

Appendix A

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

Product Name: Wireless Stereo Earbuds

Trade Mark: ABKO

Test Model: EC10

Environmental Conditions

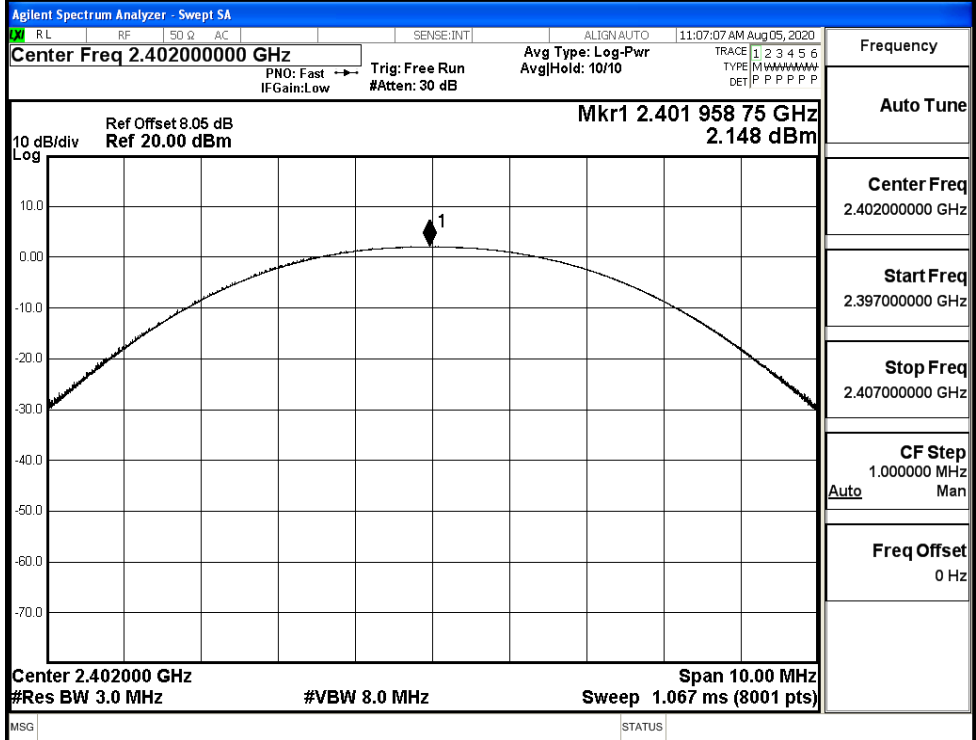
Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Li Huan
Supervised by:	Li Huan

A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2.148	21	PASS
	MCH	2.424	21	PASS
	HCH	1.319	21	PASS
π/4DQPSK	LCH	2.580	21	PASS
	MCH	2.879	21	PASS
	HCH	1.651	21	PASS
8DPSK	LCH	2.854	21	PASS
	MCH	3.254	21	PASS
	HCH	1.999	21	PASS

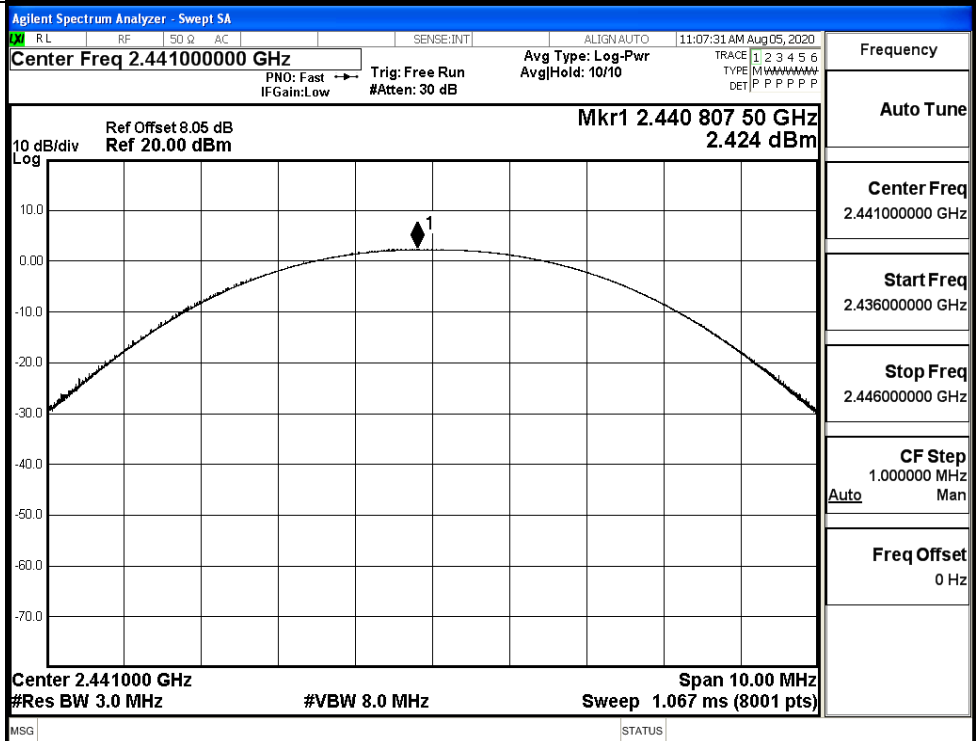
Test Graphs

GFSK/LCH



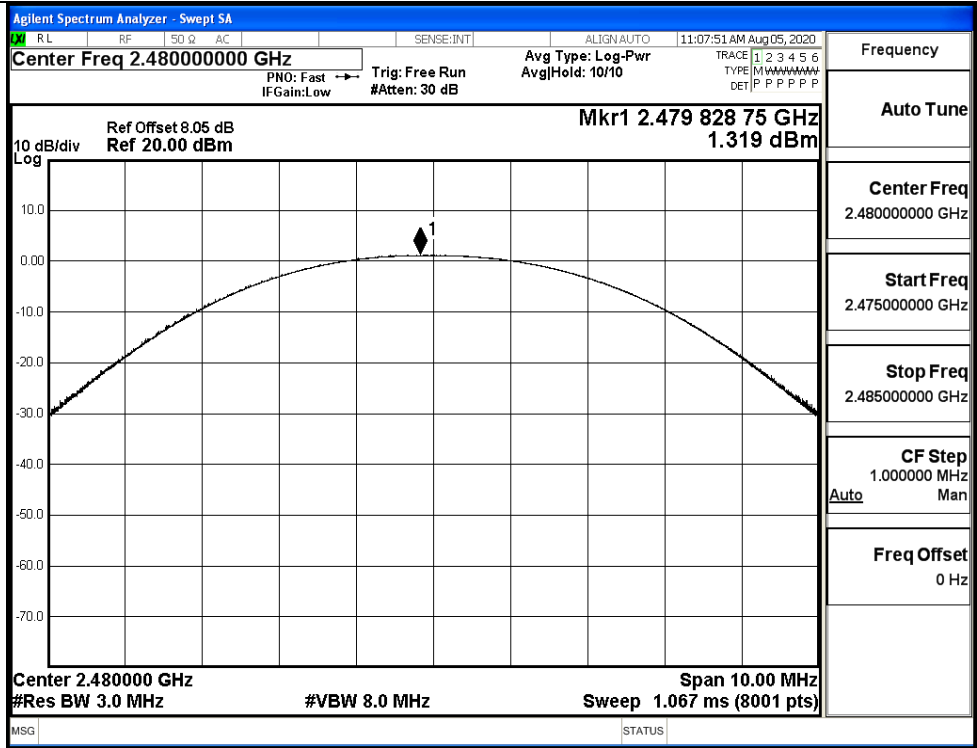
Frequency
Auto Tune
Center Freq 2.40200000 GHz
Start Freq 2.397000000 GHz
Stop Freq 2.407000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

GFSK/MCH

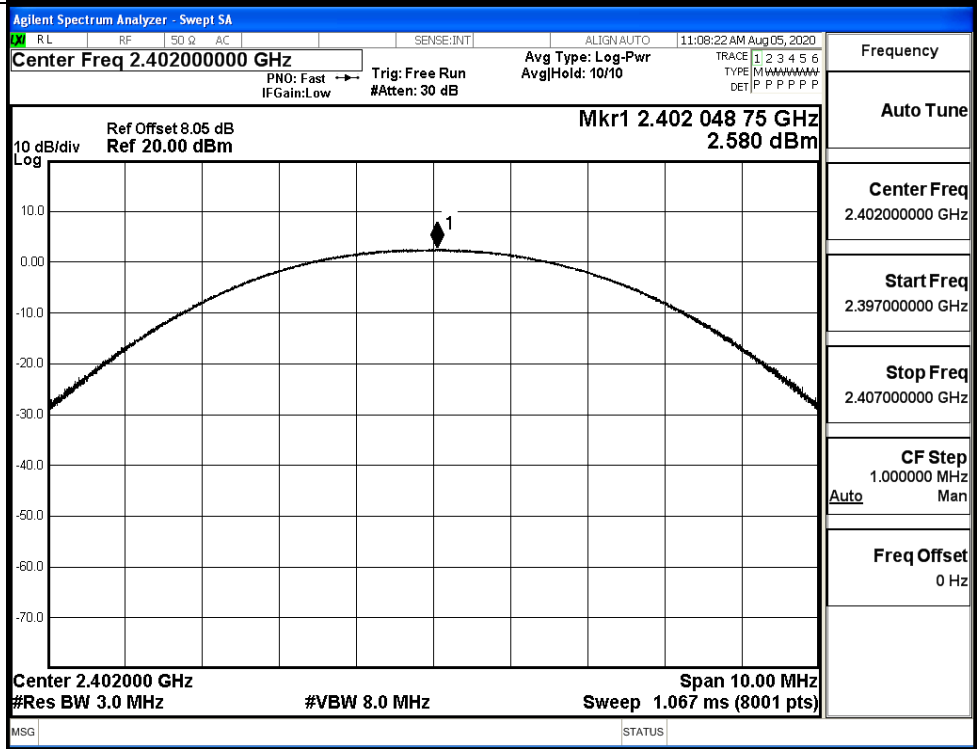


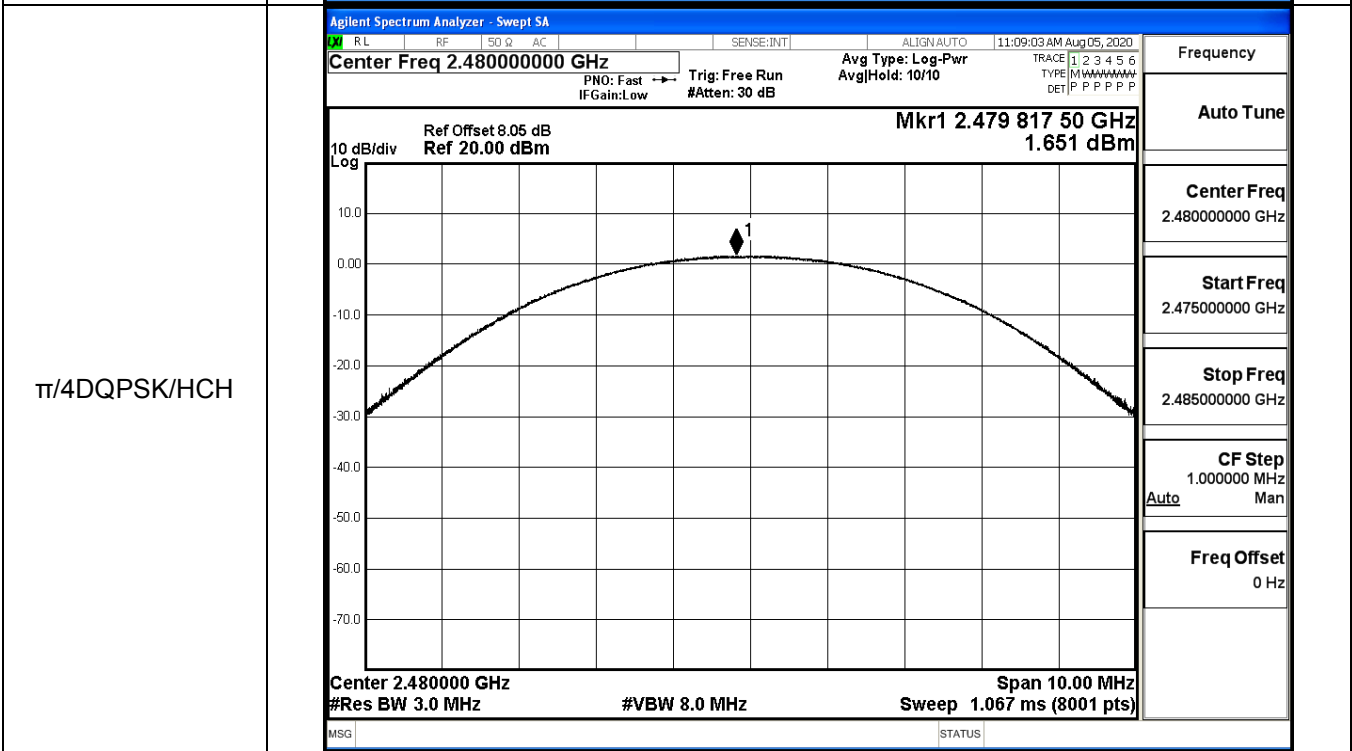
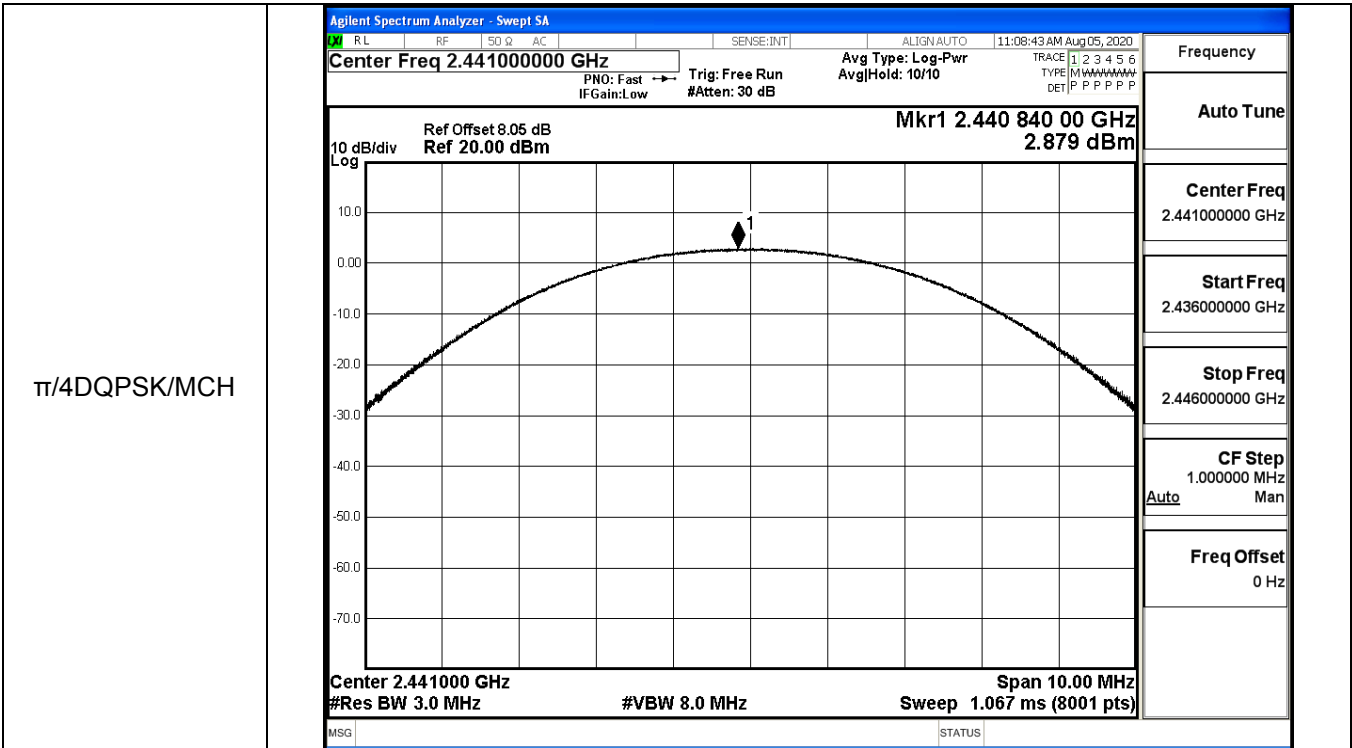
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Center Freq 2.44100000 GHz
Start Freq 2.436000000 GHz
Stop Freq 2.446000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz

GFSK/HCH

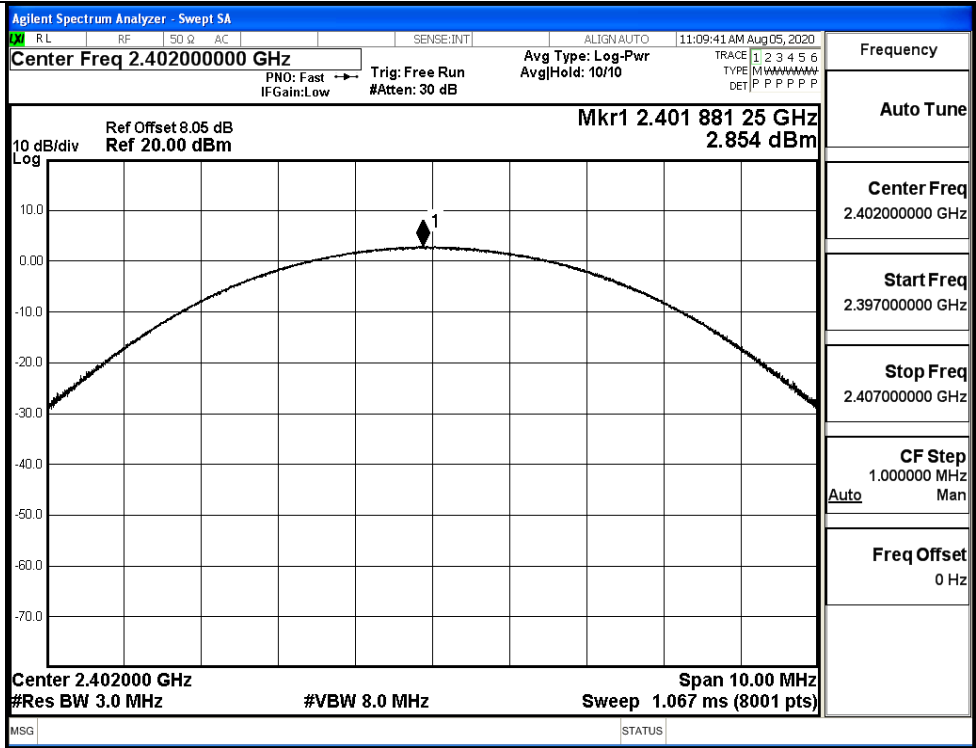


$\pi/4$ DQPSK/LCH

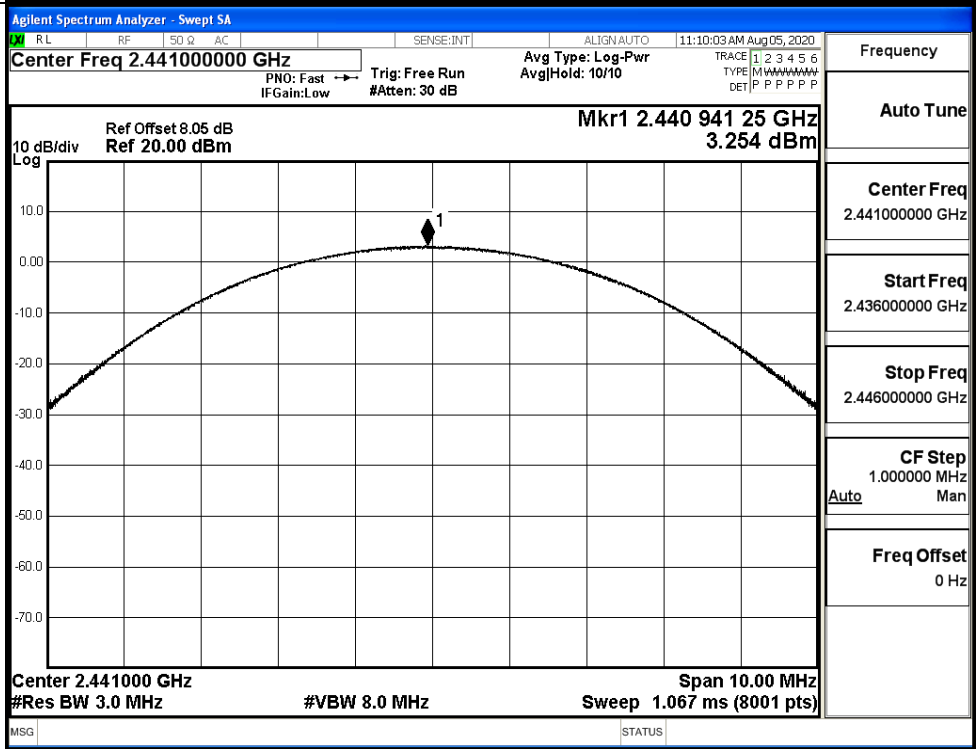




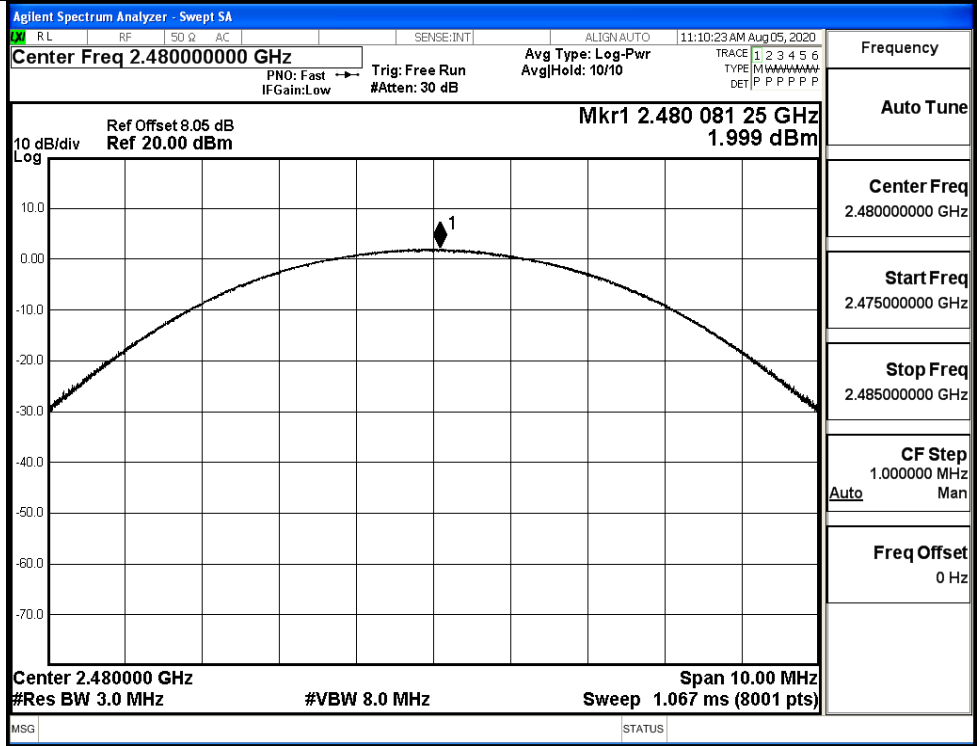
8DPSK/LCH



8DPSK/MCH

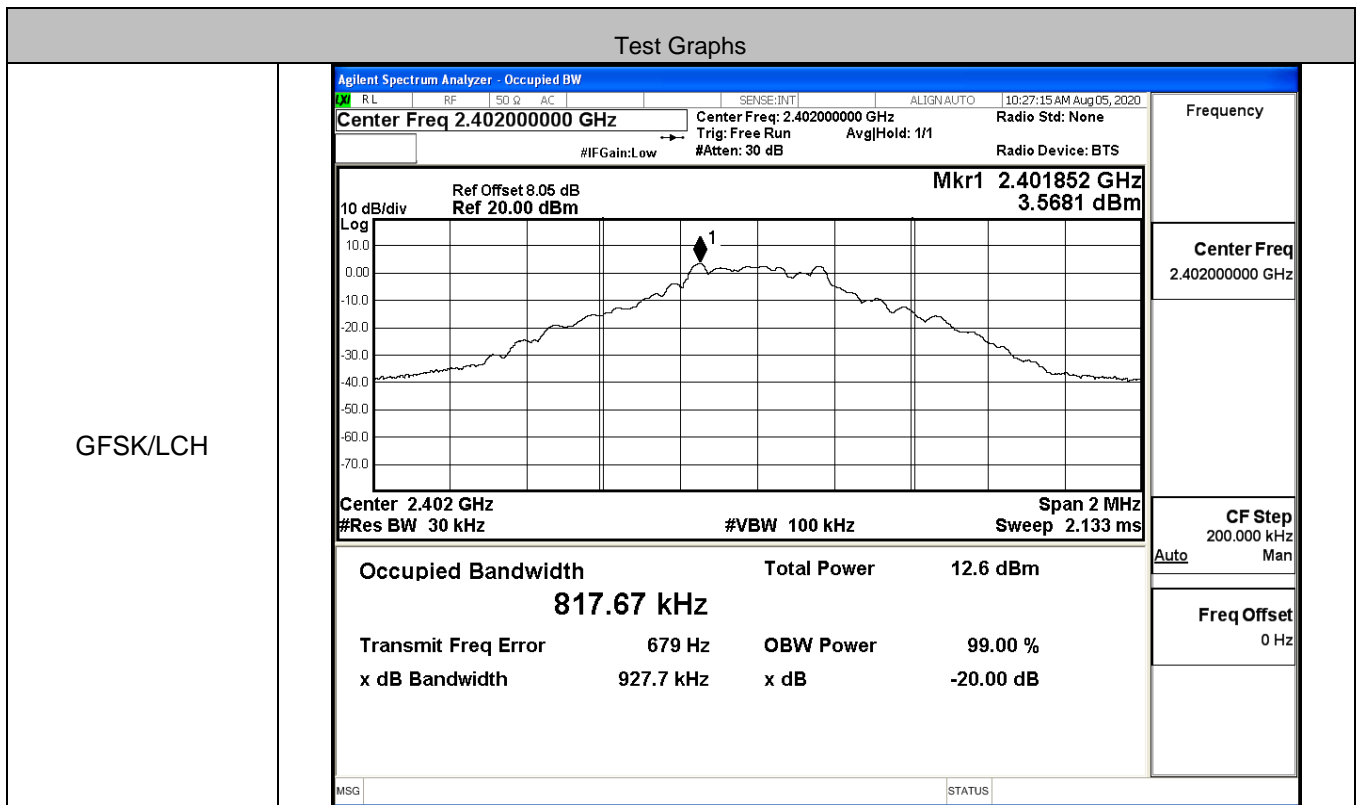


8DPSK/HCH

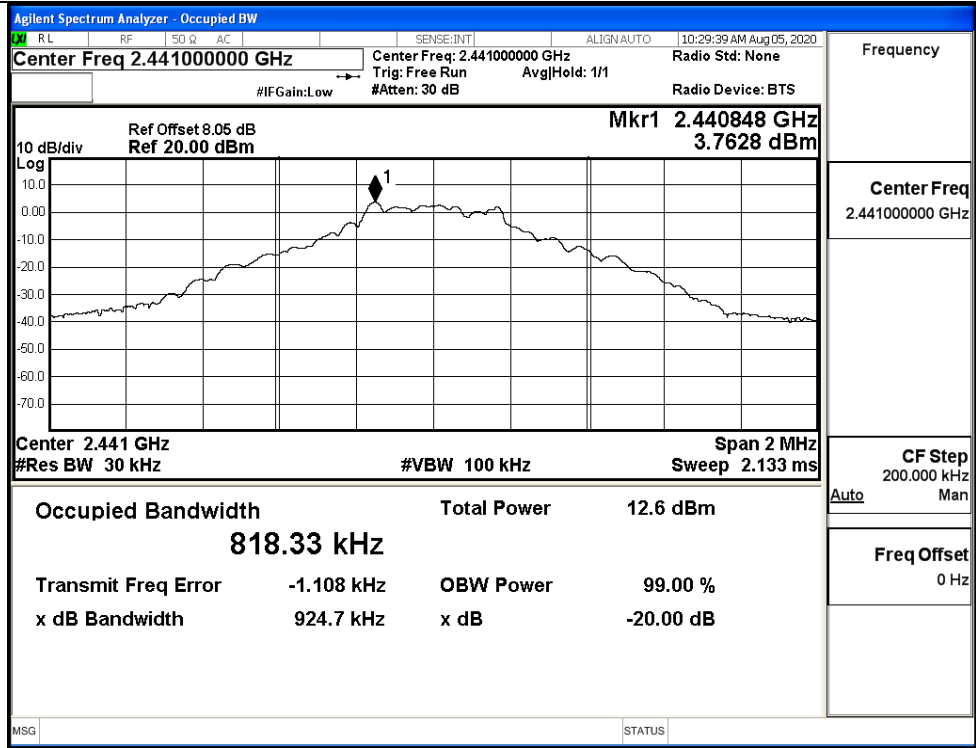


A.2 20dB Bandwidth

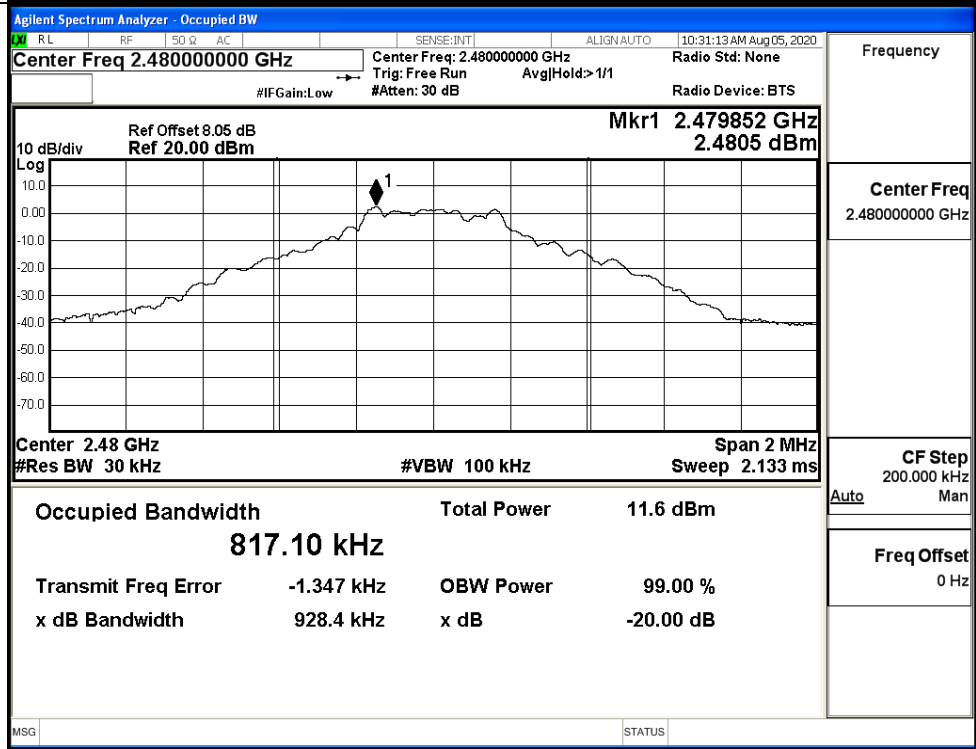
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9277	Not Specified	PASS
	MCH	0.9247	Not Specified	PASS
	HCH	0.9284	Not Specified	PASS
π/4DQPSK	LCH	1.280	Not Specified	PASS
	MCH	1.280	Not Specified	PASS
	HCH	1.280	Not Specified	PASS
8DPSK	LCH	1.286	Not Specified	PASS
	MCH	1.289	Not Specified	PASS
	HCH	1.290	Not Specified	PASS

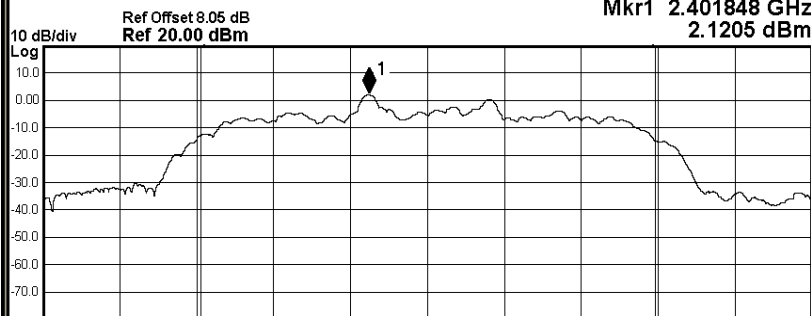


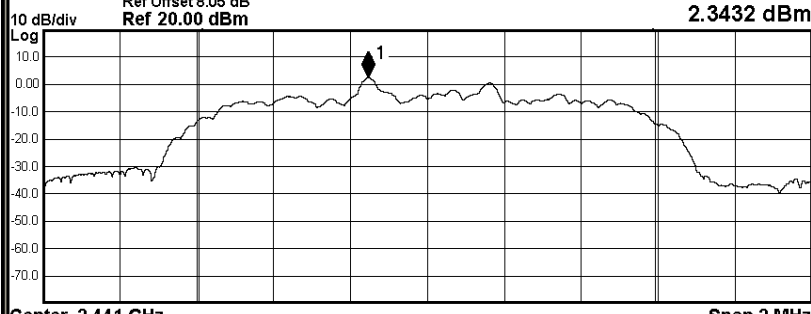
GFSK/MCH



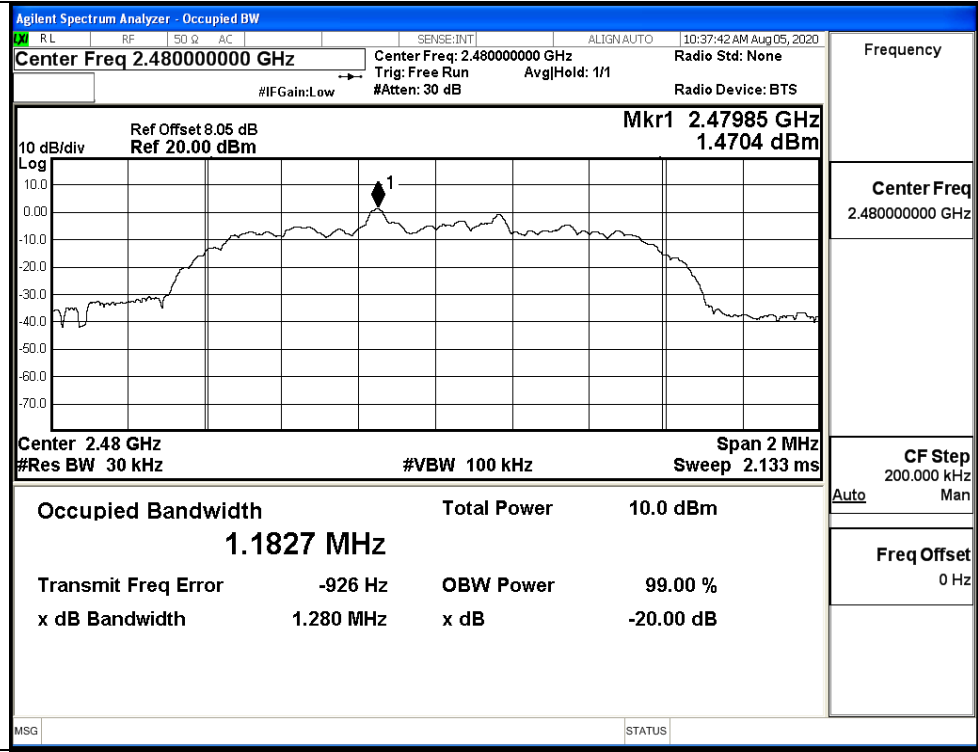
GFSK/HCH



$\pi/4$ DQPSK/LCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.40200000 GHz #IFGain: Low #Atten: 30 dB Mkr1 2.401848 GHz 2.1205 dBm Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log  Center 2.402 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1823 MHz Total Power 10.8 dBm Transmit Freq Error 1.515 kHz OBW Power 99.00 % x dB Bandwidth 1.280 MHz x dB -20.00 dB	Frequency 2.40200000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS	Frequency 2.40200000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS	Frequency 2.40200000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
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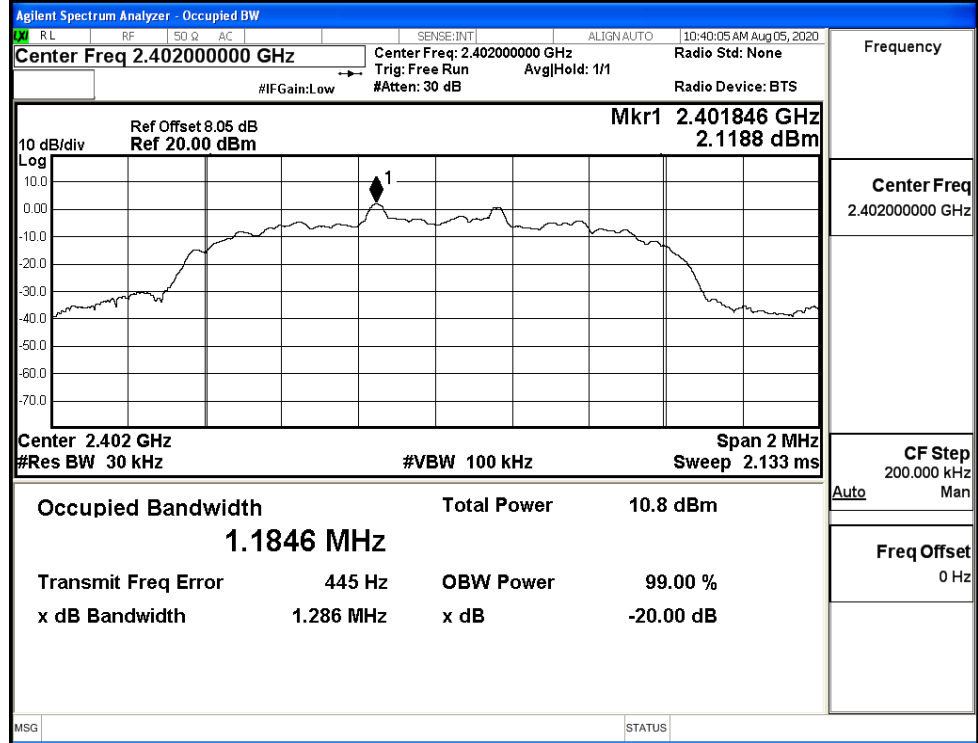
$\pi/4$ DQPSK/MCH	Agilent Spectrum Analyzer - Occupied BW Center Freq 2.44100000 GHz #IFGain: Low #Atten: 30 dB Mkr1 2.440846 GHz 2.3432 dBm Ref Offset 8.05 dB Ref 20.00 dBm 10 dB/div Log  Center 2.441 GHz #Res BW 30 kHz #VBW 100 kHz Span 2 MHz Sweep 2.133 ms Occupied Bandwidth 1.1827 MHz Total Power 11.0 dBm Transmit Freq Error 336 Hz OBW Power 99.00 % x dB Bandwidth 1.280 MHz x dB -20.00 dB	Frequency 2.44100000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS	Frequency 2.44100000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS	Frequency 2.44100000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz
	MSG STATUS	Frequency 2.44100000 GHz CF Step 200.000 kHz Auto Man Freq Offset 0 Hz

$\pi/4$ DQPSK/HCH



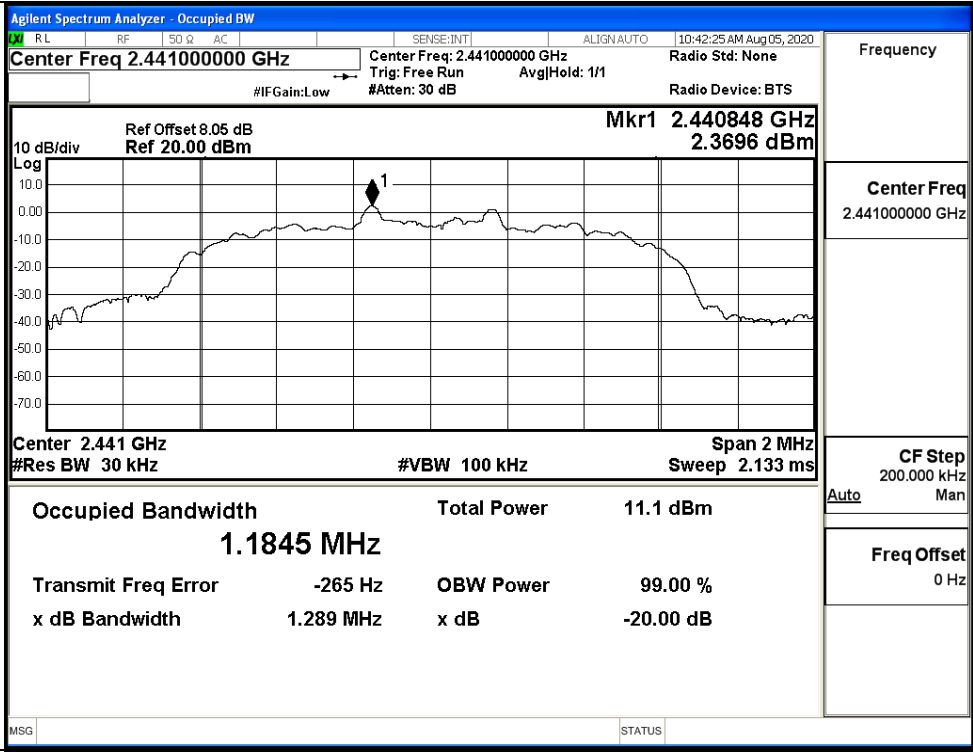
Frequency	2.48000000 GHz
Center Freq	2.48000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/LCH



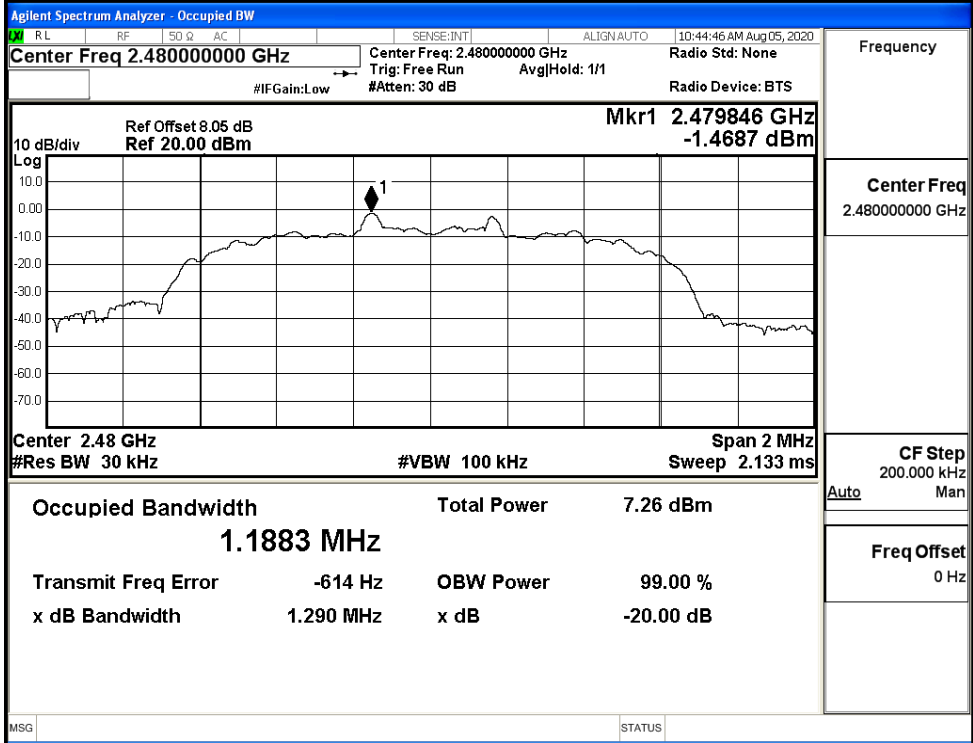
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/MCH



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

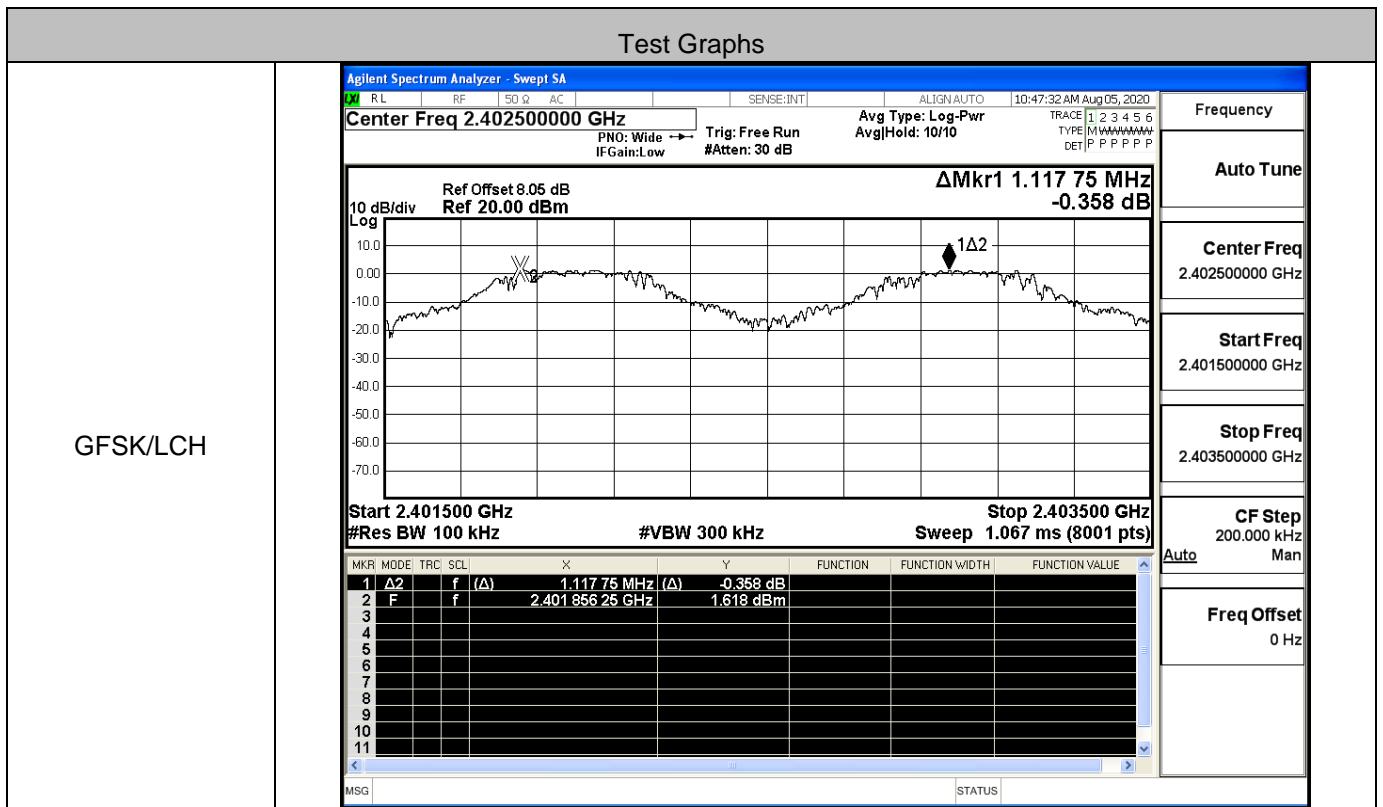
8DPSK/HCH



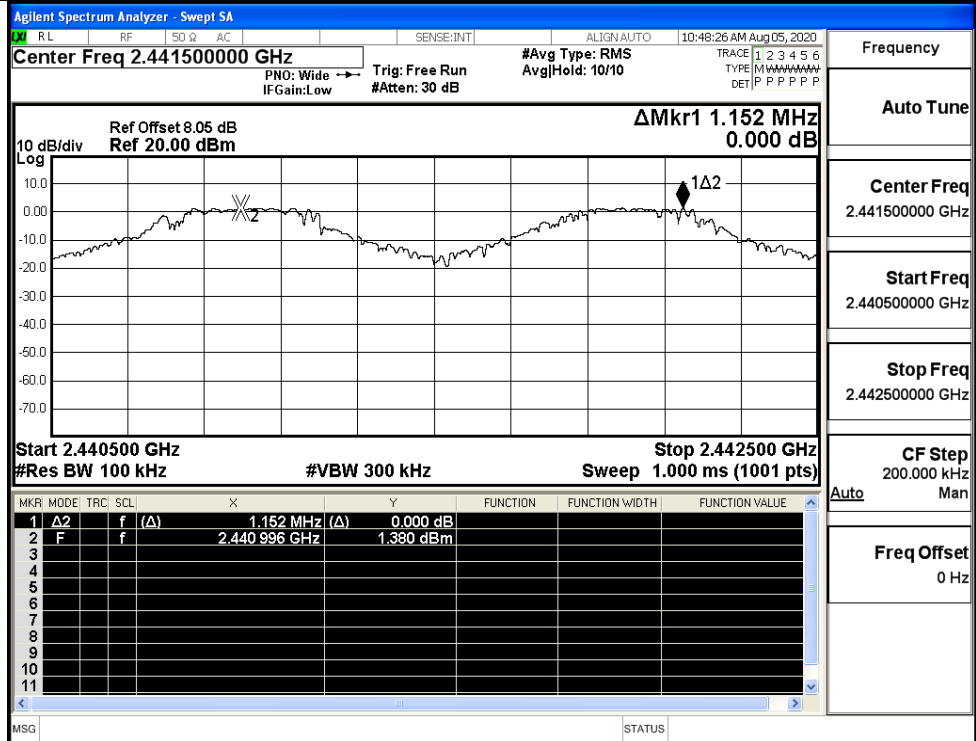
Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.118	0.619	PASS
	MCH	1.152	0.619	PASS
	HCH	1.324	0.619	PASS
π/4DQPSK	LCH	1.338	0.853	PASS
	MCH	1.334	0.853	PASS
	HCH	1.072	0.853	PASS
8DPSK	LCH	1.338	0.860	PASS
	MCH	1.282	0.860	PASS
	HCH	0.930	0.860	PASS

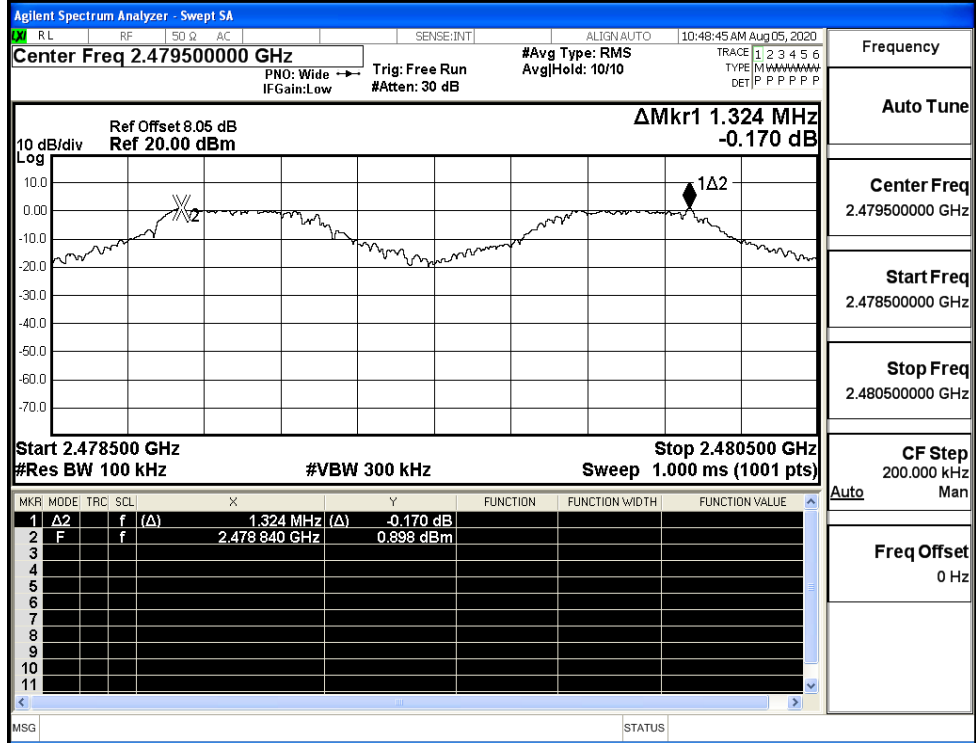


GFSK/MCH



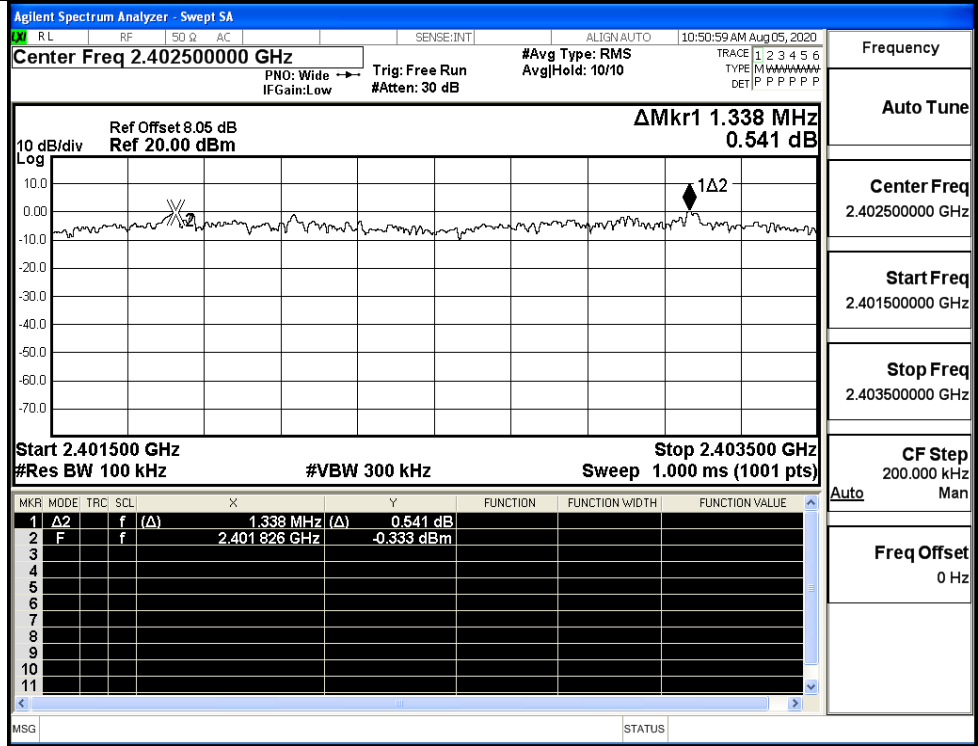
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

GFSK/HCH



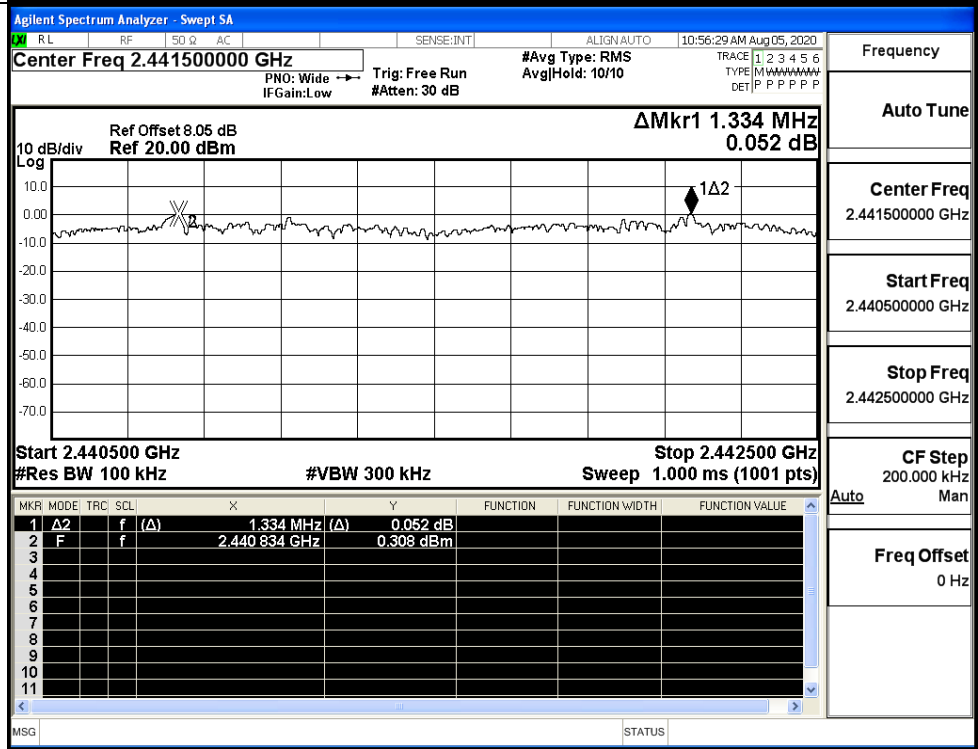
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

π/4DQPSK/LCH



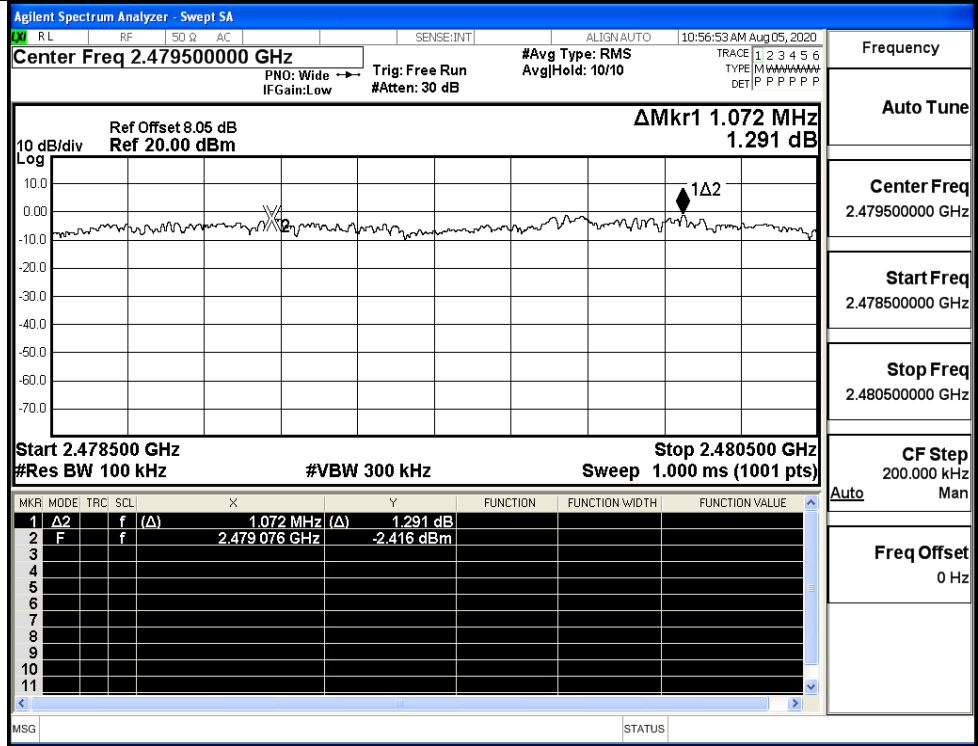
Frequency
Auto Tune
Center Freq
2.402500000 GHz
Start Freq
2.401500000 GHz
Stop Freq
2.403500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

π/4DQPSK/MCH

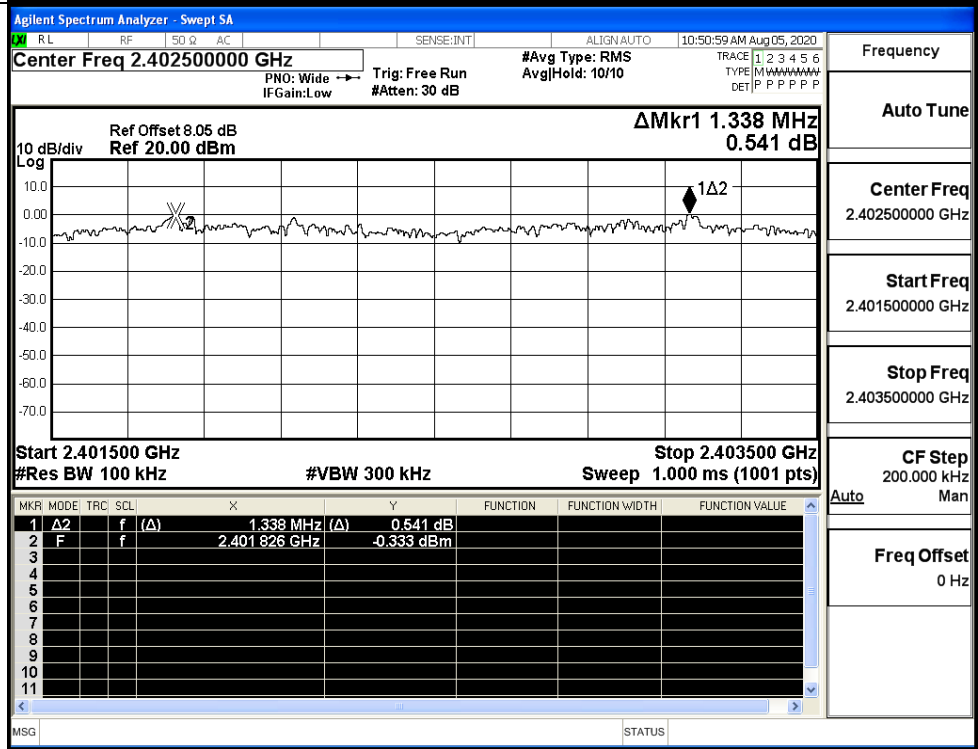


Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

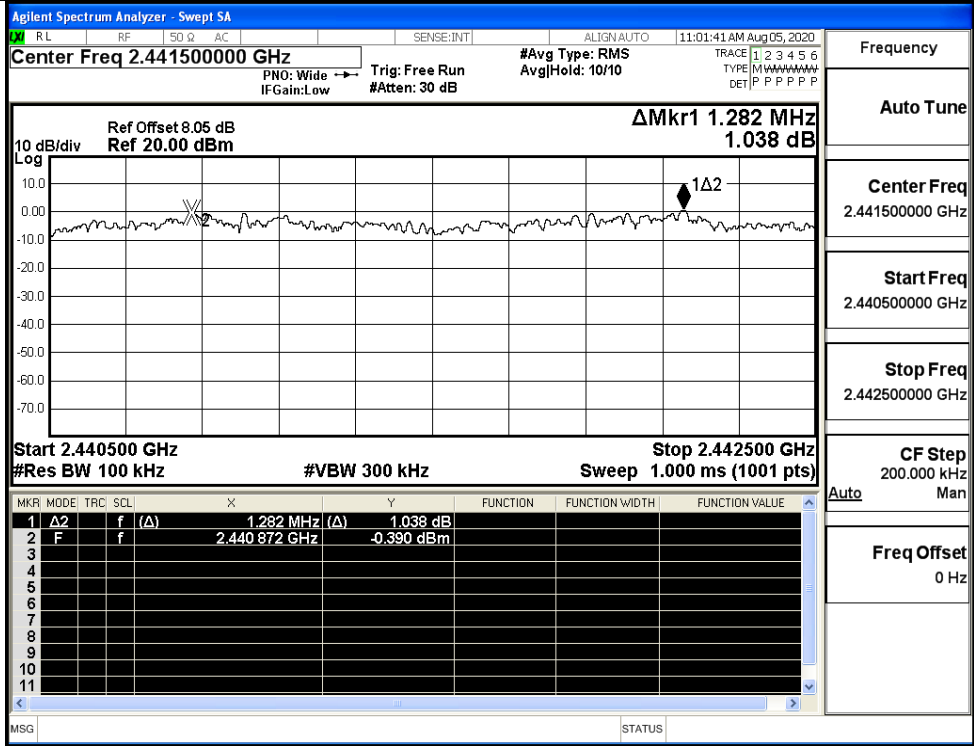
π/4DQPSK/HCH



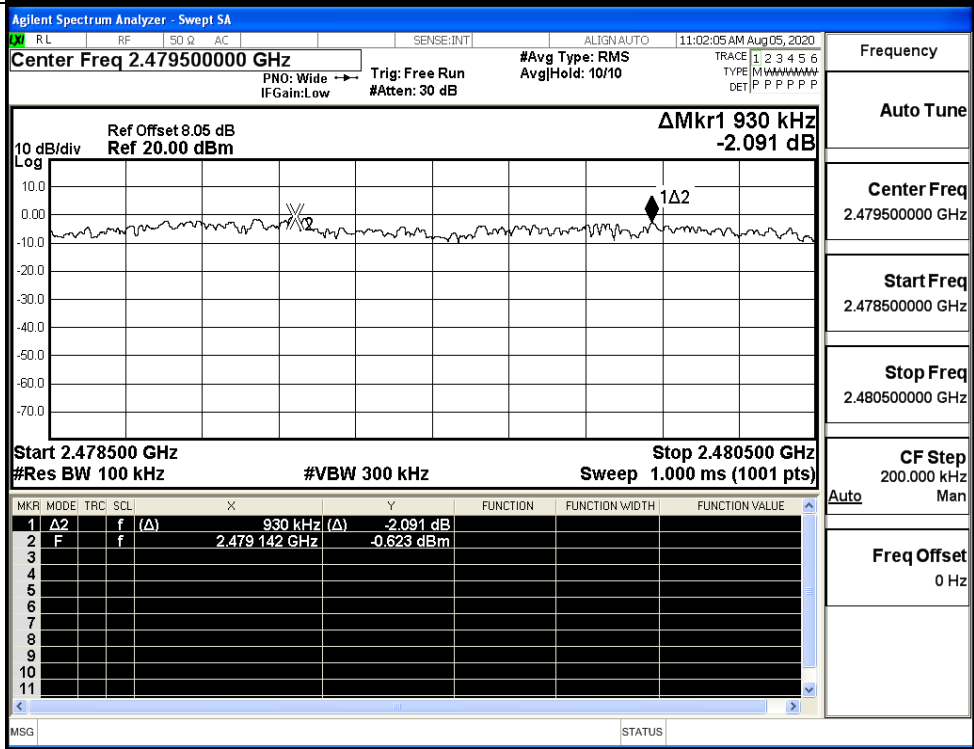
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



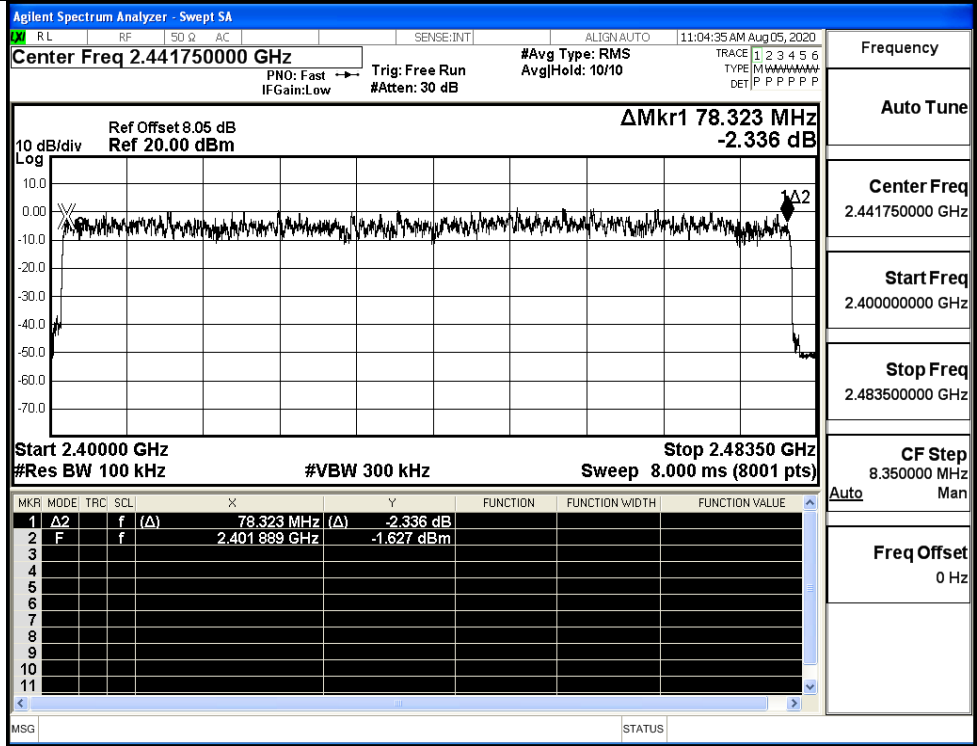
A.4 Hopping Channel Number

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

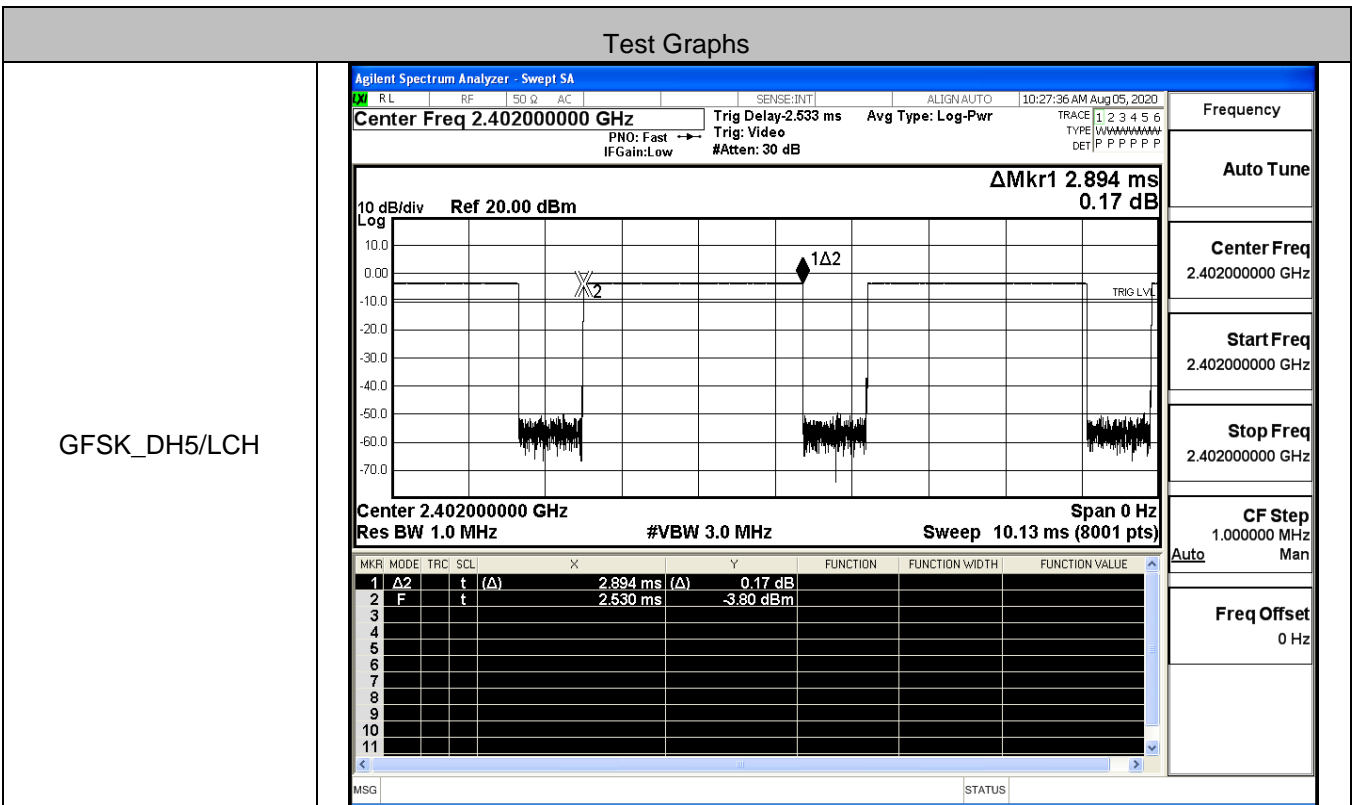
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.05 dB Ref 20.00 dBm ΔMkr1 78.020 MHz -0.395 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="font-size: small; width: 100%;"> <thead> <tr> <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>78.020 MHz (Δ)</td> <td>-0.395 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402 035 GHz</td> <td>1.080 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)	78.020 MHz (Δ)	-0.395 dB				2	F	f		2.402 035 GHz	1.080 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Man Freq Offset 0 Hz
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ2	f	(Δ)	78.020 MHz (Δ)	-0.395 dB																								
2	F	f		2.402 035 GHz	1.080 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 78.208 MHz -3.196 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="font-size: small; width: 100%;"> <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>78.208 MHz (Δ)</td> <td>-3.196 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401 858 GHz</td> <td>0.296 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)	78.208 MHz (Δ)	-3.196 dB				2	F	f		2.401 858 GHz	0.296 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Man Freq Offset 0 Hz
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ2	f	(Δ)	78.208 MHz (Δ)	-3.196 dB																								
2	F	f		2.401 858 GHz	0.296 dBm																								

8DPSK/Hop

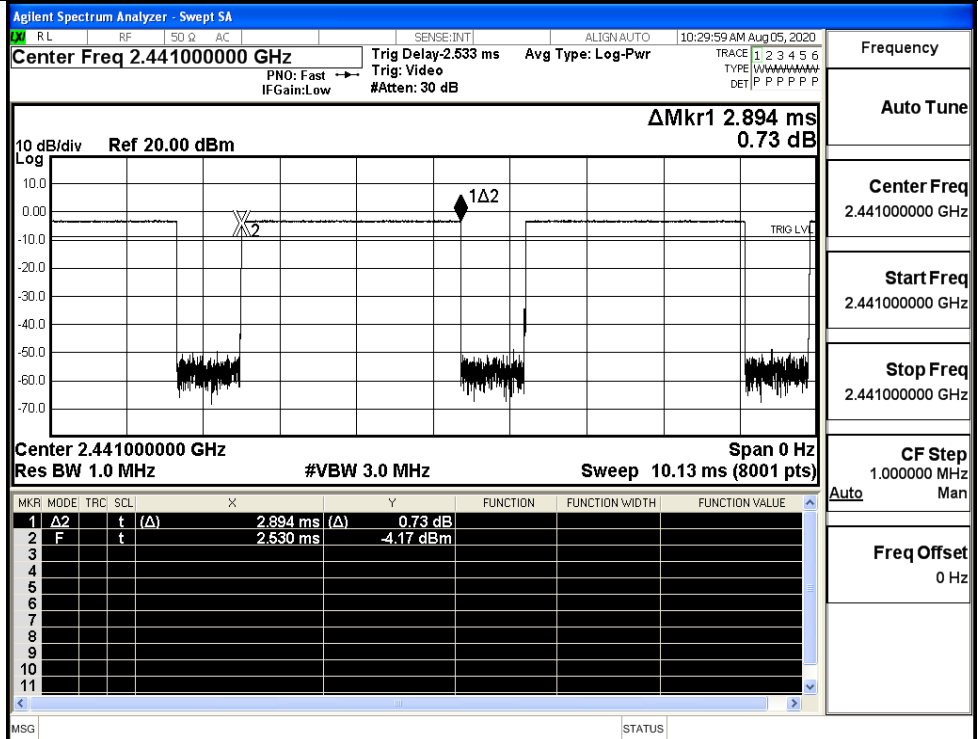


A.5 Dwell Time

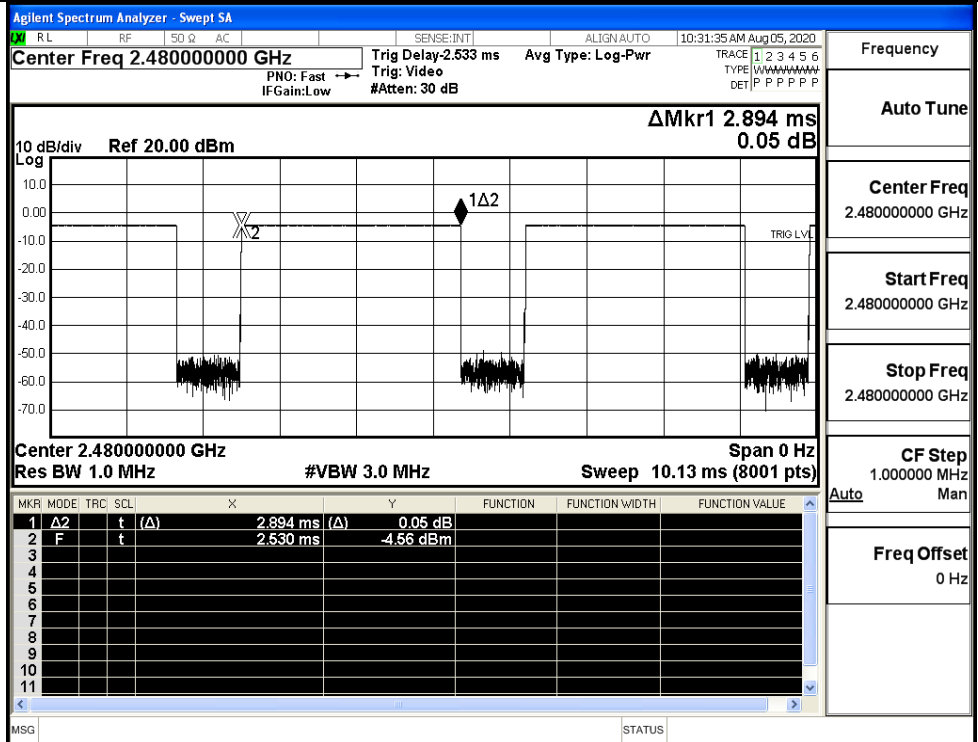
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.89	106.7	0.308	0.4	PASS
	DH5	MCH	2.89	106.7	0.308	0.4	PASS
	DH5	HCH	2.89	106.7	0.308	0.4	PASS
π/4DQPSK	2DH5	LCH	2.89	106.7	0.307	0.4	PASS
	2DH5	MCH	2.89	106.7	0.307	0.4	PASS
	2DH5	HCH	2.89	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.307	0.4	PASS
	3DH5	MCH	2.89	106.7	0.307	0.4	PASS
	3DH5	HCH	2.89	106.7	0.307	0.4	PASS



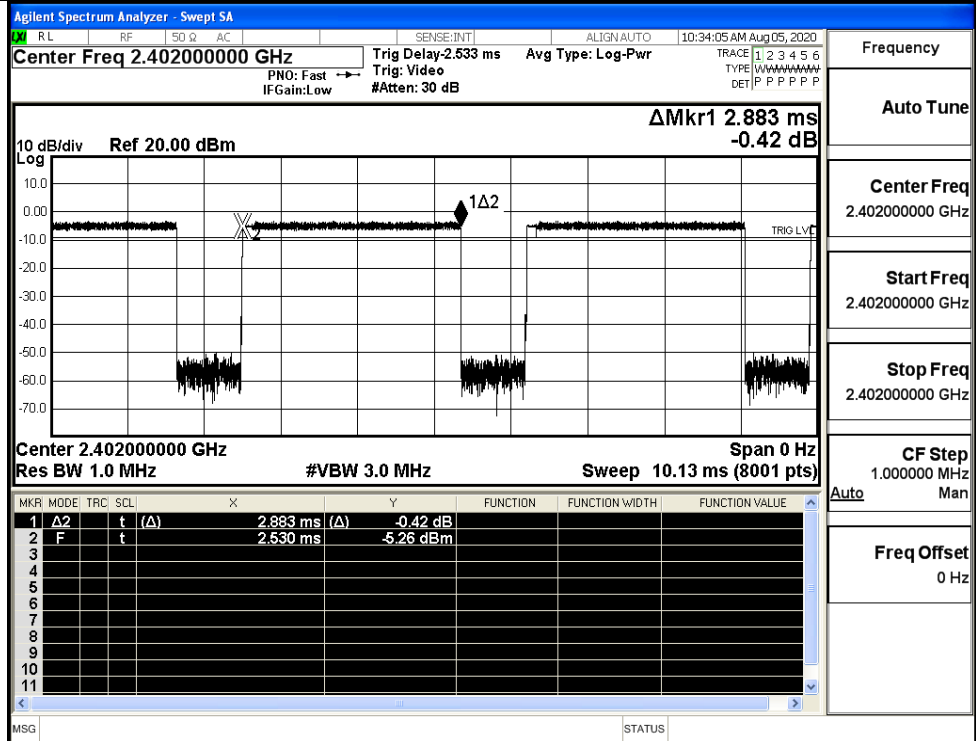
GFSK_DH5/MCH



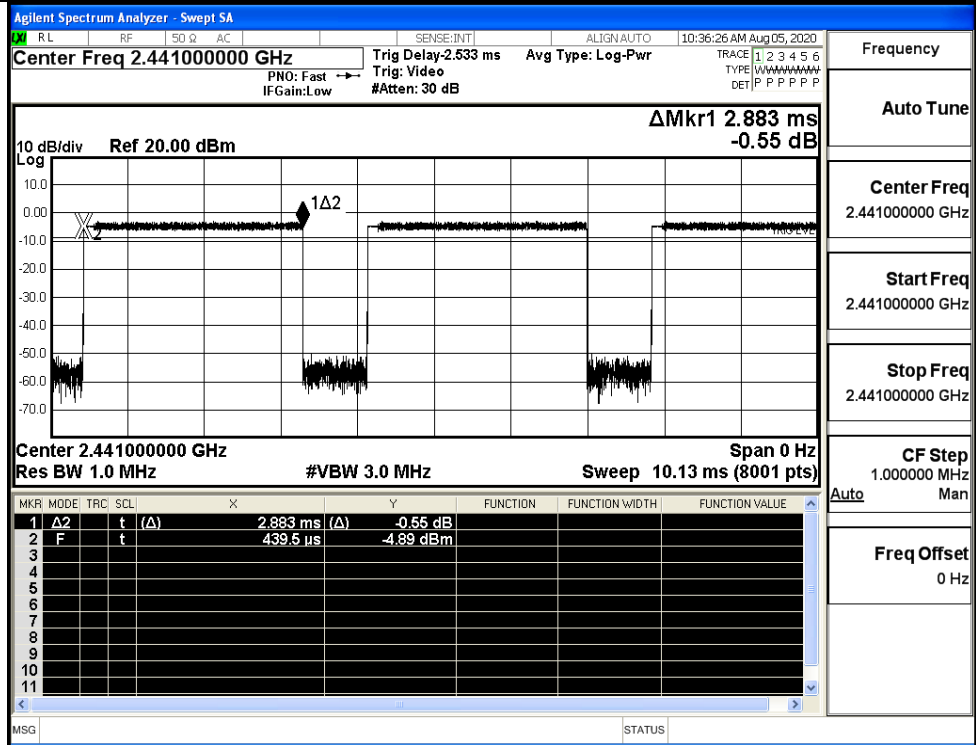
GFSK_DH5/HCH



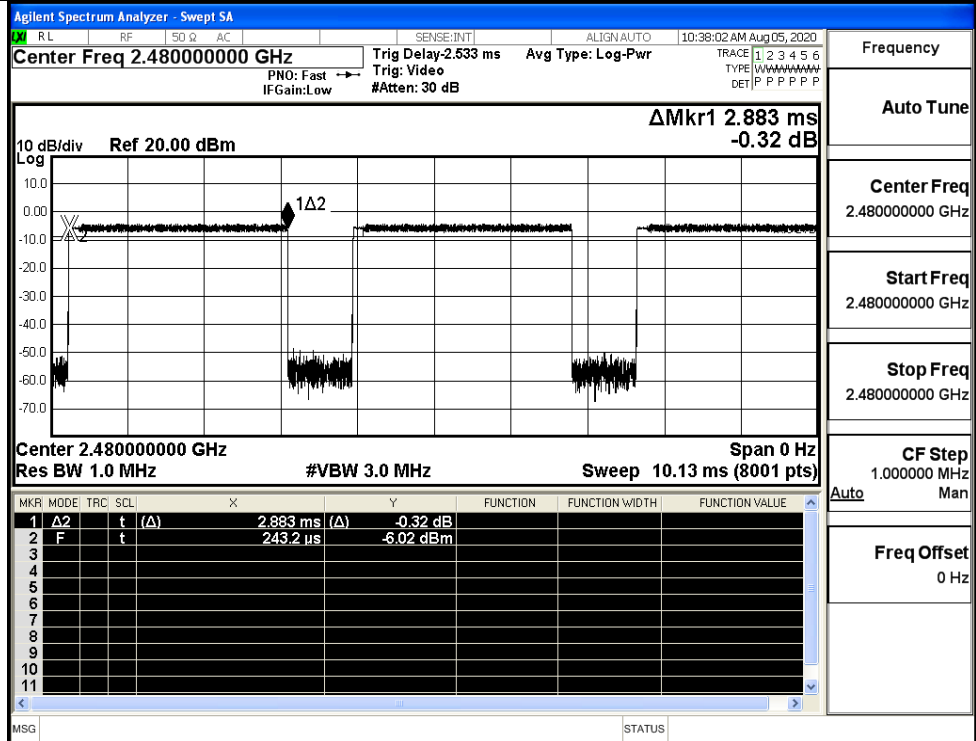
$\pi/4$ DQPSK
_2DH5/LCH



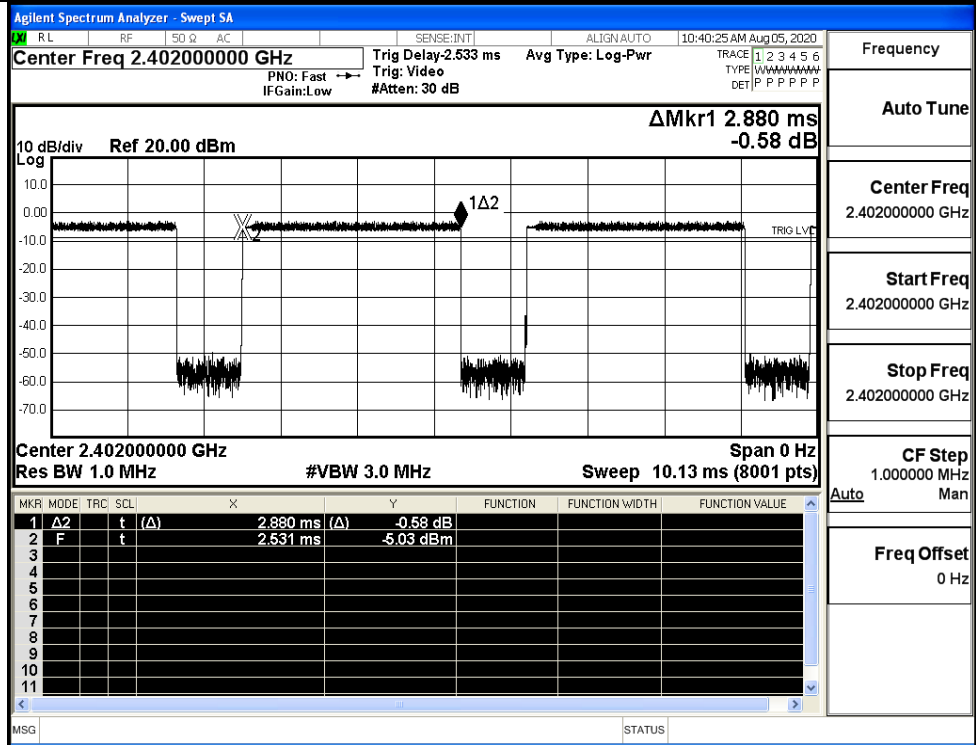
$\pi/4$ DQPSK
_2DH5/MCH



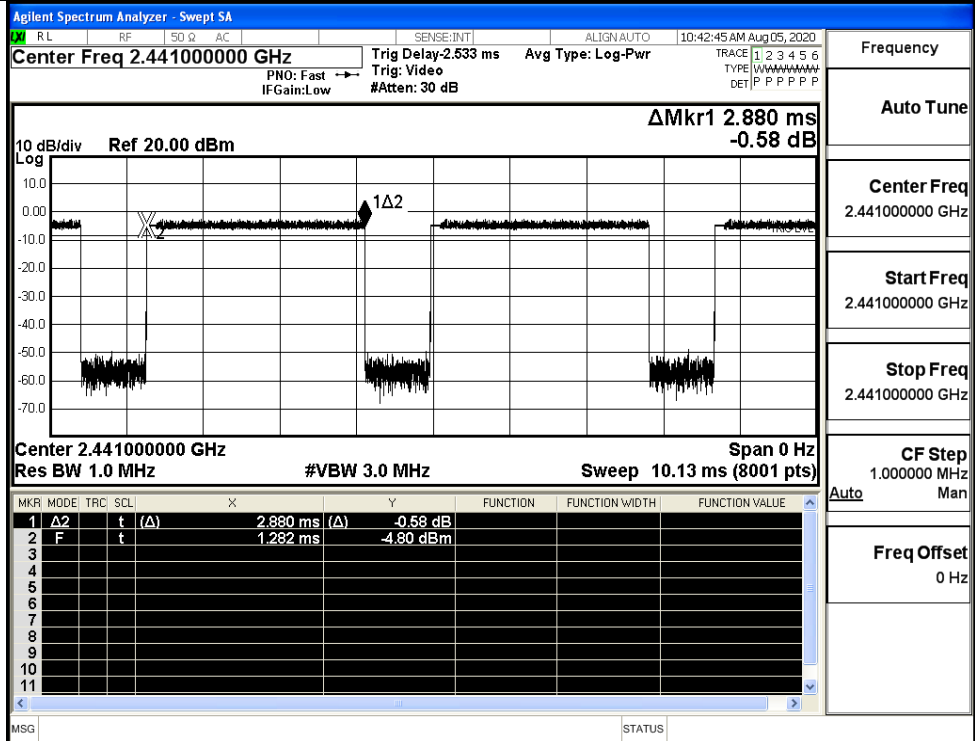
$\pi/4$ DQPSK
_2DH5/HCH



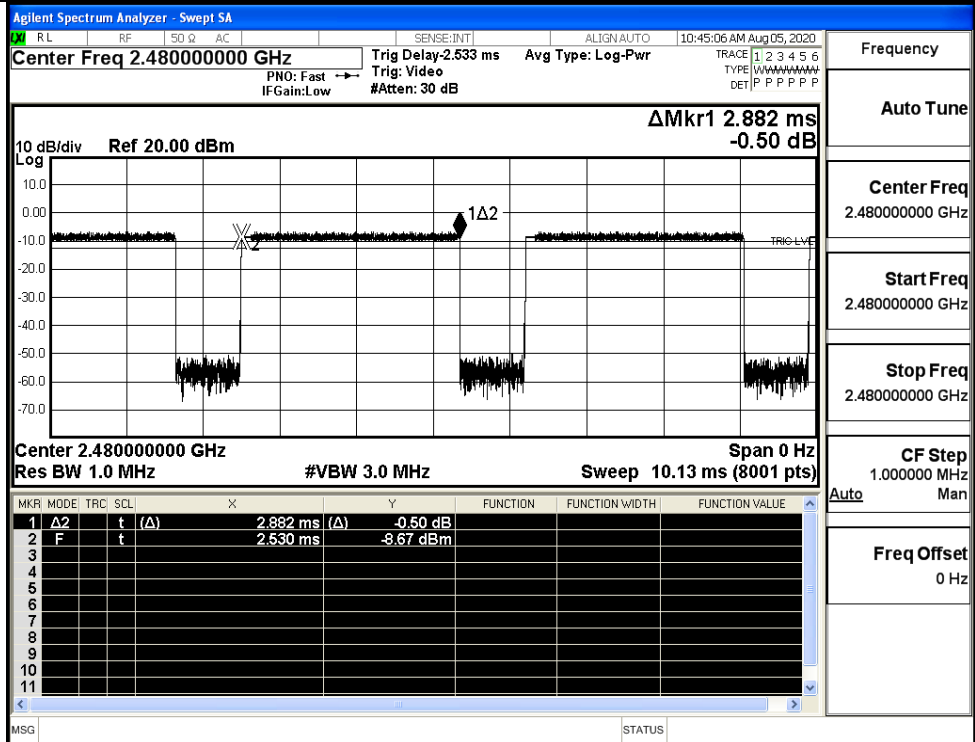
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH

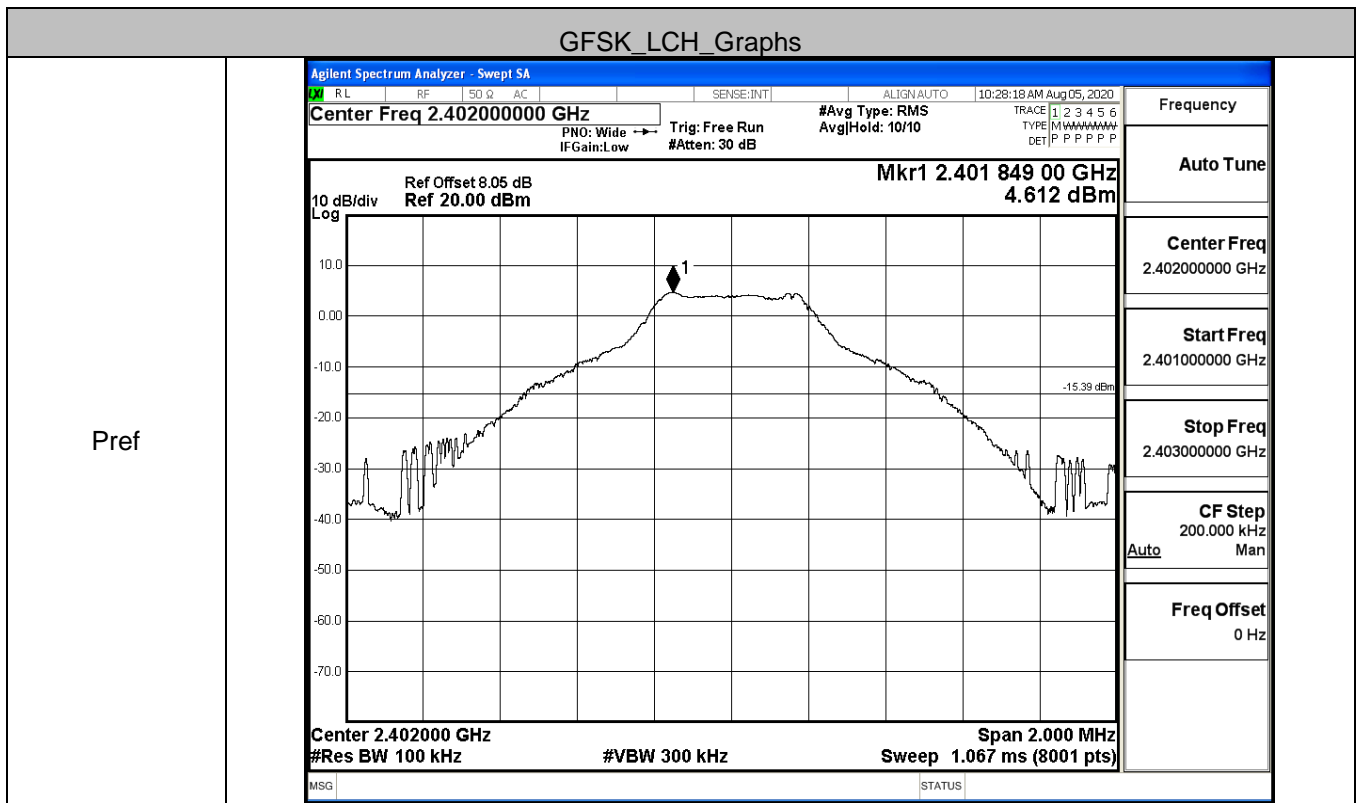


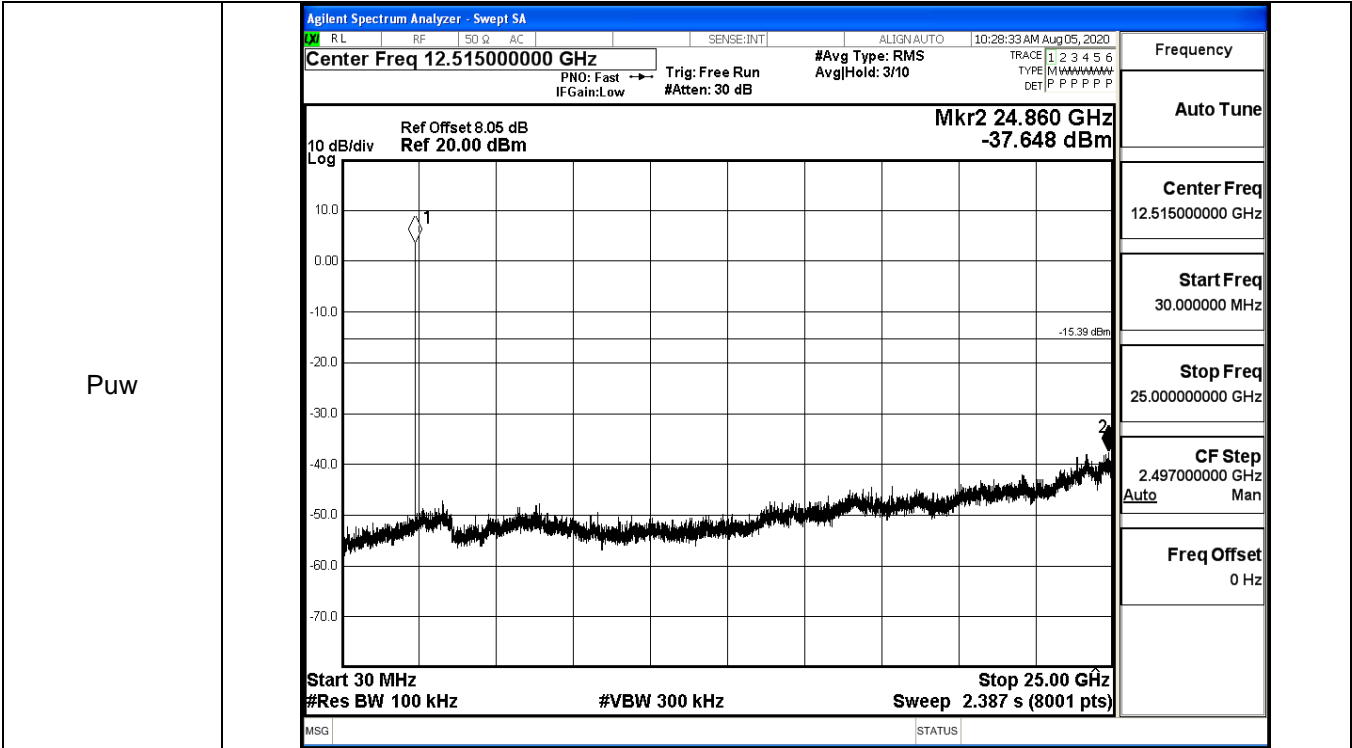
8DPSK_3DH5/HCH



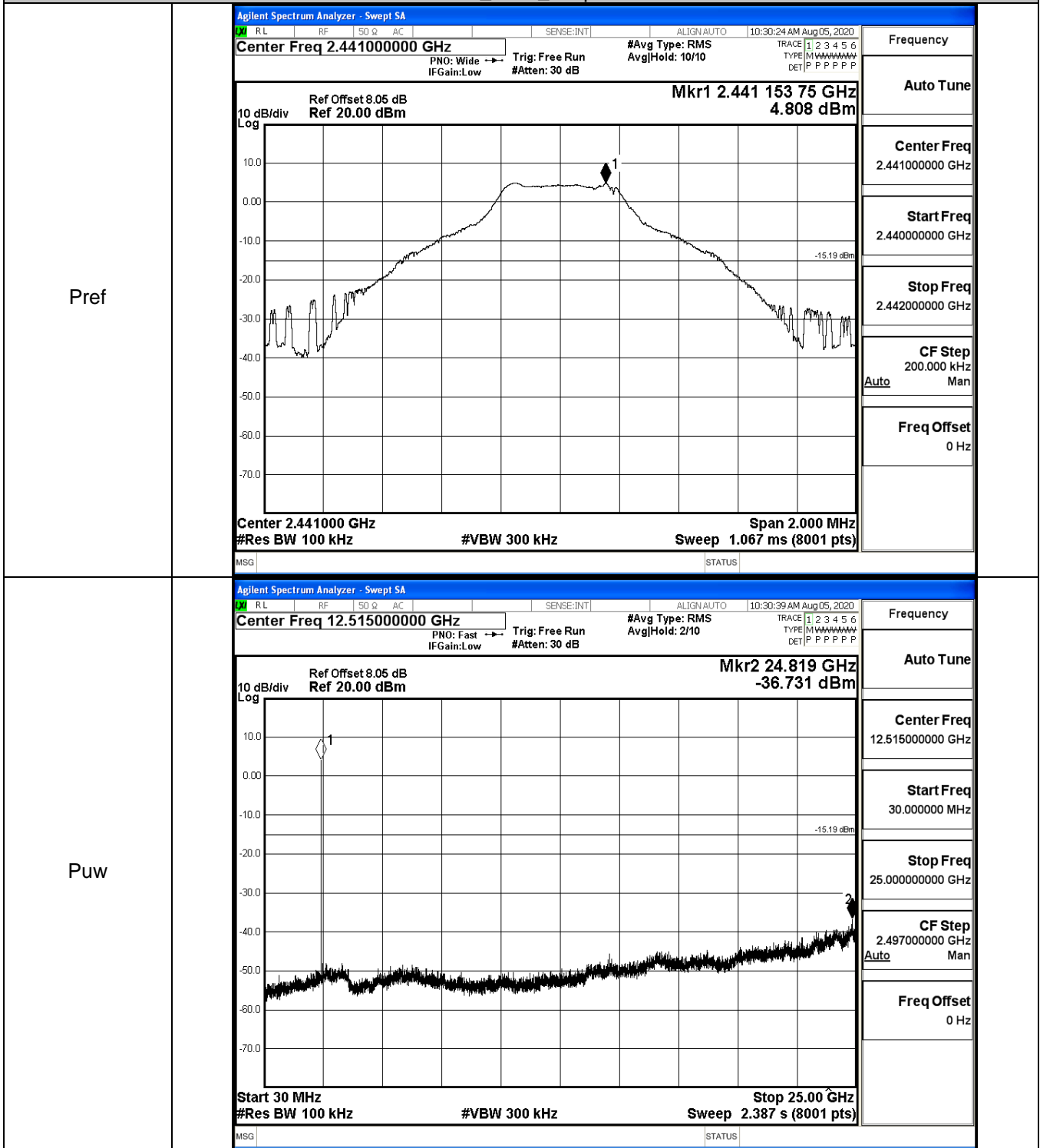
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.612	-37.648	-15.388	PASS
	MCH	4.808	-36.731	-15.192	PASS
	HCH	3.761	-37.714	-16.239	PASS
π /4DQPSK	LCH	3.028	-36.951	-16.972	PASS
	MCH	3.428	-37.292	-16.572	PASS
	HCH	2.342	-38.003	-17.658	PASS
8DPSK	LCH	3.155	-37.959	-16.845	PASS
	MCH	3.404	-37.989	-16.596	PASS
	HCH	-0.385	-37.233	-20.385	PASS

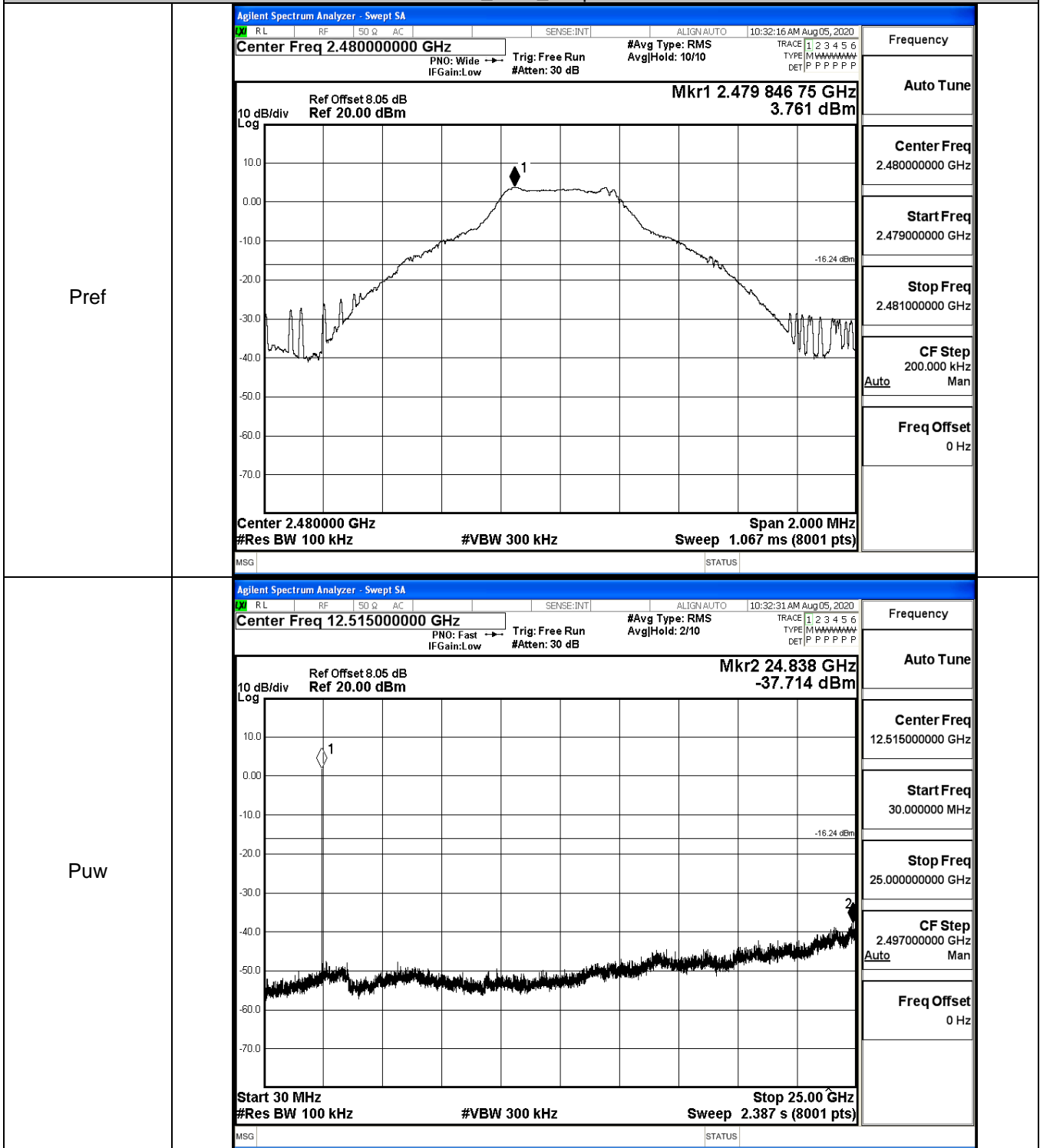




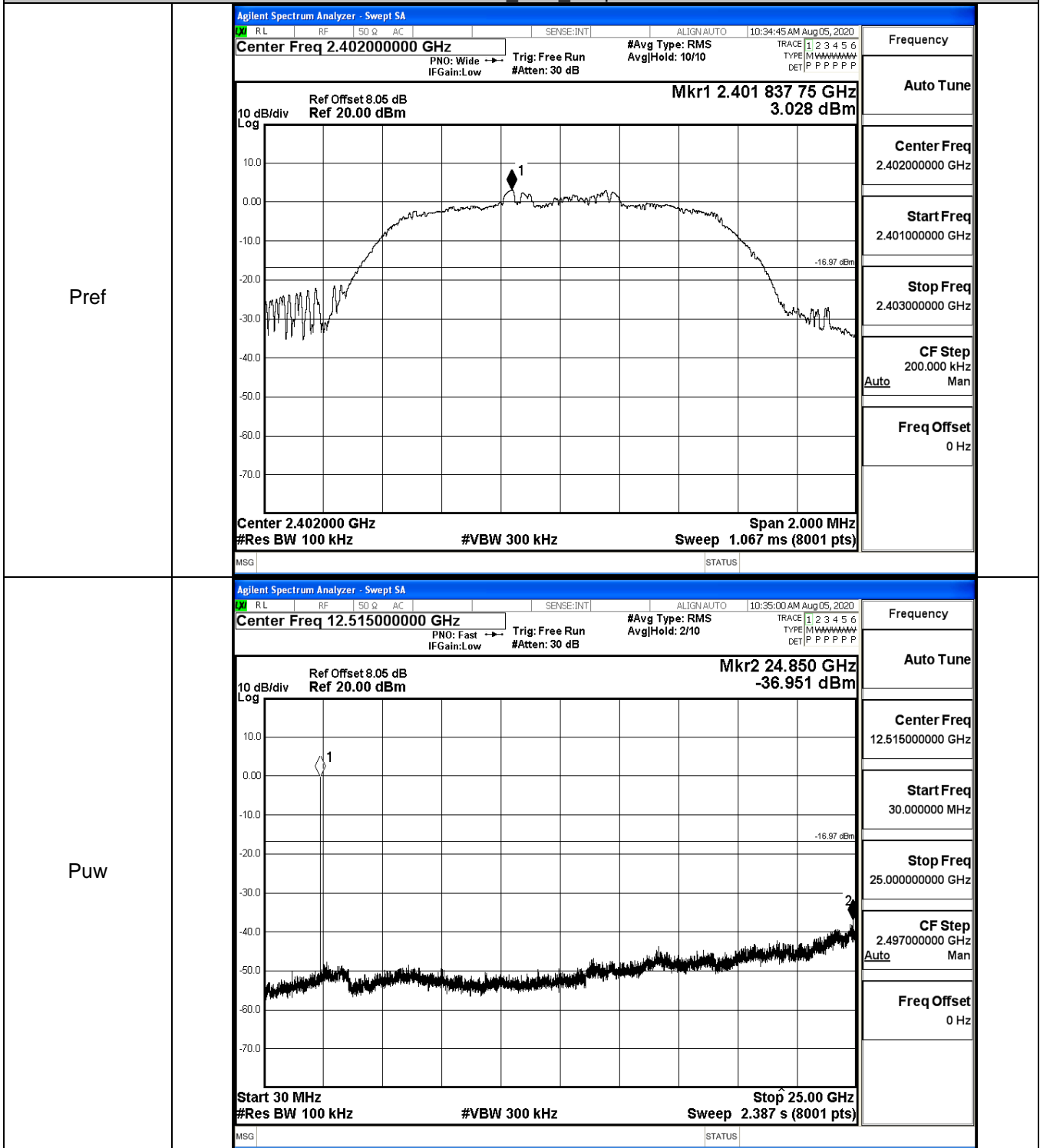
GFSK_MCH_Graphs



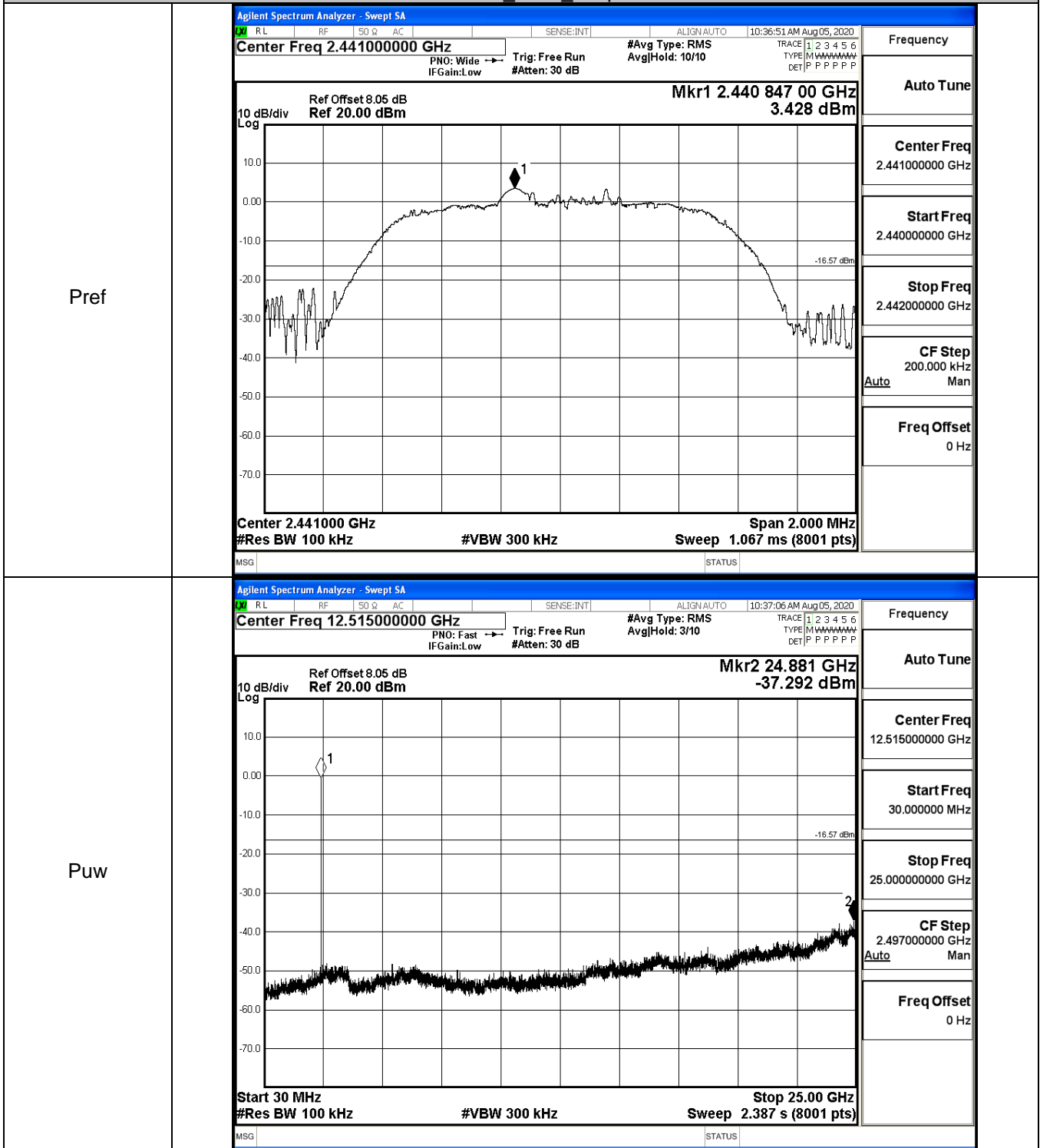
GFSK_HCH_Graphs



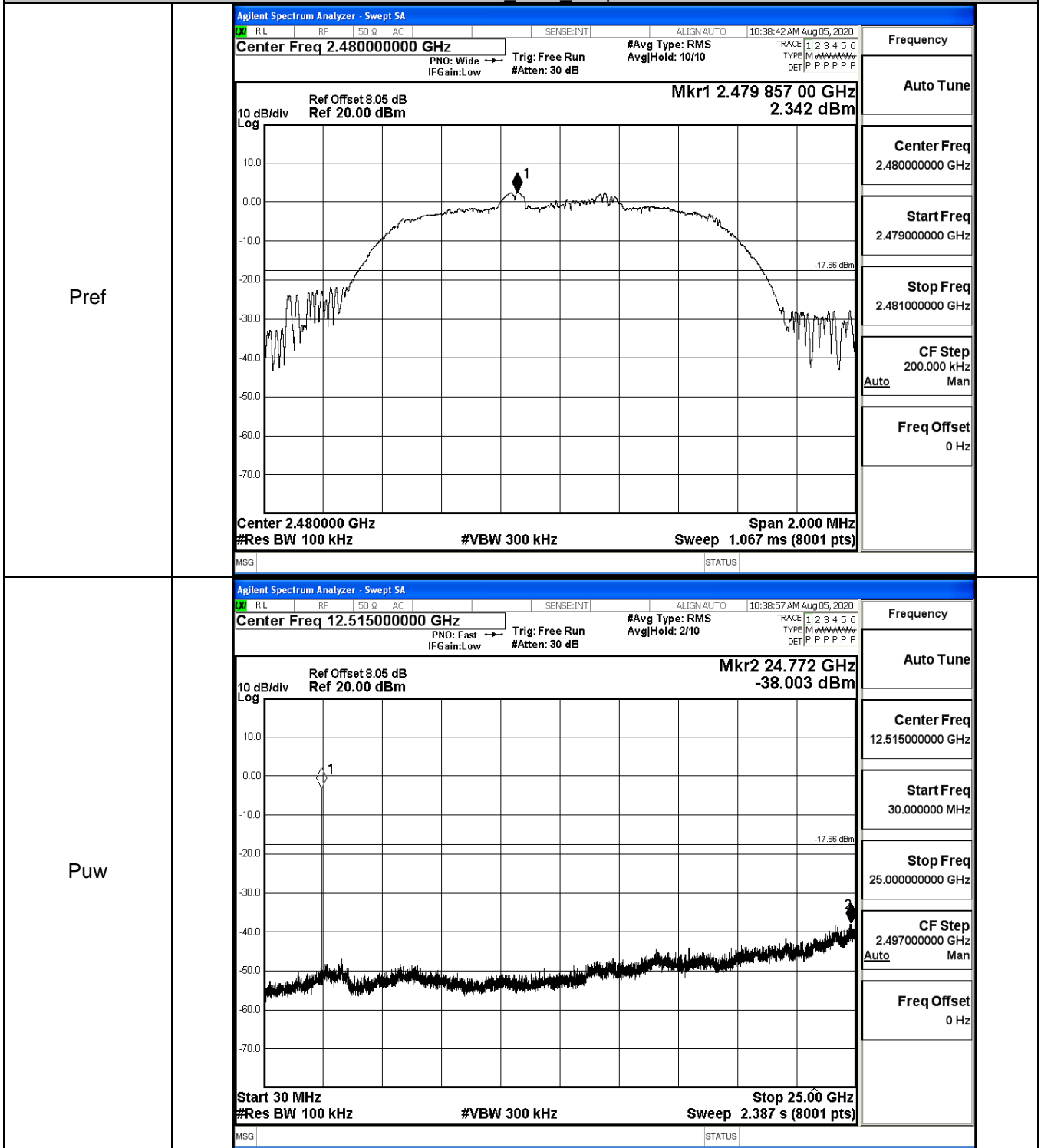
$\pi/4$ DQPSK_LCH_Graphs



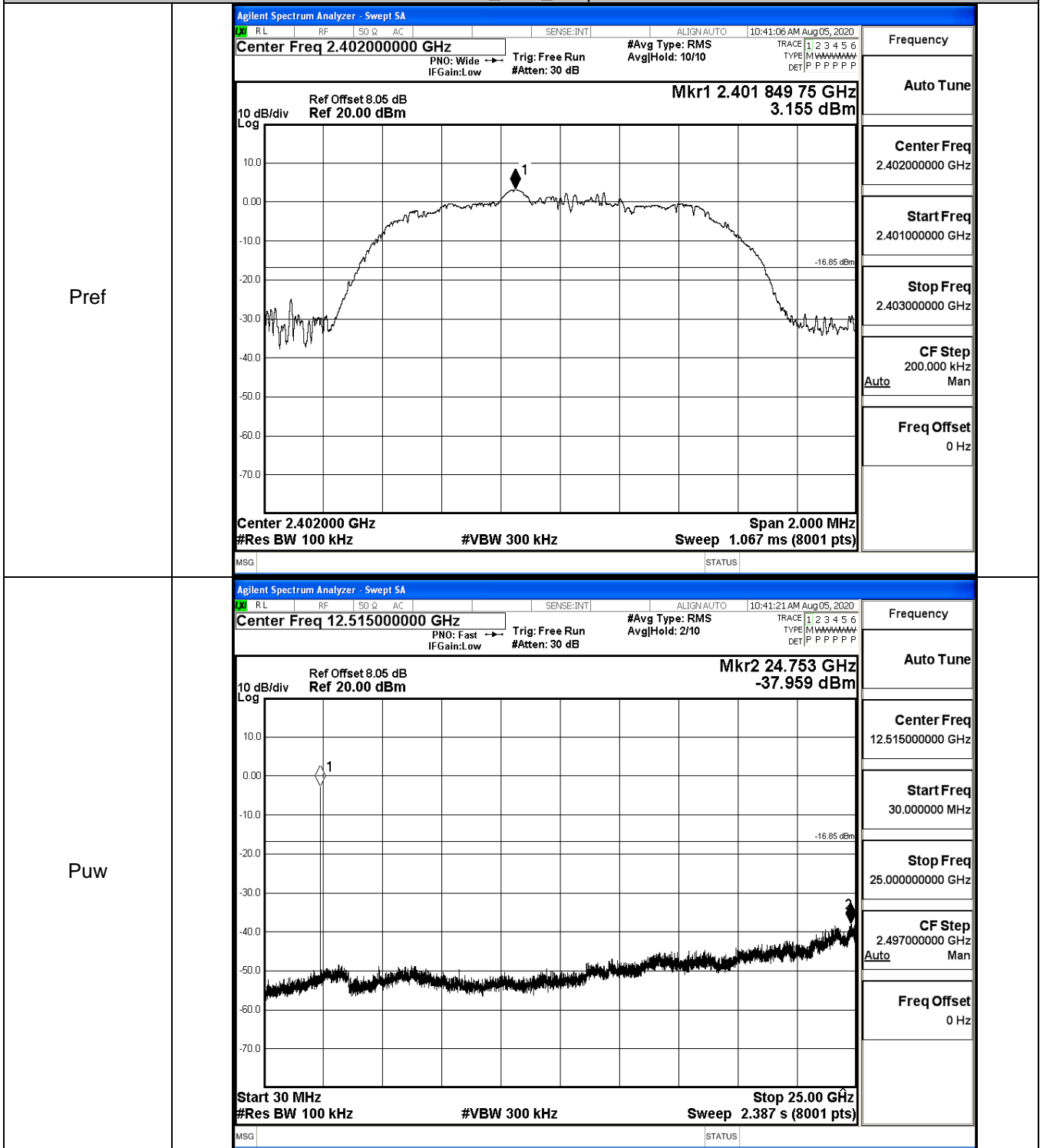
$\pi/4$ DQPSK_MCH_Graphs



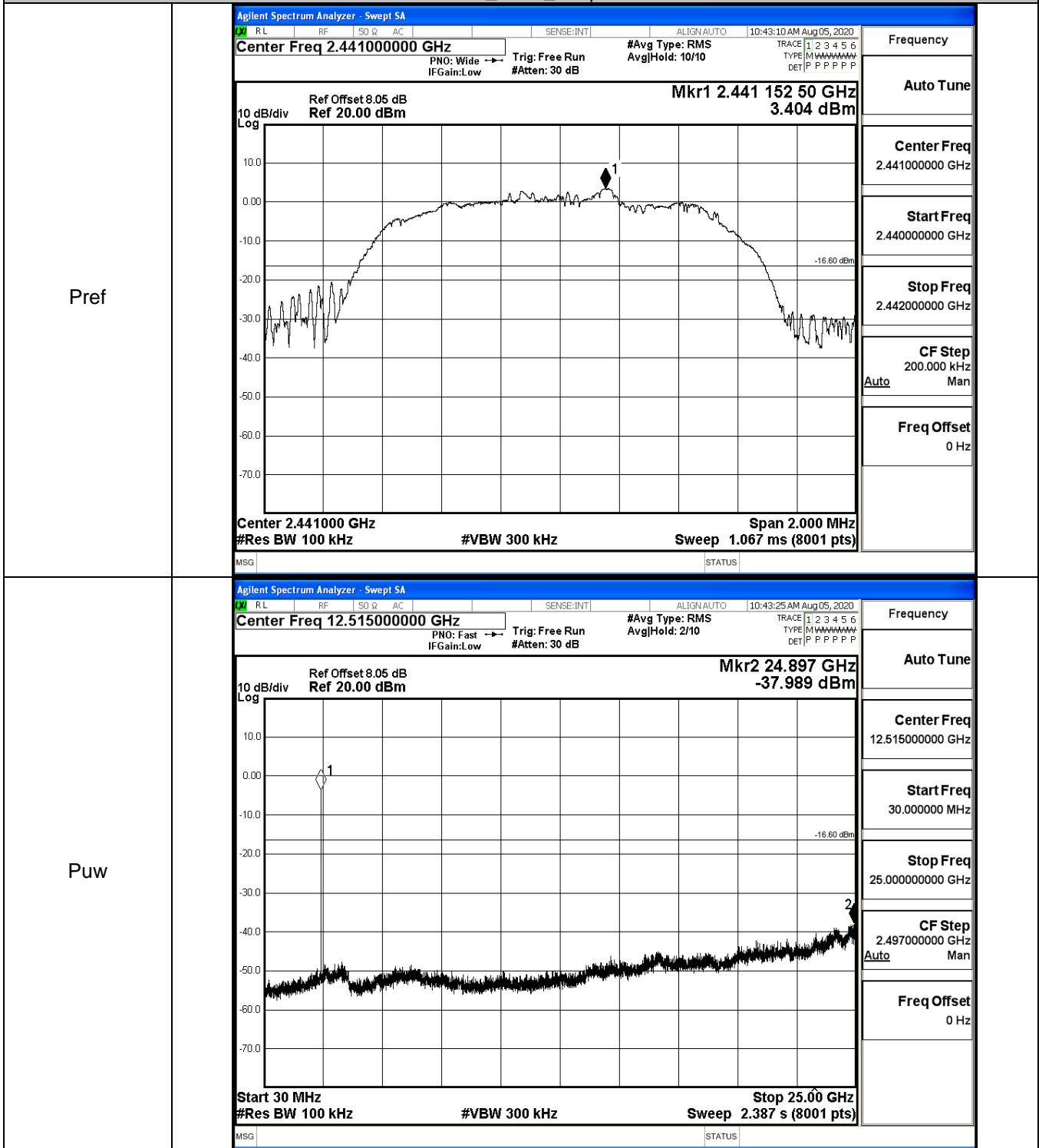
$\pi/4$ DQPSK_HCH_Graphs



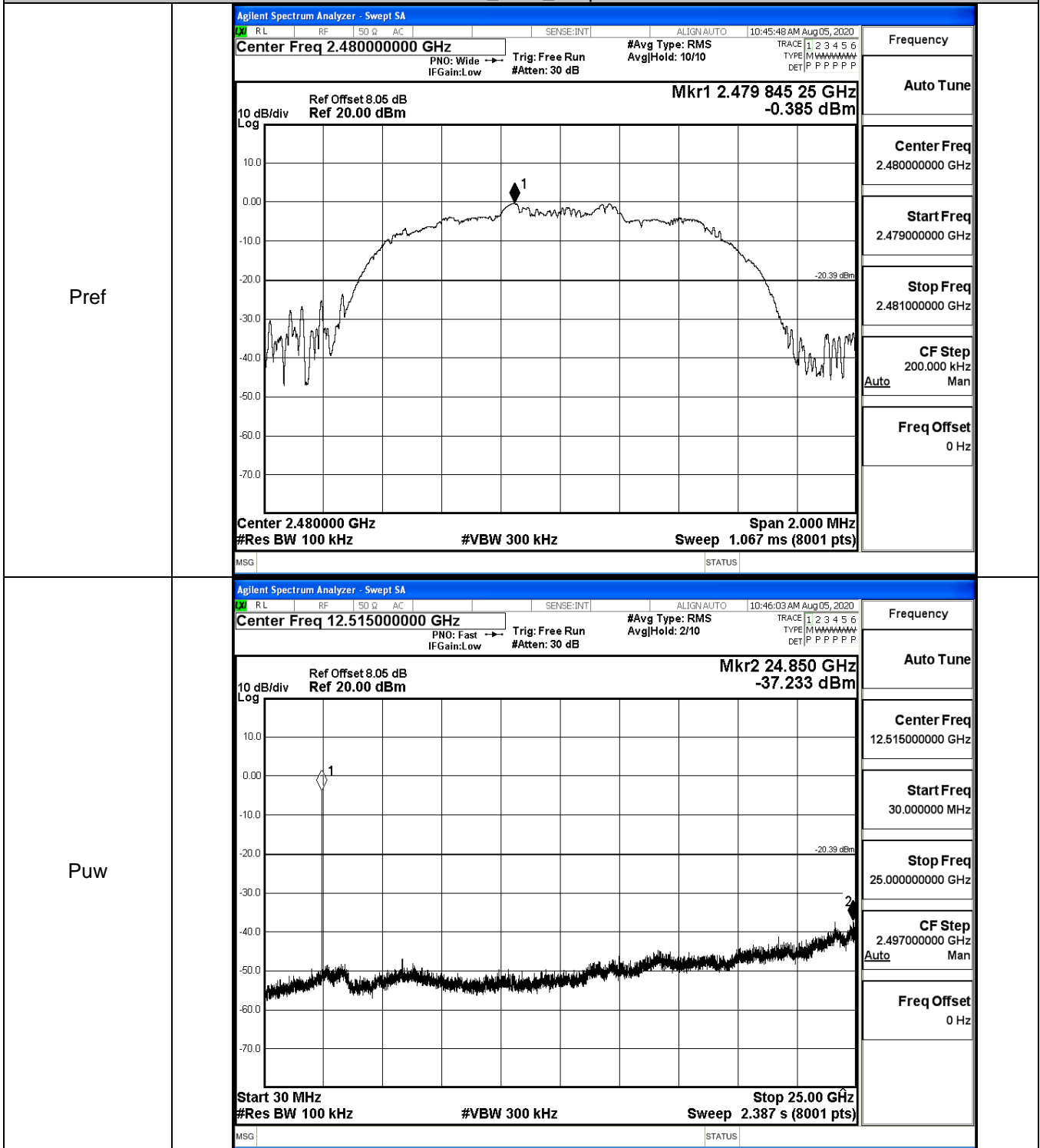
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

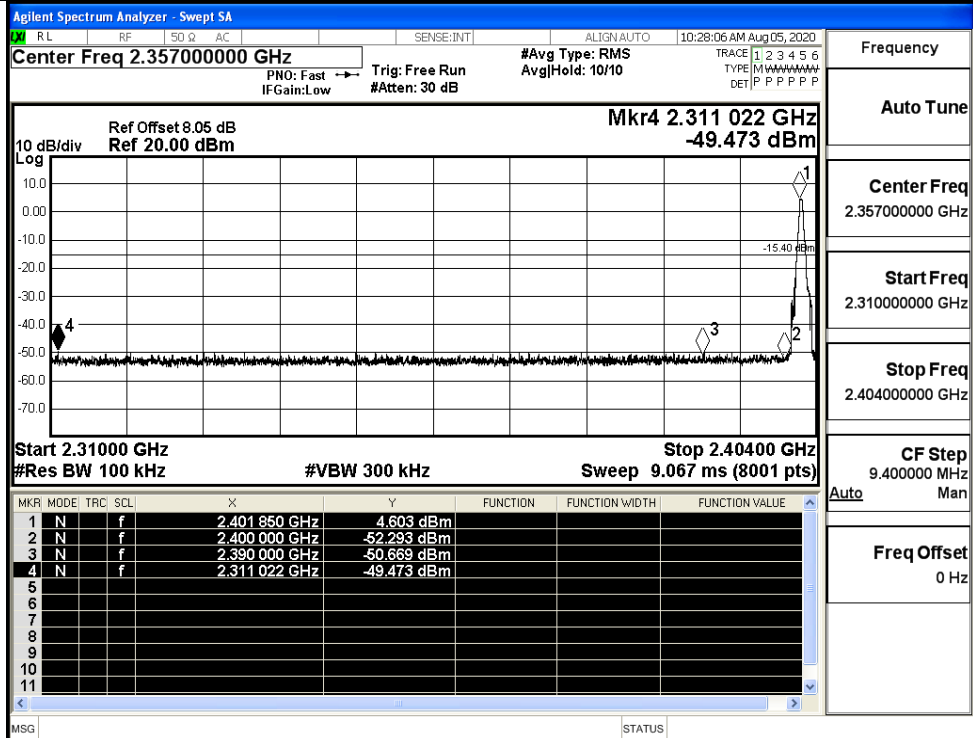


A.7 Band-edge for RF Conducted Emissions

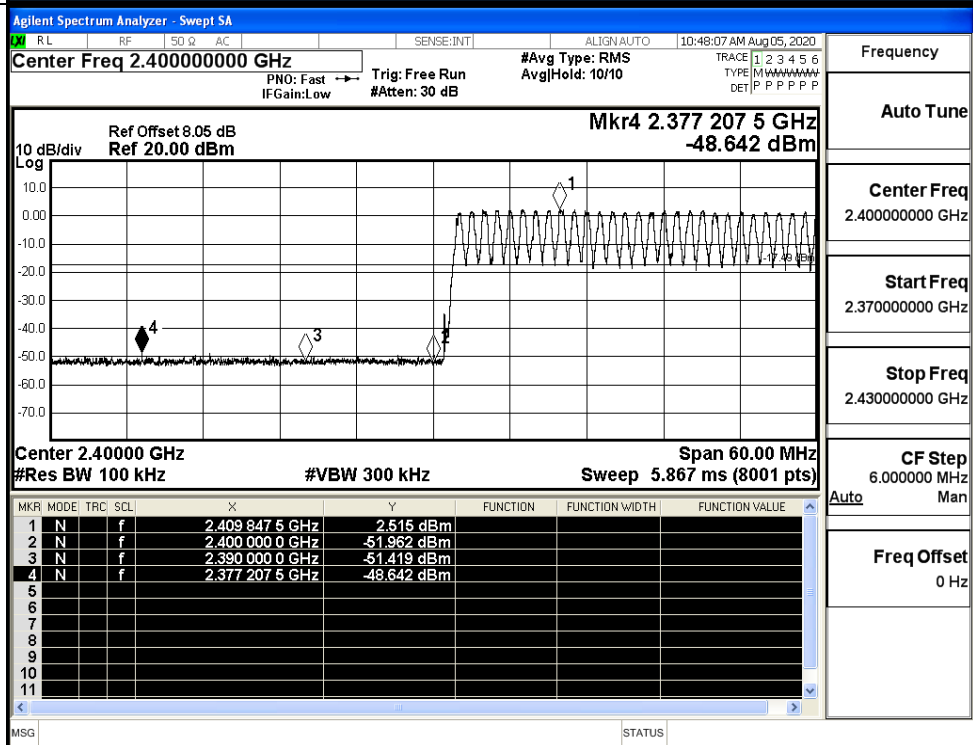
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.603	Off	-49.473	-15.40	PASS
			2.515	On	-48.642	-17.49	PASS
	HCH	2480	3.736	Off	-49.032	-16.26	PASS
			2.470	On	-48.748	-17.53	PASS
π/4DQPSK	LCH	2402	3.106	Off	-49.723	-16.89	PASS
			1.189	On	-48.590	-18.81	PASS
	HCH	2480	2.314	Off	-49.253	-17.69	PASS
			1.069	On	-48.602	-18.93	PASS
8DPSK	LCH	2402	3.287	Off	-49.010	-16.71	PASS
			0.976	On	-48.472	-19.02	PASS
	HCH	2480	-0.358	Off	-48.856	-20.36	PASS
			1.301	On	-48.638	-18.7	PASS

Test Graphs

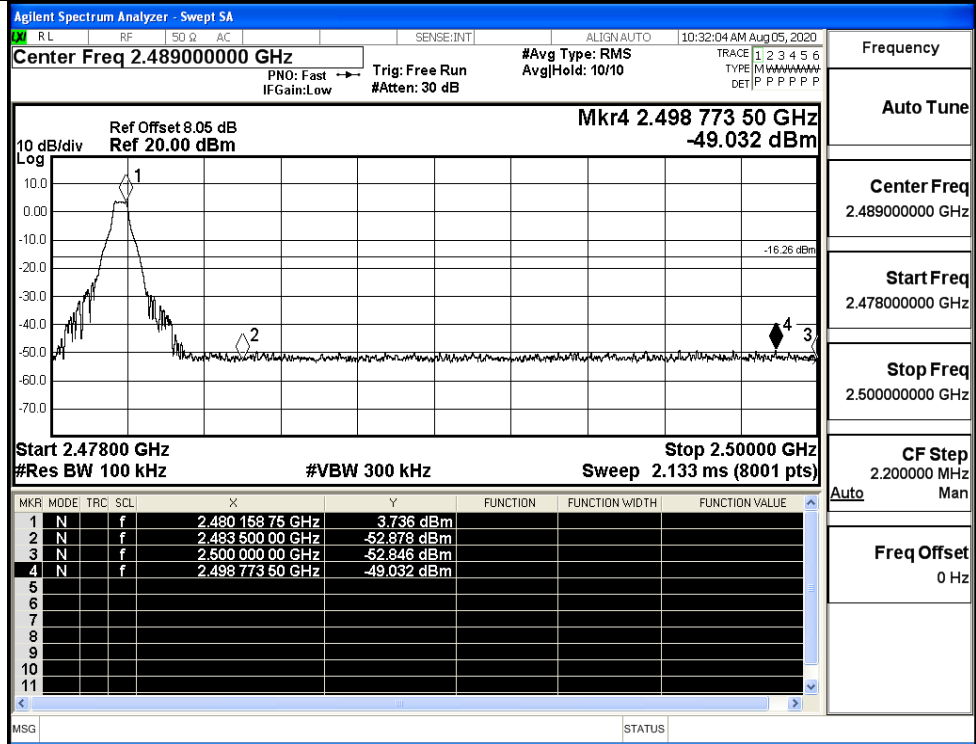
GFSK/LCH/No Hop



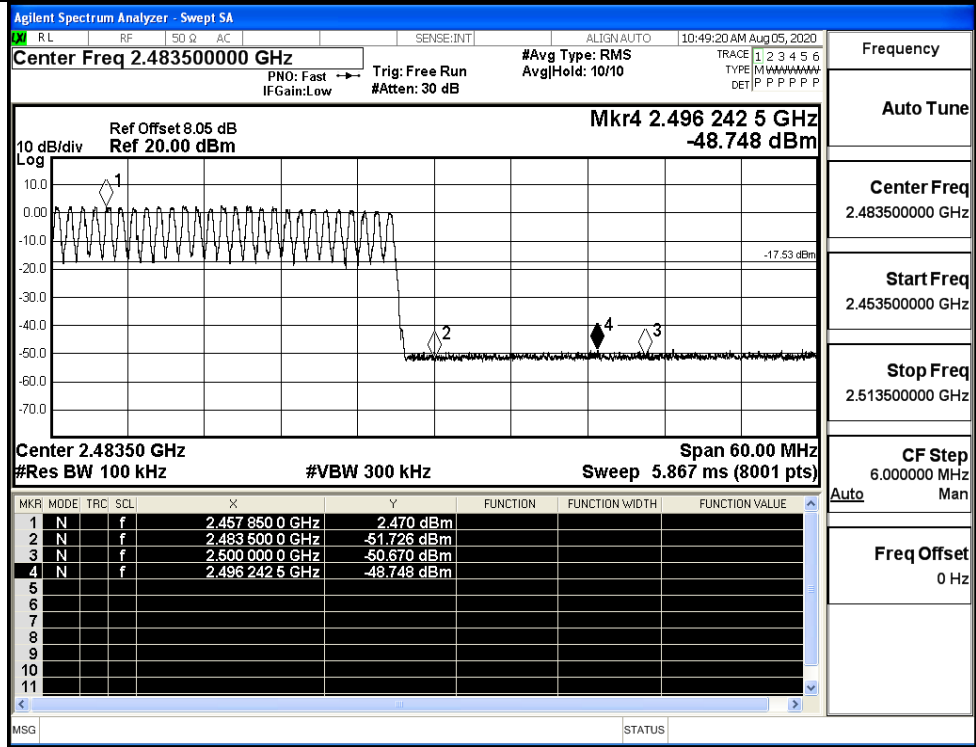
GFSK/LCH/Hop



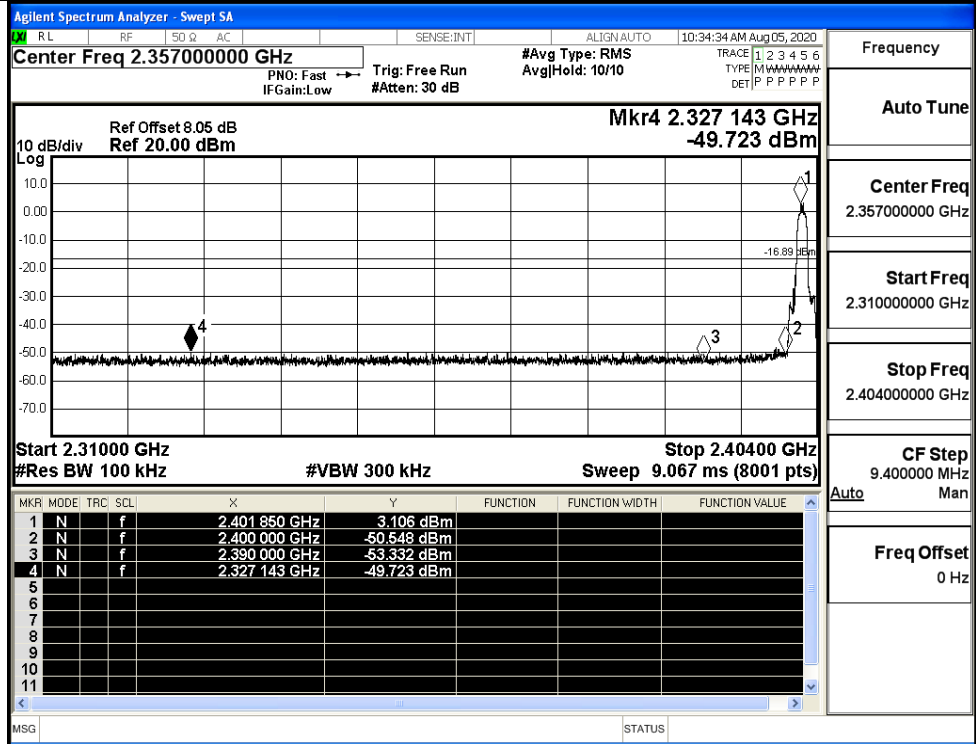
GFSK/HCH/No Hop



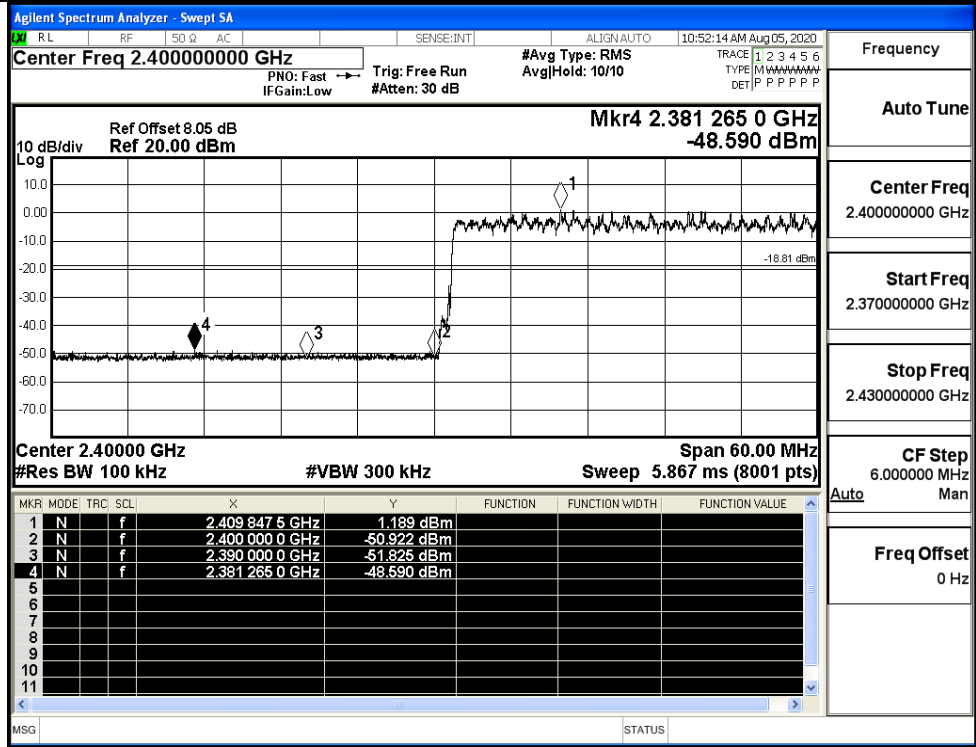
GFSK/HCH/Hop



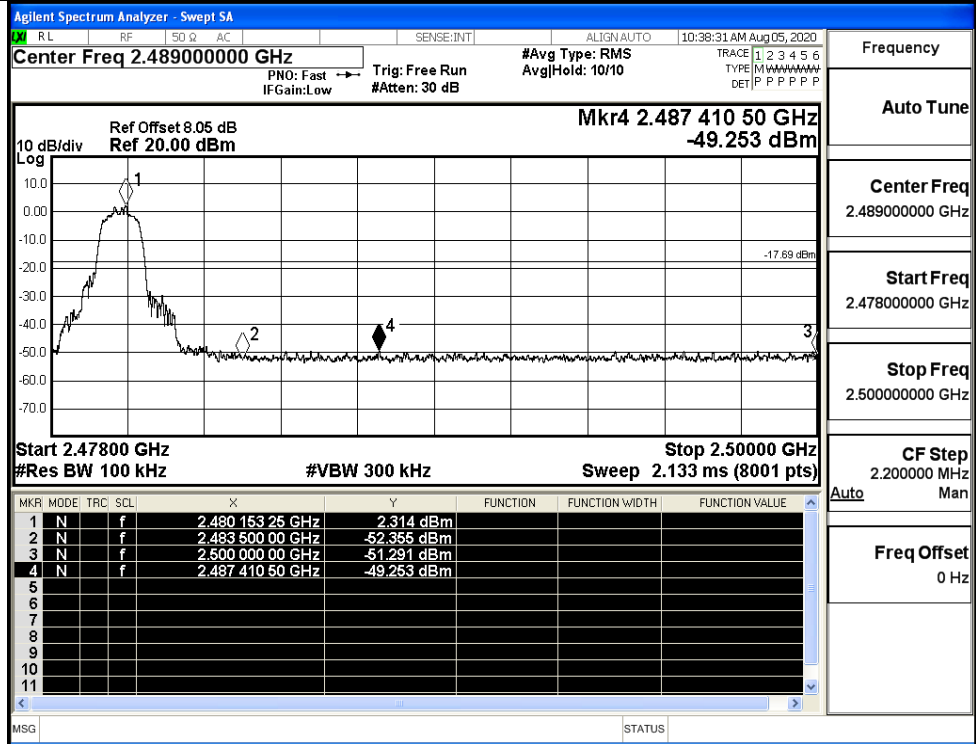
$\pi/4$ DQPSK/LCH/No
Hop



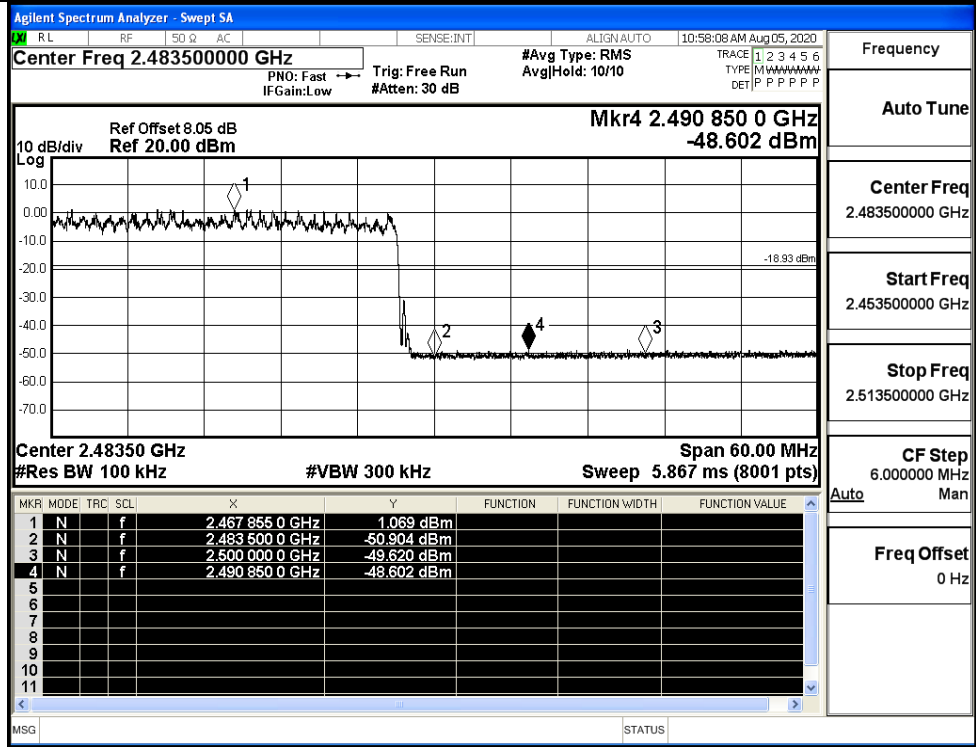
$\pi/4$ DQPSK/LCH/Hop



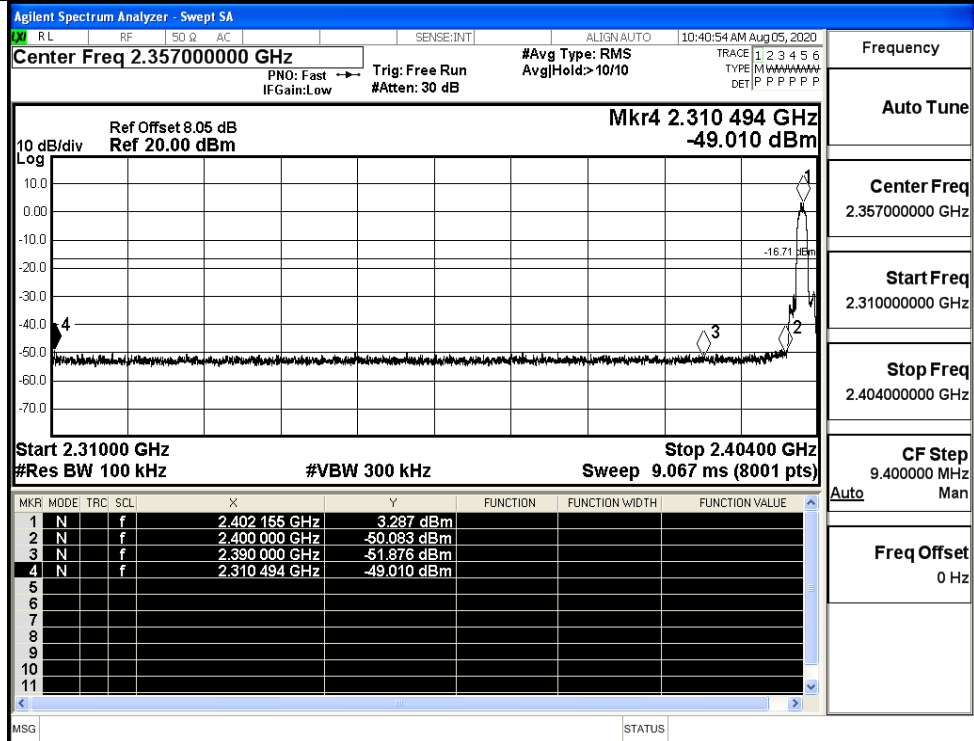
π /4DQPSK/HCH/No
Hop



π /4DQPSK/HCH/Hop

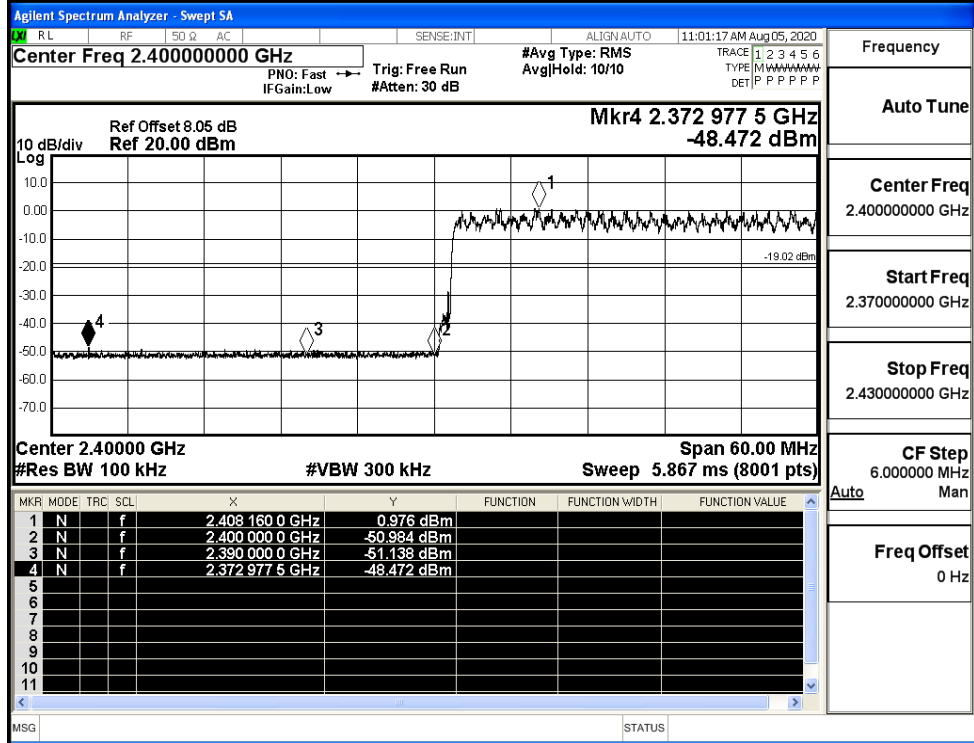


8DPSK/LCH/No Hop



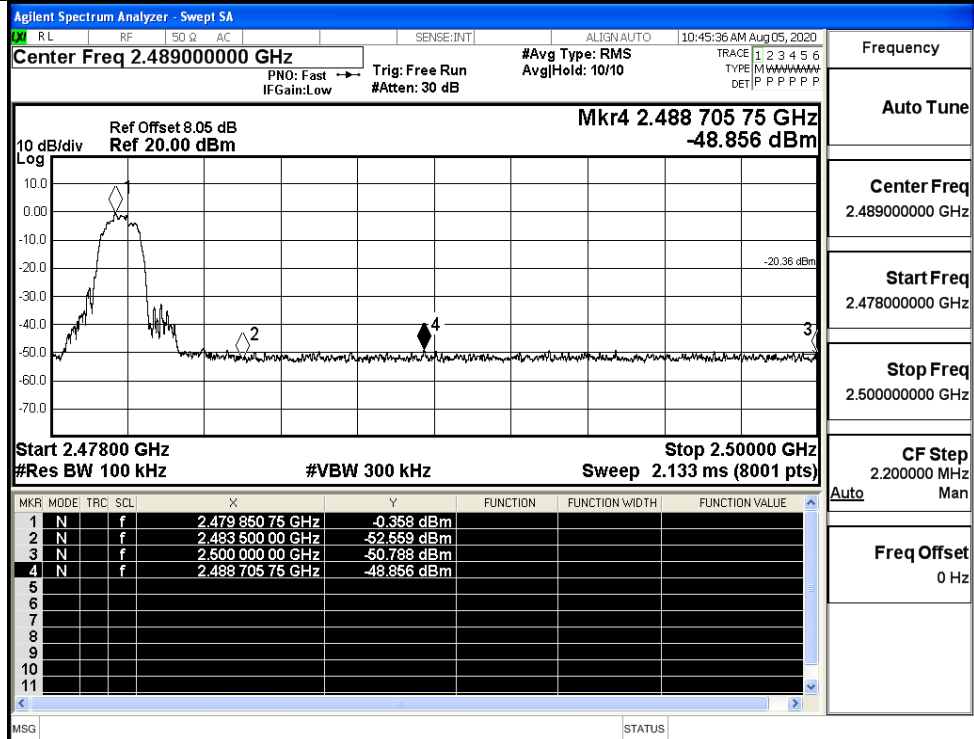
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

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

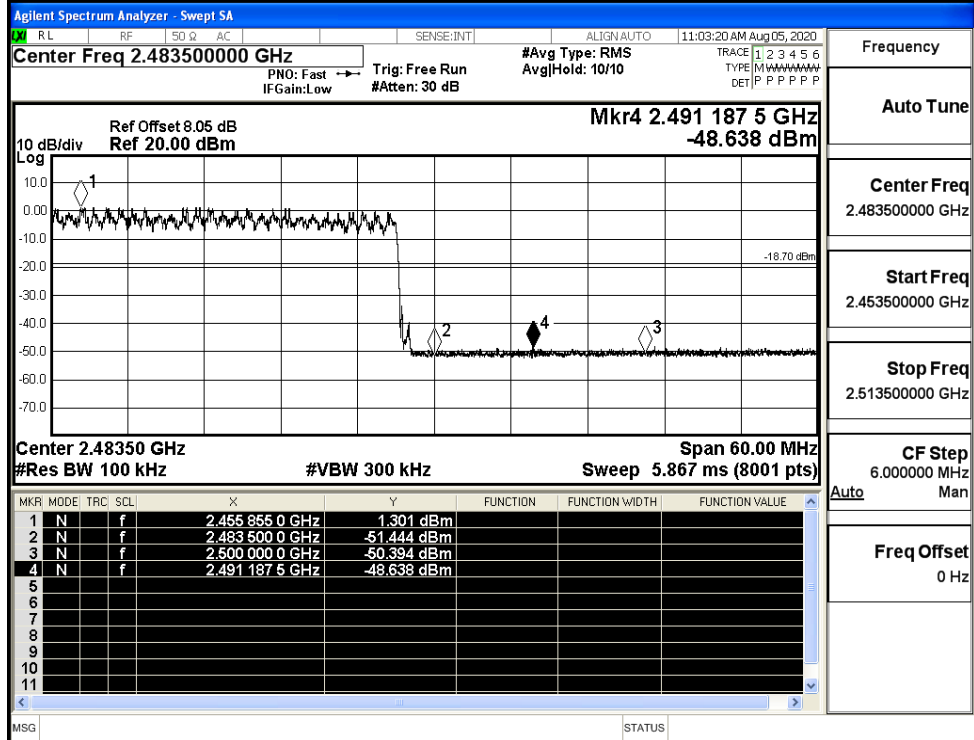
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz

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

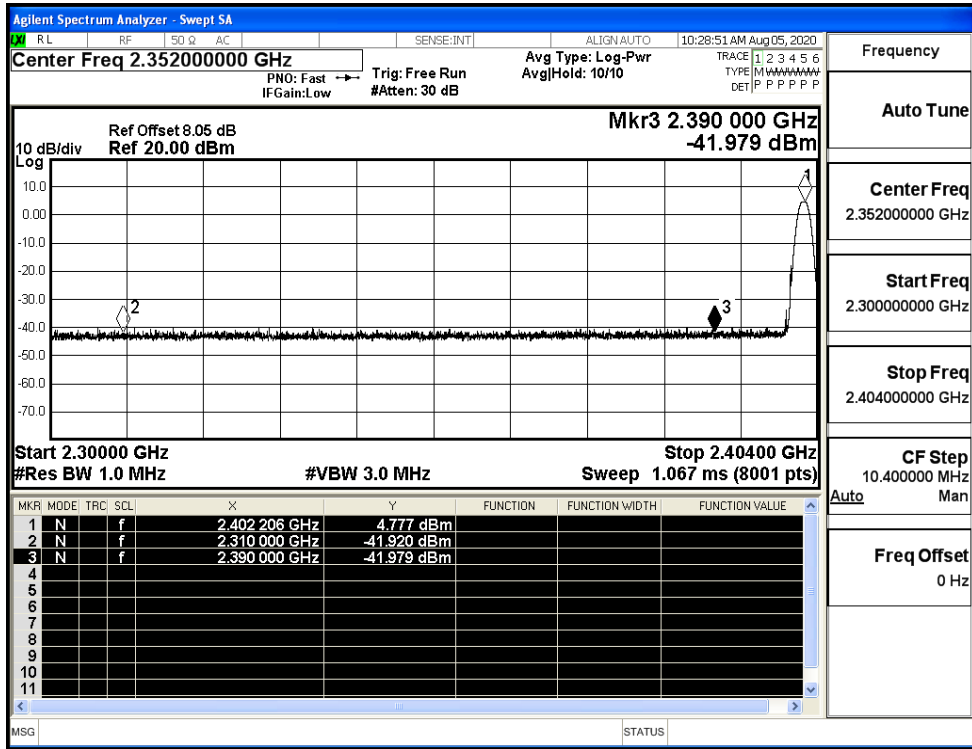
CF Step
6.000000 MHz

Freq Offset
0 Hz

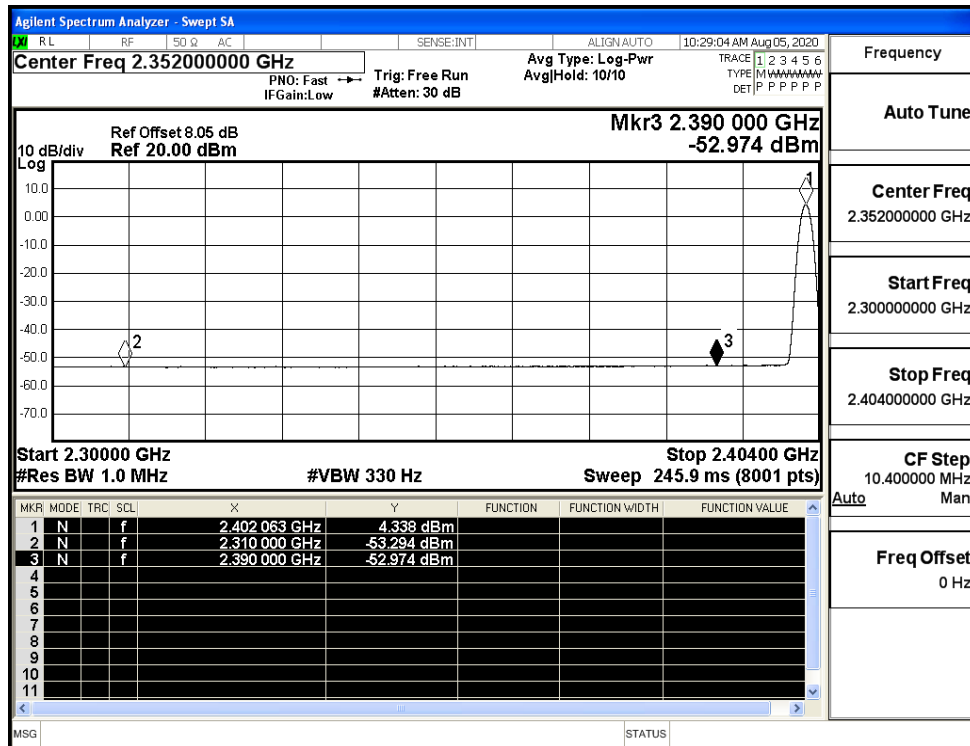
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.92	2.0	0	53.34	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	41.96	AV	54	PASS
	Off	2390.0	-41.98	2.0	0	53.28	PEAK	74	PASS
	Off	2390.0	-52.97	2.0	0	42.28	AV	54	PASS
	Off	2483.5	-41.45	2.0	0	53.80	PEAK	74	PASS
	Off	2483.5	-52.28	2.0	0	42.97	AV	54	PASS
	Off	2500.0	-42.01	2.0	0	53.24	PEAK	74	PASS
	Off	2500.0	-52.28	2.0	0	42.97	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.32	2.0	0	52.94	PEAK	74	PASS
	Off	2310.0	-53.34	2.0	0	41.92	AV	54	PASS
	Off	2390.0	-41.99	2.0	0	53.27	PEAK	74	PASS
	Off	2390.0	-52.85	2.0	0	42.40	AV	54	PASS
	Off	2483.5	-42.59	2.0	0	52.67	PEAK	74	PASS
	Off	2483.5	-52.06	2.0	0	43.20	AV	54	PASS
	Off	2500.0	-41.69	2.0	0	53.57	PEAK	74	PASS
	Off	2500.0	-52.30	2.0	0	42.96	AV	54	PASS
8DPSK	Off	2310.0	-43.18	2.0	0	52.07	PEAK	74	PASS
	Off	2310.0	-53.40	2.0	0	41.86	AV	54	PASS
	Off	2390.0	-42.81	2.0	0	52.45	PEAK	74	PASS
	Off	2390.0	-52.96	2.0	0	42.30	AV	54	PASS
	Off	2483.5	-42.15	2.0	0	53.11	PEAK	74	PASS
	Off	2483.5	-52.31	2.0	0	42.95	AV	54	PASS
	Off	2500.0	-42.46	2.0	0	52.79	PEAK	74	PASS
	Off	2500.0	-52.28	2.0	0	42.97	AV	54	PASS

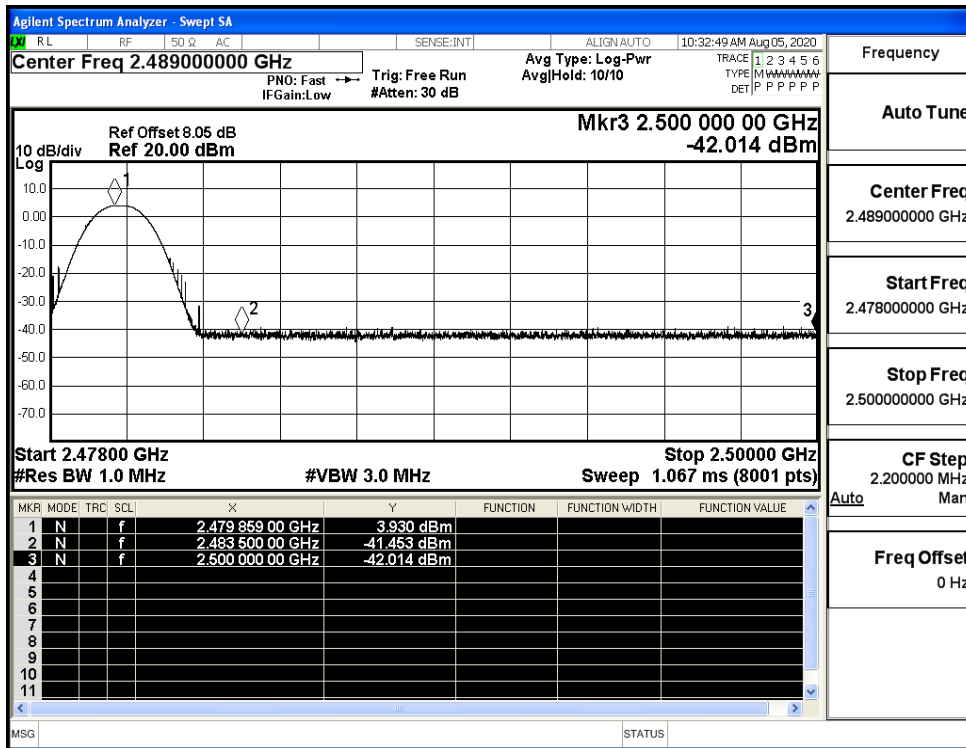
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



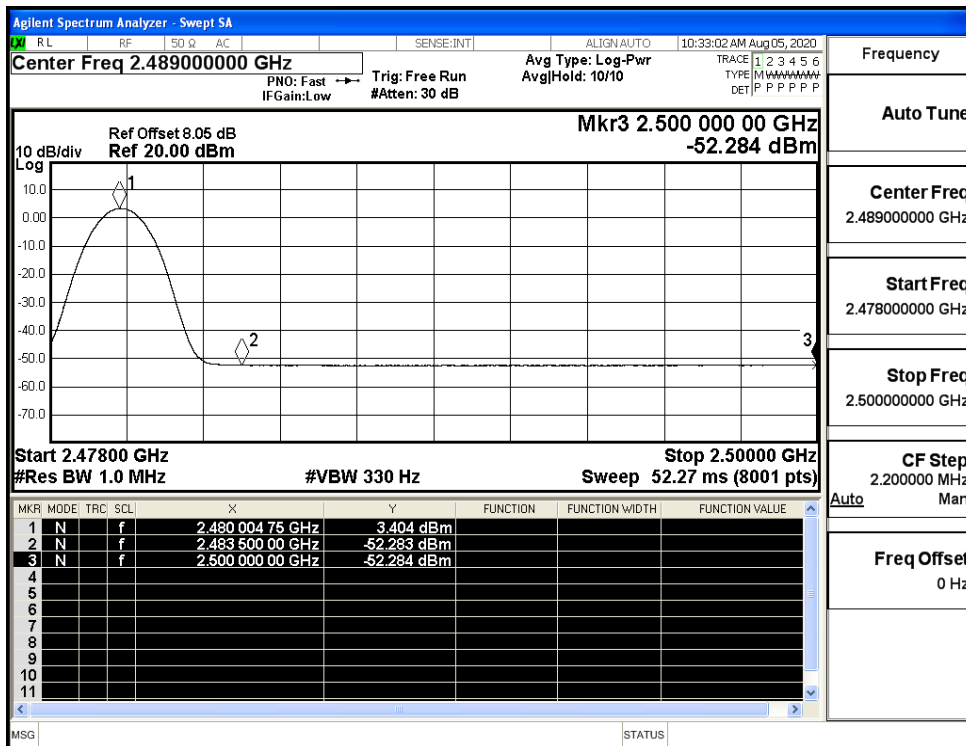
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



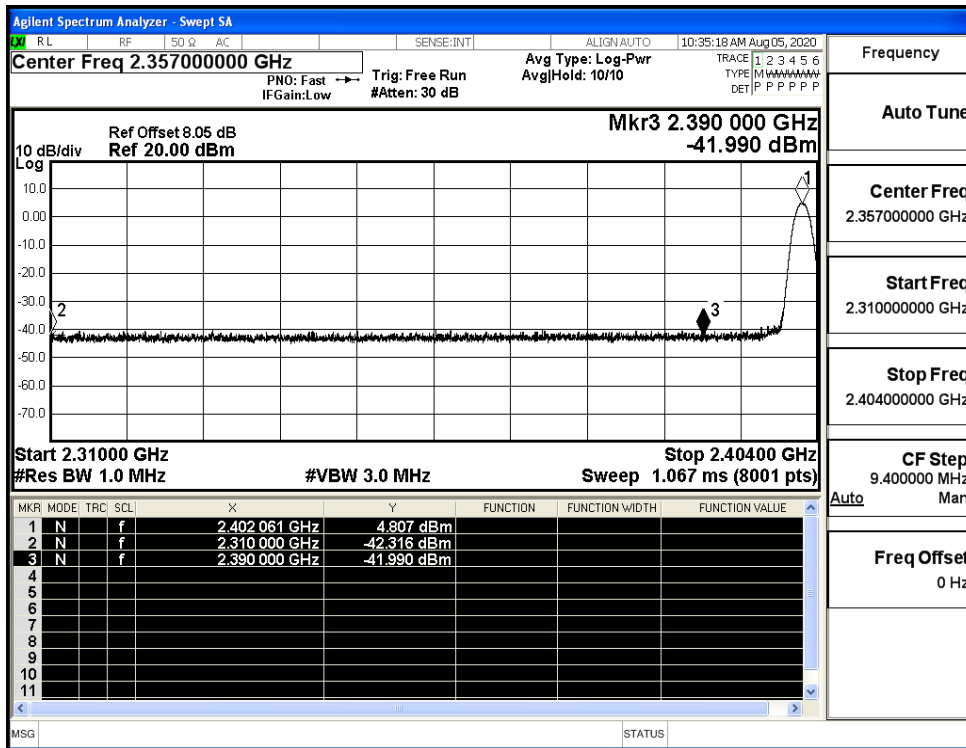
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



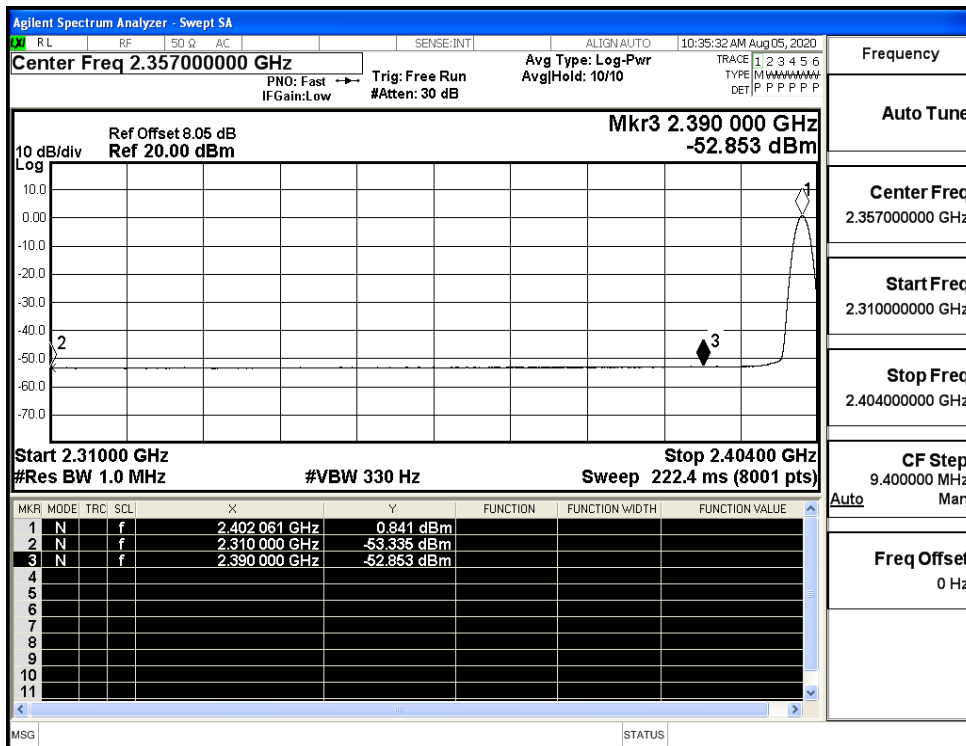
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



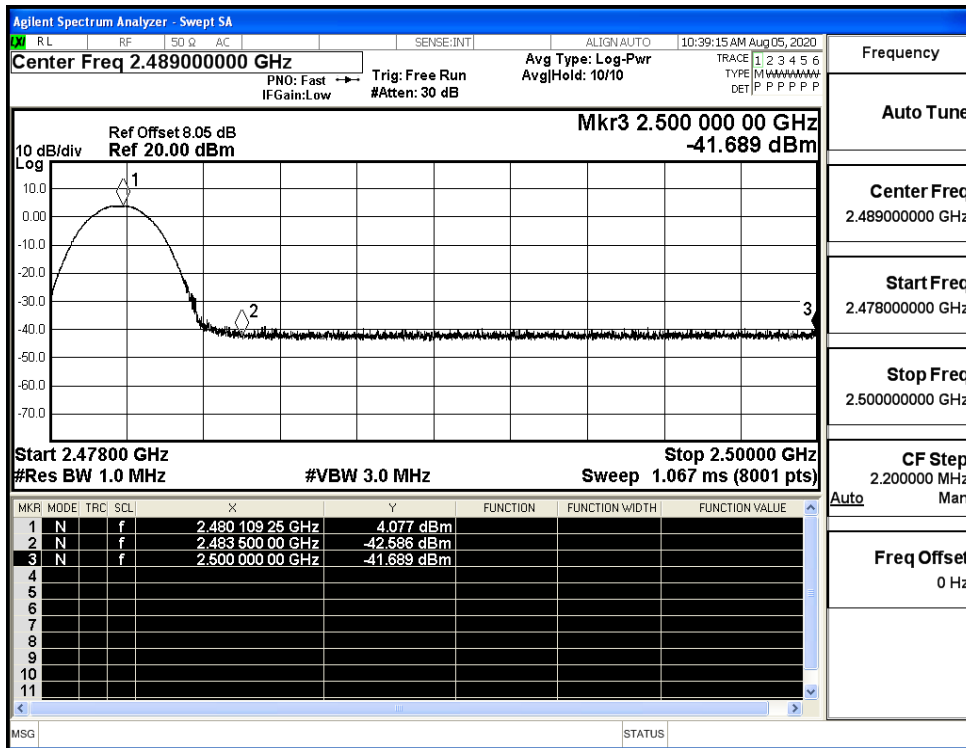
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



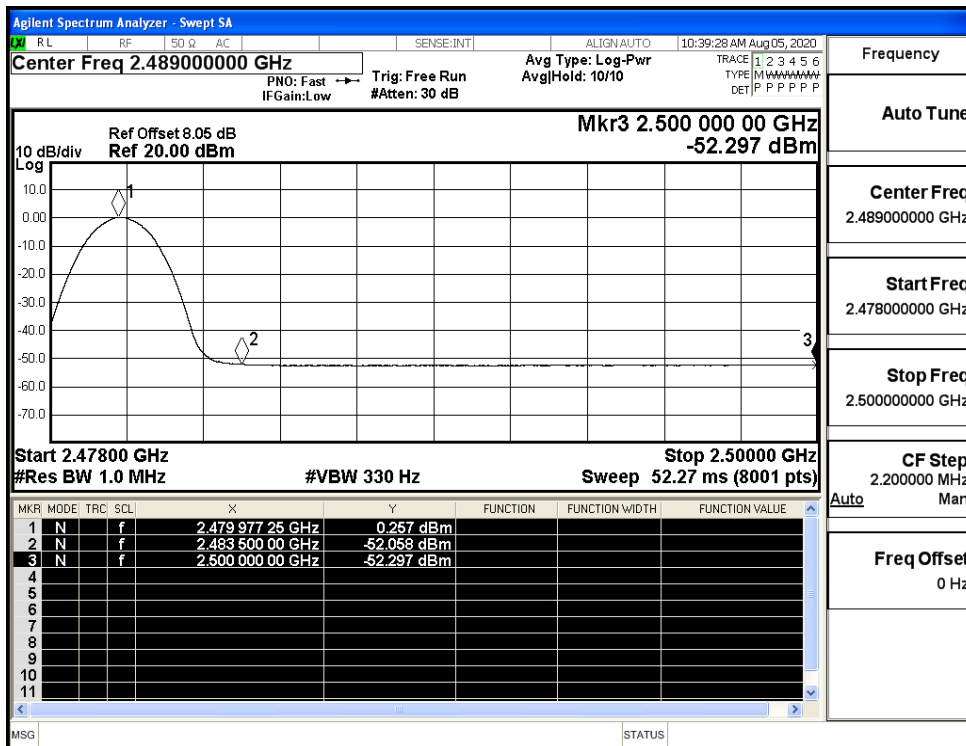
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



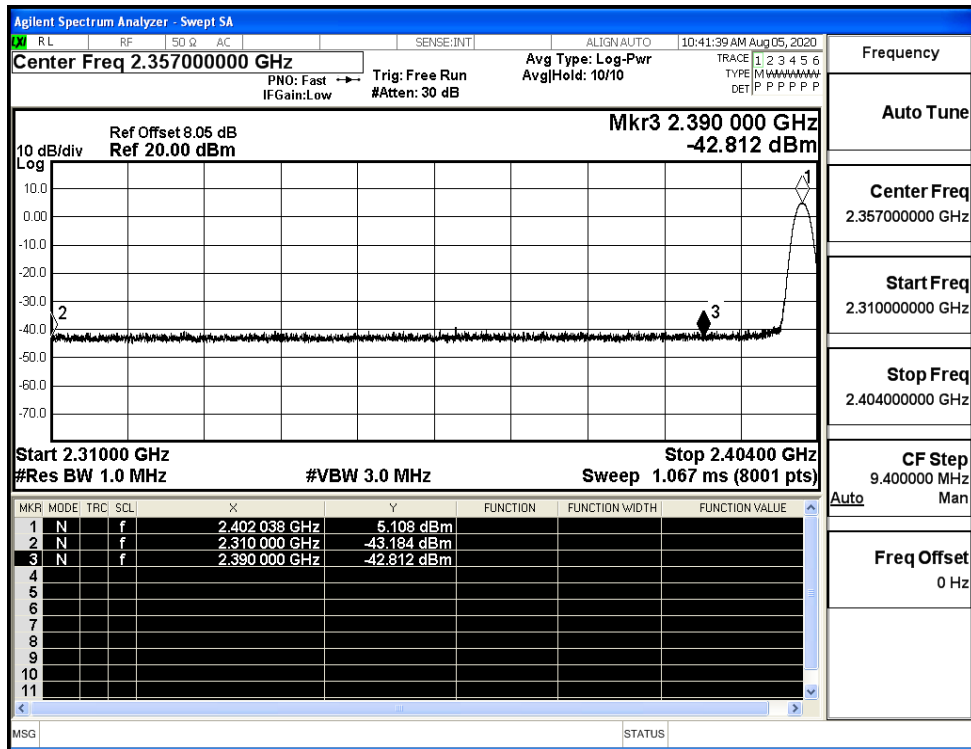
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



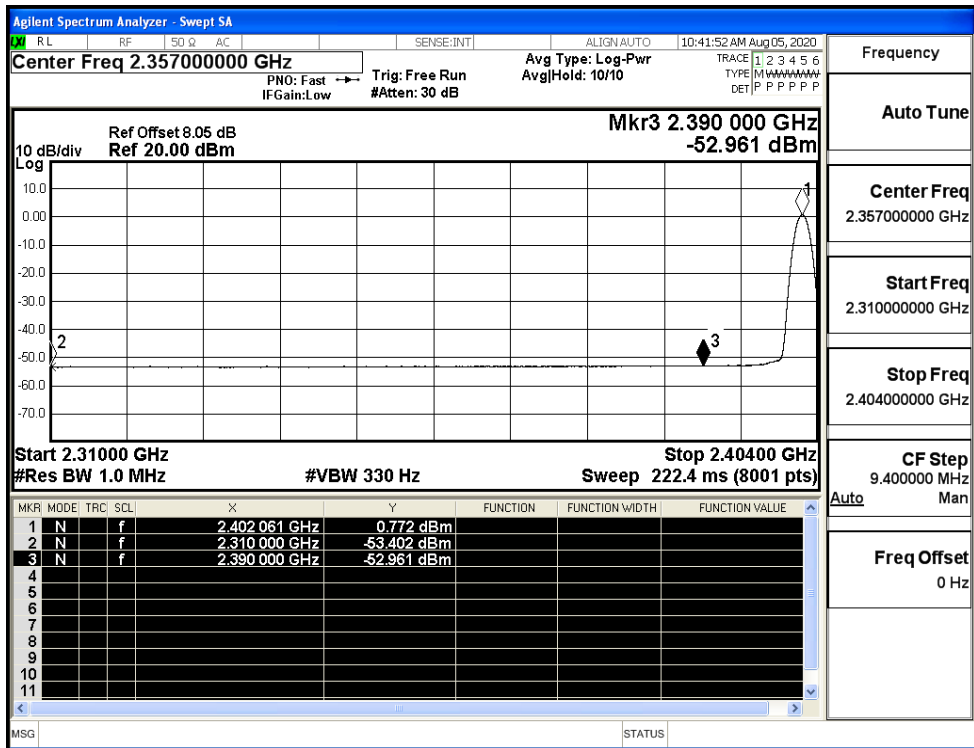
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



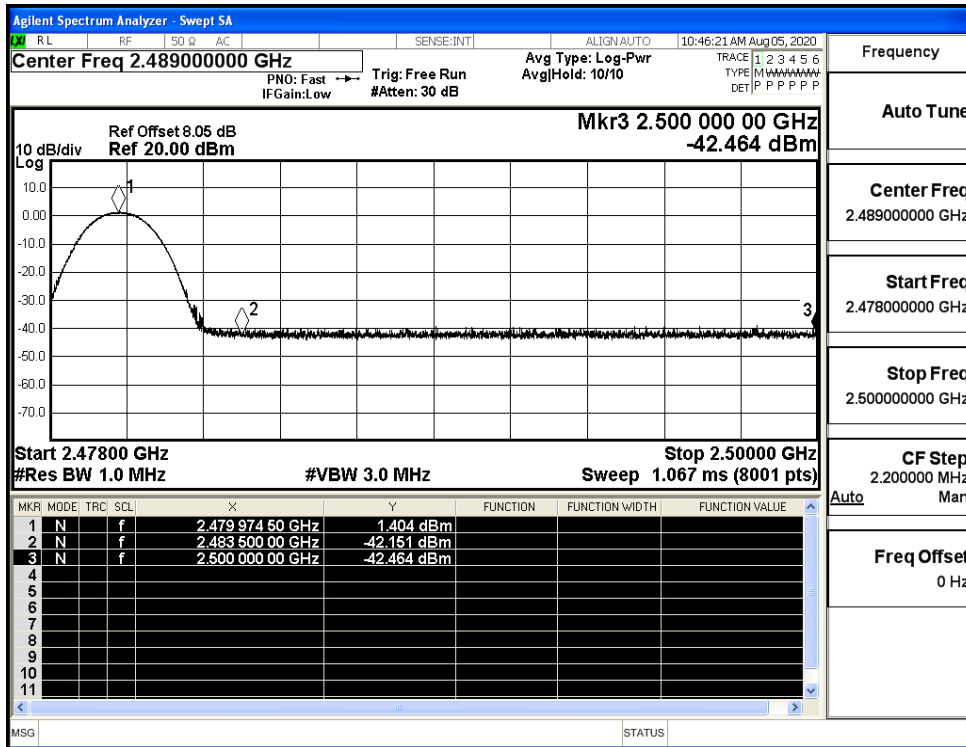
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

