

Appendix A

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

Product Name: Wireless earbuds

Trade Mark: PrimeAudio

Test Model: PAEB1004-ASST

Environmental Conditions

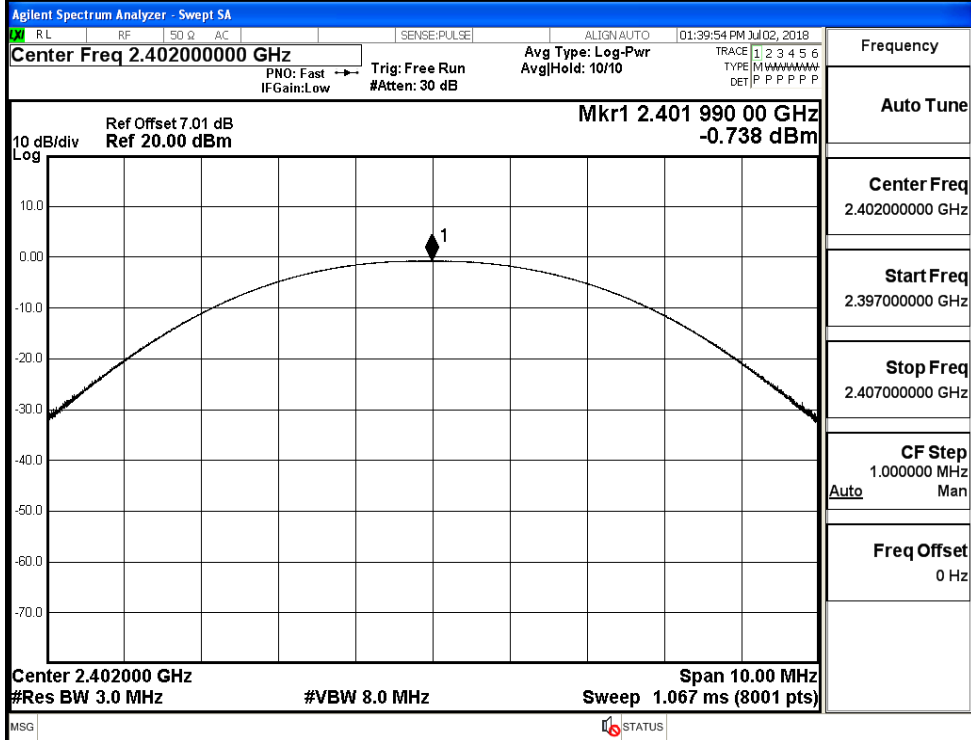
Temperature:	23.2 °C
Relative Humidity:	53.5%
ATM Pressure:	100.0 kPa
Test Engineer:	Ryan.Hu
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

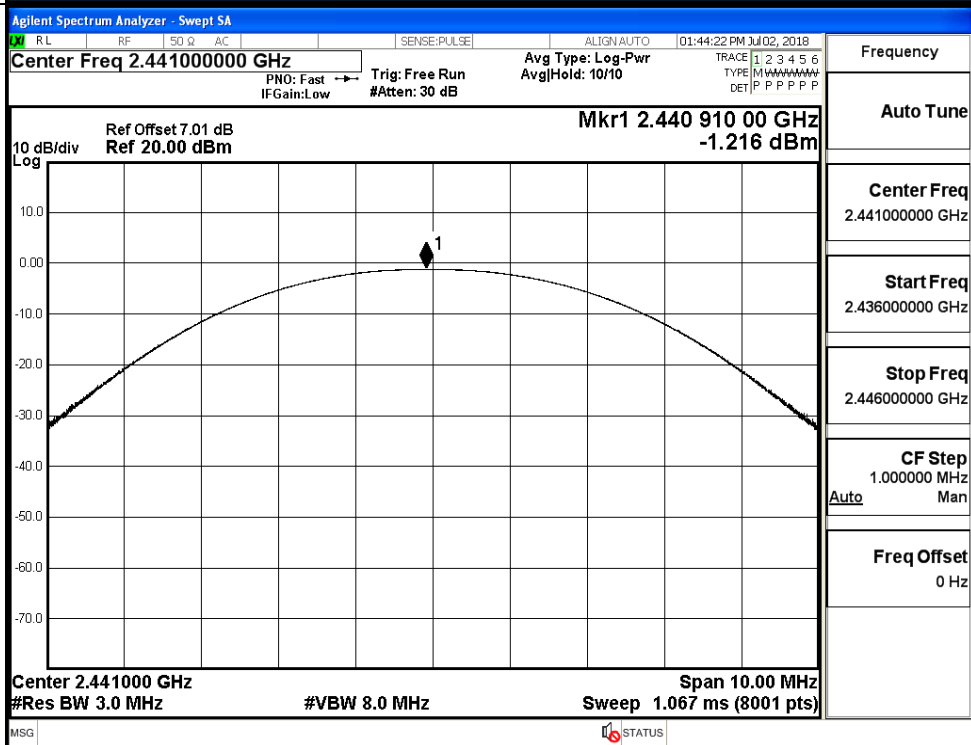
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.738	30	PASS
	MCH	-1.216	30	PASS
	HCH	-1.105	30	PASS
$\pi/4$ DQPSK	LCH	-1.458	21	PASS
	MCH	-1.648	21	PASS
	HCH	-1.332	21	PASS
8DPSK	LCH	-1.004	21	PASS
	MCH	-1.142	21	PASS
	HCH	-0.755	21	PASS

Test Graphs

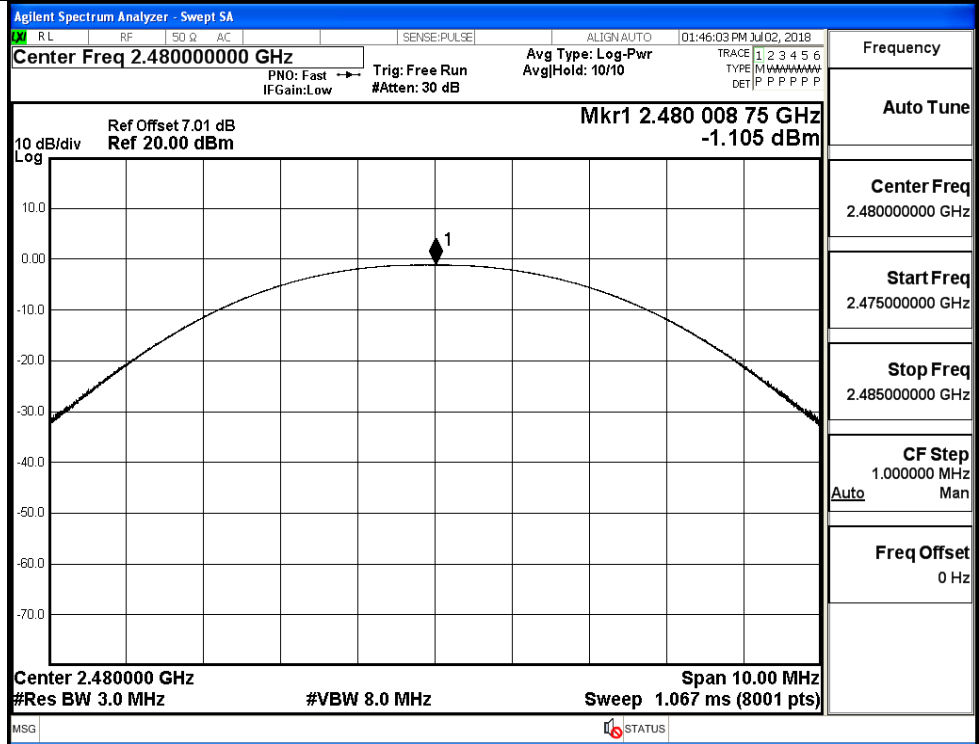
GFSK/LCH



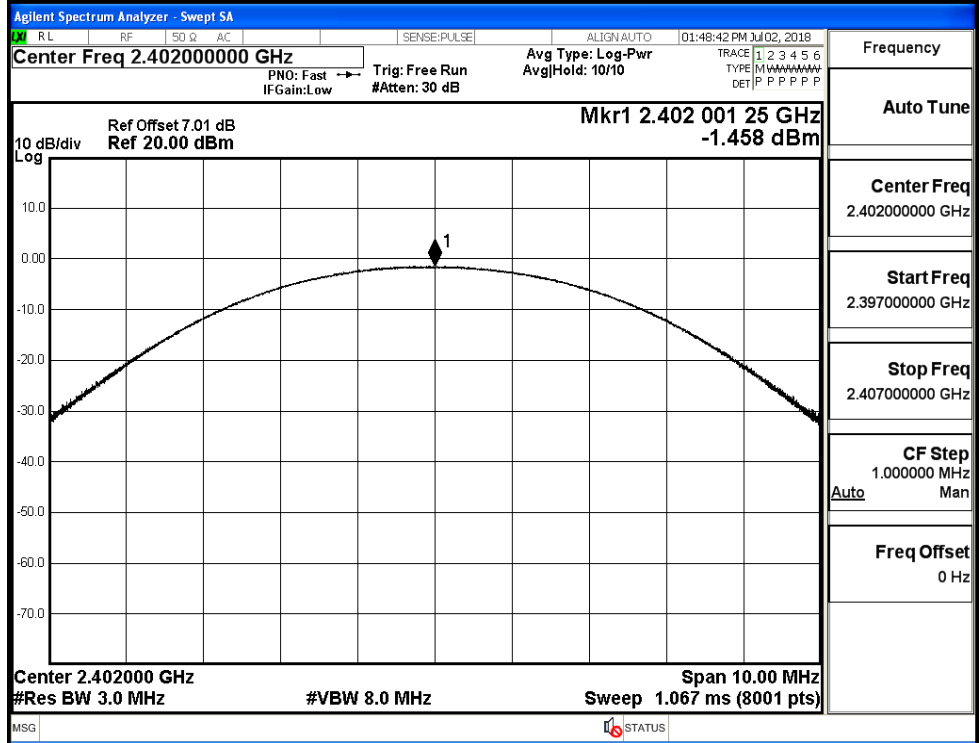
GFSK/MCH



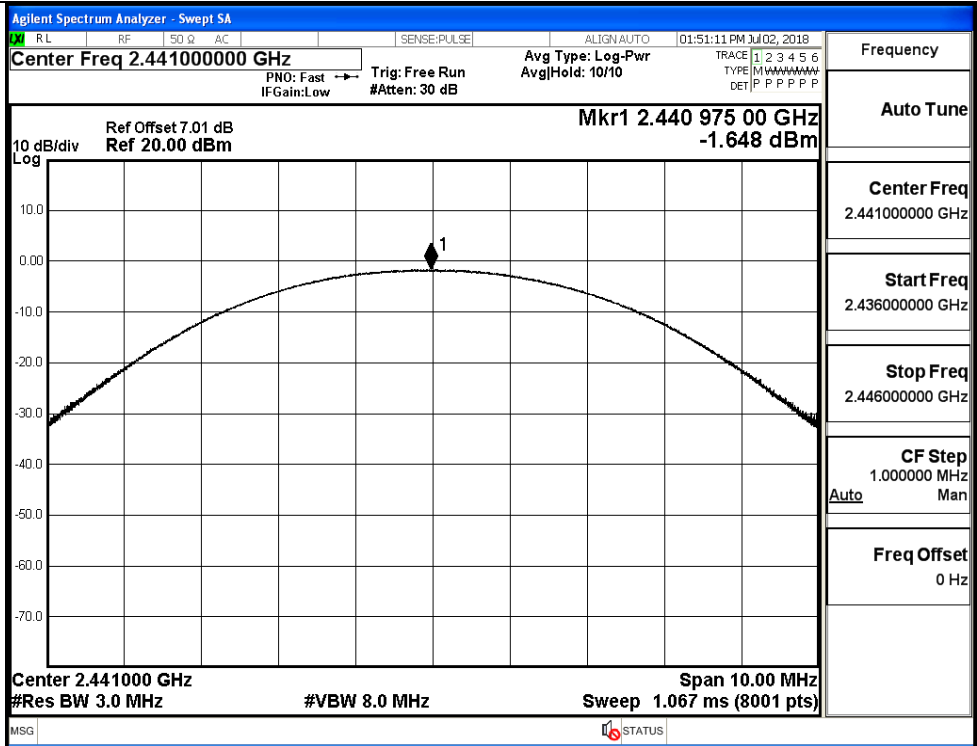
GFSK/HCH



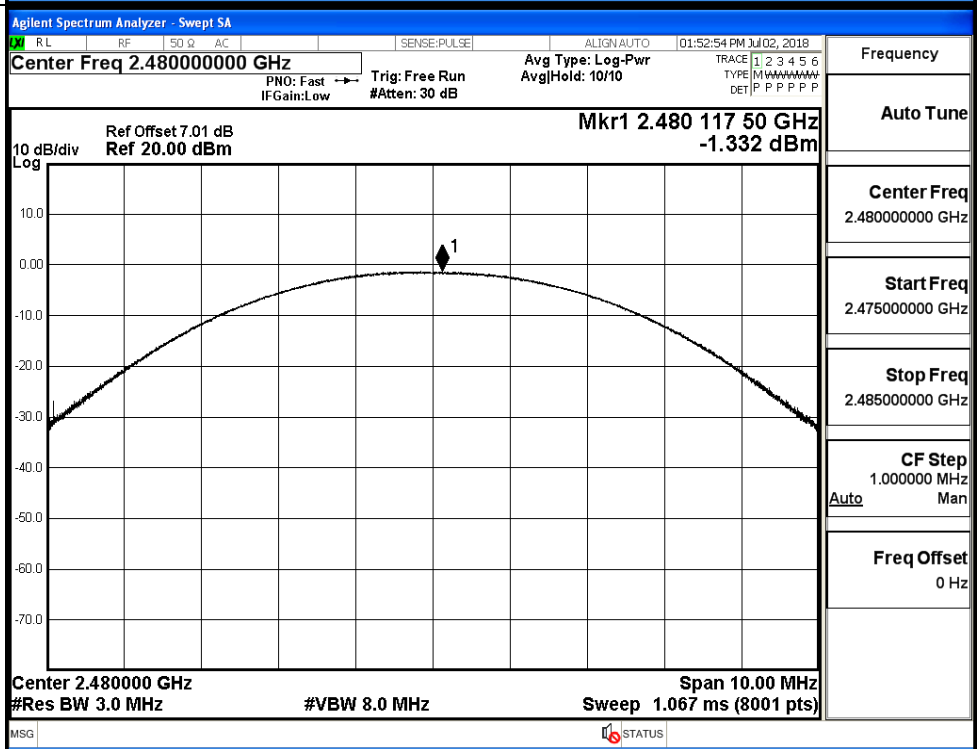
π /4DQPSK/LCH



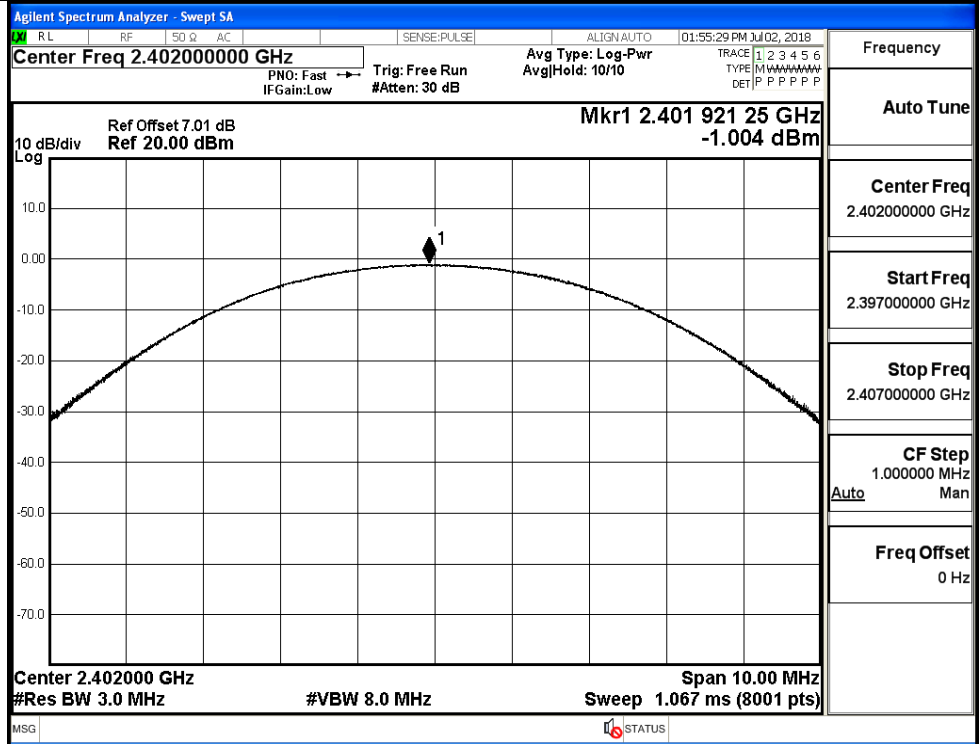
π /4DQPSK/MCH



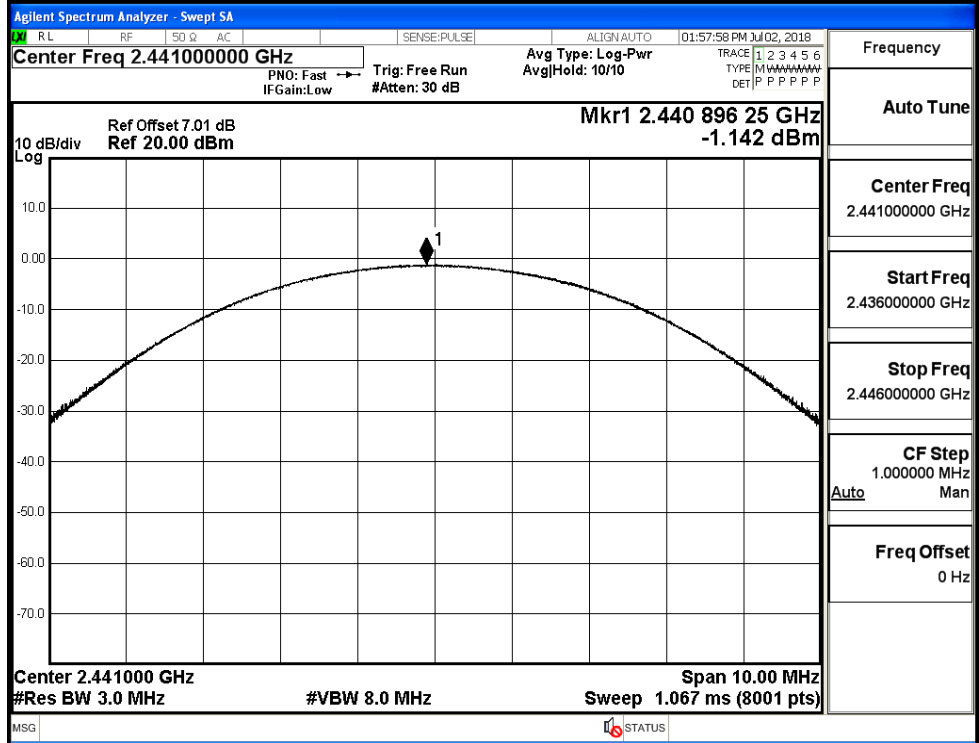
π /4DQPSK/HCH



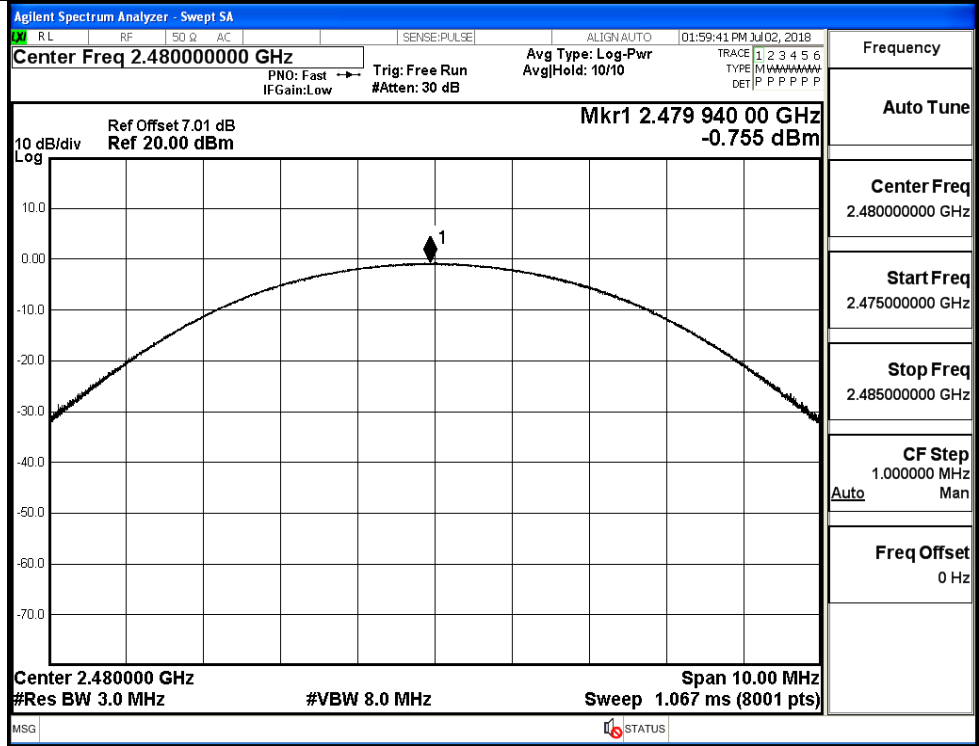
8DPSK/LCH



8DPSK/MCH

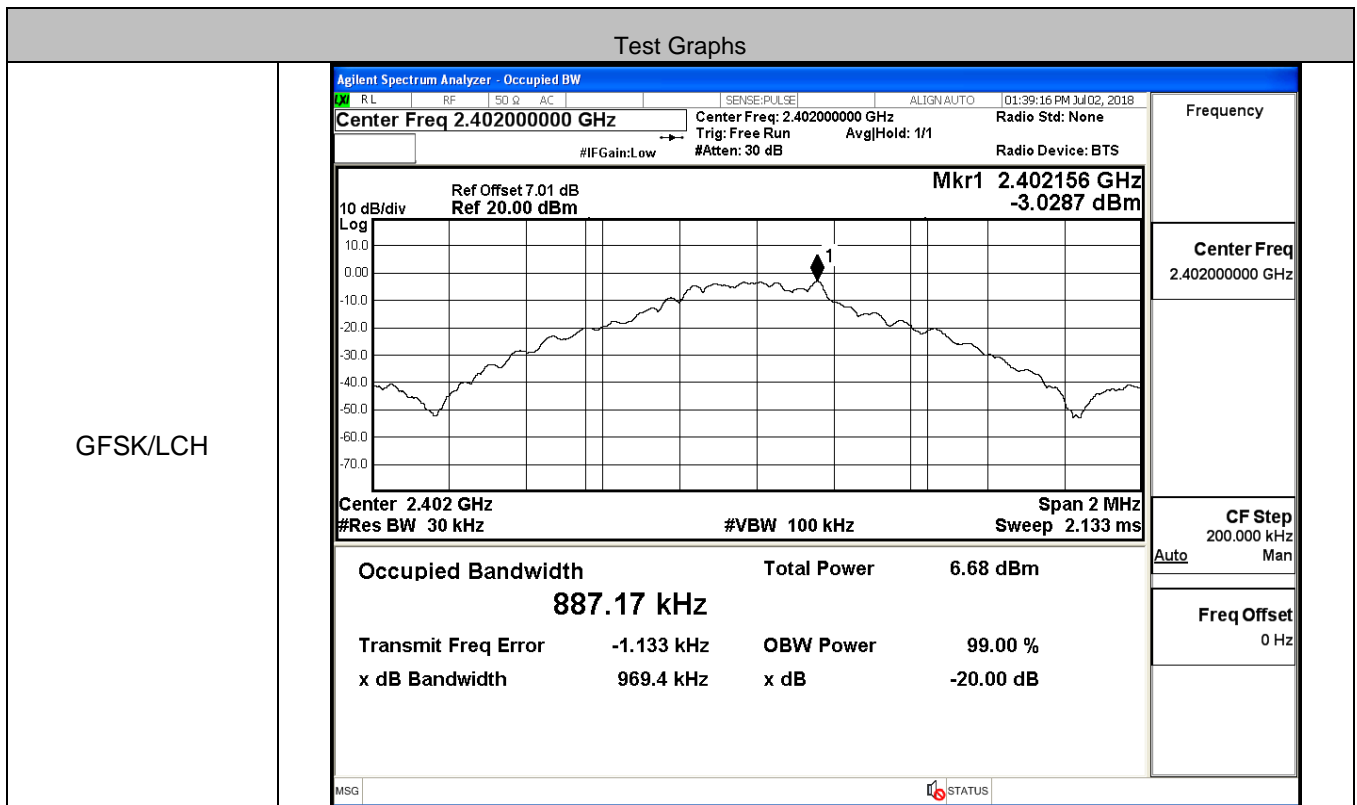


8DPSK/HCH



A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9694	Not Specified	PASS
	MCH	1.032	Not Specified	PASS
	HCH	0.9699	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.291	Not Specified	PASS
	MCH	1.289	Not Specified	PASS
	HCH	1.287	Not Specified	PASS
8DPSK	LCH	1.291	Not Specified	PASS
	MCH	1.289	Not Specified	PASS
	HCH	1.298	Not Specified	PASS

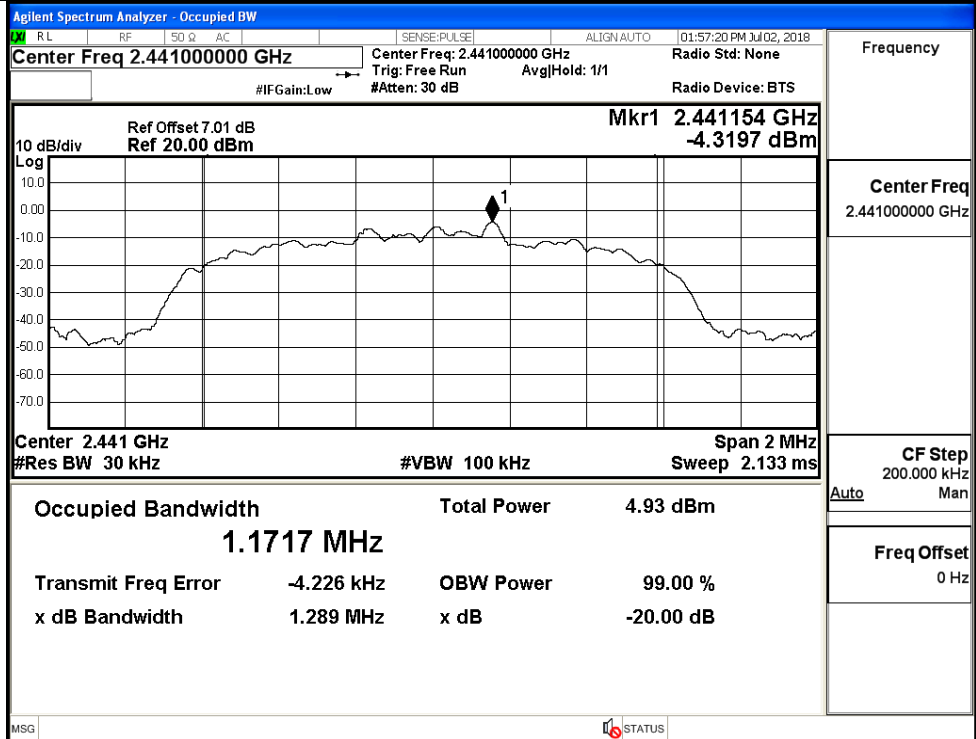


<p>GFSK/MCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.44100000 GHz</p> <p>Mkr1 2.44116 GHz -3.8050 dBm</p> <p>Occupied Bandwidth 887.70 kHz</p> <p>Total Power 6.11 dBm</p> <p>Transmit Freq Error -2.257 kHz</p> <p>x dB Bandwidth 1.032 MHz</p>	<p>Frequency</p> <p>Center Freq 2.44100000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>
<p>GFSK/HCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.48000000 GHz</p> <p>Mkr1 2.480154 GHz -3.4352 dBm</p> <p>Occupied Bandwidth 887.18 kHz</p> <p>Total Power 6.22 dBm</p> <p>Transmit Freq Error -2.722 kHz</p> <p>x dB Bandwidth 969.9 kHz</p>	<p>Frequency</p> <p>Center Freq 2.48000000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>

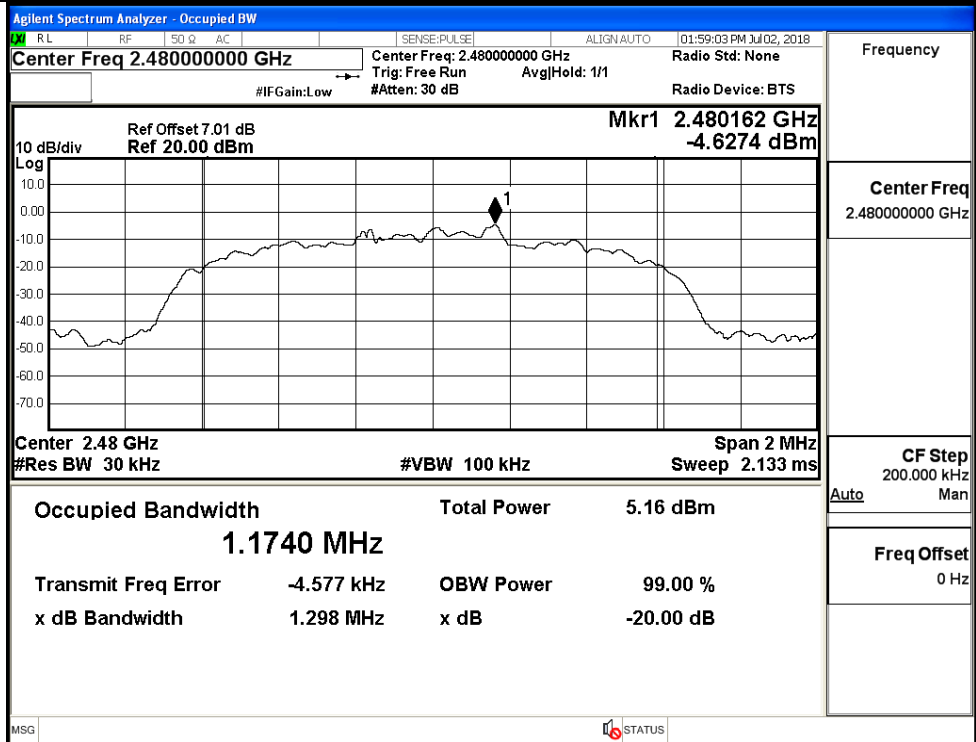
<p style="text-align: center;">π/4DQPSK/LCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz</p> <p>Mkr1 2.402158 GHz -5.2663 dBm</p> <p>Occupied Bandwidth 1.1685 MHz</p> <p>Total Power 4.91 dBm</p> <p>Transmit Freq Error -7.732 kHz</p> <p>x dB Bandwidth 1.291 MHz</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>
<p style="text-align: center;">π/4DQPSK/MCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.44100000 GHz</p> <p>Mkr1 2.441156 GHz -5.5353 dBm</p> <p>Occupied Bandwidth 1.1678 MHz</p> <p>Total Power 4.59 dBm</p> <p>Transmit Freq Error -7.232 kHz</p> <p>x dB Bandwidth 1.289 MHz</p>	<p>Frequency</p> <p>Center Freq 2.44100000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>

<p style="text-align: center;">π/4DQPSK/HCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.48000000 GHz</p> <p>Mkr1 2.480156 GHz -5.0019 dBm</p> <p>Center 2.48 GHz</p> <p>Occupied Bandwidth 1.1652 MHz</p> <p>Total Power 4.99 dBm</p> <p>Transmit Freq Error -8.117 kHz</p> <p>x dB Bandwidth 1.287 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -20.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.48000000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>
<p style="text-align: center;">8DPSK/LCH</p>	<p>Agilent Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.40200000 GHz</p> <p>Mkr1 2.402156 GHz -4.1060 dBm</p> <p>Center 2.402 GHz</p> <p>Occupied Bandwidth 1.1760 MHz</p> <p>Total Power 5.14 dBm</p> <p>Transmit Freq Error -4.122 kHz</p> <p>x dB Bandwidth 1.291 MHz</p> <p>OBW Power 99.00 %</p> <p>x dB -20.00 dB</p>	<p>Frequency</p> <p>Center Freq 2.40200000 GHz</p> <p>CF Step 200.000 kHz</p> <p>Freq Offset 0 Hz</p>

8DPSK/MCH

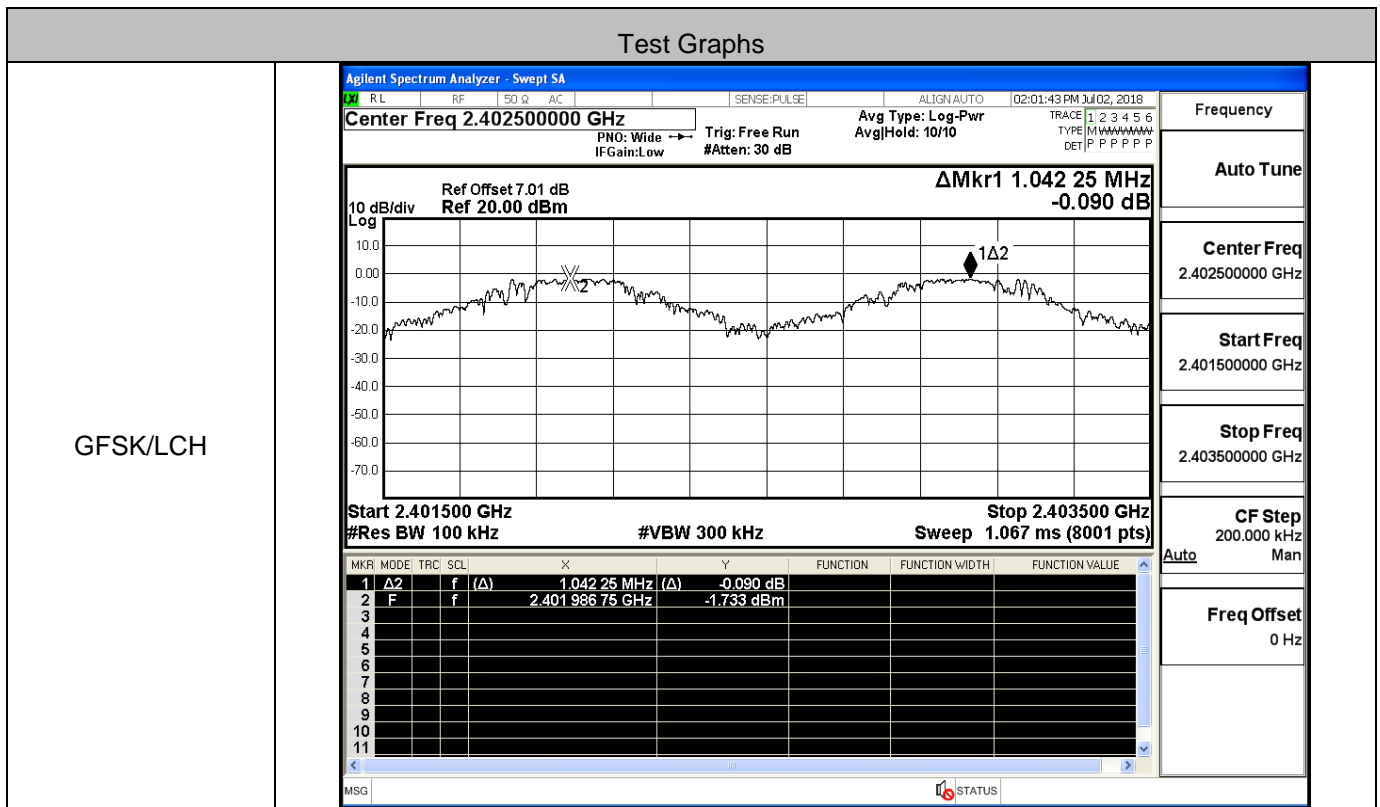


8DPSK/HCH

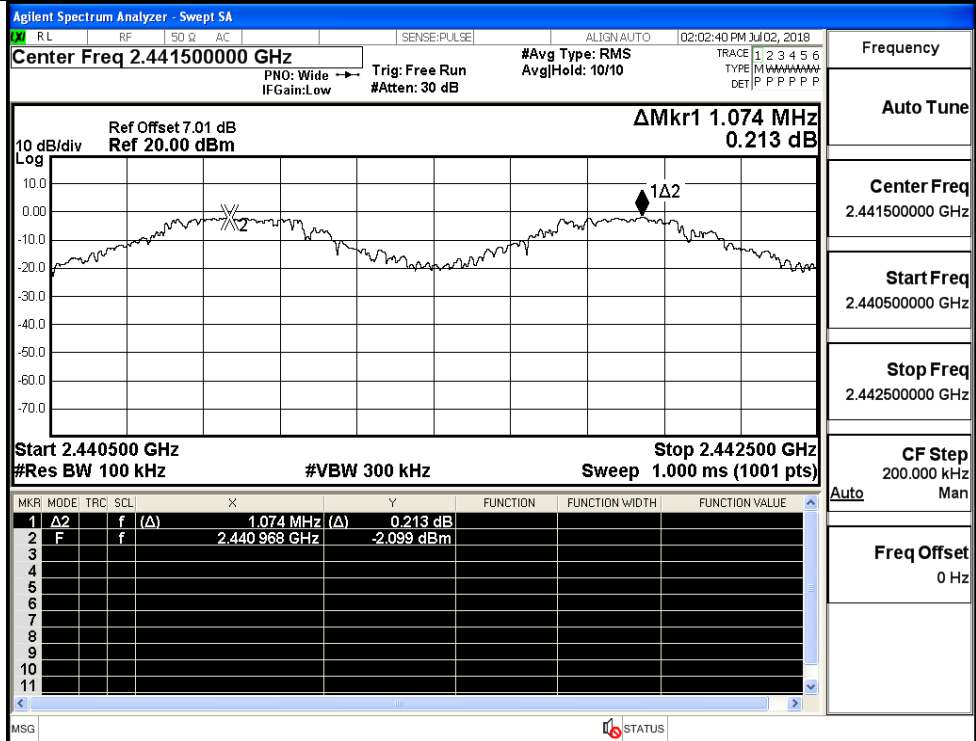


A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.042	0.688	PASS
	MCH	1.074	0.688	PASS
	HCH	1.140	0.688	PASS
π/4DQPSK	LCH	1.118	0.861	PASS
	MCH	1.296	0.861	PASS
	HCH	1.276	0.861	PASS
8DPSK	LCH	1.128	0.865	PASS
	MCH	0.876	0.865	PASS
	HCH	0.958	0.865	PASS



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

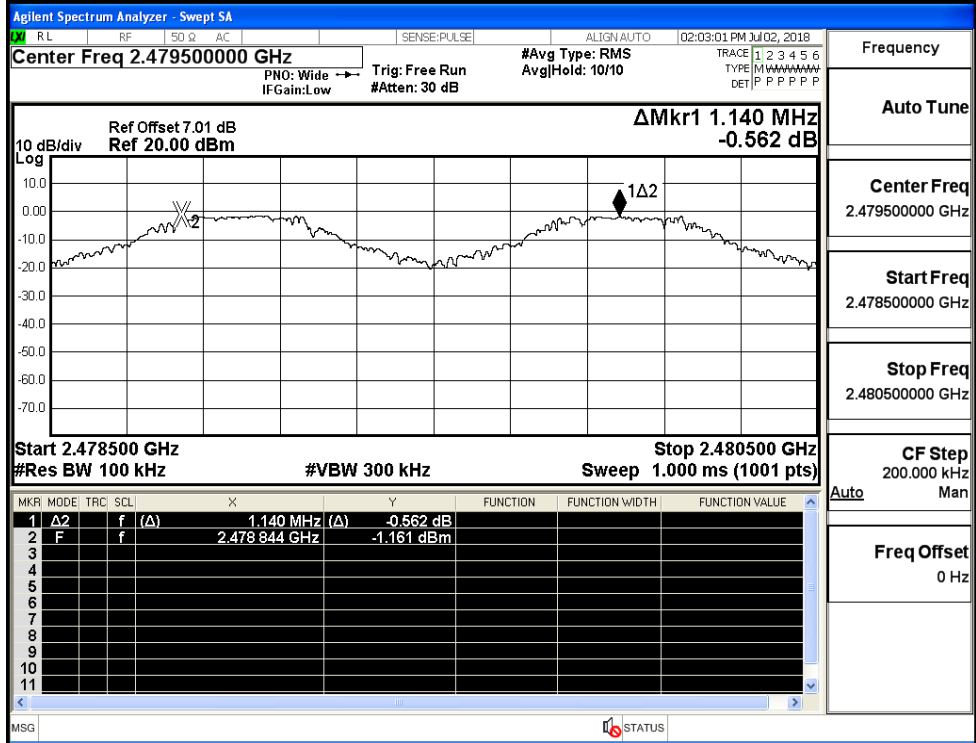
Start Freq
2.440500000 GHz

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

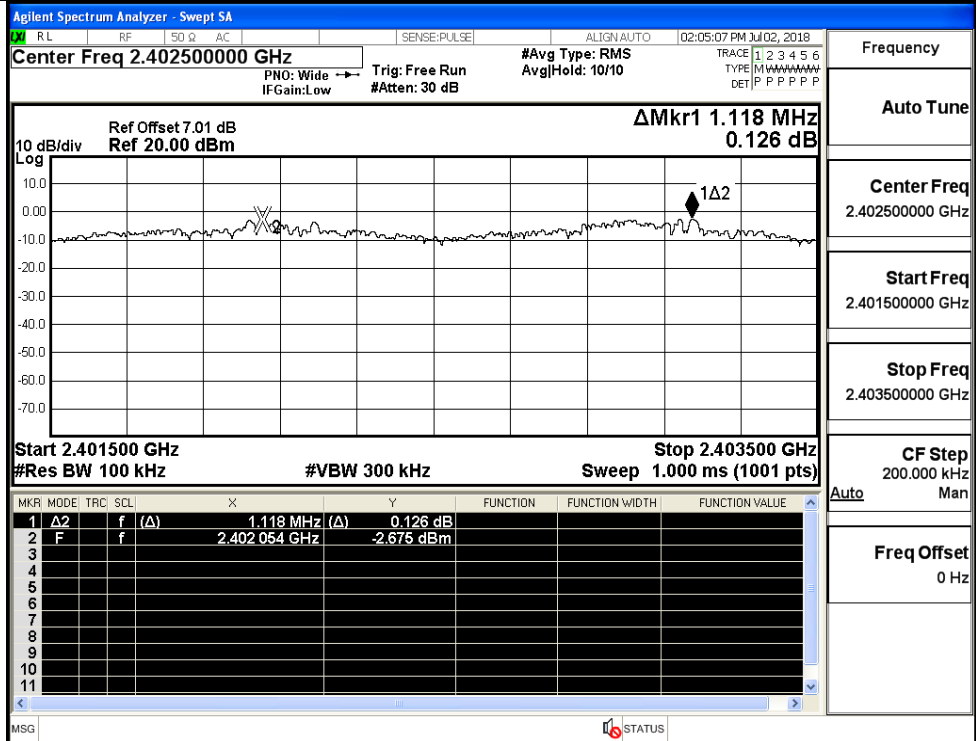
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH



Frequency

Auto Tune

Center Freq

2.402500000 GHz

Start Freq

2.401500000 GHz

Stop Freq

2.403500000 GHz

CF Step

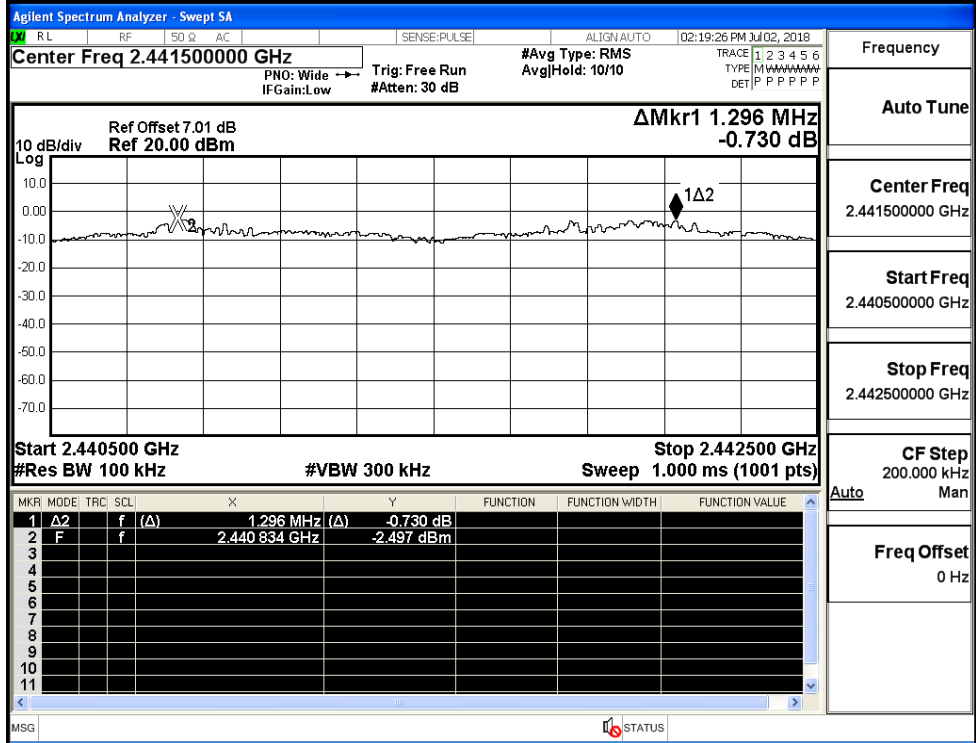
200.000 kHz

Auto

Freq Offset

0 Hz

$\pi/4$ DQPSK/MCH



Frequency

Auto Tune

Center Freq

2.441500000 GHz

Start Freq

2.440500000 GHz

Stop Freq

2.442500000 GHz

CF Step

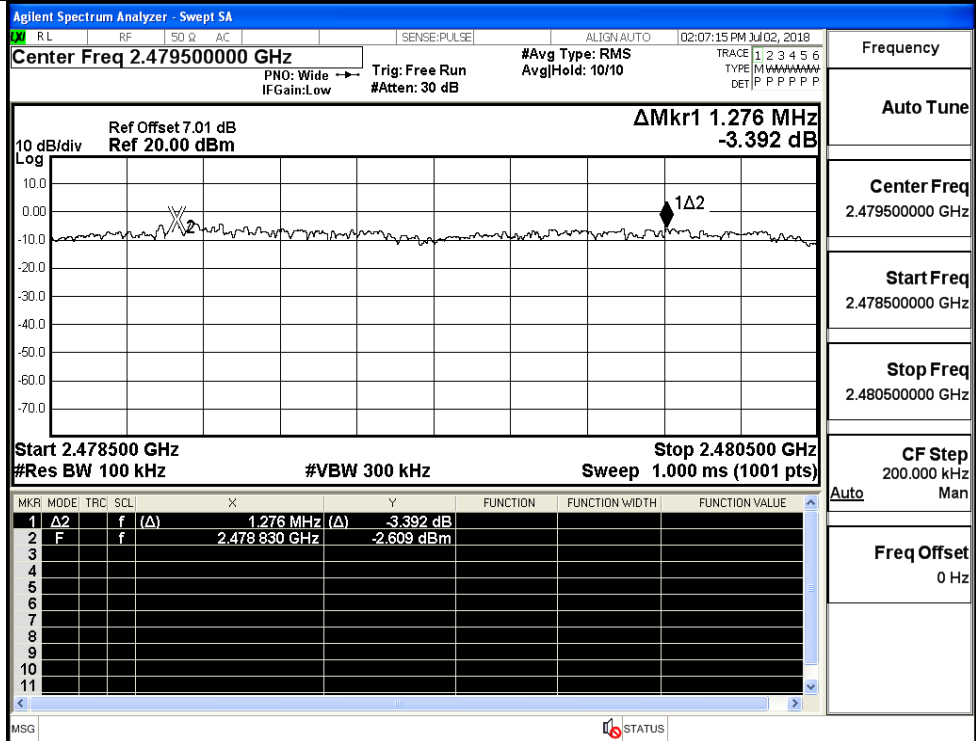
200.000 kHz

Auto

Freq Offset

0 Hz

π/4DQPSK/HCH



Frequency

Auto Tune

Center Freq
2.479500000 GHz

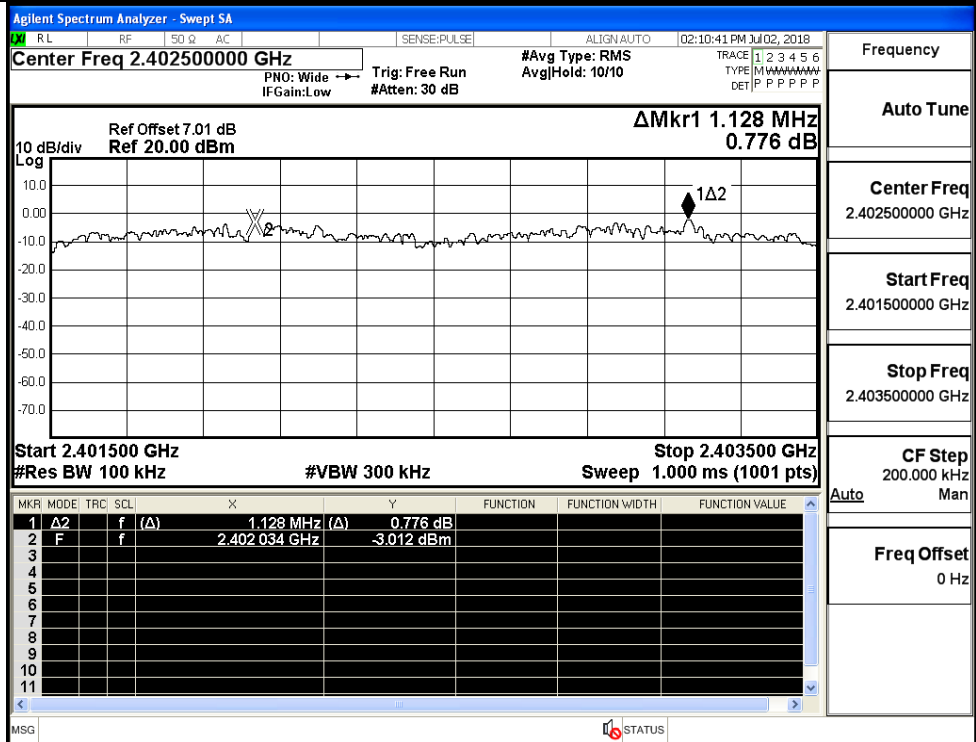
Start Freq
2.478500000 GHz

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

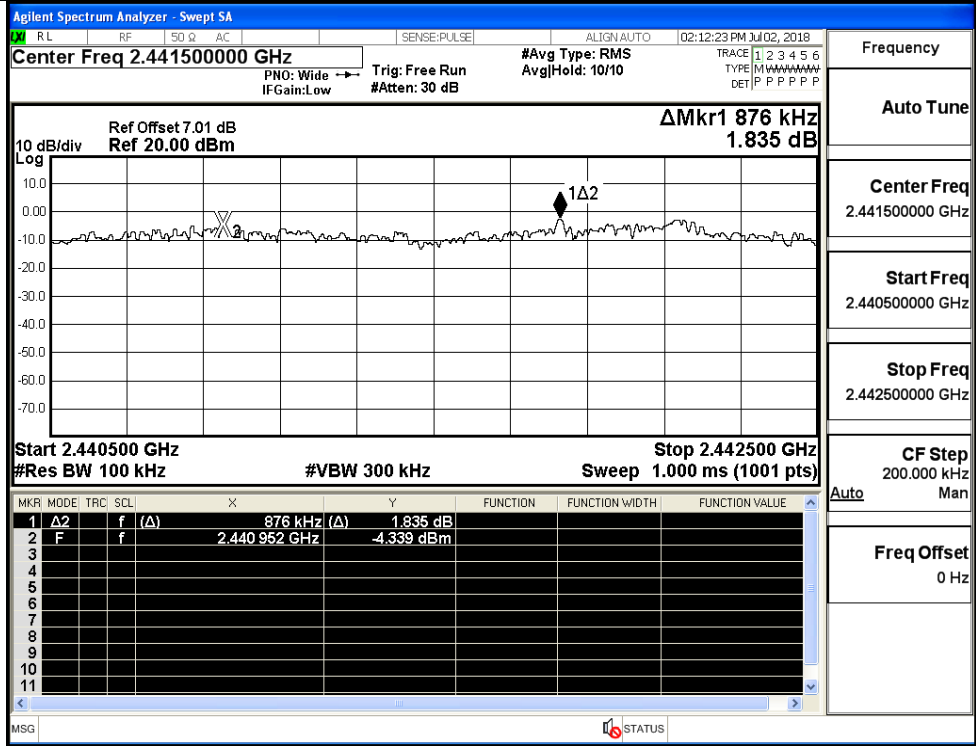
Start Freq
2.401500000 GHz

Stop Freq
2.403500000 GHz

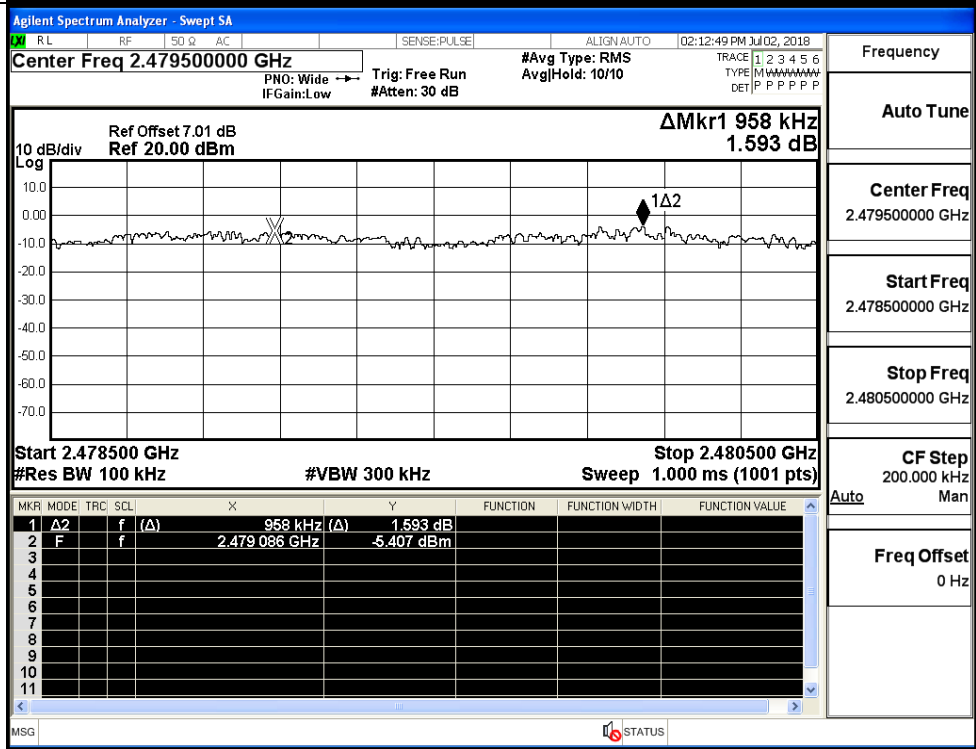
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH



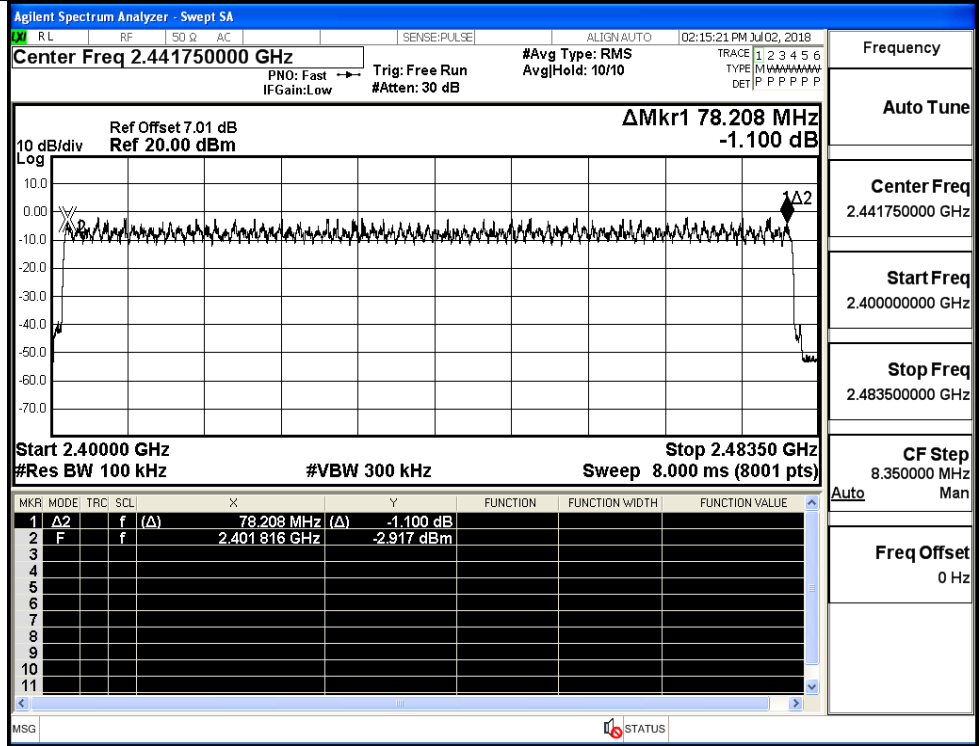
A.4 Hopping Channel Number

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

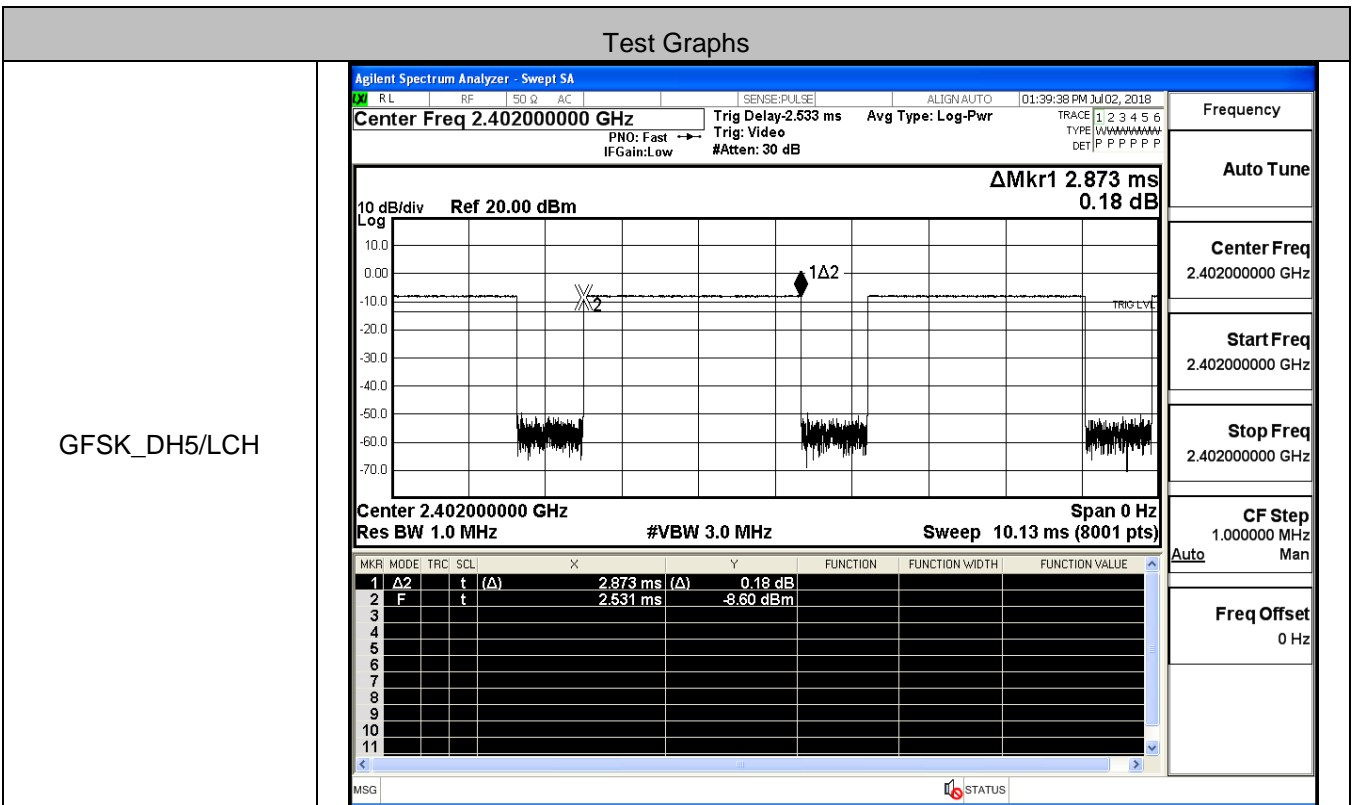
<p>GFSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.031 MHz -0.181 dB</p> <p>Start 2.40000 GHz #Res BW 100 kHz</p> <p>Stop 2.48350 GHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <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>78.031 MHz</td> <td>(Δ)</td> <td>-0.181 dB</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401962 GHz</td> <td></td> <td>-1.463 dBm</td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	f	(Δ)	78.031 MHz	(Δ)	-0.181 dB			2	F	f		2.401962 GHz		-1.463 dBm		
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	f	(Δ)	78.031 MHz	(Δ)	-0.181 dB																						
2	F	f		2.401962 GHz		-1.463 dBm																						
<p>$\pi/4$DQPSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 7.01 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.093 MHz 2.103 dB</p> <p>Start 2.40000 GHz #Res BW 100 kHz</p> <p>Stop 2.48350 GHz #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</td> <td>(Δ)</td> <td>2.103 dB</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402046 GHz</td> <td></td> <td>-4.887 dBm</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)	2.103 dB			2	F	f		2.402046 GHz		-4.887 dBm		
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	f	(Δ)	78.093 MHz	(Δ)	2.103 dB																						
2	F	f		2.402046 GHz		-4.887 dBm																						

8DPSK/Hop

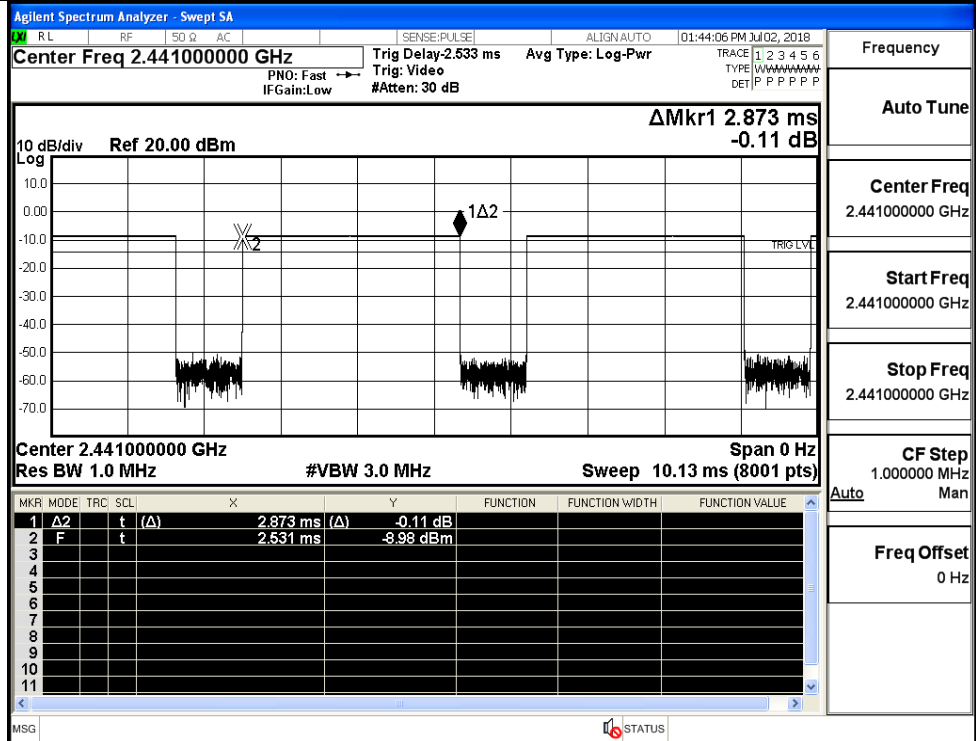


A.5 Dwell Time

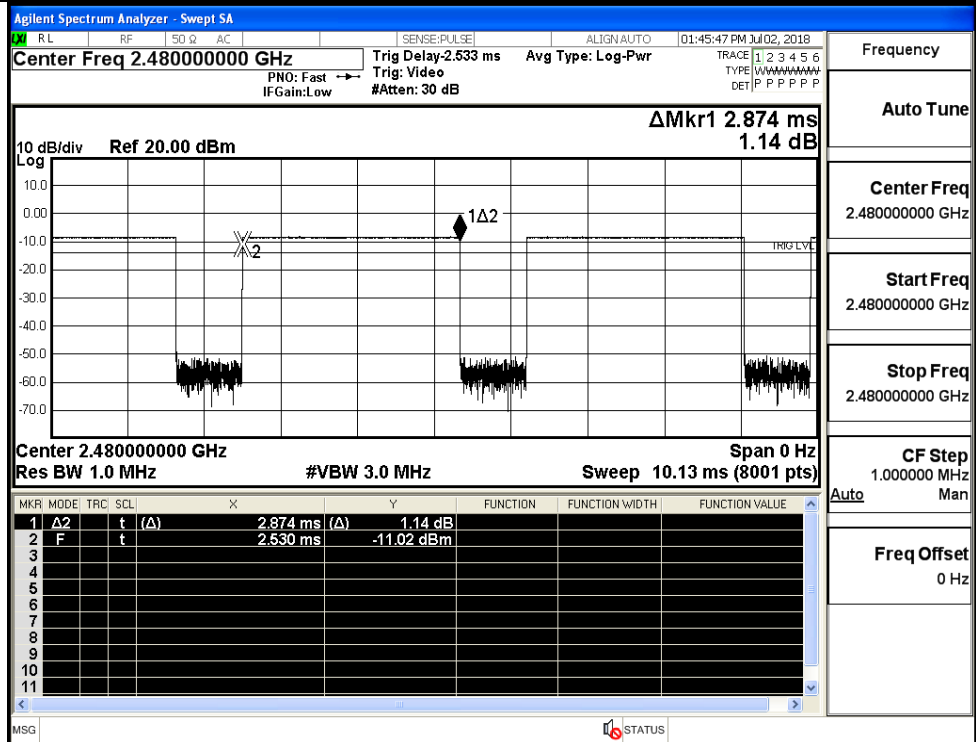
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.87	106.7	0.306	0.4	PASS
	DH5	MCH	2.87	106.7	0.306	0.4	PASS
	DH5	HCH	2.87	106.7	0.306	0.4	PASS
π/4DQPSK	2DH5	LCH	2.87	106.7	0.307	0.4	PASS
	2DH5	MCH	2.87	106.7	0.307	0.4	PASS
	2DH5	HCH	2.87	106.7	0.307	0.4	PASS
8DPSK	3DH5	LCH	2.87	106.7	0.307	0.4	PASS
	3DH5	MCH	2.87	106.7	0.307	0.4	PASS
	3DH5	HCH	2.87	106.7	0.307	0.4	PASS



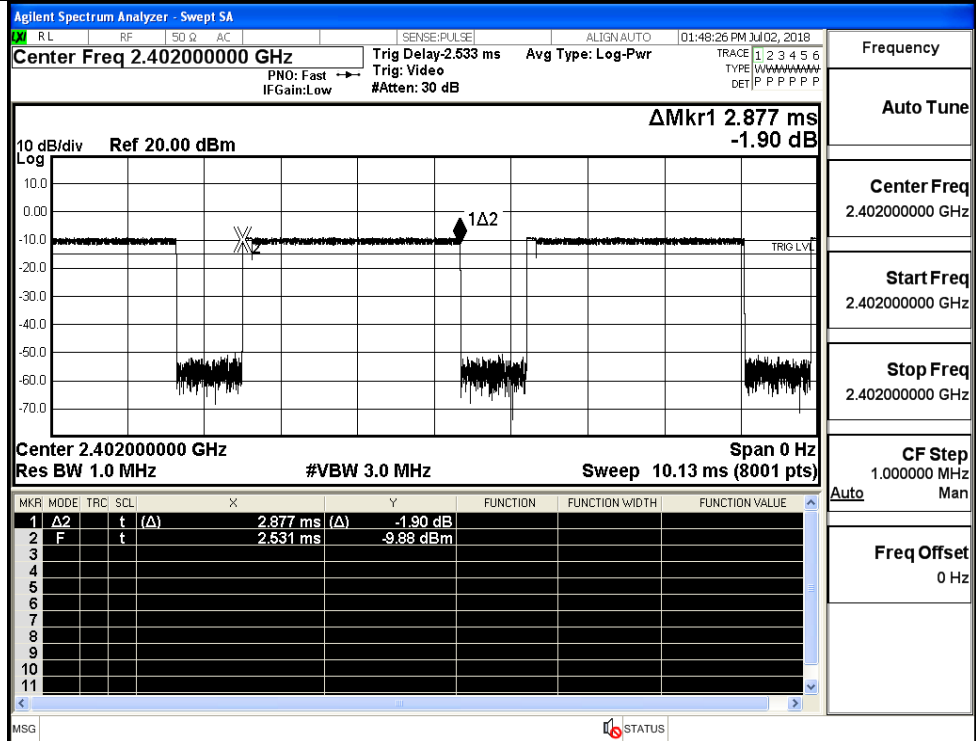
GFSK_DH5/MCH



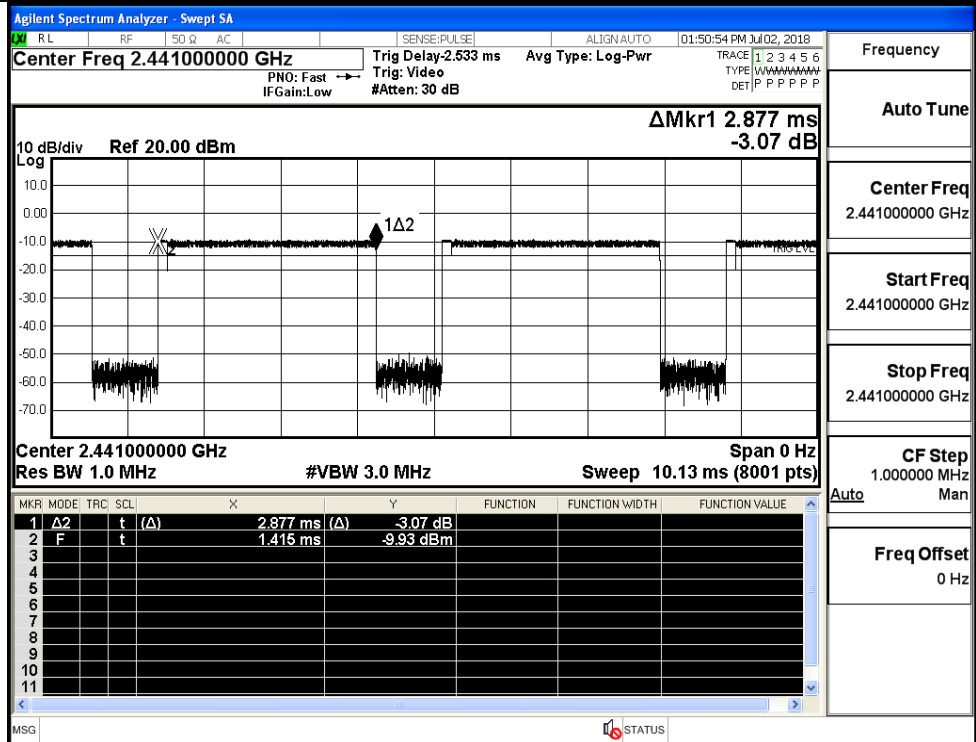
GFSK_DH5/HCH



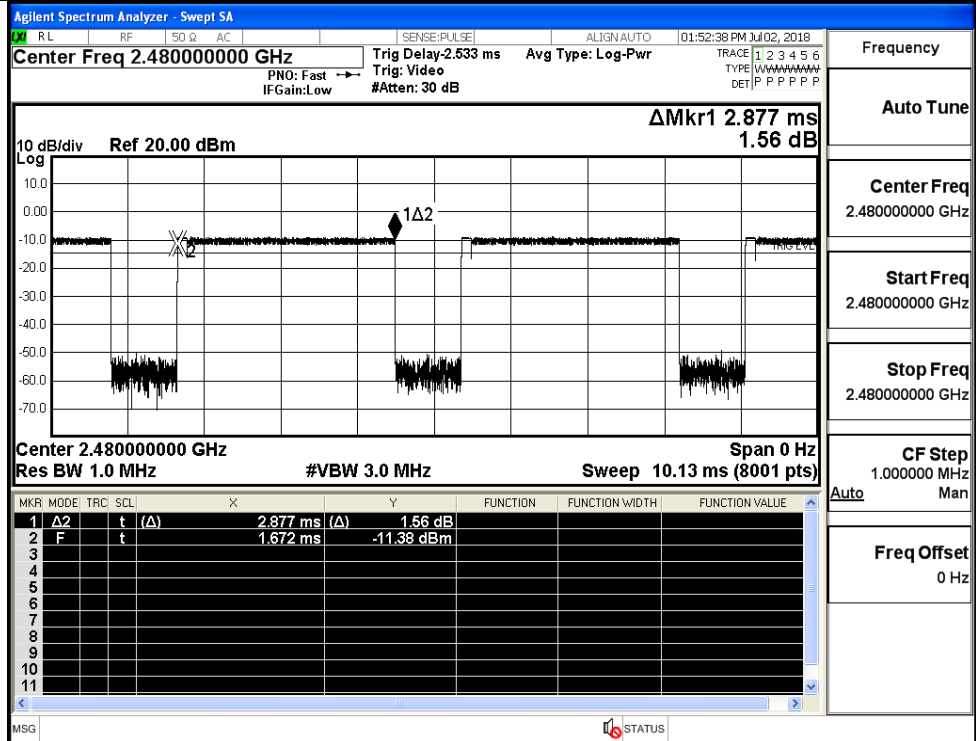
$\pi/4$ DQPSK
_2DH5/LCH



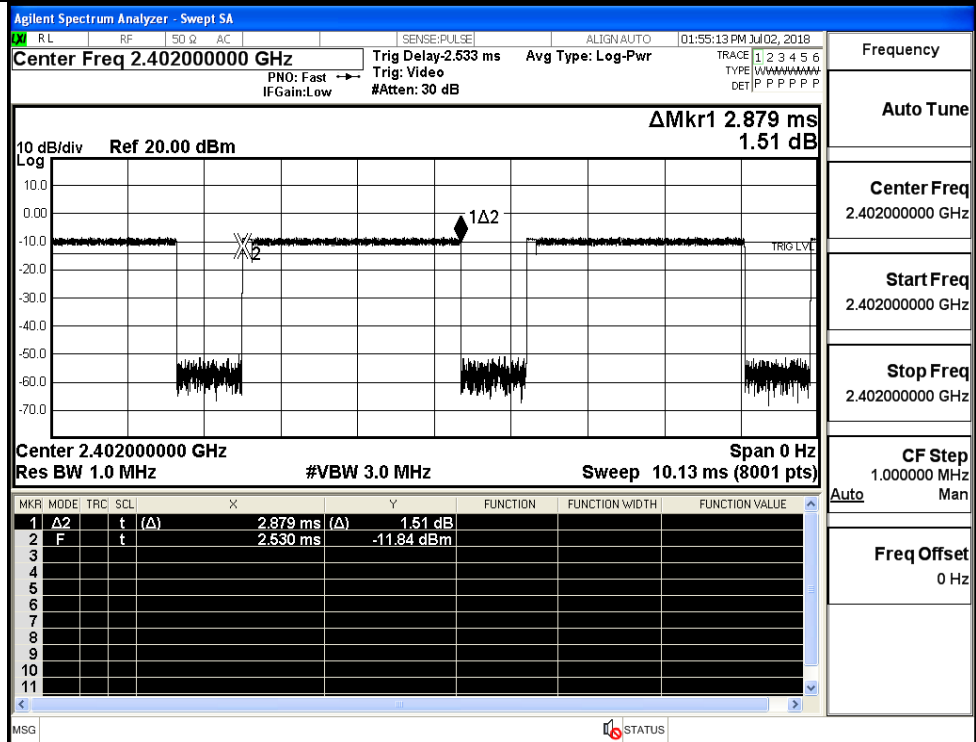
$\pi/4$ DQPSK
_2DH5/MCH



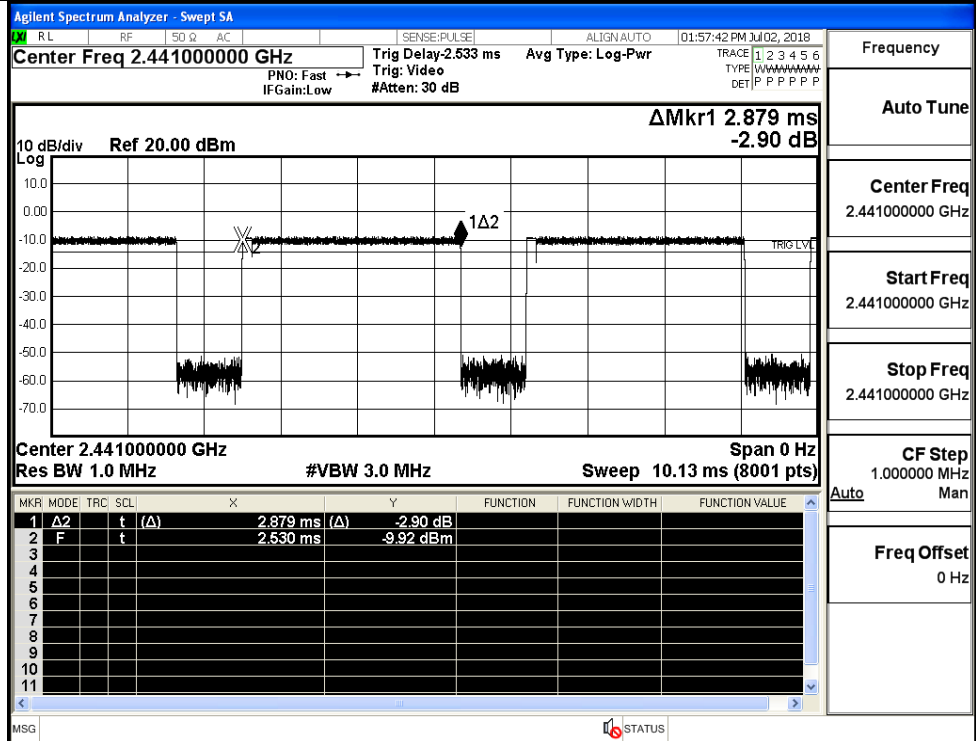
$\pi/4$ DQPSK
_2DH5/HCH



8DPSK_3DH5/LCH

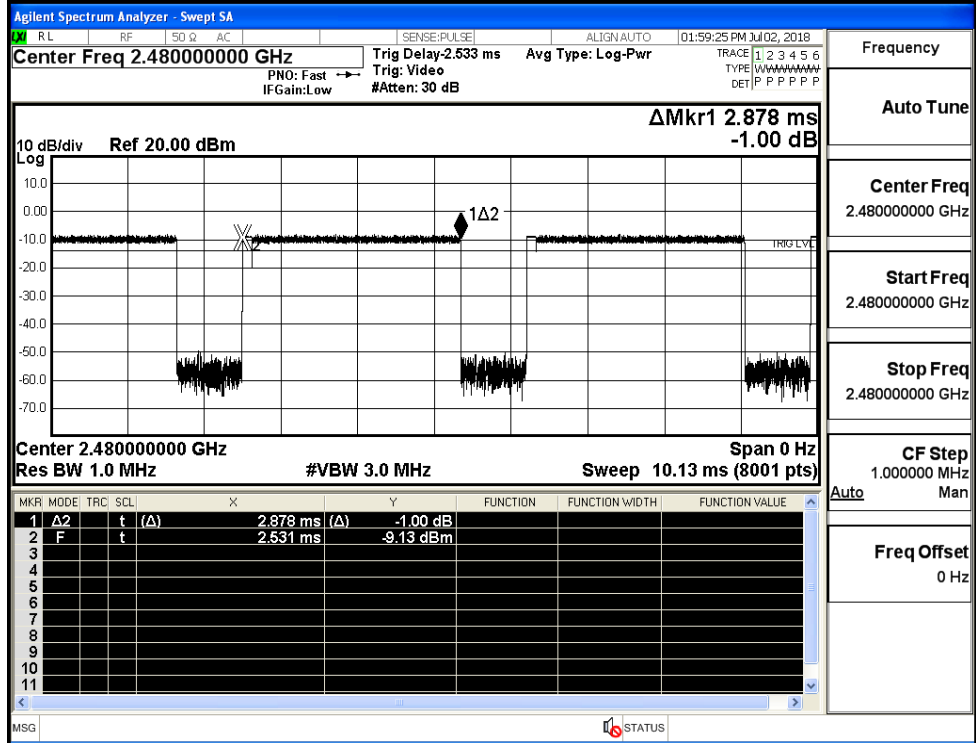


8DPSK_3DH5/MCH



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

8DPSK_3DH5/HCH



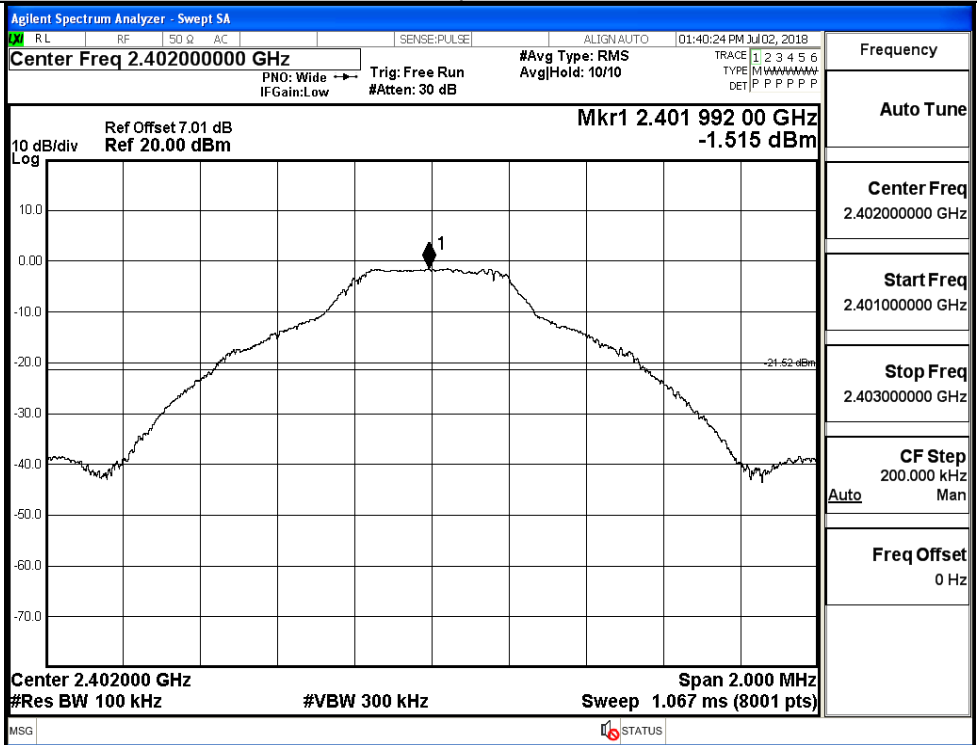
Frequency	2.480000000 GHz
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

A.6 RF Conducted Spurious Emissions

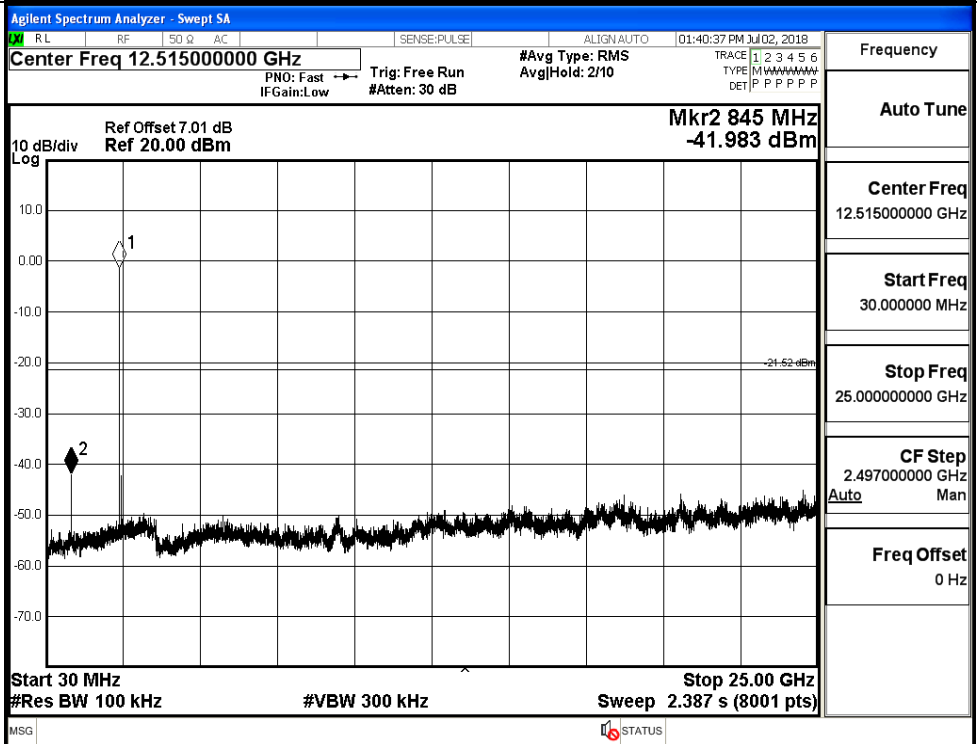
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.515	-41.983	-21.515	PASS
	MCH	-1.483	-38.098	-21.483	PASS
	HCH	-1.815	-45.898	-21.815	PASS
$\pi/4$ DQPSK	LCH	-2.337	-46.020	-22.337	PASS
	MCH	-2.573	-45.607	-22.573	PASS
	HCH	-2.519	-42.321	-22.519	PASS
8DPSK	LCH	-1.99	-35.038	-21.990	PASS
	MCH	-2.371	-41.779	-22.371	PASS
	HCH	-1.911	-34.465	-21.911	PASS

GFSK_LCH_Graphs

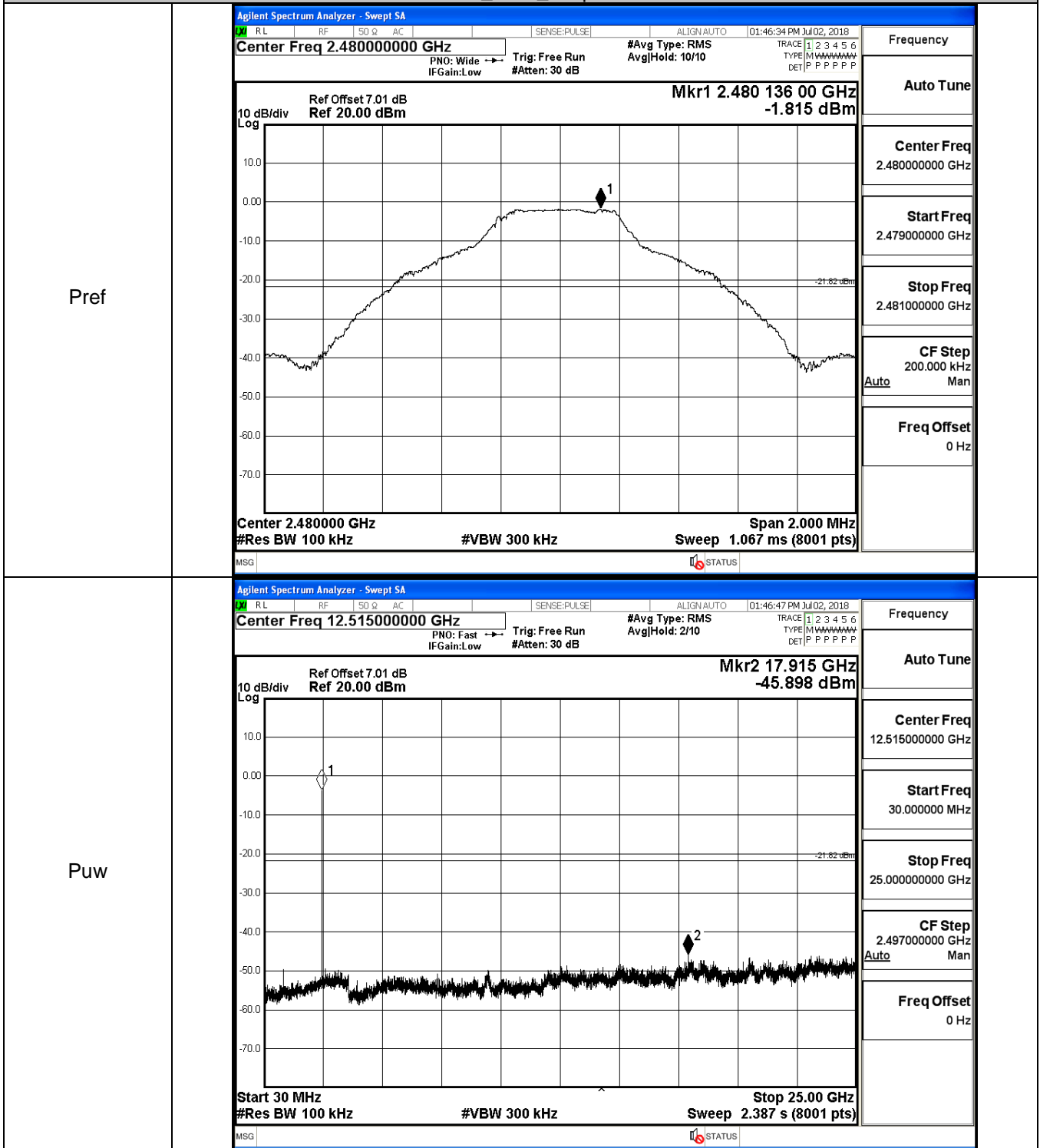
Pref



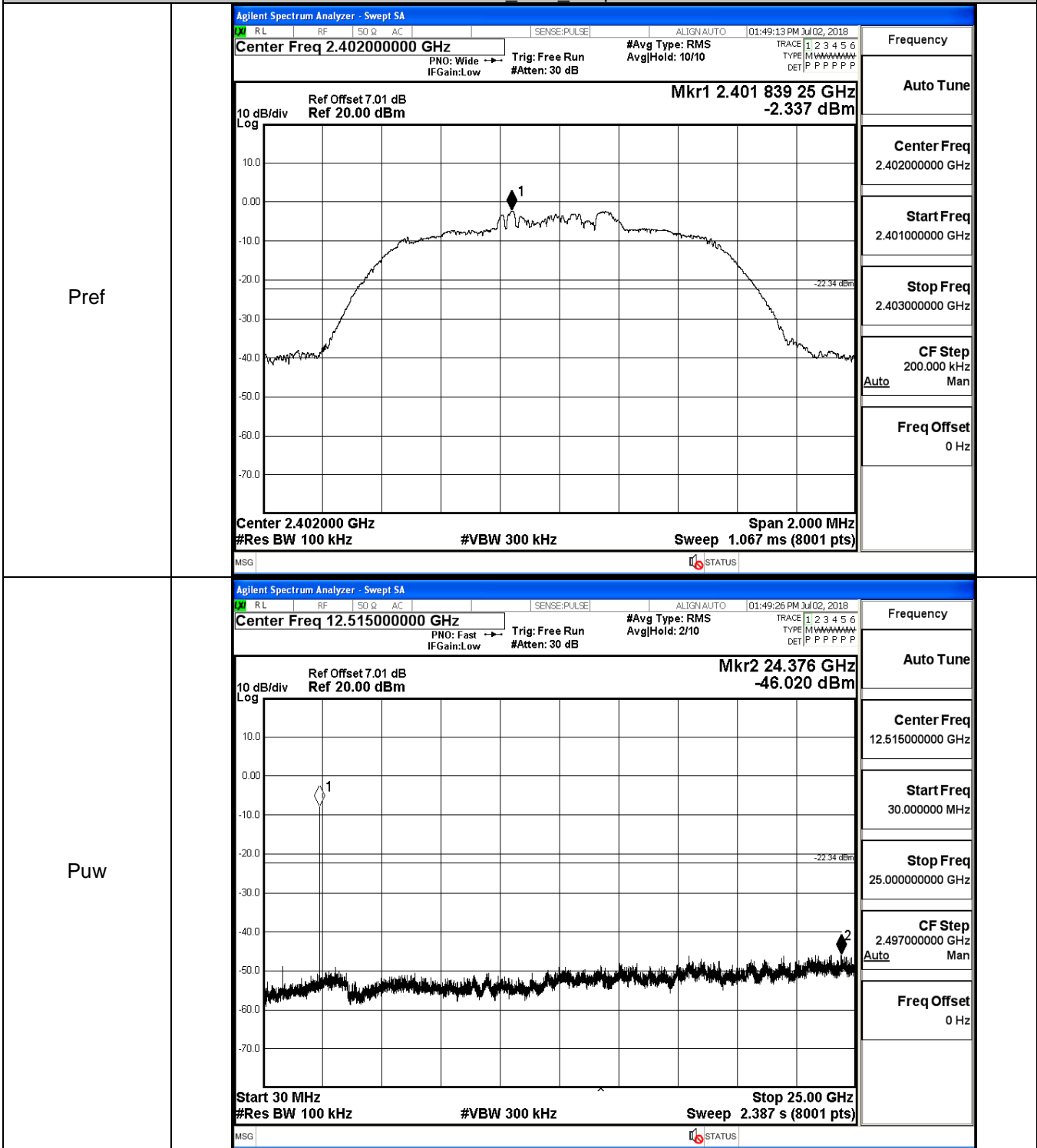
Puw



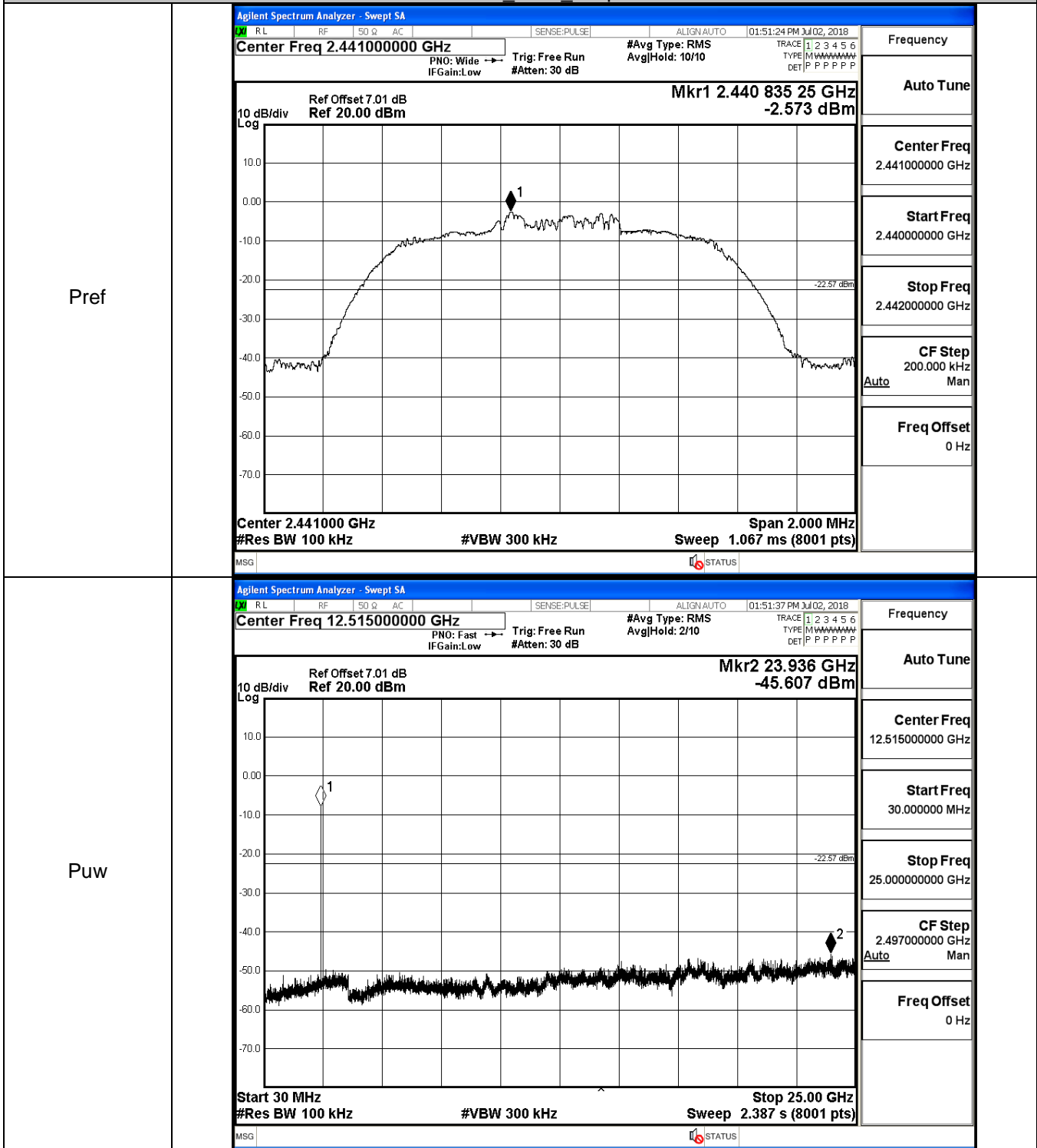
GFSK_HCH_Graphs



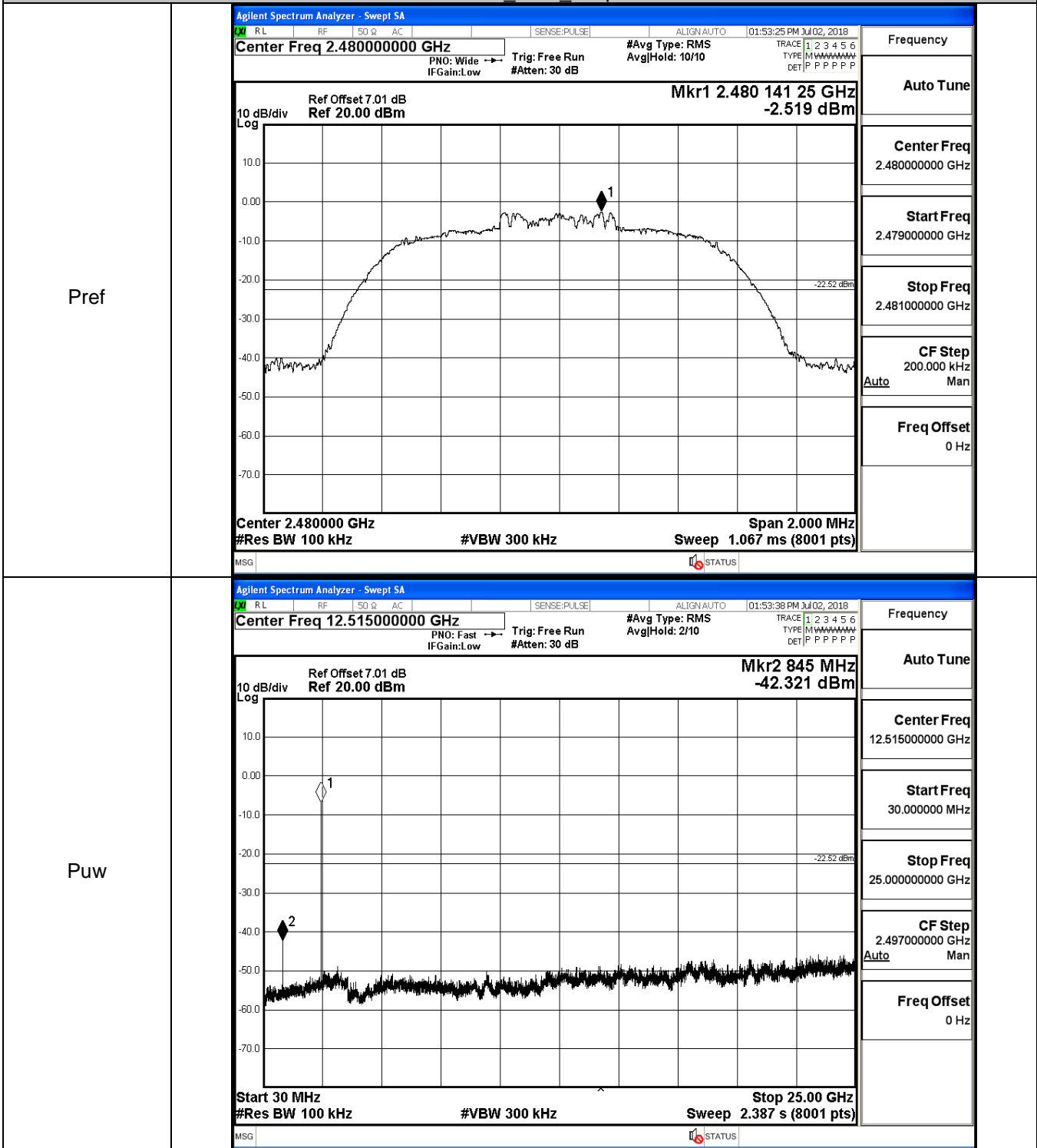
$\pi/4$ DQPSK LCH_Graphs



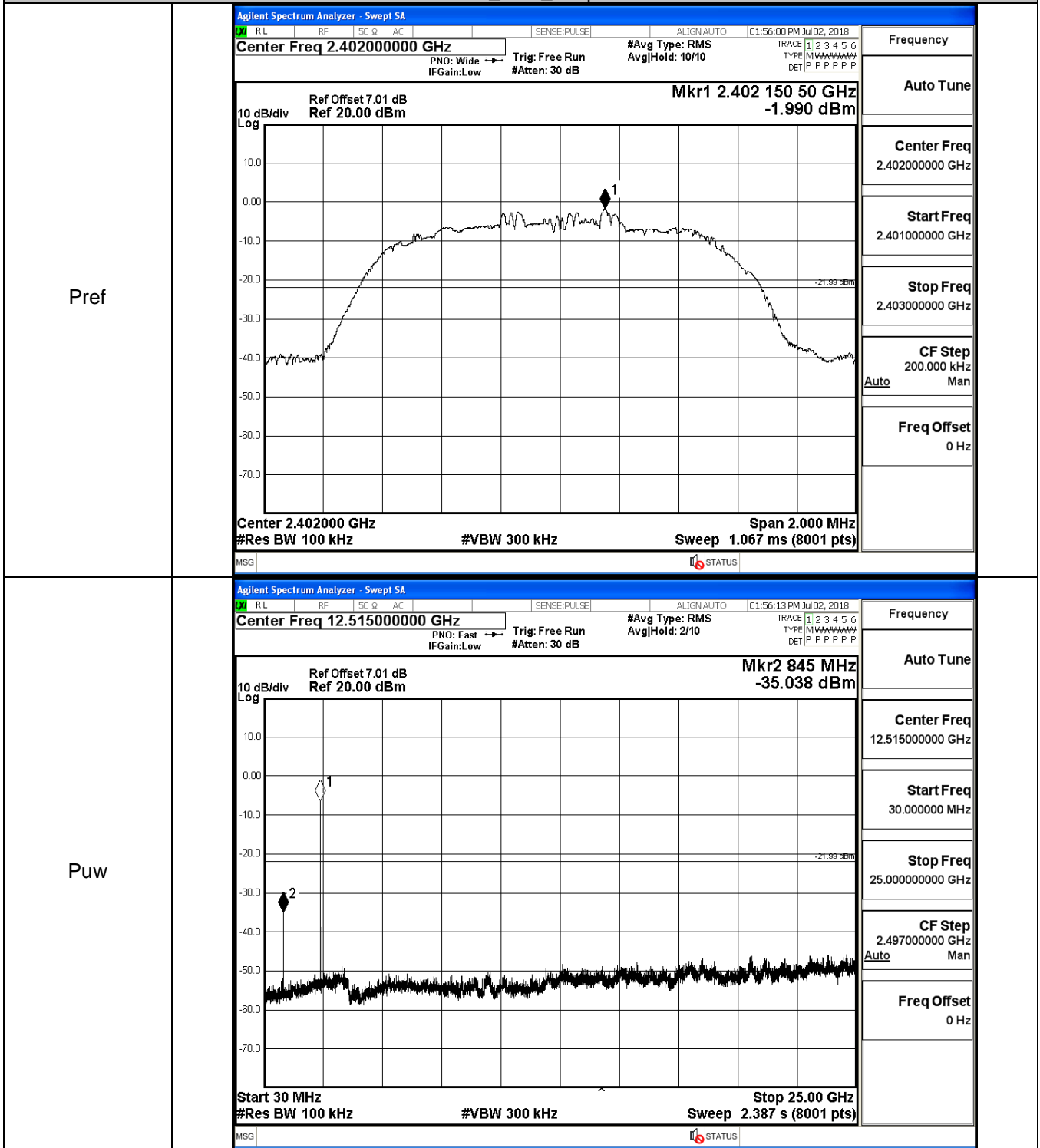
$\pi/4$ DQPSK_MCH_Graphs



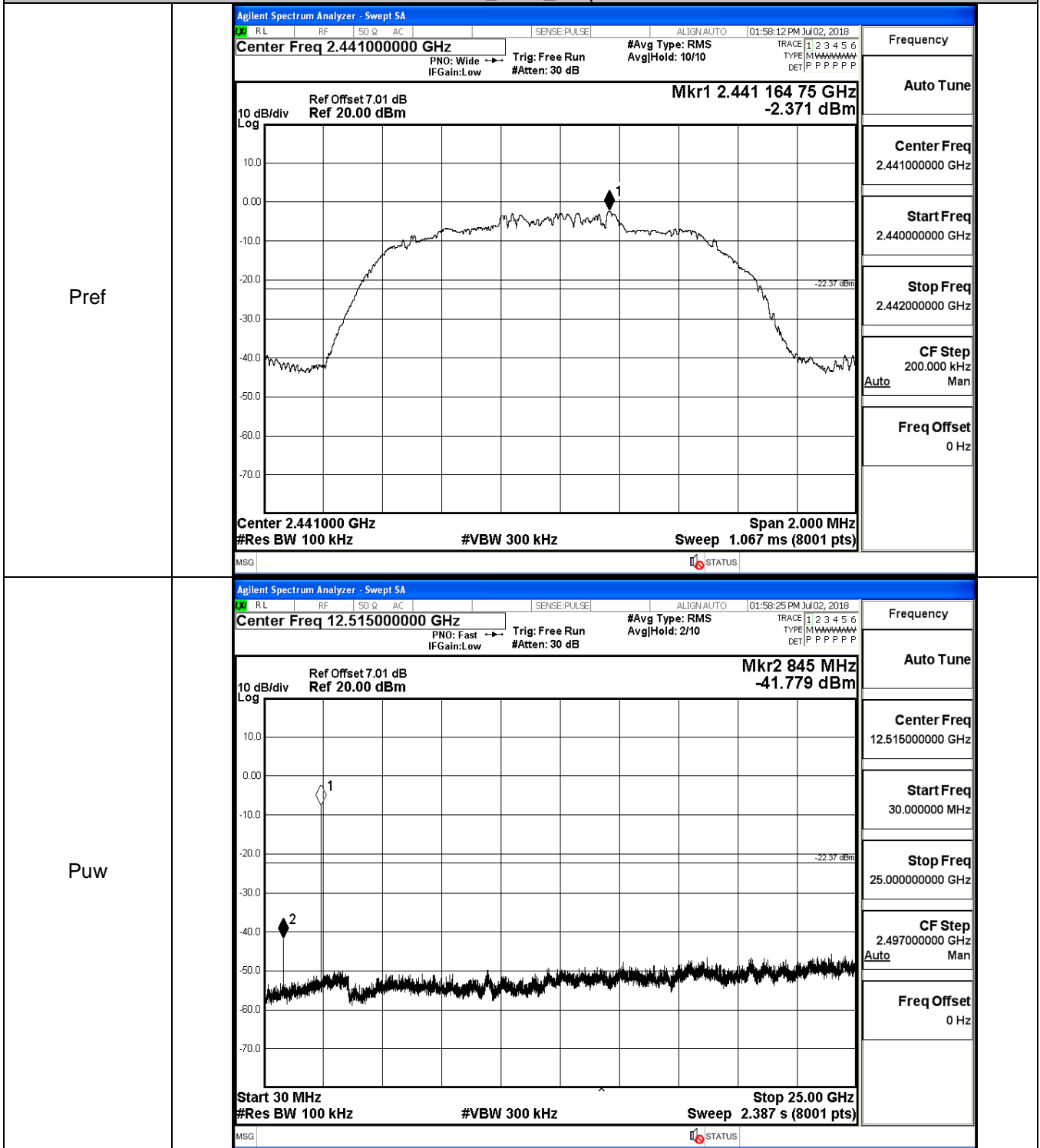
$\pi/4$ DQPSK_HCH_Graphs



8DPSK_LCH_Graphs

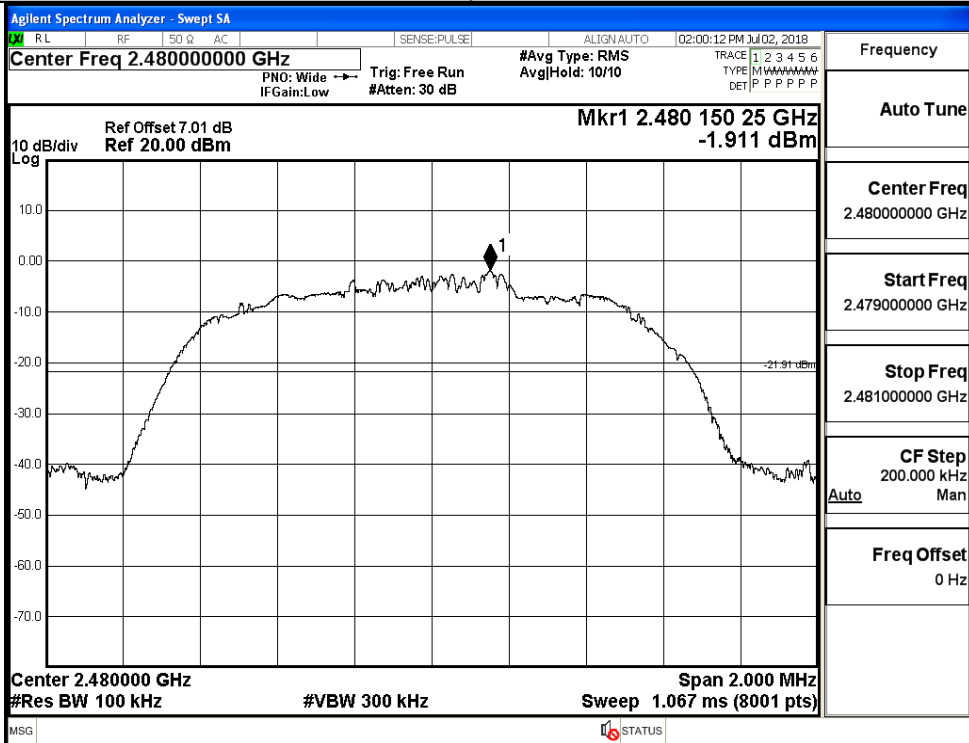


8DPSK_MCH_Graphs

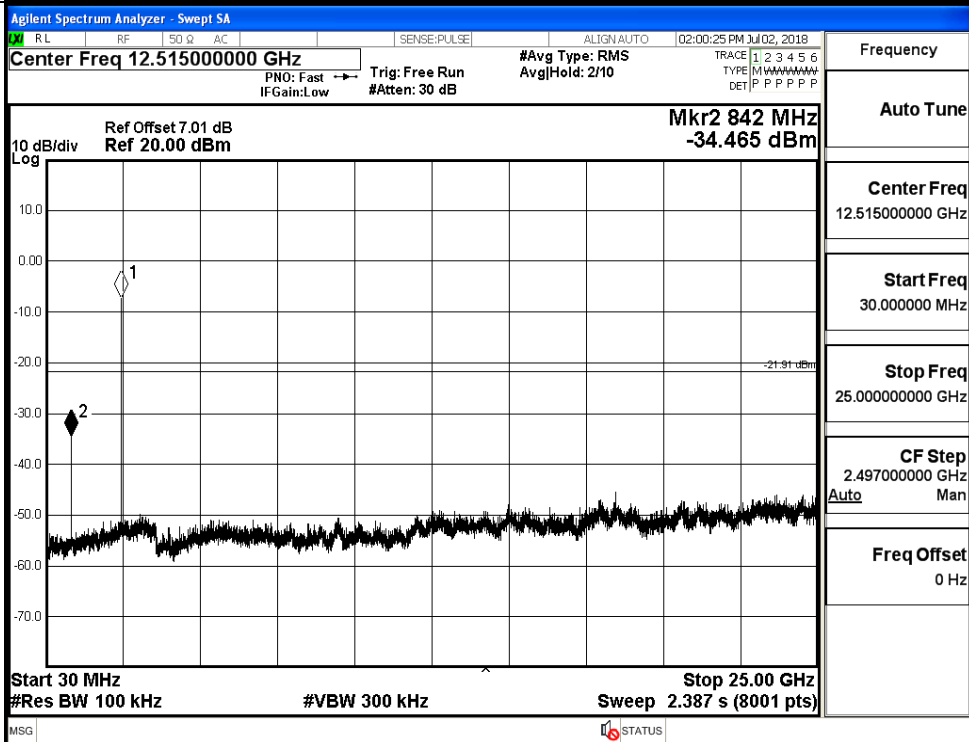


8DPSK_HCH_Graphs

Pref



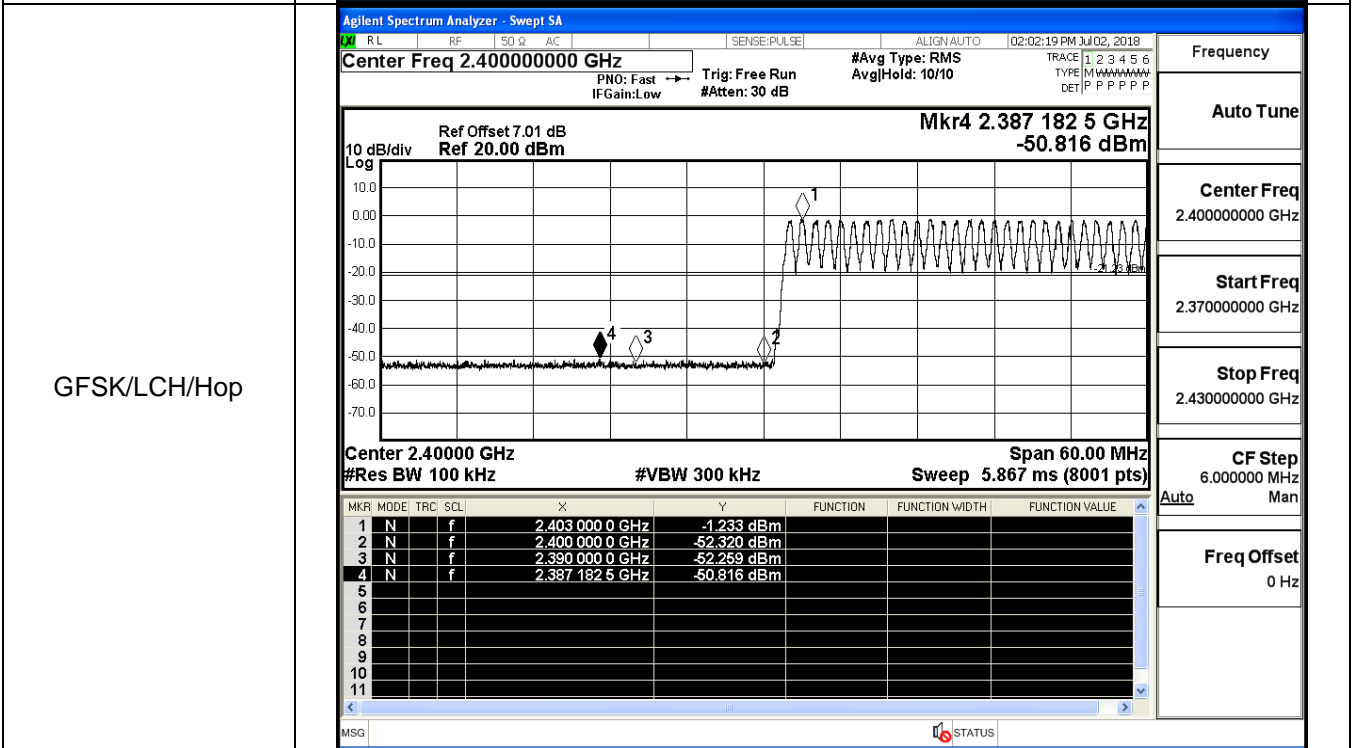
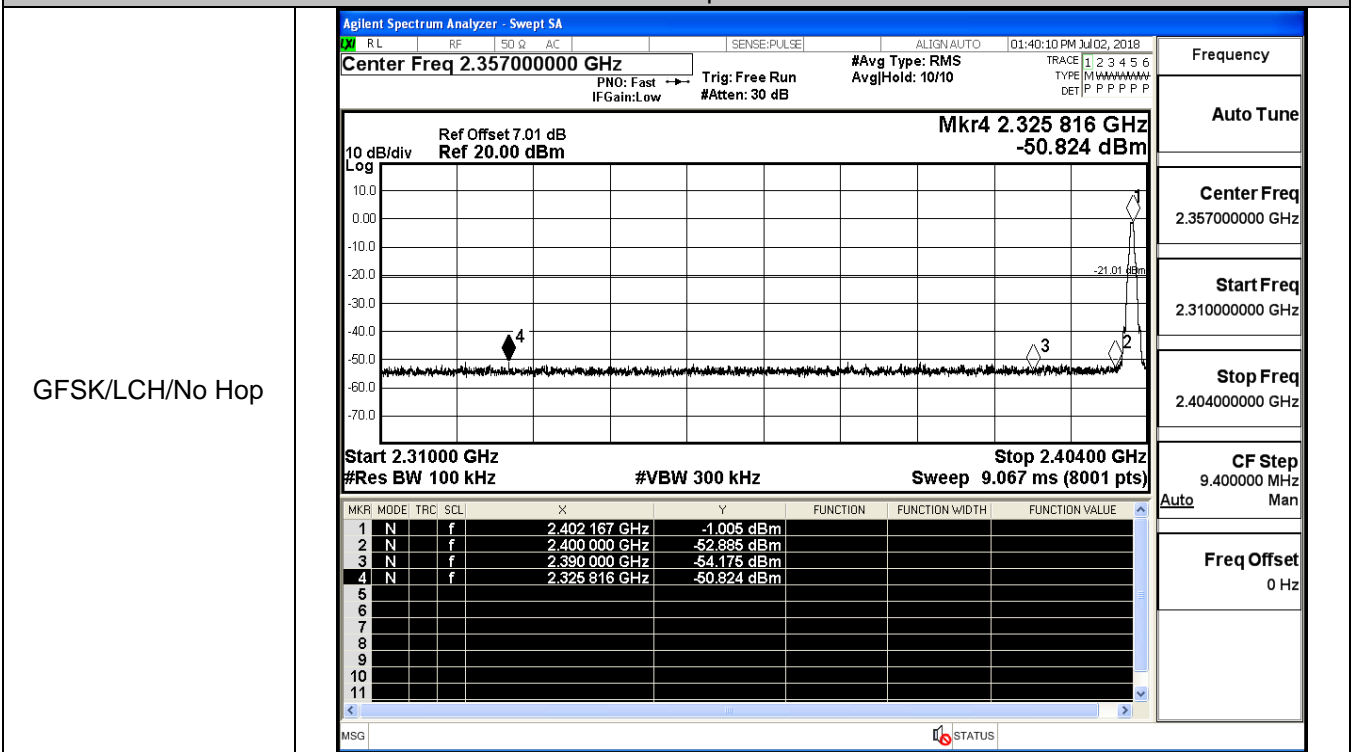
Puw



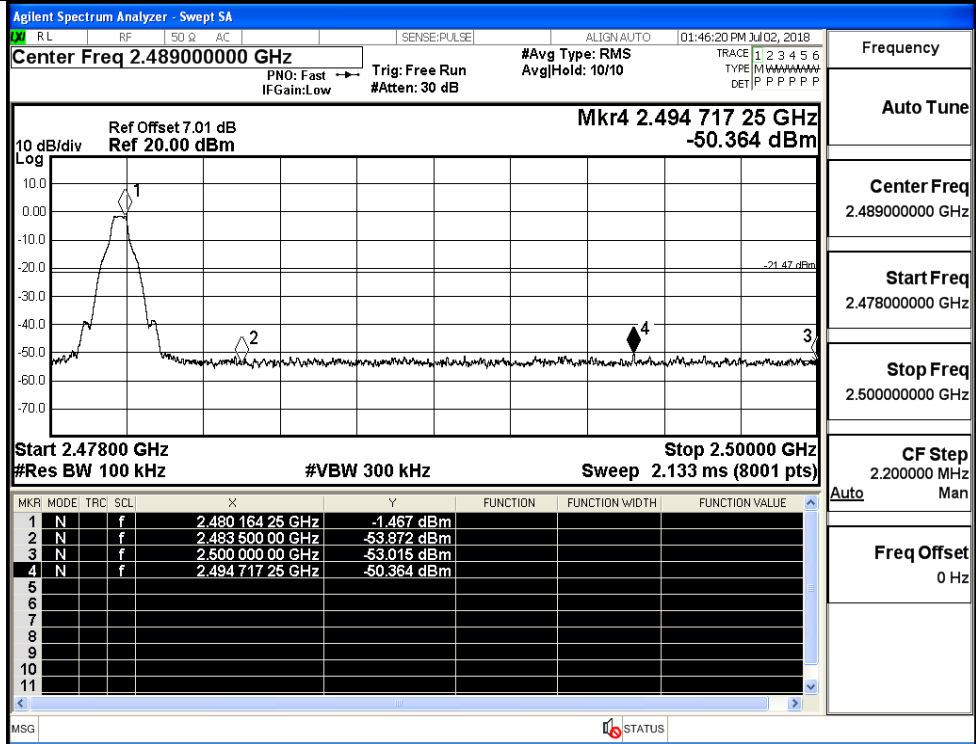
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.005	Off	-50.824	-21.01	PASS
			-1.233	On	-50.816	-21.23	PASS
	HCH	2480	-1.467	Off	-50.364	-21.47	PASS
			-1.148	On	-50.404	-21.15	PASS
$\pi/4$ DQPSK	LCH	2402	-2.741	Off	-51.087	-22.74	PASS
			-1.831	On	-50.317	-21.83	PASS
	HCH	2480	-2.251	Off	-50.860	-22.25	PASS
			-1.831	On	-50.356	-21.83	PASS
8DPSK	LCH	2402	-2.431	Off	-51.118	-22.43	PASS
			-2.012	On	-50.055	-22.01	PASS
	HCH	2480	-2.005	Off	-50.390	-22.01	PASS
			-2.039	On	-48.630	-22.04	PASS

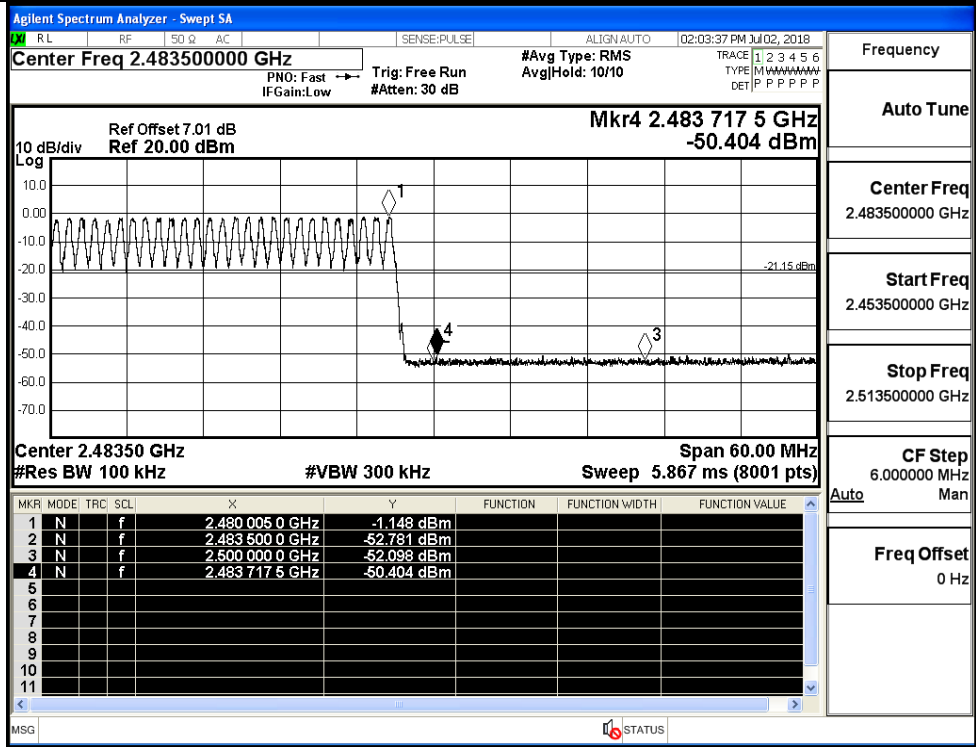
Test Graphs



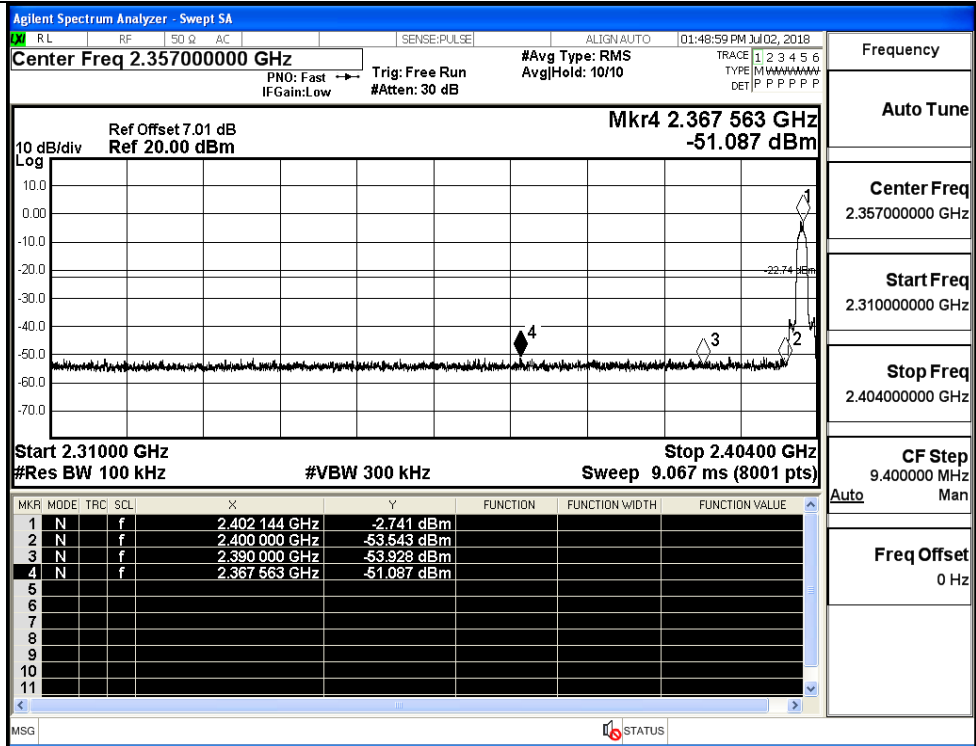
GFSK/HCH/No Hop



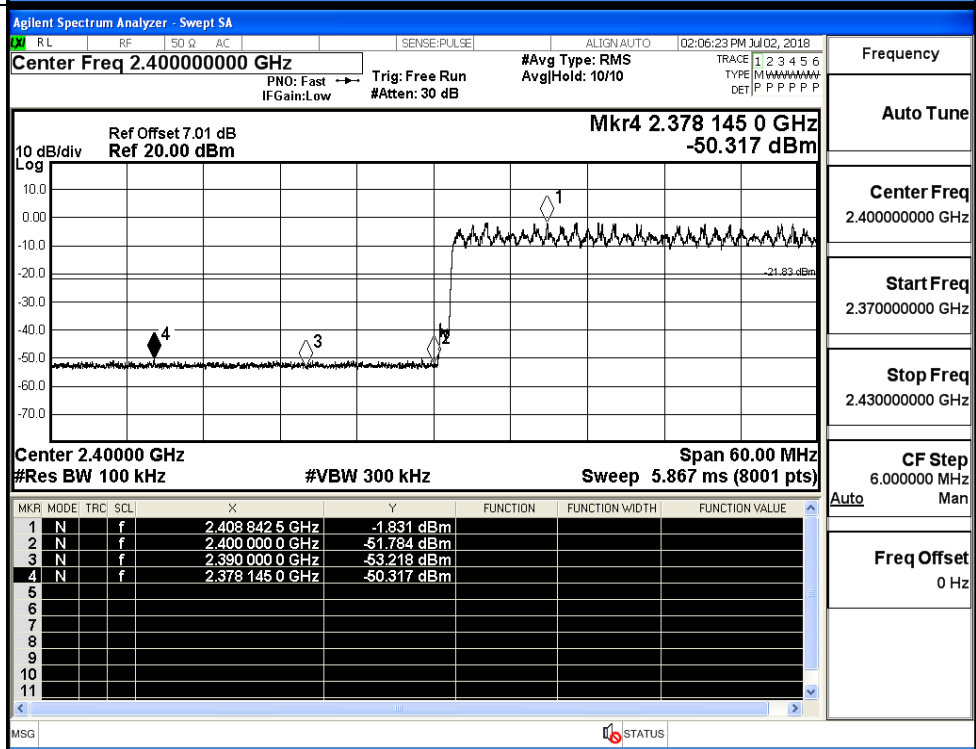
GFSK/HCH/Hop



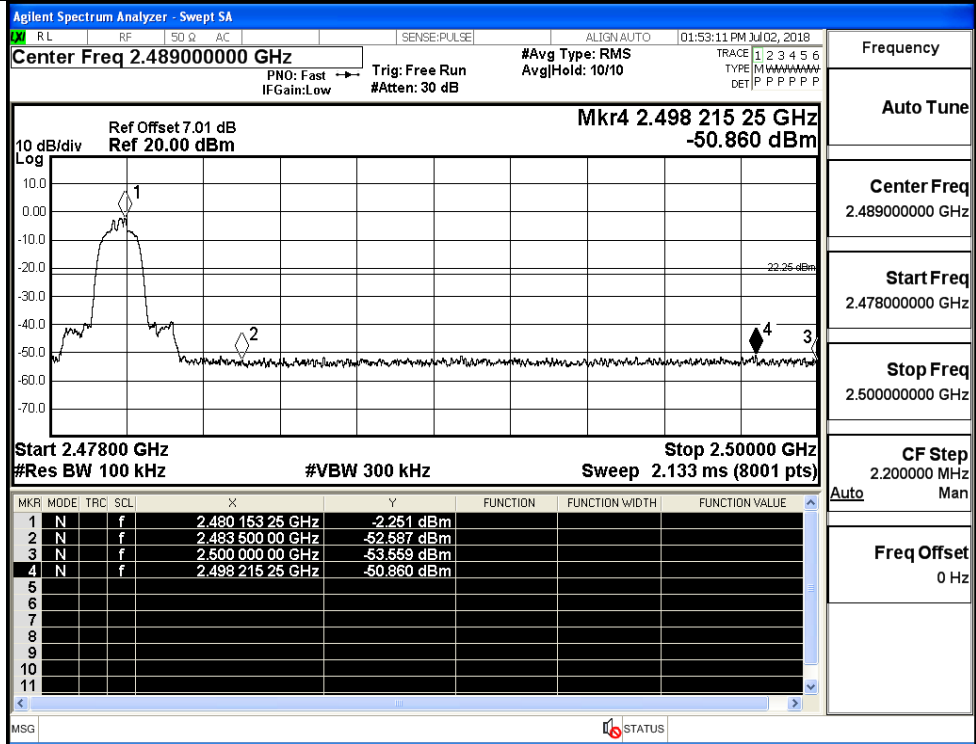
$\pi/4$ DQPSK/LCH/No
Hop



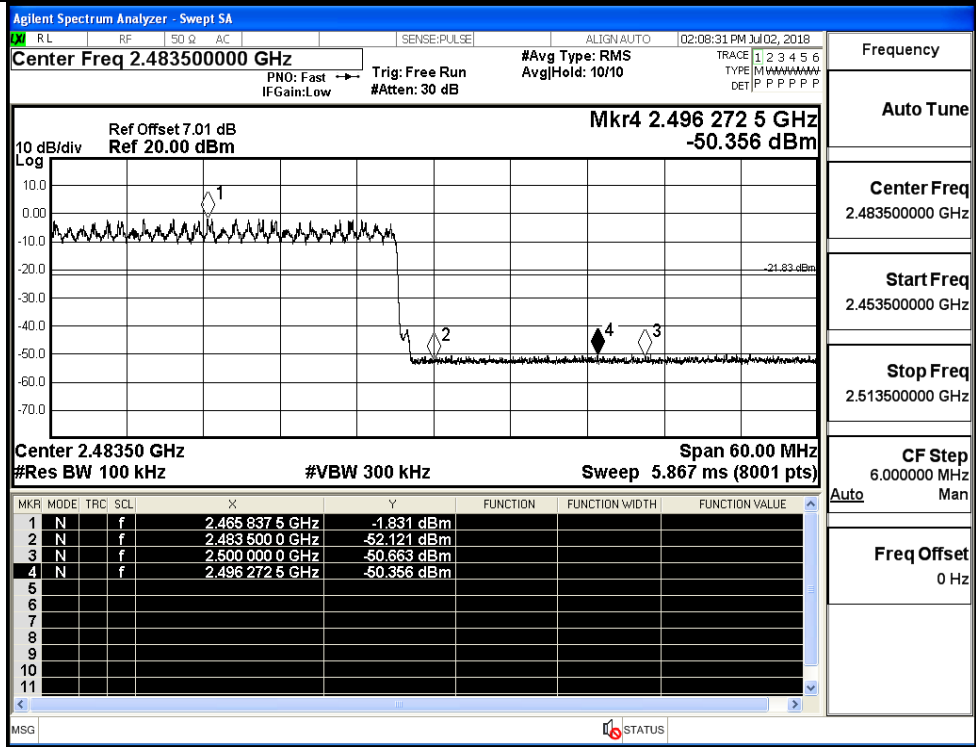
$\pi/4$ DQPSK/LCH/Hop



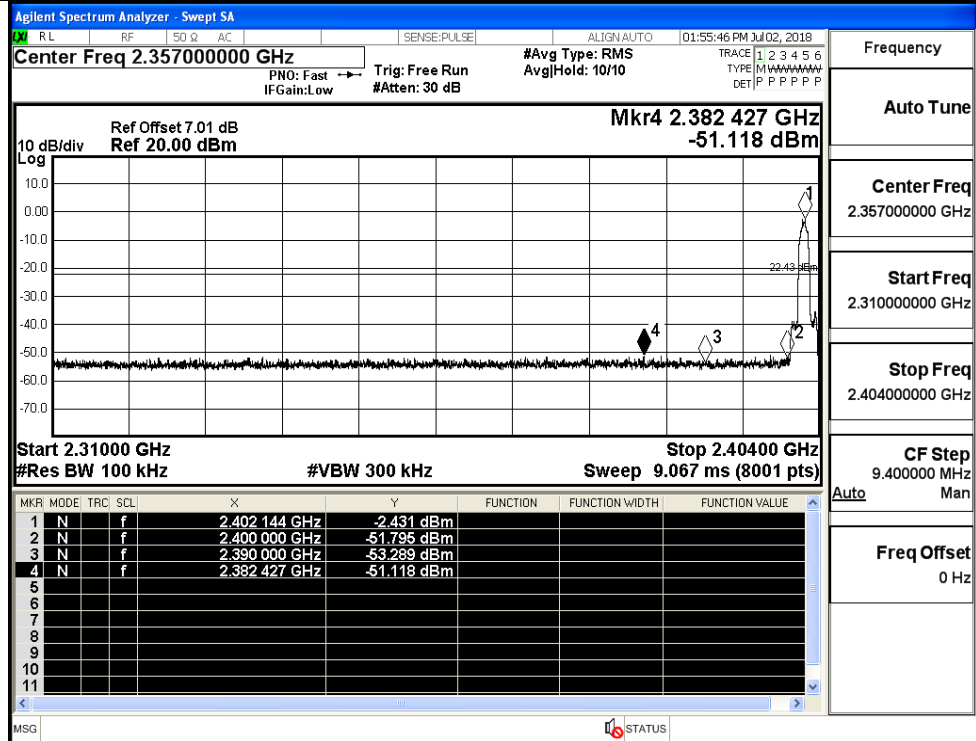
$\pi/4$ DQPSK/HCH/No
Hop



$\pi/4$ DQPSK/HCH/Hop

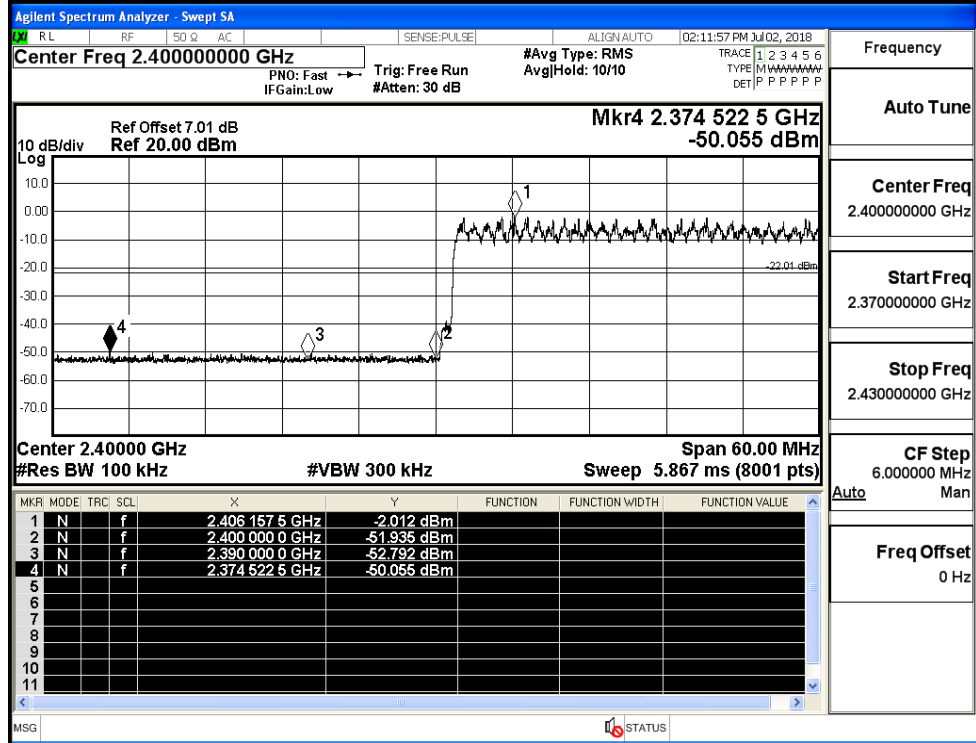


8DPSK/LCH/No Hop



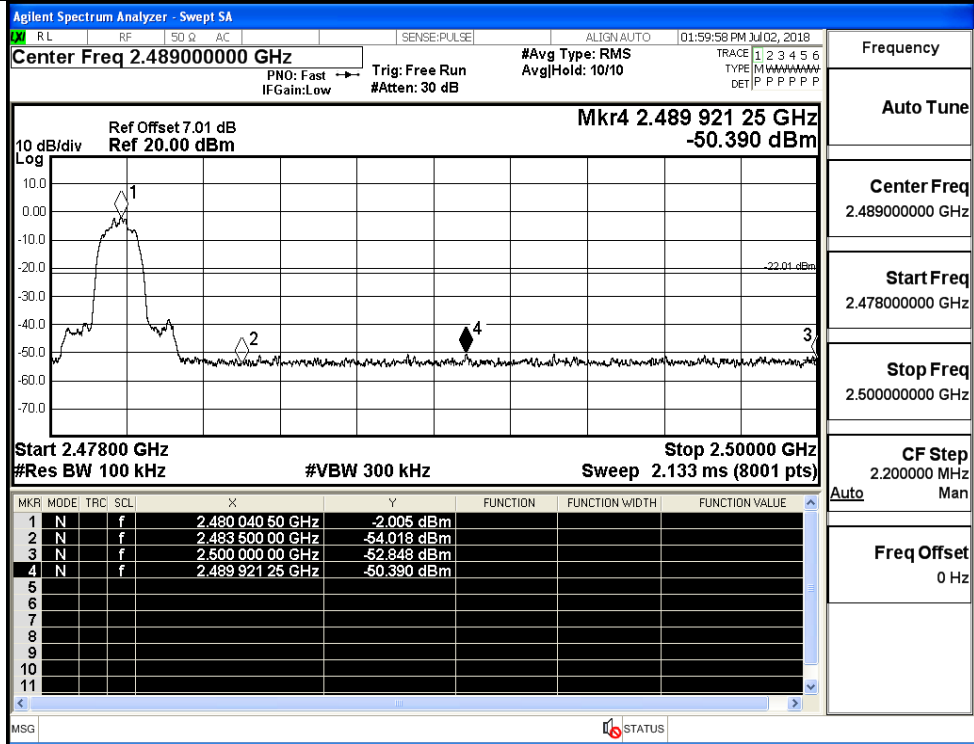
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Center Freq
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Start Freq
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Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop

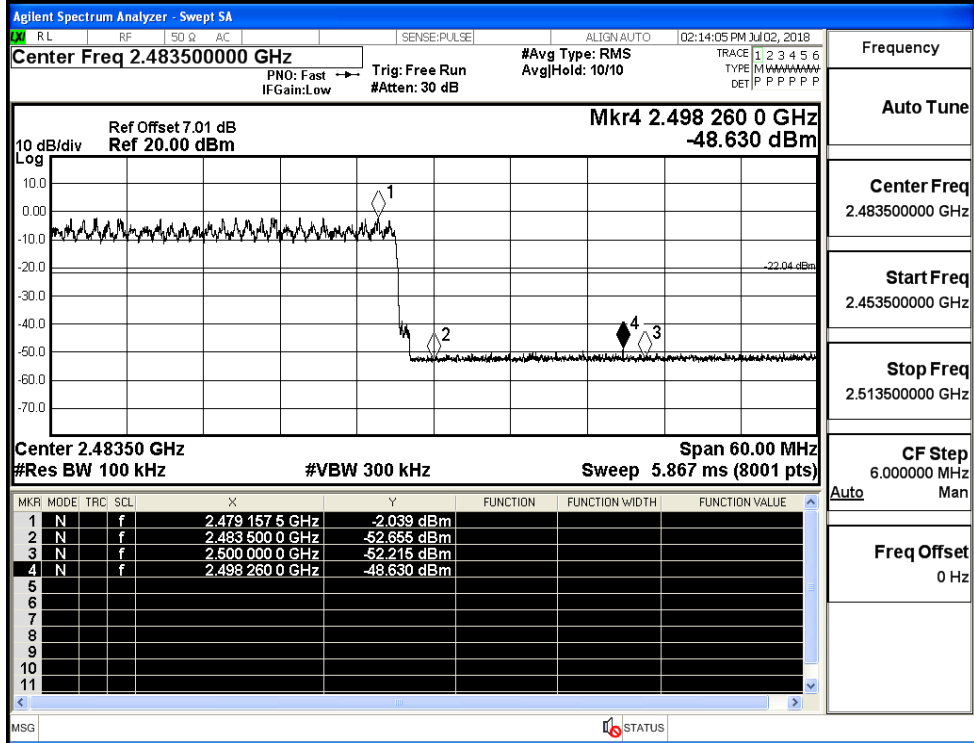


Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/HCH/No Hop



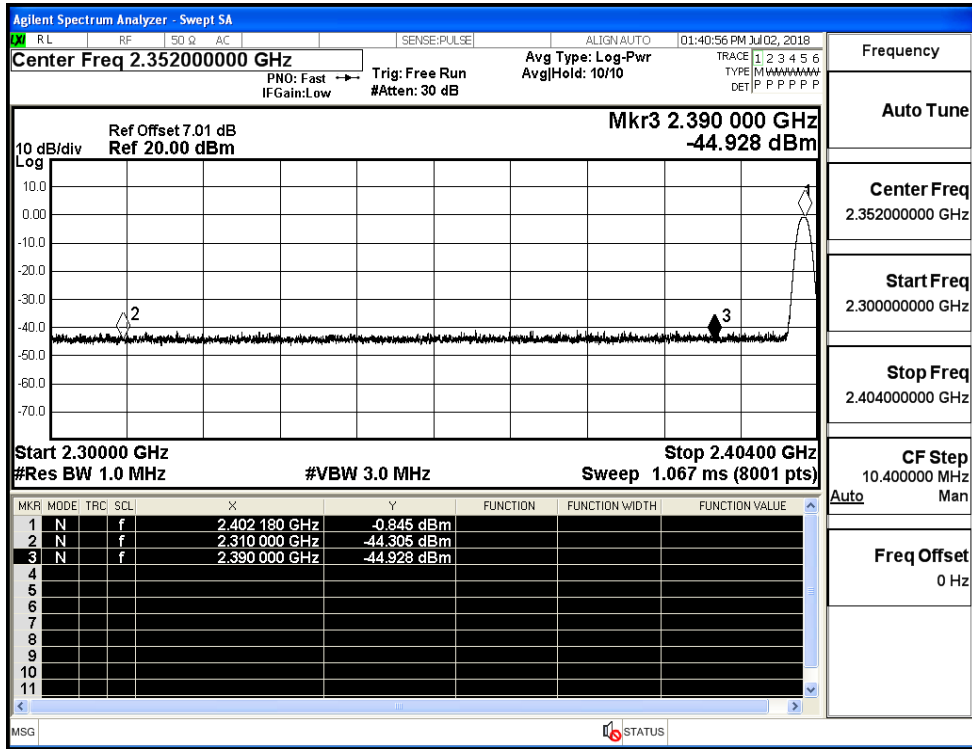
8DPSK/HCH/Hop



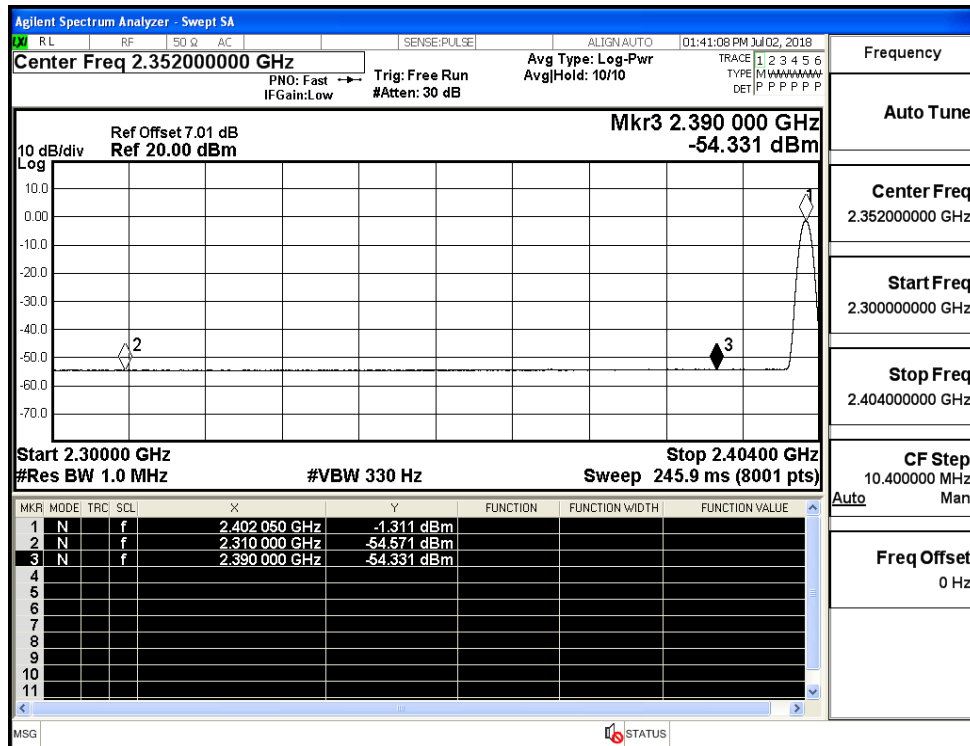
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.31	2.0	0	52.95	PEAK	74	PASS
	Off	2310.0	-54.57	2.0	0	42.69	AV	54	PASS
	Off	2390.0	-44.93	2.0	0	52.33	PEAK	74	PASS
	Off	2390.0	-54.33	2.0	0	42.93	AV	54	PASS
	Off	2483.5	-44.13	2.0	0	53.13	PEAK	74	PASS
	Off	2483.5	-54.13	2.0	0	43.13	AV	54	PASS
	Off	2500.0	-43.25	2.0	0	54.00	PEAK	74	PASS
	Off	2500.0	-53.95	2.0	0	43.30	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.57	2.0	0	53.69	PEAK	74	PASS
	Off	2310.0	-54.69	2.0	0	42.57	AV	54	PASS
	Off	2390.0	-44.04	2.0	0	53.22	PEAK	74	PASS
	Off	2390.0	-54.42	2.0	0	42.84	AV	54	PASS
	Off	2483.5	-43.25	2.0	0	54.01	PEAK	74	PASS
	Off	2483.5	-54.12	2.0	0	43.14	AV	54	PASS
	Off	2500.0	-43.53	2.0	0	53.73	PEAK	74	PASS
	Off	2500.0	-53.95	2.0	0	43.31	AV	54	PASS
8DPSK	Off	2310.0	-45.16	2.0	0	52.10	PEAK	74	PASS
	Off	2310.0	-54.66	2.0	0	42.60	AV	54	PASS
	Off	2390.0	-44.18	2.0	0	53.08	PEAK	74	PASS
	Off	2390.0	-54.46	2.0	0	42.80	AV	54	PASS
	Off	2483.5	-43.61	2.0	0	53.65	PEAK	74	PASS
	Off	2483.5	-54.11	2.0	0	43.15	AV	54	PASS
	Off	2500.0	-43.78	2.0	0	53.48	PEAK	74	PASS
	Off	2500.0	-53.98	2.0	0	43.28	AV	54	PASS

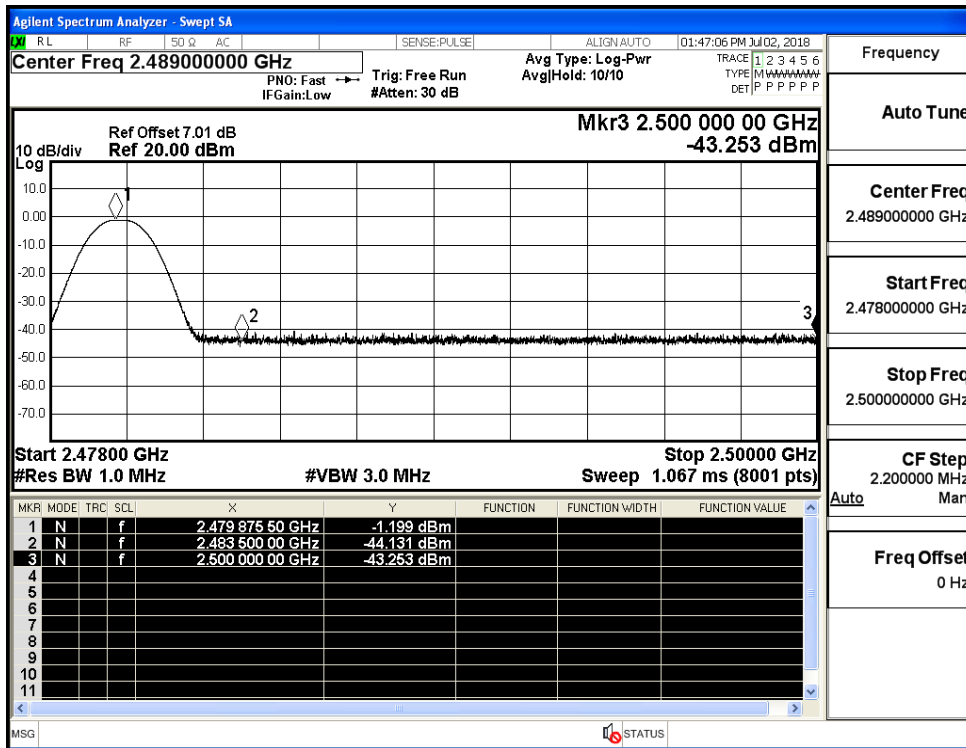
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



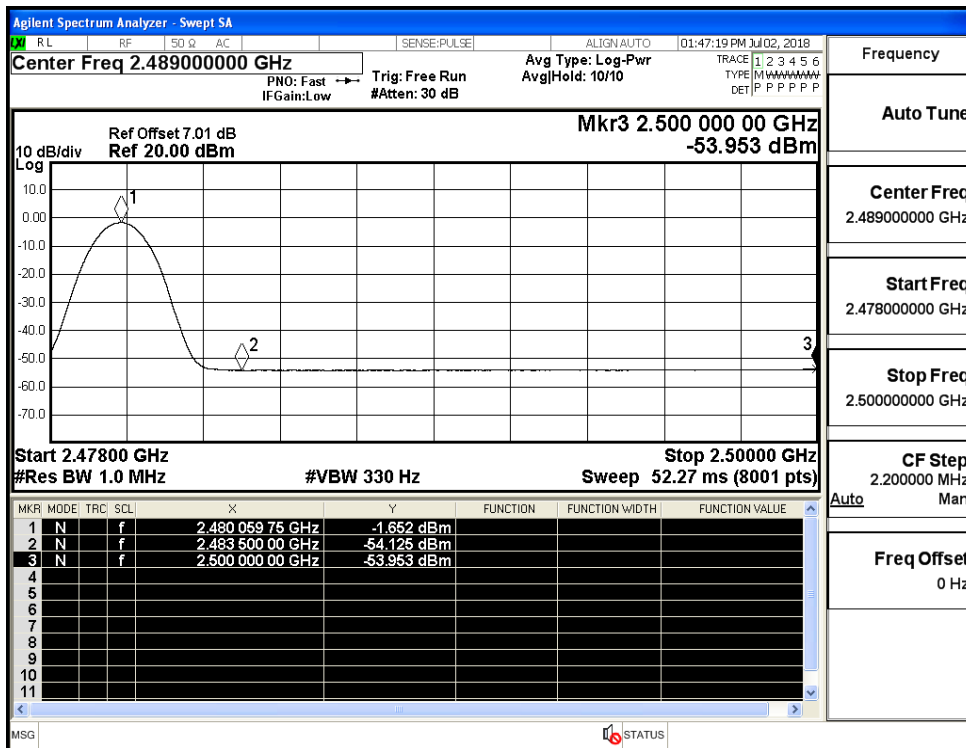
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



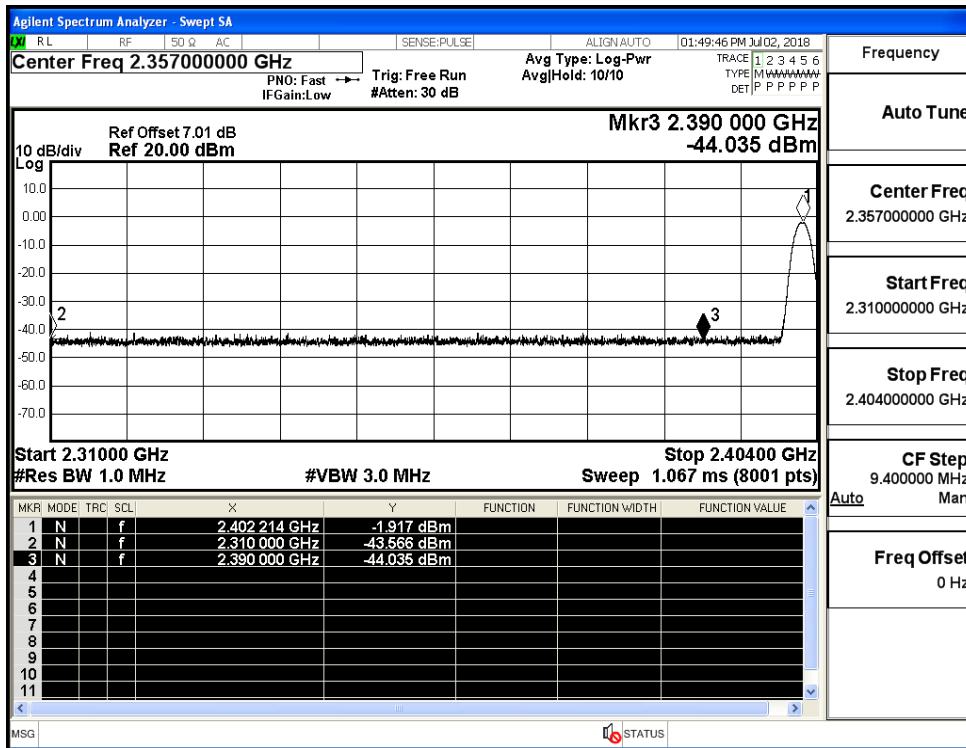
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



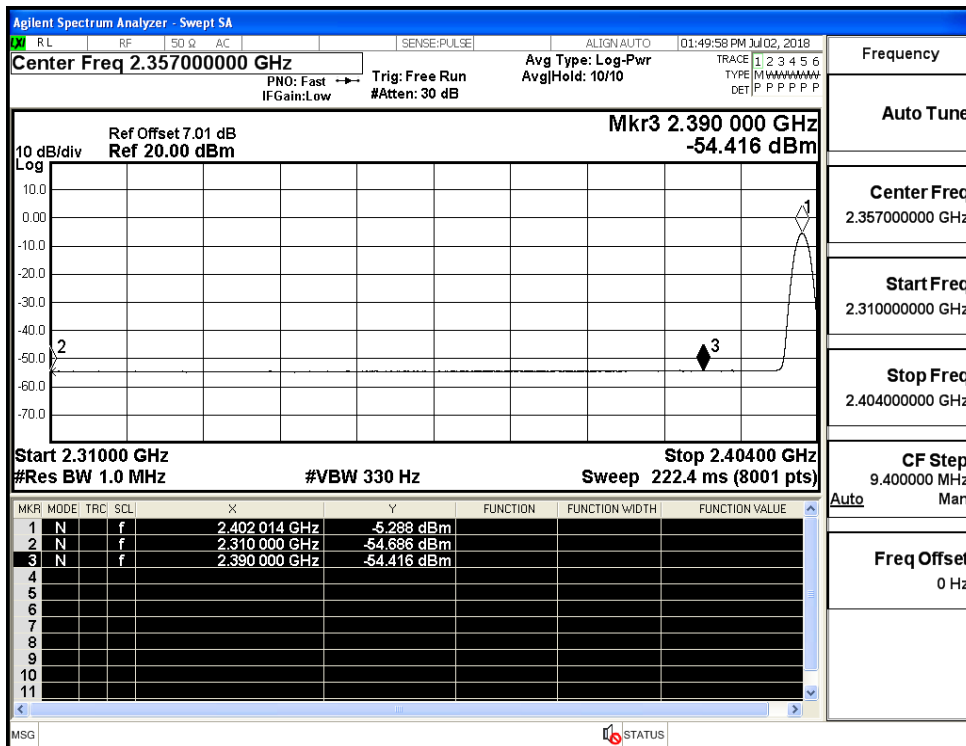
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



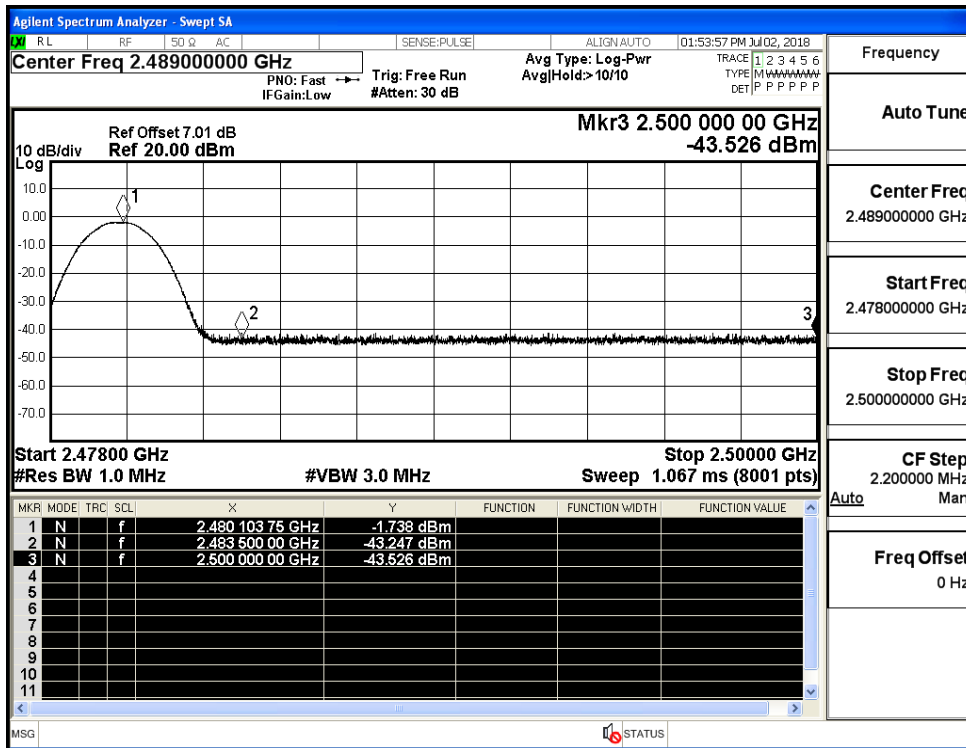
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



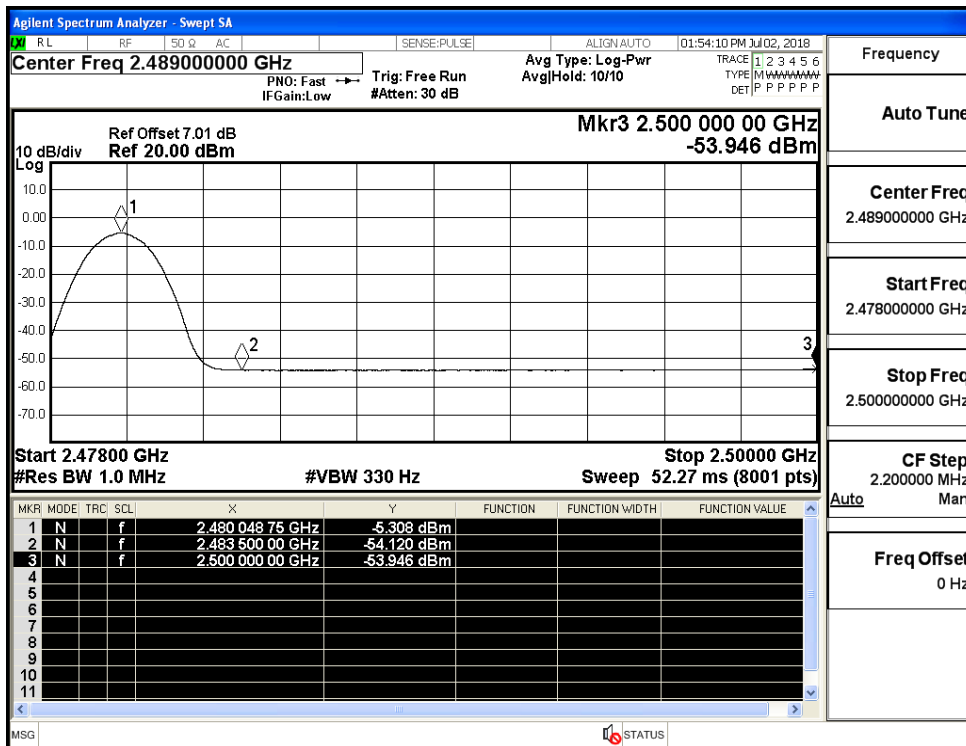
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



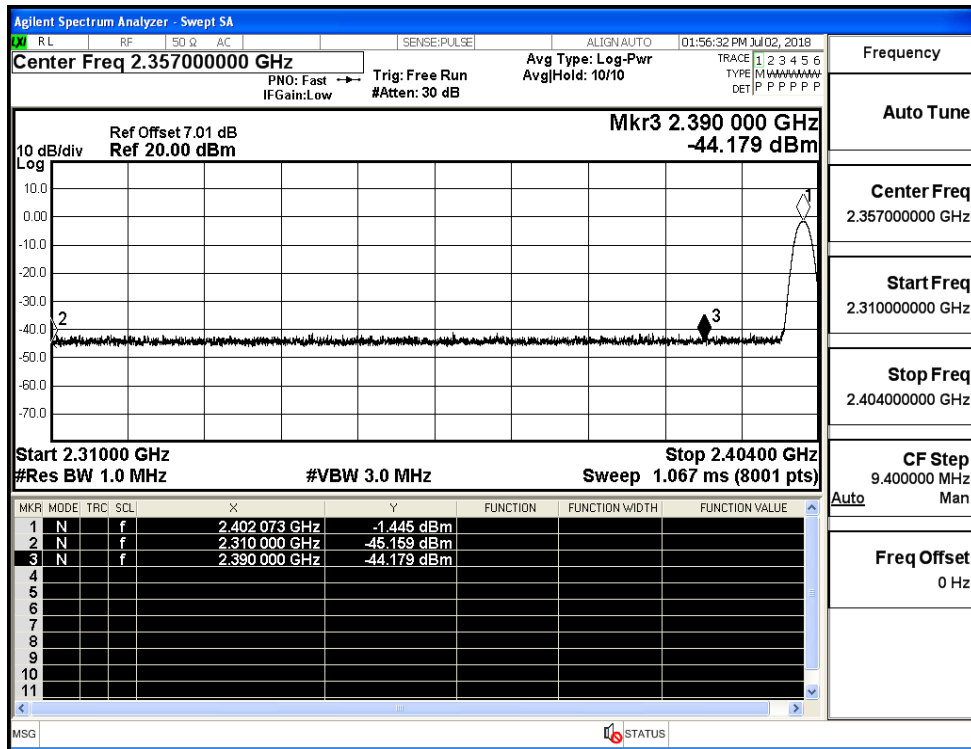
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



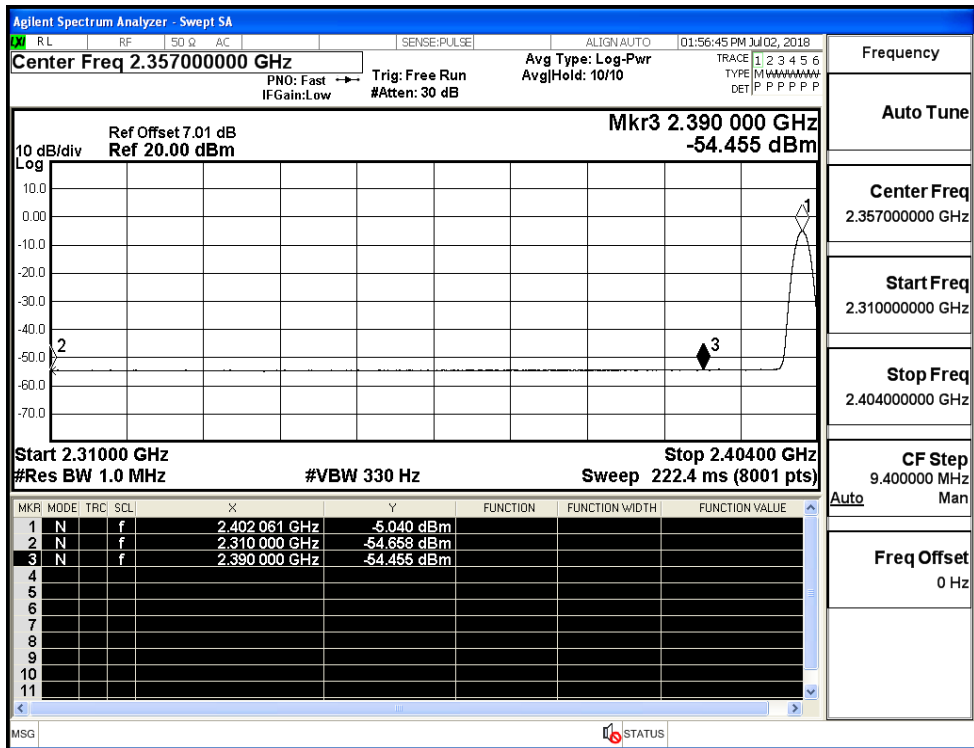
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



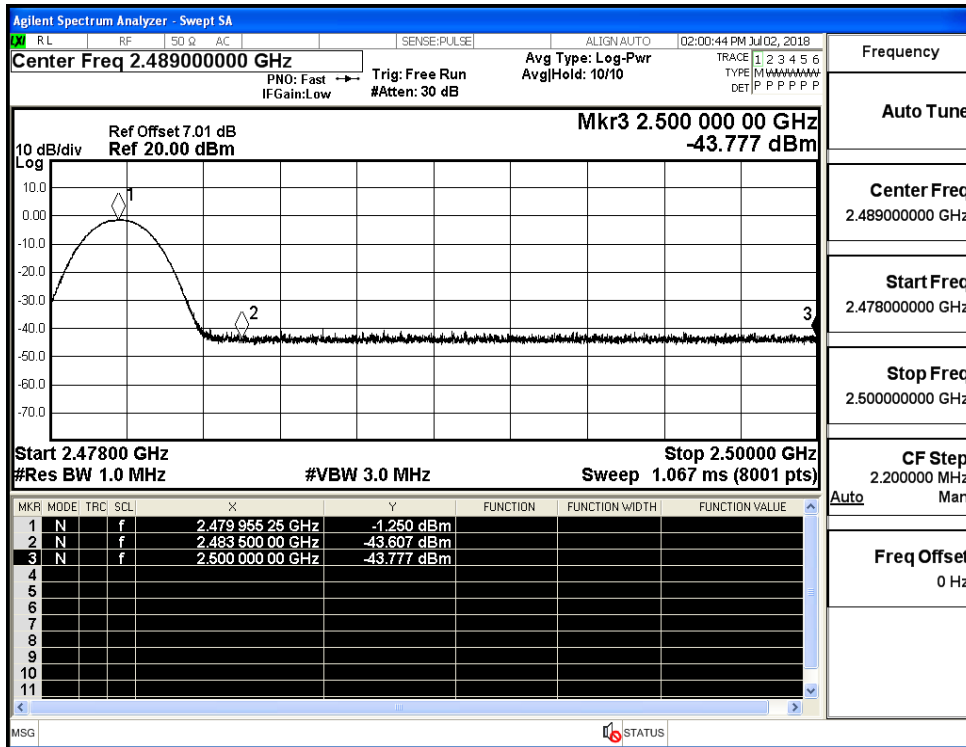
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

