

Appendix A

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

Product Name: Bluetooth headset

Trade Mark: CDX

Test Model: D60,D56C

FCC ID: 2ATOB-D60

Environmental Conditions

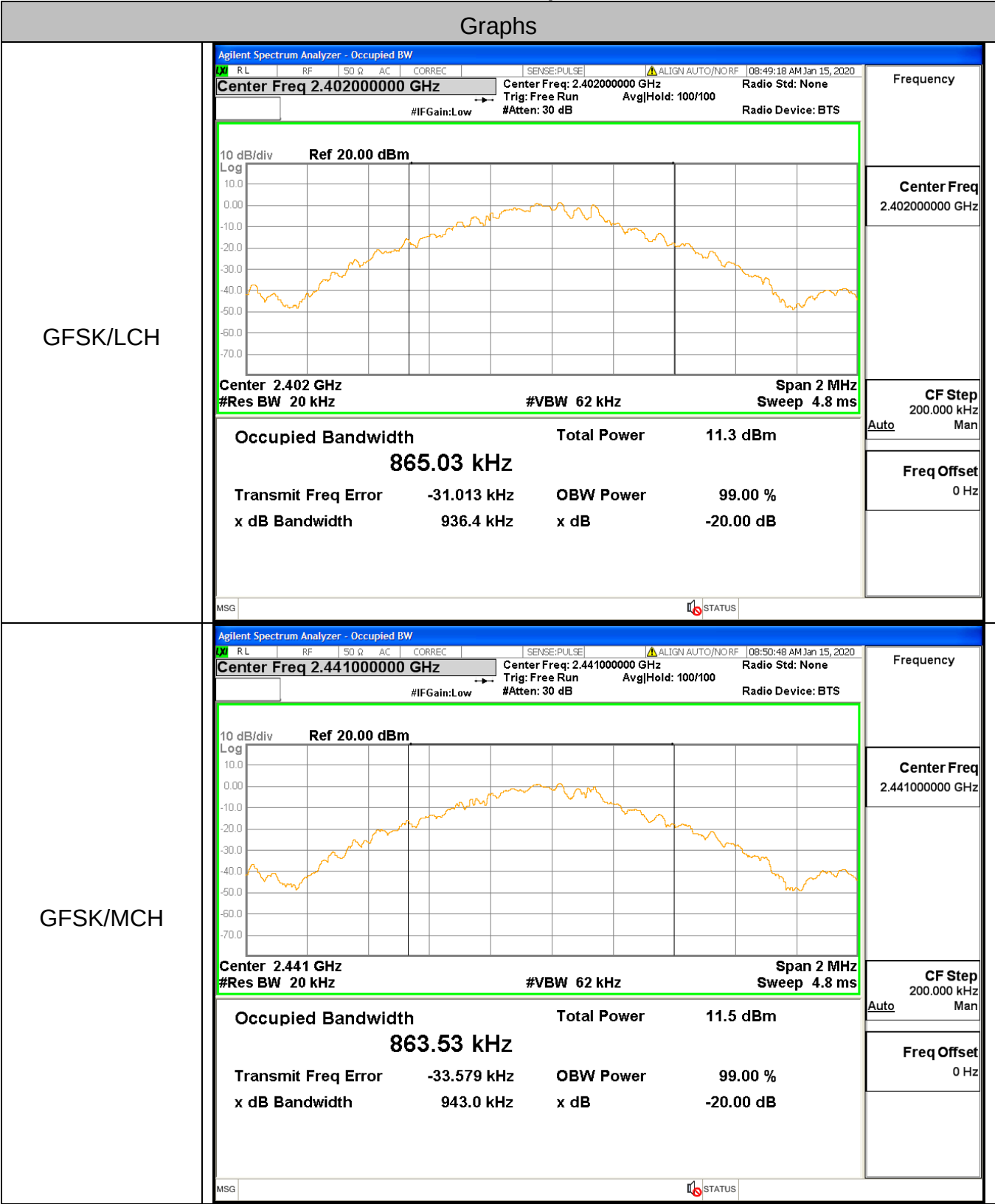
Temperature:	22.7° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Anna Hu
Supervised by:	Hugo Chen

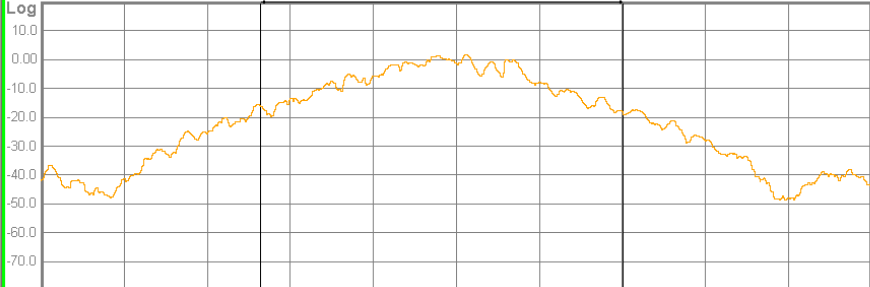
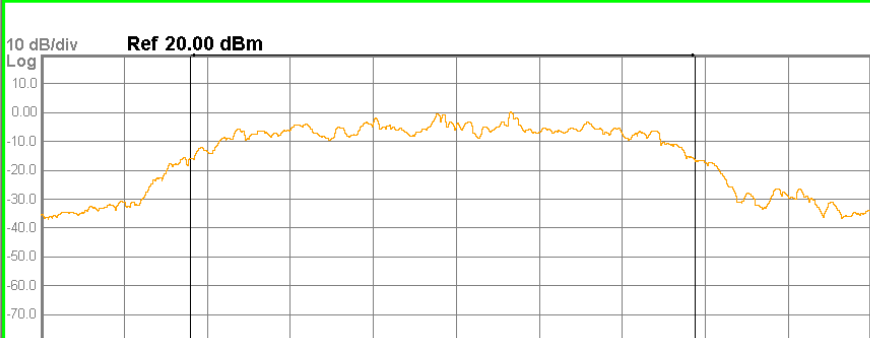
A.1 20 dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.936	Not Specified	PASS
GFSK	MCH	0.943	Not Specified	PASS
GFSK	HCH	0.940	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.329	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.333	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.324	Not Specified	PASS
8DPSK	LCH	1.324	Not Specified	PASS
8DPSK	MCH	1.326	Not Specified	PASS
8DPSK	HCH	1.330	Not Specified	PASS

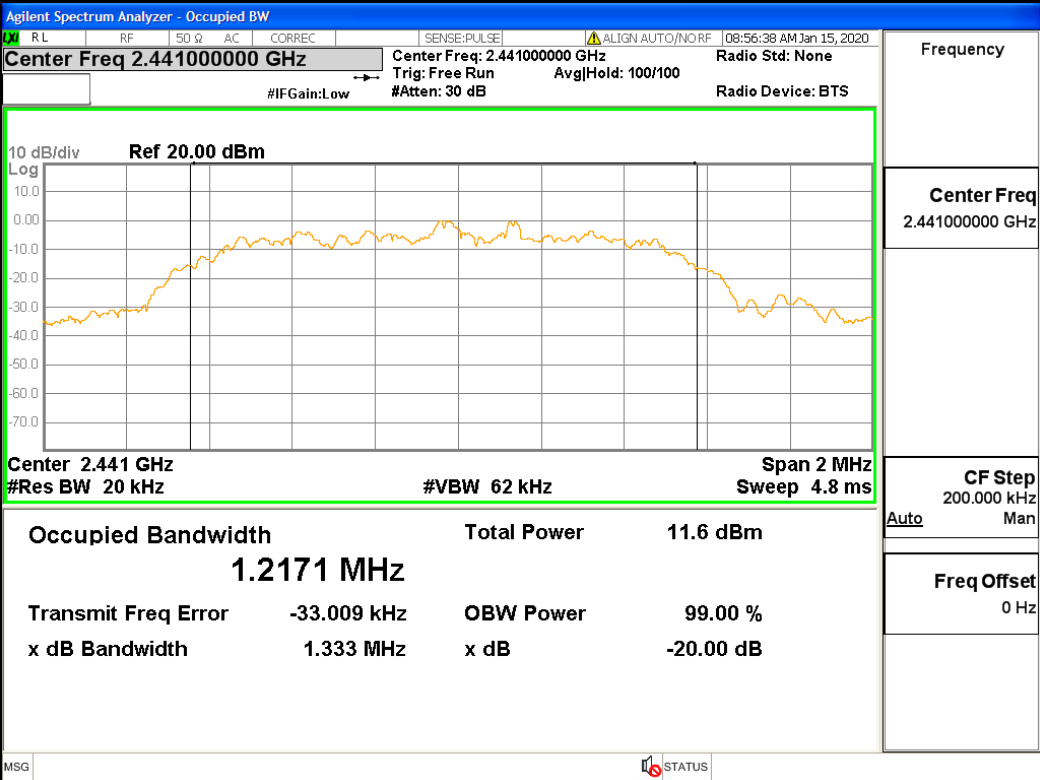
Test Graph

Graphs



GFSK/HCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN AUTO/NORF 08:52:16 AM Jan 15, 2020 Center Freq 2.480000000 GHz Center Freq: 2.480000000 GHz Trig: Free Run #Gain: Low #Atten: 30 dB AvgHold: 100/100 Radio Std: None Radio Device: BTS			Frequency
	10 dB/div Ref 20.00 dBm Log 			Center Freq 2.480000000 GHz
	Center 2.48 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 866.89 kHz Total Power 11.7 dBm Transmit Freq Error -33.582 kHz OBW Power 99.00 % x dB Bandwidth 940.1 kHz x dB -20.00 dB			CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS			
π/4DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN AUTO/NORF 08:54:34 AM Jan 15, 2020 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Trig: Free Run #Gain: Low #Atten: 30 dB AvgHold: 100/100 Radio Std: None Radio Device: BTS			Frequency
	10 dB/div Ref 20.00 dBm Log 			Center Freq 2.402000000 GHz
	Center 2.402 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms Occupied Bandwidth 1.2106 MHz Total Power 11.6 dBm Transmit Freq Error -31.029 kHz OBW Power 99.00 % x dB Bandwidth 1.329 MHz x dB -20.00 dB			CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS			

π /4DQPSK/MCH



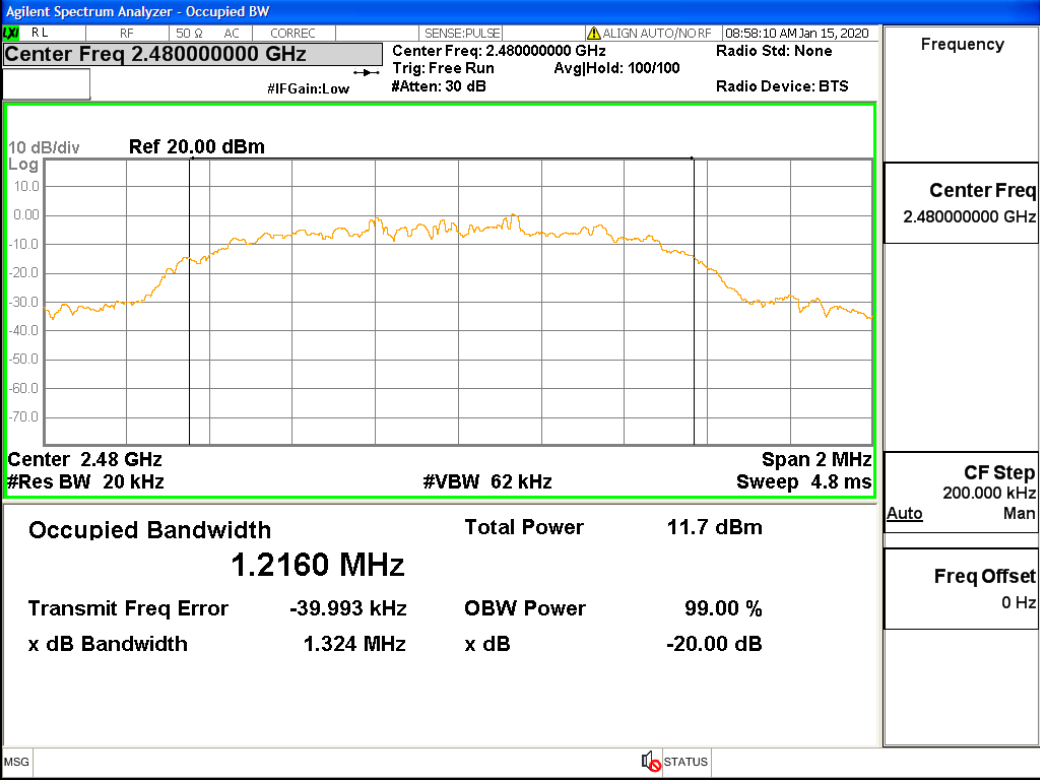
Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

π /4DQPSK/HCH

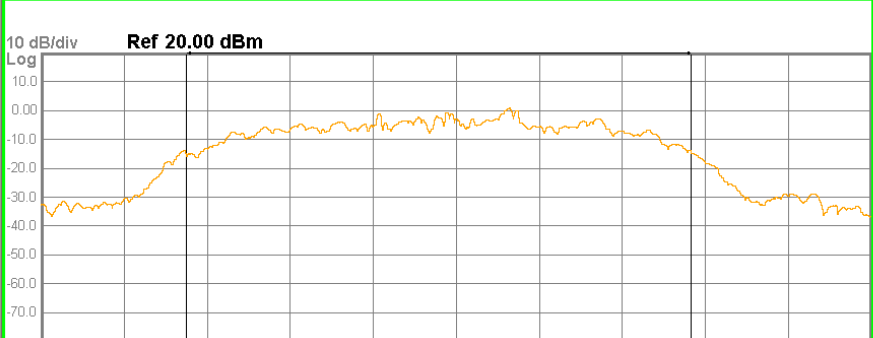
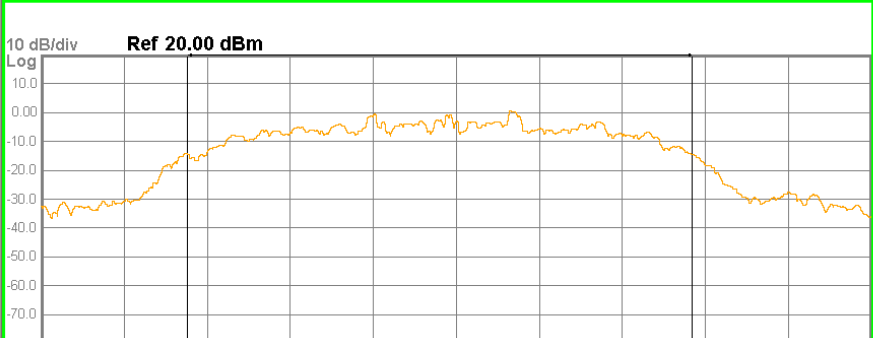


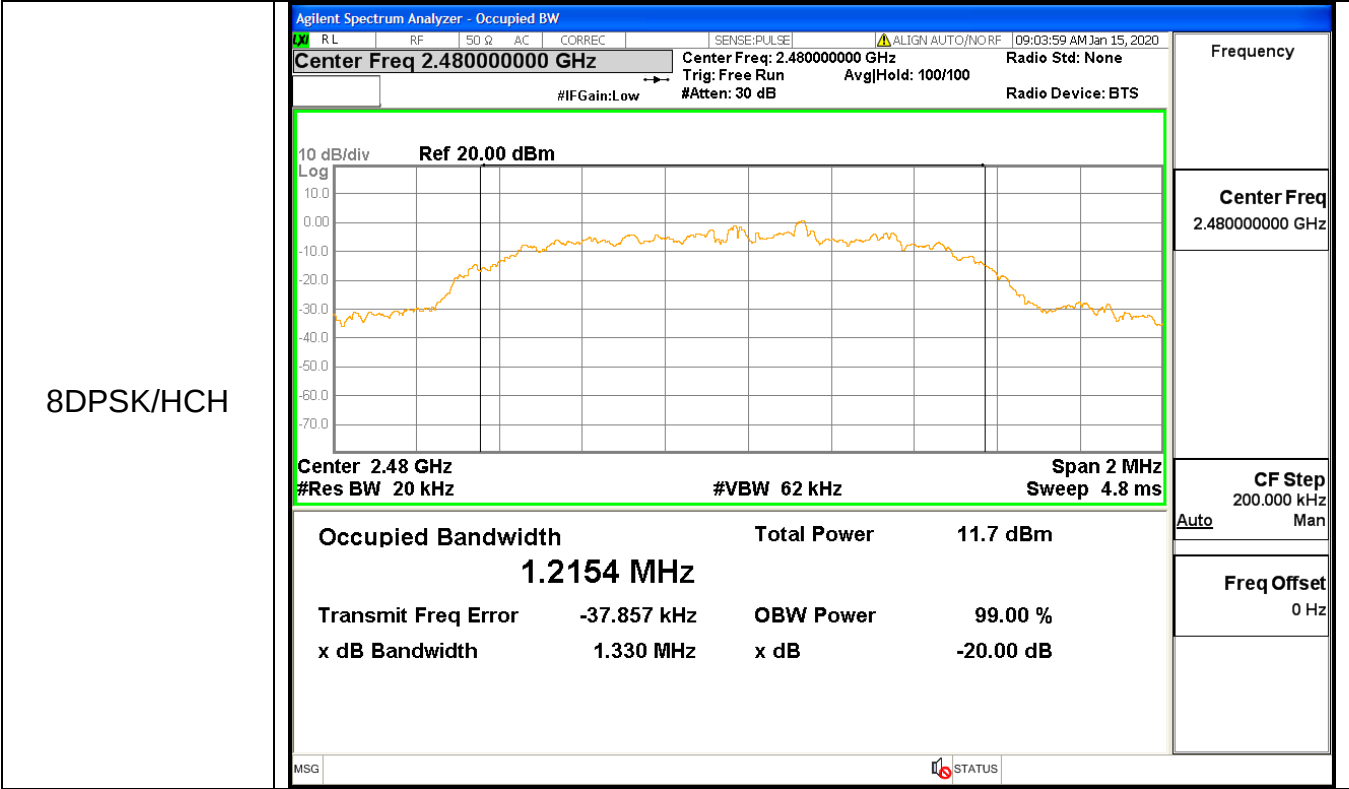
Frequency

Center Freq
2.480000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

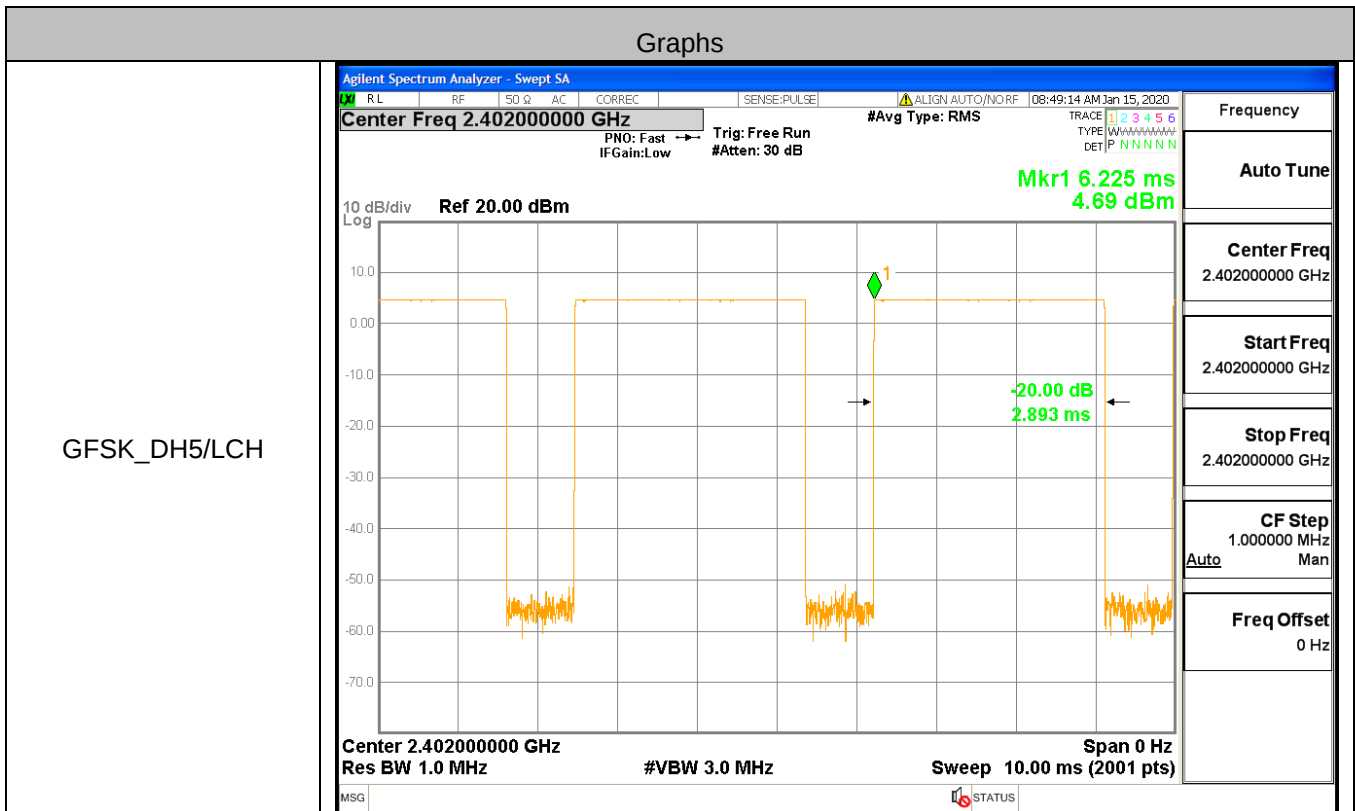
8DPSK/LCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN AUTO/NORF 09:00:10 AM Jan 15, 2020 Center Freq 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None #IFGain:Low #Atten: 30 dB AvgHold: 100/100 Radio Device: BTS				Frequency
					Center Freq 2.402000000 GHz
	Center 2.402 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms				CF Step 200.000 kHz Auto Man
	Occupied Bandwidth 1.2111 MHz Total Power 12.2 dBm Transmit Freq Error -41.300 kHz OBW Power 99.00 % x dB Bandwidth 1.324 MHz x dB -20.00 dB				Freq Offset 0 Hz
8DPSK/MCH	Agilent Spectrum Analyzer - Occupied BW RL RF 50 Ω AC CORREC SENSE:PULSE ALIGN AUTO/NORF 09:02:07 AM Jan 15, 2020 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
					Center Freq 2.441000000 GHz
	Center 2.441 GHz #Res BW 20 kHz #VBW 62 kHz Span 2 MHz Sweep 4.8 ms				CF Step 200.000 kHz Auto Man
	Occupied Bandwidth 1.2126 MHz Total Power 12.0 dBm Transmit Freq Error -39.288 kHz OBW Power 99.00 % x dB Bandwidth 1.326 MHz x dB -20.00 dB				Freq Offset 0 Hz

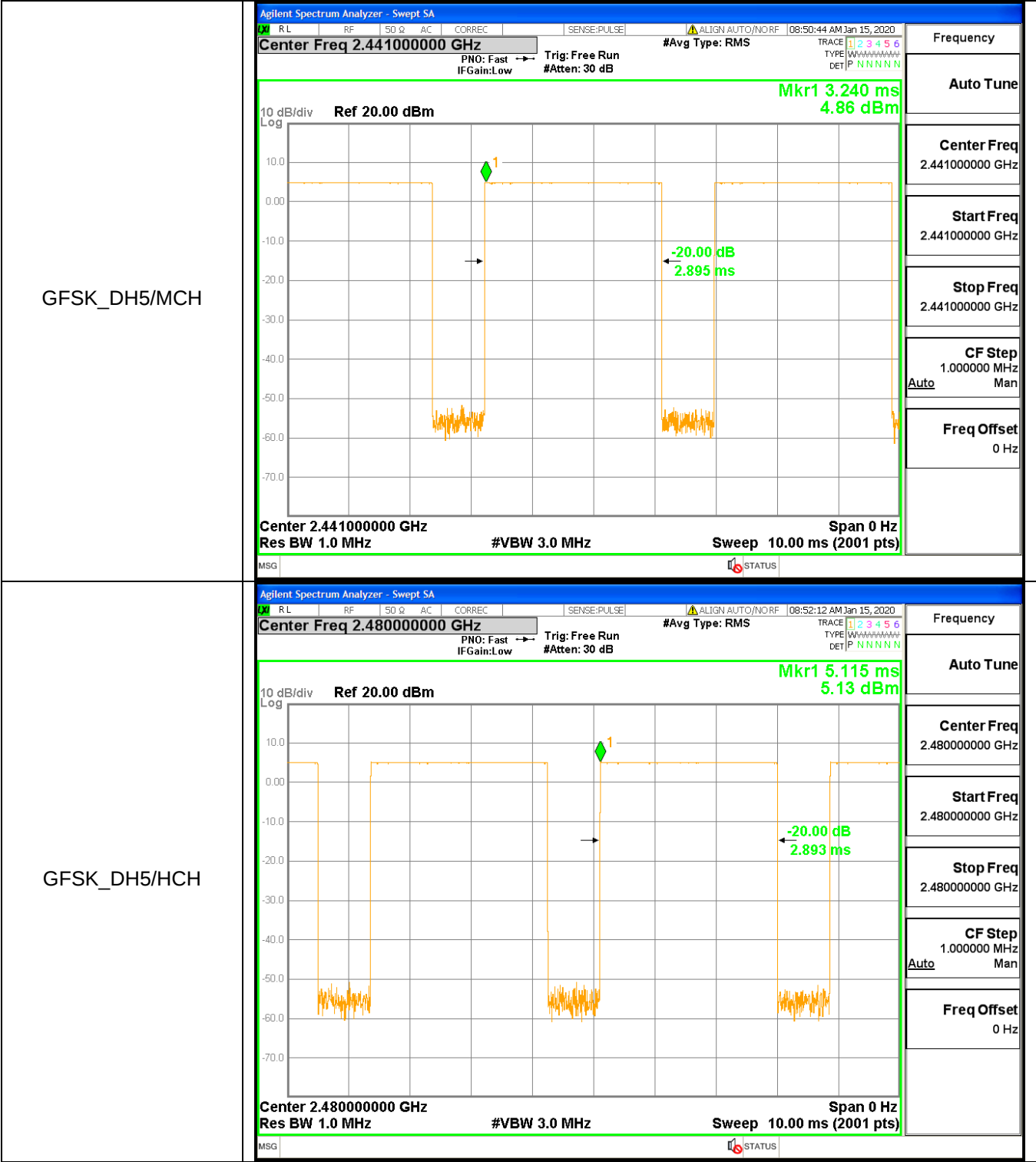


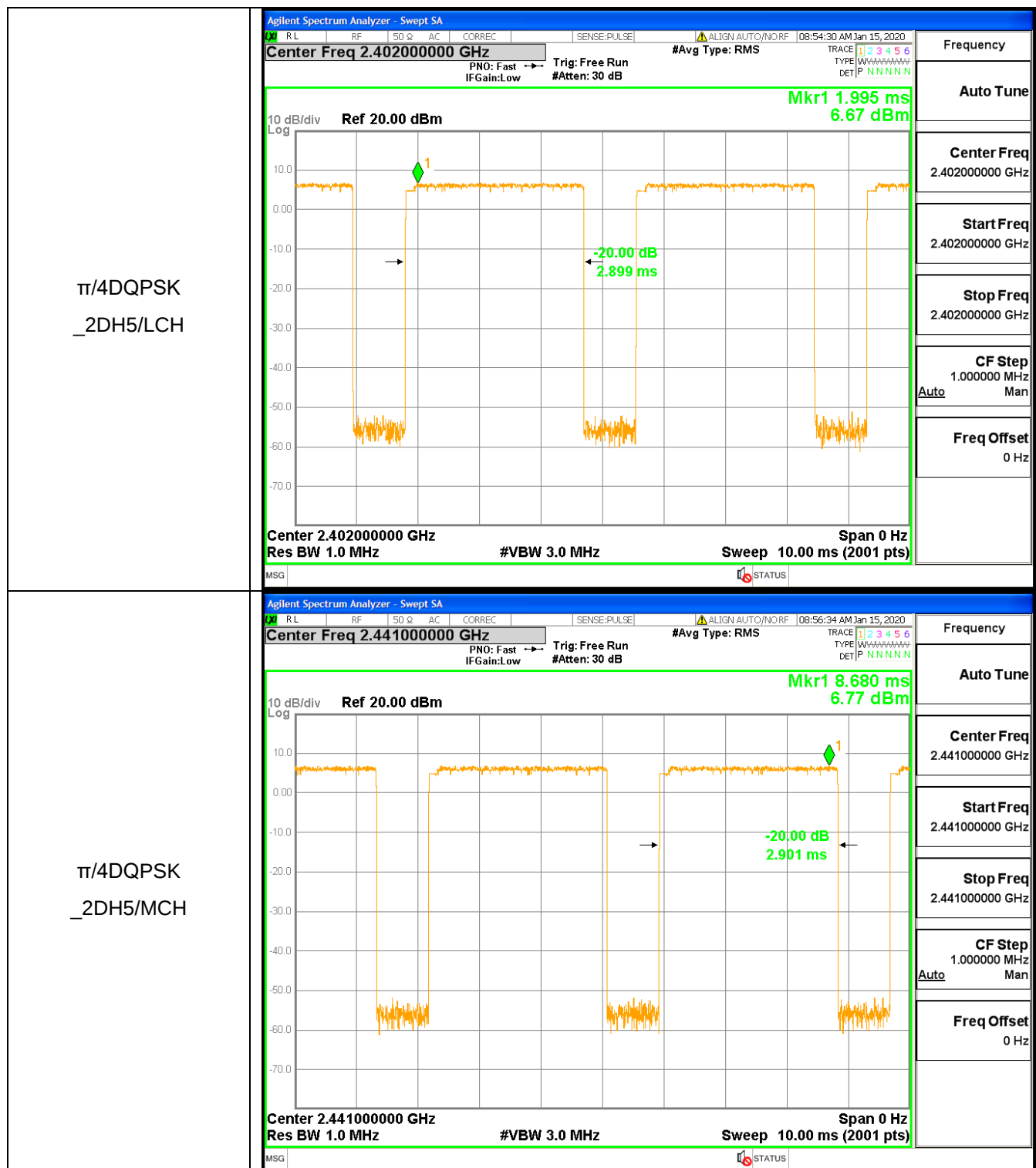
A.2 Dwell Time

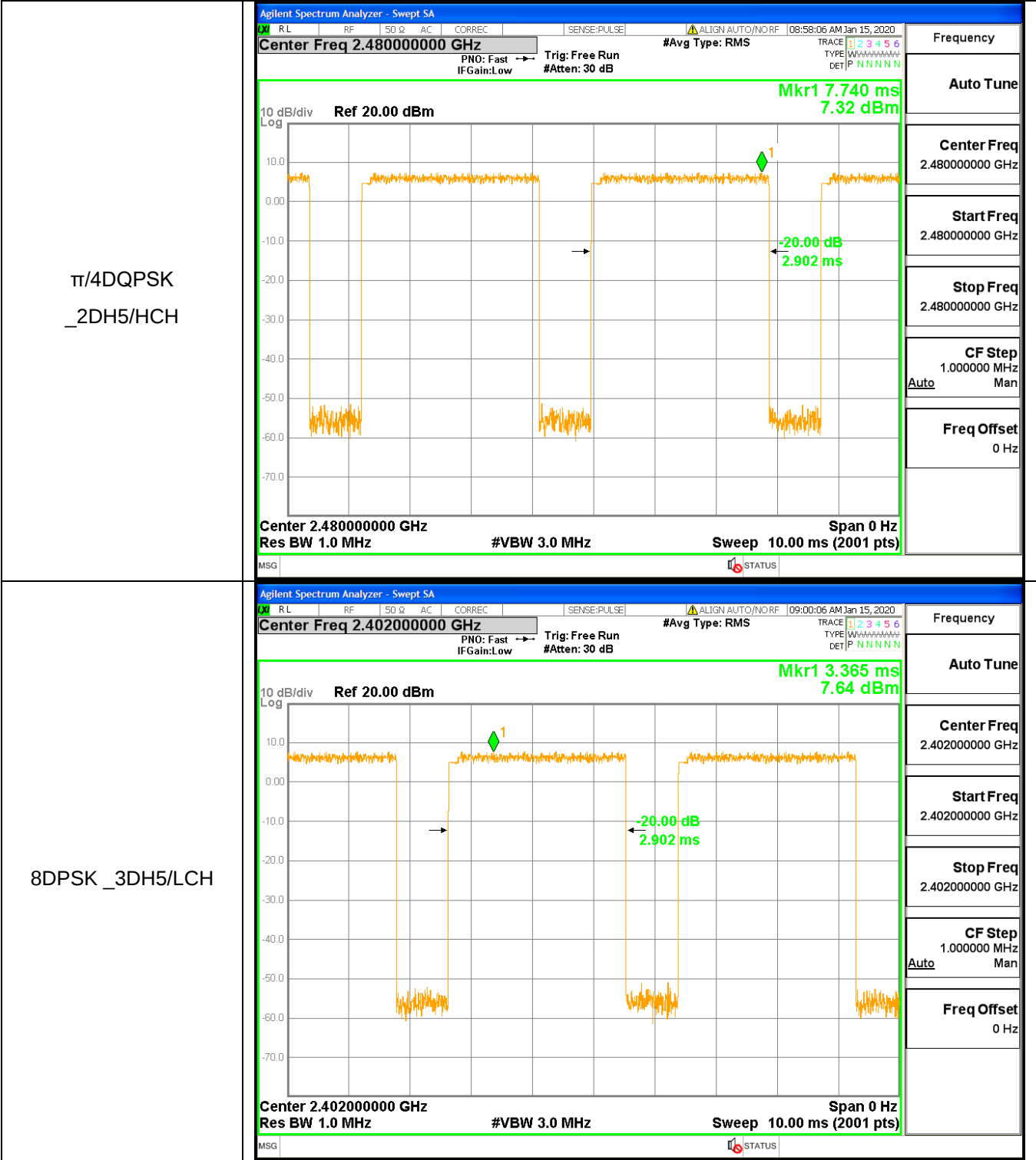
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002893	106.7	0.308732	0.4	PASS
GFSK	DH5	MCH	0.002895	106.7	0.308927	0.4	PASS
GFSK	DH5	HCH	0.002893	106.7	0.308697	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002899	106.7	0.309278	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002901	106.7	0.309537	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002902	106.7	0.309611	0.4	PASS
8DPSK	3DH5	LCH	0.002902	106.7	0.309616	0.4	PASS
8DPSK	3DH5	MCH	0.002902	106.7	0.309616	0.4	PASS
8DPSK	3DH5	HCH	0.002901	106.7	0.309588	0.4	PASS

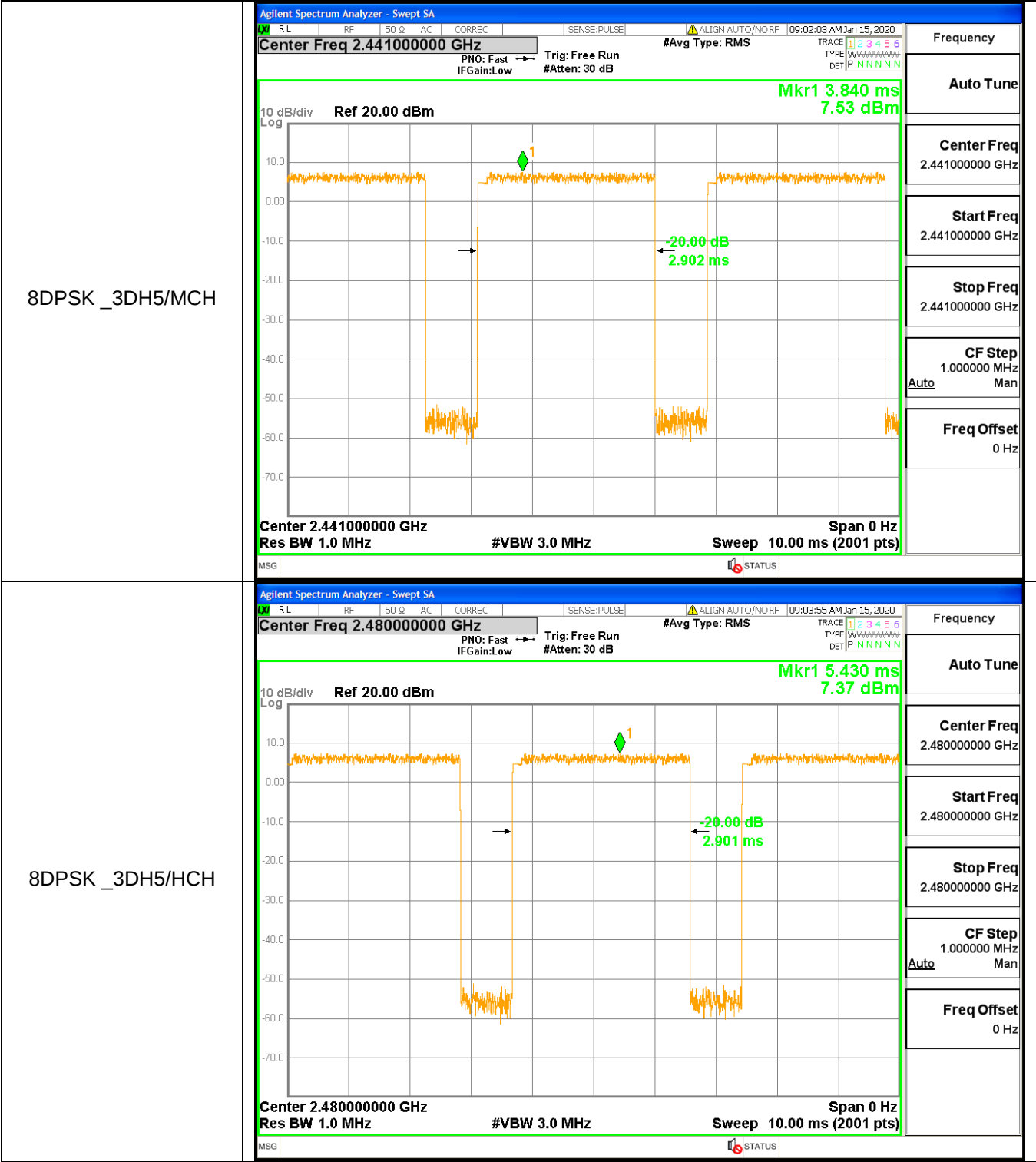
Test Graph







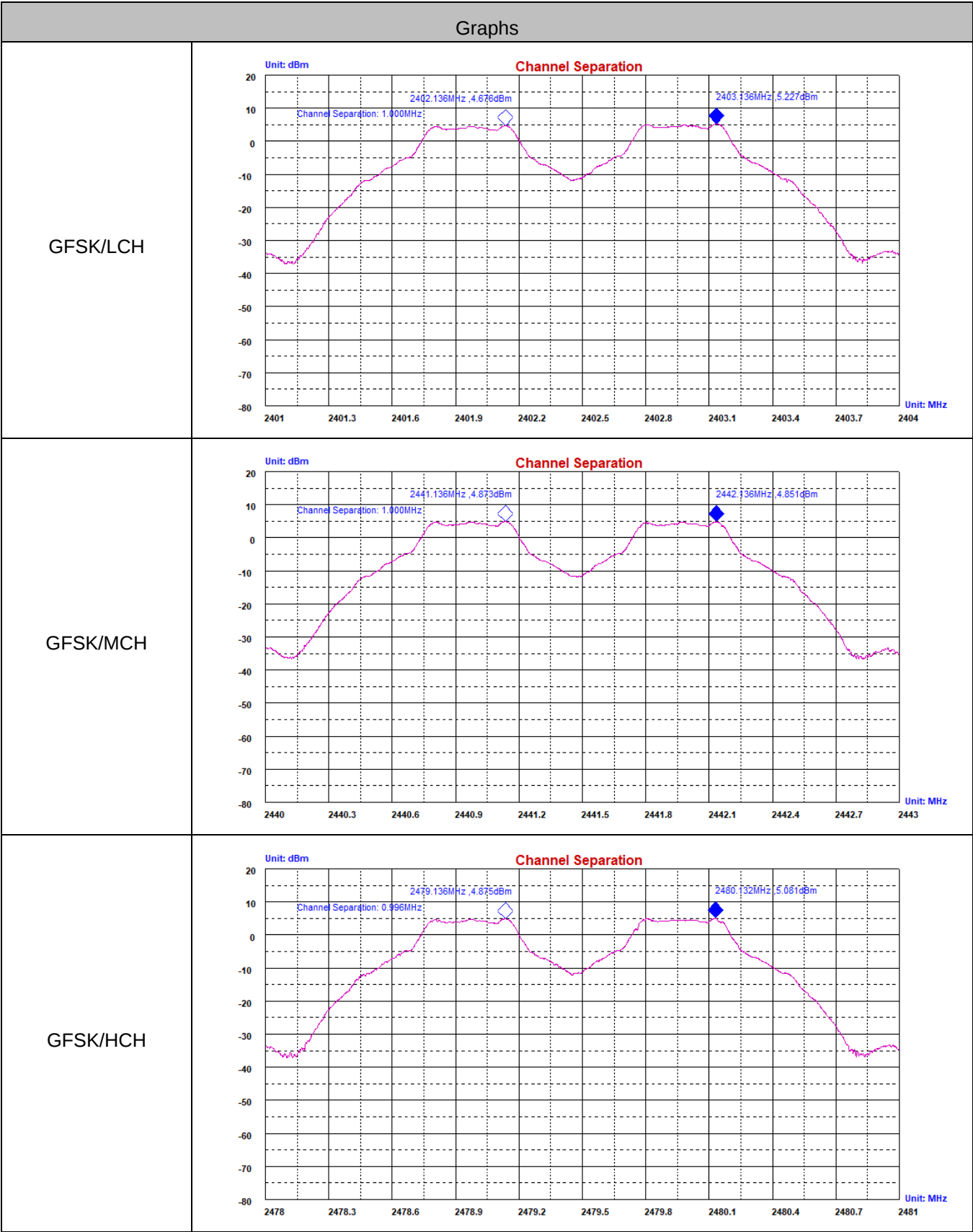


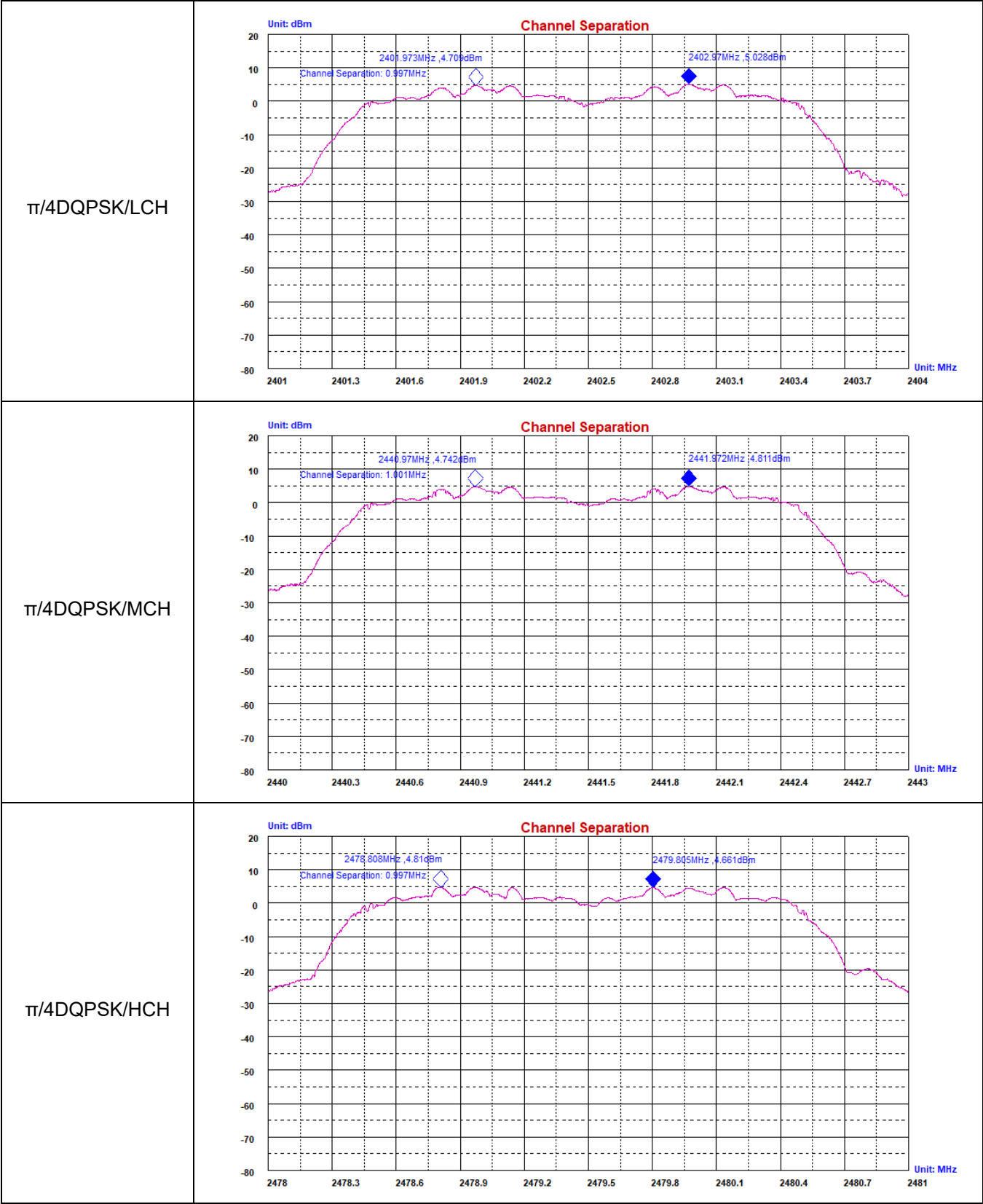


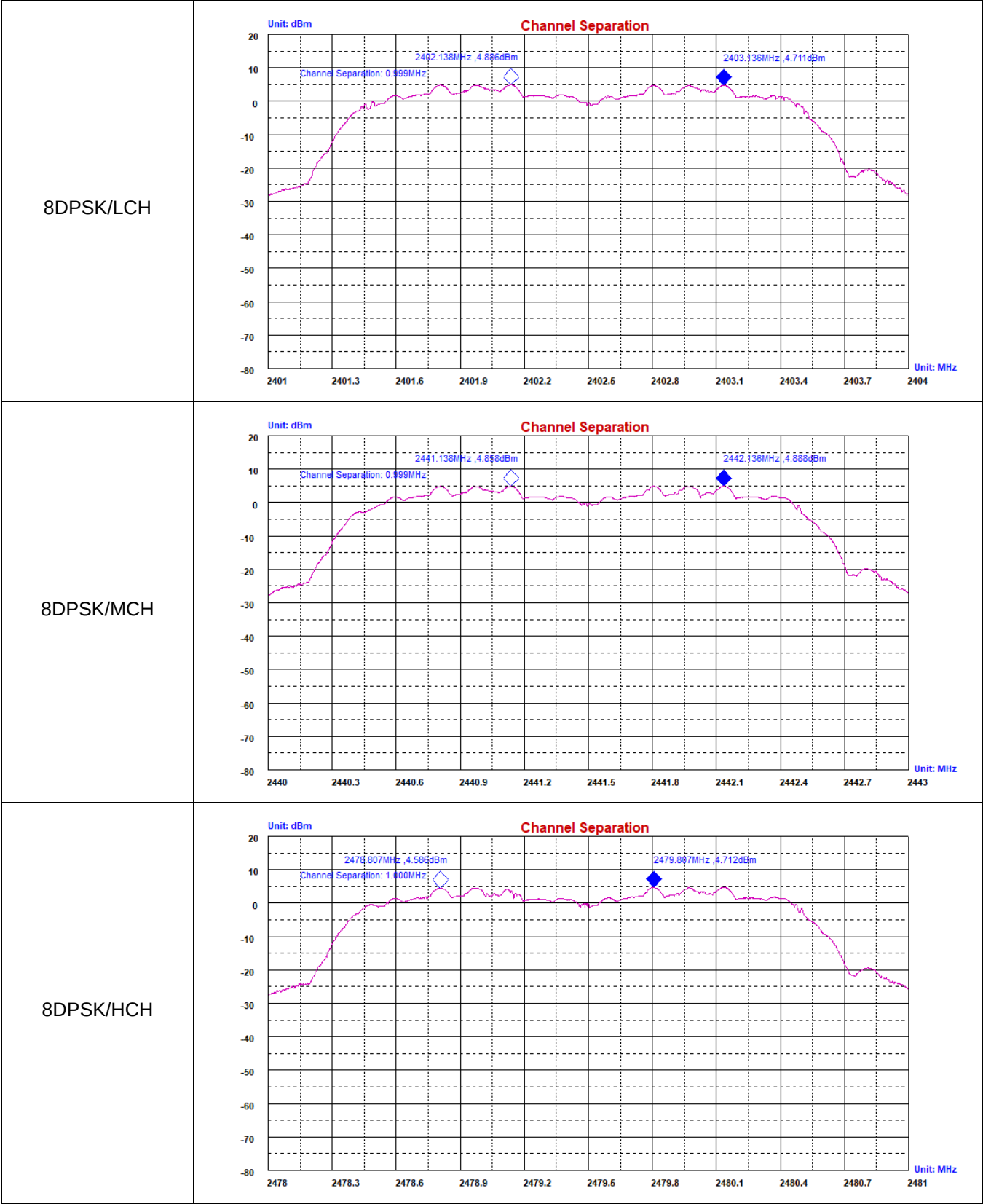
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.000	0.624	PASS
GFSK	MCH	1.000	0.629	PASS
GFSK	HCH	0.996	0.627	PASS
$\pi/4$ DQPSK	LCH	0.997	0.886	PASS
$\pi/4$ DQPSK	MCH	1.001	0.889	PASS
$\pi/4$ DQPSK	HCH	0.997	0.883	PASS
8DPSK	LCH	0.999	0.887	PASS
8DPSK	MCH	0.999	0.884	PASS
8DPSK	HCH	1.000	0.887	PASS

Test Graph



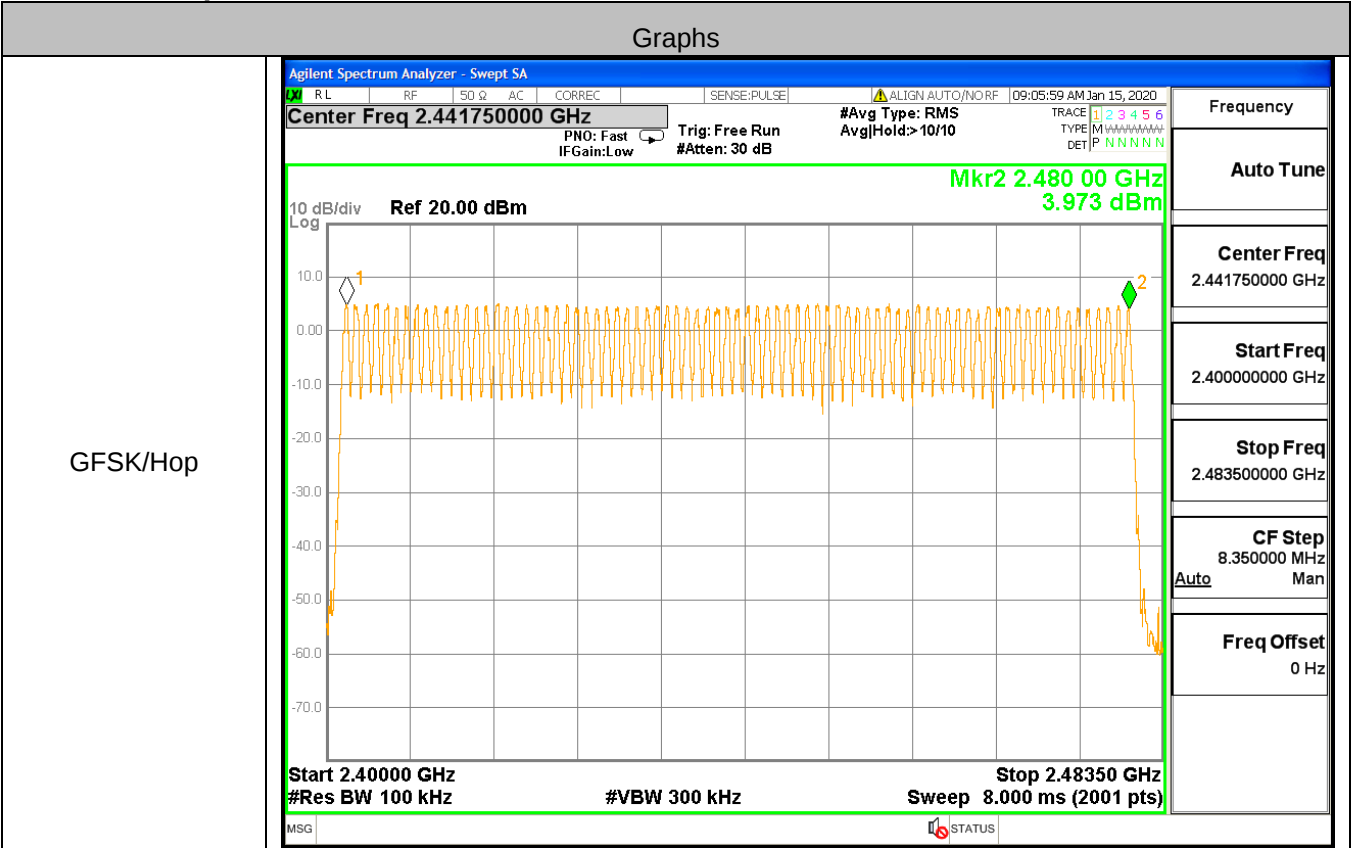


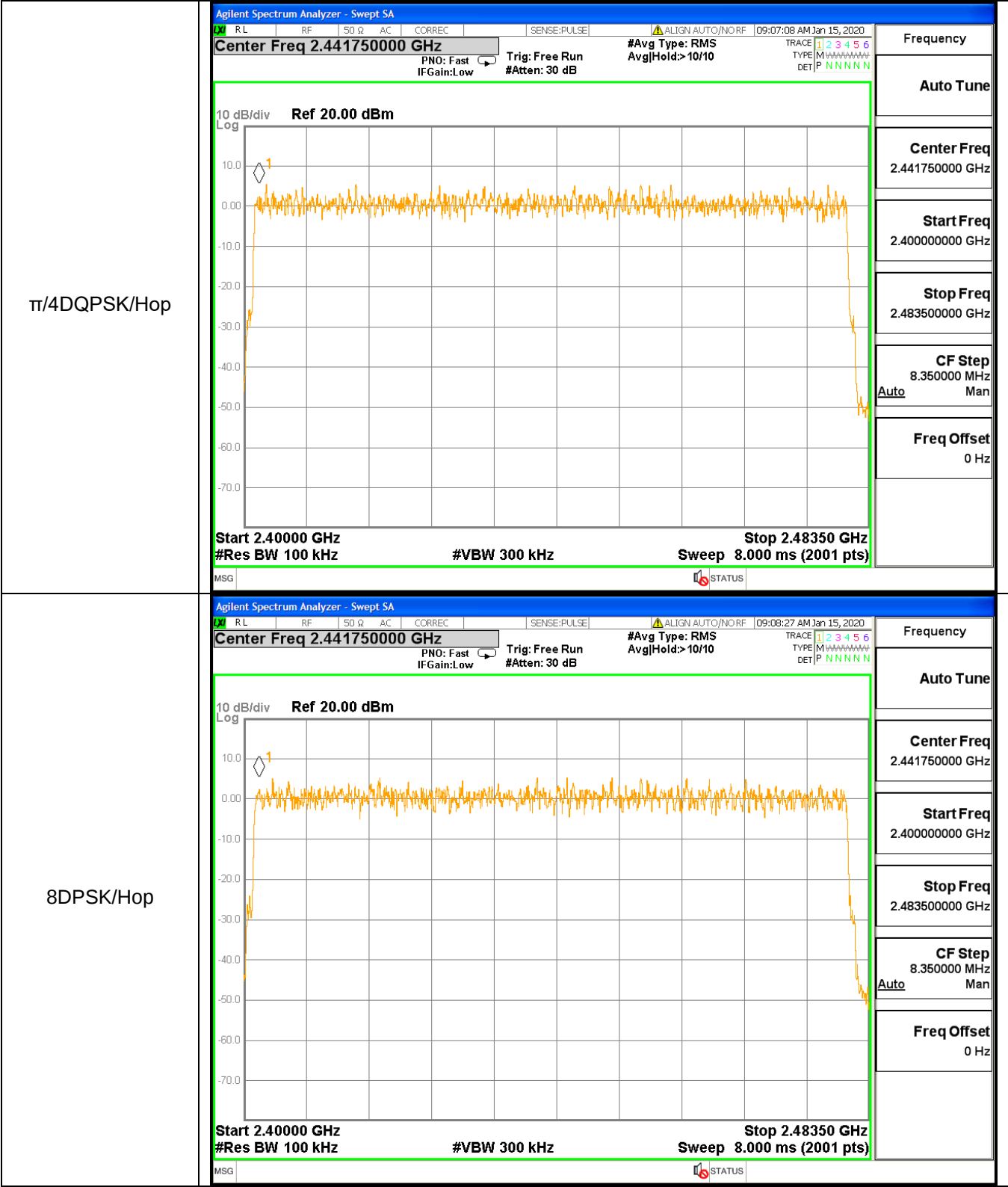


A.4 Hopping Channel Number

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

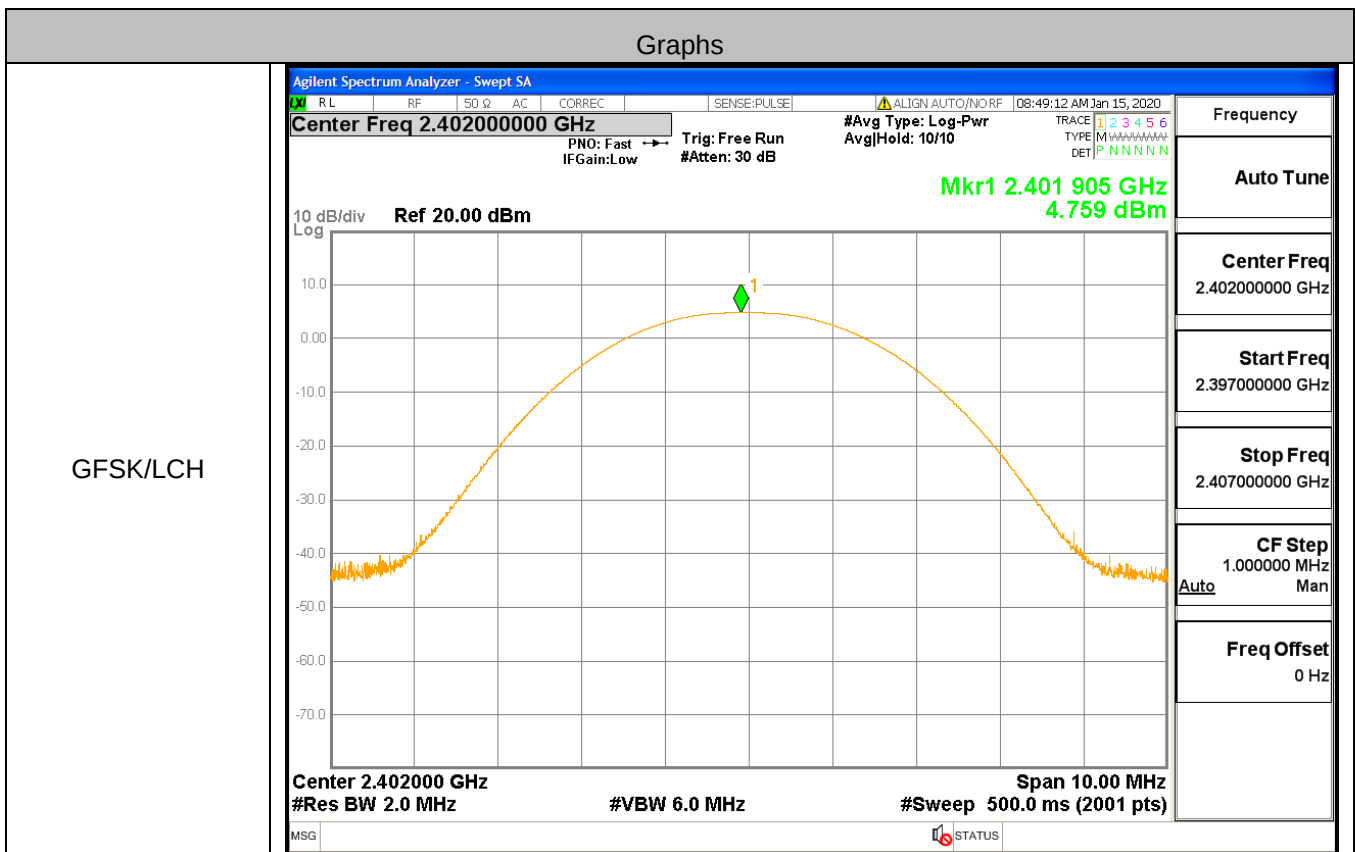


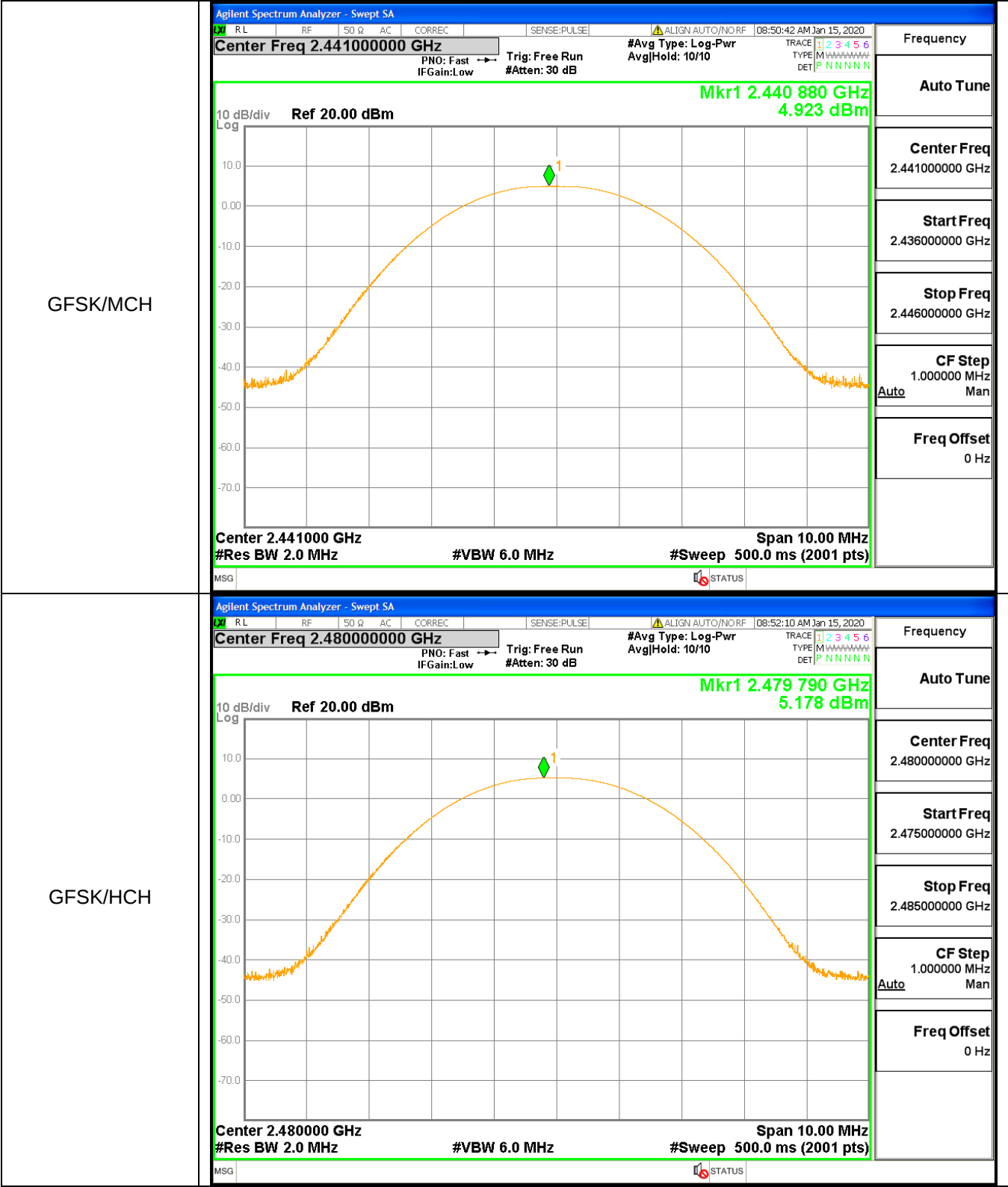


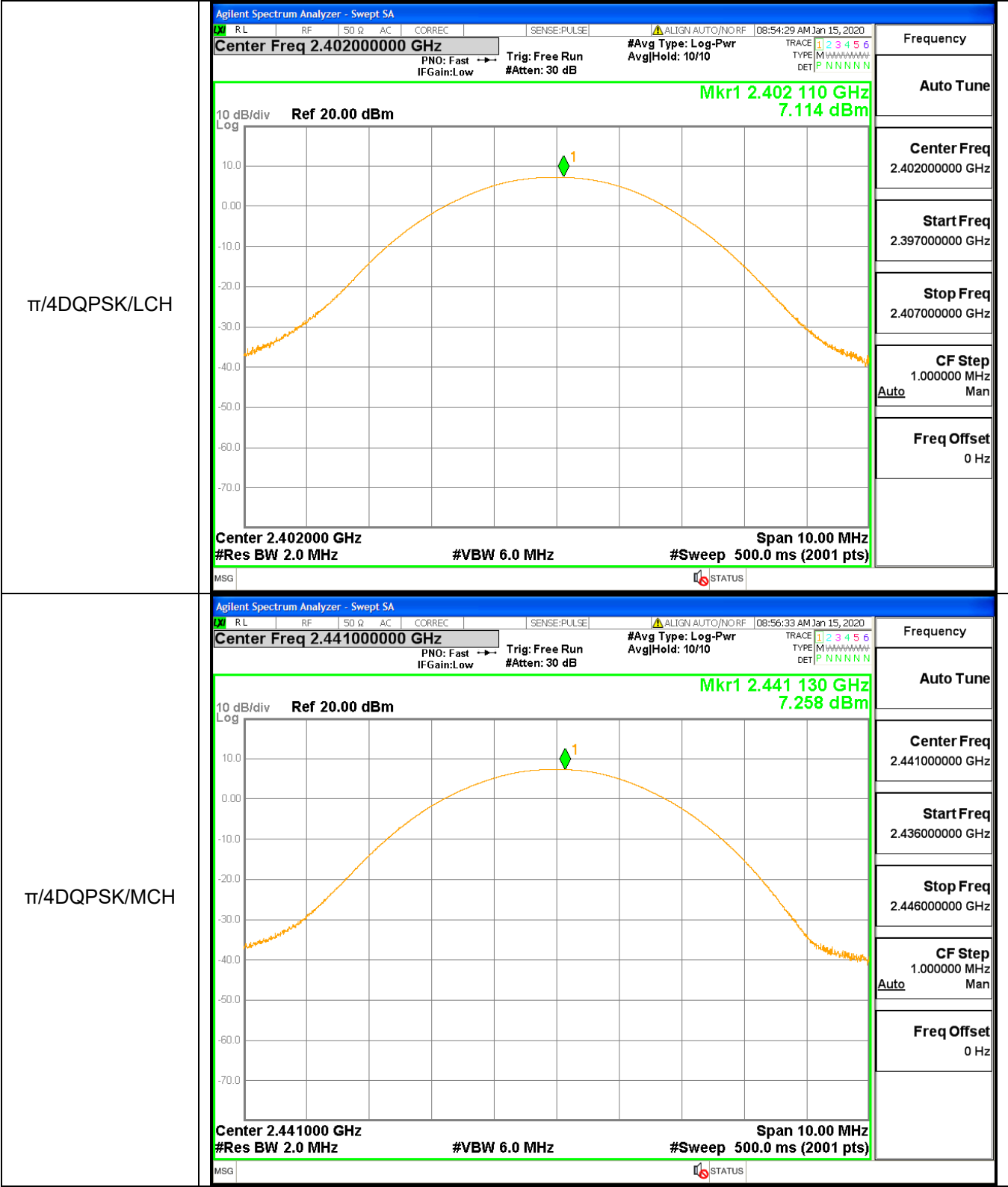
A.5 Conducted Peak Output Power

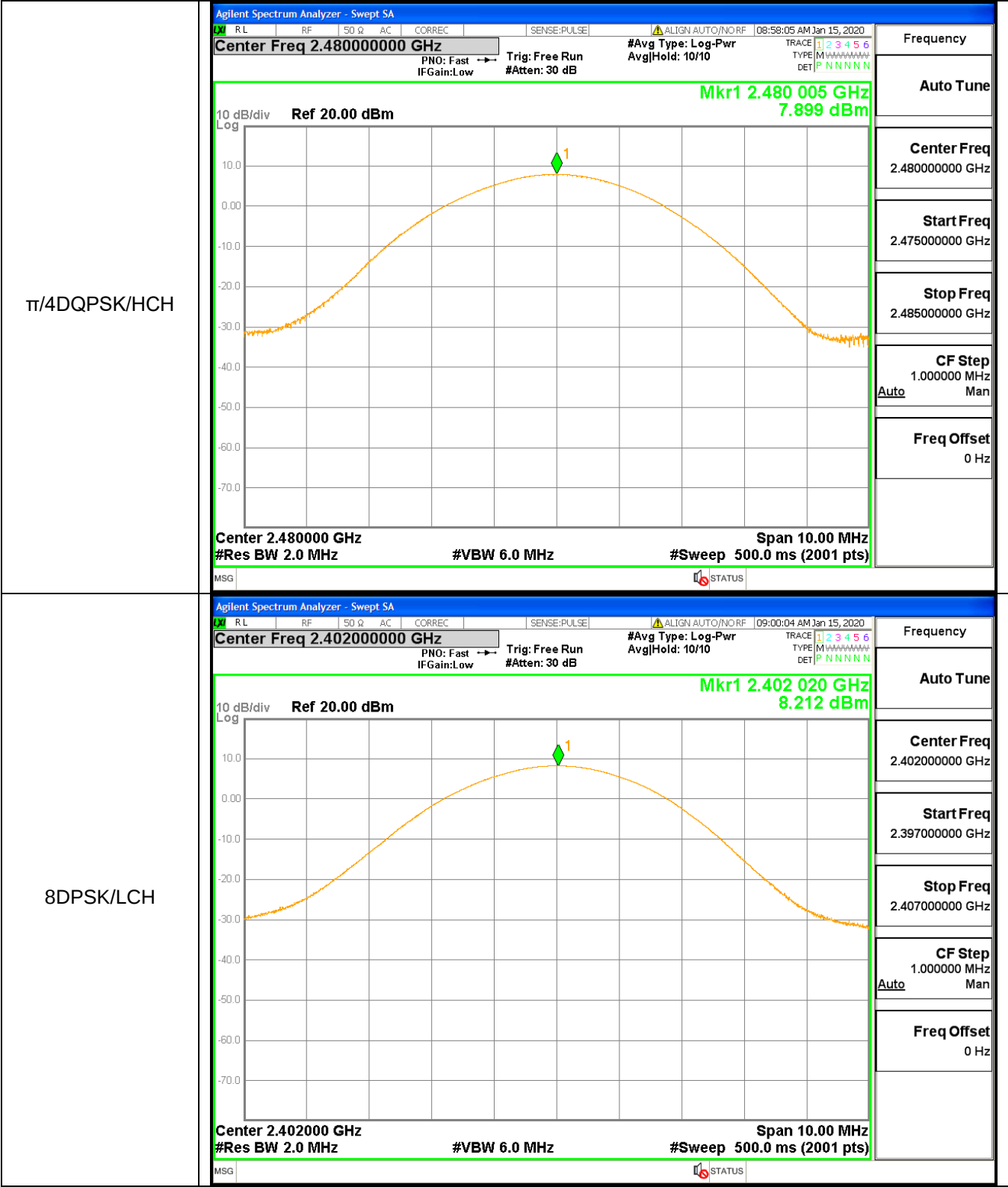
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.759	21	PASS
GFSK	MCH	4.923	21	PASS
GFSK	HCH	5.178	21	PASS
$\pi/4$ DQPSK	LCH	7.114	21	PASS
$\pi/4$ DQPSK	MCH	7.258	21	PASS
$\pi/4$ DQPSK	HCH	7.899	21	PASS
8DPSK	LCH	8.212	21	PASS
8DPSK	MCH	8.094	21	PASS
8DPSK	HCH	7.962	21	PASS

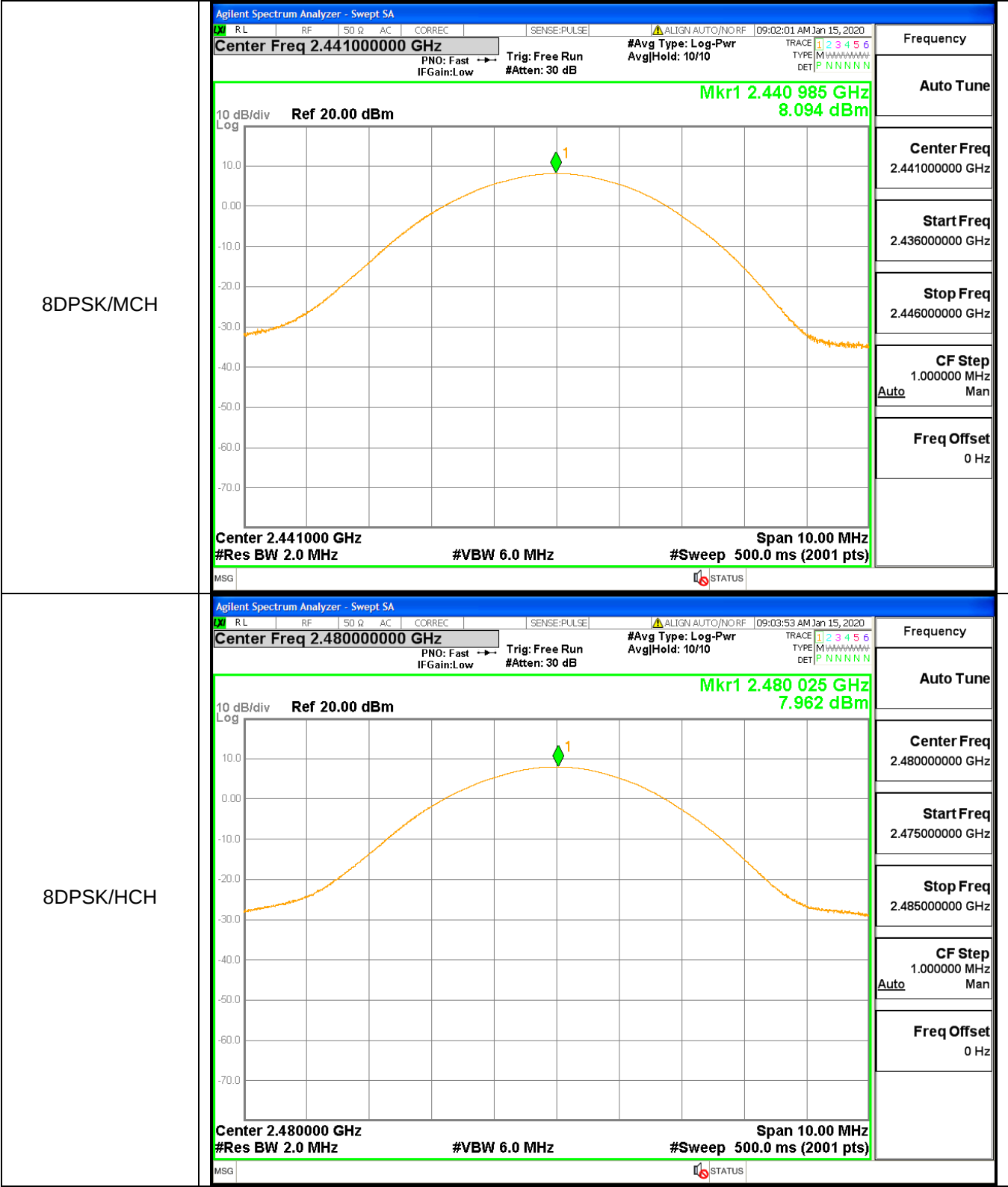
Test Graph









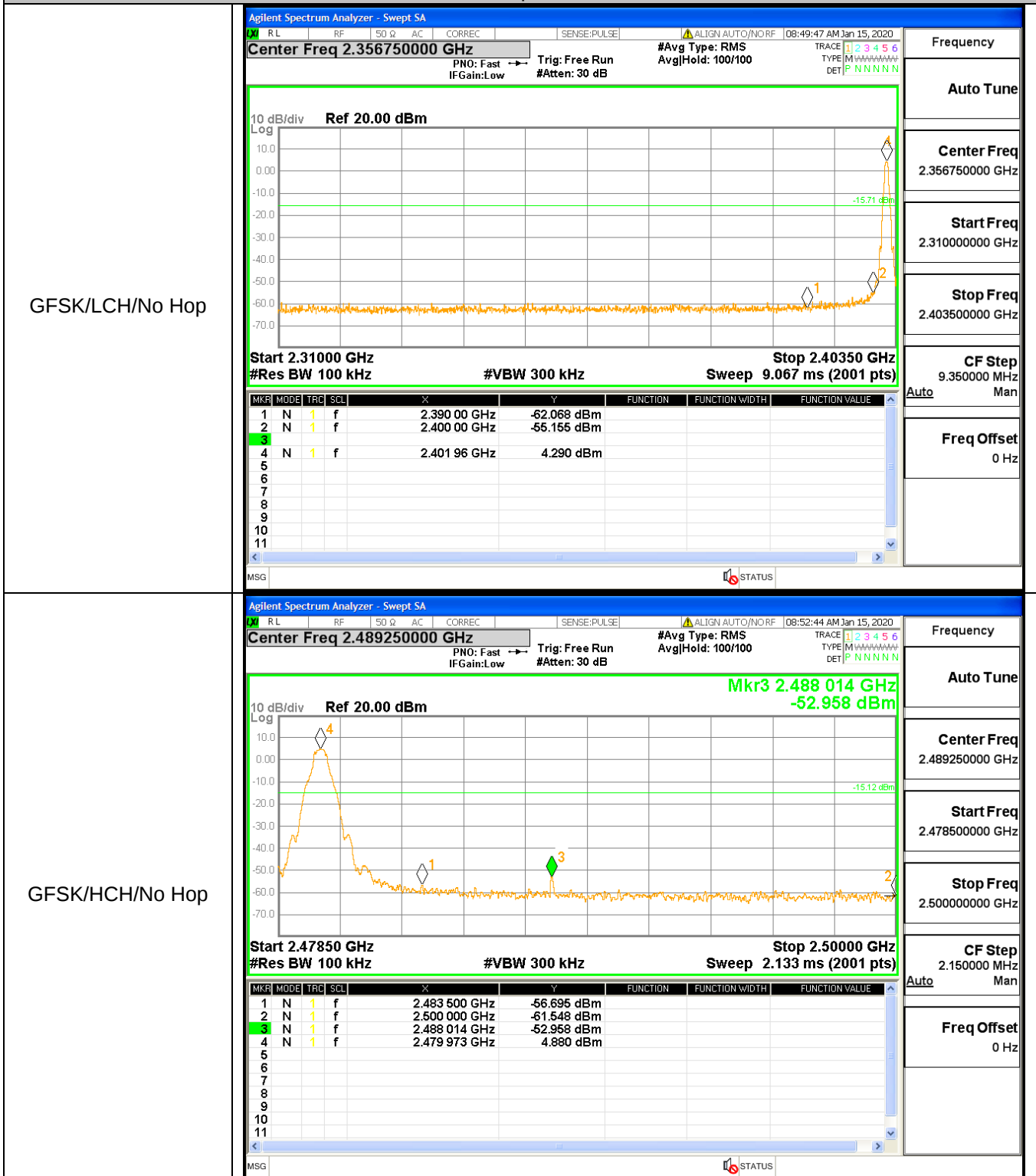


A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2400	4.29	-55.16	-15.71	Pass
1DH5	2480	2488.014	4.88	-52.958	-15.12	Pass
2DH5	2402	2400	4.685	-42.11	-15.315	Pass
2DH5	2480	2487.229	3.219	-48.226	-16.781	Pass
3DH5	2402	2400	3.534	-41.68	-16.466	Pass
3DH5	2480	2484.305	4.278	-45.165	-15.722	Pass
1DH5-Hopping	2402	2400	4.832	-54.08	-15.168	Pass
1DH5-Hopping	2480	2485.99	4.948	-51.856	-15.052	Pass
2DH5-Hopping	2402	2400	5.323	-47.56	-14.677	Pass
2DH5-Hopping	2480	2483.5	5.08	-51.88	-14.92	Pass
3DH5-Hopping	2402	2400	5.219	-40.98	-14.781	Pass
3DH5-Hopping	2480	2485.99	4.122	-50.51	-15.878	Pass

Test Graph

Graphs



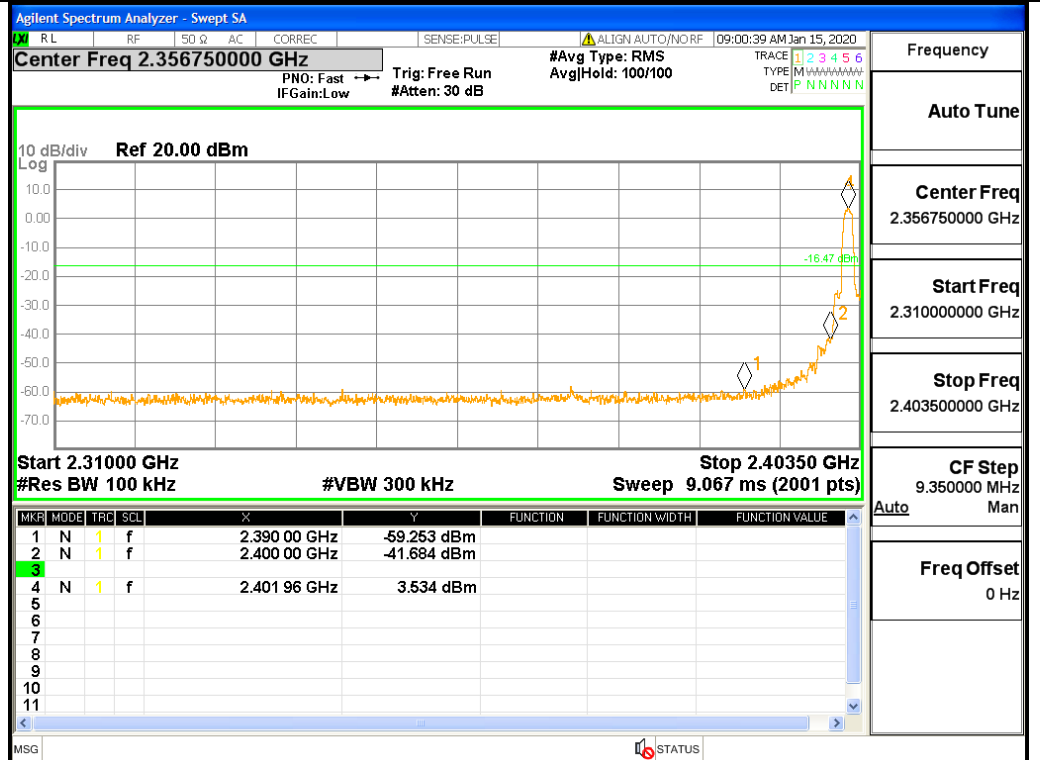
$\pi/4$ DQPSK/LCH/No
Hop

MKRF	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.390 00 GHz	-61.097 dBm			
2	N	1	f	2.400 00 GHz	-42.112 dBm			
3	N	1	f	2.394 01 GHz	-51.286 dBm			
4	N	1	f	2.402 00 GHz	4.685 dBm			

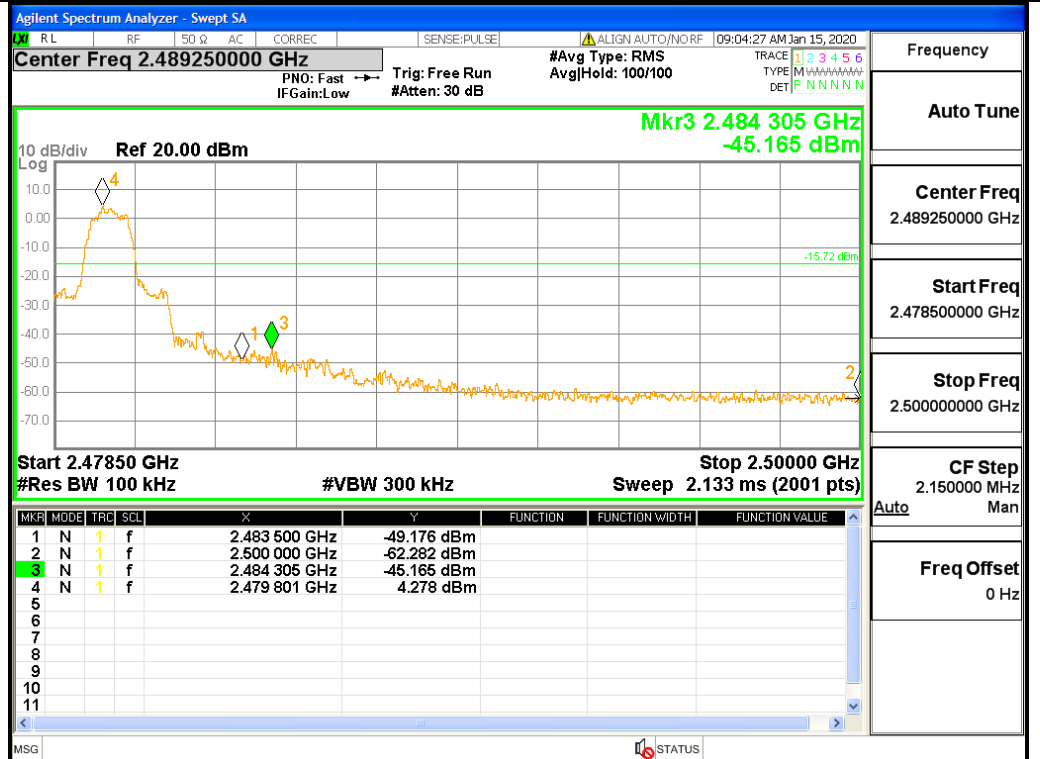
$\pi/4$ DQPSK/HCH/No
Hop

MKRF	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.483 500 GHz	-49.422 dBm			
2	N	1	f	2.500 000 GHz	-61.818 dBm			
3	N	1	f	2.487 229 GHz	-48.226 dBm			
4	N	1	f	2.479 973 GHz	3.219 dBm			

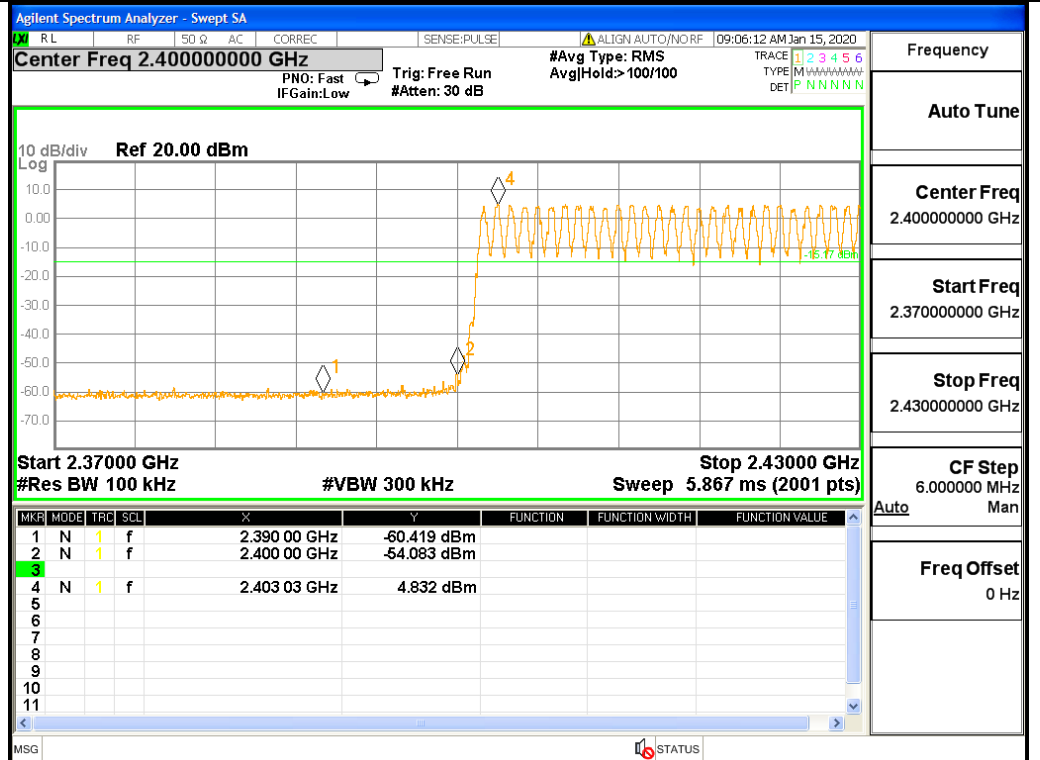
8DPSK/LCH/No Hop



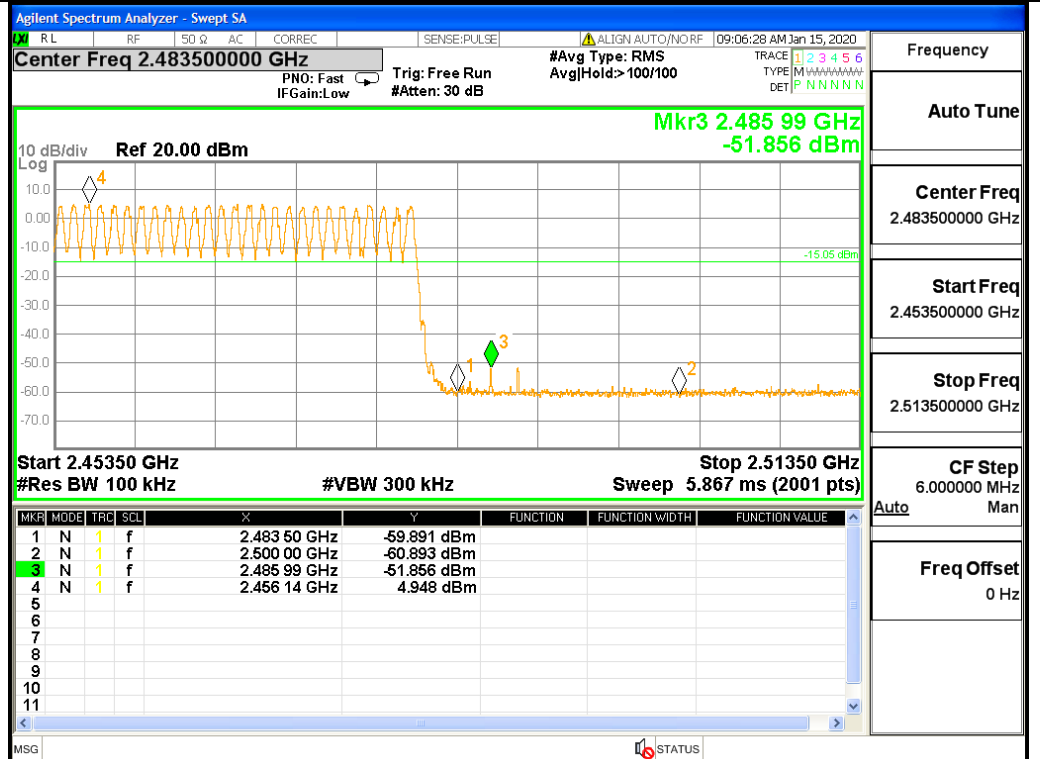
8DPSK/HCH/No Hop



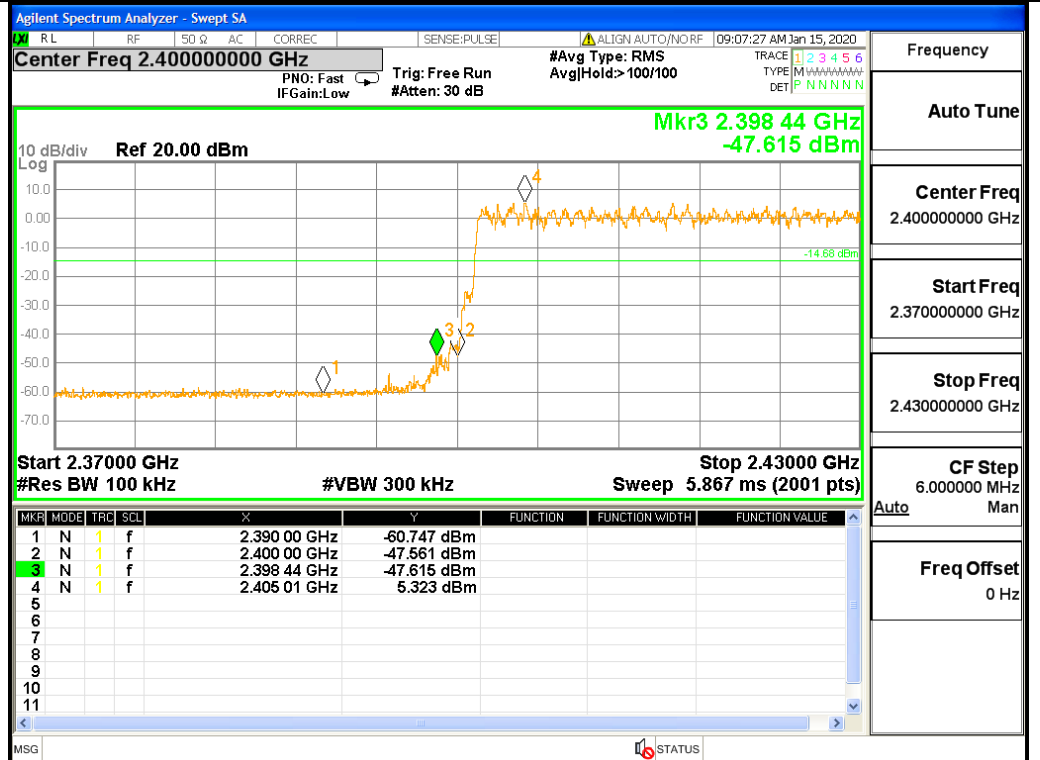
GFSK/LCH/Hop



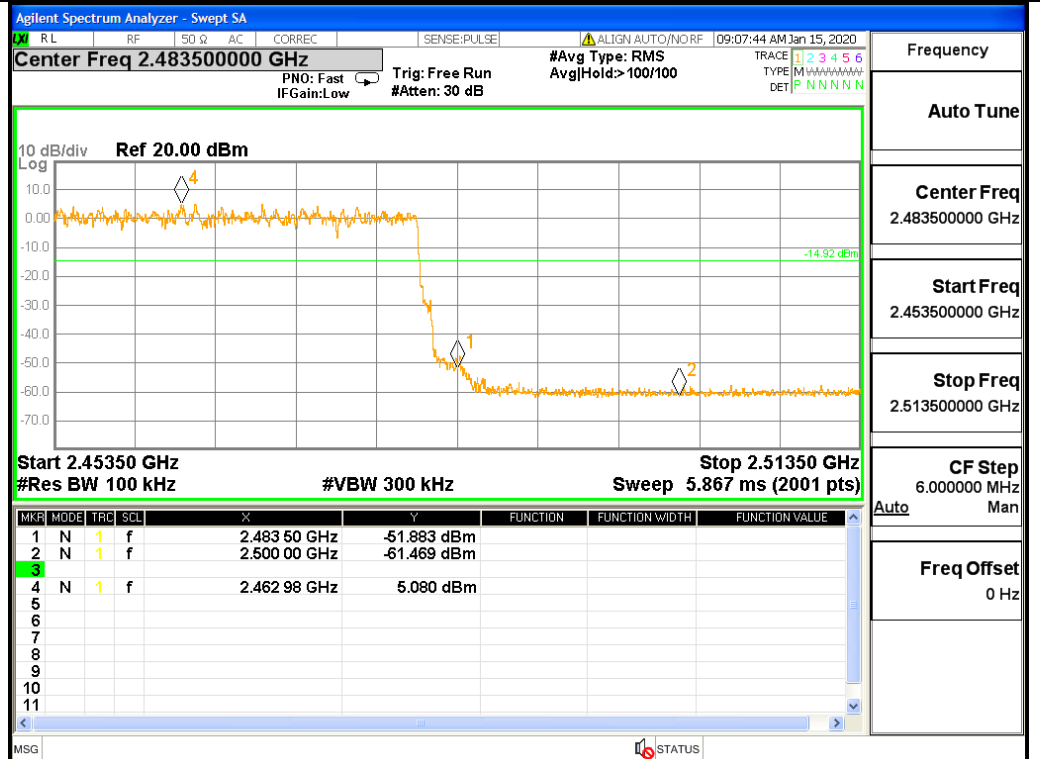
GFSK/HCH/Hop



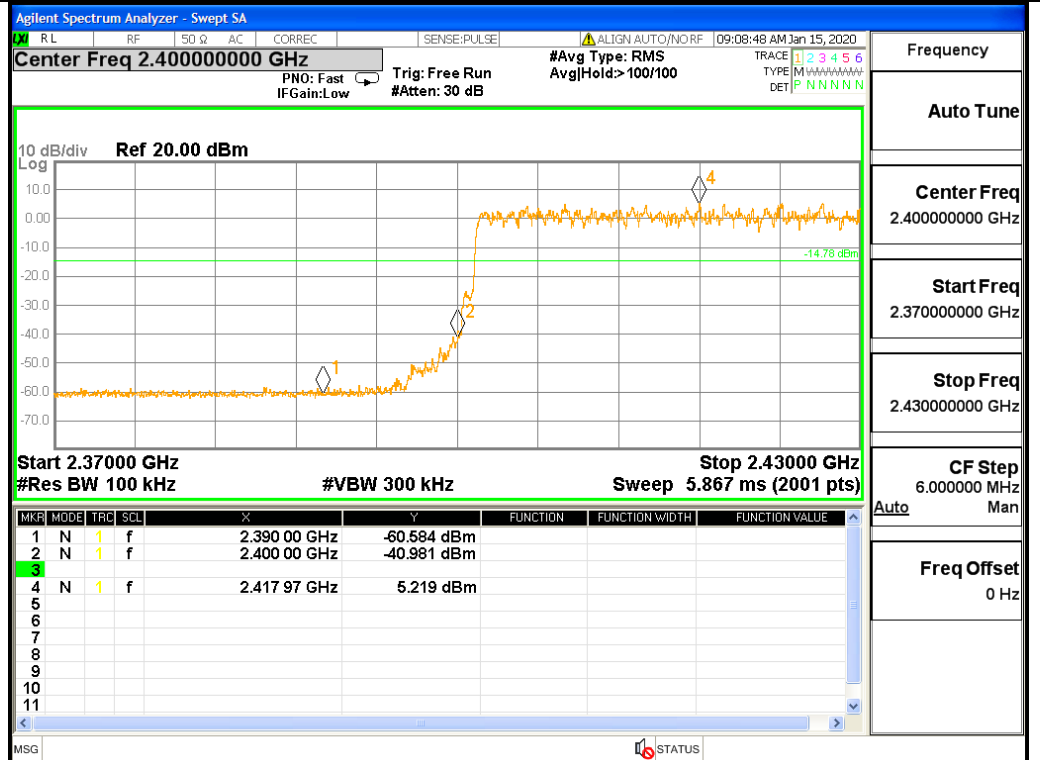
$\pi/4$ DQPSK/LCH/Hop



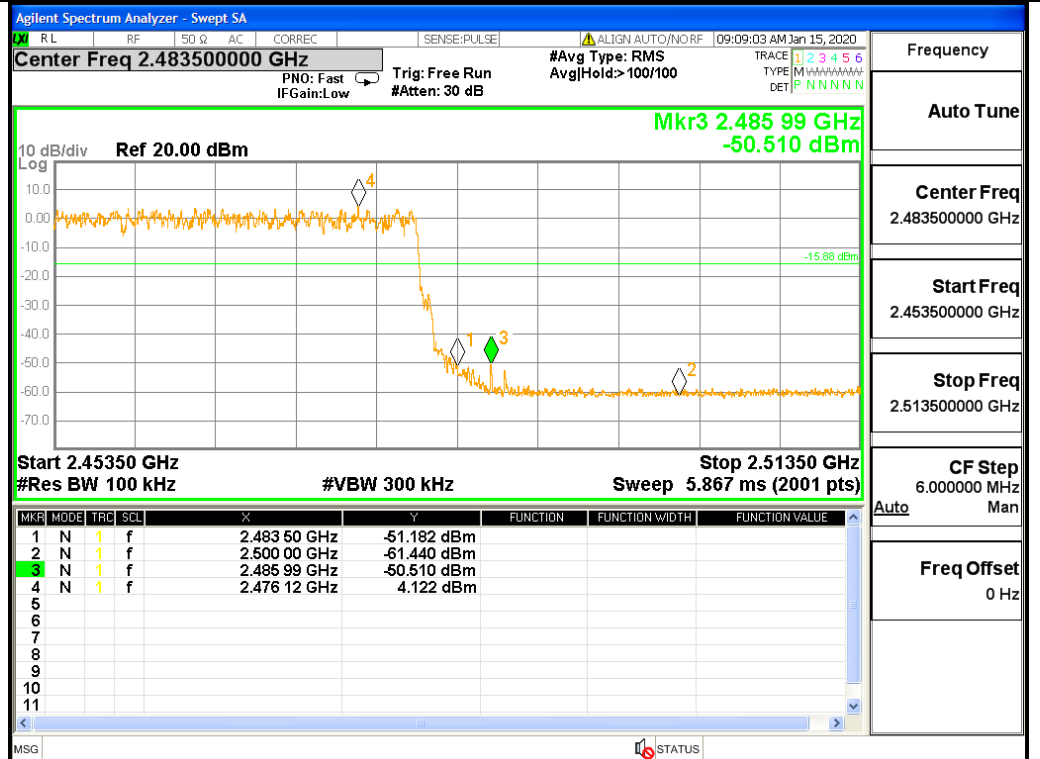
$\pi/4$ DQPSK/HCH/Hop



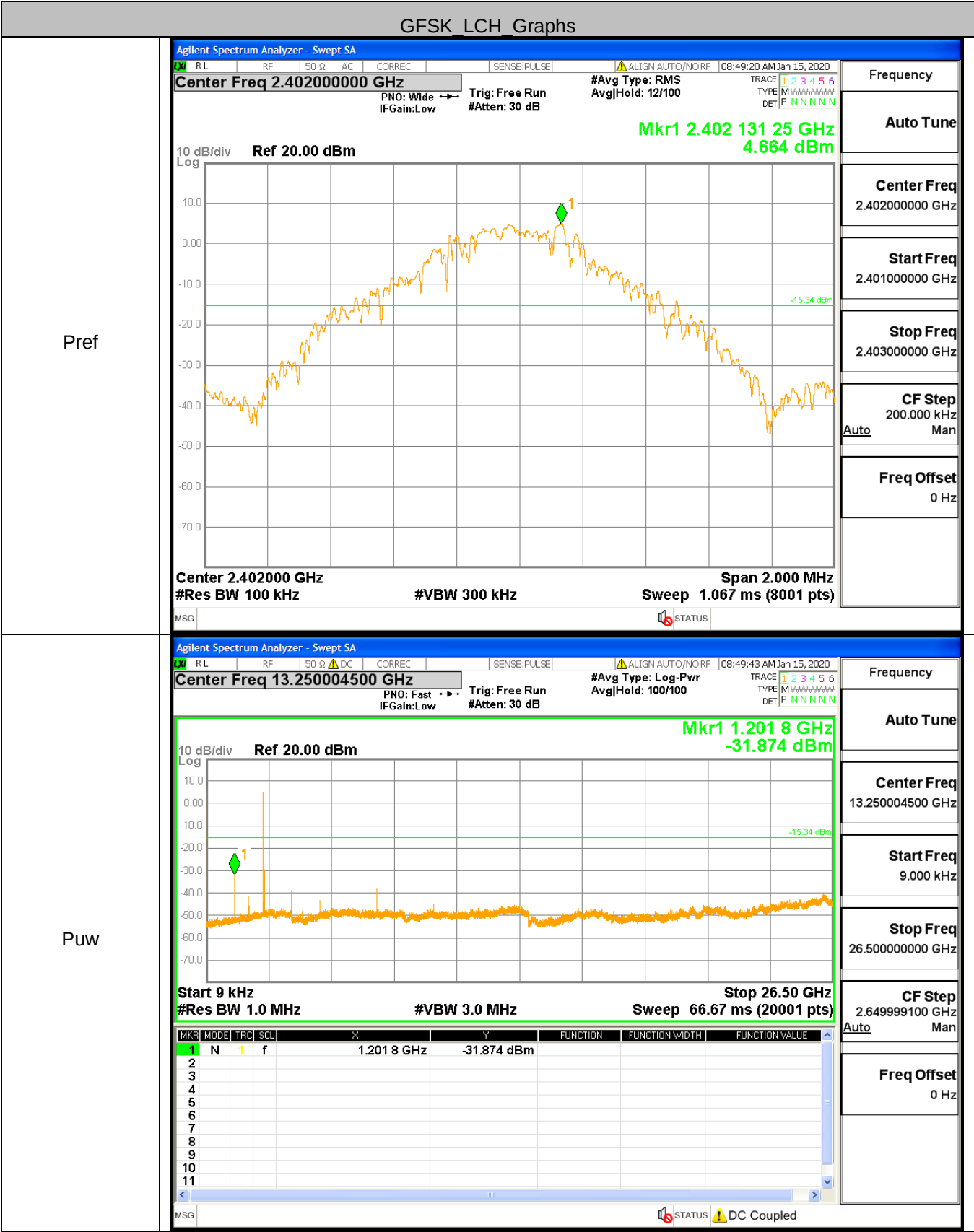
8DPSK/LCH/Hop



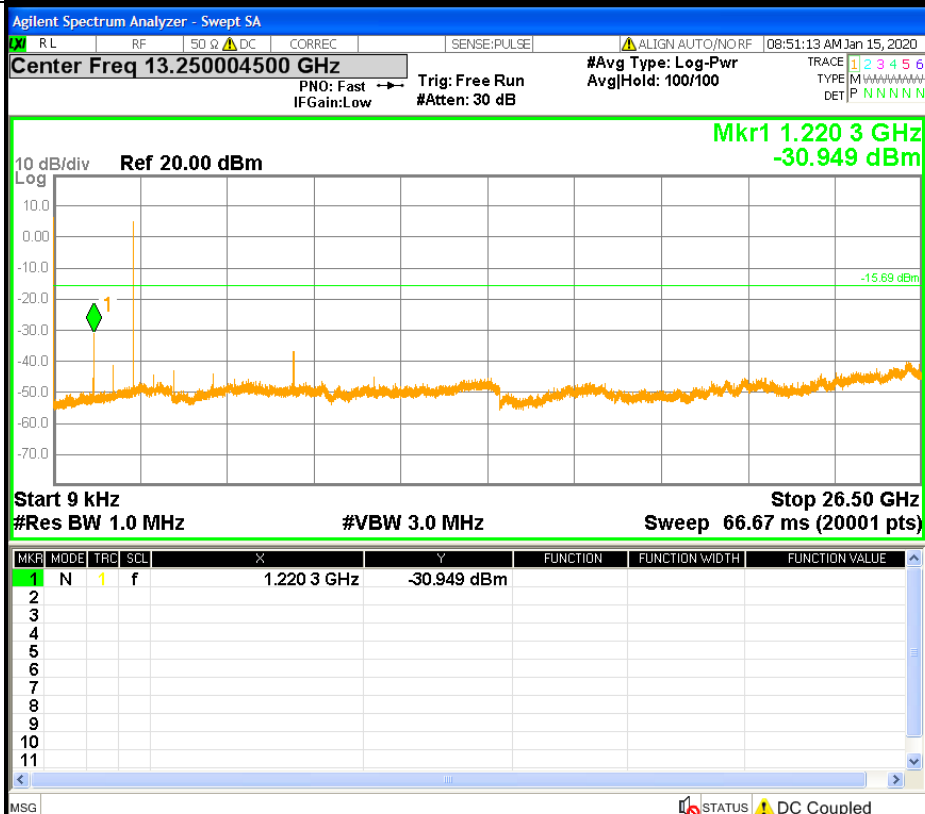
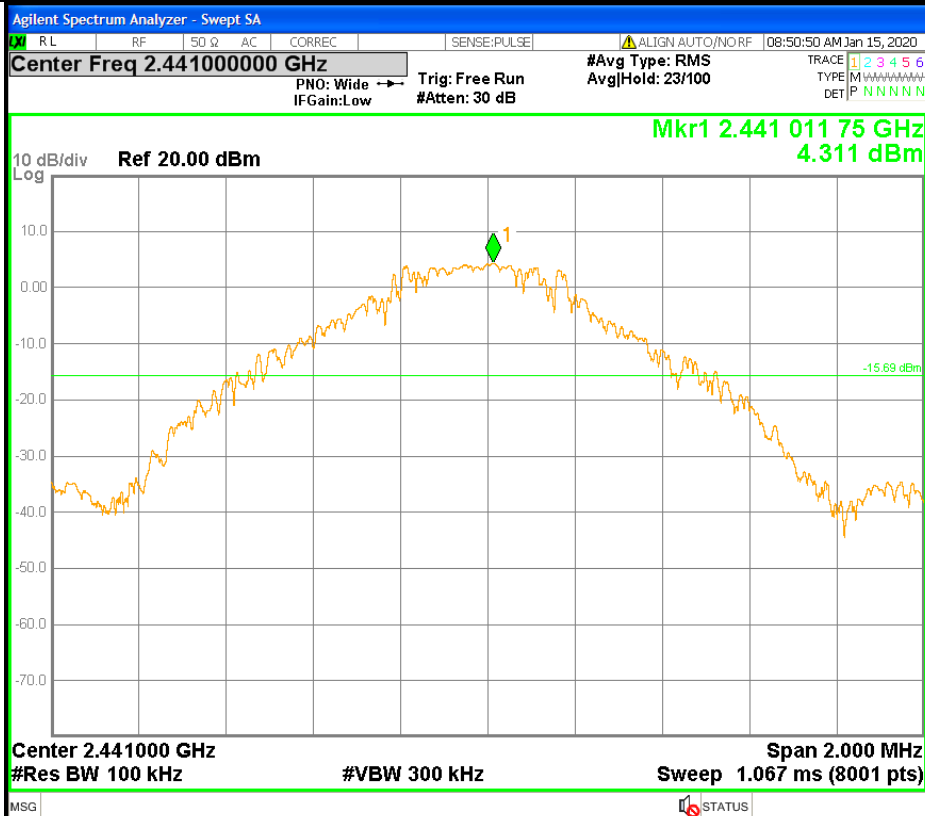
8DPSK/HCH/Hop

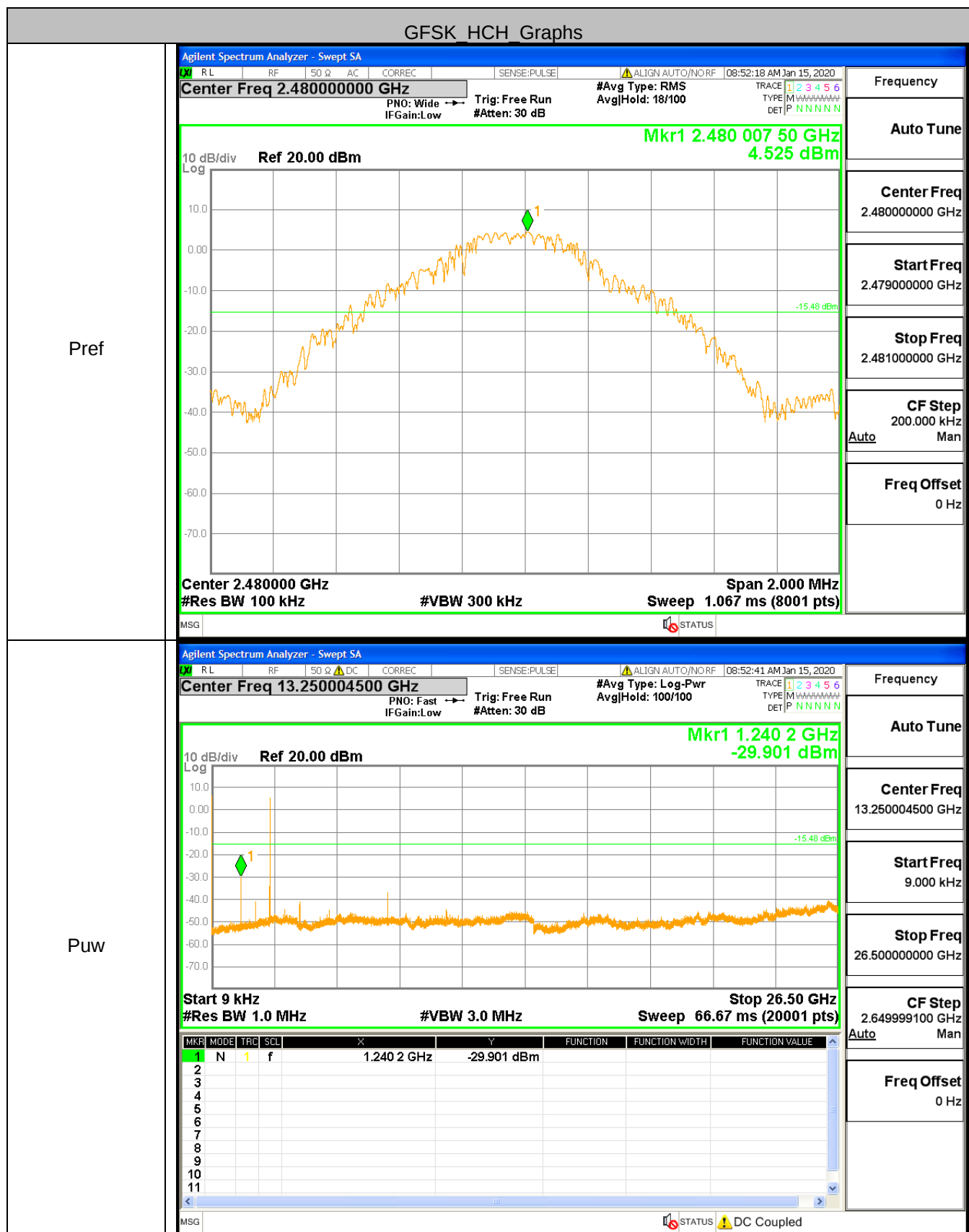


A.7 RF Conducted Spurious Emissions
Test Graph



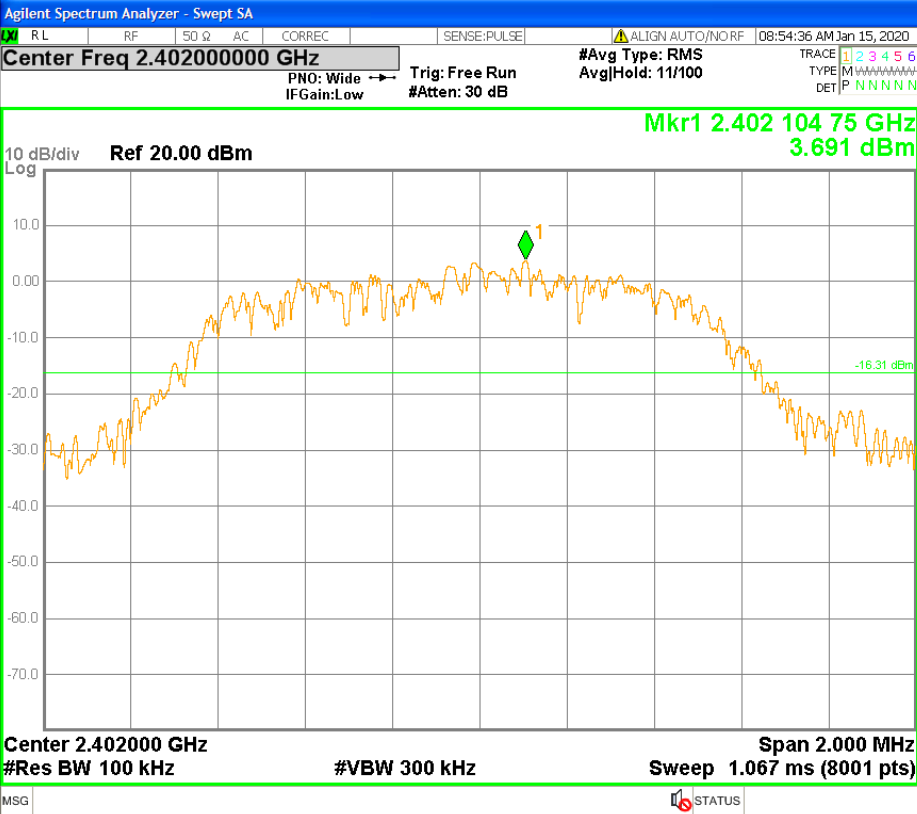
GFSK MCH Graphs





$\pi/4$ DQPSK LCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.402000000 GHz

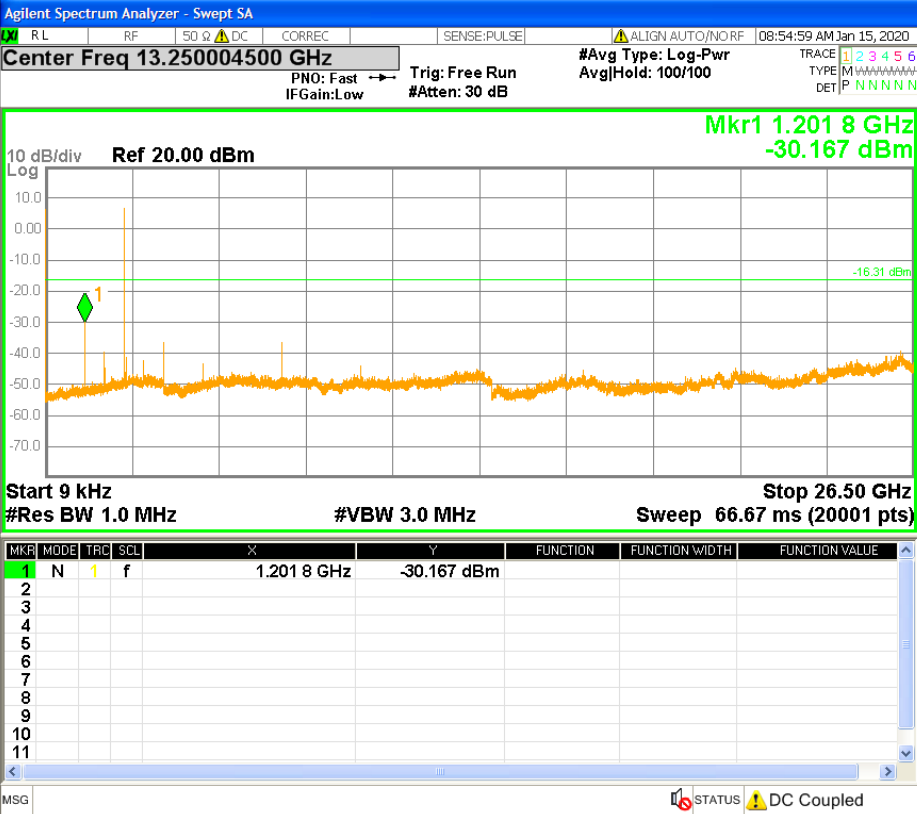
Start Freq
2.401000000 GHz

Stop Freq
2.403000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw



Frequency

Auto Tune

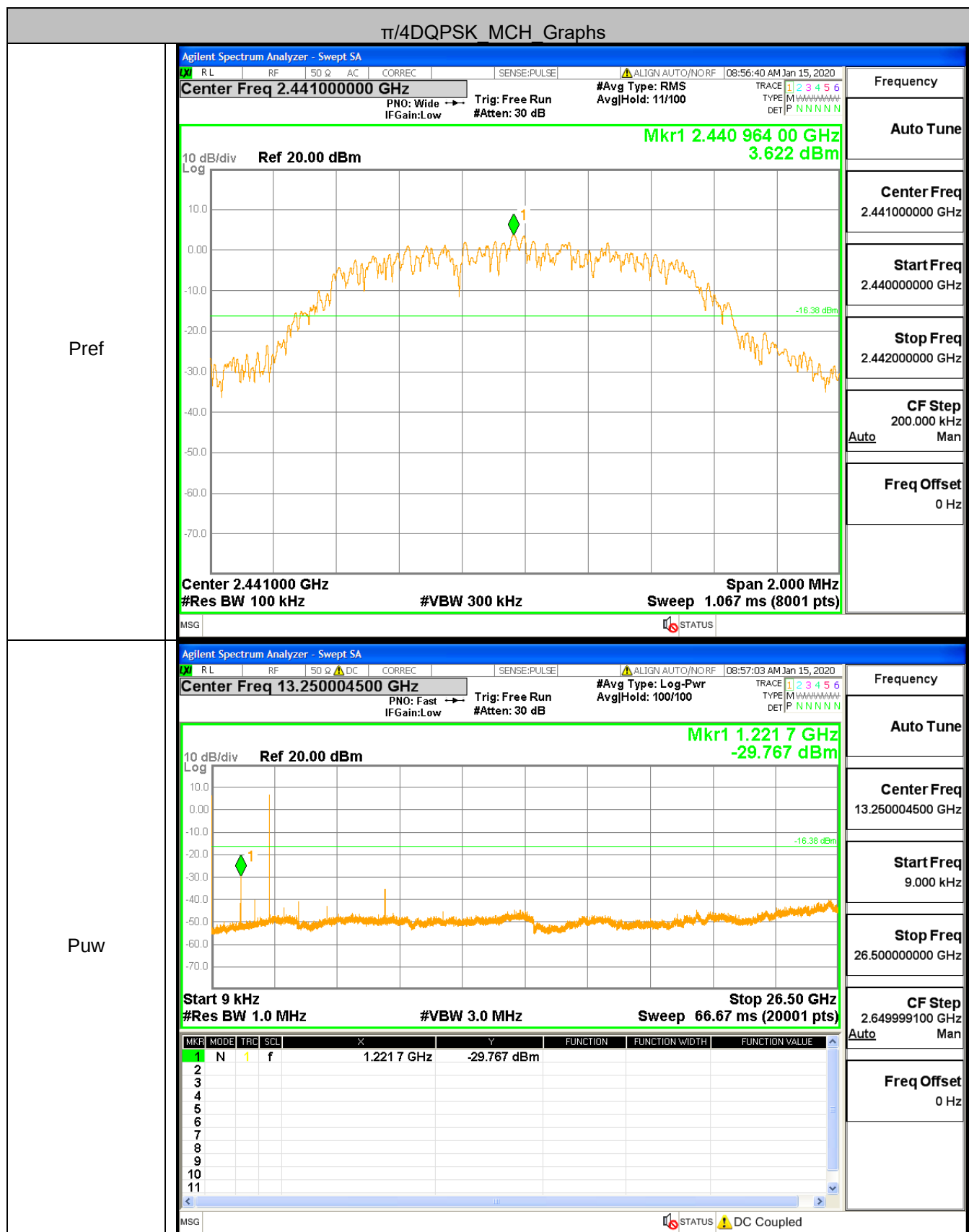
Center Freq
13.250004500 GHz

Start Freq
9.000 kHz

Stop Freq
26.500000000 GHz

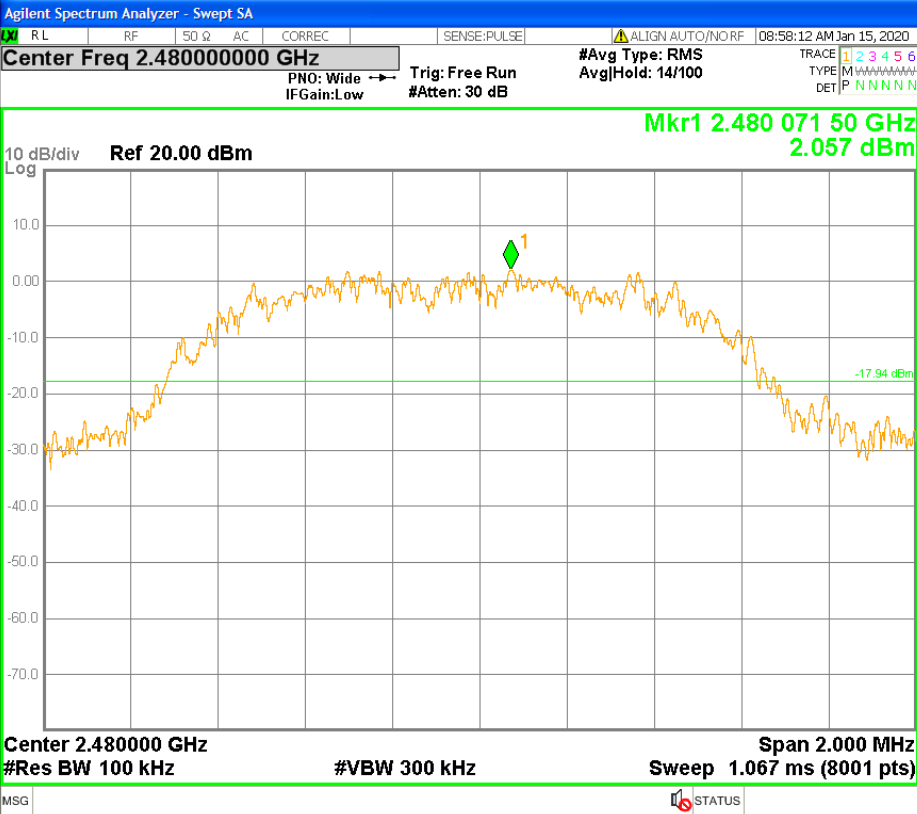
CF Step
2.649999100 GHz
Auto Man

Freq Offset
0 Hz



$\pi/4$ DQPSK HCH Graphs

Pref



Frequency

Auto Tune

Center Freq
2.480000000 GHz

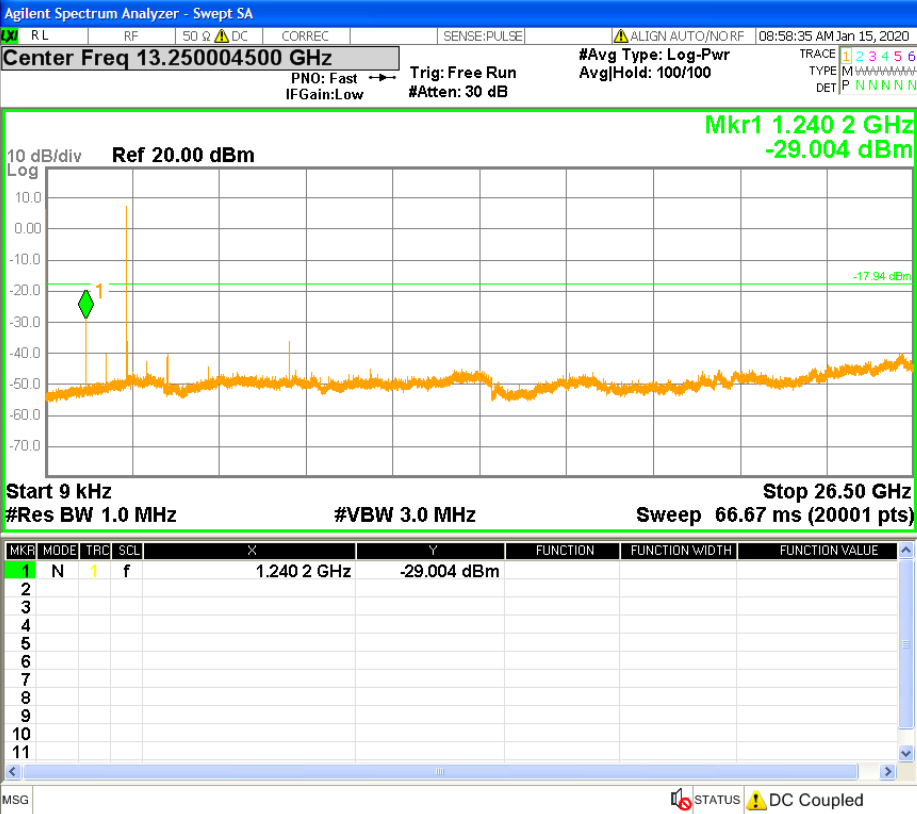
Start Freq
2.479000000 GHz

Stop Freq
2.481000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

Puw



Frequency

Auto Tune

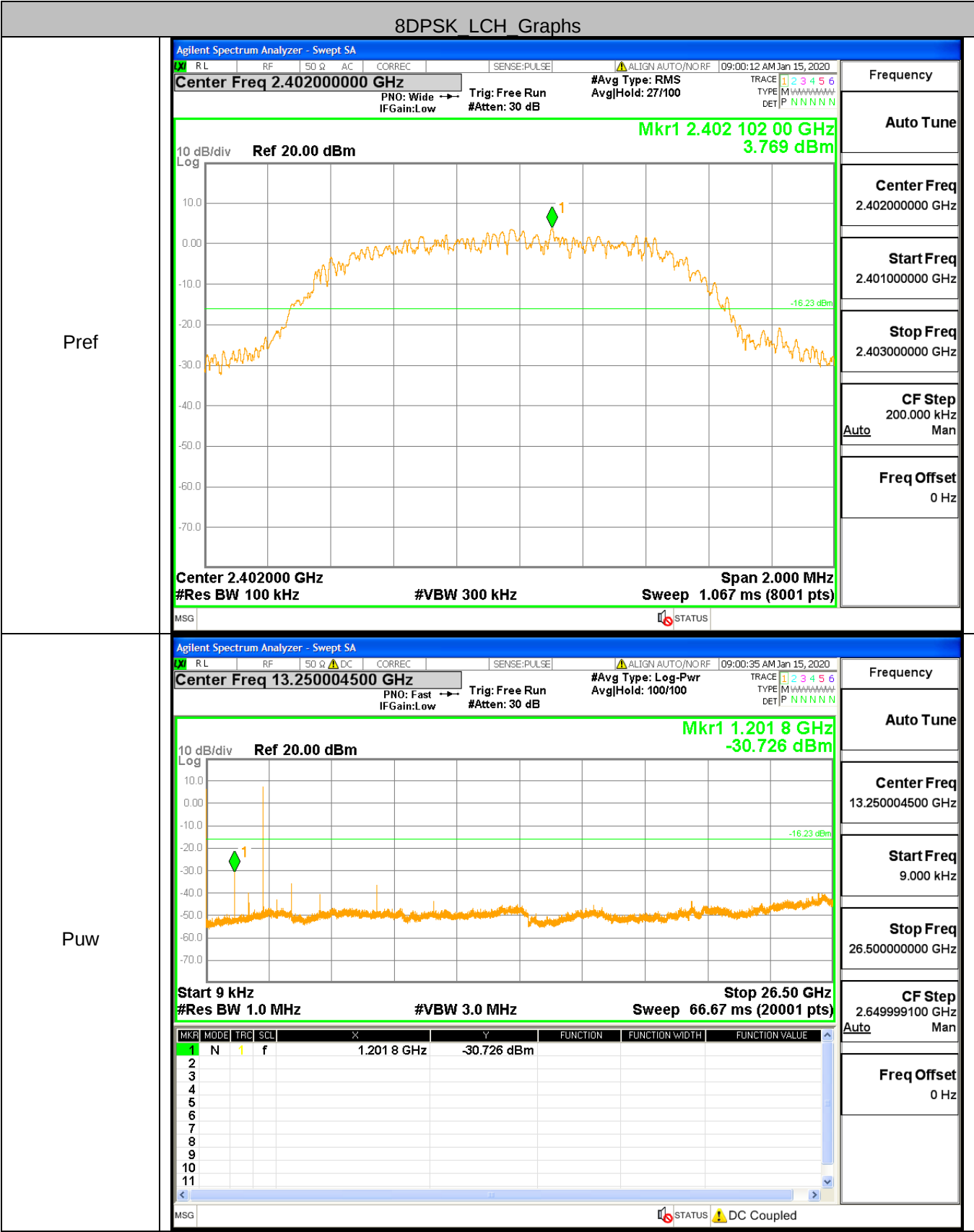
Center Freq
13.250004500 GHz

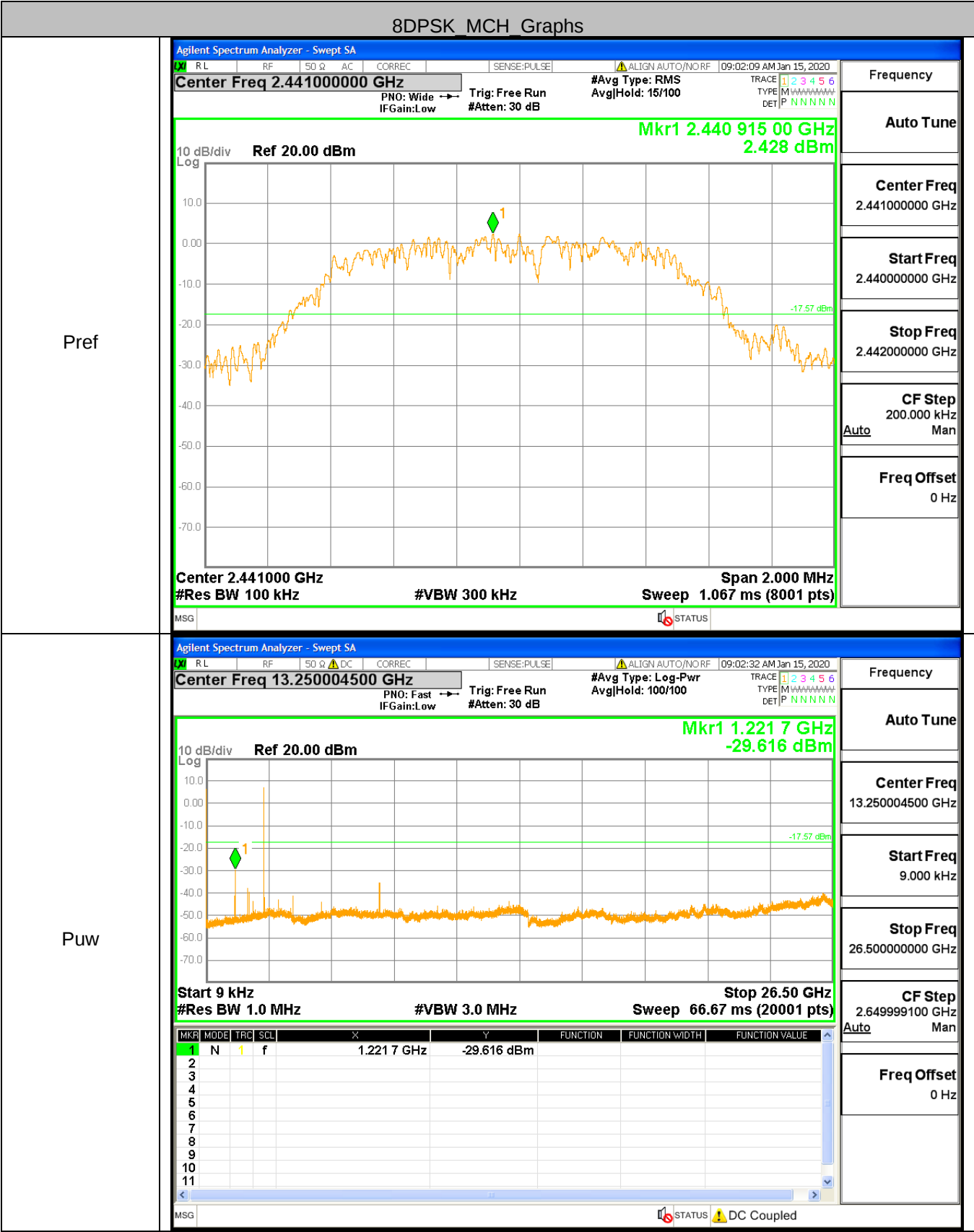
Start Freq
9.000 kHz

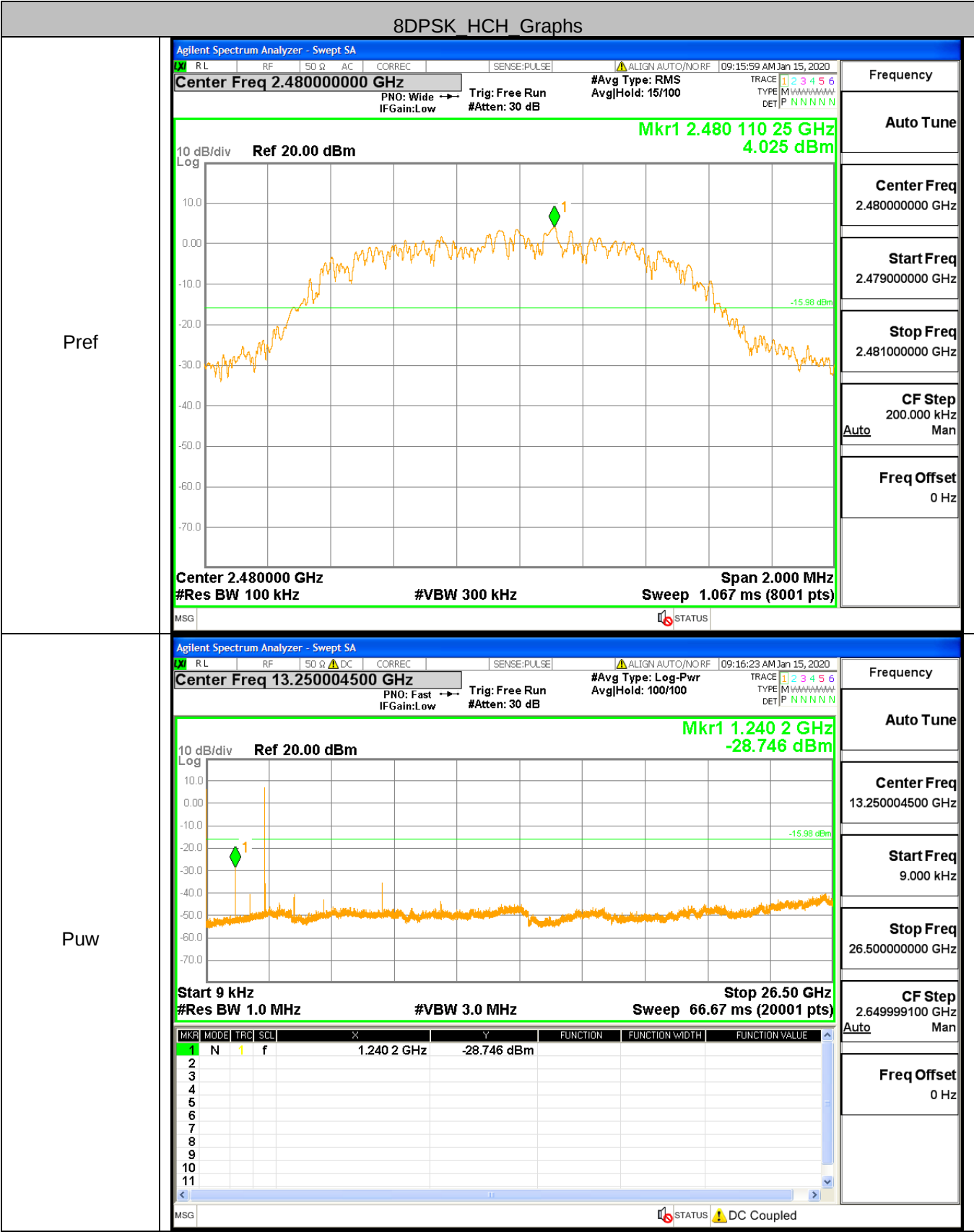
Stop Freq
26.500000000 GHz

CF Step
2.649999100 GHz
Auto Man

Freq Offset
0 Hz





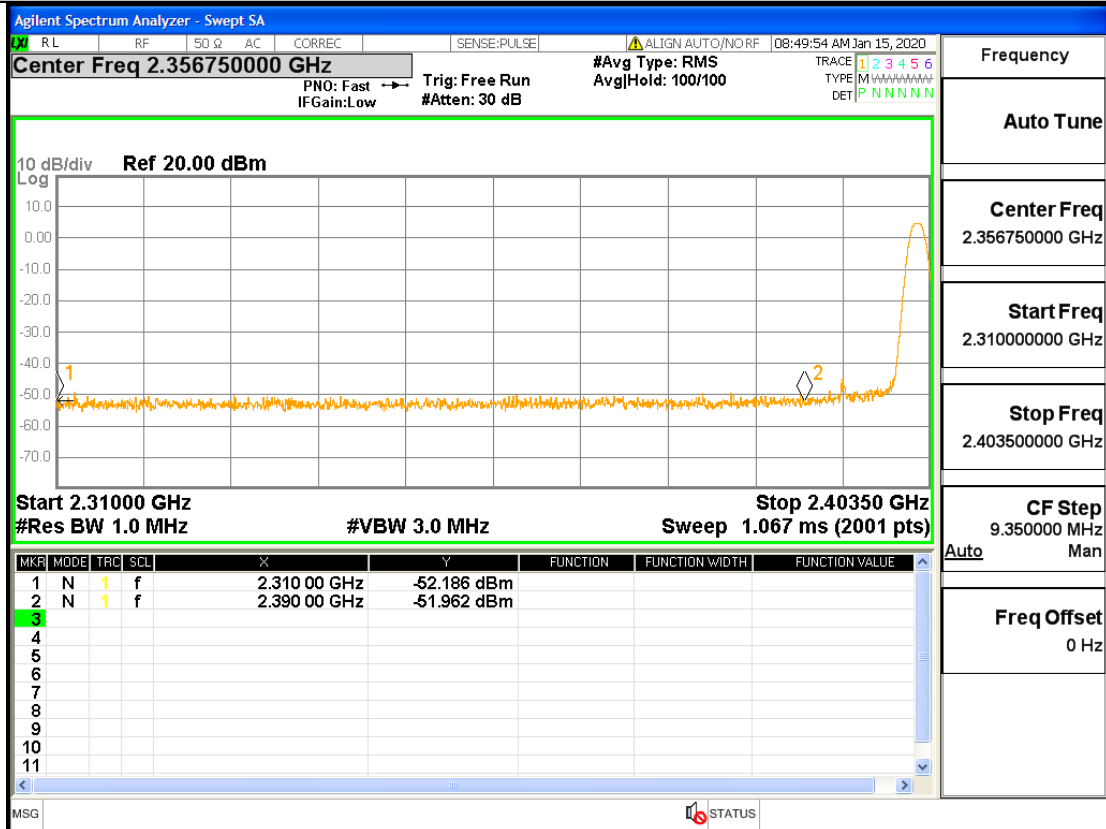


A.8 Restrict-band band-edge measurements

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2390	2	0.00	-51.962	45.238	74	Pass
1DH5	2480	2483.5	2	0.00	-47.773	49.427	74	Pass
2DH5	2402	2390	2	0.00	-51.954	45.246	74	Pass
2DH5	2480	2485.348	2	0.00	-36.481	60.719	74	Pass
3DH5	2402	2370.354	2	0.00	-48.784	48.416	74	Pass
3DH5	2480	2483.5	2	0.00	-33.546	63.654	74	Pass

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2390	2	0.00	-58.525	38.675	54	Pass
1DH5	2480	2483.5	2	0.00	-51.597	45.603	54	Pass
2DH5	2402	2390	2	0.00	-57.996	39.204	54	Pass
2DH5	2480	2485.348	2	0.00	-45.295	51.905	54	Pass
3DH5	2402	2370.354	2	0.00	-58.005	39.195	54	Pass
3DH5	2480	2483.5	2	0.00	-43.915	53.285	54	Pass

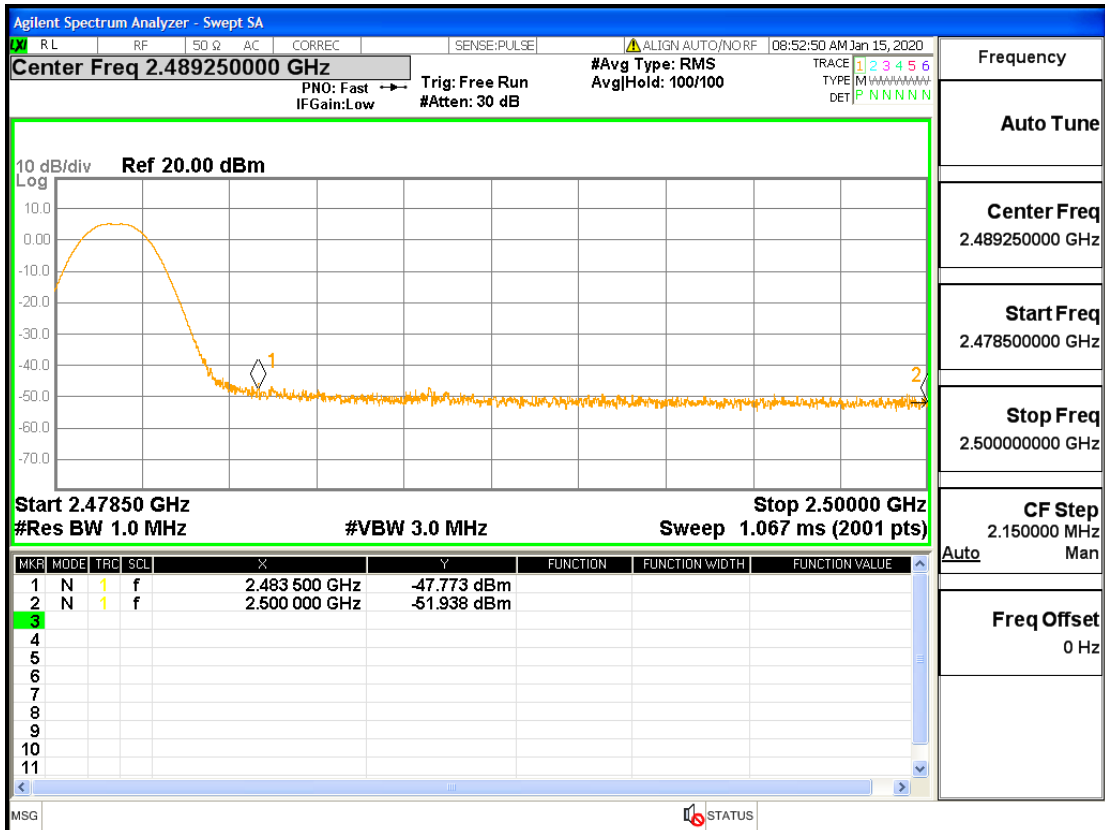
Restrict-band band-edge measurements_2402_PEAK_DH5



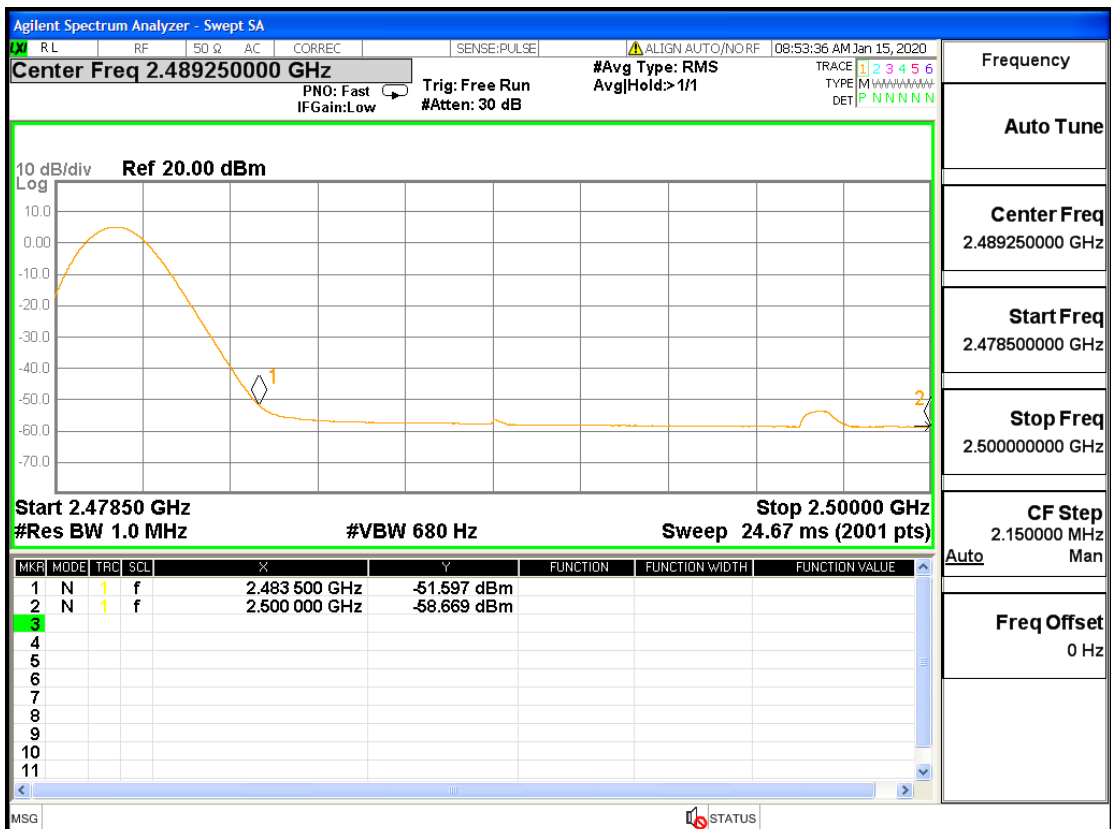
Restrict-band band-edge measurements_2402_AV_DH5



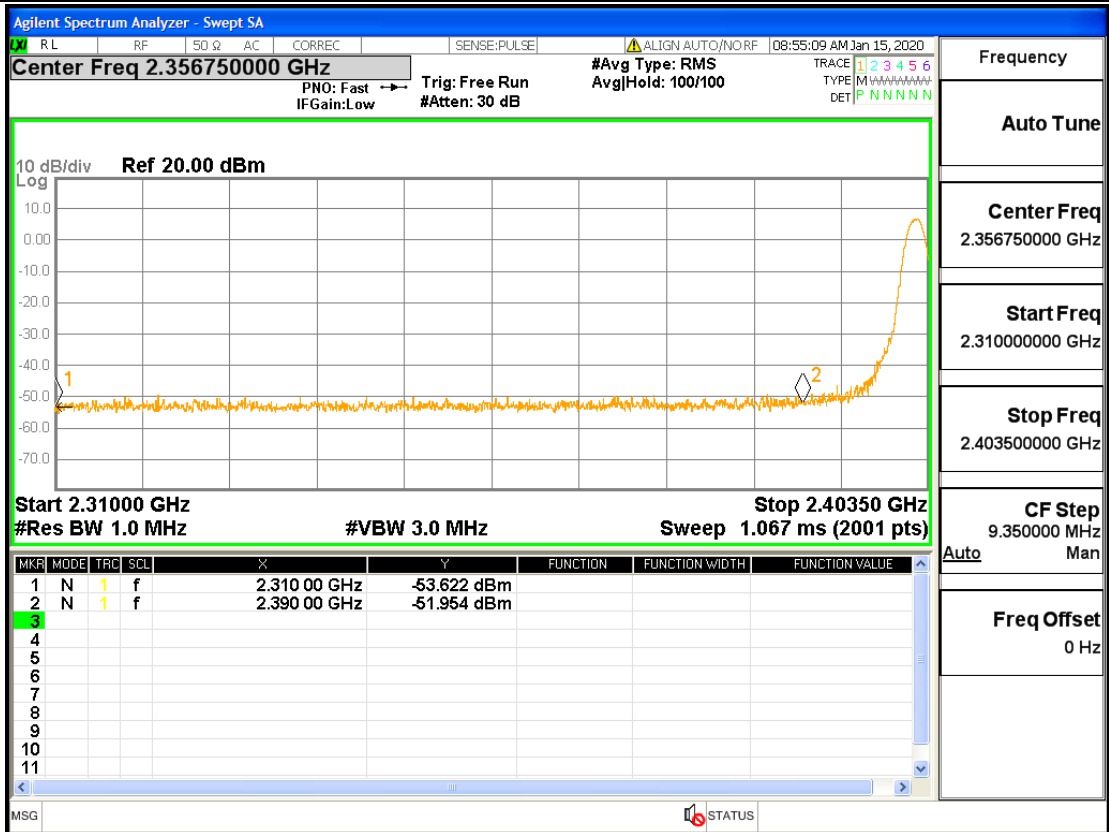
Restrict-band band-edge measurements_2480_PEAK_DH5



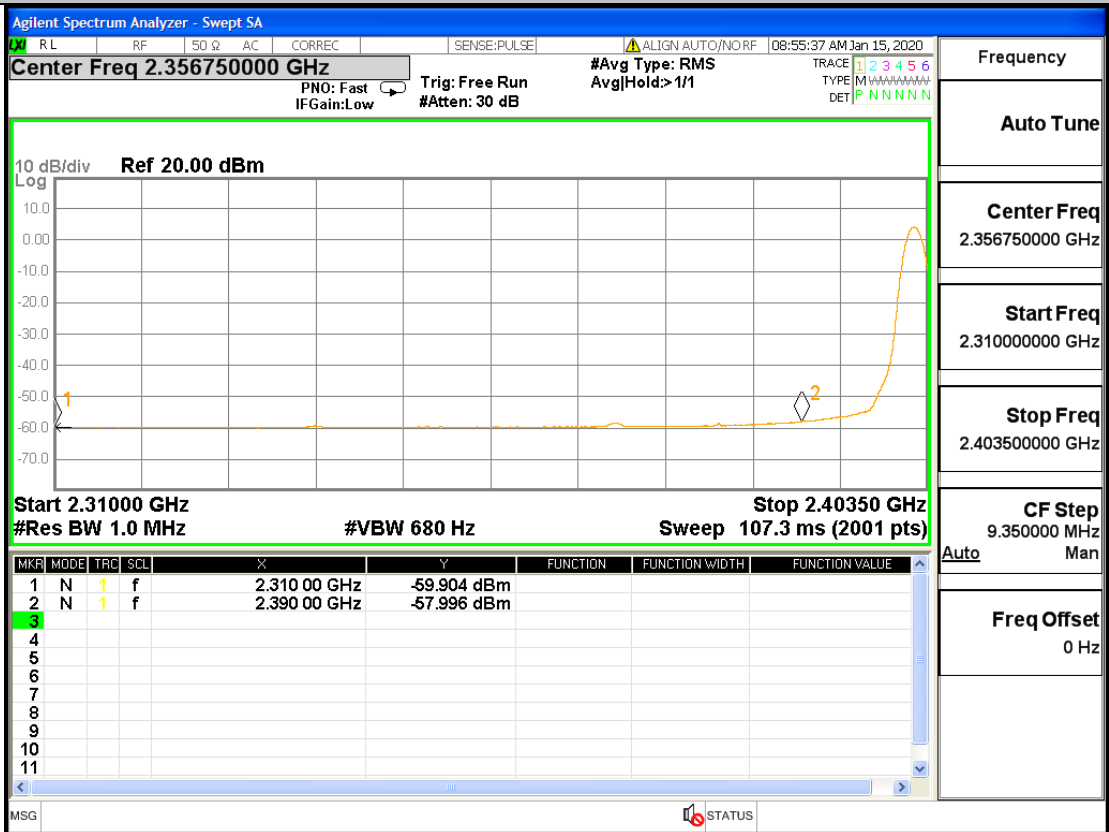
Restrict-band band-edge measurements_2480_AV_DH5



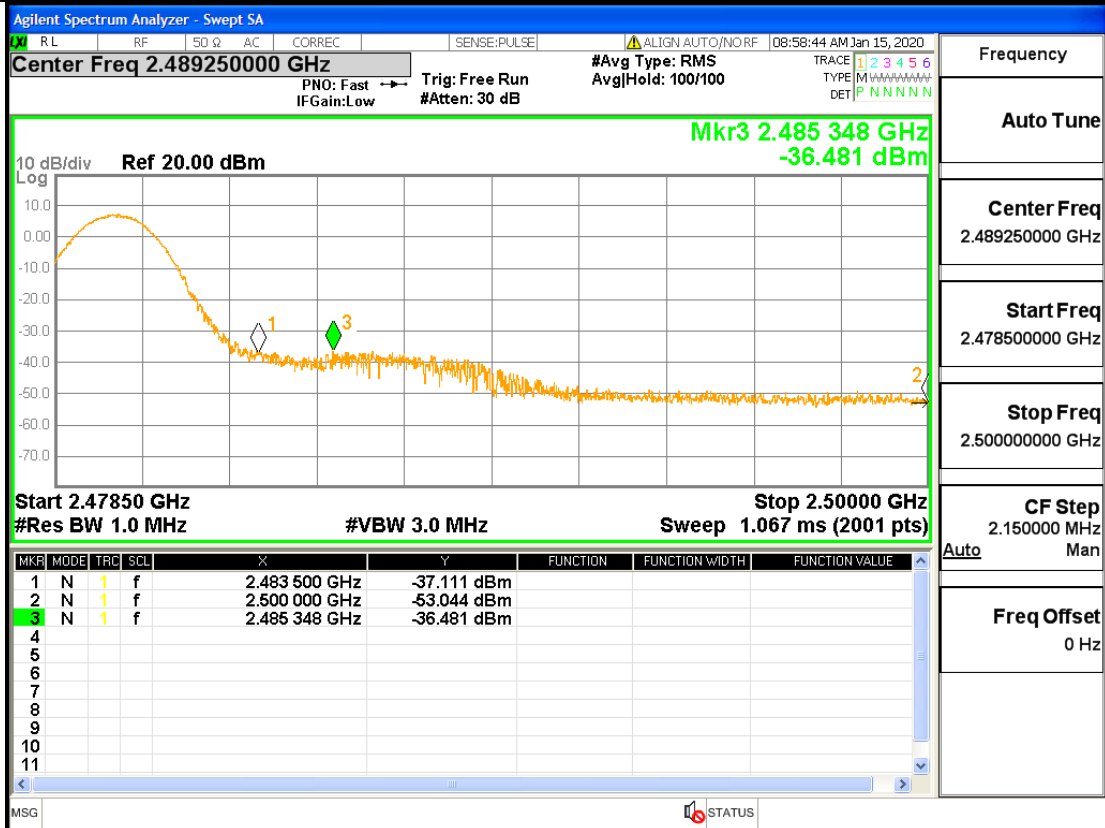
Restrict-band band-edge measurements_2402_PEAK_2DH5



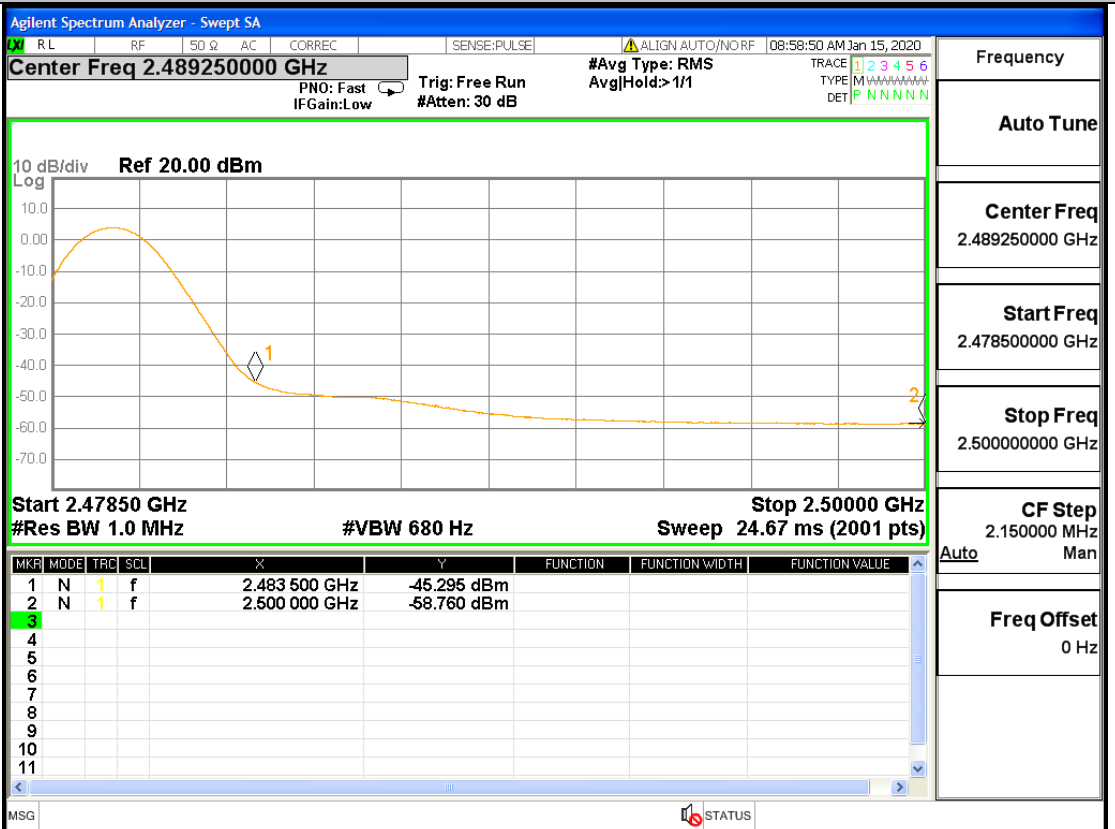
Restrict-band band-edge measurements_2402_AV_2DH5



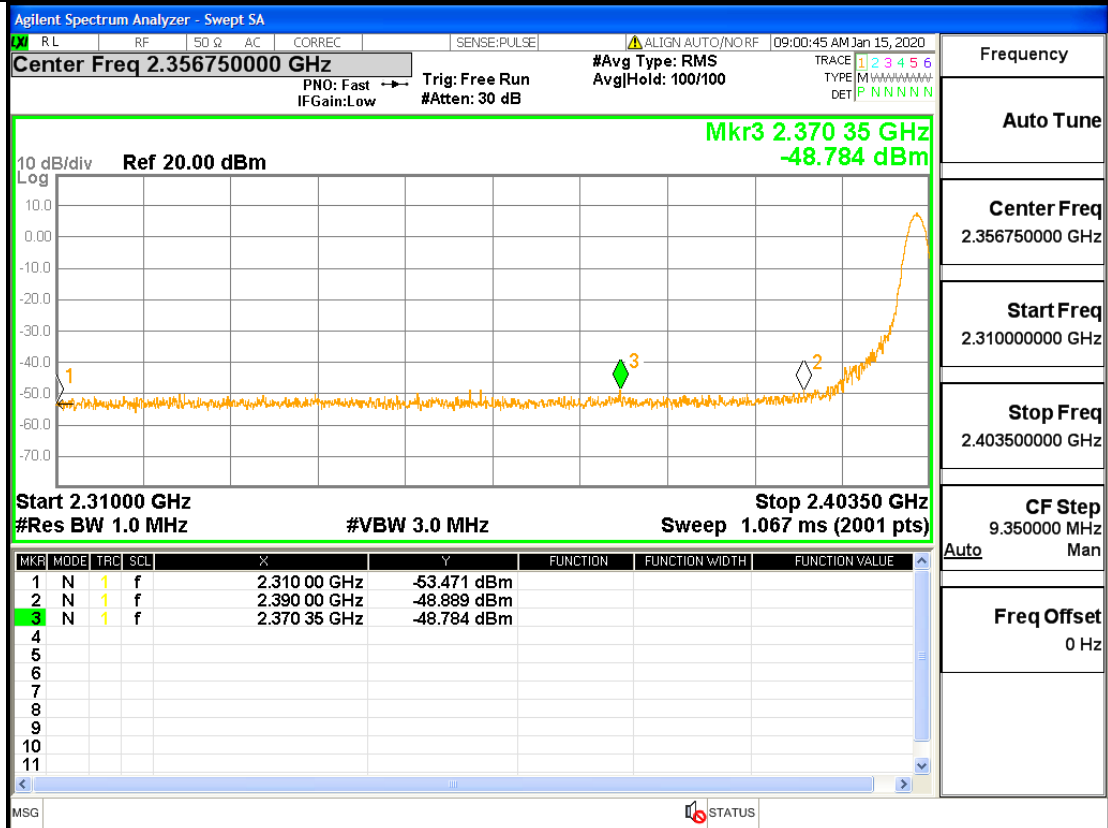
Restrict-band band-edge measurements_2480_PEAK_2DH5



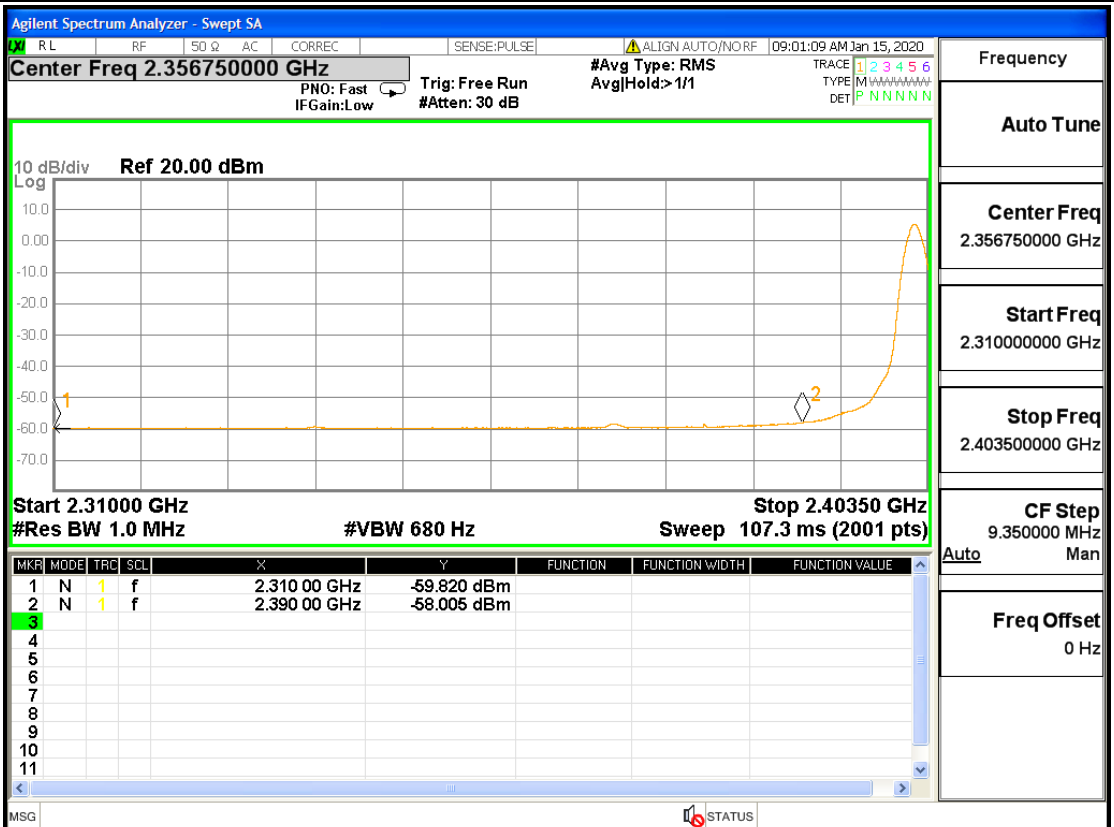
Restrict-band band-edge measurements_2480_AV_2DH5



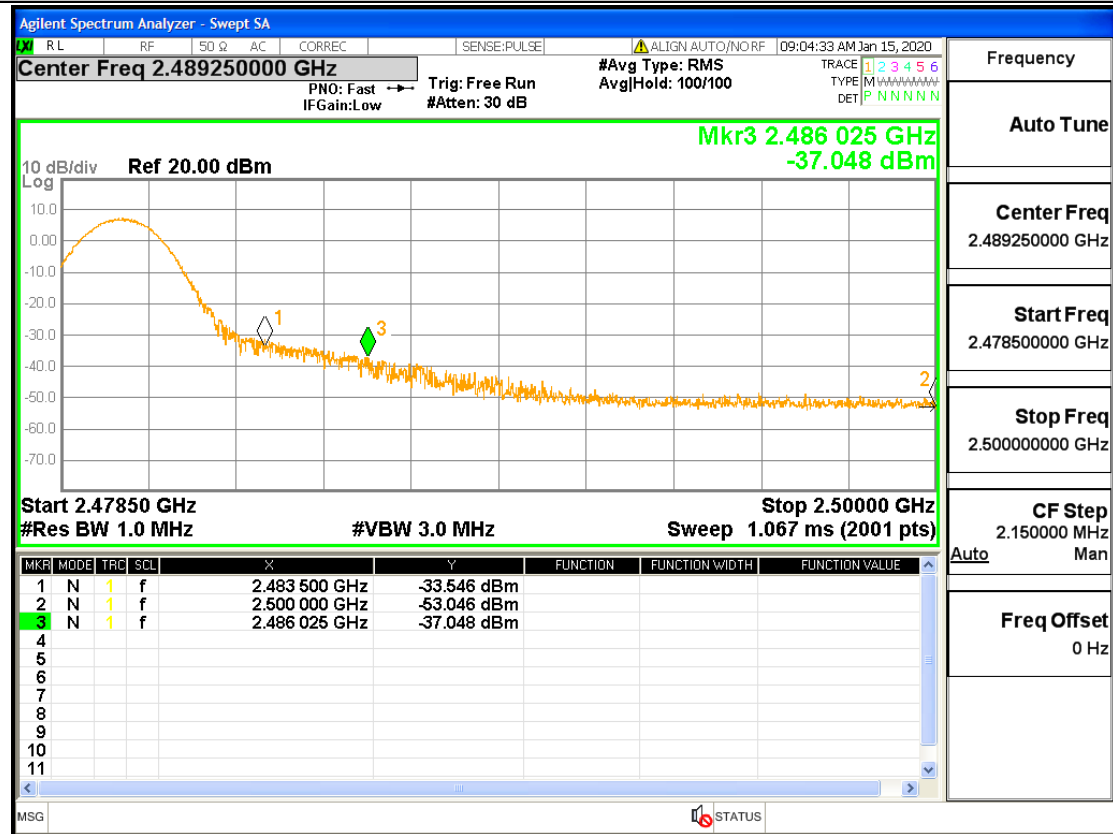
Restrict-band band-edge measurements_2402_PEAK_3DH5



Restrict-band band-edge measurements_2402_AV_3DH5



Restrict-band band-edge measurements_2480_PEAK_3DH5



Restrict-band band-edge measurements_2480_AV_3DH5

