

Appendix A

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

Product Name: Odyssey Bluetooth® Headphones

Trade Mark: Gemline

Test Model: 100252-001B

Environmental Conditions

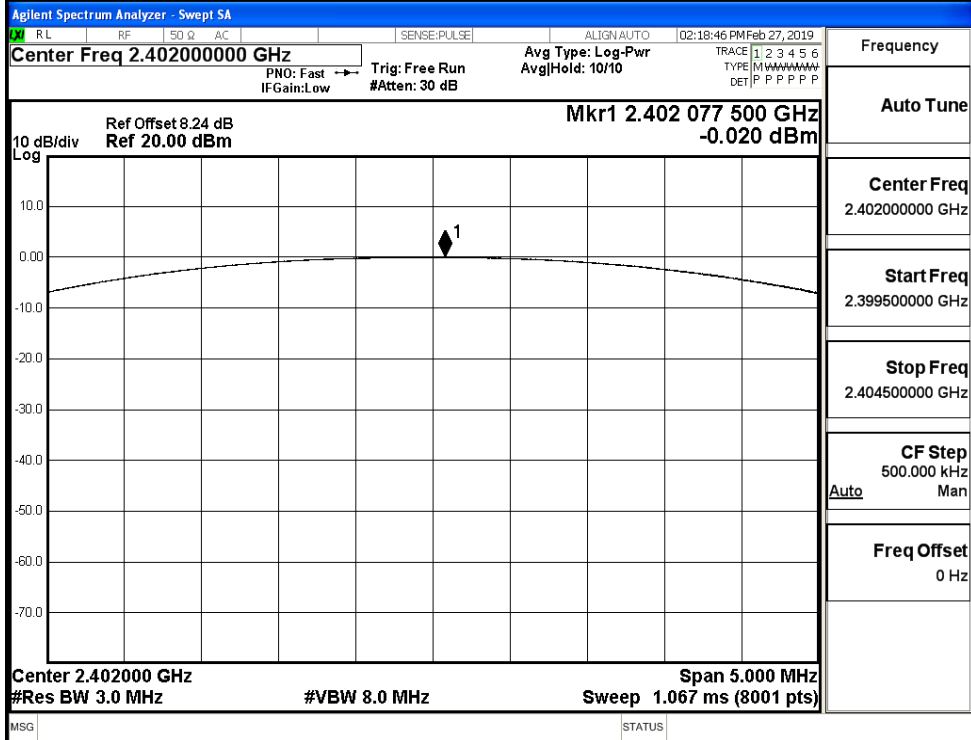
Temperature:	22.8 ° C
Relative Humidity:	53.3%
ATM Pressure:	100.0 kPa
Test Engineer:	JERRY.Zeng
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

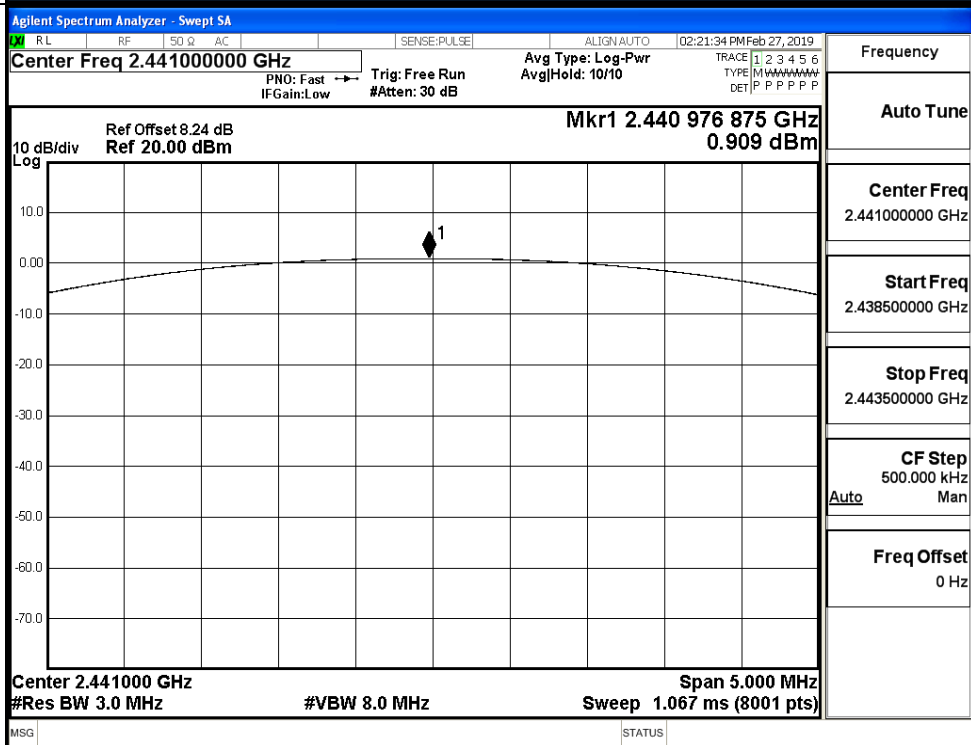
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.020	21	PASS
	MCH	0.909	21	PASS
	HCH	-0.414	21	PASS
$\pi/4$ DQPSK	LCH	-0.598	21	PASS
	MCH	0.361	21	PASS
	HCH	-1.062	21	PASS
8DPSK	LCH	-0.498	21	PASS
	MCH	0.456	21	PASS
	HCH	-0.915	21	PASS

Test Graphs

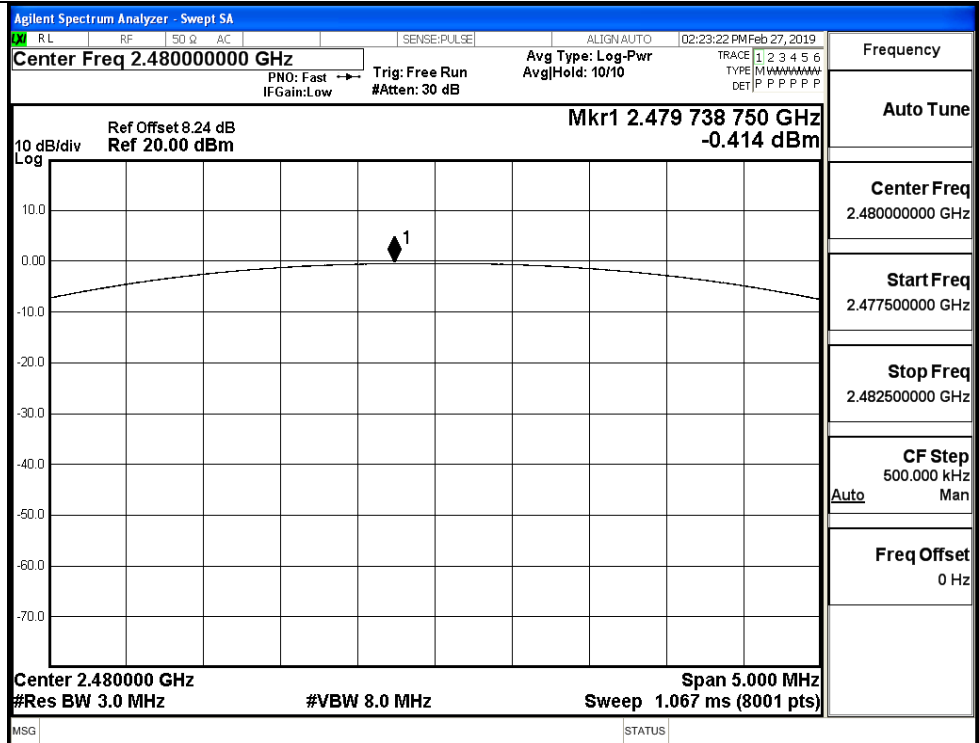
GFSK/LCH



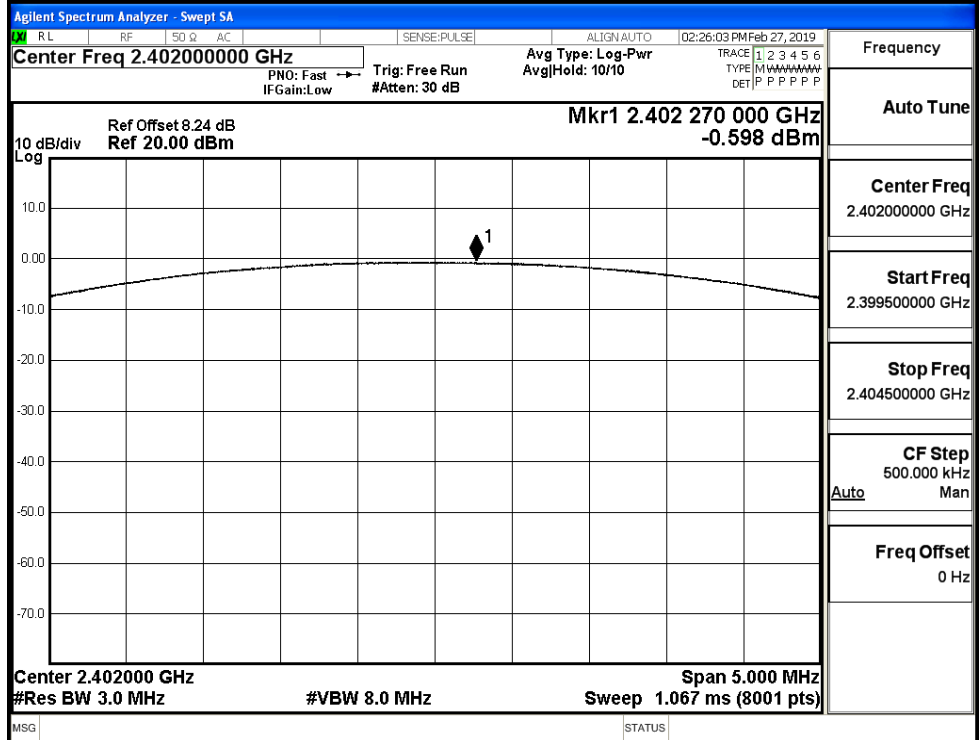
GFSK/MCH



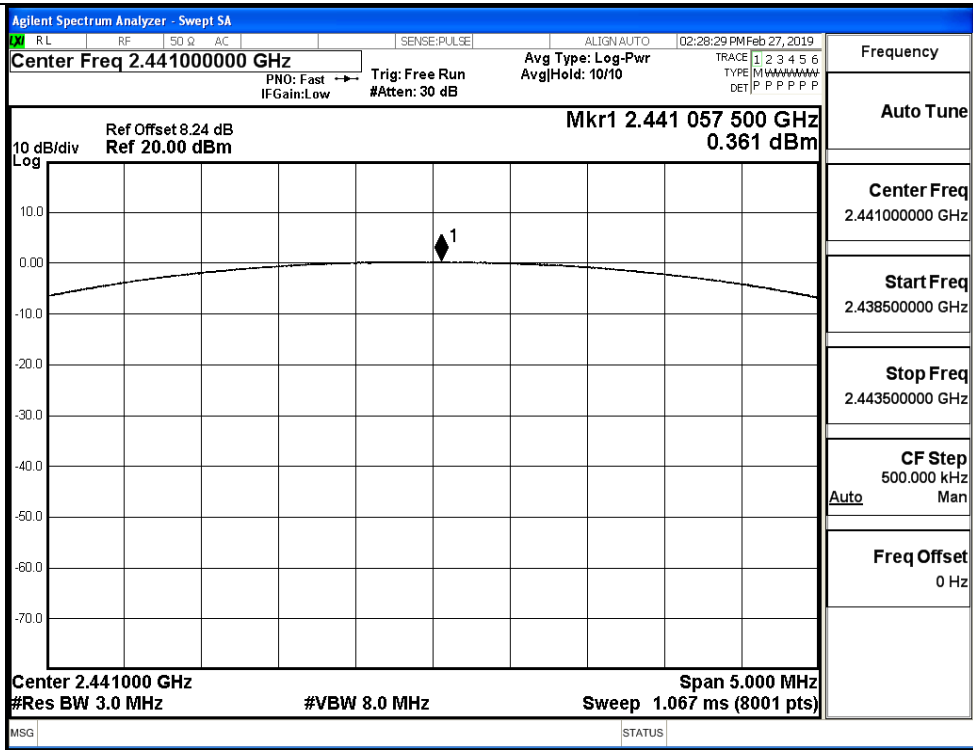
GFSK/HCH



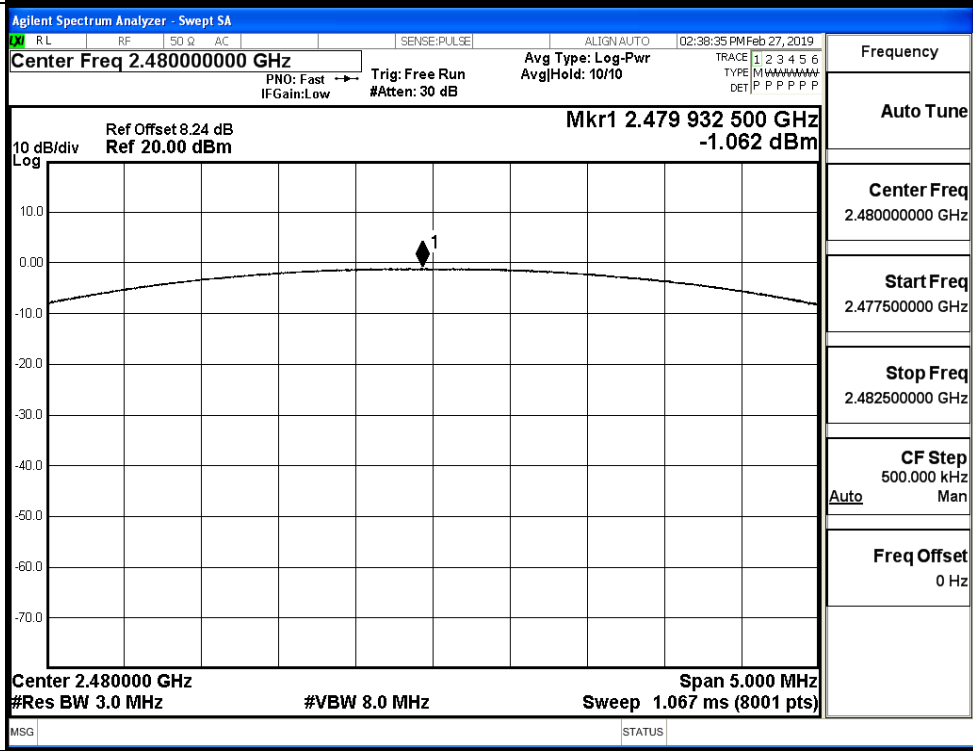
π /4DQPSK/LCH



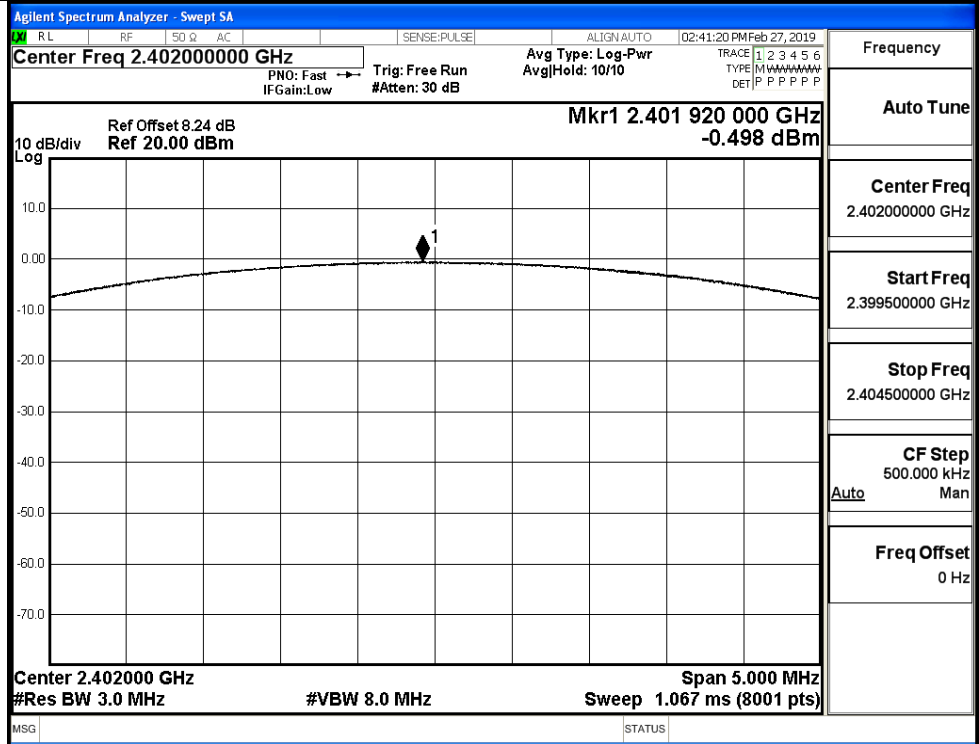
π /4DQPSK/MCH



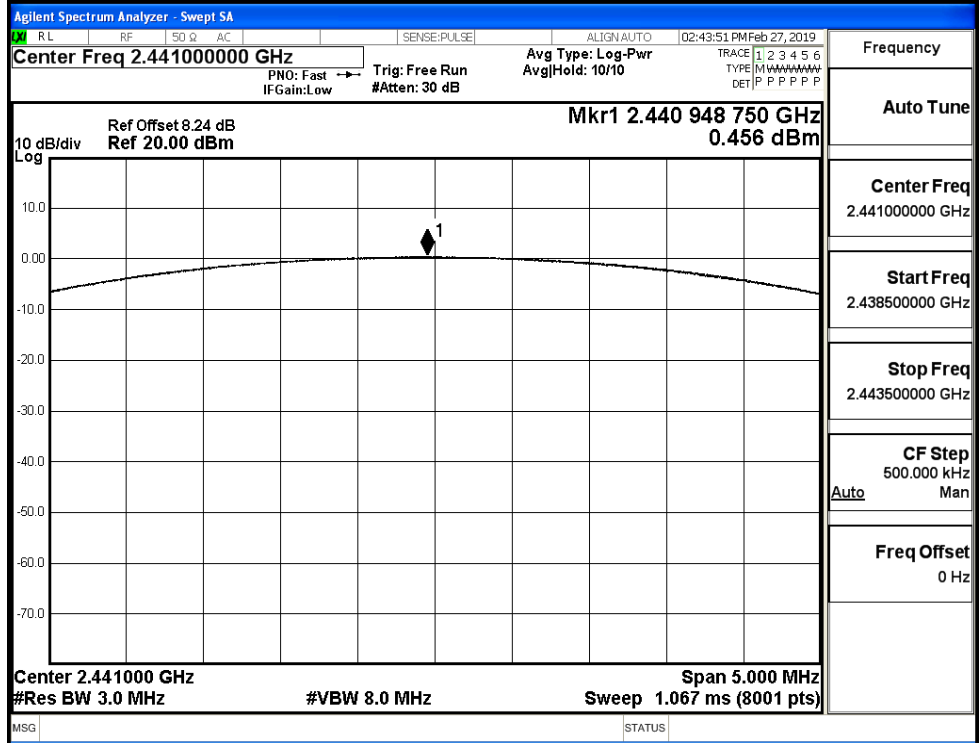
π /4DQPSK/HCH



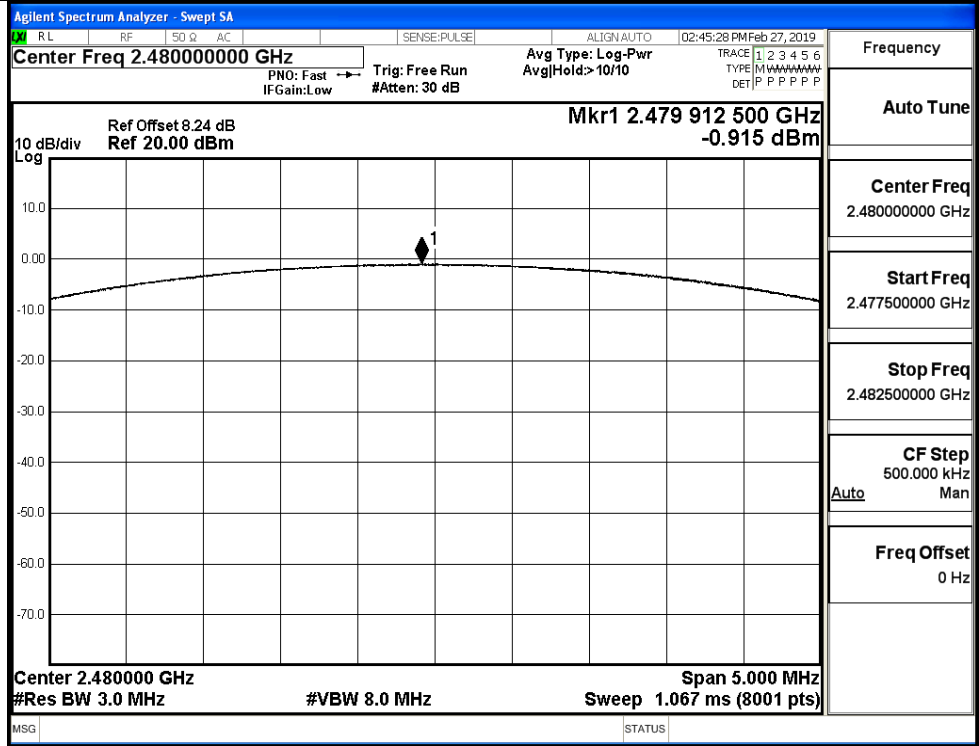
8DPSK/LCH



8DPSK/MCH

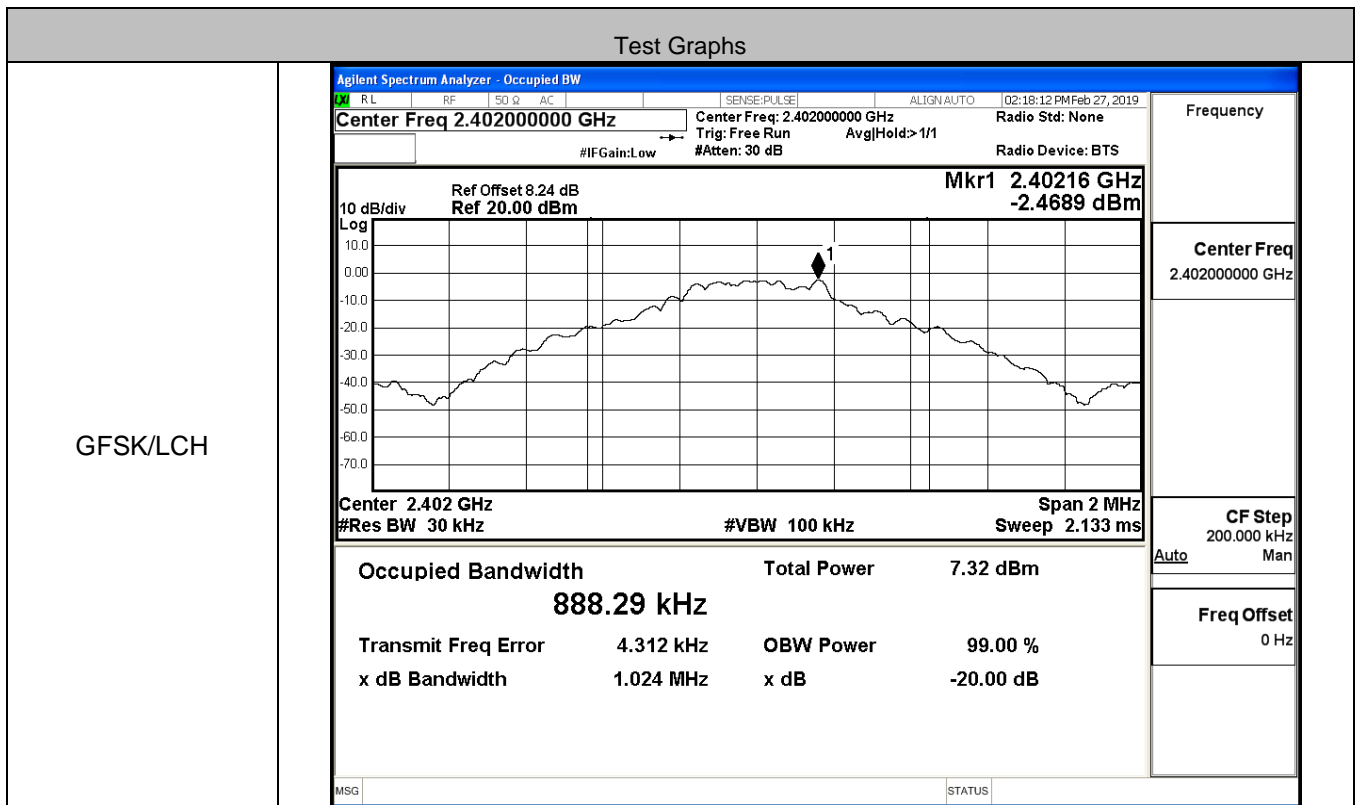


8DPSK/HCH

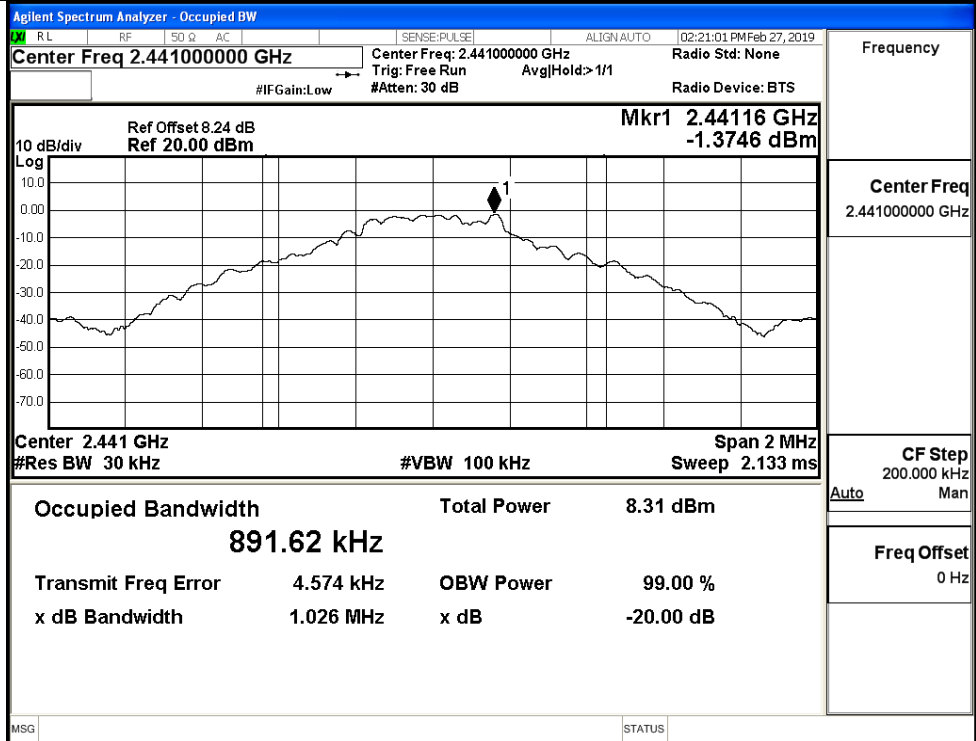


A.2 99% and 20dB Bandwidth

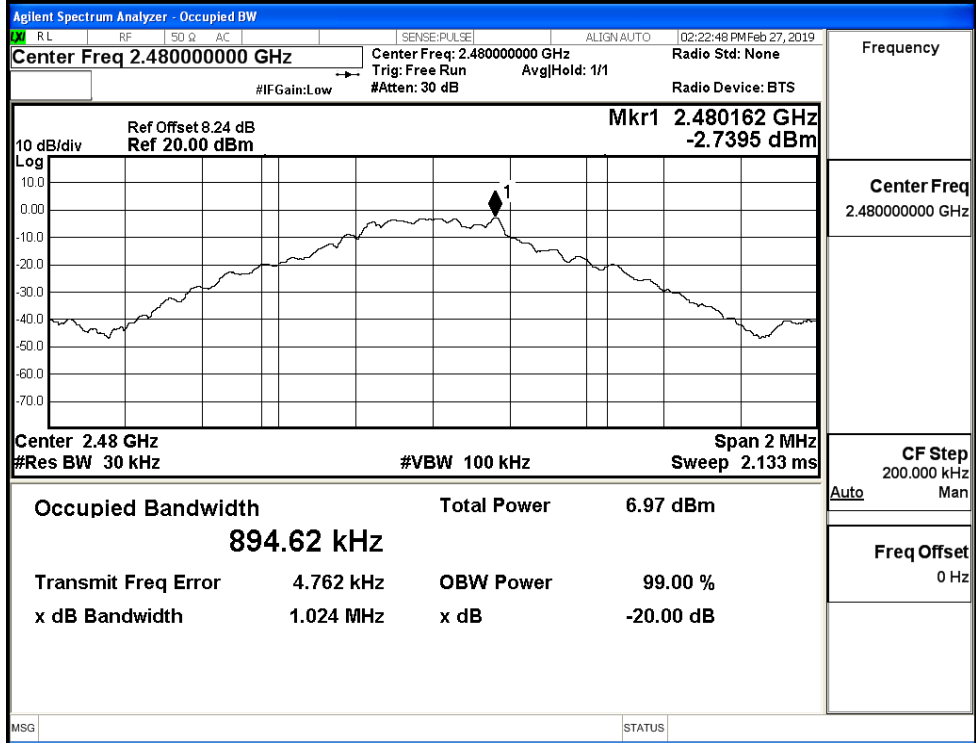
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.88829	1.024	Not Specified	PASS
	MCH	0.89162	1.026	Not Specified	PASS
	HCH	0.89462	1.024	Not Specified	PASS
π/4DQPSK	LCH	1.1795	1.292	Not Specified	PASS
	MCH	1.1780	1.293	Not Specified	PASS
	HCH	1.1742	1.307	Not Specified	PASS
8DPSK	LCH	1.1912	1.298	Not Specified	PASS
	MCH	1.1893	1.298	Not Specified	PASS
	HCH	1.1892	1.298	Not Specified	PASS



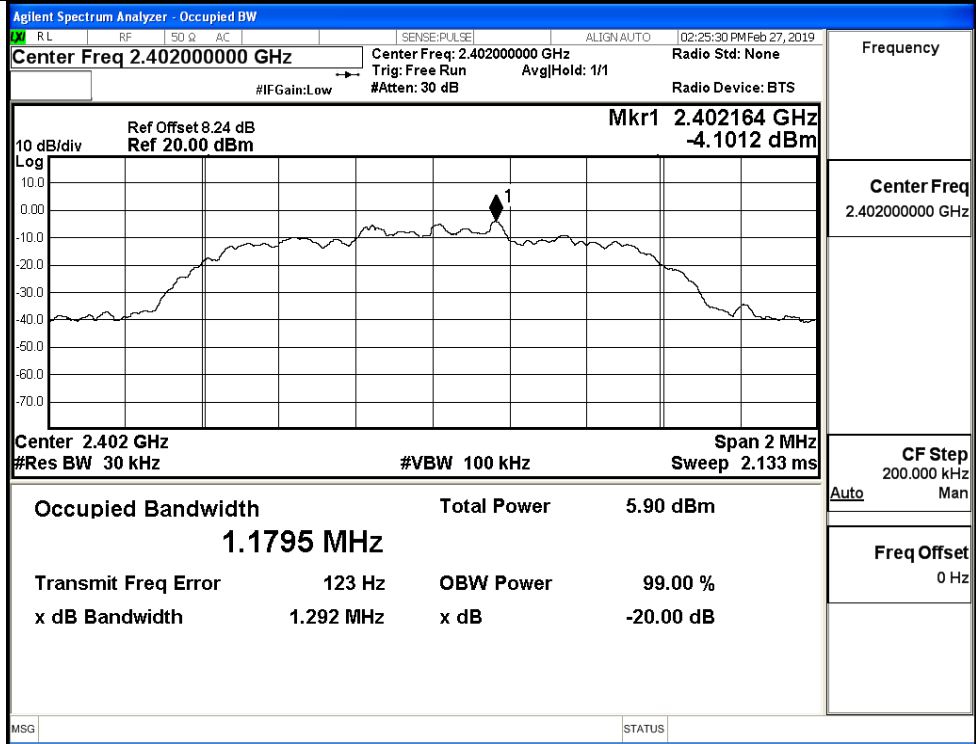
GFSK/MCH



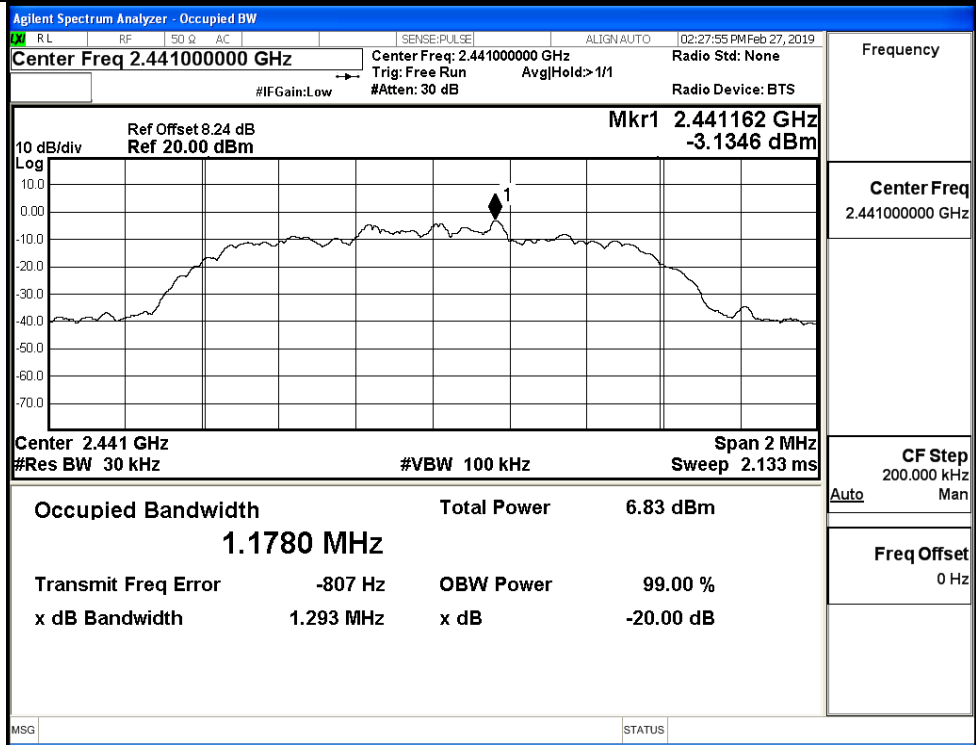
GFSK/HCH



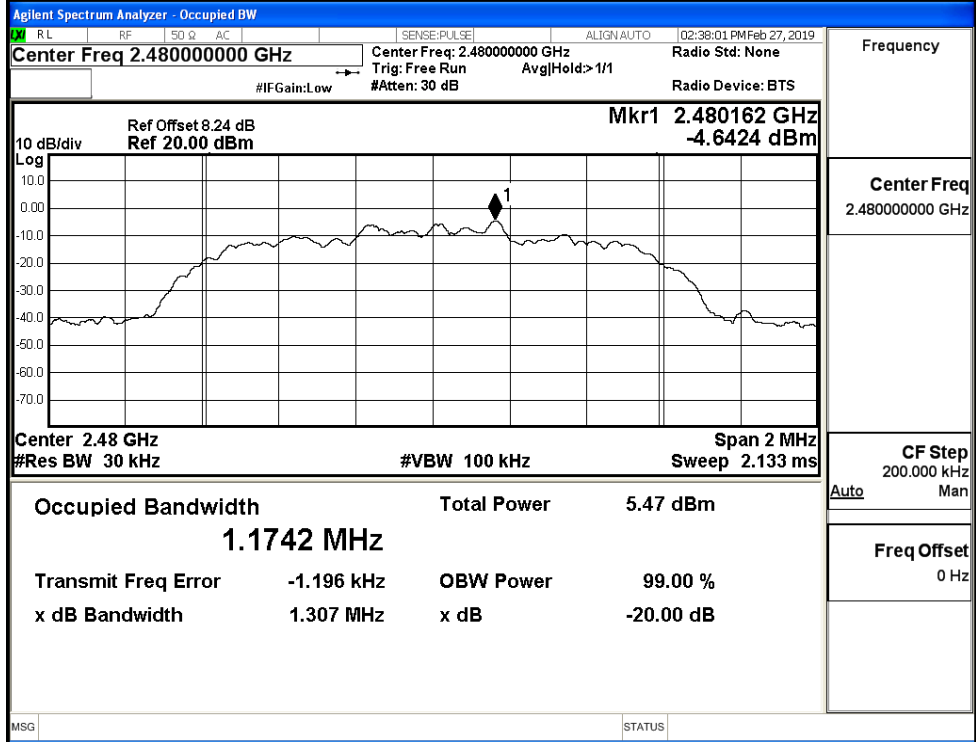
$\pi/4$ DQPSK/LCH



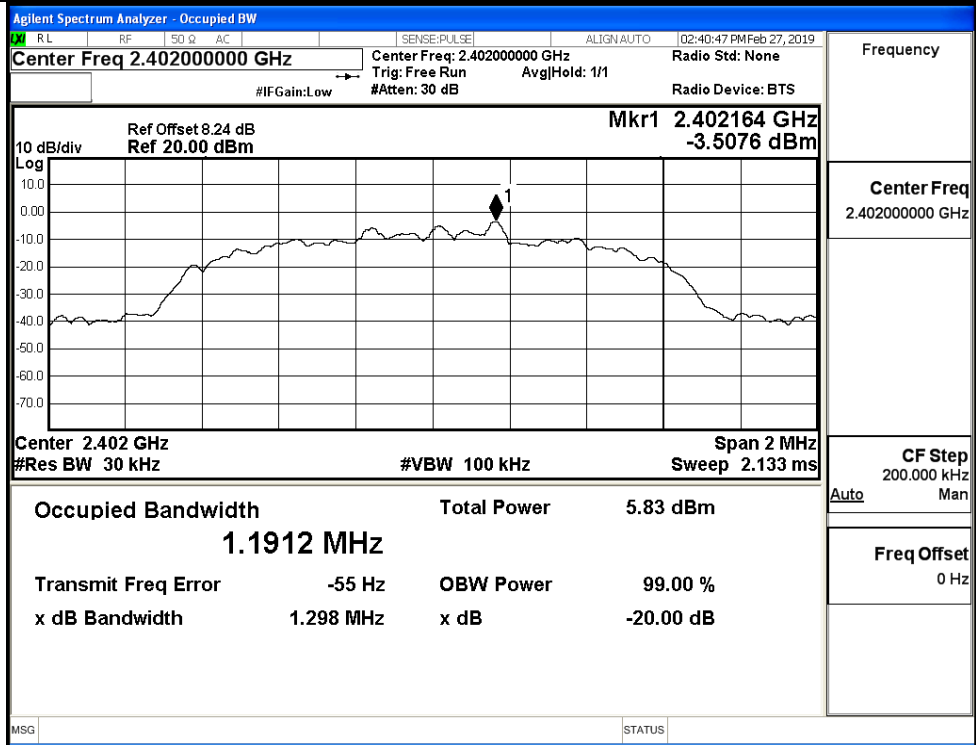
$\pi/4$ DQPSK/MCH



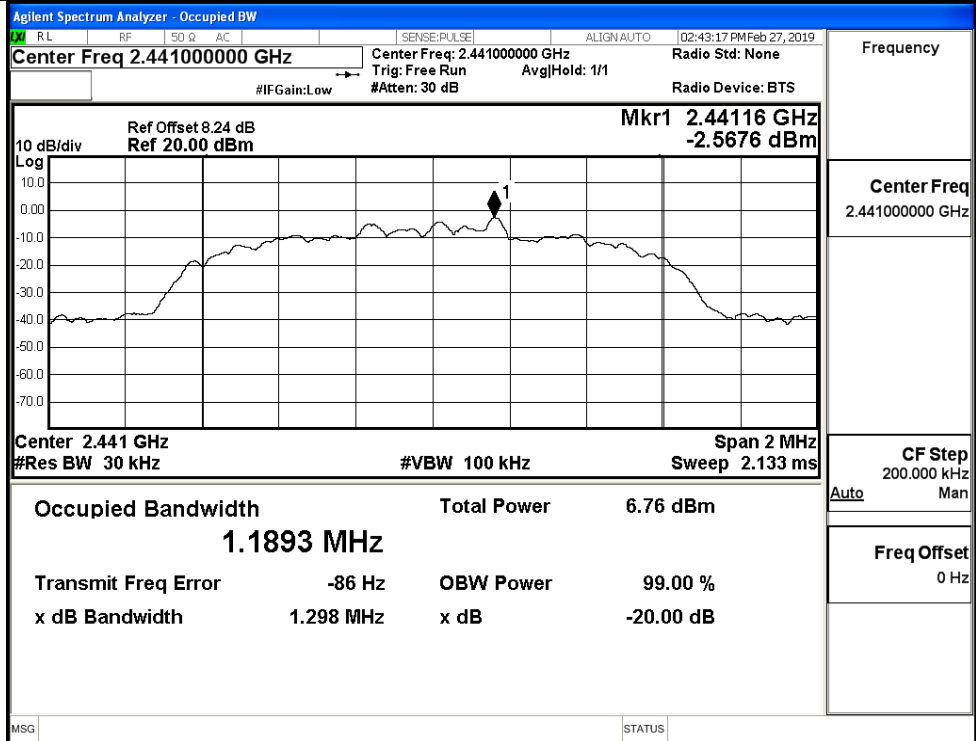
$\pi/4$ DQPSK/HCH



8DPSK/LCH

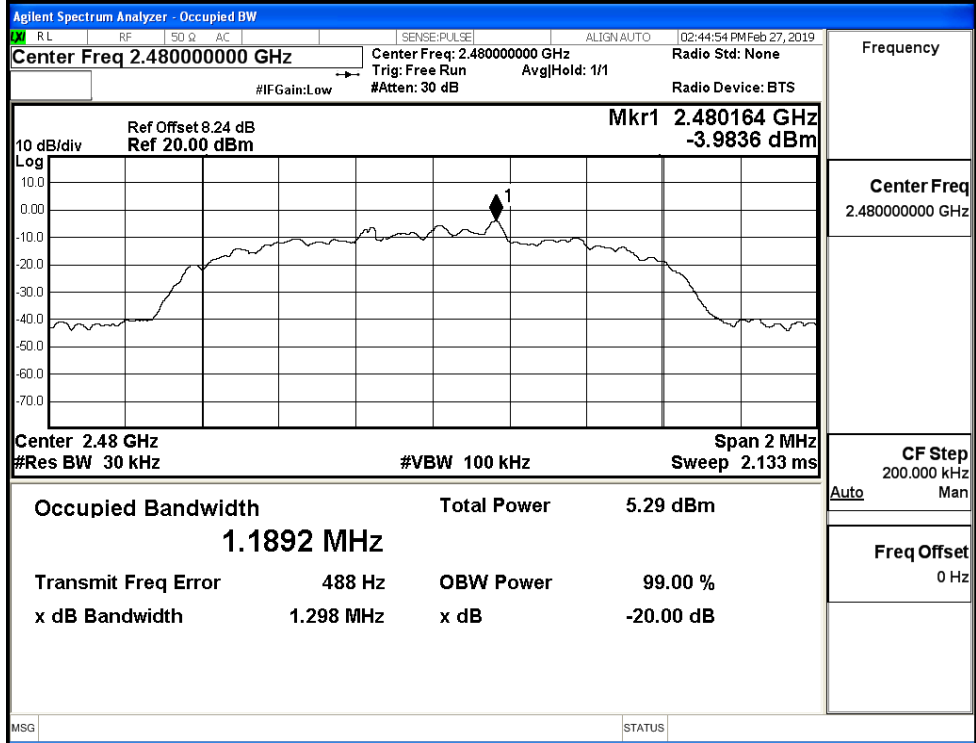


8DPSK/MCH



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

8DPSK/HCH

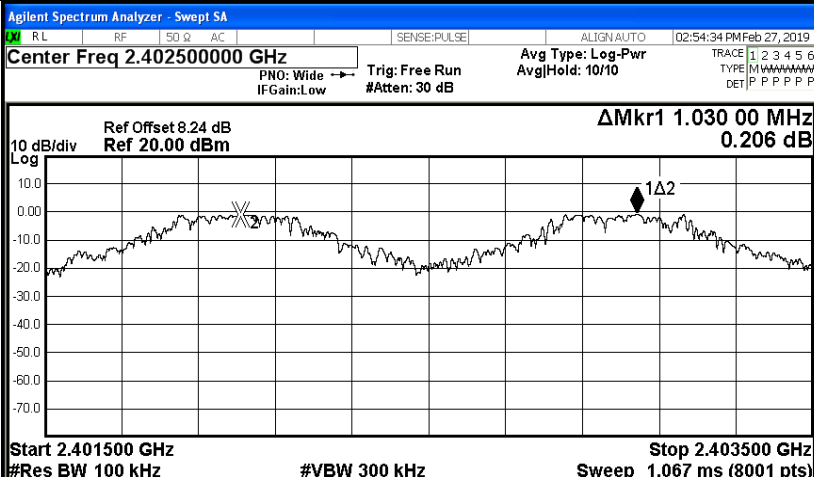


Frequency	2.48000000 GHz
Center Freq	2.48000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

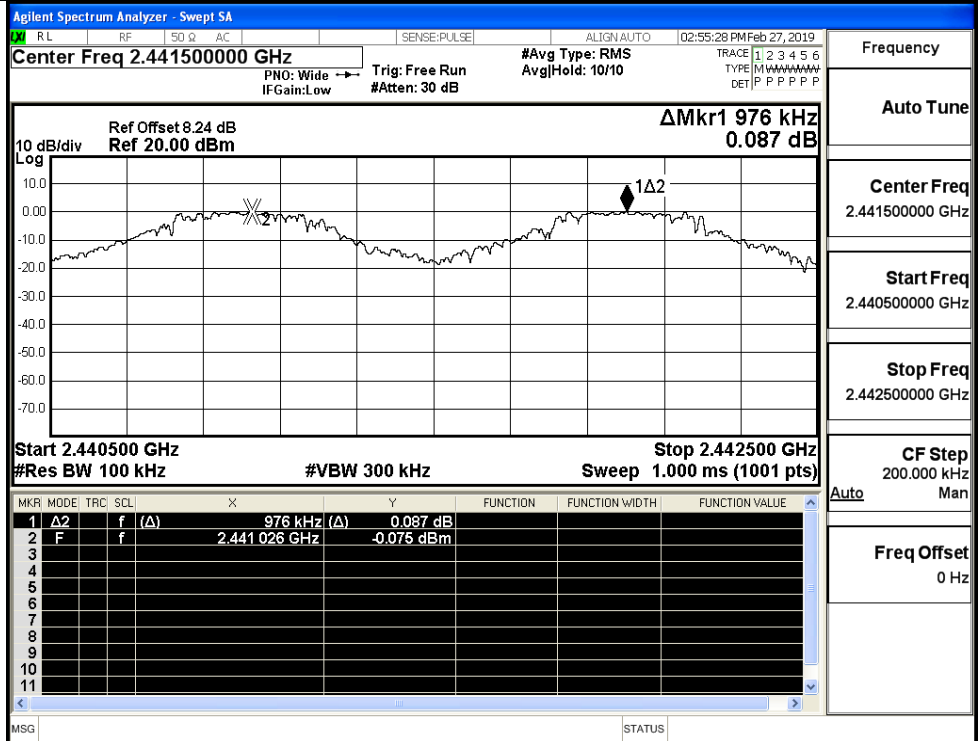
A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.030	0.684	PASS
	MCH	0.976	0.684	PASS
	HCH	0.858	0.684	PASS
π/4DQPSK	LCH	1.192	0.871	PASS
	MCH	1.050	0.871	PASS
	HCH	0.988	0.871	PASS
8DPSK	LCH	1.018	0.865	PASS
	MCH	1.090	0.865	PASS
	HCH	1.316	0.865	PASS

Test Graphs

GFSK/LCH																																																																																																														
	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.402500000 GHz</p> <p>ΔMkr1 1.030 00 MHz 0.206 dB</p> <p>Ref Offset 9.24 dB Ref 20.00 dBm</p> <p>Start 2.401500 GHz #Res BW 100 kHz</p> <p>Stop 2.403500 GHz #VBW 300 kHz Sweep 1.067 ms (8001 pts)</p>	<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.402500000 GHz</p> <p>Start Freq 2.401500000 GHz</p> <p>Stop Freq 2.403500000 GHz</p> <p>CF Step 200.000 kHz Man</p> <p>Auto</p> <p>Freq Offset 0 Hz</p>																																																																																																												
	<table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <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>1.030 00 MHz (Δ)</td> <td>0.206 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402 010 50 GHz</td> <td>-0.991 dBm</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>9</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11</td> <td></td> <td></td> <td></td> <td></td> <td></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)	1.030 00 MHz (Δ)	0.206 dB				2	F	f		2.402 010 50 GHz	-0.991 dBm				3									4									5									6									7									8									9									10									11									<p>STATUS</p>
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GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

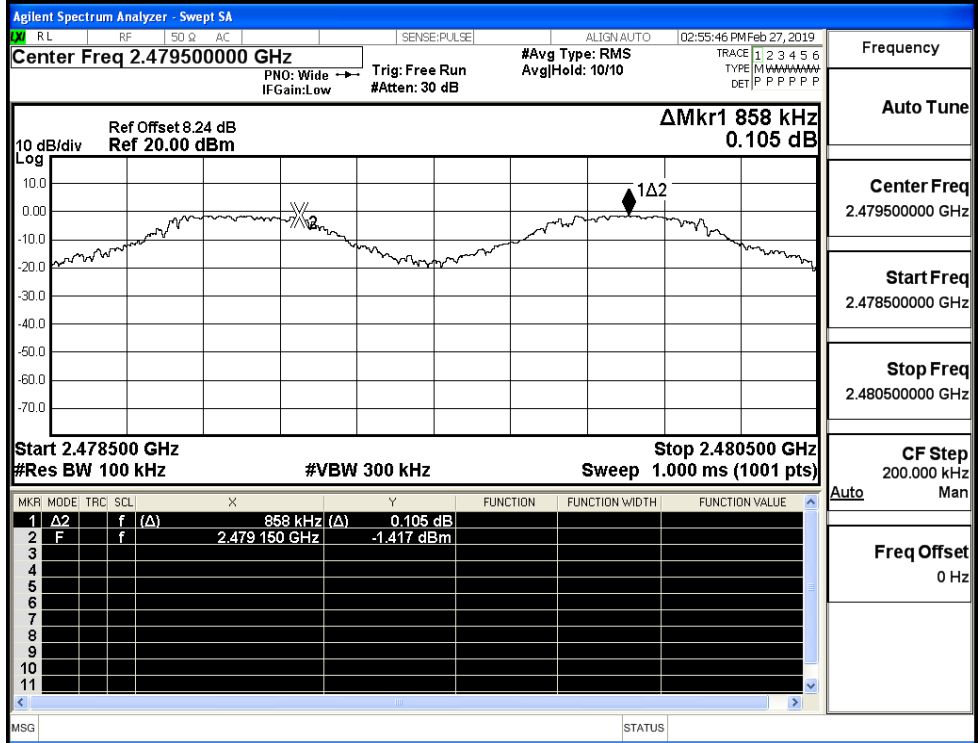
Start Freq
2.440500000 GHz

Stop Freq
2.442500000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

GFSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

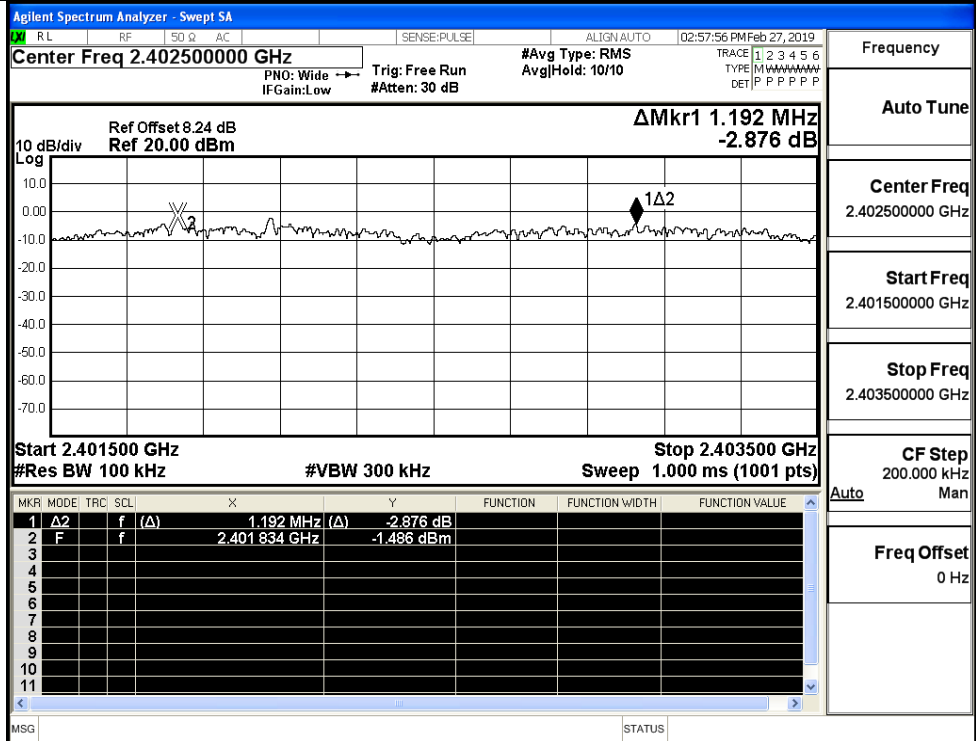
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

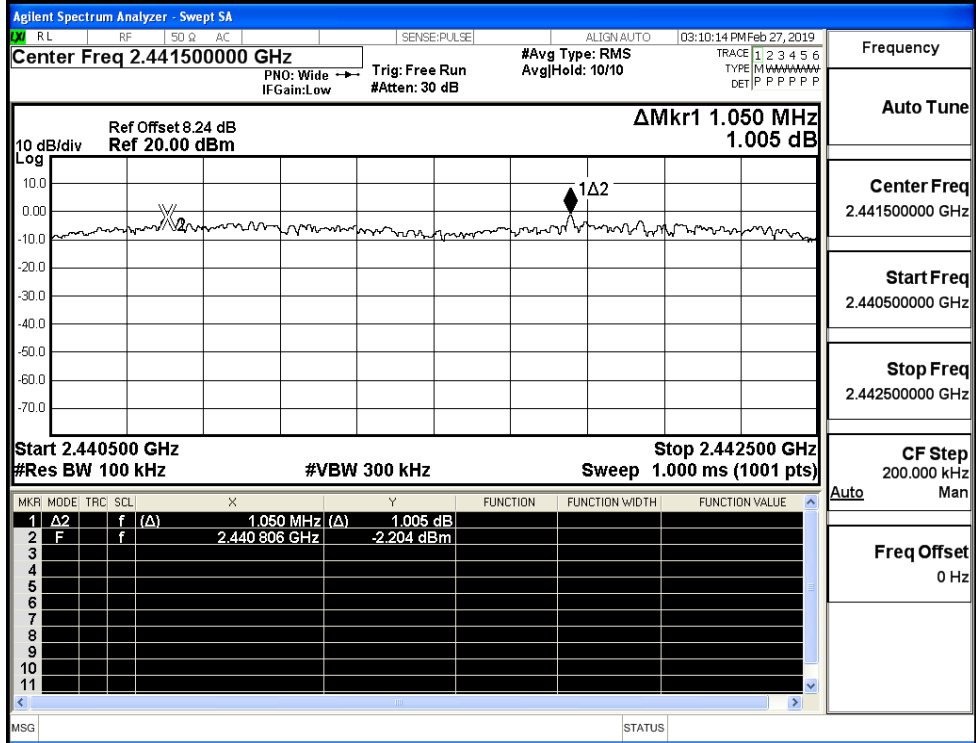
CF Step
200.000 kHz
Man

Freq Offset
0 Hz

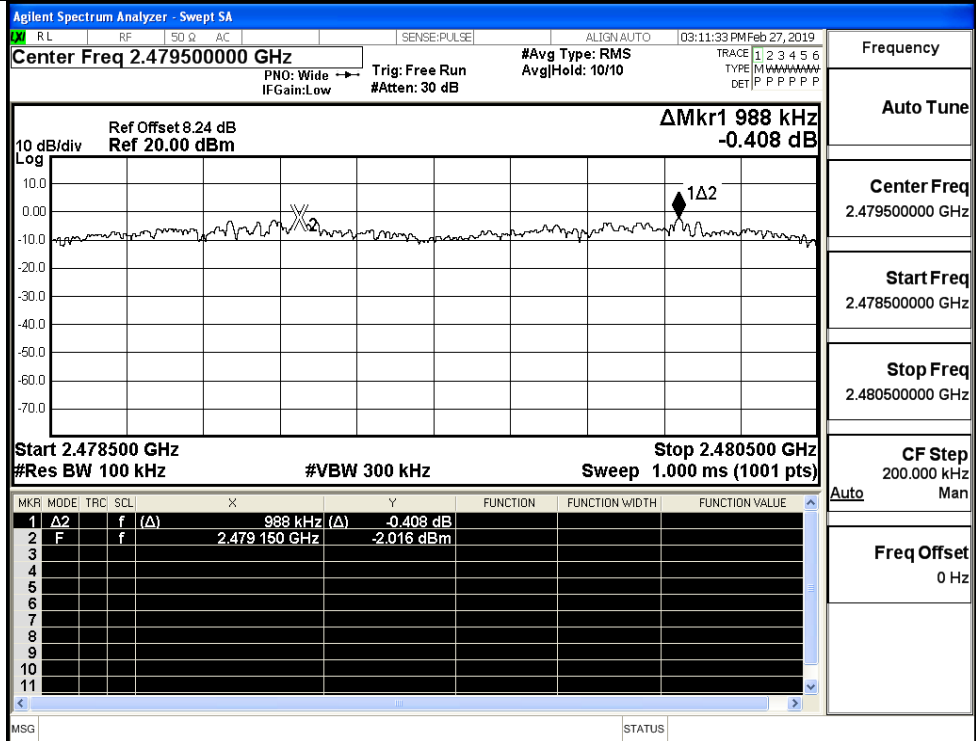
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

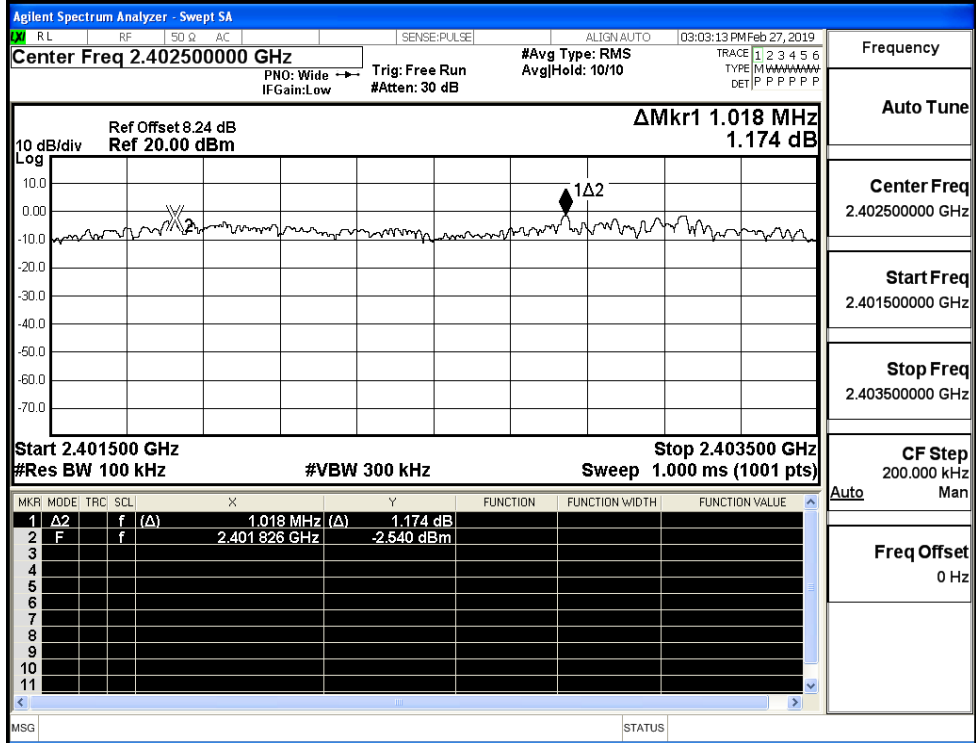


π/4DQPSK/HCH



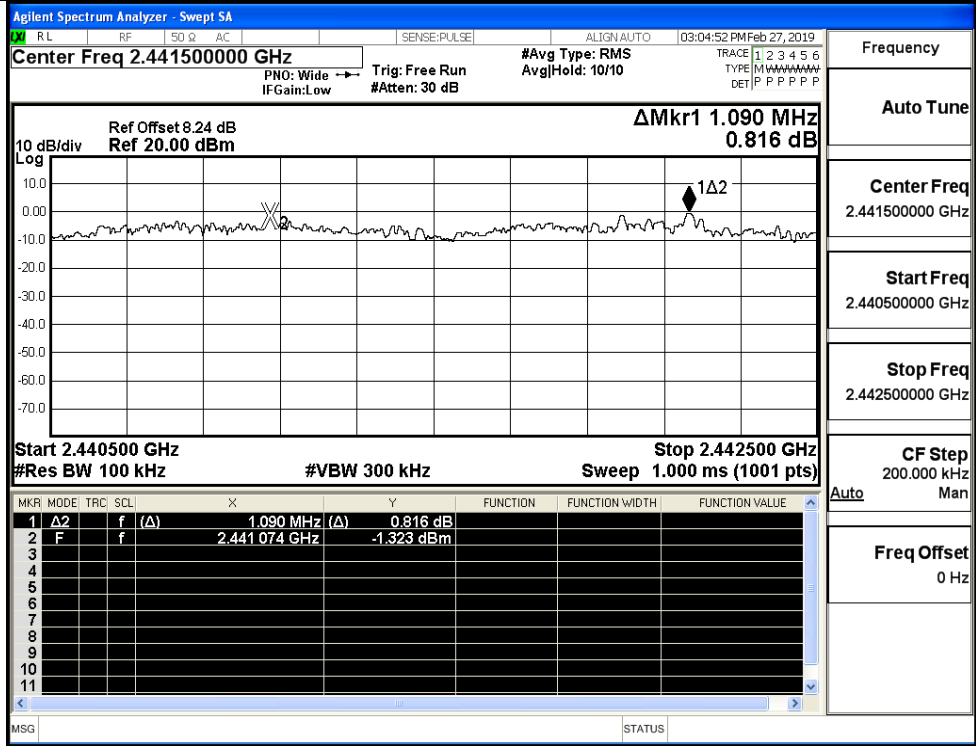
Frequency
Auto Tune
Center Freq 2.479500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.480500000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

8DPSK/LCH

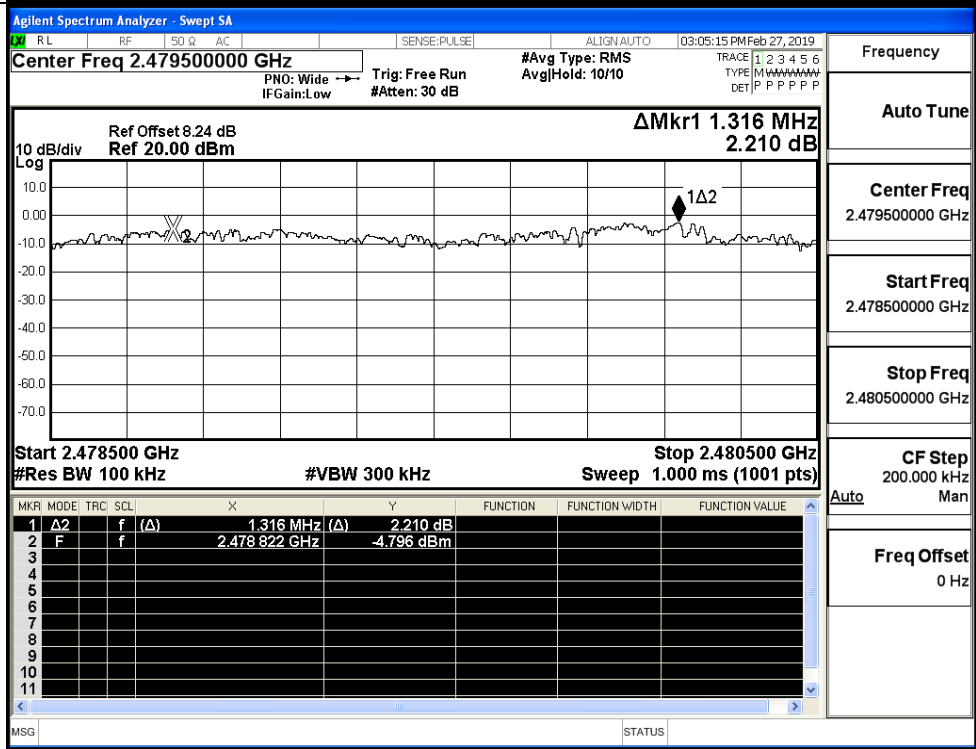


Frequency
Auto Tune
Center Freq 2.402500000 GHz
Start Freq 2.401500000 GHz
Stop Freq 2.403500000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

8DPSK/MCH



8DPSK/HCH

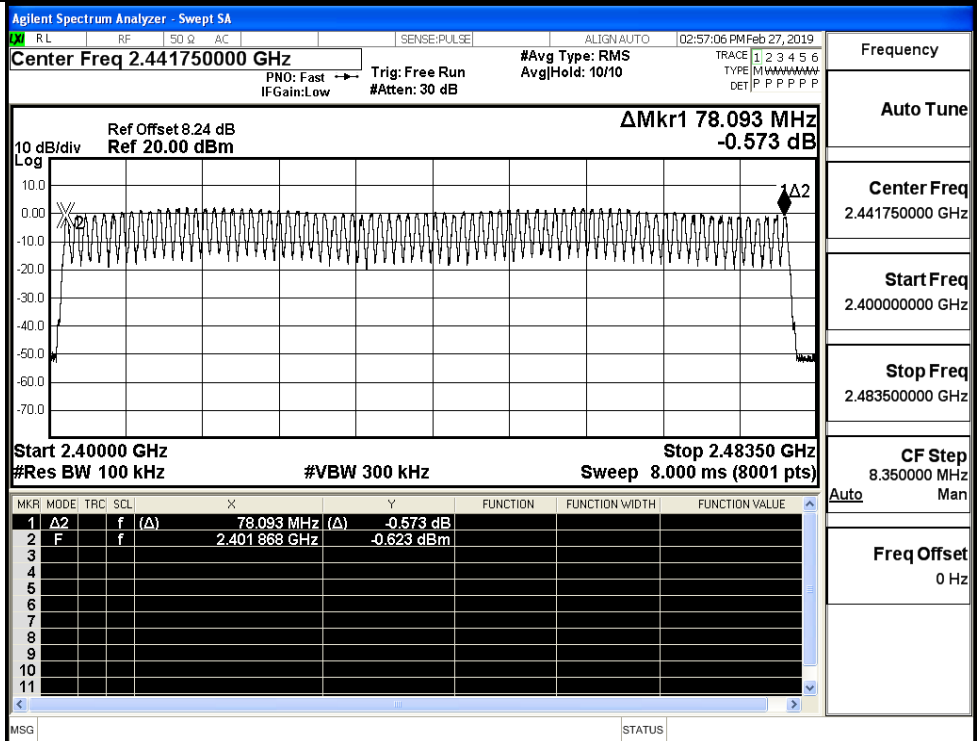


A.4 Hopping Channel Number

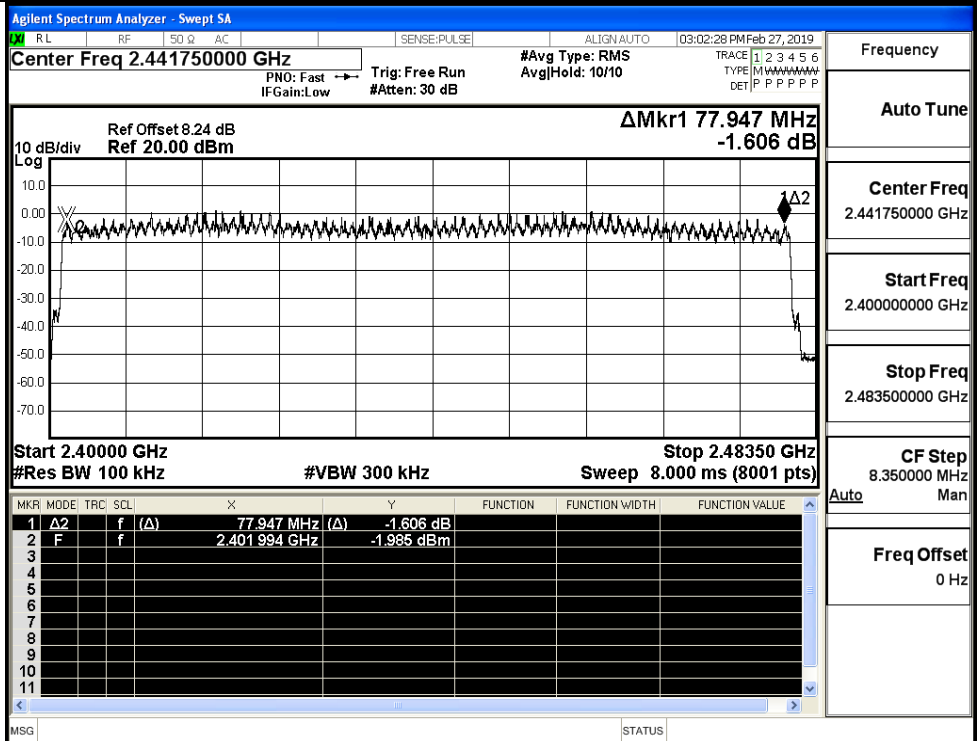
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS
8DPSK	Hop	79	>=15	PASS

Test Graphs

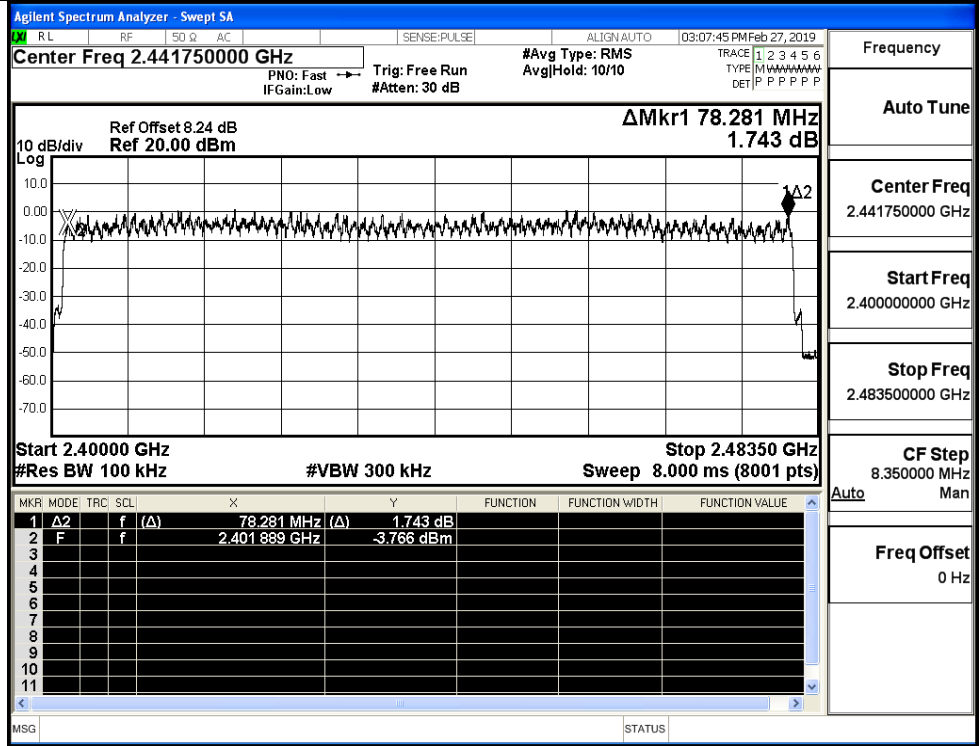
GFSK/Hop



$\pi/4$ DQPSK/Hop

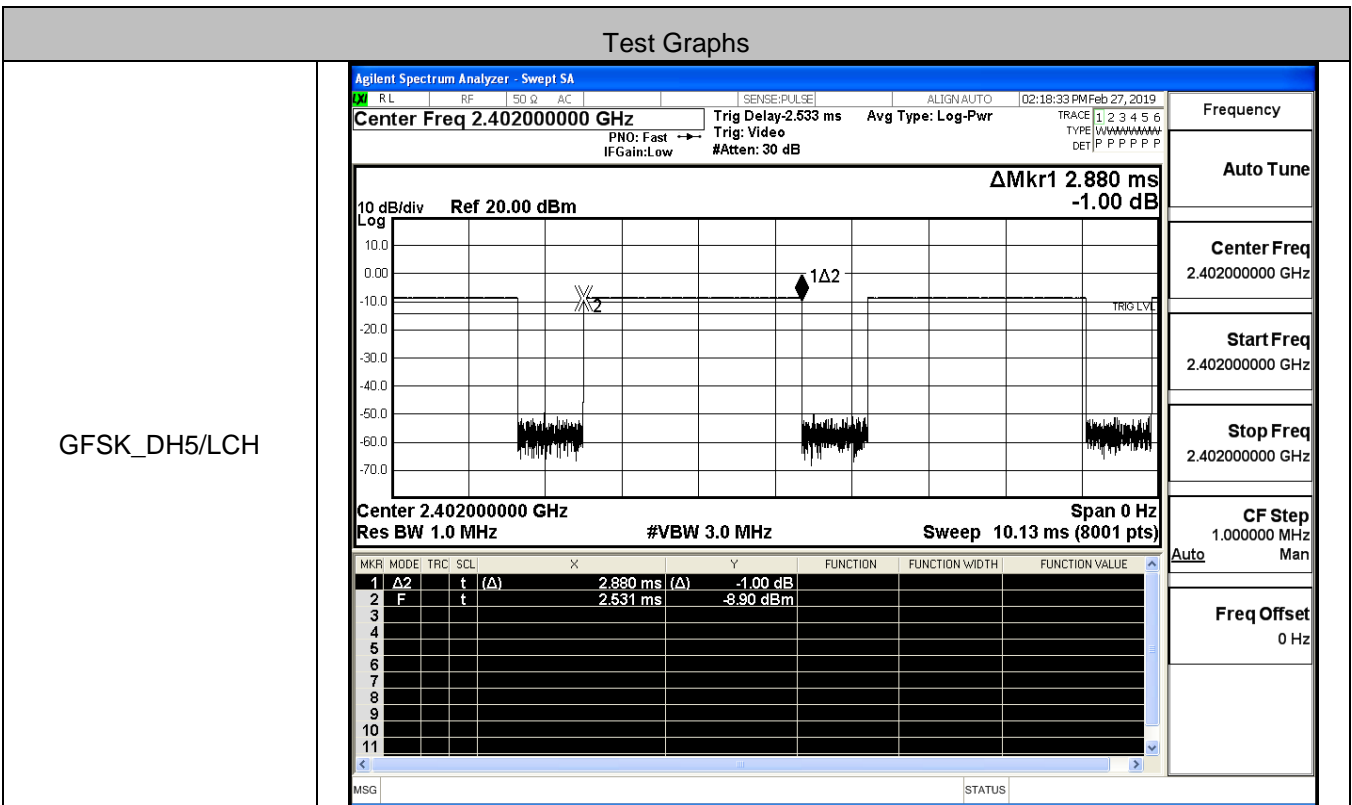


8DPSK/Hop

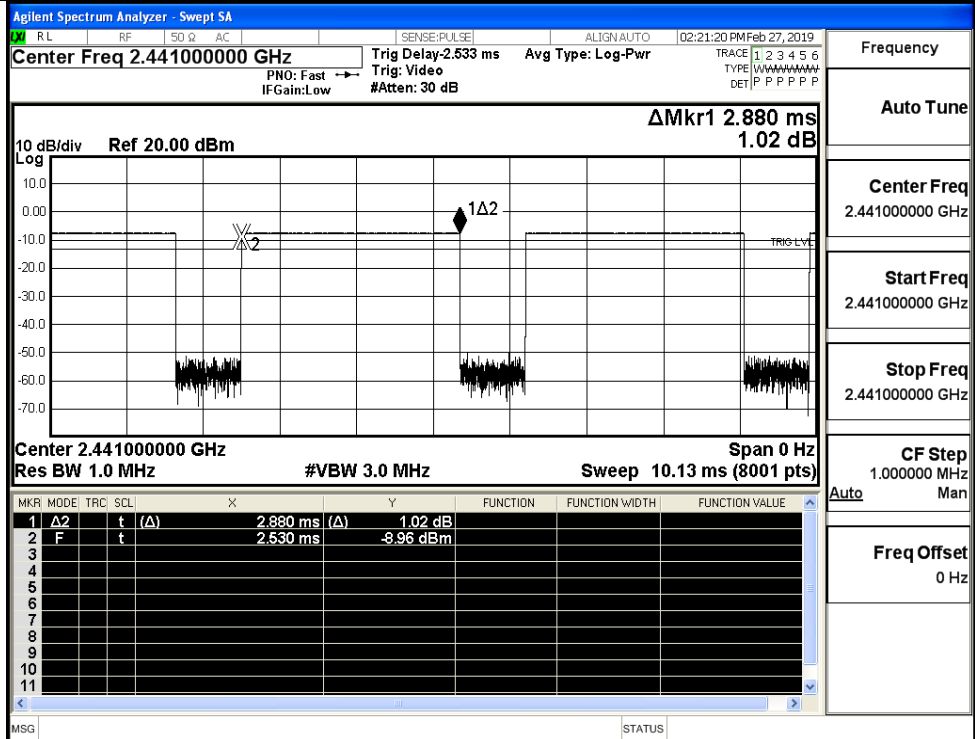


A.5 Dwell Time

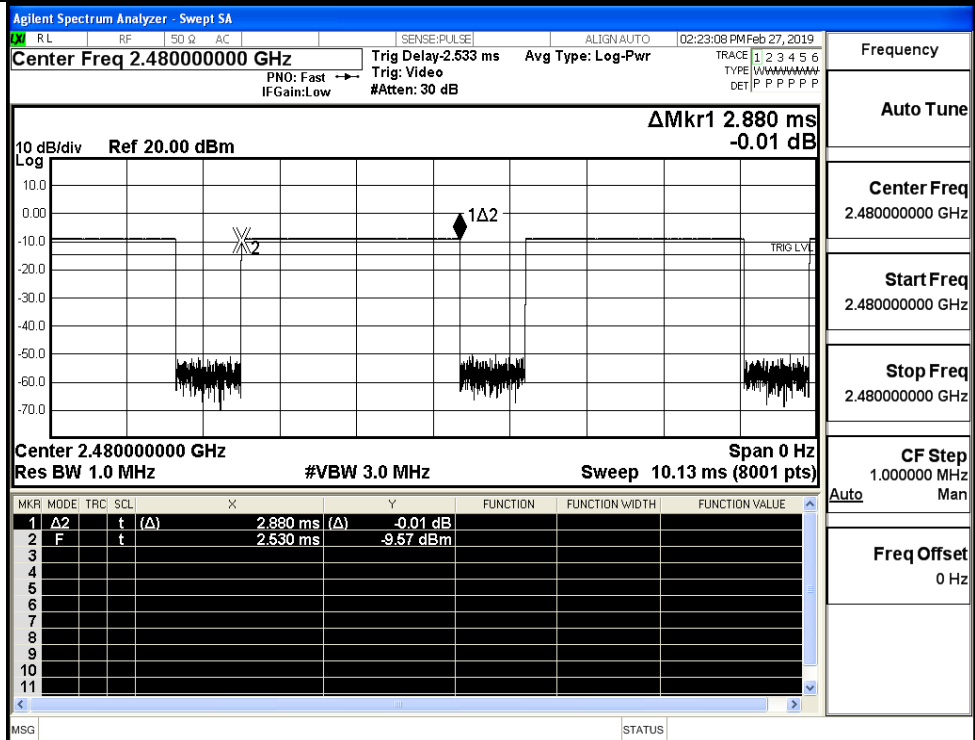
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.89	106.7	0.308	0.4	PASS
	3DH5	MCH	2.89	106.7	0.308	0.4	PASS
	3DH5	HCH	2.89	106.7	0.308	0.4	PASS



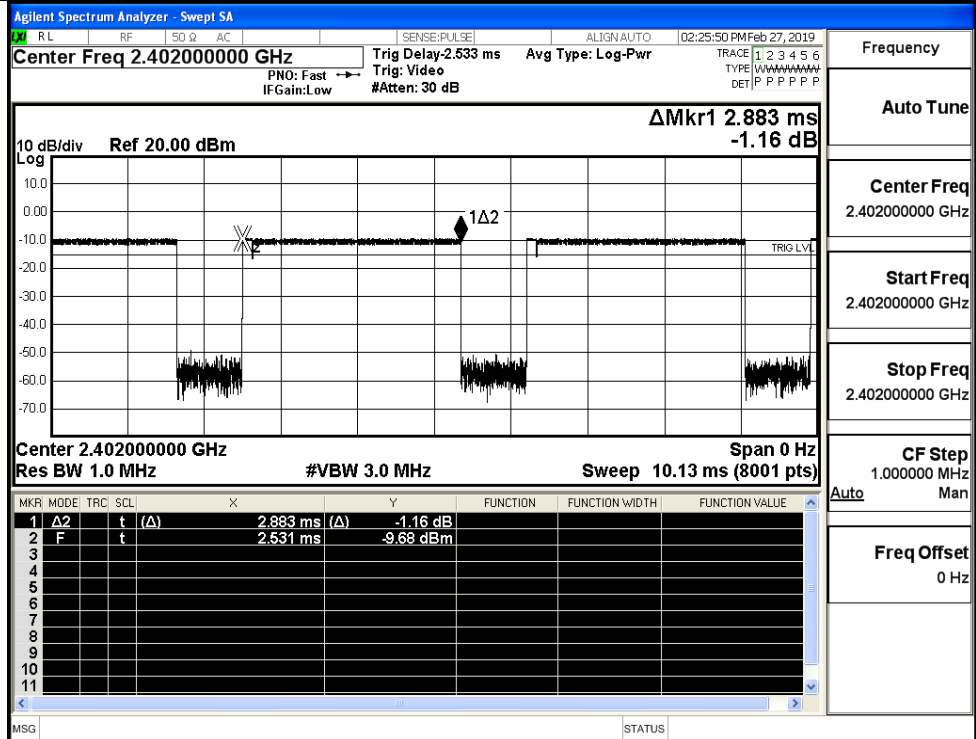
GFSK_DH5/MCH



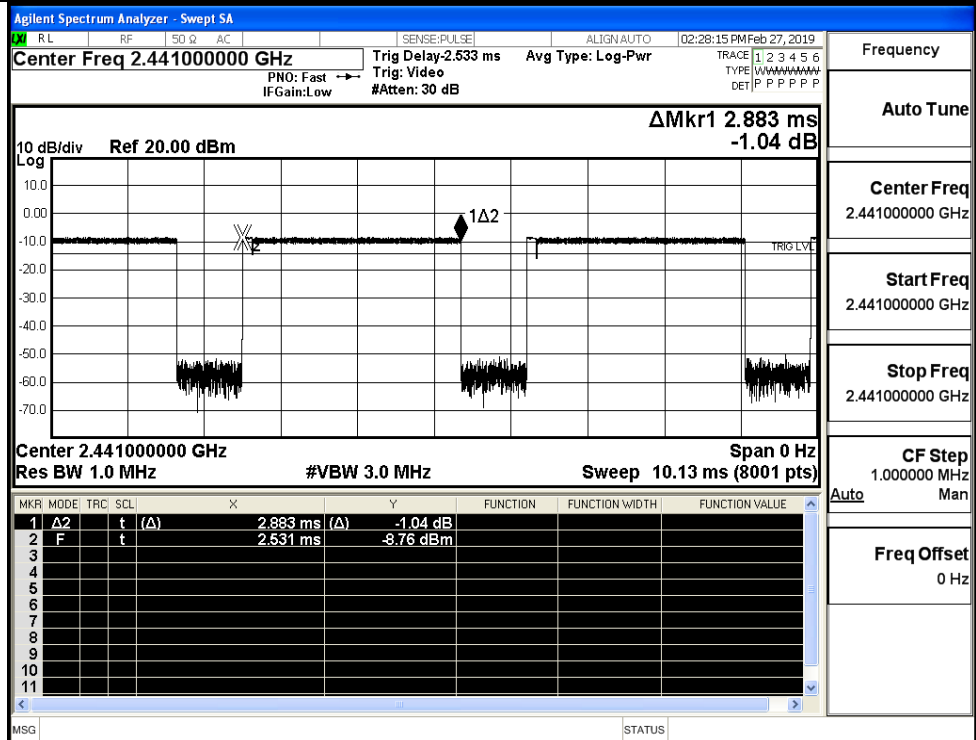
GFSK_DH5/HCH



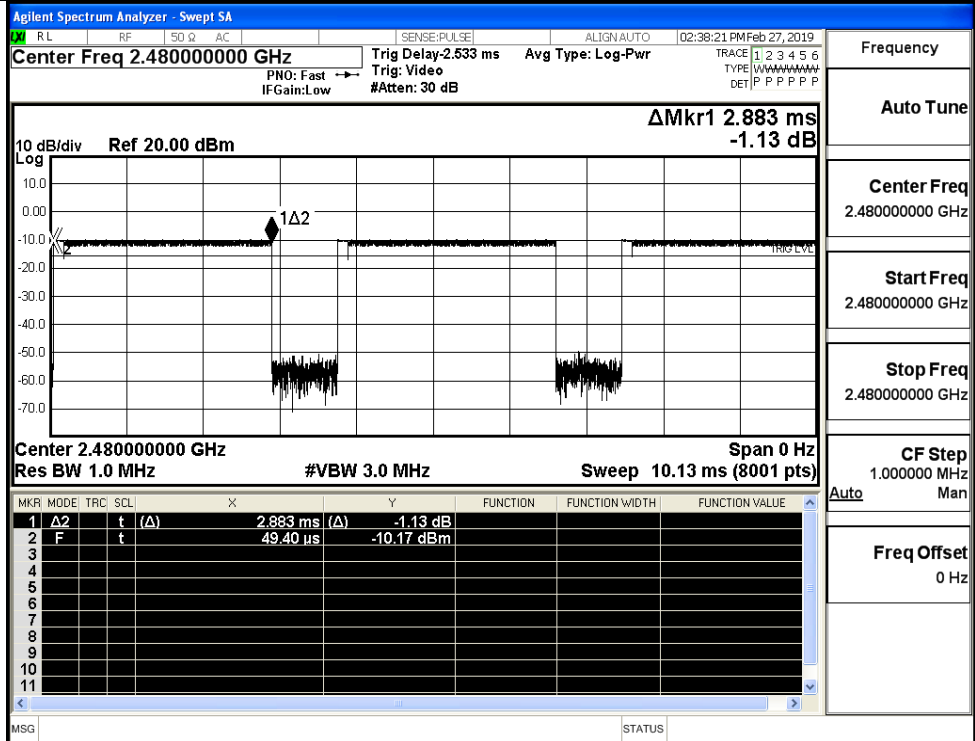
$\pi/4$ DQPSK
_2DH5/LCH



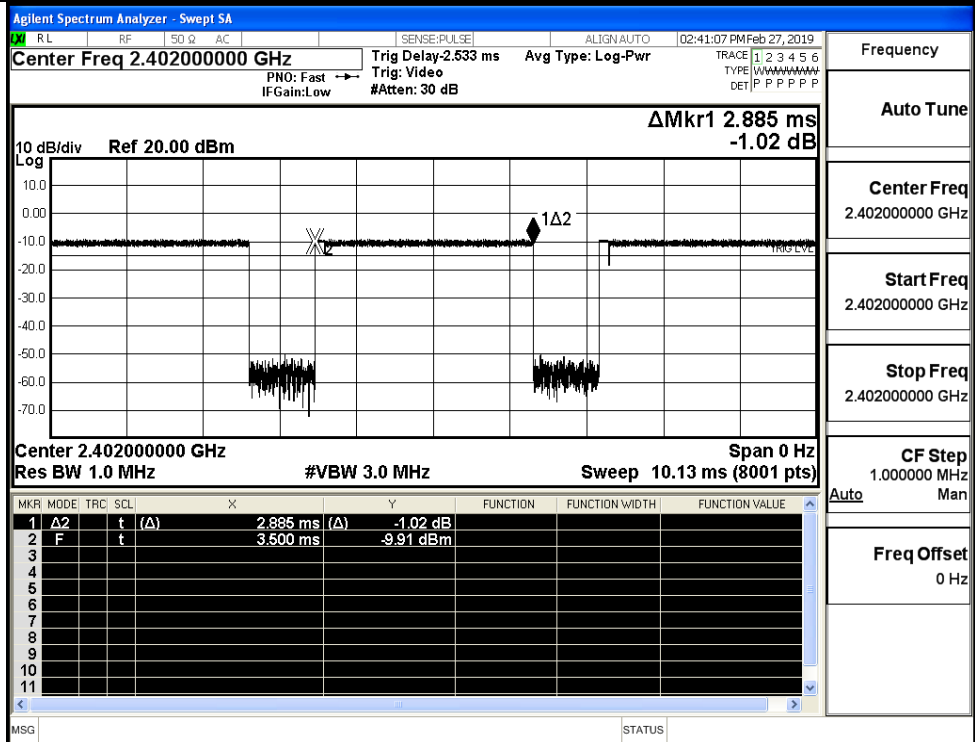
$\pi/4$ DQPSK
_2DH5/MCH



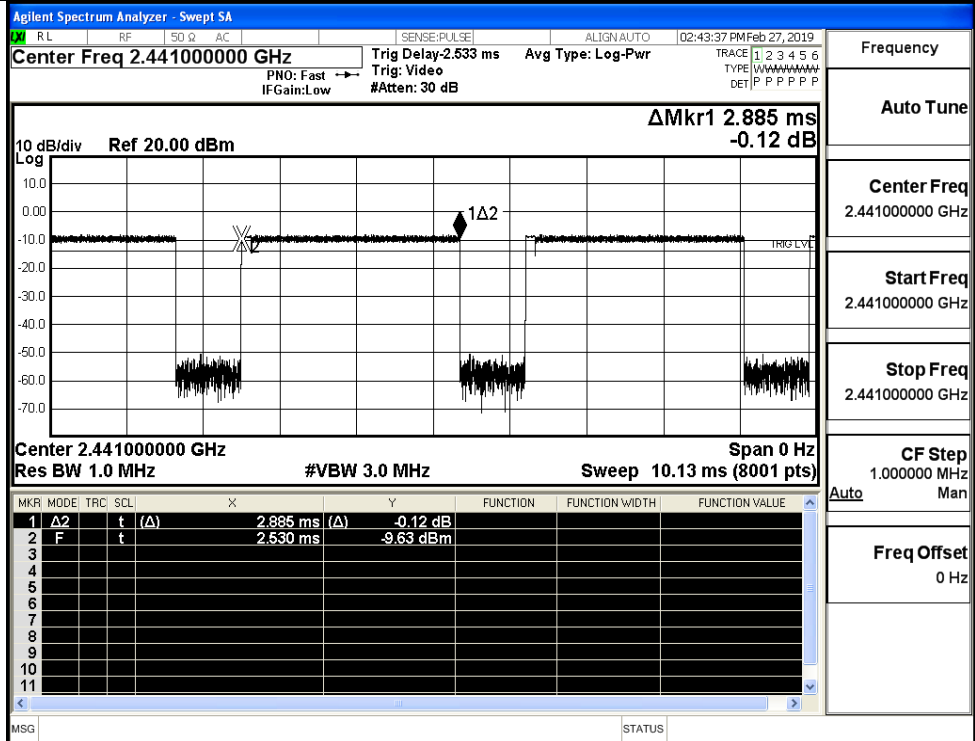
$\pi/4$ DQPSK
_2DH5/HCH



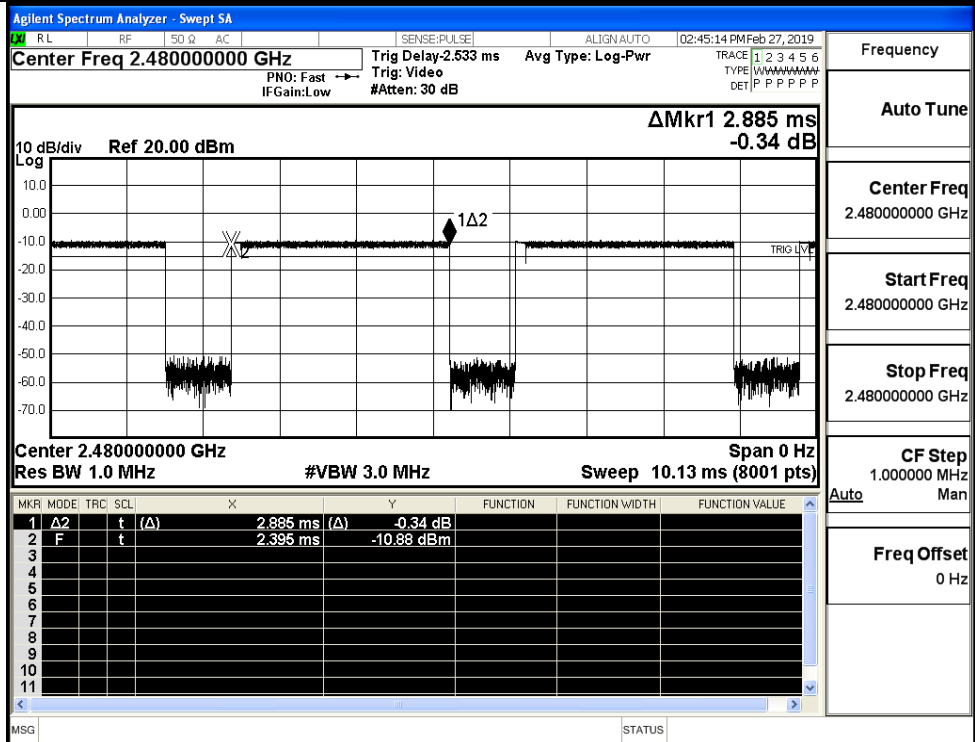
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

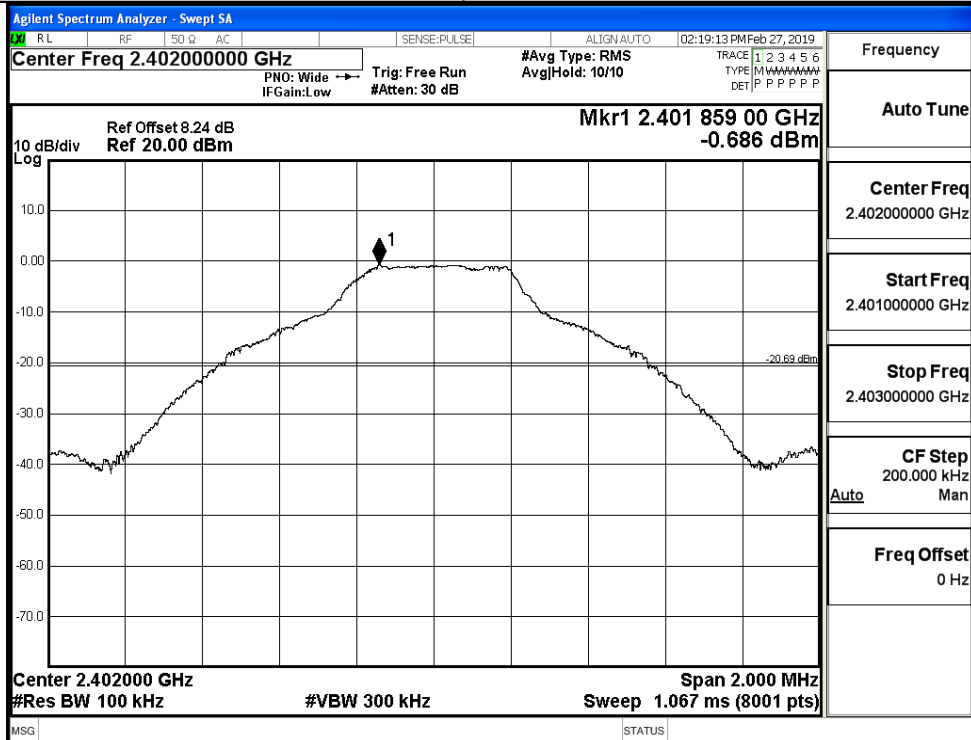


A.6 RF Conducted Spurious Emissions

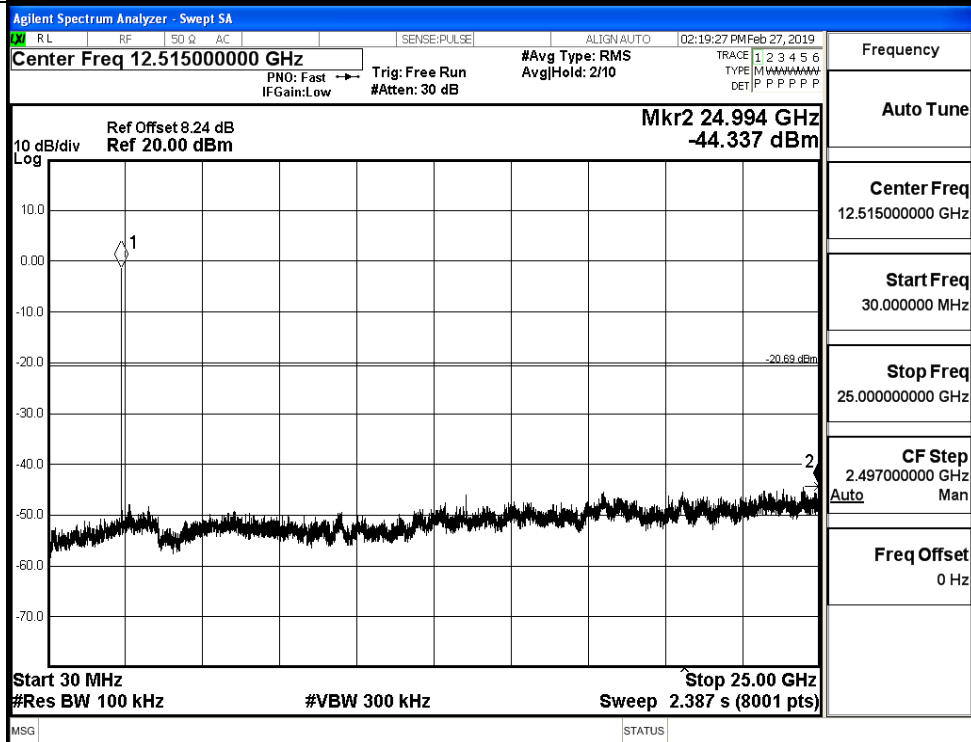
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.686	-44.337	-20.686	PASS
	MCH	0.627	-44.727	-19.373	PASS
	HCH	-0.699	-44.837	-20.699	PASS
$\pi/4$ DQPSK	LCH	-1.432	-44.643	-21.432	PASS
	MCH	-0.546	-44.406	-20.546	PASS
	HCH	-1.826	-44.909	-21.826	PASS
8DPSK	LCH	-1.365	-44.290	-21.365	PASS
	MCH	-0.443	-44.725	-20.443	PASS
	HCH	-2.532	-44.857	-22.532	PASS

GFSK_LCH_Graphs

Pref

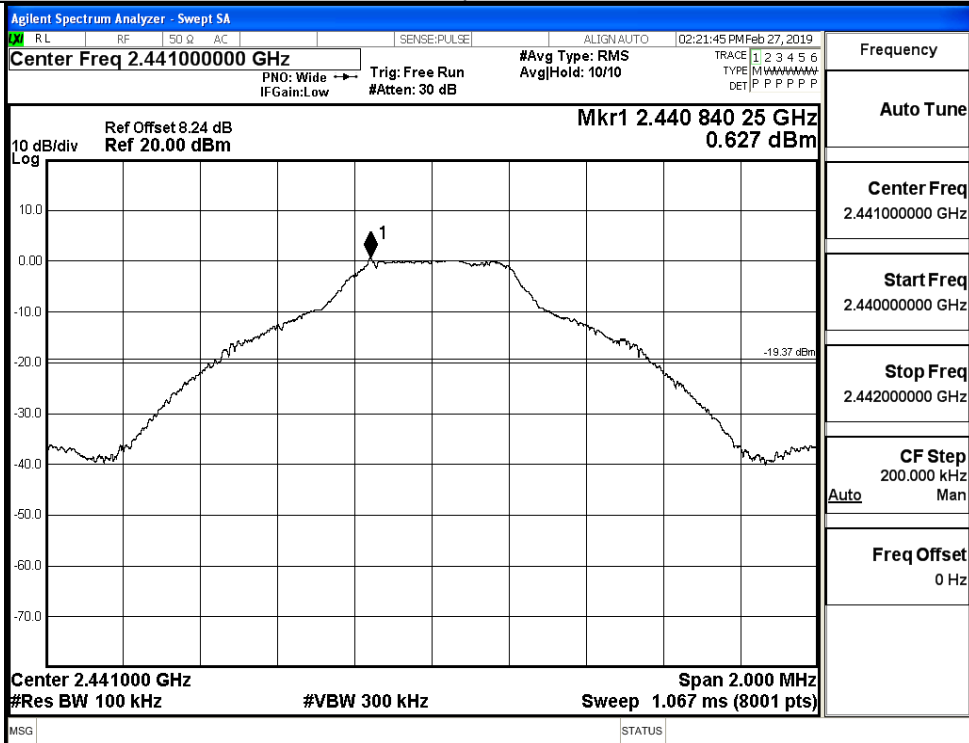


Puw

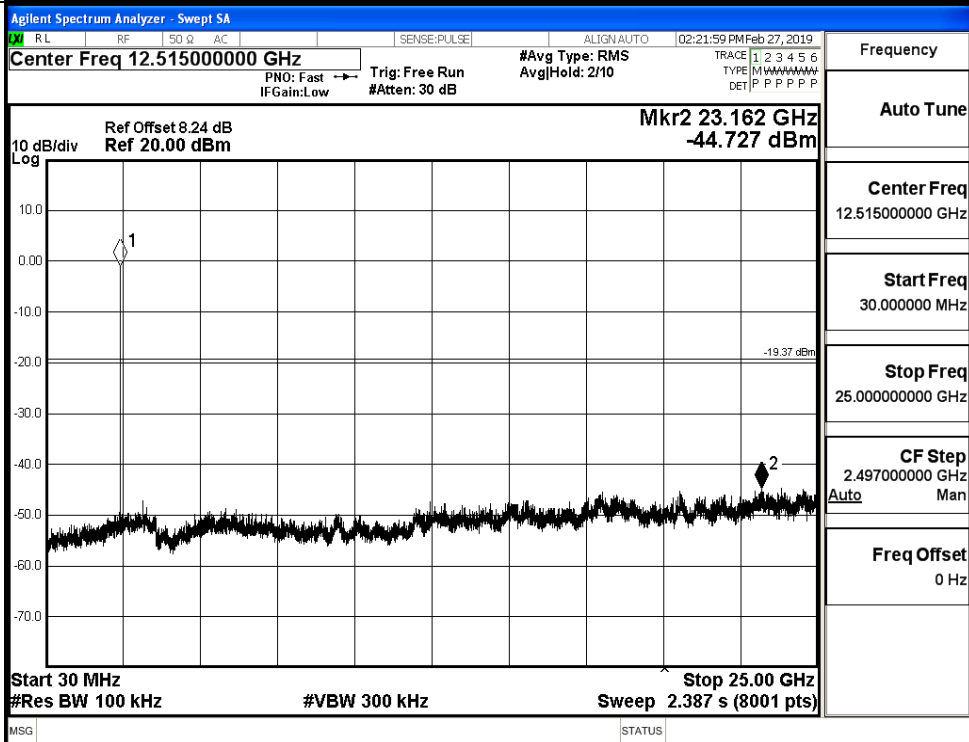


GFSK_MCH_Graphs

Pref

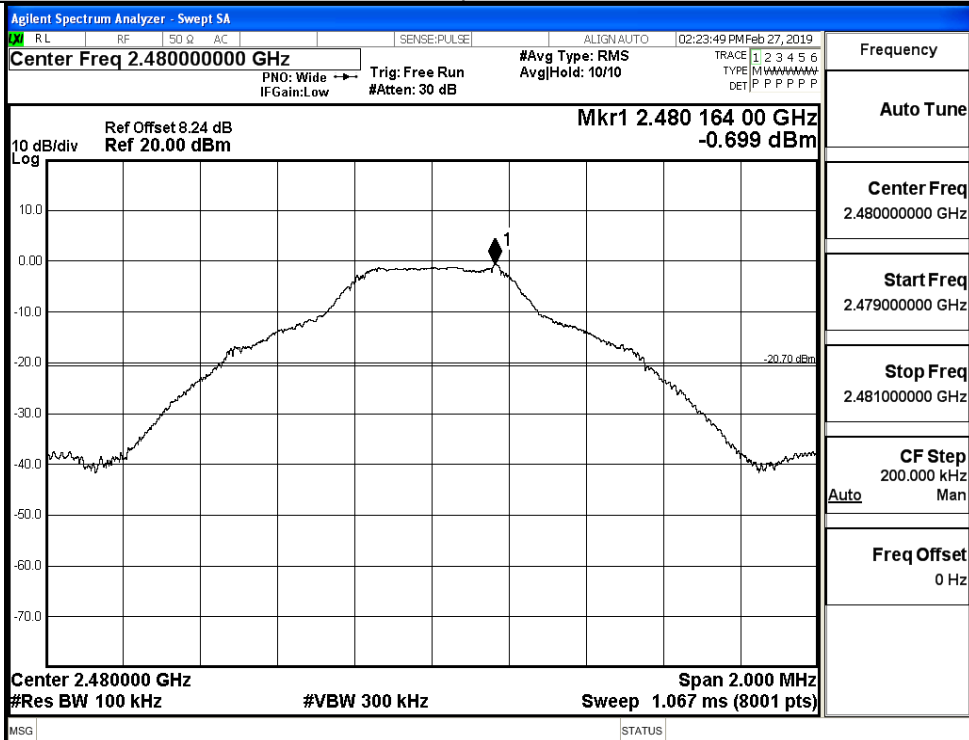


Puw

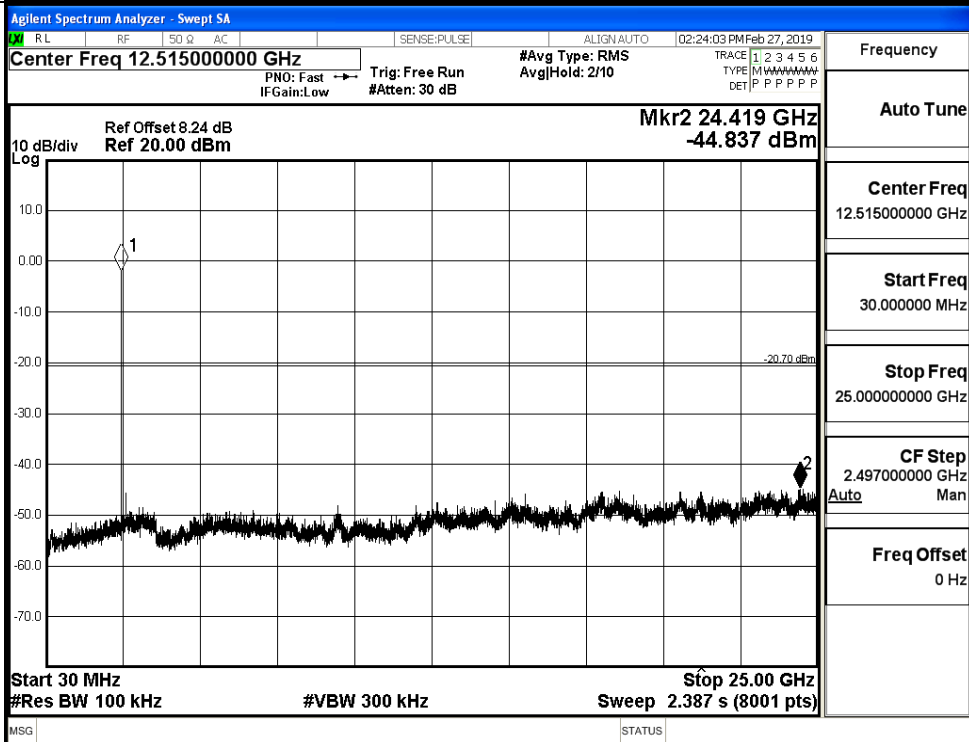


GFSK_HCH_Graphs

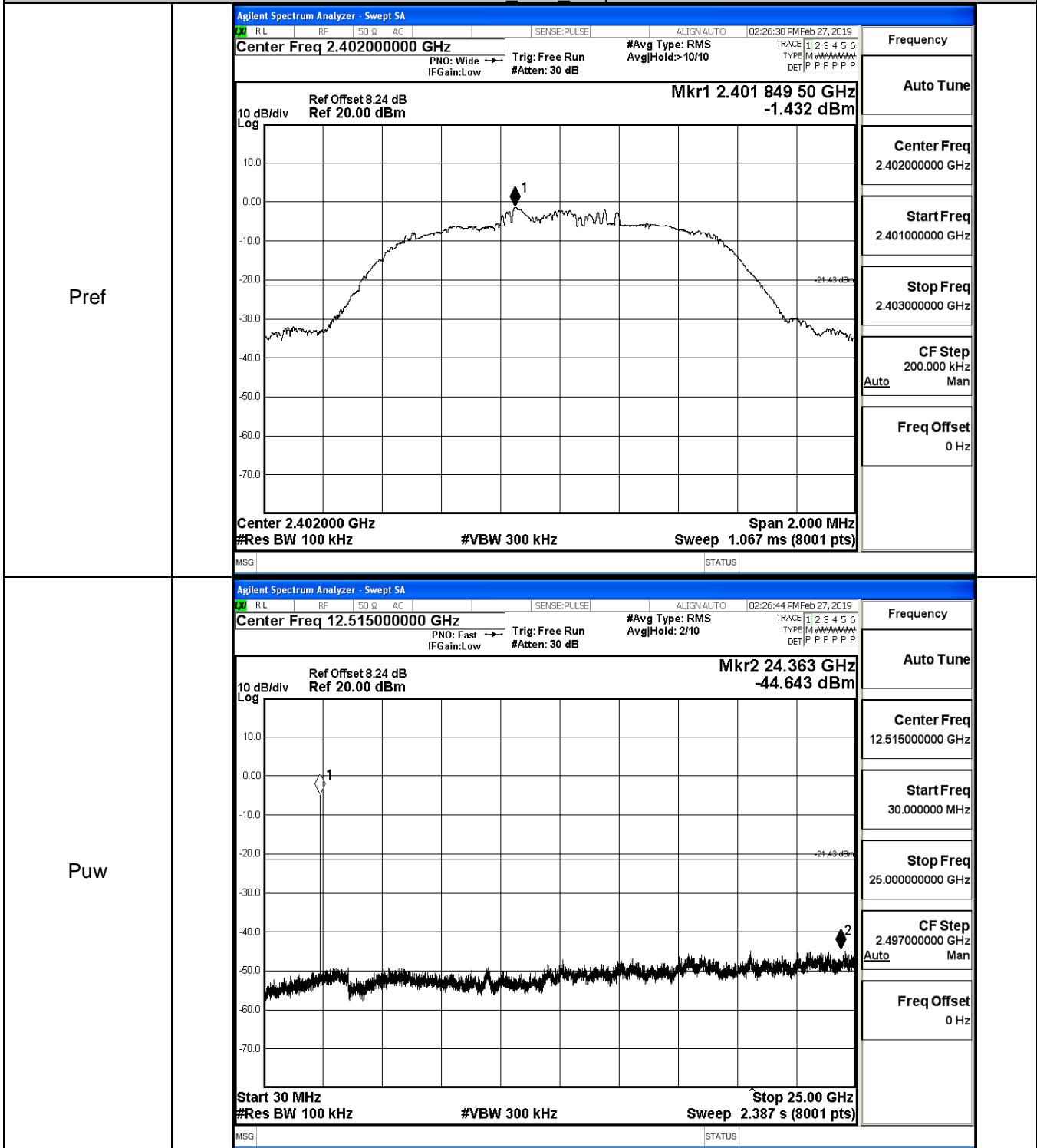
Pref



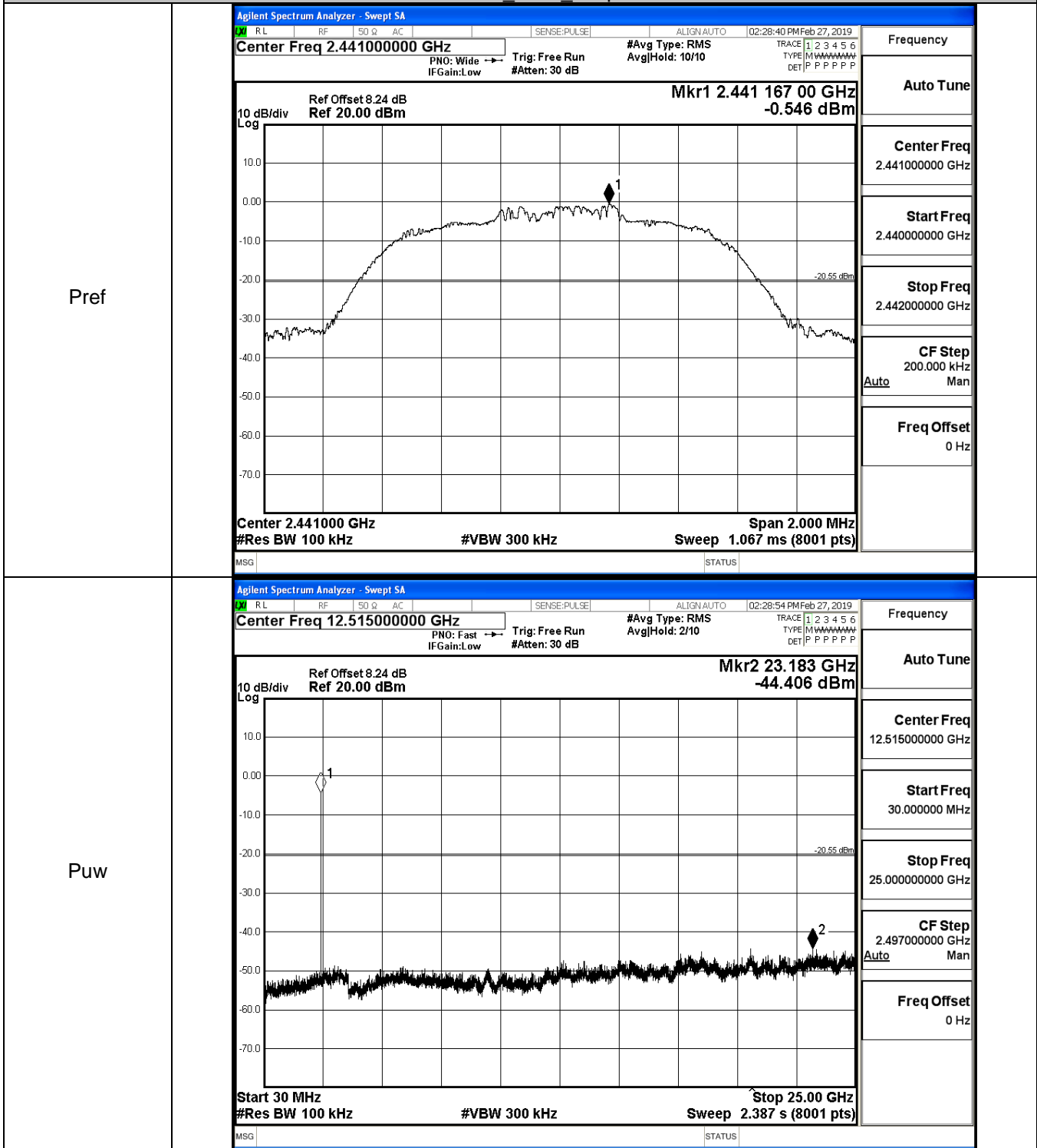
Puw



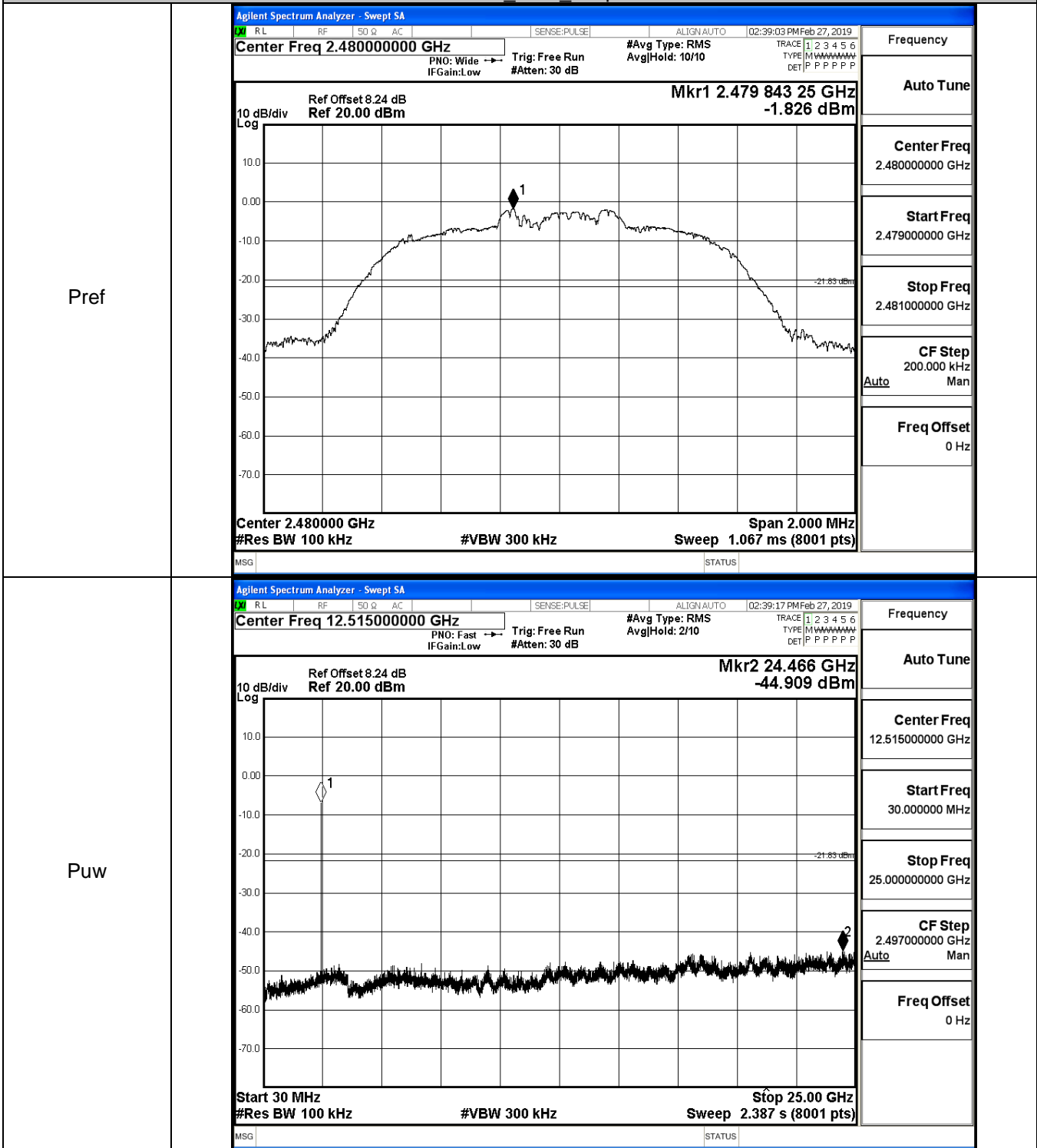
$\pi/4$ DQPSK LCH_Graphs



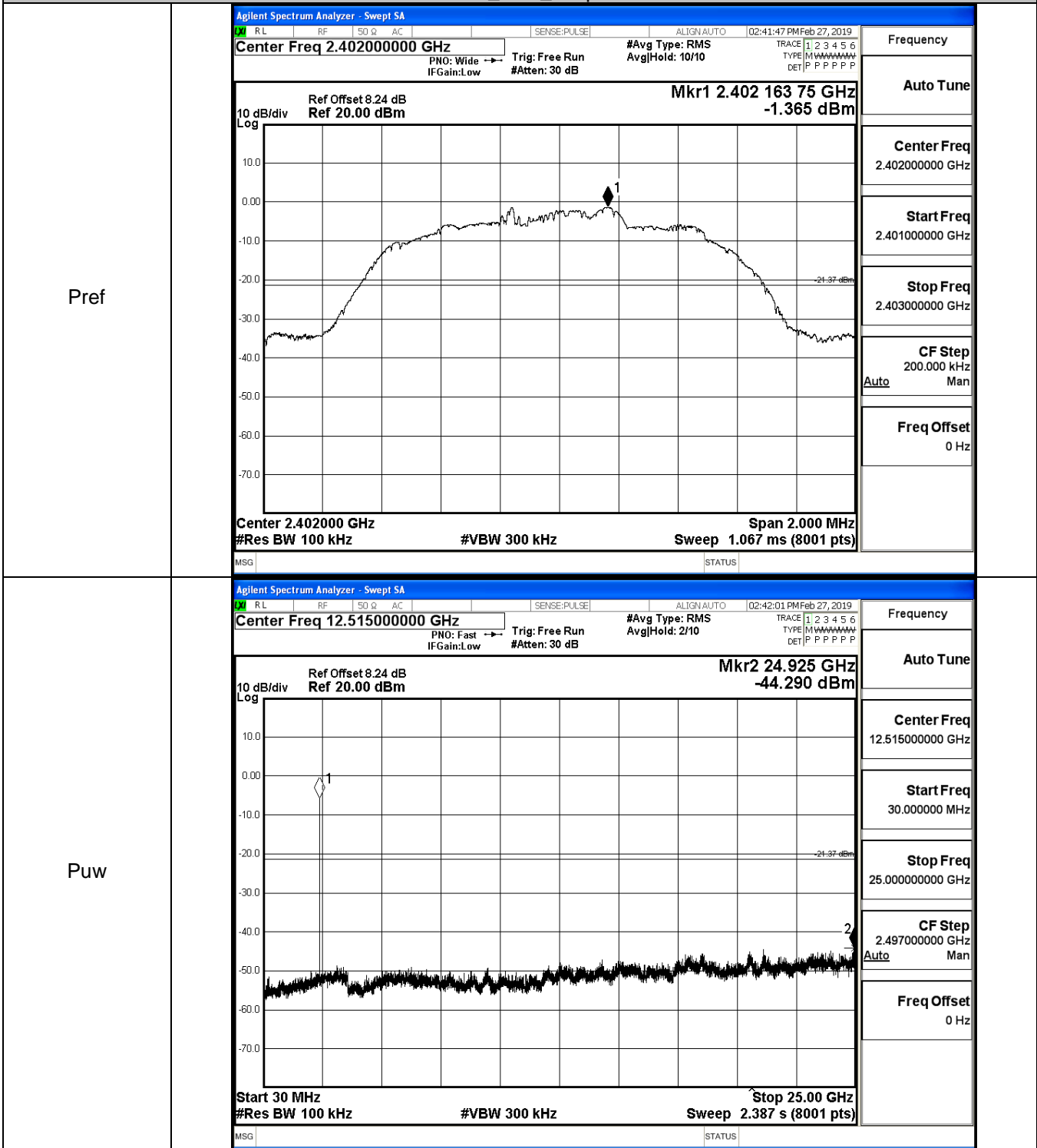
π /4DQPSK_MCH_Graphs



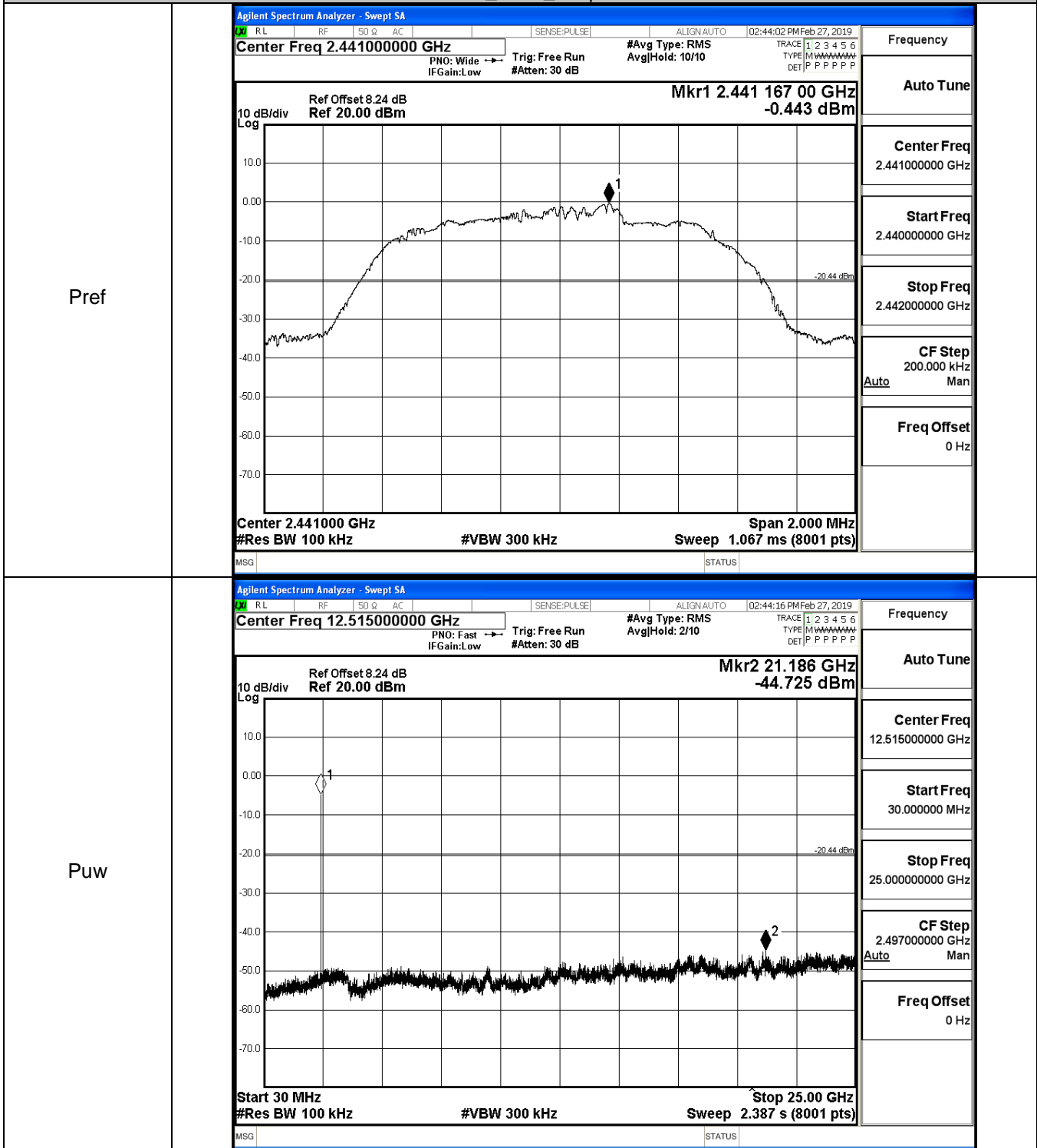
$\pi/4$ DQPSK_HCH_Graphs



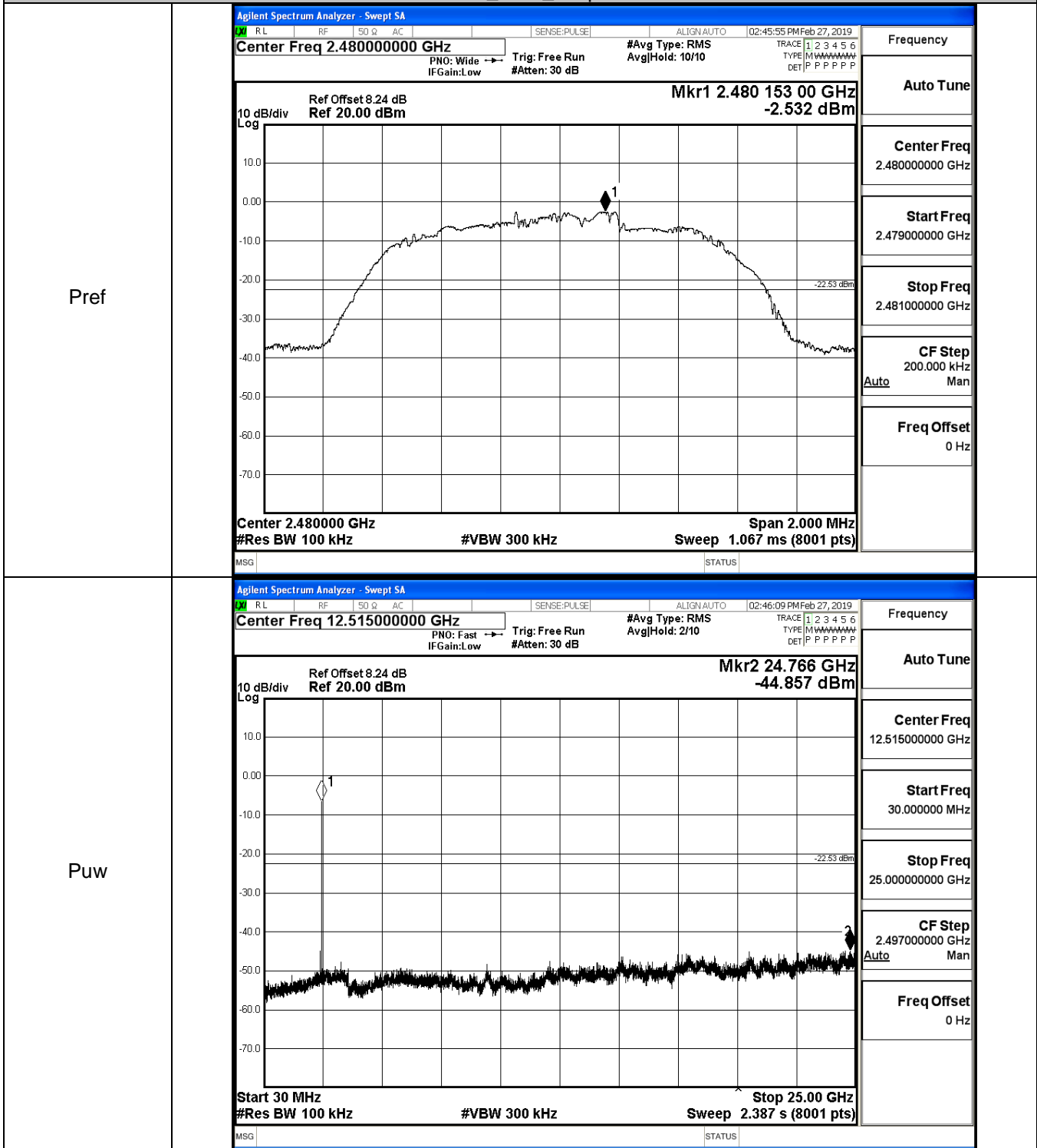
8DPSK_LCH_Graphs



8DPSK_MCH_Graphs



8DPSK_HCH_Graphs

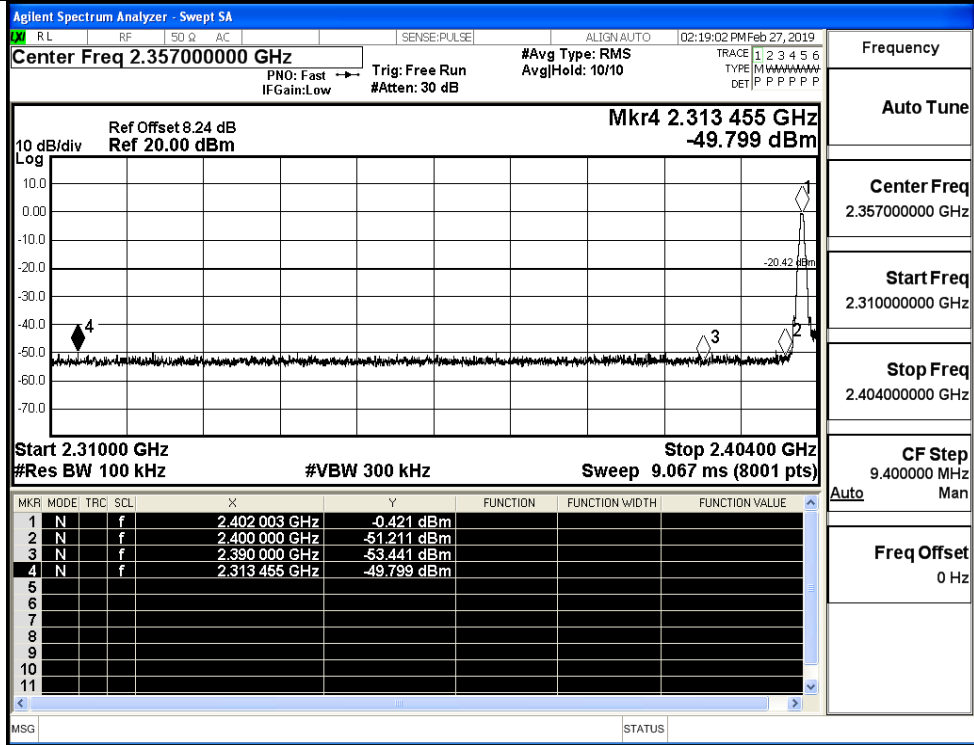


A.7 Band-edge for RF Conducted Emissions

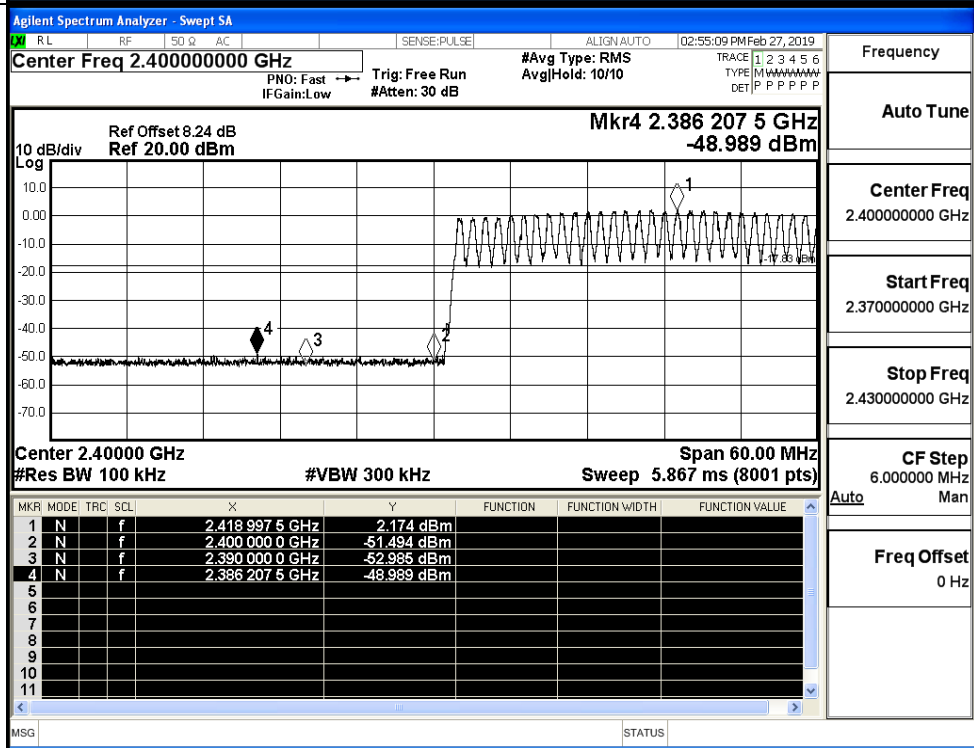
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.421	Off	-49.799	-20.42	PASS
			2.174	On	-48.989	-17.83	PASS
	HCH	2480	-0.550	Off	-49.685	-20.55	PASS
			2.124	On	-49.732	-17.88	PASS
$\pi/4$ DQPSK	LCH	2402	-3.021	Off	-50.227	-23.02	PASS
			1.114	On	-49.451	-18.89	PASS
	HCH	2480	-2.221	Off	-49.477	-22.22	PASS
			0.874	On	-49.094	-19.13	PASS
8DPSK	LCH	2402	-1.440	Off	-50.065	-21.44	PASS
			0.999	On	-48.929	-19.00	PASS
	HCH	2480	-1.736	Off	-49.193	-21.74	PASS
			0.840	On	-48.873	-19.16	PASS

Test Graphs

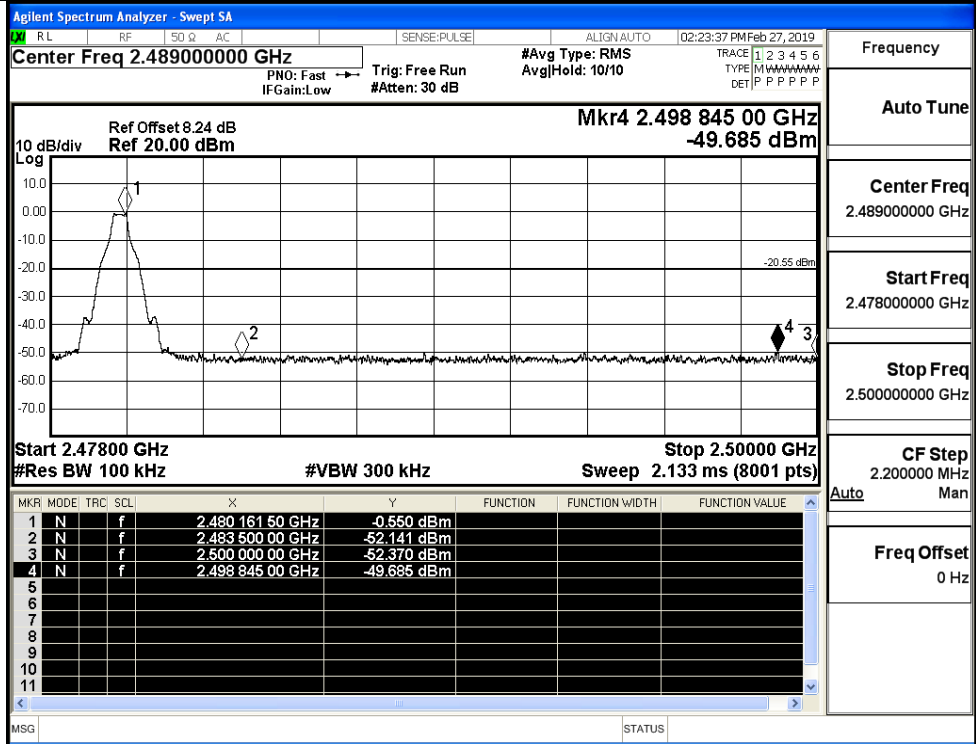
GFSK/LCH/No Hop



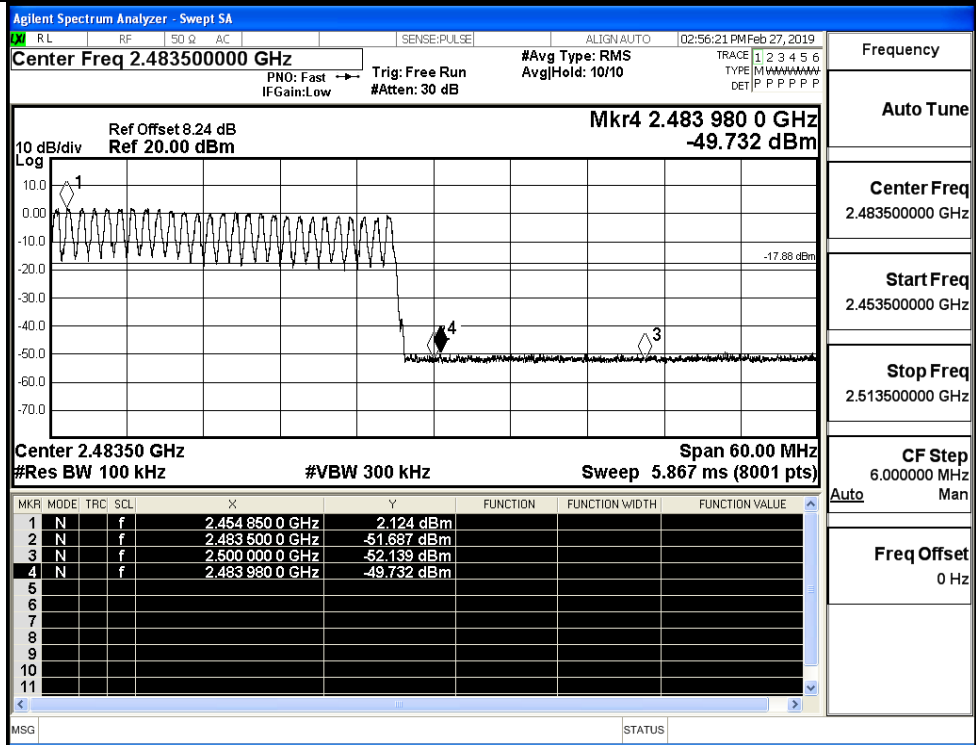
GFSK/LCH/Hop



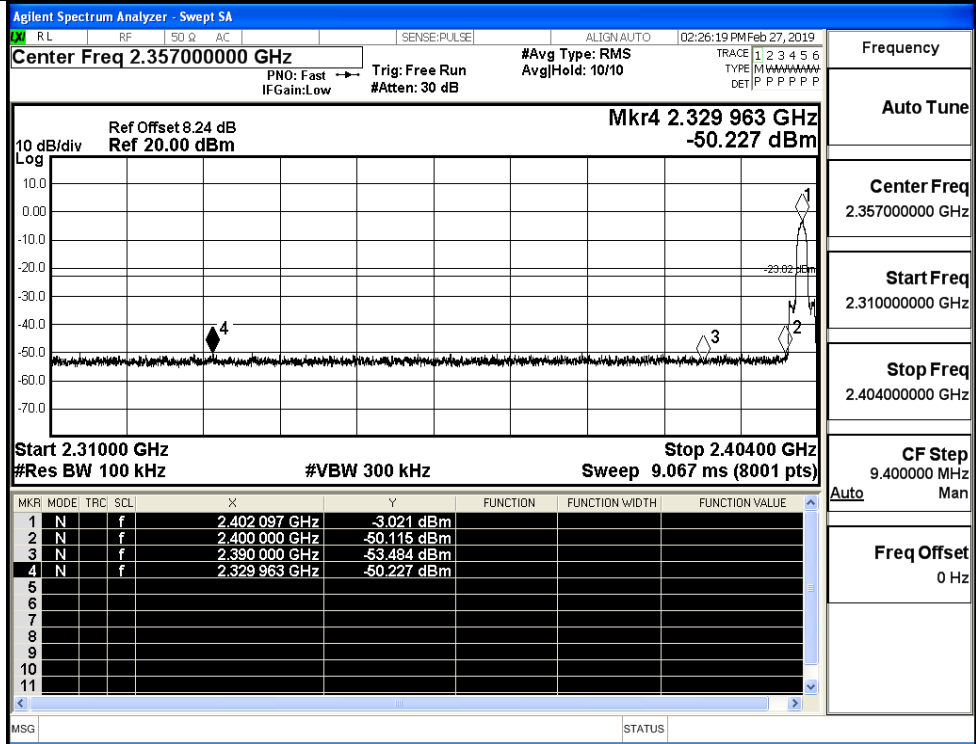
GFSK/HCH/No Hop



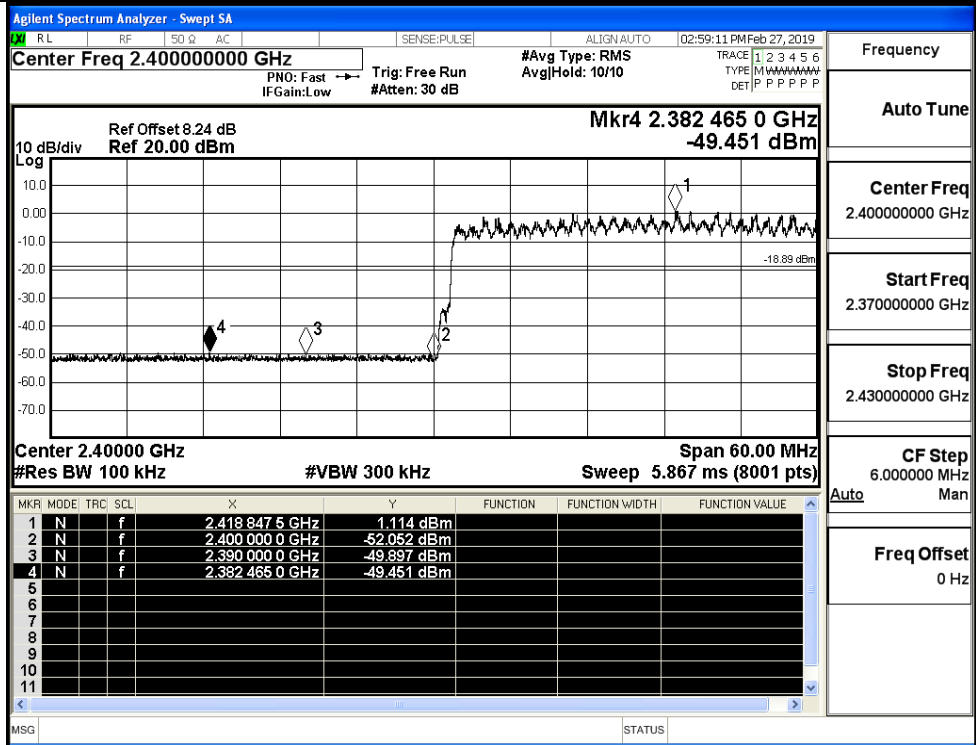
GFSK/HCH/Hop



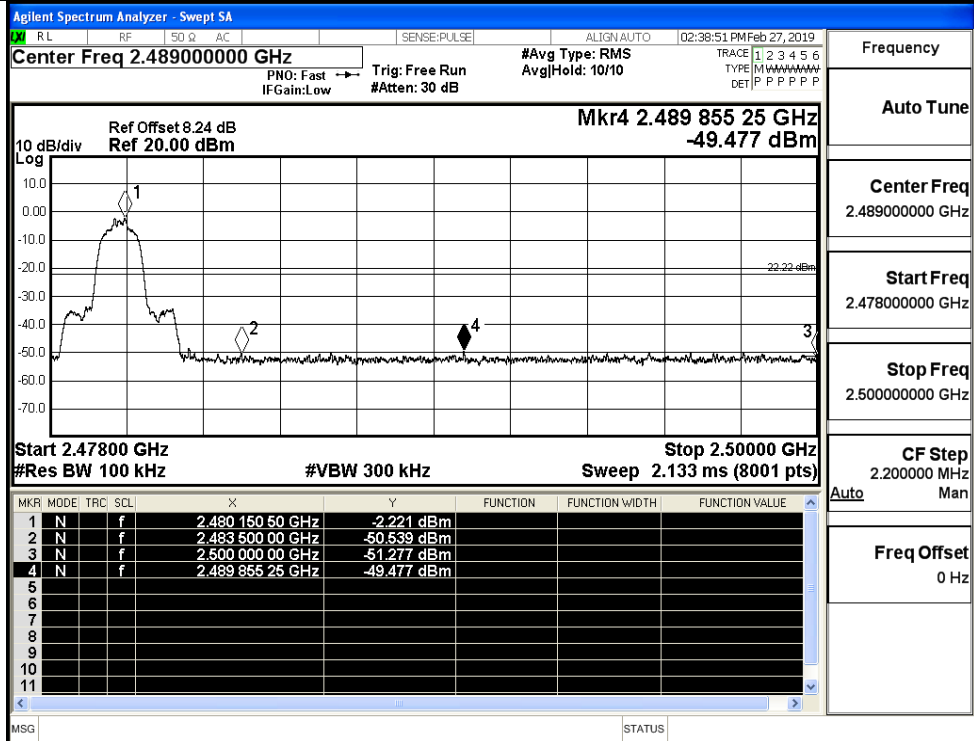
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop

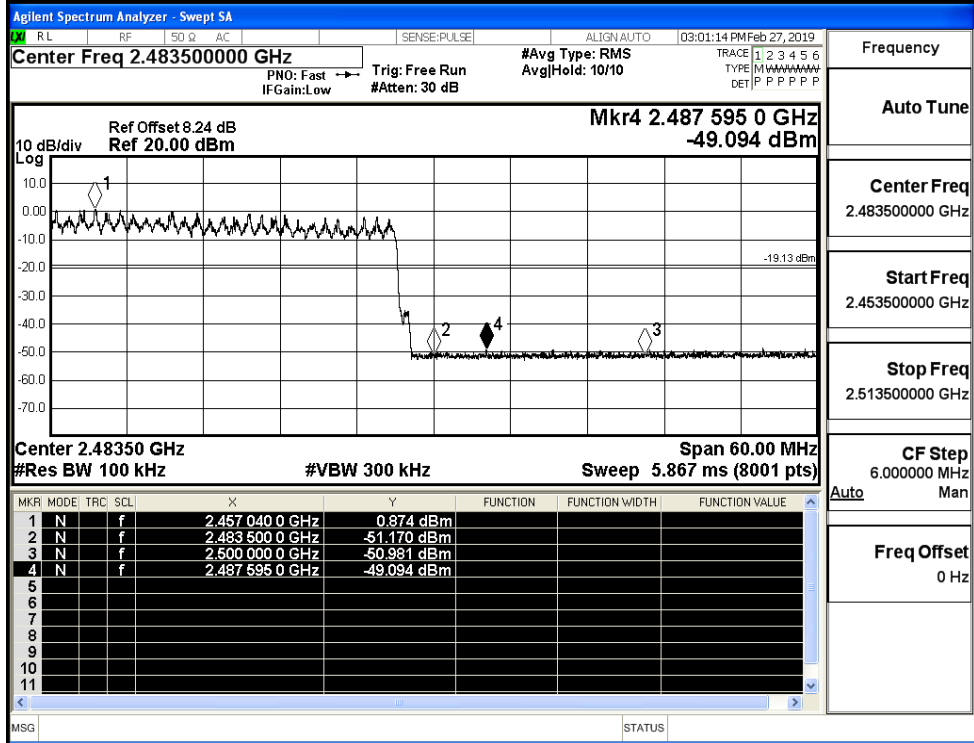


π /4DQPSK/HCH/No
Hop



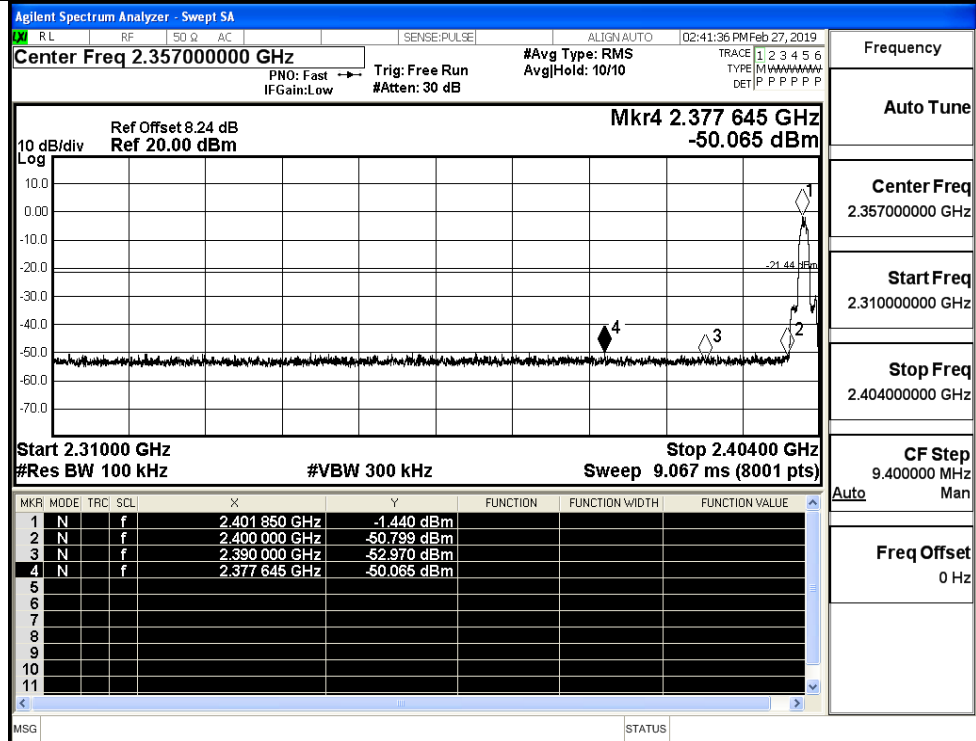
Frequency
Auto Tune
Center Freq 2.489000000 GHz
Start Freq 2.478000000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.200000 MHz
Auto Man
Freq Offset 0 Hz

π /4DQPSK/HCH/Hop



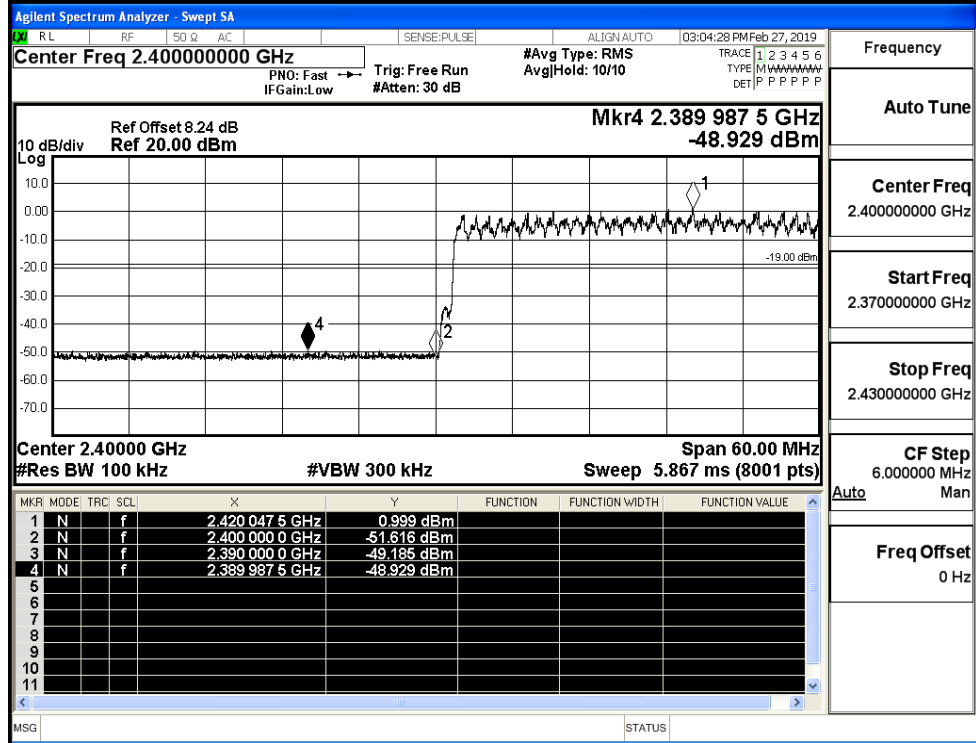
Frequency
Auto Tune
Center Freq 2.483500000 GHz
Start Freq 2.453500000 GHz
Stop Freq 2.513500000 GHz
CF Step 6.000000 MHz
Auto Man
Freq Offset 0 Hz

8DPSK/LCH/No Hop



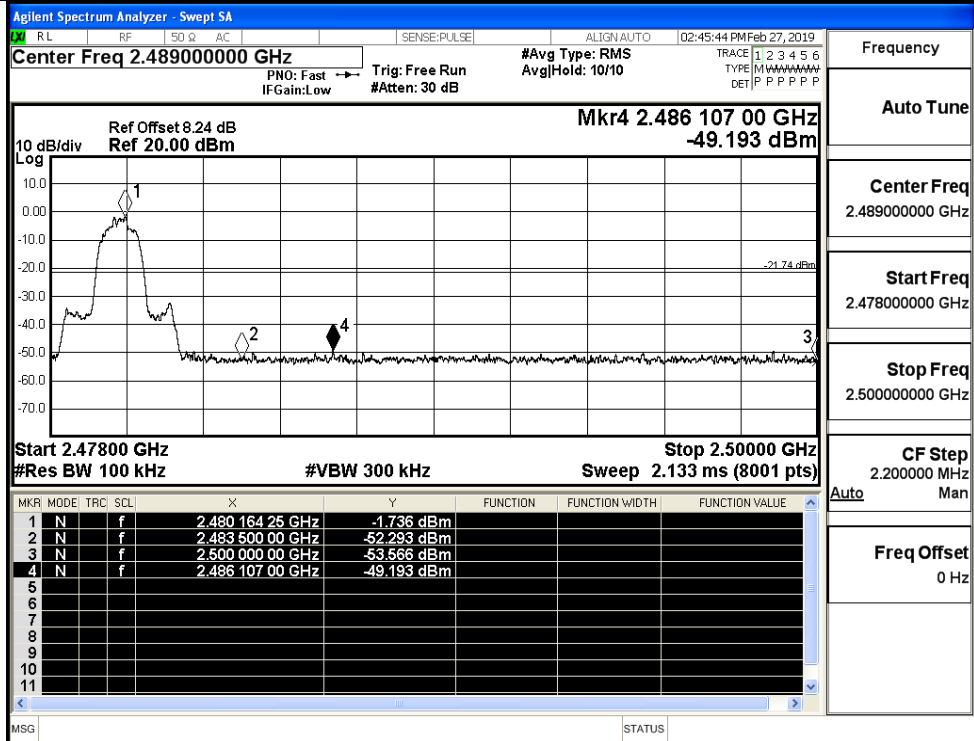
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

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

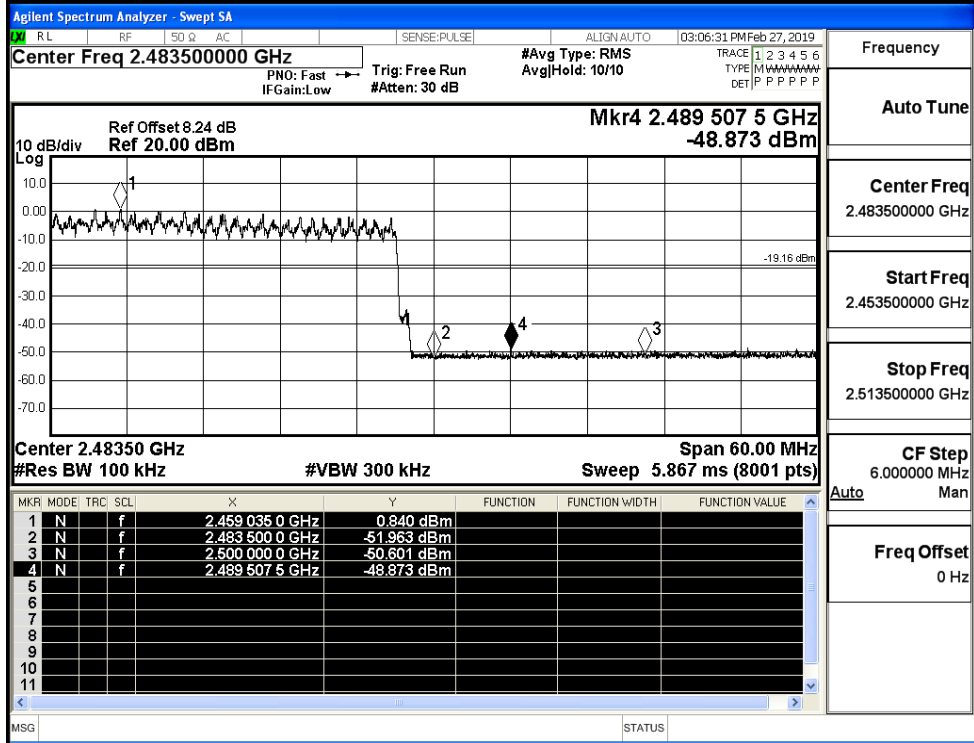
Start Freq
2.478000000 GHz

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

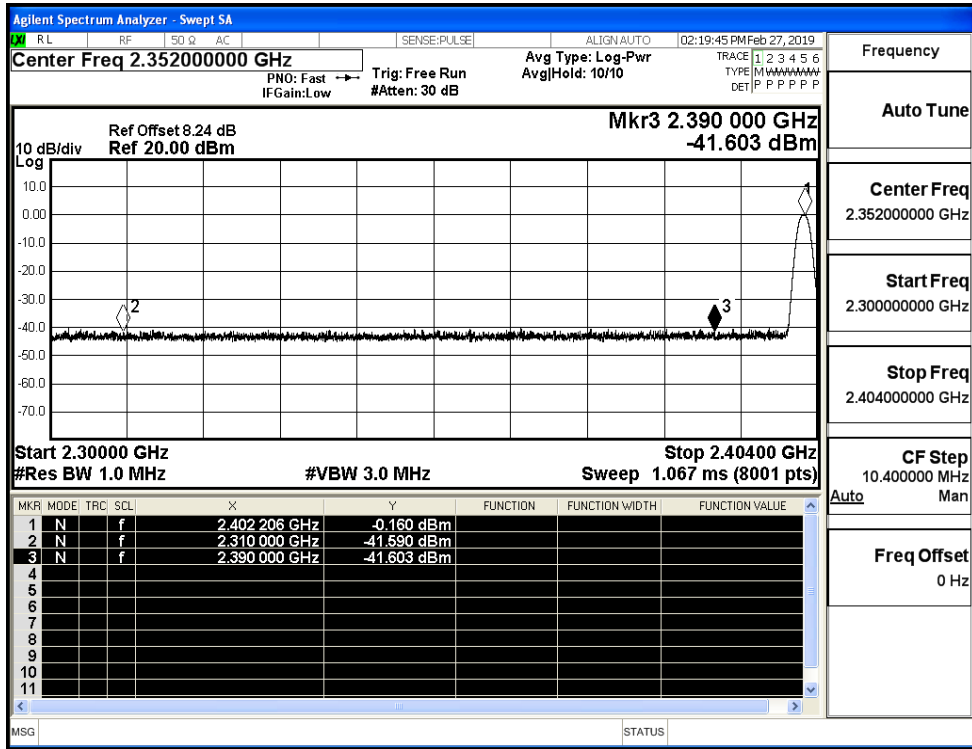
CF Step
6.000000 MHz

Freq Offset
0 Hz

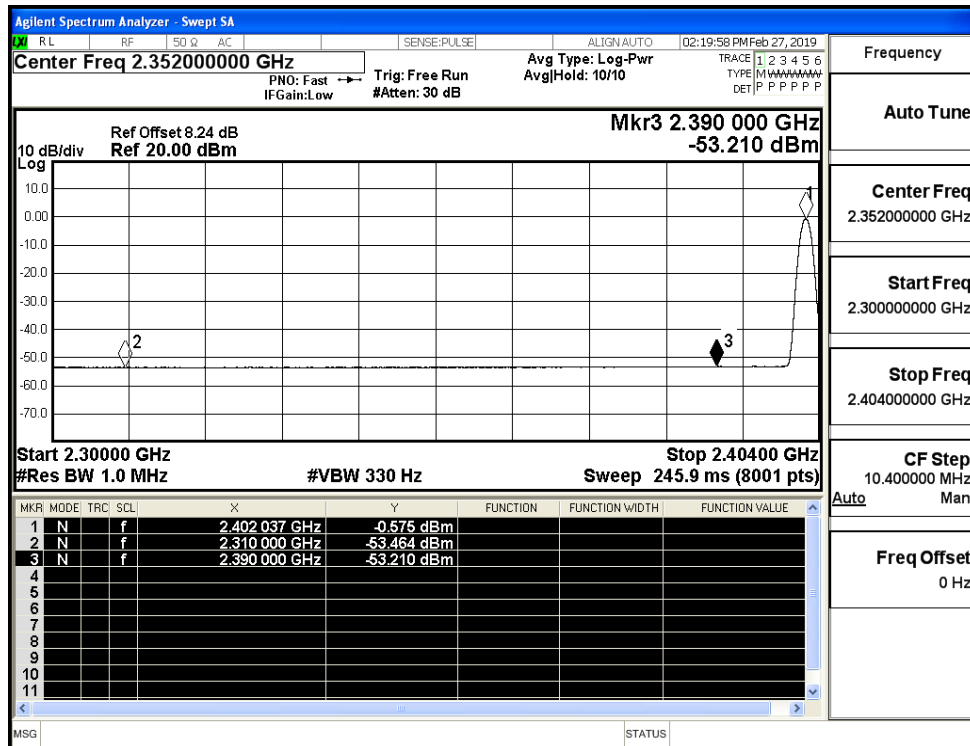
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-41.59	2.0	0	55.67	PEAK	74	PASS
	Off	2310.0	-53.46	2.0	0	43.79	AV	54	PASS
	Off	2390.0	-41.60	2.0	0	55.65	PEAK	74	PASS
	Off	2390.0	-53.21	2.0	0	44.05	AV	54	PASS
	Off	2483.5	-42.86	2.0	0	54.40	PEAK	74	PASS
	Off	2483.5	-53.01	2.0	0	44.25	AV	54	PASS
	Off	2500.0	-42.49	2.0	0	54.77	PEAK	74	PASS
	Off	2500.0	-52.86	2.0	0	44.40	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.79	2.0	0	53.46	PEAK	74	PASS
	Off	2310.0	-53.52	2.0	0	43.74	AV	54	PASS
	Off	2390.0	-42.57	2.0	0	54.69	PEAK	74	PASS
	Off	2390.0	-53.19	2.0	0	44.07	AV	54	PASS
	Off	2483.5	-43.07	2.0	0	54.19	PEAK	74	PASS
	Off	2483.5	-52.98	2.0	0	44.28	AV	54	PASS
	Off	2500.0	-42.65	2.0	0	54.61	PEAK	74	PASS
	Off	2500.0	-52.95	2.0	0	44.30	AV	54	PASS
8DPSK	Off	2310.0	-43.74	2.0	0	53.52	PEAK	74	PASS
	Off	2310.0	-53.45	2.0	0	43.81	AV	54	PASS
	Off	2390.0	-43.71	2.0	0	53.55	PEAK	74	PASS
	Off	2390.0	-53.36	2.0	0	43.90	AV	54	PASS
	Off	2483.5	-43.12	2.0	0	54.14	PEAK	74	PASS
	Off	2483.5	-52.96	2.0	0	44.30	AV	54	PASS
	Off	2500.0	-43.33	2.0	0	53.93	PEAK	74	PASS
	Off	2500.0	-52.95	2.0	0	44.30	AV	54	PASS

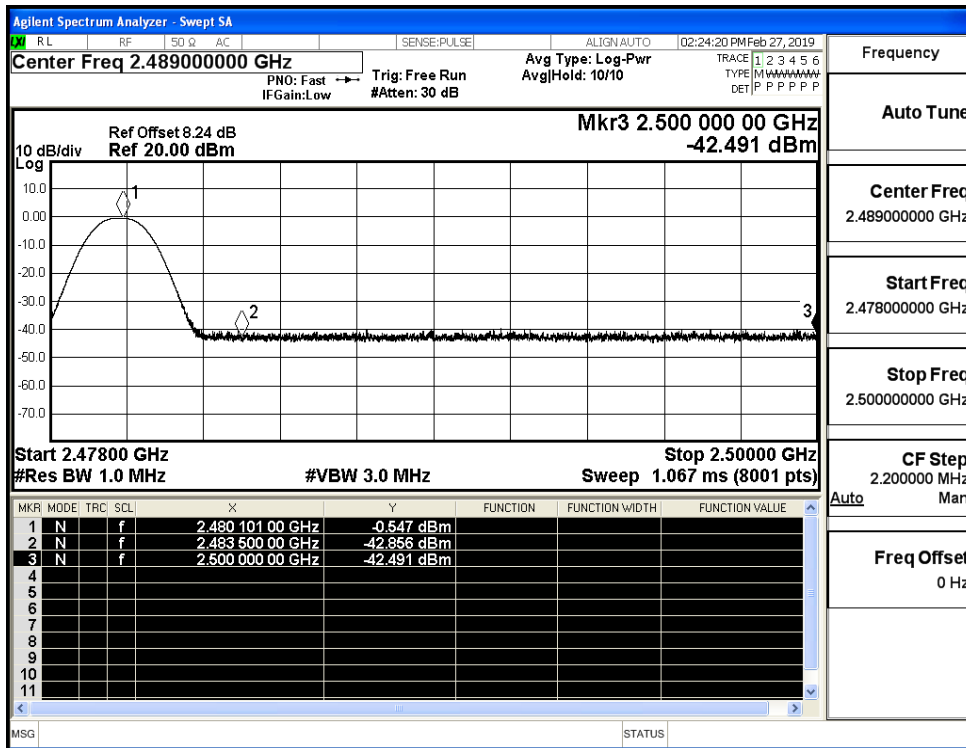
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



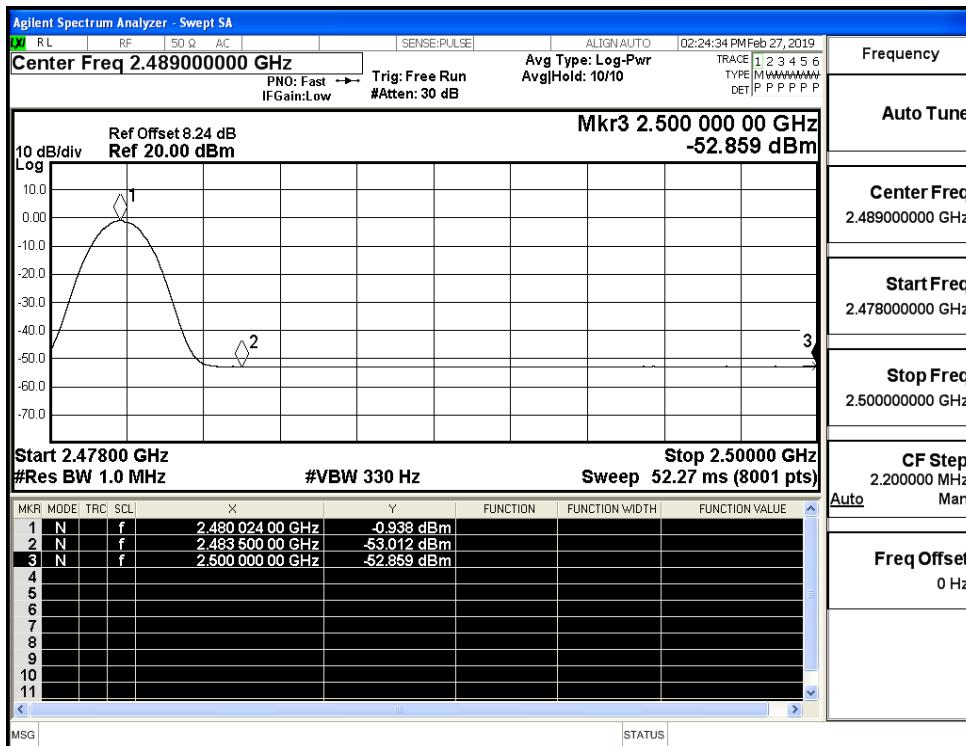
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



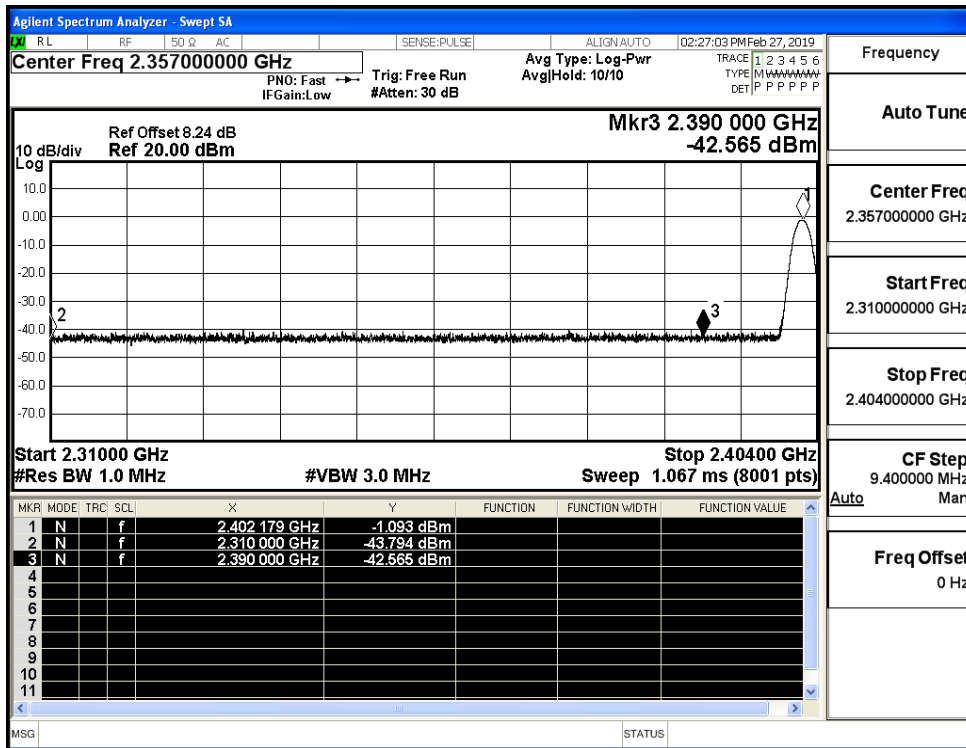
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



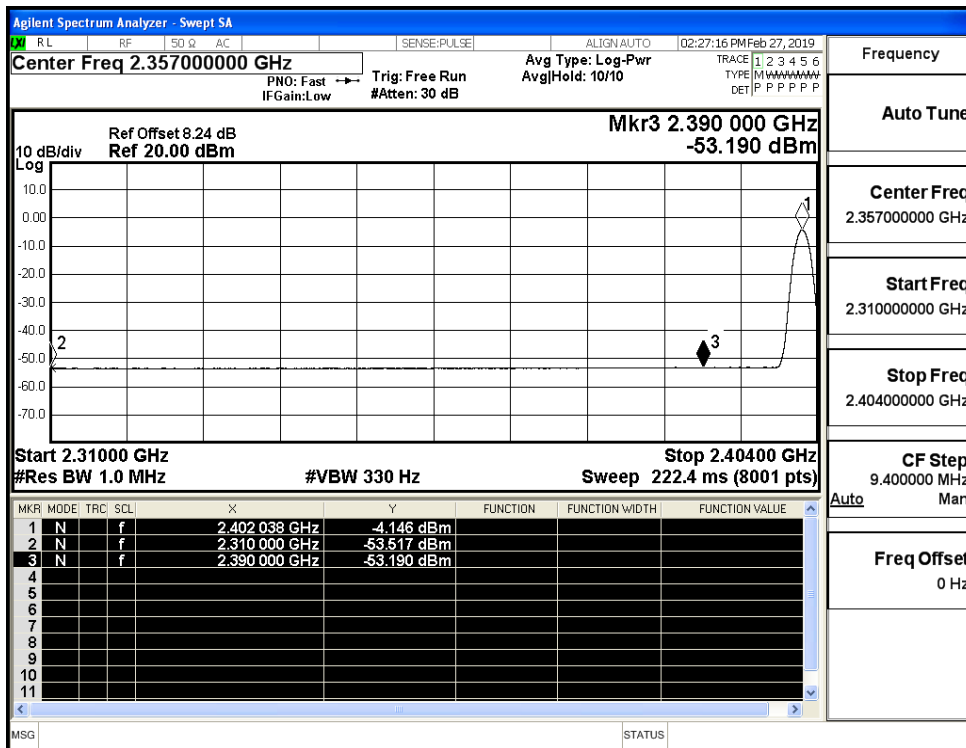
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



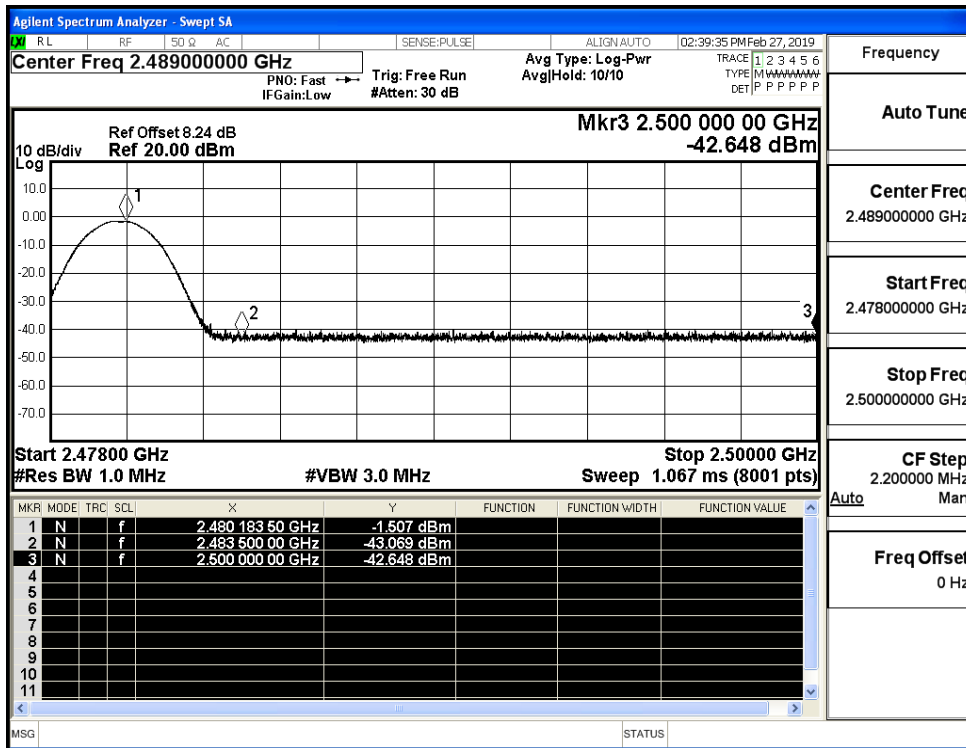
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



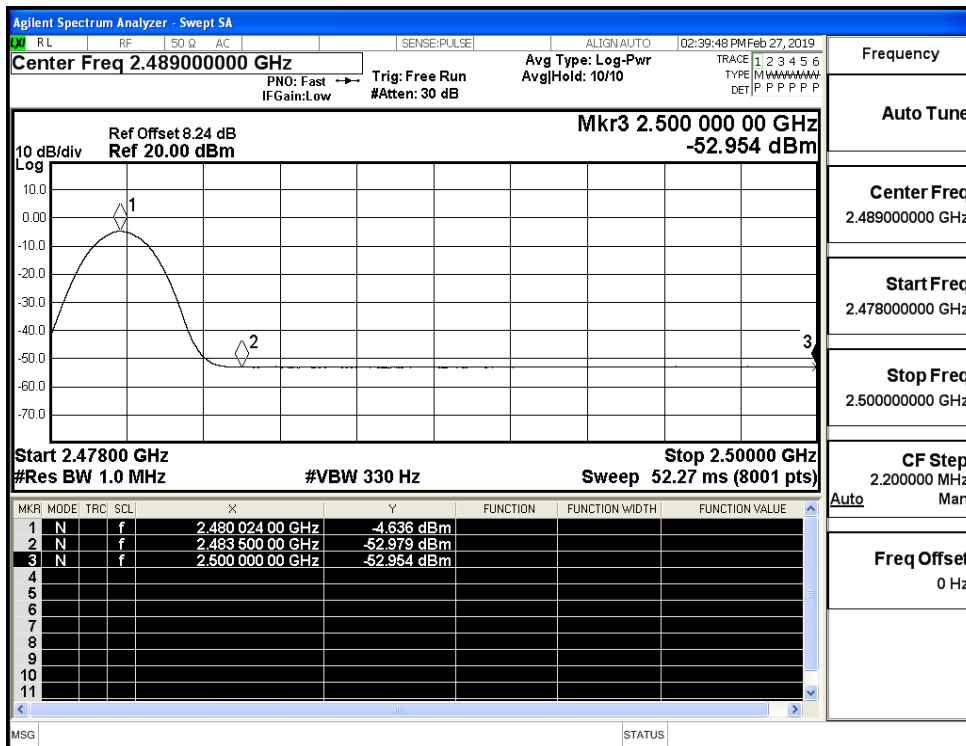
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



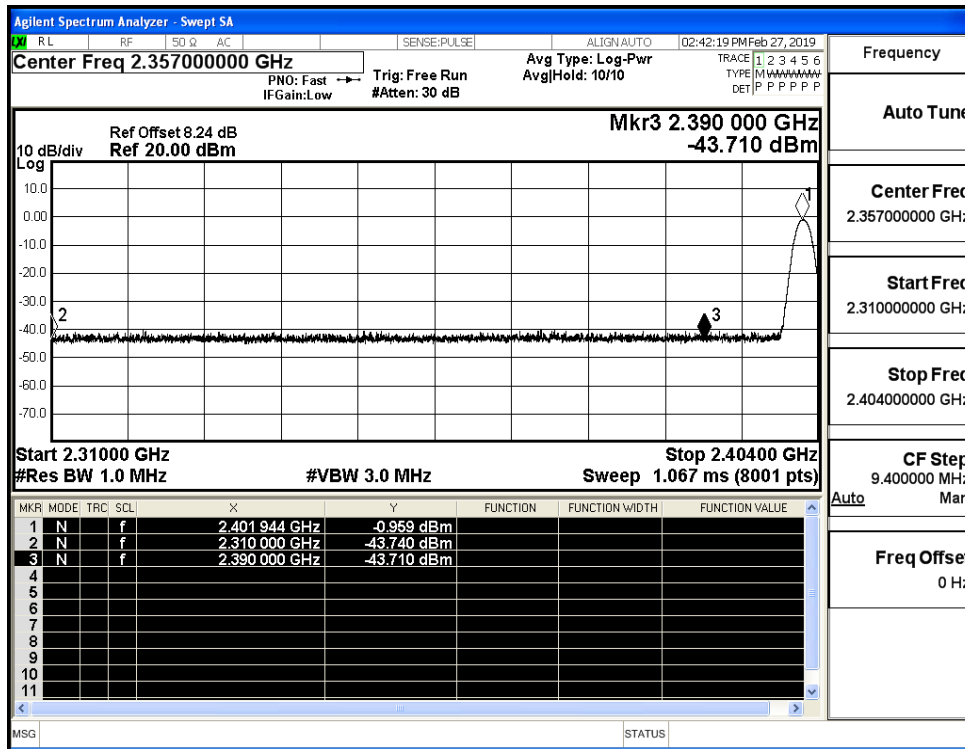
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



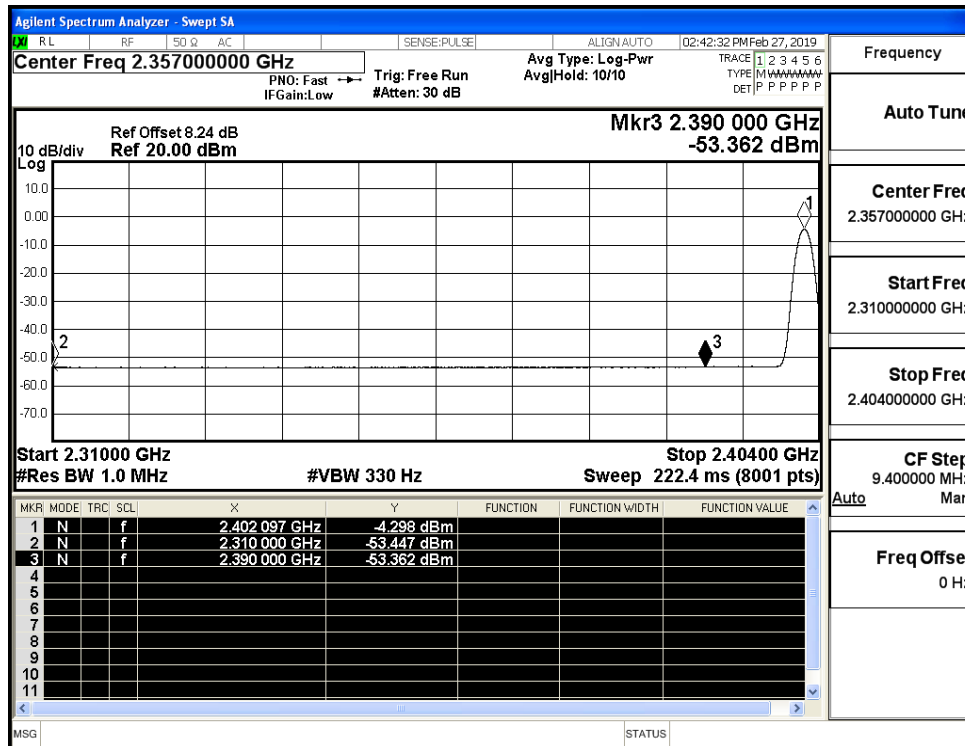
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



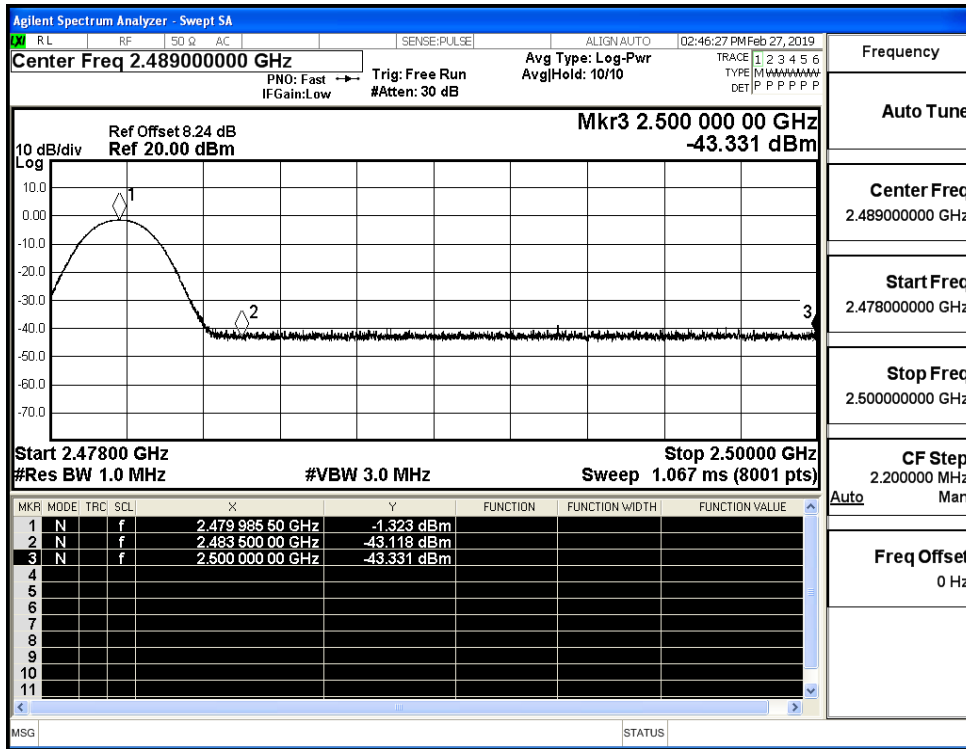
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

