

Appendix A

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

Product Name: BLUETOOTH SPEAKER

Trade Mark: N/A

Test Model: F400

Environmental Conditions

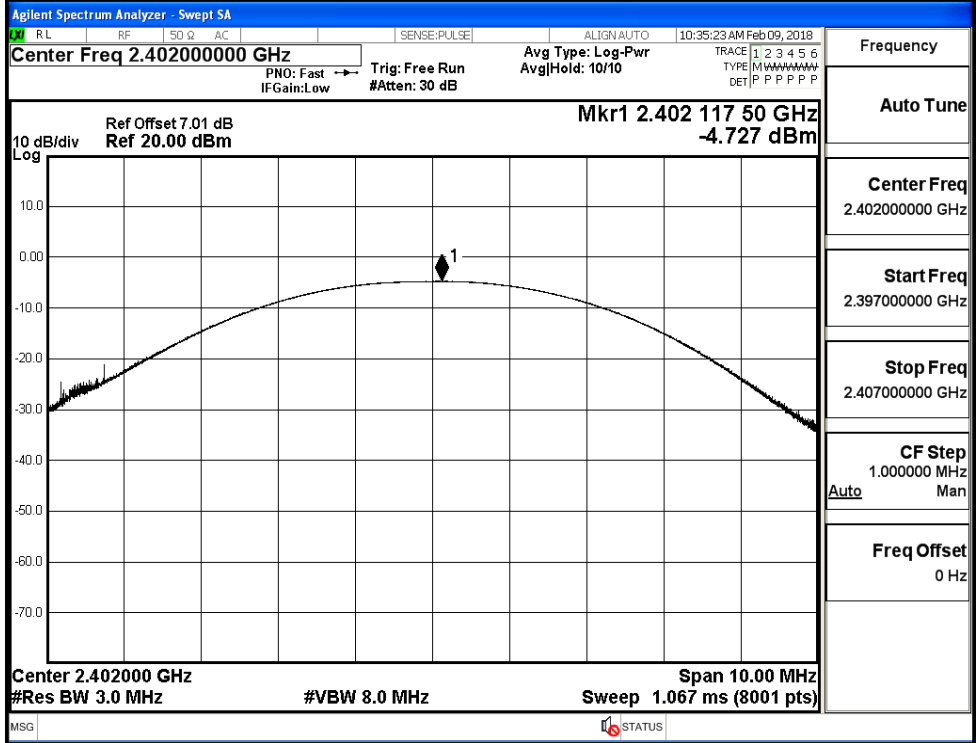
Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Mina.xu
Supervised by:	Tom.Liu

A.1 Maximum Conducted Peak Output Power

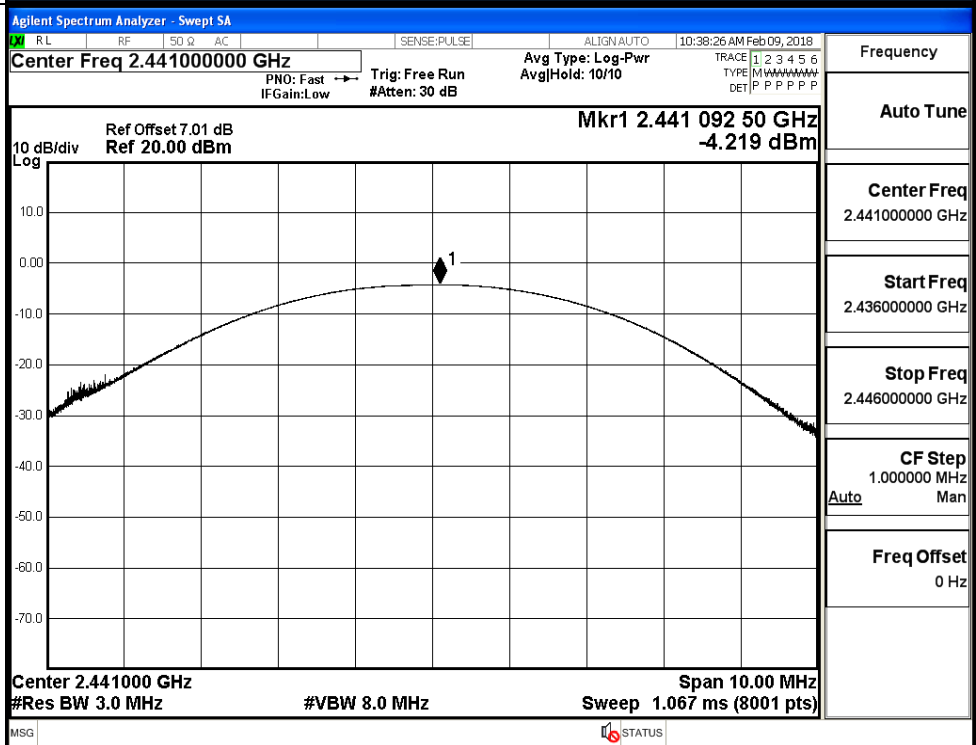
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-4.727	30	PASS
	MCH	-4.219	30	PASS
	HCH	-3.859	30	PASS
$\pi/4$ DQPSK	LCH	-3.504	21	PASS
	MCH	-2.996	21	PASS
	HCH	-2.695	21	PASS

Test Graphs

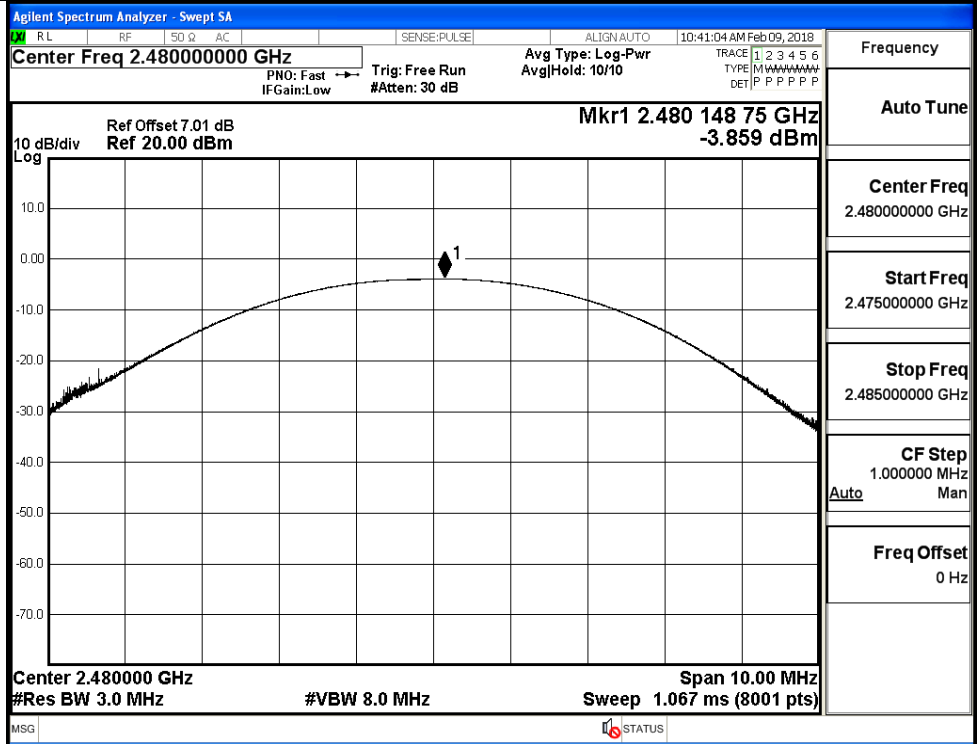
GFSK/LCH



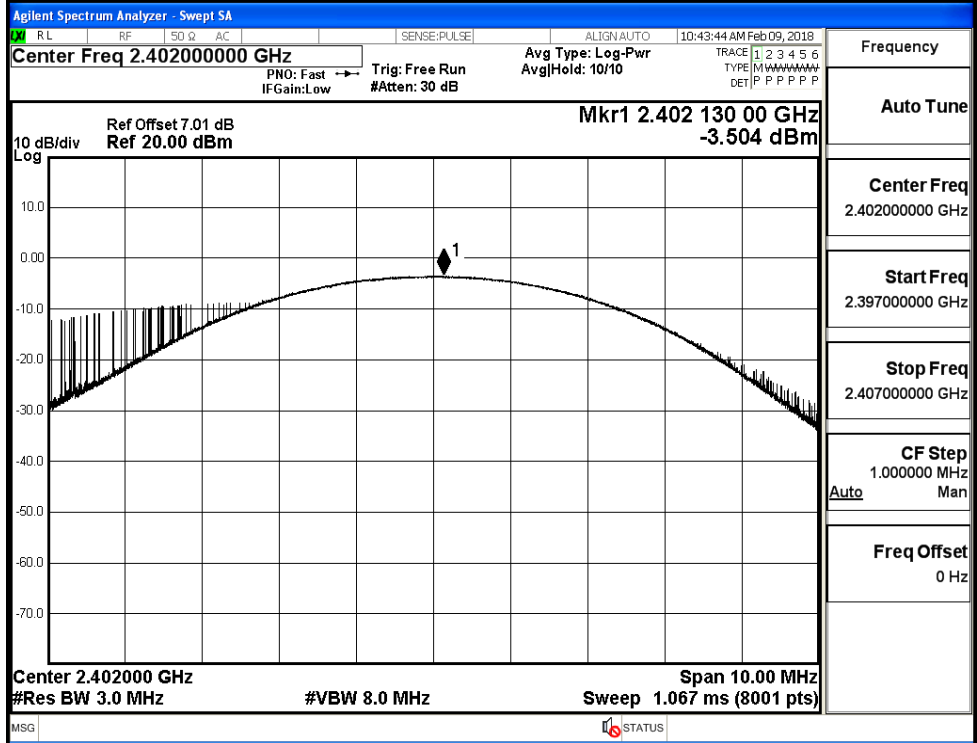
GFSK/MCH



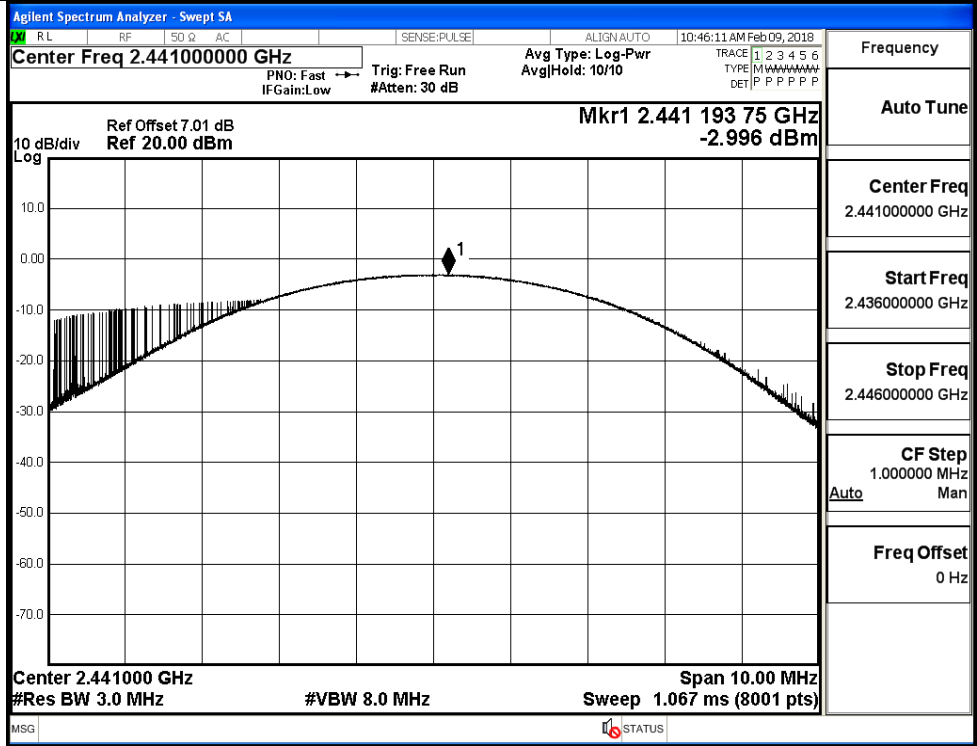
GFSK/HCH



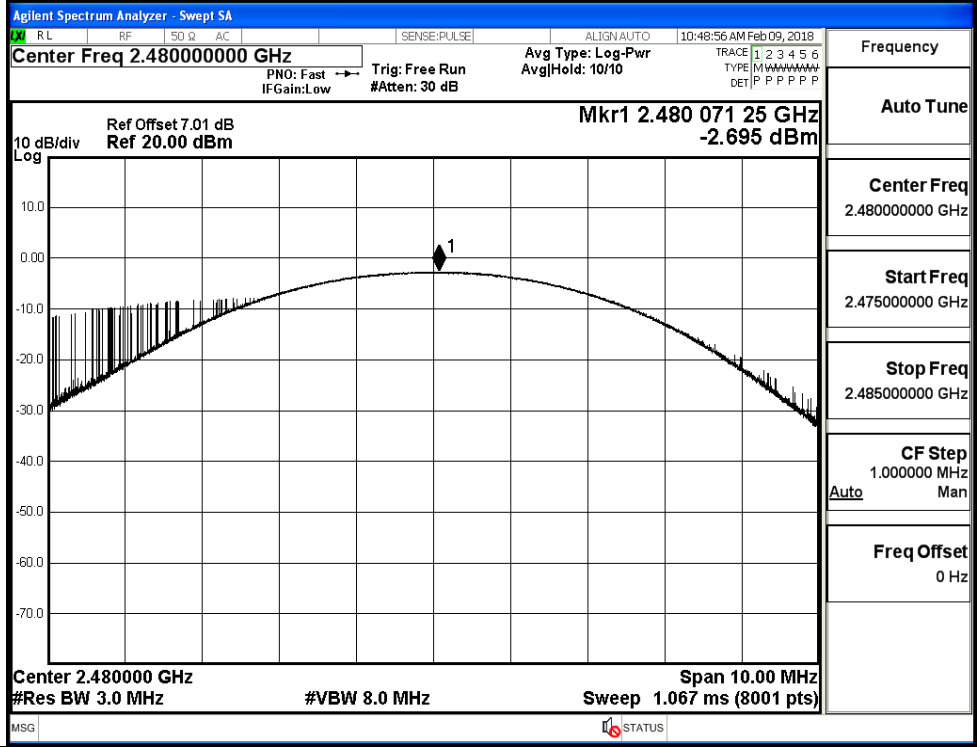
$\pi/4$ DQPSK/LCH



π /4DQPSK/MCH

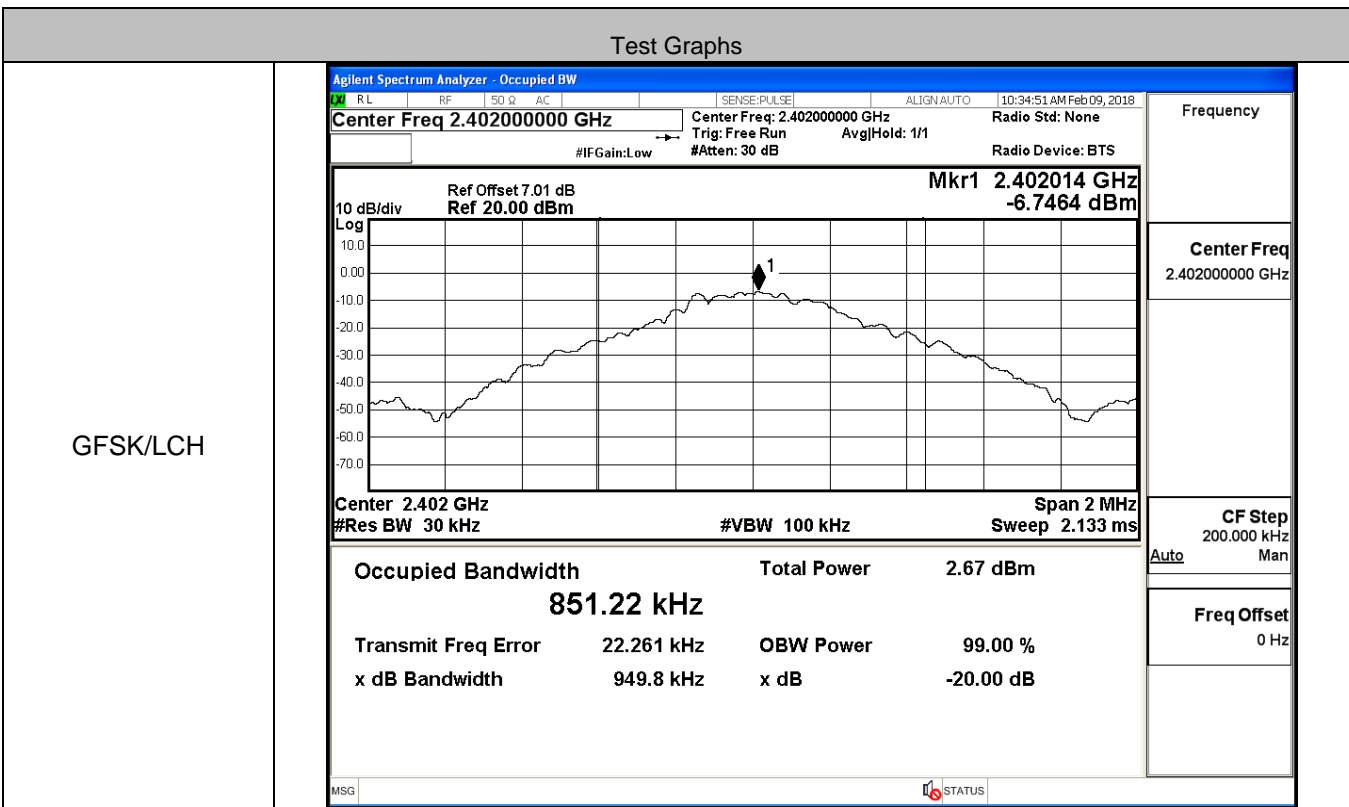


π /4DQPSK/HCH

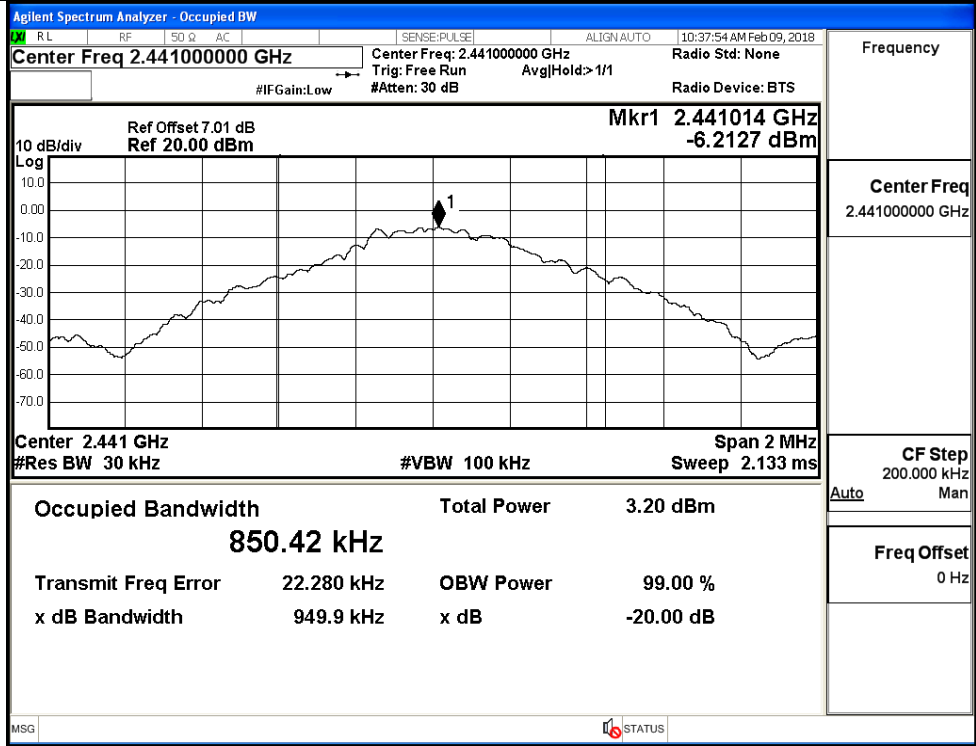


A.2 20dB Bandwidth

Mode	Channel.	20dB Bandwidth [MHz]	Verdict
GFSK	LCH	0.9498	PASS
	MCH	0.9499	PASS
	HCH	0.9506	PASS
π/4DQPSK	LCH	1.280	PASS
	MCH	1.284	PASS
	HCH	1.280	PASS

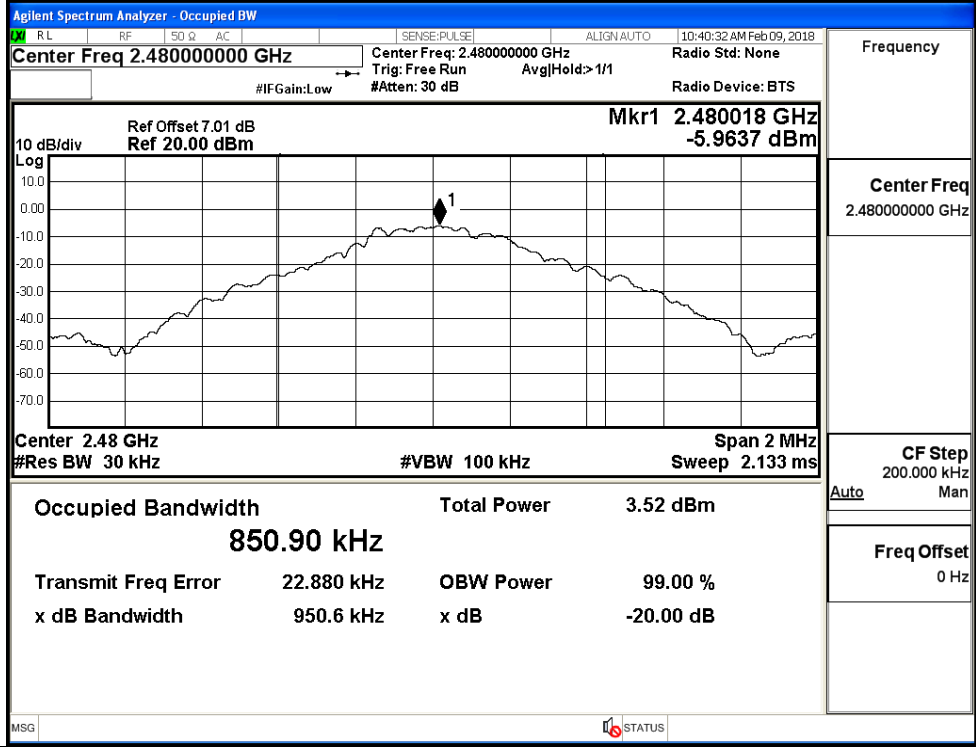


GFSK/MCH



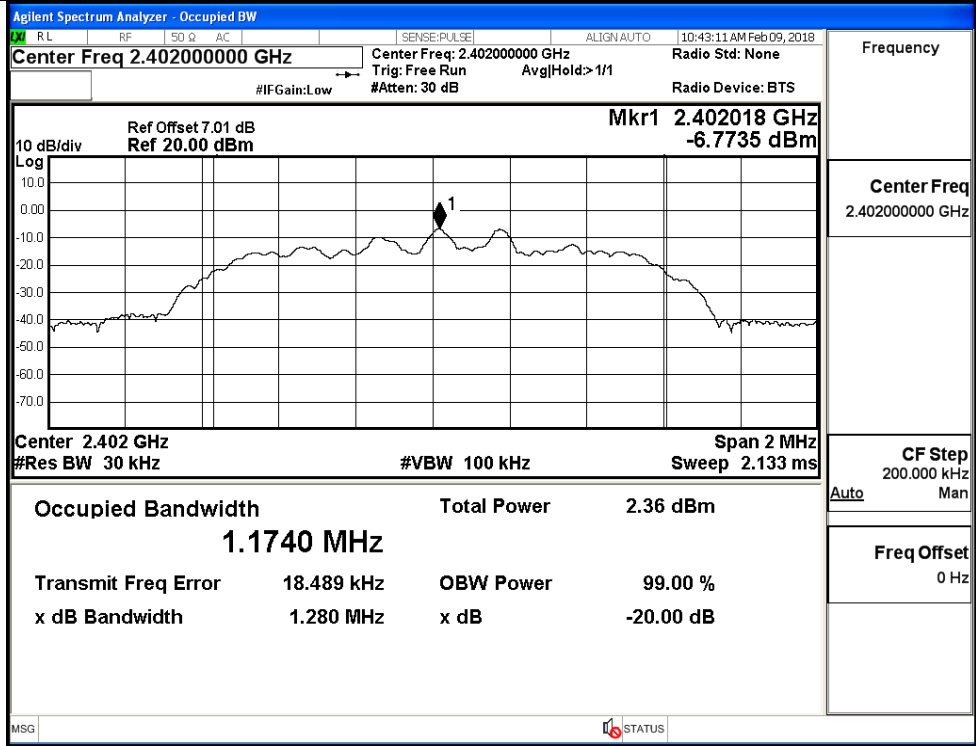
Frequency	2.441000000 GHz
Center Freq	2.441000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

GFSK/HCH

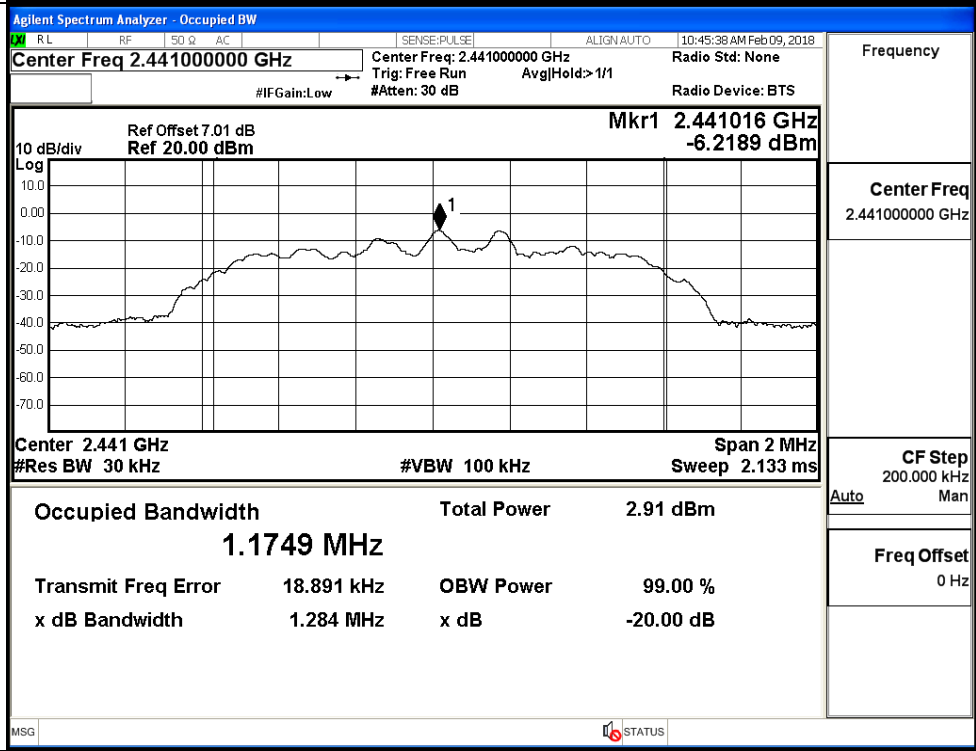


Frequency	2.480000000 GHz
Center Freq	2.480000000 GHz
CF Step	200.000 kHz
Auto	Man
Freq Offset	0 Hz

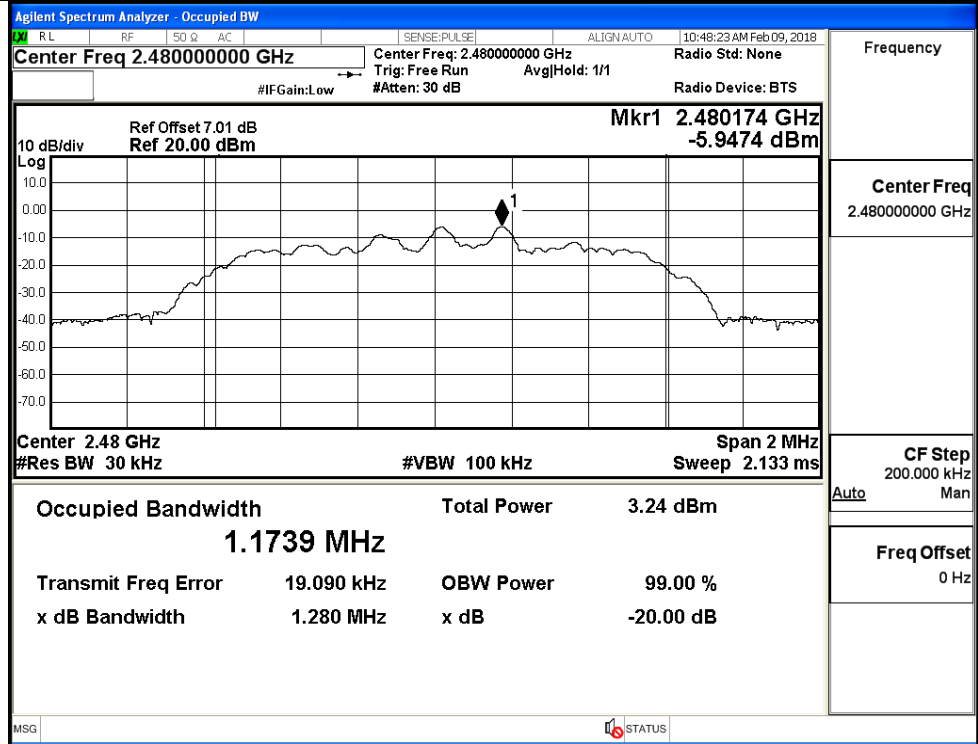
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



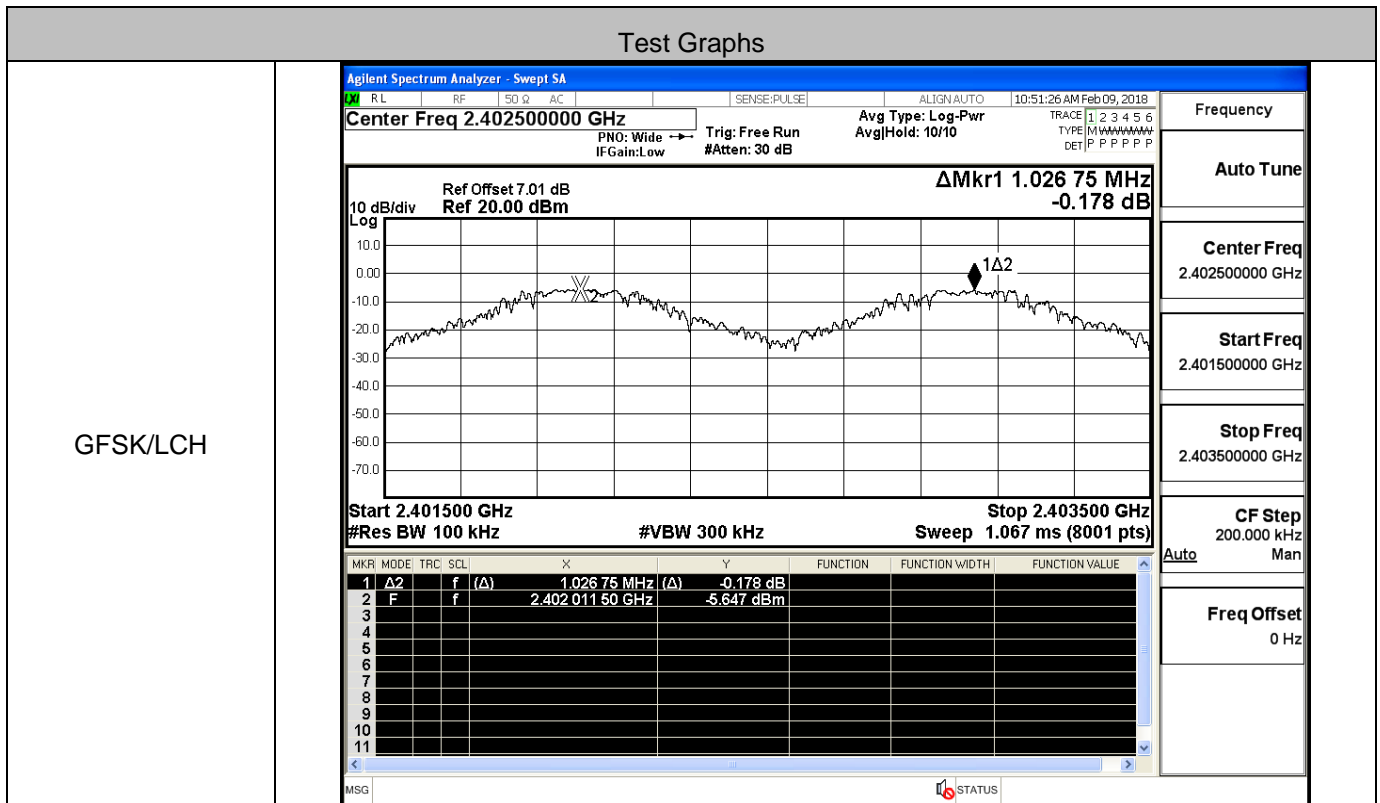
$\pi/4$ DQPSK/HCH



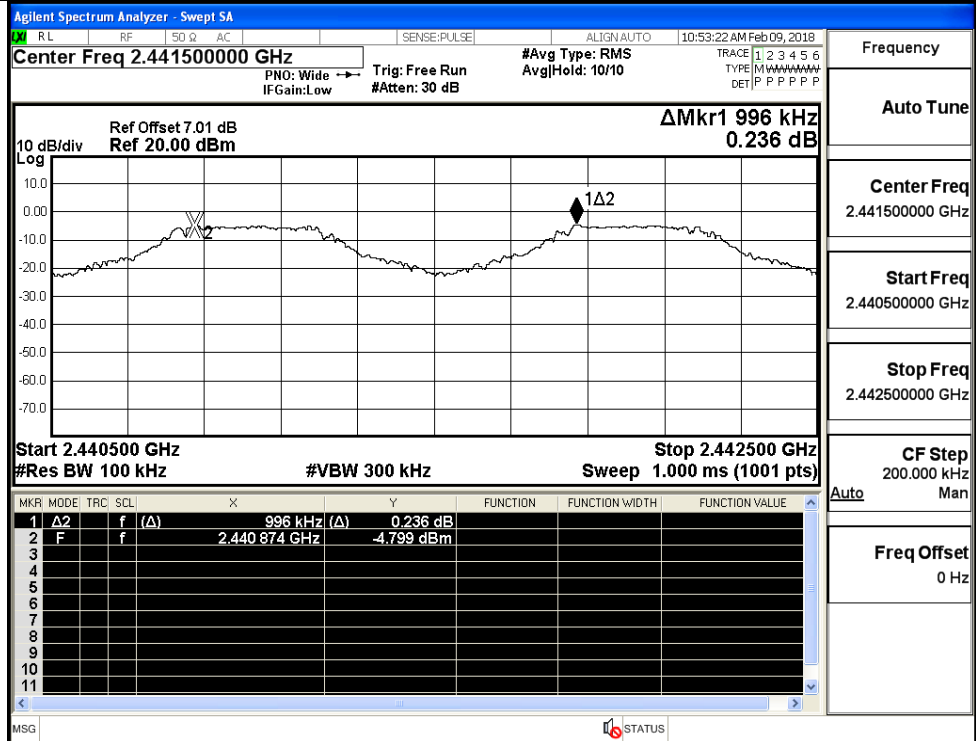
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.027	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
	MCH	0.996	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
	HCH	0.986	20dB Bandwidth or 2/3 of the 20dB Bandwidth	PASS
$\pi/4$ DQPSK	LCH	1.142	2/3 of the 20dB Bandwidth	PASS
	MCH	1.000	2/3 of the 20dB Bandwidth	PASS
	HCH	0.862	2/3 of the 20dB Bandwidth	PASS

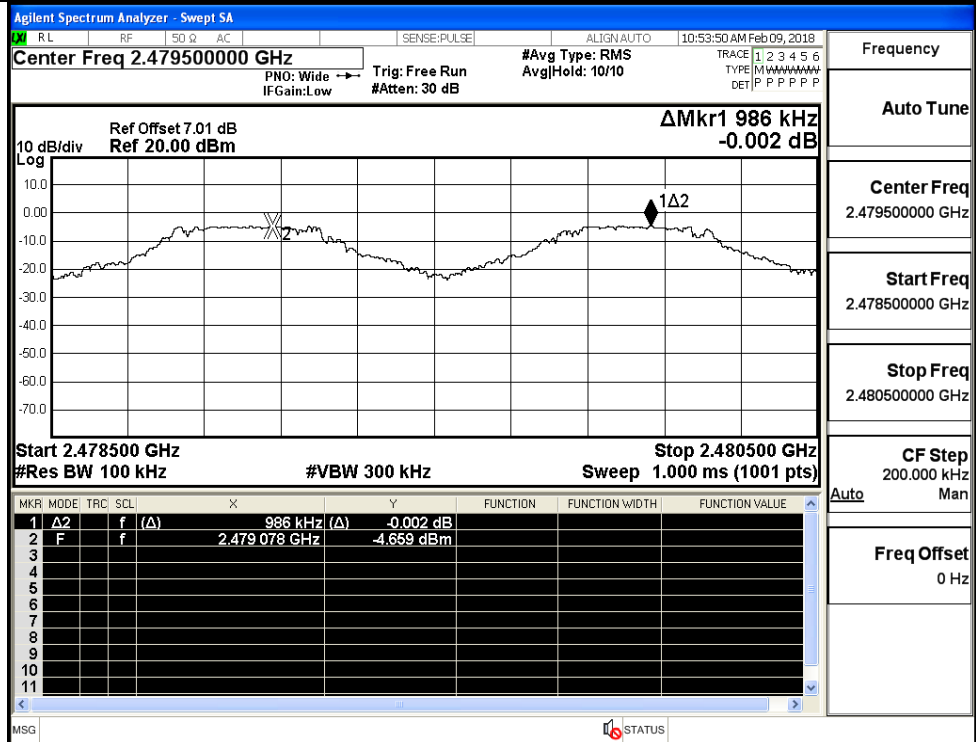
Test Graphs



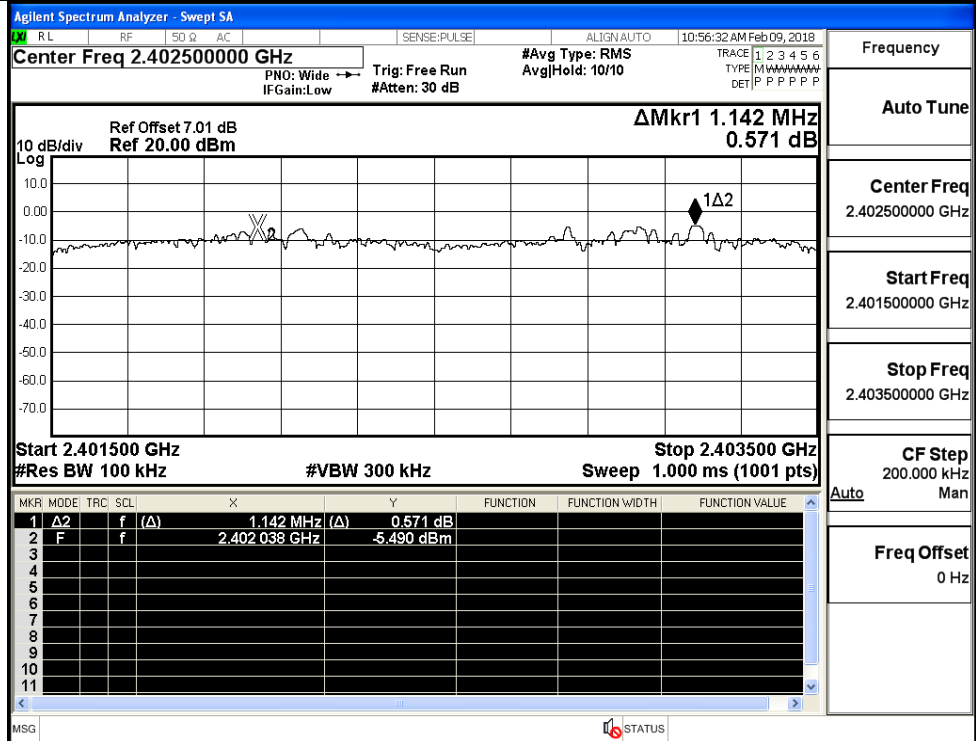
GFSK/MCH



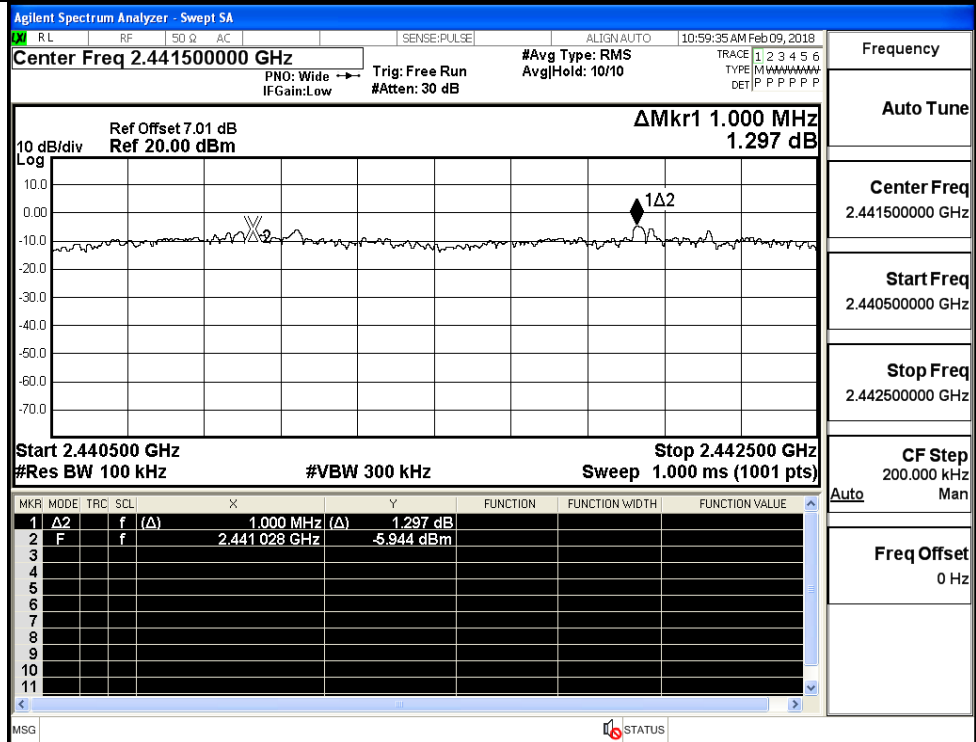
GFSK/HCH



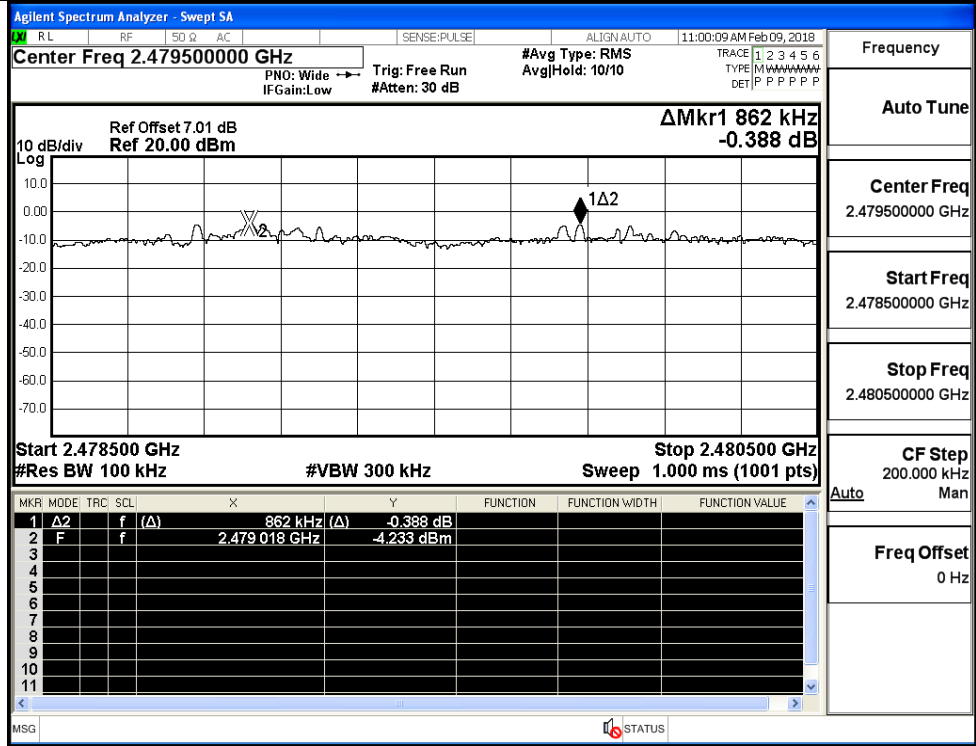
$\pi/4$ DQPSK/LCH



$\pi/4$ DQPSK/MCH



$\pi/4$ DQPSK/HCH



A.4 Hopping Channel Number

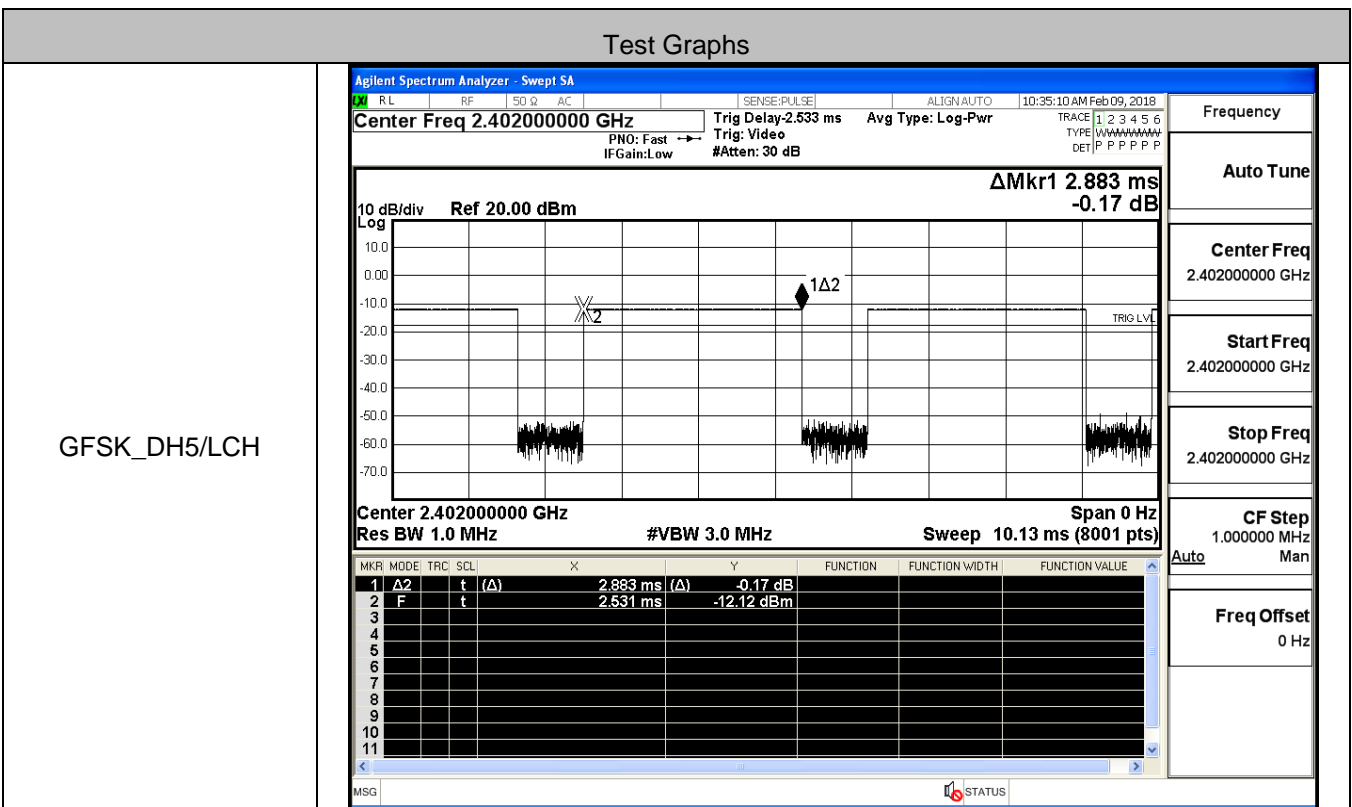
Mode	Channel.	Number of Hopping Channel	Verdict
GFSK	Hop	79	PASS
$\pi/4$ DQPSK	Hop	79	PASS

Test Graphs

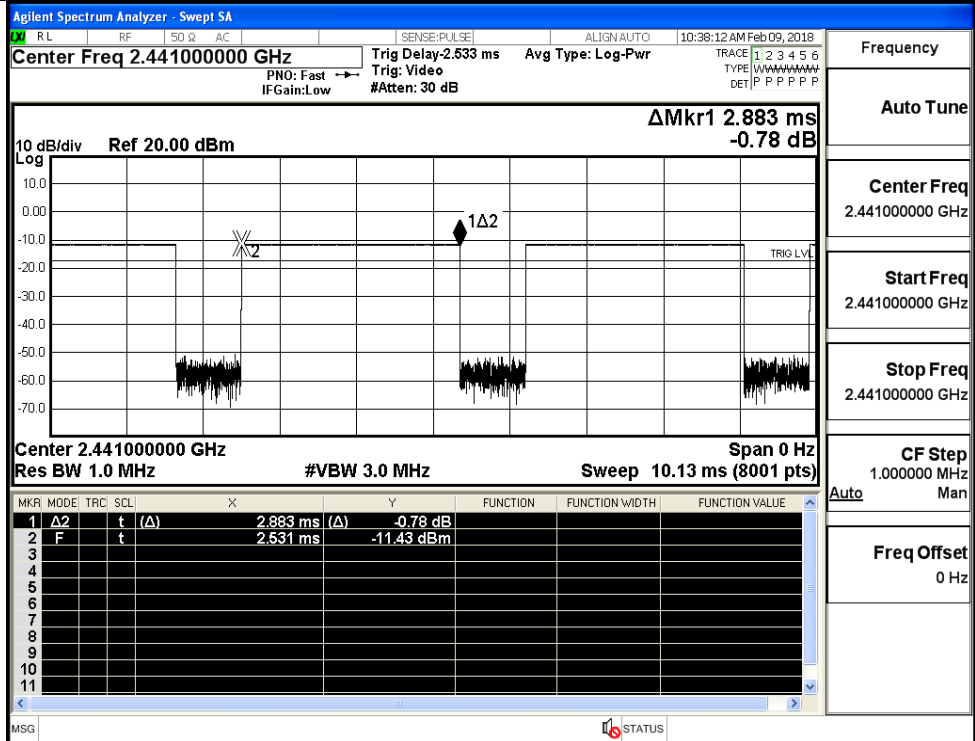
GFSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 7.01 dB Ref 20.00 dBm ΔMkr1 78.073 MHz 0.449 dB Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.48350 GHz Sweep 8.000 ms (8001 pts)</p> <table border="1"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <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>78.073 MHz (Δ)</td> <td>0.449 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.401 983 GHz</td> <td>-5.276 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)	78.073 MHz (Δ)	0.449 dB				2	F	f		2.401 983 GHz	-5.276 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Auto Man Freq Offset 0 Hz
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$\pi/4$ DQPSK/Hop	<p>Agilent Spectrum Analyzer - Swept SA Center Freq 2.441750000 GHz Ref Offset 7.01 dB Ref 20.00 dBm ΔMkr1 77.947 MHz 3.177 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>77.947 MHz (Δ)</td> <td>3.177 dB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>F</td> <td>f</td> <td></td> <td>2.402 098 GHz</td> <td>-3.491 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)	77.947 MHz (Δ)	3.177 dB				2	F	f		2.402 098 GHz	-3.491 dBm				Frequency Auto Tune Center Freq 2.441750000 GHz Start Freq 2.400000000 GHz Stop Freq 2.483500000 GHz CF Step 8.350000 MHz Auto Man Freq Offset 0 Hz
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2	F	f		2.402 098 GHz	-3.491 dBm																								

A.5 Dwell Time

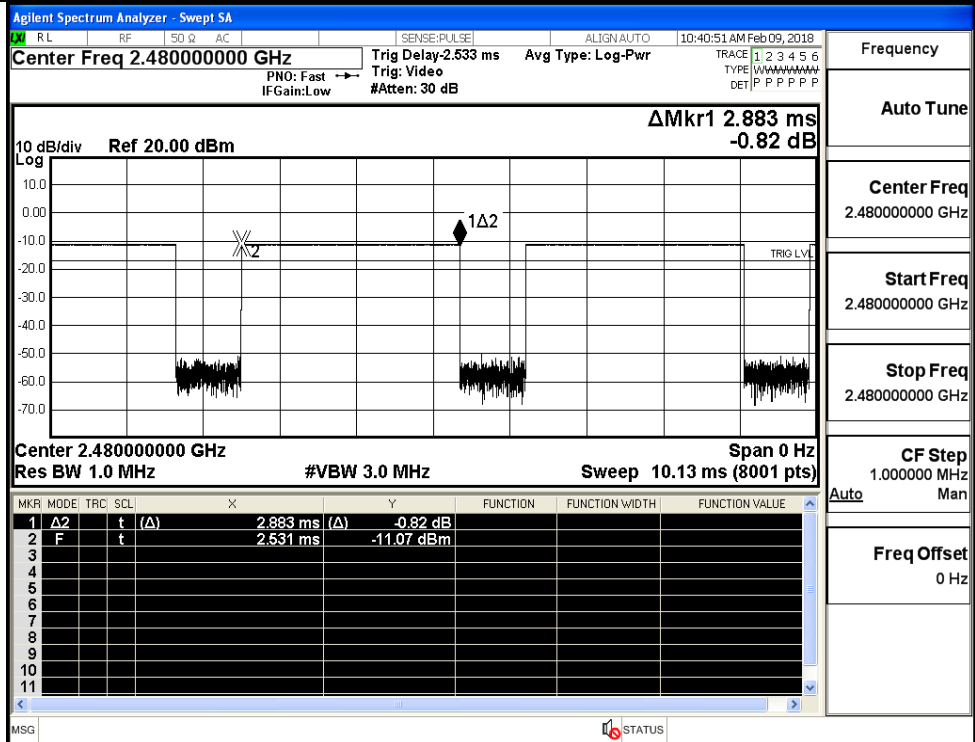
Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7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



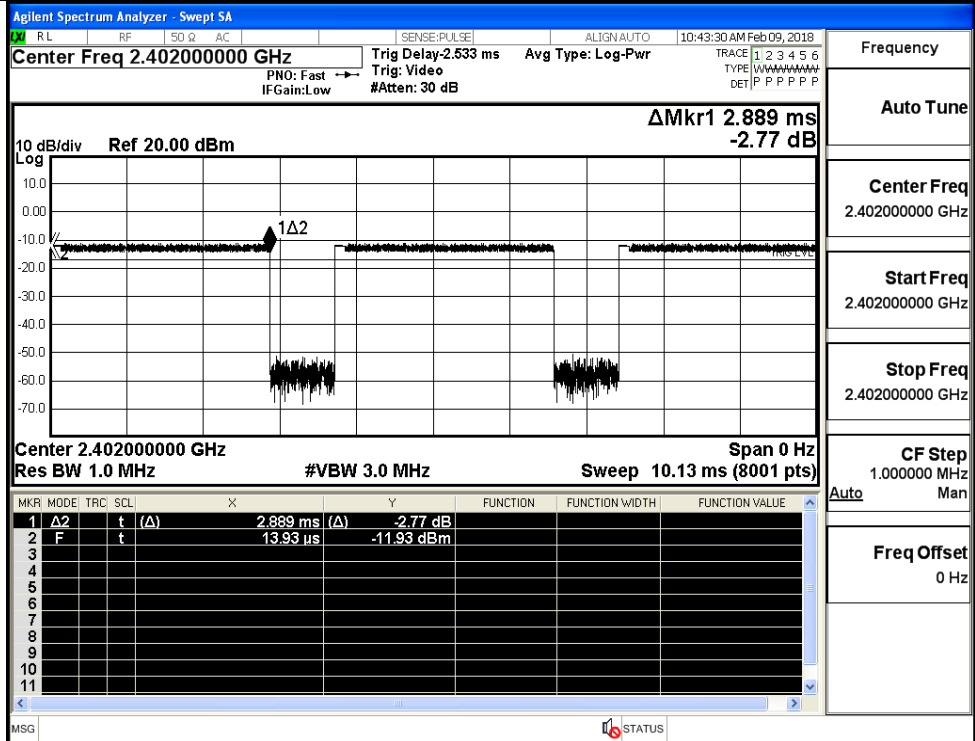
GFSK_DH5/MCH



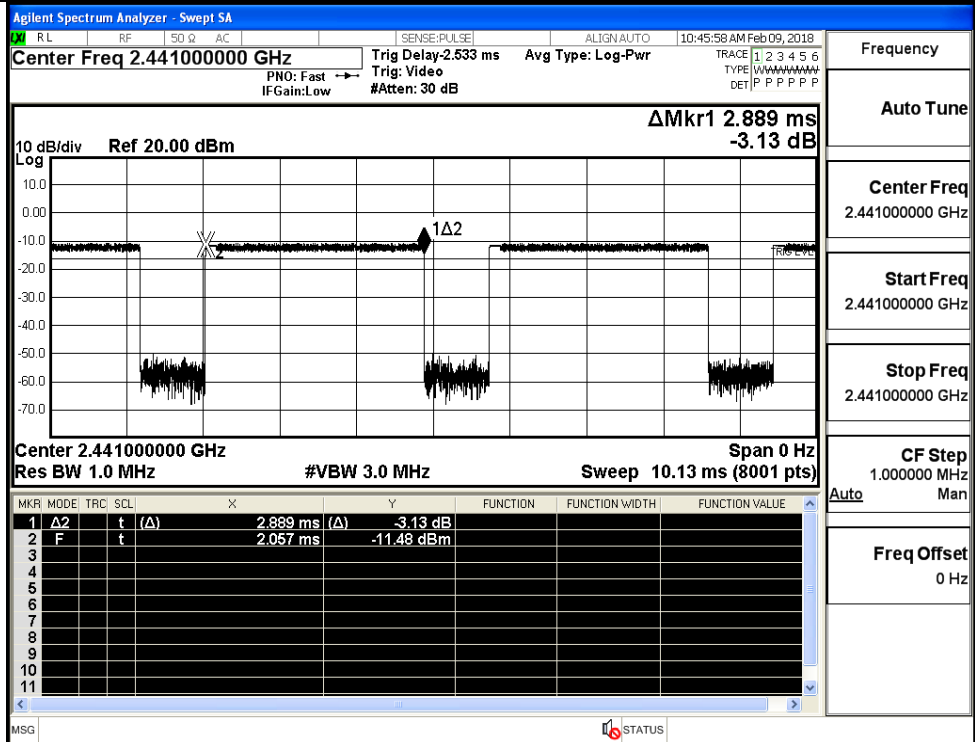
GFSK_DH5/HCH



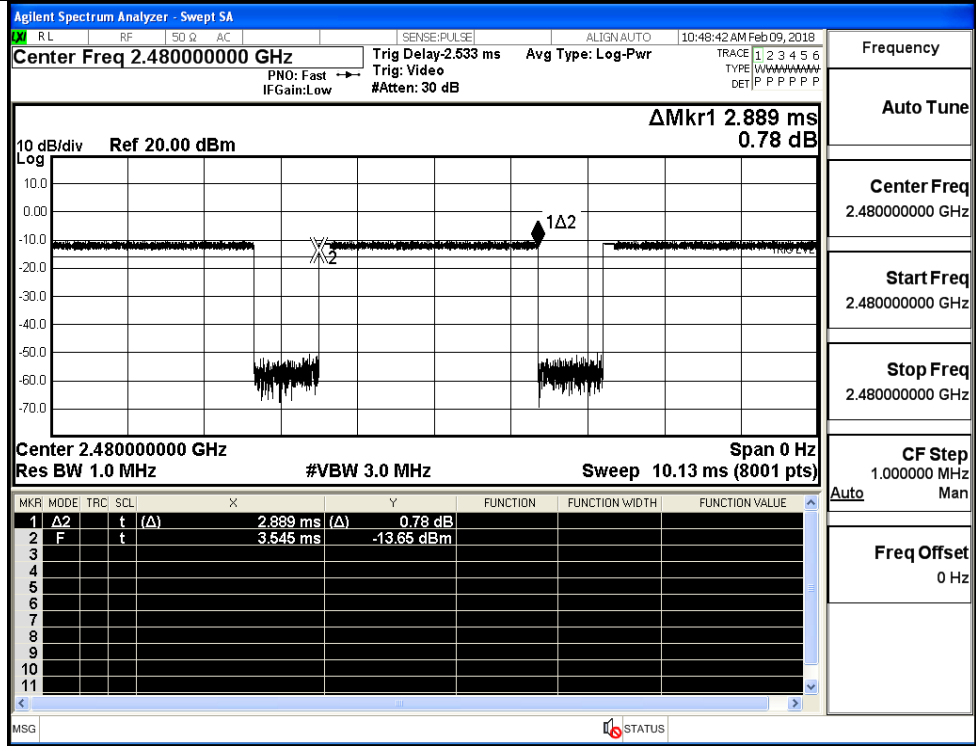
$\pi/4$ DQPSK
_2DH5/LCH



$\pi/4$ DQPSK
_2DH5/MCH



$\pi/4$ DQPSK
_2DH5/HCH

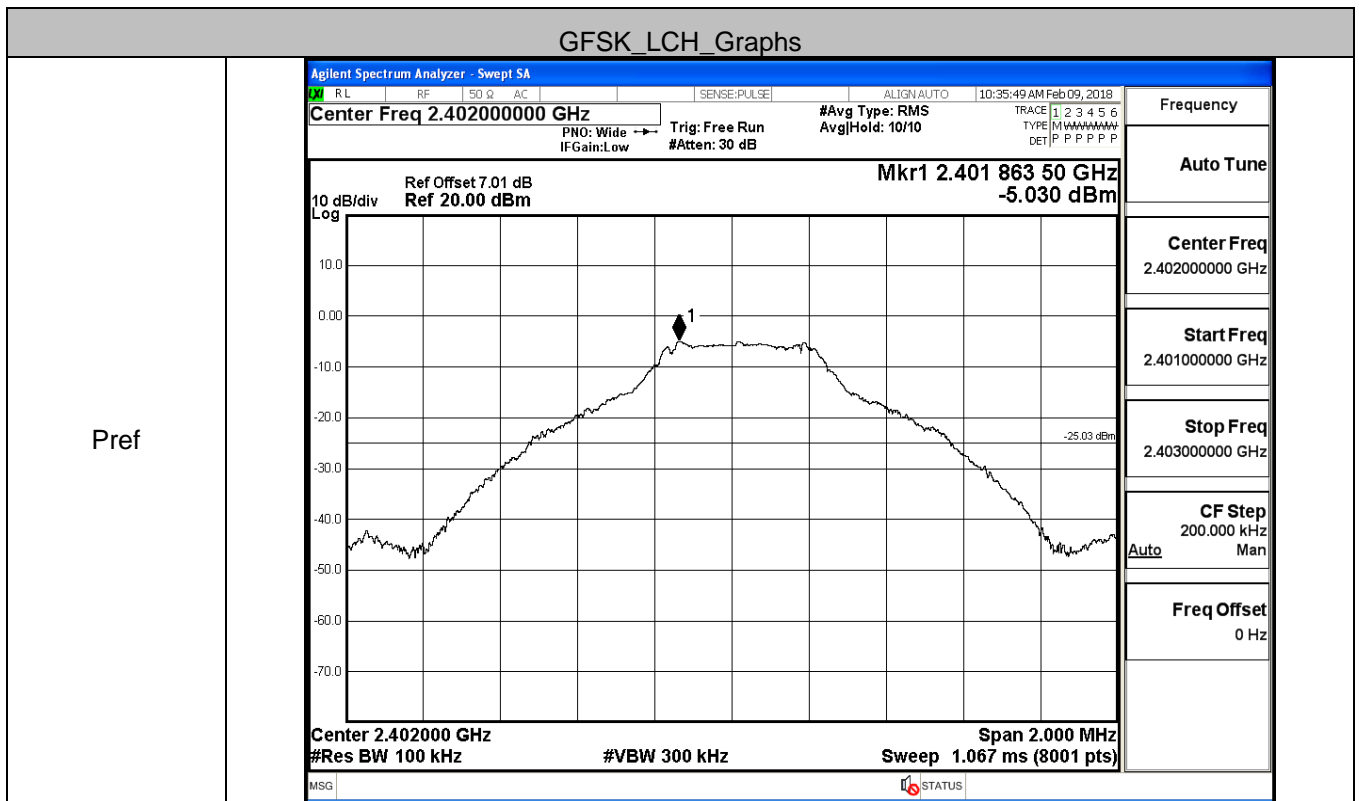


Frequency	
Auto Tune	
Center Freq	2.480000000 GHz
Start Freq	2.480000000 GHz
Stop Freq	2.480000000 GHz
CF Step	1.000000 MHz
Auto	Man
Freq Offset	0 Hz

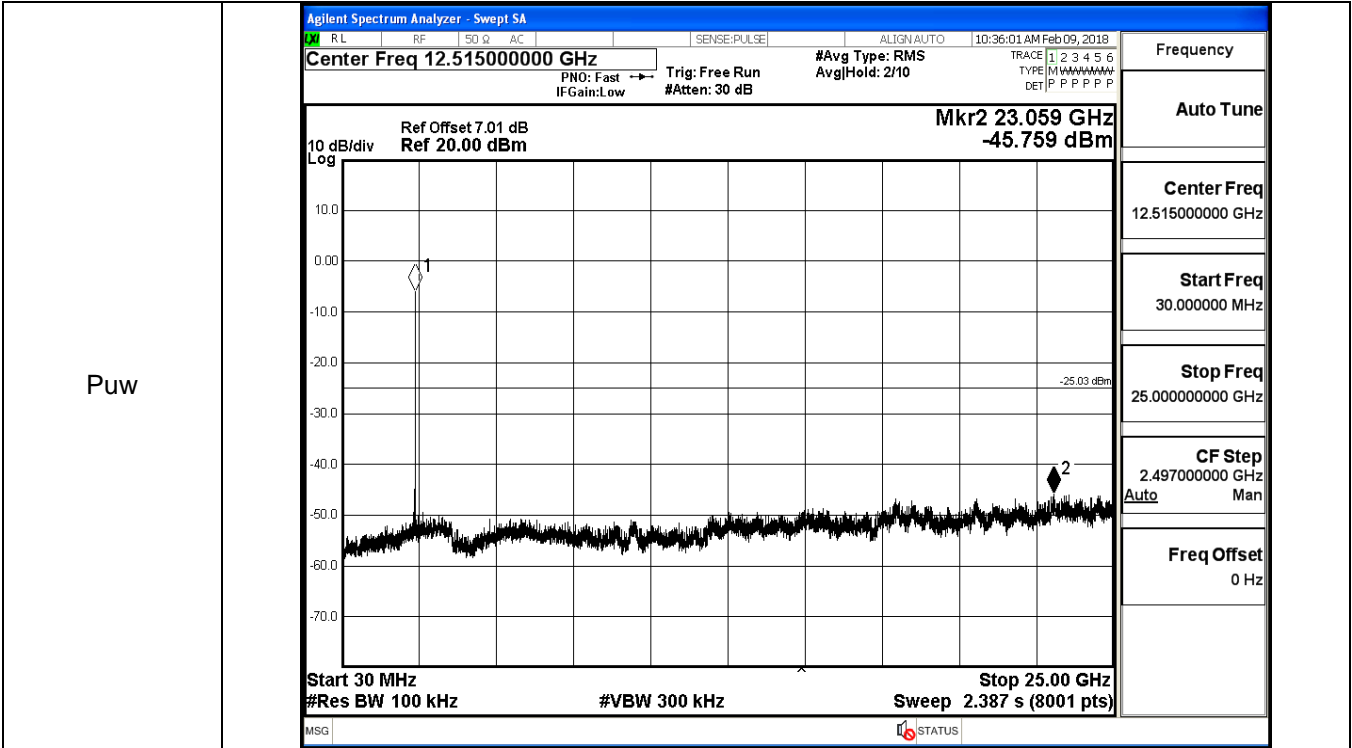
A.6 RF Conducted Spurious Emissions

Mode	Channel	Pref [dBm]	Puw[dBm]	Verdict
GFSK	LCH	-5.03	<Limit	PASS
	MCH	-4.533	<Limit	PASS
	HCH	-4.183	<Limit	PASS
$\pi/4$ DQPSK	LCH	-5.105	<Limit	PASS
	MCH	-4.604	<Limit	PASS
	HCH	-4.073	<Limit	PASS

GFSK_LCH_Graphs

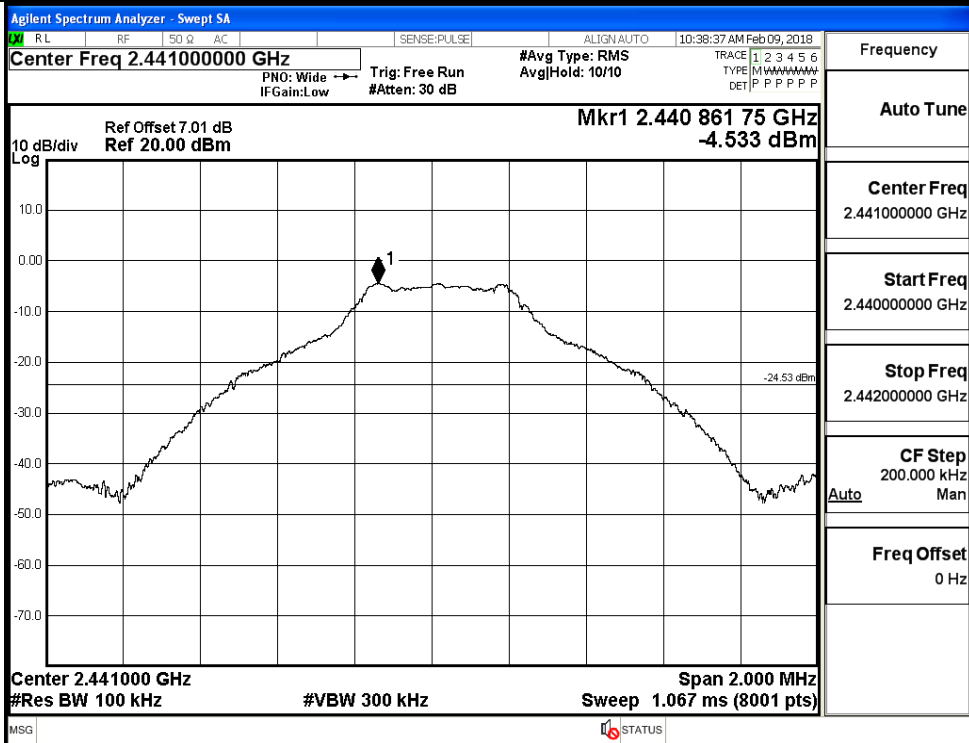


Pref

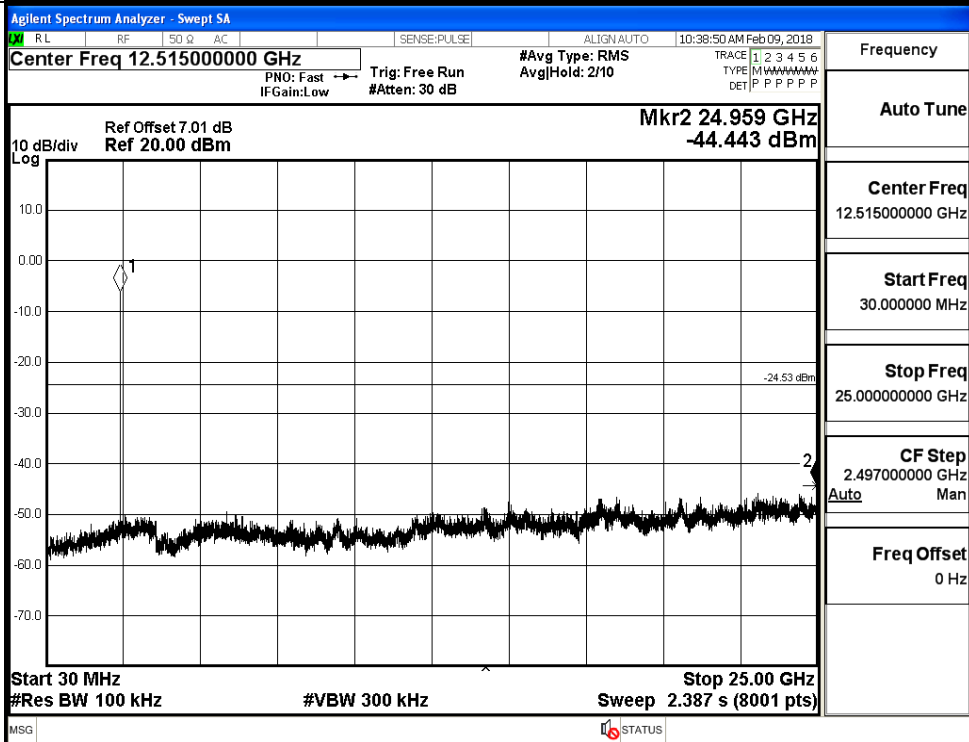


GFSK_MCH_Graphs

Pref

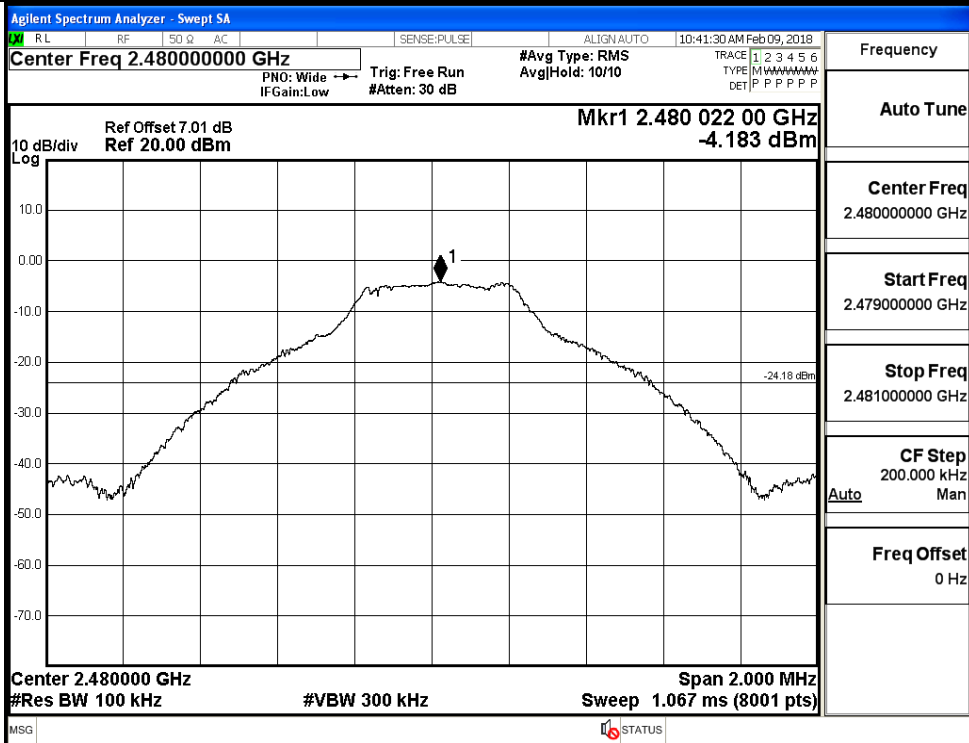


Puw

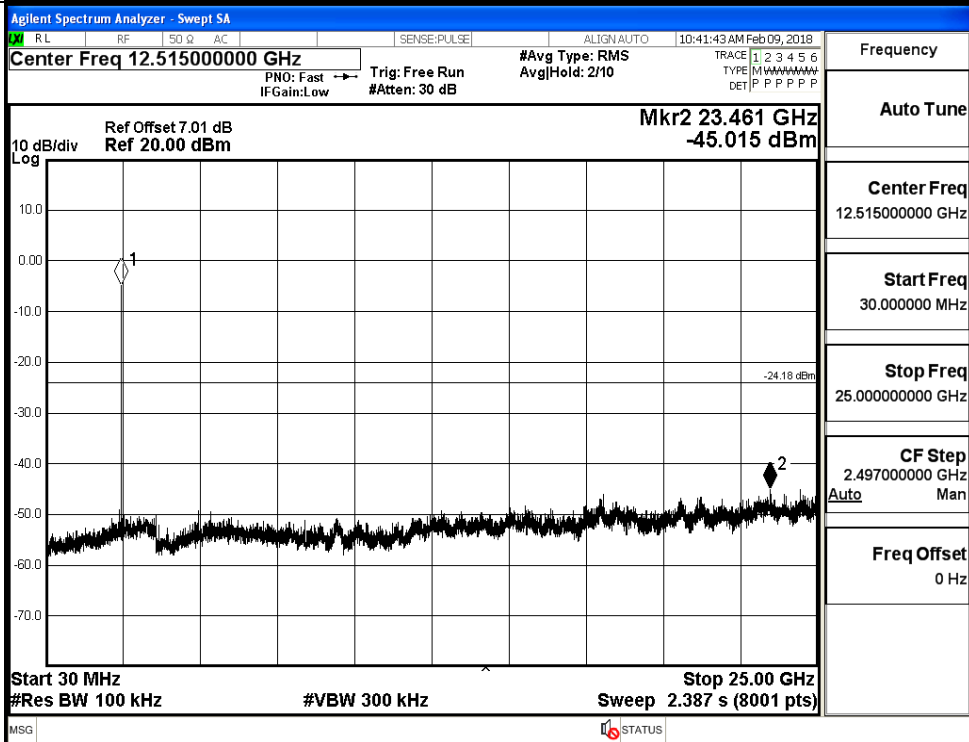


GFSK_HCH_Graphs

Pref

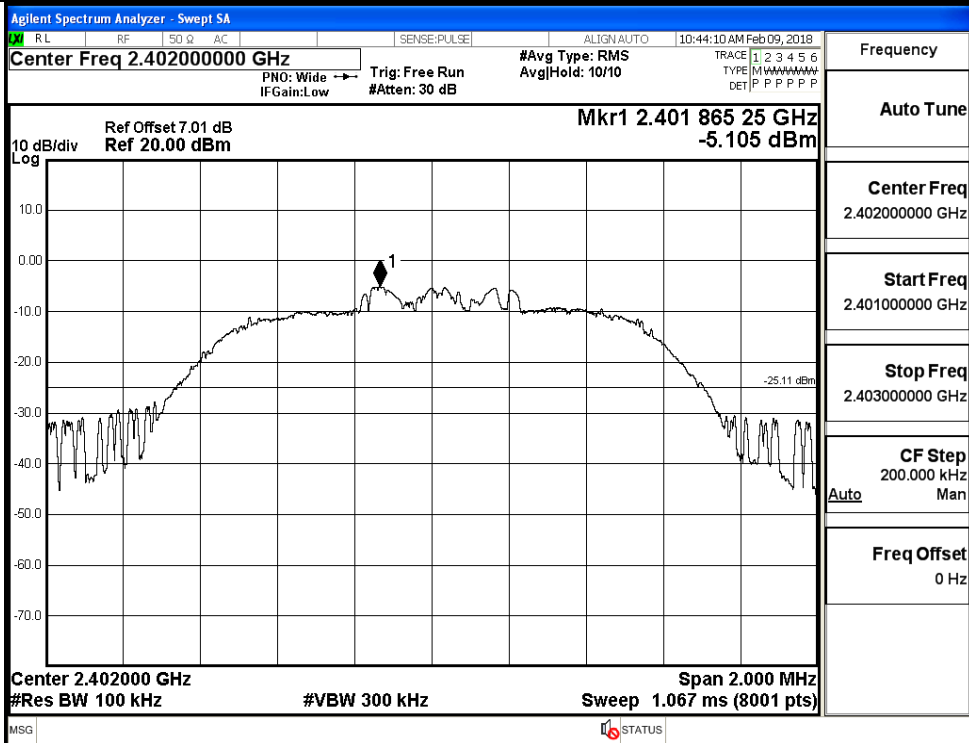


Puw

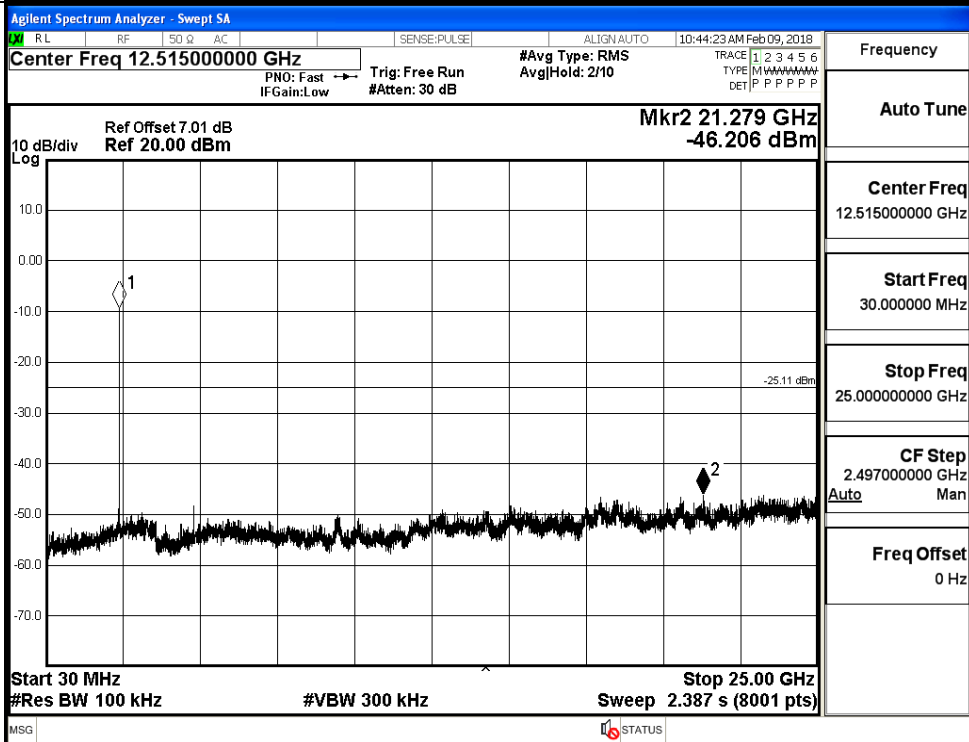


$\pi/4$ DQPSK LCH Graphs

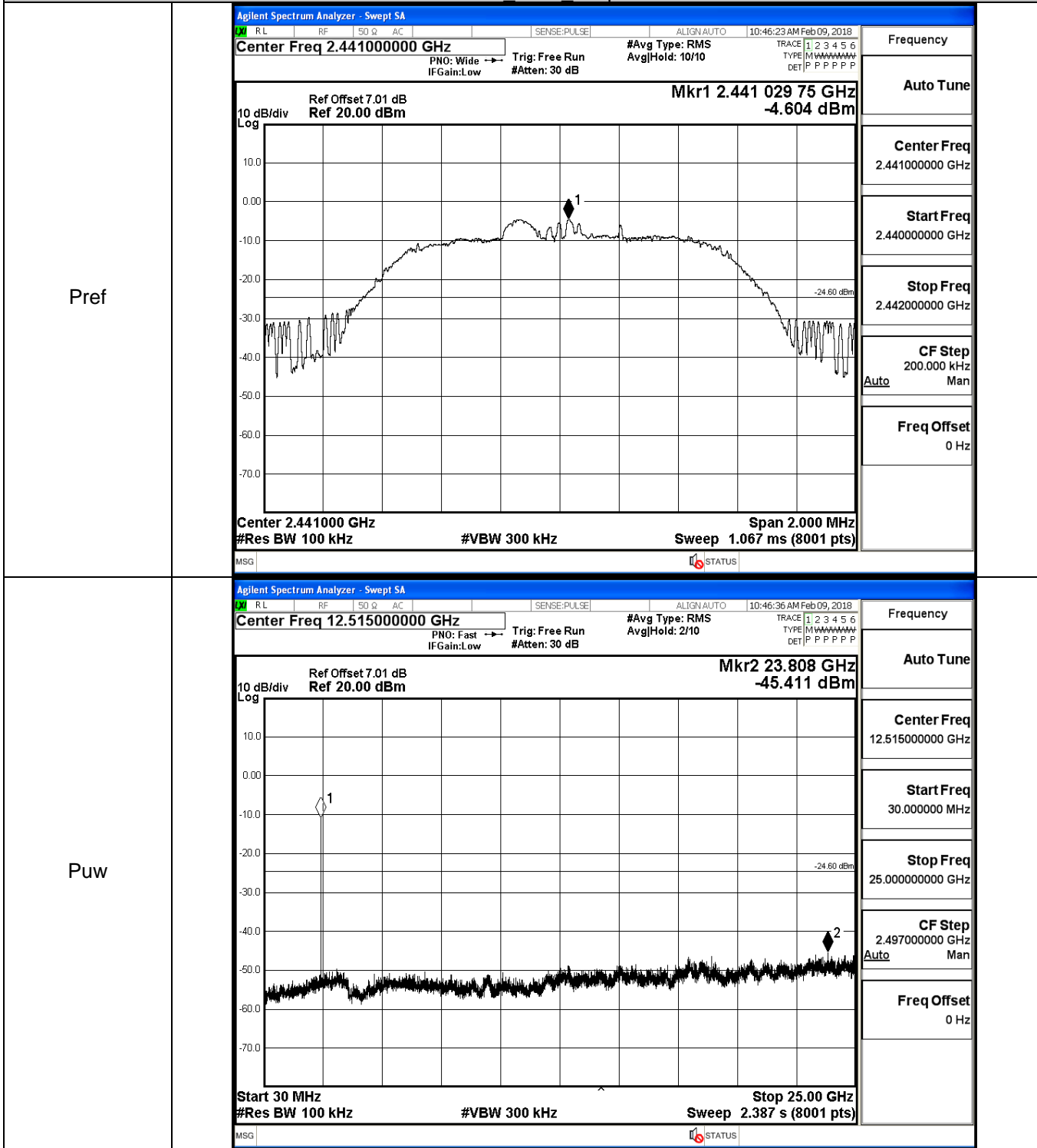
Pref



Puw

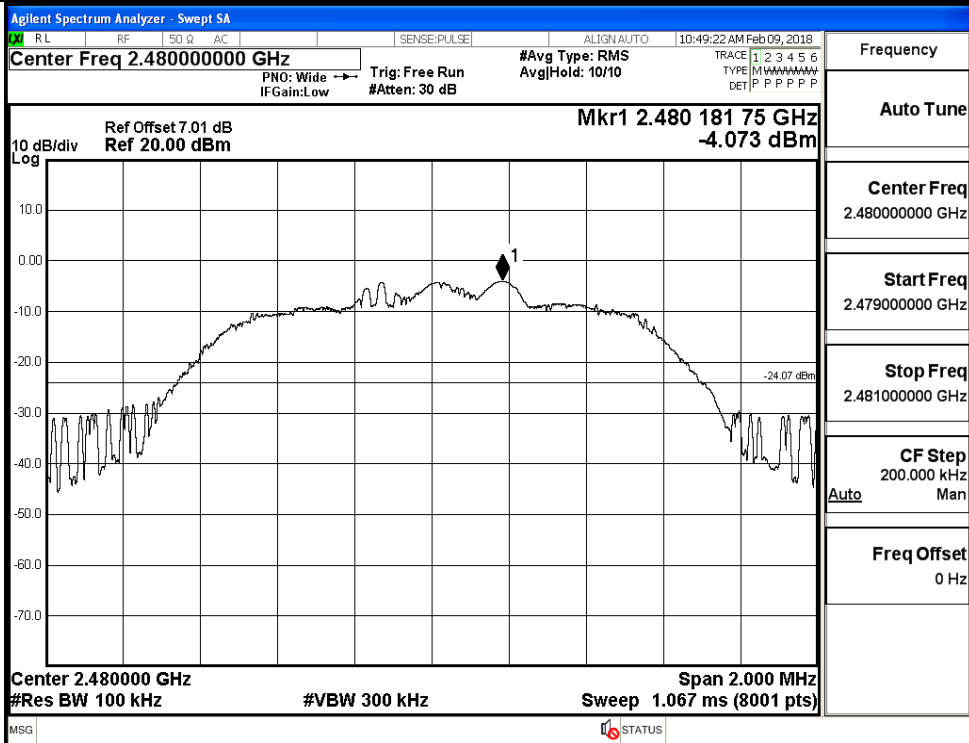


$\pi/4$ DQPSK MCH Graphs

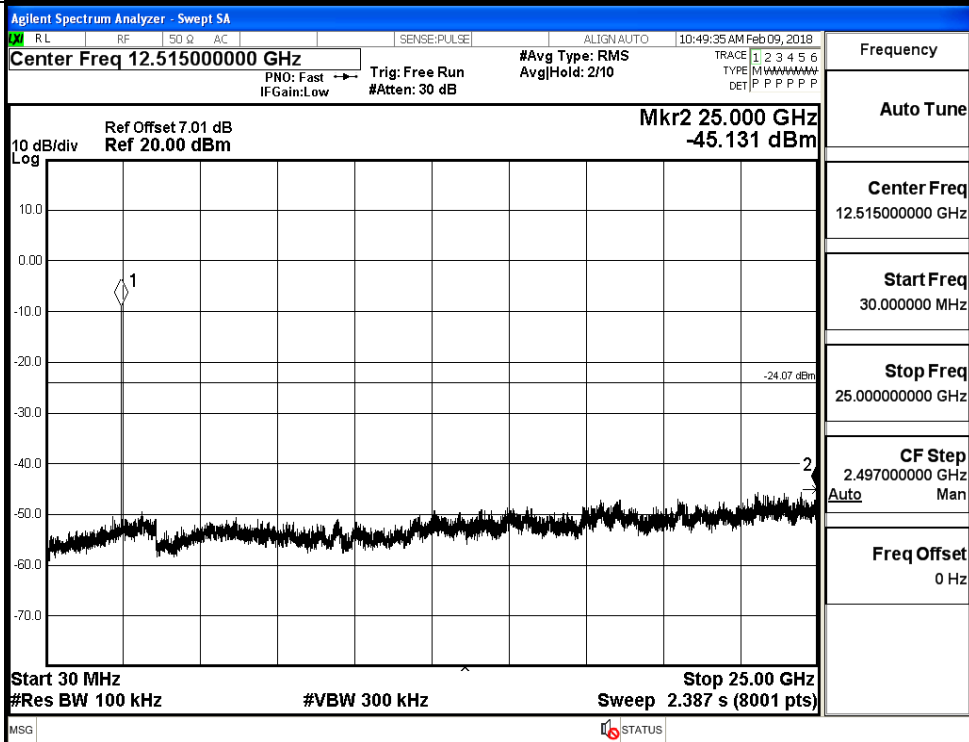


$\pi/4$ DQPSK HCH Graphs

Pref



Puw

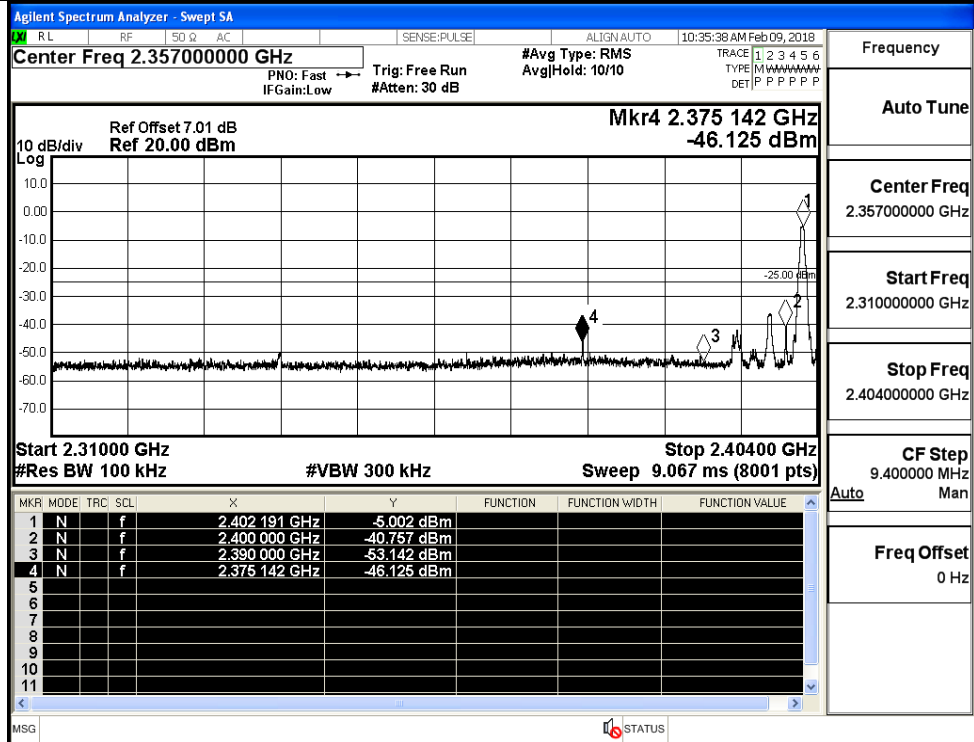


A.7 Band-edge for RF Conducted Emissions

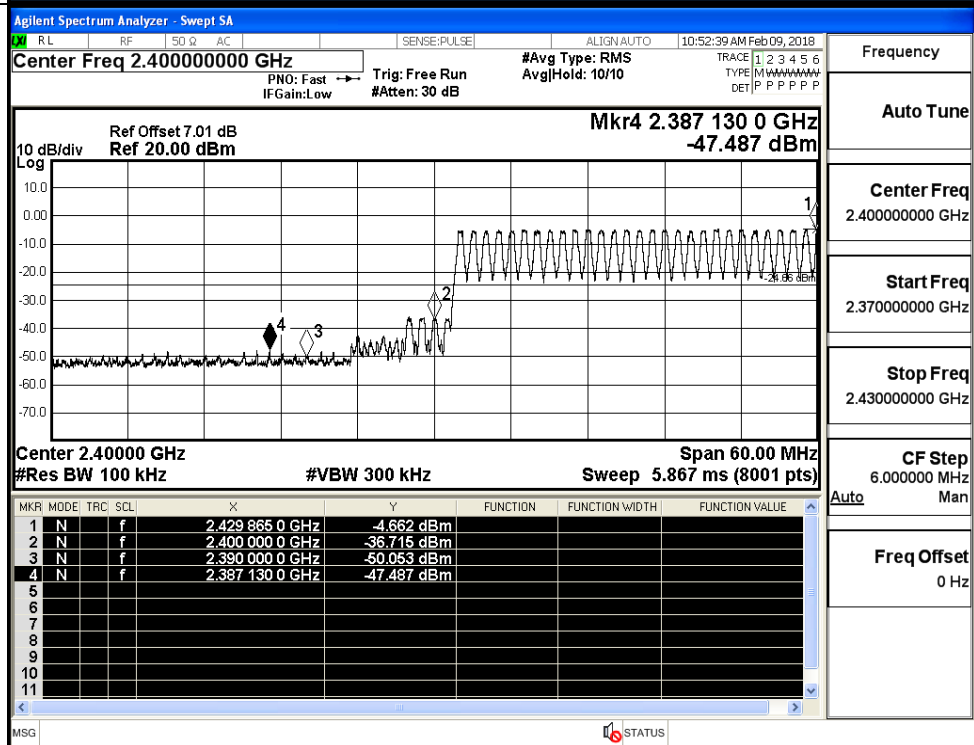
Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	-5.002	Off	-46.125	-25	PASS
			-4.662	On	-47.487	-24.66	PASS
	HCH	2480	-4.081	Off	-49.195	-24.08	PASS
			-4.309	On	-46.039	-24.31	PASS
$\pi/4$ DQPSK	LCH	2402	-4.913	Off	-48.778	-24.91	PASS
			-4.592	On	-46.905	-24.59	PASS
	HCH	2480	-4.030	Off	-48.920	-24.03	PASS
			-4.231	On	-46.816	-24.23	PASS

Test Graphs

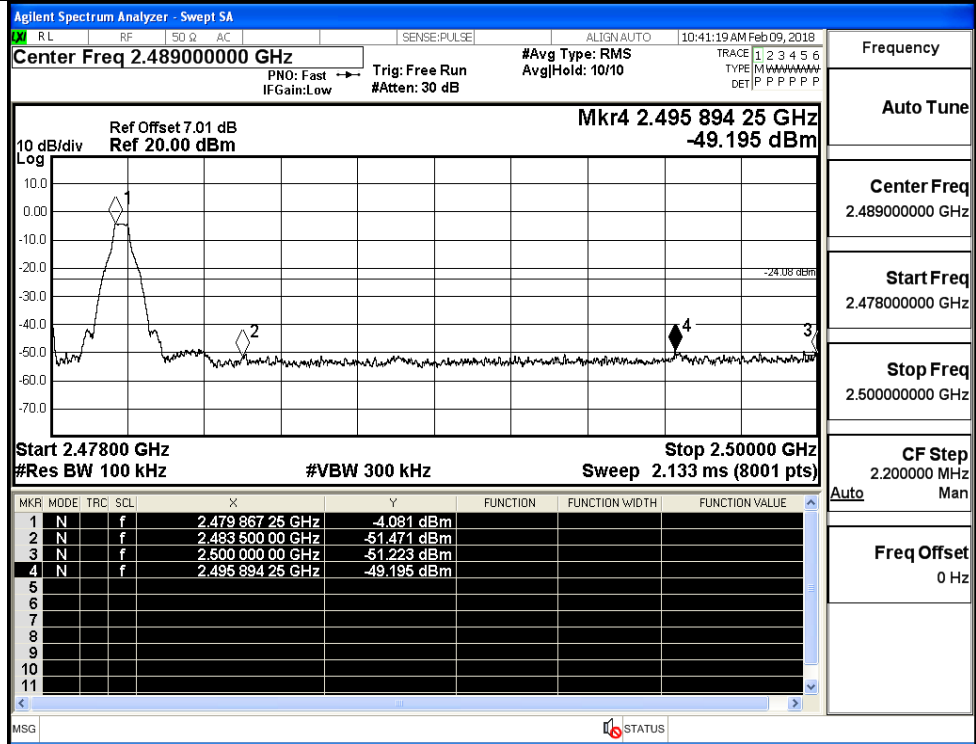
GFSK/LCH/No Hop



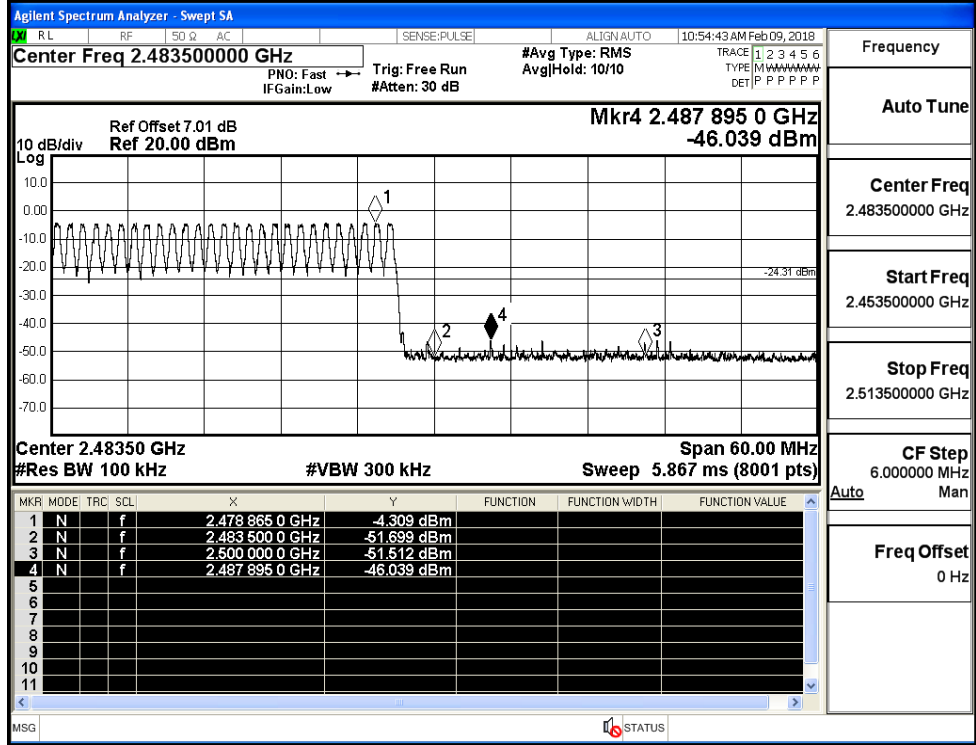
GFSK/LCH/Hop



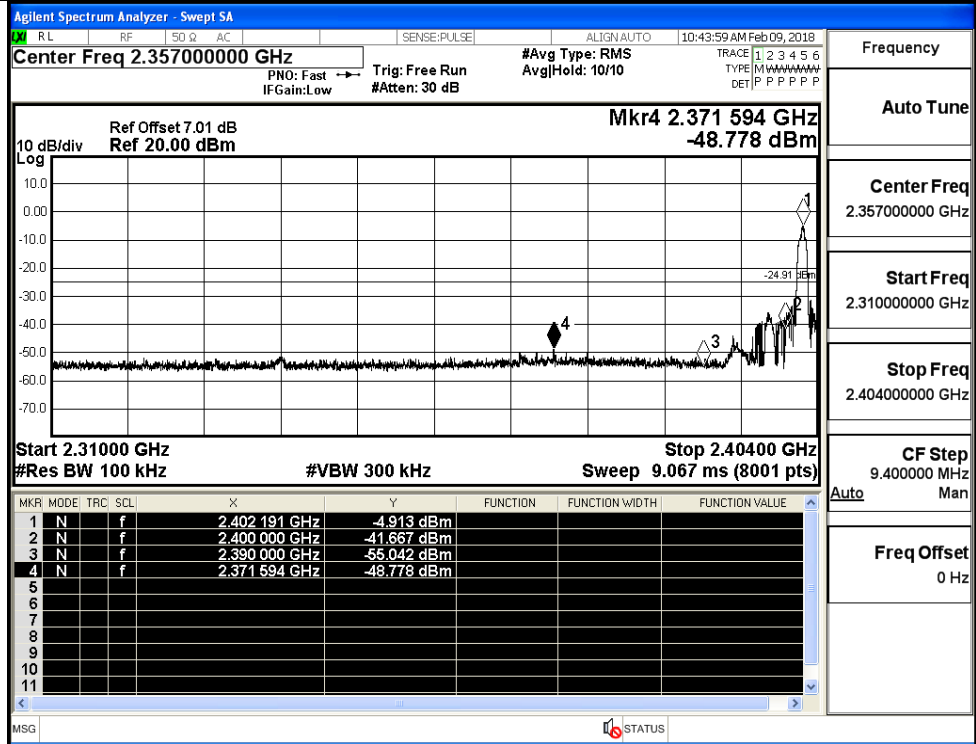
GFSK/HCH/No Hop



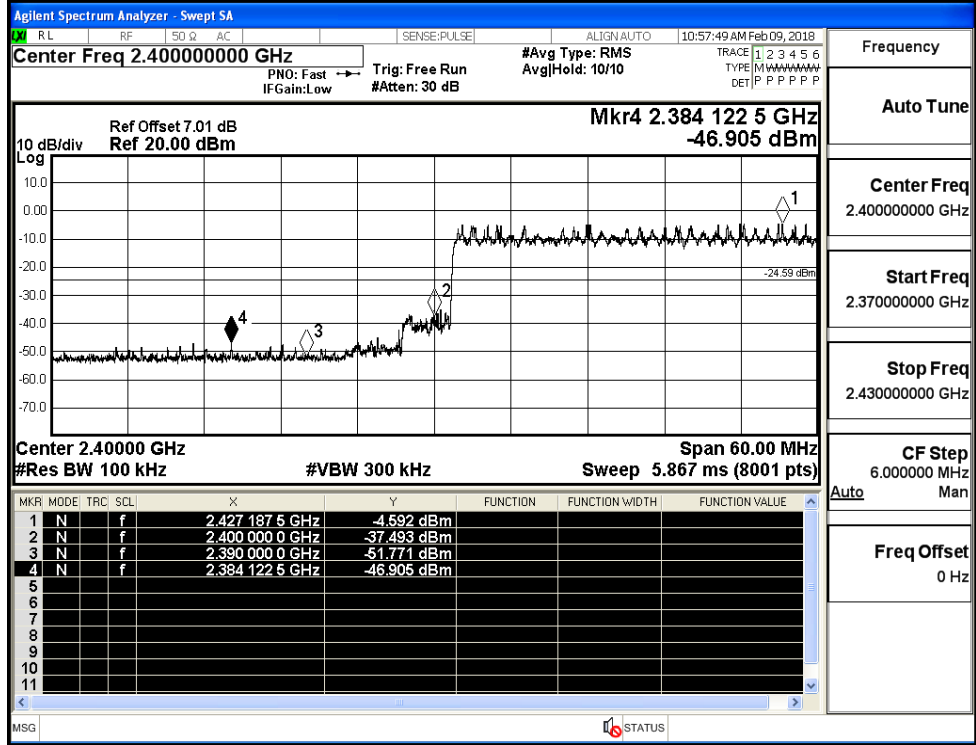
GFSK/HCH/Hop



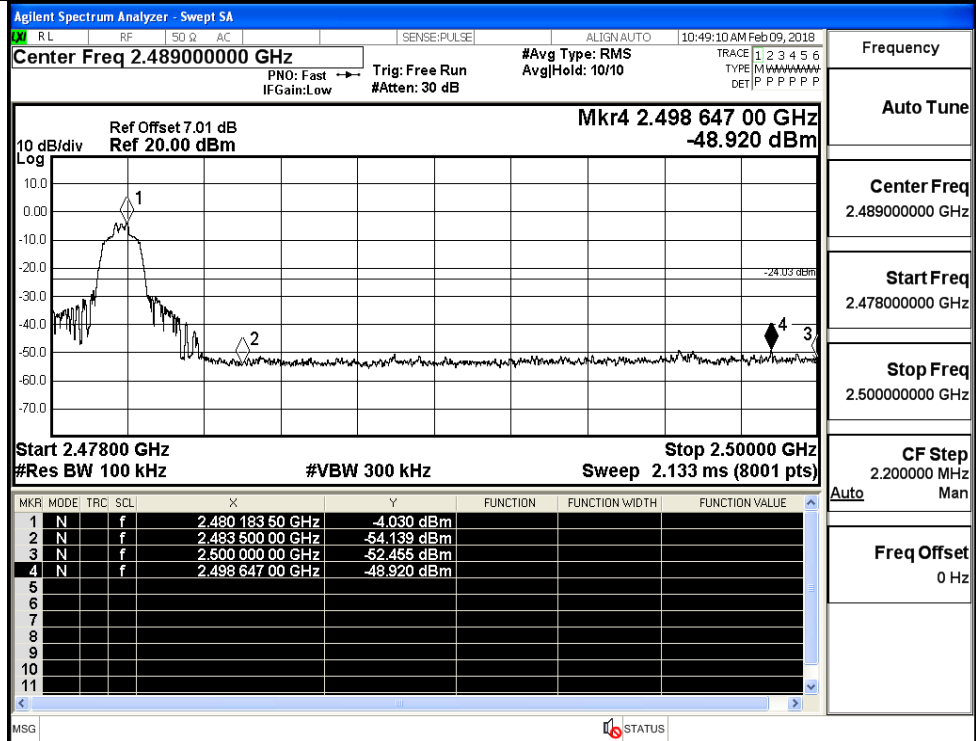
$\pi/4$ DQPSK/LCH/No
Hop



$\pi/4$ DQPSK/LCH/Hop

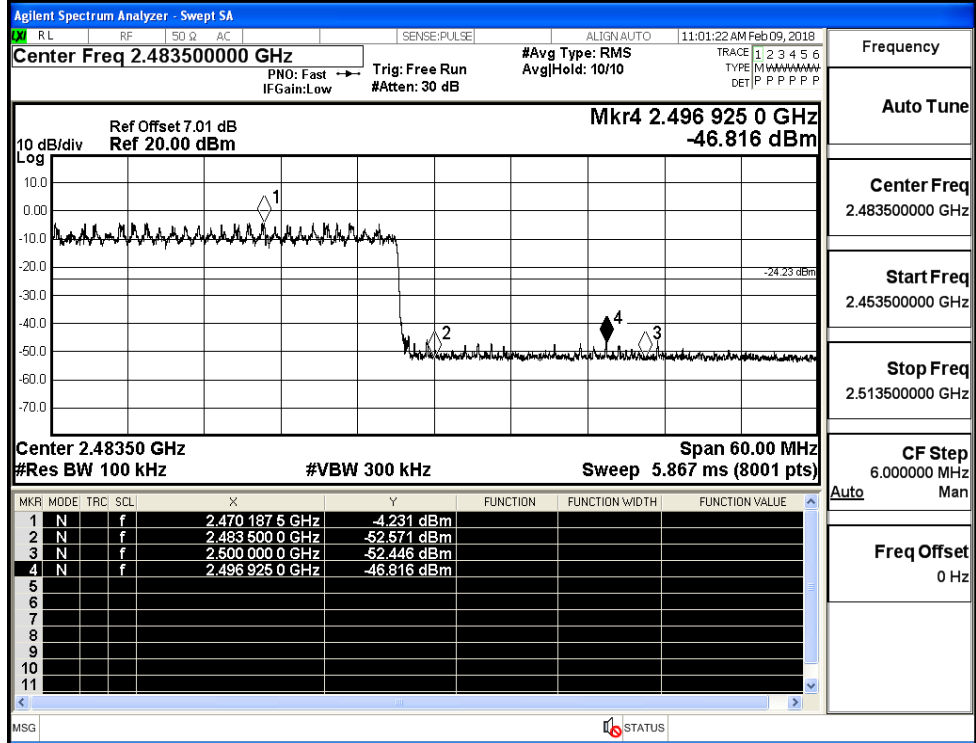


π /4DQPSK/HCH/No
Hop



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

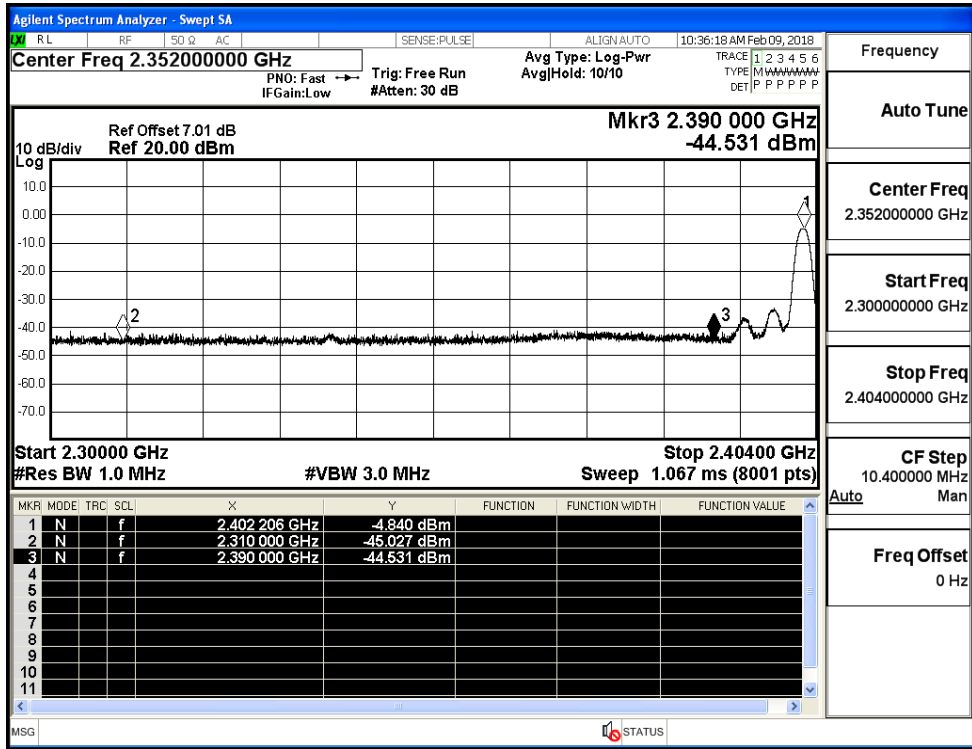


Frequency	
Auto Tune	
Center Freq	2.483500000 GHz
Start Freq	2.453500000 GHz
Stop Freq	2.513500000 GHz
CF Step	6.000000 MHz
Freq Offset	0 Hz

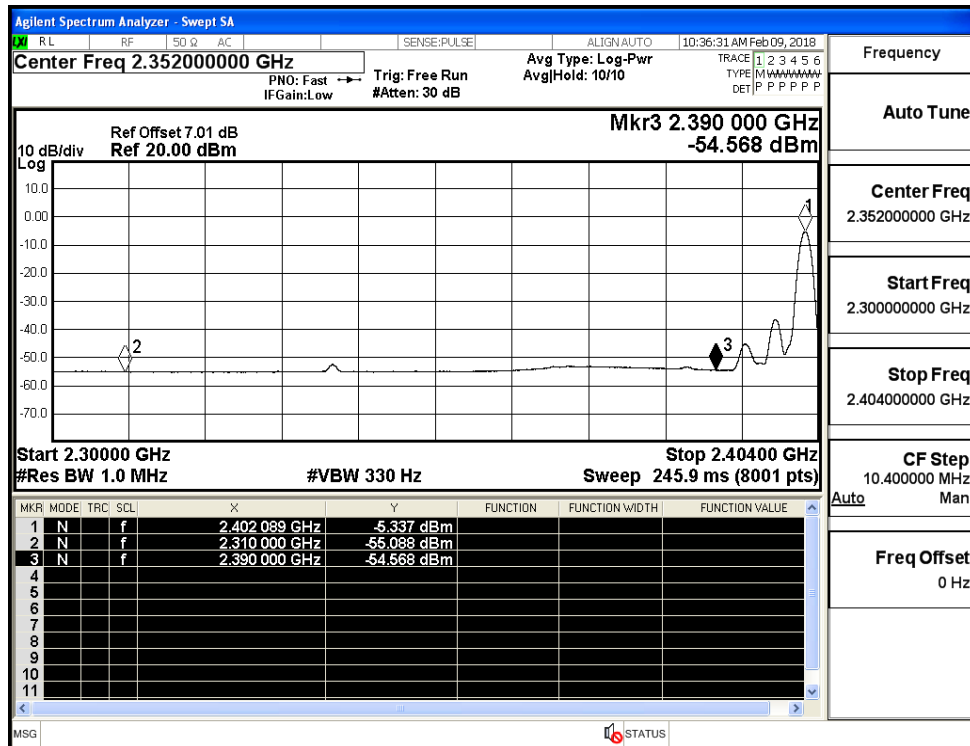
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-45.03	2.0	0	50.23	PEAK	74	PASS
	Off	2310.0	-55.09	2.0	0	40.17	AV	54	PASS
	Off	2390.0	-44.53	2.0	0	50.73	PEAK	74	PASS
	Off	2390.0	-54.57	2.0	0	40.69	AV	54	PASS
	Off	2483.5	-43.43	2.0	0	51.83	PEAK	74	PASS
	Off	2483.5	-53.30	2.0	0	41.96	AV	54	PASS
	Off	2500.0	-43.95	2.0	0	51.31	PEAK	74	PASS
	Off	2500.0	-52.93	2.0	0	42.32	AV	54	PASS
$\pi/4$ DQPSK	Off	2310.0	-42.42	2.0	0	52.83	PEAK	74	PASS
	Off	2310.0	-55.04	2.0	0	40.22	AV	54	PASS
	Off	2390.0	-44.08	2.0	0	51.17	PEAK	74	PASS
	Off	2390.0	-54.40	2.0	0	40.85	AV	54	PASS
	Off	2483.5	-42.96	2.0	0	52.30	PEAK	74	PASS
	Off	2483.5	-53.70	2.0	0	41.56	AV	54	PASS
	Off	2500.0	-42.00	2.0	0	53.26	PEAK	74	PASS
	Off	2500.0	-52.80	2.0	0	42.45	AV	54	PASS

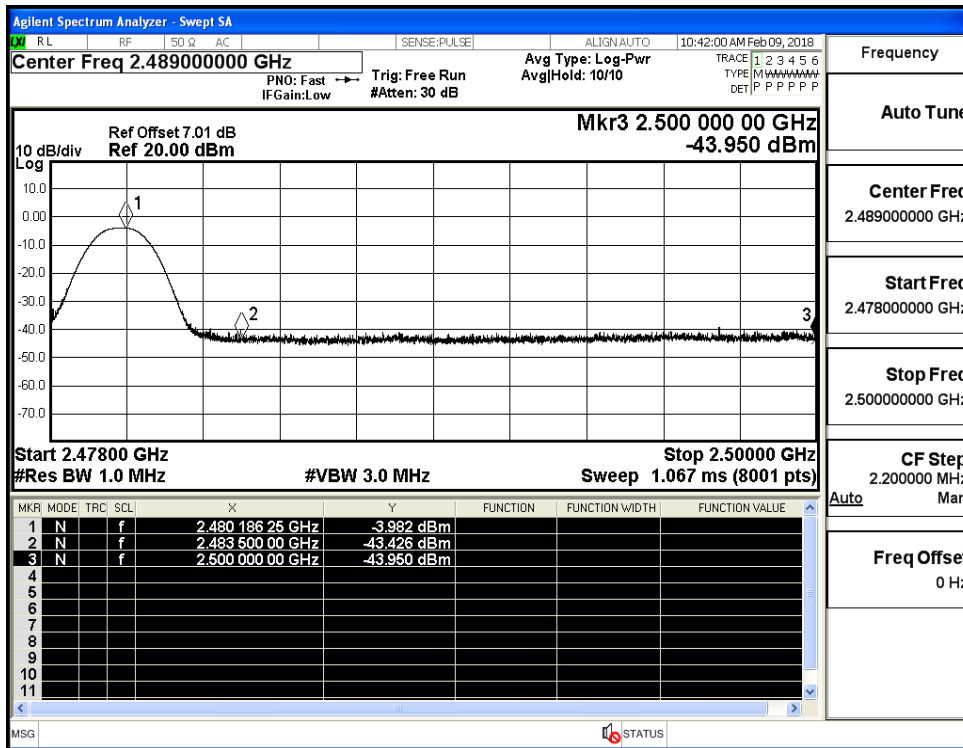
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (Low Channel)



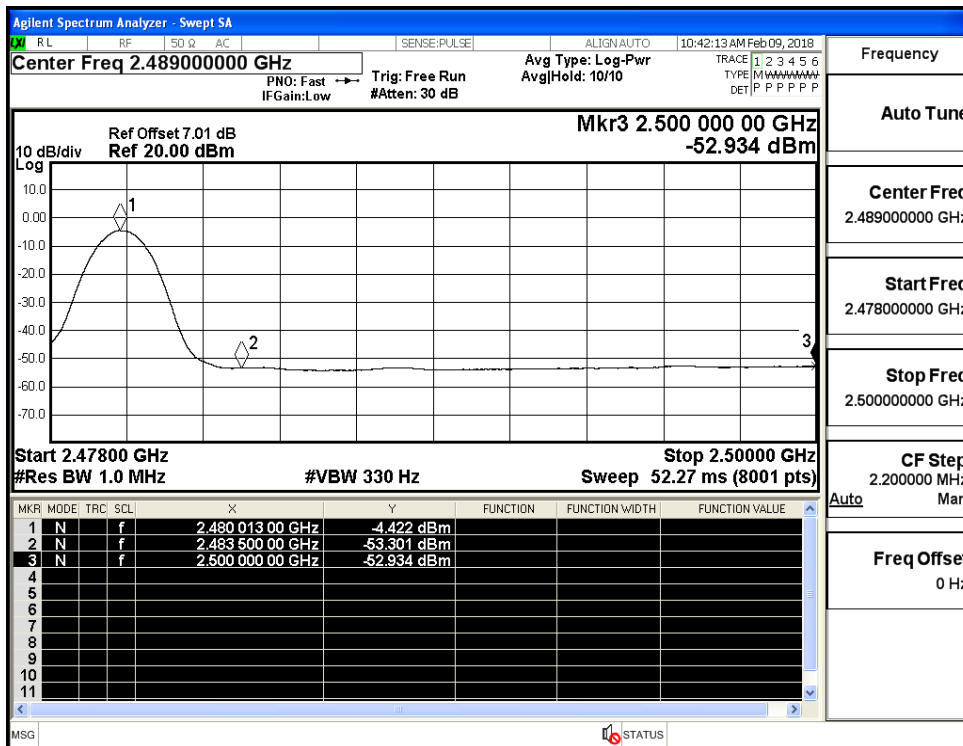
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (Low Channel)



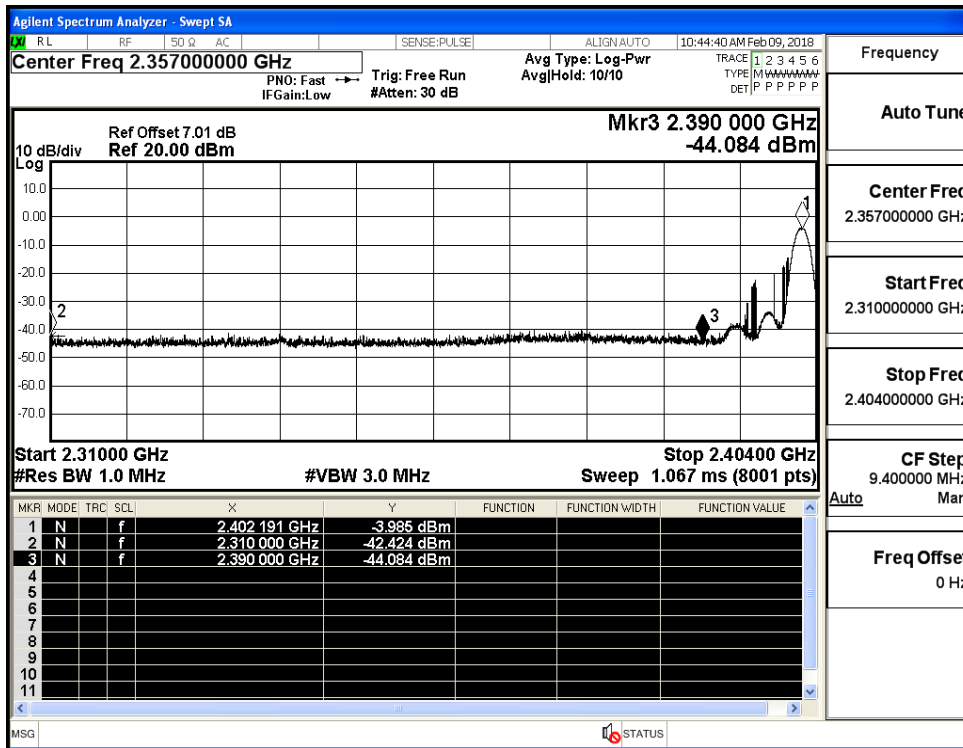
Restrict-band band-edge measurements_Hopping Off_GFSK_PEAK (High Channel)



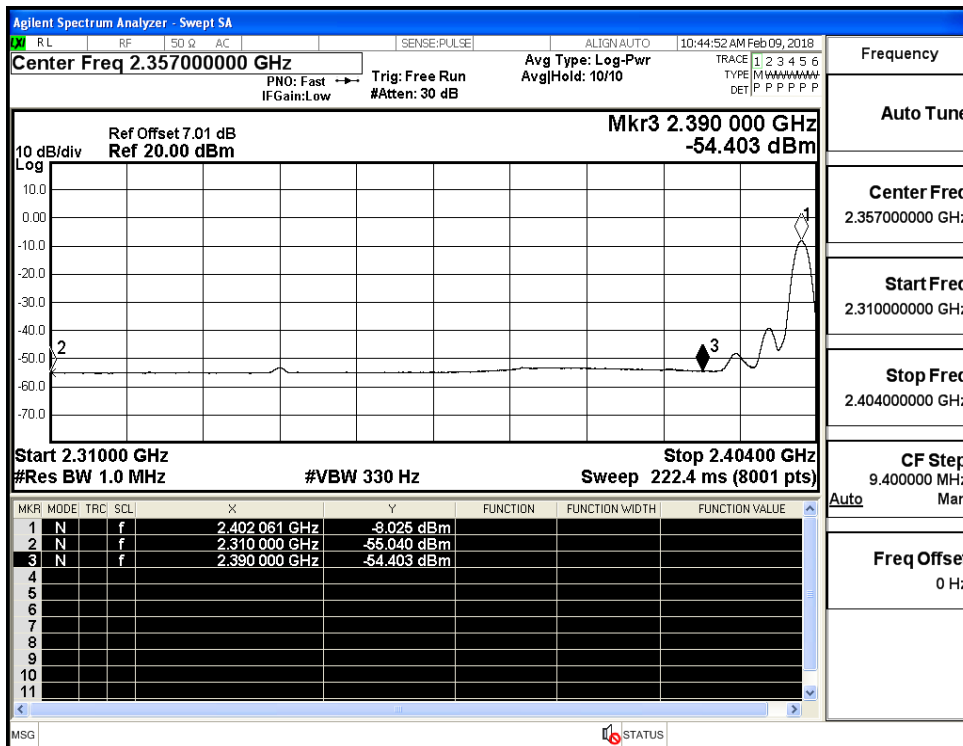
Restrict-band band-edge measurements_Hopping Off_GFSK_Average (High Channel)



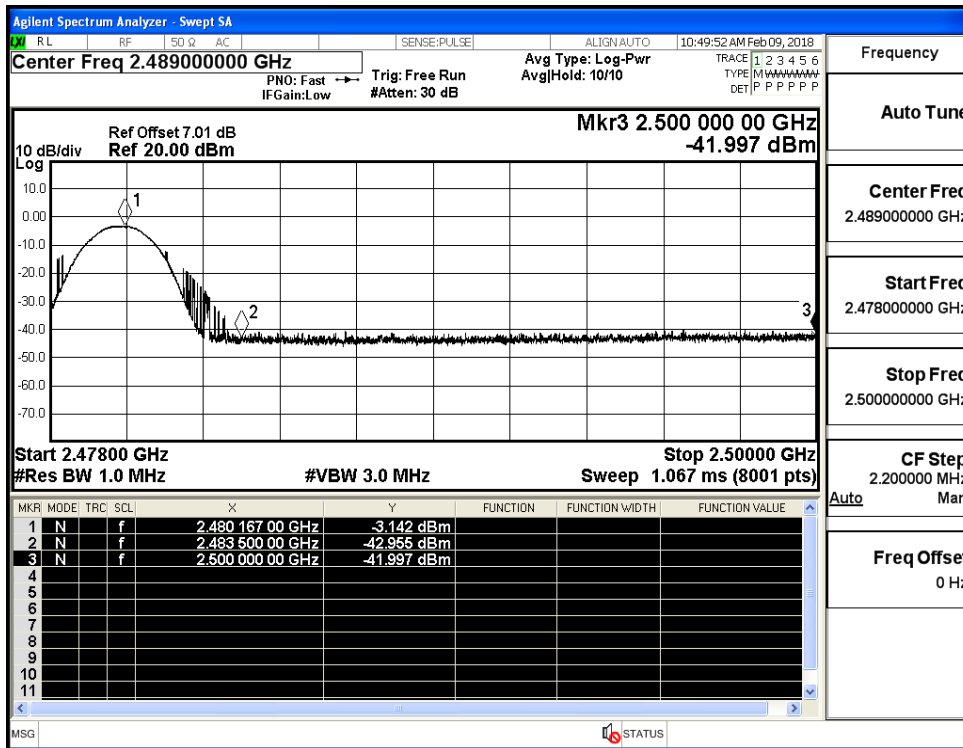
Restrict-band band-edge measurements_Hopping Off $\pi/4$ -DQPSK_PEAK (Low Channel)



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)

