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: CP-TW03

FCC ID: 2AUDSCP-TW03

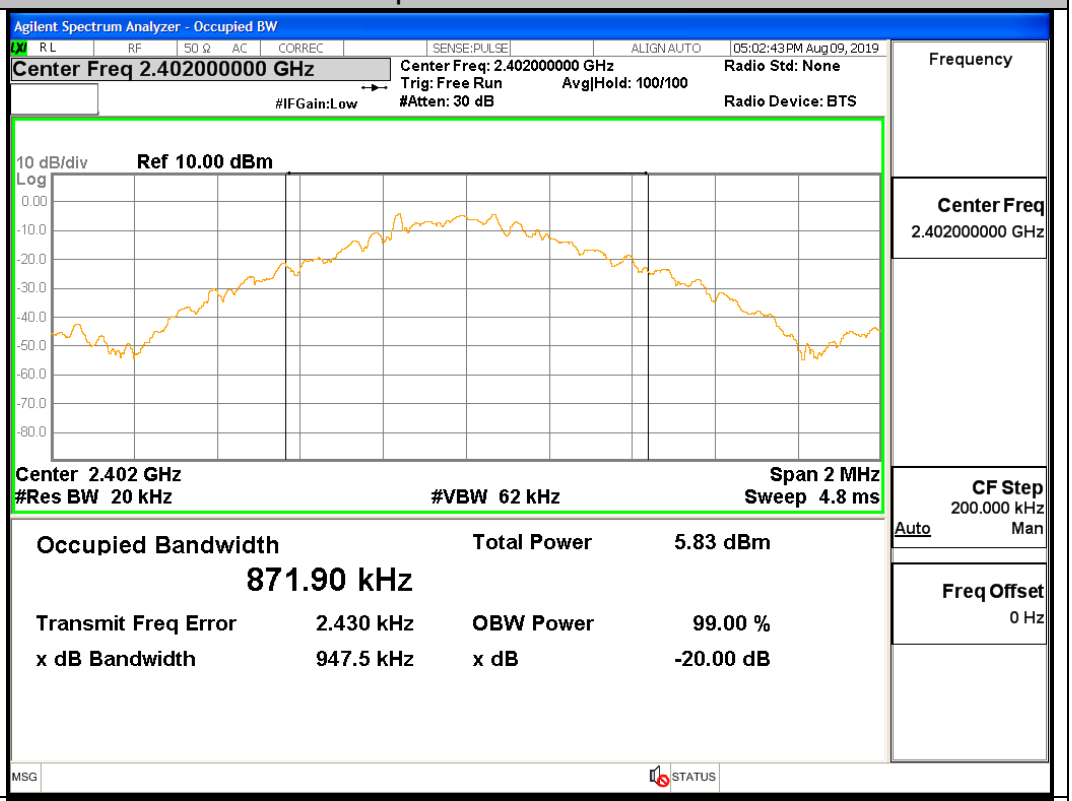
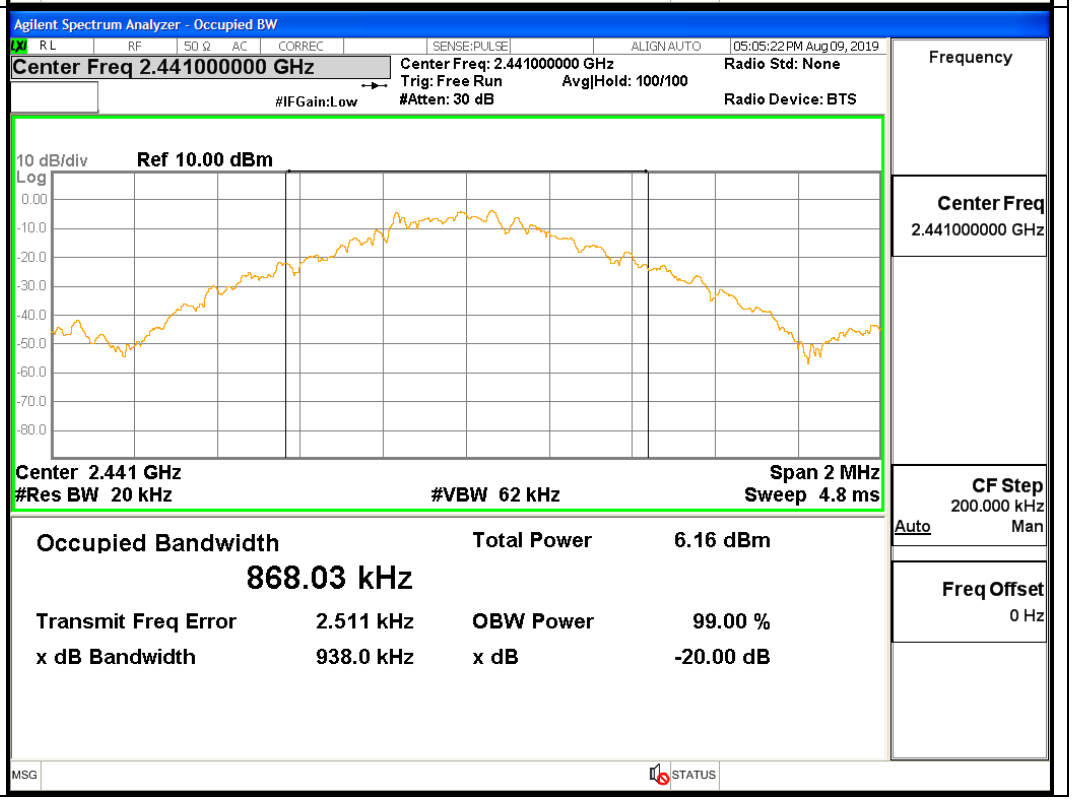
Environmental Conditions

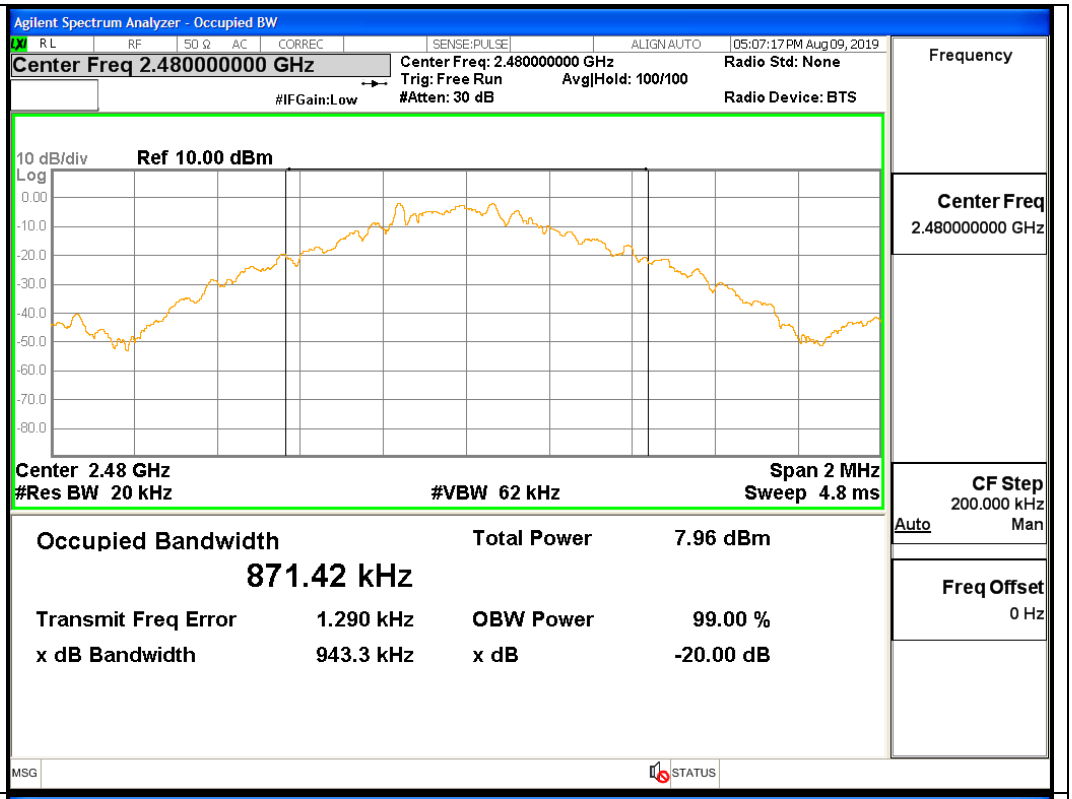
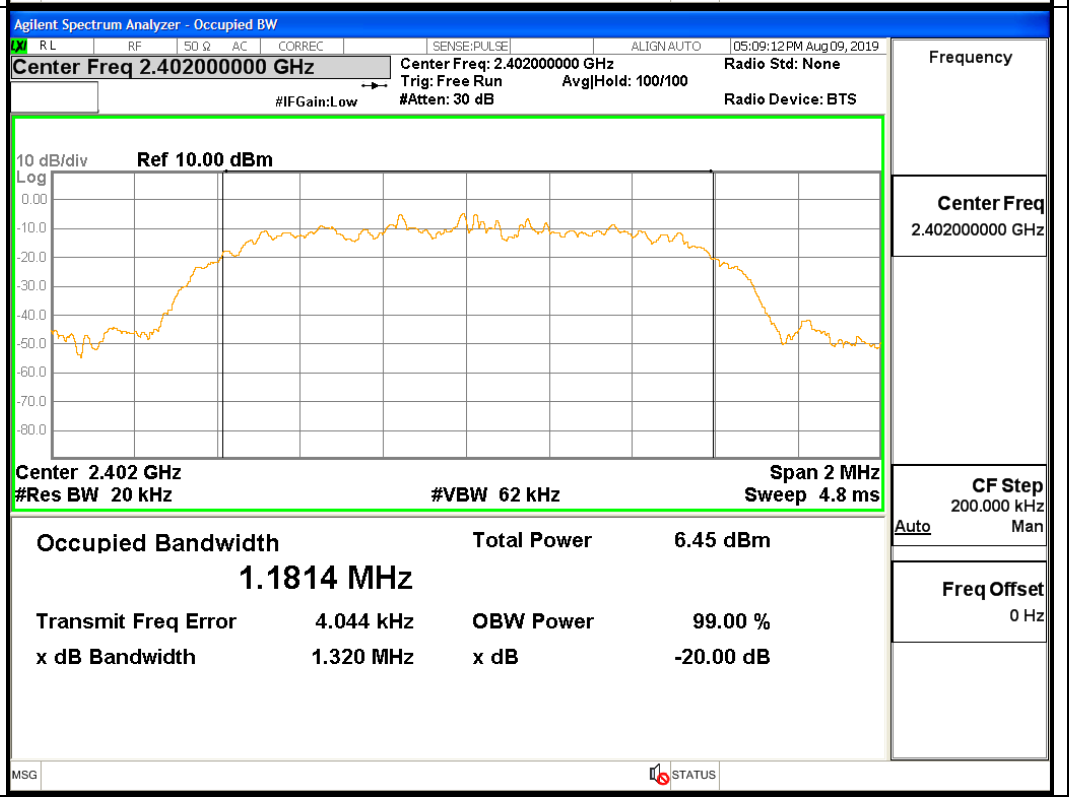
Temperature:	22.7° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

A.1 20 dB Bandwidth

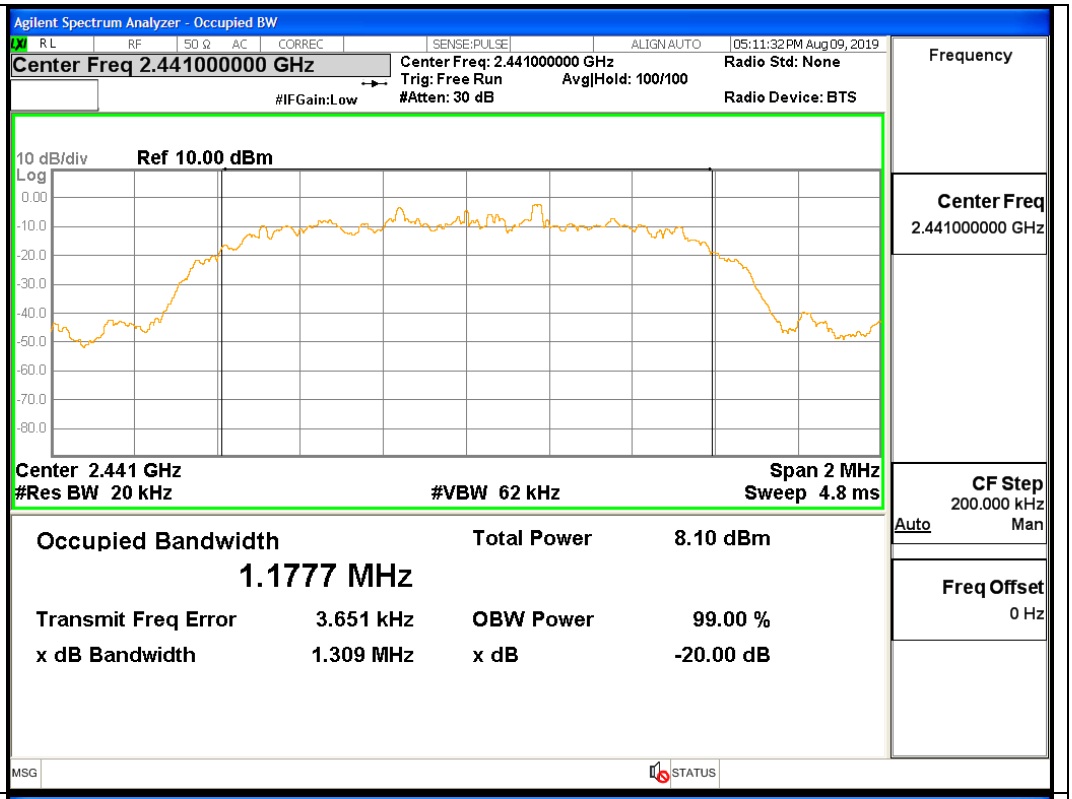
Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.948	Not Specified	PASS
GFSK	MCH	0.938	Not Specified	PASS
GFSK	HCH	0.943	Not Specified	PASS
π/4DQPSK	LCH	1.320	Not Specified	PASS
π/4DQPSK	MCH	1.309	Not Specified	PASS
π/4DQPSK	HCH	1.303	Not Specified	PASS
8DPSK	LCH	1.301	Not Specified	PASS
8DPSK	MCH	1.297	Not Specified	PASS
8DPSK	HCH	1.261	Not Specified	PASS

Test Graph

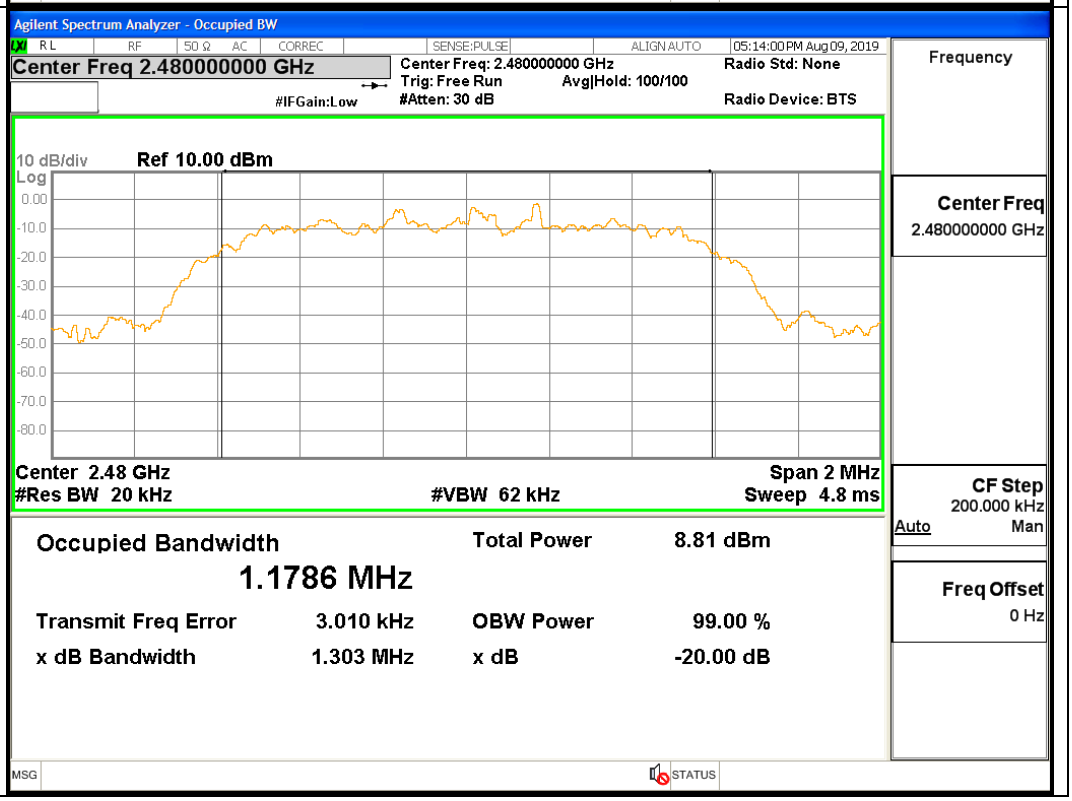
Graphs	
GFSK/LCH	
GFSK/MCH	

GFSK/HCH	
π/4DQPSK/LCH	

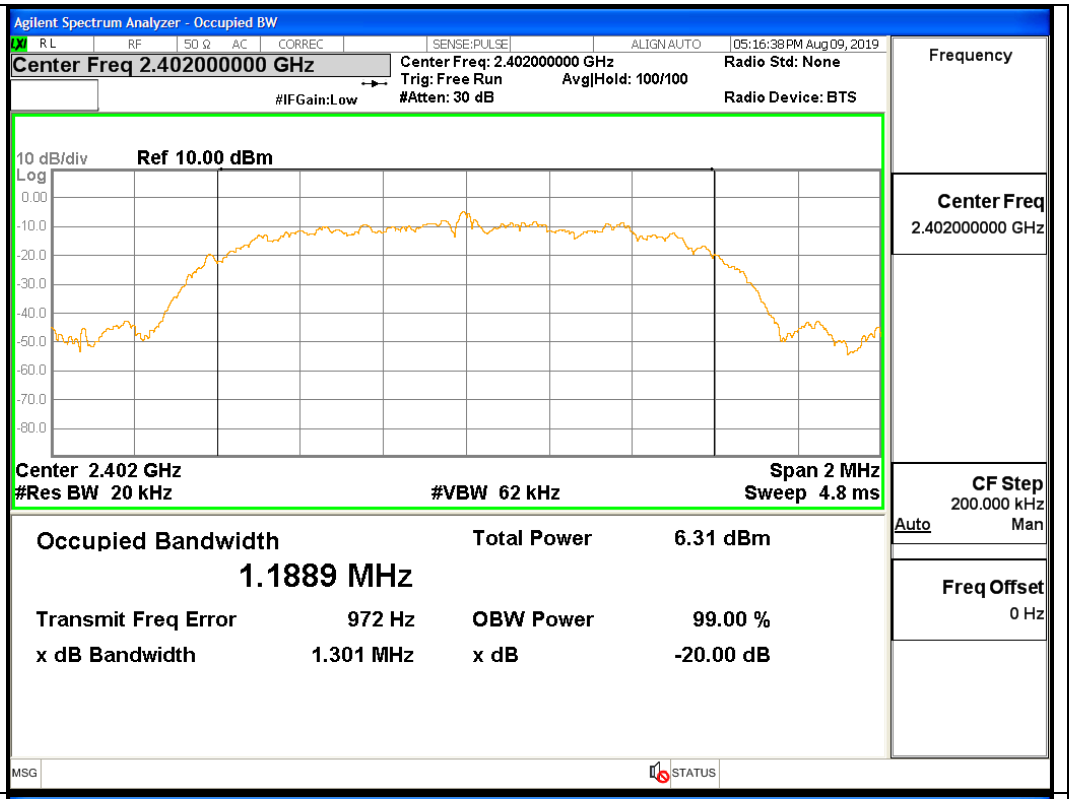
π/4DQPSK/MCH



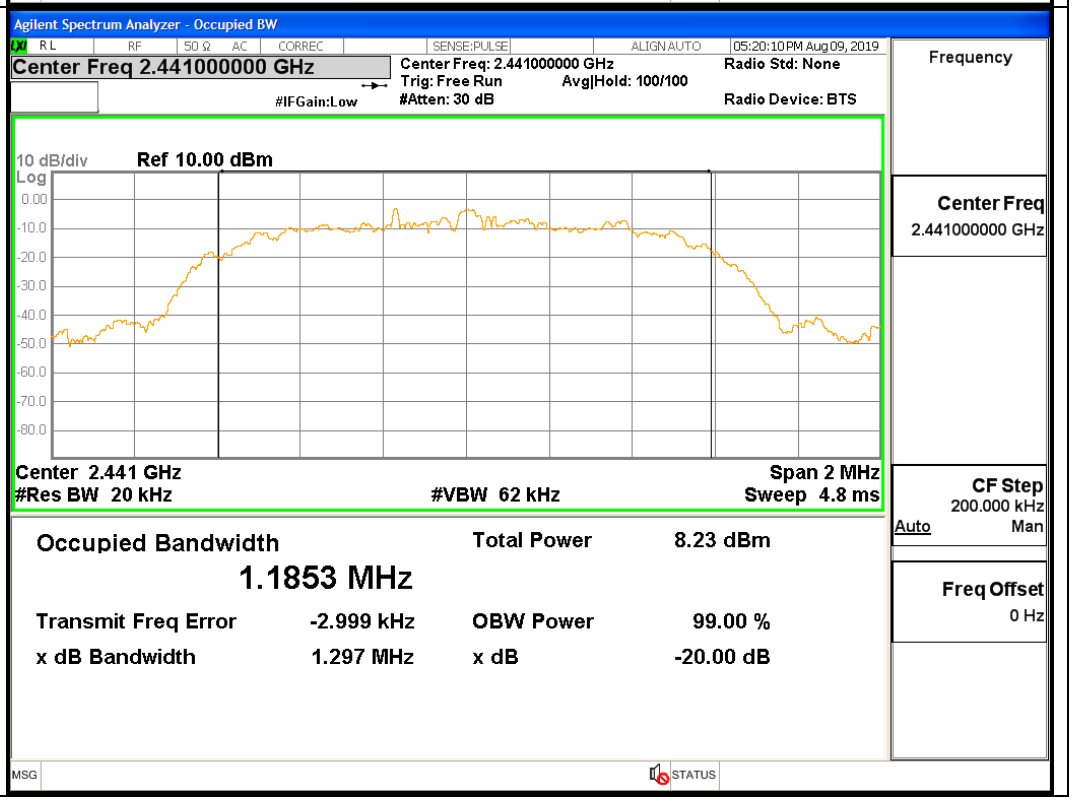
π/4DQPSK/HCH

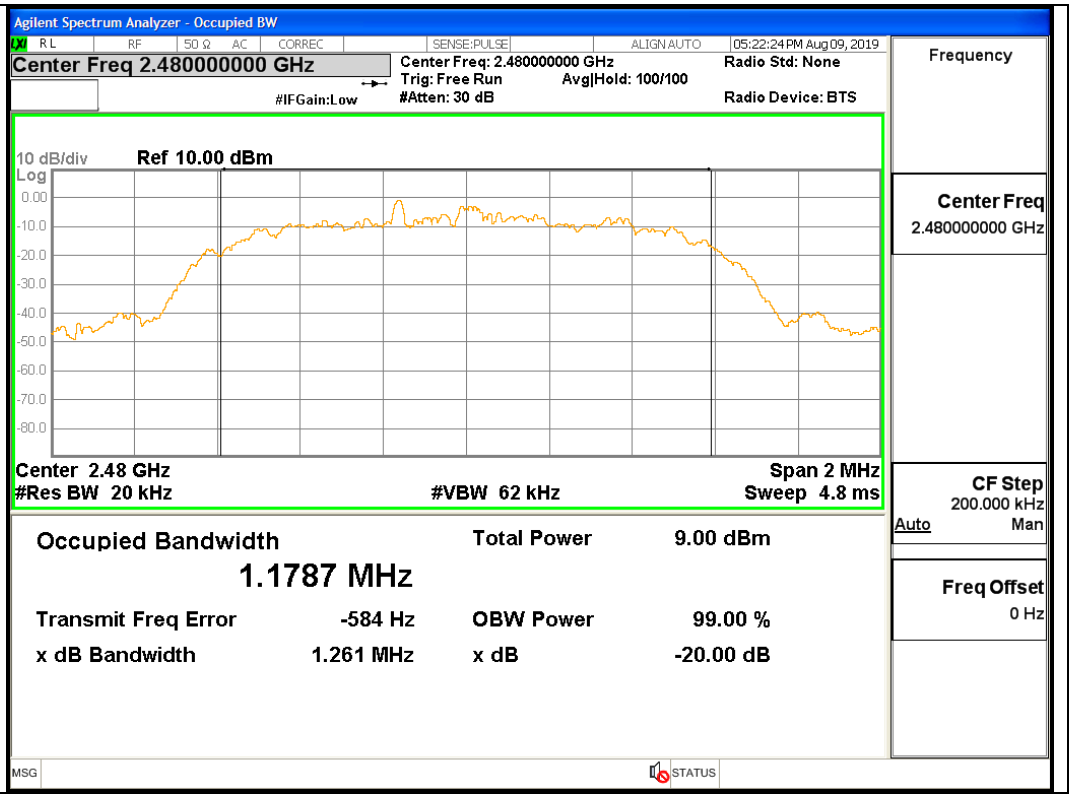


8DPSK/LCH



8DPSK/MCH



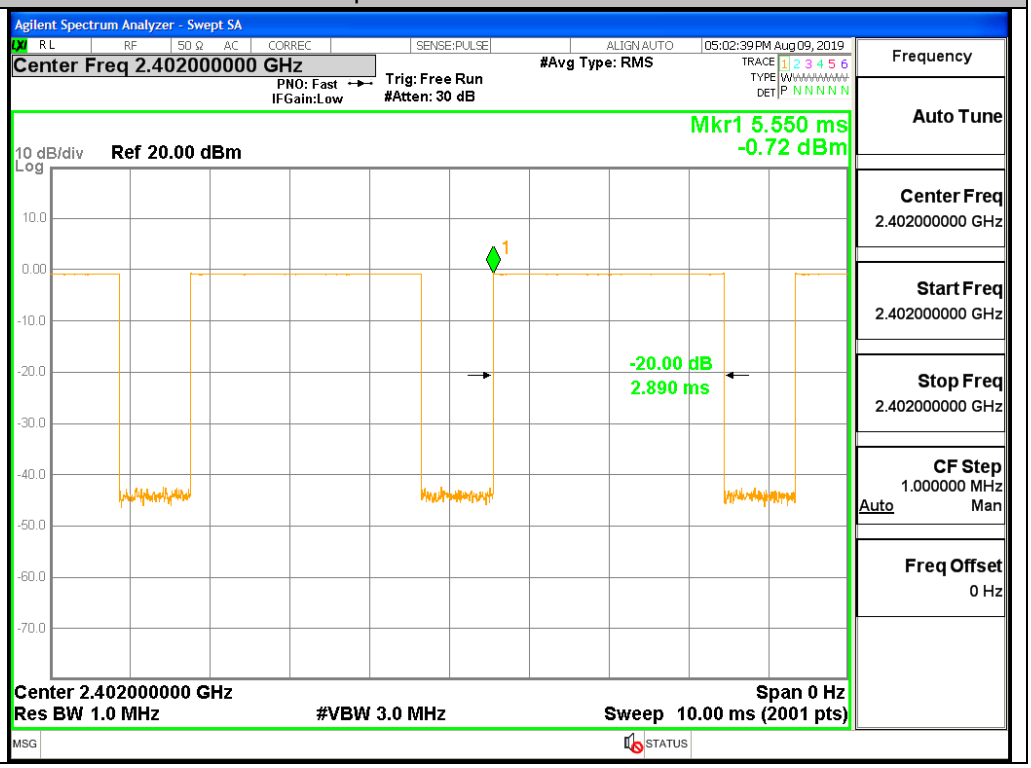
8DPSK/HCH	

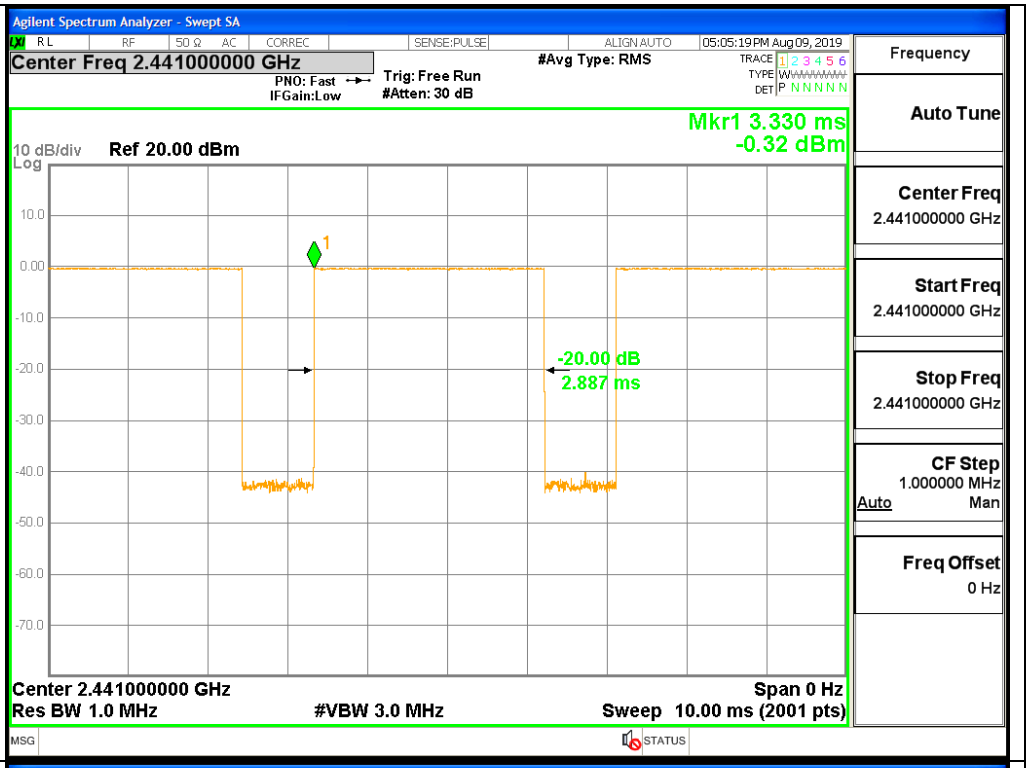
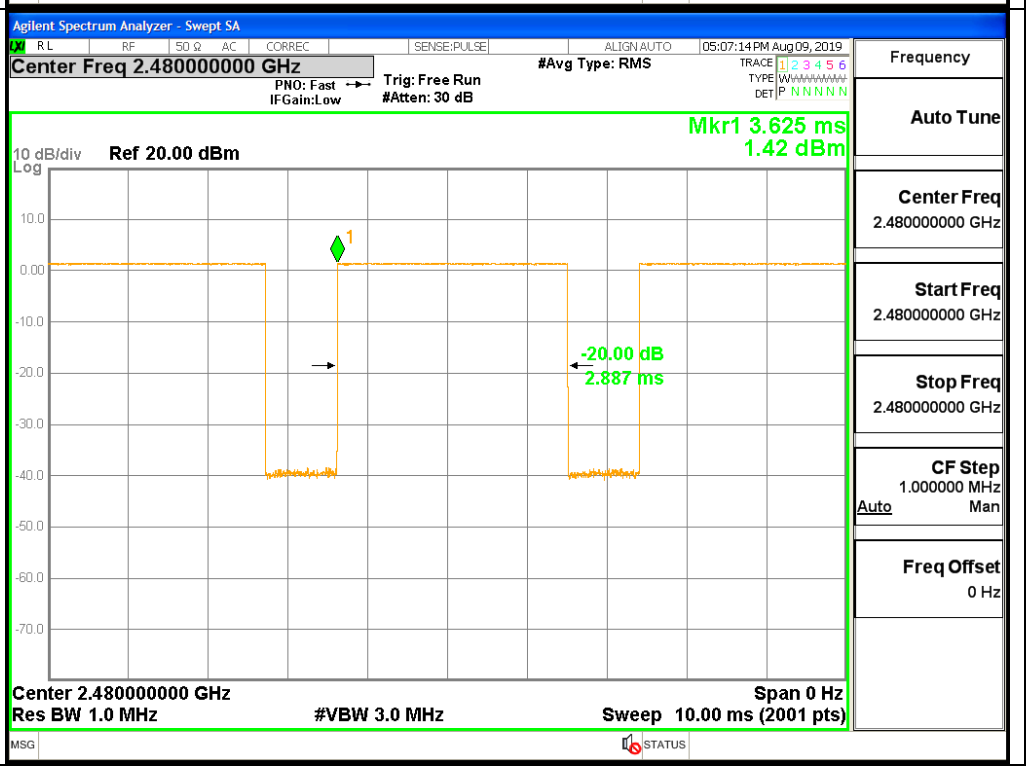
Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
CORREC
SENSE:PULSE
ALIGN AUTO
05:22:24 PM Aug 09, 2019
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
10 dB/div
Ref 10.00 dBm
Log
0.00
-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
1.1787 MHz
Total Power
9.00 dBm
Transmit Freq Error
-584 Hz
OBW Power
99.00 %
x dB Bandwidth
1.261 MHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

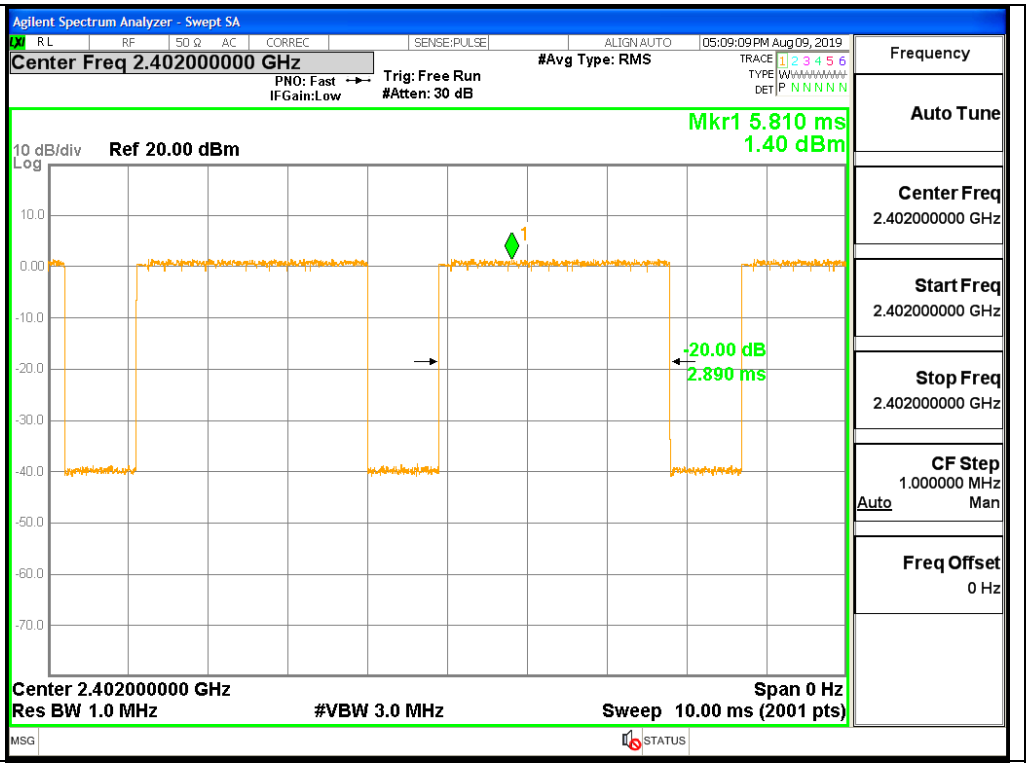
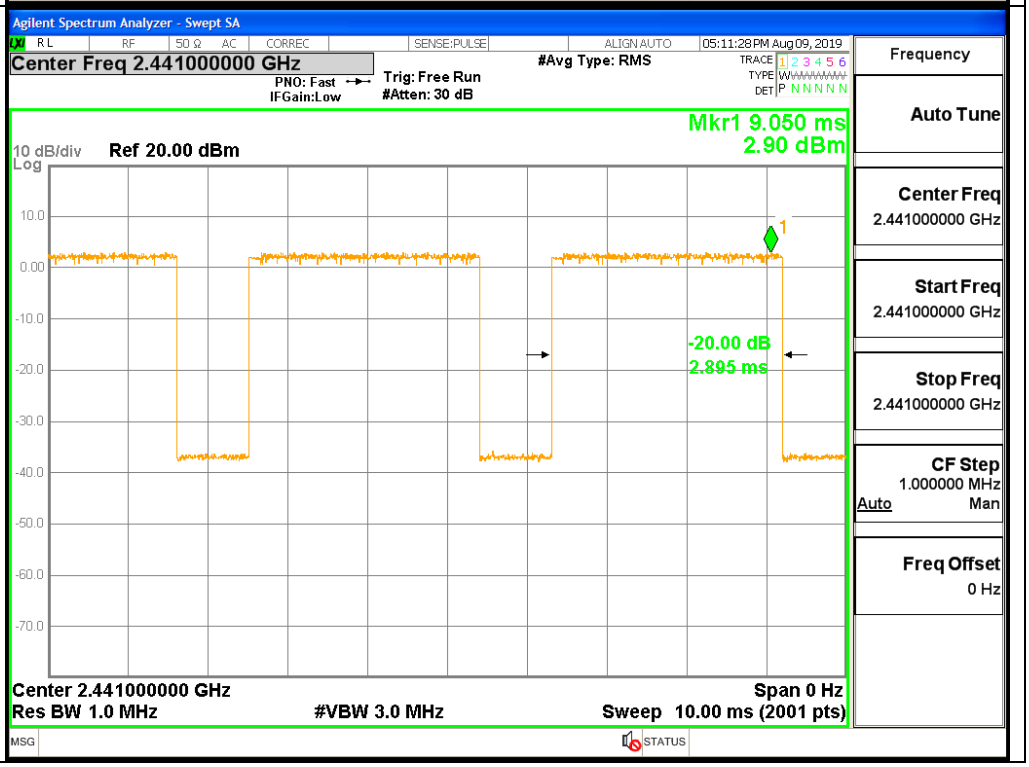
A.2 Dwell Time

Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002890	106.7	0.308316	0.4	PASS
GFSK	DH5	MCH	0.002887	106.7	0.308014	0.4	PASS
GFSK	DH5	HCH	0.002887	106.7	0.308030	0.4	PASS
π/4DQPSK	2DH5	LCH	0.002890	106.7	0.308377	0.4	PASS
π/4DQPSK	2DH5	MCH	0.002895	106.7	0.308869	0.4	PASS
π/4DQPSK	2DH5	HCH	0.002895	106.7	0.308884	0.4	PASS
8DPSK	3DH5	LCH	0.002895	106.7	0.308849	0.4	PASS
8DPSK	3DH5	MCH	0.002895	106.7	0.308901	0.4	PASS
8DPSK	3DH5	HCH	0.002894	106.7	0.308835	0.4	PASS

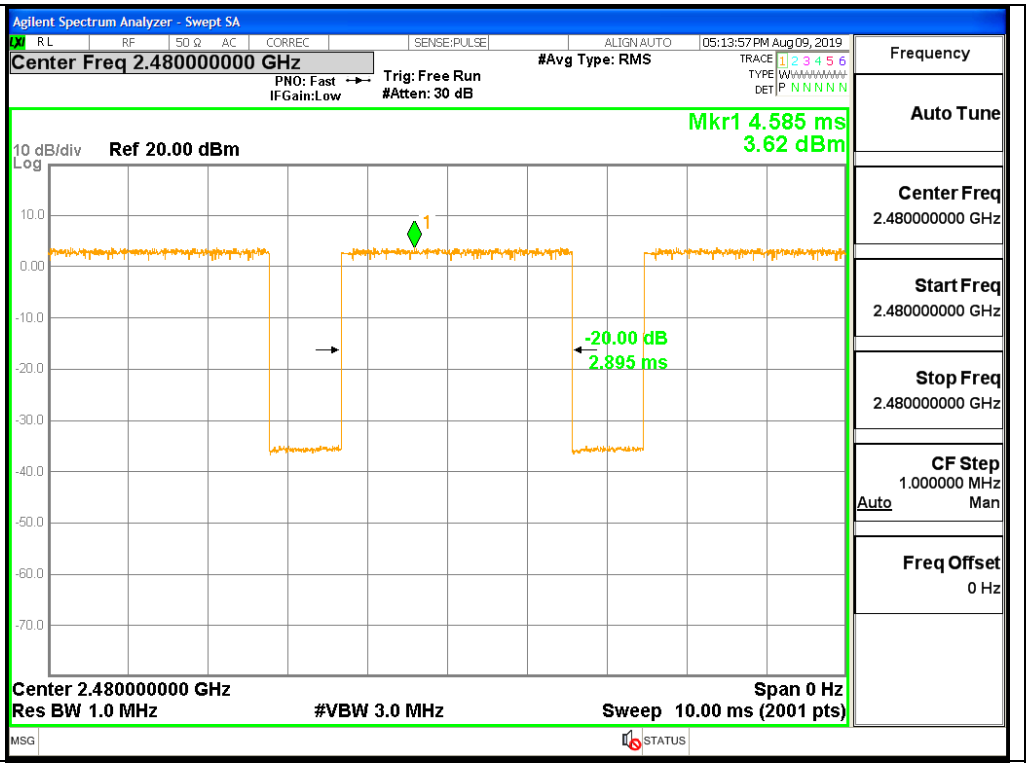
Test Graph

Graphs	
GFSK_DH5/LCH	

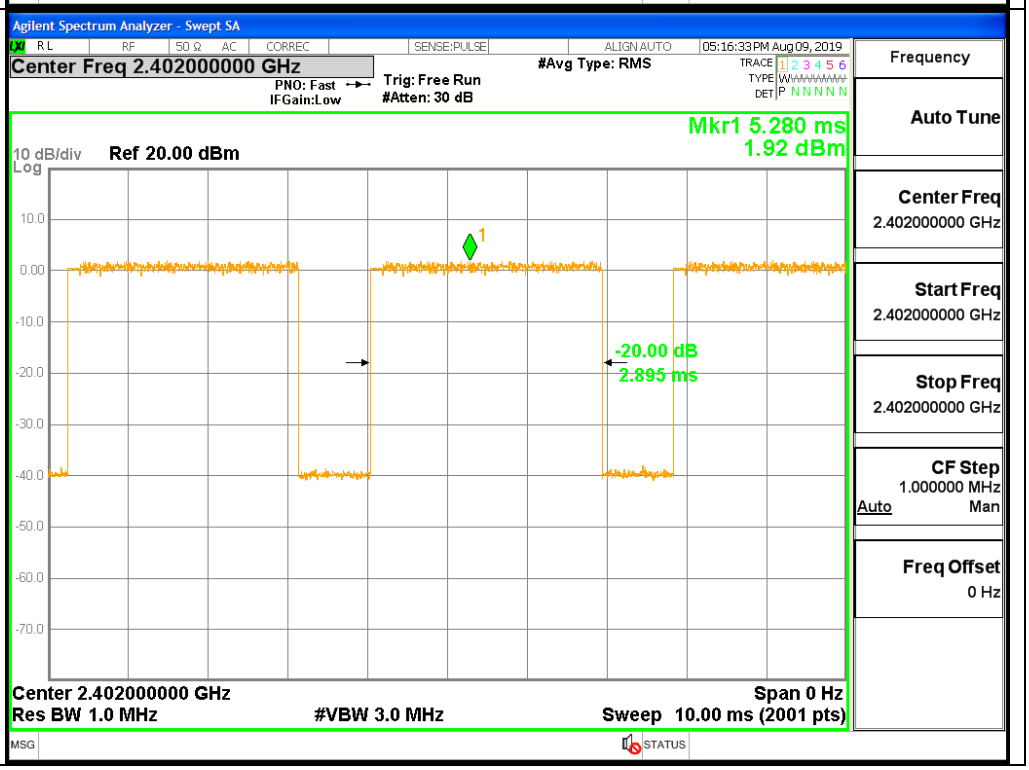
GFSK_DH5/MCH	
GFSK_DH5/HCH	

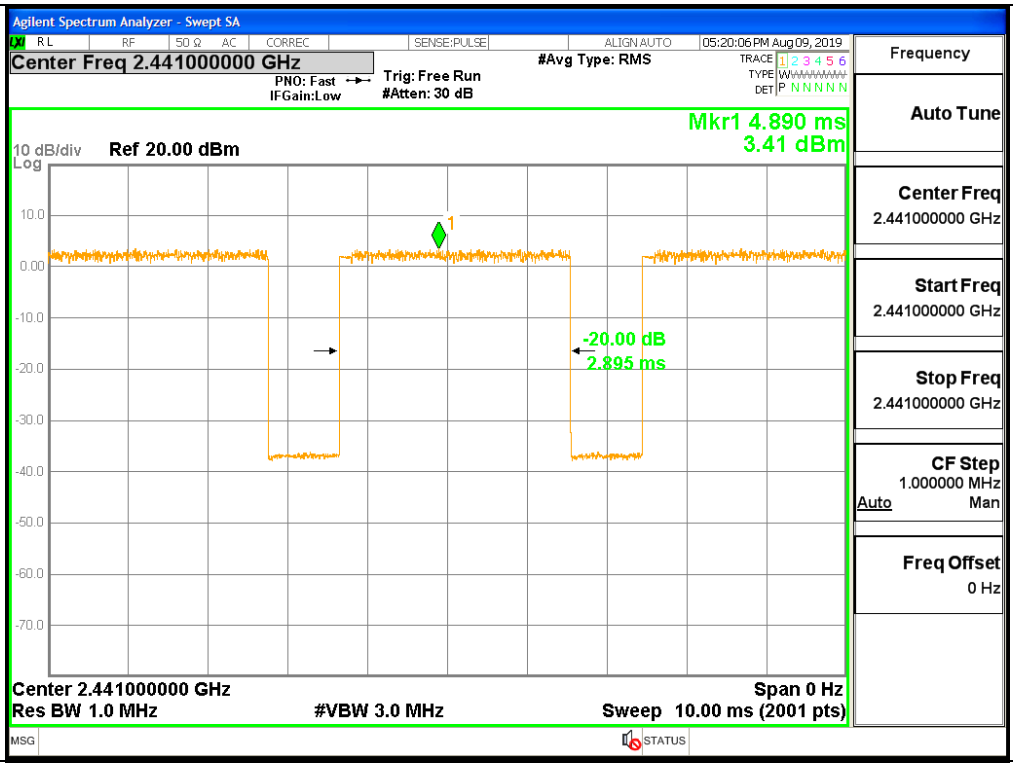
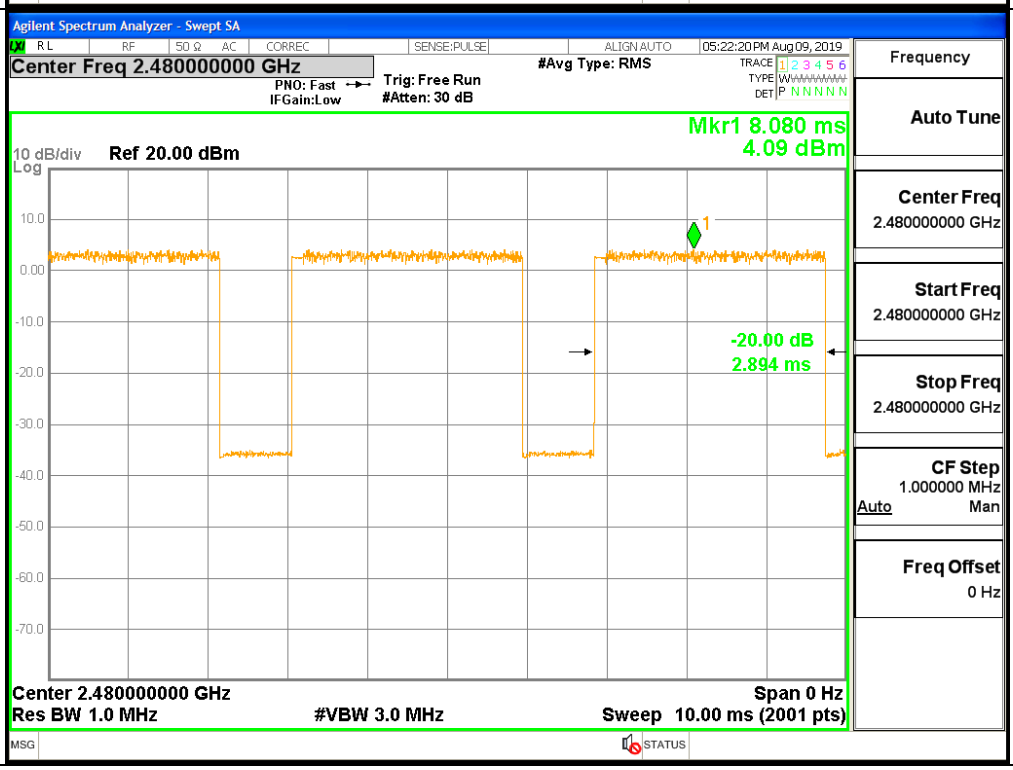
π/4DQPSK _2DH5/LCH	
π/4DQPSK _2DH5/MCH	

π/4DQPSK _2DH5/HCH



8DPSK _3DH5/LCH

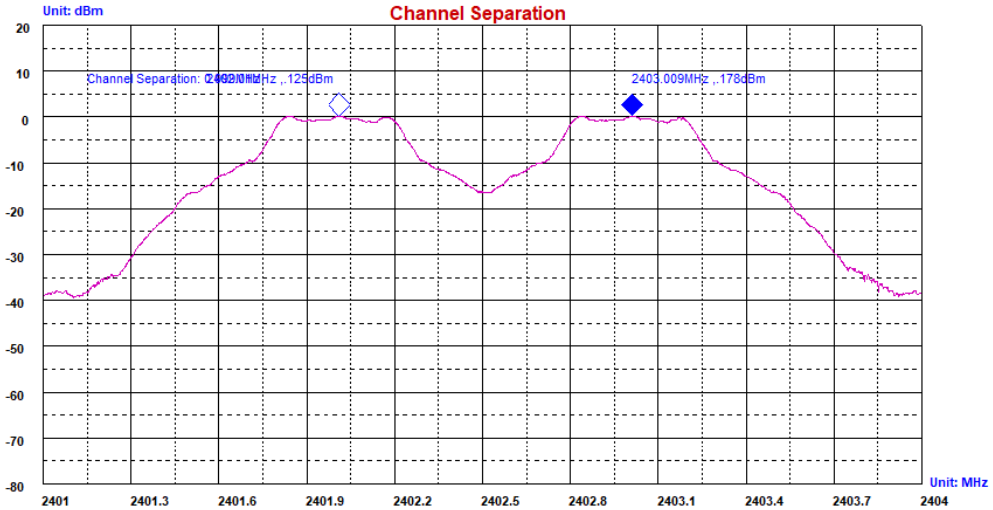
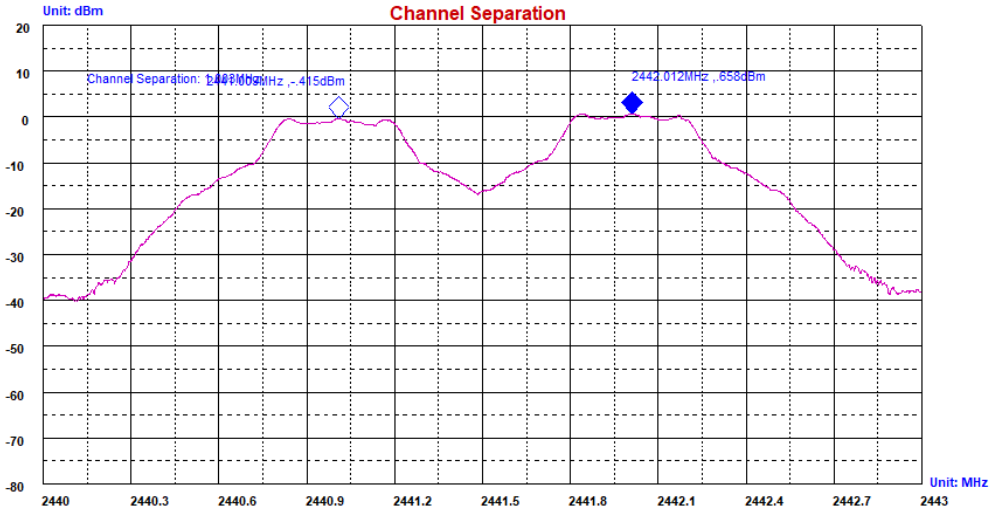
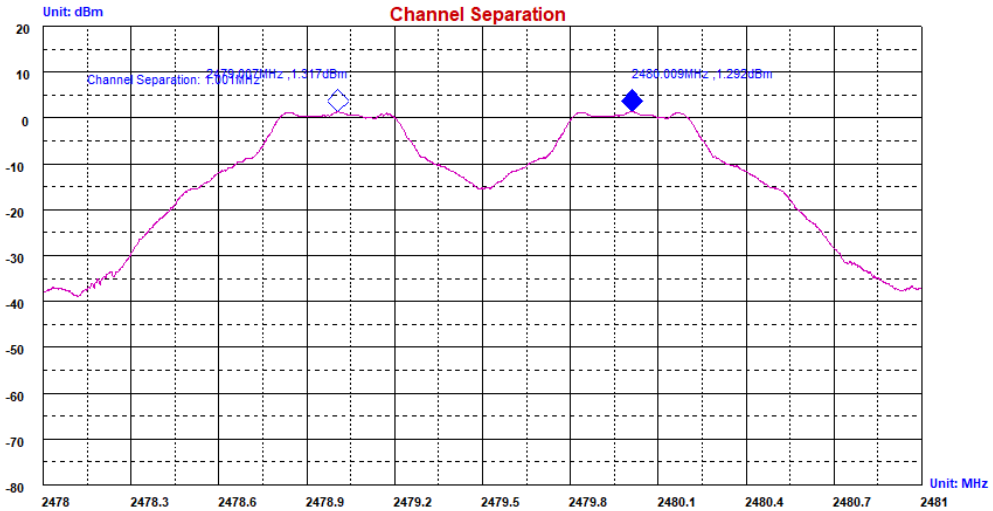


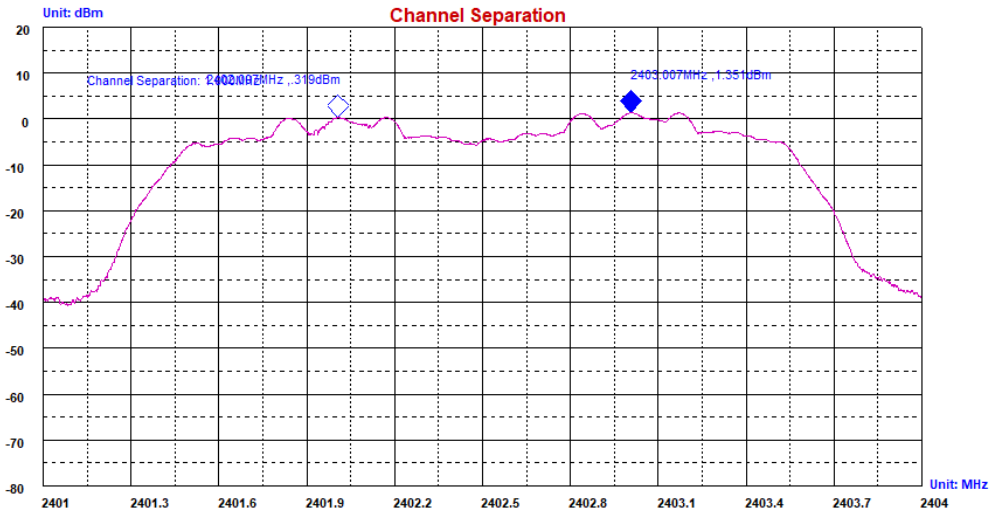
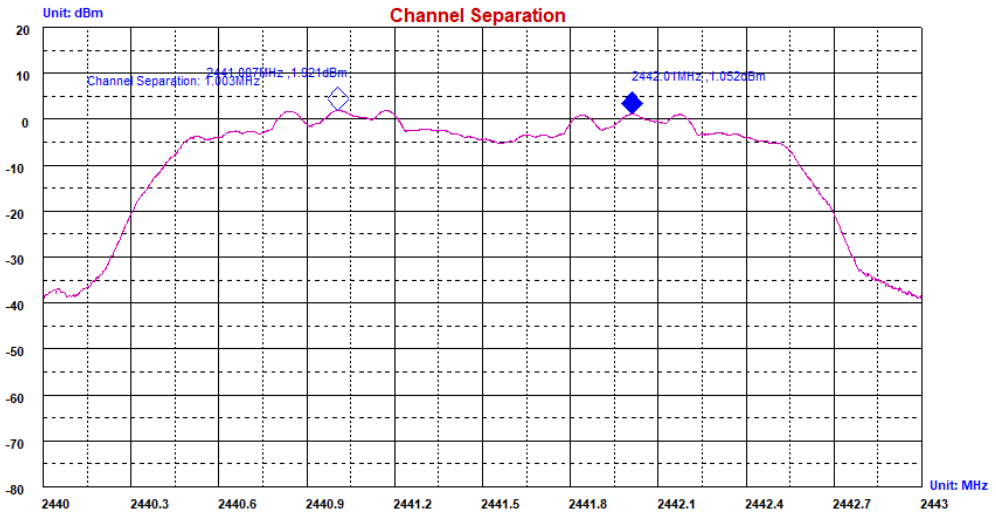
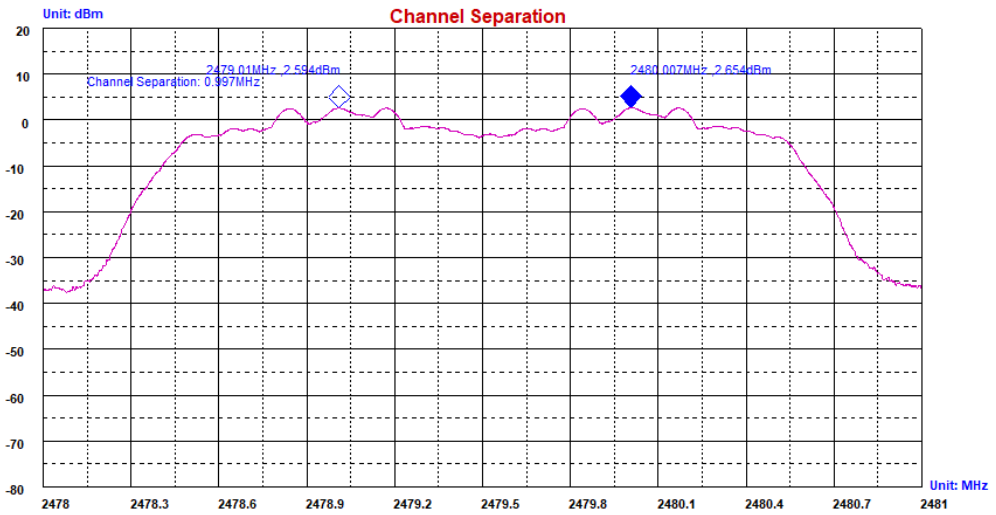
8DPSK _3DH5/MCH	
8DPSK _3DH5/HCH	

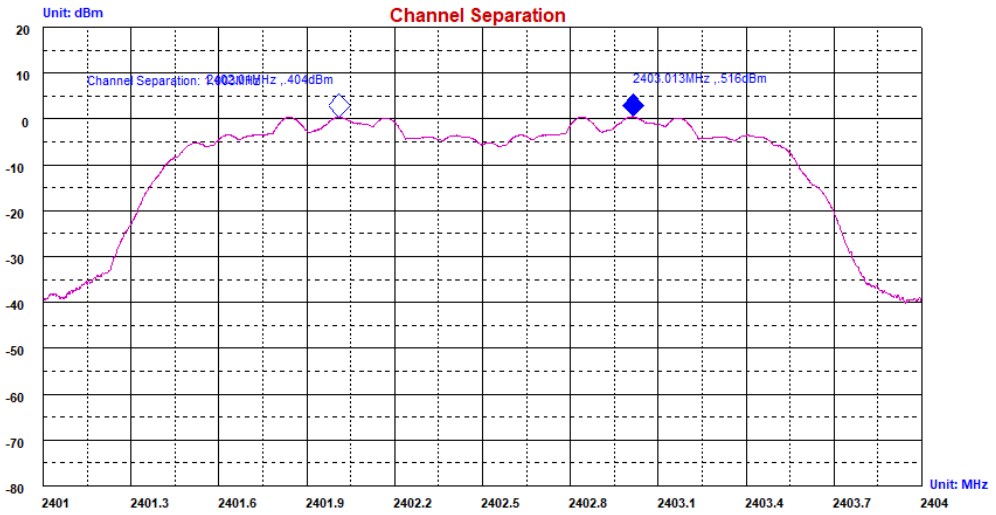
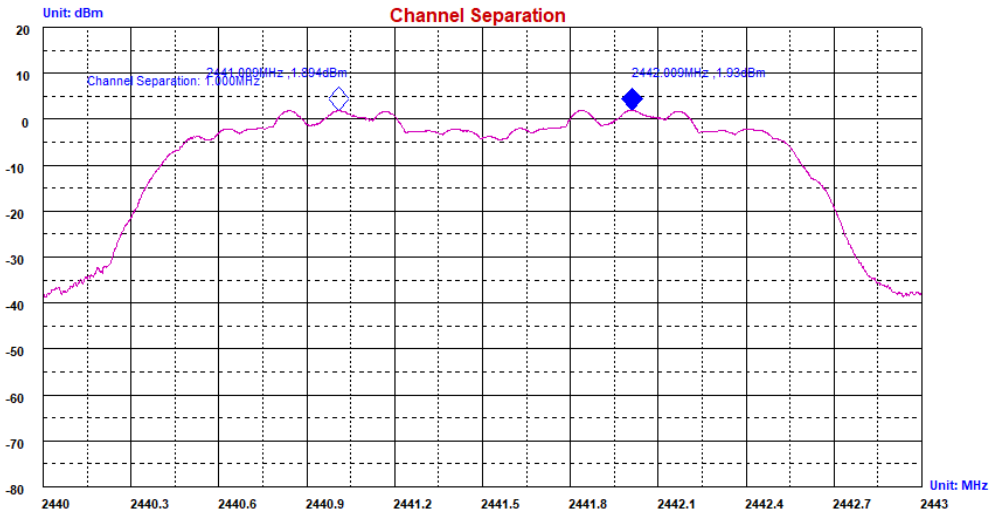
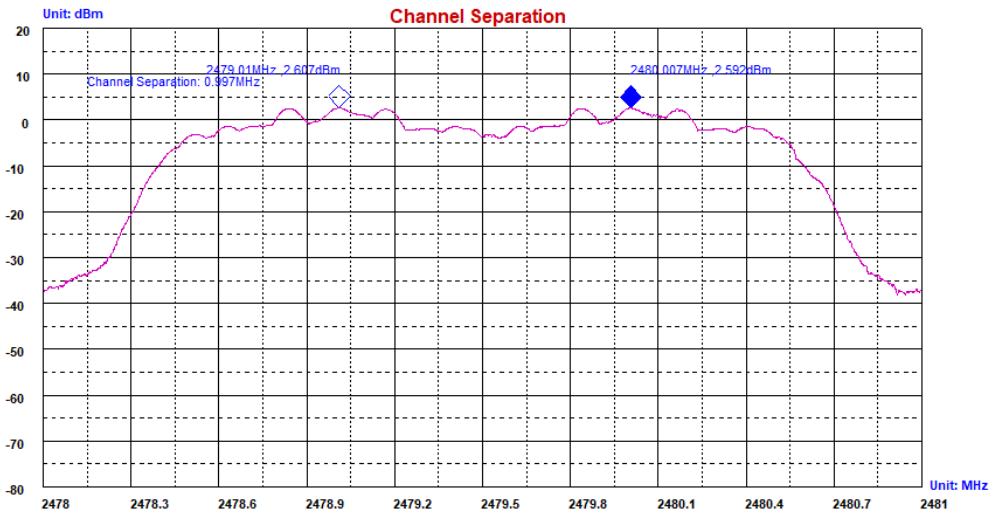
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.999	0.631	PASS
GFSK	MCH	1.003	0.625	PASS
GFSK	HCH	1.001	0.841	PASS
π/4DQPSK	LCH	1.000	0.880	PASS
π/4DQPSK	MCH	1.003	0.873	PASS
π/4DQPSK	HCH	0.997	0.869	PASS
8DPSK	LCH	1.003	0.867	PASS
8DPSK	MCH	1.000	0.865	PASS
8DPSK	HCH	0.997	0.841	PASS

Test Graph

Graphs	
GFSK/LCH	
GFSK/MCH	
GFSK/HCH	

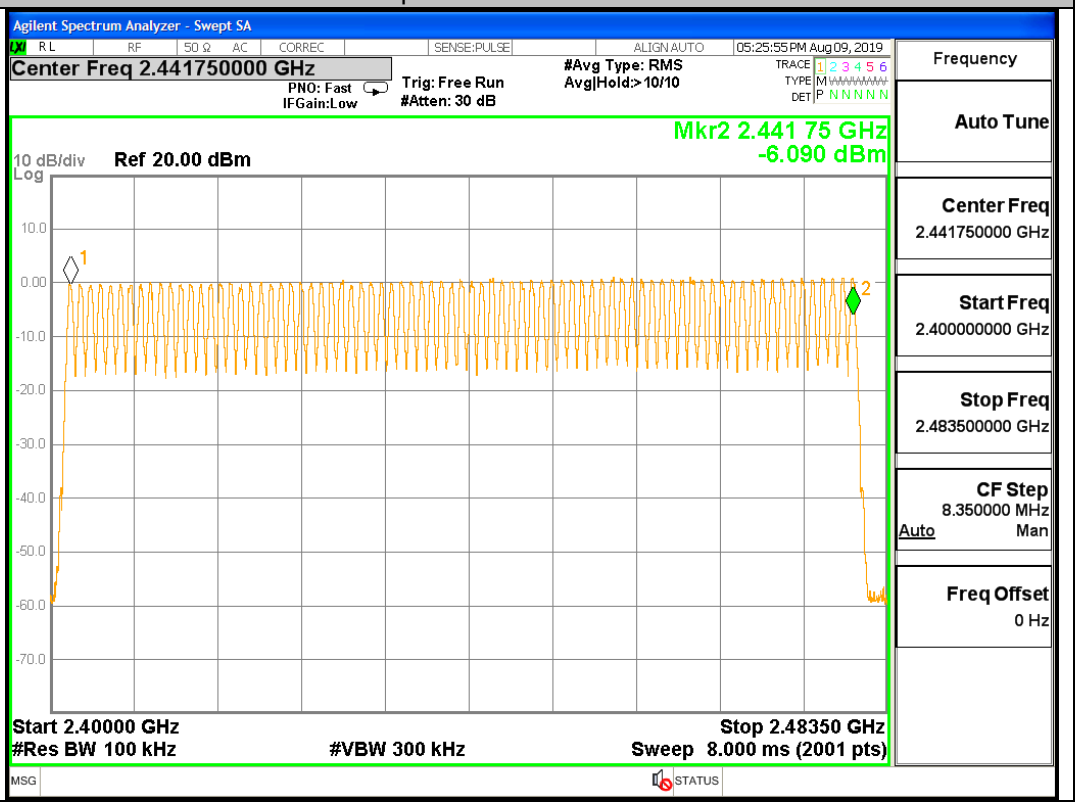
π/4DQPSK/LCH	
π/4DQPSK/MCH	
π/4DQPSK/HCH	

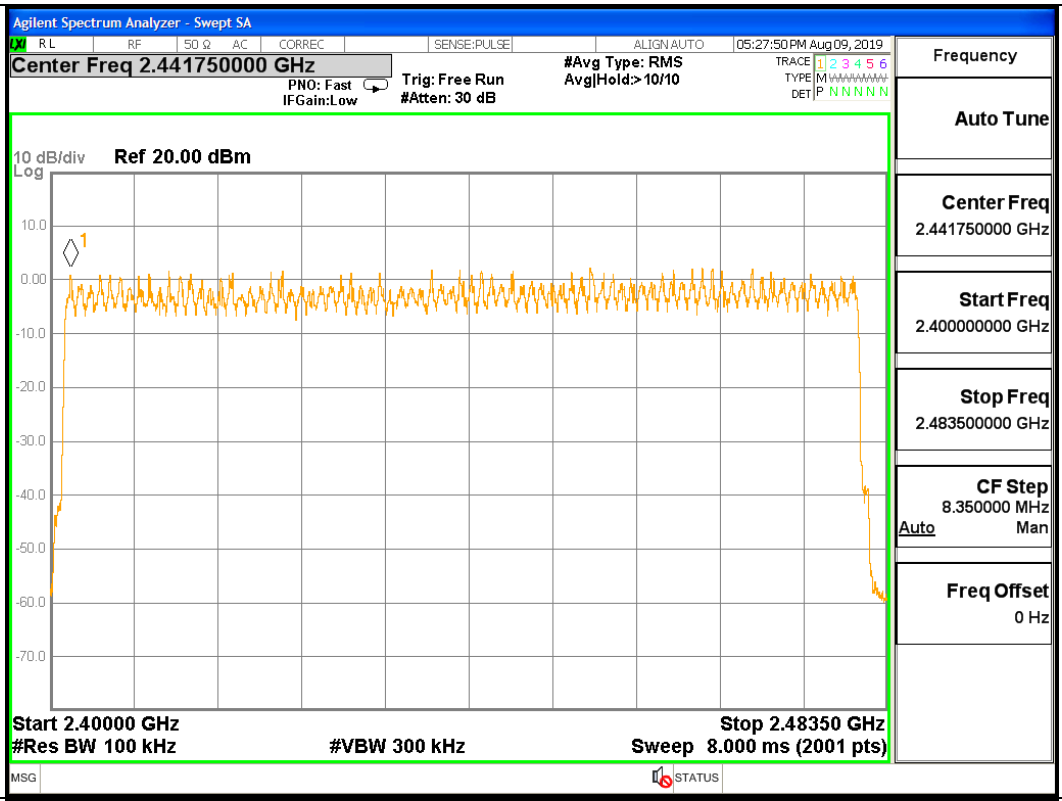
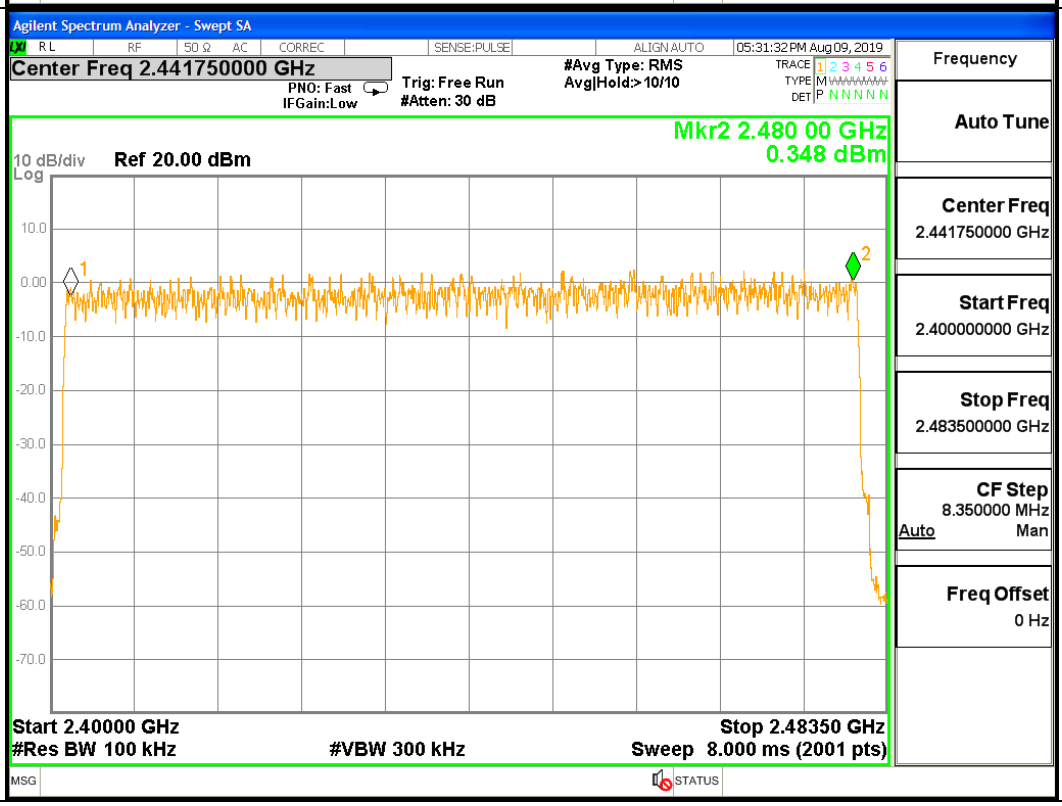
8DPSK/LCH	
8DPSK/MCH	
8DPSK/HCH	

A.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

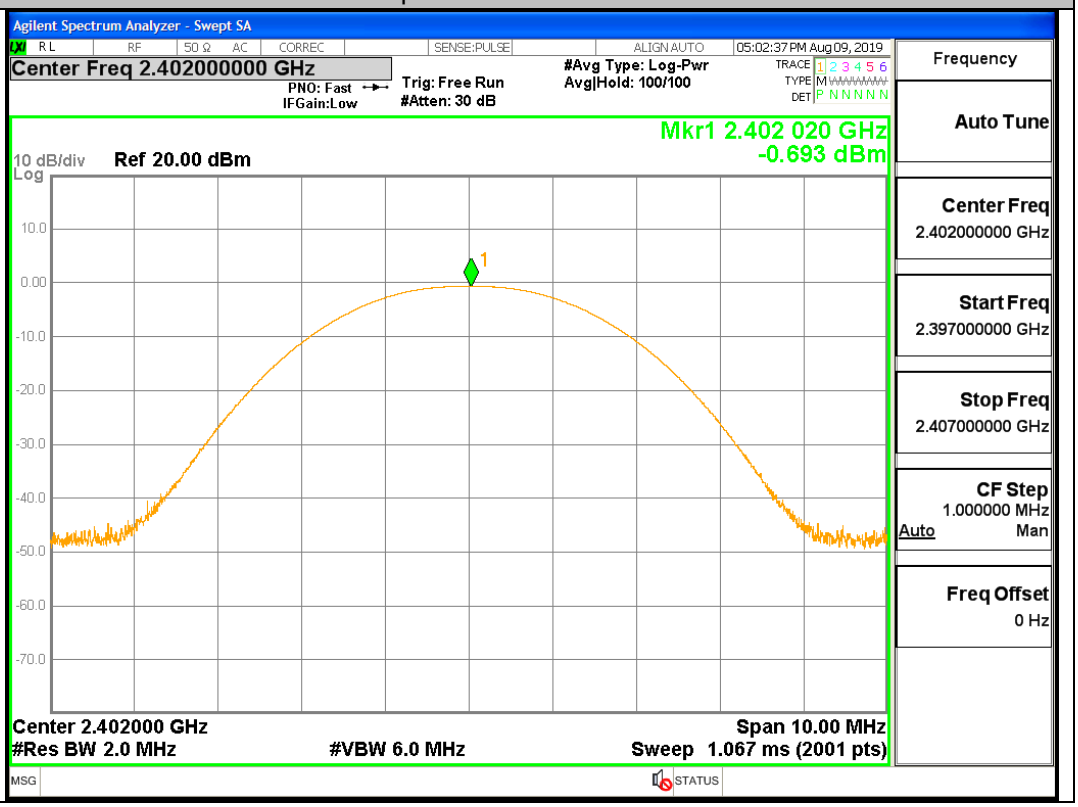
Graphs	
GFSK/Hop	

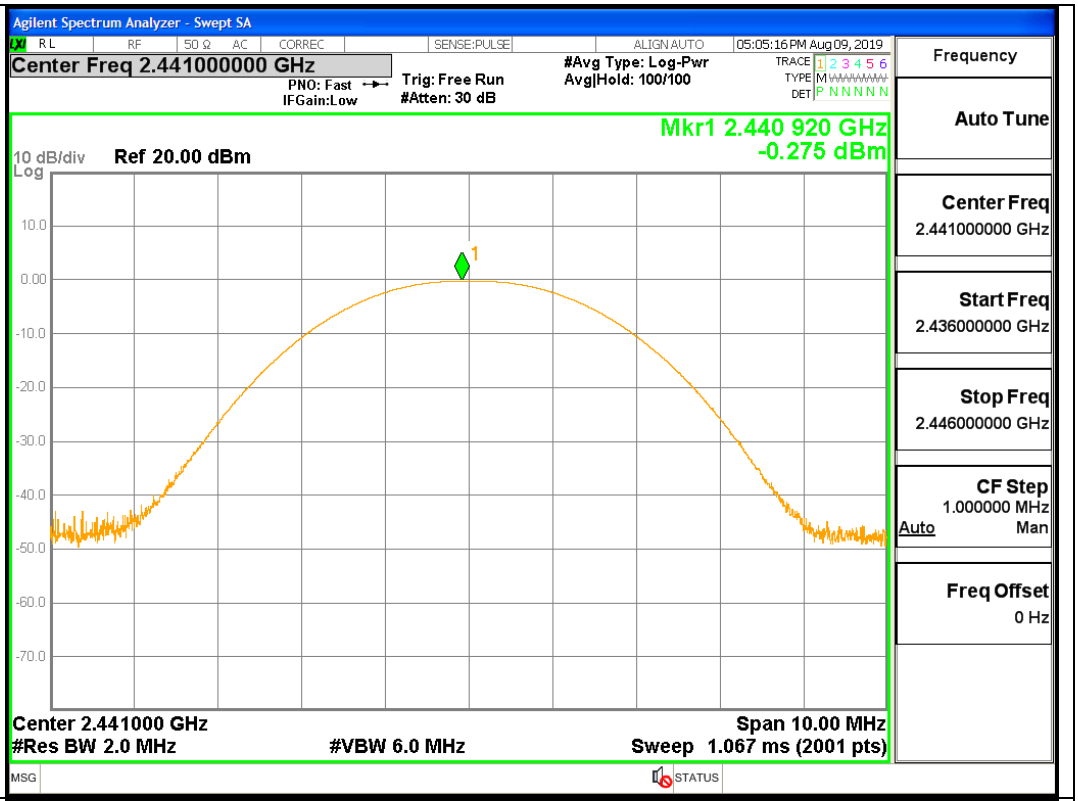
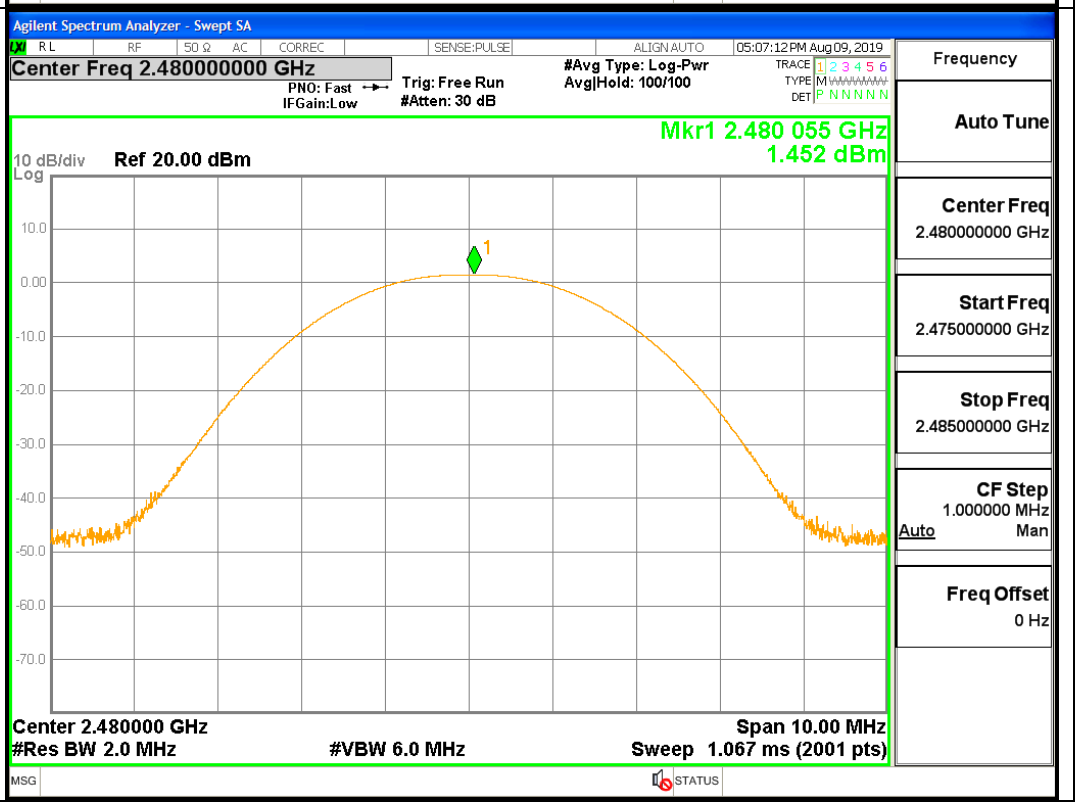
π/4DQPSK/Hop	
8DPSK/Hop	

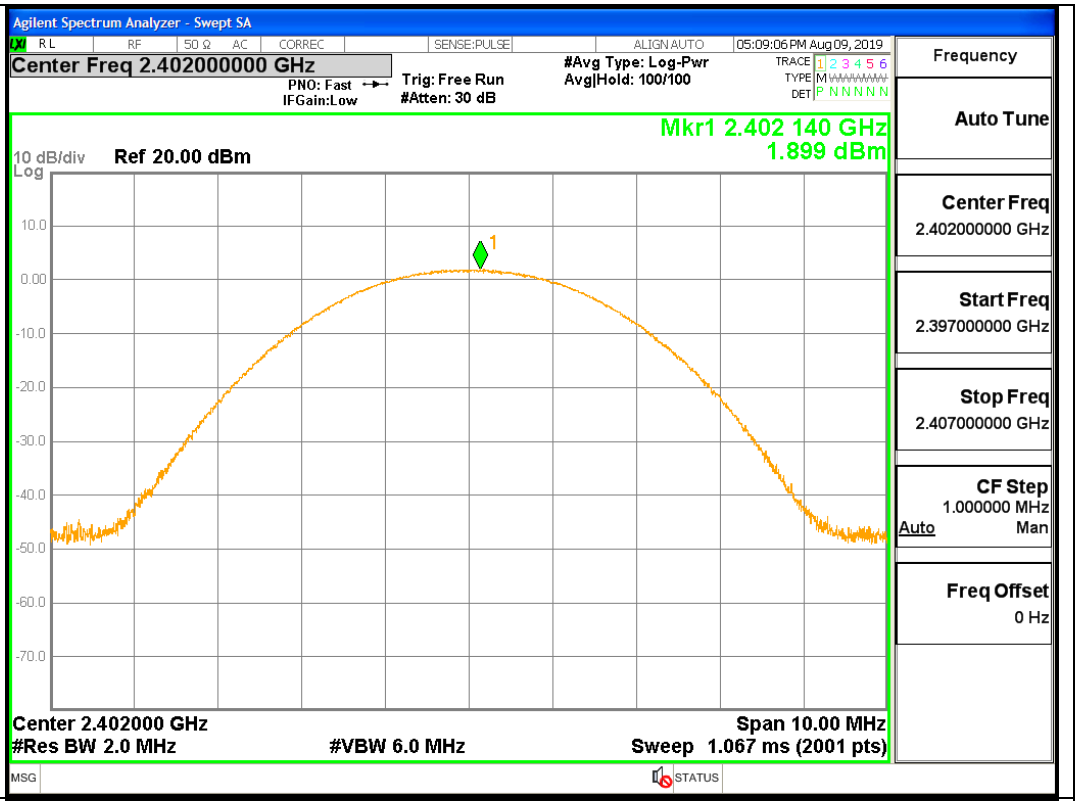
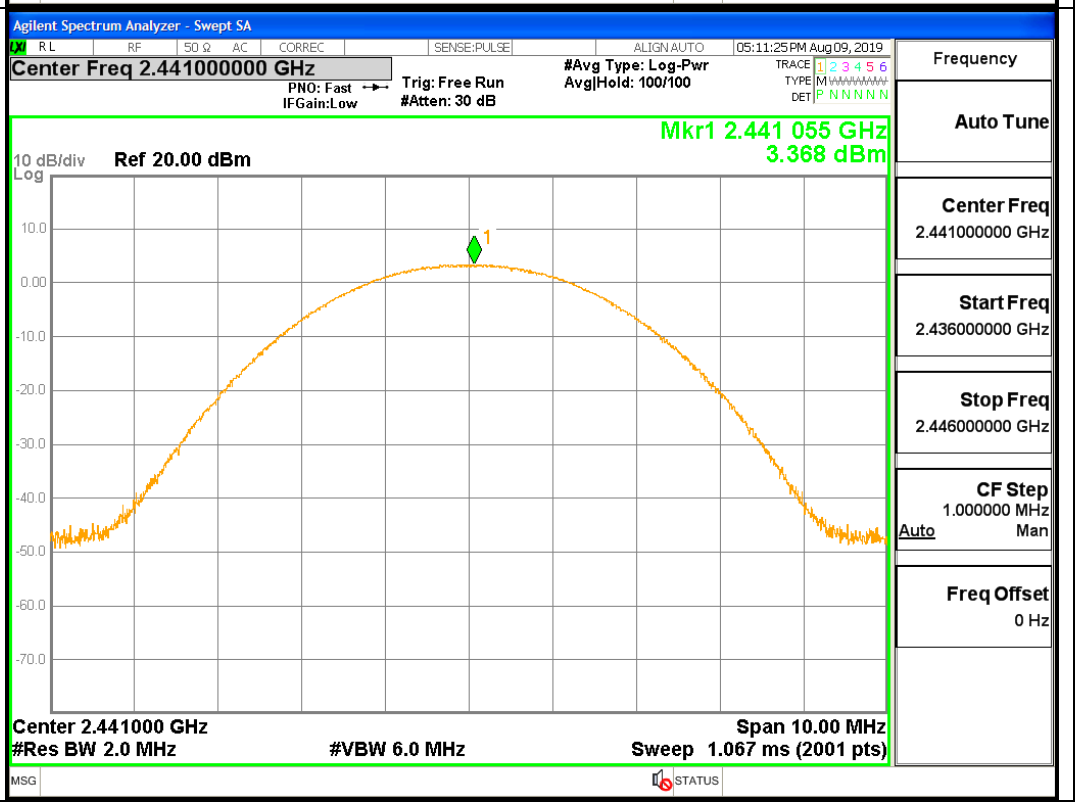
A.5 Conducted Peak Output Power

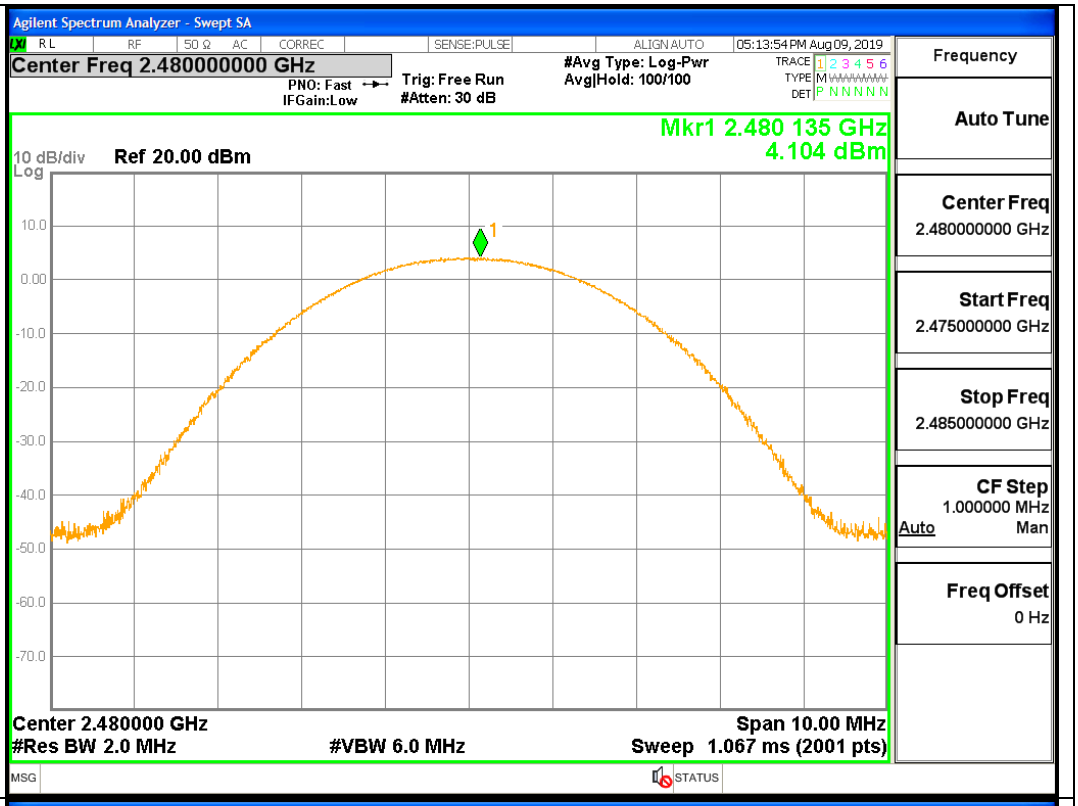
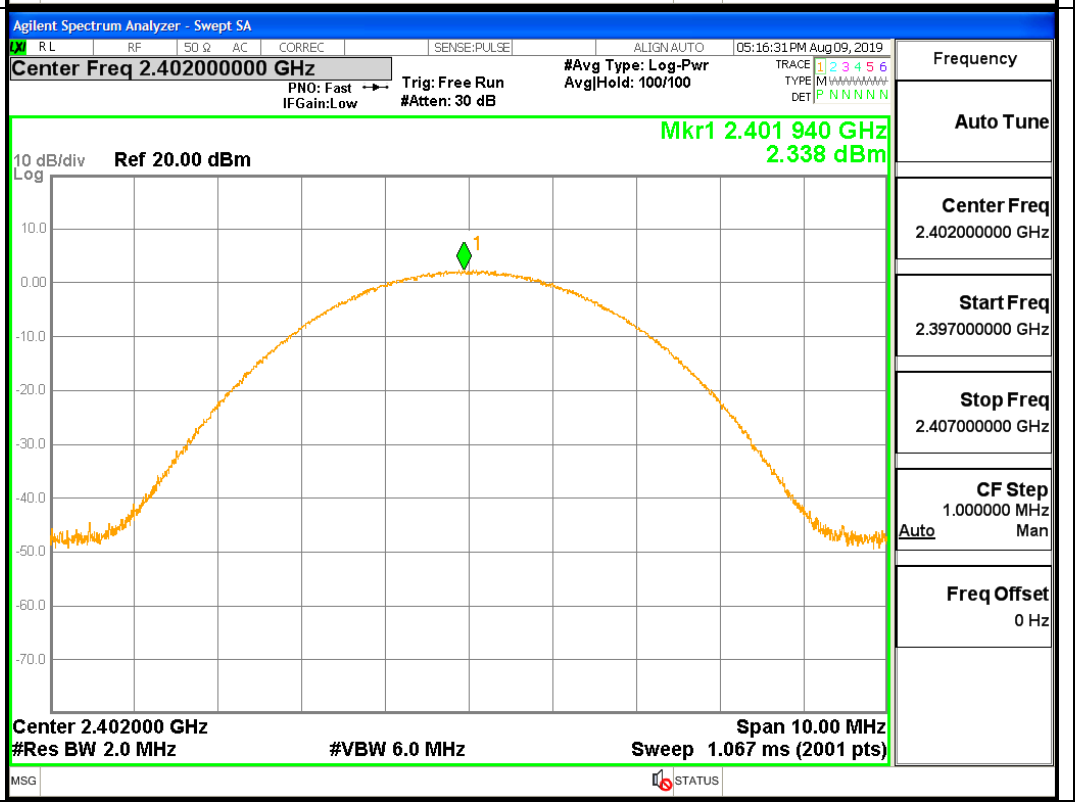
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.693	21	PASS
GFSK	MCH	-0.275	21	PASS
GFSK	HCH	1.452	21	PASS
π/4DQPSK	LCH	1.899	21	PASS
π/4DQPSK	MCH	3.368	21	PASS
π/4DQPSK	HCH	4.104	21	PASS
8DPSK	LCH	2.338	21	PASS
8DPSK	MCH	3.787	21	PASS
8DPSK	HCH	4.468	21	PASS

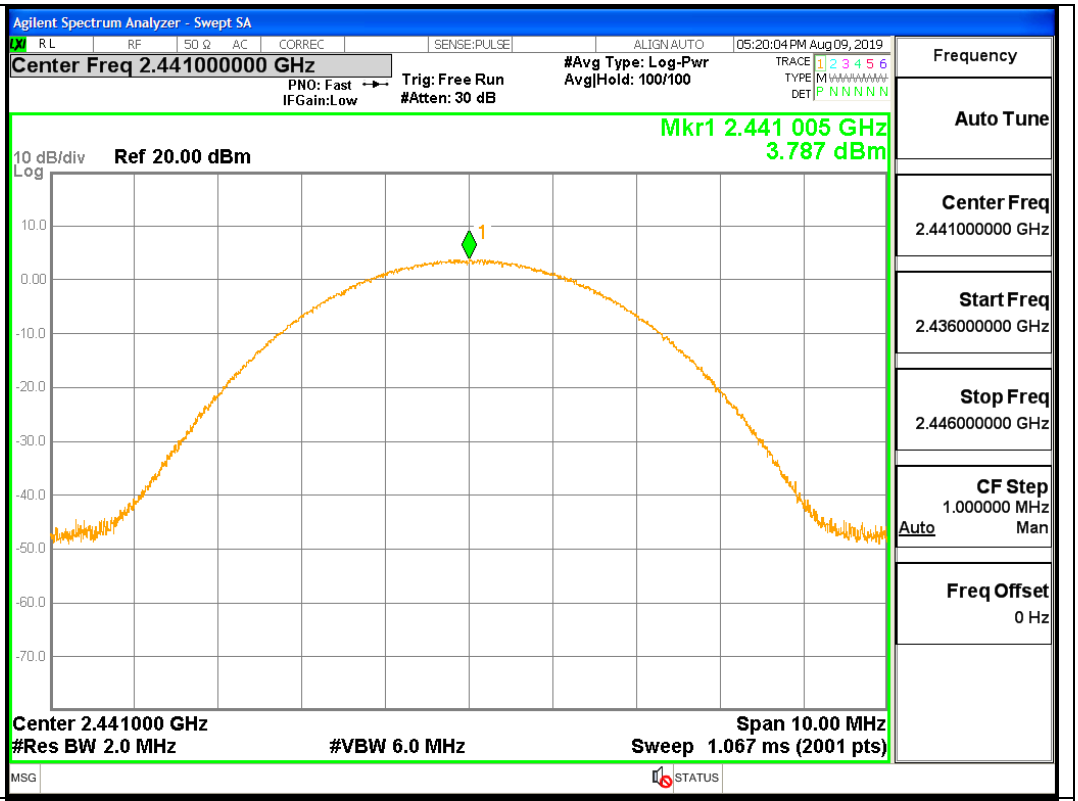
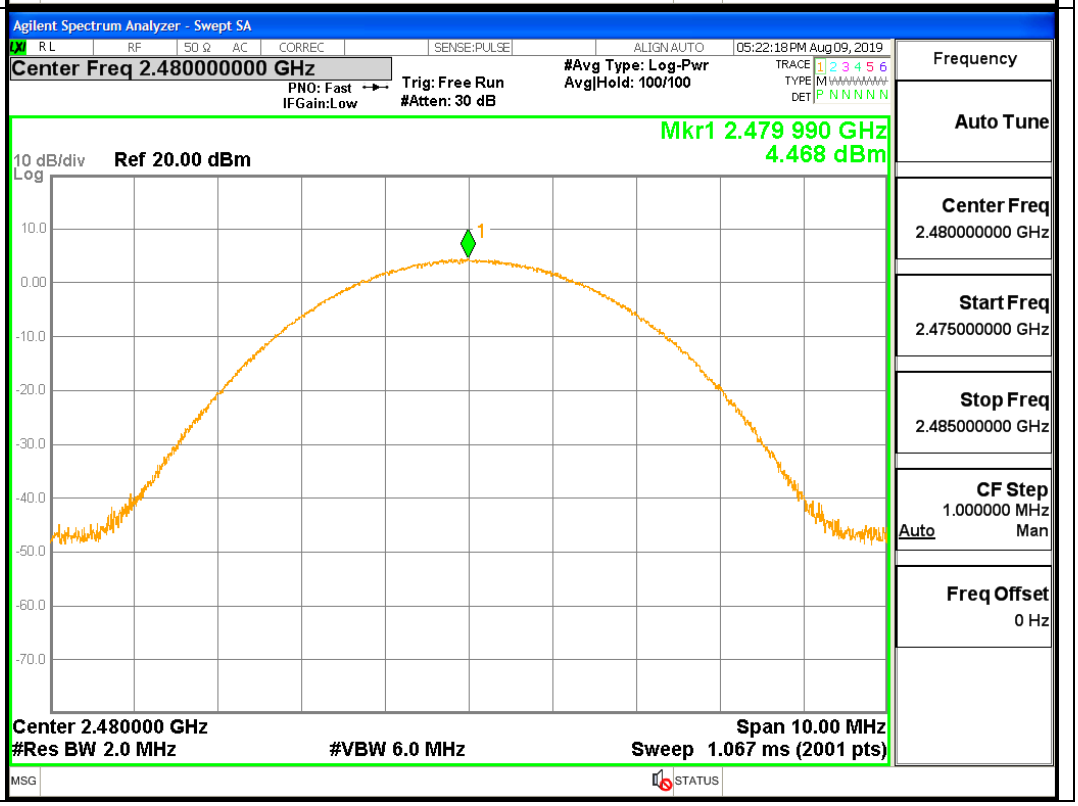
Test Graph

Graphs	
GFSK/LCH	

GFSK/MCH	
GFSK/HCH	

π/4DQPSK/LCH	
π/4DQPSK/MCH	

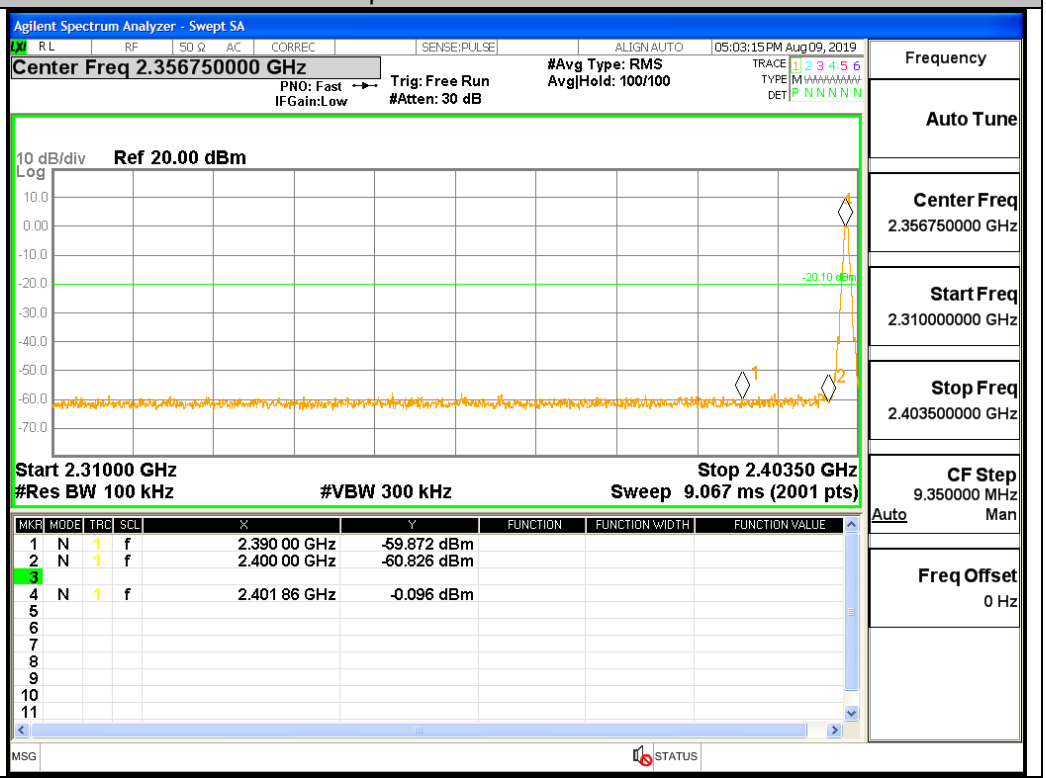
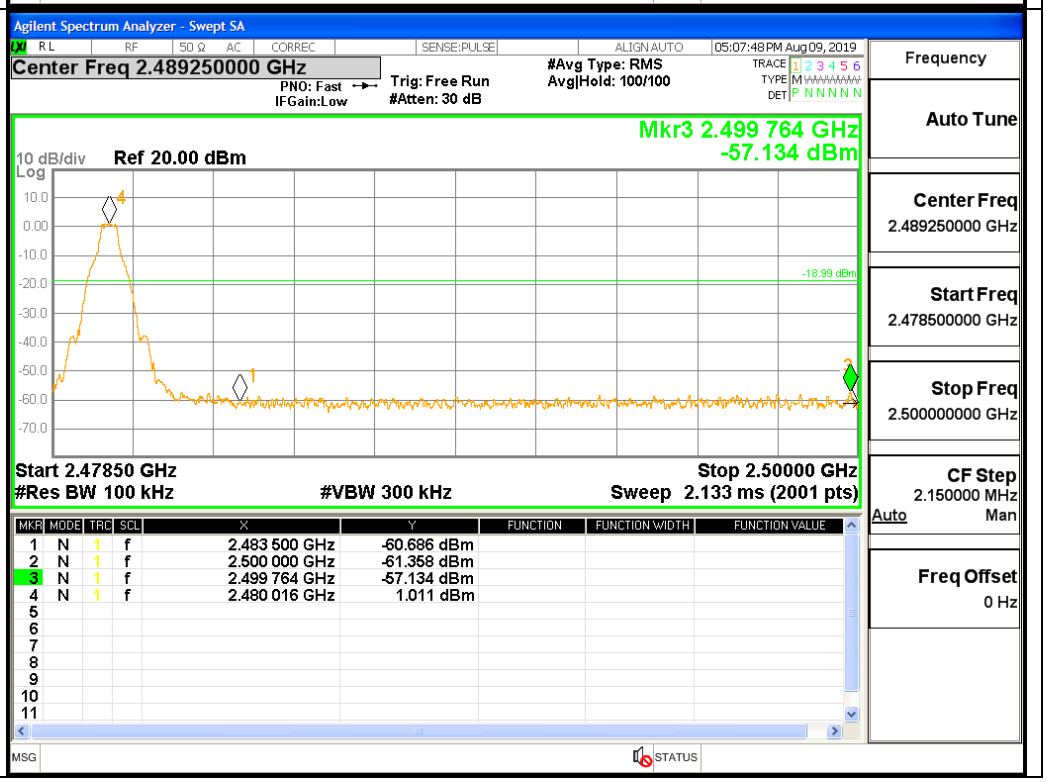
π/4DQPSK/HCH	
8DPSK/LCH	

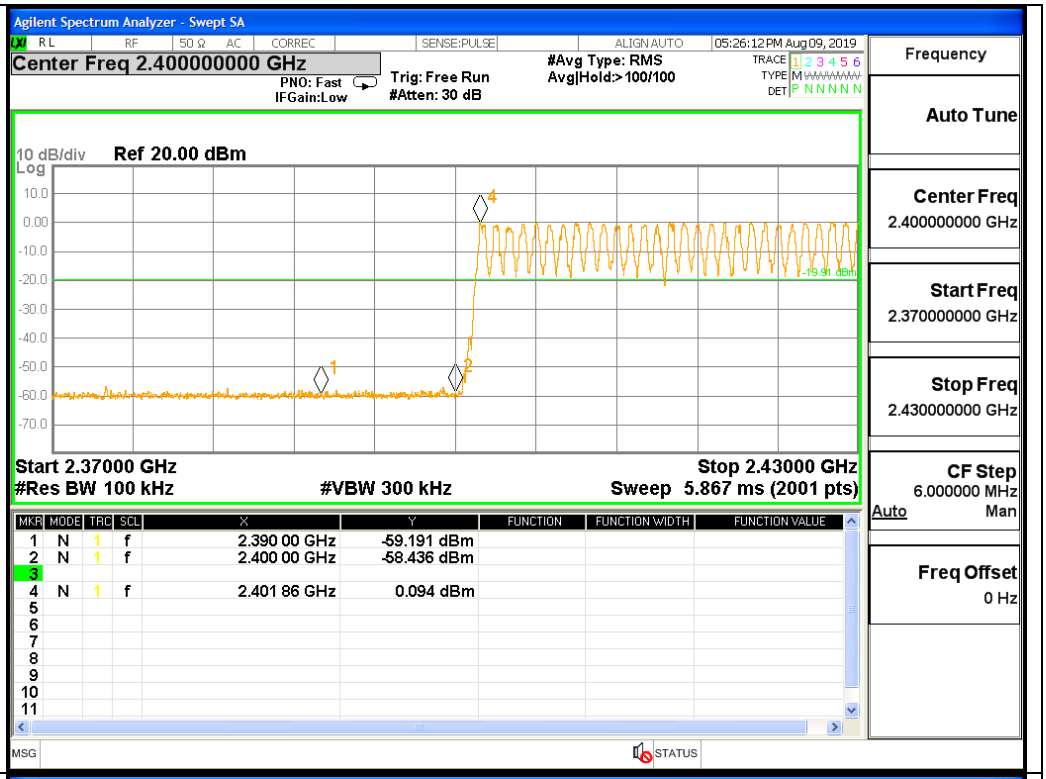
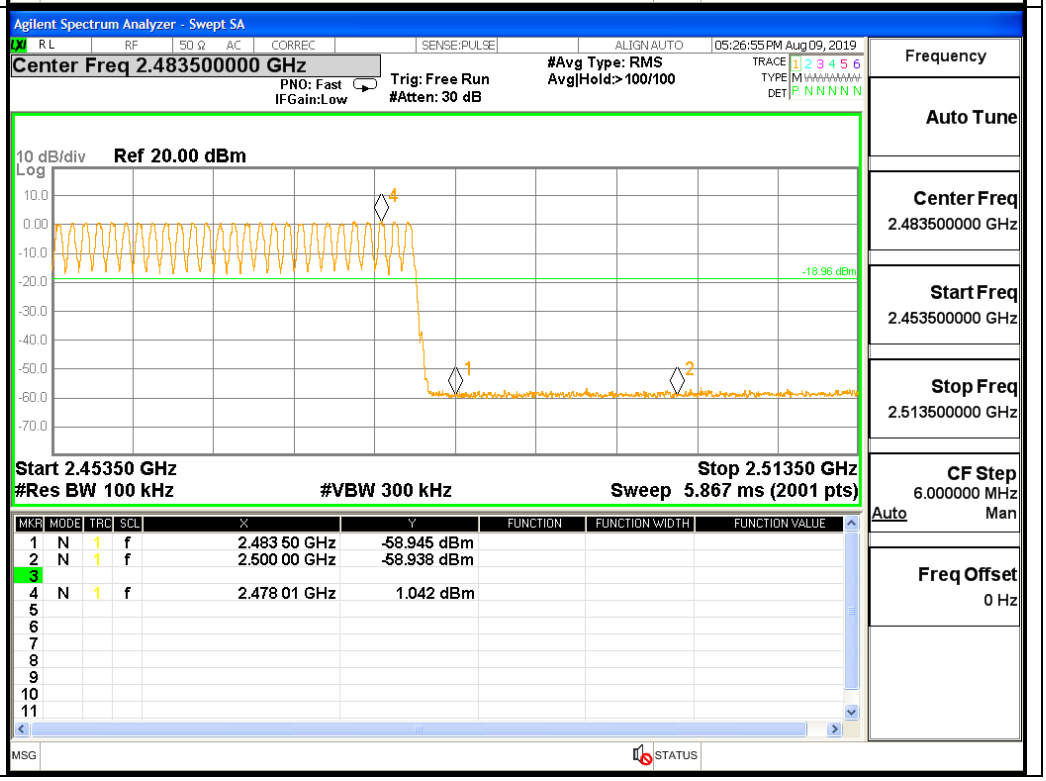
8DPSK/MCH	
8DPSK/HCH	

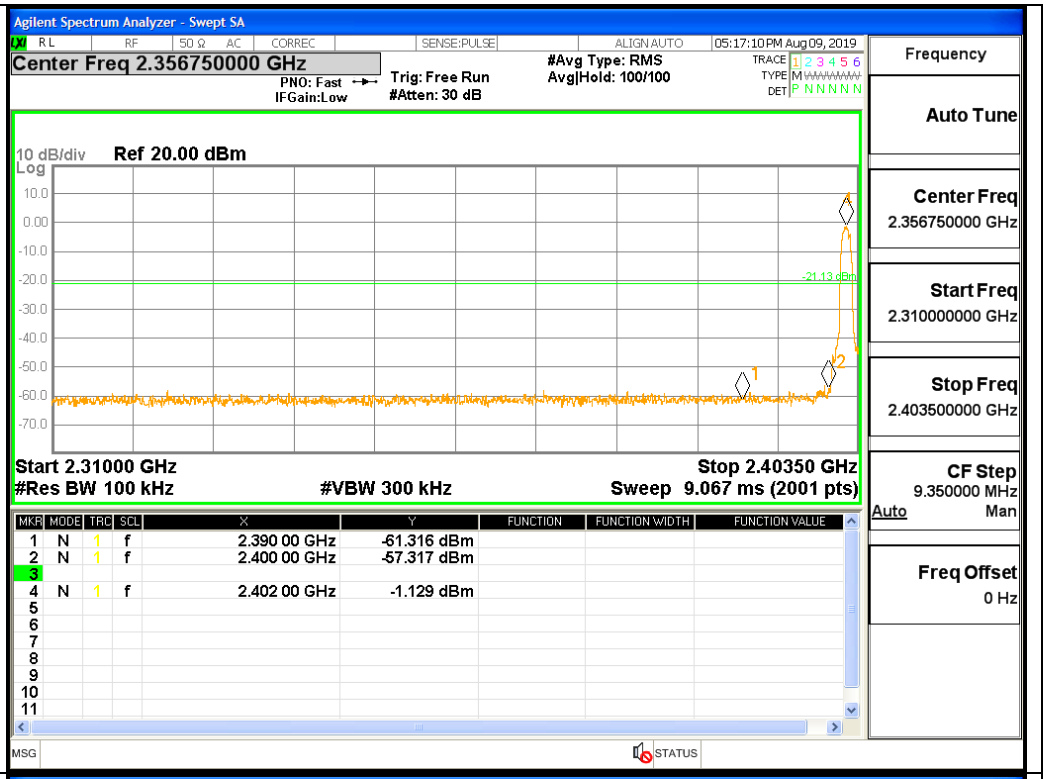
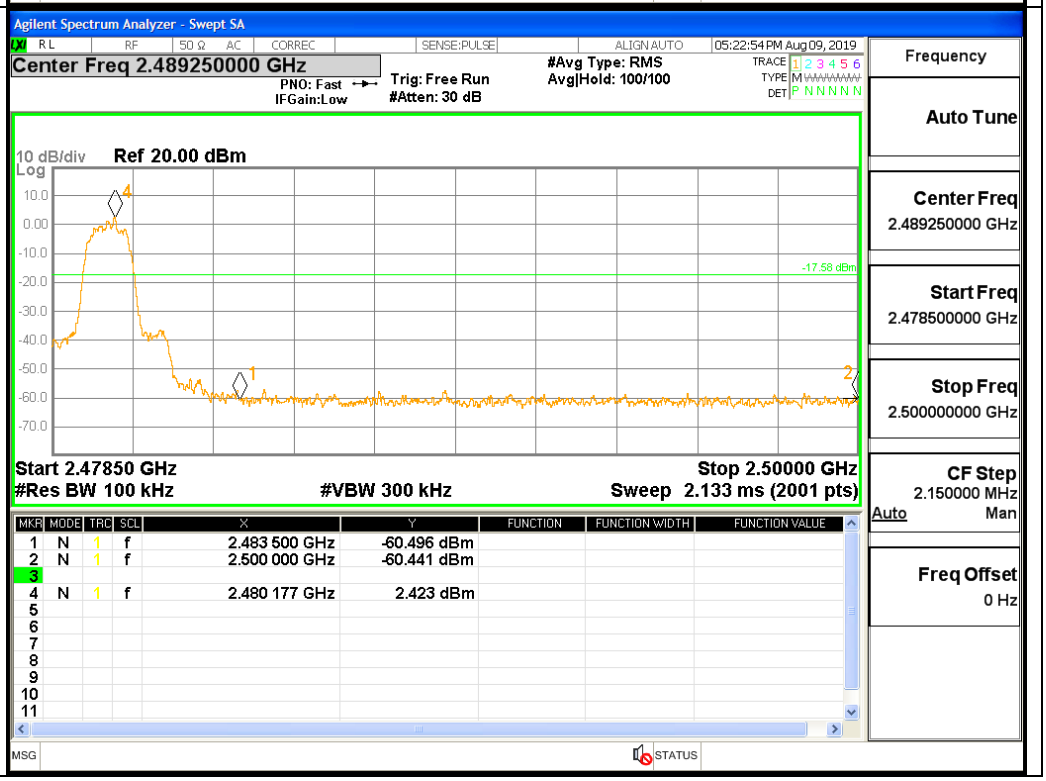
A.6 Band-edge for RF Conducted Emissions

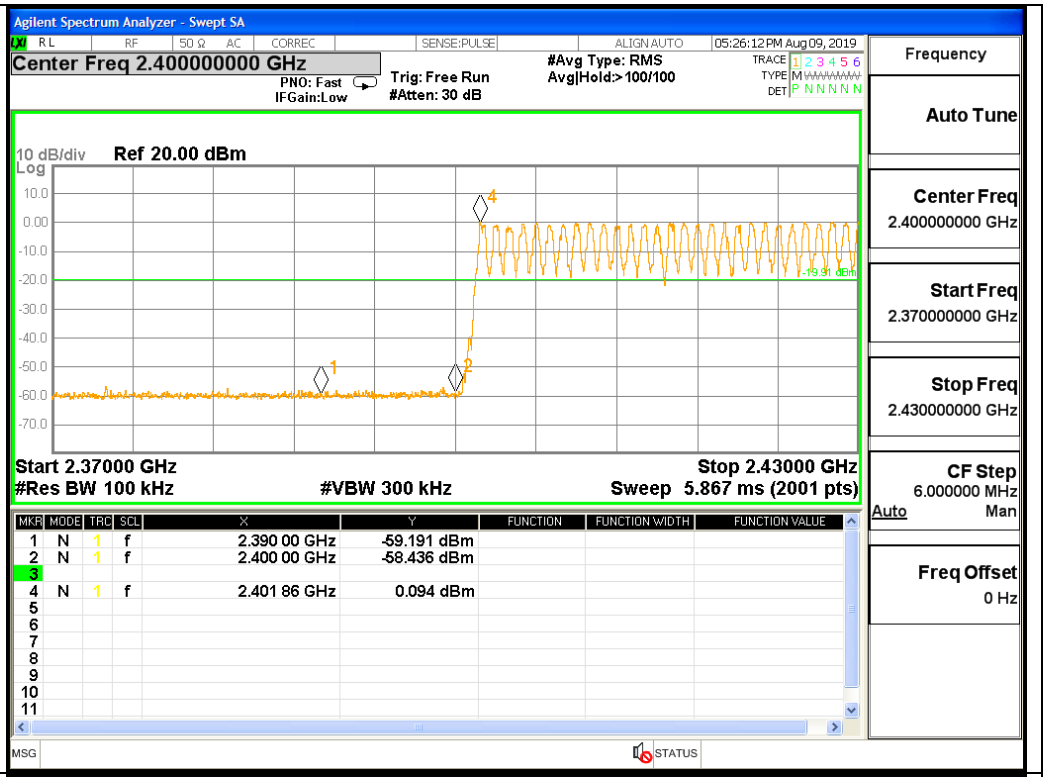
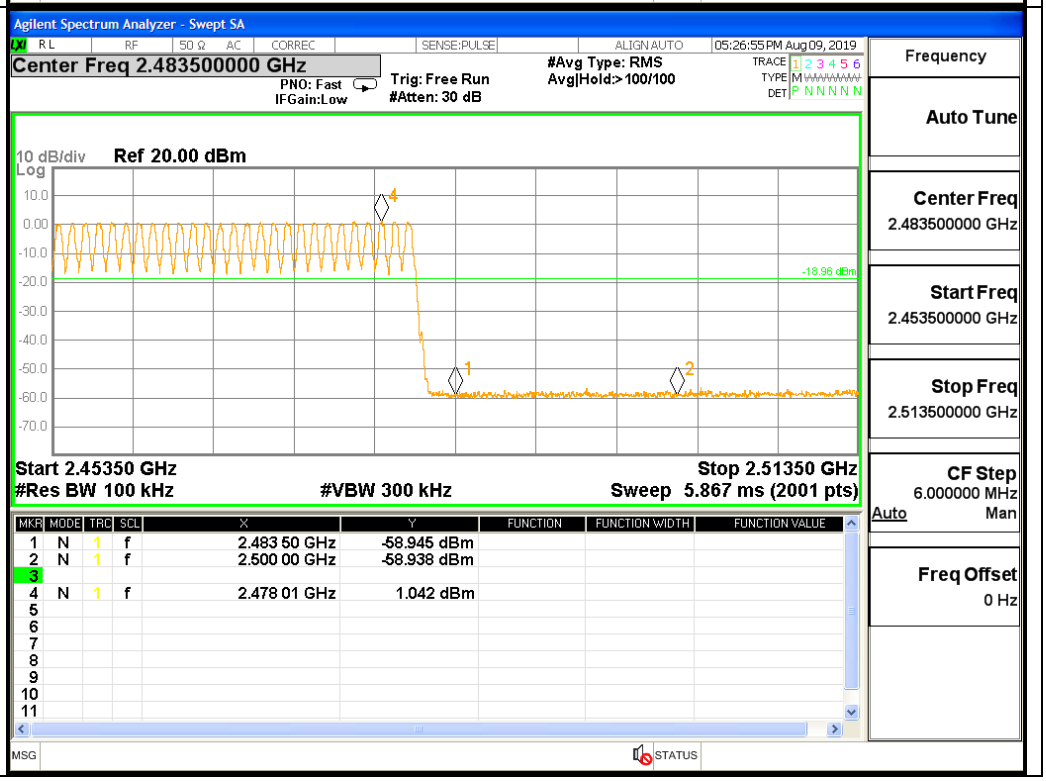
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2390	-0.096	-59.87	-20.096	Pass
1DH5	2480	2499.764	1.011	-57.134	-18.989	Pass
2DH5	2402	2400	-1.296	-57.45	-21.296	Pass
2DH5	2480	2483.5	2.547	-61.7	-17.453	Pass
3DH5	2402	2400	-1.129	-57.32	-21.129	Pass
3DH5	2480	2500	2.423	-60.44	-17.577	Pass
1DH5-Hopping	2402	2400	0.094	-58.44	-19.906	Pass
1DH5-Hopping	2480	2483.5	1.042	-58.94	-18.958	Pass
2DH5-Hopping	2402	2400	1.427	-58.07	-18.573	Pass
2DH5-Hopping	2480	2500	2.415	-57.93	-17.585	Pass
3DH5-Hopping	2402	2400	1.612	-57.02	-18.388	Pass
3DH5-Hopping	2480	2500	2.363	-58.34	-17.637	Pass

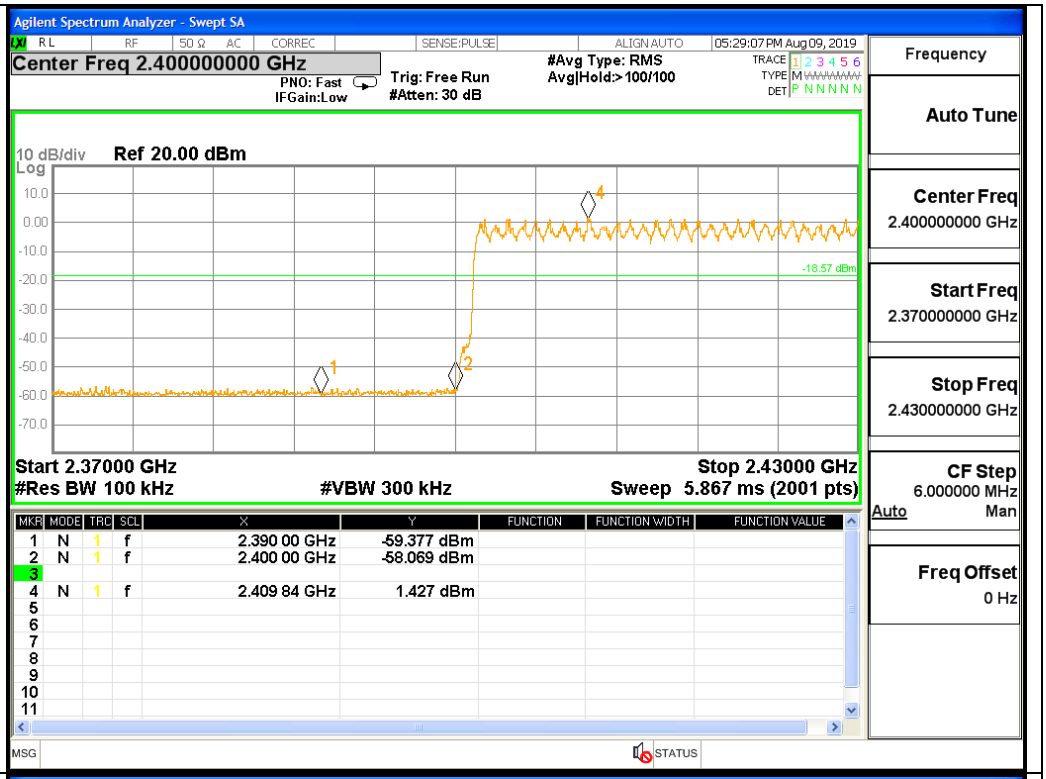
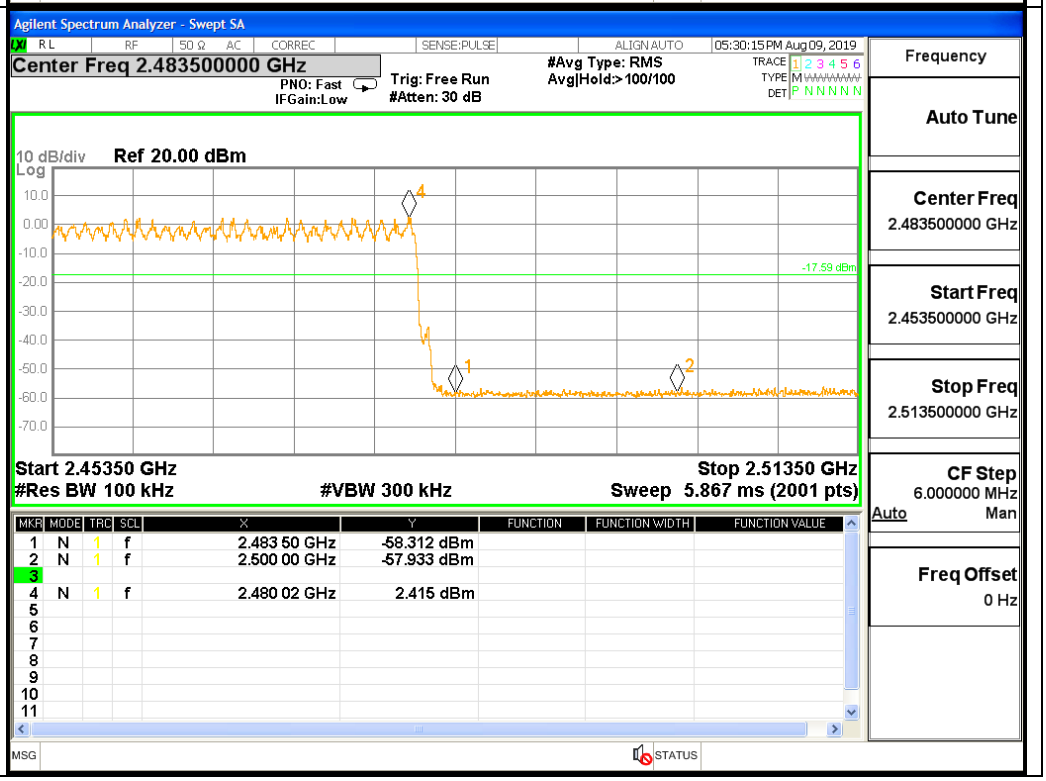
Test Graph

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

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

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

GFSK/LCH/Hop	
GFSK/HCH/Hop	

π /4DQPSK/LCH/Hop	
π /4DQPSK/HCH/Hop	

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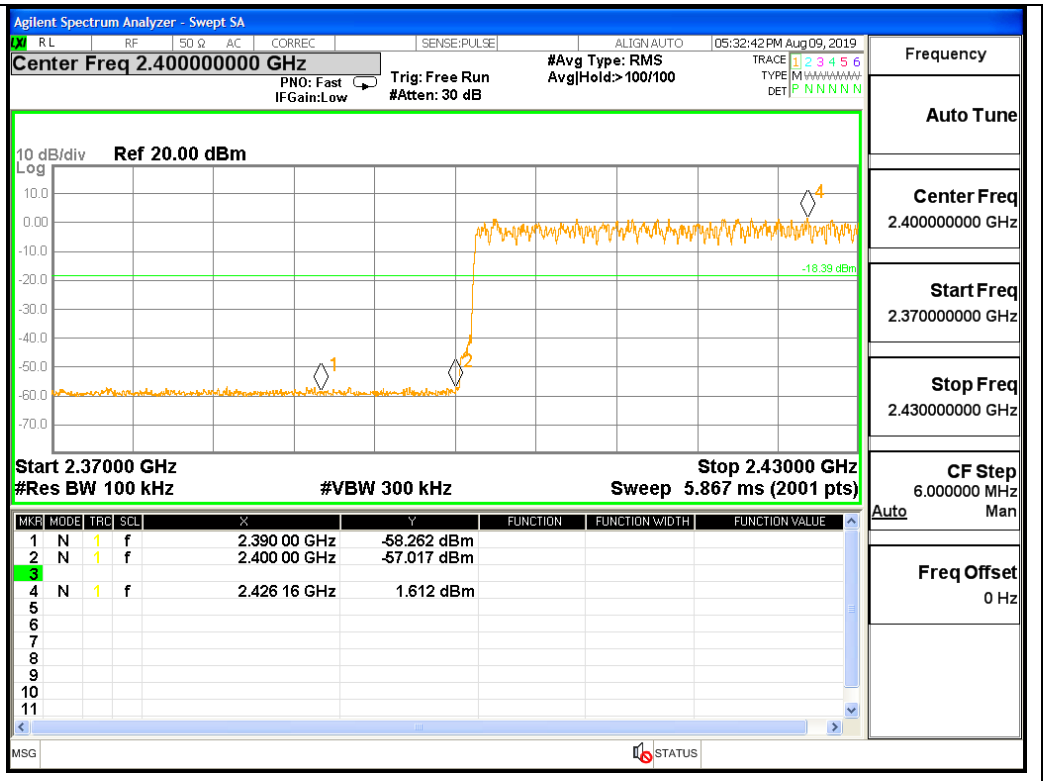
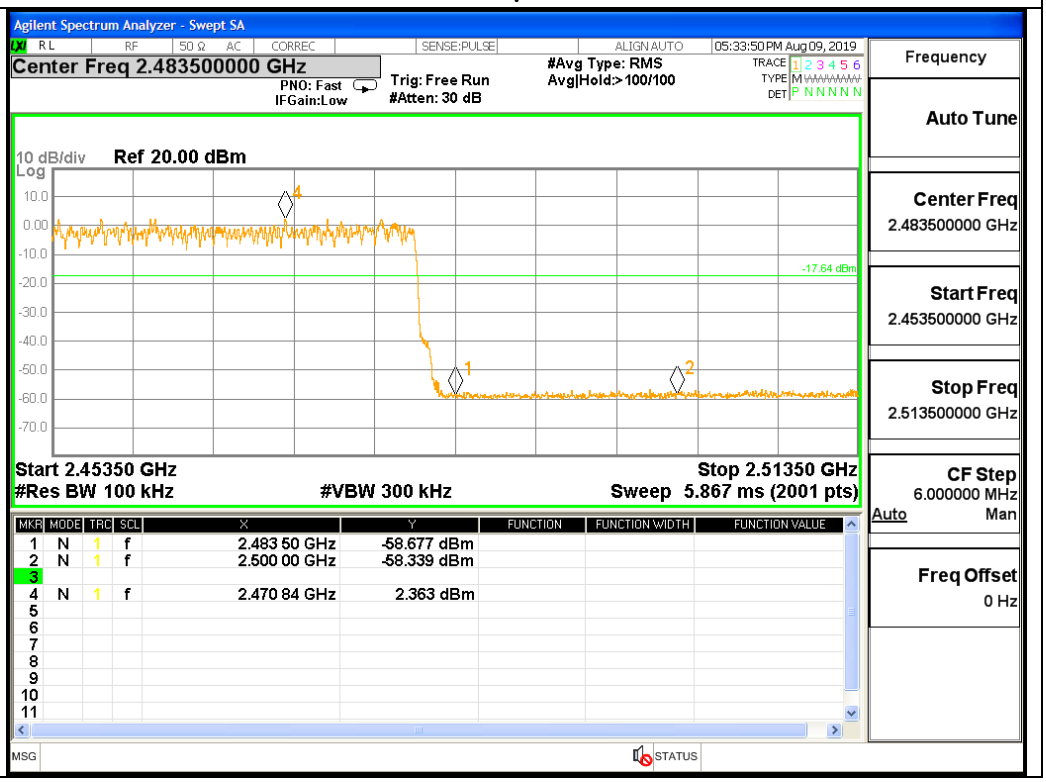


V

8DPSK/HCH/Hop



A.7 RF Conducted Spurious Emissions

Test Graph

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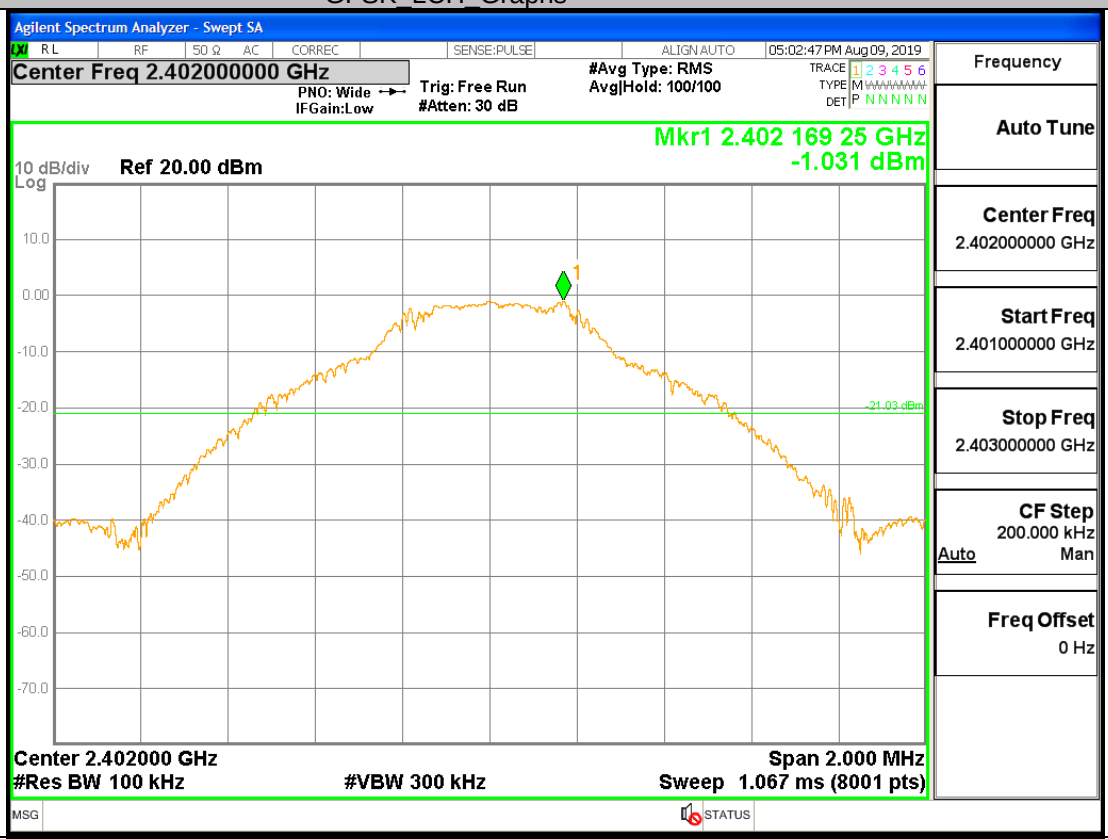
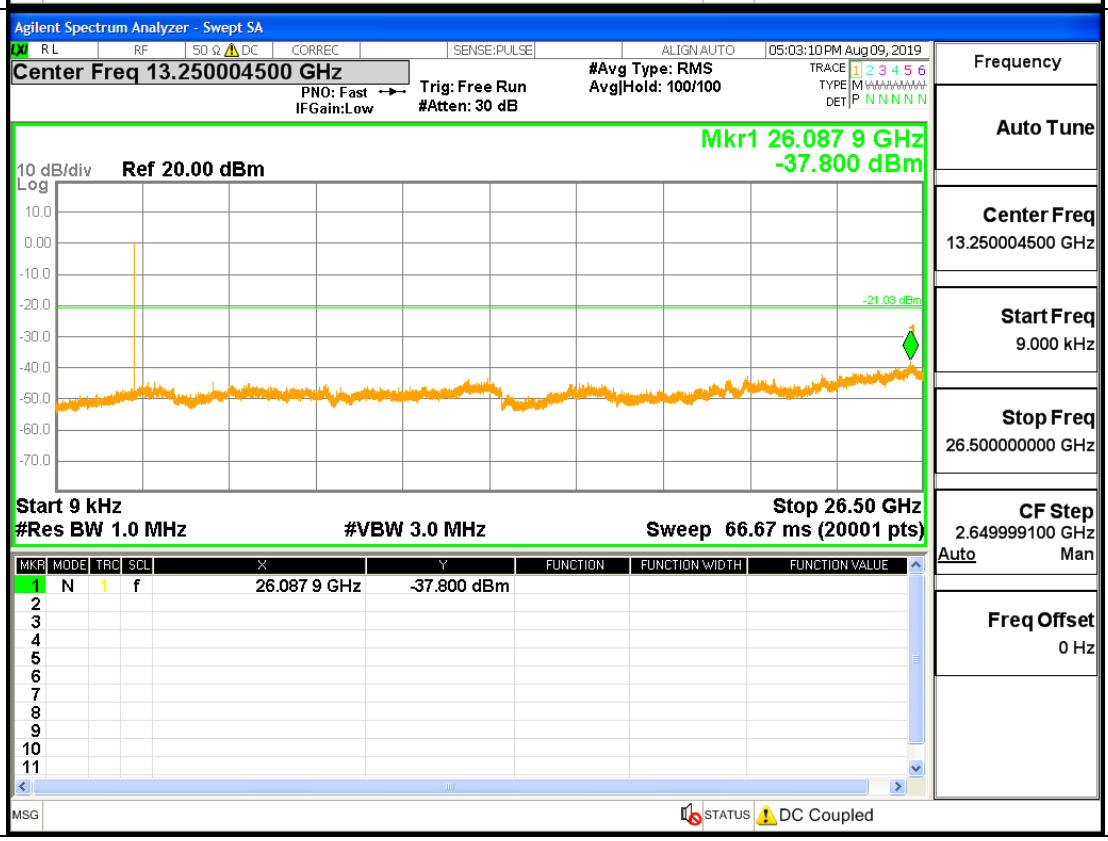
Pref	
Puw	

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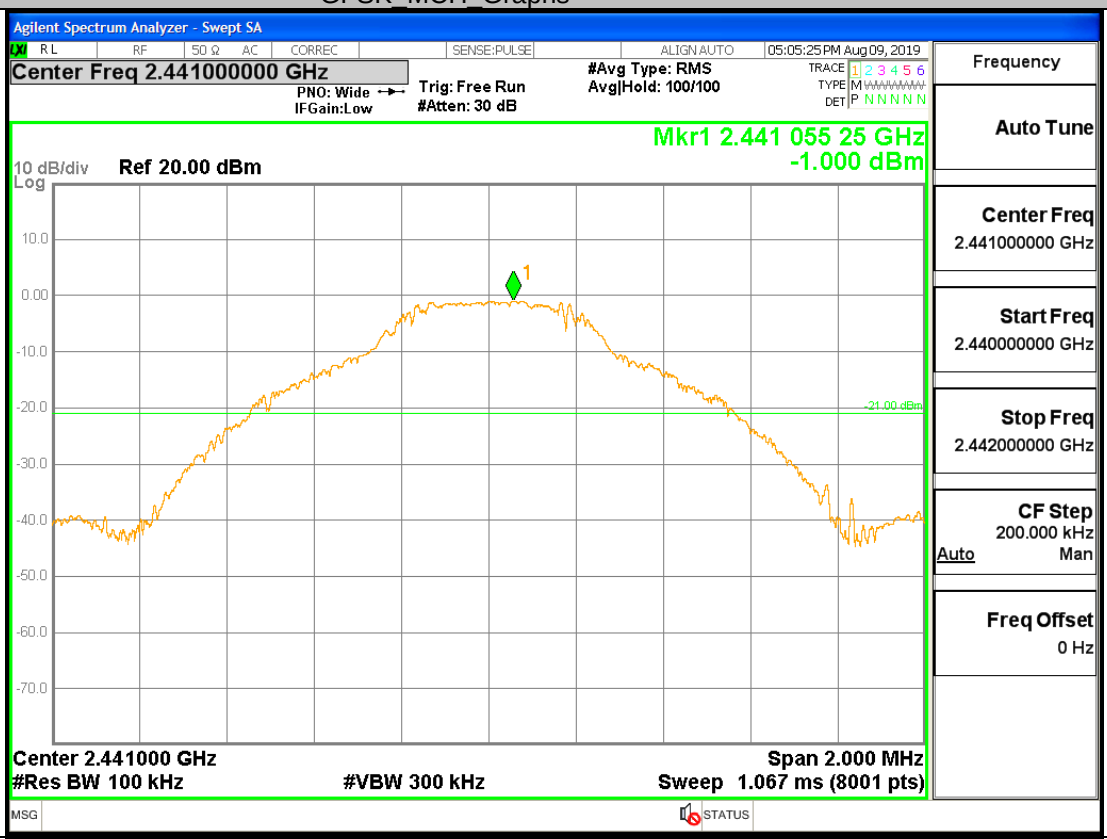
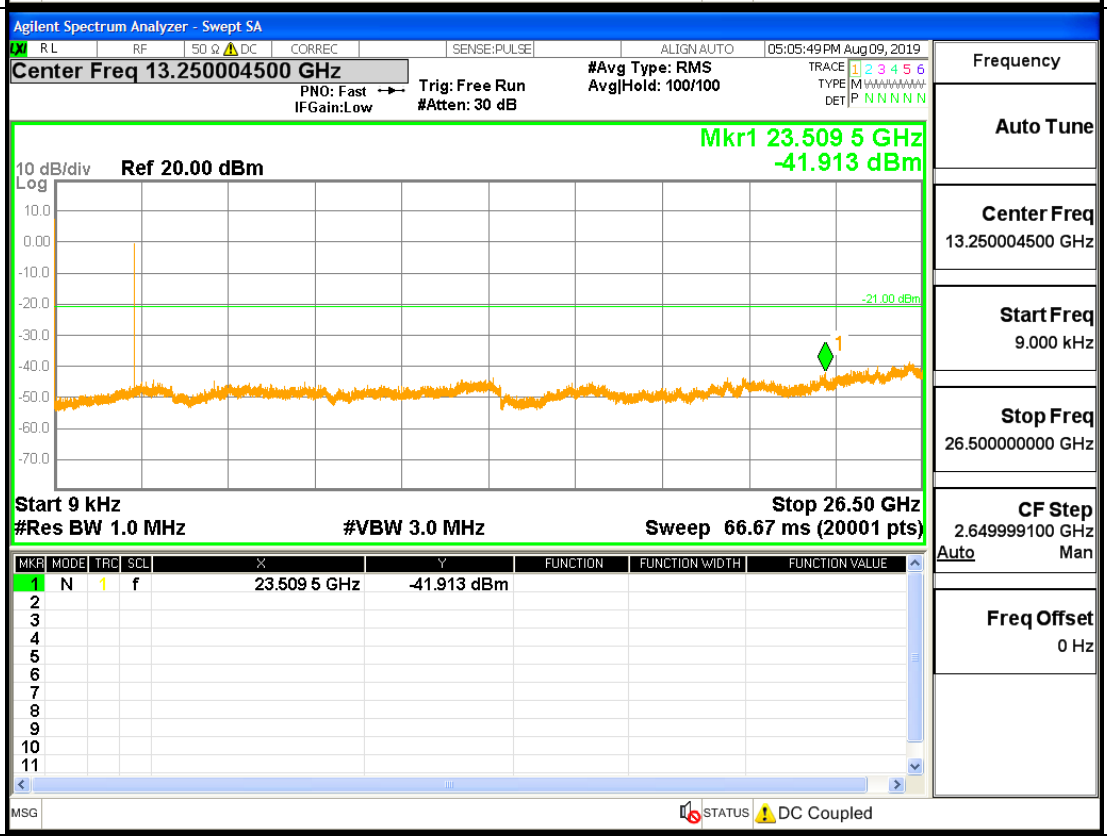
Pref	
Puw	

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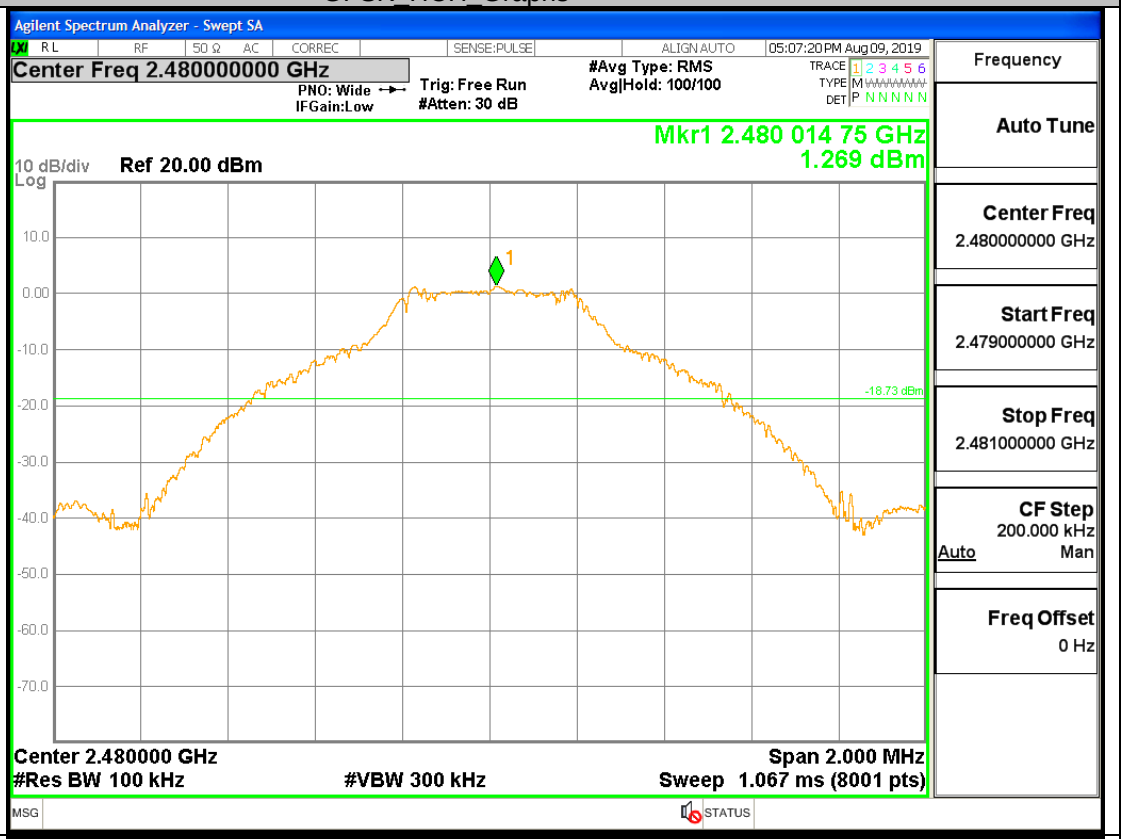
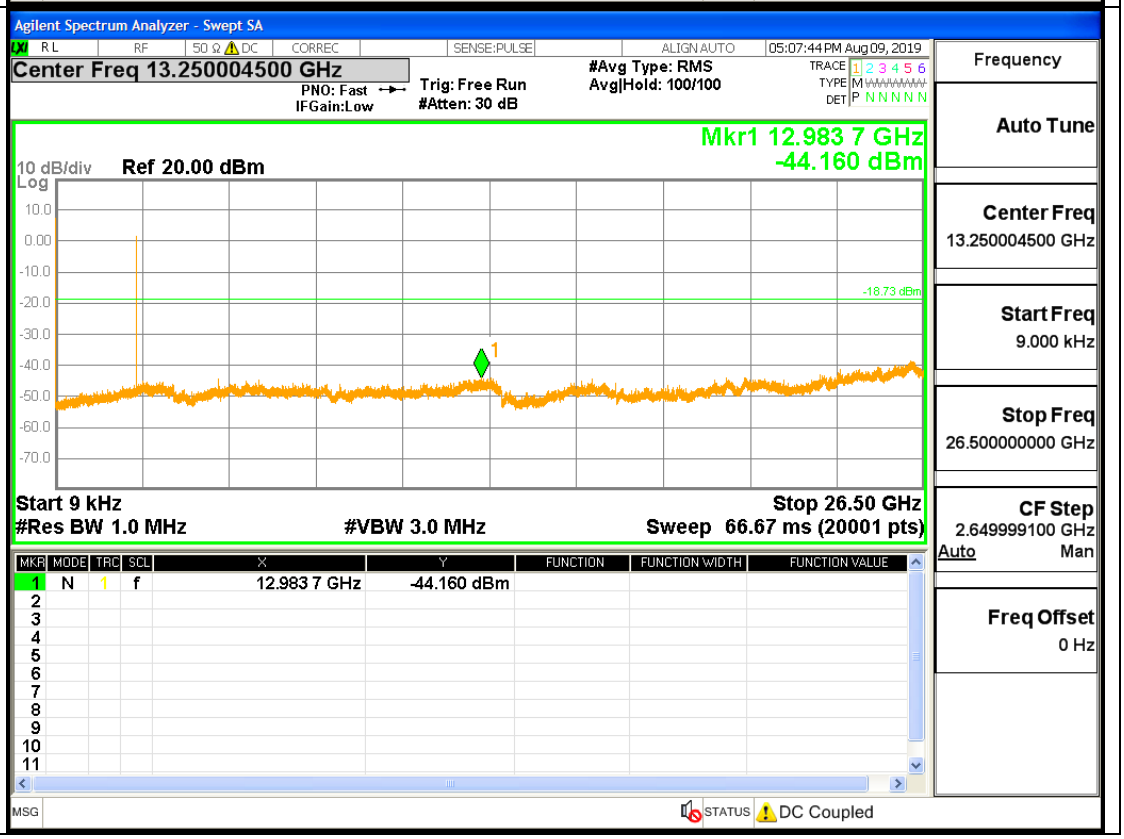
Pref	
Puw	

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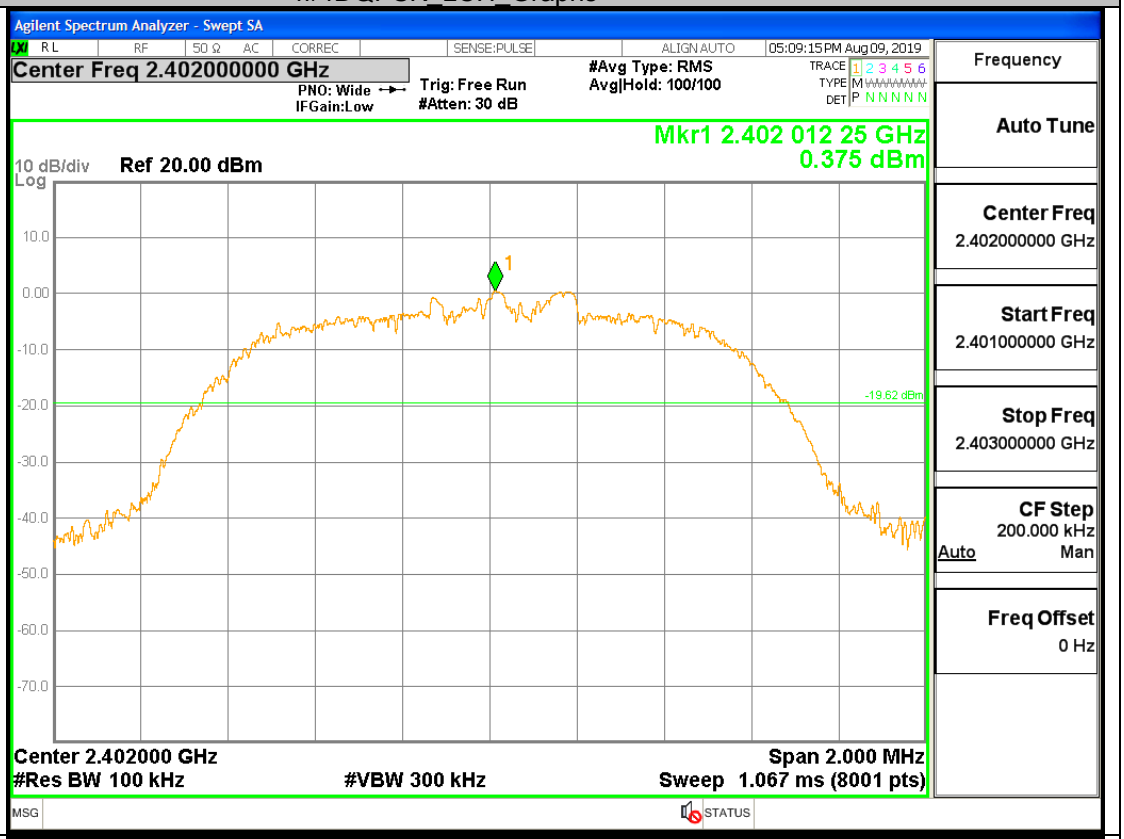
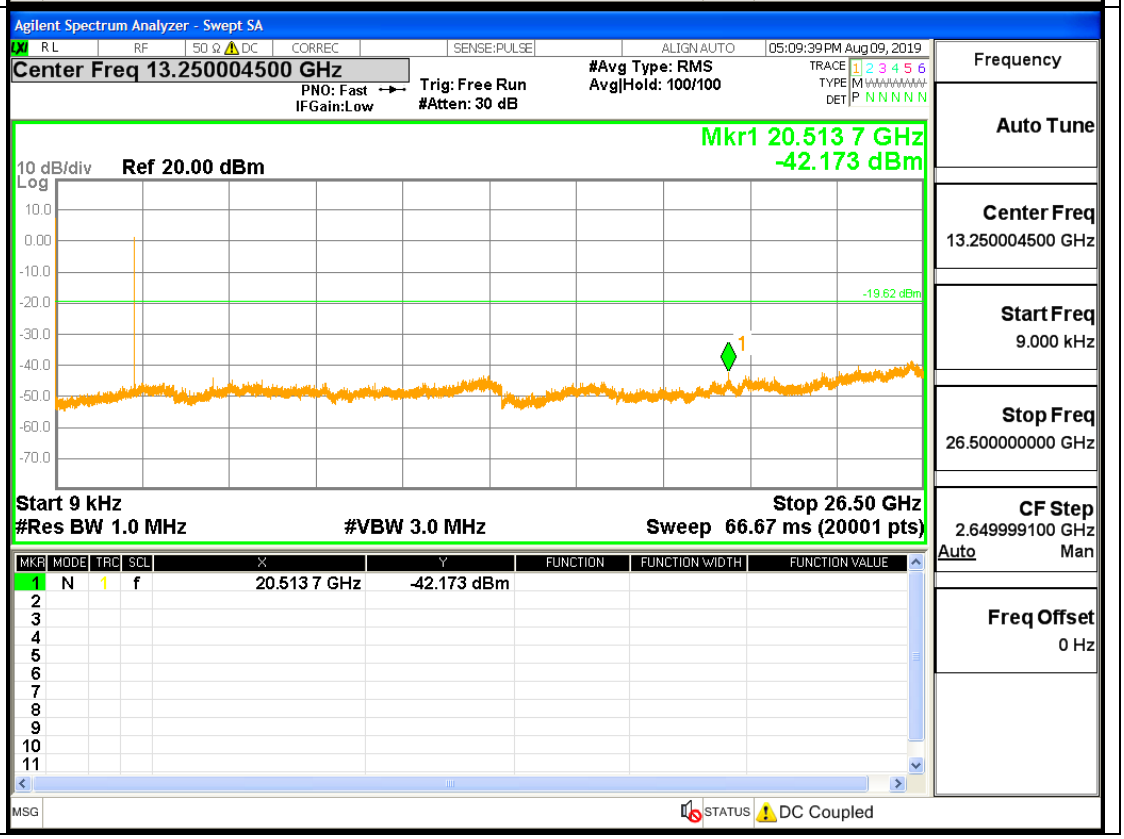
Pref	
Puw	

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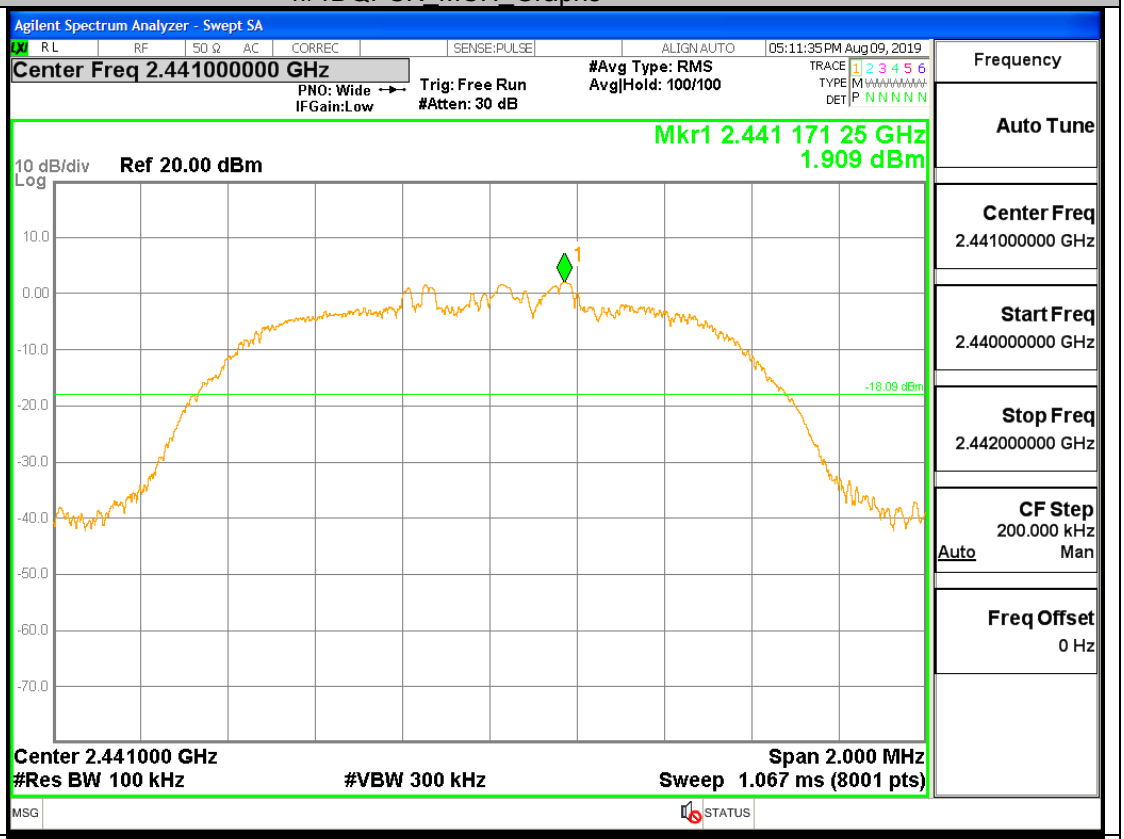
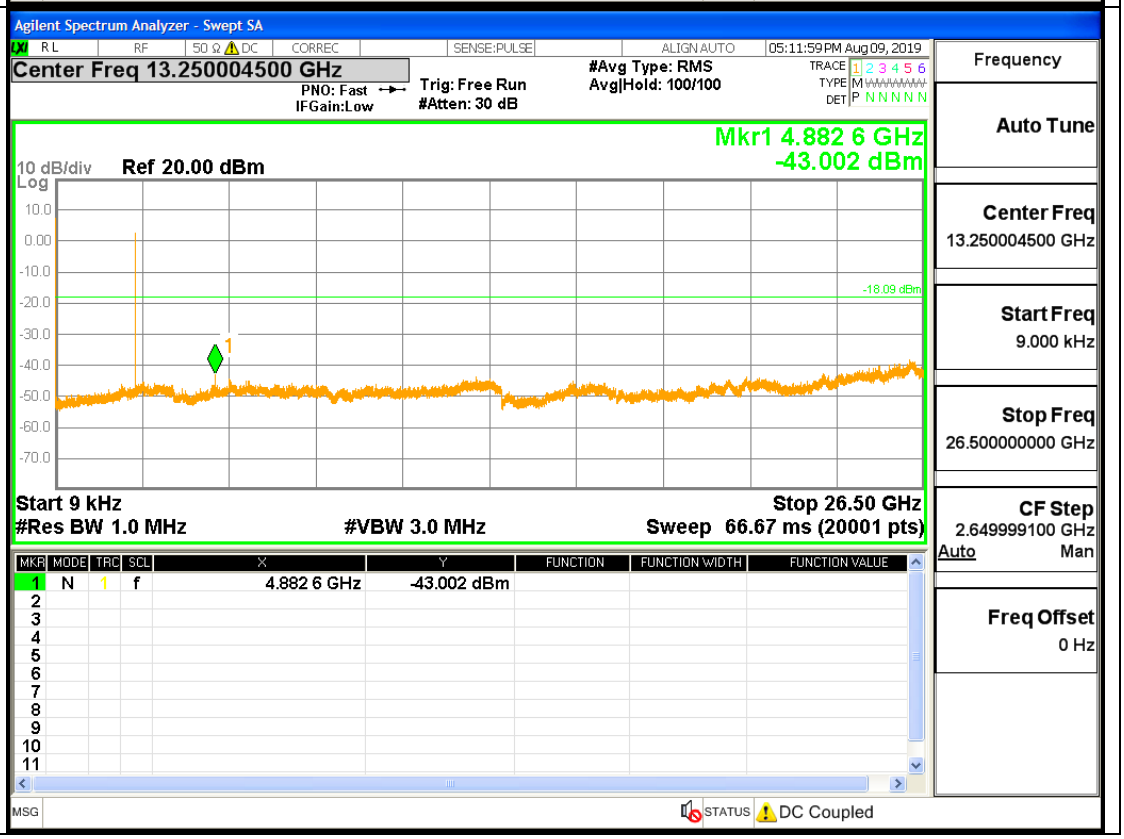
Pref	
Puw	

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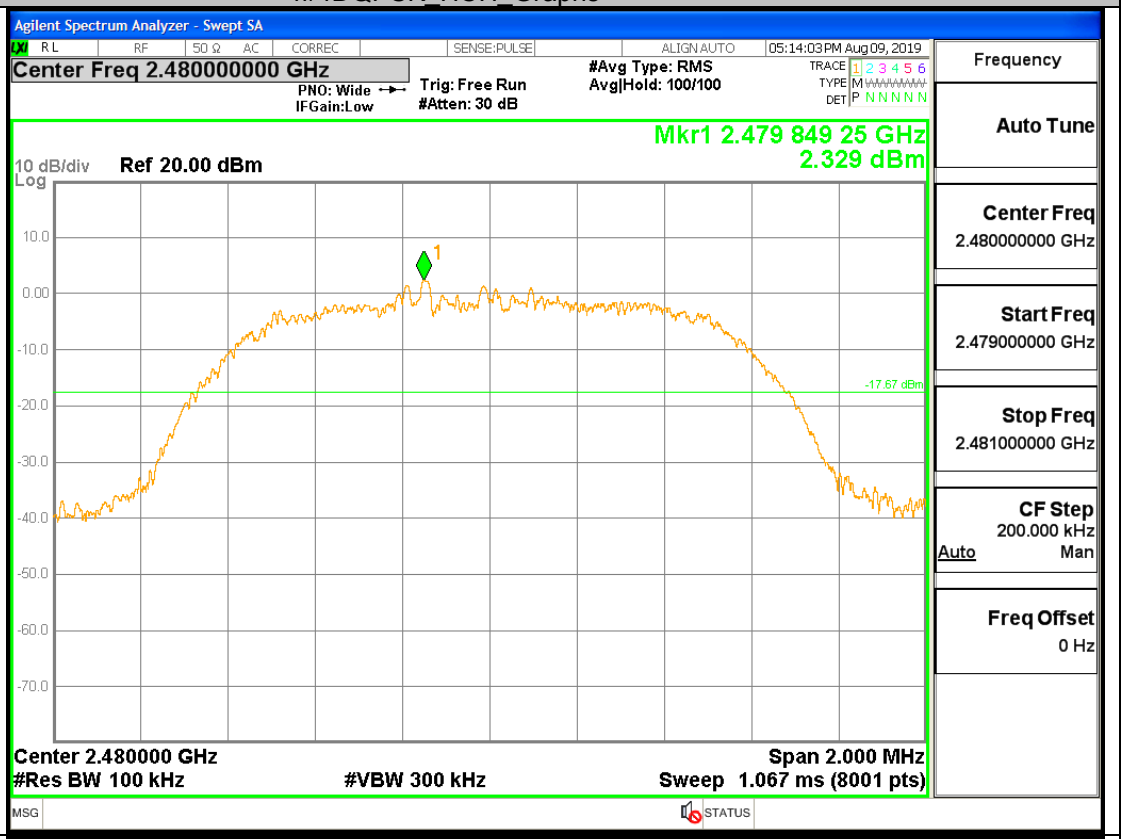
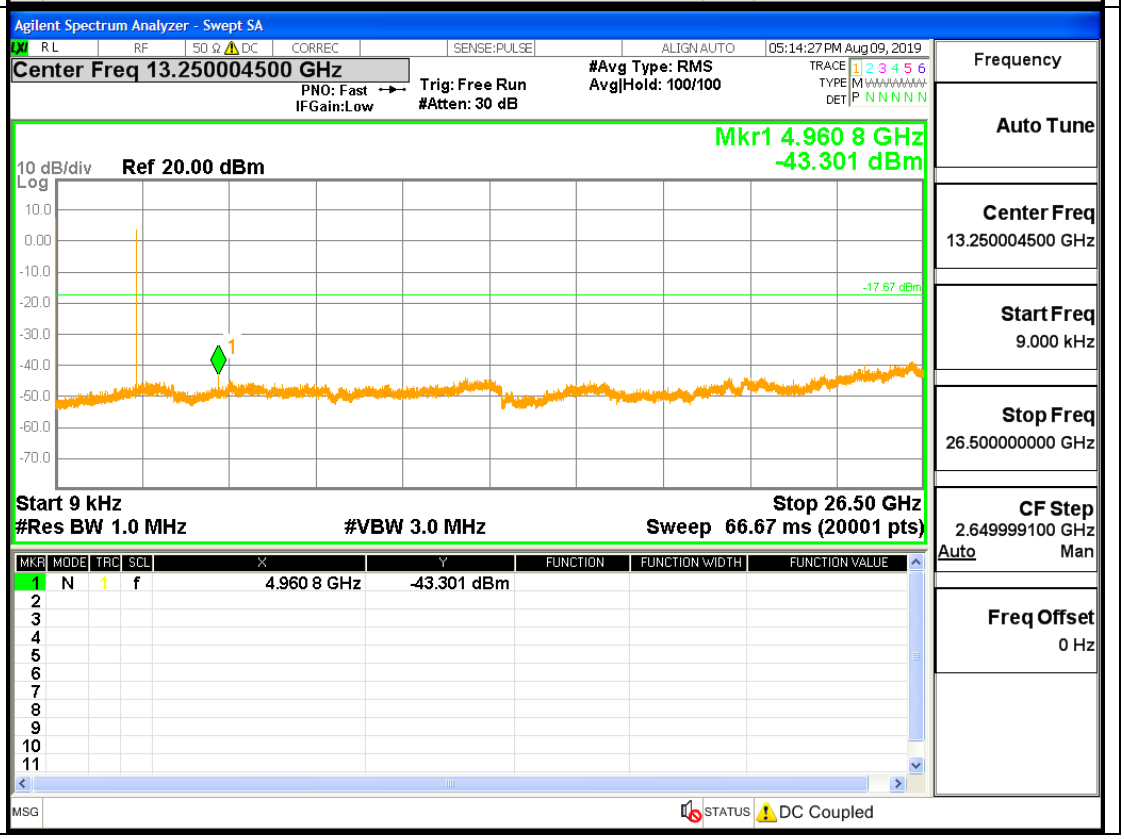
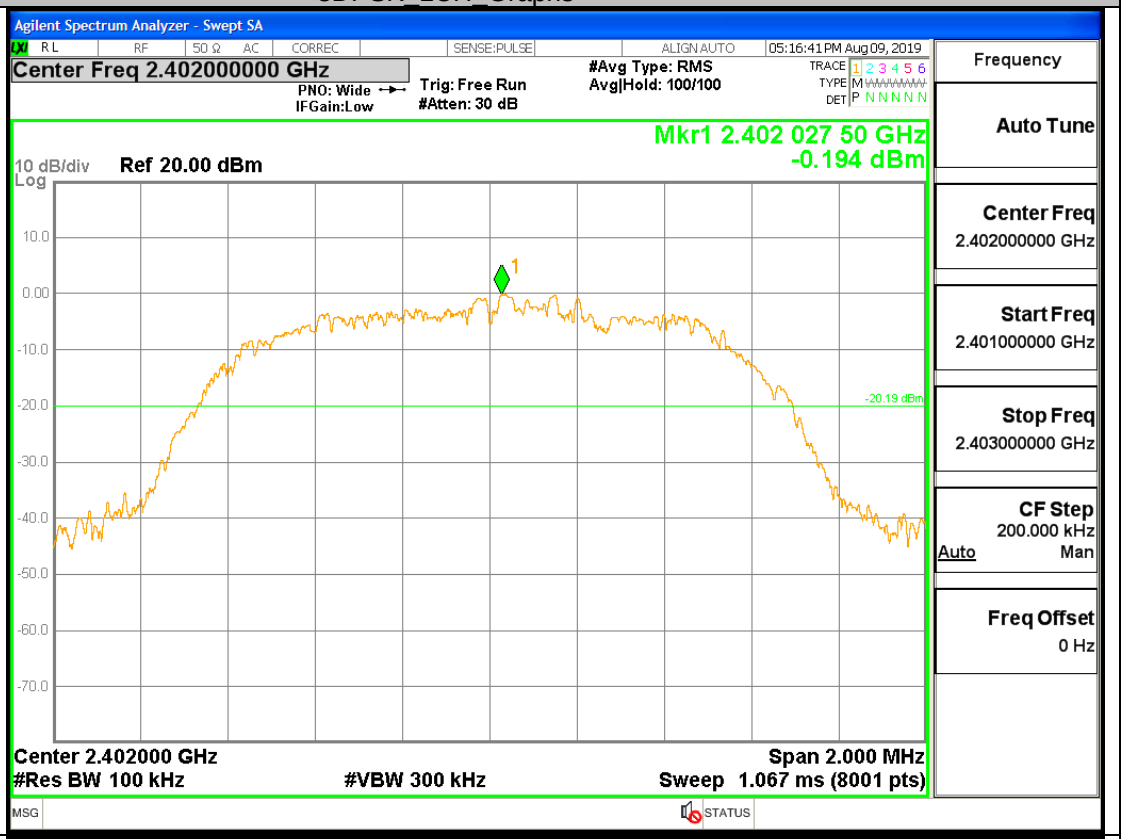
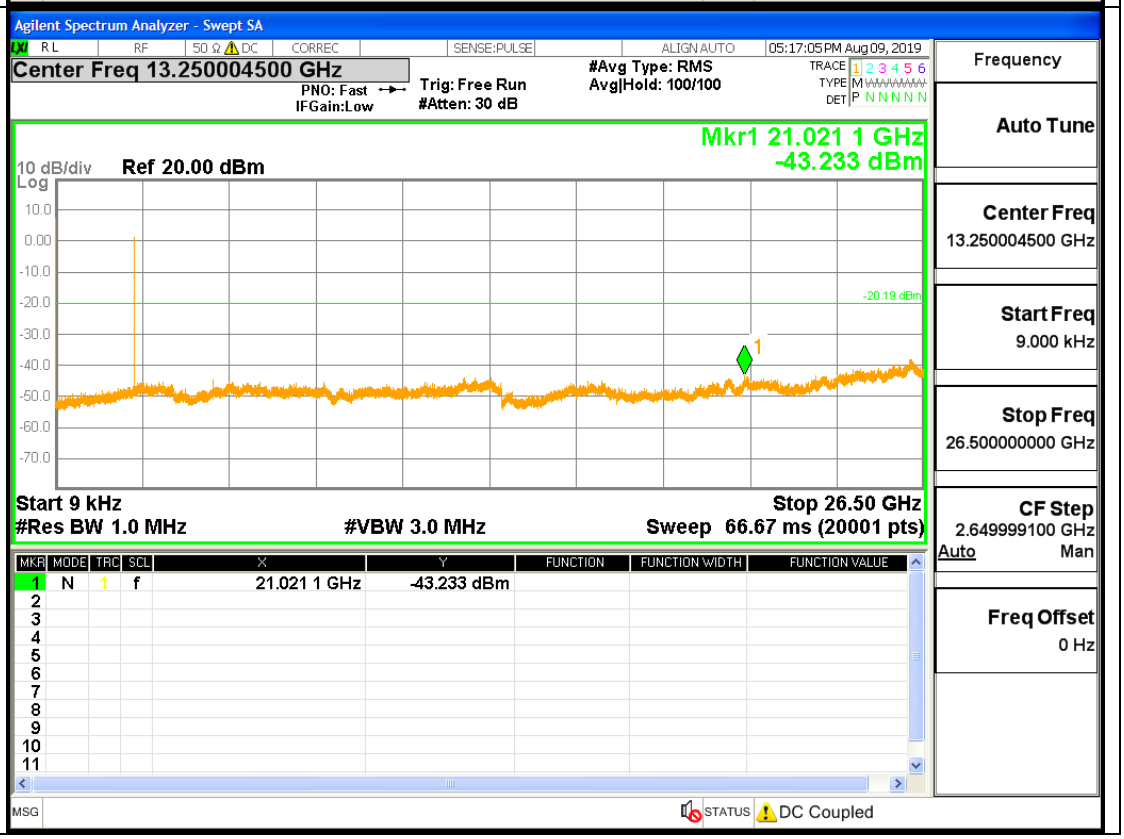
Pref	
Puw	

8DPSK_LCH_Graphs	
Pref	
Puw	

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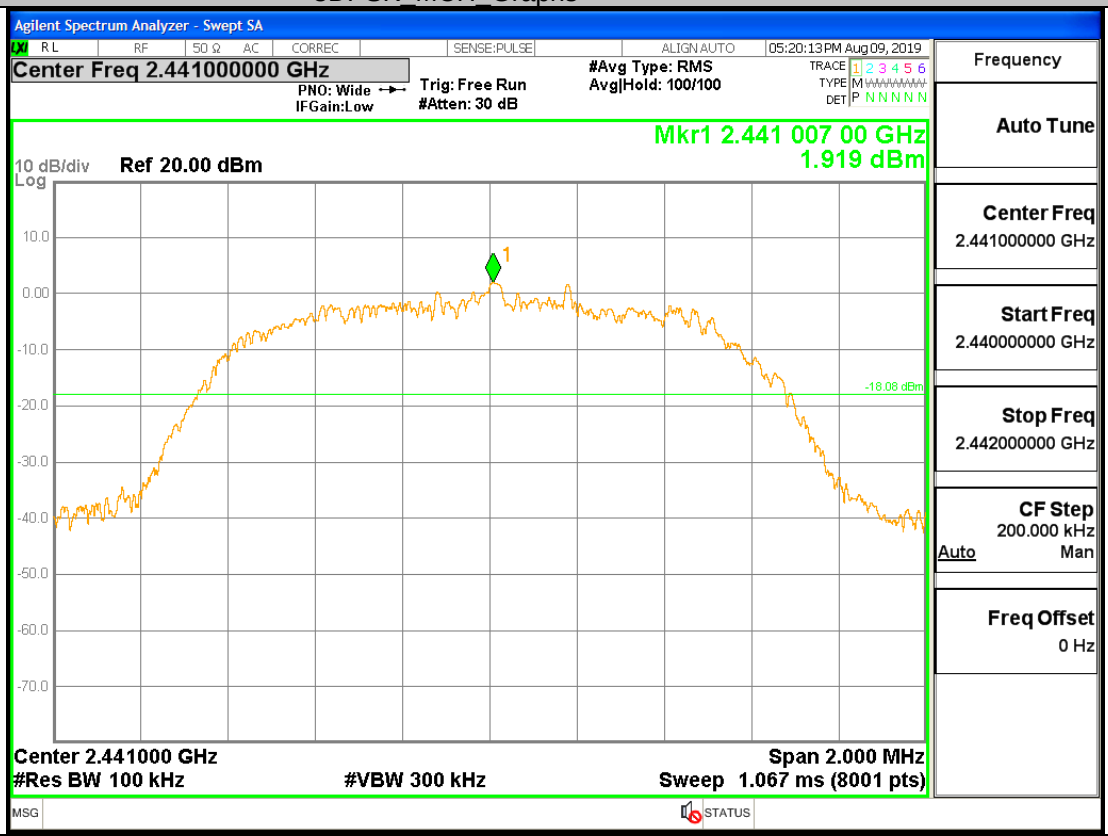
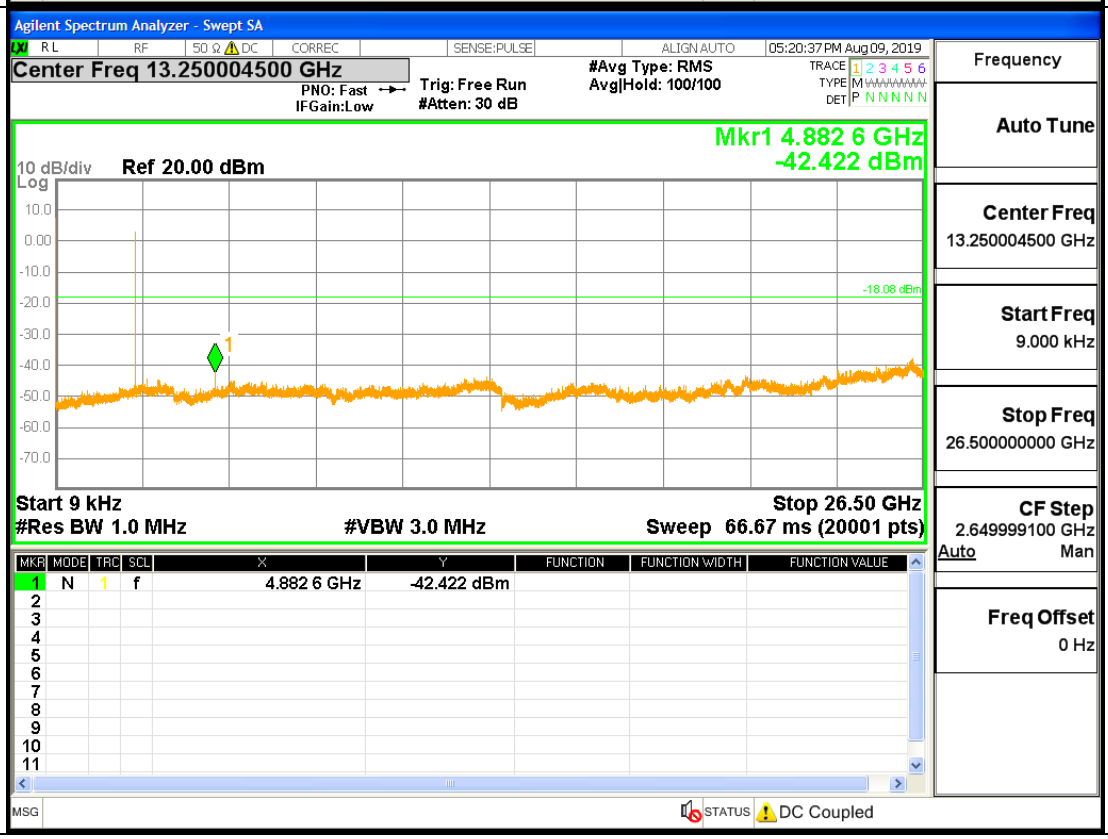
Pref	
Puw	

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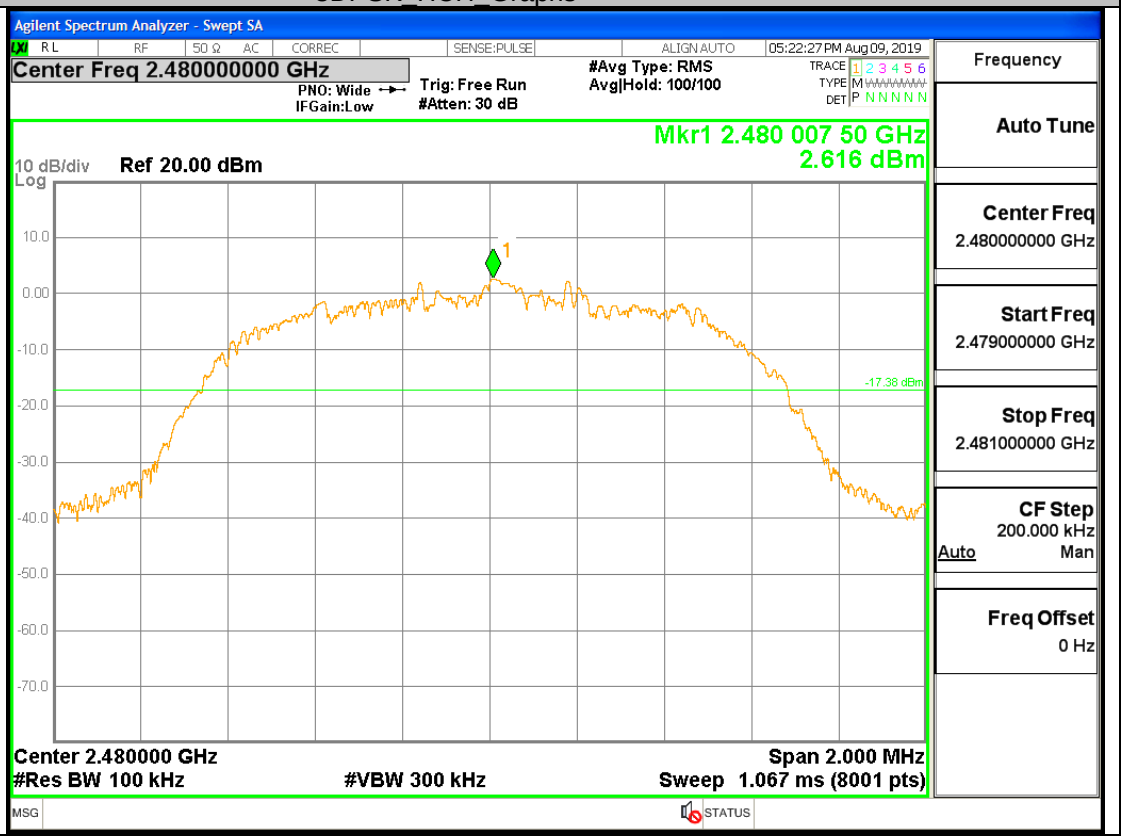
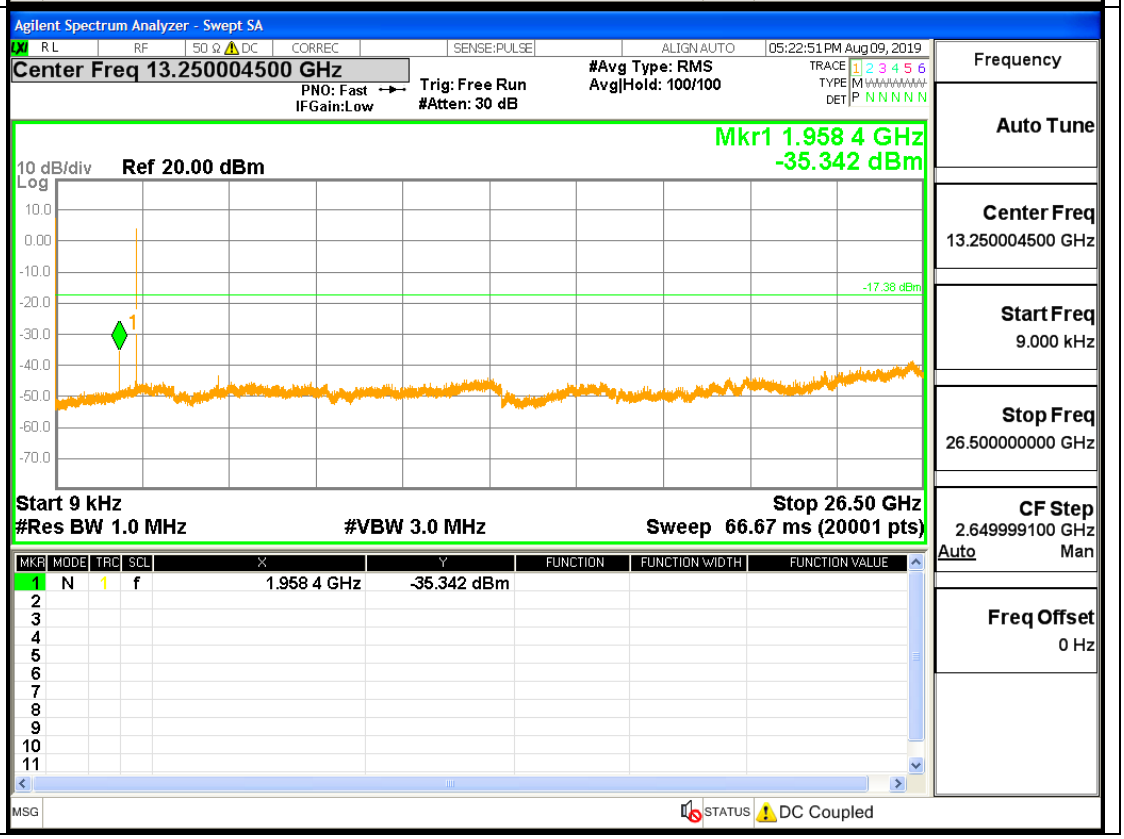
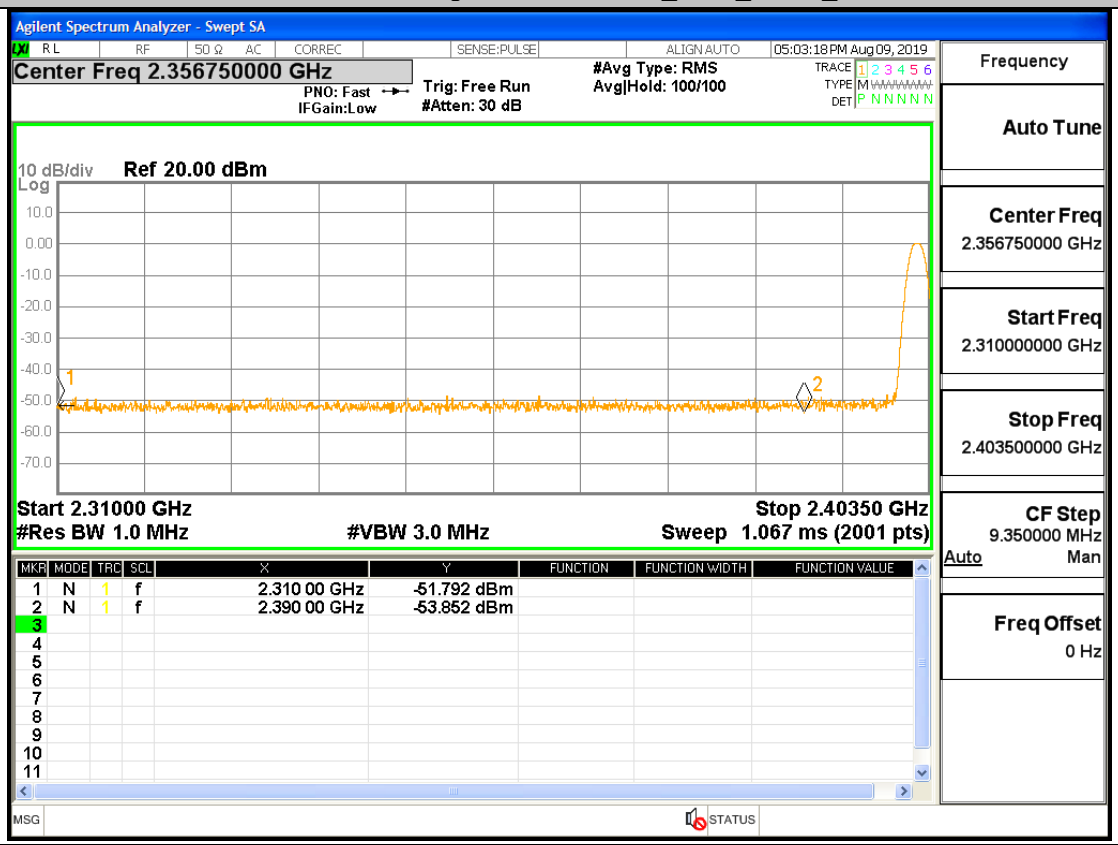
Pref	
Puw	

A.8 Restrict-band band-edge measurements

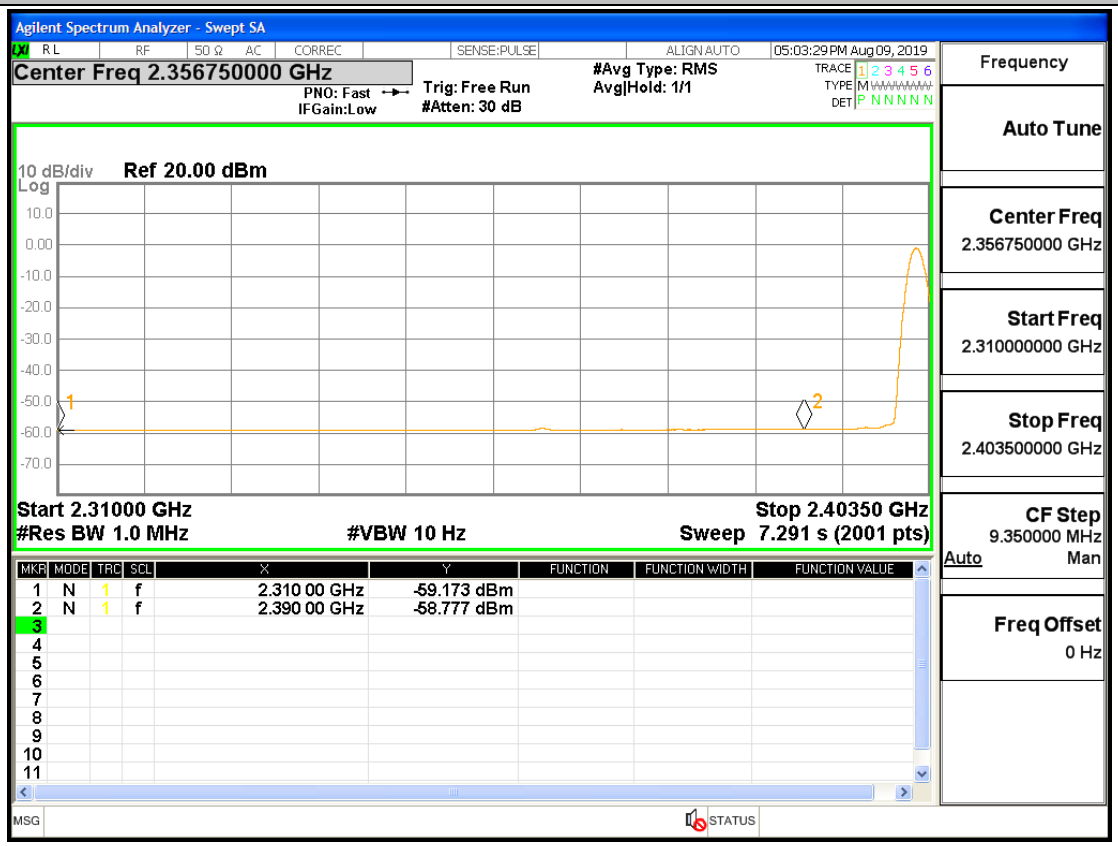
Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310.00	2.00	0.00	-51.79	45.41	74	Pass
1DH5	2480	2483.50	2.00	0.00	-50.08	46.62	74	Pass
2DH5	2402	2390.00	2.00	0.00	-52.14	45.06	74	Pass
2DH5	2480	2483.68	2.00	0.00	-45.66	51.54	74	Pass
3DH5	2402	2374.09	2.00	0.00	-47.45	49.76	74	Pass
3DH5	2480	2495.31	2.00	0.00	-47.21	49.99	74	Pass

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310.00	2.00	0.00	-58.78	38.42	54	Fail
1DH5	2480	2483.50	2.00	0.00	-56.13	41.07	54	Fail
2DH5	2402	2390.00	2.00	0.00	-58.80	38.40	54	Fail
2DH5	2480	2483.68	2.00	0.00	-54.57	42.63	54	Fail
3DH5	2402	2374.09	2.00	0.00	-58.80	38.40	54	Fail
3DH5	2480	2495.31	2.00	0.00	-54.62	42.58	54	Fail

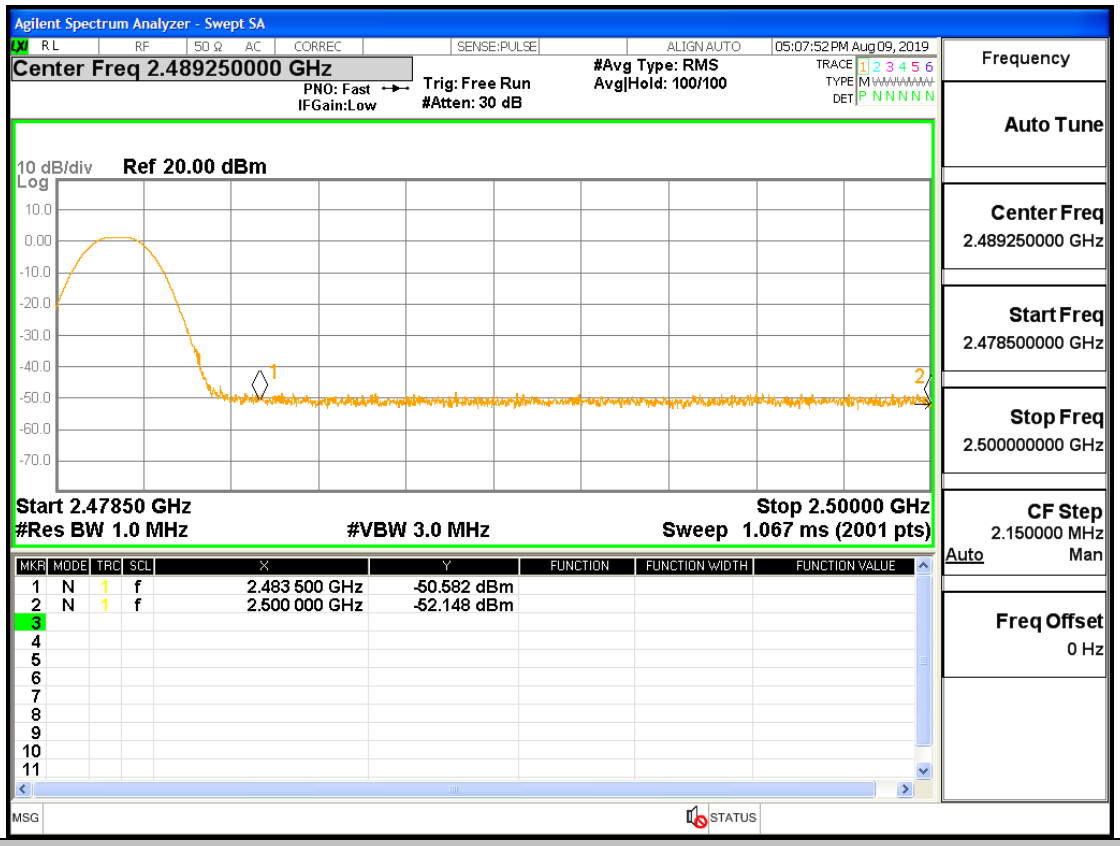
Restrict-band band-edge measurements_2402_PEAK_DH5



Restrict-band band-edge measurements_2402_AV_DH5

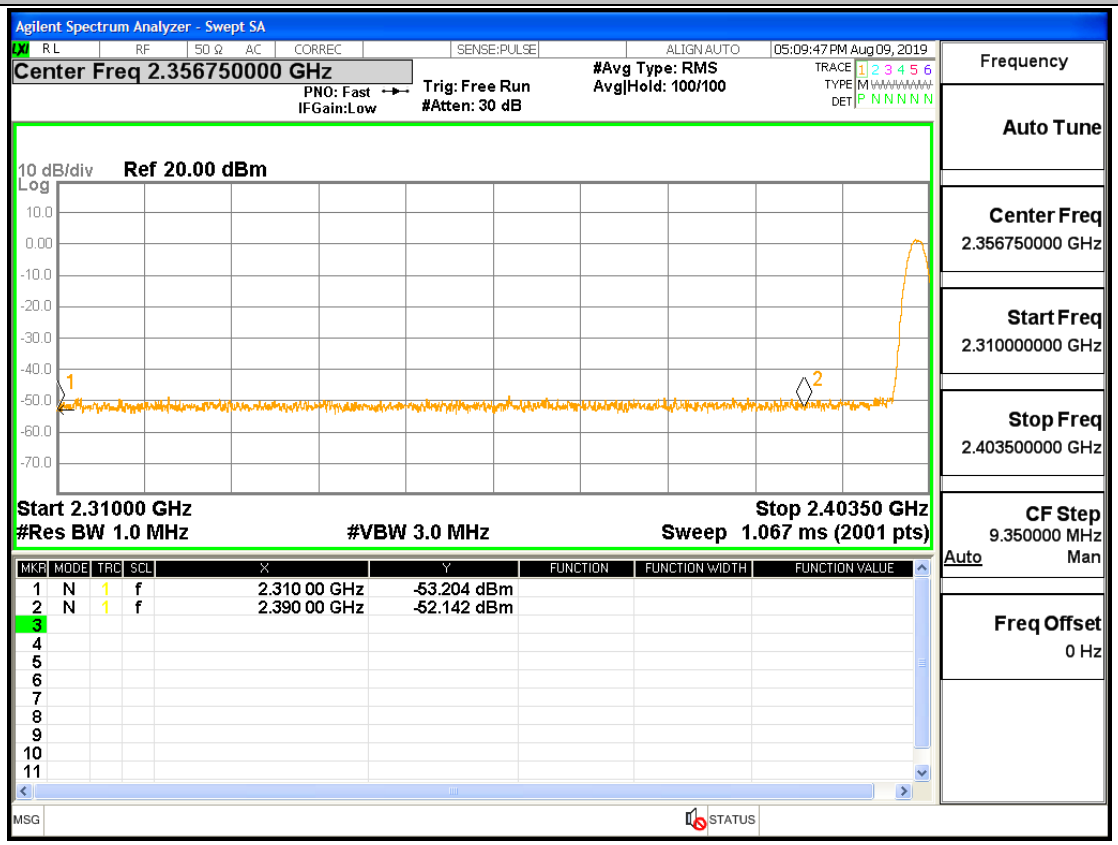


Restrict-band band-edge measurements_2480_PEAK_DH5

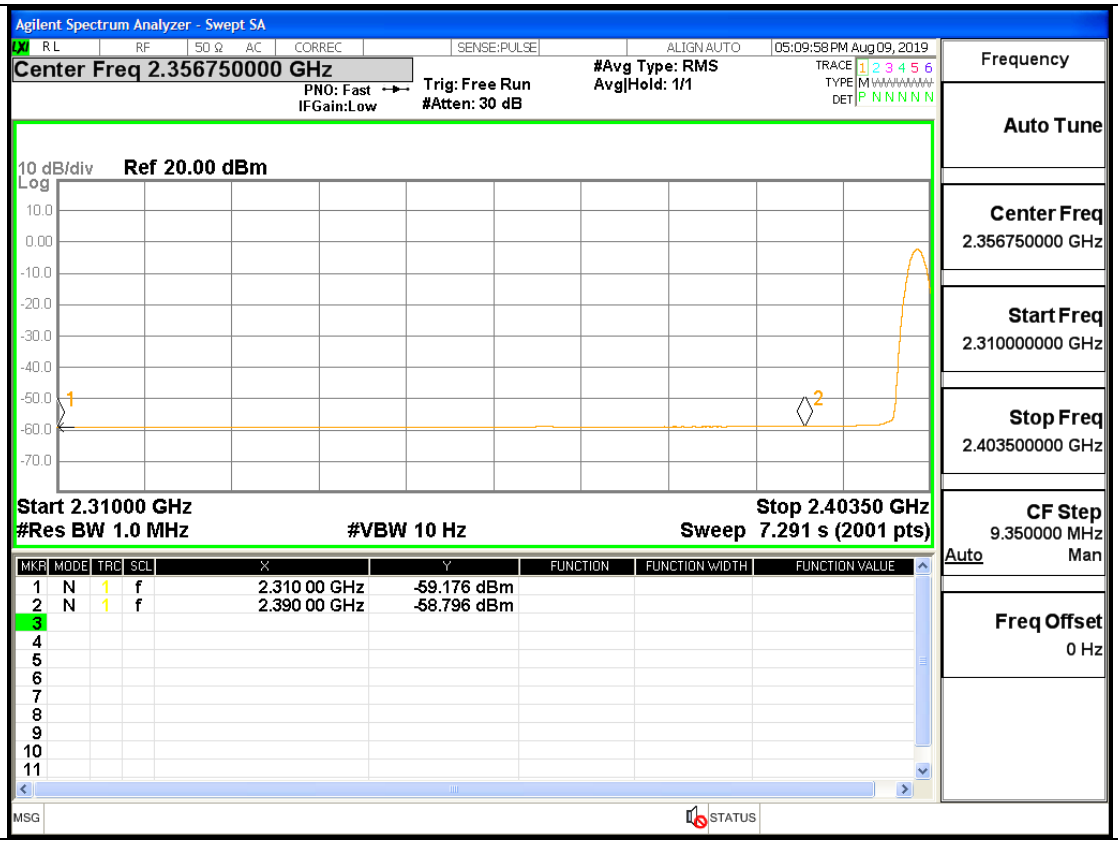


Restrict-band band-edge measurements_2480_AV_DH5

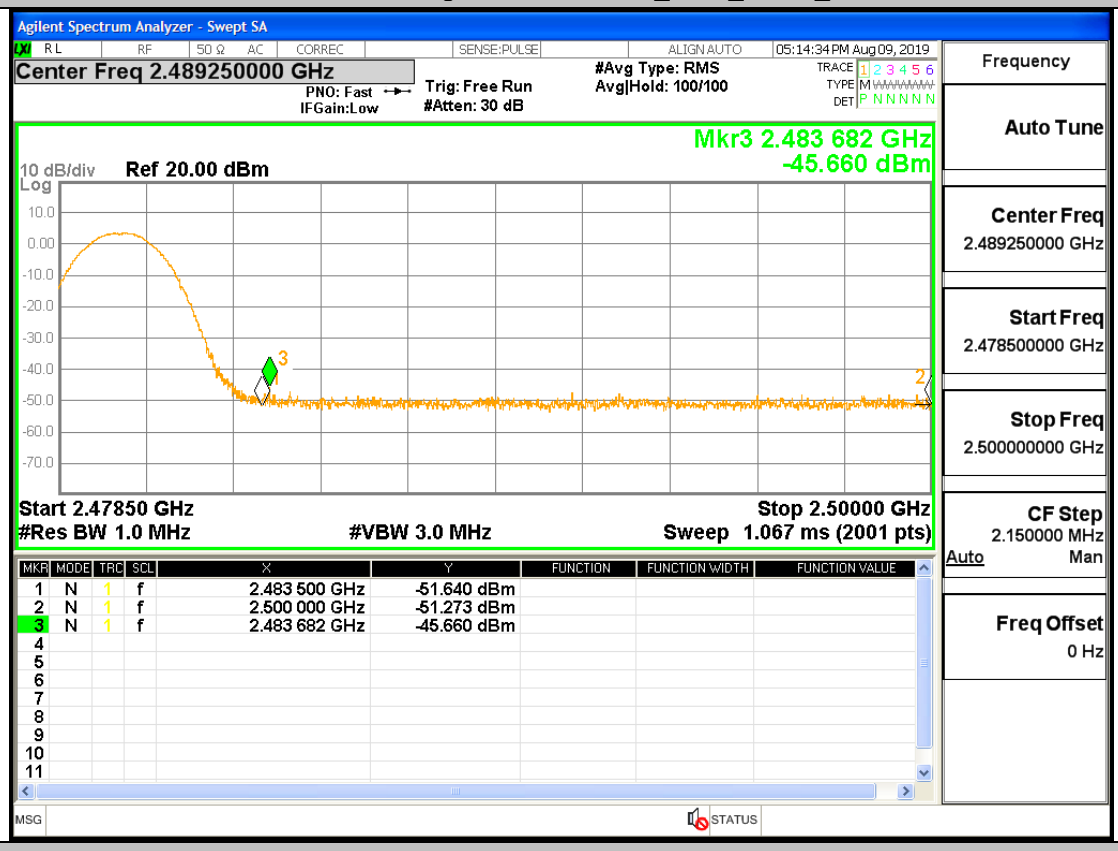
Restrict-band band-edge measurements_2402_PEAK_2DH5



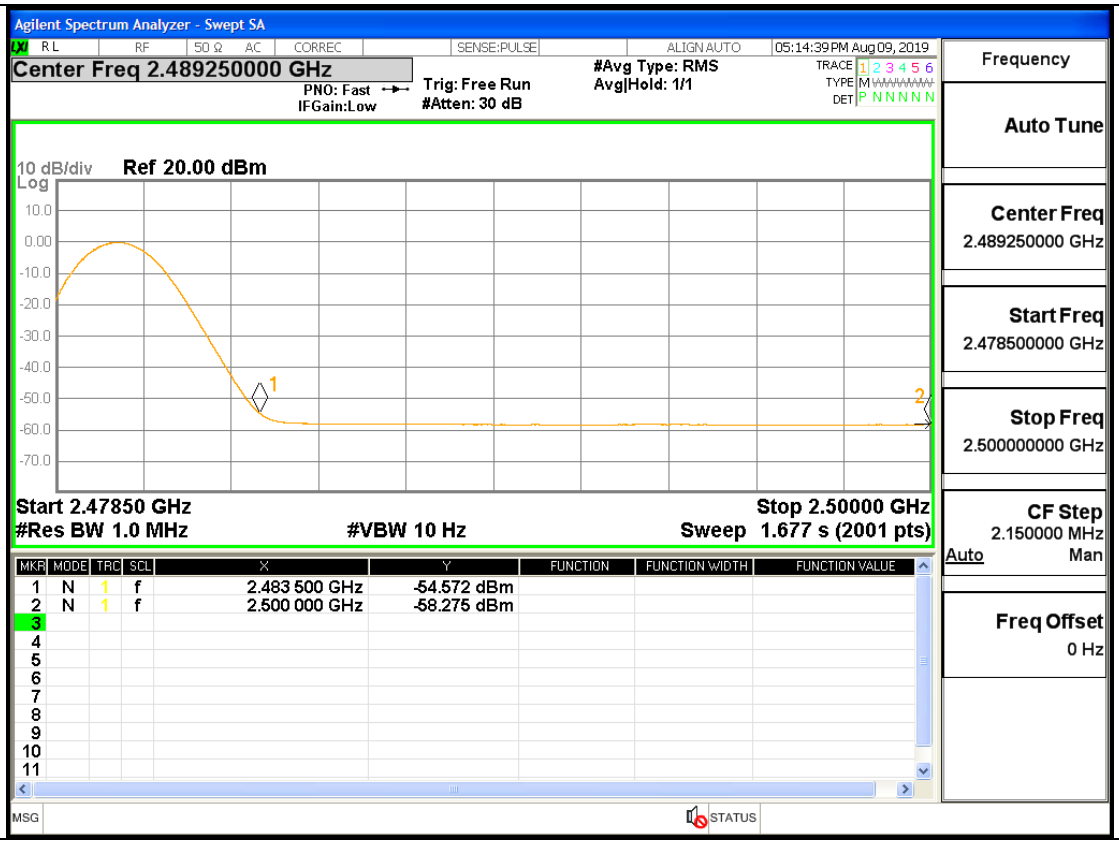
Restrict-band band-edge measurements_2402_AV_2DH5



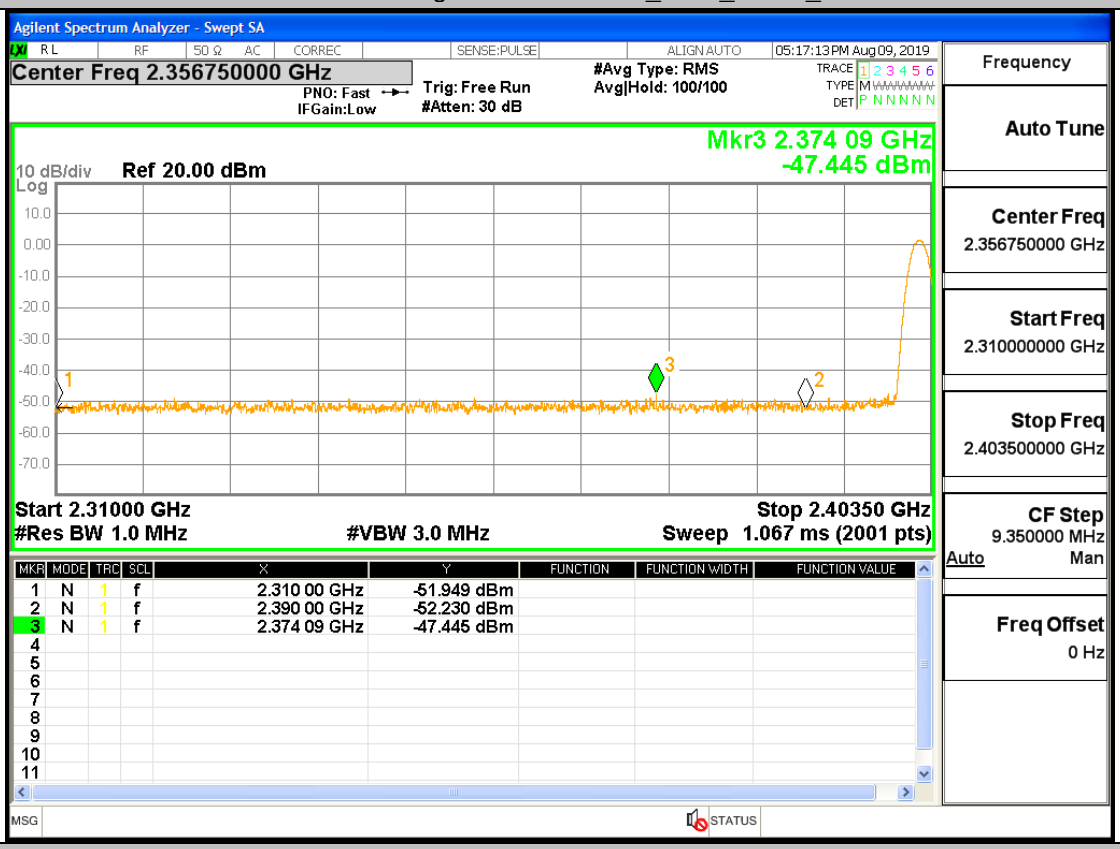
Restrict-band band-edge measurements_2480_PEAK_2DH5



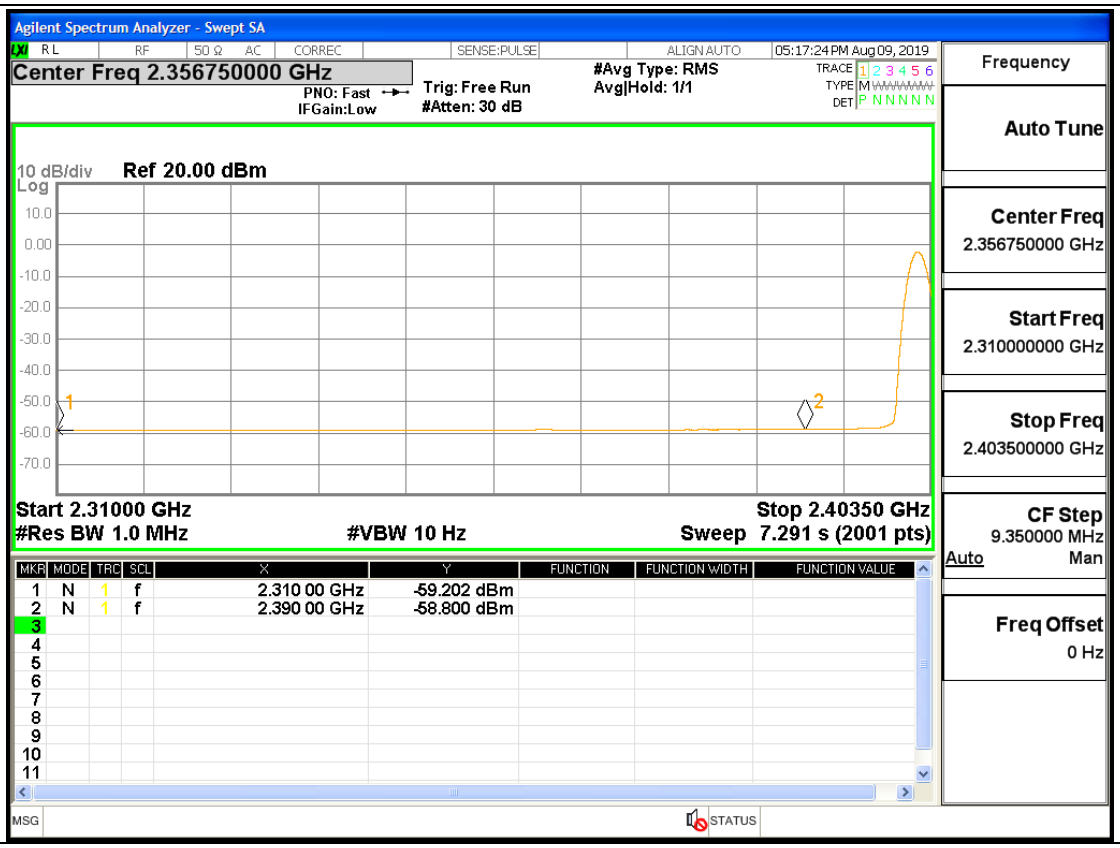
Restrict-band band-edge measurements_2480_AV_2DH5



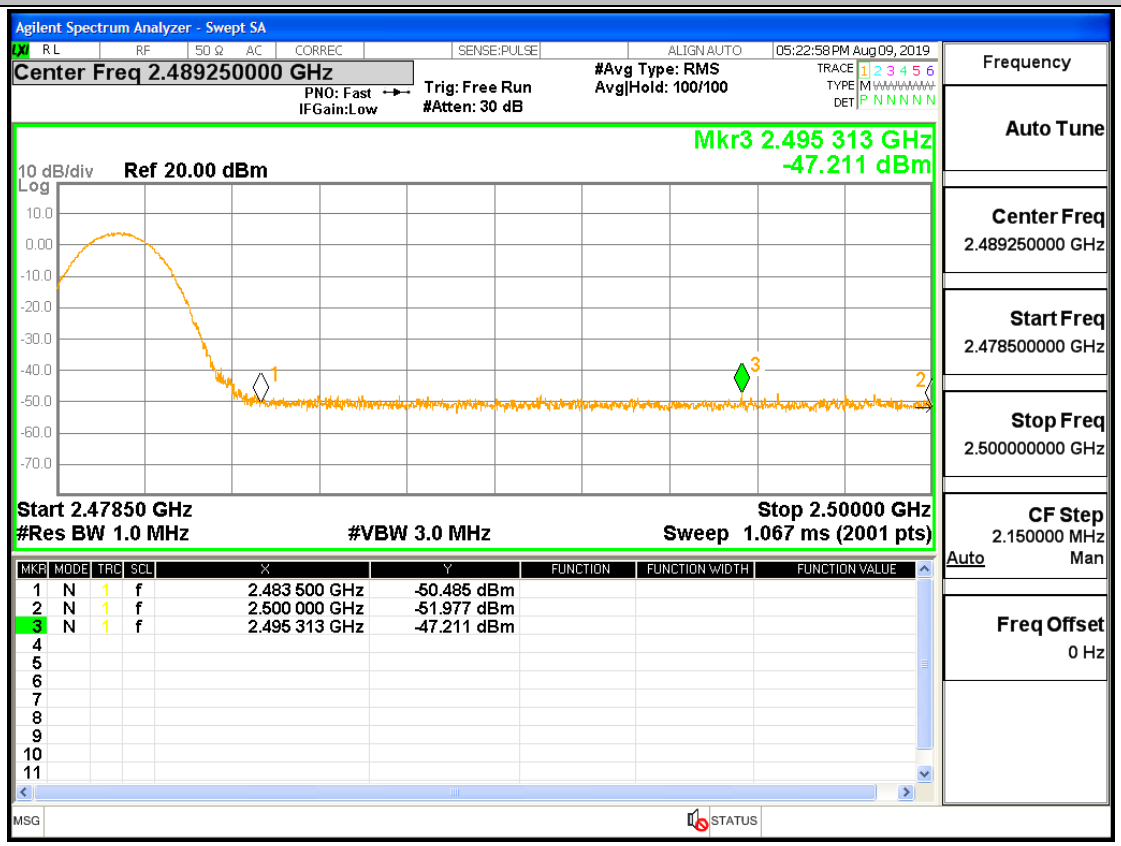
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5