

Appendix A

RF Test Data for BT V5.1 (BDR/EDR) (Conducted Measurement)

Product Name: Portable Data Collector

Trade Mark: Newland

Test Model: NLS-NFT10

Environmental Conditions

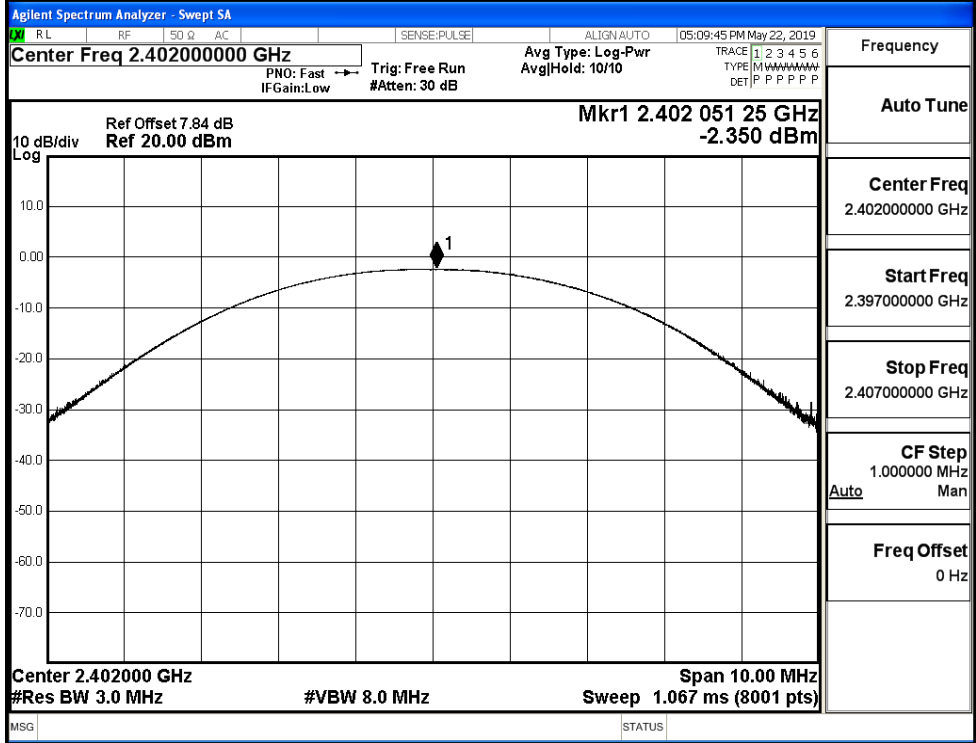
Temperature:	24.5 ° C
Relative Humidity:	53.4%
ATM Pressure:	100.0 kPa
Test Engineer:	WANGCHUANG
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

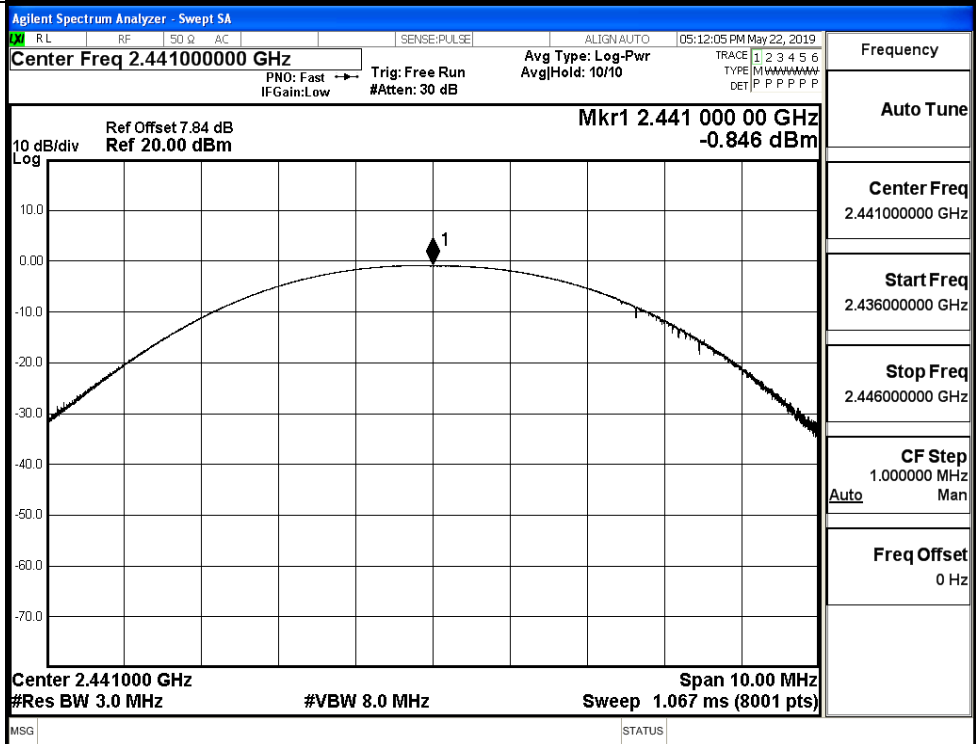
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.350	21	PASS
	MCH	-0.846	21	PASS
	HCH	-1.129	21	PASS
$\pi/4$ DQPSK	LCH	-3.256	21	PASS
	MCH	-1.792	21	PASS
	HCH	-1.987	21	PASS
8DPSK	LCH	-3.198	21	PASS
	MCH	-1.759	21	PASS
	HCH	-2.060	21	PASS

Test Graphs

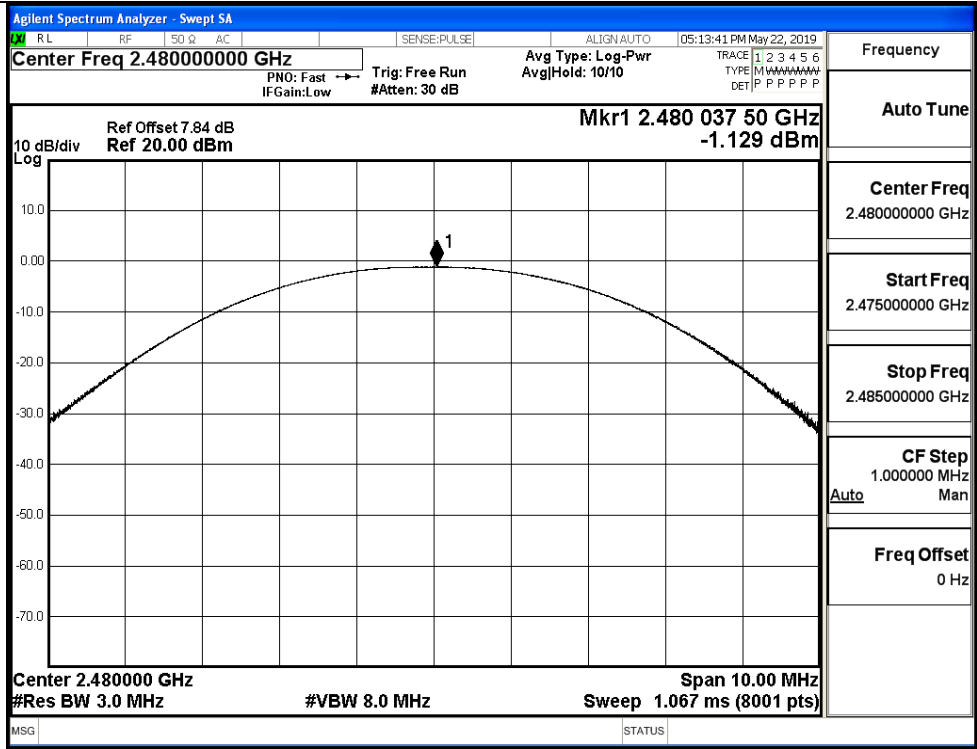
GFSK/LCH



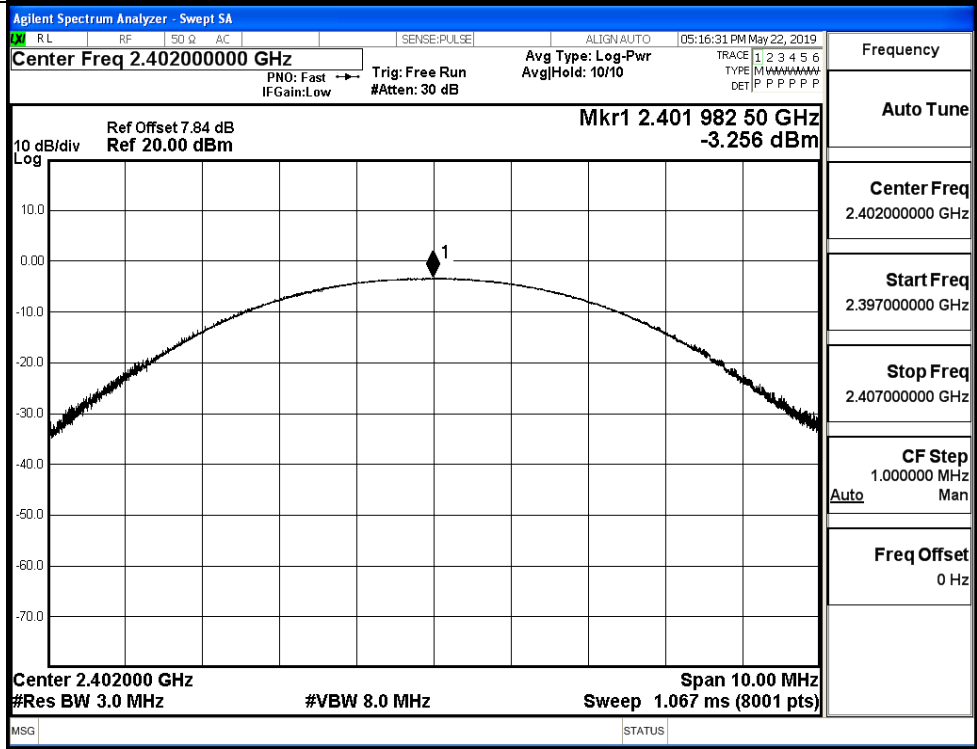
GFSK/MCH



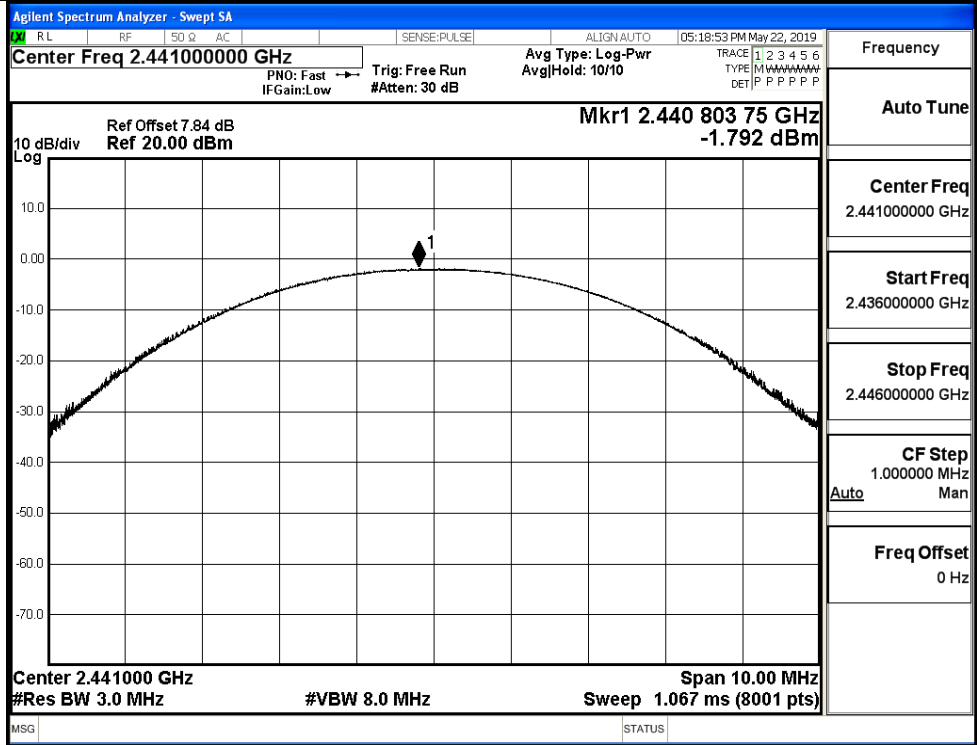
GFSK/HCH



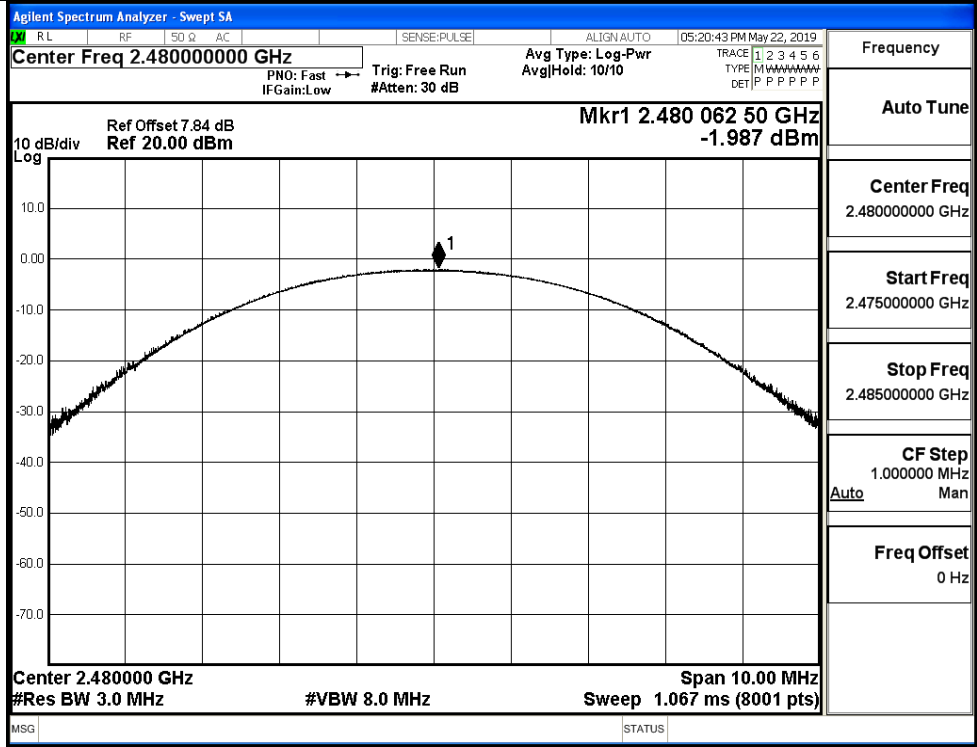
π /4DQPSK/LCH



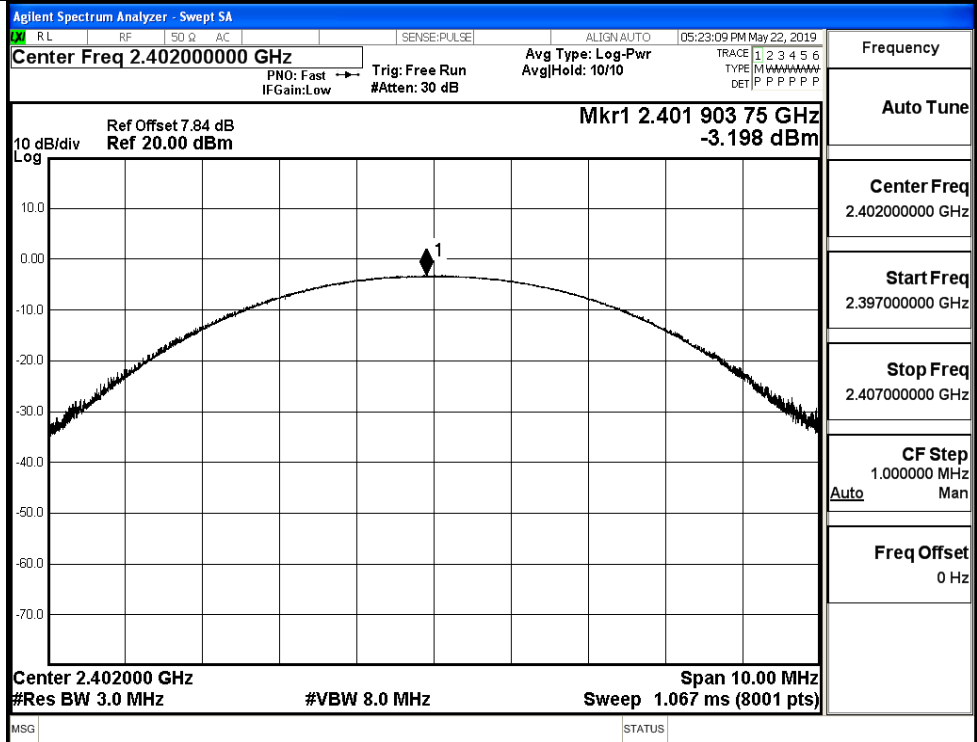
π /4DQPSK/MCH



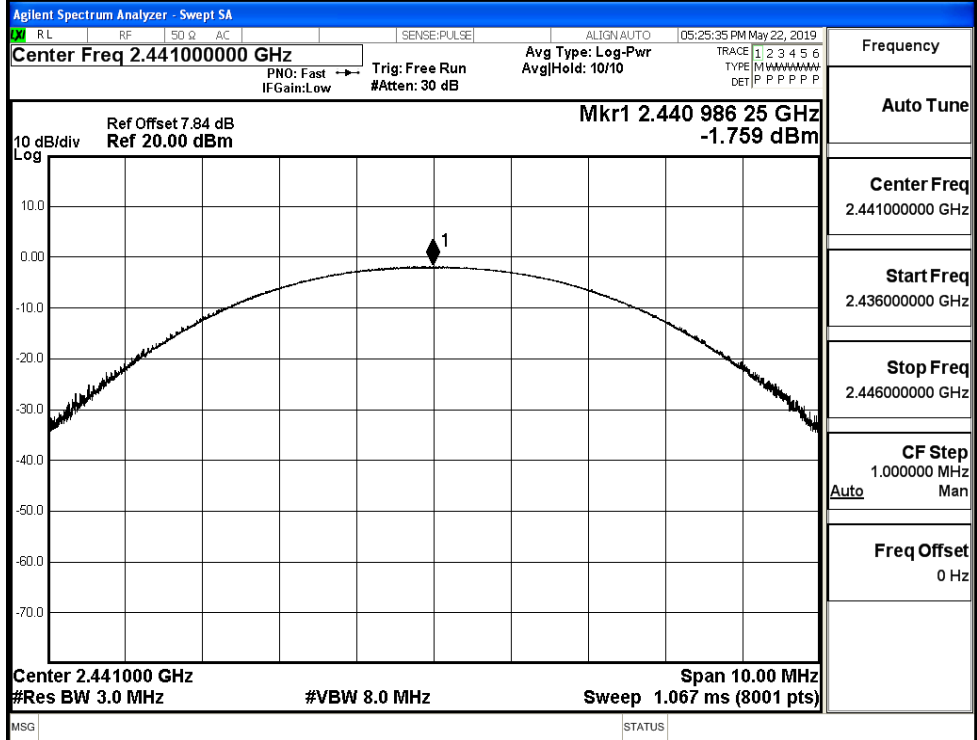
π /4DQPSK/HCH



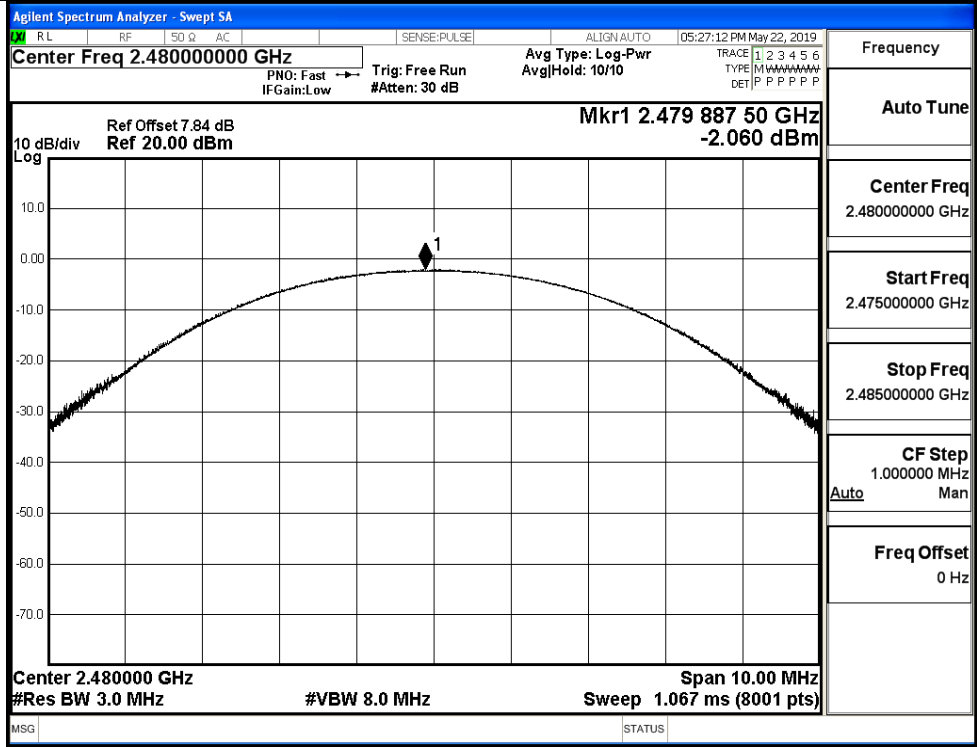
8DPSK/LCH



8DPSK/MCH

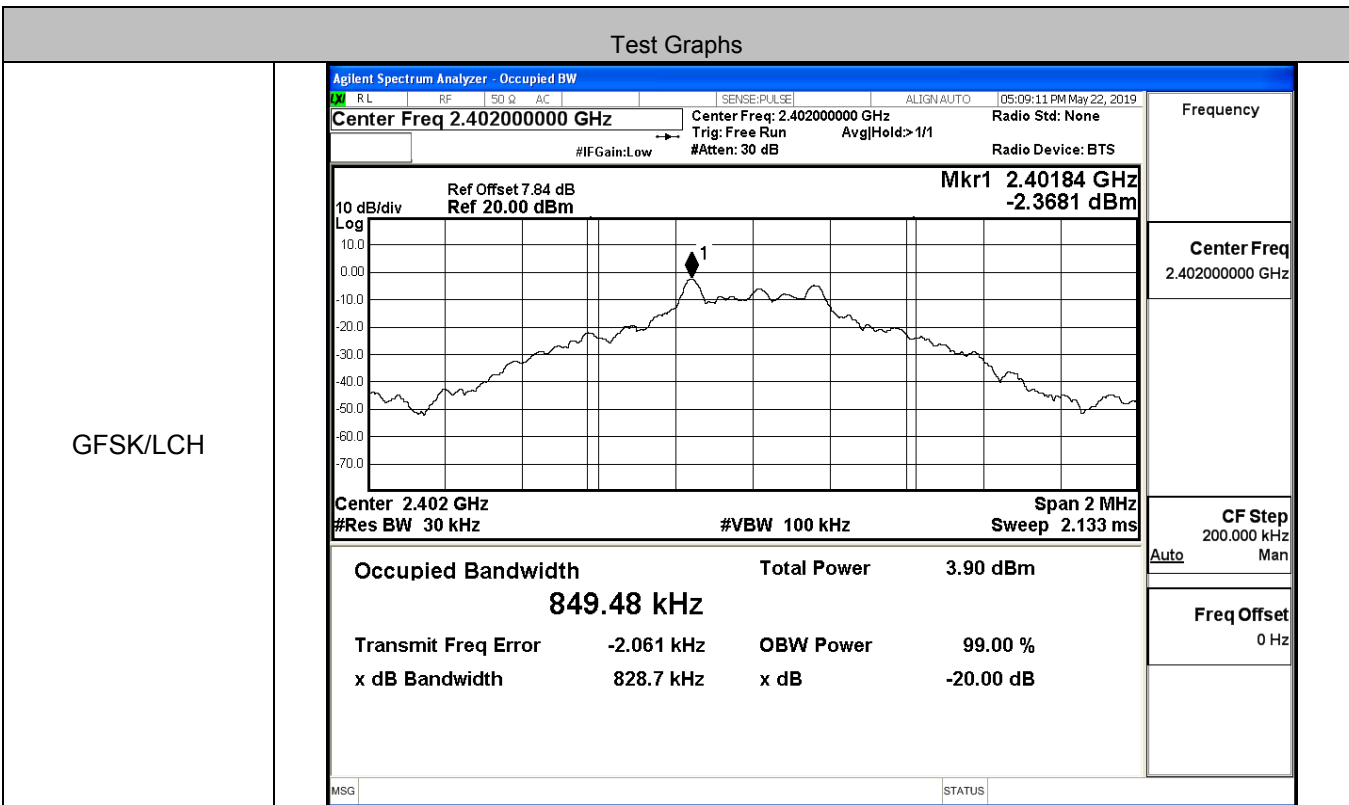


8DPSK/HCH

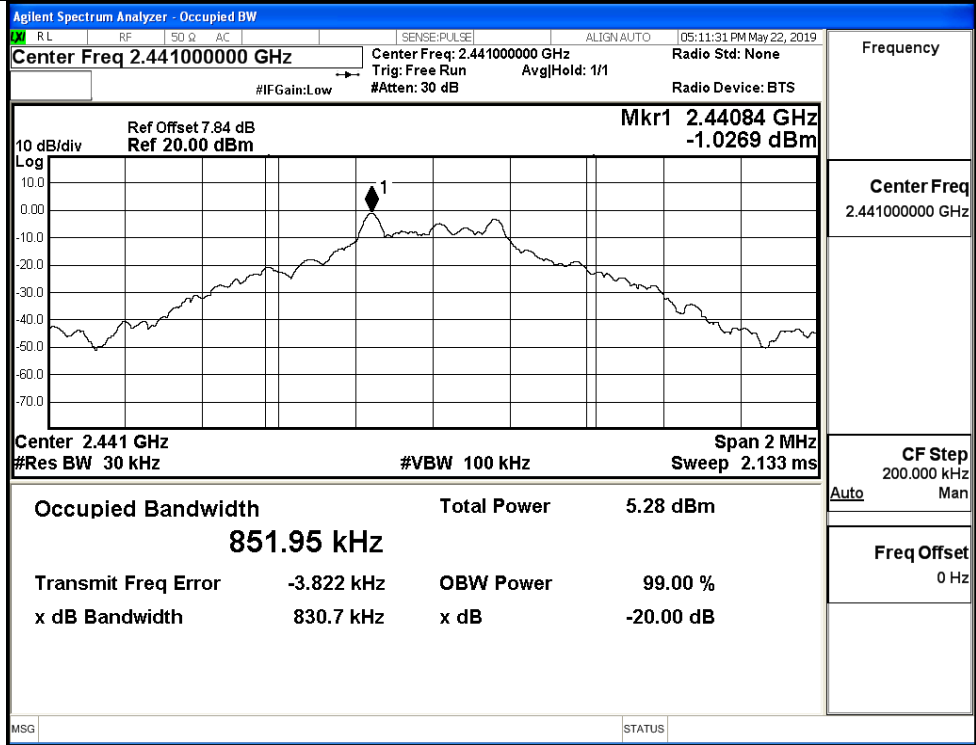


A.2 20dB Bandwidth

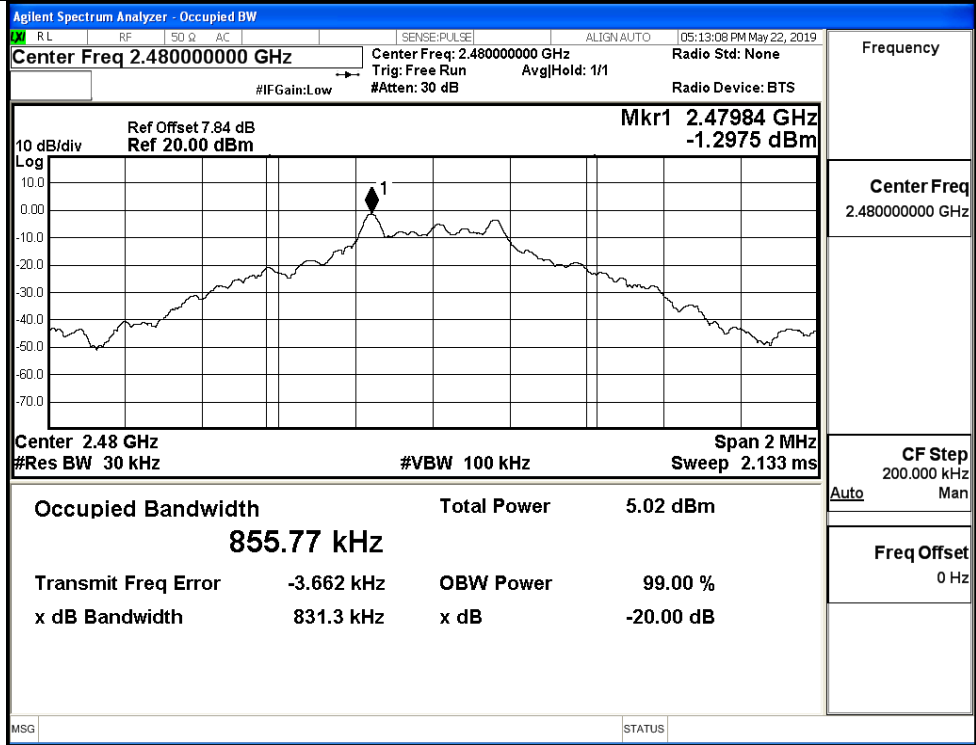
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.8287	Not Specified	PASS
	MCH	0.8307	Not Specified	PASS
	HCH	0.8313	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.115	Not Specified	PASS
	MCH	1.117	Not Specified	PASS
	HCH	1.115	Not Specified	PASS
8DPSK	LCH	1.114	Not Specified	PASS
	MCH	1.121	Not Specified	PASS
	HCH	1.119	Not Specified	PASS



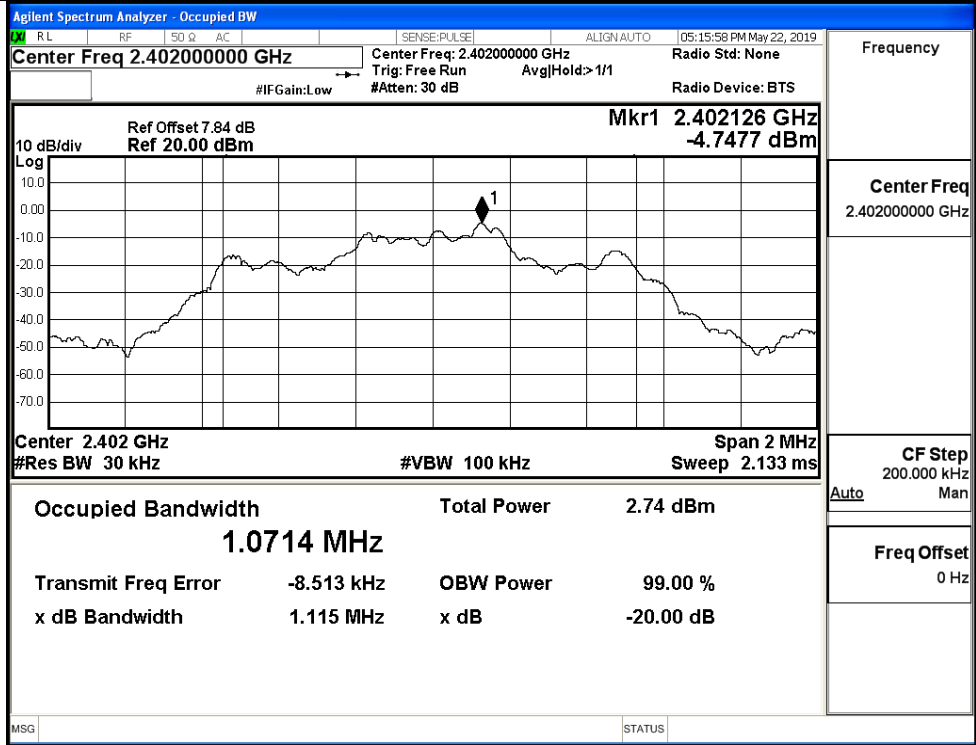
GFSK/MCH



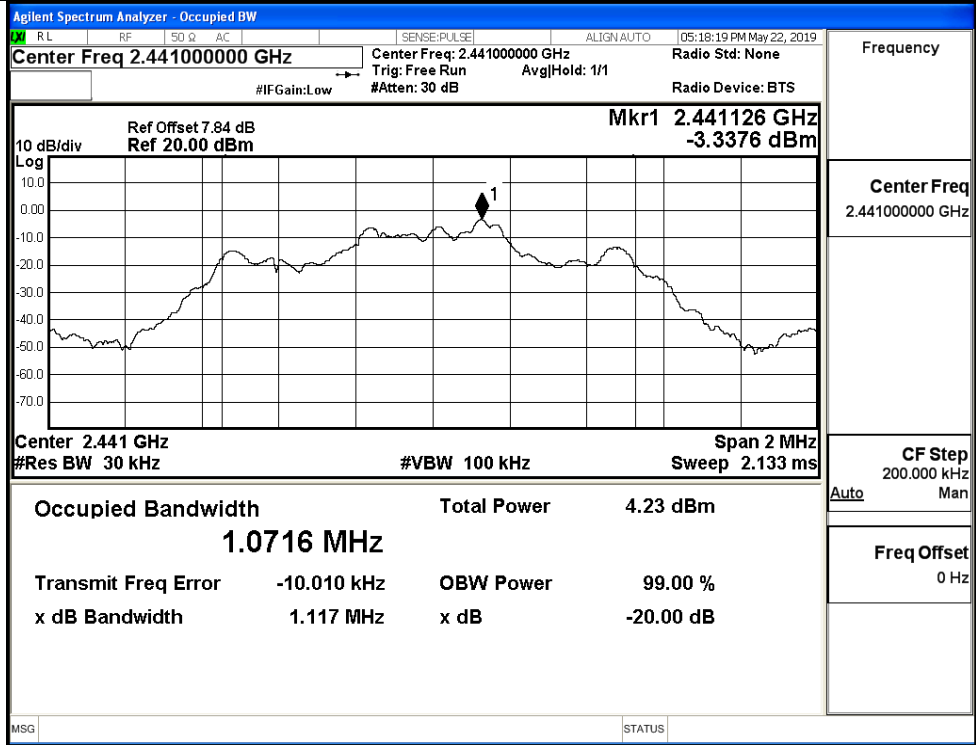
GFSK/HCH



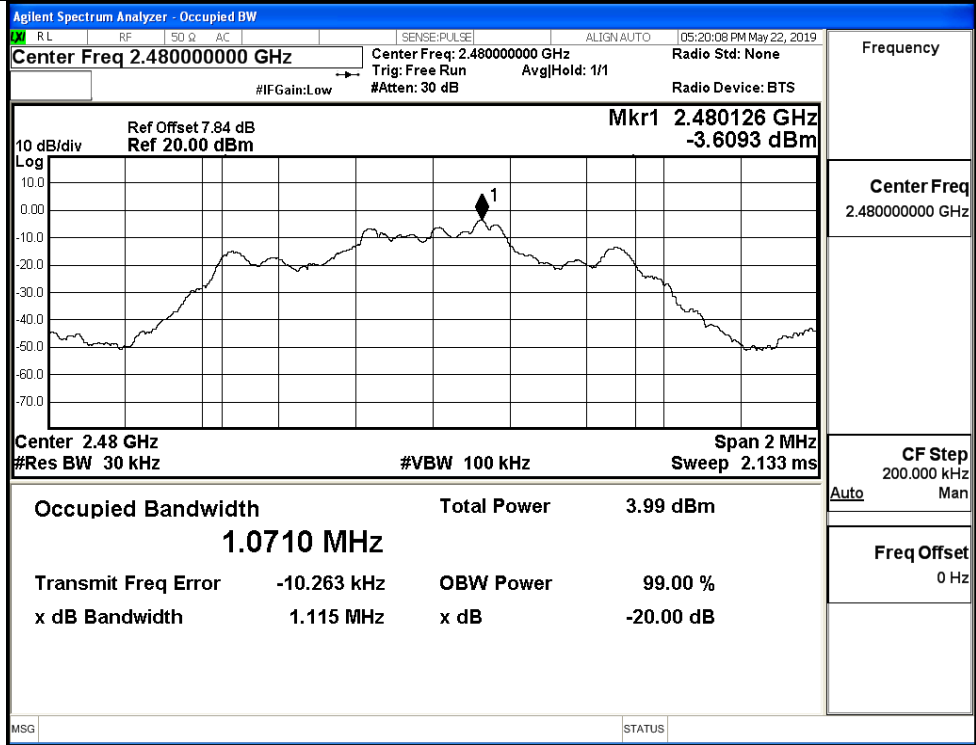
$\pi/4$ DQPSK/LCH



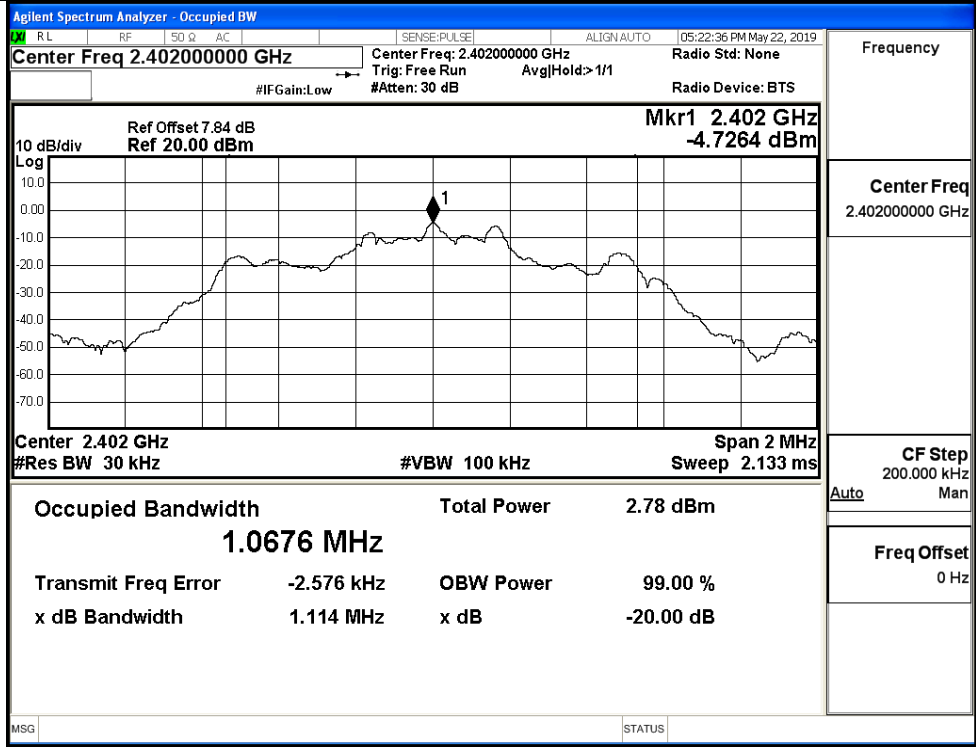
$\pi/4$ DQPSK/MCH



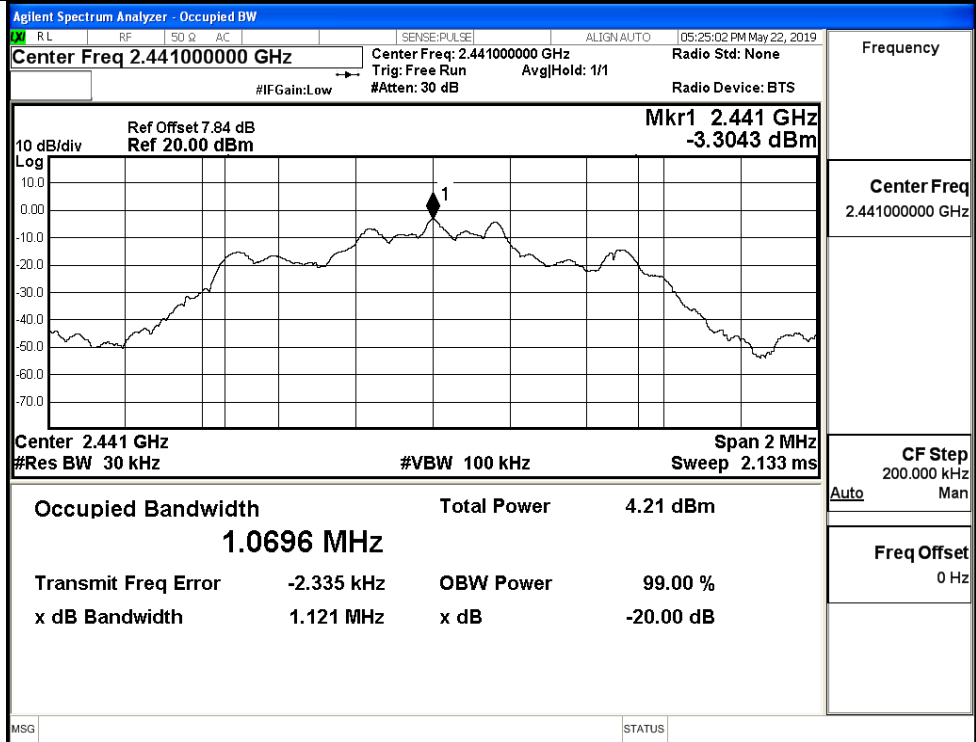
$\pi/4$ DQPSK/HCH



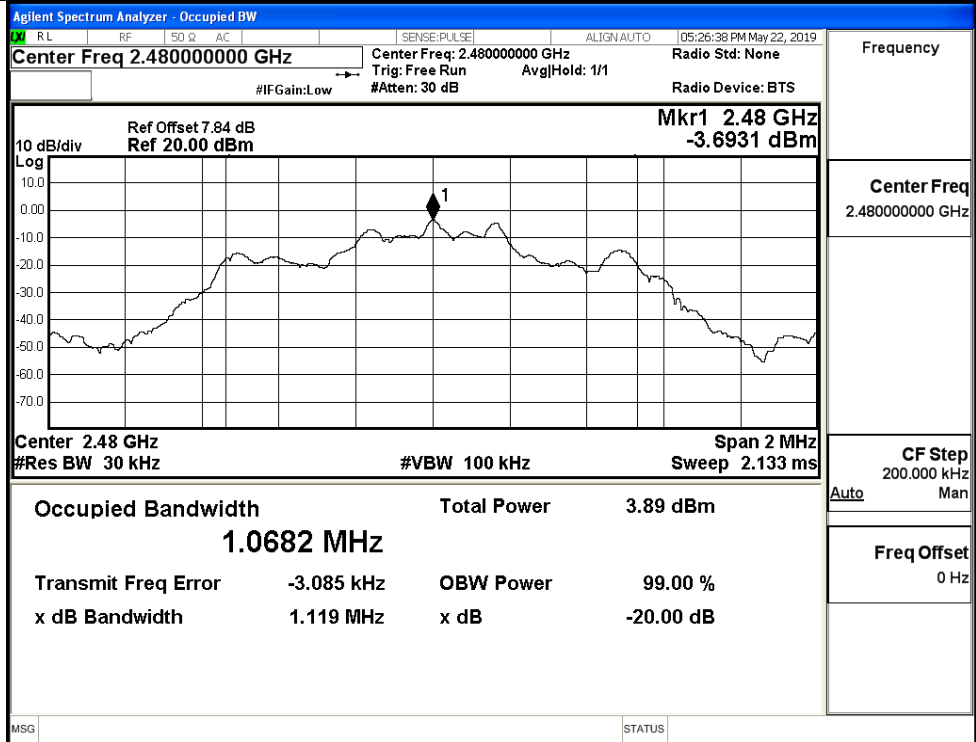
8DPSK/LCH



8DPSK/MCH

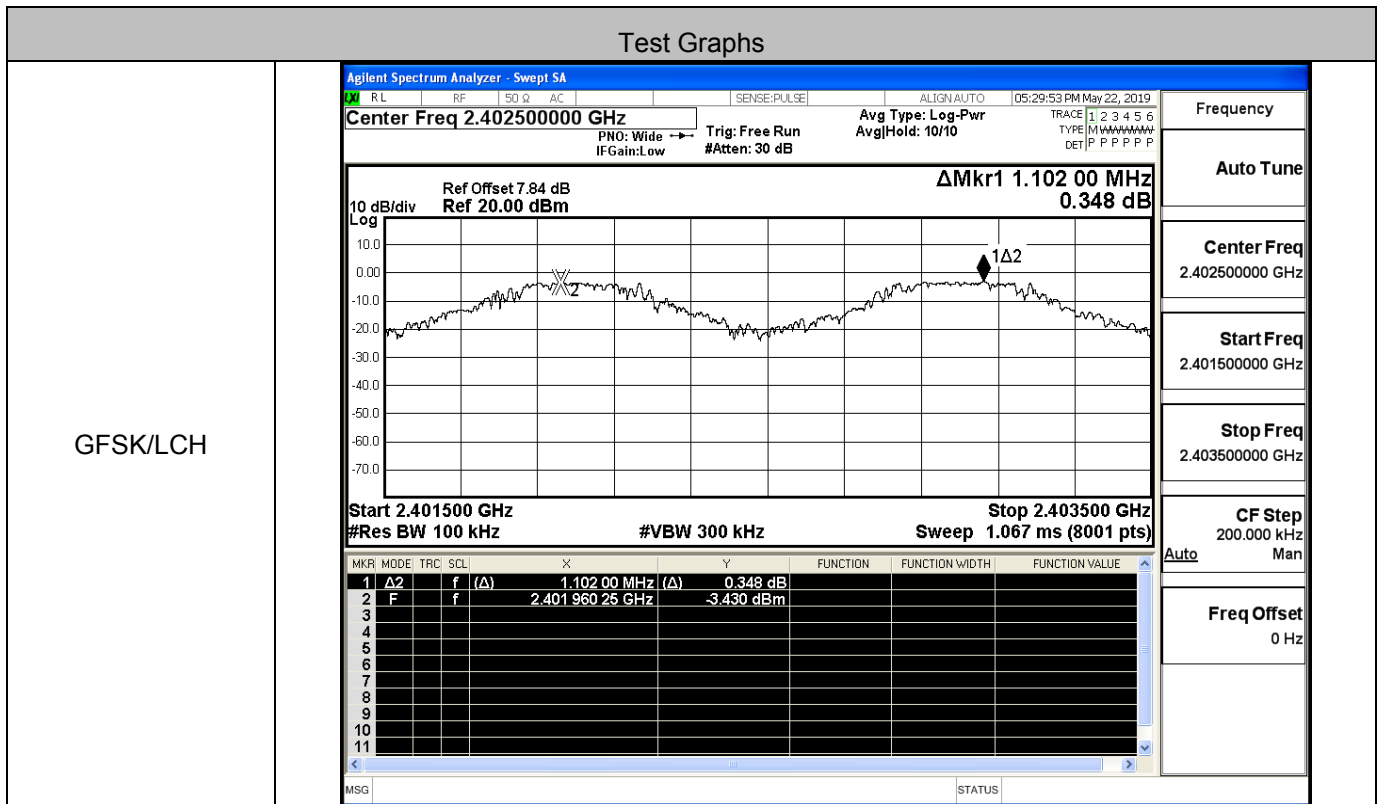


8DPSK/HCH

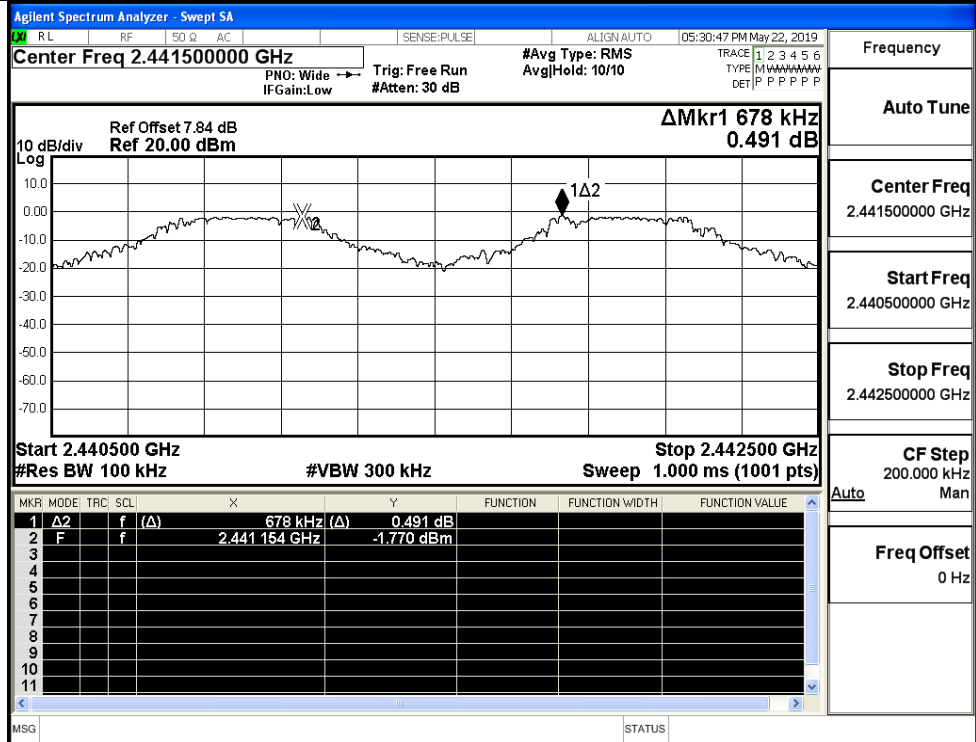


A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.102	0.554	PASS
	MCH	0.678	0.554	PASS
	HCH	1.060	0.554	PASS
π/4DQPSK	LCH	1.318	0.745	PASS
	MCH	1.104	0.745	PASS
	HCH	0.666	0.745	PASS
8DPSK	LCH	0.994	0.747	PASS
	MCH	1.032	0.747	PASS
	HCH	0.968	0.747	PASS

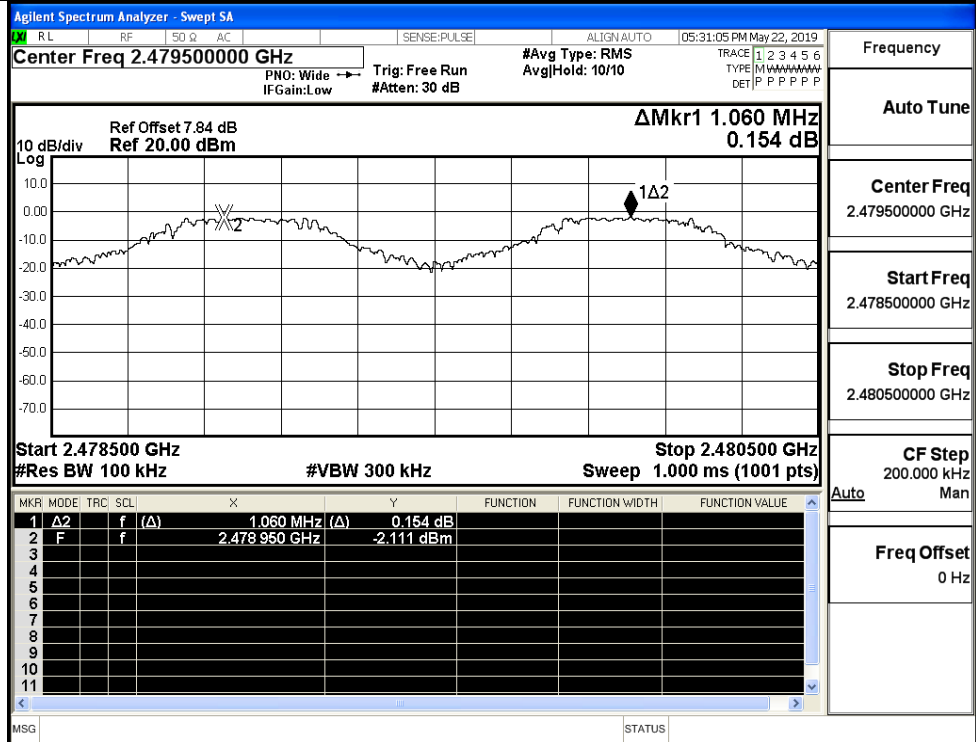


GFSK/MCH



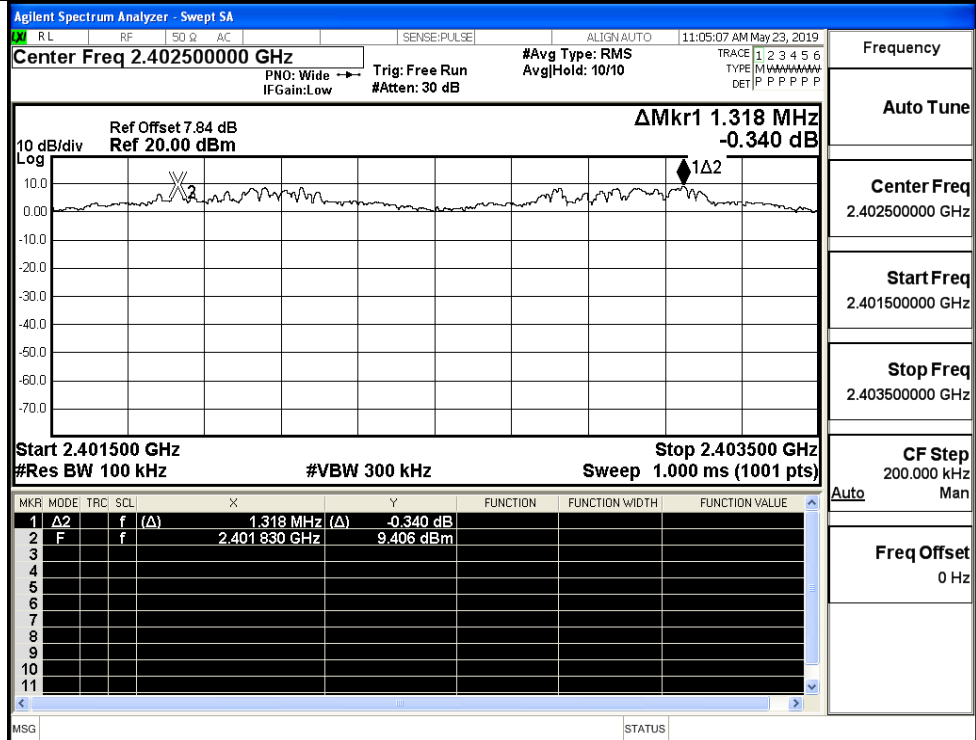
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

GFSK/HCH



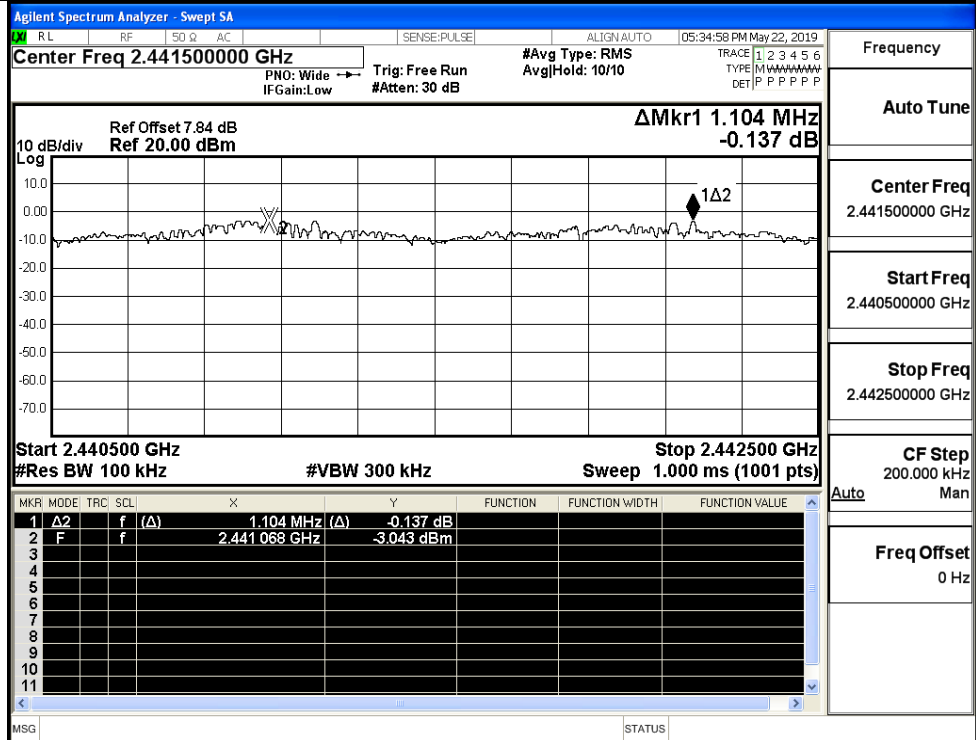
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH



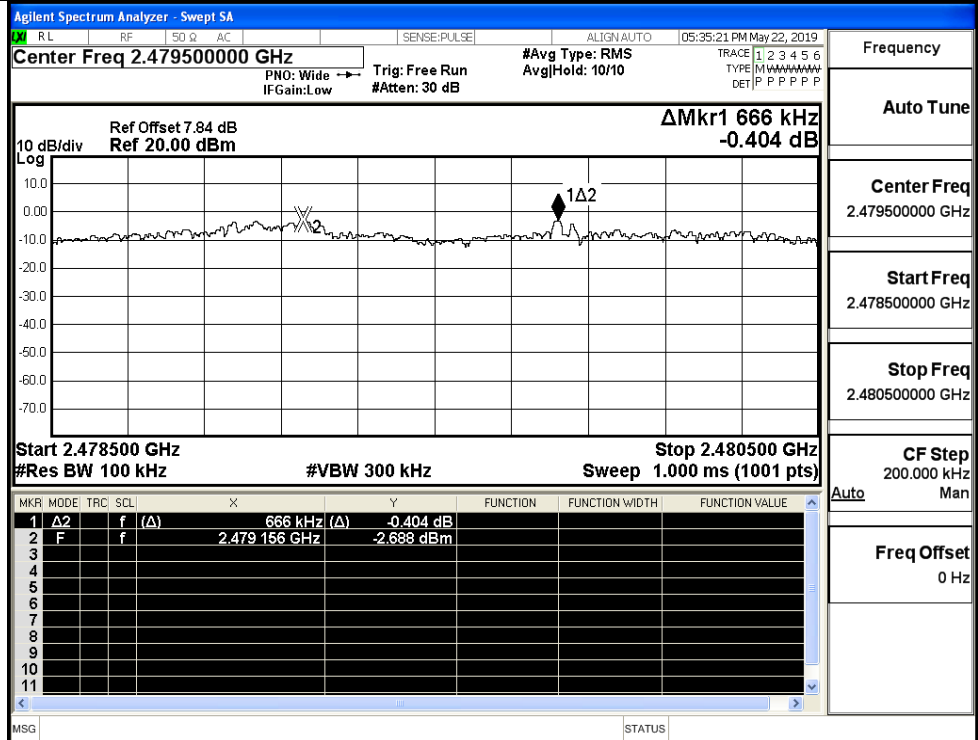
Frequency
Auto Tune
Center Freq
2.402500000 GHz
Start Freq
2.401500000 GHz
Stop Freq
2.403500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

$\pi/4$ DQPSK/MCH



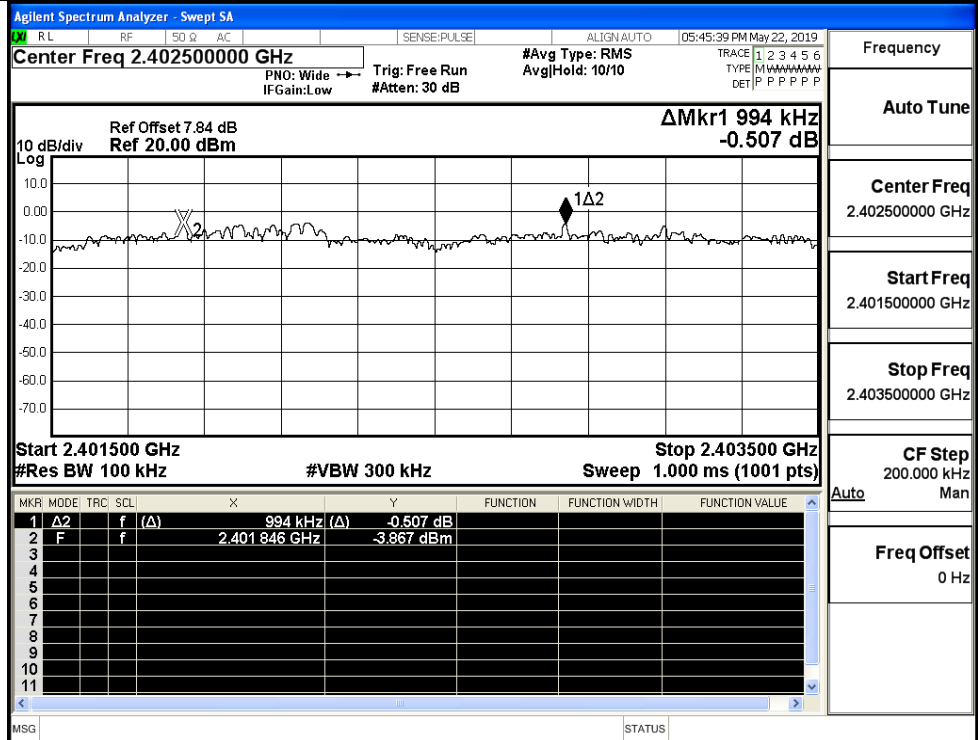
Frequency
Auto Tune
Center Freq
2.441500000 GHz
Start Freq
2.440500000 GHz
Stop Freq
2.442500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

π/4DQPSK/HCH



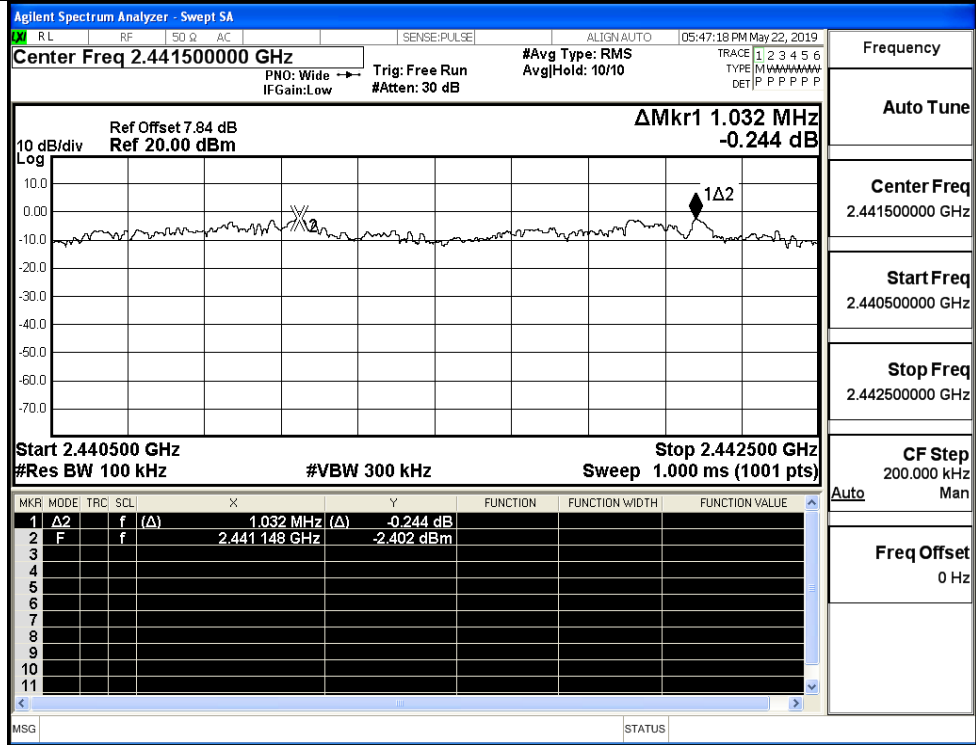
Frequency	2.479500000 GHz
Auto Tune	
Center Freq	2.479500000 GHz
Start Freq	2.478500000 GHz
Stop Freq	2.480500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/LCH



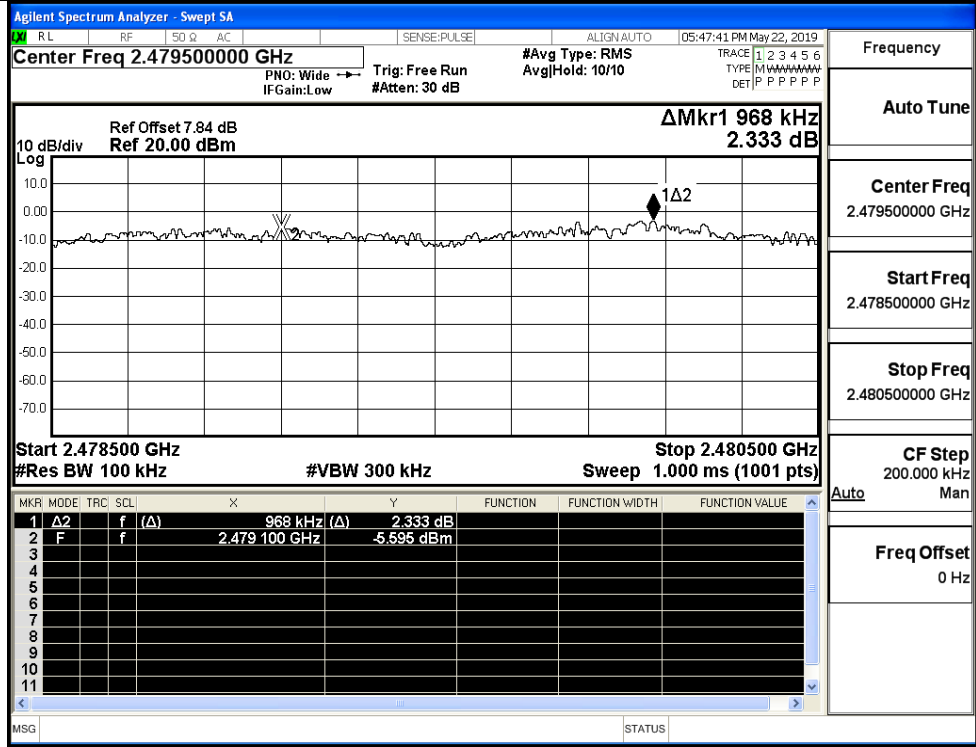
Frequency	2.402500000 GHz
Auto Tune	
Center Freq	2.402500000 GHz
Start Freq	2.401500000 GHz
Stop Freq	2.403500000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

8DPSK/MCH



Frequency
Auto Tune
Center Freq
2.44150000 GHz
Start Freq
2.44050000 GHz
Stop Freq
2.44250000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

8DPSK/HCH



Frequency
Auto Tune
Center Freq
2.47950000 GHz
Start Freq
2.47850000 GHz
Stop Freq
2.48050000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

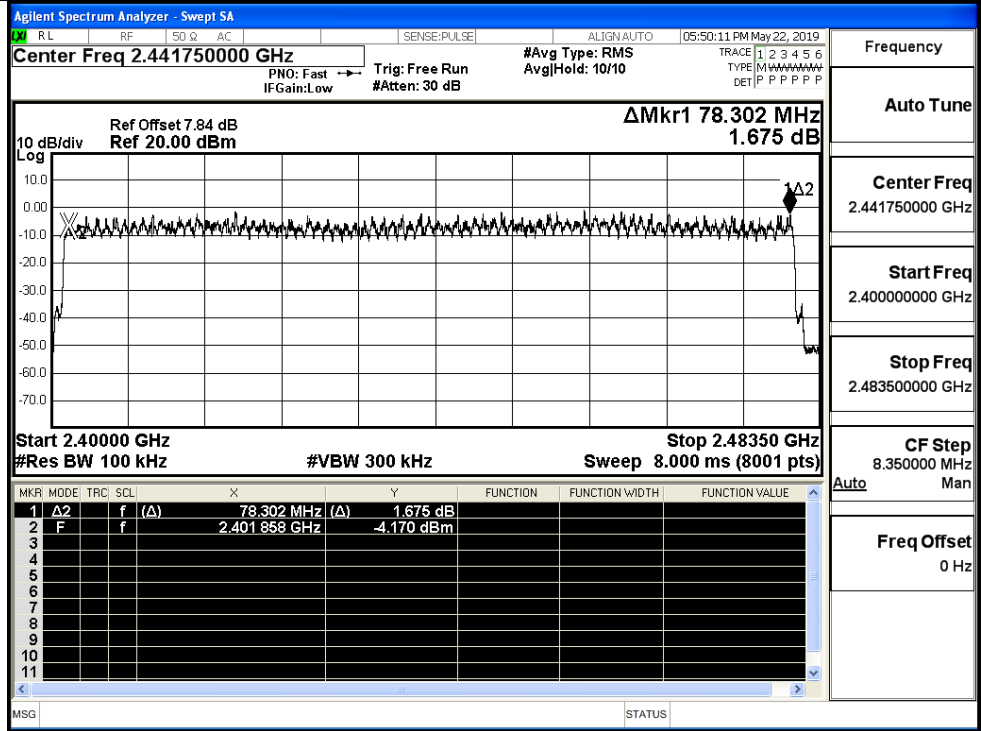
A.4 Hopping Channel Number

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

Test Graphs

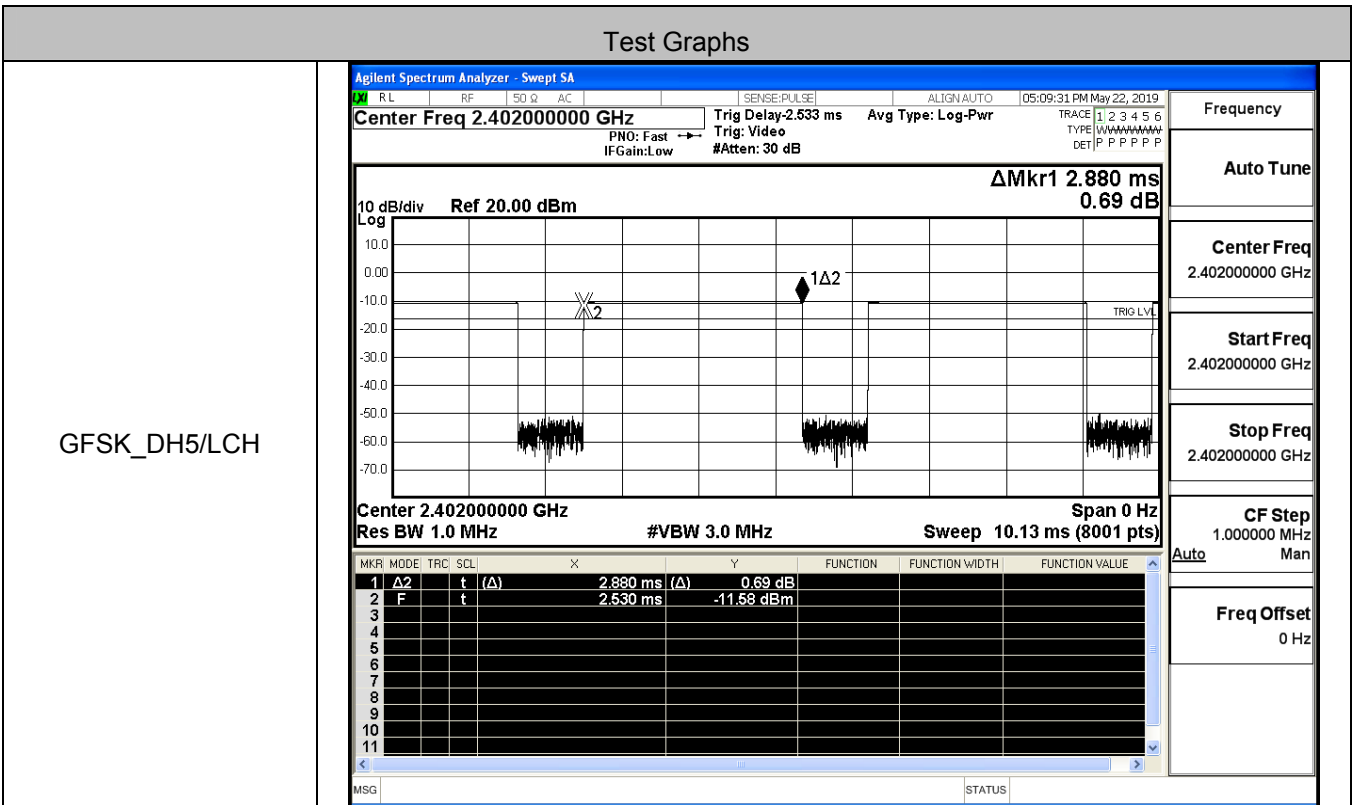
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 7.84 dB Ref 20.00 dBm ΔMkr1 77.843 MHz 0.885 dB Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.48350 GHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <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>77.843 MHz</td> <td>0.885 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402161 GHz</td> <td>-2.711 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)	77.843 MHz	0.885 dB				2	F	f		2.402161 GHz	-2.711 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Man Freq Offset 0 Hz
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2	F	f		2.402161 GHz	-2.711 dBm																								
$\pi/4$ DQPSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 7.84 dB Ref 20.00 dBm ΔMkr1 77.926 MHz 4.108 dB Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.48350 GHz 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>77.926 MHz</td> <td>4.108 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>-6.558 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)	77.926 MHz	4.108 dB				2	F	f		2.401921 GHz	-6.558 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Man Freq Offset 0 Hz
	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ 2	f	(Δ)	77.926 MHz	4.108 dB																								
2	F	f		2.401921 GHz	-6.558 dBm																								

8DPSK/Hop

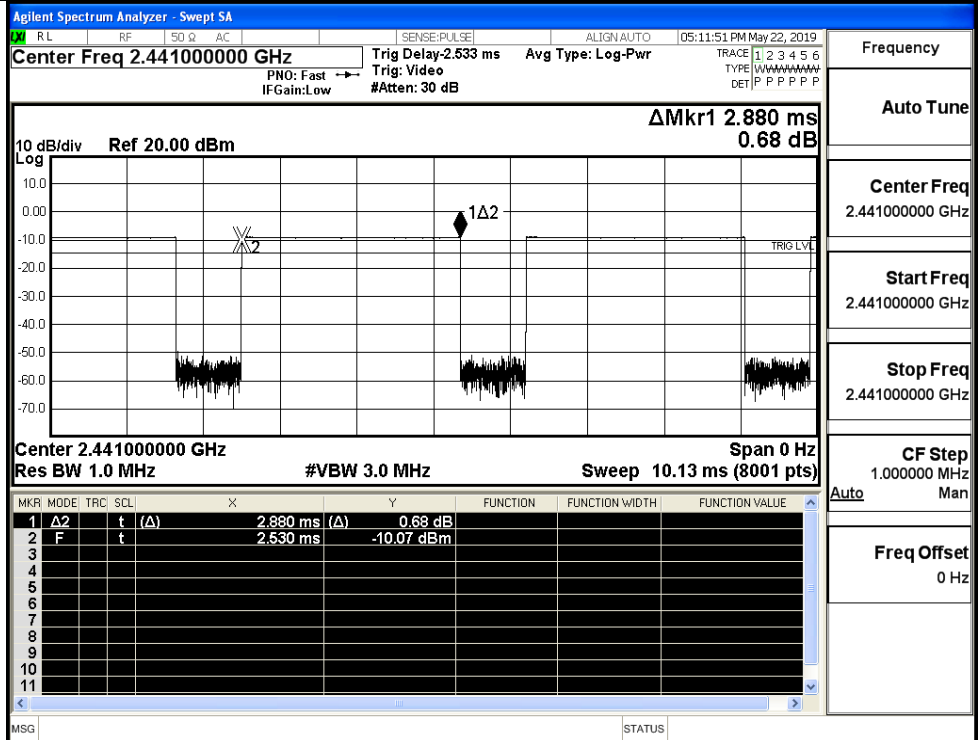


A.5 Dwell Time

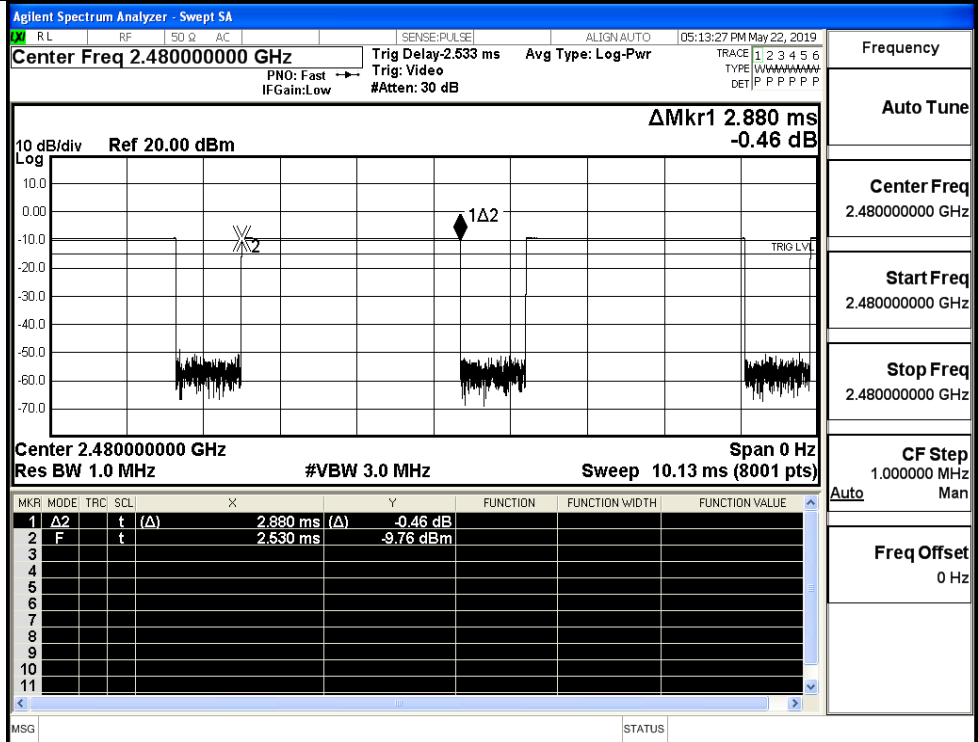
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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



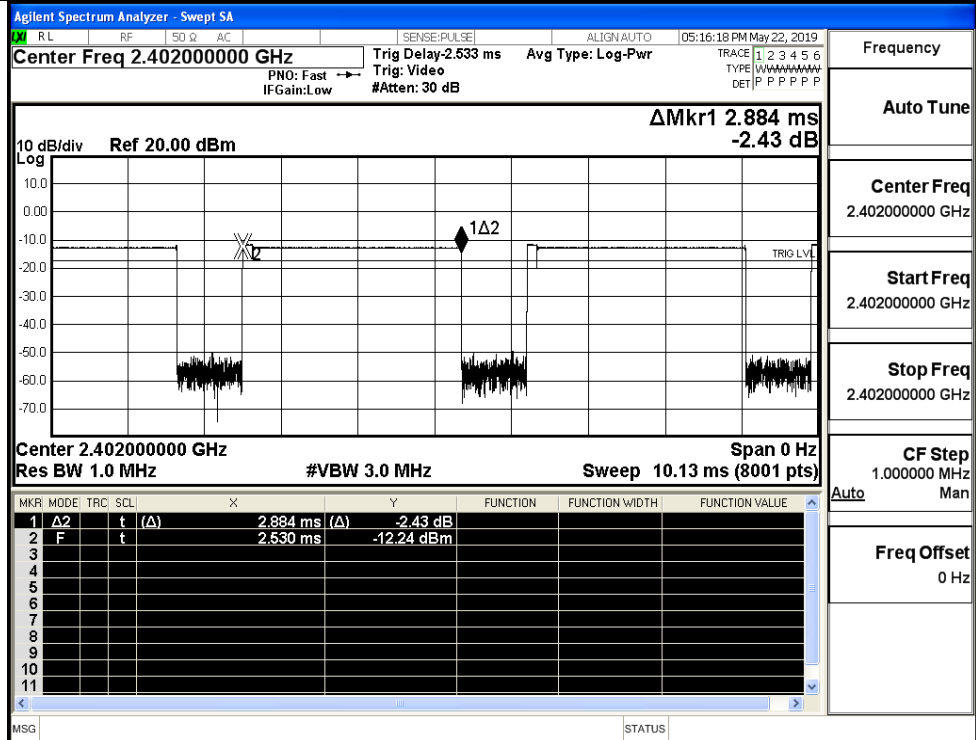
GFSK_DH5/MCH



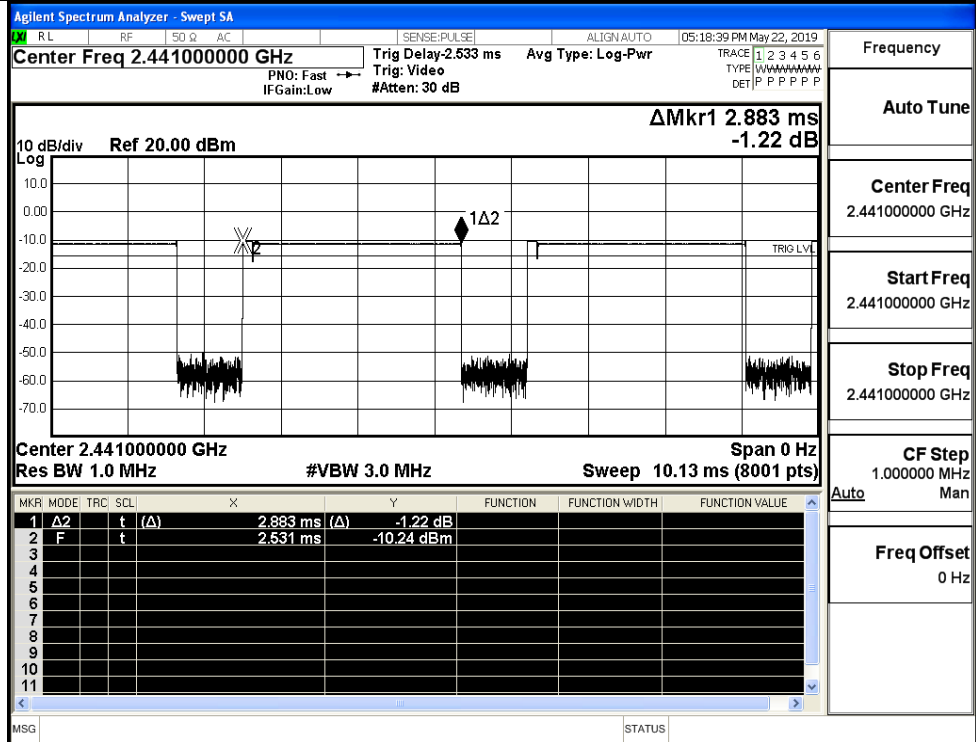
GFSK_DH5/HCH



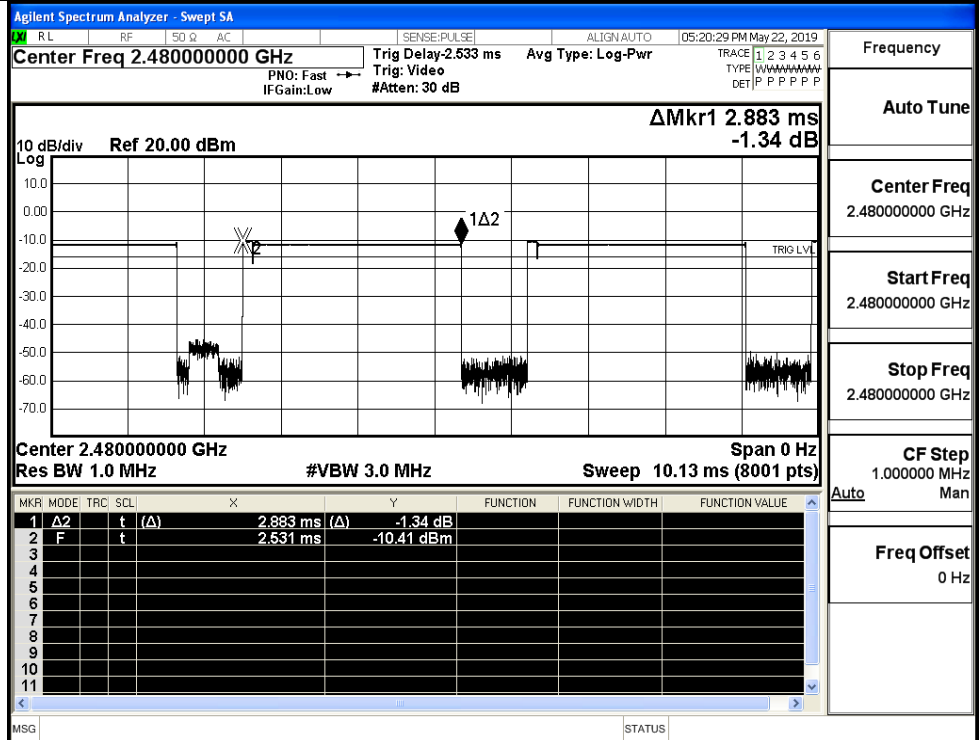
π /4DQPSK
_2DH5/LCH



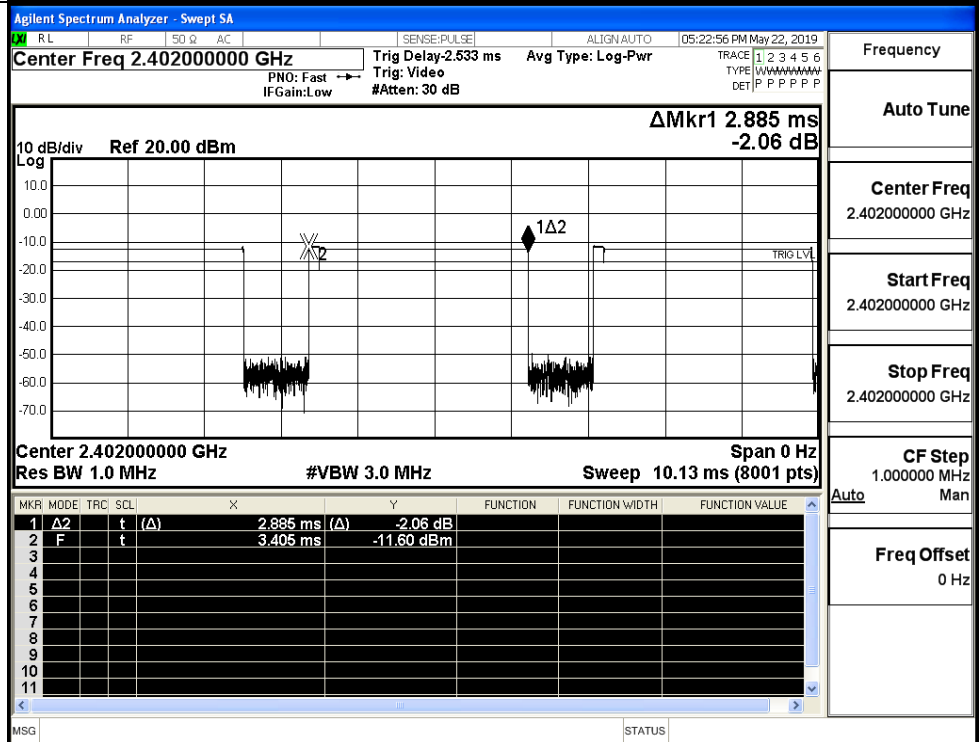
π /4DQPSK
_2DH5/MCH



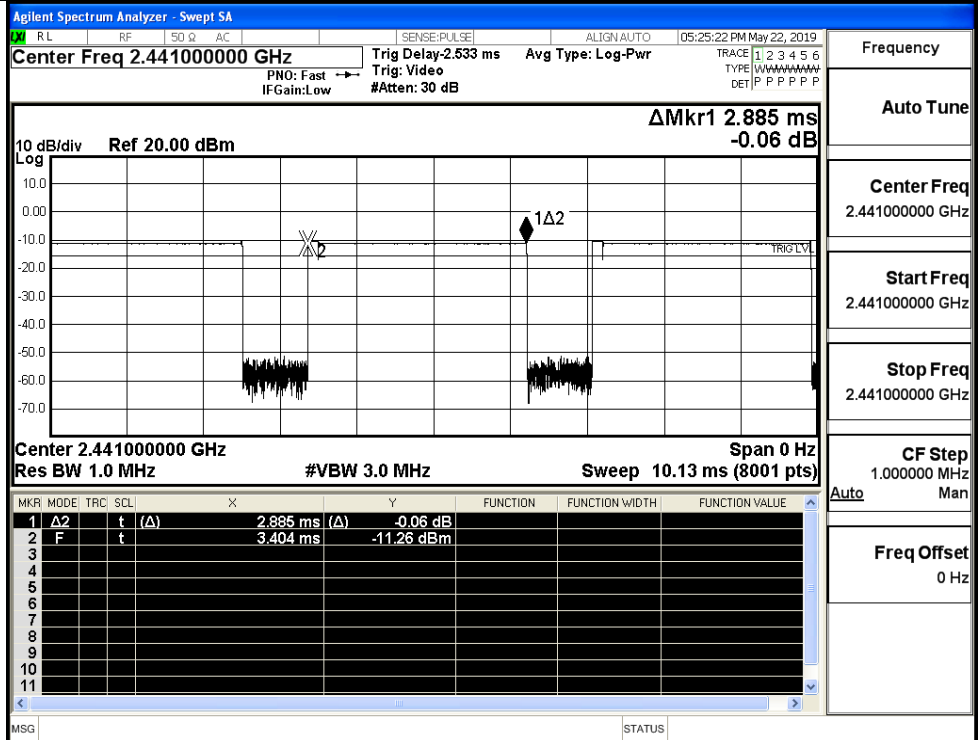
$\pi/4$ DQPSK
_2DH5/HCH



8DPSK_3DH5/LCH



8DPSK_3DH5/MCH



Frequency

Auto Tune

Center Freq
2.441000000 GHz

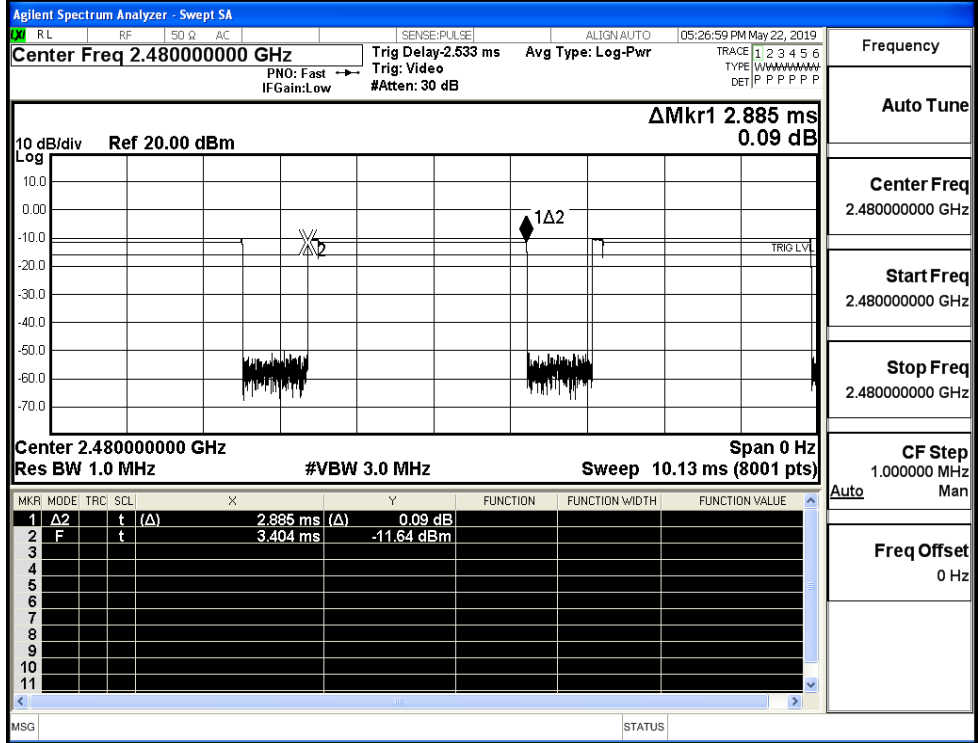
Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

CF Step
1.000000 MHz

Freq Offset
0 Hz

8DPSK_3DH5/HCH



Frequency

Auto Tune

Center Freq
2.480000000 GHz

Start Freq
2.480000000 GHz

Stop Freq
2.480000000 GHz

CF Step
1.000000 MHz

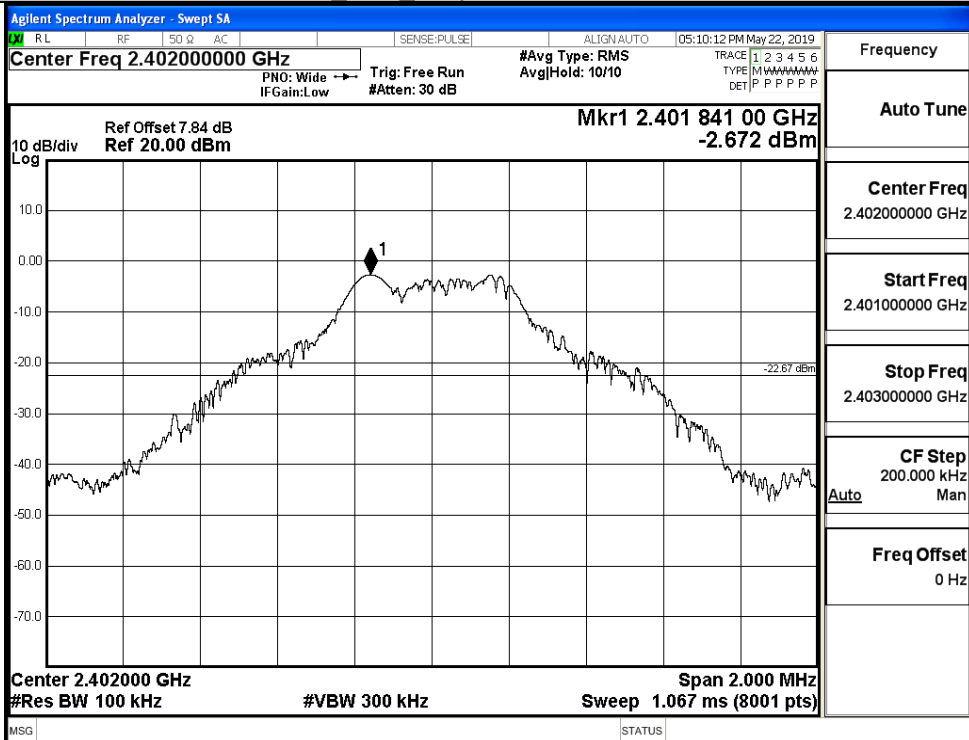
Freq Offset
0 Hz

A.6 RF Conducted Spurious Emissions

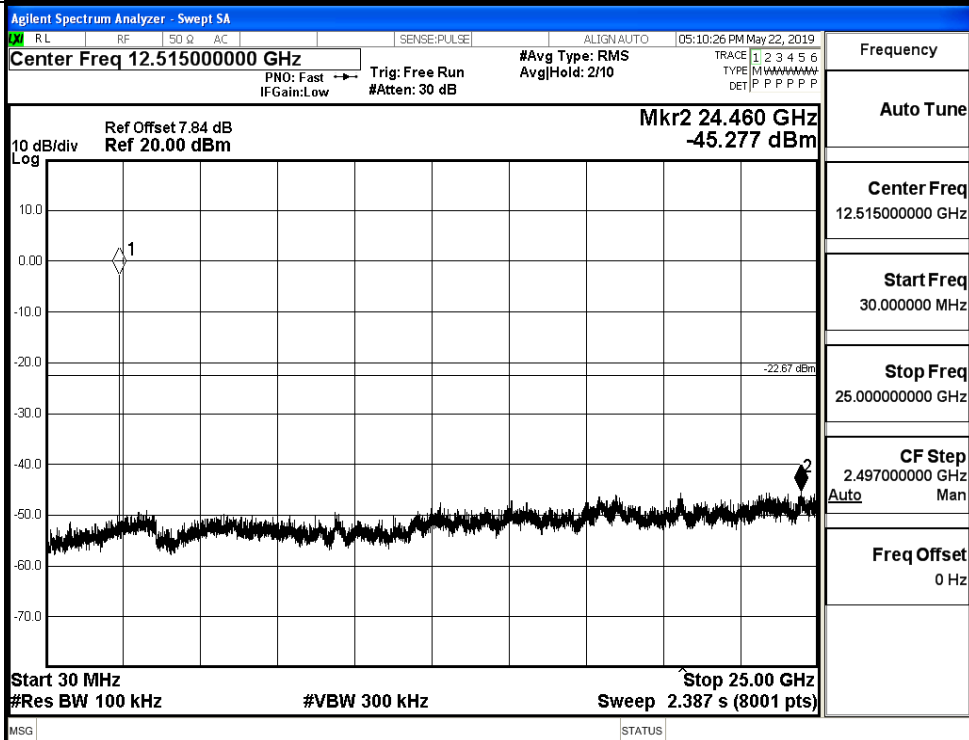
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-2.672	-45.277	-22.672	PASS
	MCH	-1.08	-45.096	-21.080	PASS
	HCH	-1.317	-45.460	-21.317	PASS
$\pi/4$ DQPSK	LCH	-3.953	-45.189	-23.953	PASS
	MCH	-2.425	-45.292	-22.425	PASS
	HCH	-2.589	-44.785	-22.589	PASS
8DPSK	LCH	-3.705	-44.969	-23.705	PASS
	MCH	-2.295	-45.696	-22.295	PASS
	HCH	-2.606	-44.605	-22.606	PASS

GFSK_LCH_Graphs

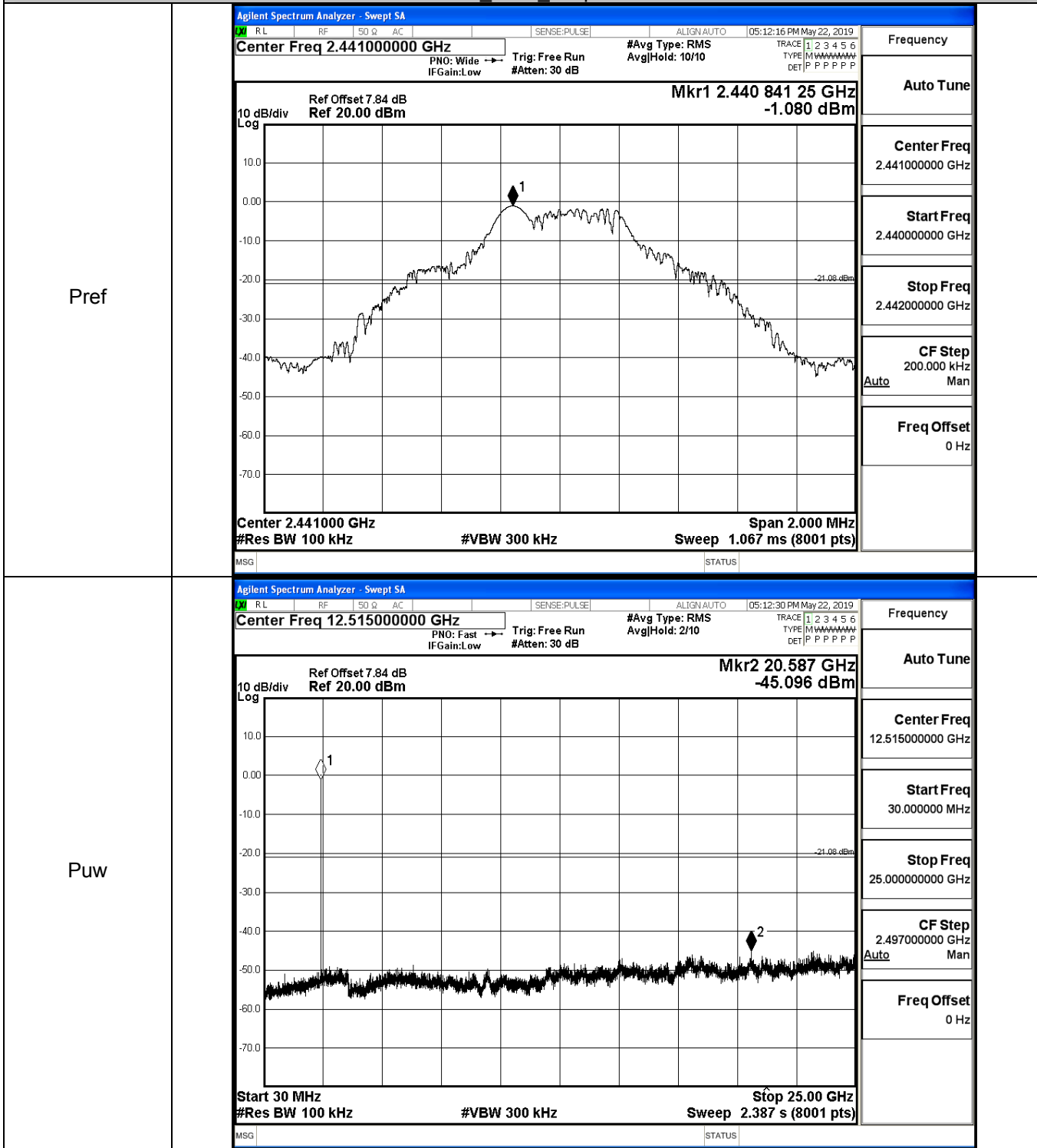
Pref



Puw

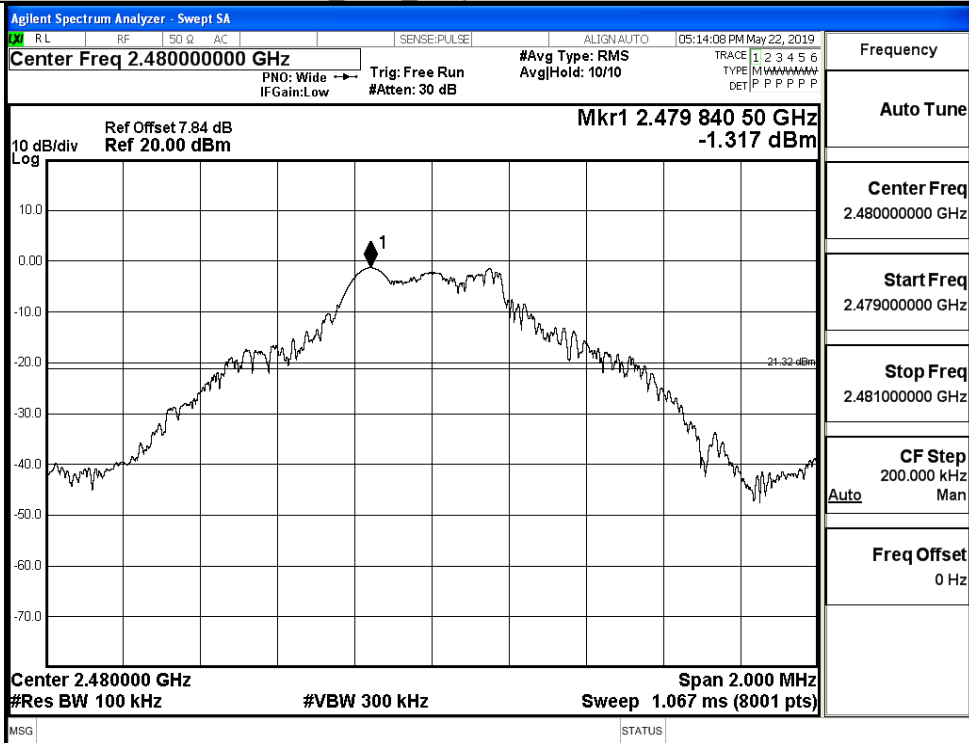


GFSK_MCH_Graphs

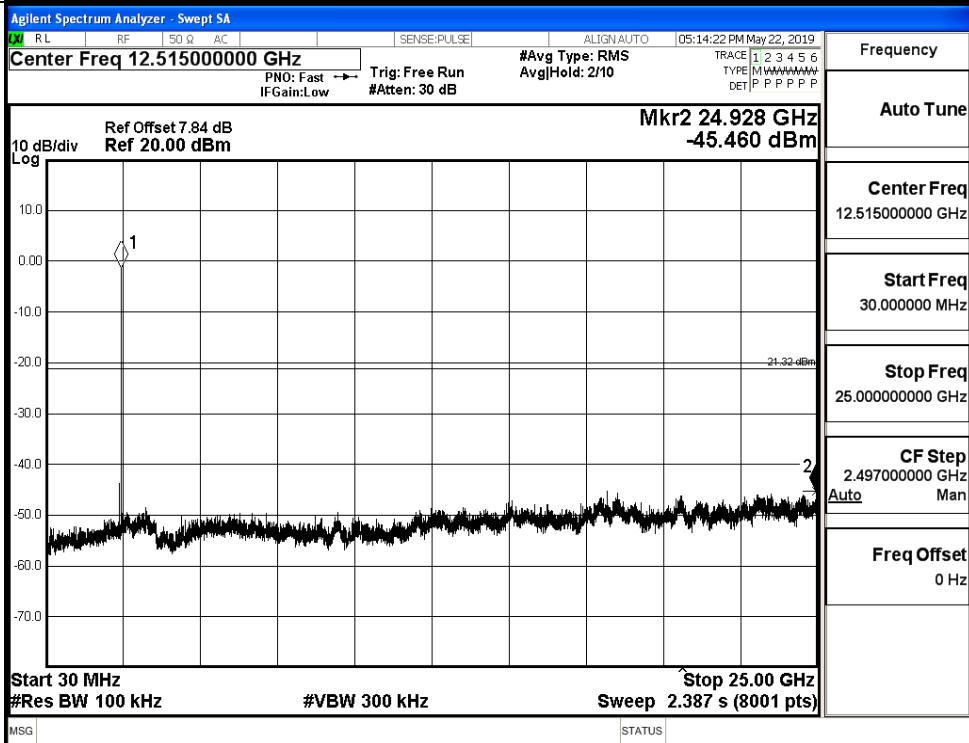


GFSK_HCH_Graphs

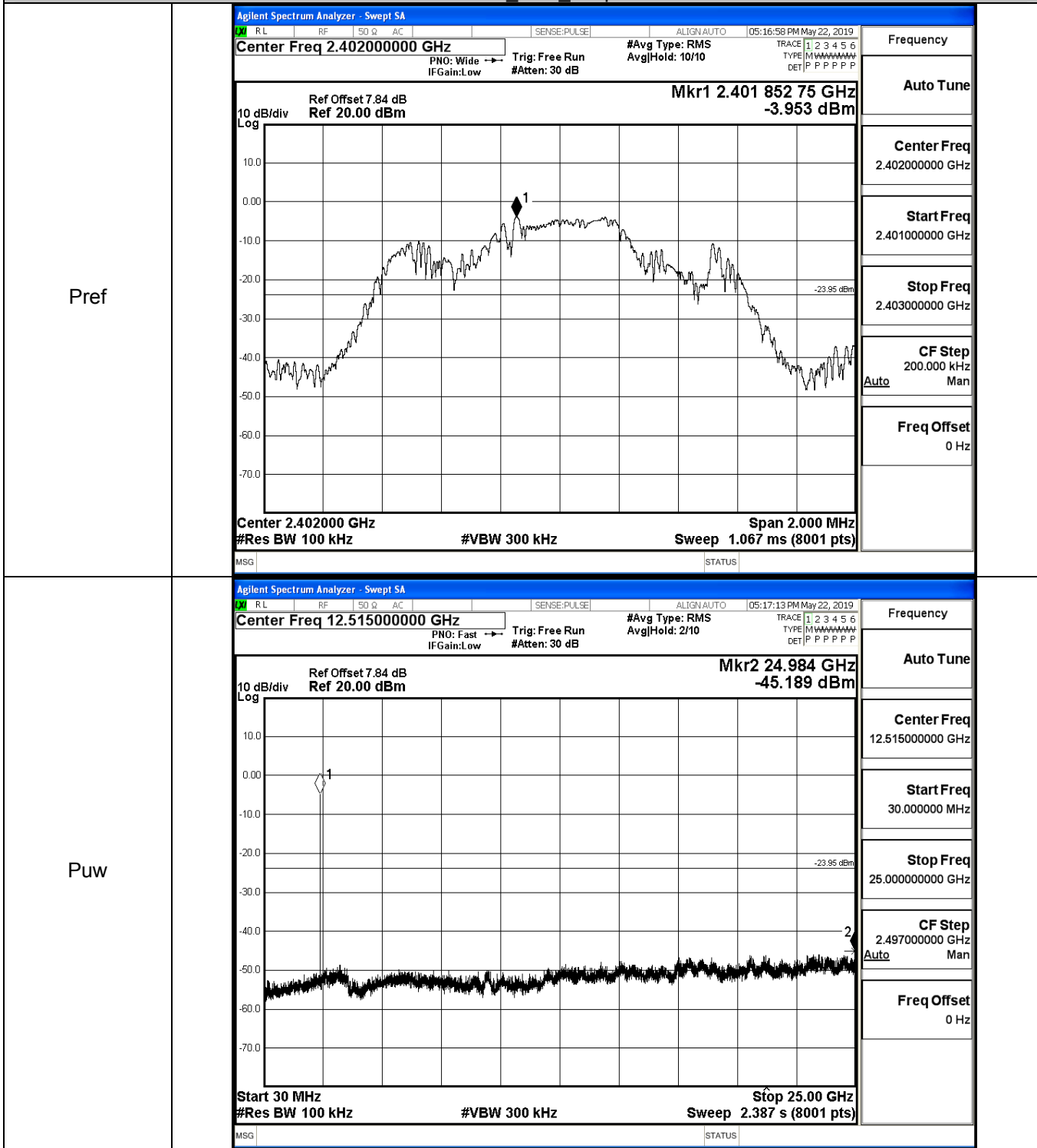
Pref



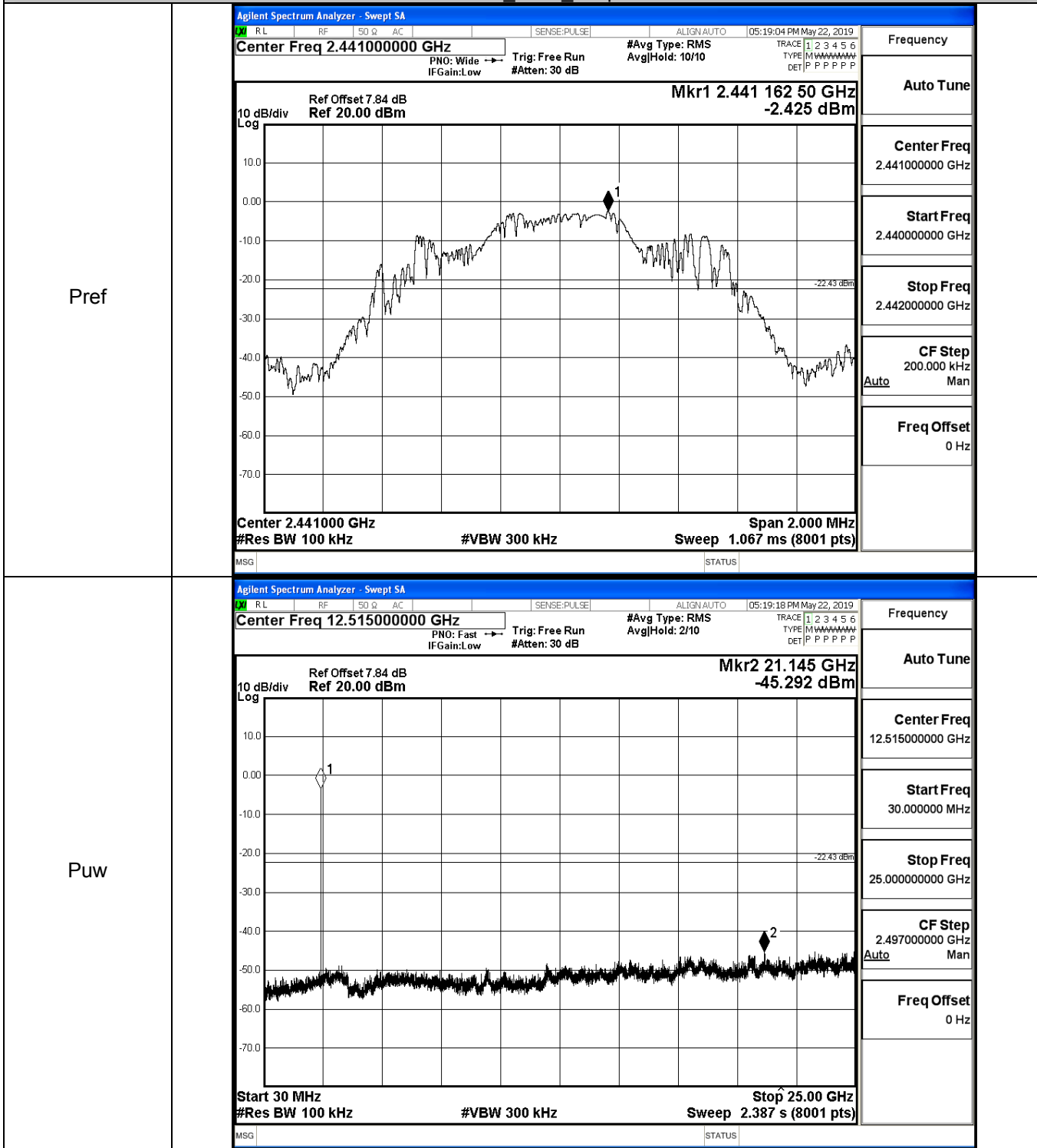
Puw



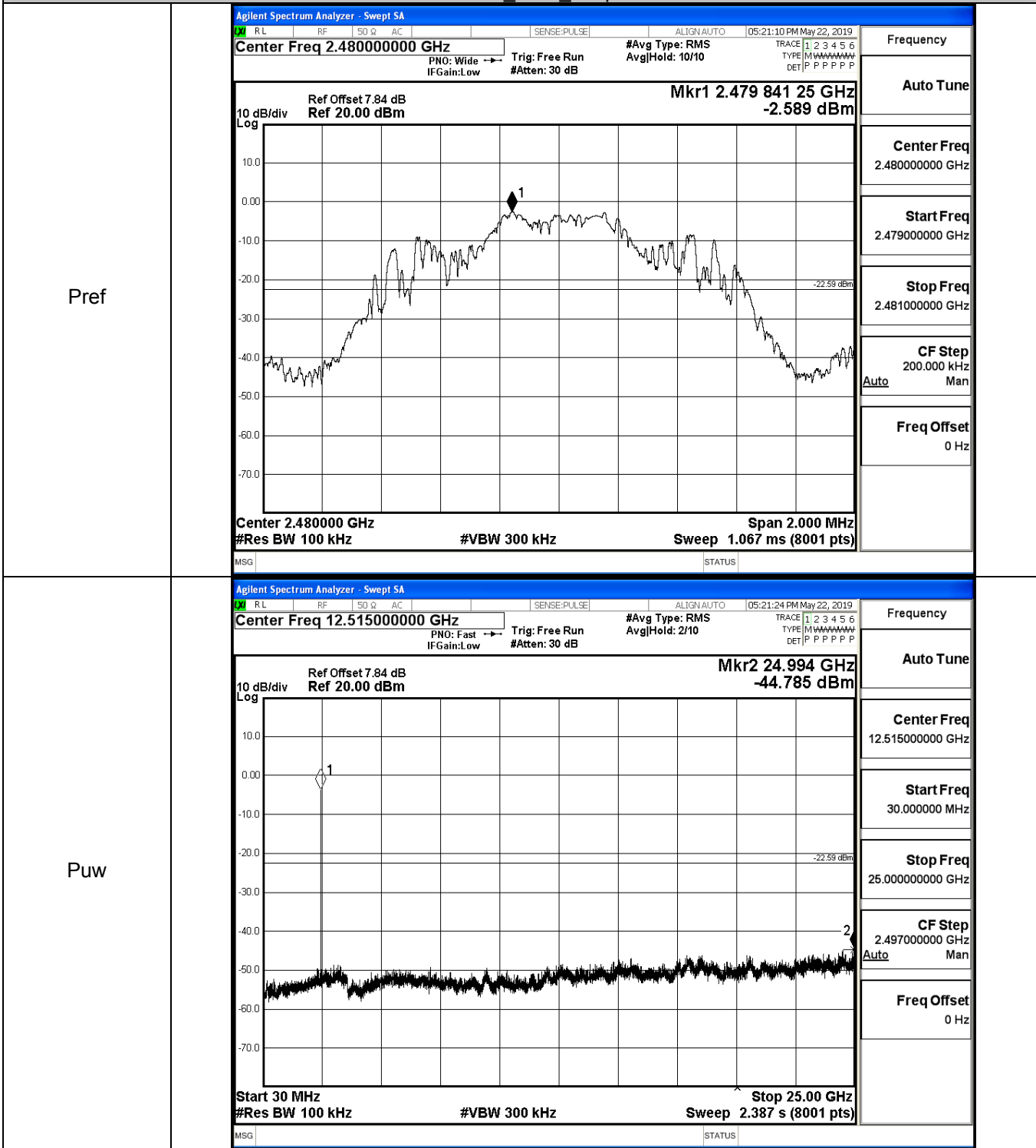
$\pi/4$ DQPSK_LCH_Graphs



$\pi/4$ DQPSK_MCH_Graphs

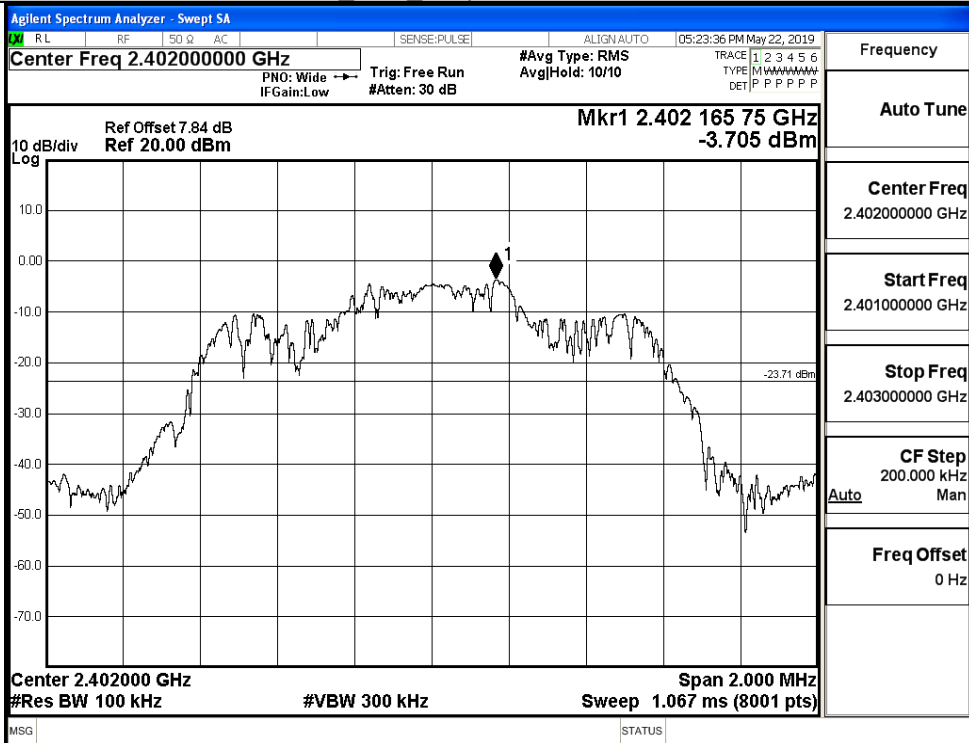


$\pi/4$ DQPSK_HCH_Graphs

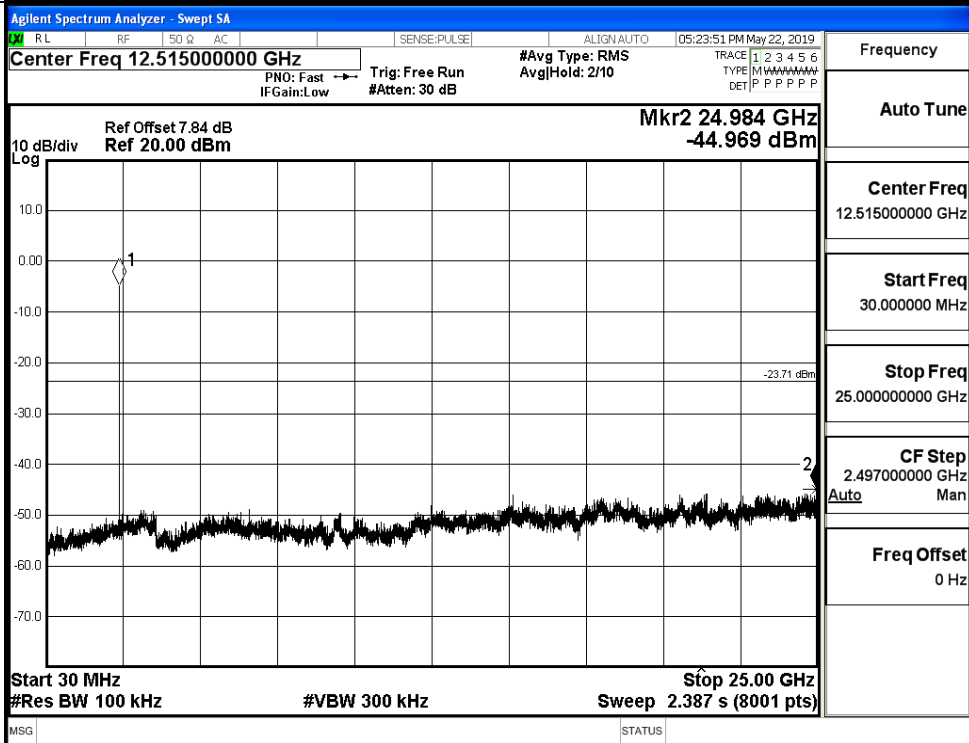


8DPSK_LCH_Graphs

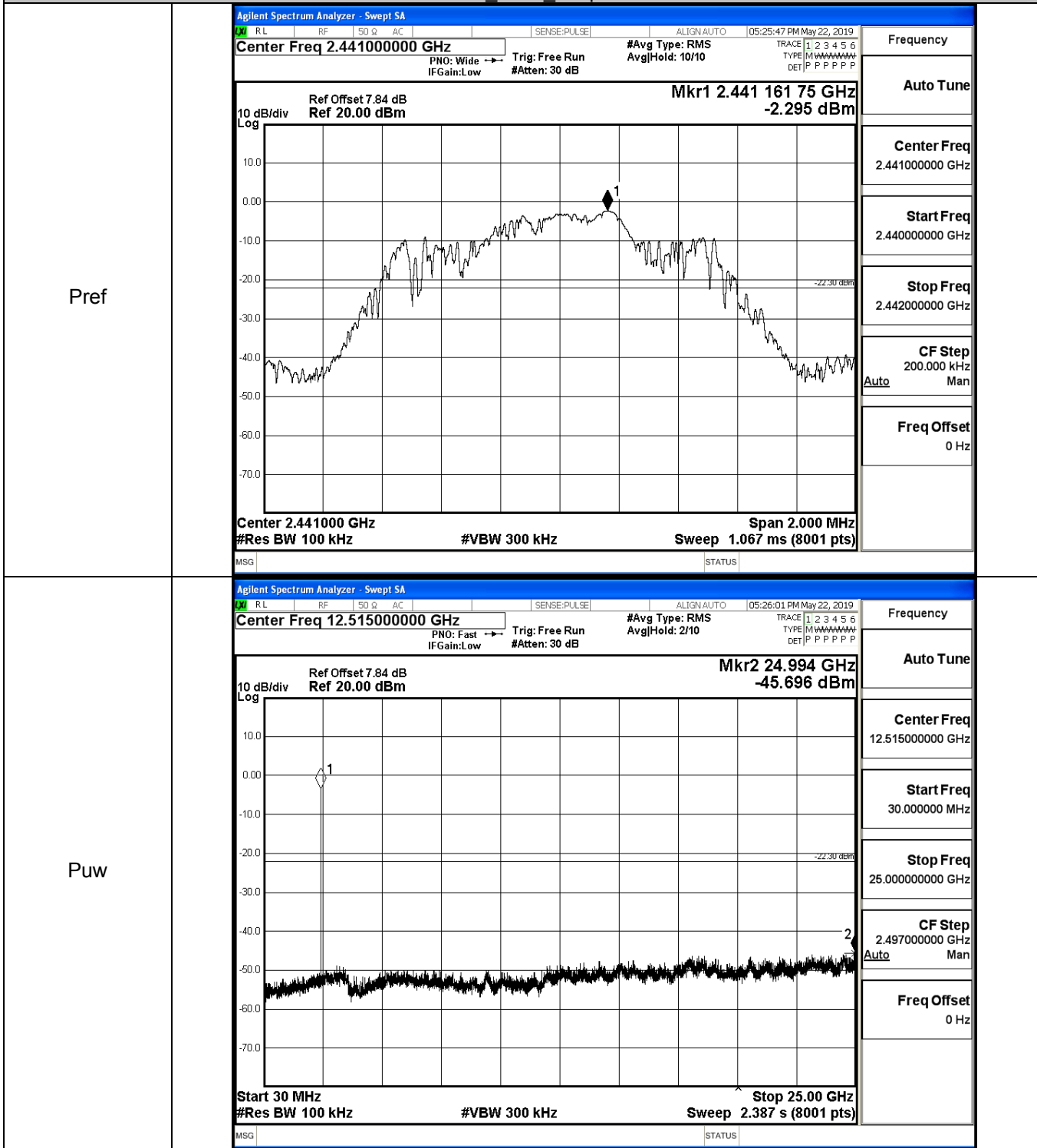
Pref



Puw

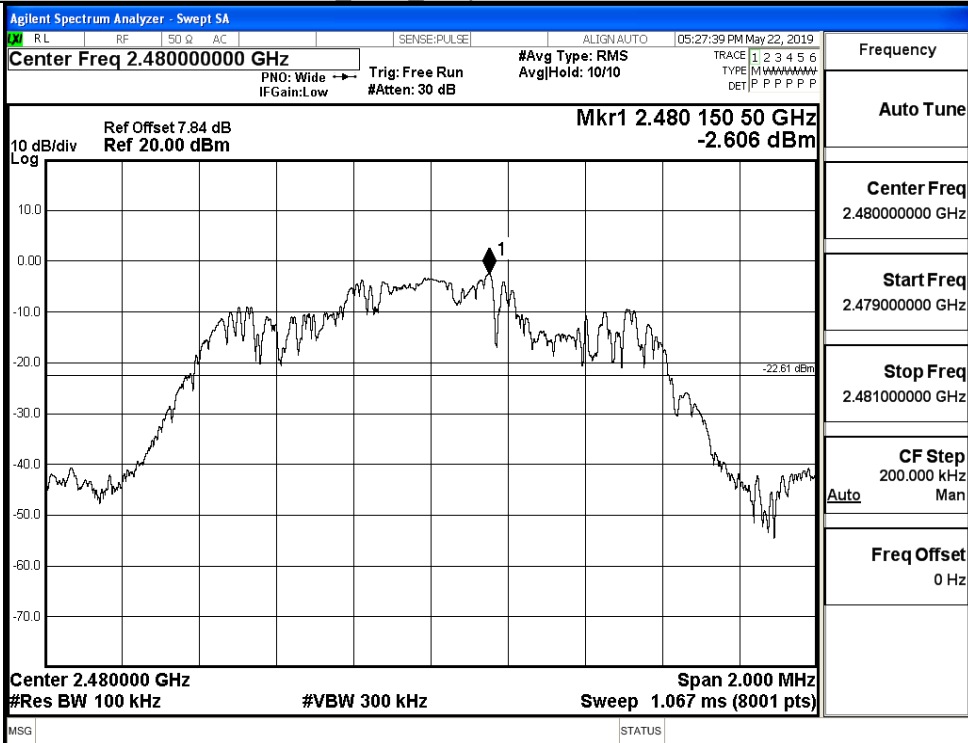


8DPSK_MCH_Graphs

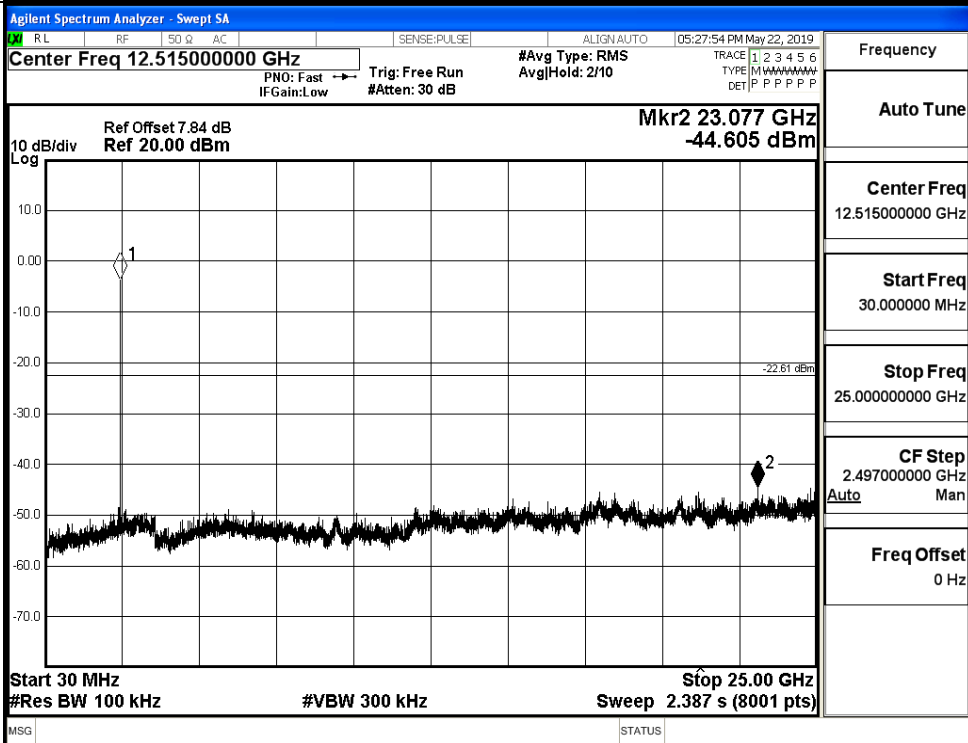


8DPSK_HCH_Graphs

Pref



Puw

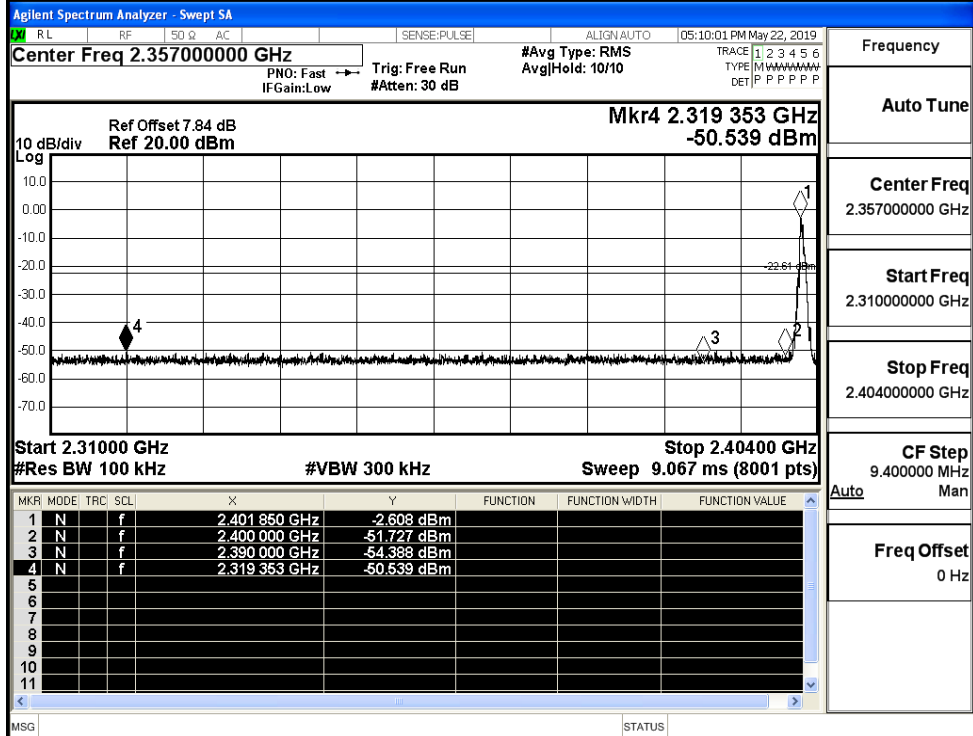


A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-2.608	Off	-50.539	-22.61	PASS
			-0.421	On	-49.330	-20.42	PASS
	HCH	2480	-1.295	Off	-49.870	-21.3	PASS
			0.386	On	-49.062	-19.61	PASS
$\pi/4$ DQPSK	LCH	2402	-4.767	Off	-49.983	-24.77	PASS
			-1.690	On	-49.189	-21.69	PASS
	HCH	2480	-2.566	Off	-50.121	-22.57	PASS
			-0.930	On	-49.337	-20.93	PASS
8DPSK	LCH	2402	-3.751	Off	-49.698	-23.75	PASS
			-1.719	On	-49.927	-21.72	PASS
	HCH	2480	-2.479	Off	-50.303	-22.48	PASS
			-0.867	On	-49.083	-20.87	PASS

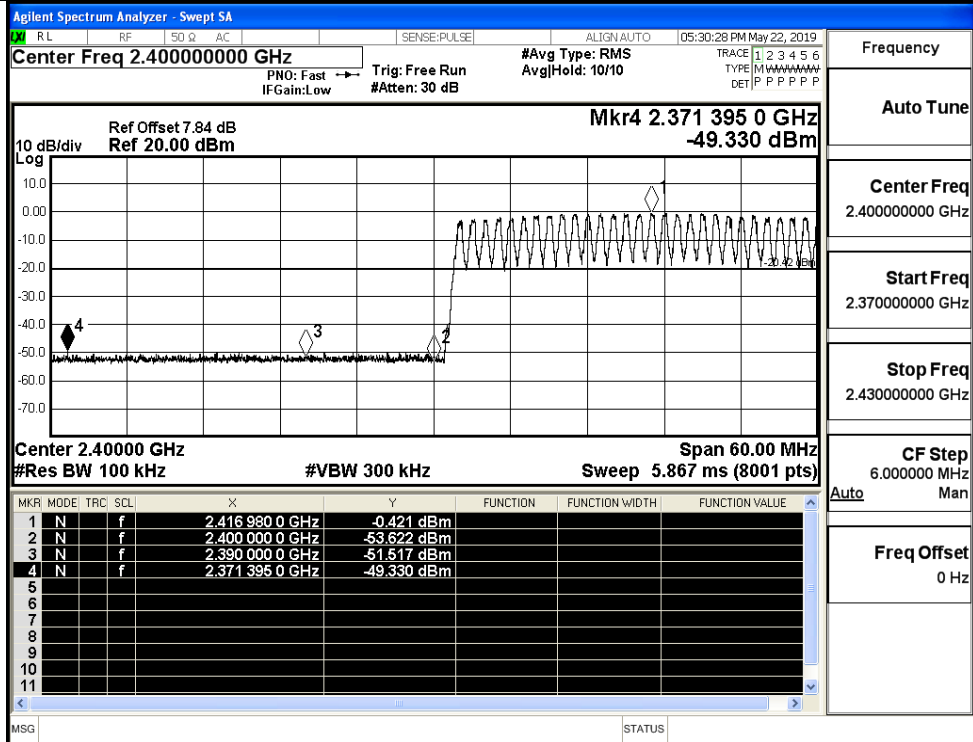
Test Graphs

GFSK/LCH/No Hop



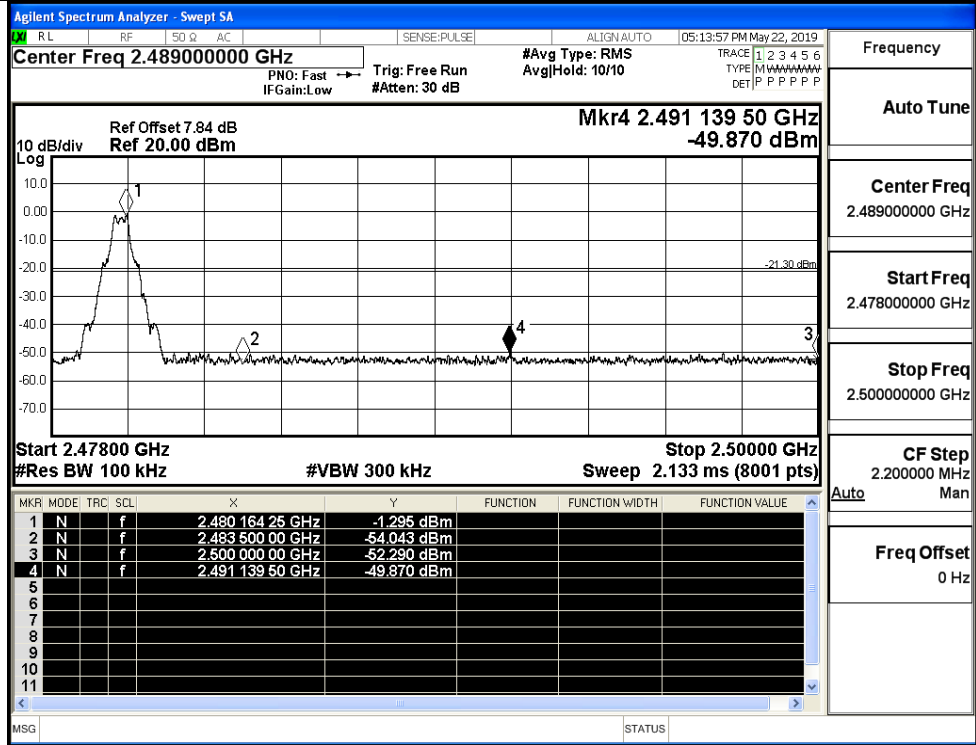
Frequency	Auto Tune
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK/LCH/Hop



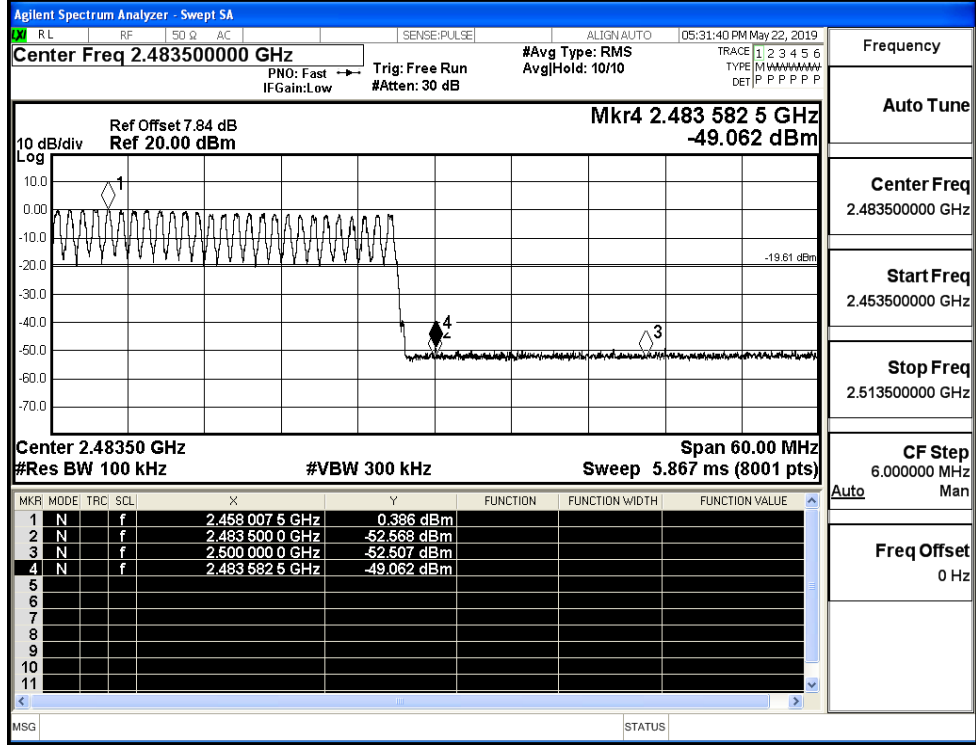
Frequency	Auto Tune
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH/No Hop



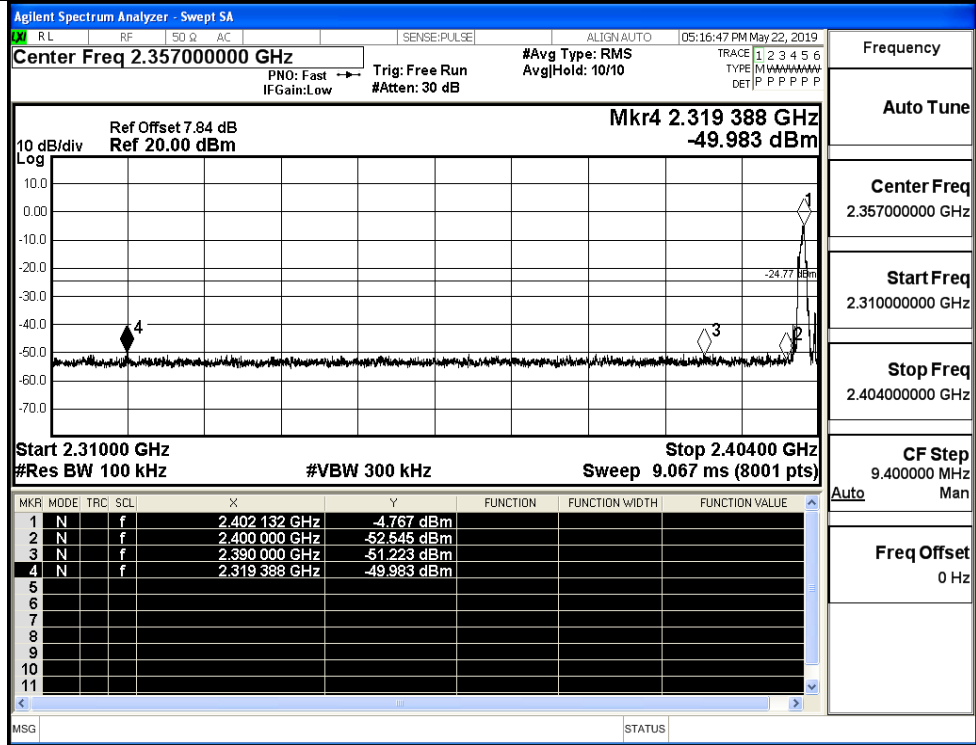
Frequency
Auto Tune
Center Freq
2.489000000 GHz
Start Freq
2.478000000 GHz
Stop Freq
2.500000000 GHz
CF Step
2.200000 MHz
Auto Man
Freq Offset
0 Hz

GFSK/HCH/Hop



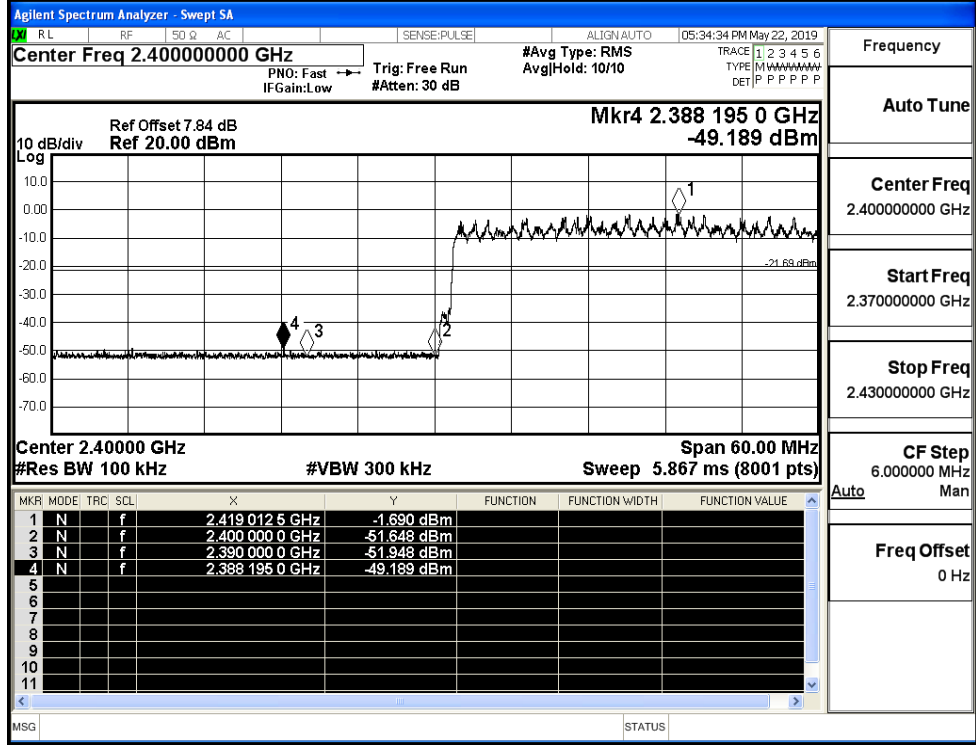
Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.453500000 GHz
Stop Freq
2.513500000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

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



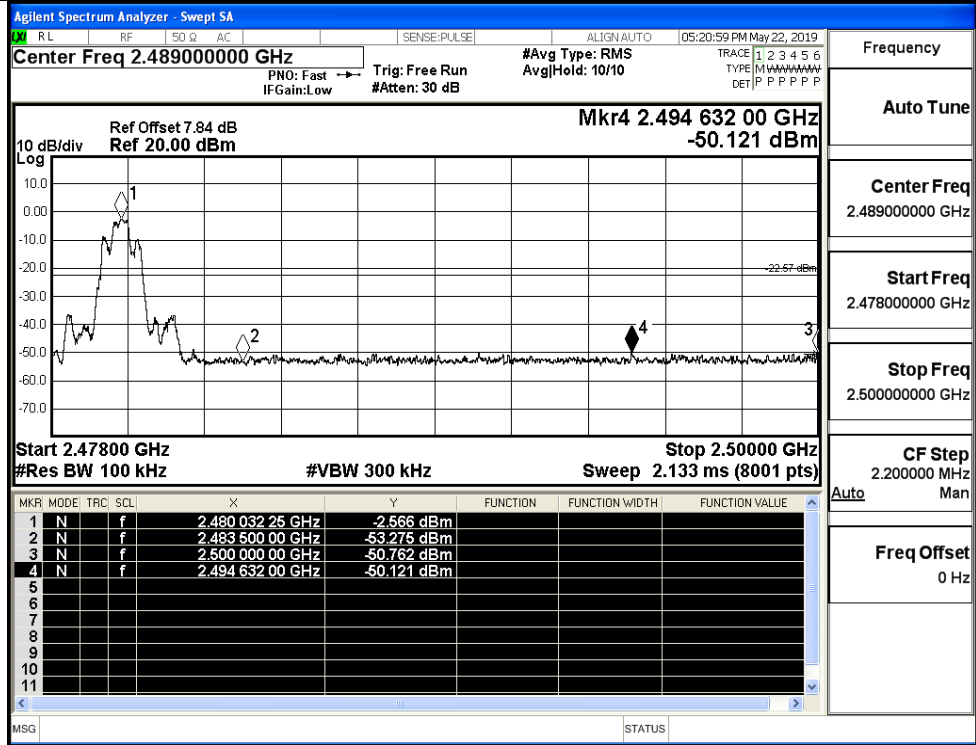
Frequency
Auto Tune
Center Freq
2.357000000 GHz
Start Freq
2.310000000 GHz
Stop Freq
2.404000000 GHz
CF Step
9.400000 MHz
Auto Man
Freq Offset
0 Hz

$\pi/4$ DQPSK/LCH/Hop



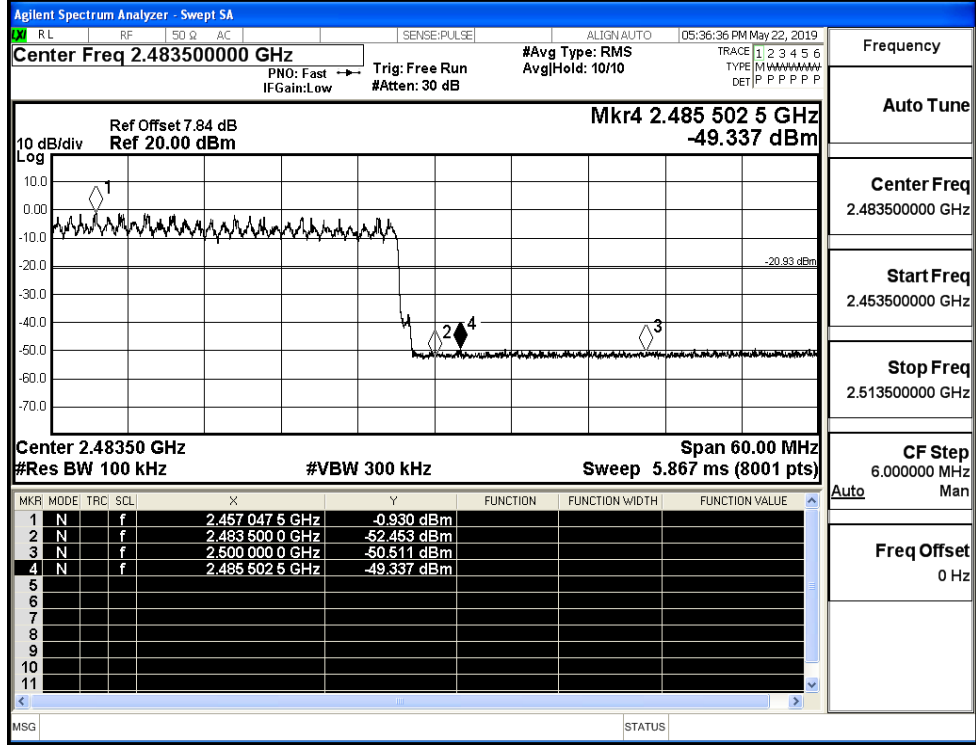
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.370000000 GHz
Stop Freq
2.430000000 GHz
CF Step
6.000000 MHz
Auto Man
Freq Offset
0 Hz

π /4DQPSK/HCH/No
Hop



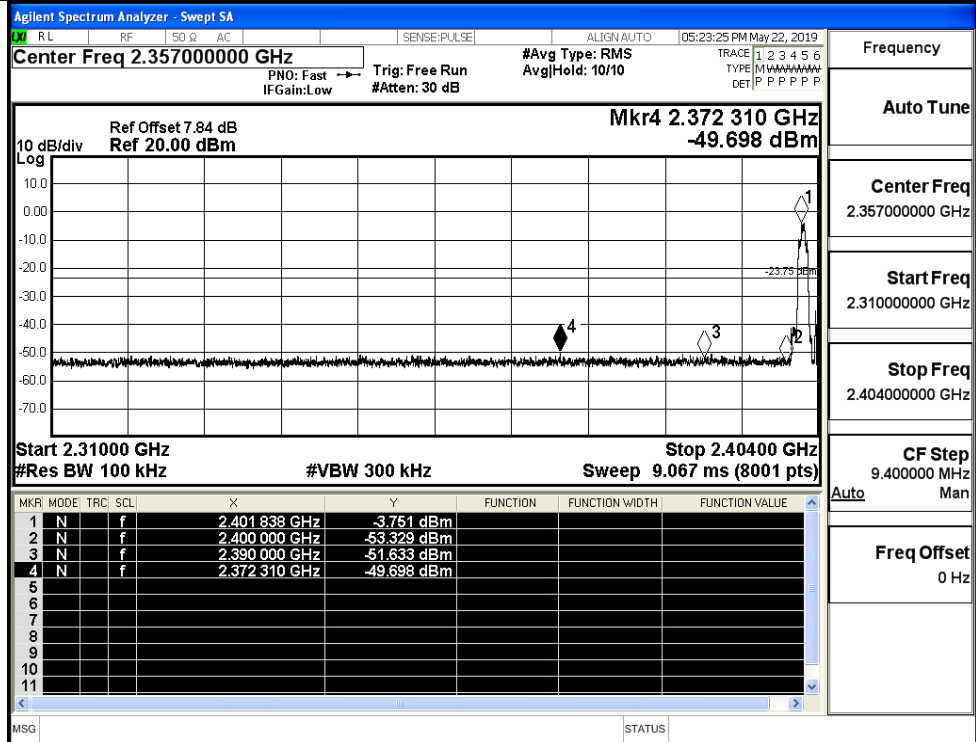
Frequency	2.489000000 GHz
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Freq Offset	0 Hz

π /4DQPSK/HCH/Hop



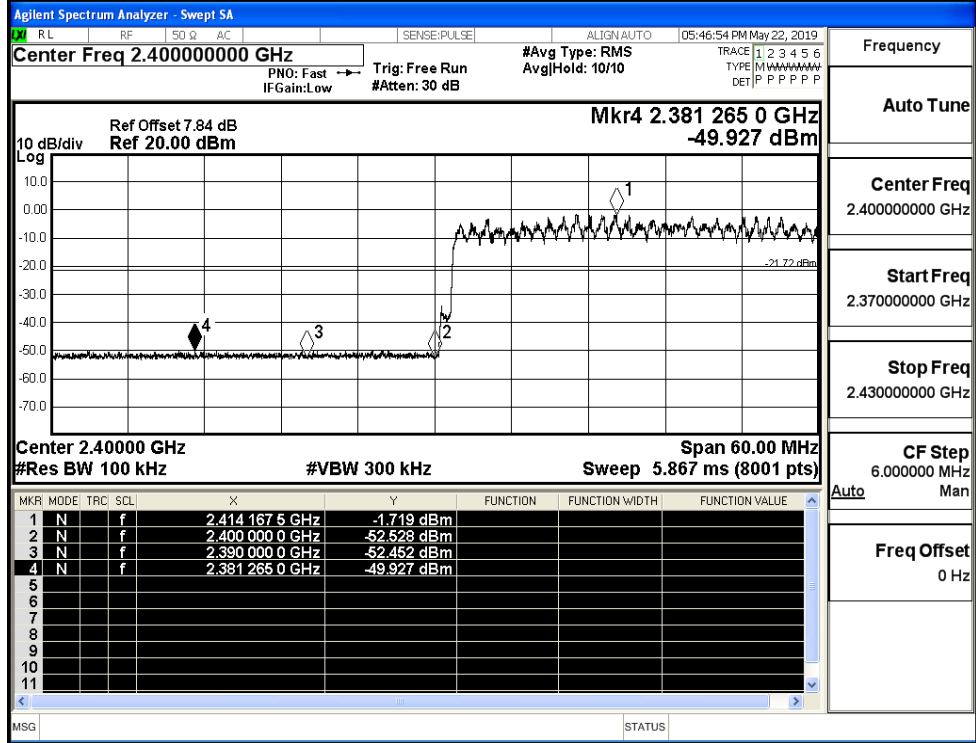
Frequency	2.483500000 GHz
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

8DPSK/LCH/No Hop



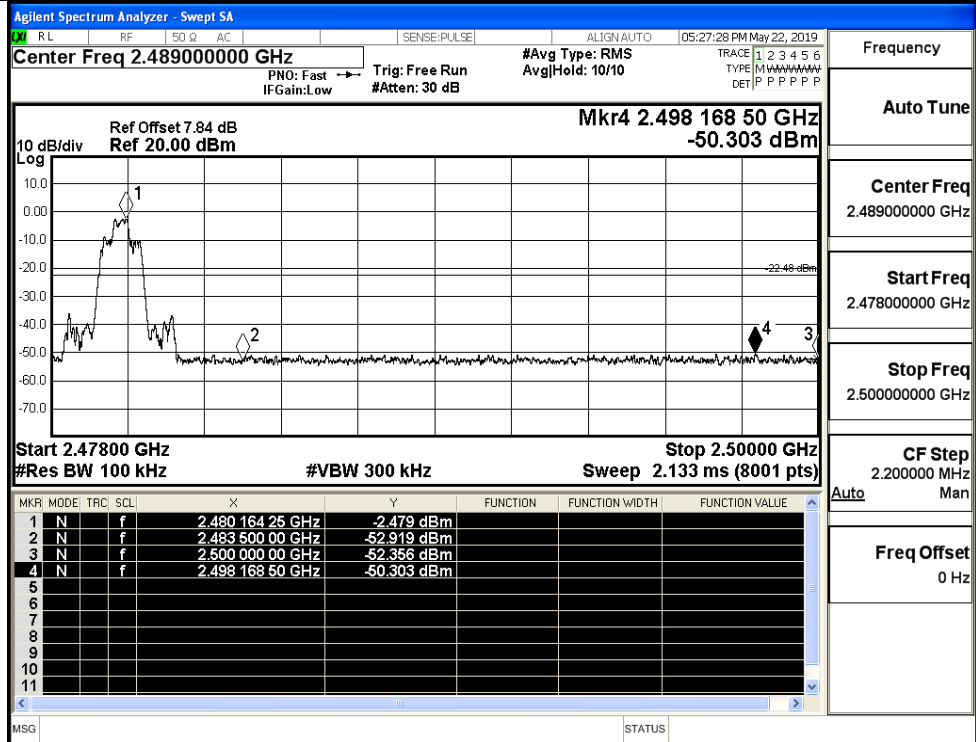
Frequency	2.357000000 GHz
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Freq Offset	0 Hz

8DPSK/LCH/Hop



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

8DPSK/HCH/No Hop



Frequency

Auto Tune

Center Freq
2.489000000 GHz

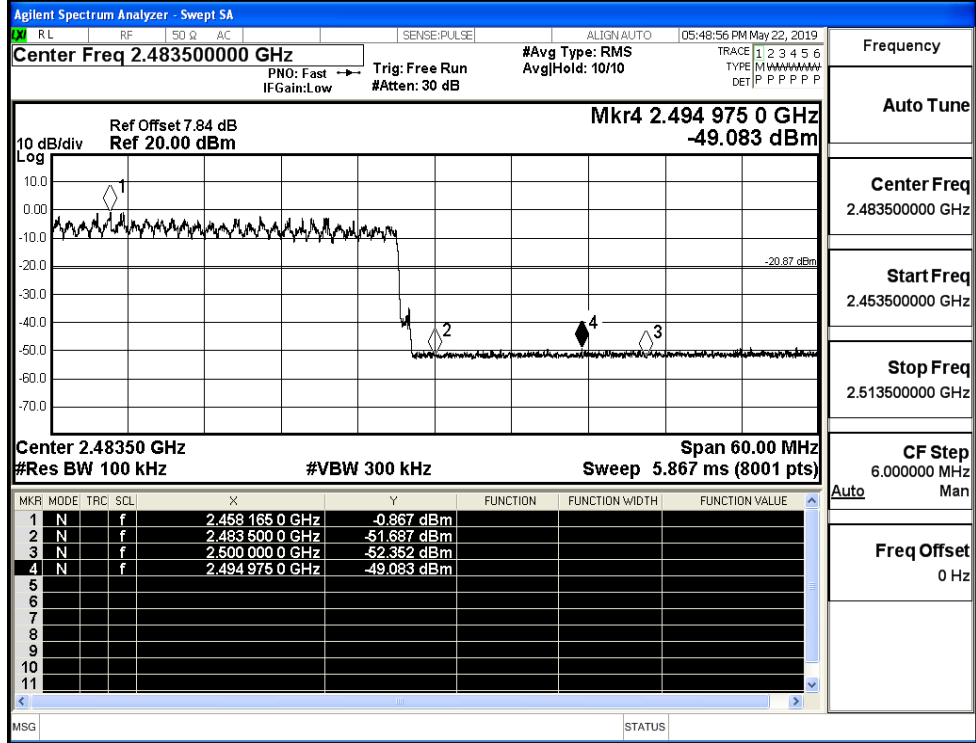
Start Freq
2.478000000 GHz

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

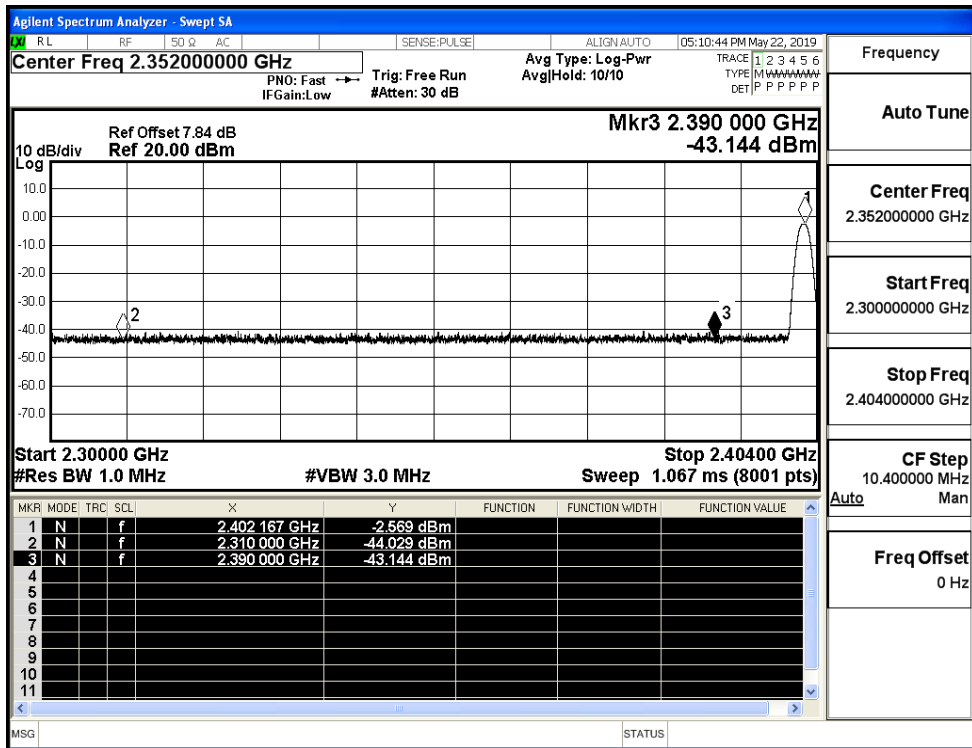
CF Step
6.000000 MHz

Freq Offset
0 Hz

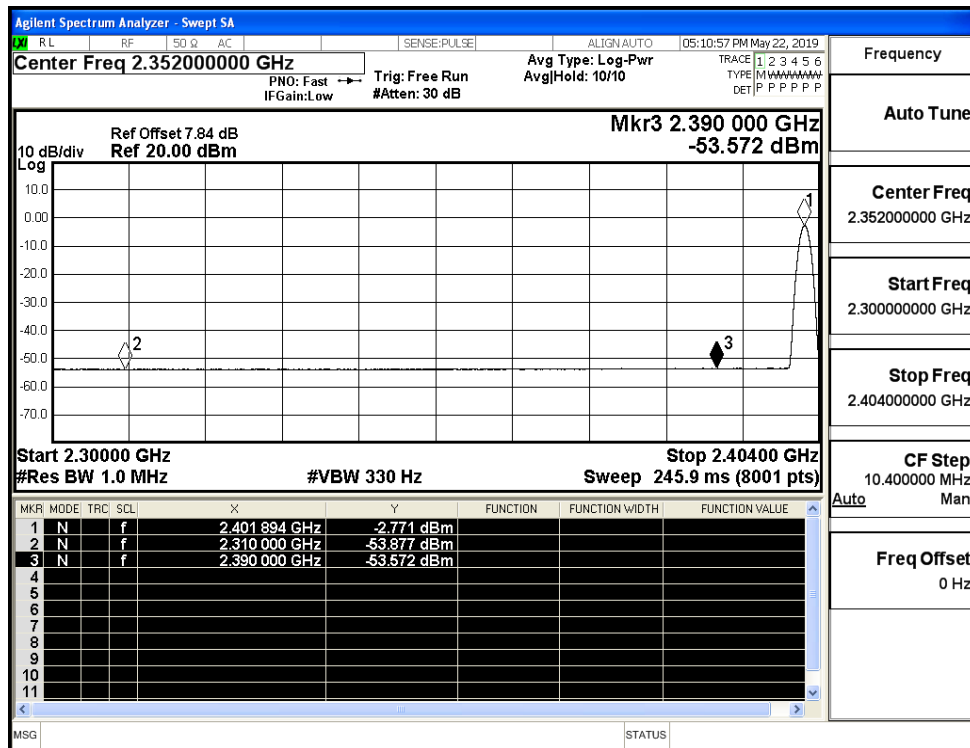
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.03	2.0	0	51.23	PEAK	74	PASS
	Off	2310.0	-53.88	2.0	0	41.38	AV	54	PASS
	Off	2390.0	-43.14	2.0	0	52.11	PEAK	74	PASS
	Off	2390.0	-53.57	2.0	0	41.69	AV	54	PASS
	Off	2483.5	-43.53	2.0	0	51.73	PEAK	74	PASS
	Off	2483.5	-53.31	2.0	0	41.95	AV	54	PASS
	Off	2500.0	-42.79	2.0	0	52.47	PEAK	74	PASS
	Off	2500.0	-53.28	2.0	0	41.98	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-43.43	2.0	0	51.83	PEAK	74	PASS
	Off	2310.0	-53.99	2.0	0	41.27	AV	54	PASS
	Off	2390.0	-42.46	2.0	0	52.80	PEAK	74	PASS
	Off	2390.0	-53.61	2.0	0	41.65	AV	54	PASS
	Off	2483.5	-43.17	2.0	0	52.08	PEAK	74	PASS
	Off	2483.5	-53.39	2.0	0	41.87	AV	54	PASS
	Off	2500.0	-42.49	2.0	0	52.76	PEAK	74	PASS
	Off	2500.0	-53.21	2.0	0	42.05	AV	54	PASS
8DPSK	Off	2310.0	-44.06	2.0	0	51.20	PEAK	74	PASS
	Off	2310.0	-53.91	2.0	0	41.34	AV	54	PASS
	Off	2390.0	-44.21	2.0	0	51.05	PEAK	74	PASS
	Off	2390.0	-53.65	2.0	0	41.61	AV	54	PASS
	Off	2483.5	-43.68	2.0	0	51.58	PEAK	74	PASS
	Off	2483.5	-53.33	2.0	0	41.93	AV	54	PASS
	Off	2500.0	-43.15	2.0	0	52.10	PEAK	74	PASS
	Off	2500.0	-53.15	2.0	0	42.11	AV	54	PASS

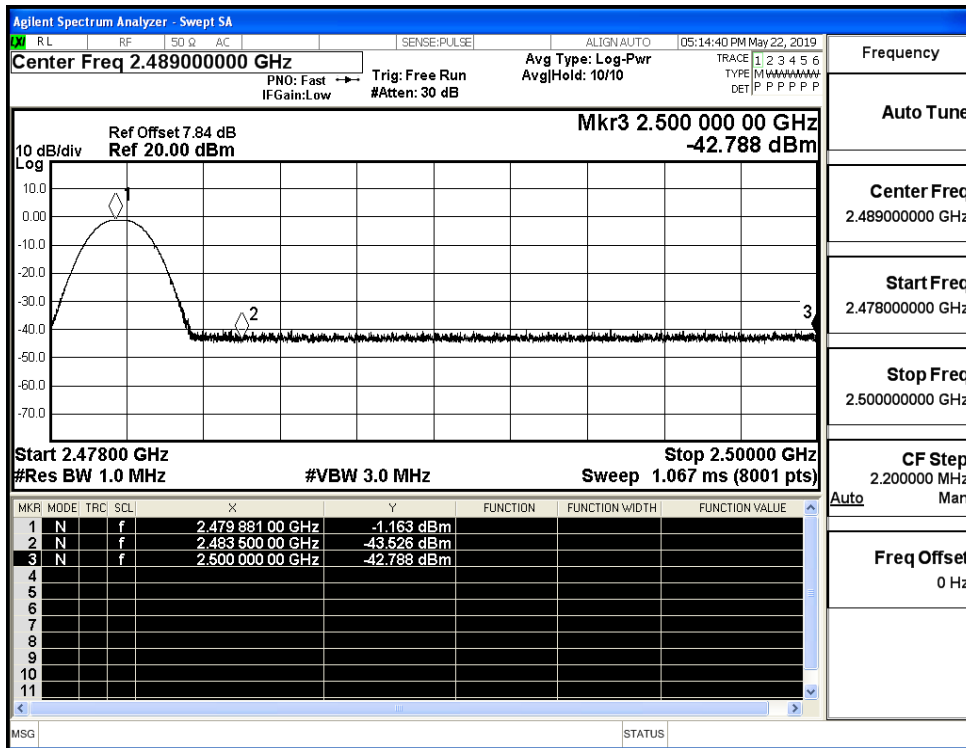
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



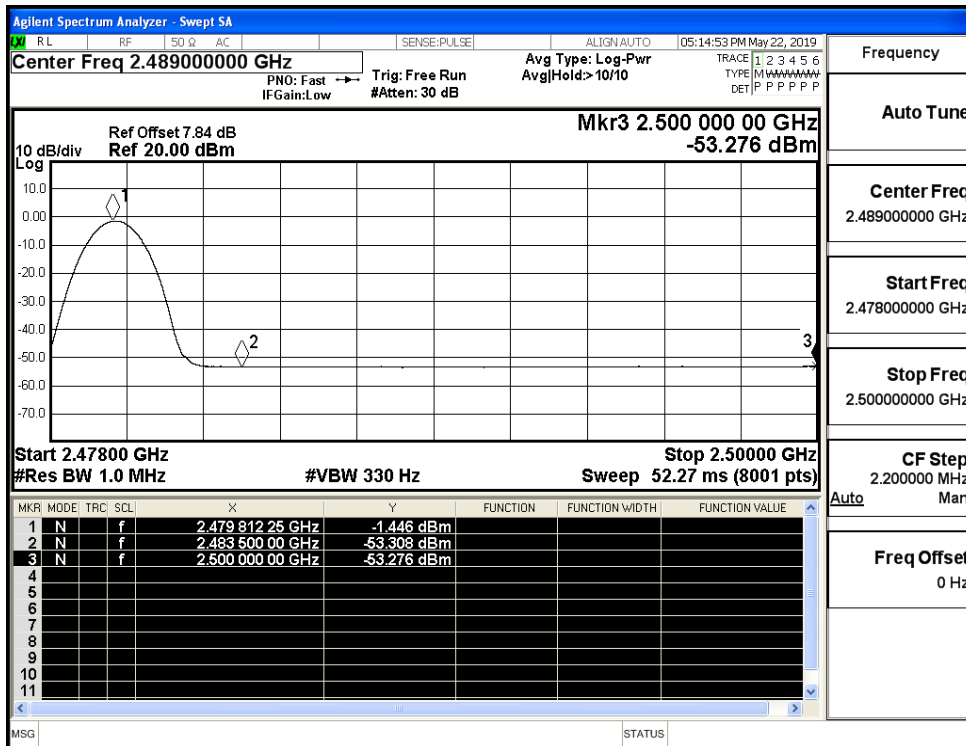
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



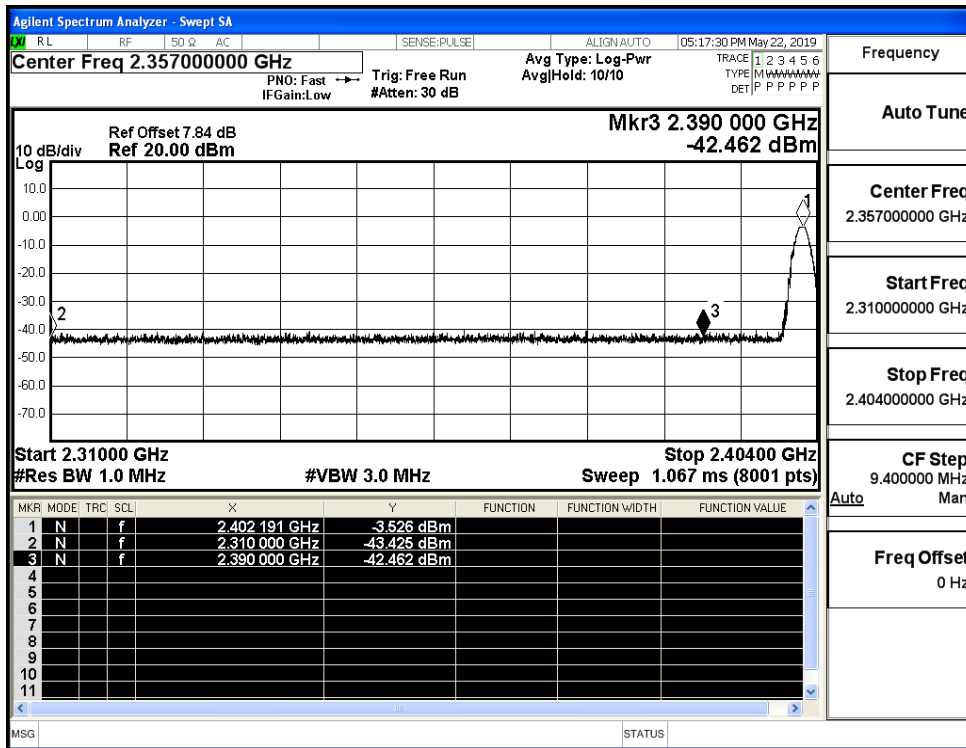
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



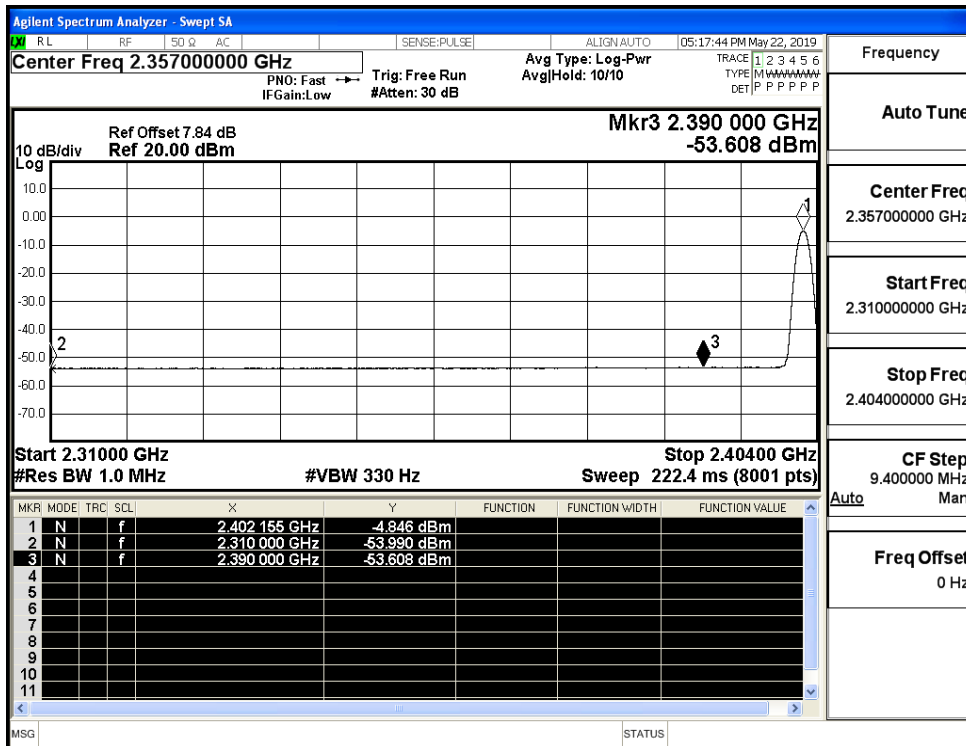
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



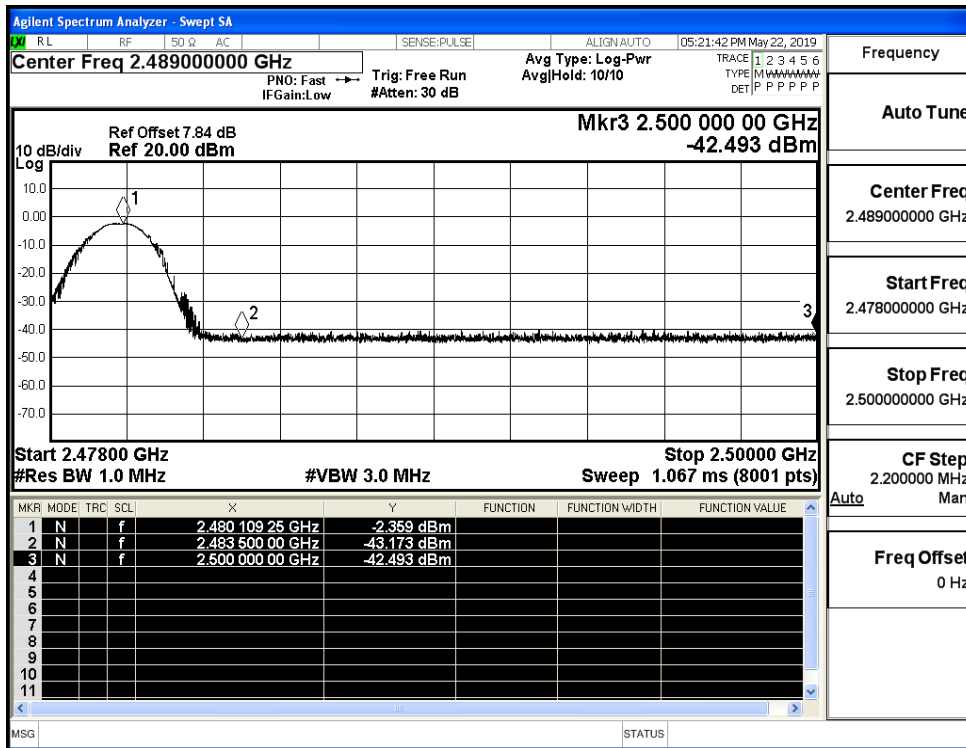
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



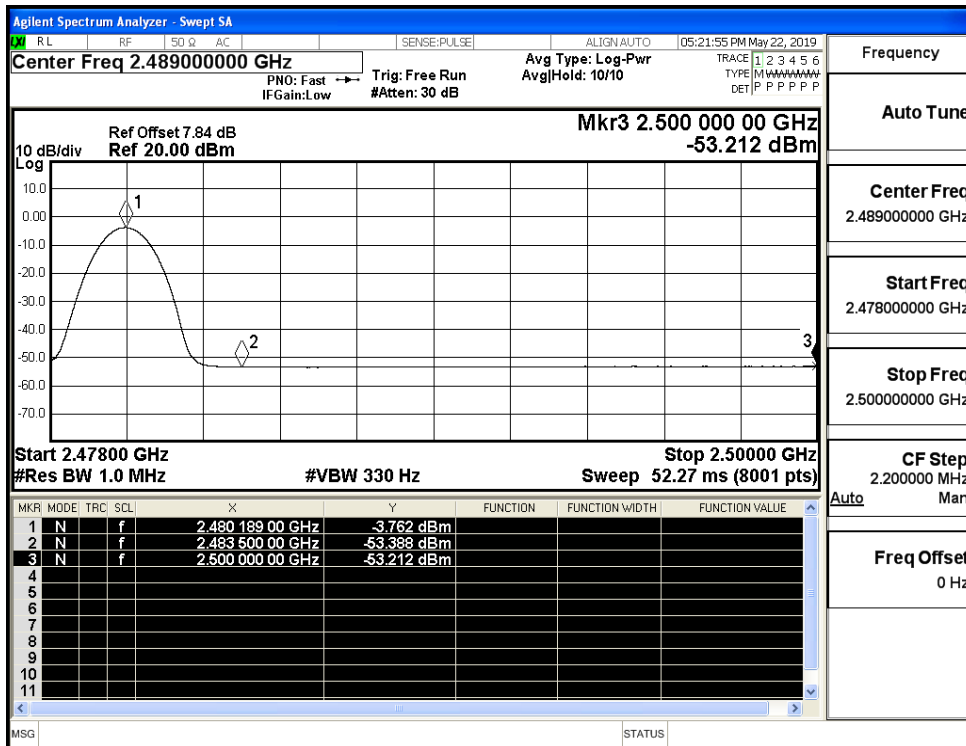
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_Average (Low Channel)



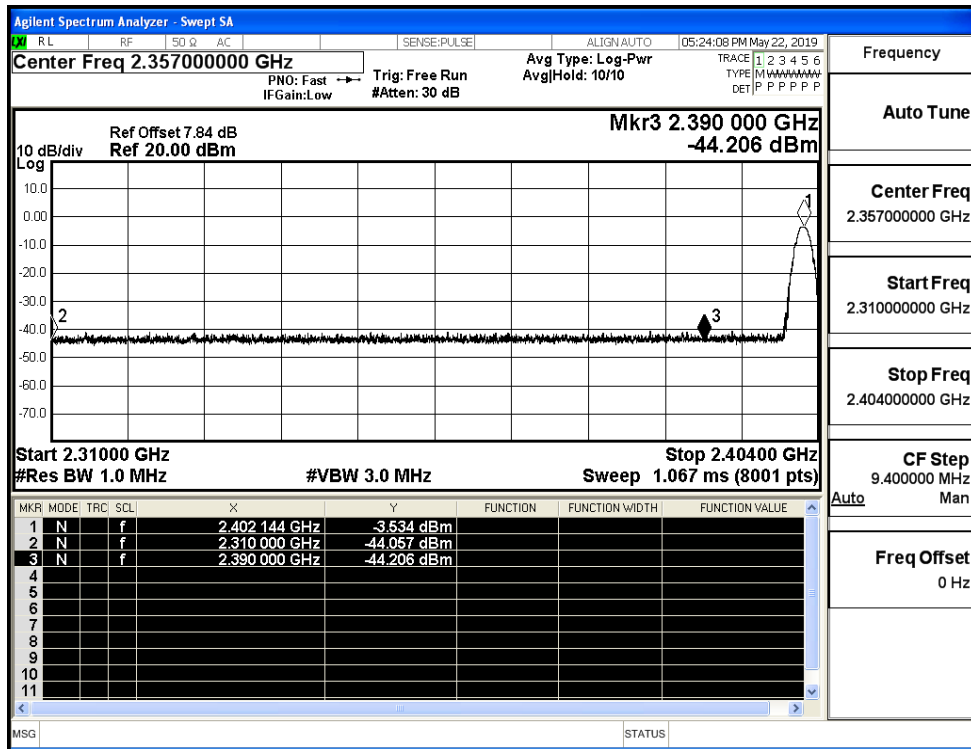
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



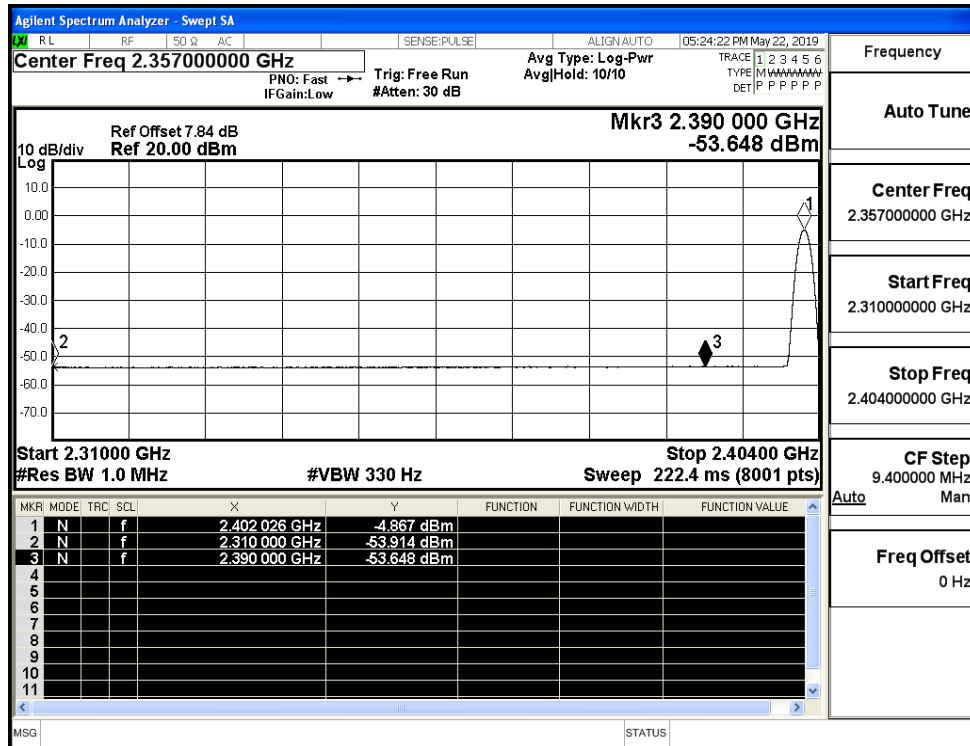
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)



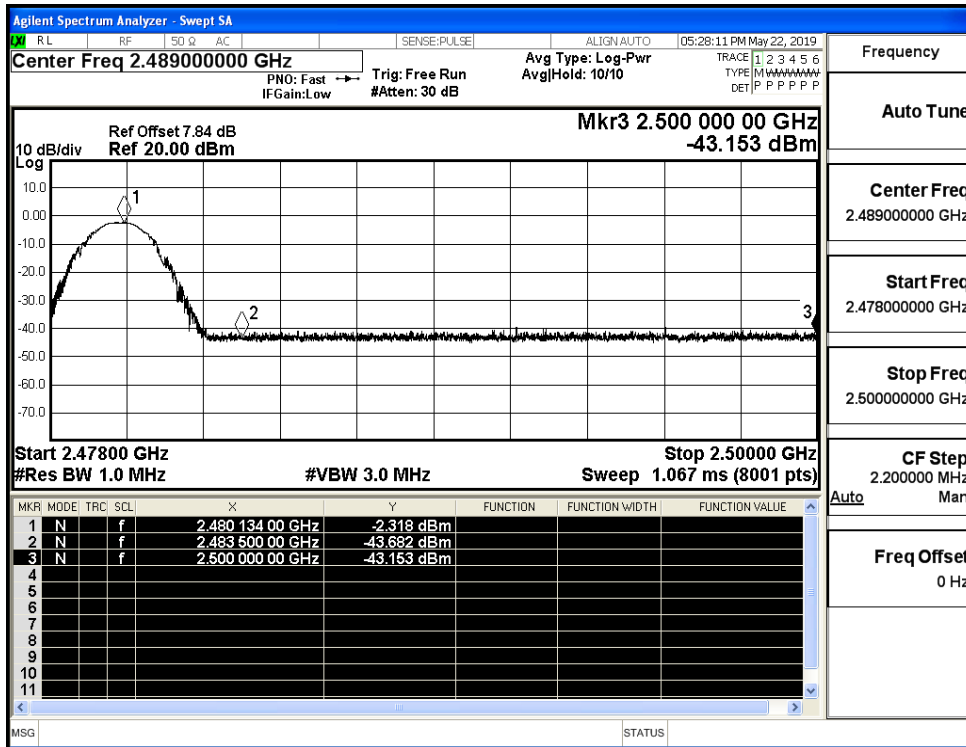
Restrict-band band-edge measurements_Hopping Off_8DPSK_PEAK (Low Channel)



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)

