

Appendix A

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

Product Name: Projector

Trade Mark: N/A

Test Model: F-701

Environmental Conditions

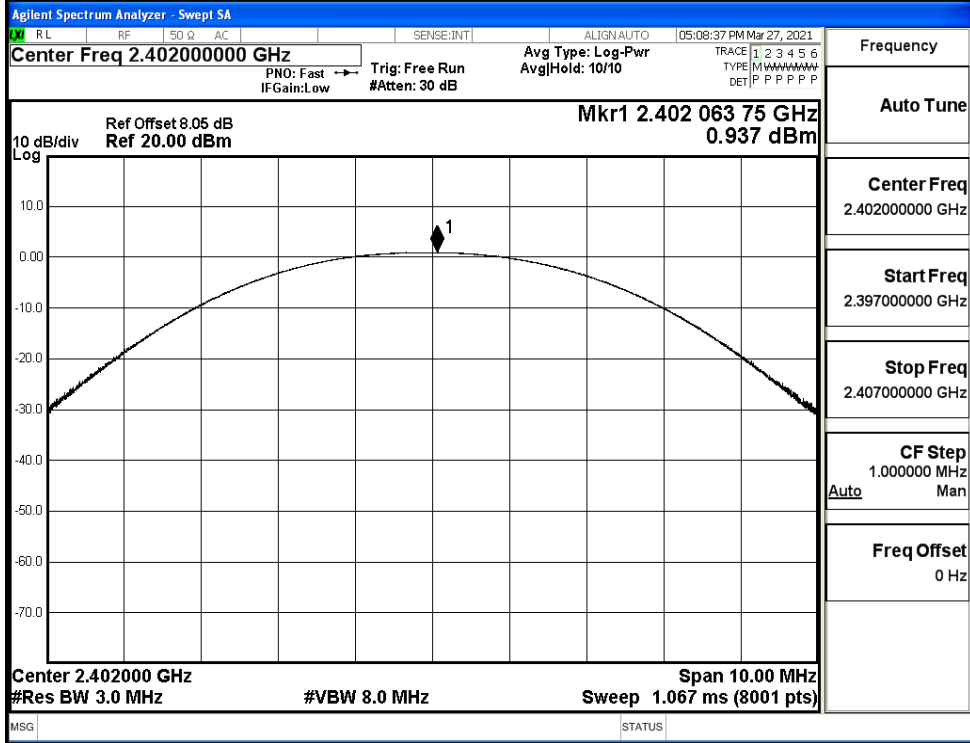
Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond Lu
Supervised by:	Li Huan

A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.937	21	PASS
	MCH	-0.120	21	PASS
	HCH	-0.247	21	PASS
$\pi/4$ DQPSK	LCH	0.073	21	PASS
	MCH	1.979	21	PASS
	HCH	2.006	21	PASS
8DPSK	LCH	0.579	21	PASS
	MCH	2.460	21	PASS
	HCH	2.354	21	PASS

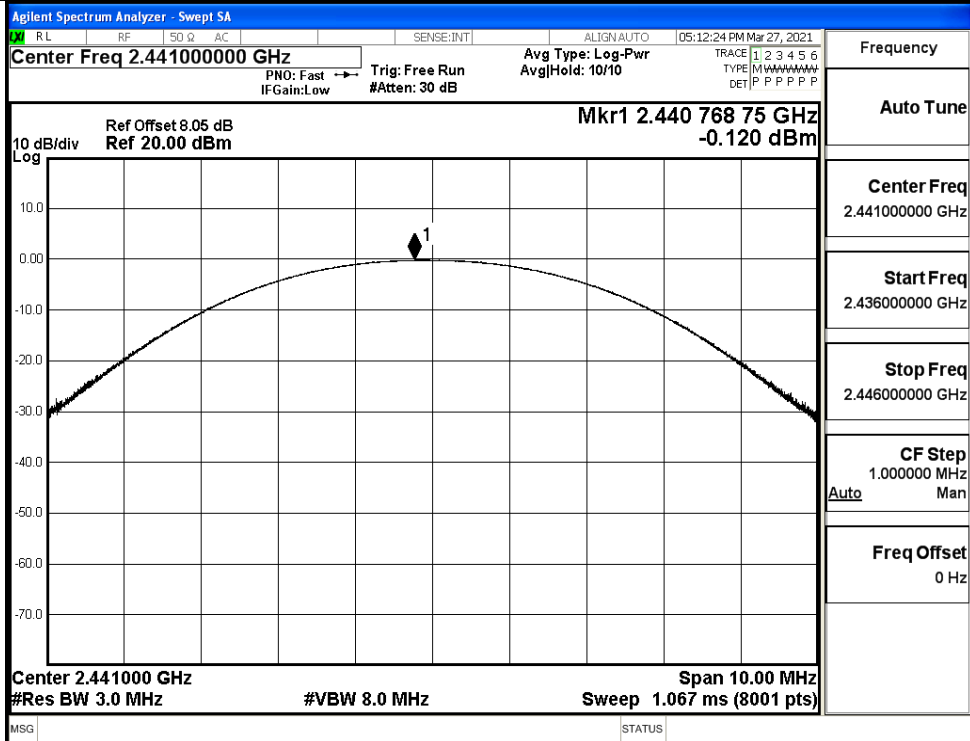
Test Graphs

GFSK/LCH



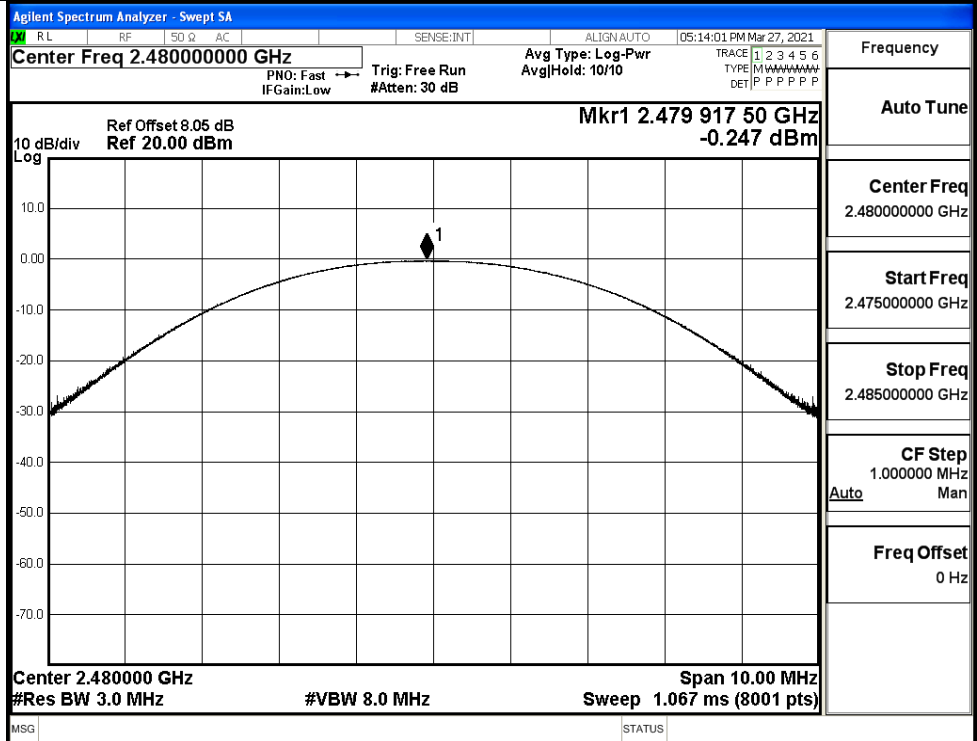
Frequency	2.402000000 GHz
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.397000000 GHz
Stop Freq	2.407000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK/MCH

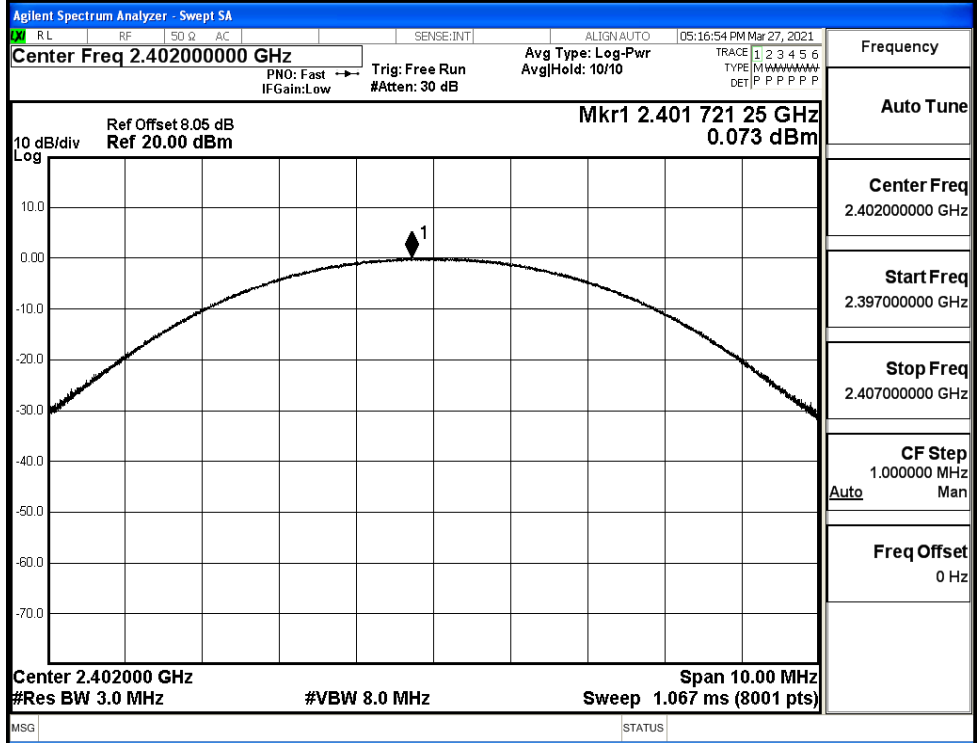


Frequency	2.441000000 GHz
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.436000000 GHz
Stop Freq	2.446000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

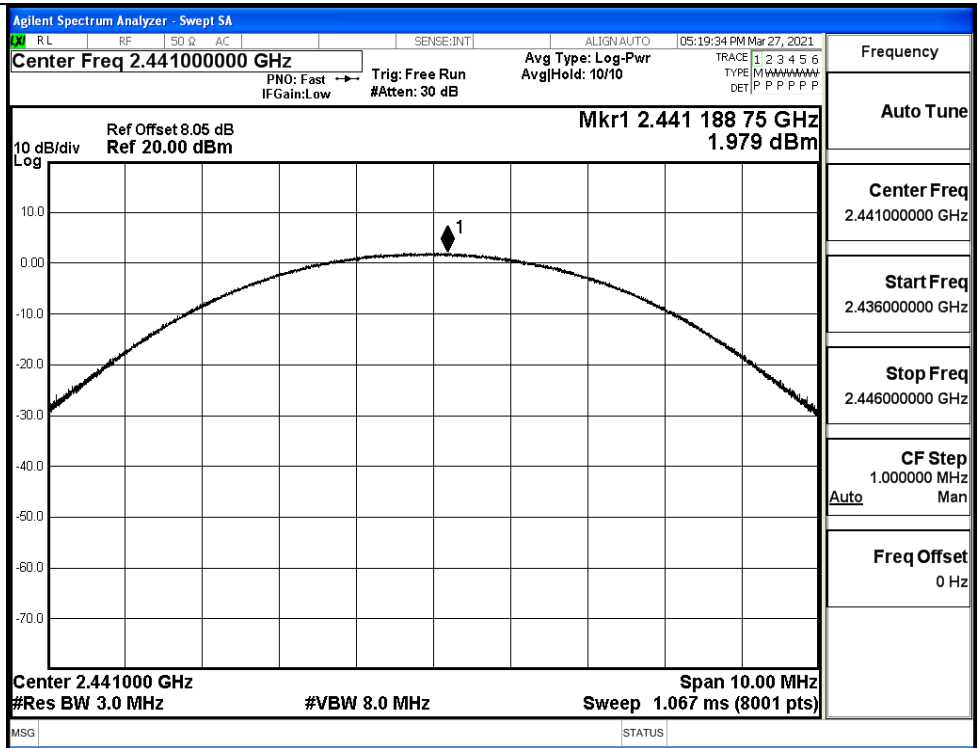
GFSK/HCH



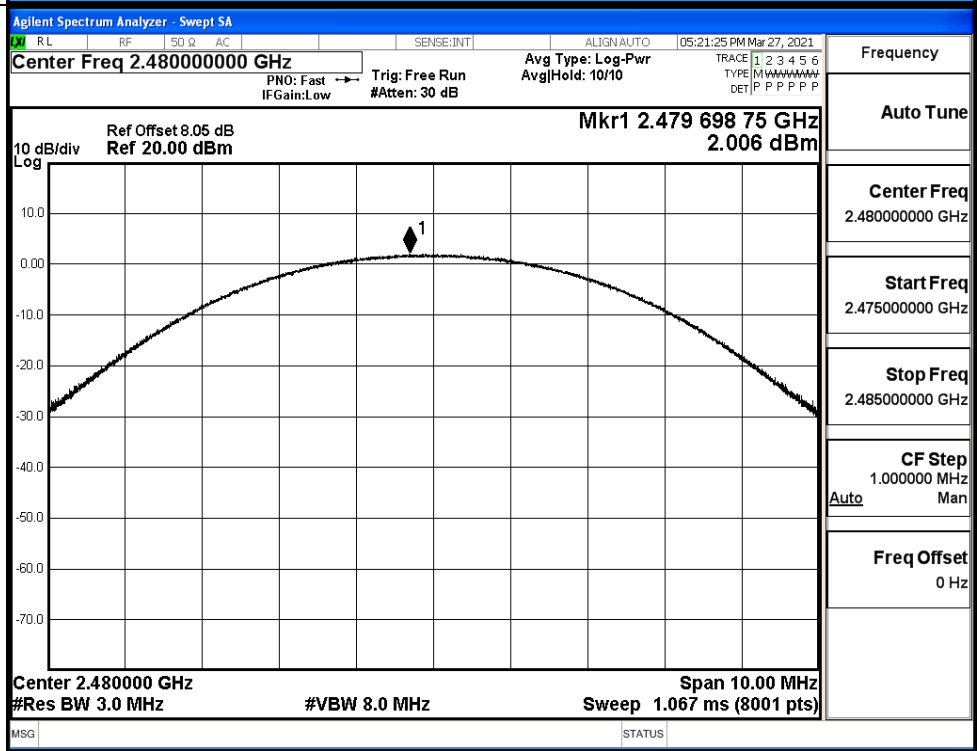
$\pi/4$ DQPSK/LCH



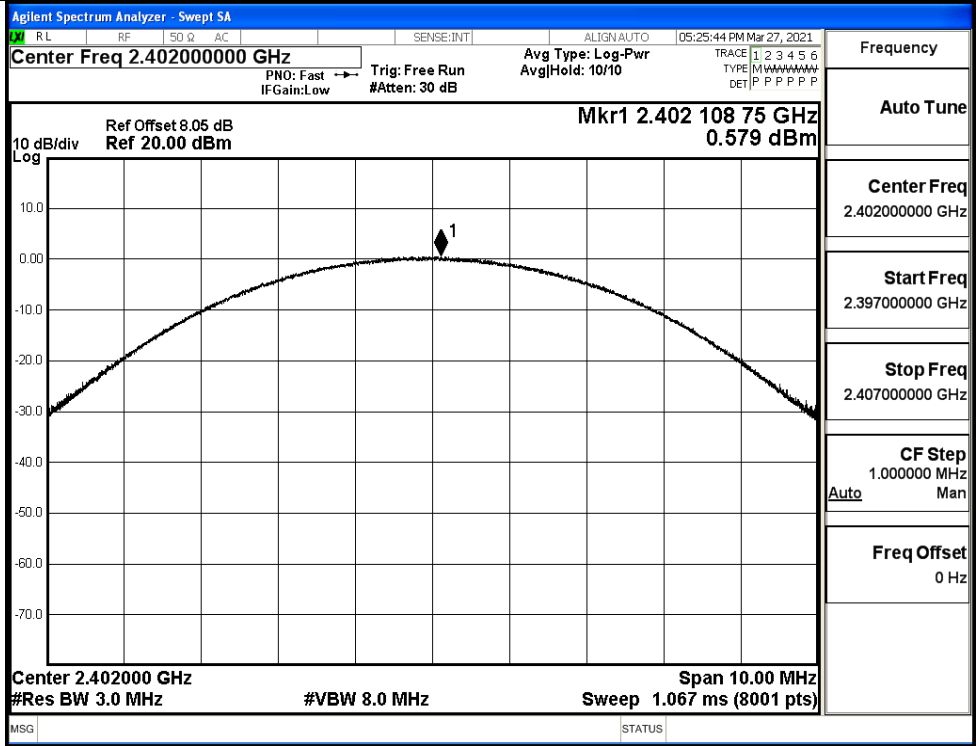
$\pi/4$ DQPSK/MCH



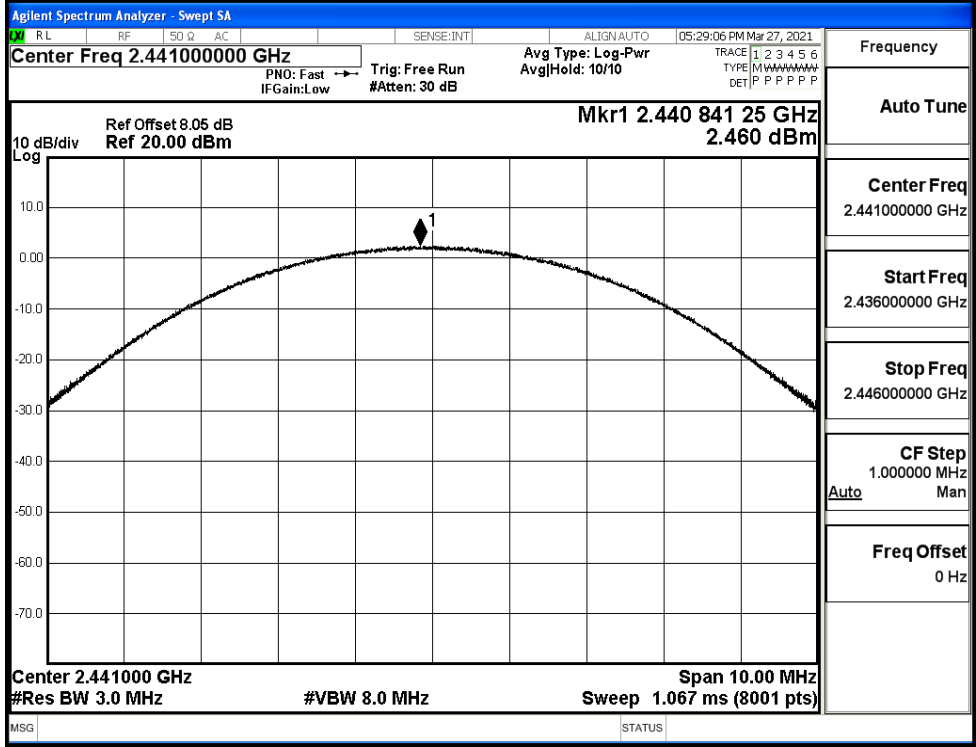
$\pi/4$ DQPSK/HCH



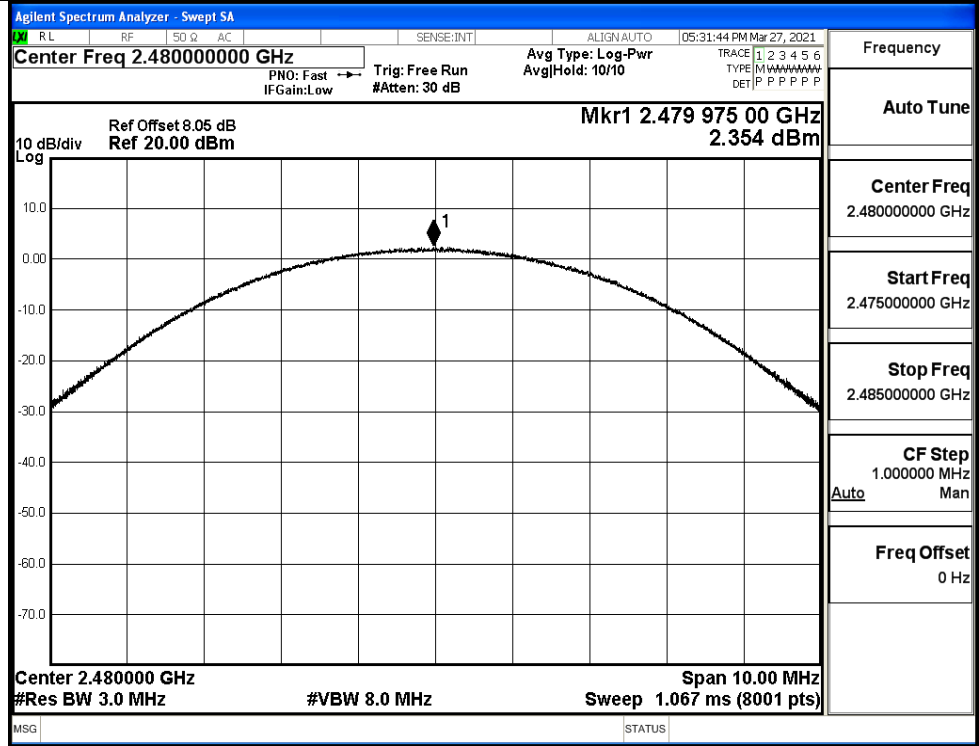
8DPSK/LCH



8DPSK/MCH

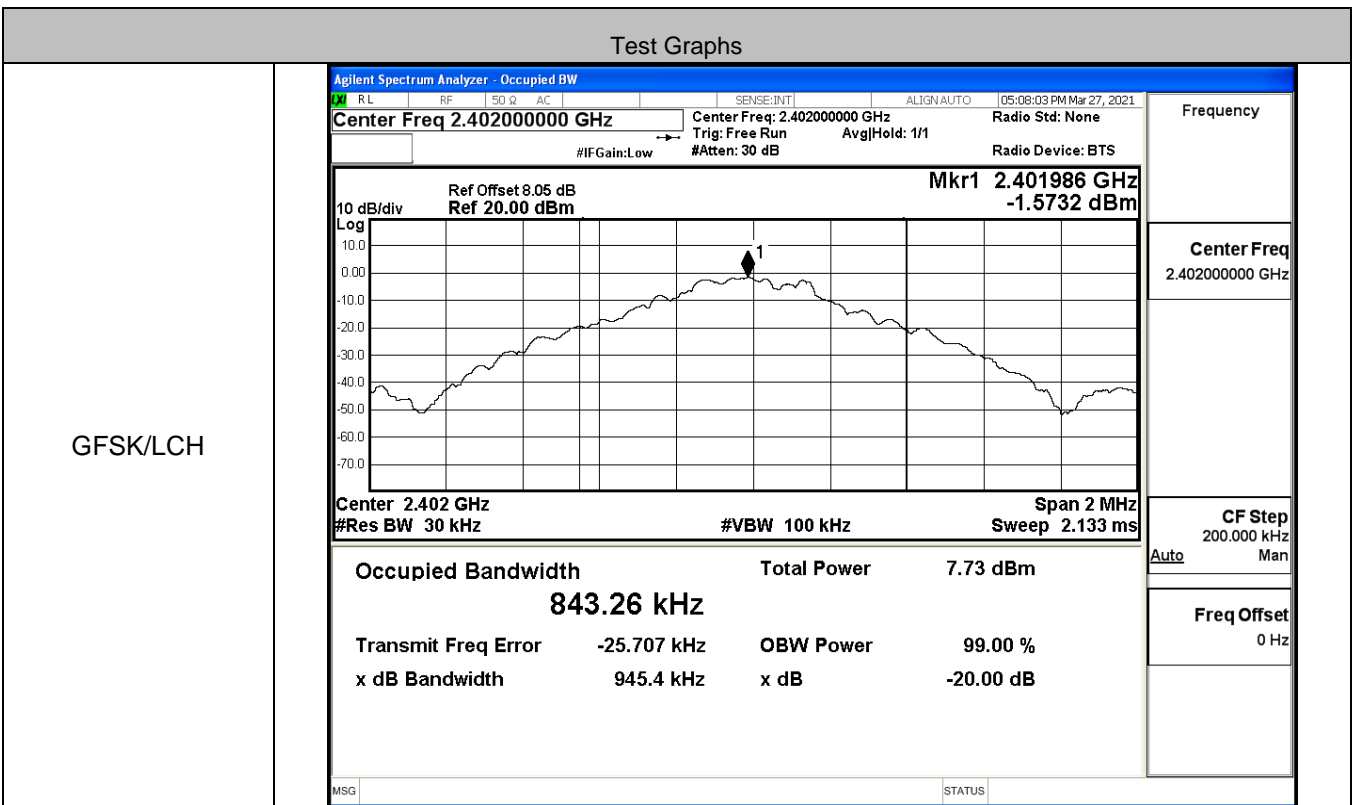


8DPSK/HCH

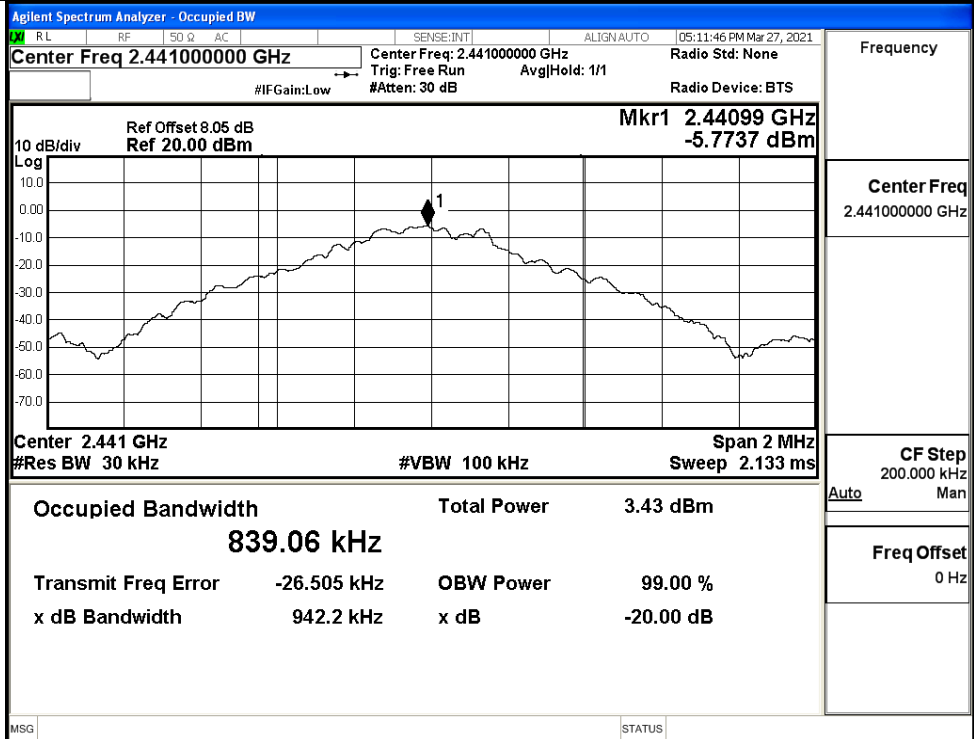


A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9454	Not Specified	PASS
	MCH	0.9422	Not Specified	PASS
	HCH	0.9389	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.319	Not Specified	PASS
	MCH	1.315	Not Specified	PASS
	HCH	1.315	Not Specified	PASS
8DPSK	LCH	1.314	Not Specified	PASS
	MCH	1.313	Not Specified	PASS
	HCH	1.311	Not Specified	PASS

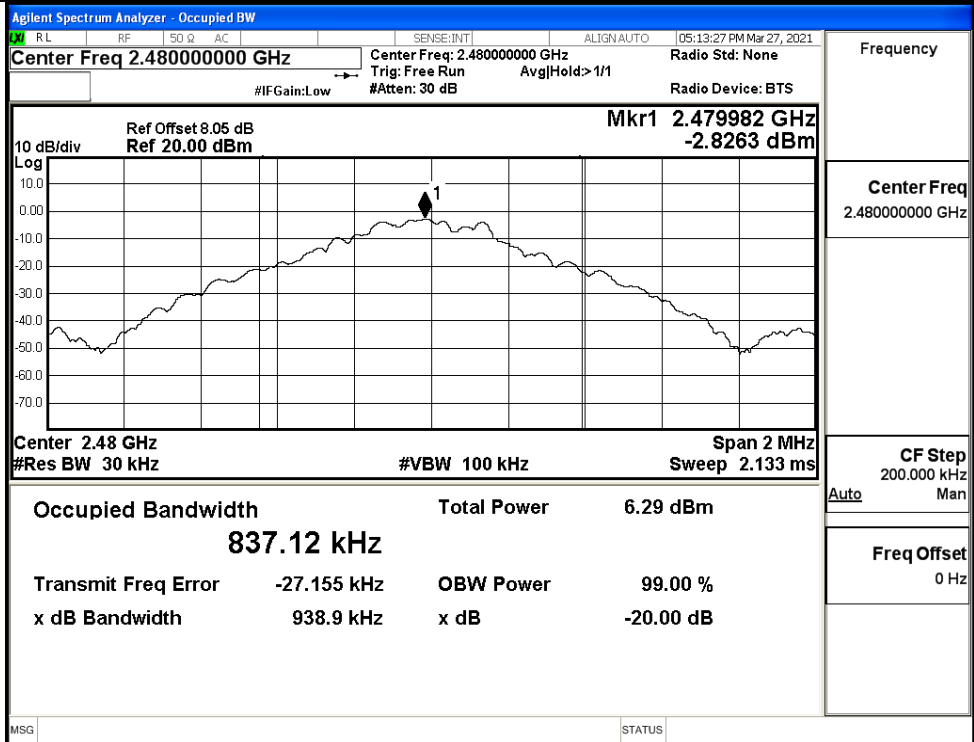


GFSK/MCH



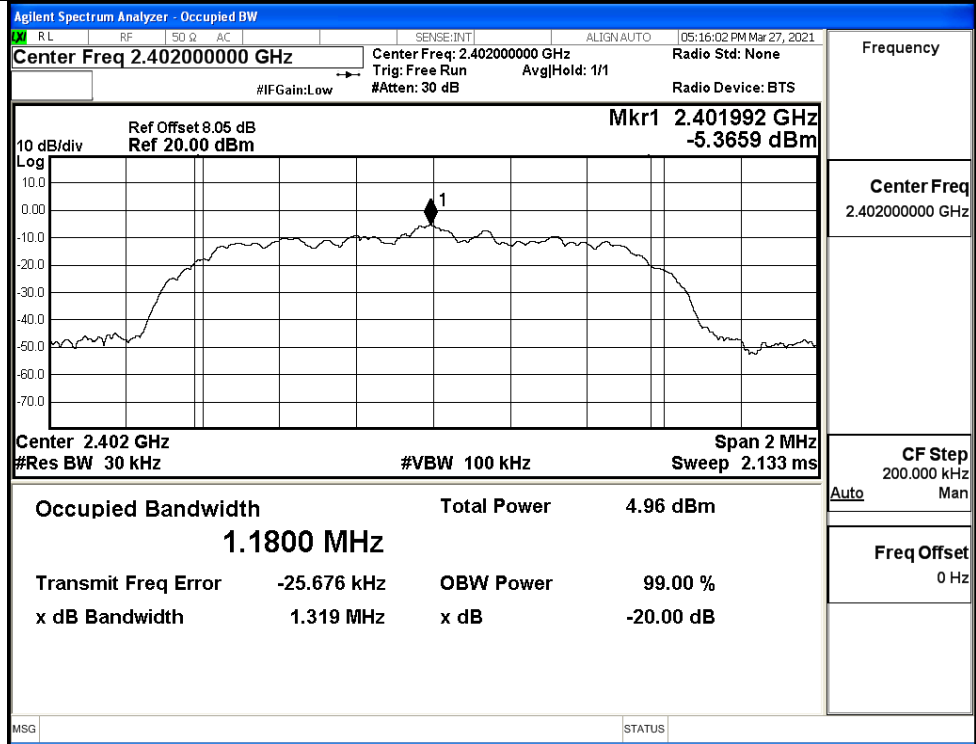
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Center Freq	2.441000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH



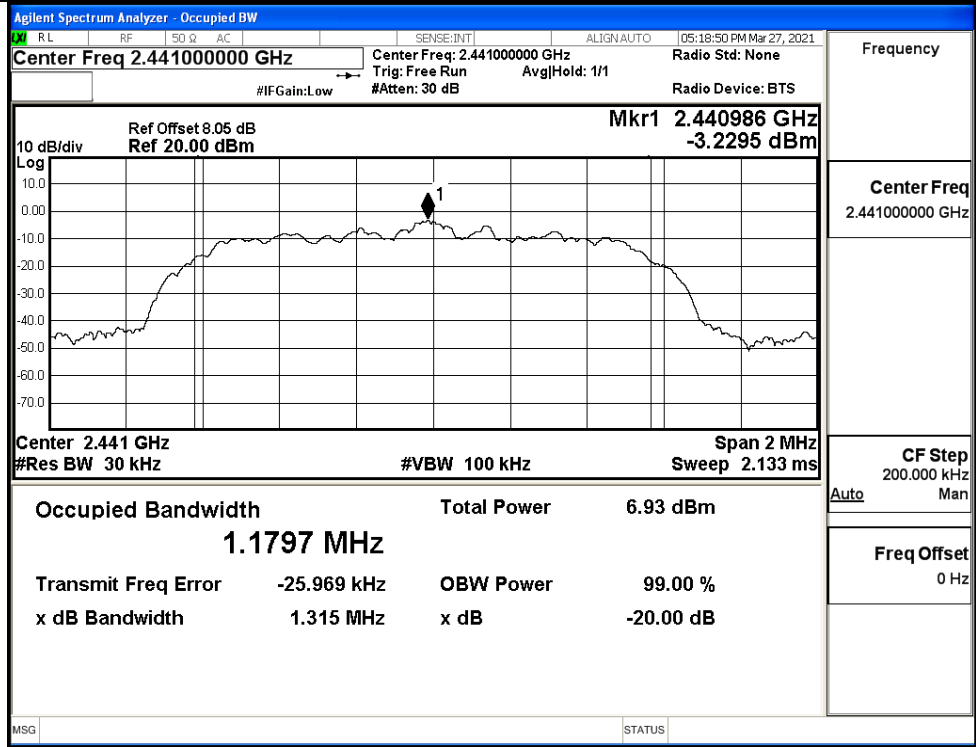
Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH



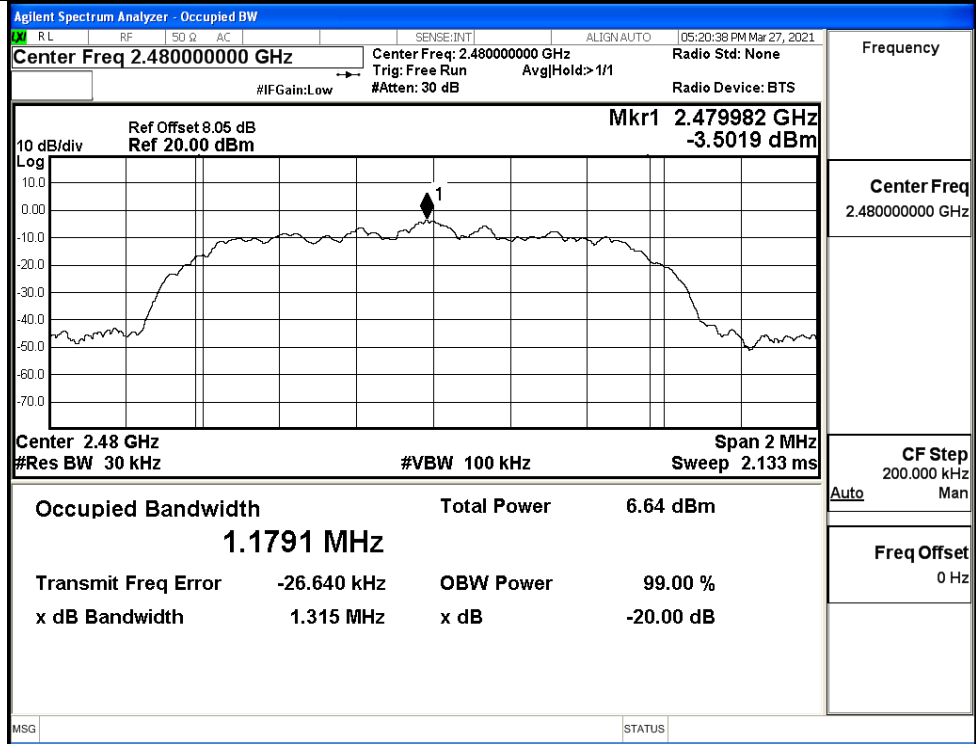
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/MCH

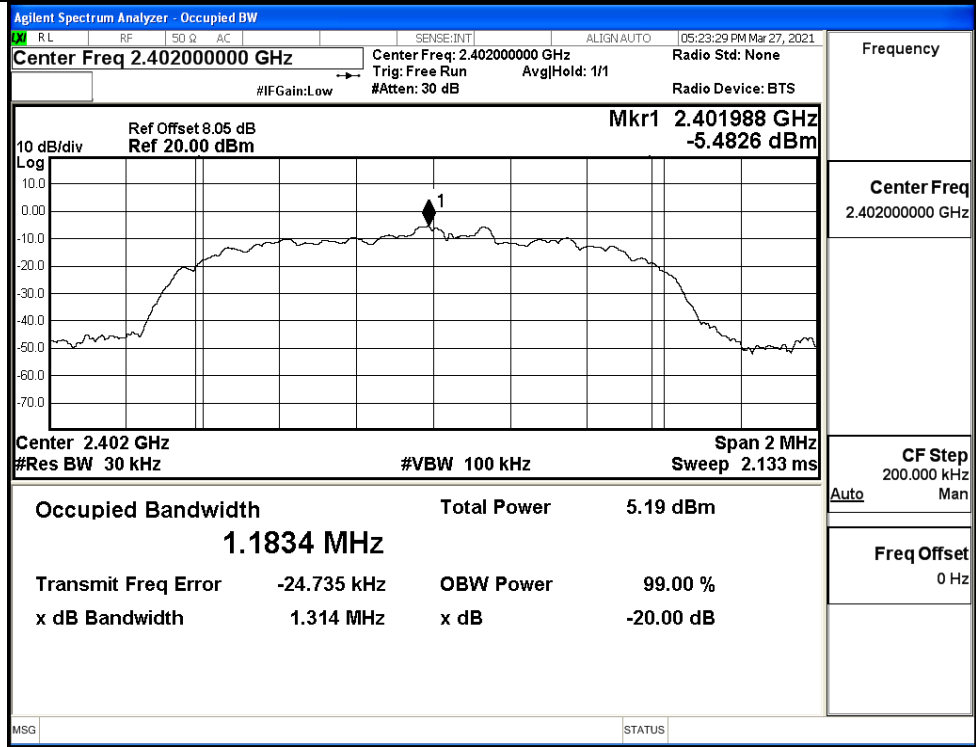


Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

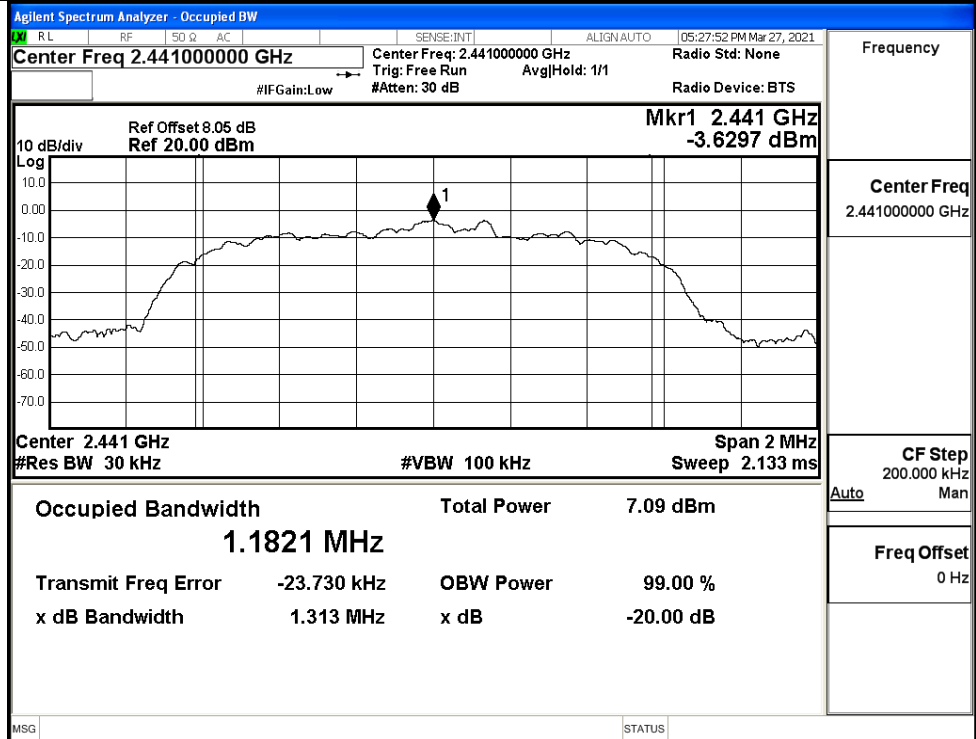
$\pi/4$ DQPSK/HCH



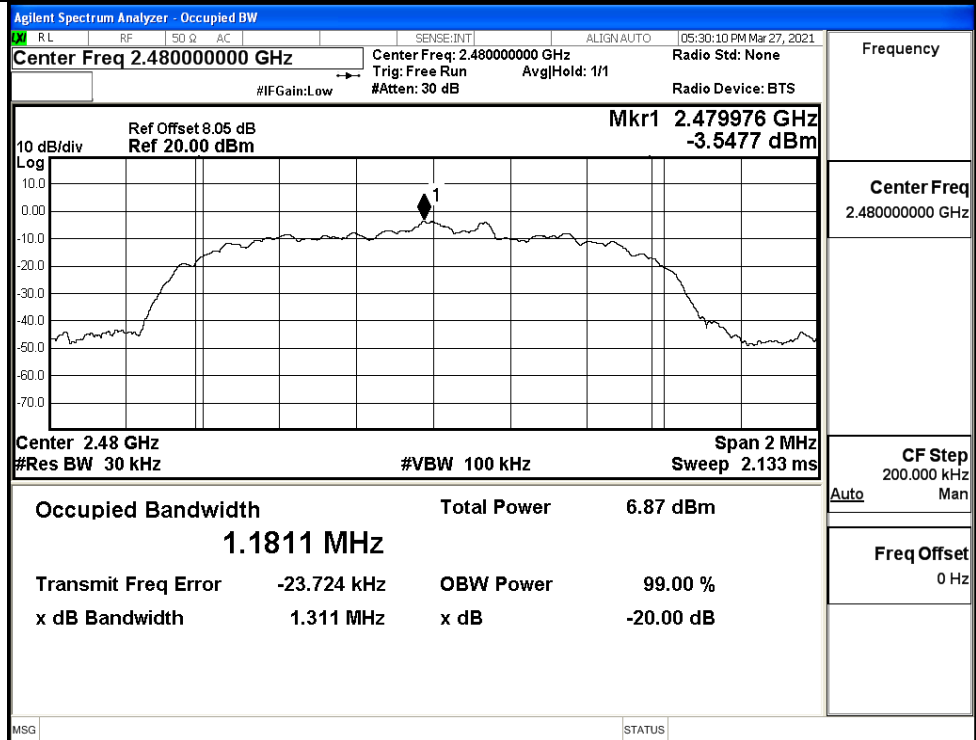
8DPSK/LCH



8DPSK/MCH



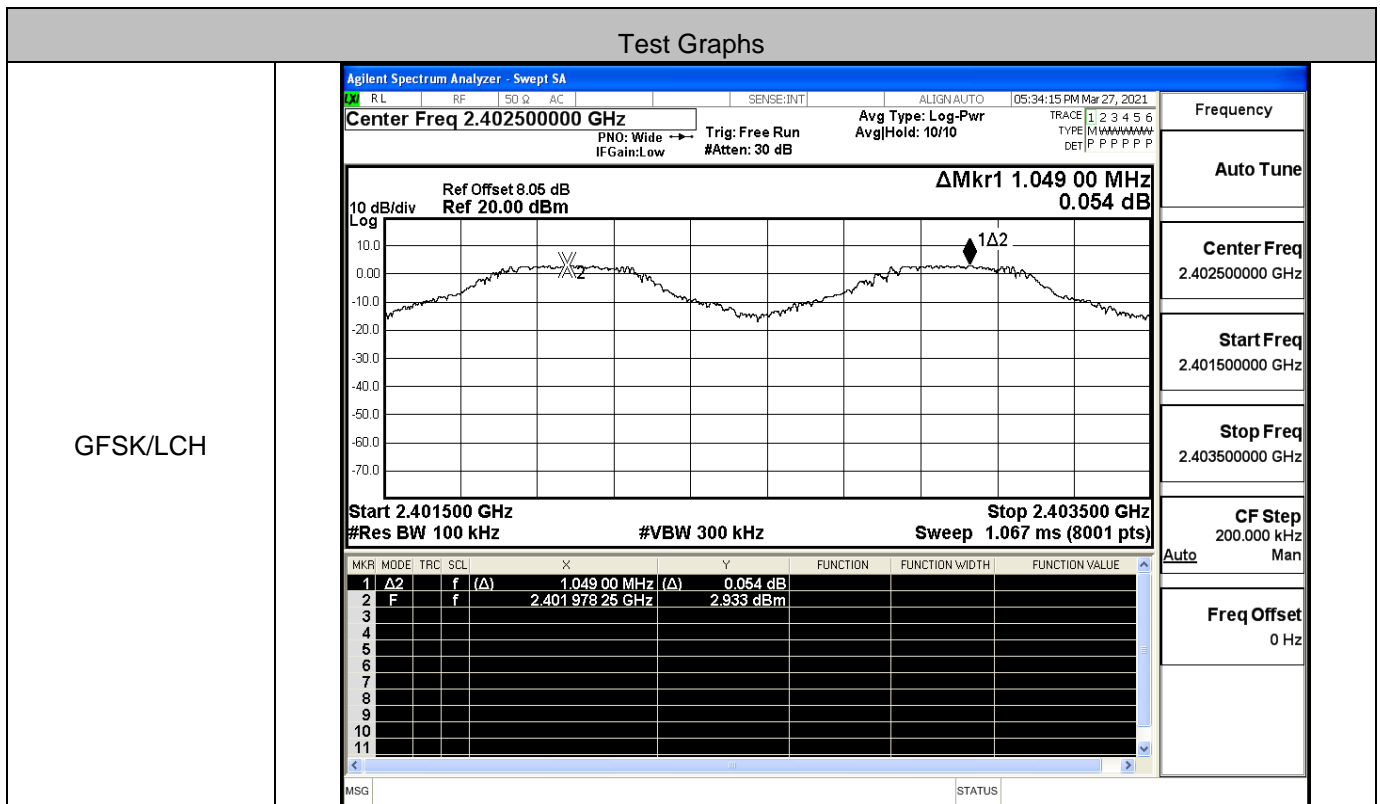
8DPSK/HCH



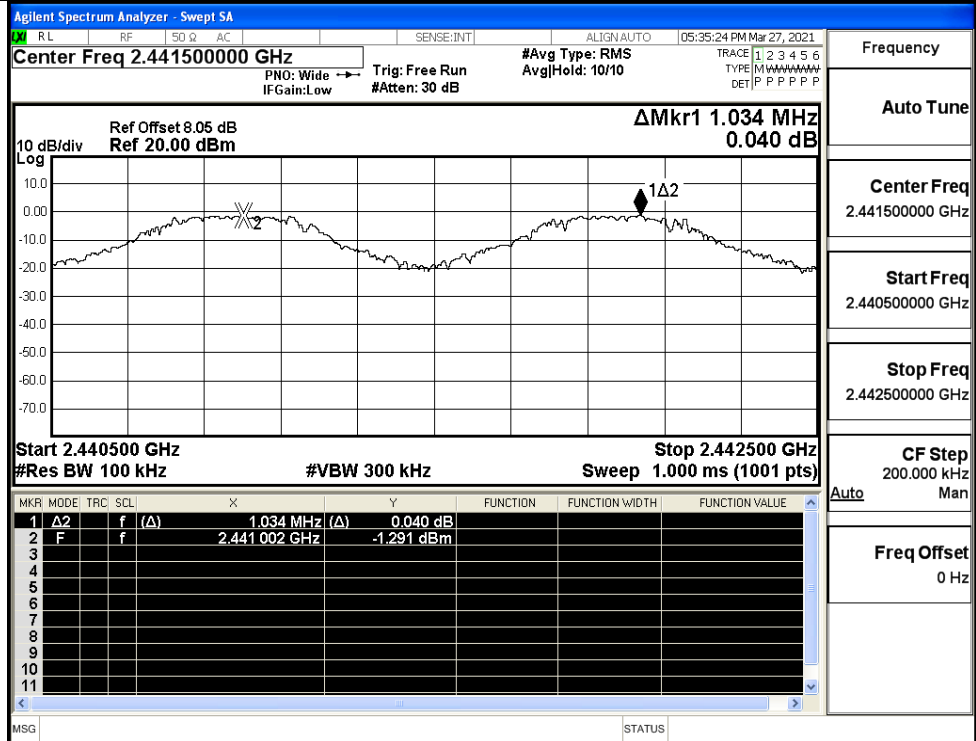
A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.049	0.630	PASS
	MCH	1.034	0.630	PASS
	HCH	1.014	0.630	PASS
π/4DQPSK	LCH	0.998	0.879	PASS
	MCH	1.114	0.879	PASS
	HCH	0.962	0.879	PASS
8DPSK	LCH	0.940	0.876	PASS
	MCH	0.990	0.876	PASS
	HCH	0.888	0.876	PASS

Test Graphs



GFSK/MCH



Frequency

Auto Tune

Center Freq
2.441500000 GHz

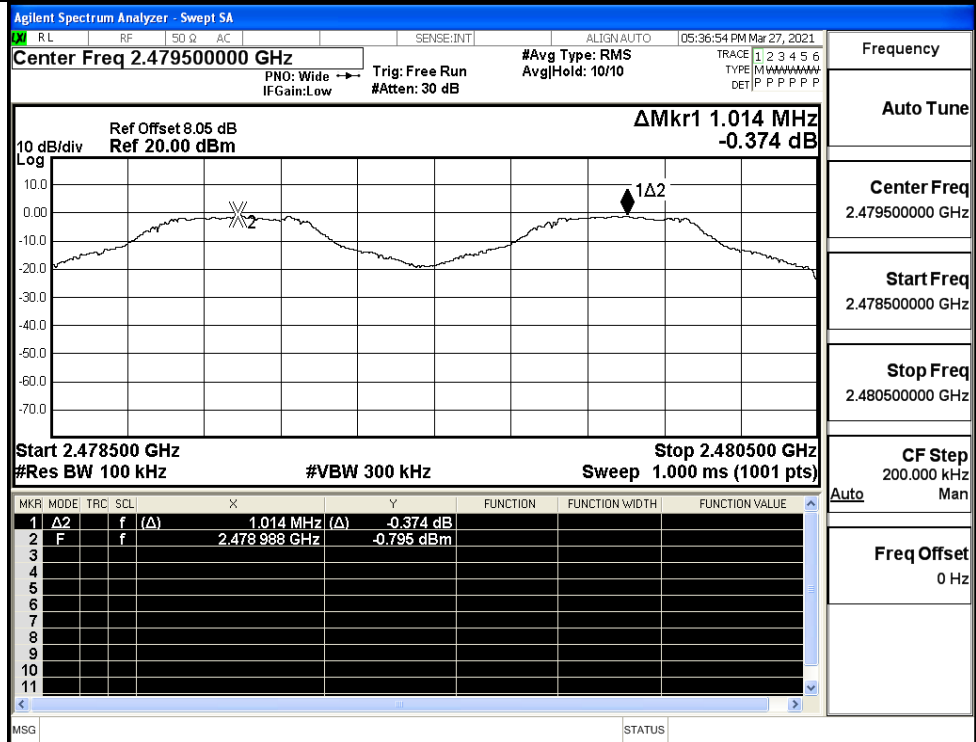
Start Freq
2.440500000 GHz

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

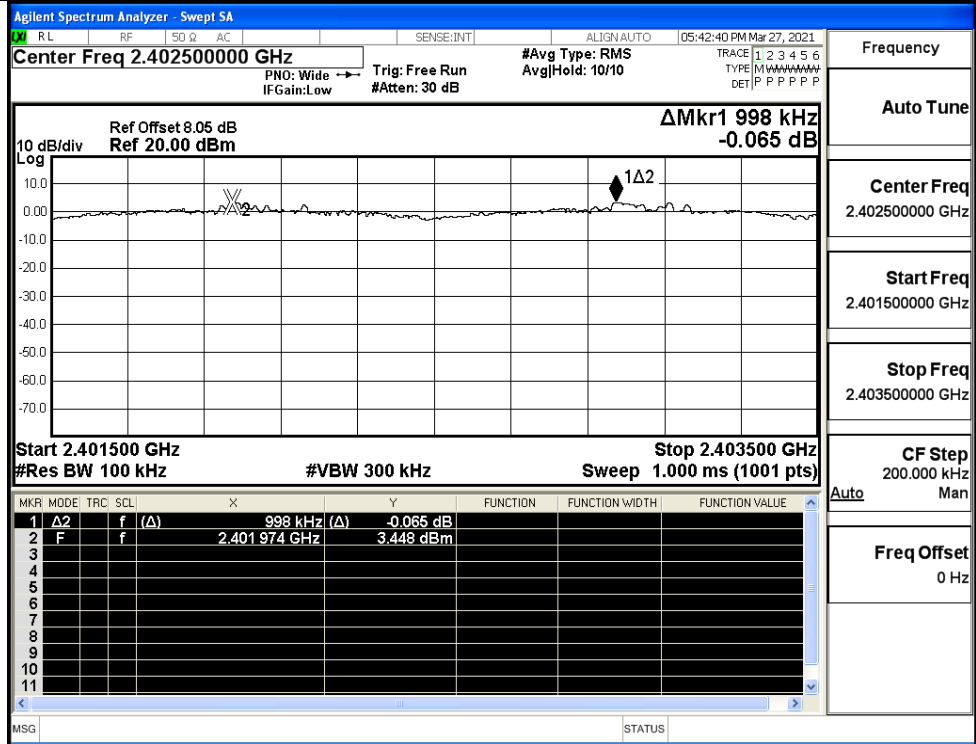
Start Freq
2.478500000 GHz

Stop Freq
2.480500000 GHz

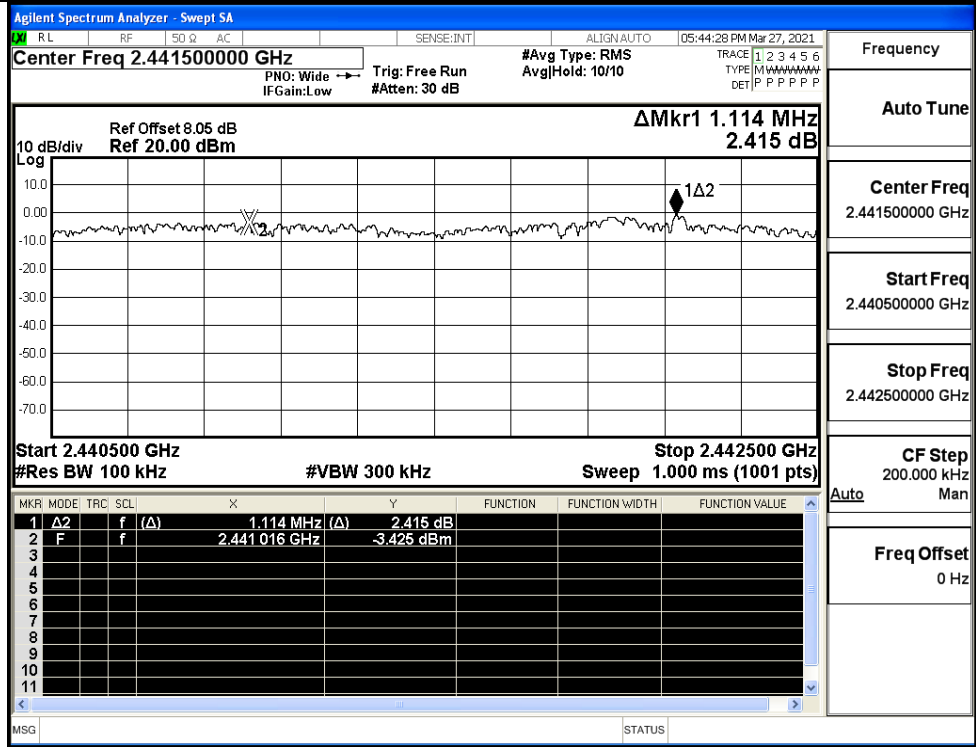
CF Step
200.000 kHz
Auto Man

Freq Offset
0 Hz

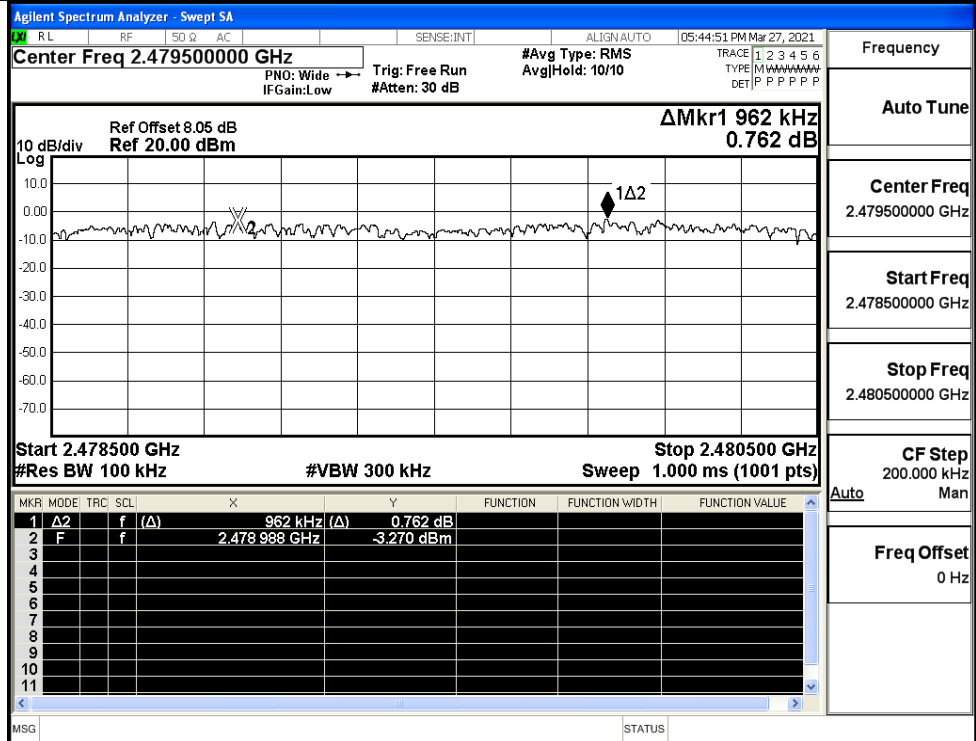
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

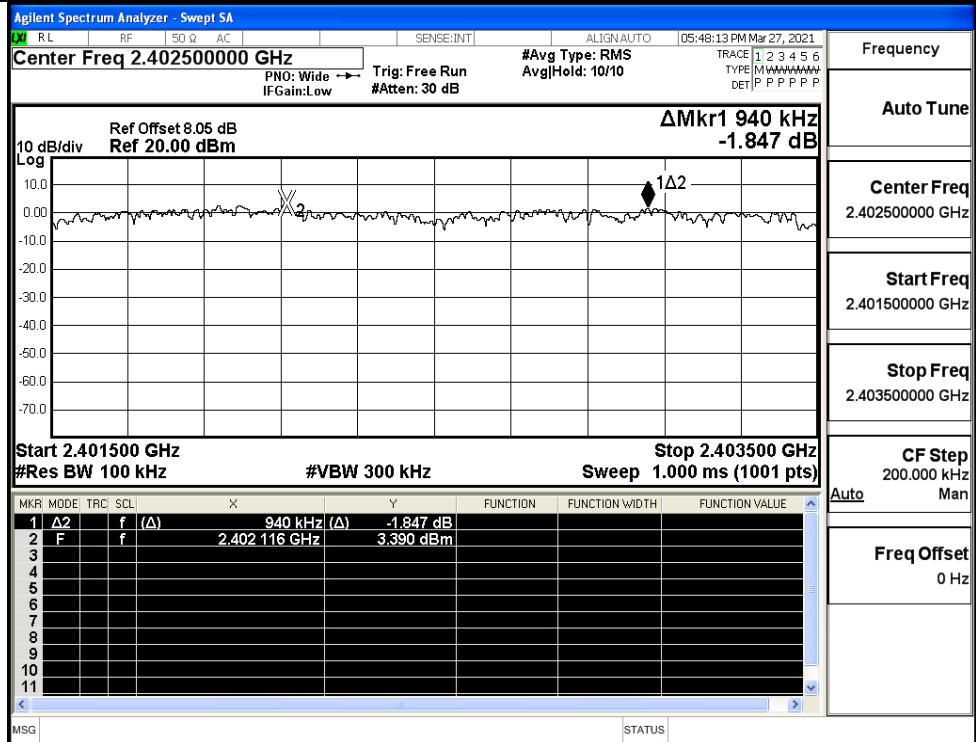


π/4DQPSK/HCH



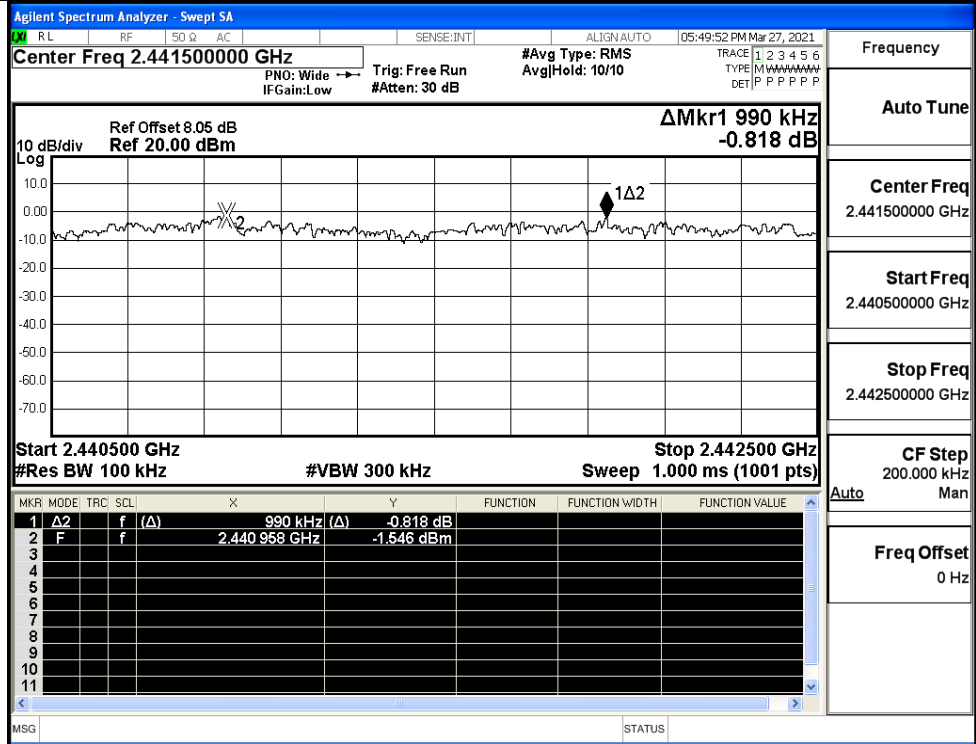
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH

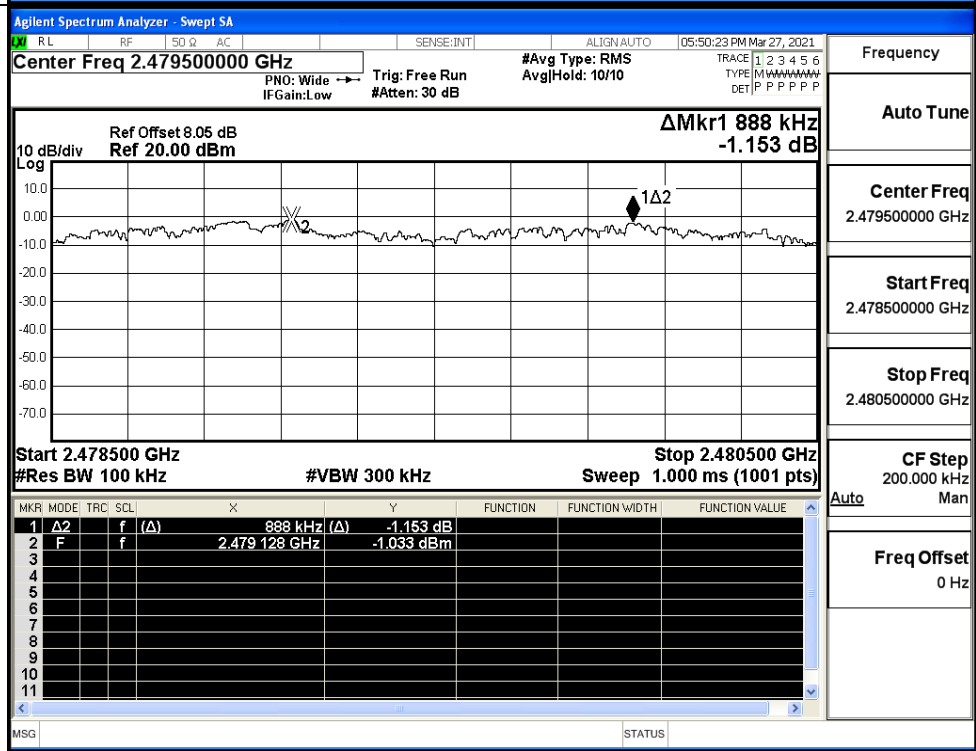


Frequency
Auto Tune
Center Freq
2.402500000 GHz
Start Freq
2.401500000 GHz
Stop Freq
2.403500000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH



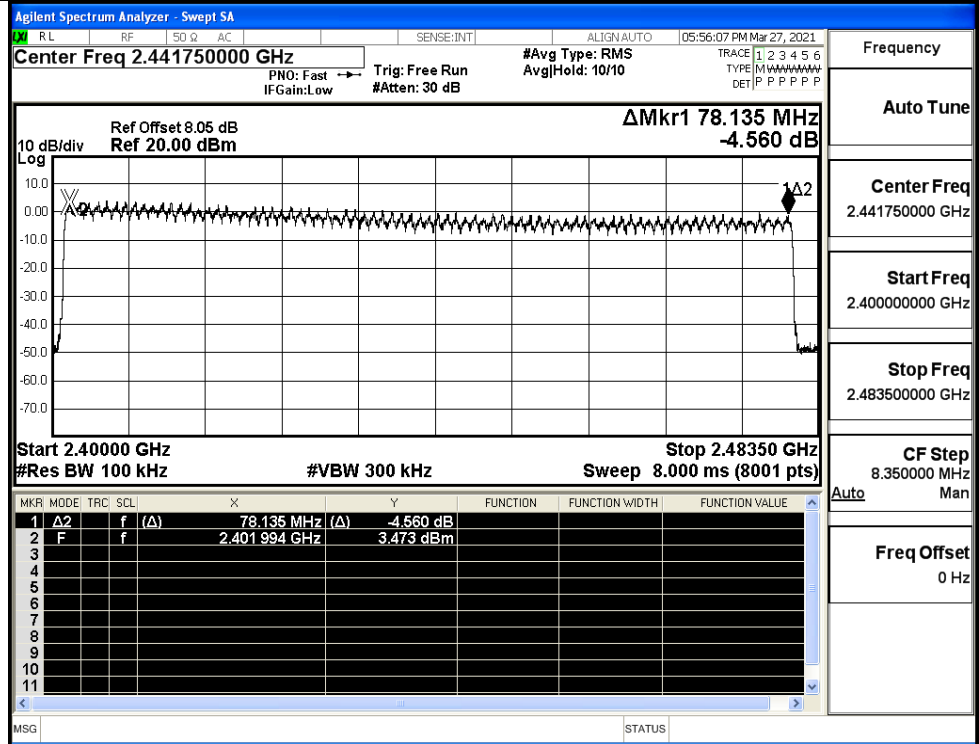
A.4 Hopping Channel Number

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

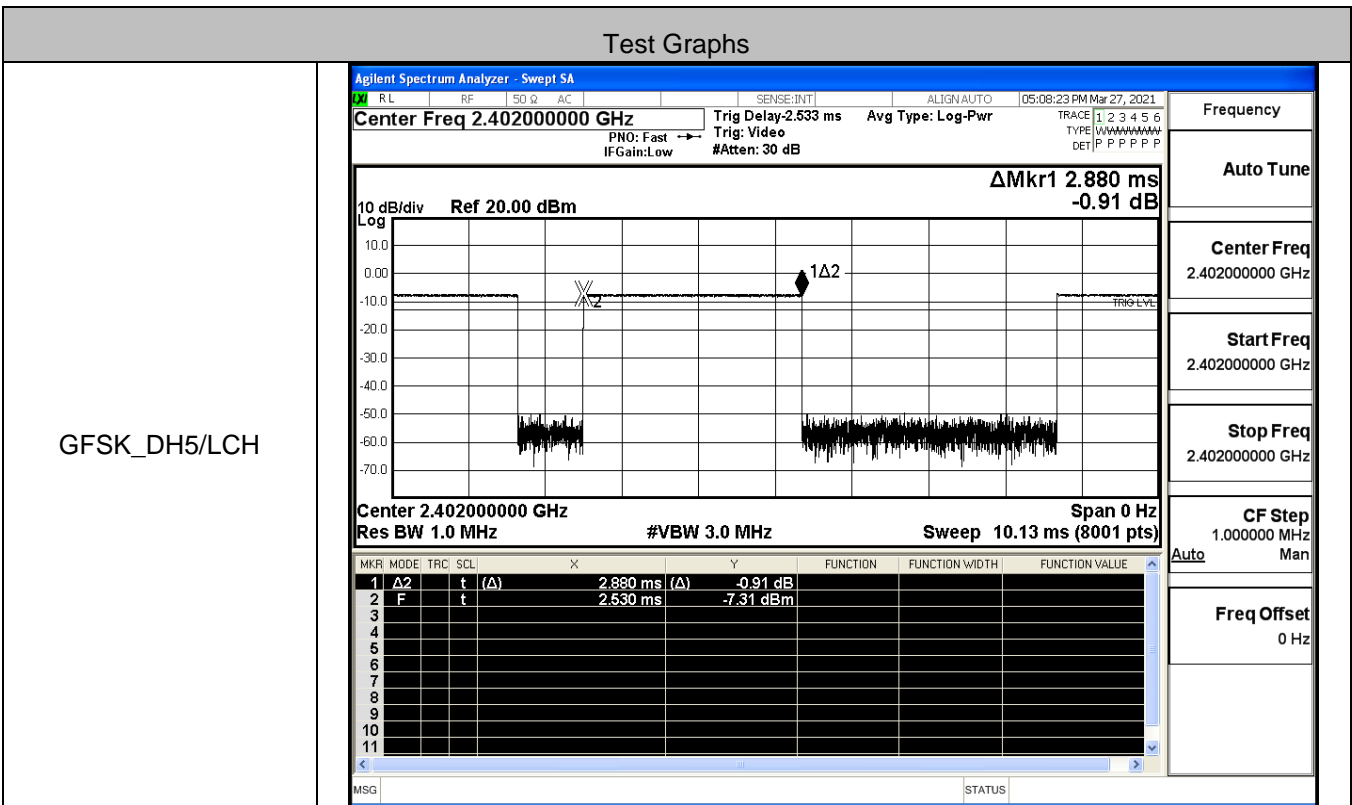
<p>GFSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.031 MHz -4.335 dB</p> <p>Start 2.40000 GHz Stop 2.48350 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <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>78.031 MHz</td> <td>(Δ)</td> <td>-4.335 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>3.355 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)	-4.335 dB			2	F	f		2.401962 GHz		3.355 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)	78.031 MHz	(Δ)	-4.335 dB																							
2	F	f		2.401962 GHz		3.355 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 77.999 MHz -4.983 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>77.999 MHz</td> <td>(Δ)</td> <td>-4.983 dB</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401983 GHz</td> <td></td> <td>2.894 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)	77.999 MHz	(Δ)	-4.983 dB			2	F	f		2.401983 GHz		2.894 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)	77.999 MHz	(Δ)	-4.983 dB																							
2	F	f		2.401983 GHz		2.894 dBm																							

8DPSK/Hop

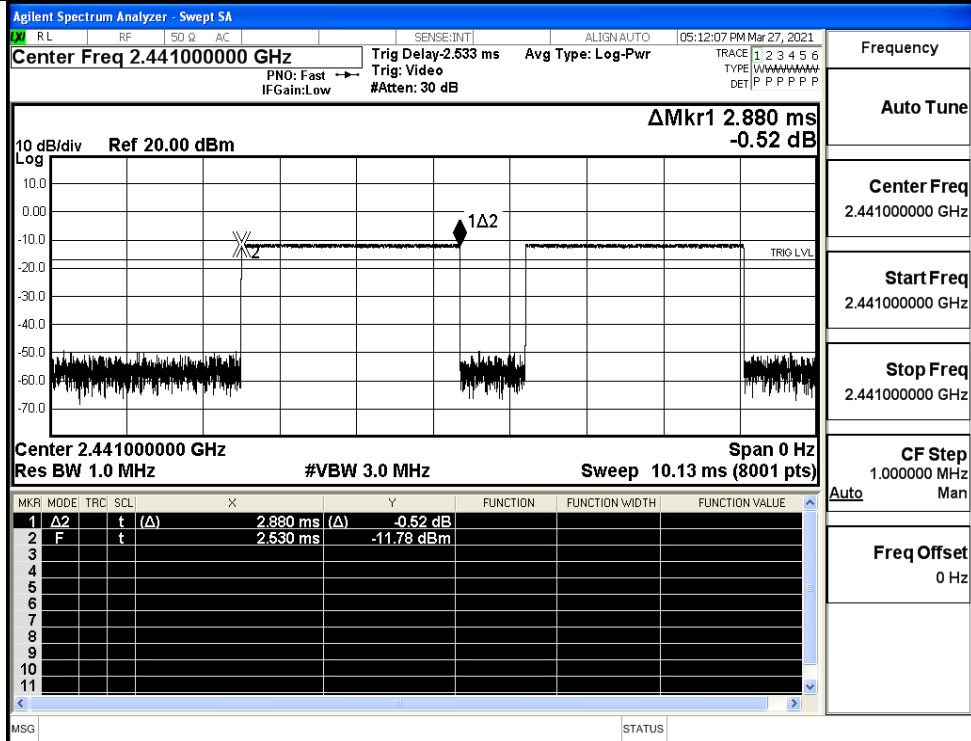


A.5 Dwell Time

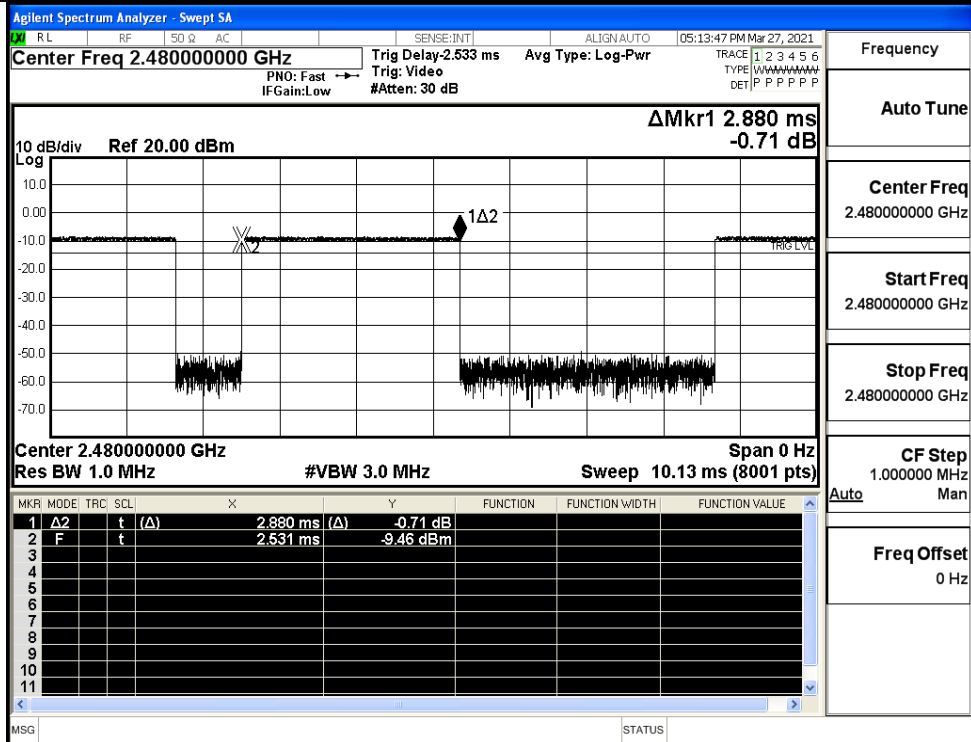
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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



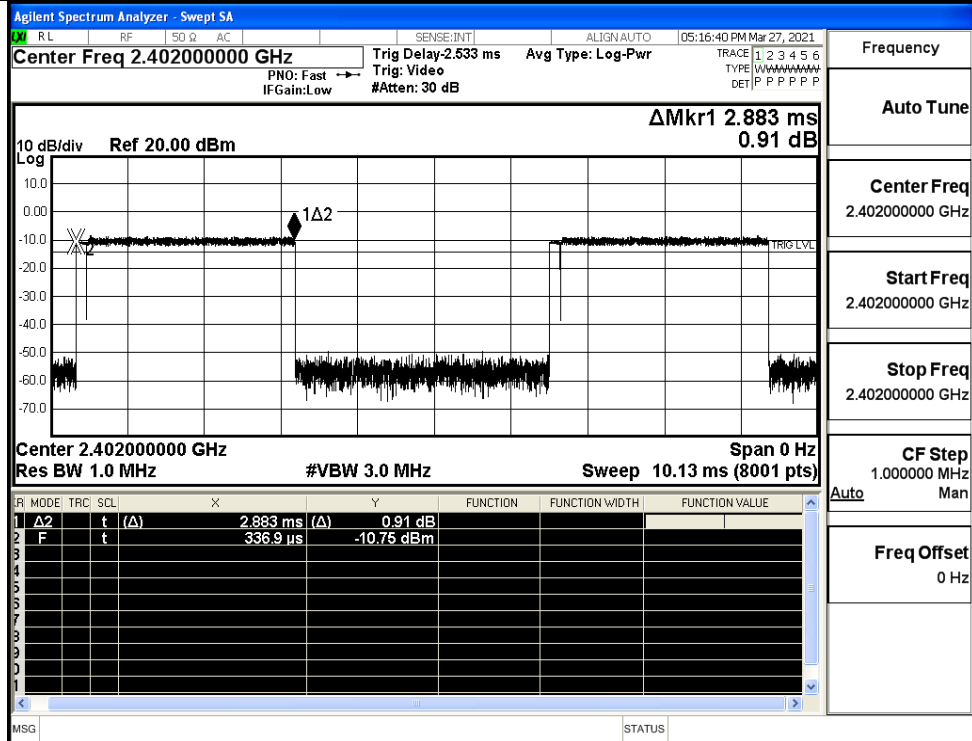
GFSK_DH5/MCH



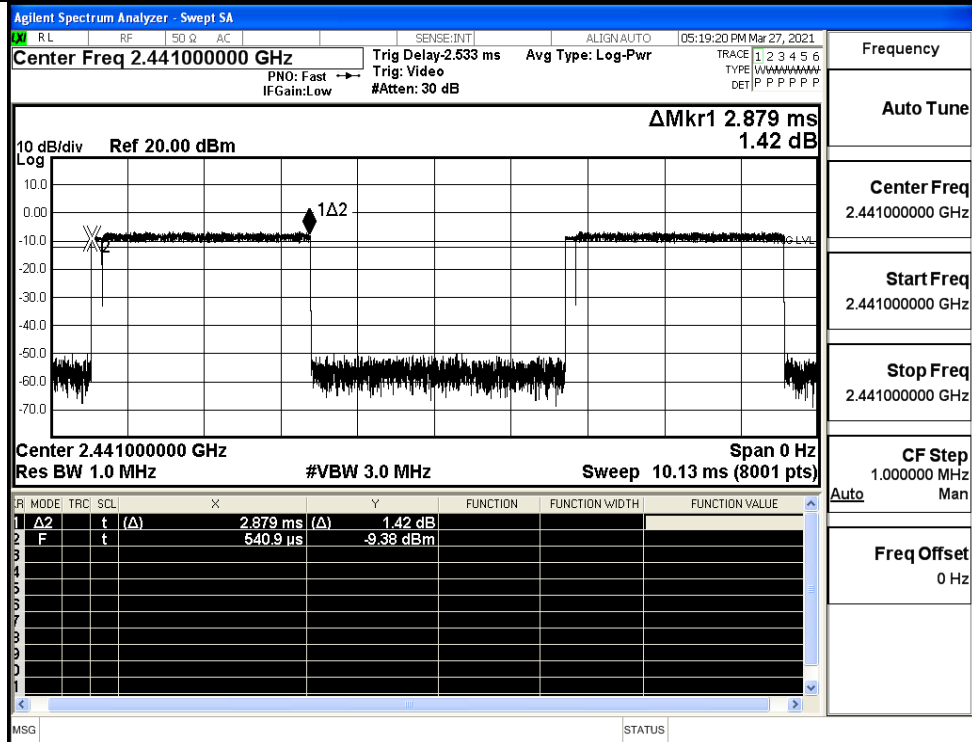
GFSK_DH5/HCH



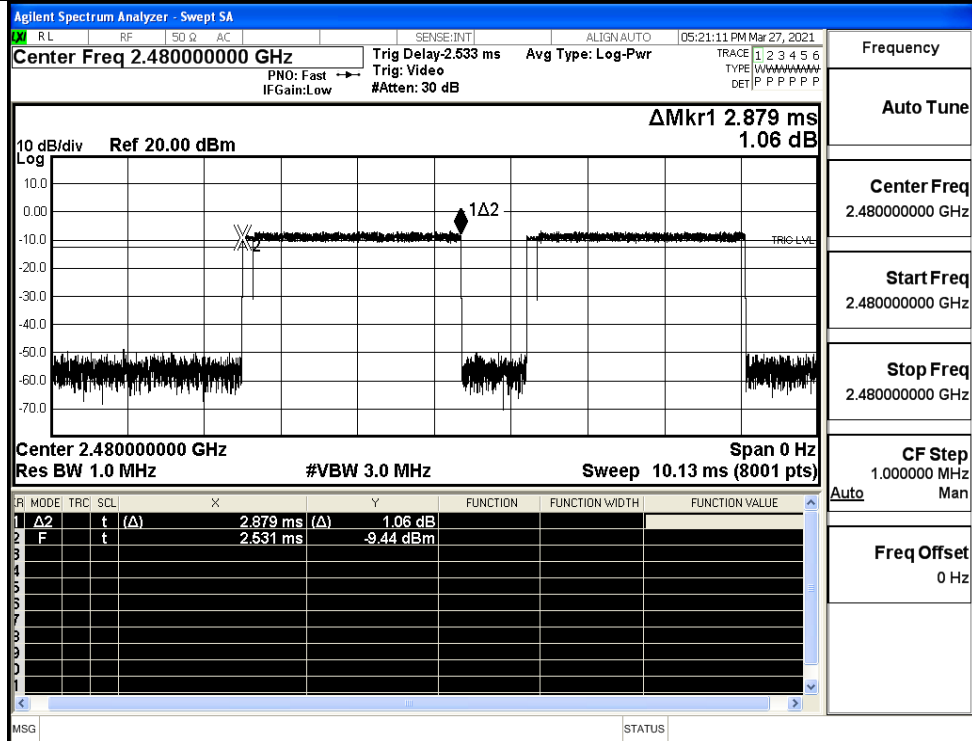
$\pi/4$ DQPSK
_2DH5/LCH



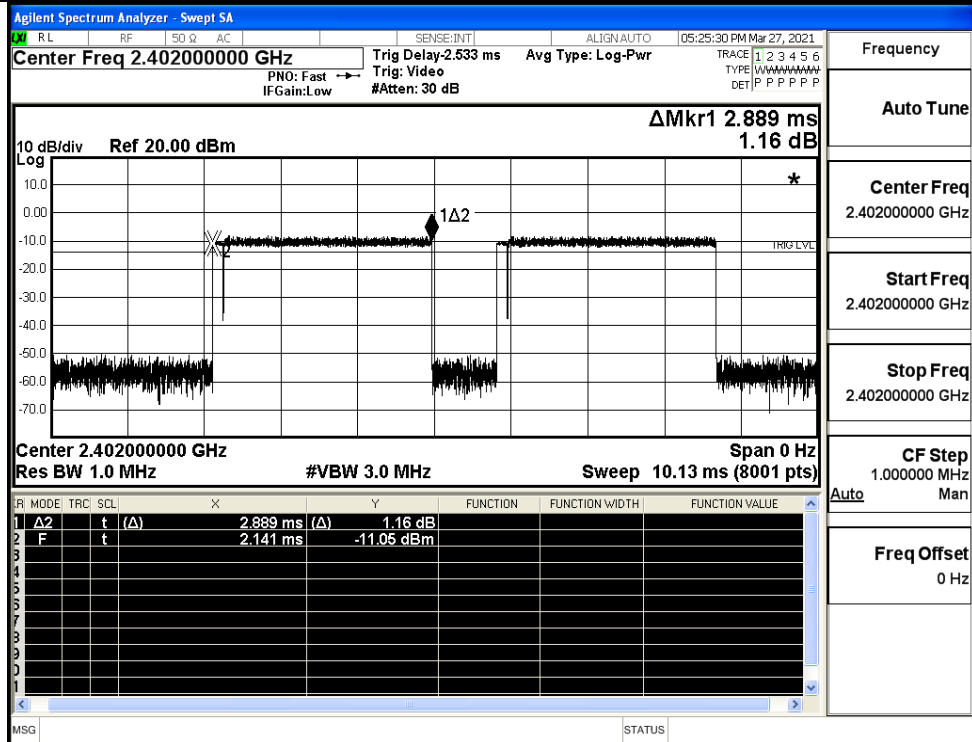
$\pi/4$ DQPSK
_2DH5/MCH



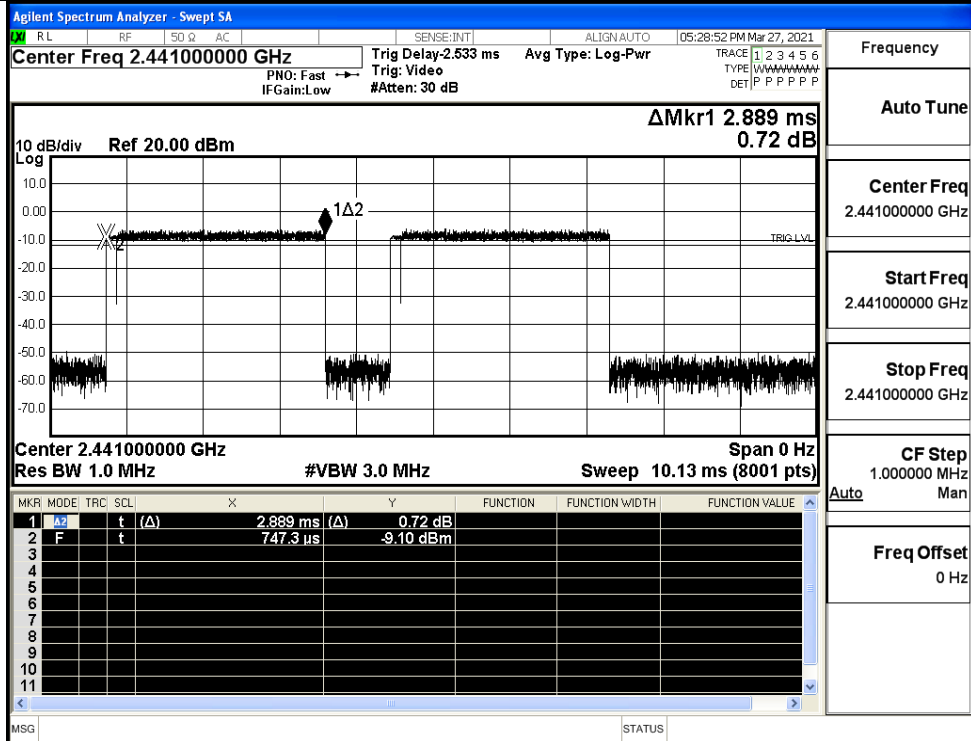
$\pi/4$ DQPSK
_2DH5/HCH



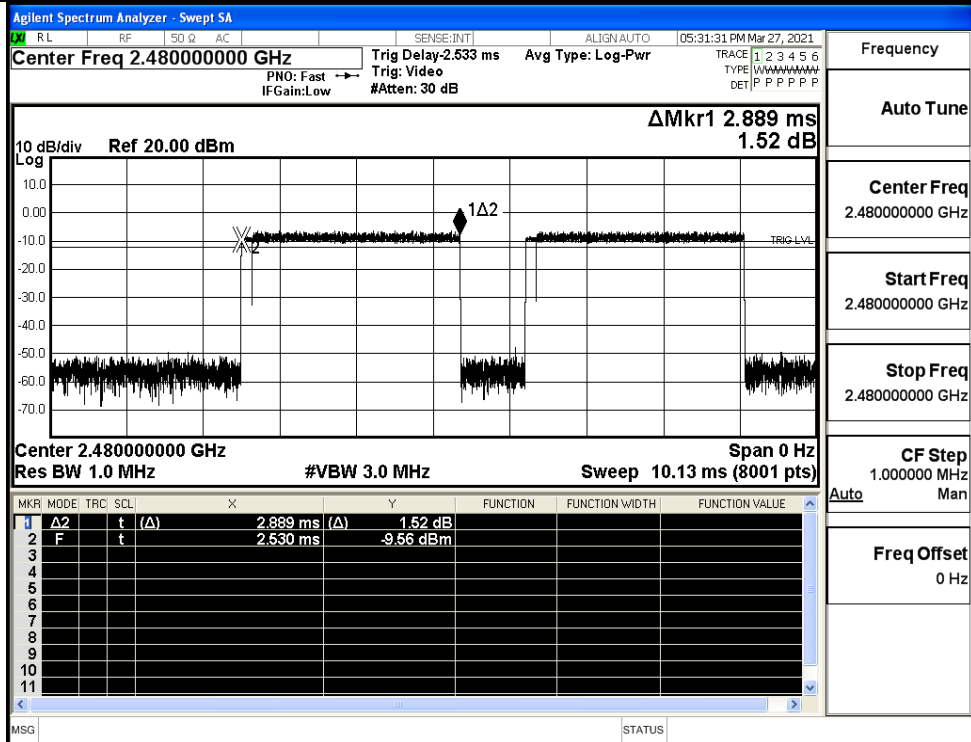
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



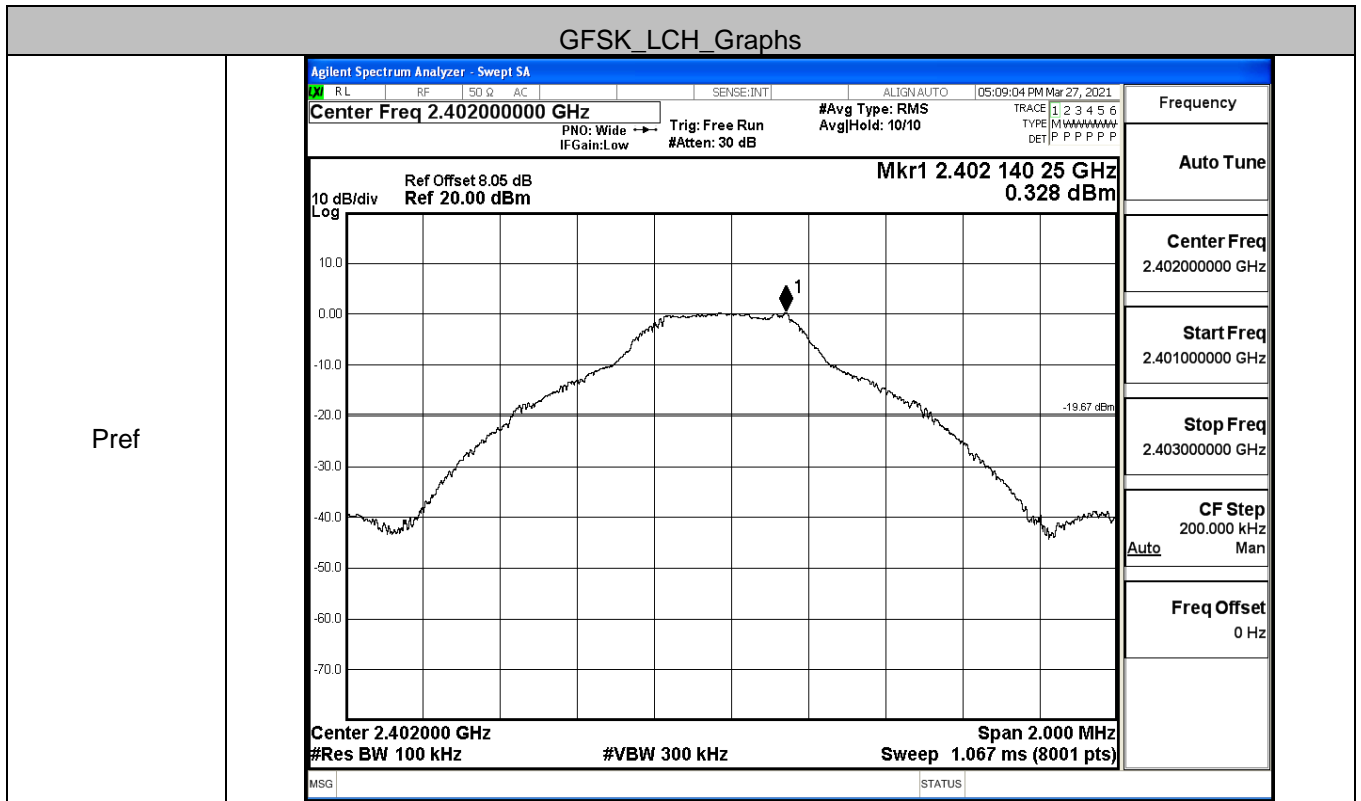
8DPSK_3DH5/HCH

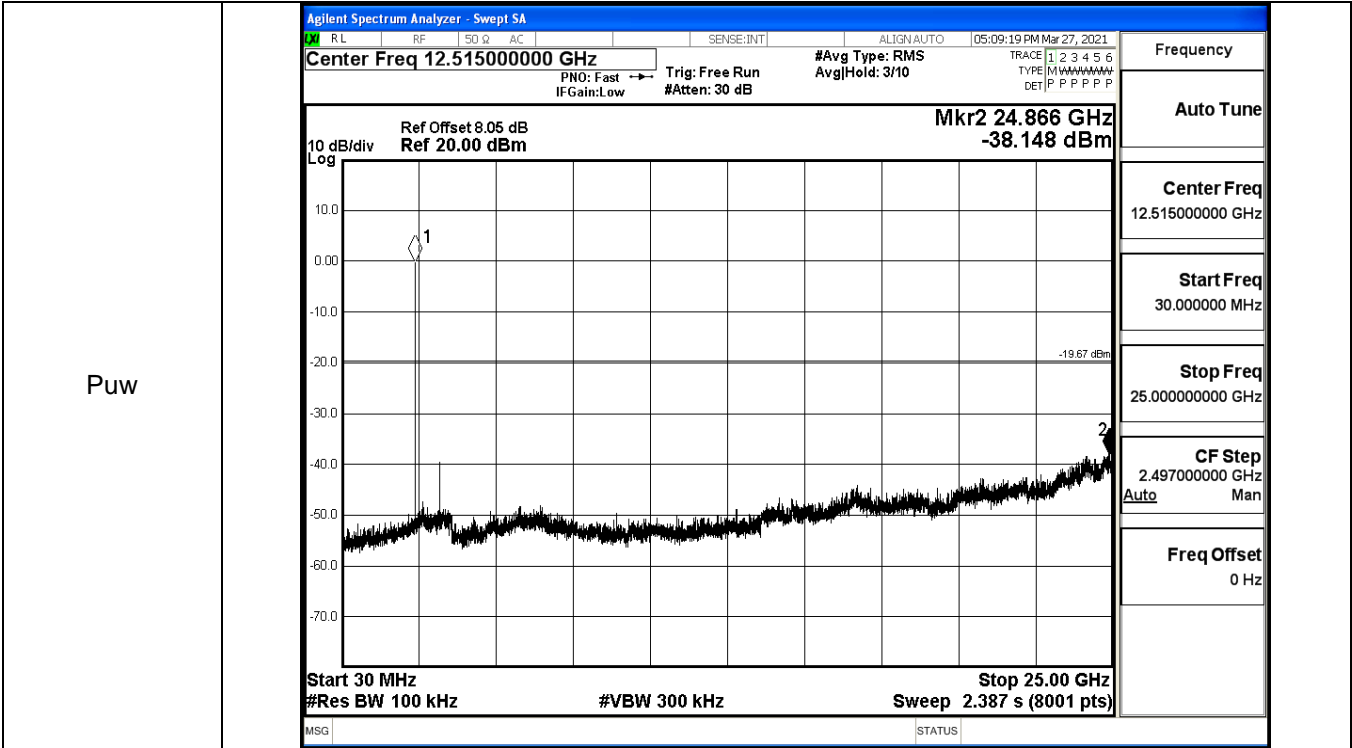


A.6 RF Conducted Spurious Emissions

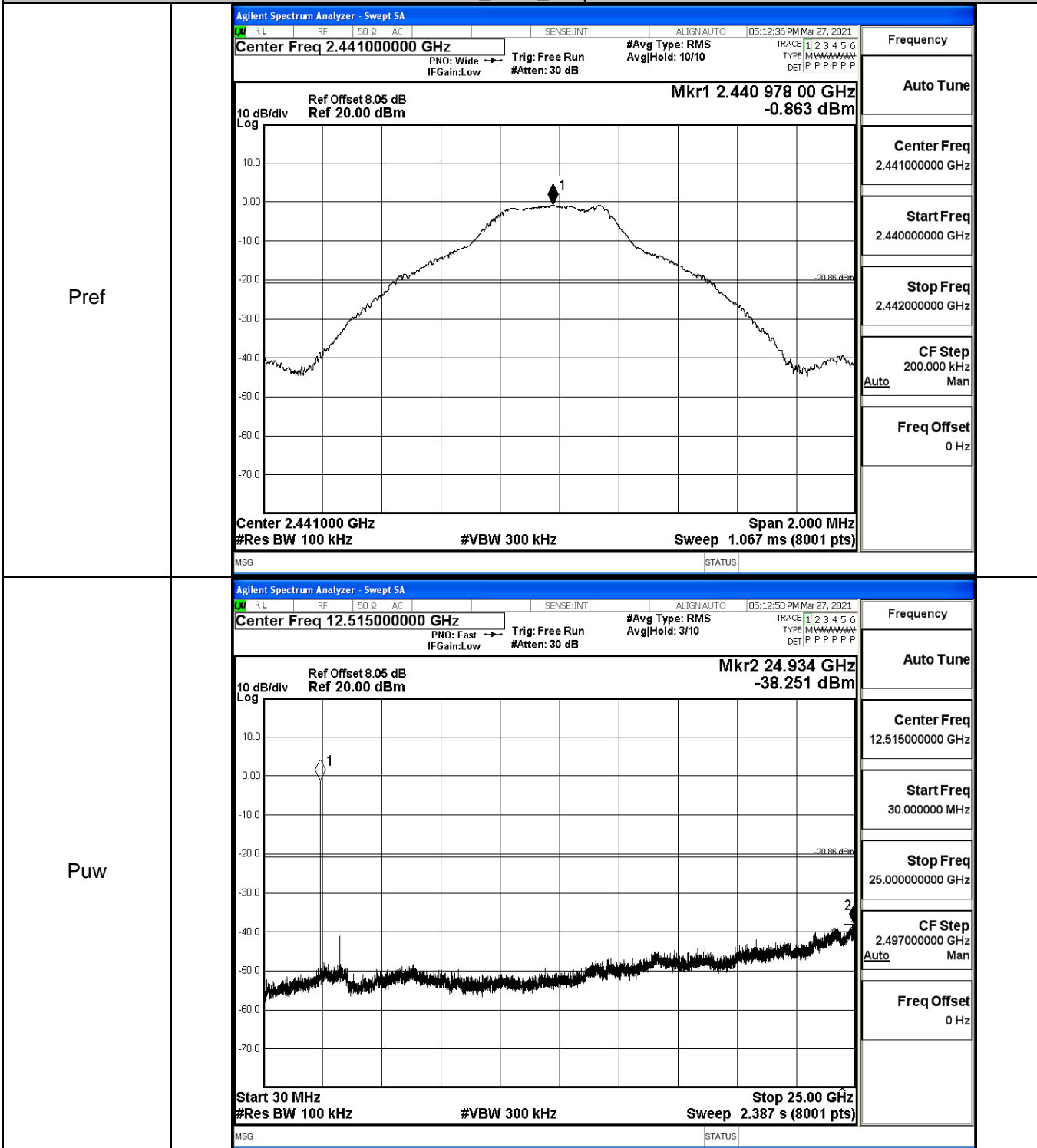
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.328	-38.148	-19.672	PASS
	MCH	-0.863	-38.251	-20.863	PASS
	HCH	-0.843	-37.966	-20.843	PASS
π /4DQPSK	LCH	-2.673	-37.636	-22.673	PASS
	MCH	-0.953	-37.052	-20.953	PASS
	HCH	-1.782	-38.460	-21.782	PASS
8DPSK	LCH	-2.811	-37.160	-22.811	PASS
	MCH	-1.372	-38.149	-21.372	PASS
	HCH	-1.44	-38.081	-21.440	PASS

GFSK_LCH_Graphs



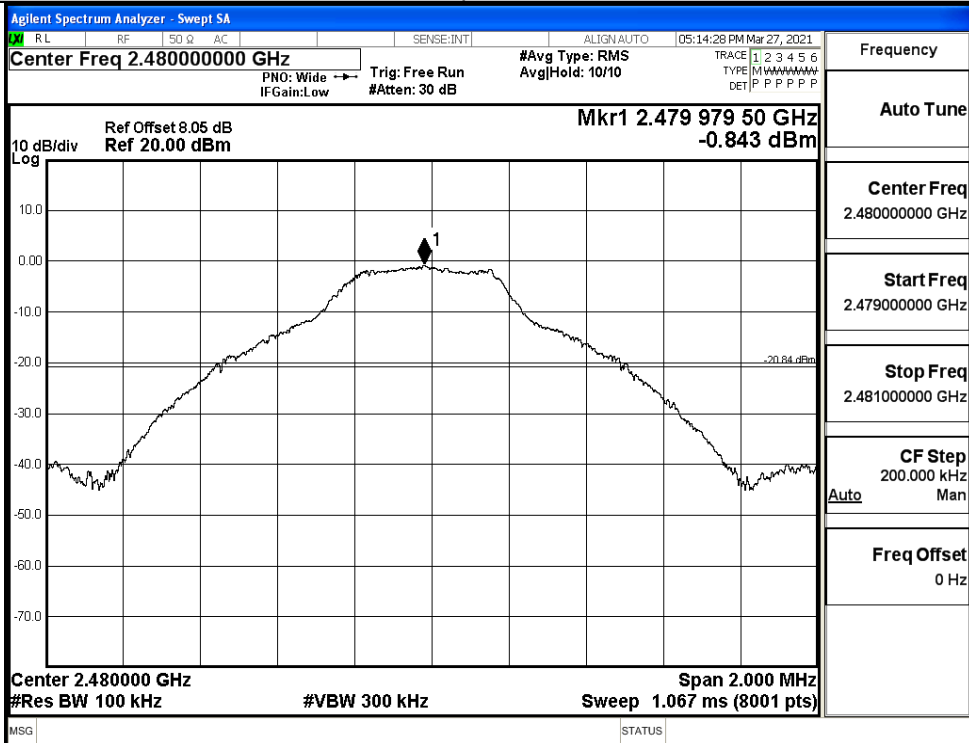


GFSK_MCH_Graphs

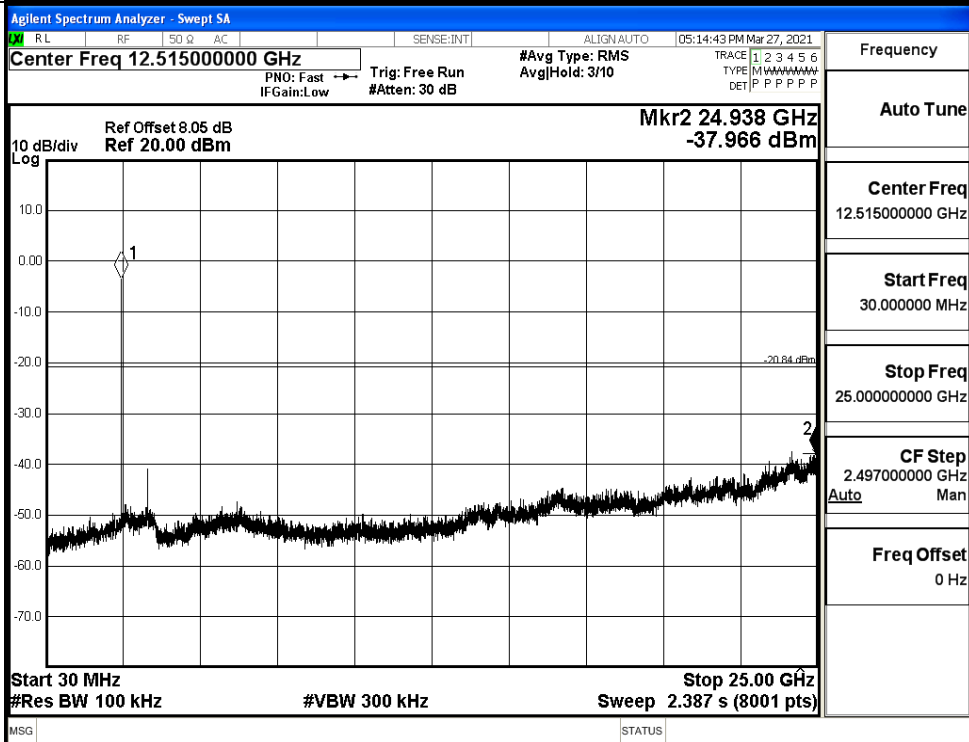


GFSK_HCH_Graphs

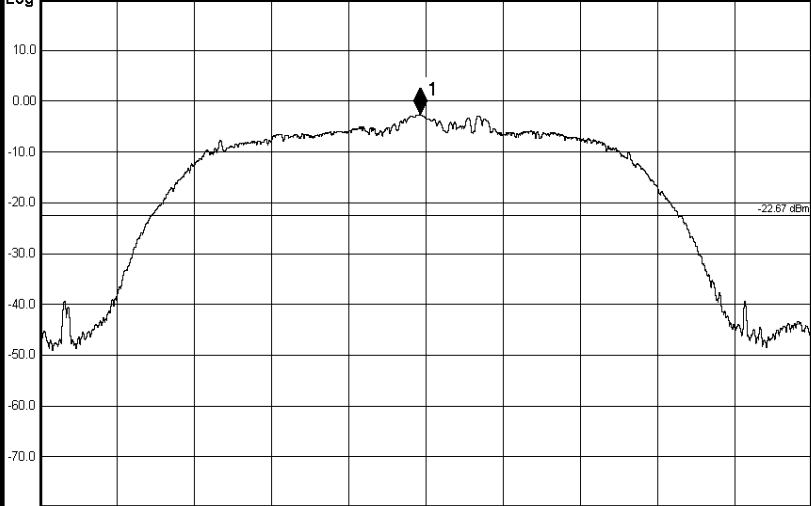
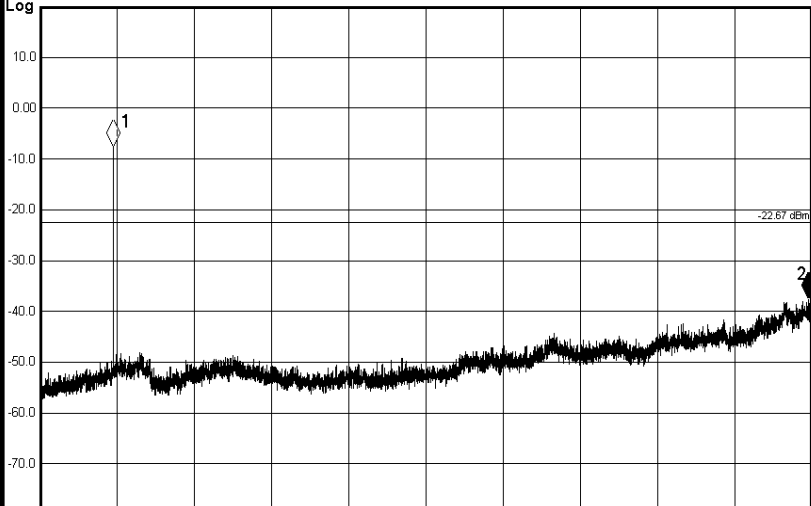
Pref



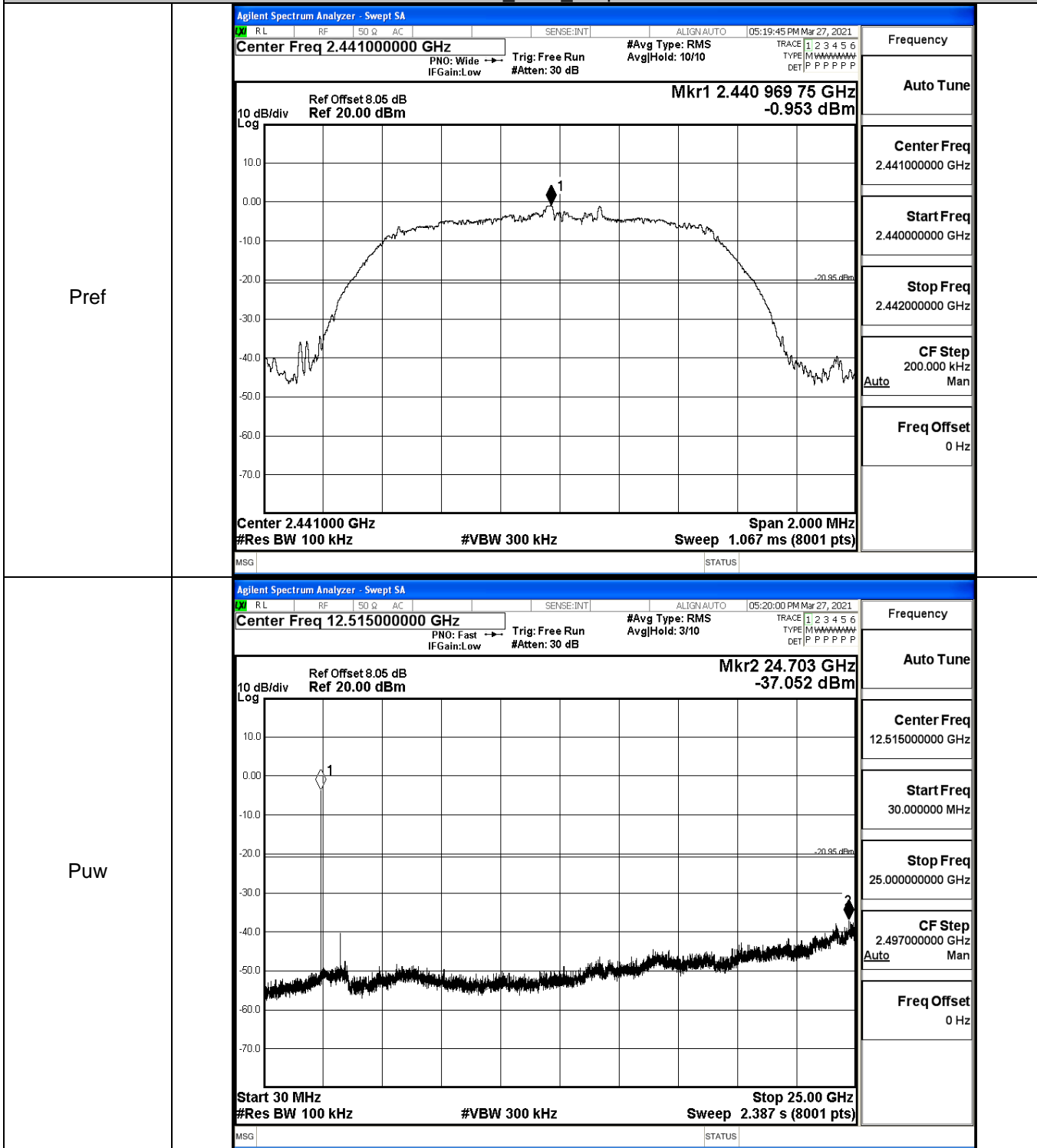
Puw



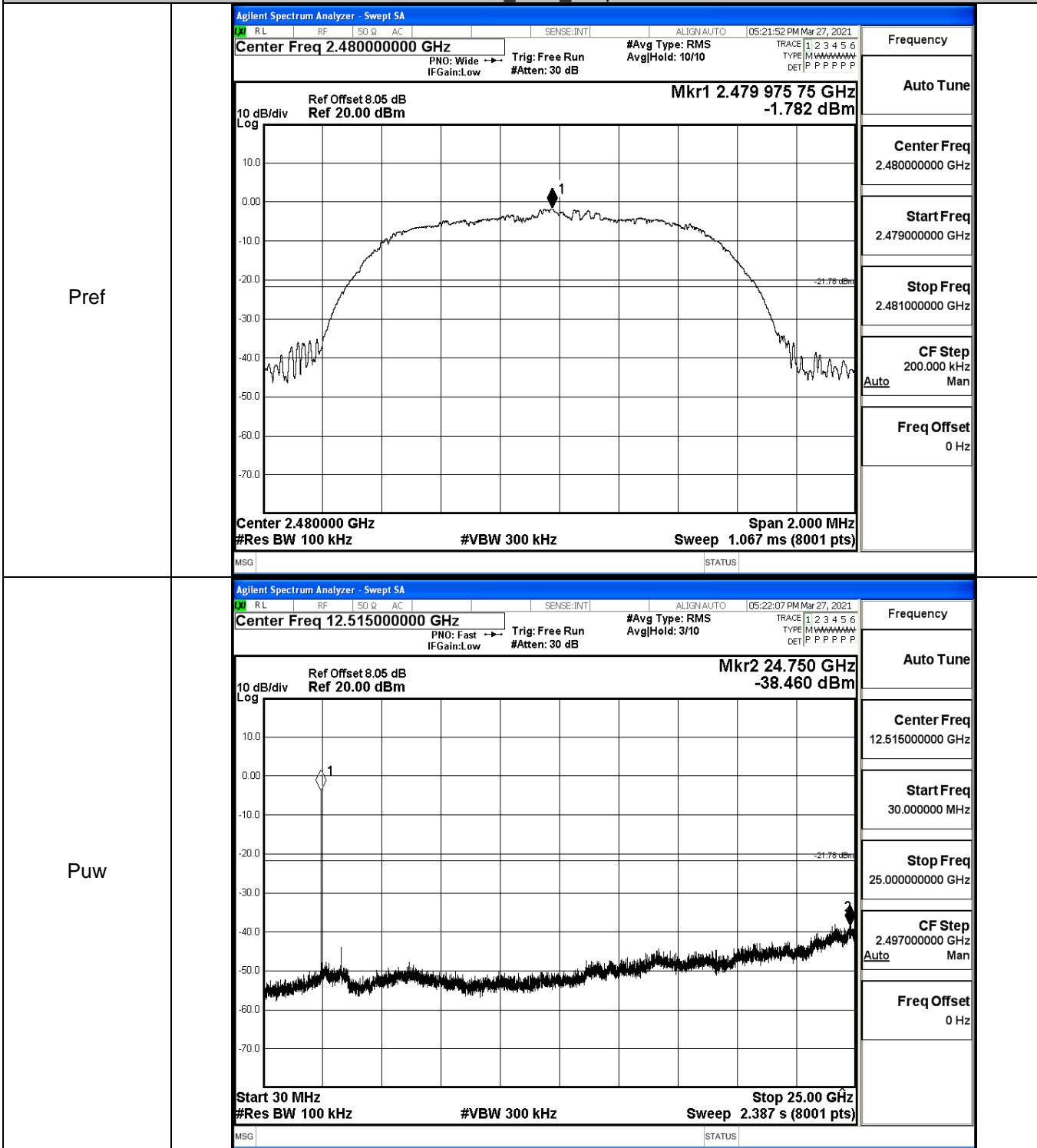
$\pi/4$ DQPSK_LCH_Graphs

Pref	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>RL RF SO Q AC SENSE:INT ALIGN:AUTO 05:17:22 PM Mar 27, 2021</p> <p>Center Freq 2.40200000 GHz #Avg Type: RMS TRACE 1 2 3 4 5 6</p> <p>PN0: Wide IF Gain:Low Trig: Free Run #Atten: 30 dB AvgHold: 10/10 TYPE M W W W W W W W</p> <p>Ref Offset 8.05 dB Mkr1 2.401 984 25 GHz -2.673 dBm</p> <p>10 dB/div Log</p>  <p>Center 2.402000 GHz Span 2.000 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms (8001 pts)</p> <p>MSG STATUS</p>	<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.401000000 GHz</p> <p>Stop Freq 2.403000000 GHz</p> <p>CF Step 200.000 kHz Auto Man</p> <p>Freq Offset 0 Hz</p>
Puw	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>RL RF SO Q AC SENSE:INT ALIGN:AUTO 05:17:36 PM Mar 27, 2021</p> <p>Center Freq 12.515000000 GHz #Avg Type: RMS TRACE 1 2 3 4 5 6</p> <p>PN0: Fast IF Gain:Low Trig: Free Run #Atten: 30 dB AvgHold: 3/10 TYPE M W W W W W W W</p> <p>Ref Offset 8.05 dB Mkr2 24.878 GHz -37.636 dBm</p> <p>10 dB/div Log</p>  <p>Start 30 MHz Stop 25.00 GHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 2.387 s (8001 pts)</p> <p>MSG STATUS</p>	<p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 12.515000000 GHz</p> <p>Start Freq 30.000000 MHz</p> <p>Stop Freq 25.000000000 GHz</p> <p>CF Step 2.497000000 GHz Auto Man</p> <p>Freq Offset 0 Hz</p>

$\pi/4$ DQPSK_MCH_Graphs

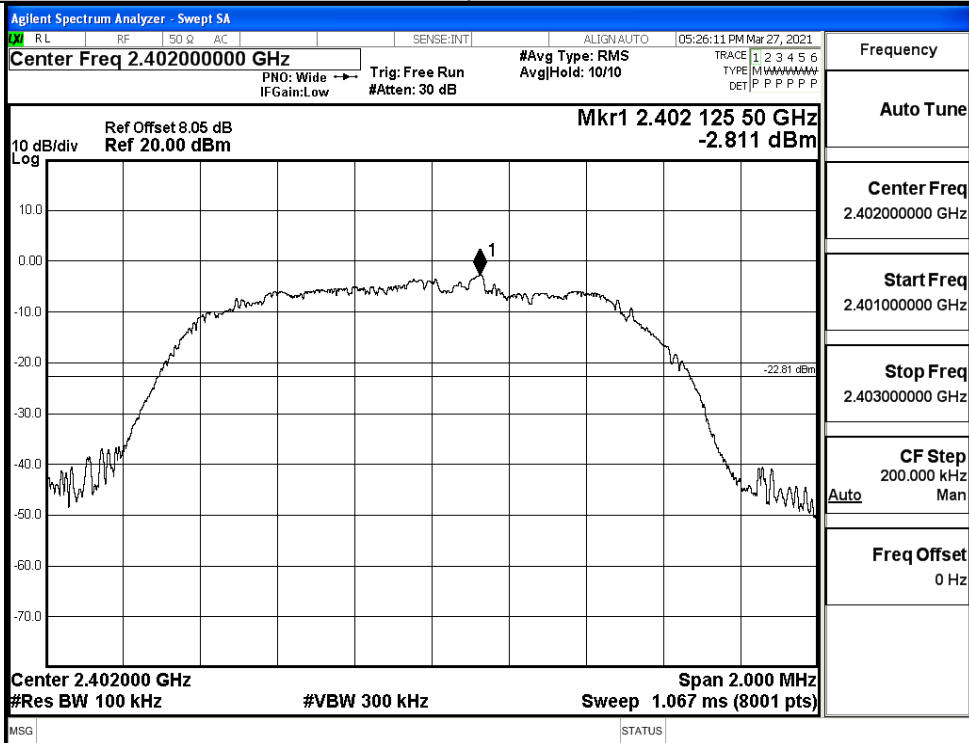


$\pi/4$ DQPSK_HCH_Graphs

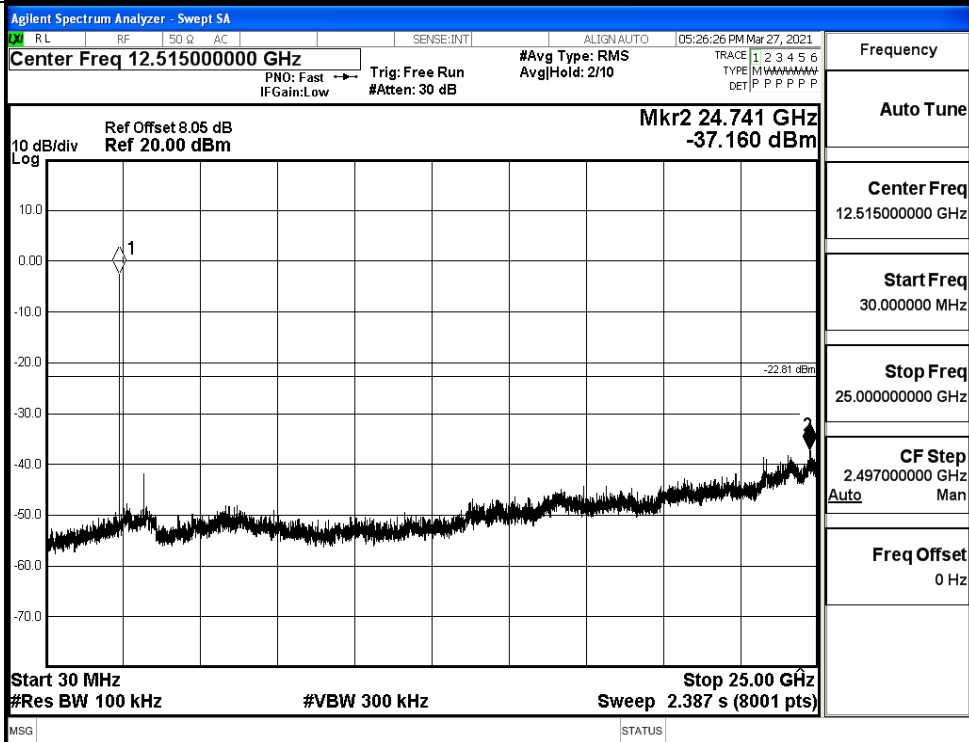


8DPSK_LCH_Graphs

Pref

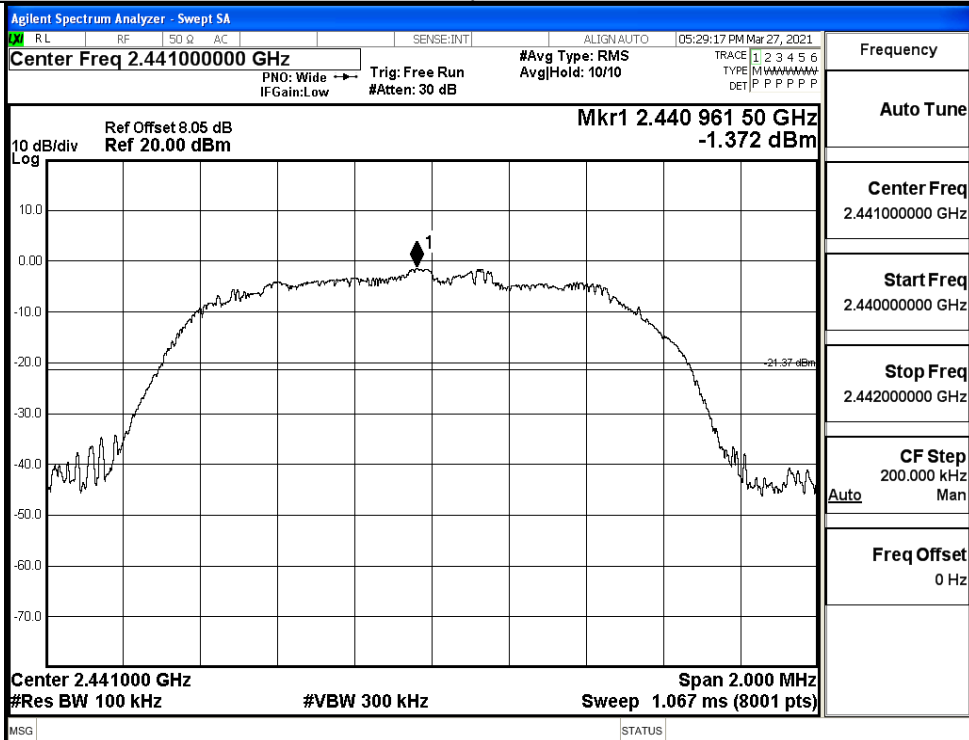


Puw

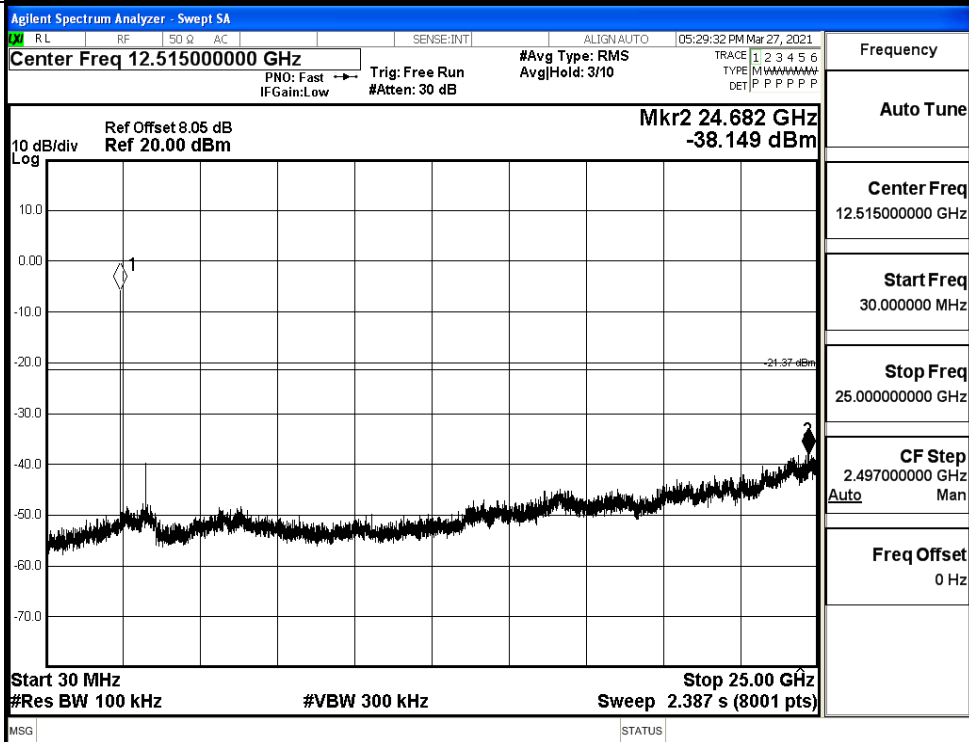


8DPSK_MCH_Graphs

Pref

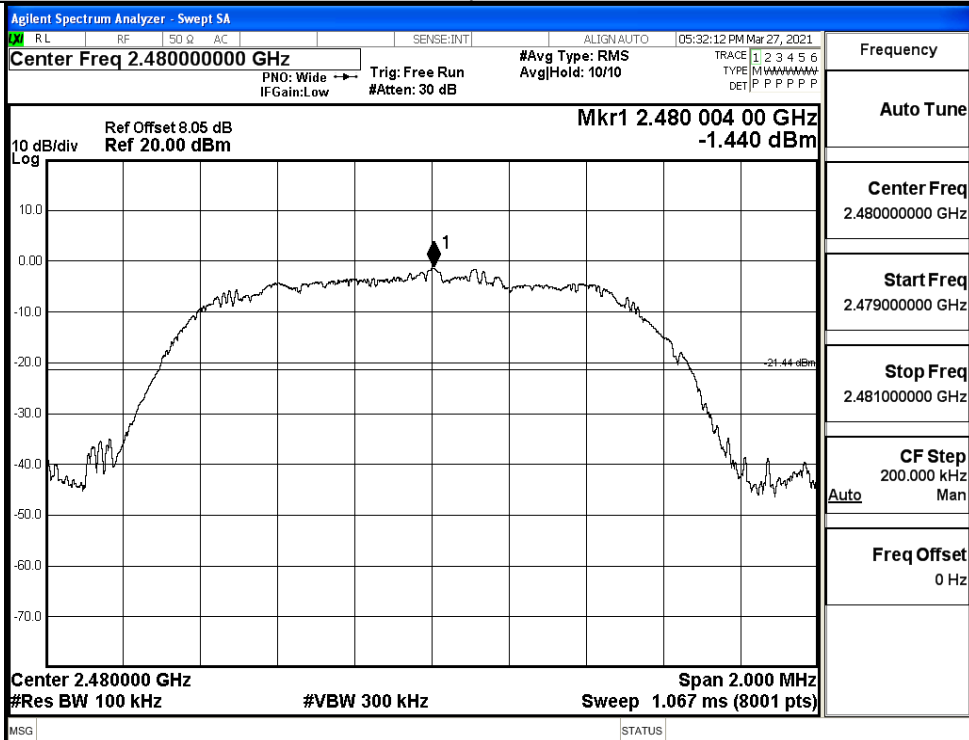


Puw

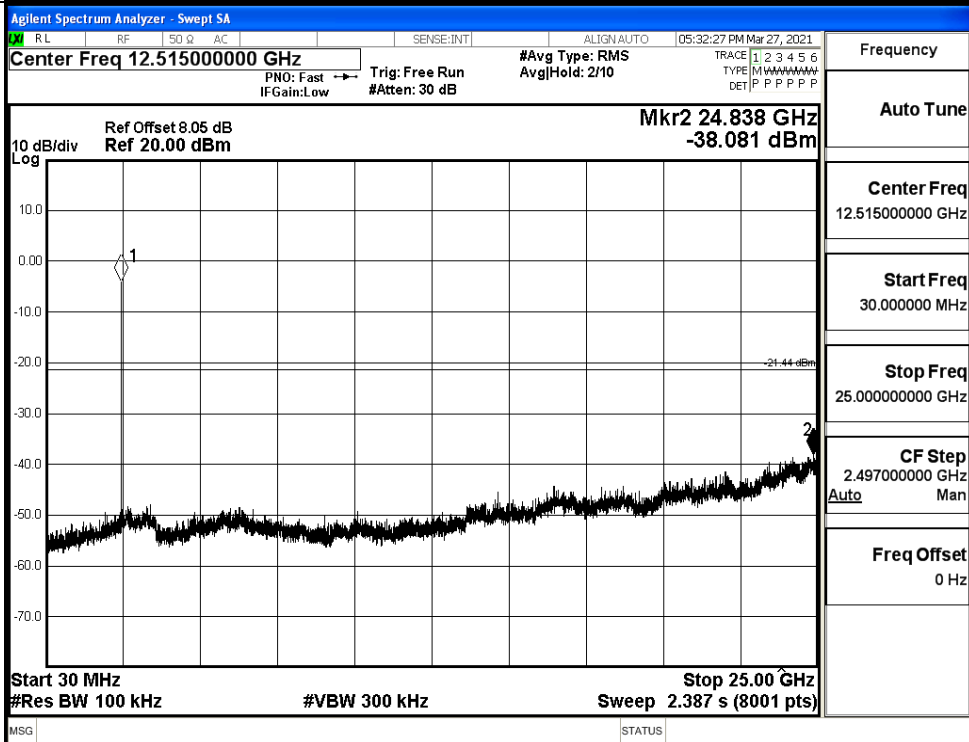


8DPSK_HCH_Graphs

Pref



Puw

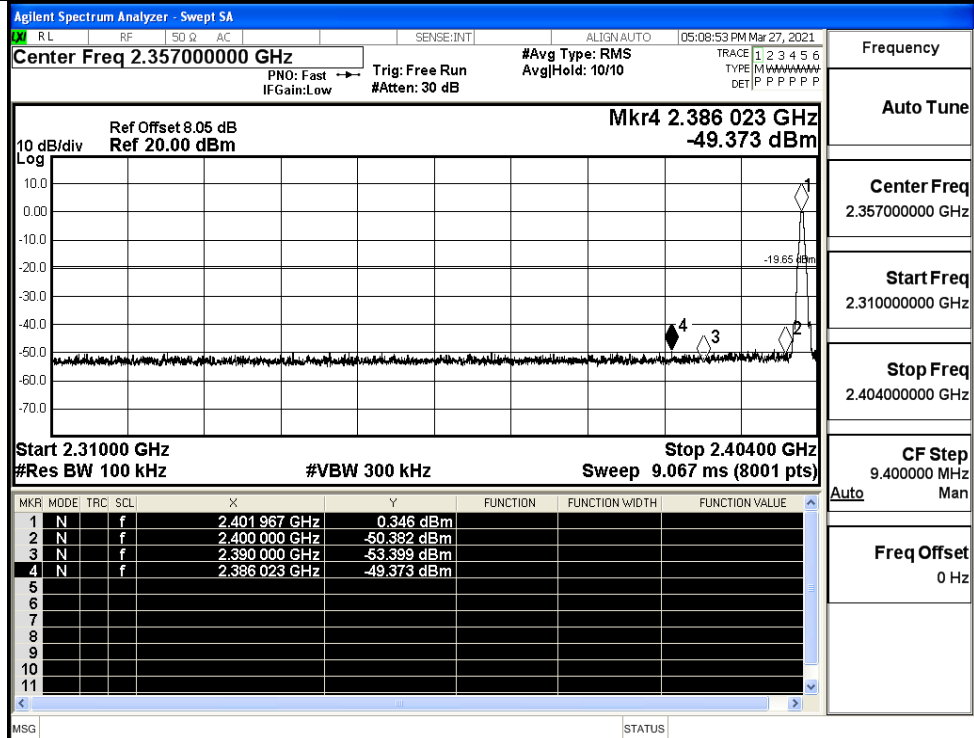


A.7 Band-edge for RF Conducted Emissions

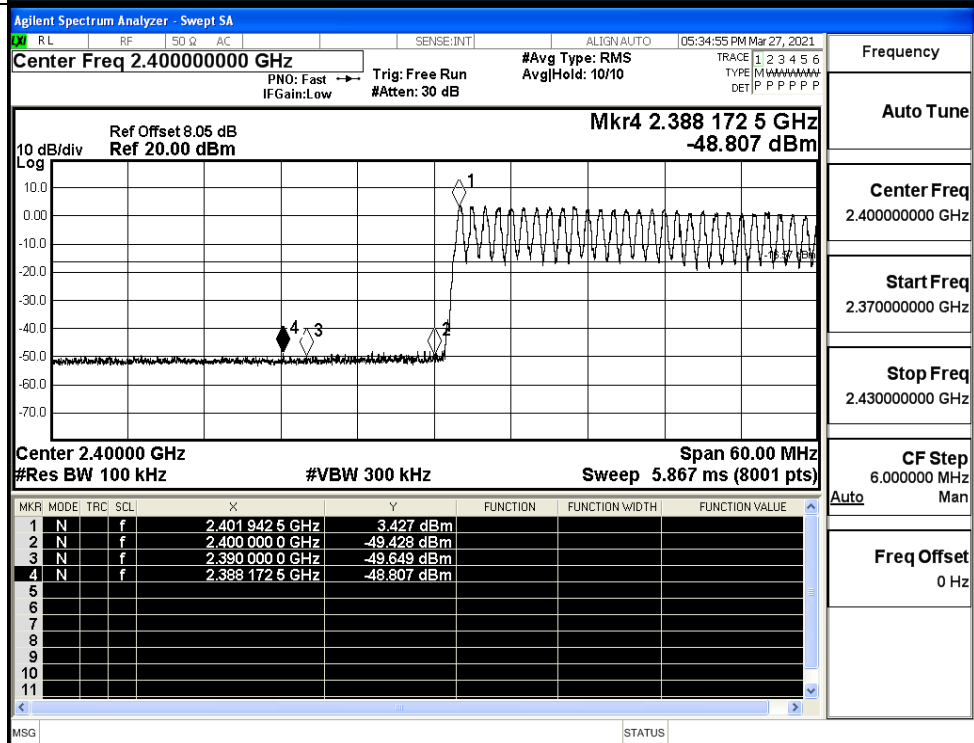
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	0.346	Off	-49.373	-19.65	PASS
			3.427	On	-48.807	-16.57	PASS
	HCH	2480	-0.501	Off	-46.691	-20.5	PASS
			-1.061	On	-47.722	-21.06	PASS
$\pi/4$ DQPSK	LCH	2402	-2.972	Off	-49.841	-22.97	PASS
			3.707	On	-49.155	-16.29	PASS
	HCH	2480	-1.149	Off	-47.255	-21.15	PASS
			-1.489	On	-46.830	-21.49	PASS
8DPSK	LCH	2402	-2.546	Off	-49.619	-22.55	PASS
			3.163	On	-49.297	-16.84	PASS
	HCH	2480	-0.839	Off	-47.103	-20.84	PASS
			-1.063	On	-47.430	-21.06	PASS

Test Graphs

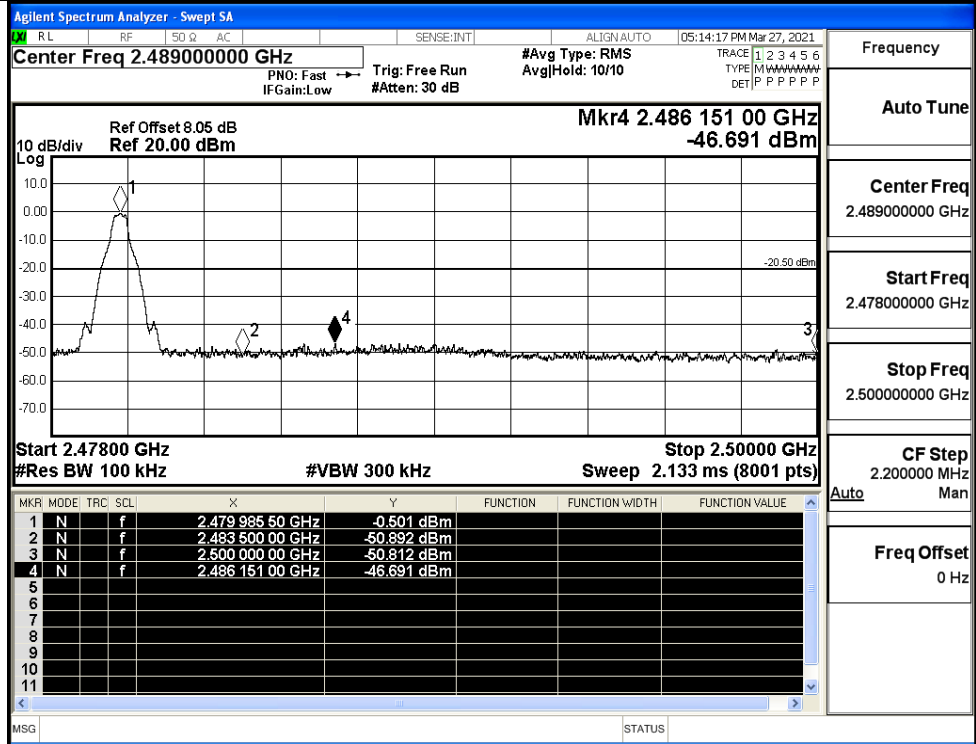
GFSK/LCH/No Hop



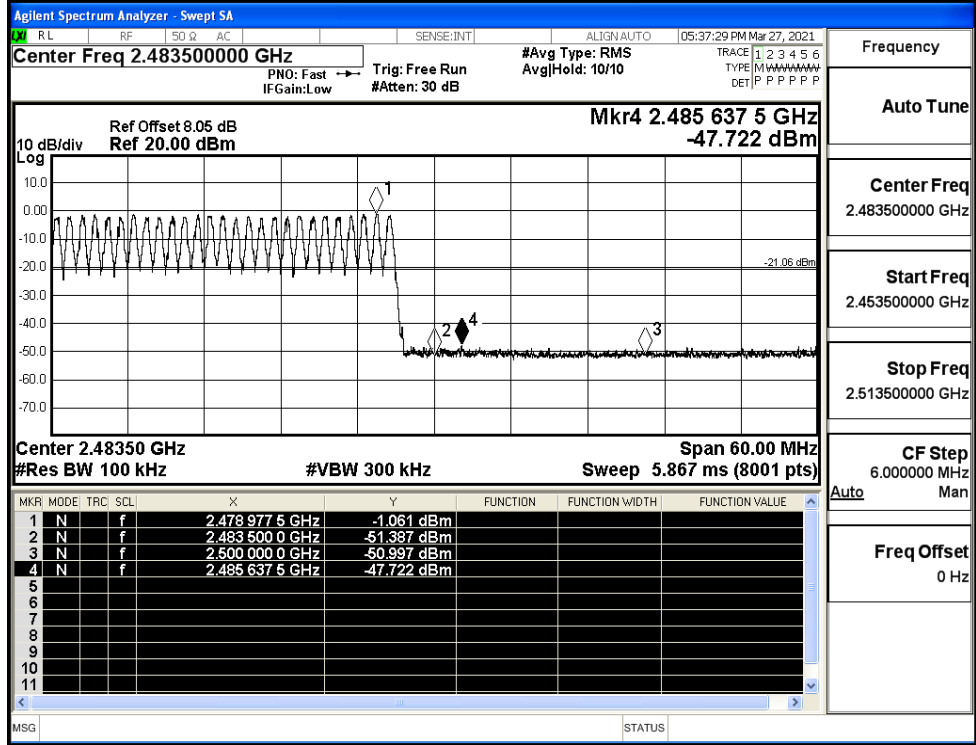
GFSK/LCH/Hop



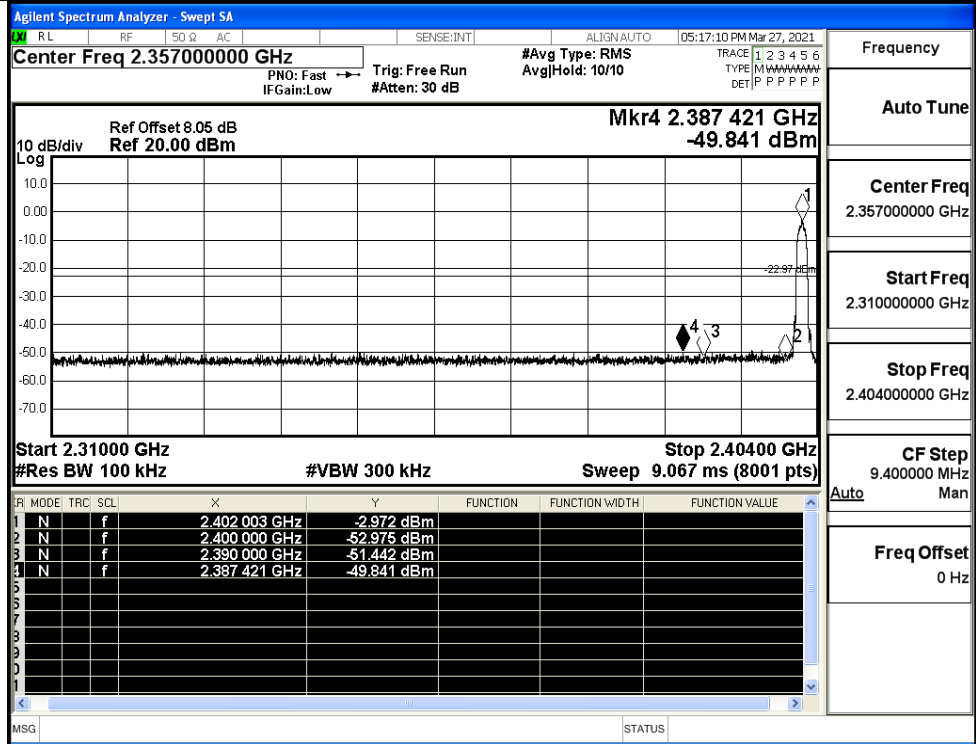
GFSK/HCH/No Hop



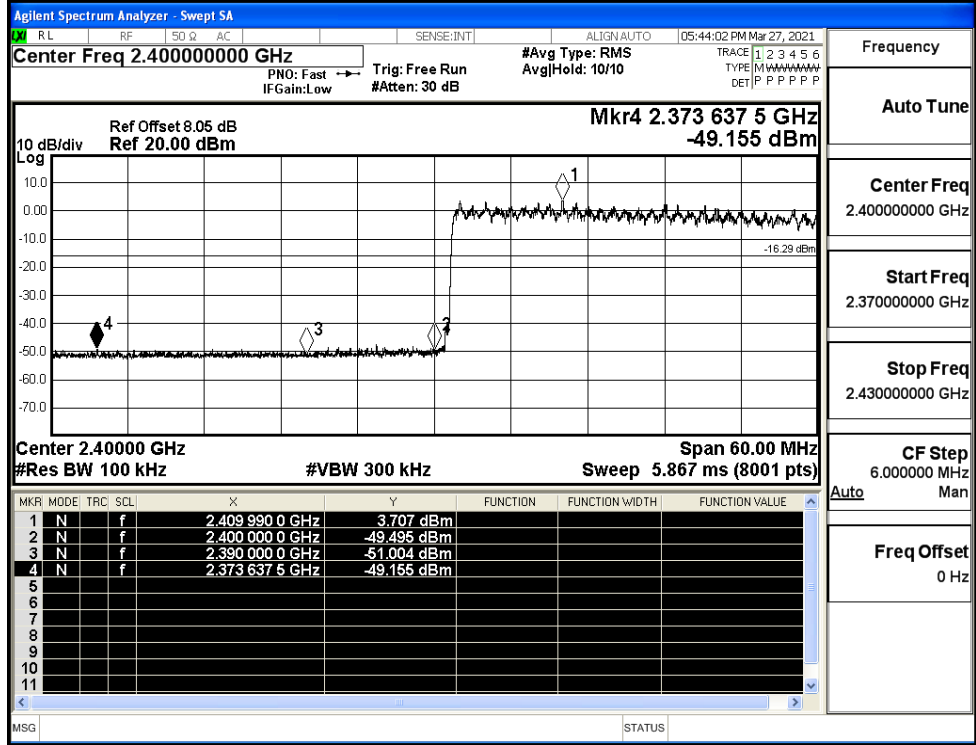
GFSK/HCH/Hop



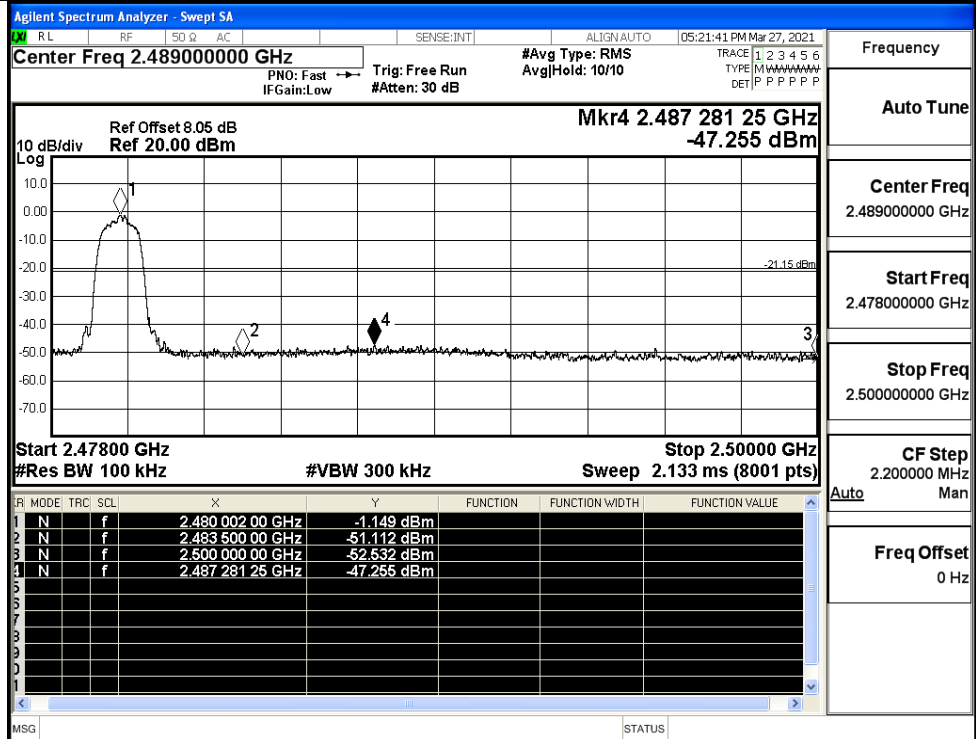
$\pi/4$ DQPSK/LCH/No Hop



$\pi/4$ DQPSK/LCH/Hop

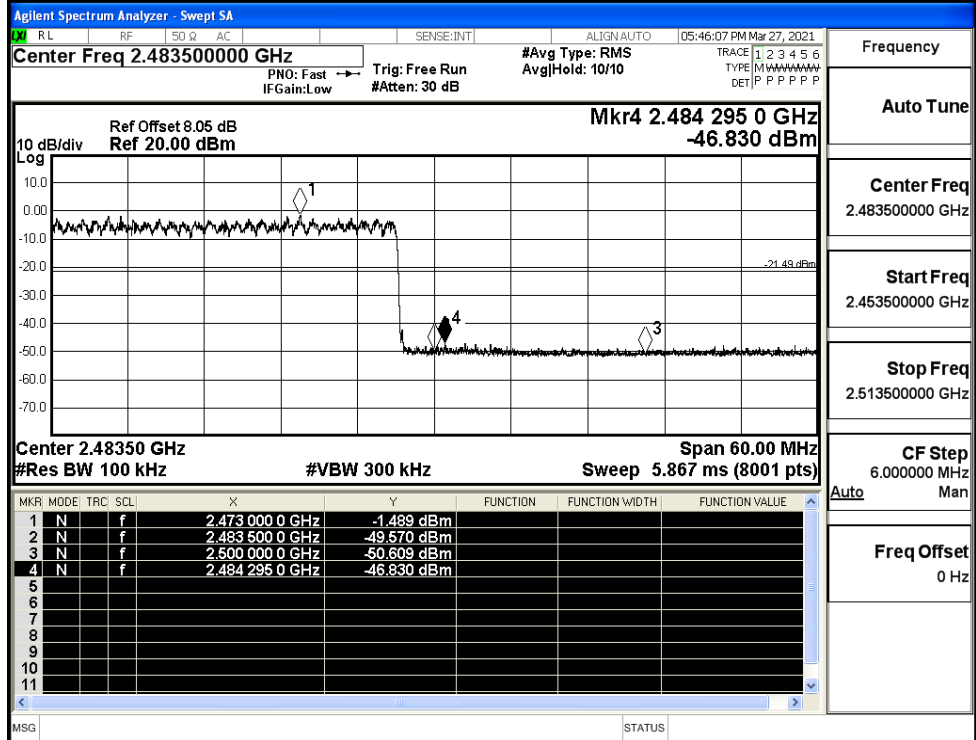


$\pi/4$ DQPSK/HCH/No Hop



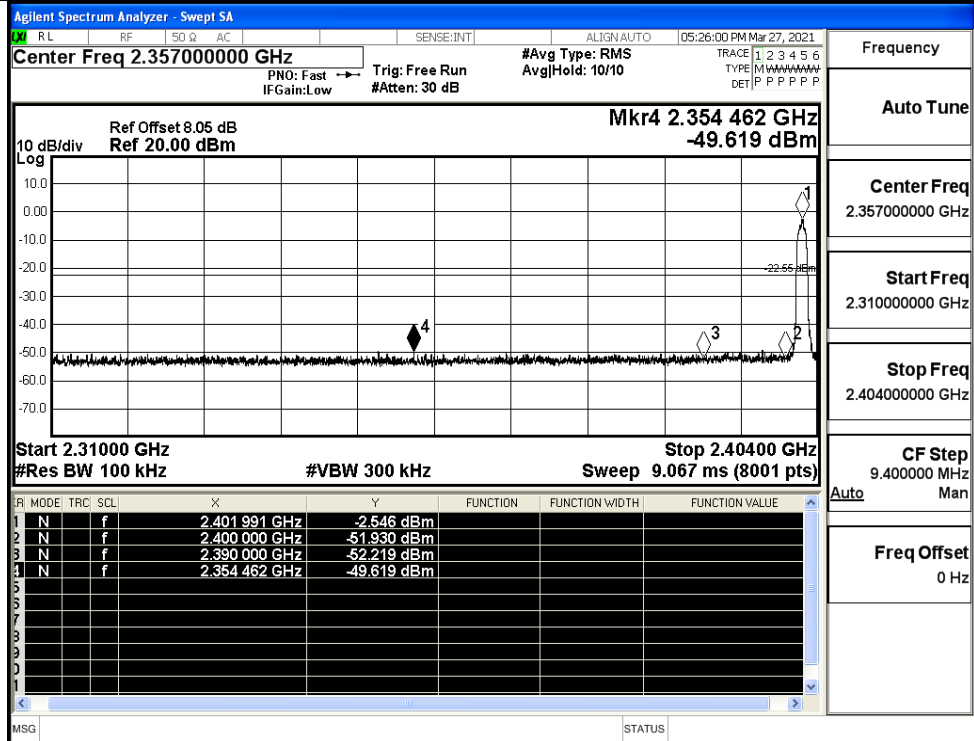
Frequency	
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Freq Offset	0 Hz

$\pi/4$ DQPSK/HCH/Hop



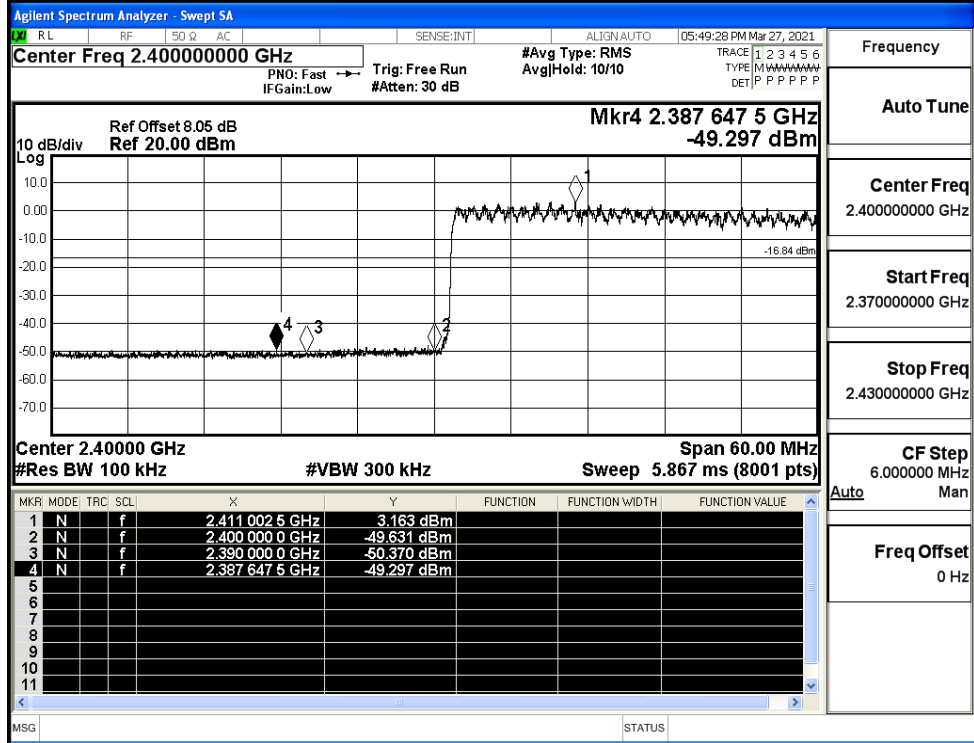
Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

8DPSK/LCH/No Hop



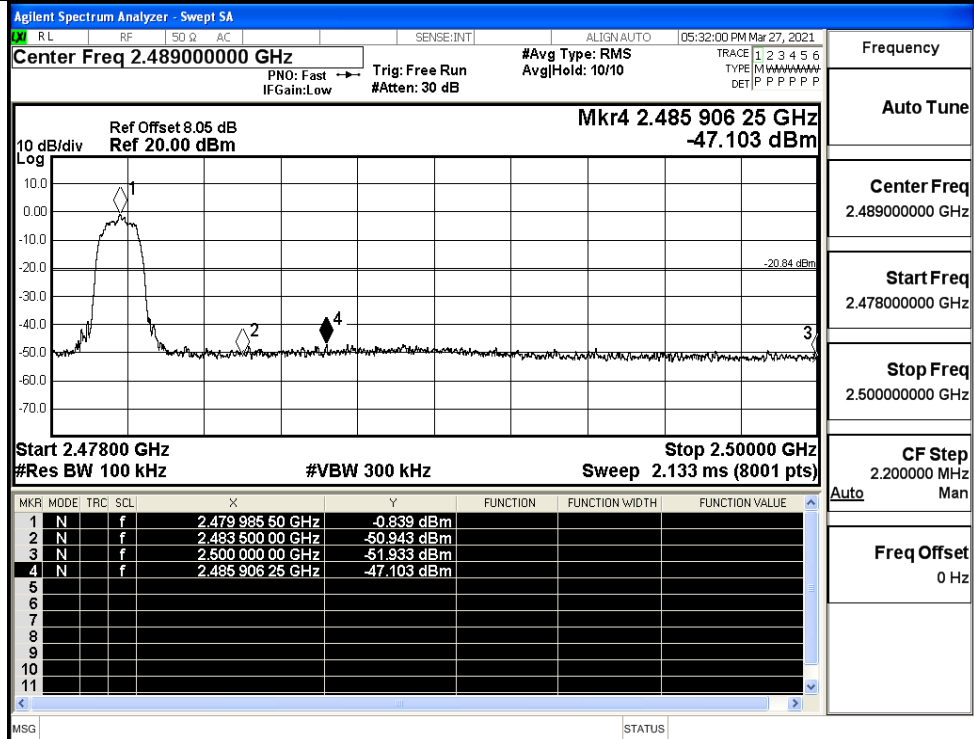
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



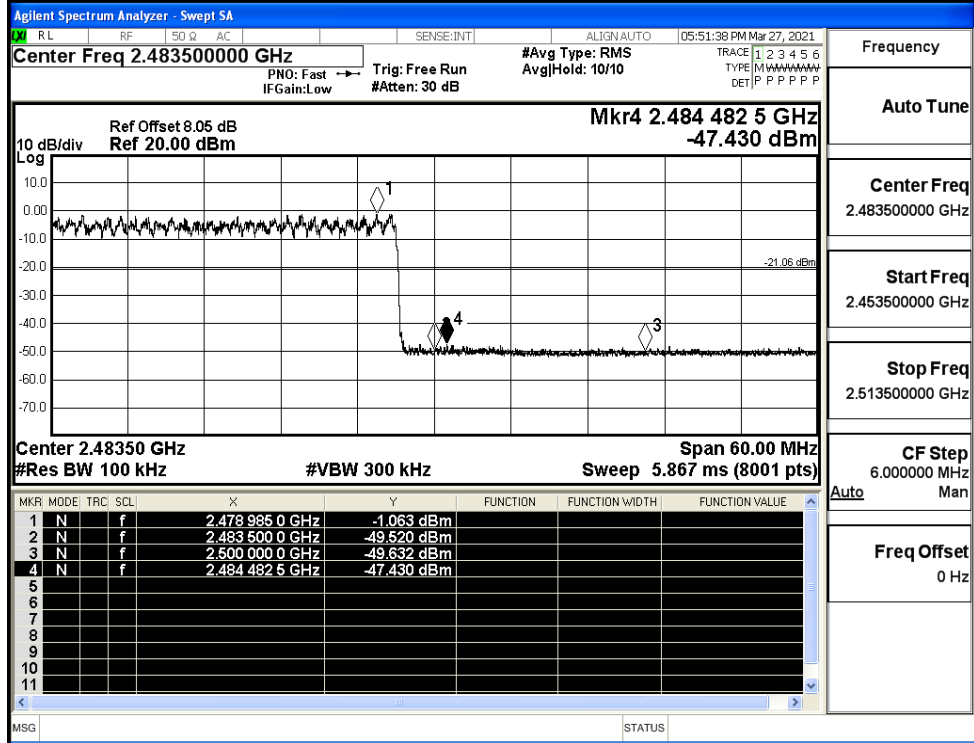
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

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

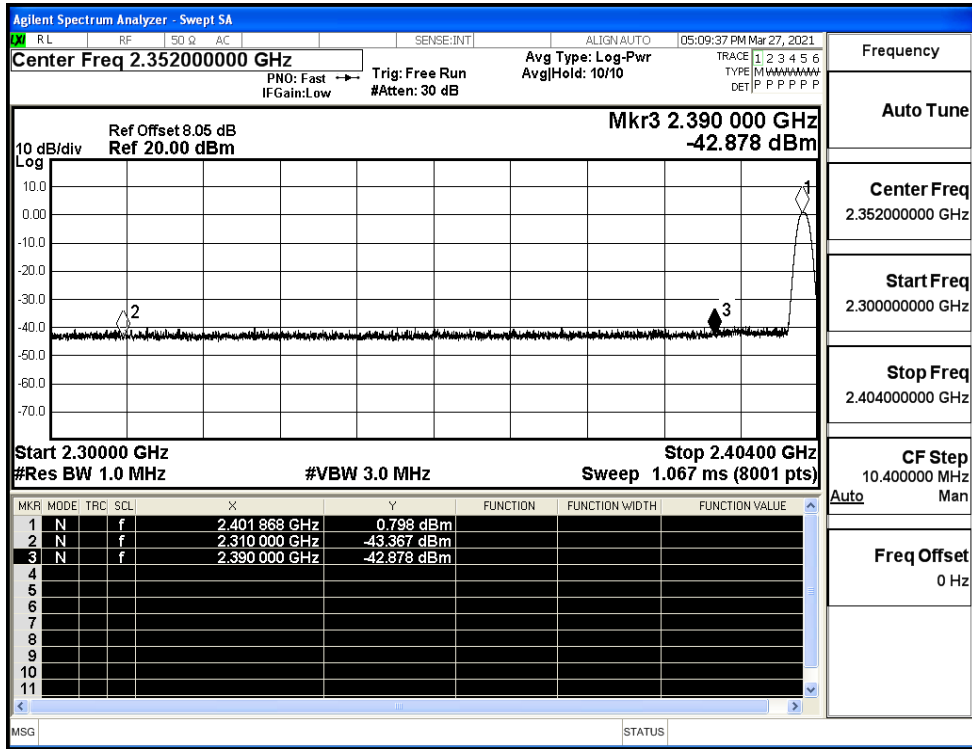


Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

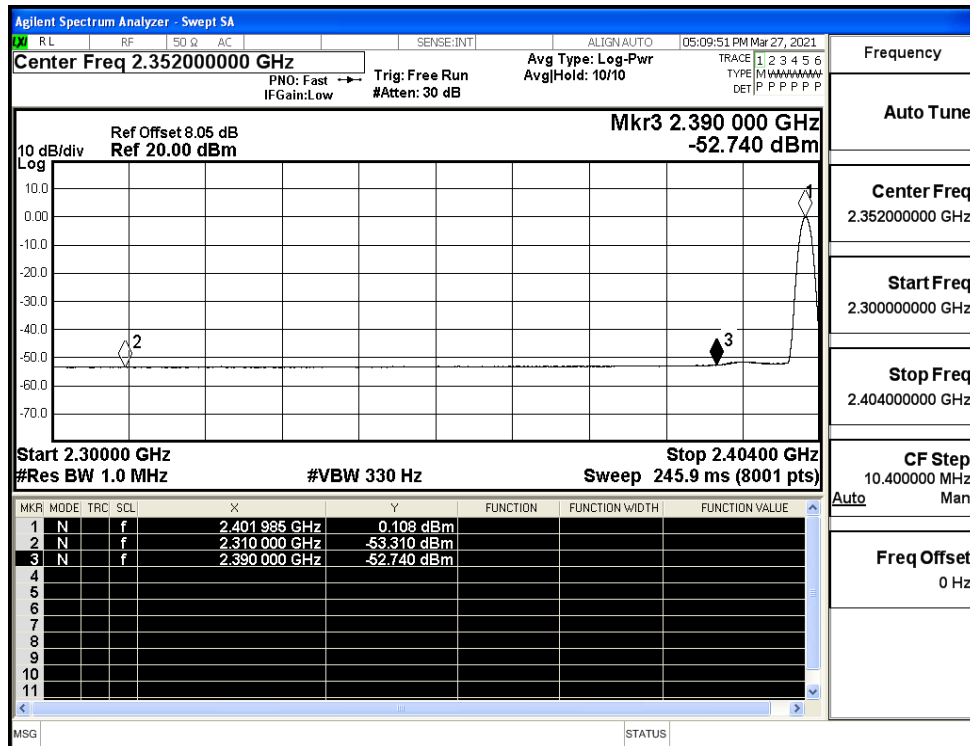
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.37	2.0	0	53.89	PEAK	74	PASS
	Off	2310.0	-53.31	2.0	0	43.95	AV	54	PASS
	Off	2390.0	-42.88	2.0	0	54.38	PEAK	74	PASS
	Off	2390.0	-52.74	2.0	0	44.52	AV	54	PASS
	Off	2483.5	-40.74	2.0	0	56.52	PEAK	74	PASS
	Off	2483.5	-50.77	2.0	0	46.49	AV	54	PASS
	Off	2500.0	-40.33	2.0	0	56.93	PEAK	74	PASS
	Off	2500.0	-52.17	2.0	0	45.09	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.32	2.0	0	53.94	PEAK	74	PASS
	Off	2310.0	-53.32	2.0	0	43.94	AV	54	PASS
	Off	2390.0	-42.50	2.0	0	54.76	PEAK	74	PASS
	Off	2390.0	-52.63	2.0	0	44.63	AV	54	PASS
	Off	2483.5	-41.47	2.0	0	55.79	PEAK	74	PASS
	Off	2483.5	-50.66	2.0	0	46.6	AV	54	PASS
	Off	2500.0	-40.66	2.0	0	56.6	PEAK	74	PASS
	Off	2500.0	-52.17	2.0	0	45.09	AV	54	PASS
8DPSK	Off	2310.0	-41.96	2.0	0	55.3	PEAK	74	PASS
	Off	2310.0	-53.38	2.0	0	43.88	AV	54	PASS
	Off	2390.0	-43.32	2.0	0	53.94	PEAK	74	PASS
	Off	2390.0	-52.90	2.0	0	44.36	AV	54	PASS
	Off	2483.5	-40.72	2.0	0	56.54	PEAK	74	PASS
	Off	2483.5	-50.55	2.0	0	46.71	AV	54	PASS
	Off	2500.0	-40.01	2.0	0	57.25	PEAK	74	PASS
	Off	2500.0	-52.08	2.0	0	45.18	AV	54	PASS

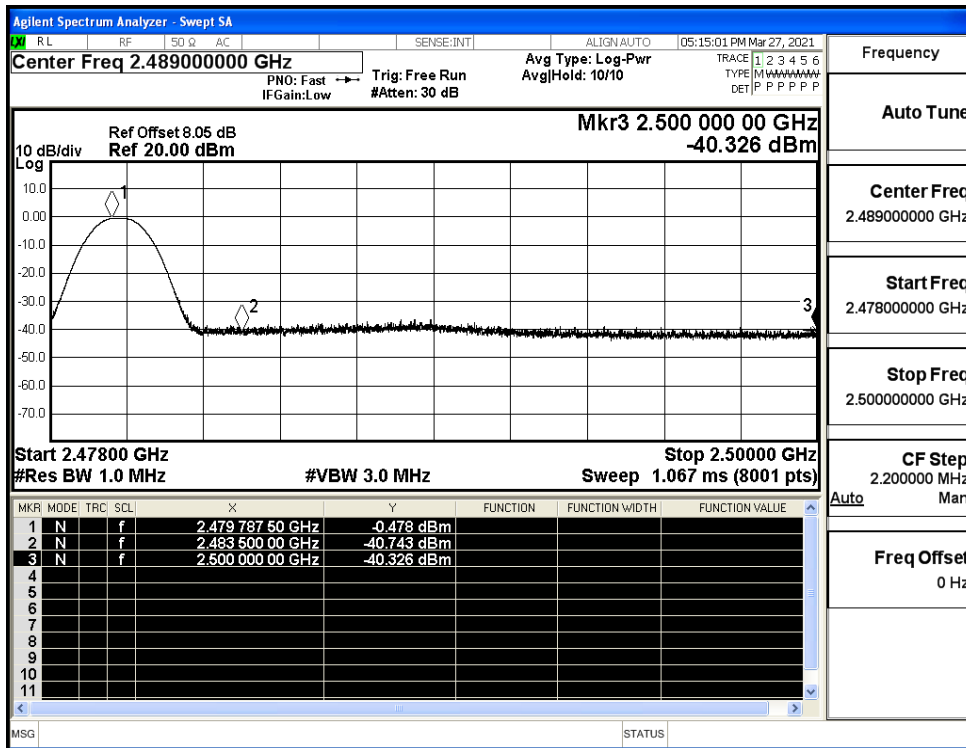
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



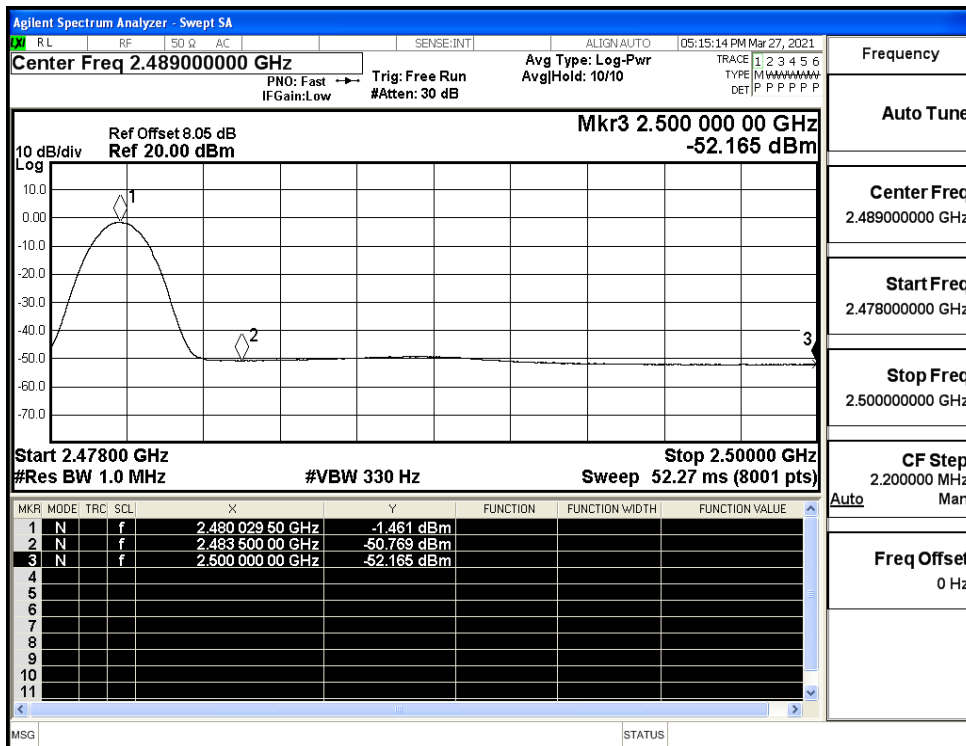
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



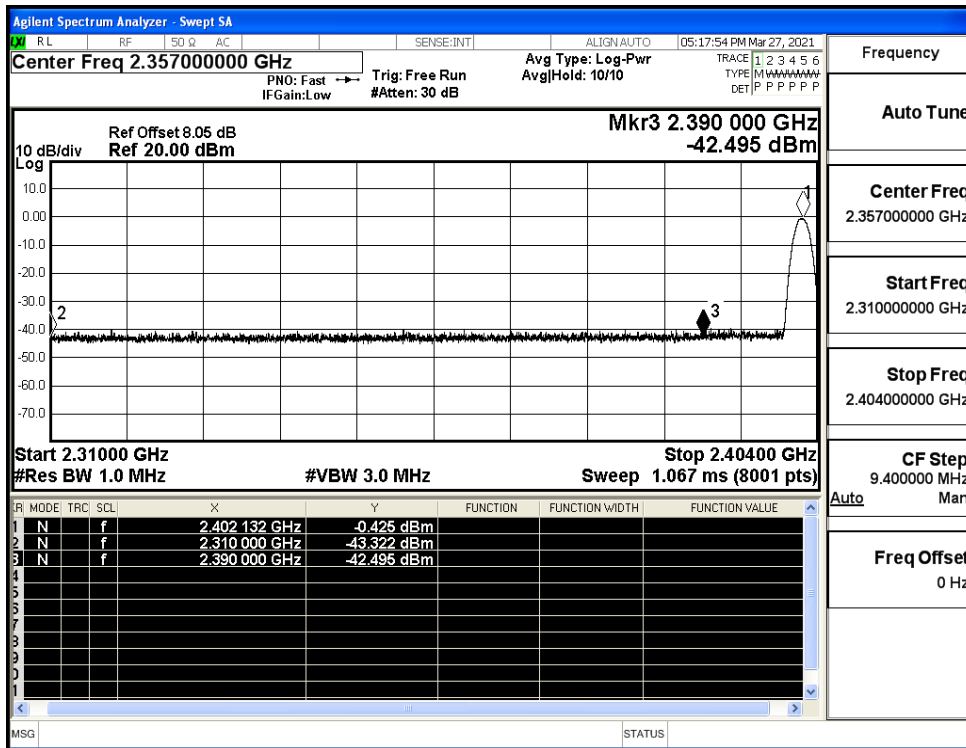
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



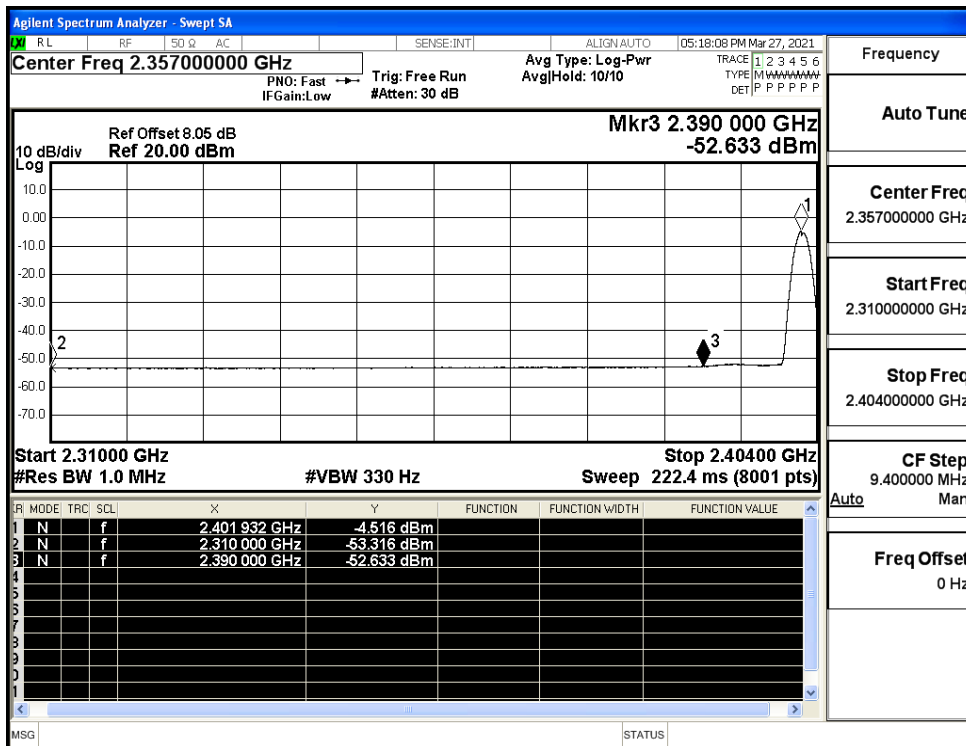
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



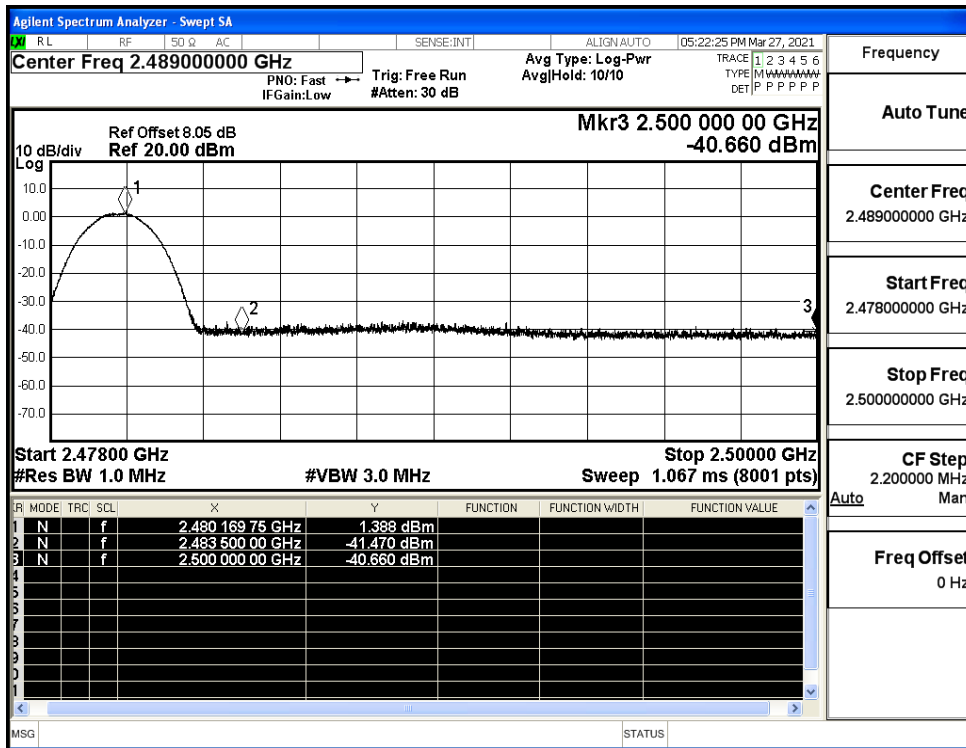
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



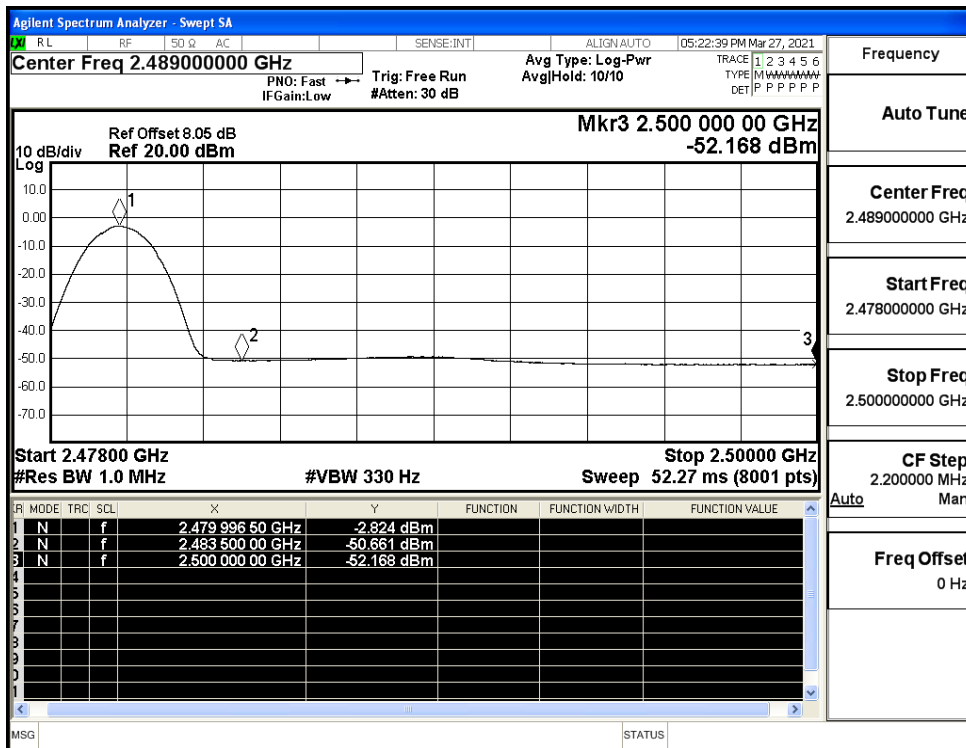
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



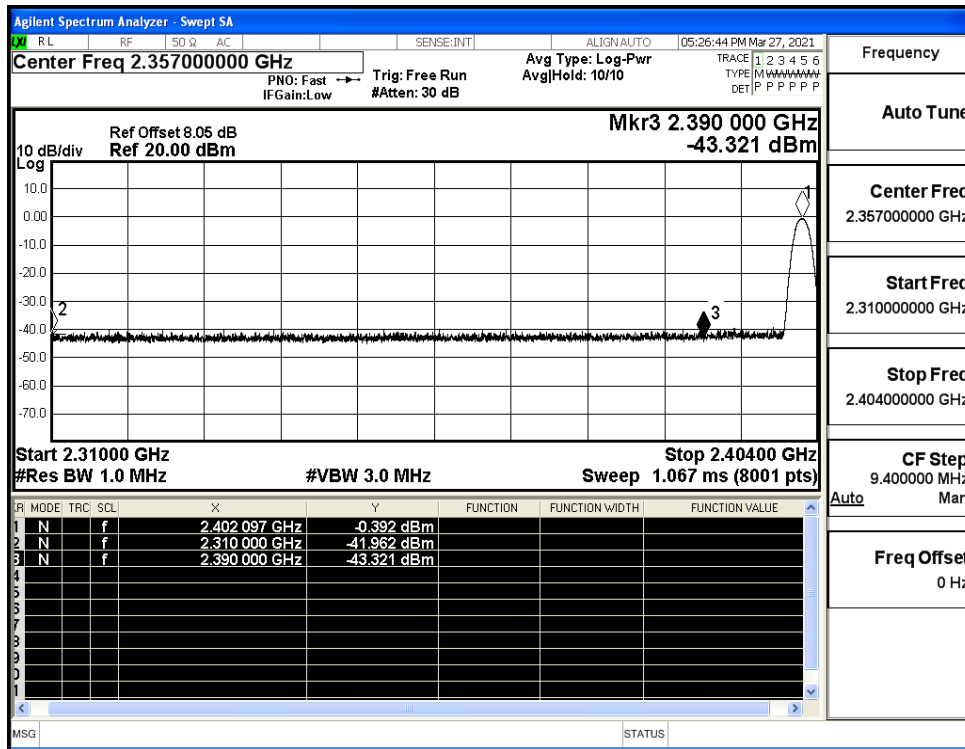
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



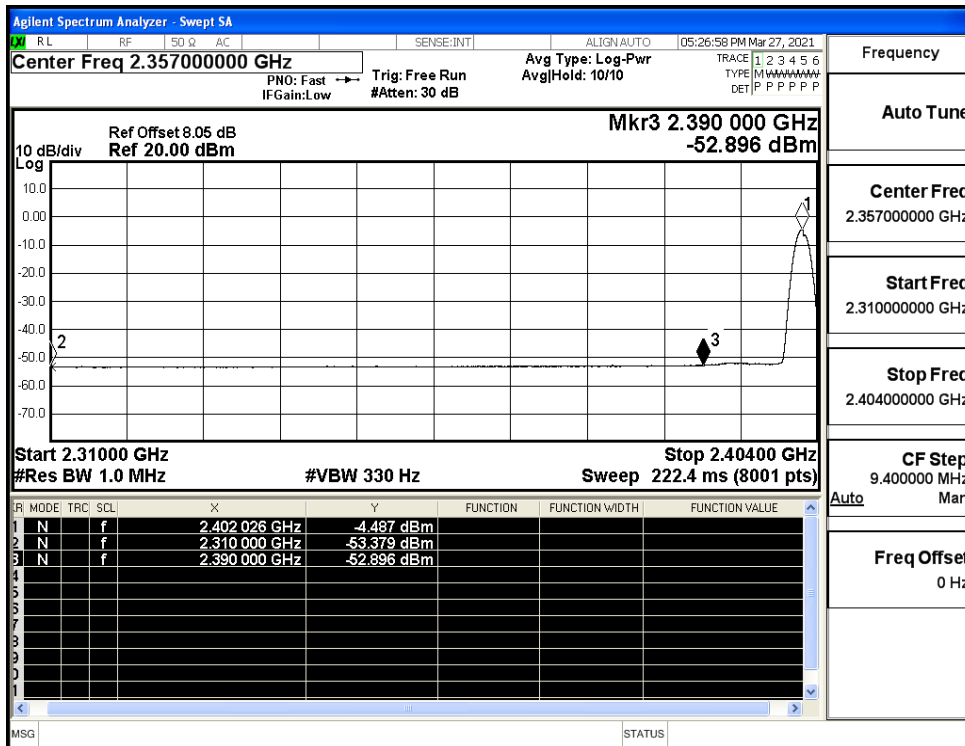
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



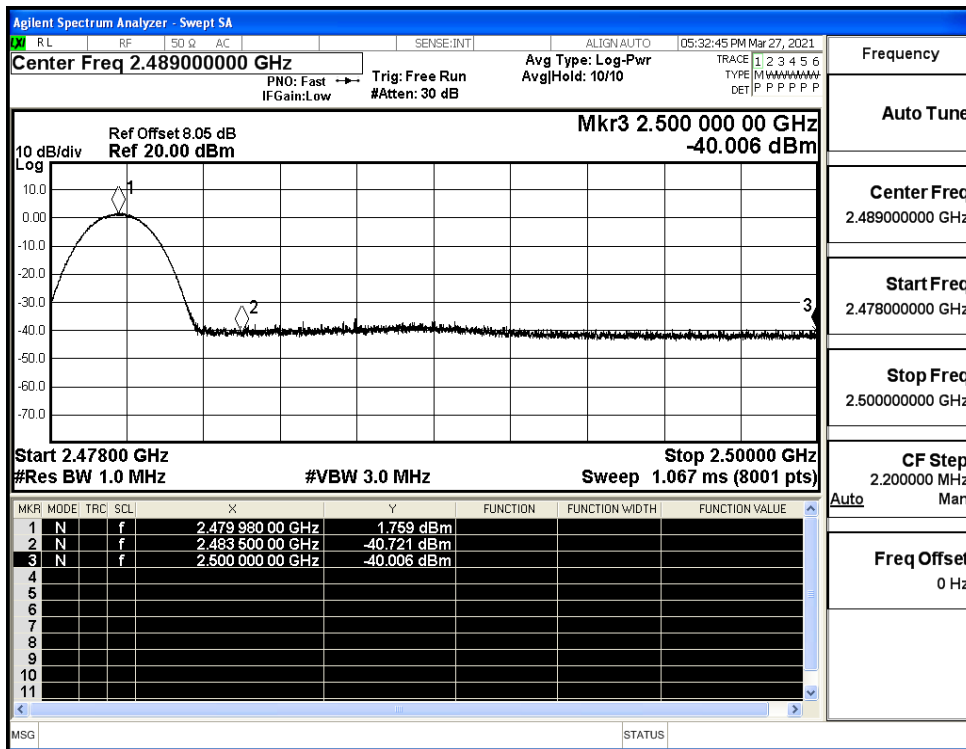
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

