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

Product Name: TRUE WIRELESS EARBUDS WITH CHARGING CASE

Trade Mark: N/A

Test Model: RT19

FCC ID: 2ATOY-RT19

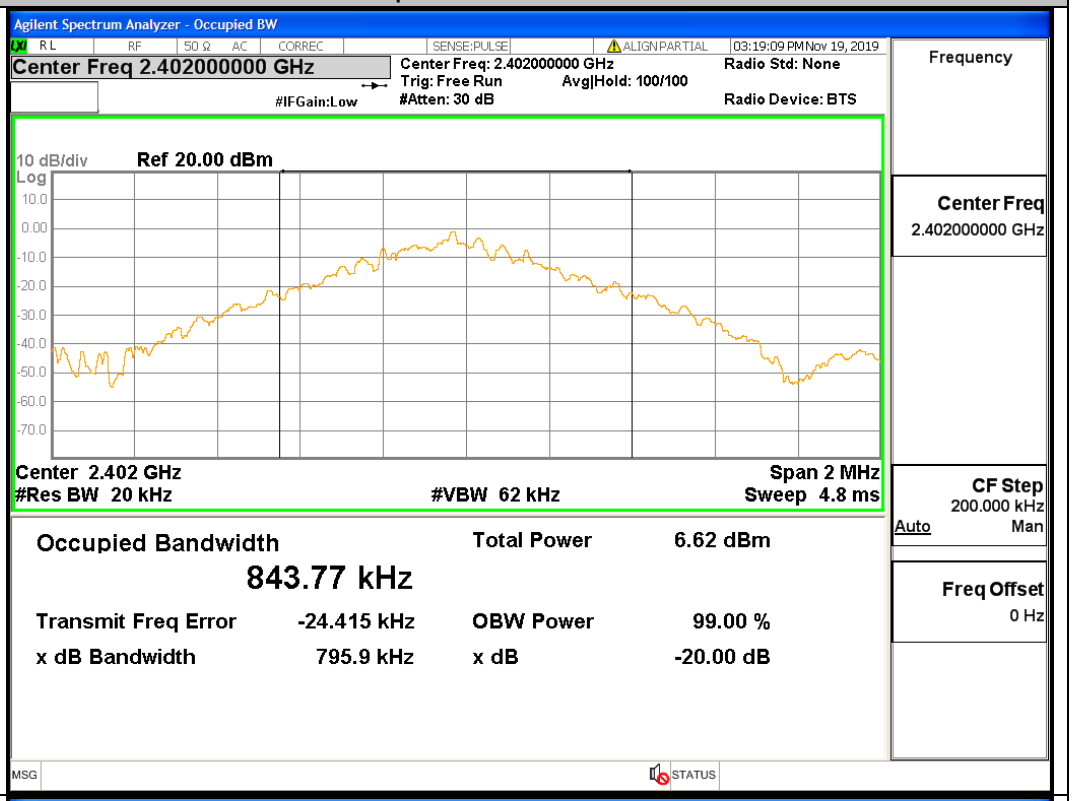
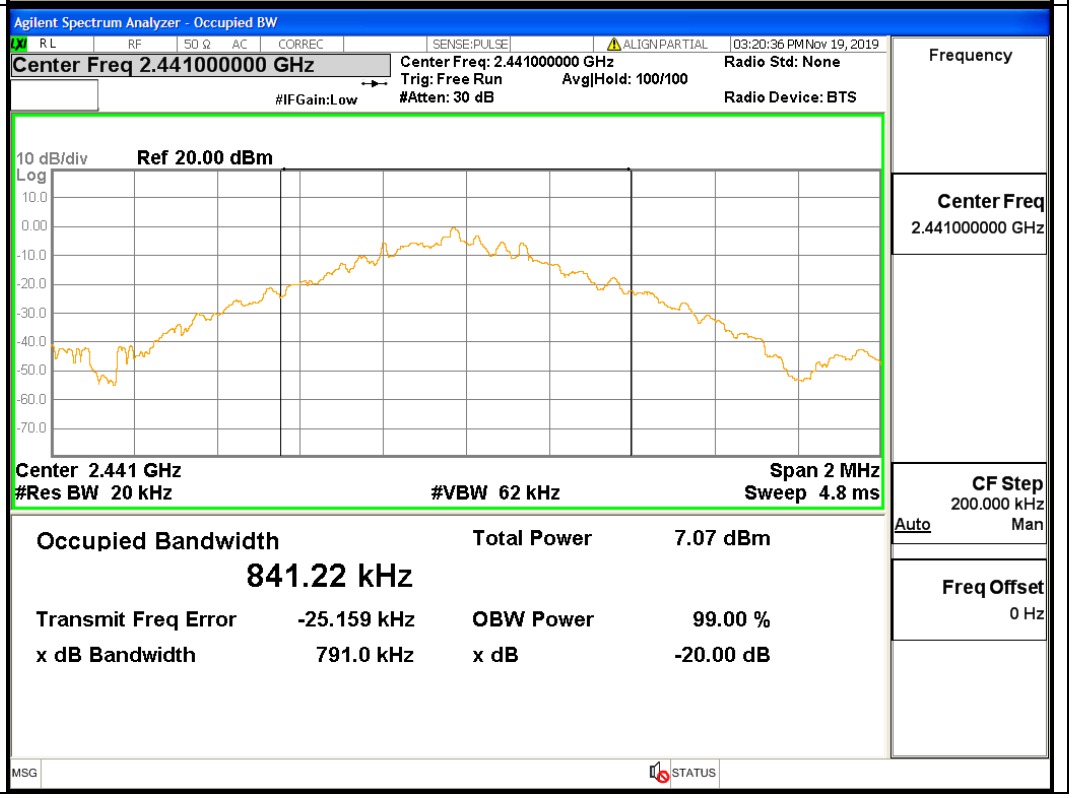
Environmental Conditions

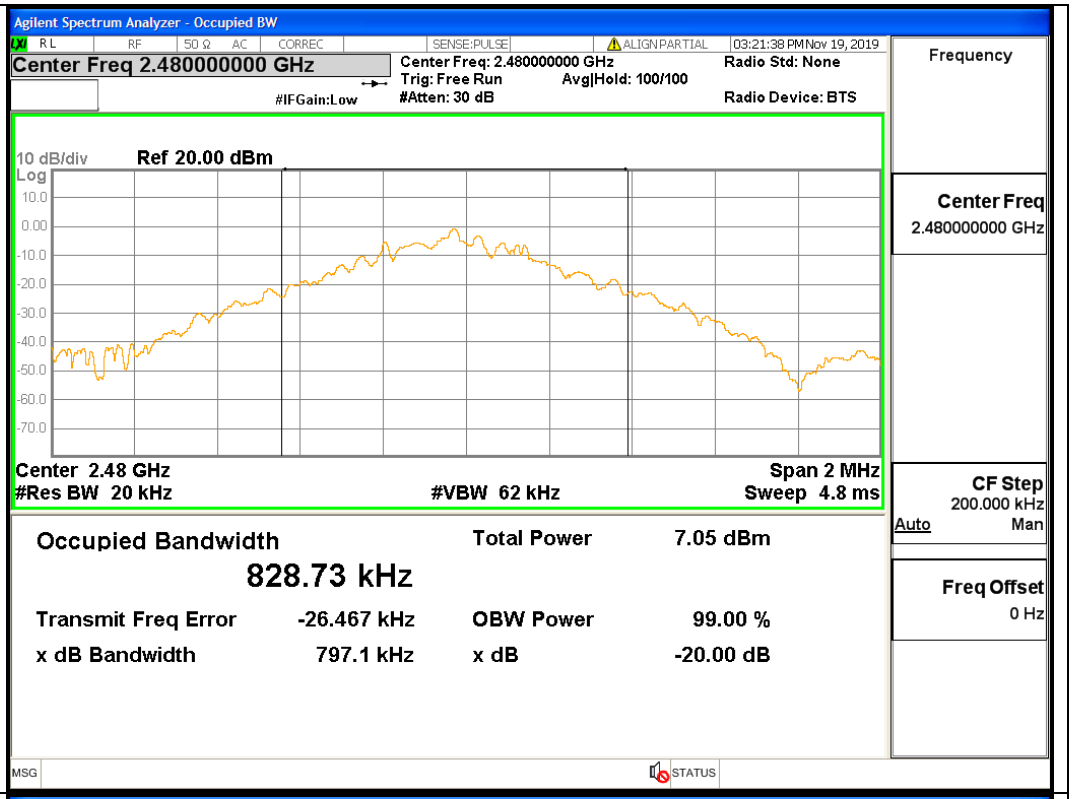
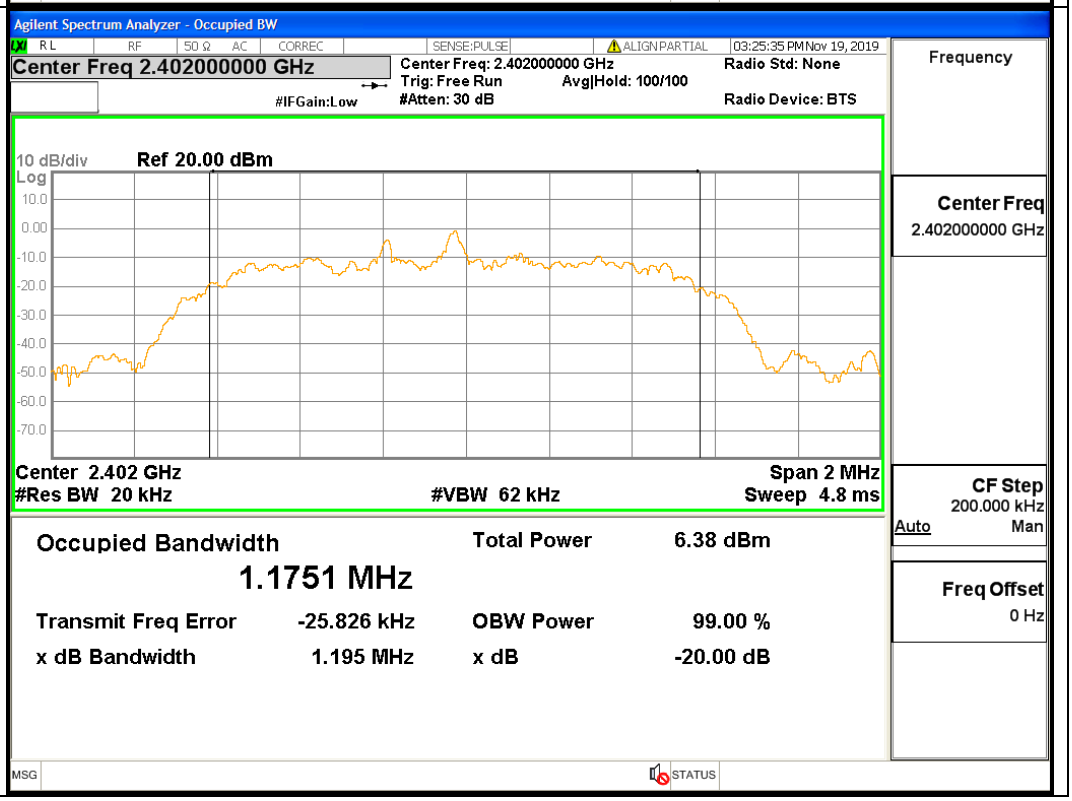
Temperature:	22.7° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

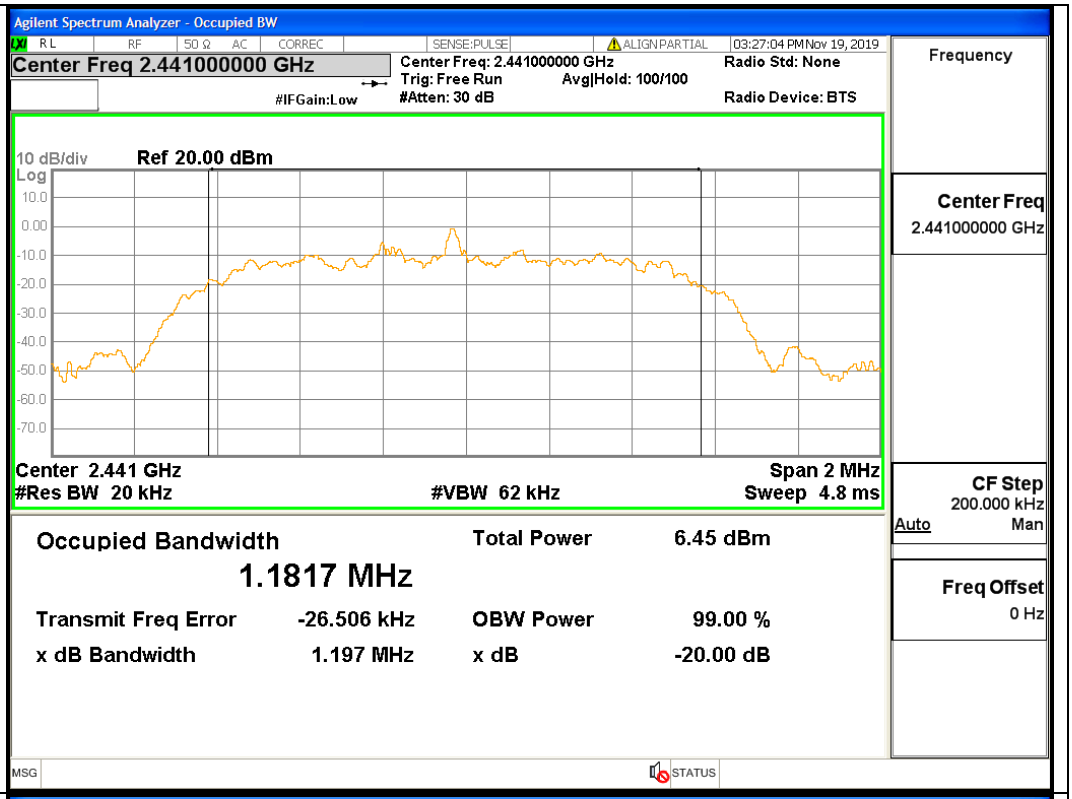
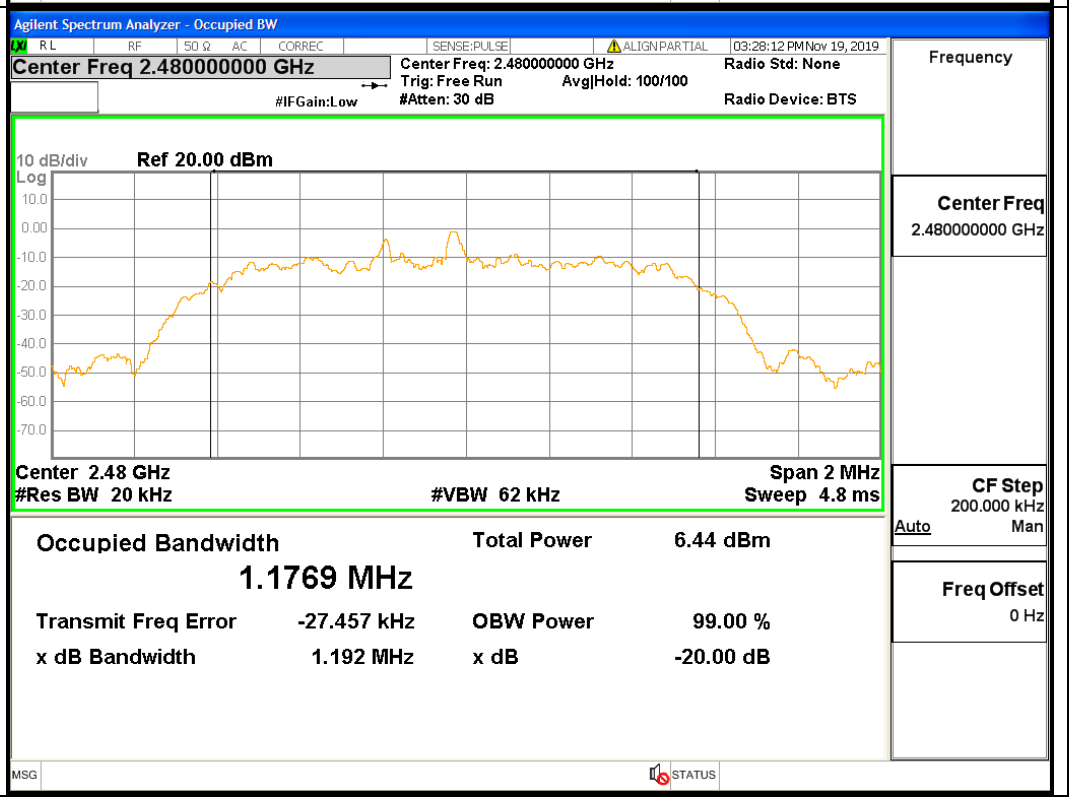
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.796	Not Specified	PASS
GFSK	MCH	0.791	Not Specified	PASS
GFSK	HCH	0.797	Not Specified	PASS
π/4DQPSK	LCH	1.195	Not Specified	PASS
π/4DQPSK	MCH	1.197	Not Specified	PASS
π/4DQPSK	HCH	1.192	Not Specified	PASS

Test Graph

Graphs	
GFSK/LCH	
GFSK/MCH	

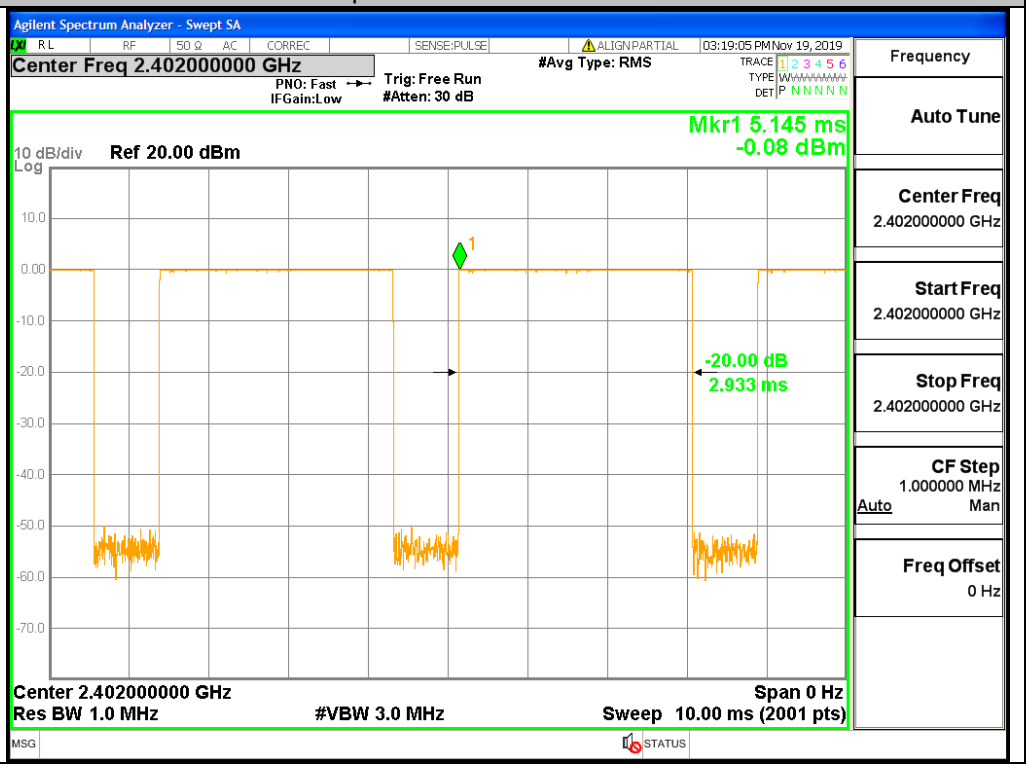
GFSK/HCH	
π/4DQPSK/LCH	

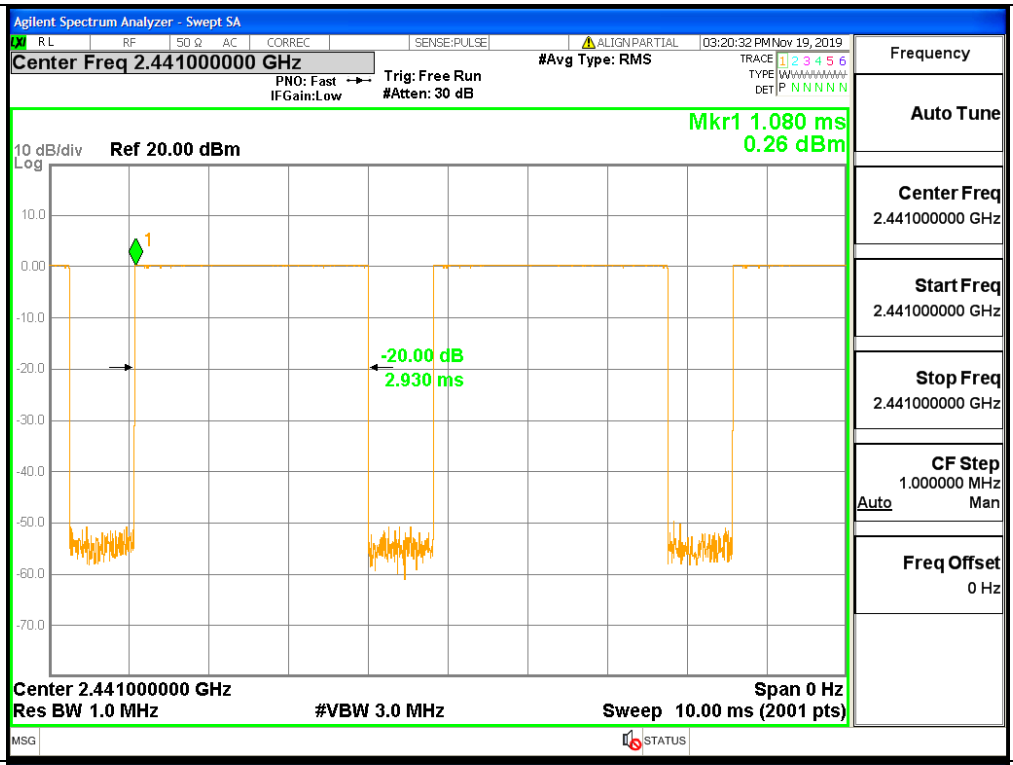
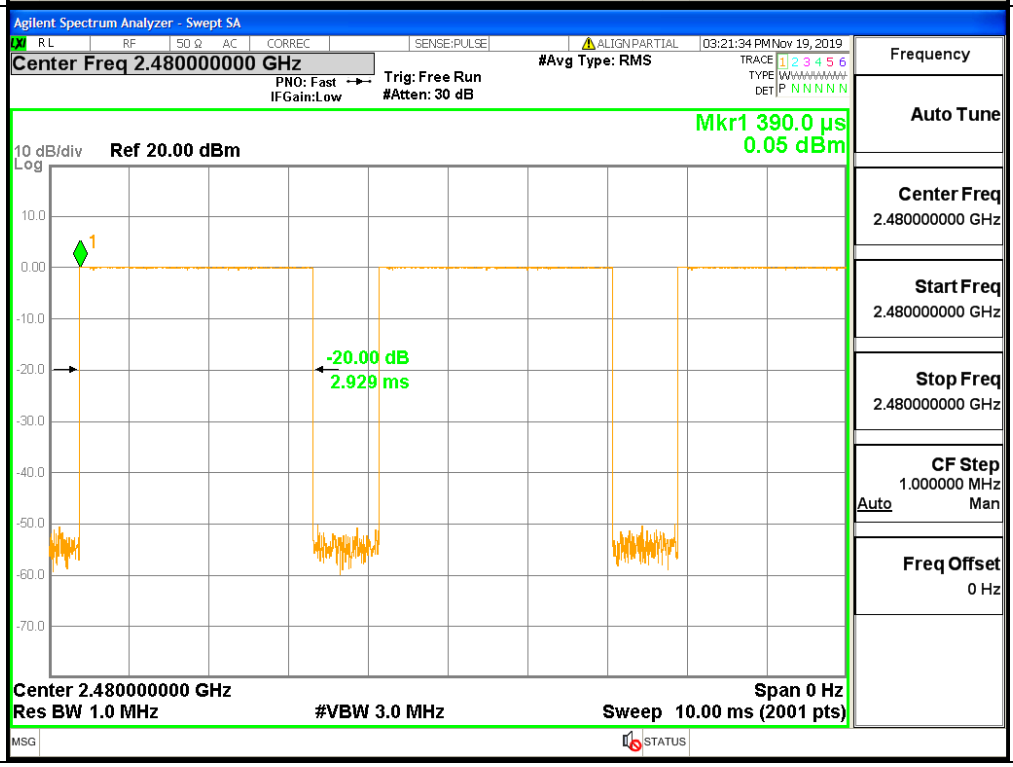
π/4DQPSK/MCH	
π/4DQPSK/HCH	

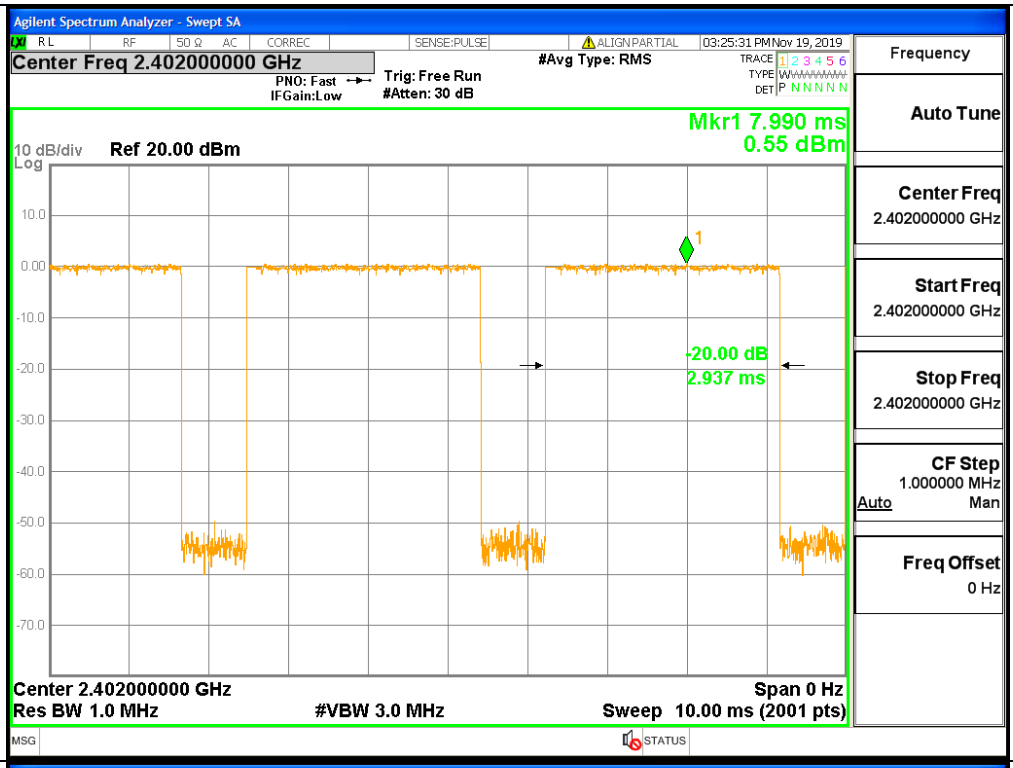
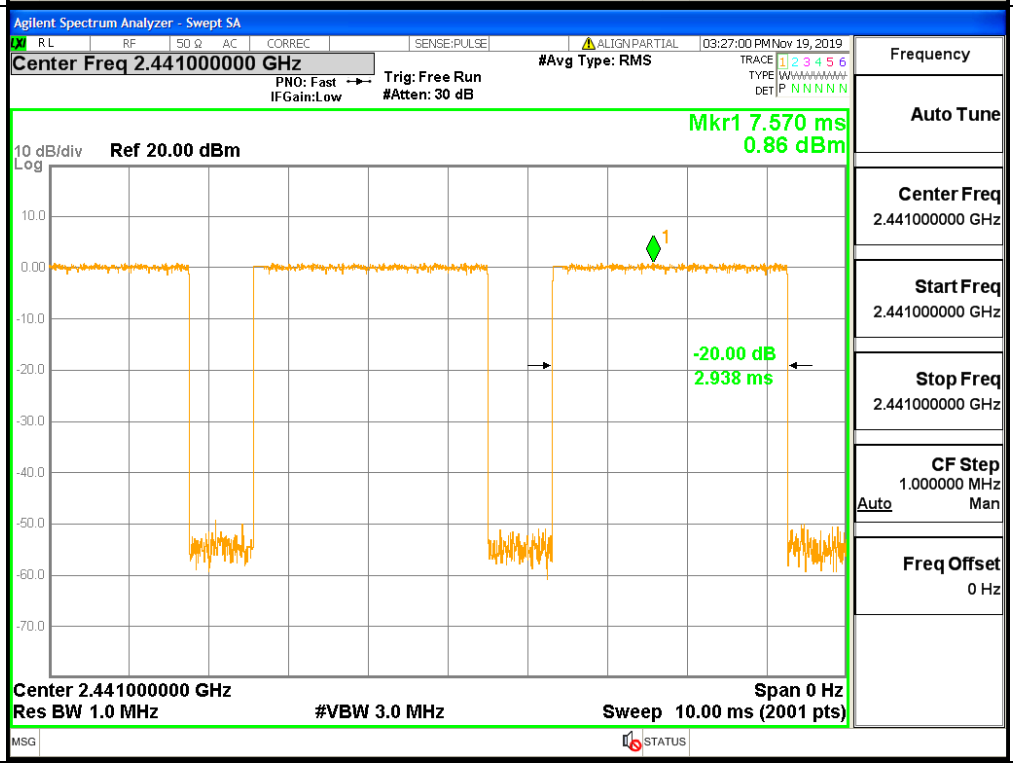
A.2 Dwell Time

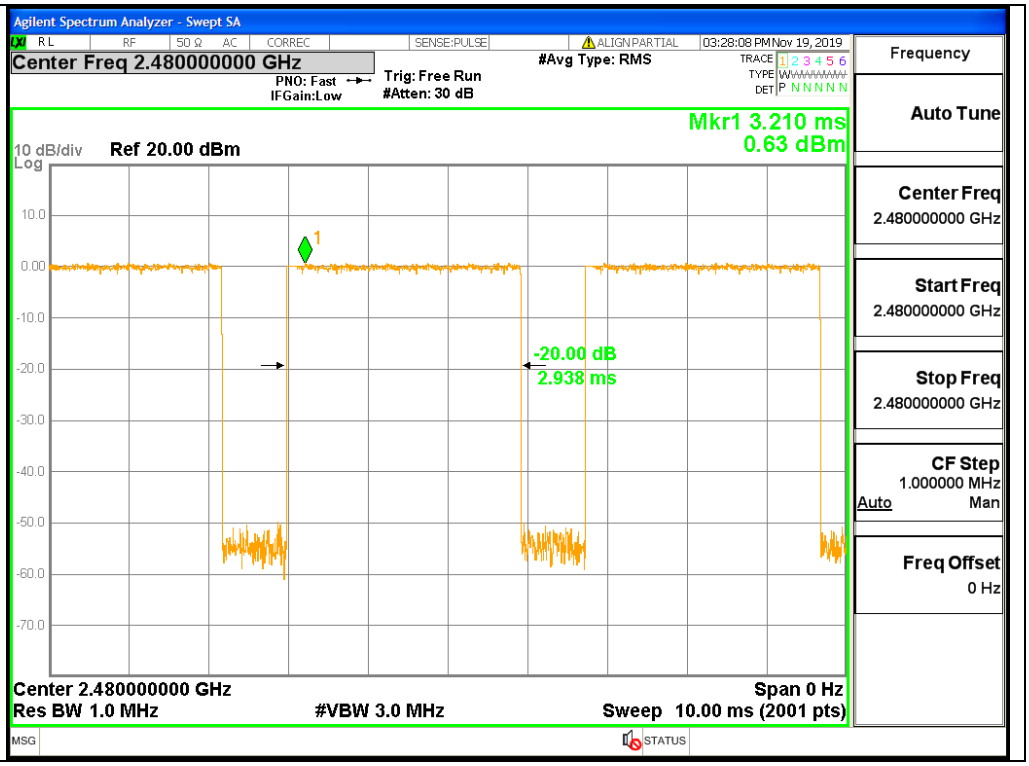
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002933	106.7	0.312954	0.4	PASS
GFSK	DH5	MCH	0.002930	106.7	0.312628	0.4	PASS
GFSK	DH5	HCH	0.002929	106.7	0.312486	0.4	PASS
π/4DQPSK	2DH5	LCH	0.002937	106.7	0.313394	0.4	PASS
π/4DQPSK	2DH5	MCH	0.002938	106.7	0.313501	0.4	PASS
π/4DQPSK	2DH5	HCH	0.002938	106.7	0.313450	0.4	PASS

Test Graph

Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

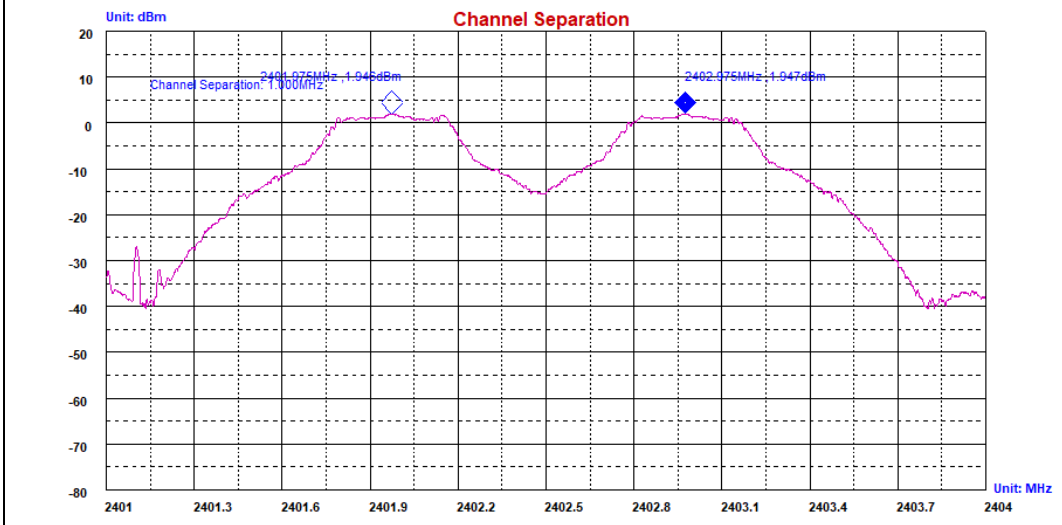
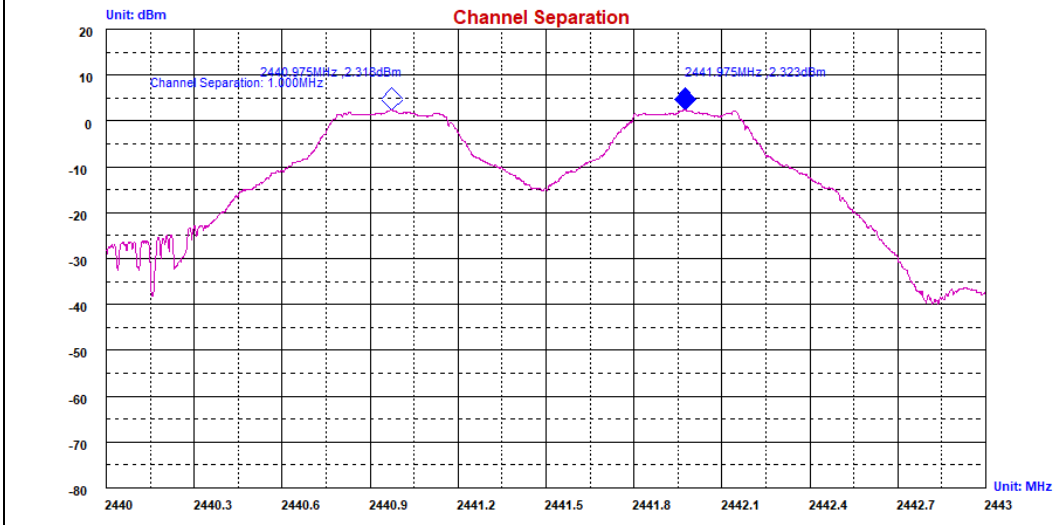
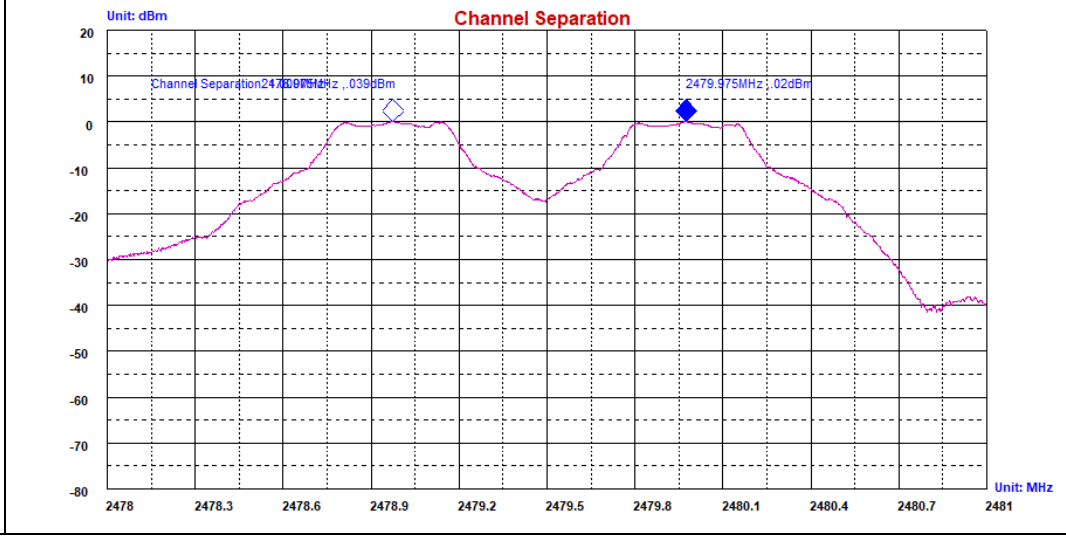
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

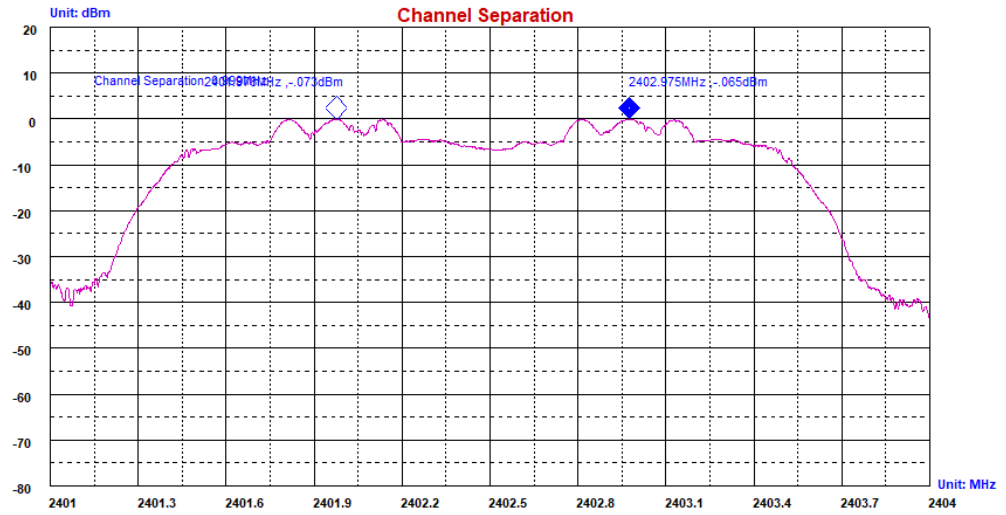
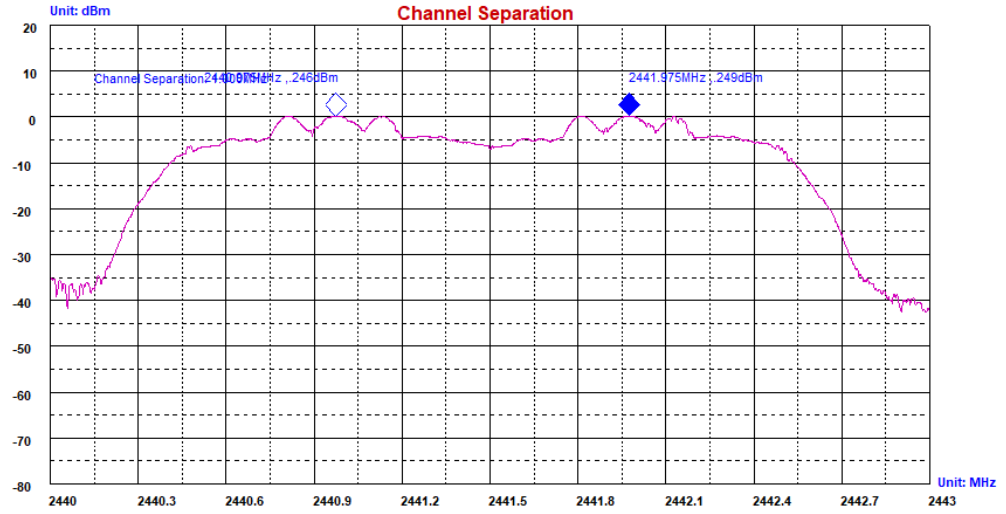
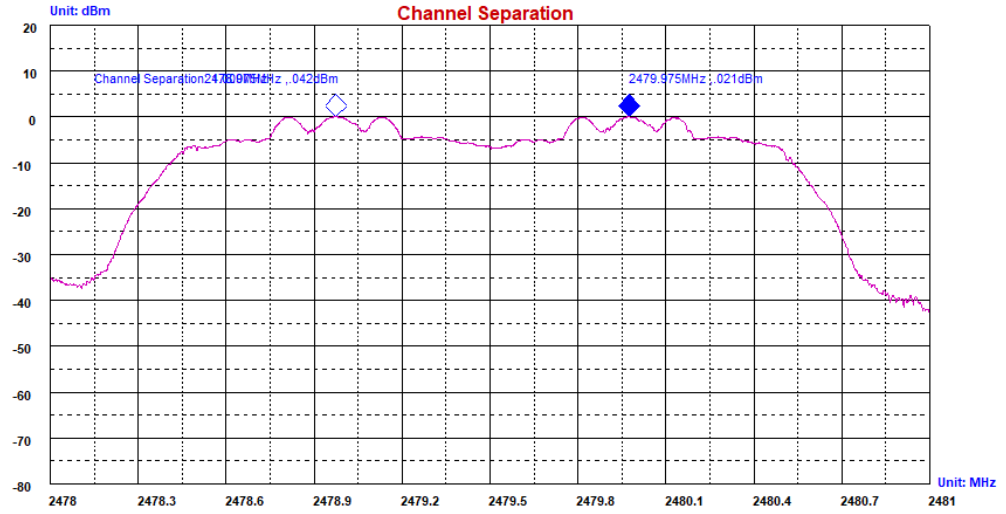
π/4DQPSK _2DH5/HCH	

A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.000	0.820	PASS
GFSK	MCH	1.000	0.820	PASS
GFSK	HCH	1.000	0.531	PASS
π/4DQPSK	LCH	0.999	0.797	PASS
π/4DQPSK	MCH	1.000	0.798	PASS
π/4DQPSK	HCH	1.000	0.795	PASS

Test Graph

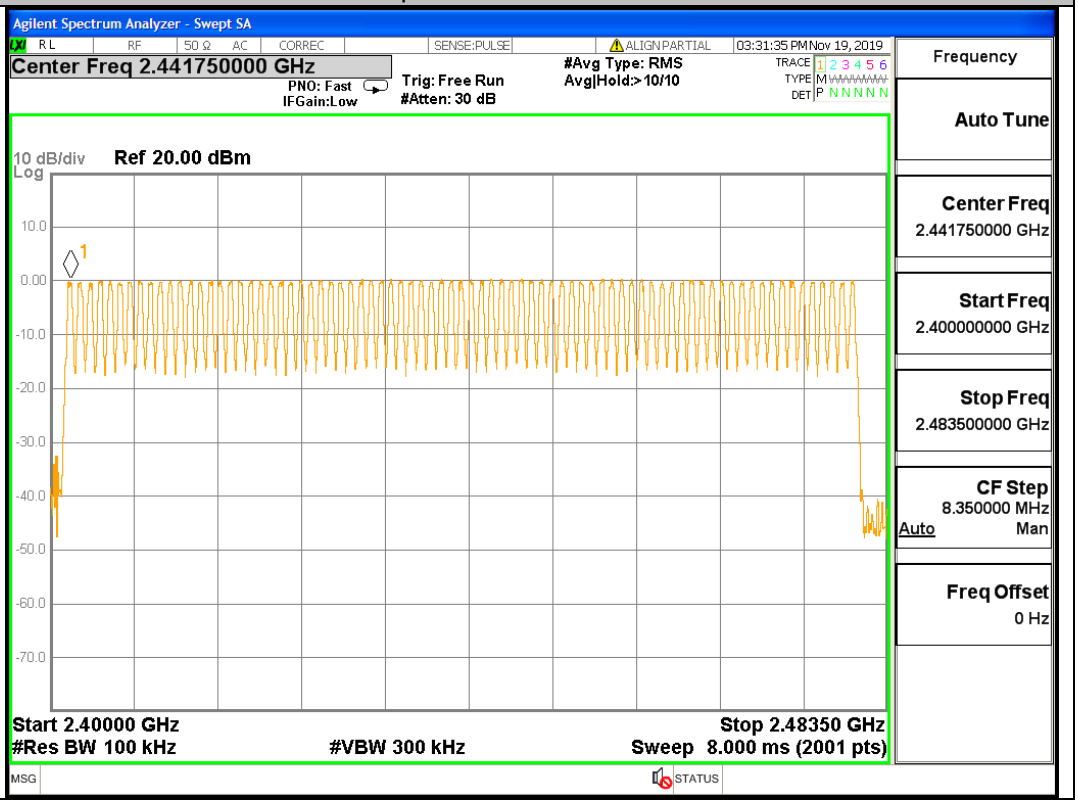
Graphs	
GFSK/LCH	
GFSK/MCH	
GFSK/HCH	

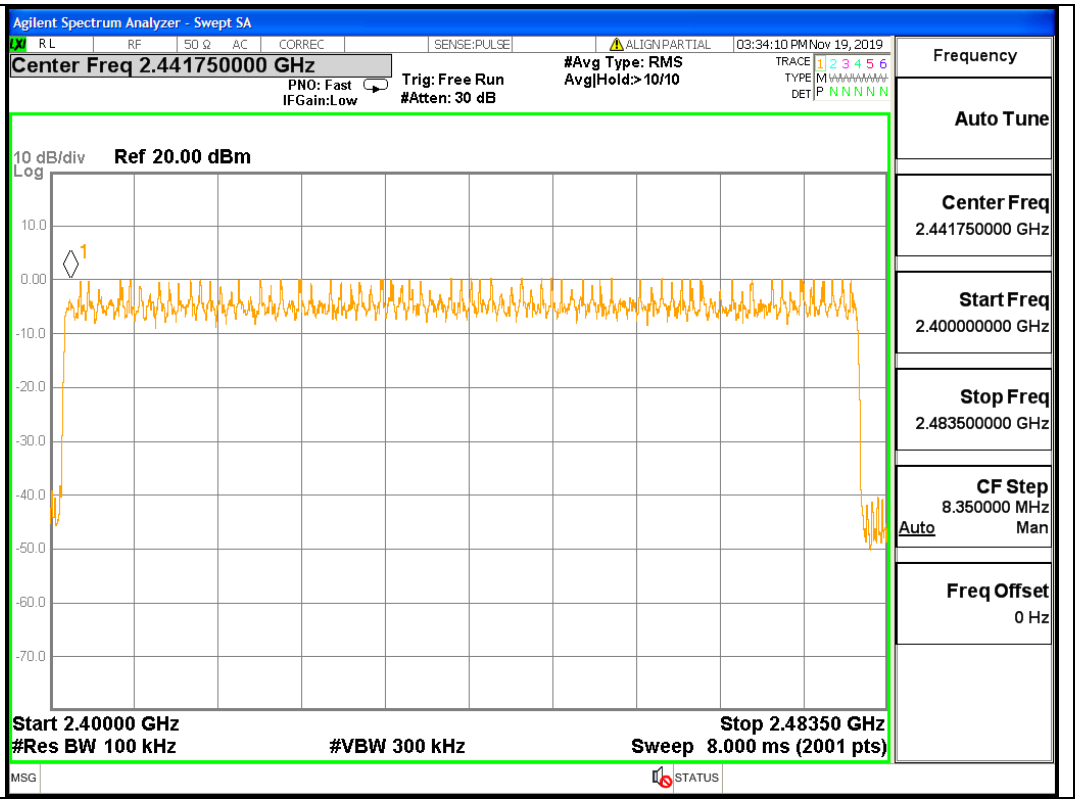
π/4DQPSK/LCH	
π/4DQPSK/MCH	
π/4DQPSK/HCH	

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 Graph

Graphs	
GFSK/Hop	

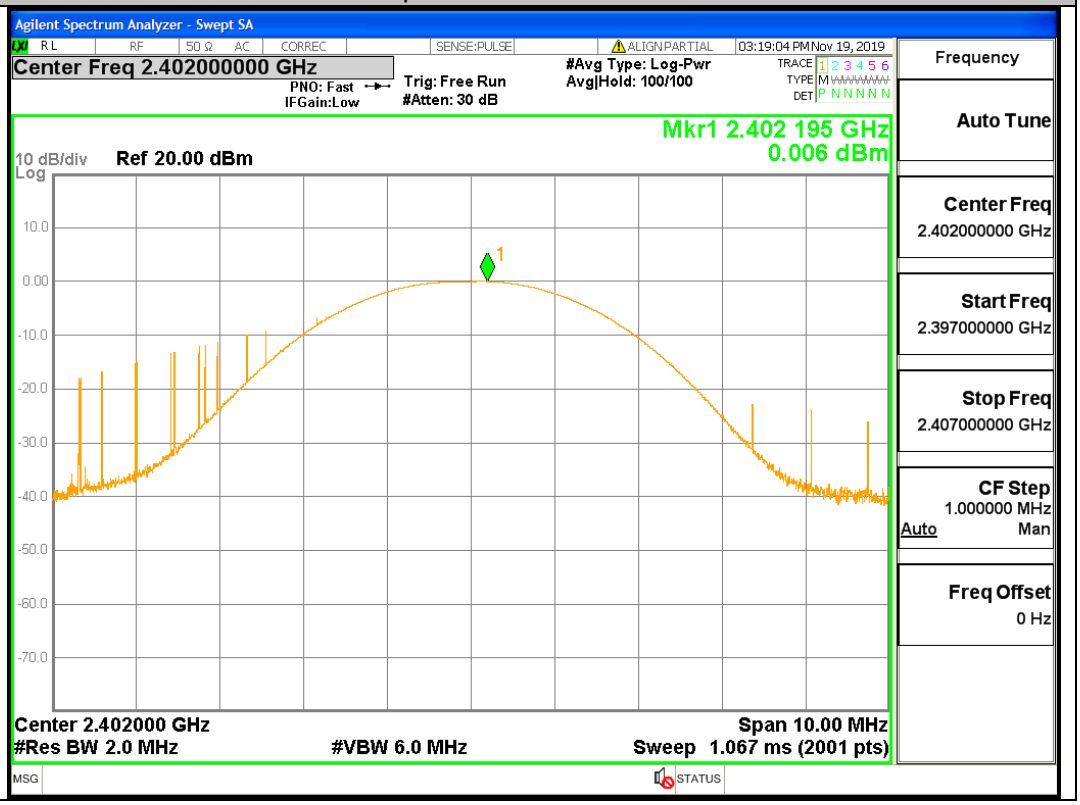
π/4DQPSK/Hop	

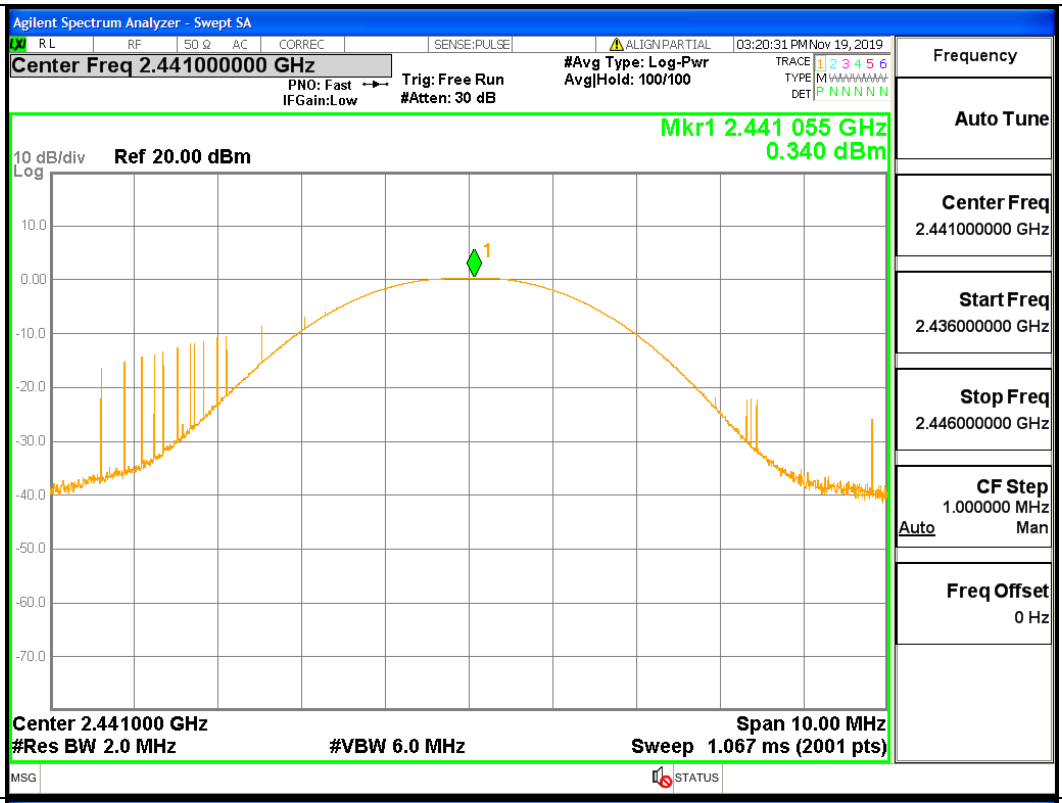
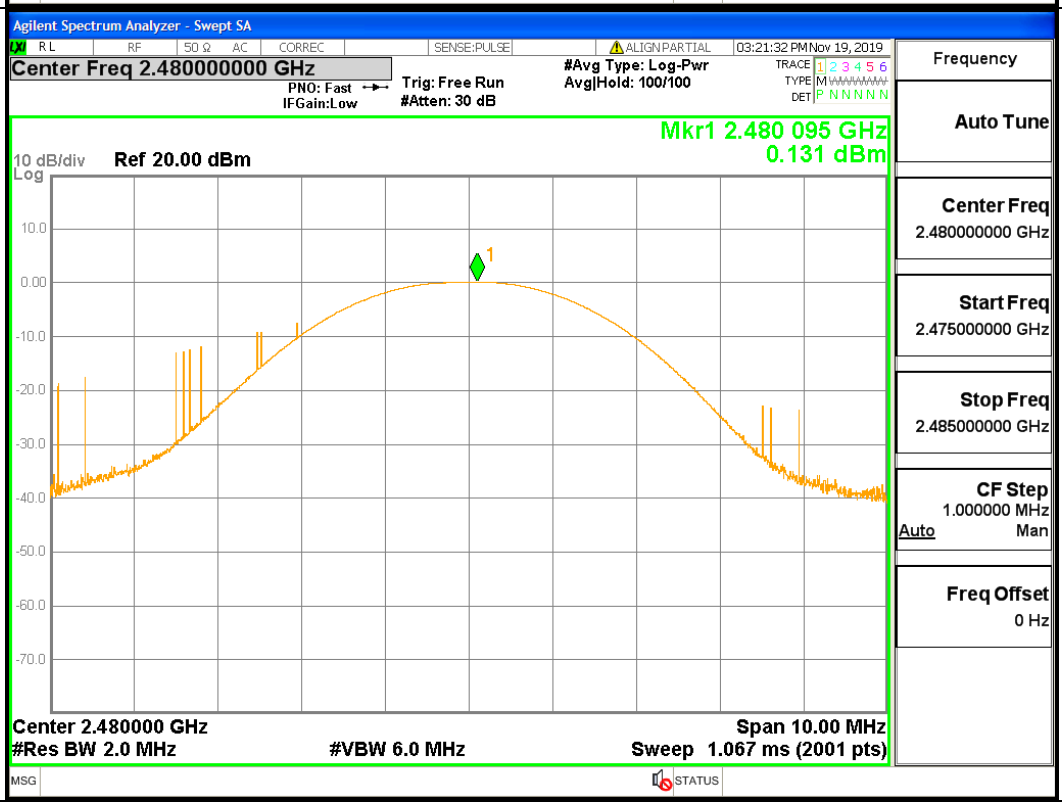
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
CORREC
SENSE:PULSE
ALIGN PARTIAL
03:34:10 PM Nov 19, 2019
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>10/10
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (2001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz

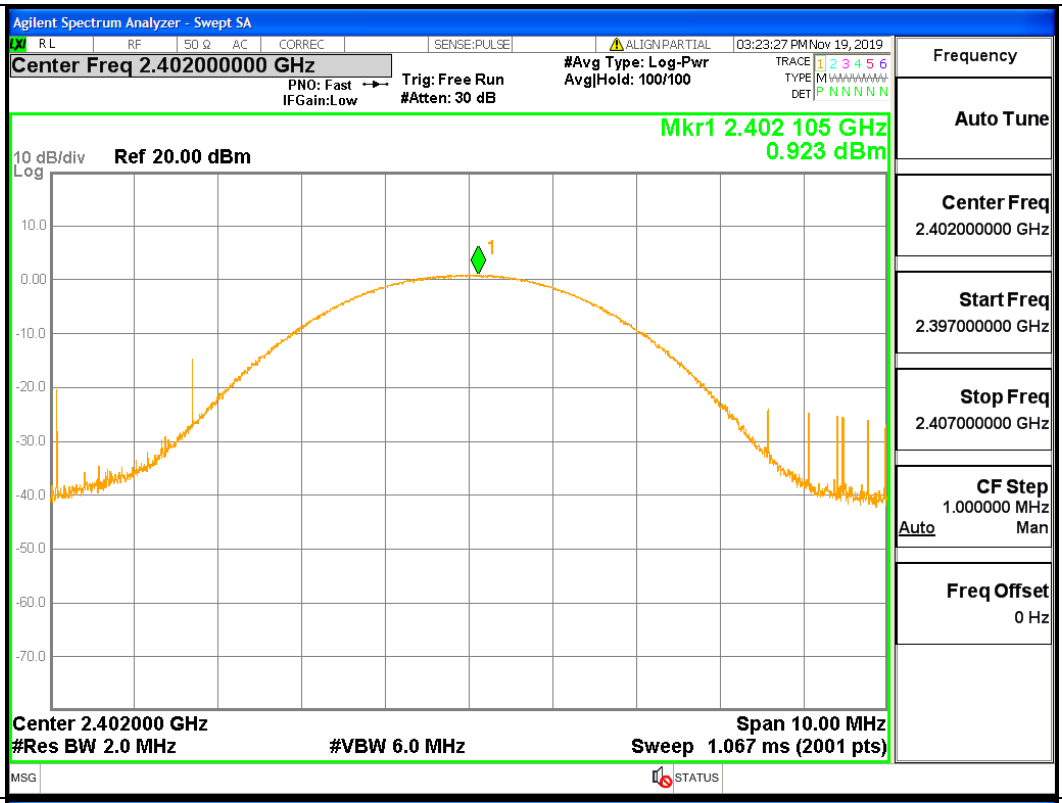
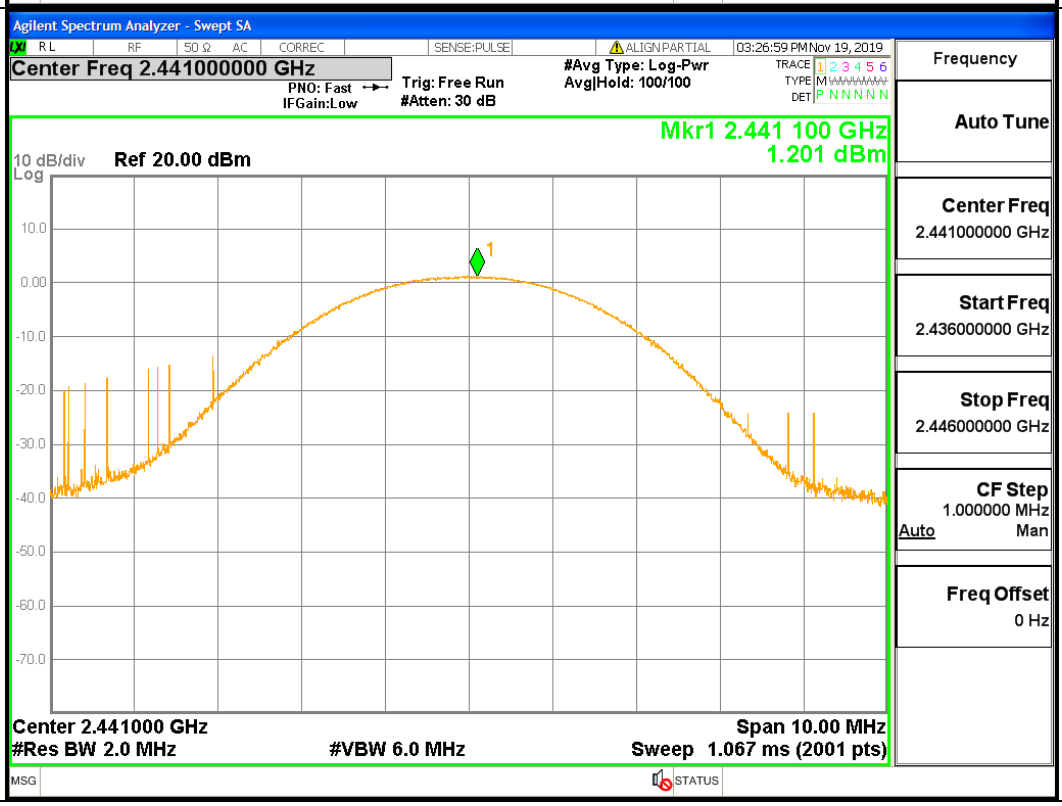
A.5 Conducted Peak Output Power

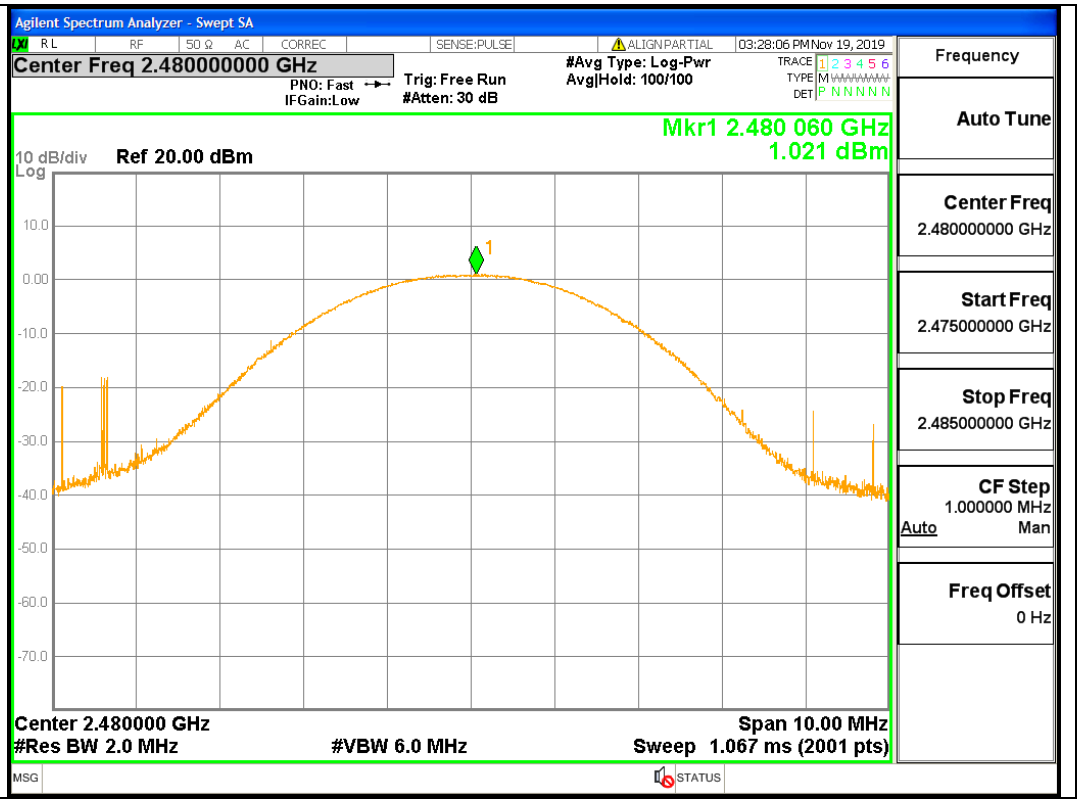
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.006	21	PASS
GFSK	MCH	0.340	21	PASS
GFSK	HCH	0.131	21	PASS
π/4DQPSK	LCH	0.878	21	PASS
π/4DQPSK	MCH	1.201	21	PASS
π/4DQPSK	HCH	1.021	21	PASS

Test Graph

Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

π/4DQPSK/LCH	
π/4DQPSK/MCH	

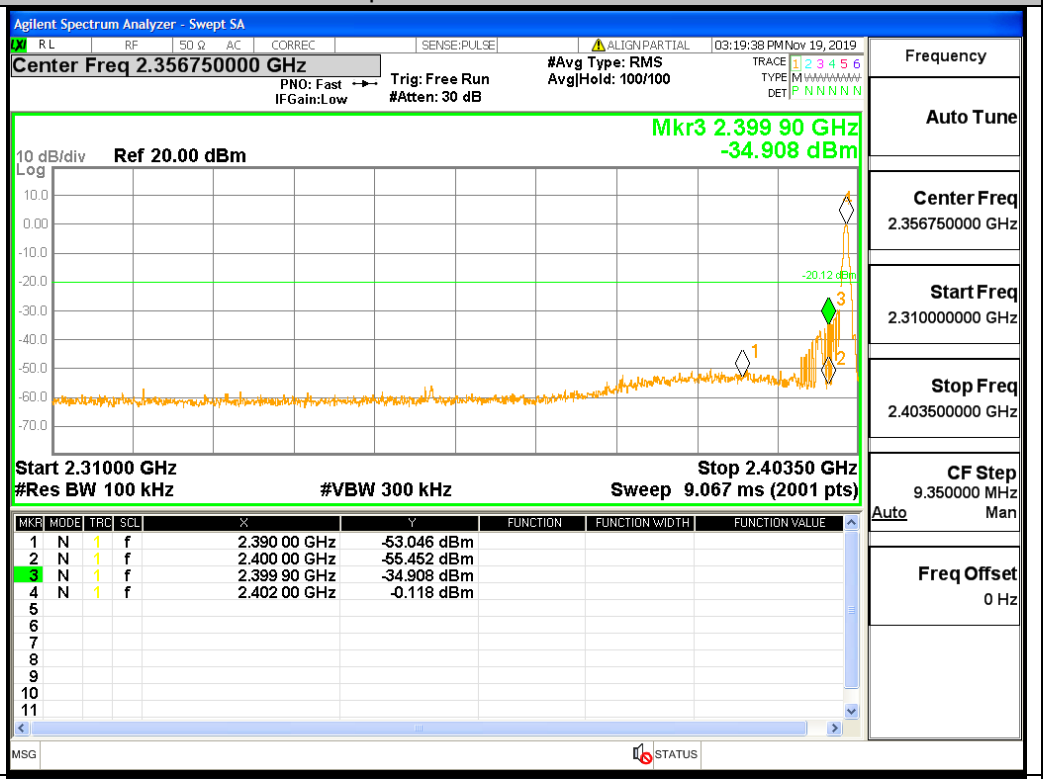
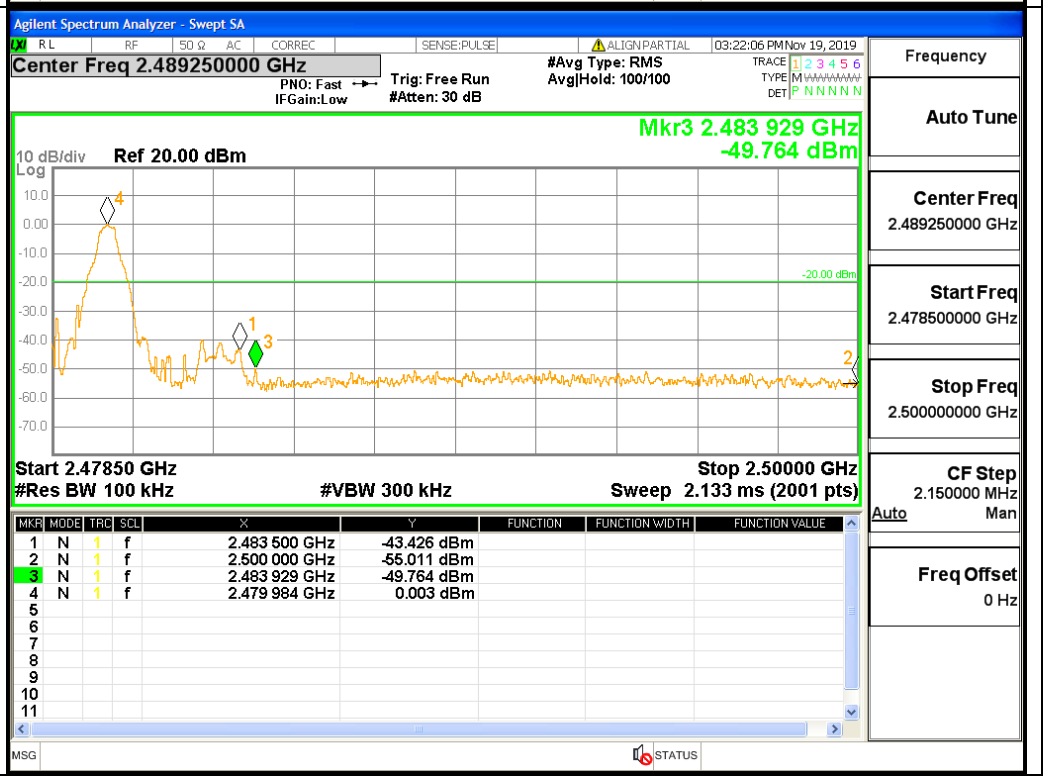
π/4DQPSK/HCH	

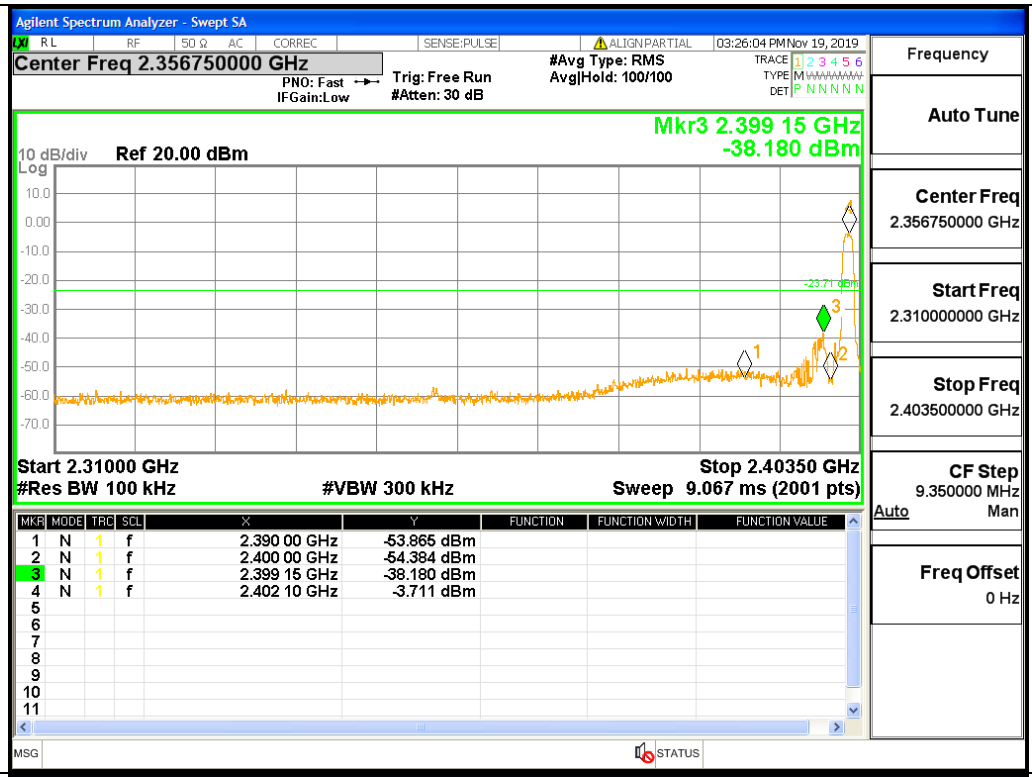
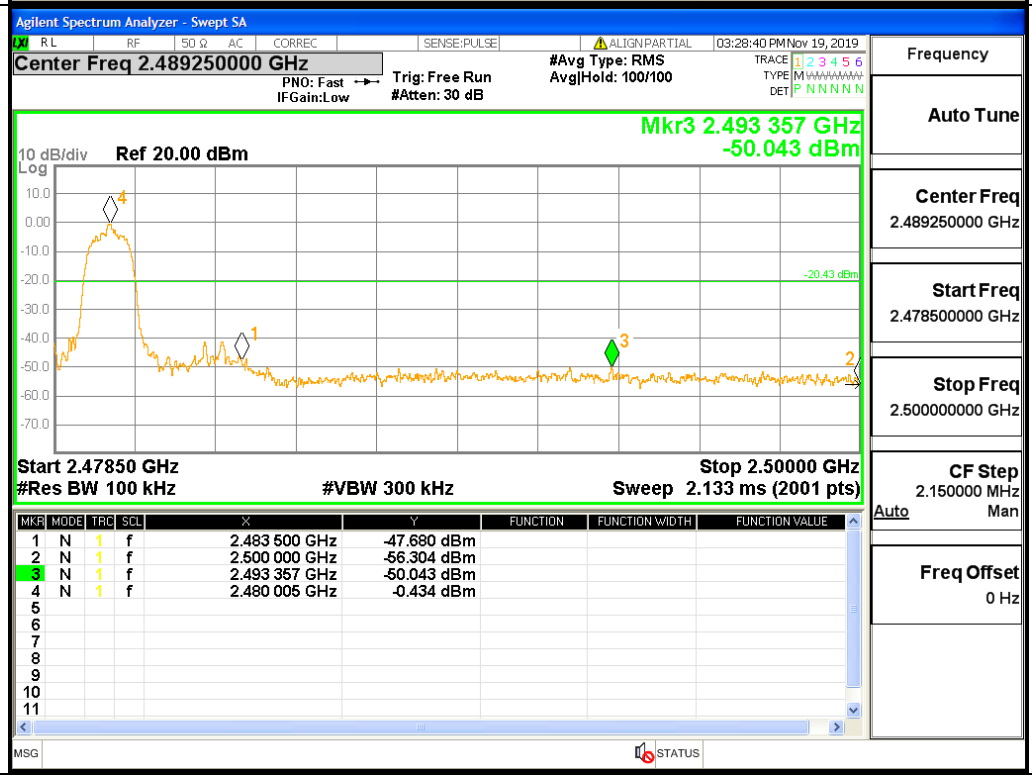
Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
CORREC
SENSE:PULSE
ALIGN PARTIAL
03:28:06 PM Nov 19, 2019
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 2.480 060 GHz
1.021 dBm
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 10.00 MHz
Sweep 1.067 ms (2001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.475000000 GHz
Stop Freq
2.485000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

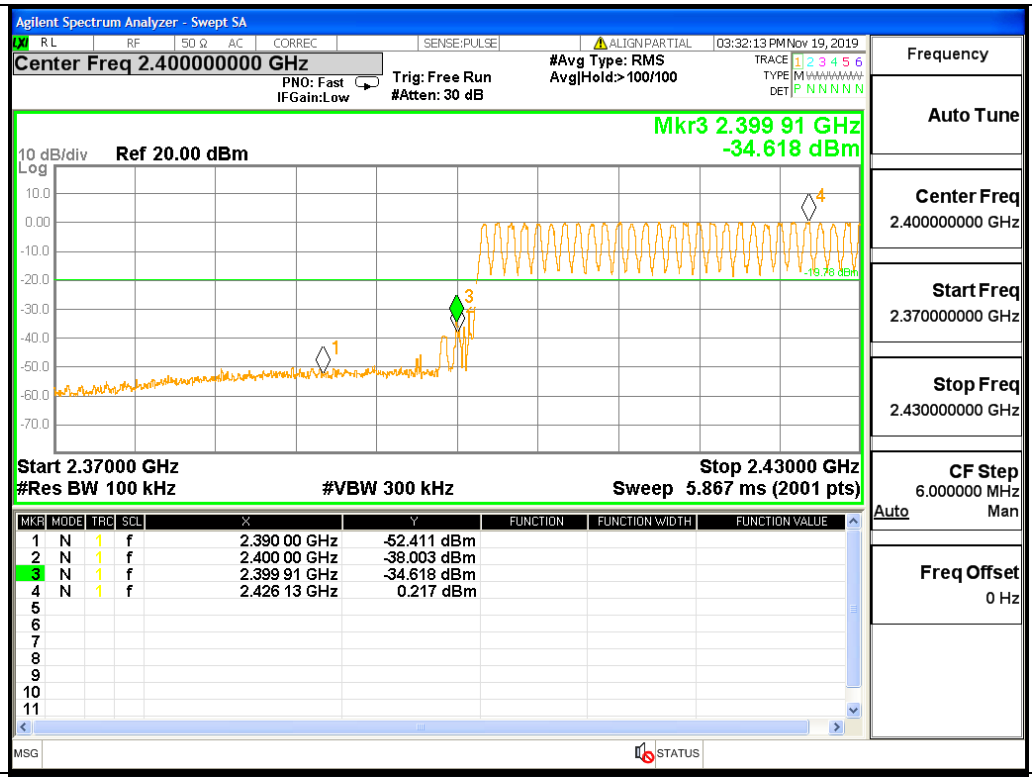
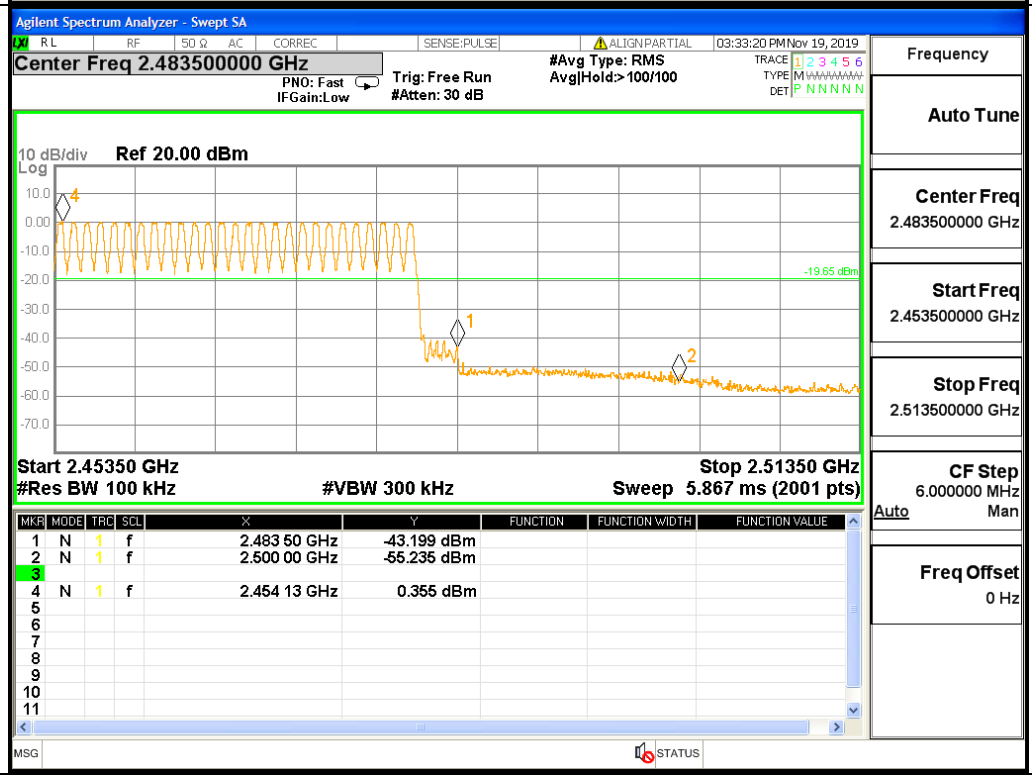
A.6 Band-edge for RF Conducted Emissions

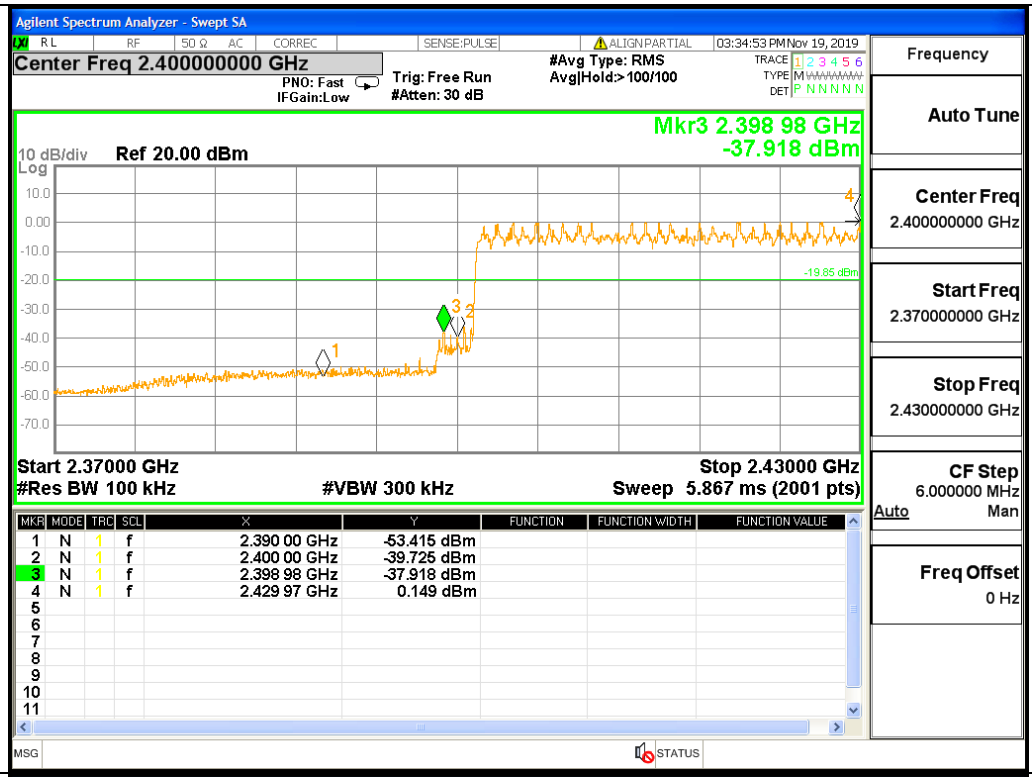
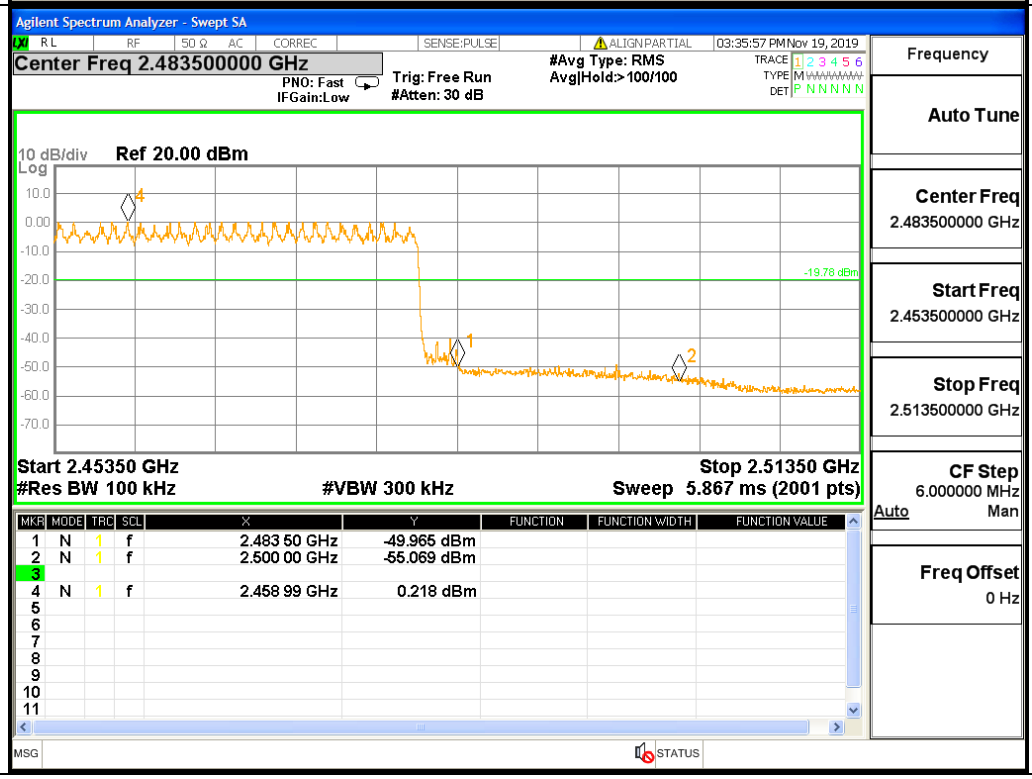
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2399.9	-0.118	-34.908	-20.118	Pass
1DH5	2480	2483.5	0.003	-43.43	-19.997	Pass
2DH5	2402	2399.152	-3.711	-38.18	-23.711	Pass
2DH5	2480	2483.5	-0.434	-47.68	-20.434	Pass
1DH5-Hopping	2402	2399.91	0.217	-34.618	-19.783	Pass
1DH5-Hopping	2480	2483.5	0.355	-43.20	-19.645	Pass
2DH5-Hopping	2402	2398.98	0.149	-37.918	-19.851	Pass
2DH5-Hopping	2480	2483.5	0.218	-49.96	-19.782	Pass

Test Graph

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

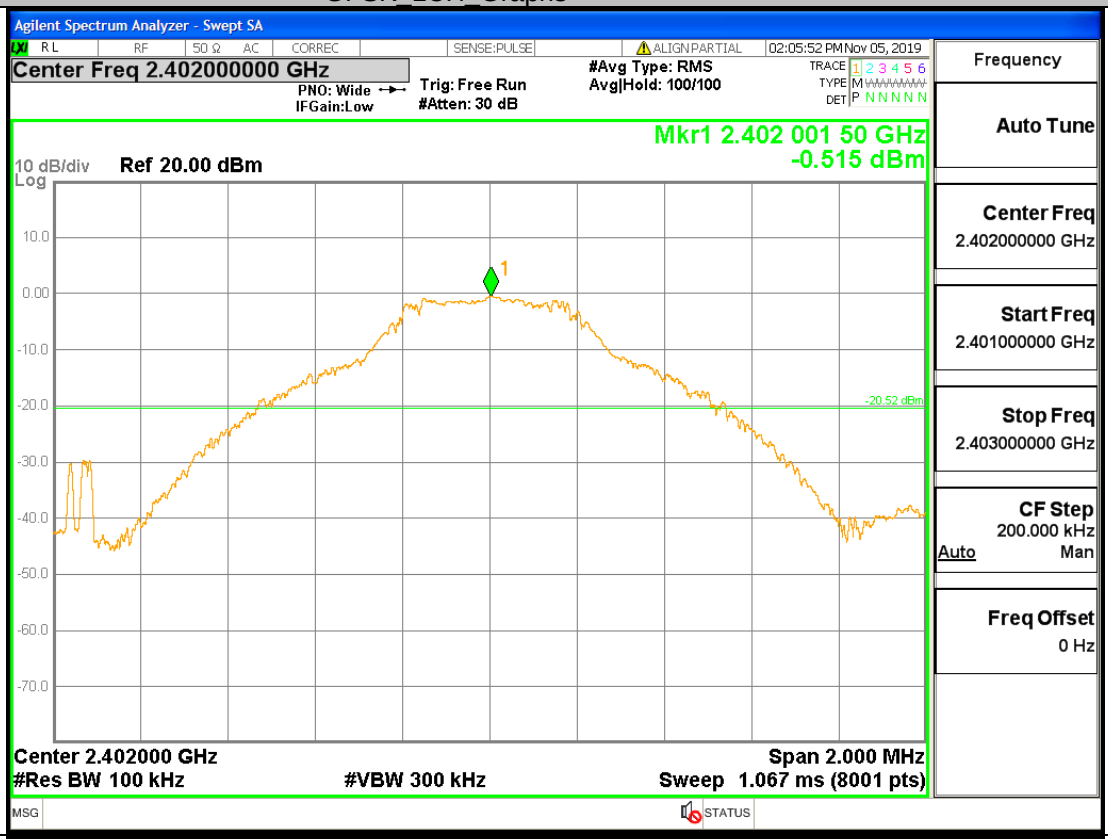
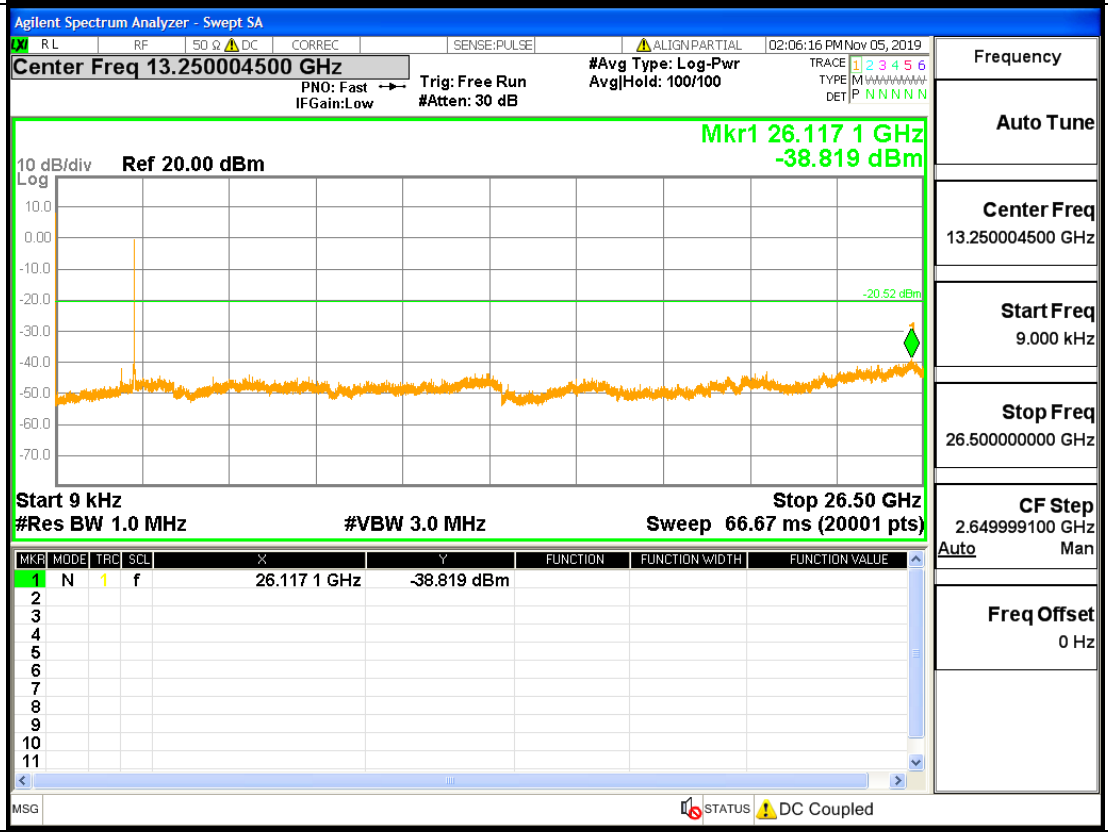
π/4DQPSK/LCH/No Hop	
π/4DQPSK/HCH/No Hop	

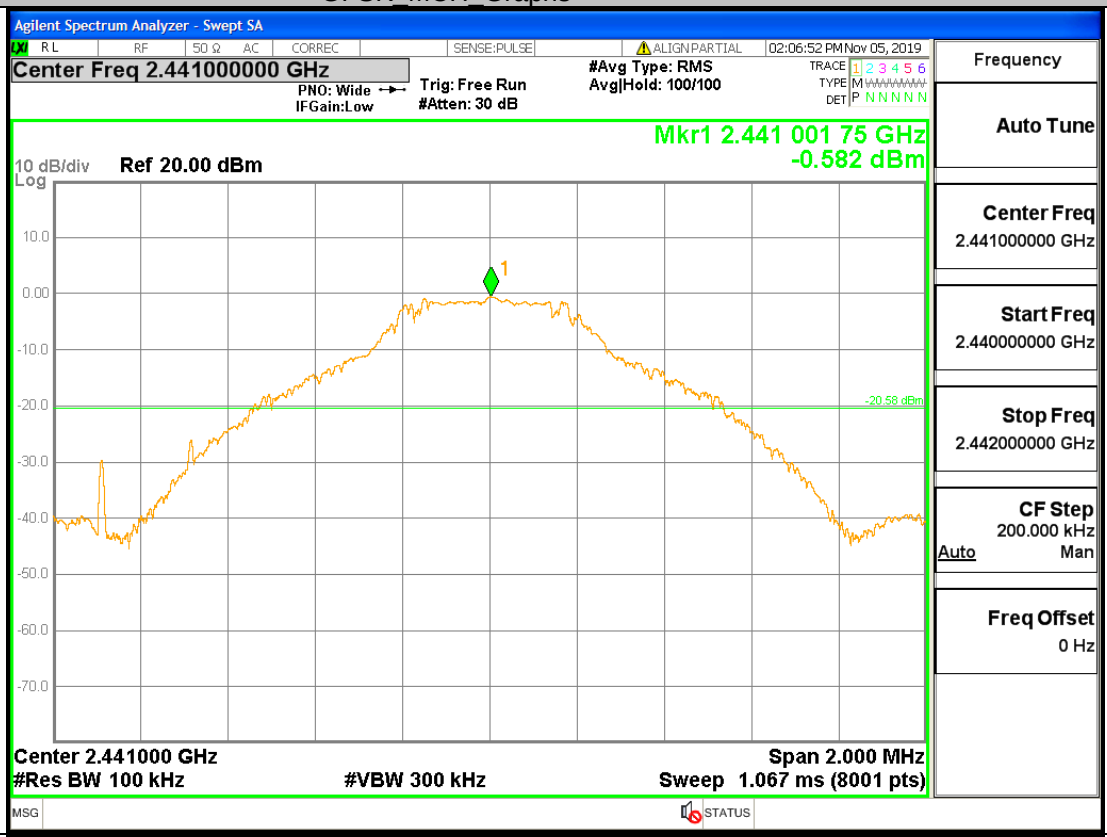
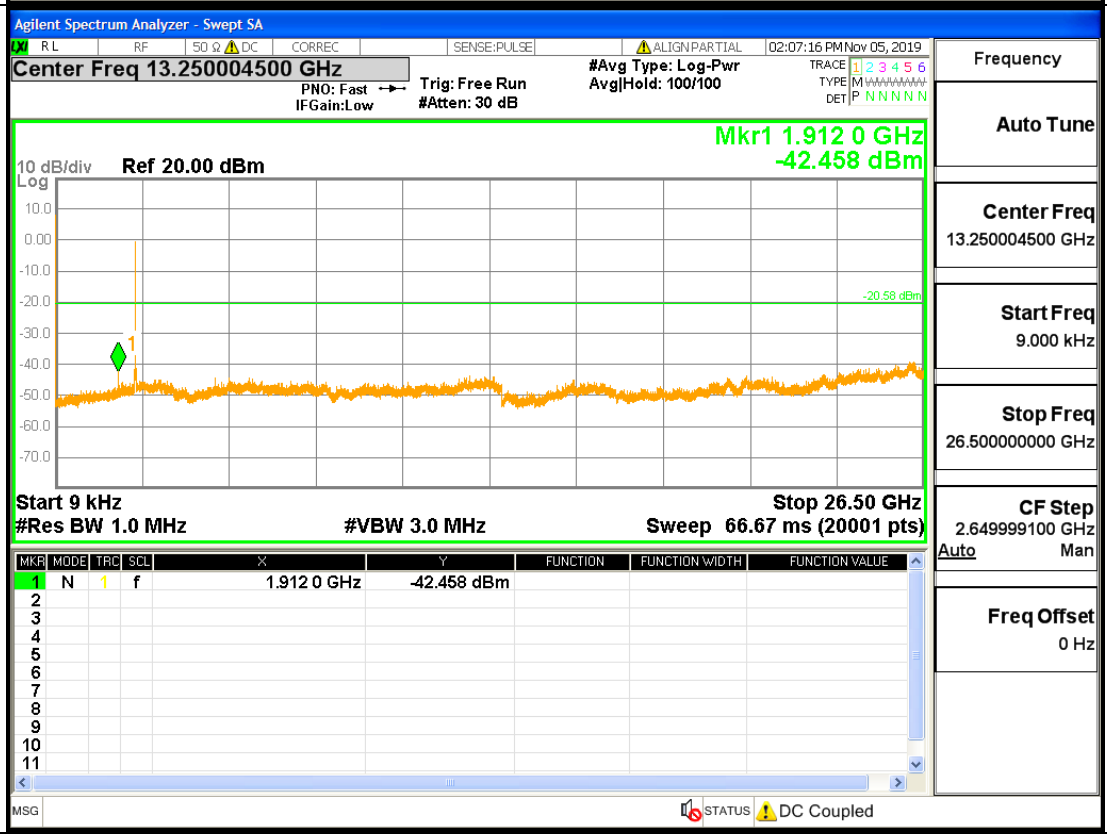
GFSK/LCH/Hop	
GFSK/HCH/Hop	

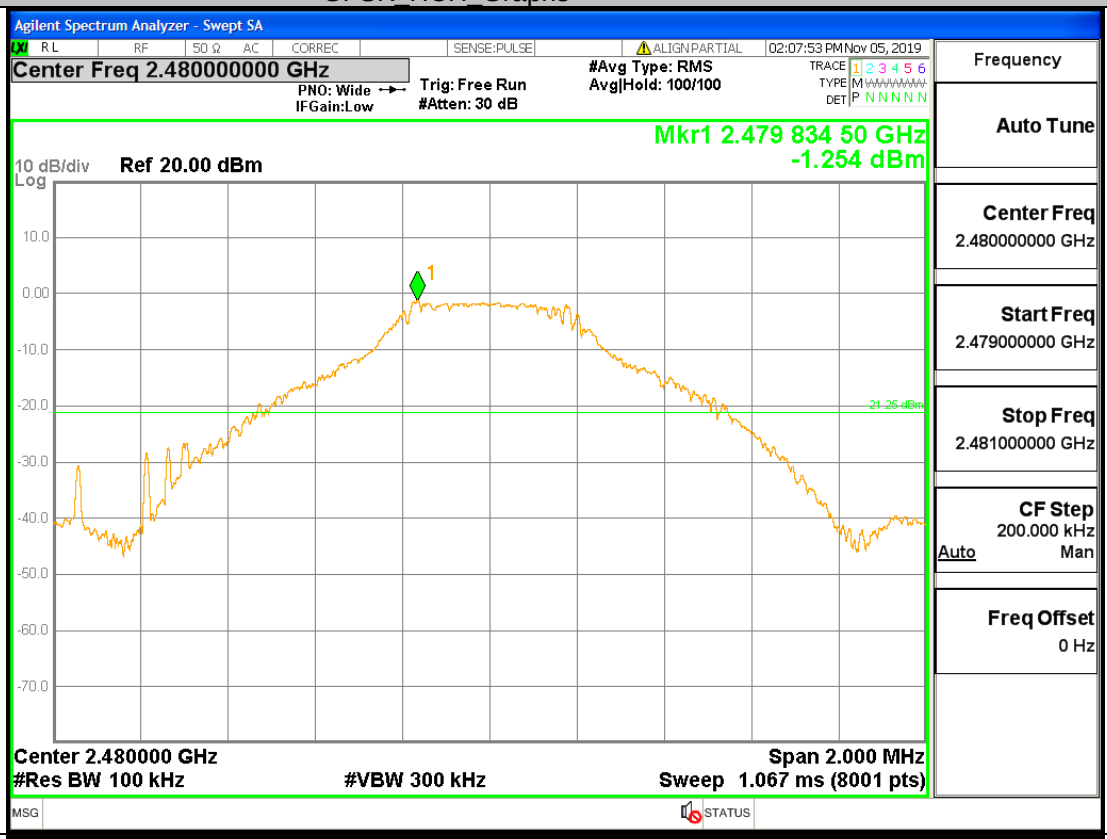
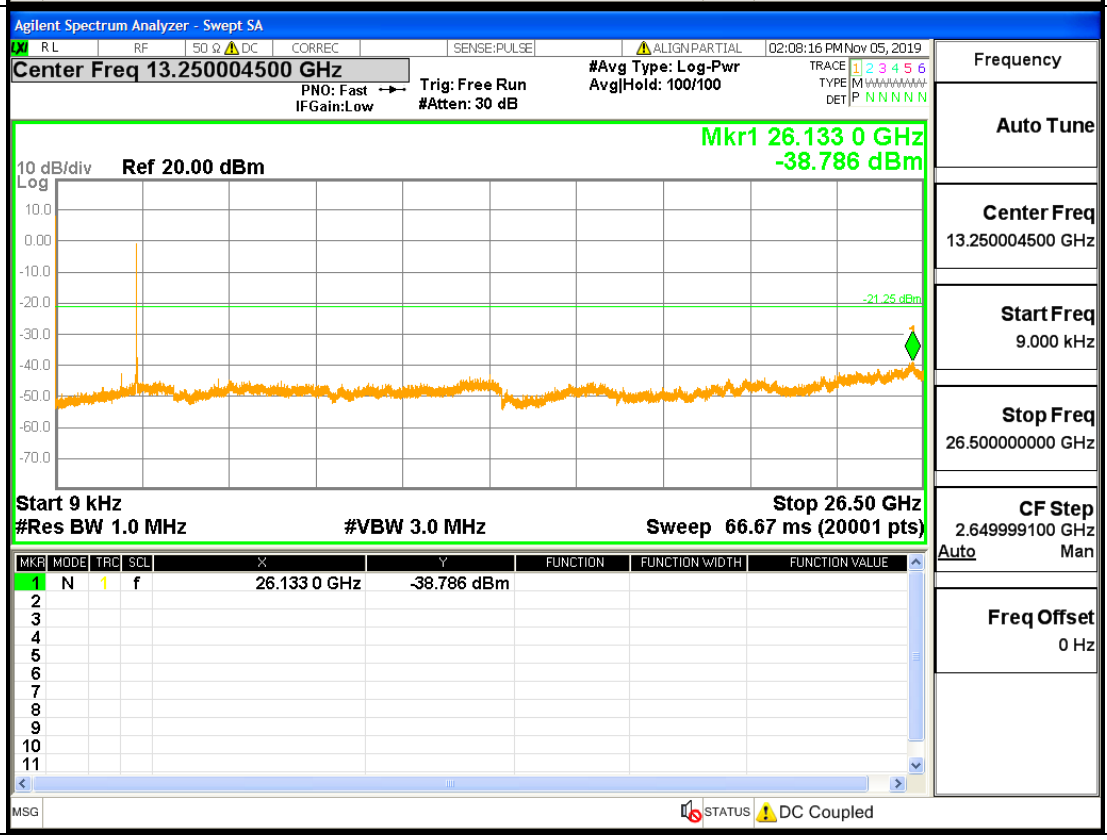
π/4DQPSK/LCH/Hop	
π /4DQPSK/HCH/Hop	

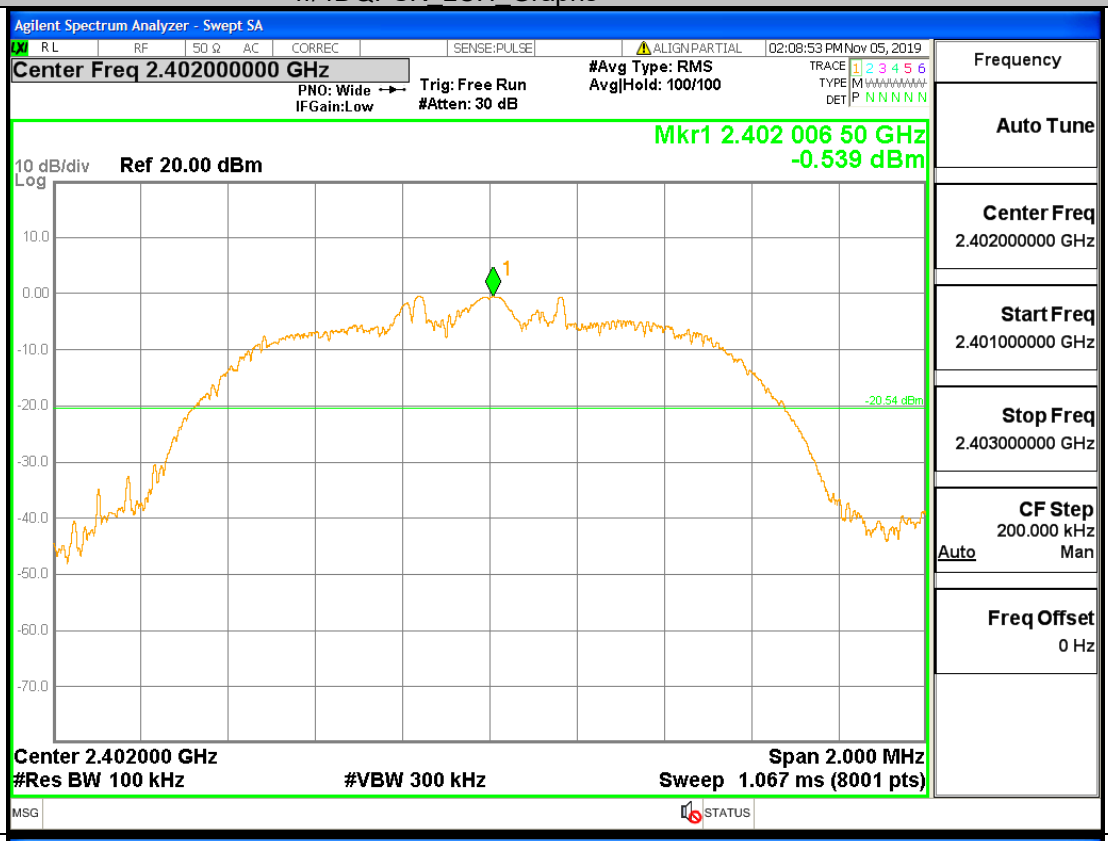
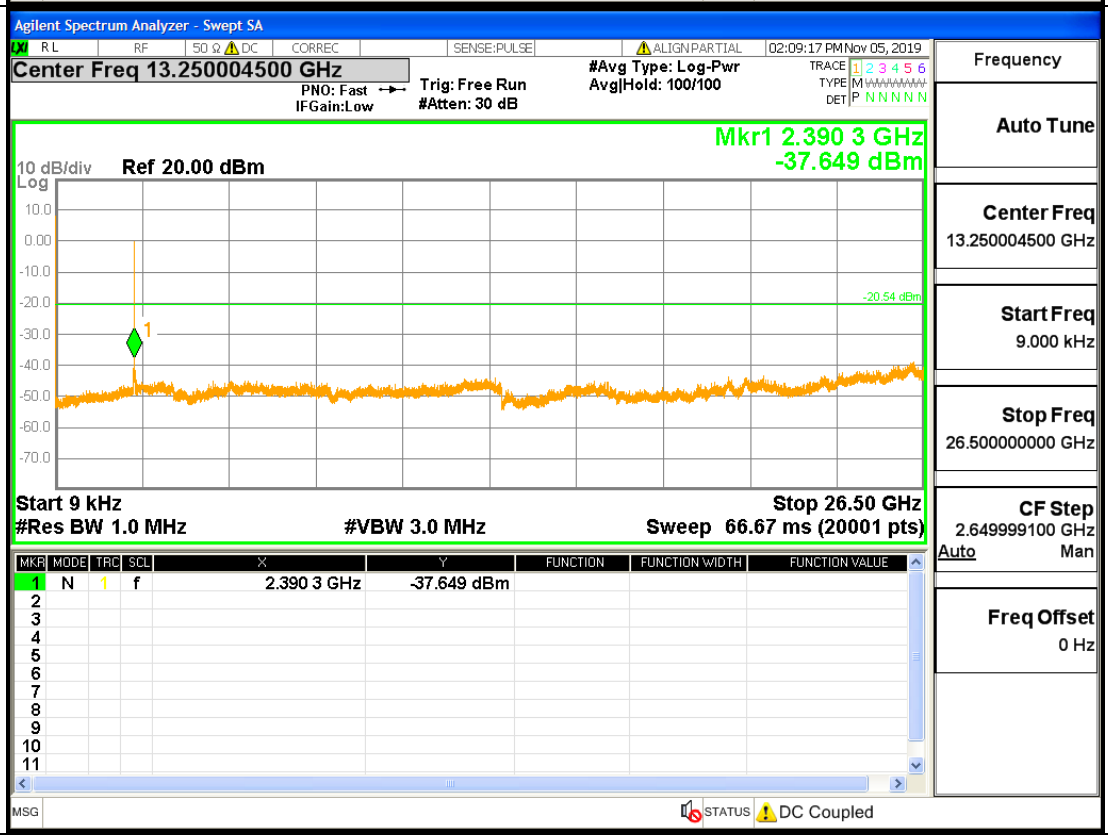
A.7 RF Conducted Spurious Emissions

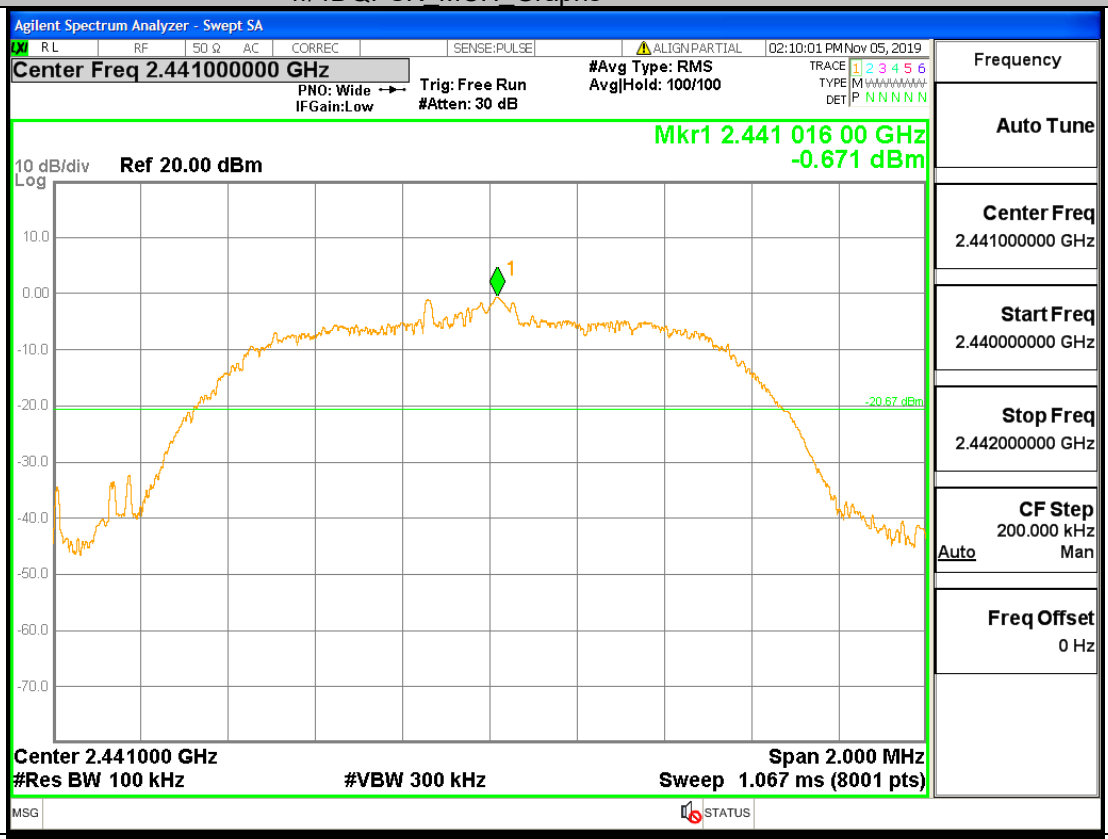
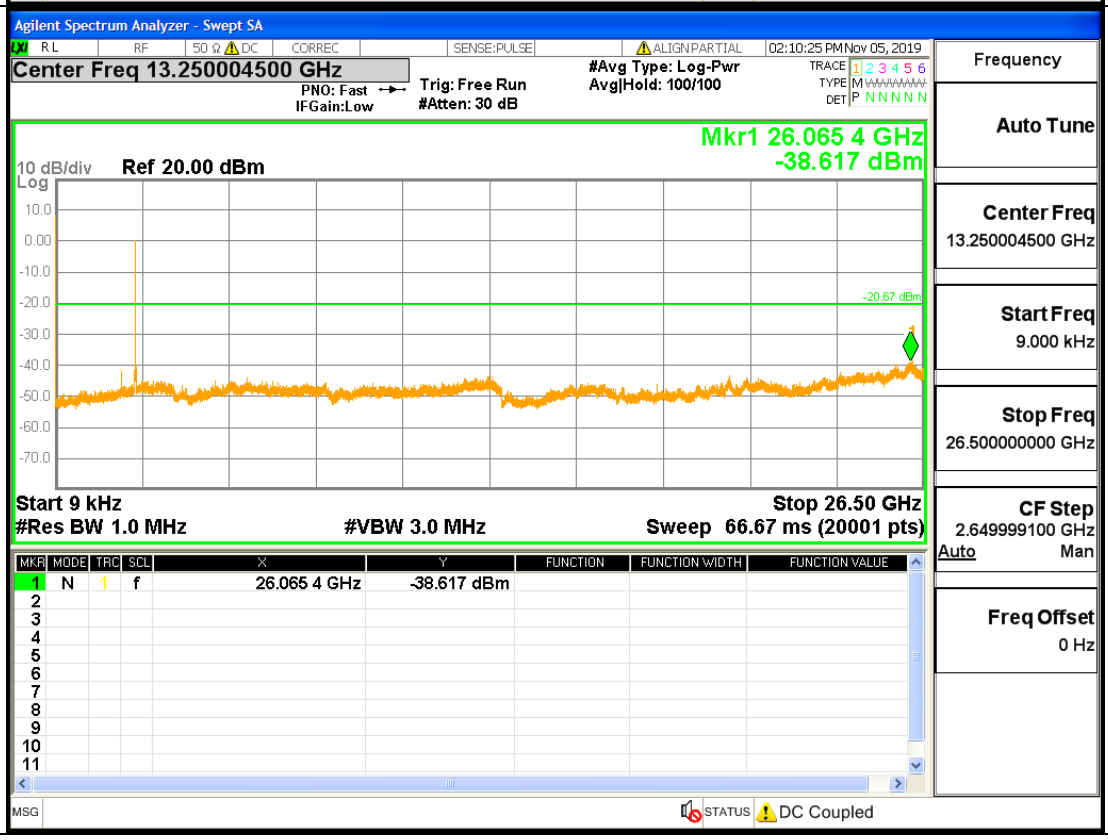
Test Graph

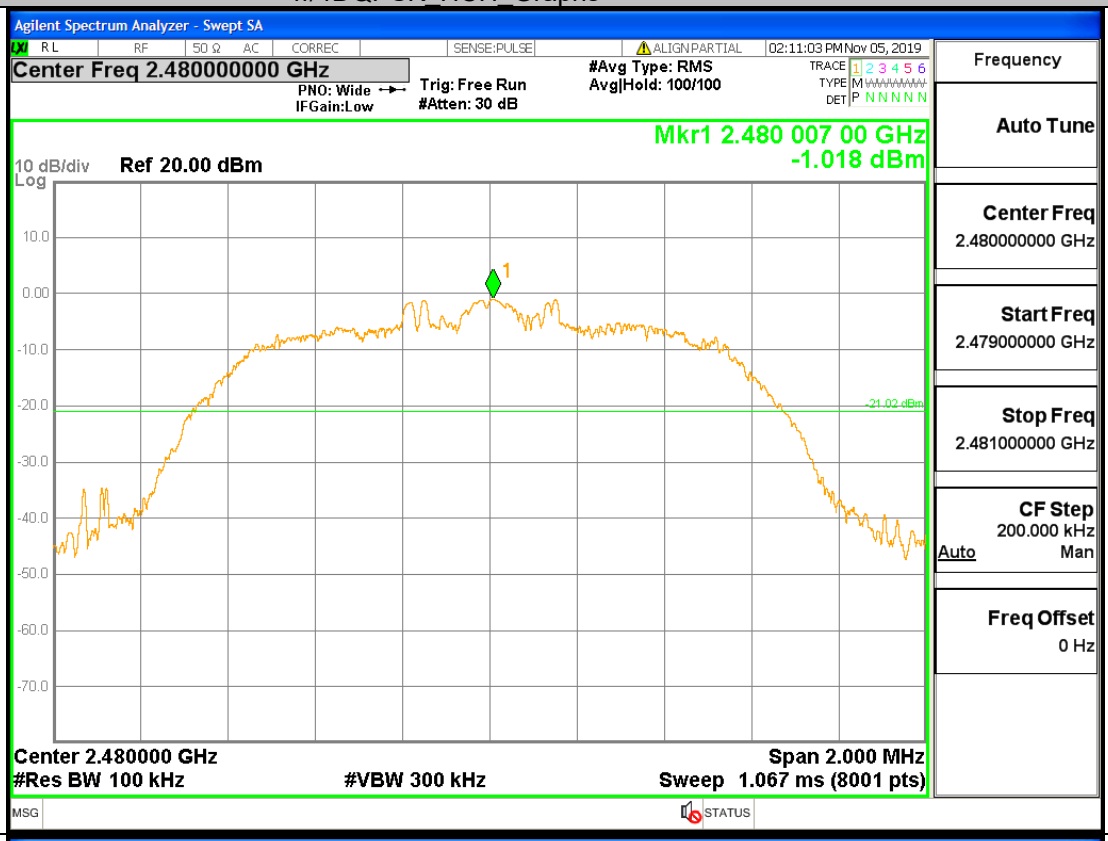
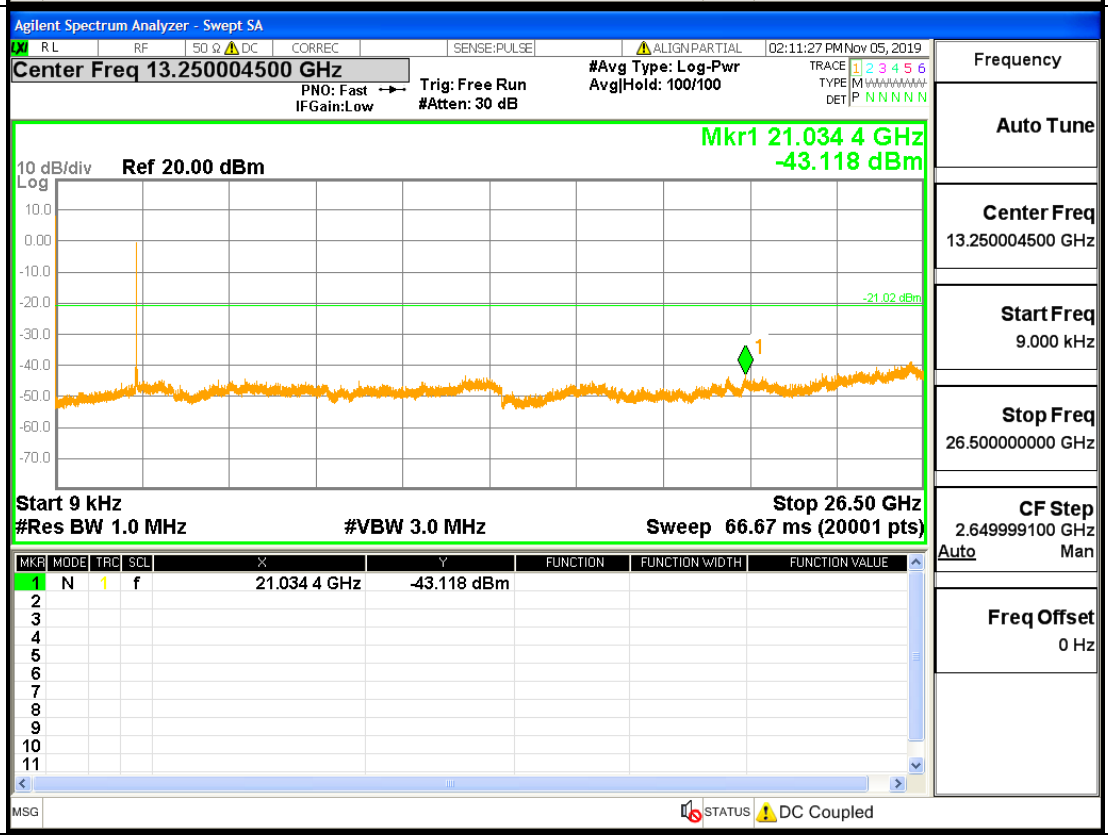
GFSK_LCH_Graphs	
Pref	
Puw	

GFSK_MCH_Graphs	
Pref	
Puw	

GFSK_HCH_Graphs	
Pref	
Puw	

π/4DQPSK_LCH_Graphs	
Pref	
Puw	

π/4DQPSK_MCH_Graphs	
Pref	
Puw	

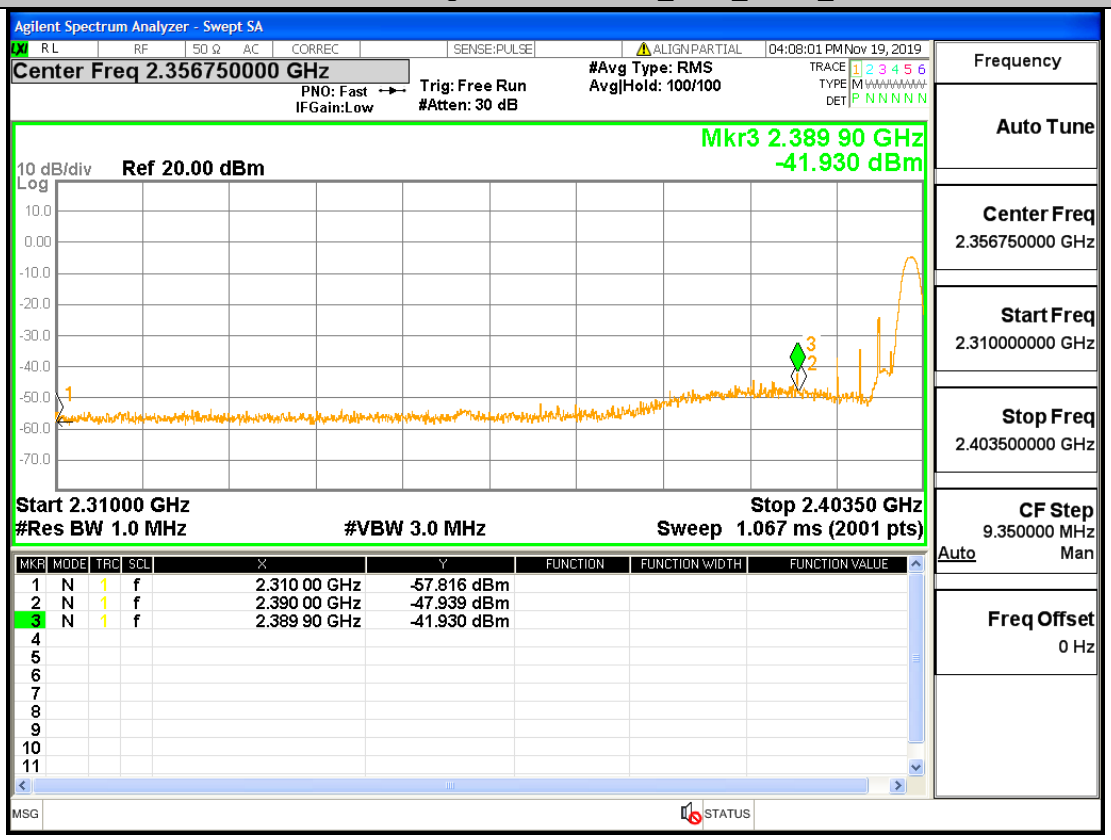
π/4DQPSK_HCH_Graphs	
Pref	
Puw	

A.8 Restrict-band band-edge measurements

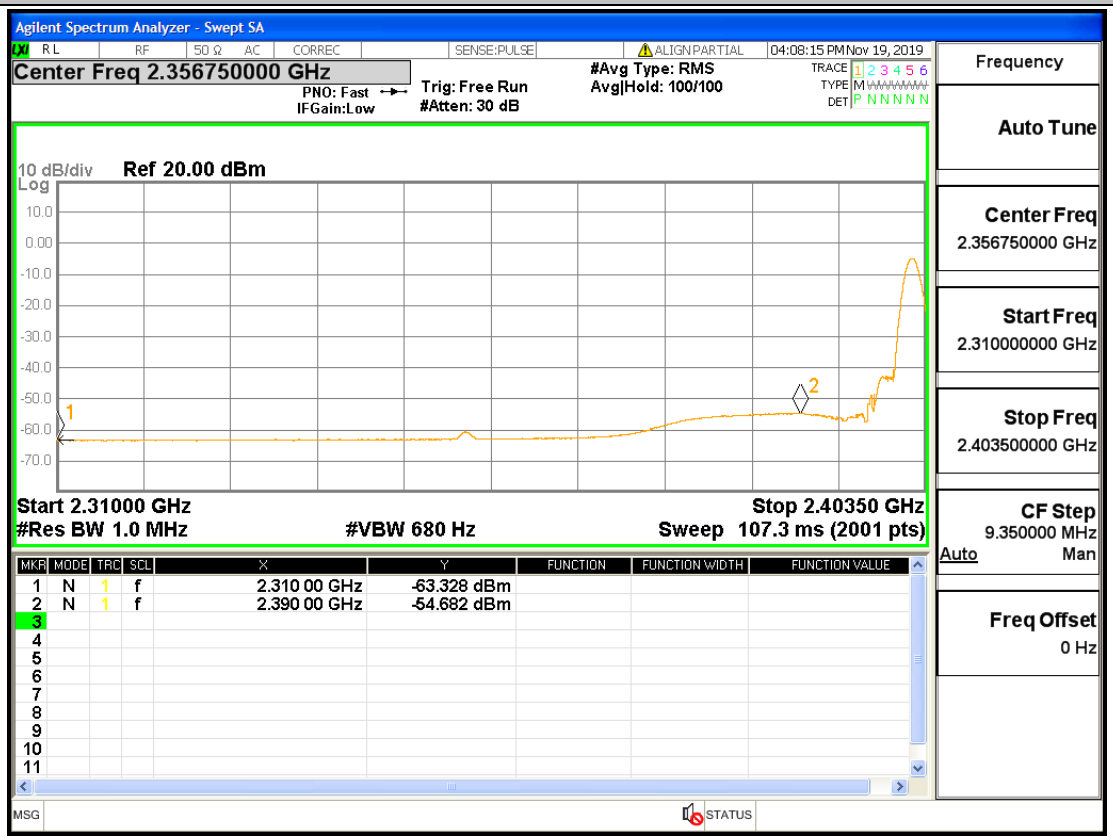
Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2389.896	5.54	0.00	-41.930	58.81	74	Pass
1DH5	2480	2484.671	5.54	0.00	-38.198	62.542	74	Pass
2DH5	2402	2390	5.54	0.00	-48.003	52.737	74	Pass
2DH5	2480	2485.262	5.54	0.00	-39.145	61.595	74	Pass

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2389.896	5.54	0.00	-54.682	46.058	54	Pass
1DH5	2480	2484.671	5.54	0.00	-47.859	52.881	54	Pass
2DH5	2402	2390	5.54	0.00	-54.687	46.053	54	Pass
2DH5	2480	2485.262	5.54	0.00	-49.802	50.938	54	Pass

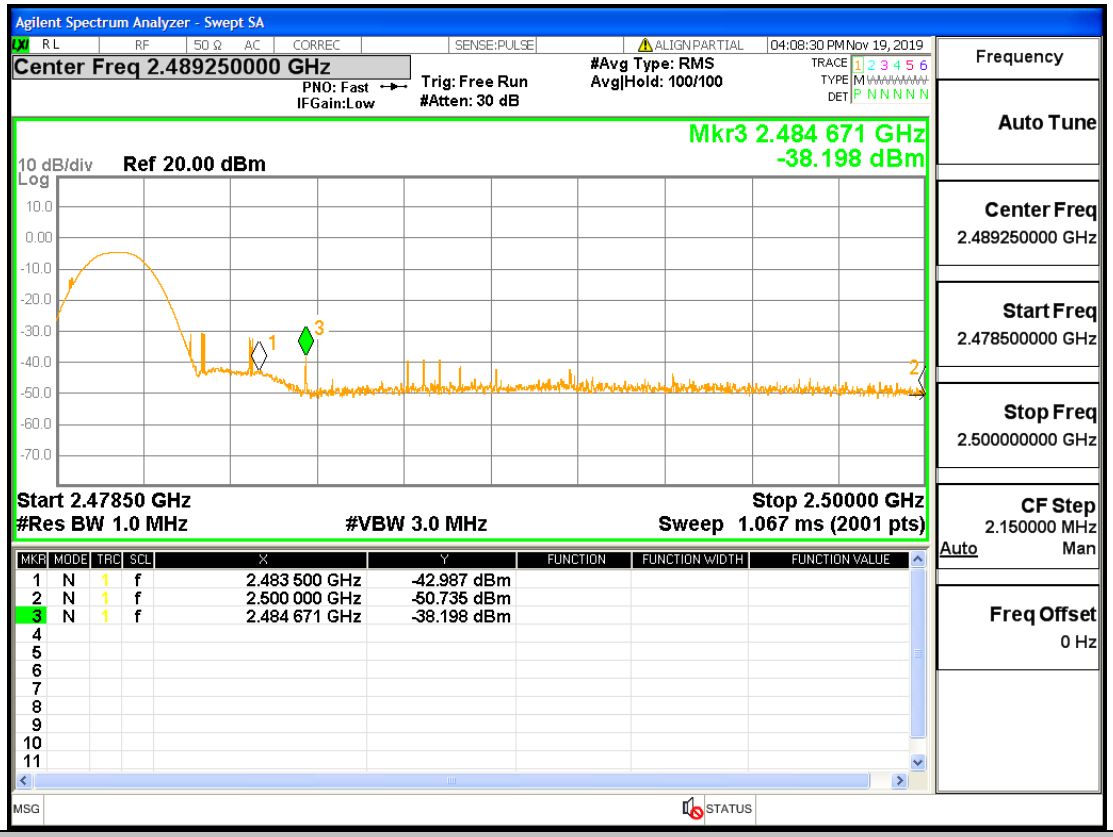
Restrict-band band-edge measurements_2402_PEAK_DH5



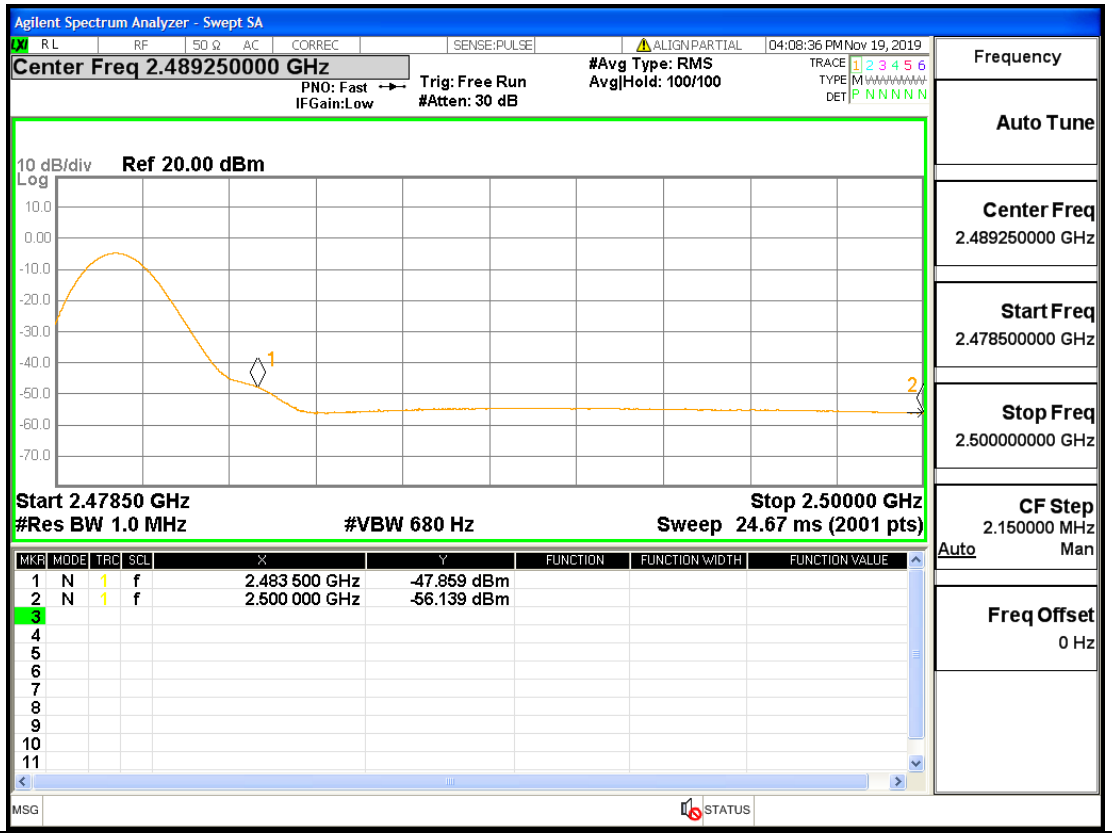
Restrict-band band-edge measurements_2402_AV_DH5



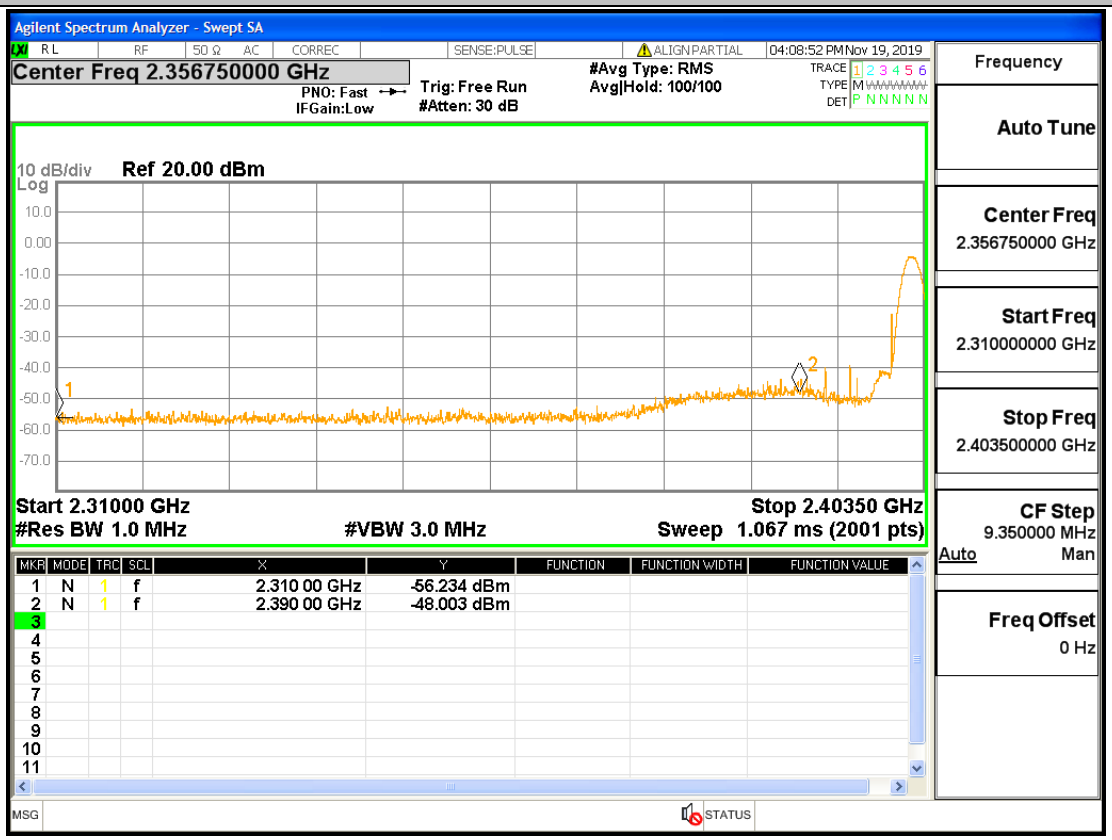
Restrict-band band-edge measurements_2480_PEAK_DH5



Restrict-band band-edge measurements_2480_AV_DH5

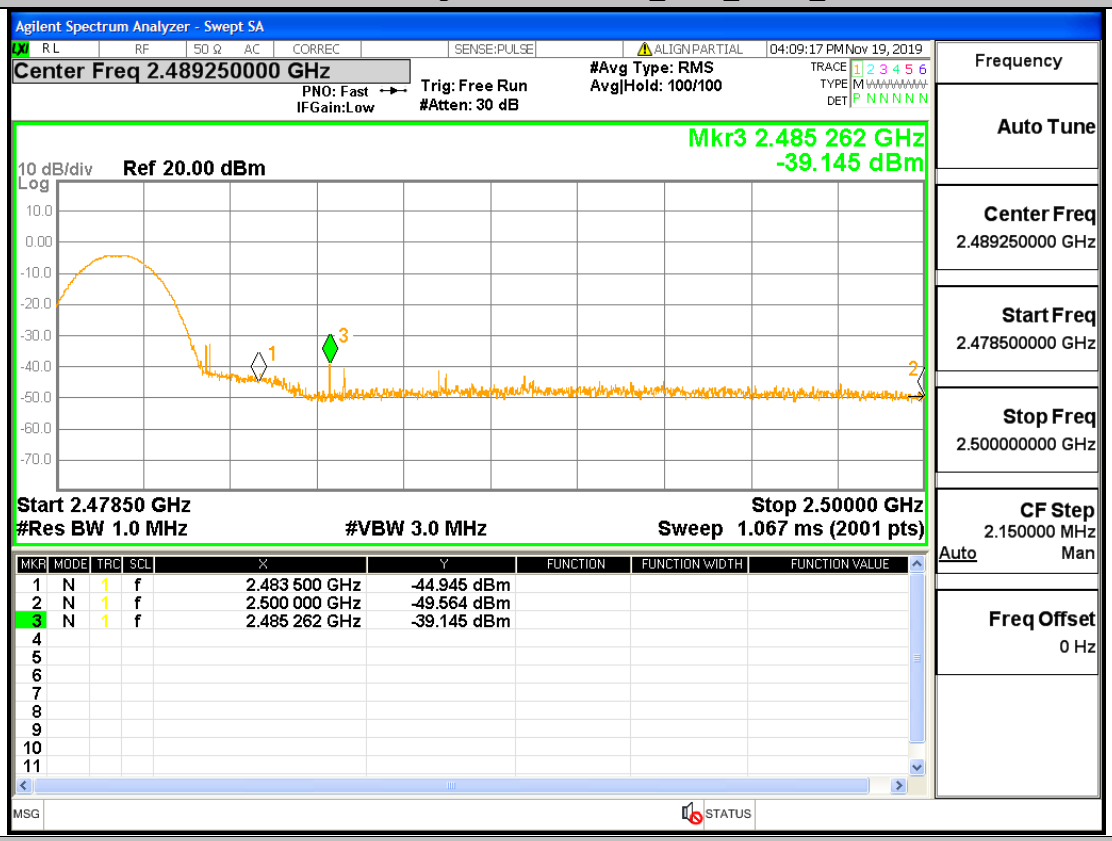


Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5

Restrict-band band-edge measurements_2480_PEAK_2DH5



Restrict-band band-edge measurements_2480_AV_2DH5