

Appendix A

RF Test Data for BT V5.0 (BDR/EDR) (Conducted Measurement)

Product Name: Ture Wireless Earbuds

Trade Mark: Linklike

Test Model: LINKLIKE Genie 10

Environmental Conditions

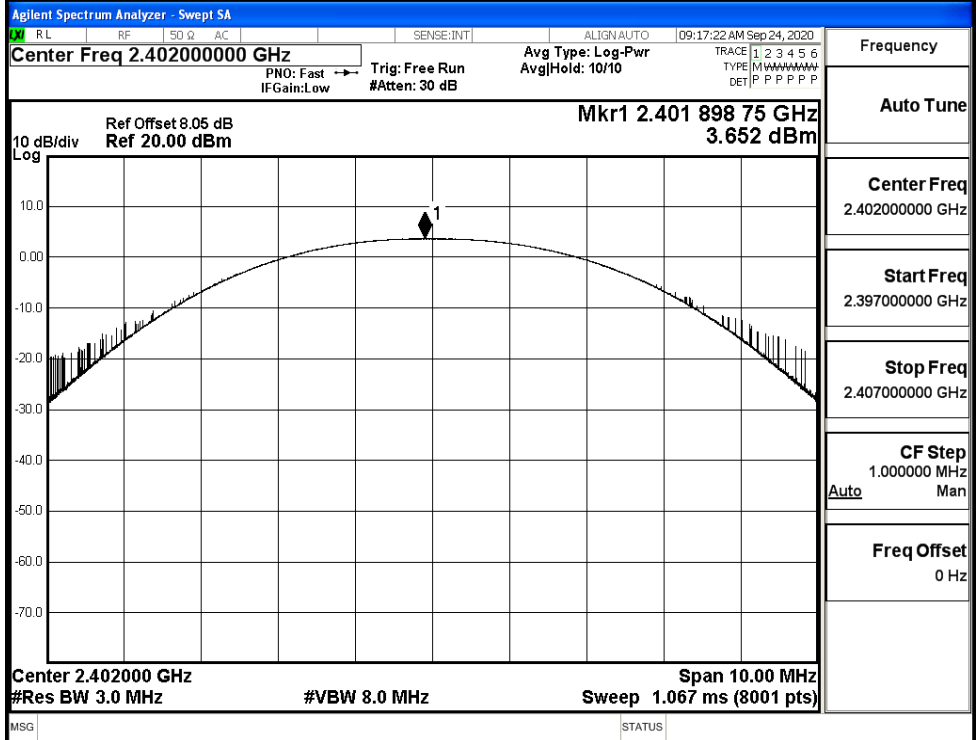
Temperature:	23.7 °C
Relative Humidity:	56%
ATM Pressure:	100.0 kPa
Test Engineer:	CHUANG WANG
Supervised by:	JAYDEN ZHUO

A.1 Maxmum Conducted Peak Output Power

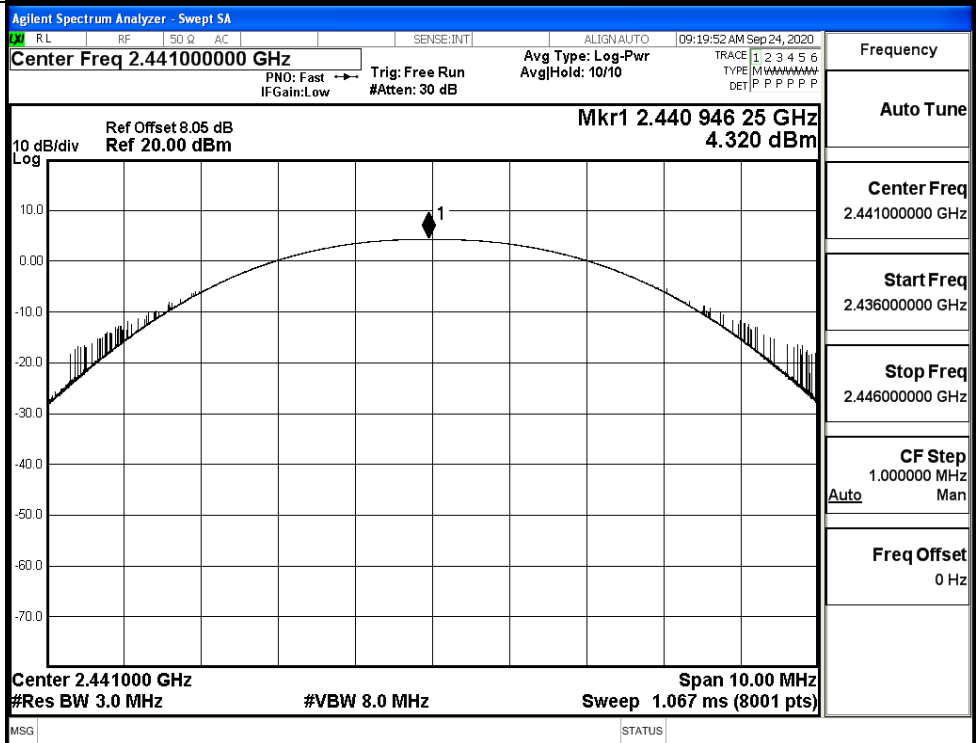
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	3.652	30	PASS
	MCH	4.320	30	PASS
	HCH	5.010	30	PASS
π/4DQPSK	LCH	4.708	21	PASS
	MCH	5.392	21	PASS
	HCH	6.082	21	PASS
8DPSK	LCH	4.952	21	PASS
	MCH	5.647	21	PASS
	HCH	6.327	21	PASS

Test Graphs

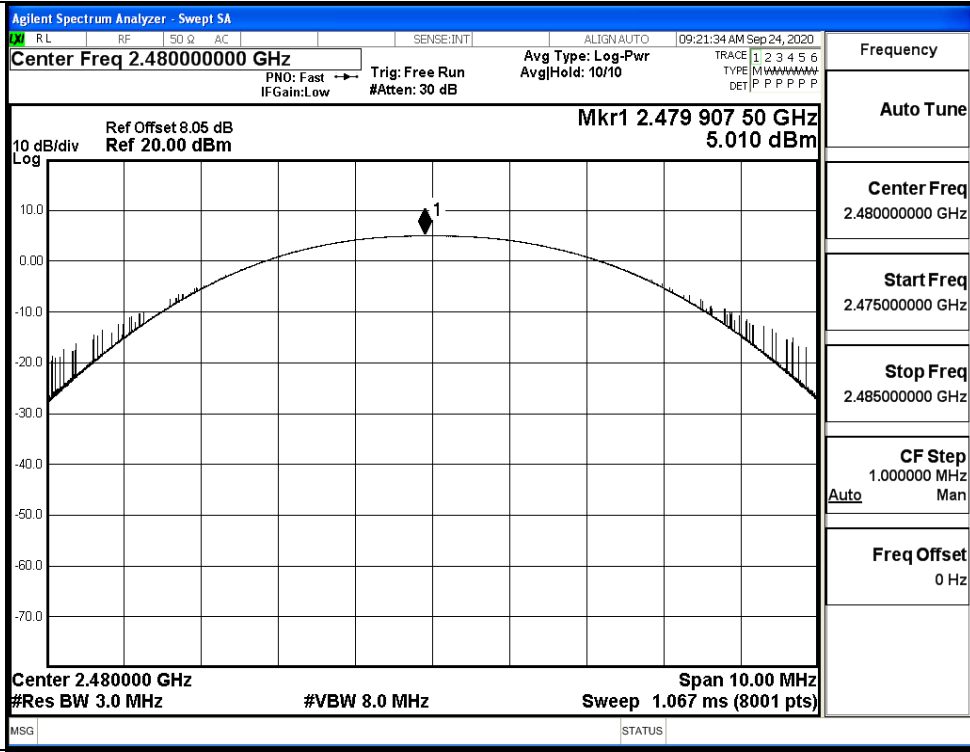
GFSK/LCH



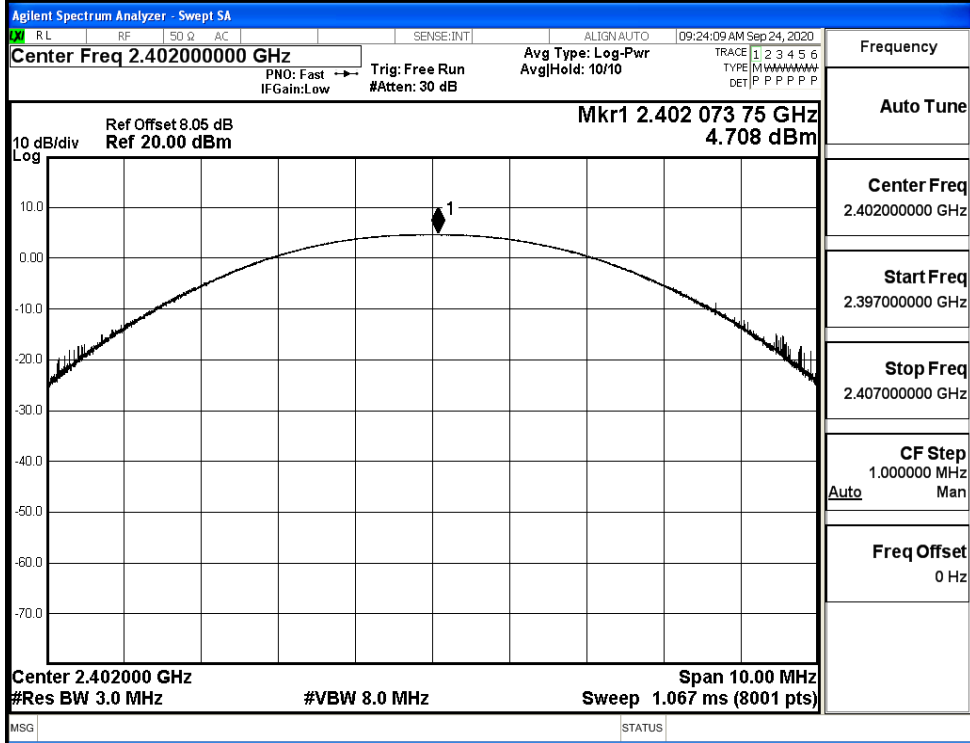
GFSK/MCH



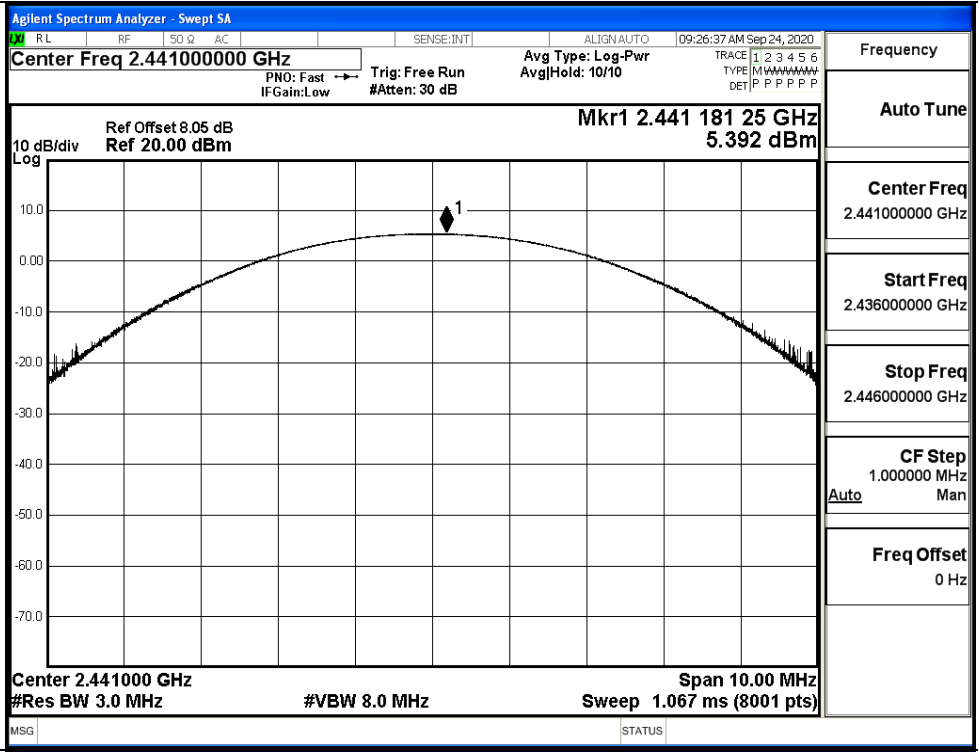
GFSK/HCH



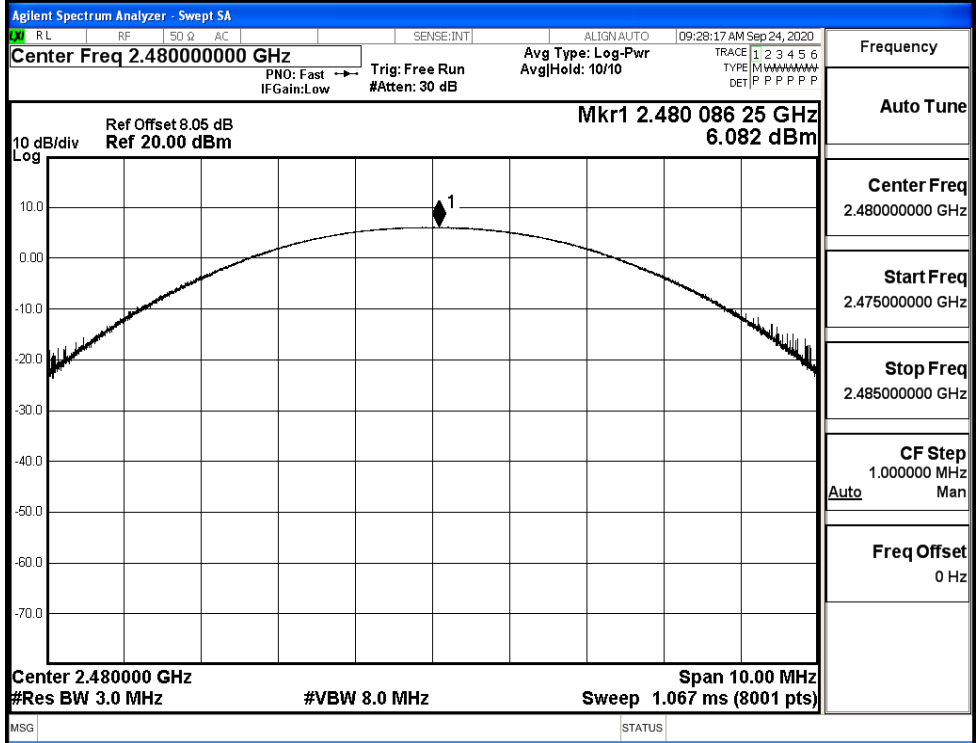
$\pi/4$ DQPSK/LCH

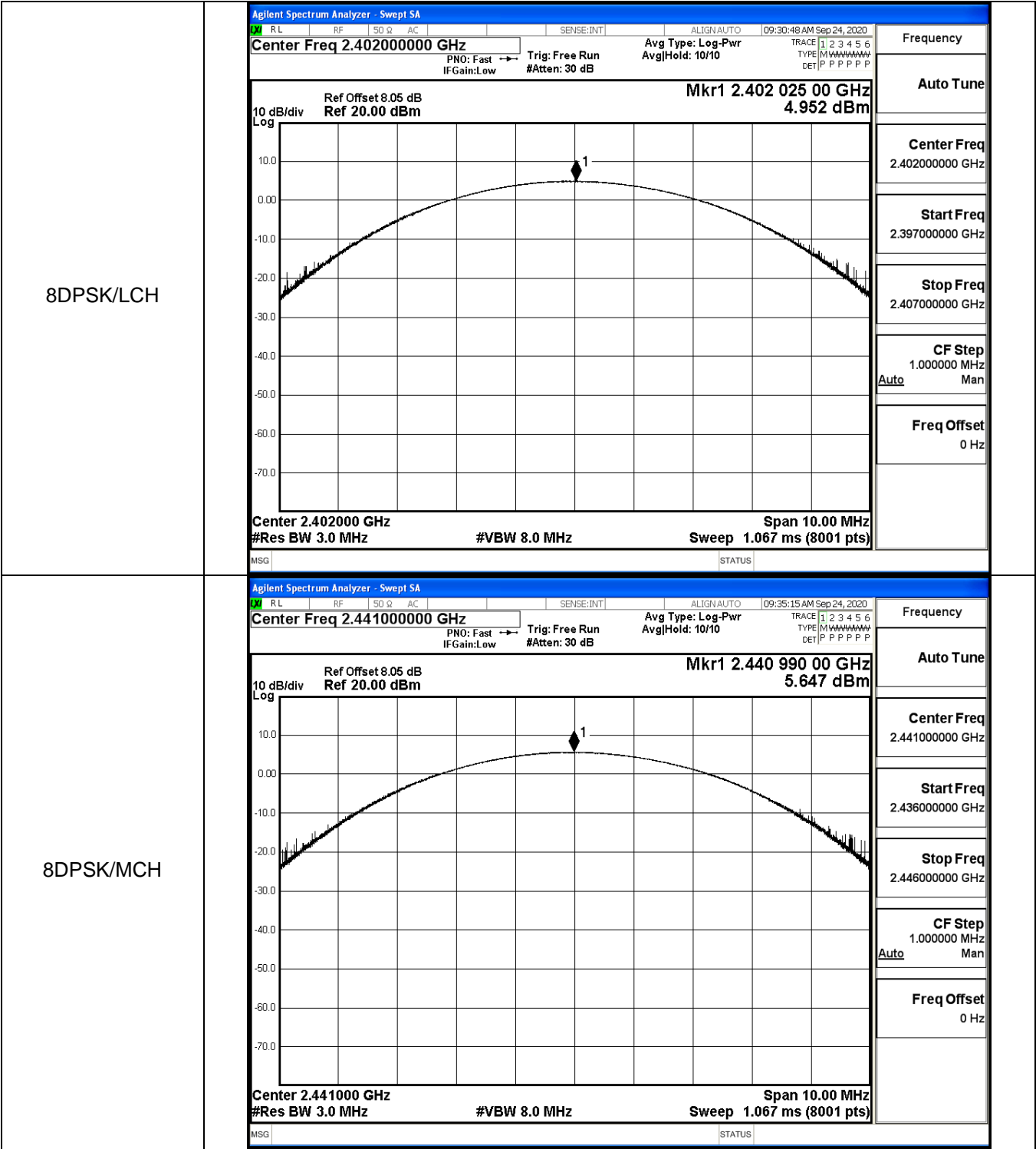


π /4DQPSK/MCH

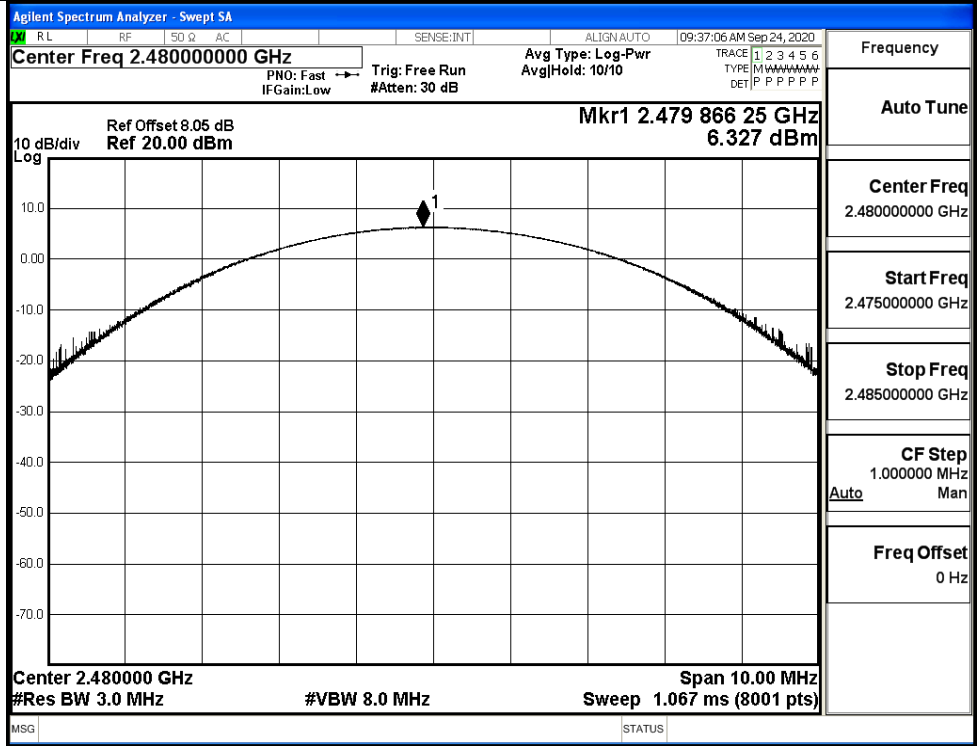


π /4DQPSK/HCH



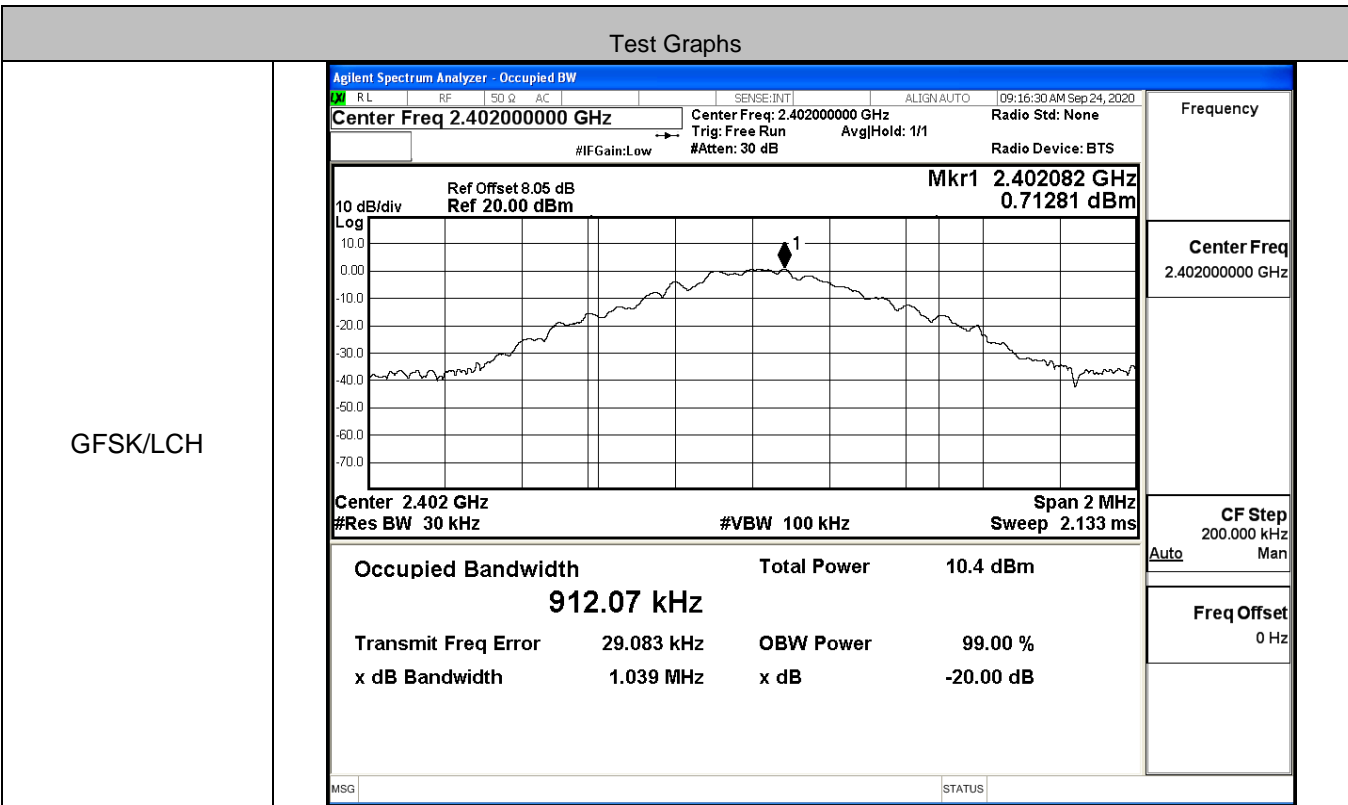


8DPSK/HCH

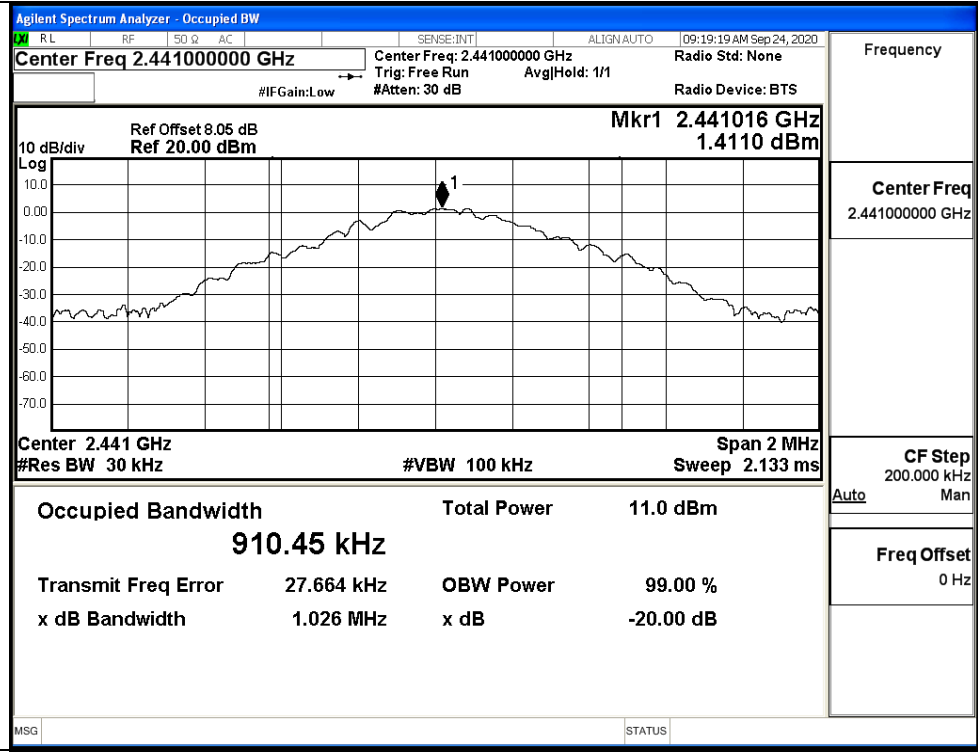


A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.039	Not Specified	PASS
	MCH	1.026	Not Specified	PASS
	HCH	1.032	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.394	Not Specified	PASS
	MCH	1.397	Not Specified	PASS
	HCH	1.399	Not Specified	PASS
8DPSK	LCH	1.376	Not Specified	PASS
	MCH	1.380	Not Specified	PASS
	HCH	1.379	Not Specified	PASS

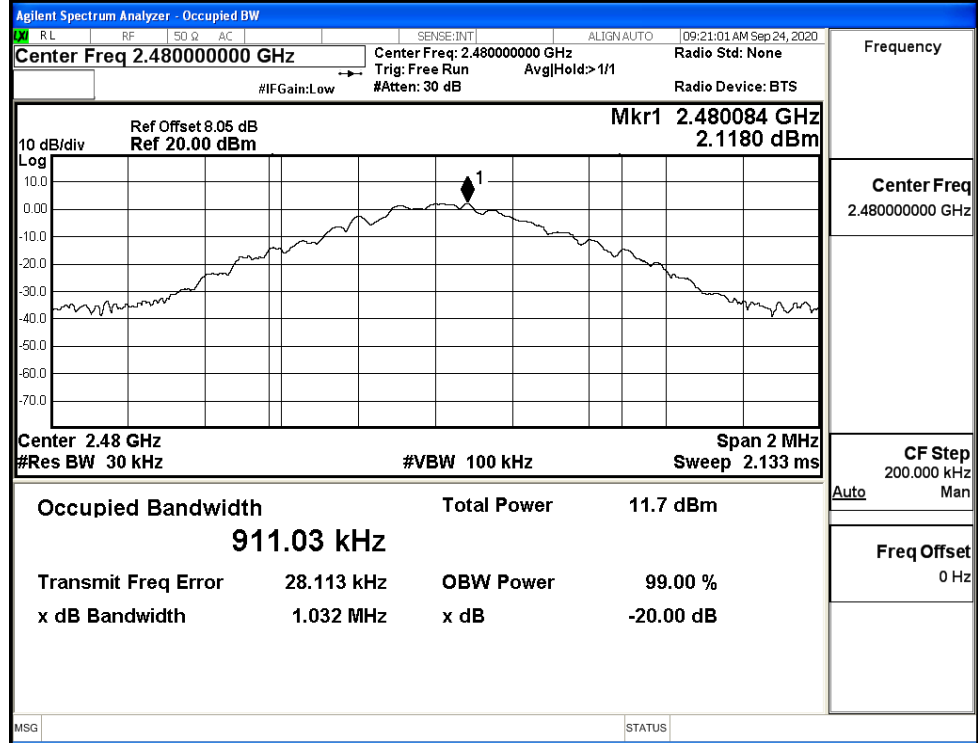


GFSK/MCH



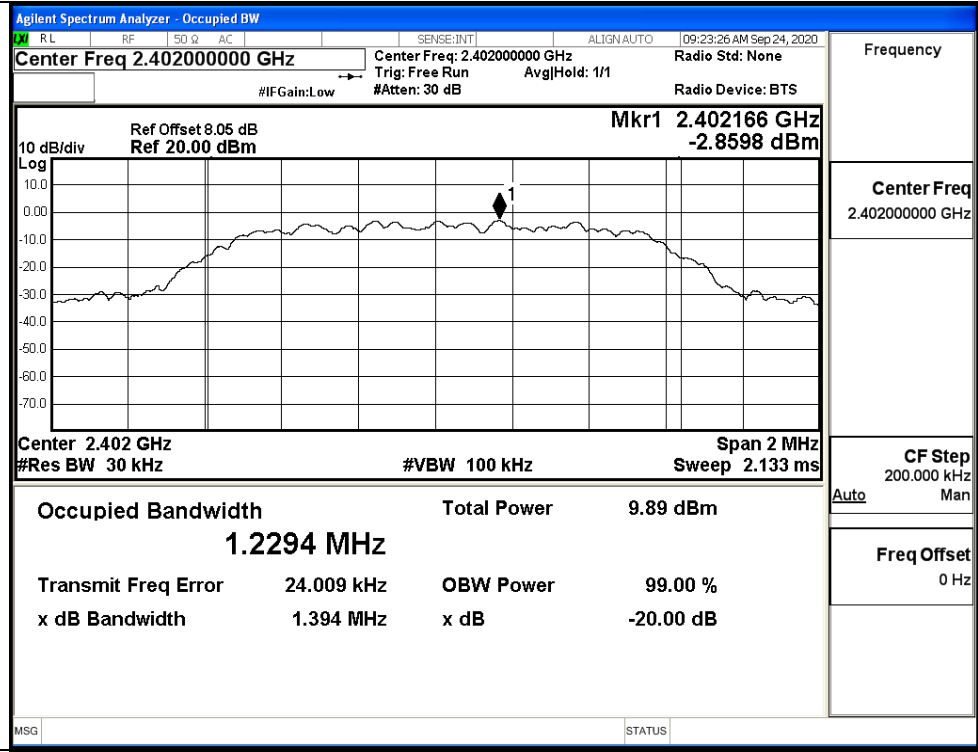
Frequency	2.441000000 GHz
Center Freq	2.441000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH



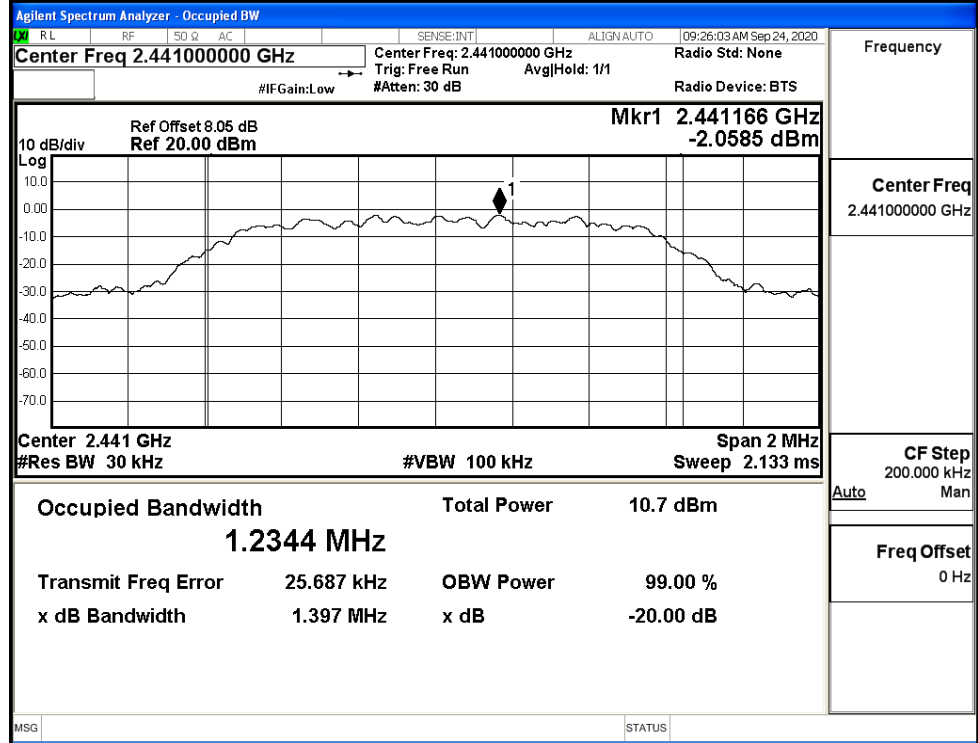
Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH



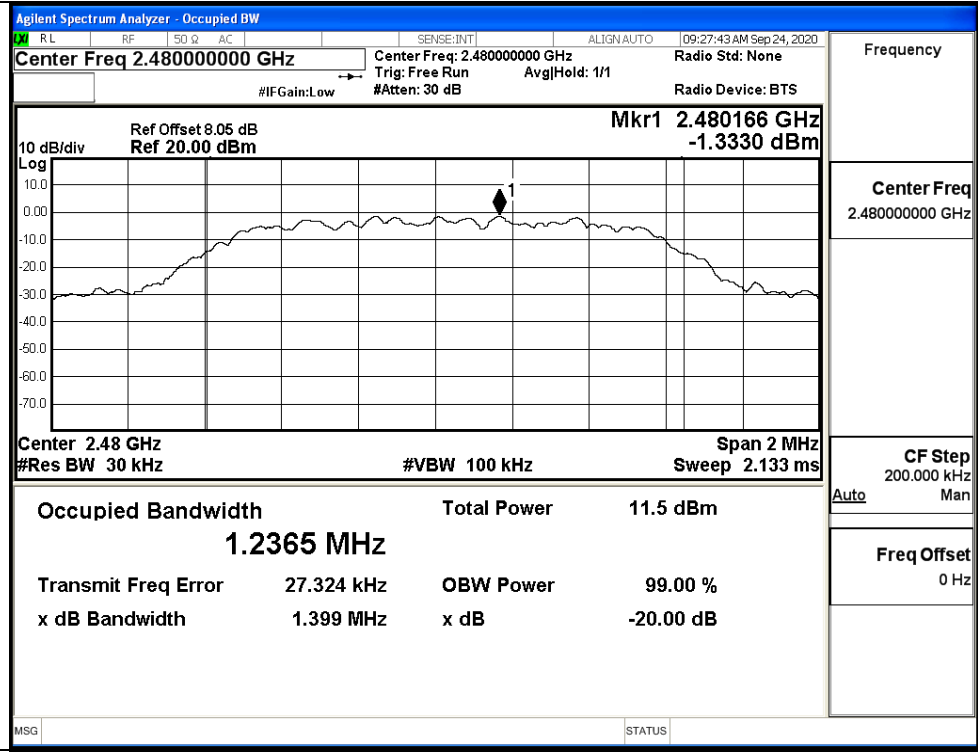
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/MCH

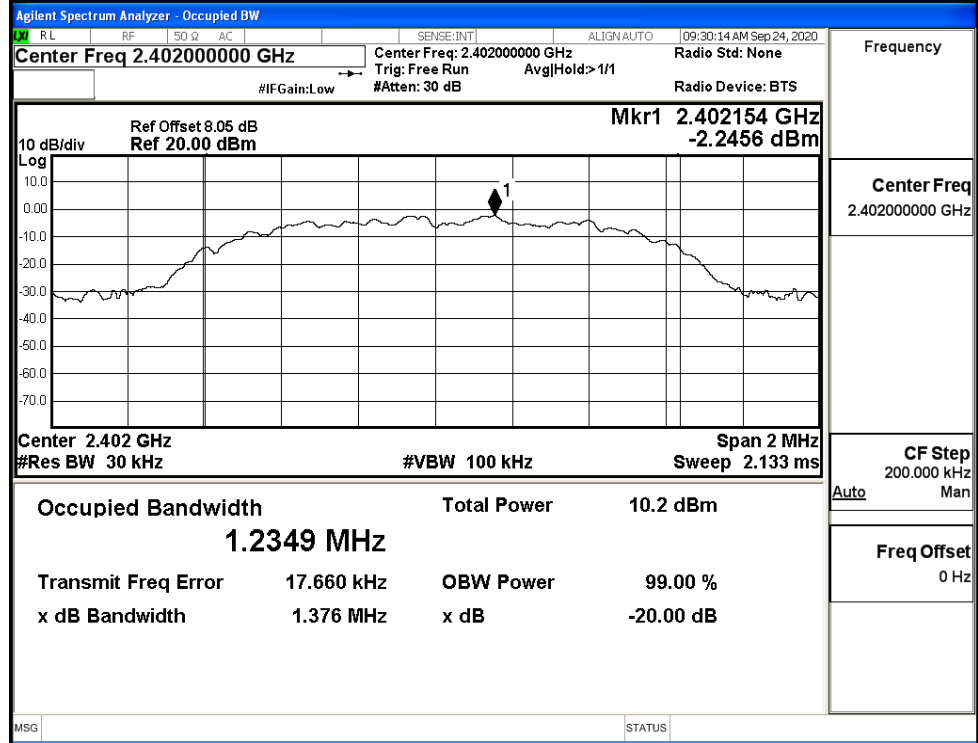


Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

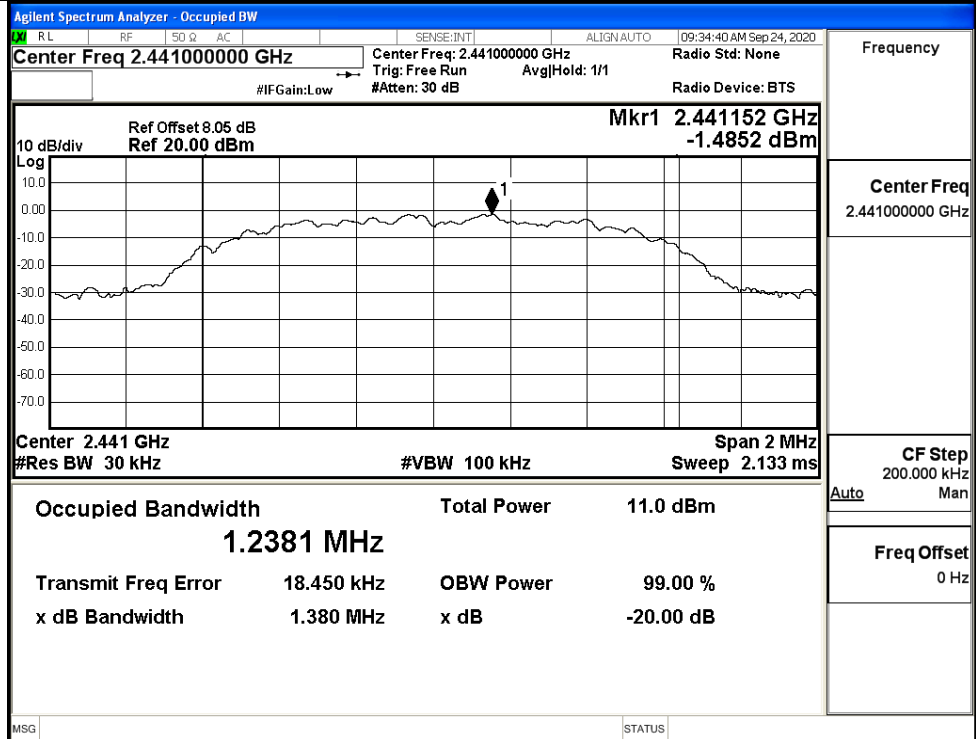
$\pi/4$ DQPSK/HCH



8DPSK/LCH

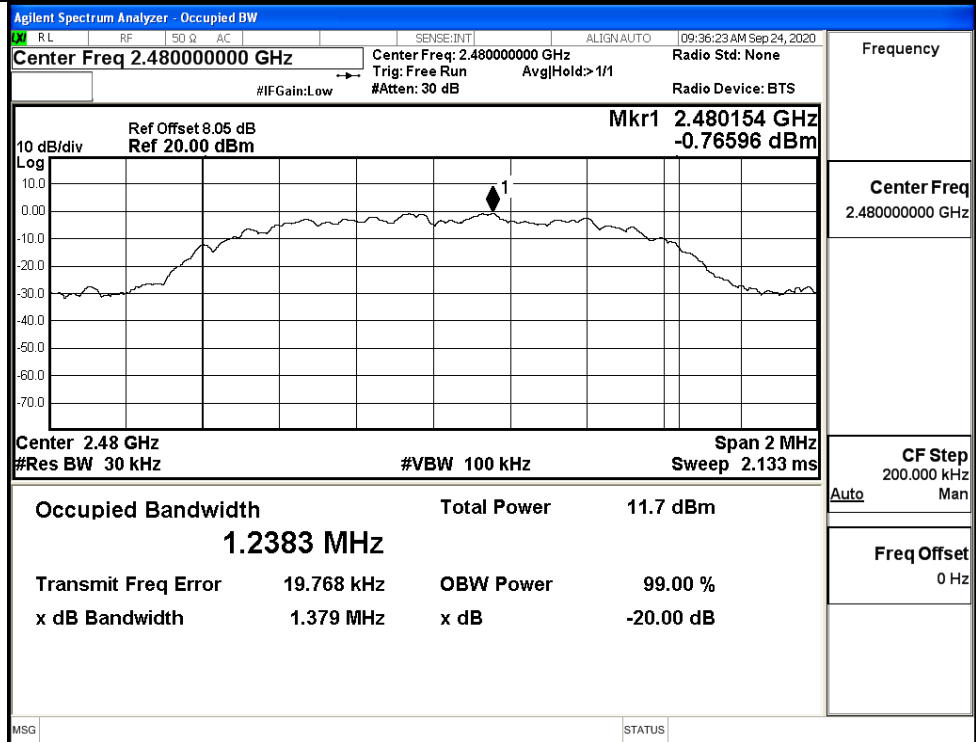


8DPSK/MCH



Frequency	2.441000000 GHz
Center Freq	2.441000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

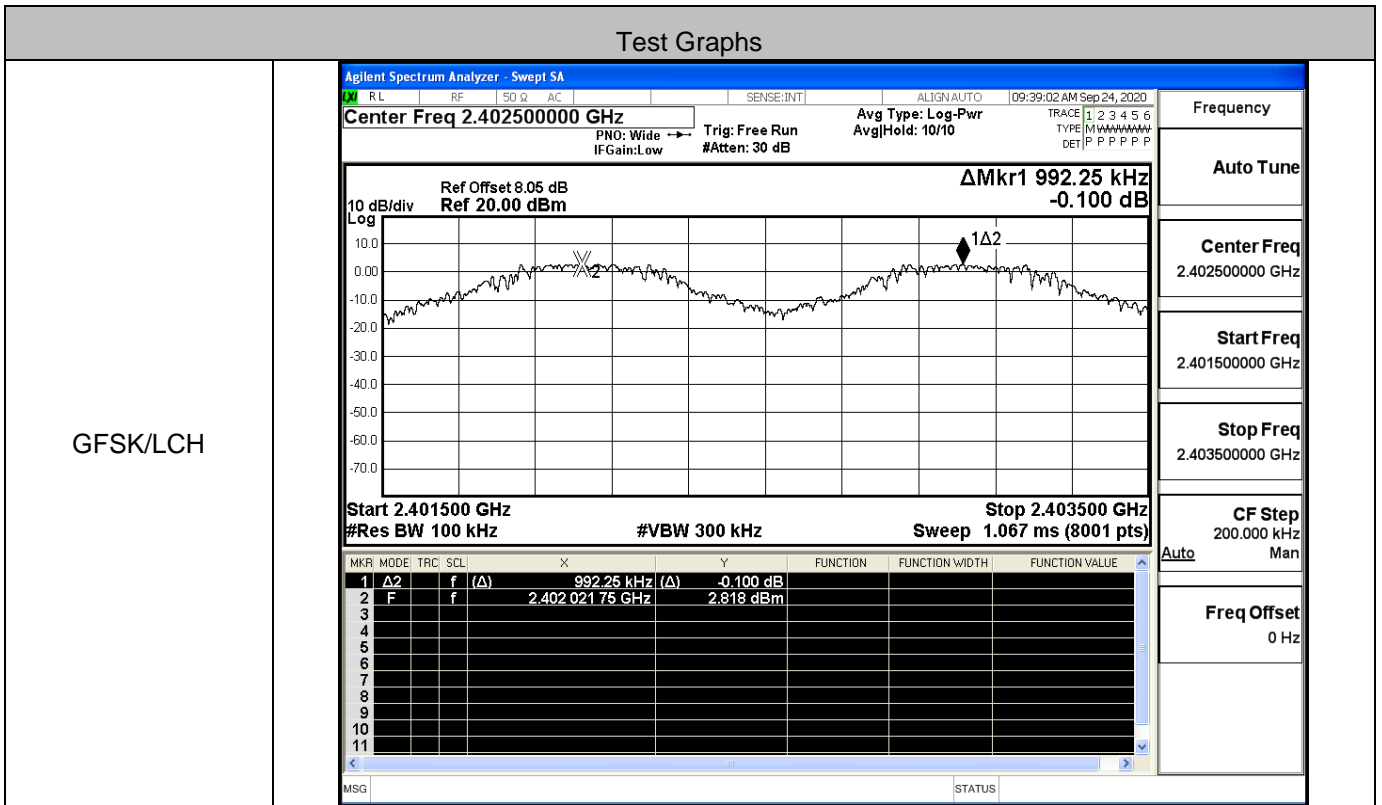
8DPSK/HCH



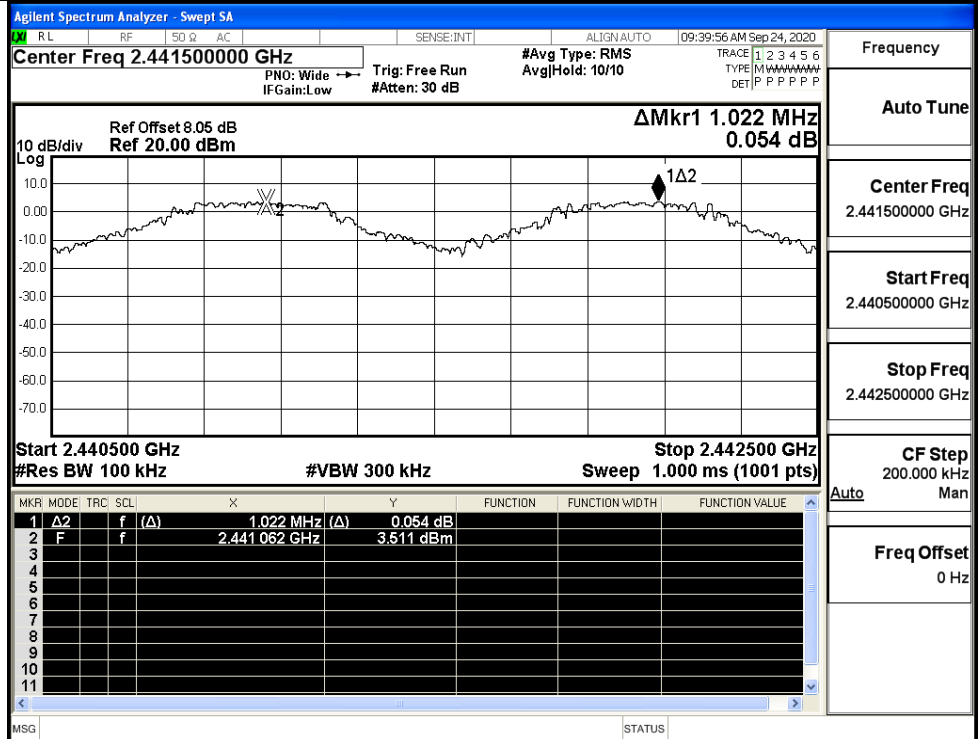
Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.992	0.693	PASS
	MCH	1.022	0.693	PASS
	HCH	1.074	0.693	PASS
π/4DQPSK	LCH	0.968	0.933	PASS
	MCH	0.984	0.933	PASS
	HCH	1.010	0.933	PASS
8DPSK	LCH	1.124	0.920	PASS
	MCH	0.982	0.920	PASS
	HCH	1.128	0.920	PASS

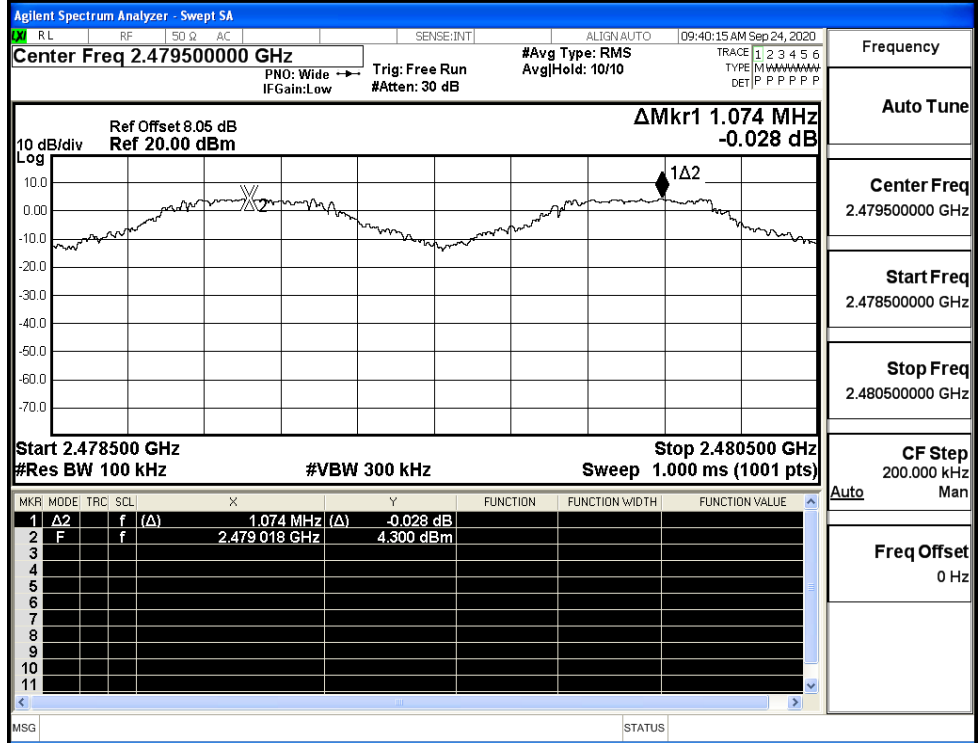


GFSK/MCH



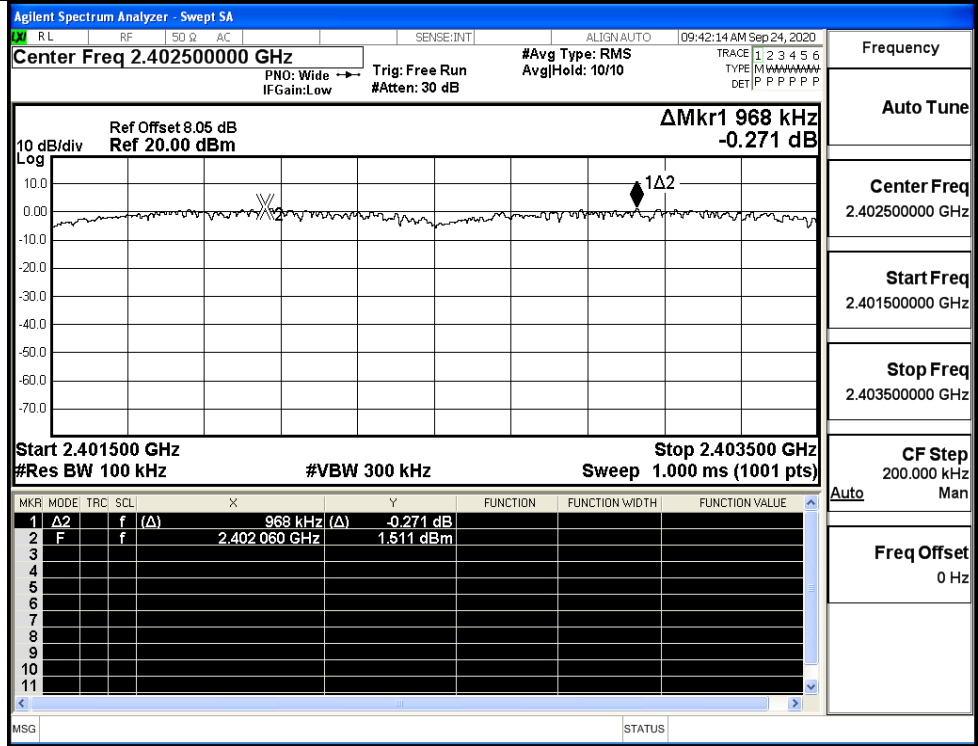
Frequency	2.441500000 GHz
Auto Tune	
Center Freq	2.441500000 GHz
Start Freq	2.440500000 GHz
Stop Freq	2.442500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH



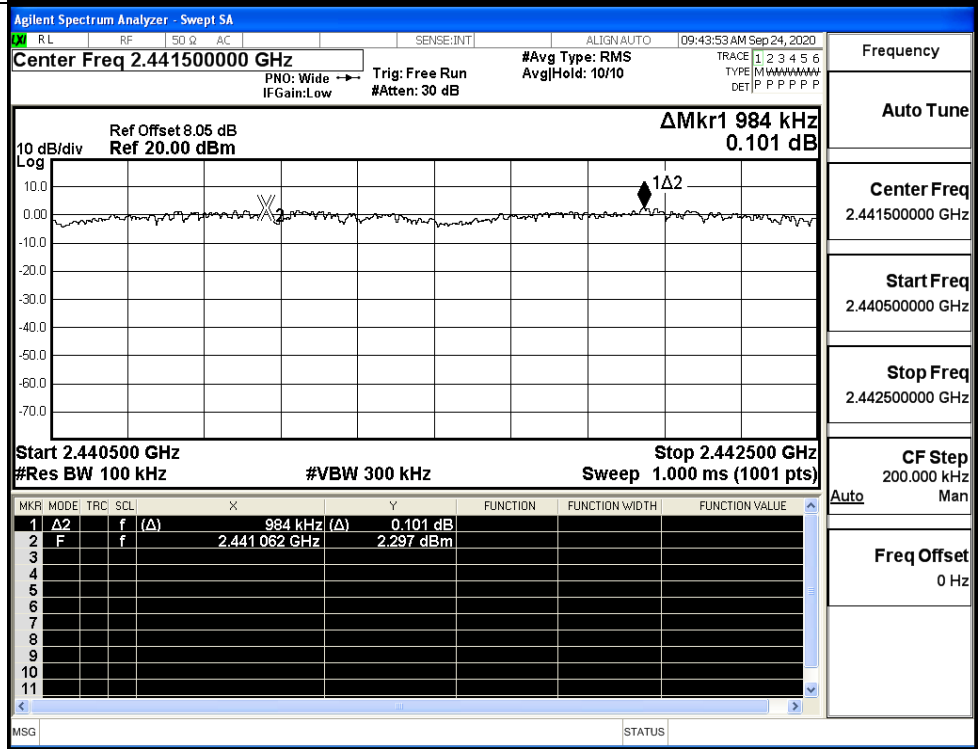
Frequency	2.479500000 GHz
Auto Tune	
Center Freq	2.479500000 GHz
Start Freq	2.478500000 GHz
Stop Freq	2.480500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH



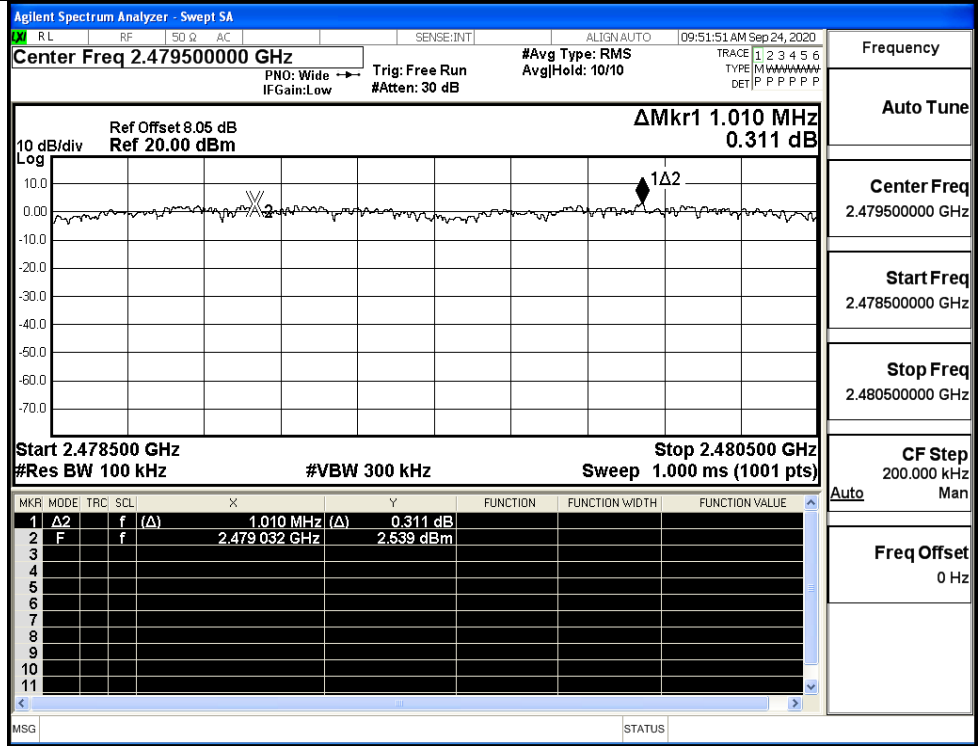
Frequency
Auto Tune
Center Freq 2.402500000 GHz
Start Freq 2.401500000 GHz
Stop Freq 2.403500000 GHz
CF Step 200.000 kHz
Auto
Freq Offset 0 Hz

$\pi/4$ DQPSK/MCH

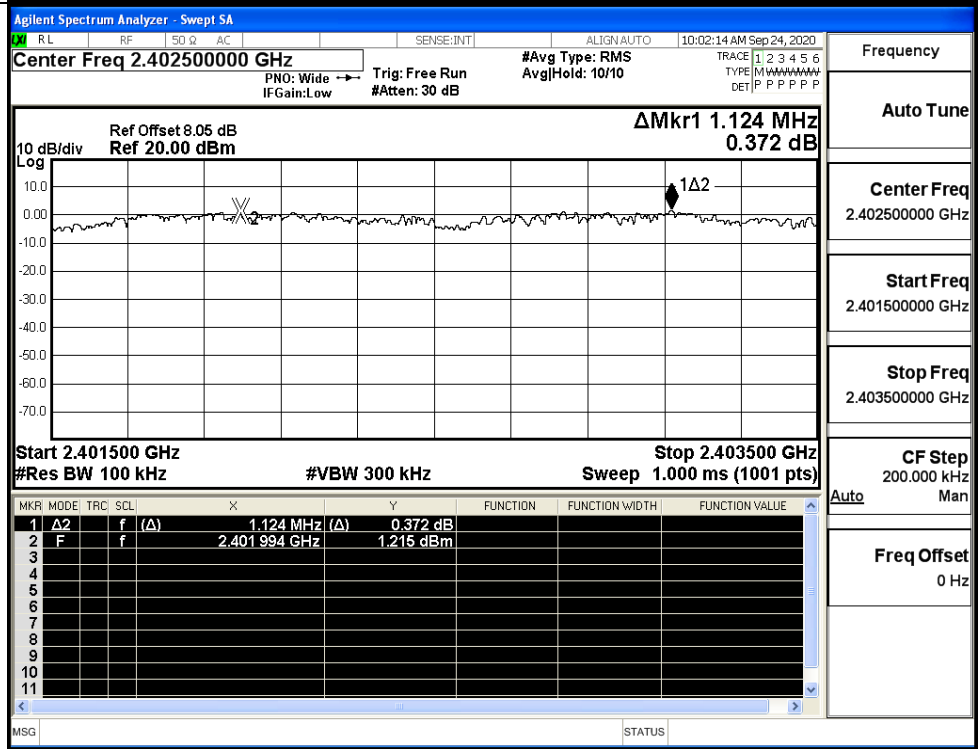


Frequency
Auto Tune
Center Freq 2.441500000 GHz
Start Freq 2.440500000 GHz
Stop Freq 2.442500000 GHz
CF Step 200.000 kHz
Auto
Freq Offset 0 Hz

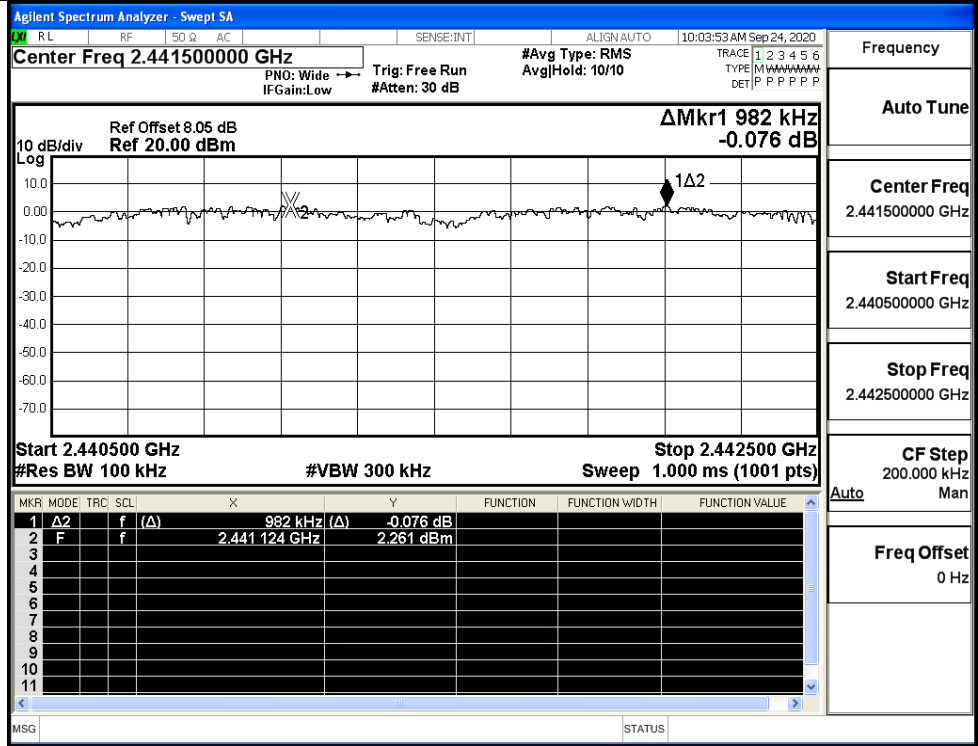
π/4DQPSK/HCH



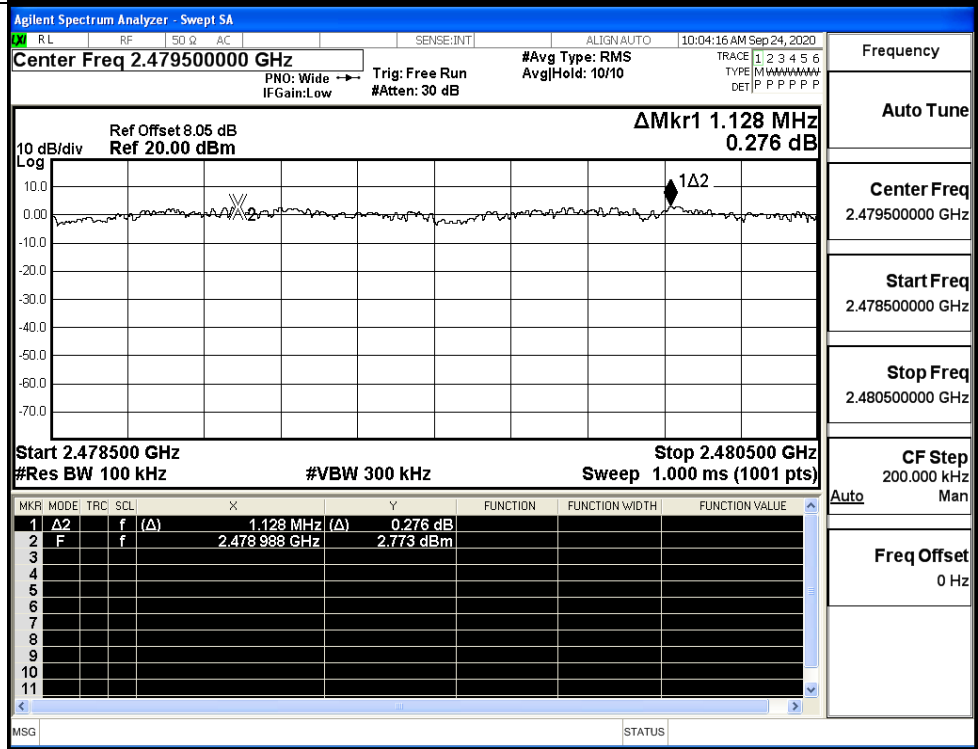
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



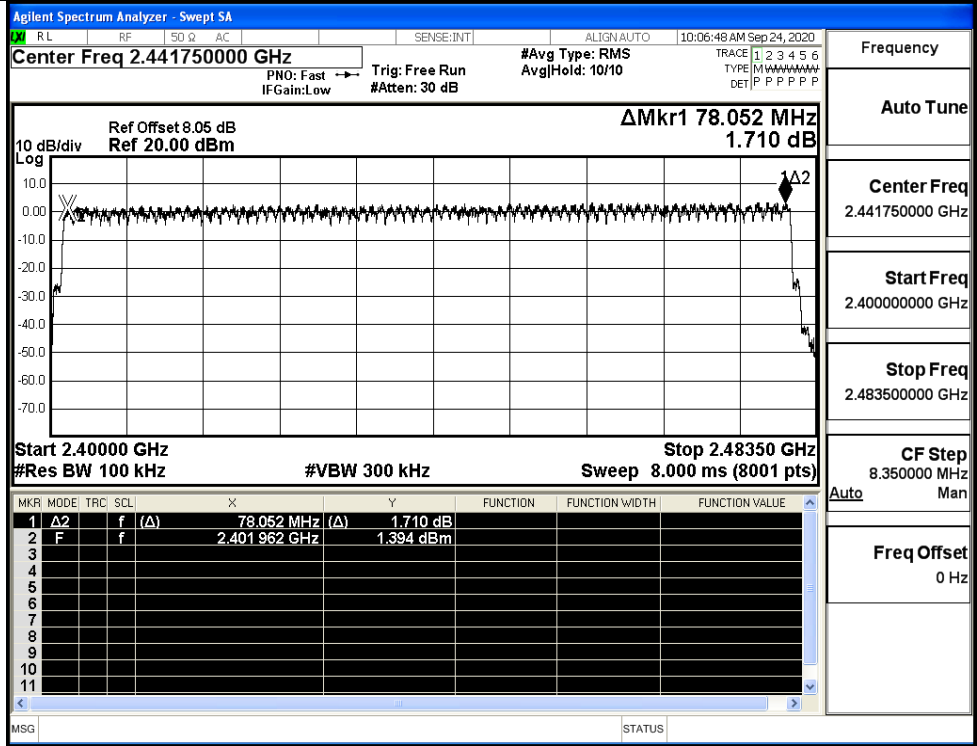
A.4 Hopping Channel Number

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

Test Graphs

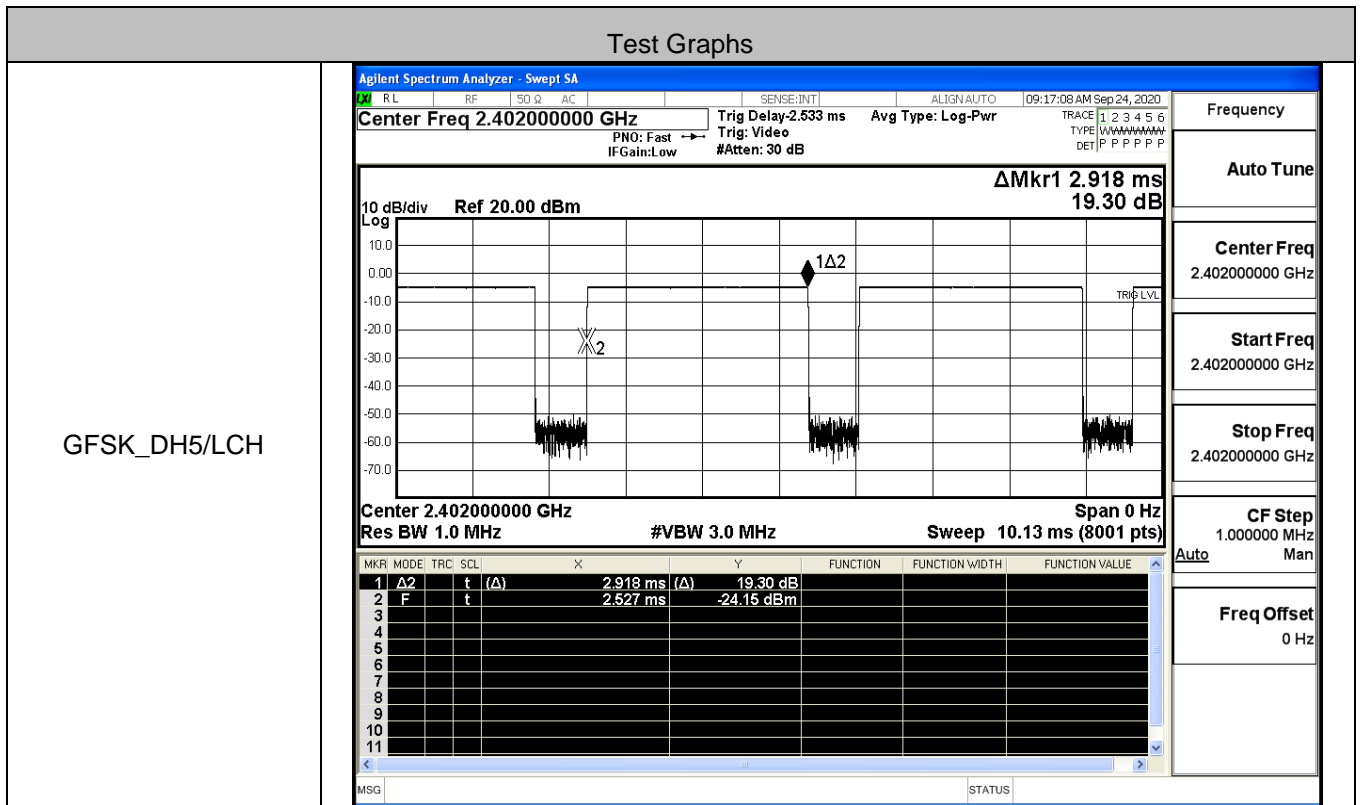
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 77.999 MHz 1.547 dB Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.48350 GHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <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>Δ2</td> <td>f</td> <td>(Δ)</td> <td>77.999 MHz (Δ)</td> <td>1.547 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td>(Δ)</td> <td>2.402025 GHz</td> <td>2.844 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	77.999 MHz (Δ)	1.547 dB				2	F	f	(Δ)	2.402025 GHz	2.844 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Auto Man Freq Offset 0 Hz
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ2	f	(Δ)	77.999 MHz (Δ)	1.547 dB																								
2	F	f	(Δ)	2.402025 GHz	2.844 dBm																								
$\pi/4$ DQPSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 78.292 MHz 1.246 dB Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.48350 GHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <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>Δ2</td> <td>f</td> <td>(Δ)</td> <td>78.292 MHz (Δ)</td> <td>1.246 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td>(Δ)</td> <td>2.401879 GHz</td> <td>1.196 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	78.292 MHz (Δ)	1.246 dB				2	F	f	(Δ)	2.401879 GHz	1.196 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Auto Man Freq Offset 0 Hz
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ2	f	(Δ)	78.292 MHz (Δ)	1.246 dB																								
2	F	f	(Δ)	2.401879 GHz	1.196 dBm																								

8DPSK/Hop

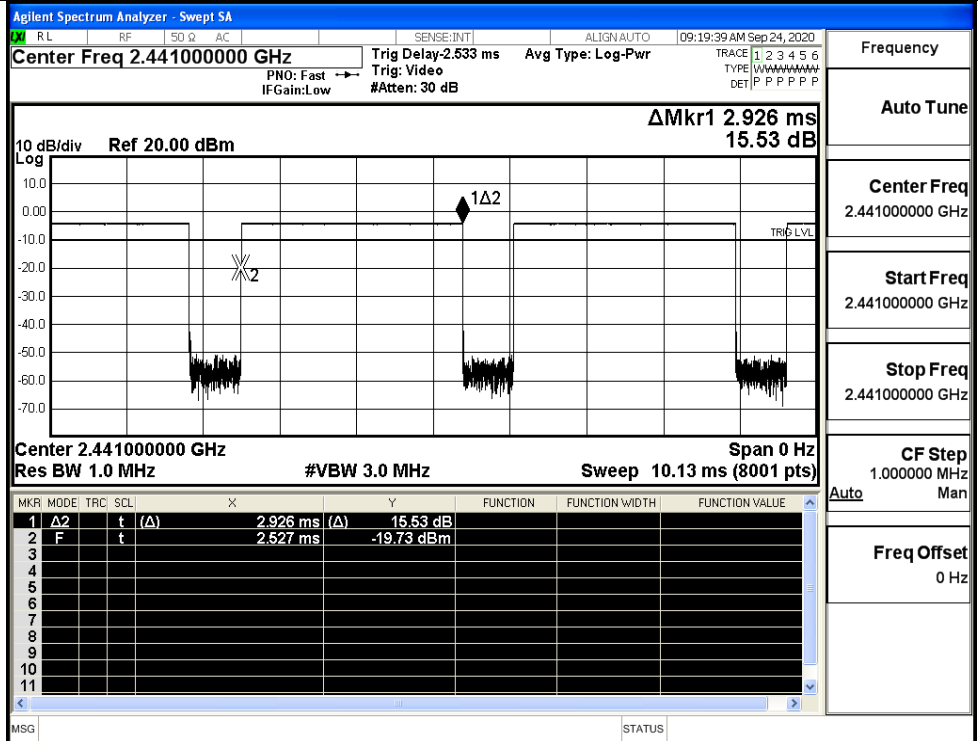


A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.92	106.7	0.312	0.4	PASS
	DH5	MCH	2.93	106.7	0.313	0.4	PASS
	DH5	HCH	2.93	106.7	0.313	0.4	PASS
π/4DQPSK	2DH5	LCH	2.92	106.7	0.313	0.4	PASS
	2DH5	MCH	2.93	106.7	0.313	0.4	PASS
	2DH5	HCH	2.93	106.7	0.313	0.4	PASS
8DPSK	3DH5	LCH	2.92	106.7	0.31	0.4	PASS
	3DH5	MCH	2.93	106.7	0.313	0.4	PASS
	3DH5	HCH	2.93	106.7	0.313	0.4	PASS

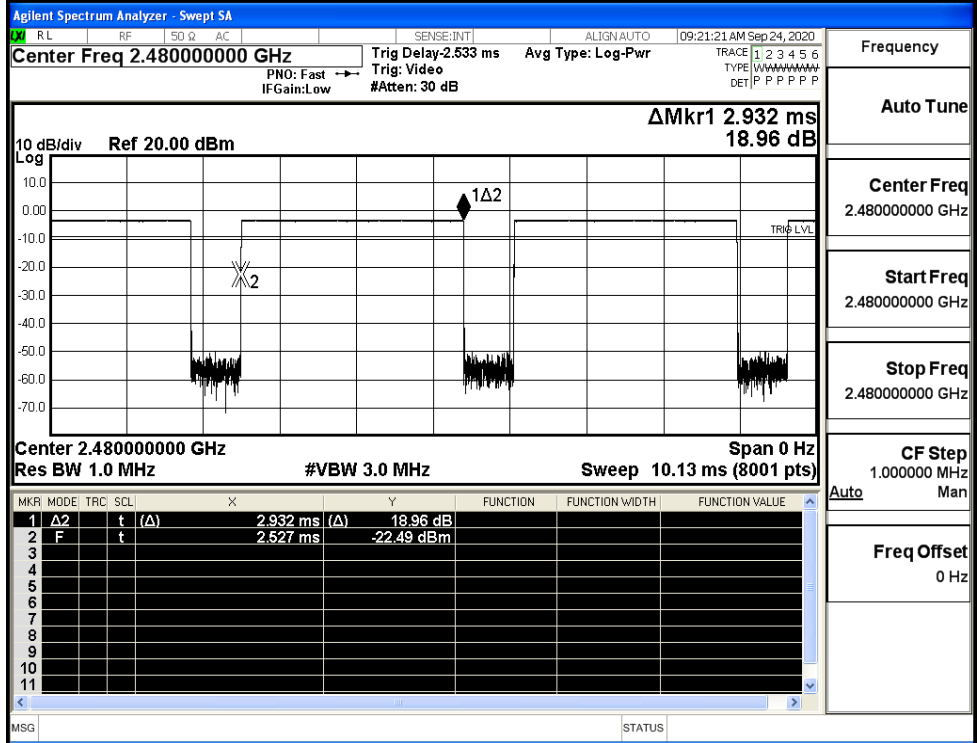


GFSK_DH5/MCH



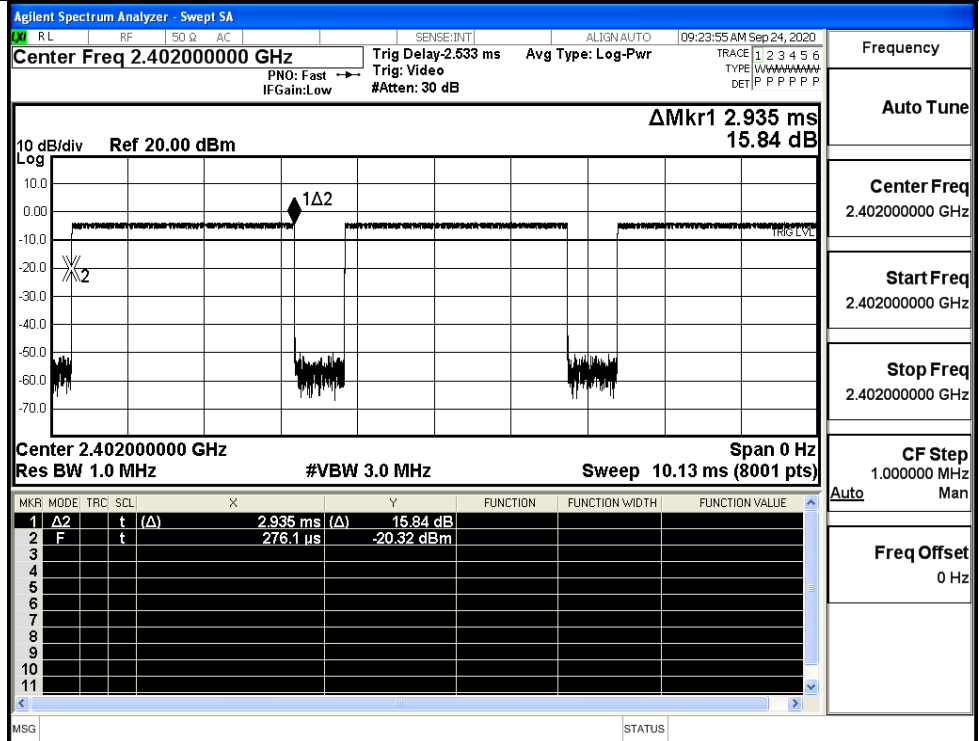
Frequency	2.441000000 GHz
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK_DH5/HCH

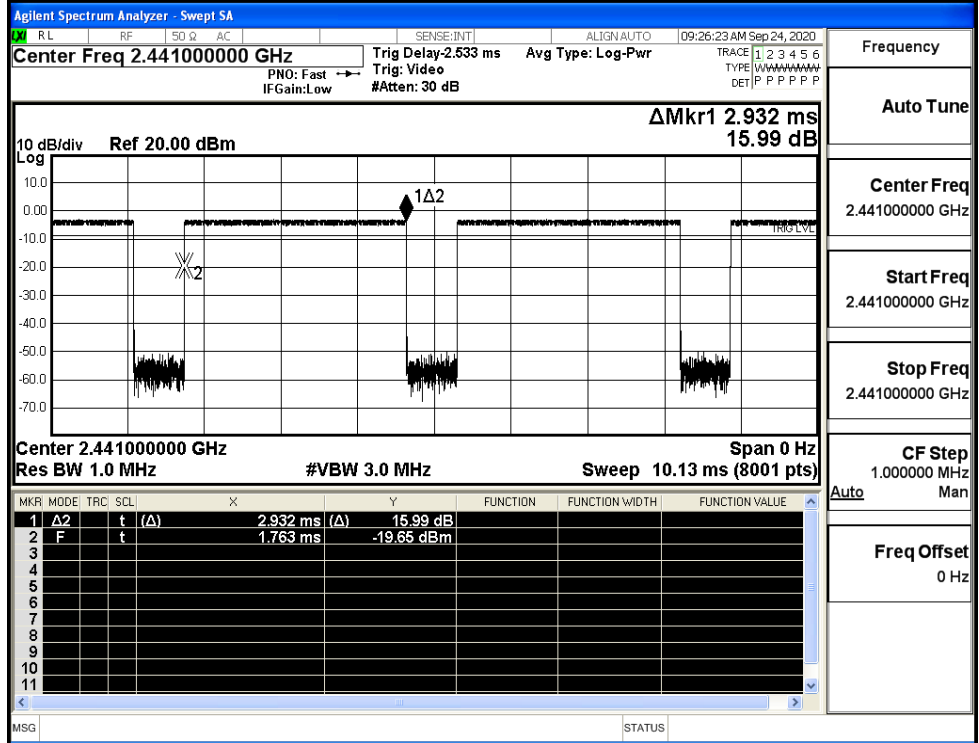


Frequency	2.480000000 GHz
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

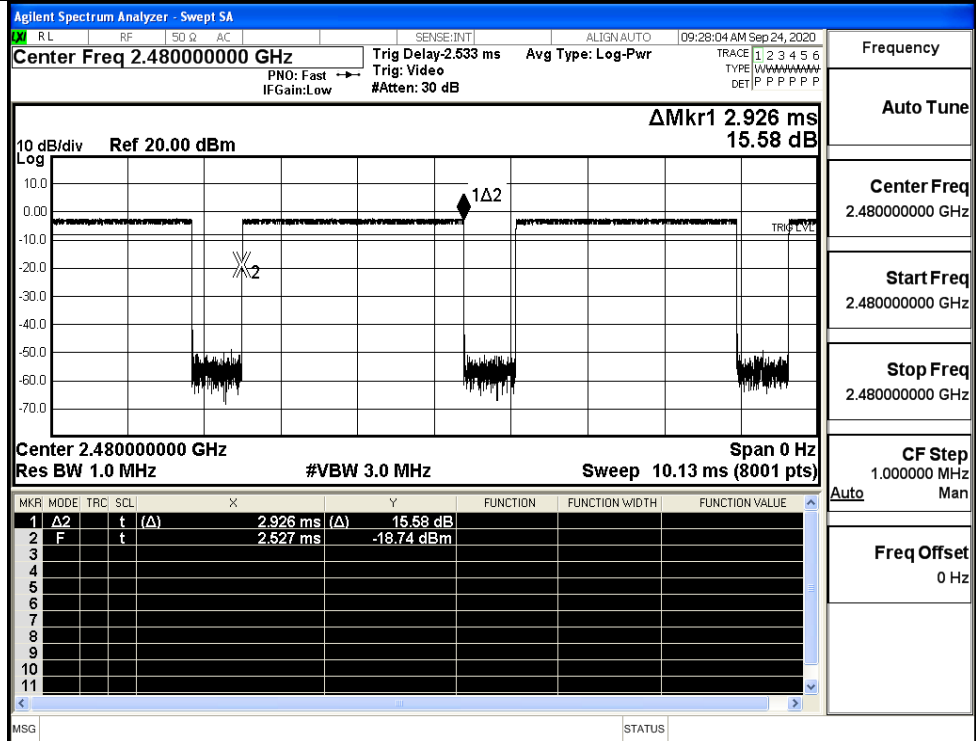
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH

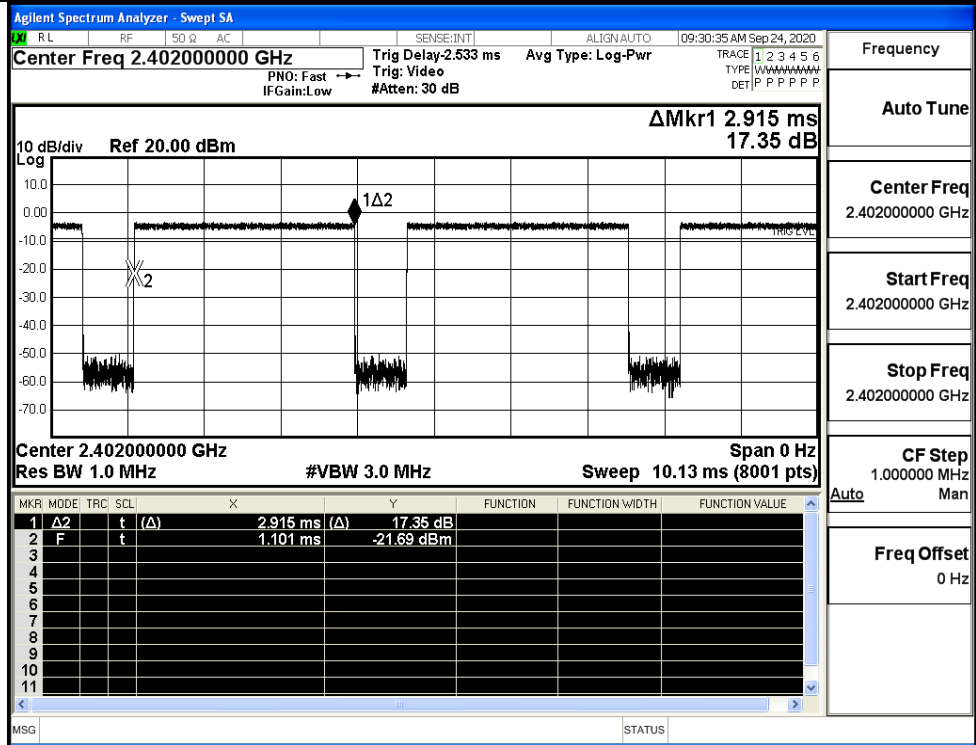


$\pi/4$ DQPSK
_2DH5/HCH



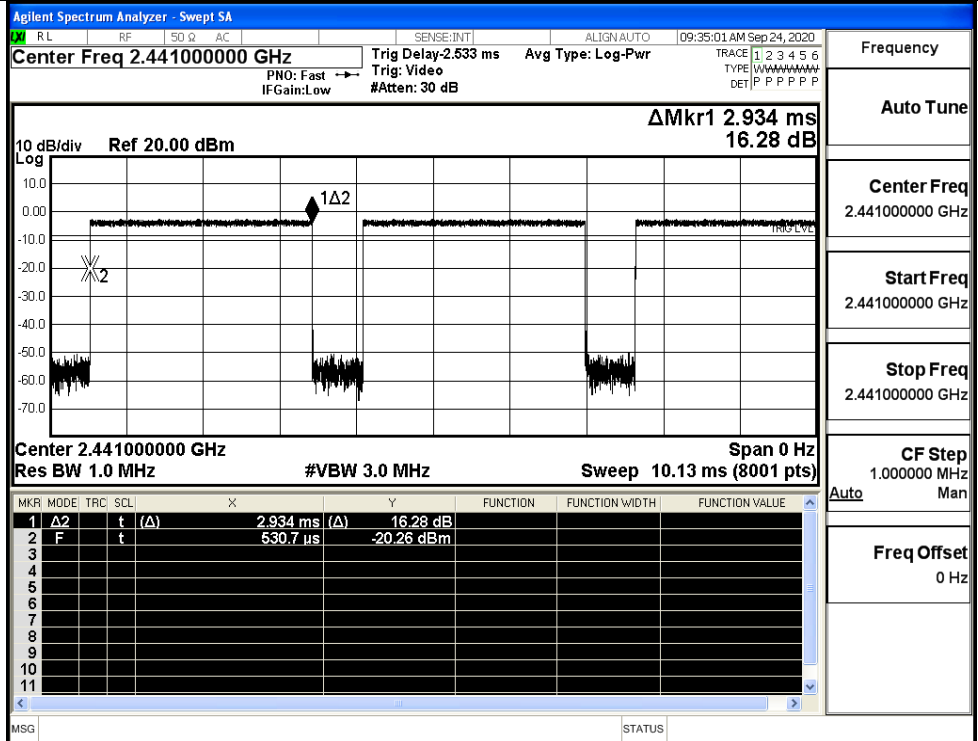
Frequency	2.480000000 GHz
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Freq Offset	0 Hz

8DPSK_3DH5/LCH



Frequency	2.402000000 GHz
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.402000000 GHz
Stop Freq	2.402000000 GHz
CF Step	1.000000 MHz
Freq Offset	0 Hz

8DPSK_3DH5/MCH



Frequency

Auto Tune

Center Freq 2.441000000 GHz

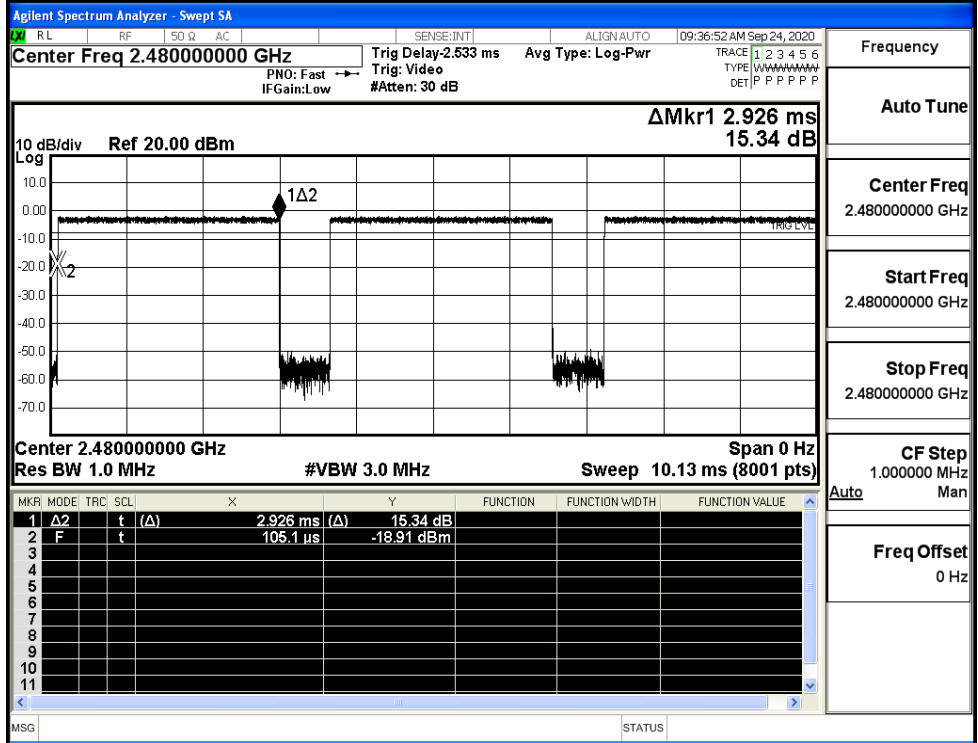
Start Freq 2.441000000 GHz

Stop Freq 2.441000000 GHz

CF Step 1.000000 MHz

Freq Offset 0 Hz

8DPSK_3DH5/HCH



Frequency

Auto Tune

Center Freq 2.480000000 GHz

Start Freq 2.480000000 GHz

Stop Freq 2.480000000 GHz

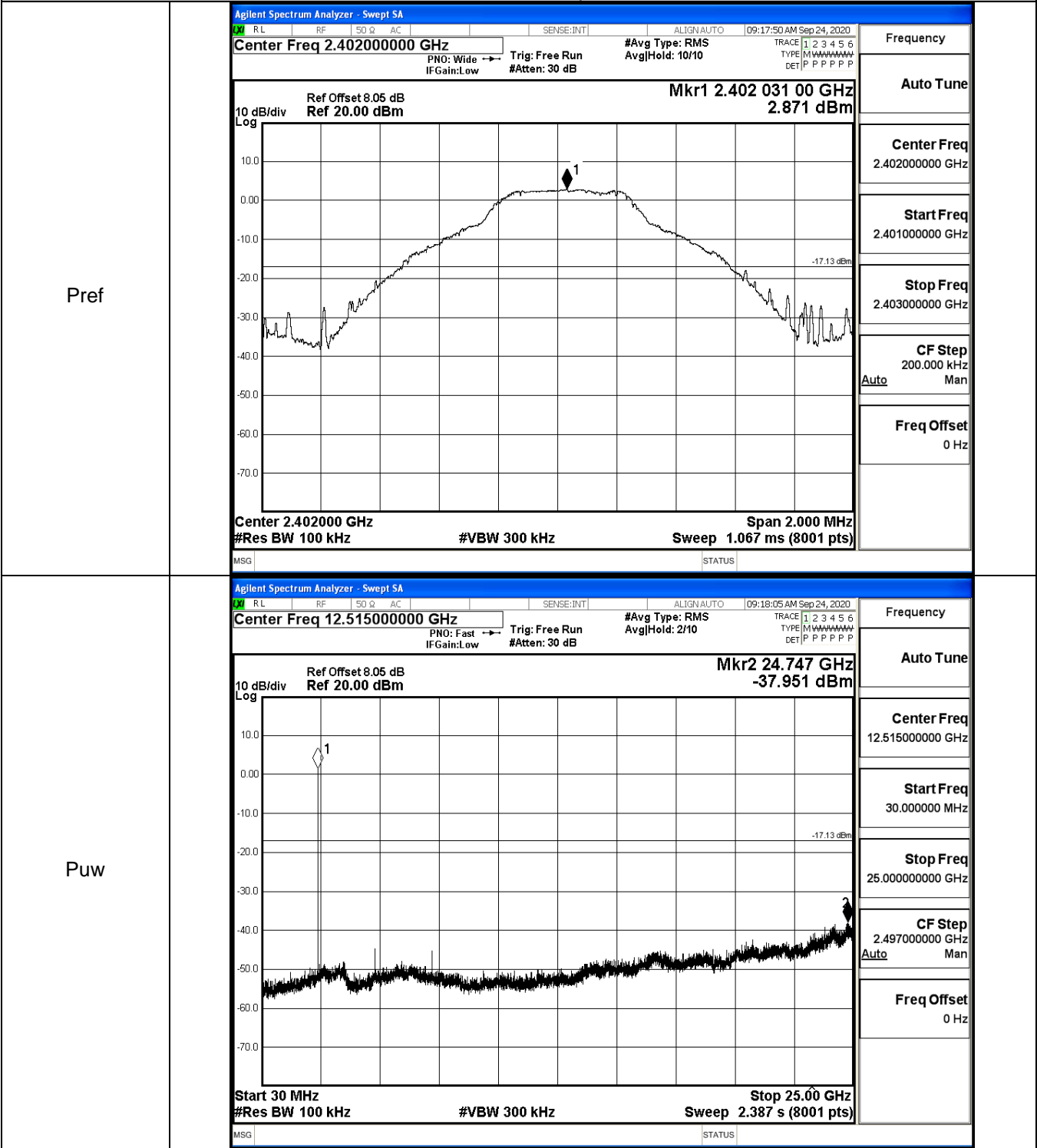
CF Step 1.000000 MHz

Freq Offset 0 Hz

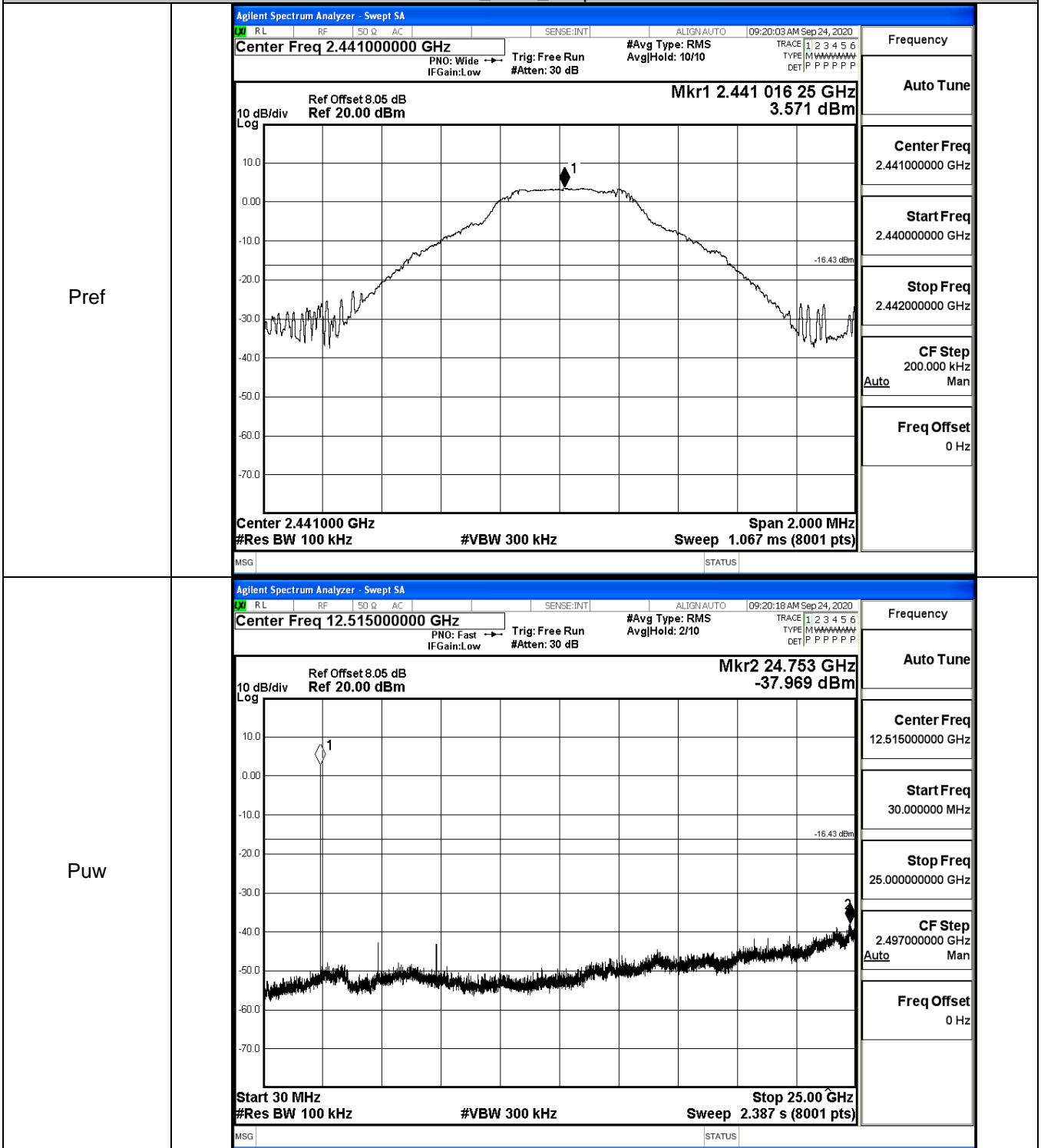
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.871	-37.951	-17.129	PASS
	MCH	3.571	-37.969	-16.429	PASS
	HCH	4.176	-37.542	-15.824	PASS
$\pi/4$ DQPSK	LCH	1.641	-37.283	-18.359	PASS
	MCH	2.387	-38.495	-17.613	PASS
	HCH	3.089	-38.772	-16.911	PASS
8DPSK	LCH	1.713	-37.717	-18.287	PASS
	MCH	2.47	-38.216	-17.530	PASS
	HCH	3.233	-37.399	-16.767	PASS

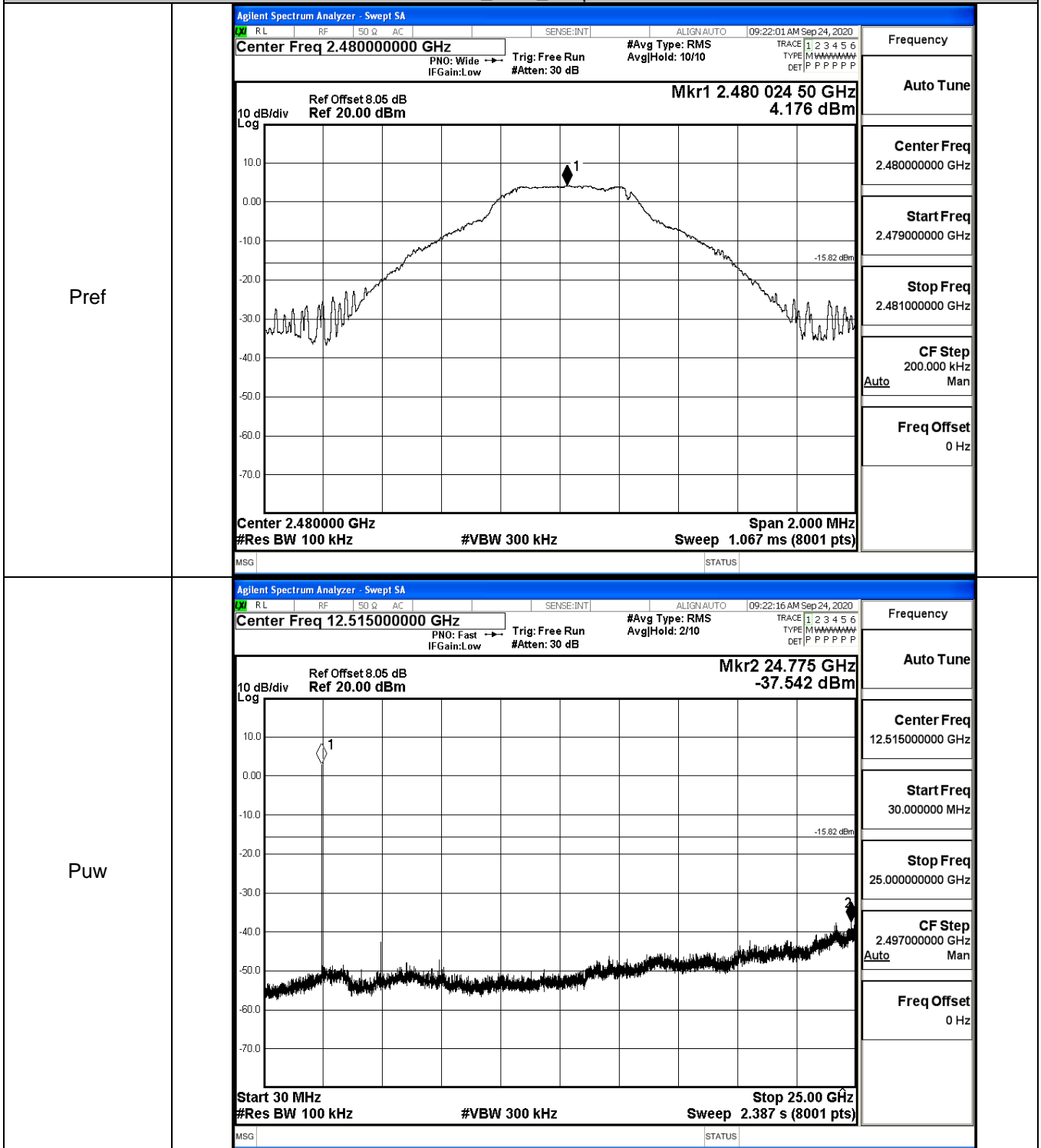
GFSK_LCH_Graphs



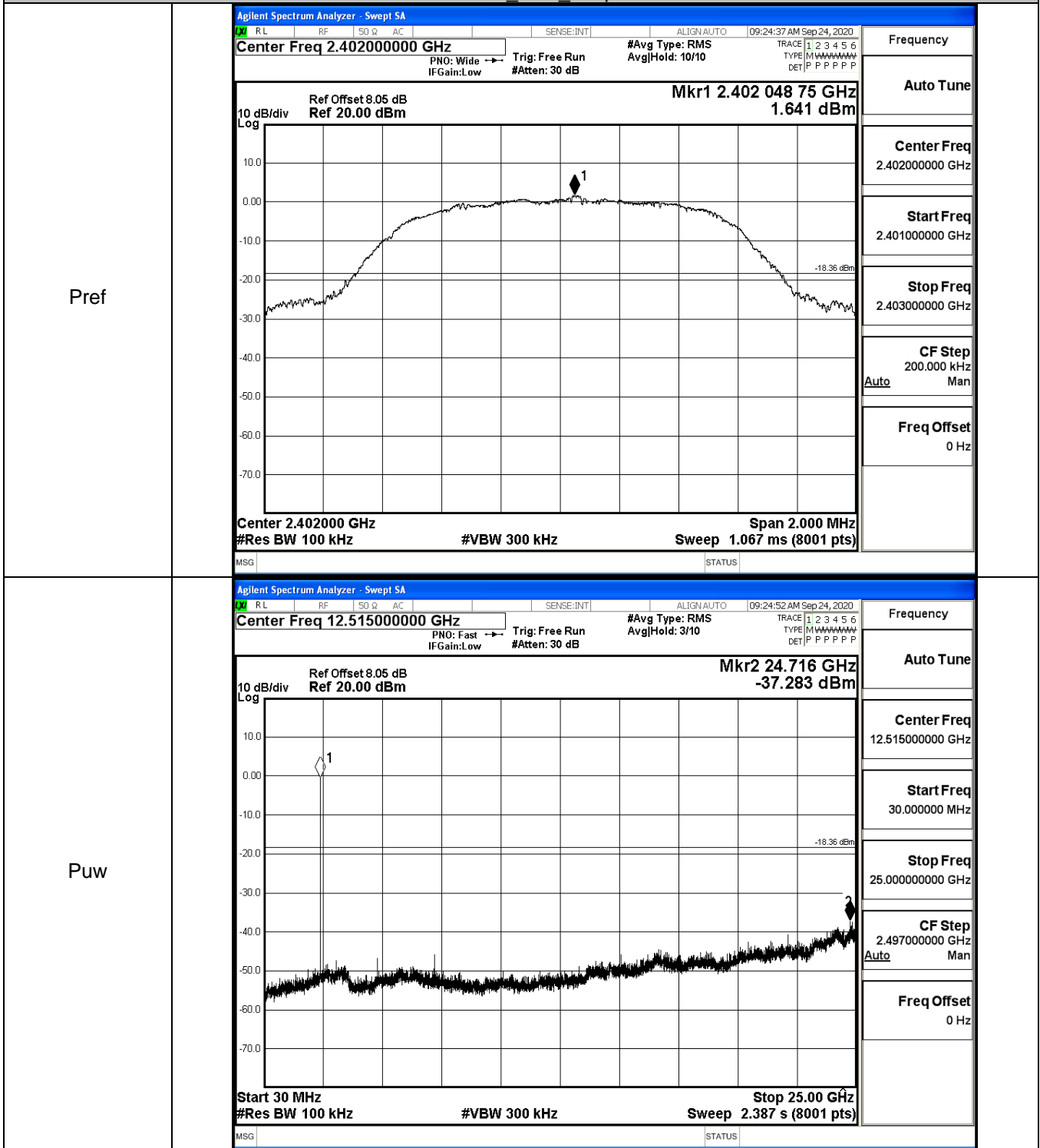
GFSK_MCH_Graphs



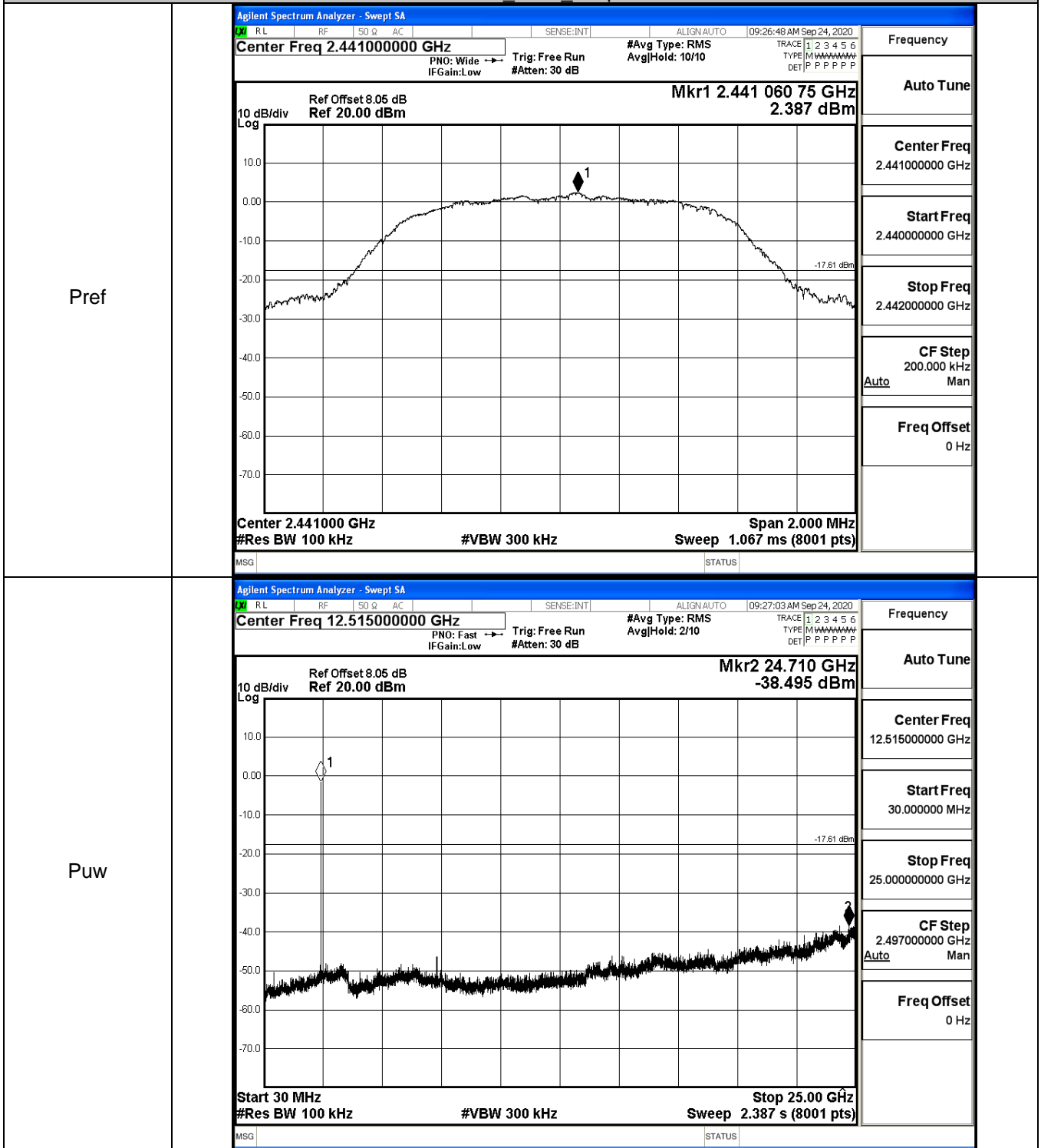
GFSK_HCH_Graphs



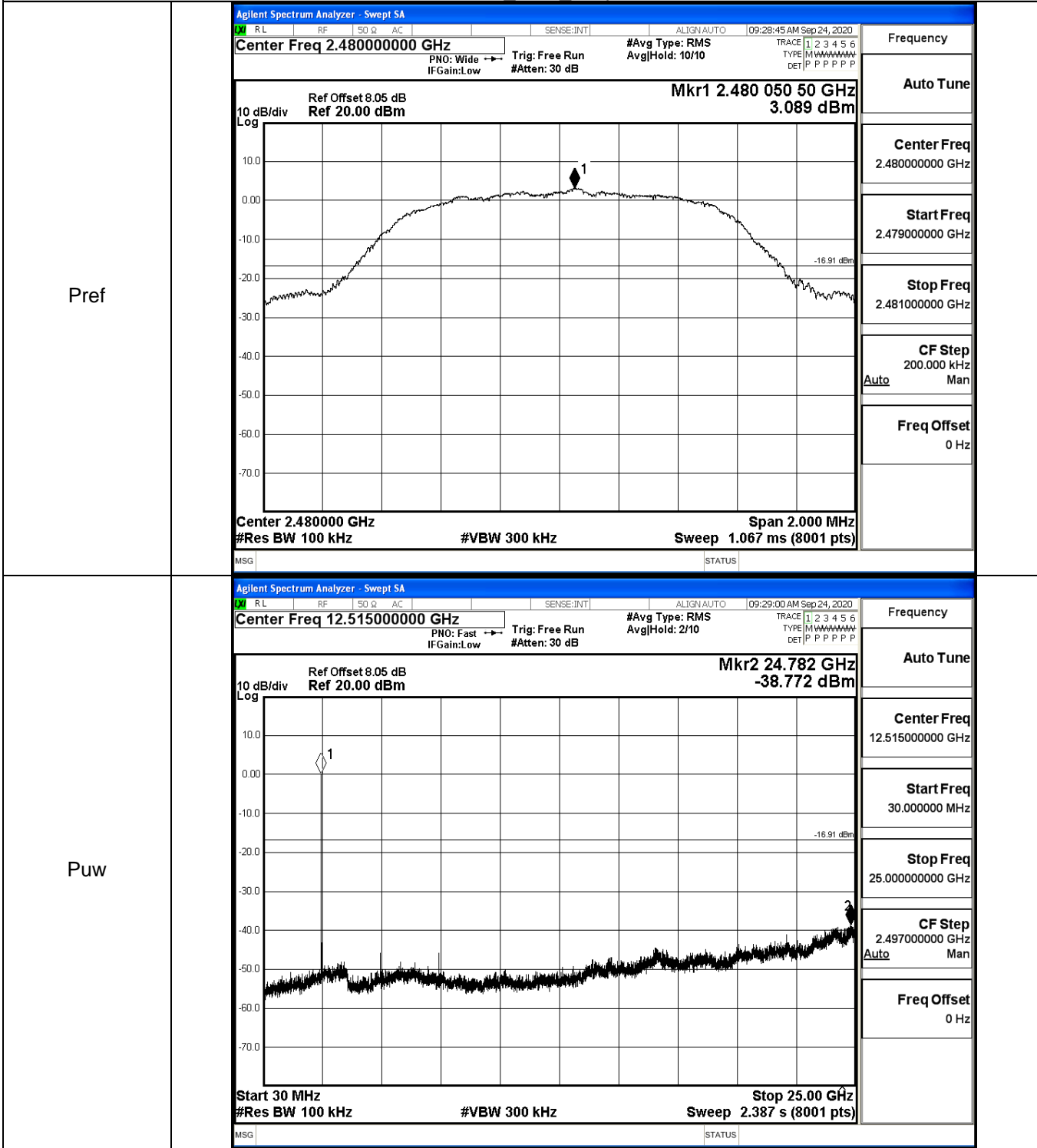
$\pi/4$ DQPSK LCH_Graphs



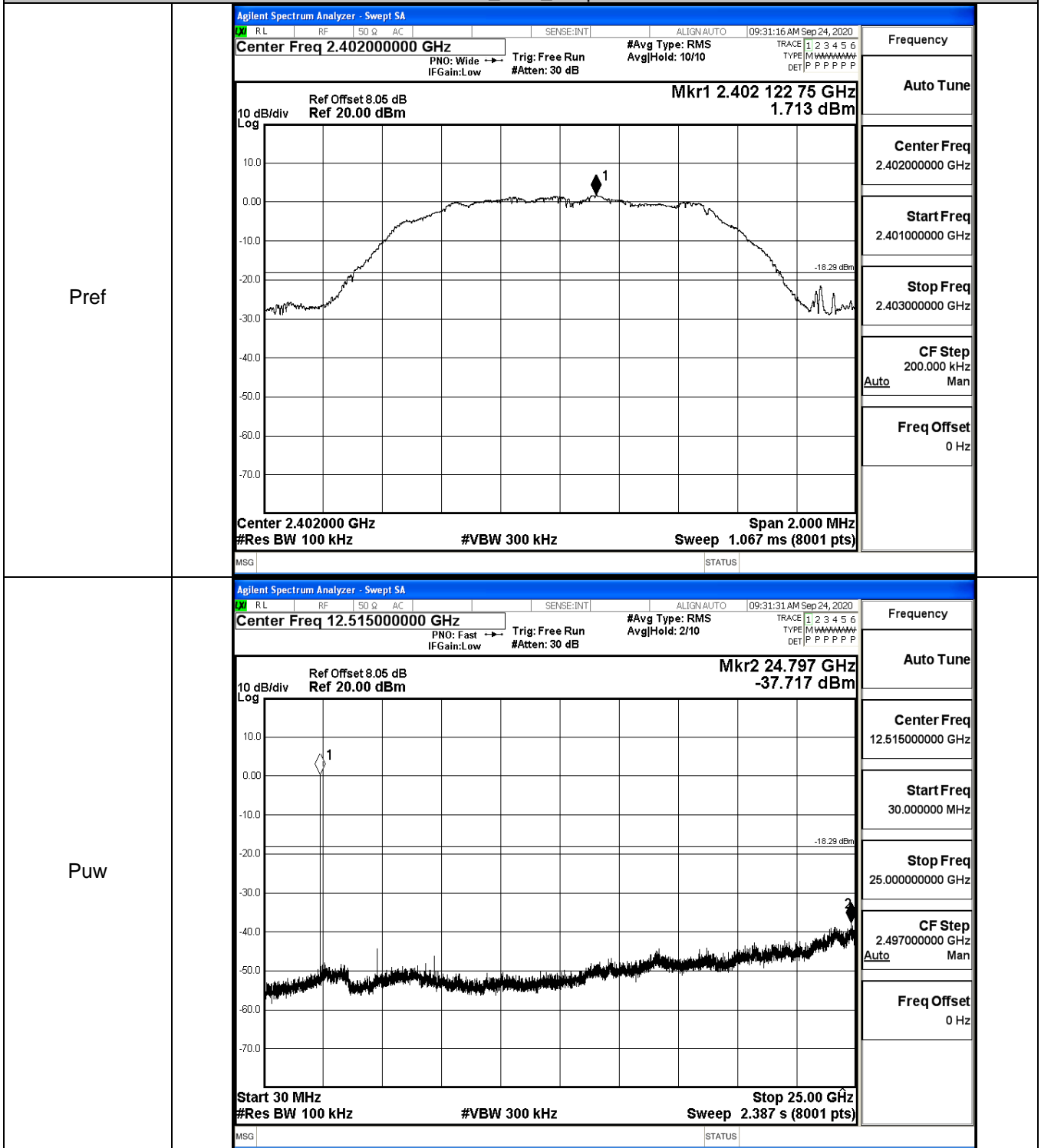
$\pi/4$ DQPSK_MCH_Graphs



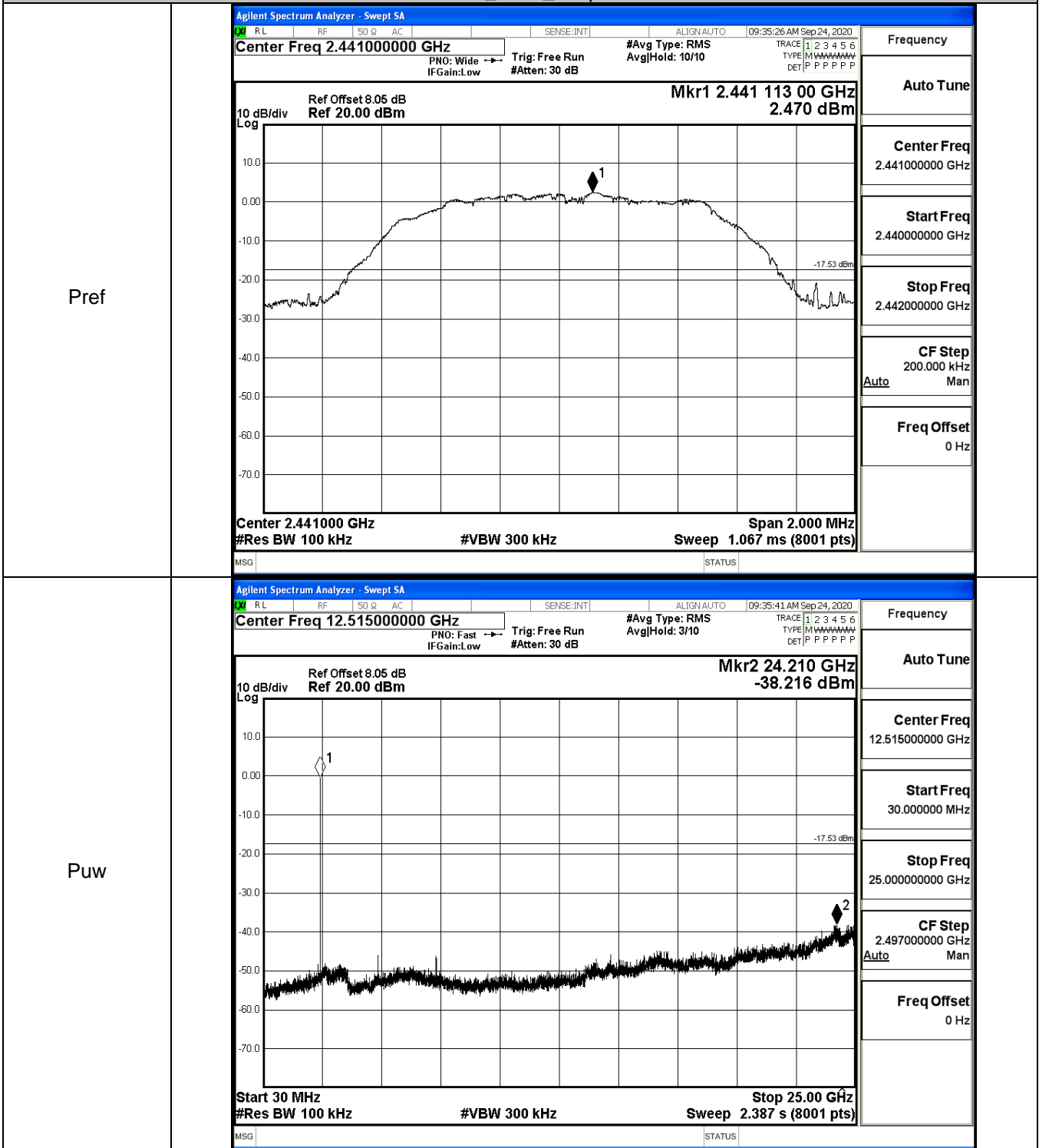
$\pi/4$ DQPSK_HCH_Graphs



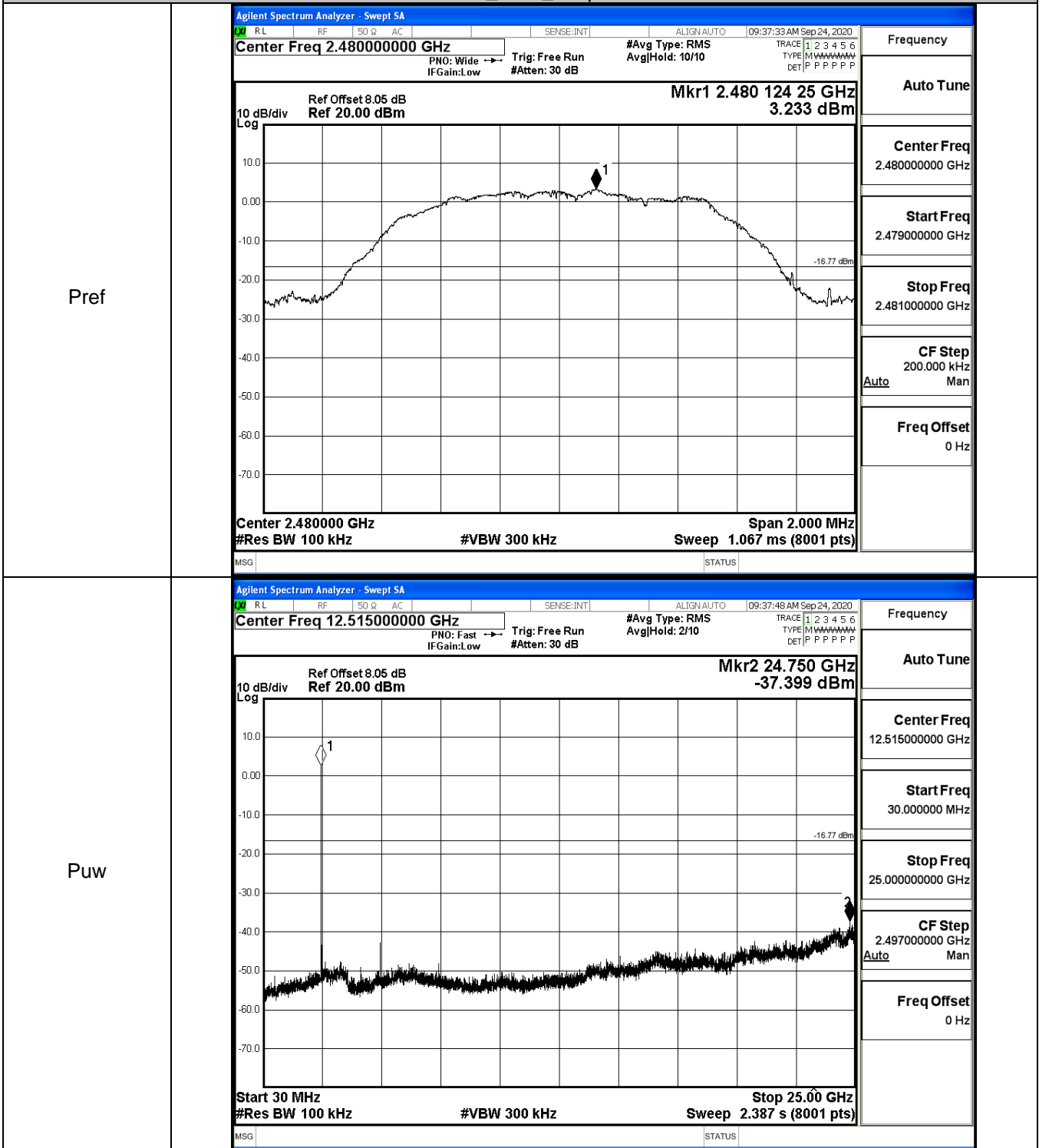
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

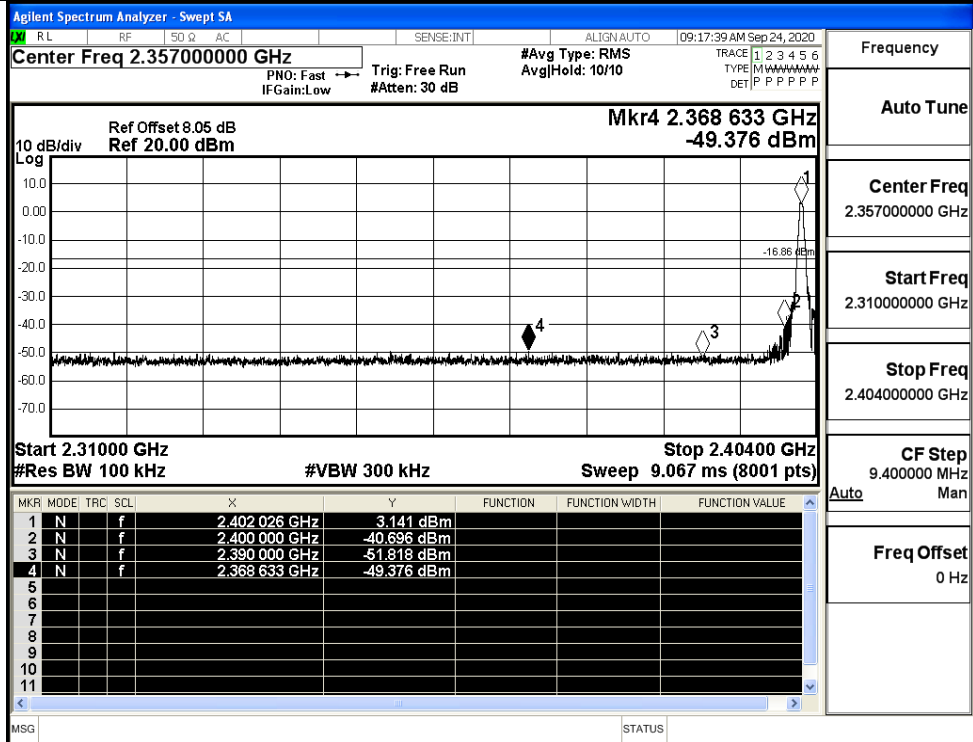


A.7 Band-edge for RF Conducted Emissions

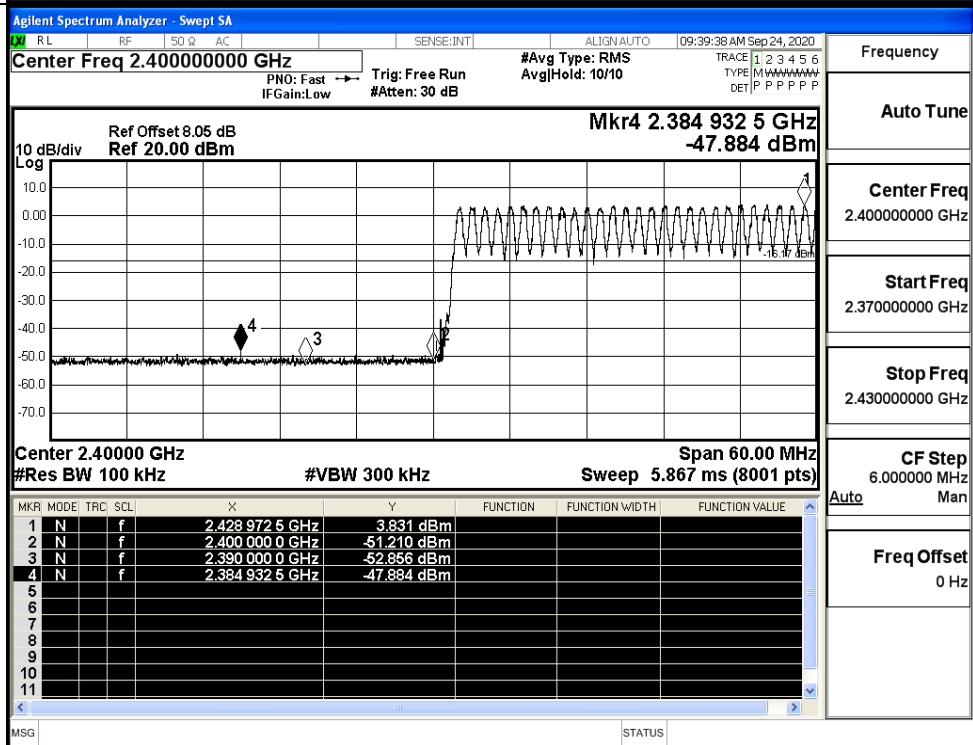
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	3.141	Off	-49.376	-16.86	PASS
			3.831	On	-47.884	-16.17	PASS
	HCH	2480	4.595	Off	-43.961	-15.41	PASS
			4.645	On	-47.529	-15.36	PASS
$\pi/4$ DQPSK	LCH	2402	1.927	Off	-49.383	-18.07	PASS
			2.549	On	-49.169	-17.45	PASS
	HCH	2480	3.325	Off	-44.792	-16.68	PASS
			3.131	On	-48.302	-16.87	PASS
8DPSK	LCH	2402	2.034	Off	-49.606	-17.97	PASS
			2.427	On	-48.808	-17.57	PASS
	HCH	2480	3.448	Off	-44.864	-16.55	PASS
			3.300	On	-46.596	-16.7	PASS

Test Graphs

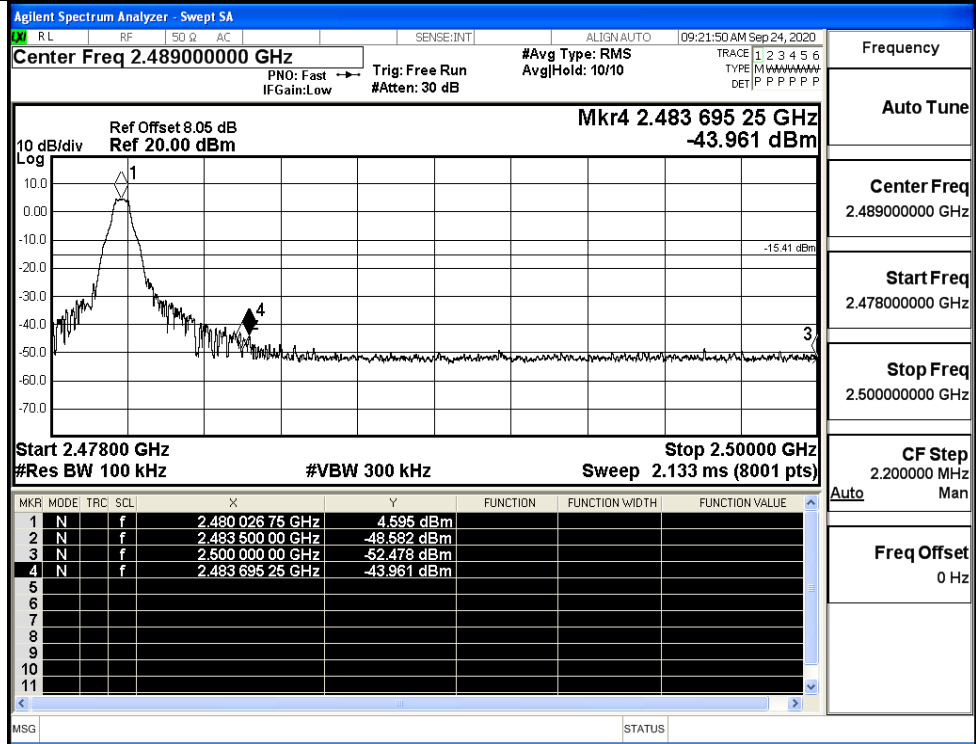
GFSK/LCH/No Hop



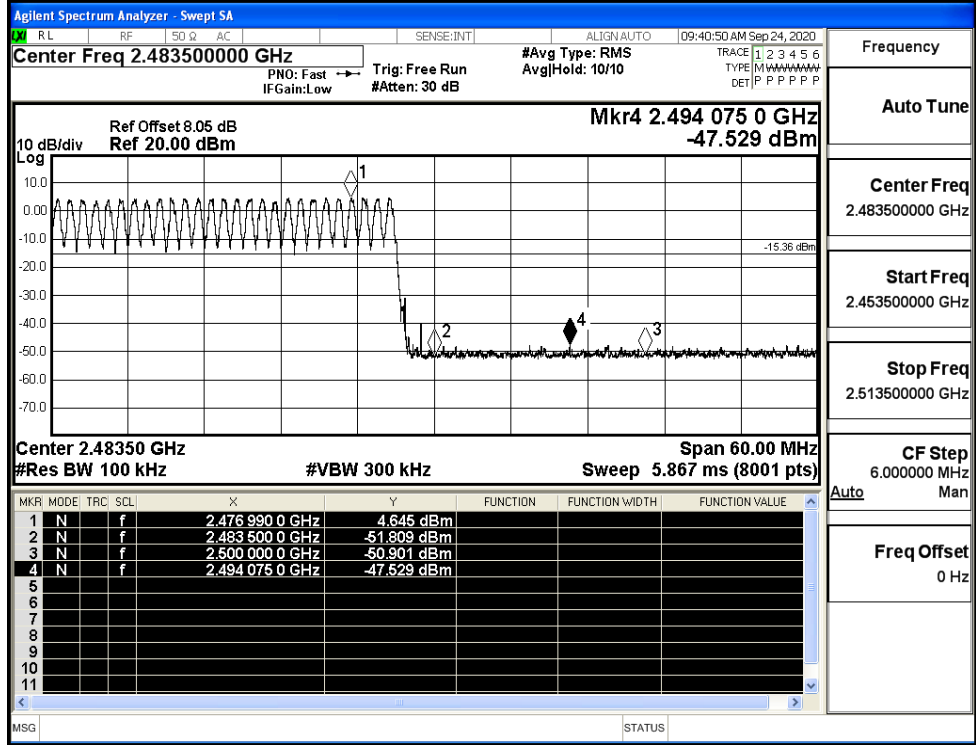
GFSK/LCH/Hop



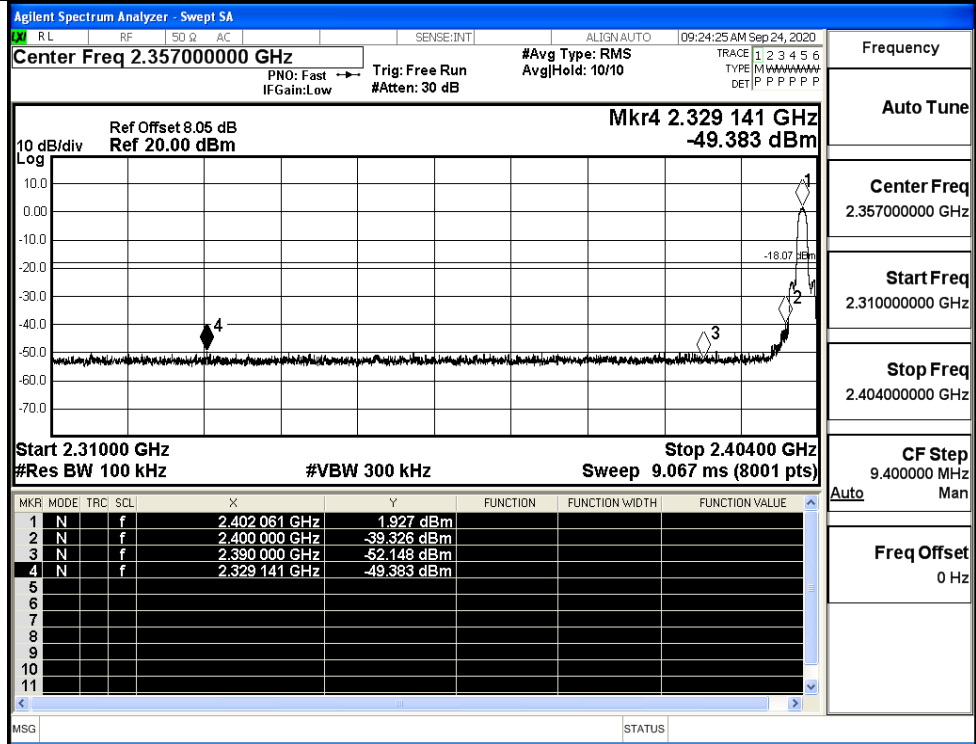
GFSK/HCH/No Hop



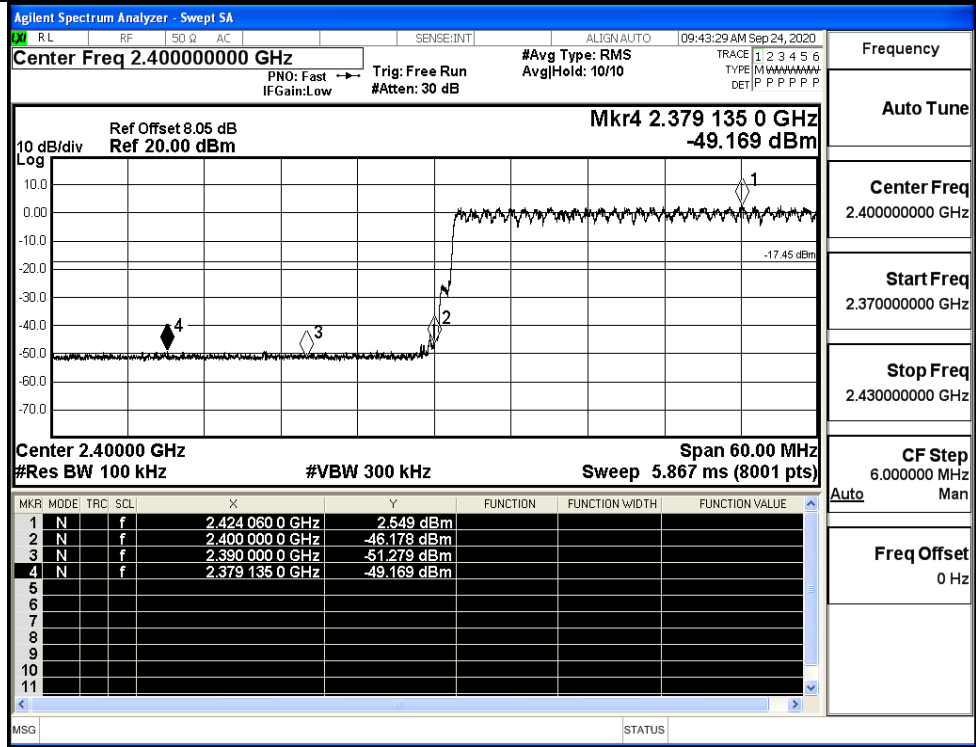
GFSK/HCH/Hop



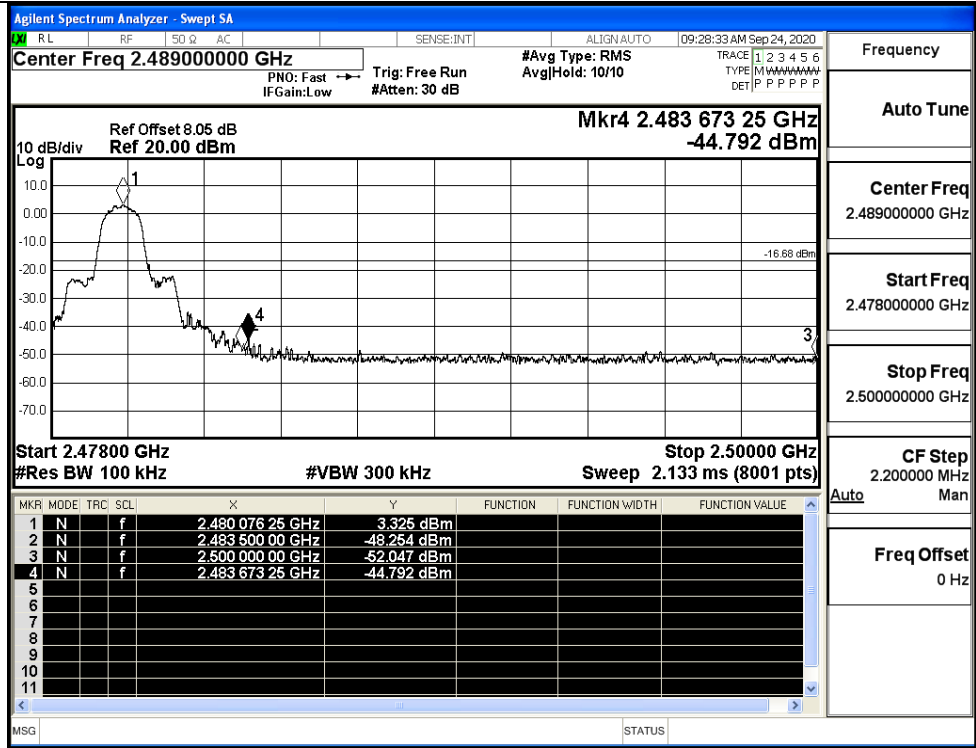
$\pi/4$ DQPSK/LCH/No
Hop



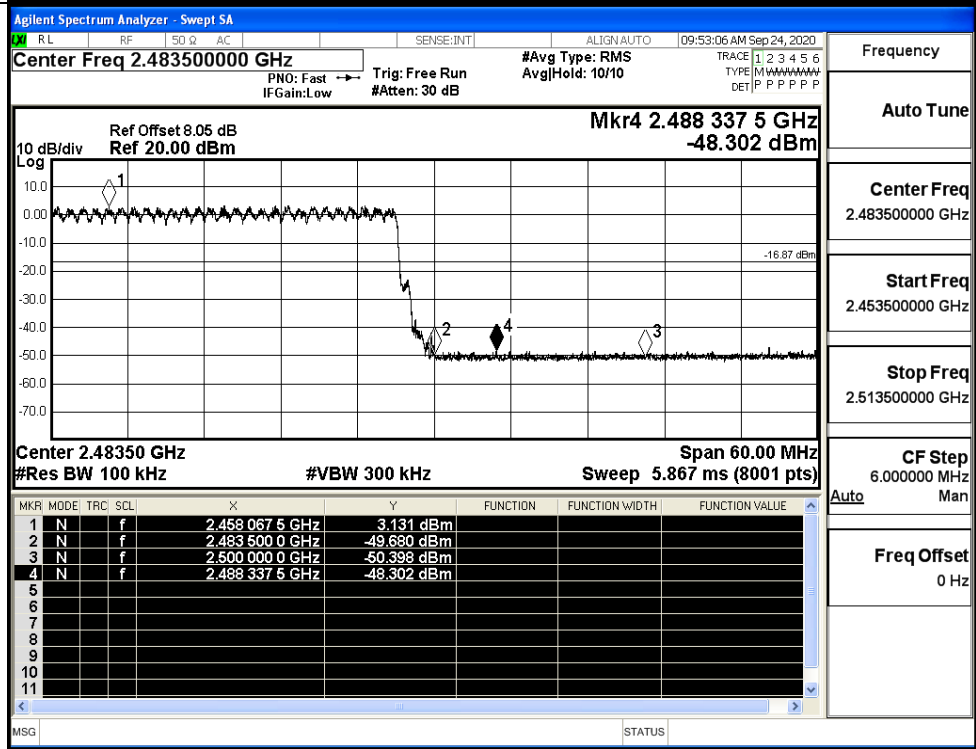
$\pi/4$ DQPSK/LCH/Hop



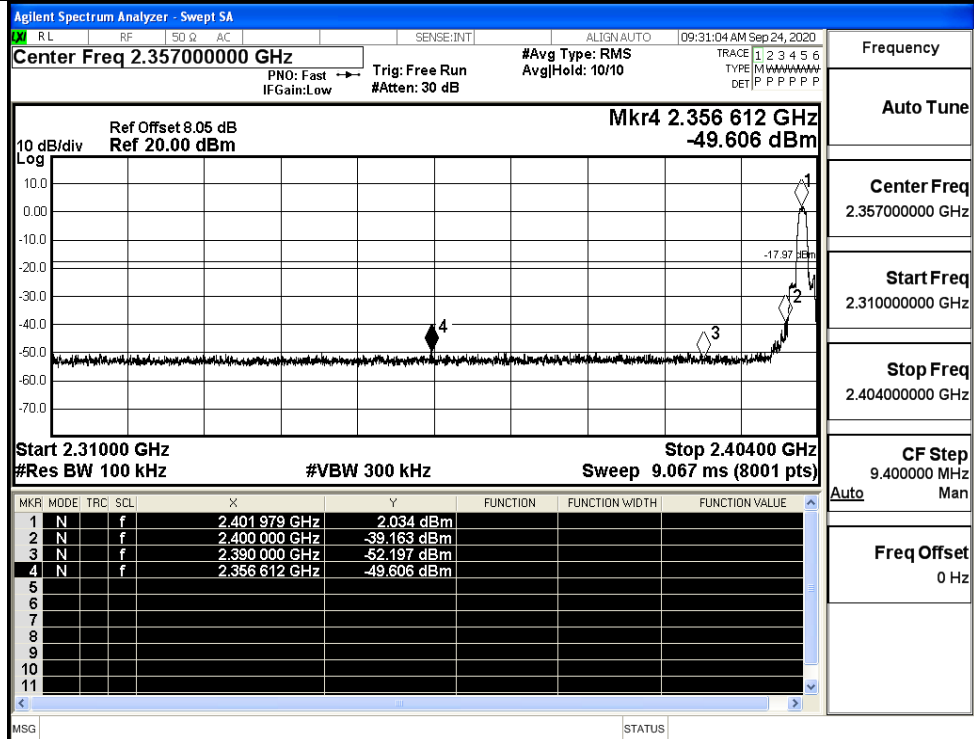
$\pi/4$ DQPSK/HCH/No
Hop



$\pi/4$ DQPSK/HCH/Hop

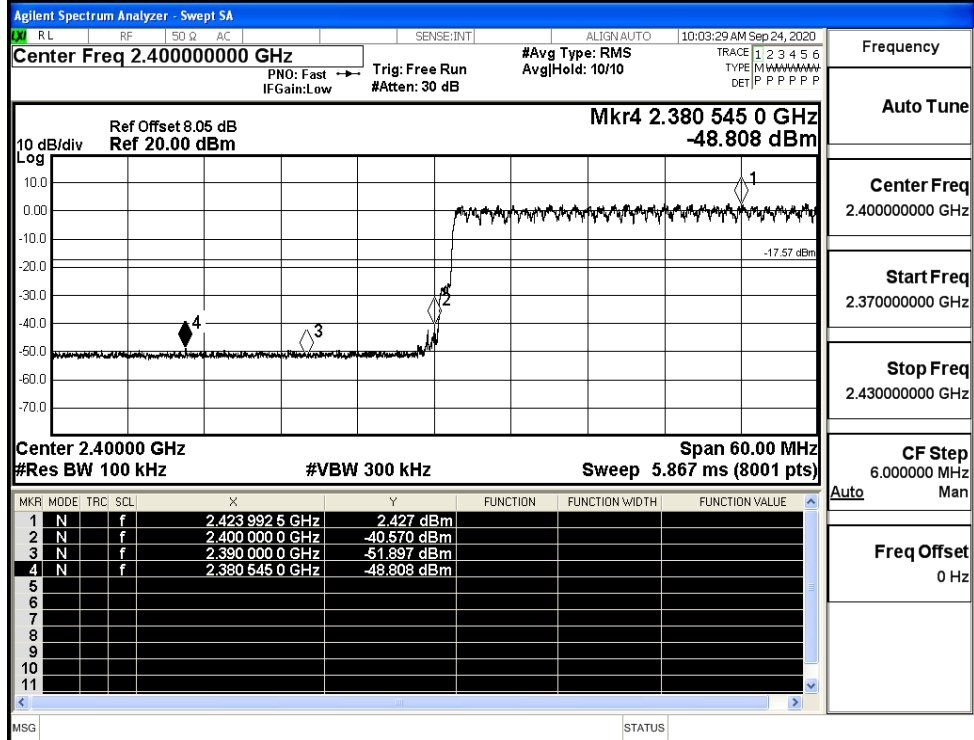


8DPSK/LCH/No Hop



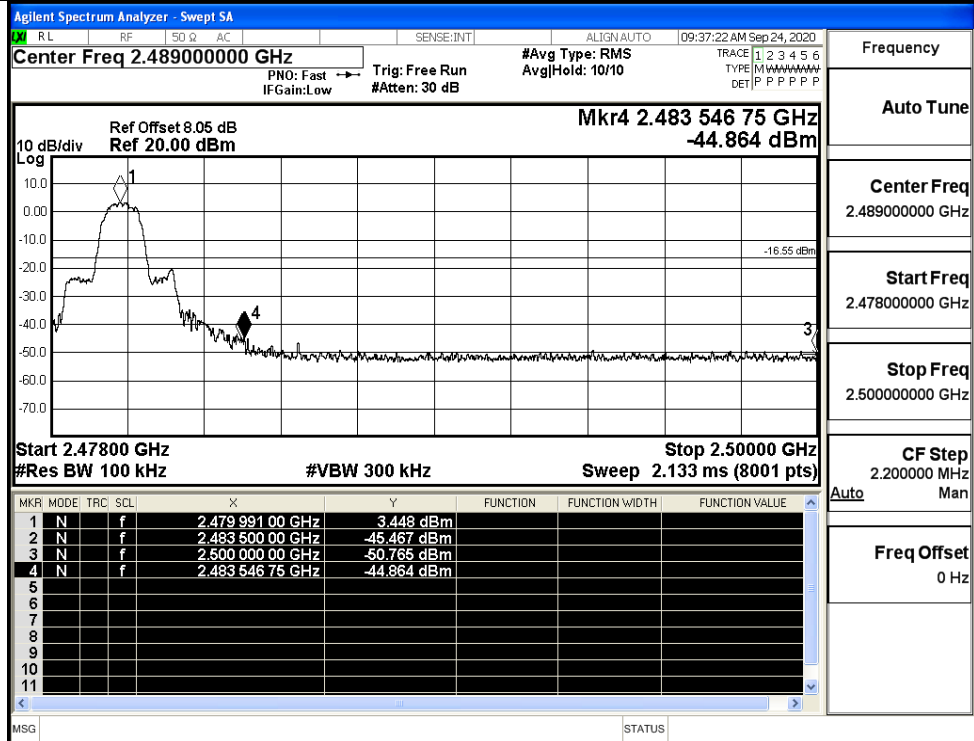
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



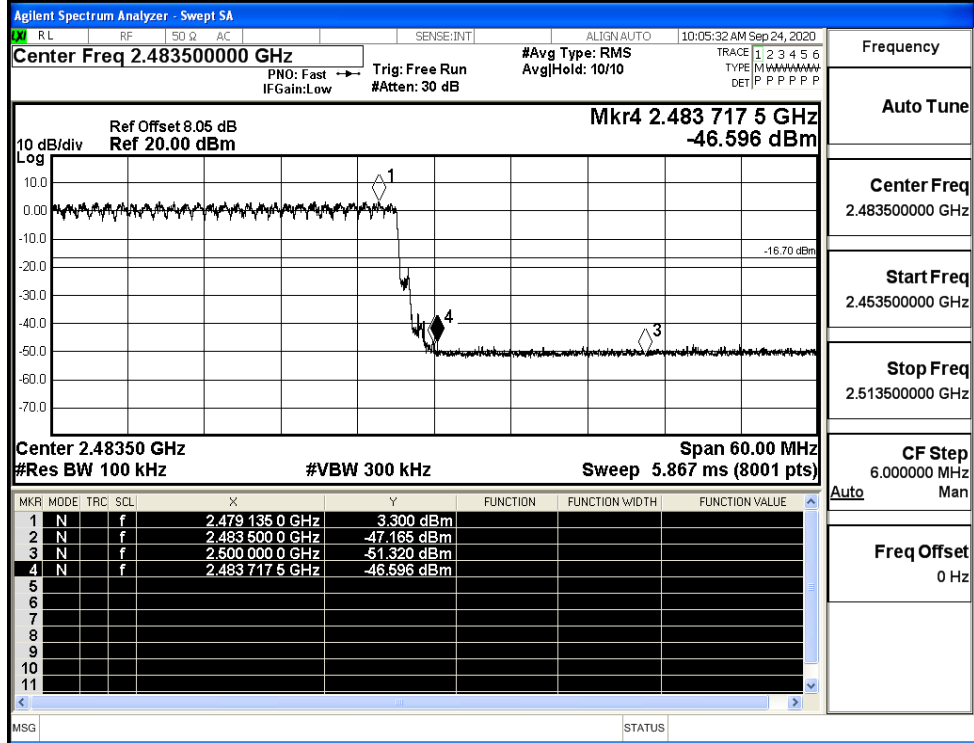
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/HCH/No Hop



Frequency
Auto Tune
Center Freq
2.489000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.500000000 GHz
CF Step
2.200000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/HCH/Hop

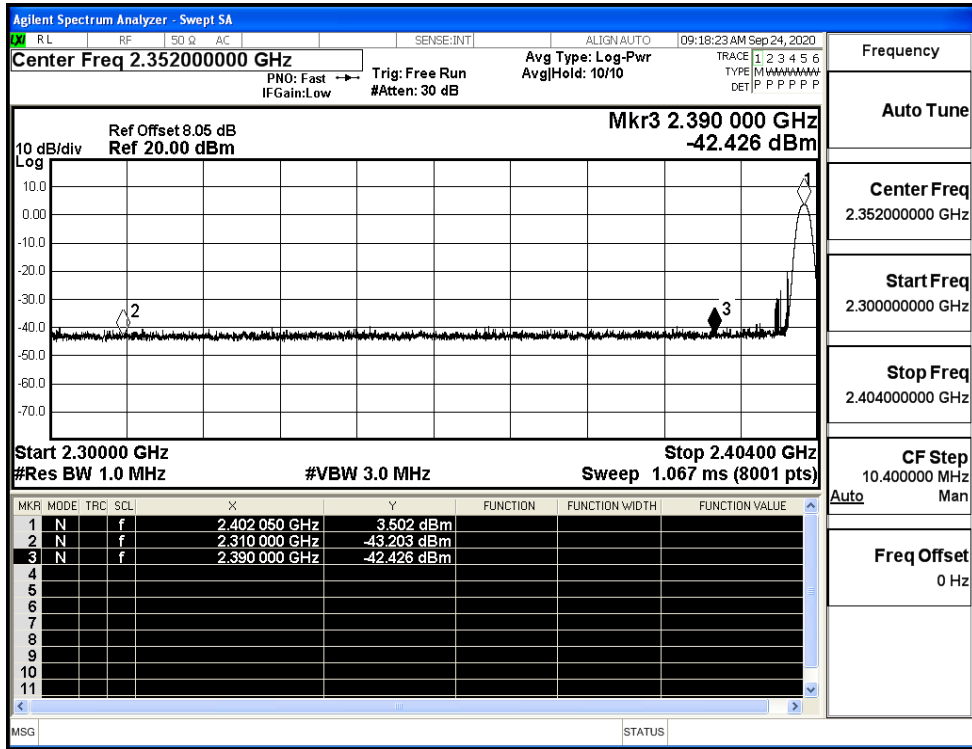


Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.453500000 GHz
Stop Freq
2.513500000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

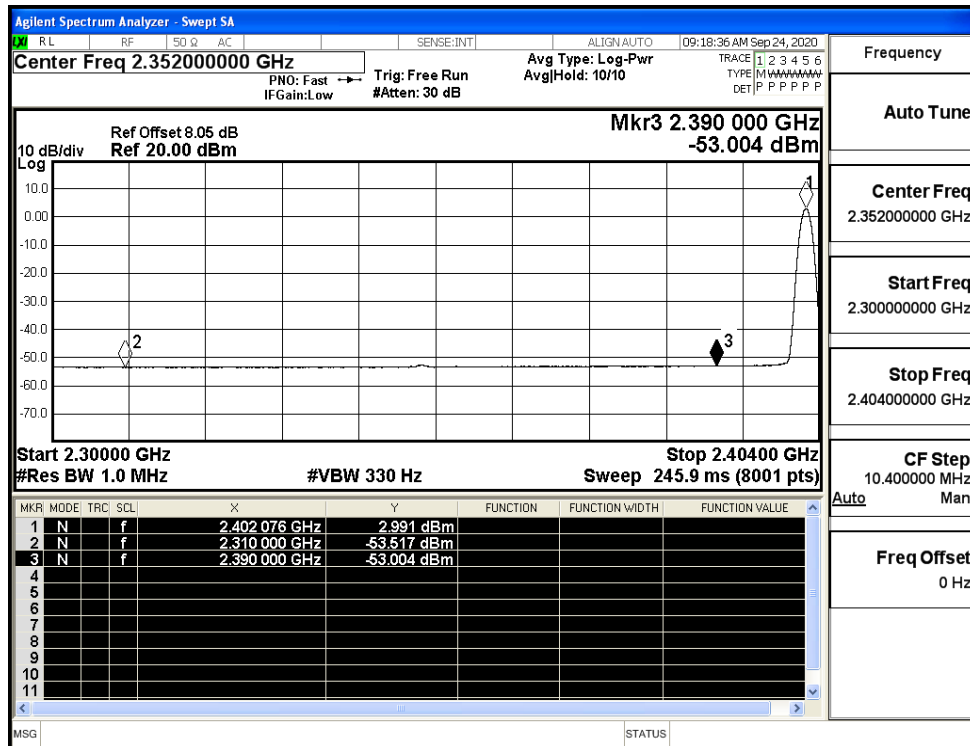
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.20	2.0	0	52.05	PEAK	74	PASS
	Off	2310.0	-53.52	2.0	0	41.74	AV	54	PASS
	Off	2390.0	-42.43	2.0	0	52.83	PEAK	74	PASS
	Off	2390.0	-53.00	2.0	0	42.25	AV	54	PASS
	Off	2483.5	-42.14	2.0	0	53.12	PEAK	74	PASS
	Off	2483.5	-51.75	2.0	0	43.51	AV	54	PASS
	Off	2500.0	-41.22	2.0	0	54.04	PEAK	74	PASS
	Off	2500.0	-52.38	2.0	0	42.88	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.23	2.0	0	52.03	PEAK	74	PASS
	Off	2310.0	-53.33	2.0	0	41.93	AV	54	PASS
	Off	2390.0	-43.09	2.0	0	52.17	PEAK	74	PASS
	Off	2390.0	-52.92	2.0	0	42.34	AV	54	PASS
	Off	2483.5	-36.62	2.0	0	58.64	PEAK	74	PASS
	Off	2483.5	-49.47	2.0	0	45.79	AV	54	PASS
	Off	2500.0	-42.07	2.0	0	53.18	PEAK	74	PASS
	Off	2500.0	-52.28	2.0	0	42.98	AV	54	PASS
8DPSK	Off	2310.0	-43.33	2.0	0	51.93	PEAK	74	PASS
	Off	2310.0	-53.26	2.0	0	42.00	AV	54	PASS
	Off	2390.0	-40.87	2.0	0	54.39	PEAK	74	PASS
	Off	2390.0	-52.92	2.0	0	42.34	AV	54	PASS
	Off	2483.5	-36.00	2.0	0	59.26	PEAK	74	PASS
	Off	2483.5	-49.52	2.0	0	45.74	AV	54	PASS
	Off	2500.0	-41.50	2.0	0	53.76	PEAK	74	PASS
	Off	2500.0	-52.10	2.0	0	43.16	AV	54	PASS

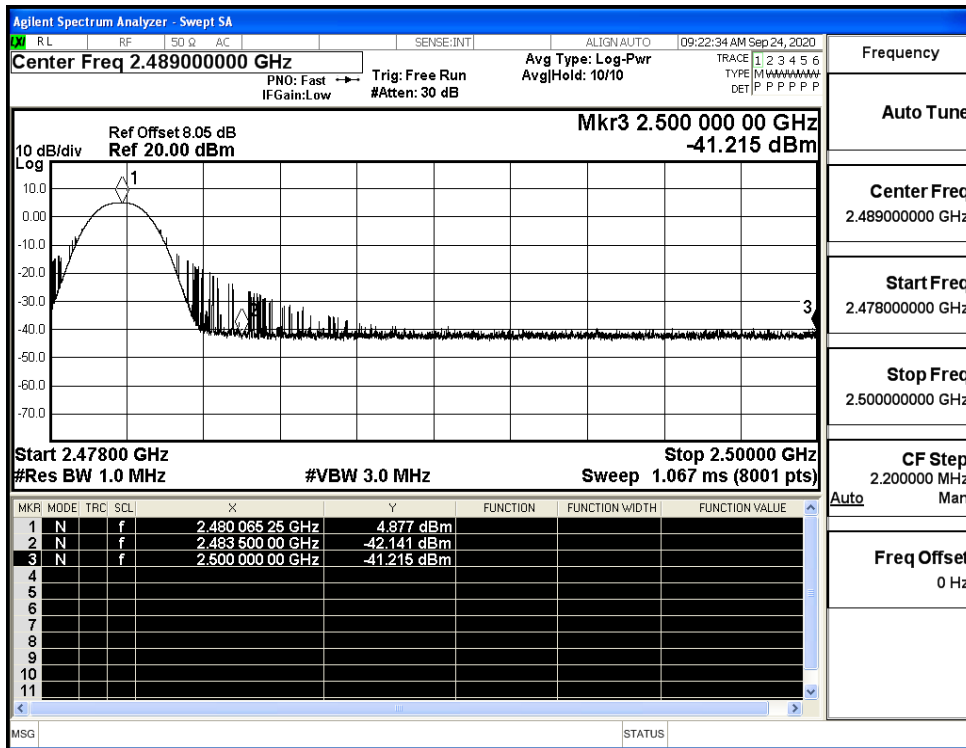
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



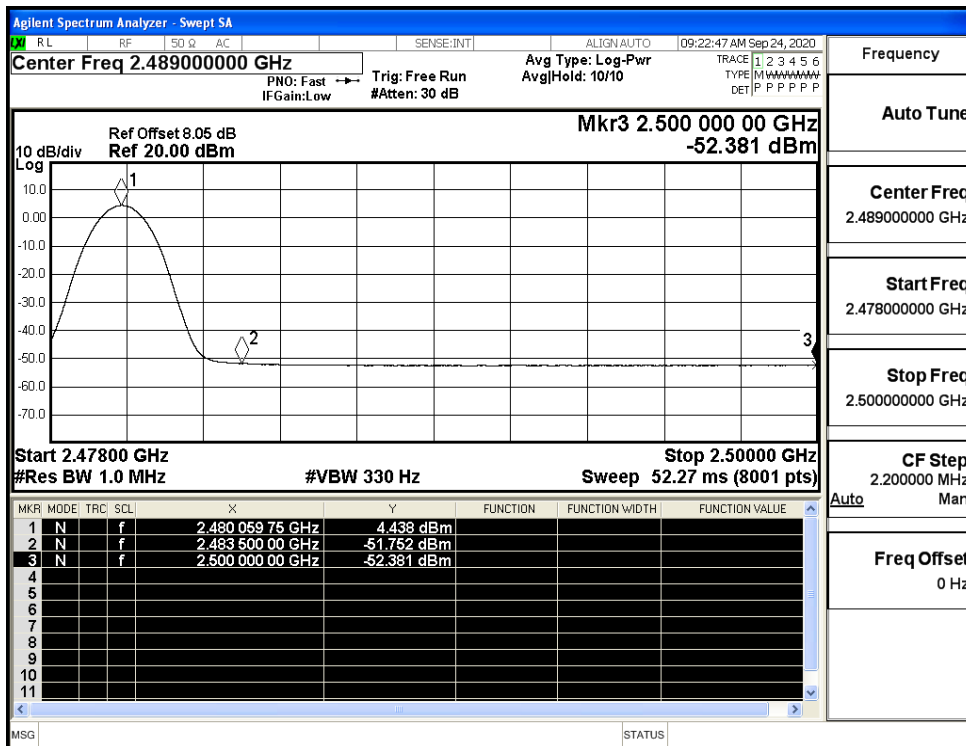
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



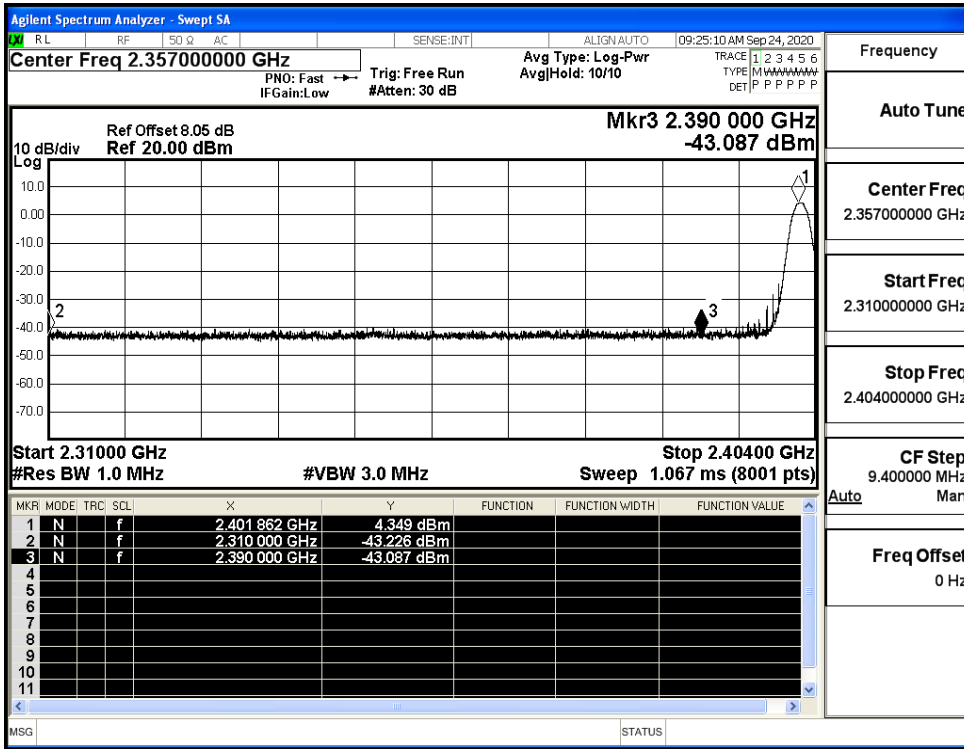
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



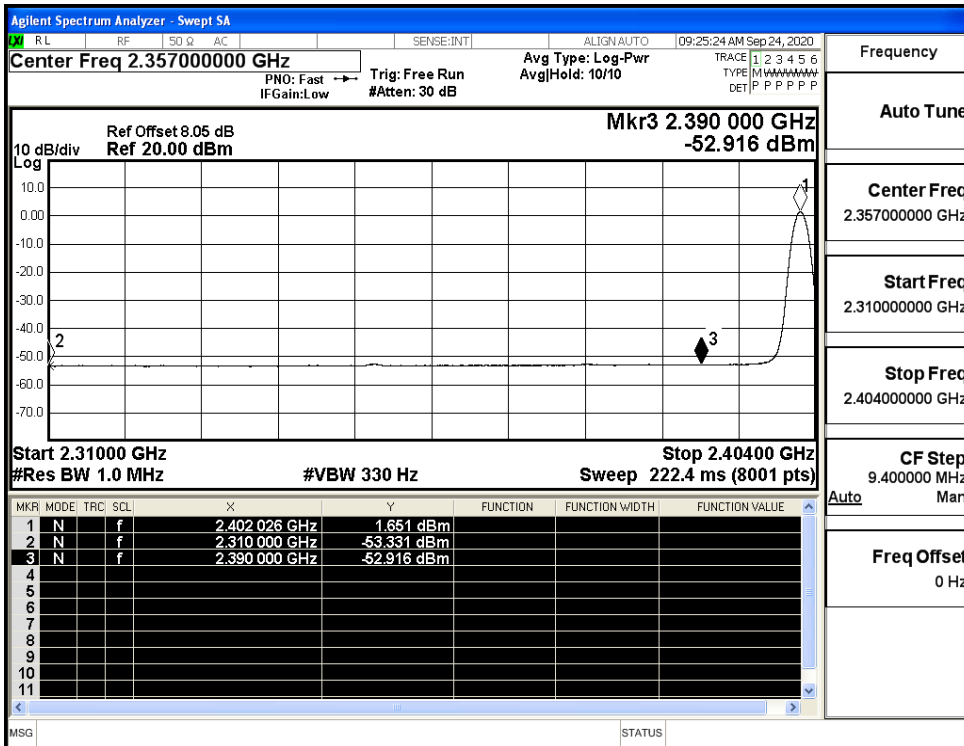
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



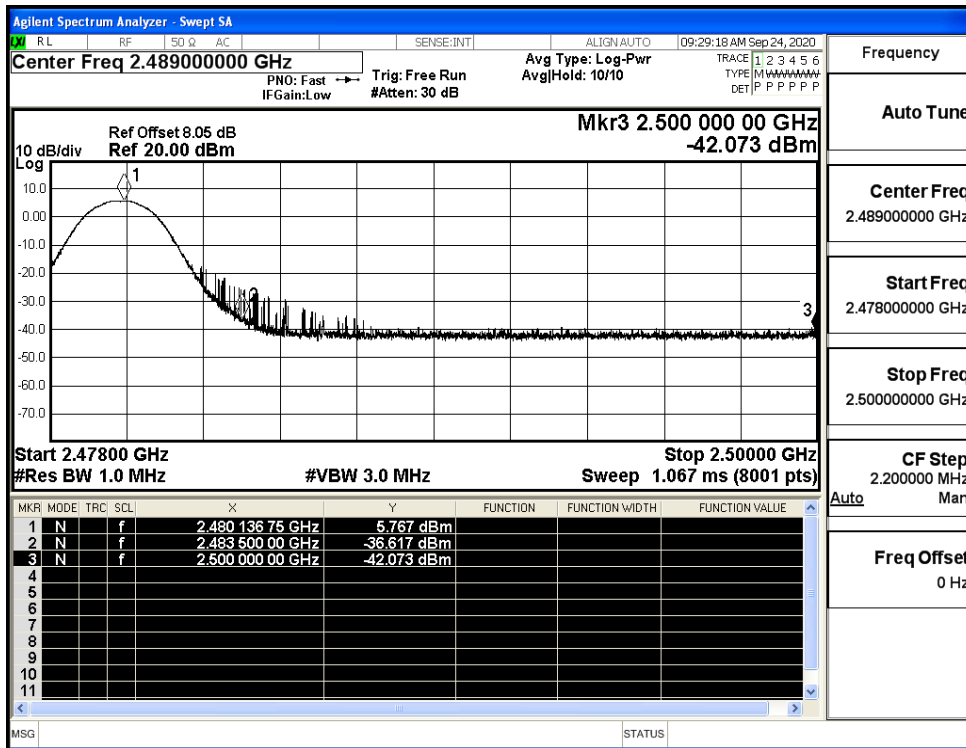
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



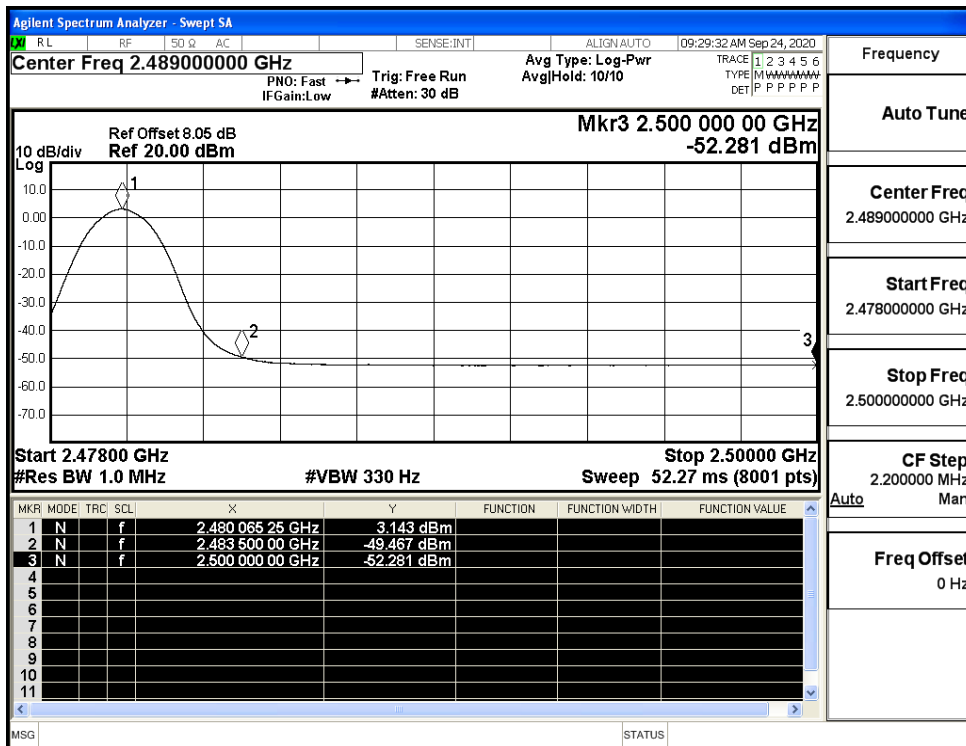
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



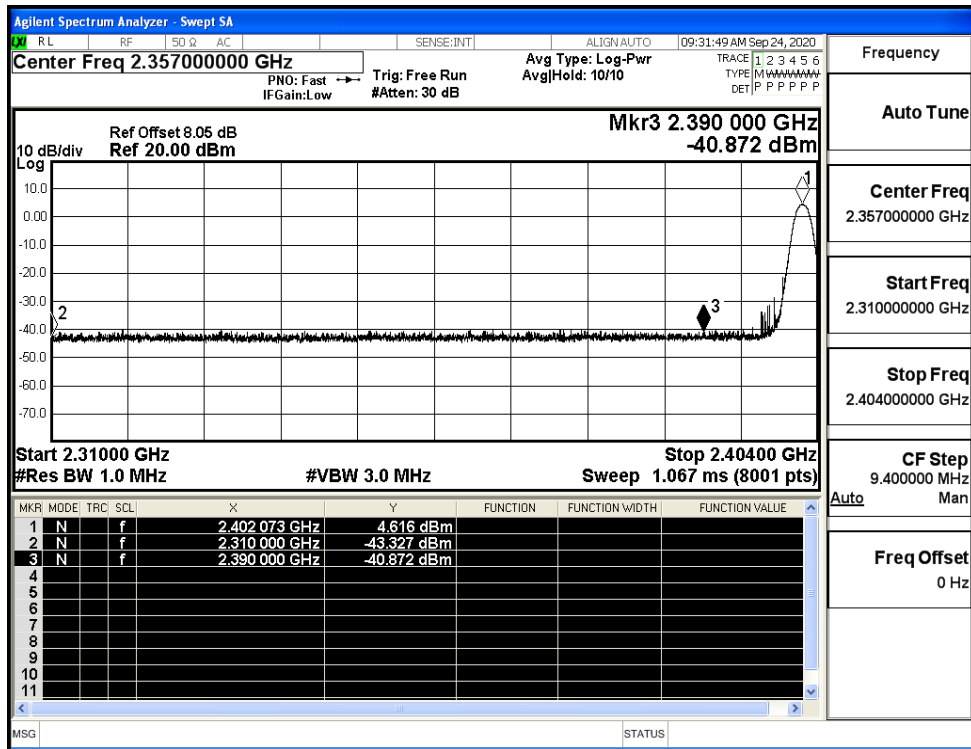
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



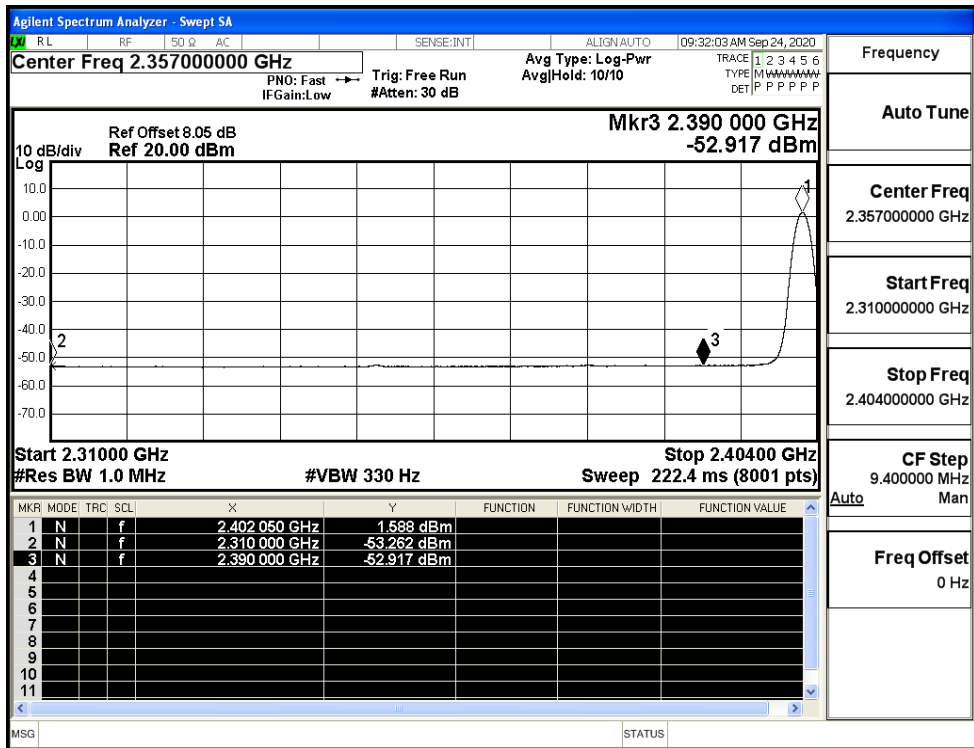
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



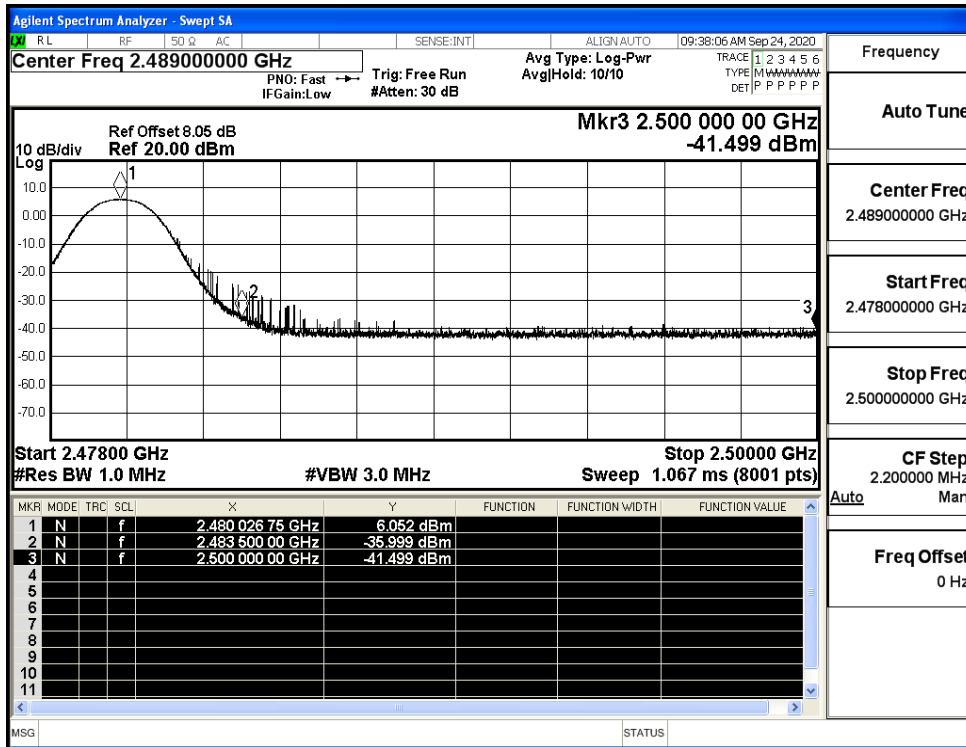
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (Low Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (High Channel)



Restrict-band band-edge measurements_Hopping Off_8DPSK_Average (High Channel)

