

Appendix A

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

Product Name: Bluetooth Speaker

Trade Mark: N/A

Test Model: B107

FCC ID: 2ATOY-B107

Environmental Conditions

Temperature:	23.3 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

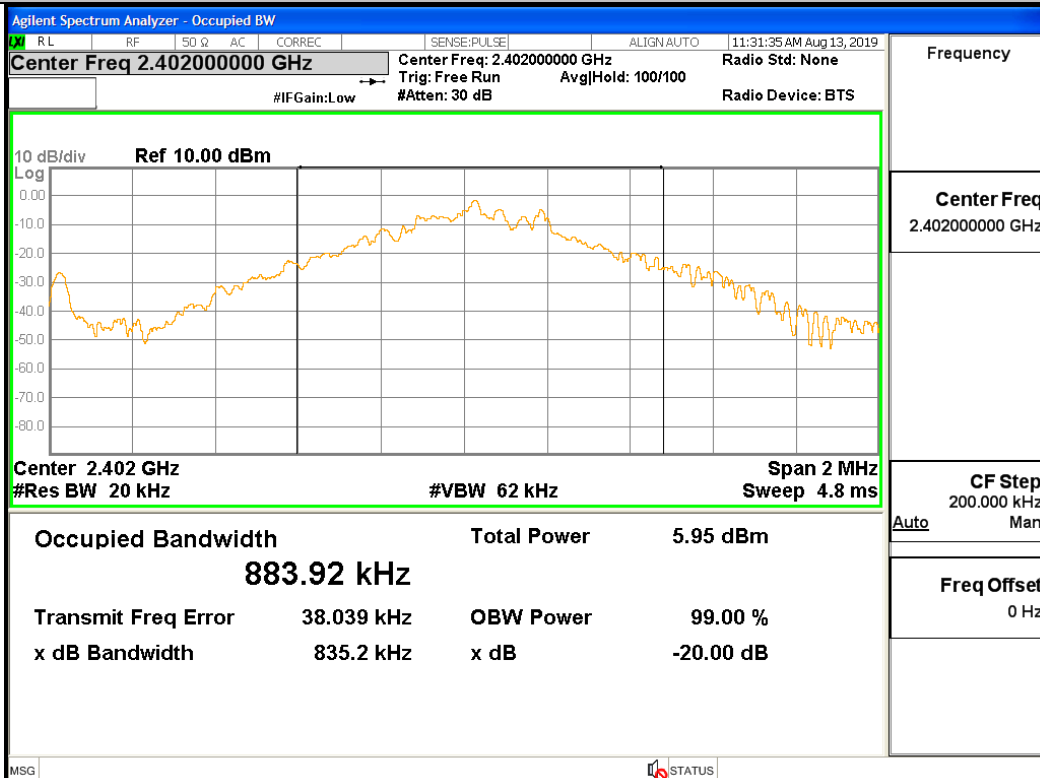
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.835	Not Specified	PASS
GFSK	MCH	0.793	Not Specified	PASS
GFSK	HCH	0.774	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.589	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.593	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.586	Not Specified	PASS
8DPSK	LCH	1.593	Not Specified	PASS
8DPSK	MCH	1.602	Not Specified	PASS
8DPSK	HCH	1.601	Not Specified	PASS

Test Graph

Graphs

GFSK/LCH



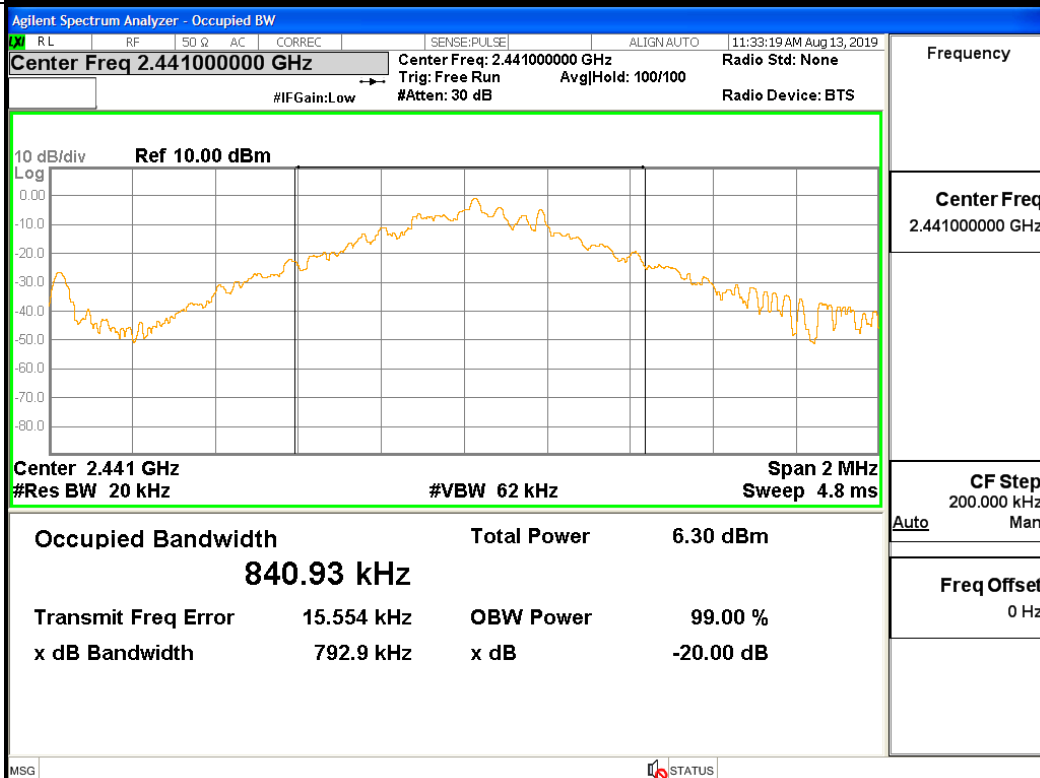
Frequency

Center Freq
2.40200000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/MCH

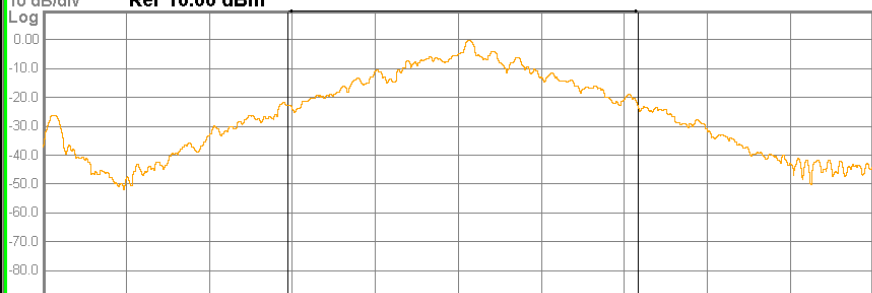


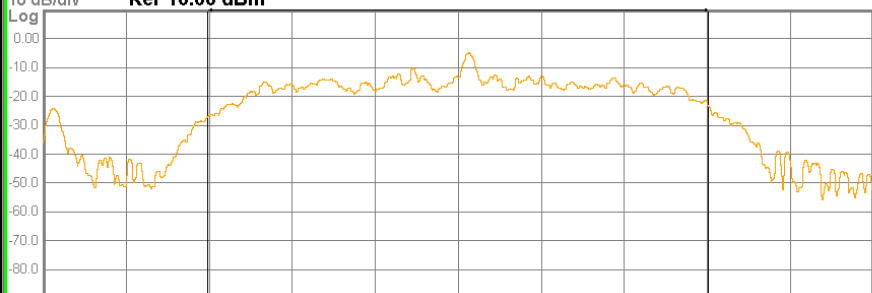
Frequency

Center Freq
2.44100000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW				SENSE:PULSE		ALIGN AUTO	11:36:21 AM Aug 13, 2019	Frequency	
	RL	RF	50 Ω	AC	CORREC	Center Freq: 2.480000000 GHz	Trig: Free Run	Avg/Hold: 100/100	Radio Std: None	
	Center Freq 2.480000000 GHz				#IFGain:Low	#Atten: 30 dB	Radio Device: BTS		Center Freq	
										2.480000000 GHz
	Center 2.48 GHz				#Res BW 20 kHz		#VBW 62 kHz		Span 2 MHz	CF Step
								Sweep 4.8 ms	200.000 kHz	
				Occupied Bandwidth		Total Power		6.51 dBm	Auto	
				840.99 kHz					Man	
				Transmit Freq Error		11.339 kHz		OBW Power	99.00 %	
				x dB Bandwidth		773.9 kHz		x dB	-20.00 dB	
									Freq Offset	
									0 Hz	
				MSG		STATUS				

π/4DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW				SENSE:PULSE		ALIGN AUTO	11:38:33 AM Aug 13, 2019	Frequency	
	RL	RF	50 Ω	AC	CORREC	Center Freq: 2.402000000 GHz	Trig: Free Run	Avg/Hold: 100/100	Radio Std: None	
	Center Freq 2.402000000 GHz				#IFGain:Low	#Atten: 30 dB	Radio Device: BTS		Center Freq	
										2.402000000 GHz
	Center 2.402 GHz				#Res BW 20 kHz		#VBW 62 kHz		Span 2 MHz	CF Step
								Sweep 4.8 ms	200.000 kHz	
				Occupied Bandwidth		Total Power		2.40 dBm	Auto	
				1.2002 MHz					Man	
				Transmit Freq Error		783 Hz		OBW Power	99.00 %	
				x dB Bandwidth		1.589 MHz		x dB	-20.00 dB	
									Freq Offset	
									0 Hz	
				MSG		STATUS				

Center Freq 2.402000000 GHz

Center Freq: 2.402000000 GHz

Radio Std: None

#IFGain:Low

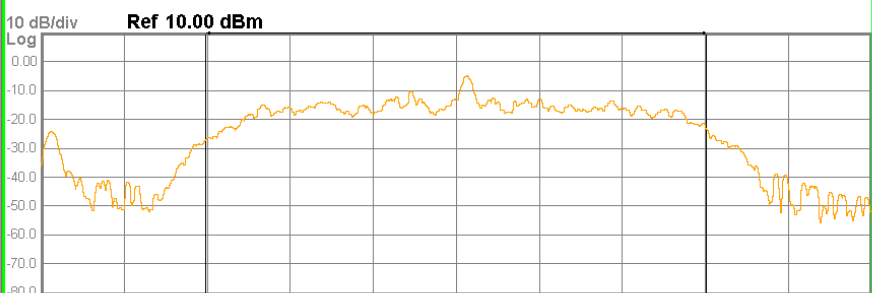
#Atten: 30 dB

AvgHold: 100/100

Radio Device: BTS

10 dB/div

Ref 10.00 dBm



Center 2.402 GHz

#Res BW 20 kHz

#VBW 62 kHz

Span 2 MHz

Sweep 4.8 ms

Occupied Bandwidth

1.2002 MHz

Total Power

2.40 dBm

Transmit Freq Error

783 Hz

OBW Power

99.00 %

x dB Bandwidth

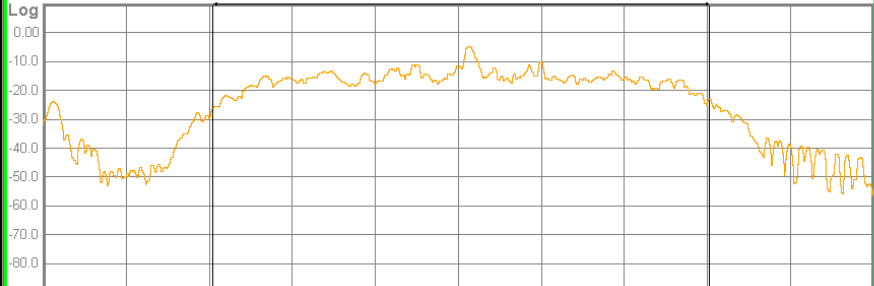
1.589 MHz

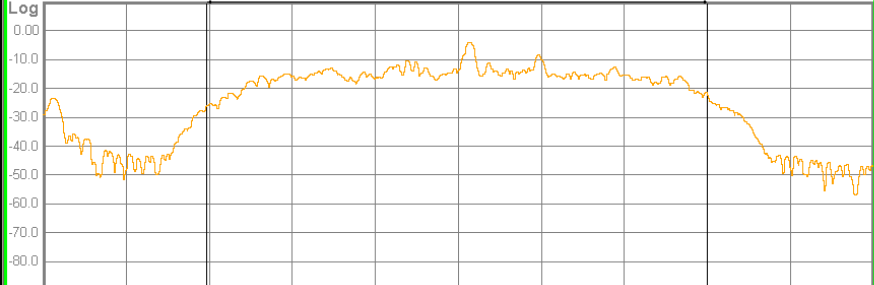
x dB

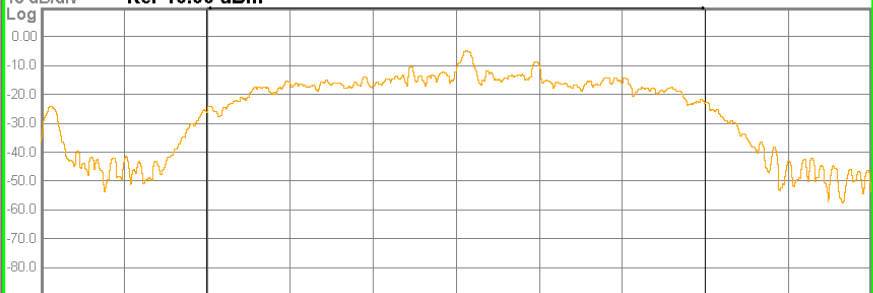
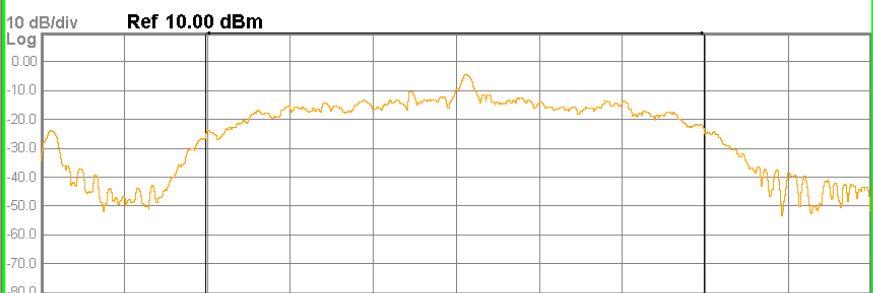
-20.00 dB

MSG

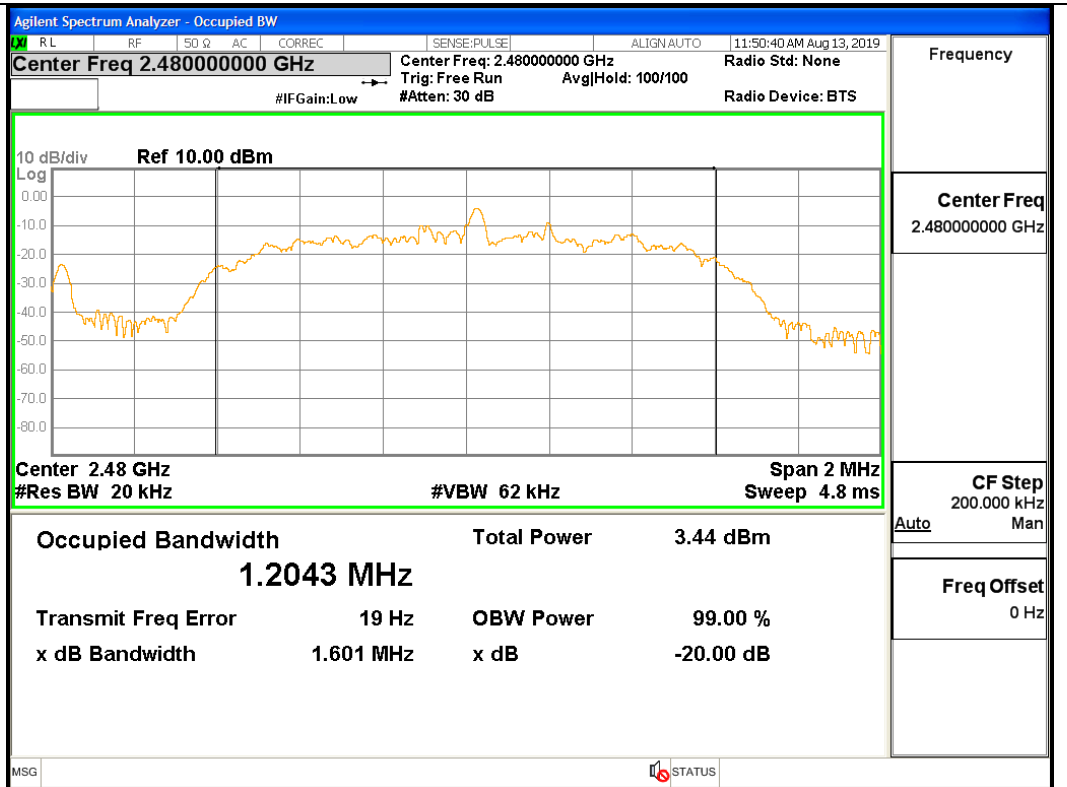
STATUS

π/4DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW										Frequency	
	Center Freq 2.441000000 GHz								Center Freq: 2.441000000 GHz		Radio Std: None	
	#IFGain:Low								Trig: Free Run		Avg Hold: 100/100	
	#Atten: 30 dB								Radio Device: BTS			
	10 dB/div Log 										Center Freq 2.441000000 GHz	
	Center 2.441 GHz										Span 2 MHz	
	#Res BW 20 kHz										#VBW 62 kHz	
	Sweep 4.8 ms										CF Step 200.000 kHz	
	Auto										Man	
	Occupied Bandwidth										Total Power 2.76 dBm	
1.1959 MHz												
Transmit Freq Error 6.744 kHz										OBW Power 99.00 %		
x dB Bandwidth 1.593 MHz										x dB -20.00 dB		
MSG										STATUS		

π/4DQPSK/HCH	Agilent Spectrum Analyzer - Occupied BW										Frequency	
	Center Freq 2.480000000 GHz								Center Freq: 2.480000000 GHz		Radio Std: None	
	#IFGain:Low								Trig: Free Run		Avg Hold: 100/100	
	#Atten: 30 dB								Radio Device: BTS			
	10 dB/div Log 										Center Freq 2.480000000 GHz	
	Center 2.48 GHz										Span 2 MHz	
	#Res BW 20 kHz										#VBW 62 kHz	
	Sweep 4.8 ms										CF Step 200.000 kHz	
	Auto										Man	
	Occupied Bandwidth										Total Power 3.25 dBm	
1.2025 MHz												
Transmit Freq Error -1.502 kHz										OBW Power 99.00 %		
x dB Bandwidth 1.586 MHz										x dB -20.00 dB		
MSG										STATUS		

8DPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:45:46 AM Aug 13, 2019 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS 10 dB/div Ref 10.00 dBm  Center 2.402 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1981 MHz Total Power 2.74 dBm Transmit Freq Error 626 Hz OBW Power 99.00 % x dB Bandwidth 1.593 MHz x dB -20.00 dB MSG STATUS
8DPSK/MCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:48:20 AM Aug 13, 2019 Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS 10 dB/div Ref 10.00 dBm  Center 2.441 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1960 MHz Total Power 3.01 dBm Transmit Freq Error -2.243 kHz OBW Power 99.00 % x dB Bandwidth 1.602 MHz x dB -20.00 dB MSG STATUS

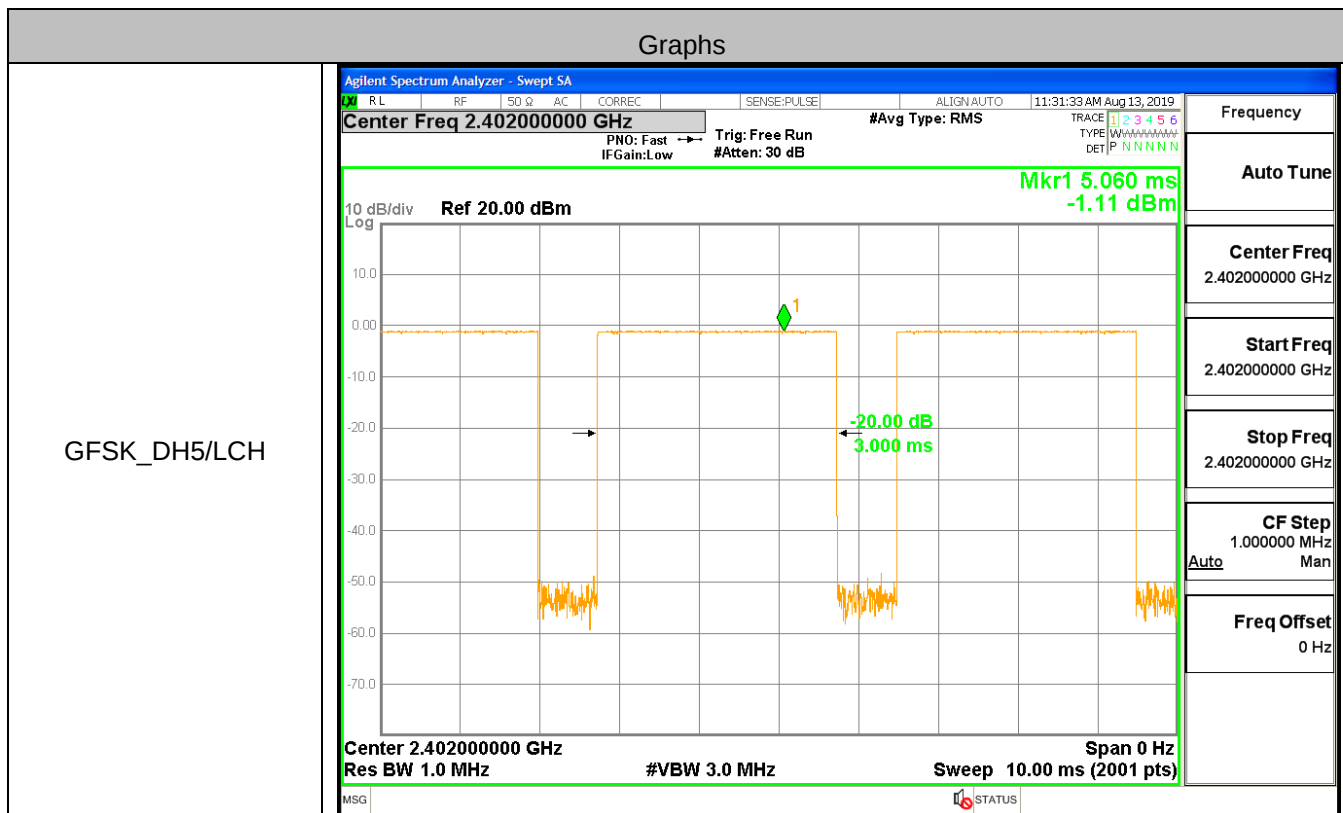
8DPSK/HCH

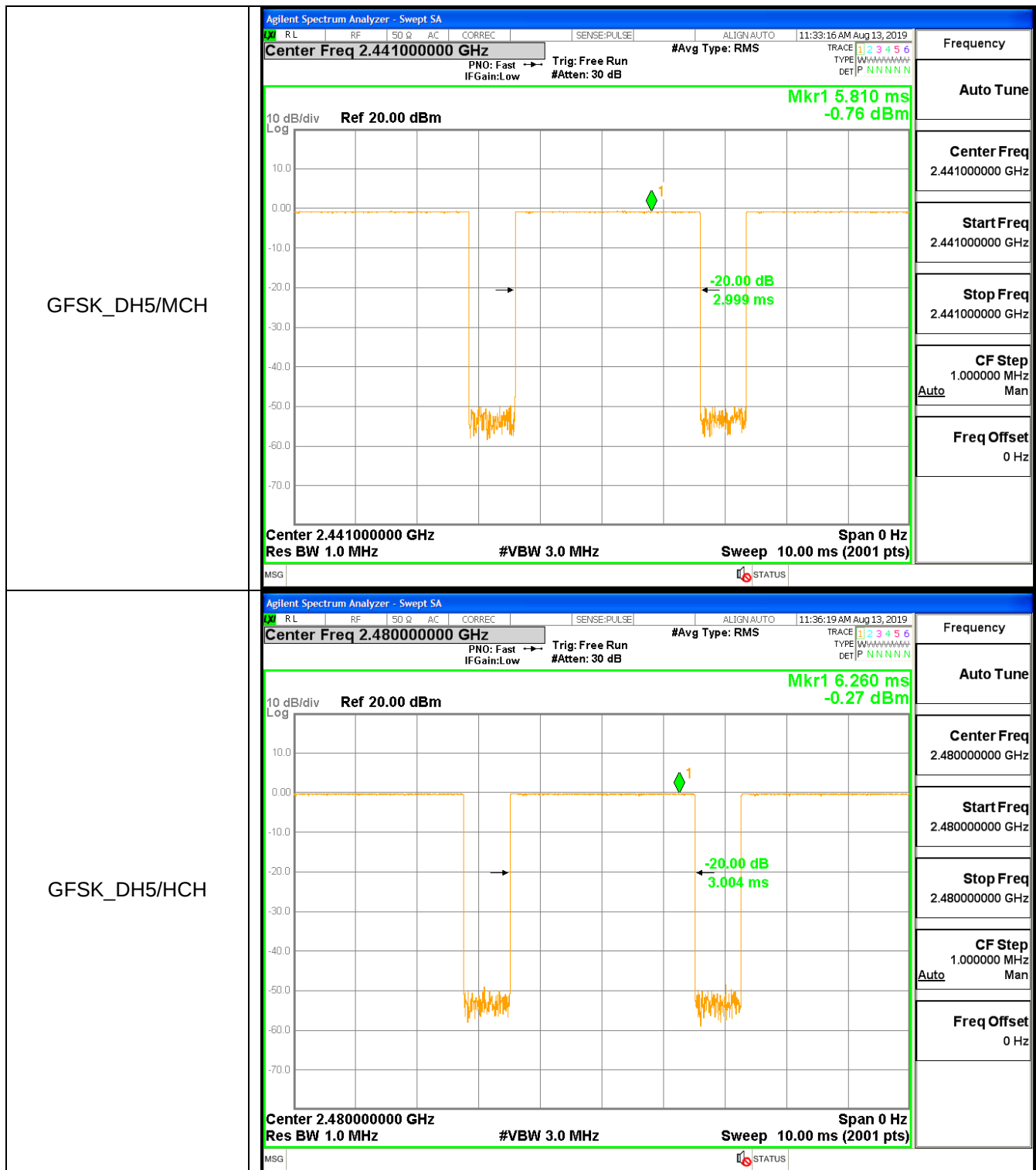


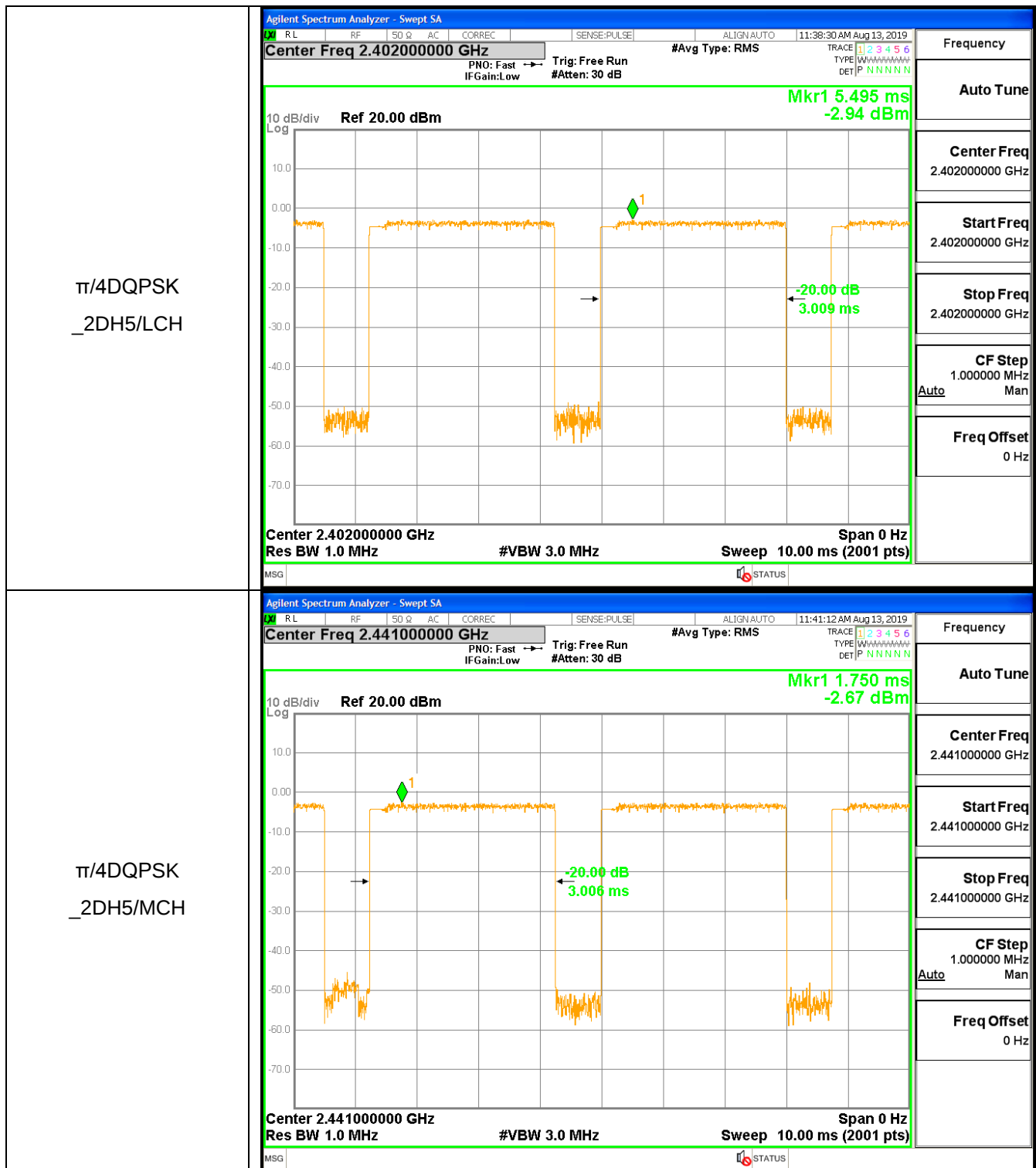
A.2 Dwell Time

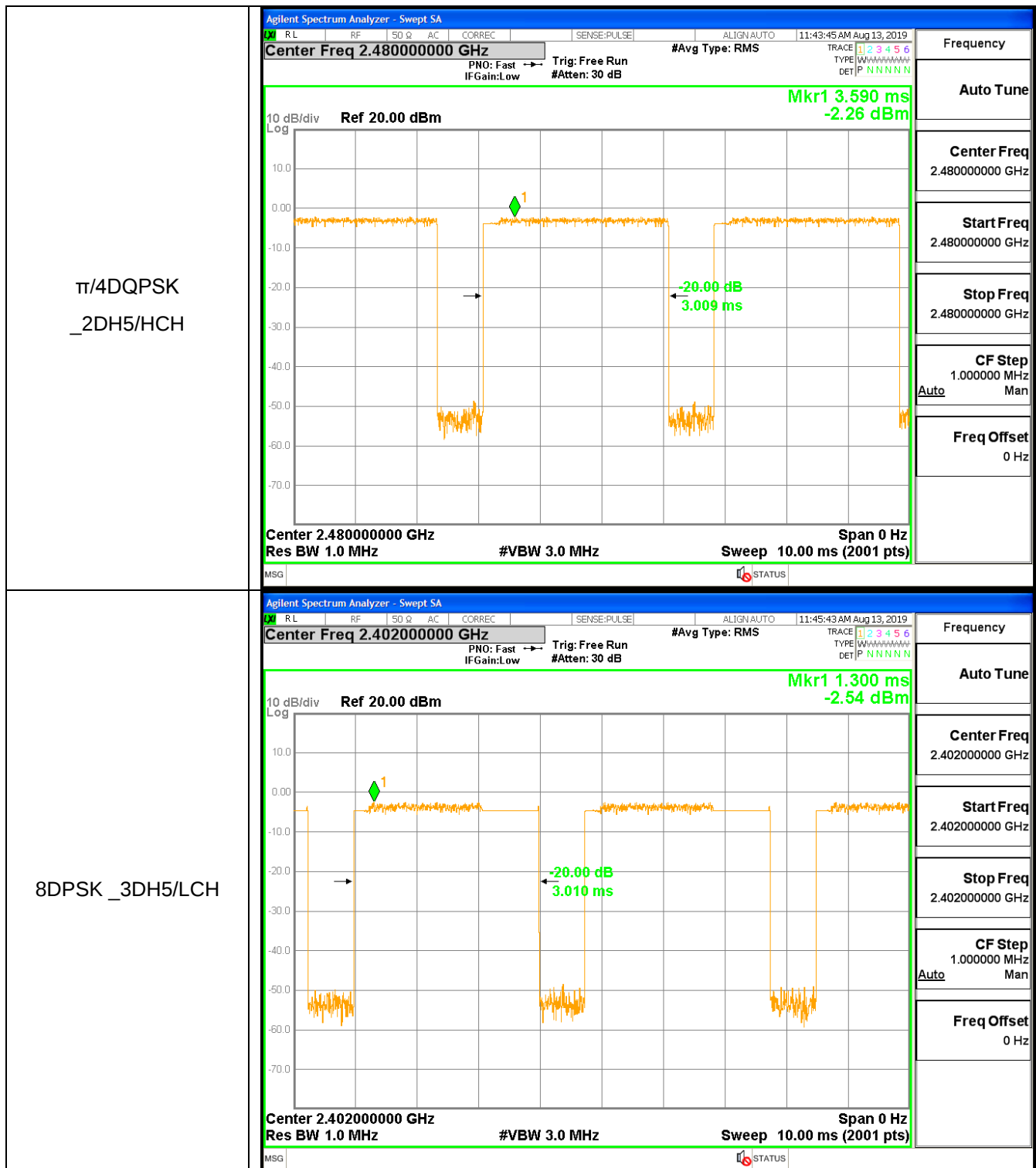
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.003000	106.7	0.320092	0.4	PASS
GFSK	DH5	MCH	0.002999	106.7	0.319999	0.4	PASS
GFSK	DH5	HCH	0.003004	106.7	0.320507	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.003009	106.7	0.321017	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.003006	106.7	0.320788	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.003009	106.7	0.321024	0.4	PASS
8DPSK	3DH5	LCH	0.00301	106.7	0.321123	0.4	PASS
8DPSK	3DH5	MCH	0.003008	106.7	0.320996	0.4	PASS
8DPSK	3DH5	HCH	0.003009	106.7	0.321026	0.4	PASS

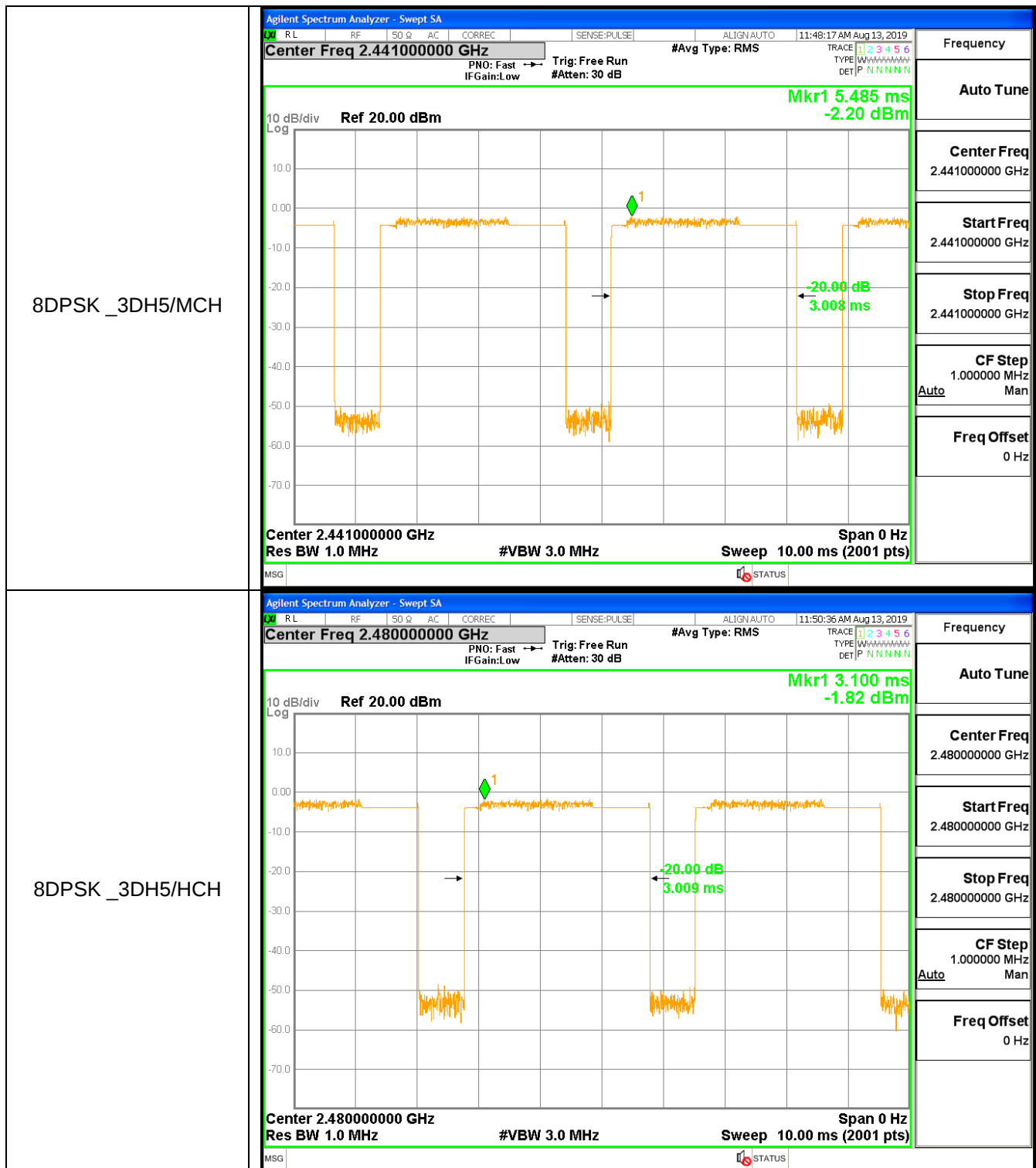
Test Graph







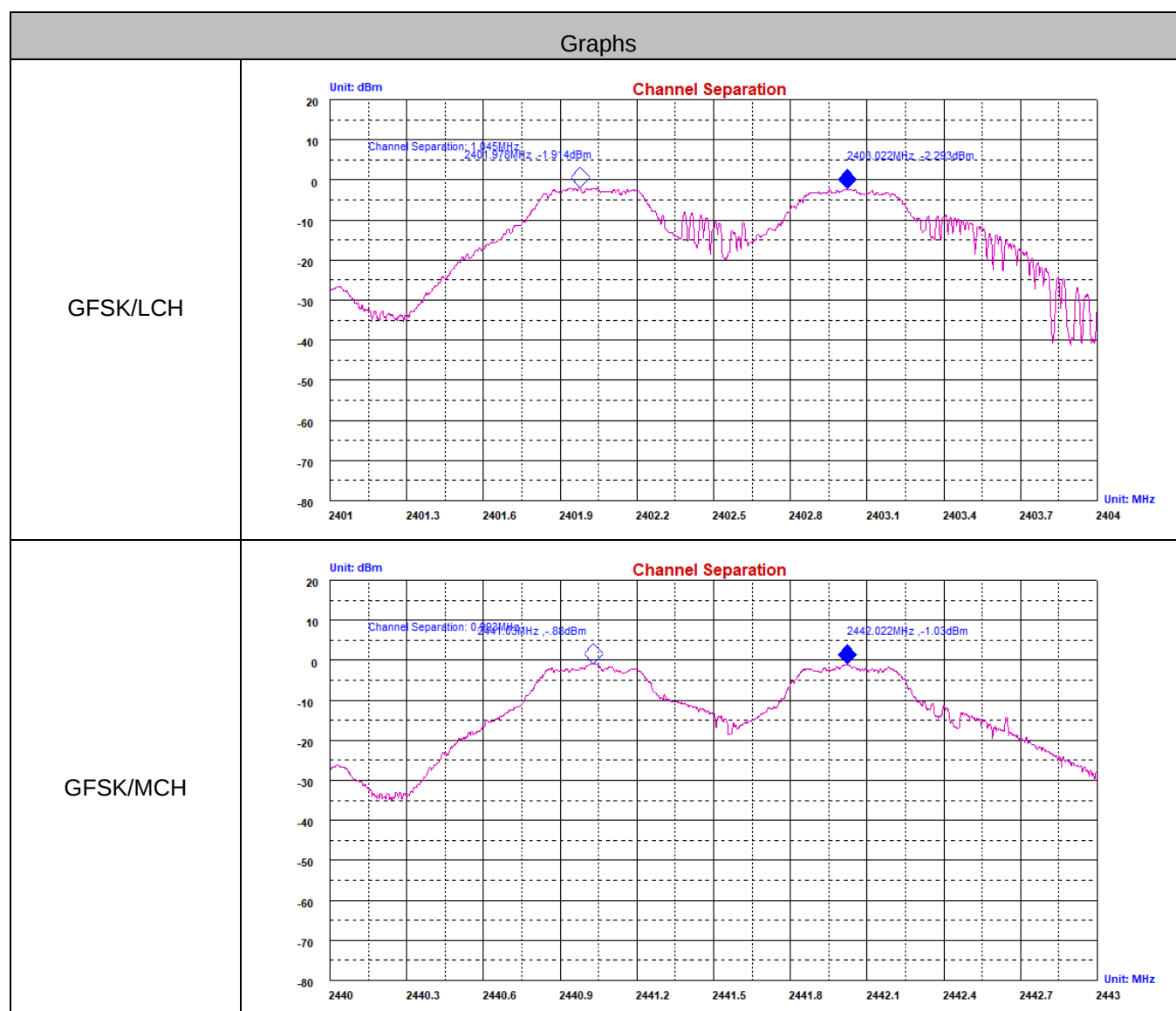


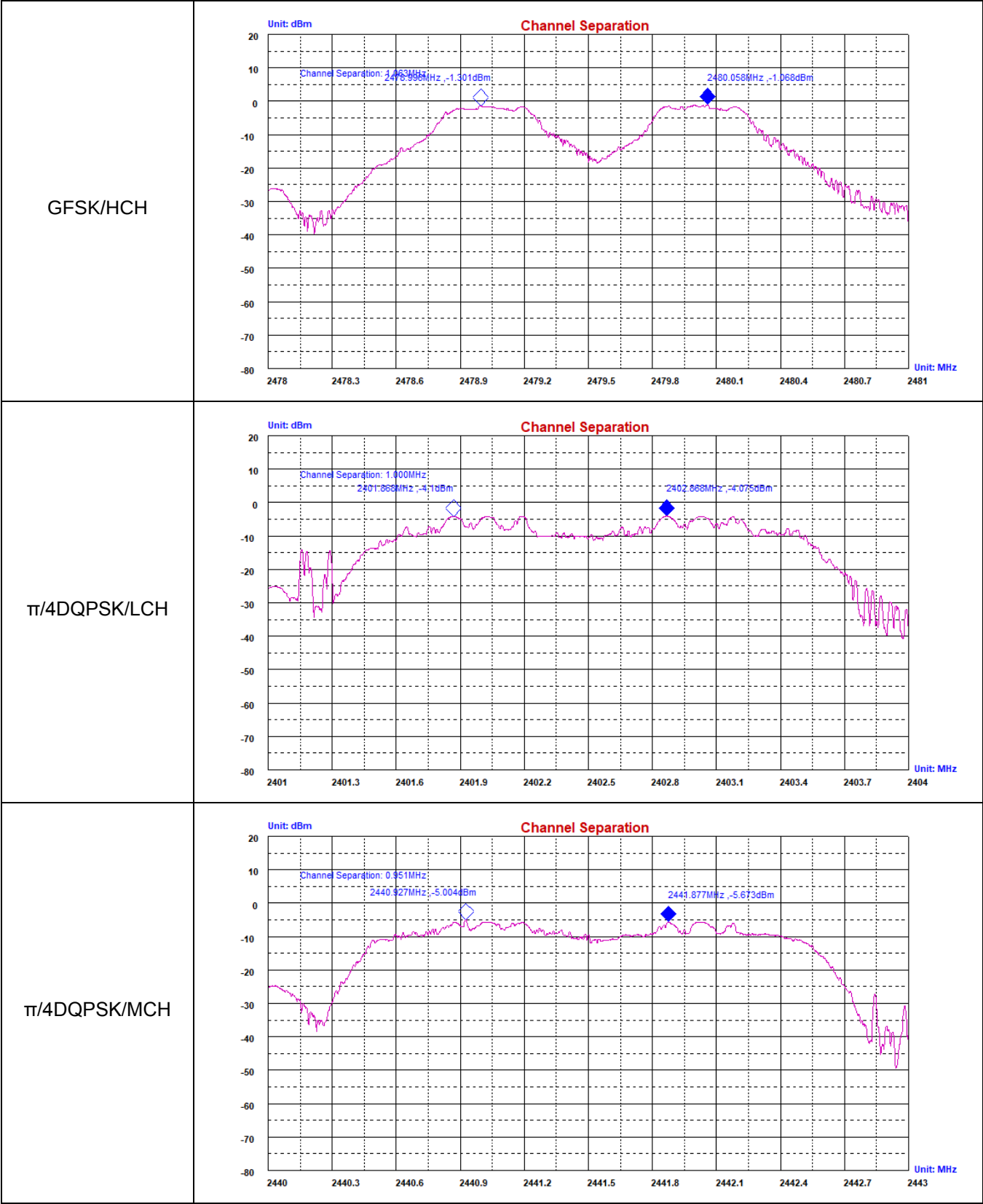


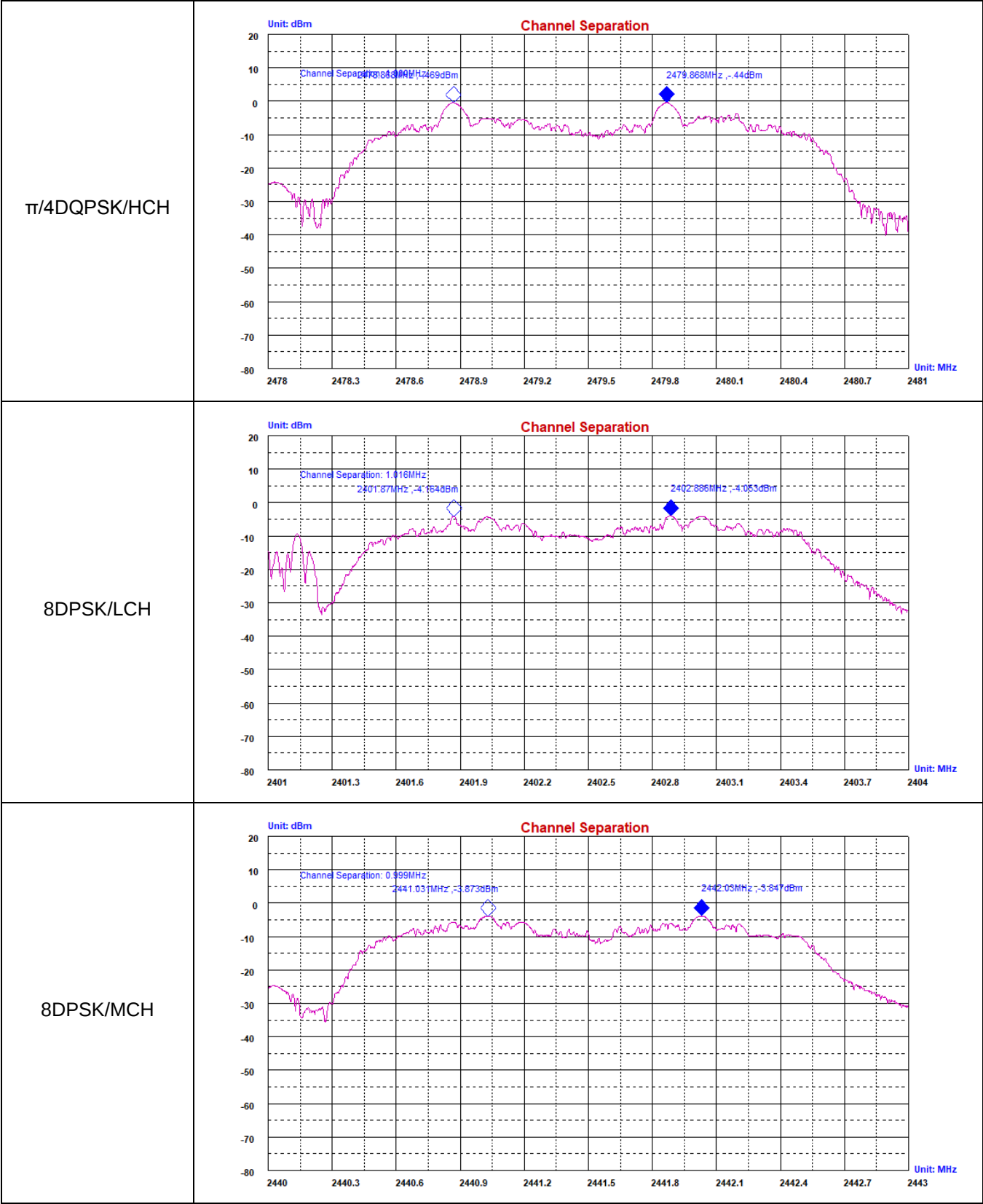
A.3 Carrier Frequency Separation

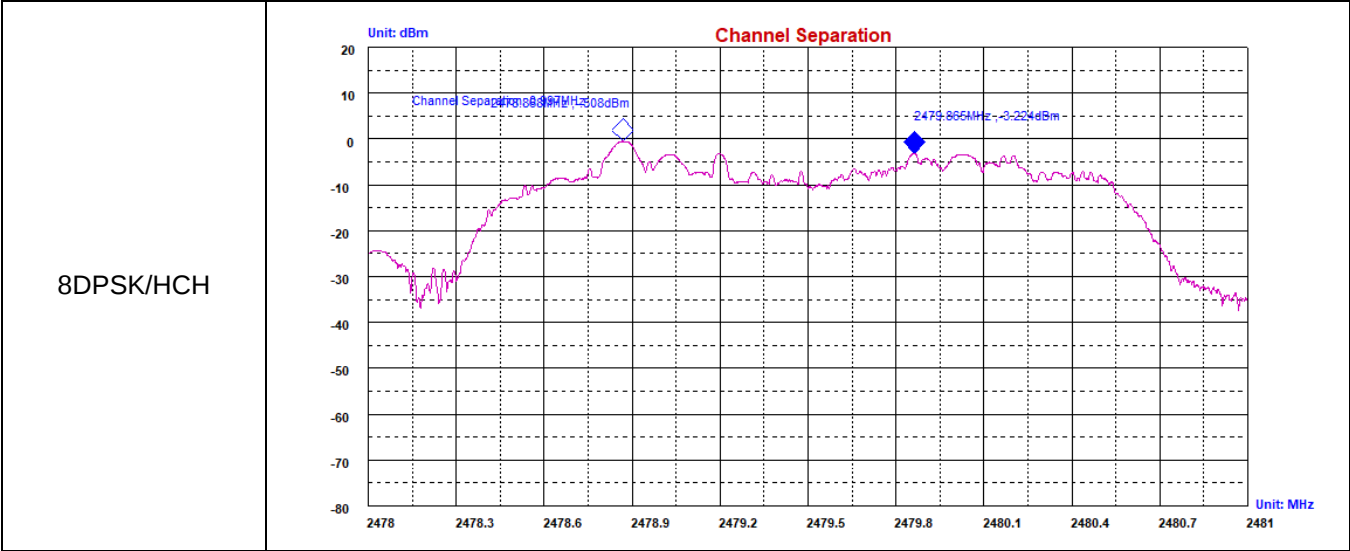
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.045	0.623	PASS
GFSK	MCH	0.993	0.625	PASS
GFSK	HCH	1.063	0.626	PASS
$\pi/4$ DQPSK	LCH	0.712	0.828	PASS
$\pi/4$ DQPSK	MCH	1.000	0.823	PASS
$\pi/4$ DQPSK	HCH	1.000	0.857	PASS
8DPSK	LCH	1.016	0.834	PASS
8DPSK	MCH	0.999	0.841	PASS
8DPSK	HCH	0.997	0.836	PASS

Test Graph





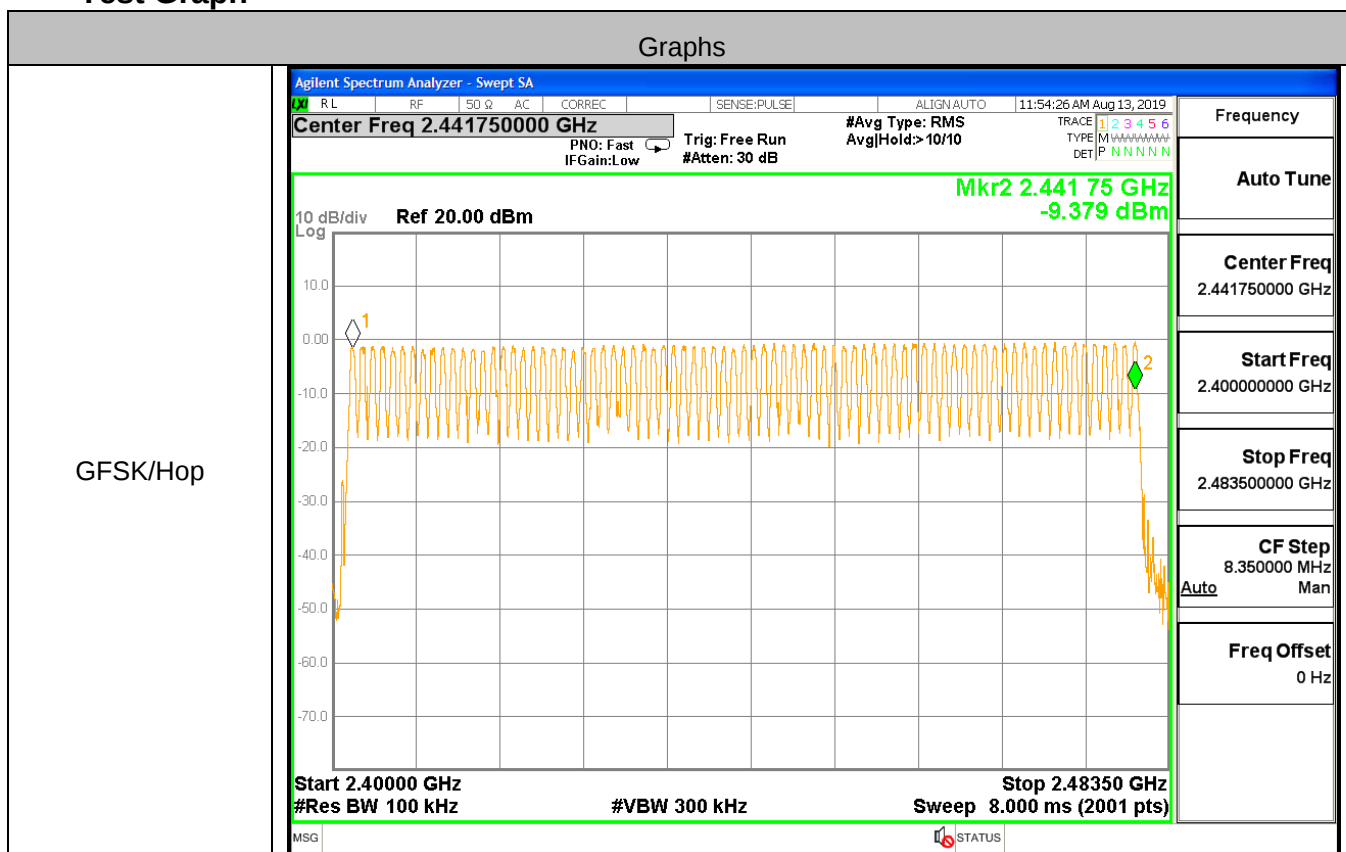


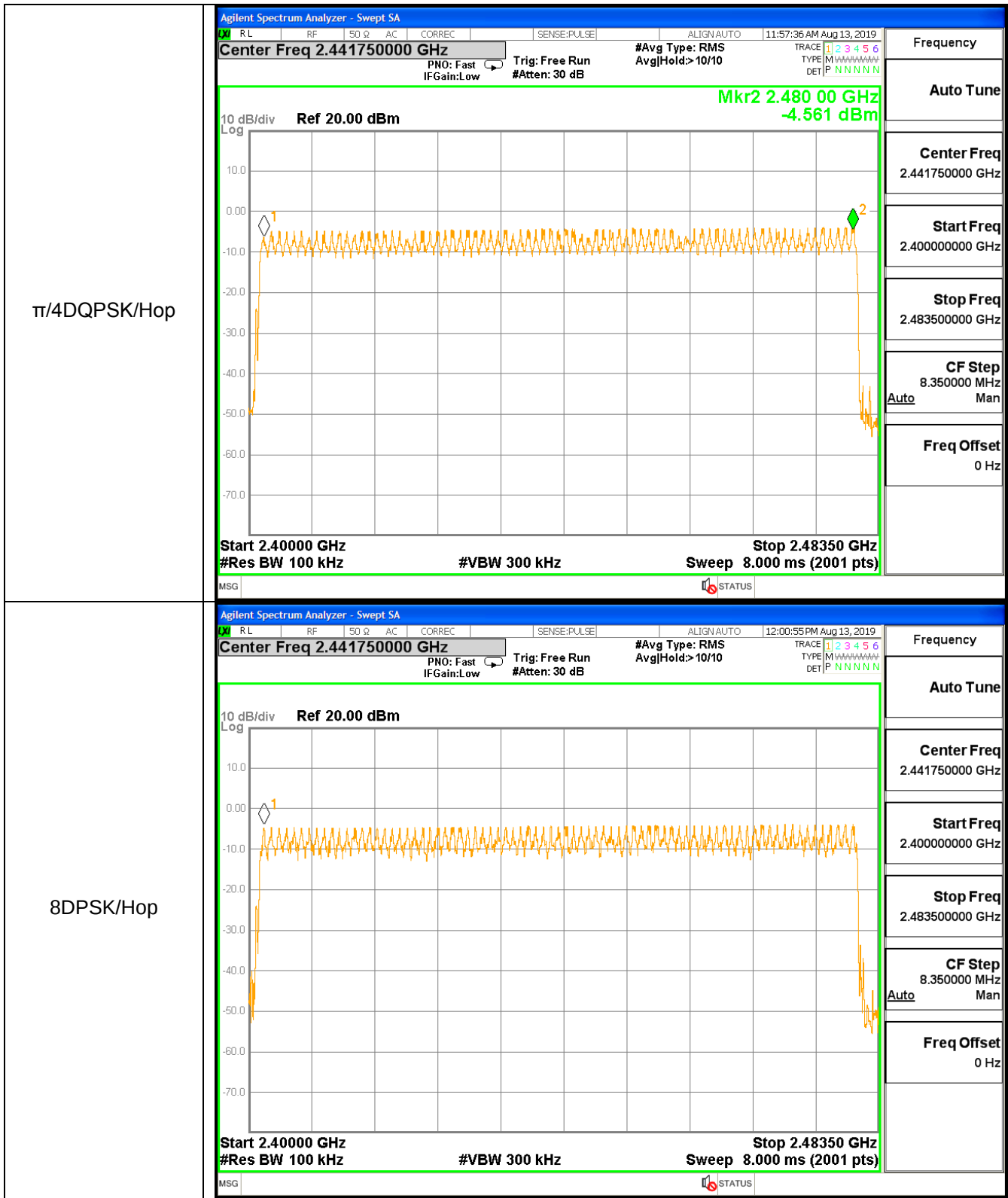


A.4 Hopping Channel Number

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

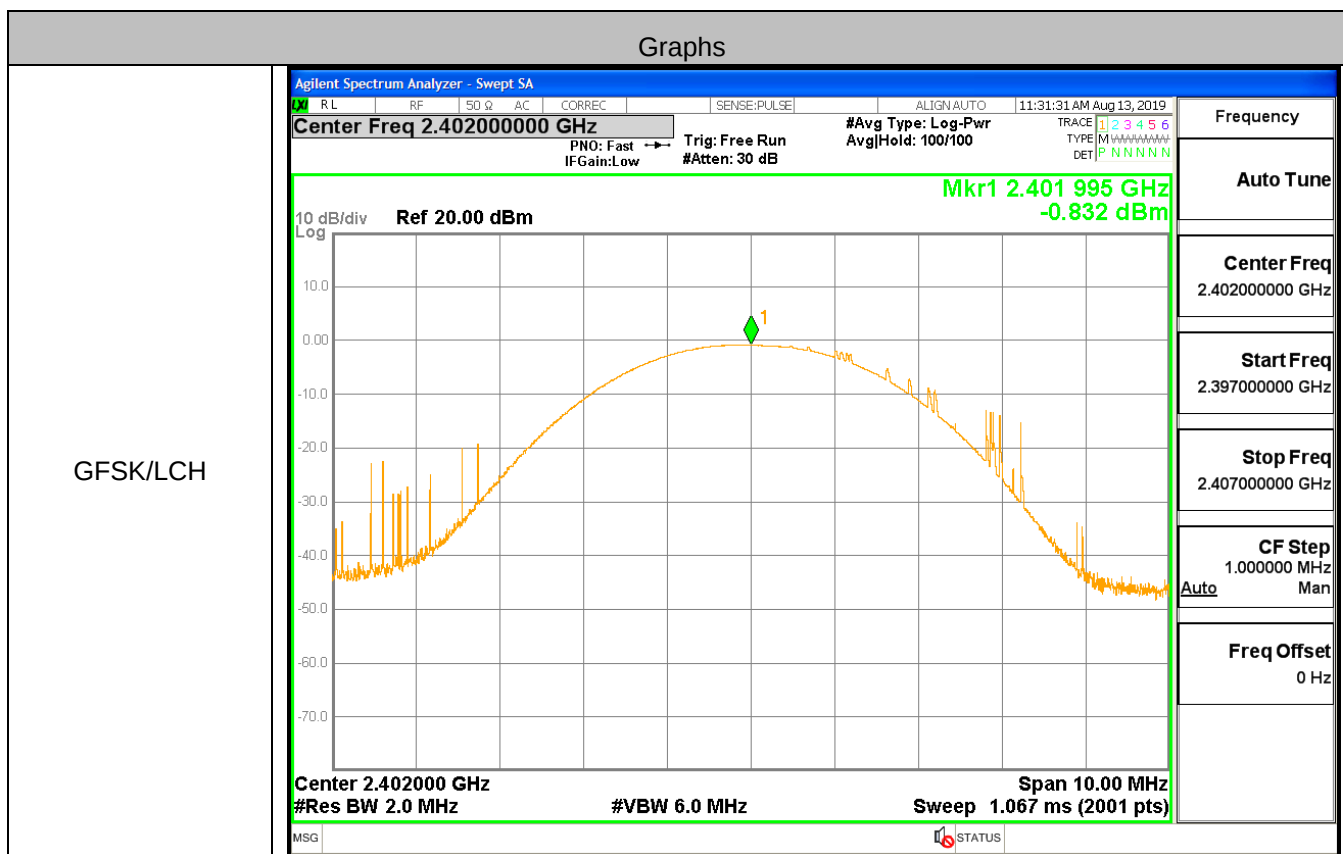


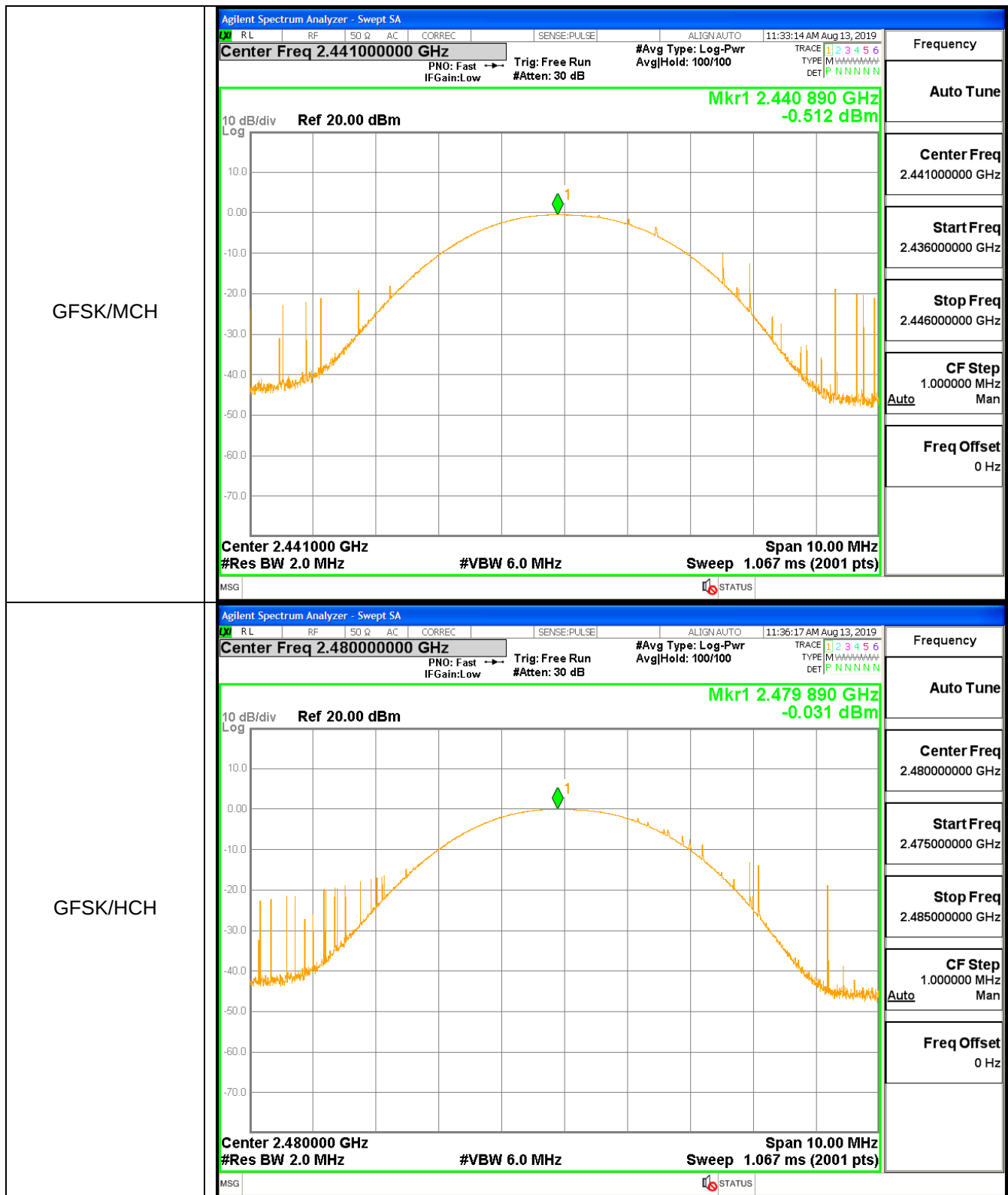


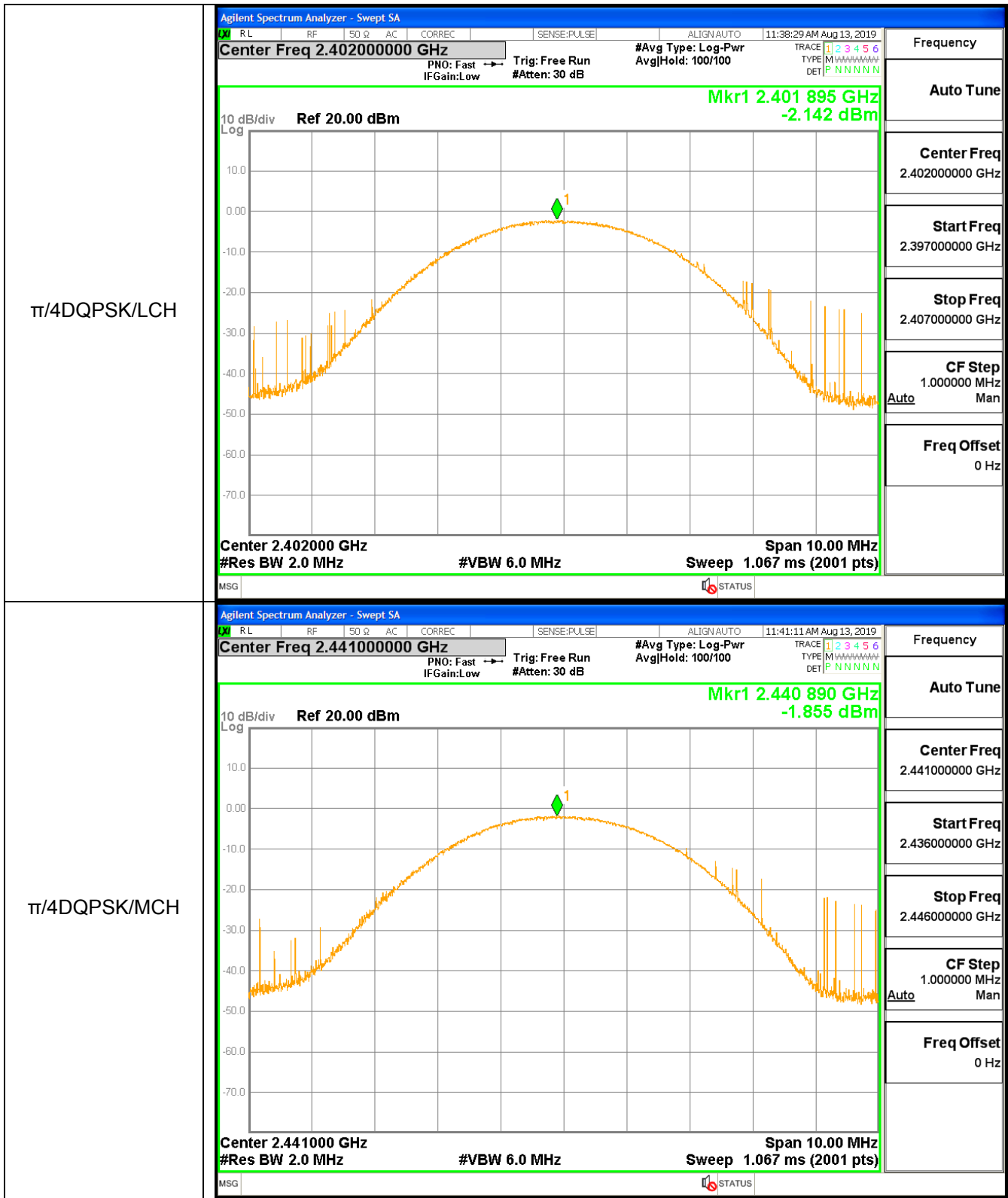
A.5 Conducted Peak Output Power

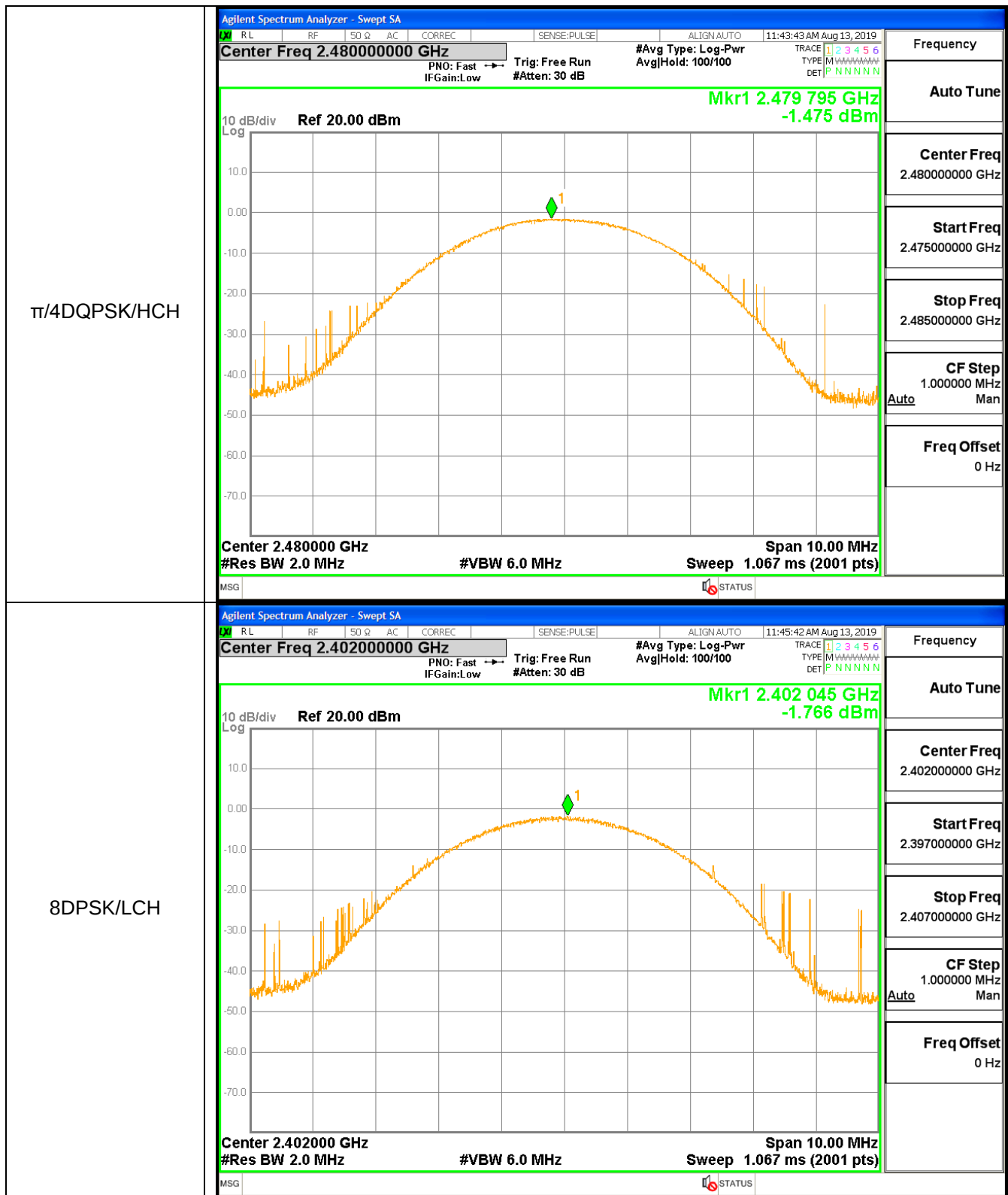
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.832	21	PASS
GFSK	MCH	-0.512	21	PASS
GFSK	HCH	-0.031	21	PASS
$\pi/4$ DQPSK	LCH	-2.142	21	PASS
$\pi/4$ DQPSK	MCH	-1.855	21	PASS
$\pi/4$ DQPSK	HCH	-1.475	21	PASS
8DPSK	LCH	-1.766	21	PASS
8DPSK	MCH	-1.426	21	PASS
8DPSK	HCH	-1.114	21	PASS

Test Graph









Frequency

Auto Tune

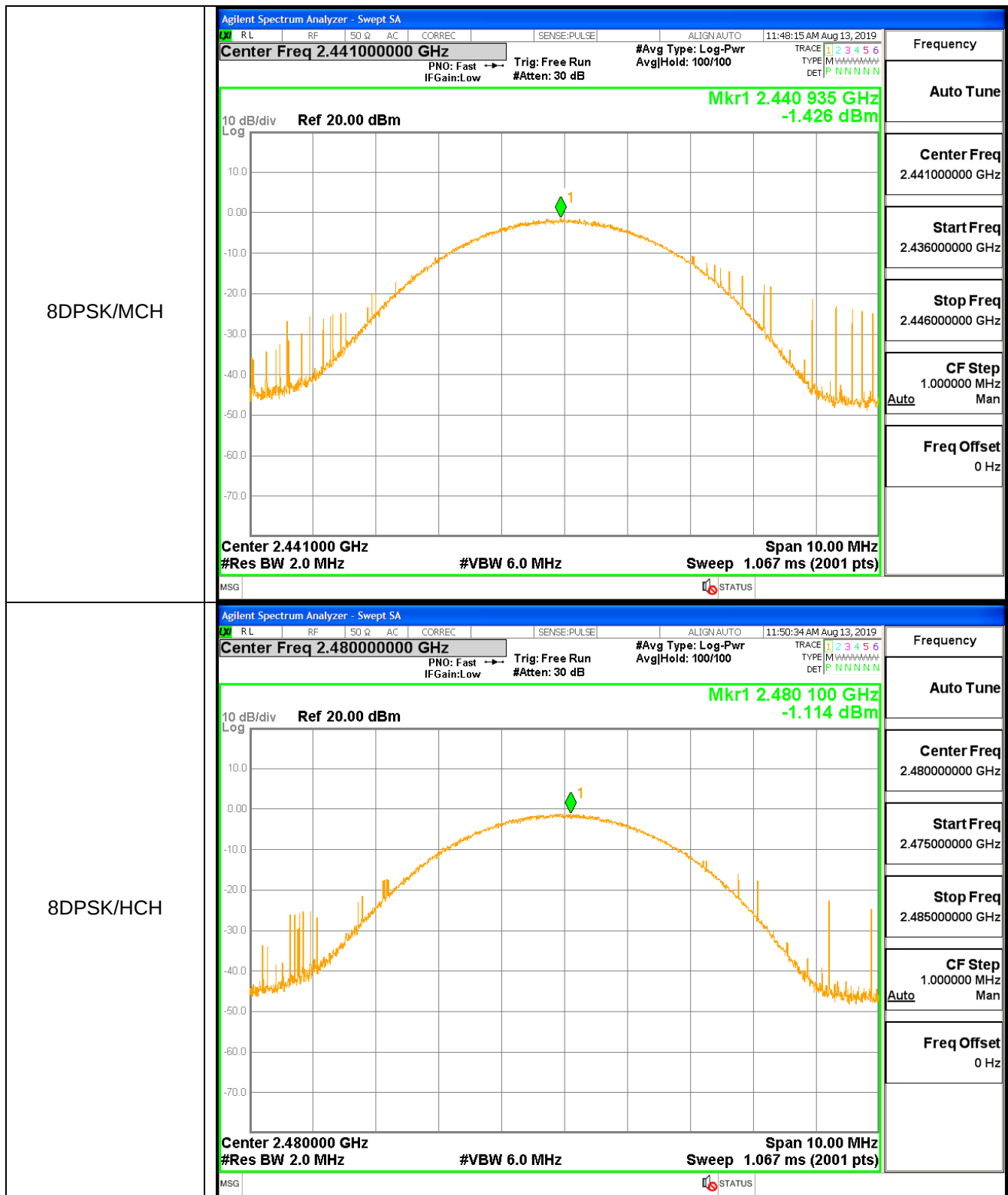
Center Freq
2.480000000 GHz

Start Freq
2.475000000 GHz

Stop Freq
2.485000000 GHz

CF Step
1.000000 MHz
Auto Man

Freq Offset
0 Hz

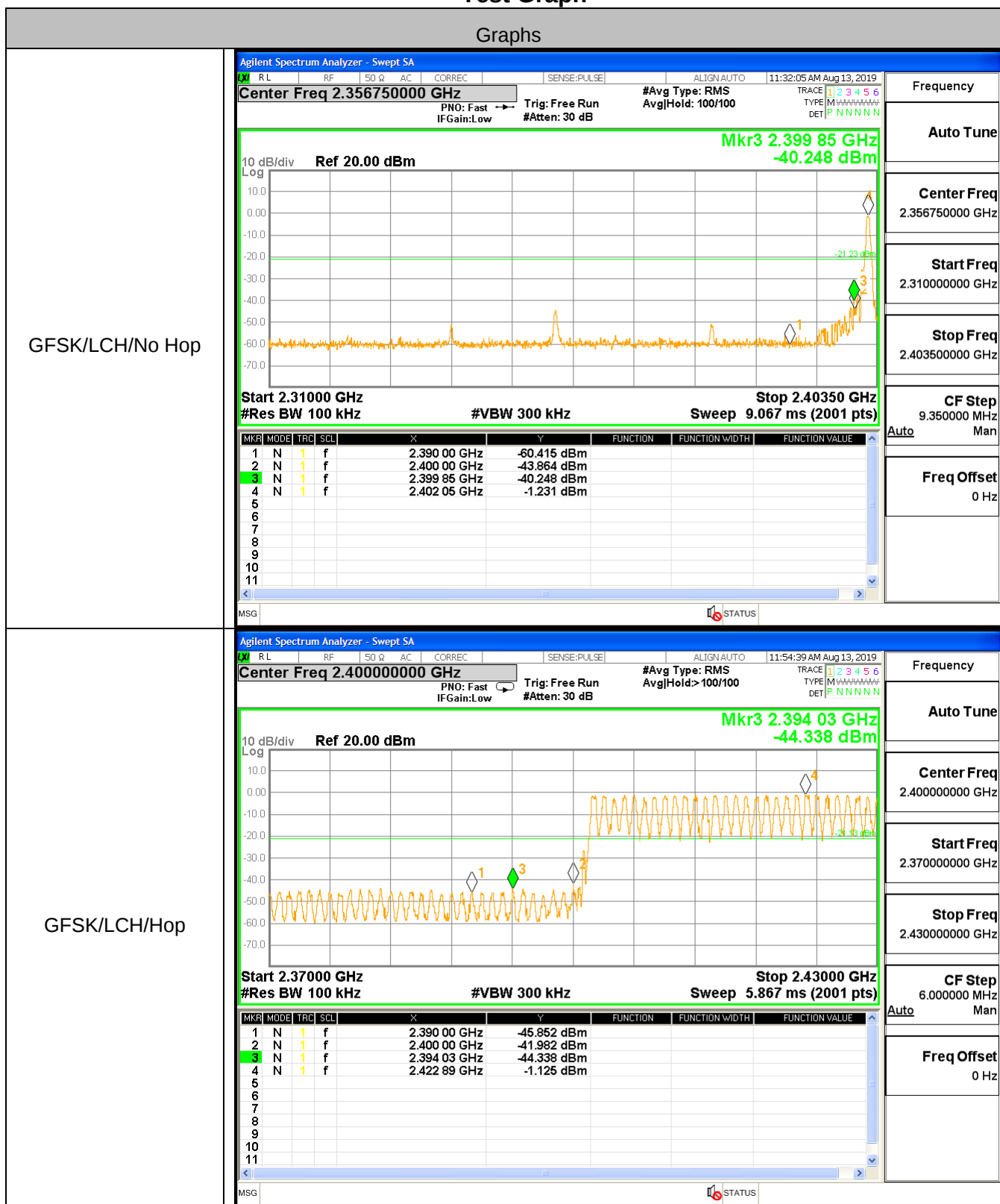


A.6 Band-edge for RF Conducted Emissions

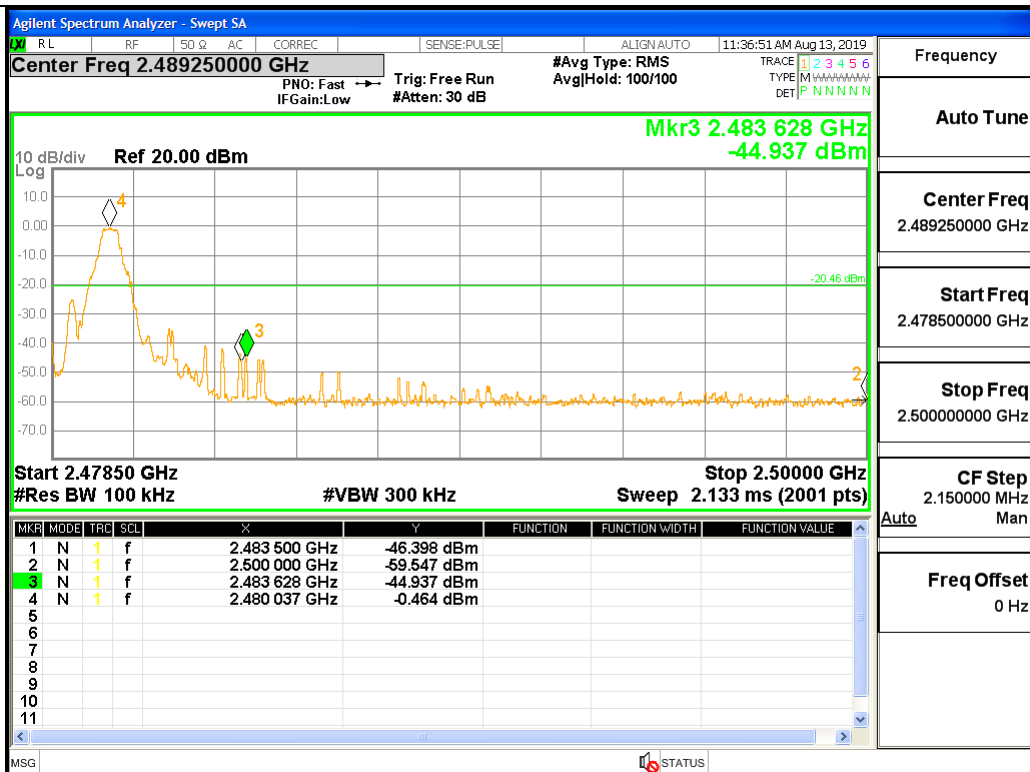
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2399.854	-1.231	-40.248	-21.231	Pass
1DH5	2480	2483.628	-0.464	-44.937	-20.464	Pass
2DH5	2402	2400	-4.928	-44.94	-24.928	Pass
2DH5	2480	2483.735	-3.996	-48.808	-23.996	Pass
3DH5	2402	2399.76	-4.826	-43.777	-24.826	Pass
3DH5	2480	2483.51	-4.01	-47.362	-24.01	Pass
1DH5-Hopping	2402	2400	-1.125	-41.98	-21.125	Pass
1DH5-Hopping	2480	2483.56	-0.422	-43.795	-20.422	Pass
2DH5-Hopping	2402	2393.04	-4.655	-48.401	-24.655	Pass
2DH5-Hopping	2480	2488.03	-4.036	-49.021	-24.036	Pass
3DH5-Hopping	2402	2399.76	-4.513	-44.074	-24.513	Pass
3DH5-Hopping	2480	2483.71	-3.953	-47.103	-23.953	Pass

Test Graph

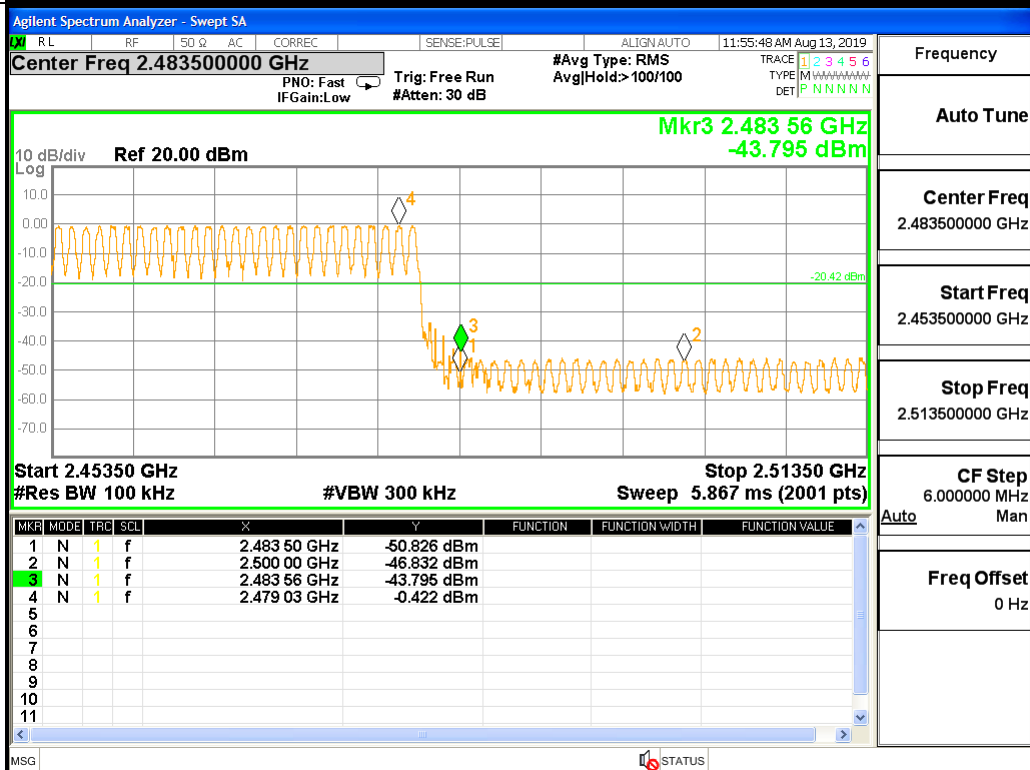
Graphs



GFSK/HCH/No Hop

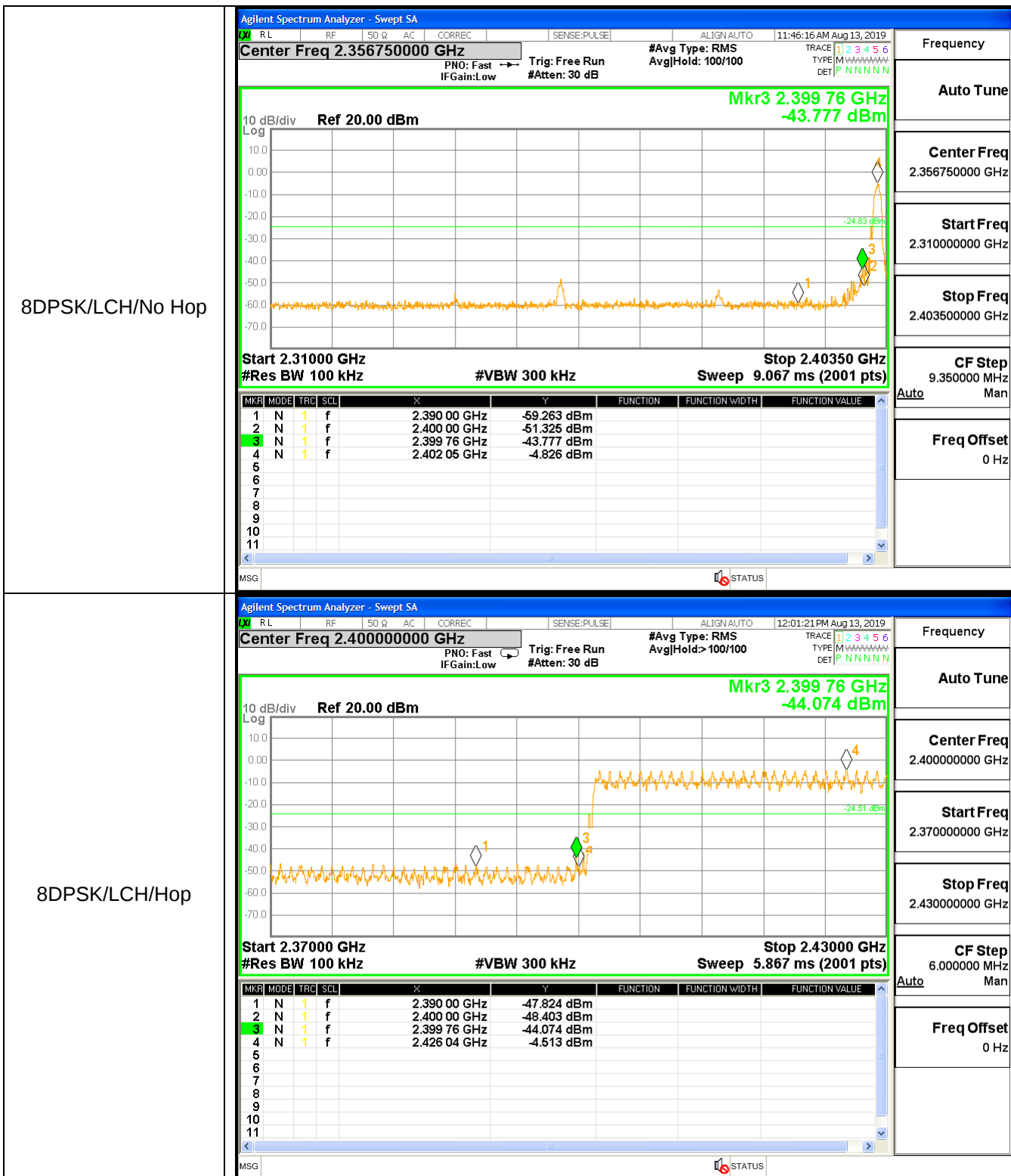


GFSK/HCH/Hop

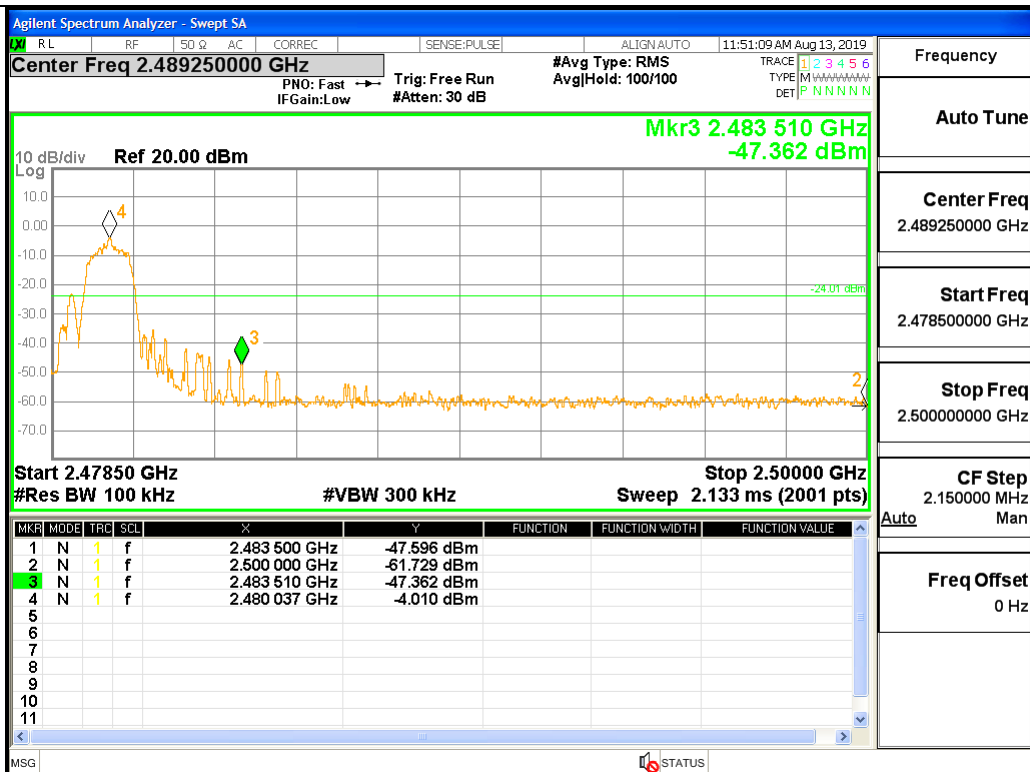




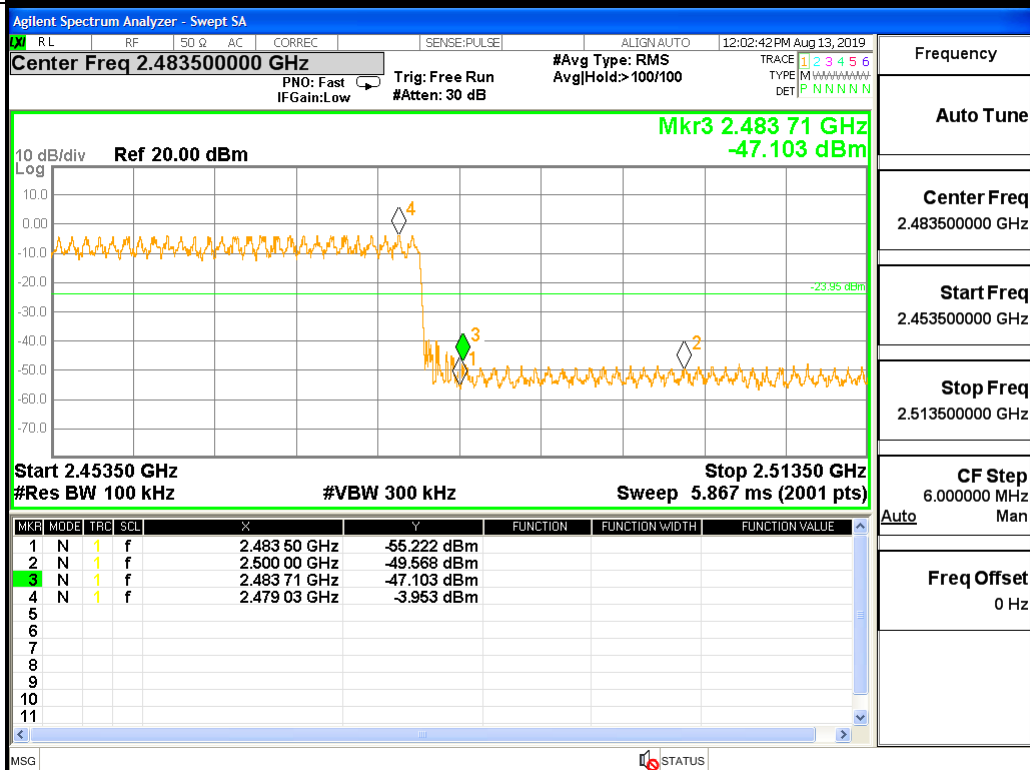
$\pi/4$ DQPSK/HCH/No Hop	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:44:18 AM Aug 13, 2019 Center Freq 2.489250000 GHz PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg Hold: 100/100 TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P N N N N N N 10 dB/div Ref 20.00 dBm Log Start 2.47850 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.50000 GHz Sweep 2.133 ms (2001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.483 500 GHz</td><td>-60.851 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.500 000 GHz</td><td>-60.450 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.483 735 GHz</td><td>-48.808 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.480 037 GHz</td><td>-3.996 dBm</td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table> MSG STATUS Frequency Auto Tune Center Freq 2.489250000 GHz Start Freq 2.478500000 GHz Stop Freq 2.500000000 GHz CF Step 2.1500000 MHz Auto Man Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.483 500 GHz	-60.851 dBm				2	N	1	f	2.500 000 GHz	-60.450 dBm				3	N	1	f	2.483 735 GHz	-48.808 dBm				4	N	1	f	2.480 037 GHz	-3.996 dBm				5									6									7									8									9									10									11								
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	3	N	1	f	2.483 735 GHz	-48.808 dBm																																																																																																							
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$\pi/4$ DQPSK/HCH/Hop	Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:59:34 AM Aug 13, 2019 Center Freq 2.483500000 GHz PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg Hold: >100/100 TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P N N N N N N 10 dB/div Ref 20.00 dBm Log Start 2.45350 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.51350 GHz Sweep 5.867 ms (2001 pts) <table><thead><tr><th>MKR</th><th>MODE</th><th>TRC</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.483 50 GHz</td><td>-54.314 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.500 00 GHz</td><td>-49.984 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.488 03 GHz</td><td>-49.021 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.479 03 GHz</td><td>-4.036 dBm</td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>8</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table> MSG STATUS Frequency Auto Tune Center Freq 2.483500000 GHz Start Freq 2.453500000 GHz Stop Freq 2.513500000 GHz CF Step 6.000000 MHz Auto Man Freq Offset 0 Hz	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.483 50 GHz	-54.314 dBm				2	N	1	f	2.500 00 GHz	-49.984 dBm				3	N	1	f	2.488 03 GHz	-49.021 dBm				4	N	1	f	2.479 03 GHz	-4.036 dBm				5									6									7									8									9									10									11								
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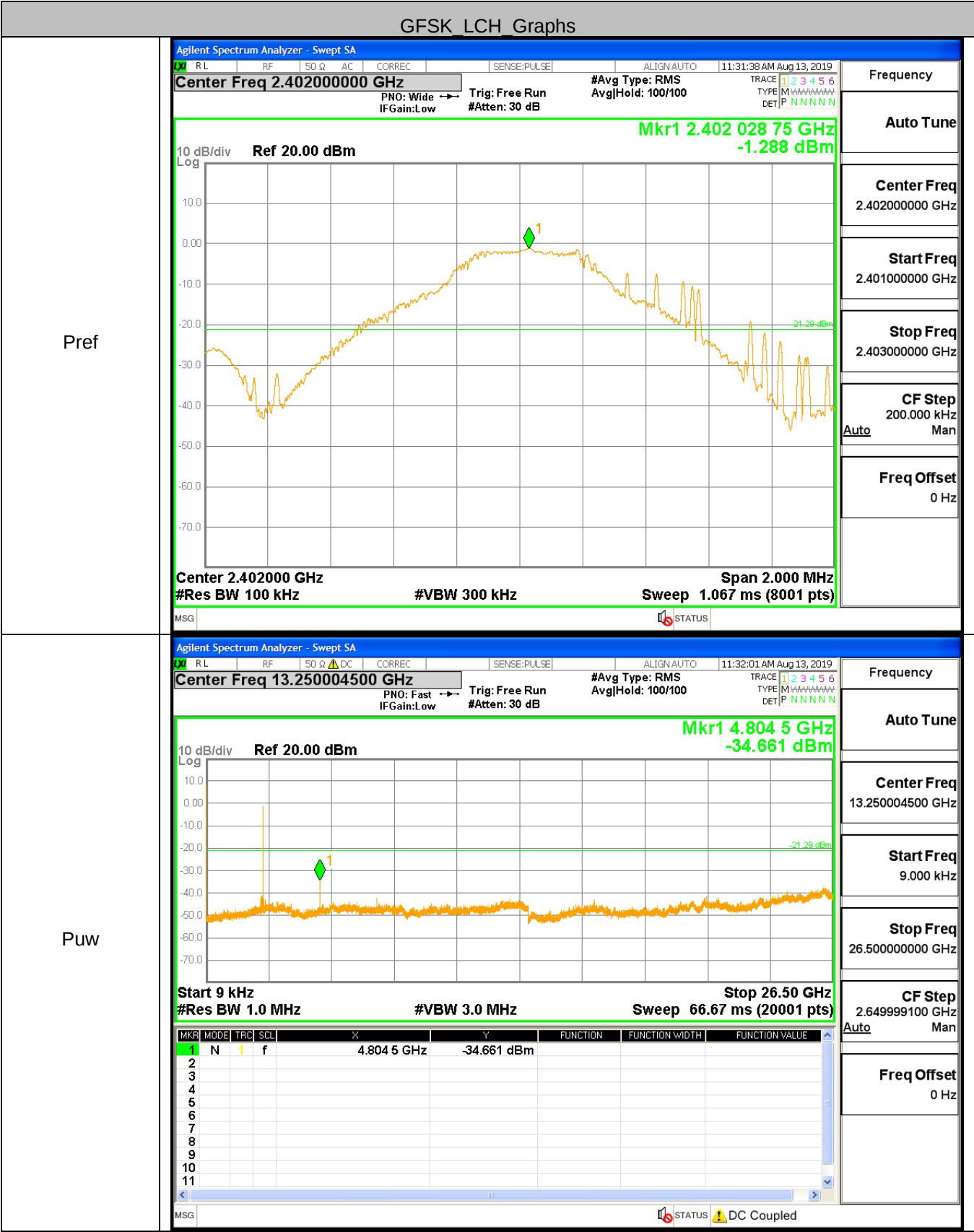
8DPSK/HCH/No Hop

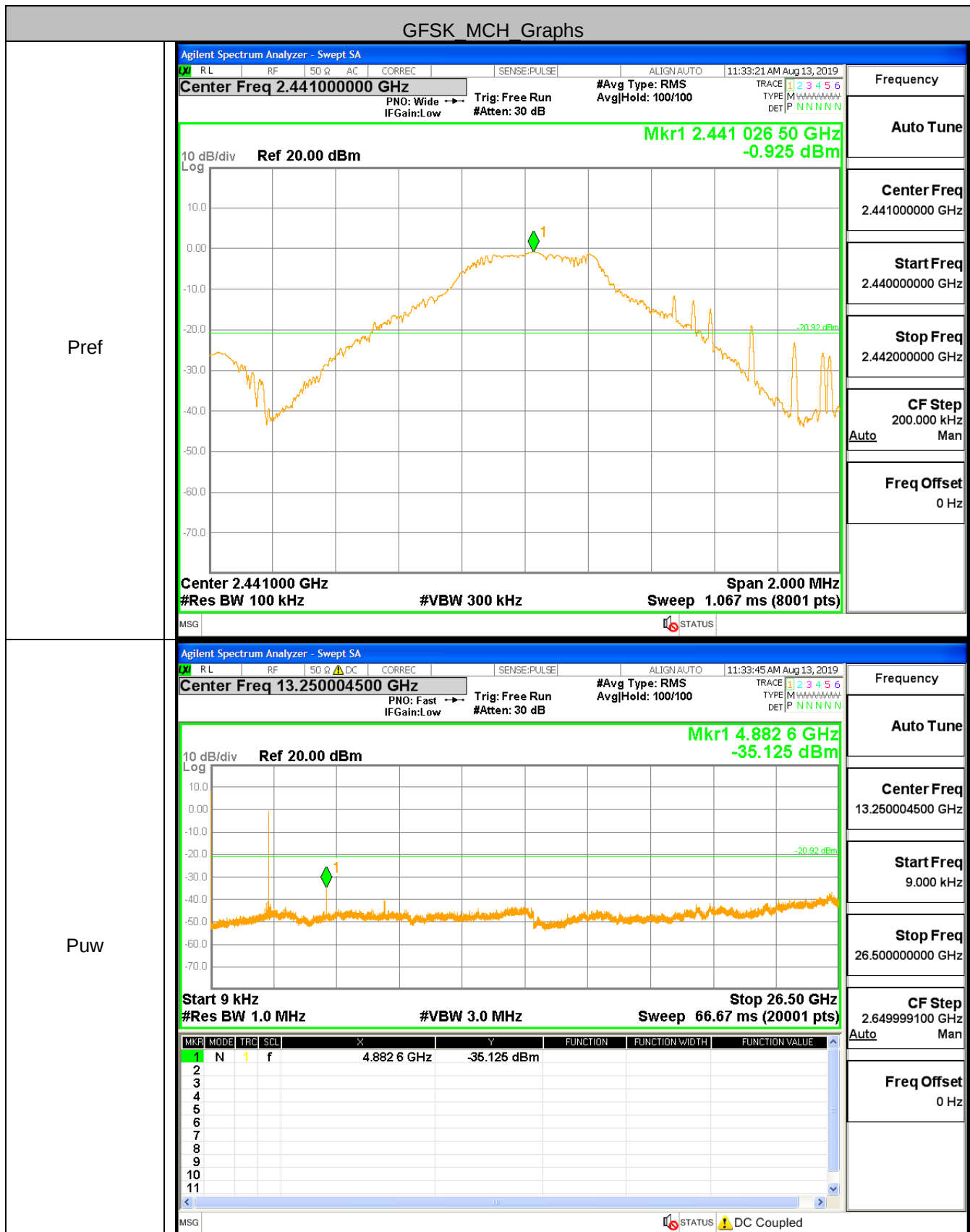


8DPSK/HCH/Hop



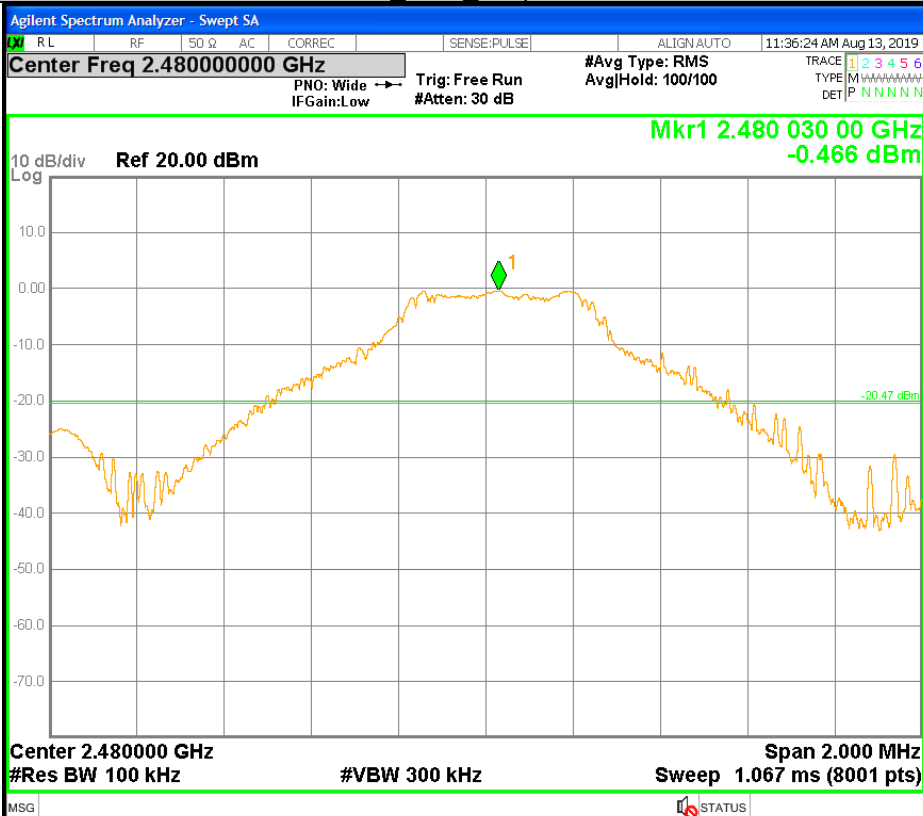
A.7 RF Conducted Spurious Emissions
Test Graph



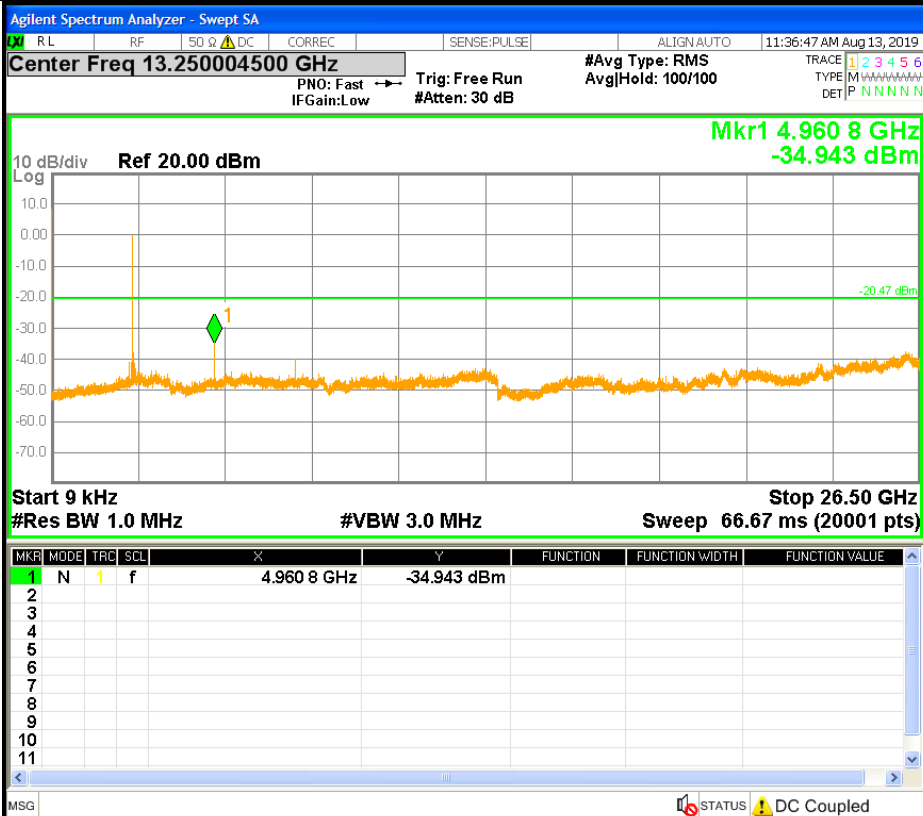


GFSK HCH Graphs

Pref

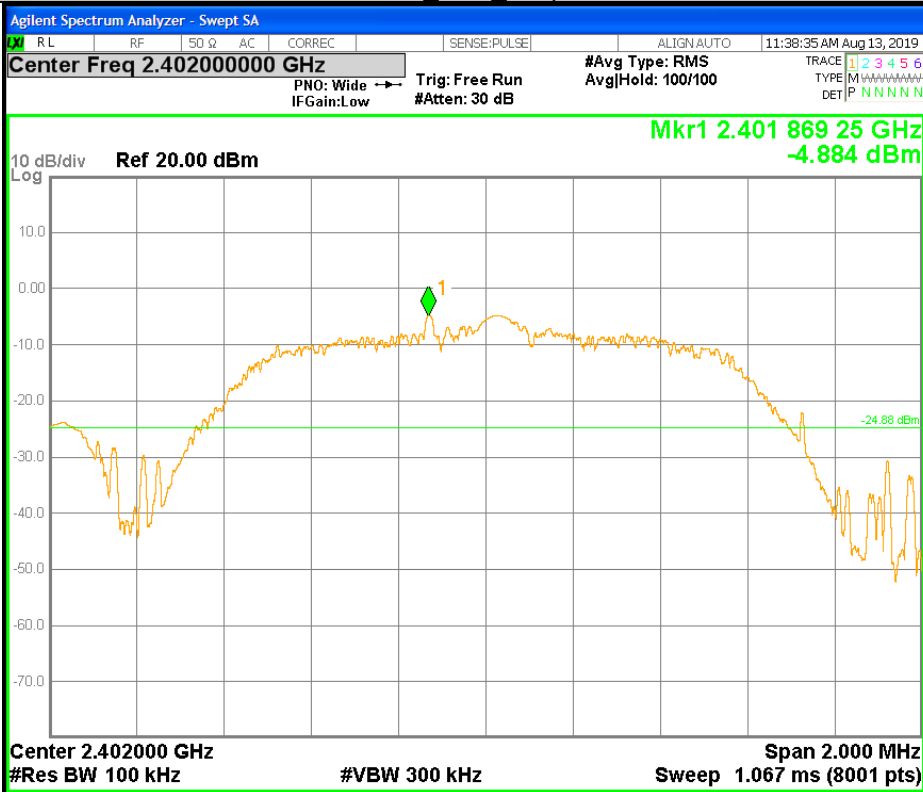


Puw

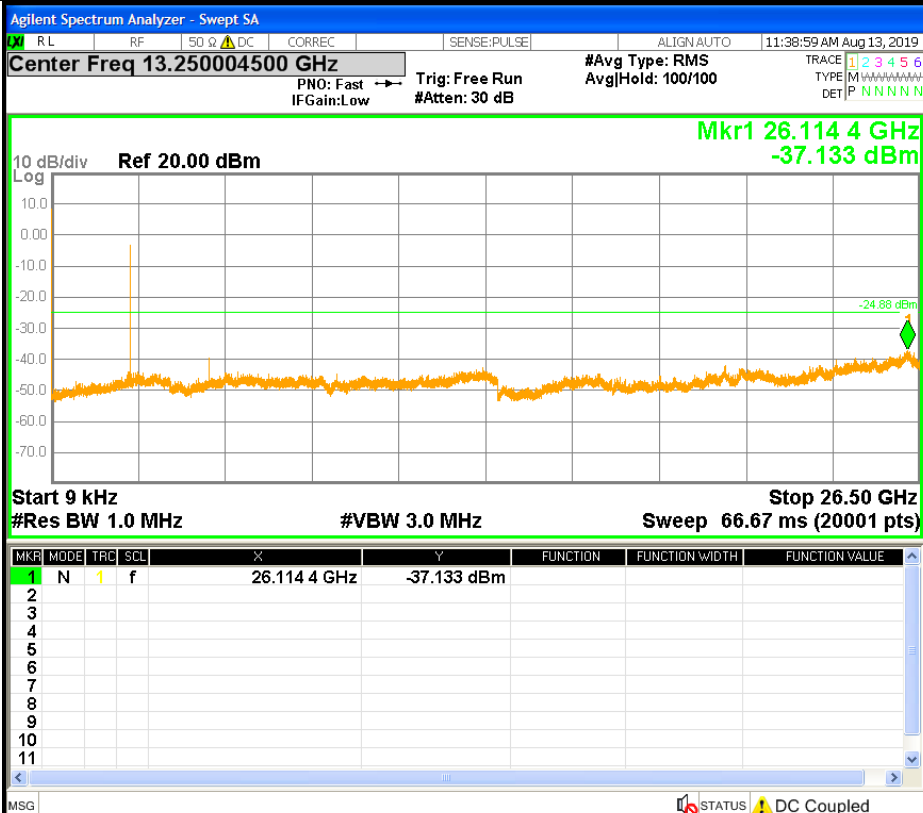


$\pi/4$ DQPSK LCH Graphs

Pref

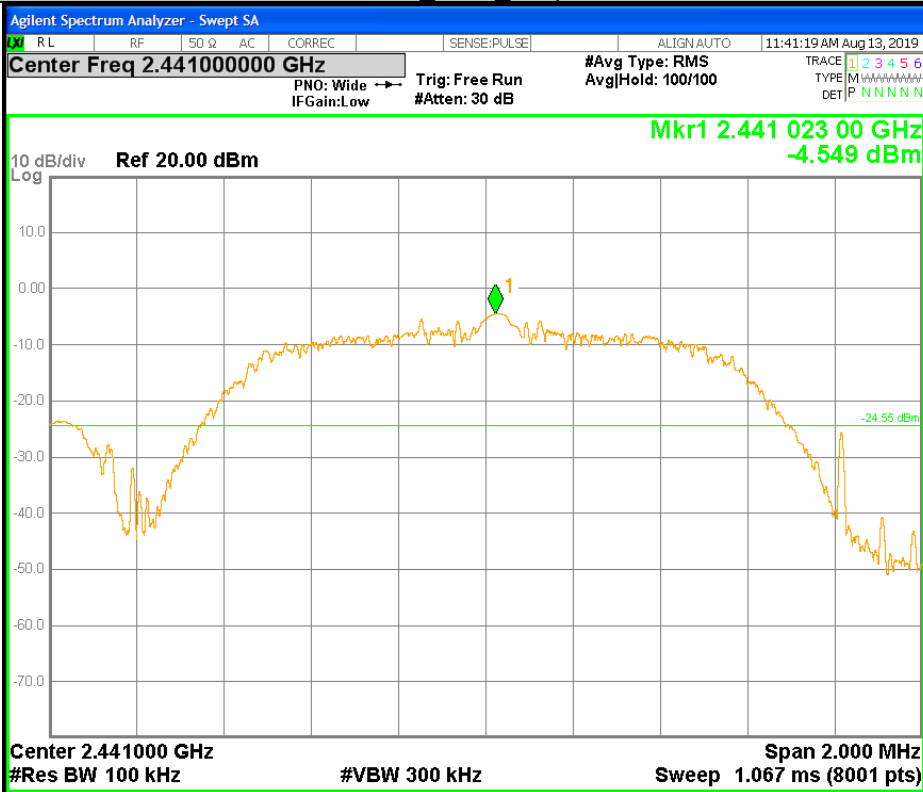


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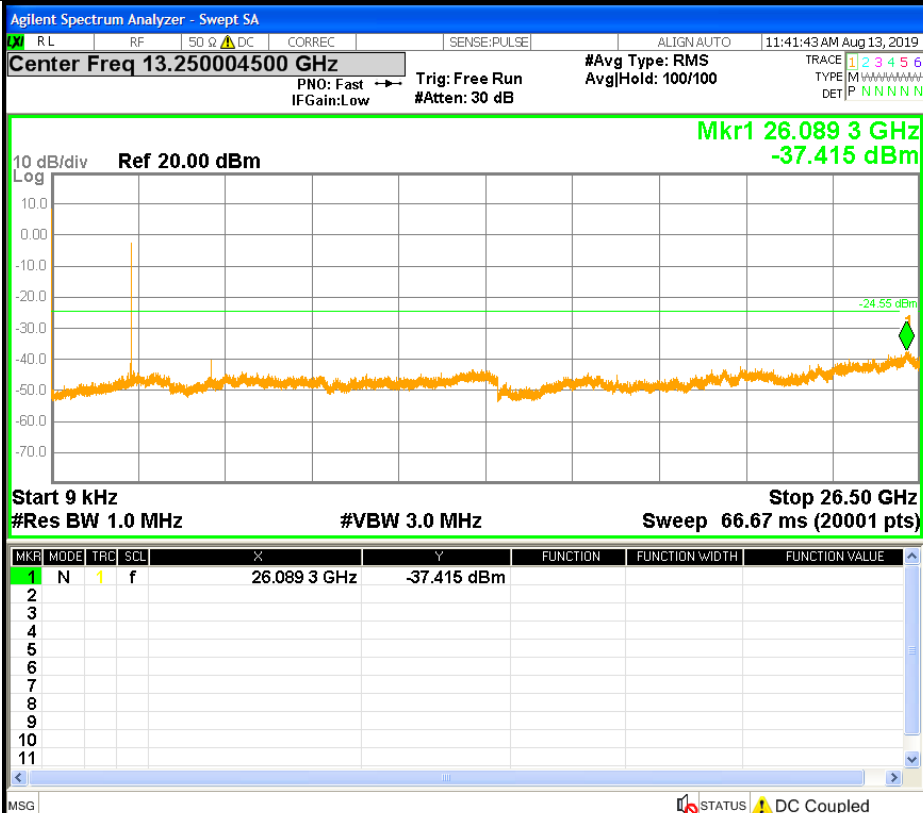


$\pi/4$ DQPSK MCH Graphs

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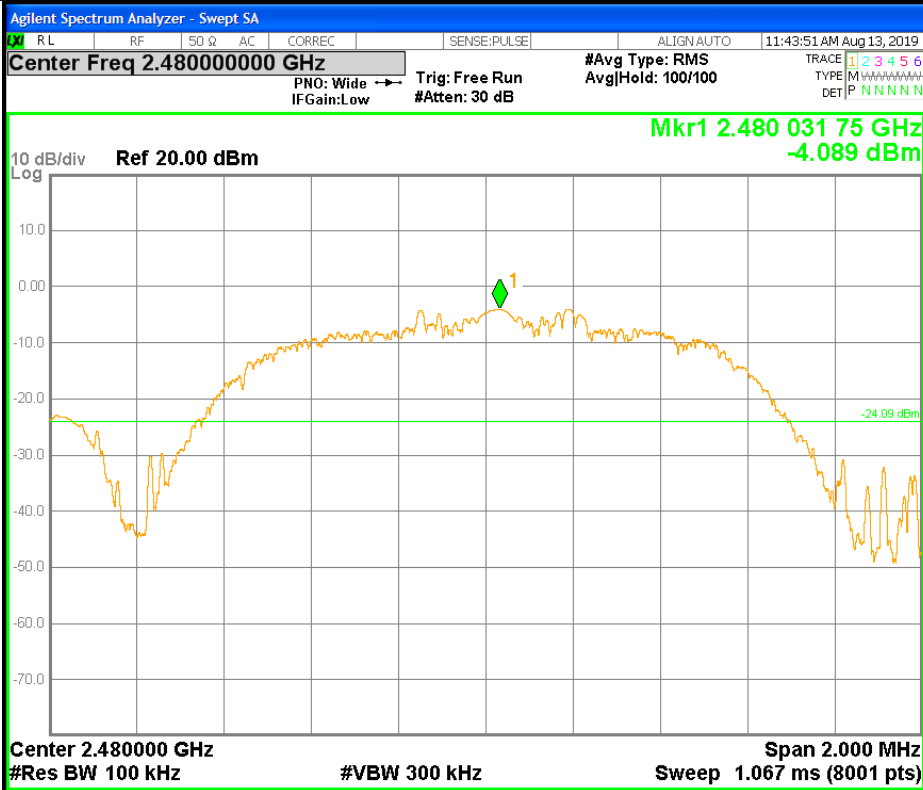


Puw



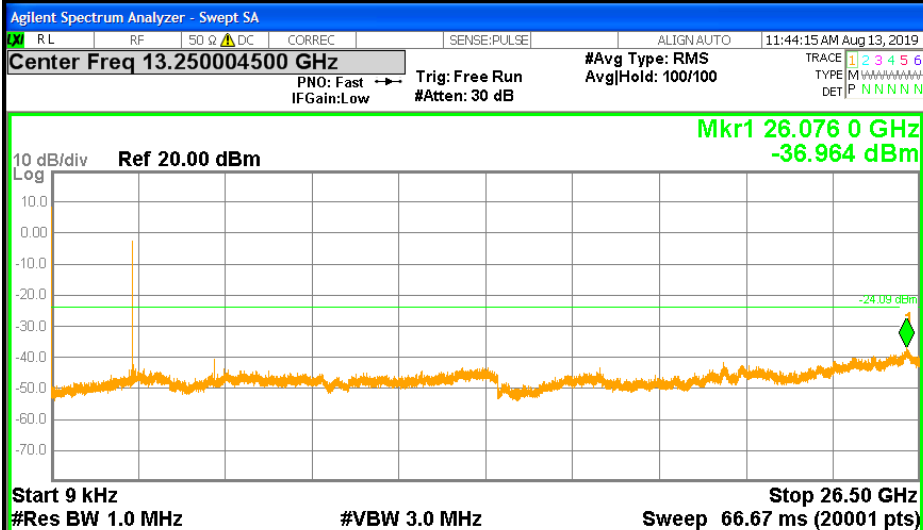
$\pi/4$ DQPSK HCH Graphs

Pref



Frequency
Auto Tune
Center Freq 2.480000000 GHz
Start Freq 2.479000000 GHz
Stop Freq 2.481000000 GHz
CF Step 200.000 kHz Auto
Freq Offset 0 Hz

Puw

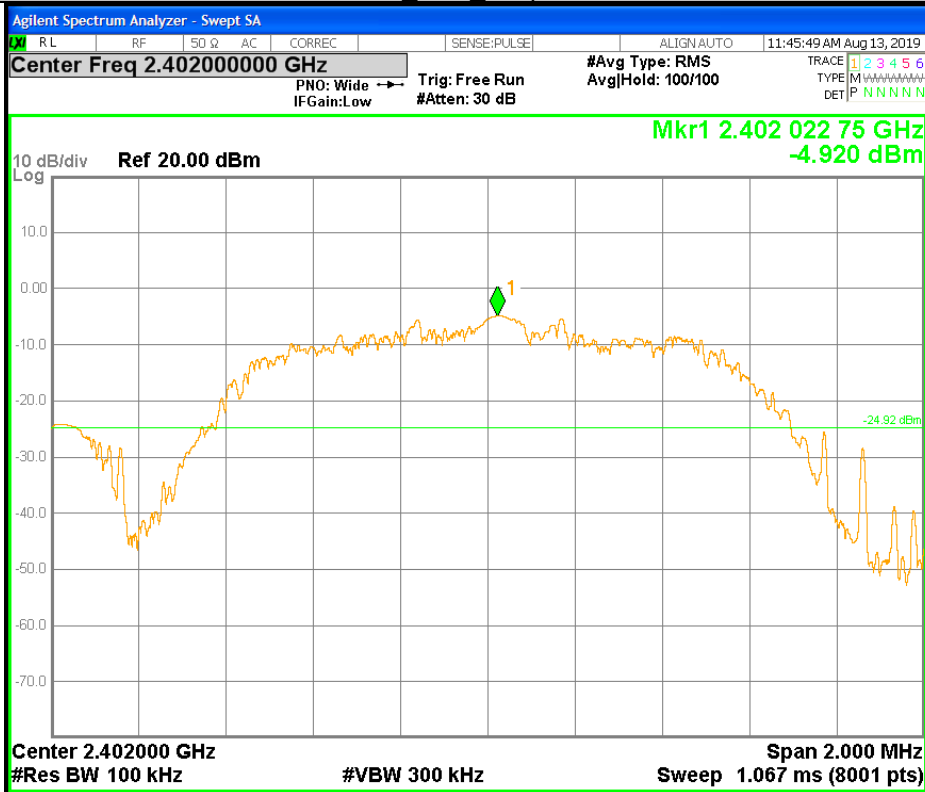


Frequency
Auto Tune
Center Freq 13.250004500 GHz
Start Freq 9.000 kHz
Stop Freq 26.500000000 GHz
CF Step 2.649999100 GHz Auto
Freq Offset 0 Hz

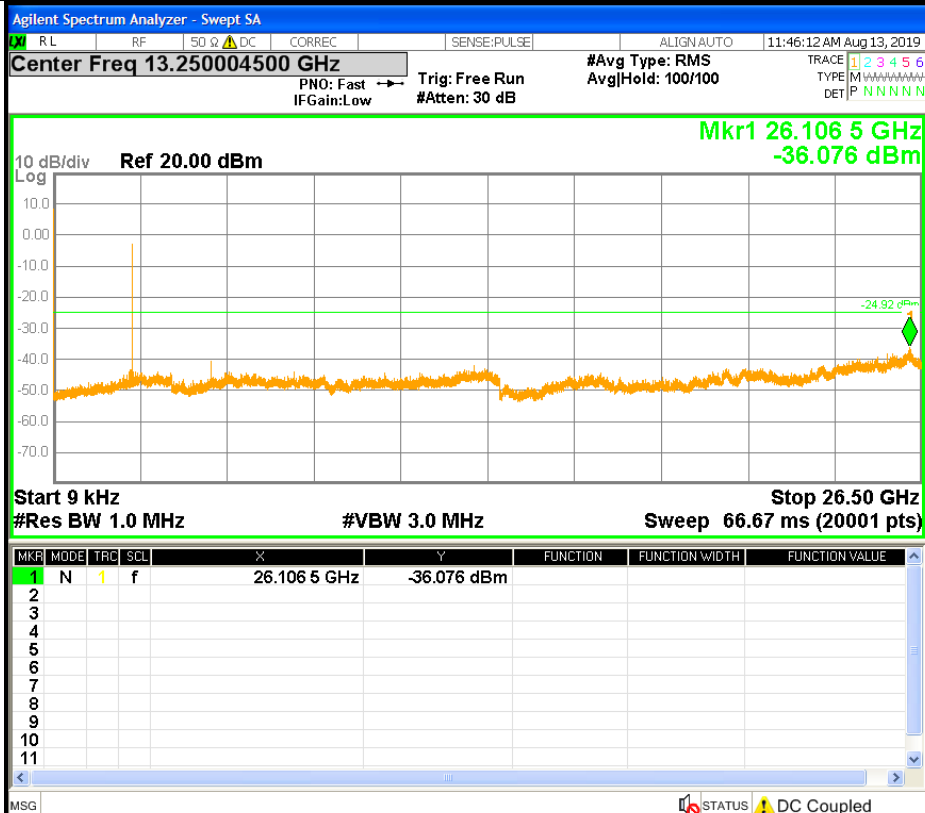
MR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	26.076 0 GHz	-36.964 dBm			
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

8DPSK LCH Graphs

Pref

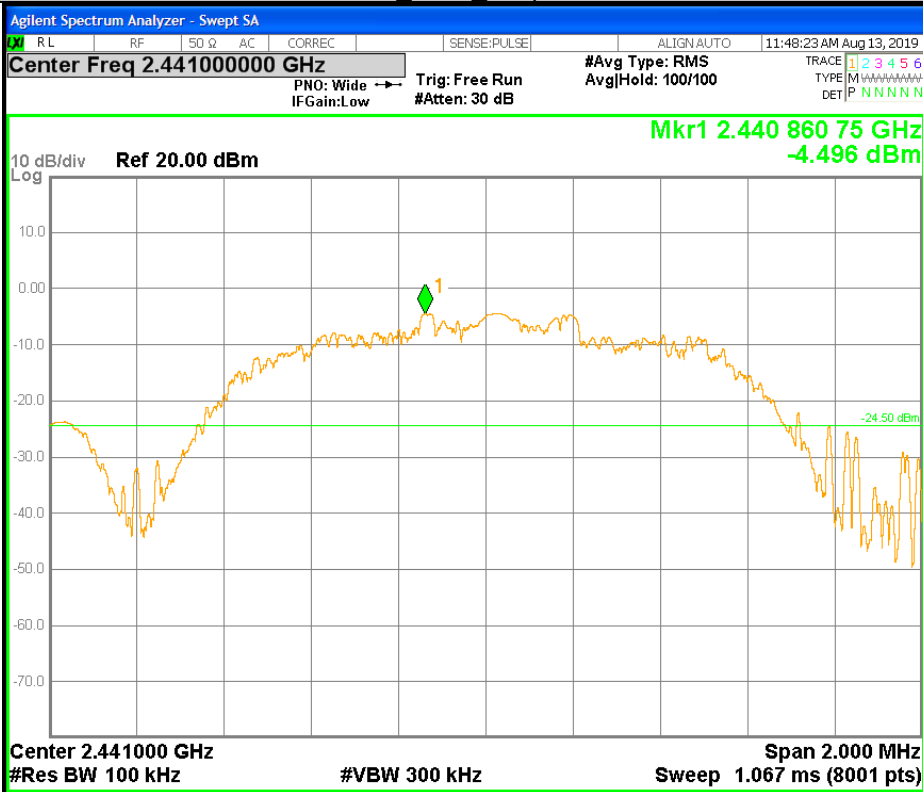


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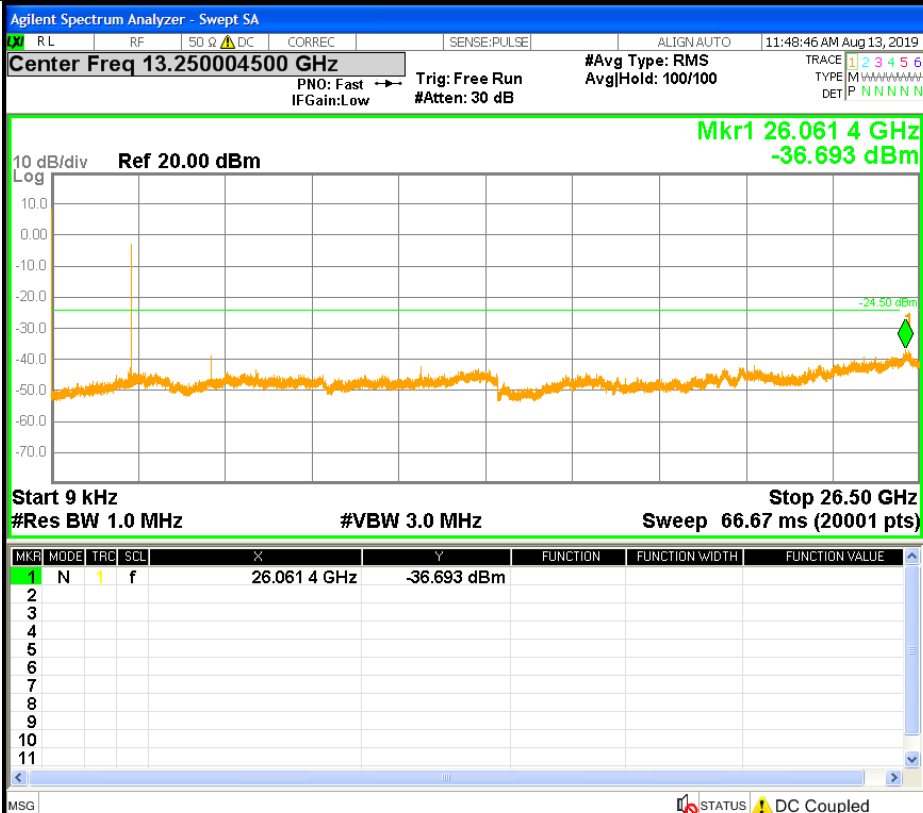


8DPSK MCH Graphs

Pref

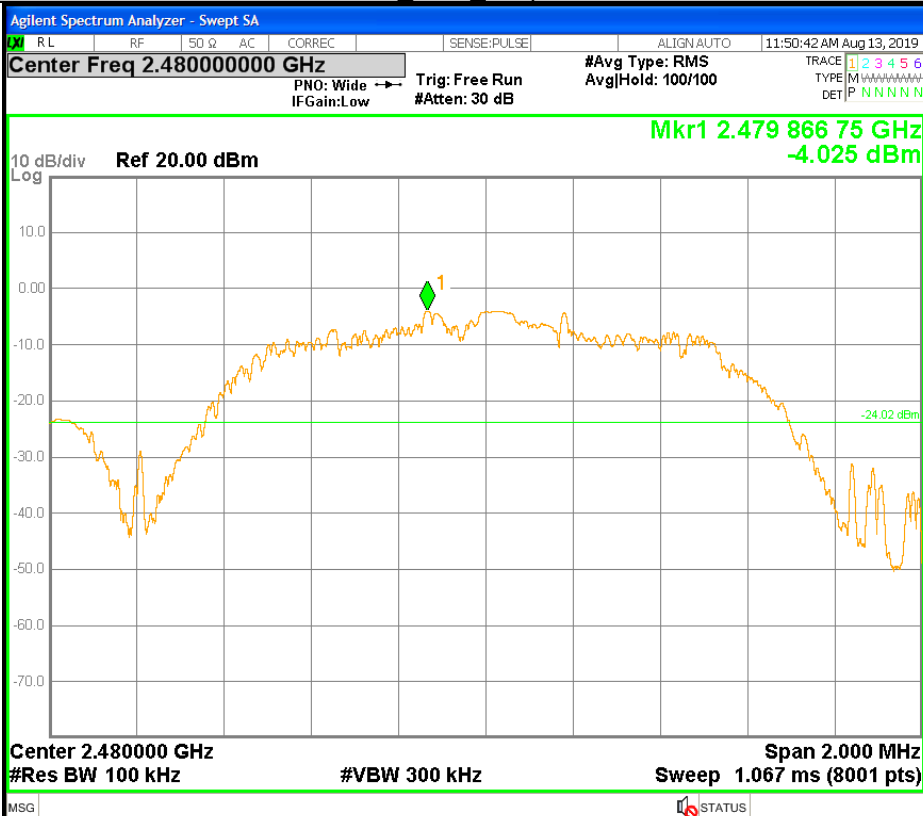


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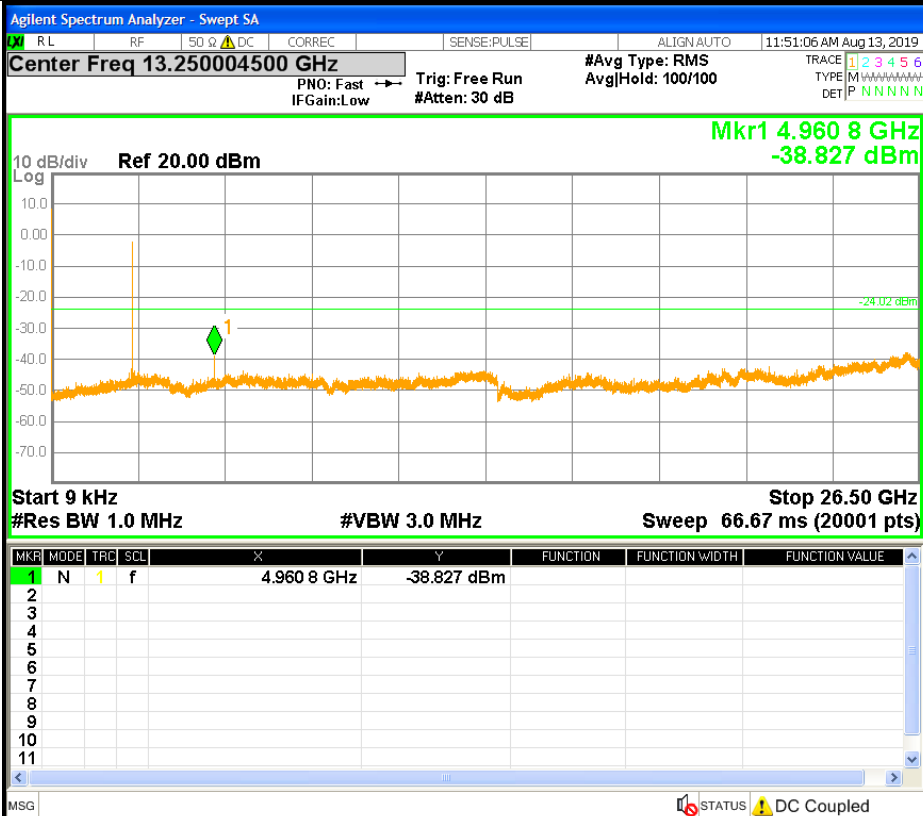


8DPSK HCH Graphs

Pref



Puw

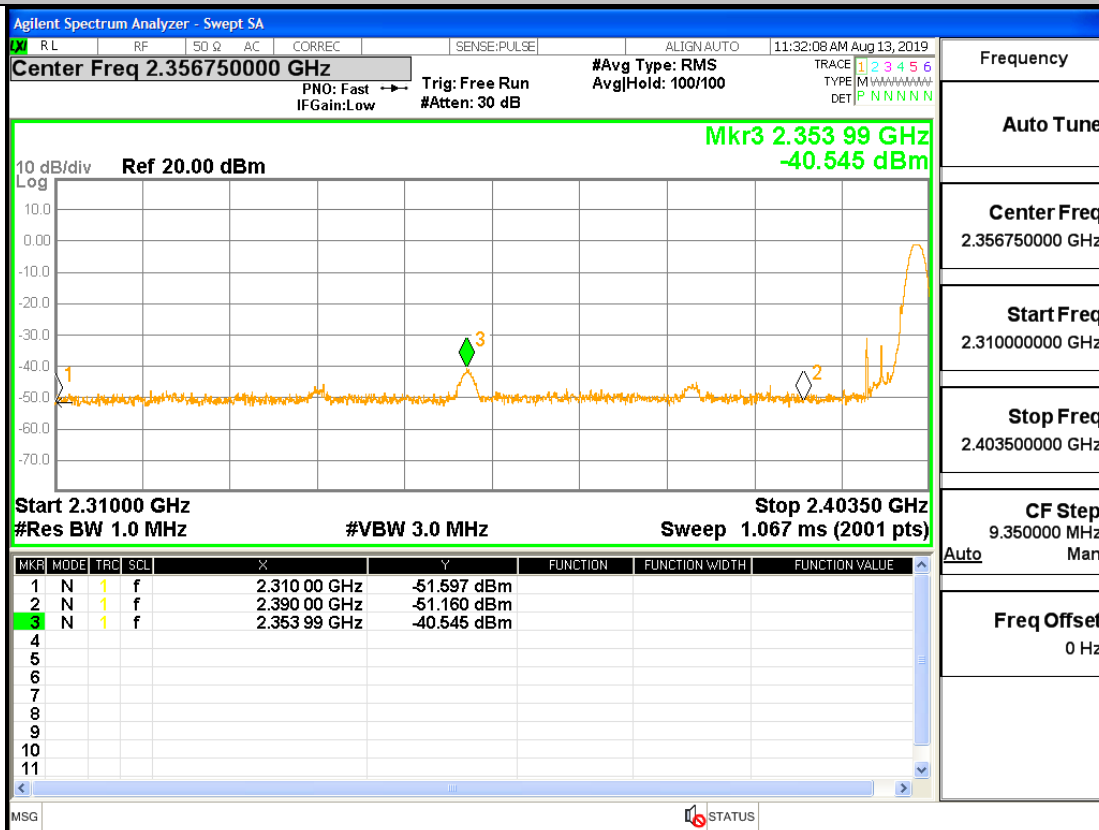


A.8 Restrict-band band-edge measurements

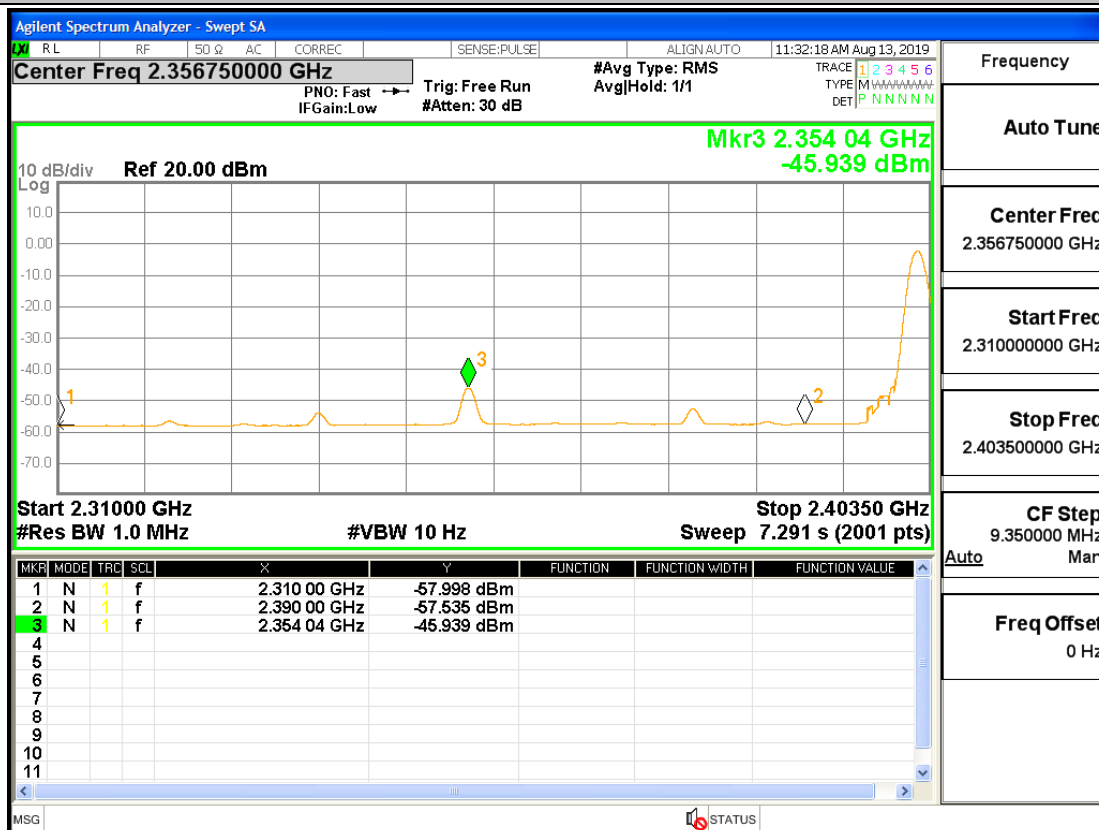
Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2353.99	2.00	0.00	-40.55	56.66	74	Pass
1DH5	2480	2483.93	2.00	0.00	-25.31	71.89	74	Pass
2DH5	2402	2353.71	2.00	0.00	-43.35	53.85	74	Pass
2DH5	2480	2483.99	2.00	0.00	-29.16	68.04	74	Pass
3DH5	2402	2353.80	2.00	0.00	-43.30	53.90	74	Pass
3DH5	2480	2483.57	2.00	0.00	-28.06	69.14	74	Pass

Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402.00	2353.99	2.00	0.00	-45.94	51.26	54	Pass
1DH5	2480.00	2483.93	2.00	0.00	-47.15	50.05	54	Pass
2DH5	2402.00	2353.71	2.00	0.00	-49.73	47.47	54	Pass
2DH5	2480.00	2483.99	2.00	0.00	-51.76	45.44	54	Pass
3DH5	2402.00	2353.80	2.00	0.00	-49.85	47.35	54	Pass
3DH5	2480.00	2483.57	2.00	0.00	-55.69	41.51	54	Pass

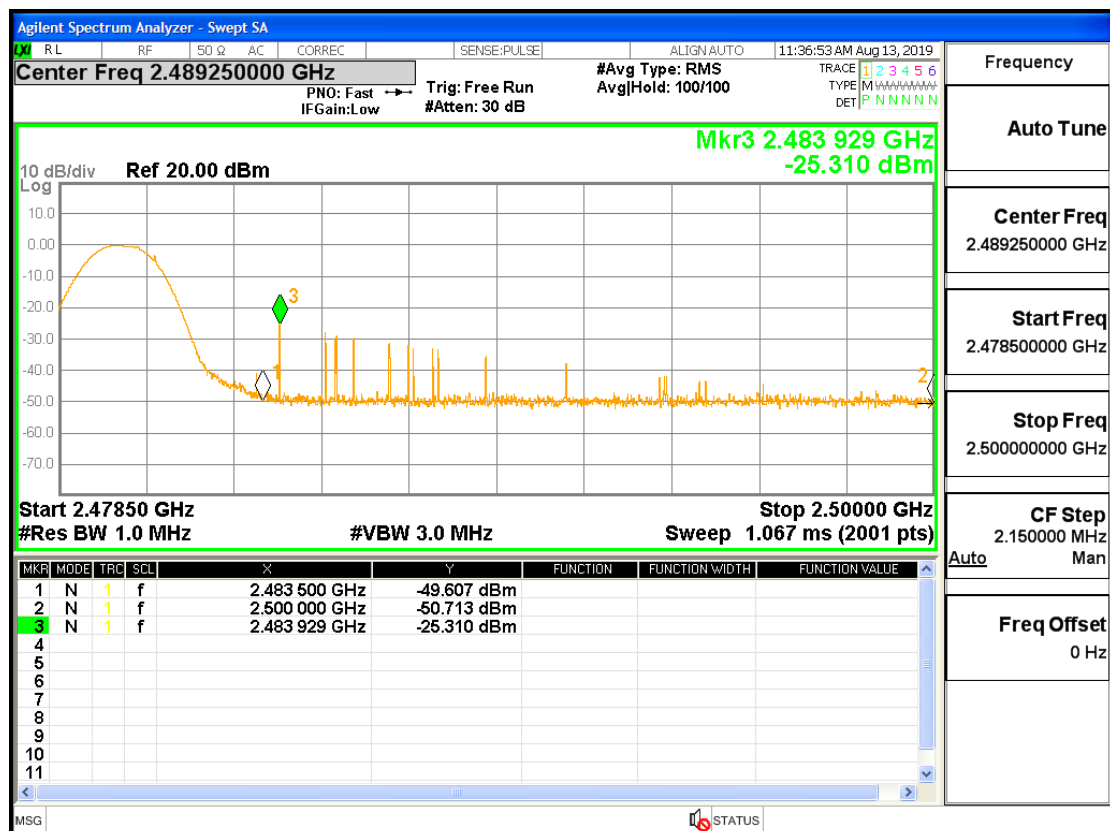
Restrict-band band-edge measurements_2402_PEAK_DH5



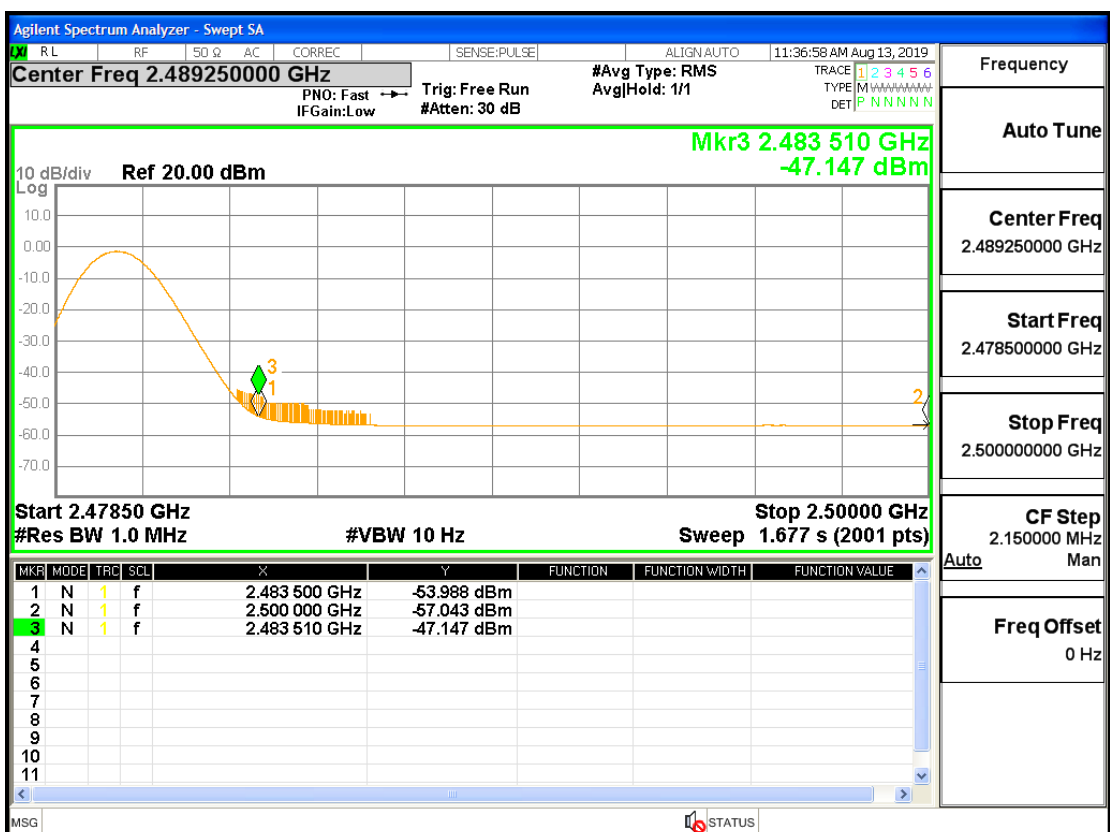
Restrict-band band-edge measurements_2402_AV_DH5



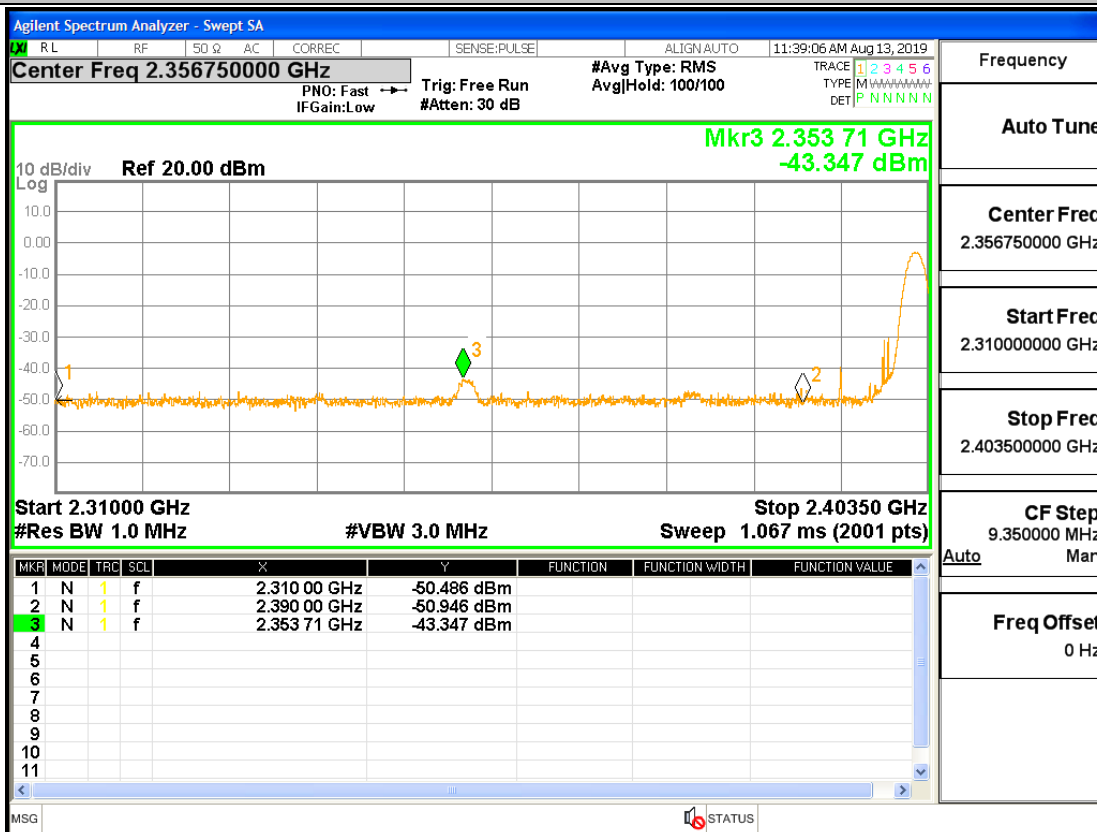
Restrict-band band-edge measurements 2480 PEAK DH5



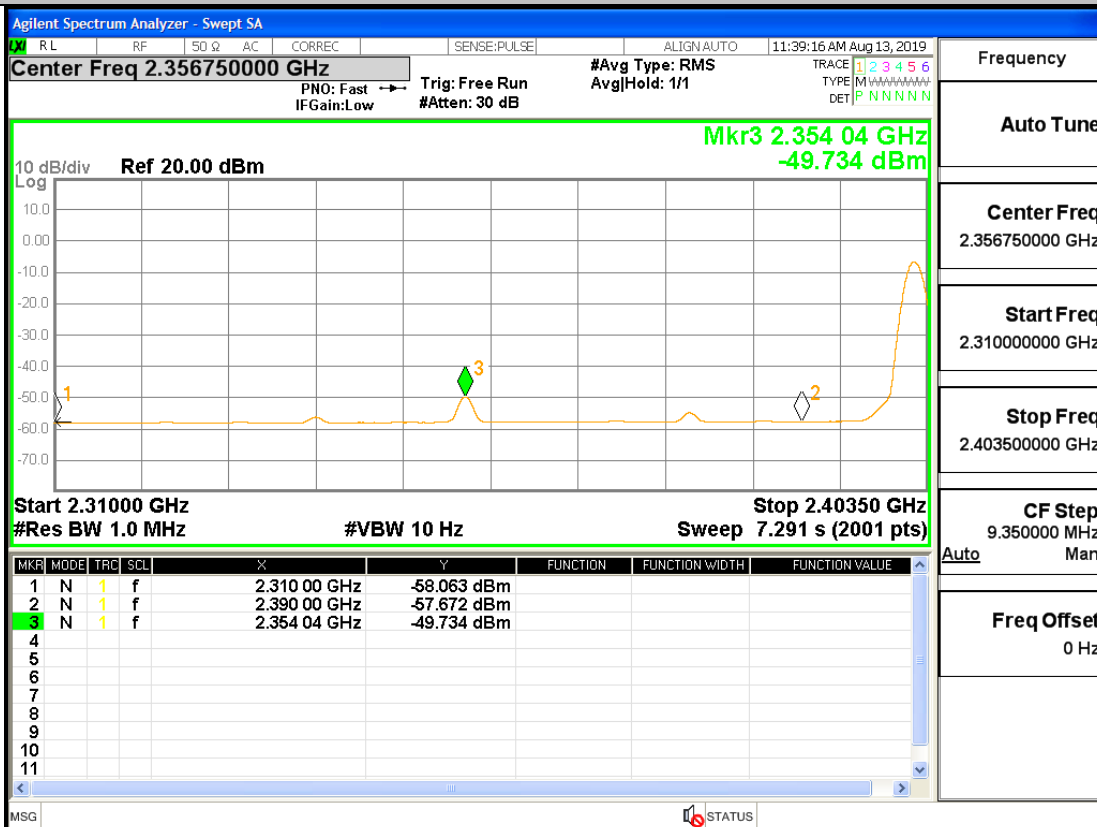
Restrict-band band-edge measurements 2480 AV DH5



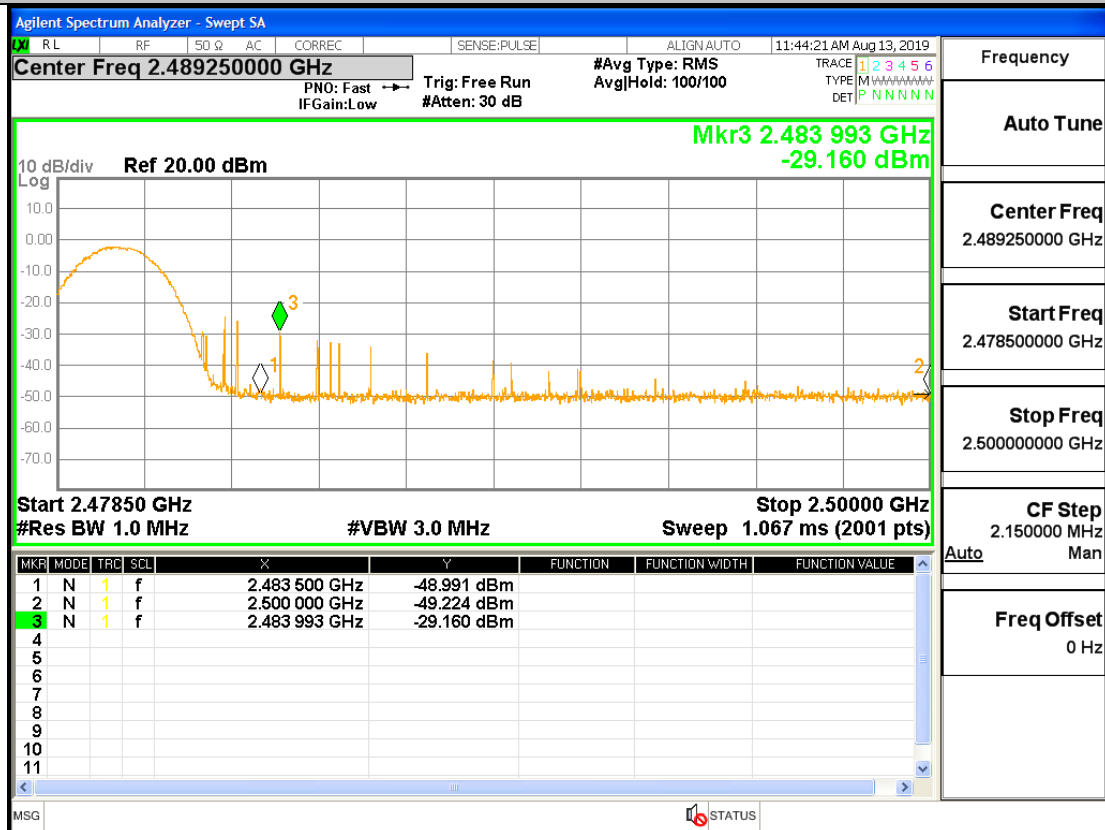
Restrict-band band-edge measurements_2402_PEAK_2DH5



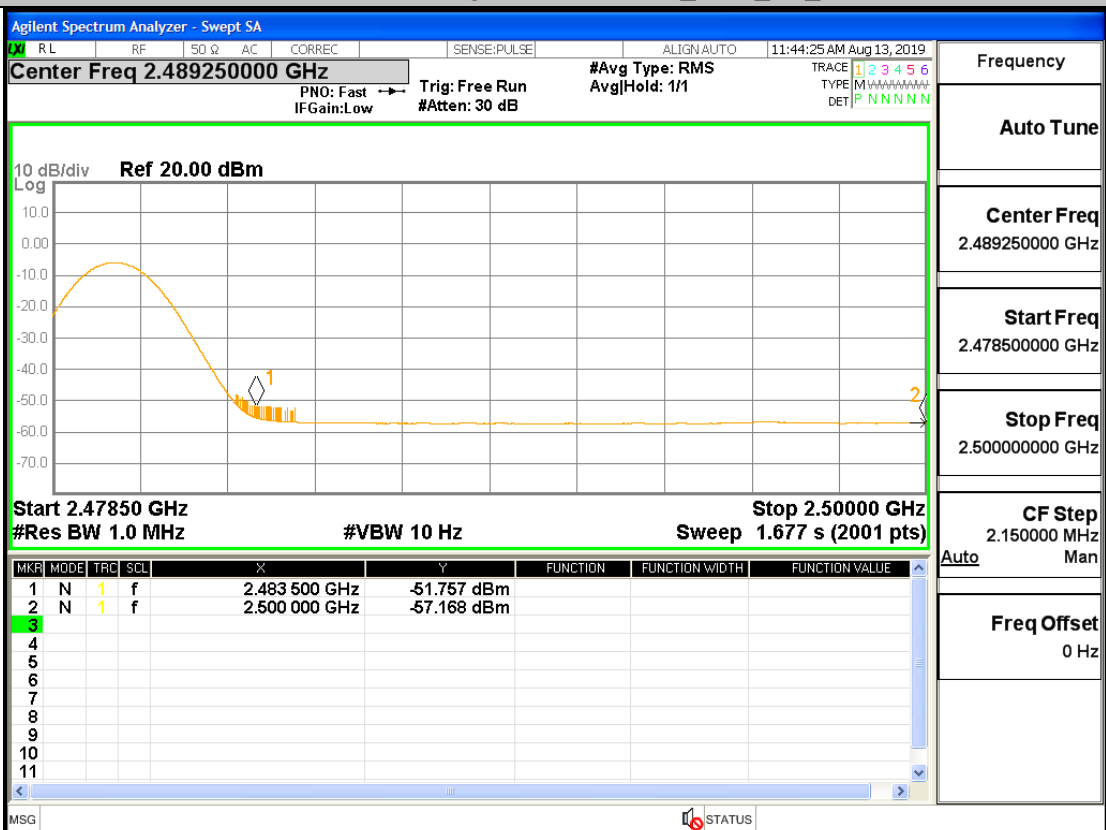
Restrict-band band-edge measurements_2402_AV_2DH5



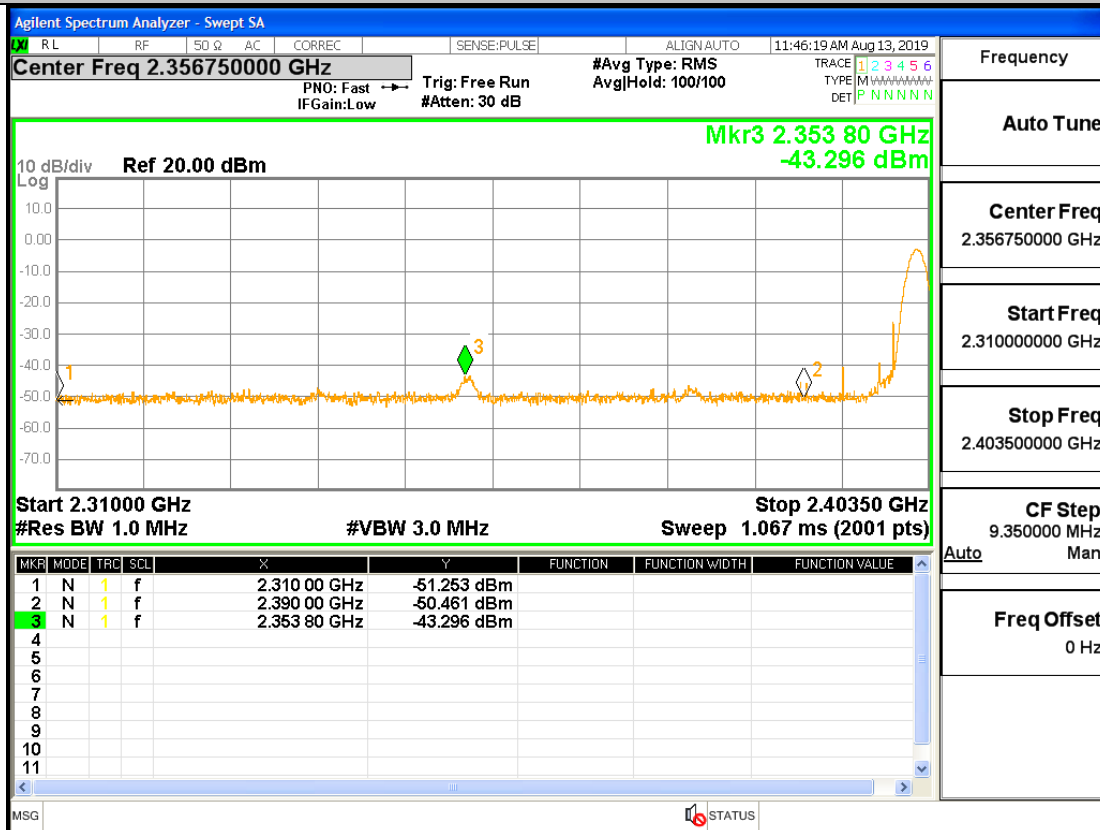
Restrict-band band-edge measurements_2480_PEAK_2DH5



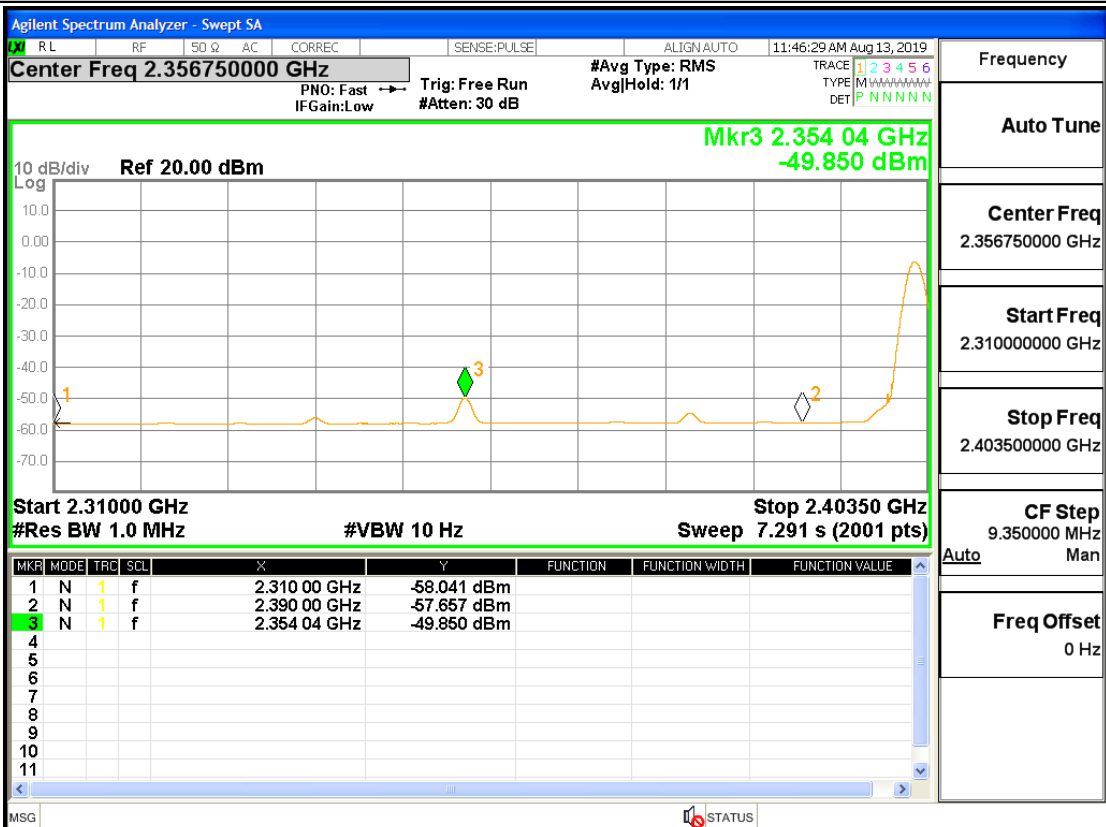
Restrict-band band-edge measurements_2480_AV_2DH5



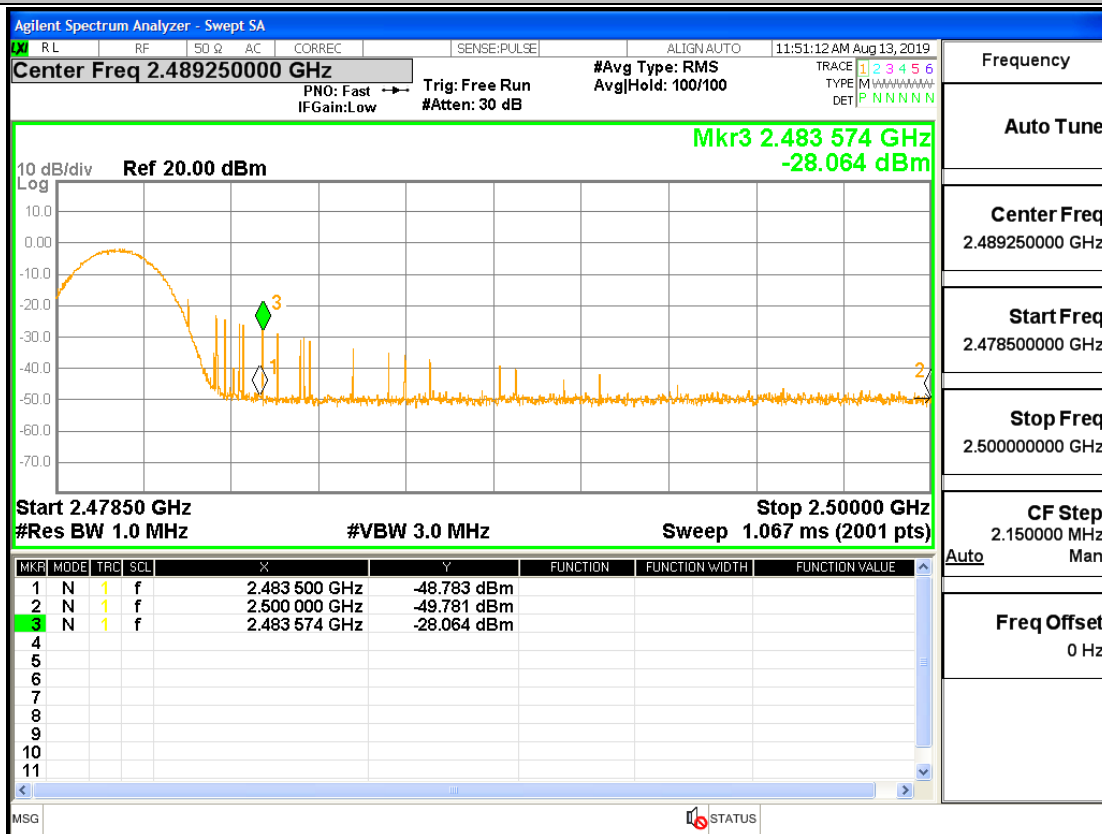
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

