

Appendix A

RF Test Data for BT V4.0(BDR/EDR) (Conducted Measurement)

Product Name: VCI diagnostic box

Trade Mark: XTOOL

Test Model: VCI+

Environmental Conditions

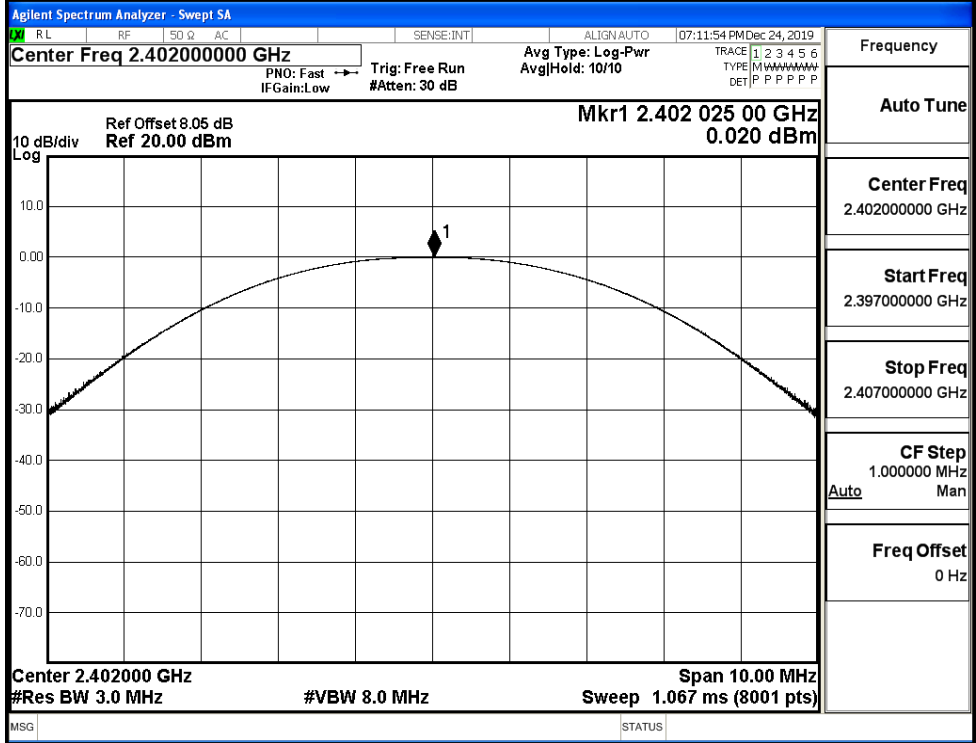
Temperature:	23.2 °C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond Lu
Supervised by:	Jayden.Zhuo

A.1 Maxmum Conducted Peak Output Power

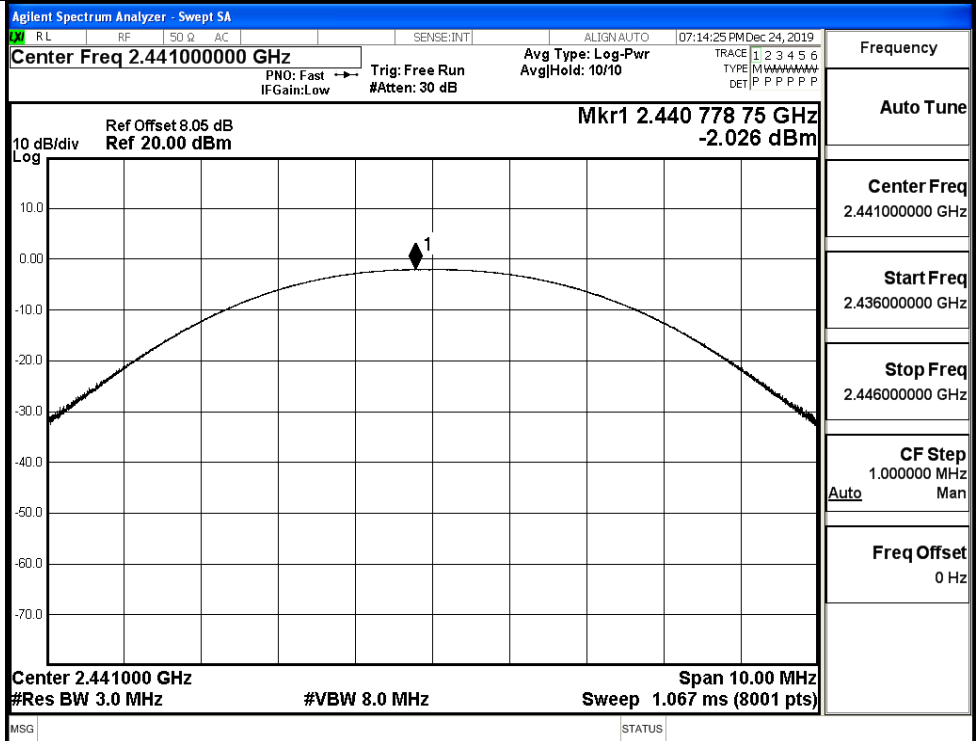
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.020	21	PASS
	MCH	-2.026	21	PASS
	HCH	-0.835	21	PASS
$\pi/4$ DQPSK	LCH	-0.774	21	PASS
	MCH	-2.688	21	PASS
	HCH	-1.533	21	PASS
8DPSK	LCH	-0.598	21	PASS
	MCH	-2.457	21	PASS
	HCH	-1.351	21	PASS

Test Graphs

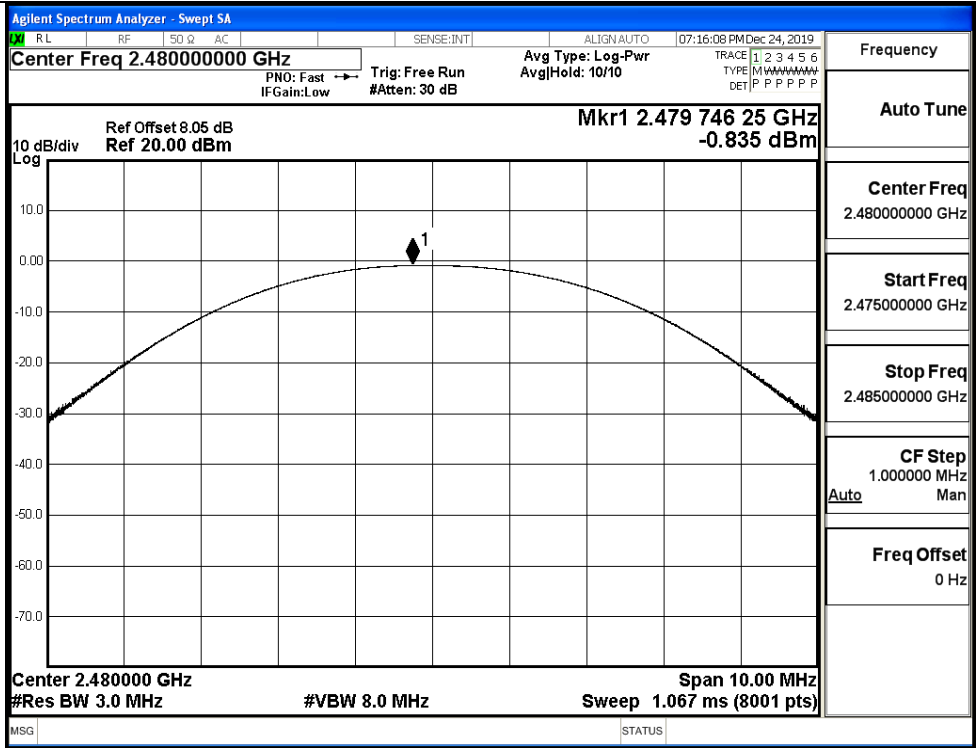
GFSK/LCH



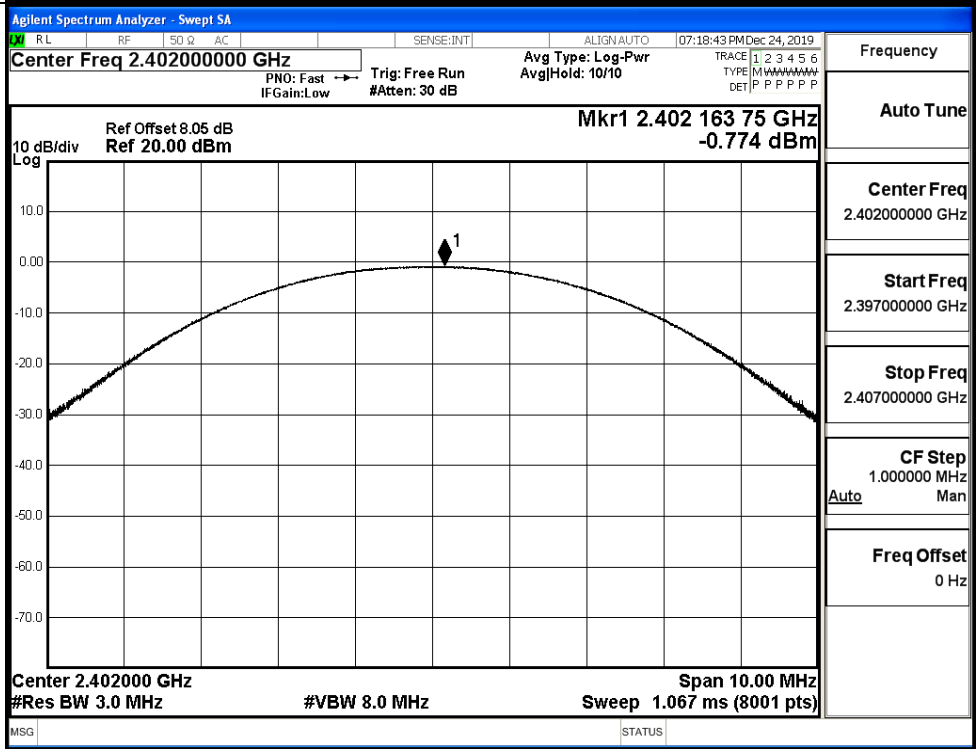
GFSK/MCH

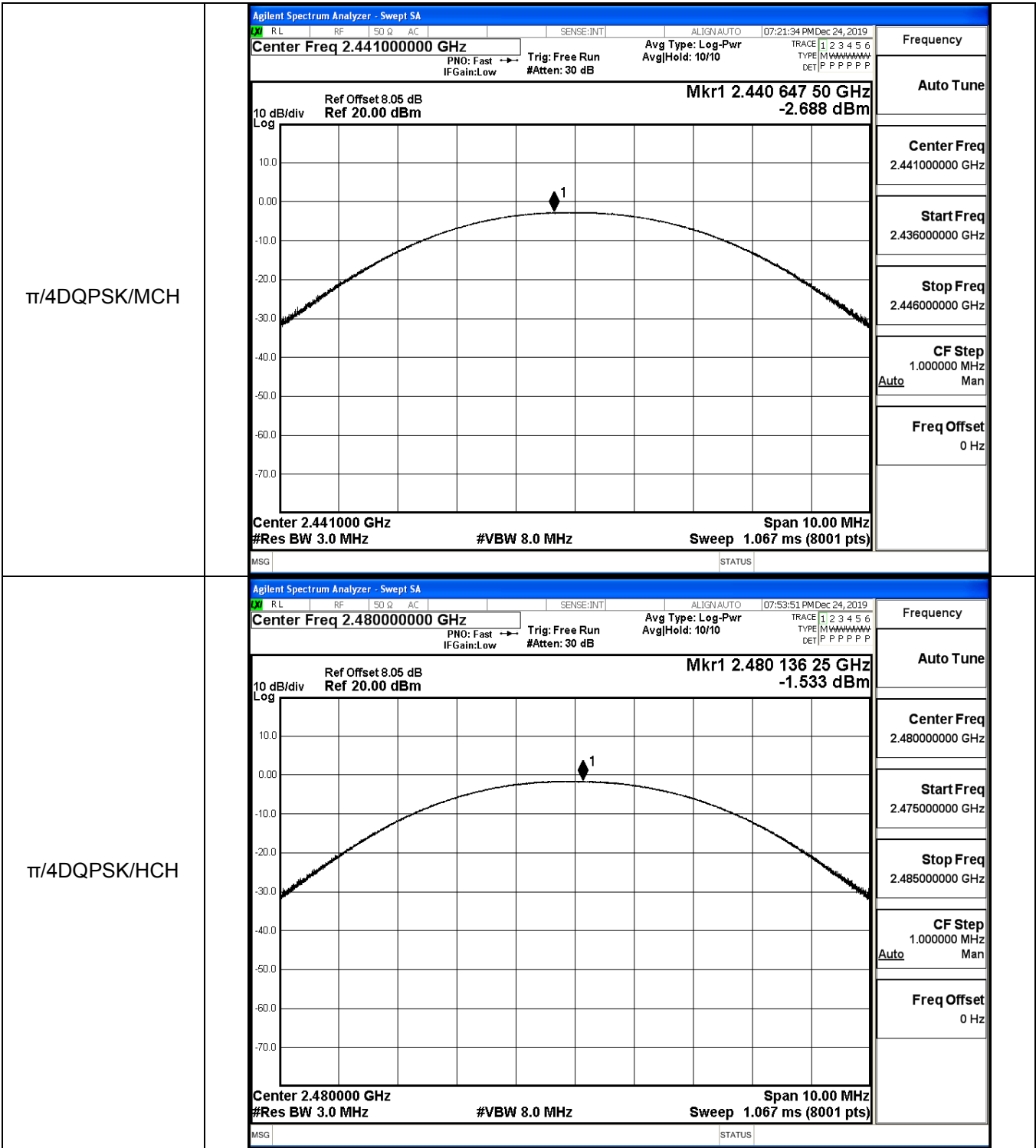


GFSK/HCH

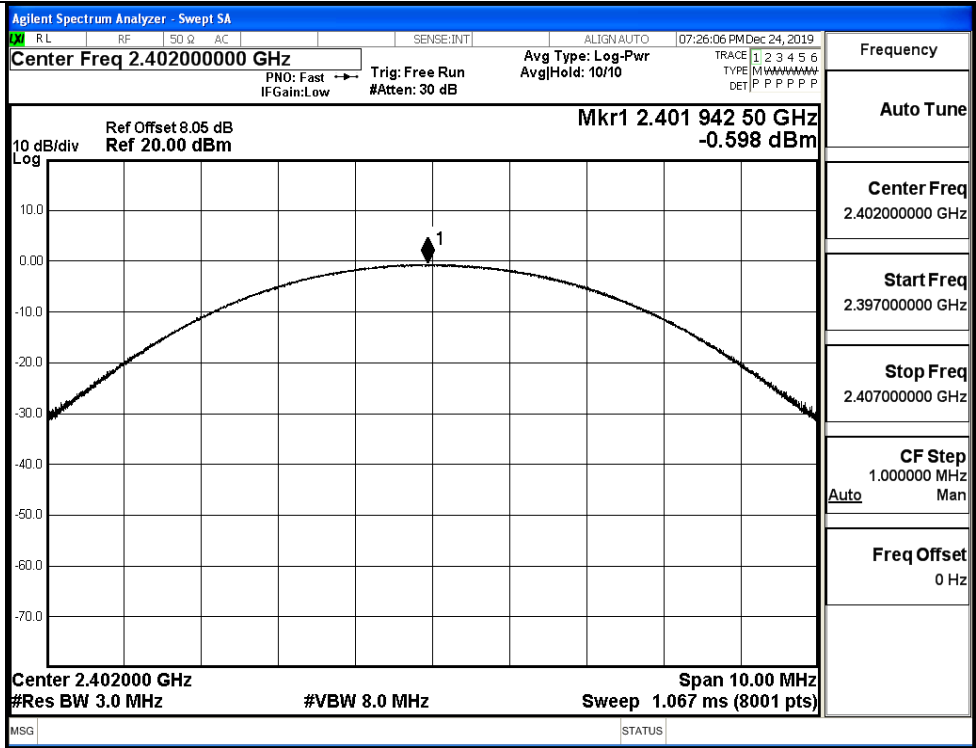


π /4DQPSK/LCH

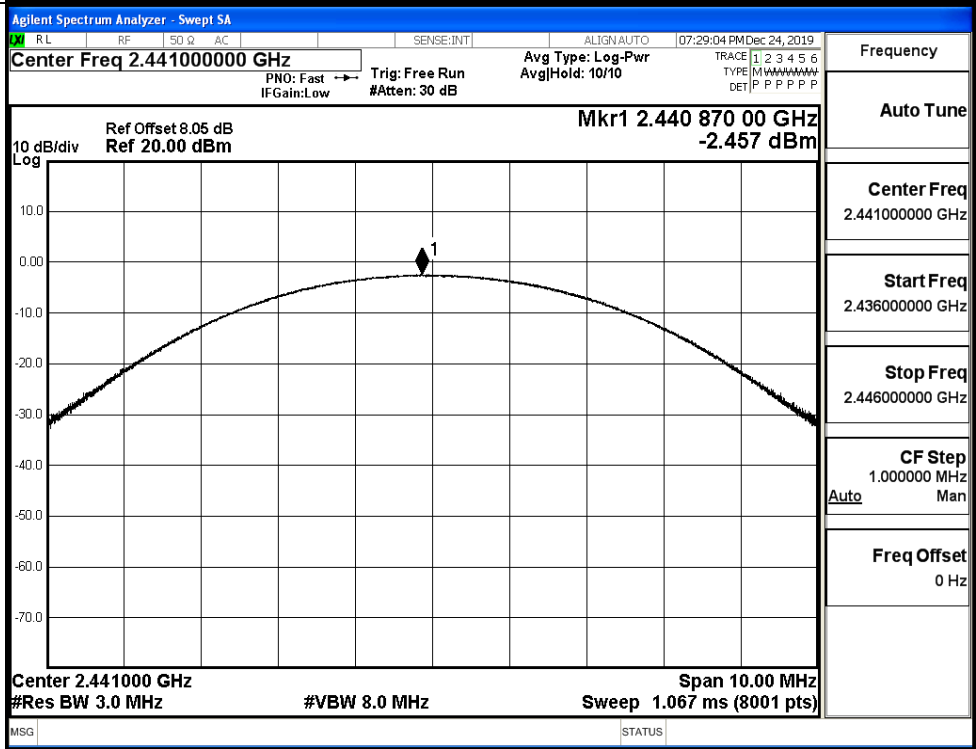




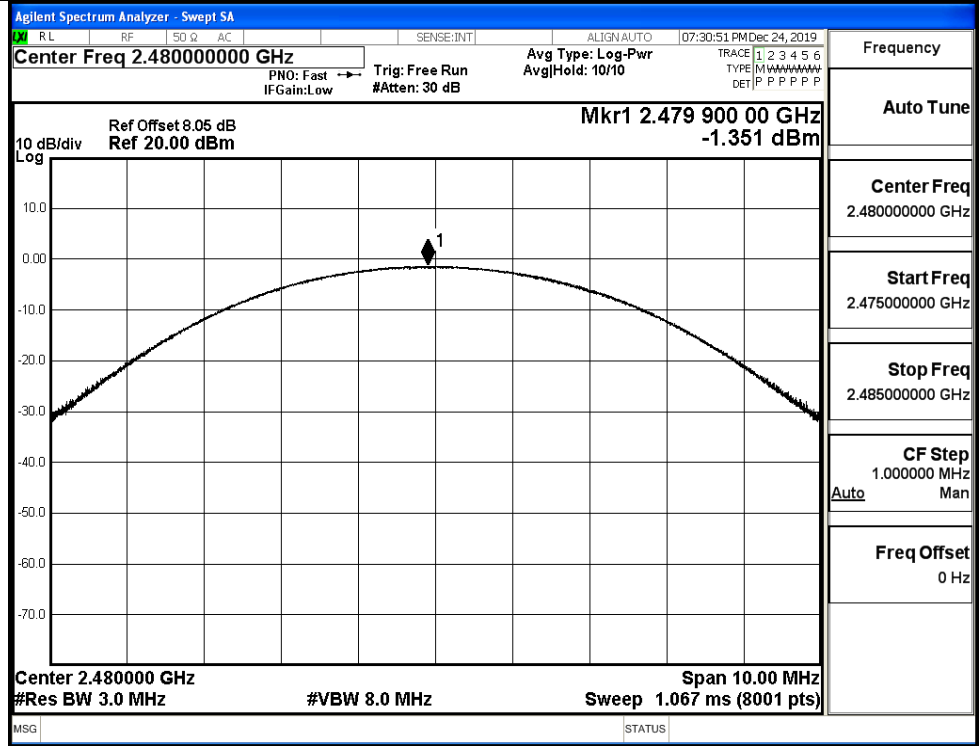
8DPSK/LCH



8DPSK/MCH



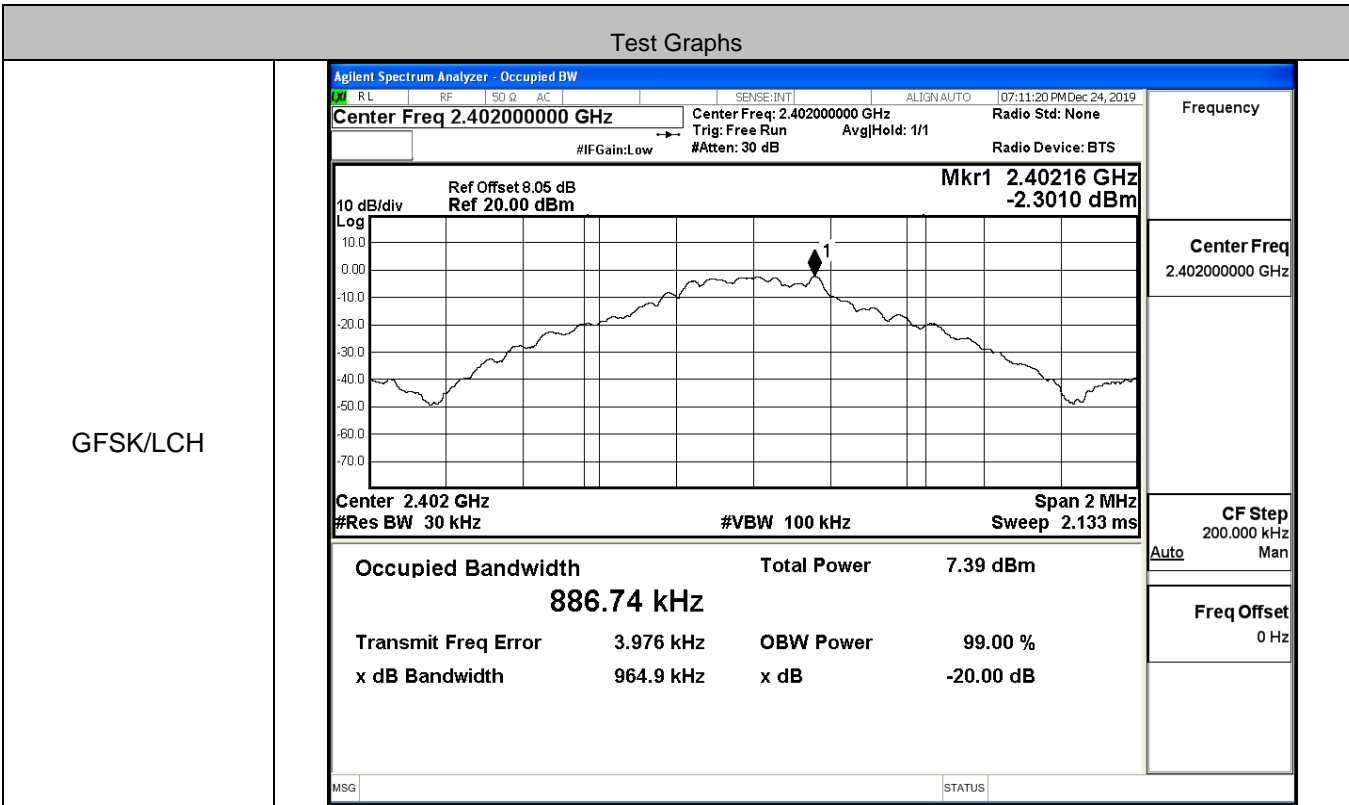
8DPSK/HCH



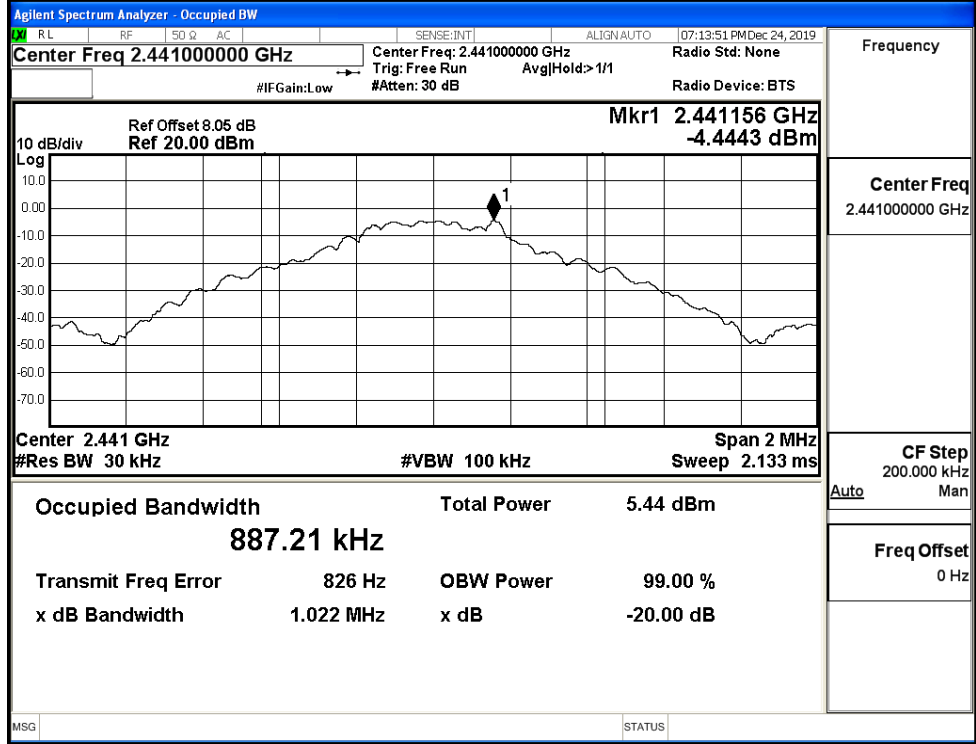
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9649	Not Specified	PASS
	MCH	1.022	Not Specified	PASS
	HCH	1.025	Not Specified	PASS
π/4DQPSK	LCH	1.288	Not Specified	PASS
	MCH	1.320	Not Specified	PASS
	HCH	1.291	Not Specified	PASS
8DPSK	LCH	1.293	Not Specified	PASS
	MCH	1.298	Not Specified	PASS
	HCH	1.294	Not Specified	PASS

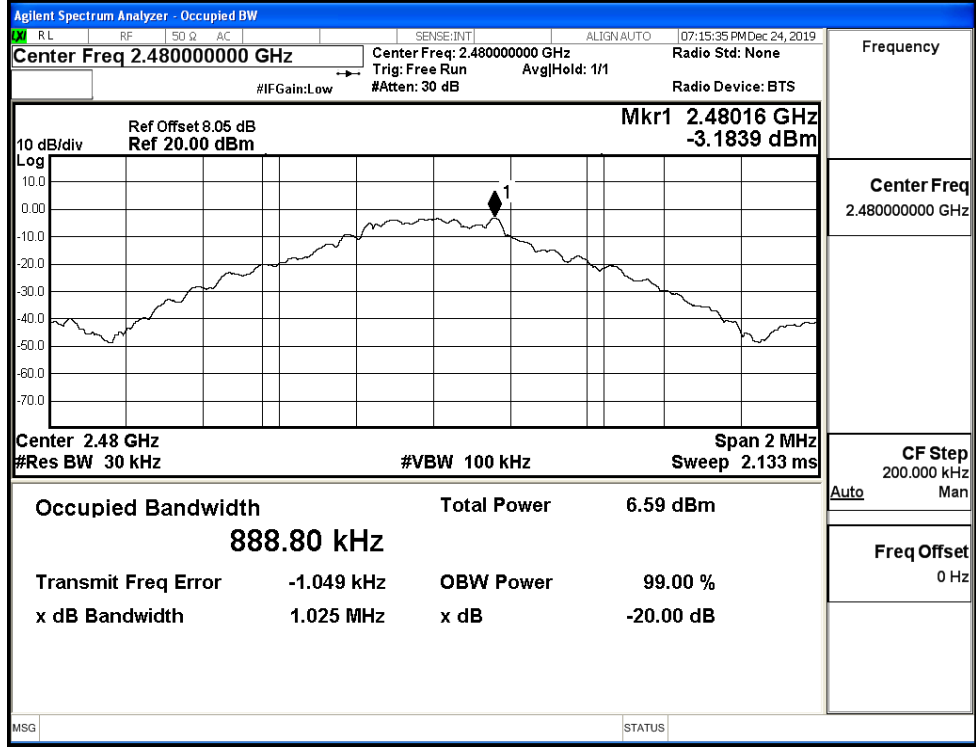
Test Graphs



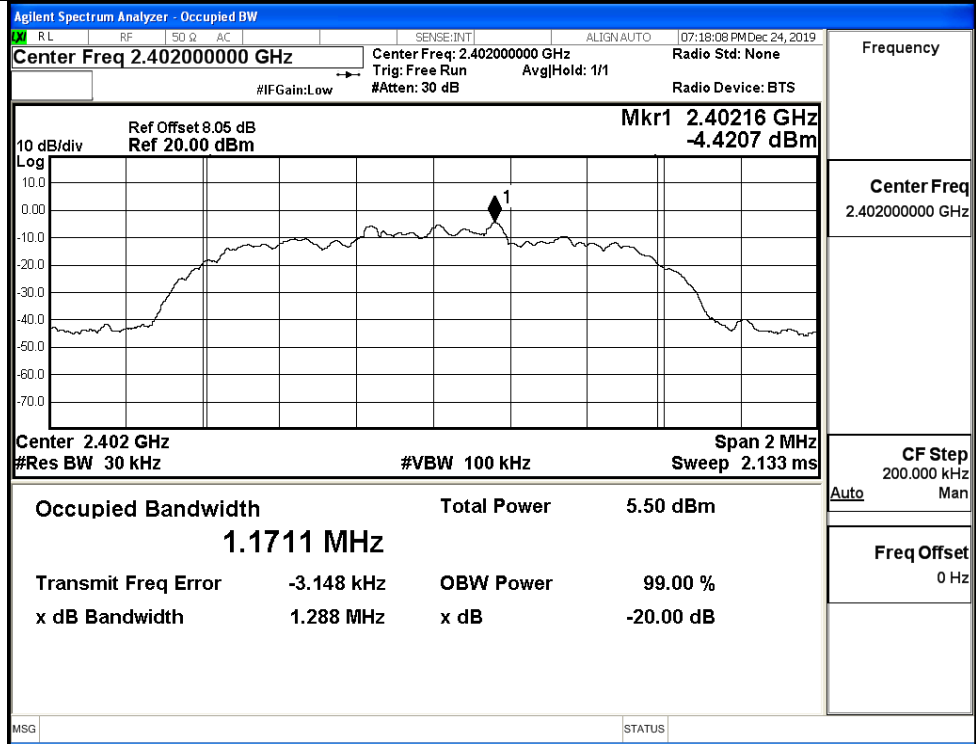
GFSK/MCH



GFSK/HCH

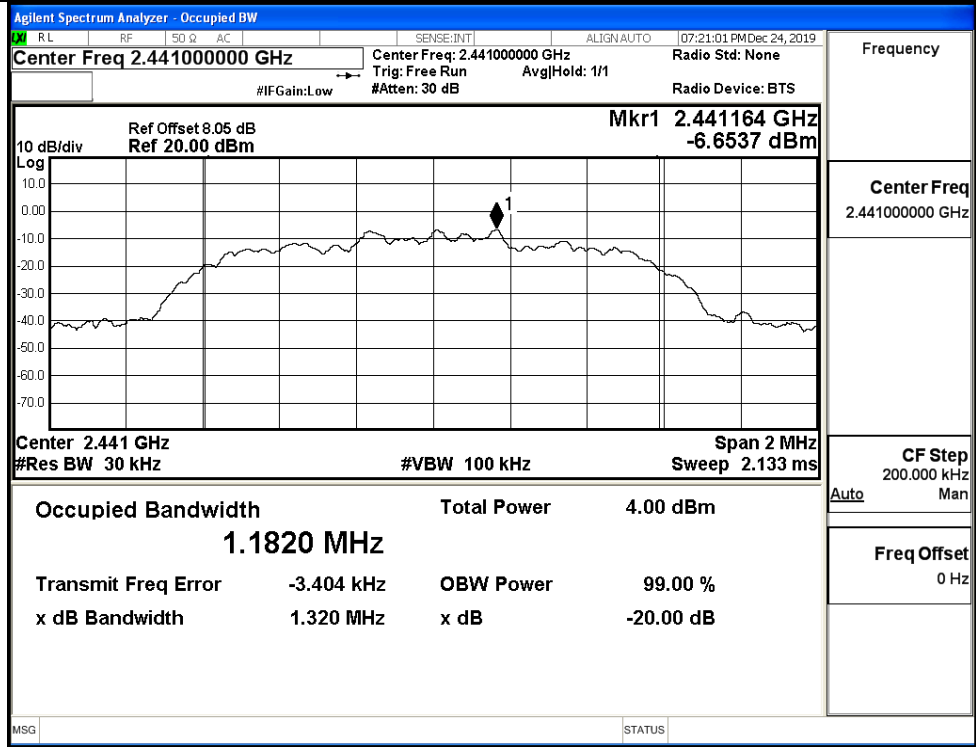


$\pi/4$ DQPSK/LCH



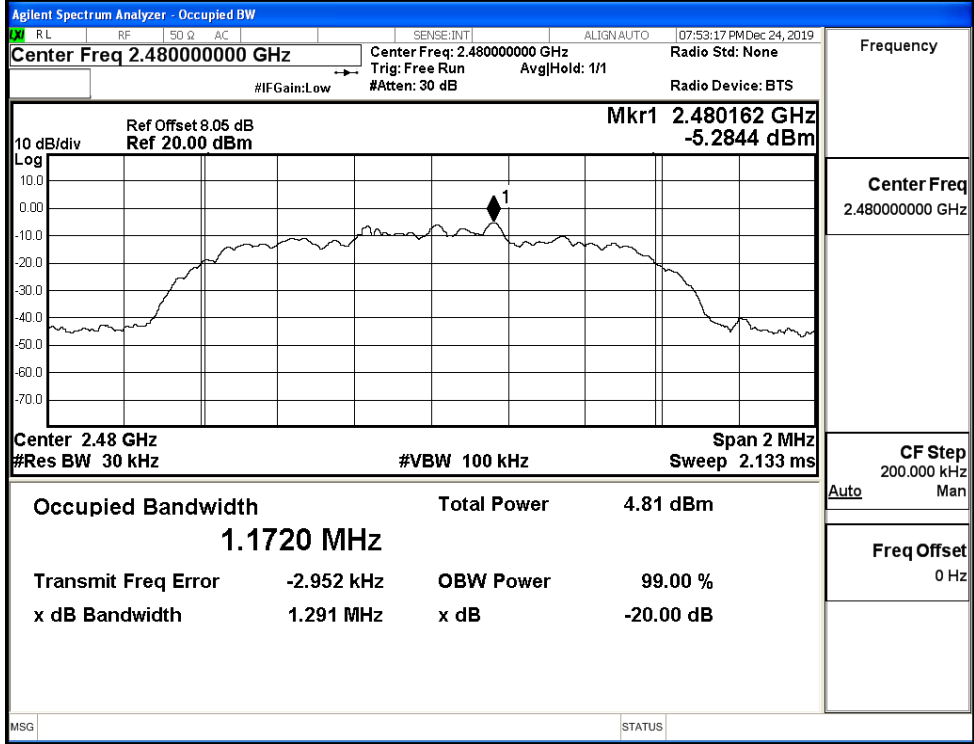
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/MCH

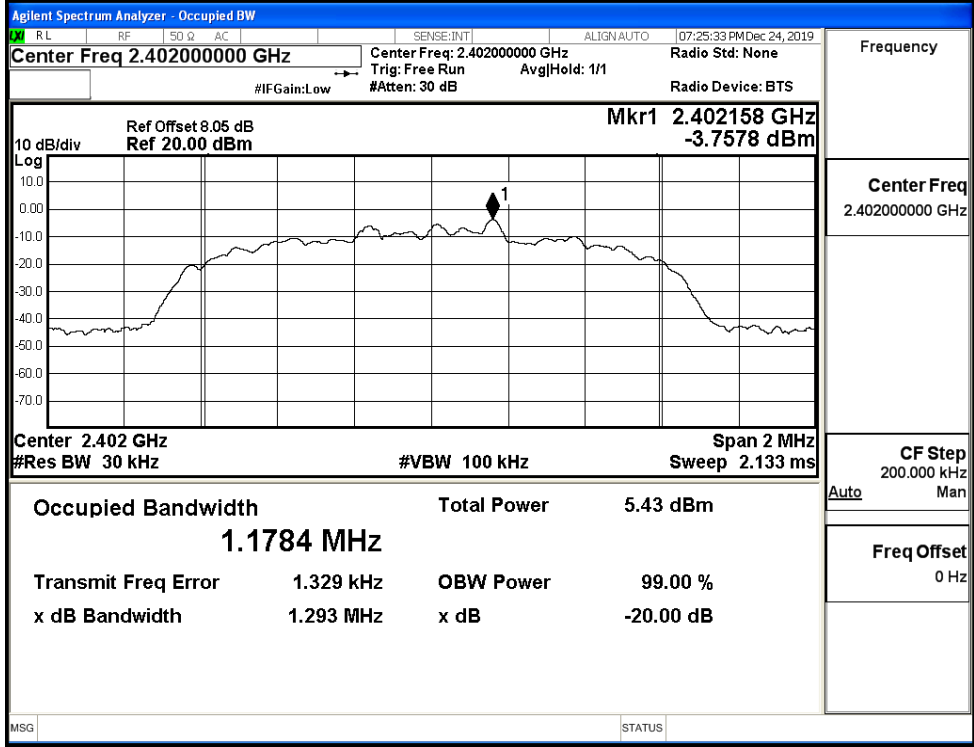


Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

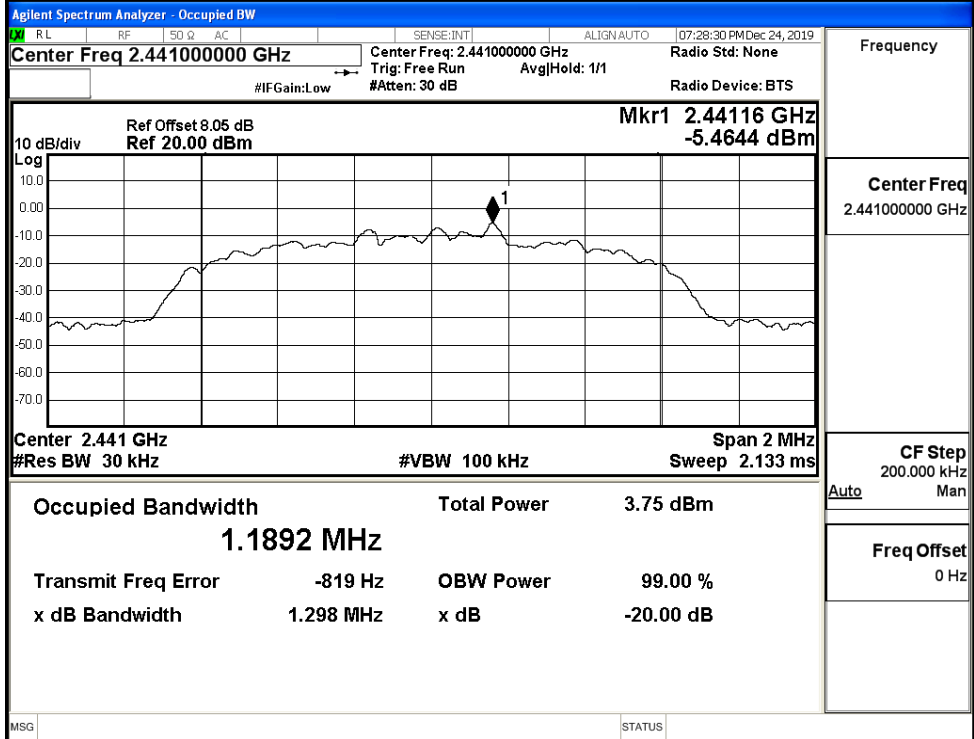
$\pi/4$ DQPSK/HCH



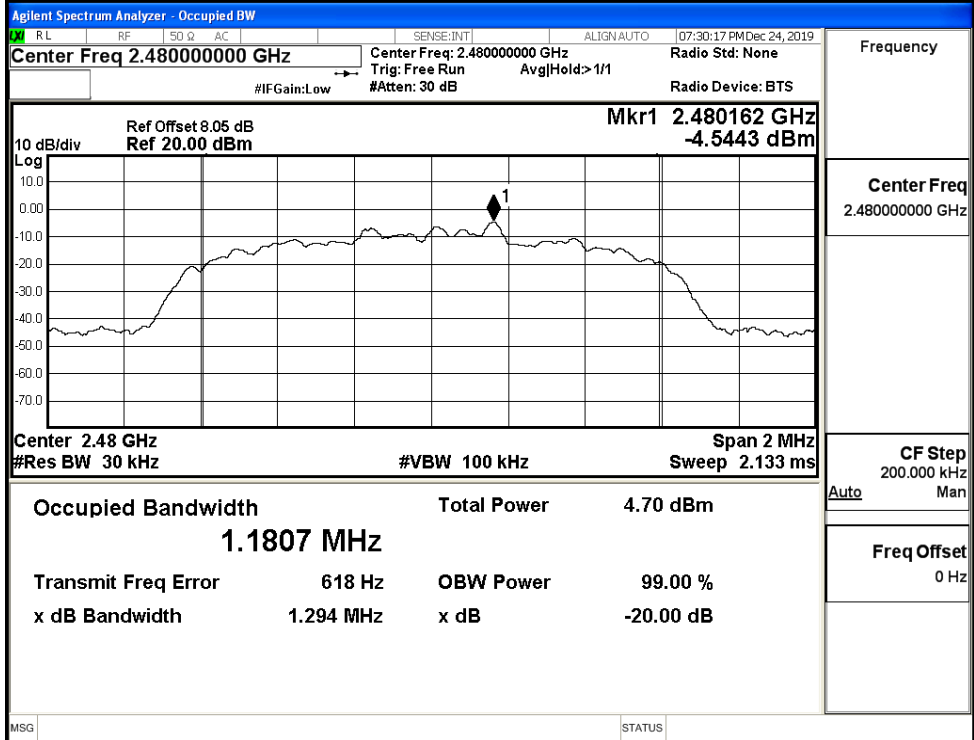
8DPSK/LCH



8DPSK/MCH

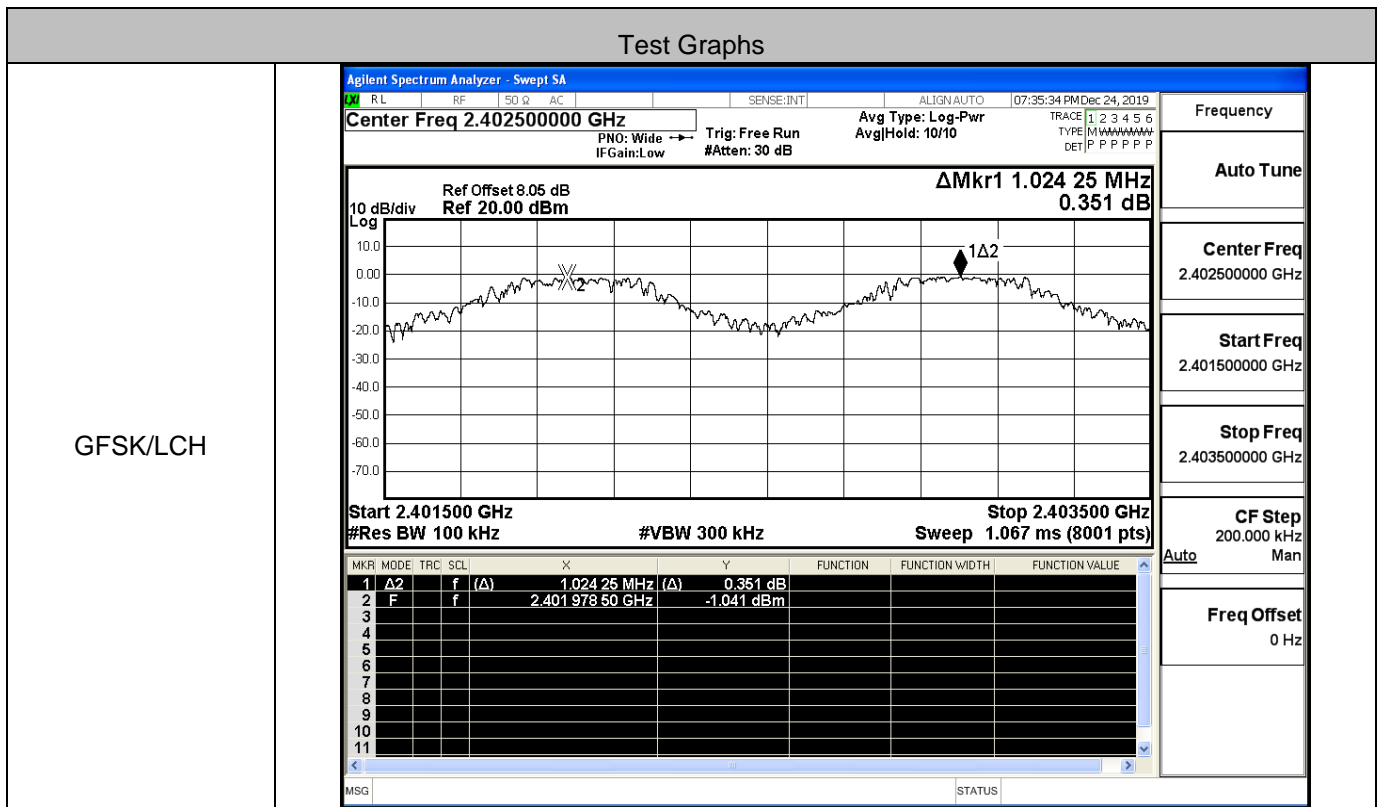


8DPSK/HCH

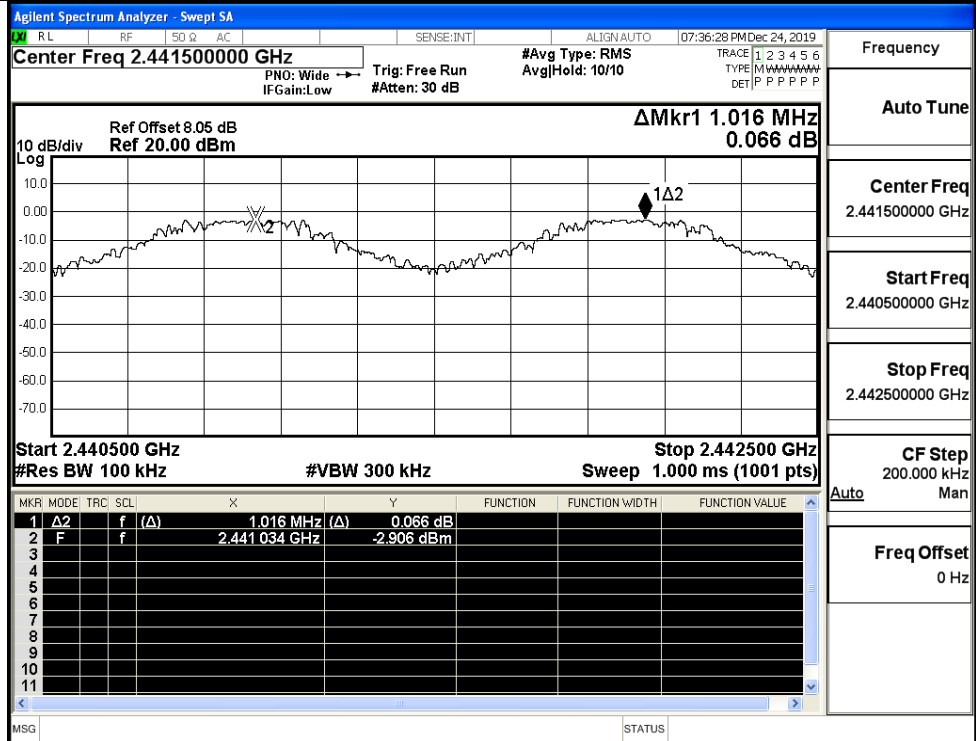


A.3 Carrier Frequency Separation

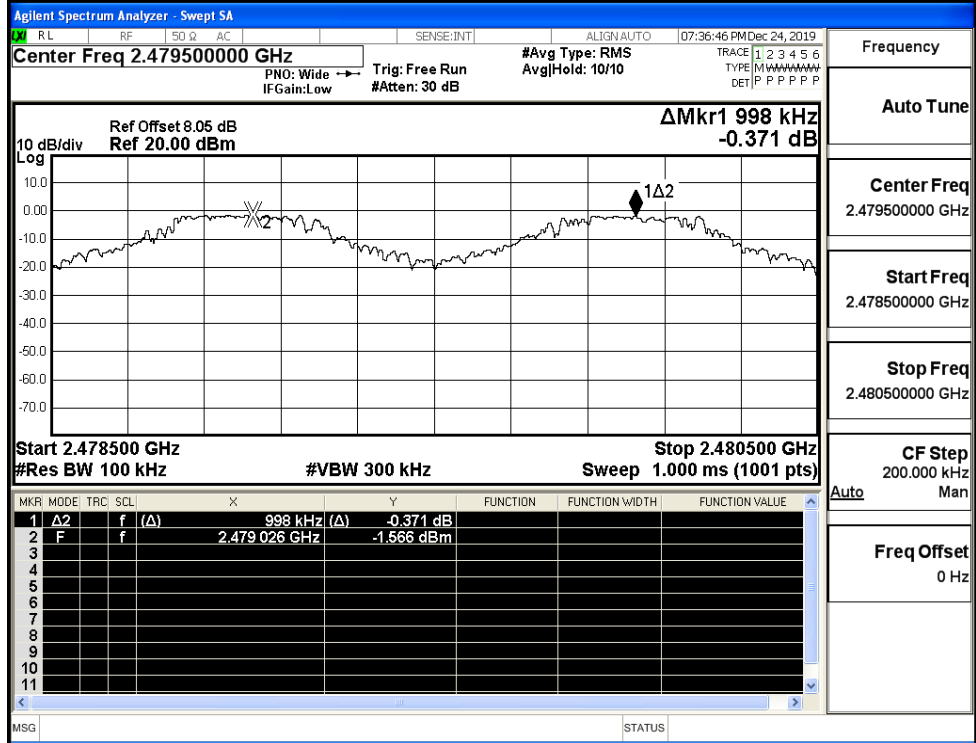
Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.024	0.683	PASS
	MCH	1.016	0.683	PASS
	HCH	0.998	0.683	PASS
π/4DQPSK	LCH	1.136	0.880	PASS
	MCH	1.310	0.880	PASS
	HCH	0.662	0.880	PASS
8DPSK	LCH	1.076	0.865	PASS
	MCH	0.874	0.865	PASS
	HCH	1.060	0.865	PASS



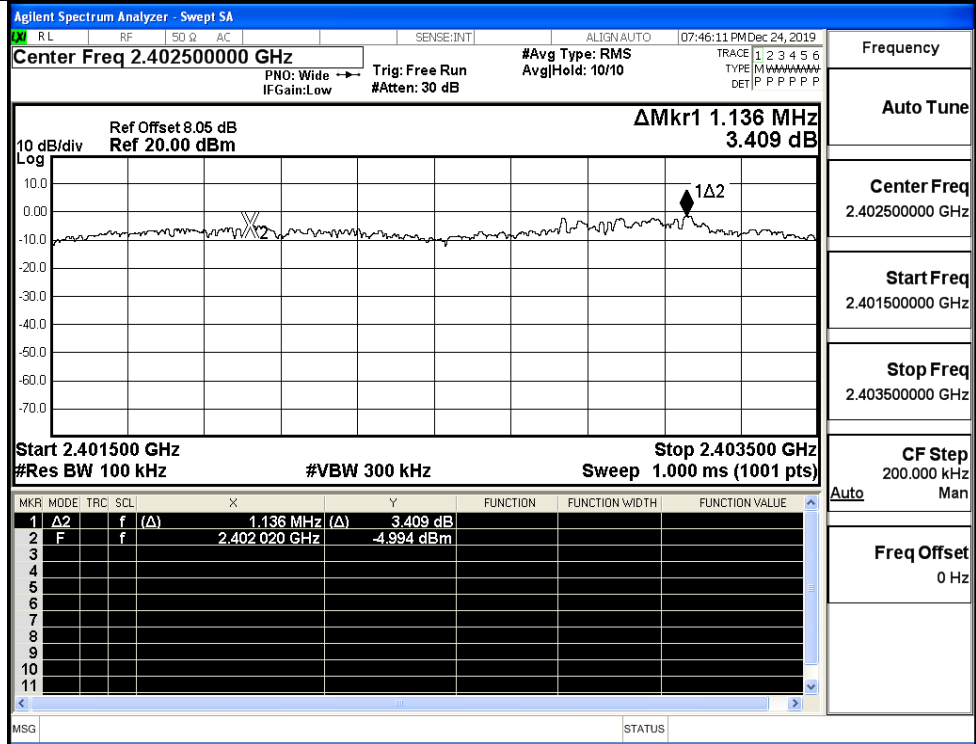
GFSK/MCH



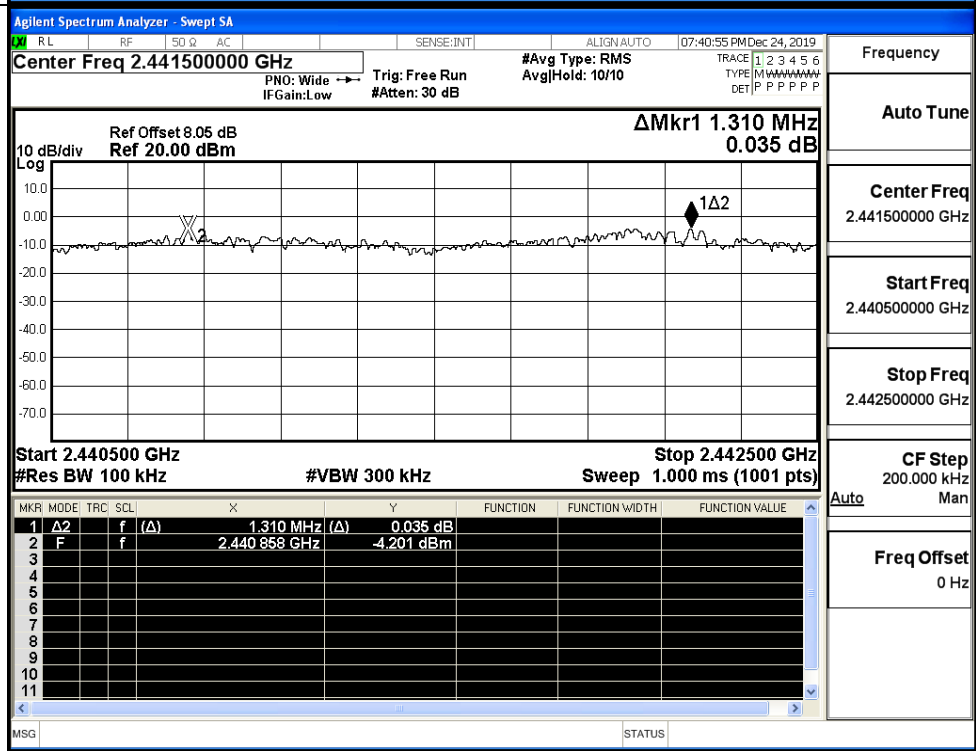
GFSK/HCH



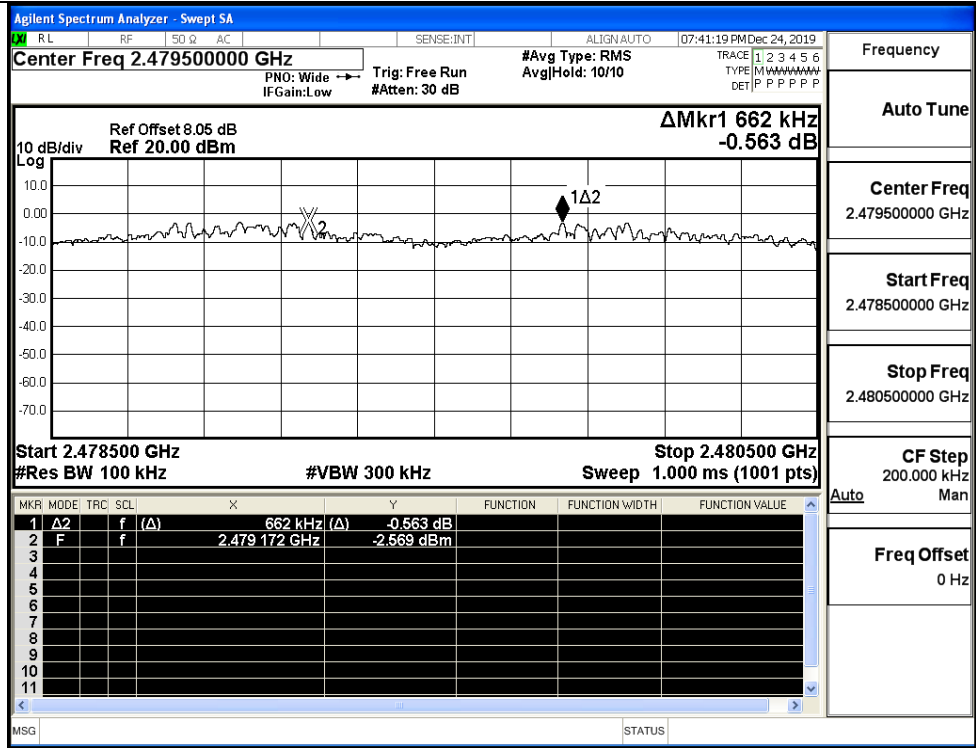
$\pi/4$ DQPSK/LCH



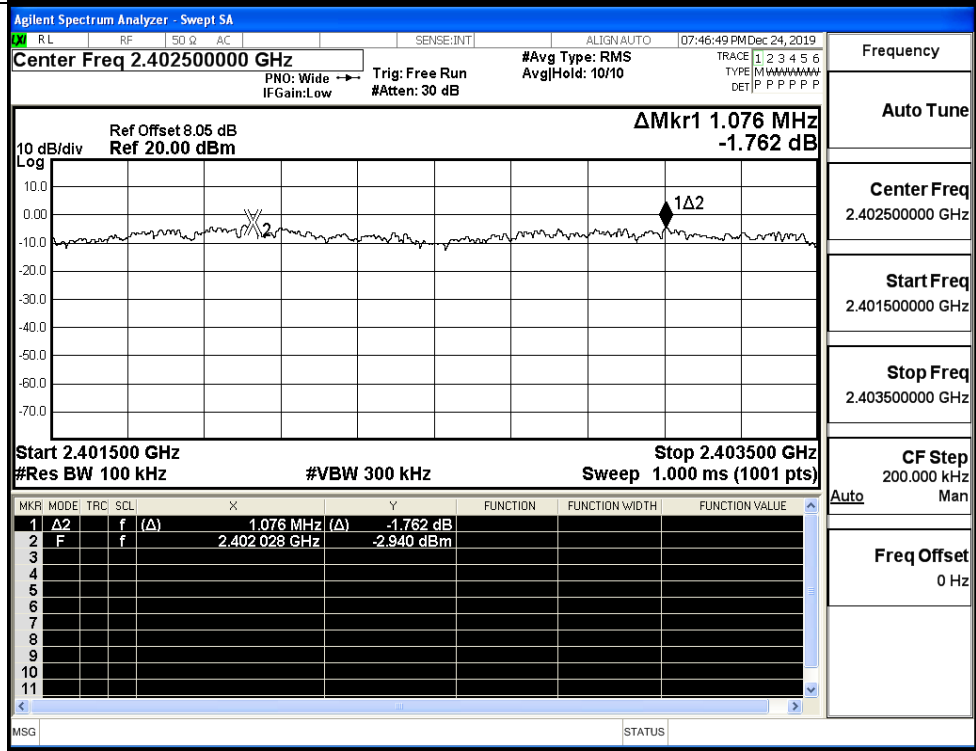
$\pi/4$ DQPSK/MCH



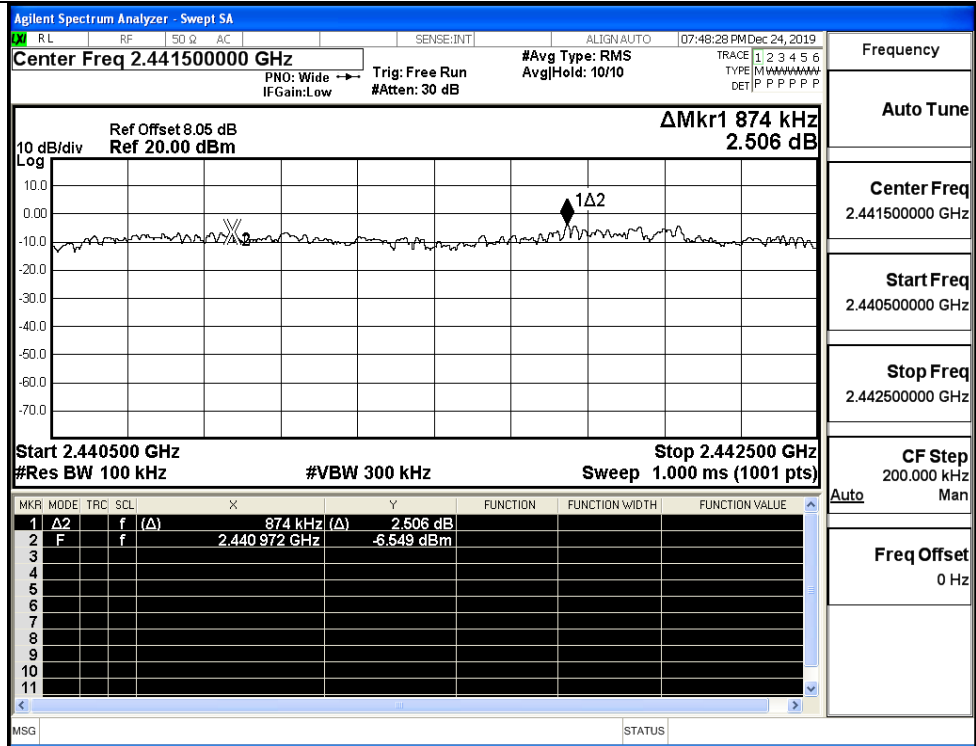
π/4DQPSK/HCH



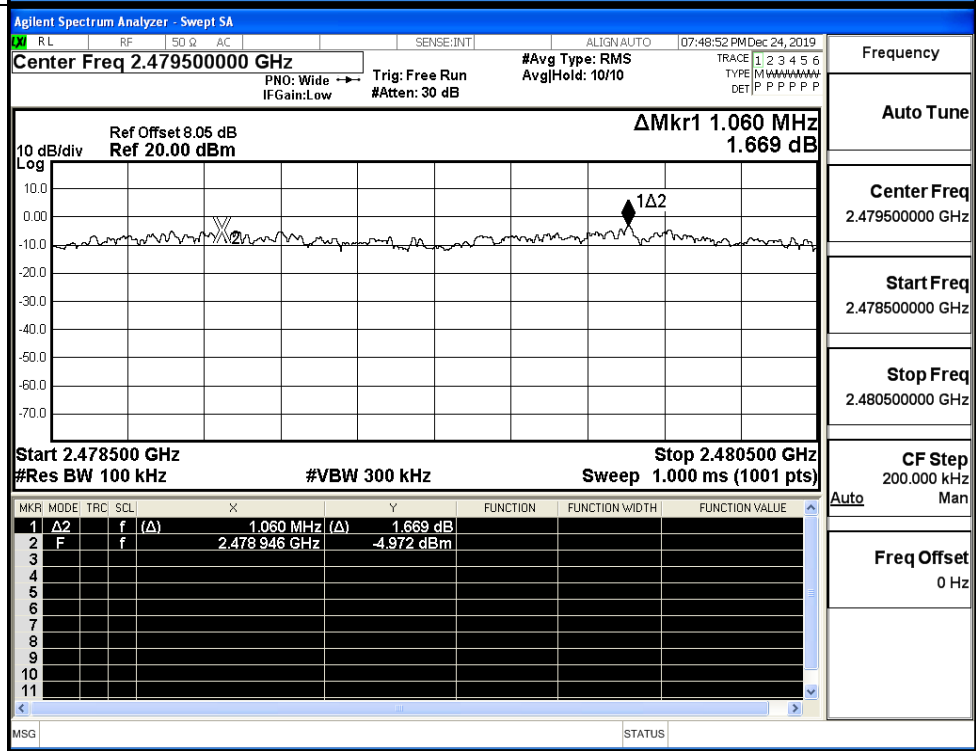
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



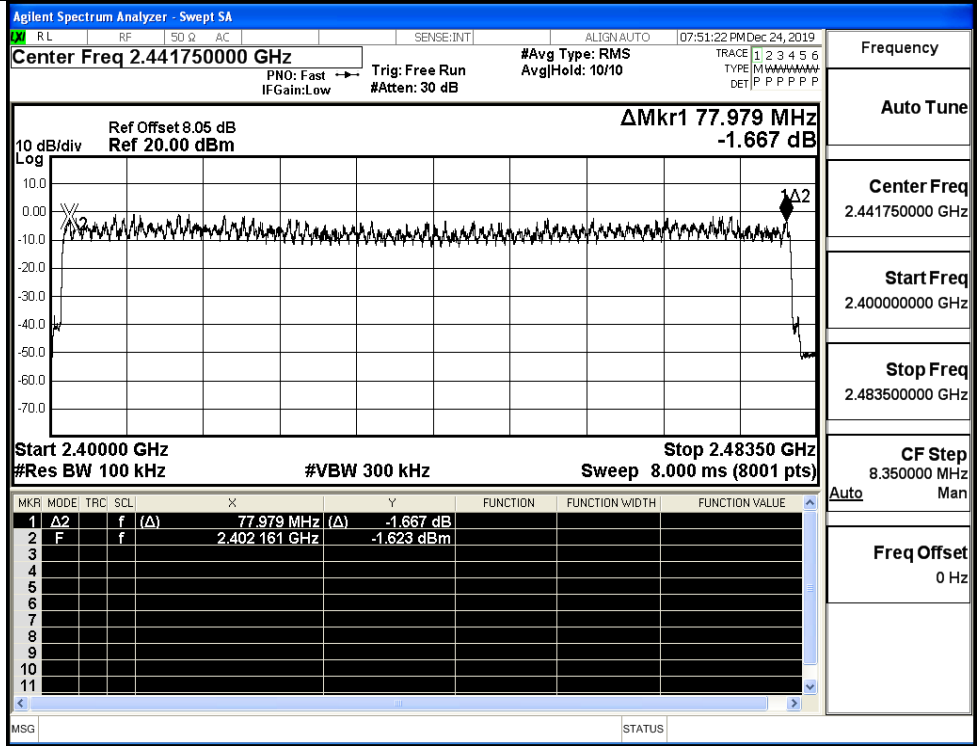
A.4 Hopping Channel Number

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

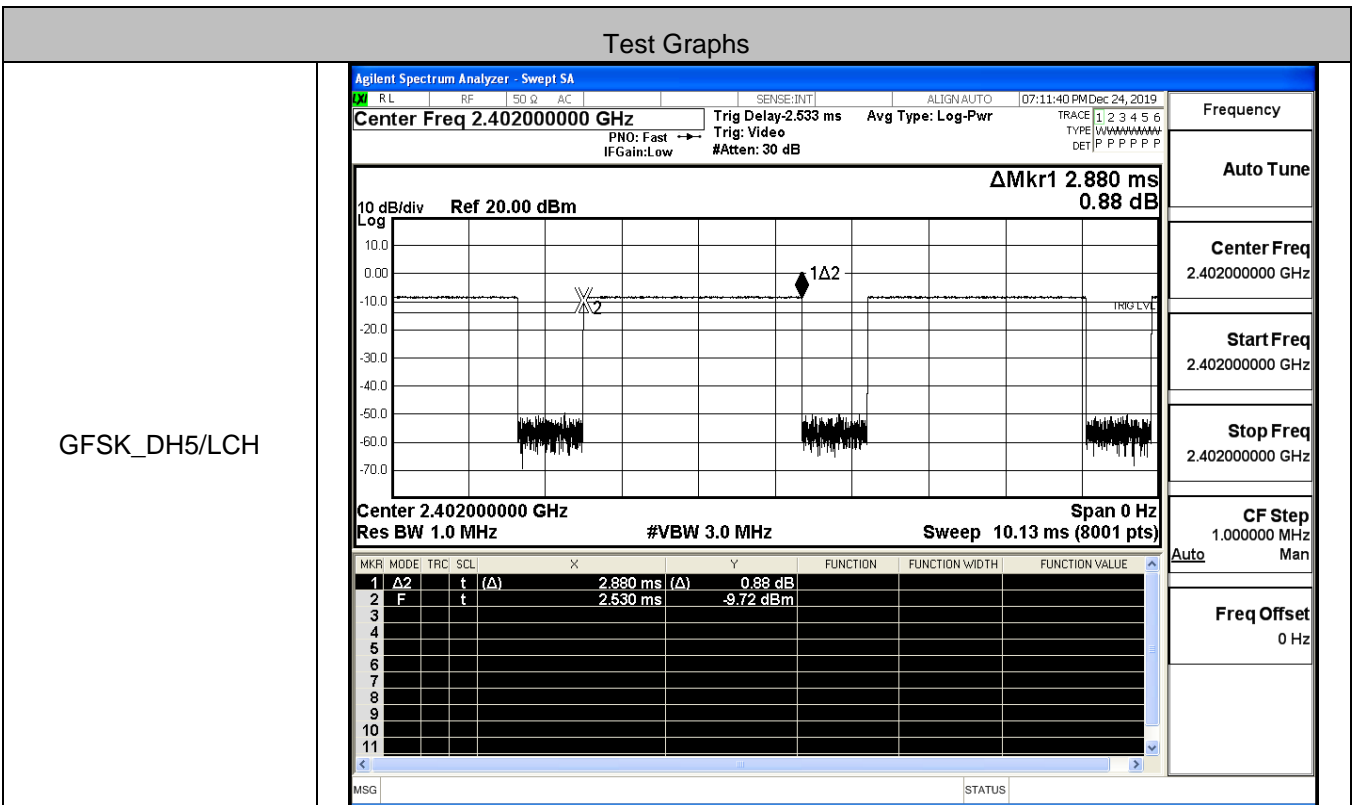
<p>GFSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.093 MHz -1.088 dB</p> <p>Start 2.40000 GHz Stop 2.48350 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <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>78.093 MHz (Δ)</td> <td>-1.088 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401952 GHz</td> <td>-0.524 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)	78.093 MHz (Δ)	-1.088 dB				2	F	f		2.401952 GHz	-0.524 dBm				<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.441750000 GHz</p> <p>Start Freq 2.400000000 GHz</p> <p>Stop Freq 2.483500000 GHz</p> <p>CF Step 8.350000 MHz Man</p> <p>Freq Offset 0 Hz</p>
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ 2	f	(Δ)	78.093 MHz (Δ)	-1.088 dB																								
2	F	f		2.401952 GHz	-0.524 dBm																								
<p>$\pi/4$DQPSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.073 MHz 0.087 dB</p> <p>Start 2.40000 GHz Stop 2.48350 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</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>78.073 MHz (Δ)</td> <td>0.087 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401806 GHz</td> <td>-5.088 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)	78.073 MHz (Δ)	0.087 dB				2	F	f		2.401806 GHz	-5.088 dBm				<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.441750000 GHz</p> <p>Start Freq 2.400000000 GHz</p> <p>Stop Freq 2.483500000 GHz</p> <p>CF Step 8.350000 MHz Man</p> <p>Freq Offset 0 Hz</p>
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																					
1	Δ 2	f	(Δ)	78.073 MHz (Δ)	0.087 dB																								
2	F	f		2.401806 GHz	-5.088 dBm																								

8DPSK/Hop

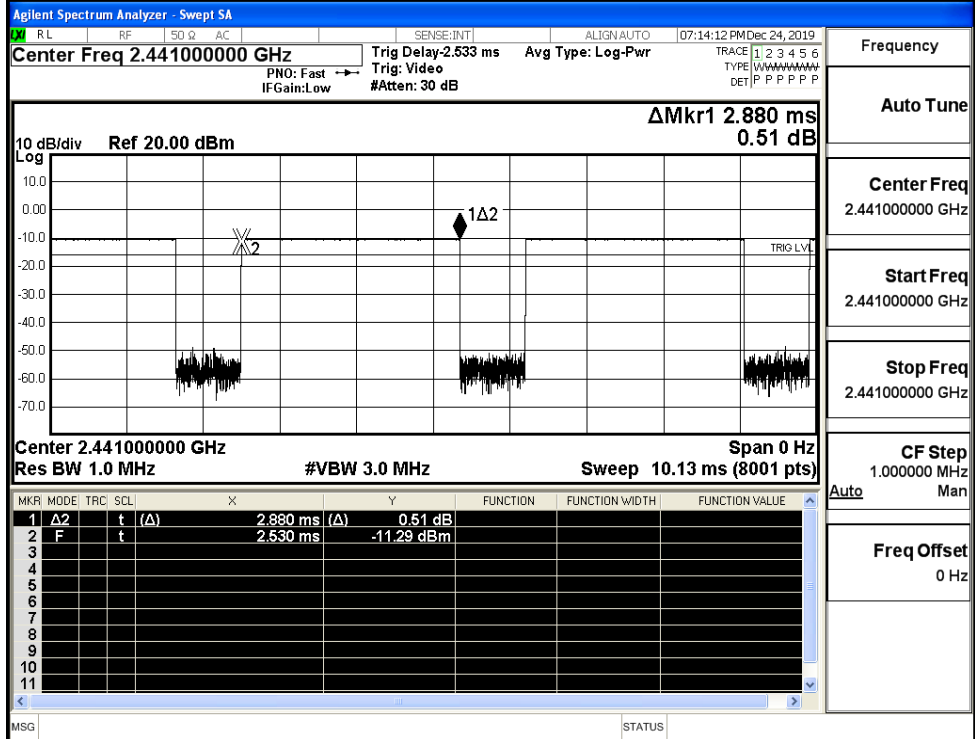


A.5 Dwell Time

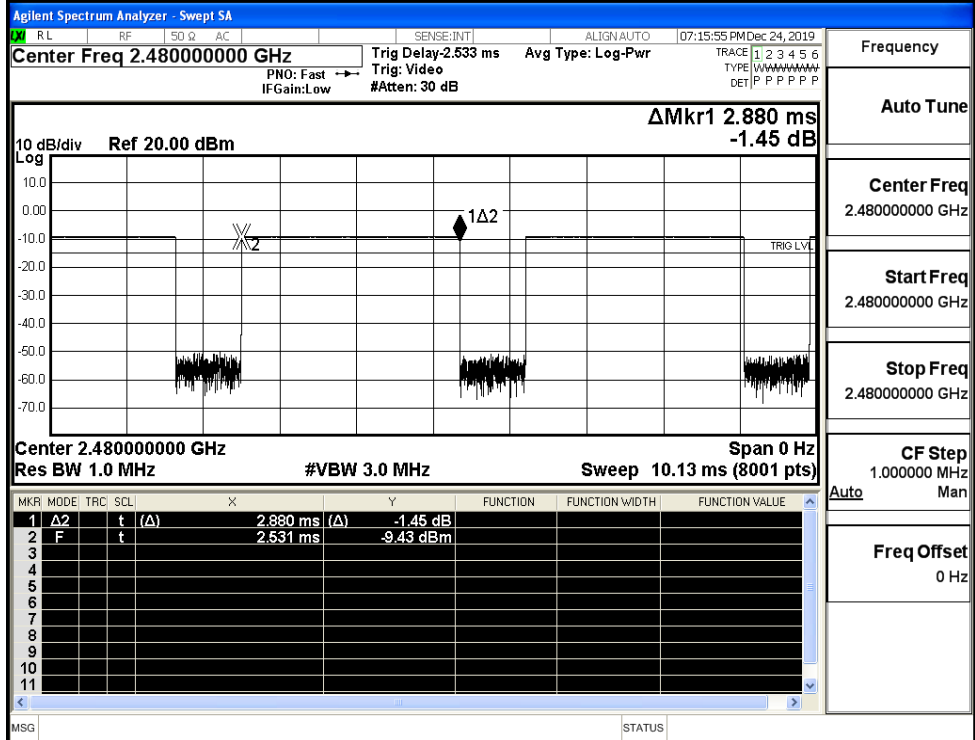
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.88	106.7	0.308	0.4	PASS
	3DH5	MCH	2.88	106.7	0.308	0.4	PASS
	3DH5	HCH	2.88	106.7	0.308	0.4	PASS



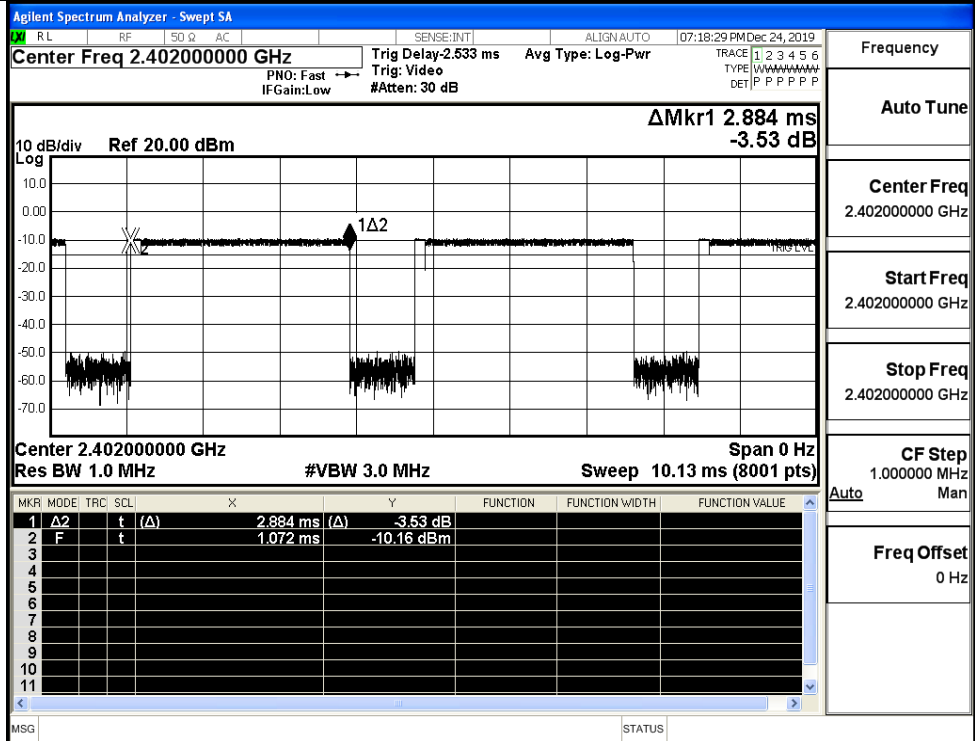
GFSK_DH5/MCH



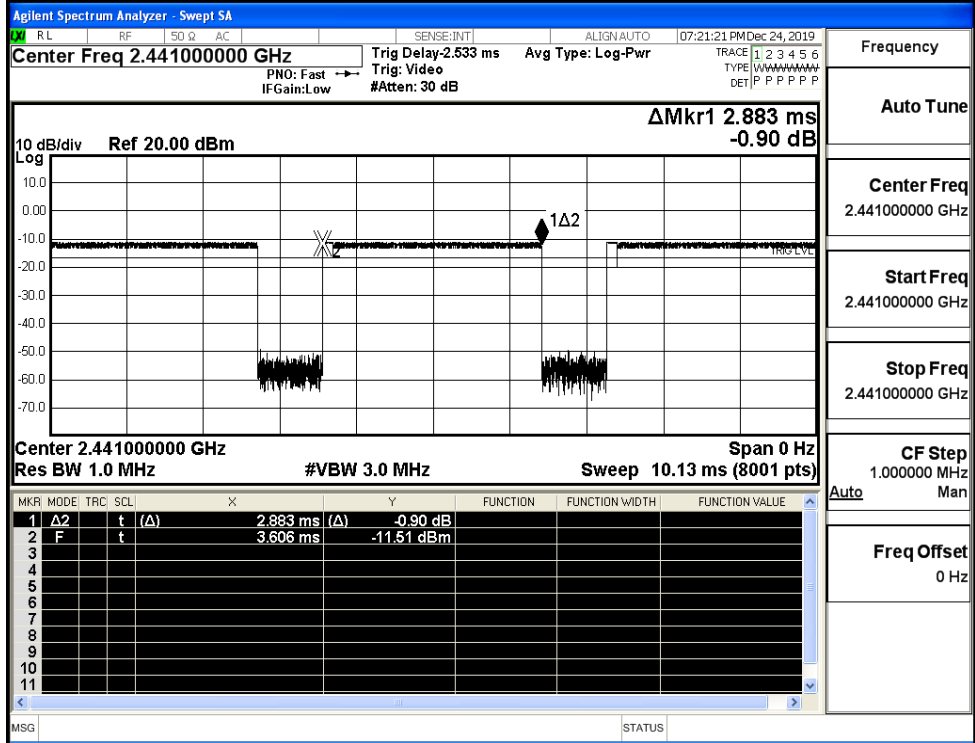
GFSK_DH5/HCH



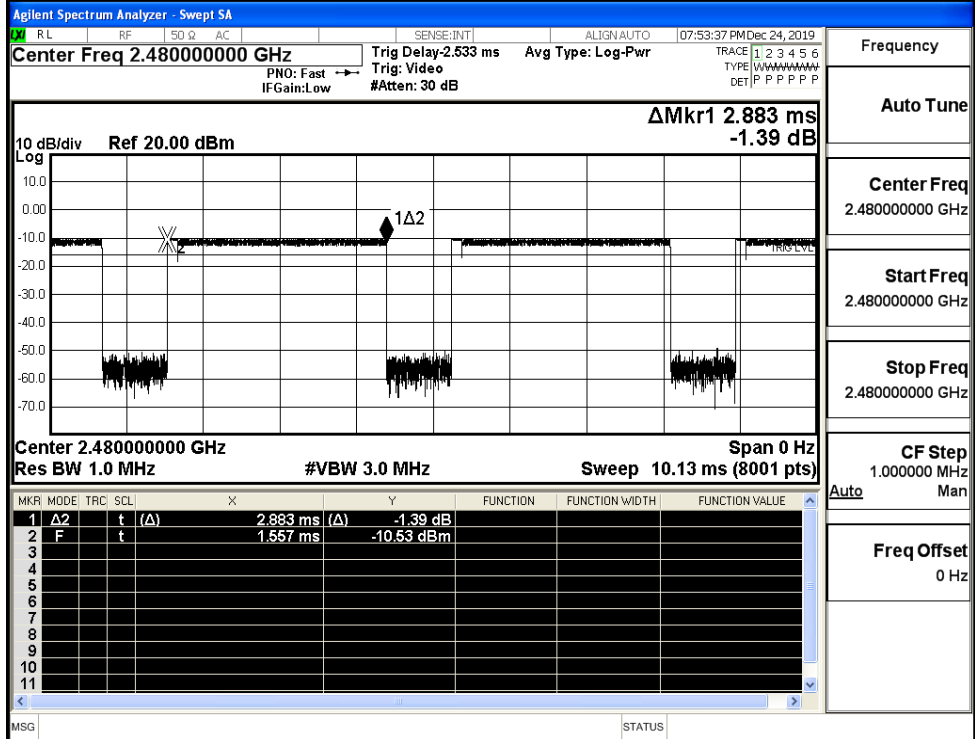
π /4DQPSK
_2DH5/LCH



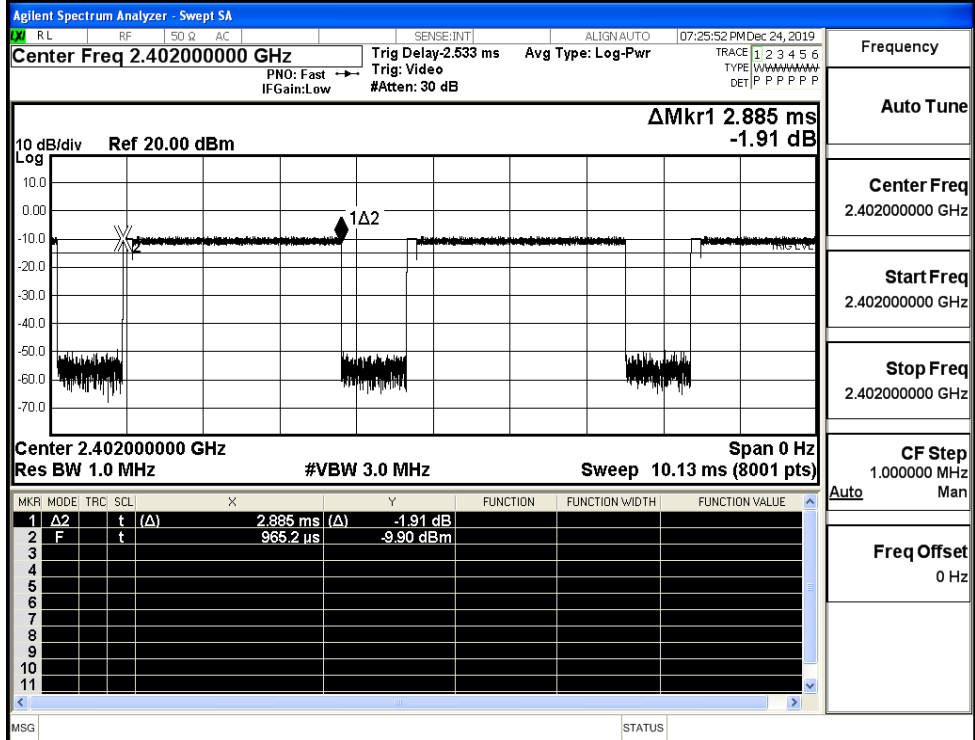
π /4DQPSK
_2DH5/MCH



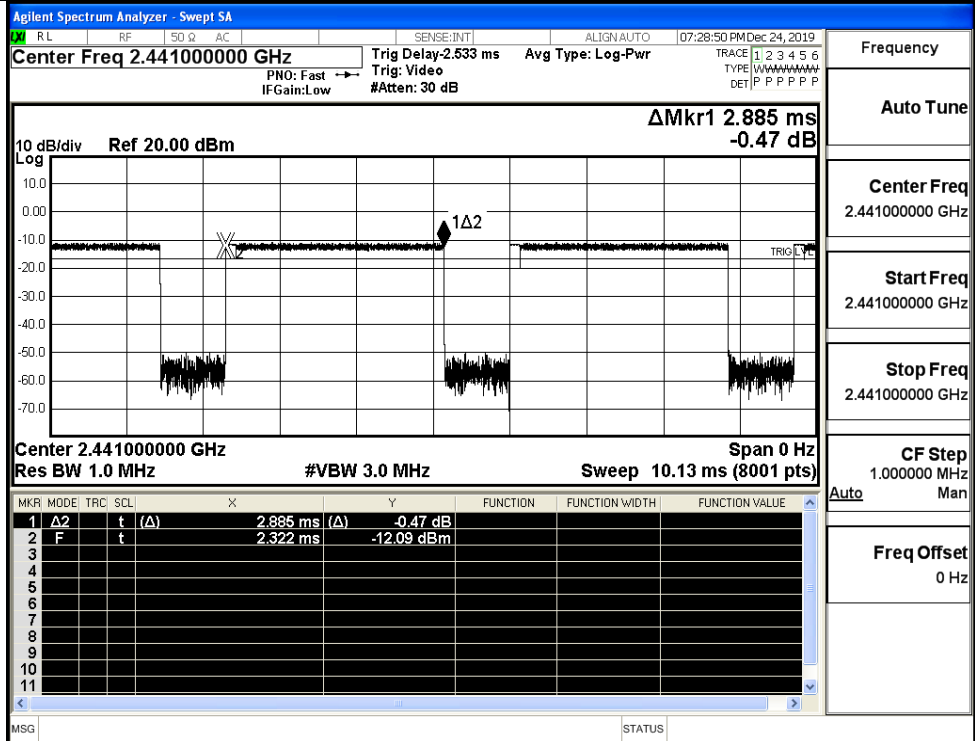
$\pi/4$ DQPSK
_2DH5/HCH



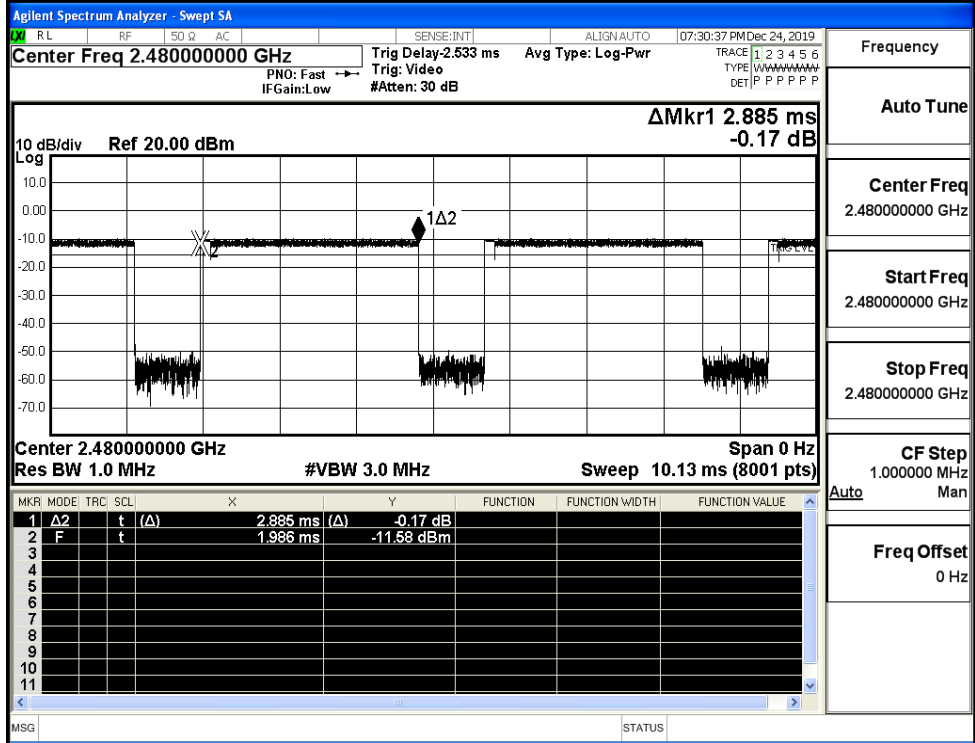
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



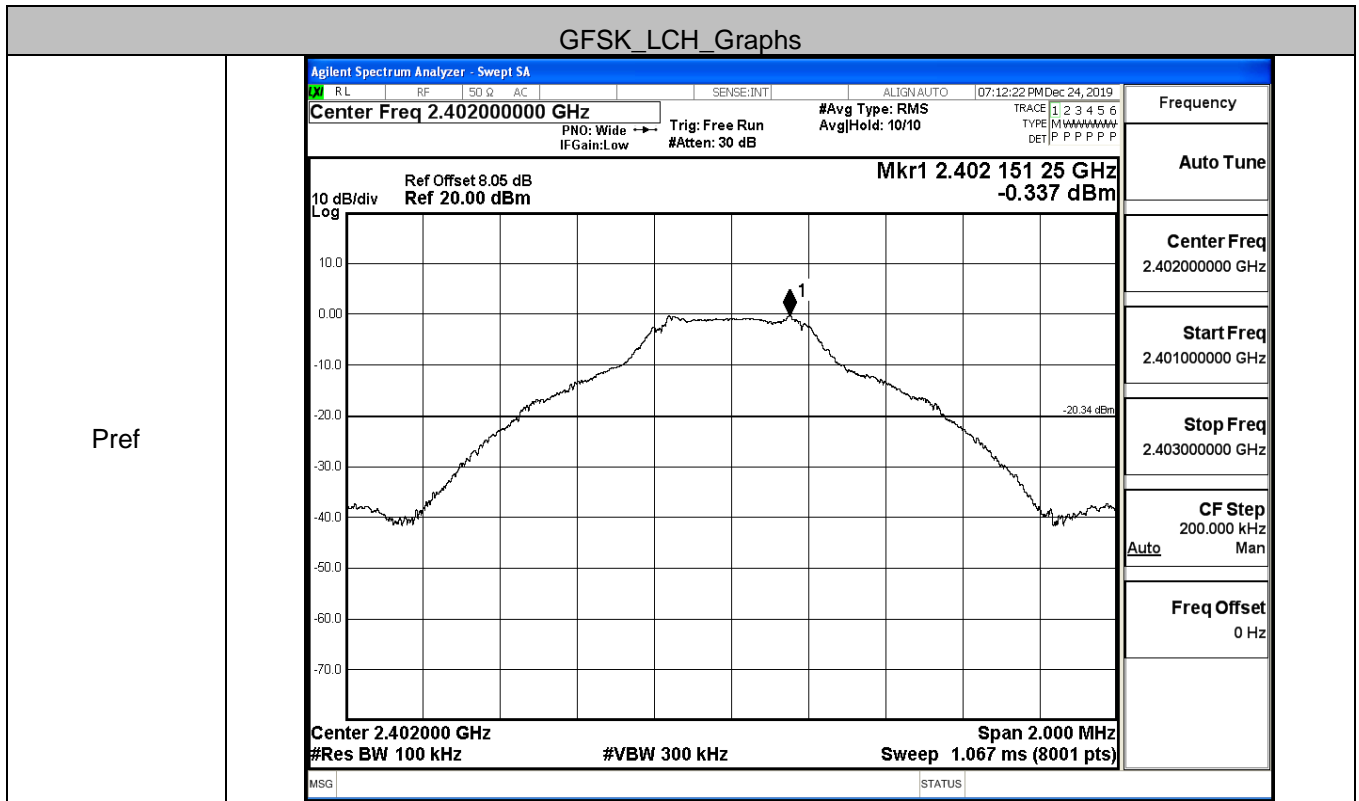
8DPSK_3DH5/HCH

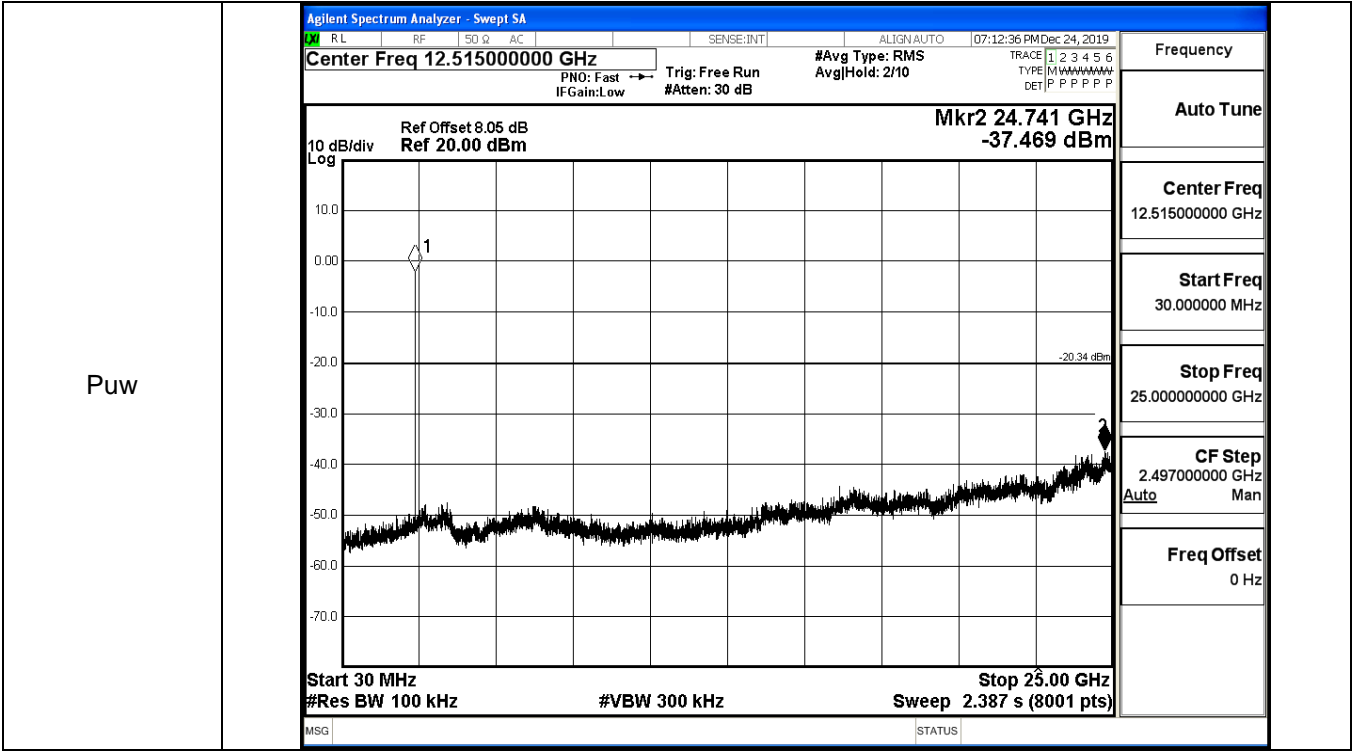


A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.337	-37.469	-20.337	PASS
	MCH	-2.319	-37.254	-22.319	PASS
	HCH	-1.147	-37.783	-21.147	PASS
$\pi/4$ DQPSK	LCH	-1.768	-36.427	-21.768	PASS
	MCH	-3.574	-36.911	-23.574	PASS
	HCH	-2.376	-37.145	-22.376	PASS
8DPSK	LCH	-1.657	-37.548	-21.657	PASS
	MCH	-3.534	-37.647	-23.534	PASS
	HCH	-2.492	-37.974	-22.492	PASS

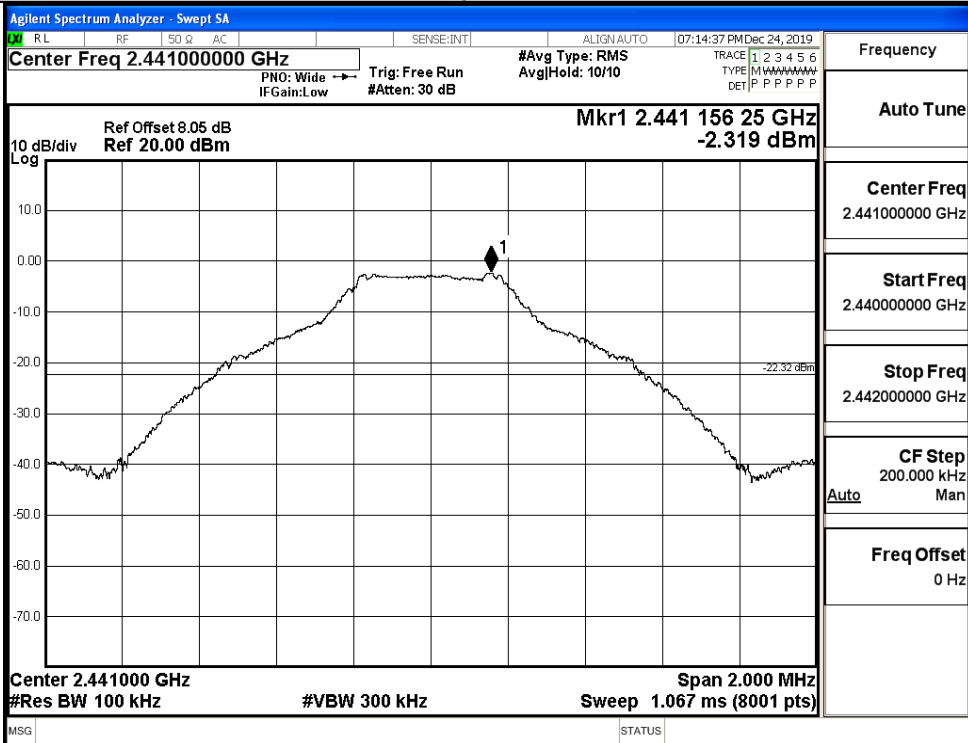
GFSK_LCH_Graphs



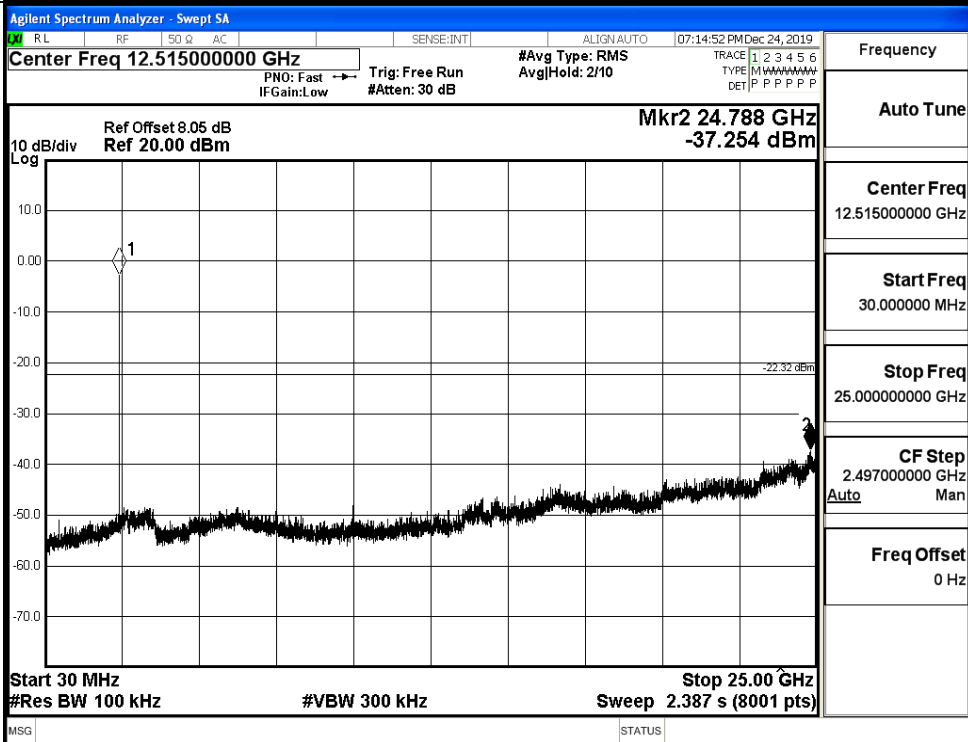


GFSK_MCH_Graphs

Pref

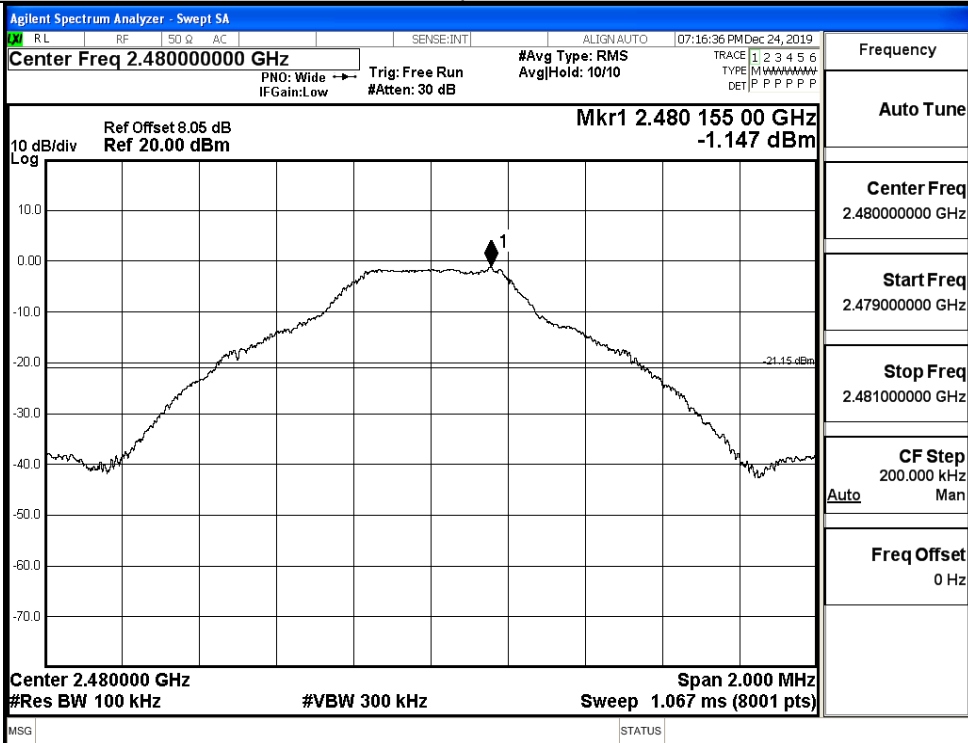


Puw

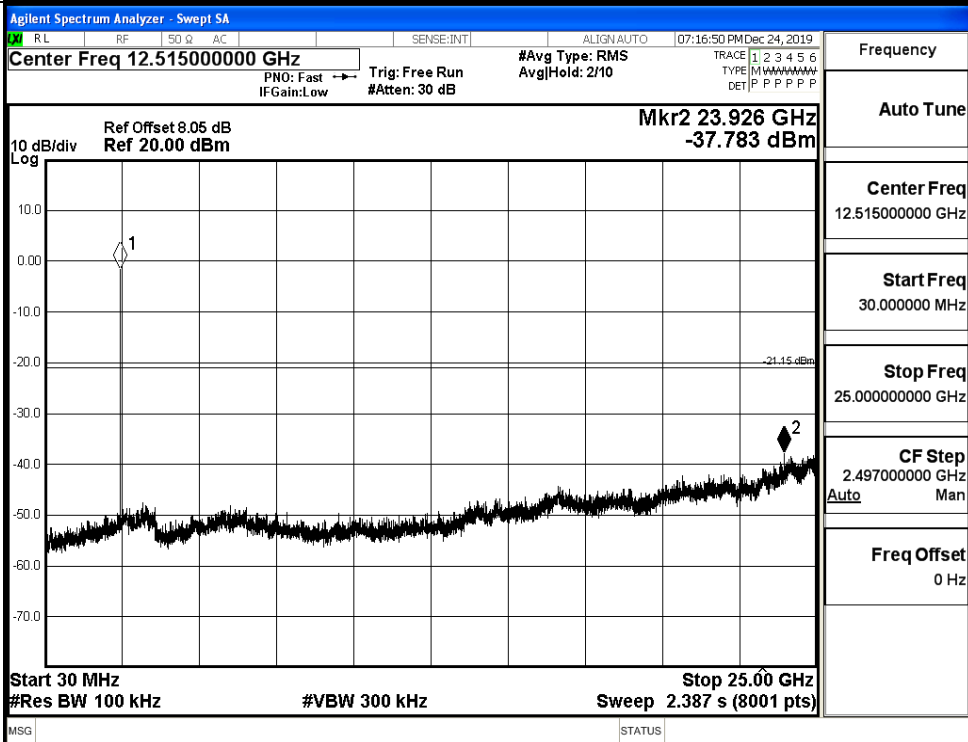


GFSK_HCH_Graphs

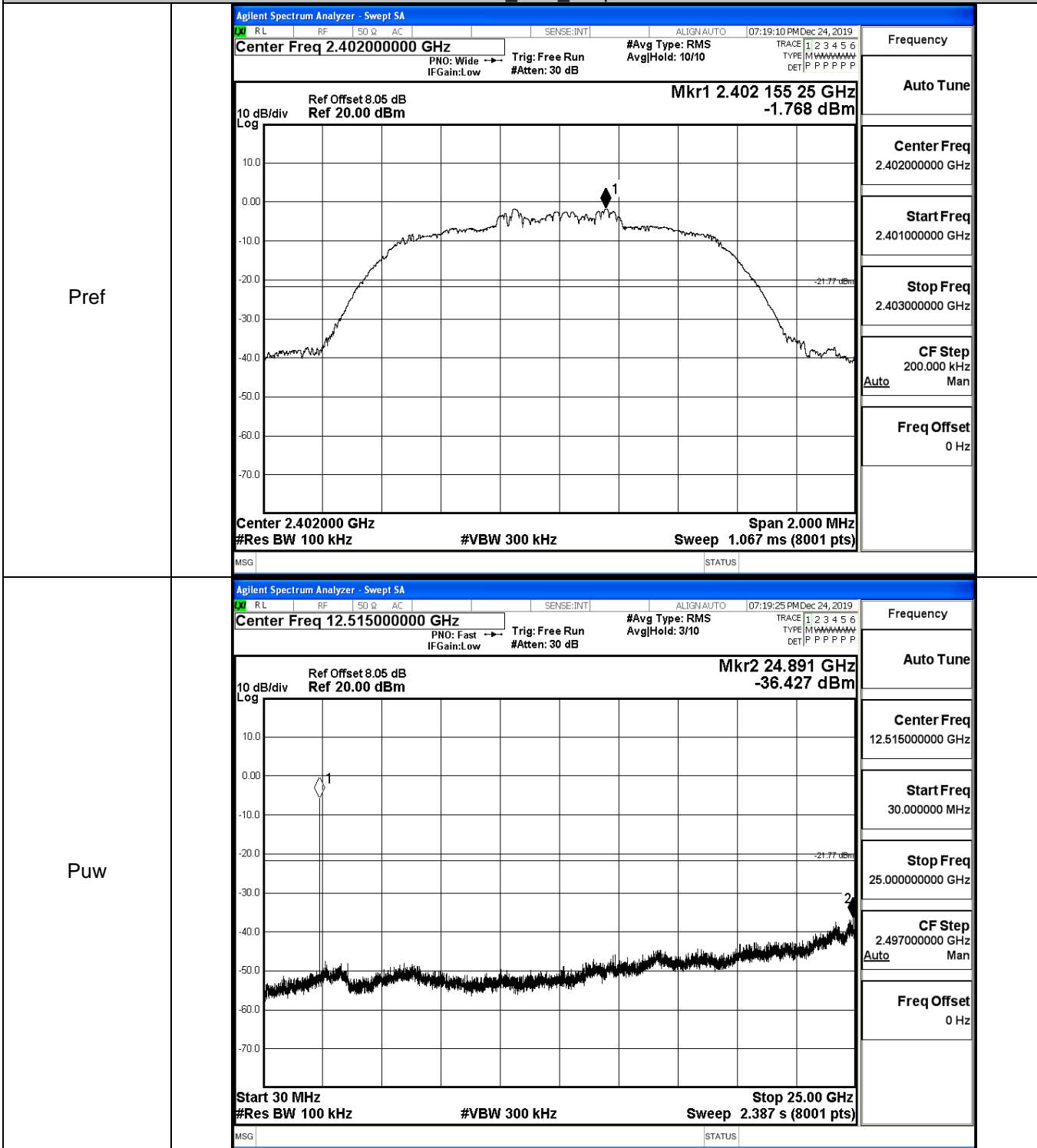
Pref



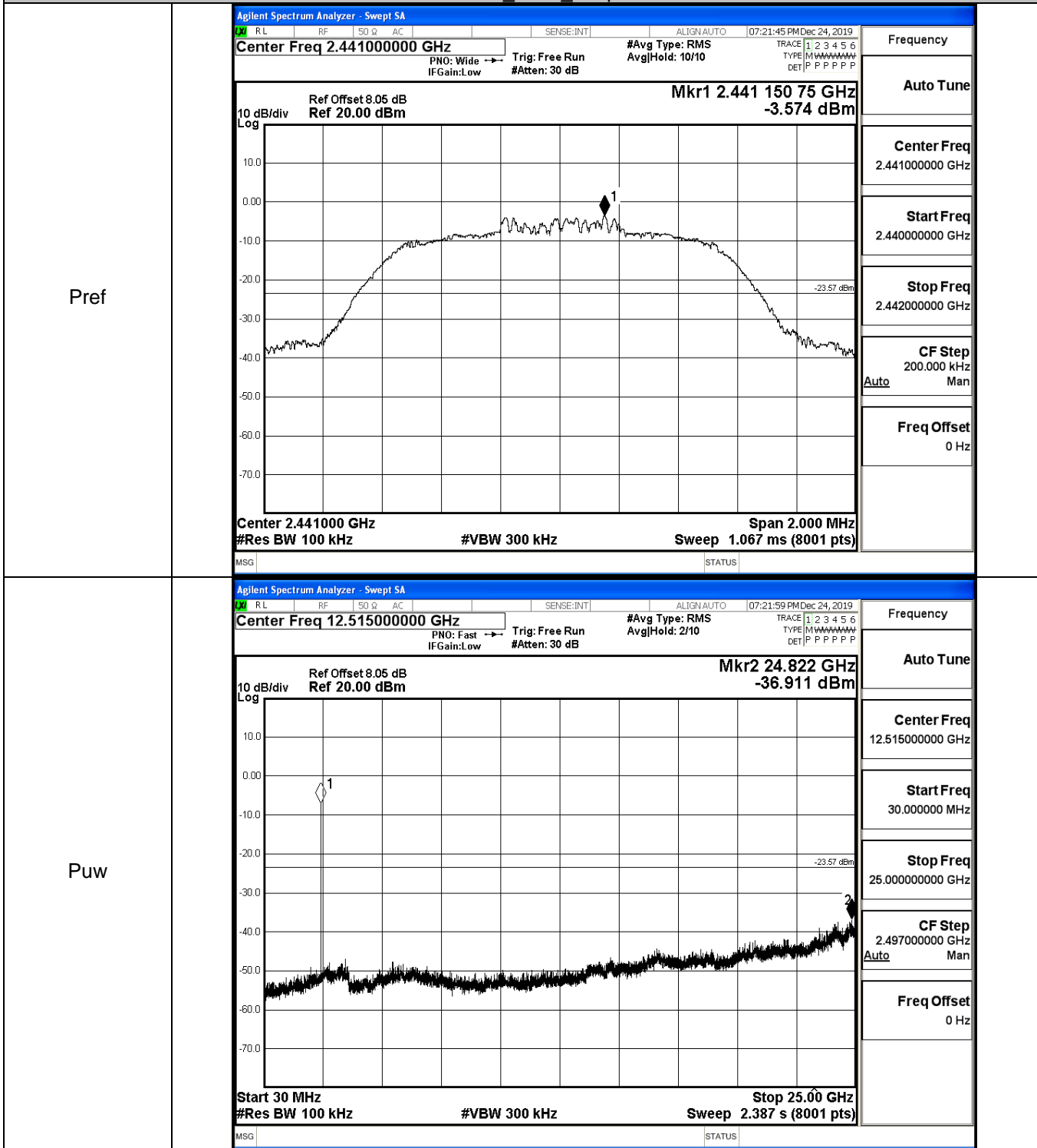
Puw



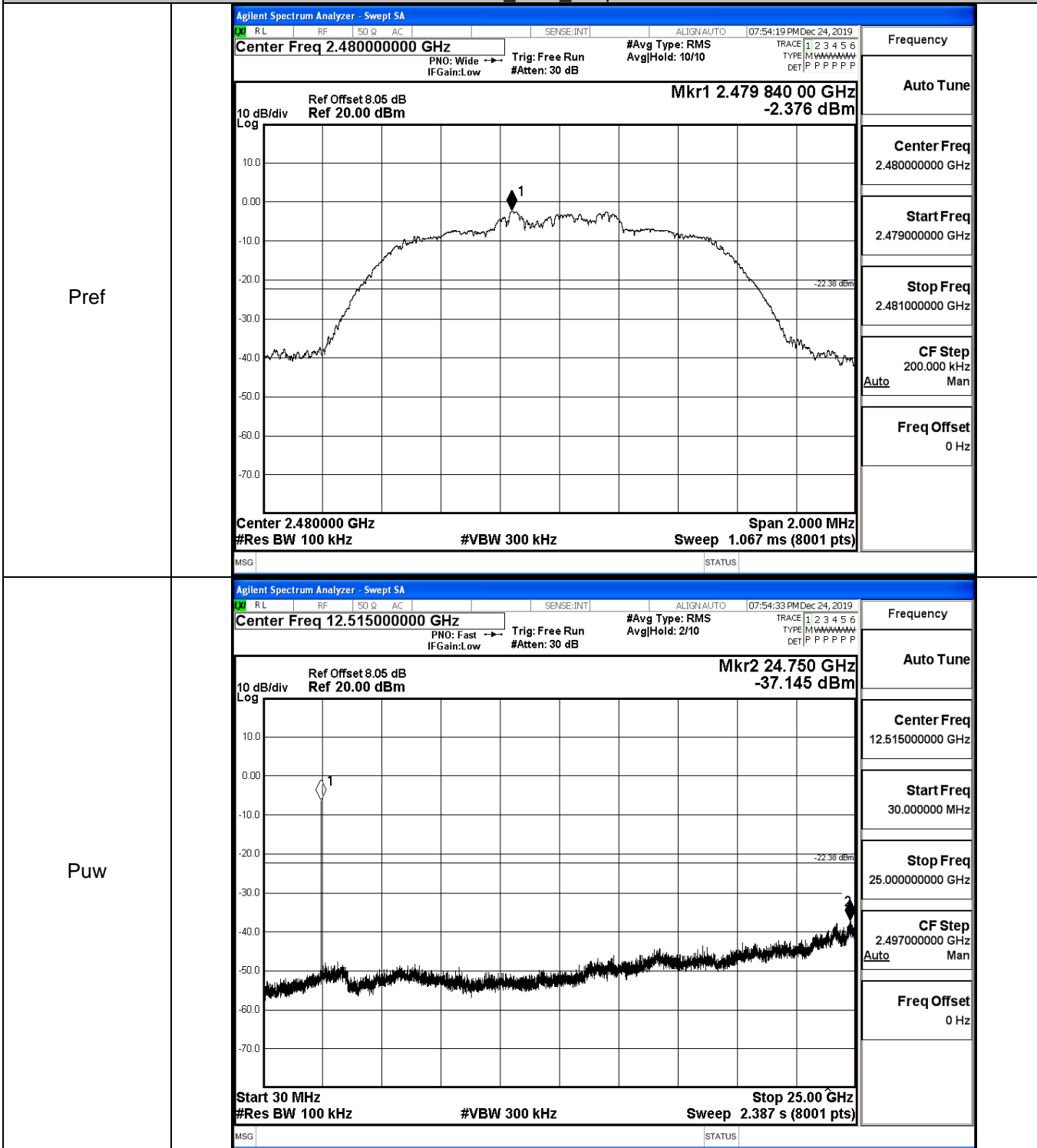
$\pi/4$ DQPSK_LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs

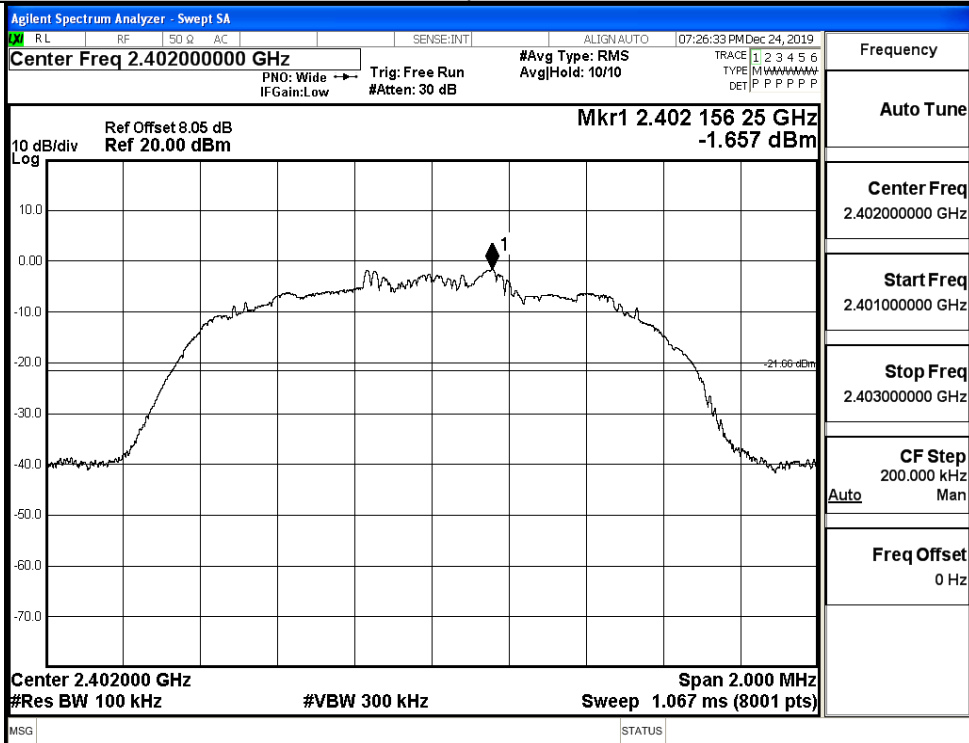


$\pi/4$ DQPSK_HCH_Graphs

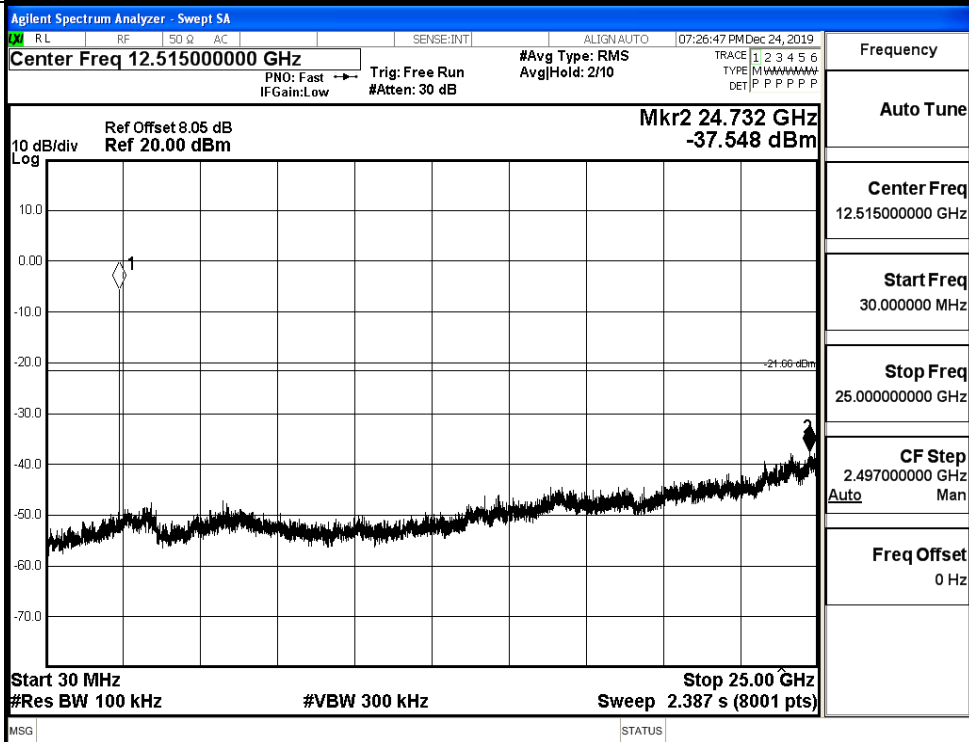


8DPSK_LCH_Graphs

Pref

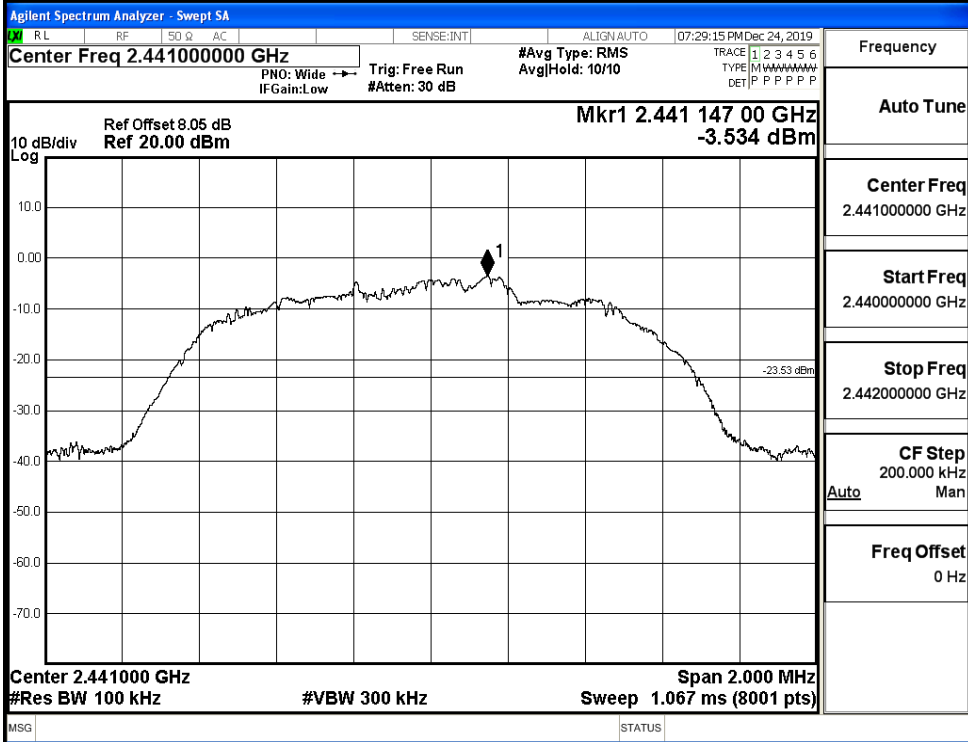


Puw

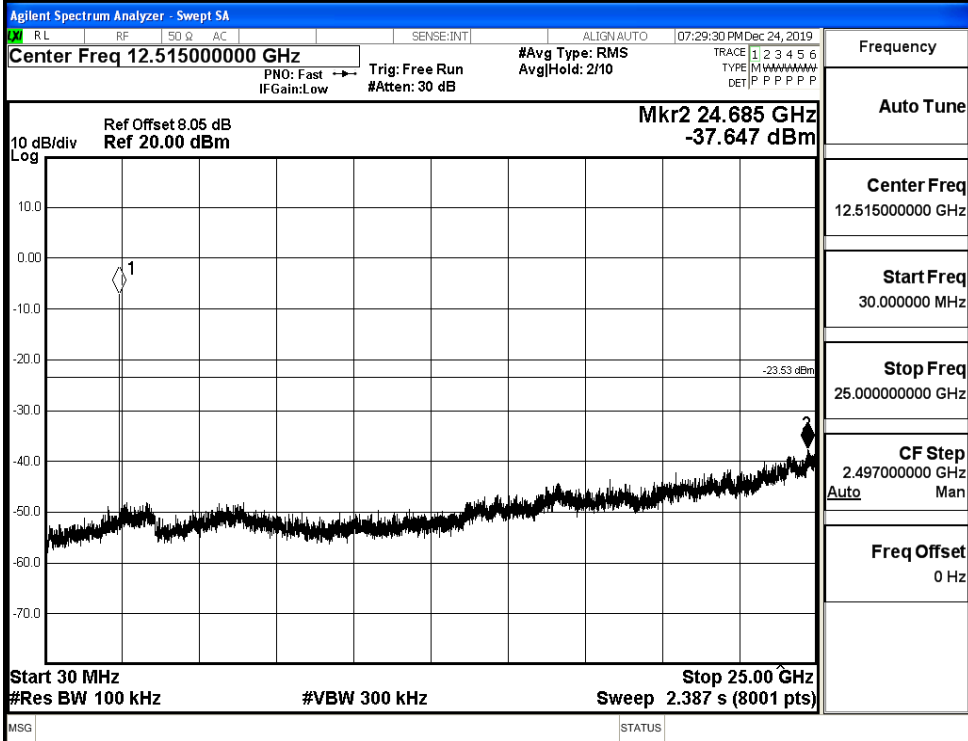


8DPSK_MCH_Graphs

Pref

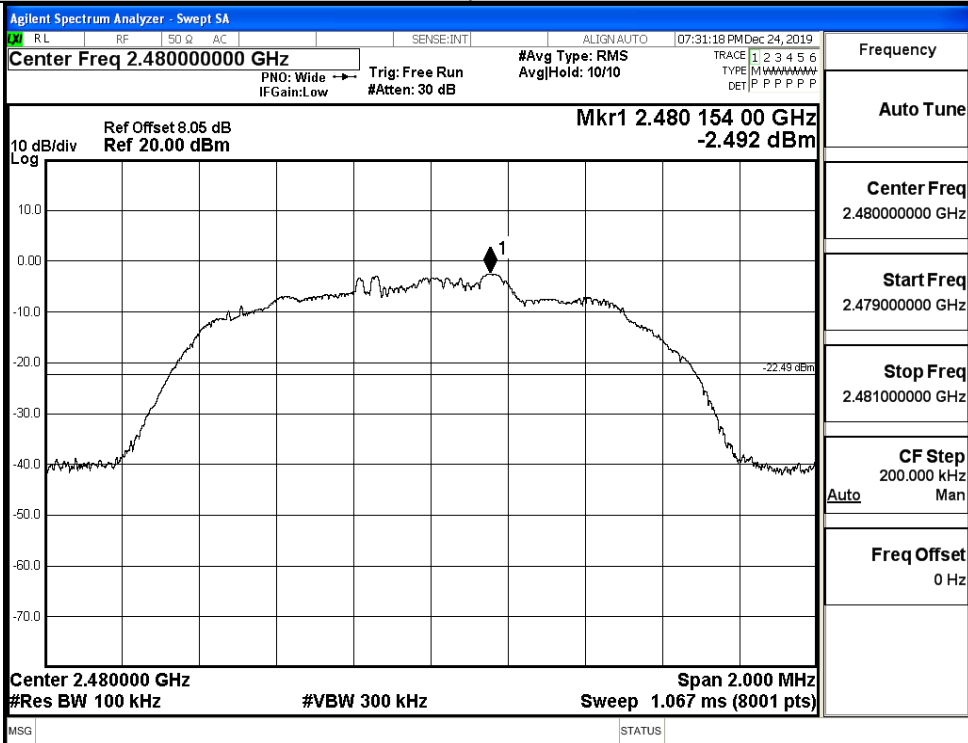


Puw

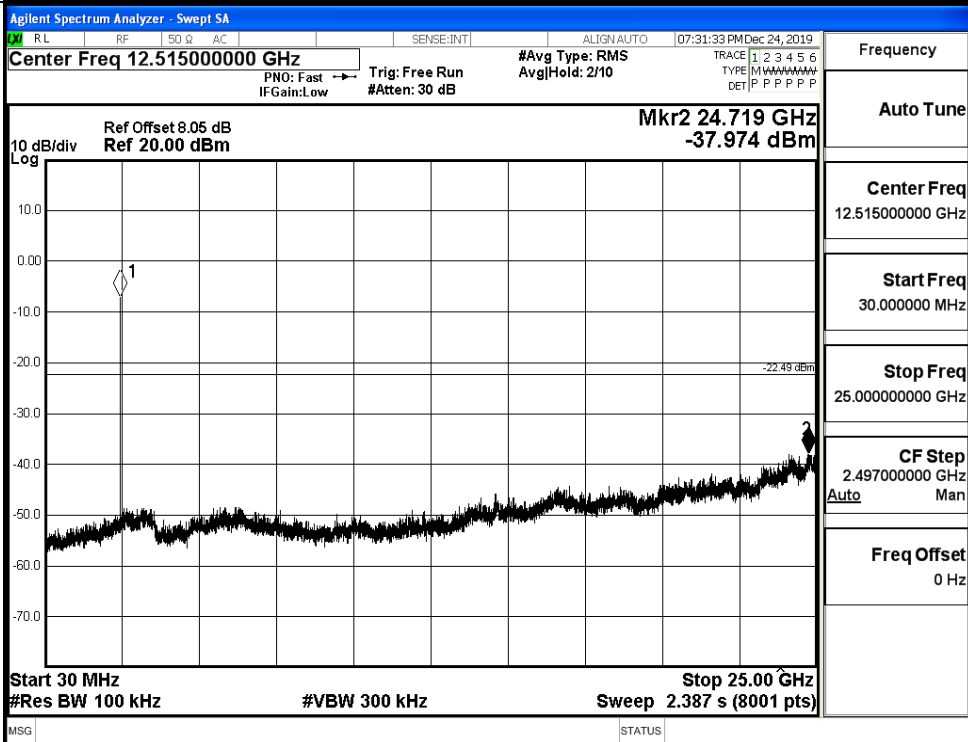


8DPSK_HCH_Graphs

Pref



Puw

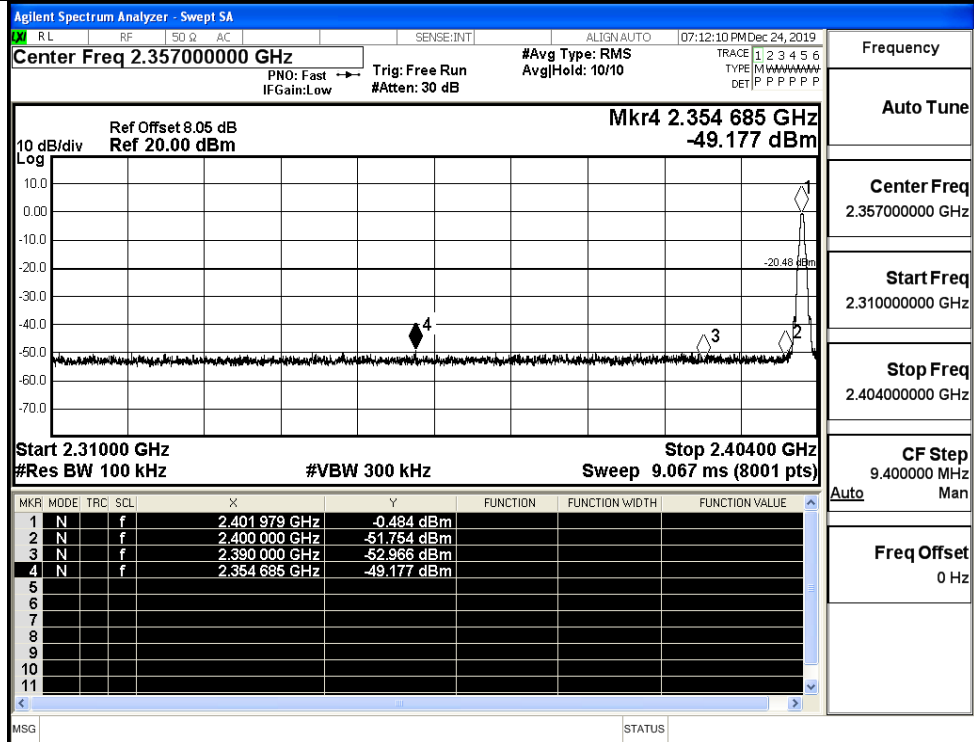


A.7 Band-edge for RF Conducted Emissions

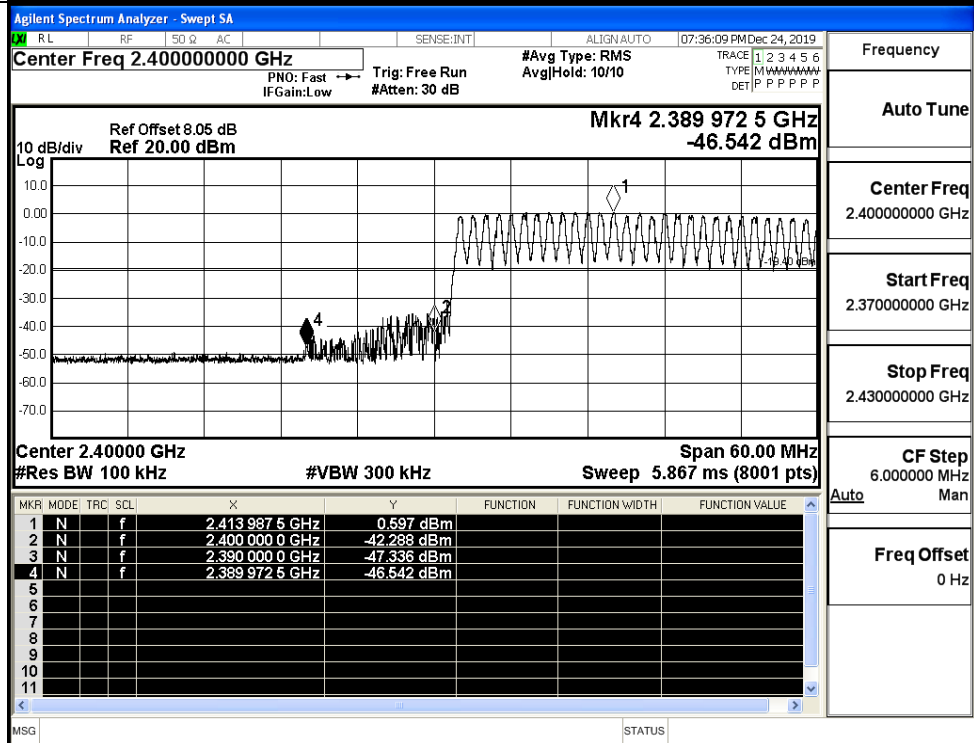
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.484	Off	-49.177	-20.48	PASS
			0.597	On	-46.542	-19.4	PASS
	HCH	2480	-1.110	Off	-48.290	-21.11	PASS
			0.286	On	-48.306	-19.71	PASS
$\pi/4$ DQPSK	LCH	2402	-2.863	Off	-49.590	-22.86	PASS
			1.418	On	-42.540	-18.58	PASS
	HCH	2480	-3.327	Off	-48.542	-23.33	PASS
			0.650	On	-32.199	-19.35	PASS
8DPSK	LCH	2402	-1.682	Off	-49.296	-21.68	PASS
			-0.727	On	-48.356	-20.73	PASS
	HCH	2480	-2.428	Off	-49.182	-22.43	PASS
			3.149	On	-34.950	-16.85	PASS

Test Graphs

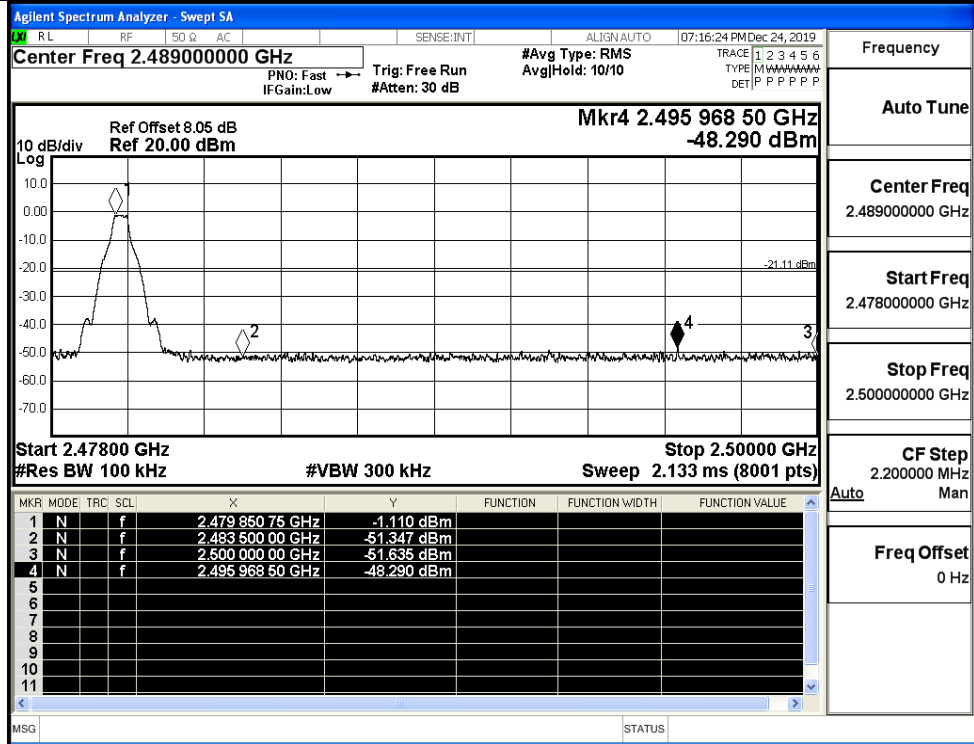
GFSK/LCH/No Hop



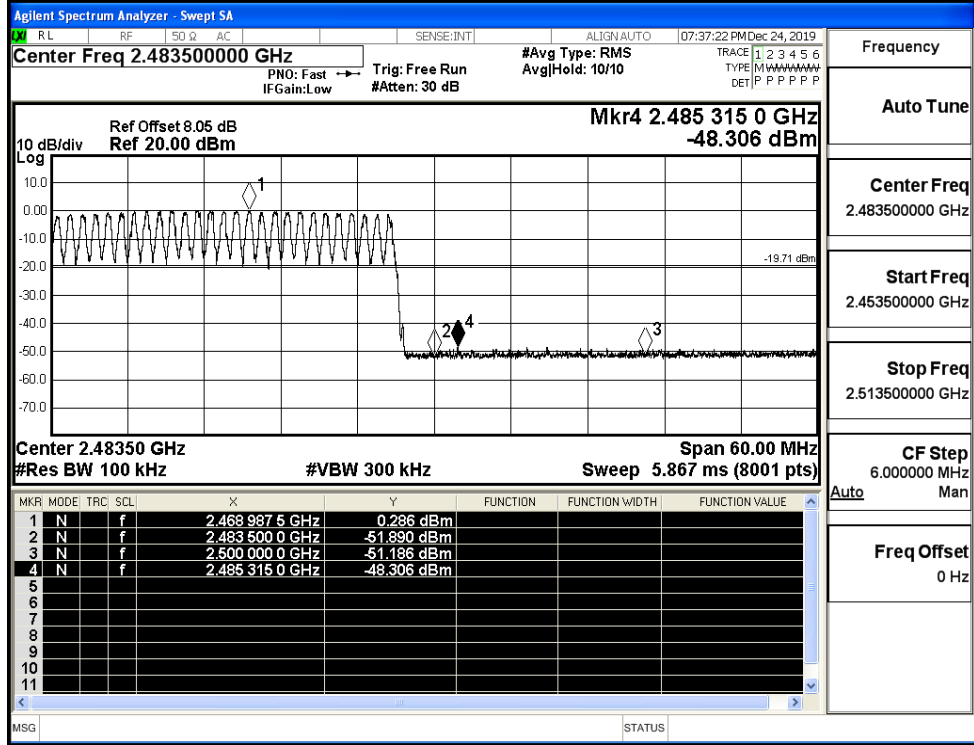
GFSK/LCH/Hop



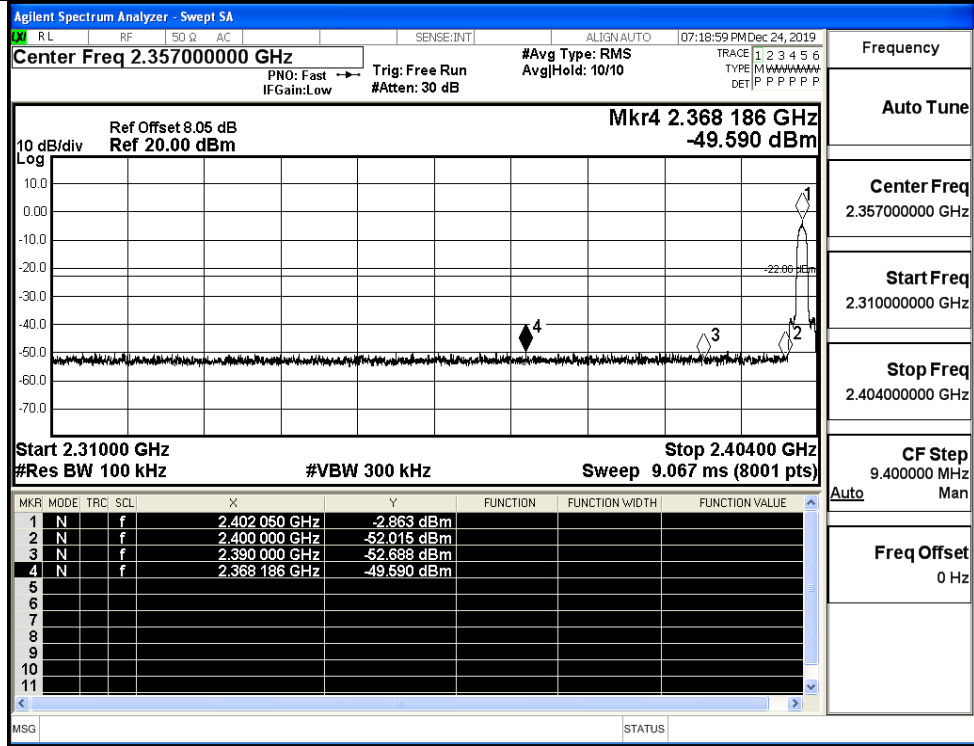
GFSK/HCH/No Hop



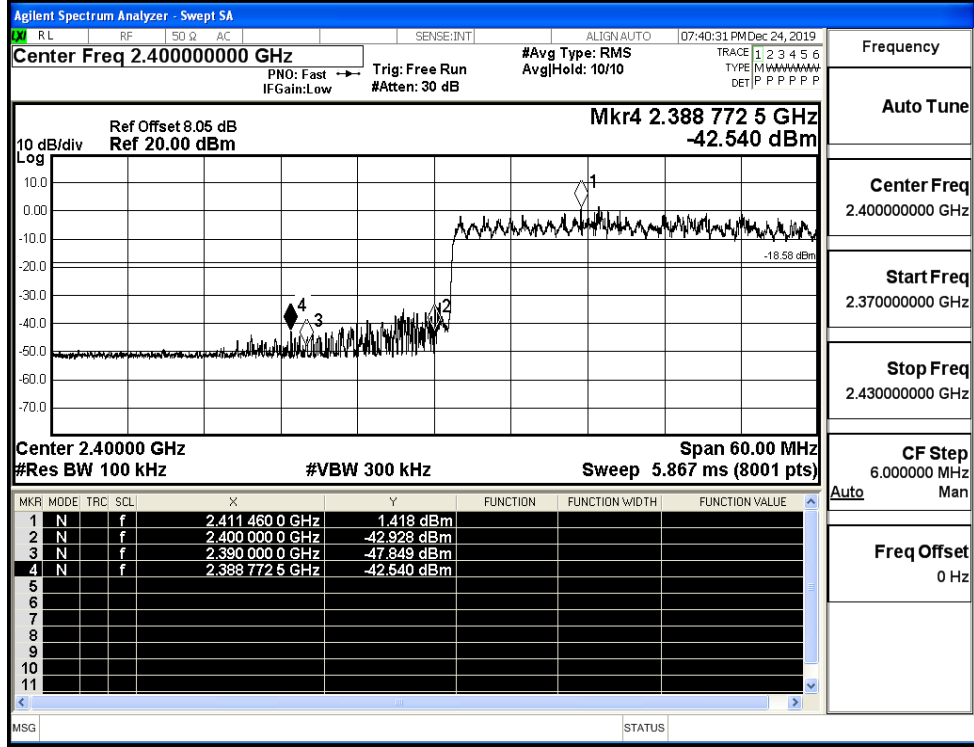
GFSK/HCH/Hop



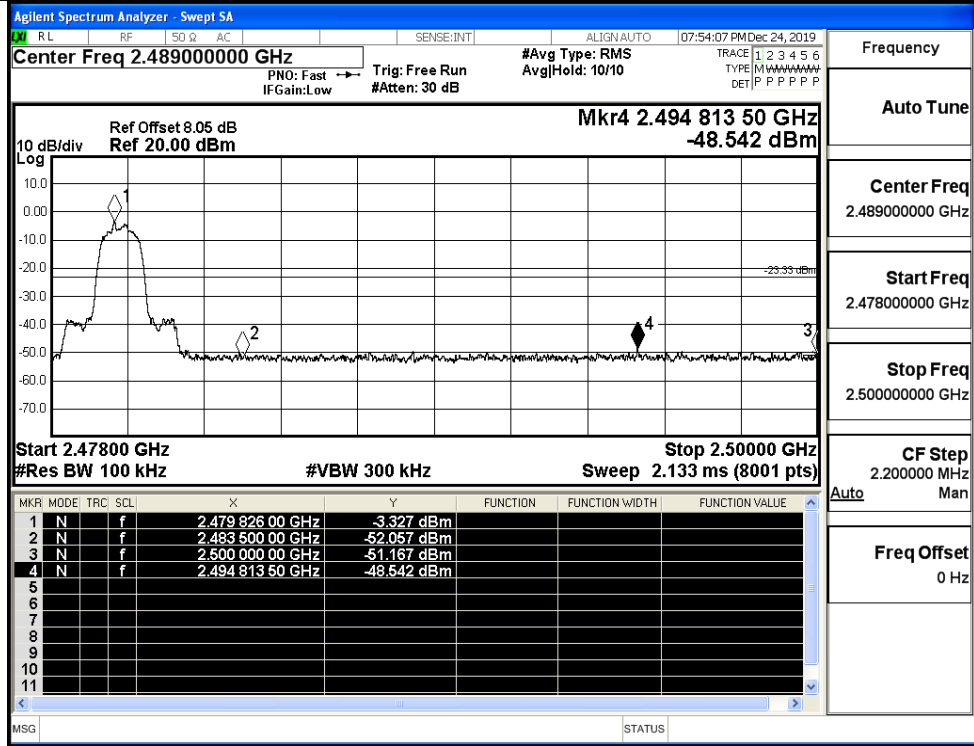
$\pi/4$ DQPSK/LCH/No
Hop



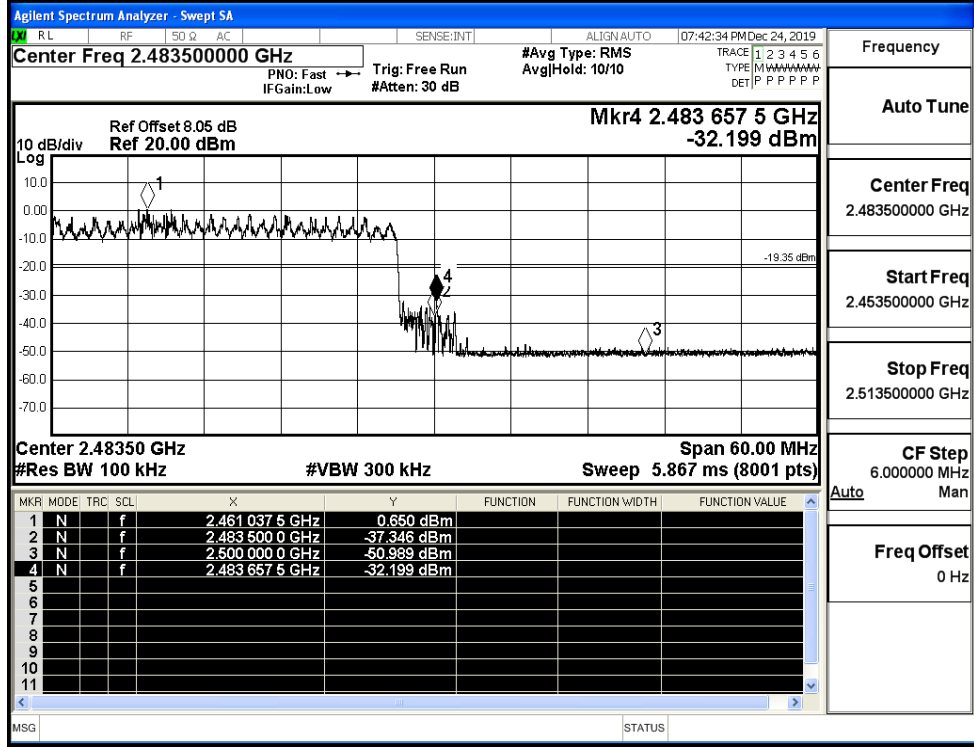
$\pi/4$ DQPSK/LCH/Hop



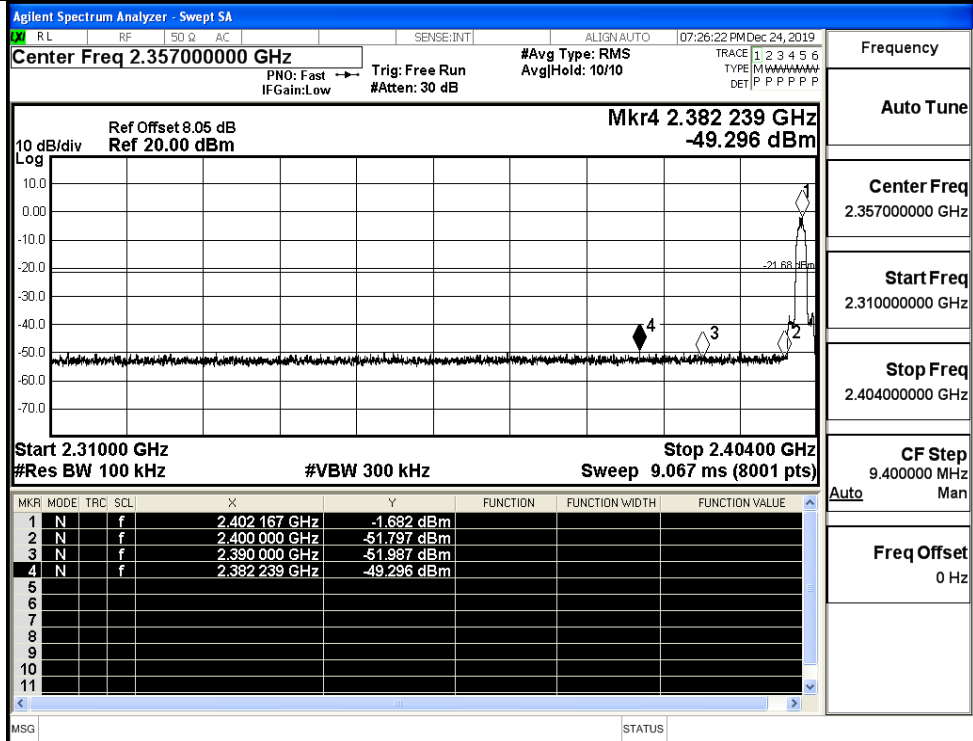
$\pi/4$ DQPSK/HCH/No Hop



$\pi/4$ DQPSK/HCH/Hop

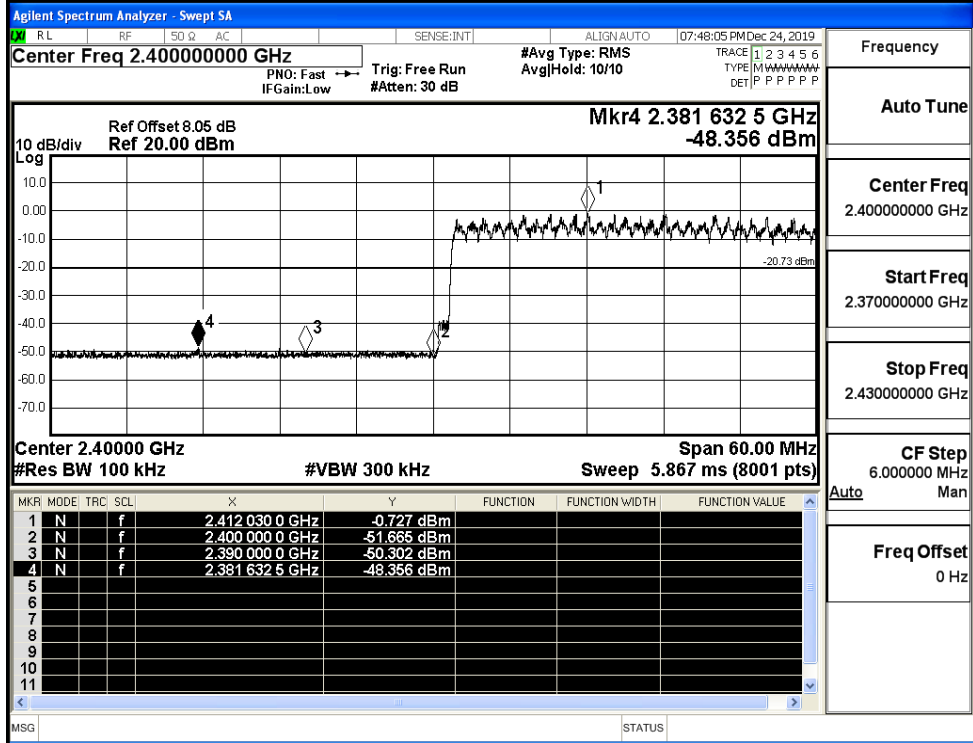


8DPSK/LCH/No Hop



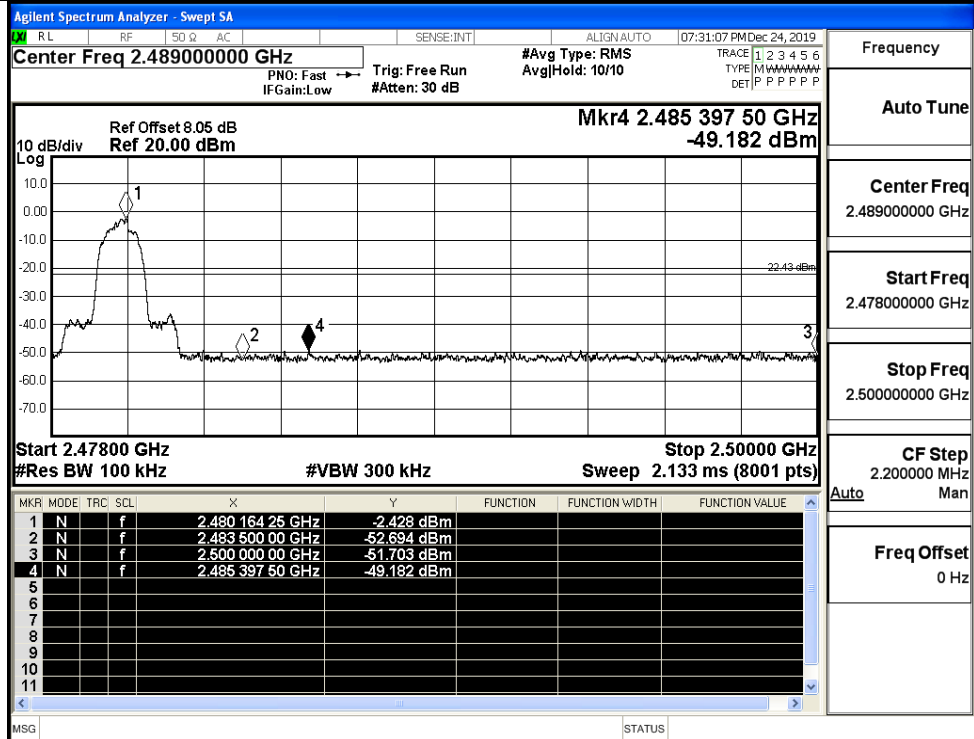
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Freq Offset
0 Hz

8DPSK/LCH/Hop

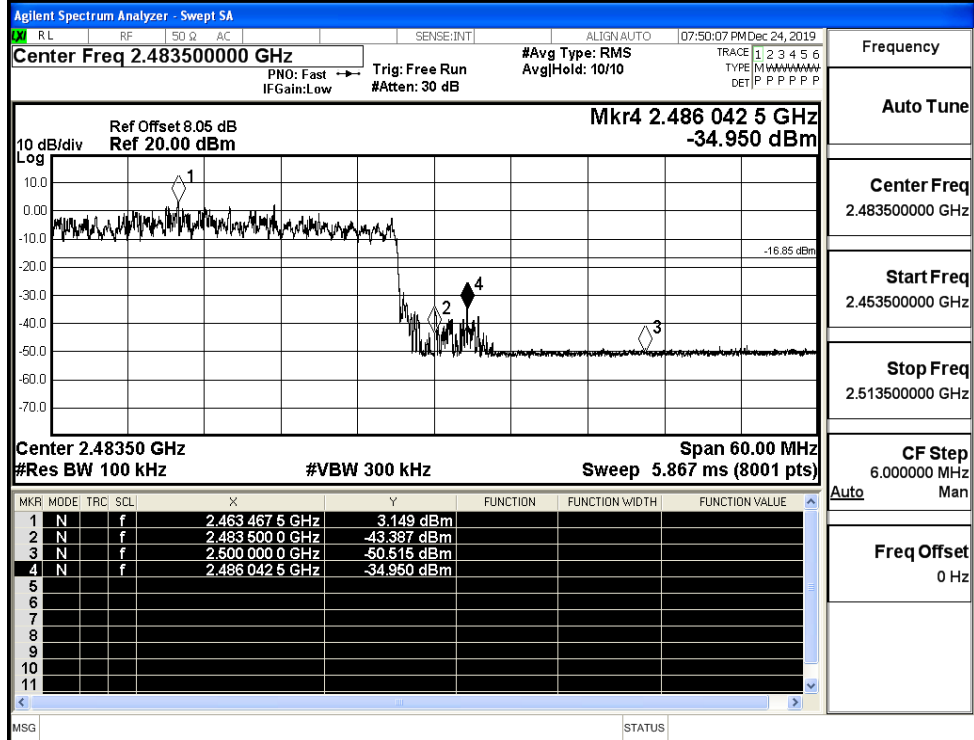


Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Freq Offset
0 Hz

8DPSK/HCH/No Hop



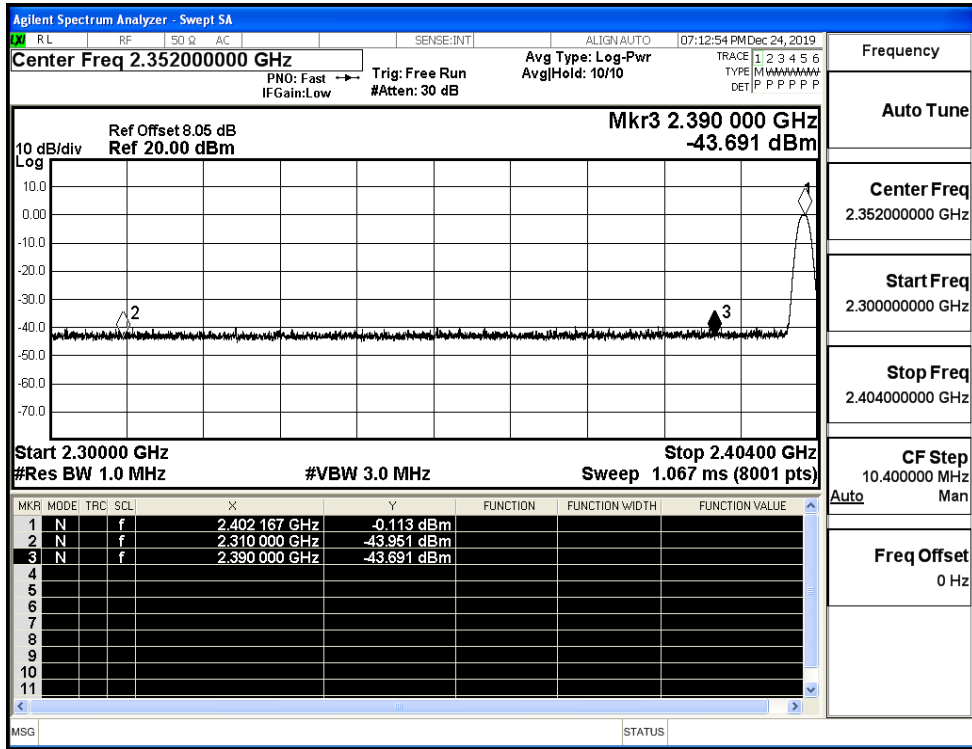
8DPSK/HCH/Hop



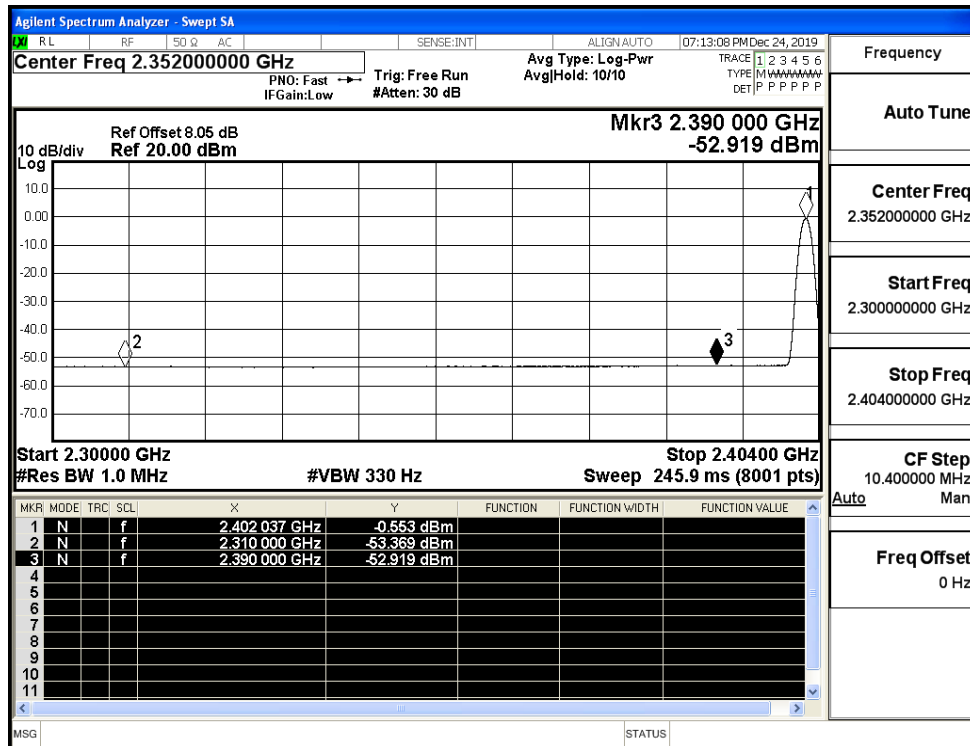
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.95	2.0	0	53.31	PEAK	74	PASS
	Off	2310.0	-53.37	2.0	0	43.89	AV	54	PASS
	Off	2390.0	-43.69	2.0	0	53.57	PEAK	74	PASS
	Off	2390.0	-52.92	2.0	0	44.34	AV	54	PASS
	Off	2483.5	-41.60	2.0	0	55.66	PEAK	74	PASS
	Off	2483.5	-52.44	2.0	0	44.82	AV	54	PASS
	Off	2500.0	-41.67	2.0	0	55.59	PEAK	74	PASS
	Off	2500.0	-52.35	2.0	0	44.91	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.75	2.0	0	54.51	PEAK	74	PASS
	Off	2310.0	-53.20	2.0	0	44.06	AV	54	PASS
	Off	2390.0	-41.50	2.0	0	55.76	PEAK	74	PASS
	Off	2390.0	-52.93	2.0	0	44.33	AV	54	PASS
	Off	2483.5	-43.10	2.0	0	54.16	PEAK	74	PASS
	Off	2483.5	-52.19	2.0	0	45.07	AV	54	PASS
	Off	2500.0	-41.99	2.0	0	55.27	PEAK	74	PASS
	Off	2500.0	-52.24	2.0	0	45.02	AV	54	PASS
8DPSK	Off	2310.0	-43.51	2.0	0	53.75	PEAK	74	PASS
	Off	2310.0	-53.43	2.0	0	43.83	AV	54	PASS
	Off	2390.0	-42.18	2.0	0	55.08	PEAK	74	PASS
	Off	2390.0	-52.89	2.0	0	44.37	AV	54	PASS
	Off	2483.5	-42.05	2.0	0	55.21	PEAK	74	PASS
	Off	2483.5	-52.49	2.0	0	44.77	AV	54	PASS
	Off	2500.0	-42.08	2.0	0	55.18	PEAK	74	PASS
	Off	2500.0	-52.29	2.0	0	44.97	AV	54	PASS

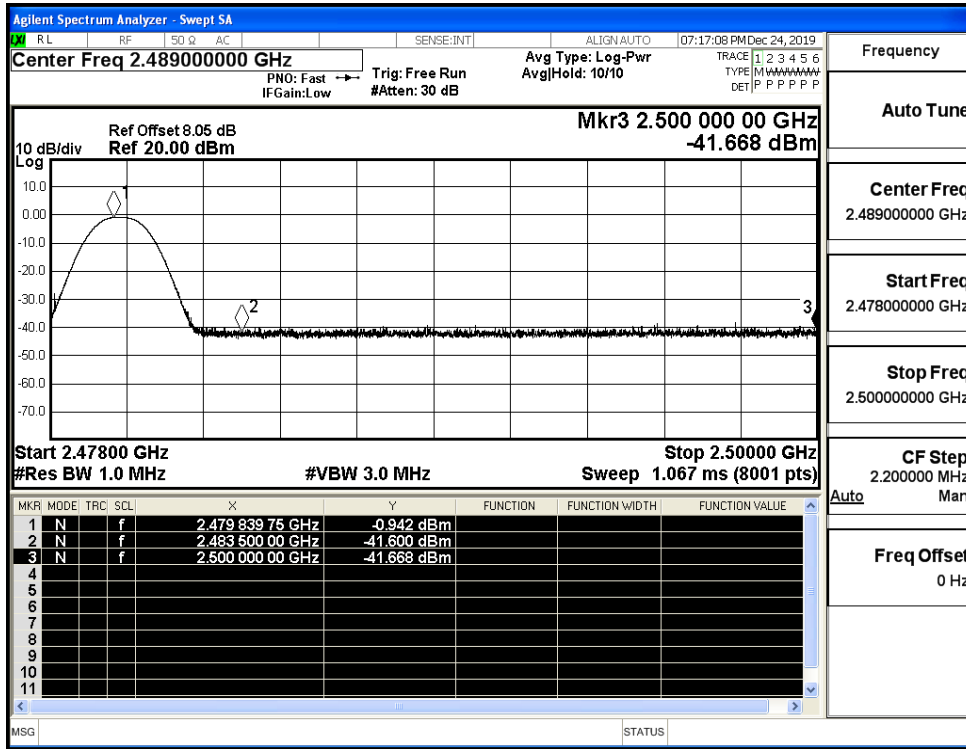
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



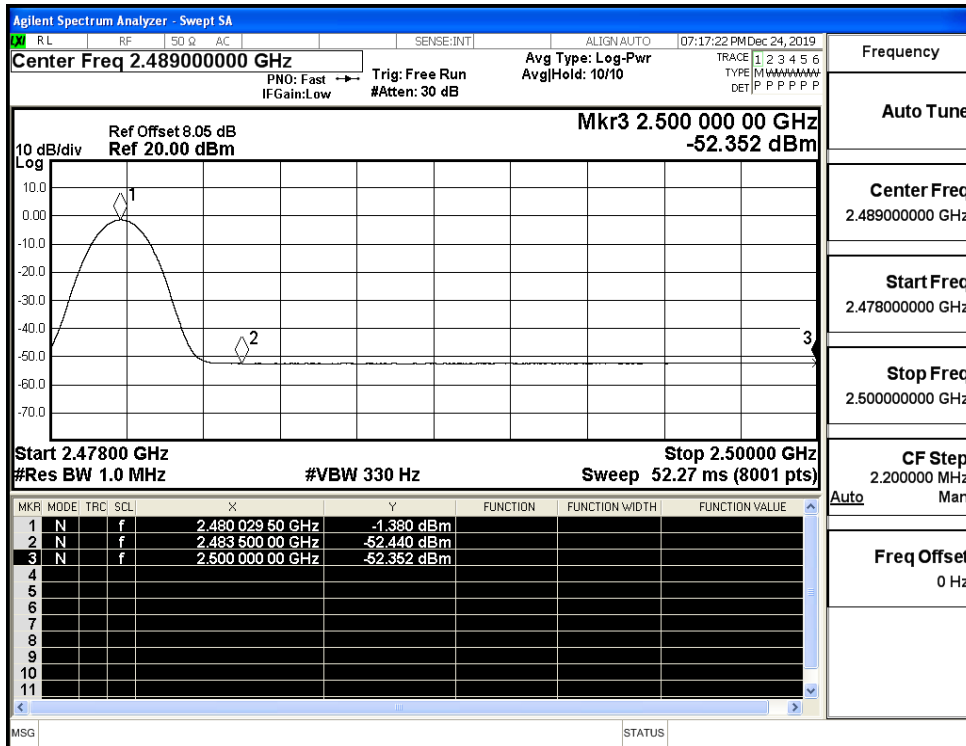
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



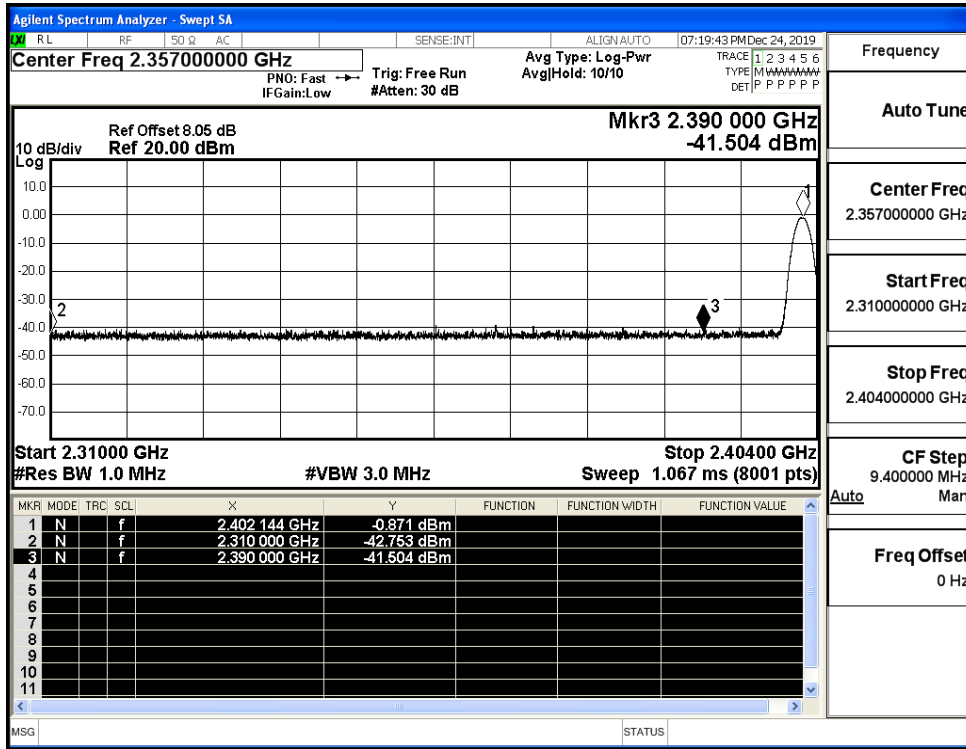
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



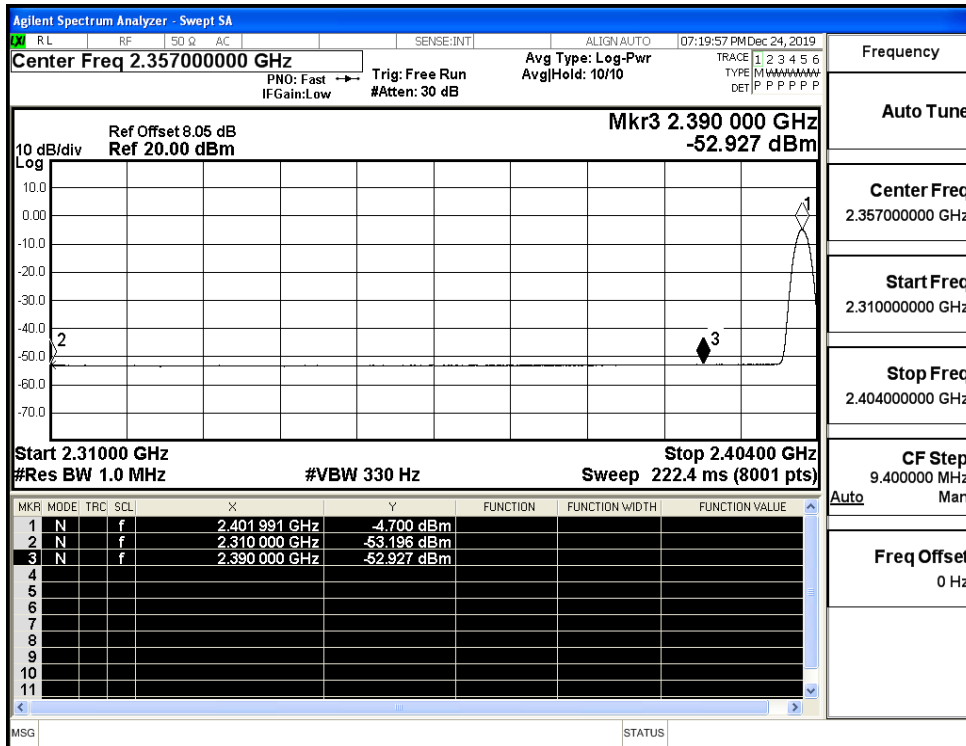
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



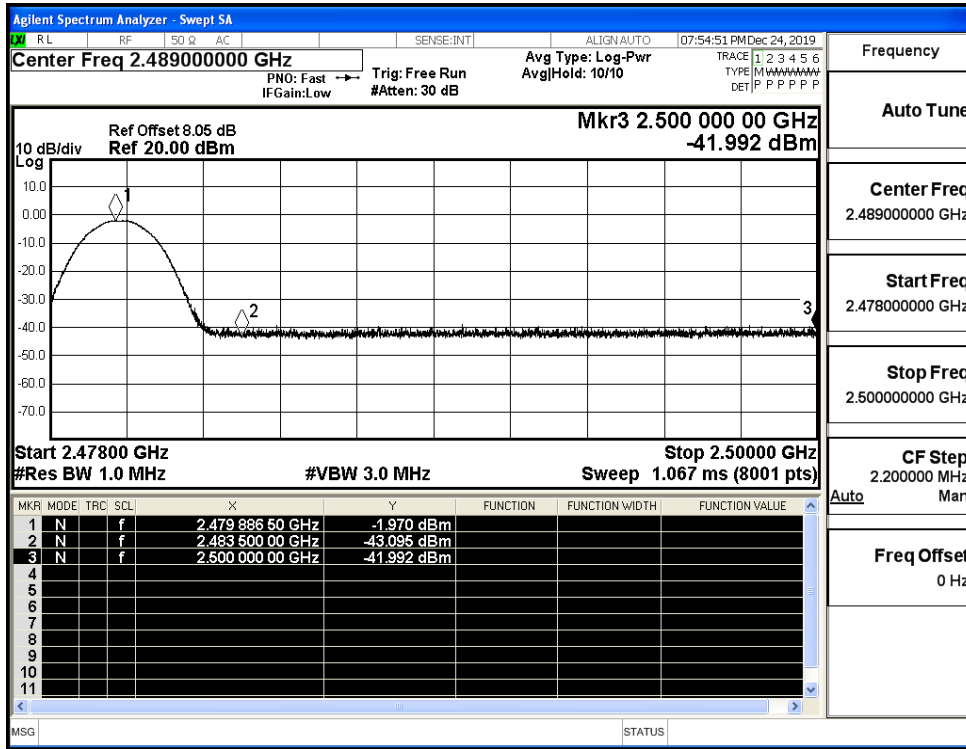
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



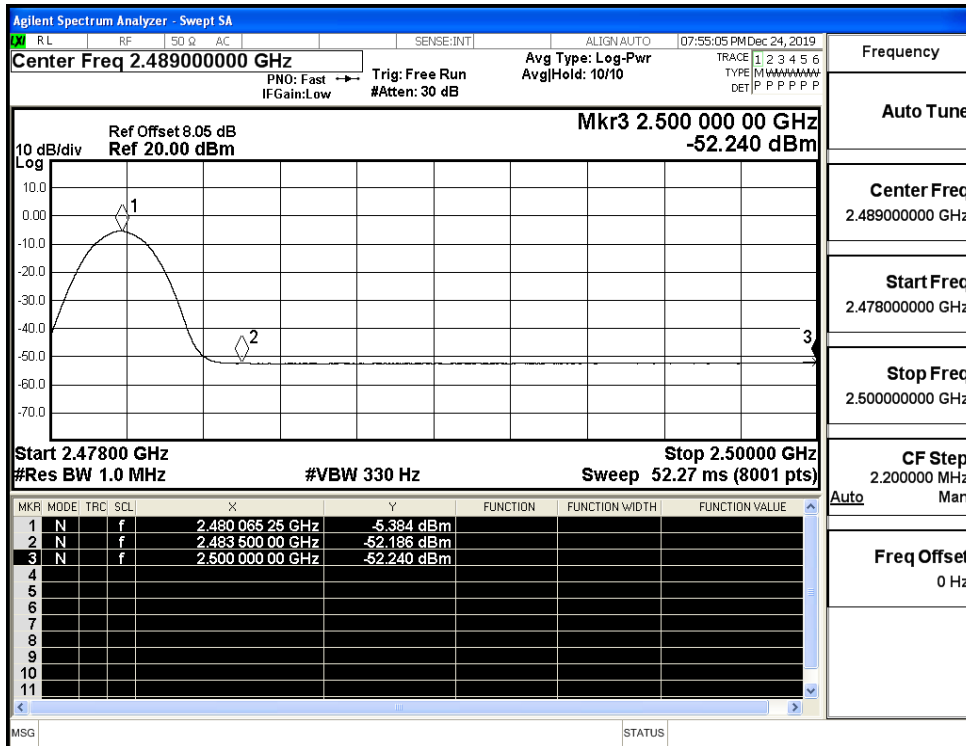
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



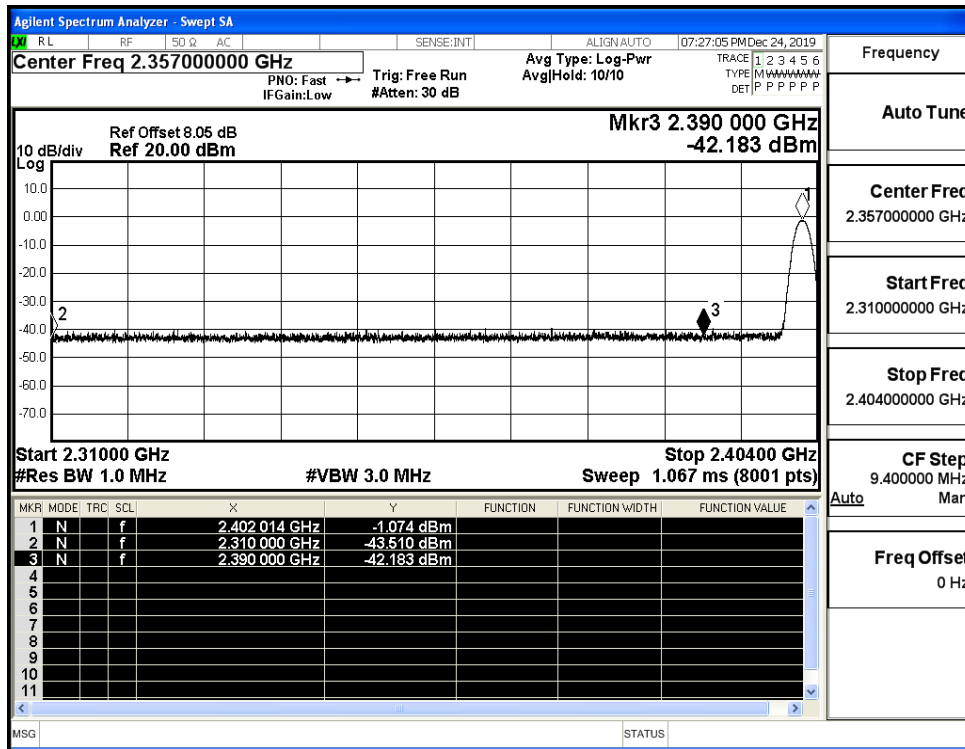
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



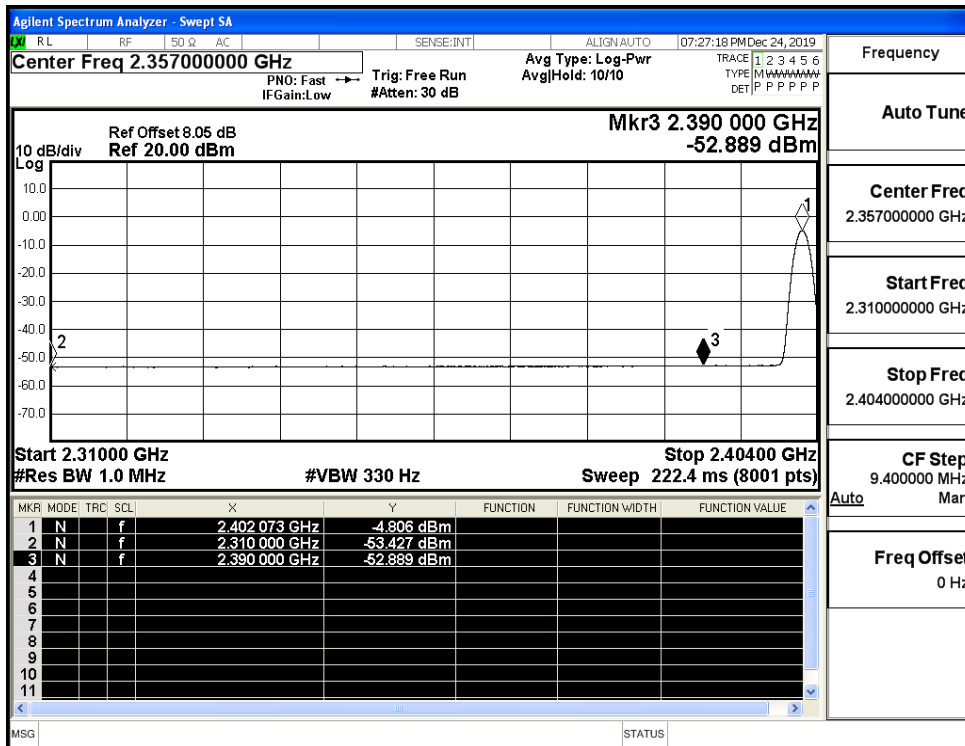
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



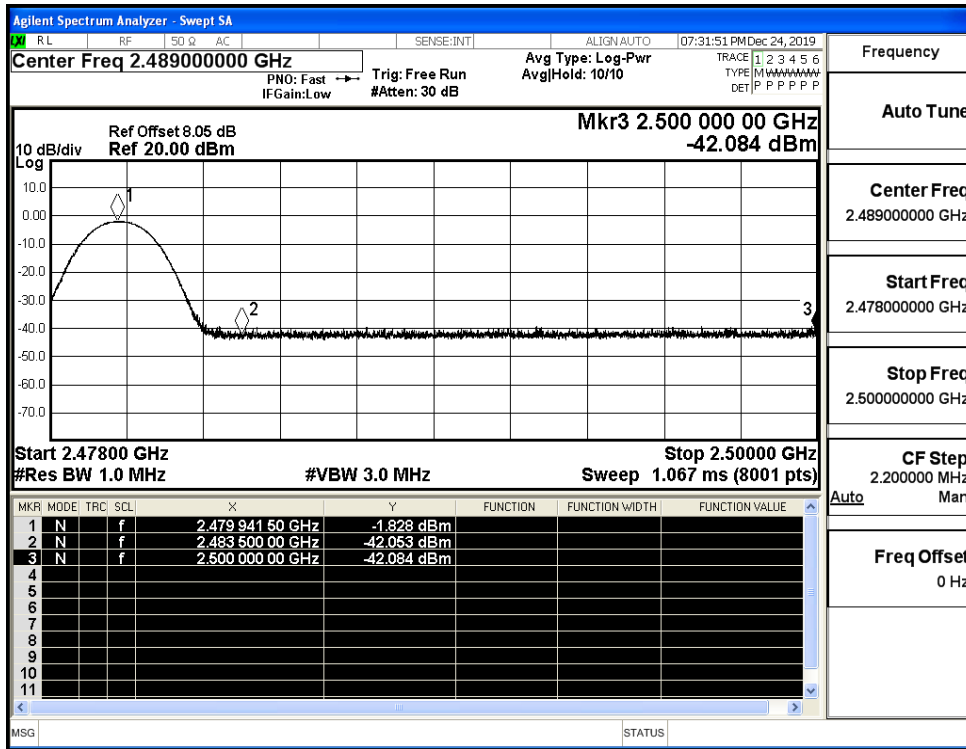
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

