

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

Product Name: X-brain Smart gateway

Trade Mark: Xunison

Test Model: XUS100

FCC ID: 2AP2F-XUS100

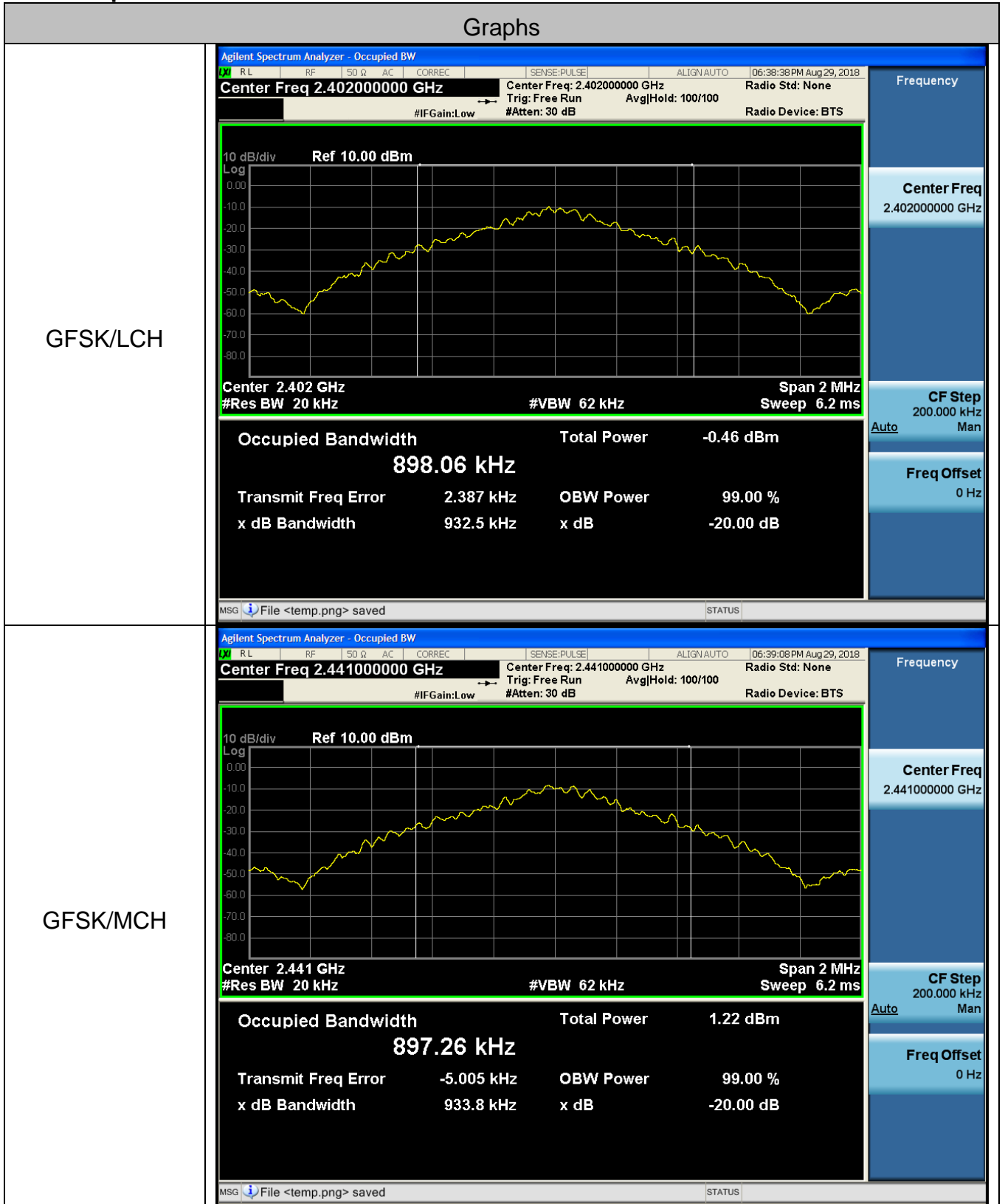
Environmental Conditions

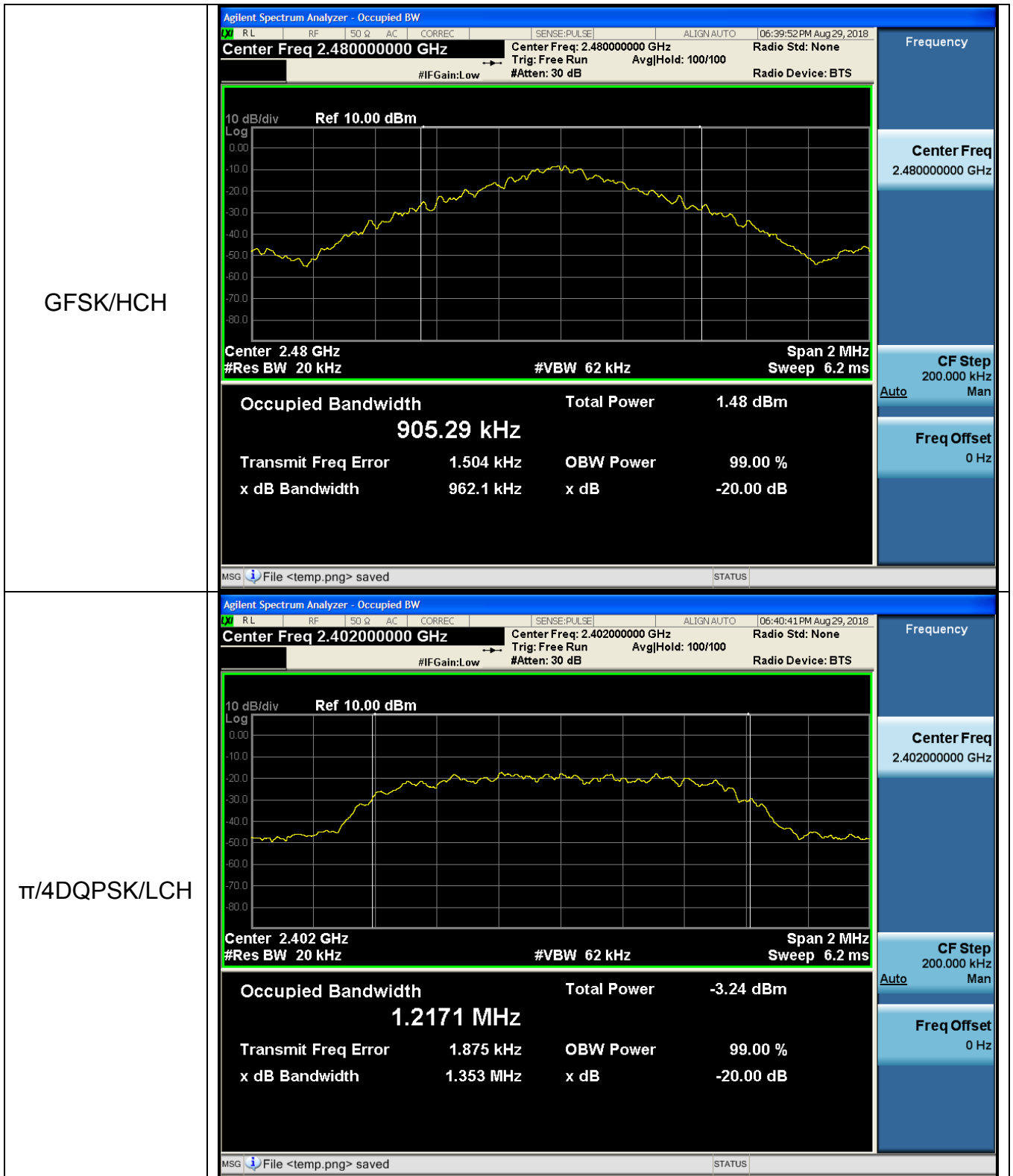
Temperature:	22.9 ° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

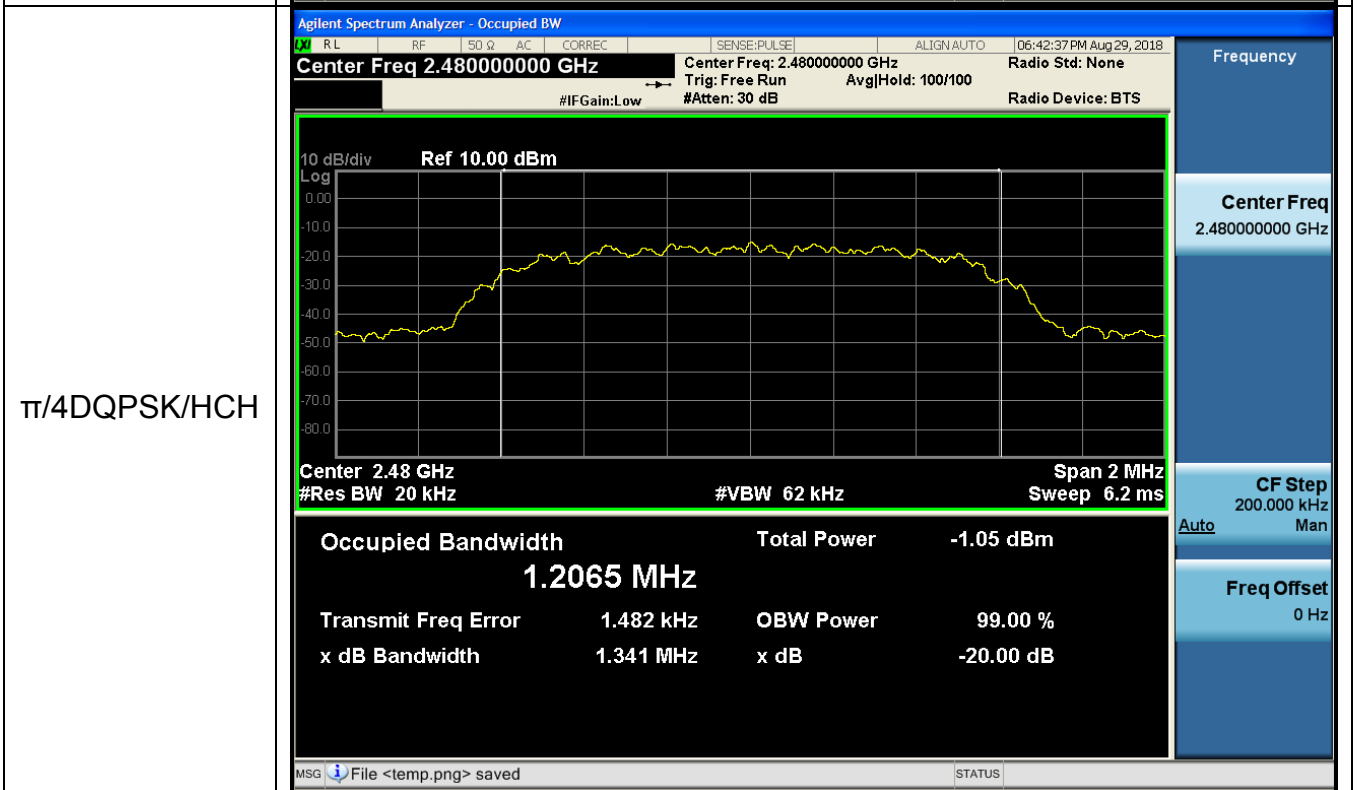
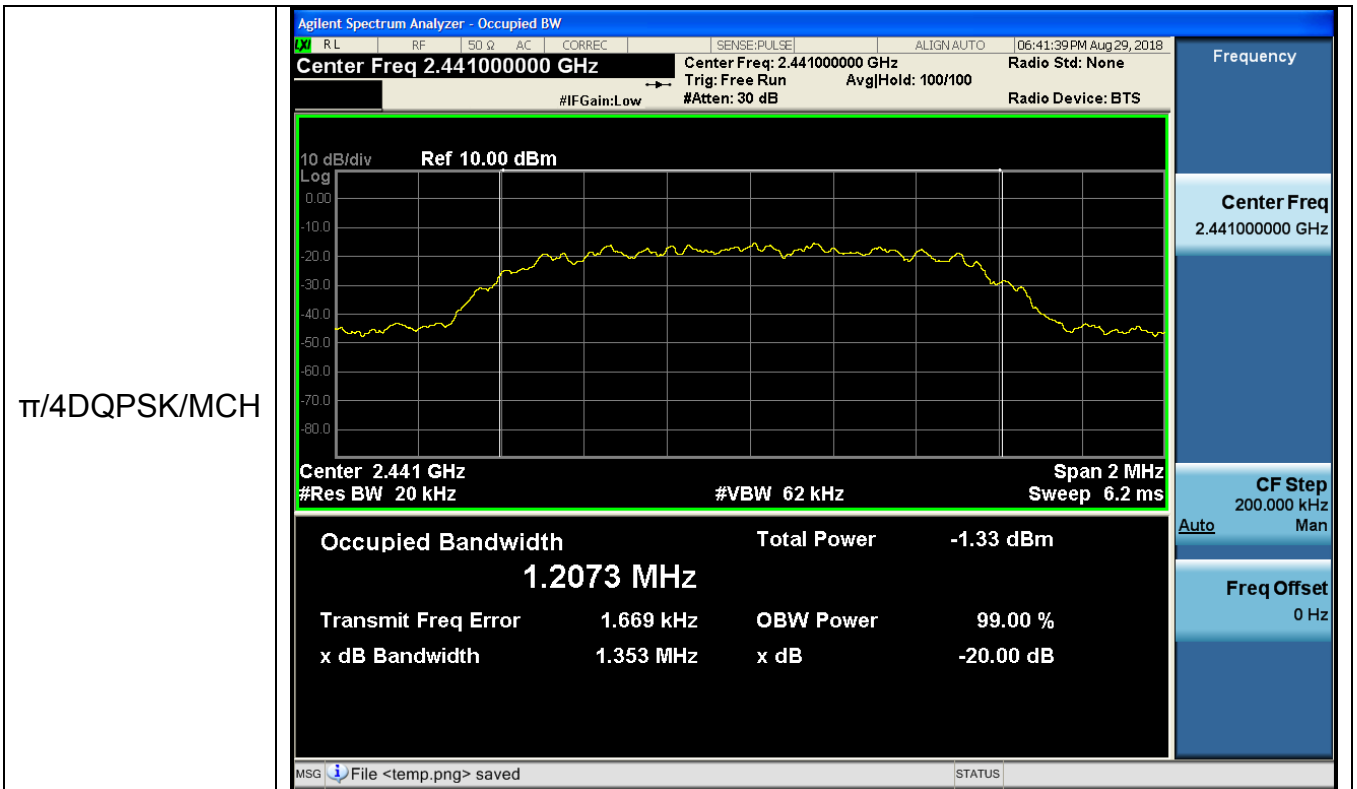
A.1 20 dB Bandwidth

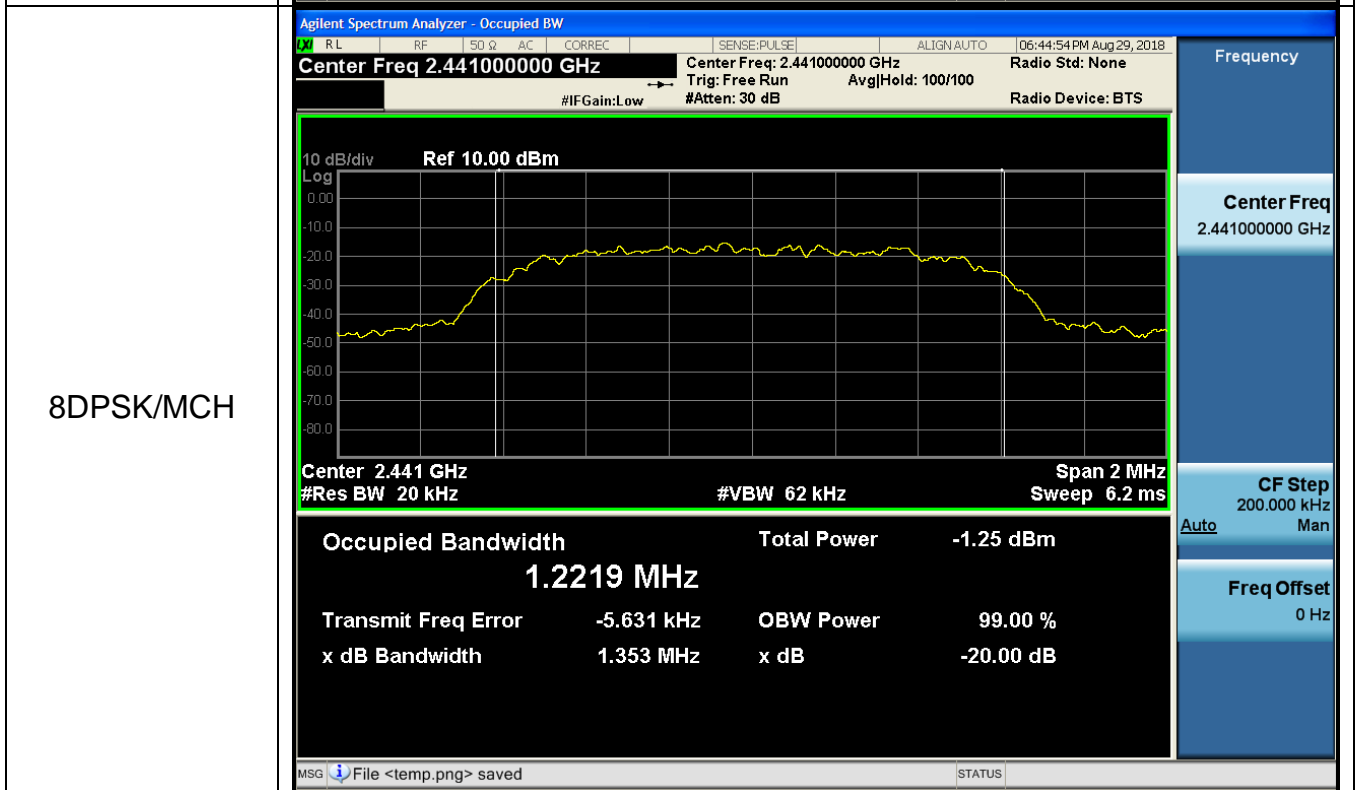
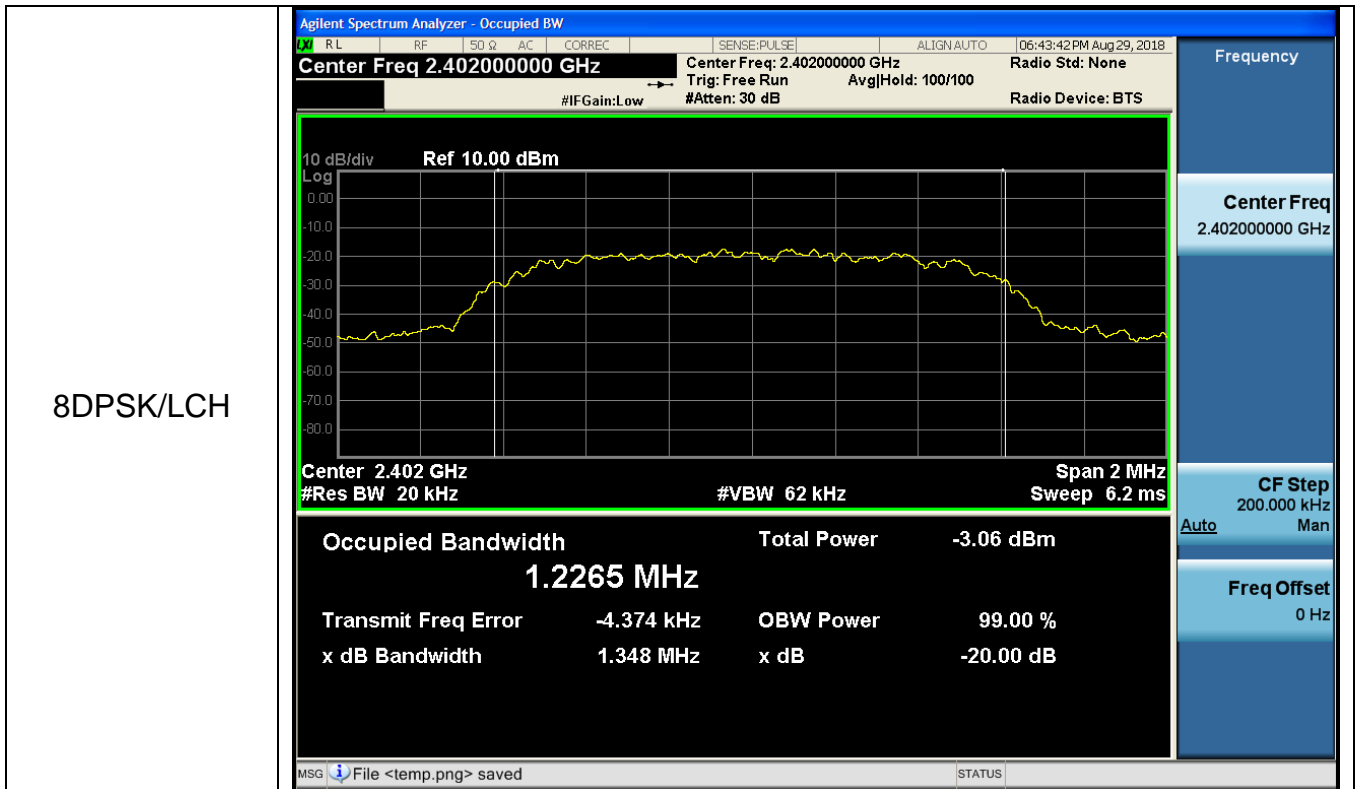
Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.933	Not Specified	PASS
GFSK	MCH	0.934	Not Specified	PASS
GFSK	HCH	0.962	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.353	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.353	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.341	Not Specified	PASS
8DPSK	LCH	1.348	Not Specified	PASS
8DPSK	MCH	1.353	Not Specified	PASS
8DPSK	HCH	1.345	Not Specified	PASS

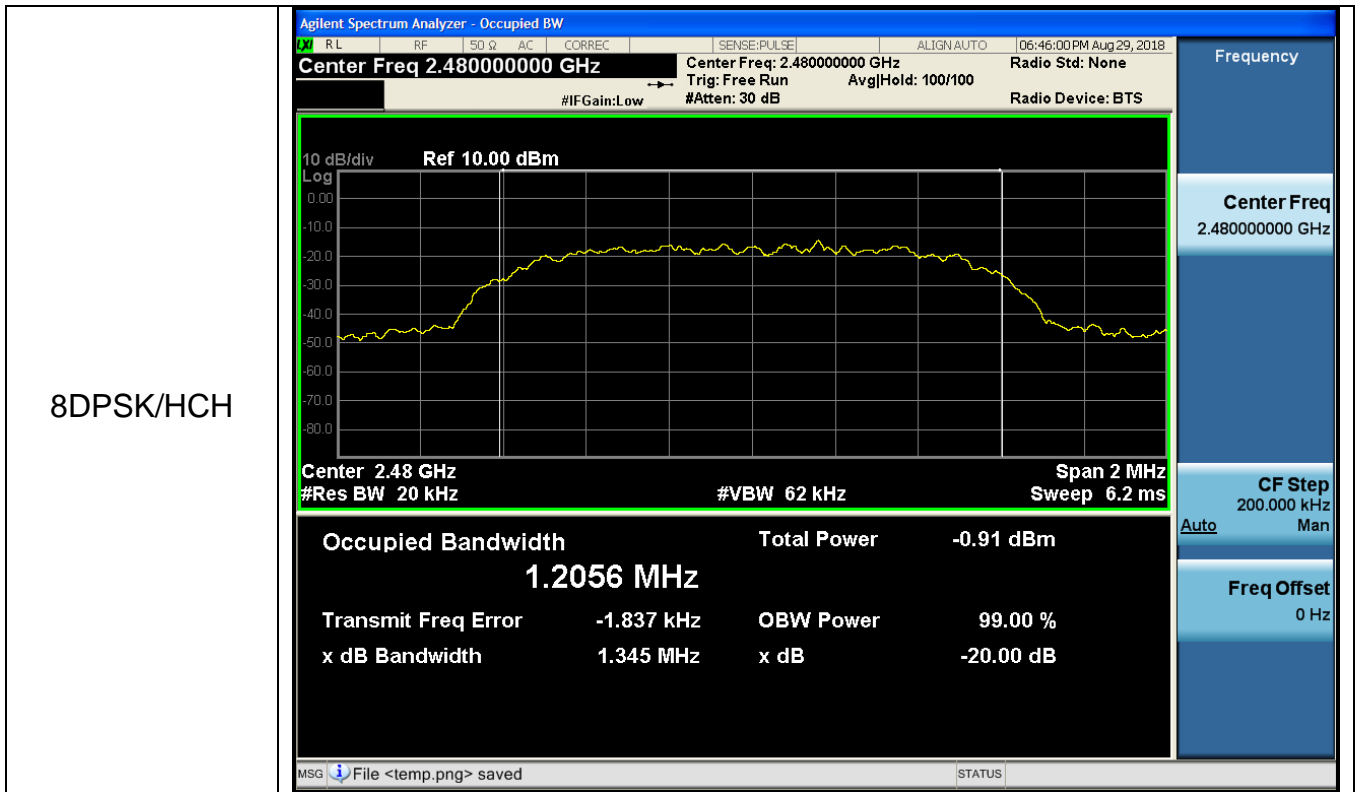
Test Graph







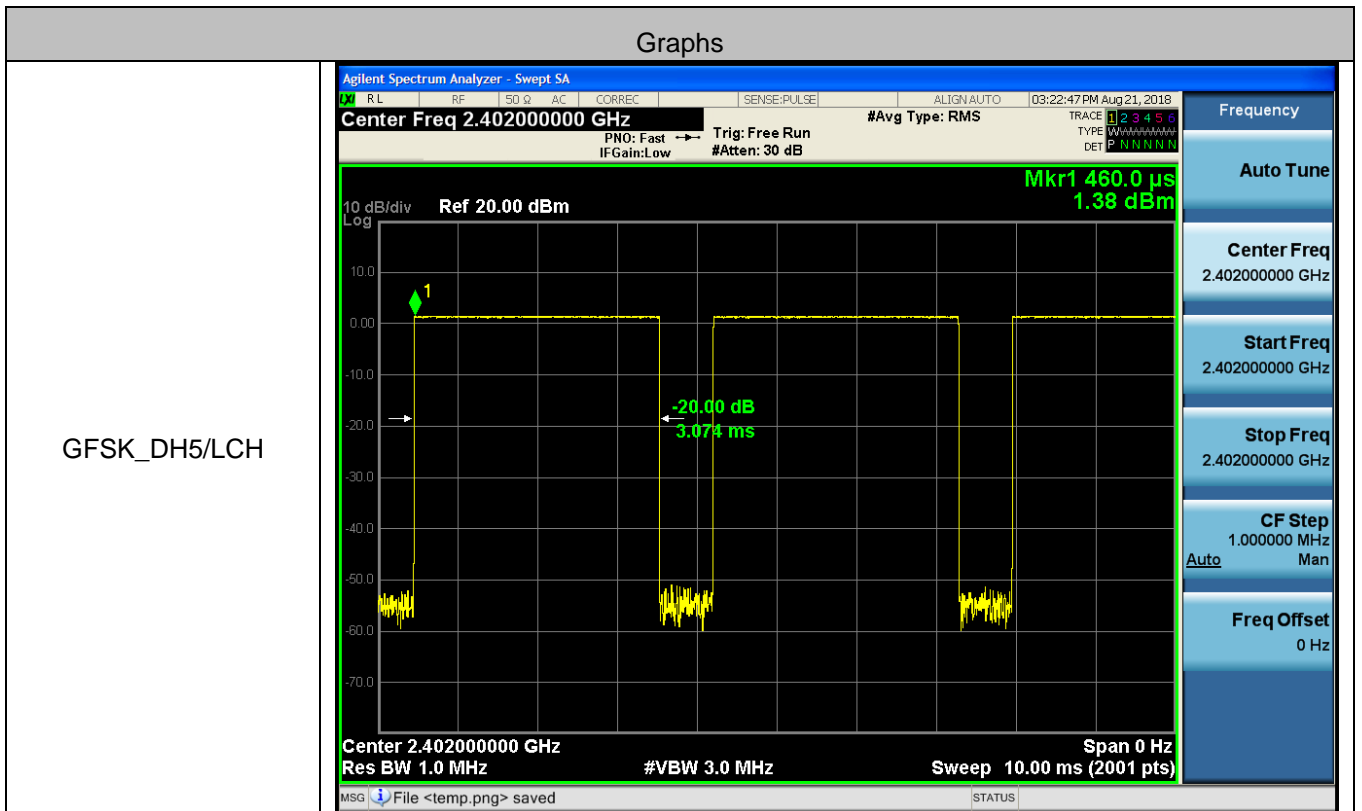


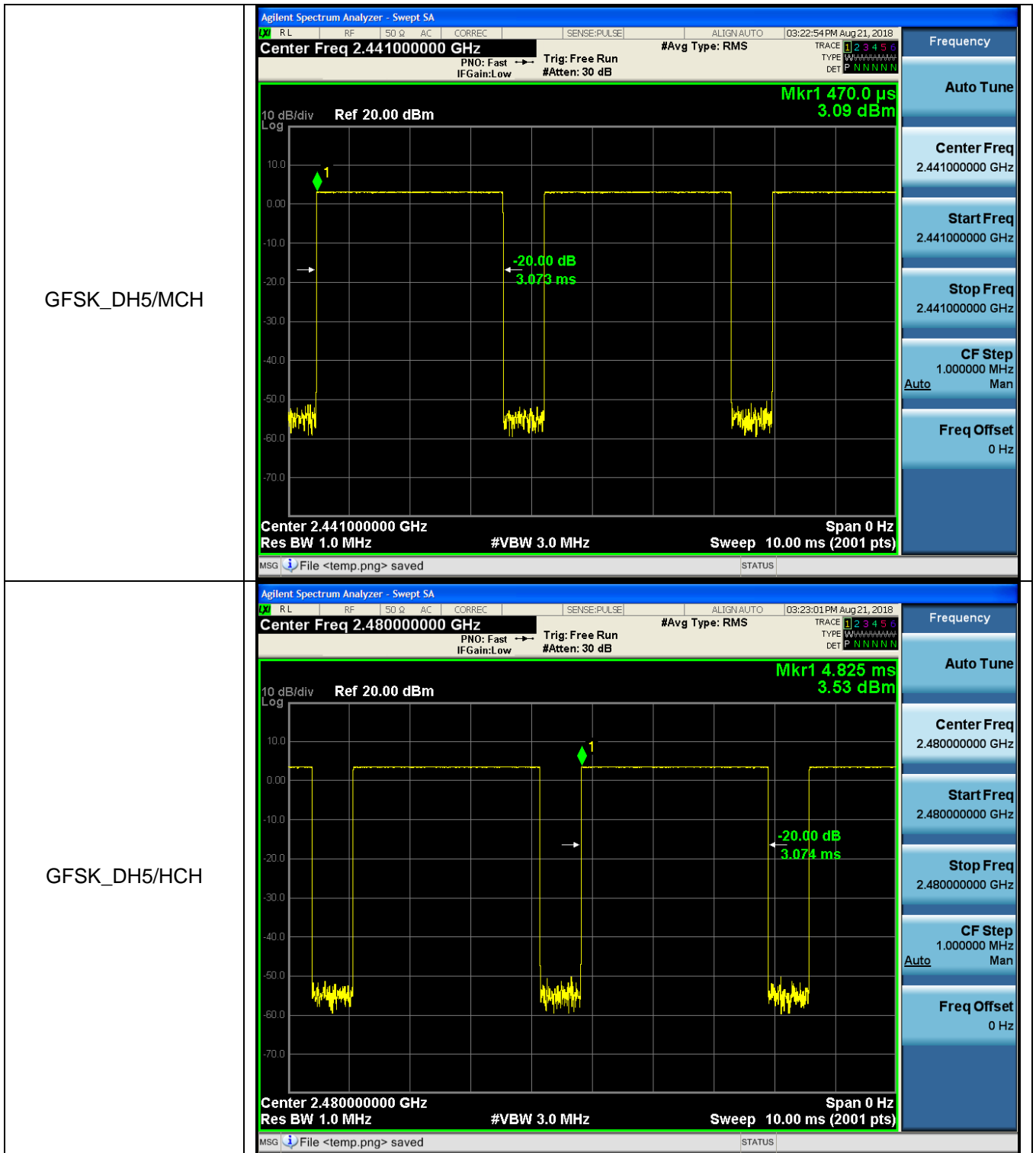


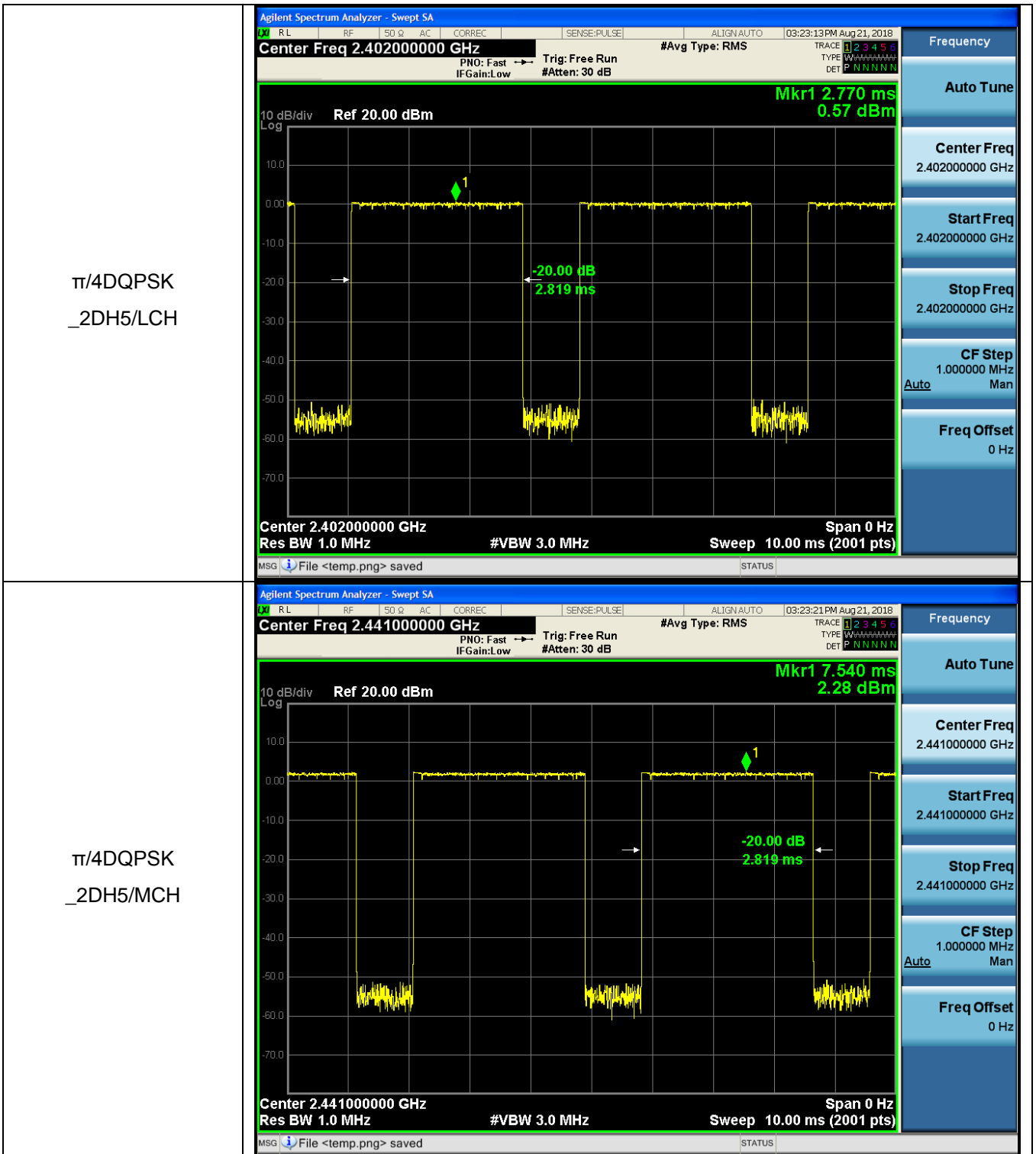
A.2 Dwell Time

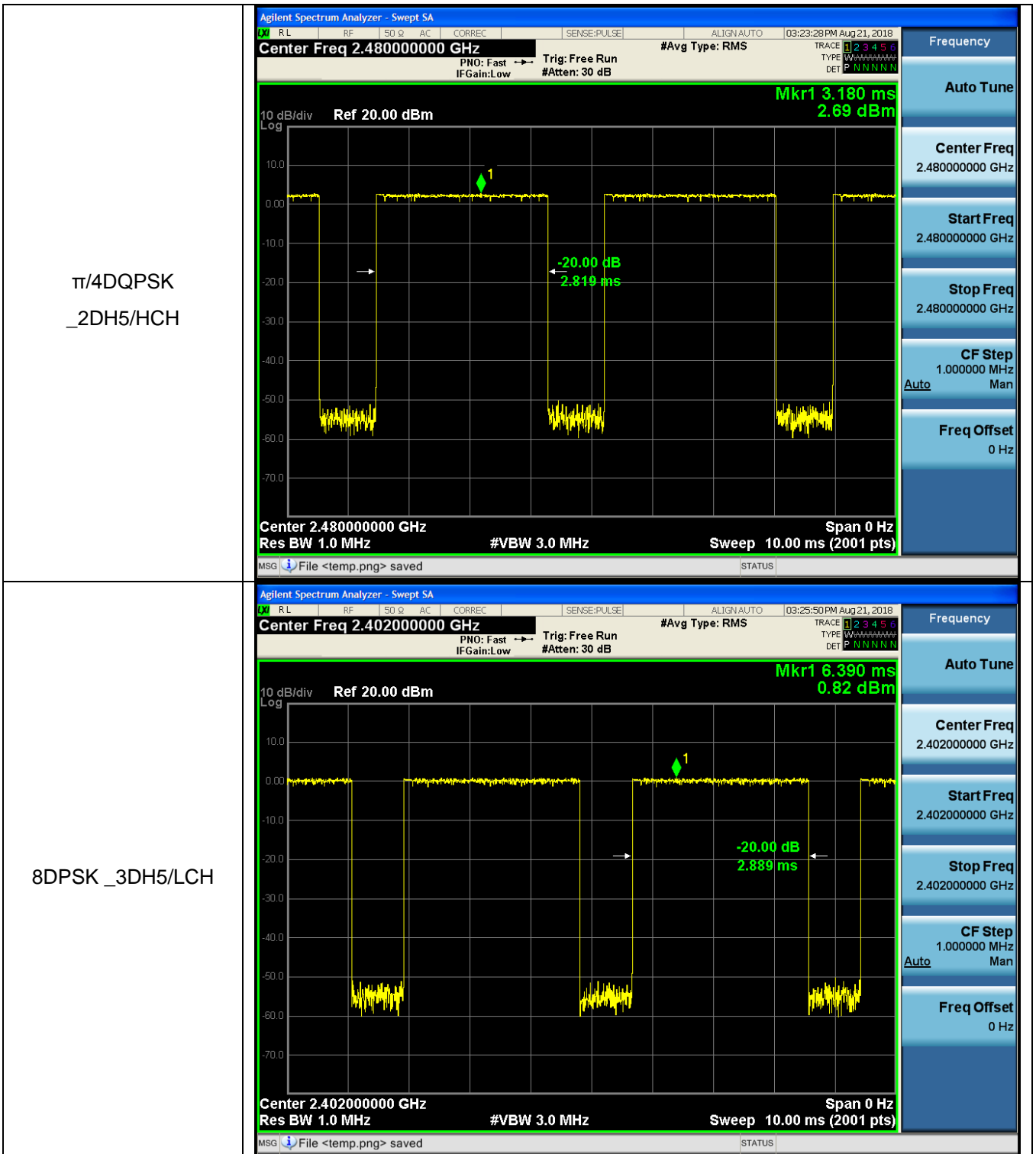
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.003074	106.7	0.327983	0.4	PASS
GFSK	DH5	MCH	0.003073	106.7	0.327941	0.4	PASS
GFSK	DH5	HCH	0.003074	106.7	0.327953	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002819	106.7	0.300768	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002819	106.7	0.300795	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002819	106.7	0.300758	0.4	PASS
8DPSK	3DH5	LCH	0.002889	106.7	0.308246	0.4	PASS
8DPSK	3DH5	MCH	0.002891	106.7	0.30851	0.4	PASS
8DPSK	3DH5	HCH	0.002889	106.7	0.308248	0.4	PASS

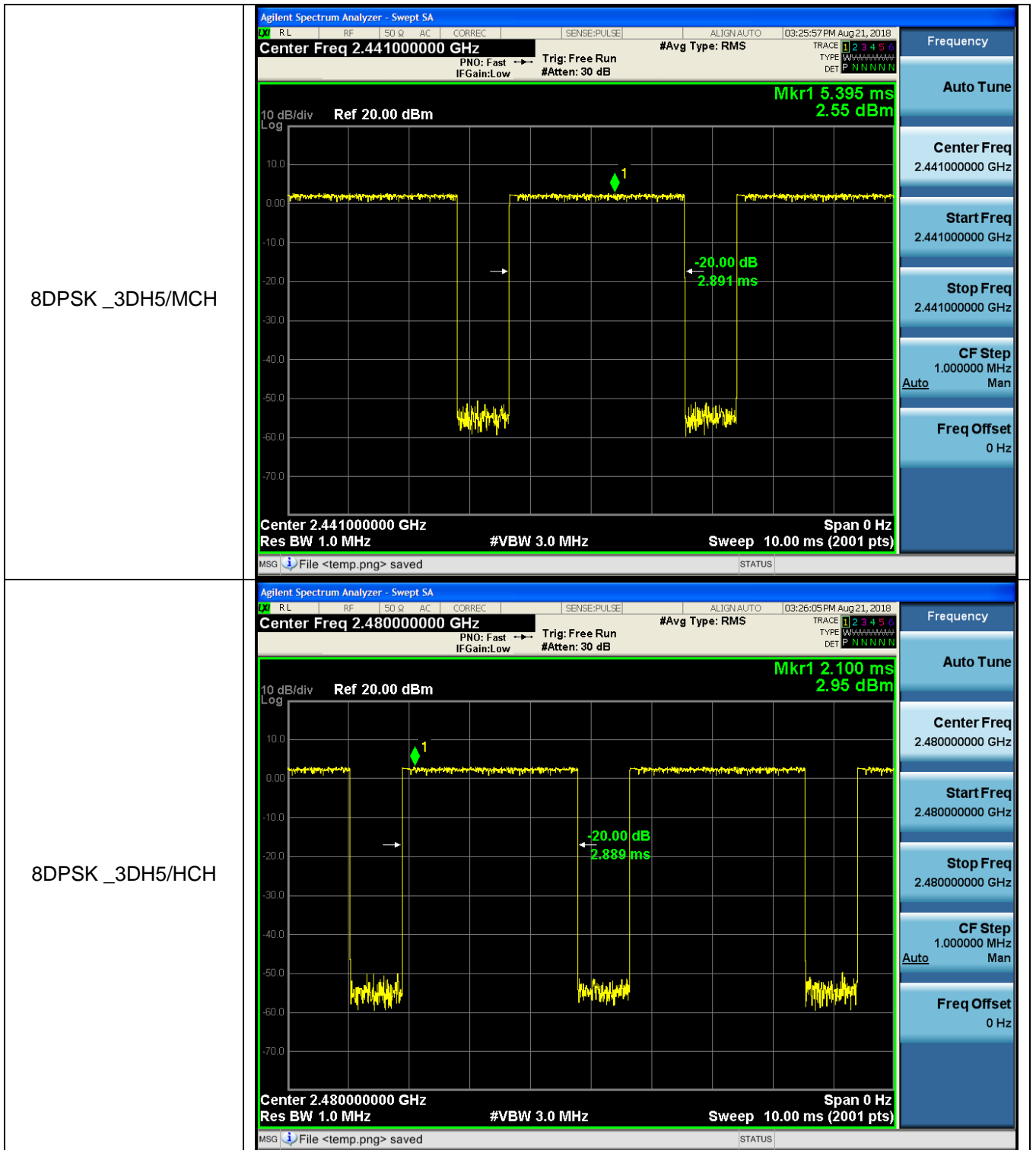
Test Graph

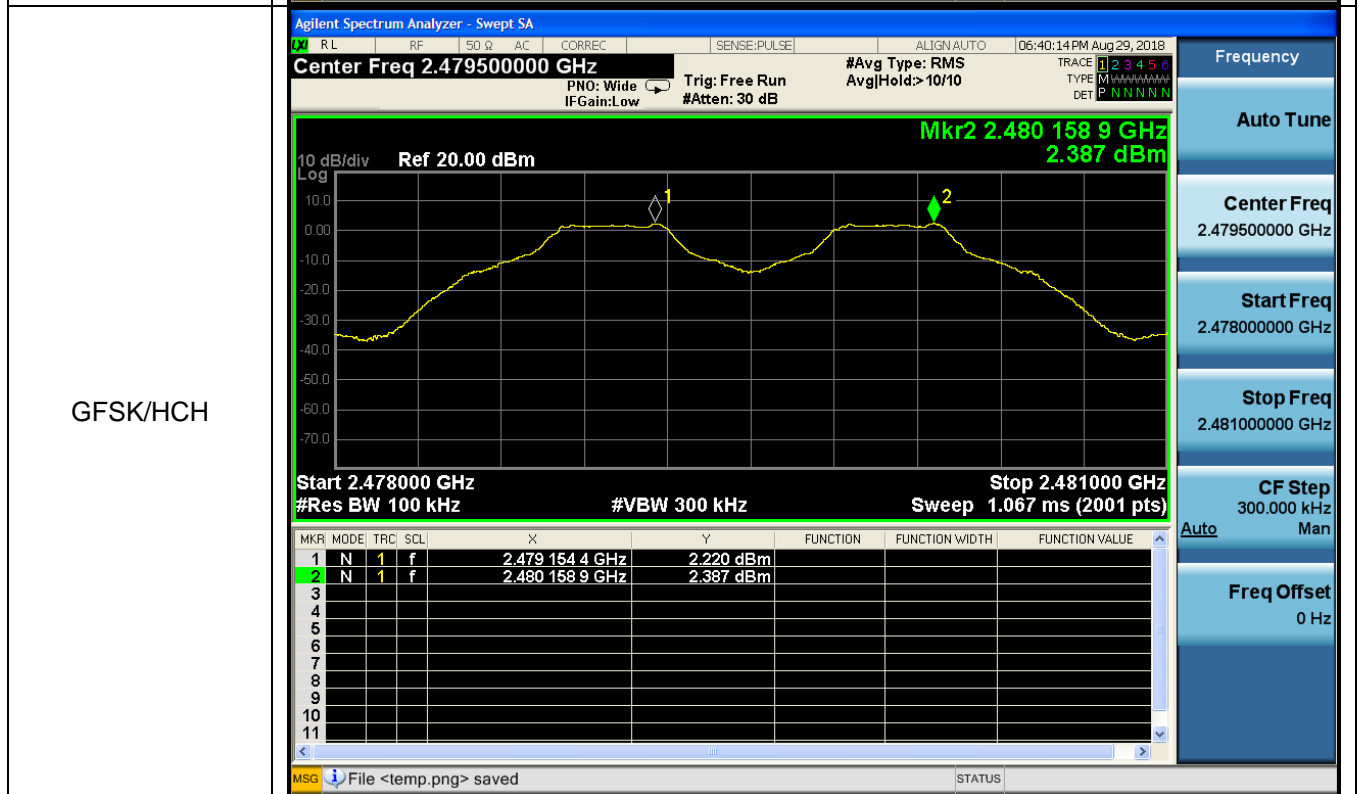
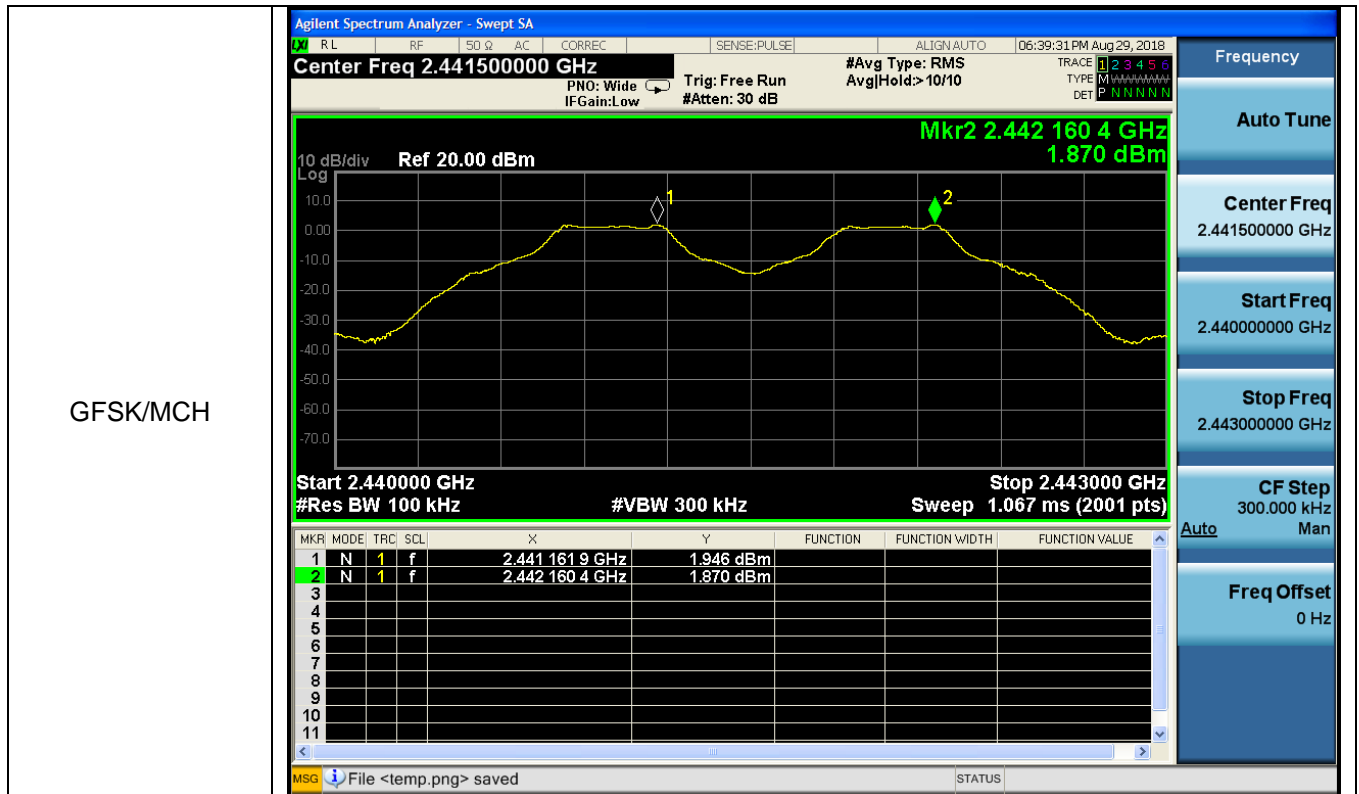


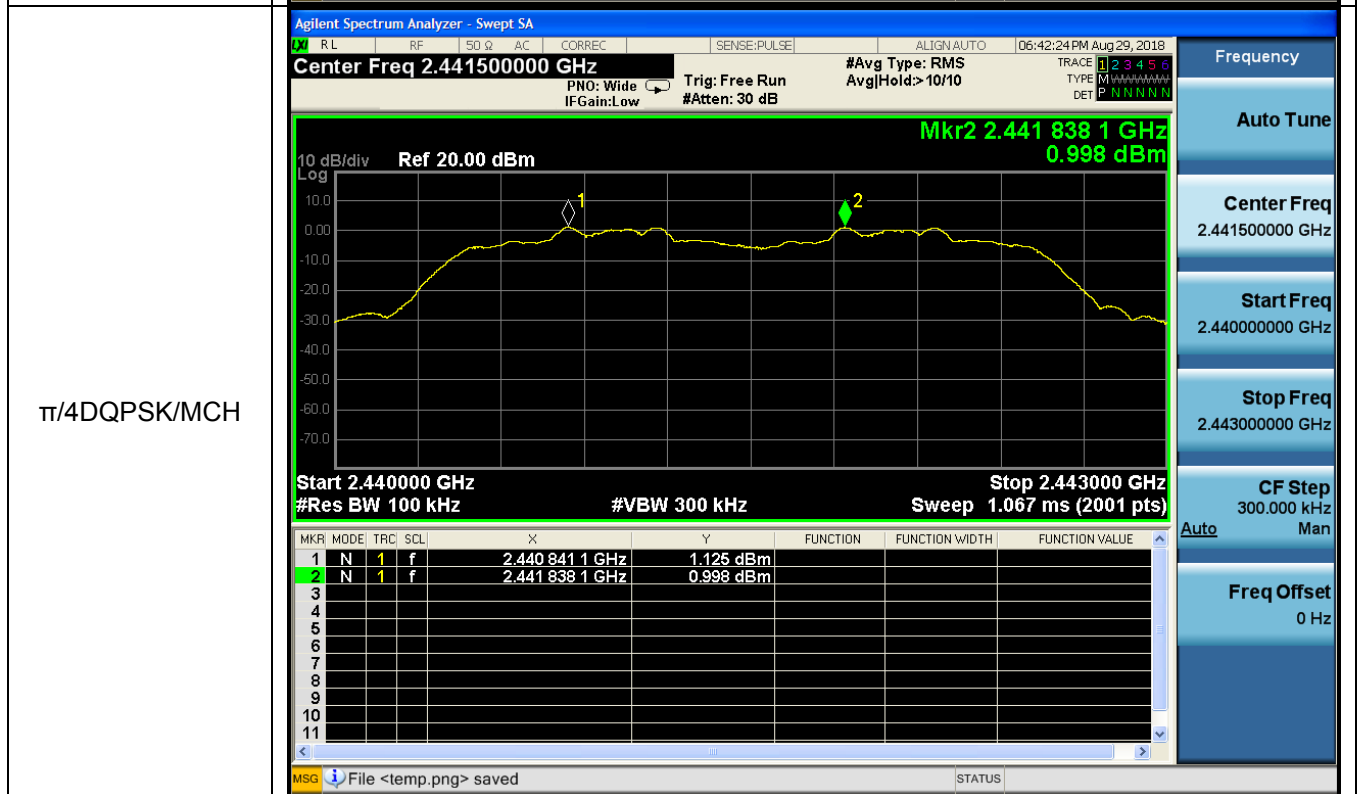
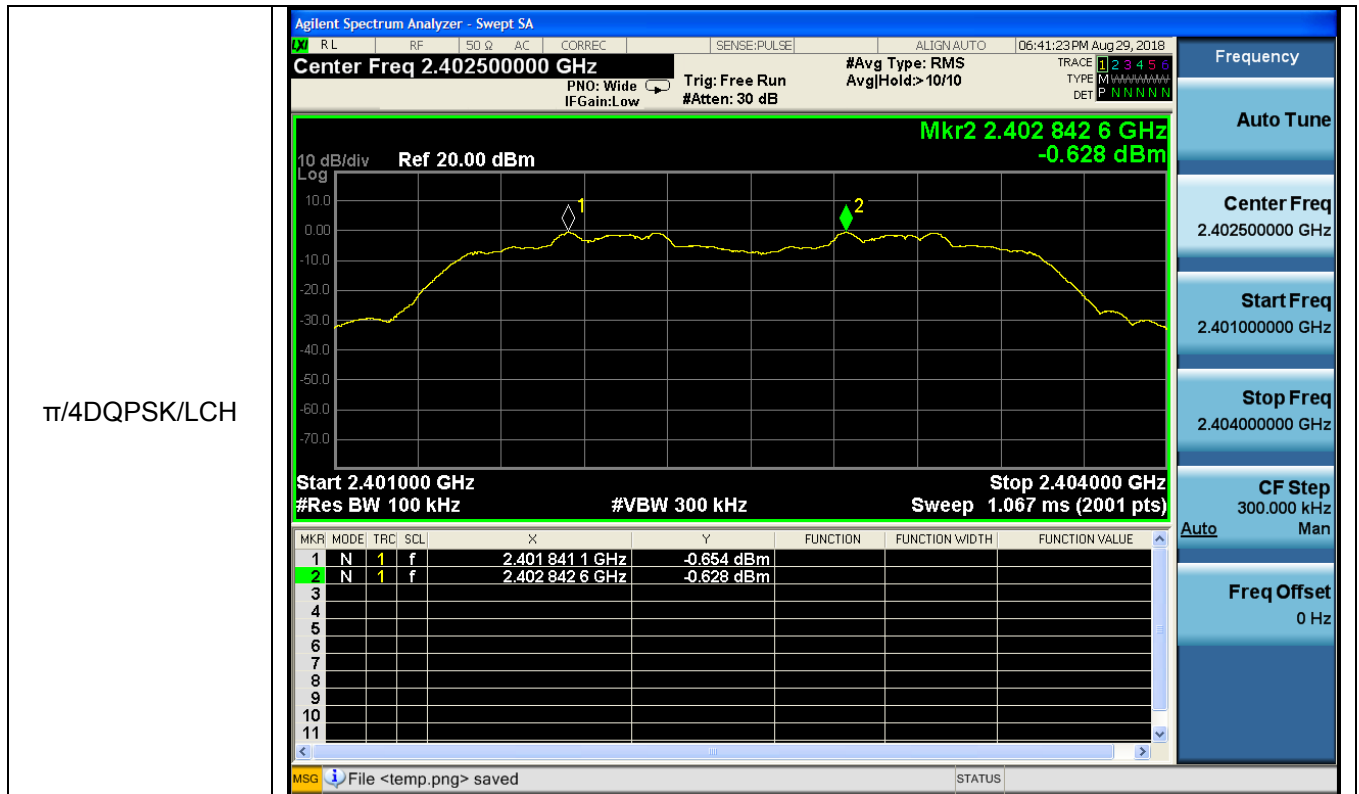


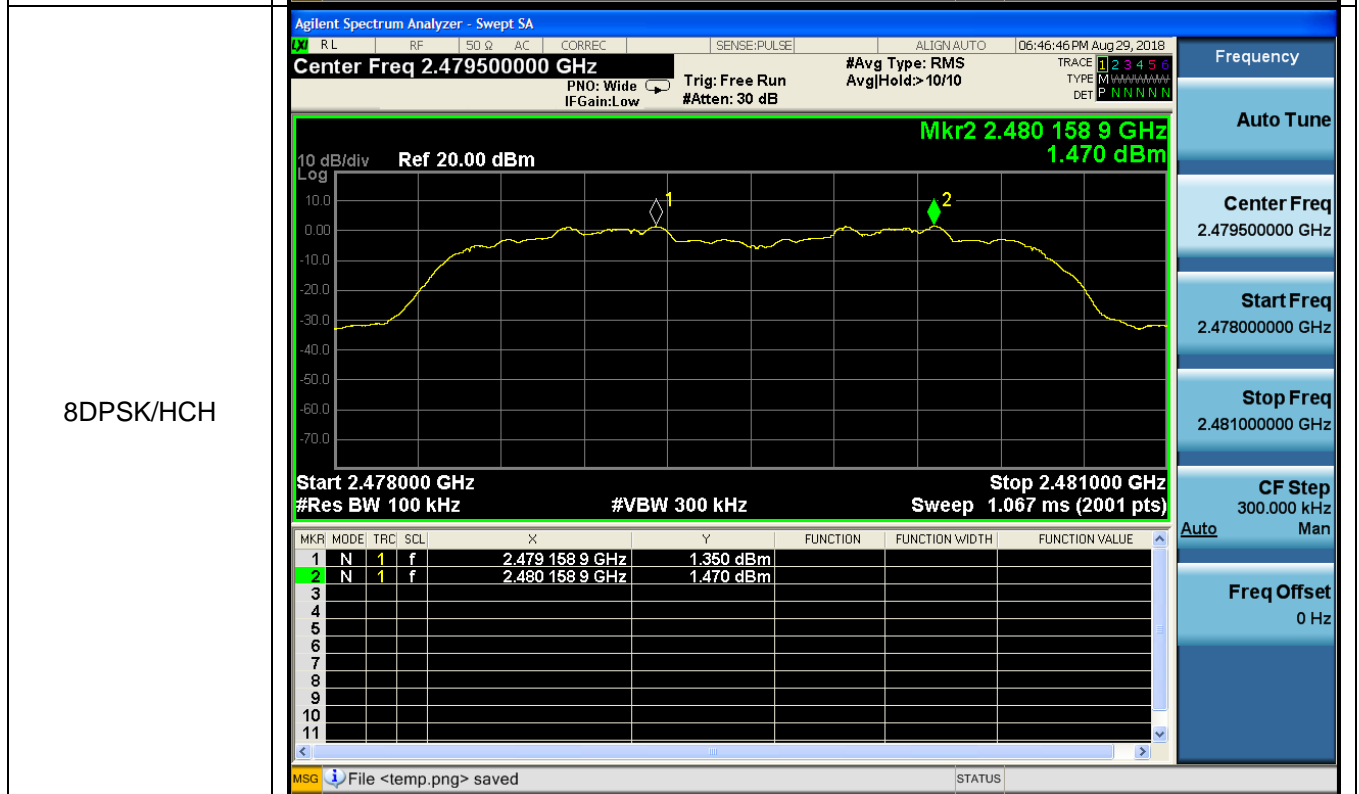
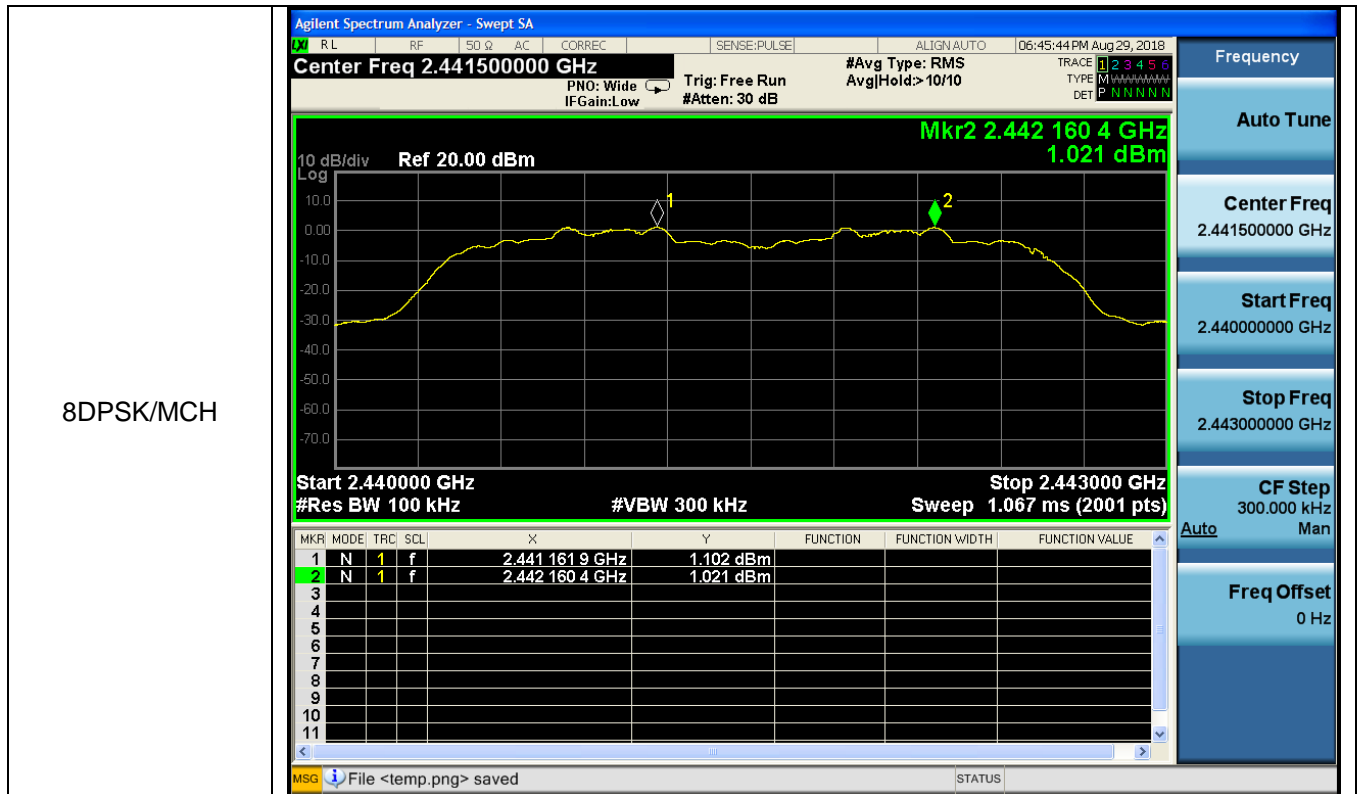








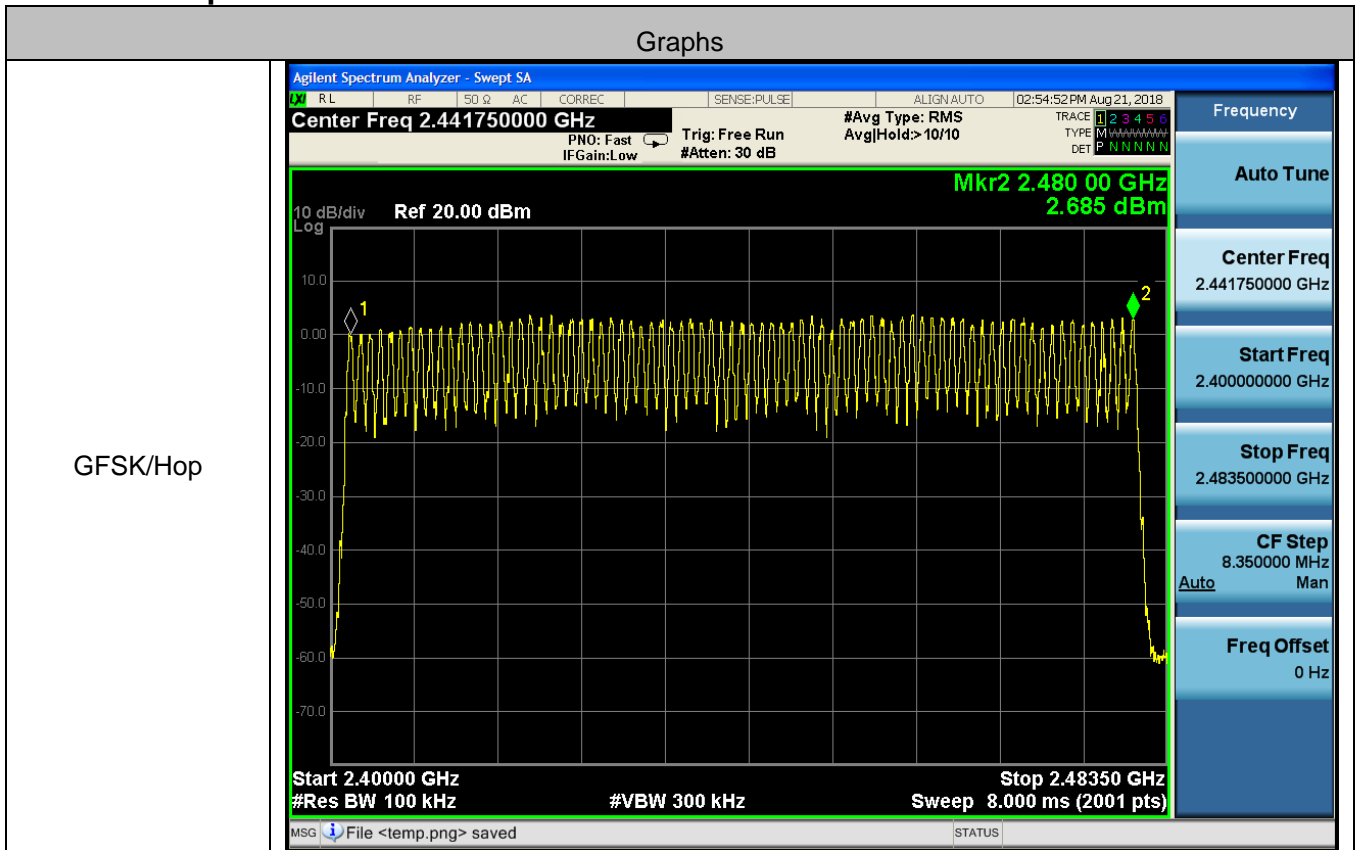


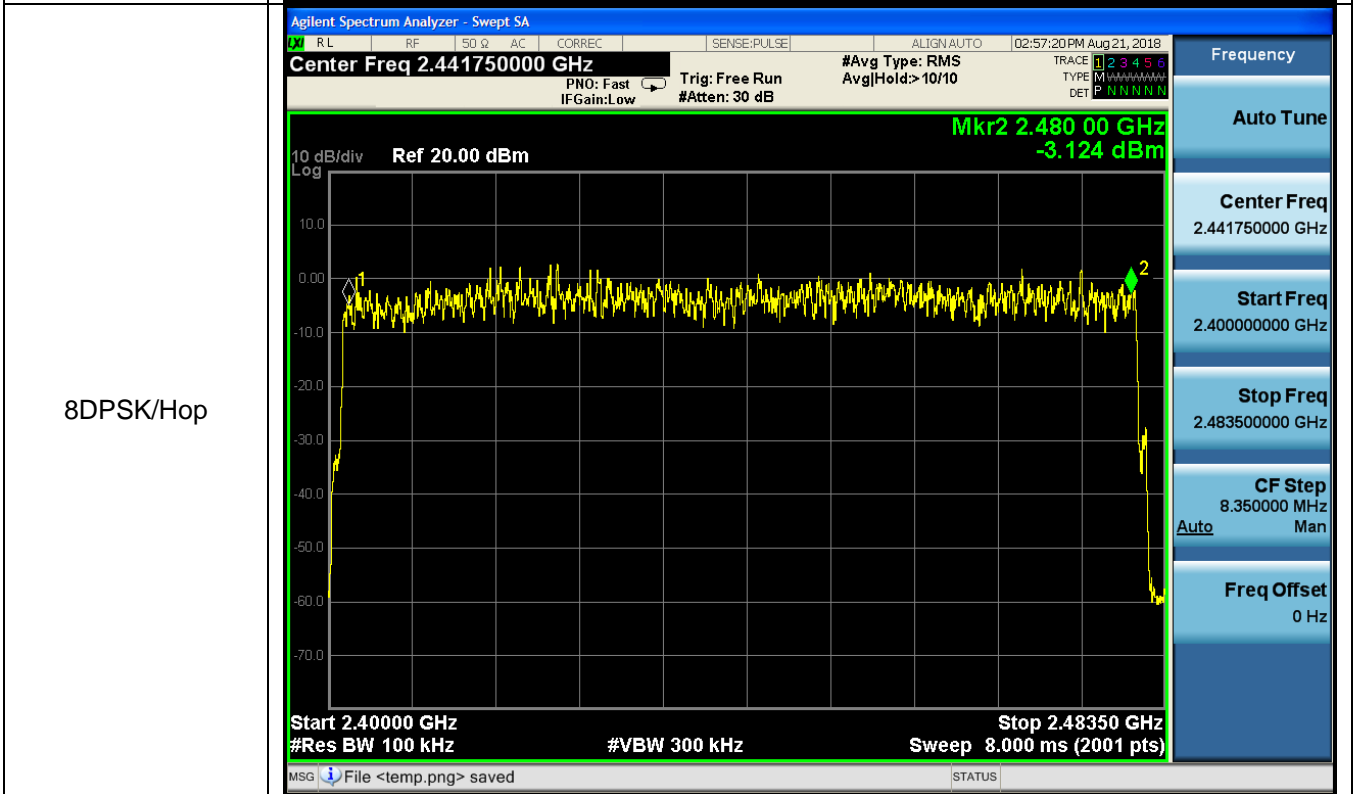
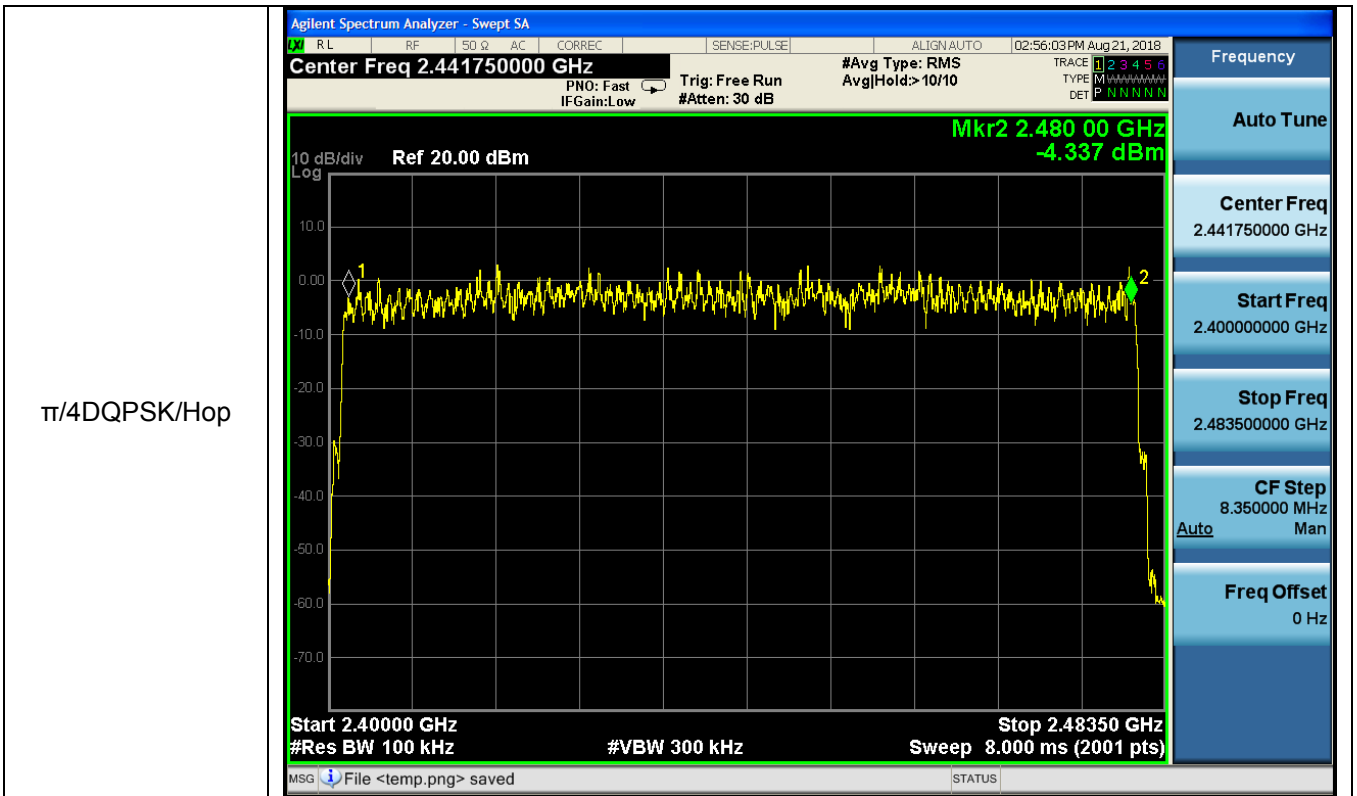


A.4 Hopping Channel Number

Mode	Channel.	Number of Hopping Channel[N]	Limit[N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graph

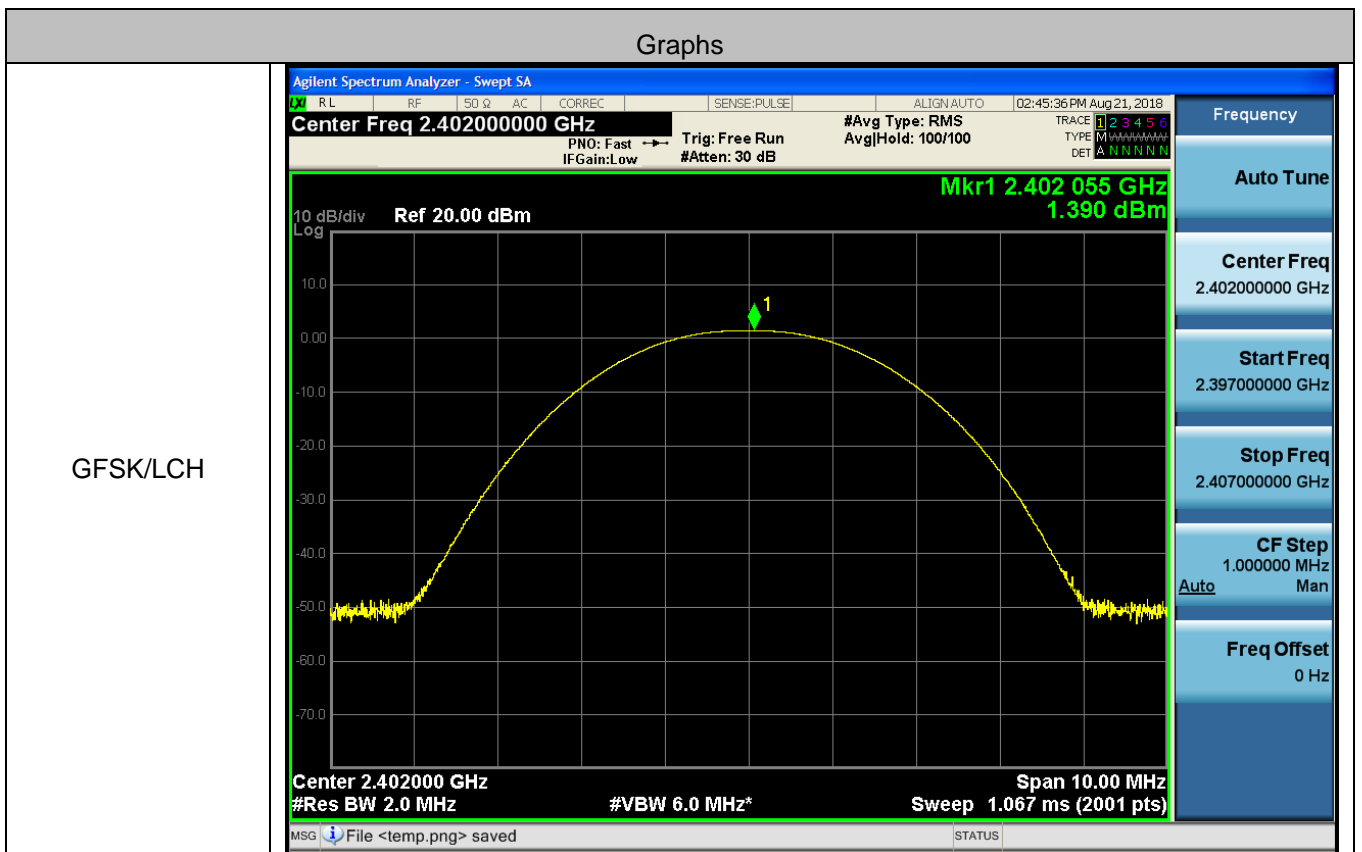


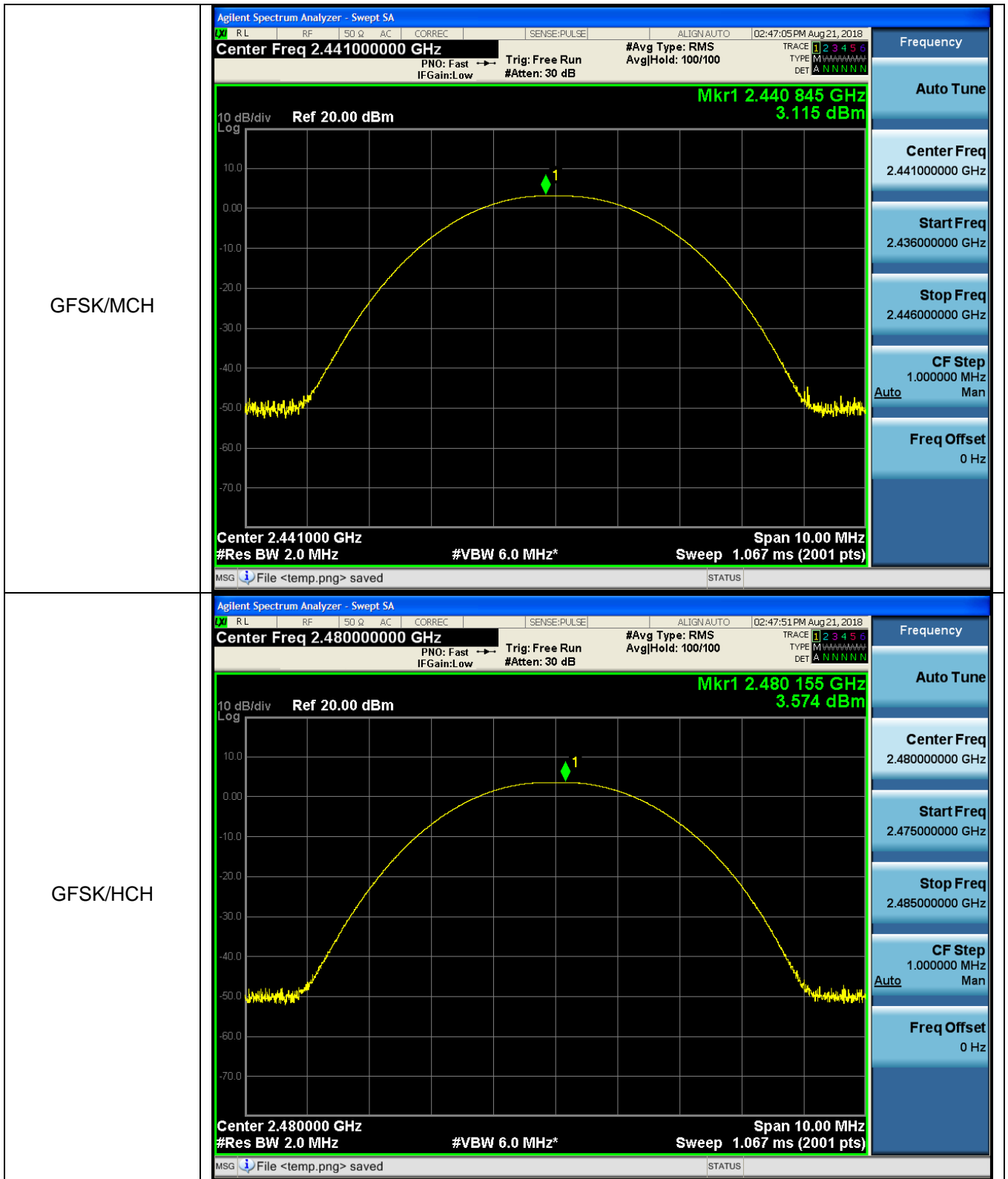


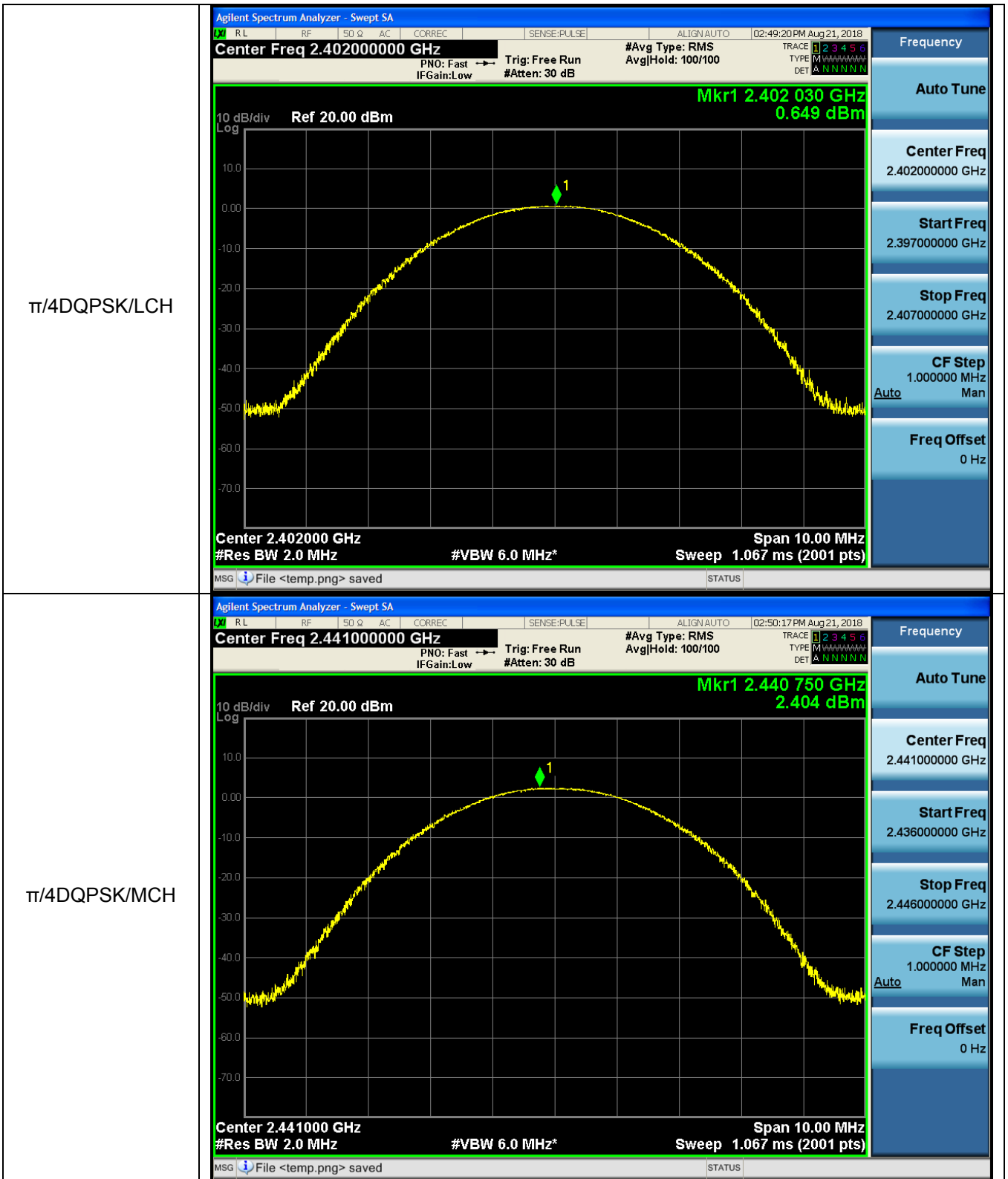
A.5 Conducted Peak Output Power

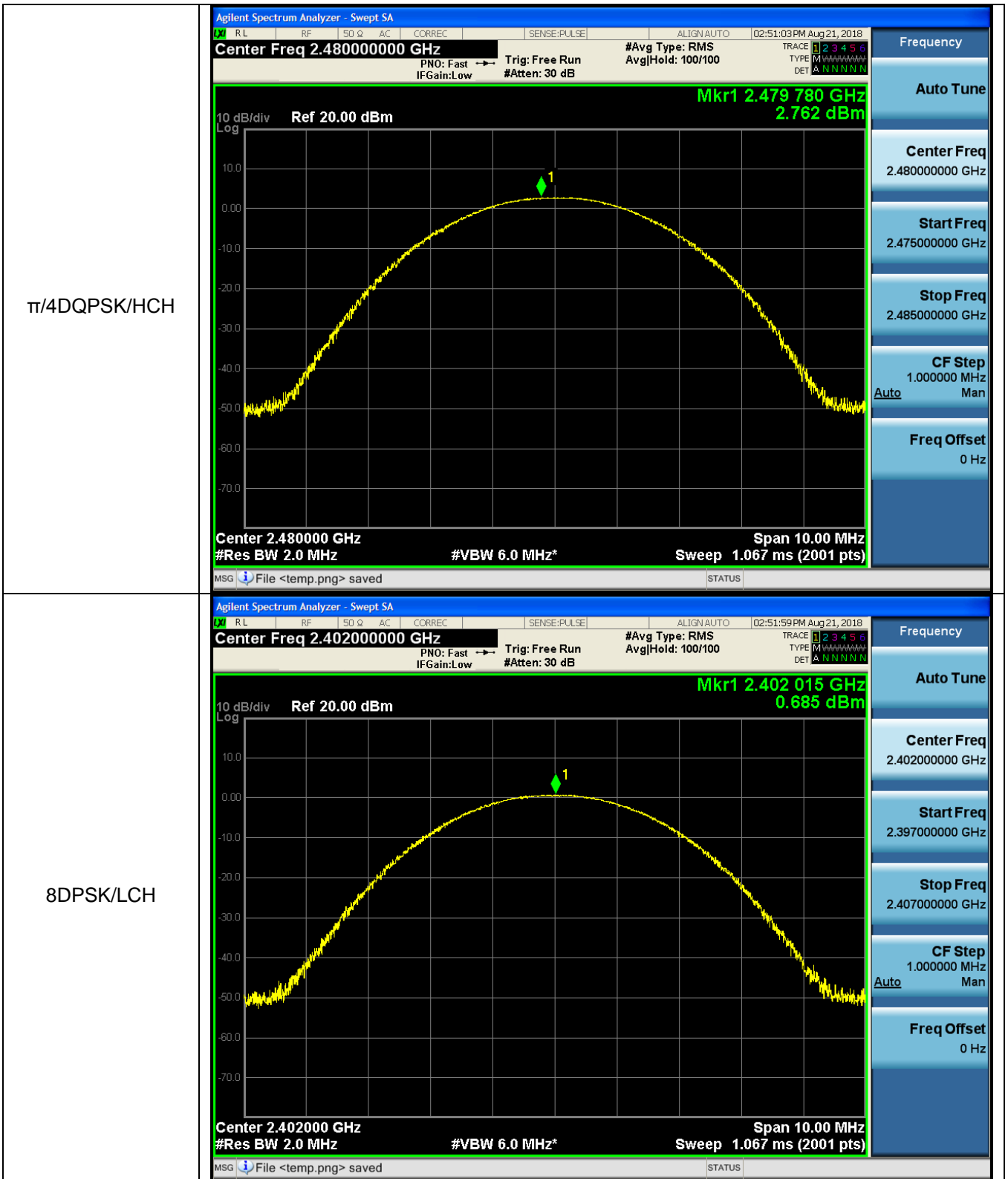
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	1.39	21	PASS
GFSK	MCH	3.12	21	PASS
GFSK	HCH	3.57	21	PASS
$\pi/4$ DQPSK	LCH	0.65	21	PASS
$\pi/4$ DQPSK	MCH	2.40	21	PASS
$\pi/4$ DQPSK	HCH	2.76	21	PASS
8DPSK	LCH	0.69	21	PASS
8DPSK	MCH	2.46	21	PASS
8DPSK	HCH	2.79	21	PASS

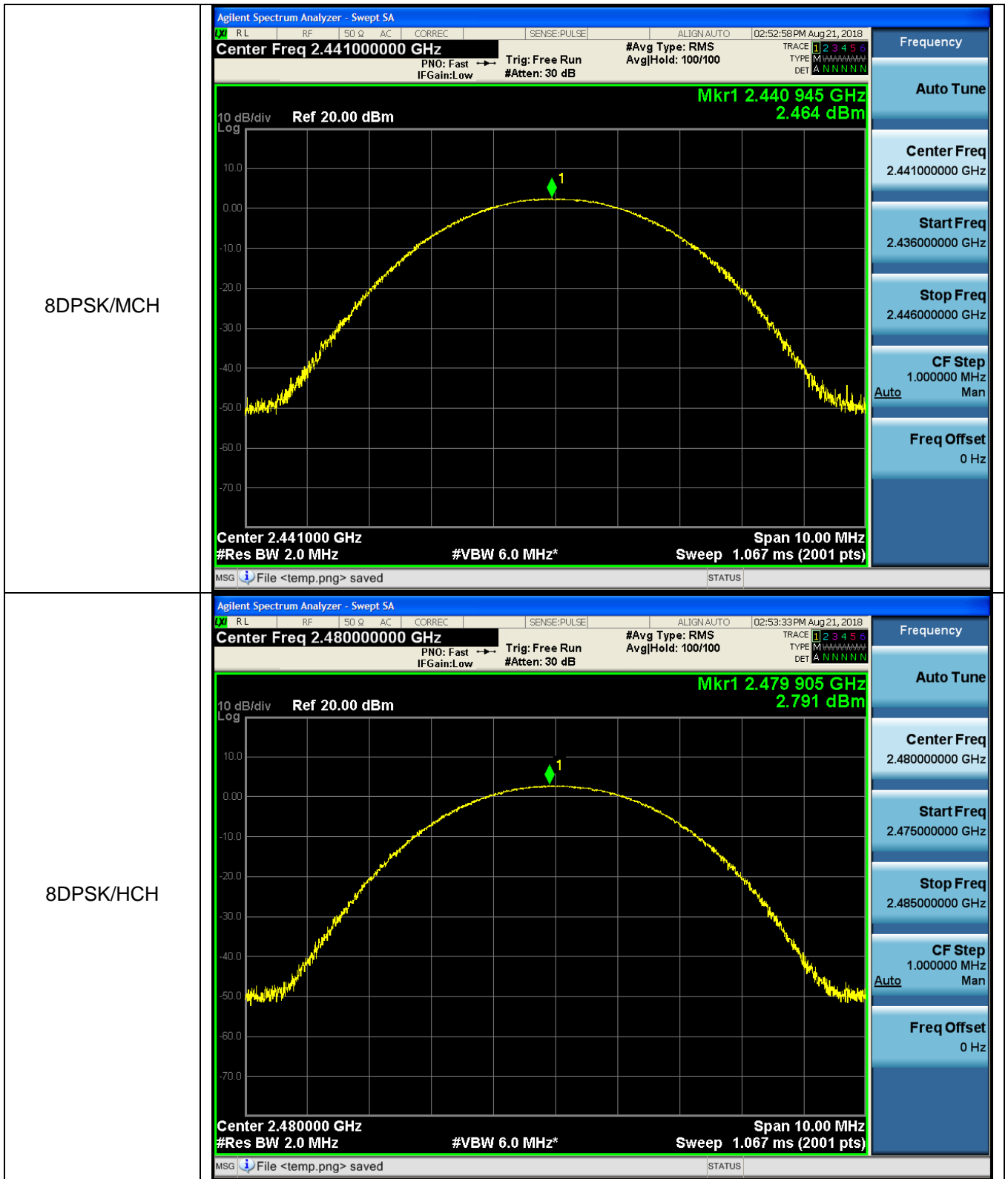
Test Graph







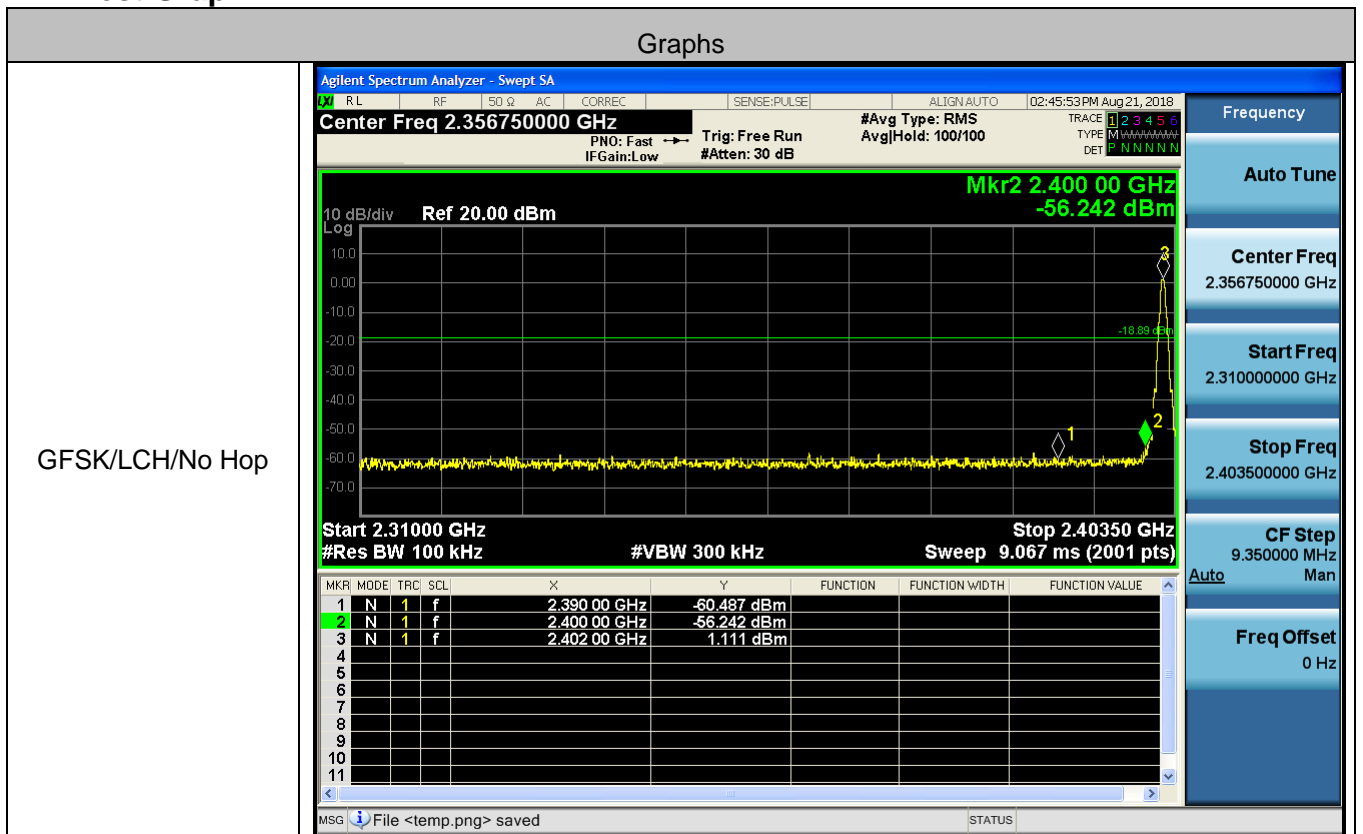


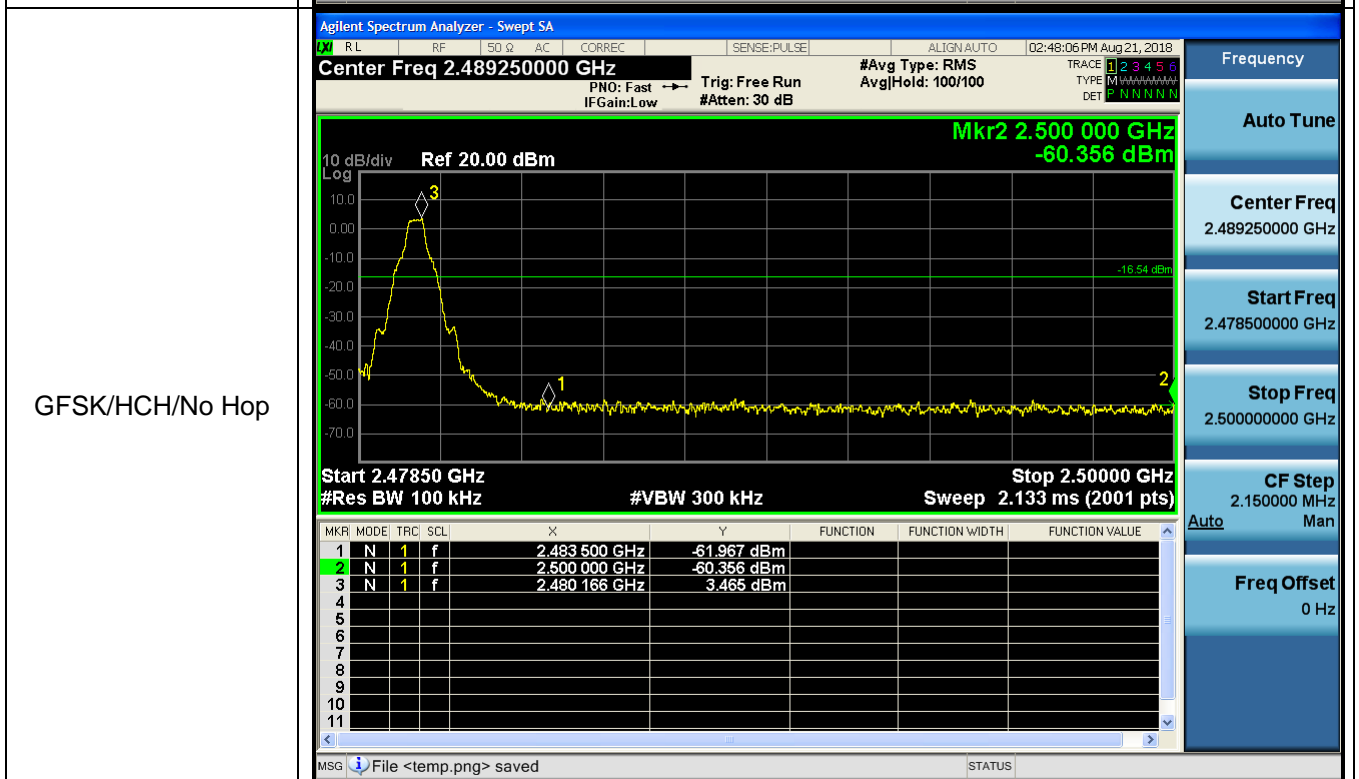
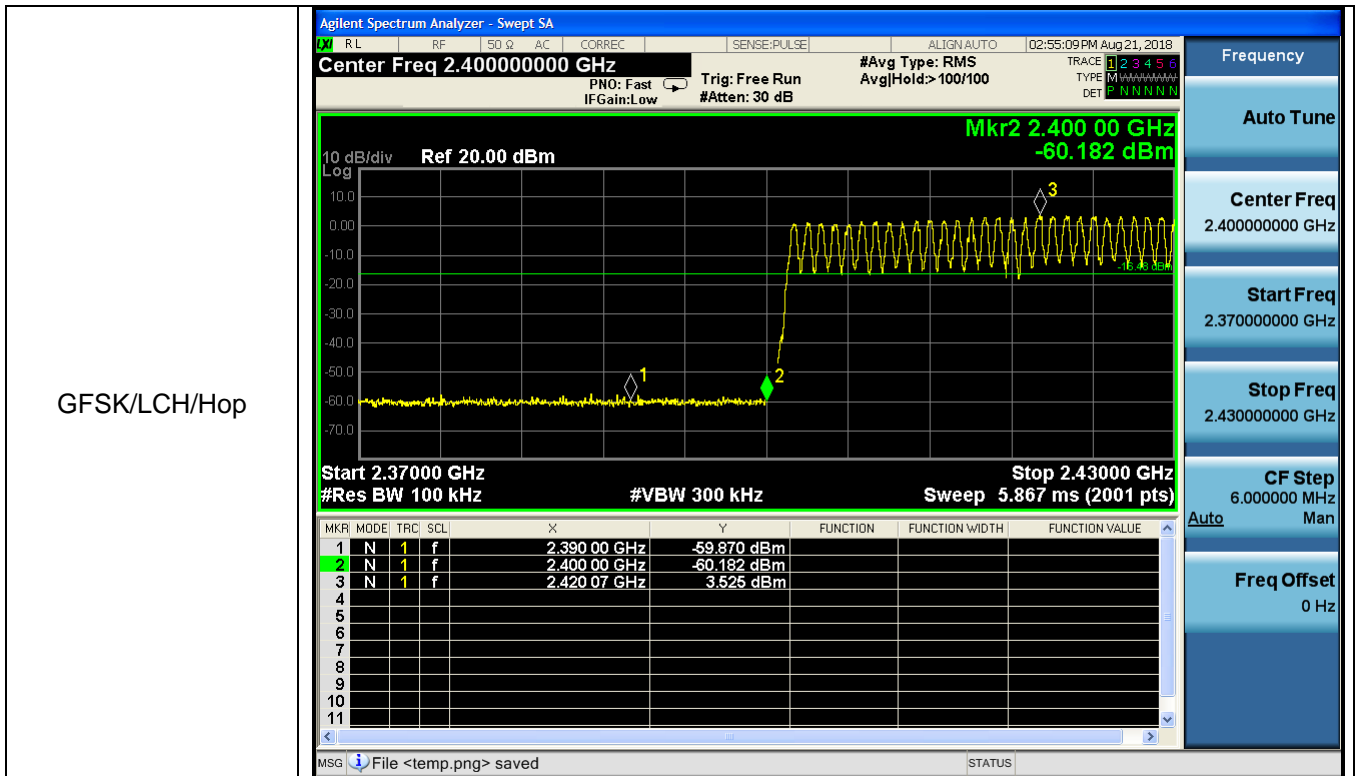


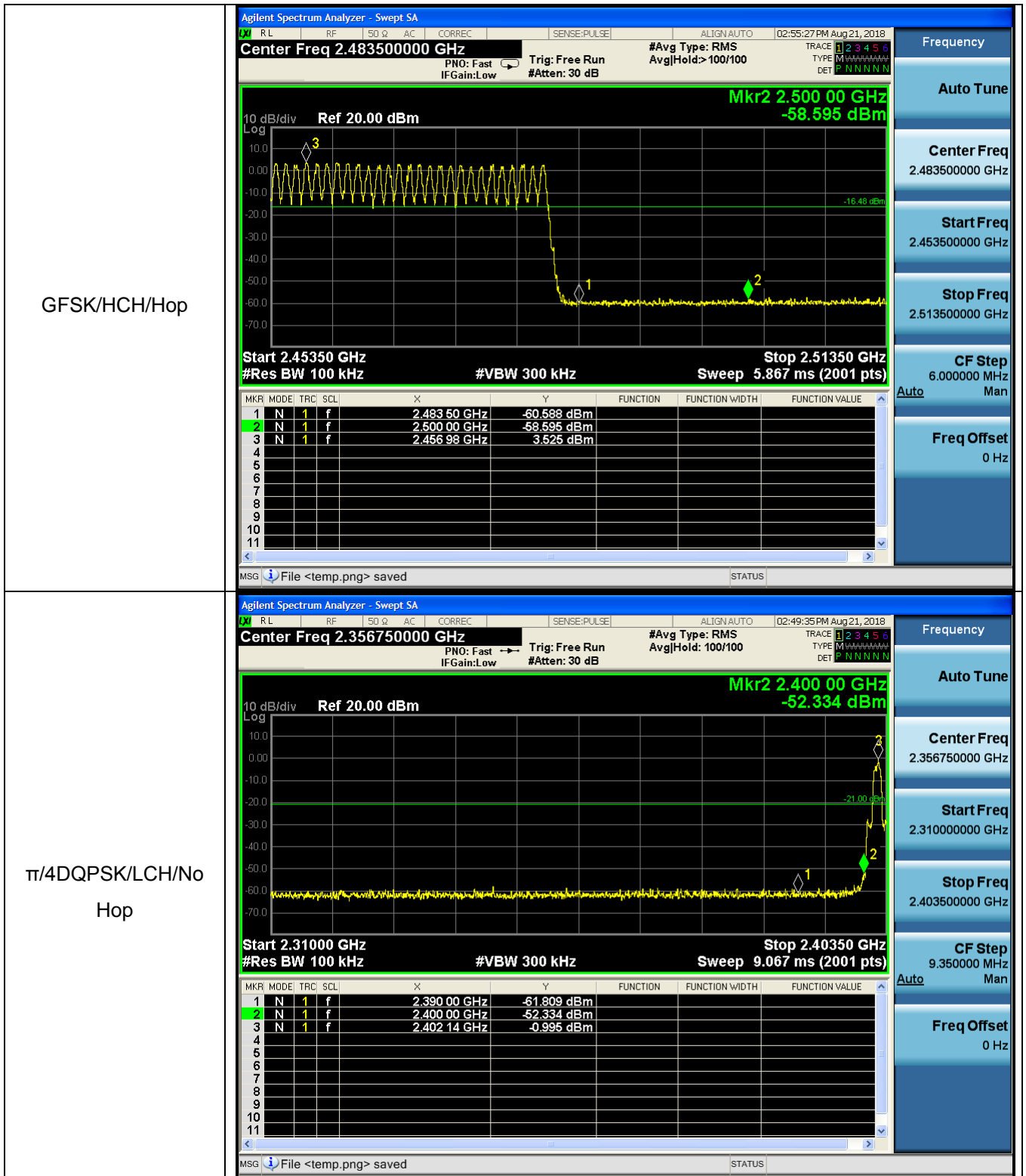
A.6 Band-edge for RF Conducted Emissions

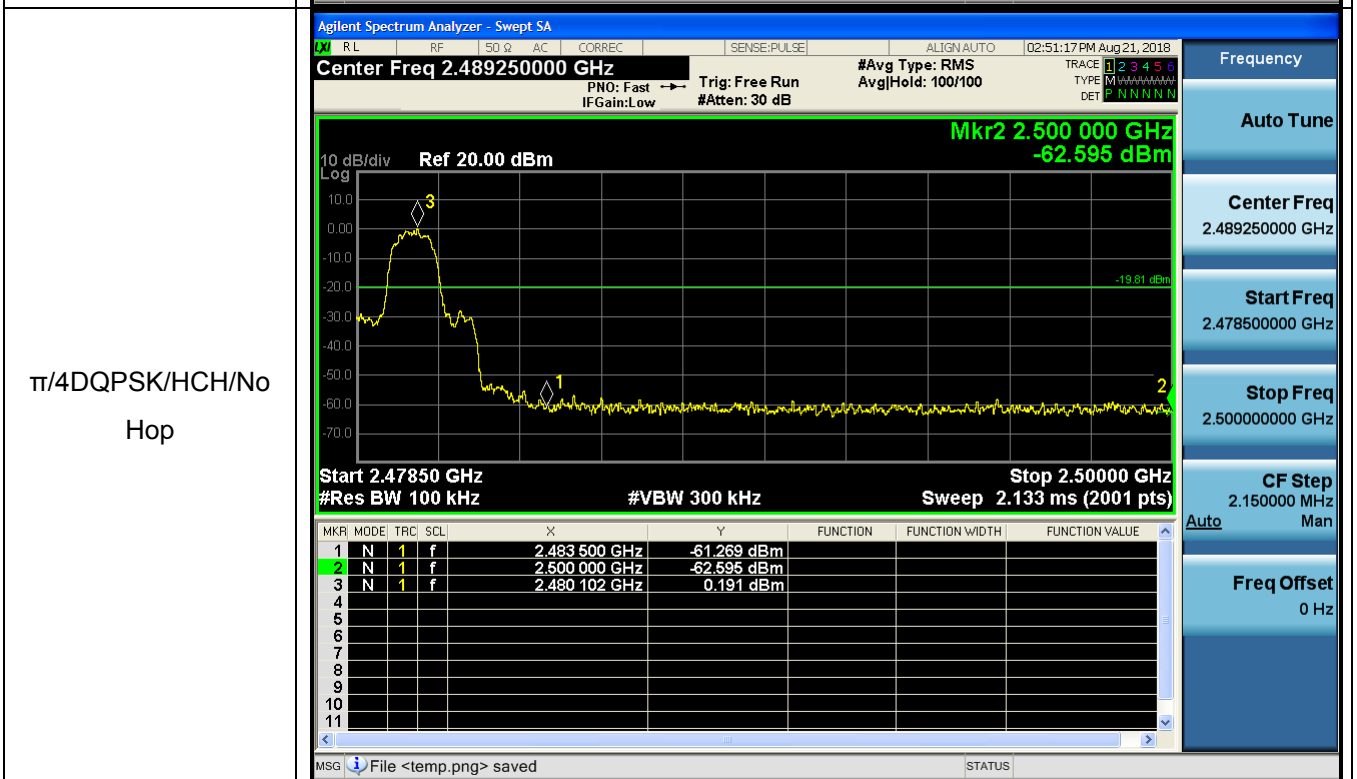
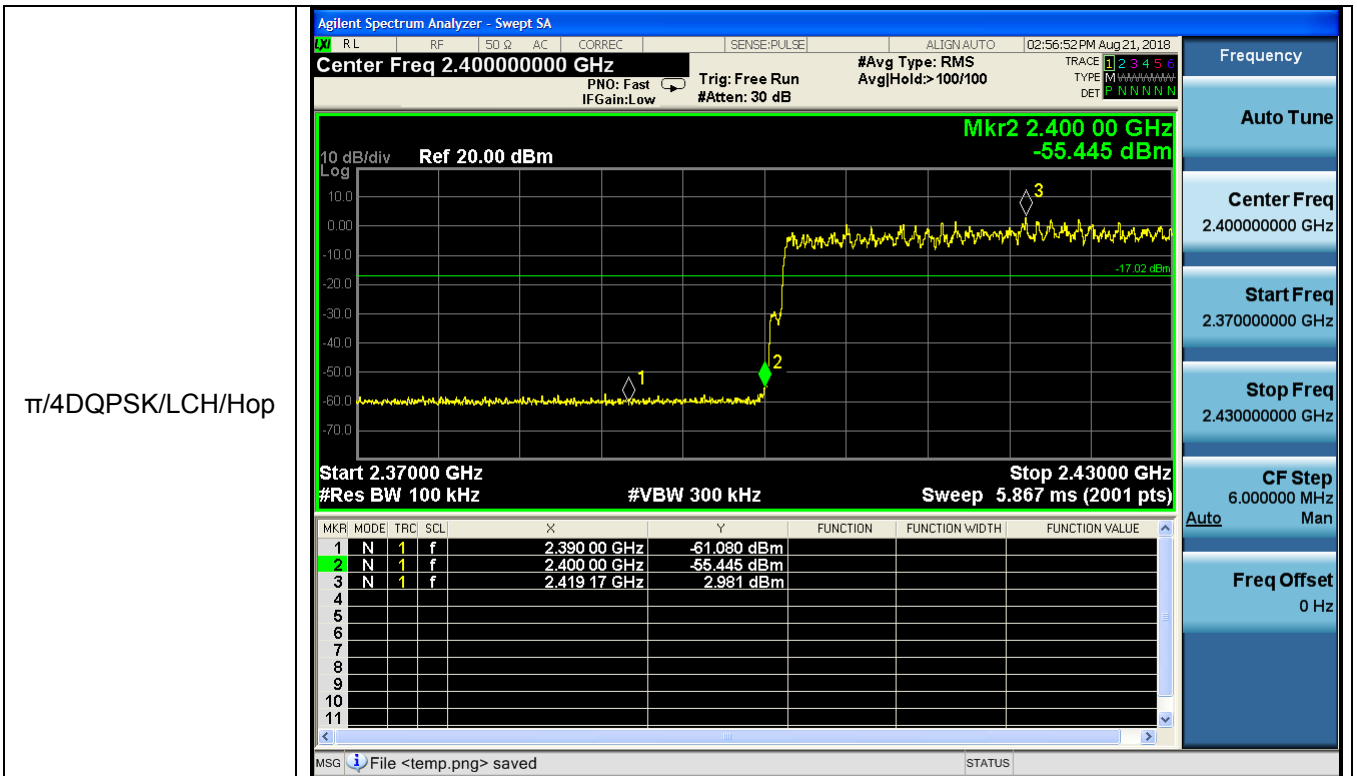
Mode	Channel	Carrier Frequency [MHz]	Frequency Hopping	Carrier Frequency Power [dBm]	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	Off	1.11	-56.24	-18.89	PASS
			On	3.52	-59.87	-16.48	PASS
GFSK	HCH	2480	Off	3.46	-60.36	-16.54	PASS
			On	3.52	-58.60	-16.48	PASS
π/4DQPSK K	LCH	2402	Off	-1.00	-52.33	-21.00	PASS
			On	2.98	-55.44	-17.02	PASS
π/4DQPSK K	HCH	2480	Off	2.27	-53.47	-17.73	PASS
			On	0.19	-61.27	-19.81	PASS
8DPSK	LCH	2402	Off	3.06	-59.10	-16.94	PASS
			On	2.55	-53.95	-17.45	PASS
8DPSK	HCH	2480	Off	0.94	-59.24	-19.06	PASS
			On	2.01	-59.21	-17.99	PASS

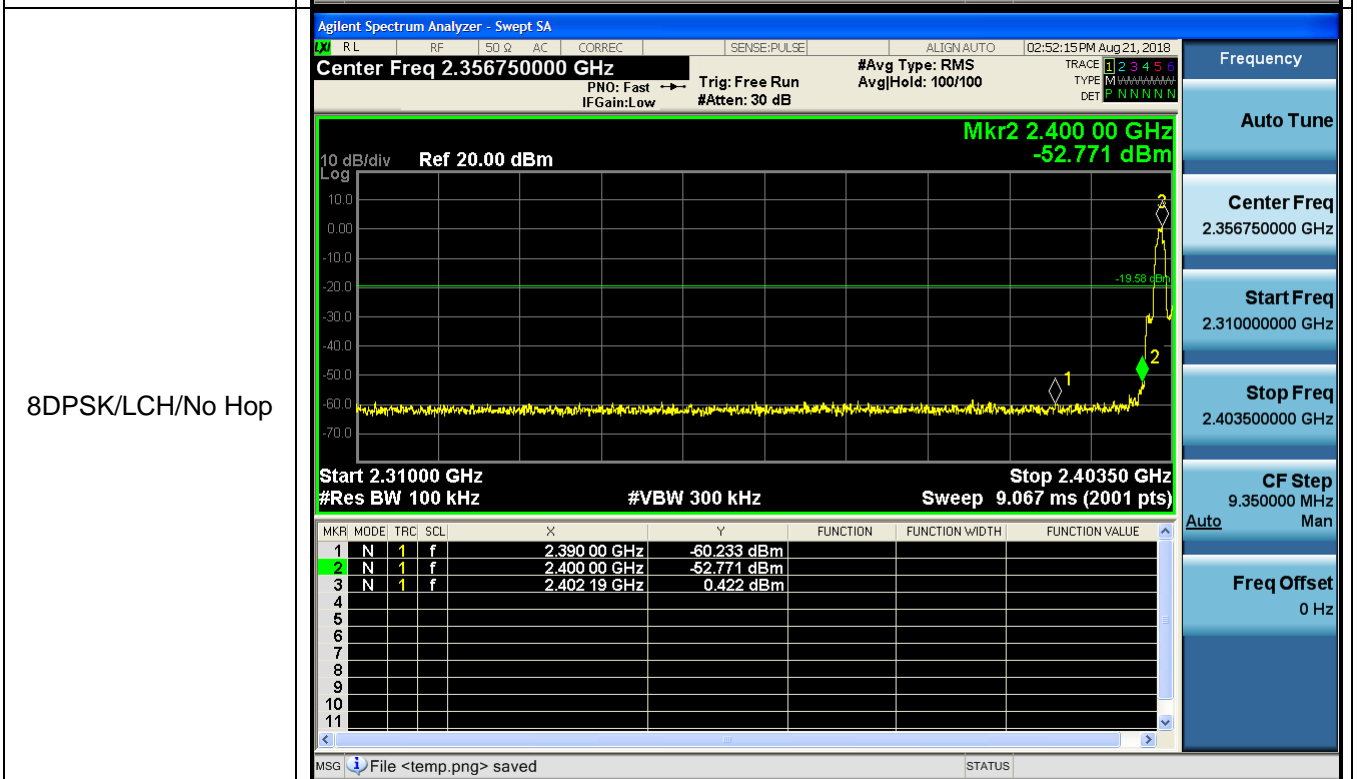
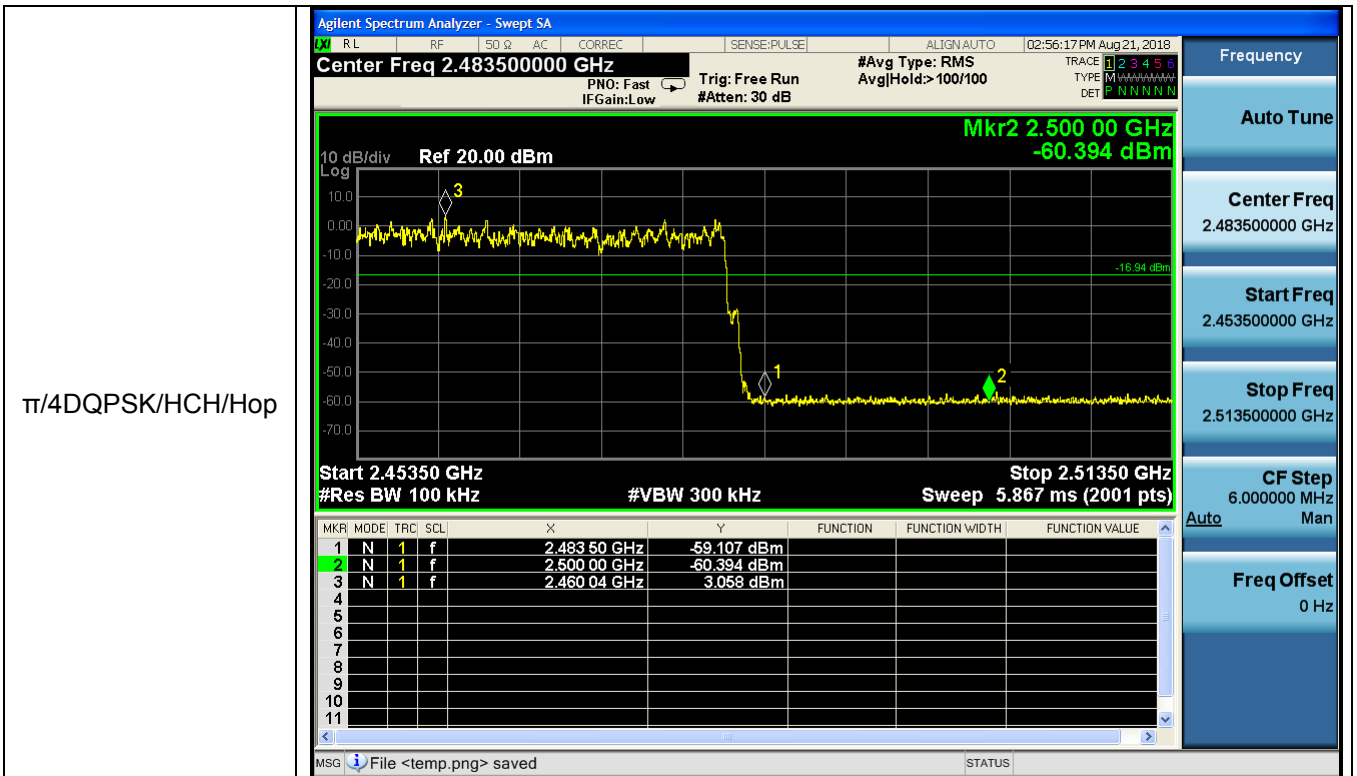
Test Graph

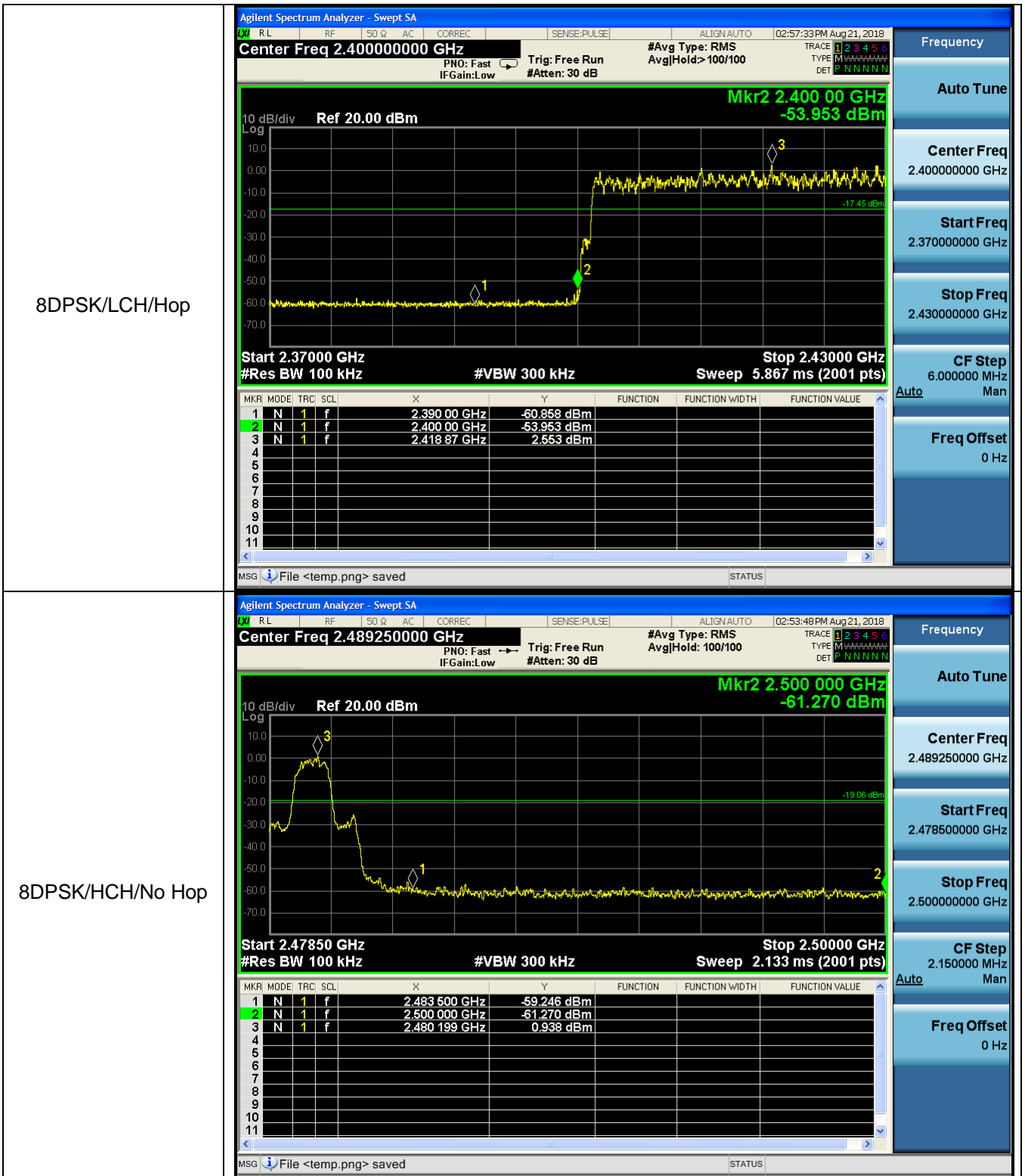


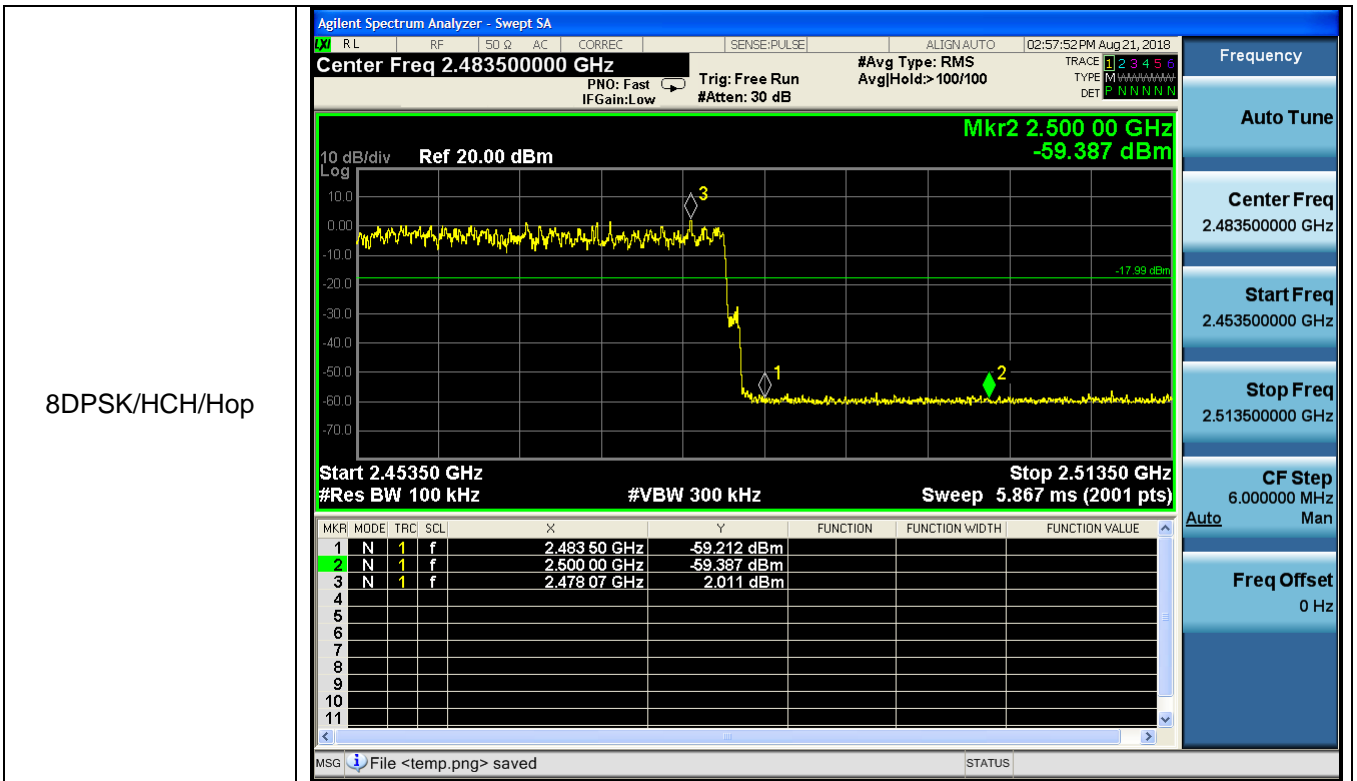




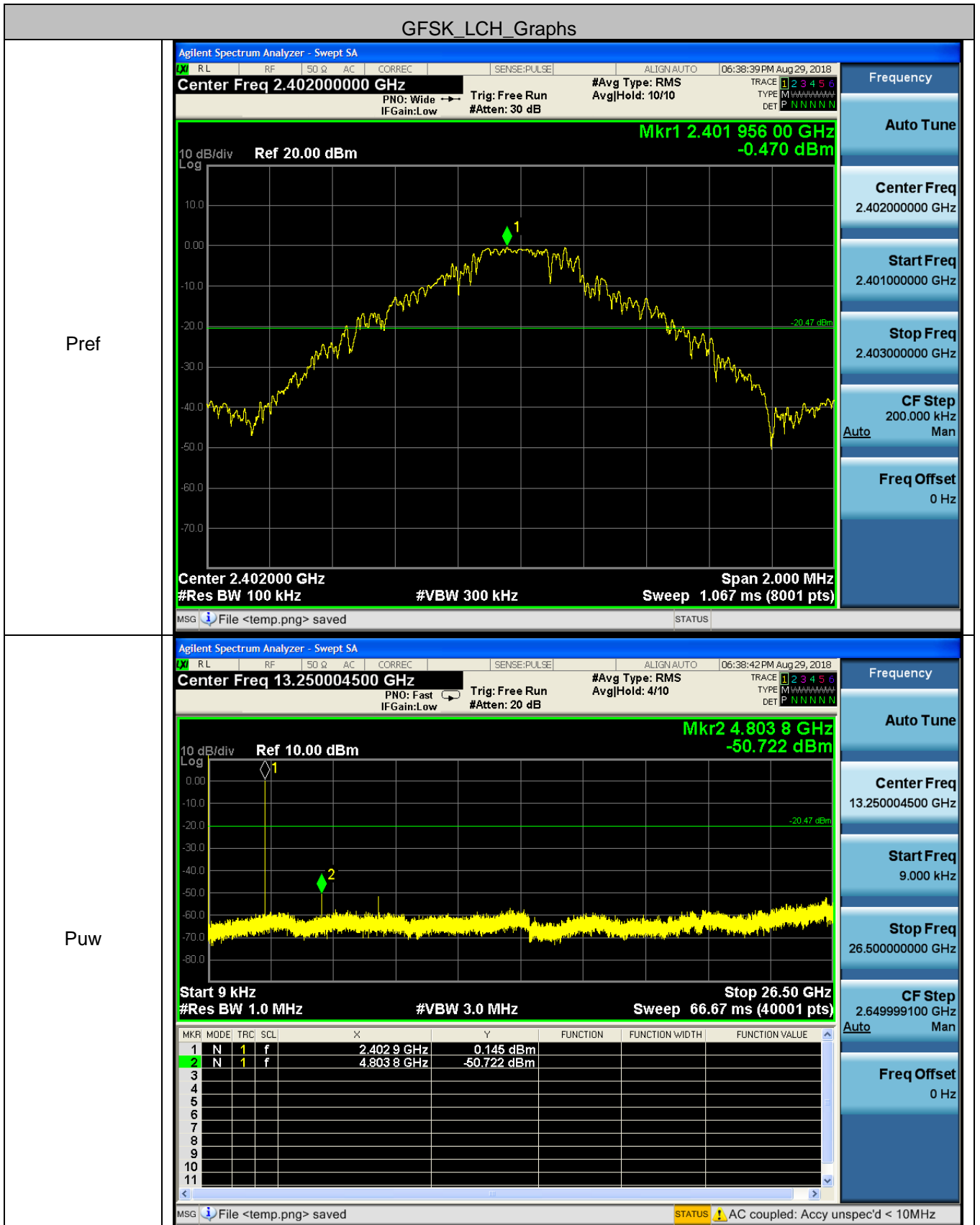




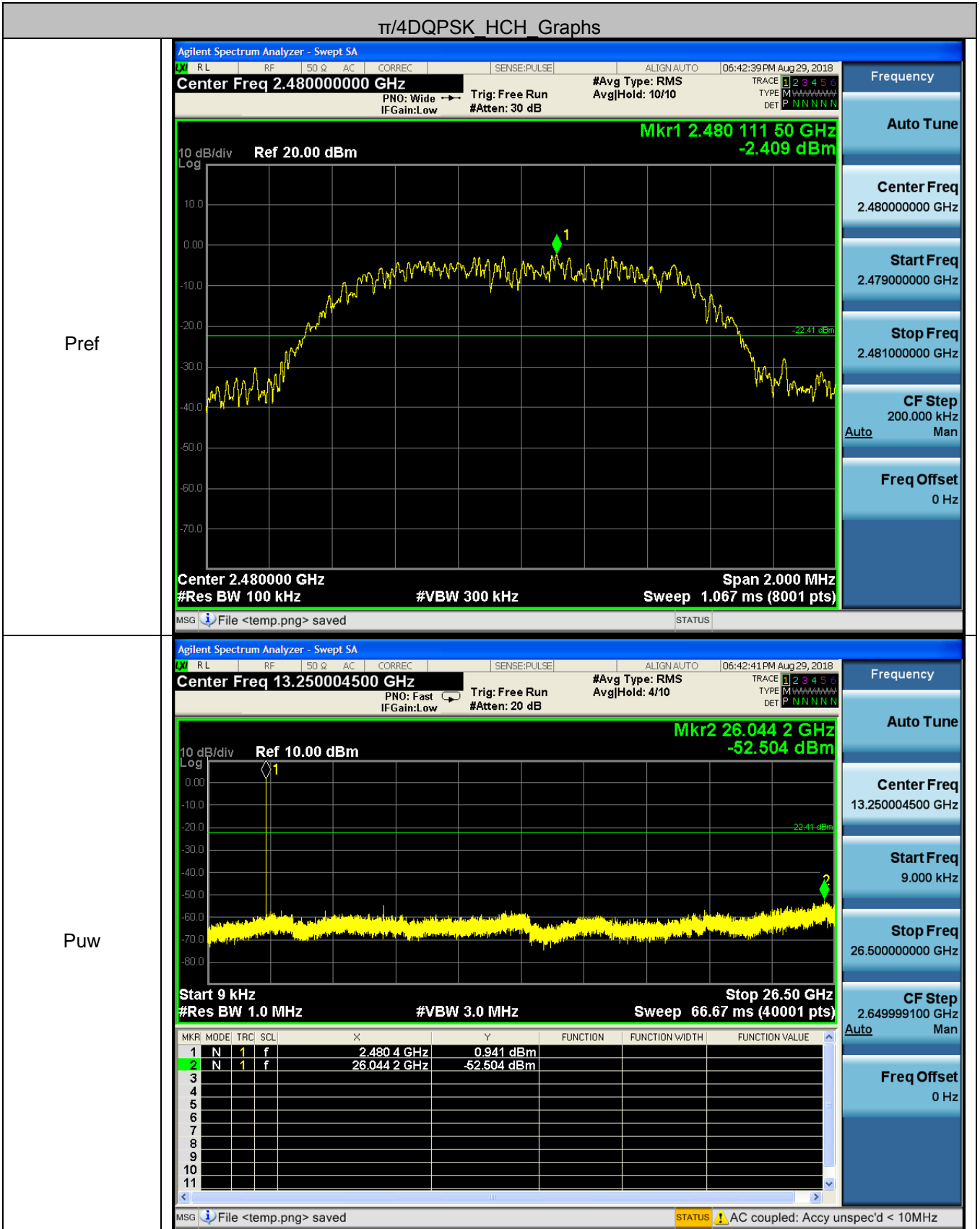




A.7 RF Conducted Spurious Emissions Test Graph



$\pi/4$ DQPSK HCH Graphs



8DPSK_LCH_Graphs

Pref

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 06:43:44 PM Aug 29, 2018
TRACE 1 2 3 4 5 6
TYPE M W W W W W W W W W
DET P N N N N N N

Center Freq 2.40200000 GHz

PNO: Wide → IFGain:Low
Trig: Free Run #Atten: 30 dB
#Avg Type: RMS AvgHold: 10/10

10 dB/div Log
Ref 20.00 dBm
Mkr1 2.401 925 00 GHz
-4.117 dBm

Center 2.402000 GHz #Res BW 100 kHz
#VBW 300 kHz
Span 2.000 MHz Sweep 1.067 ms (8001 pts)

MSG File <temp.png> saved STATUS

Frequency

Auto Tune

Center Freq
2.402000000 GHz

Start Freq
2.401000000 GHz

Stop Freq
2.403000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw

Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 06:43:46 PM Aug 29, 2018
TRACE 1 2 3 4 5 6
TYPE M W W W W W W W W W
DET P N N N N N N

Center Freq 13.250004500 GHz

PNO: Fast IFGain:Low
Trig: Free Run #Atten: 20 dB
#Avg Type: RMS AvgHold: 4/10

10 dB/div Log
Ref 10.00 dBm
Mkr2 26.103 8 GHz
-52.103 dBm

Start 9 kHz #Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 26.50 GHz Sweep 66.67 ms (40001 pts)

MSG File <temp.png> saved STATUS

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

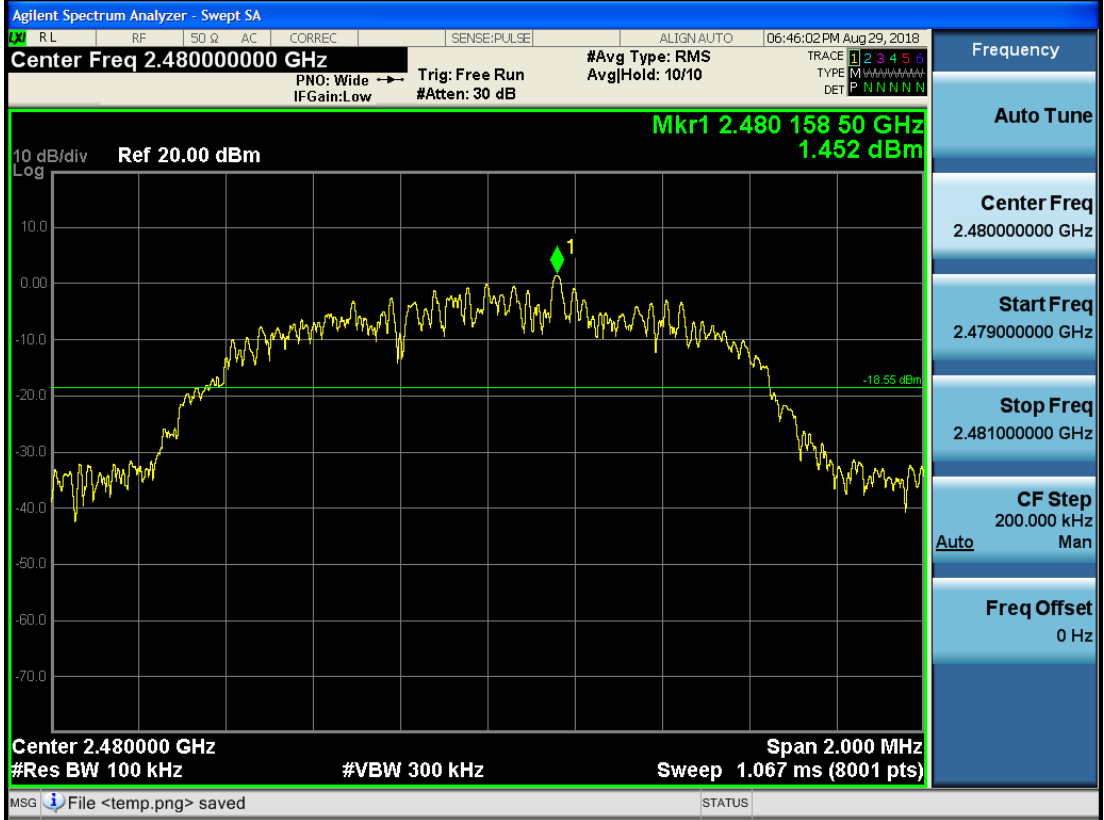
Freq Offset
0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 2 GHz	-1.401 dBm			
2	N	1	f	26.103 8 GHz	-52.103 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

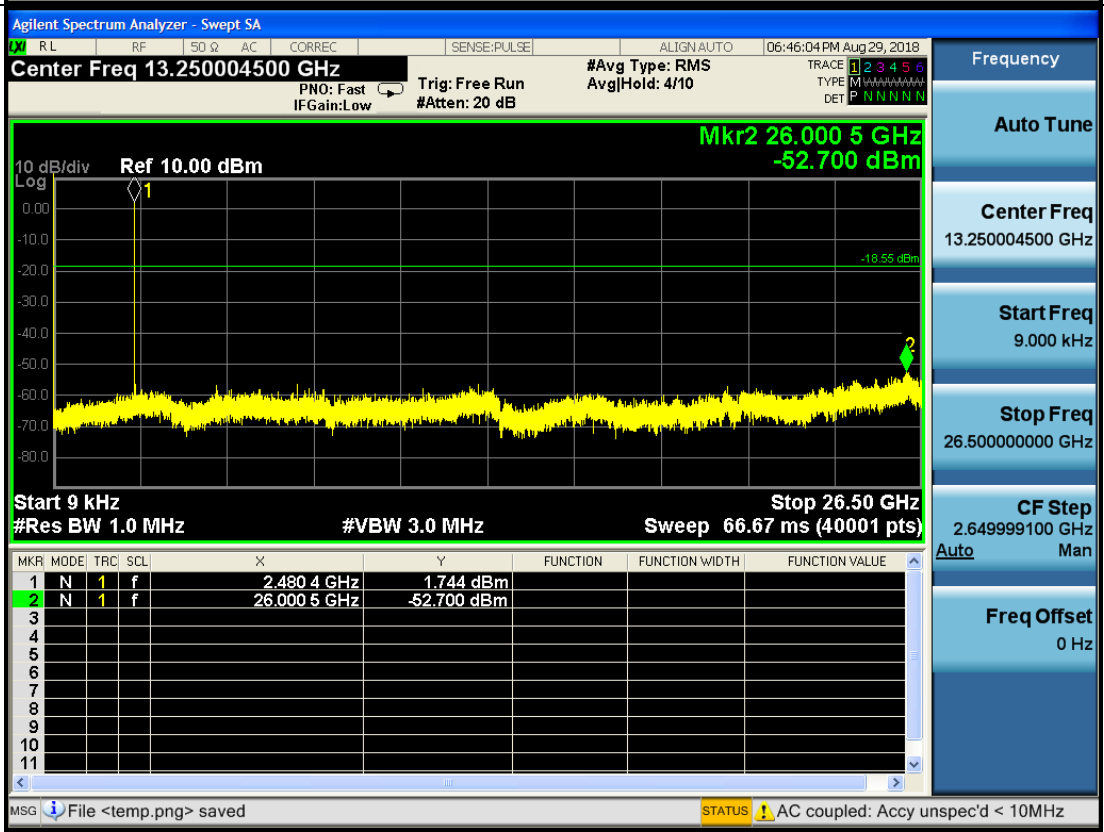
MSG File <temp.png> saved STATUS AC coupled: Accy unspec'd < 10MHz

8DPSK_HCH_Graphs

Pref



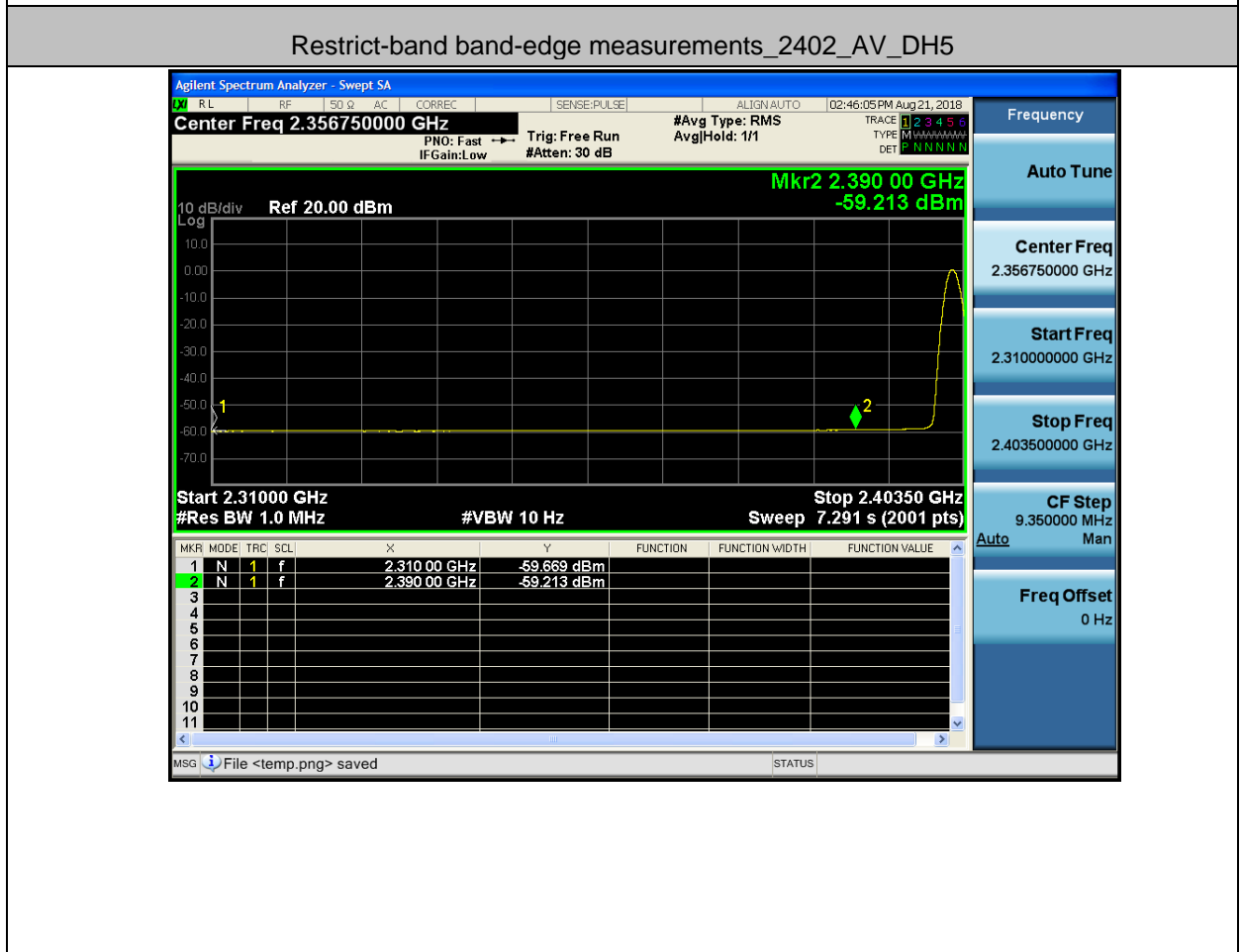
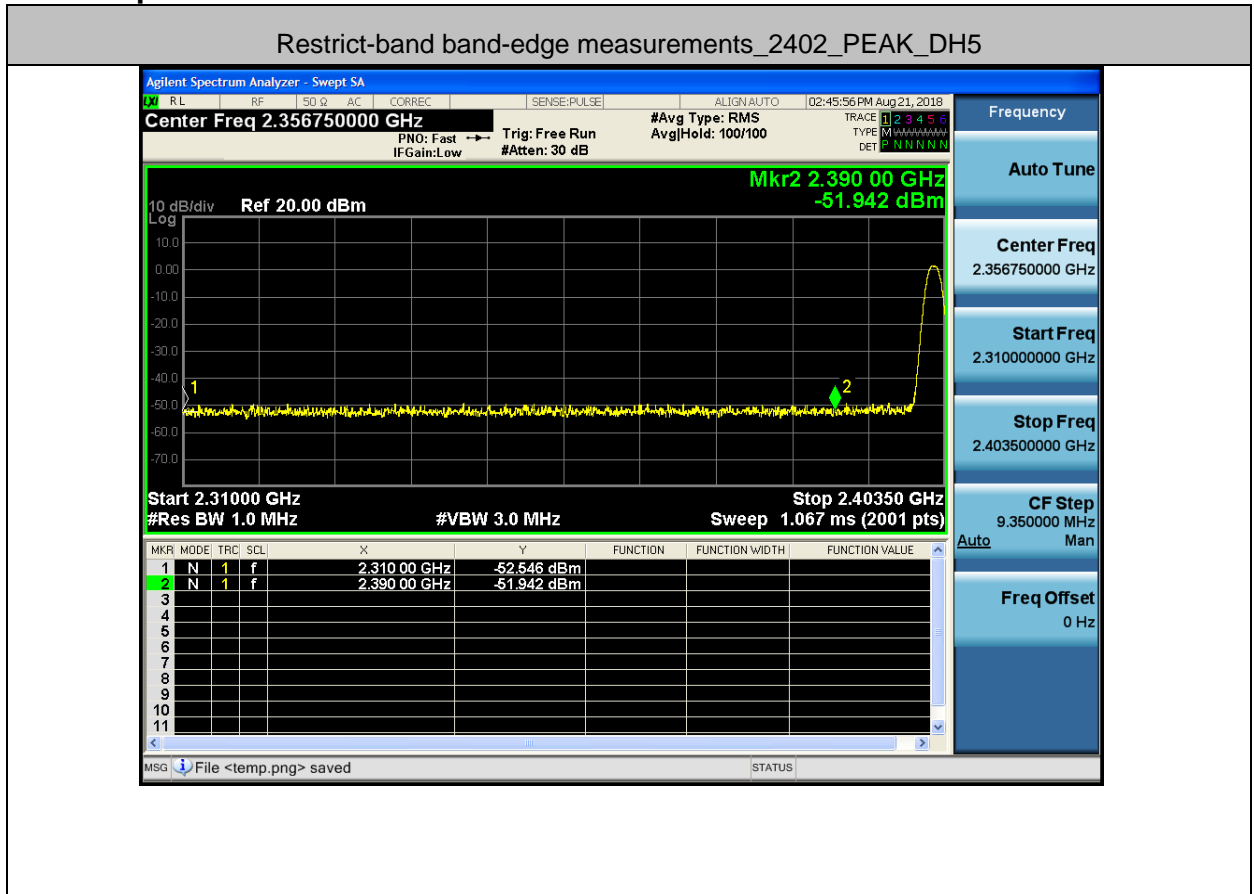
Puw



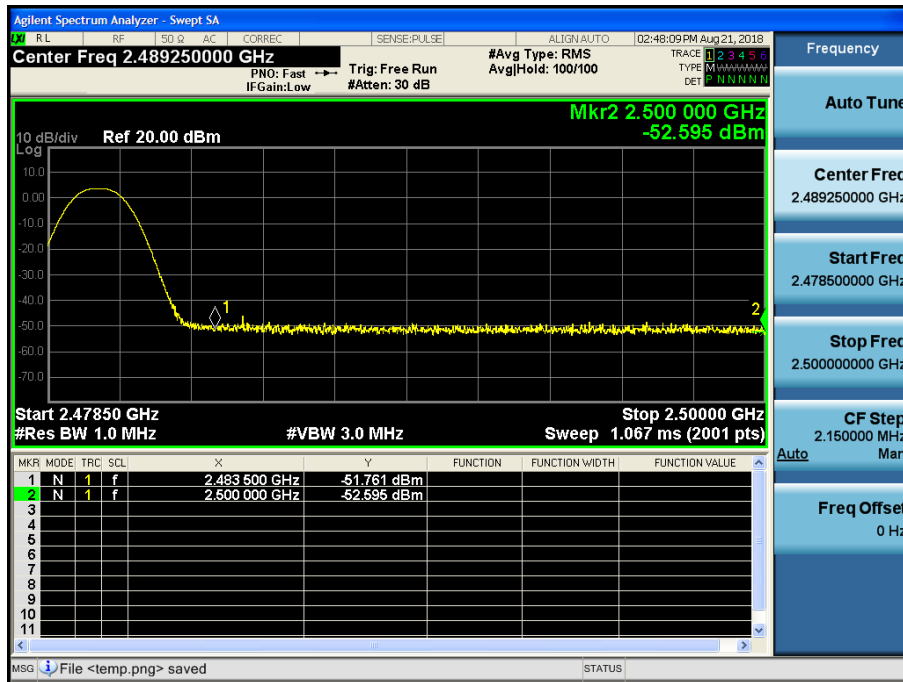
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detect or	Limit [dBuV/m]	Verdi
GFSK	Off	2310.0-2390.0	-51.94	2.00	0	45.26	PEAK	74	PASS
	Off	2310.0-2390.0	-59.21	2.00	0	37.99	AV	54	PASS
	Off	2483.5-2500.0	-51.76	2.00	0	45.44	PEAK	74	PASS
	Off	2483.5-2500.0	-55.34	2.00	0	41.86	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0-2390.0	-51.22	2.00	0	45.98	PEAK	74	PASS
	Off	2310.0-2390.0	-59.16	2.00	0	38.04	AV	54	PASS
	Off	2483.5-2500.0	-49.18	2.00	0	48.02	PEAK	74	PASS
	Off	2483.5-2500.0	-54.4	2.00	0	42.80	AV	54	PASS
8DPSK	Off	2310.0-2390.0	-51.38	2.00	0	45.82	PEAK	74	PASS
	Off	2310.0-2390.0	-59.19	2.00	0	38.01	AV	54	PASS
	Off	2483.5-2500.0	-49.71	2.00	0	47.49	PEAK	74	PASS
	Off	2483.5-2500.0	-54.25	2.00	0	42.95	AV	54	PASS

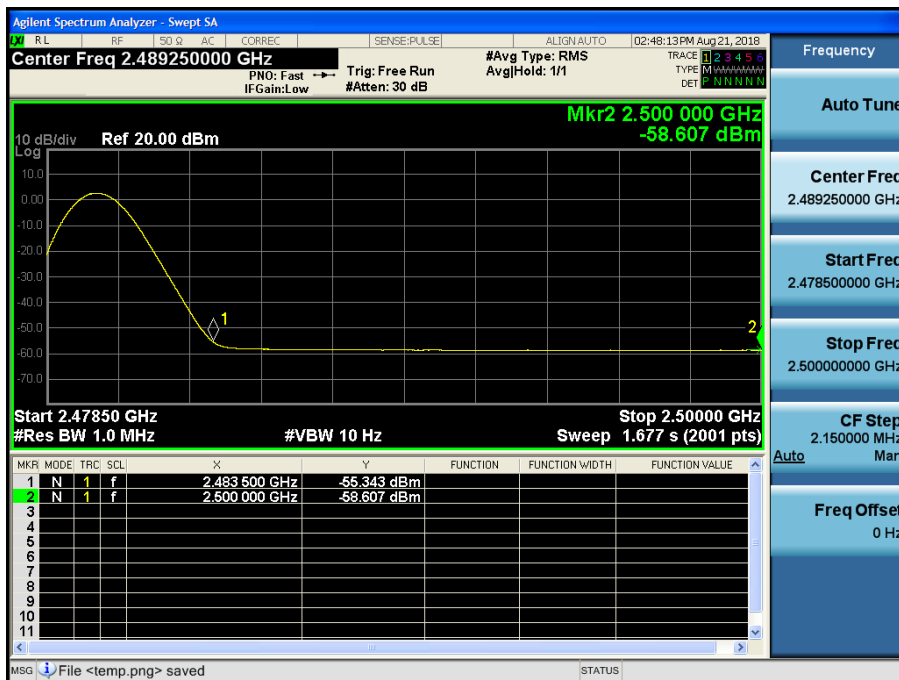
Test Graph



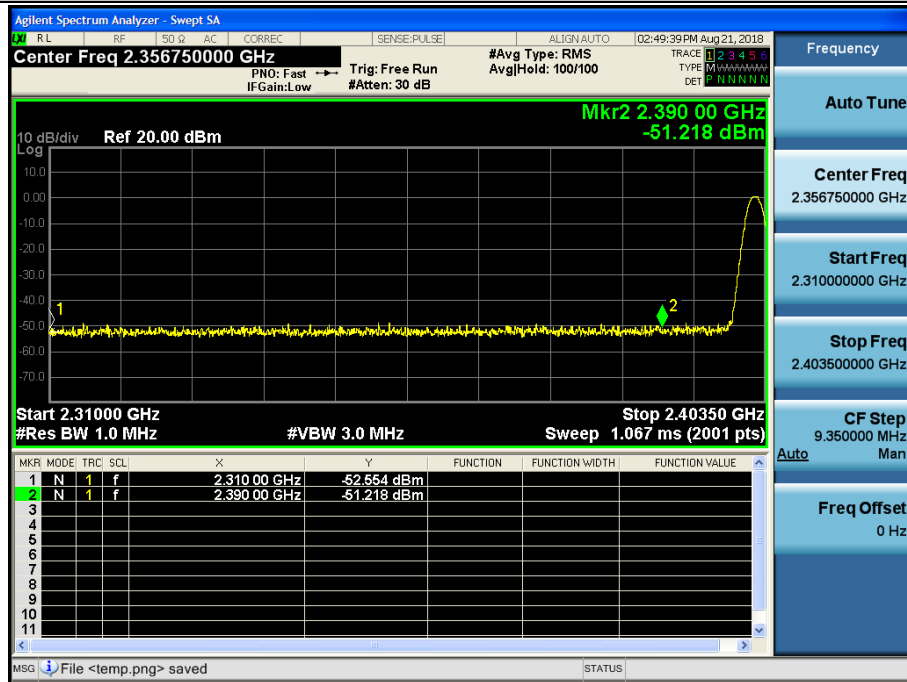
Restrict-band band-edge measurements_2480_PEAK_DH5



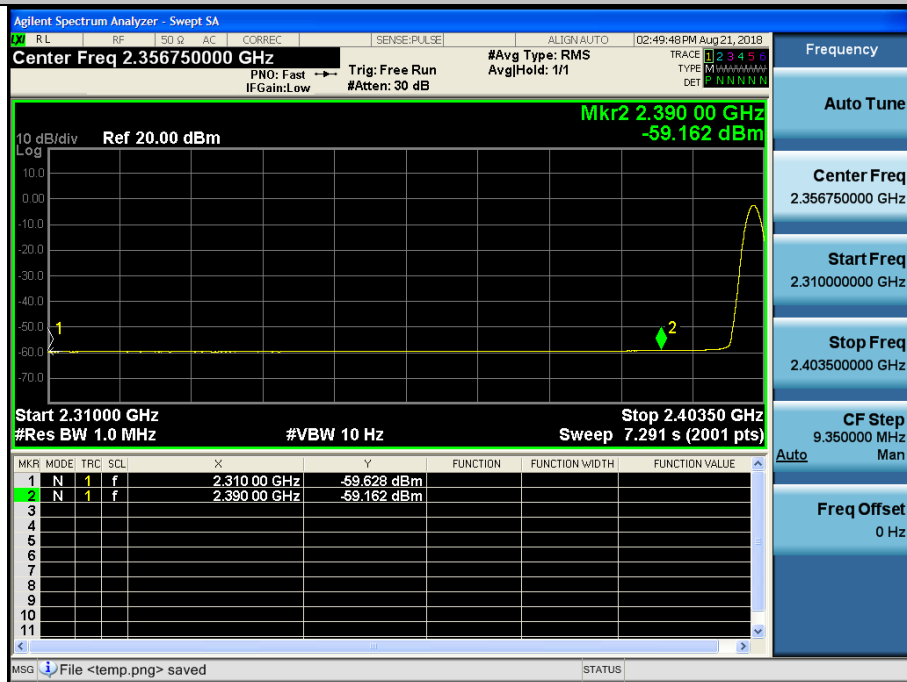
Restrict-band band-edge measurements_2480_AV_DH5



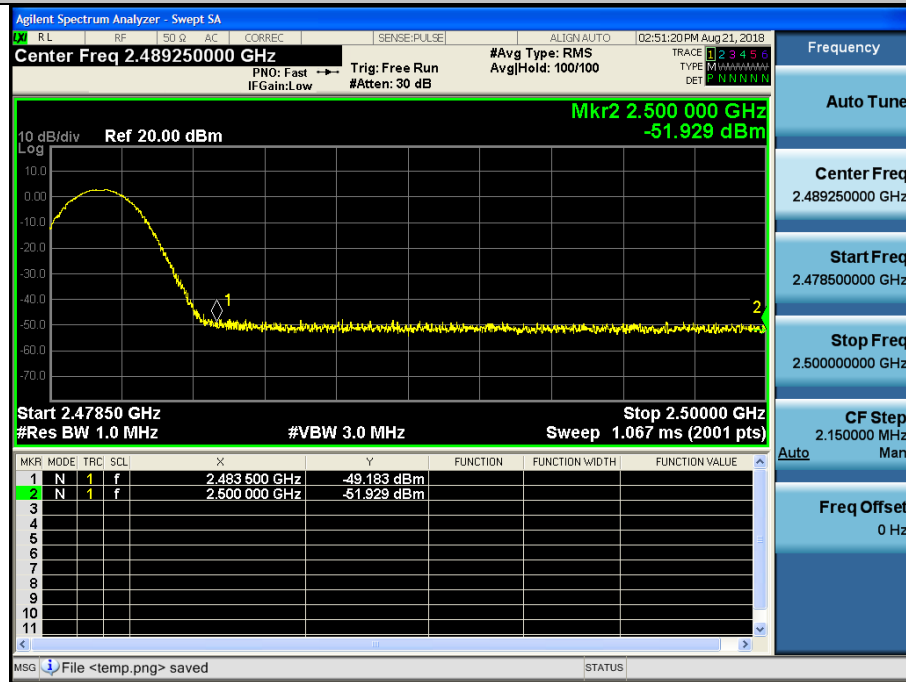
Restrict-band band-edge measurements_2402_PEAK_2DH5



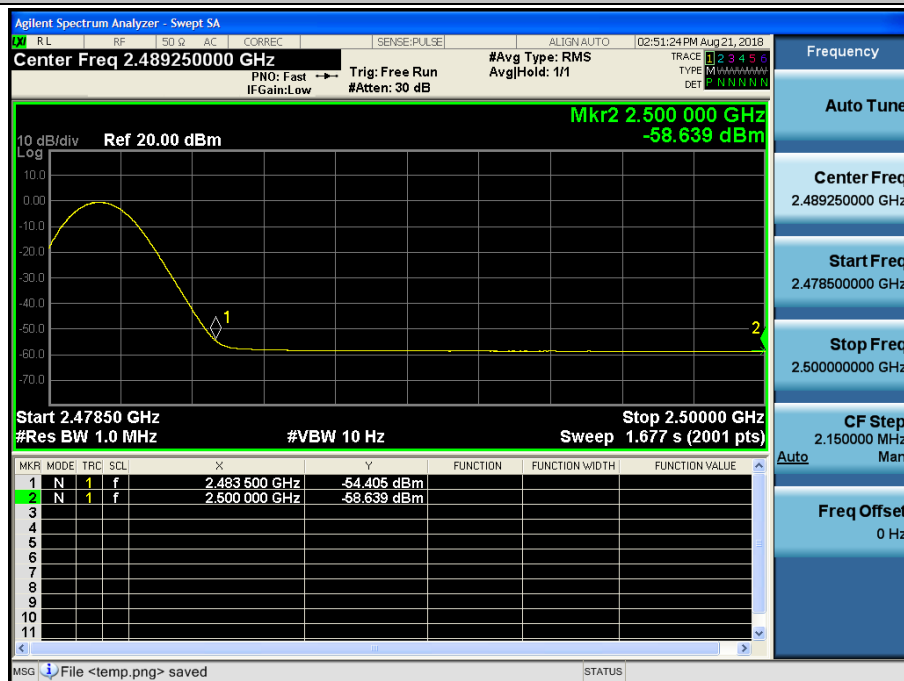
Restrict-band band-edge measurements_2402_AV_2DH5



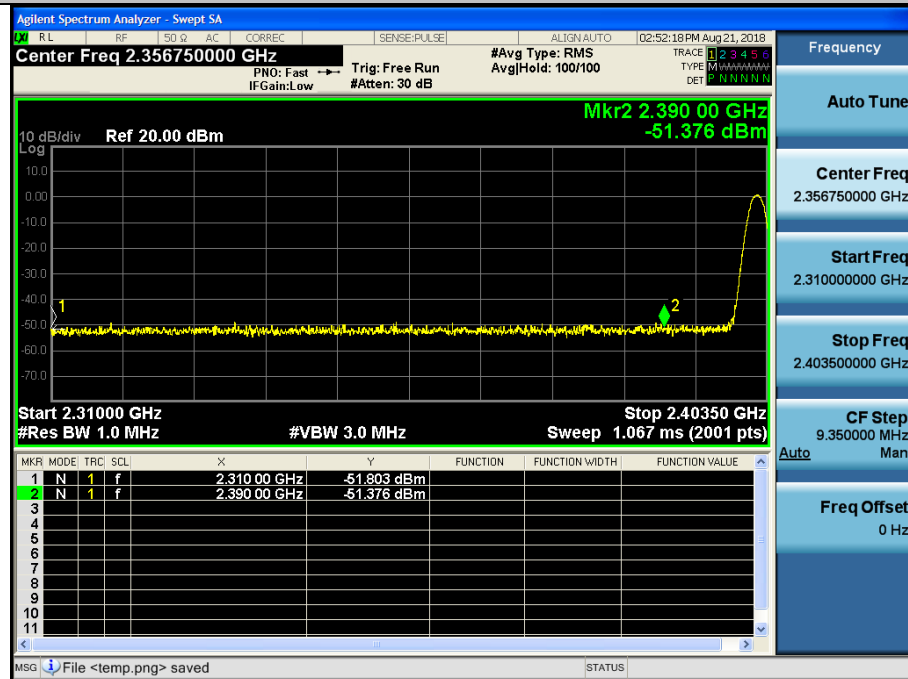
Restrict-band band-edge measurements_2480_PEAK_2DH5



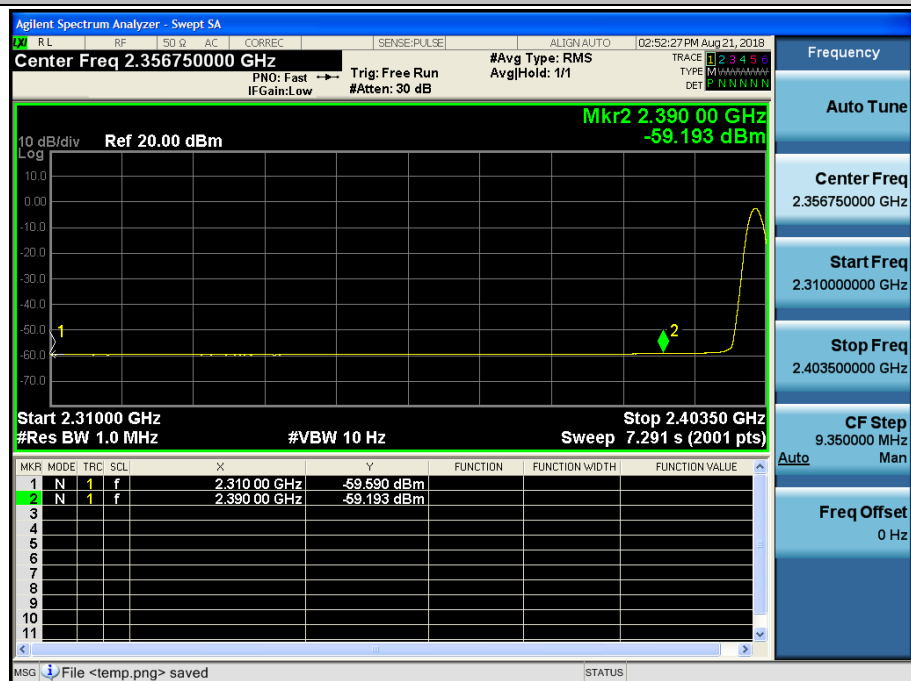
Restrict-band band-edge measurements_2480_AV_2DH5



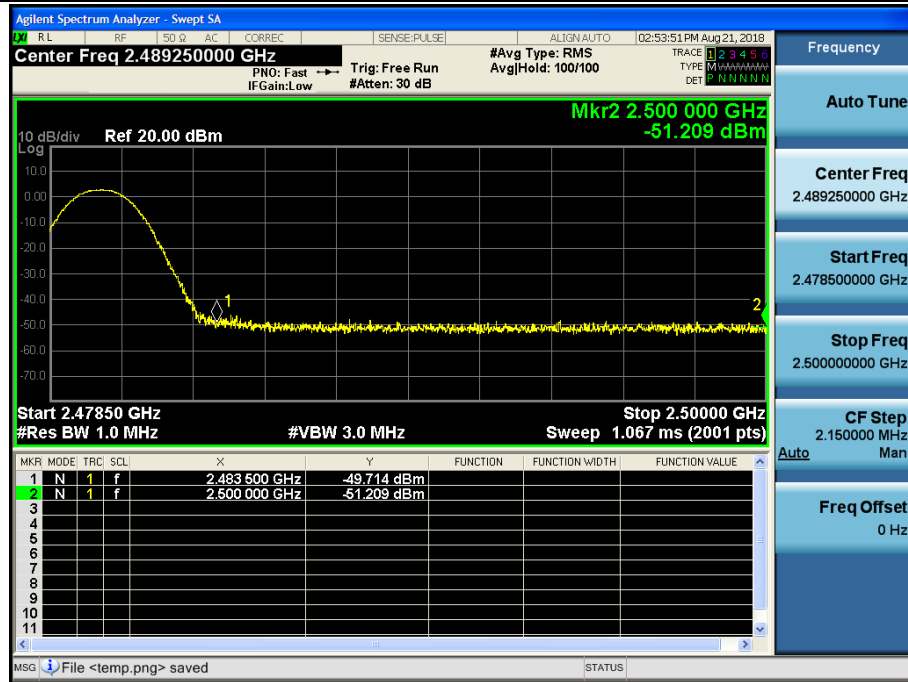
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

