

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

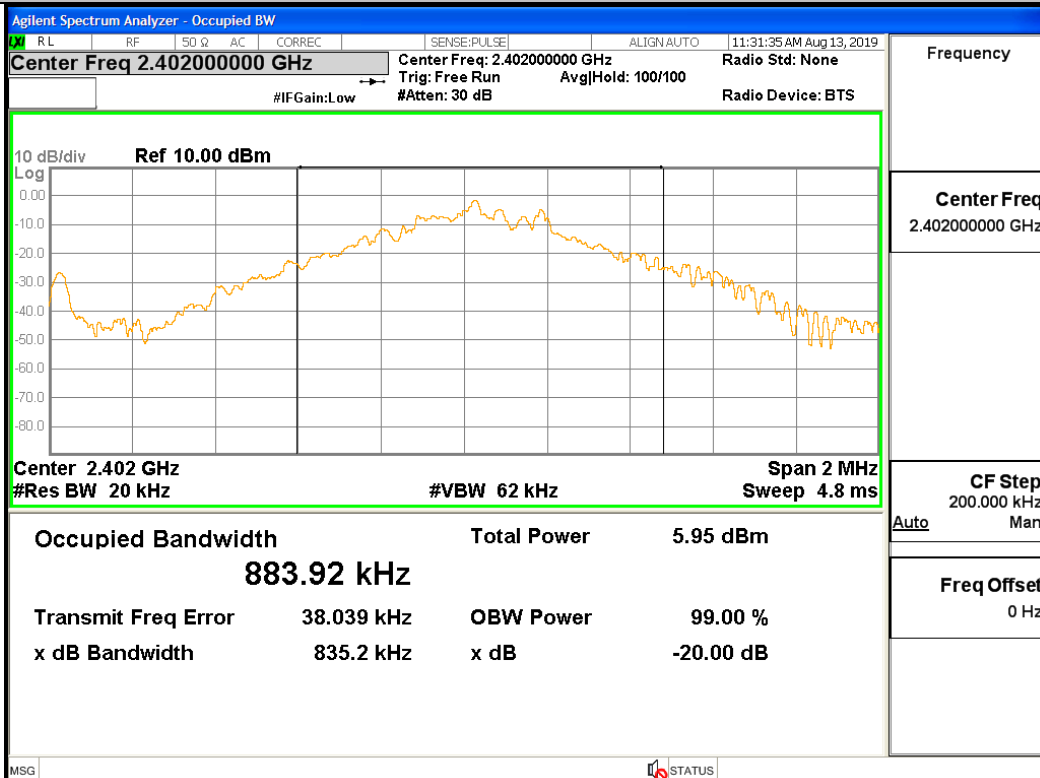
A.1 20 dB Bandwidth

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



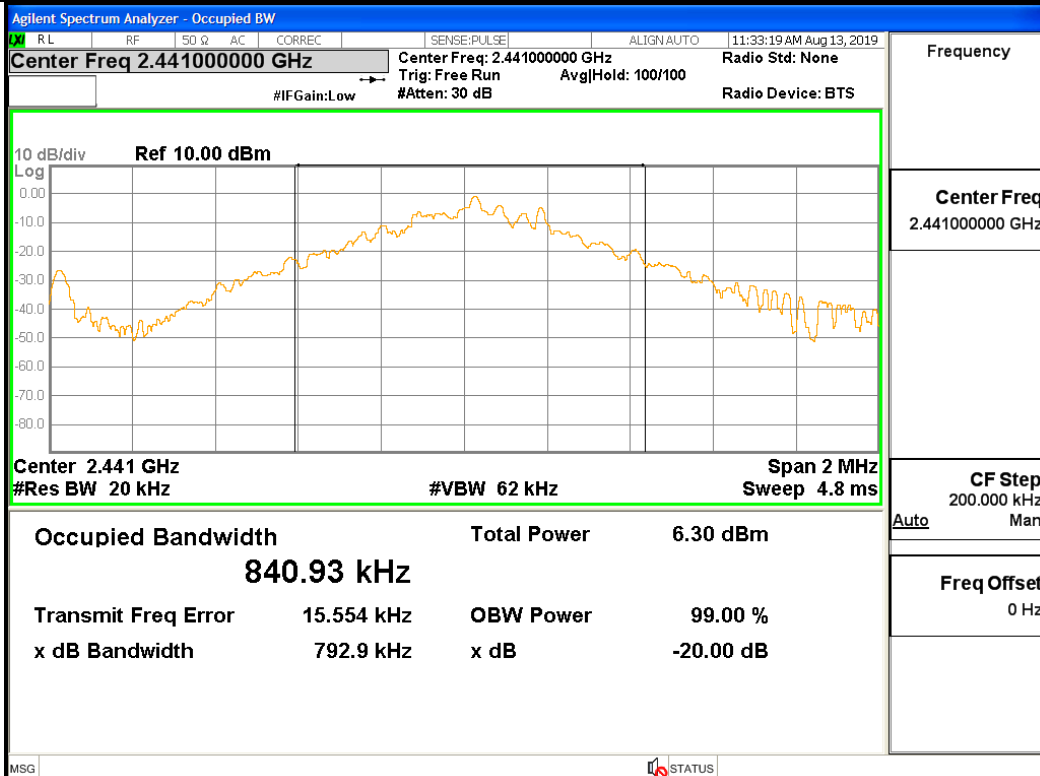
Frequency

Center Freq
2.40200000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/MCH



Frequency

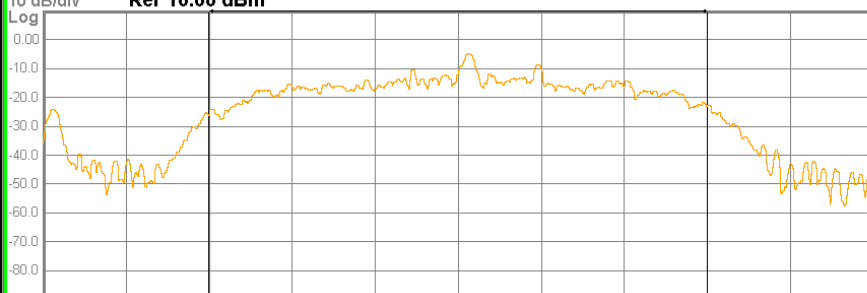
Center Freq
2.44100000 GHz

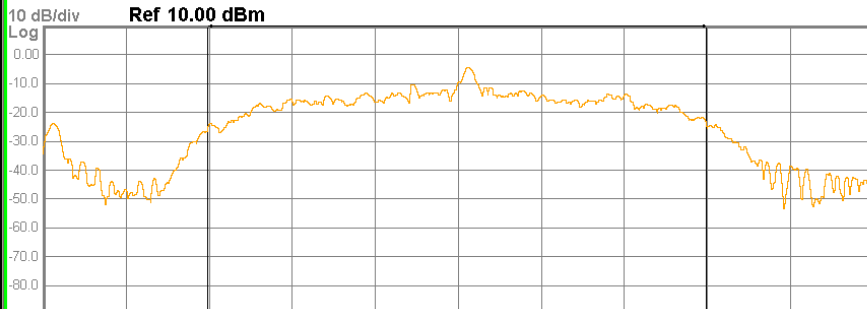
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:36:21 AM Aug 13, 2019 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS										Frequency
	10 dB/div Ref 10.00 dBm Log Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 840.99 kHz Total Power 6.51 dBm Transmit Freq Error 11.339 kHz OBW Power 99.00 % x dB Bandwidth 773.9 kHz x dB -20.00 dB										Center Freq 2.480000000 GHz
											CF Step 200.000 kHz Auto Man
											Freq Offset 0 Hz
π/4DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:38:33 AM Aug 13, 2019										Frequency
	Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS										Center Freq 2.402000000 GHz
	10 dB/div Ref 10.00 dBm Log 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										CF Step 200.000 kHz Auto Man
											Freq Offset 0 Hz

π/4DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:41:16 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										Frequency
	10 dB/div Ref 10.00 dBm Log Center 2.441 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.1959 MHz Total Power 2.76 dBm Transmit Freq Error 6.744 kHz OBW Power 99.00 % x dB Bandwidth 1.593 MHz x dB -20.00 dB										Center Freq 2.441000000 GHz
											CF Step 200.000 kHz Auto Man
											Freq Offset 0 Hz
π/4DQPSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN:AUTO 11:43:49 AM Aug 13, 2019										Frequency
	Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS										Center Freq 2.480000000 GHz
	10 dB/div Ref 10.00 dBm Log Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.2025 MHz Total Power 3.25 dBm Transmit Freq Error -1.502 kHz OBW Power 99.00 % x dB Bandwidth 1.586 MHz x dB -20.00 dB										CF Step 200.000 kHz Auto Man
											Freq Offset 0 Hz

8DPSK/LCH	Agilent Spectrum Analyzer - Occupied BW				SENSE:PULSE				ALIGN AUTO		11:45:46 AM Aug 13, 2019		Frequency					
	Center Freq 2.40200000 GHz				Center Freq: 2.402000000 GHz				Radio Std: None				Center Freq 2.402000000 GHz					
	#IFGain:Low				#Atten: 30 dB				AvgHld: 100/100		Radio Device: BTS							
																		
	Center 2.402 GHz				#Res BW 20 kHz				#VBW 62 kHz				Span 2 MHz		CF Step 200.000 kHz			
												Sweep 4.8 ms	Auto					
Occupied Bandwidth												Total Power		2.74 dBm				
1.1981 MHz																		
Transmit Freq Error												626 Hz		OBW Power		99.00 %		Freq Offset 0 Hz
x dB Bandwidth												1.593 MHz		x dB		-20.00 dB		
MSG												STATUS						

8DPSK/MCH	Agilent Spectrum Analyzer - Occupied BW				SENSE:PULSE				ALIGN AUTO		11:48:20 AM Aug 13, 2019		Frequency					
	Center Freq 2.441000000 GHz				Center Freq: 2.441000000 GHz				Radio Std: None				Center Freq 2.441000000 GHz					
	#IFGain:Low				#Atten: 30 dB				AvgHld: 100/100		Radio Device: BTS							
																		
	Center 2.441 GHz				#Res BW 20 kHz				#VBW 62 kHz				Span 2 MHz		CF Step 200.000 kHz			
												Sweep 4.8 ms		Auto				
Occupied Bandwidth												Total Power		3.01 dBm				
1.1960 MHz																		
Transmit Freq Error												-2.243 kHz		OBW Power		99.00 %		Freq Offset 0 Hz
x dB Bandwidth												1.602 MHz		x dB		-20.00 dB		
MSG												STATUS						

Center Freq 2.441000000 GHz

Center Freq: 2.441000000 GHz

Radio Std: None

#IFGain:Low

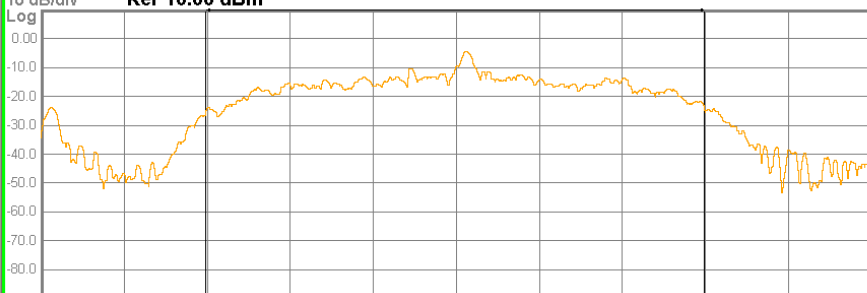
#Atten: 30 dB

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

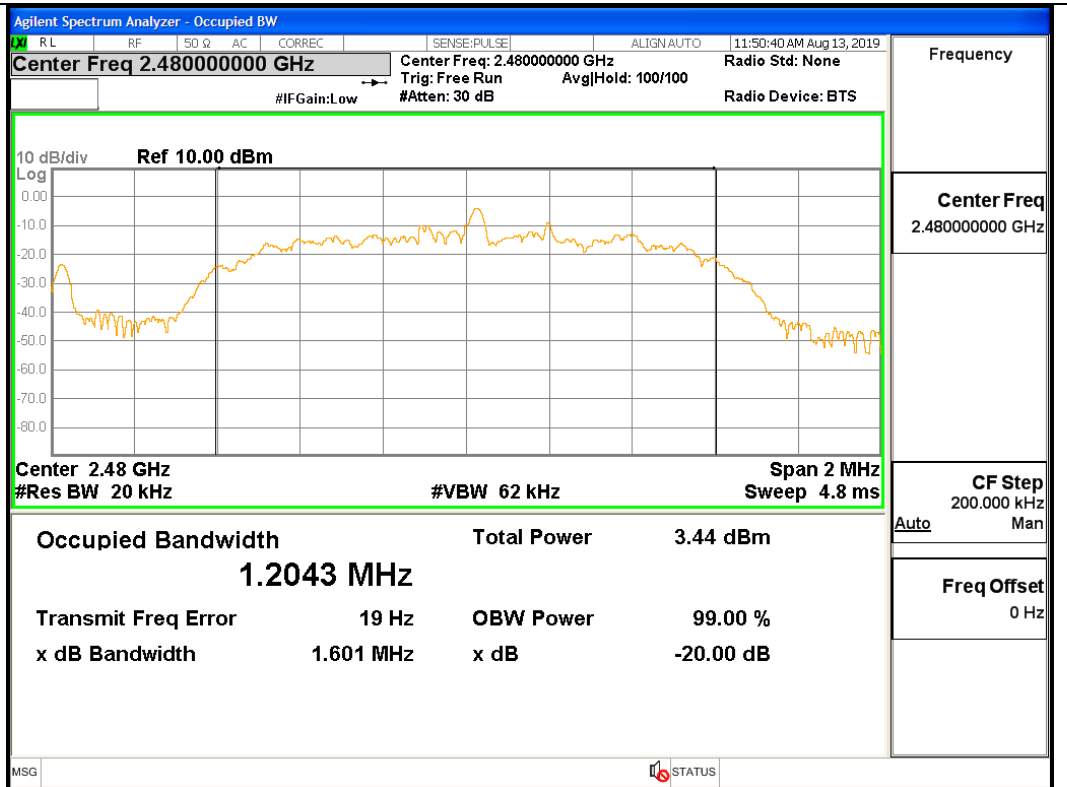
x dB

-20.00 dB

MSG

STATUS

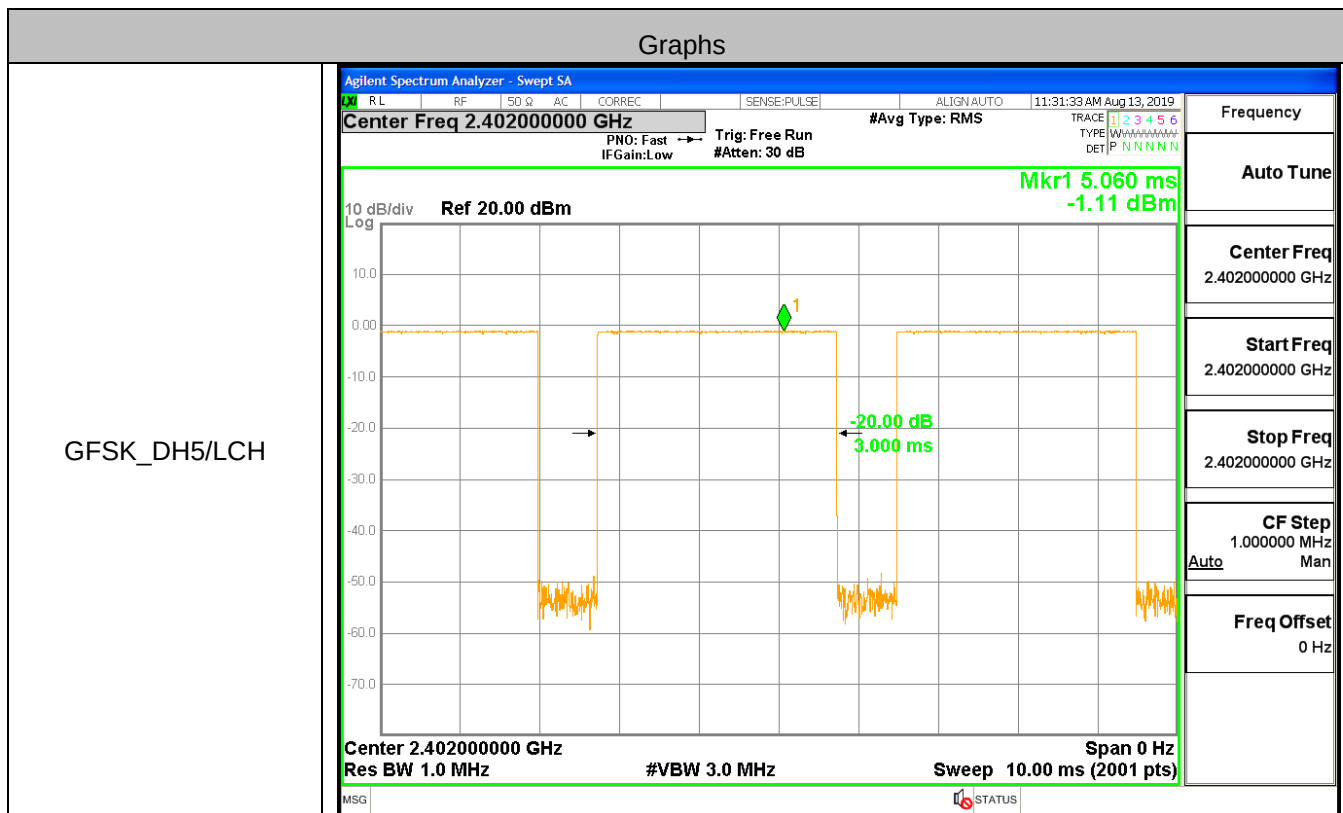
8DPSK/HCH

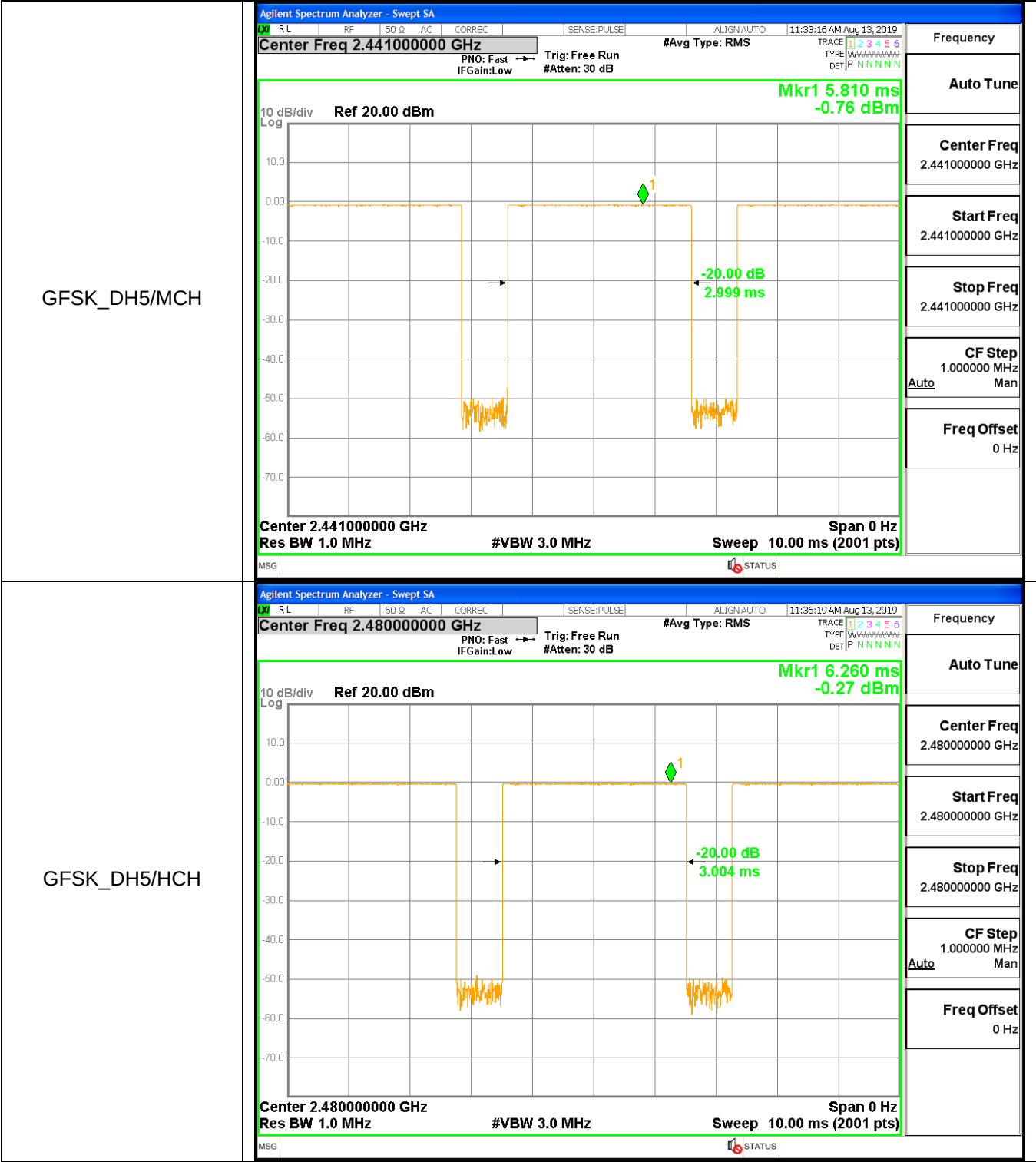


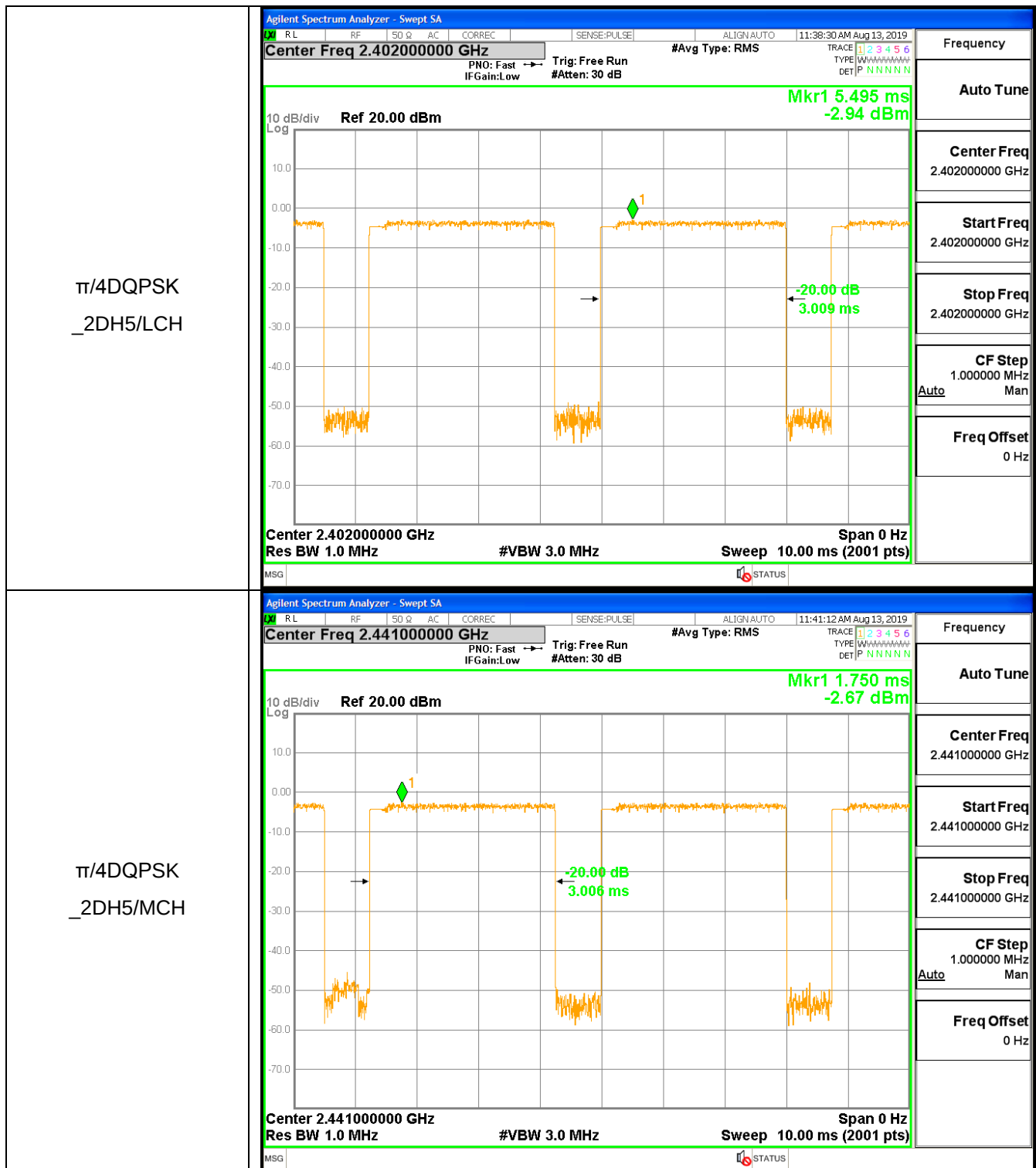
A.2 Dwell Time

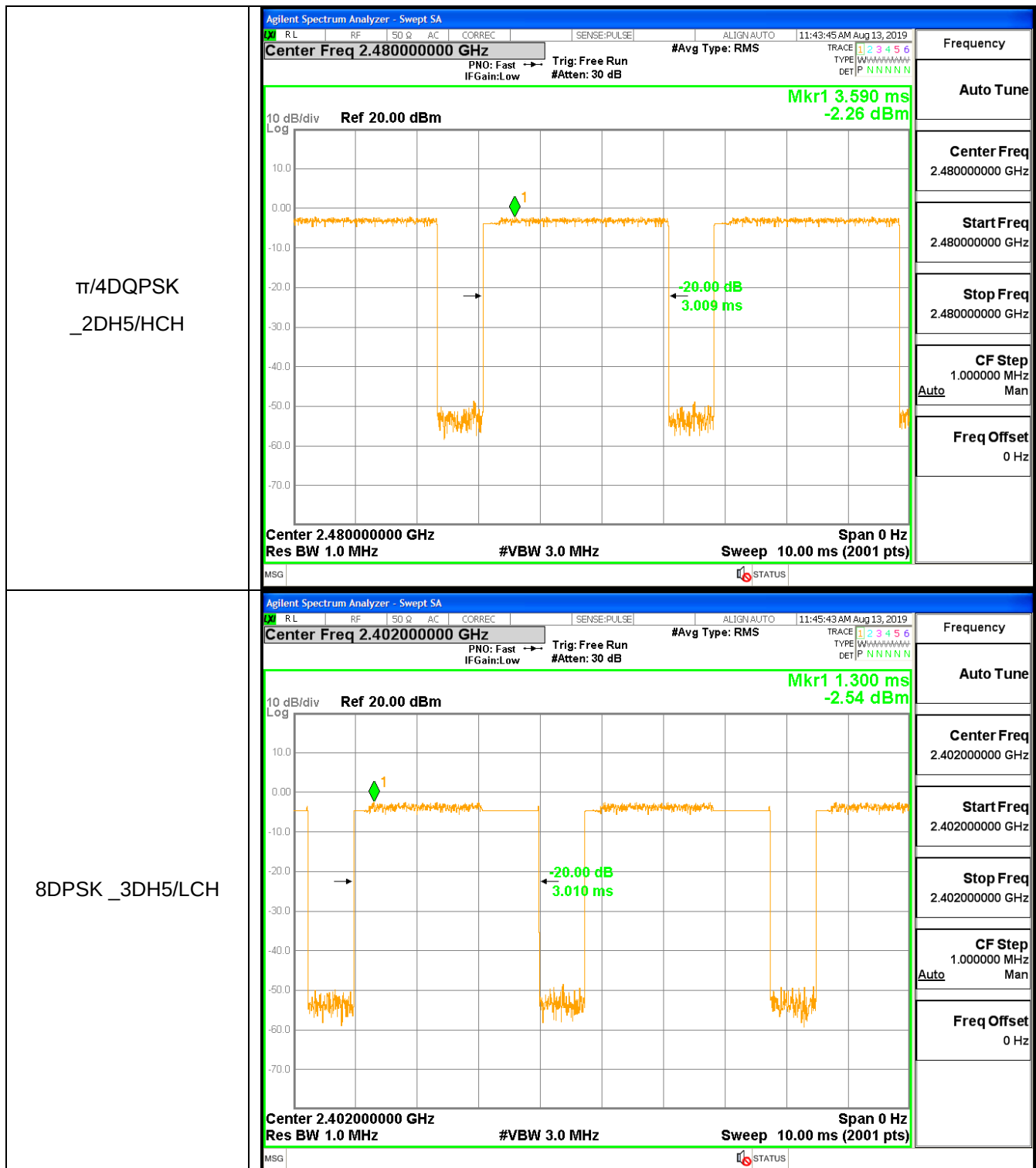
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.003000	106.7	0.320092	0.4	PASS
GFSK	DH5	MCH	0.002999	106.7	0.319999	0.4	PASS
GFSK	DH5	HCH	0.003004	106.7	0.320507	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.003009	106.7	0.321017	0.4	PASS
$\pi/4$ DQPSK	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

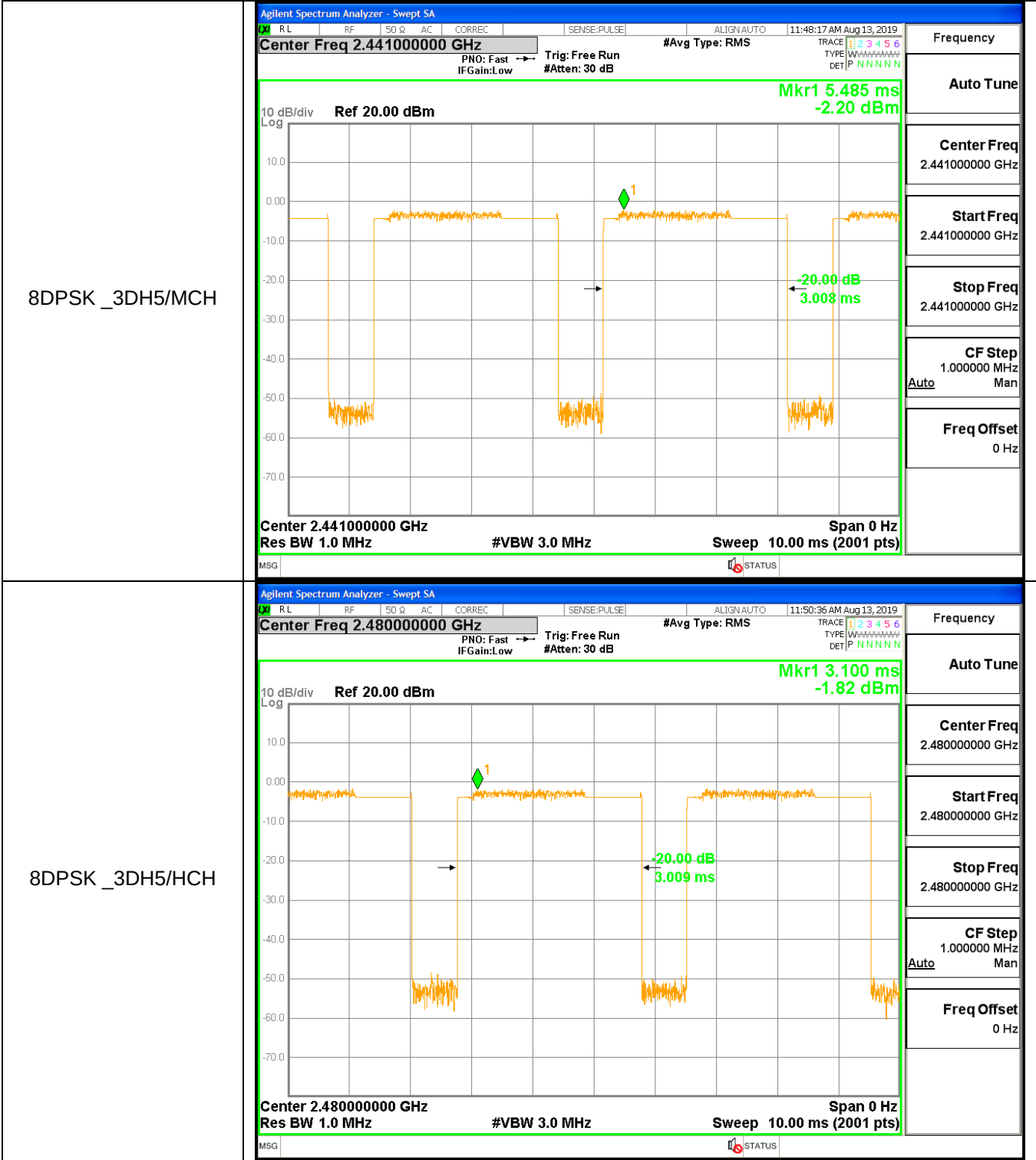
Test Graph







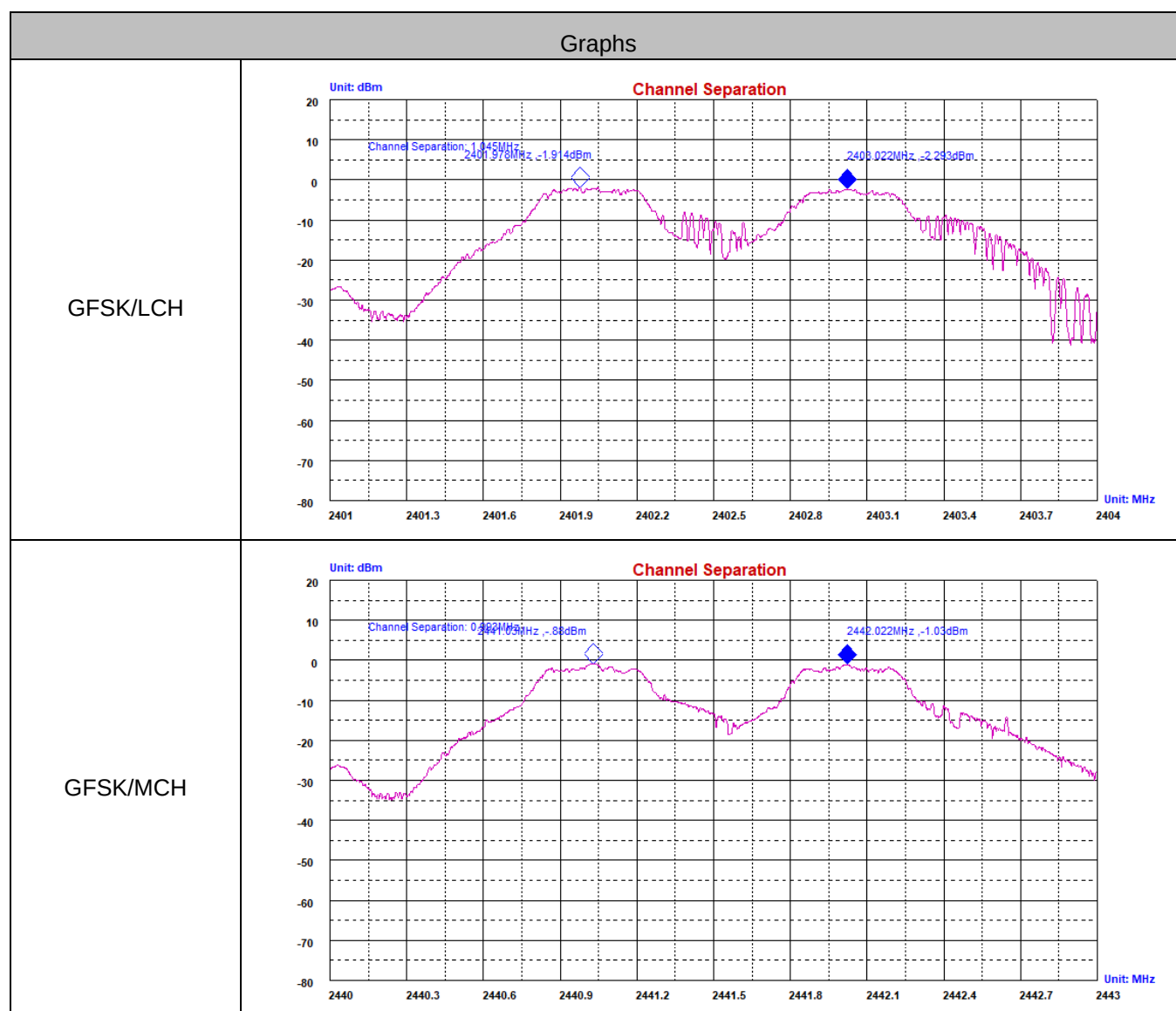


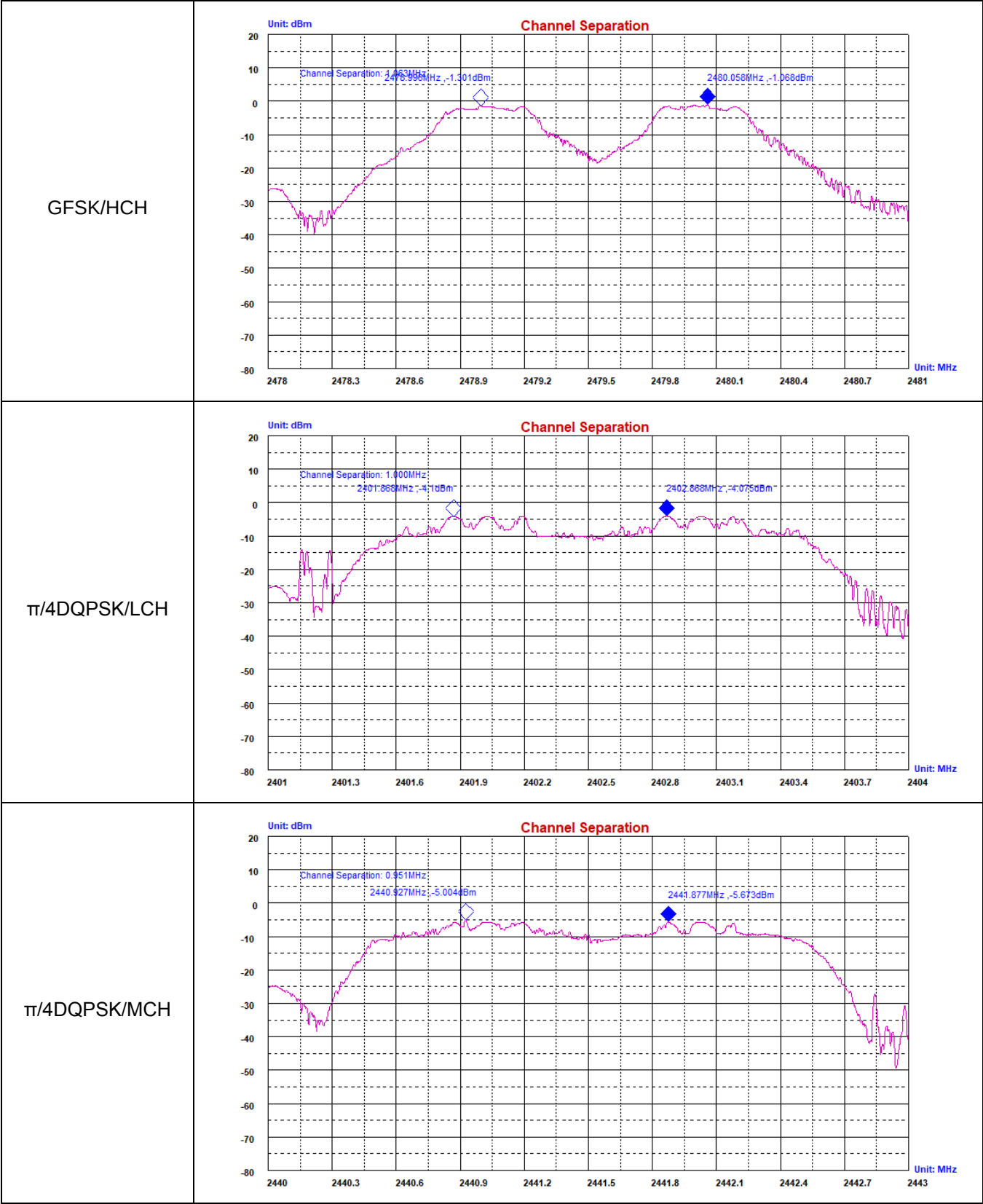


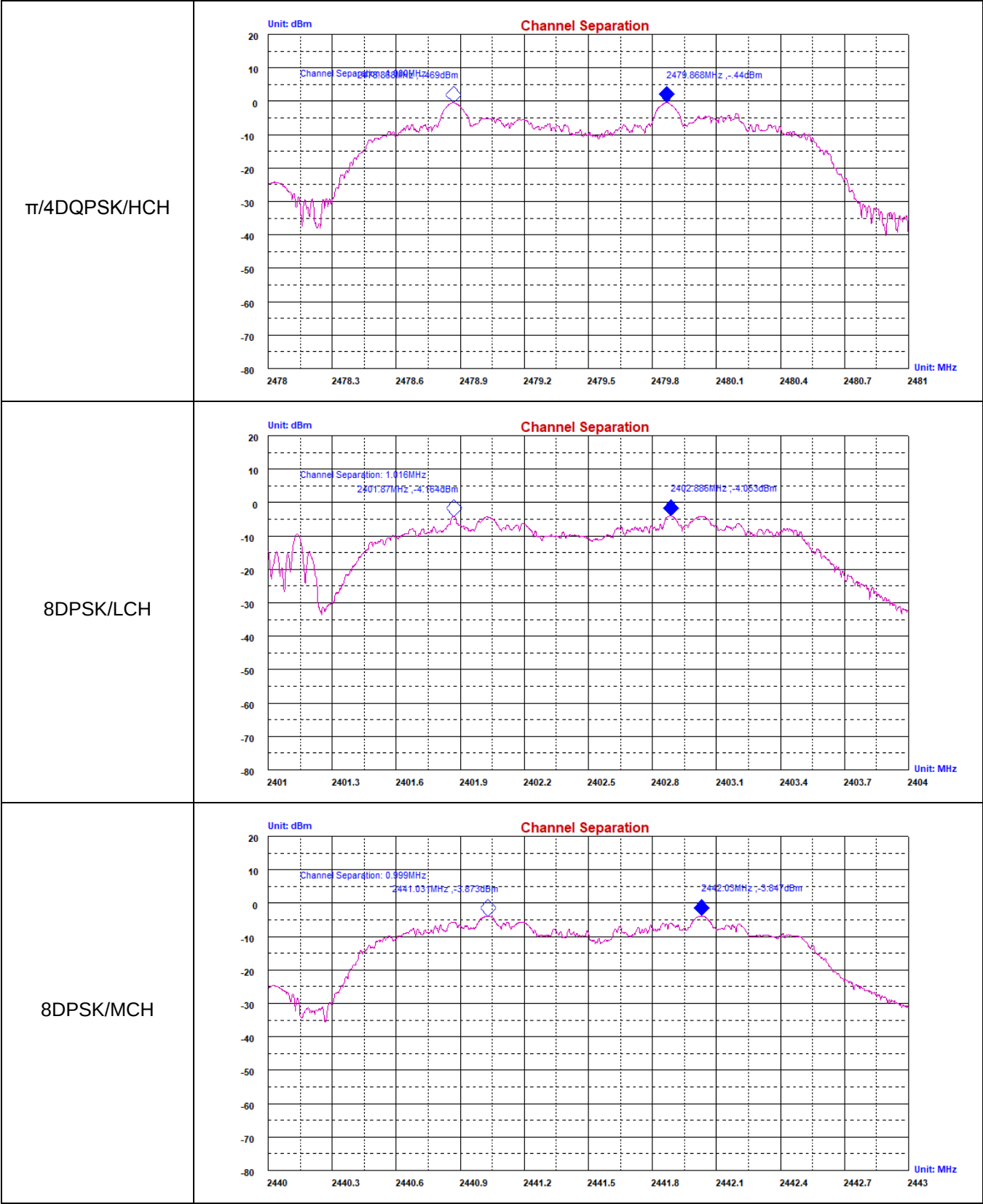
A.3 Carrier Frequency Separation

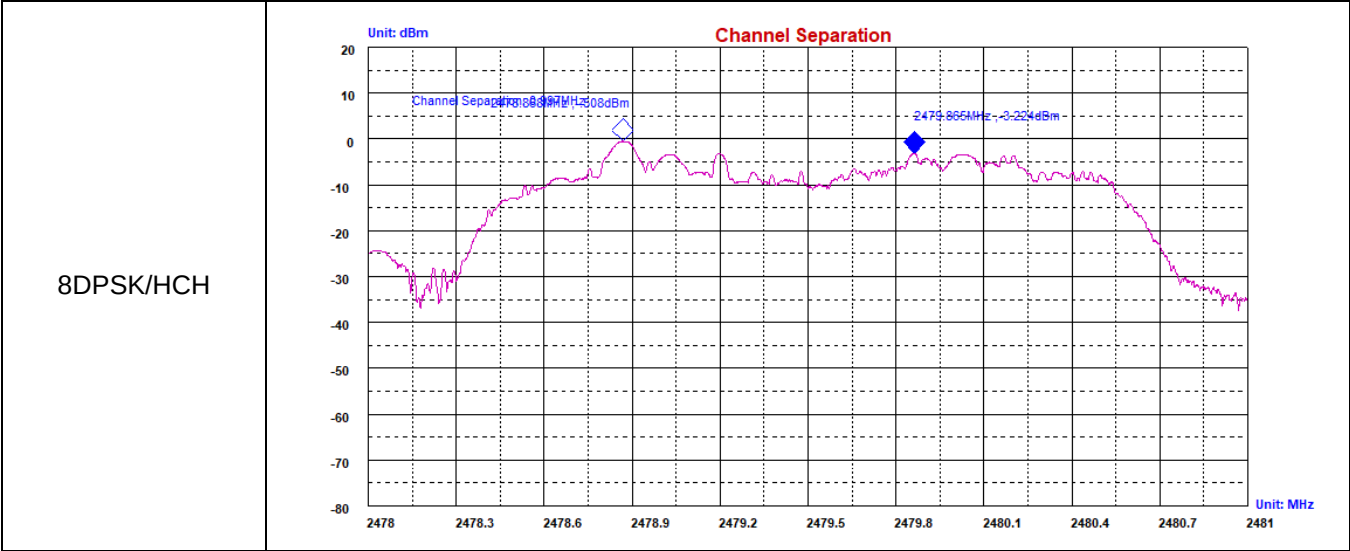
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.045	0.623	PASS
GFSK	MCH	0.993	0.625	PASS
GFSK	HCH	1.063	0.626	PASS
$\pi/4$ DQPSK	LCH	0.712	0.828	PASS
$\pi/4$ DQPSK	MCH	1.000	0.823	PASS
$\pi/4$ DQPSK	HCH	1.000	0.857	PASS
8DPSK	LCH	1.016	0.834	PASS
8DPSK	MCH	0.999	0.841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

Test Graph





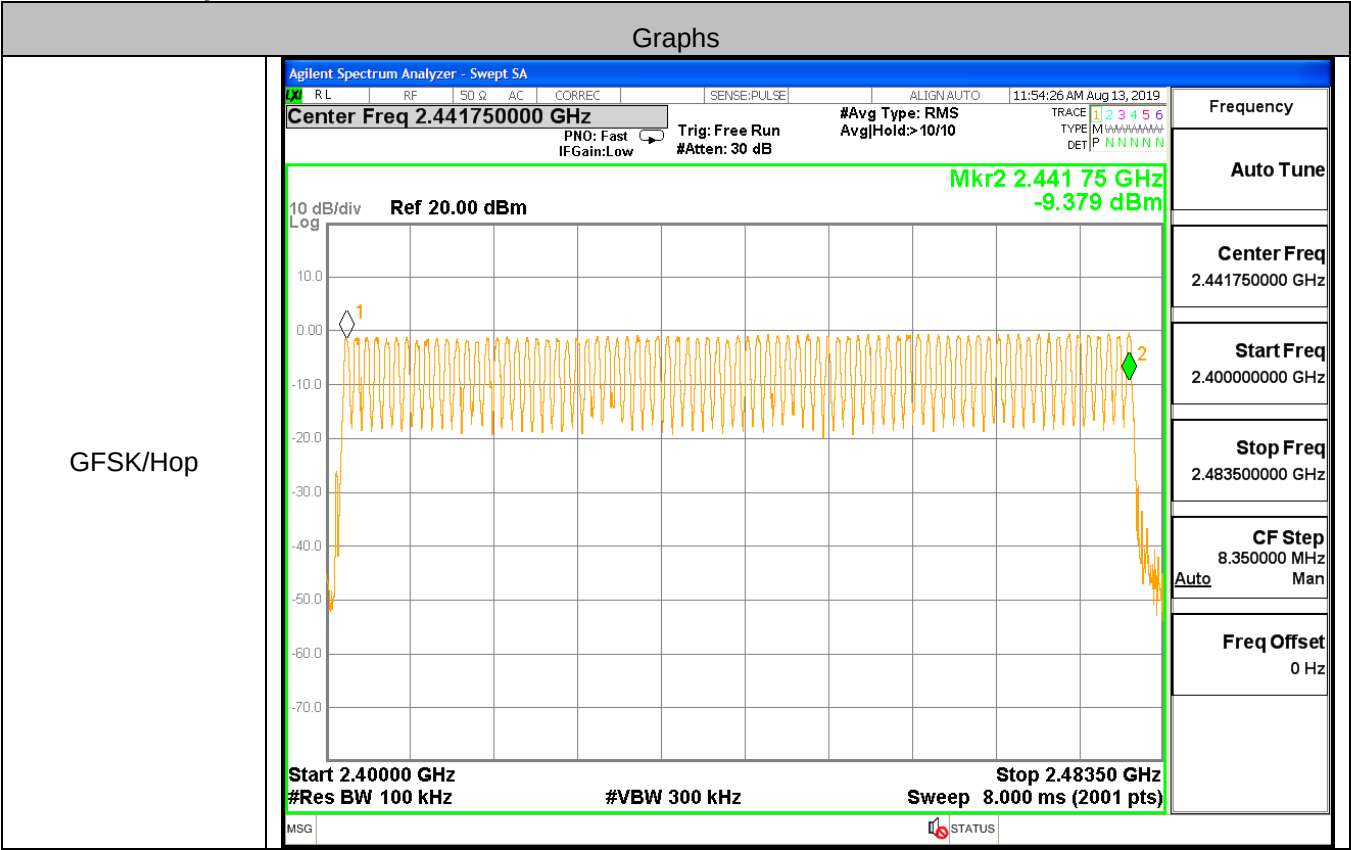


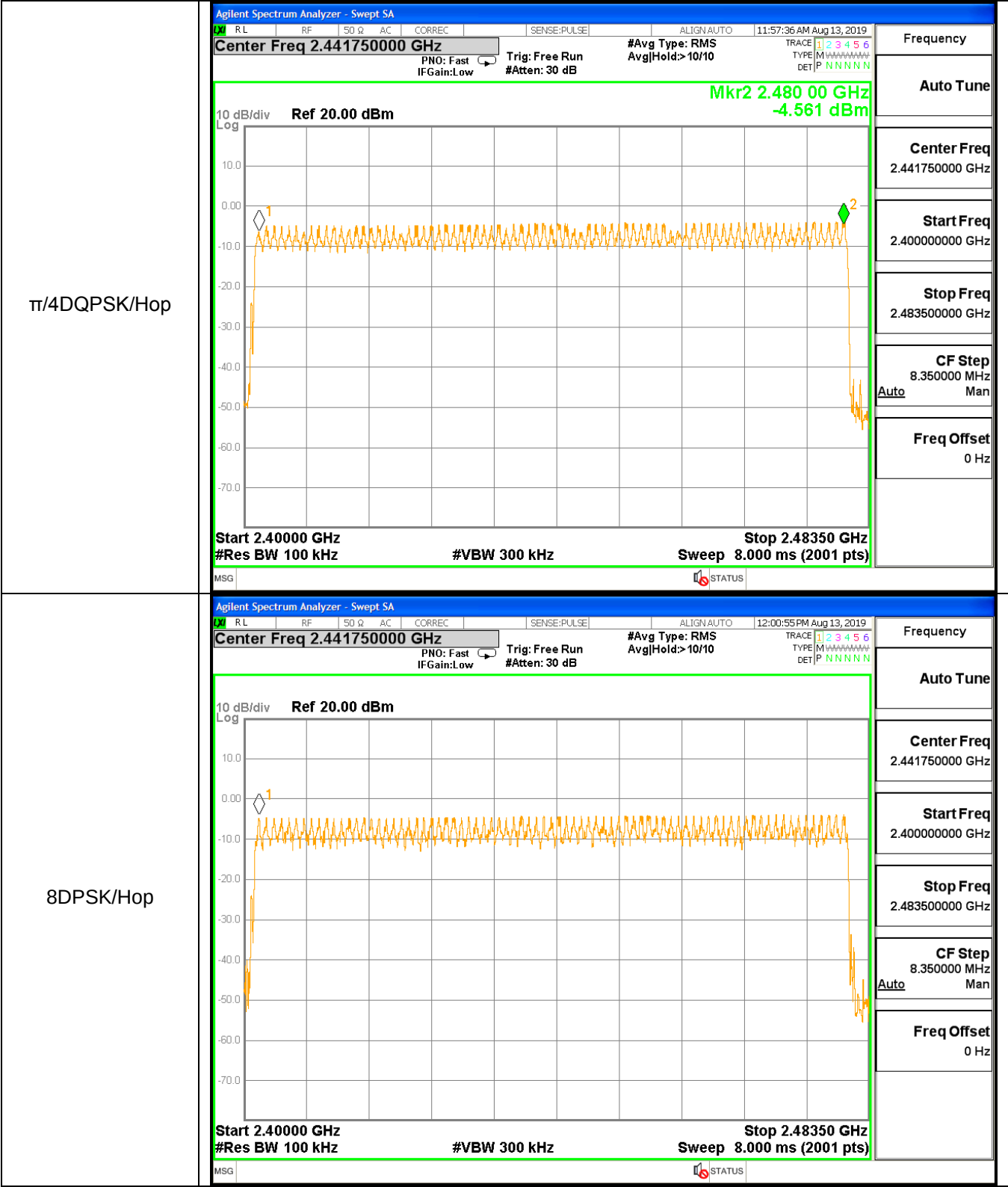


A.4 Hopping Channel Number

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

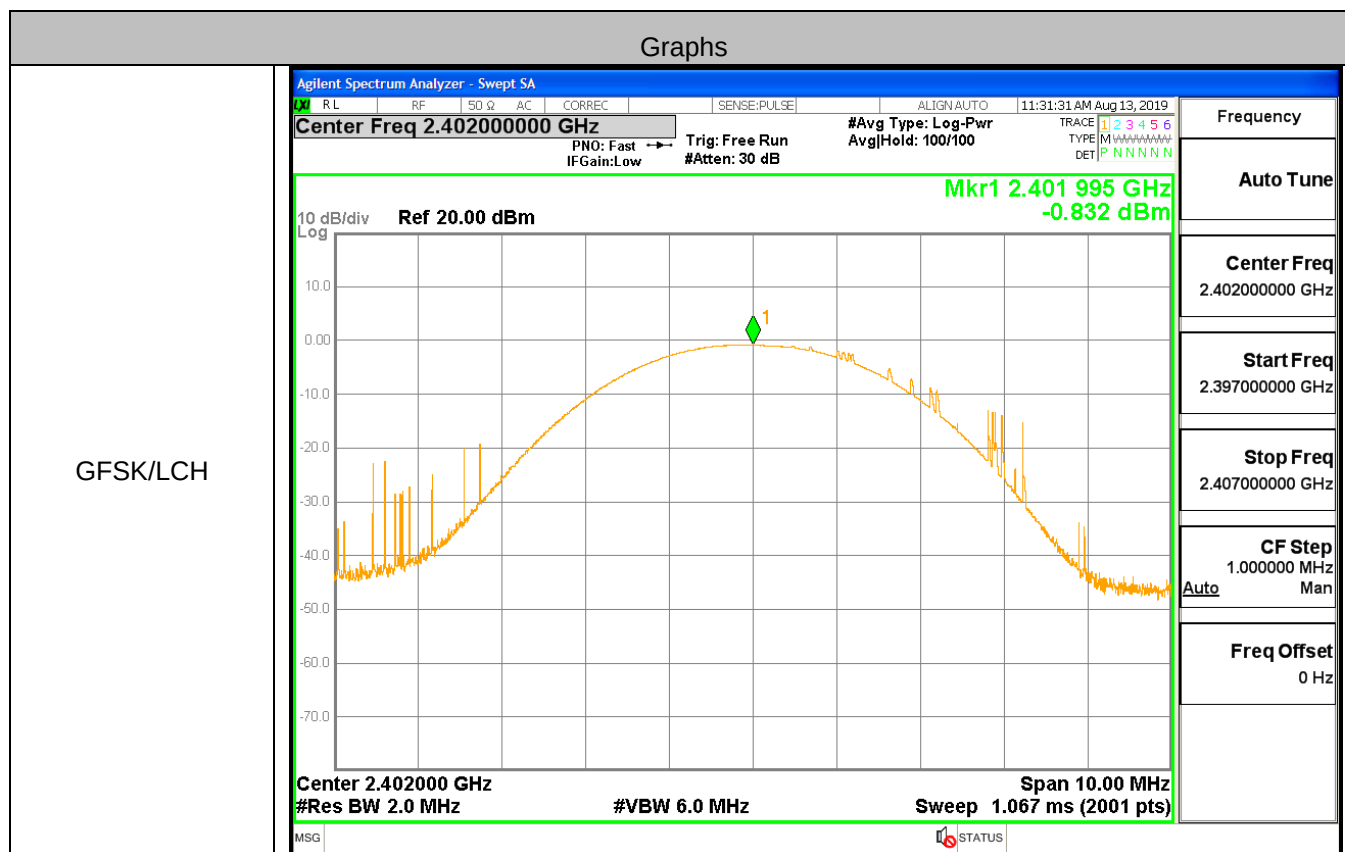


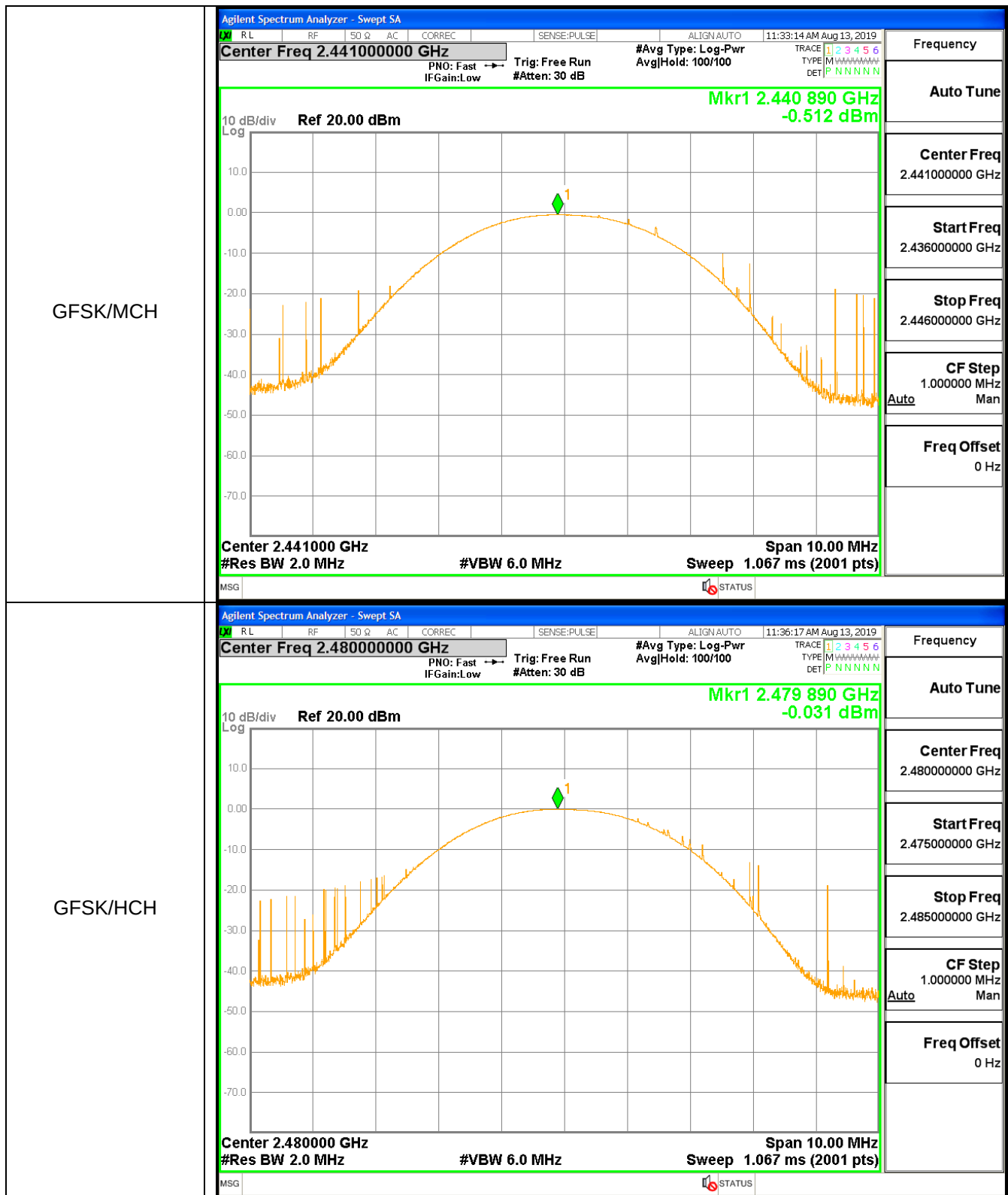


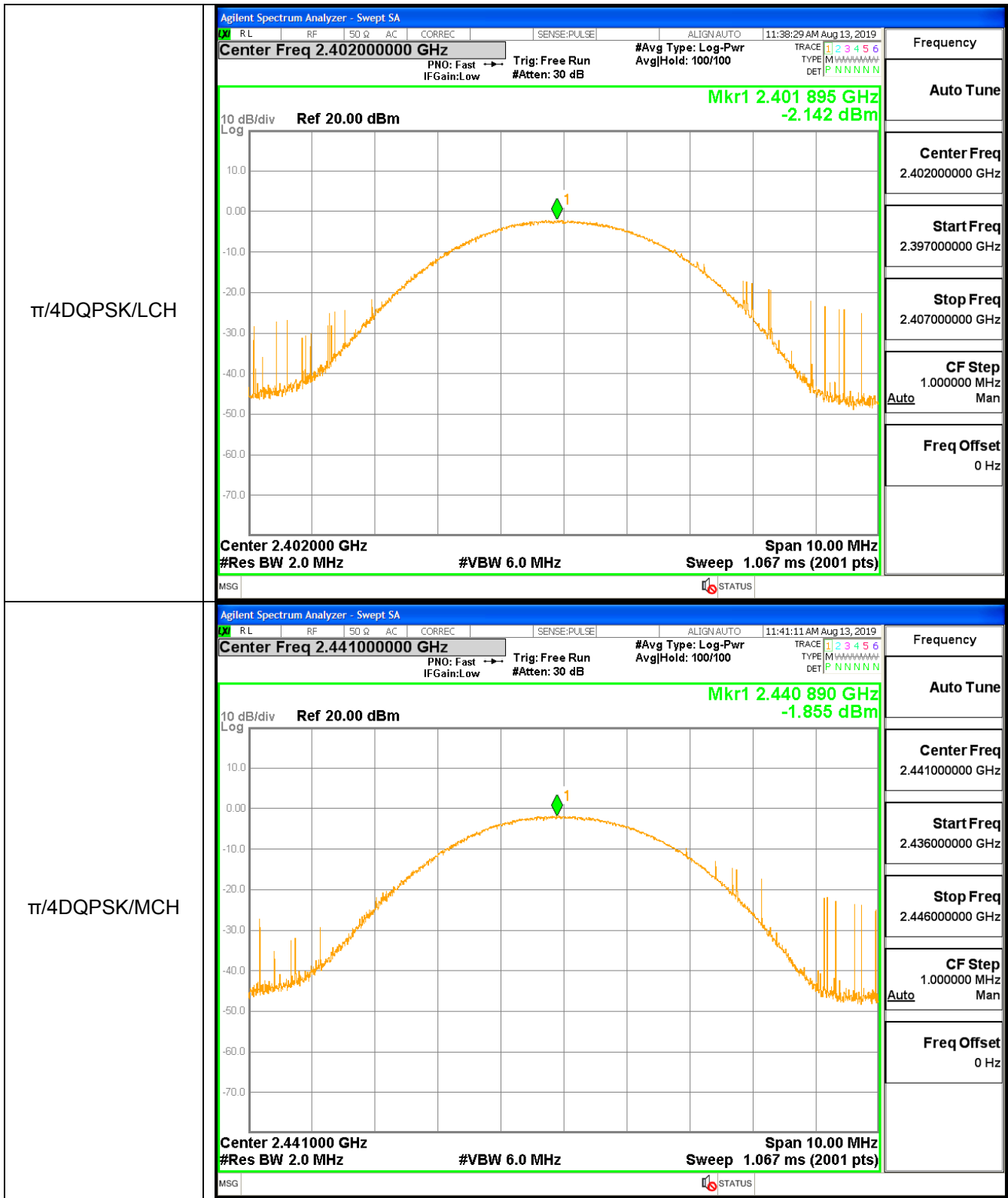
A.5 Conducted Peak Output Power

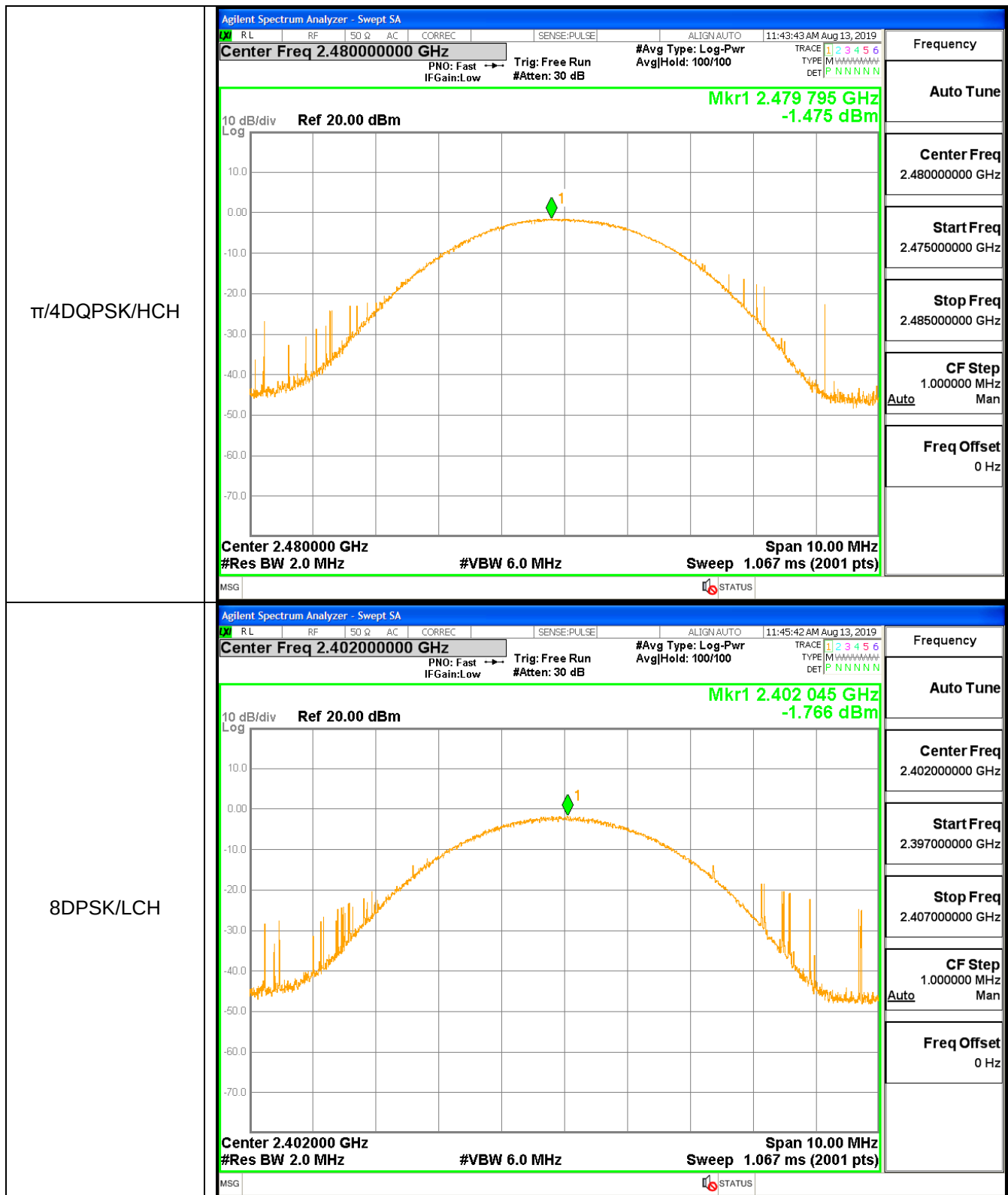
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.832	21	PASS
GFSK	MCH	-0.512	21	PASS
GFSK	HCH	-0.031	21	PASS
$\pi/4$ DQPSK	LCH	-2.142	21	PASS
$\pi/4$ DQPSK	MCH	-1.855	21	PASS
$\pi/4$ DQPSK	HCH	-1.475	21	PASS
8DPSK	LCH	-1.766	21	PASS
8DPSK	MCH	-1.426	21	PASS
8DPSK	HCH	-1.114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

Test Graph









Frequency

Auto Tune

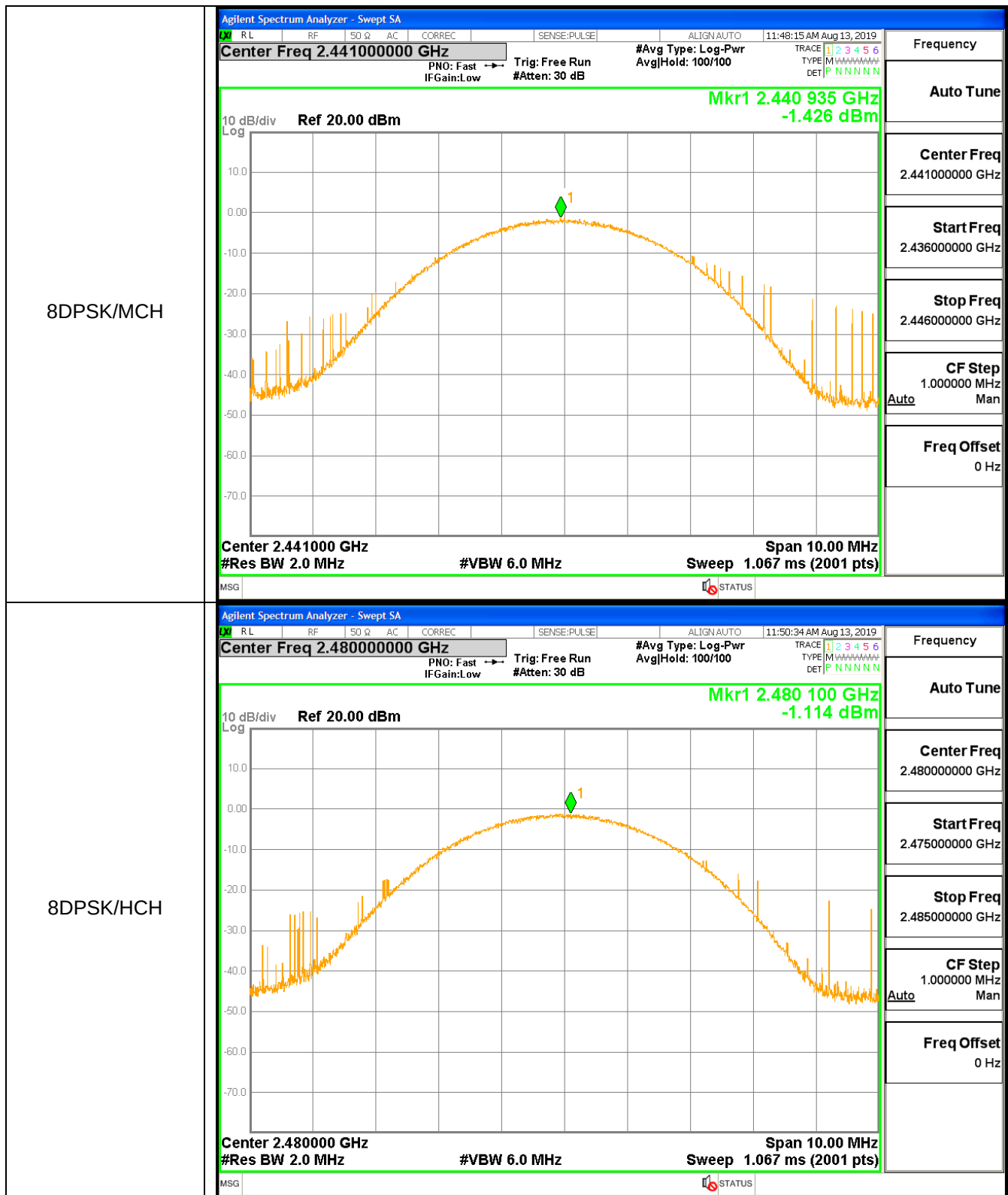
Center Freq
2.480000000 GHz

Start Freq
2.475000000 GHz

Stop Freq
2.485000000 GHz

CF Step
1.000000 MHz
Auto Man

Freq Offset
0 Hz



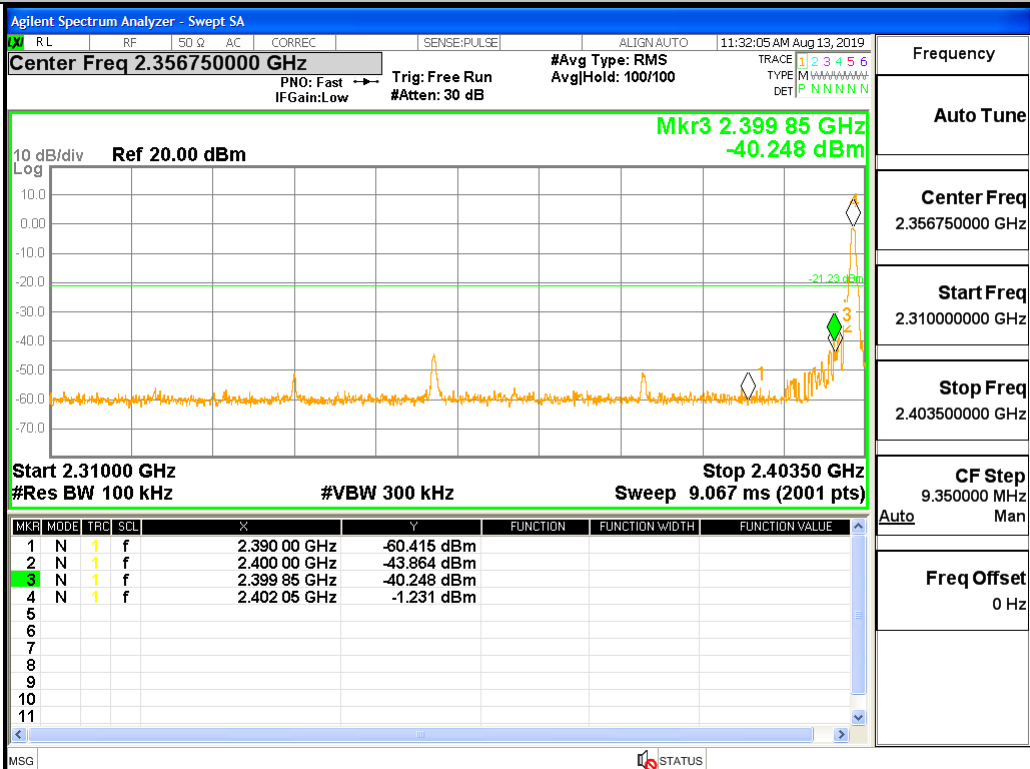
A.6 Band-edge for RF Conducted Emissions

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

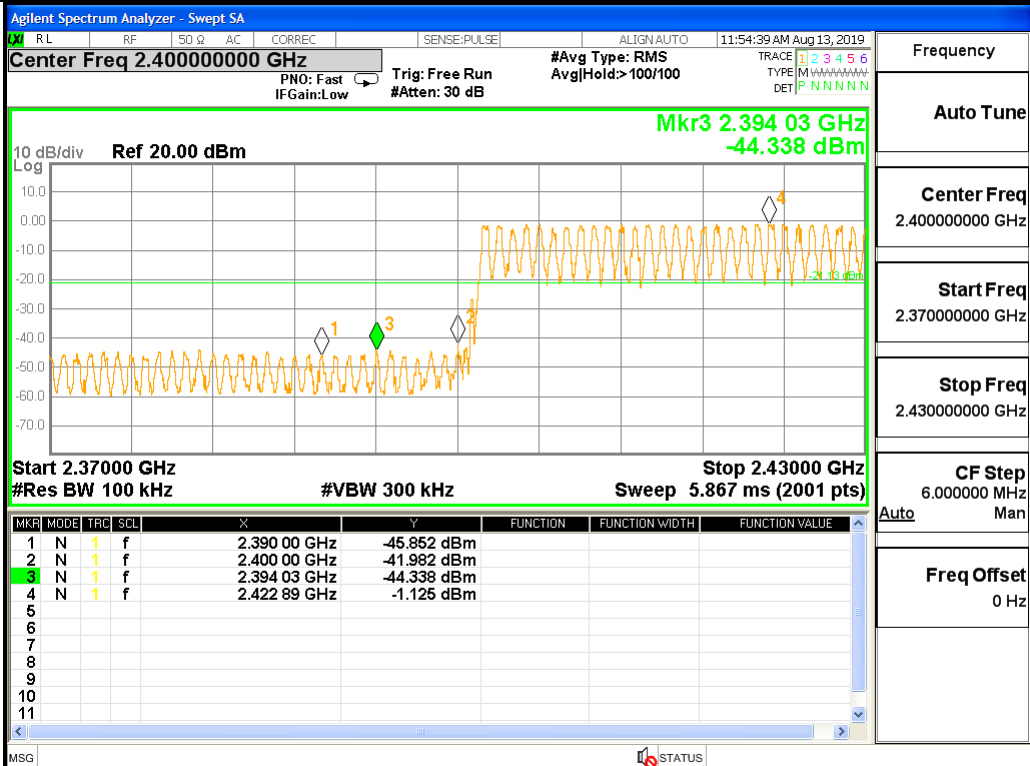
Test Graph

Graphs

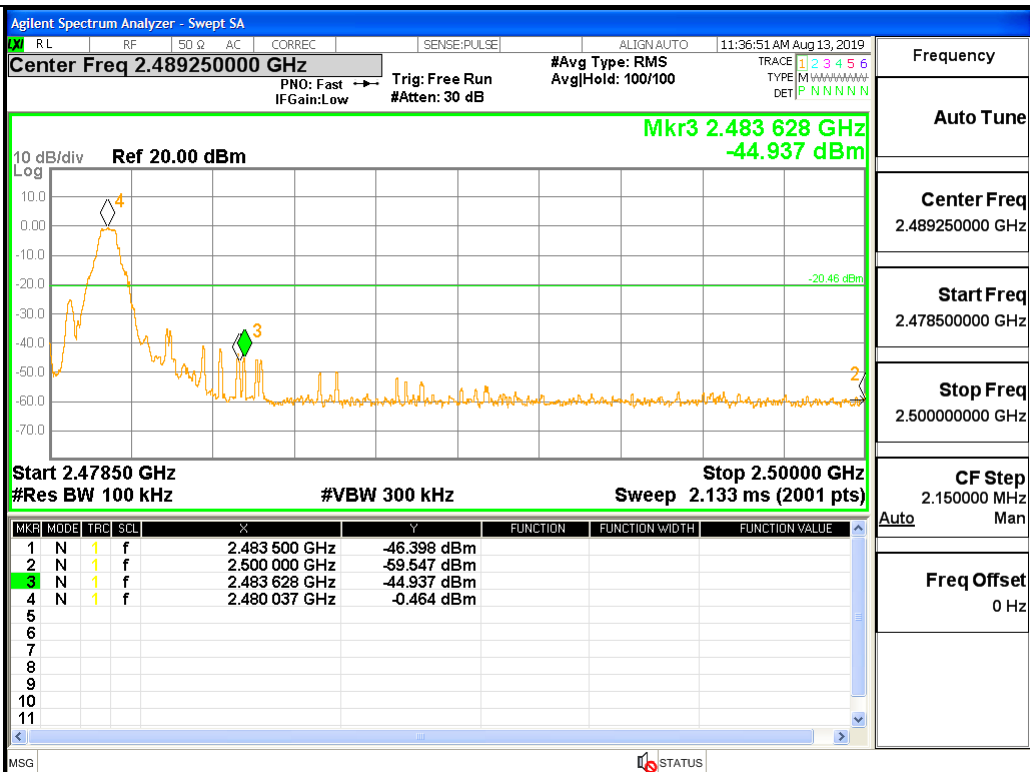
GFSK/LCH/No Hop



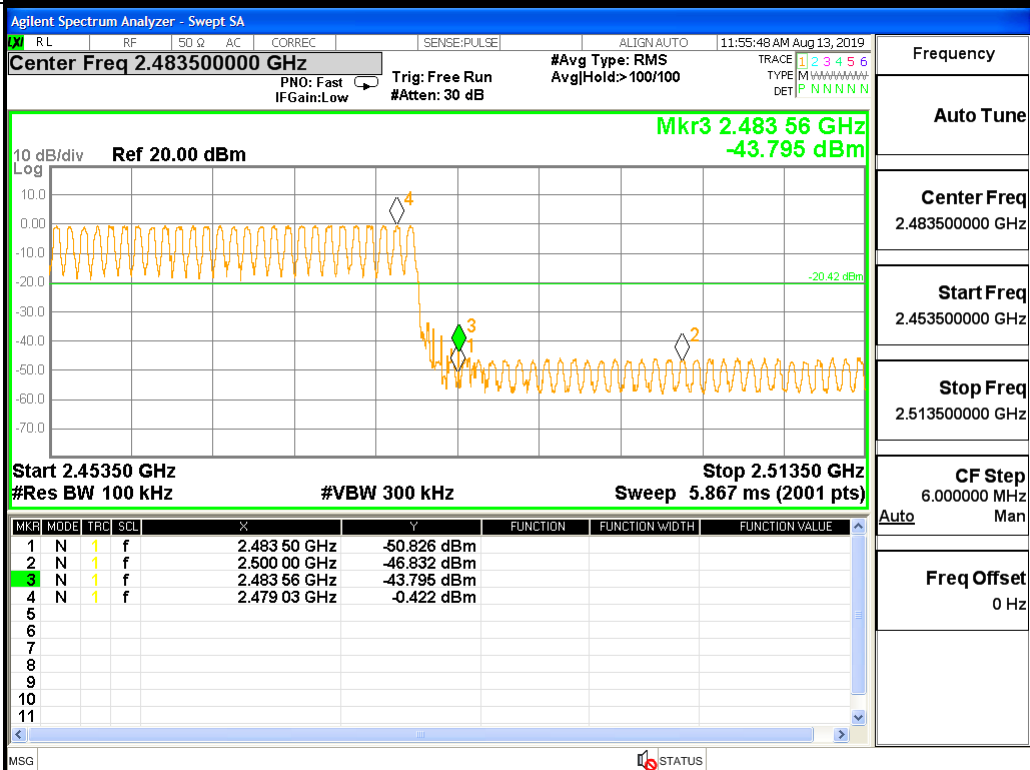
GFSK/LCH/Hop



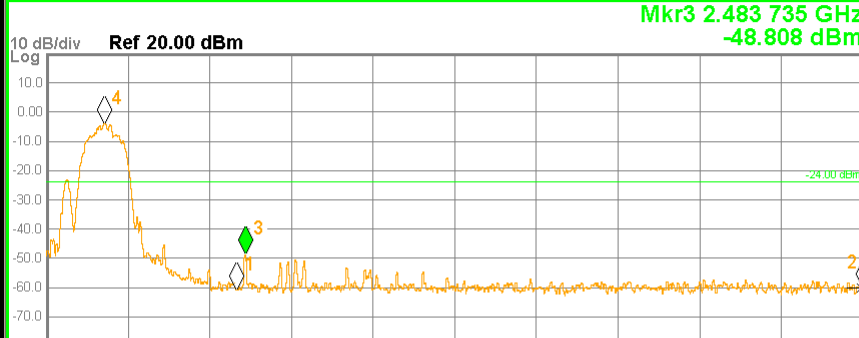
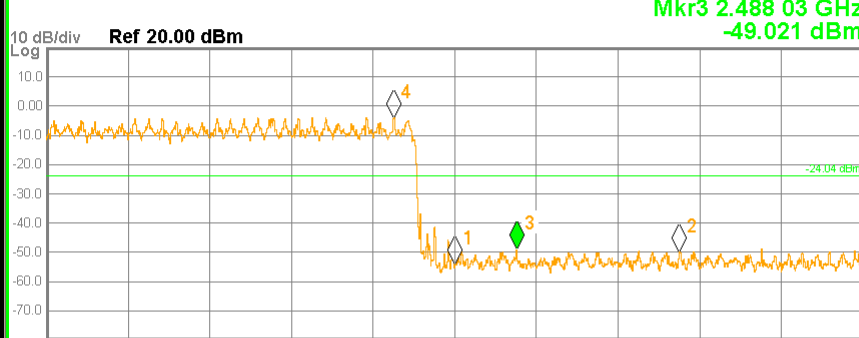
GFSK/HCH/No Hop



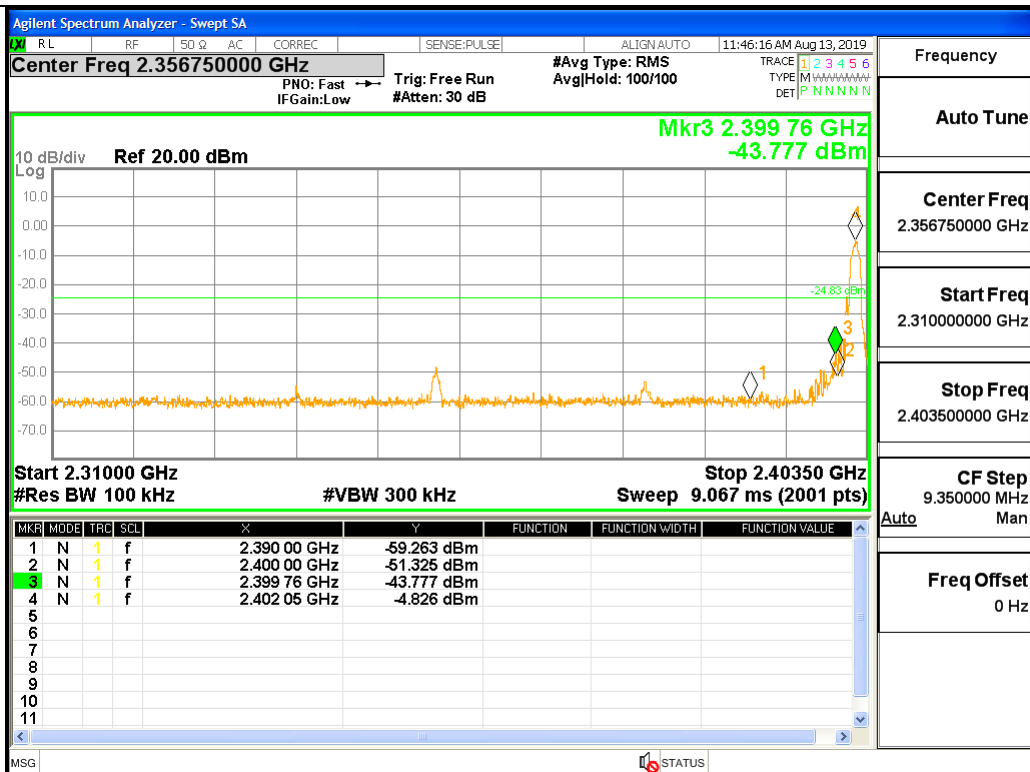
GFSK/HCH/Hop



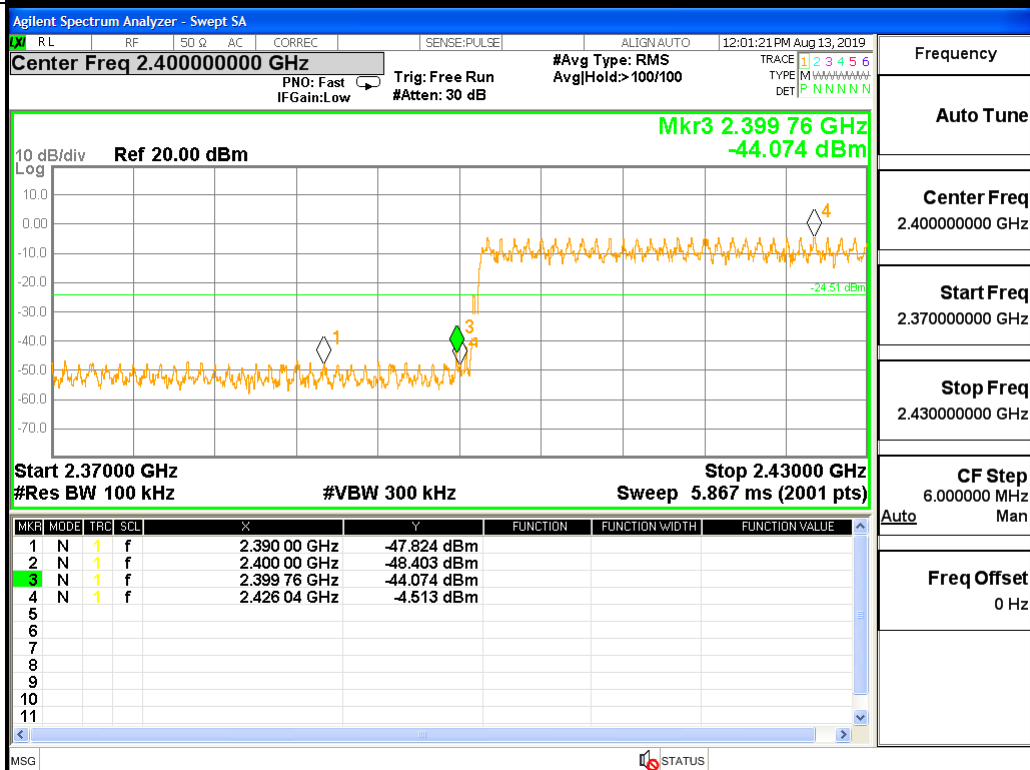


$\pi/4$ DQPSK/HCH/No Hop	Agilent Spectrum Analyzer - Swept SA RLRF50 ΩACCORRECSENSE:PULSEALIGN AUTO11:44:18 AM Aug 13, 2019 Center Freq 2.489250000 GHz PNO: FastIFGain:Low Trig: Free Run#Atten: 30 dB #Avg Type: RMSAvgHold: 100/100 TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P N N N N N N 10 dB/divRef 20.00 dBm Mkr3 2.483 735 GHz -48.808 dBm  Start 2.47850 GHz#Res BW 100 kHz#VBW 300 kHzStop 2.50000 GHzSweep 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> MSGSTATUS	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									Frequency Auto Tune Center Freq 2.489250000 GHz Start Freq 2.478500000 GHz Stop Freq 2.500000000 GHz CF Step 2.1500000 MHz Auto 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																																																																																																								
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$\pi/4$ DQPSK/HCH/Hop	Agilent Spectrum Analyzer - Swept SA RLRF50 ΩACCORRECSENSE:PULSEALIGN AUTO11:59:34 AM Aug 13, 2019 Center Freq 2.483500000 GHz PNO: FastIFGain:Low Trig: Free Run#Atten: 30 dB #Avg Type: RMSAvgHold: >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/divRef 20.00 dBm Mkr3 2.488 03 GHz -49.021 dBm  Start 2.45350 GHz#Res BW 100 kHz#VBW 300 kHzStop 2.51350 GHzSweep 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> MSGSTATUS	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									Frequency Auto Tune Center Freq 2.483500000 GHz Start Freq 2.453500000 GHz Stop Freq 2.513500000 GHz CF Step 6.000000 MHz Auto Freq Offset 0 Hz
	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																																																																																																					
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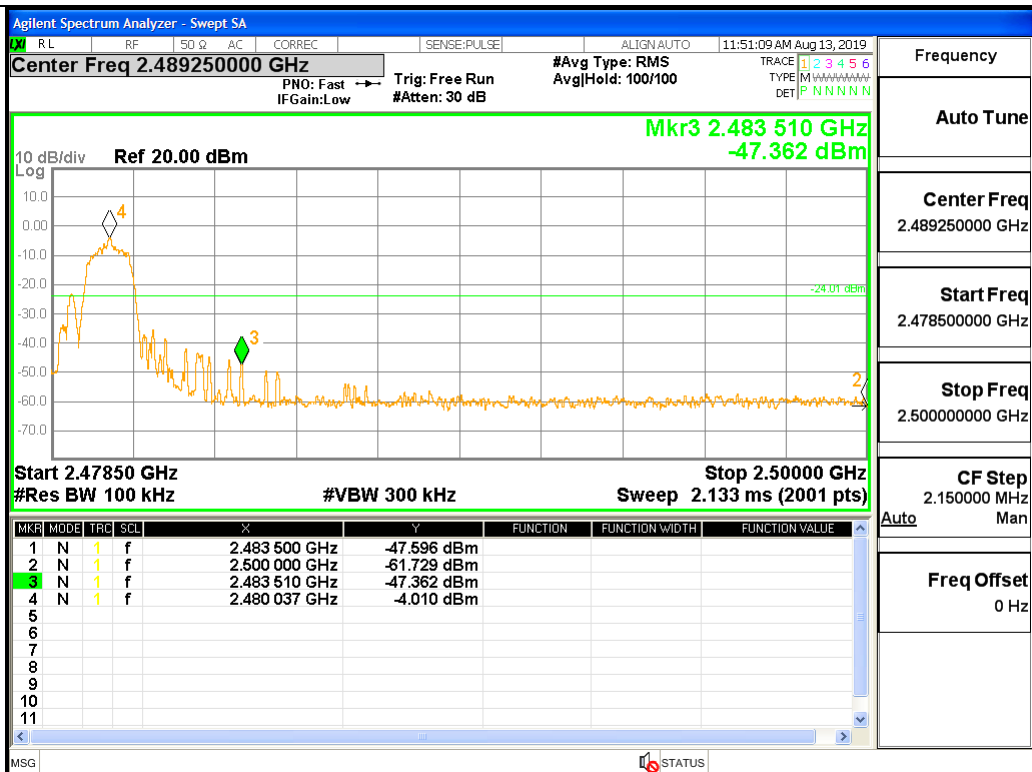
8DPSK/LCH/No Hop



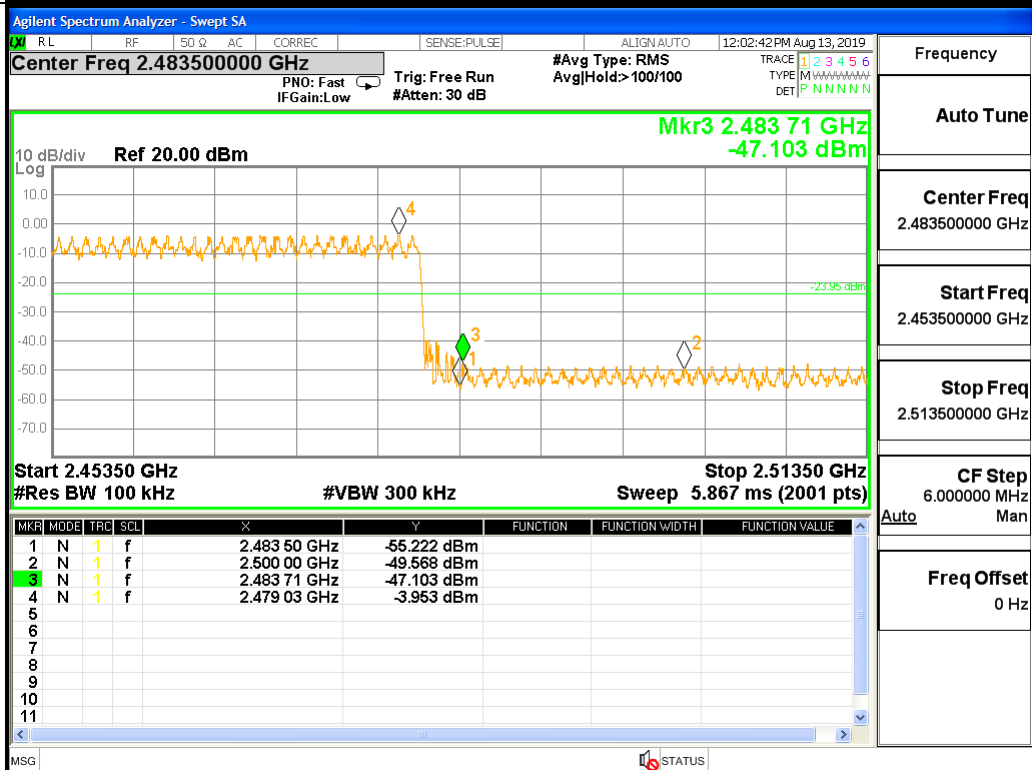
8DPSK/LCH/Hop



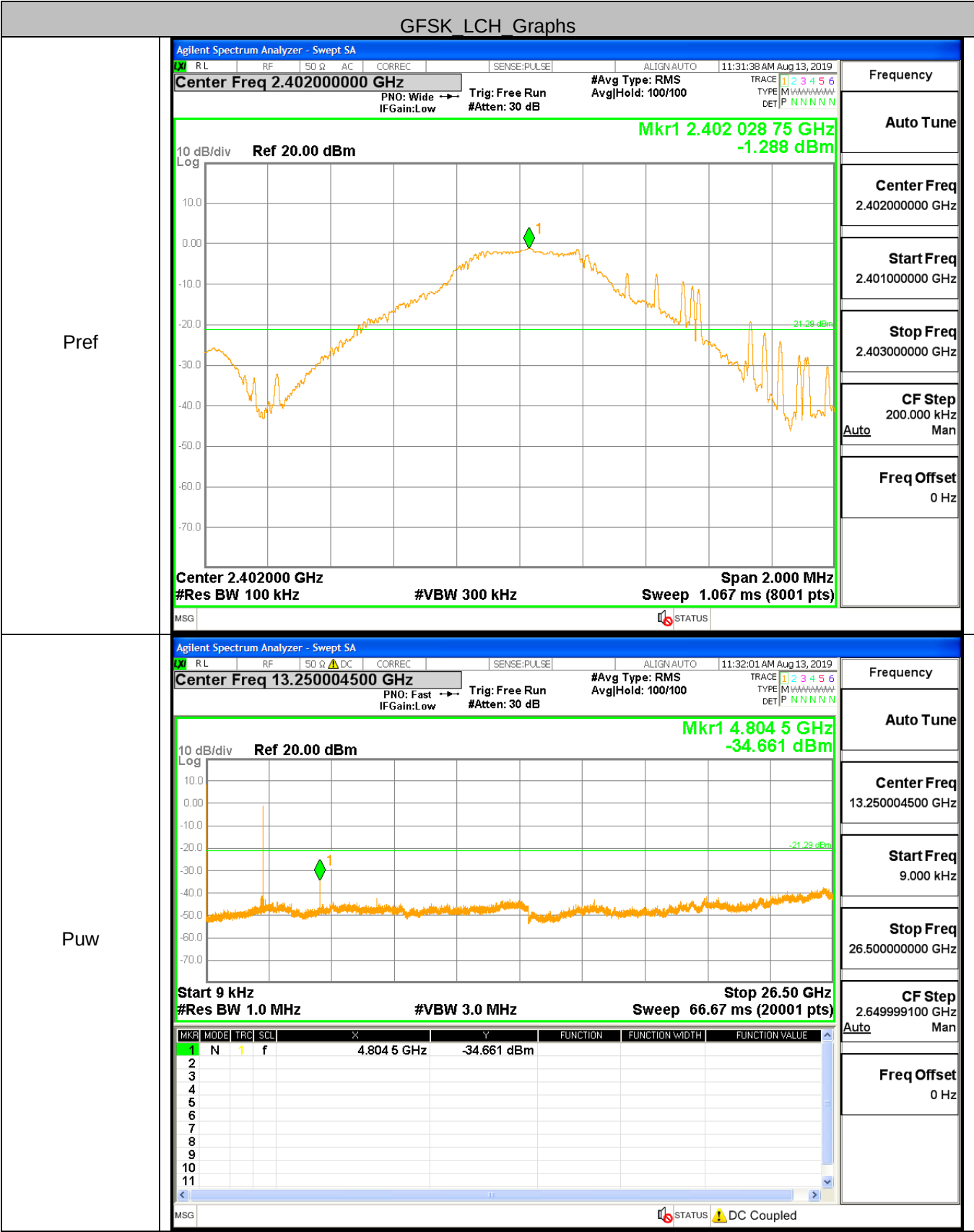
8DPSK/HCH/No Hop



8DPSK/HCH/Hop

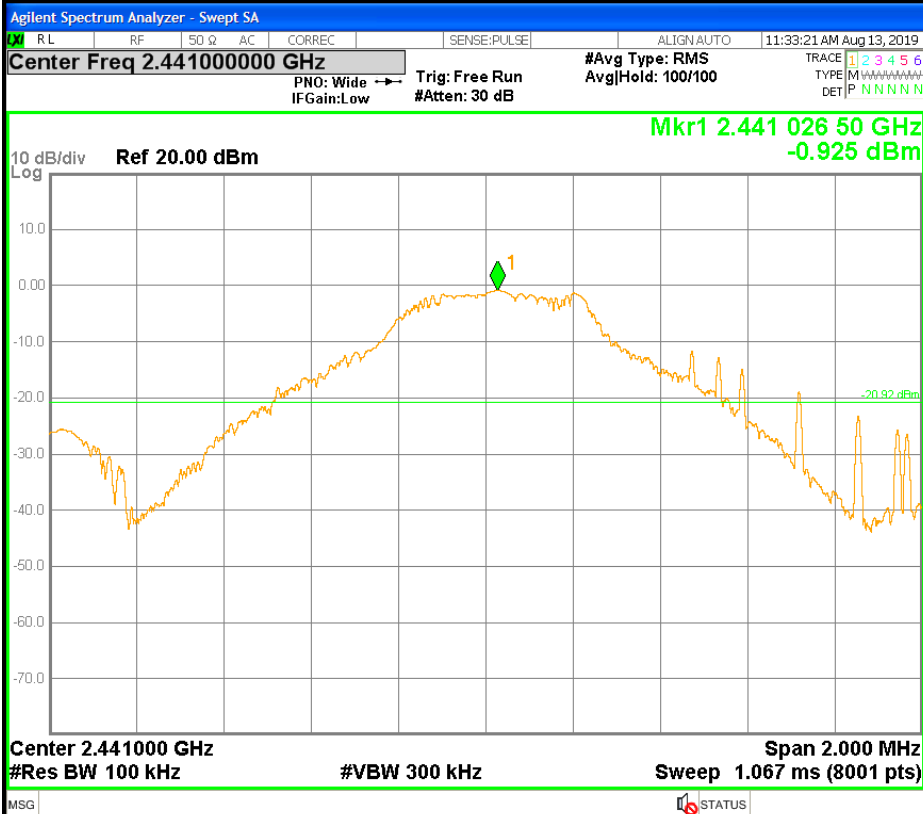


A.7 RF Conducted Spurious Emissions
Test Graph



GFSK MCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.441000000 GHz

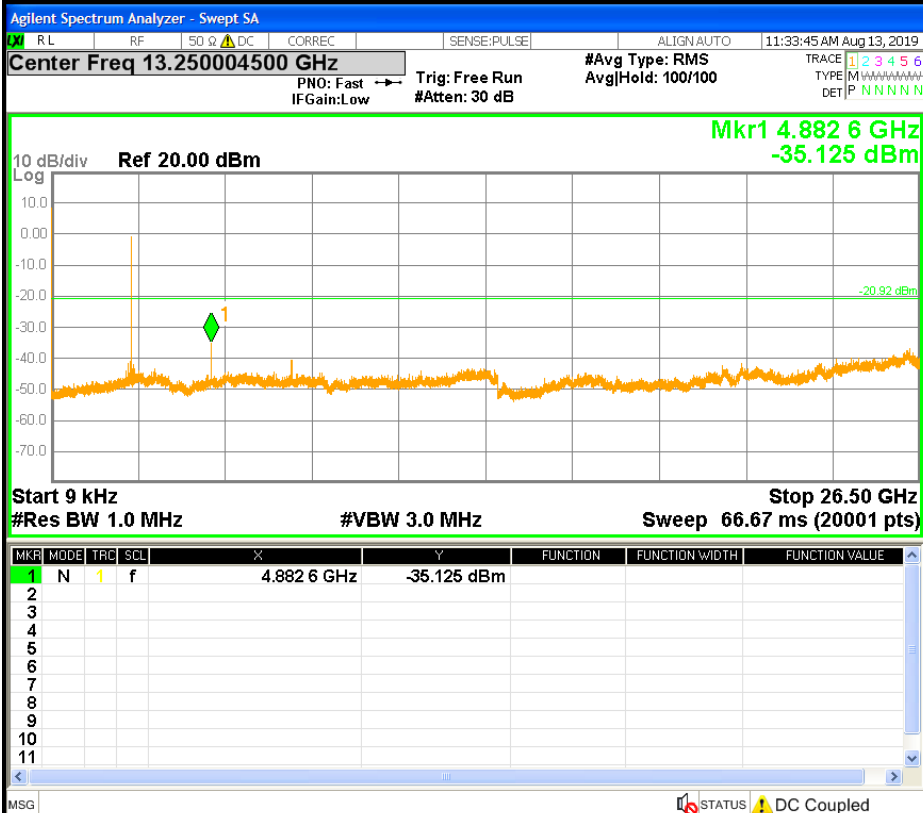
Start Freq
2.440000000 GHz

Stop Freq
2.442000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw



Frequency

Auto Tune

Center Freq
13.250004500 GHz

Start Freq
9.000 kHz

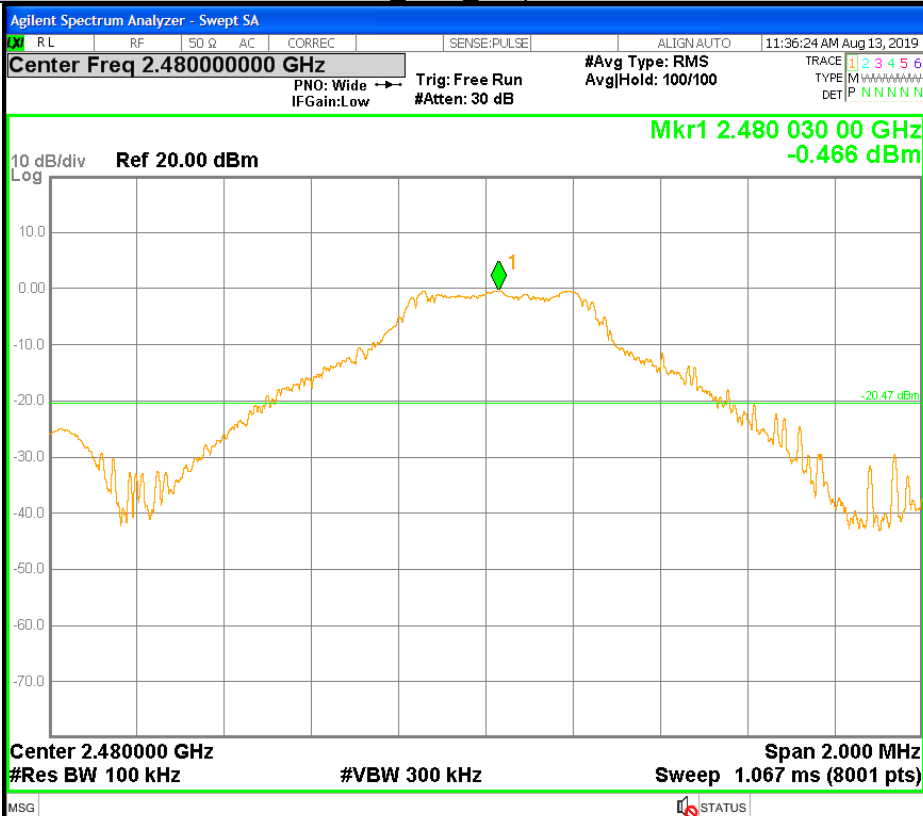
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

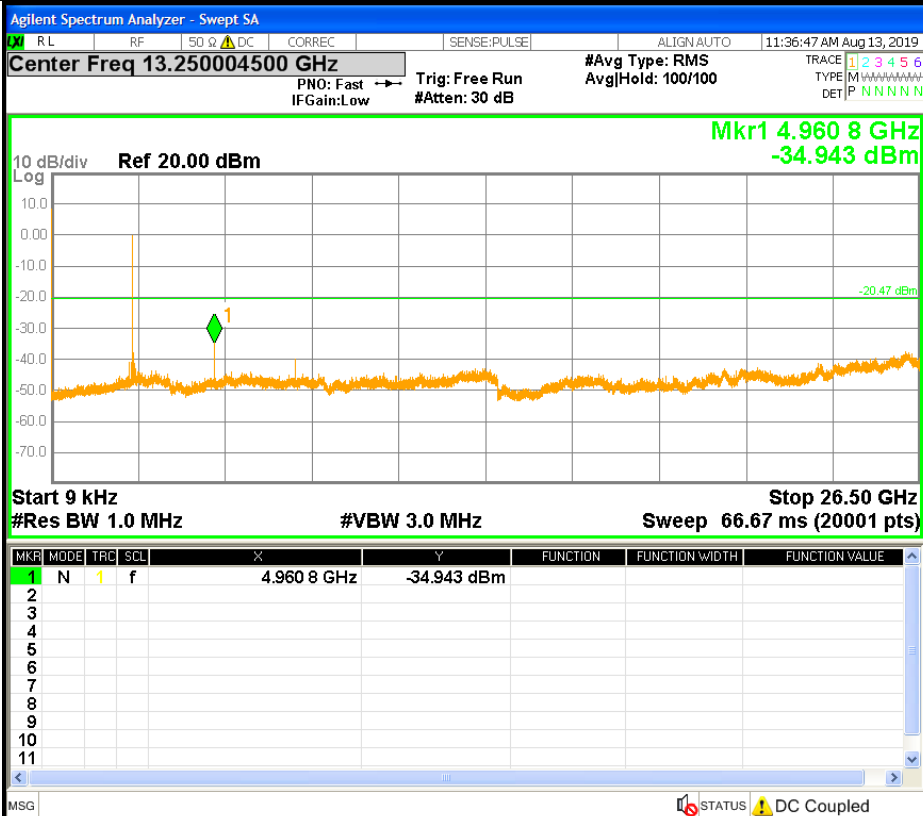
Freq Offset
0 Hz

GFSK HCH Graphs

Pref

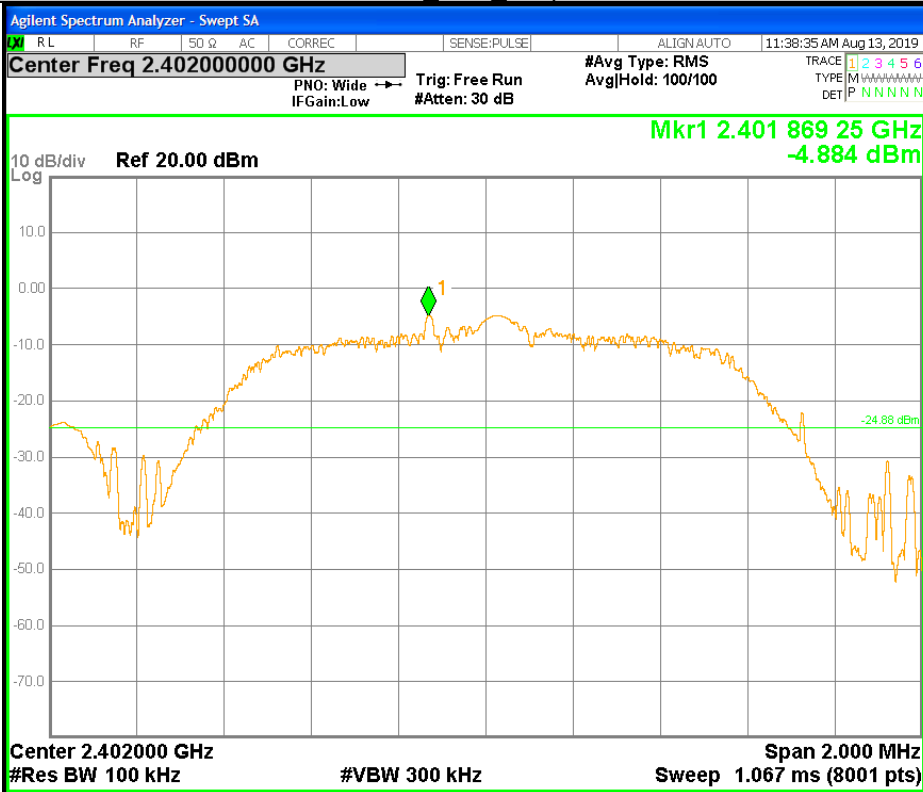


Puw

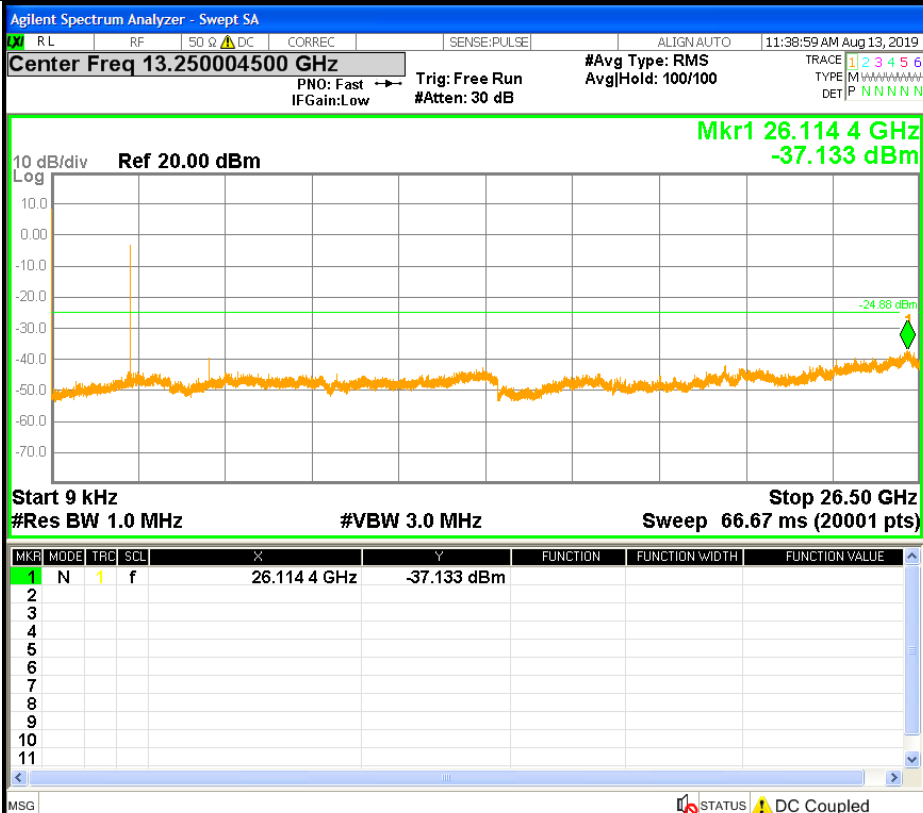


$\pi/4$ DQPSK LCH Graphs

Pref

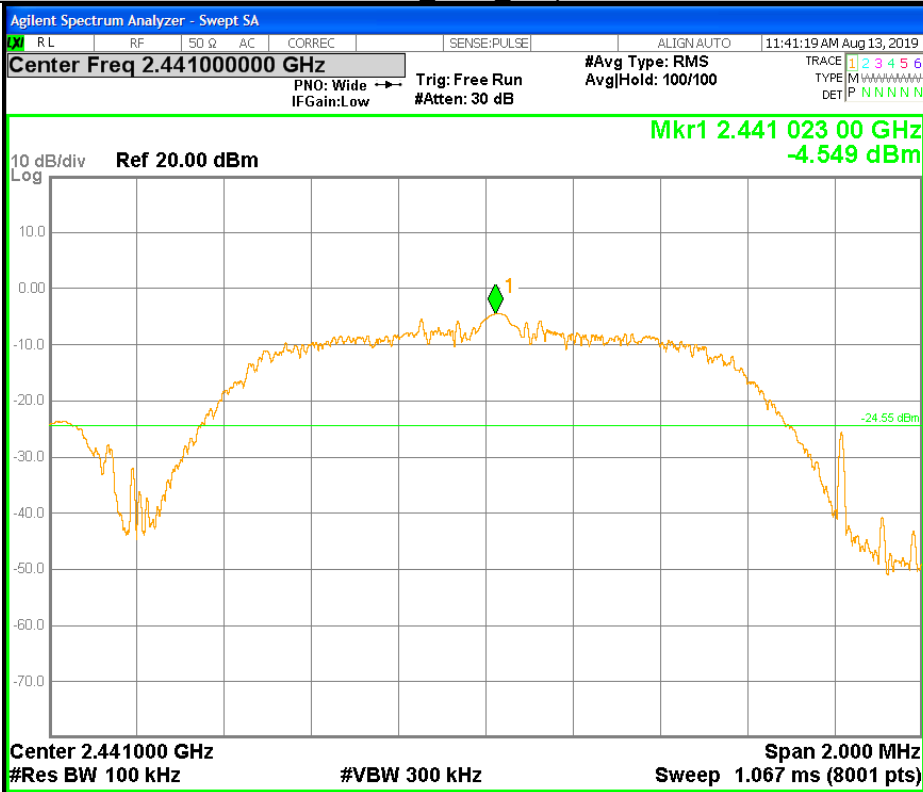


Puw

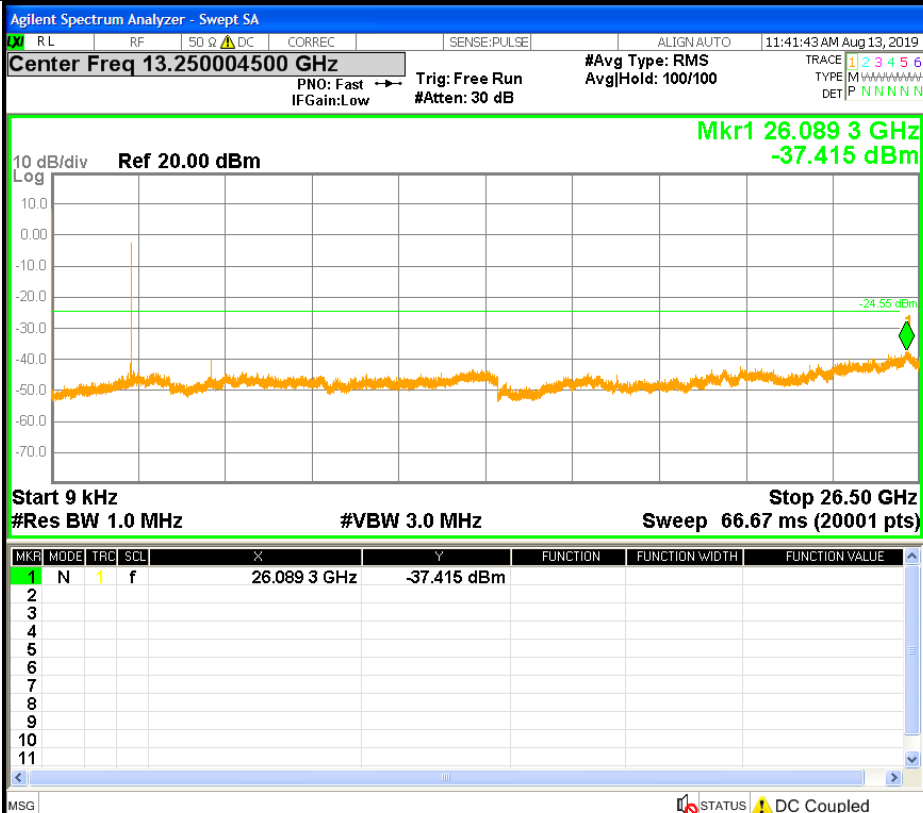


$\pi/4$ DQPSK MCH Graphs

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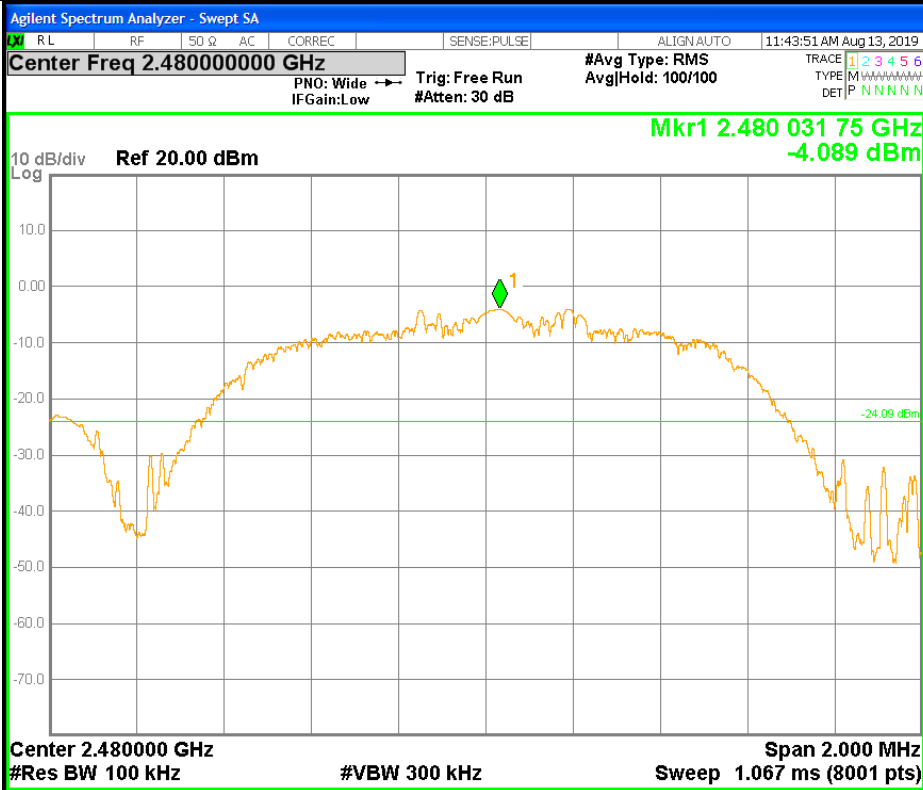


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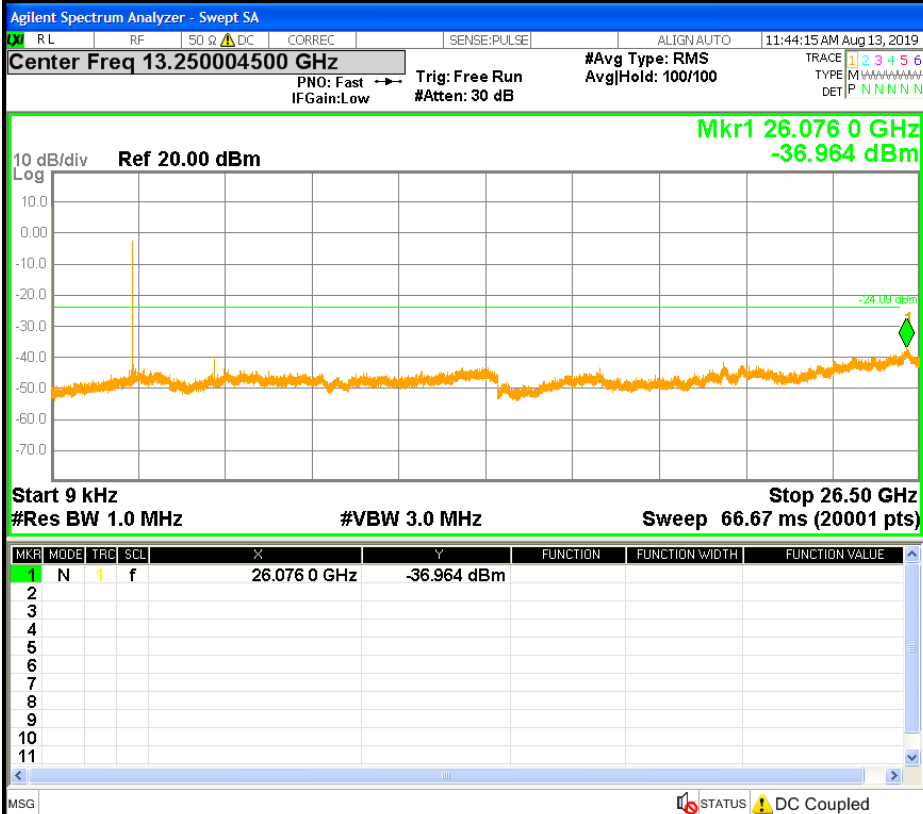


$\pi/4$ DQPSK HCH Graphs

Pref

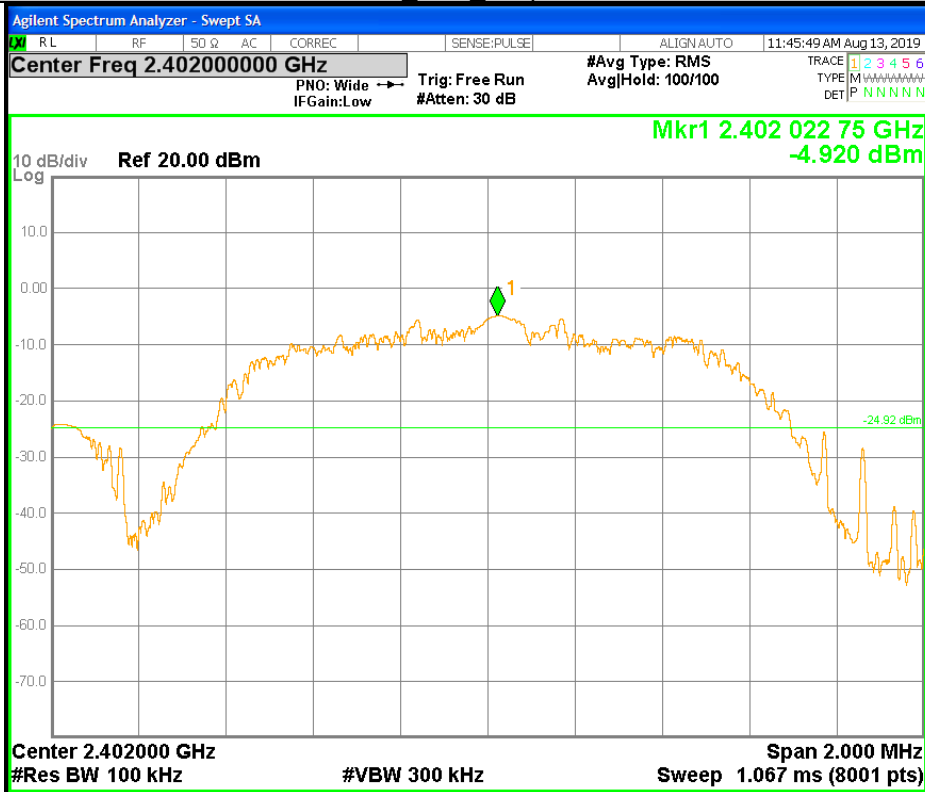


Puw

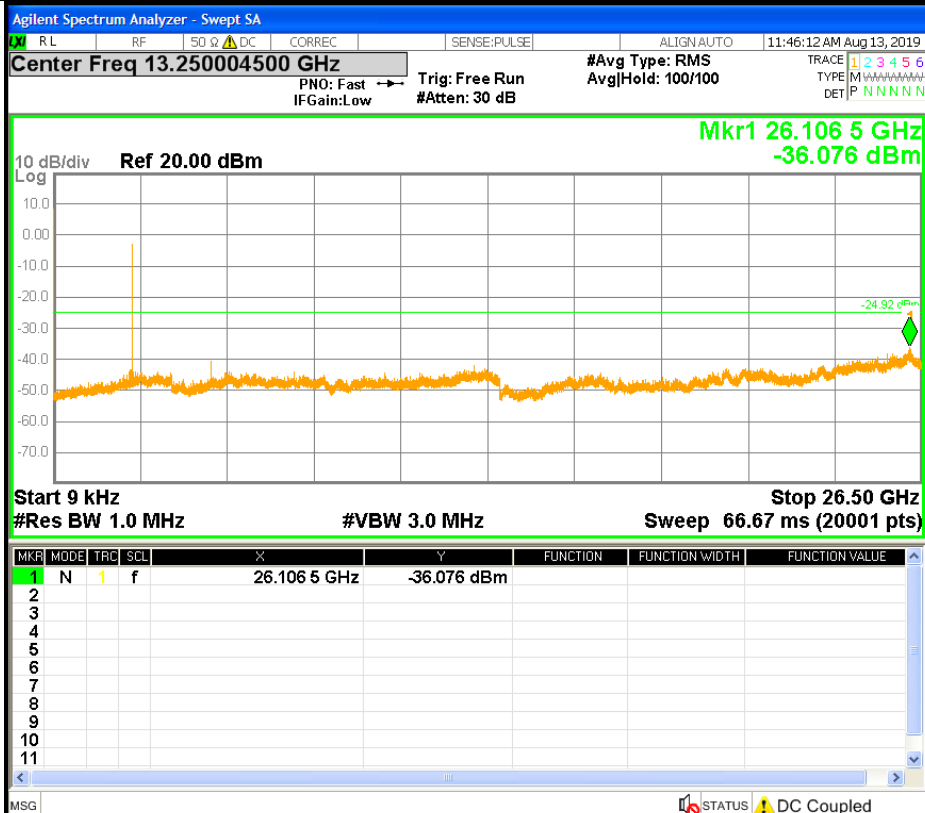


8DPSK LCH Graphs

Pref

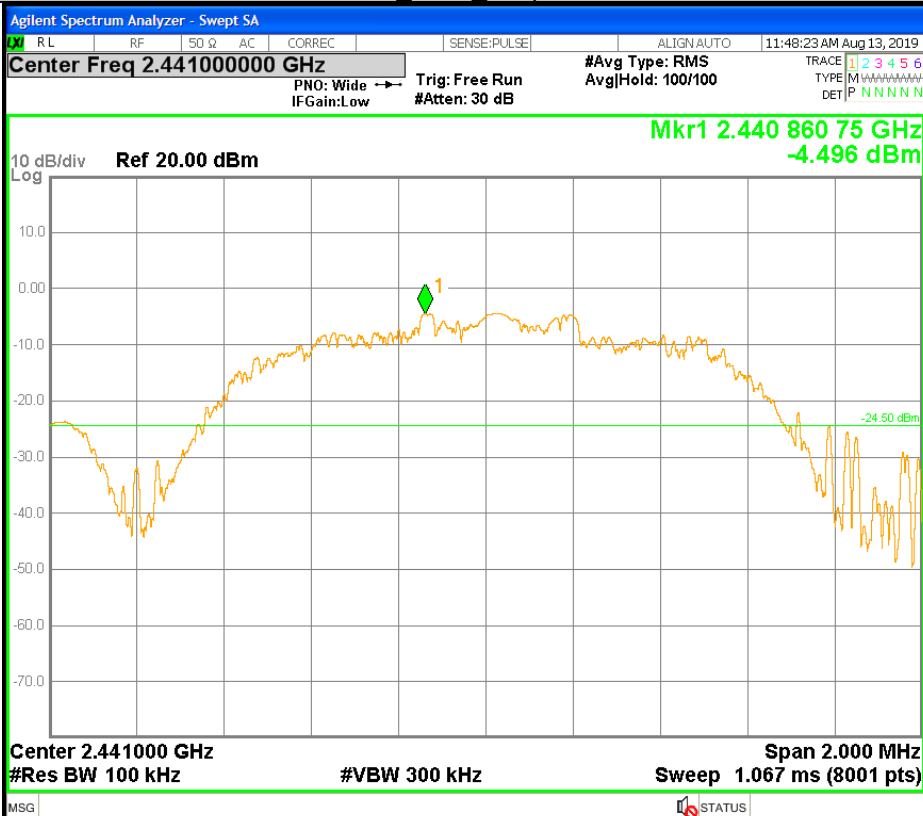


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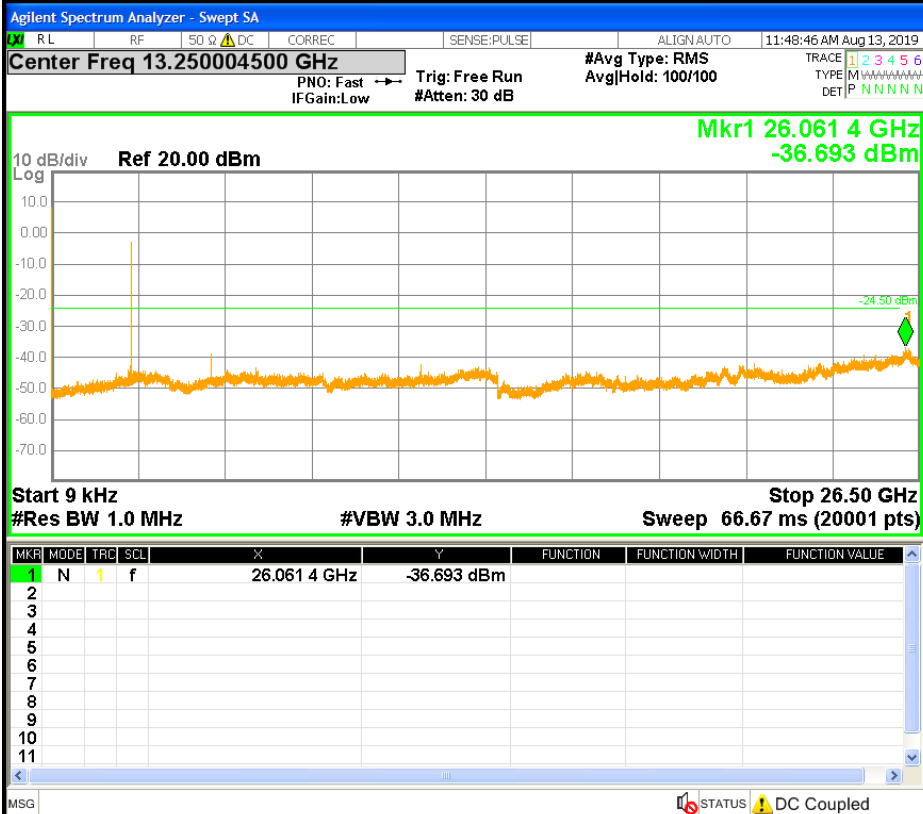


8DPSK MCH Graphs

Pref

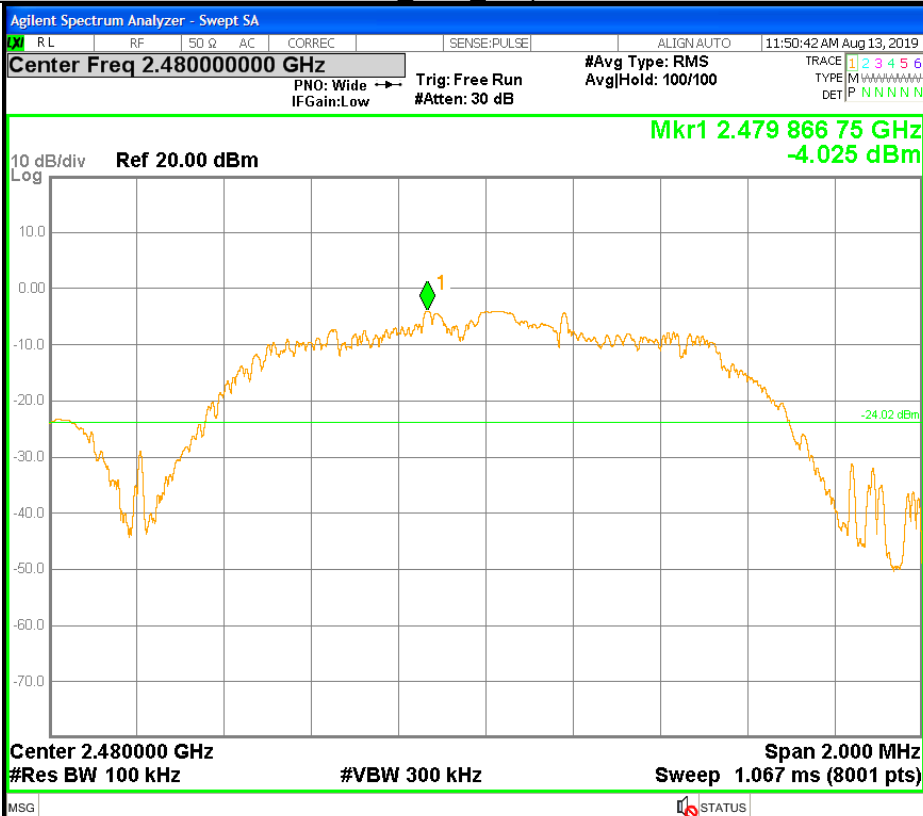


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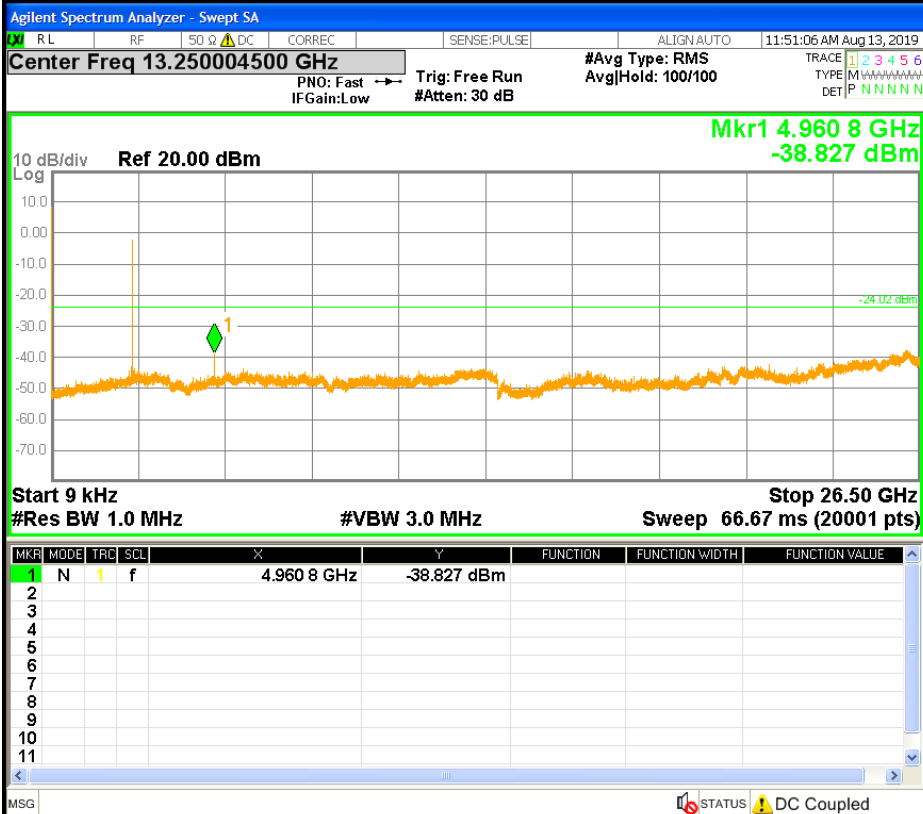


8DPSK HCH Graphs

Pref



Puw

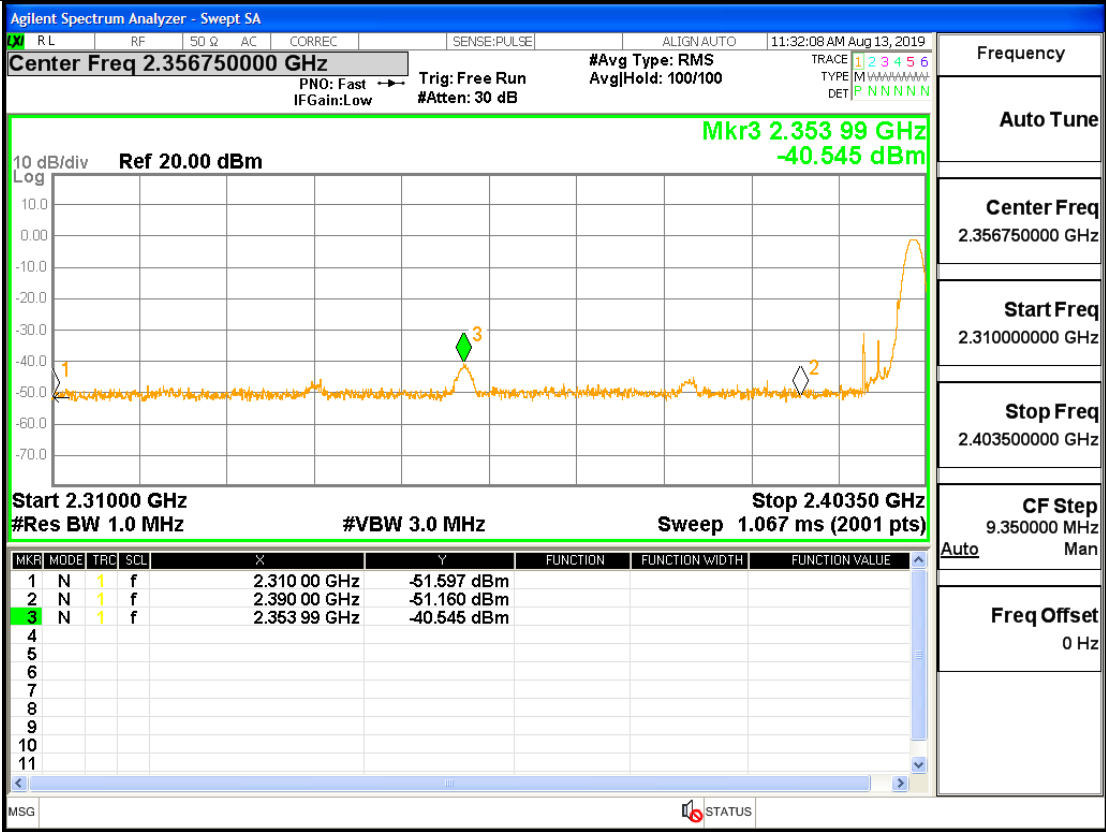


A.8 Restrict-band band-edge measurements

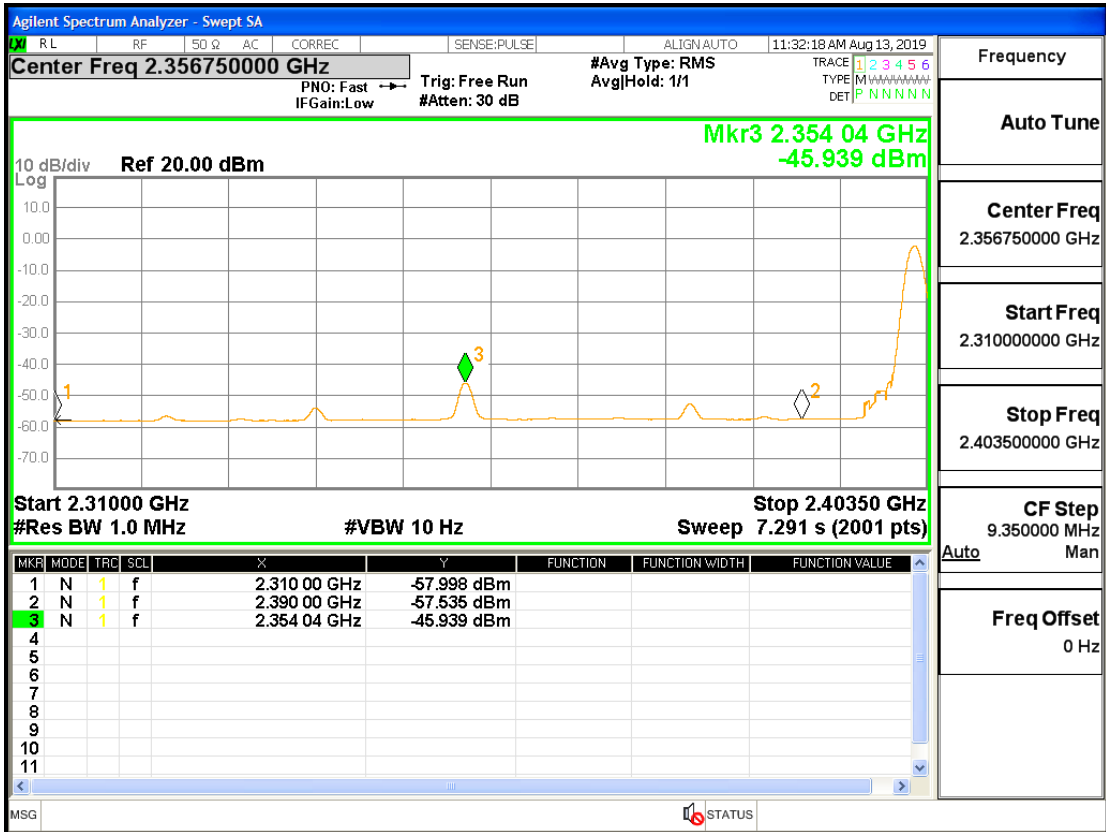
Type	Carrier Frequency (MHz)	Frequency(M Hz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2353.99	2.00	0.00	-40.55	56.66	74	Pass
1DH5	2480	2483.93	2.00	0.00	-25.31	71.89	74	Pass
2DH5	2402	2353.71	2.00	0.00	-43.35	53.85	74	Pass
2DH5	2480	2483.99	2.00	0.00	-29.16	68.04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

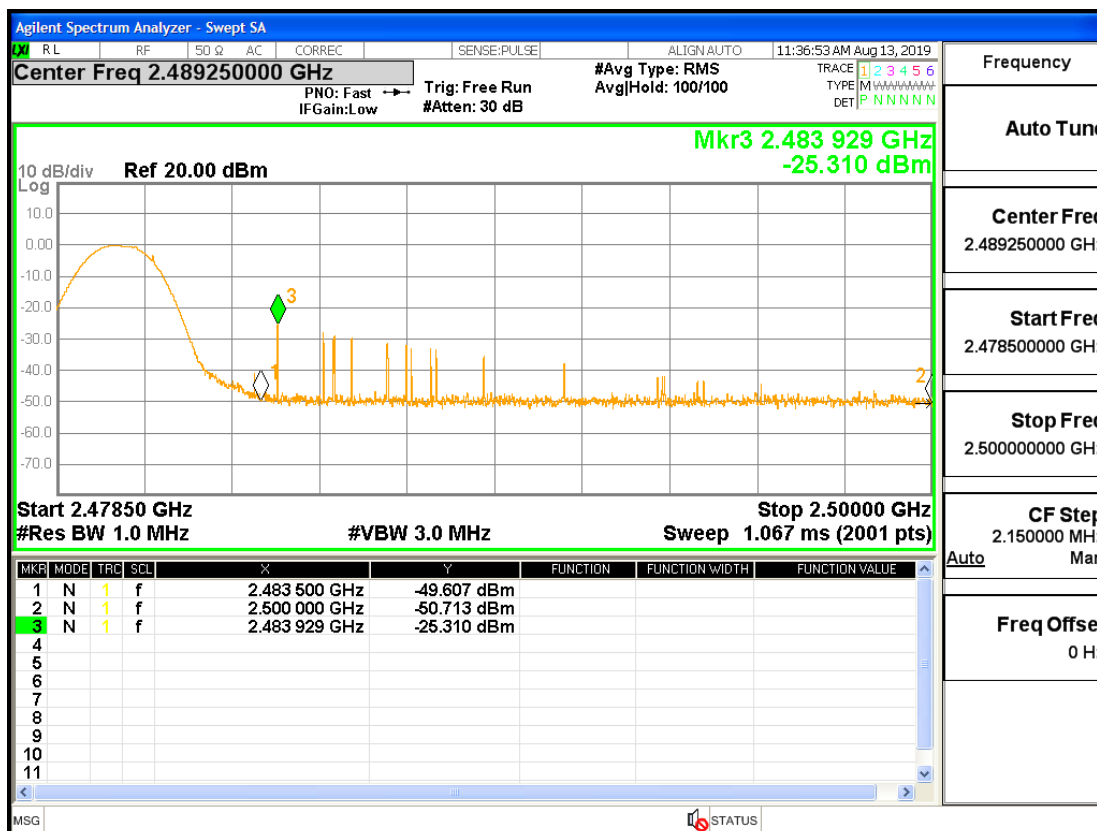
Restrict-band band-edge measurements 2402 PEAK DH5



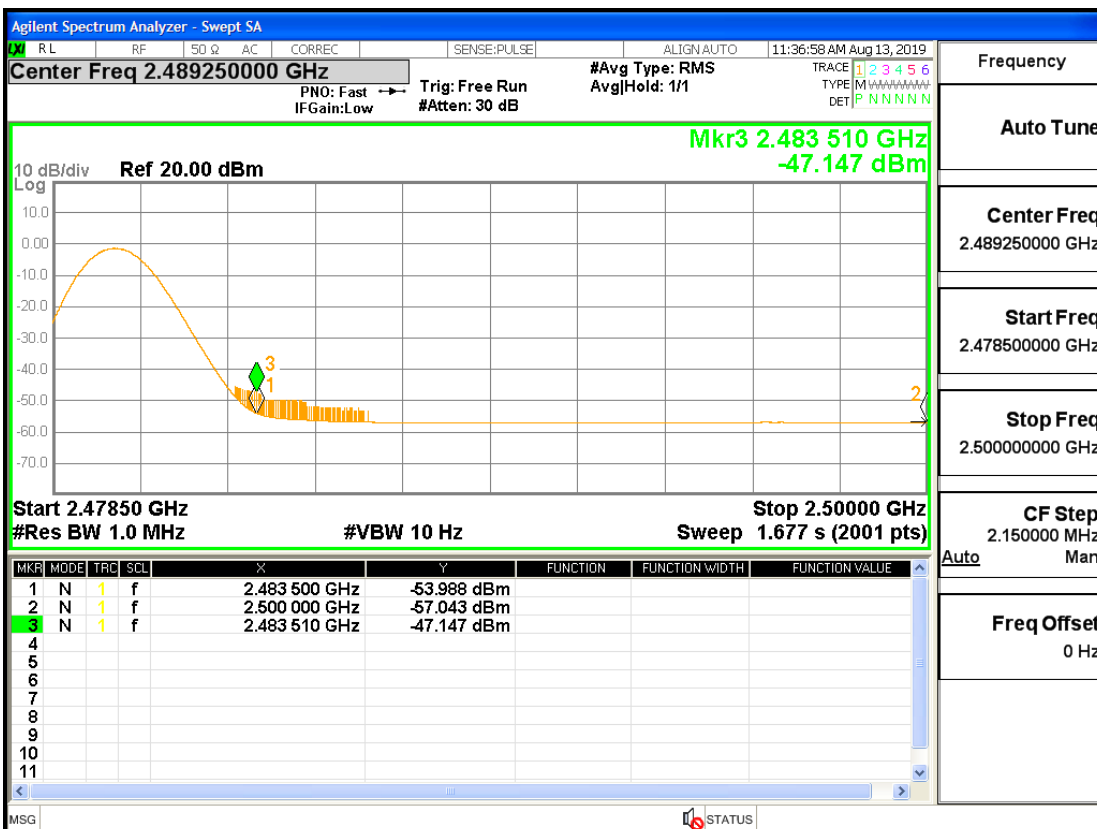
Restrict-band band-edge measurements 2402 AV DH5



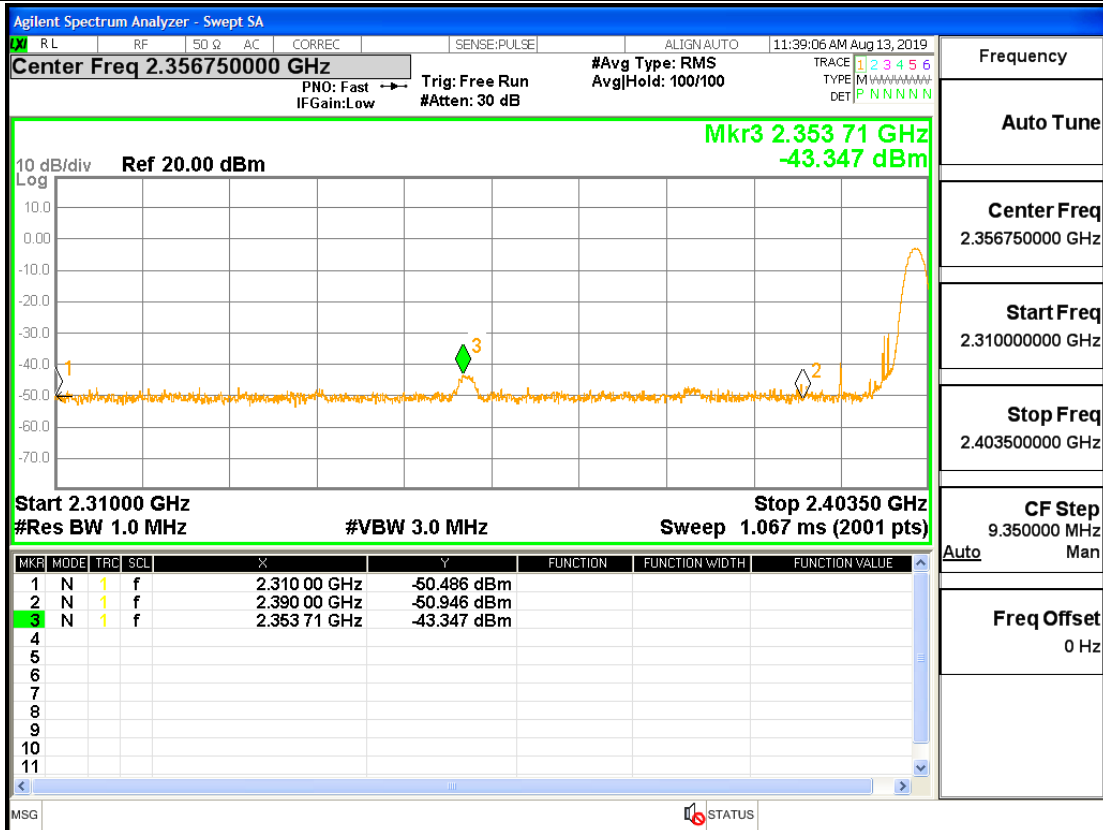
Restrict-band band-edge measurements_2480_PEAK_DH5



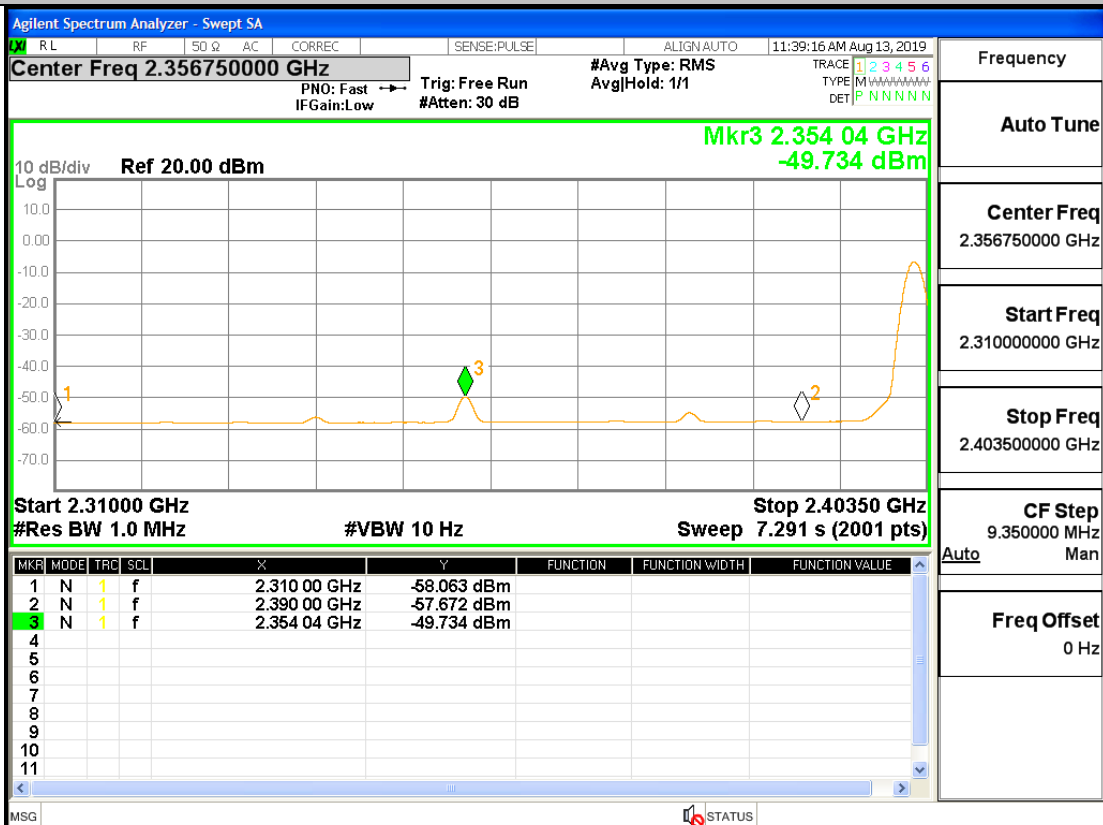
Restrict-band band-edge measurements_2480_AV_DH5



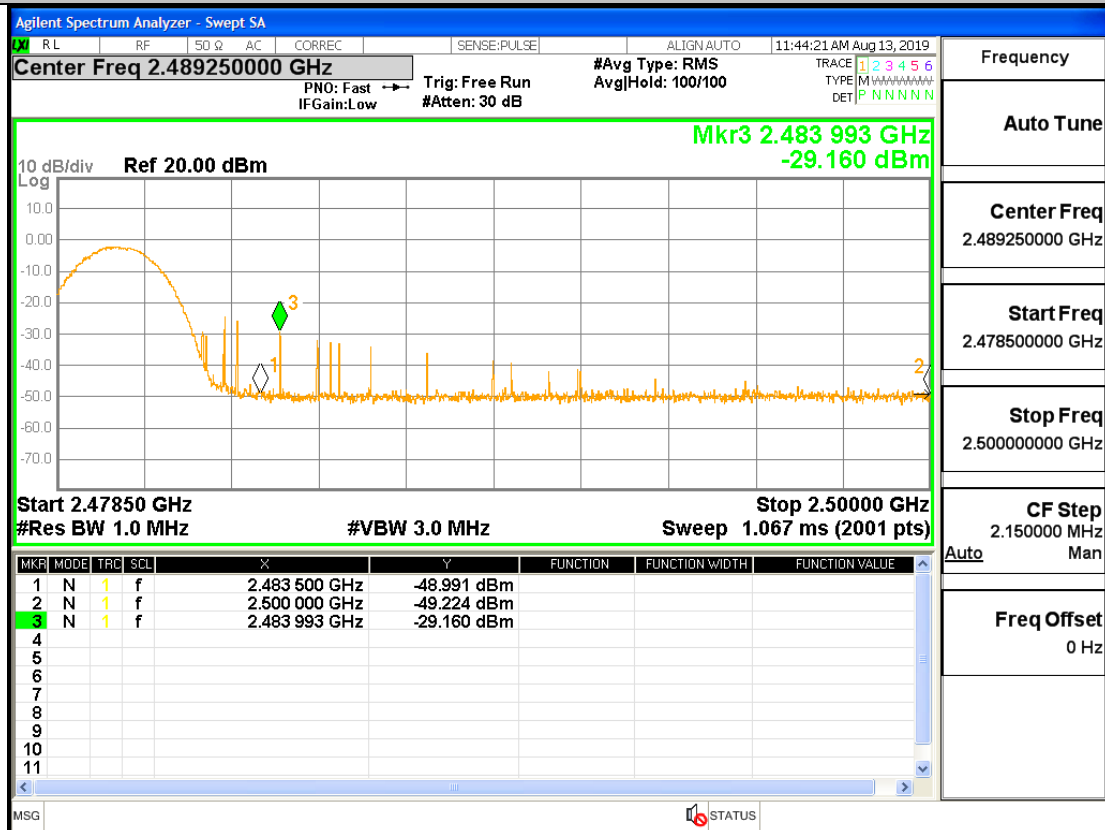
Restrict-band band-edge measurements_2402_PEAK_2DH5



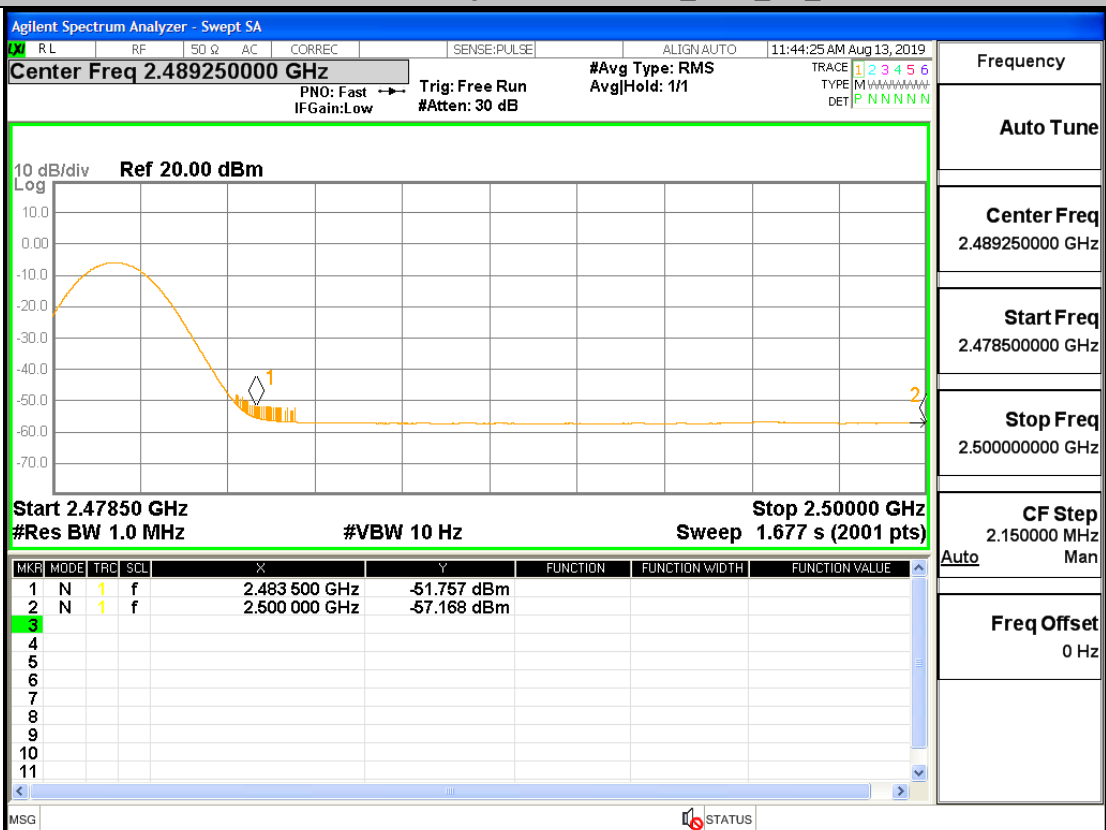
Restrict-band band-edge measurements_2402_AV_2DH5



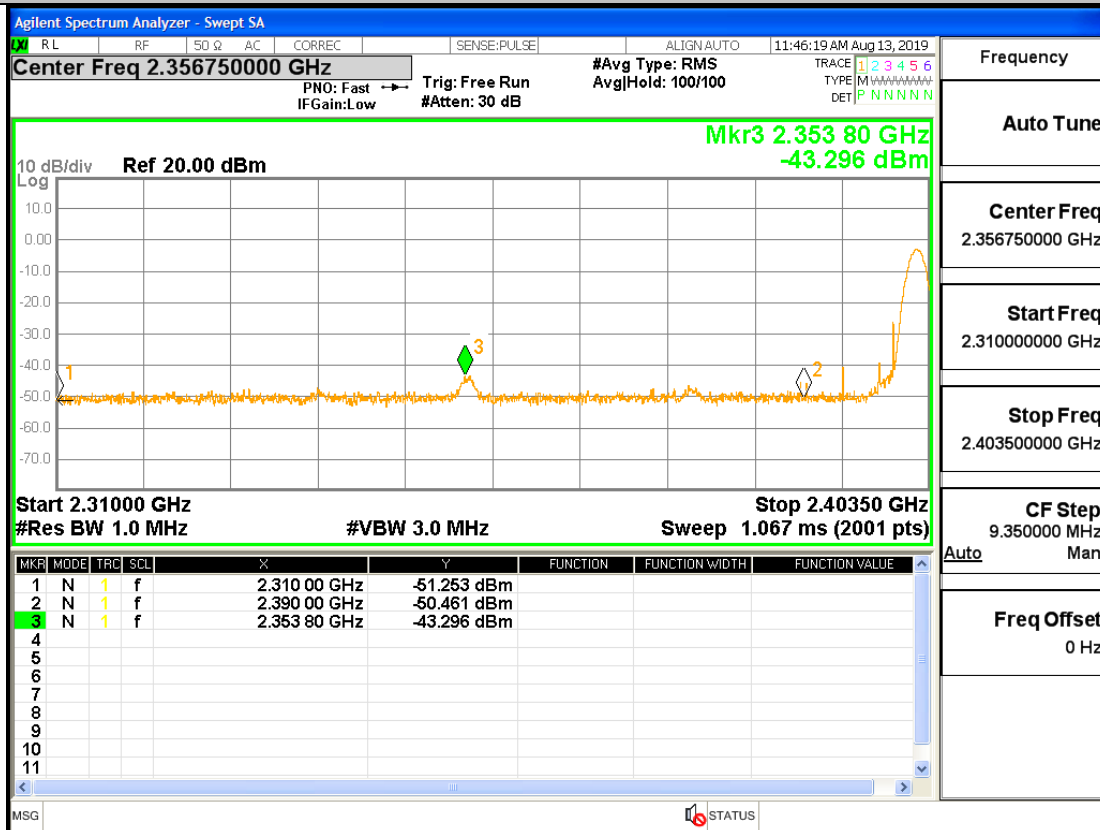
Restrict-band band-edge measurements_2480_PEAK_2DH5



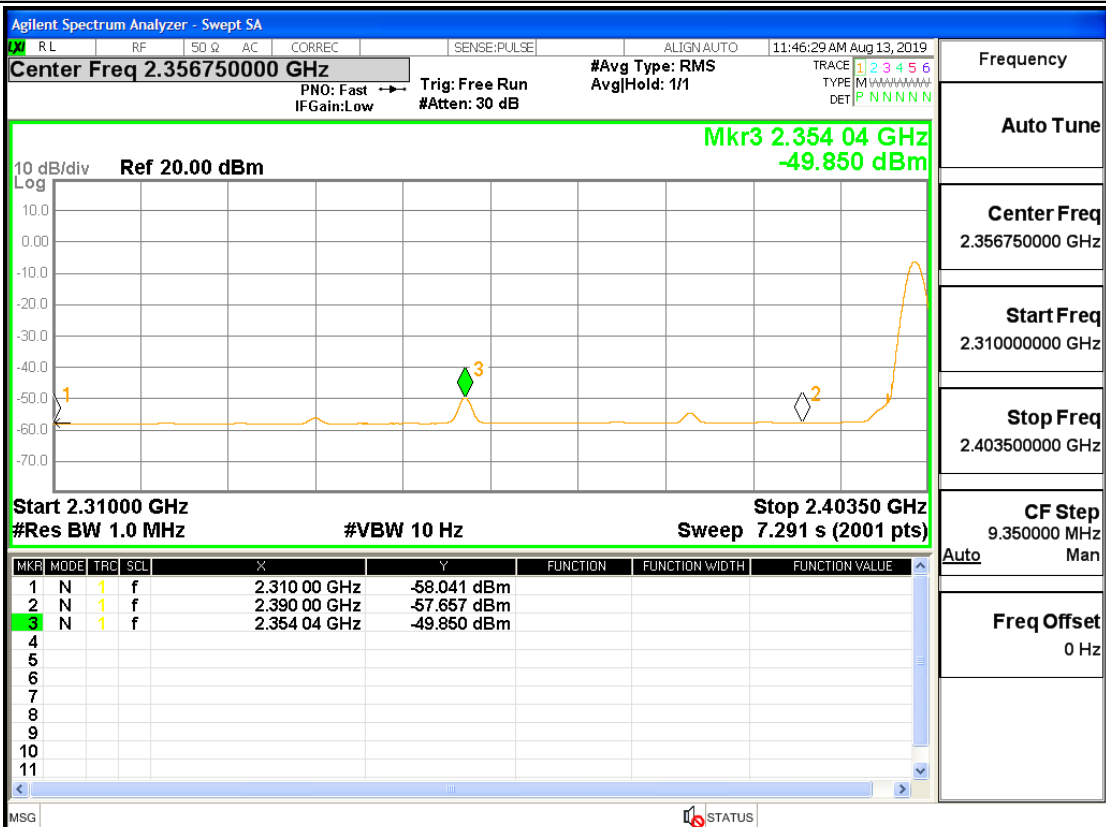
Restrict-band band-edge measurements_2480_AV_2DH5



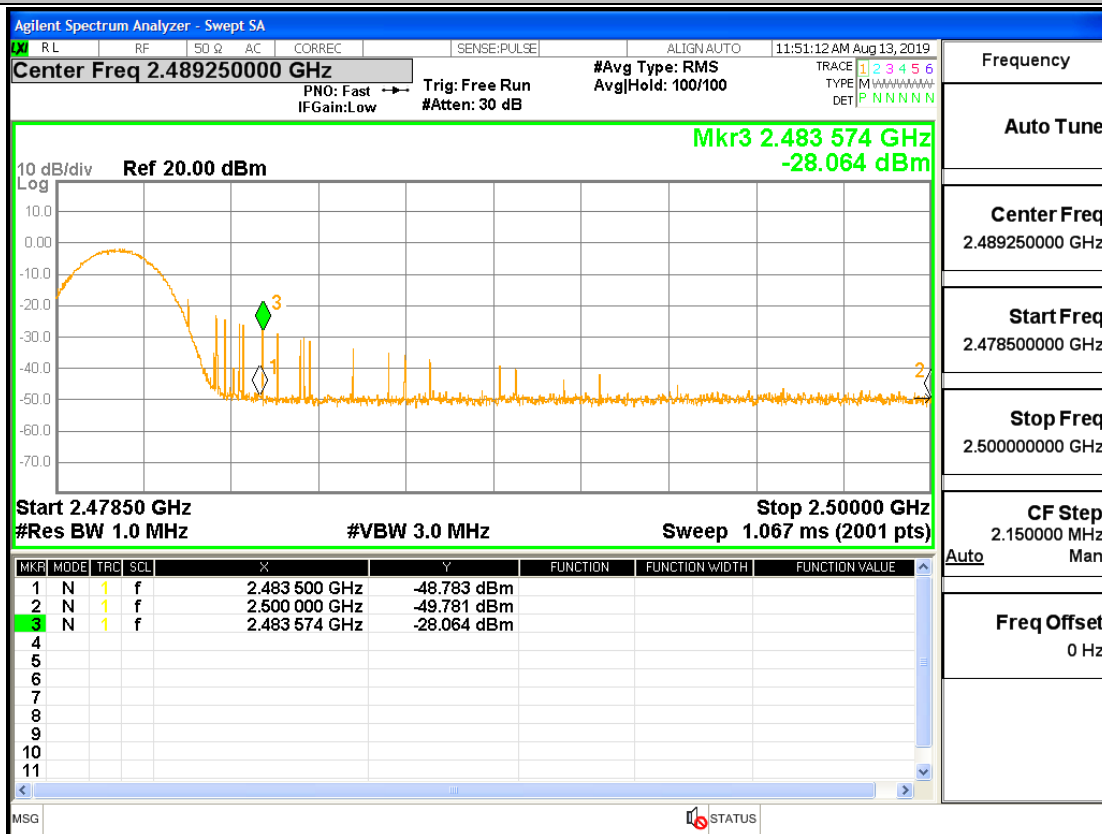
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

