Appendix A
RF Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth Earphones
Trade Mark: Altec Lansing

Test Model: MZX857

FCC ID: 2AL9B-MZX857

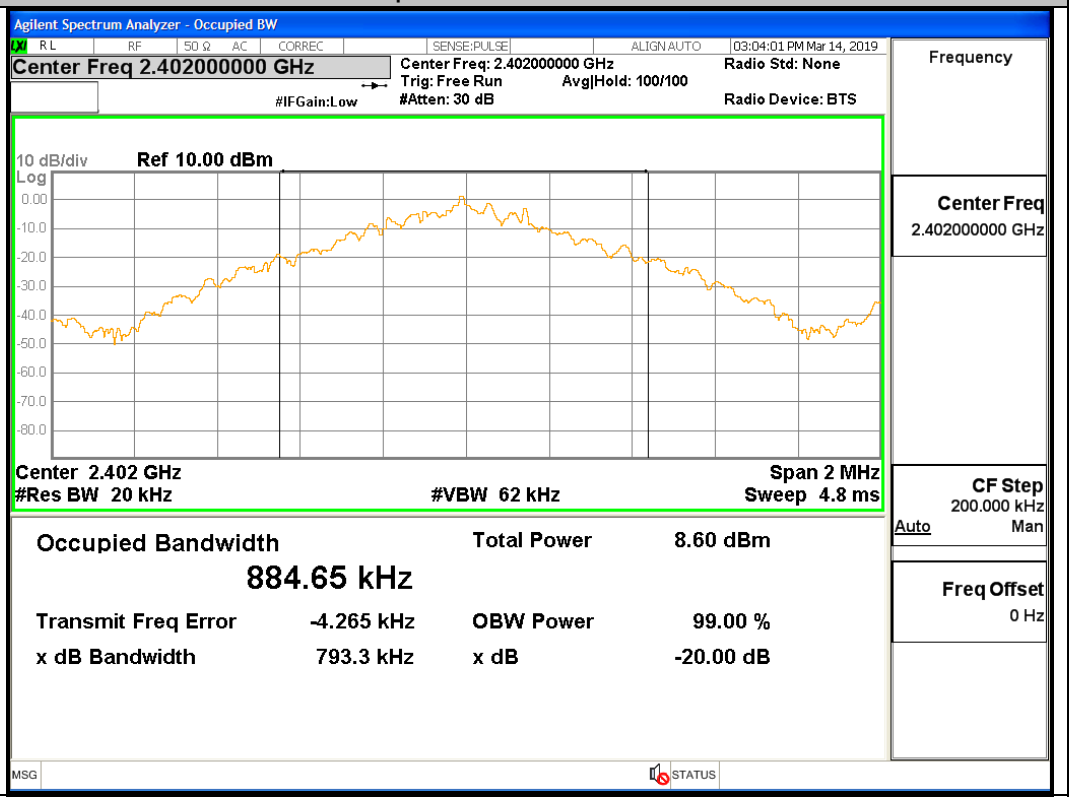
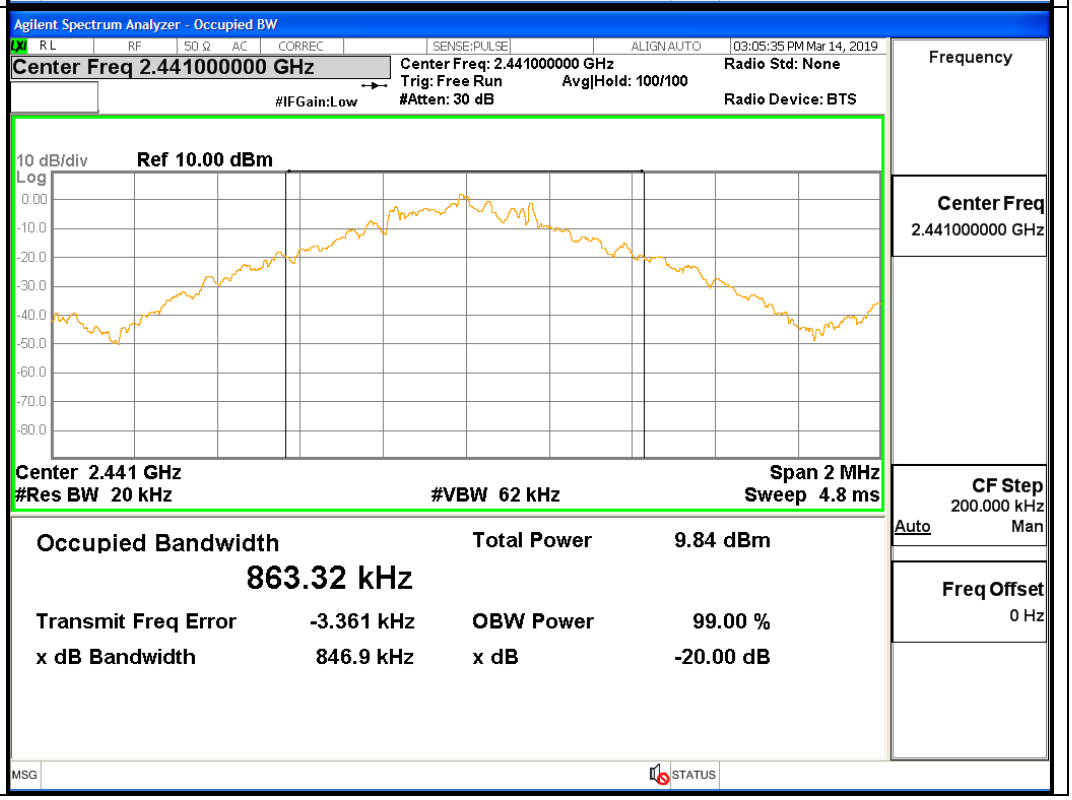
Environmental Conditions

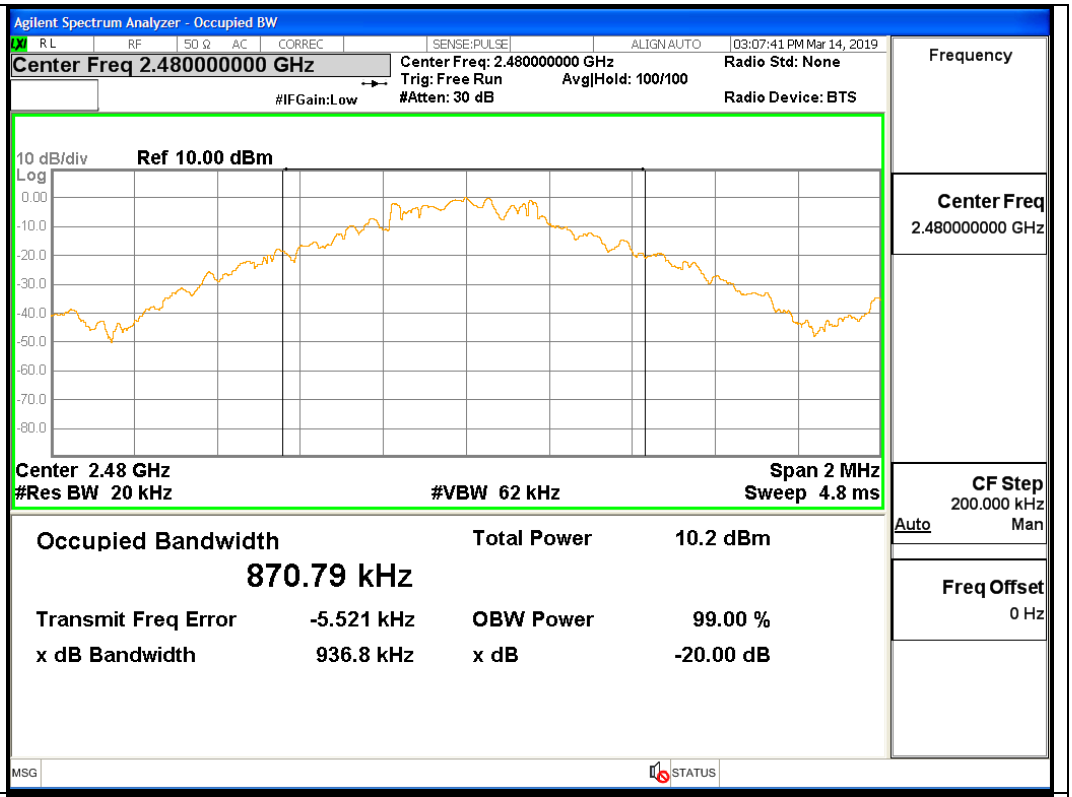
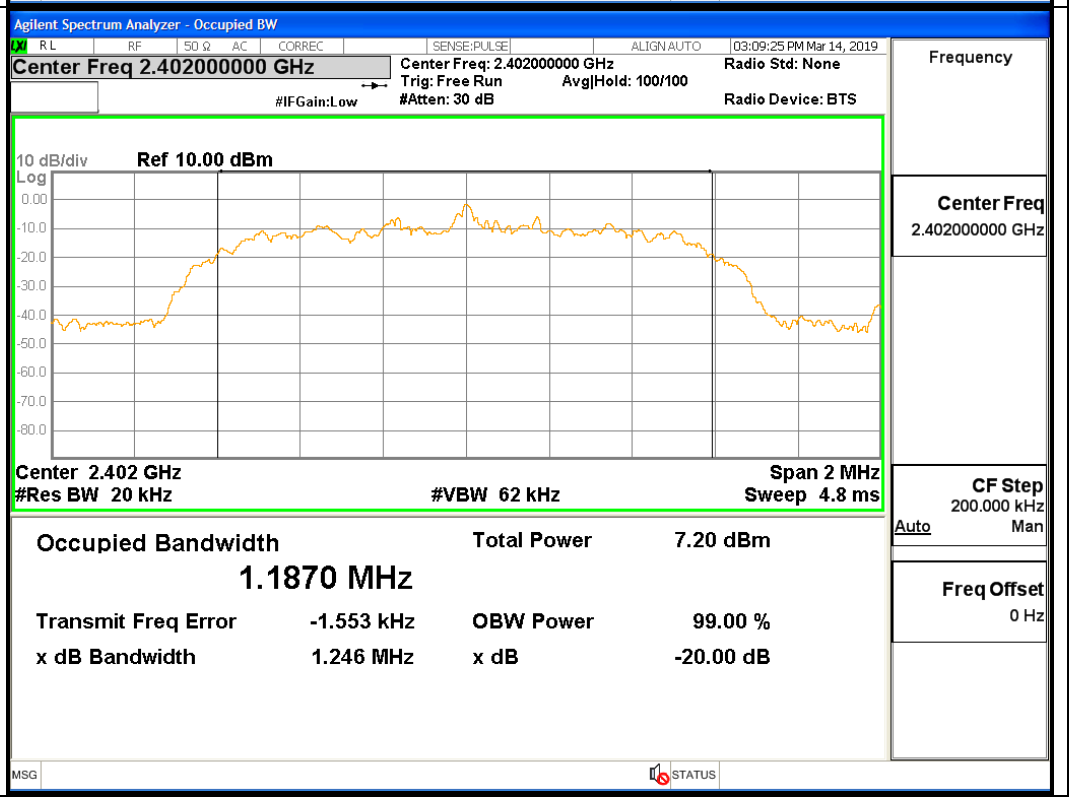
Temperature:	23.1 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

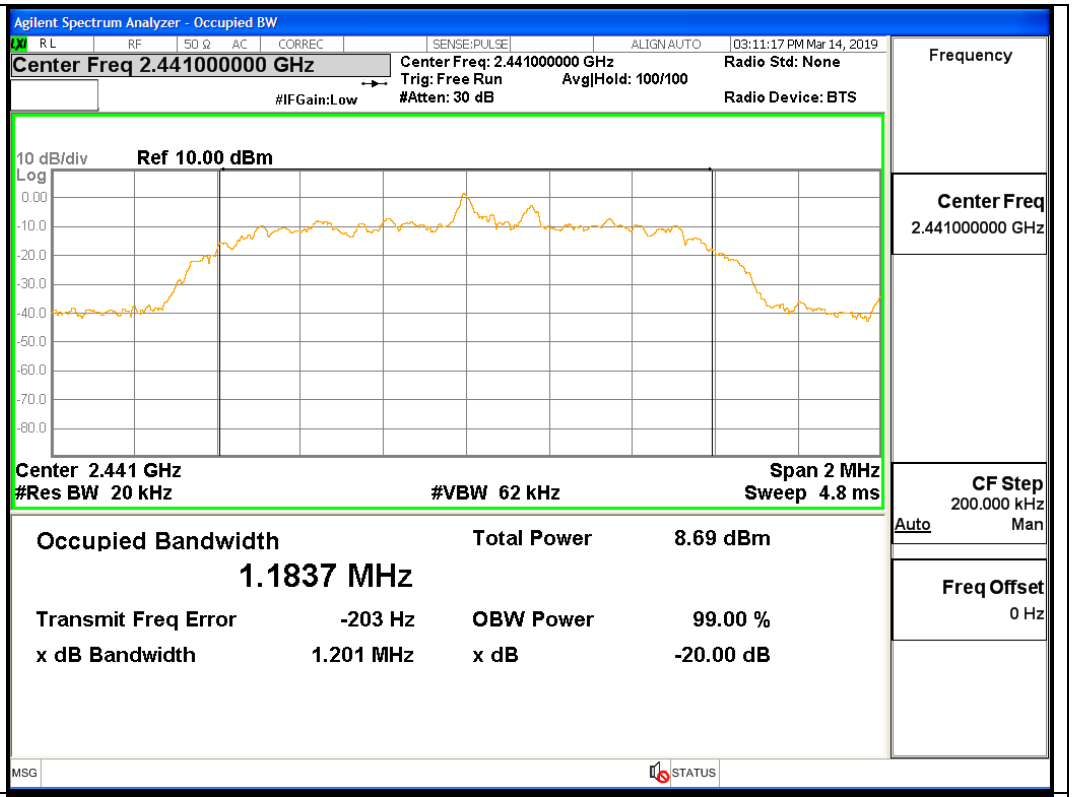
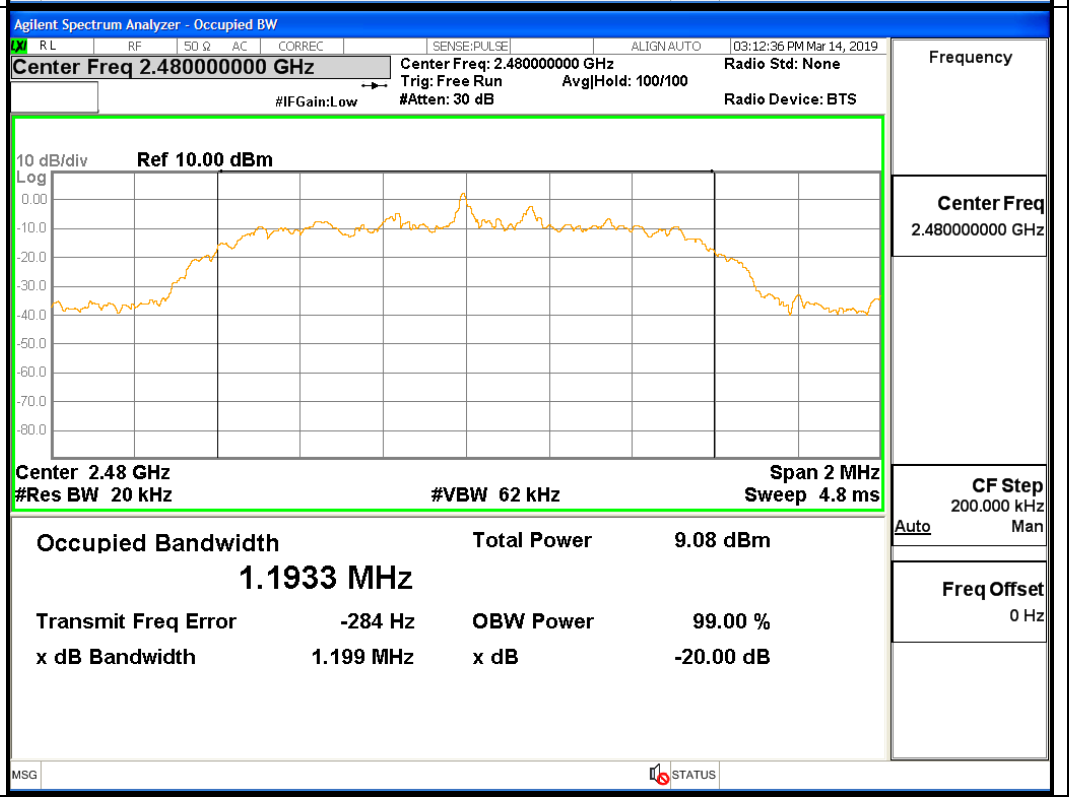
A.1 20 dB Bandwidth

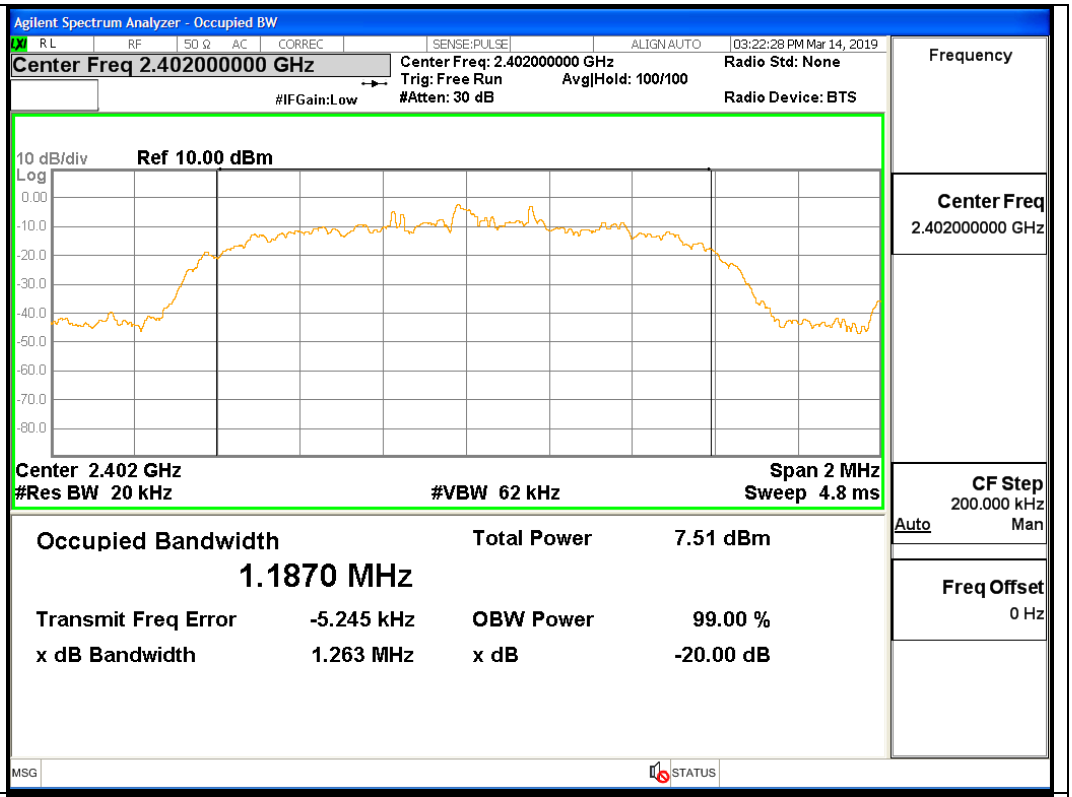
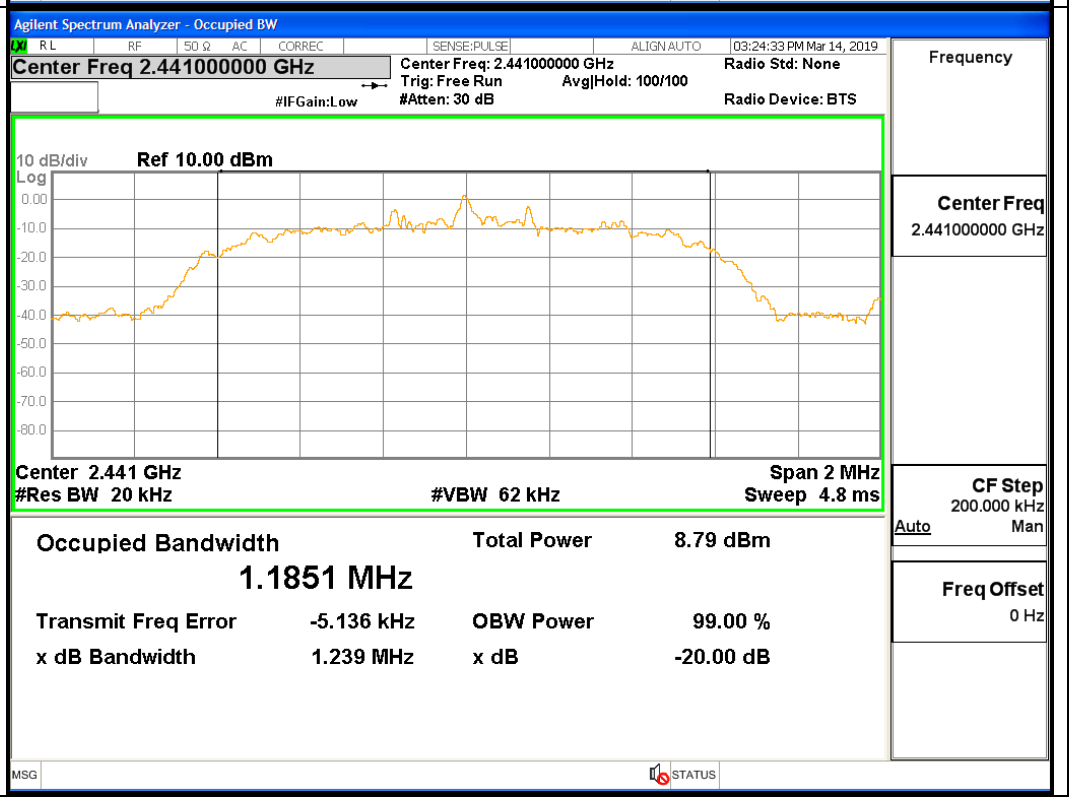
Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.793	Not Specified	PASS
GFSK	MCH	0.847	Not Specified	PASS
GFSK	HCH	0.937	Not Specified	PASS
π/4DQPSK	LCH	1.246	Not Specified	PASS
π/4DQPSK	MCH	1.201	Not Specified	PASS
π/4DQPSK	HCH	1.199	Not Specified	PASS
8DPSK	LCH	1.263	Not Specified	PASS
8DPSK	MCH	1.239	Not Specified	PASS
8DPSK	HCH	1.241	Not Specified	PASS

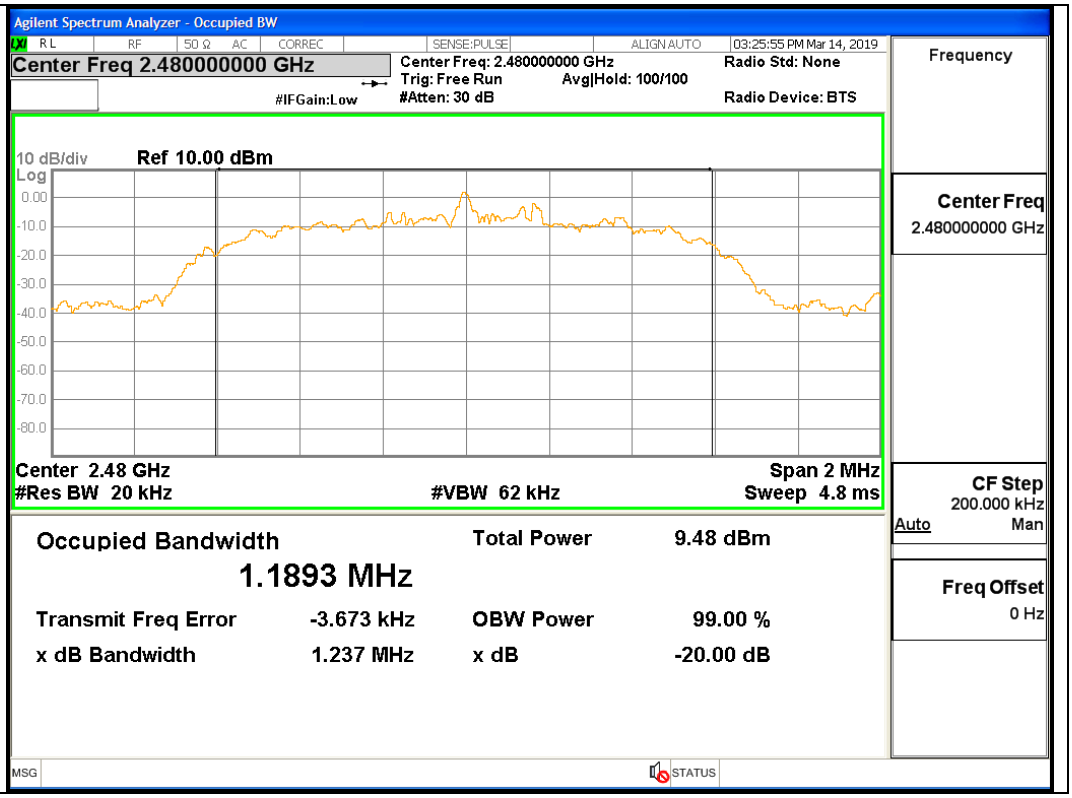
Test Graph

Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

π/4DQPSK/MCH	
π/4DQPSK/HCH	

8DPSK/LCH	
8DPSK/MCH	

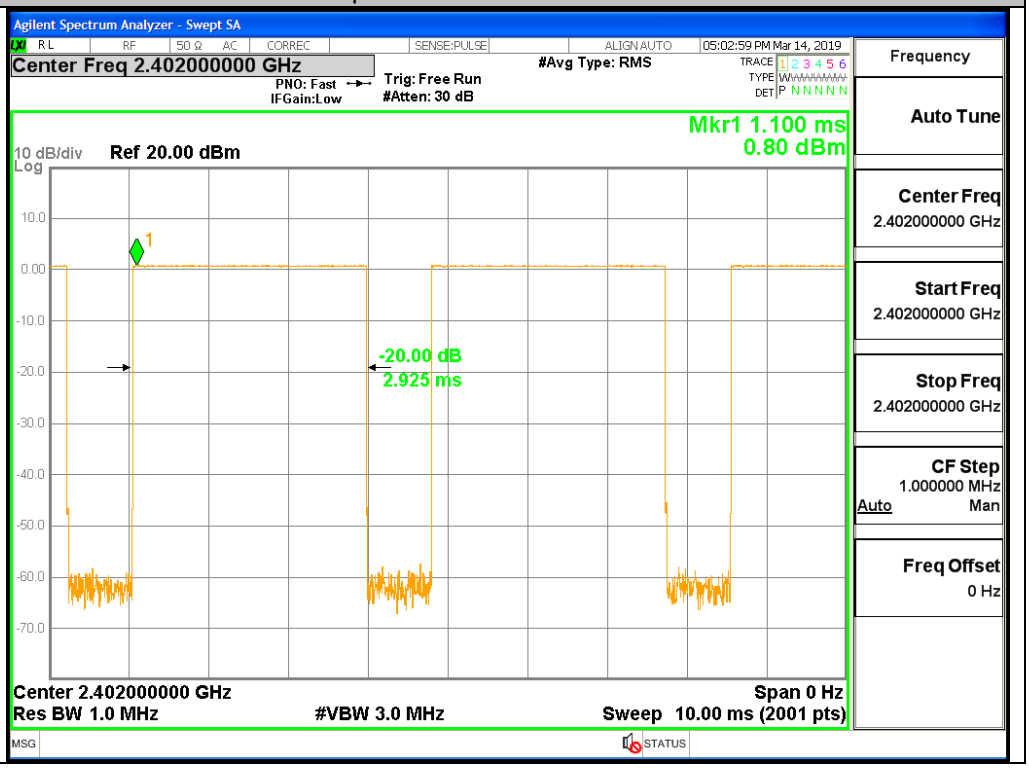
8DPSK/HCH	

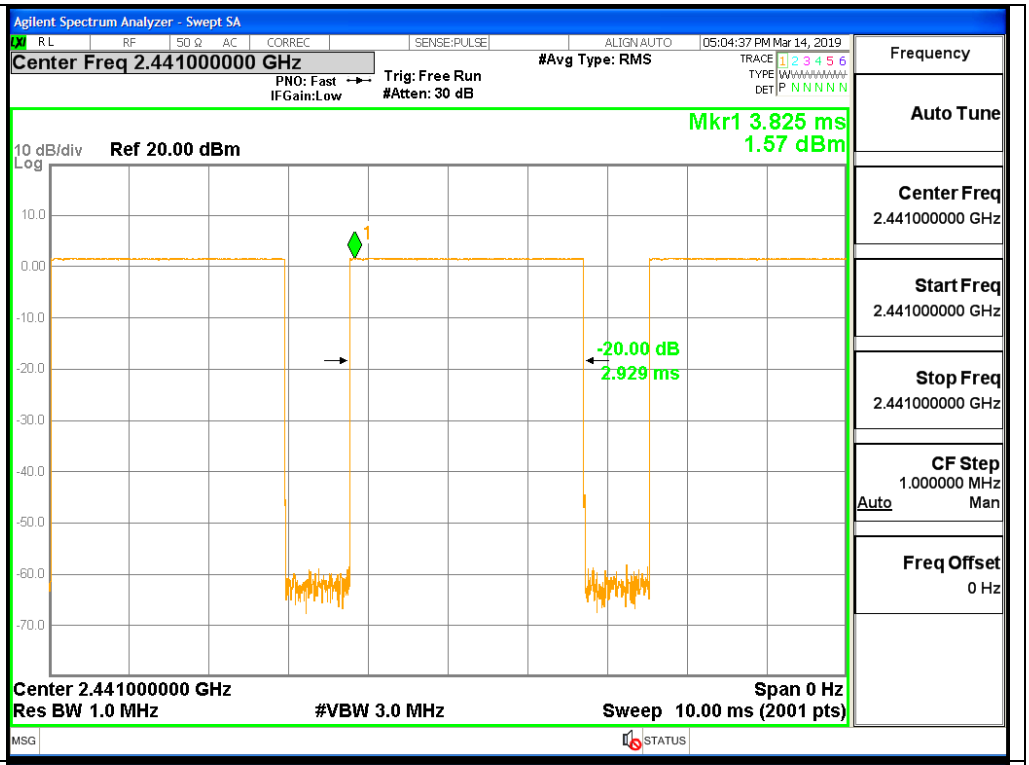
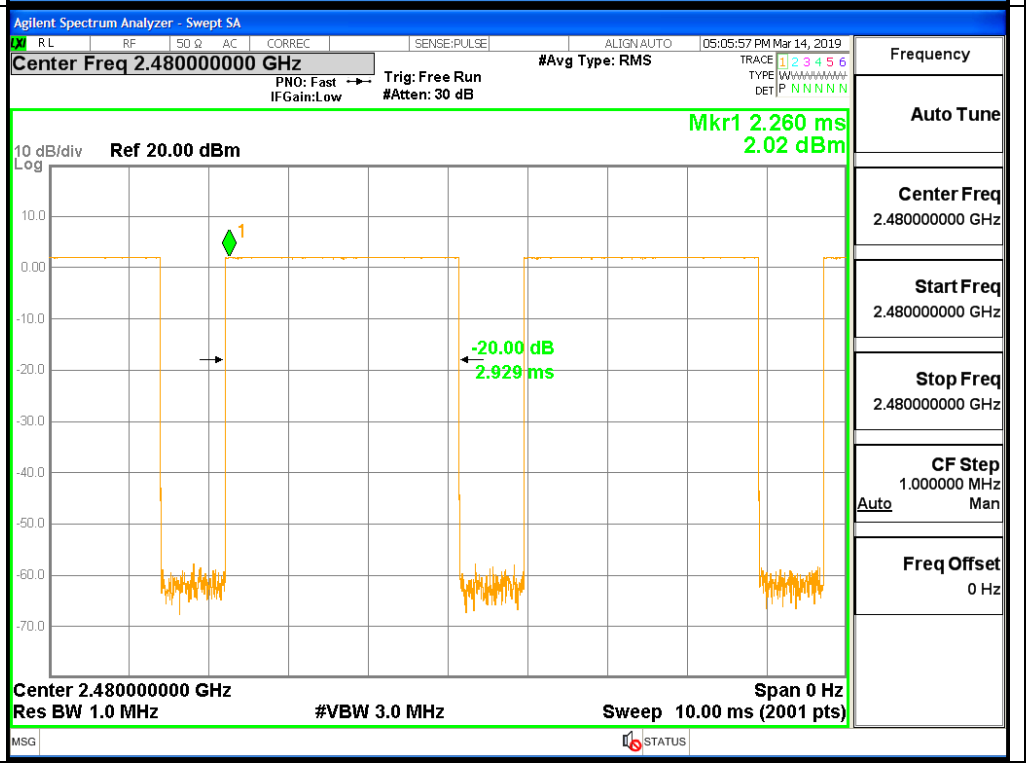
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
CORREC
SENSE:PULSE
ALIGN AUTO
03:25:55 PM Mar 14, 2019
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Log
Ref 10.00 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 20 kHz
#VBW 62 kHz
Span 2 MHz
Sweep 4.8 ms
CF Step
200.000 kHz
Auto
Man
Occupied Bandwidth
1.1893 MHz
Total Power
9.48 dBm
Transmit Freq Error
-3.673 kHz
OBW Power
99.00 %
x dB Bandwidth
1.237 MHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

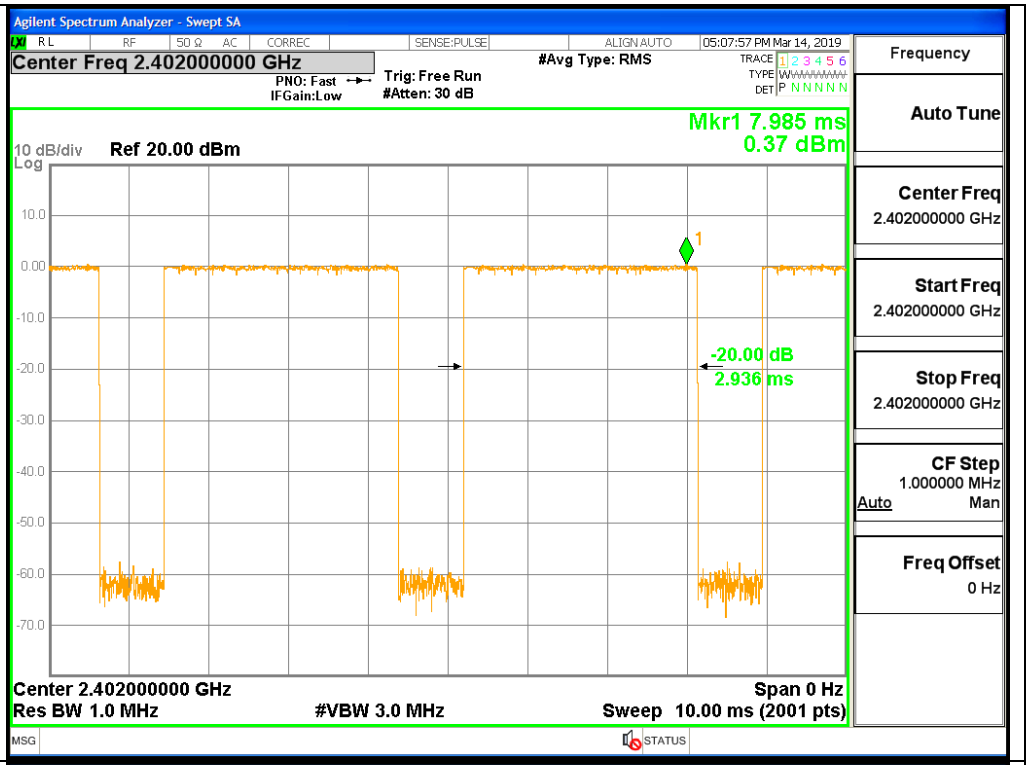
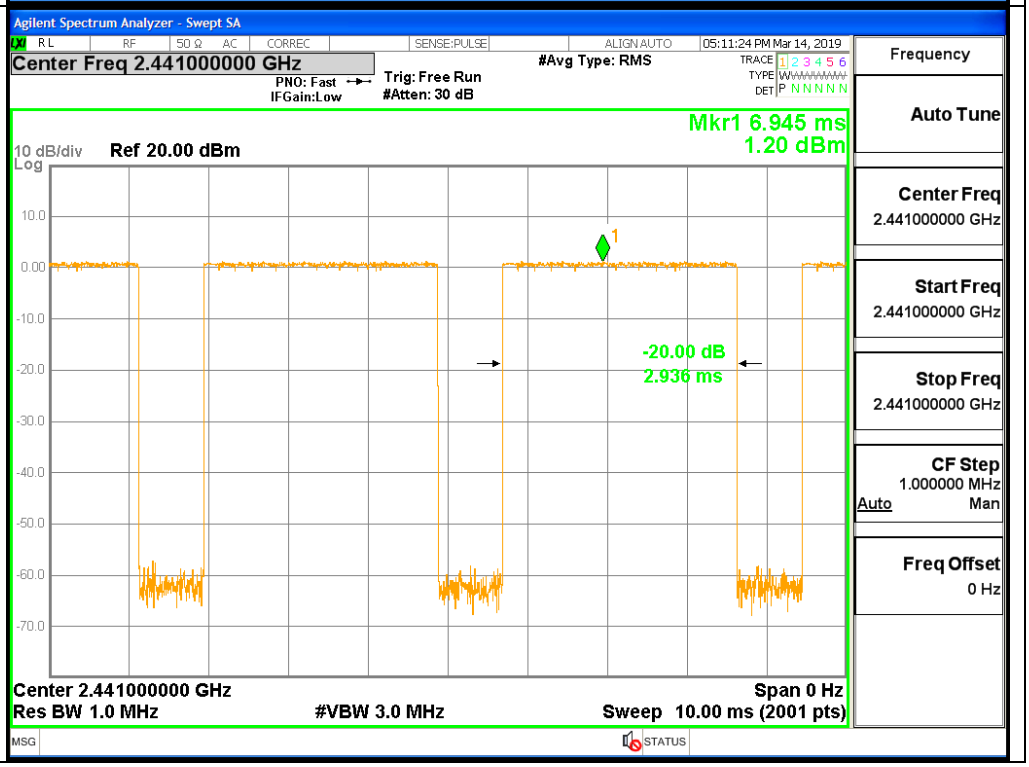
A.2 Dwell Time

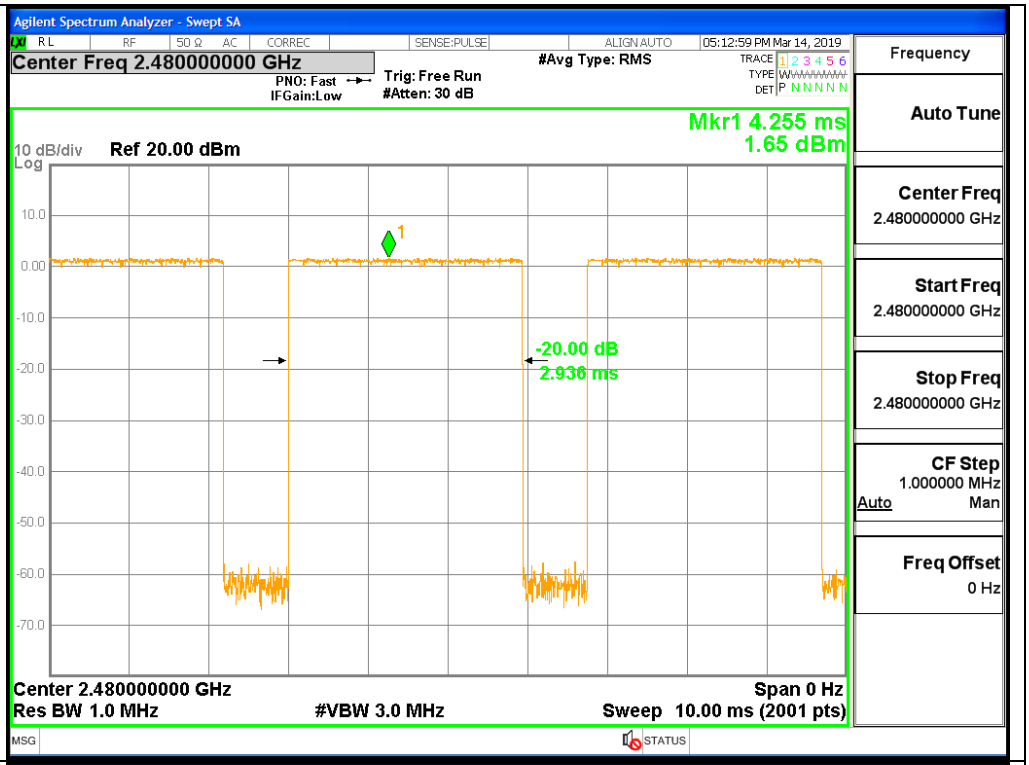
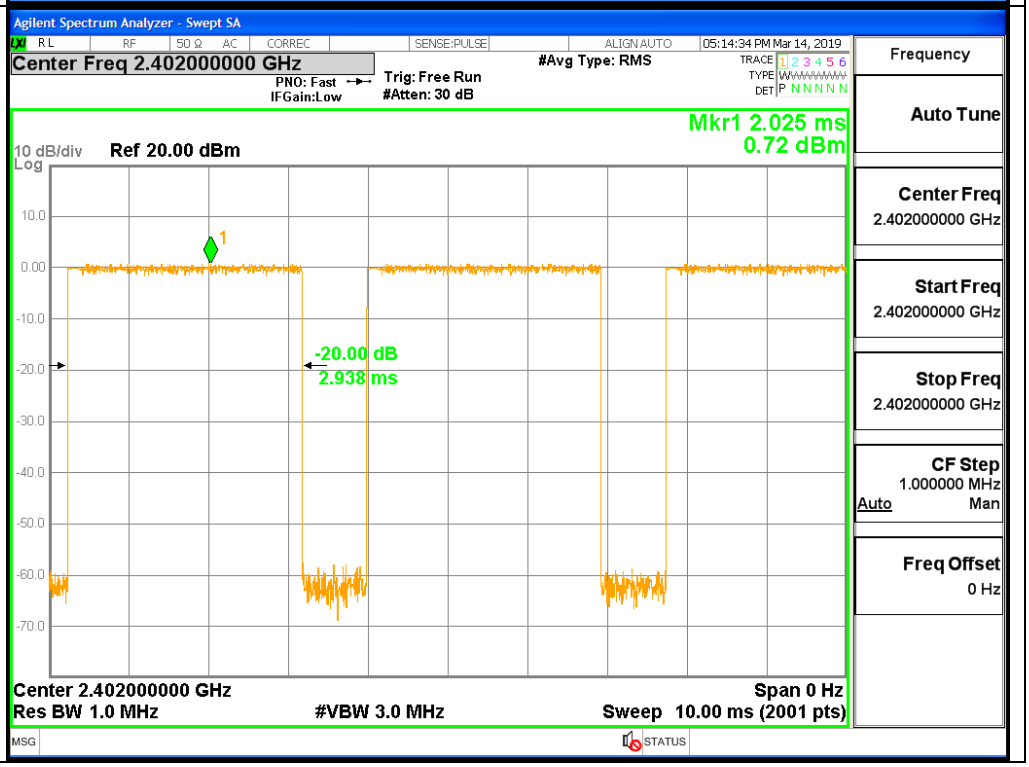
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002925	106.7	0.312112	0.4	PASS
GFSK	DH5	MCH	0.002929	106.7	0.312483	0.4	PASS
GFSK	DH5	HCH	0.002929	106.7	0.31249	0.4	PASS
π/4DQPSK	2DH5	LCH	0.002936	106.7	0.313253	0.4	PASS
π/4DQPSK	2DH5	MCH	0.002936	106.7	0.313237	0.4	PASS
π/4DQPSK	2DH5	HCH	0.002936	106.7	0.313303	0.4	PASS
8DPSK	3DH5	LCH	0.002938	106.7	0.313441	0.4	PASS
8DPSK	3DH5	MCH	0.002935	106.7	0.313167	0.4	PASS
8DPSK	3DH5	HCH	0.002936	106.7	0.313324	0.4	PASS

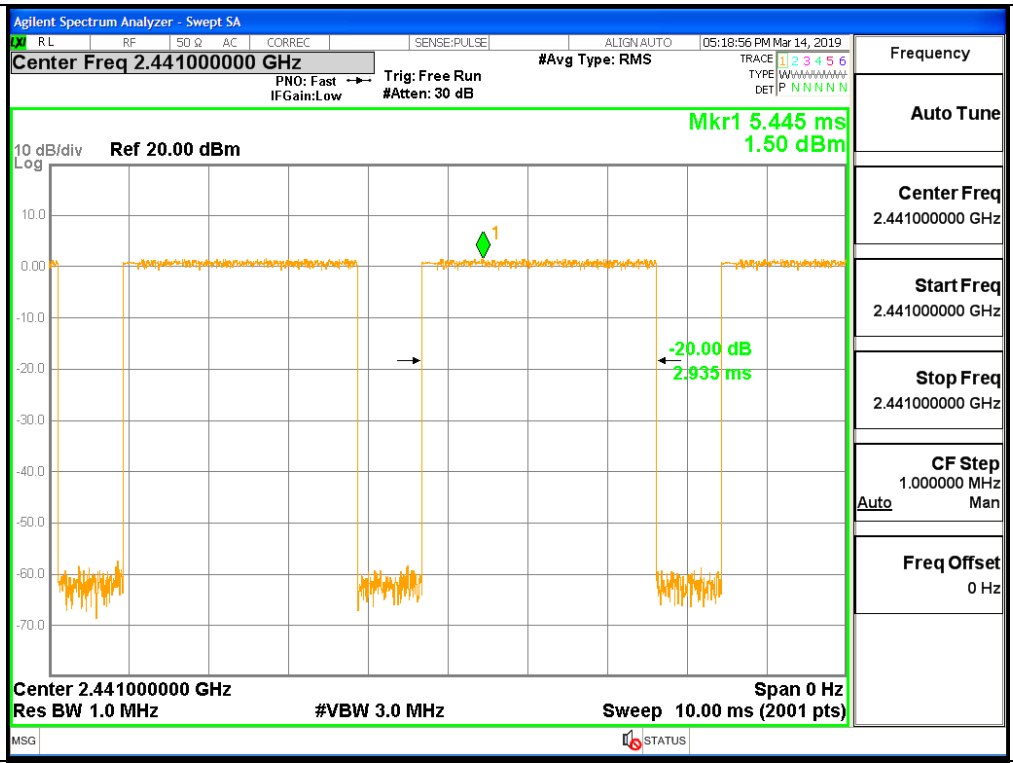
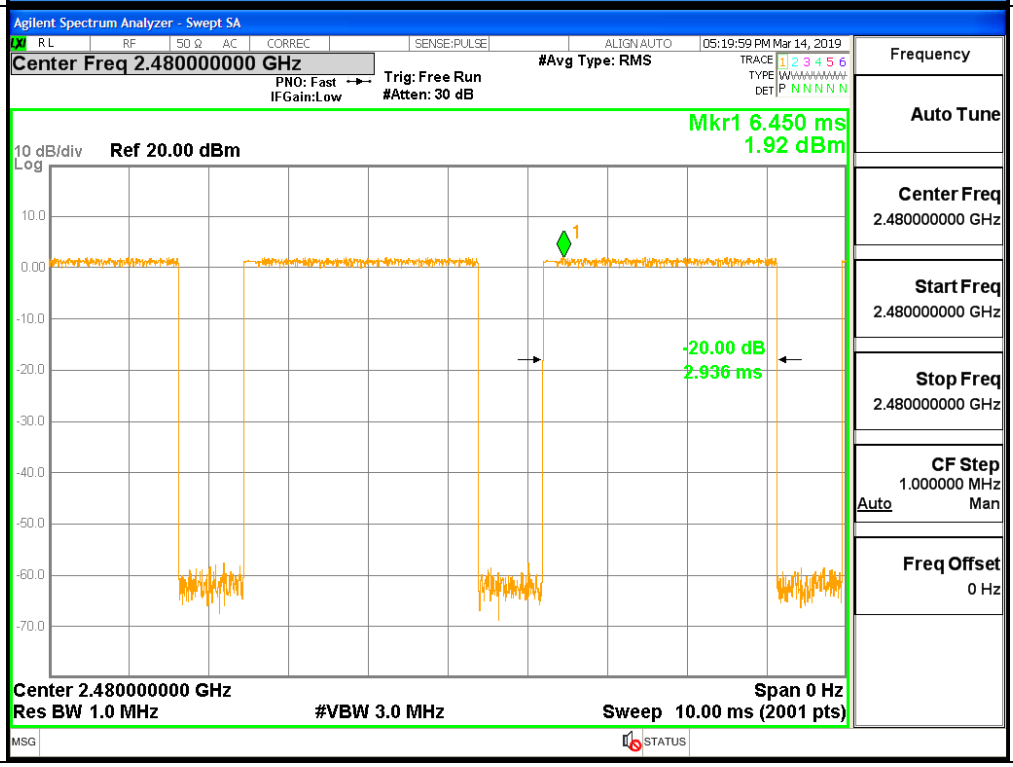
Test Graph

Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

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

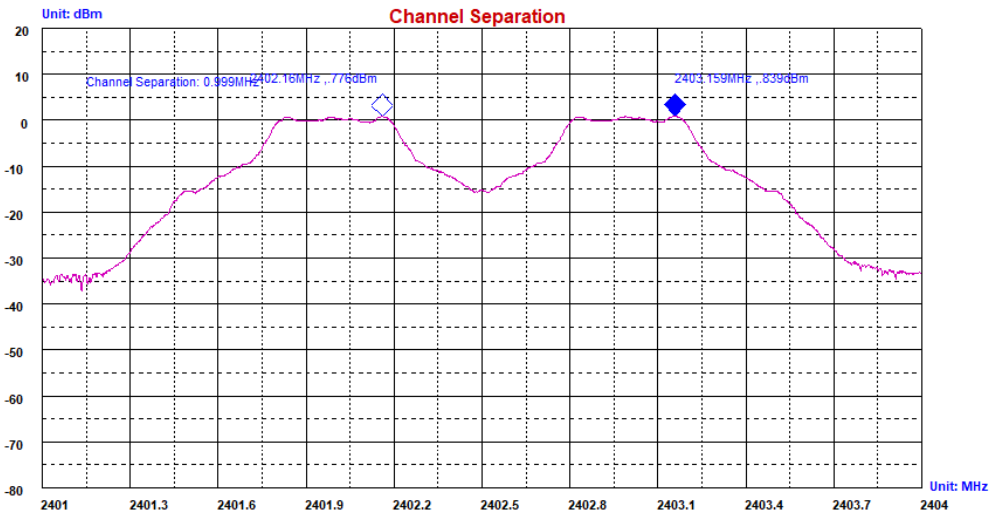
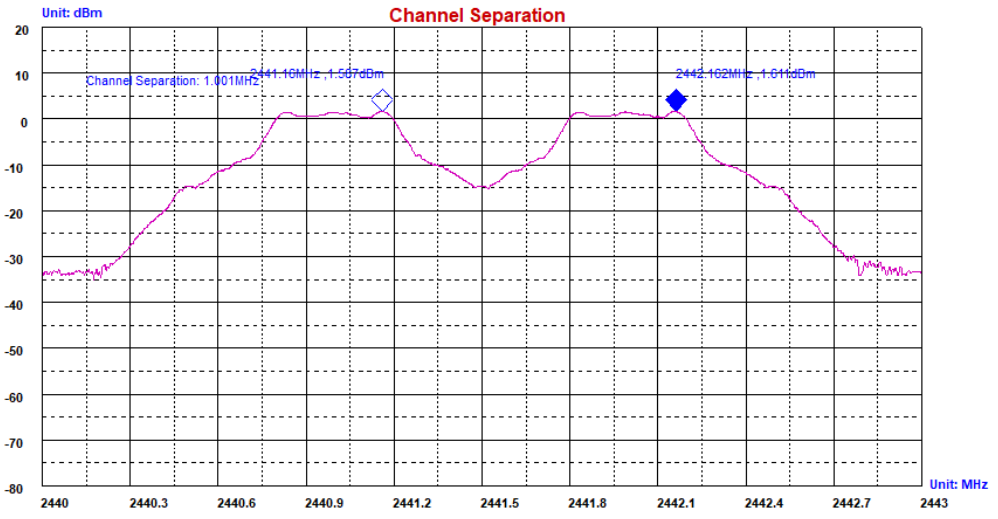
π/4DQPSK _2DH5/HCH	
8DPSK _3DH5/LCH	

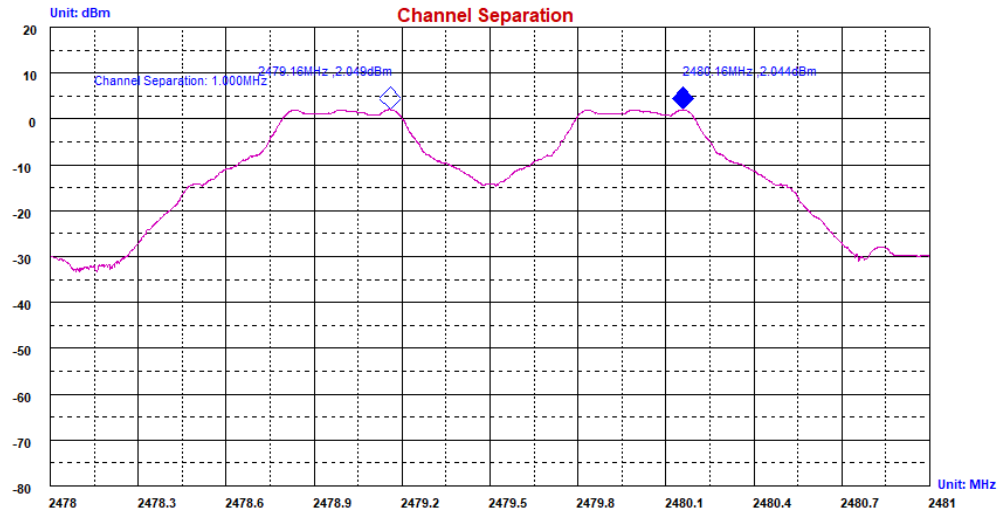
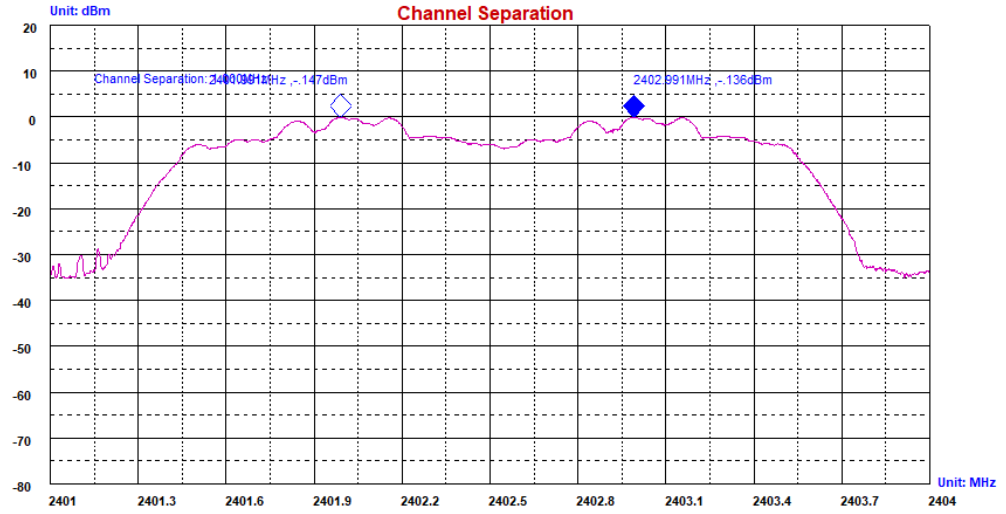
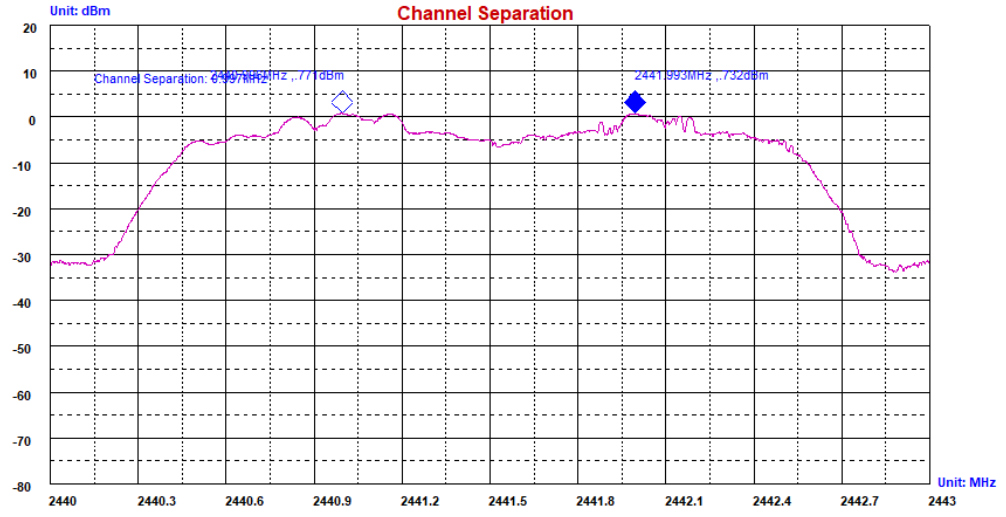
8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

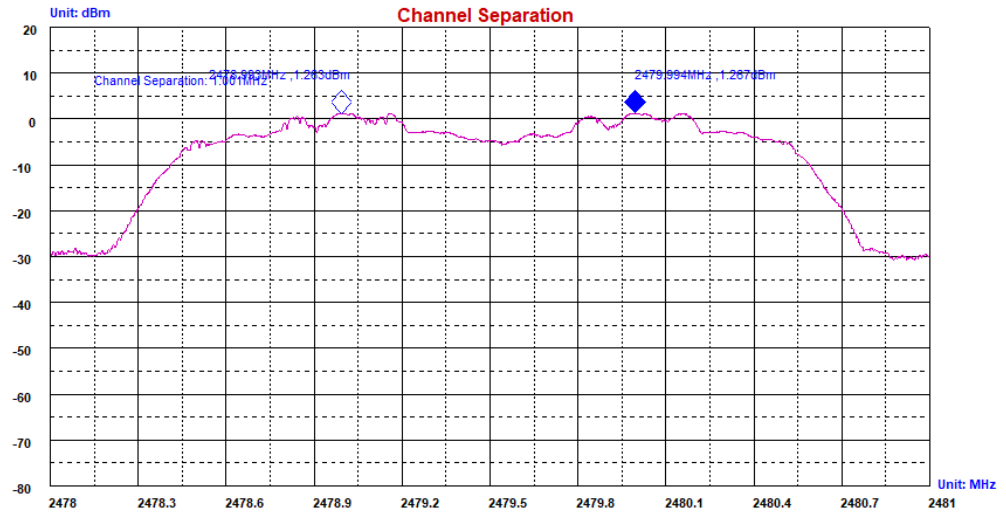
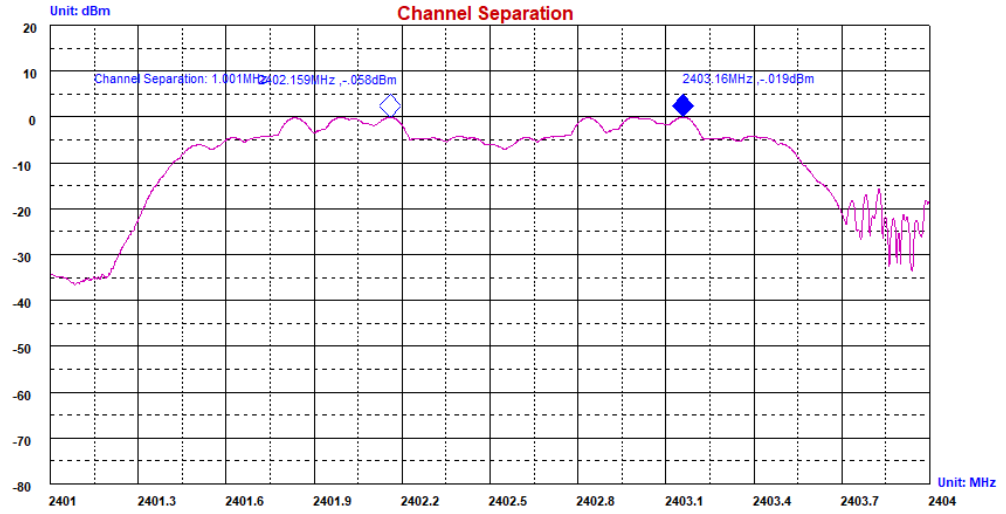
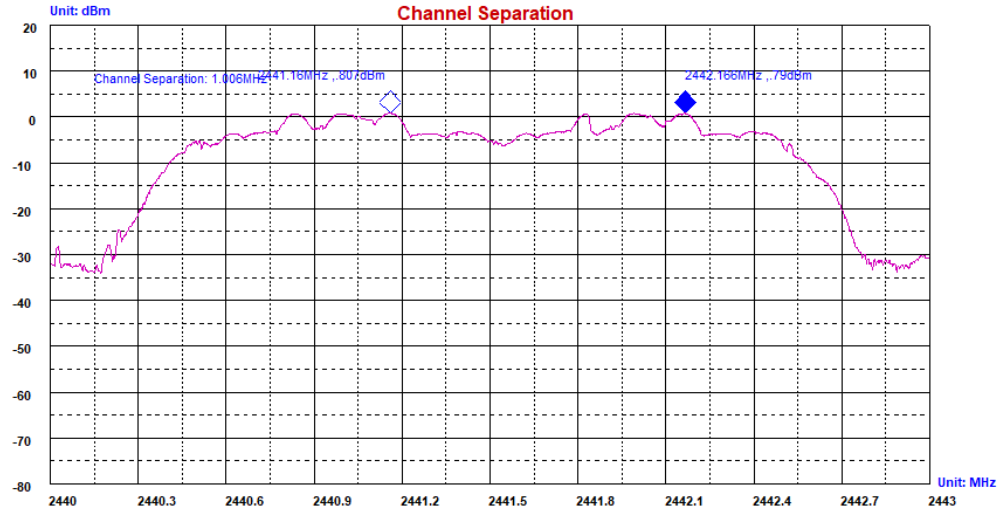
A.3 Carrier Frequency Separation

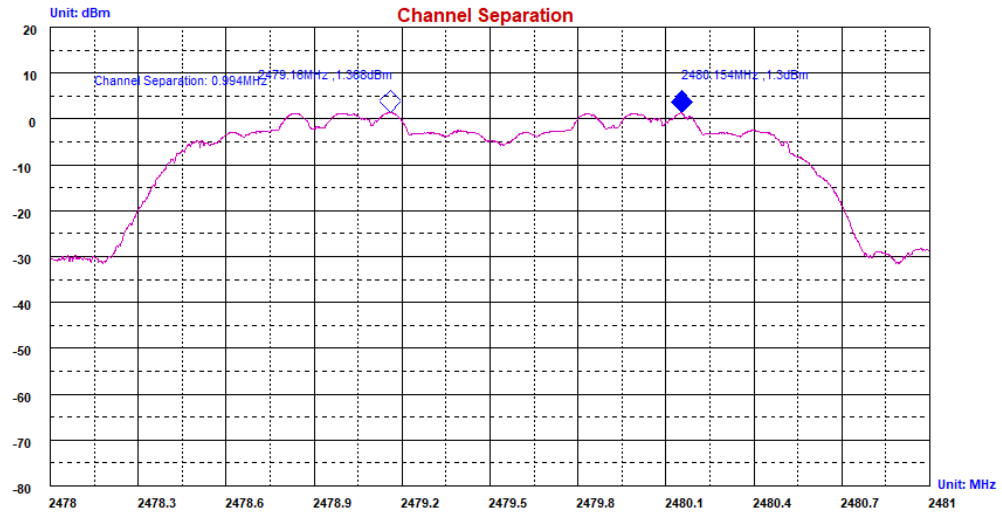
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.529	PASS
GFSK	MCH	1.001	0.565	PASS
GFSK	HCH	1.000	0.625	PASS
π/4DQPSK	LCH	1.000	0.831	PASS
π/4DQPSK	MCH	0.997	0.801	PASS
π/4DQPSK	HCH	1.001	0.799	PASS
8DPSK	LCH	1.001	0.842	PASS
8DPSK	MCH	1.006	0.826	PASS
8DPSK	HCH	0.994	0.827	PASS

Test Graph

Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	
π/4DQPSK/MCH	

π/4DQPSK/HCH	
8DPSK/LCH	
8DPSK/MCH	

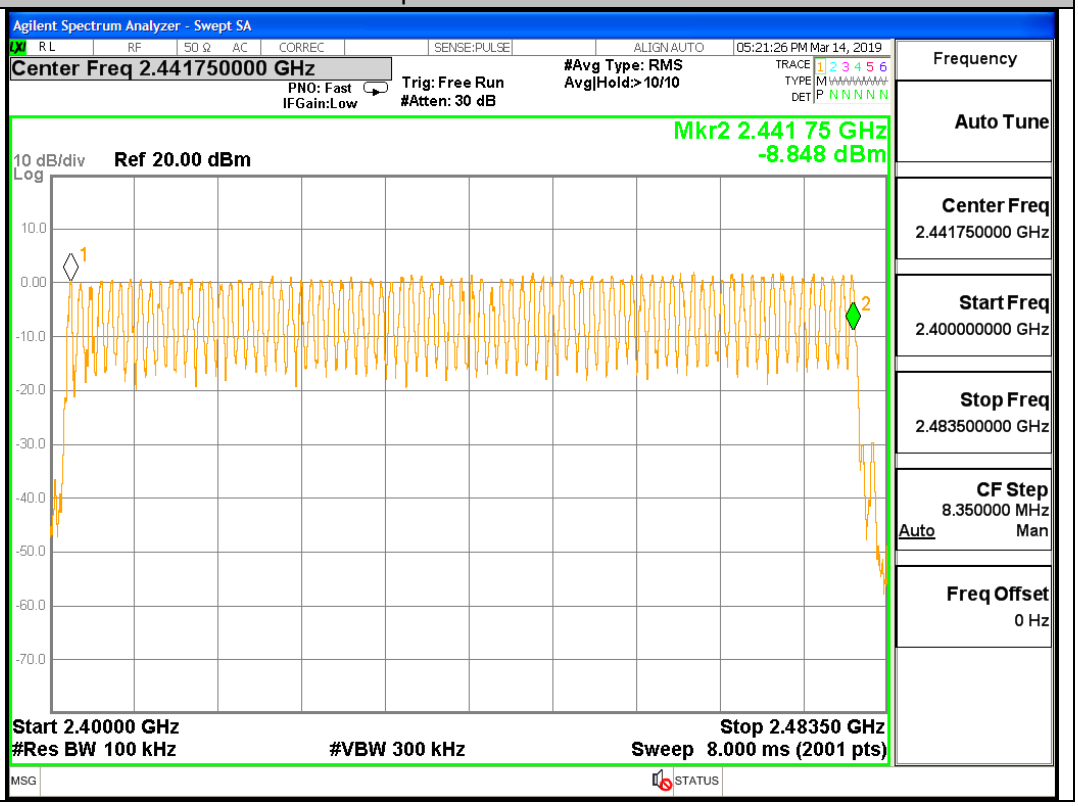
8DPSK/HCH	

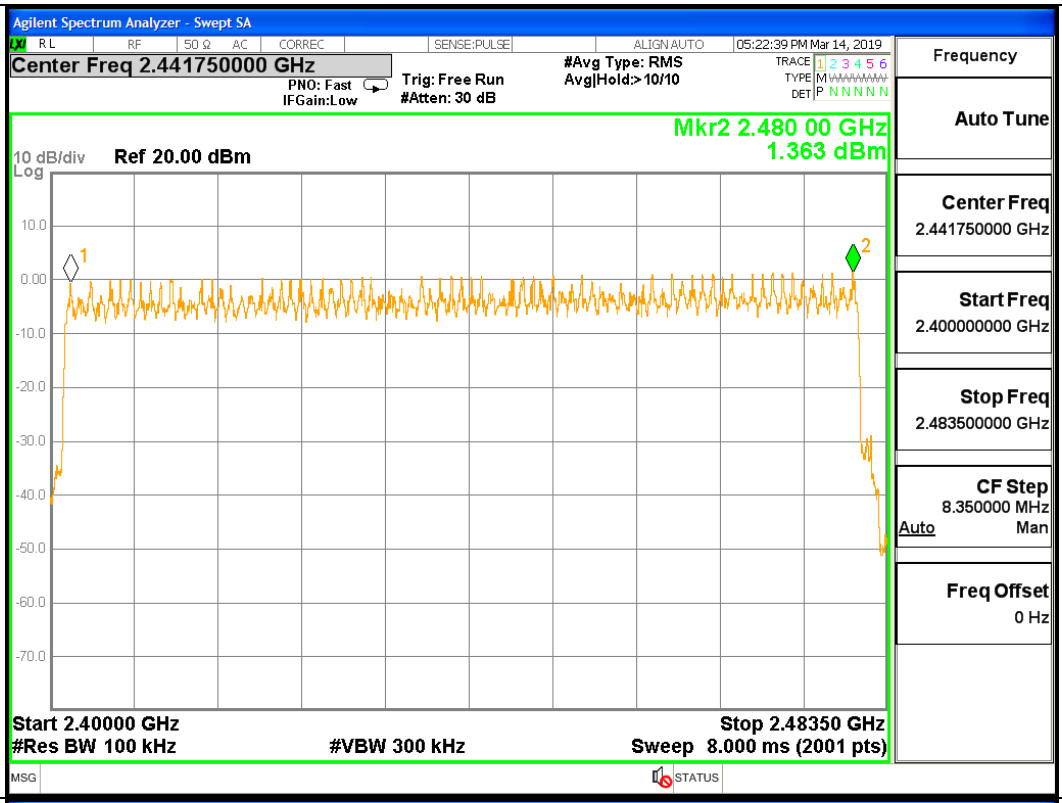
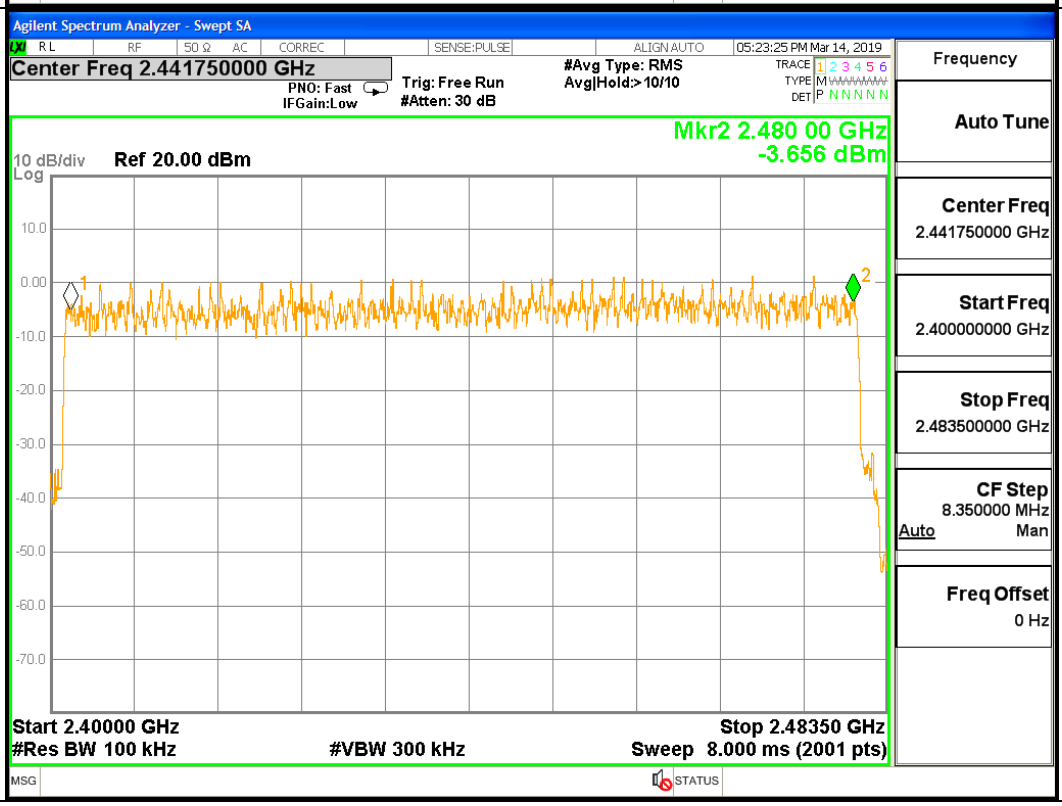
Channel Separation
Unit: dBm
Channel Separation: 0.994MHz
2479.16MHz , 1.368dBm
2480.154MHz , 1.3dBm
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
2478
2478.3
2478.6
2478.9
2479.2
2479.5
2479.8
2480.1
2480.4
2480.7
2481
Unit: MHz

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
8DPSK	Hop	79	>=15	PASS

Test Graph

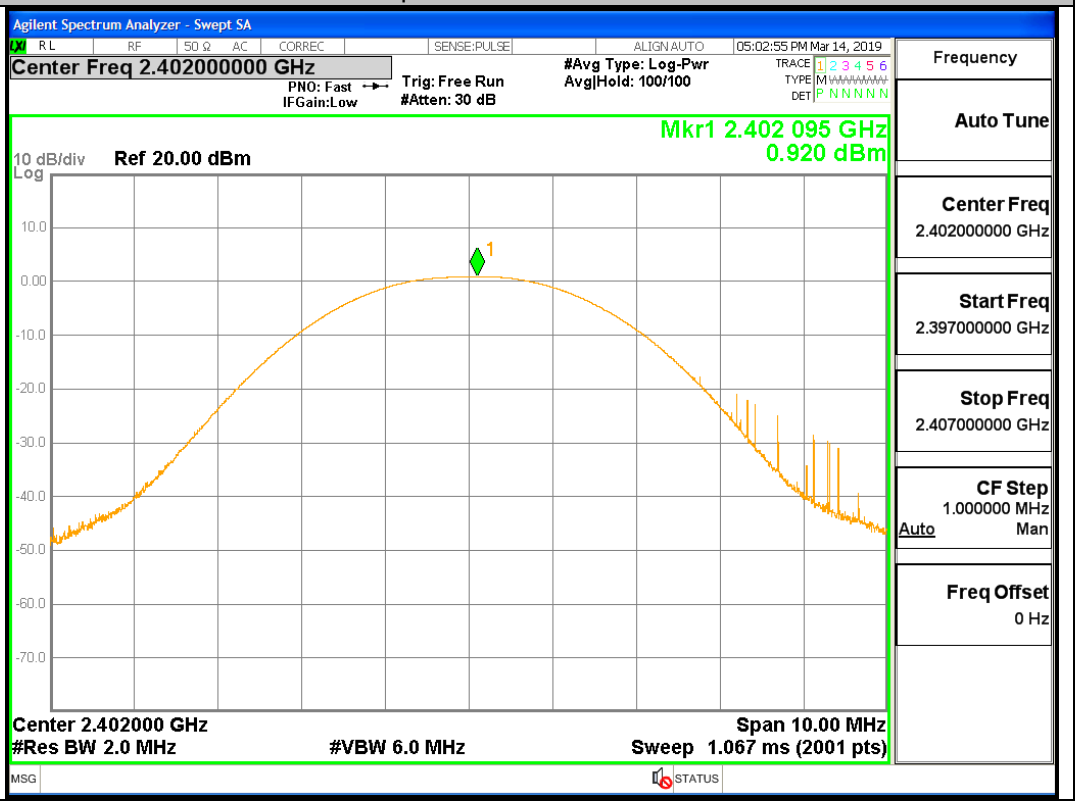
Graphs	
GFSK/Hop	

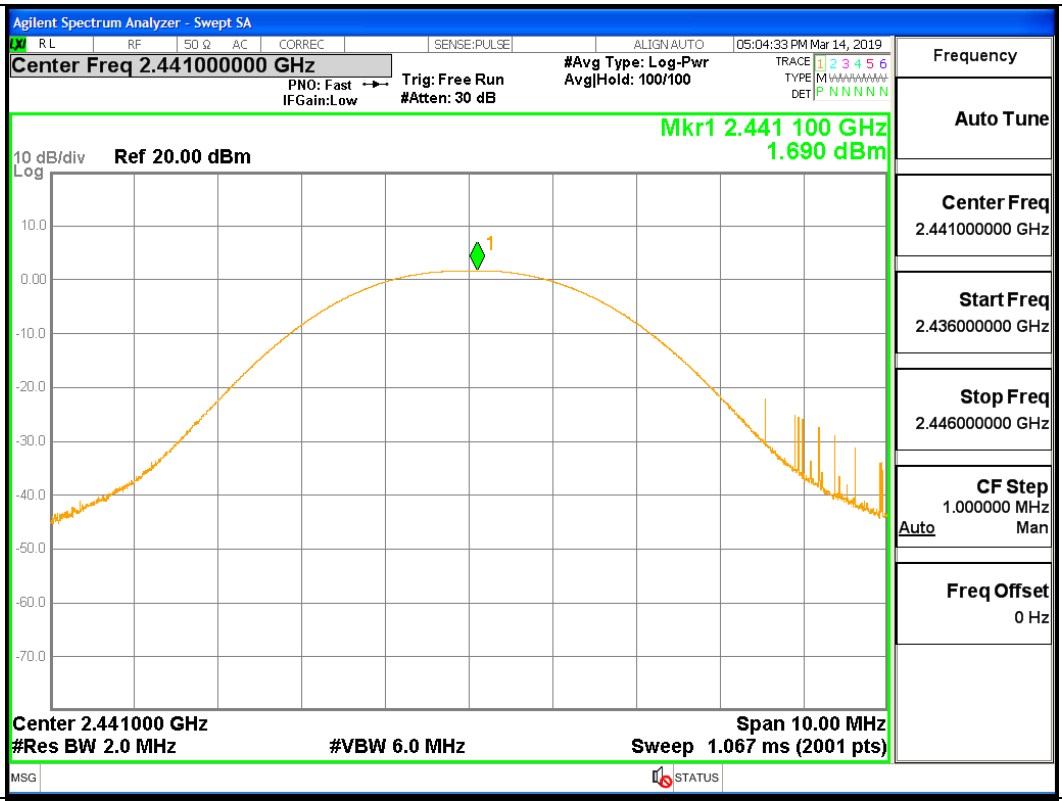
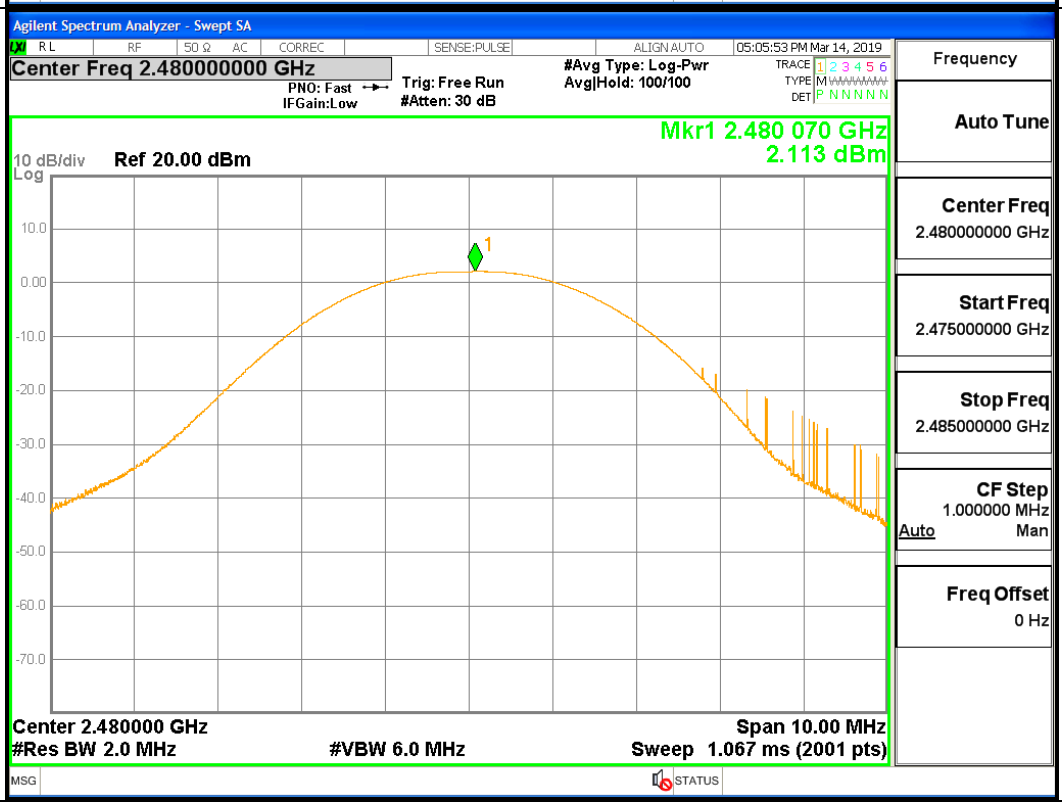
π/4DQPSK/Hop	
8DPSK/Hop	

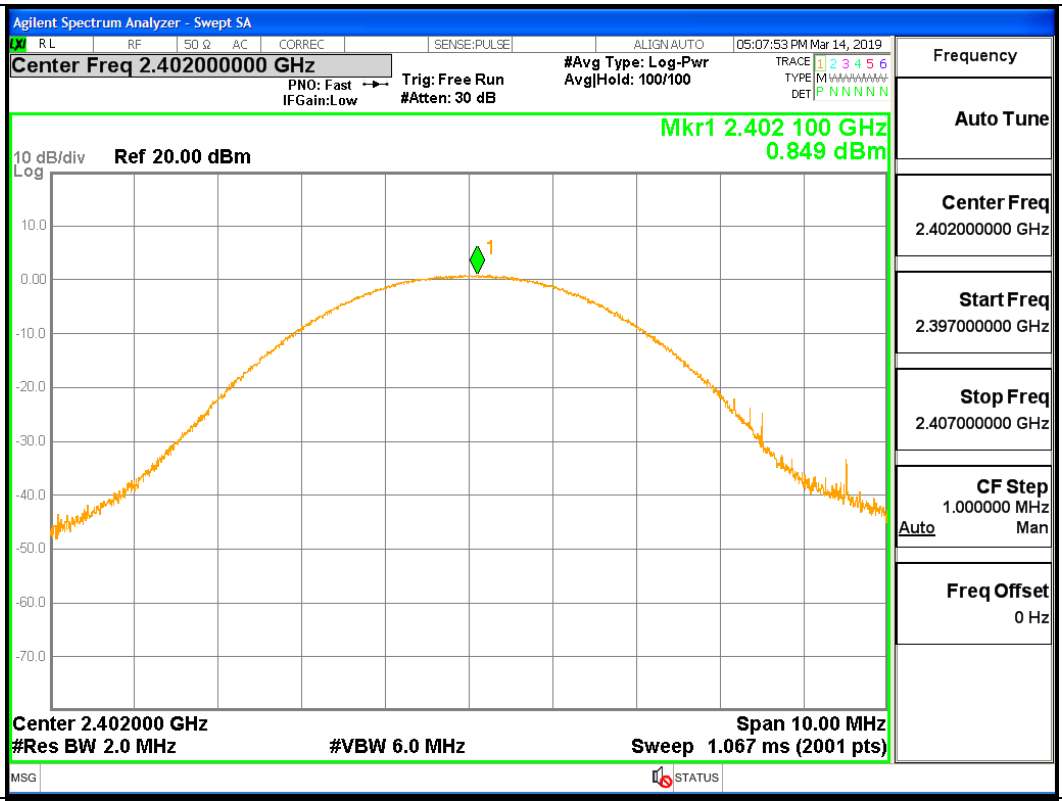
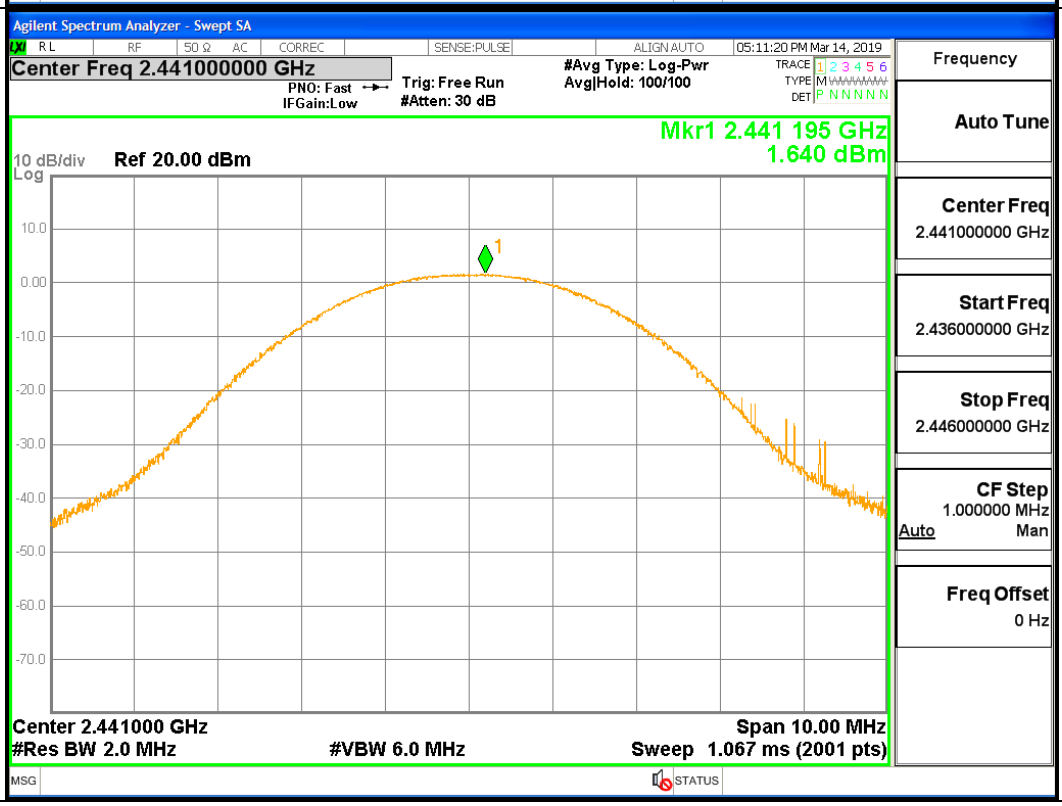
A.5 Conducted Peak Output Power

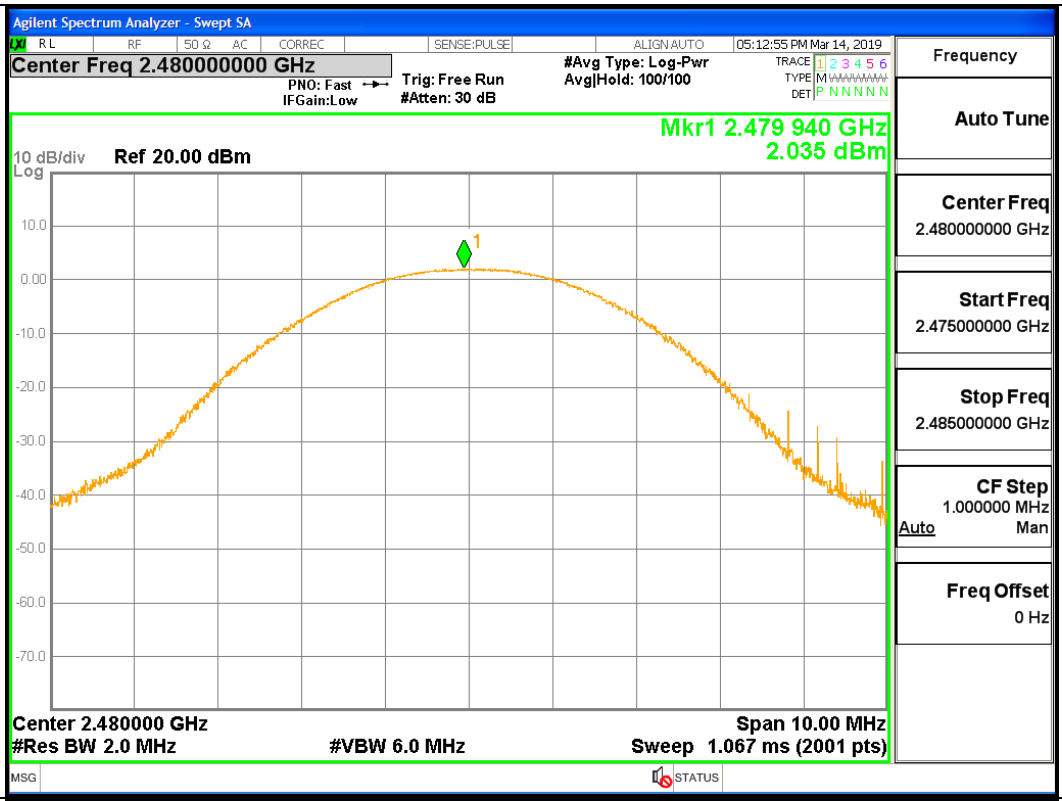
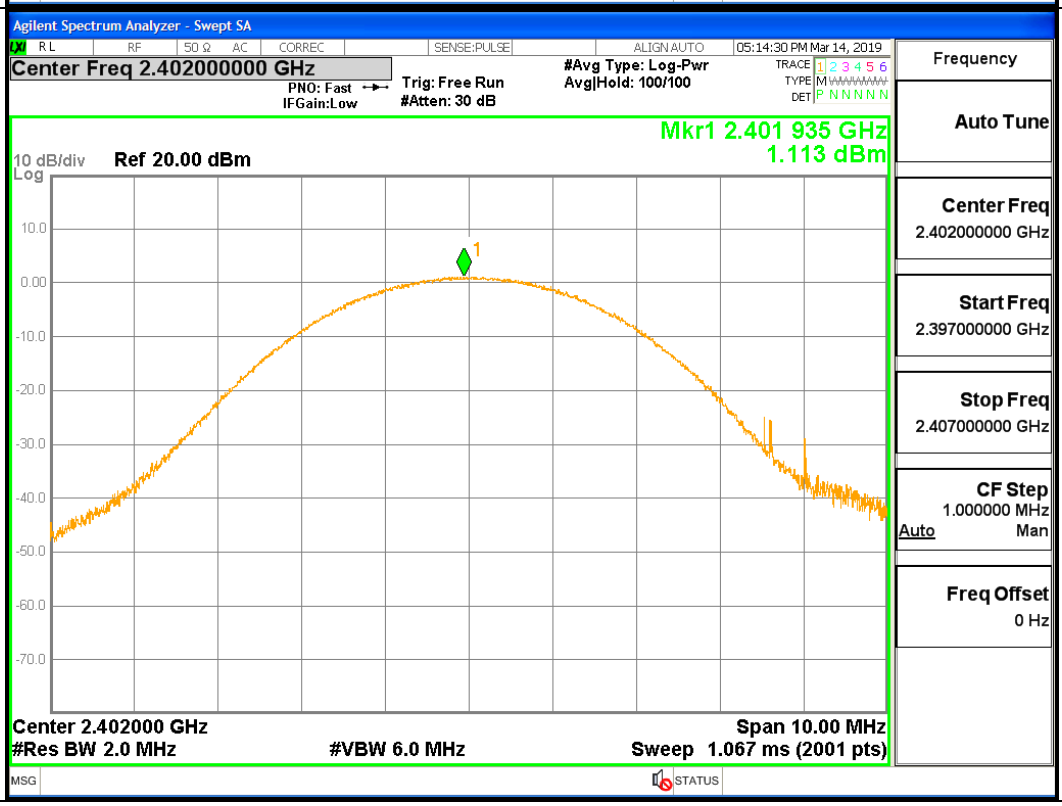
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.920	21	PASS
GFSK	MCH	1.690	21	PASS
GFSK	HCH	2.113	21	PASS
π/4DQPSK	LCH	0.849	21	PASS
π/4DQPSK	MCH	1.640	21	PASS
π/4DQPSK	HCH	2.035	21	PASS
8DPSK	LCH	1.113	21	PASS
8DPSK	MCH	1.817	21	PASS
8DPSK	HCH	2.193	21	PASS

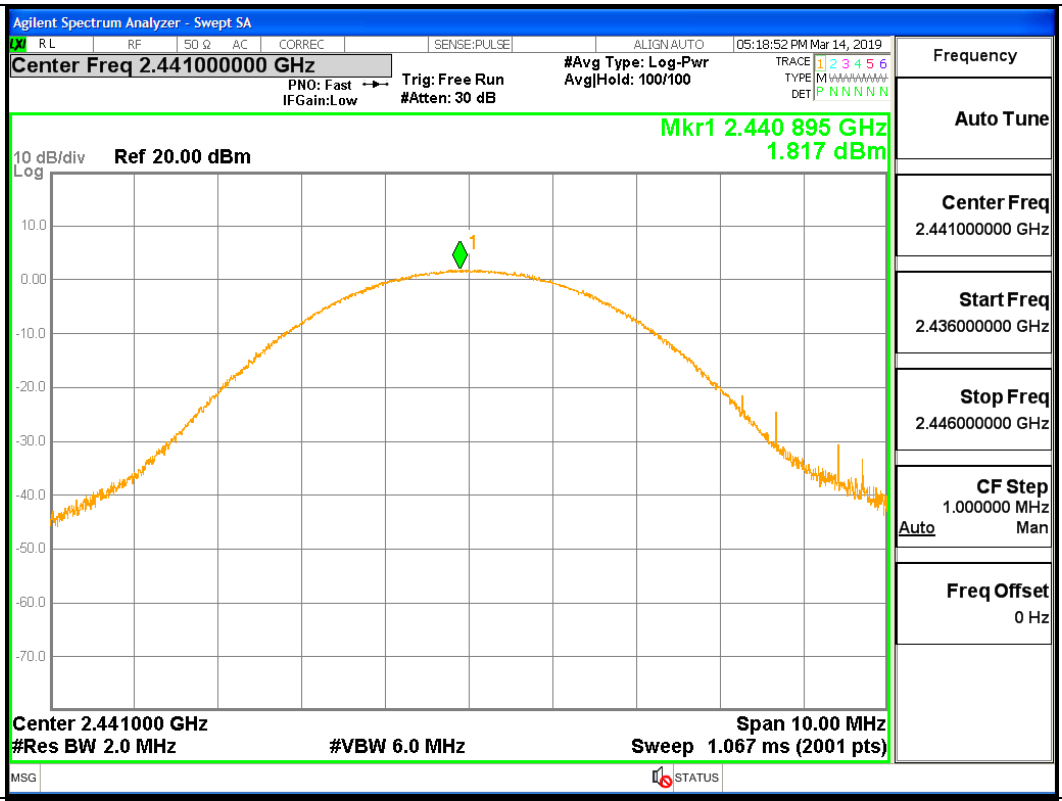
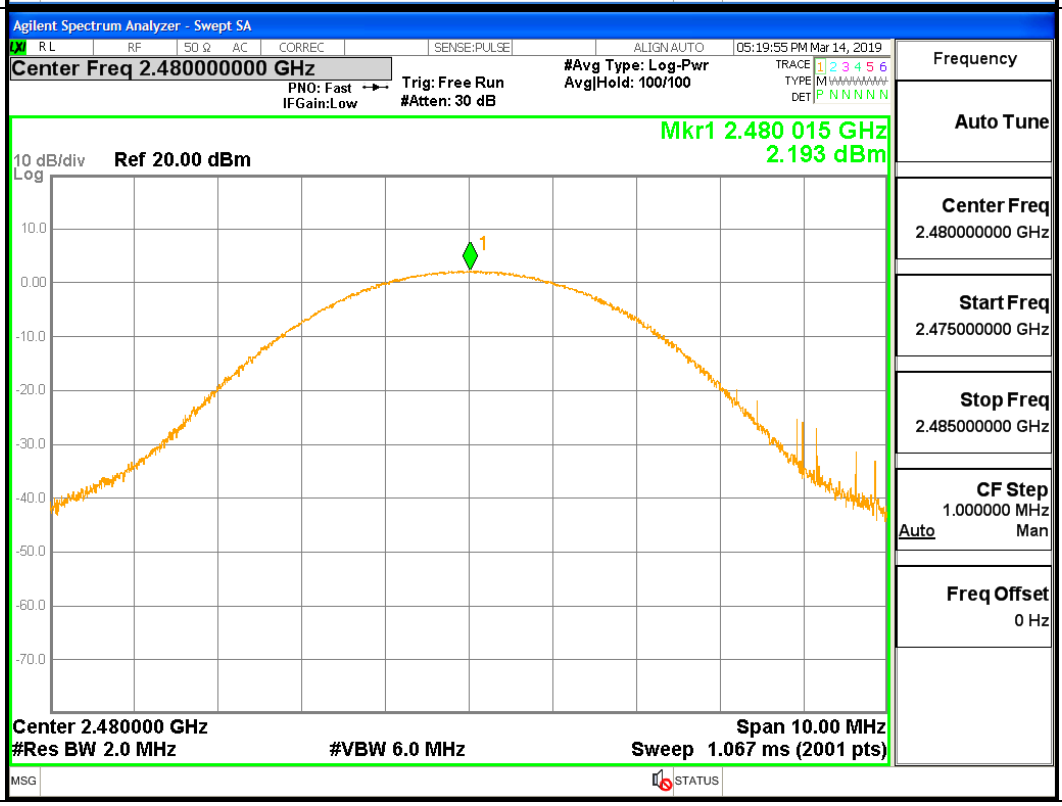
Test Graph

Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

π/4DQPSK/LCH	
π/4DQPSK/MCH	

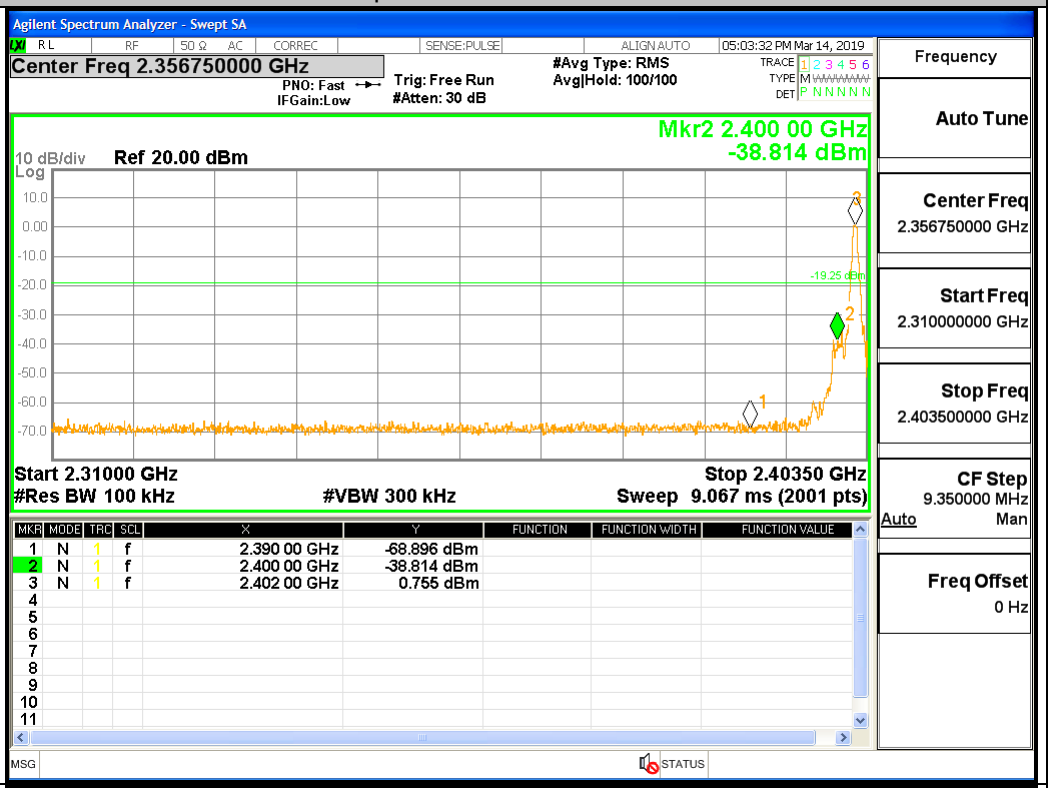
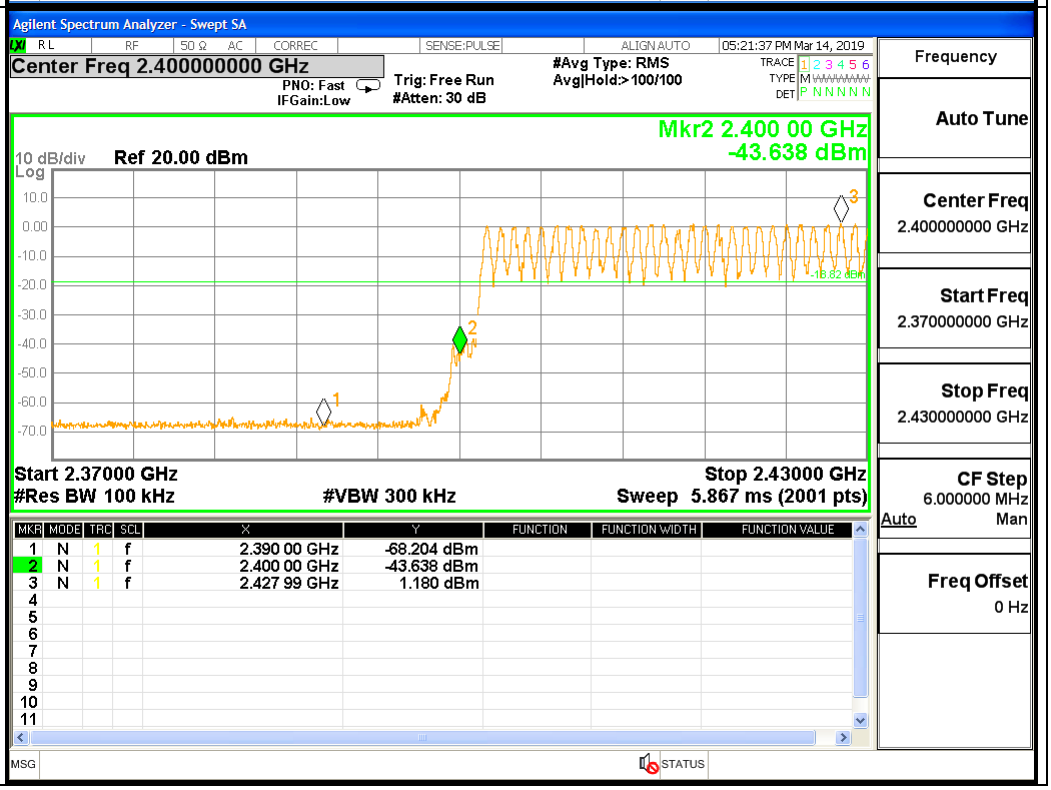
π/4DQPSK/HCH	
8DPSK/LCH	

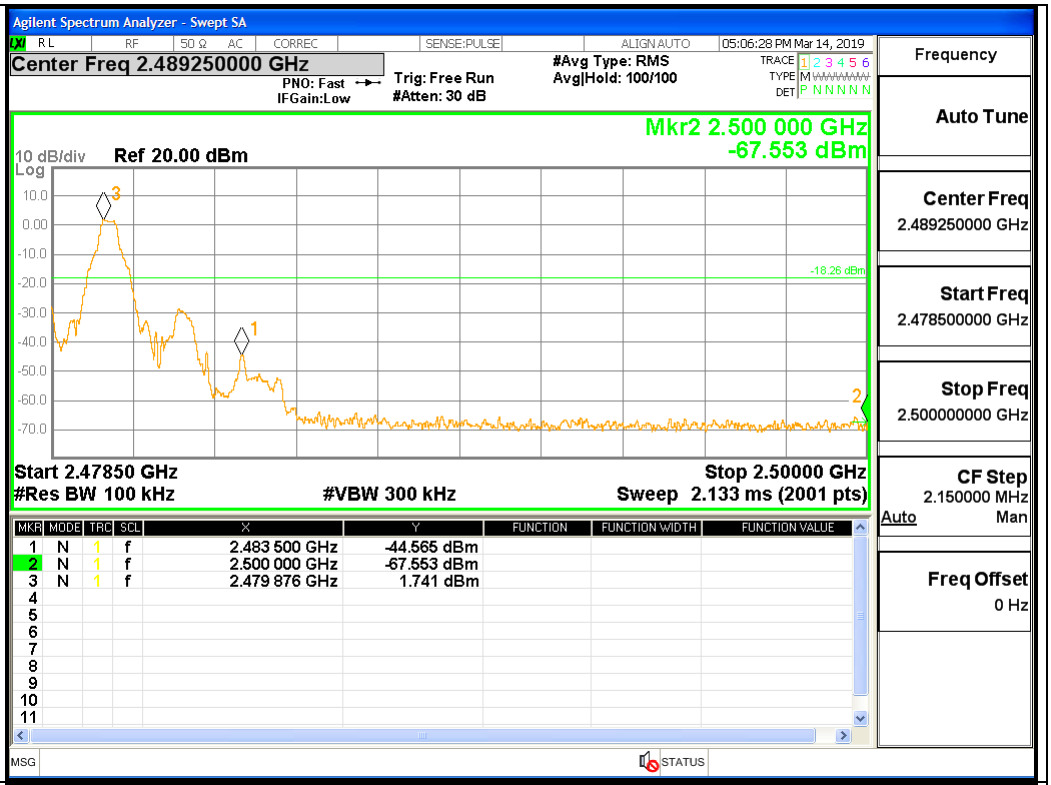
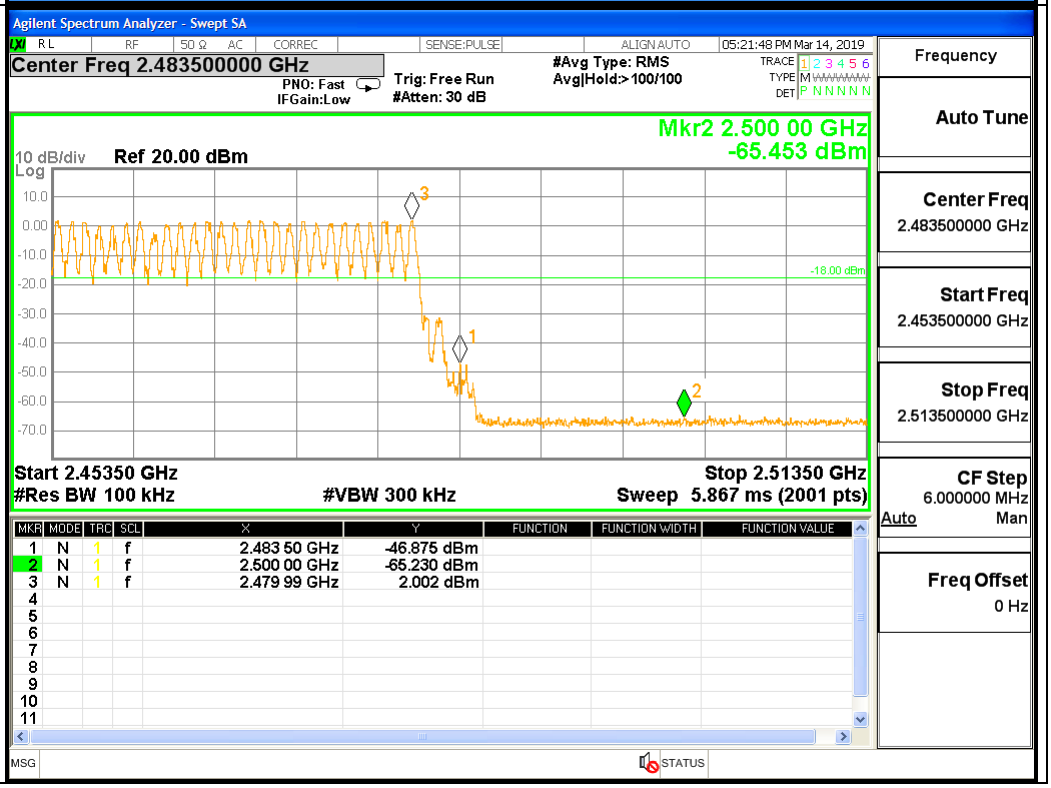
8DPSK/MCH	
8DPSK/HCH	

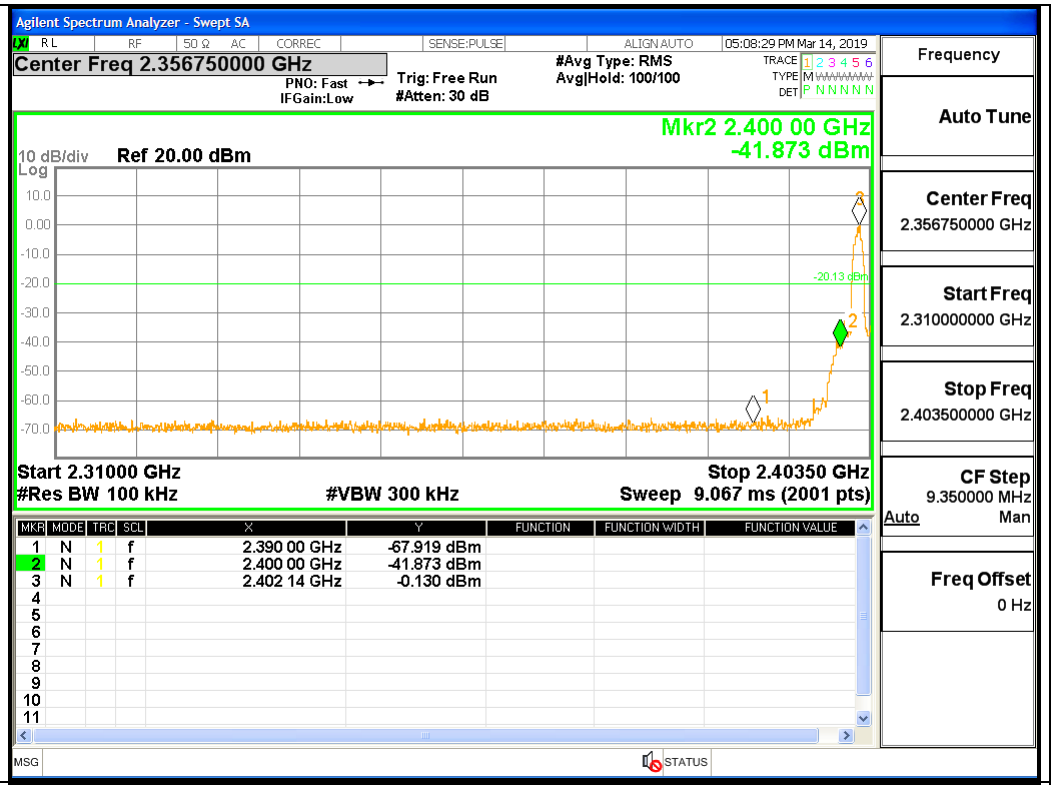
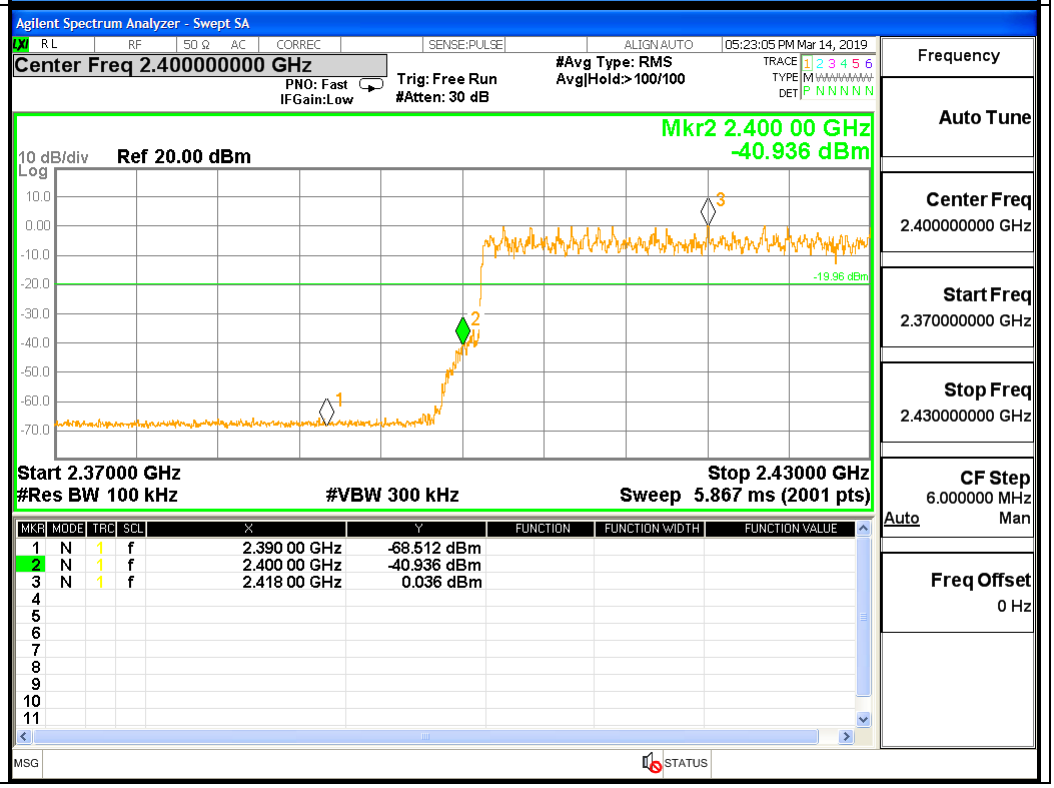
A.6 Band-edge for RF Conducted Emissions

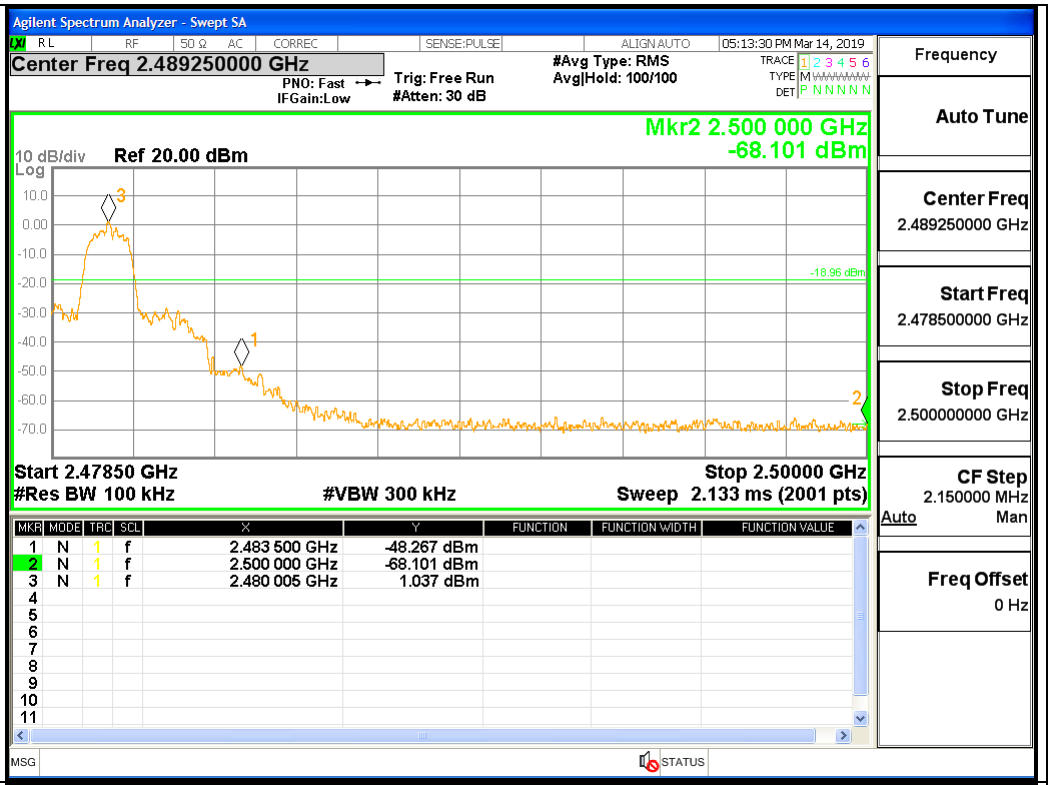
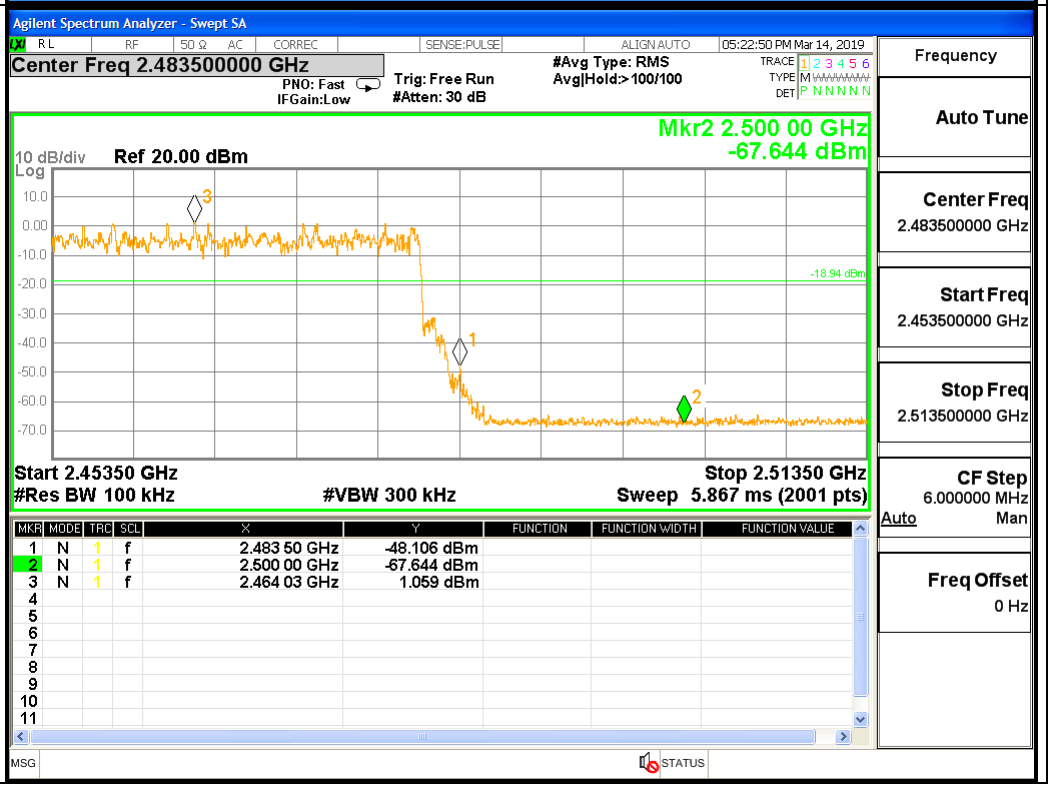
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2390	0.75	-68.90	-19.25	Pass
1DH5	2402	2400	0.75	-38.81	-19.25	Pass
1DH5-Hopping	2402	2390	1.18	-68.20	-18.82	Pass
1DH5-Hopping	2402	2400	1.18	-43.64	-18.82	Pass
1DH5	2480	2483.5	1.74	-44.56	-18.26	Pass
1DH5	2480	2500	1.74	-67.55	-18.26	Pass
1DH5-Hopping	2480	2483.5	2.00	-46.88	-18.00	Pass
1DH5-Hopping	2480	2500	2.00	-65.45	-18.00	Pass
2DH5	2402	2390	-0.13	-67.92	-20.13	Pass
2DH5	2402	2400	-0.13	-41.87	-20.13	Pass
2DH5-Hopping	2402	2390	1.06	-48.11	-18.94	Pass
2DH5-Hopping	2402	2400	1.06	-67.64	-18.94	Pass
2DH5	2480	2483.5	1.04	-48.27	-18.96	Pass
2DH5	2480	2500	1.04	-68.10	-18.96	Pass
2DH5-Hopping	2480	2483.5	0.04	-68.51	-19.96	Pass
2DH5-Hopping	2480	2500	0.04	-40.94	-19.96	Pass
3DH5	2402	2390	-0.05	-68.73	-20.05	Pass
3DH5	2402	2400	-0.05	-34.56	-20.05	Pass
3DH5-Hopping	2402	2390	0.10	-66.94	-19.90	Pass
3DH5-Hopping	2402	2400	0.10	-36.06	-19.90	Pass
3DH5	2480	2483.5	1.16	-45.89	-18.84	Pass
3DH5	2480	2500	1.16	-69.92	-18.84	Pass
3DH5-Hopping	2480	2483.5	1.10	-55.84	-18.90	Pass
3DH5-Hopping	2480	2500	1.10	-66.84	-18.90	Pass

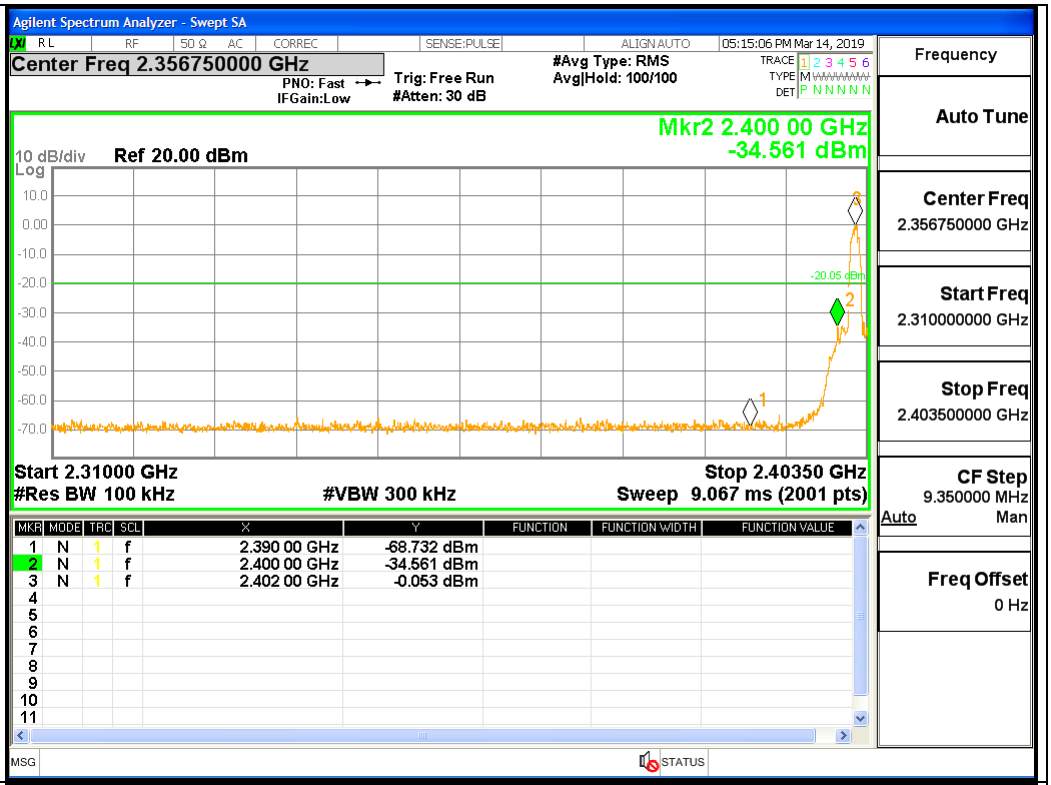
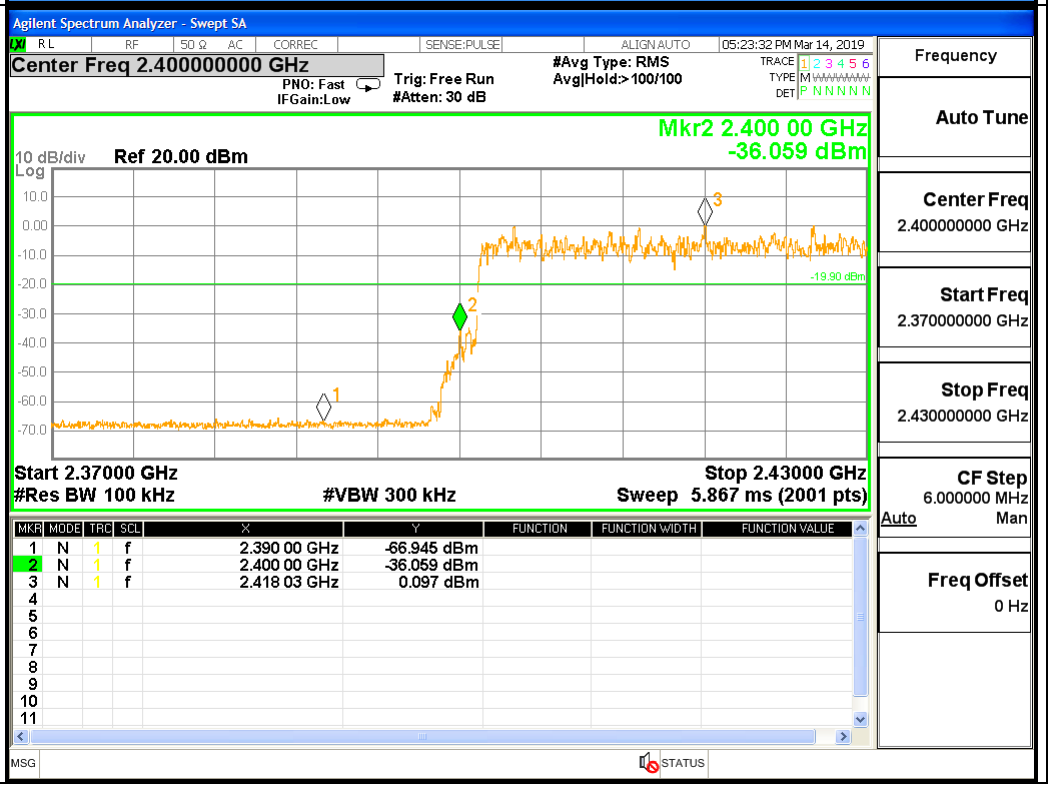
Test Graph

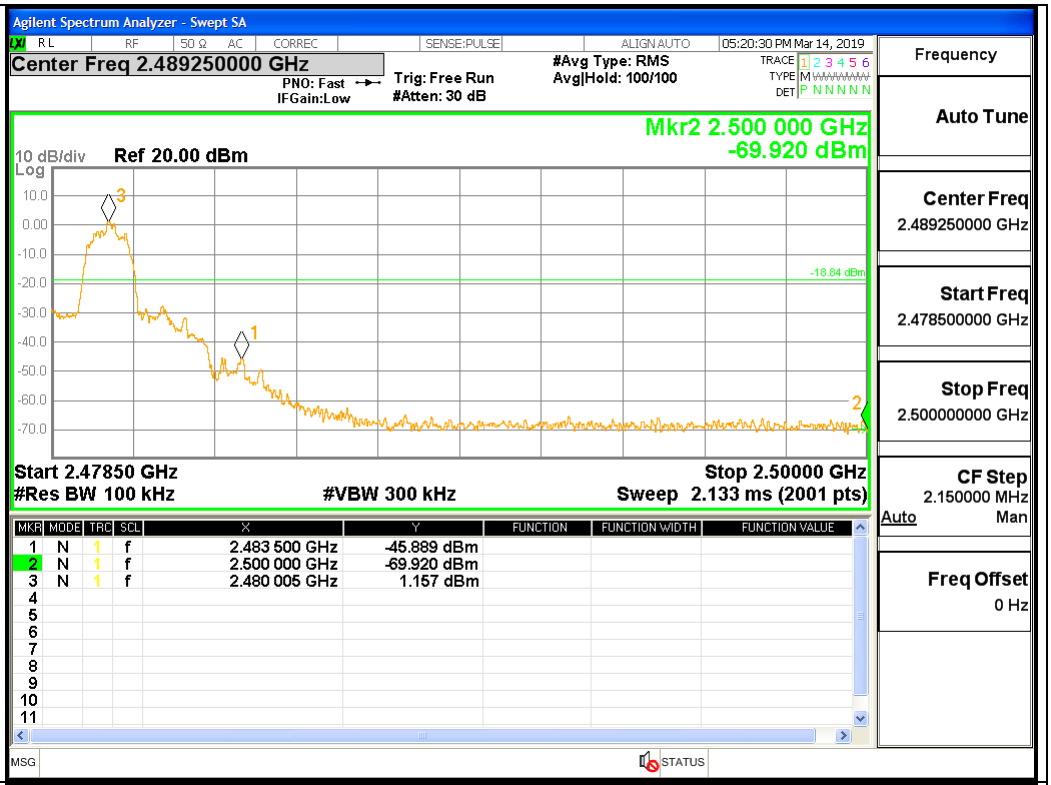
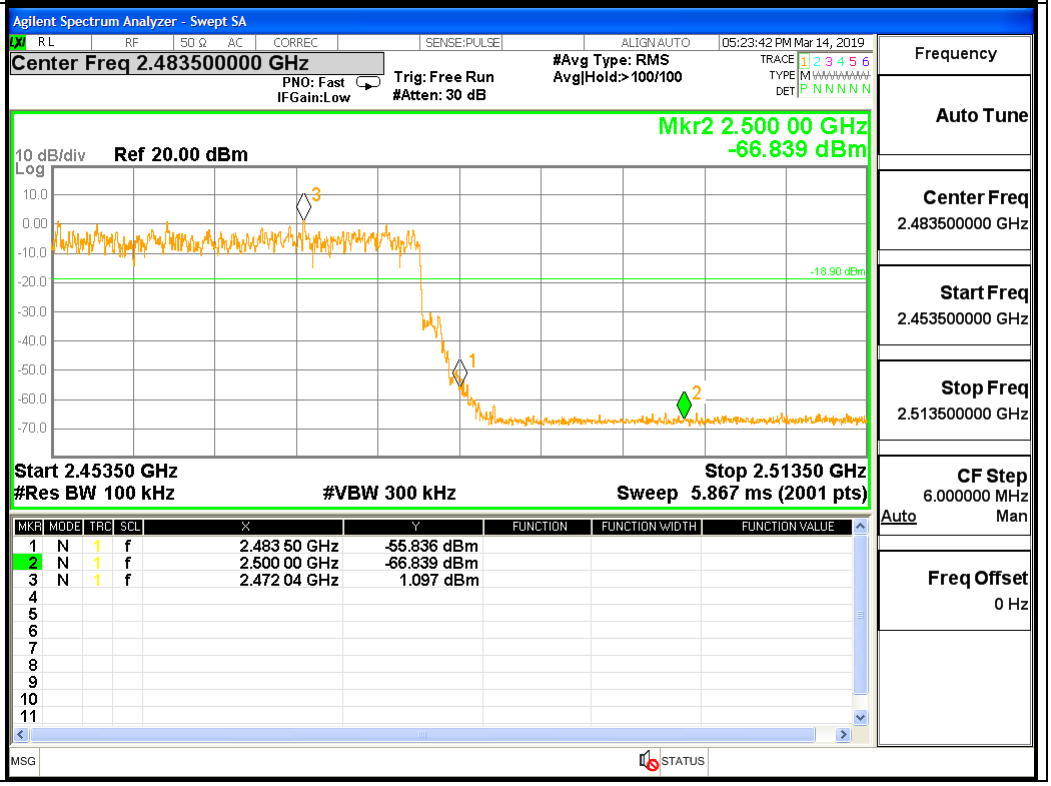
Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

GFSK/HCH/No Hop	
GFSK/HCH/Hop	

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

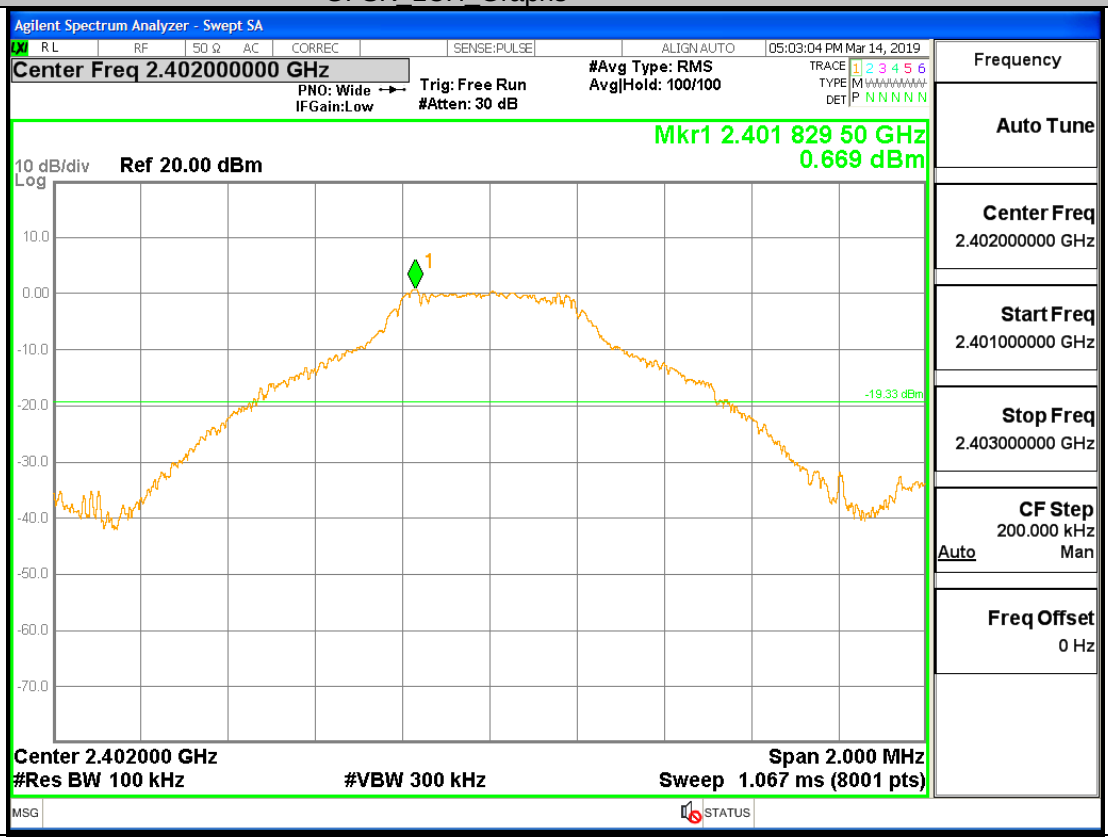
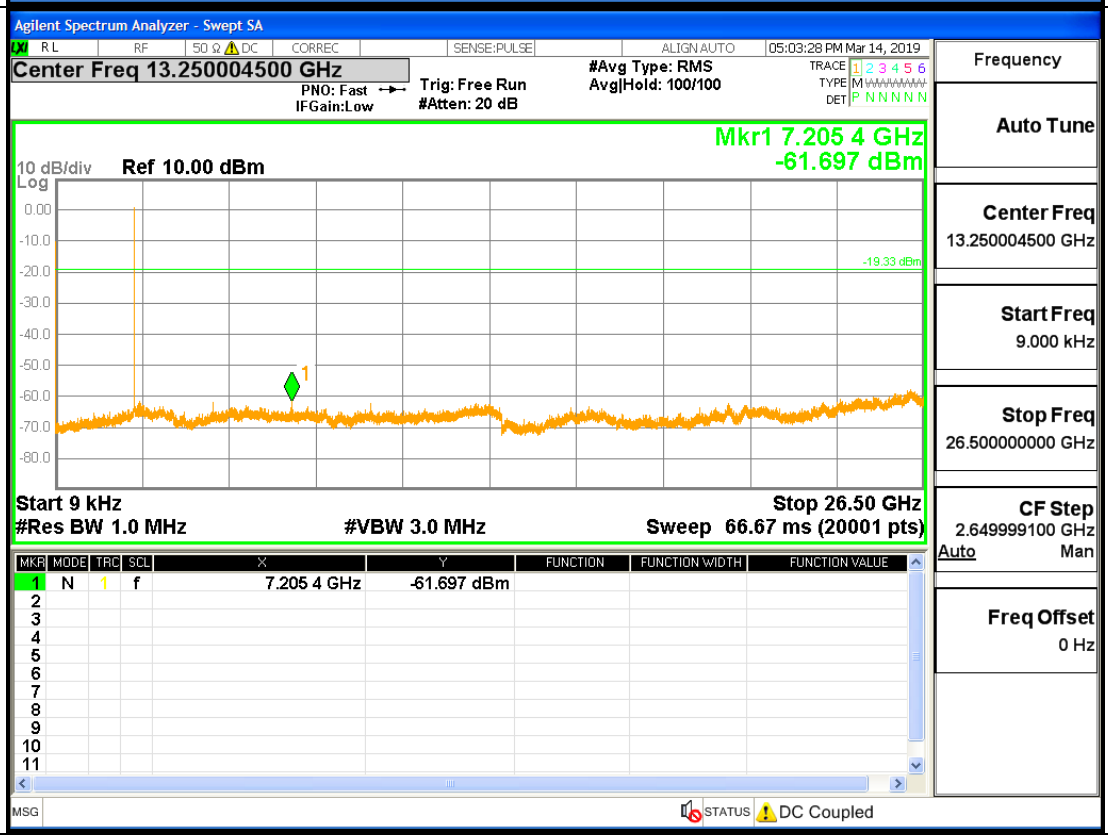
π/4DQPSK/HCH/No Hop	
π/4DQPSK/HCH/Hop	

8DPSK/LCH/No Hop	
8DPSK/LCH/Hop	

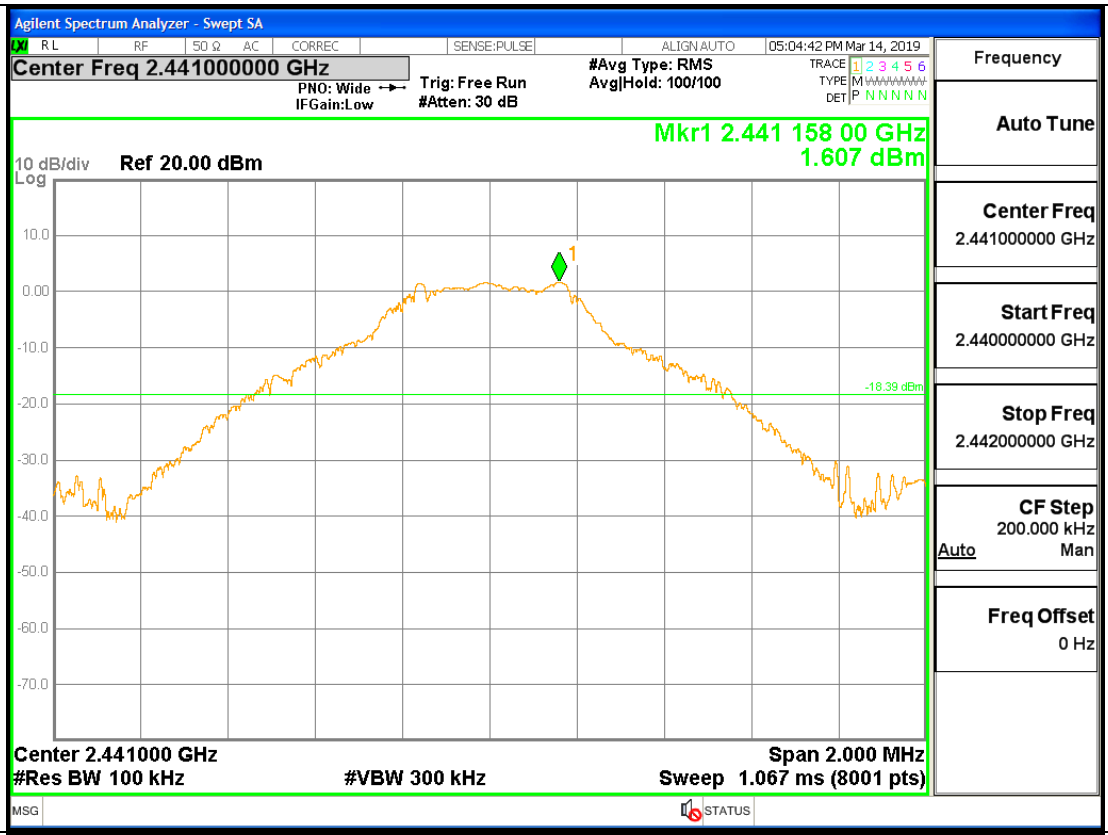
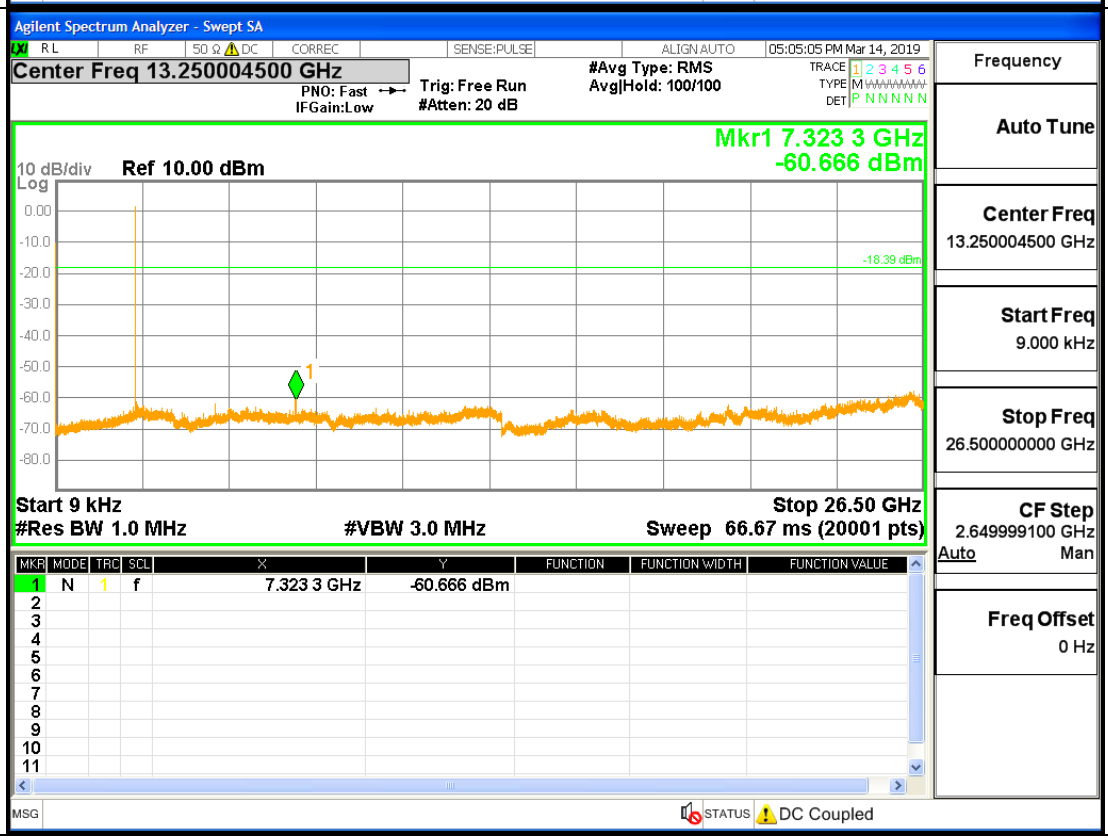
8DPSK/HCH/No Hop	
8DPSK/HCH/Hop	

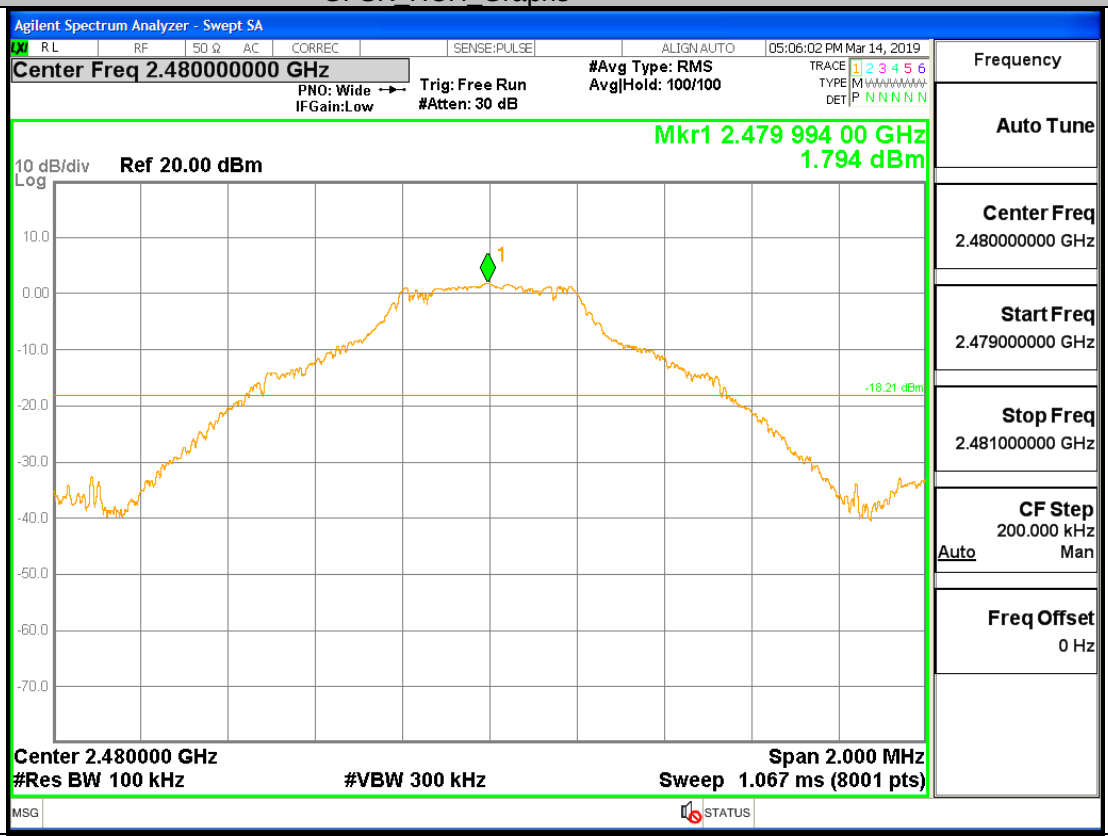
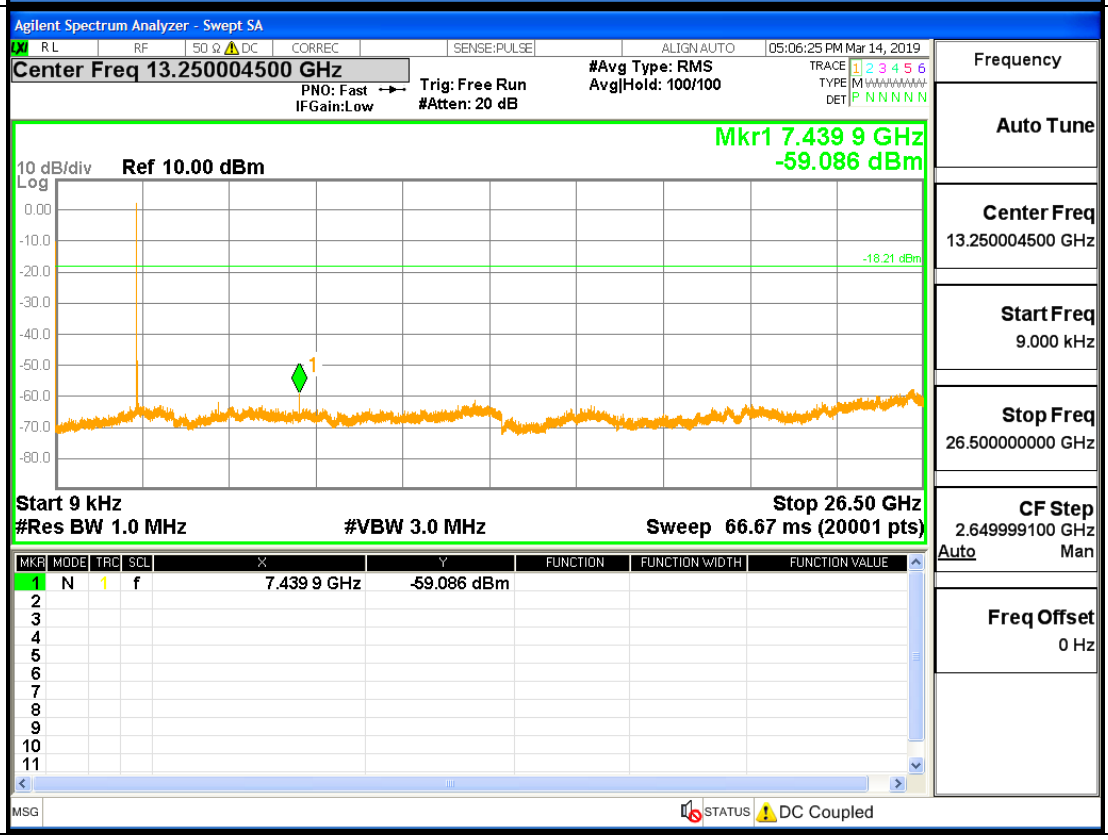
A.7 RF Conducted Spurious Emissions

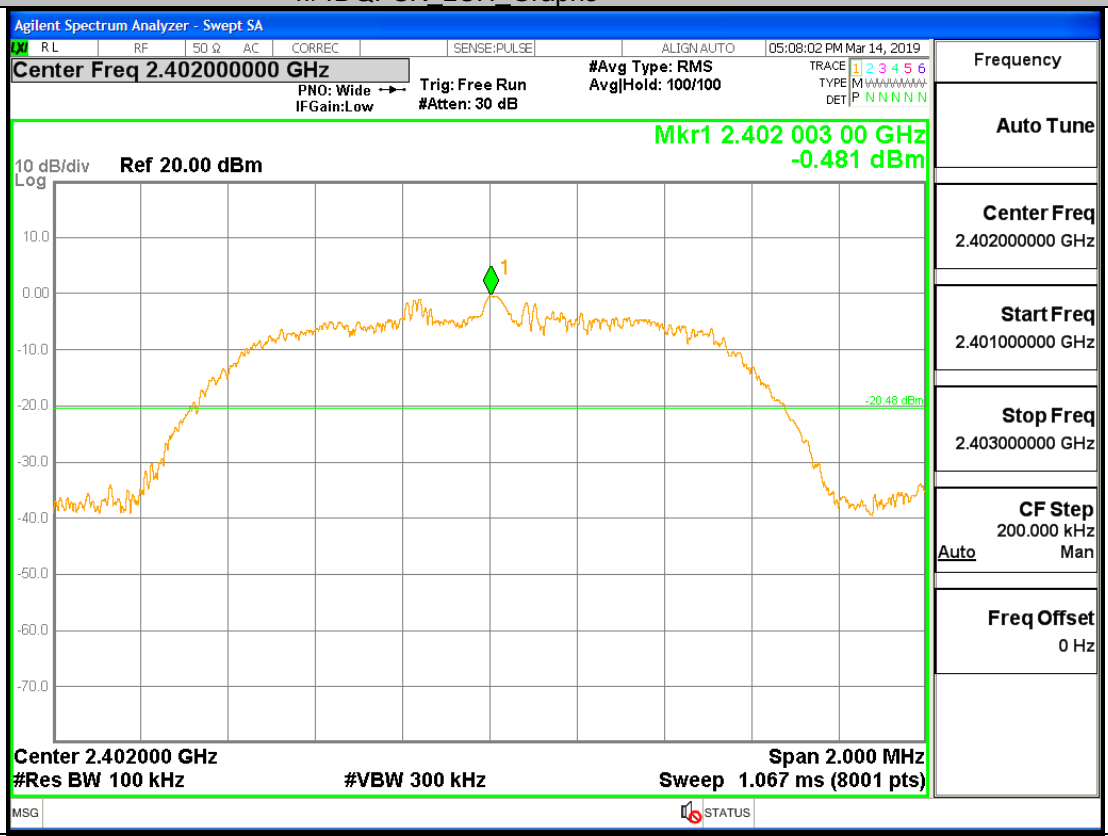
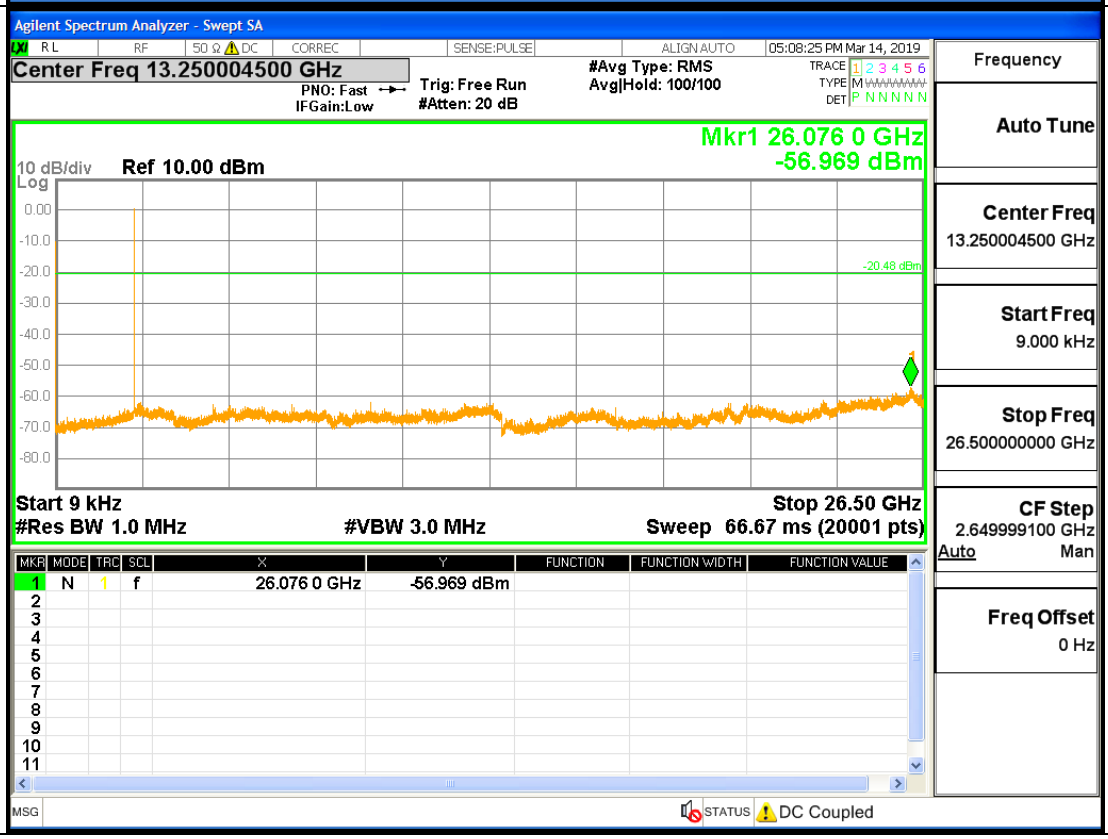
Test Graph

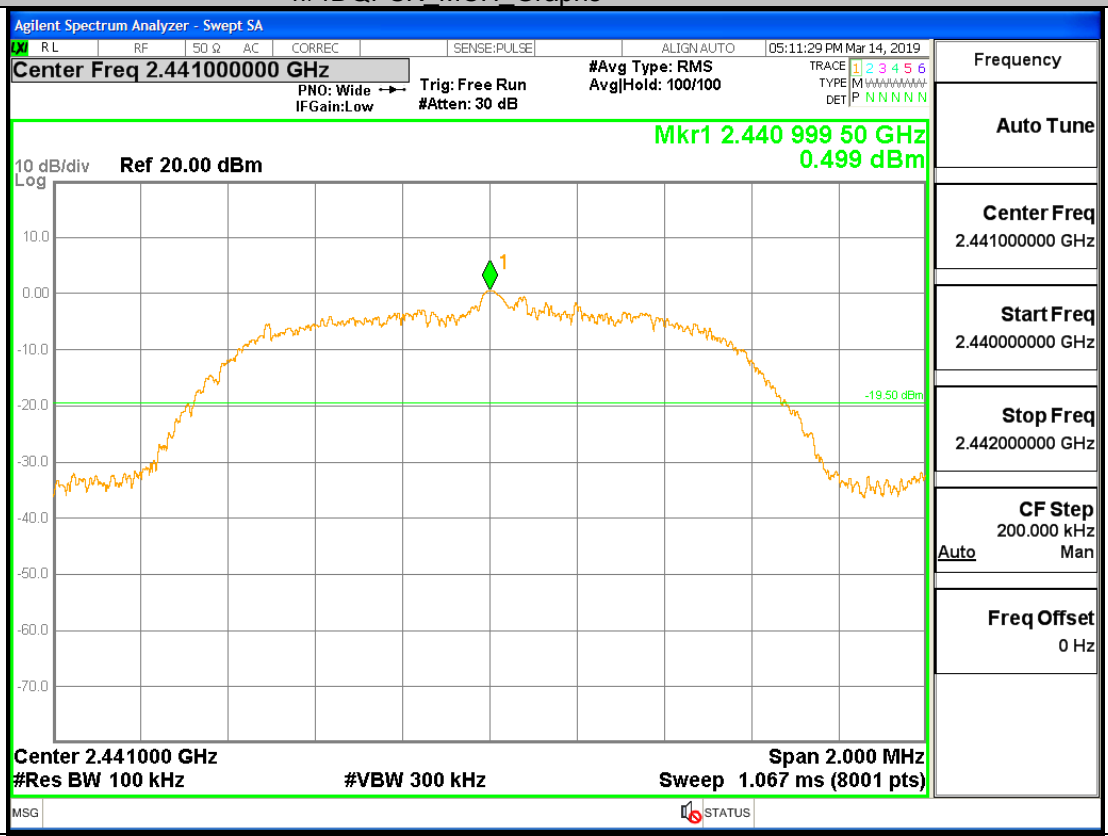
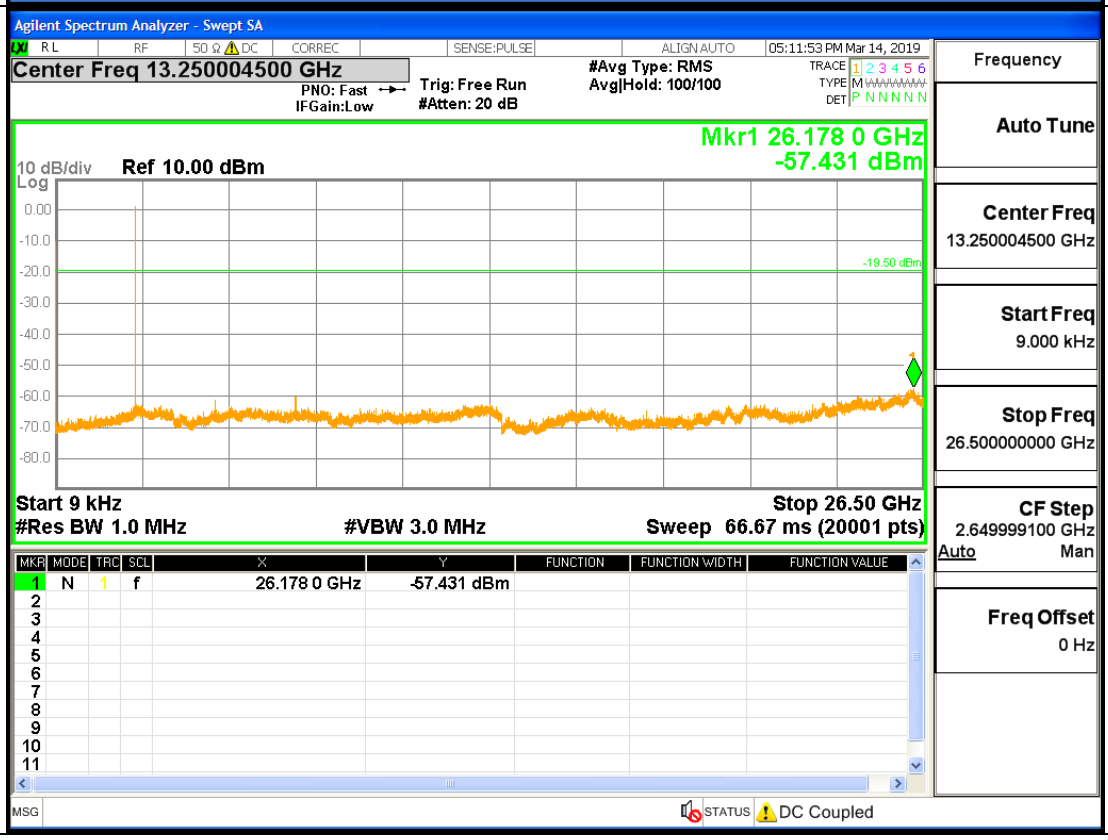
GFSK_LCH_Graphs	
Pref	
Puw	

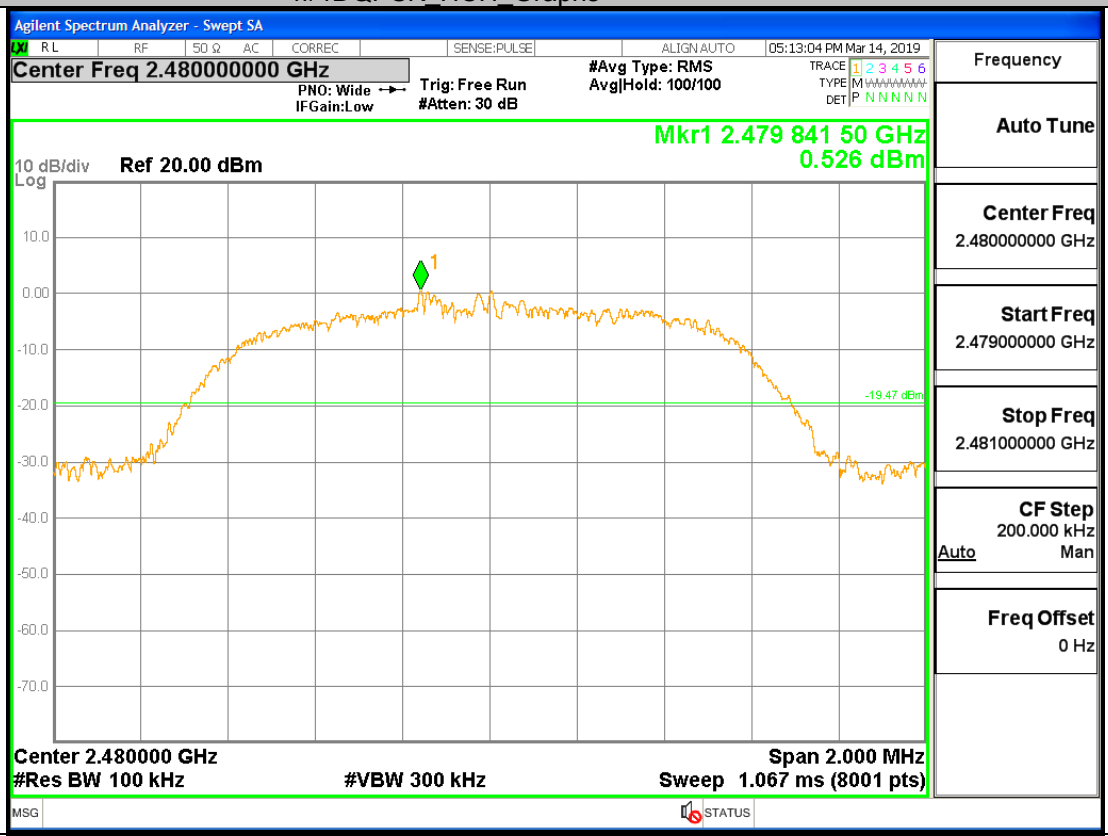
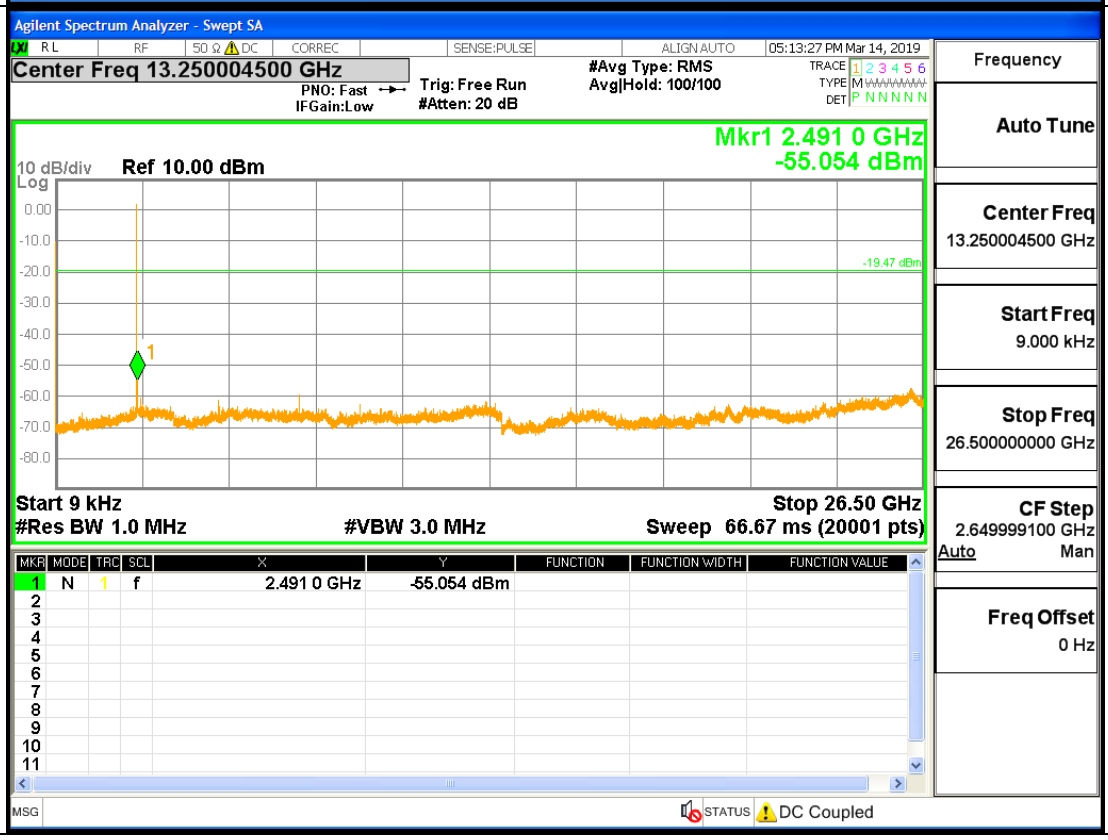
GFSK_MCH_Graphs

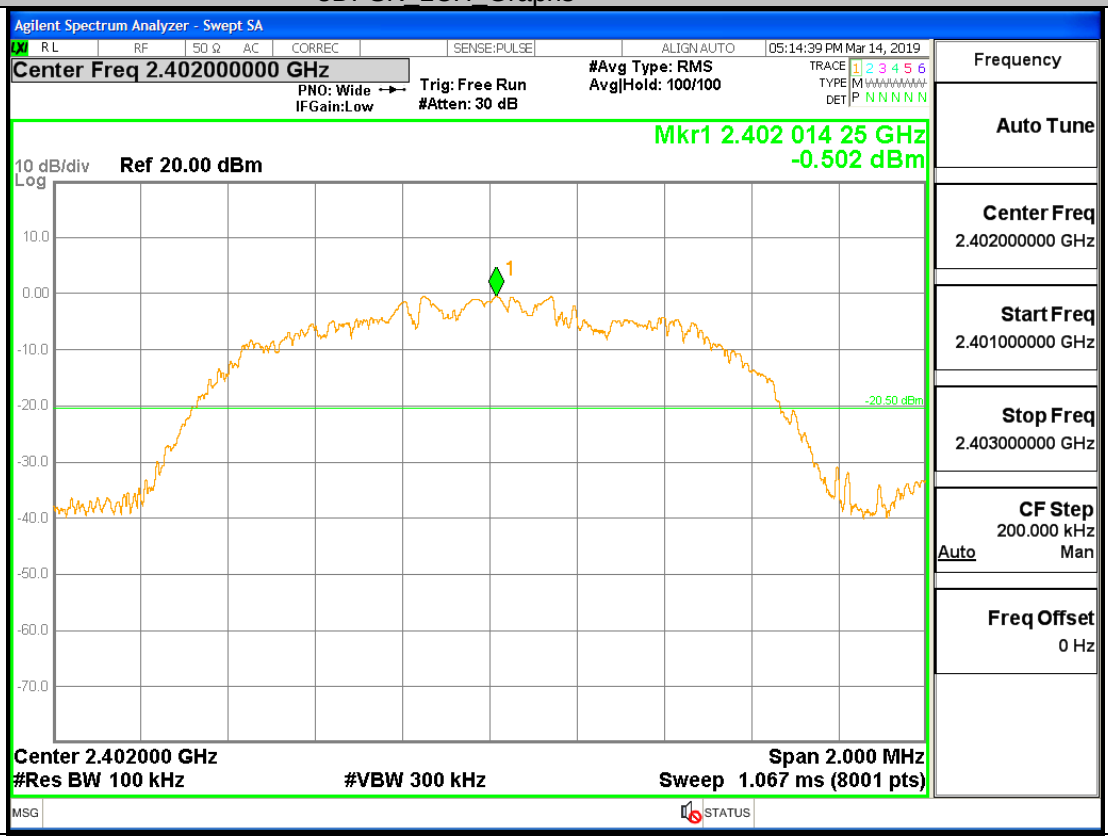
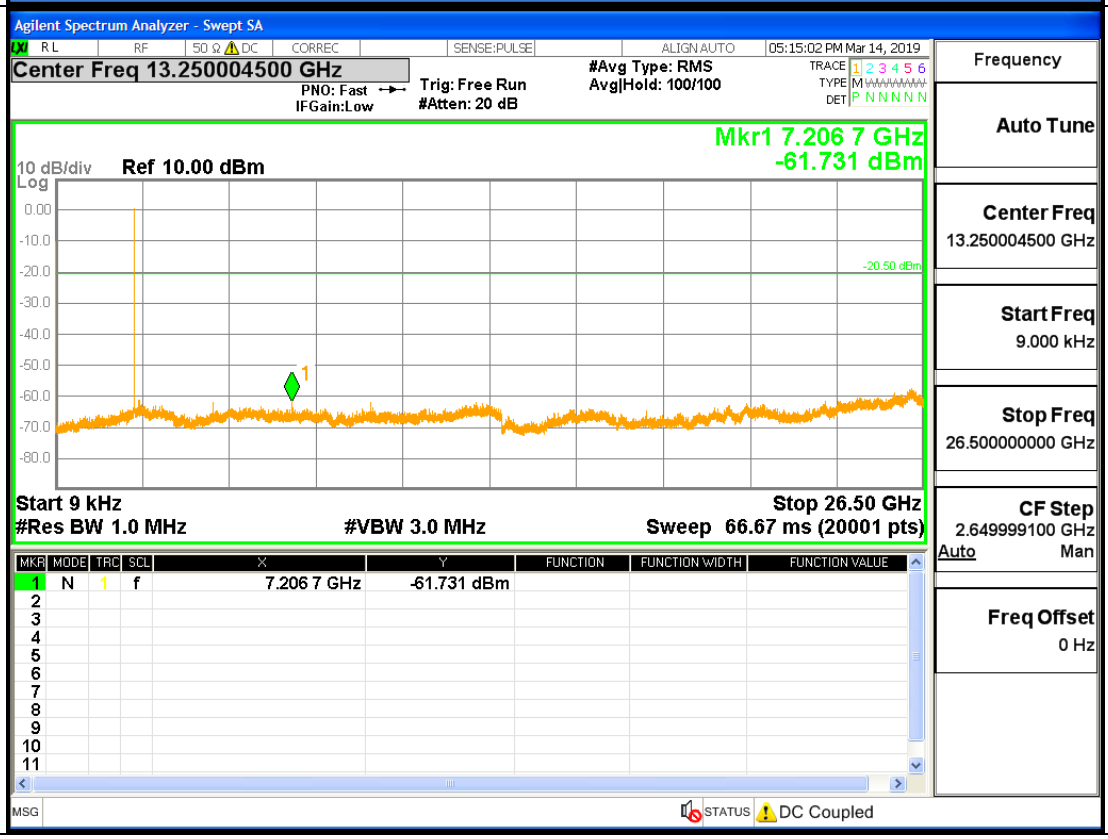
Pref	 Agilent Spectrum Analyzer - Swept SA Center Freq 2.441000000 GHz PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg|Hold: 100/100 05:04:42 PM Mar 14, 2019 Mkr1 2.441 158 00 GHz 1.607 dBm 10 dB/div Log Ref 20.00 dBm -18.39 dBm Center 2.441000 GHz #Res BW 100 kHz #VBW 300 kHz Span 2.000 MHz Sweep 1.067 ms (8001 pts) Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.440000000 GHz Stop Freq 2.442000000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz MSG STATUS
Puw	 Agilent Spectrum Analyzer - Swept SA Center Freq 13.250004500 GHz PNO: Fast IFGain:Low Trig: Free Run #Atten: 20 dB #Avg Type: RMS Avg|Hold: 100/100 05:05:05 PM Mar 14, 2019 Mkr1 7.323 3 GHz -60.666 dBm 10 dB/div Log Ref 10.00 dBm -18.39 dBm Start 9 kHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 26.50 GHz Sweep 66.67 ms (20001 pts) 1 N 1 f 7.323 3 GHz -60.666 dBm Frequency Auto Tune Center Freq 13.250004500 GHz Start Freq 9.000 kHz Stop Freq 26.500000000 GHz CF Step 2.649999100 GHz Auto Man Freq Offset 0 Hz MSG STATUS DC Coupled

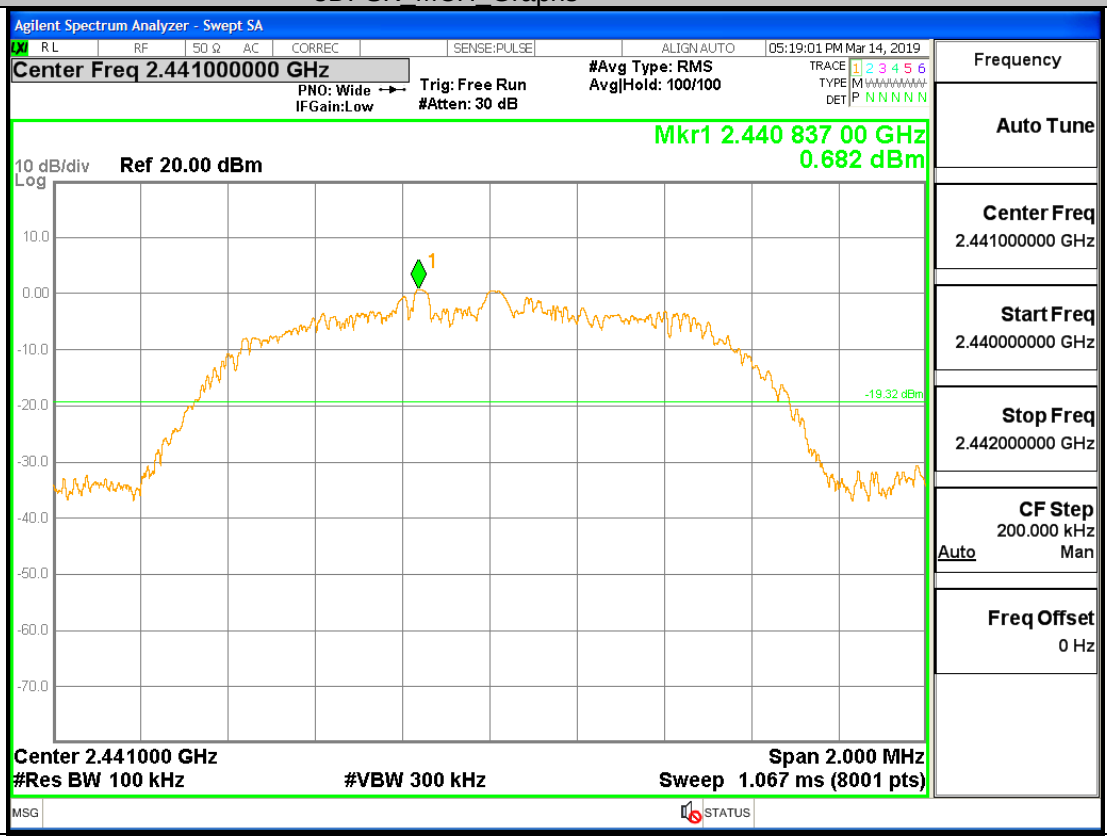
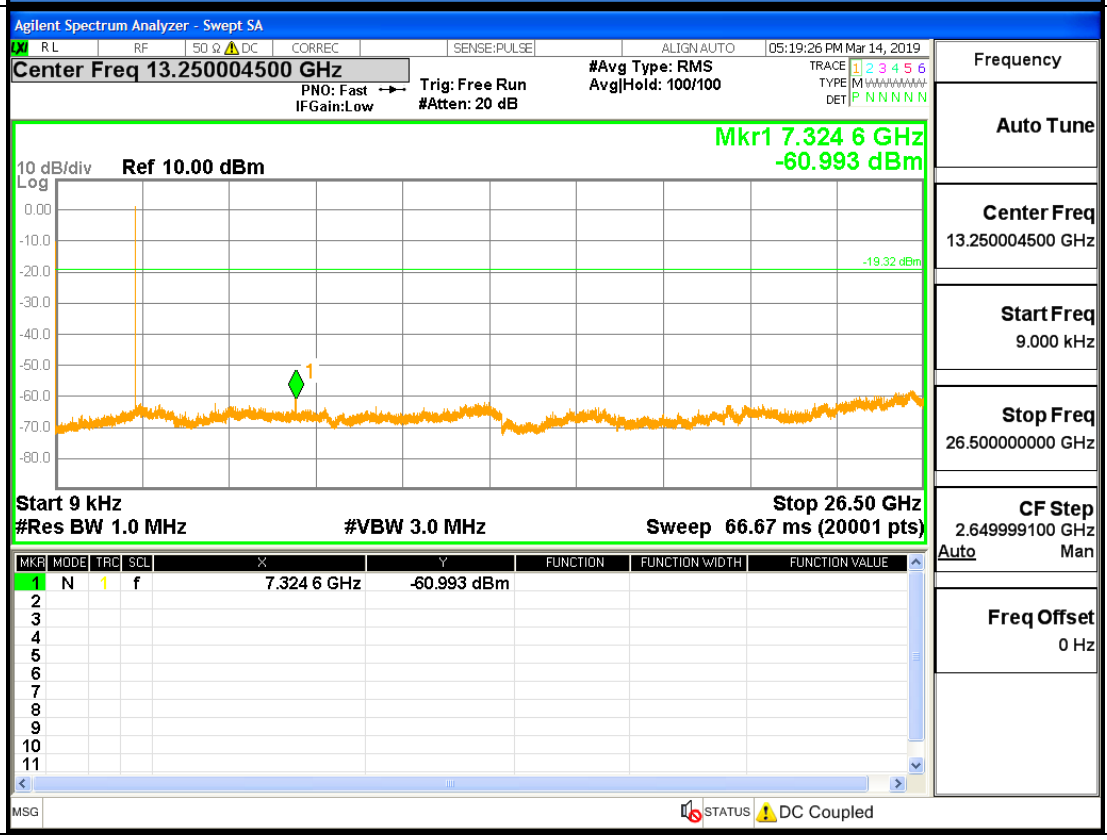
GFSK_HCH_Graphs	
Pref	
Puw	

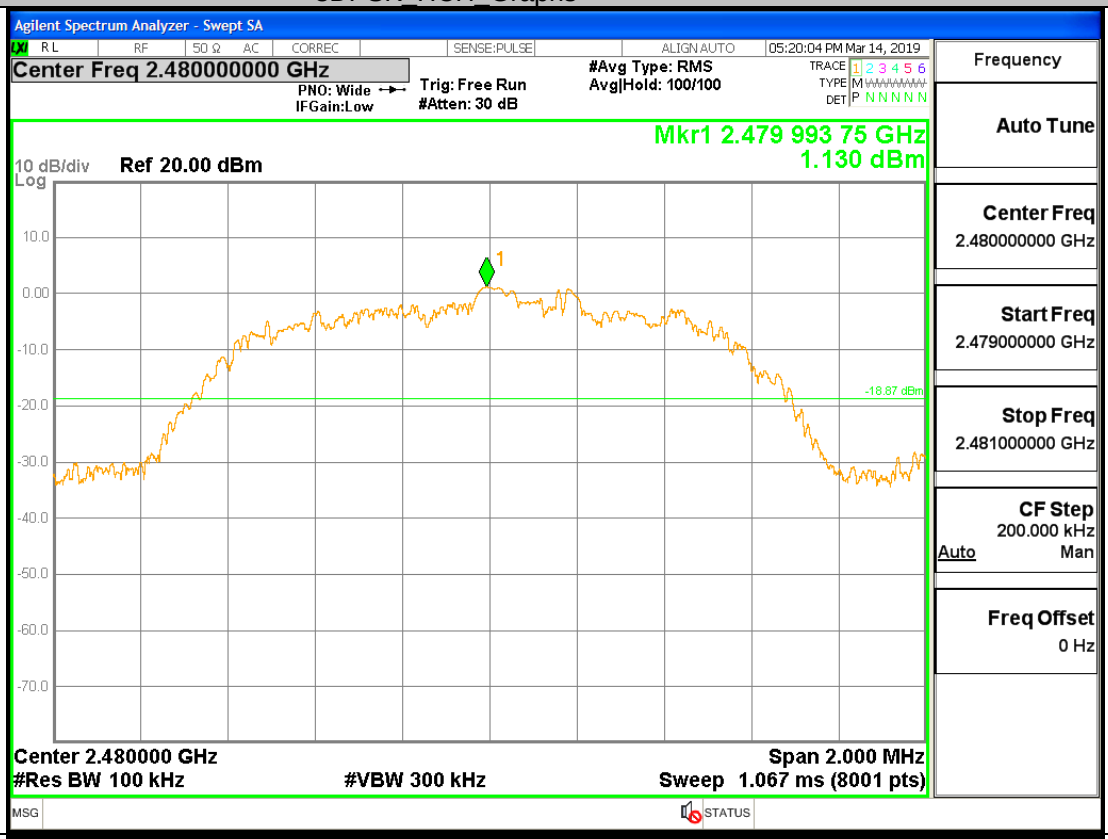
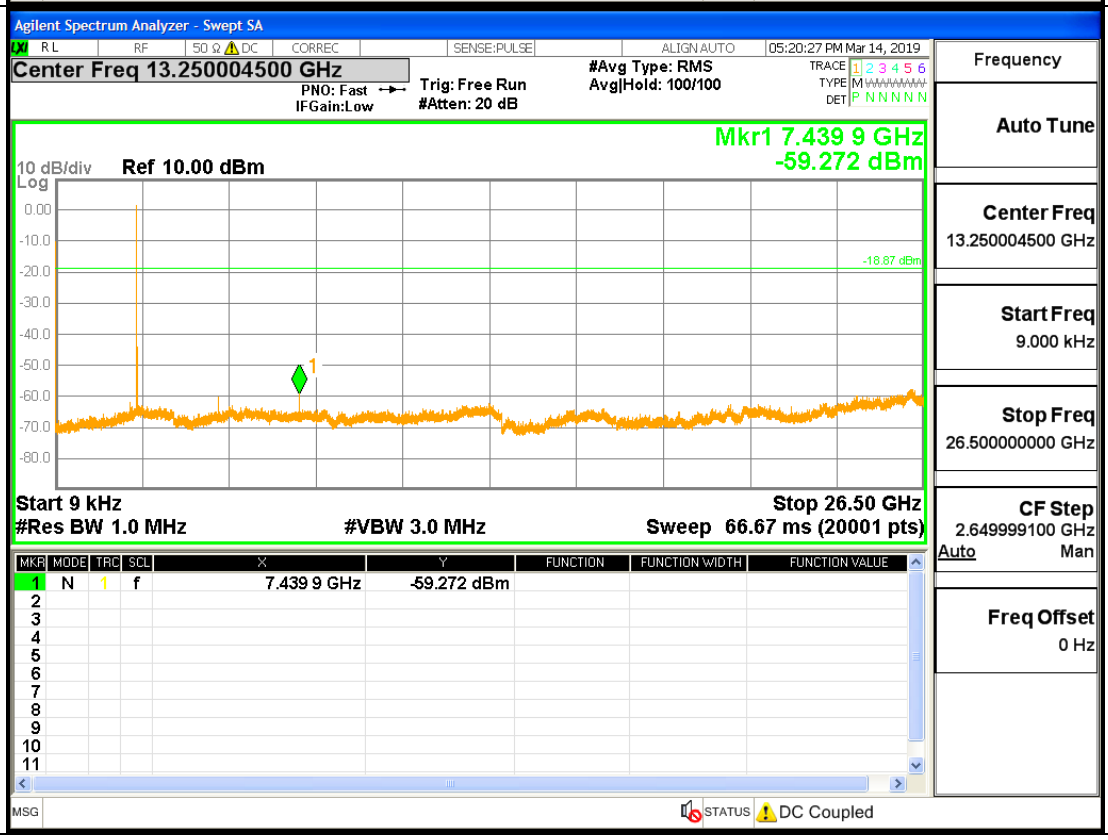
π/4DQPSK_LCH_Graphs	
Pref	
Puw	

π/4DQPSK_MCH_Graphs	
Pref	
Puw	

π/4DQPSK_HCH_Graphs	
Pref	
Puw	

8DPSK_LCH_Graphs	
Pref	
Puw	

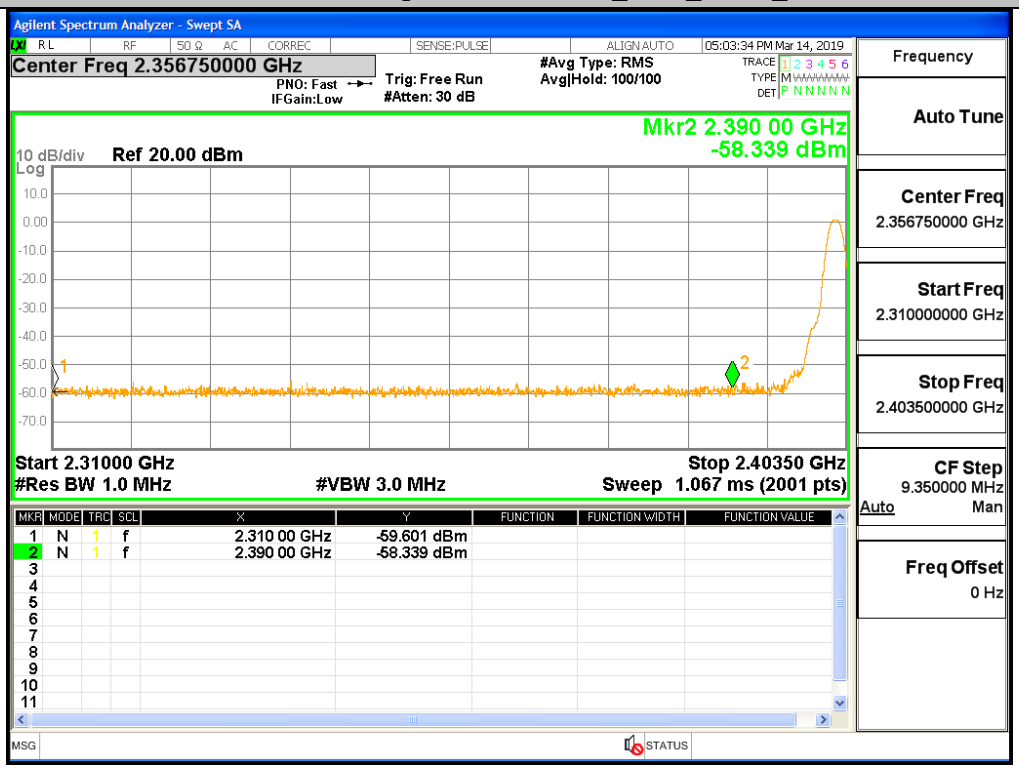
8DPSK_MCH_Graphs	
Pref	
Puw	

8DPSK_HCH_Graphs	
Pref	
Puw	

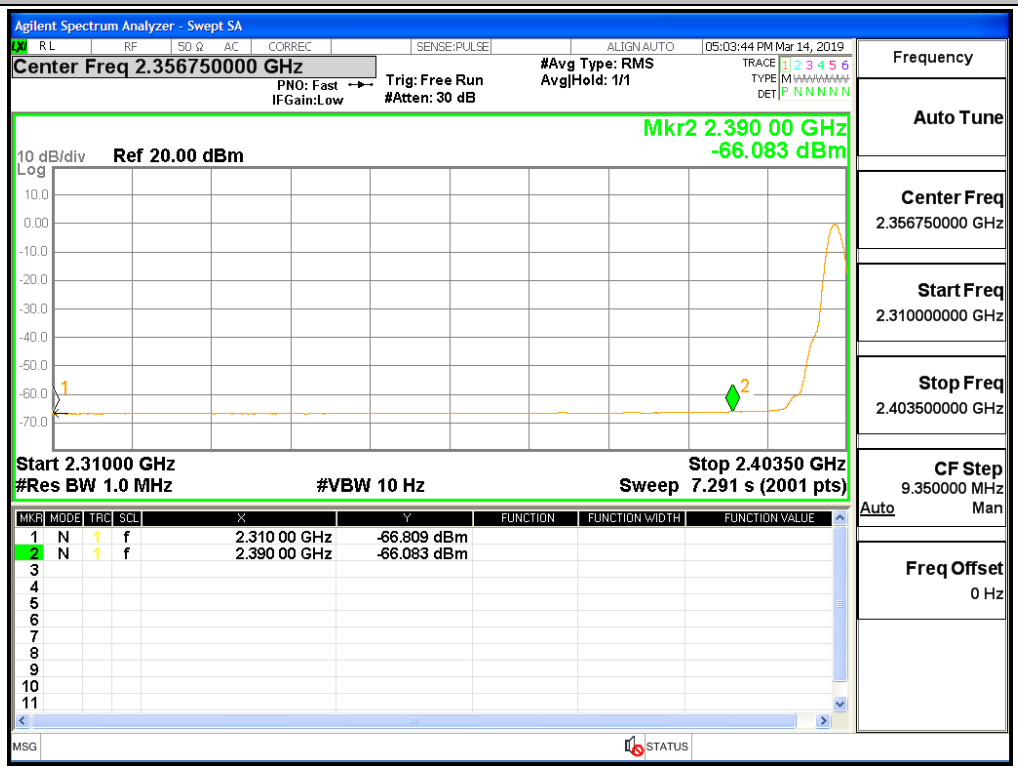
A.8 Restrict-band band-edge measurements

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310	2.00	0.00	-59.60	37.6	74	-66.81	30.39	54	Pass
1DH5	2402	2390	2.00	0.00	-58.34	38.86	74	-66.08	31.12	54	Pass
1DH5	2480	2483.5	2.00	0.00	-41.97	55.23	74	-45.97	51.23	54	Pass
1DH5	2480	2500	2.00	0.00	-58.78	38.42	74	-65.8	31.40	54	Pass
2DH5	2402	2310	2.00	0.00	-58.13	39.07	74	-66.82	30.38	54	Pass
2DH5	2402	2390	2.00	0.00	-59.39	37.81	74	-66.26	30.94	54	Pass
2DH5	2480	2483.5	2.00	0.00	-41.48	55.72	74	-46.7	50.50	54	Pass
2DH5	2480	2500	2.00	0.00	-59.39	37.81	74	-65.81	31.39	54	Pass
3DH5	2402	2310	2.00	0.00	-58.36	38.84	74	-66.81	30.39	54	Pass
3DH5	2402	2390	2.00	0.00	-59.89	37.31	74	-66.23	30.97	54	Pass
3DH5	2480	2483.5	2.00	0.00	-40.11	57.09	74	-46.65	50.55	54	Pass
3DH5	2480	2500	2.00	0.00	-59.24	37.96	74	-65.83	31.37	54	Pass

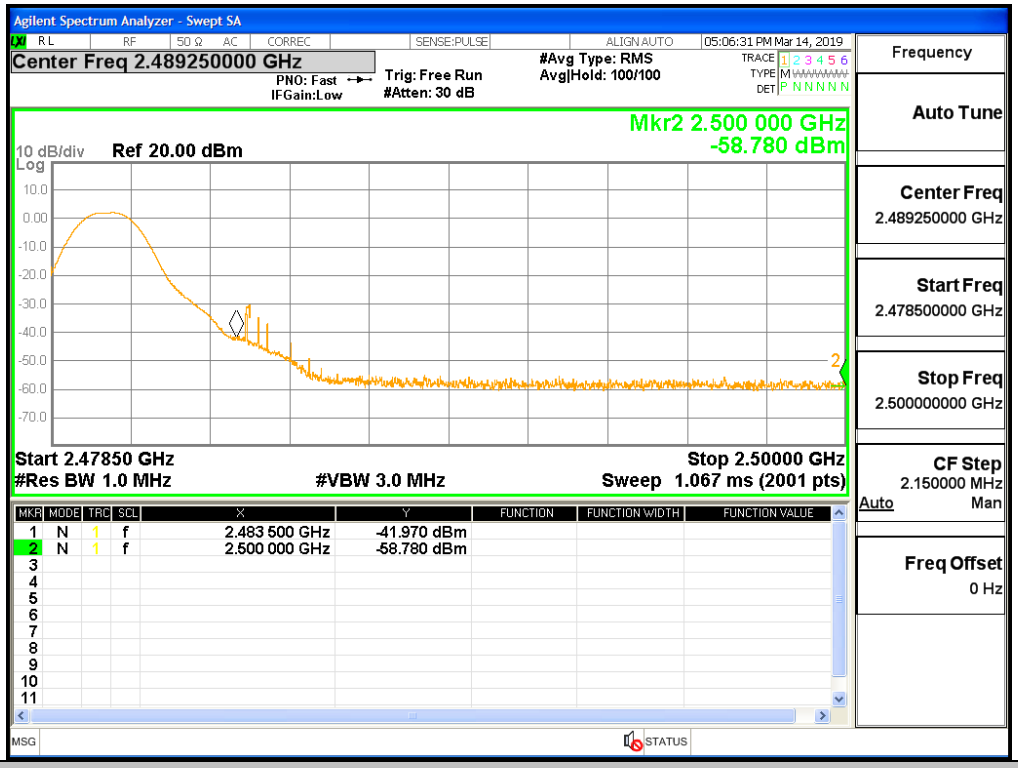
Restrict-band band-edge measurements_2402_PEAK_DH5



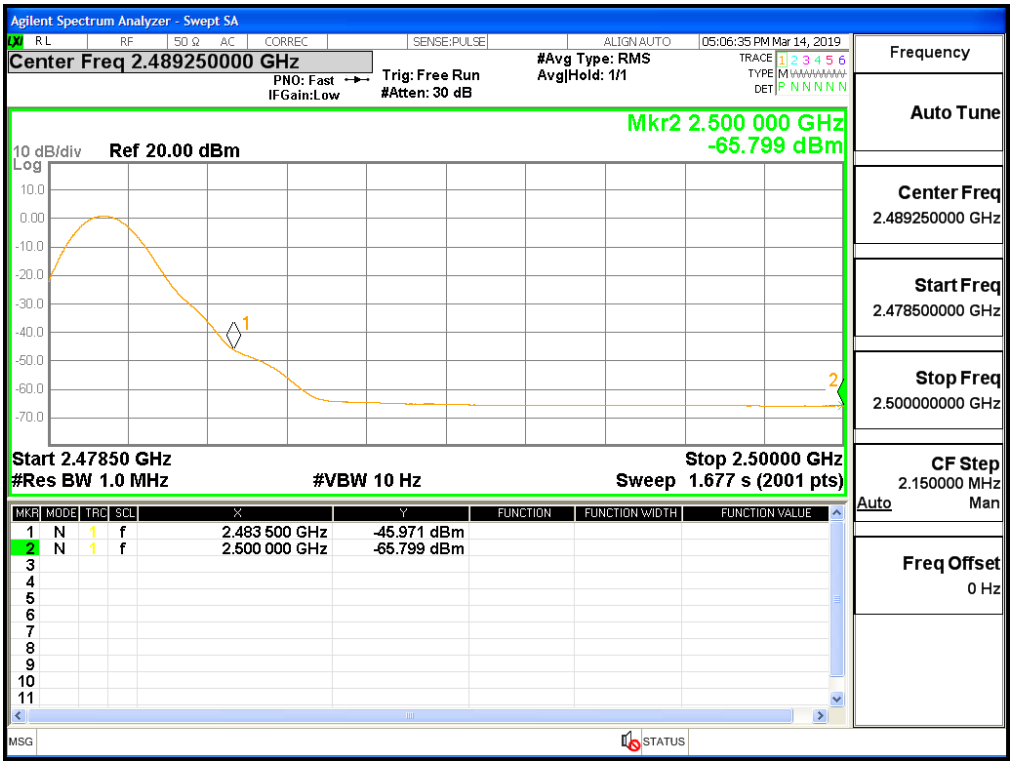
Restrict-band band-edge measurements_2402_AV_DH5



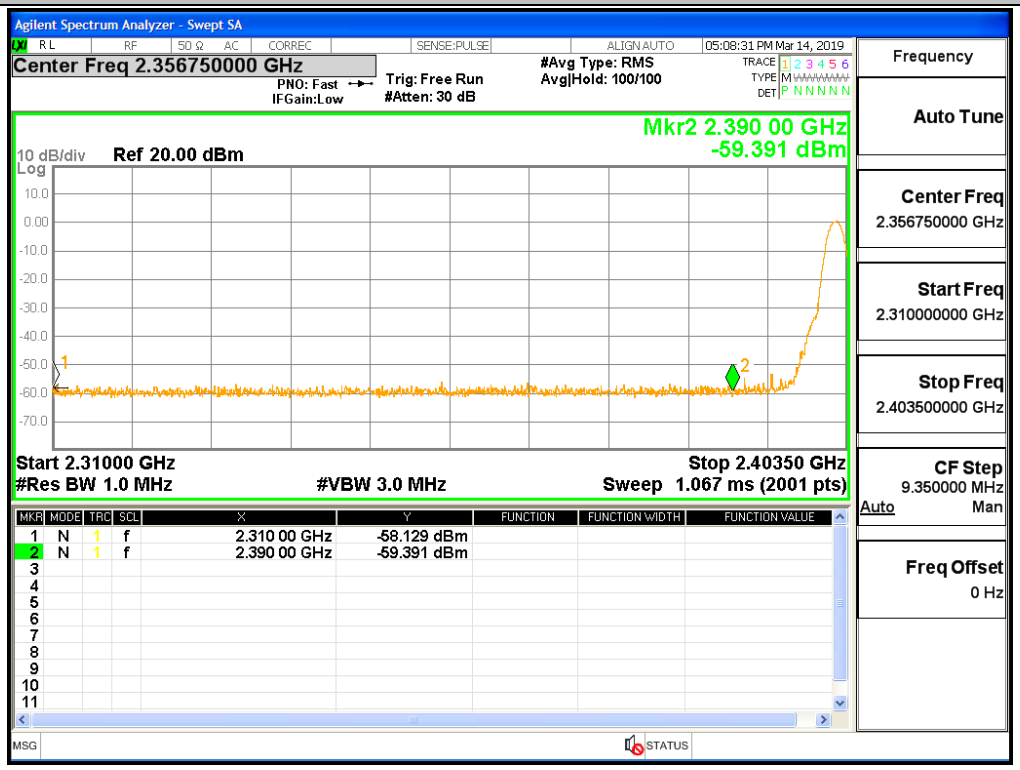
Restrict-band band-edge measurements_2480_PEAK_DH5



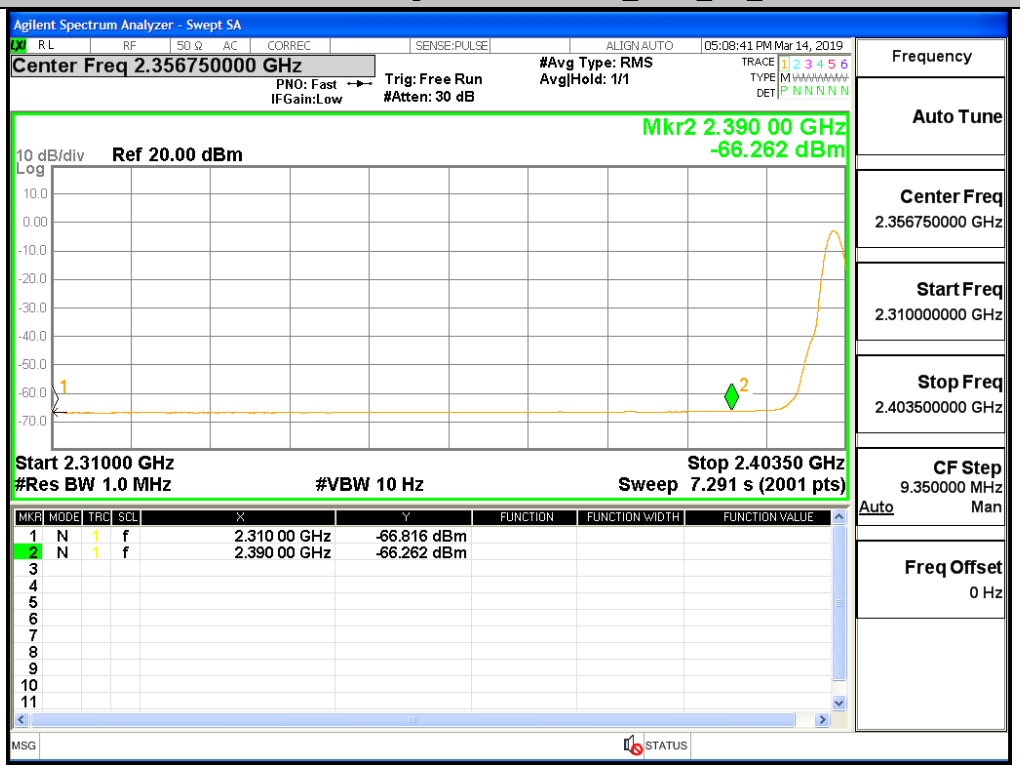
Restrict-band band-edge measurements_2480_AV_DH5



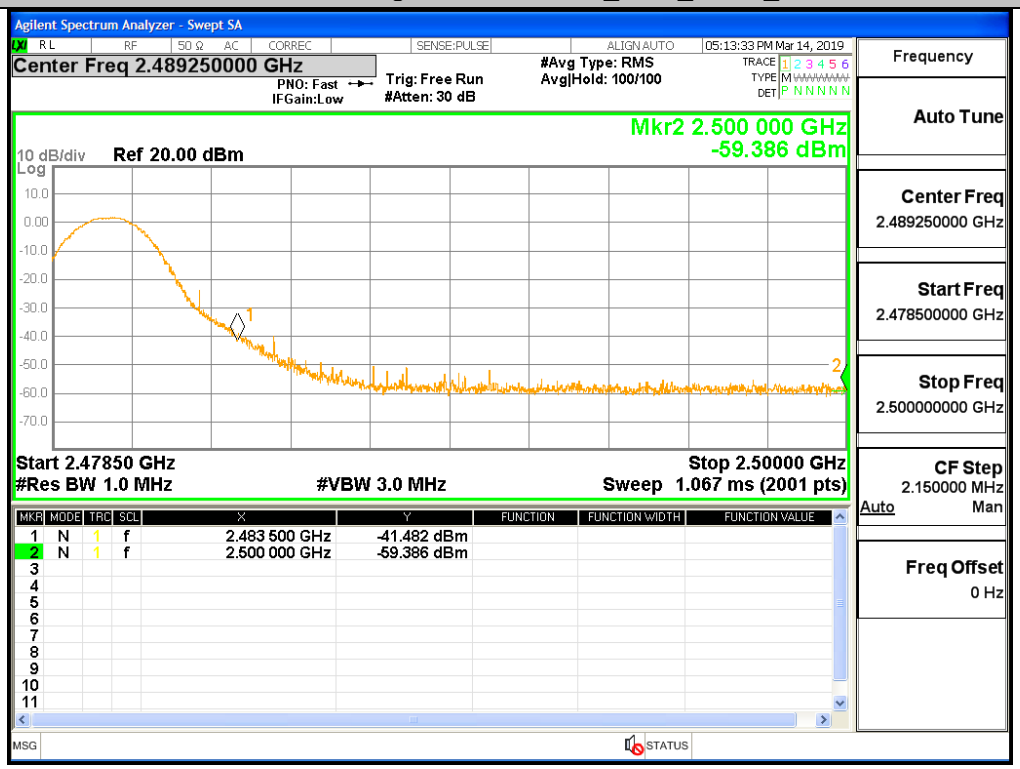
Restrict-band band-edge measurements_2402_PEAK_2DH5



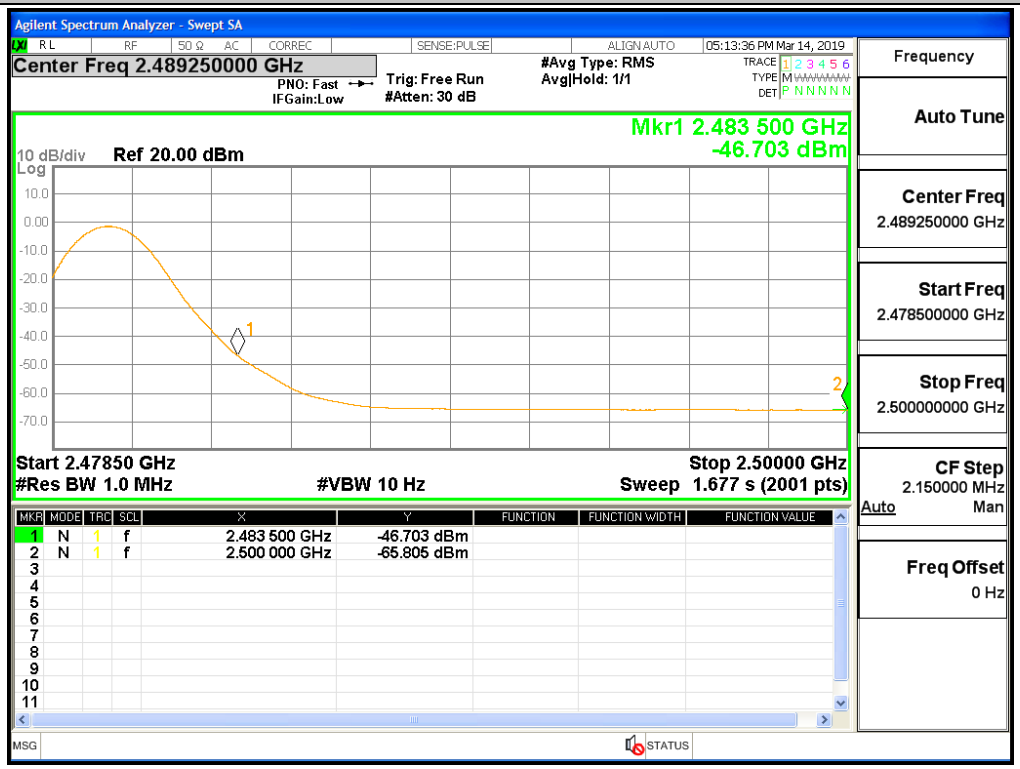
Restrict-band band-edge measurements_2402_AV_2DH5



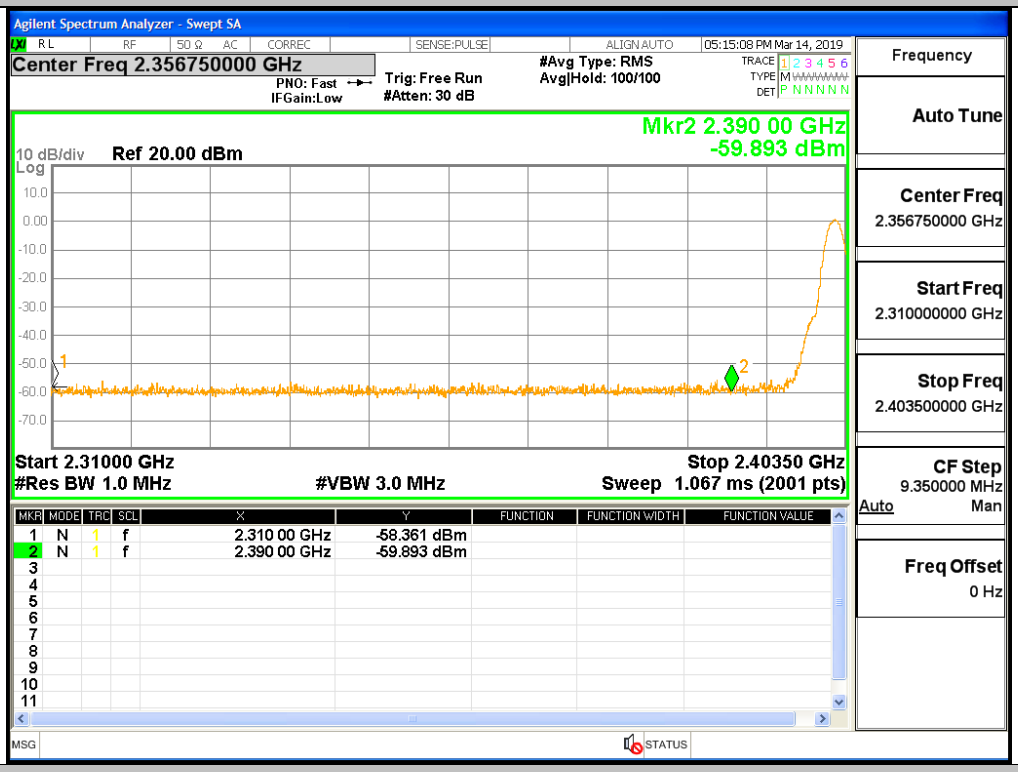
Restrict-band band-edge measurements_2480_PEAK_2DH5



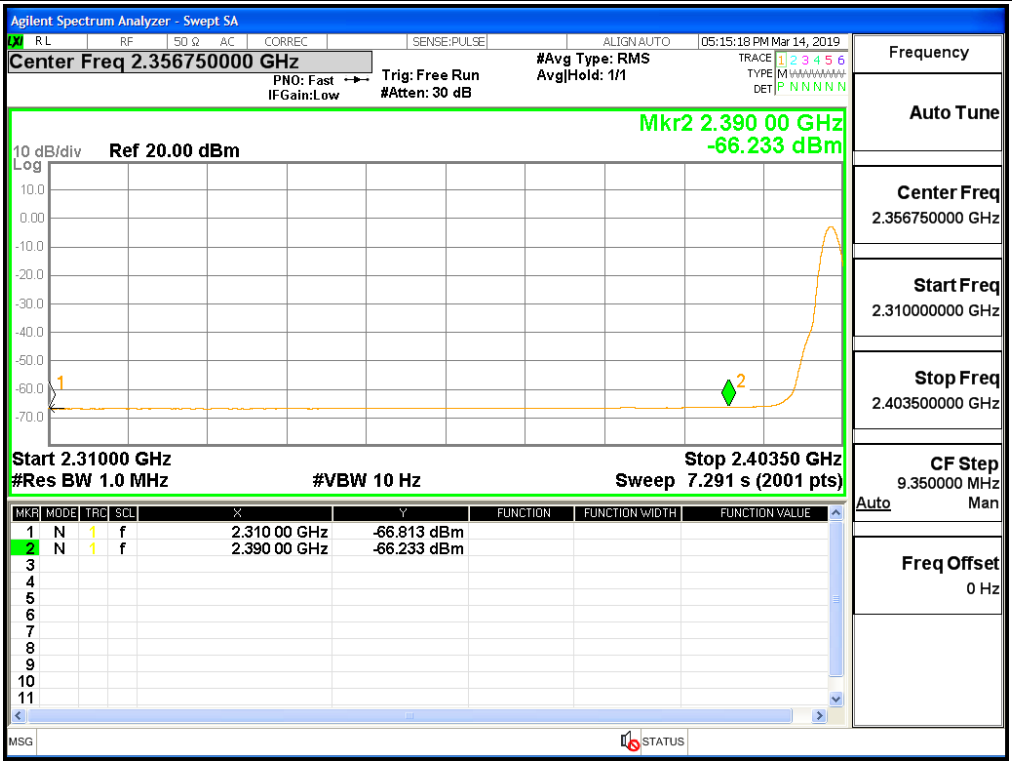
Restrict-band band-edge measurements_2480_AV_2DH5



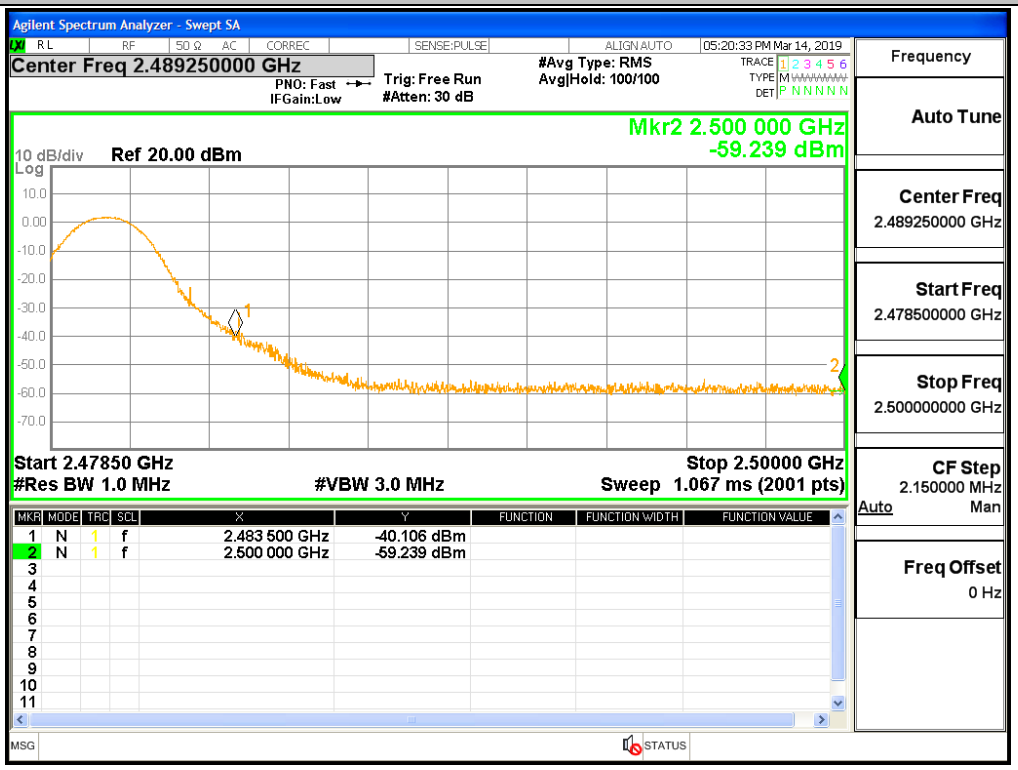
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5