

Appendix A

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

Product Name: WIRELESS EARBUDS

Trade Mark: iWorld

Test Model: FVBT1001-GRY

Environmental Conditions

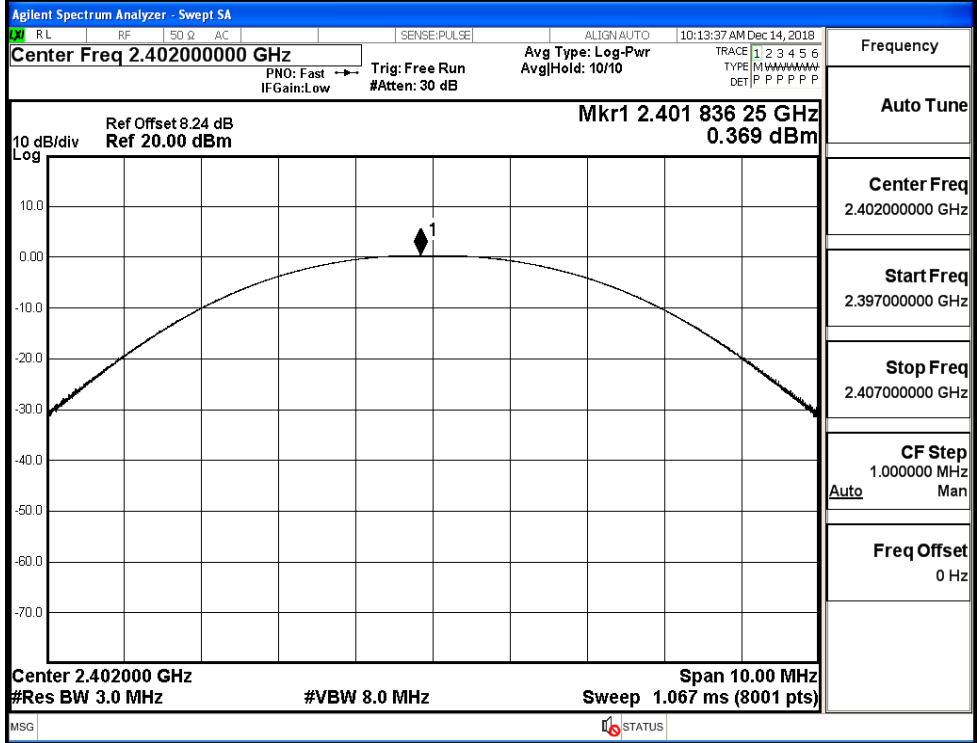
Temperature:	23.4 °C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Diamond Lu
Supervised by:	Jayden Zhuo

A.1 Maximum Conducted Peak Output Power

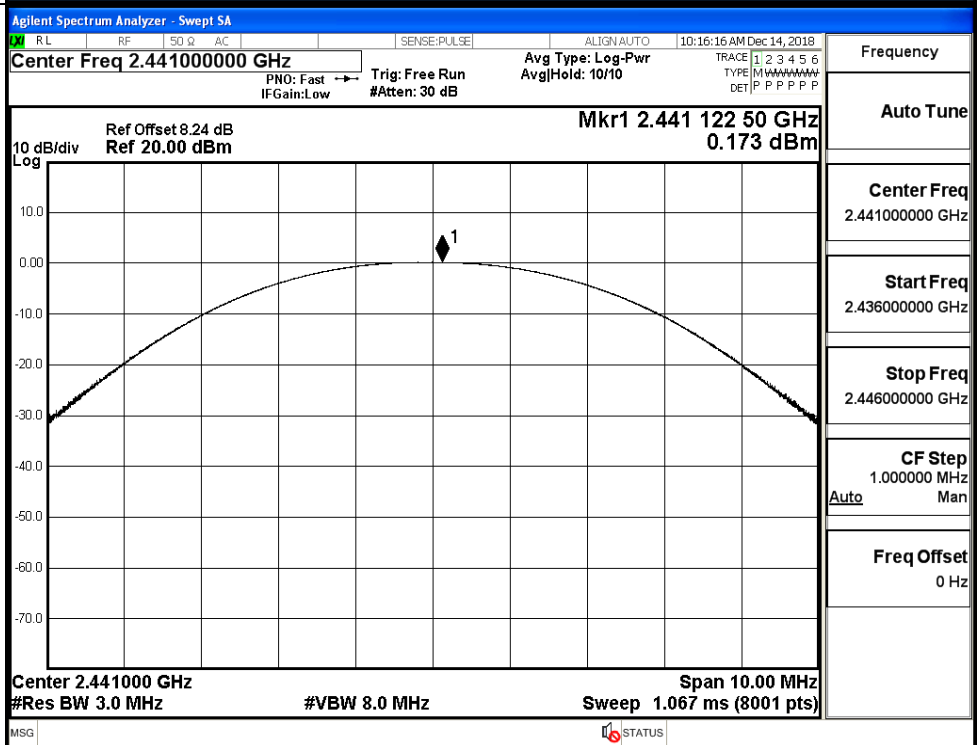
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	0.369	21	PASS
	MCH	0.173	21	PASS
	HCH	-0.559	21	PASS
π/4DQPSK	LCH	-0.179	21	PASS
	MCH	-1.197	21	PASS
	HCH	-1.085	21	PASS

Test Graphs

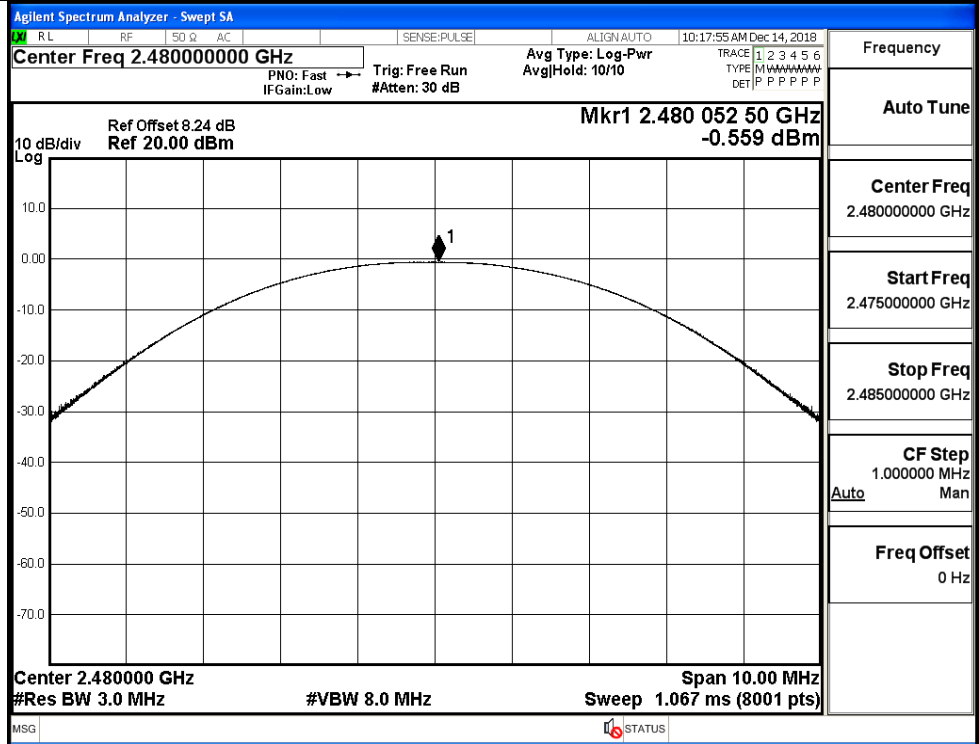
GFSK/LCH



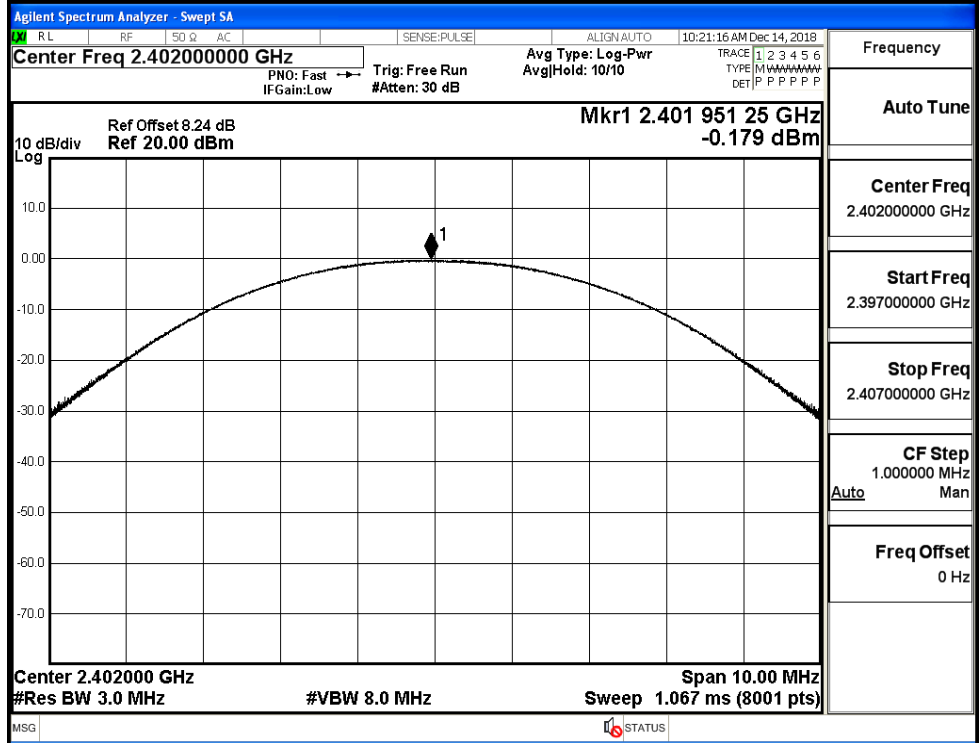
GFSK/MCH



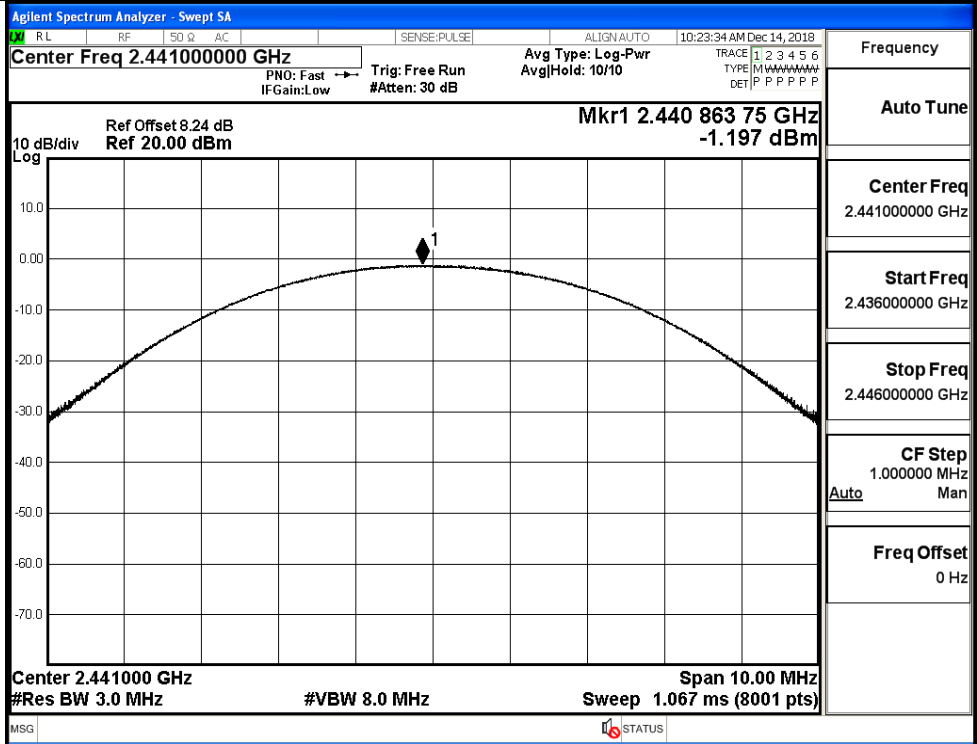
GFSK/HCH



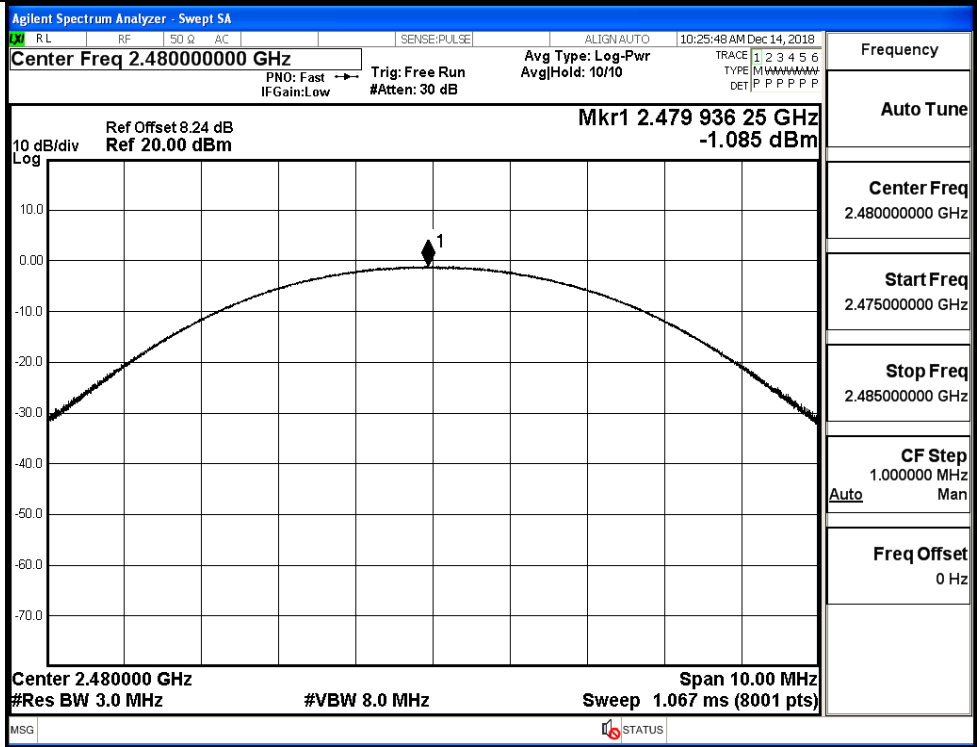
π /4DQPSK/LCH



π /4DQPSK/MCH

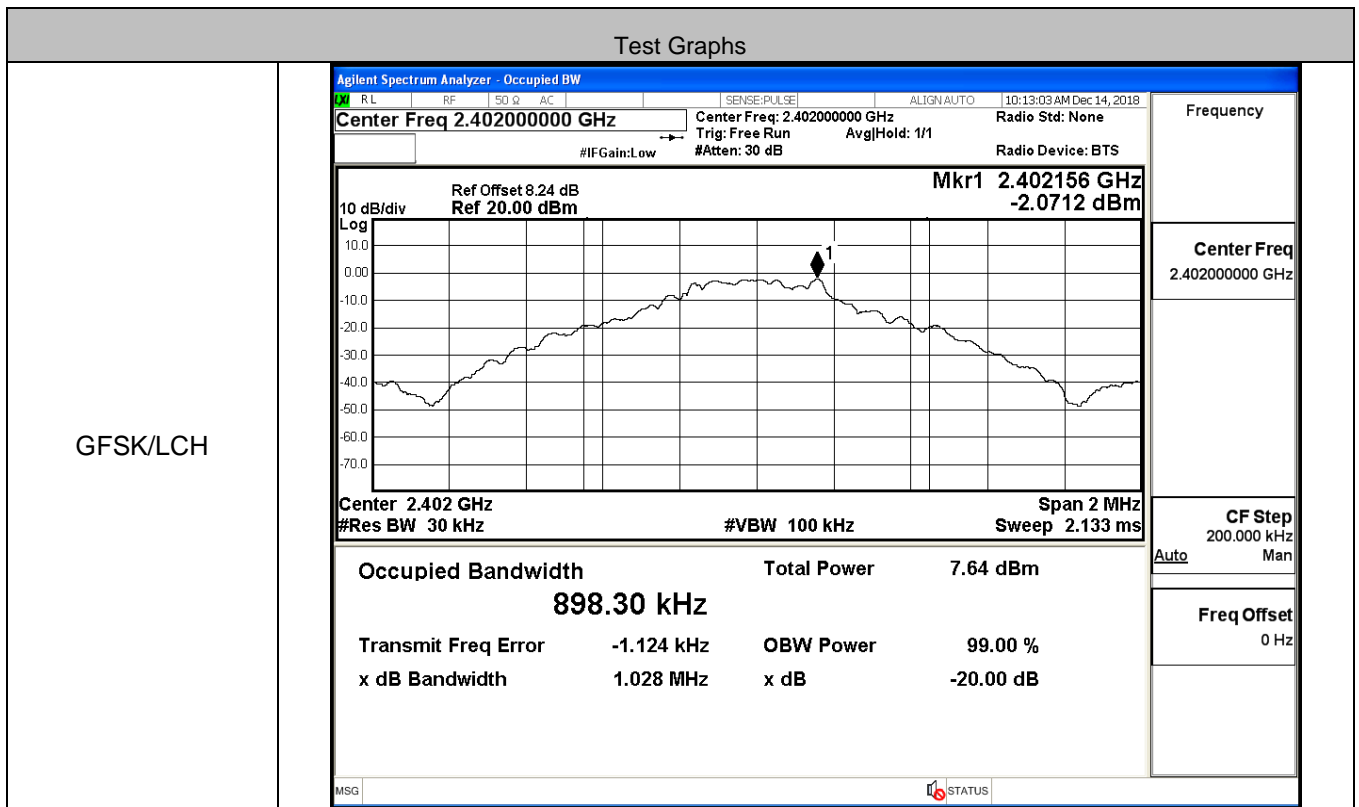


π /4DQPSK/HCH

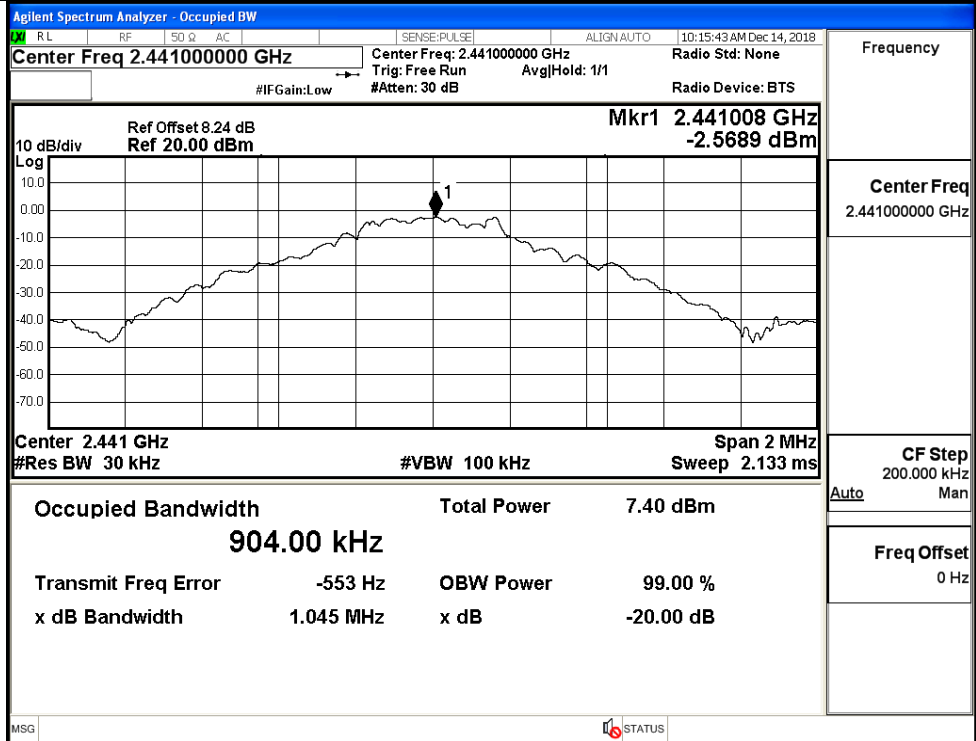


A.2 99% and 20dB Bandwidth

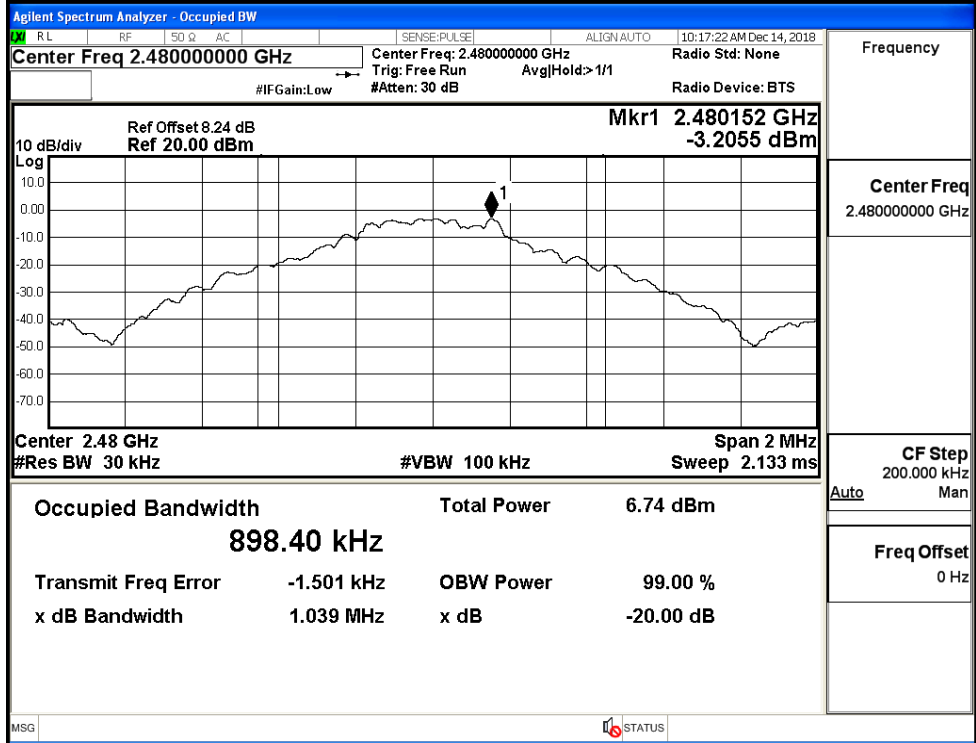
Mode	Channel.	99% Bandwidth [MHz]	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.89830	1.028	Not Specified	PASS
	MCH	0.90400	1.045	Not Specified	PASS
	HCH	0.89840	1.039	Not Specified	PASS
π/4DQPSK	LCH	1.1695	1.290	Not Specified	PASS
	MCH	1.1673	1.286	Not Specified	PASS
	HCH	1.1701	1.290	Not Specified	PASS



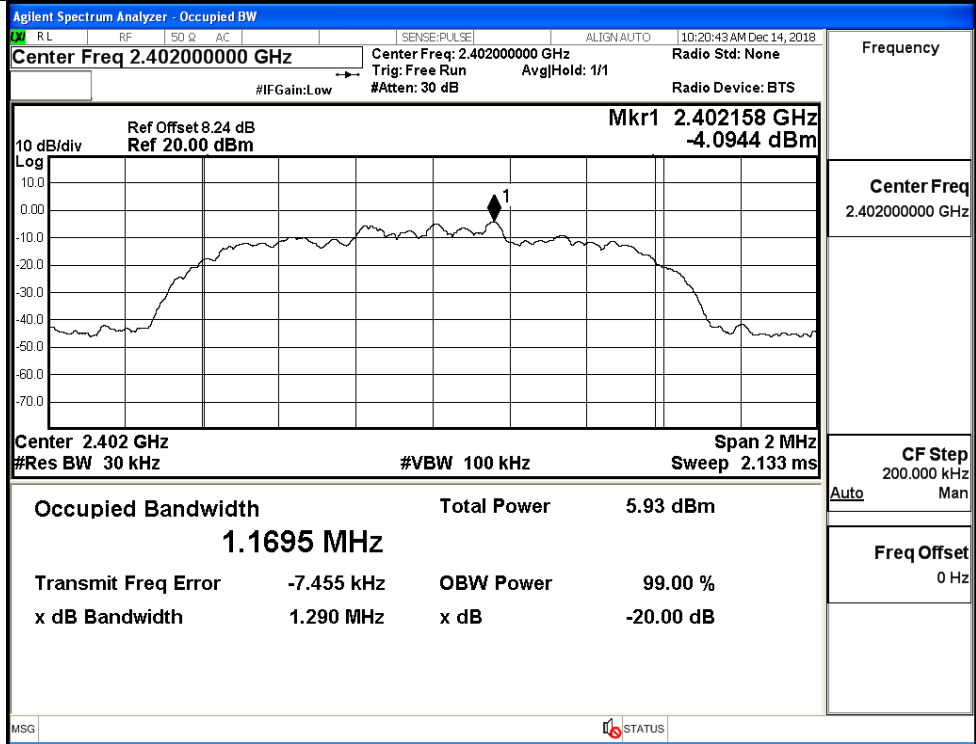
GFSK/MCH



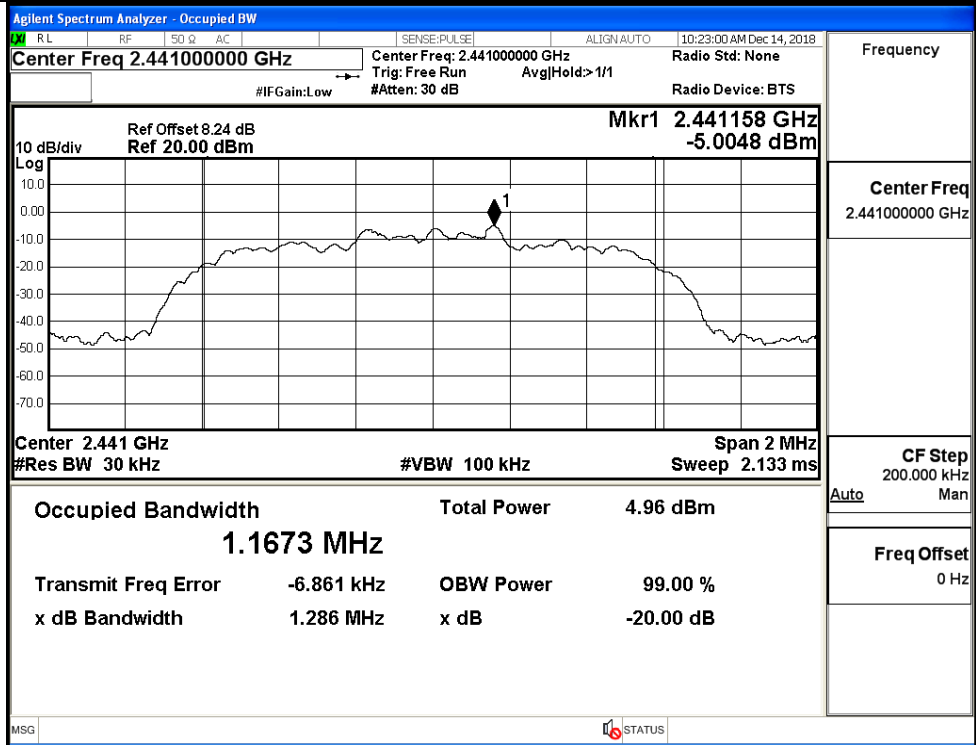
GFSK/HCH



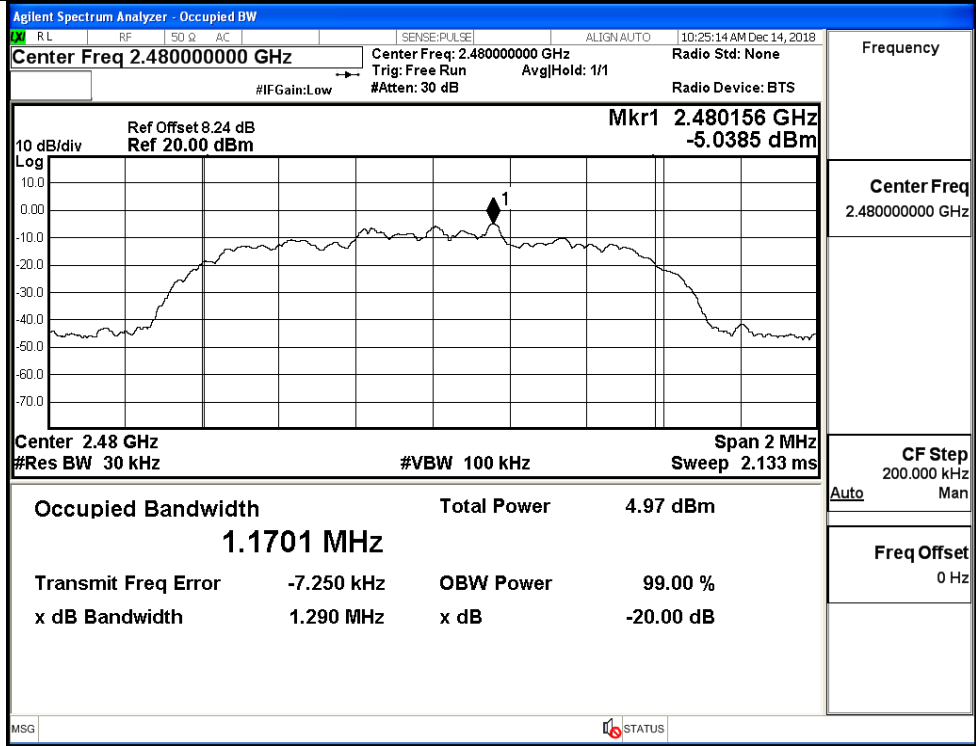
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH

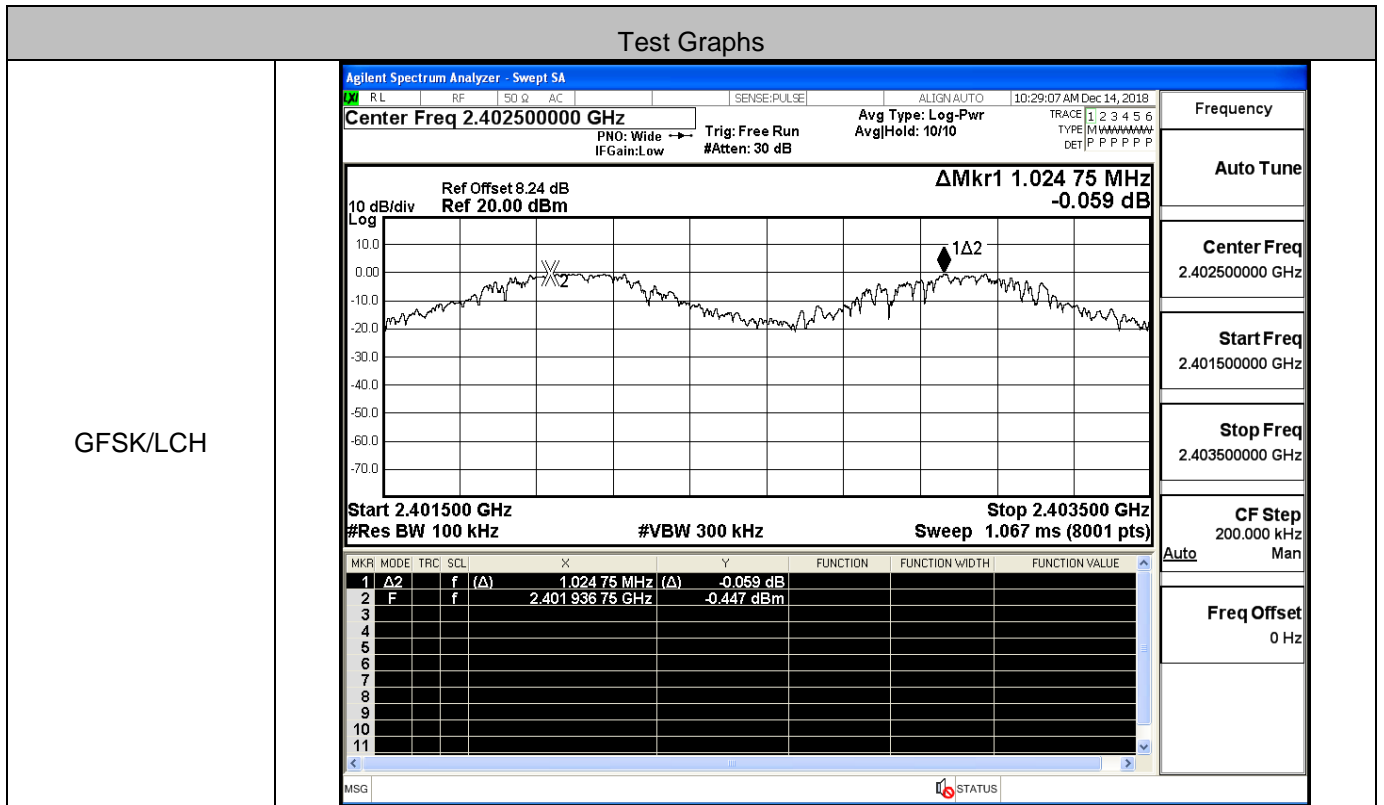


$\pi/4$ DQPSK/HCH

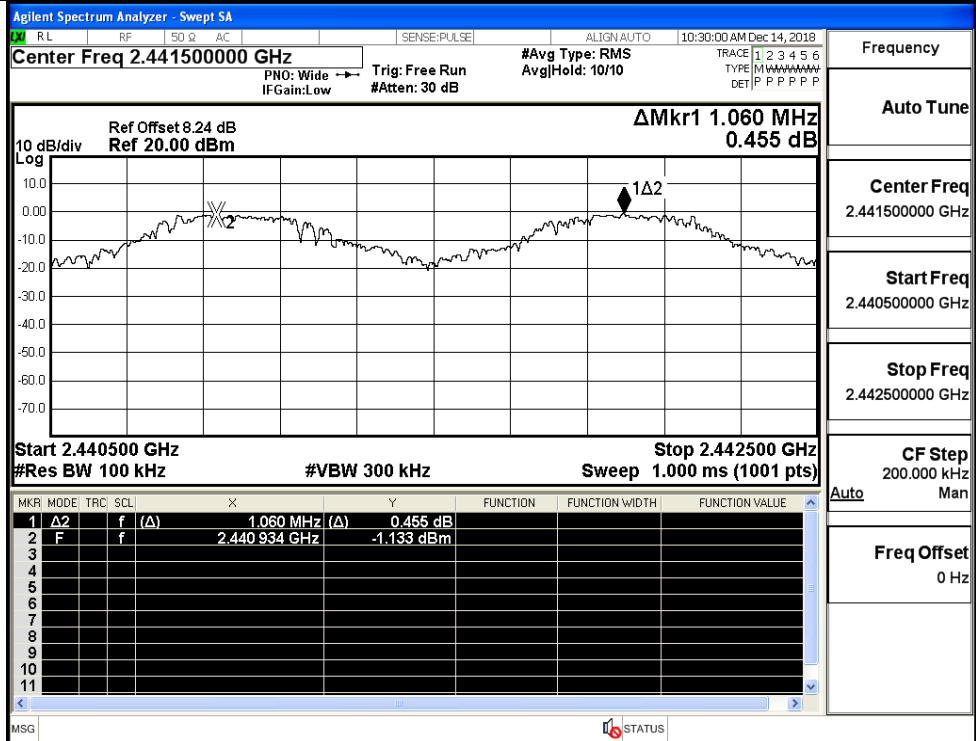


A.3 Carrier Frequency Separation

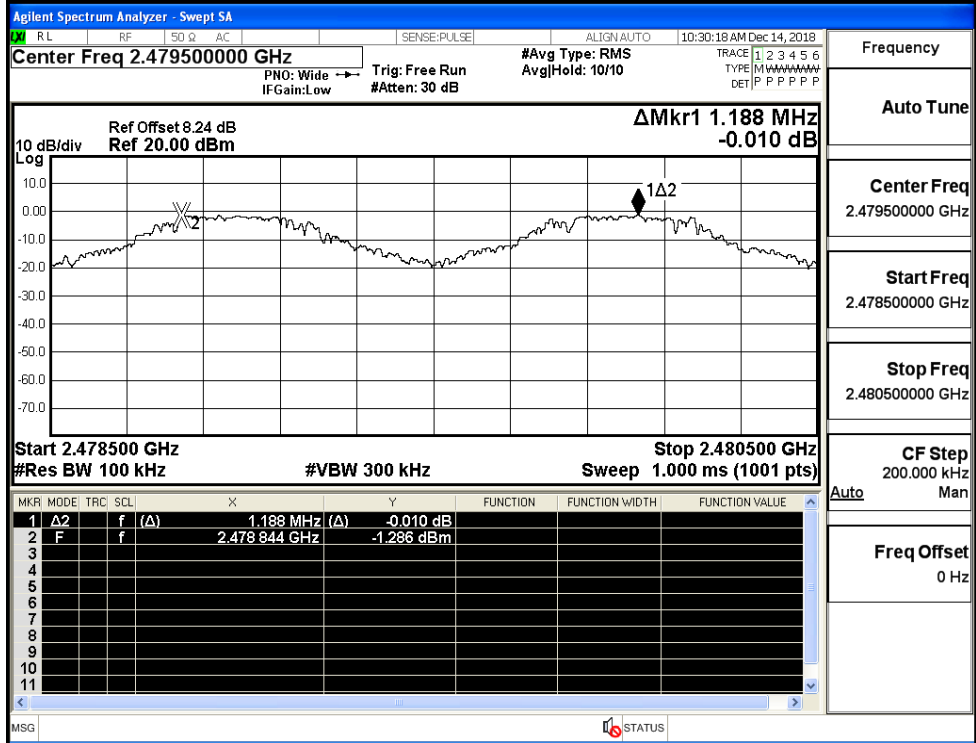
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.025	0.697	PASS
	MCH	1.060	0.697	PASS
	HCH	1.188	0.697	PASS
π/4DQPSK	LCH	0.880	0.860	PASS
	MCH	0.982	0.860	PASS
	HCH	0.878	0.860	PASS



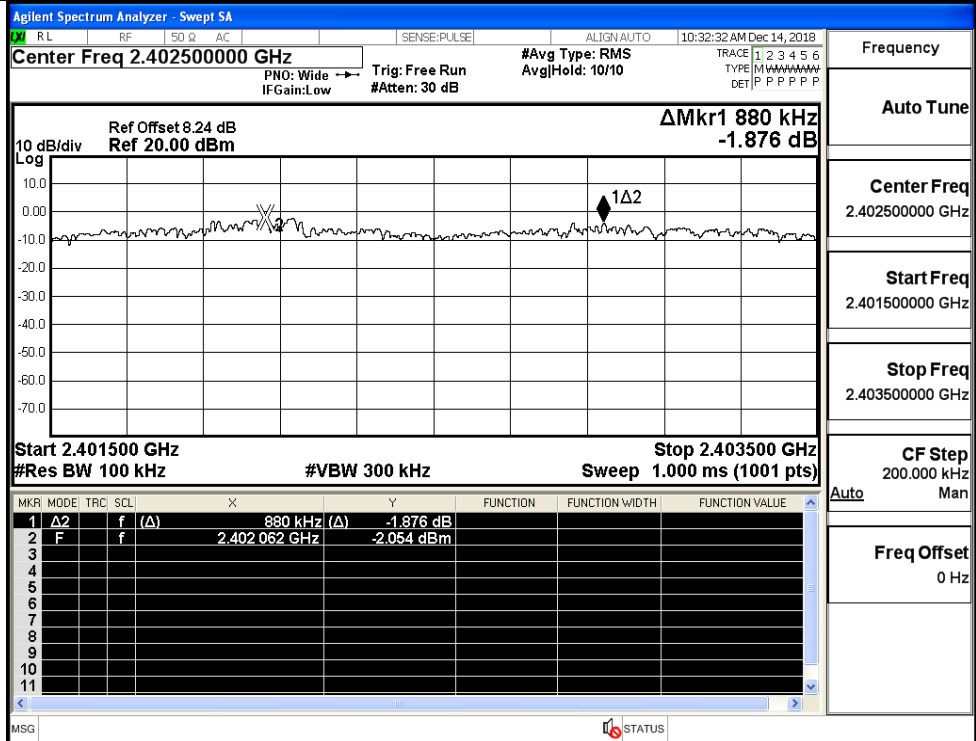
GFSK/MCH



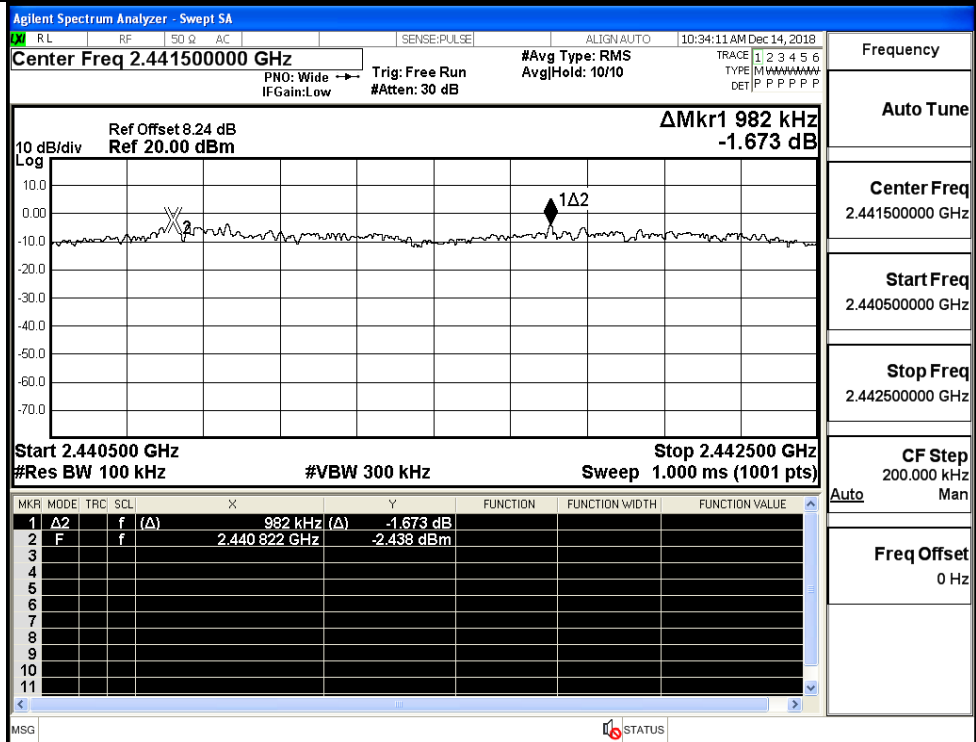
GFSK/HCH



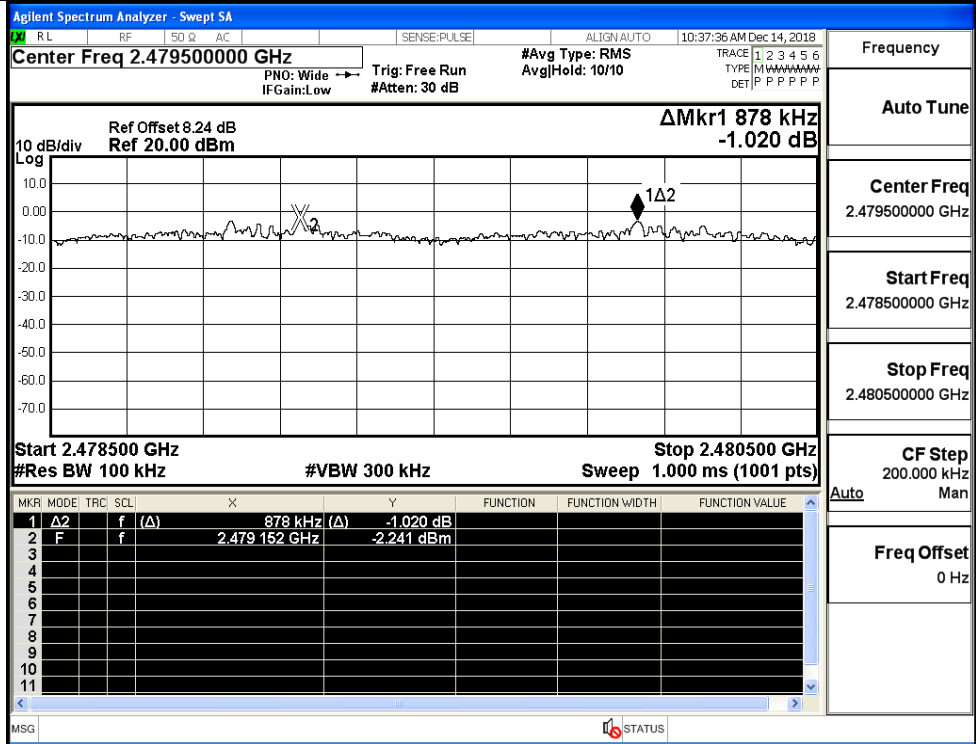
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



$\pi/4$ DQPSK/HCH



A.4 Hopping Channel Number

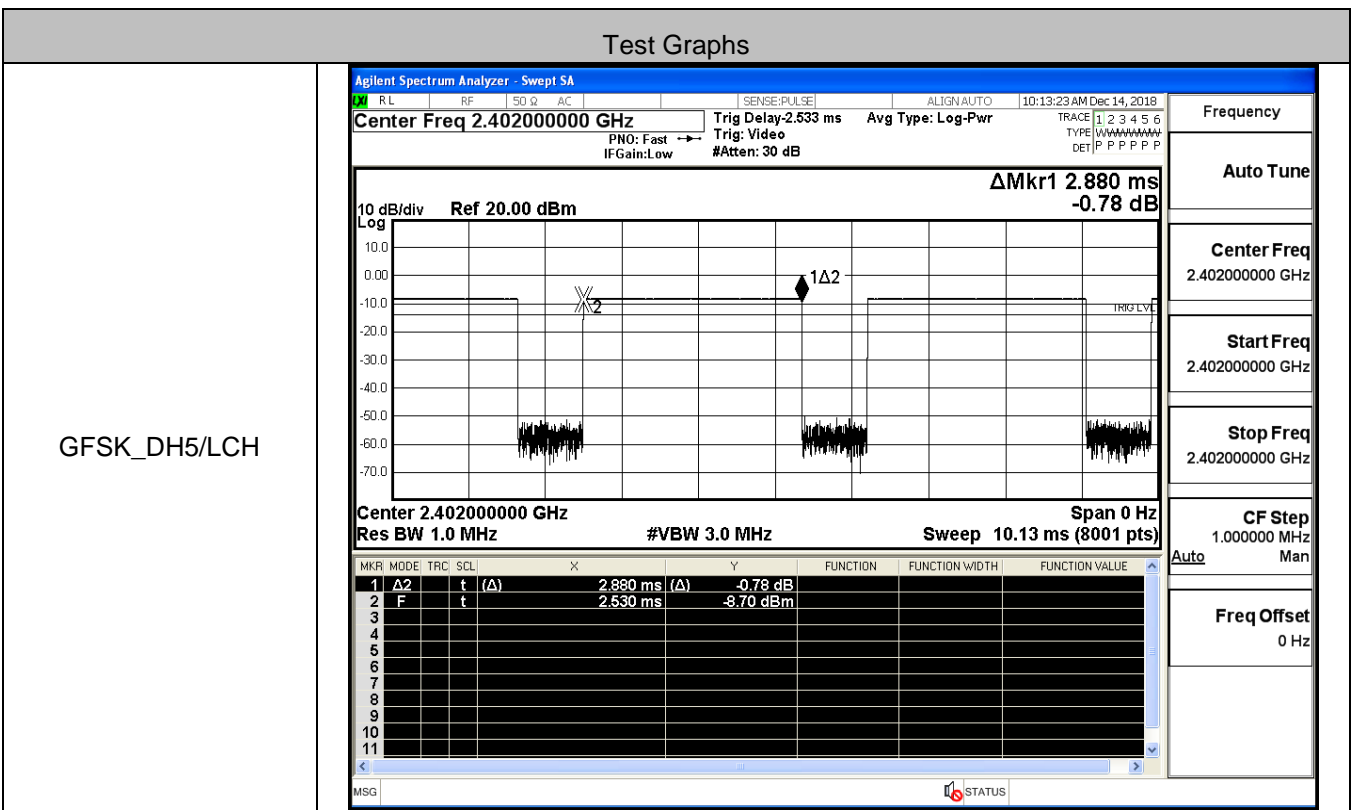
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
$\pi/4$ DQPSK	Hop	79	>=15	PASS

Test Graphs

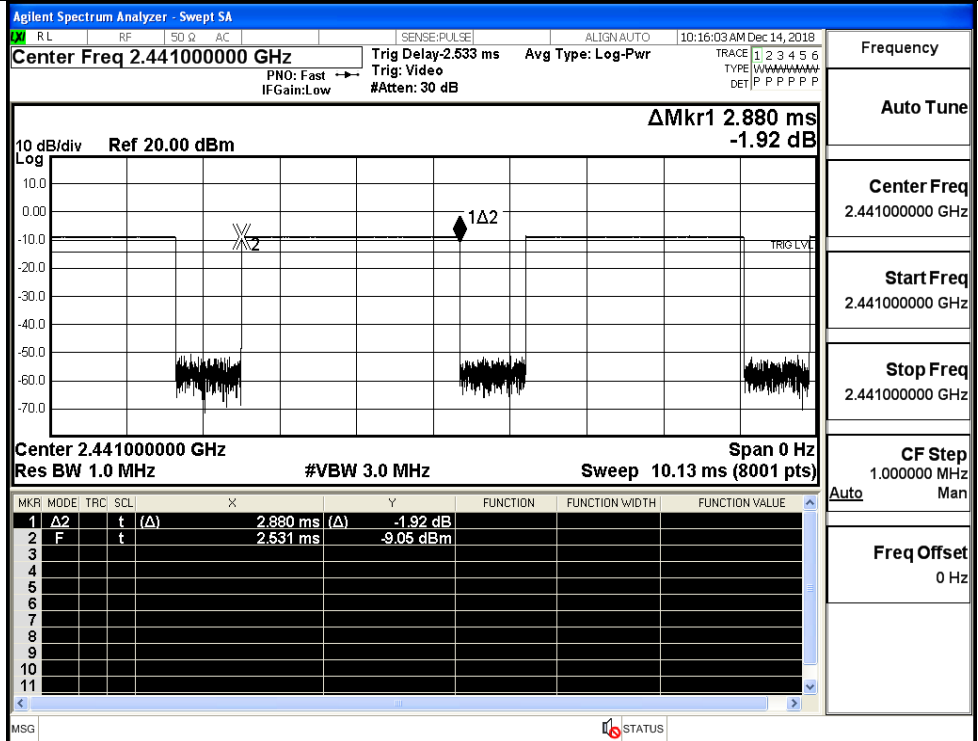
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 77.958 MHz -0.522 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <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>-0.522 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>-0.619 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	77.958 MHz (Δ)	-0.522 dB				2	F	f		2.402077 GHz	-0.619 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ2	f	(Δ)	77.958 MHz (Δ)	-0.522 dB																							
2	F	f		2.402077 GHz	-0.619 dBm																							
$\pi/4$ DQPSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 8.24 dB Ref 20.00 dBm ΔMkr1 78.010 MHz -0.532 dB Start 2.40000 GHz Stop 2.48350 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 8.000 ms (8001 pts)</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <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>78.010 MHz (Δ)</td> <td>-0.532 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402129 GHz</td> <td>-2.670 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	Δ2	f	(Δ)	78.010 MHz (Δ)	-0.532 dB				2	F	f		2.402129 GHz	-2.670 dBm			
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
1	Δ2	f	(Δ)	78.010 MHz (Δ)	-0.532 dB																							
2	F	f		2.402129 GHz	-2.670 dBm																							

A.5 Dwell Time

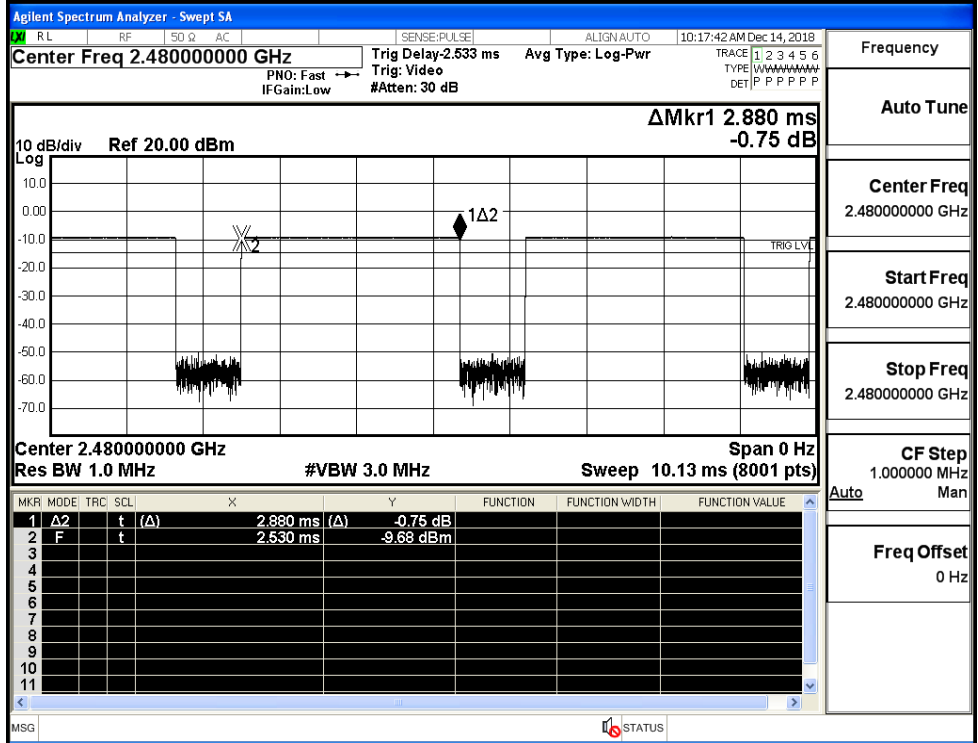
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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



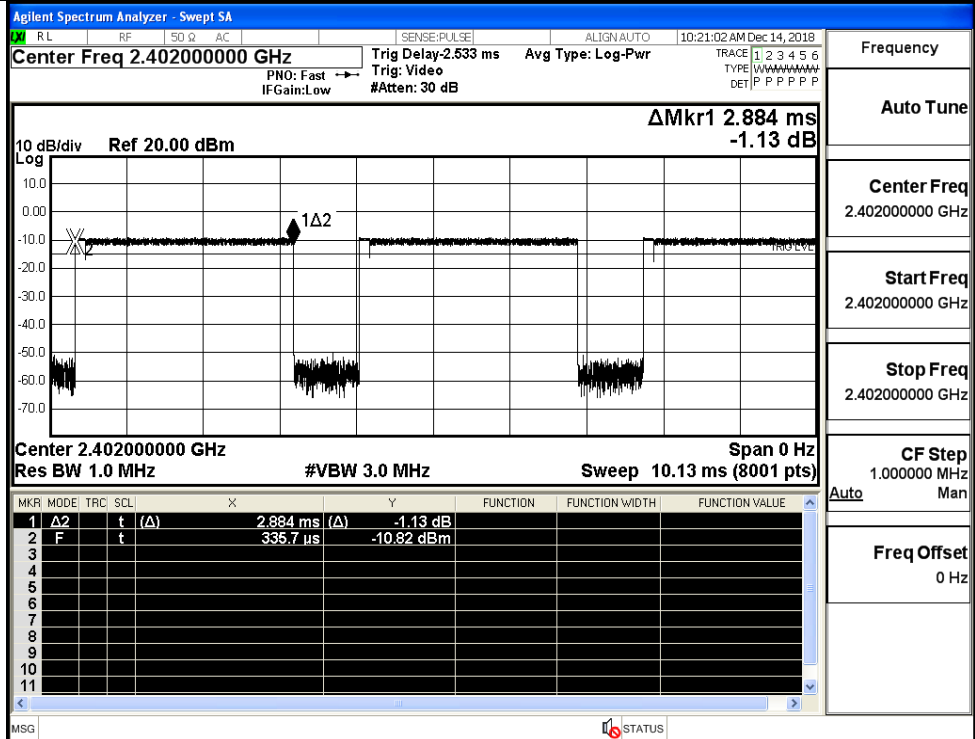
GFSK_DH5/MCH



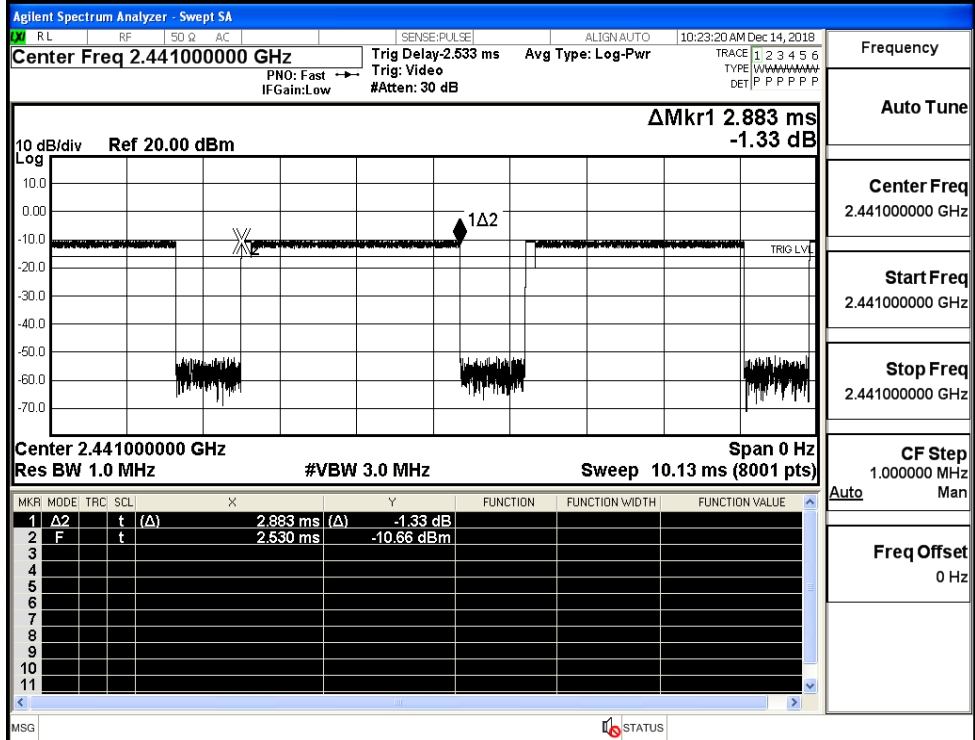
GFSK_DH5/HCH



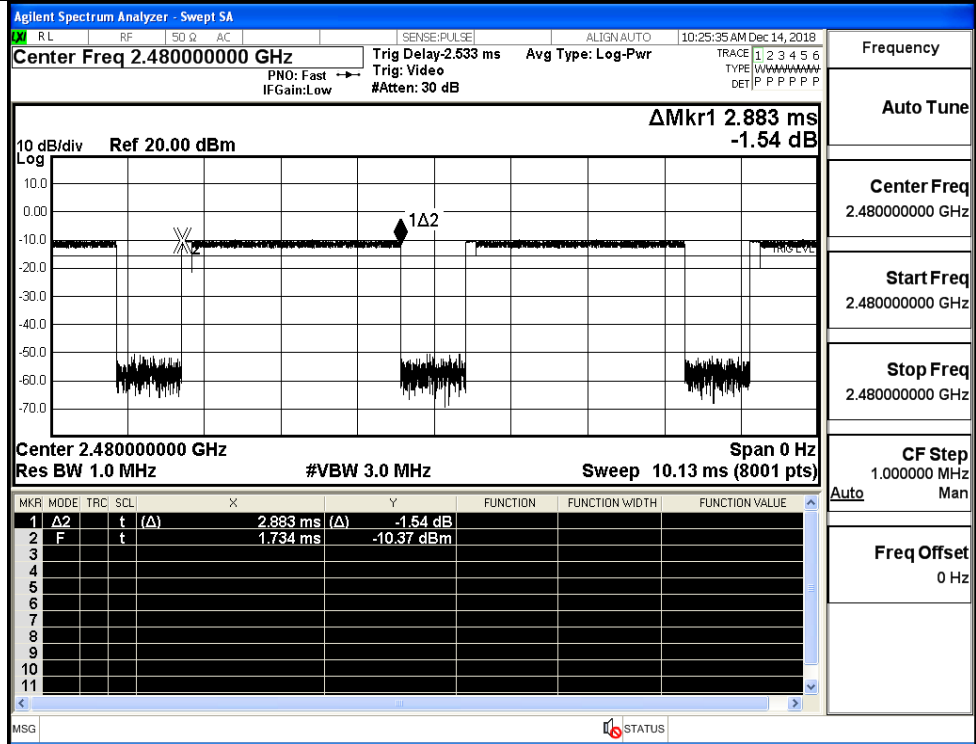
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



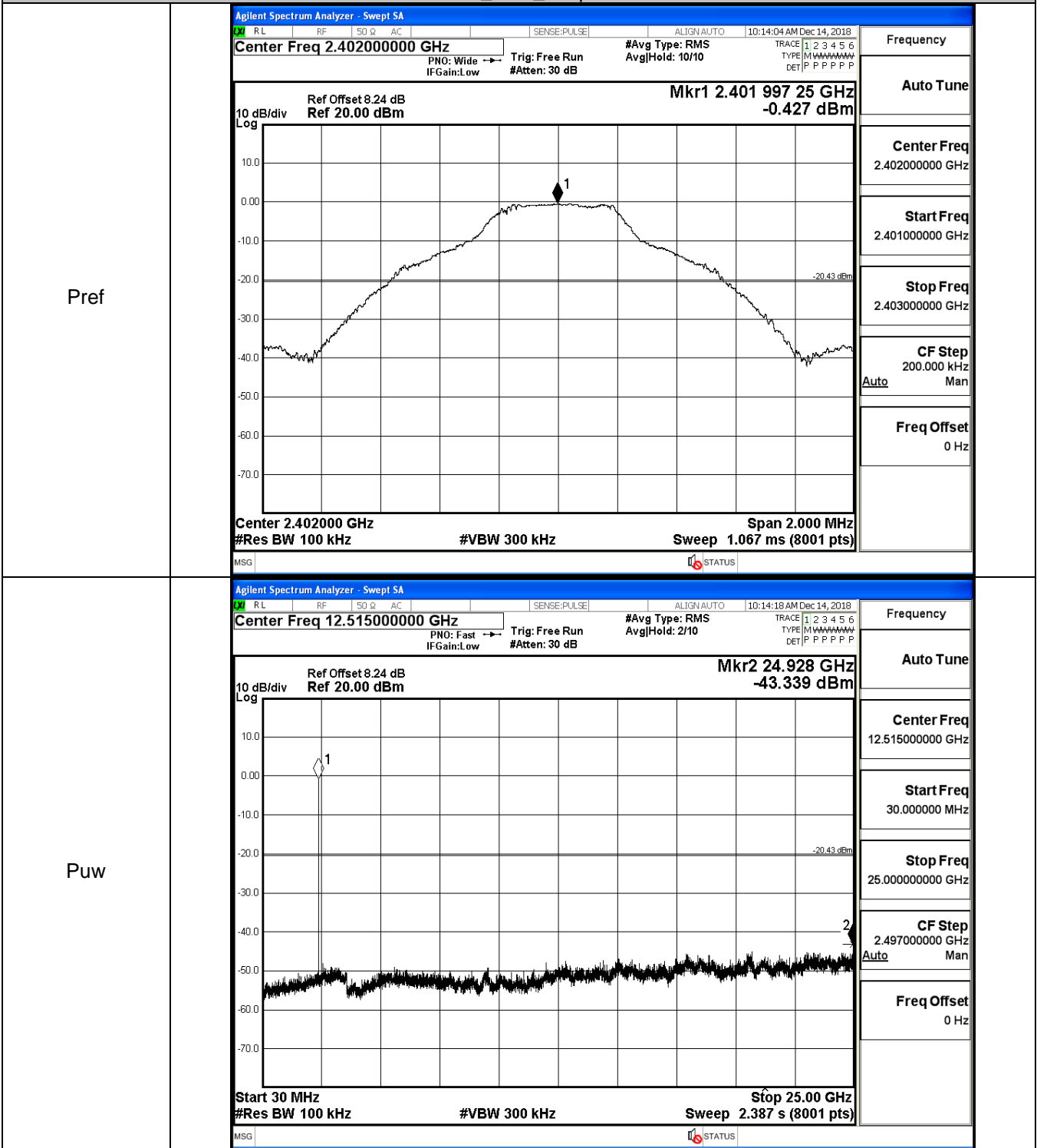
$\pi/4$ DQPSK
_2DH5/HCH



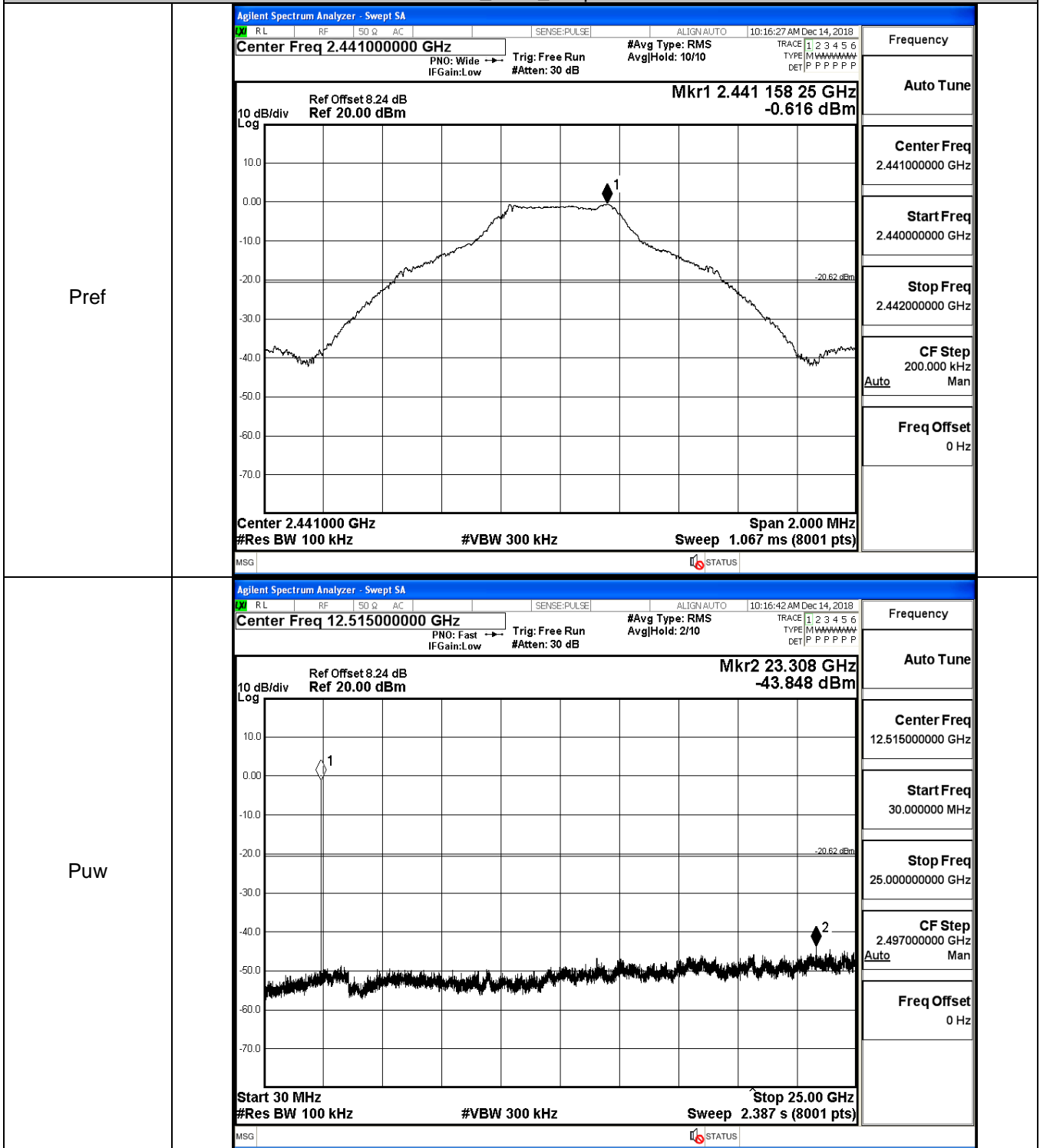
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.427	-43.339	-20.427	PASS
	MCH	-0.616	-43.848	-20.616	PASS
	HCH	-0.948	-44.957	-20.948	PASS
$\pi/4$ DQPSK	LCH	-1.697	-44.536	-21.697	PASS
	MCH	-2.23	-44.441	-22.230	PASS
	HCH	-2.196	-44.968	-22.196	PASS

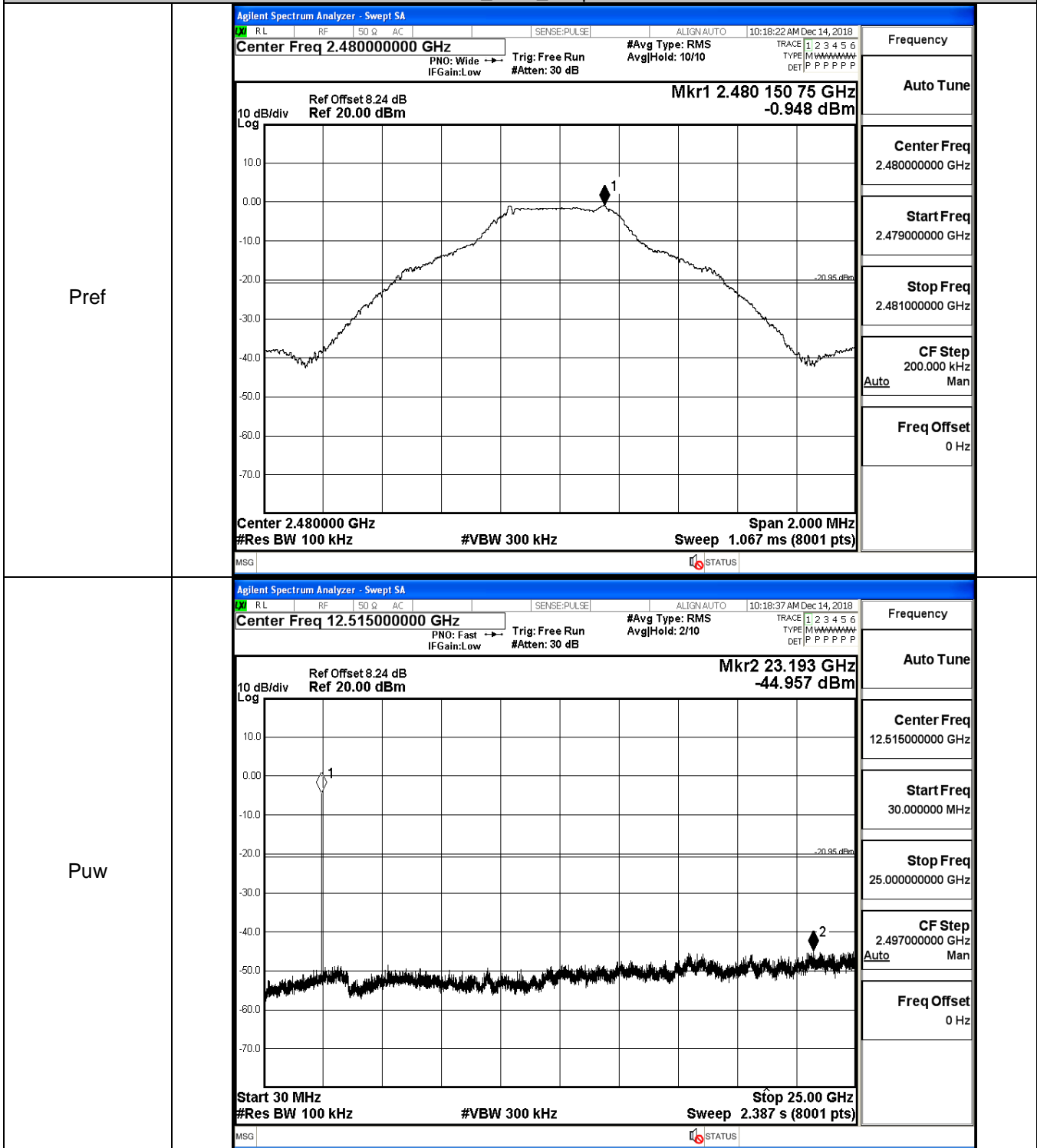
GFSK_LCH_Graphs



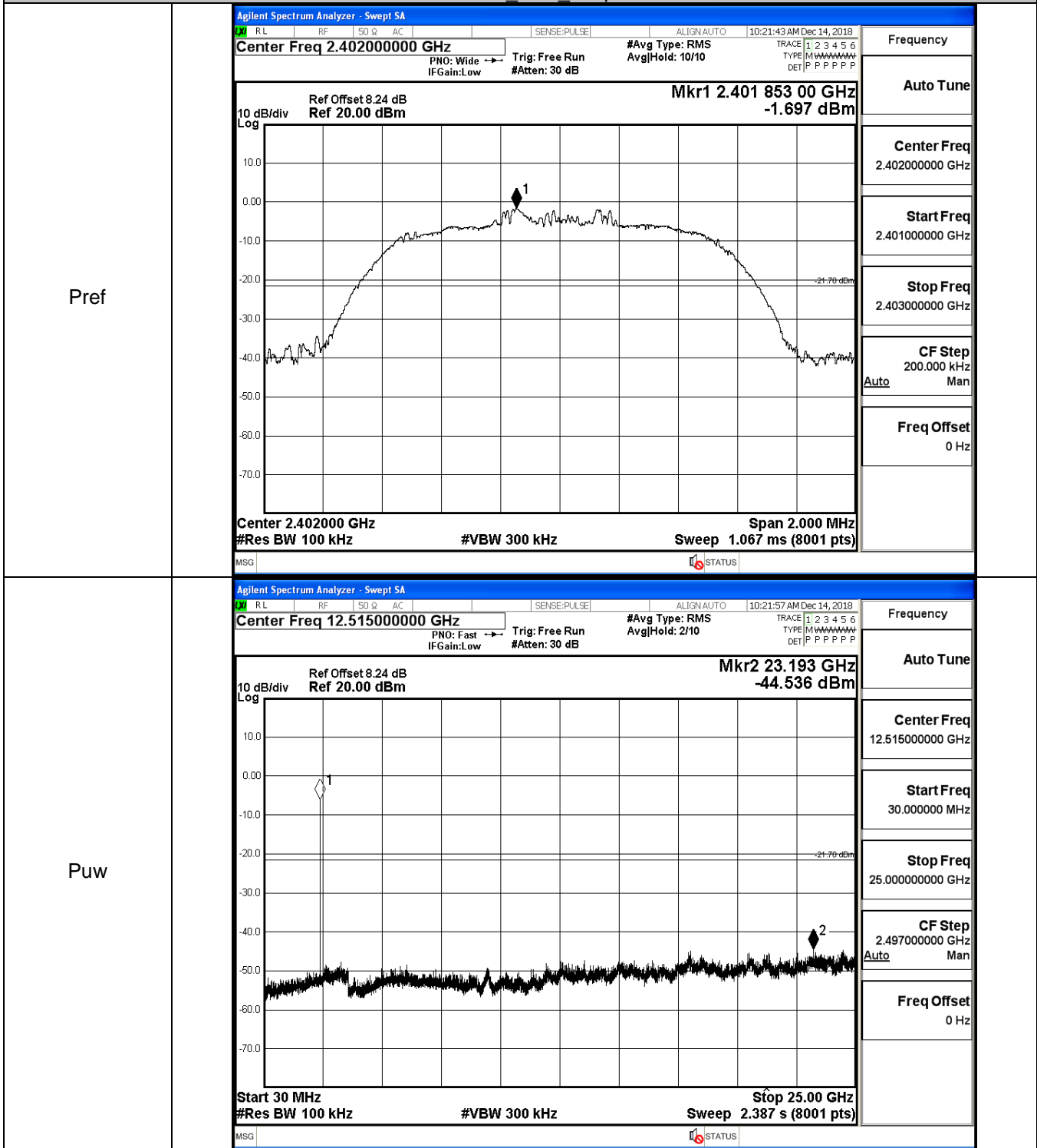
GFSK_MCH_Graphs



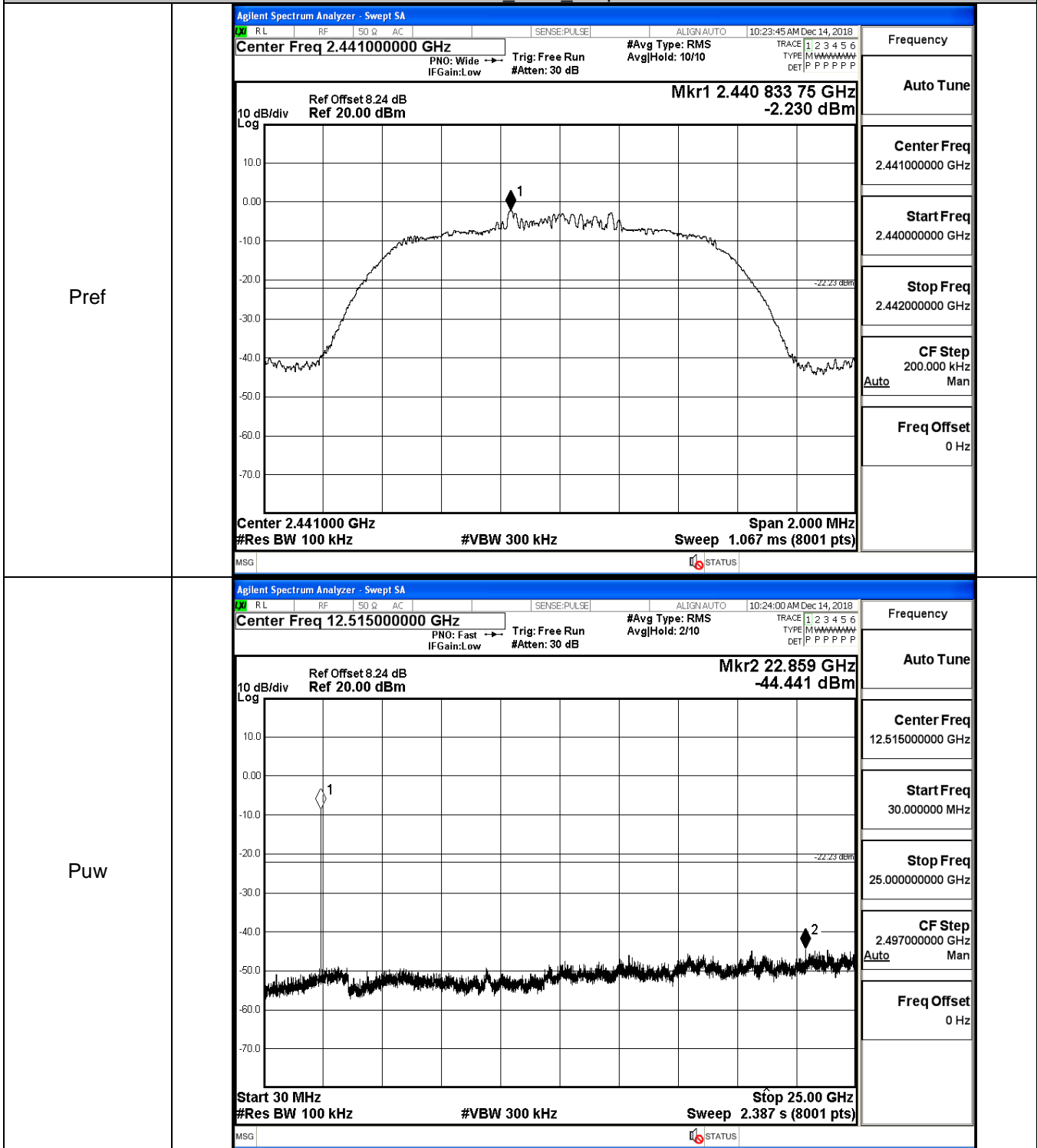
GFSK_HCH_Graphs



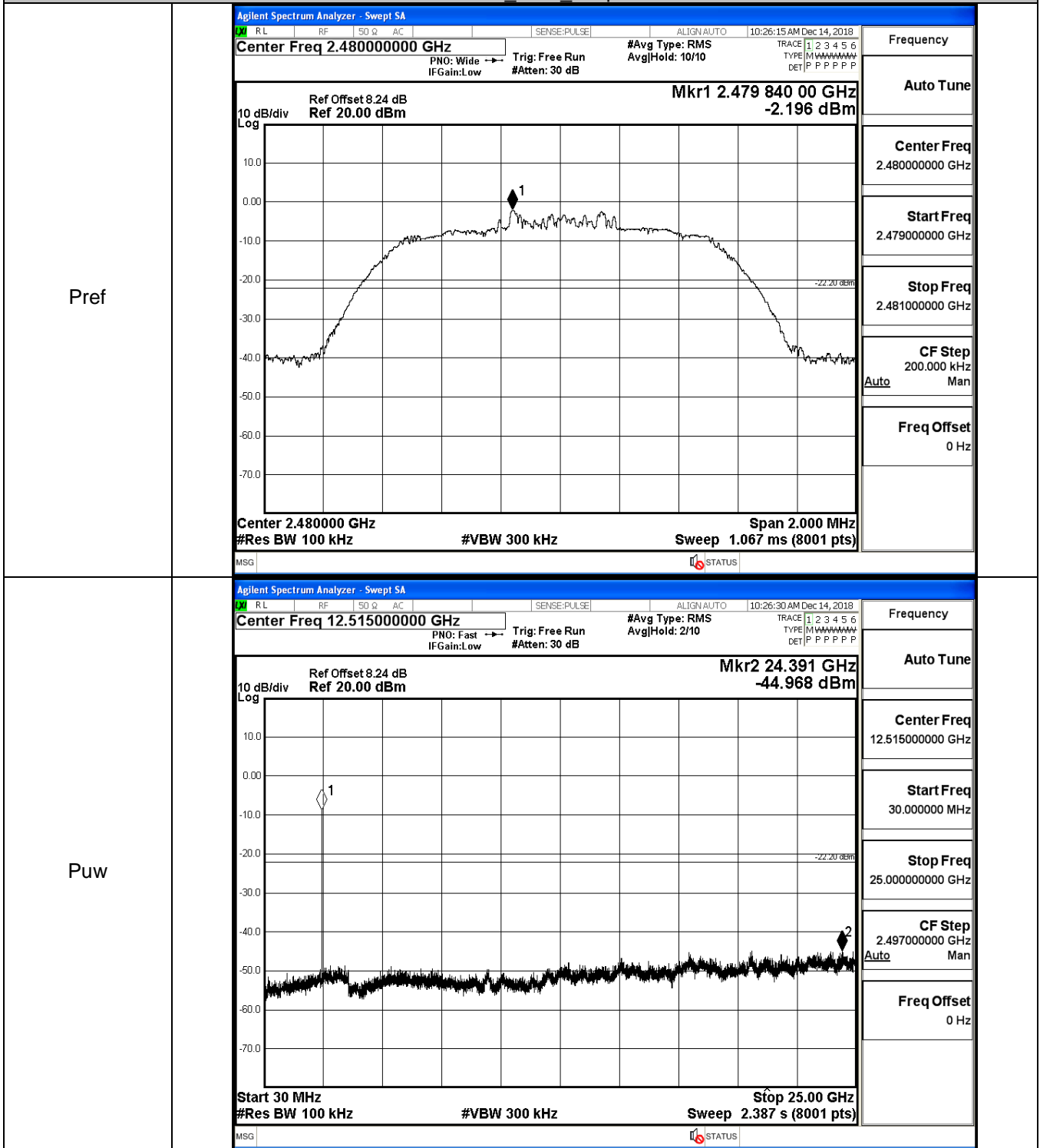
$\pi/4$ DQPSK LCH_Graphs



π /4DQPSK_MCH_Graphs



$\pi/4$ DQPSK_HCH_Graphs

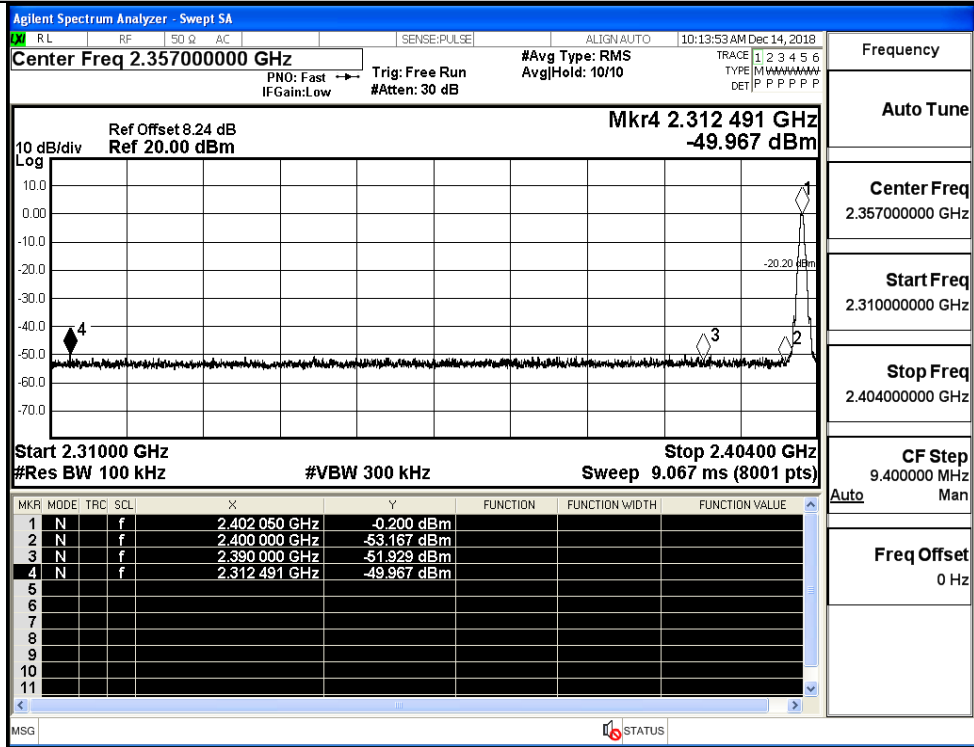


A.7 Band-edge for RF Conducted Emissions

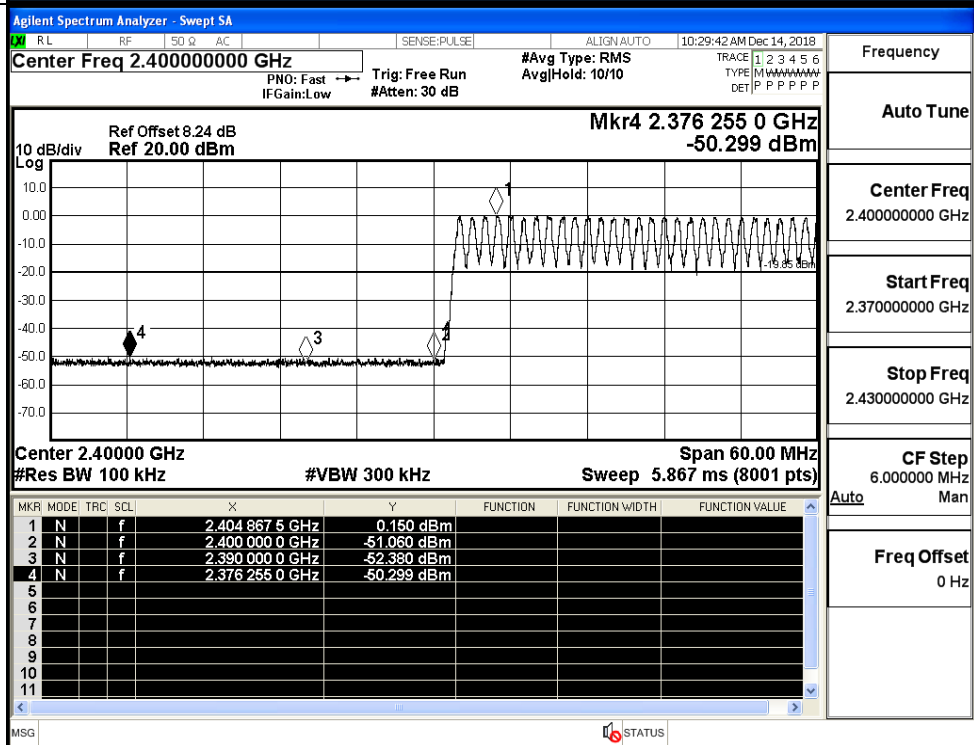
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-0.200	Off	-49.967	-20.2	PASS
			0.150	On	-50.299	-19.85	PASS
	HCH	2480	-0.955	Off	-50.140	-20.96	PASS
			-0.545	On	-49.764	-20.55	PASS
$\pi/4$ DQPSK	LCH	2402	-1.418	Off	-49.570	-21.42	PASS
			-0.756	On	-49.453	-20.76	PASS
	HCH	2480	-2.095	Off	-50.077	-22.1	PASS
			-2.073	On	-49.235	-22.07	PASS

Test Graphs

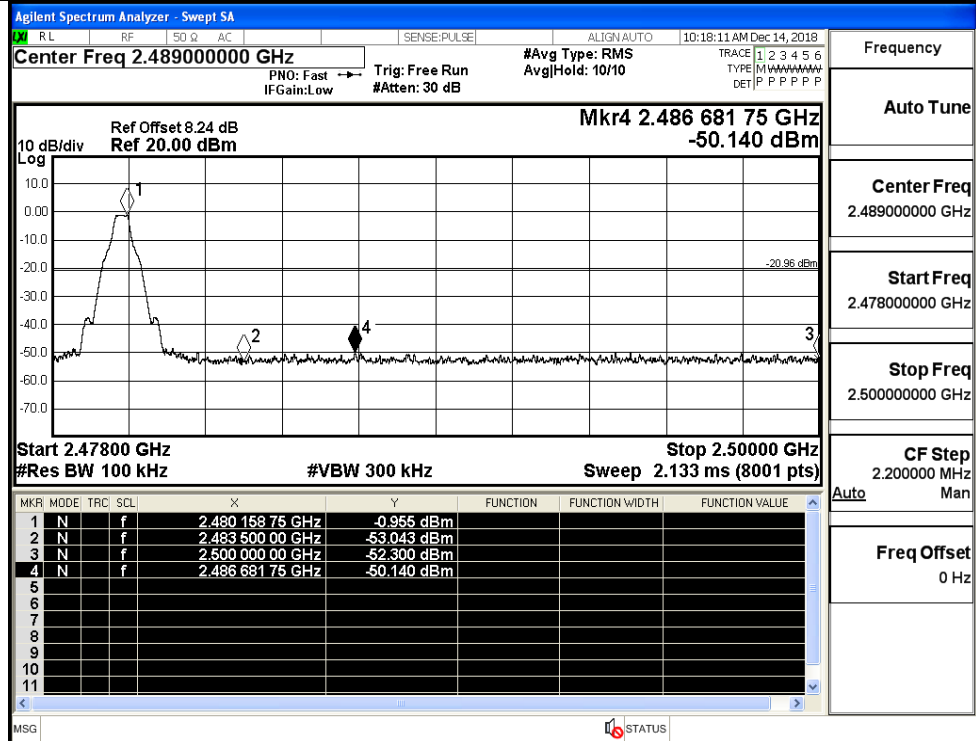
GFSK/LCH/No Hop



GFSK/LCH/Hop

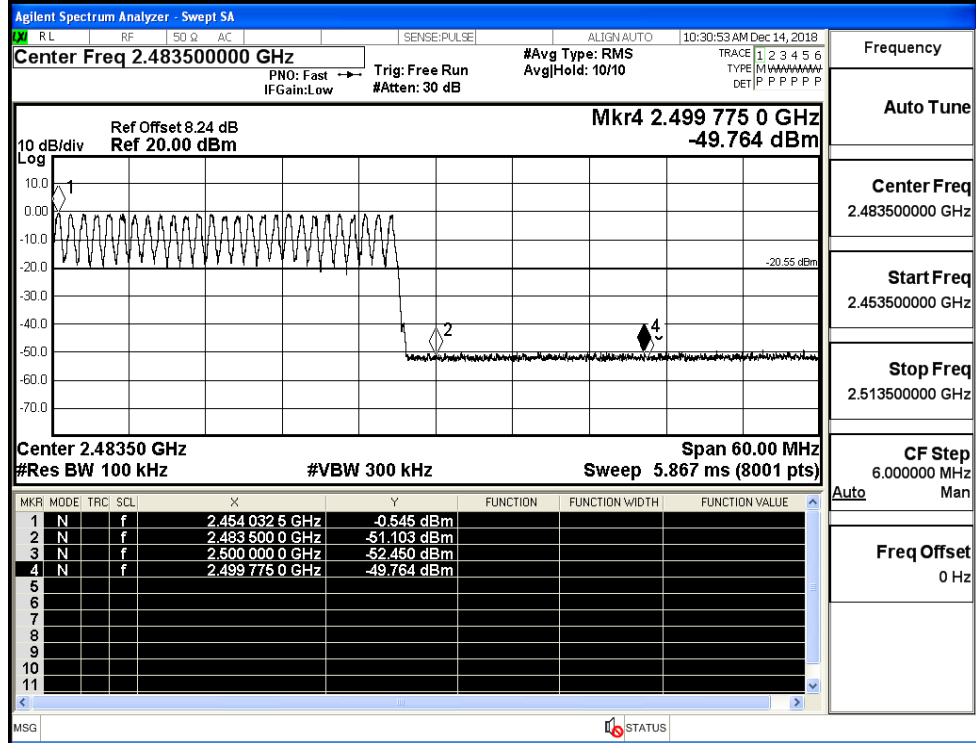


GFSK/HCH/No Hop



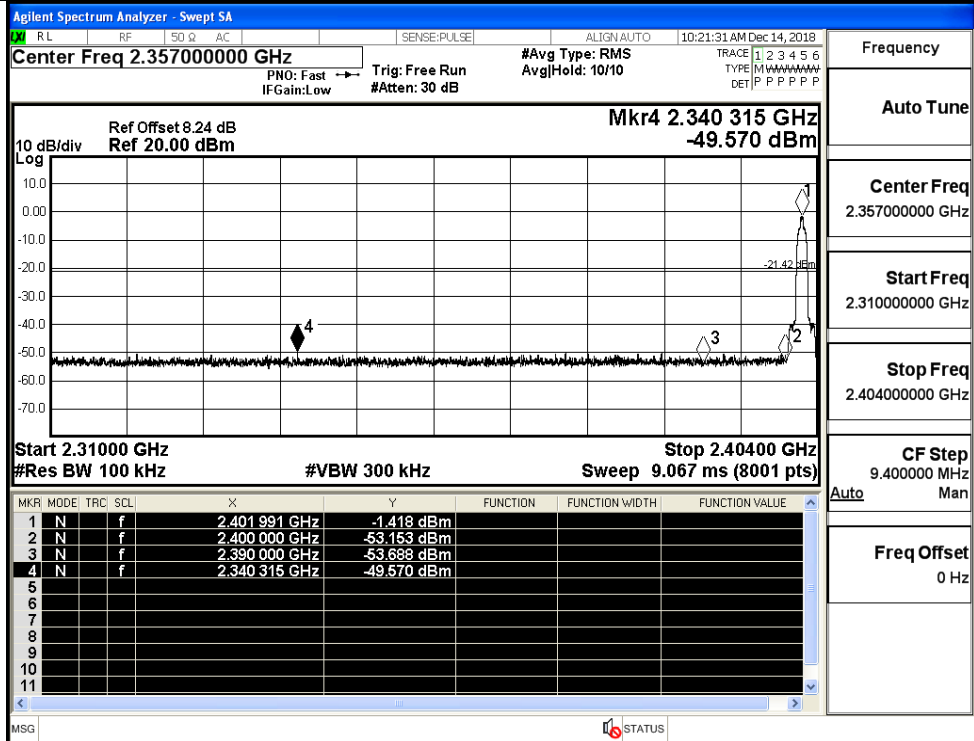
Frequency	
Auto Tune	
Center Freq	2.489000000 GHz
Start Freq	2.478000000 GHz
Stop Freq	2.500000000 GHz
CF Step	2.200000 MHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH/Hop



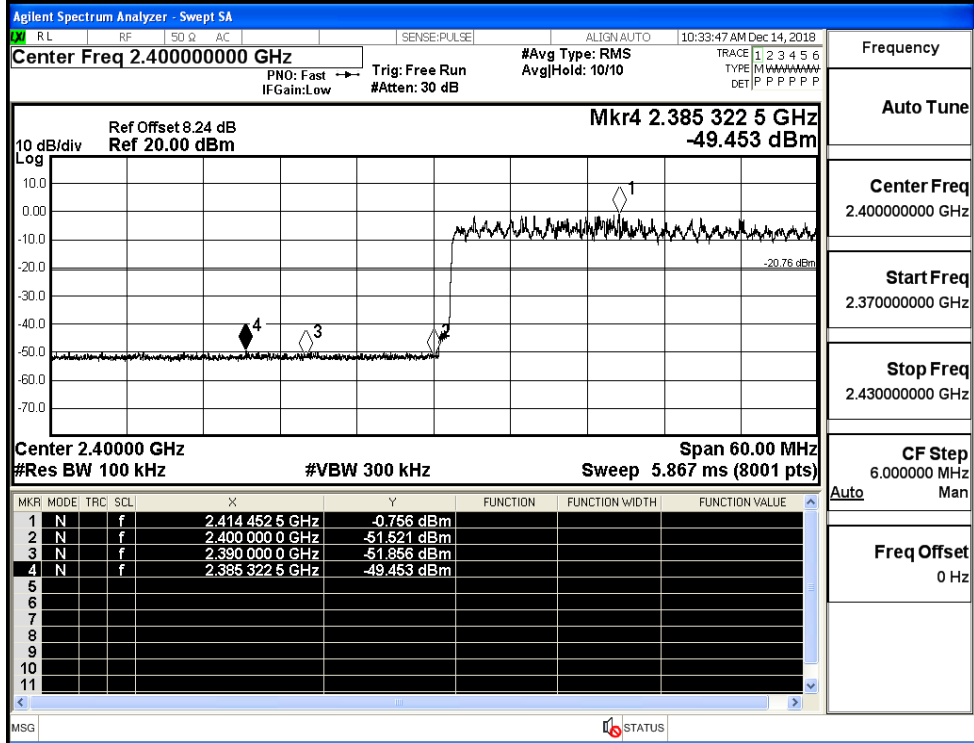
Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

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



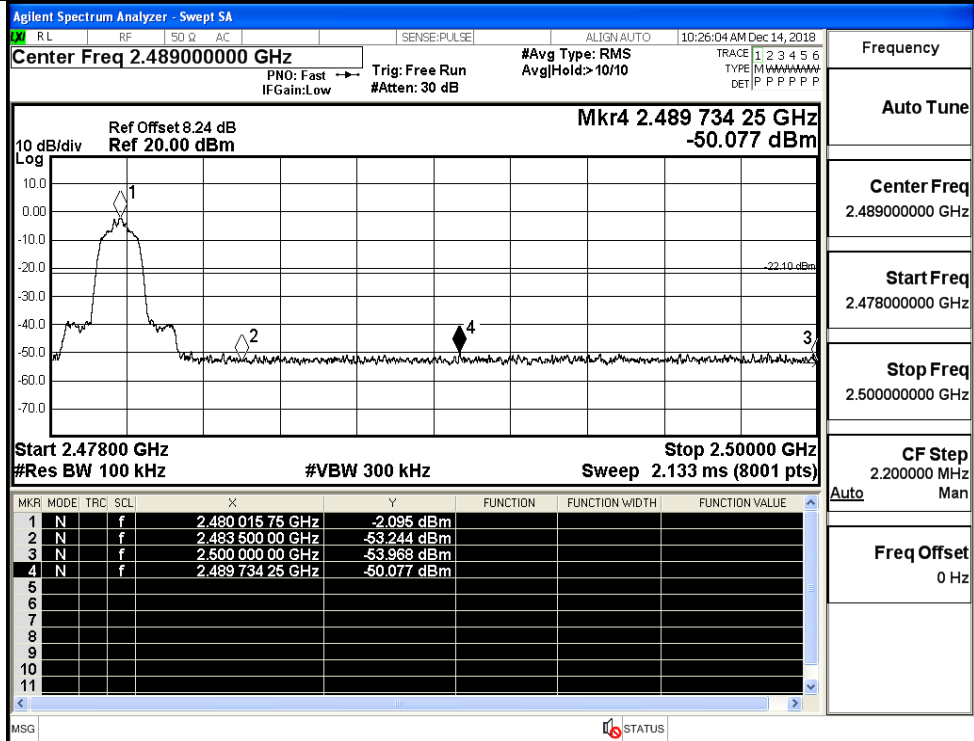
Frequency	2.357000000 GHz
Auto Tune	
Center Freq	2.357000000 GHz
Start Freq	2.310000000 GHz
Stop Freq	2.404000000 GHz
CF Step	9.400000 MHz
Auto	Man
Freq Offset	0 Hz

$\pi/4$ DQPSK/LCH/Hop

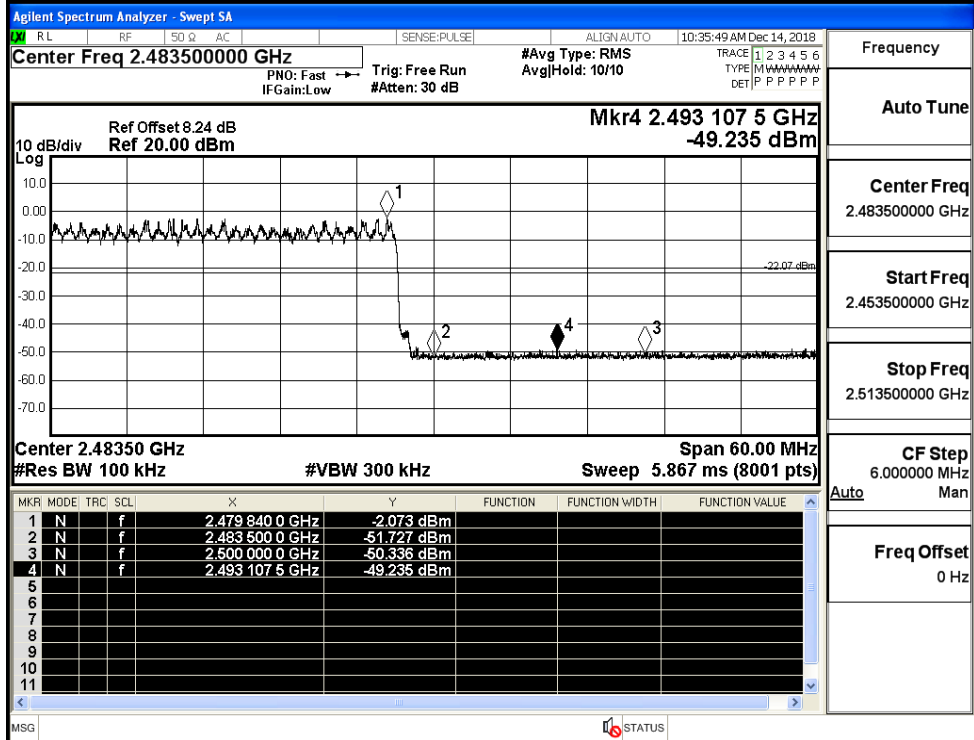


Frequency	2.400000000 GHz
Auto Tune	
Center Freq	2.400000000 GHz
Start Freq	2.370000000 GHz
Stop Freq	2.430000000 GHz
CF Step	6.000000 MHz
Auto	Man
Freq Offset	0 Hz

π /4DQPSK/HCH/No
Hop



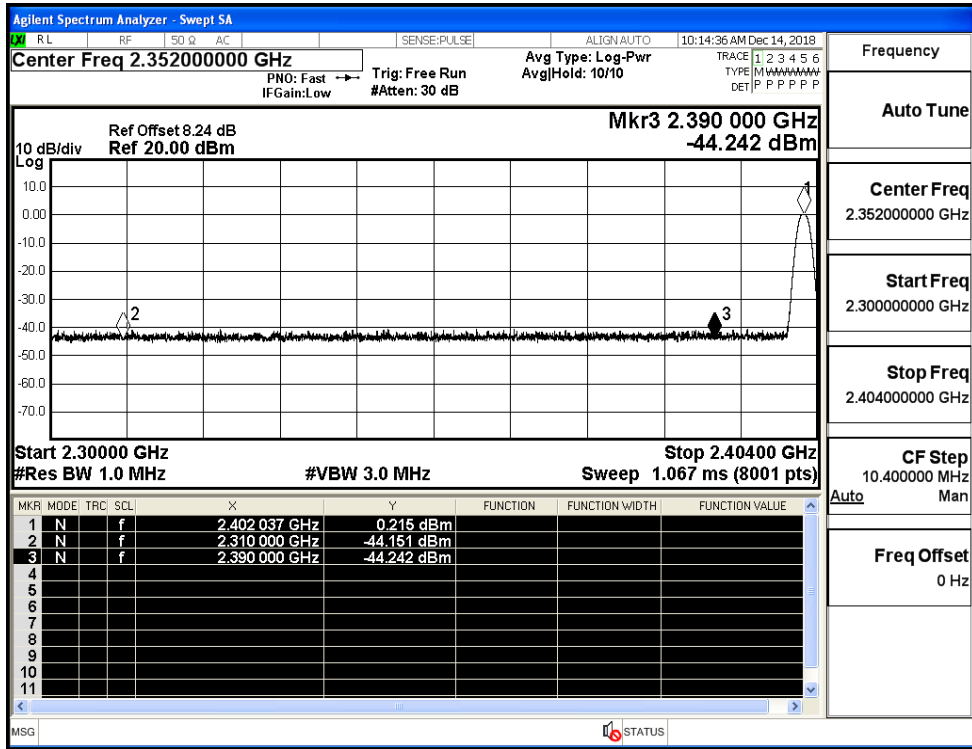
π /4DQPSK/HCH/Hop



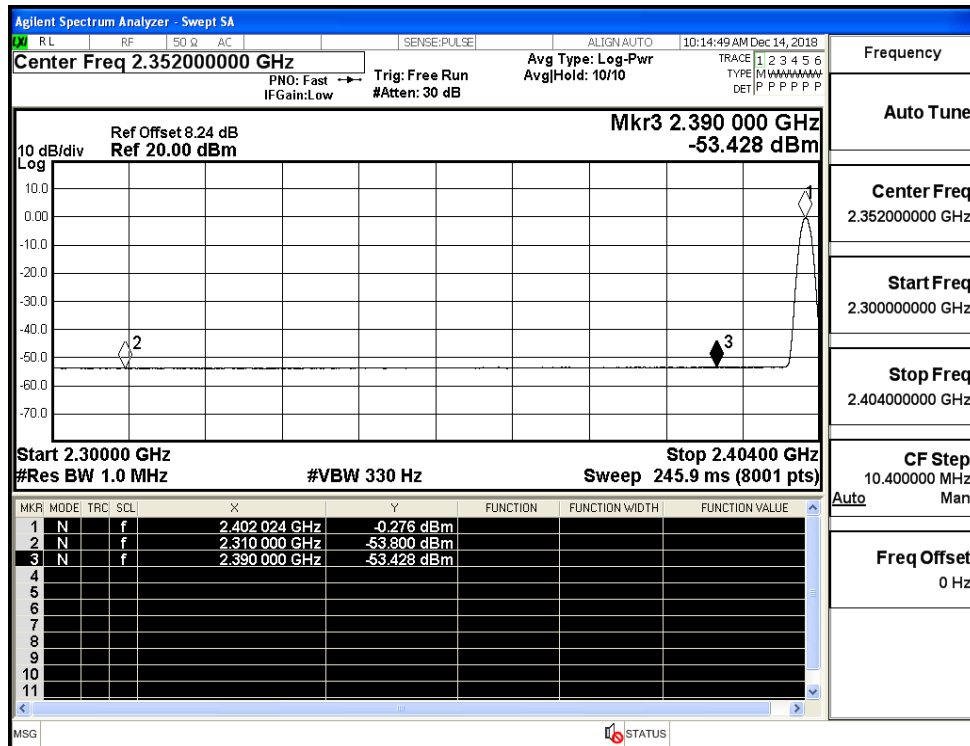
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-44.15	2.0	0	51.11	PEAK	74	PASS
	Off	2310.0	-53.80	2.0	0	41.46	AV	54	PASS
	Off	2390.0	-44.24	2.0	0	51.02	PEAK	74	PASS
	Off	2390.0	-53.43	2.0	0	41.83	AV	54	PASS
	Off	2483.5	-43.54	2.0	0	51.72	PEAK	74	PASS
	Off	2483.5	-53.17	2.0	0	42.09	AV	54	PASS
	Off	2500.0	-42.85	2.0	0	52.41	PEAK	74	PASS
	Off	2500.0	-53.10	2.0	0	42.16	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-44.04	2.0	0	51.21	PEAK	74	PASS
	Off	2310.0	-53.82	2.0	0	41.44	AV	54	PASS
	Off	2390.0	-42.97	2.0	0	52.29	PEAK	74	PASS
	Off	2390.0	-53.54	2.0	0	41.72	AV	54	PASS
	Off	2483.5	-42.88	2.0	0	52.38	PEAK	74	PASS
	Off	2483.5	-53.25	2.0	0	42.01	AV	54	PASS
	Off	2500.0	-42.73	2.0	0	52.53	PEAK	74	PASS
	Off	2500.0	-53.11	2.0	0	42.15	AV	54	PASS

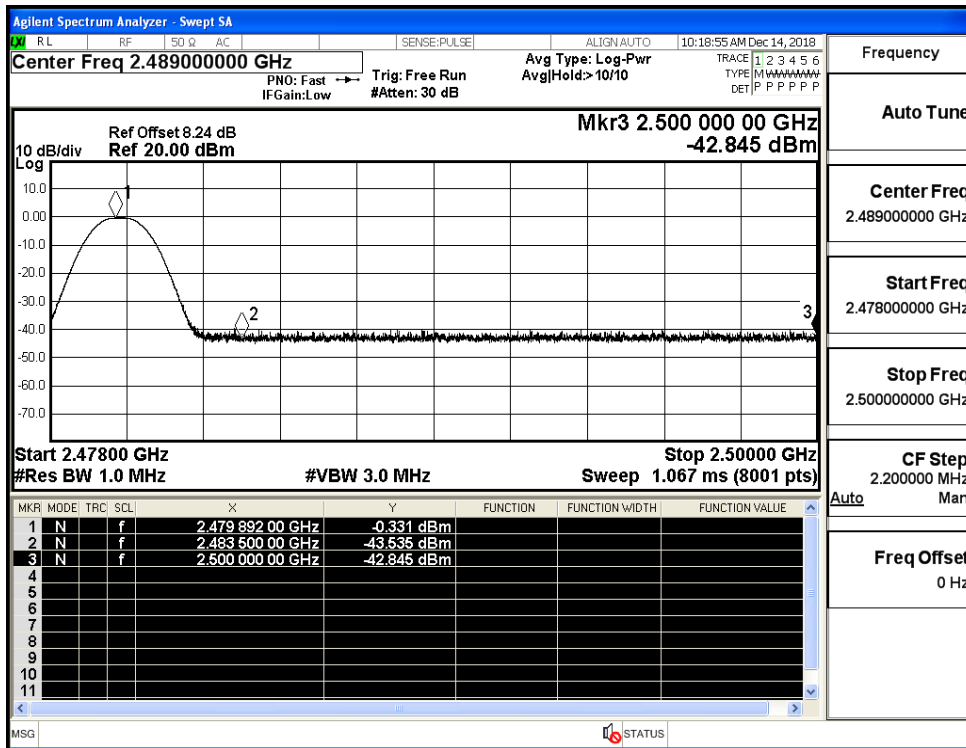
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



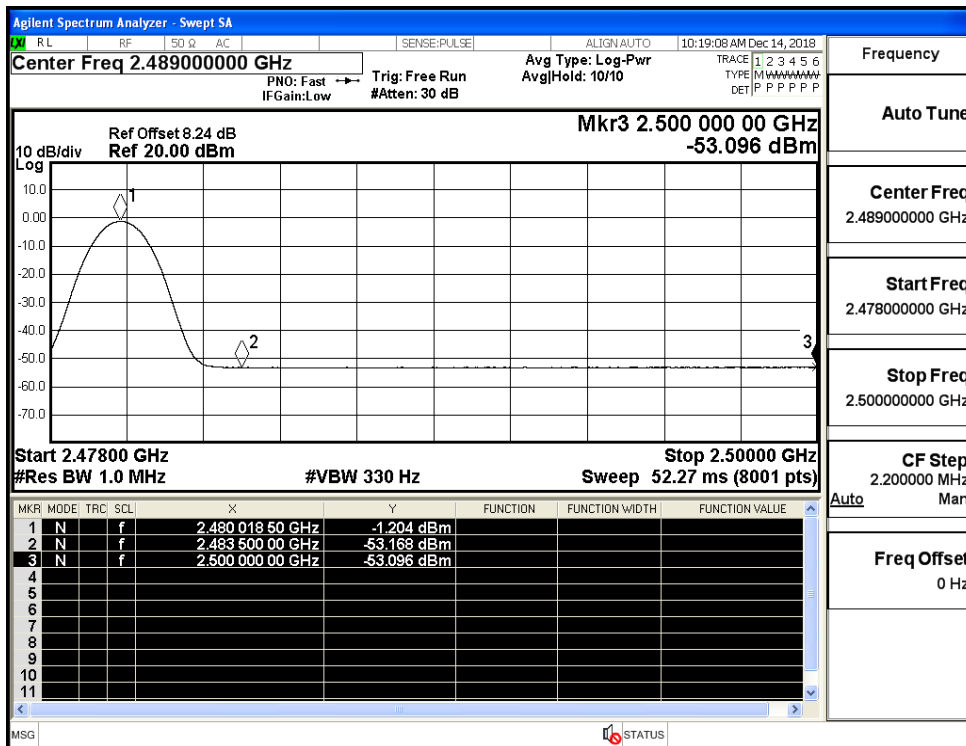
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



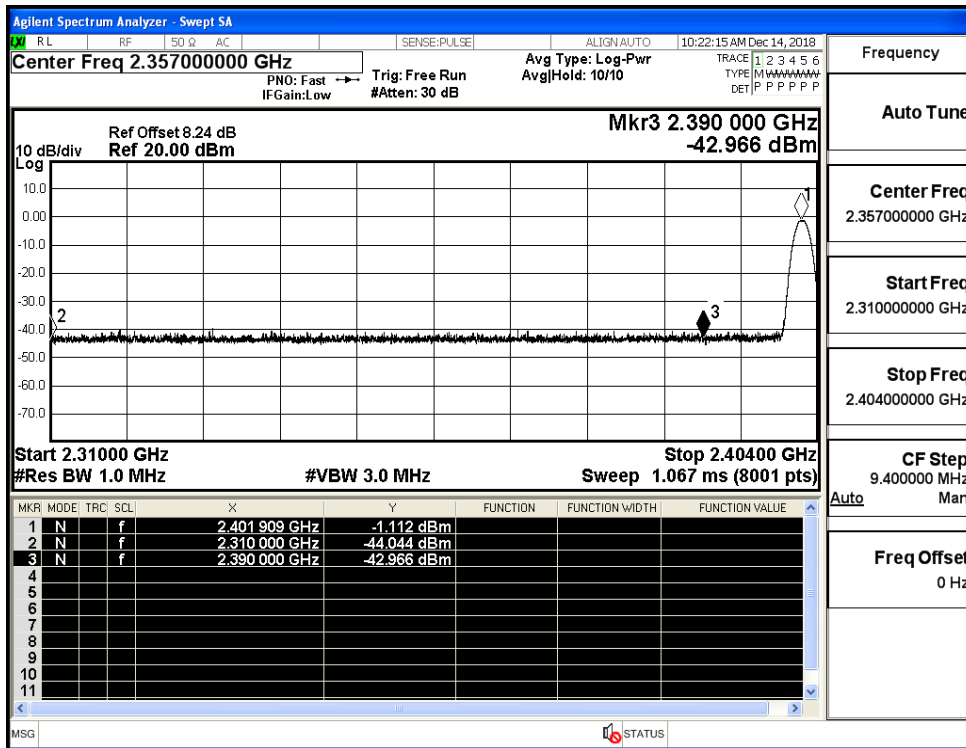
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



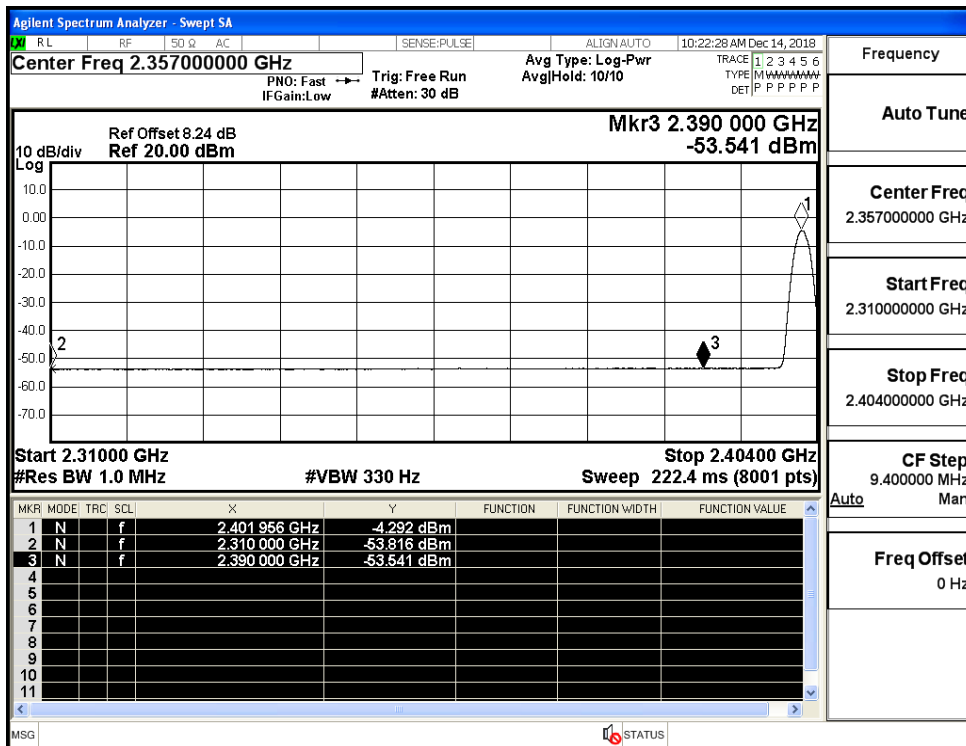
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



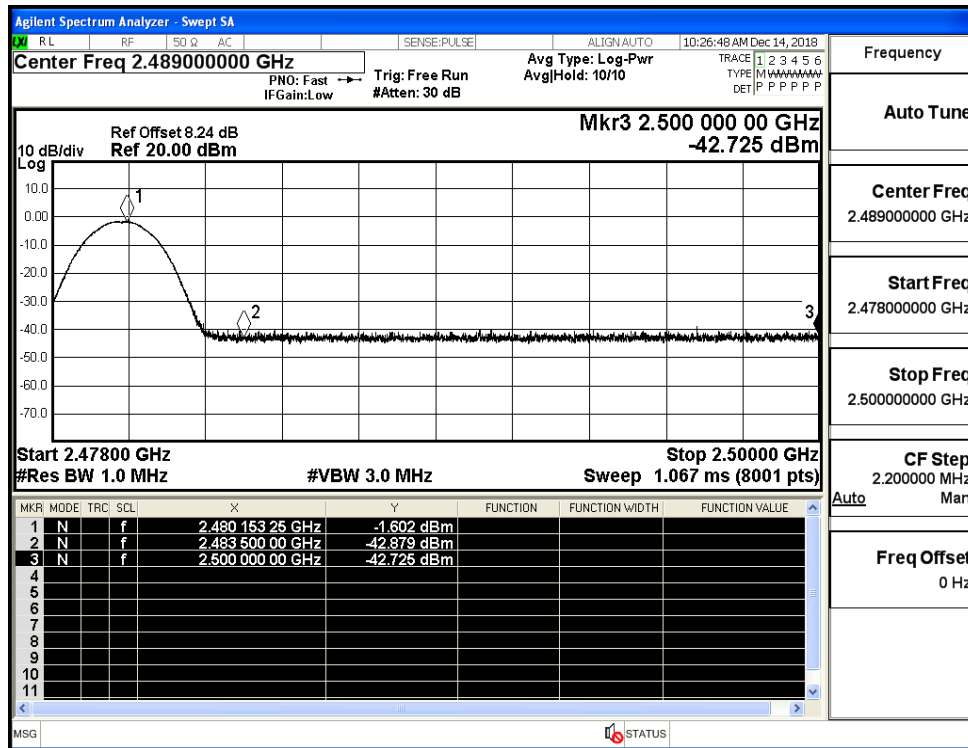
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



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)

