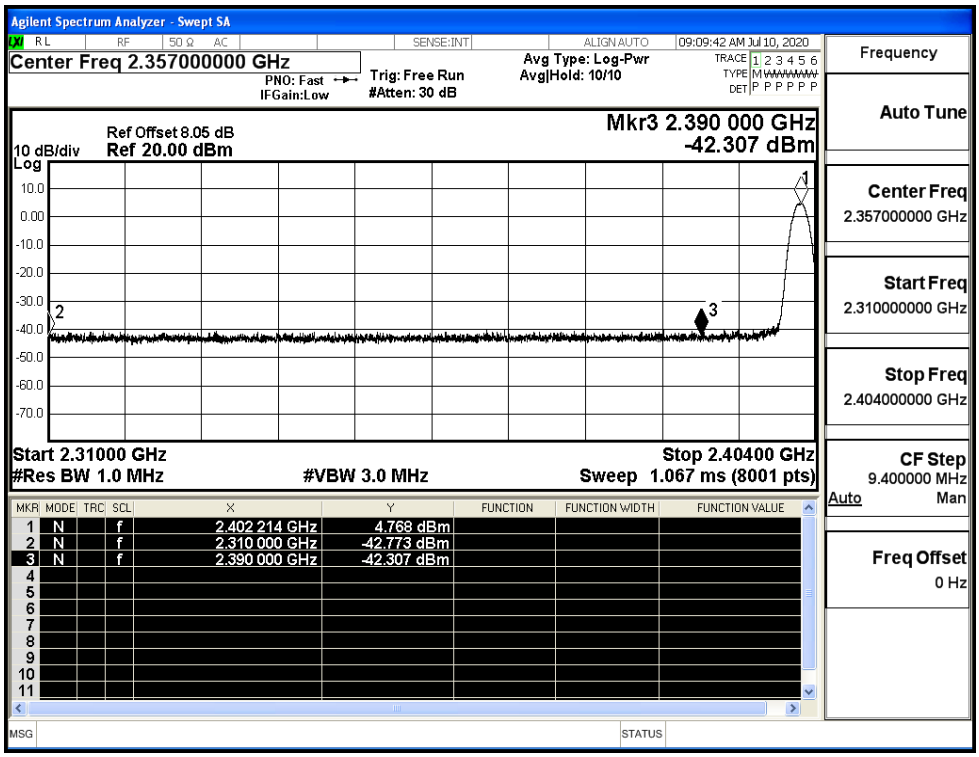
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



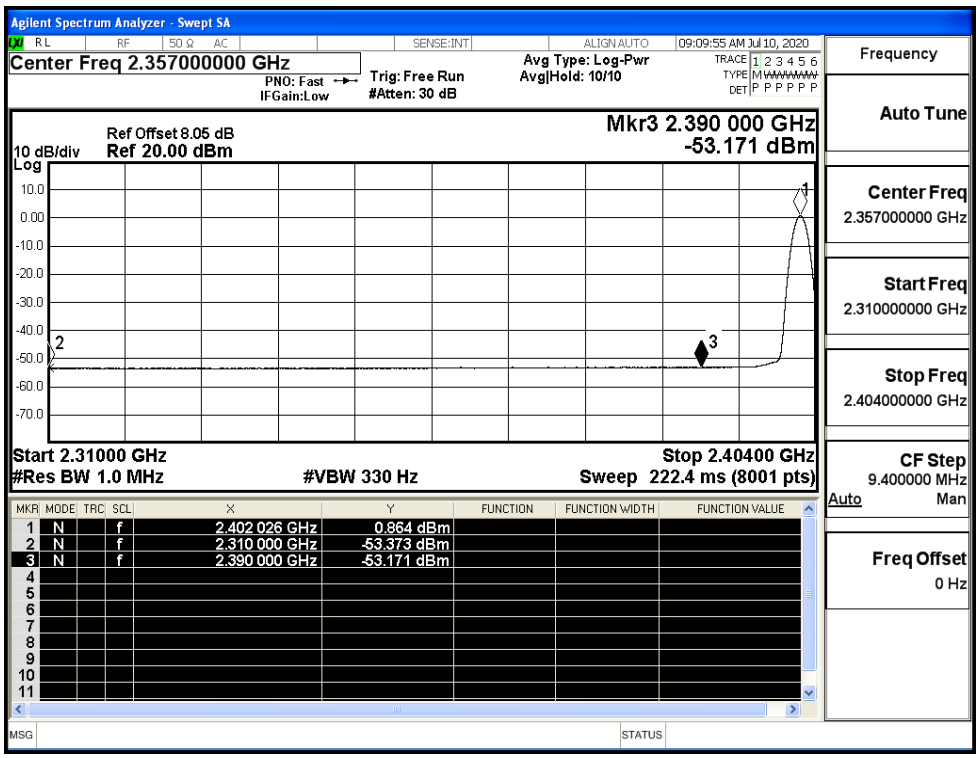
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



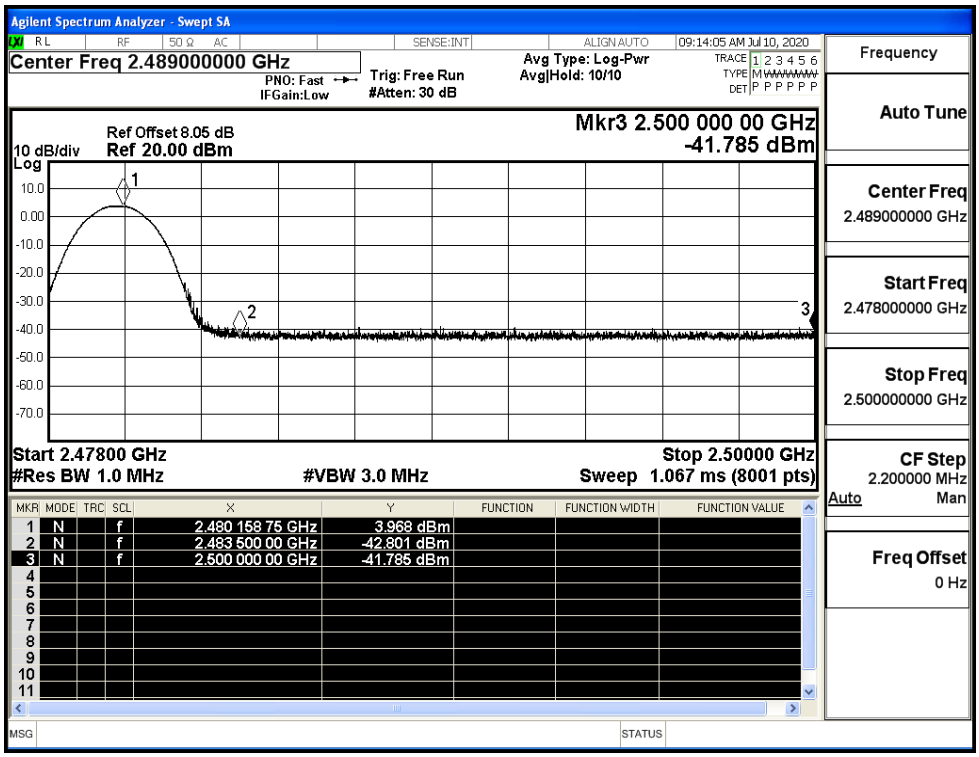
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



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)