

Appendix A

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

Product Name: Bluetooth Speaker

Trade Mark: Aitkenson

Test Model: B316

Environmental Conditions

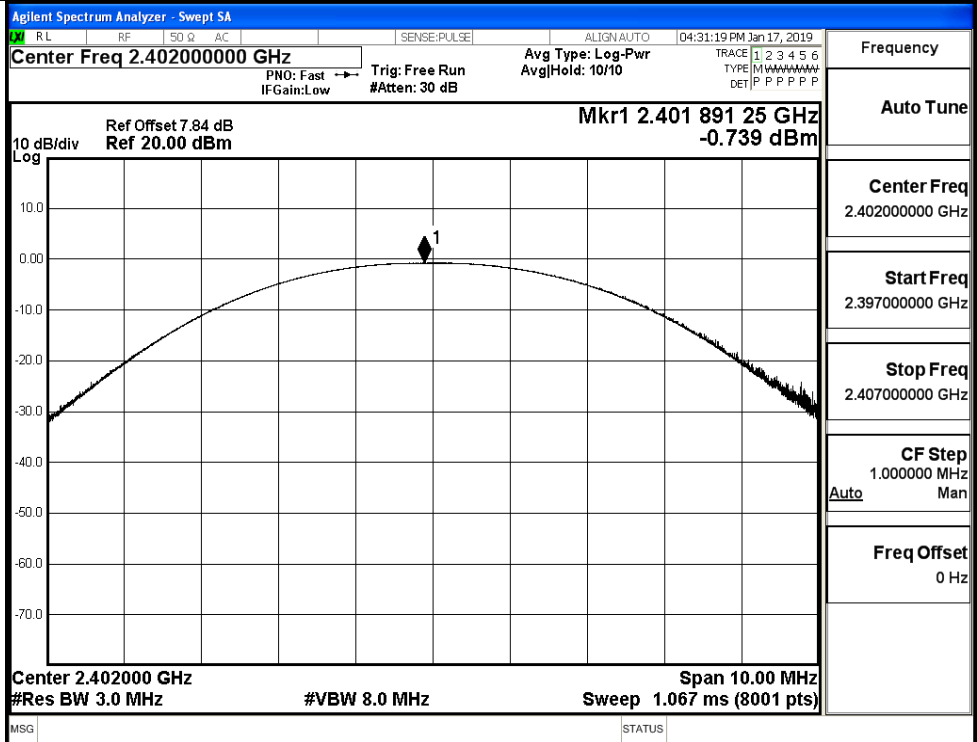
Temperature:	24.8 ° C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Jerry.Zeng
Supervised by:	Jayden.Zhuo

A.1 Maximum Conducted Peak Output Power

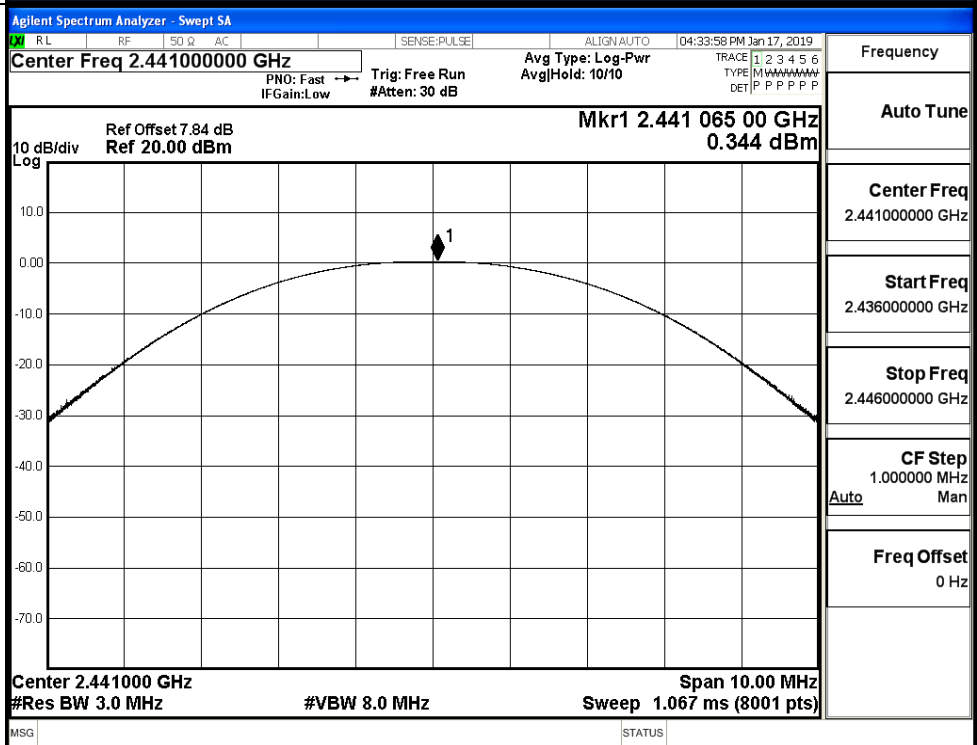
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.739	30	PASS
	MCH	0.344	30	PASS
	HCH	-0.716	30	PASS
$\pi/4$ DQPSK	LCH	-1.305	21	PASS
	MCH	-0.239	21	PASS
	HCH	-1.411	21	PASS
8DPSK	LCH	-1.068	21	PASS
	MCH	-0.127	21	PASS
	HCH	-1.258	21	PASS

Test Graphs

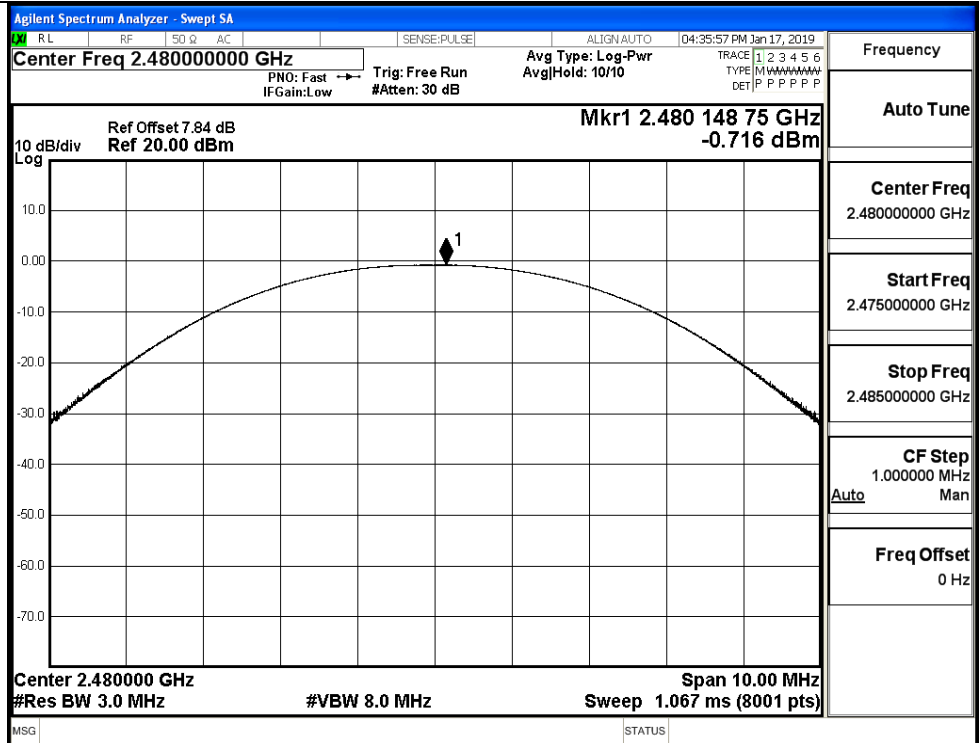
GFSK/LCH



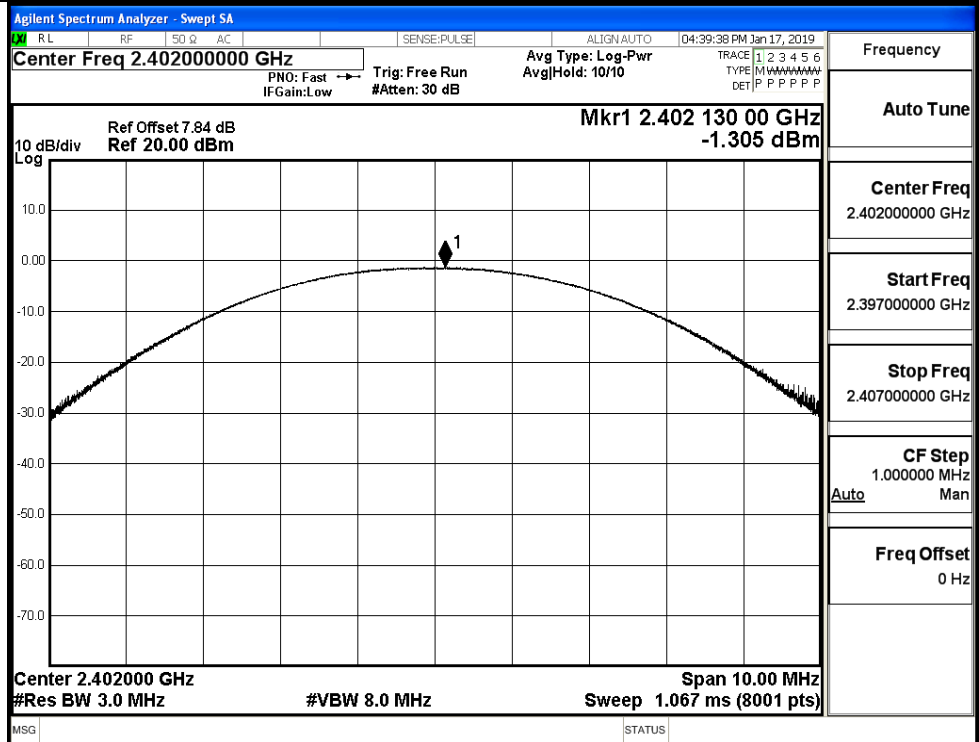
GFSK/MCH



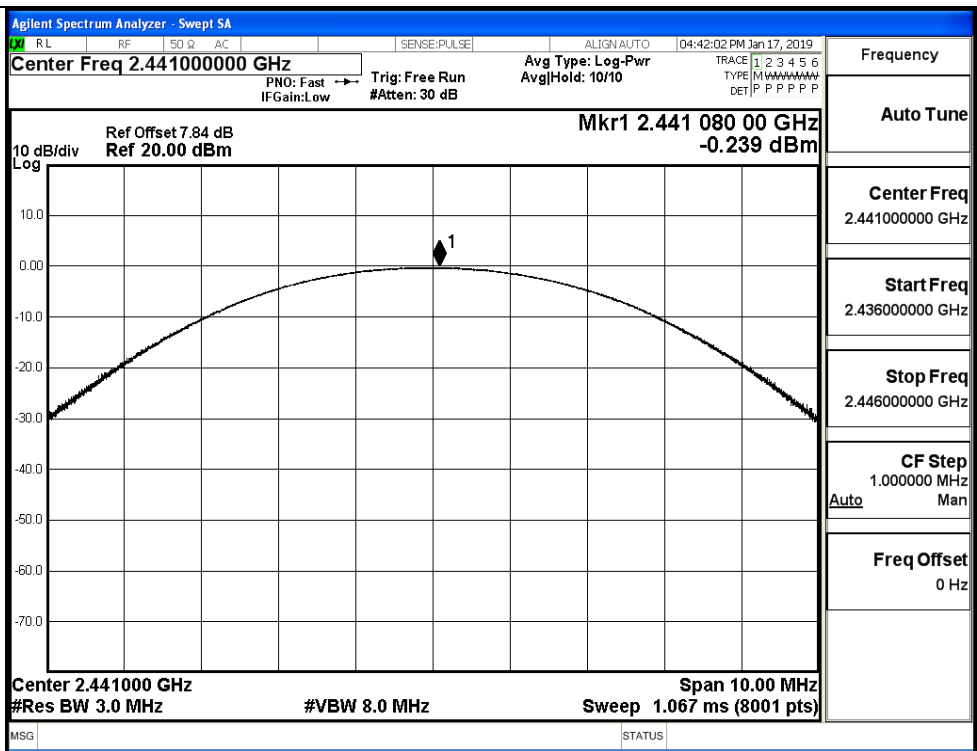
GFSK/HCH



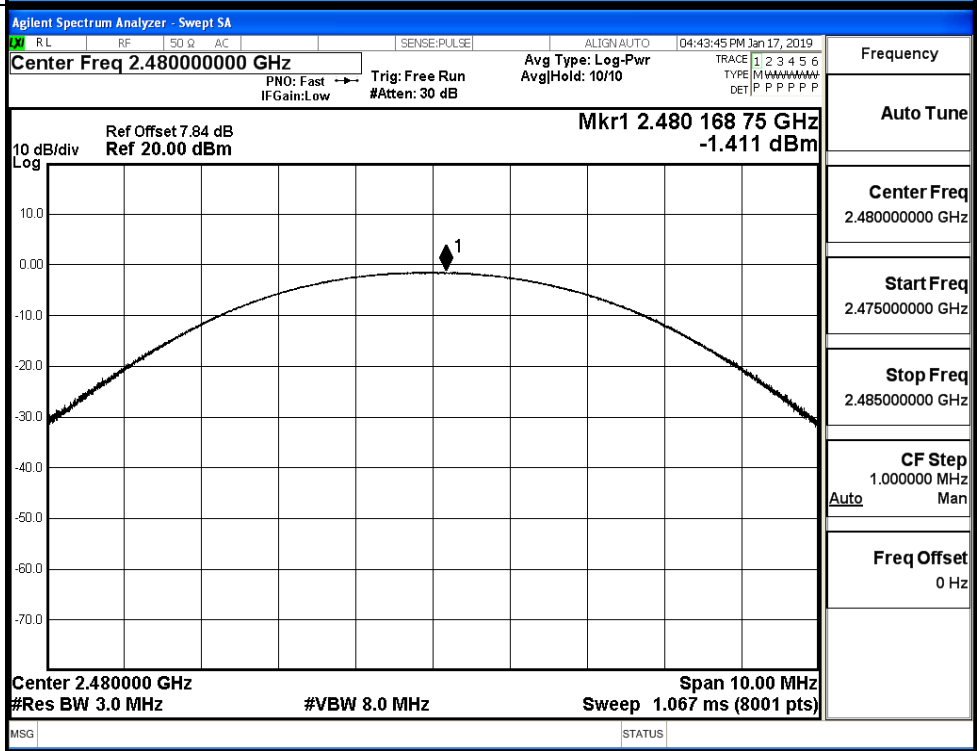
$\pi/4$ DQPSK/LCH



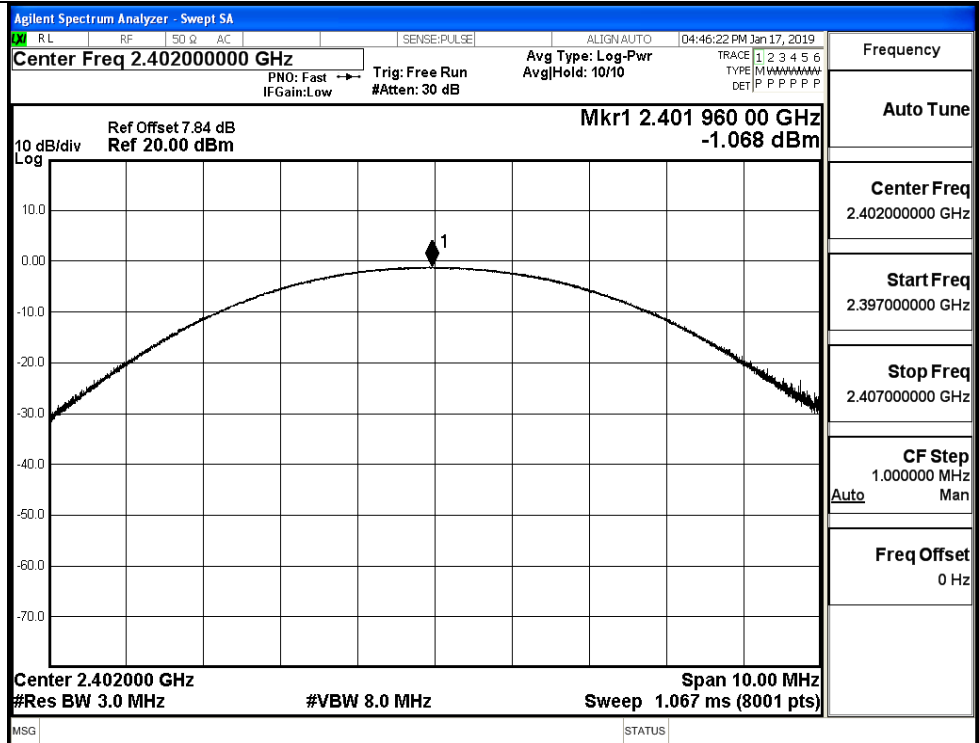
π /4DQPSK/MCH



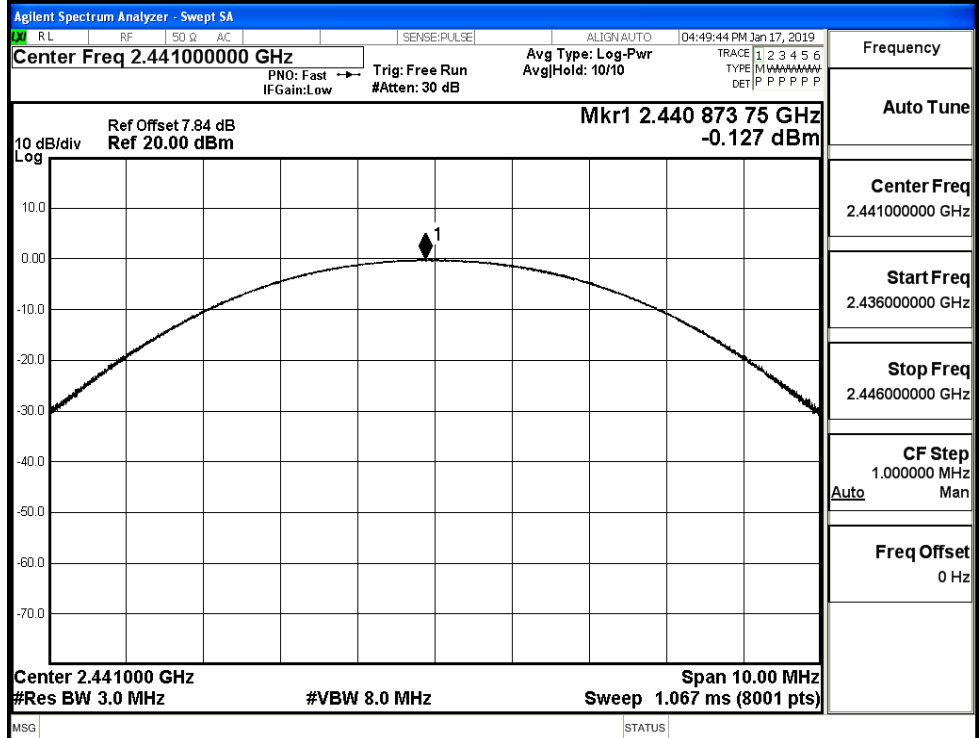
π /4DQPSK/HCH



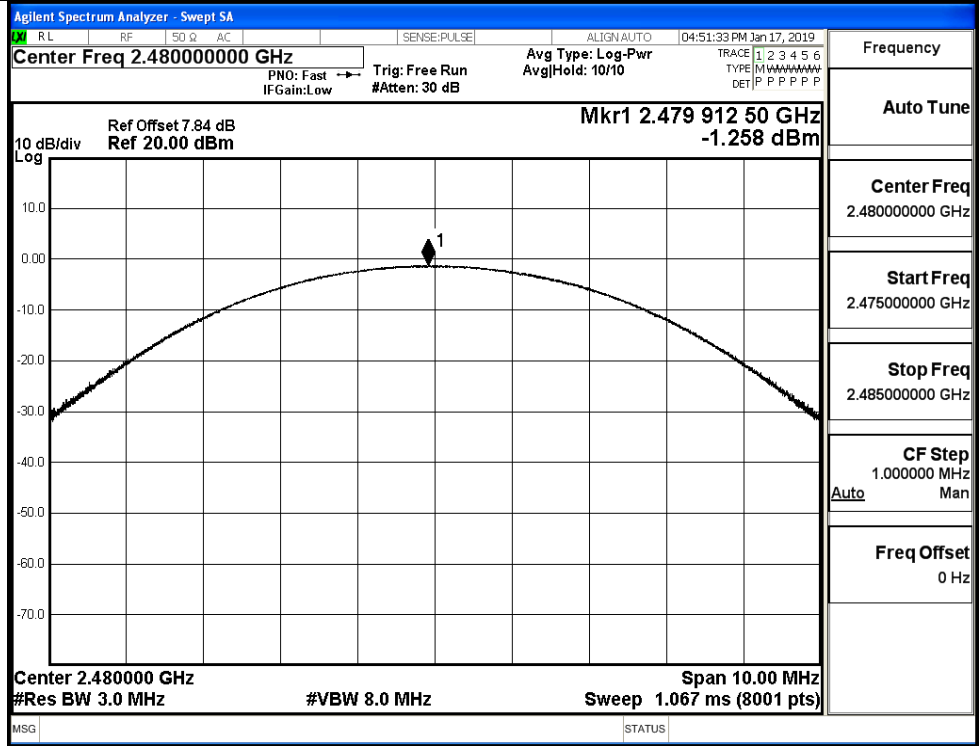
8DPSK/LCH



8DPSK/MCH

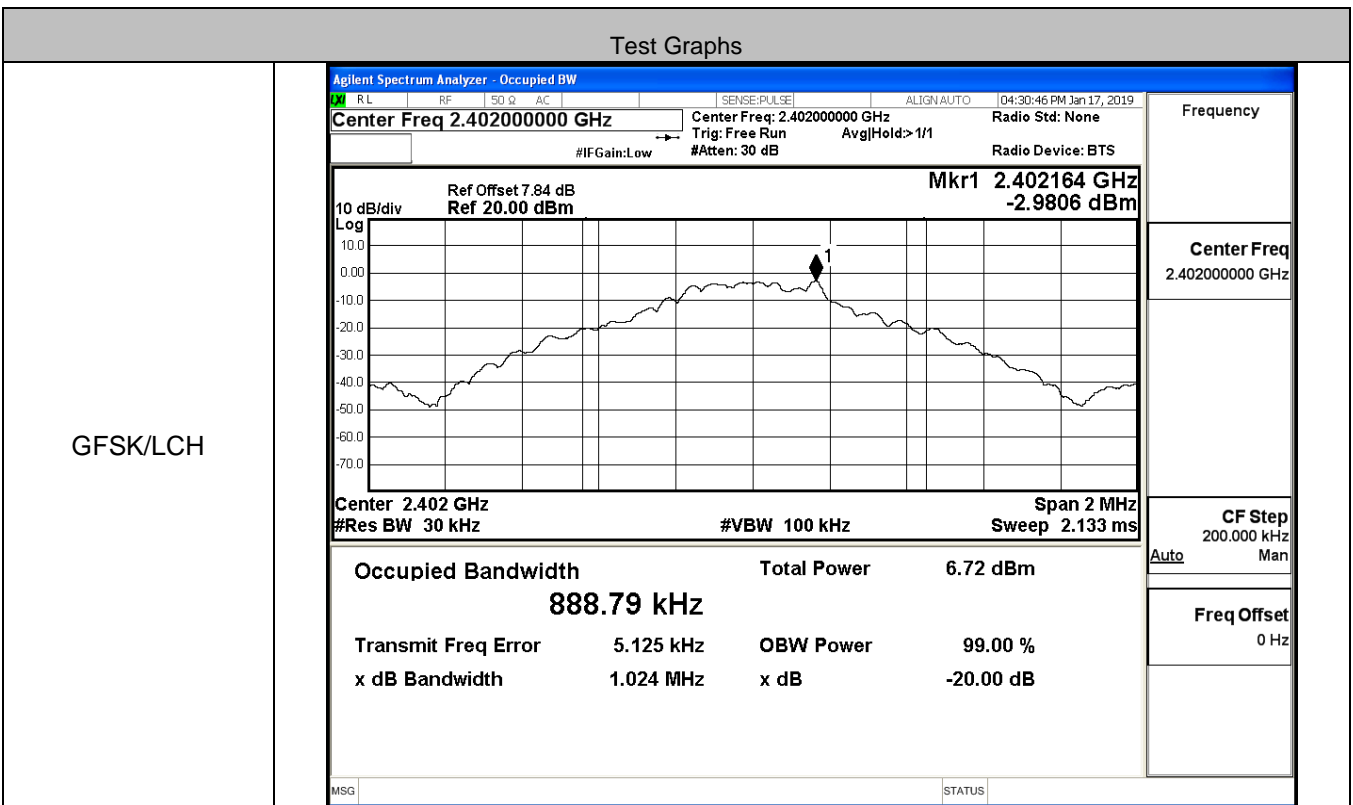


8DPSK/HCH

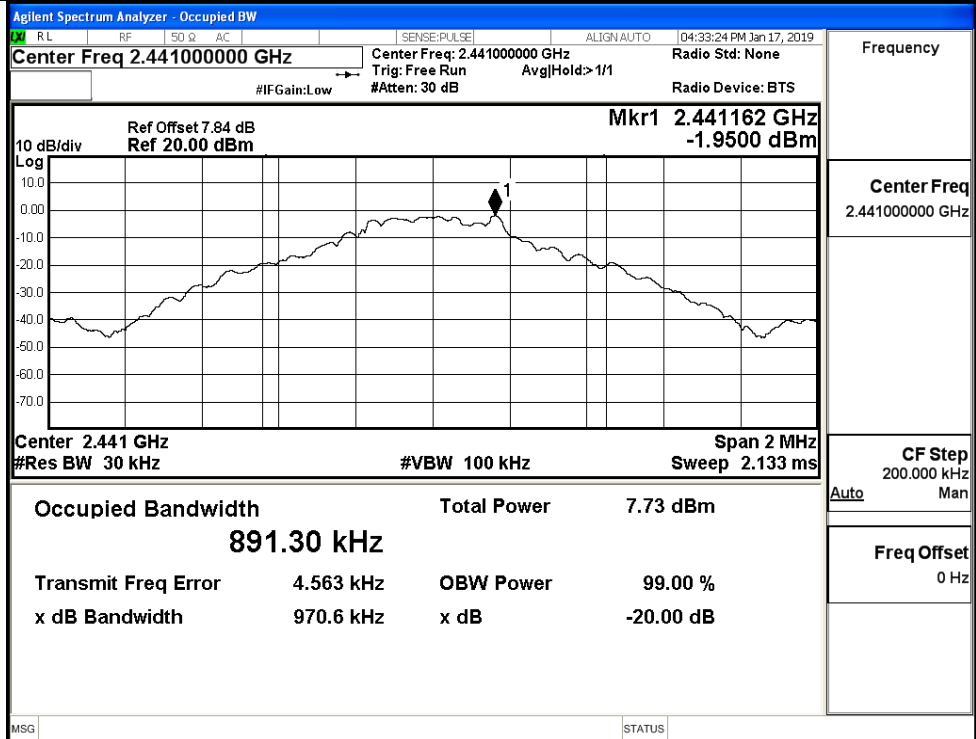


A.2 99% and 20dB Bandwidth

Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.88879	1.024	Not Specified	PASS
	MCH	0.89130	0.9706	Not Specified	PASS
	HCH	0.89456	1.016	Not Specified	PASS
π/4DQPSK	LCH	1.1795	1.309	Not Specified	PASS
	MCH	1.1771	1.311	Not Specified	PASS
	HCH	1.1772	1.312	Not Specified	PASS
8DPSK	LCH	1.1945	1.298	Not Specified	PASS
	MCH	1.1910	1.299	Not Specified	PASS
	HCH	1.1899	1.299	Not Specified	PASS



GFSK/MCH



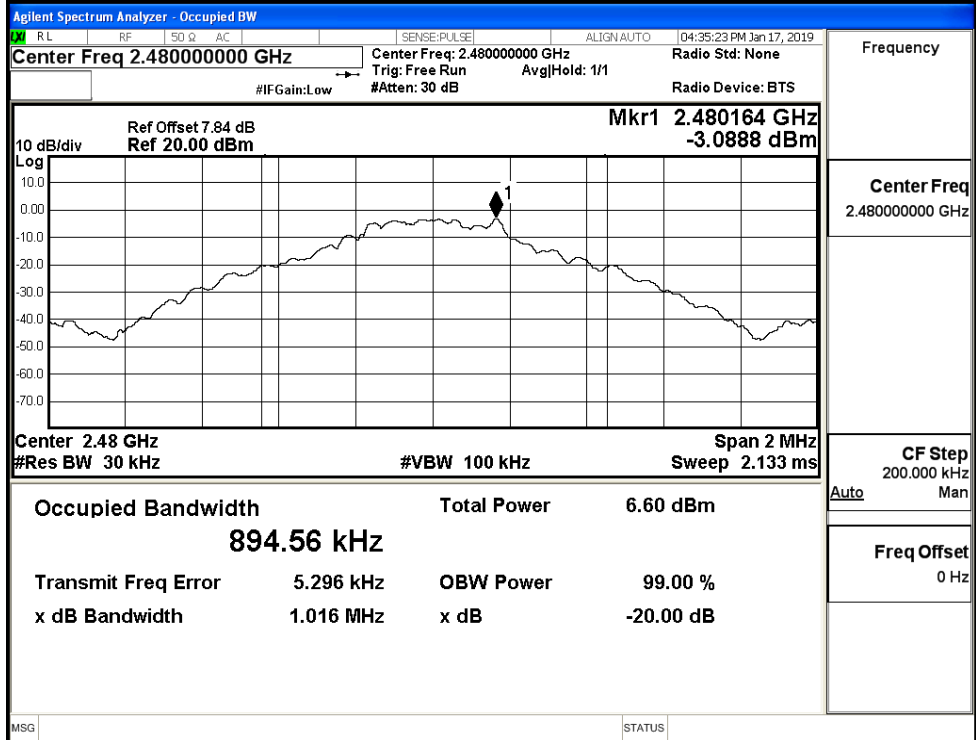
Frequency

Center Freq
2.441000000 GHz

CF Step
200.000 kHz

Freq Offset
0 Hz

GFSK/HCH



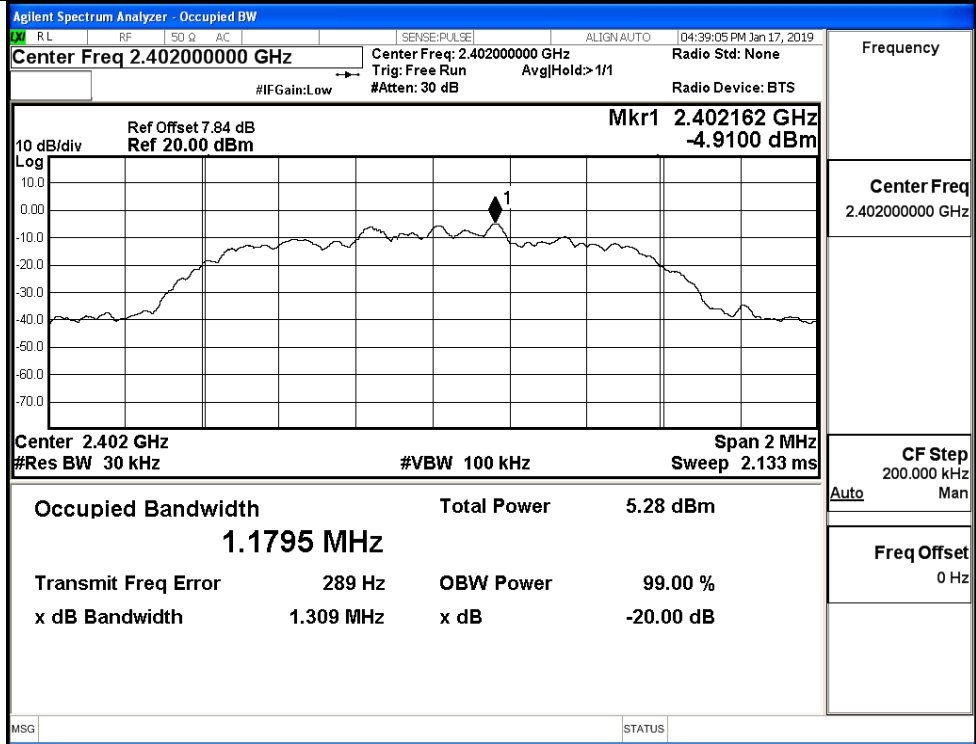
Frequency

Center Freq
2.480000000 GHz

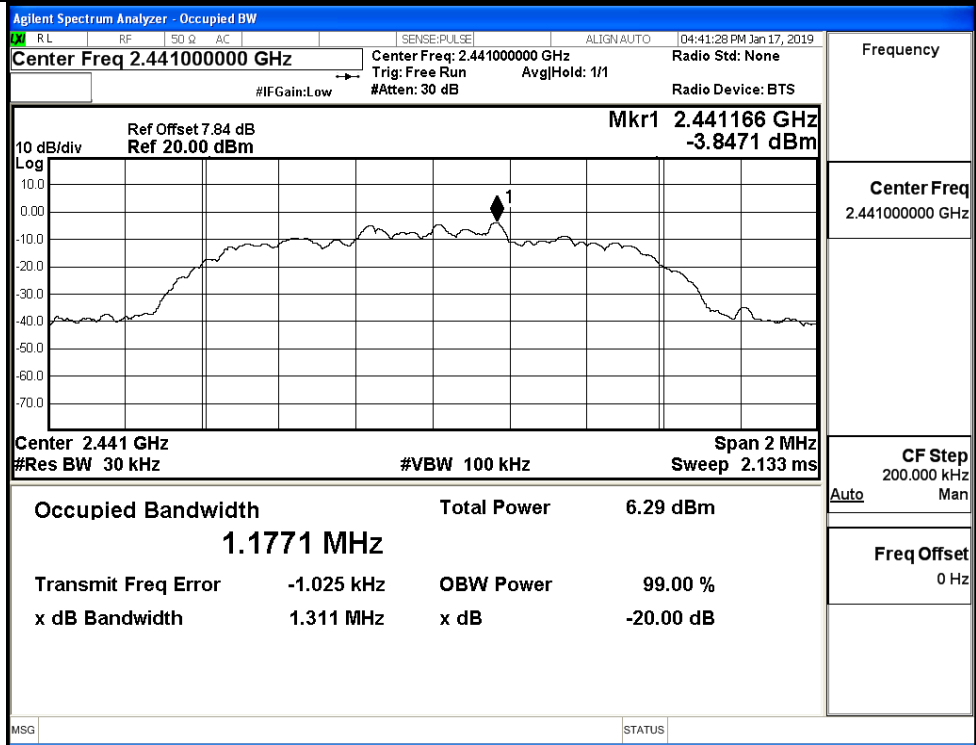
CF Step
200.000 kHz

Freq Offset
0 Hz

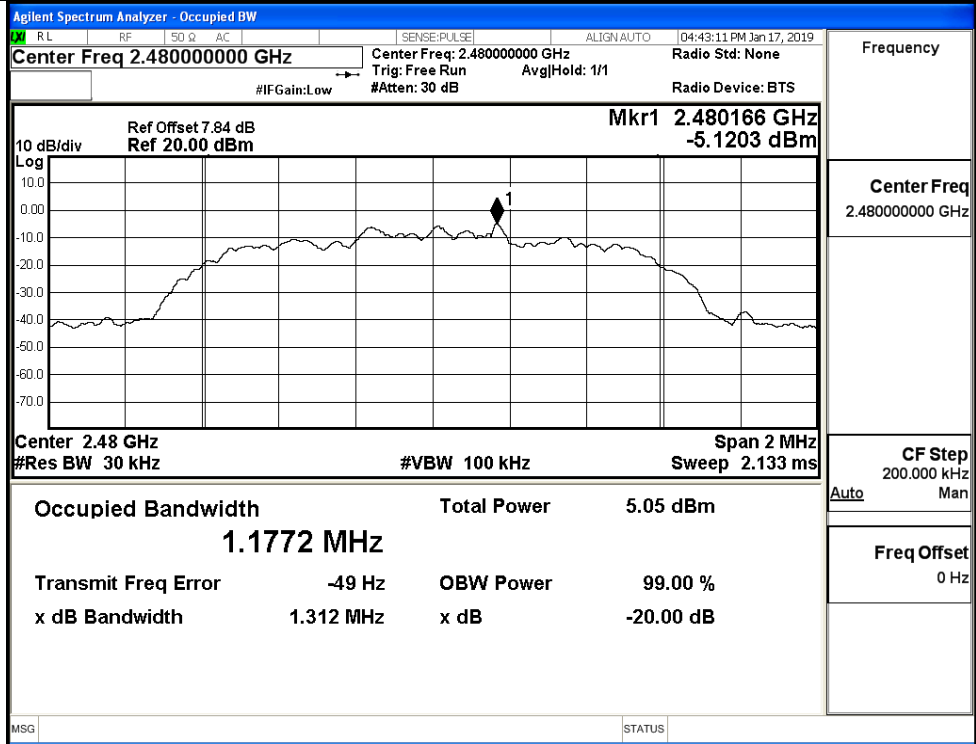
$\pi/4$ DQPSK/LCH



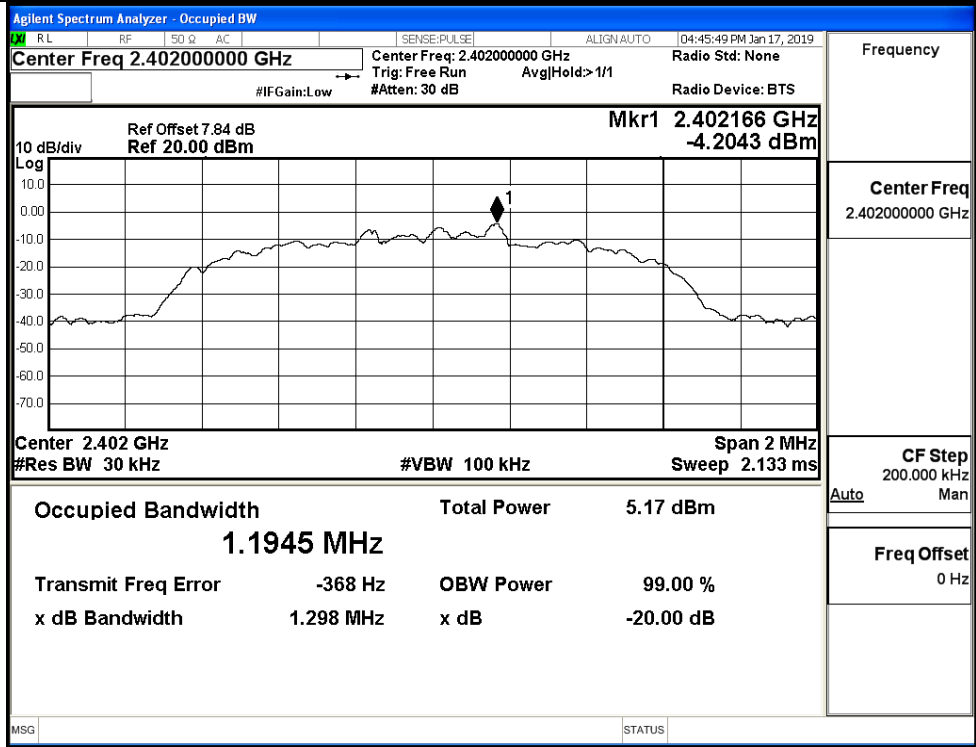
$\pi/4$ DQPSK/MCH



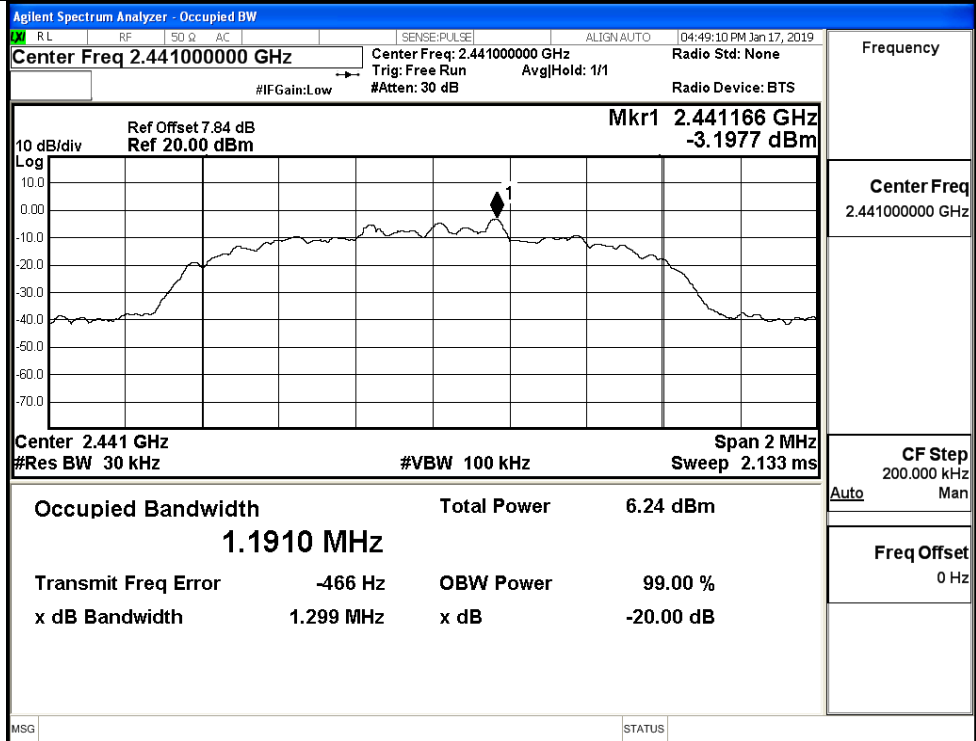
$\pi/4$ DQPSK/HCH



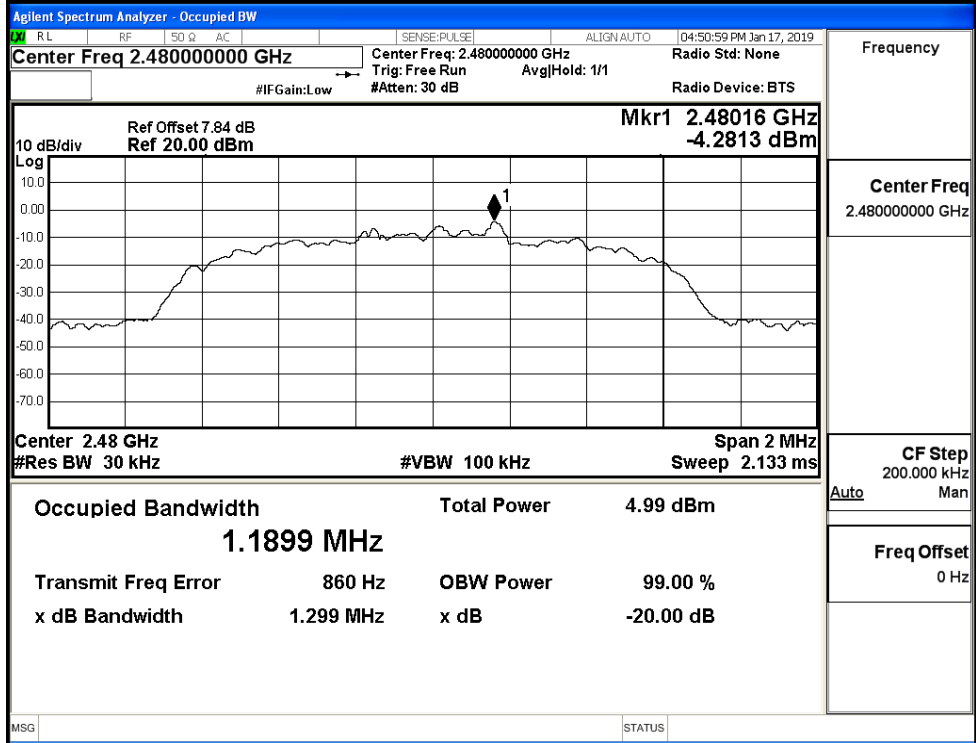
8DPSK/LCH



8DPSK/MCH

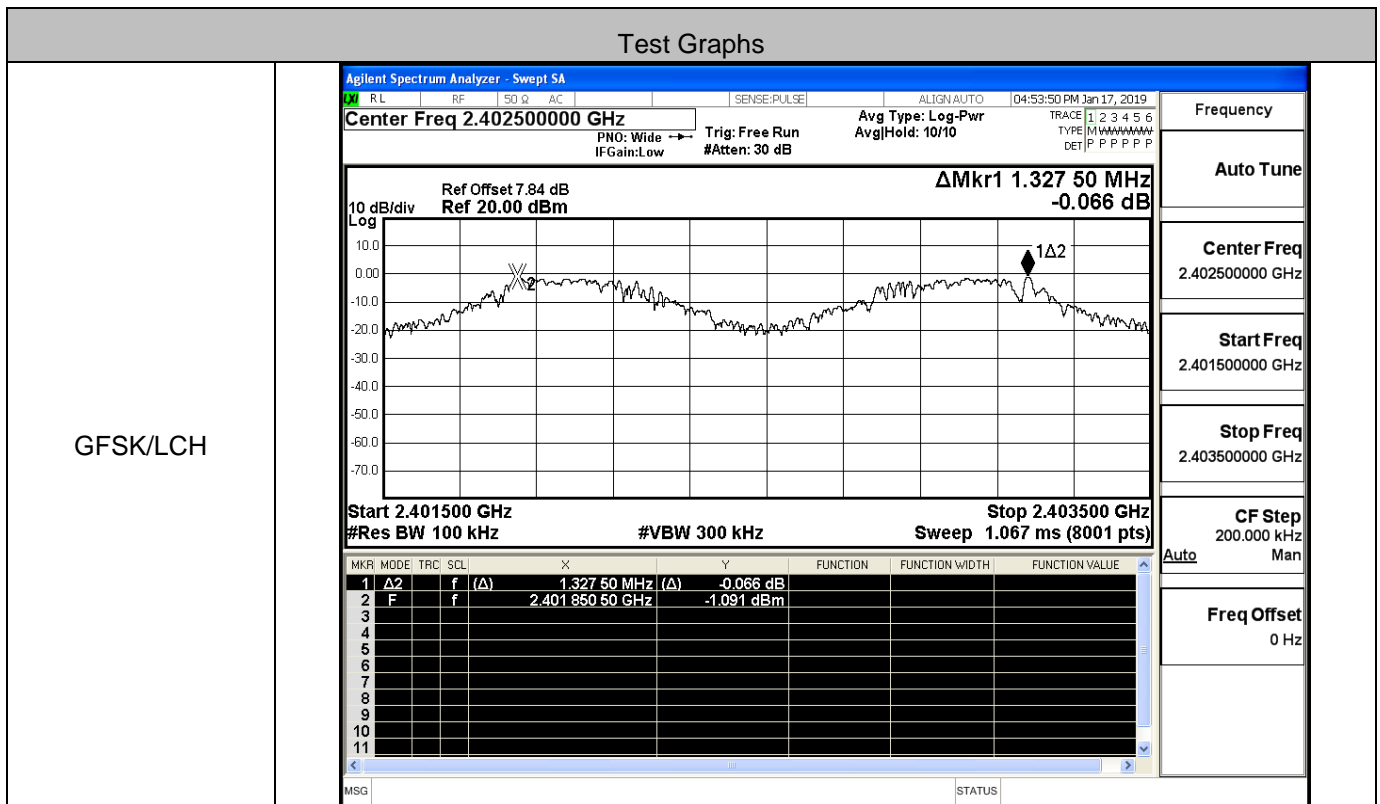


8DPSK/HCH

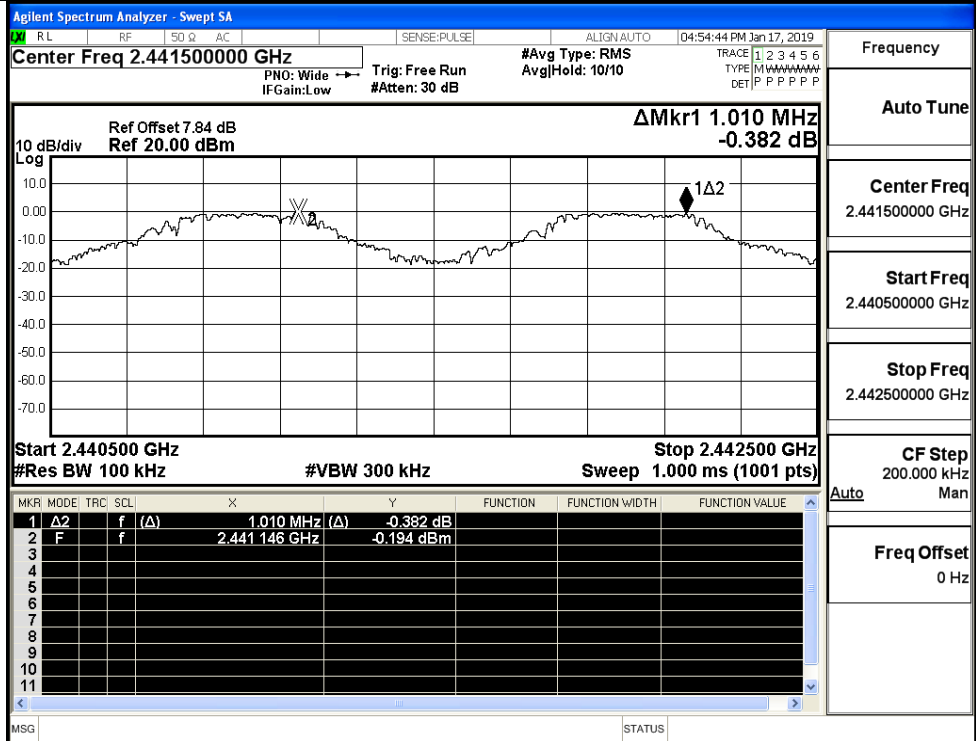


A.3 Carrier Frequency Separation

Mode	Channel	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.327	0.683	PASS
	MCH	1.010	0.683	PASS
	HCH	1.224	0.683	PASS
π/4DQPSK	LCH	1.274	0.875	PASS
	MCH	1.088	0.875	PASS
	HCH	1.198	0.875	PASS
8DPSK	LCH	1.054	0.866	PASS
	MCH	0.984	0.866	PASS
	HCH	0.922	0.866	PASS

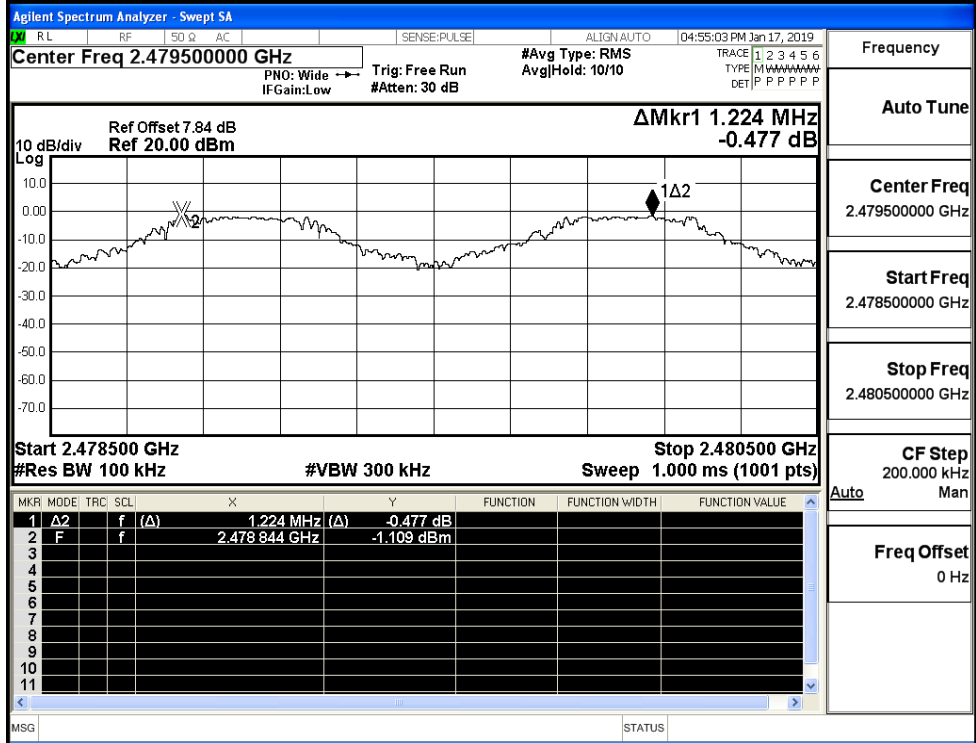


GFSK/MCH



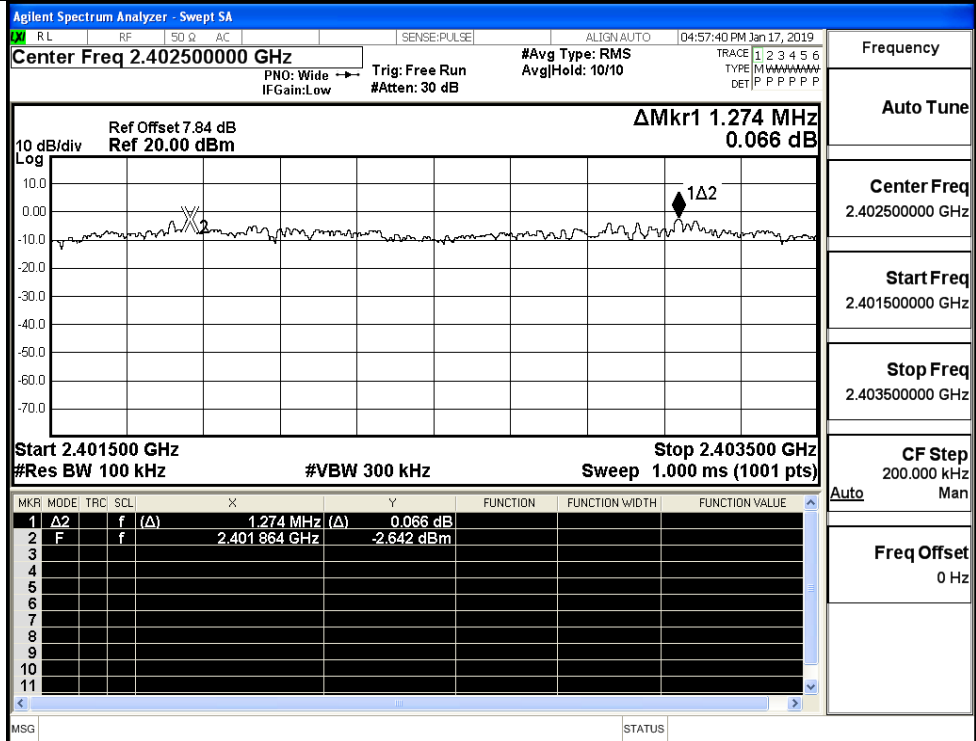
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

GFSK/HCH

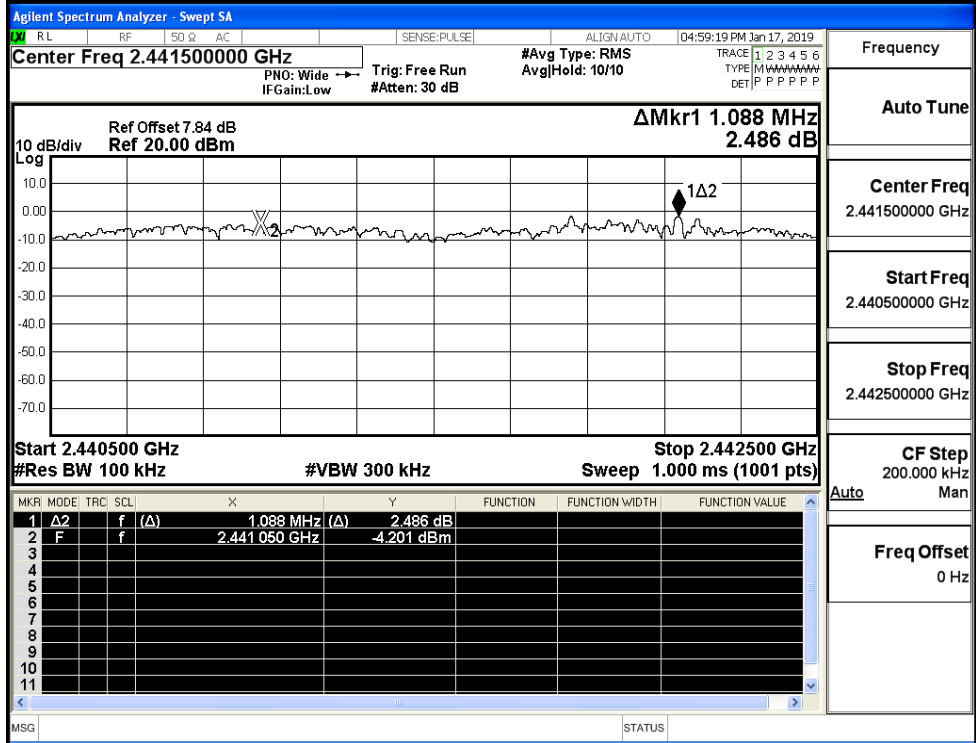


Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

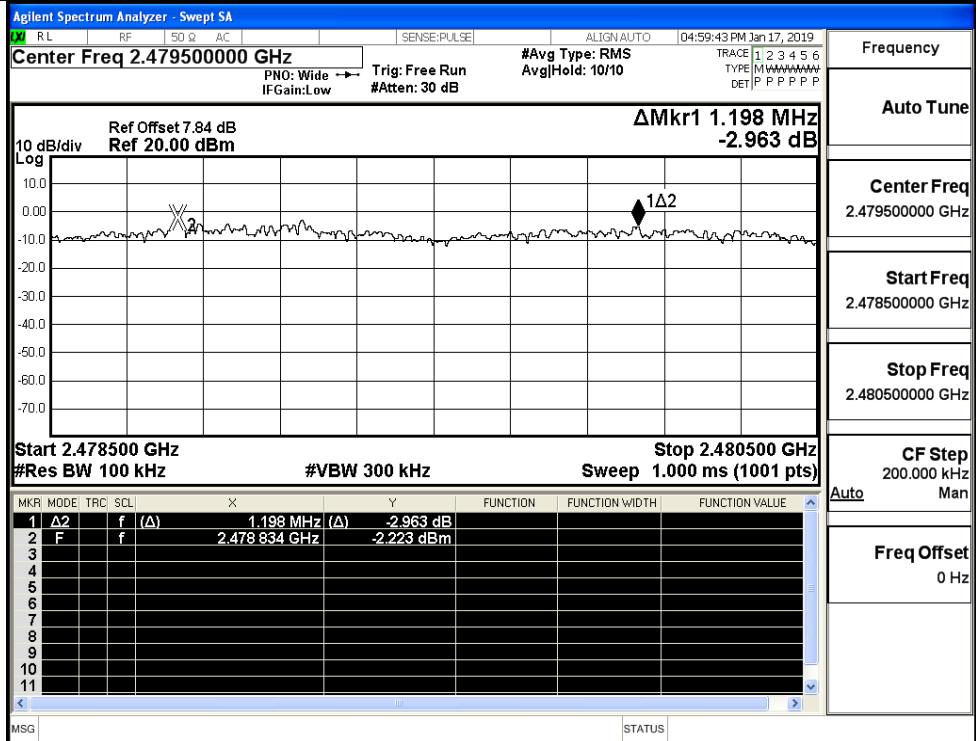
π /4DQPSK/LCH



π /4DQPSK/MCH

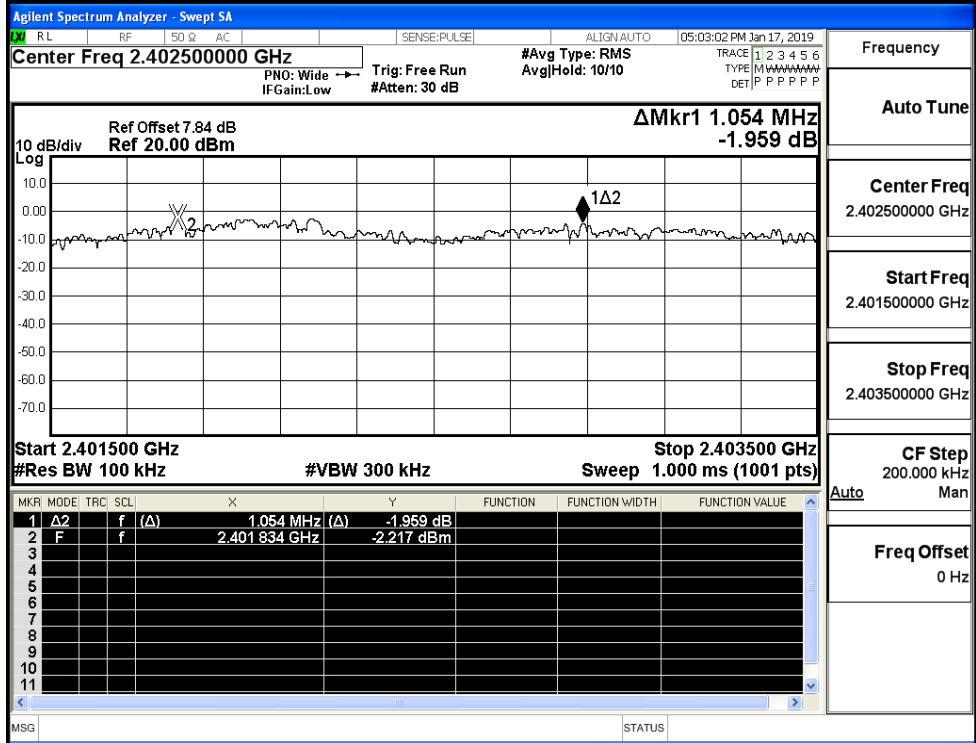


π/4DQPSK/HCH



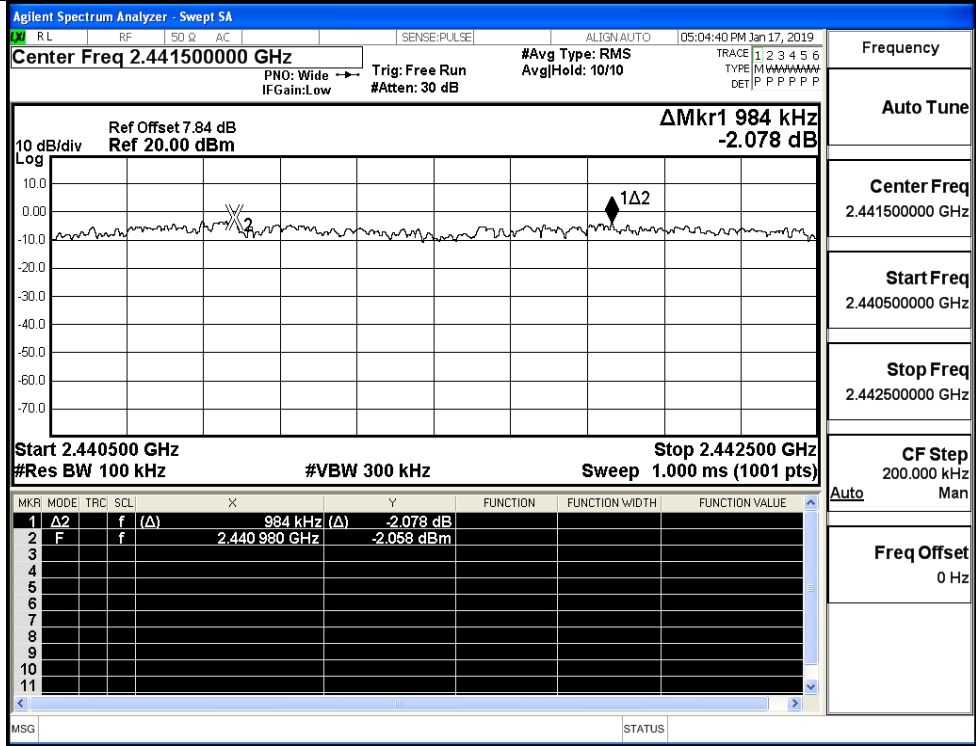
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

8DPSK/LCH

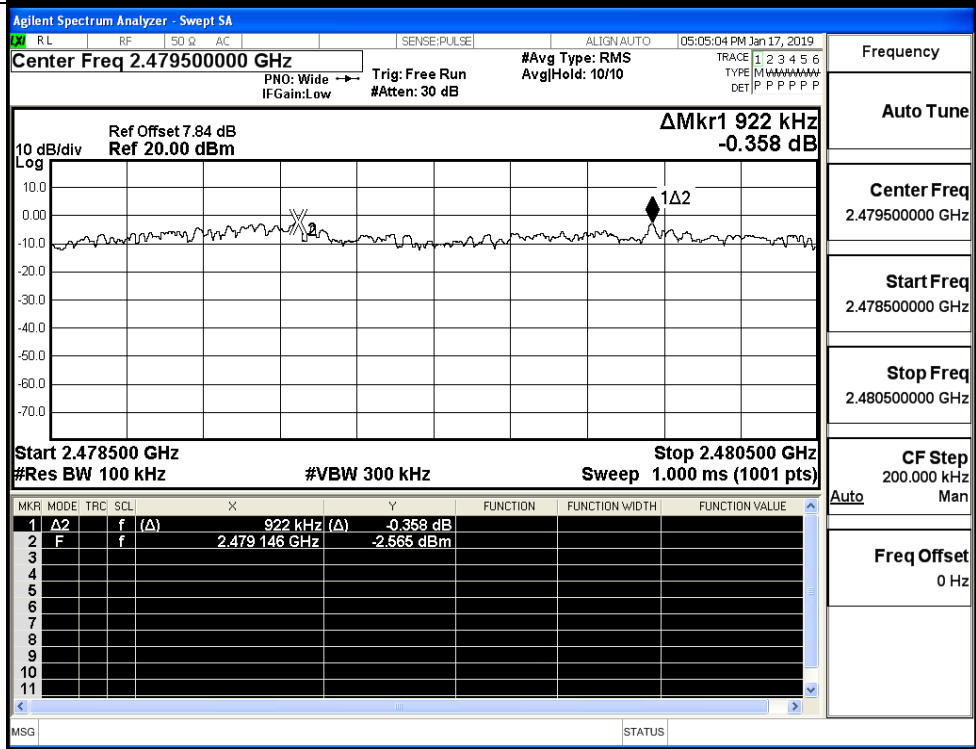


Frequency
Auto Tune
Center Freq
2.402500000 GHz
Start Freq
2.401500000 GHz
Stop Freq
2.403500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

8DPSK/MCH



8DPSK/HCH



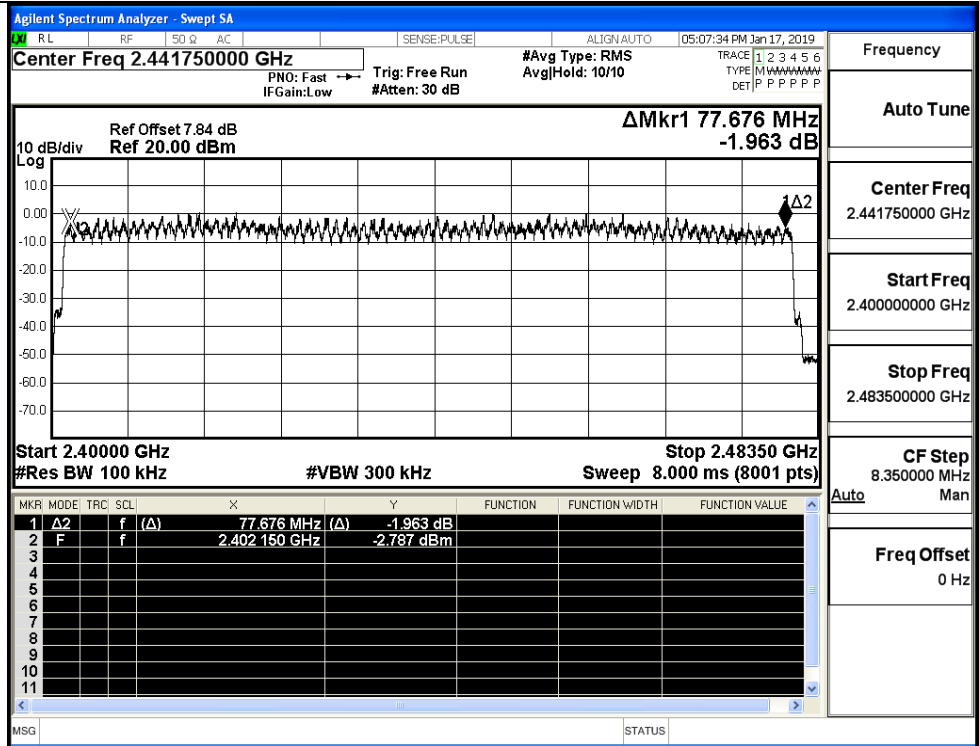
A.4 Hopping Channel Number

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

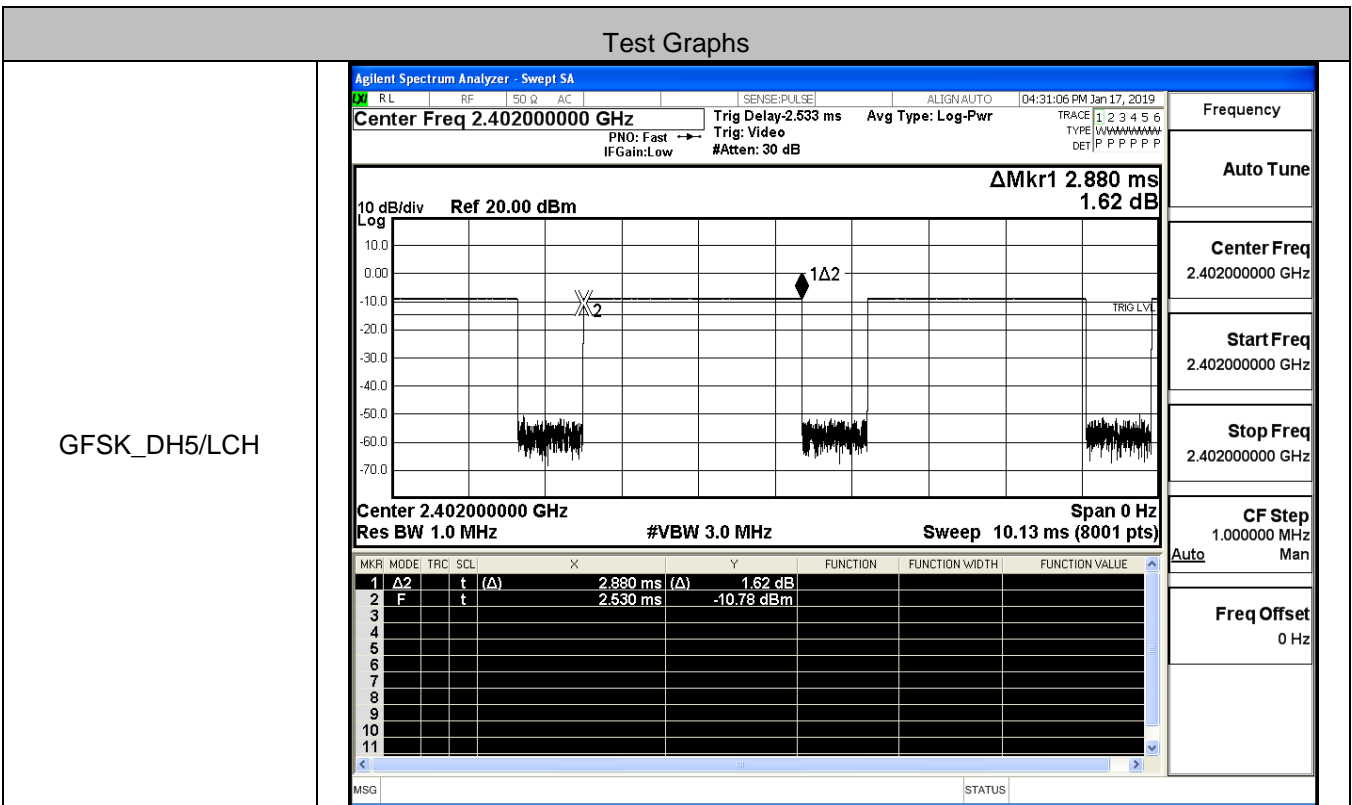
<p>GFSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 7.84 dB Ref 20.00 dBm</p> <p>ΔMkr1 77.958 MHz 0.441 dB</p> <p>Start 2.40000 GHz #Res BW 100 kHz</p> <p>Stop 2.48350 GHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <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>77.958 MHz (Δ)</td> <td>0.441 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401921 GHz</td> <td>-1.547 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)	77.958 MHz (Δ)	0.441 dB				2	F	f		2.401921 GHz	-1.547 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	f	(Δ)	77.958 MHz (Δ)	0.441 dB																							
2	F	f		2.401921 GHz	-1.547 dBm																							
<p>$\pi/4$DQPSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 7.84 dB Ref 20.00 dBm</p> <p>ΔMkr1 77.906 MHz 1.301 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>77.906 MHz (Δ)</td> <td>1.301 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402077 GHz</td> <td>-5.131 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)	77.906 MHz (Δ)	1.301 dB				2	F	f		2.402077 GHz	-5.131 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	f	(Δ)	77.906 MHz (Δ)	1.301 dB																							
2	F	f		2.402077 GHz	-5.131 dBm																							

8DPSK/Hop

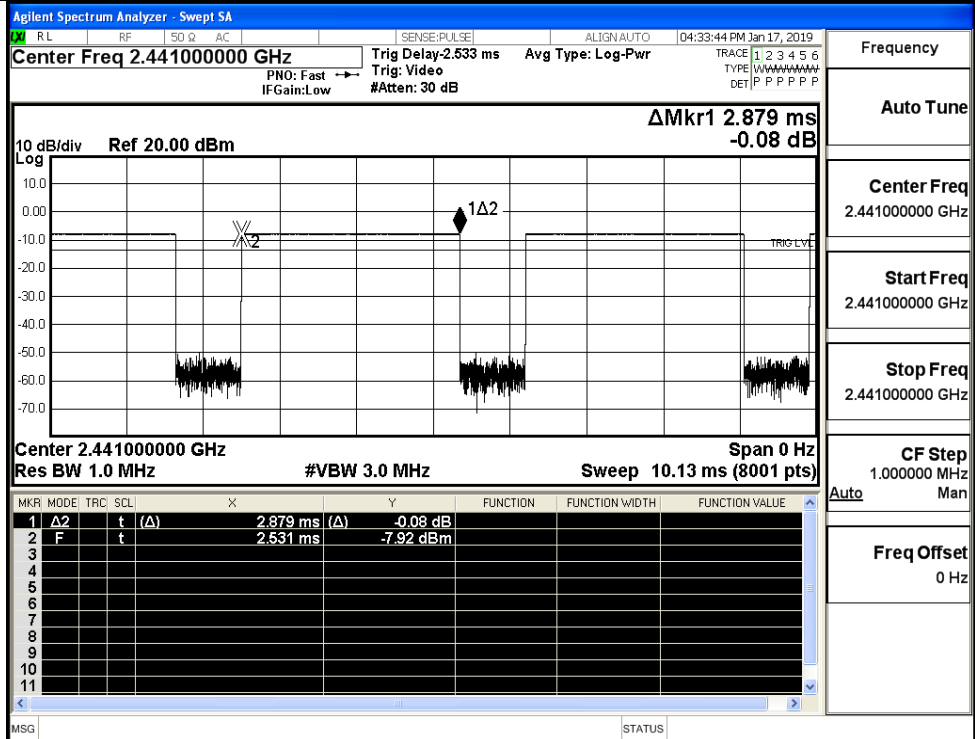


A.5 Dwell Time

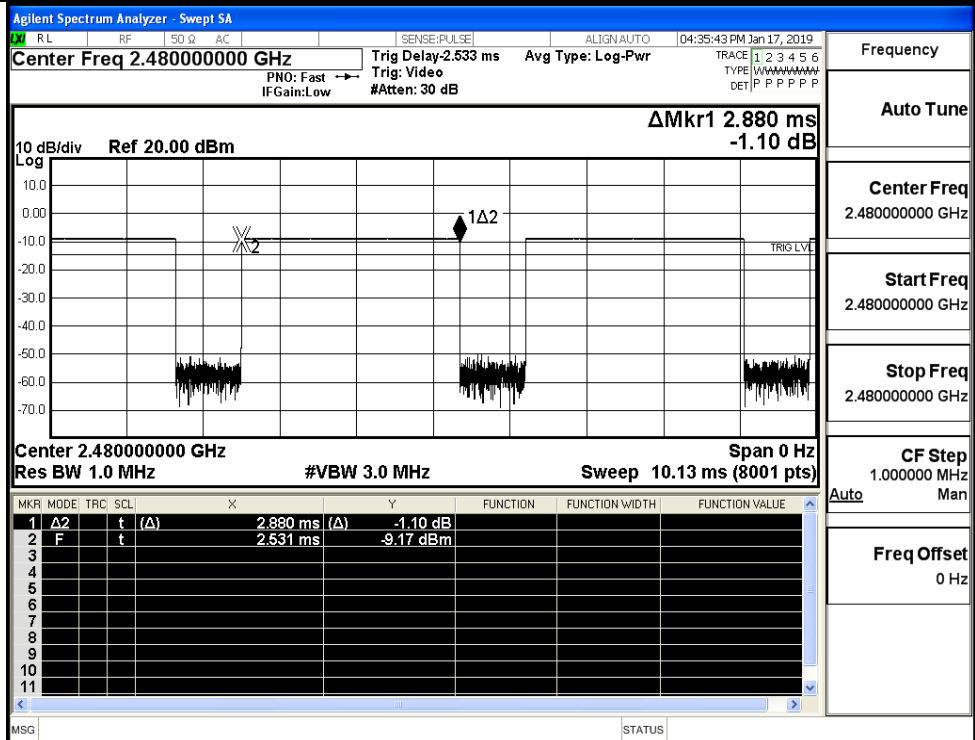
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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



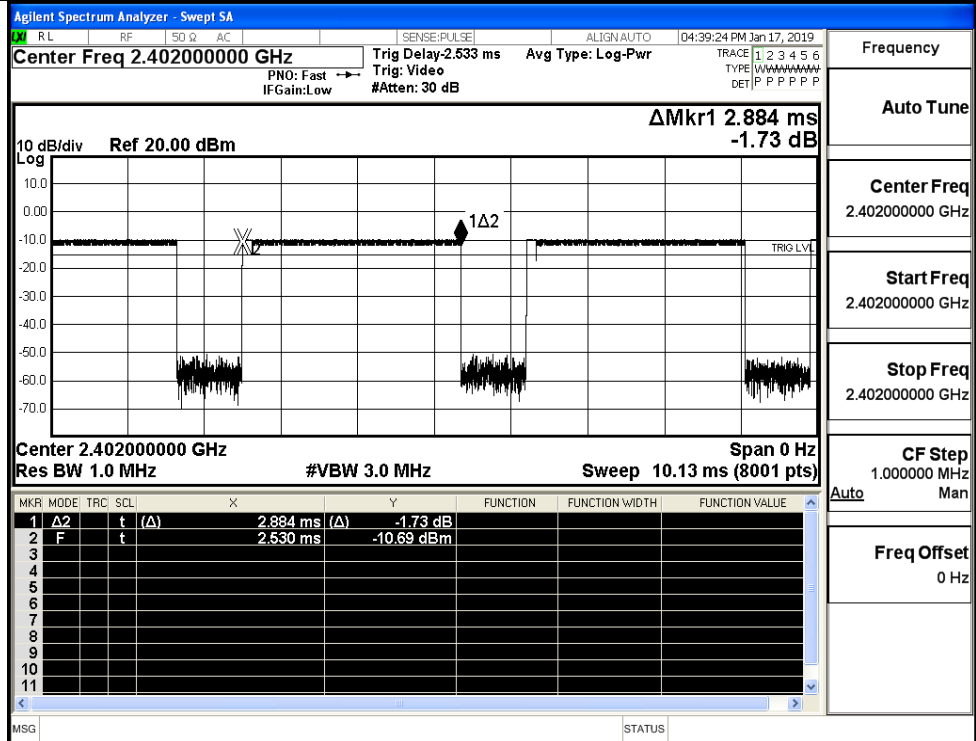
GFSK_DH5/MCH



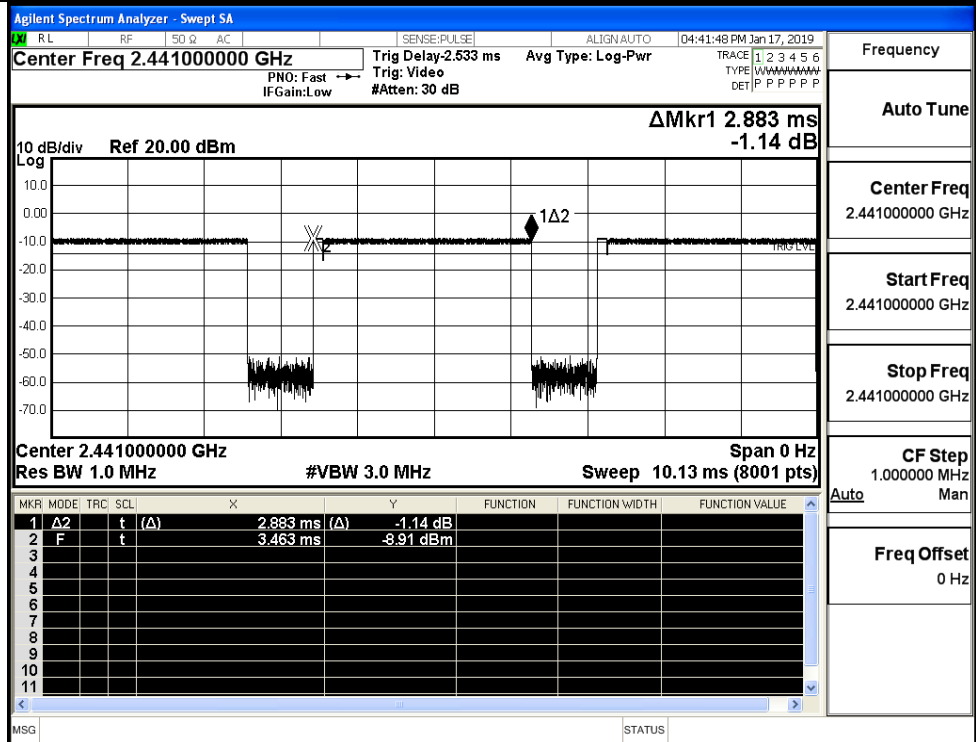
GFSK_DH5/HCH



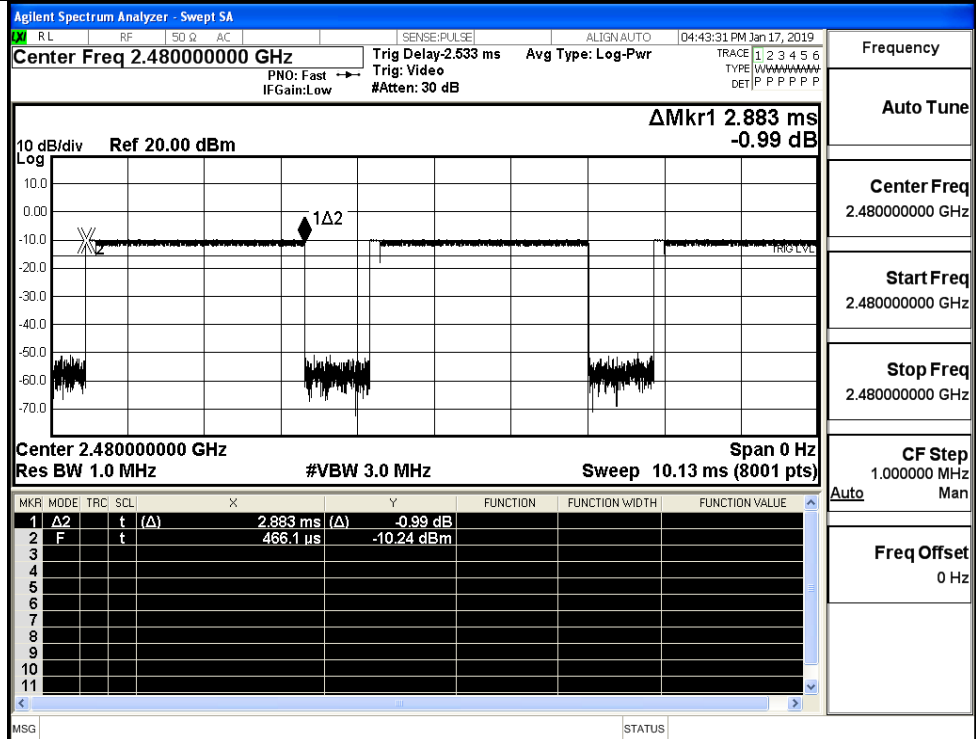
$\pi/4$ DQPSK
_2DH5/LCH



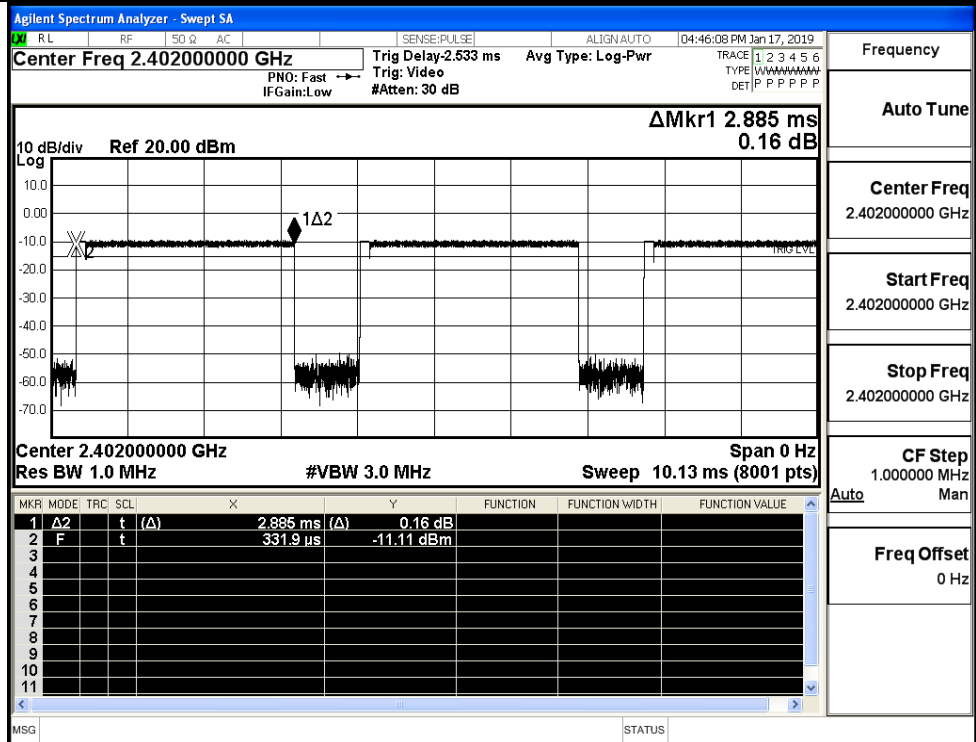
$\pi/4$ DQPSK
_2DH5/MCH



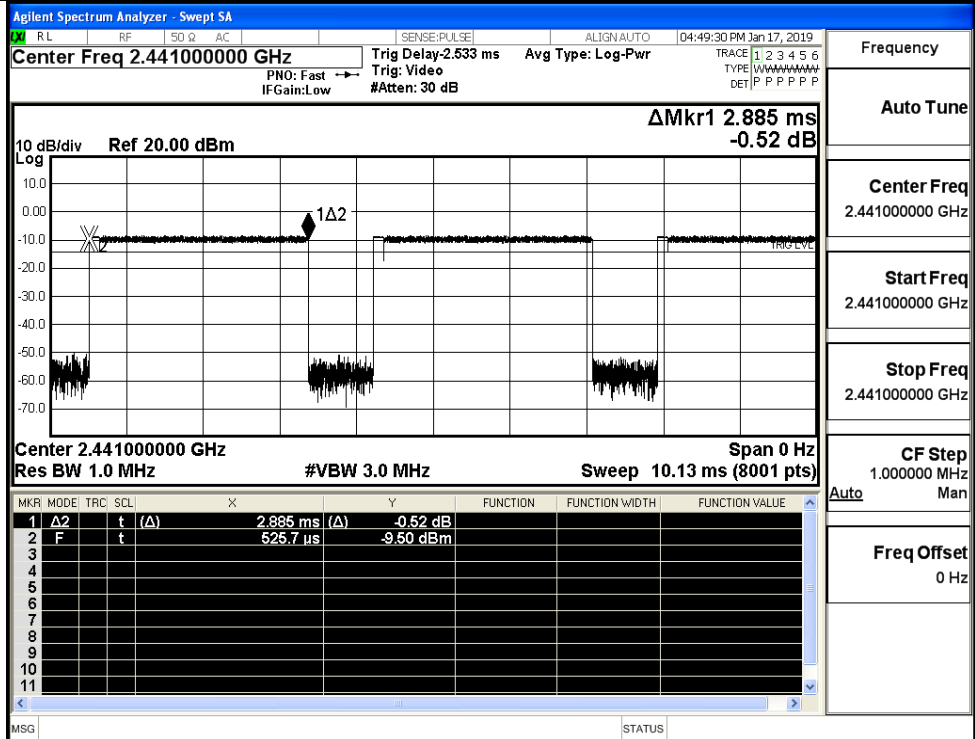
$\pi/4$ DQPSK
_2DH5/HCH



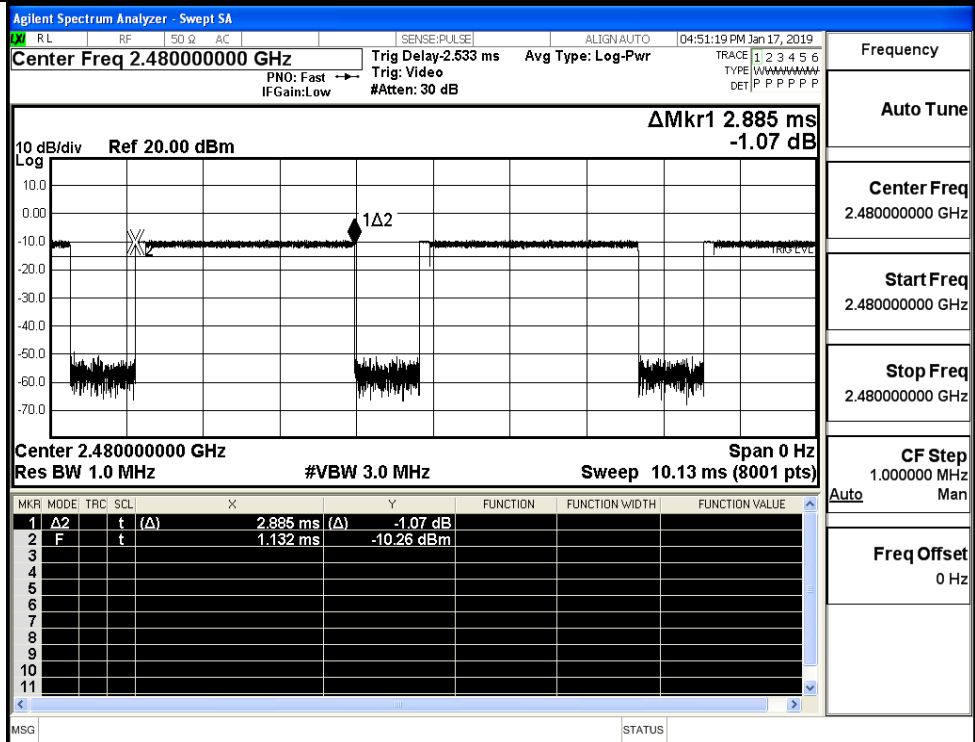
8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



8DPSK_3DH5/HCH

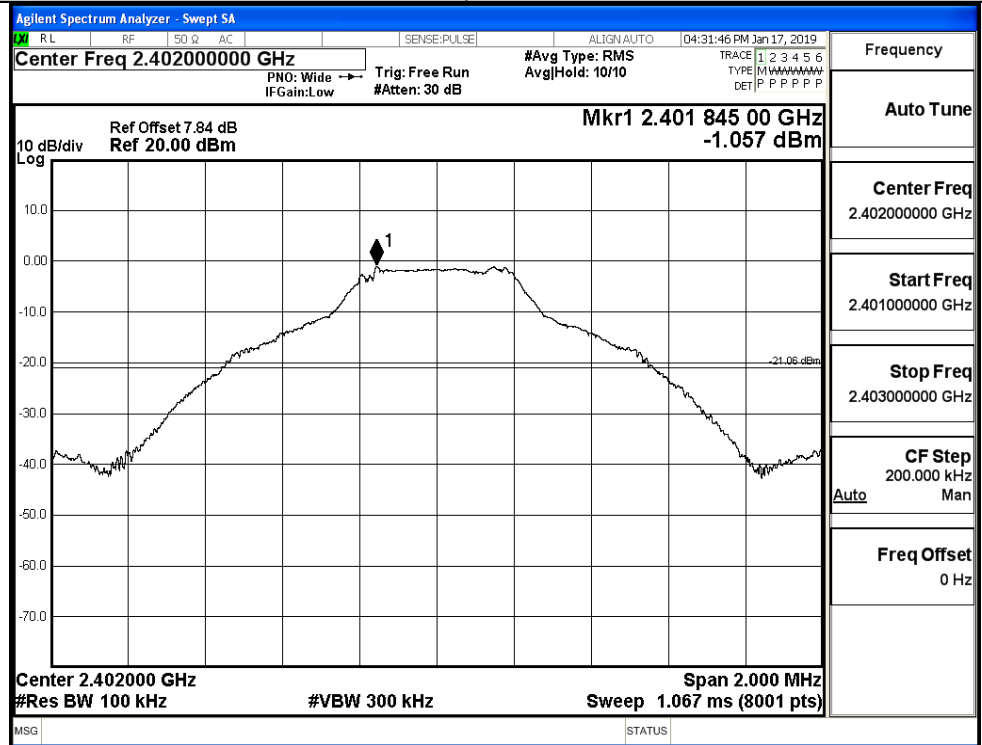


A.6 RF Conducted Spurious Emissions

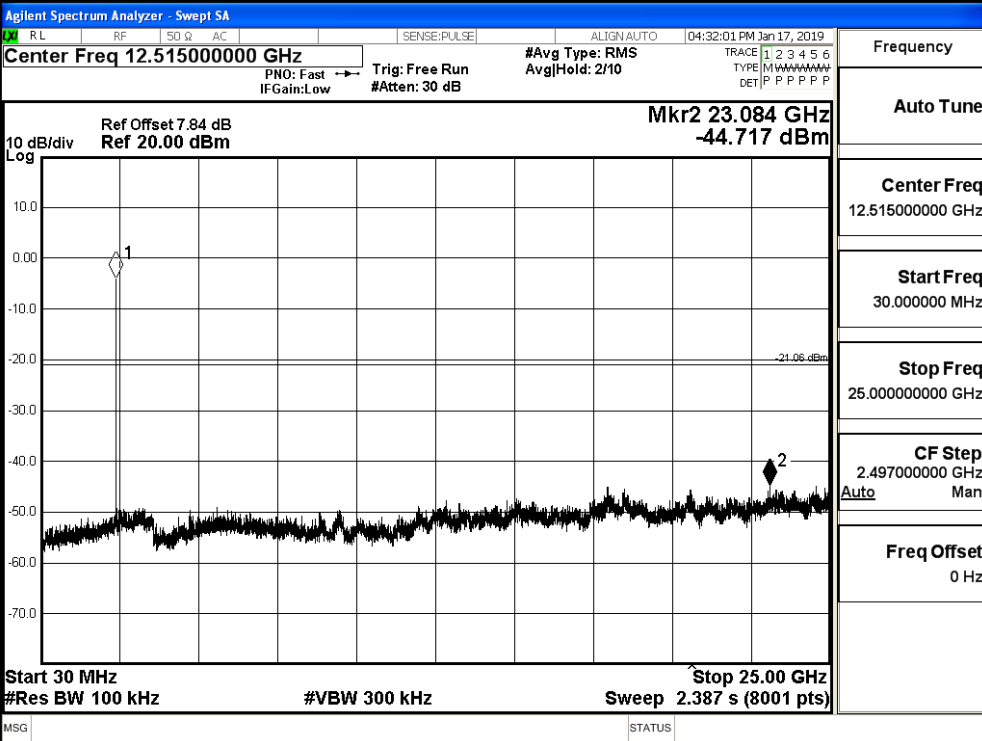
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-1.057	-44.717	-21.057	PASS
	MCH	0.064	-45.442	-19.936	PASS
	HCH	-1.134	-44.191	-21.134	PASS
$\pi/4$ DQPSK	LCH	-2.771	-45.170	-22.771	PASS
	MCH	-1.046	-44.994	-21.046	PASS
	HCH	-2.345	-45.044	-22.345	PASS
8DPSK	LCH	-2.02	-44.814	-22.020	PASS
	MCH	-1.214	-44.642	-21.214	PASS
	HCH	-2.161	-43.968	-22.161	PASS

GFSK_LCH_Graphs

Pref

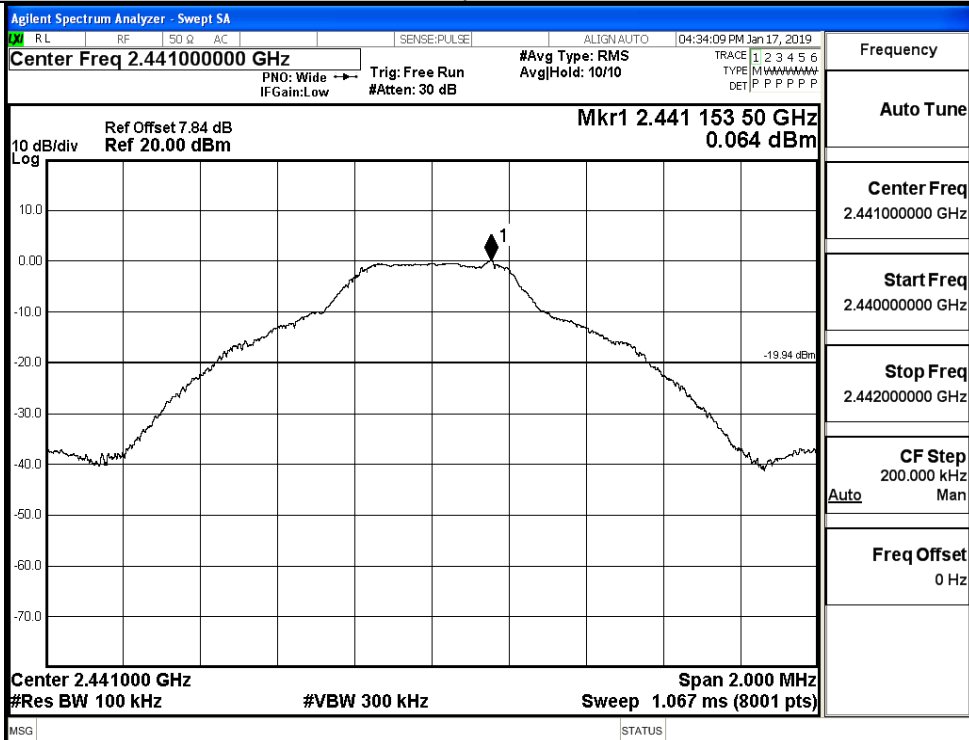


Puw

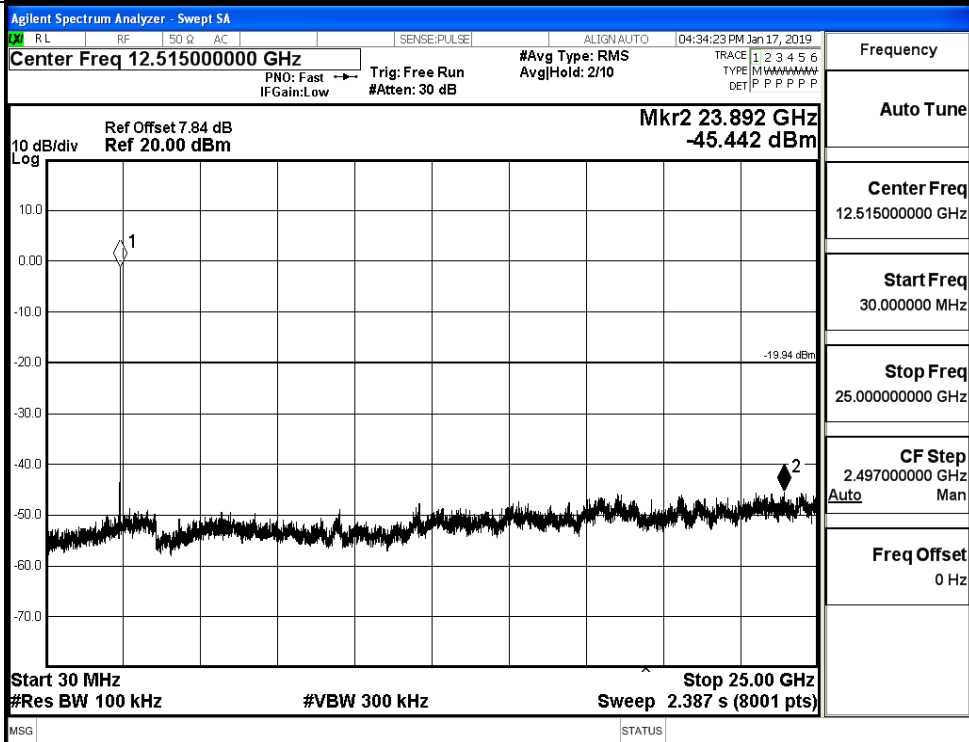


GFSK_MCH_Graphs

Pref

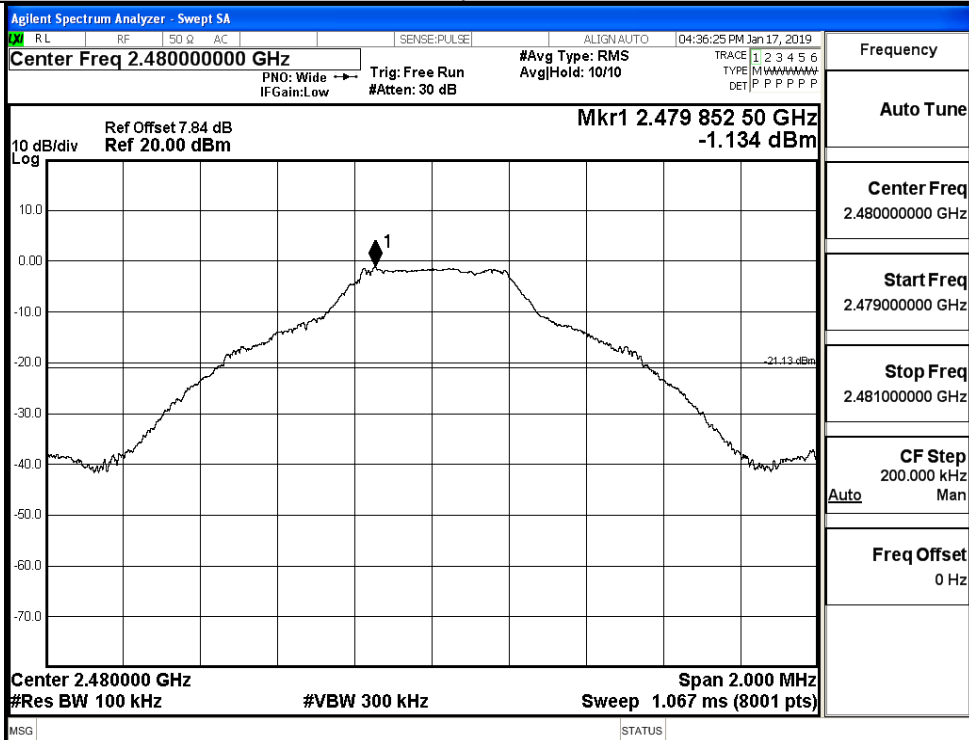


Puw



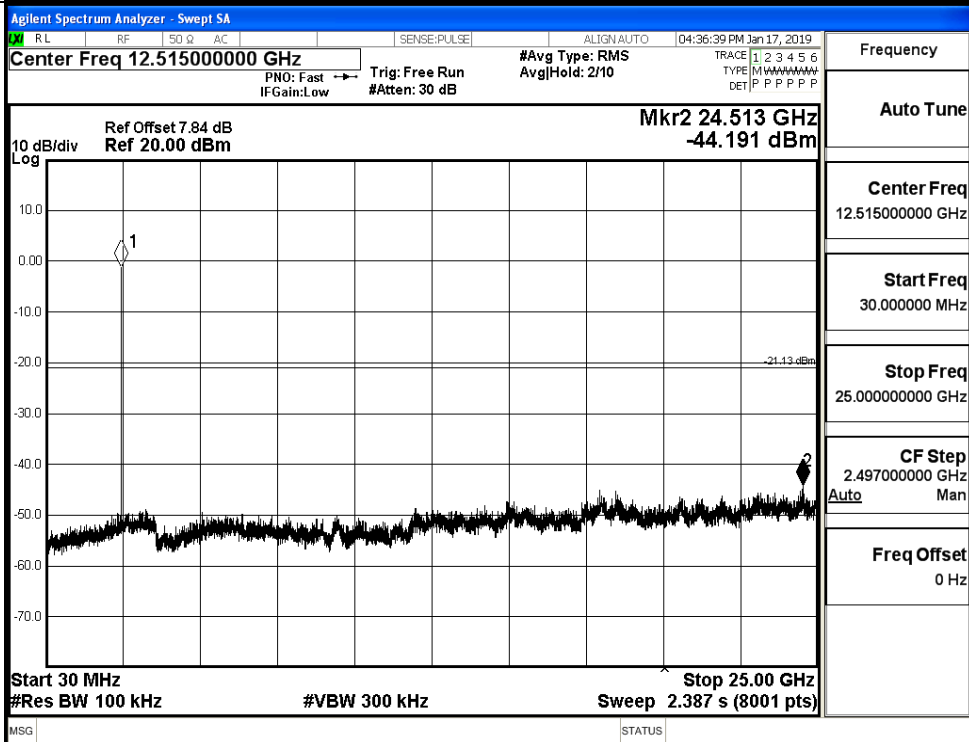
GFSK_HCH_Graphs

Pref



Frequency
Auto Tune
Center Freq 2.480000000 GHz
Start Freq 2.479000000 GHz
Stop Freq 2.481000000 GHz
CF Step 200.000 kHz Auto Man
Freq Offset 0 Hz

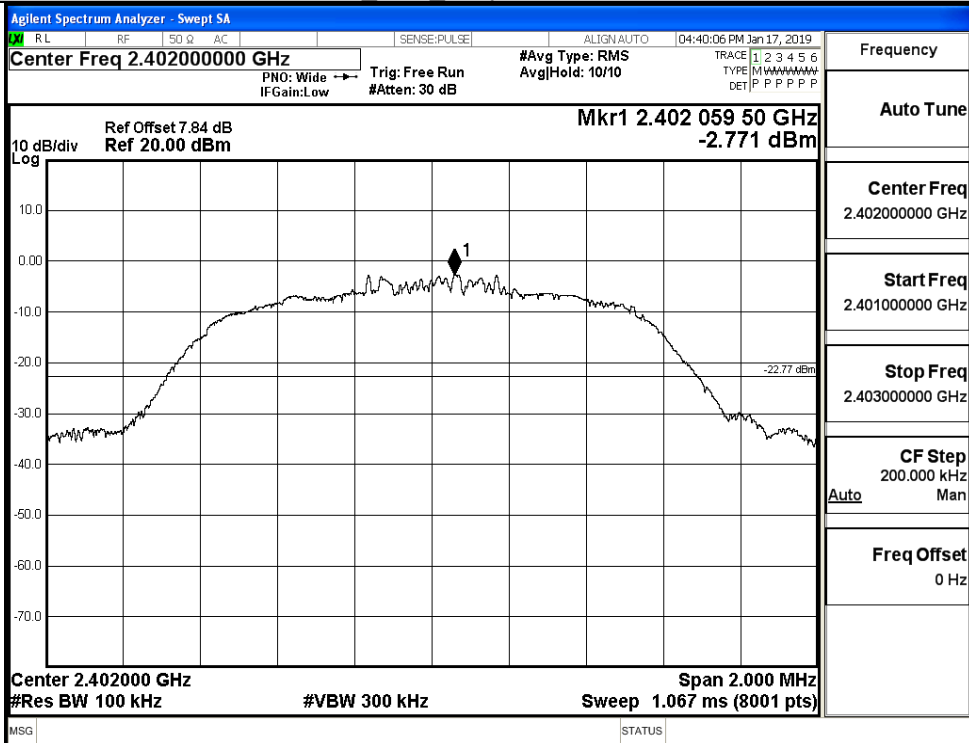
Puw



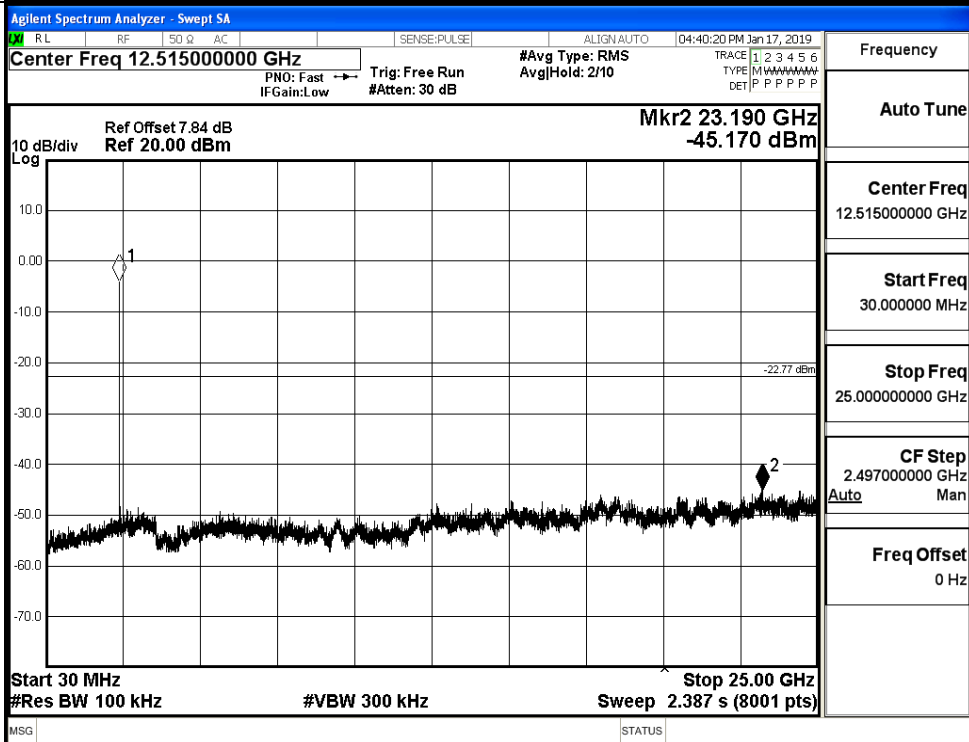
Frequency
Auto Tune
Center Freq 12.515000000 GHz
Start Freq 30.000000 MHz
Stop Freq 25.000000000 GHz
CF Step 2.497000000 GHz Auto Man
Freq Offset 0 Hz

$\pi/4$ DQPSK LCH_Graphs

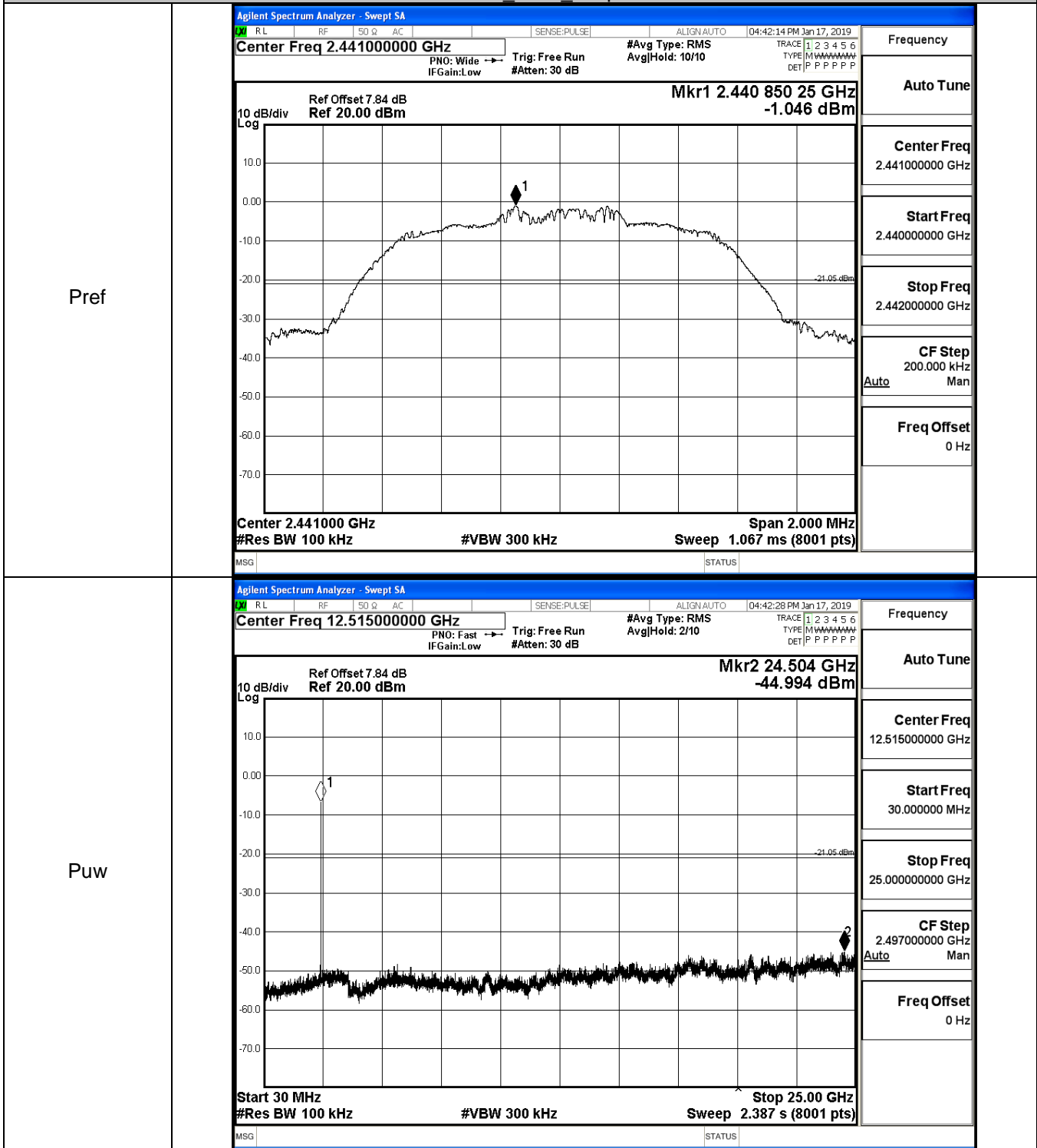
Pref



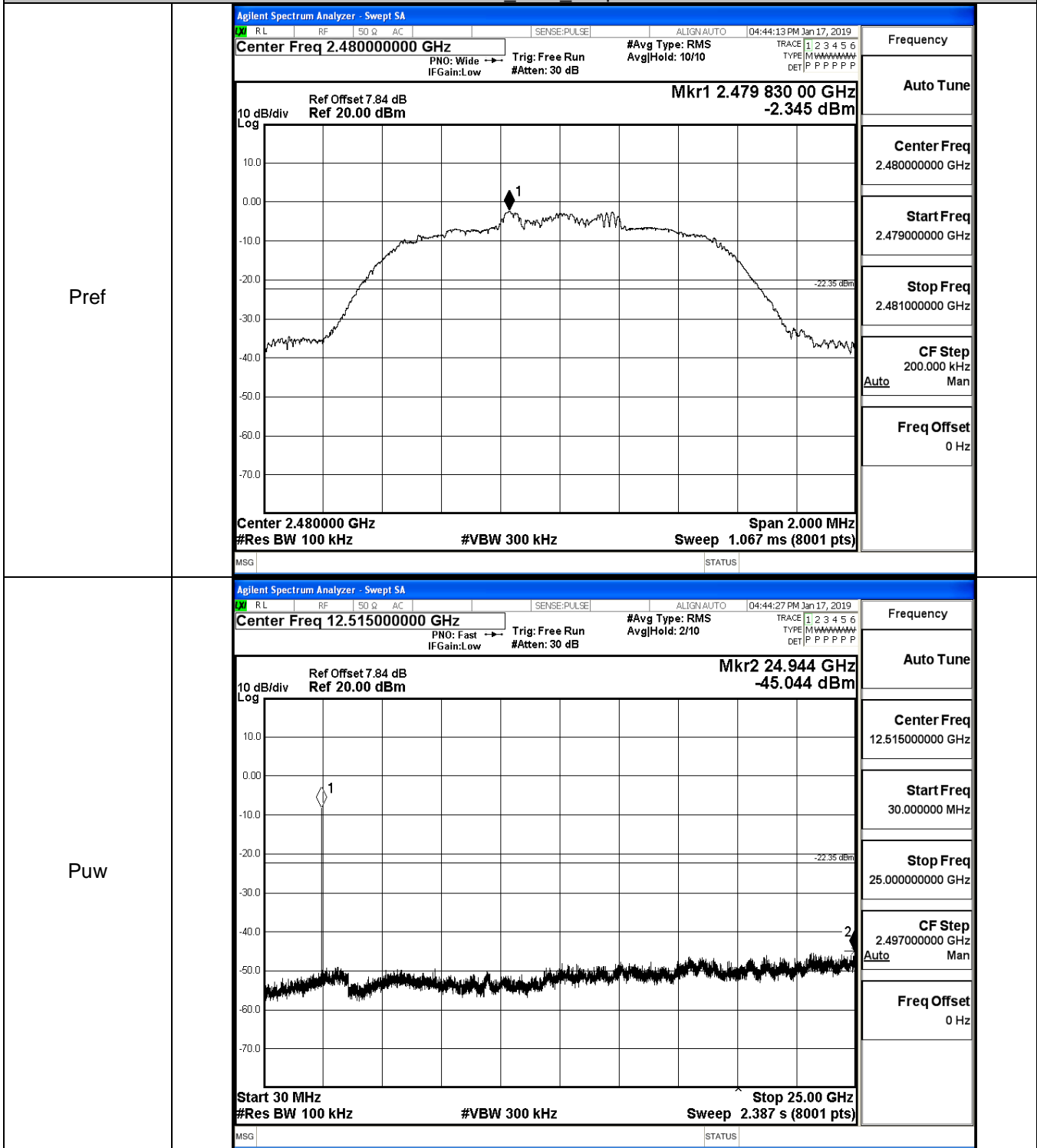
Puw



$\pi/4$ DQPSK_MCH_Graphs

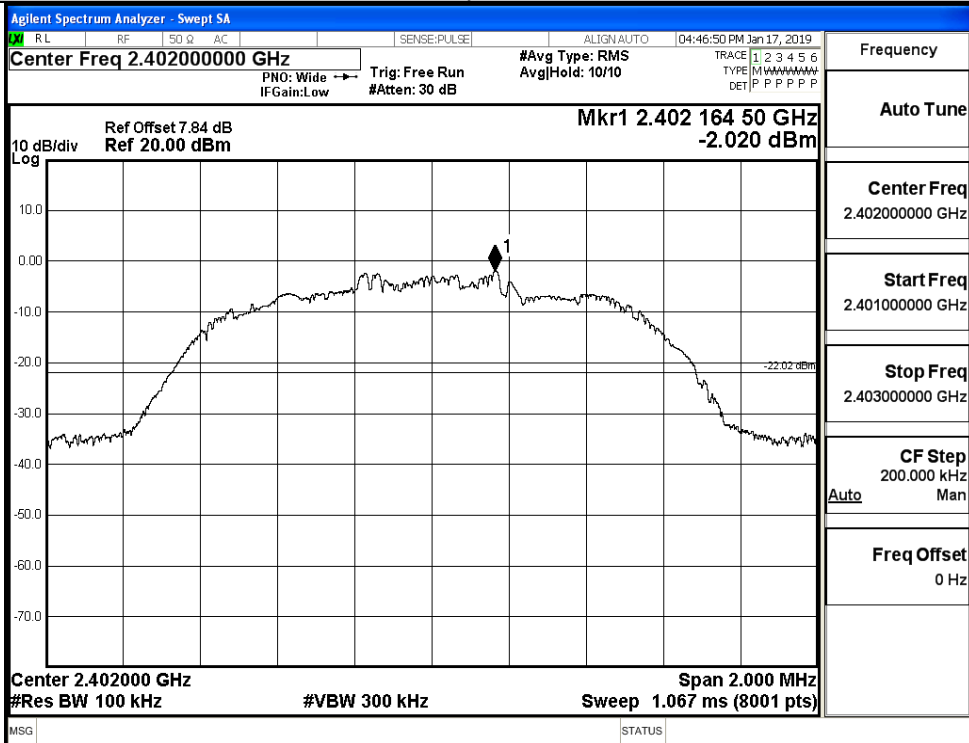


$\pi/4$ DQPSK_HCH_Graphs

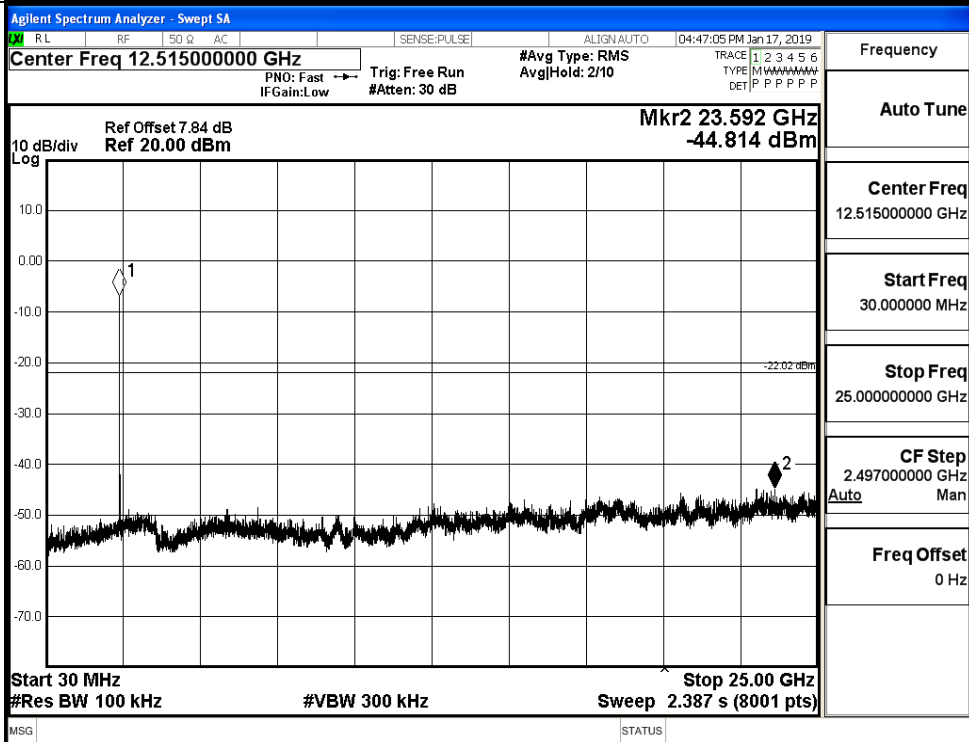


8DPSK_LCH_Graphs

Pref

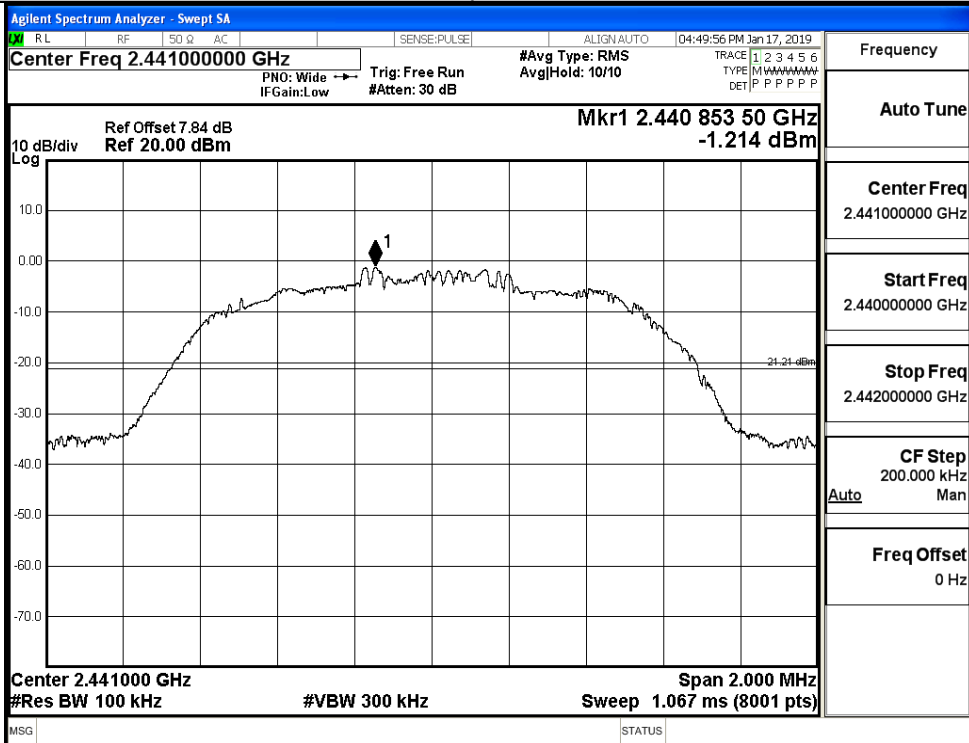


Puw

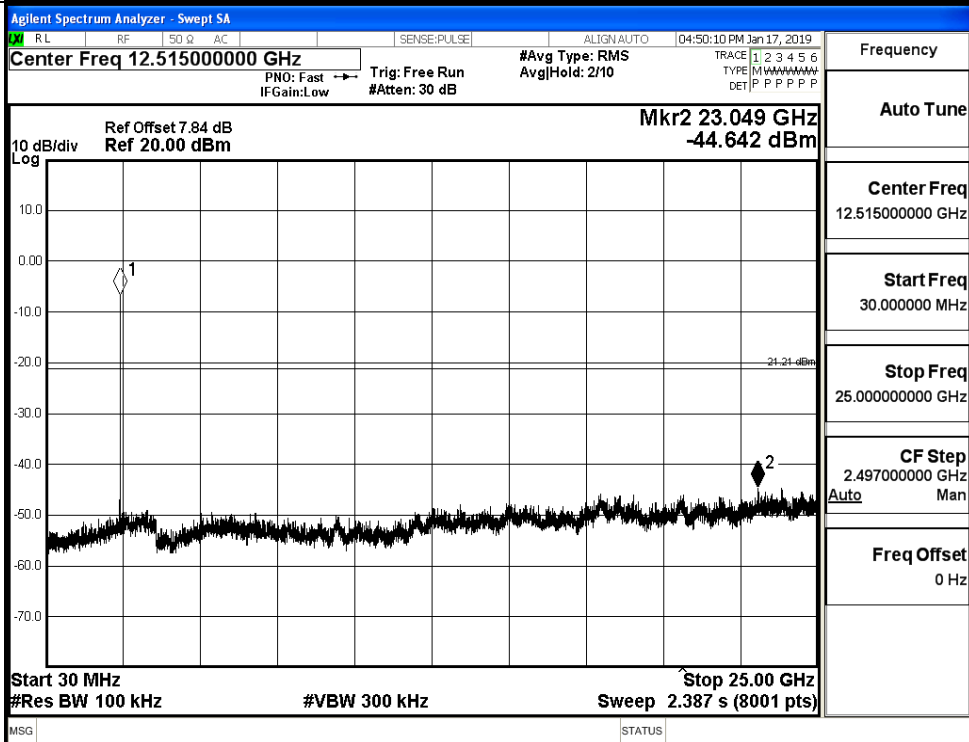


8DPSK_MCH_Graphs

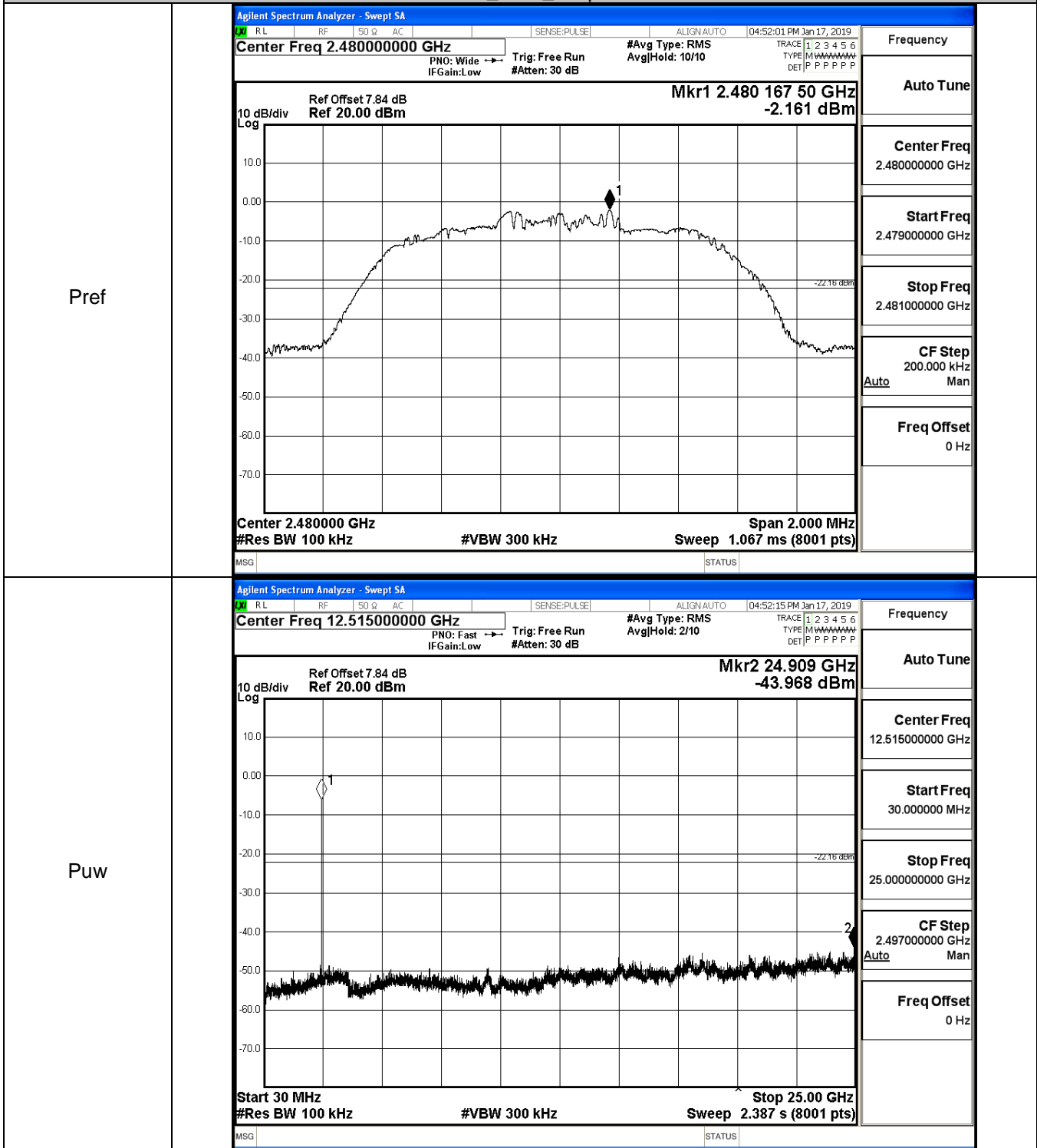
Pref



Puw



8DPSK_HCH_Graphs

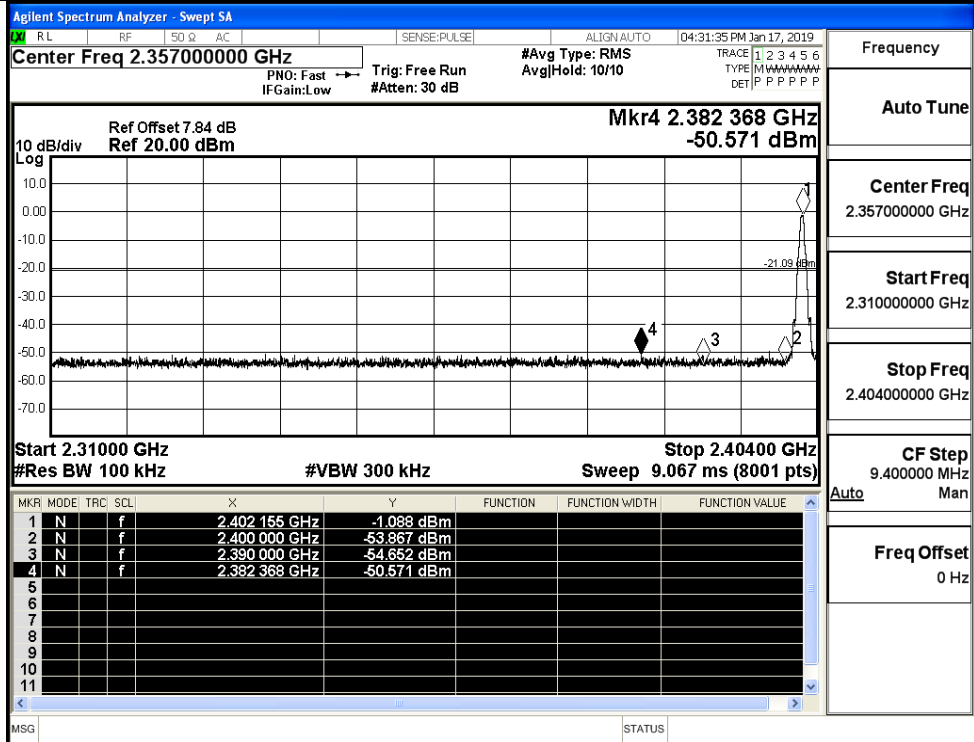


A.7 Band-edge for RF Conducted Emissions

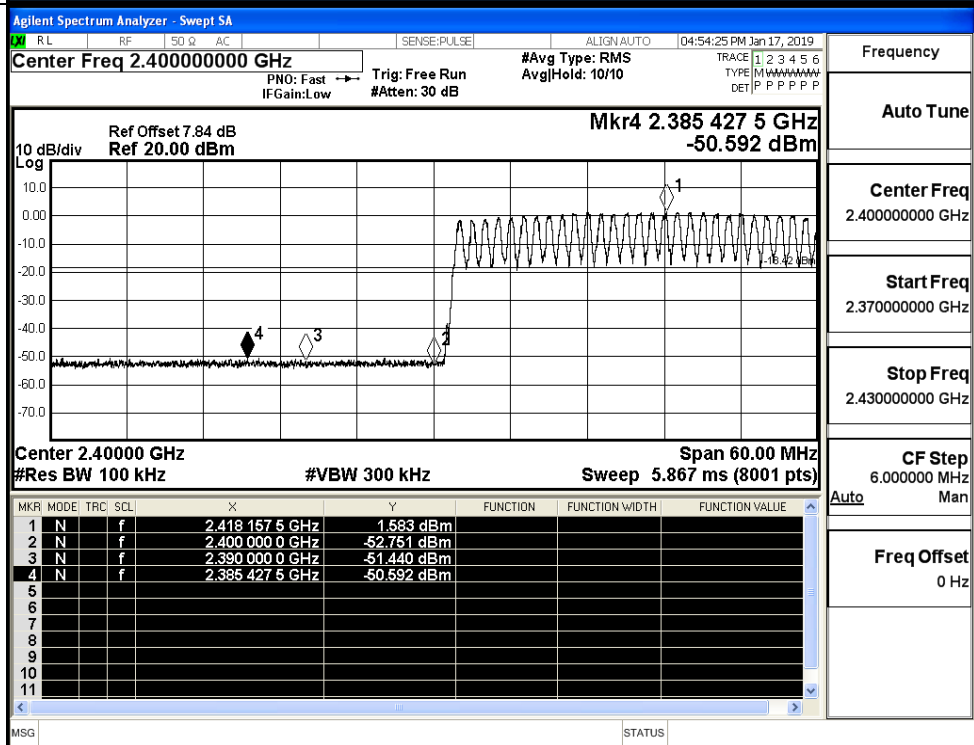
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-1.088	Off	-50.571	-21.09	PASS
			1.583	On	-50.592	-18.42	PASS
	HCH	2480	-1.144	Off	-50.100	-21.14	PASS
			1.875	On	-49.373	-18.13	PASS
$\pi/4$ DQPSK	LCH	2402	-2.053	Off	-50.686	-22.05	PASS
			-0.118	On	-49.934	-20.12	PASS
	HCH	2480	-2.172	Off	-50.261	-22.17	PASS
			0.292	On	-48.725	-19.71	PASS
8DPSK	LCH	2402	-1.879	Off	-49.875	-21.88	PASS
			0.485	On	-49.285	-19.52	PASS
	HCH	2480	-2.191	Off	-50.029	-22.19	PASS
			0.410	On	-49.224	-19.59	PASS

Test Graphs

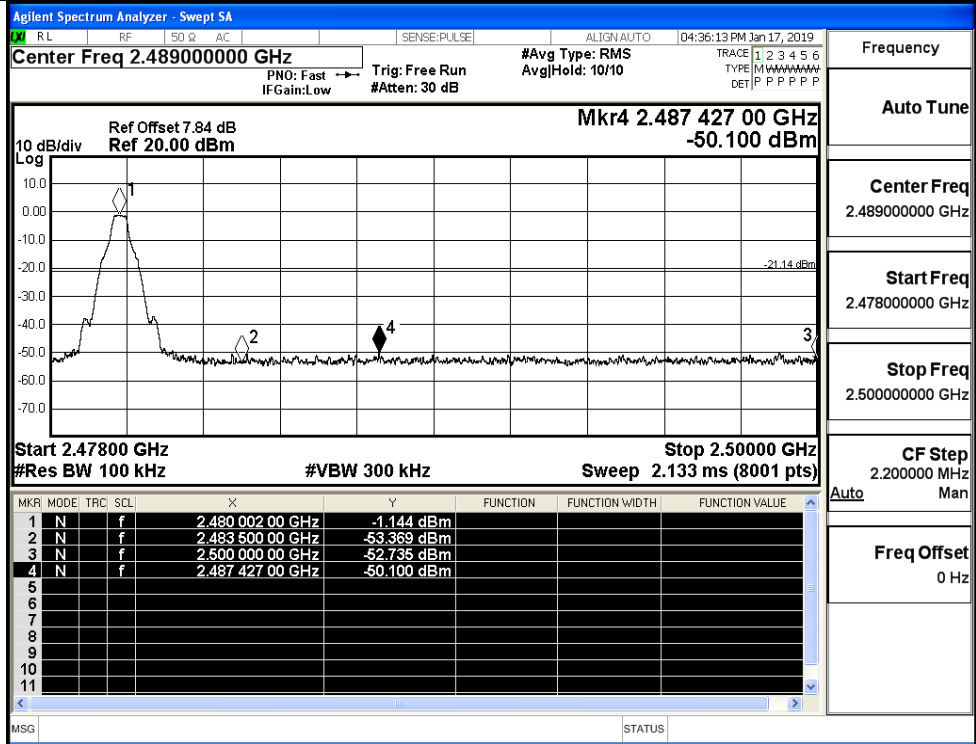
GFSK/LCH/No Hop



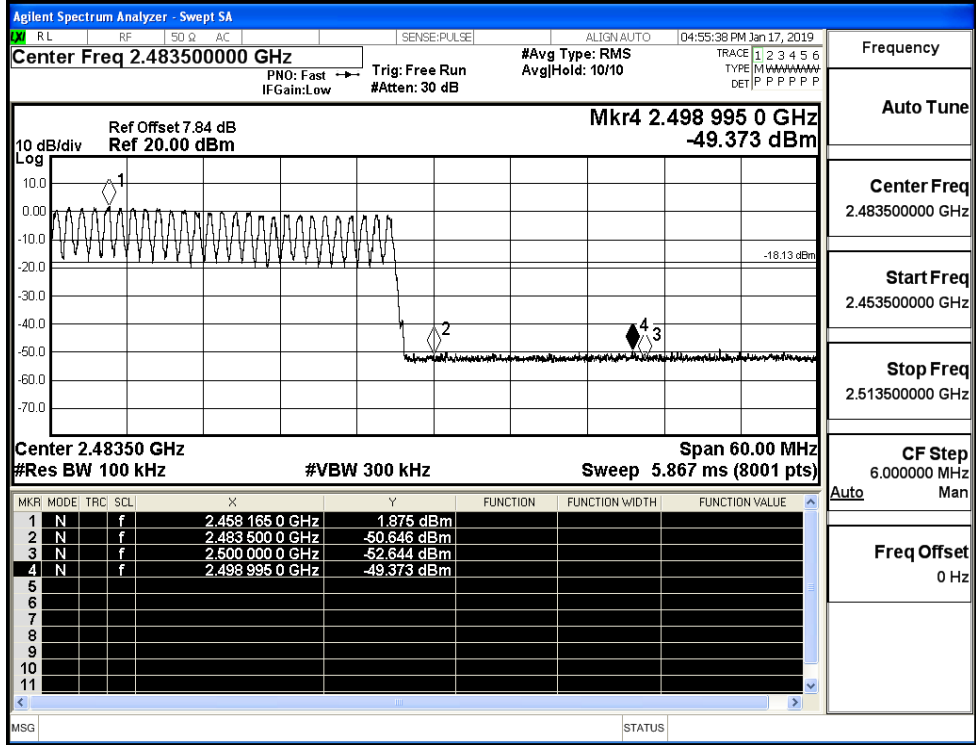
GFSK/LCH/Hop



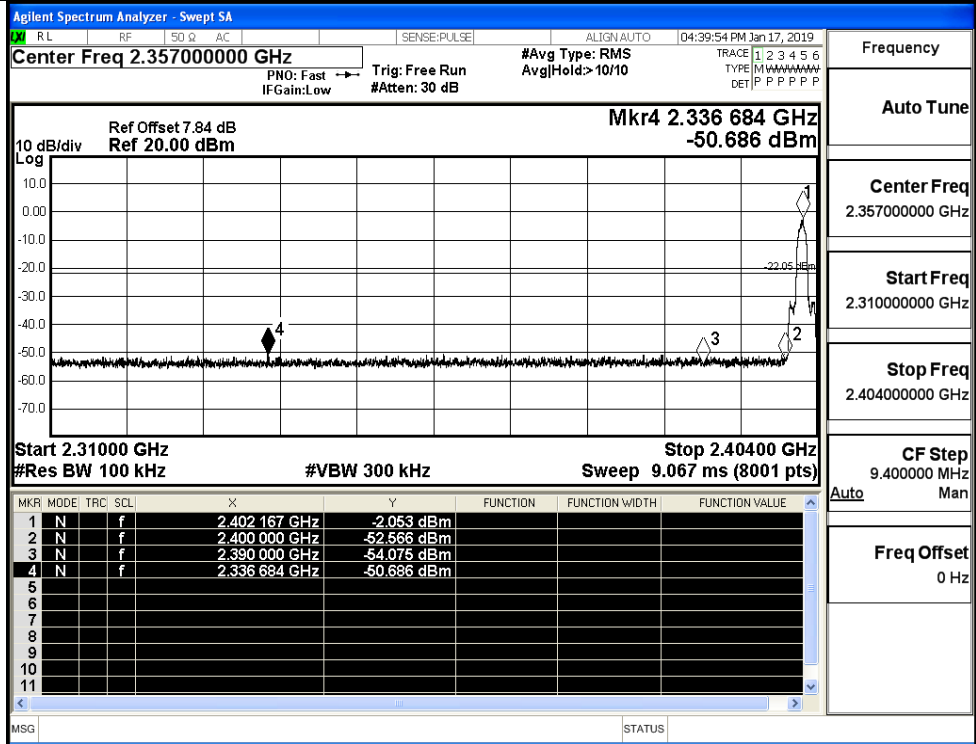
GFSK/HCH/No Hop



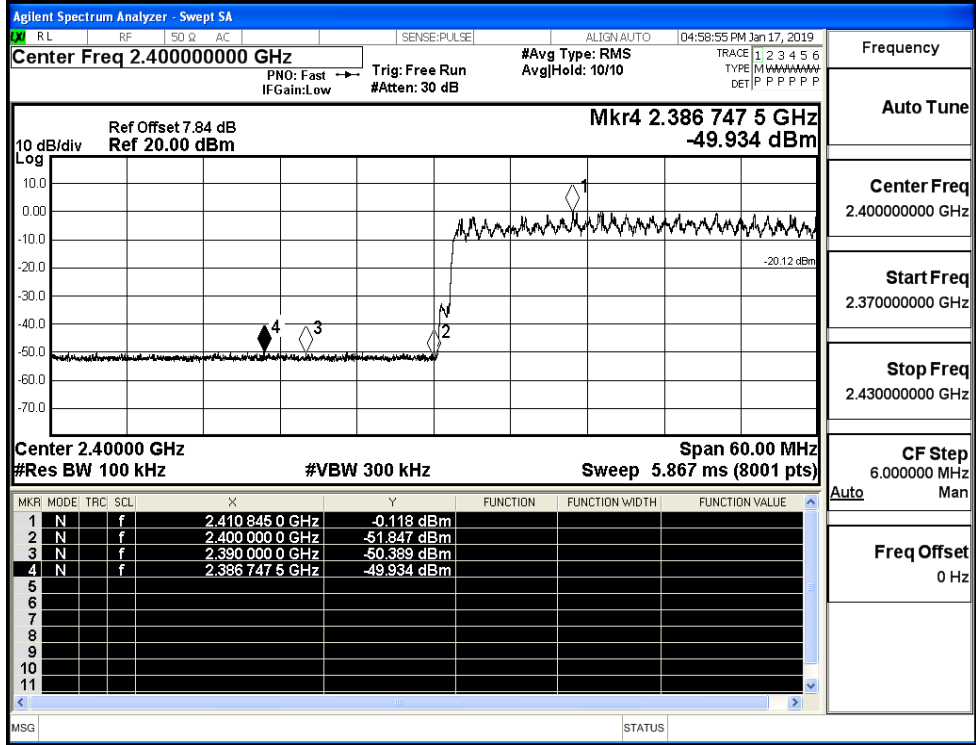
GFSK/HCH/Hop



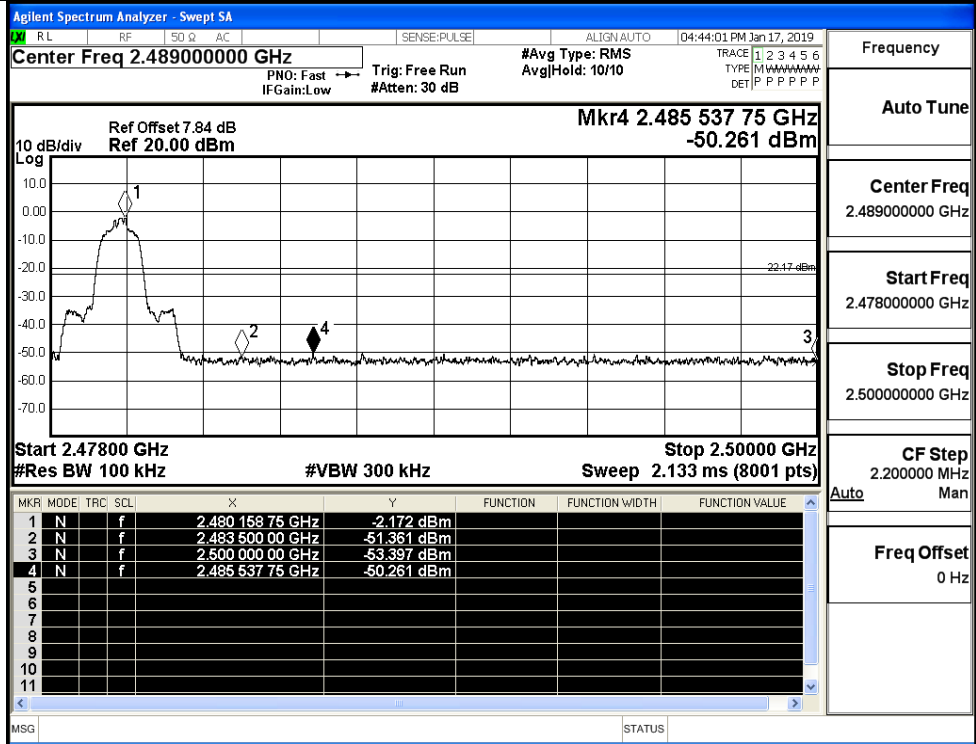
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop



π /4DQPSK/HCH/No Hop



Frequency

Auto Tune

Center Freq
2.489000000 GHz

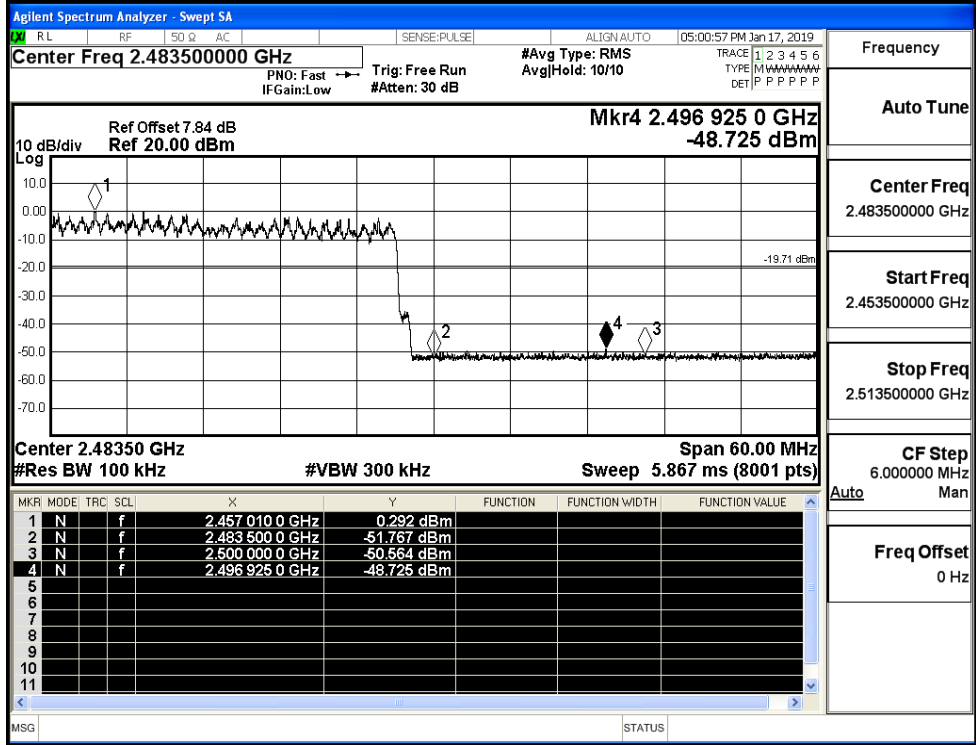
Start Freq
2.478000000 GHz

Stop Freq
2.500000000 GHz

CF Step
2.200000 MHz

Freq Offset
0 Hz

π /4DQPSK/HCH/Hop



Frequency

Auto Tune

Center Freq
2.483500000 GHz

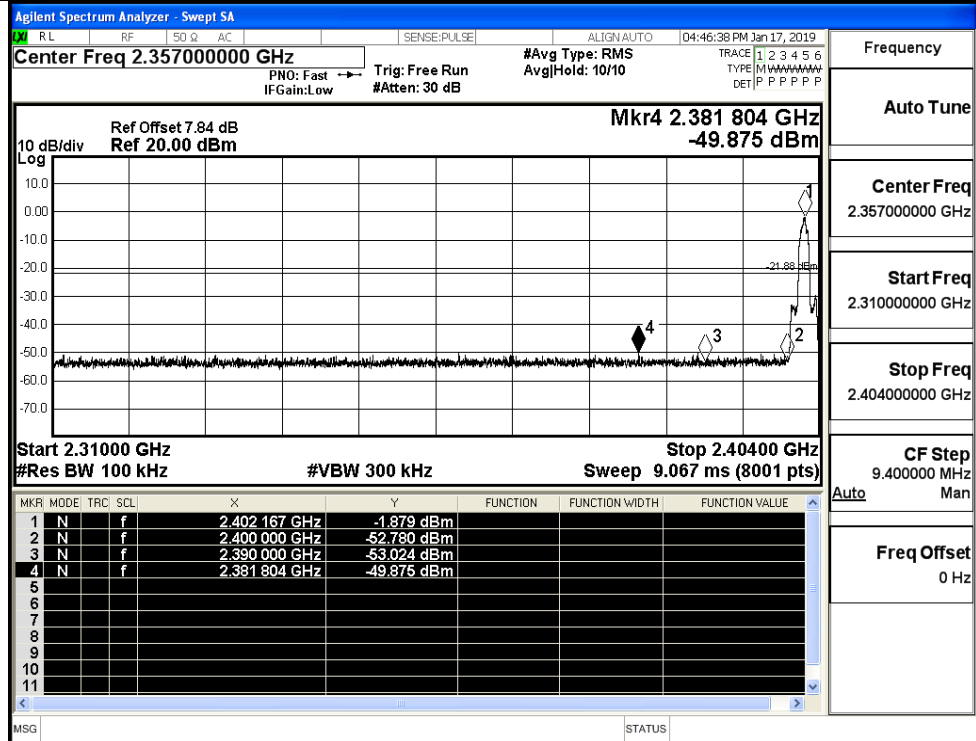
Start Freq
2.453500000 GHz

Stop Freq
2.513500000 GHz

CF Step
6.000000 MHz

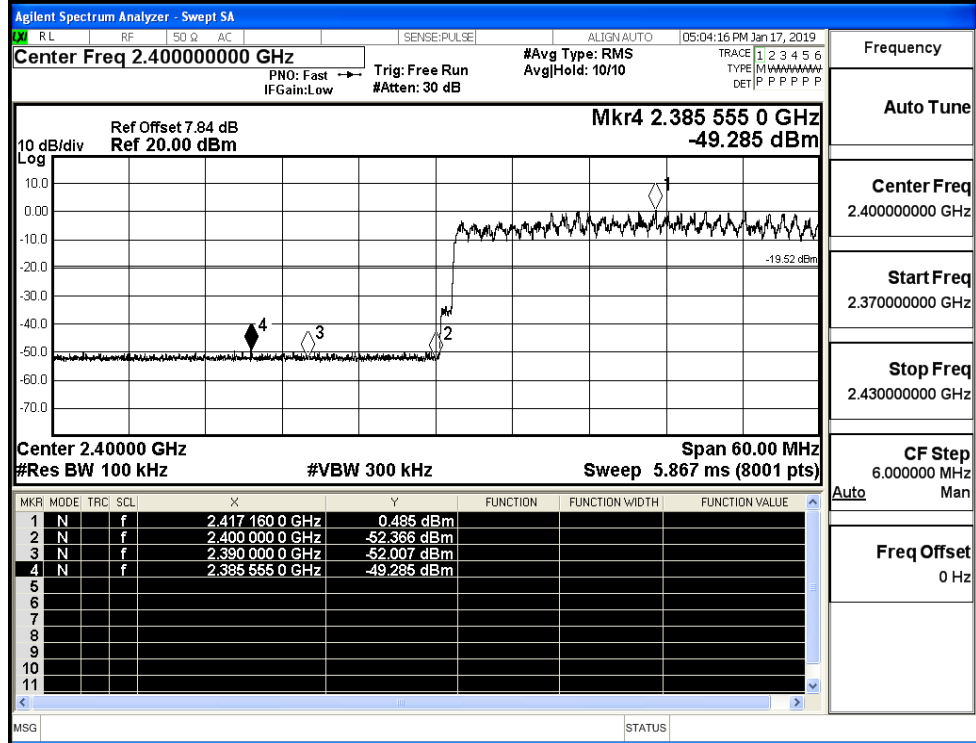
Freq Offset
0 Hz

8DPSK/LCH/No Hop



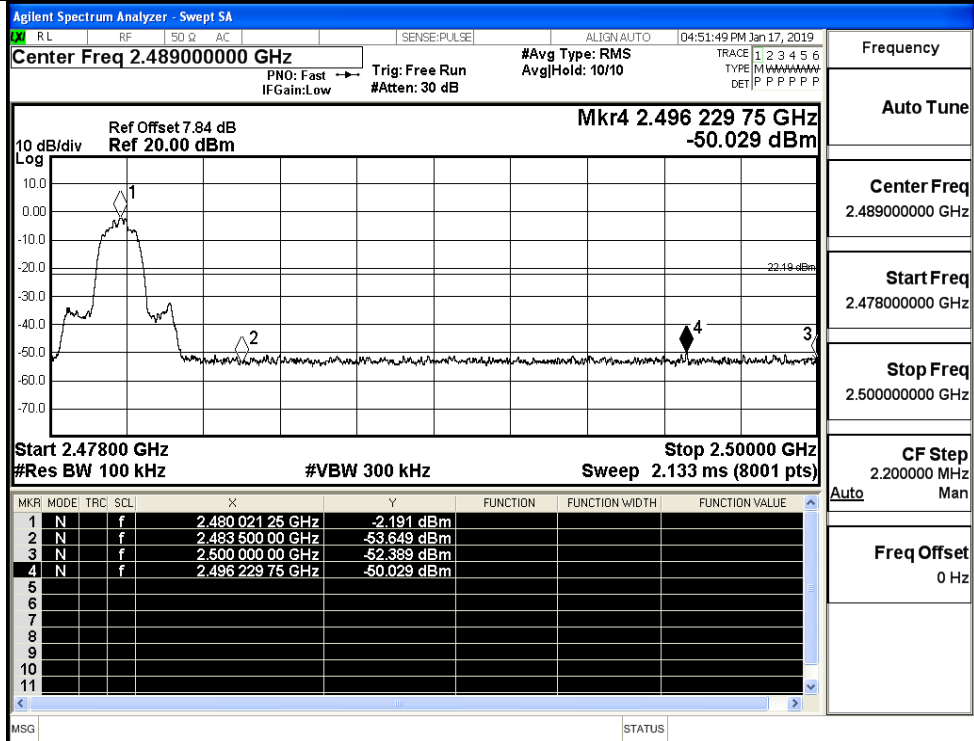
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



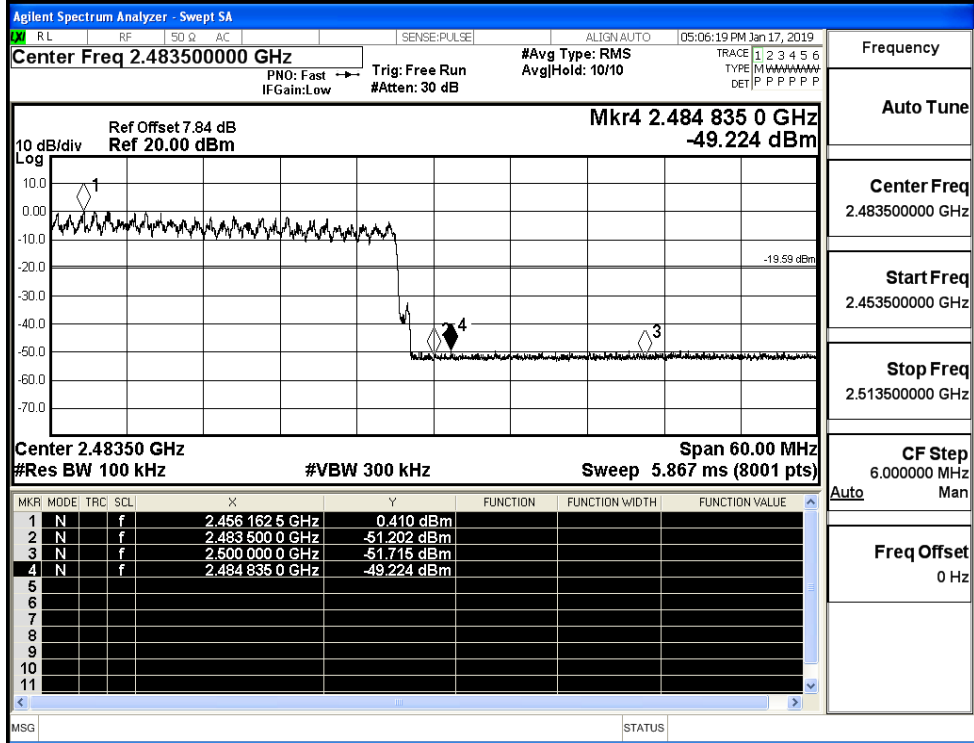
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/HCH/No Hop



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

8DPSK/HCH/Hop

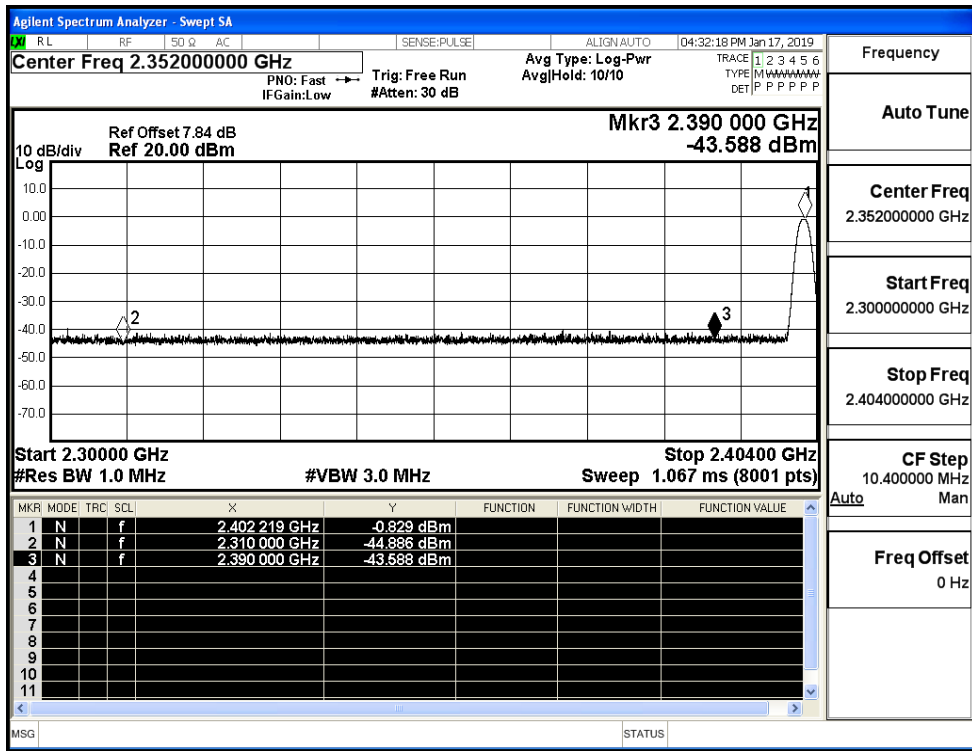


Frequency	2.483500000 GHz
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

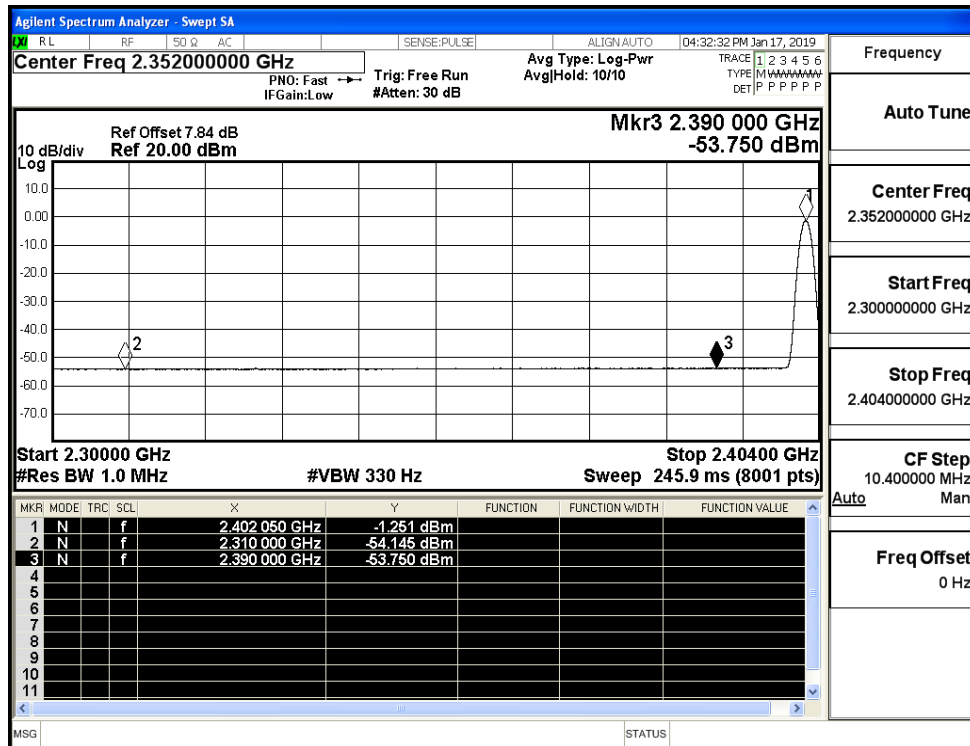
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.89	2.0	0	52.37	PEAK	74	PASS
	Off	2310.0	-54.15	2.0	0	43.11	AV	54	PASS
	Off	2390.0	-43.59	2.0	0	53.67	PEAK	74	PASS
	Off	2390.0	-53.75	2.0	0	43.51	AV	54	PASS
	Off	2483.5	-42.73	2.0	0	54.53	PEAK	74	PASS
	Off	2483.5	-53.54	2.0	0	43.71	AV	54	PASS
	Off	2500.0	-43.06	2.0	0	54.19	PEAK	74	PASS
	Off	2500.0	-53.46	2.0	0	43.80	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.63	2.0	0	52.63	PEAK	74	PASS
	Off	2310.0	-54.11	2.0	0	43.15	AV	54	PASS
	Off	2390.0	-42.91	2.0	0	54.35	PEAK	74	PASS
	Off	2390.0	-53.81	2.0	0	43.45	AV	54	PASS
	Off	2483.5	-42.65	2.0	0	54.61	PEAK	74	PASS
	Off	2483.5	-53.42	2.0	0	43.84	AV	54	PASS
	Off	2500.0	-43.81	2.0	0	53.45	PEAK	74	PASS
	Off	2500.0	-53.50	2.0	0	43.75	AV	54	PASS
8DPSK	Off	2310.0	-43.73	2.0	0	53.53	PEAK	74	PASS
	Off	2310.0	-54.11	2.0	0	43.15	AV	54	PASS
	Off	2390.0	-44.33	2.0	0	52.93	PEAK	74	PASS
	Off	2390.0	-53.75	2.0	0	43.51	AV	54	PASS
	Off	2483.5	-42.97	2.0	0	54.28	PEAK	74	PASS
	Off	2483.5	-53.35	2.0	0	43.91	AV	54	PASS
	Off	2500.0	-43.91	2.0	0	53.34	PEAK	74	PASS
	Off	2500.0	-53.35	2.0	0	43.90	AV	54	PASS

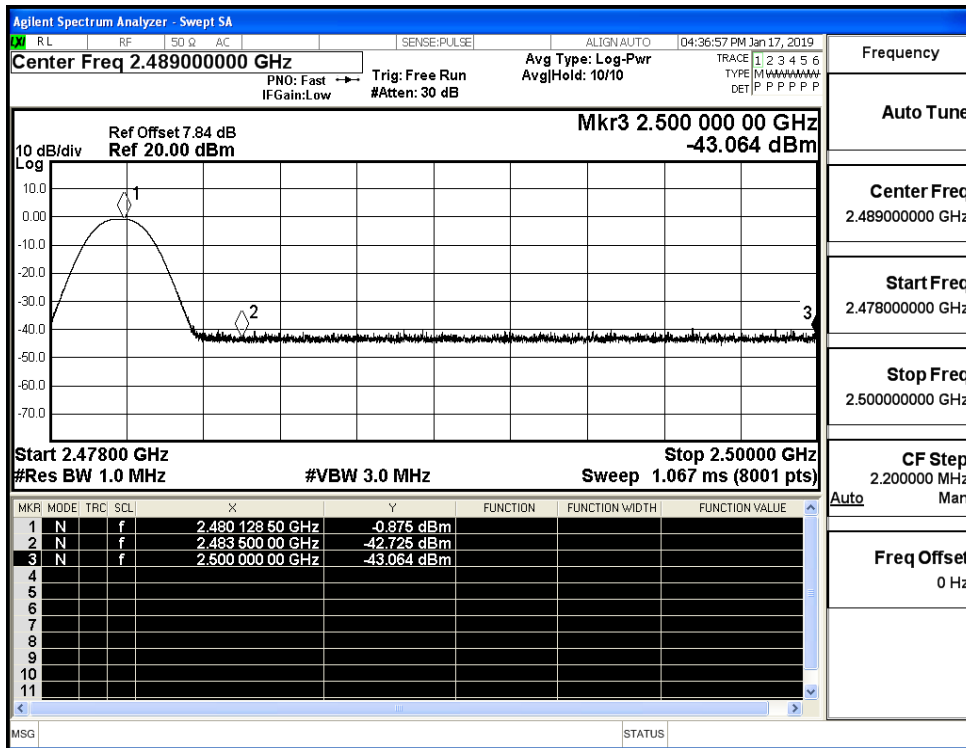
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



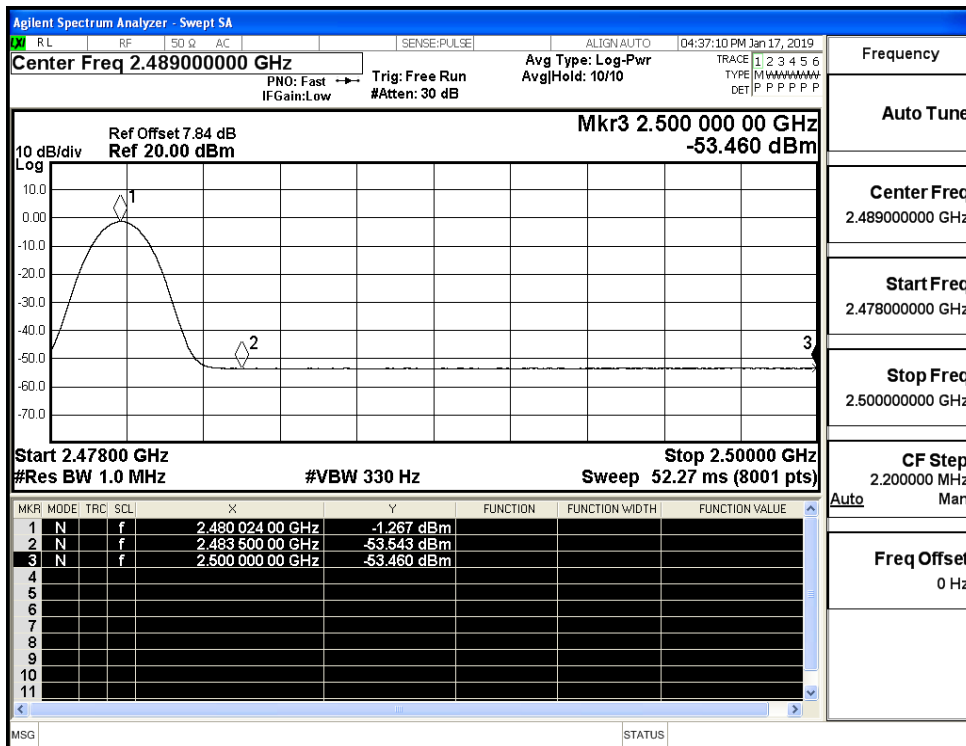
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



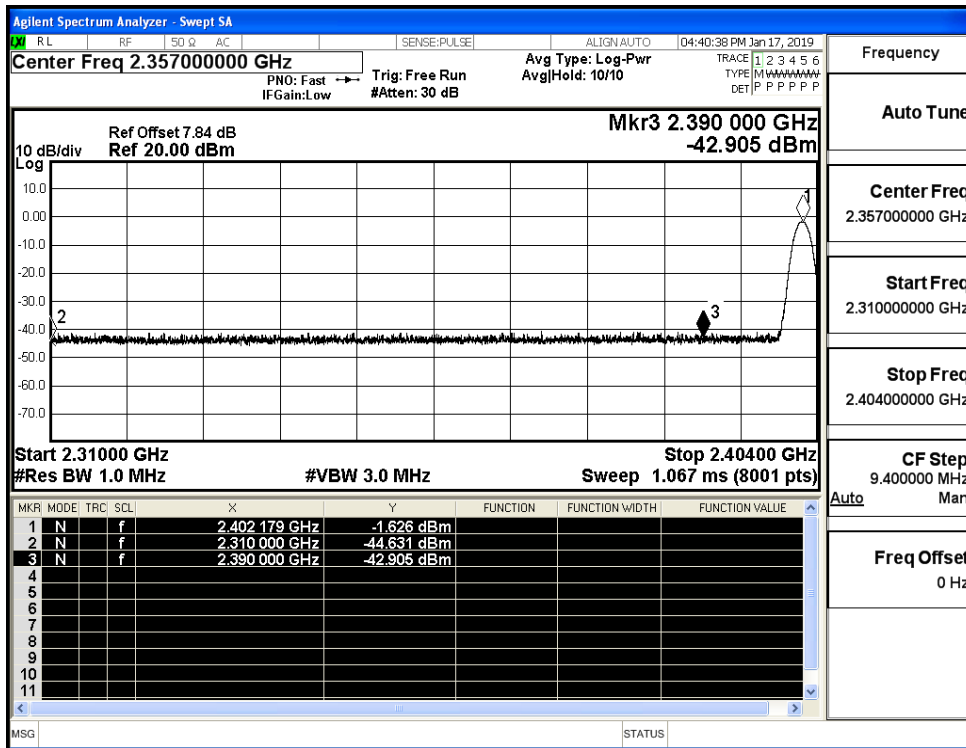
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



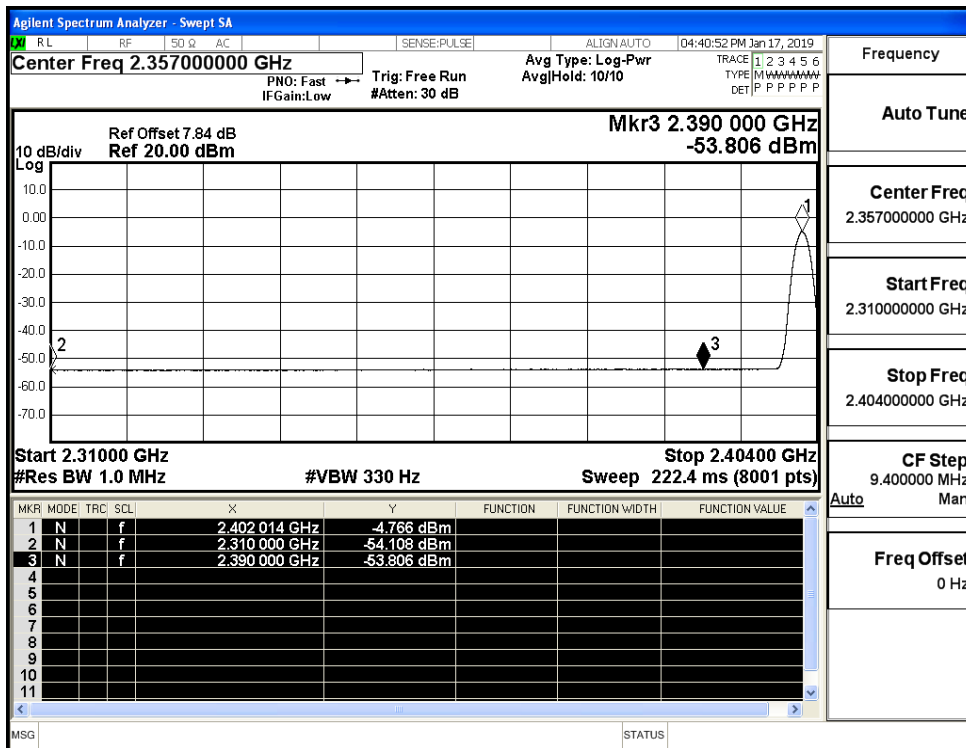
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



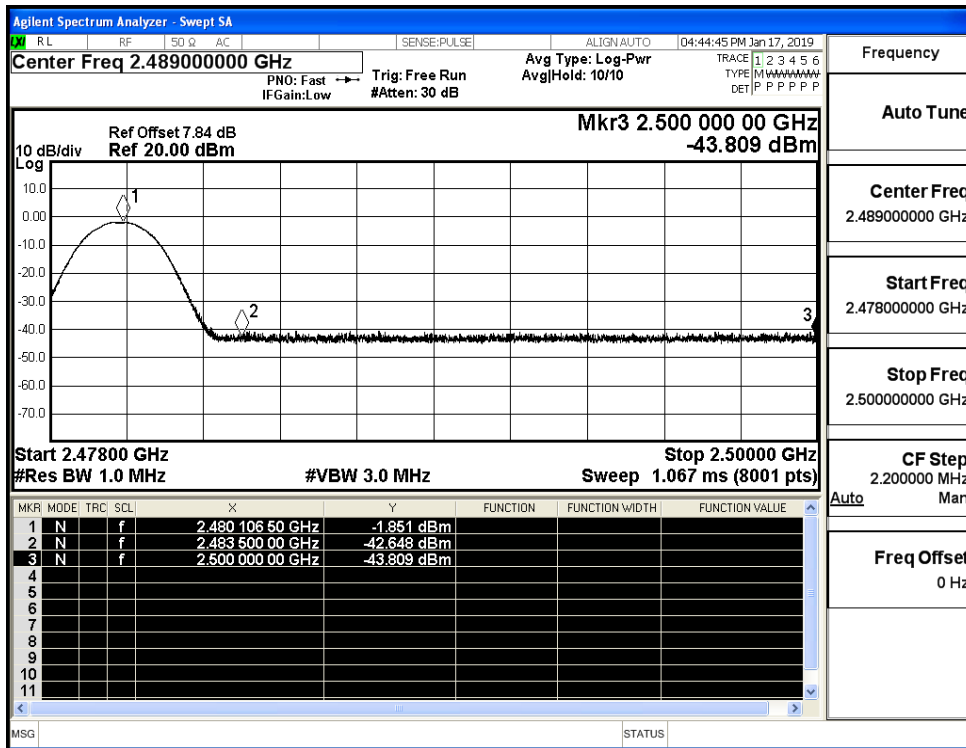
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



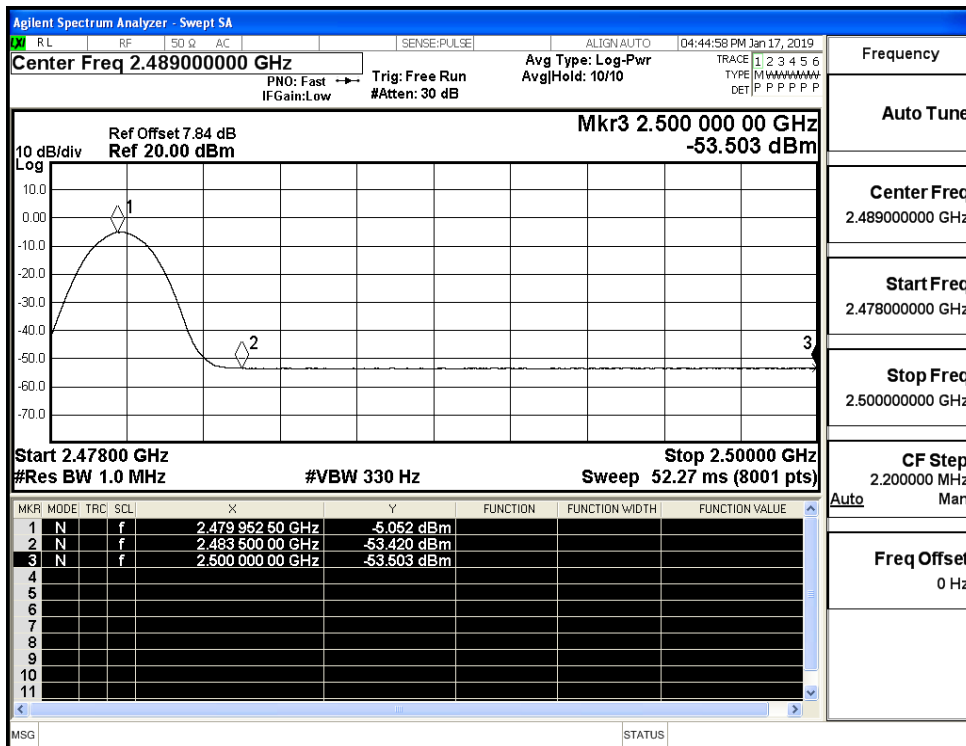
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



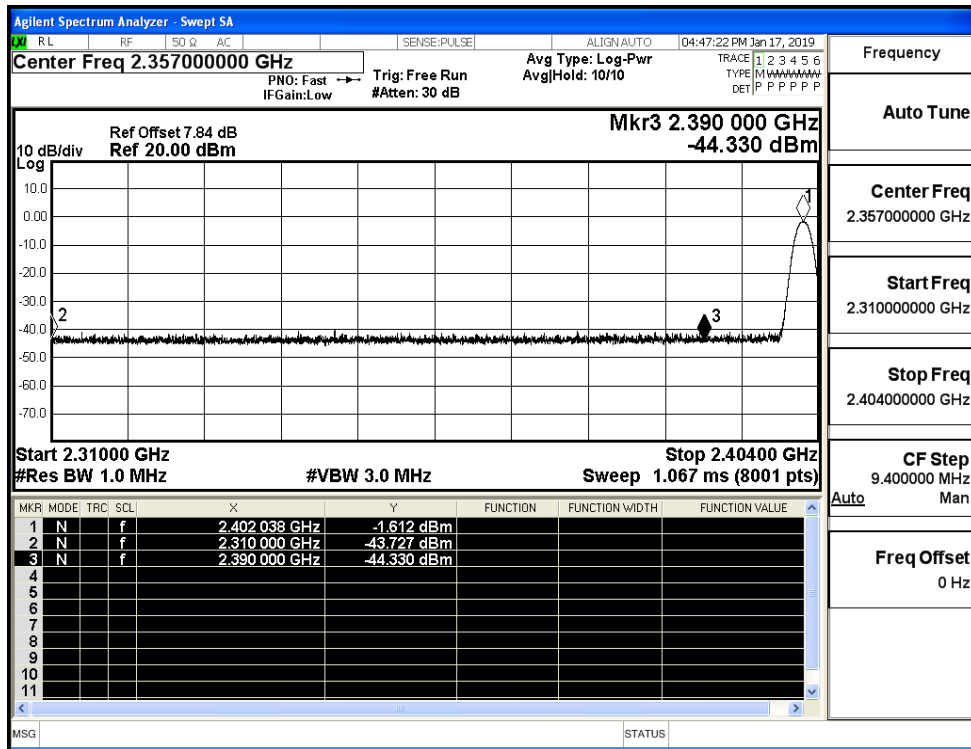
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



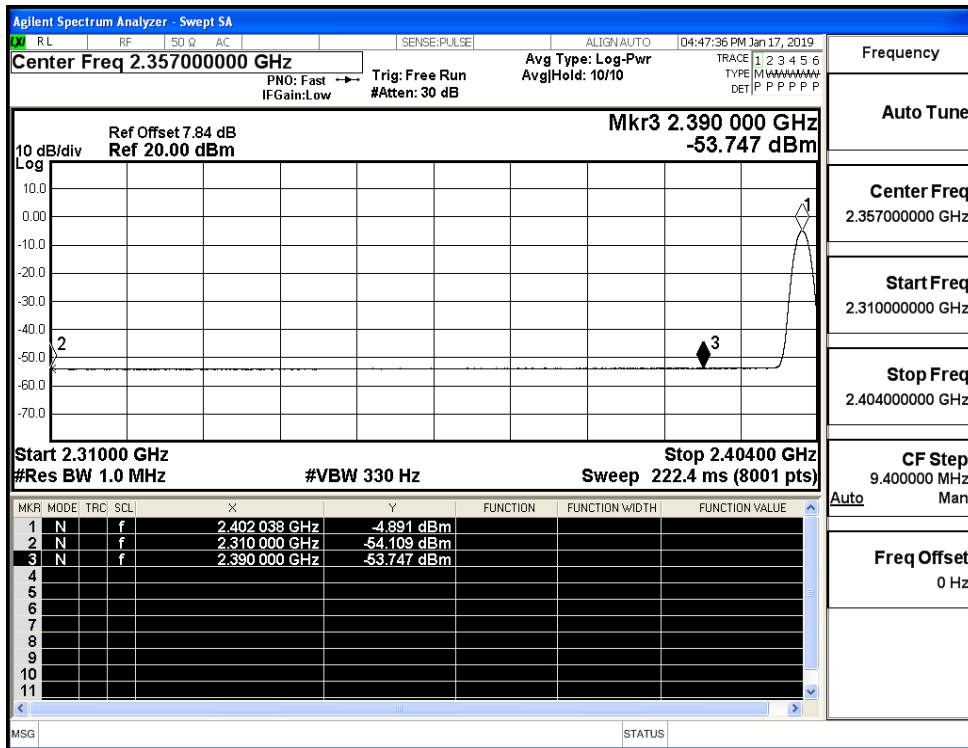
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



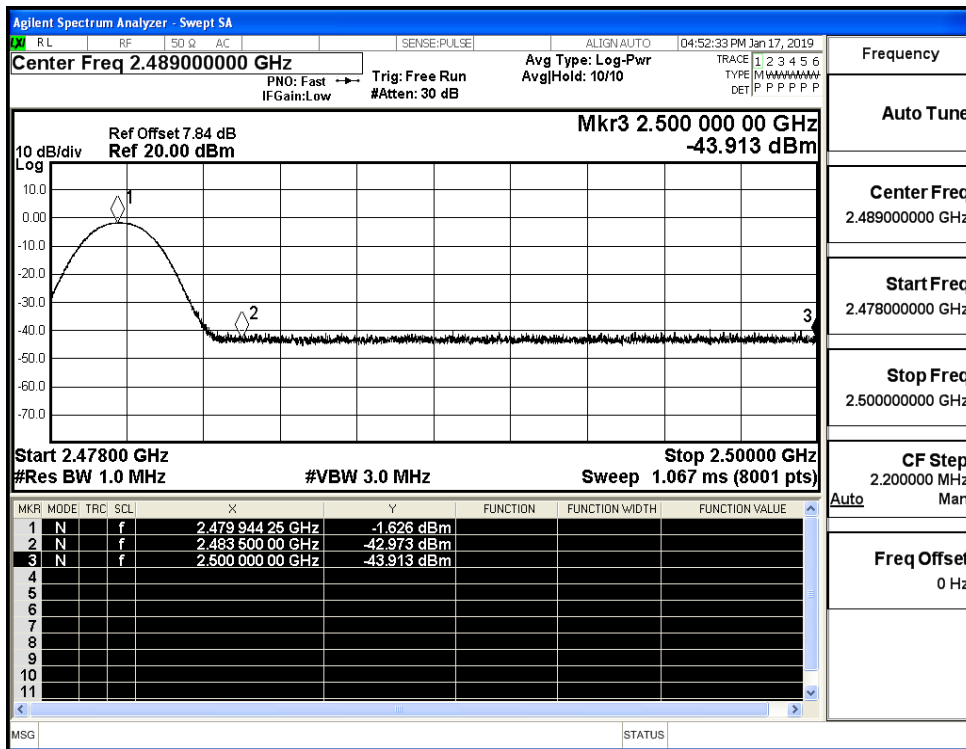
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

