

Appendix A
RF Test Data for BT V5.0(DSS) (Conducted Measurement)
Product Name: Wireless earbuds
Trade Mark: Origaudio
Test Model: Kronies

Environmental Conditions

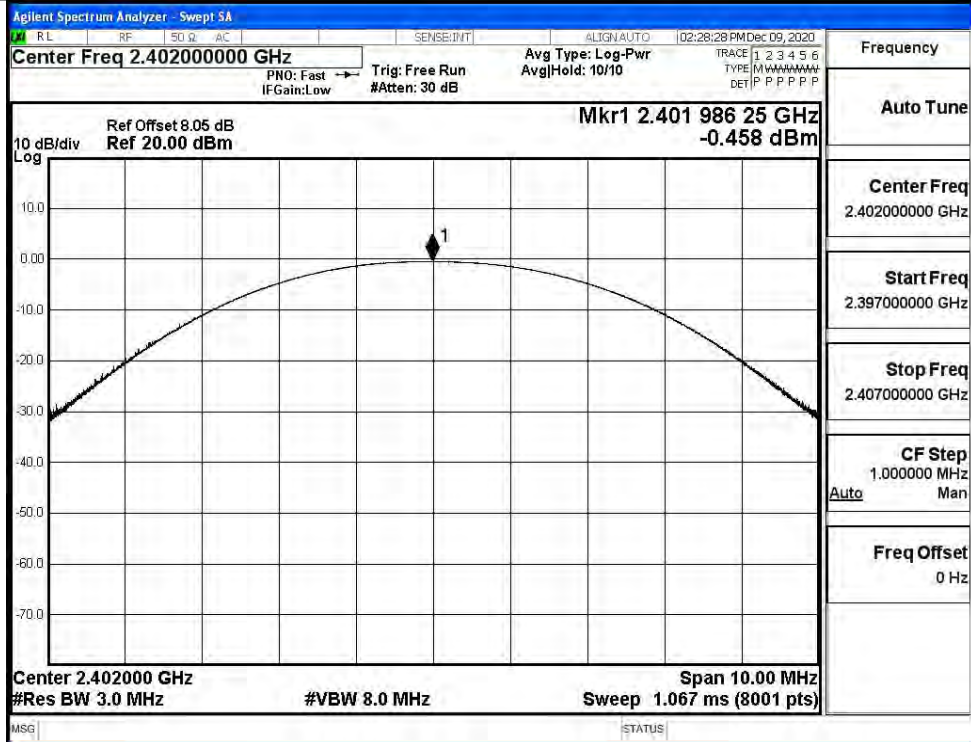
Temperature:	22.3 ° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Ken He
Supervised by:	Li Huan

A.1 Maxmum Conducted Peak Output Power

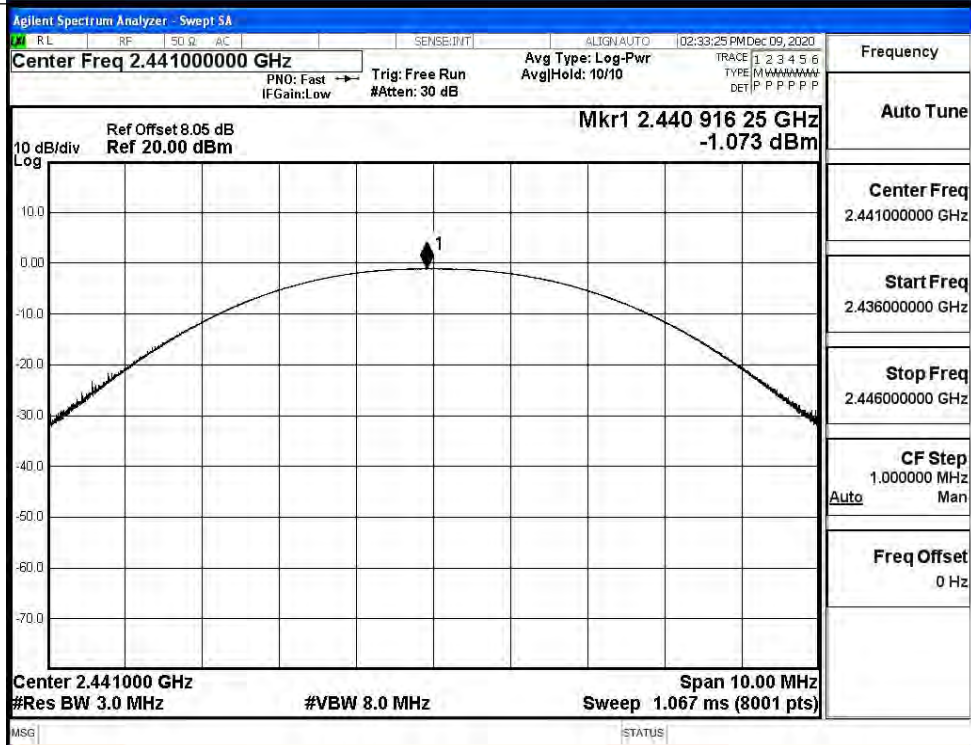
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.458	30	PASS
	MCH	-1.073	30	PASS
	HCH	-2.546	30	PASS
$\pi/4$ DQPSK	LCH	1.841	21	PASS
	MCH	1.280	21	PASS
	HCH	-0.273	21	PASS
8DPSK	LCH	2.369	21	PASS
	MCH	1.773	21	PASS
	HCH	0.211	21	PASS

Test Graphs

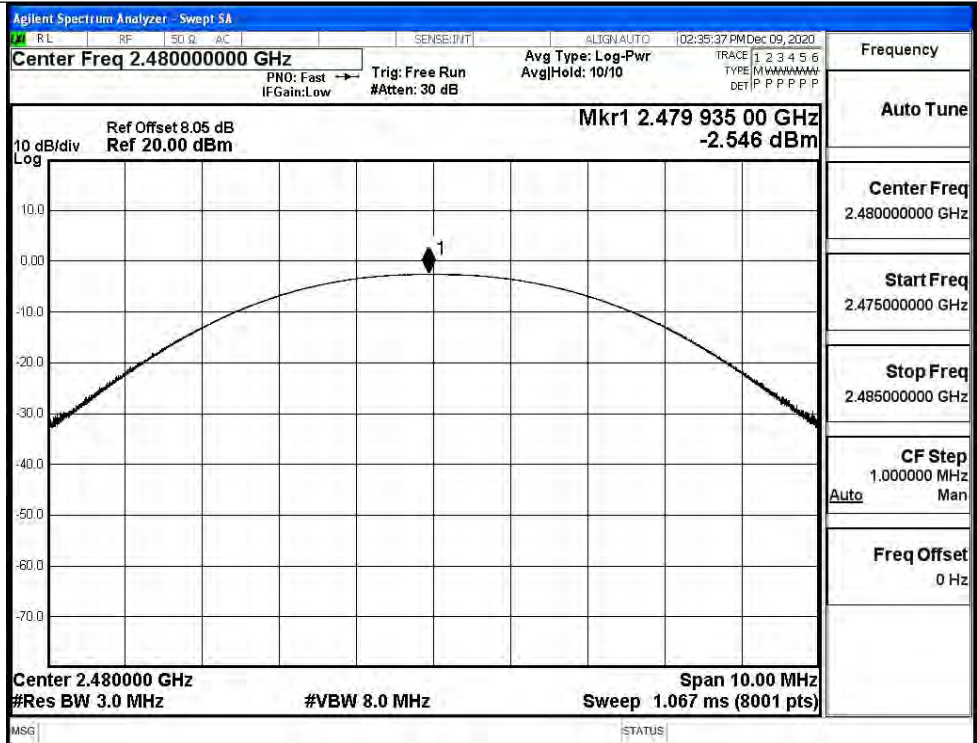
GFSK/LCH



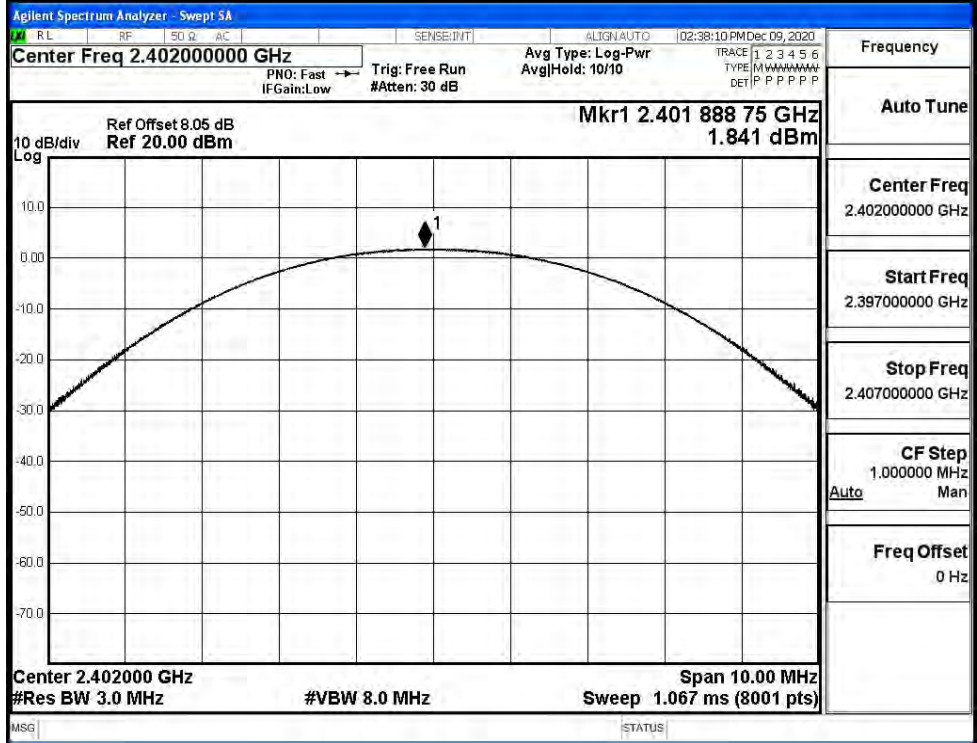
GFSK/MCH

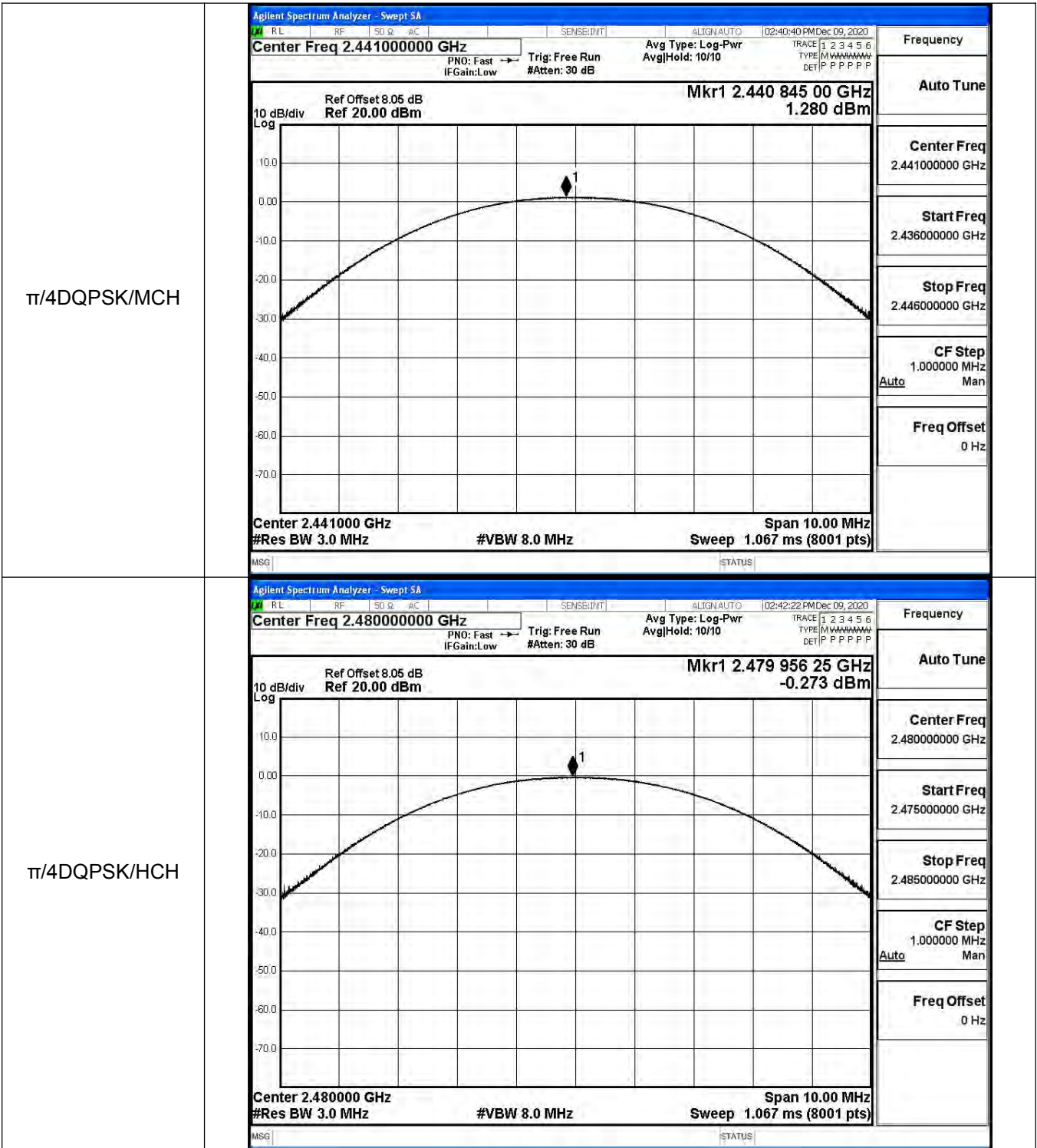


GFSK/HCH

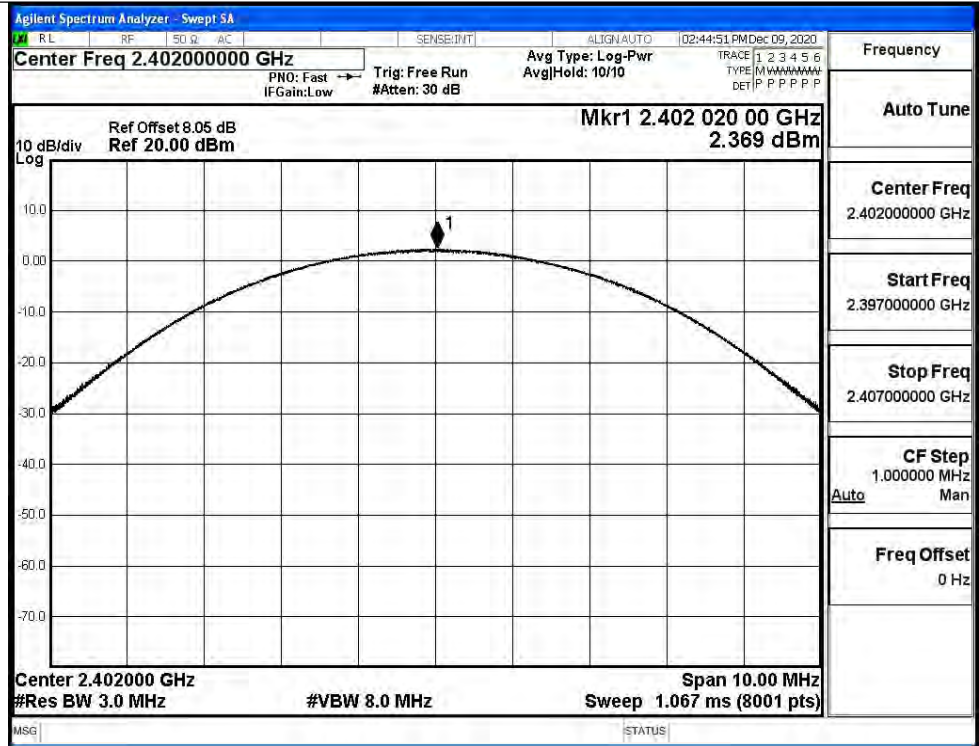


$\pi/4$ DQPSK/LCH

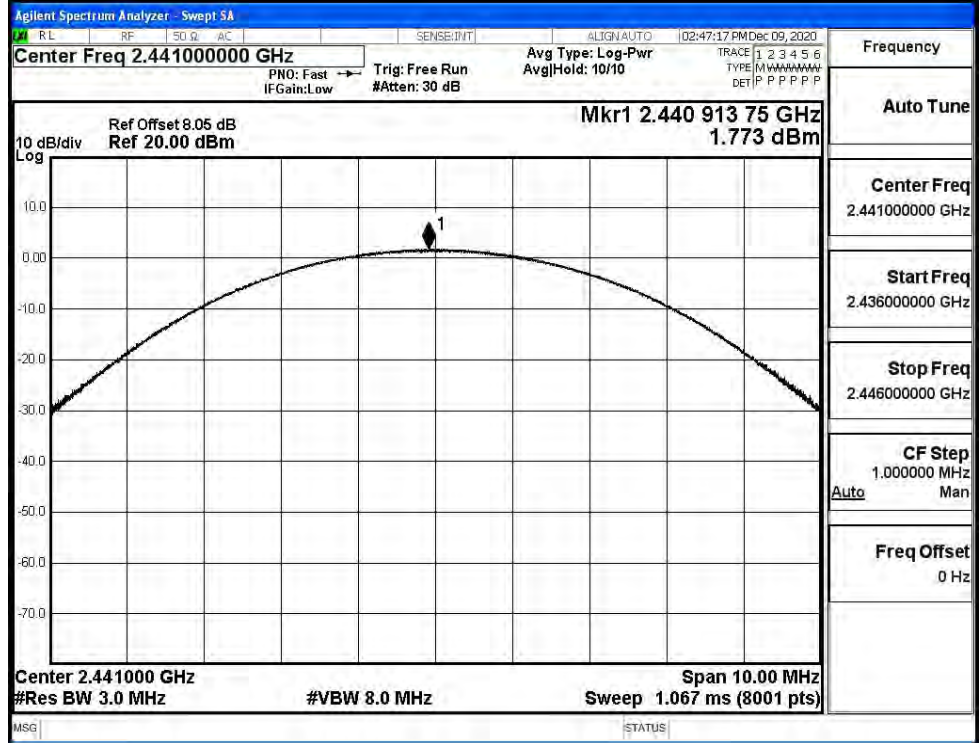




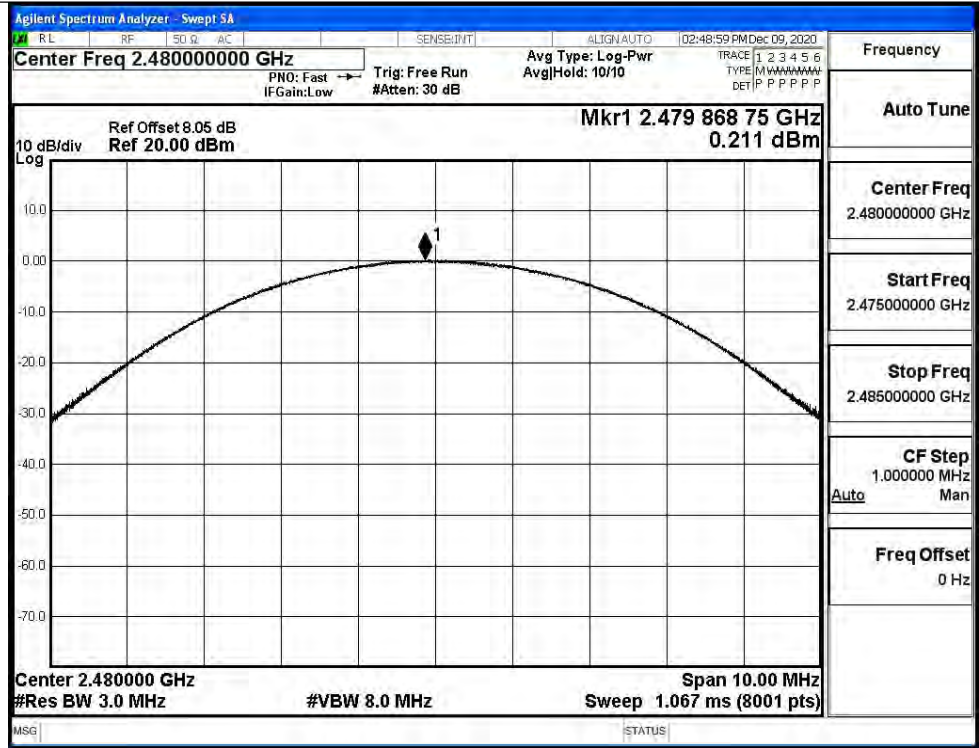
8DPSK/LCH



8DPSK/MCH



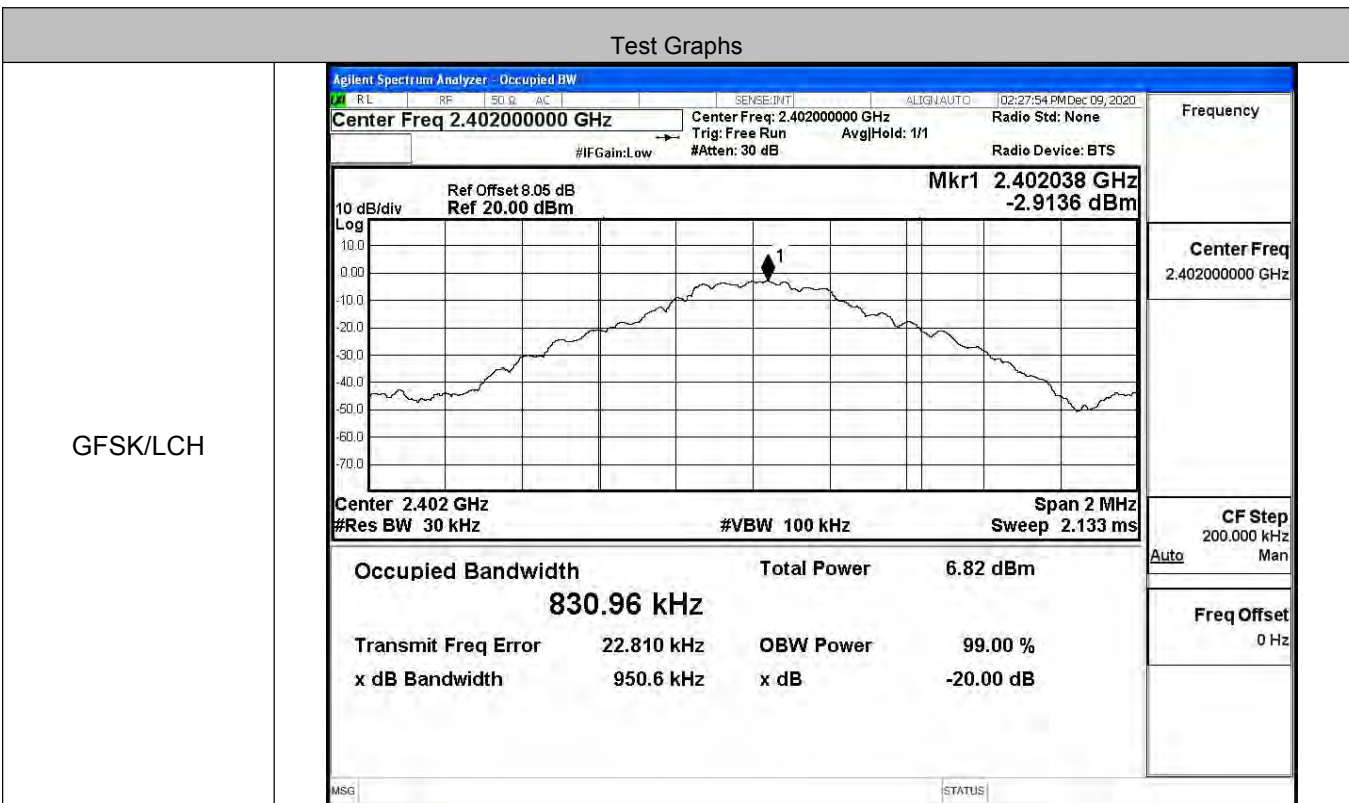
8DPSK/HCH



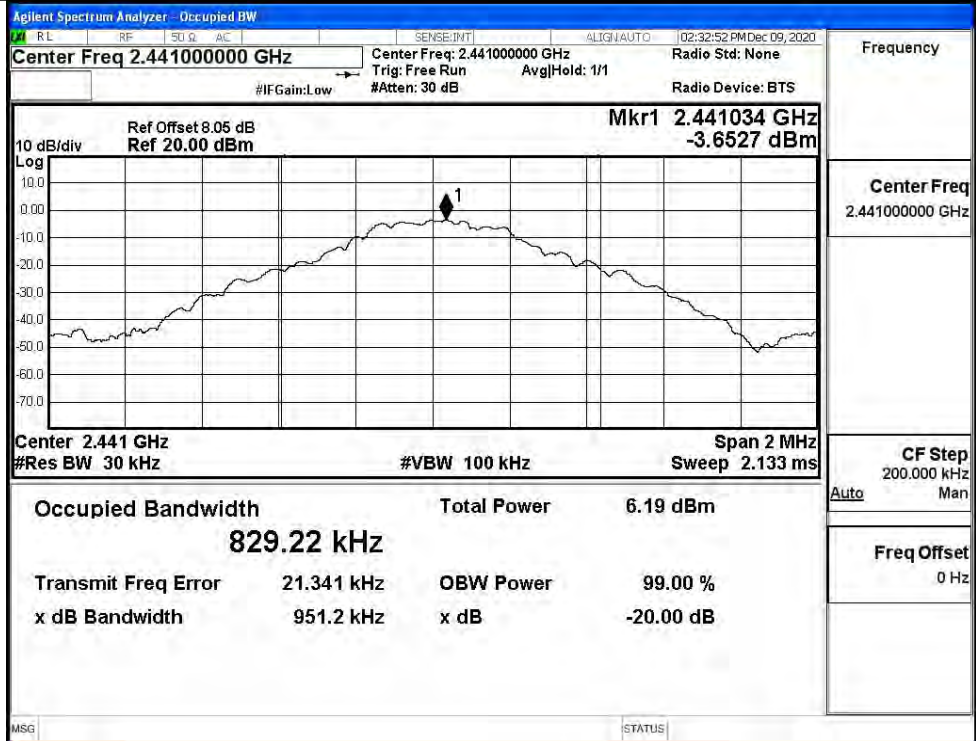
A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.9506	Not Specified	PASS
	MCH	0.9512	Not Specified	PASS
	HCH	0.9513	Not Specified	PASS
π/4DQPSK	LCH	1.331	Not Specified	PASS
	MCH	1.332	Not Specified	PASS
	HCH	1.332	Not Specified	PASS
8DPSK	LCH	1.301	Not Specified	PASS
	MCH	1.301	Not Specified	PASS
	HCH	1.303	Not Specified	PASS

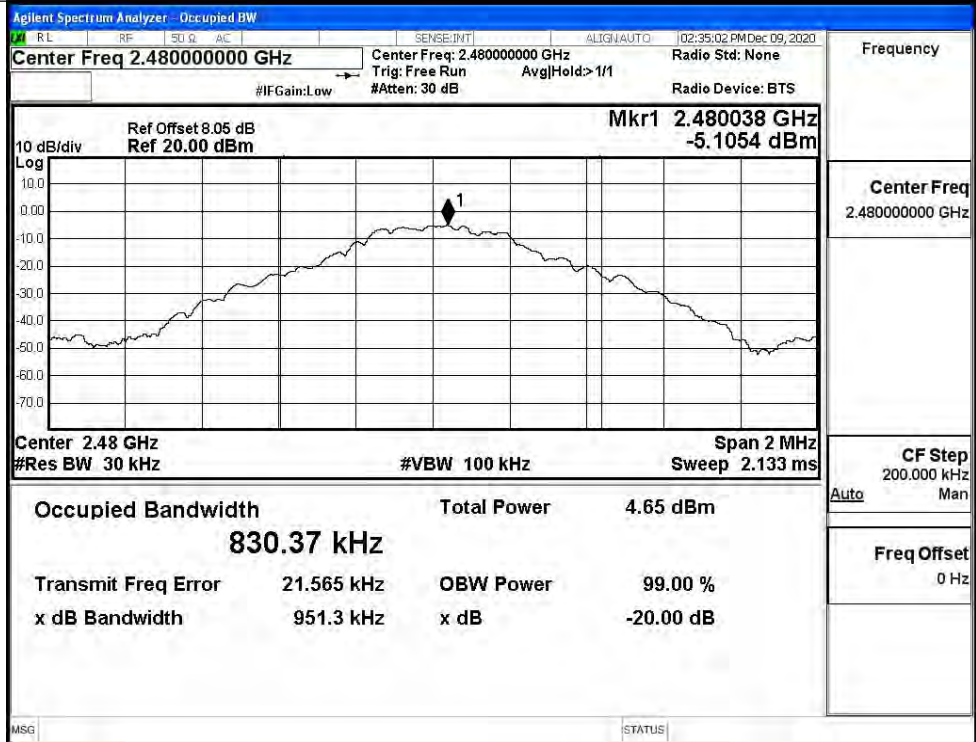
Test Graphs



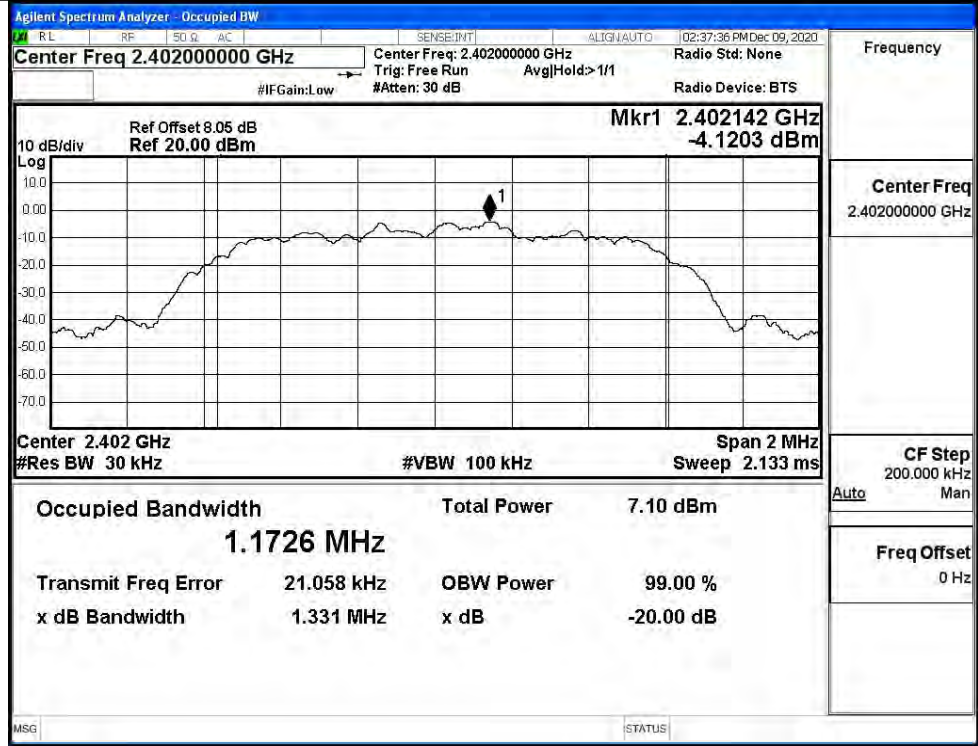
GFSK/MCH



GFSK/HCH

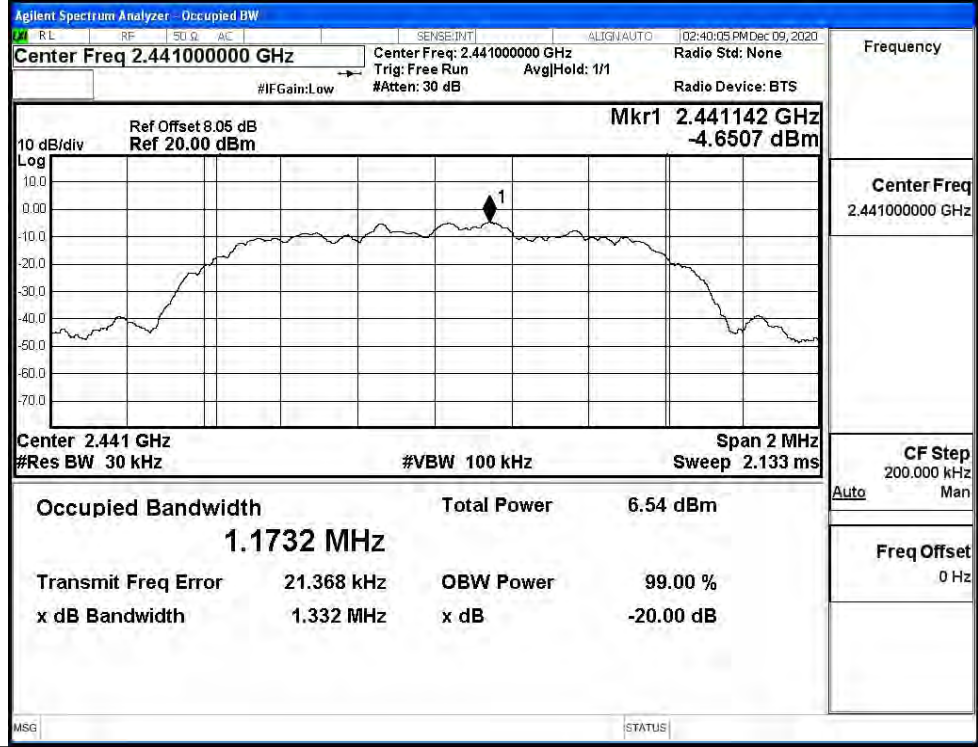


$\pi/4$ DQPSK/LCH



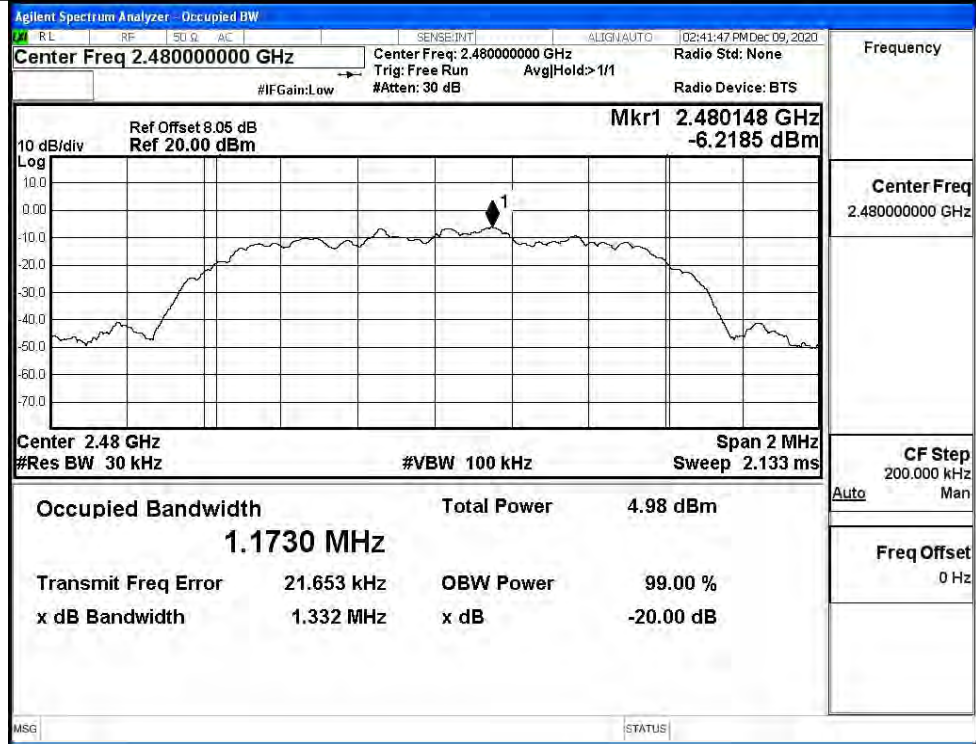
Frequency	2.40200000 GHz
Center Freq	2.40200000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/MCH

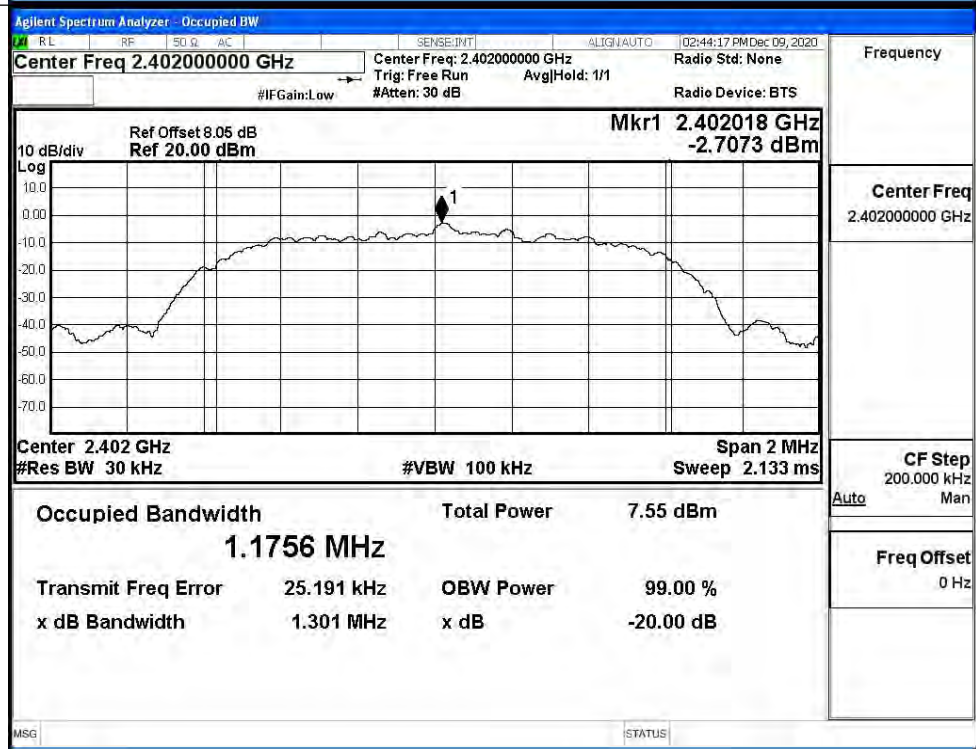


Frequency	2.44100000 GHz
Center Freq	2.44100000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

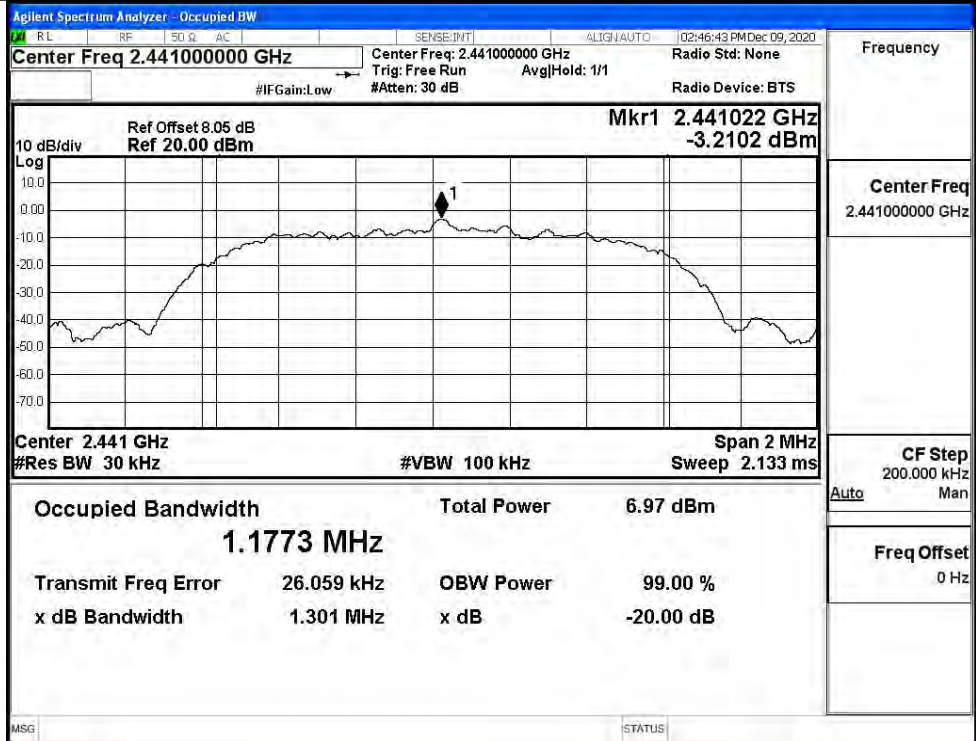
$\pi/4$ DQPSK/HCH



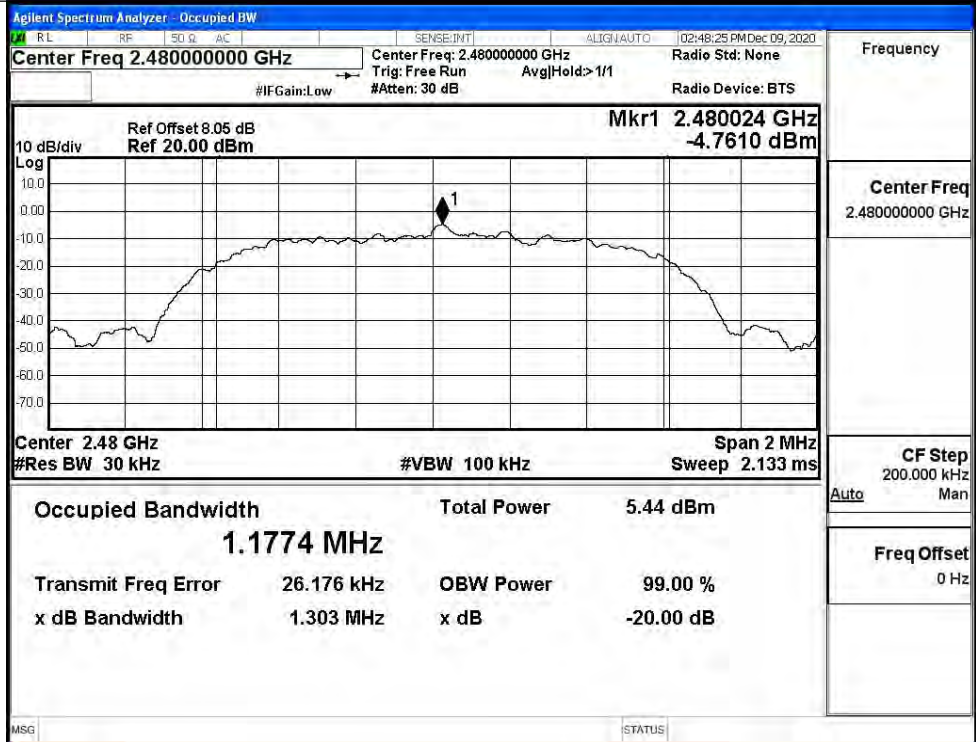
8DPSK/LCH



8DPSK/MCH

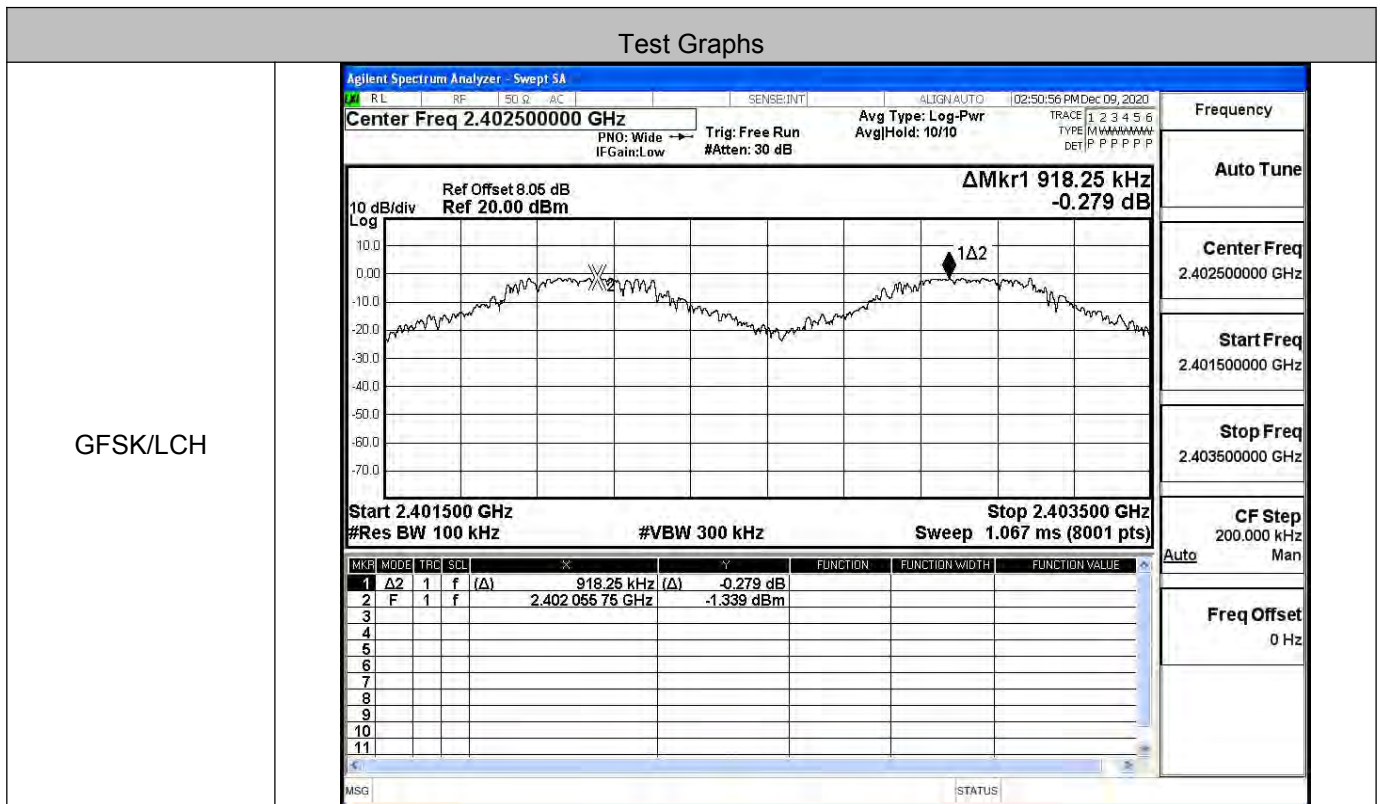


8DPSK/HCH

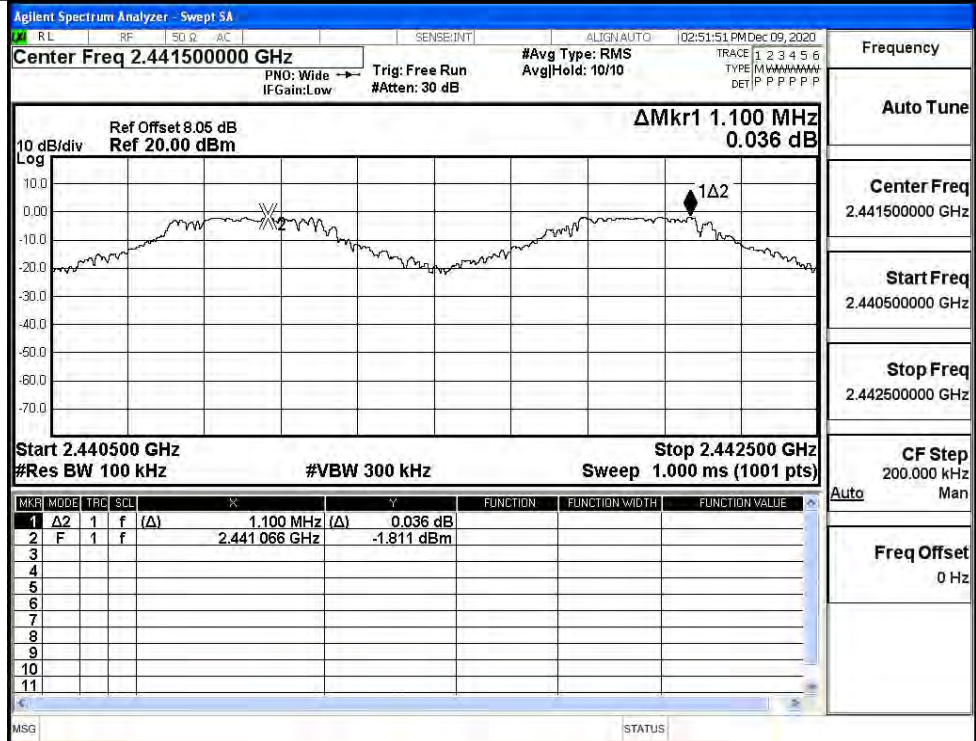


A.3 Carrier Frequency Separation

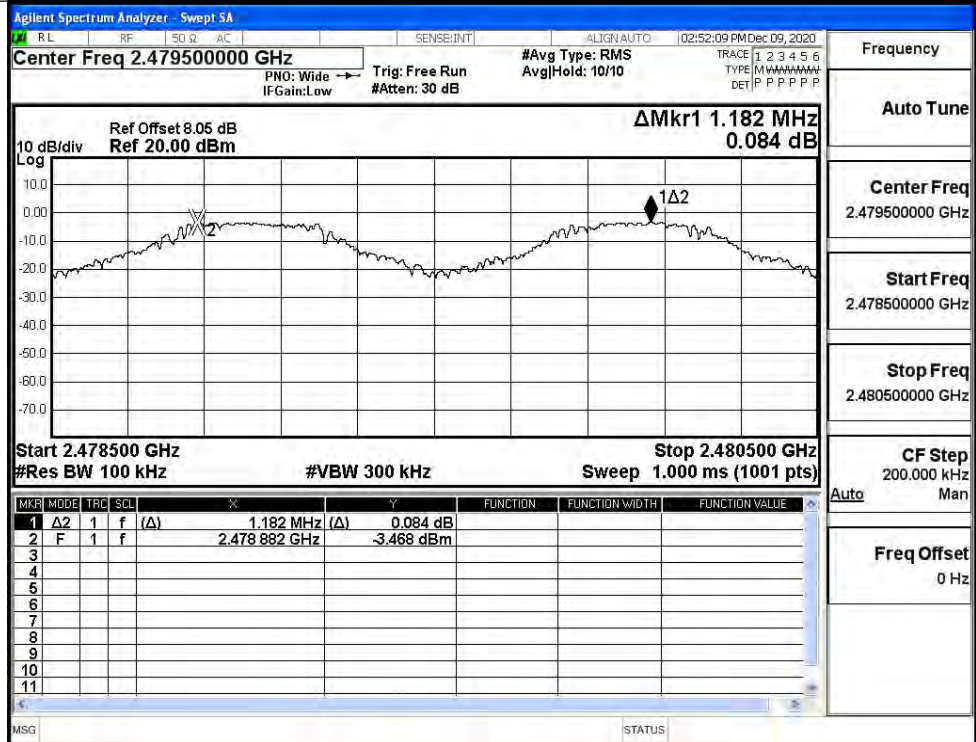
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.918	0.634	PASS
	MCH	1.100	0.634	PASS
	HCH	1.182	0.634	PASS
π/4DQPSK	LCH	1.314	0.888	PASS
	MCH	1.016	0.888	PASS
	HCH	1.000	0.888	PASS
8DPSK	LCH	1.102	0.869	PASS
	MCH	1.080	0.869	PASS
	HCH	1.214	0.869	PASS



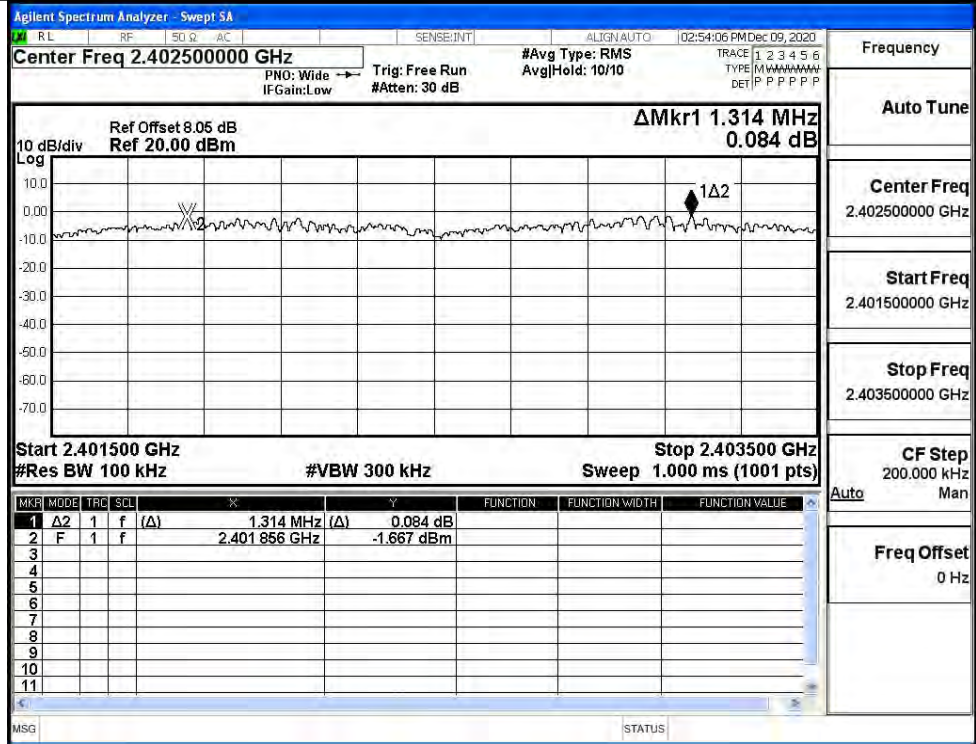
GFSK/MCH



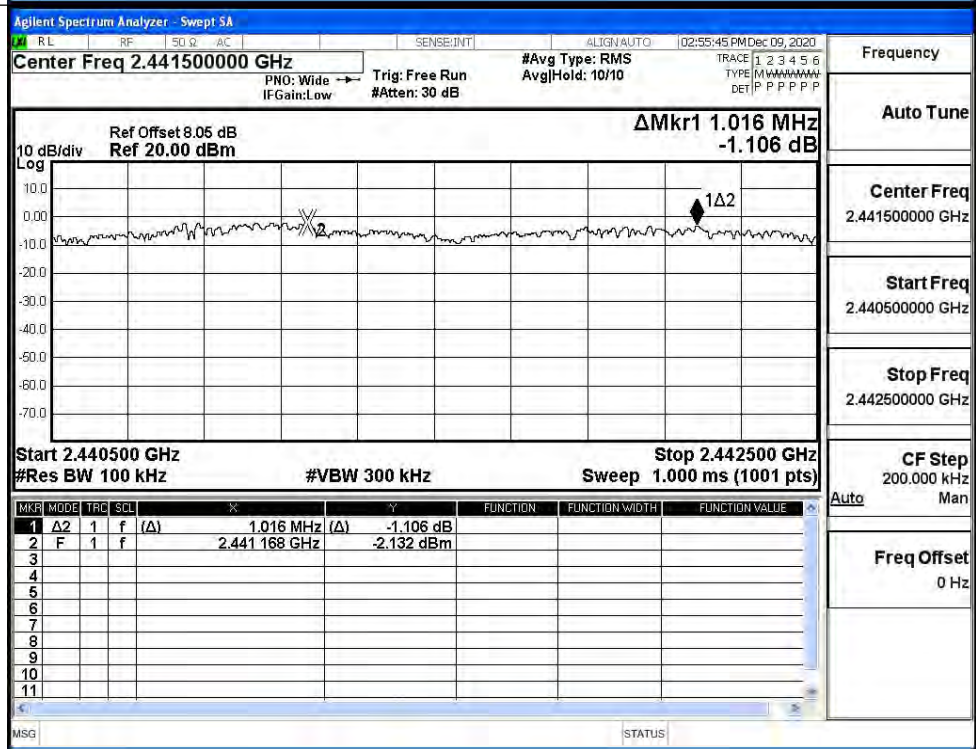
GFSK/HCH



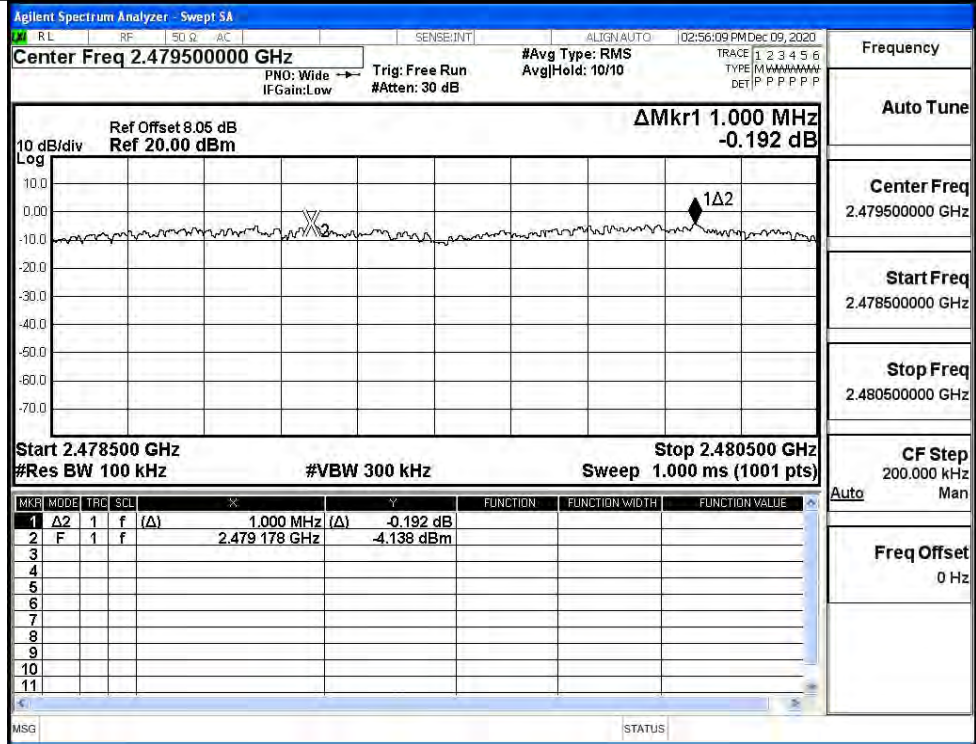
$\pi/4$ DQPSK/LCH



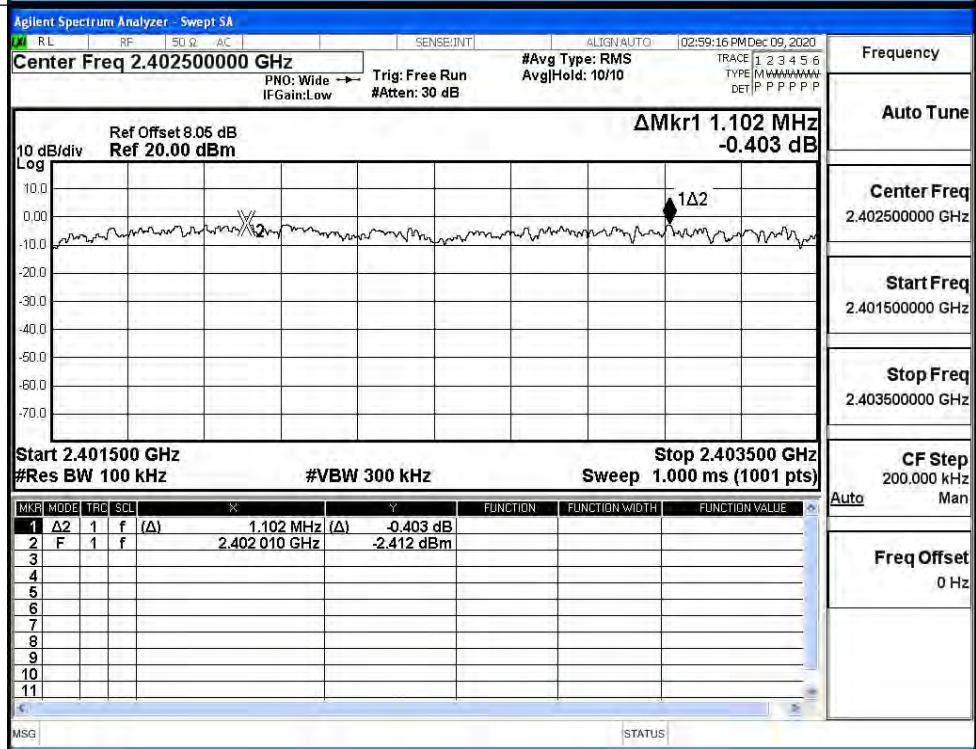
$\pi/4$ DQPSK/MCH



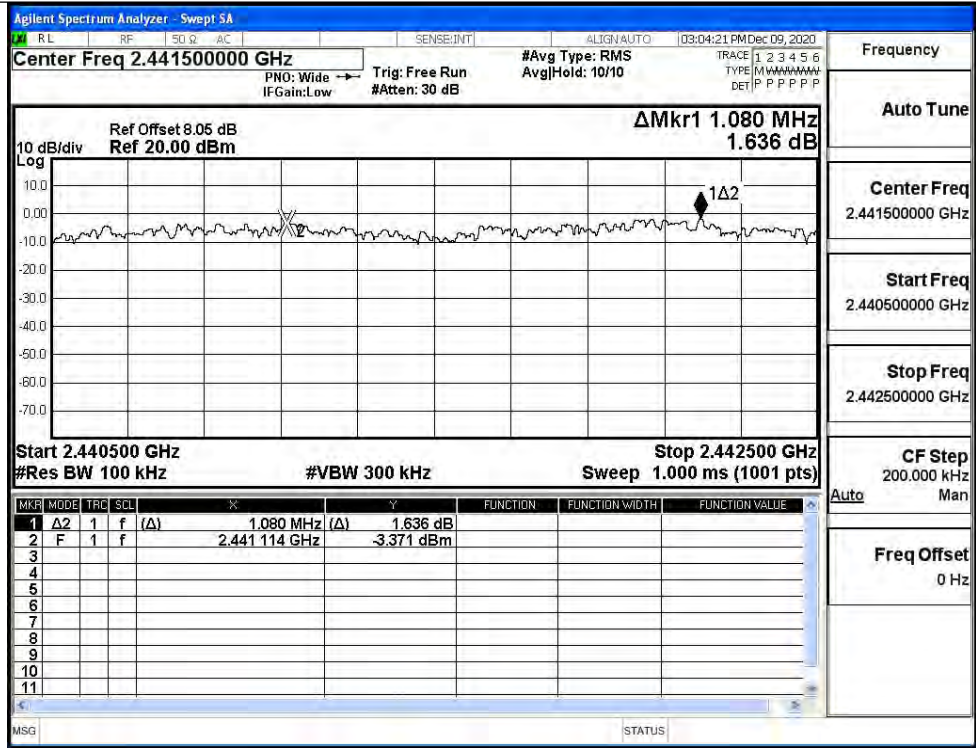
π/4DQPSK/HCH



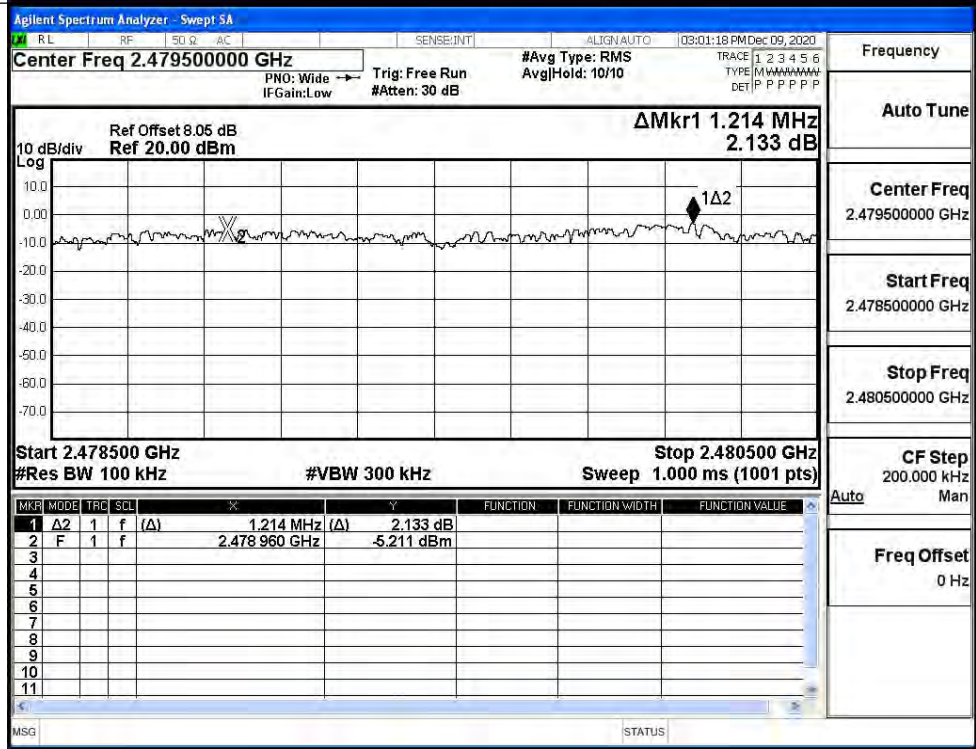
8DPSK/LCH



8DPSK/MCH



8DPSK/HCH



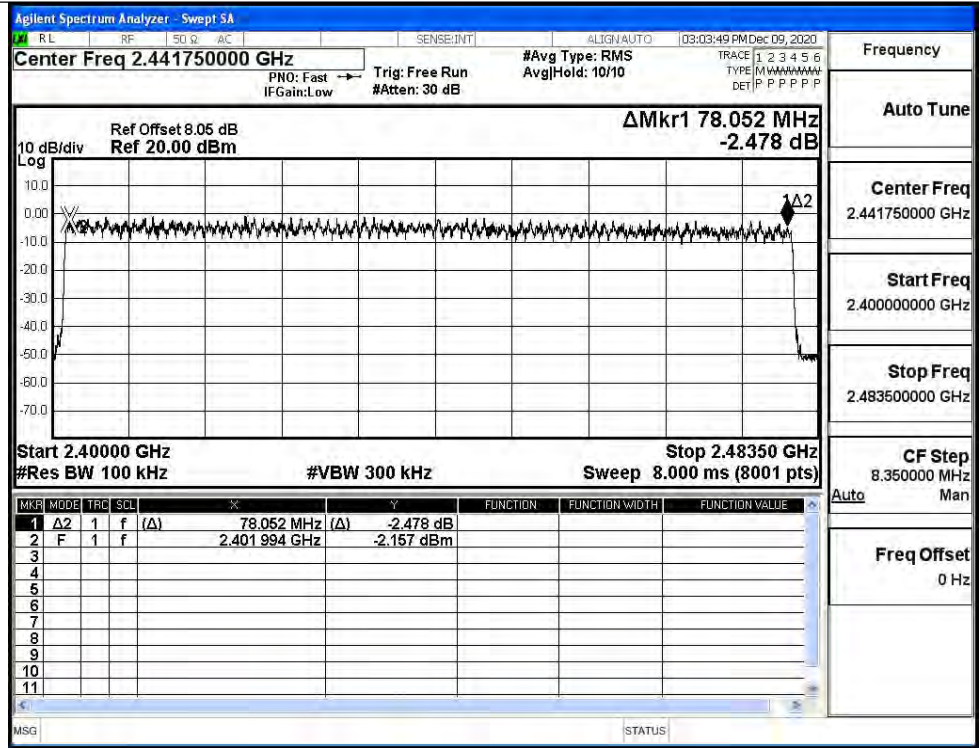
A.4 Hopping Channel Number

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

Test Graphs

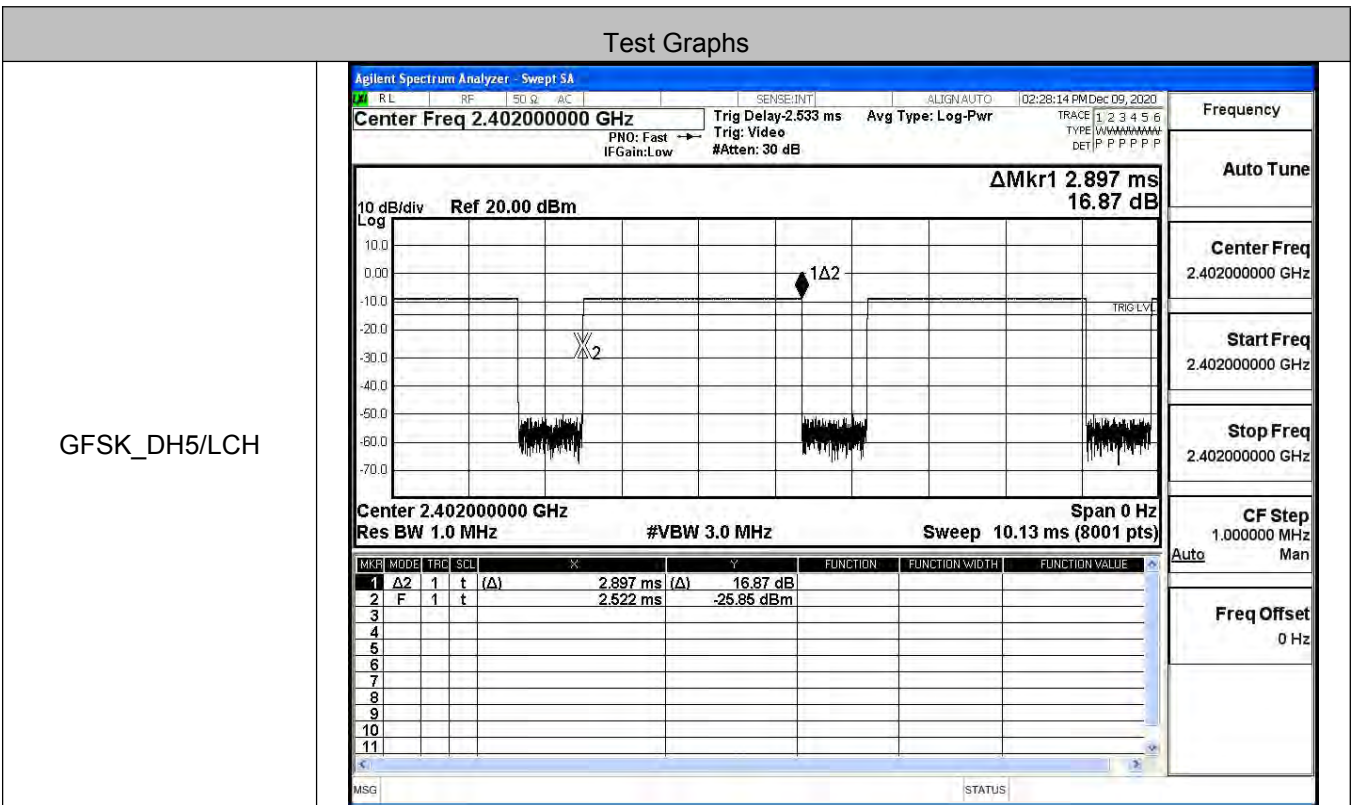
<p>GFSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.104 MHz -2.637 dB</p> <p>Start 2.40000 GHz #Res BW 100 kHz</p> <p>Stop 2.48350 GHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <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>1</td> <td>f</td> <td>(Δ)</td> <td>78.104 MHz</td> <td>(Δ)</td> <td></td> <td>-2.637 dB</td> </tr> <tr> <td>2</td> <td>F</td> <td>1</td> <td>f</td> <td></td> <td>2.401889 GHz</td> <td></td> <td></td> <td>-1.104 dBm</td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	1	f	(Δ)	78.104 MHz	(Δ)		-2.637 dB	2	F	1	f		2.401889 GHz			-1.104 dBm
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	1	f	(Δ)	78.104 MHz	(Δ)		-2.637 dB																				
2	F	1	f		2.401889 GHz			-1.104 dBm																				
<p>$\pi/4$DQPSK/Hop</p>	<p>Agilent Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441750000 GHz</p> <p>Ref Offset 8.05 dB Ref 20.00 dBm</p> <p>ΔMkr1 78.166 MHz -1.984 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>1</td> <td>f</td> <td>(Δ)</td> <td>78.166 MHz</td> <td>(Δ)</td> <td></td> <td>-1.984 dB</td> </tr> <tr> <td>2</td> <td>F</td> <td>1</td> <td>f</td> <td></td> <td>2.401889 GHz</td> <td></td> <td></td> <td>-1.325 dBm</td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ 2	1	f	(Δ)	78.166 MHz	(Δ)		-1.984 dB	2	F	1	f		2.401889 GHz			-1.325 dBm
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	1	f	(Δ)	78.166 MHz	(Δ)		-1.984 dB																				
2	F	1	f		2.401889 GHz			-1.325 dBm																				

8DPSK/Hop

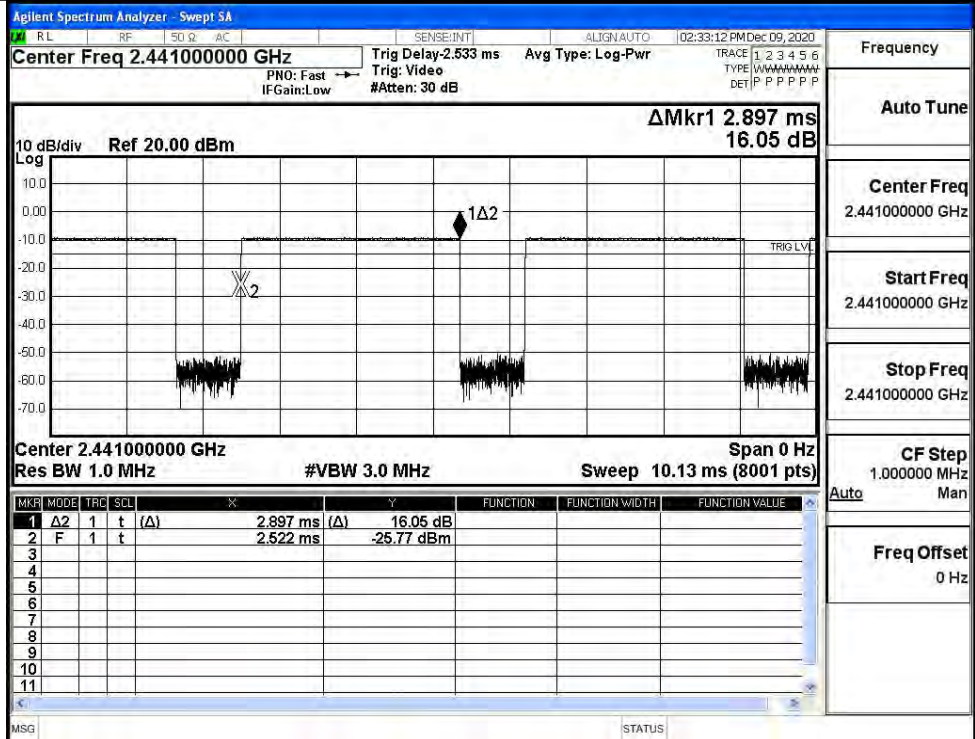


A.5 Dwell Time

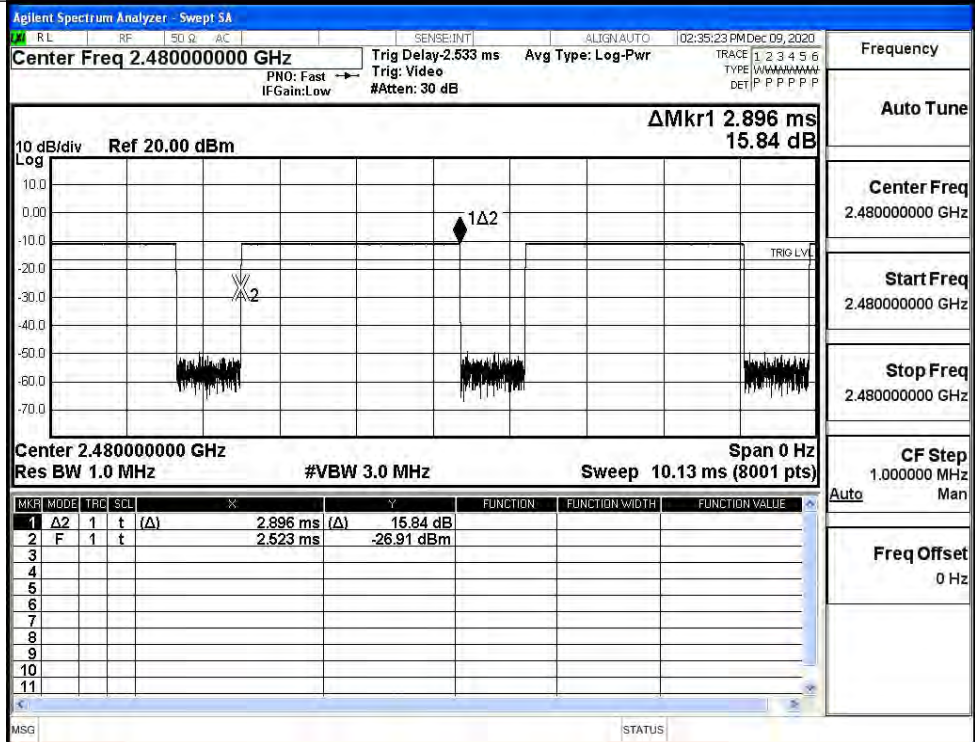
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.9	106.7	0.309	0.4	PASS
	DH5	MCH	2.9	106.7	0.309	0.4	PASS
	DH5	HCH	2.9	106.7	0.309	0.4	PASS
π/4DQPSK	2DH5	LCH	2.9	106.7	0.309	0.4	PASS
	2DH5	MCH	2.9	106.7	0.309	0.4	PASS
	2DH5	HCH	2.9	106.7	0.309	0.4	PASS
8DPSK	3DH5	LCH	2.9	106.7	0.309	0.4	PASS
	3DH5	MCH	2.9	106.7	0.309	0.4	PASS
	3DH5	HCH	2.9	106.7	0.309	0.4	PASS



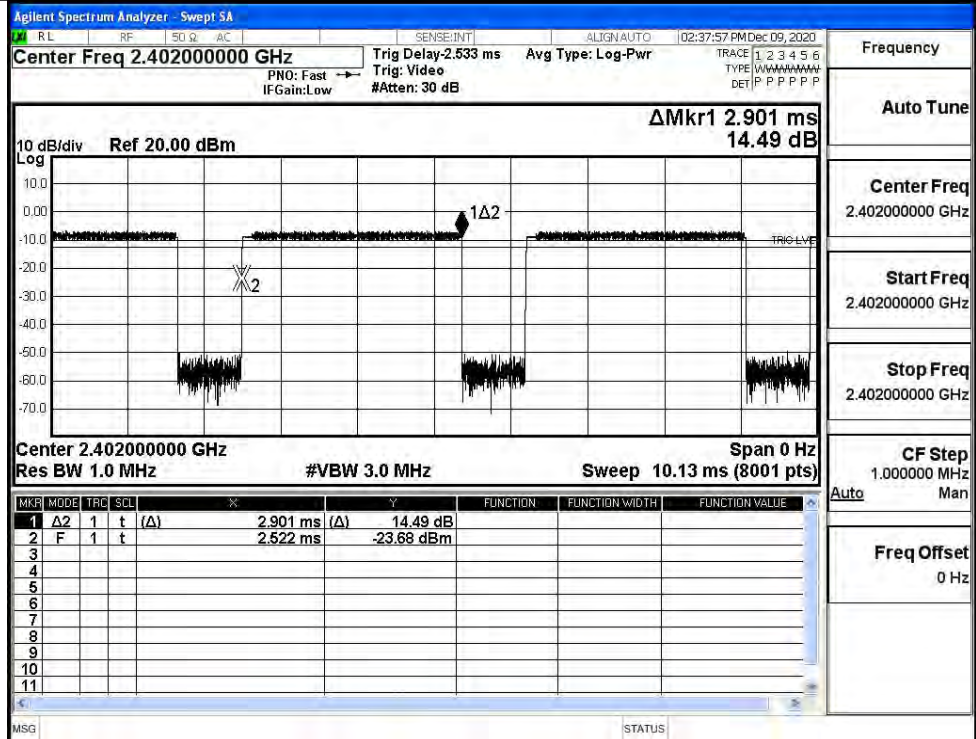
GFSK_DH5/MCH



GFSK_DH5/HCH

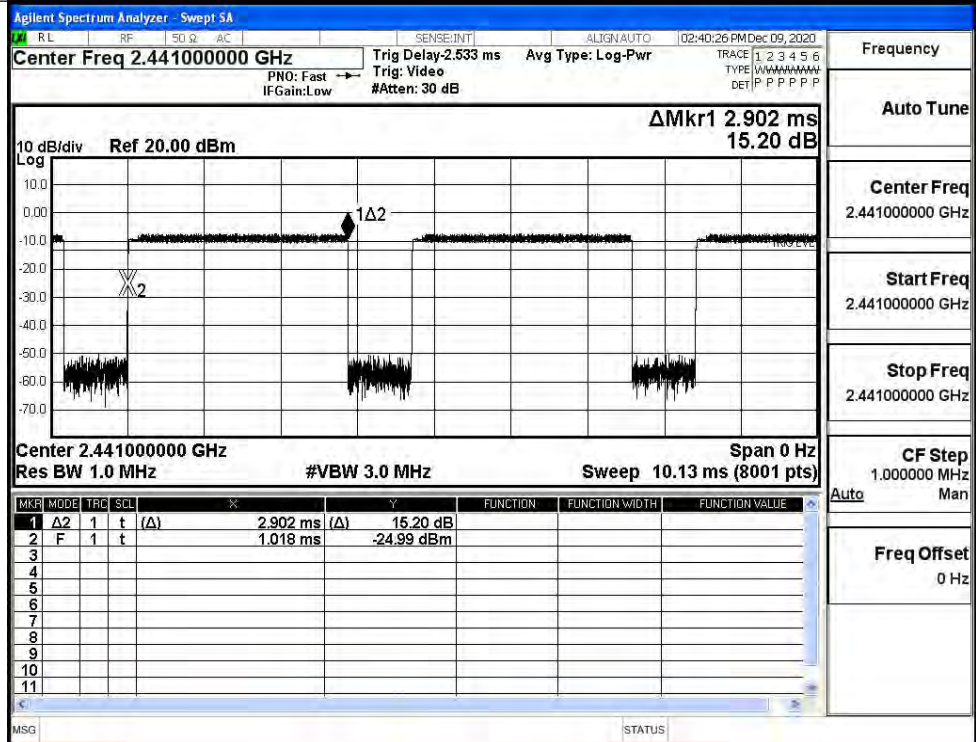


$\pi/4$ DQPSK
_2DH5/LCH



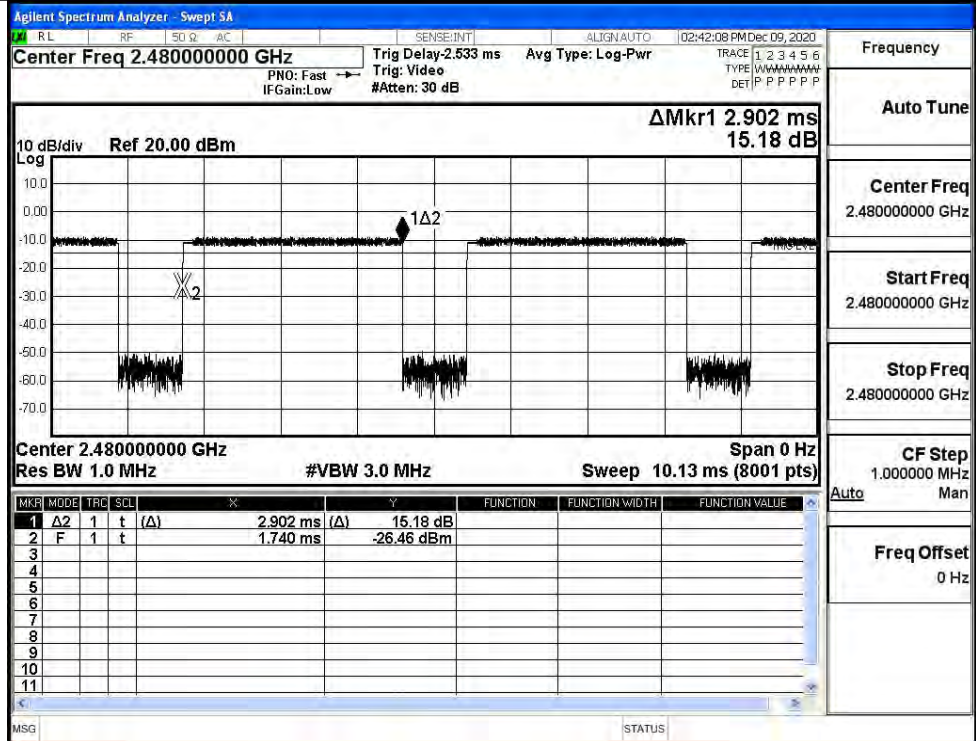
Frequency	
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.402000000 GHz
Stop Freq	2.402000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK
_2DH5/MCH



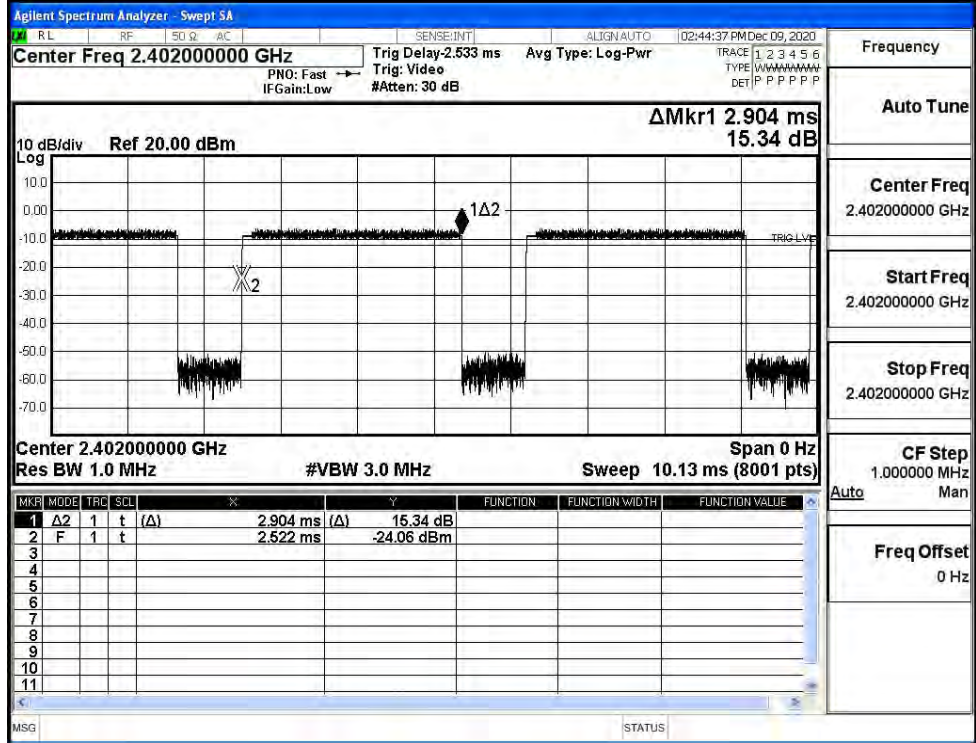
Frequency	
Auto Tune	
Center Freq	2.441000000 GHz
Start Freq	2.441000000 GHz
Stop Freq	2.441000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK
_2DH5/HCH



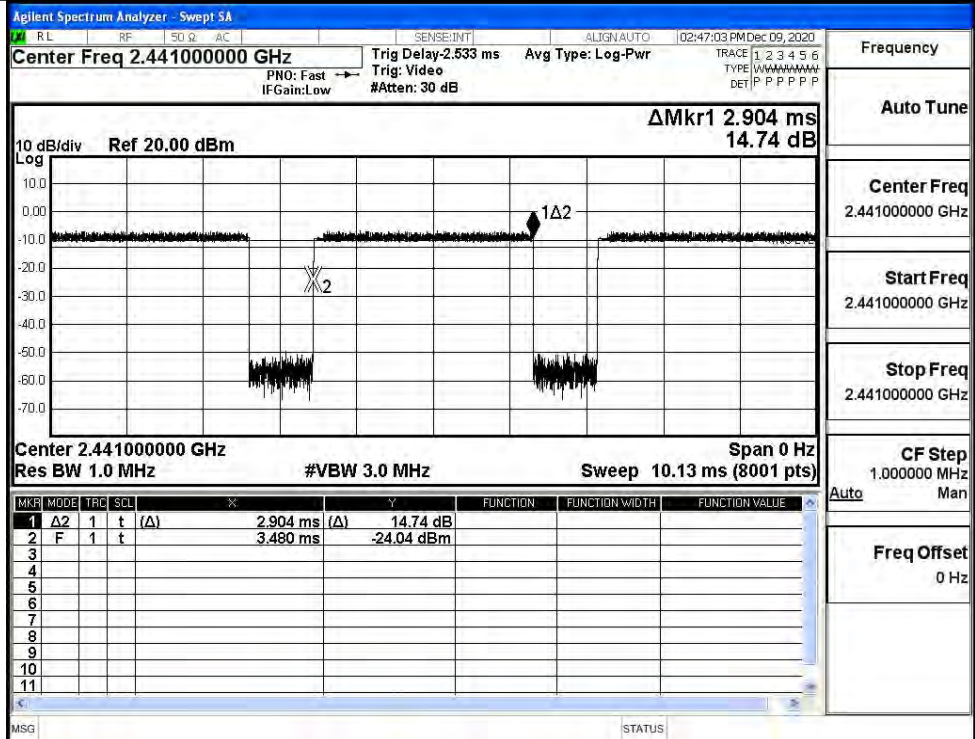
Frequency	2.480000000 GHz
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK_3DH5/LCH

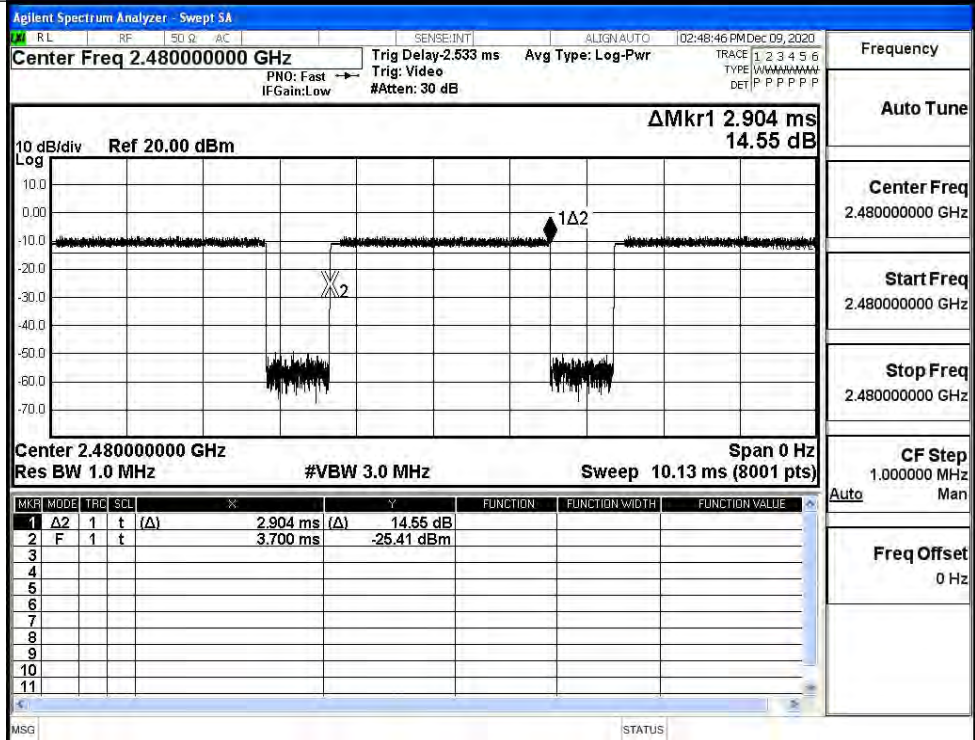


Frequency	2.402000000 GHz
Auto Tune	
Center Freq	2.402000000 GHz
Start Freq	2.402000000 GHz
Stop Freq	2.402000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

8DPSK_3DH5/MCH



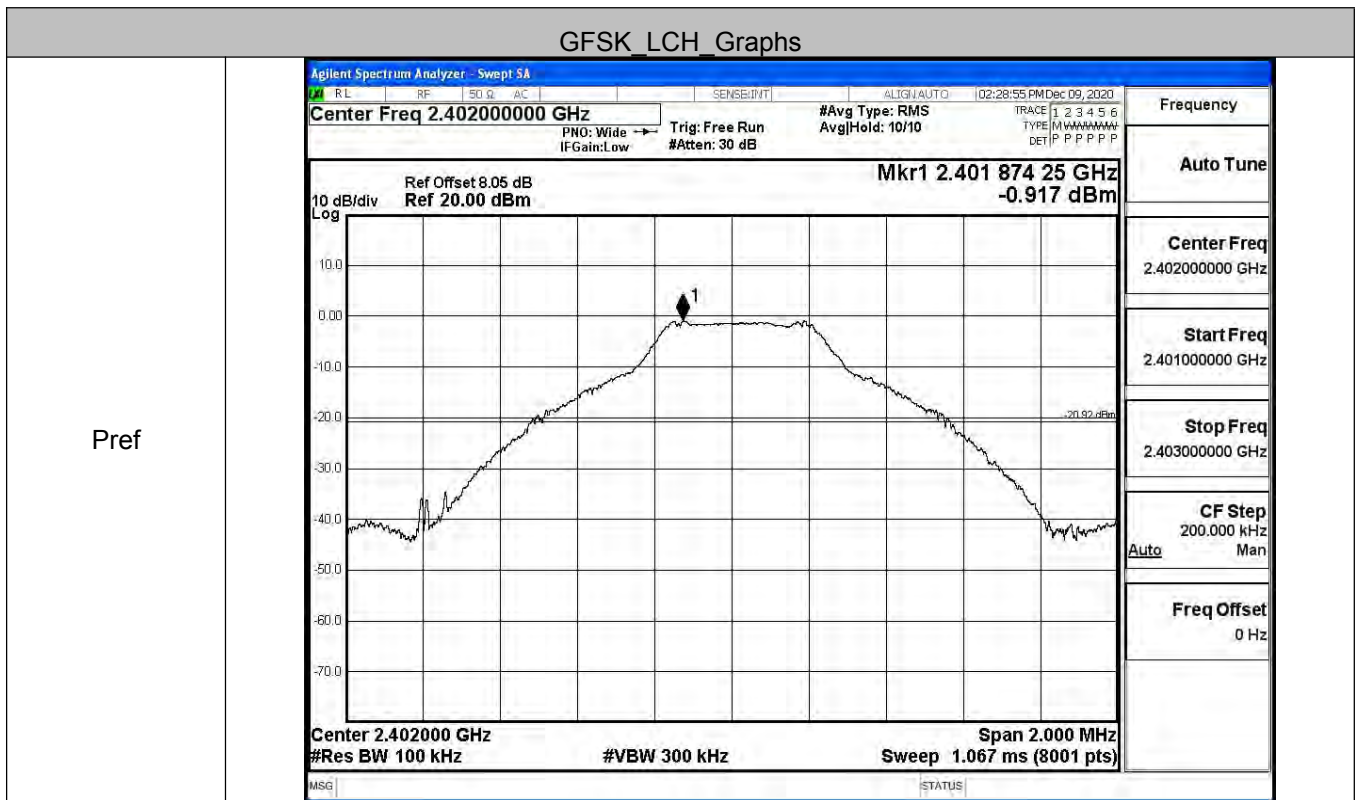
8DPSK_3DH5/HCH



A.6 RF Conducted Spurious Emissions

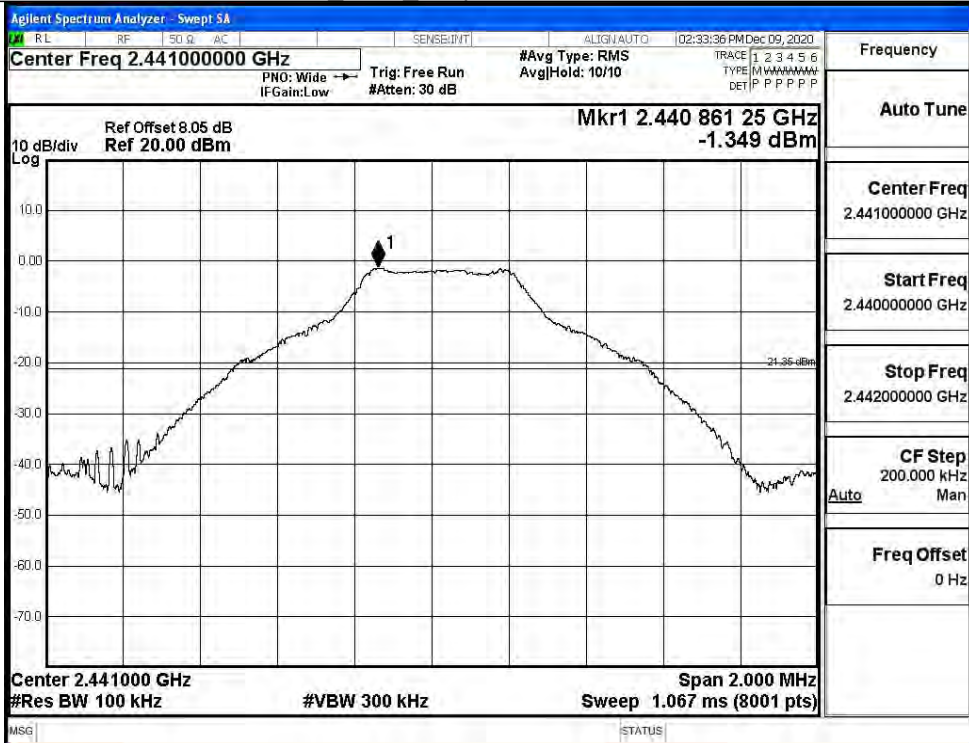
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.917	-37.698	-20.917	PASS
	MCH	-1.349	-37.401	-21.349	PASS
	HCH	-3.021	-37.162	-23.021	PASS
π /4DQPSK	LCH	-0.936	-37.726	-20.936	PASS
	MCH	-2.07	-37.896	-22.070	PASS
	HCH	-3.541	-36.951	-23.541	PASS
8DPSK	LCH	-0.762	-38.328	-20.762	PASS
	MCH	-1.242	-38.420	-21.242	PASS
	HCH	-3.052	-37.452	-23.052	PASS

GFSK LCH Graphs

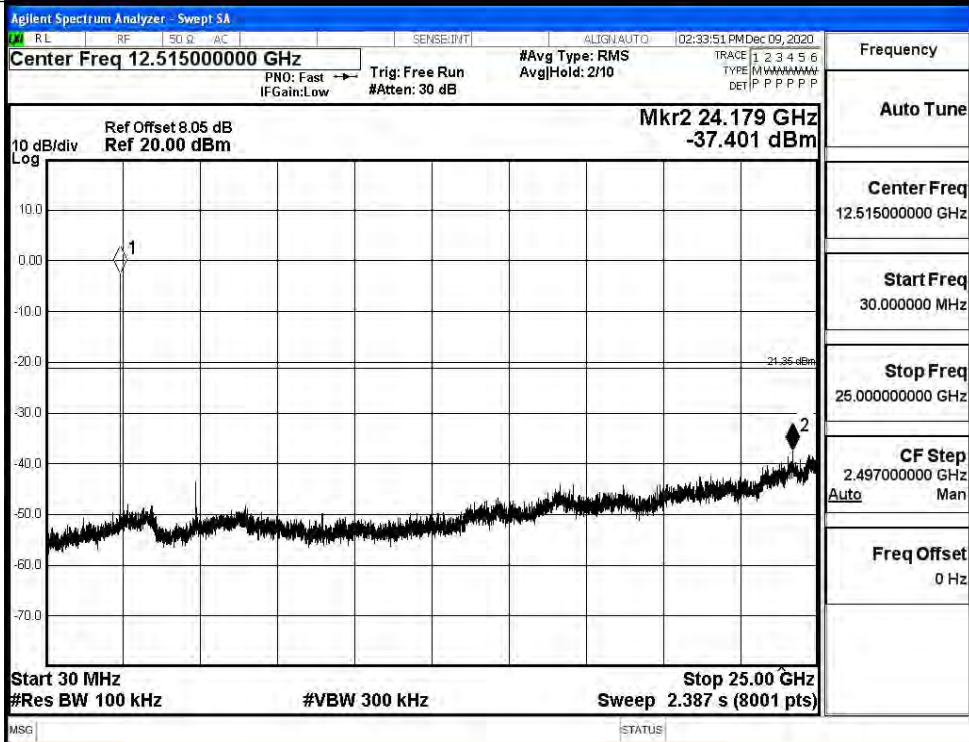


GFSK_MCH_Graphs

Pref

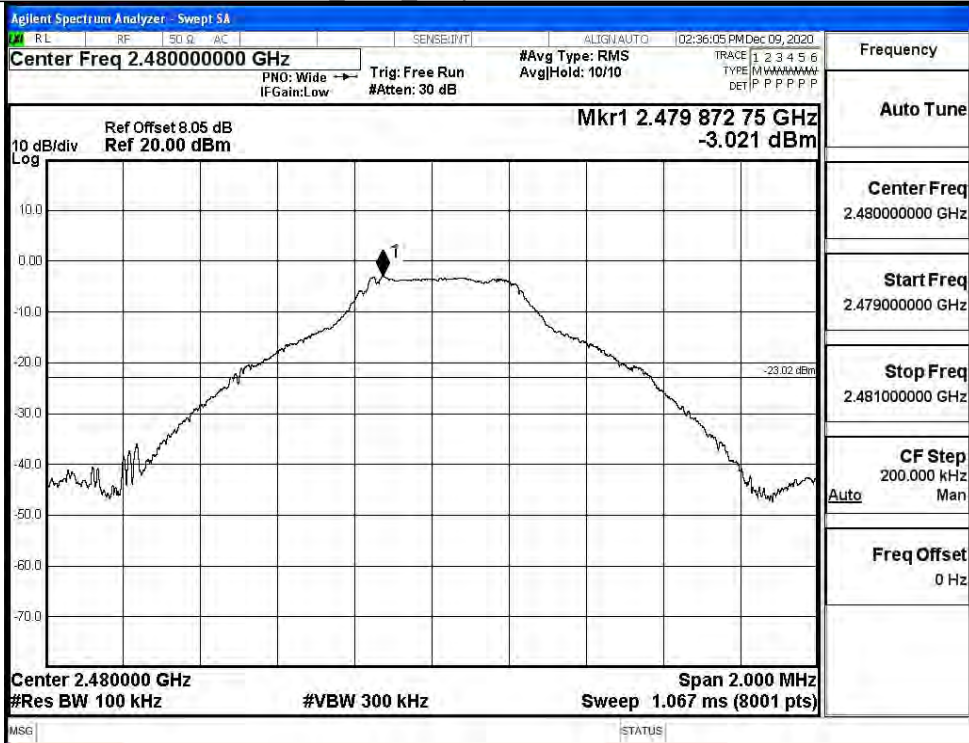


Puw

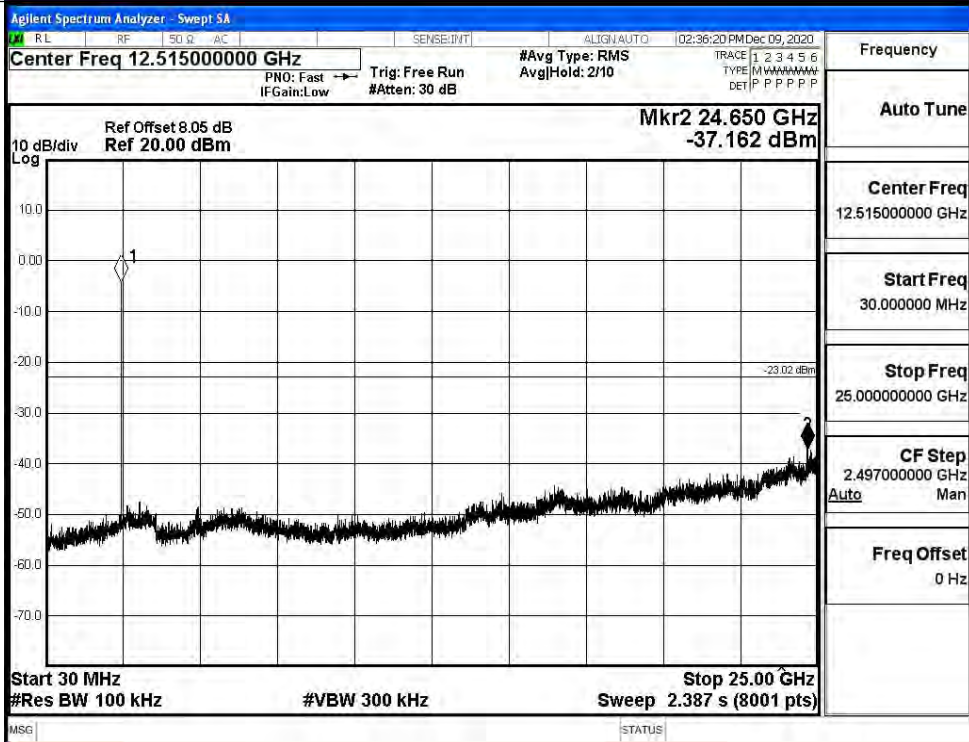


GFSK_HCH_Graphs

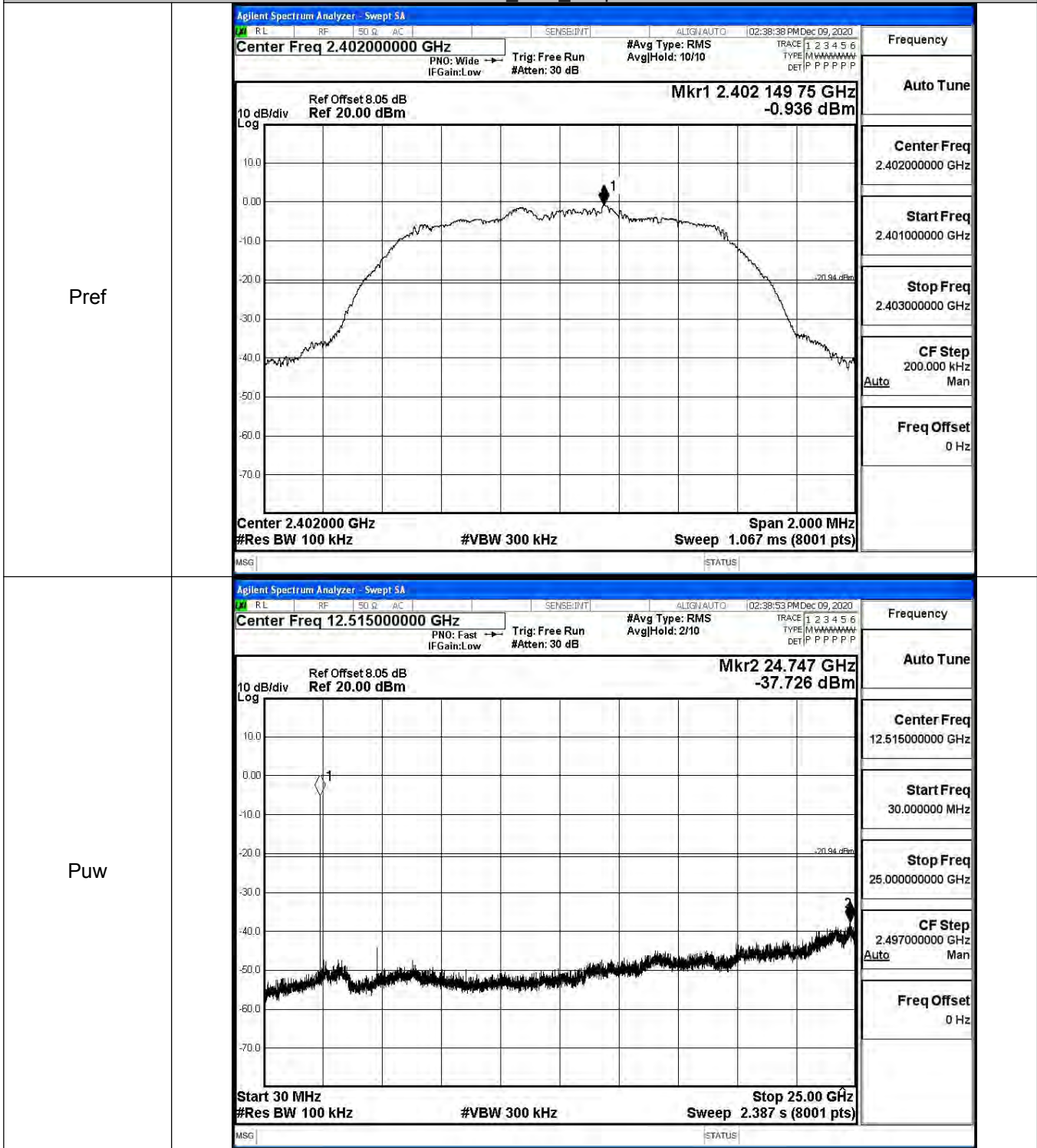
Pref



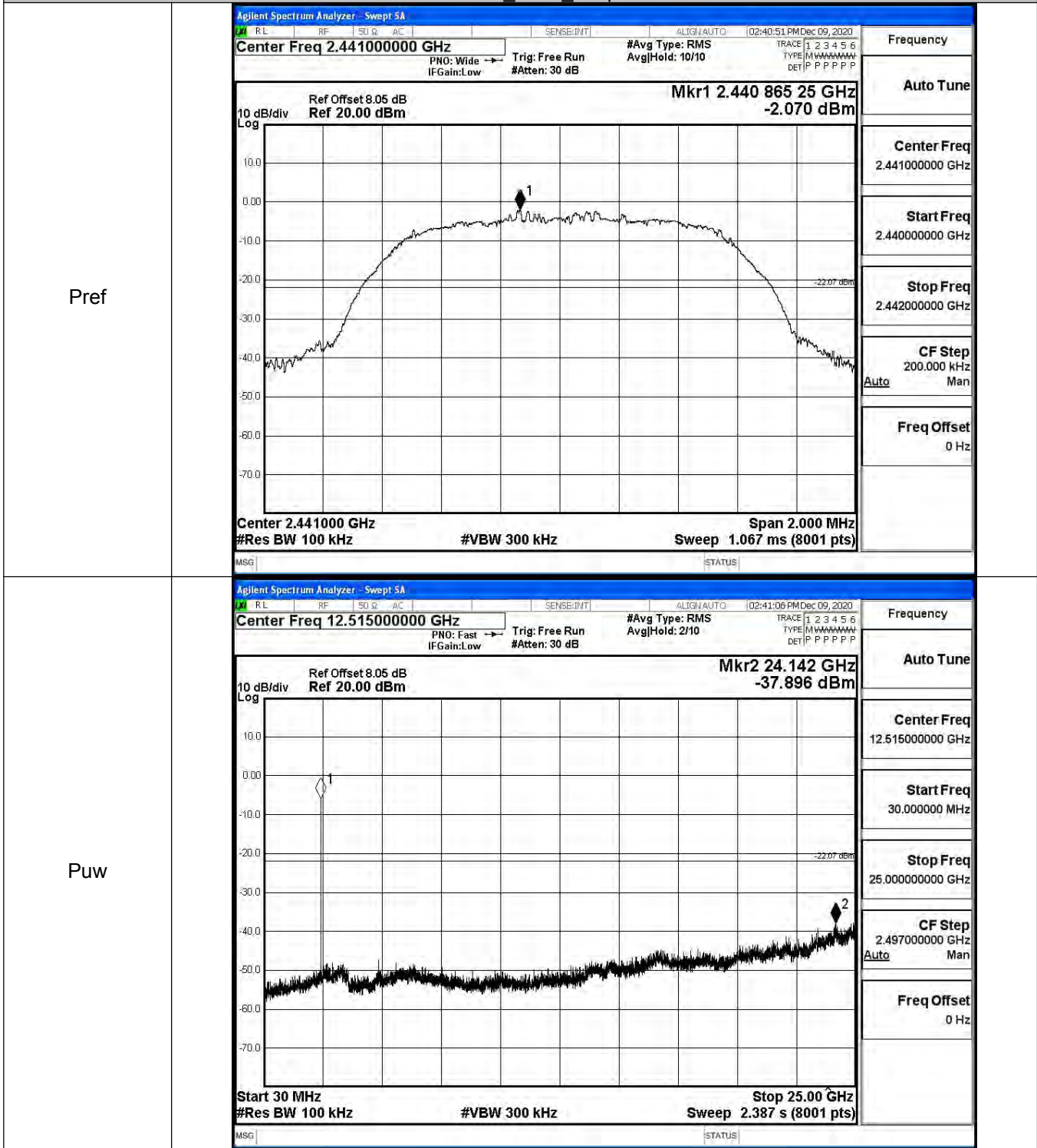
Puw



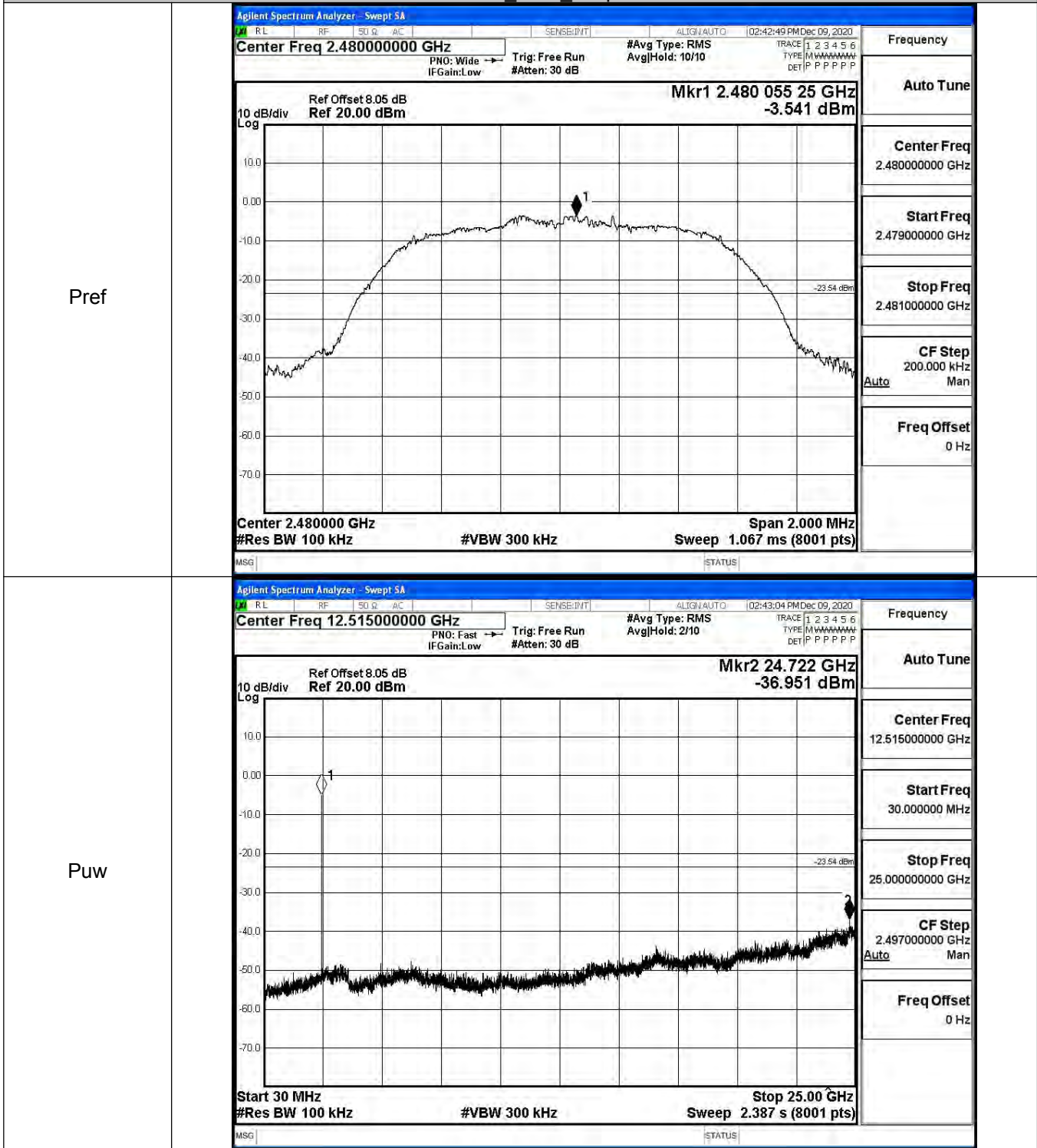
$\pi/4$ DQPSK_LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs

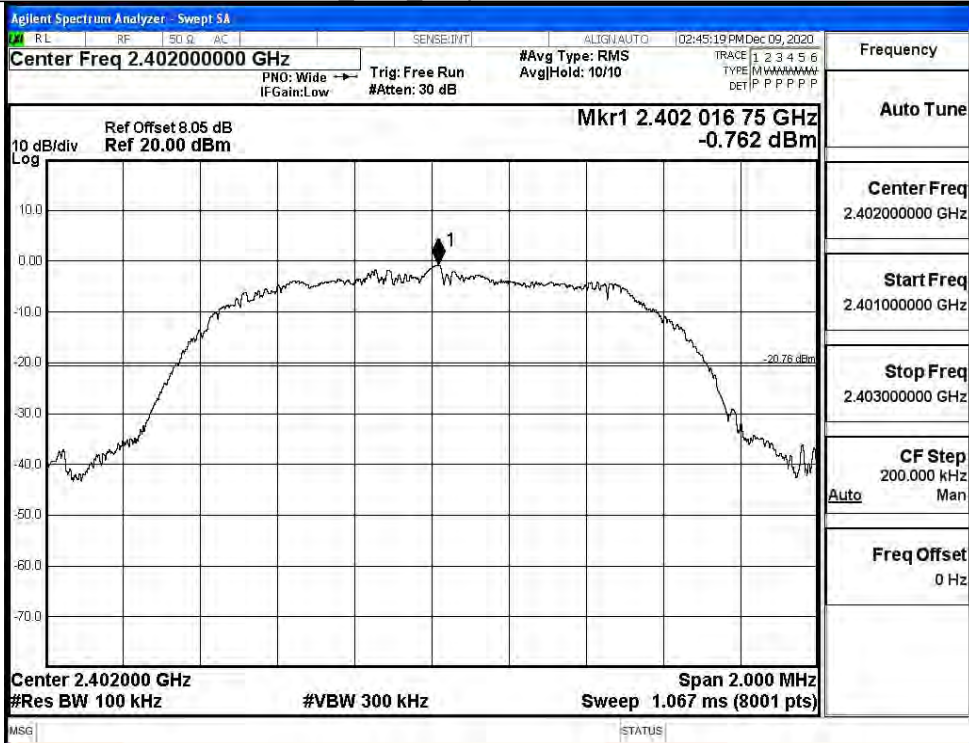


$\pi/4$ DQPSK_HCH_Graphs

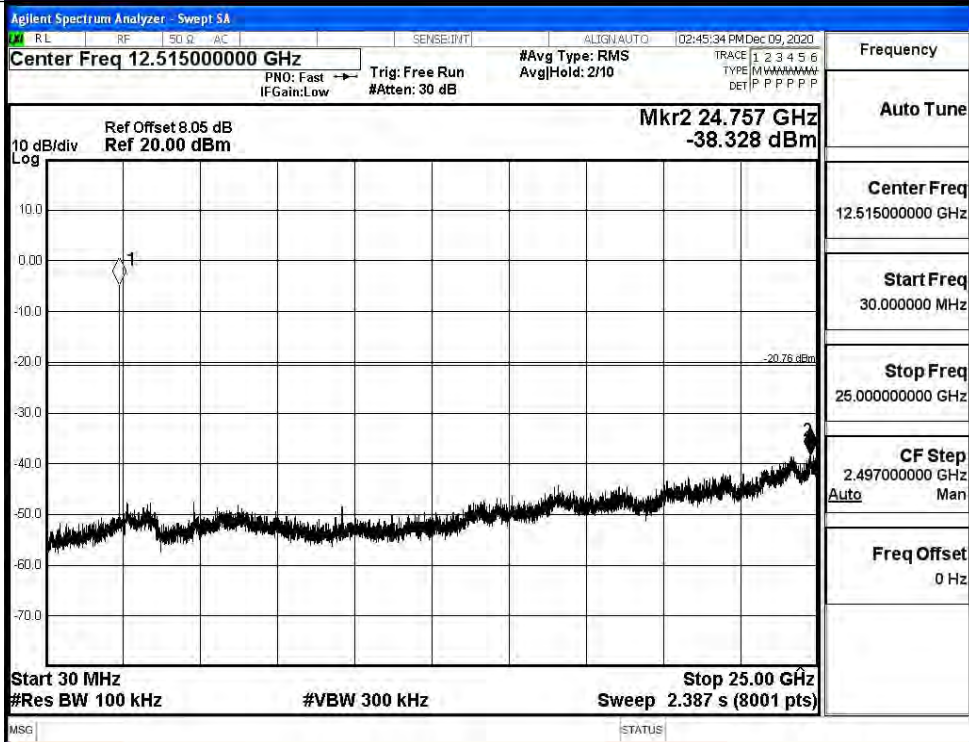


8DPSK_LCH_Graphs

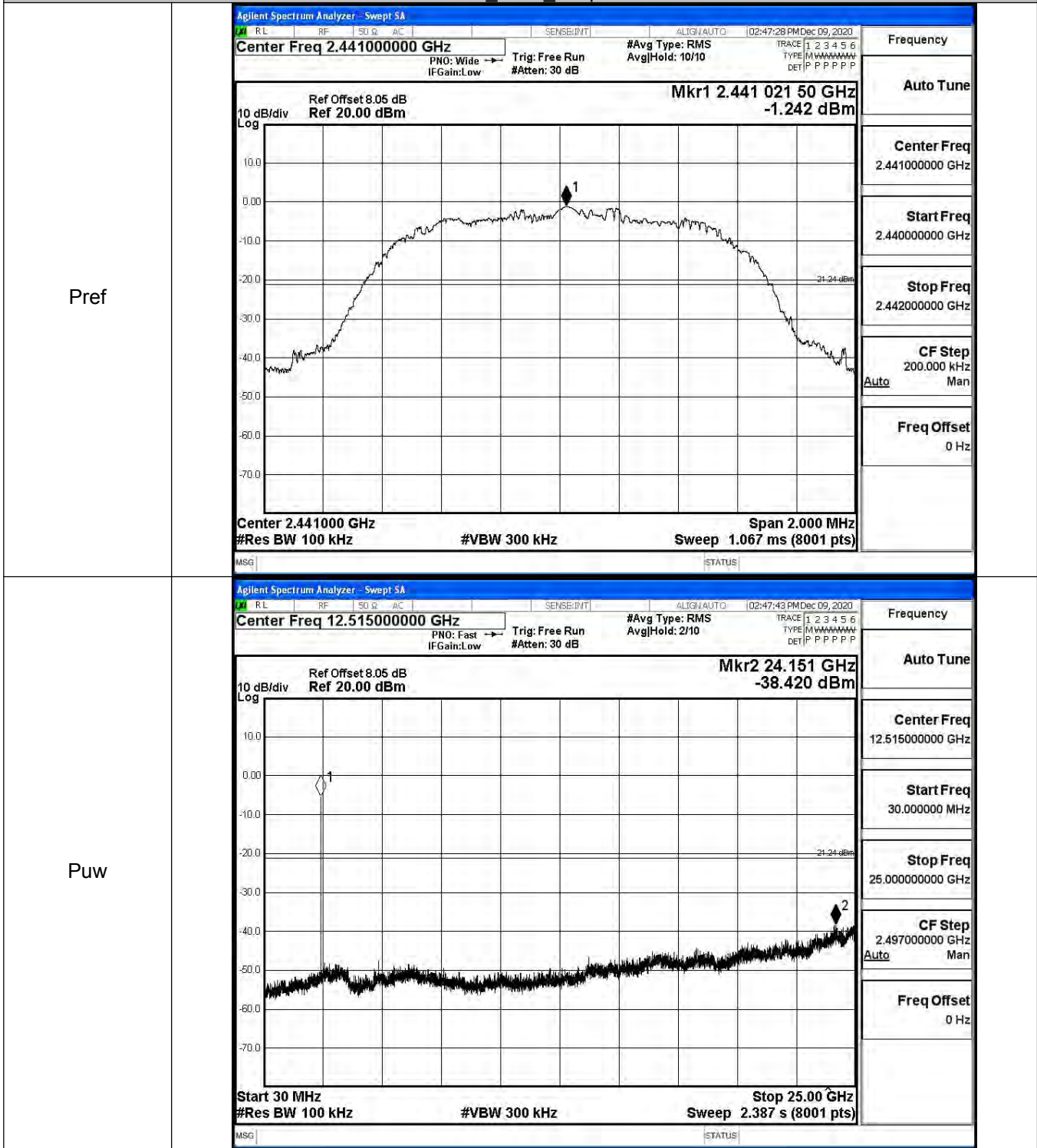
Pref



Puw

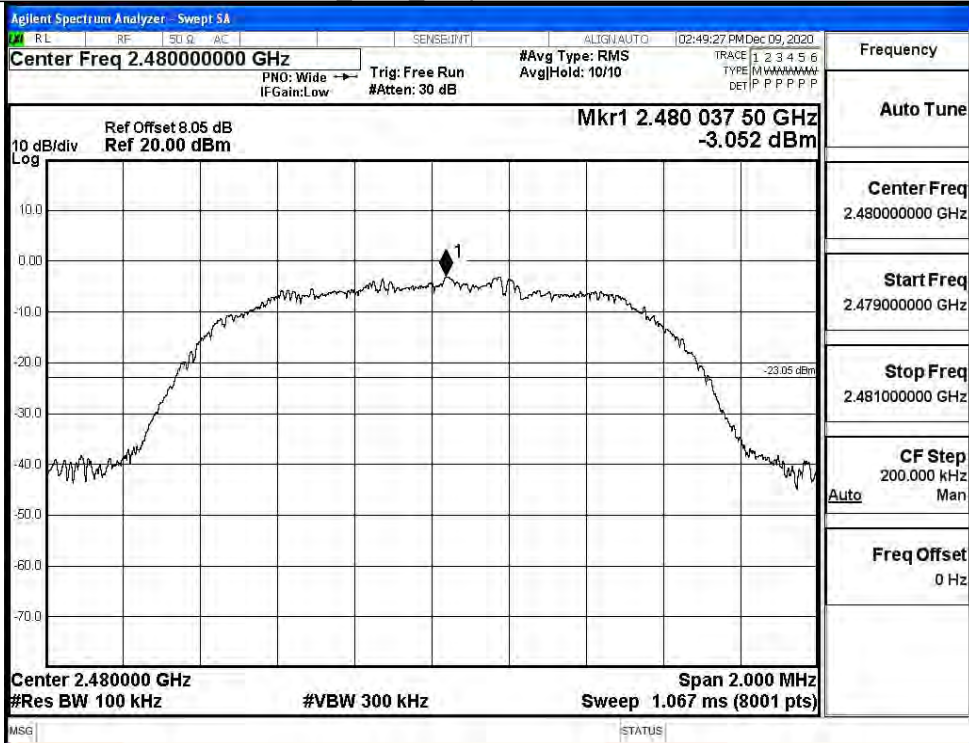


8DPSK_MCH_Graphs

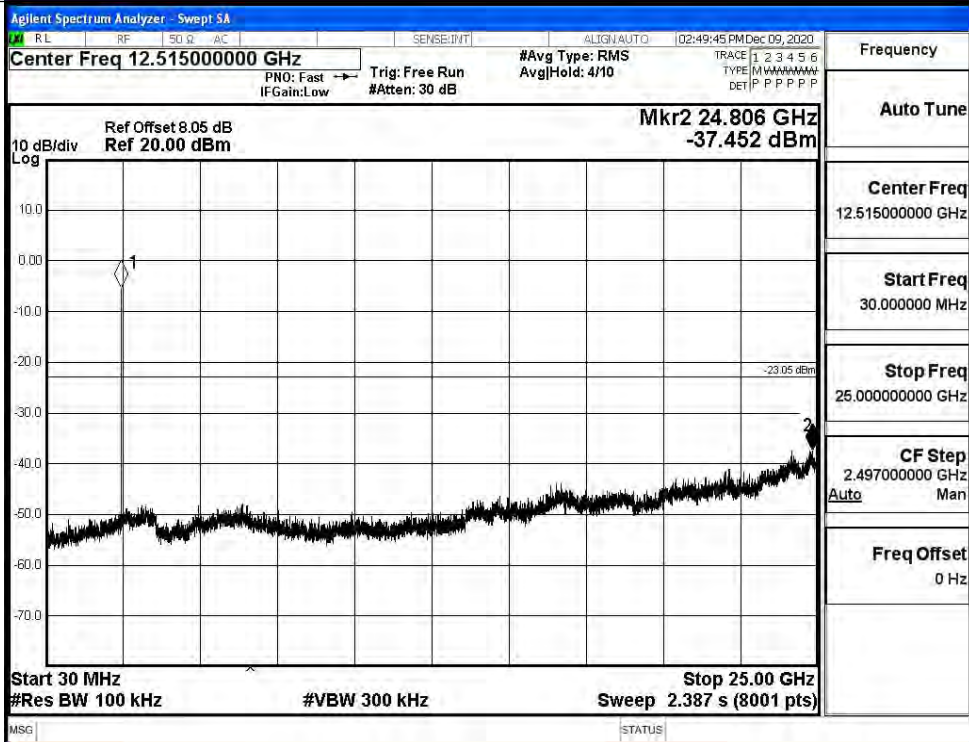


8DPSK_HCH_Graphs

Pref



Puw

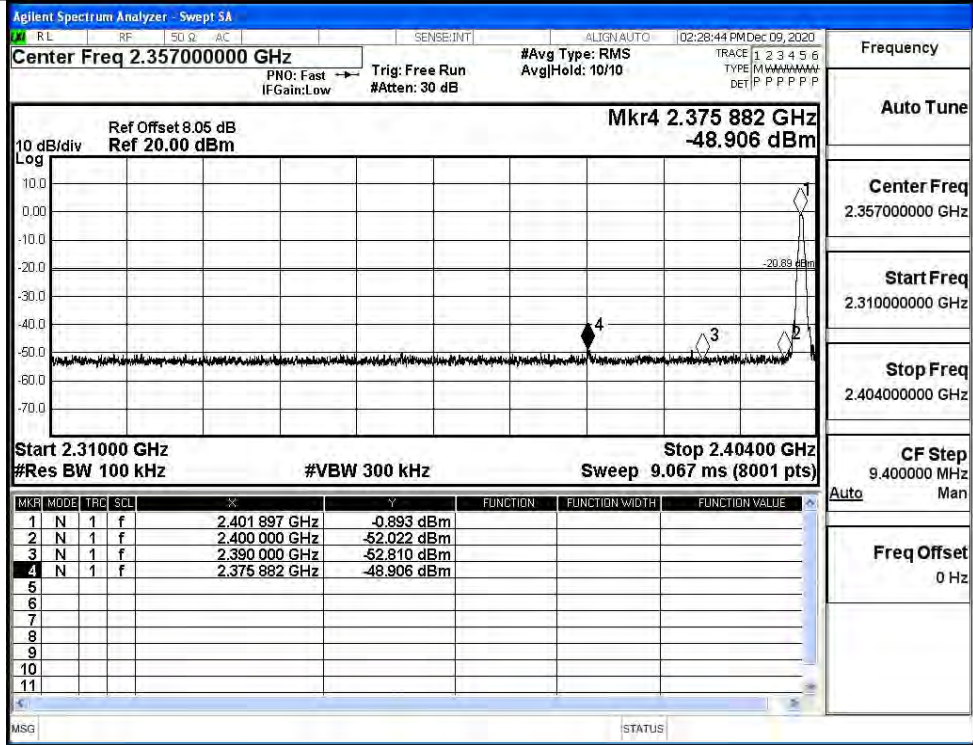


A.7 Band-edge for RF Conducted Emissions

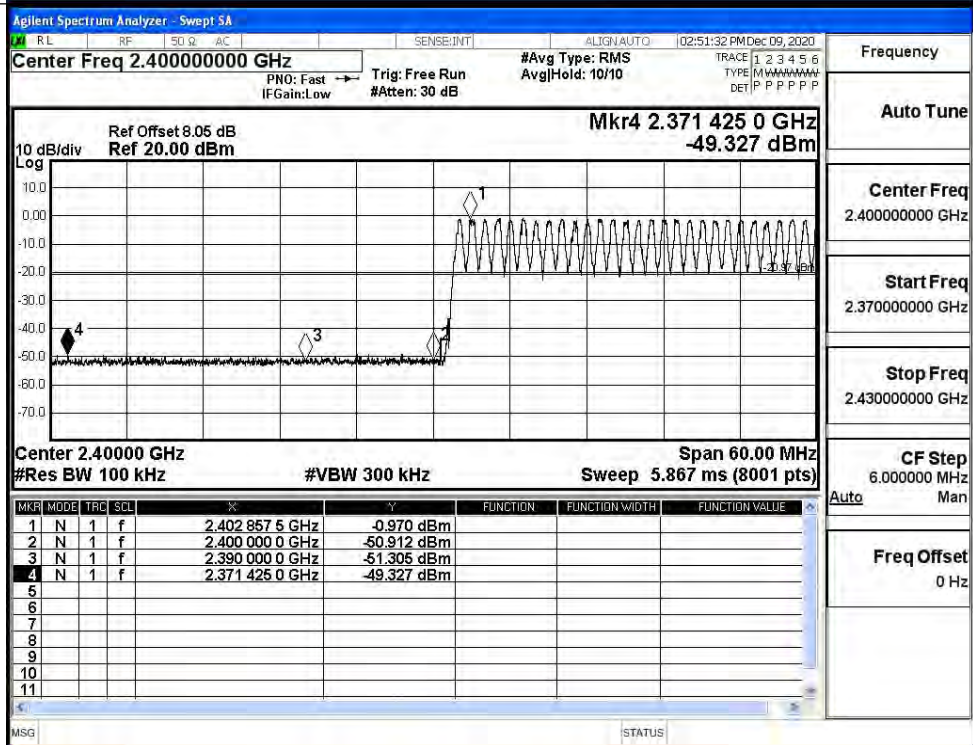
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.893	Off	-48.906	-20.89	PASS
			-0.970	On	-49.327	-20.97	PASS
	HCH	2480	-2.959	Off	-47.841	-22.96	PASS
			-2.141	On	-48.528	-22.14	PASS
$\pi/4$ DQPSK	LCH	2402	-0.907	Off	-49.772	-20.91	PASS
			-0.936	On	-48.459	-20.94	PASS
	HCH	2480	-3.062	Off	-49.398	-23.06	PASS
			-2.158	On	-48.358	-22.16	PASS
8DPSK	LCH	2402	-1.288	Off	-49.809	-21.29	PASS
			-0.691	On	-48.941	-20.69	PASS
	HCH	2480	-2.966	Off	-48.542	-22.97	PASS
			-1.801	On	-48.609	-21.80	PASS

Test Graphs

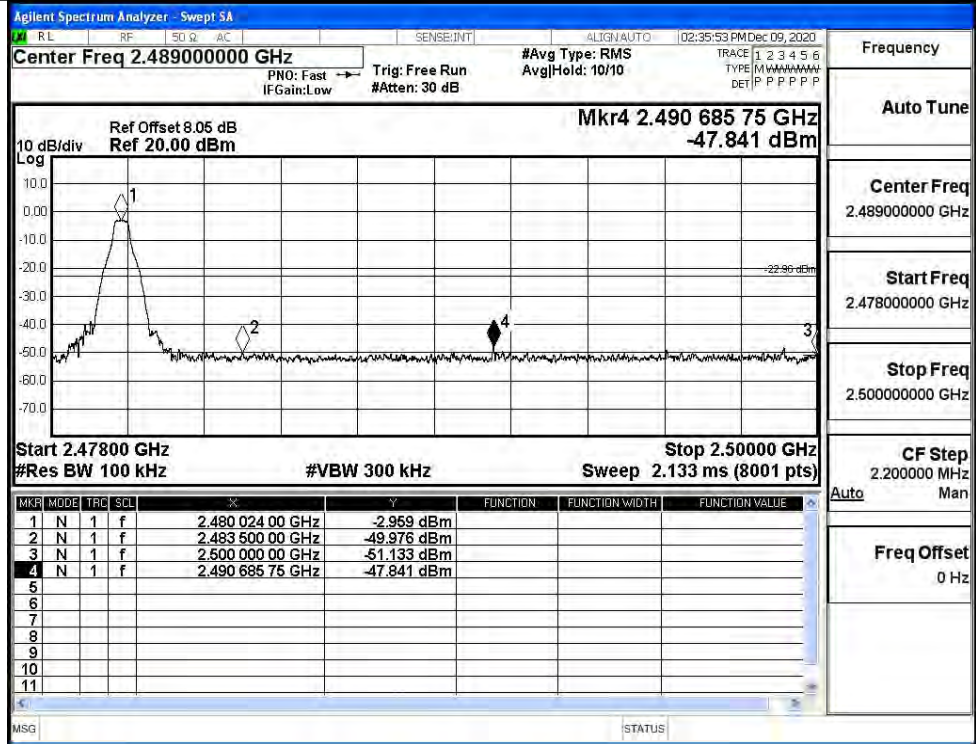
GFSK/LCH/No Hop



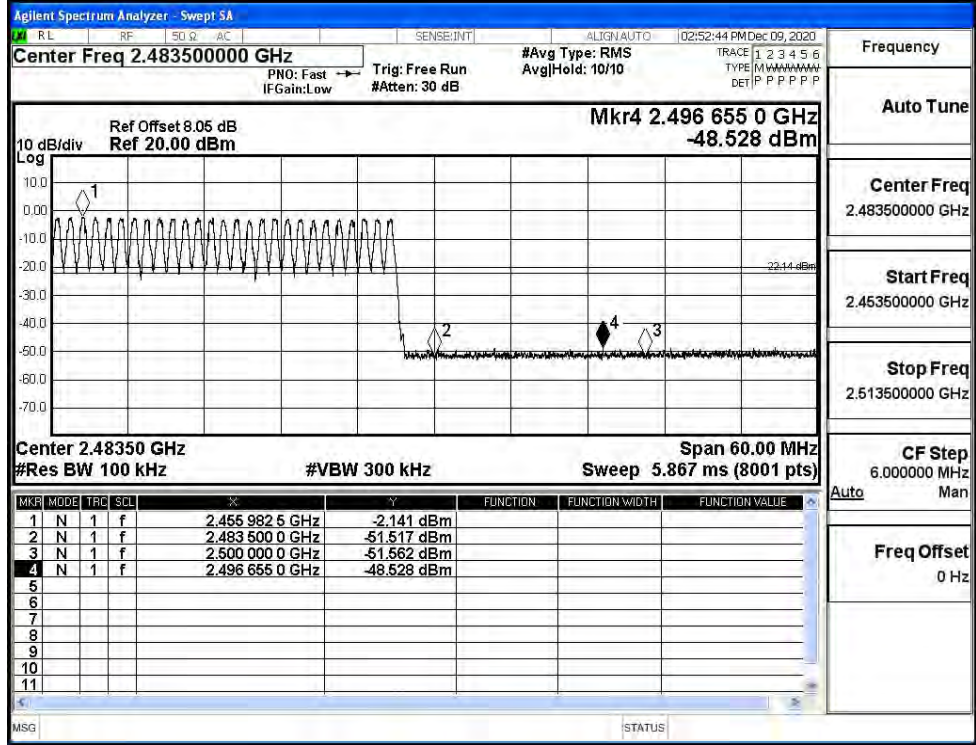
GFSK/LCH/Hop



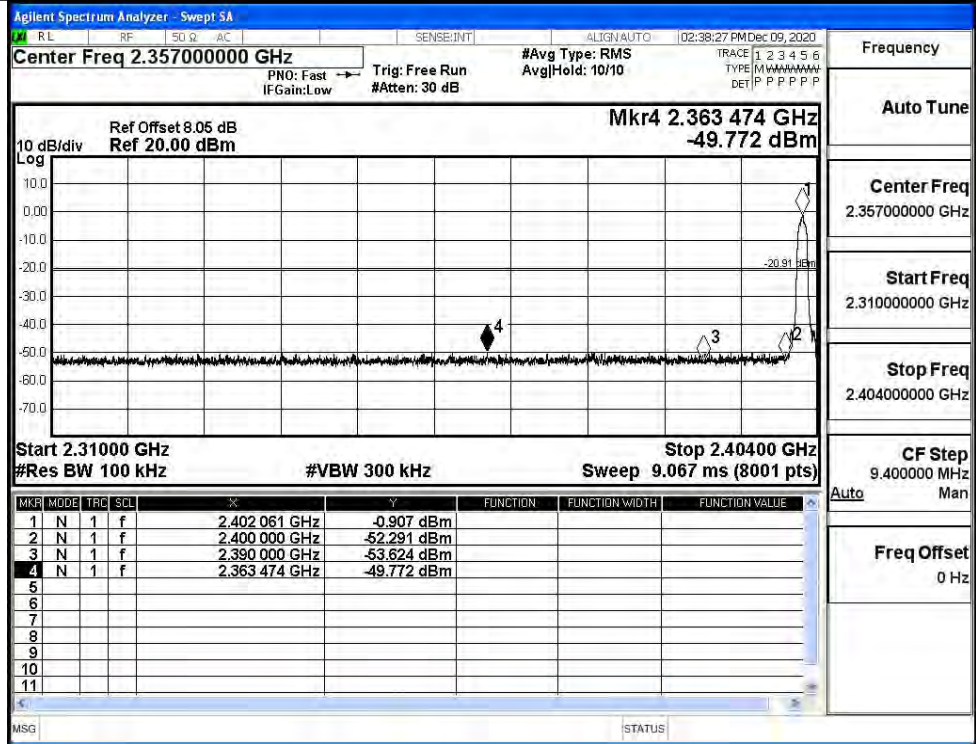
GFSK/HCH/No Hop



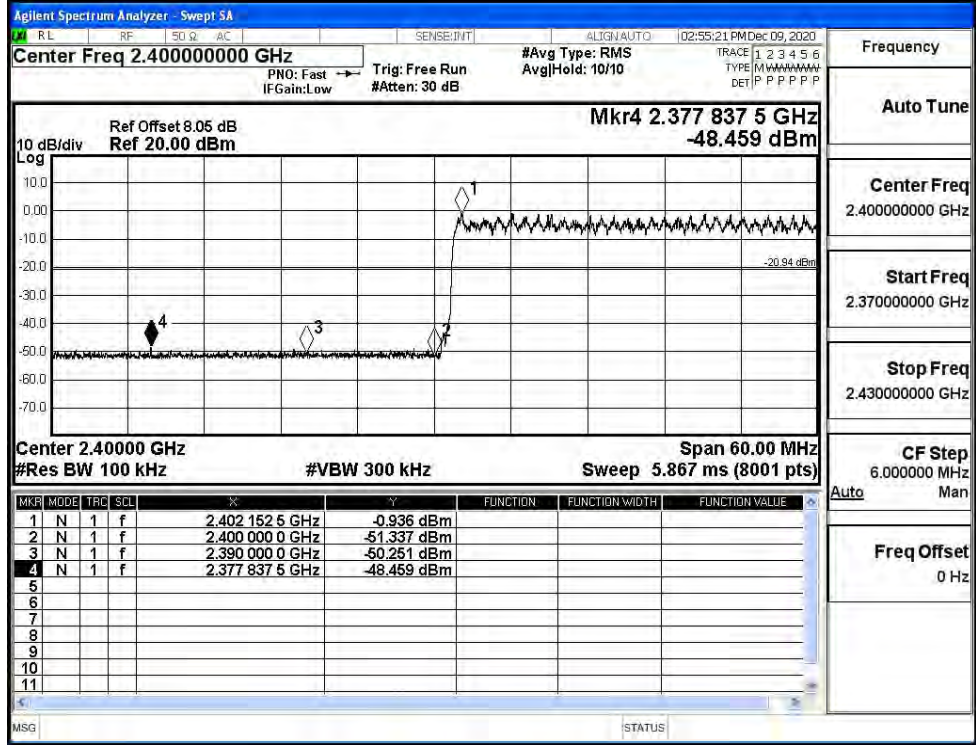
GFSK/HCH/Hop



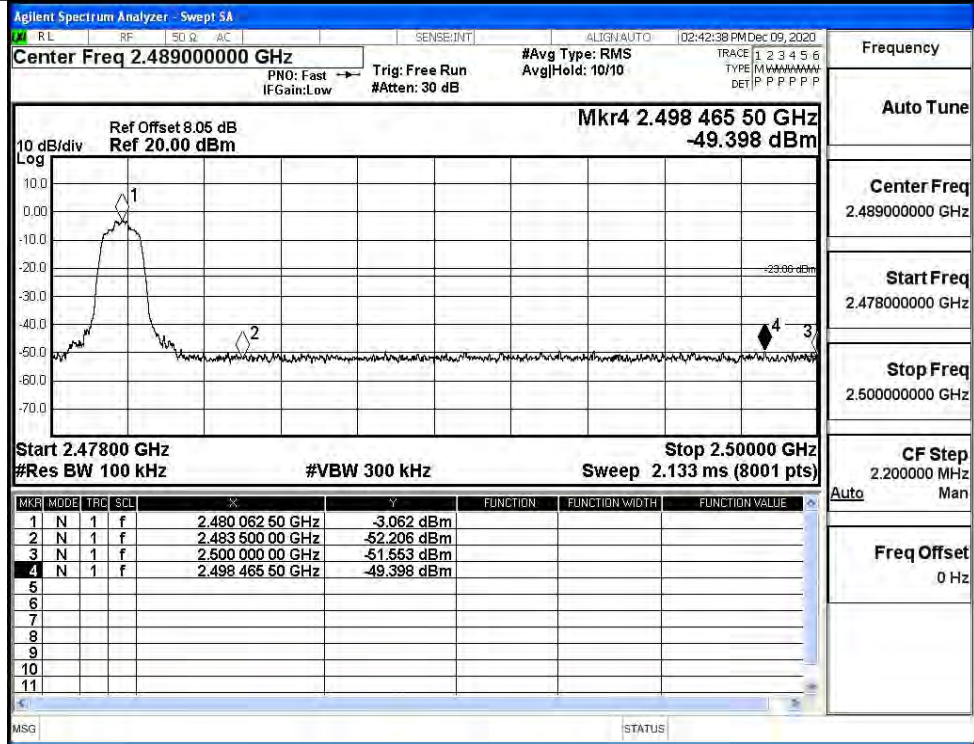
$\pi/4$ DQPSK/LCH/No Hop



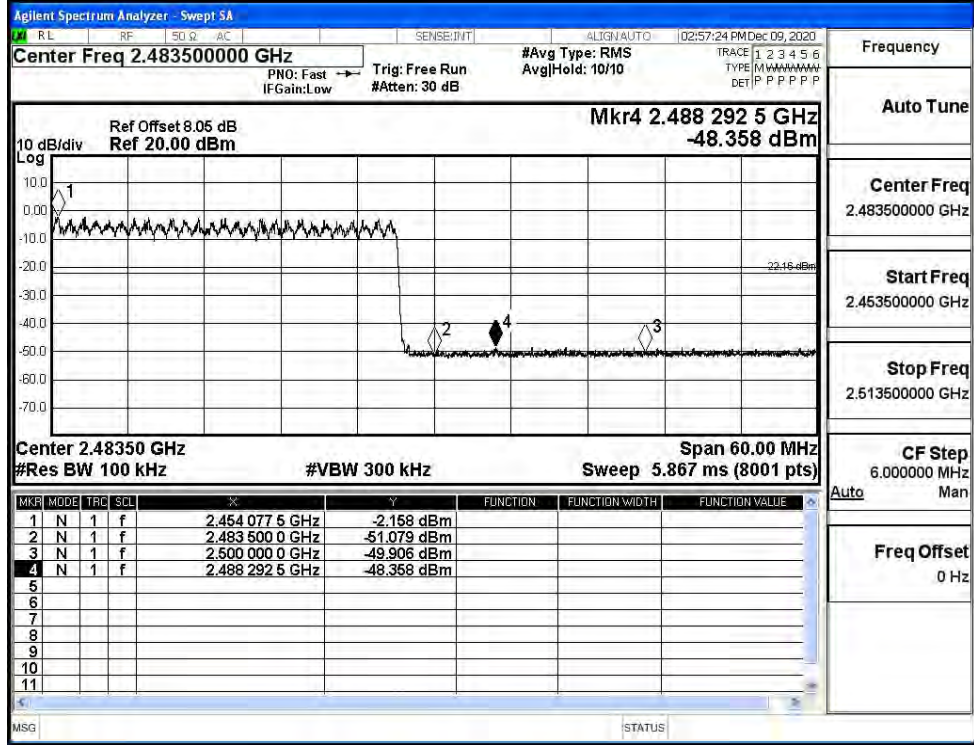
$\pi/4$ DQPSK/LCH/Hop



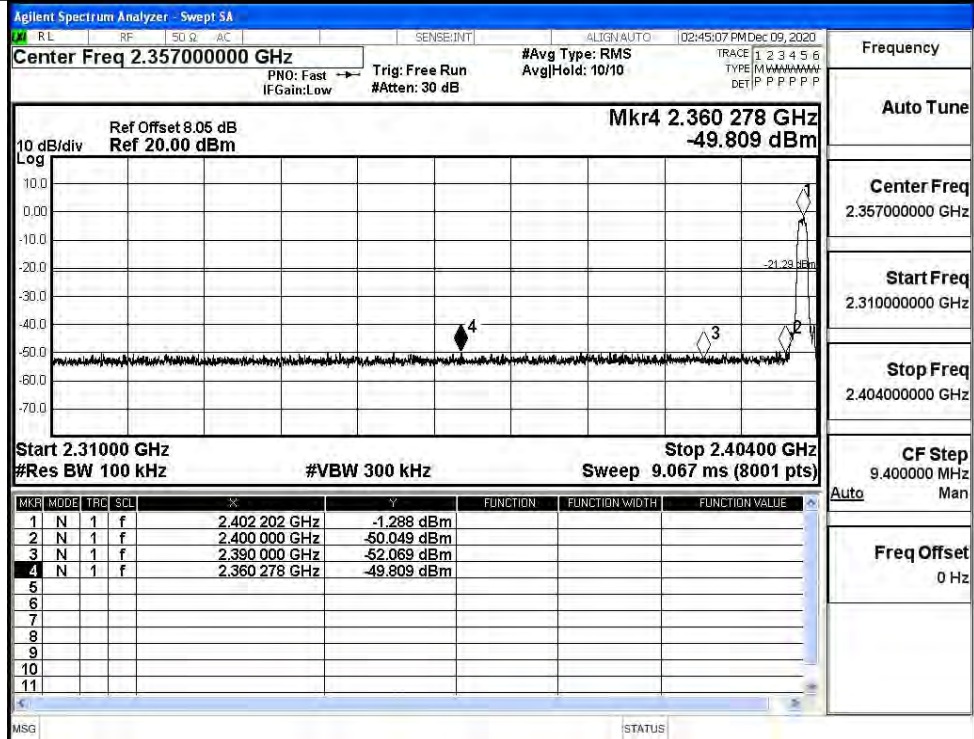
π /4DQPSK/HCH/No
Hop



π /4DQPSK/HCH/Hop

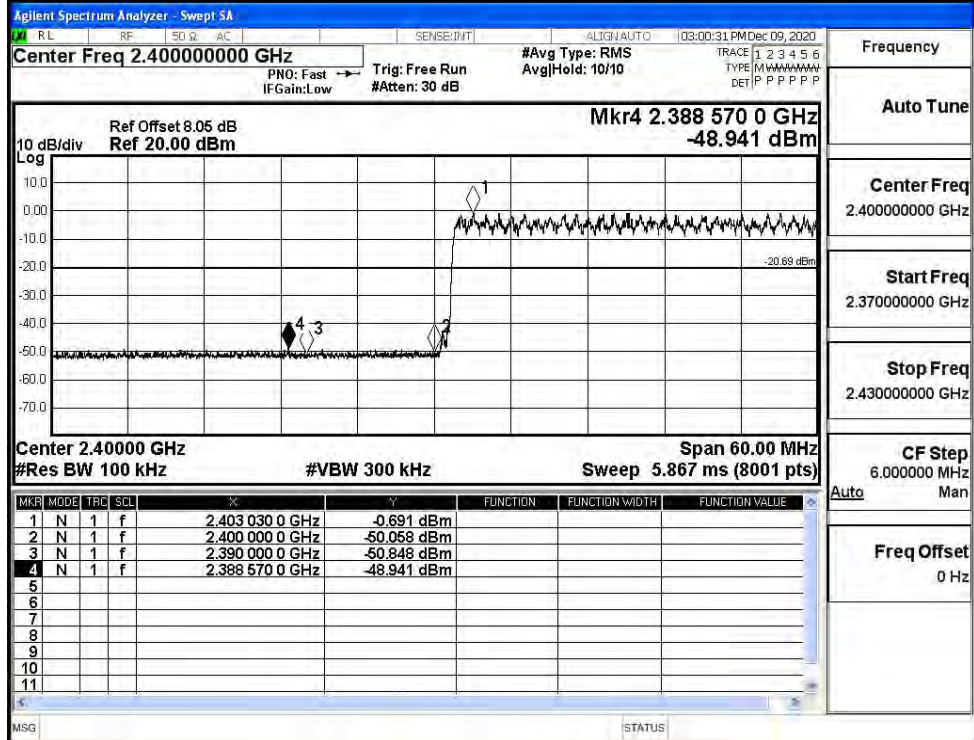


8DPSK/LCH/No Hop



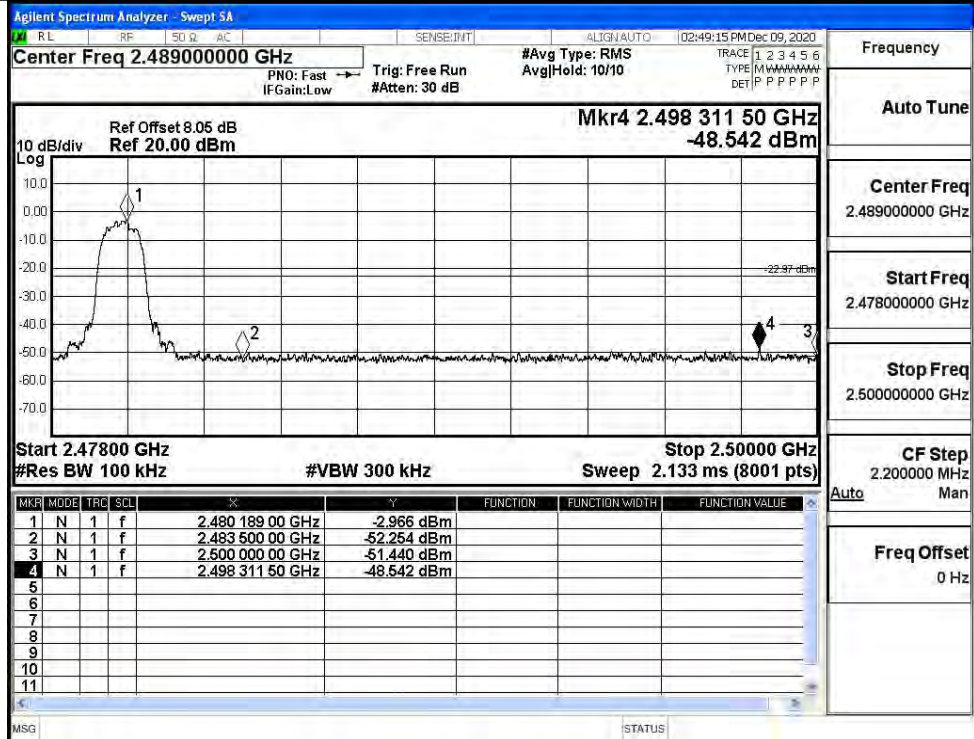
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

8DPSK/LCH/Hop



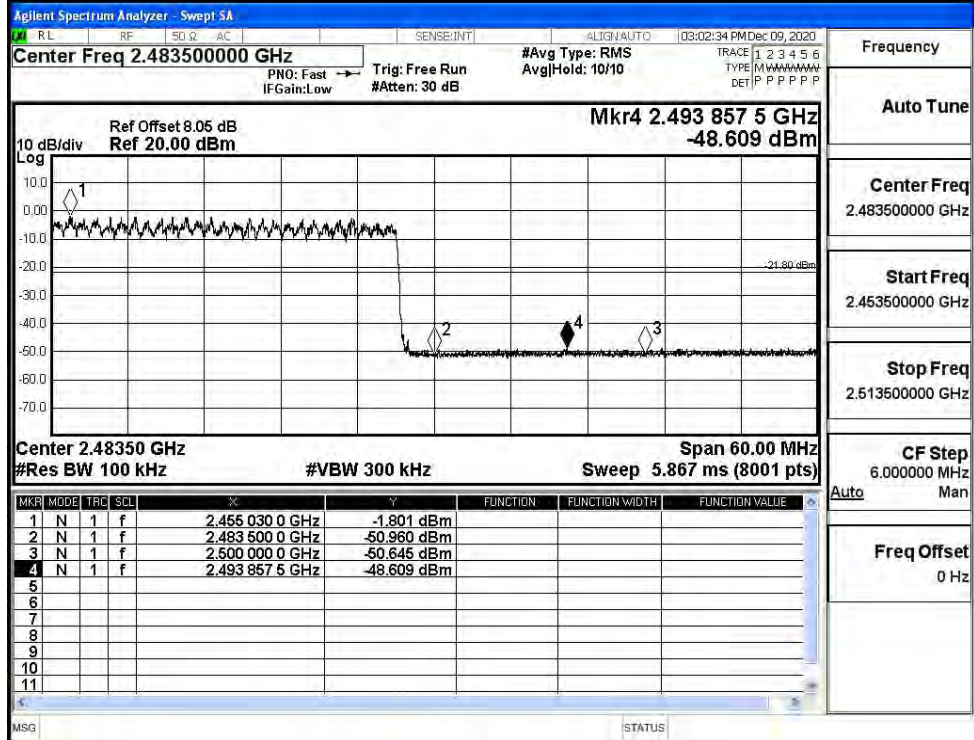
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

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
Auto	Man
Freq Offset	0 Hz

8DPSK/HCH/Hop

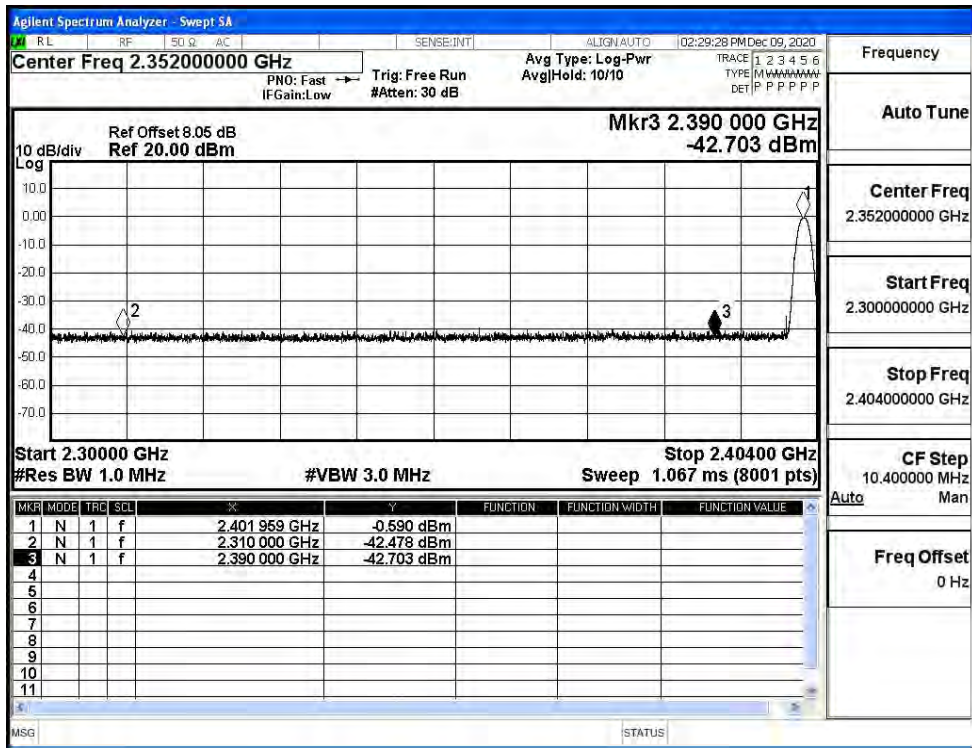


Frequency	2.483500000 GHz
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

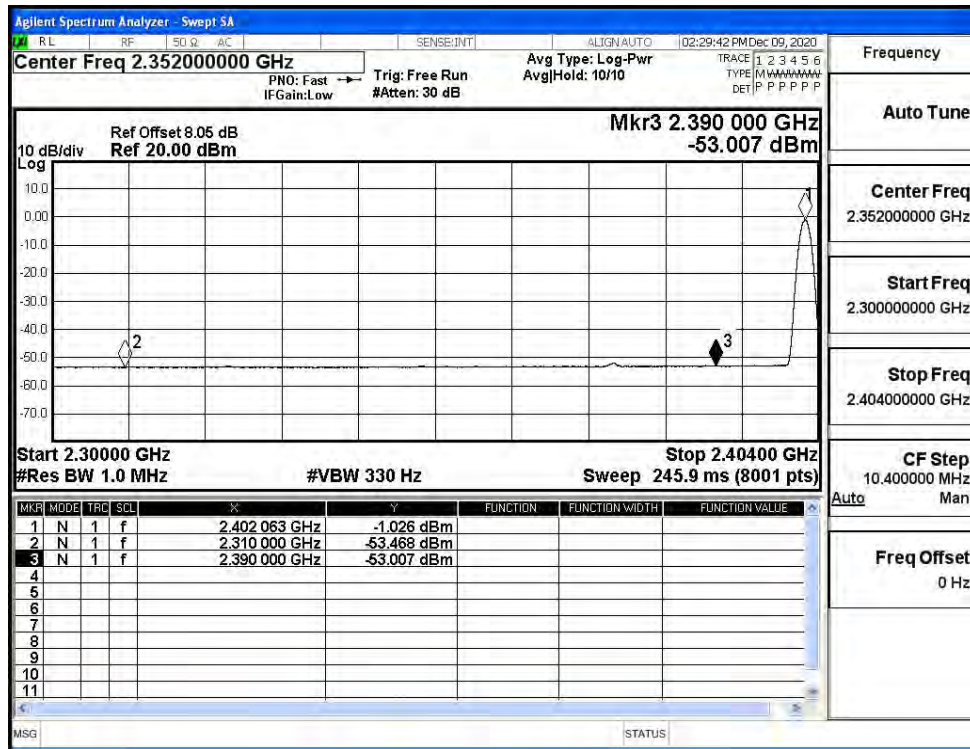
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-42.48	3.19	0	55.94	PEAK	74	PASS
	Off	2310.0	-53.47	3.19	0	44.95	AV	54	PASS
	Off	2390.0	-42.70	3.19	0	55.72	PEAK	74	PASS
	Off	2390.0	-53.01	3.19	0	45.41	AV	54	PASS
	Off	2483.5	-42.04	3.19	0	56.38	PEAK	74	PASS
	Off	2483.5	-52.60	3.19	0	45.82	AV	54	PASS
	Off	2500.0	-42.12	3.19	0	56.30	PEAK	74	PASS
	Off	2500.0	-52.41	3.19	0	46.01	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.35	3.19	0	54.07	PEAK	74	PASS
	Off	2310.0	-53.36	3.19	0	45.06	AV	54	PASS
	Off	2390.0	-42.62	3.19	0	55.80	PEAK	74	PASS
	Off	2390.0	-52.87	3.19	0	45.55	AV	54	PASS
	Off	2483.5	-41.90	3.19	0	56.52	PEAK	74	PASS
	Off	2483.5	-52.50	3.19	0	45.92	AV	54	PASS
	Off	2500.0	-42.99	3.19	0	55.43	PEAK	74	PASS
	Off	2500.0	-52.36	3.19	0	46.06	AV	54	PASS
8DPSK	Off	2310.0	-43.98	3.19	0	54.44	PEAK	74	PASS
	Off	2310.0	-53.42	3.19	0	45.00	AV	54	PASS
	Off	2390.0	-42.94	3.19	0	55.48	PEAK	74	PASS
	Off	2390.0	-53.01	3.19	0	45.41	AV	54	PASS
	Off	2483.5	-41.36	3.19	0	57.06	PEAK	74	PASS
	Off	2483.5	-52.44	3.19	0	45.98	AV	54	PASS
	Off	2500.0	-42.32	3.19	0	56.10	PEAK	74	PASS
	Off	2500.0	-52.42	3.19	0	46.00	AV	54	PASS

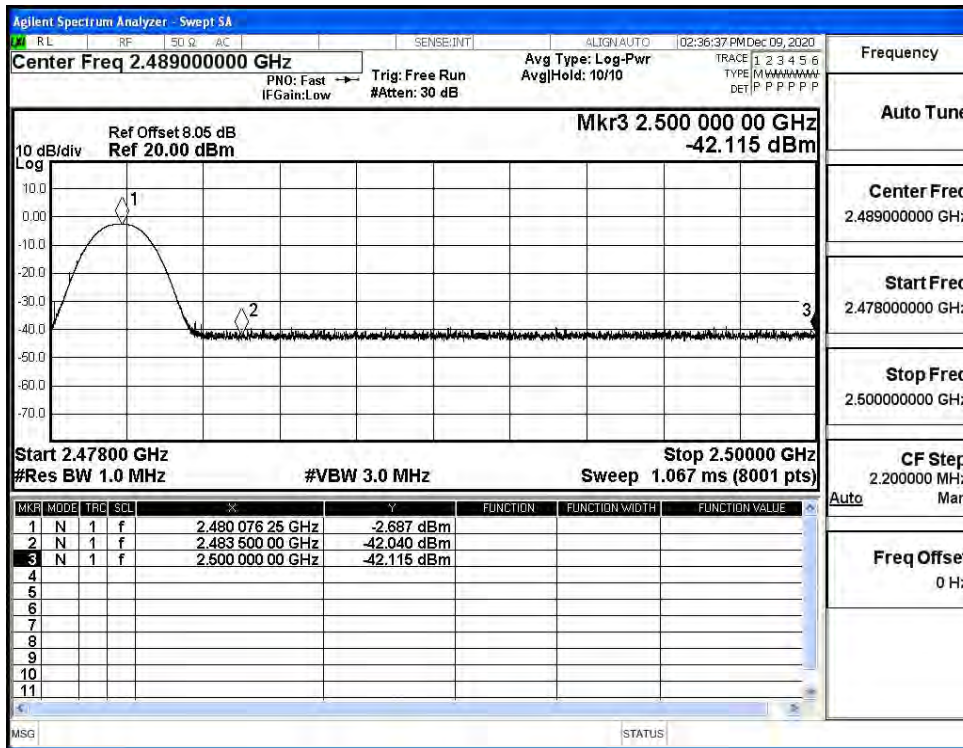
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



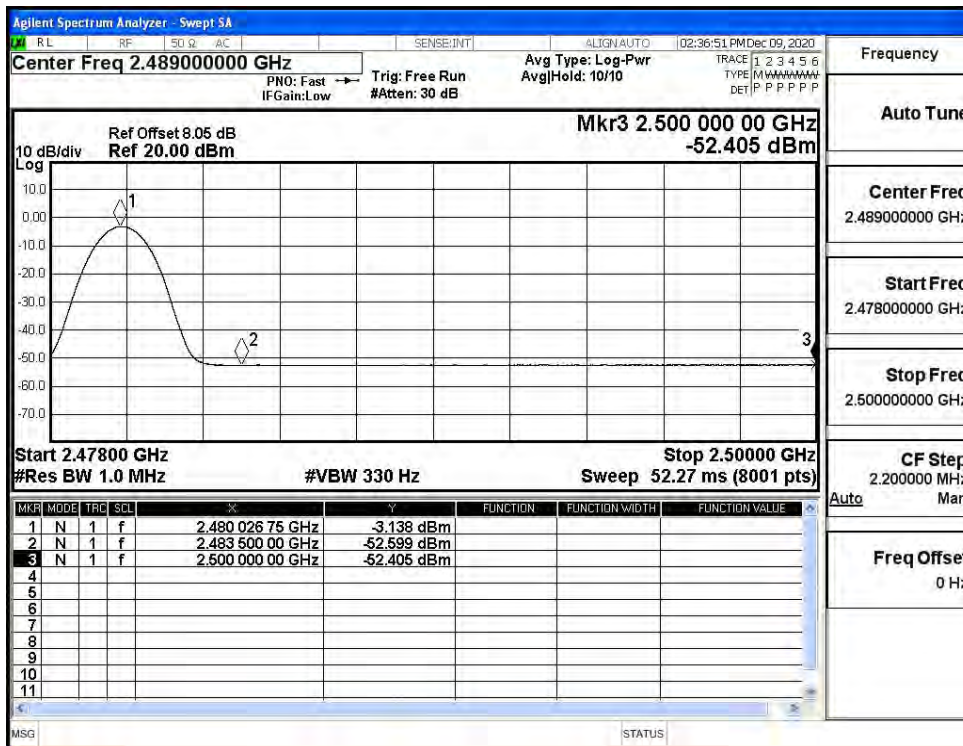
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



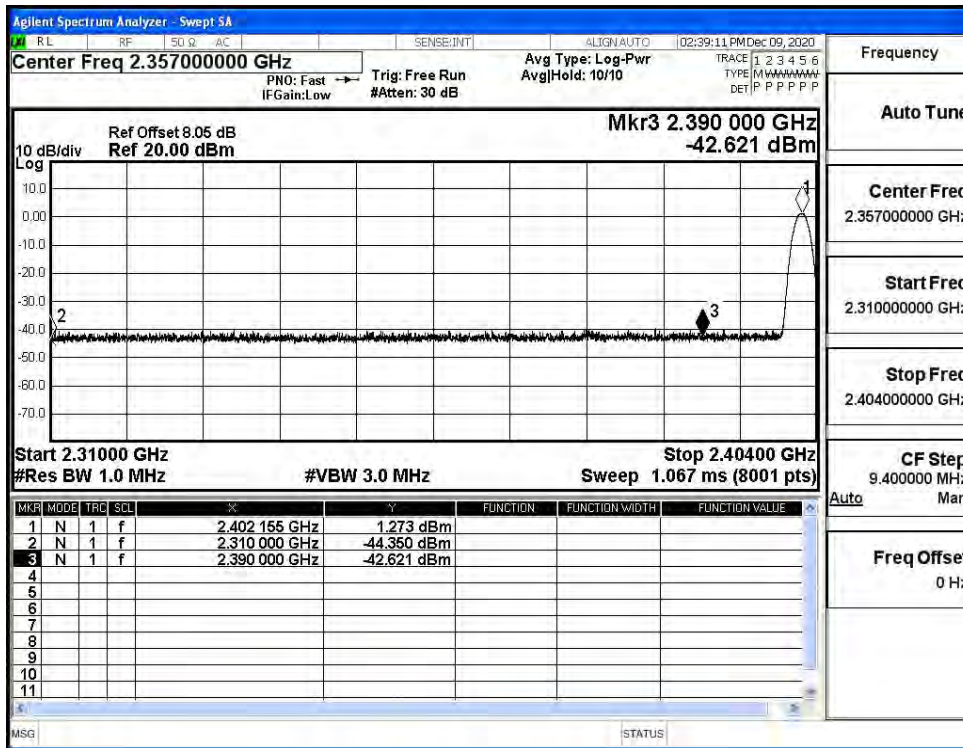
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



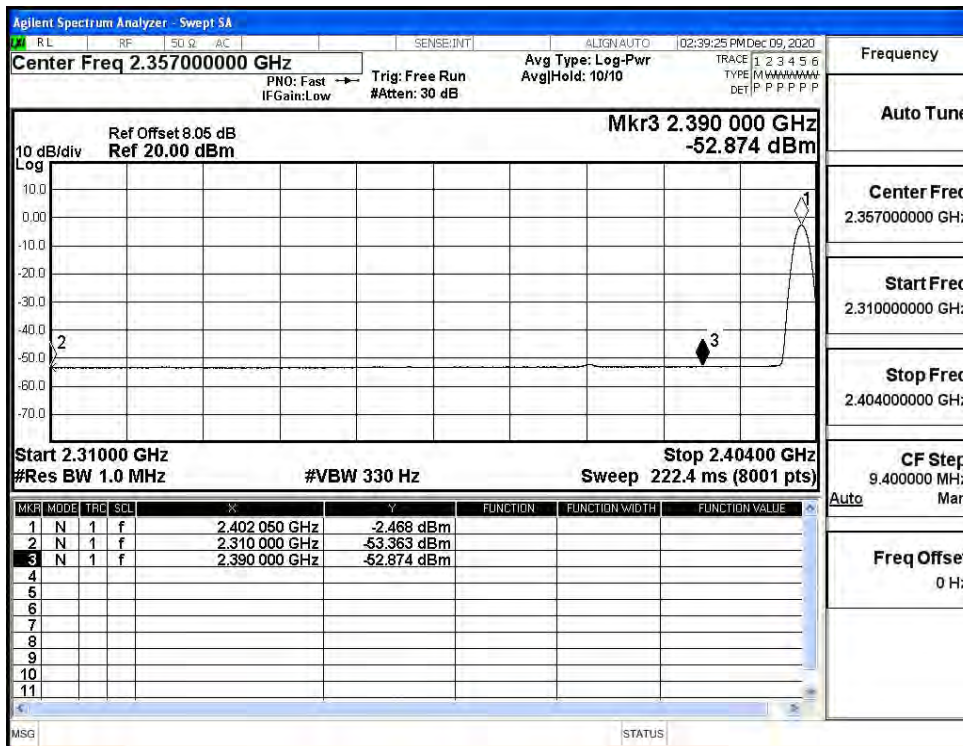
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



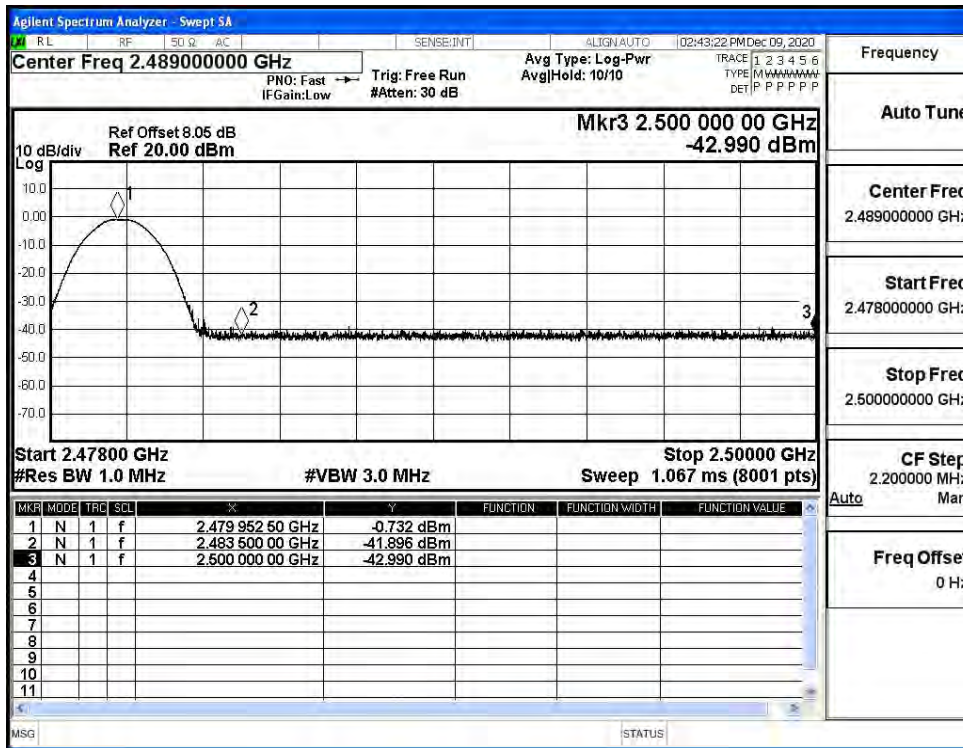
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



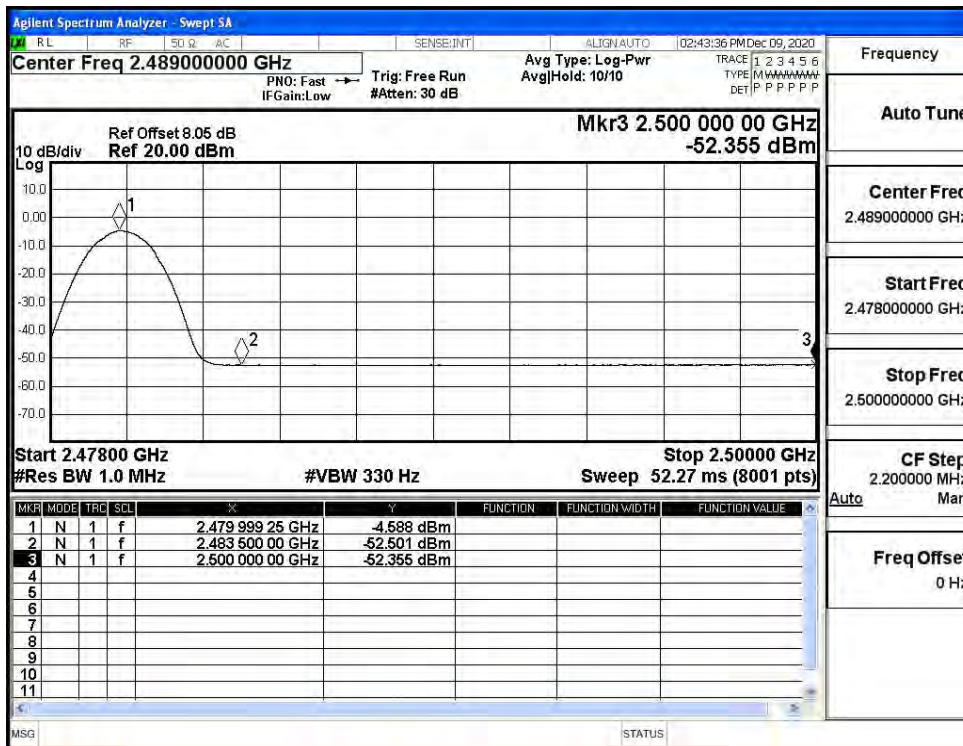
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



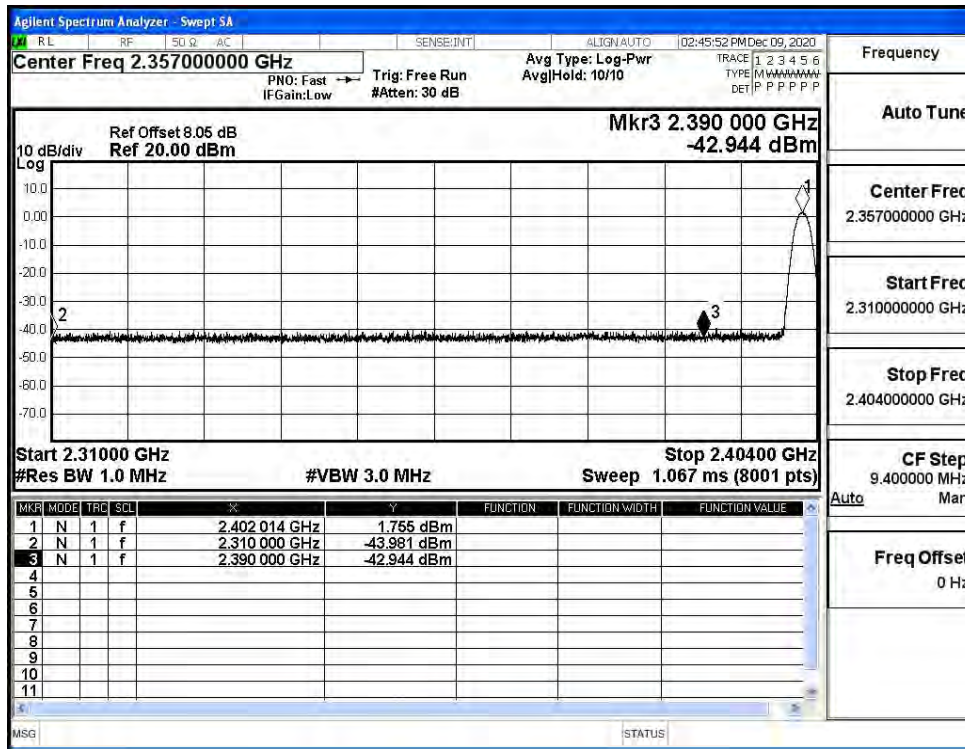
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (High Channel)



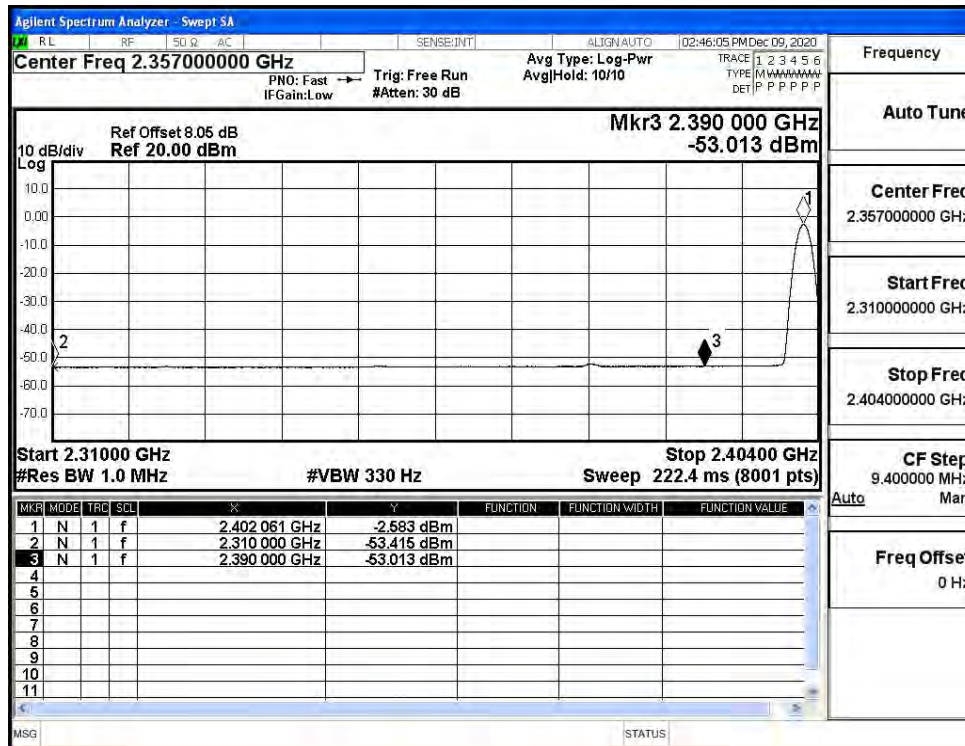
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (High Channel)



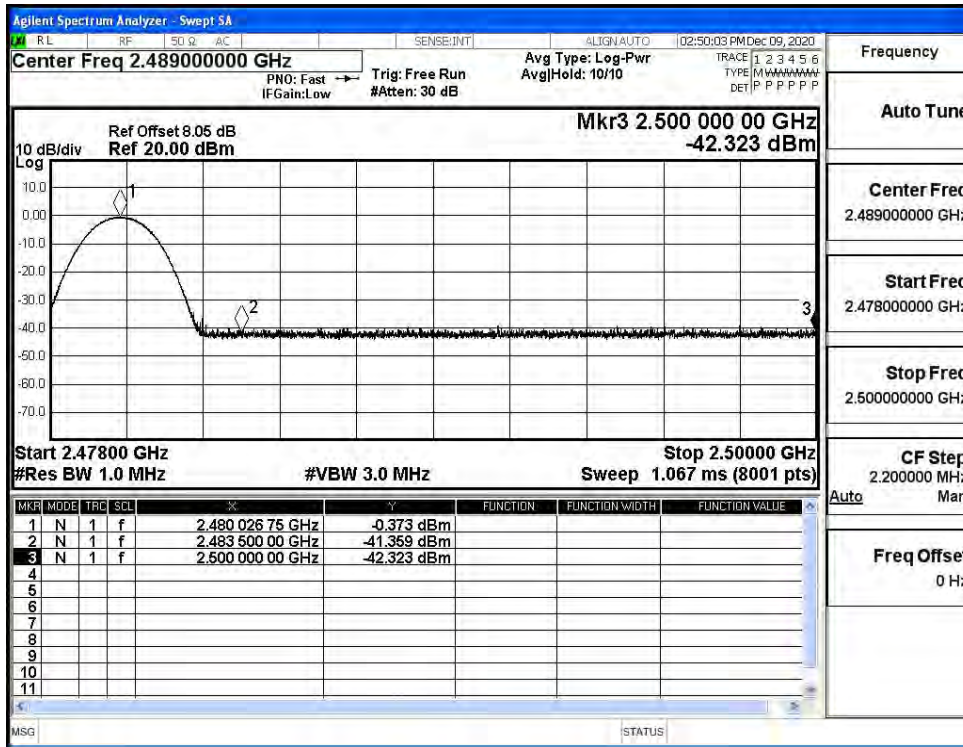
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

