

Appendix A

RF Test Data for BT V4.1(BDR/EDR) (Conducted Measurement)

Product Name: Portable Karaoke Party Speaker

Trade Mark: gemini

Test Model: MPA-K650

Environmental Conditions

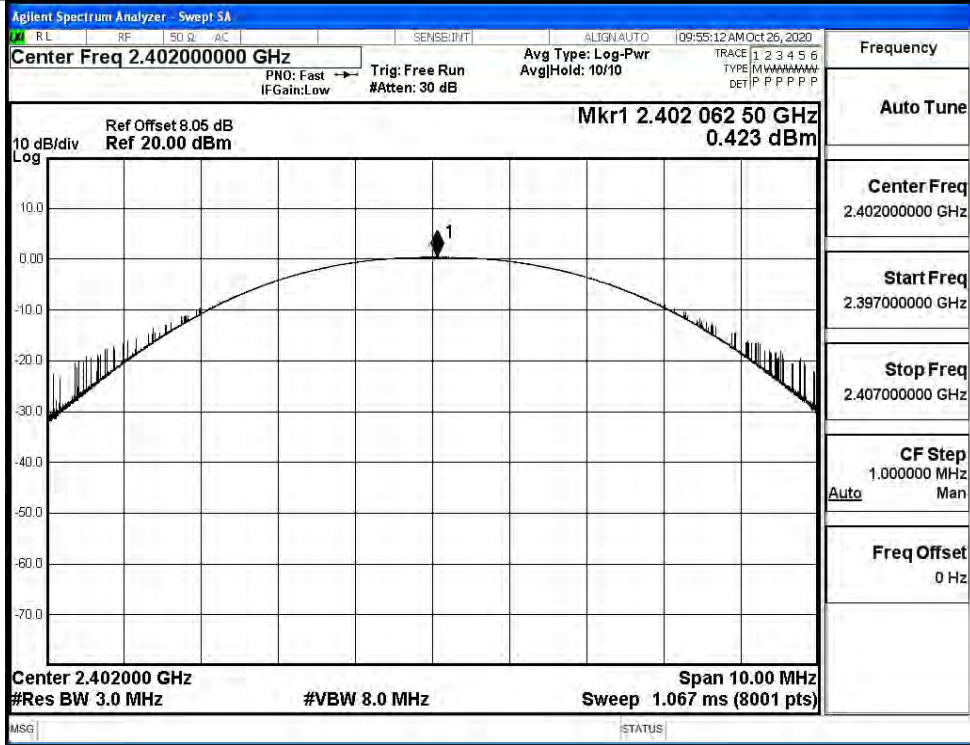
Temperature:	22.3° C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Jay Li
Supervised by:	Li Huan

A.1 Maximum Conducted Peak Output Power

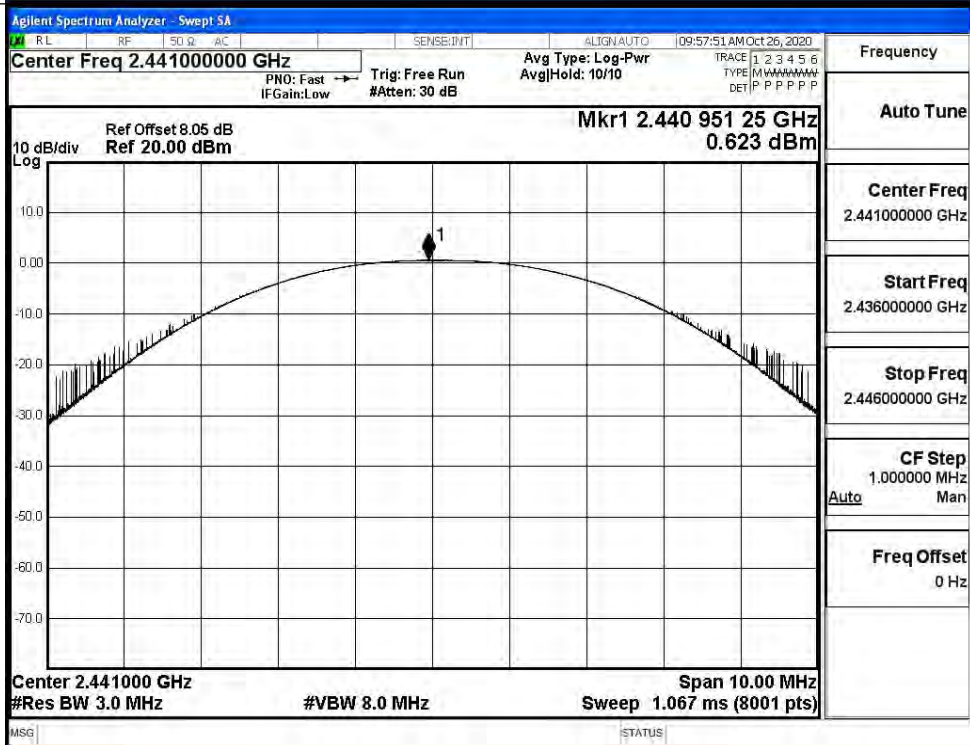
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.423	21	PASS
	MCH	0.623	21	PASS
	HCH	0.700	21	PASS
$\pi/4$ DQPSK	LCH	2.541	21	PASS
	MCH	2.786	21	PASS
	HCH	2.833	21	PASS
8DPSK	LCH	3.013	21	PASS
	MCH	3.177	21	PASS
	HCH	3.268	21	PASS

Test Graphs

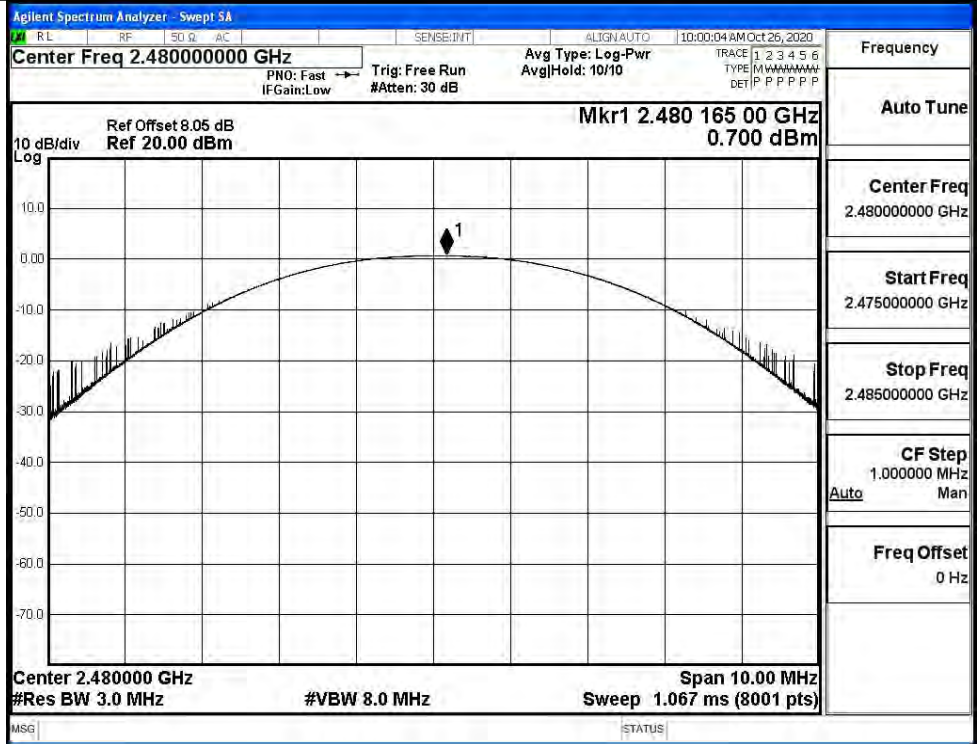
GFSK/LCH



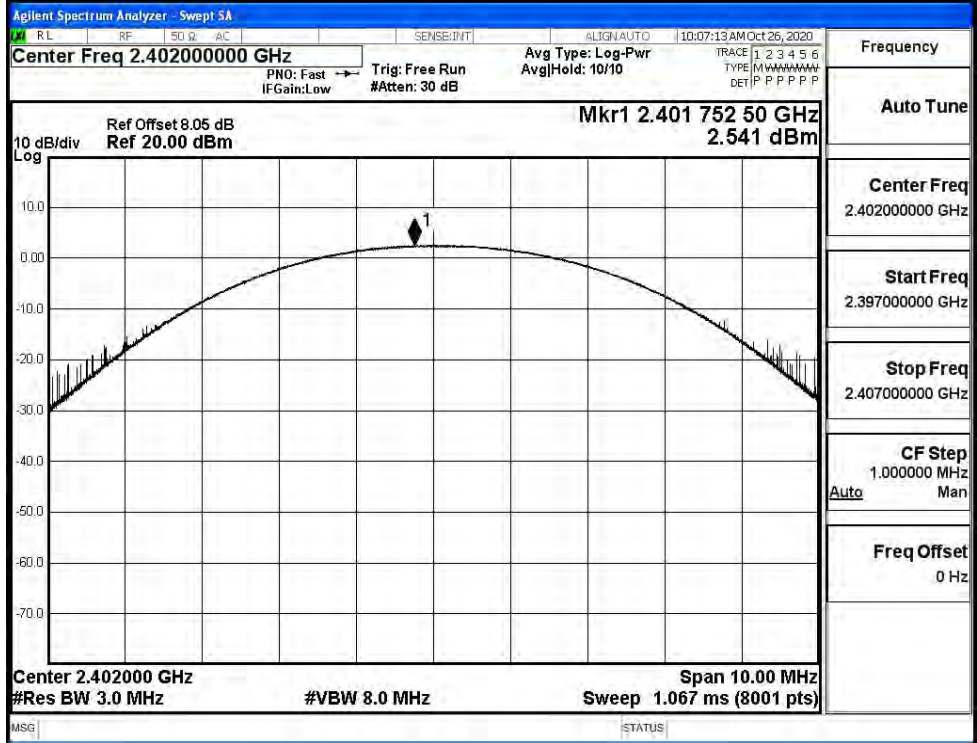
GFSK/MCH



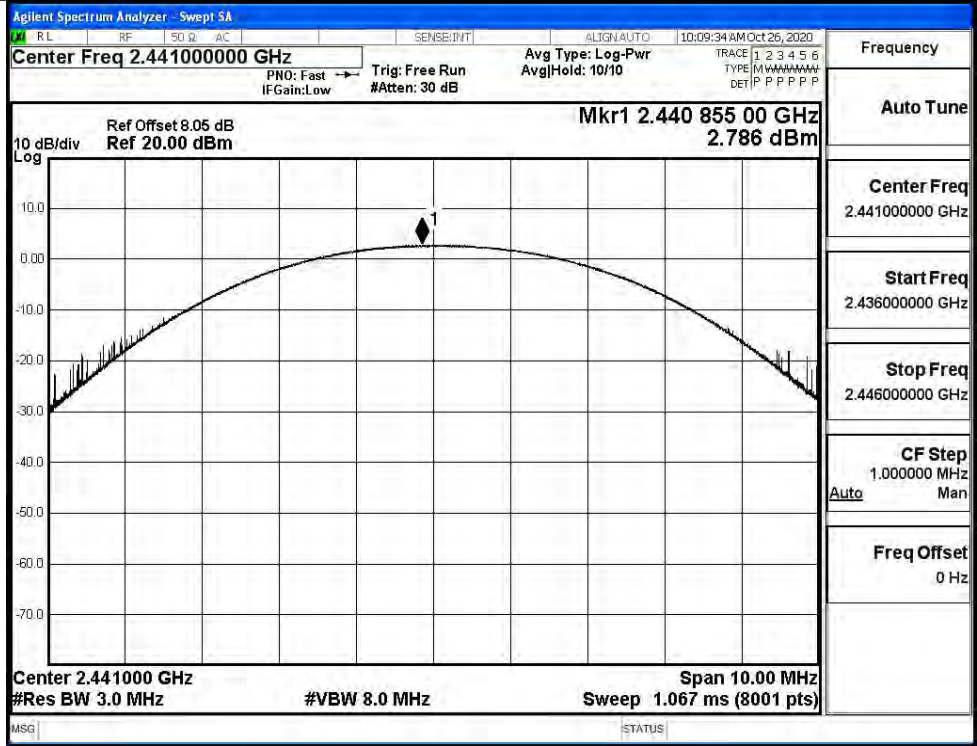
GFSK/HCH



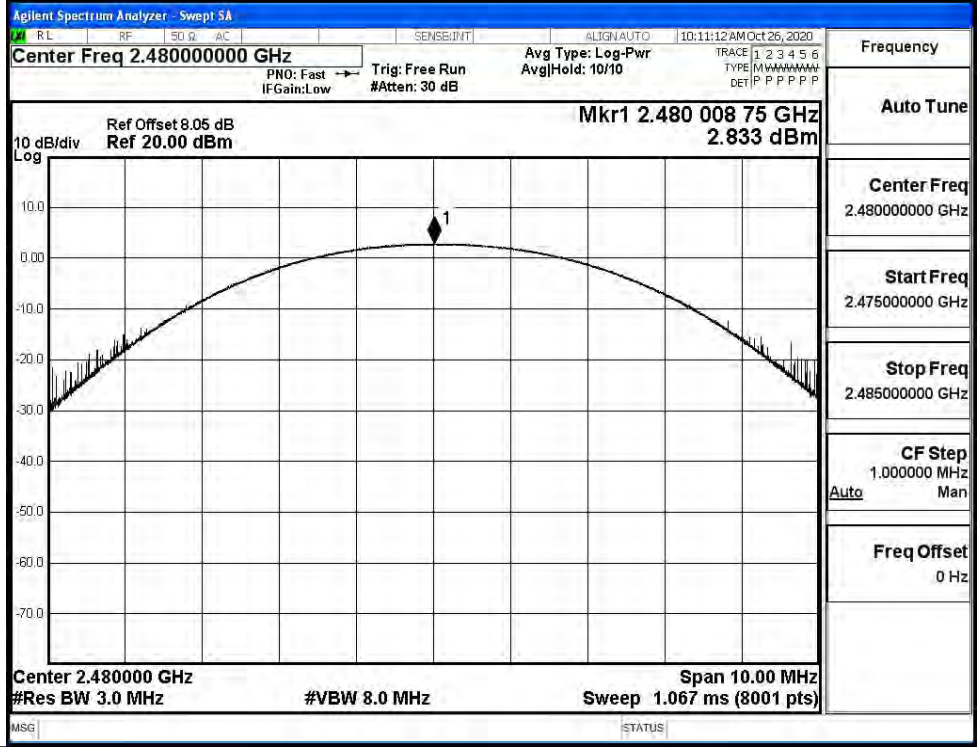
$\pi/4$ DQPSK/LCH



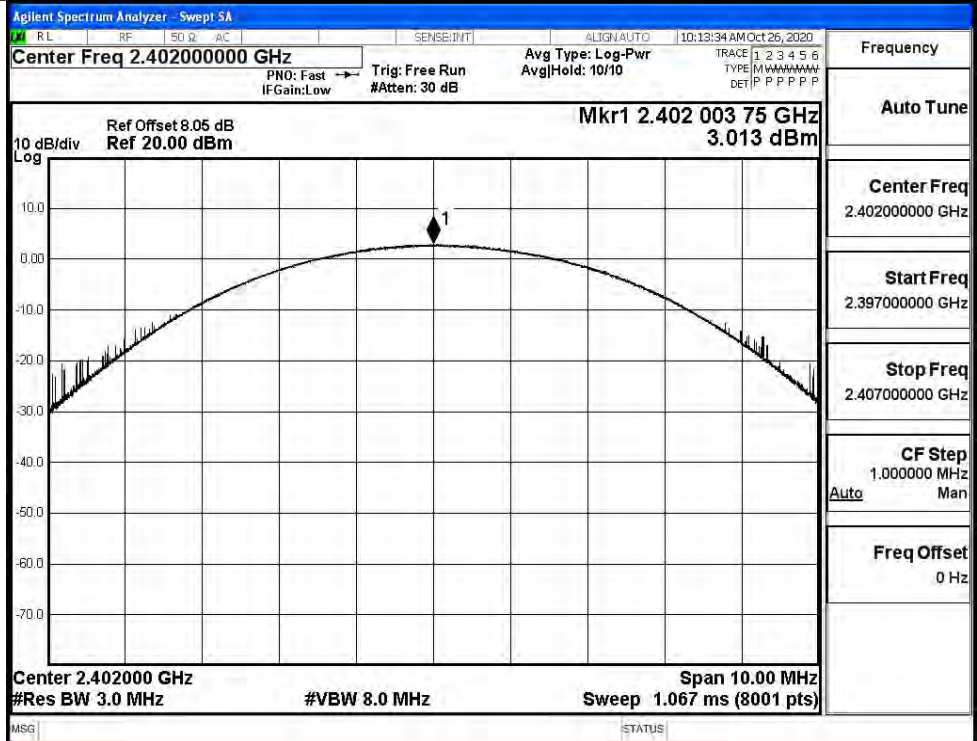
π /4DQPSK/MCH



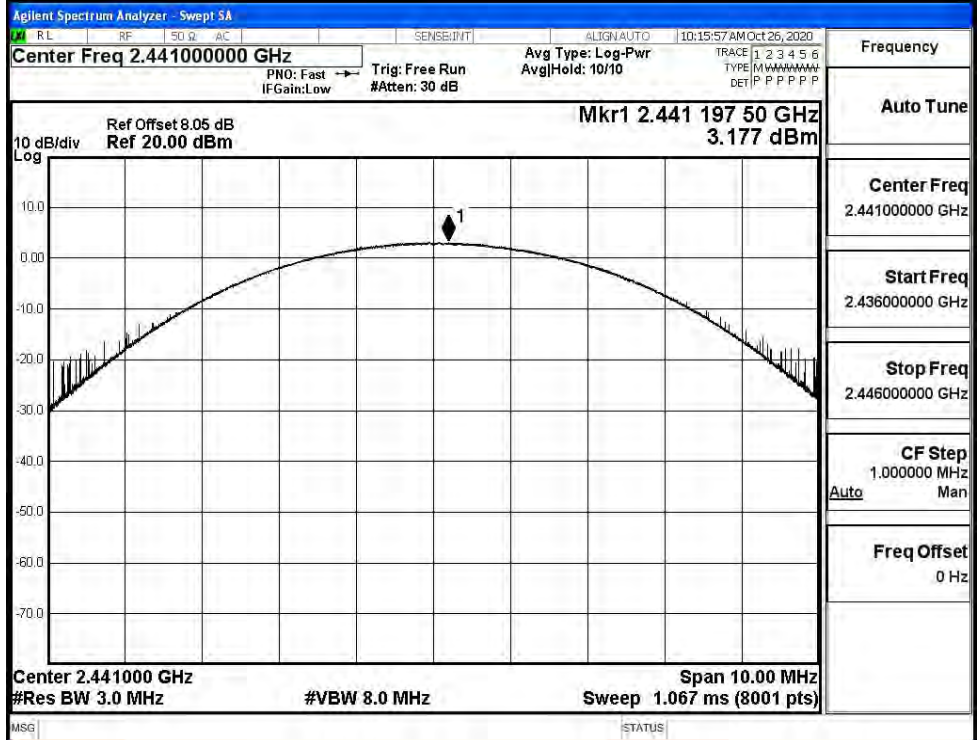
π /4DQPSK/HCH



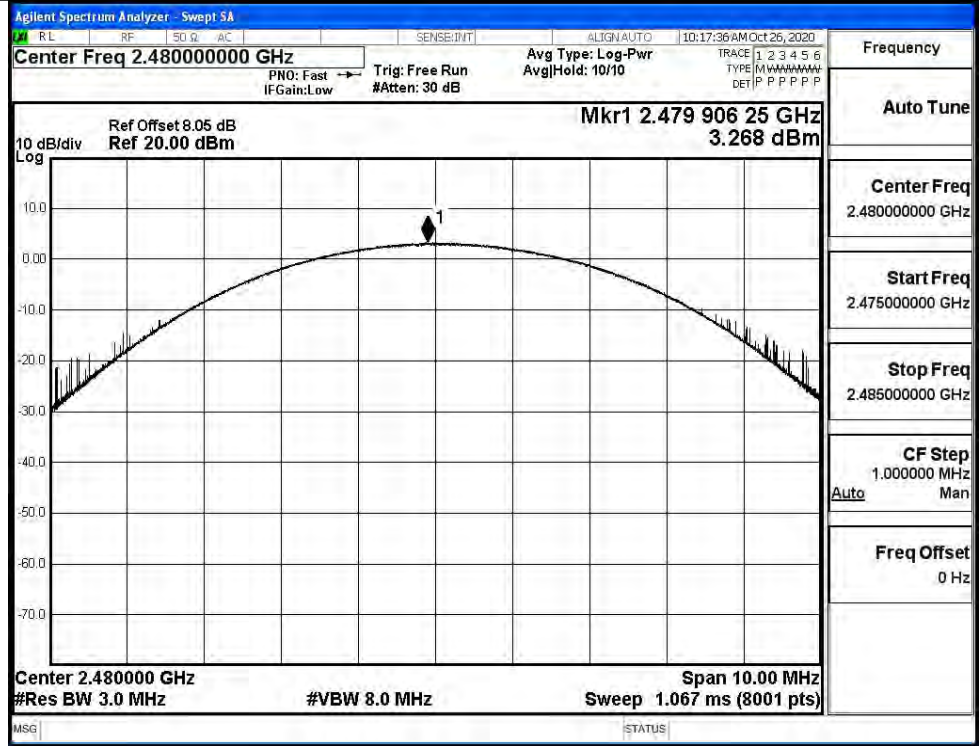
8DPSK/LCH



8DPSK/MCH

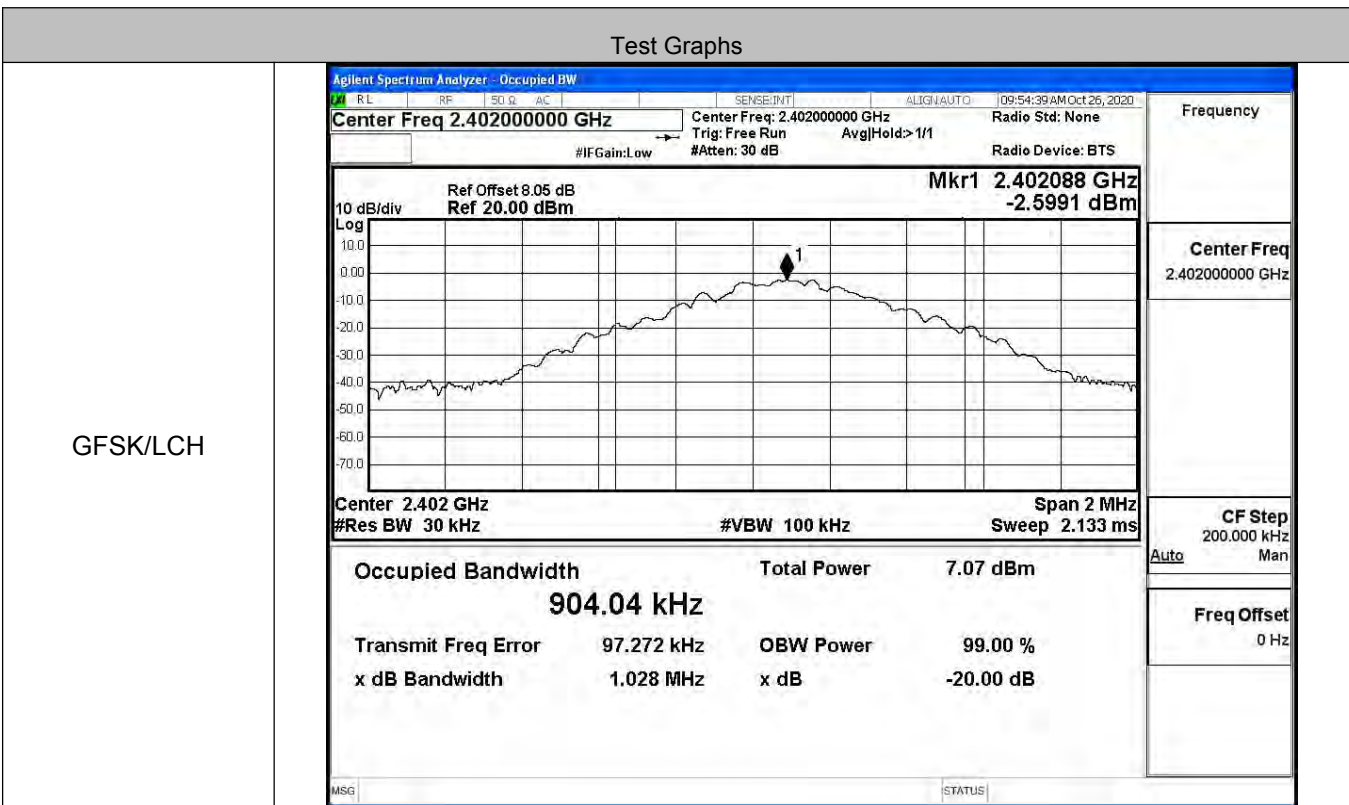


8DPSK/HCH



A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.028	Not Specified	PASS
	MCH	1.031	Not Specified	PASS
	HCH	1.027	Not Specified	PASS
π/4DQPSK	LCH	1.367	Not Specified	PASS
	MCH	1.366	Not Specified	PASS
	HCH	1.363	Not Specified	PASS
8DPSK	LCH	1.347	Not Specified	PASS
	MCH	1.349	Not Specified	PASS
	HCH	1.346	Not Specified	PASS



GFSK/MCH



Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

GFSK/HCH



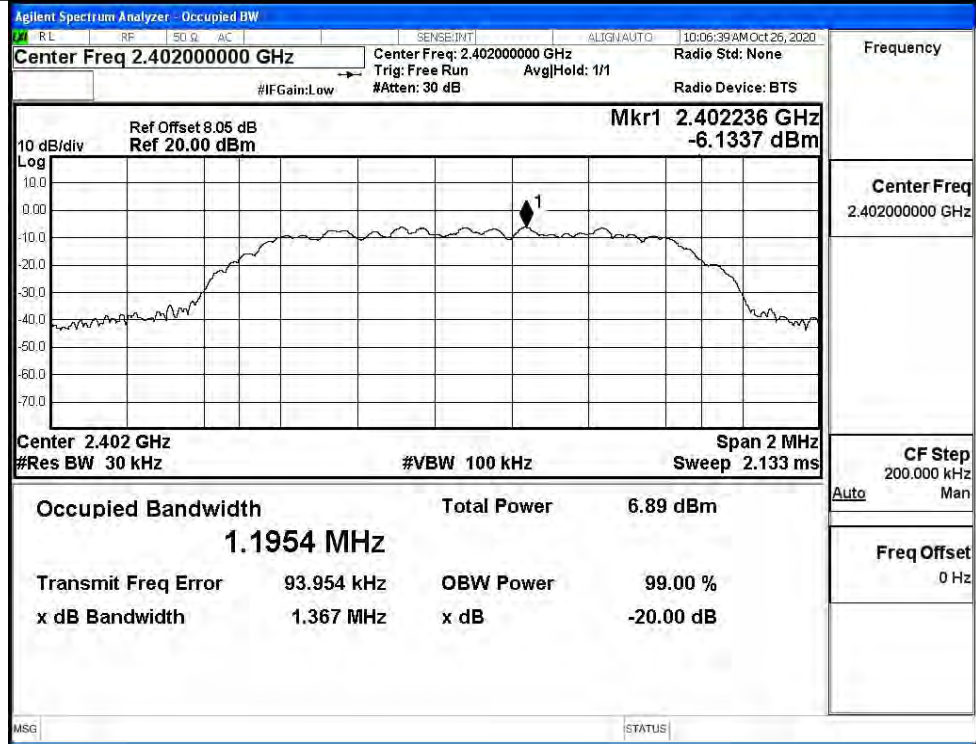
Frequency

Center Freq
2.480000000 GHz

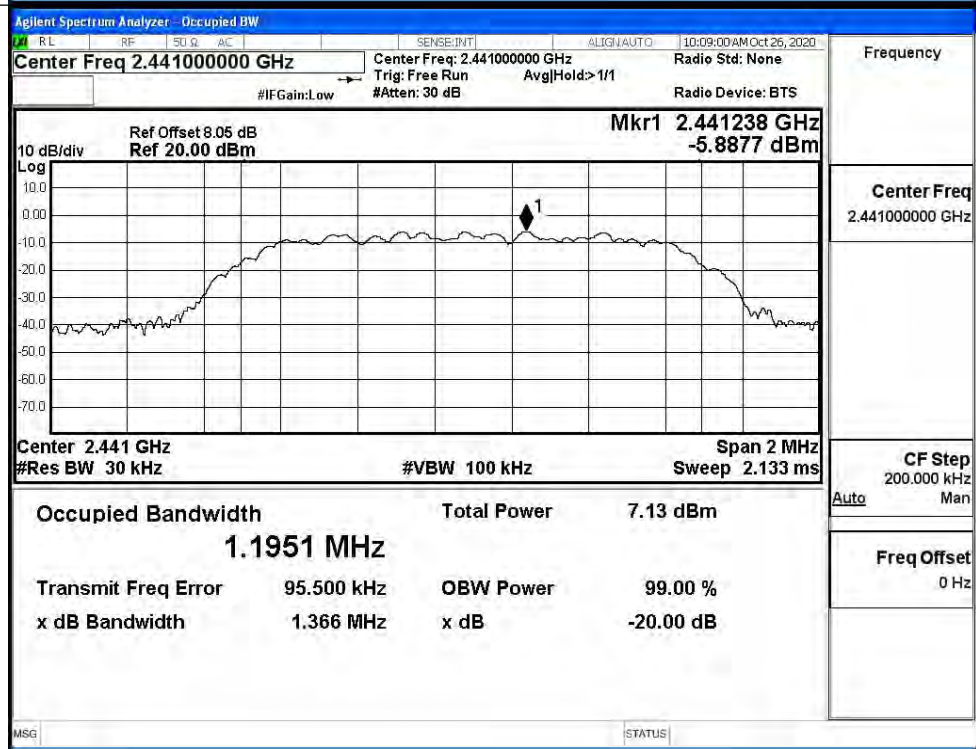
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

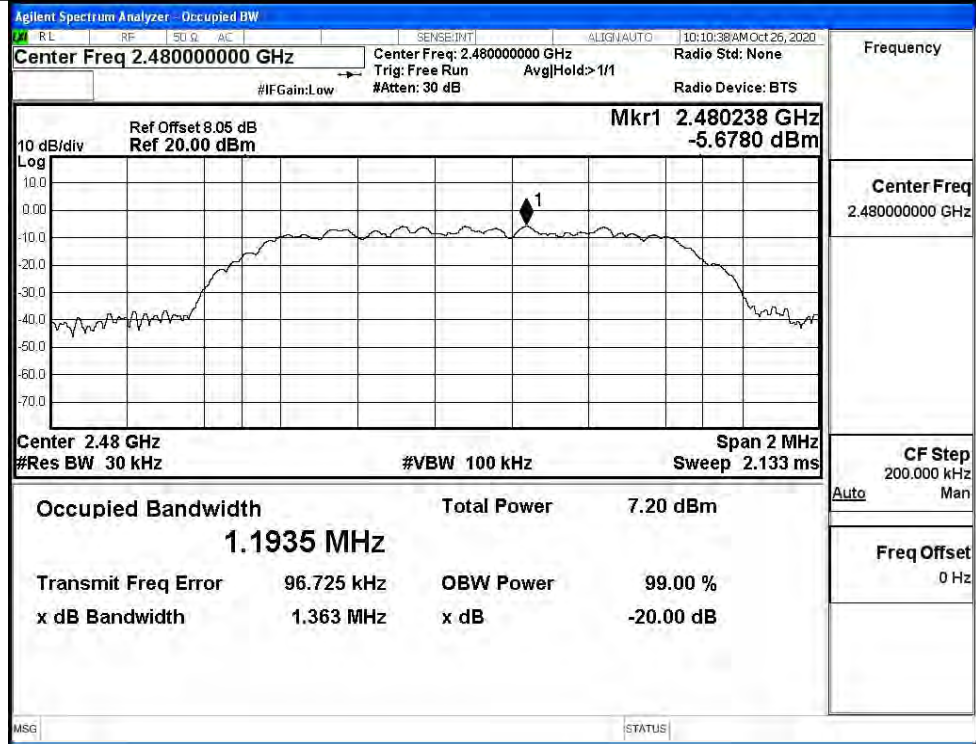
$\pi/4$ DQPSK/LCH



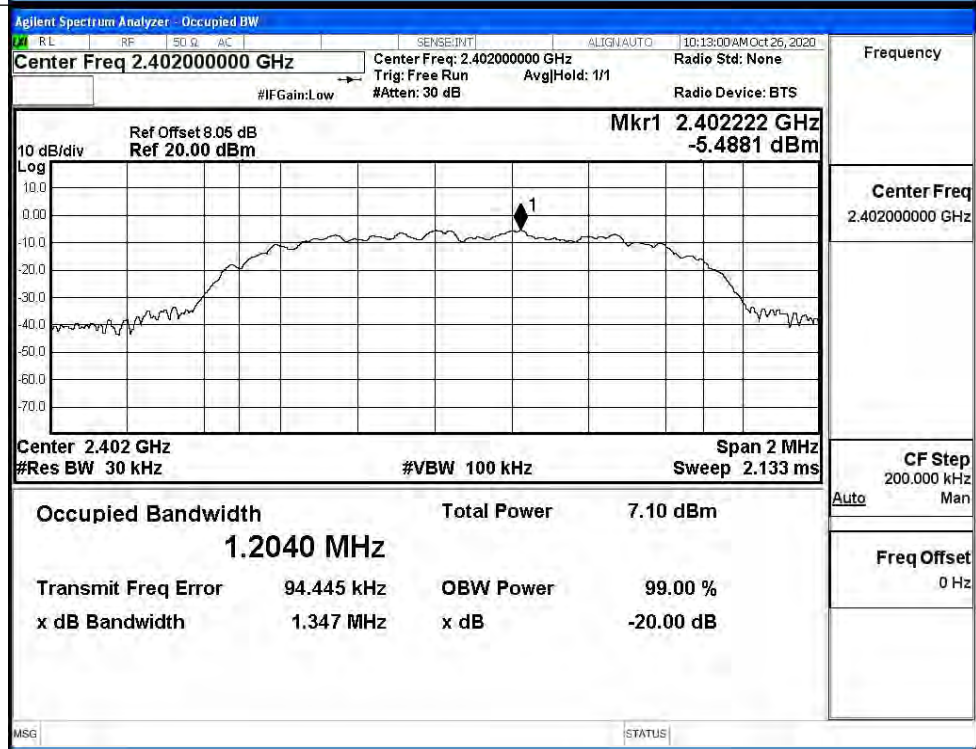
$\pi/4$ DQPSK/MCH



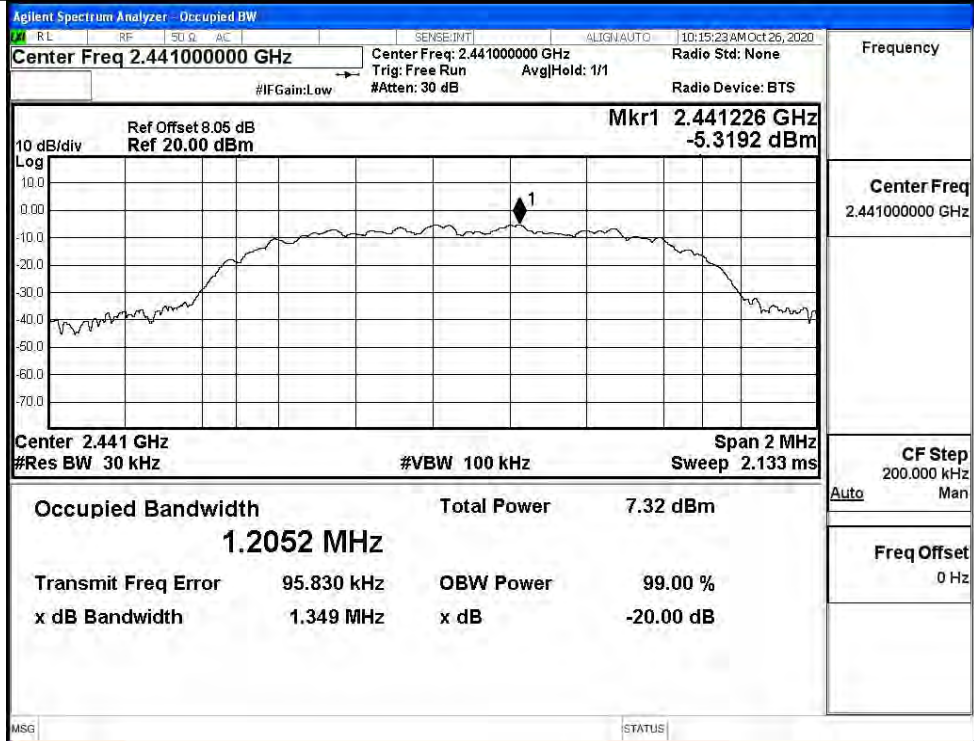
$\pi/4$ DQPSK/HCH



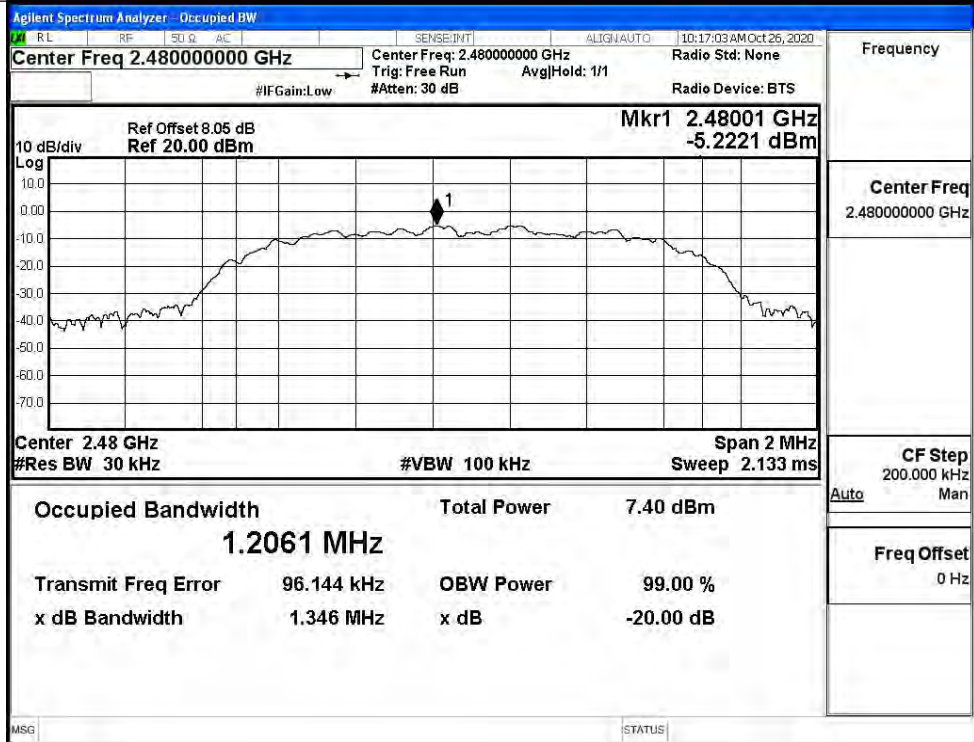
8DPSK/LCH



8DPSK/MCH

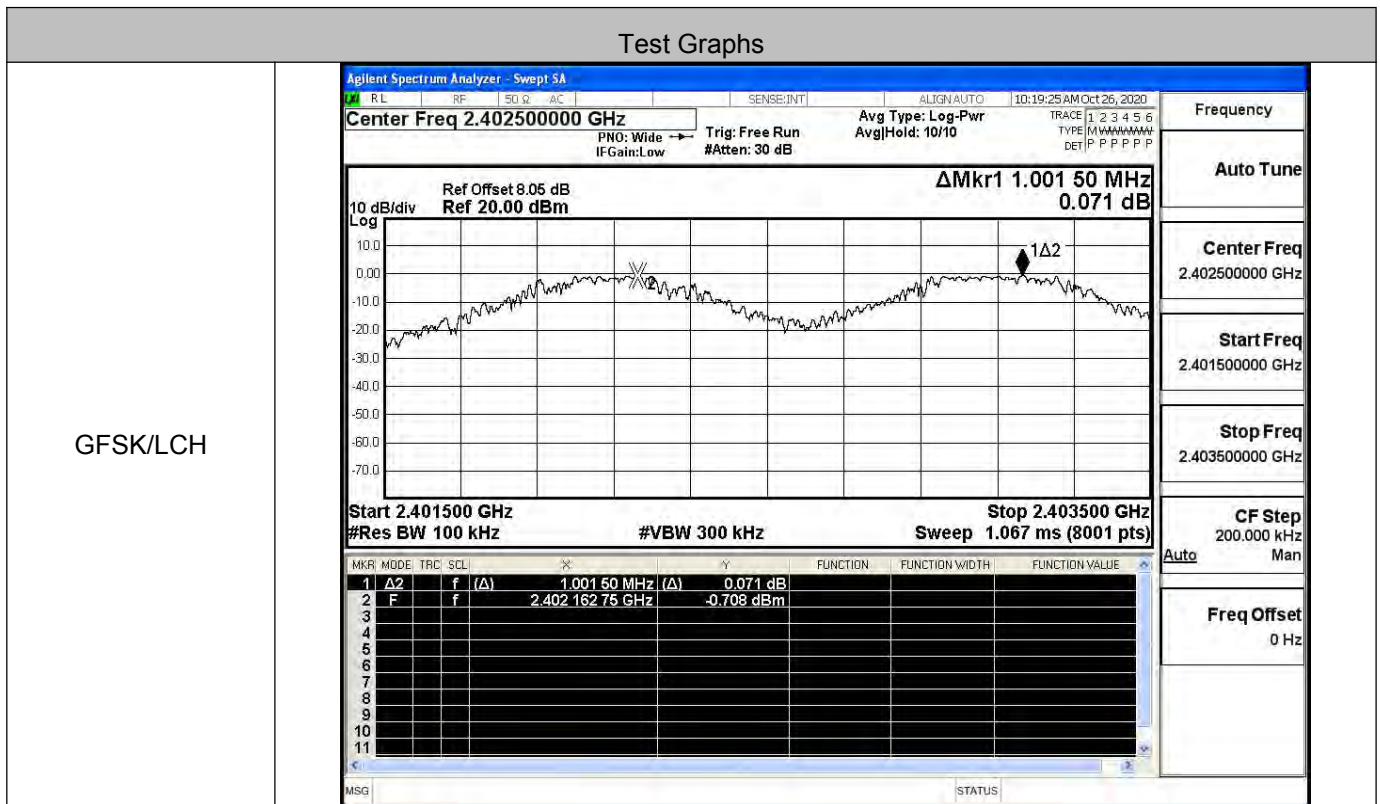


8DPSK/HCH

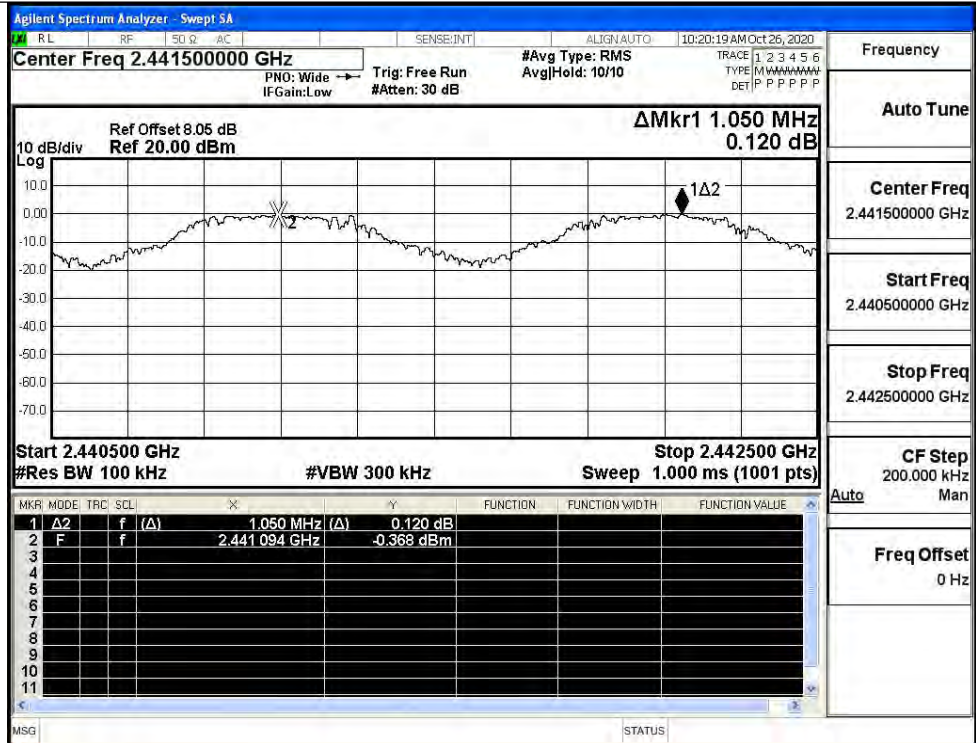


A.3 Carrier Frequency Separation

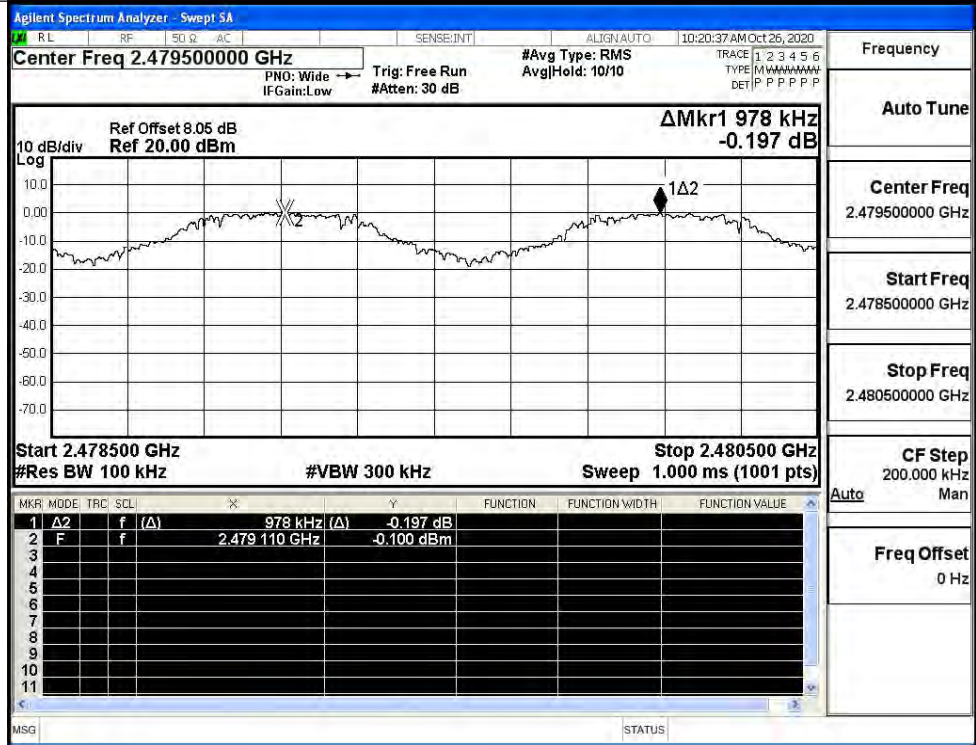
Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.001	0.685	PASS
	MCH	1.050	0.687	PASS
	HCH	0.978	0.685	PASS
π/4DQPSK	LCH	1.024	0.911	PASS
	MCH	0.988	0.911	PASS
	HCH	1.156	0.909	PASS
8DPSK	LCH	1.038	0.898	PASS
	MCH	1.006	0.899	PASS
	HCH	0.996	0.897	PASS



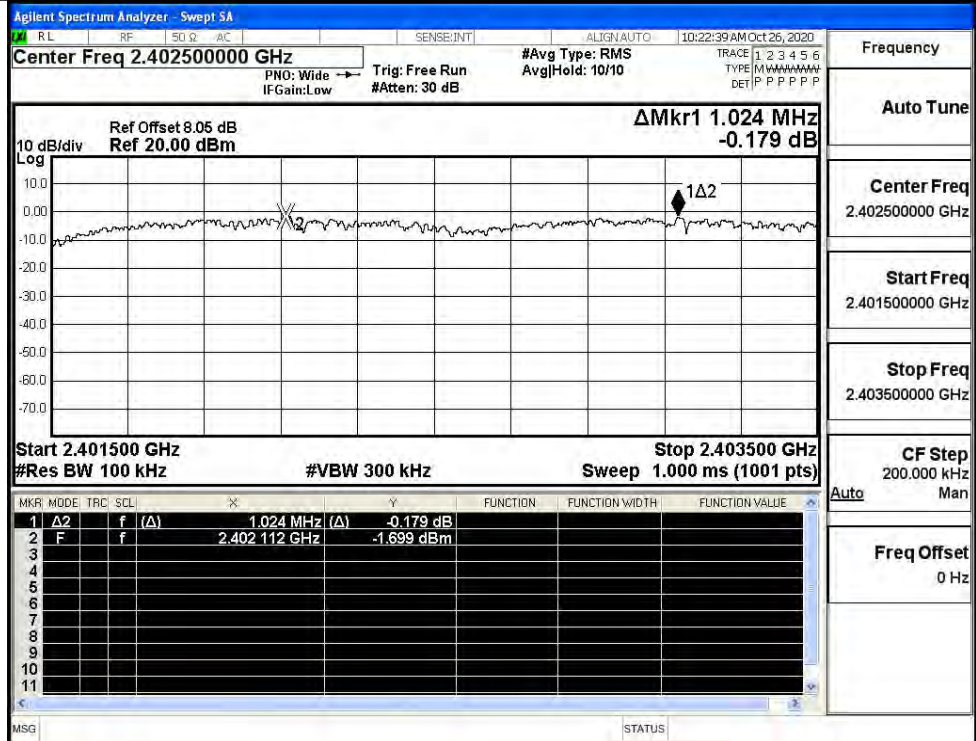
GFSK/MCH



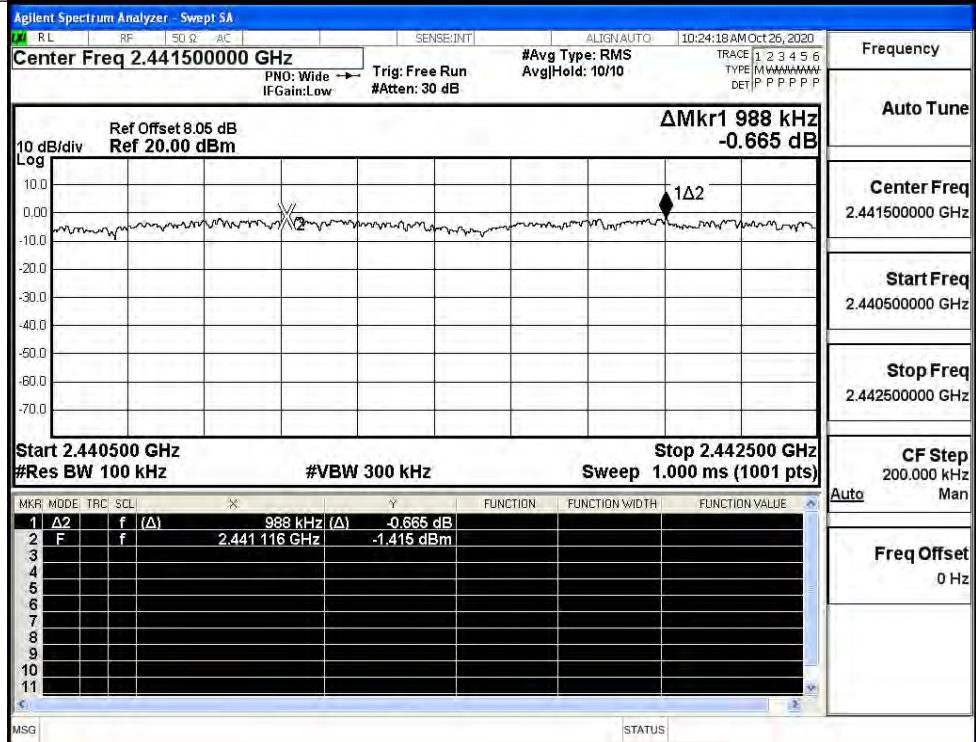
GFSK/HCH



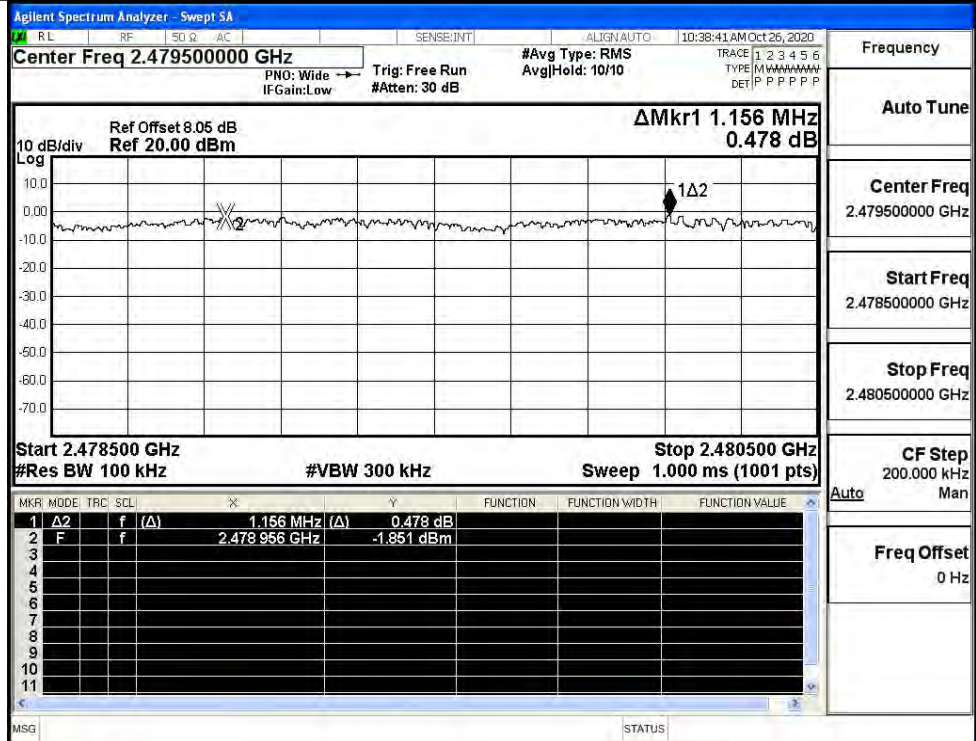
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

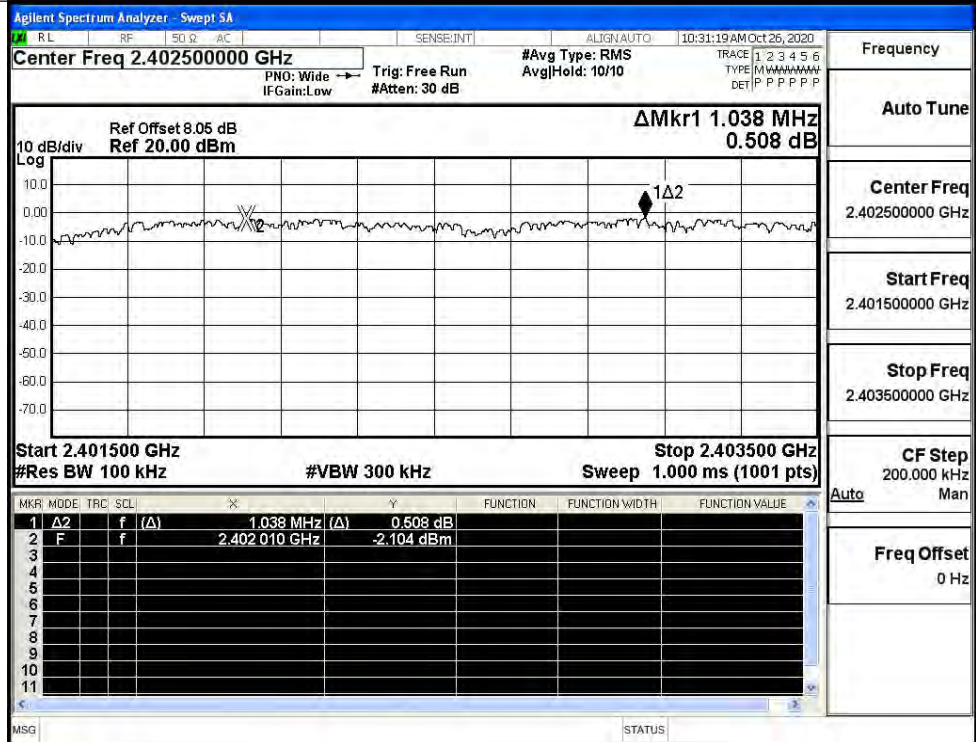


TT/4DQPSK/HCH



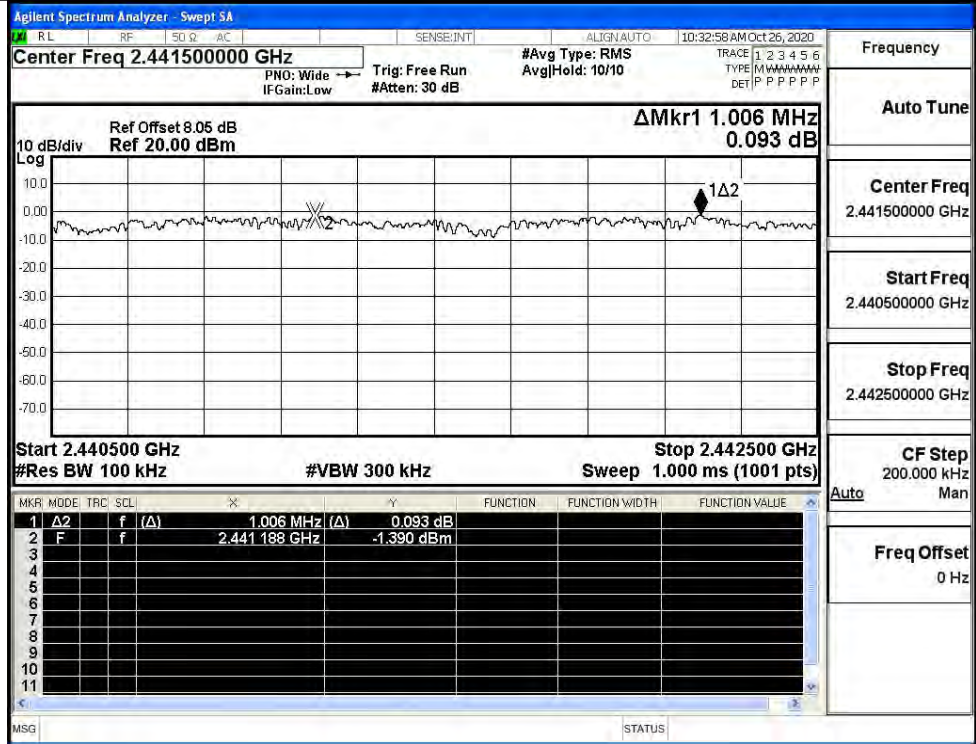
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH

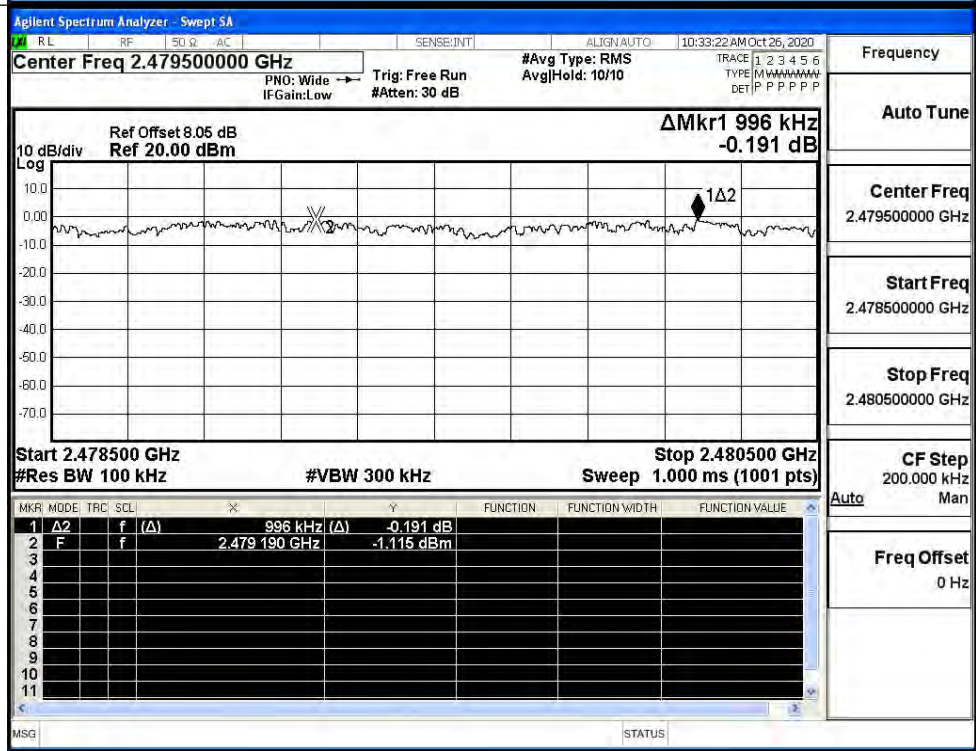


Frequency
Auto Tune
Center Freq
2.402500000 GHz
Start Freq
2.401500000 GHz
Stop Freq
2.403500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH



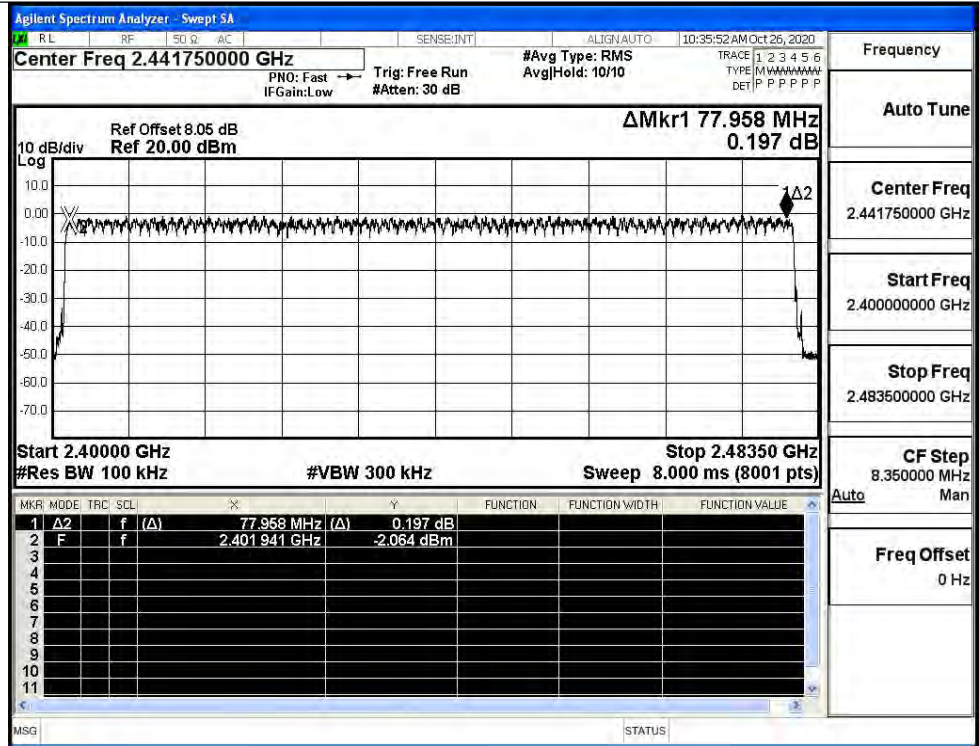
A.4 Hopping Channel Number

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

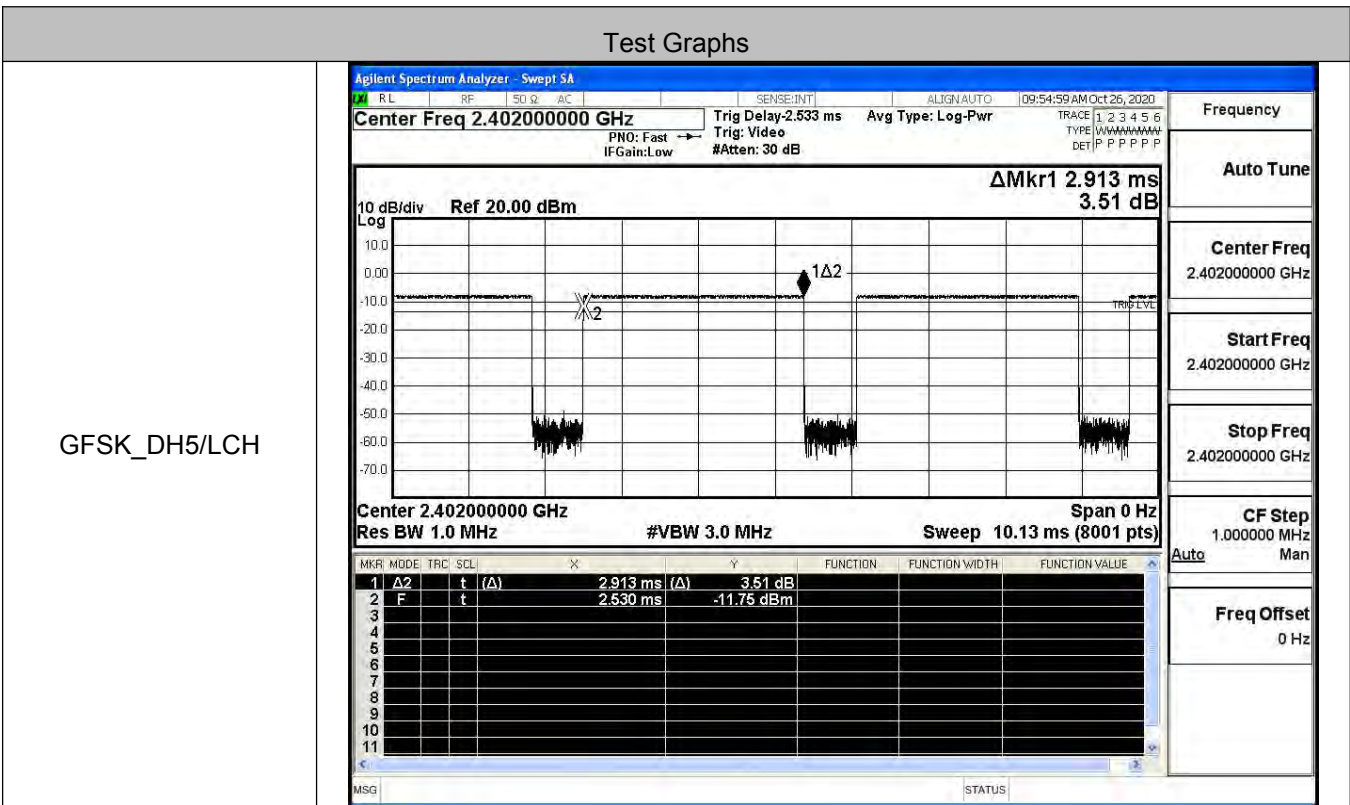
<p>GFSK/Hop</p>	<table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Δ2</td> <td>f</td> <td>(Δ)</td> <td>78.114 MHz (Δ)</td> <td>-0.080 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401994 GHz</td> <td>-0.578 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	78.114 MHz (Δ)	-0.080 dB				2	F	f		2.401994 GHz	-0.578 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
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<p>$\pi/4$DQPSK/Hop</p>	<table border="1"> <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>78.187 MHz (Δ)</td> <td>0.925 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401941 GHz</td> <td>-2.083 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	78.187 MHz (Δ)	0.925 dB				2	F	f		2.401941 GHz	-2.083 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	f	(Δ)	78.187 MHz (Δ)	0.925 dB																							
2	F	f		2.401941 GHz	-2.083 dBm																							

8DPSK/Hop

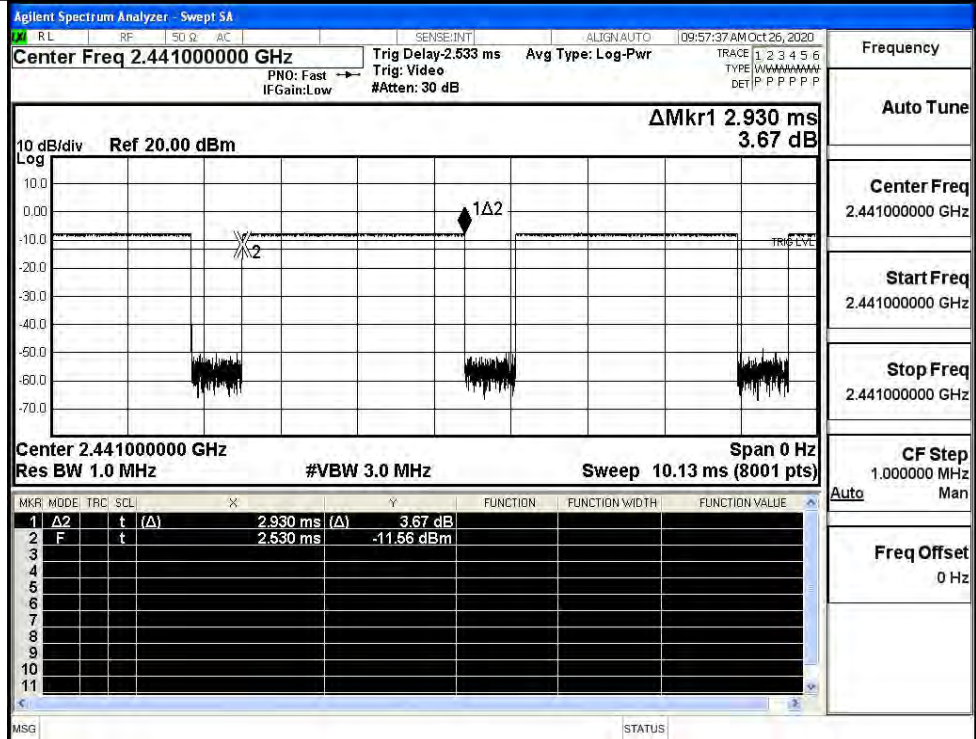


A.5 Dwell Time

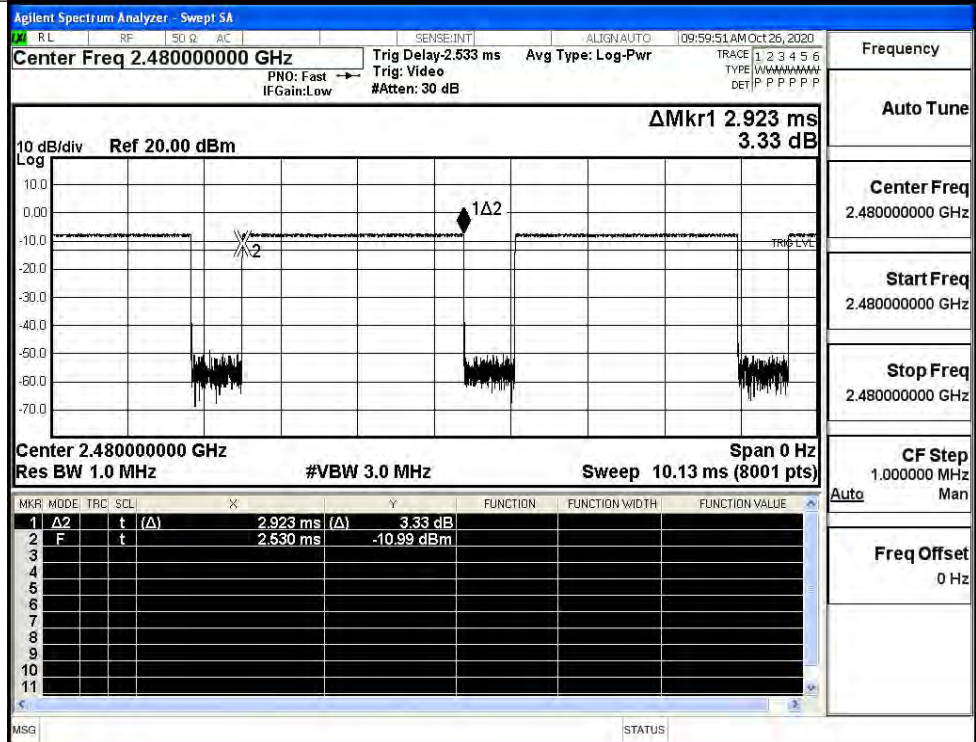
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.91	106.7	0.310	0.4	PASS
	DH5	MCH	2.93	106.7	0.313	0.4	PASS
	DH5	HCH	2.92	106.7	0.312	0.4	PASS
π/4DQPSK	2DH5	LCH	2.91	106.7	0.312	0.4	PASS
	2DH5	MCH	2.93	106.7	0.314	0.4	PASS
	2DH5	HCH	2.92	106.7	0.312	0.4	PASS
8DPSK	3DH5	LCH	2.91	106.7	0.310	0.4	PASS
	3DH5	MCH	2.93	106.7	0.313	0.4	PASS
	3DH5	HCH	2.92	106.7	0.312	0.4	PASS



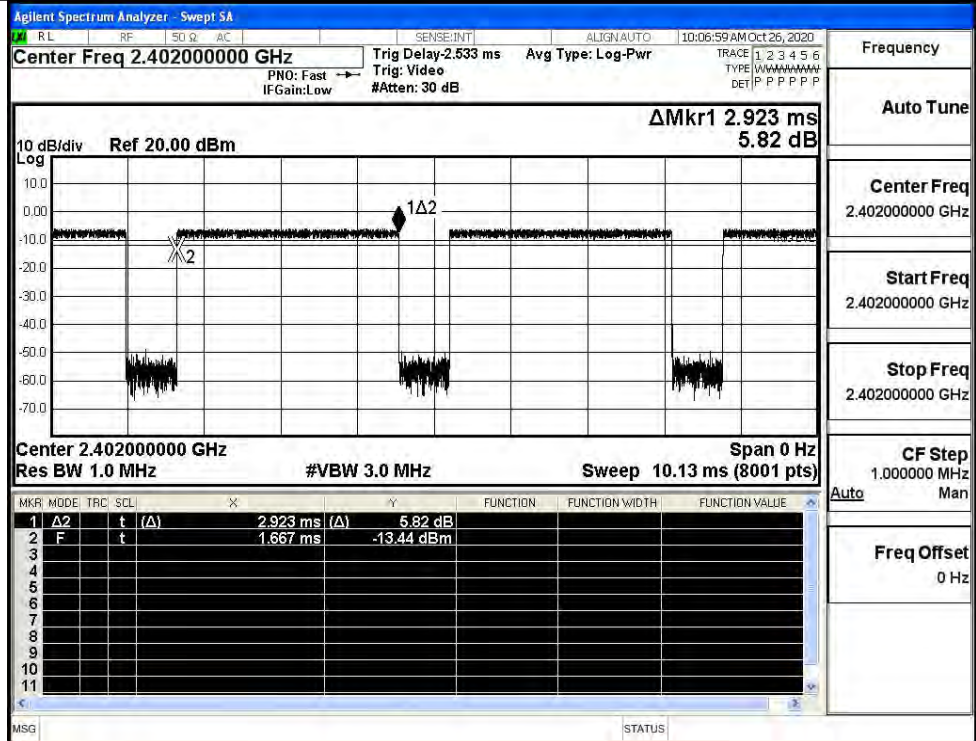
GFSK_DH5/MCH



GFSK_DH5/HCH

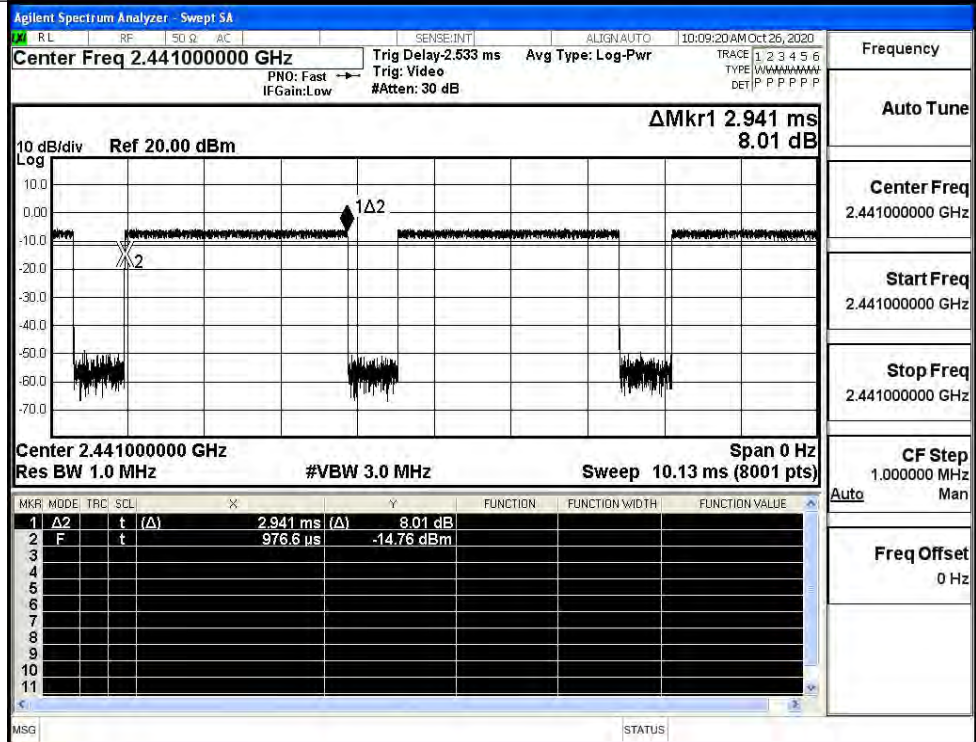


$\pi/4$ DQPSK
_2DH5/LCH



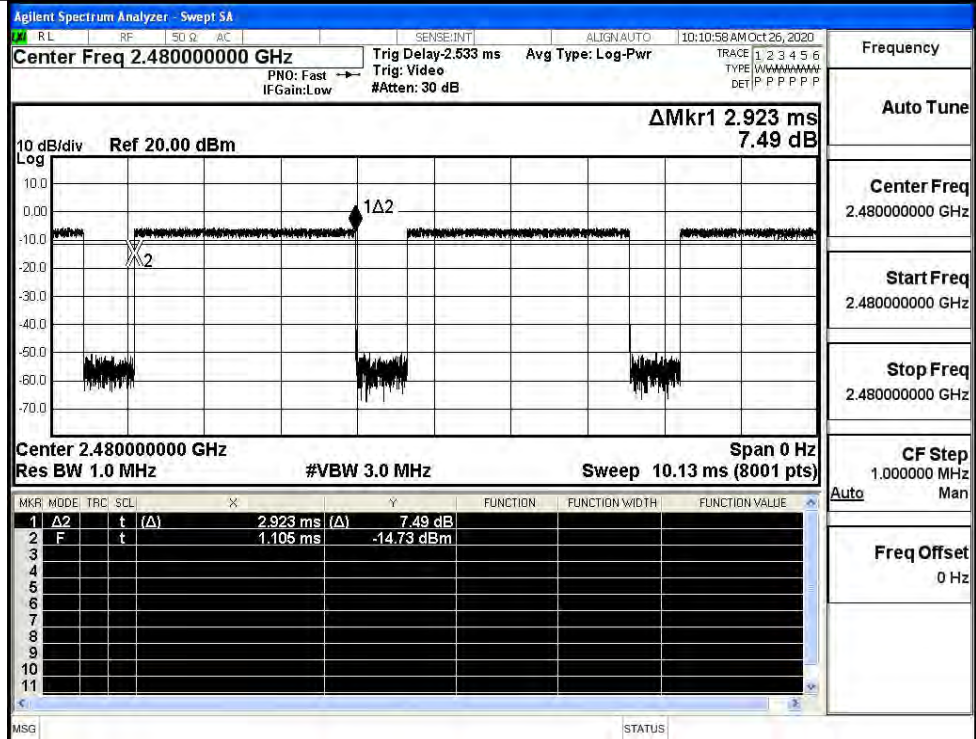
Frequency	2.402000000 GHz
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.402000000 GHz
Stop Freq	2.402000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK
_2DH5/MCH

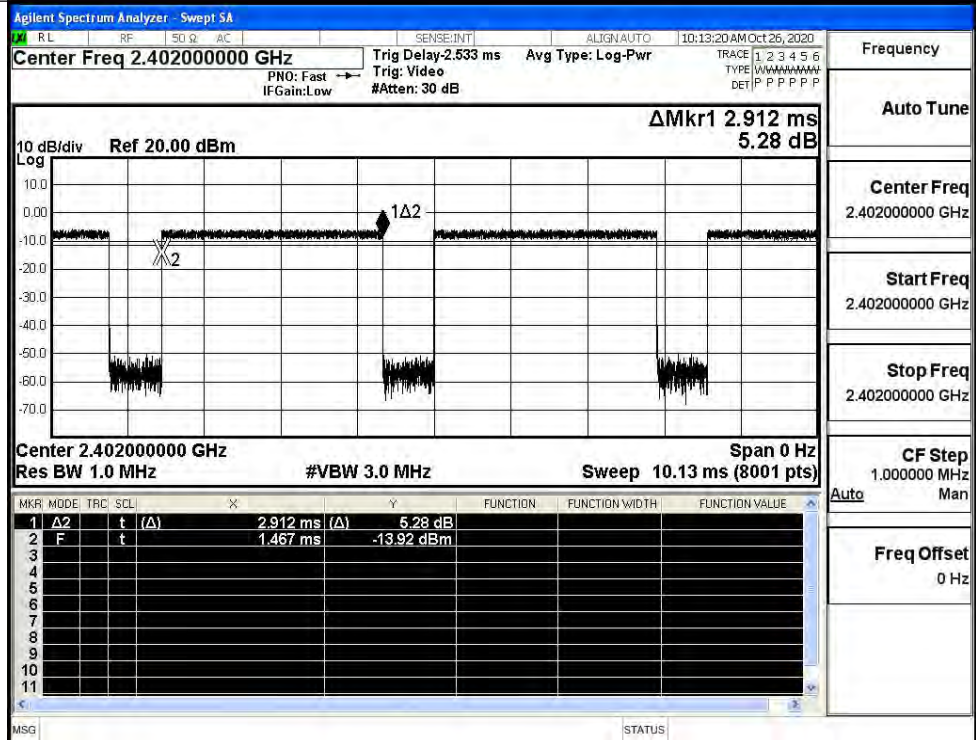


Frequency	2.441000000 GHz
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

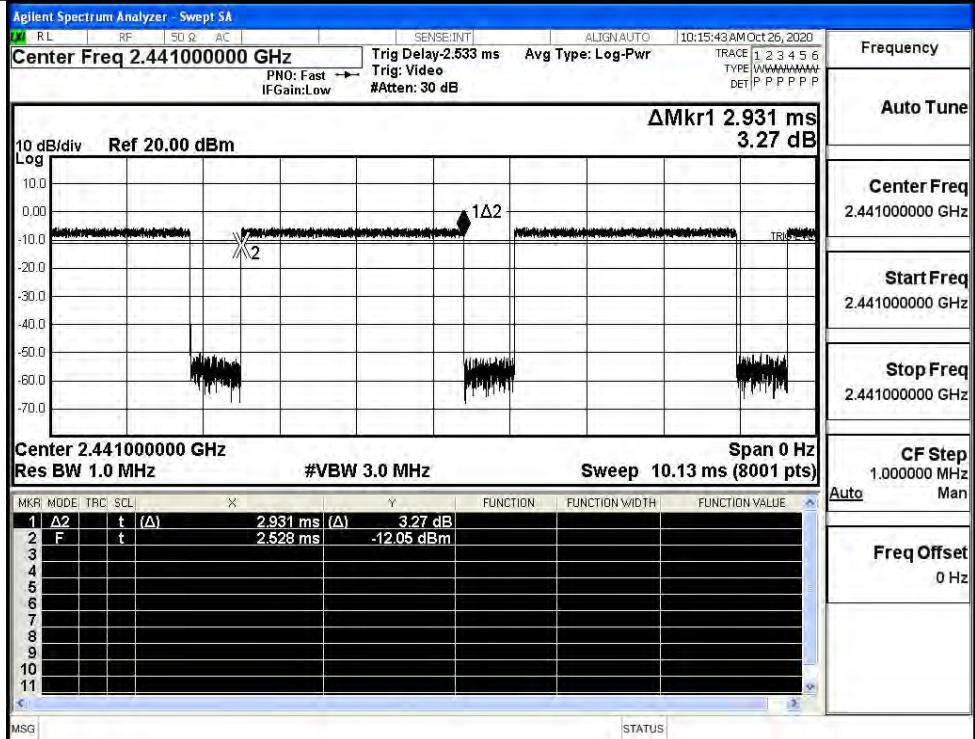
$\pi/4$ DQPSK
_2DH5/HCH



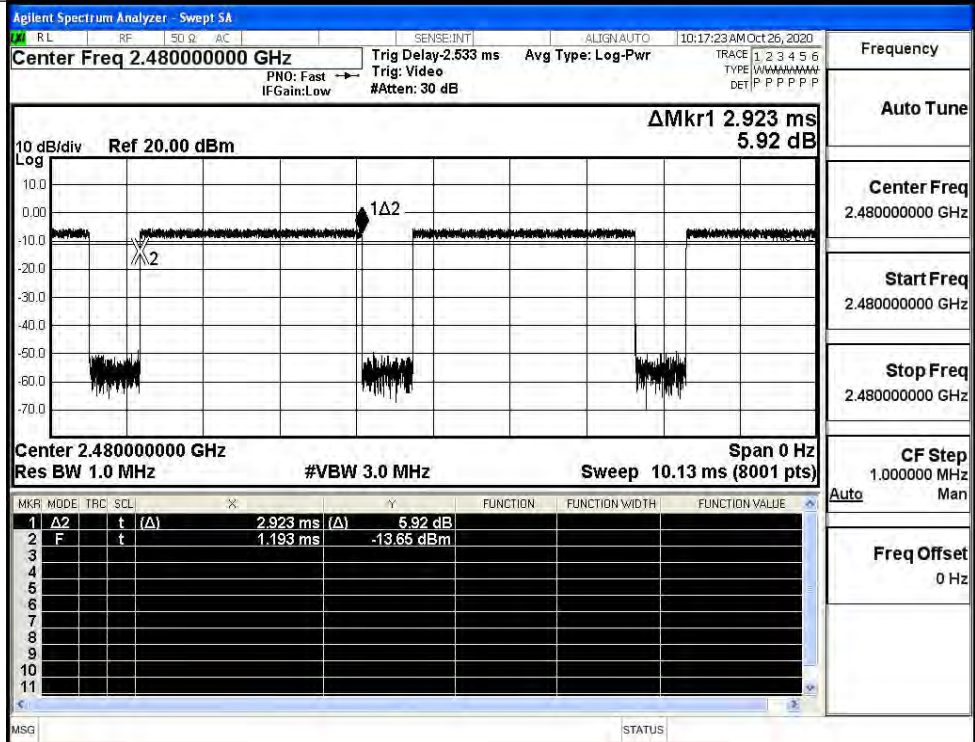
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



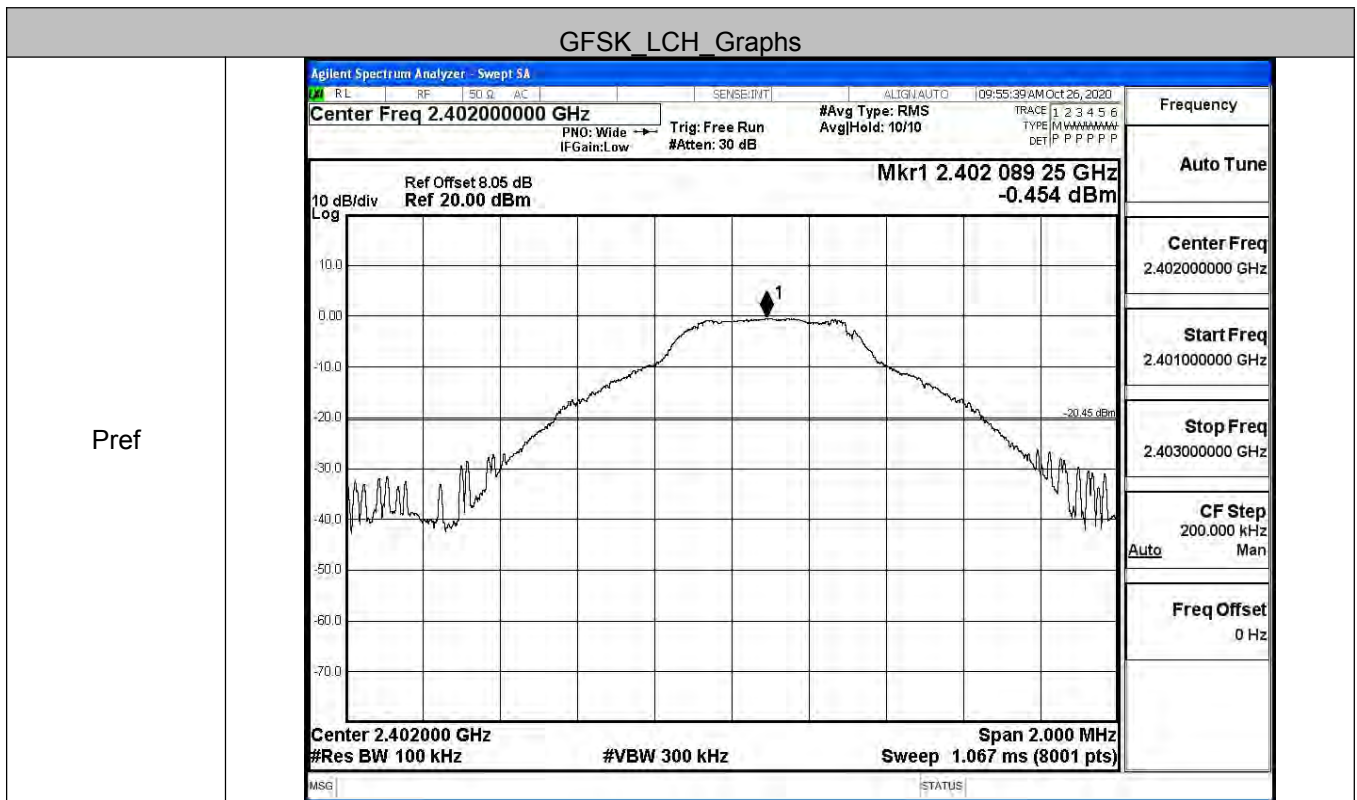
8DPSK_3DH5/HCH



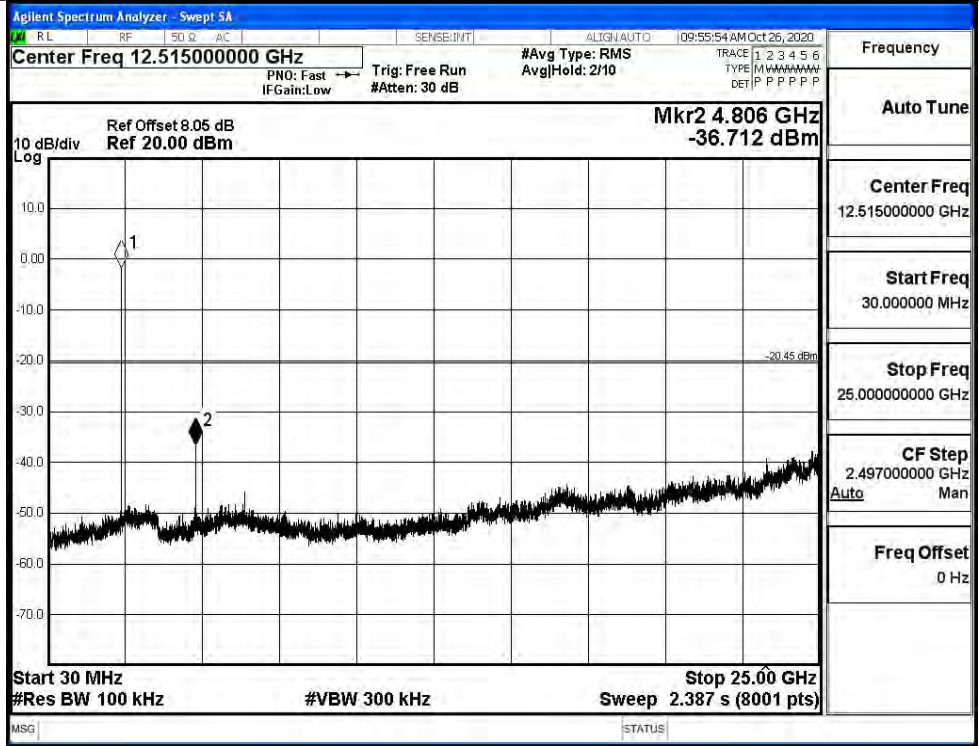
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.454	-36.712	-20.454	PASS
	MCH	-0.37	-37.669	-20.370	PASS
	HCH	-0.116	-37.825	-20.116	PASS
π/4DQPSK	LCH	-1.568	-37.109	-21.568	PASS
	MCH	-1.299	-37.528	-21.299	PASS
	HCH	-1.357	-38.186	-21.357	PASS
8DPSK	LCH	-1.594	-37.520	-21.594	PASS
	MCH	-1.391	-37.470	-21.391	PASS
	HCH	-1.282	-38.023	-21.282	PASS

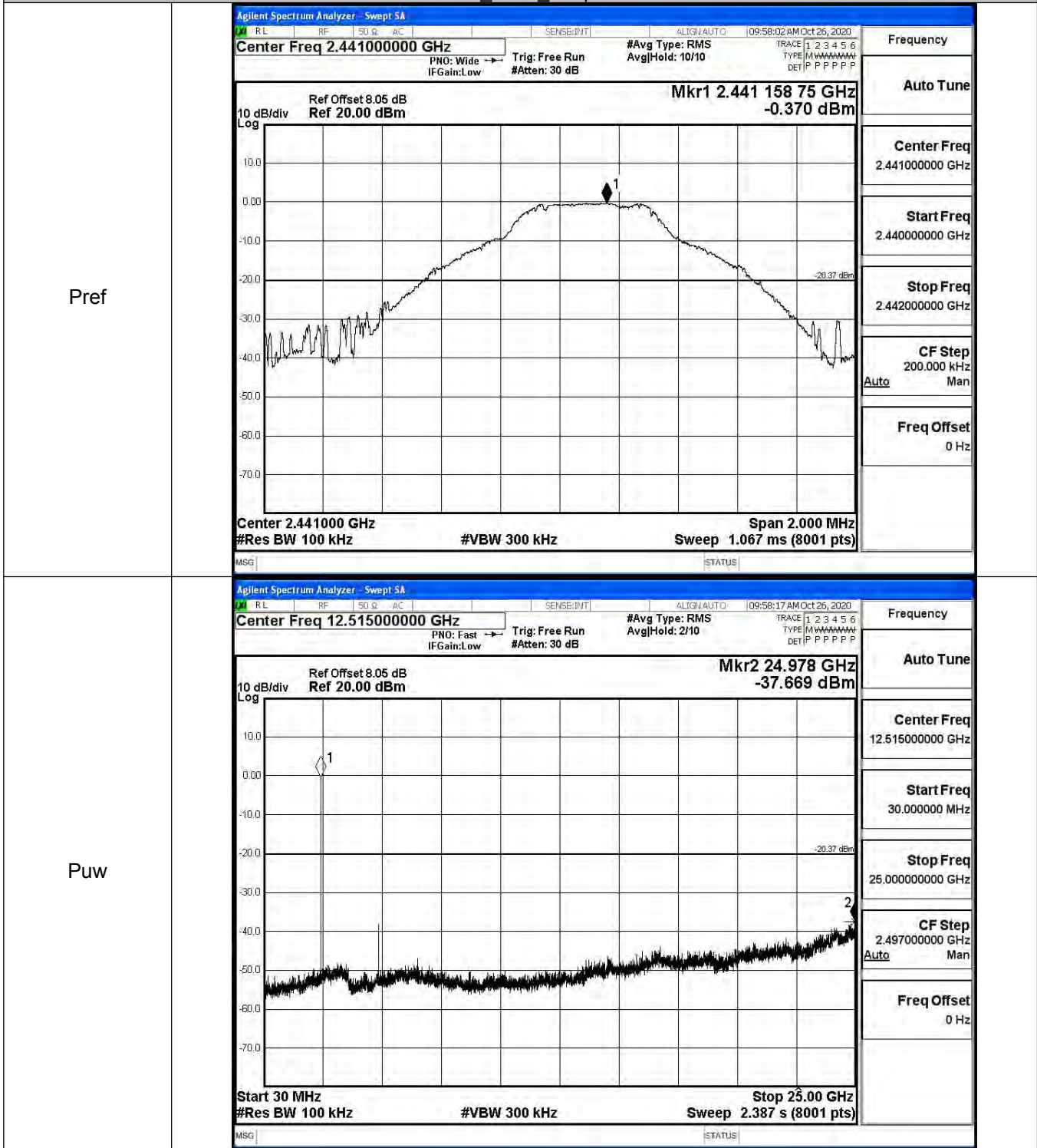
GFSK LCH Graphs



P_{uw}

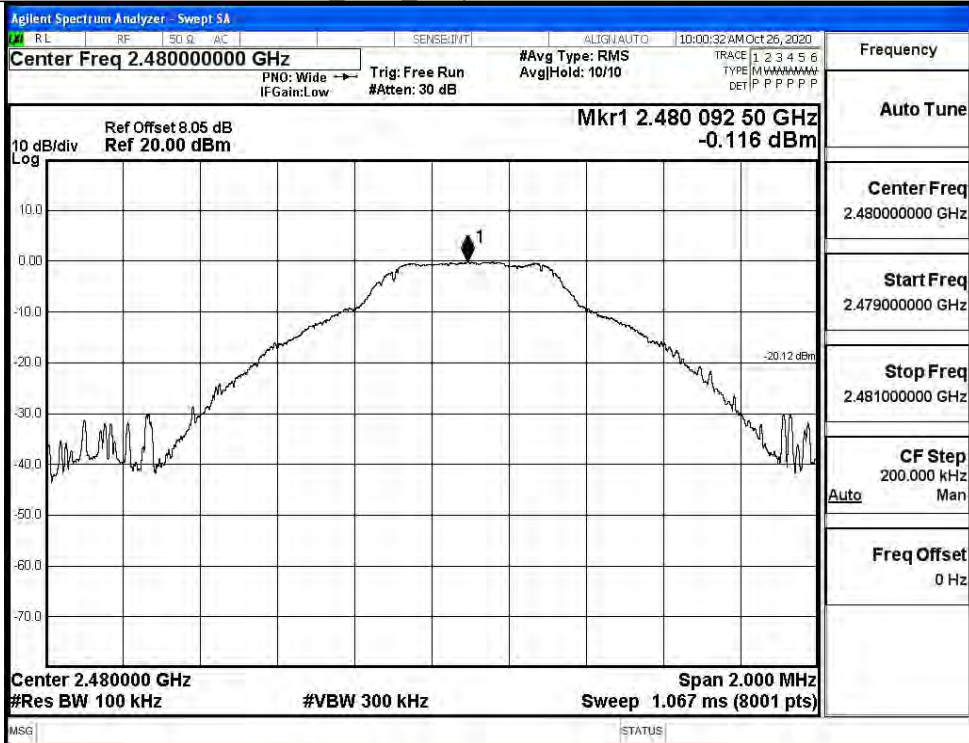


GFSK_MCH_Graphs

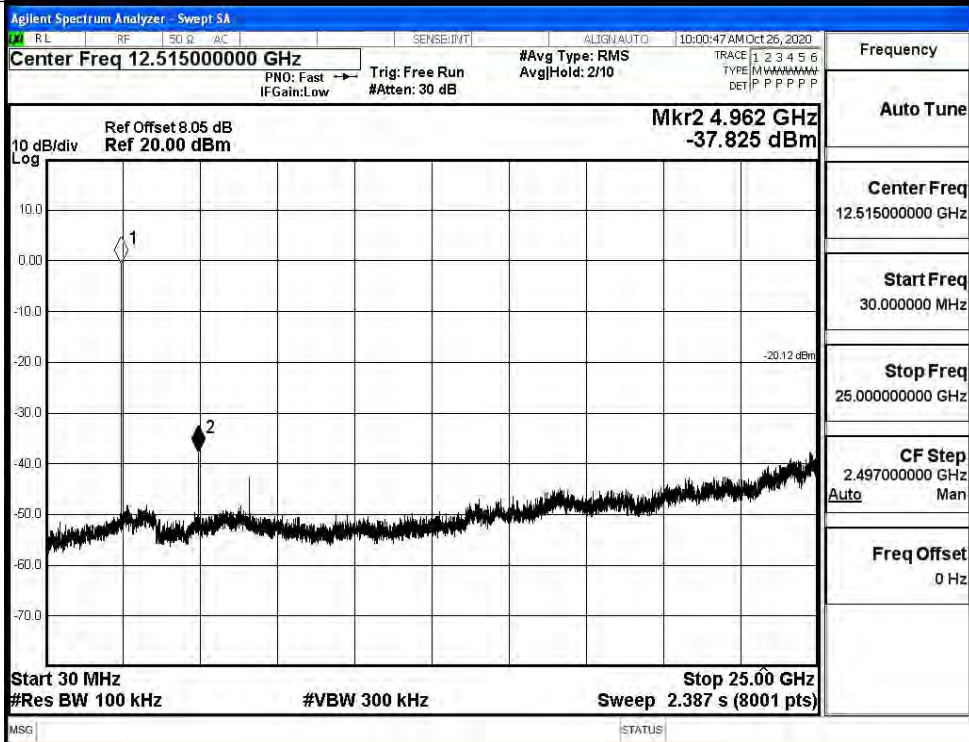


GFSK_HCH_Graphs

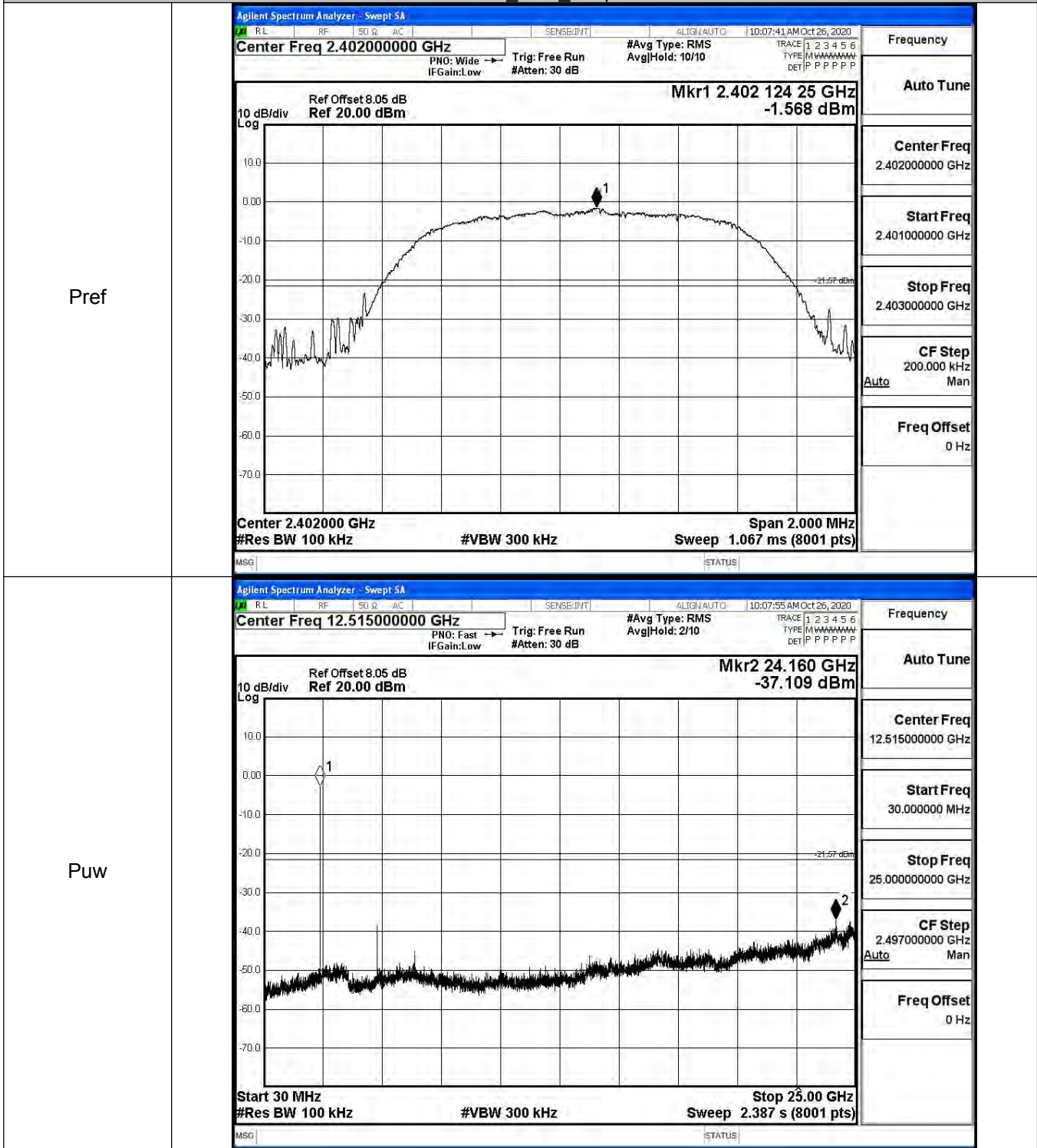
Pref



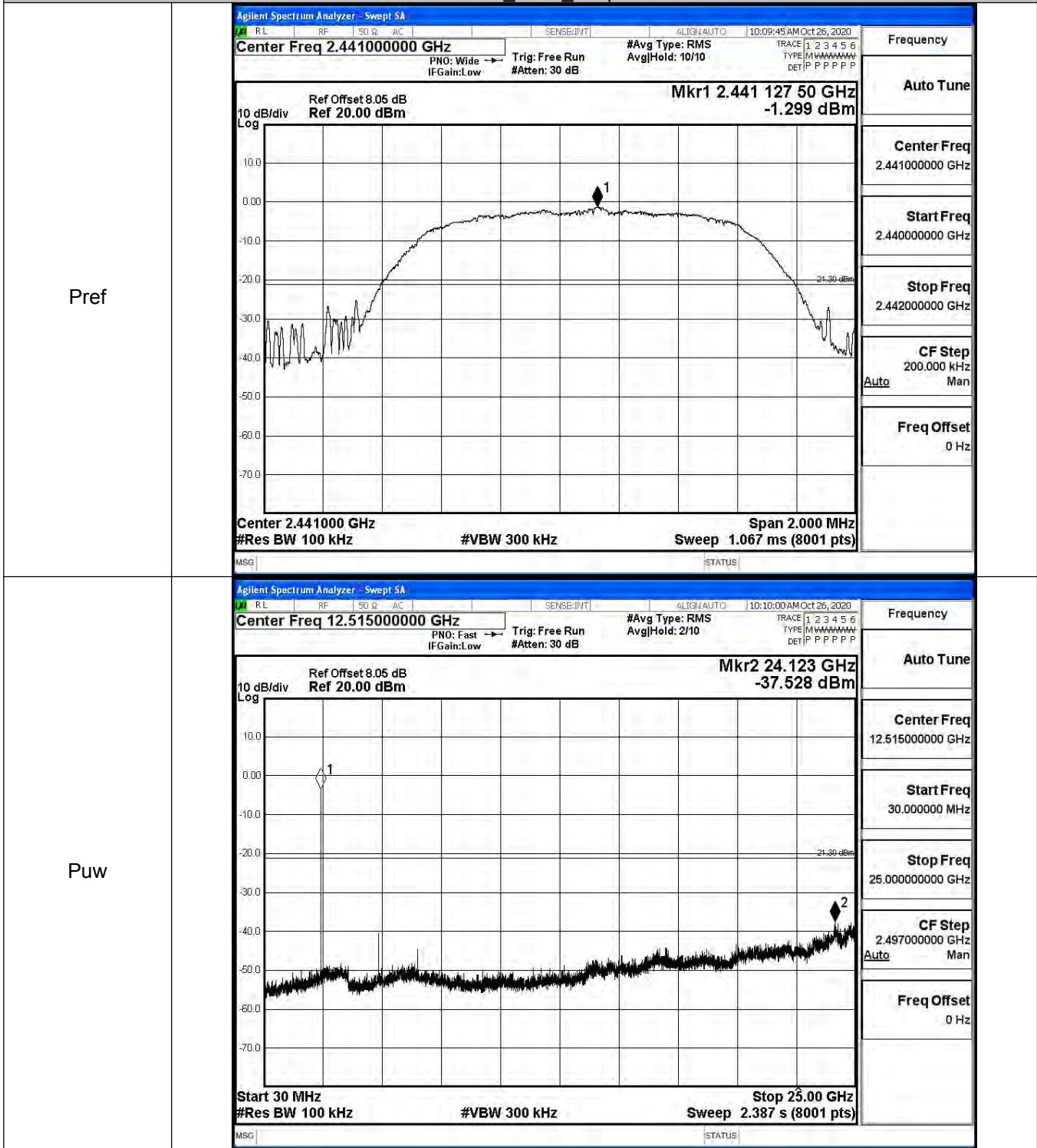
Puw



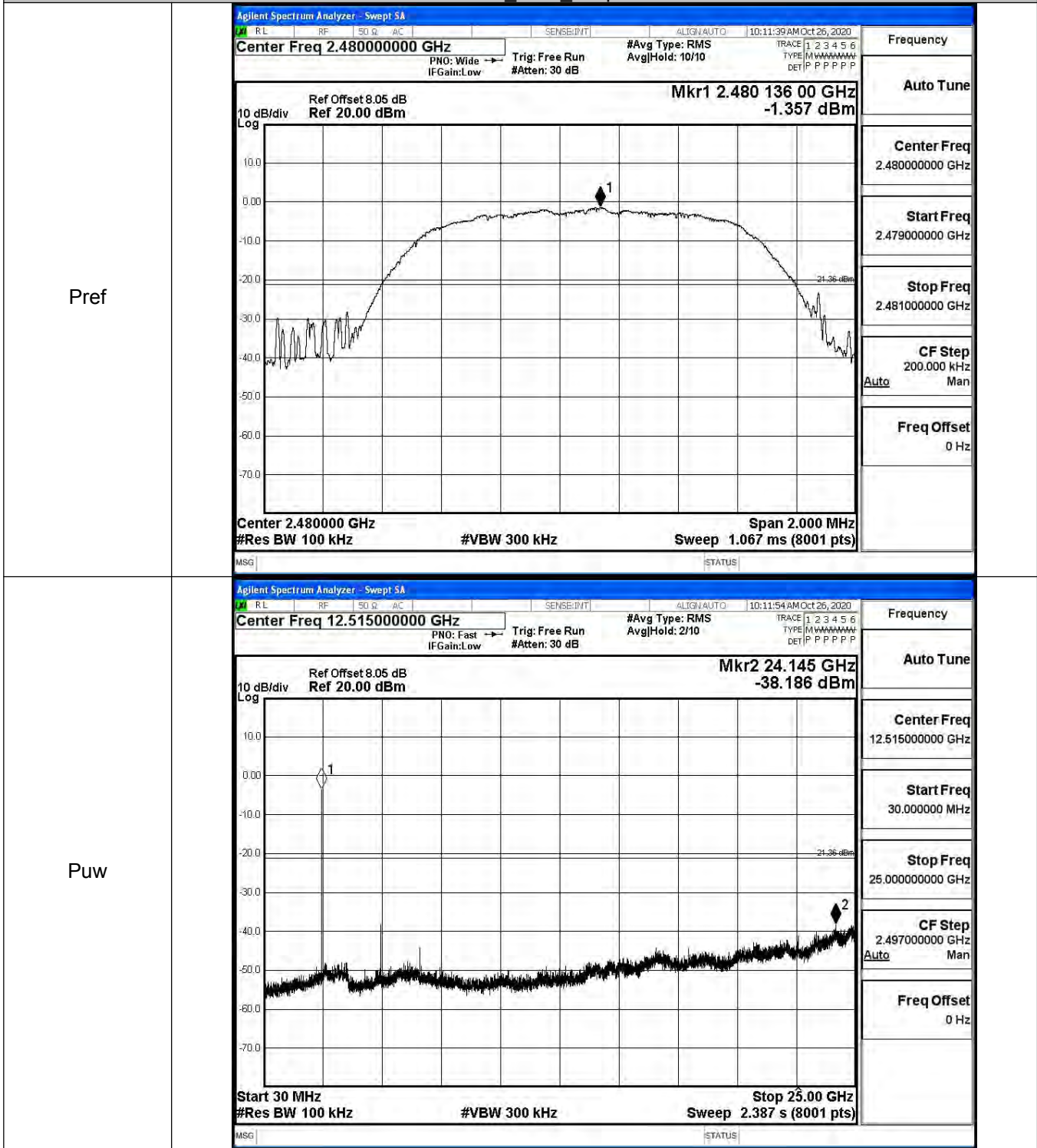
$\pi/4$ DQPSK_LCH_Graphs



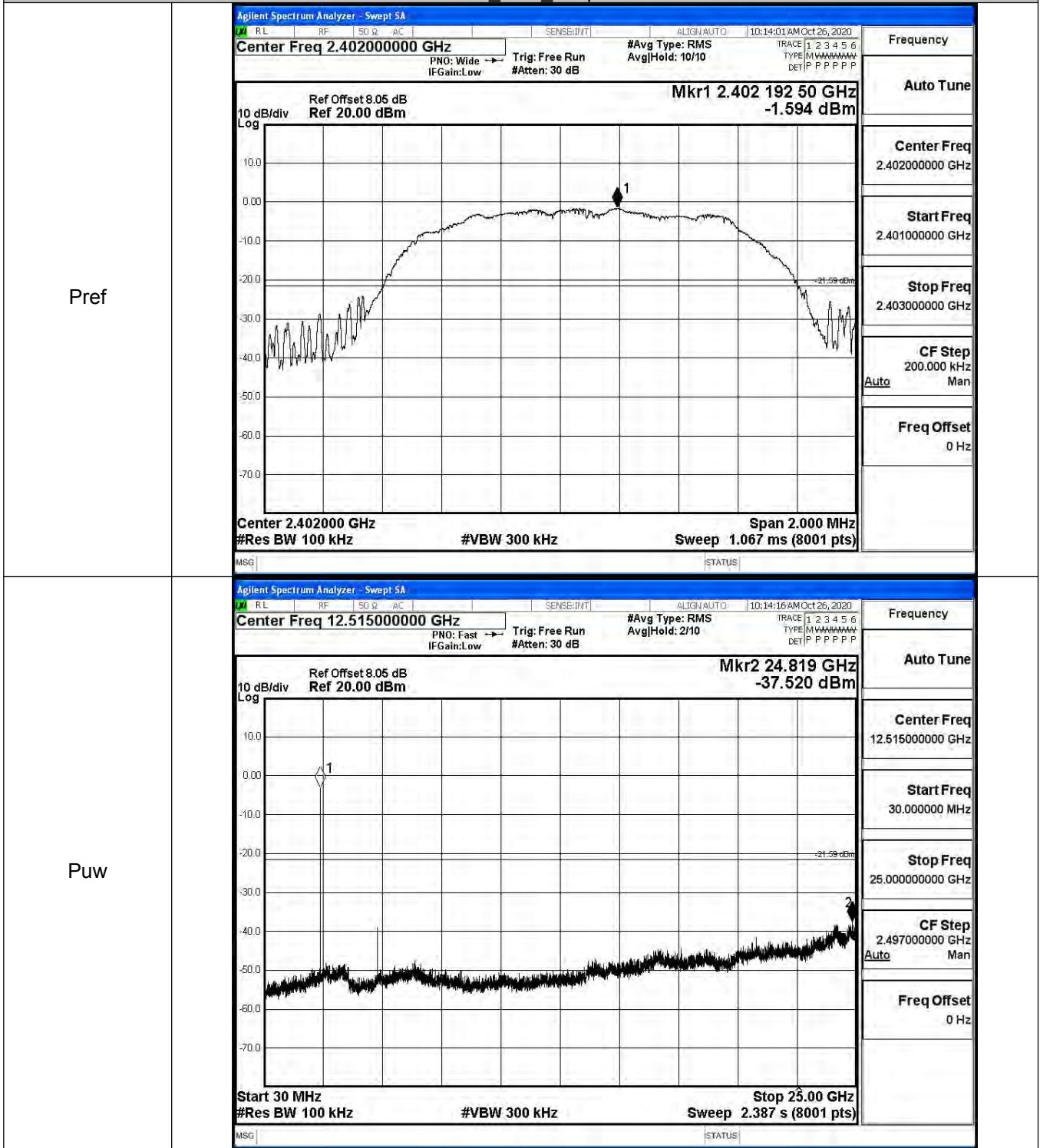
$\pi/4$ DQPSK_MCH_Graphs



$\pi/4$ DQPSK_HCH_Graphs

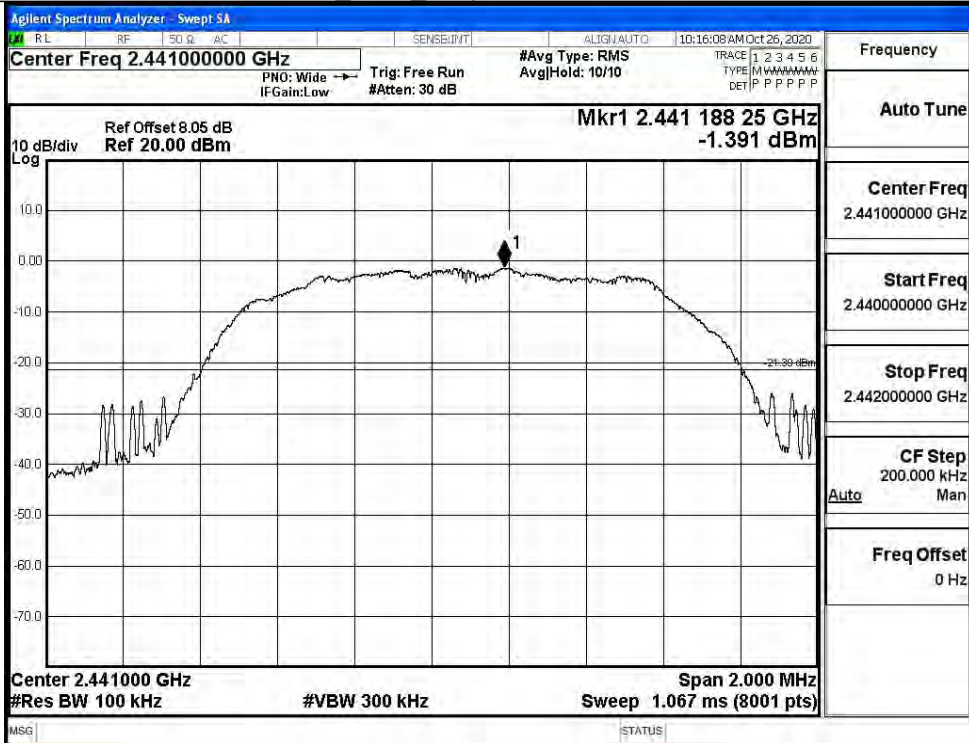


8DPSK_LCH_Graphs

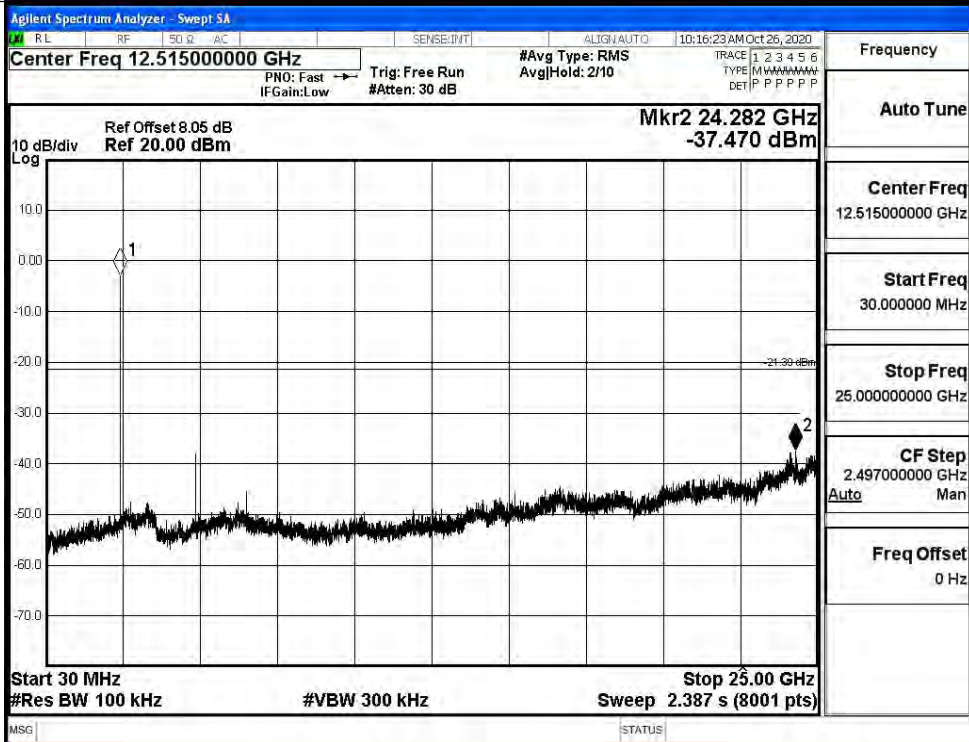


8DPSK_MCH_Graphs

Pref

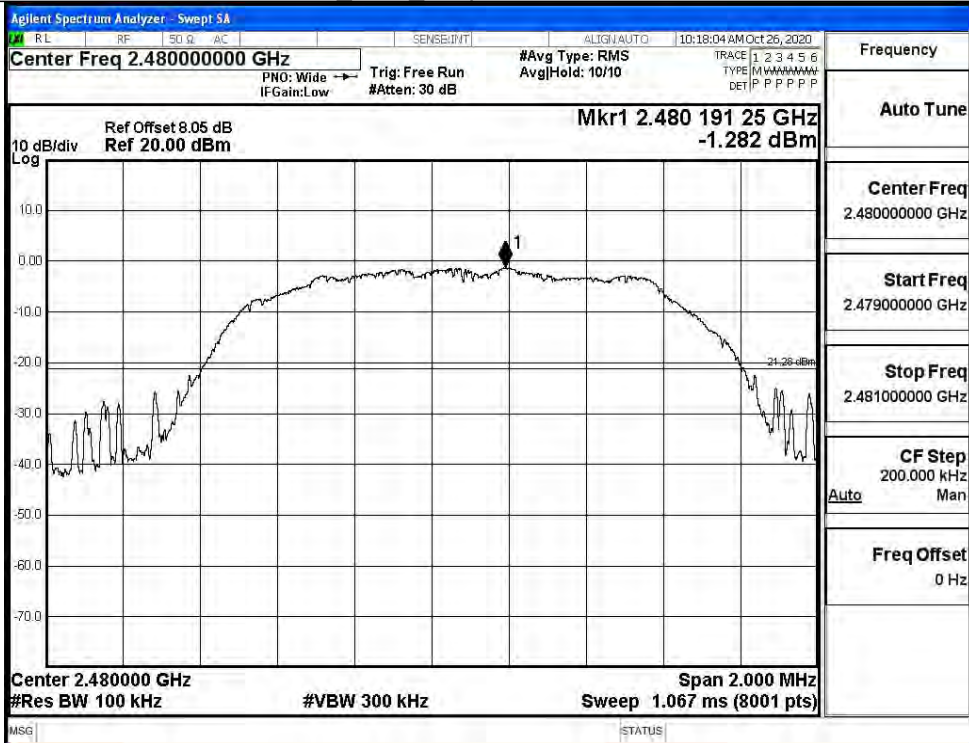


Puw

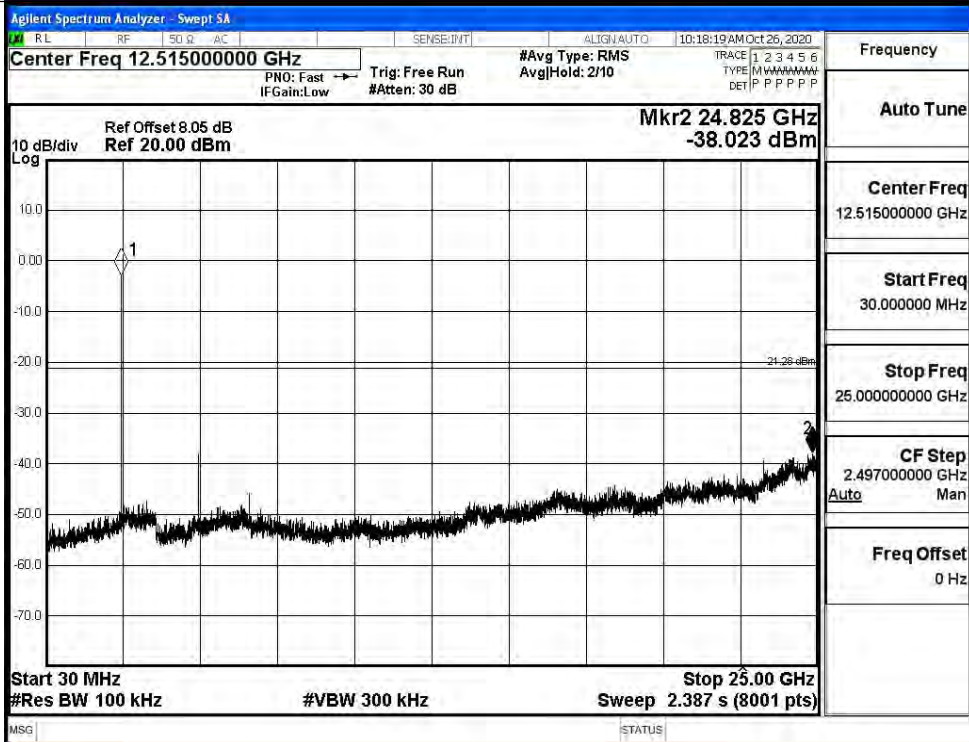


8DPSK_HCH_Graphs

Pref



Puw

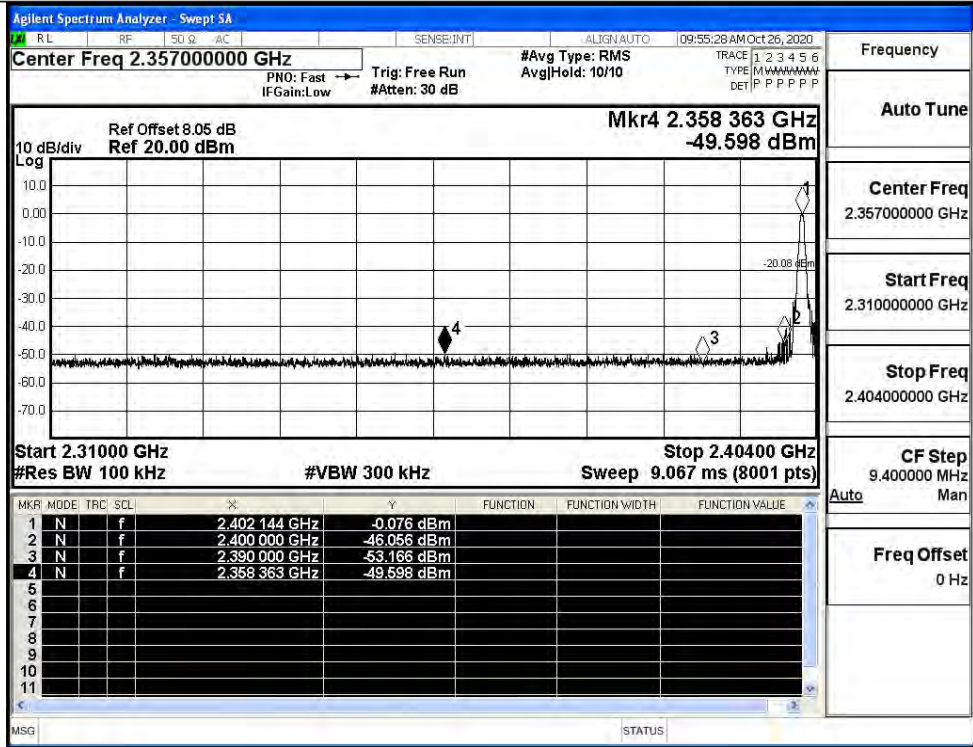


A.7 Band-edge for RF Conducted Emissions

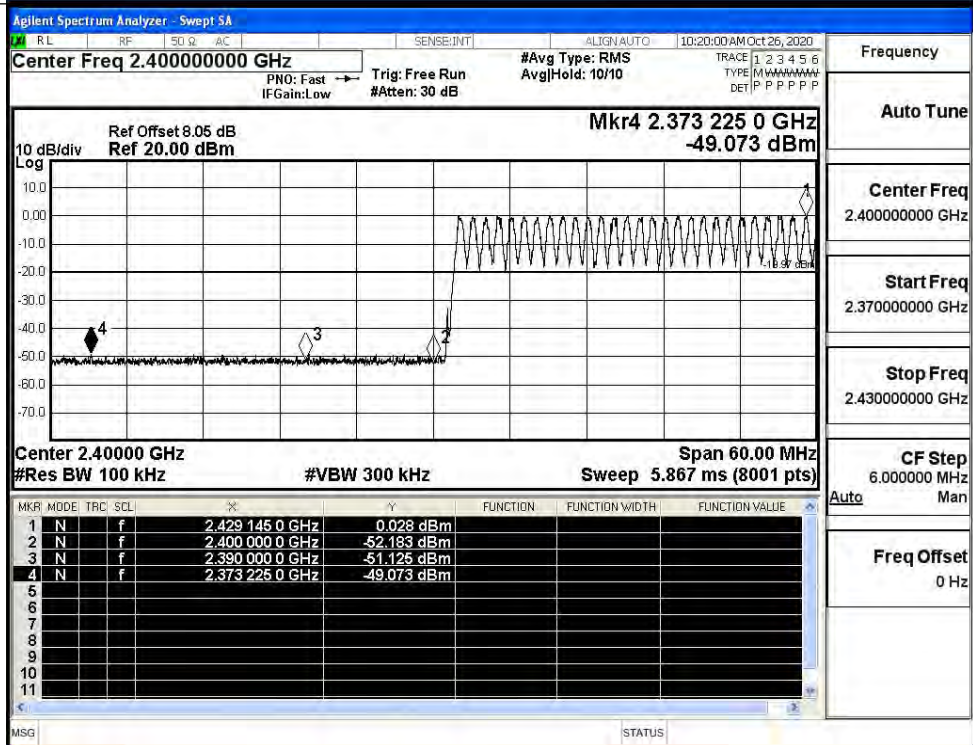
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.076	Off	-49.598	-20.08	PASS
			0.028	On	-49.073	-19.97	PASS
	HCH	2480	0.239	Off	-49.338	-19.76	PASS
			0.497	On	-48.574	-19.5	PASS
$\pi/4$ DQPSK	LCH	2402	-1.512	Off	-49.394	-21.51	PASS
			-1.223	On	-49.056	-21.22	PASS
	HCH	2480	-1.130	Off	-48.295	-21.13	PASS
			-0.938	On	-48.524	-20.94	PASS
8DPSK	LCH	2402	-1.412	Off	-49.596	-21.41	PASS
			-0.862	On	-49.009	-20.86	PASS
	HCH	2480	-0.781	Off	-46.843	-20.78	PASS
			-0.608	On	-48.345	-20.61	PASS

Test Graphs

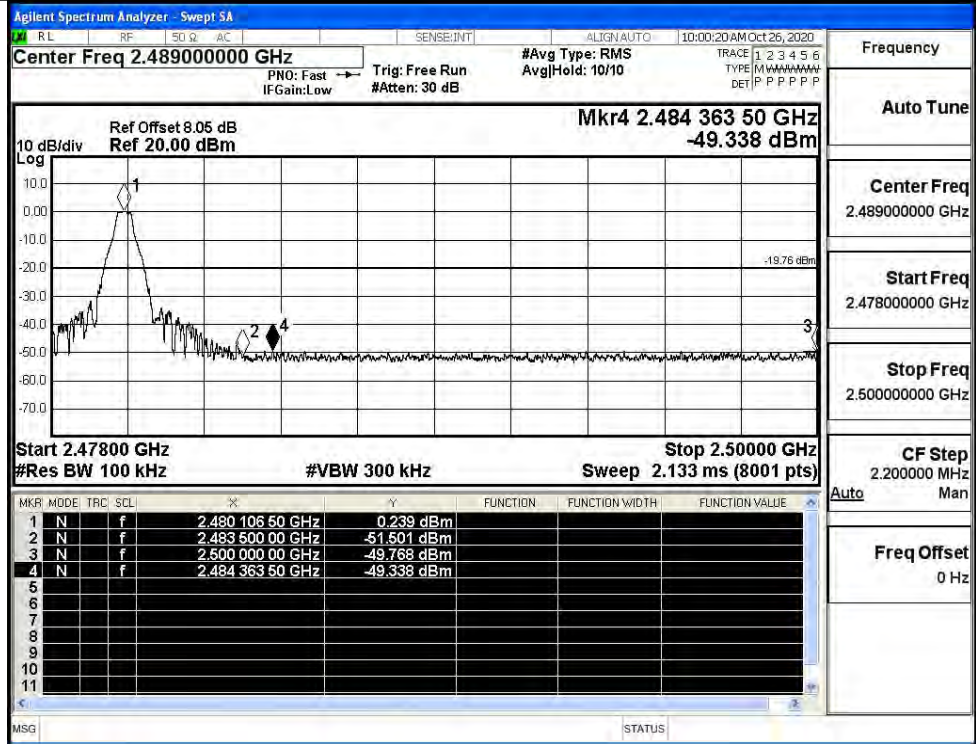
GFSK/LCH/No Hop



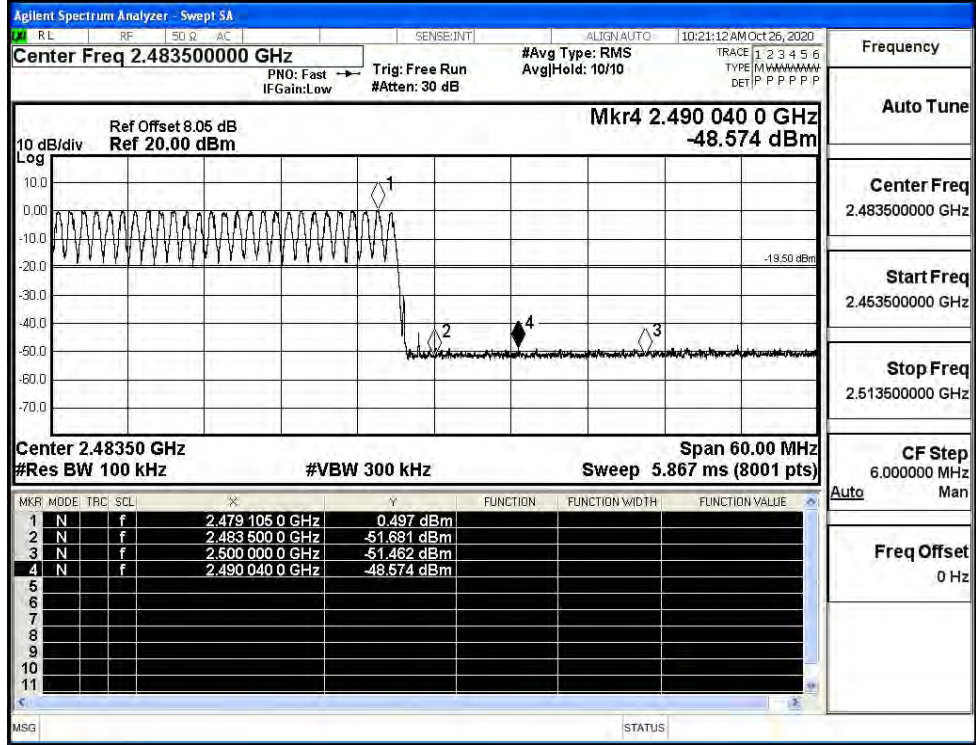
GFSK/LCH/Hop



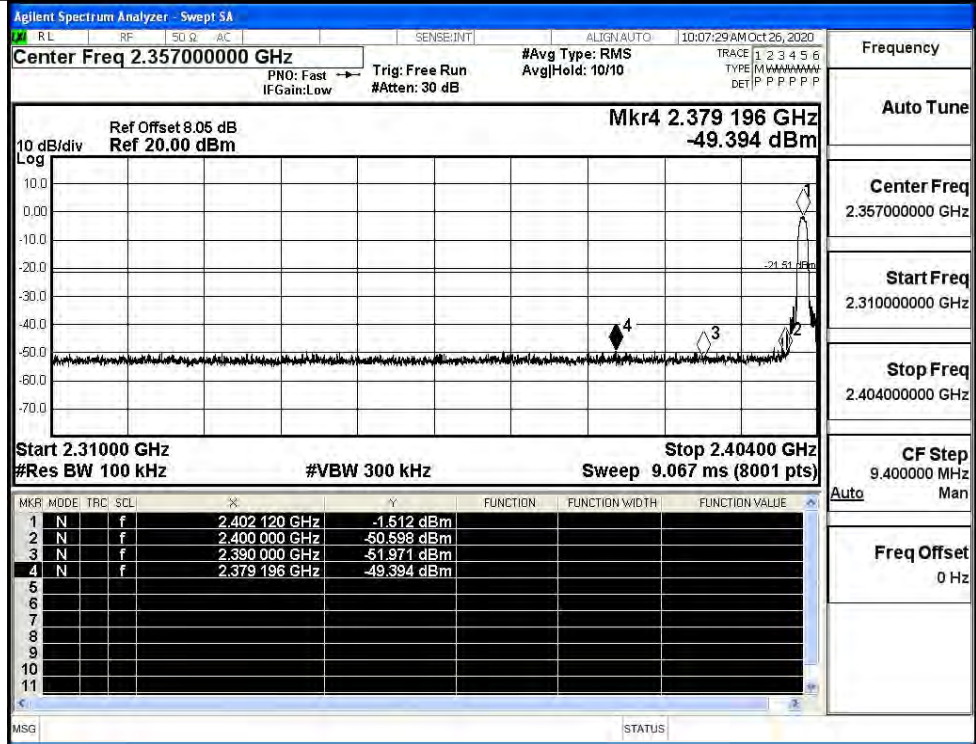
GFSK/HCH/No Hop



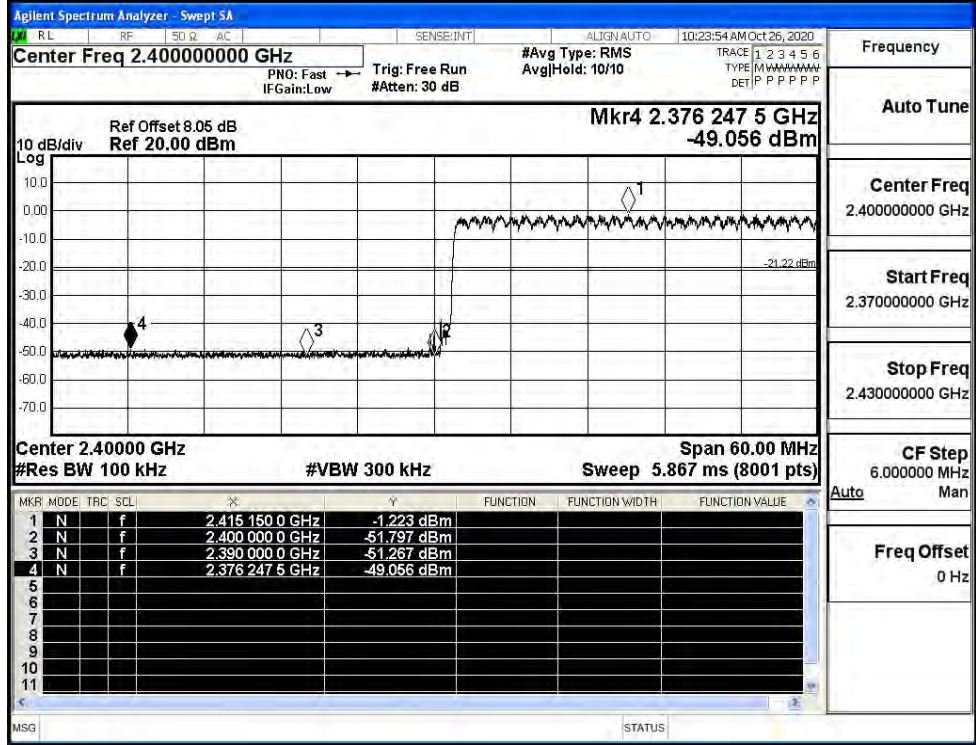
GFSK/HCH/Hop



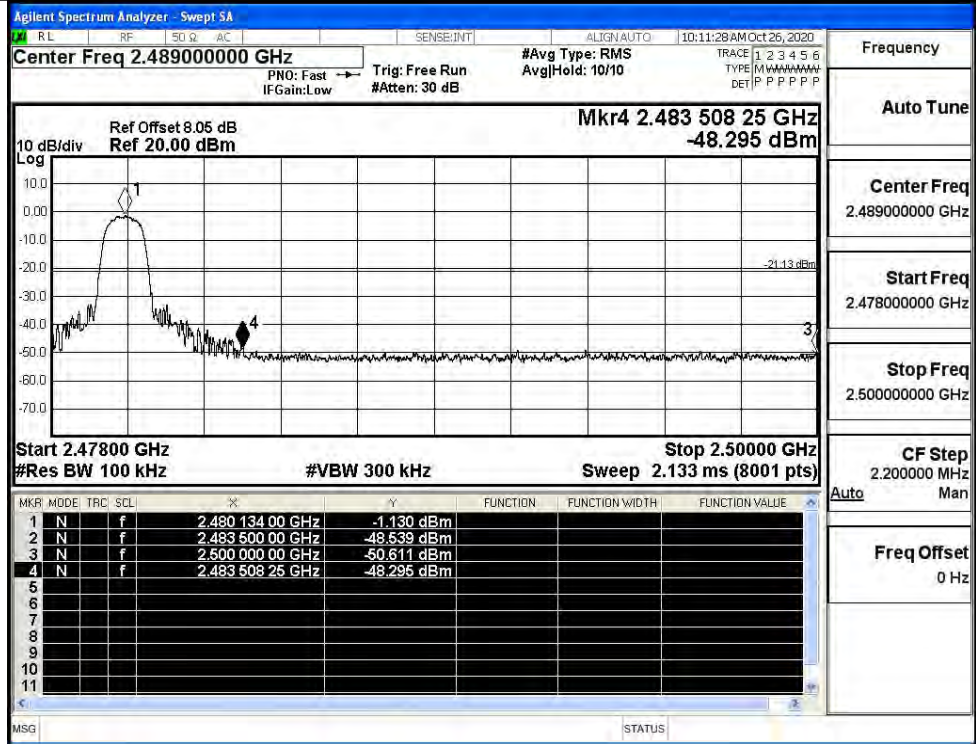
$\pi/4$ DQPSK/LCH/No Hop



$\pi/4$ DQPSK/LCH/Hop

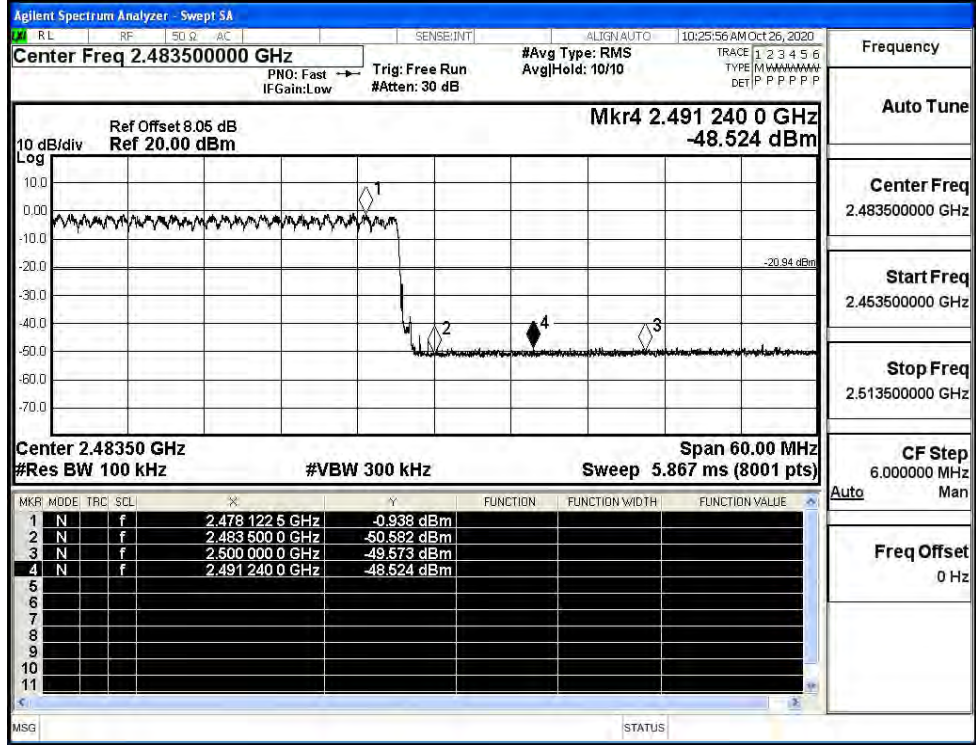


π /4DQPSK/HCH/No Hop



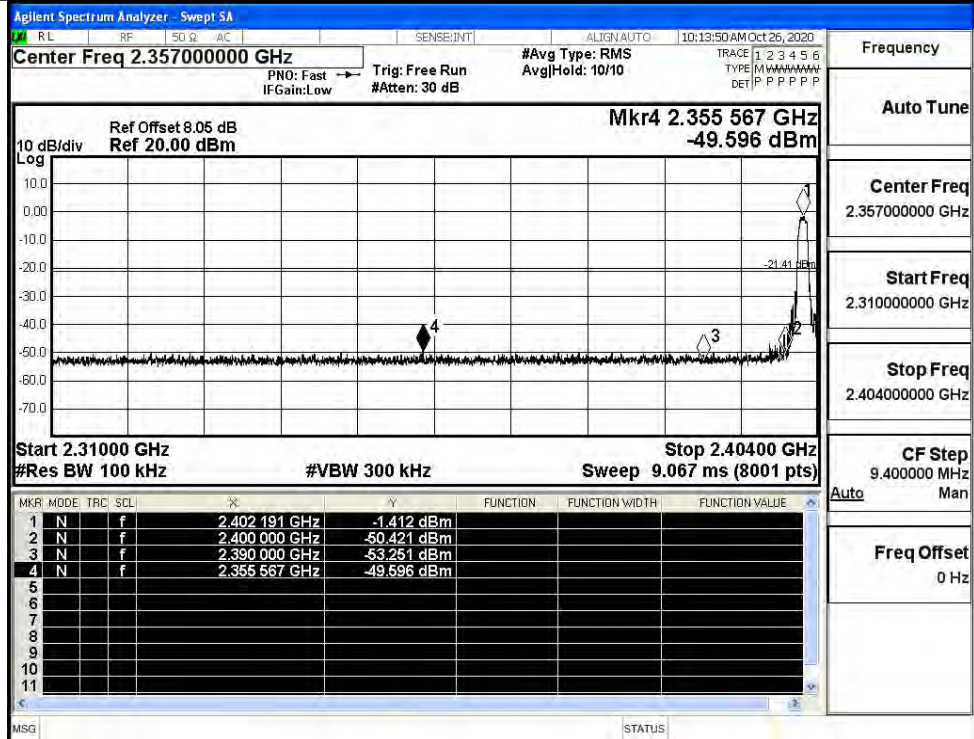
Frequency	2.489000000 GHz
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Freq Offset	0 Hz

π /4DQPSK/HCH/Hop



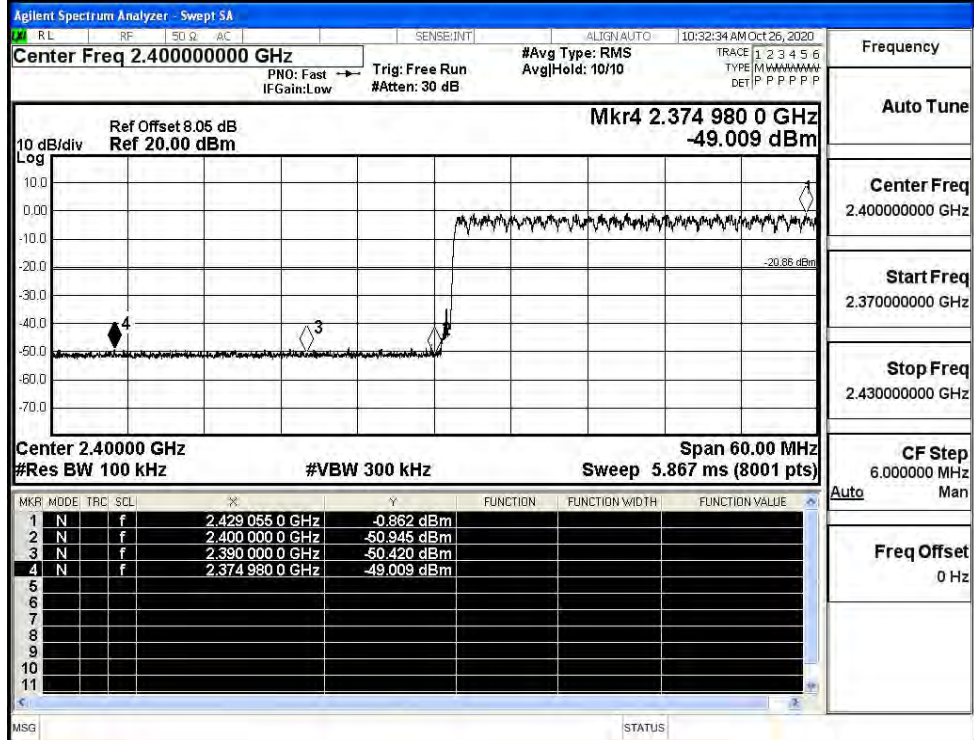
Frequency	2.483500000 GHz
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

8DPSK/LCH/No Hop



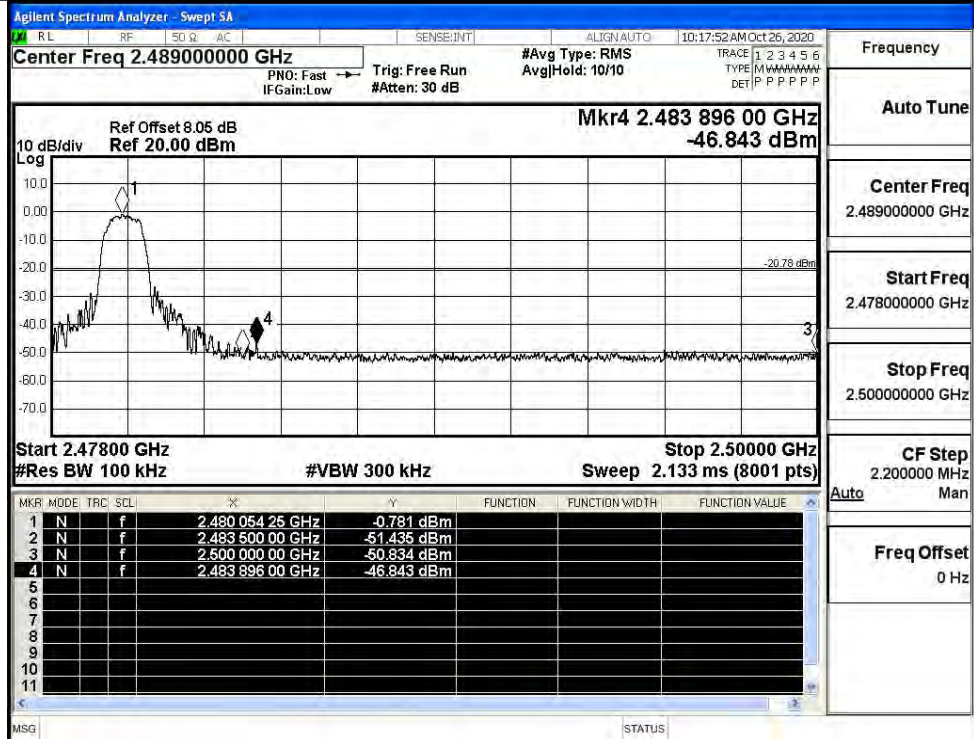
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



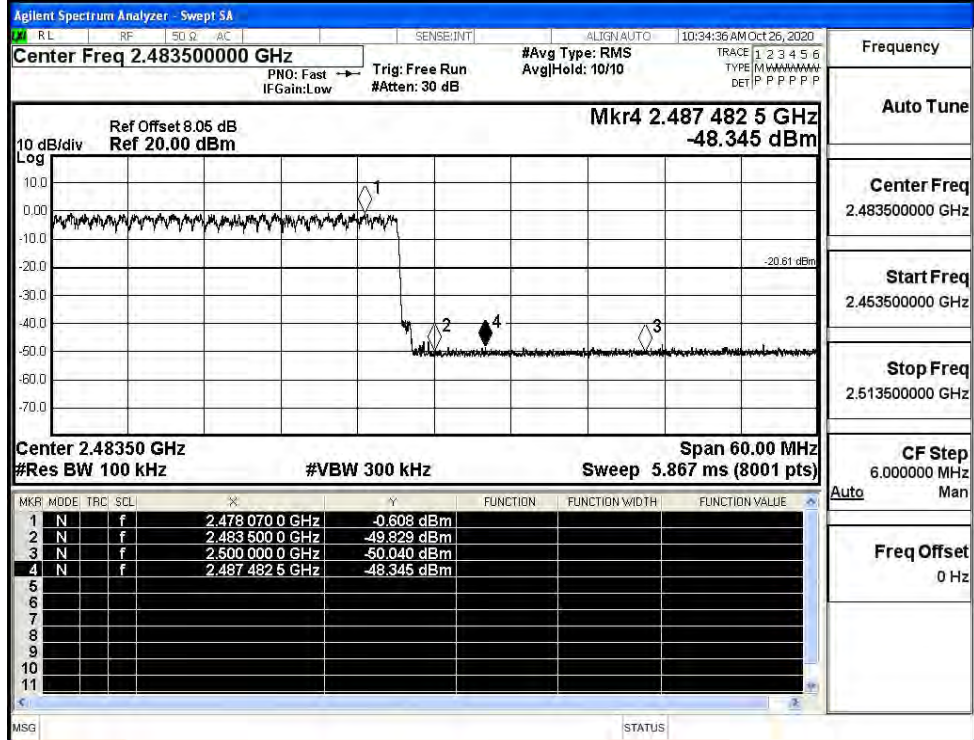
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/HCH/No Hop



Frequency	2.489000000 GHz
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

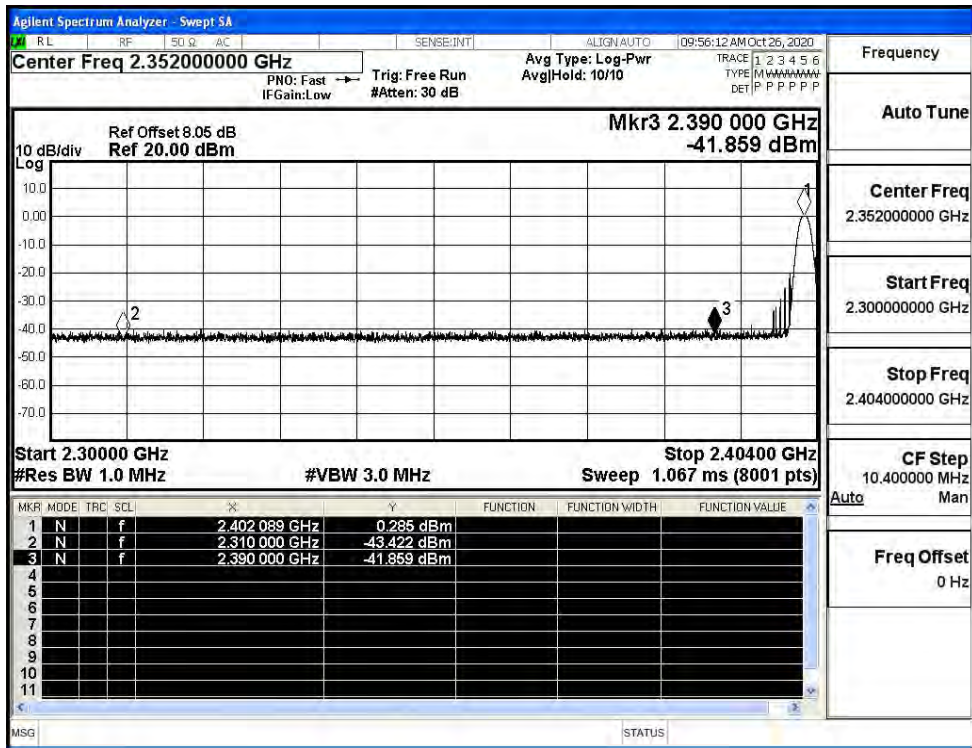


Frequency	2.483500000 GHz
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

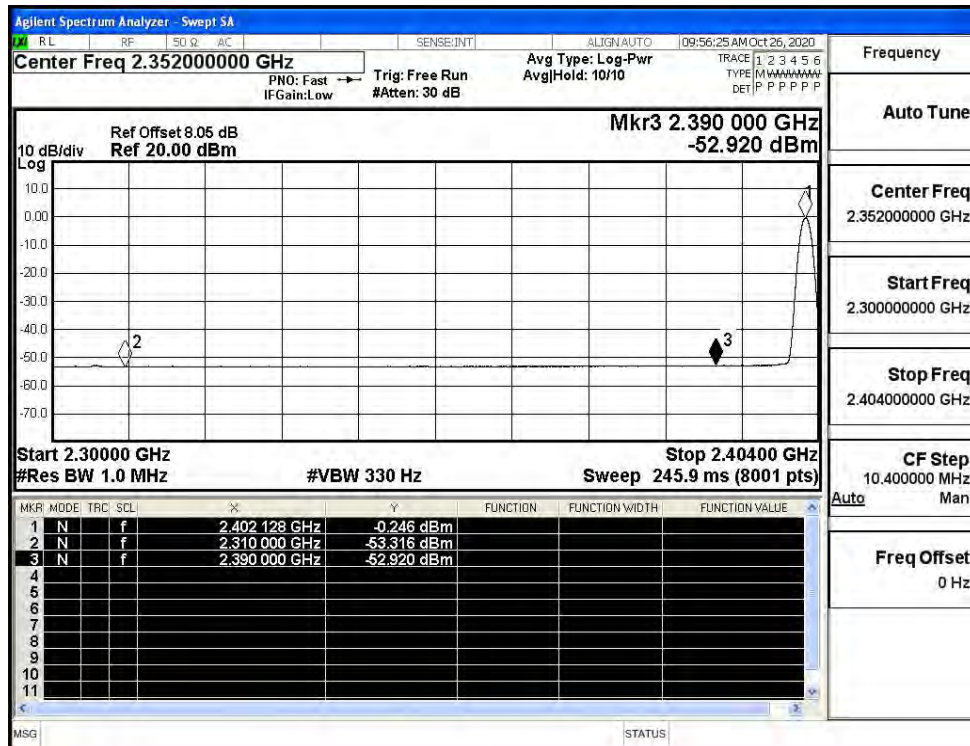
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.42	2.0	0	53.81	PEAK	74	PASS
	Off	2310.0	-53.32	2.0	0	43.91	AV	54	PASS
	Off	2390.0	-41.86	2.0	0	55.37	PEAK	74	PASS
	Off	2390.0	-52.92	2.0	0	44.31	AV	54	PASS
	Off	2483.5	-41.79	2.0	0	55.44	PEAK	74	PASS
	Off	2483.5	-51.93	2.0	0	45.30	AV	54	PASS
	Off	2500.0	-41.40	2.0	0	55.83	PEAK	74	PASS
	Off	2500.0	-52.23	2.0	0	45.00	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.20	2.0	0	53.03	PEAK	74	PASS
	Off	2310.0	-53.29	2.0	0	43.94	AV	54	PASS
	Off	2390.0	-41.69	2.0	0	55.54	PEAK	74	PASS
	Off	2390.0	-52.82	2.0	0	44.41	AV	54	PASS
	Off	2483.5	-41.33	2.0	0	55.90	PEAK	74	PASS
	Off	2483.5	-51.80	2.0	0	45.43	AV	54	PASS
	Off	2500.0	-43.26	2.0	0	53.97	PEAK	74	PASS
	Off	2500.0	-52.17	2.0	0	45.06	AV	54	PASS
8DPSK	Off	2310.0	-43.69	2.0	0	53.54	PEAK	74	PASS
	Off	2310.0	-53.19	2.0	0	44.04	AV	54	PASS
	Off	2390.0	-41.02	2.0	0	56.21	PEAK	74	PASS
	Off	2390.0	-52.87	2.0	0	44.36	AV	54	PASS
	Off	2483.5	-41.72	2.0	0	55.51	PEAK	74	PASS
	Off	2483.5	-51.82	2.0	0	45.41	AV	54	PASS
	Off	2500.0	-41.80	2.0	0	55.43	PEAK	74	PASS
	Off	2500.0	-52.22	2.0	0	45.01	AV	54	PASS

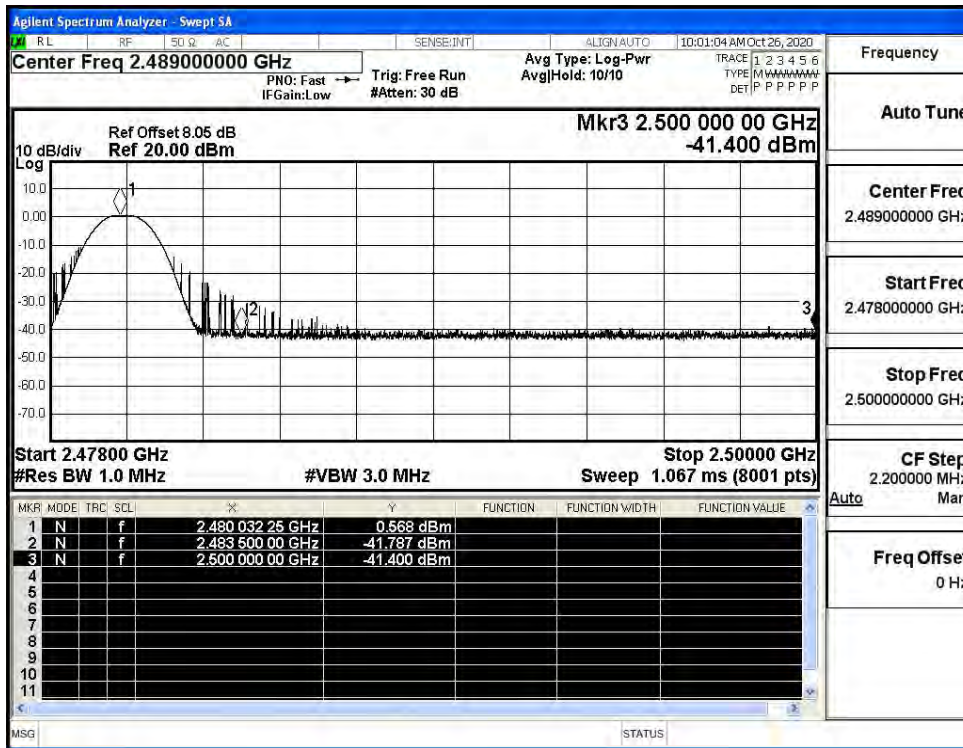
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



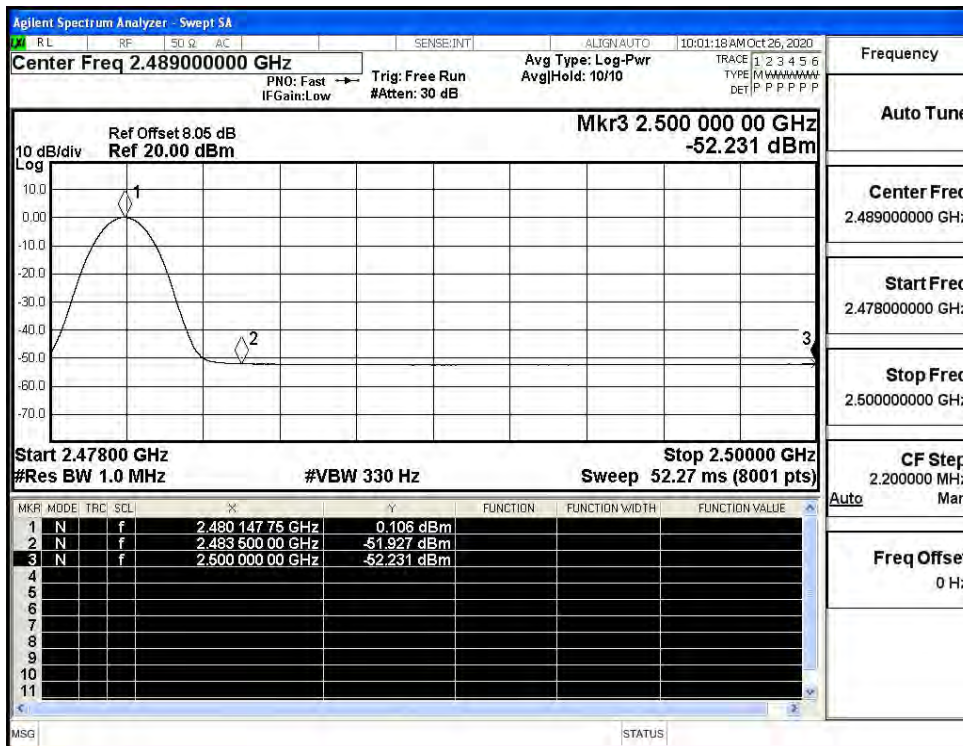
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



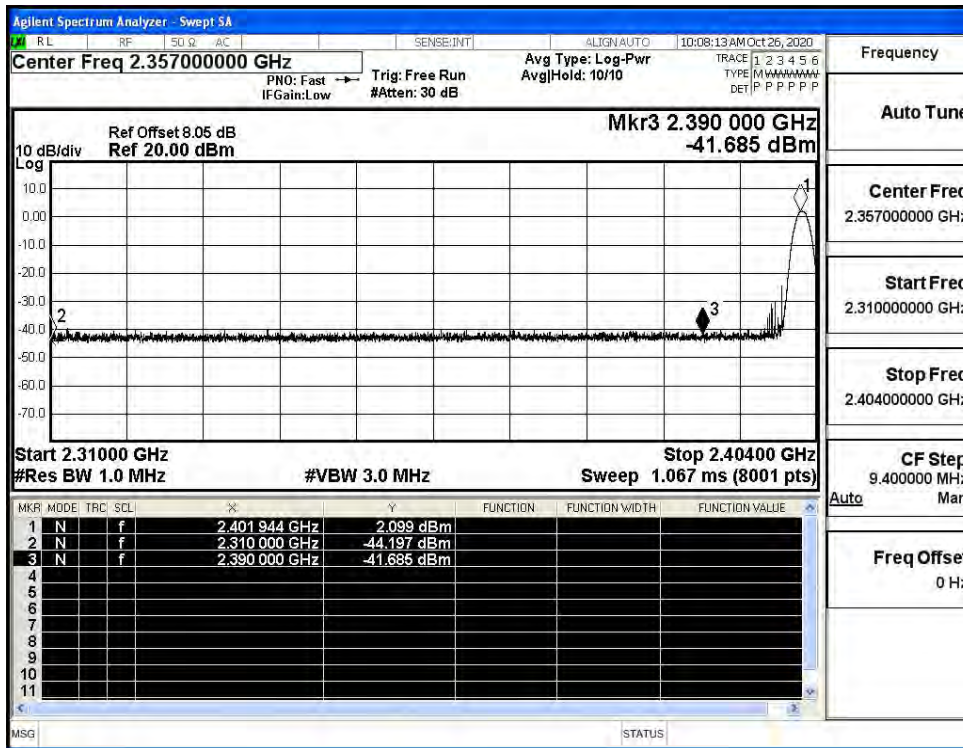
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



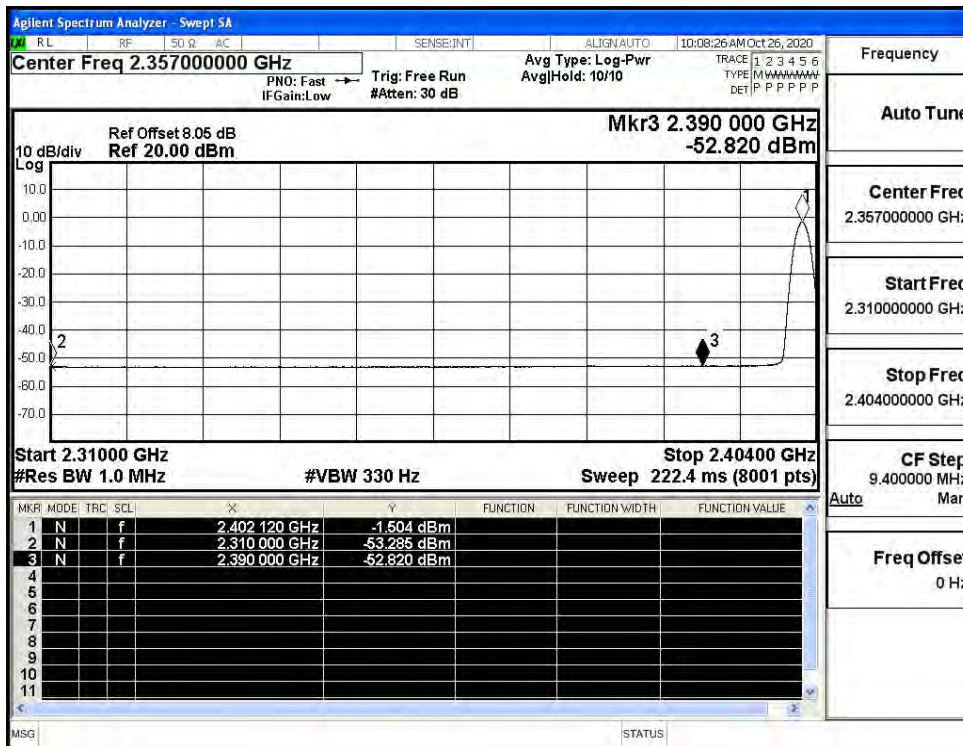
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



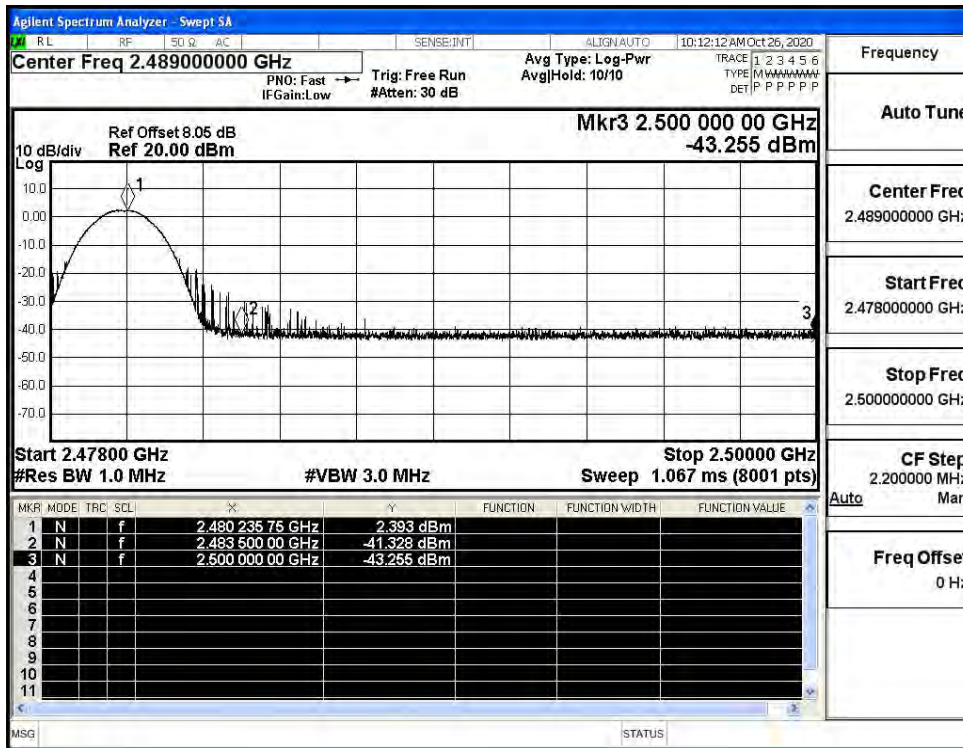
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



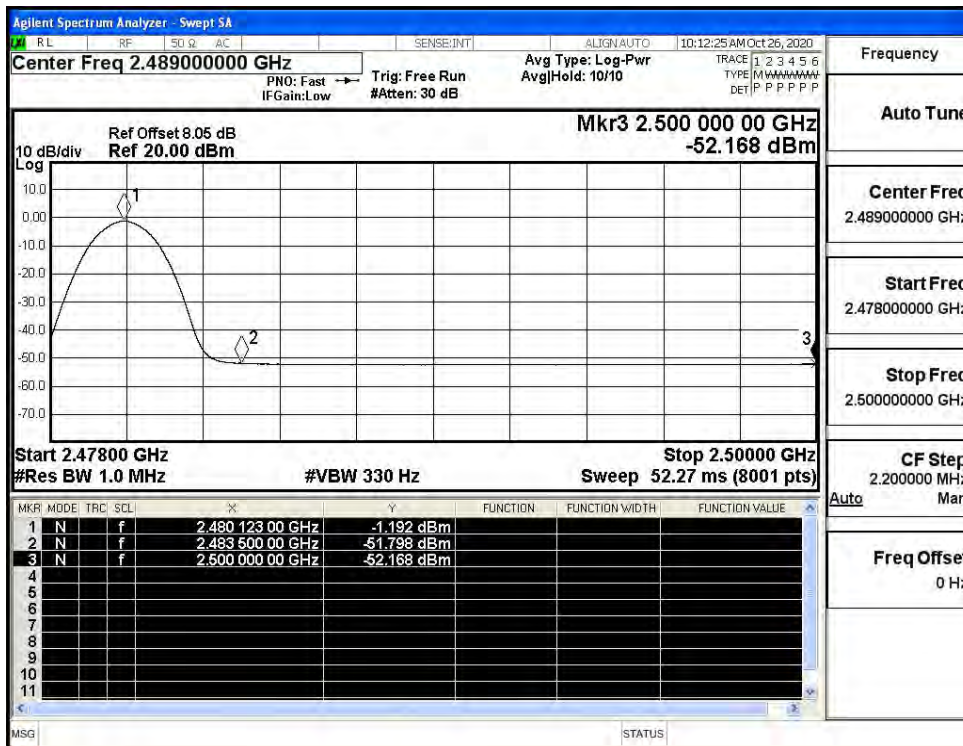
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



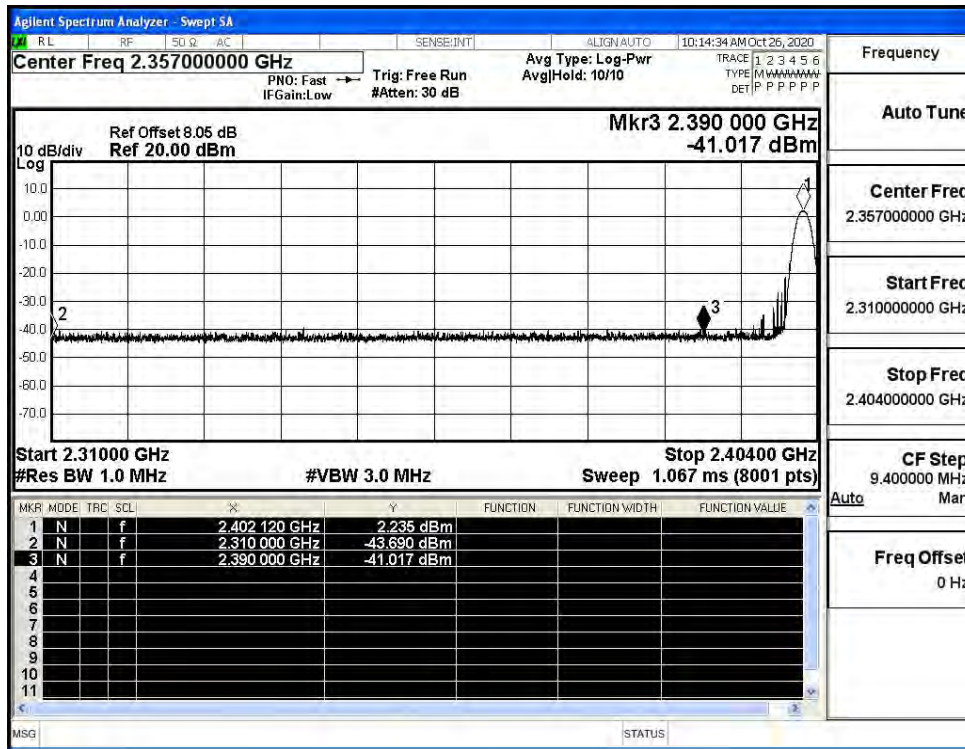
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



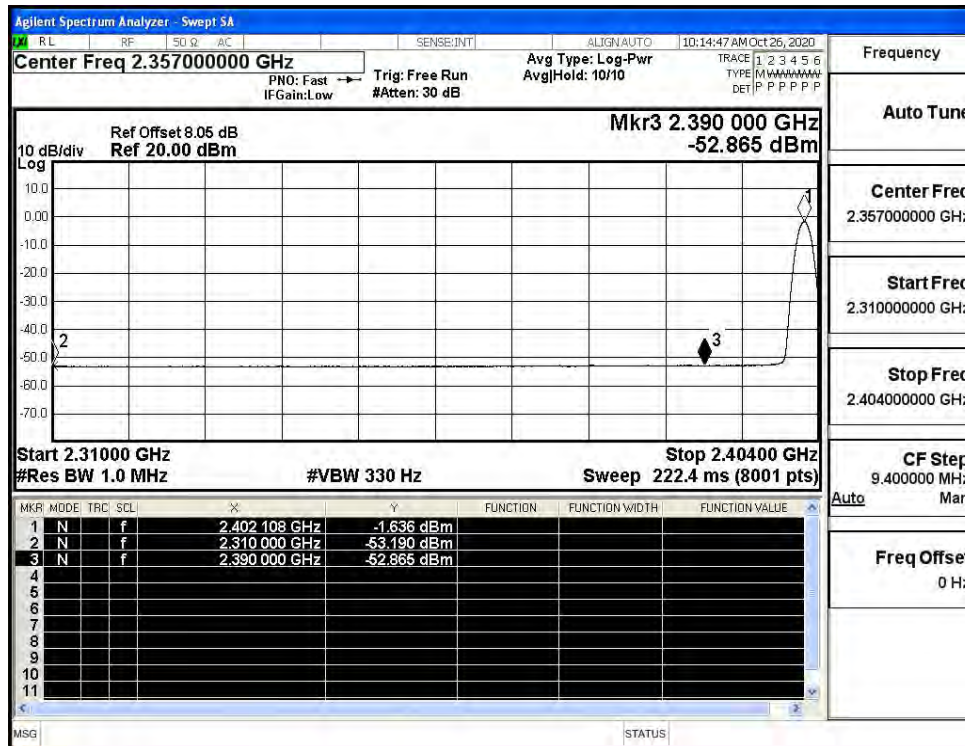
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



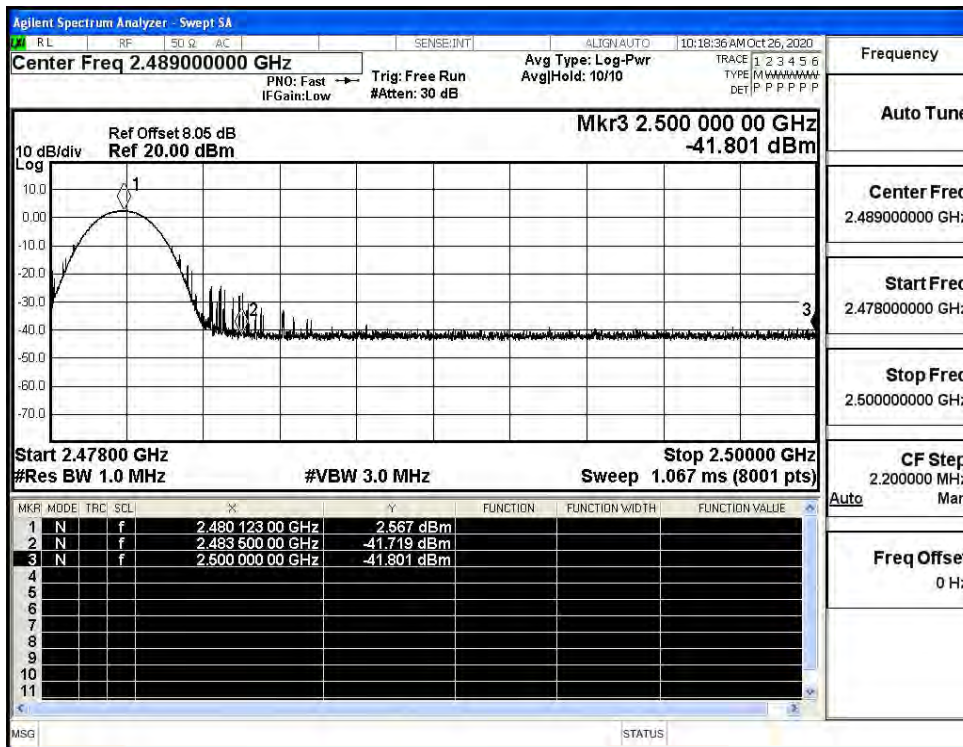
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

