

**Appendix A**  
**RF Test Data for BT(BDR/EDR) (Conducted Measurement)**

**Product Name: Bluetooth Earphones**

**Trade Mark: Altec Lansing**

**Test Model: MZX148**

**FCC ID: 2AL9B-MZX148**

**Environmental Conditions**

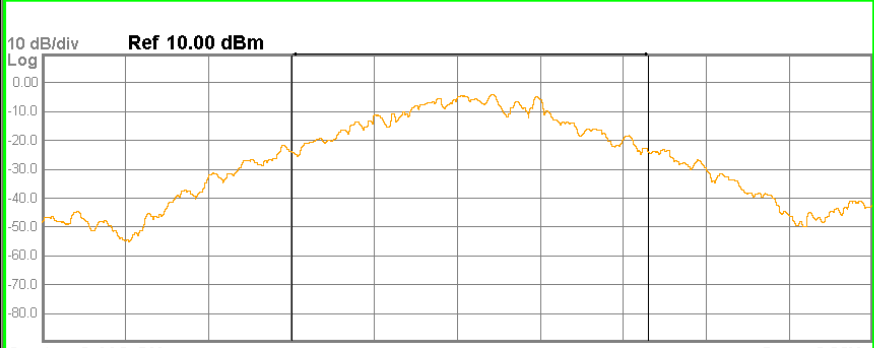
Temperature:	22.3 ° C
Relative Humidity:	50%
ATM Pressure:	100.0 kPa
Test Engineer:	Gary Qian
Supervised by:	Eden Hu

**A.1 20 dB Bandwidth**

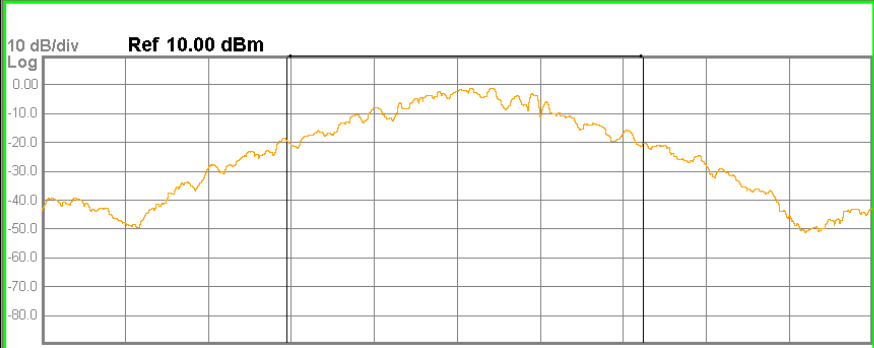
Mode	Channel.	20dB Bandwidth [MHz]	Limit(MHz)	Verdict
GFSK	LCH	0.939	Not Specified	PASS
GFSK	MCH	0.936	Not Specified	PASS
GFSK	HCH	0.944	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.285	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.250	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.228	Not Specified	PASS
8DPSK	LCH	1.297	Not Specified	PASS
8DPSK	MCH	1.255	Not Specified	PASS
8DPSK	HCH	1.253	Not Specified	PASS

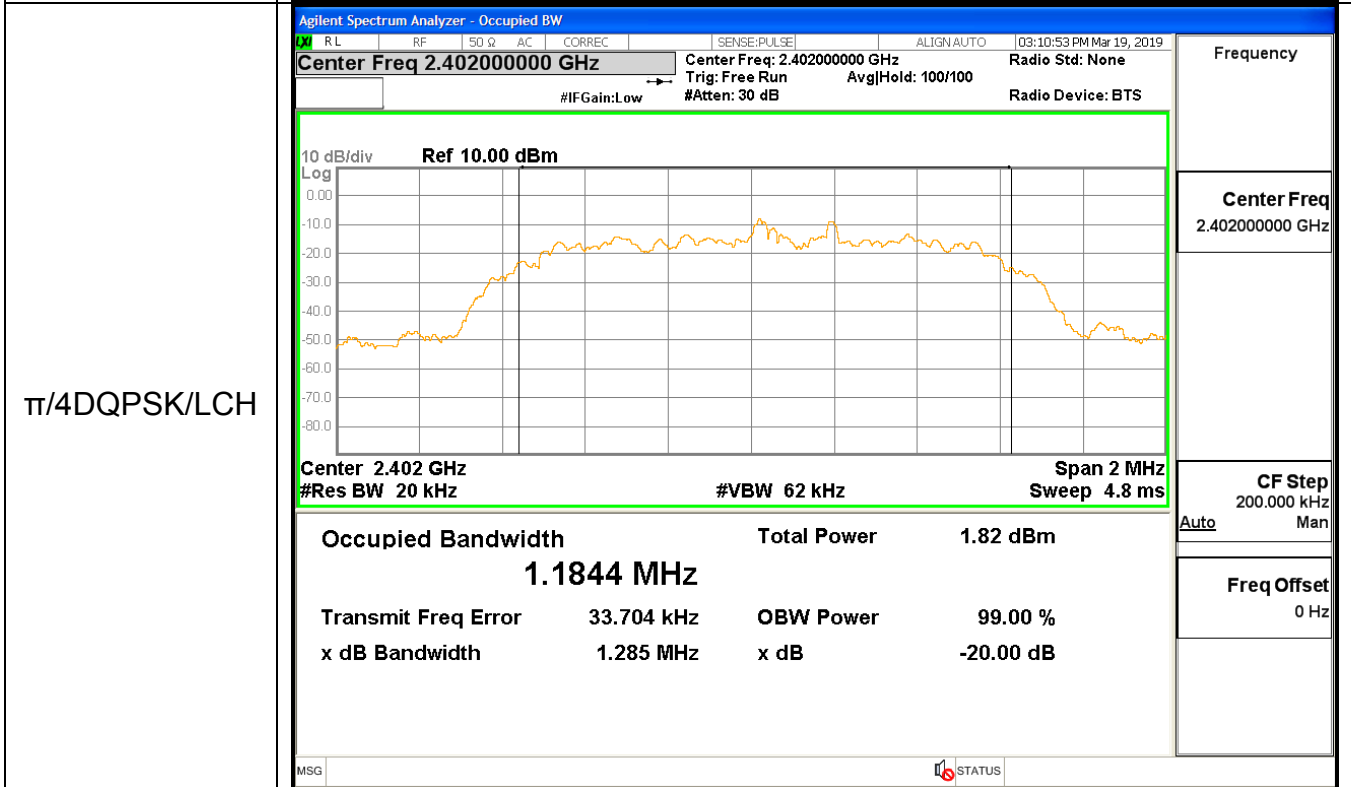
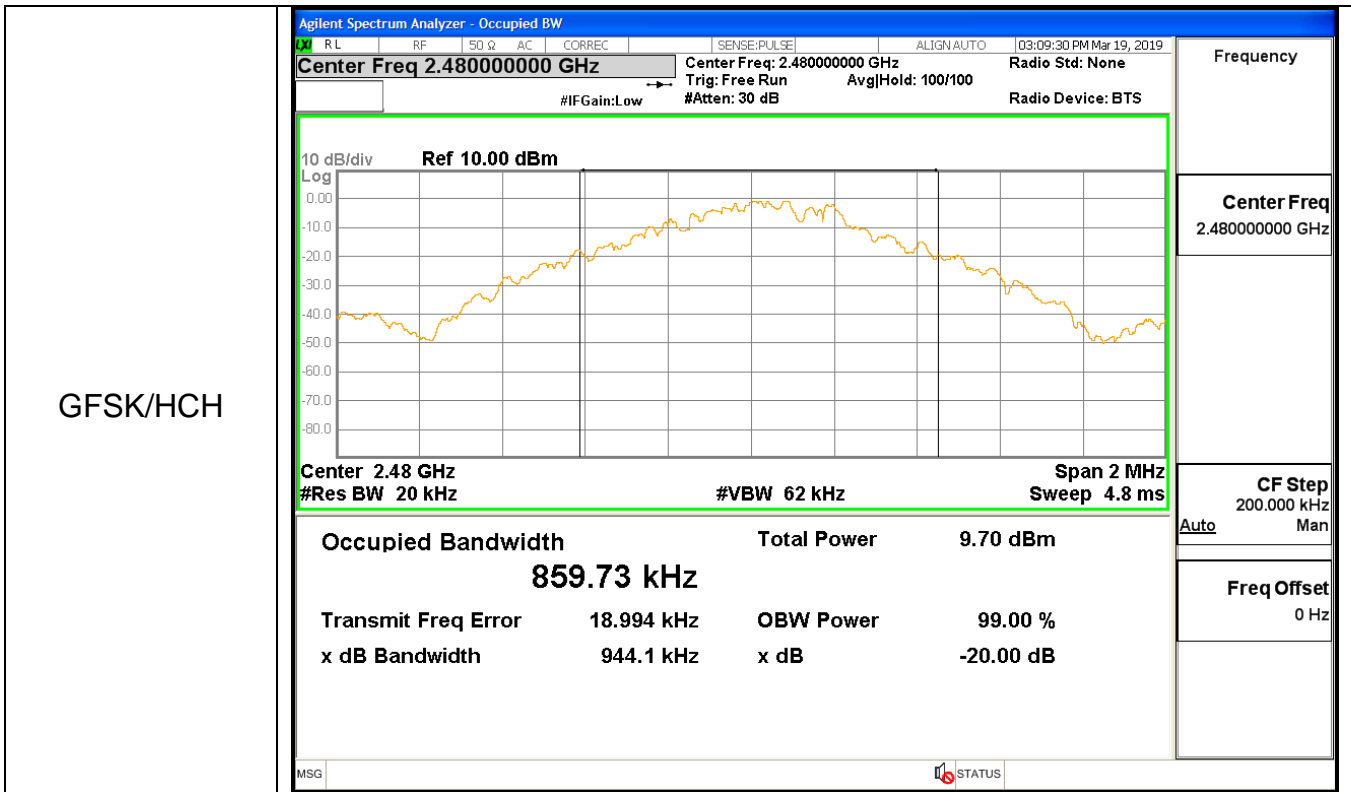
### Test Graph

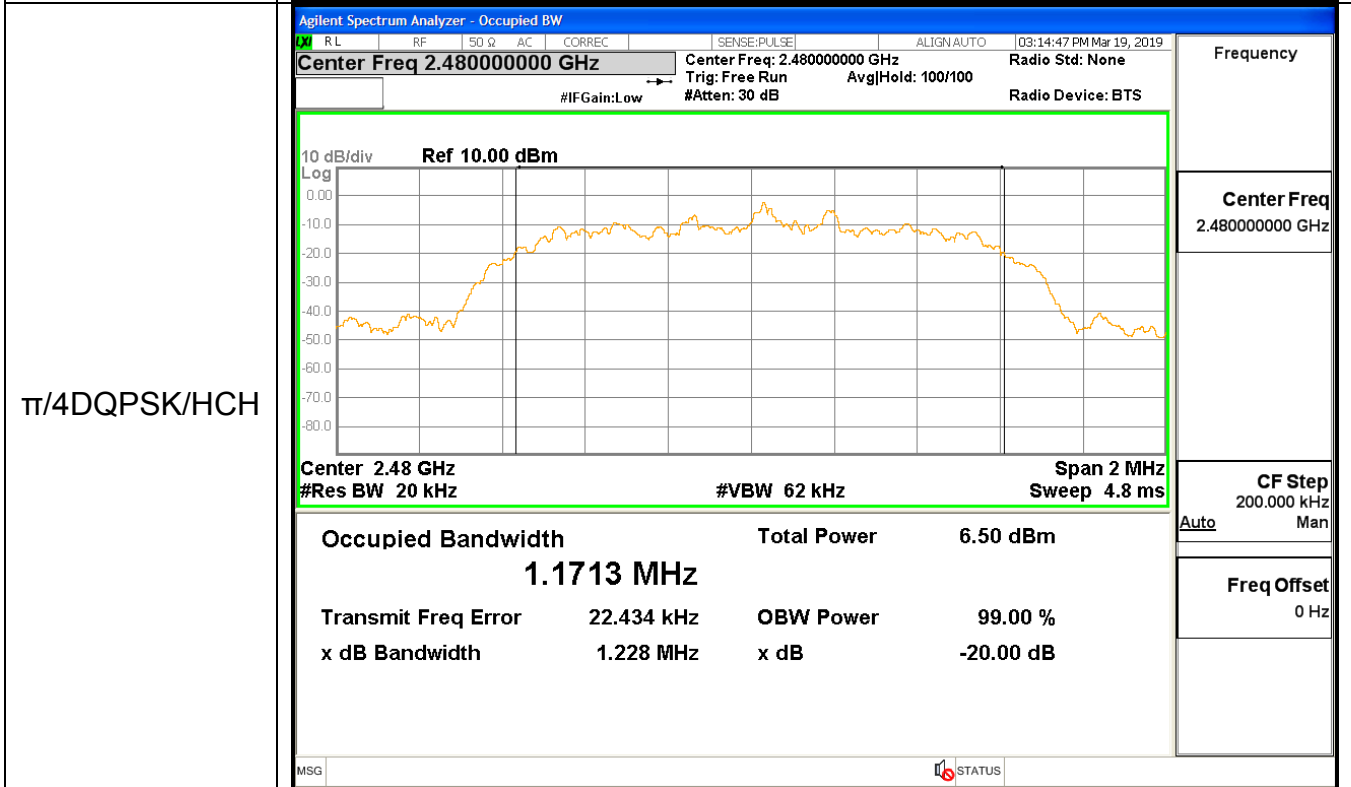
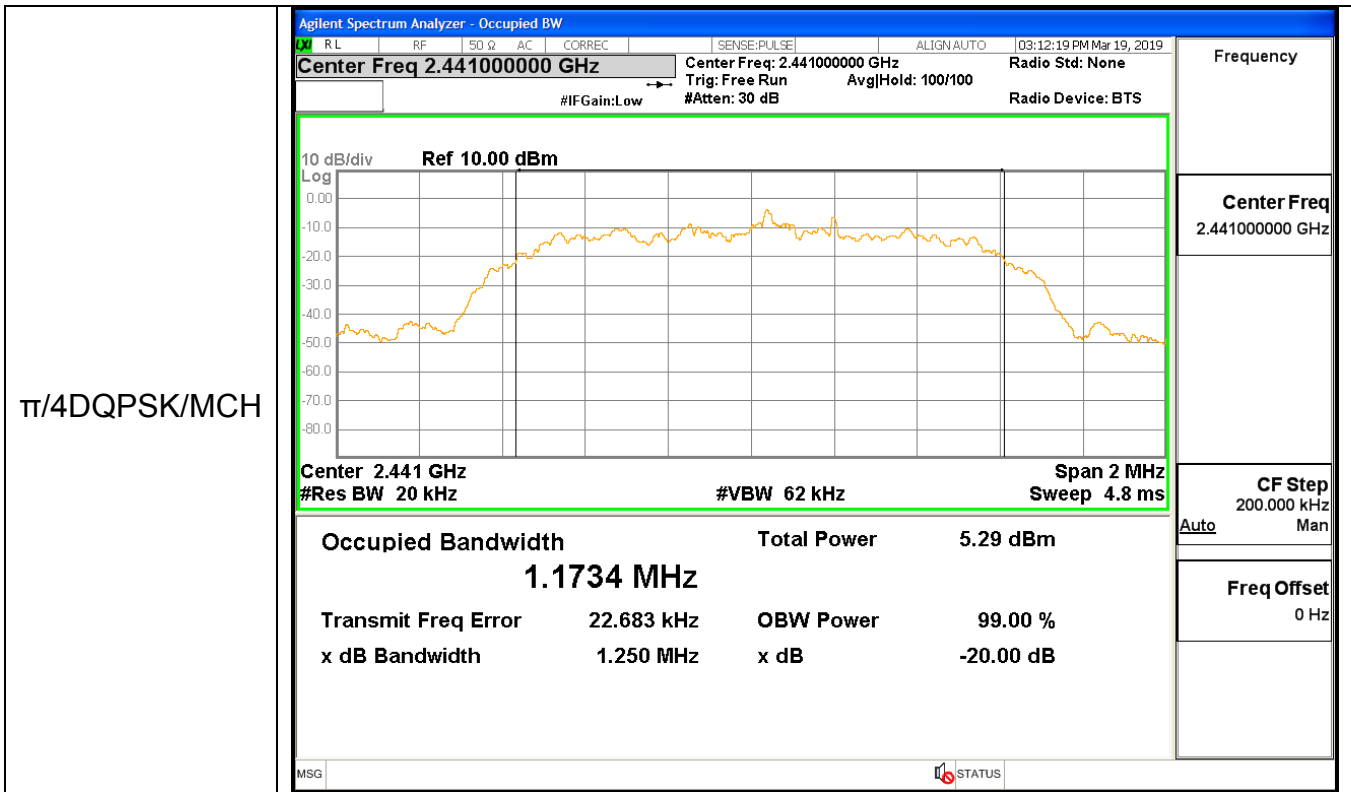
#### Graphs

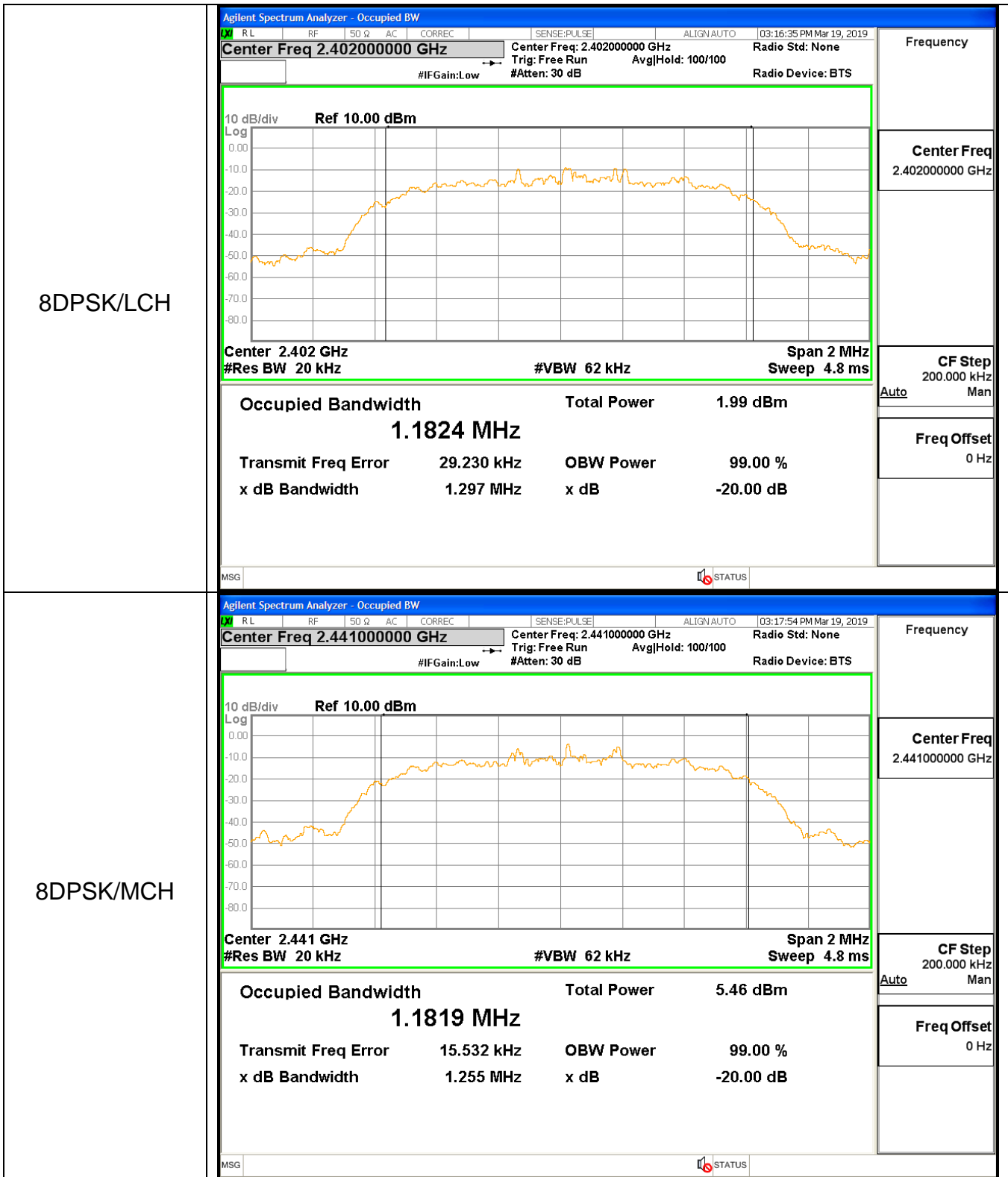
GFSK/LCH	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: 10px; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <table style="width: 100%; font-size: 10px; border-collapse: collapse;"> <tr> <td style="width: 15%;"><input checked="" type="checkbox"/> RL</td> <td style="width: 15%;"><input type="checkbox"/> RF</td> <td style="width: 15%;"><input type="checkbox"/> 50 Ω</td> <td style="width: 15%;"><input type="checkbox"/> AC</td> <td style="width: 15%;"><input type="checkbox"/> CORREC</td> <td style="width: 15%;"><input type="checkbox"/> SENSE:PULSE</td> <td style="width: 15%;"><input type="checkbox"/> ALIGN:AUTO</td> <td style="width: 15%;">03:05:29 PM Mar 19, 2019</td> </tr> <tr> <td colspan="4"><b>Center Freq 2.40200000 GHz</b></td> <td colspan="2">Center Freq: 2.40200000 GHz</td> <td colspan="2">Radio Std: None</td> </tr> <tr> <td colspan="4"></td> <td colspan="2">Trig: Free Run</td> <td colspan="2">Avg Hold: 100/100</td> </tr> <tr> <td colspan="4">#IFGain:Low</td> <td colspan="2">#Atten: 30 dB</td> <td colspan="2">Radio Device: BTS</td> </tr> </table> </div>	<input checked="" type="checkbox"/> RL	<input type="checkbox"/> RF	<input type="checkbox"/> 50 Ω	<input type="checkbox"/> AC	<input type="checkbox"/> CORREC	<input type="checkbox"/> SENSE:PULSE	<input type="checkbox"/> ALIGN:AUTO	03:05:29 PM Mar 19, 2019	<b>Center Freq 2.40200000 GHz</b>				Center Freq: 2.40200000 GHz		Radio Std: None						Trig: Free Run		Avg Hold: 100/100		#IFGain:Low				#Atten: 30 dB		Radio Device: BTS		<p style="font-size: 12px;">Frequency</p>
	<input checked="" type="checkbox"/> RL	<input type="checkbox"/> RF	<input type="checkbox"/> 50 Ω	<input type="checkbox"/> AC	<input type="checkbox"/> CORREC	<input type="checkbox"/> SENSE:PULSE	<input type="checkbox"/> ALIGN:AUTO	03:05:29 PM Mar 19, 2019																										
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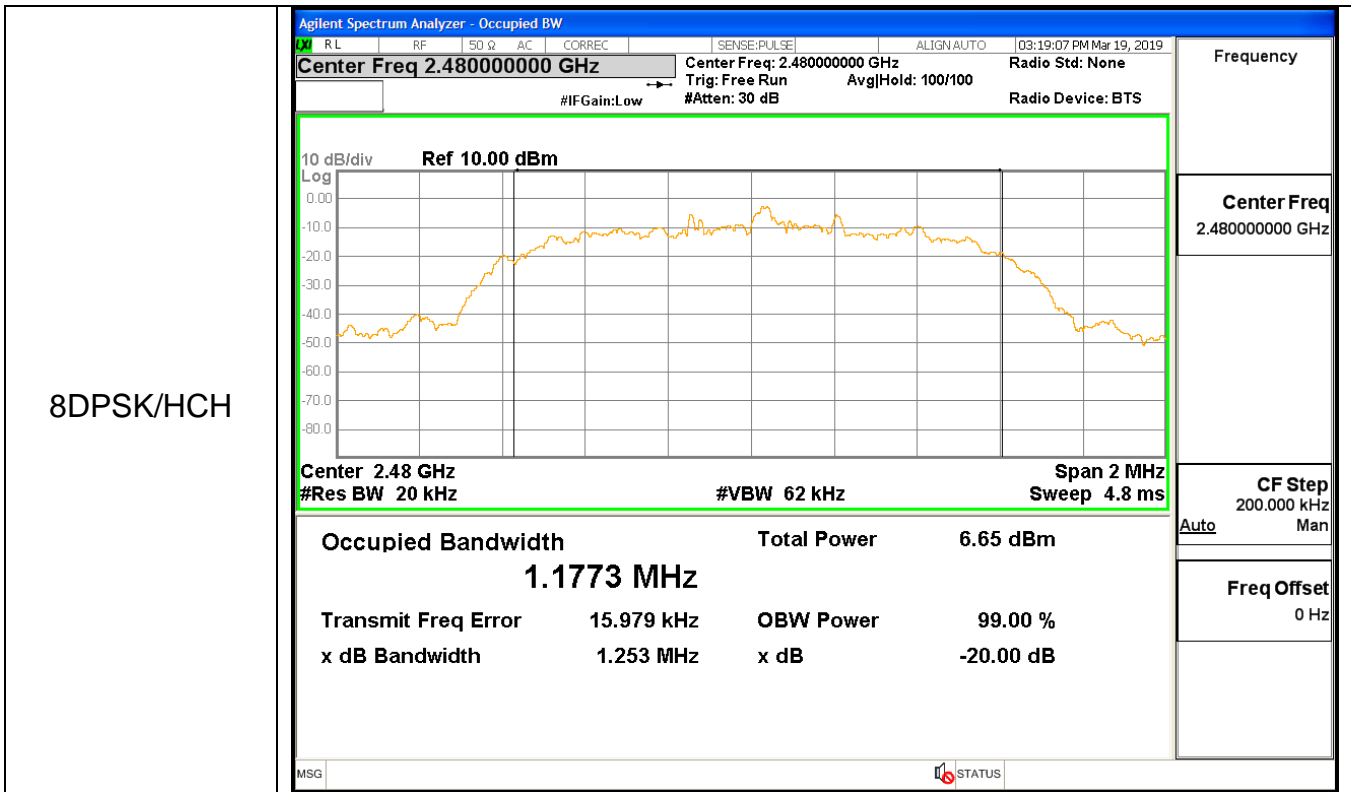
  

GFSK/MCH	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: 10px; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <table style="width: 100%; font-size: 10px; border-collapse: collapse;"> <tr> <td style="width: 15%;"><input checked="" type="checkbox"/> RL</td> <td style="width: 15%;"><input type="checkbox"/> RF</td> <td style="width: 15%;"><input type="checkbox"/> 50 Ω</td> <td style="width: 15%;"><input type="checkbox"/> AC</td> <td style="width: 15%;"><input type="checkbox"/> CORREC</td> <td style="width: 15%;"><input type="checkbox"/> SENSE:PULSE</td> <td style="width: 15%;"><input type="checkbox"/> ALIGN:AUTO</td> <td style="width: 15%;">03:06:49 PM Mar 19, 2019</td> </tr> <tr> <td colspan="4"><b>Center Freq 2.44100000 GHz</b></td> <td colspan="2">Center Freq: 2.44100000 GHz</td> <td colspan="2">Radio Std: None</td> </tr> <tr> <td colspan="4"></td> <td colspan="2">Trig: Free Run</td> <td colspan="2">Avg Hold: 100/100</td> </tr> <tr> <td colspan="4">#IFGain:Low</td> <td colspan="2">#Atten: 30 dB</td> <td colspan="2">Radio Device: BTS</td> </tr> </table> </div>	<input checked="" type="checkbox"/> RL	<input type="checkbox"/> RF	<input type="checkbox"/> 50 Ω	<input type="checkbox"/> AC	<input type="checkbox"/> CORREC	<input type="checkbox"/> SENSE:PULSE	<input type="checkbox"/> ALIGN:AUTO	03:06:49 PM Mar 19, 2019	<b>Center Freq 2.44100000 GHz</b>				Center Freq: 2.44100000 GHz		Radio Std: None						Trig: Free Run		Avg Hold: 100/100		#IFGain:Low				#Atten: 30 dB		Radio Device: BTS		<p style="font-size: 12px;">Frequency</p>
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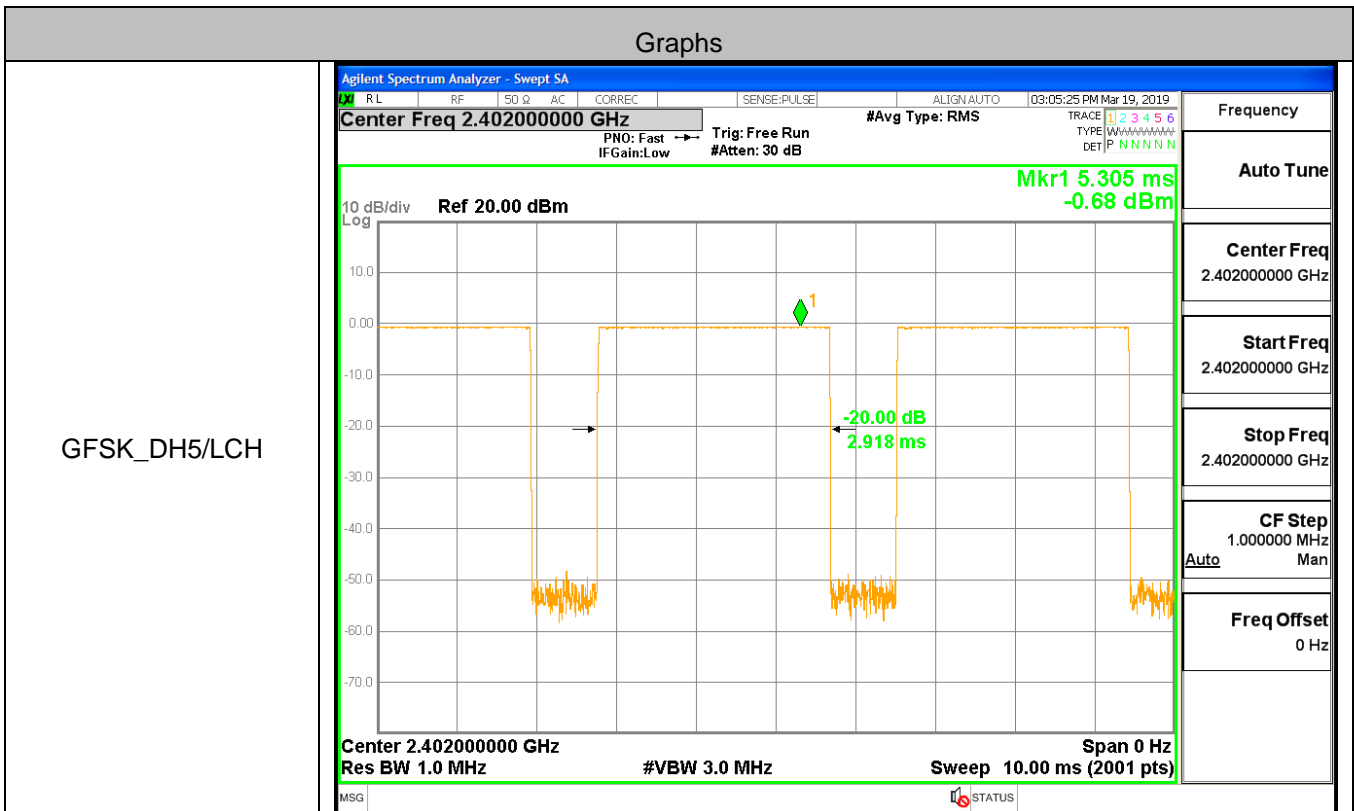


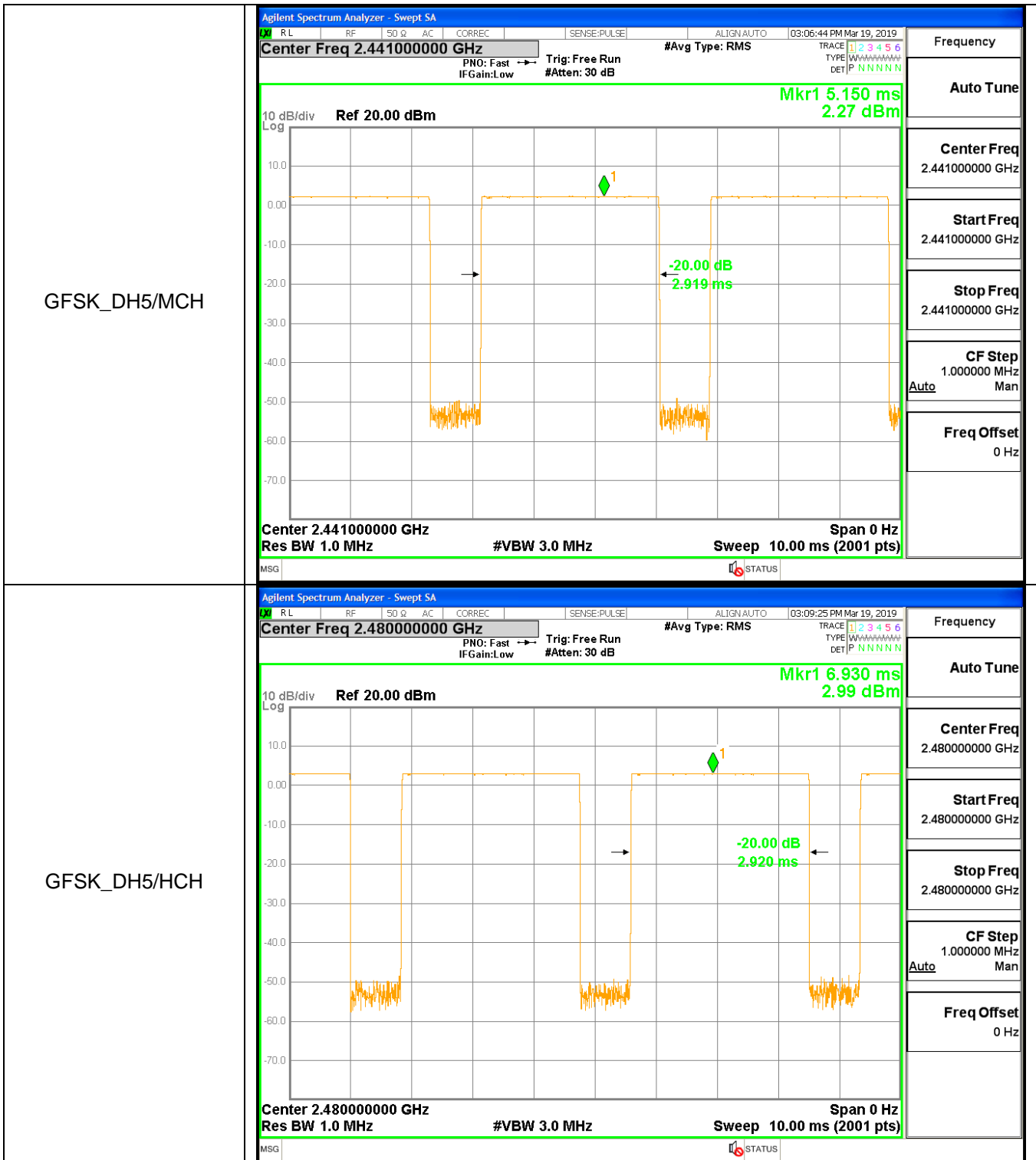


### A.2 Dwell Time

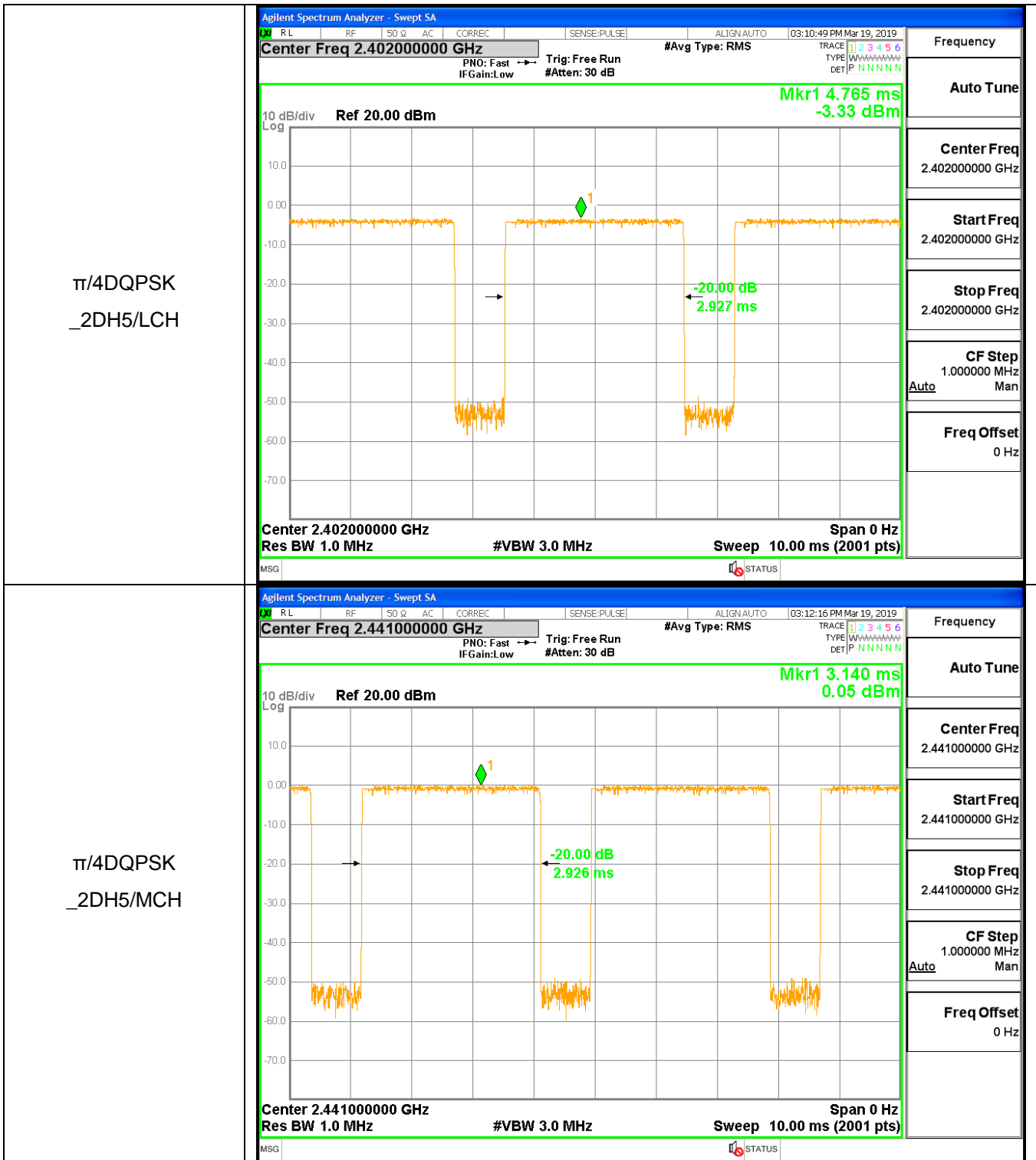
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002918	106.7	0.311373	0.4	PASS
GFSK	DH5	MCH	0.002919	106.7	0.311479	0.4	PASS
GFSK	DH5	HCH	0.00292	106.7	0.311604	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002927	106.7	0.312334	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002926	106.7	0.312196	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002927	106.7	0.312289	0.4	PASS
8DPSK	3DH5	LCH	0.002927	106.7	0.312297	0.4	PASS
8DPSK	3DH5	MCH	0.002927	106.7	0.312305	0.4	PASS
8DPSK	3DH5	HCH	0.002928	106.7	0.312443	0.4	PASS

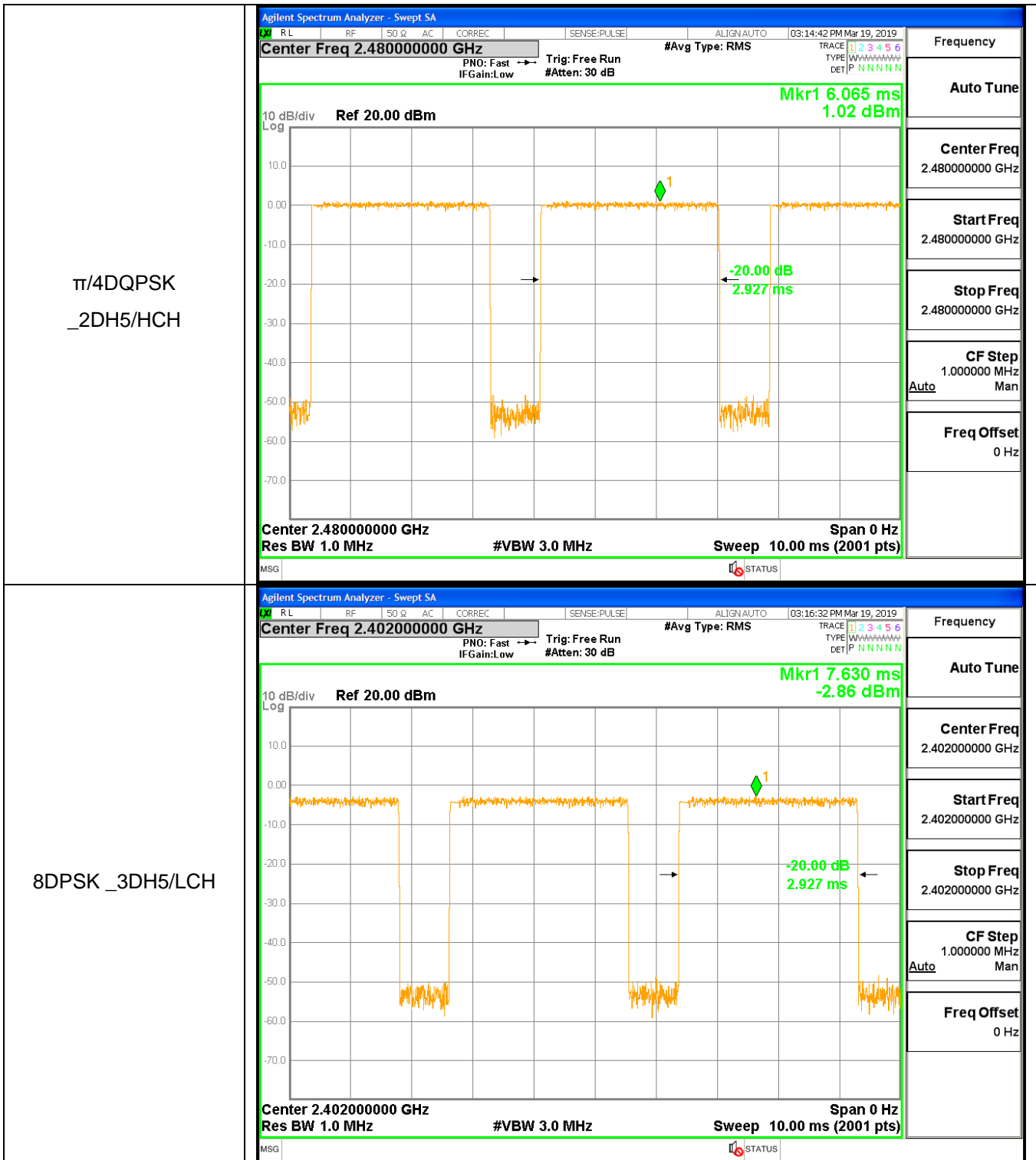
### Test Graph

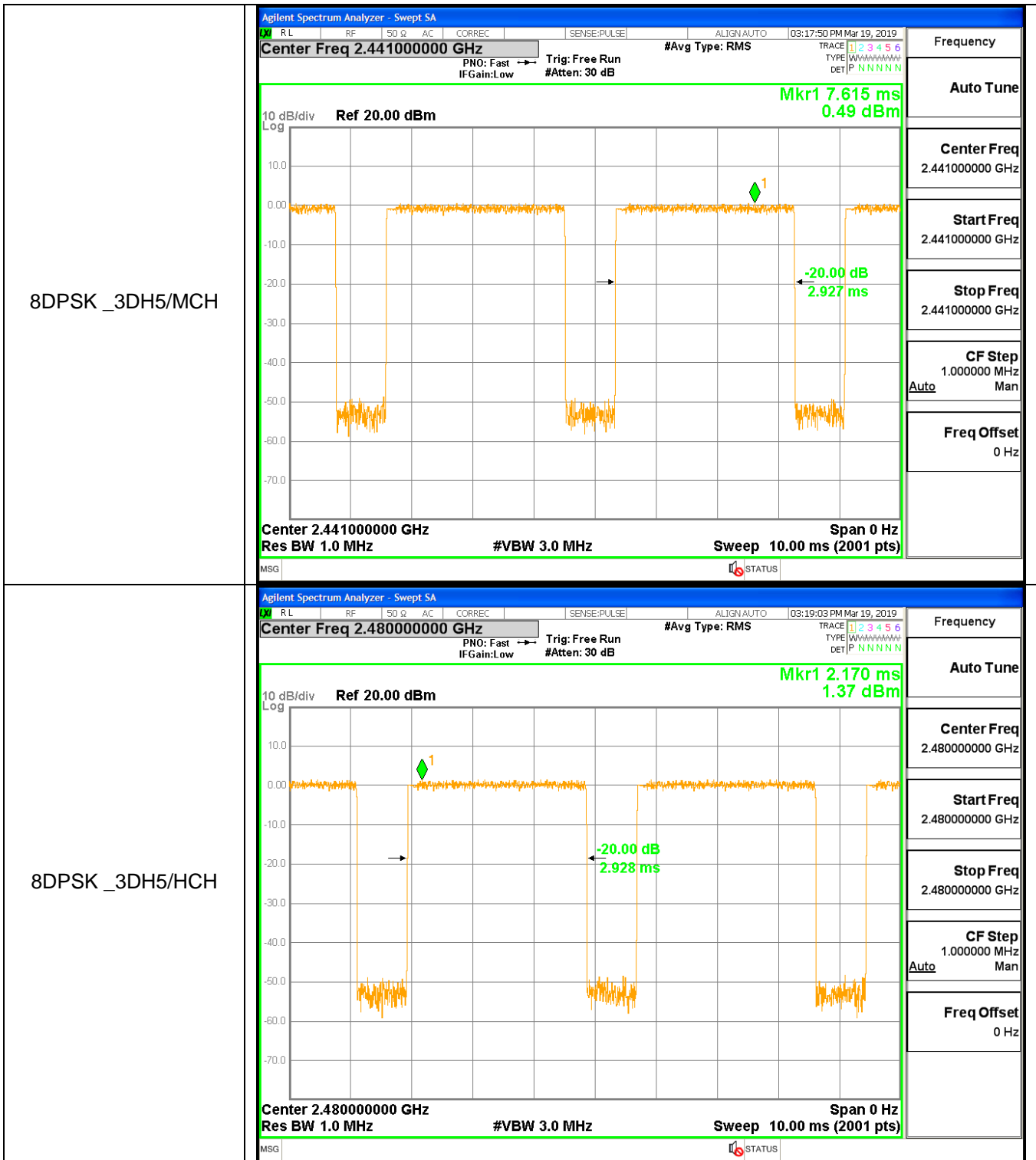








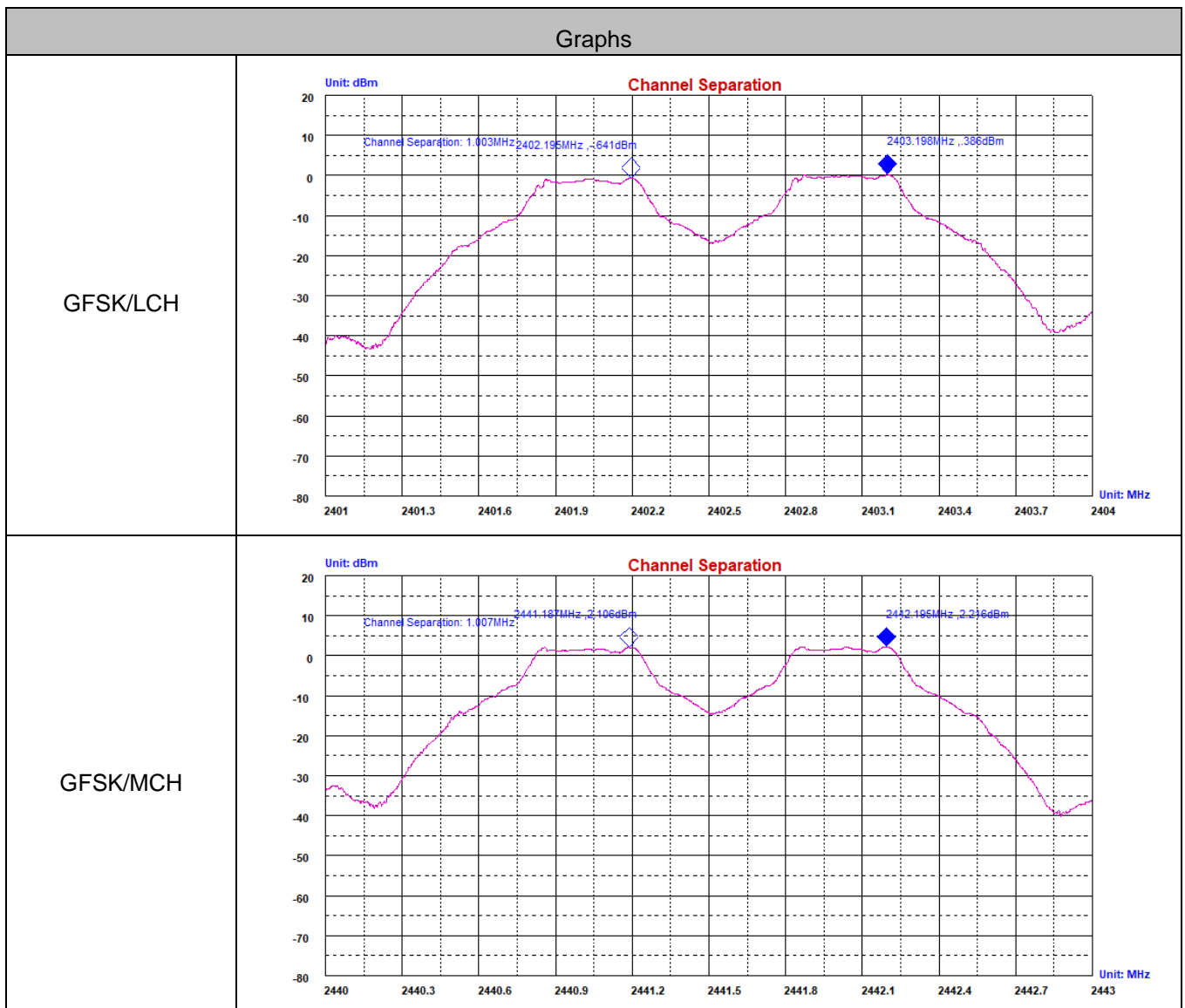


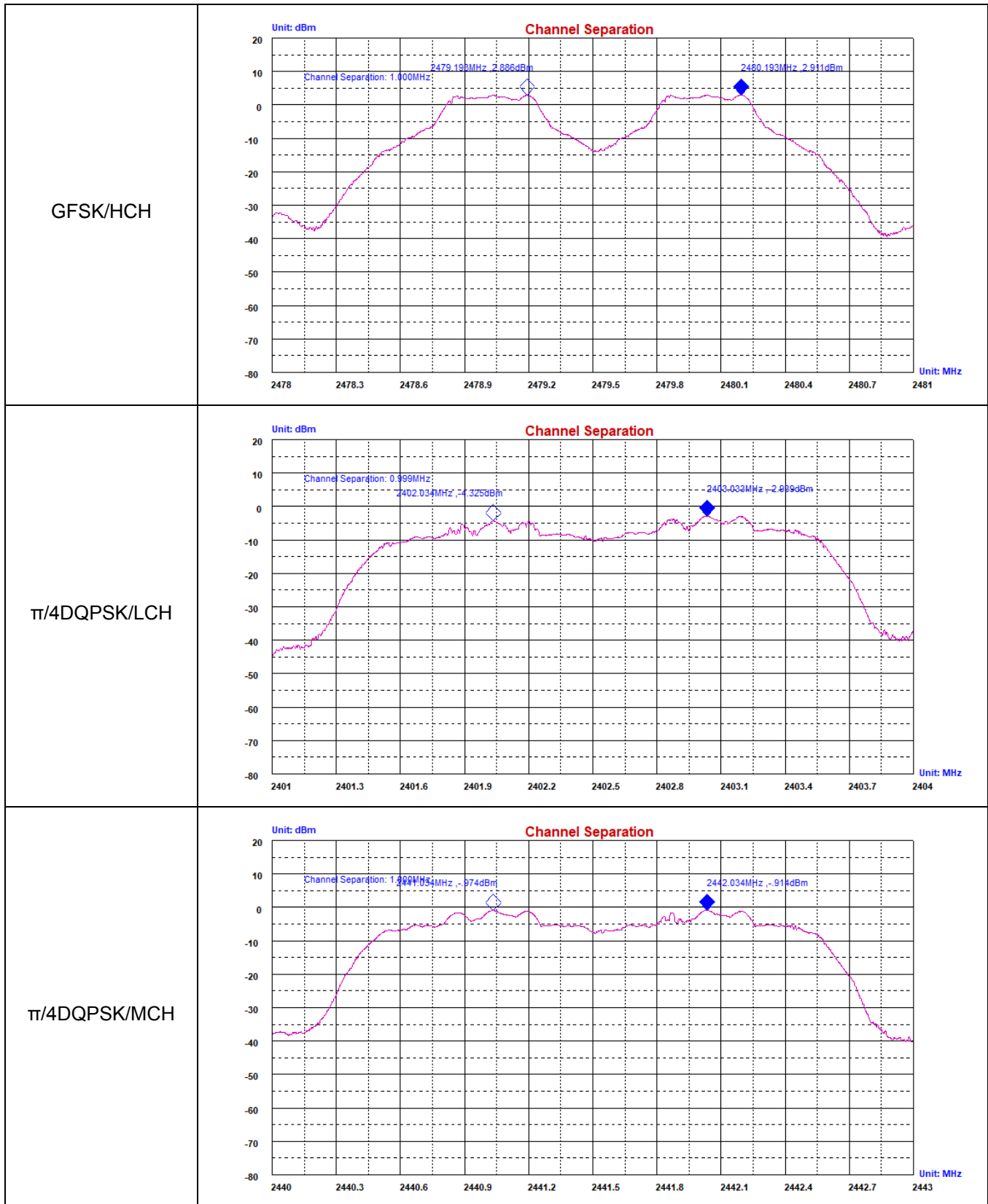


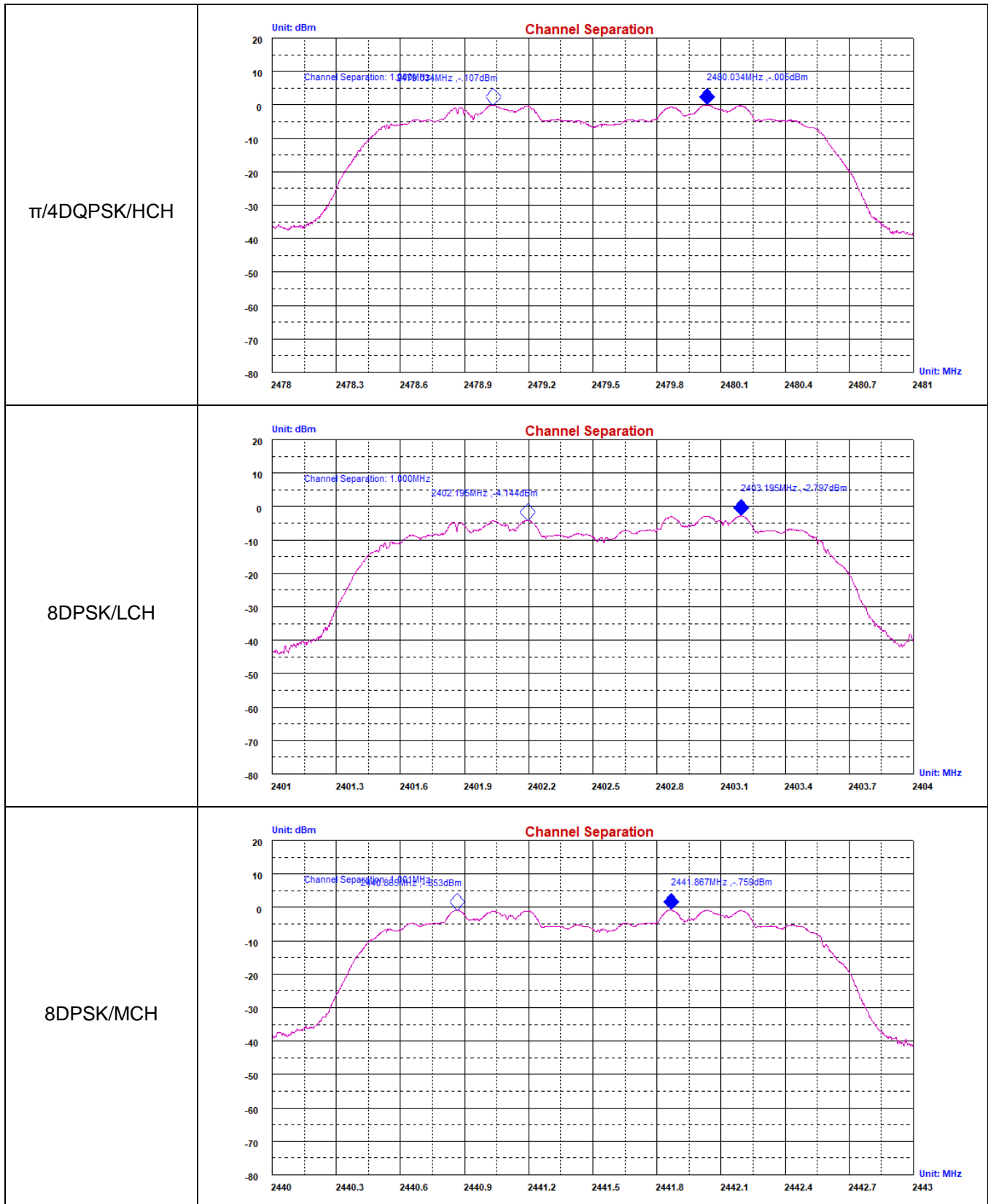
### A.3 Carrier Frequency Separation

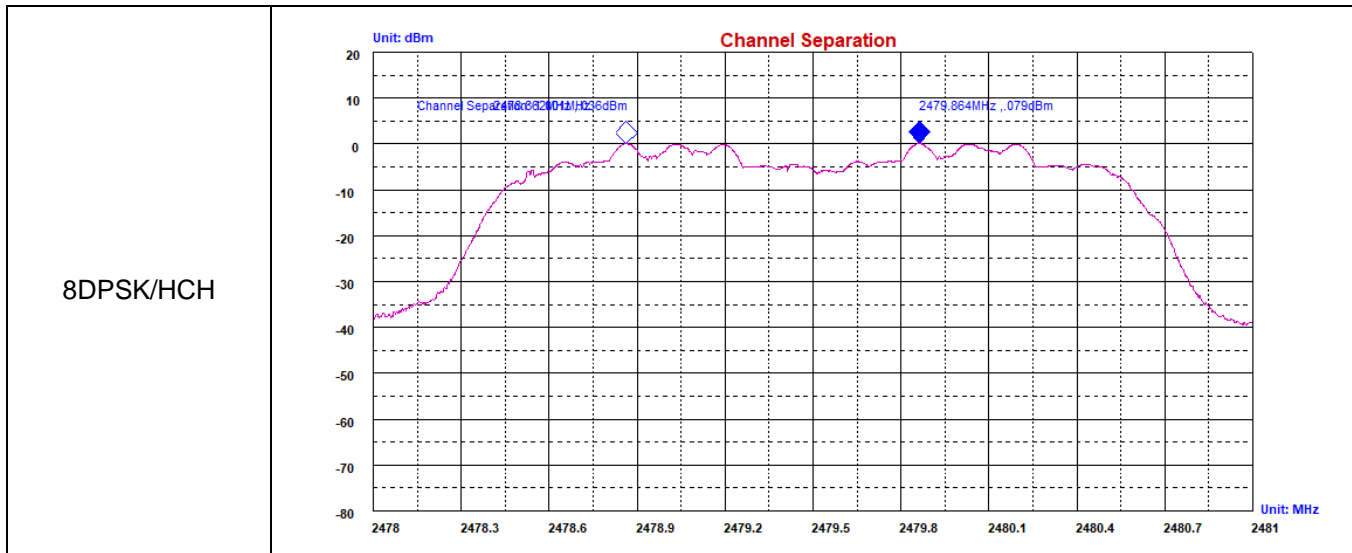
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.003	0.626	PASS
GFSK	MCH	1.007	0.624	PASS
GFSK	HCH	1.000	0.629	PASS
$\pi/4$ DQPSK	LCH	0.999	0.857	PASS
$\pi/4$ DQPSK	MCH	1.000	0.833	PASS
$\pi/4$ DQPSK	HCH	1.000	0.819	PASS
8DPSK	LCH	1.000	0.865	PASS
8DPSK	MCH	1.001	0.837	PASS
8DPSK	HCH	1.001	0.835	PASS

### Test Graph





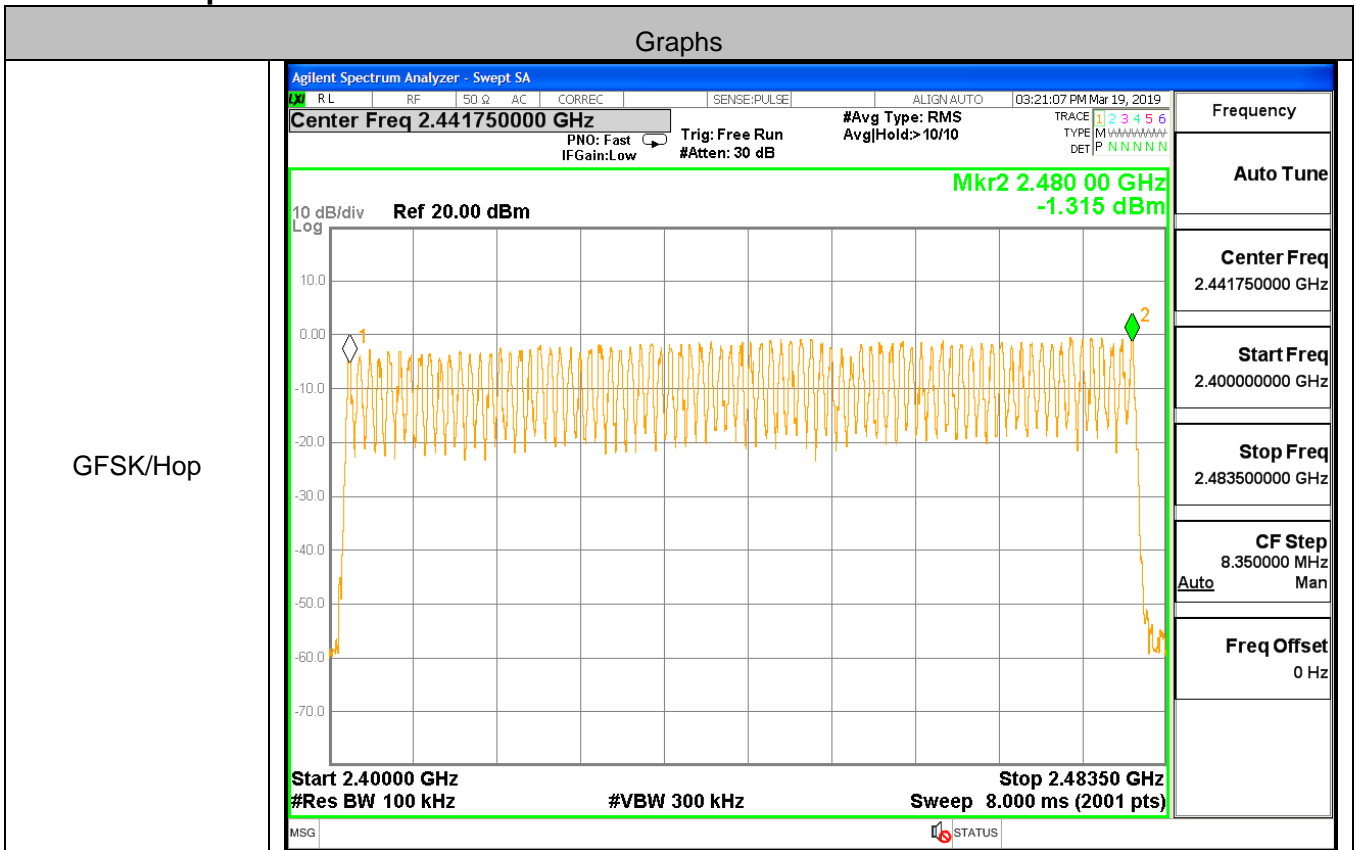




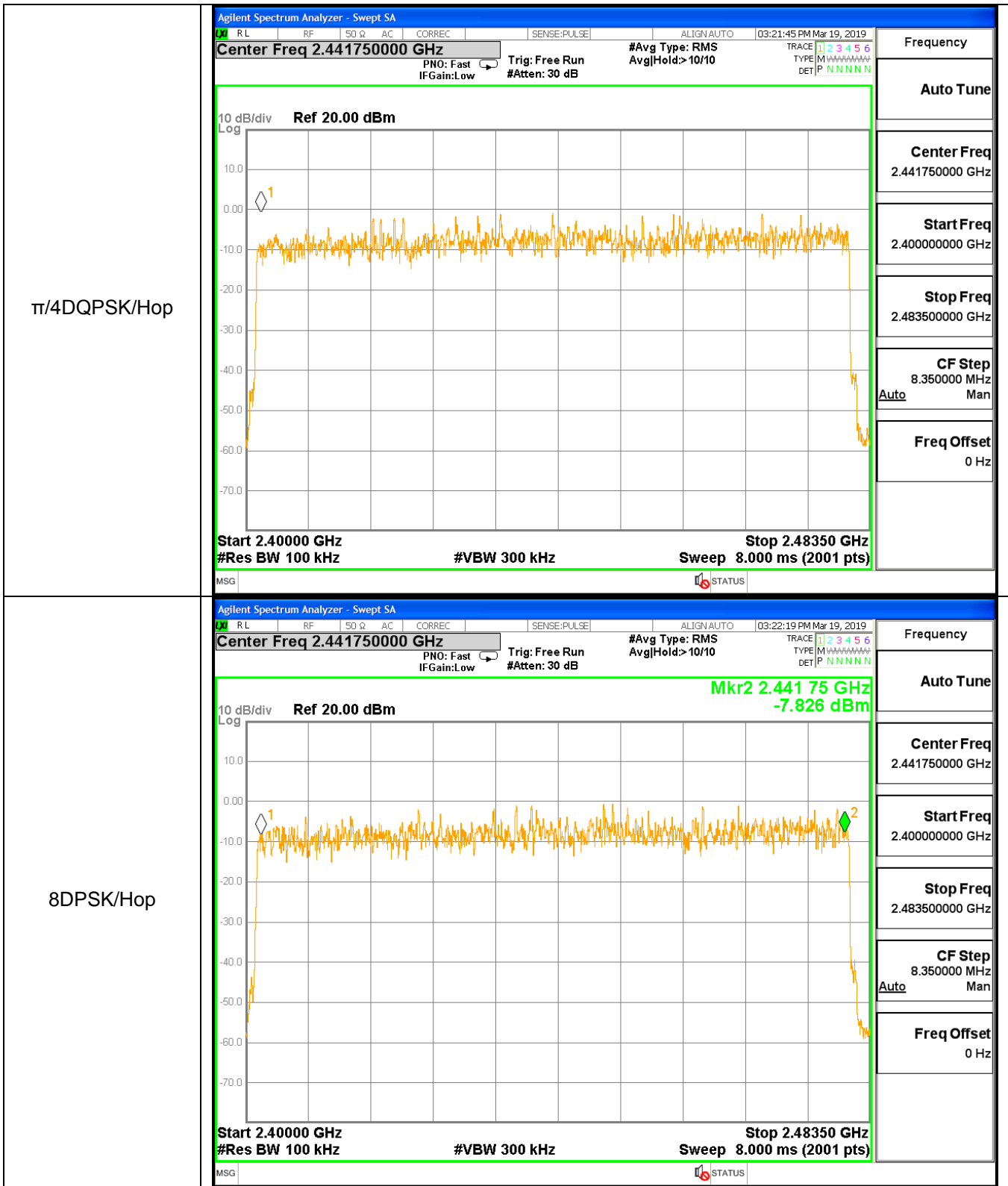
### A.4 Hopping Channel Number

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 Graph



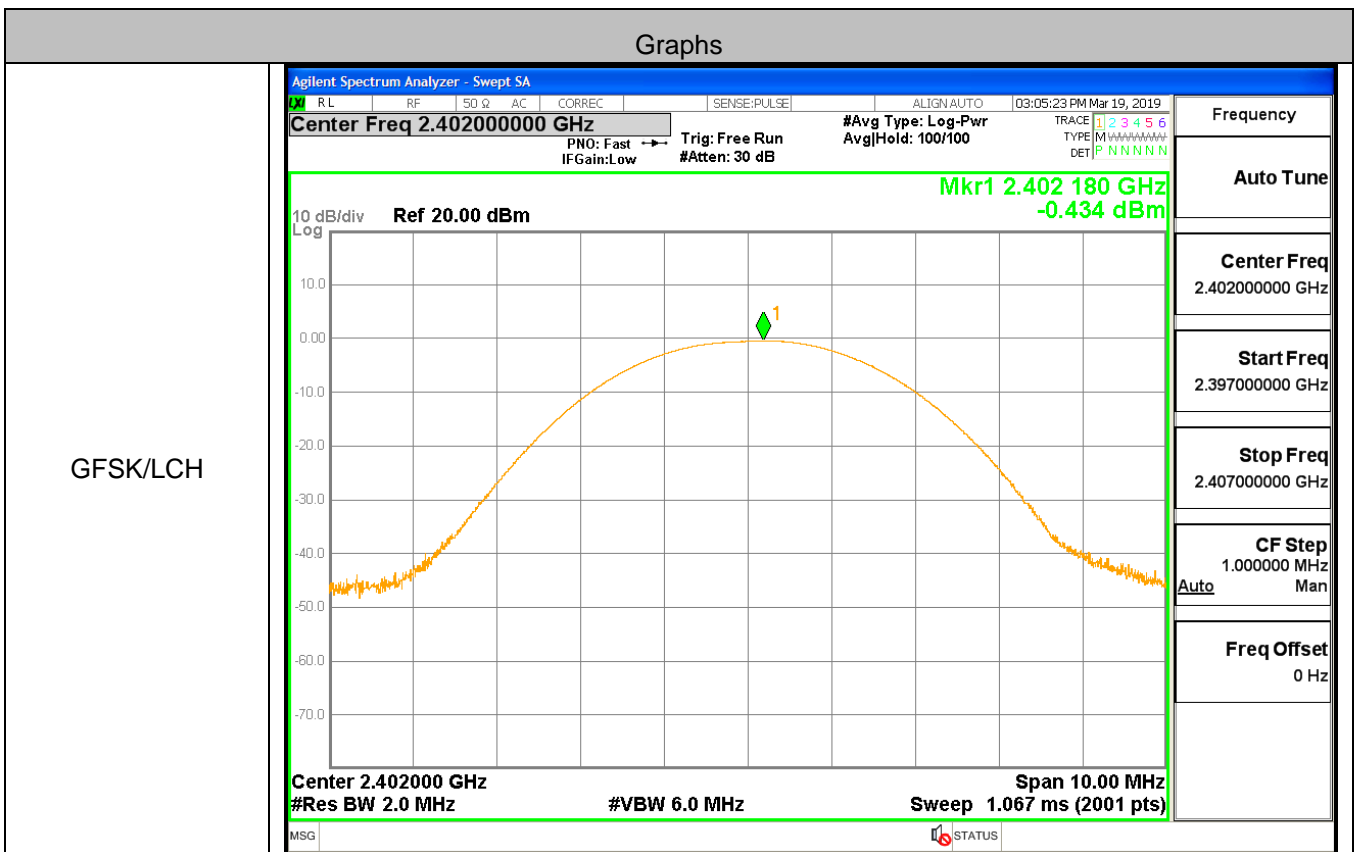


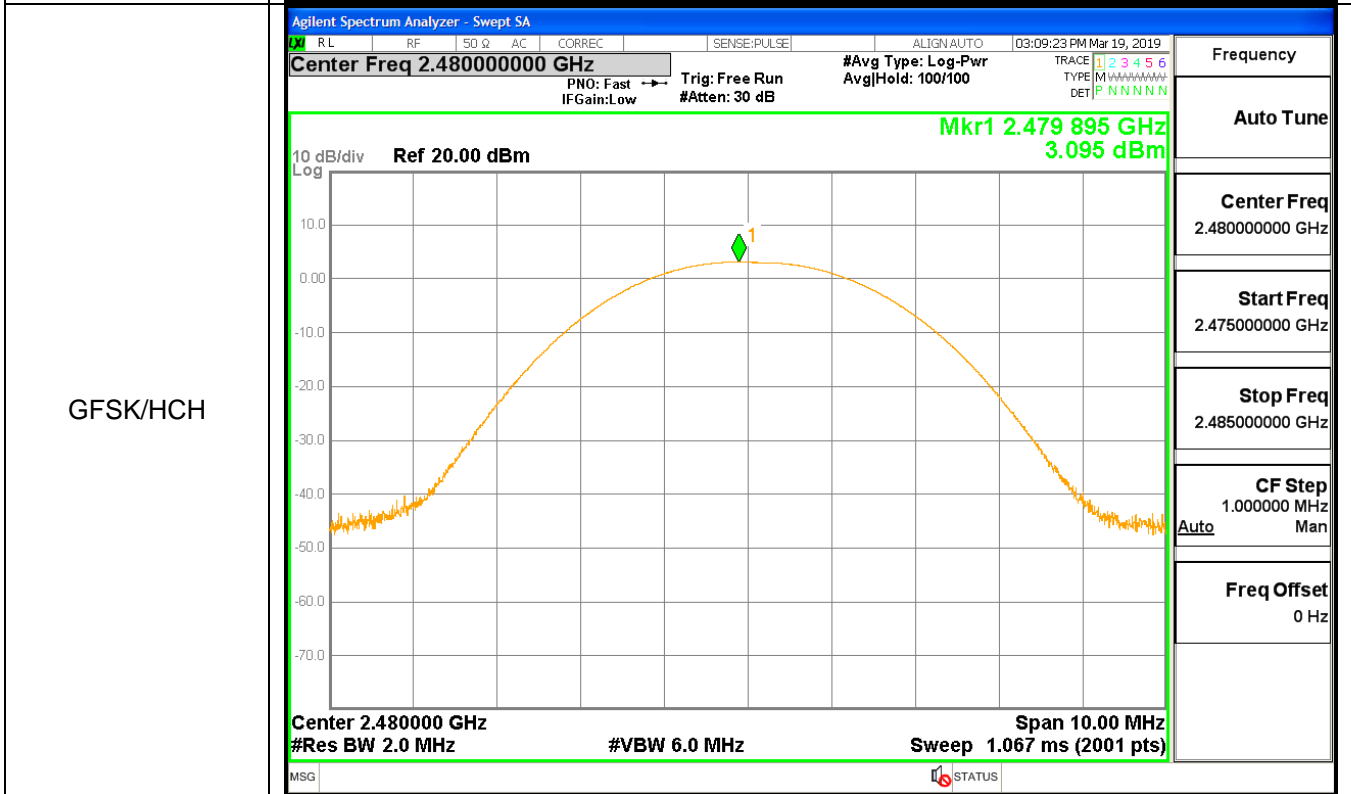
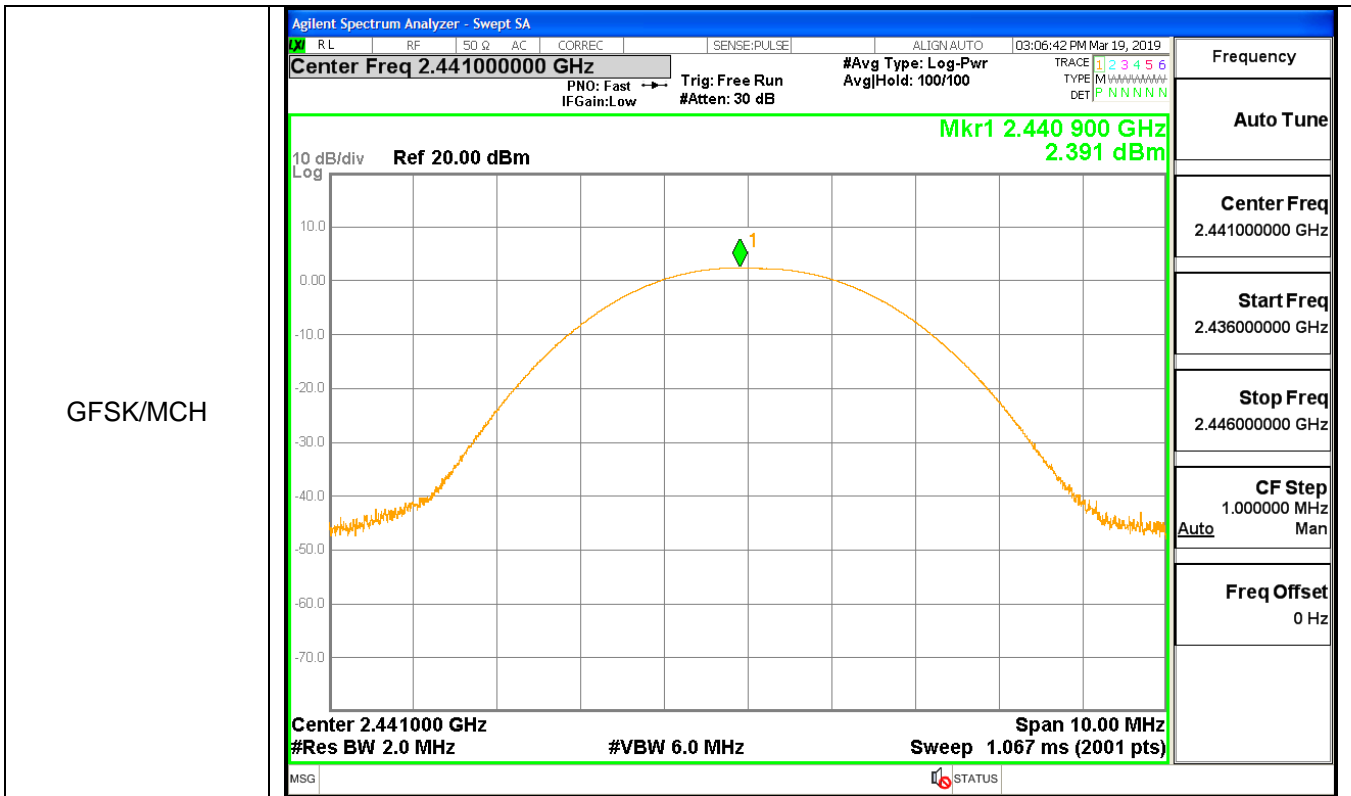


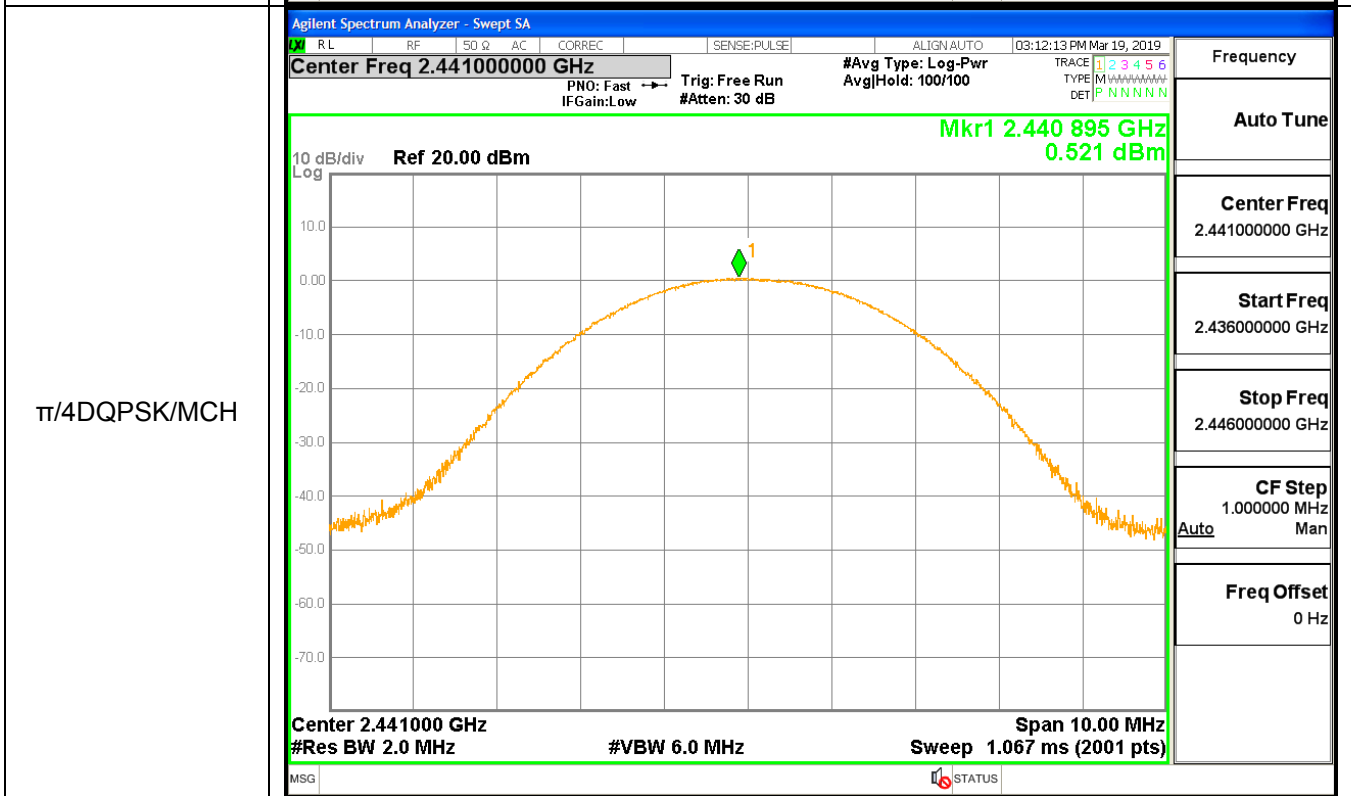
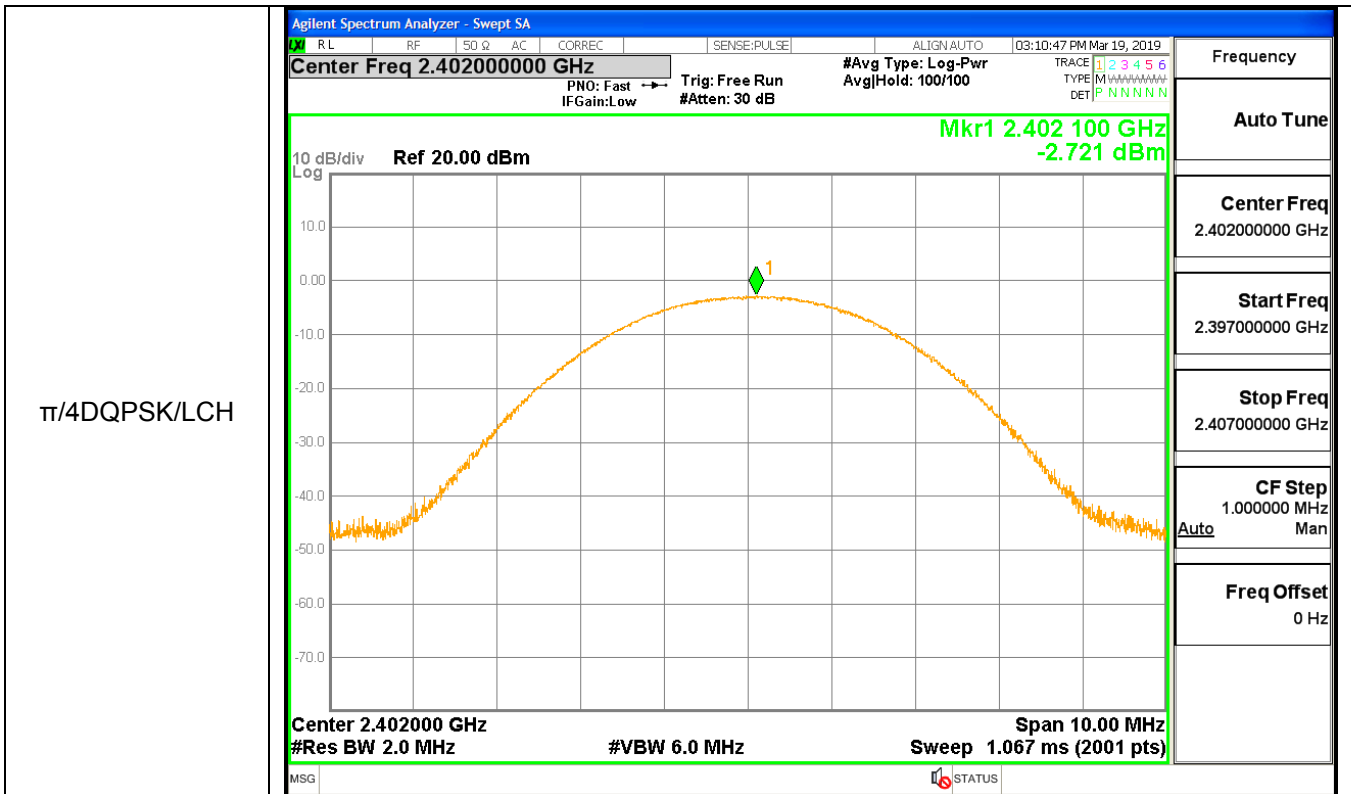
### A.5 Conducted Peak Output Power

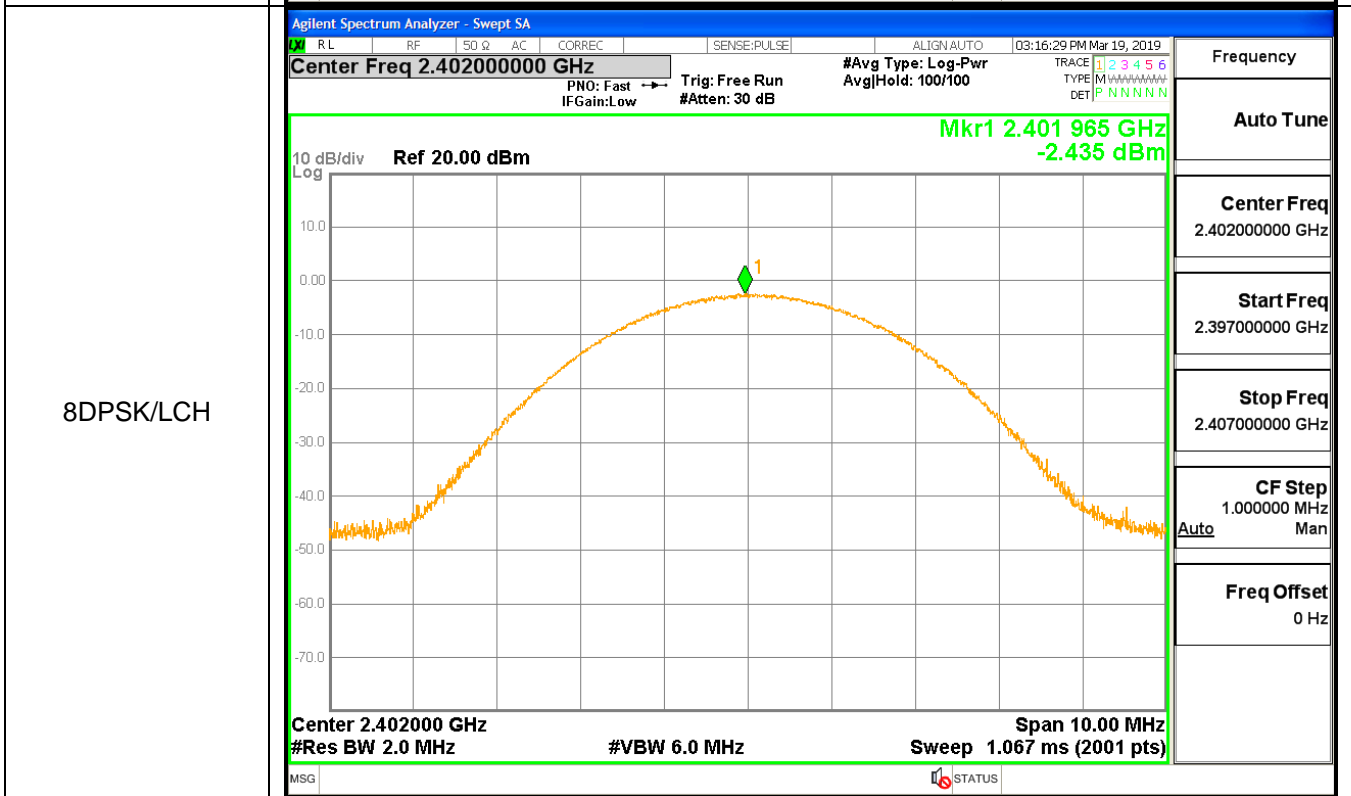
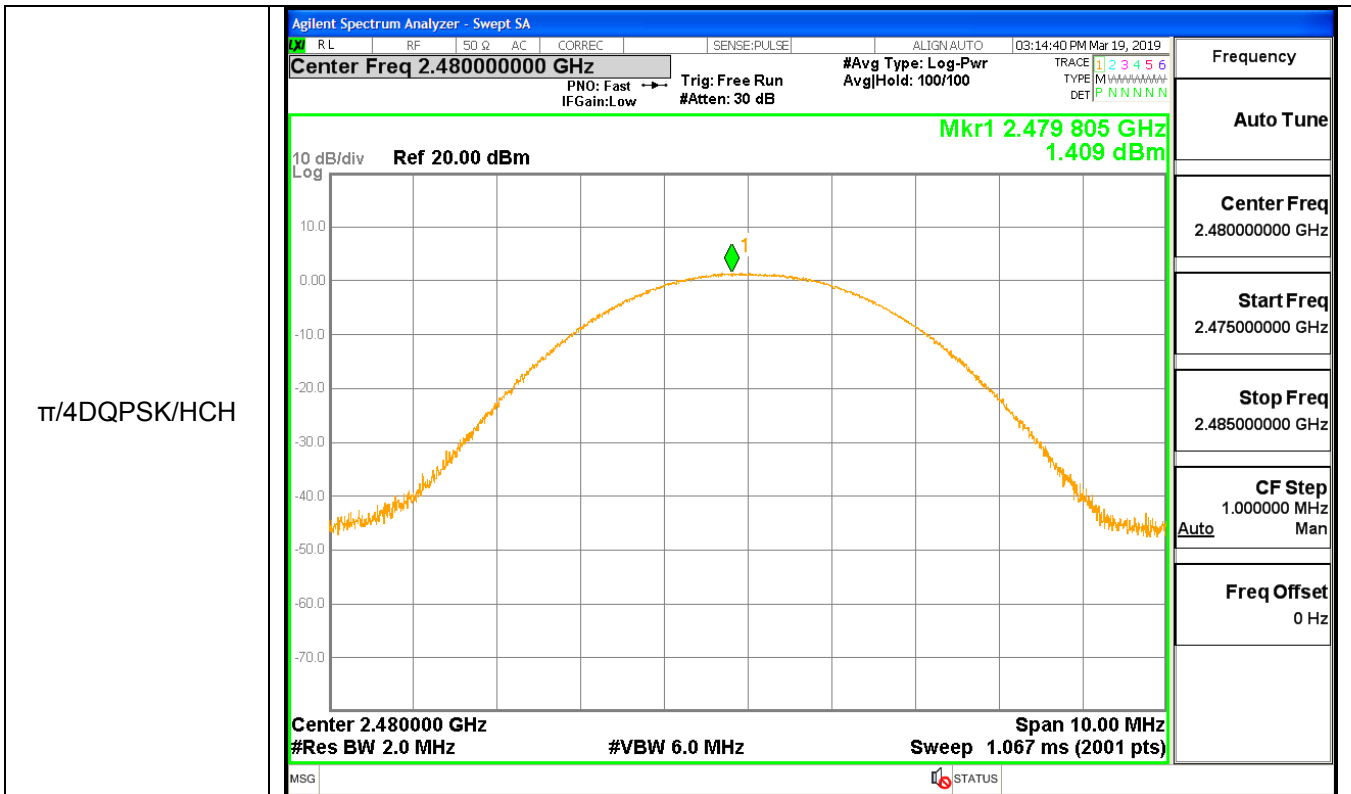
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-0.434	21	PASS
GFSK	MCH	2.391	21	PASS
GFSK	HCH	3.095	21	PASS
$\pi/4$ DQPSK	LCH	-2.721	21	PASS
$\pi/4$ DQPSK	MCH	0.521	21	PASS
$\pi/4$ DQPSK	HCH	1.409	21	PASS
8DPSK	LCH	-2.435	21	PASS
8DPSK	MCH	0.939	21	PASS
8DPSK	HCH	1.832	21	PASS

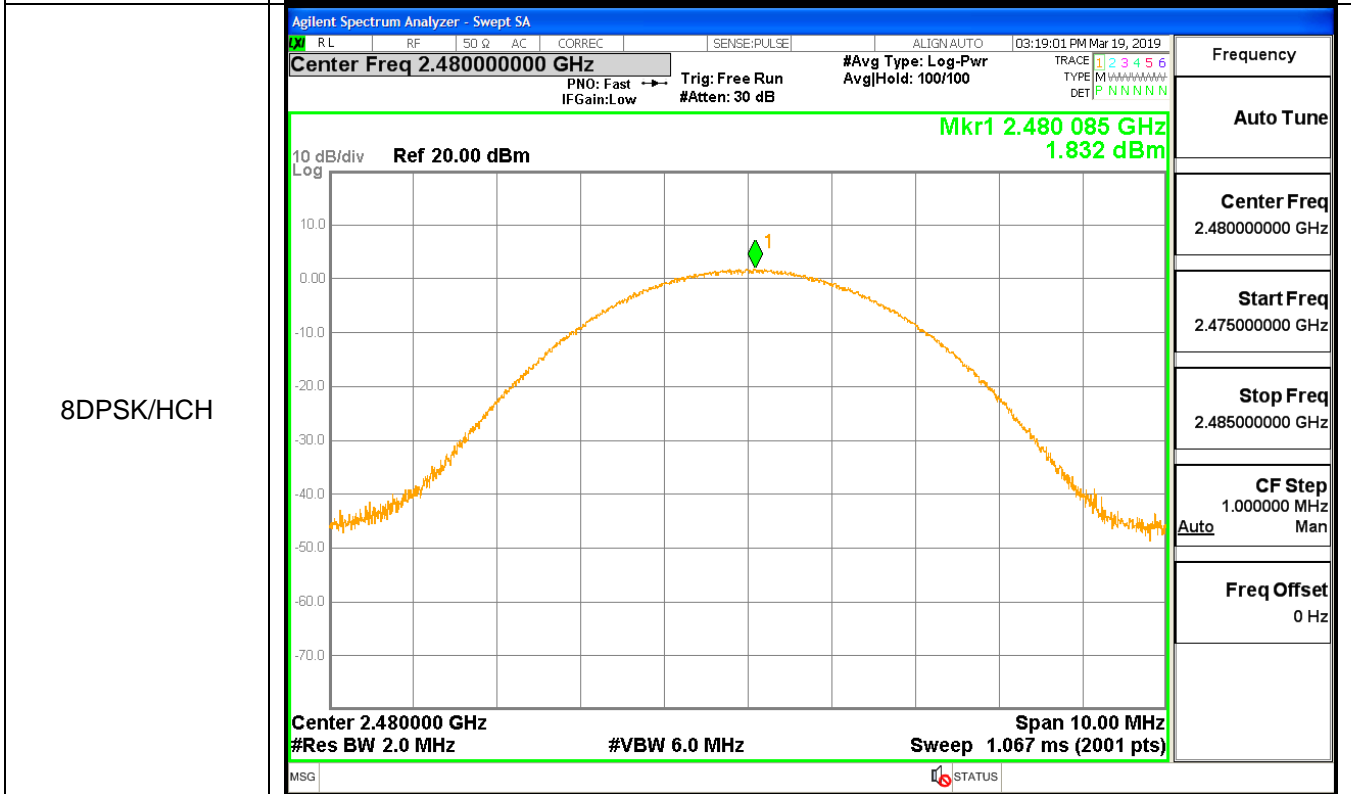
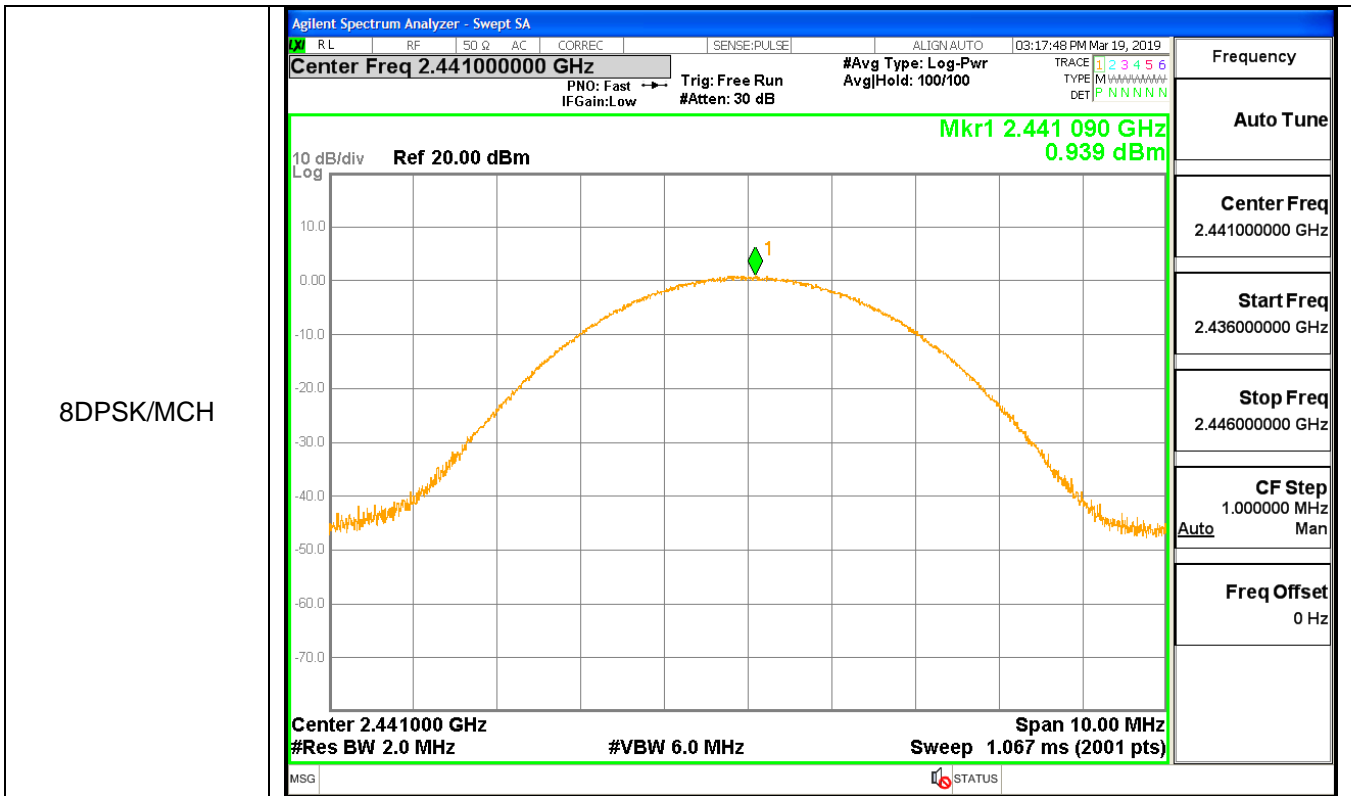
### Test Graph









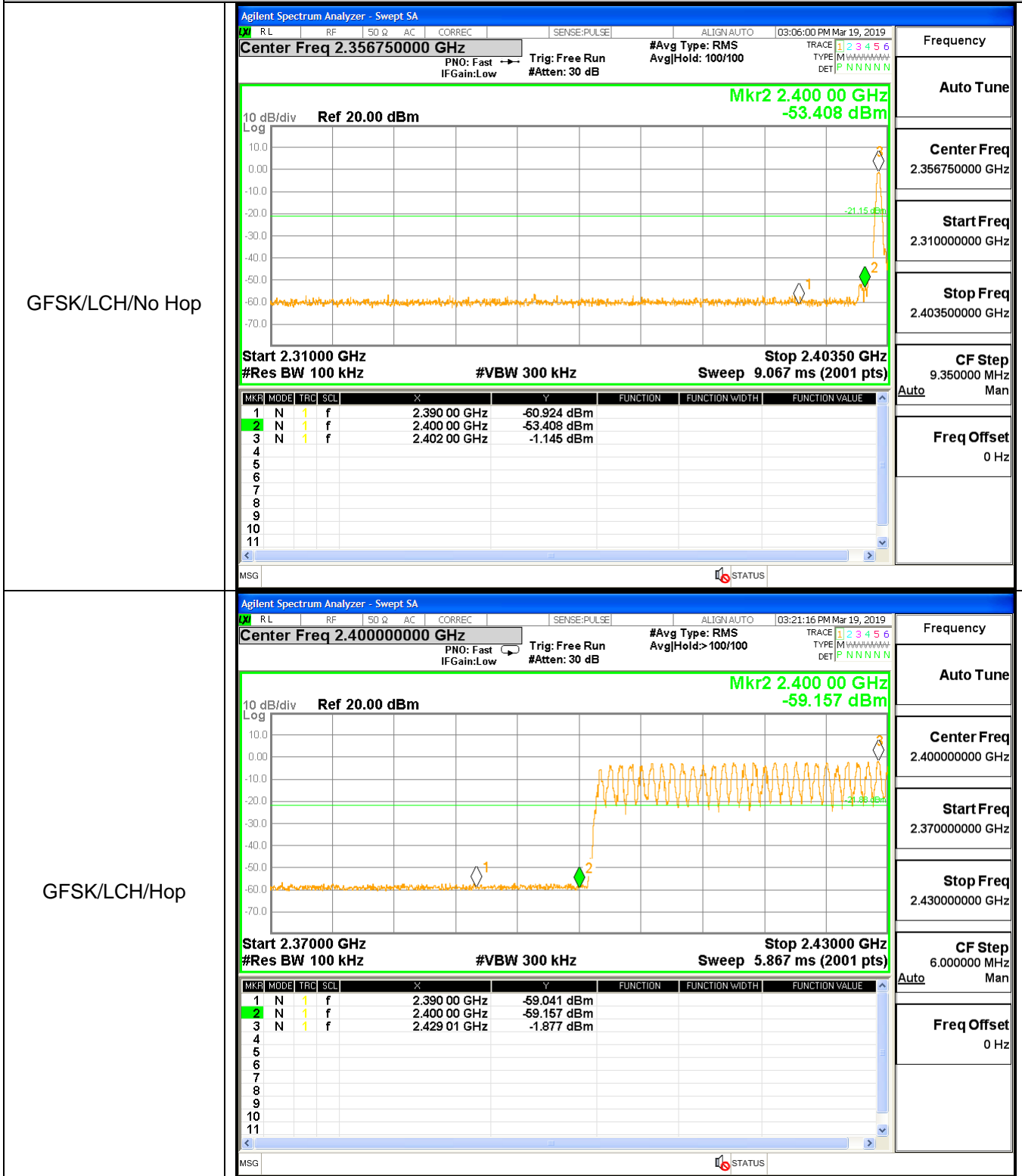


**A.6 Band-edge for RF Conducted Emissions**

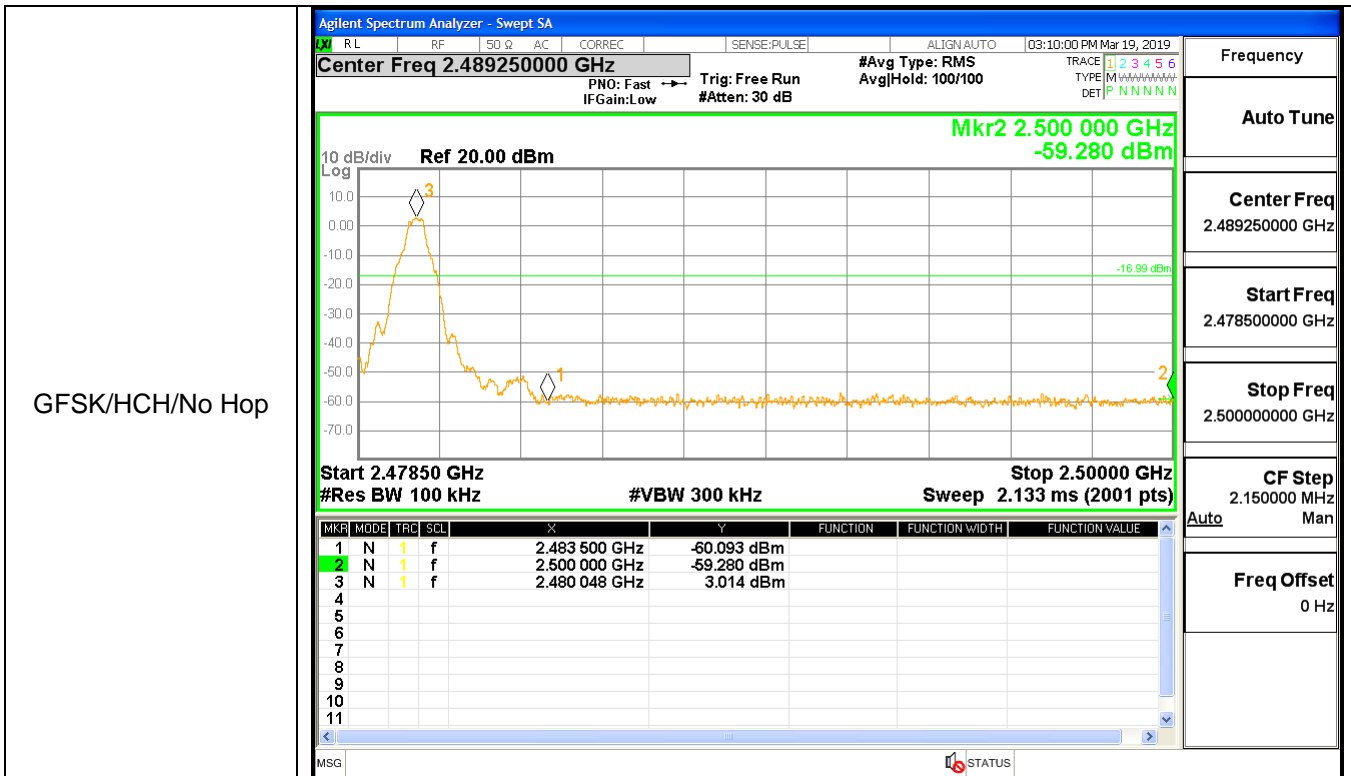
Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2390	-1.145	-60.92	-21.145	Pass
1DH5	2402	2400	-1.145	-53.41	-21.145	Pass
1DH5-Hopping	2402	2390	-1.877	-59.04	-21.877	Pass
1DH5-Hopping	2402	2400	-1.877	-59.16	-21.877	Pass
1DH5	2480	2483.5	3.014	-60.09	-16.986	Pass
1DH5	2480	2500	3.014	-59.28	-16.986	Pass
1DH5-Hopping	2480	2483.5	-0.567	-59.05	-20.567	Pass
1DH5-Hopping	2480	2500	-0.567	-55.36	-20.567	Pass
2DH5	2402	2390	-4.444	-60.66	-24.444	Pass
2DH5	2402	2400	-4.444	-56.62	-24.444	Pass
2DH5-Hopping	2480	2483.5	-0.723	-57.81	-20.723	Pass
2DH5-Hopping	2480	2500	-0.723	-56.04	-20.723	Pass
2DH5	2480	2483.5	-0.416	-59.11	-20.416	Pass
2DH5	2480	2500	-0.416	-59.84	-20.416	Pass
2DH5-Hopping	2402	2390	-2.508	-59.19	-22.508	Pass
2DH5-Hopping	2402	2400	-2.508	-58.57	-22.508	Pass
3DH5	2402	2390	-4.153	-59.04	-24.153	Pass
3DH5	2402	2400	-4.153	-55.90	-24.153	Pass
3DH5-Hopping	2402	2390	-3.283	-60.19	-23.283	Pass
3DH5-Hopping	2402	2400	-3.283	-59.64	-23.283	Pass
3DH5	2480	2483.5	-0.073	-55.58	-20.073	Pass
3DH5	2480	2500	-0.073	-58.79	-20.073	Pass
3DH5-Hopping	2480	2483.5	-1.644	-56.88	-21.644	Pass
3DH5-Hopping	2480	2500	-1.644	-55.15	-21.644	Pass

### Test Graph

#### Graphs

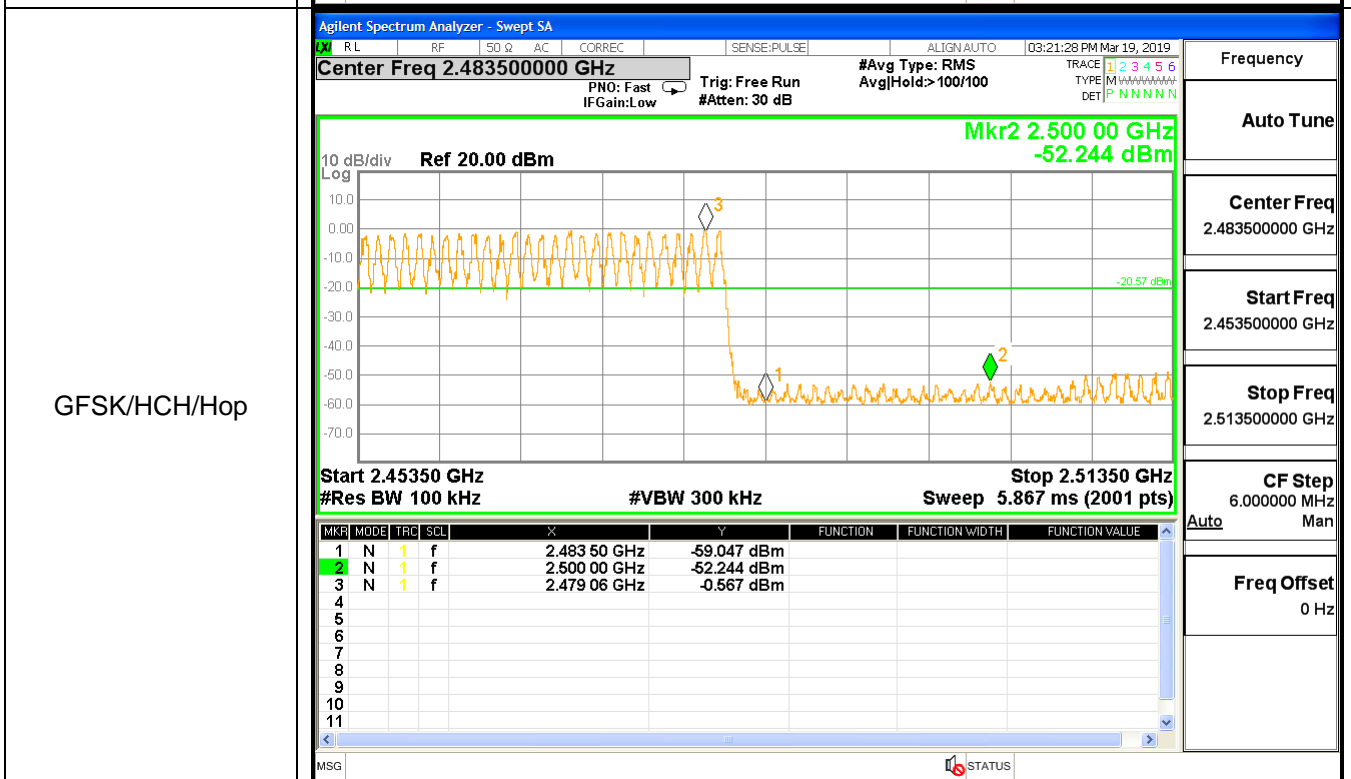






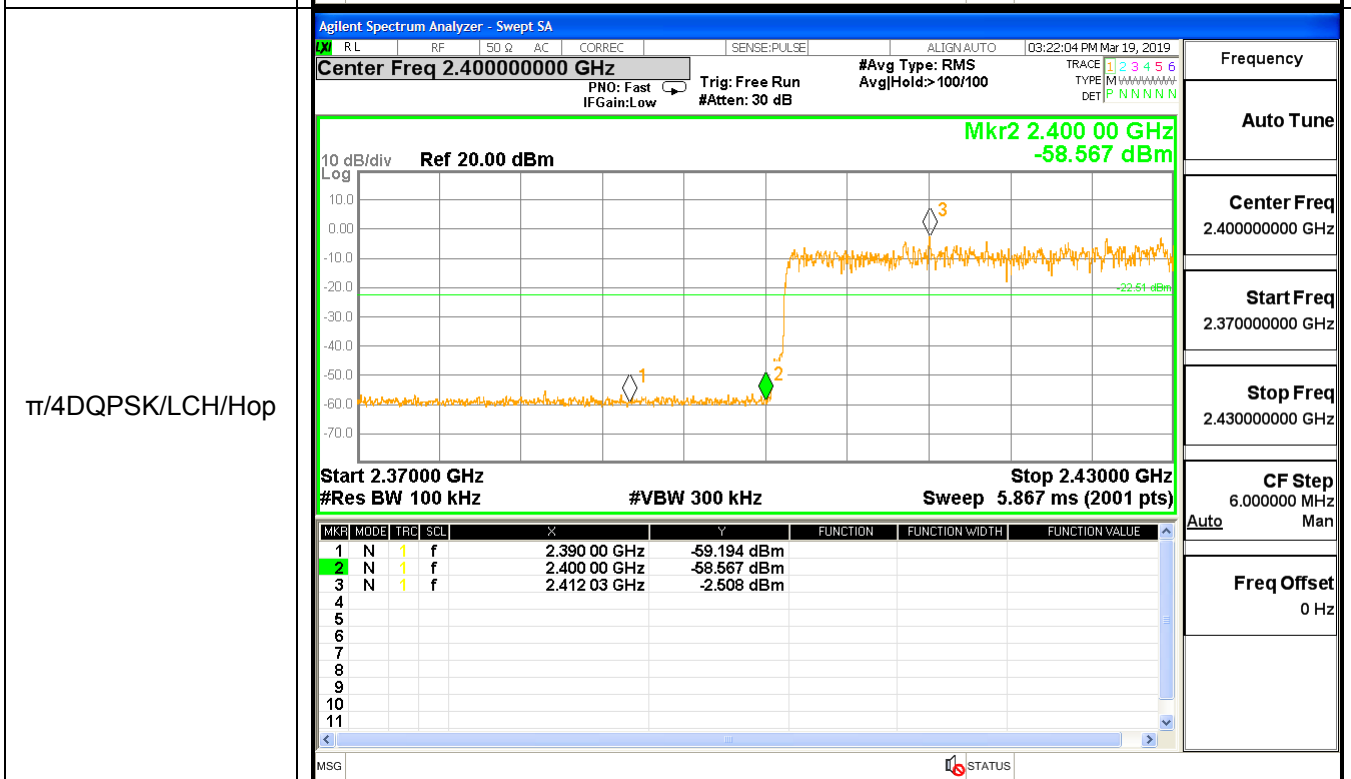
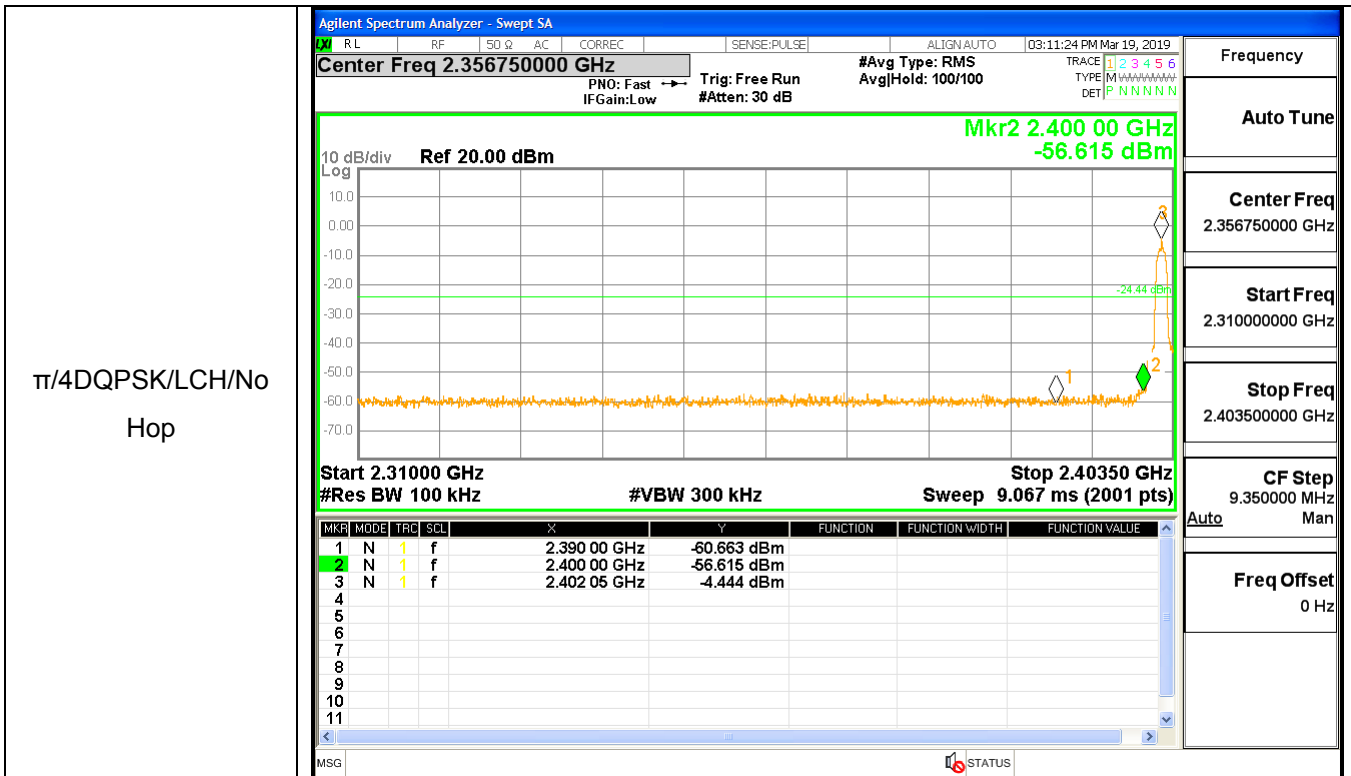
GFSK/HCH/No Hop

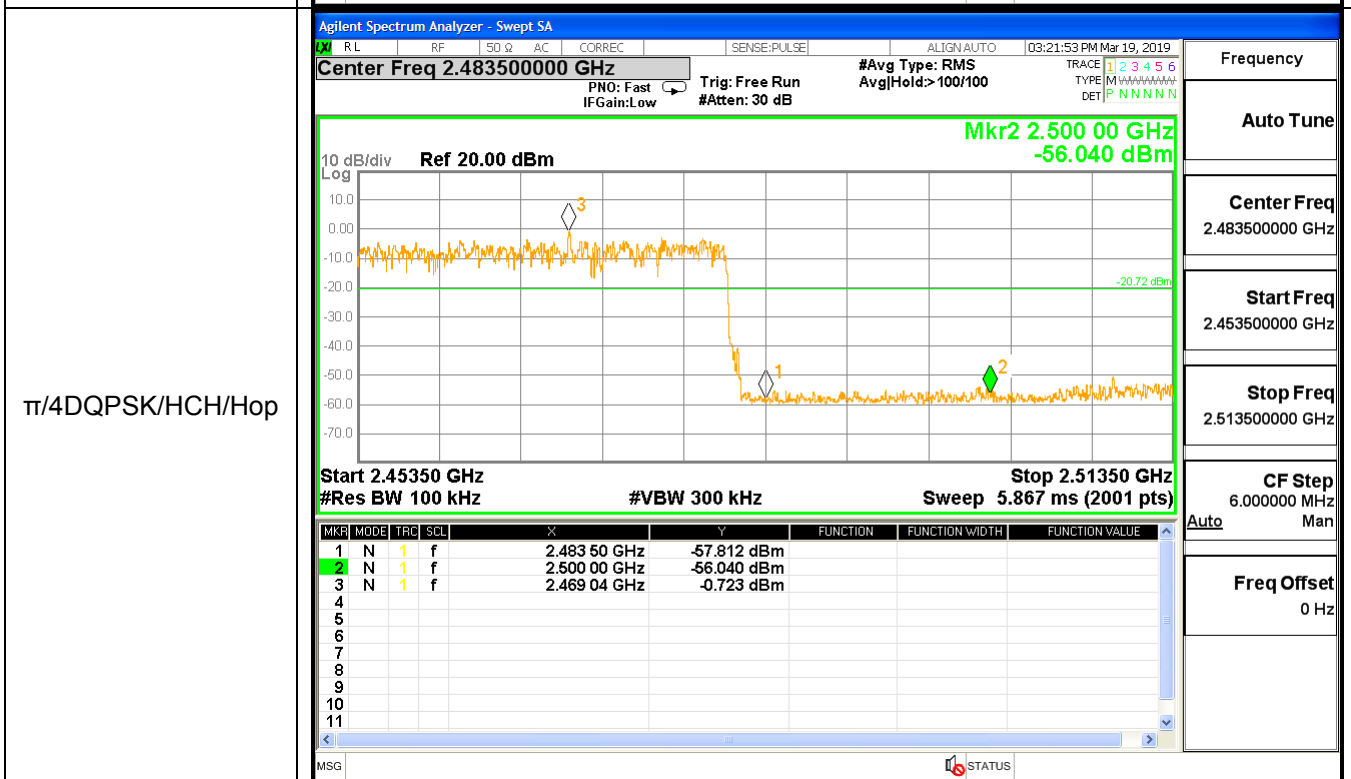
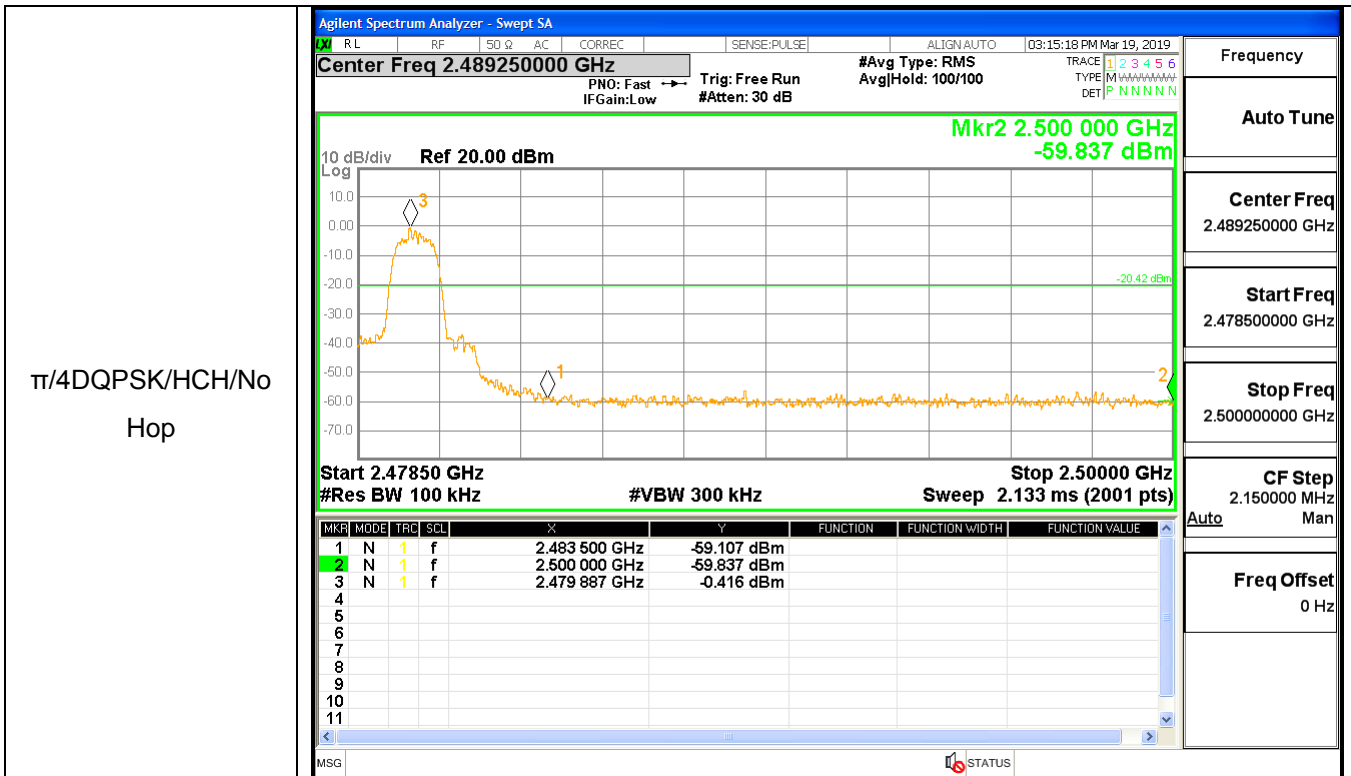
Frequency
Auto Tune
Center Freq 2.489250000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.150000 MHz
Auto
Freq Offset 0 Hz

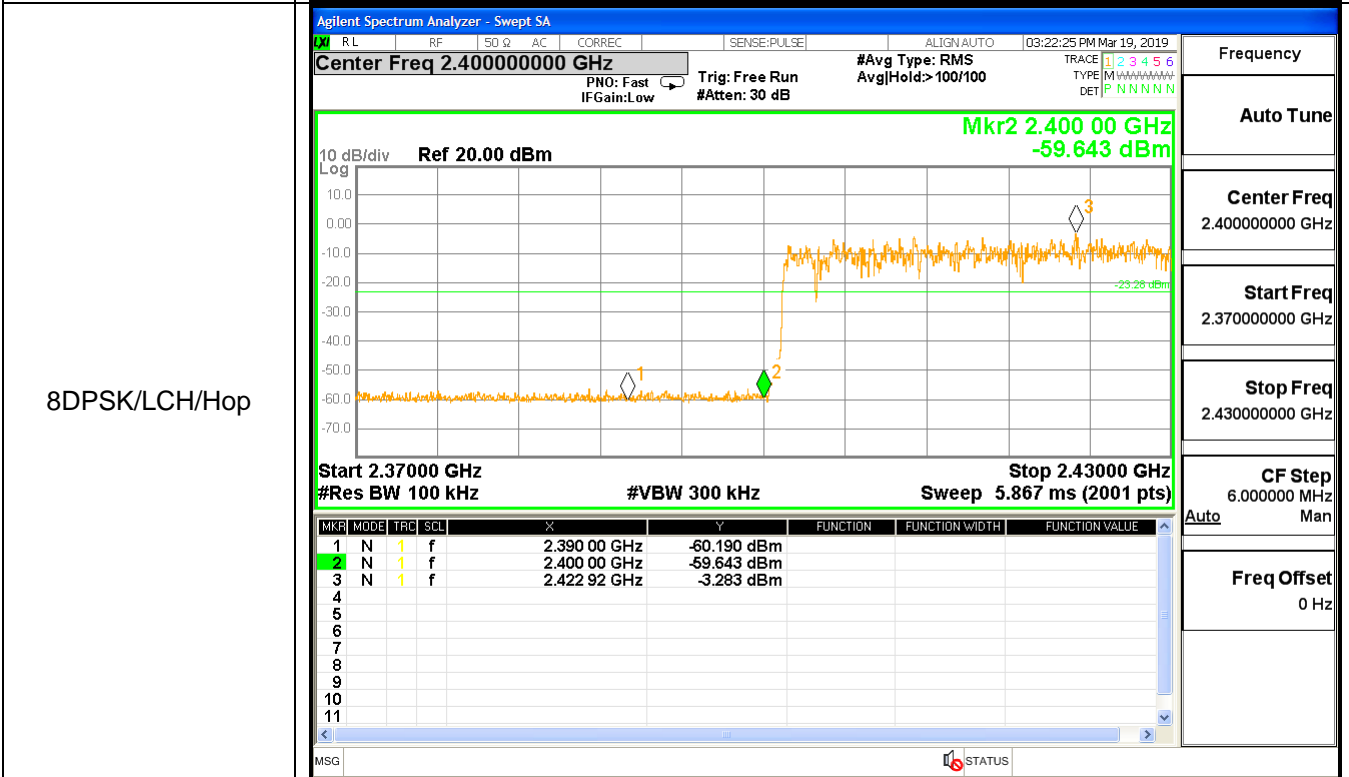
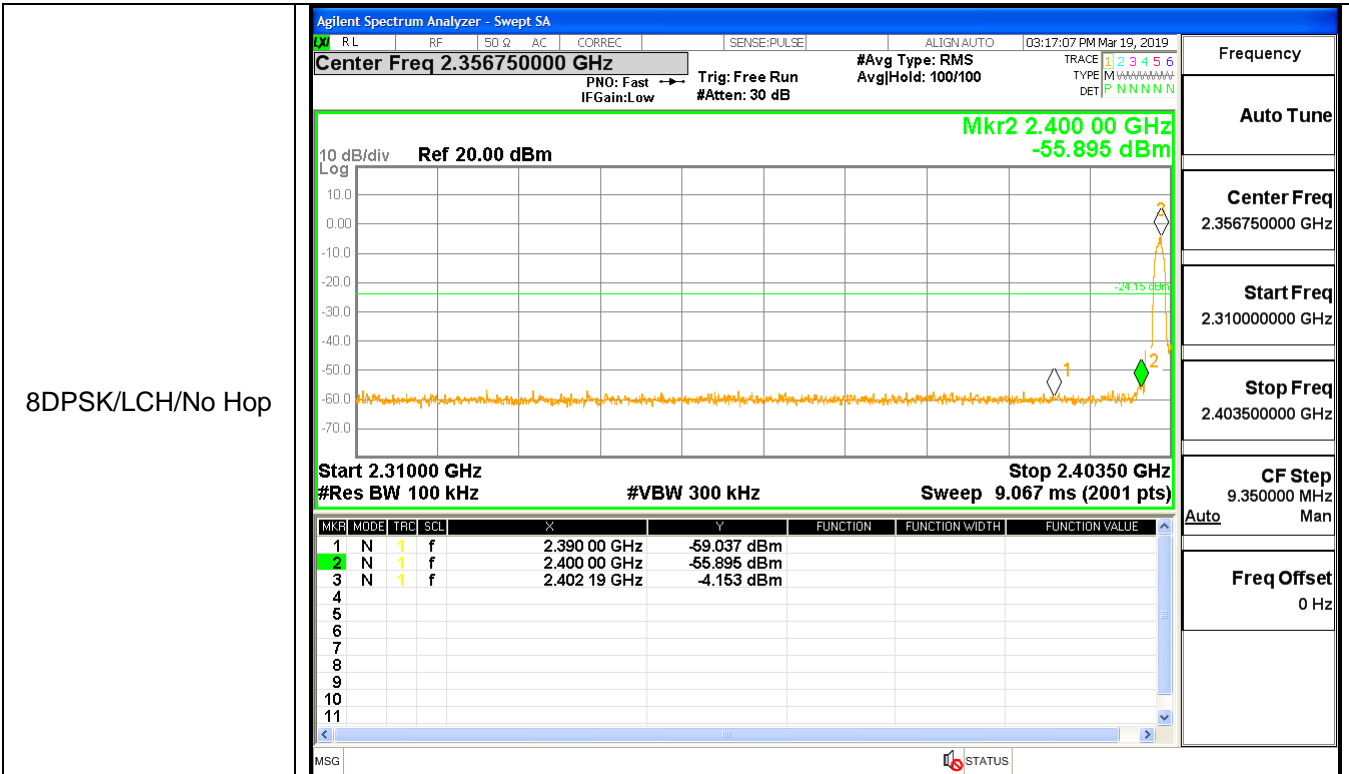


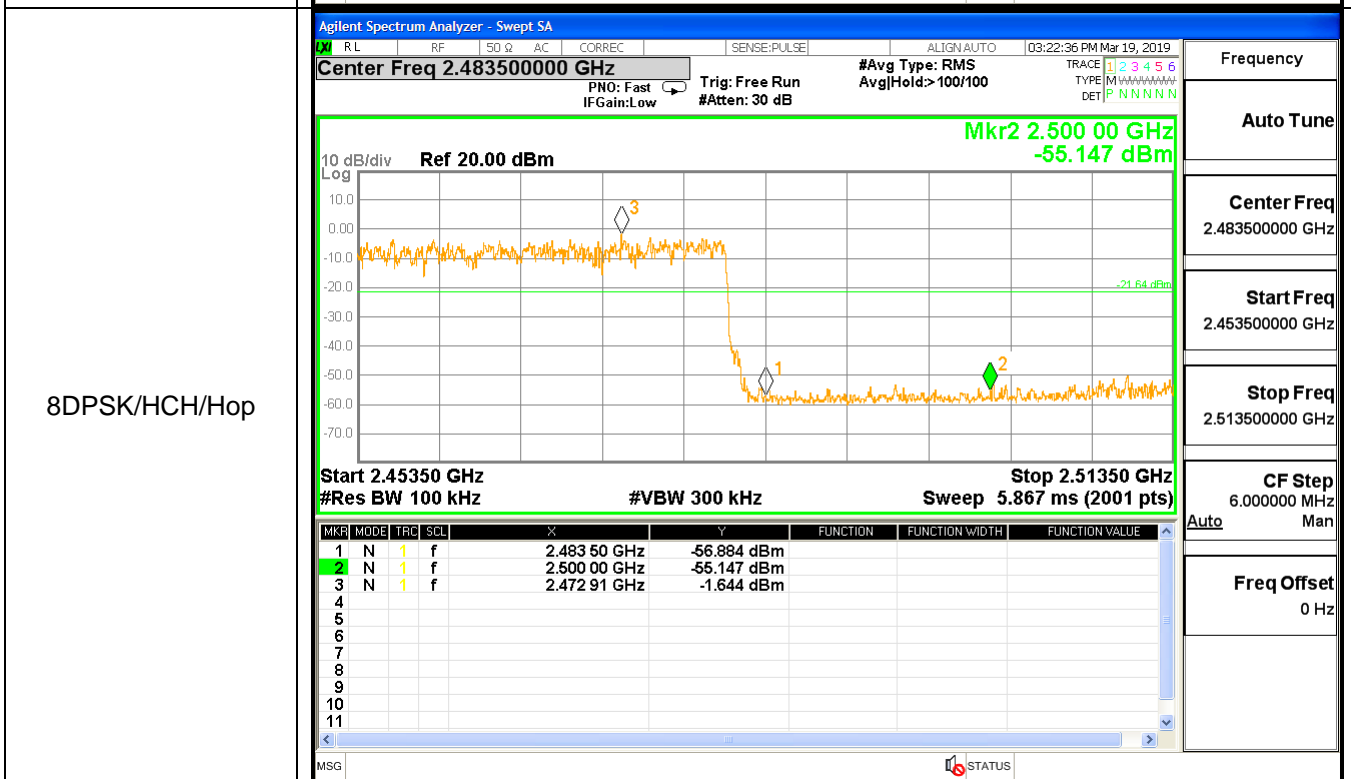
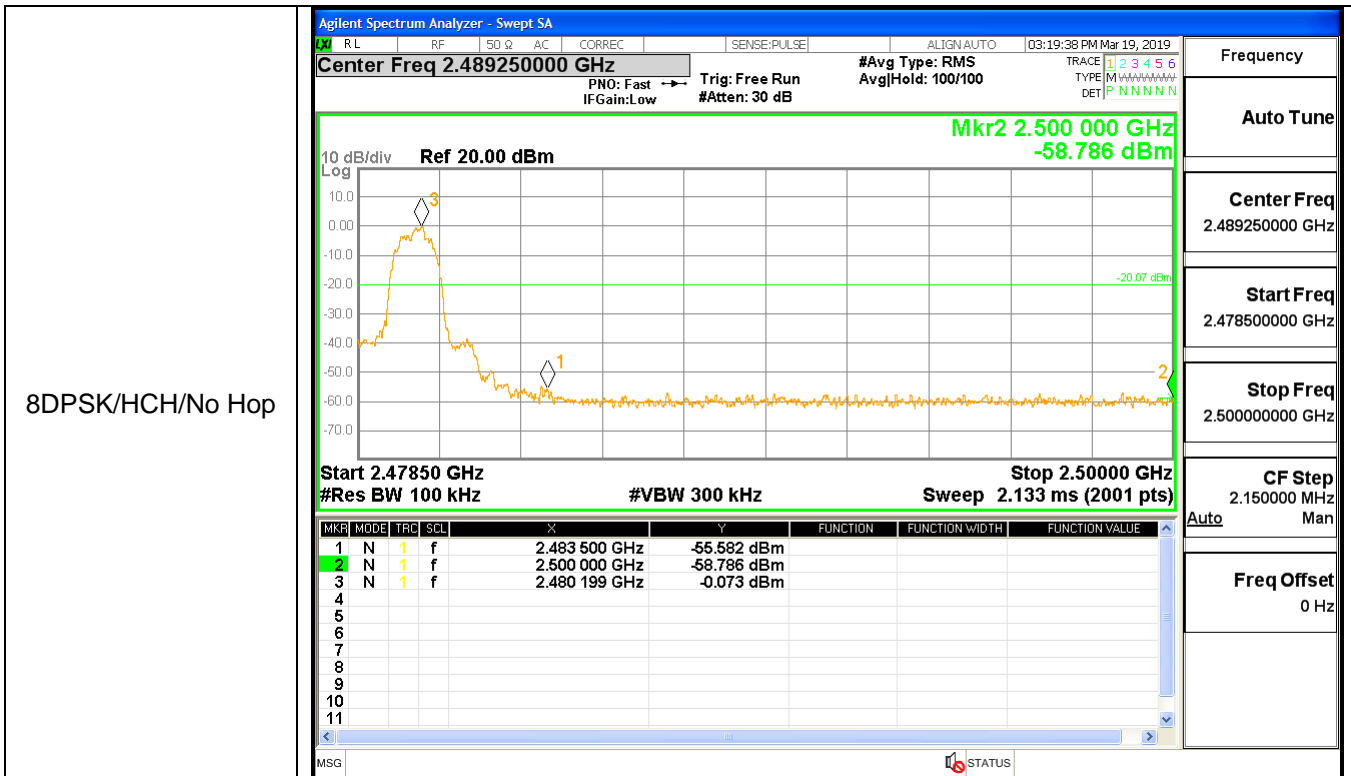
GFSK/HCH/Hop

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





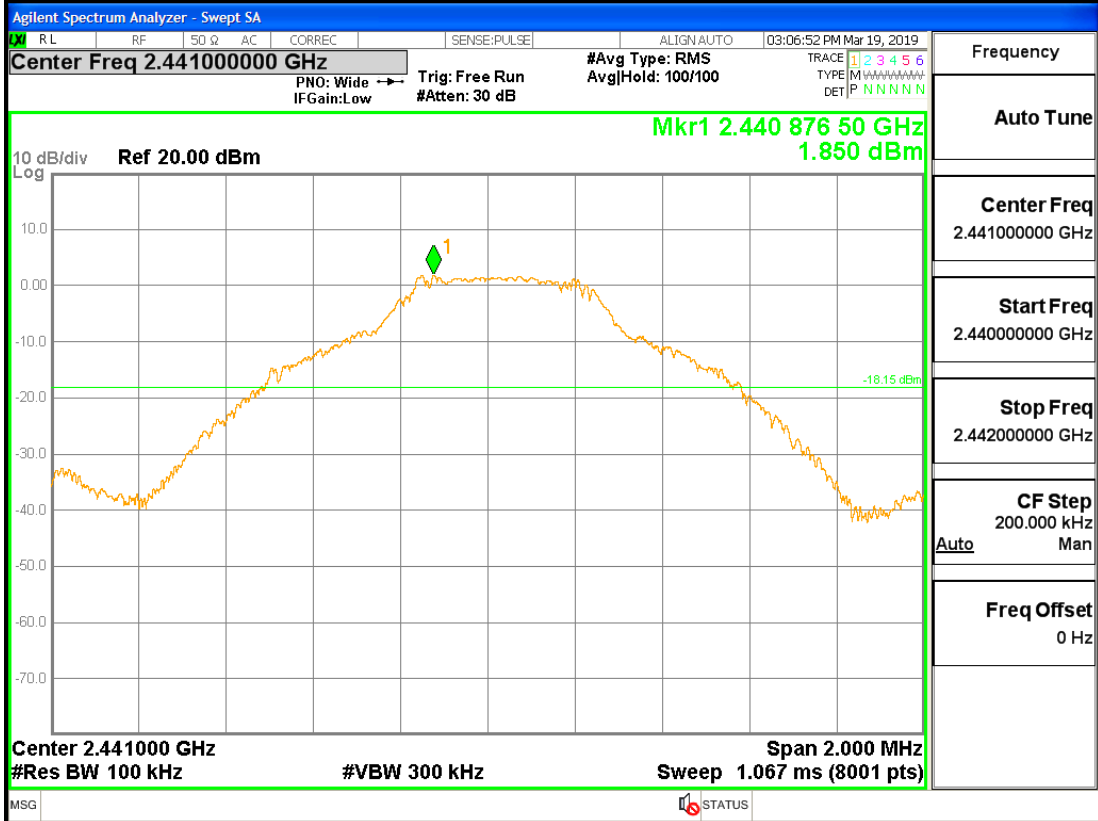




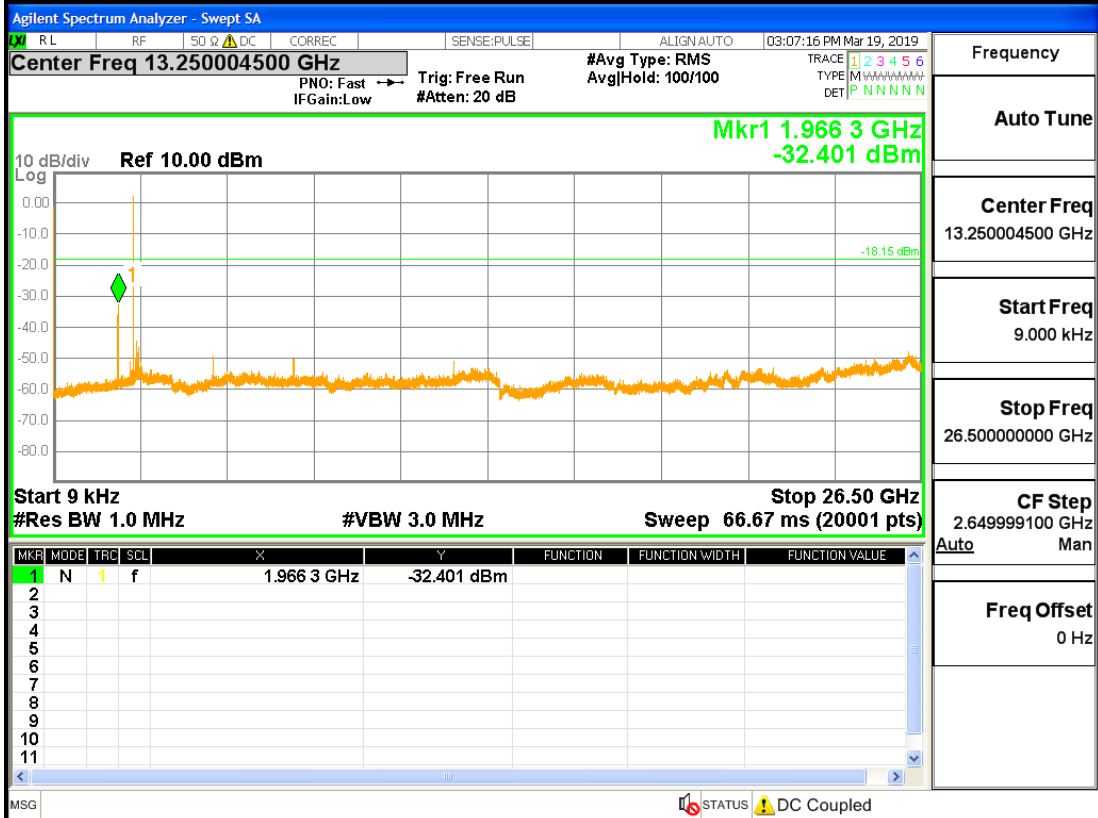


GFSK\_MCH\_Graphs

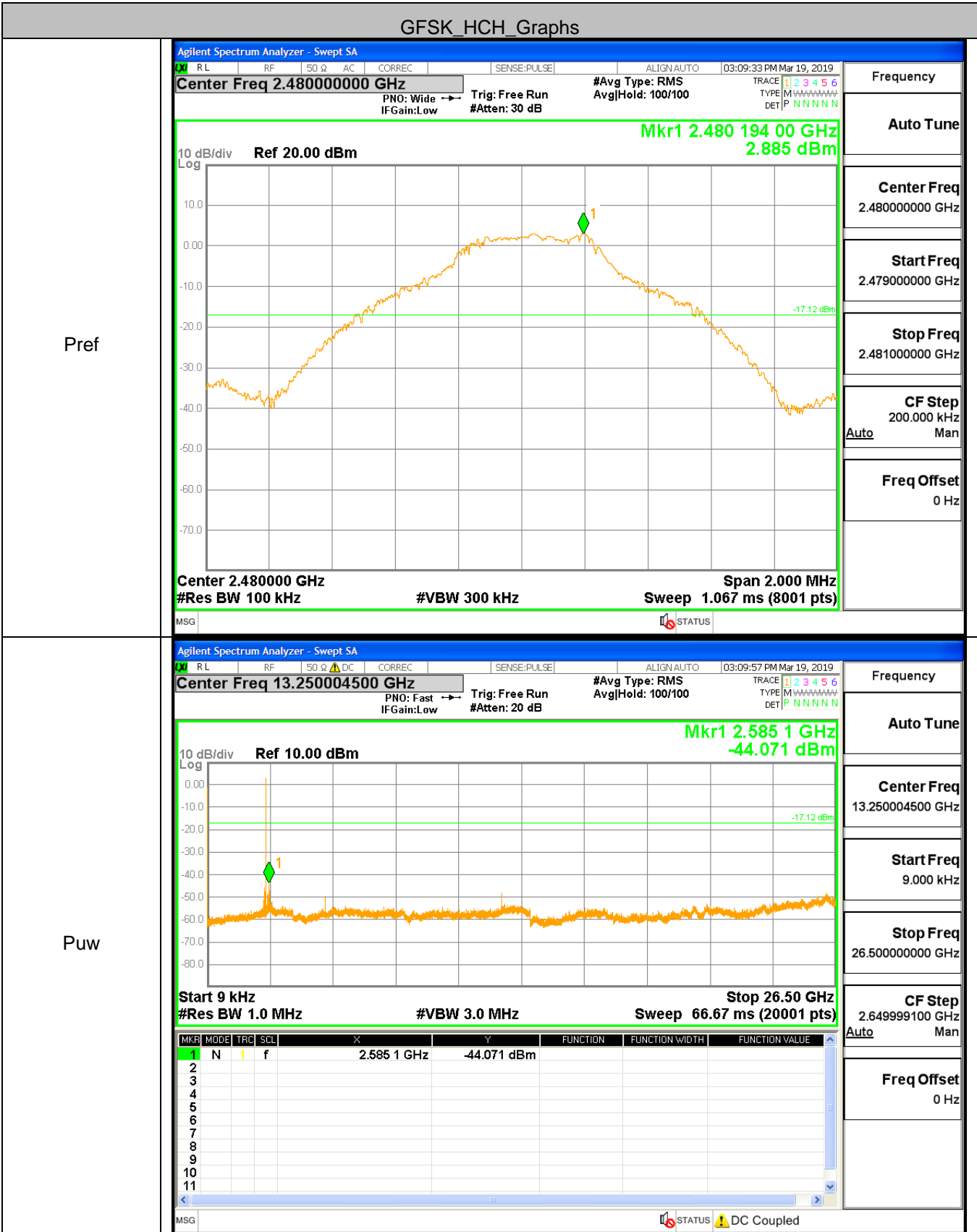
Pref



Puw

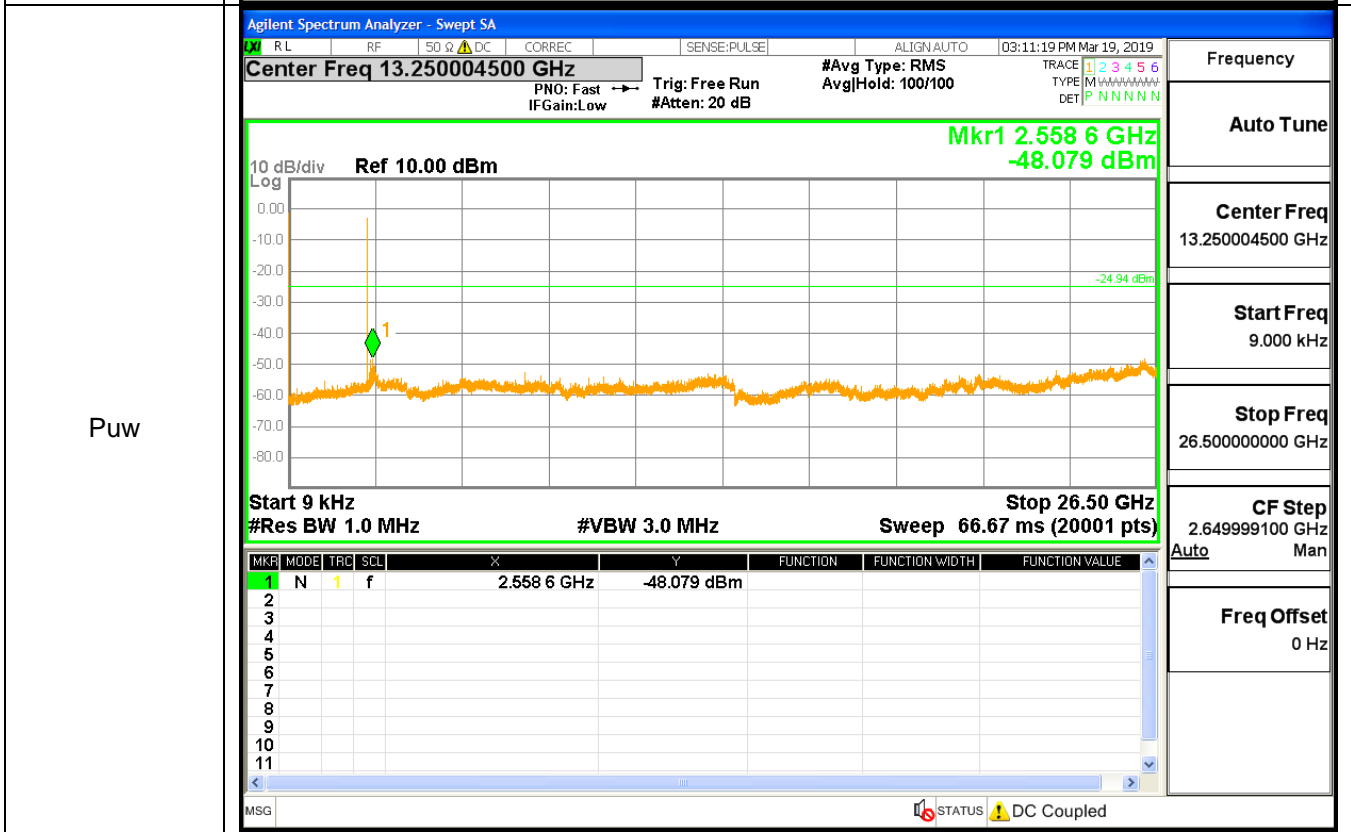
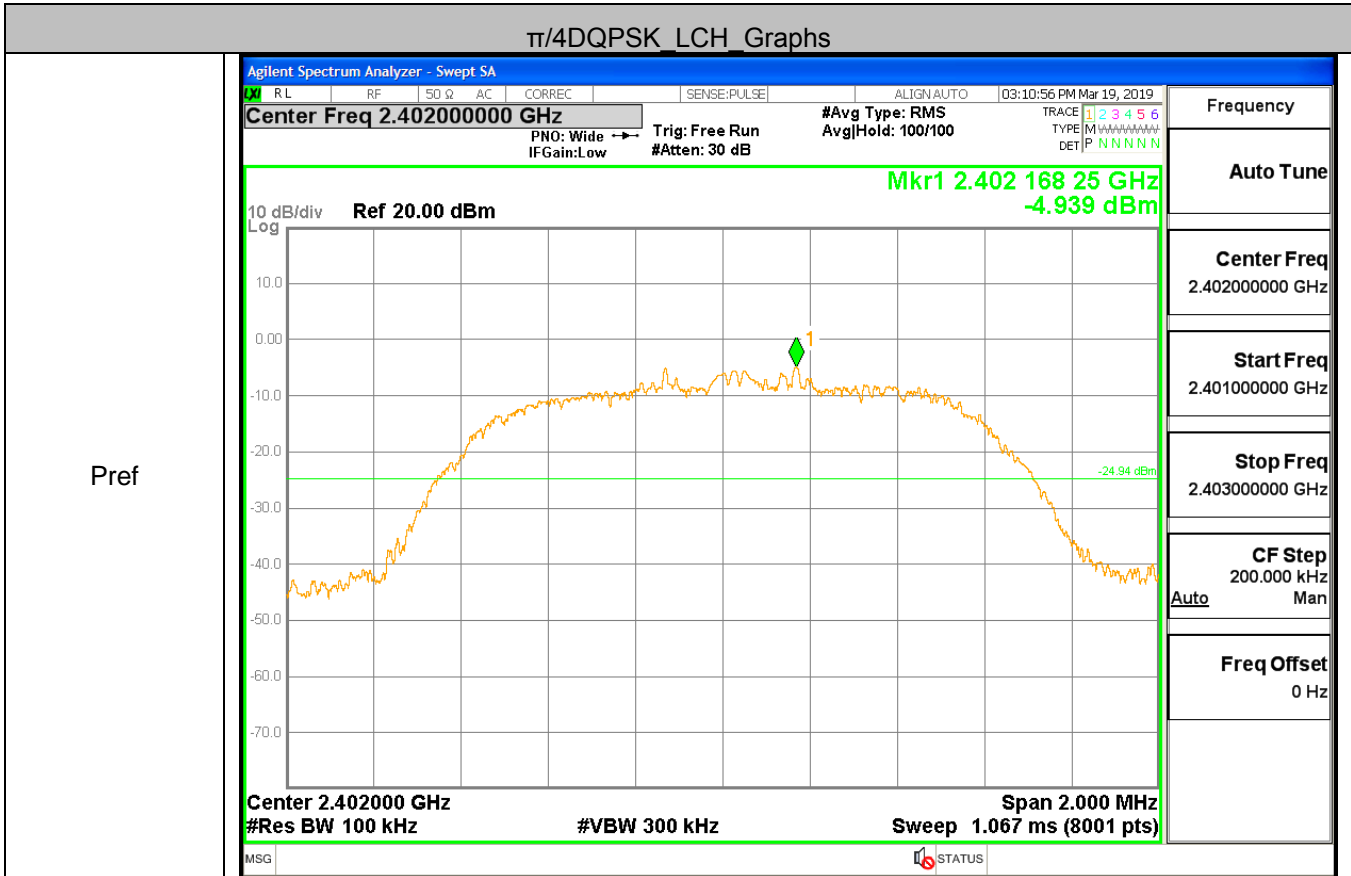


GFSK\_HCH\_Graphs

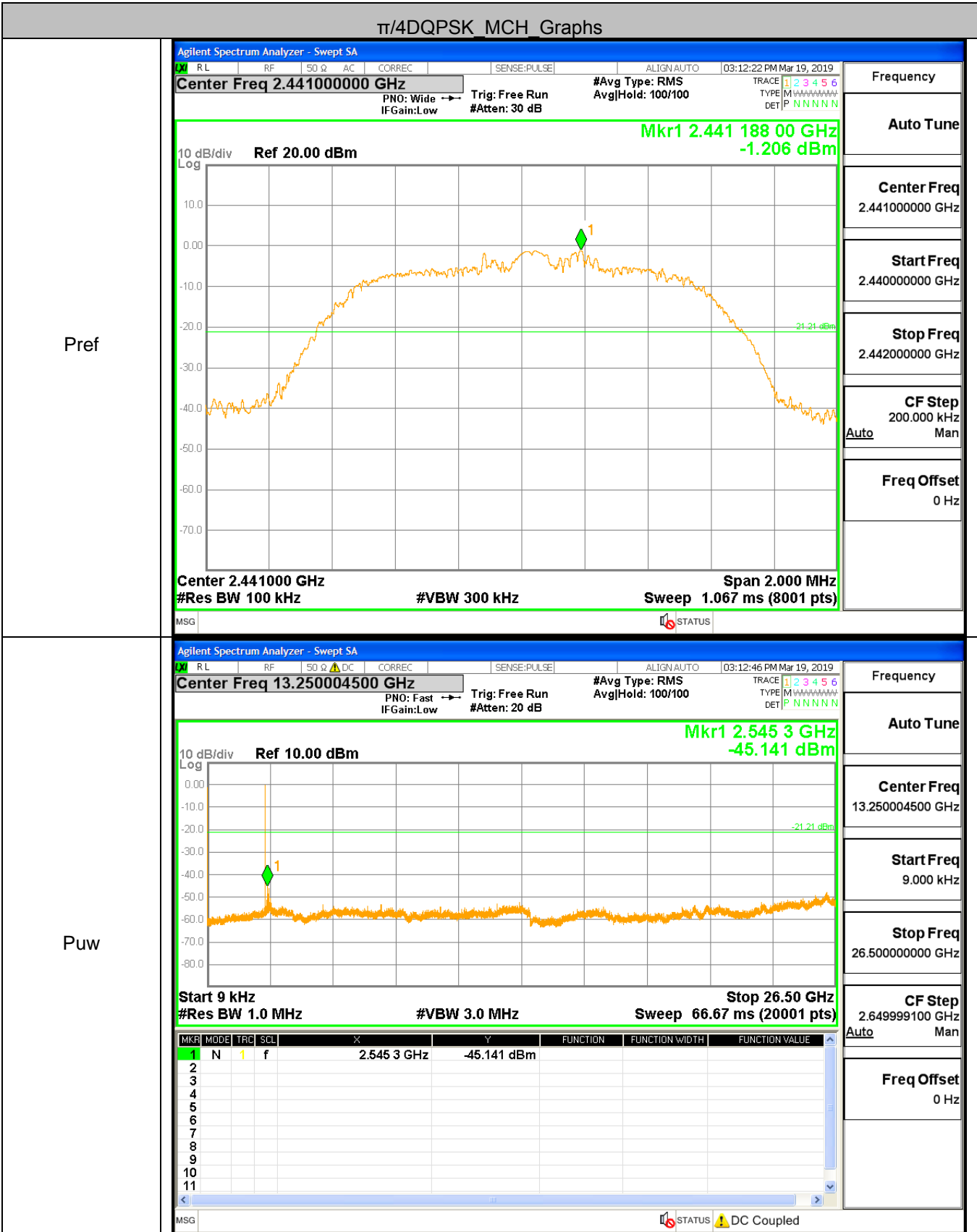




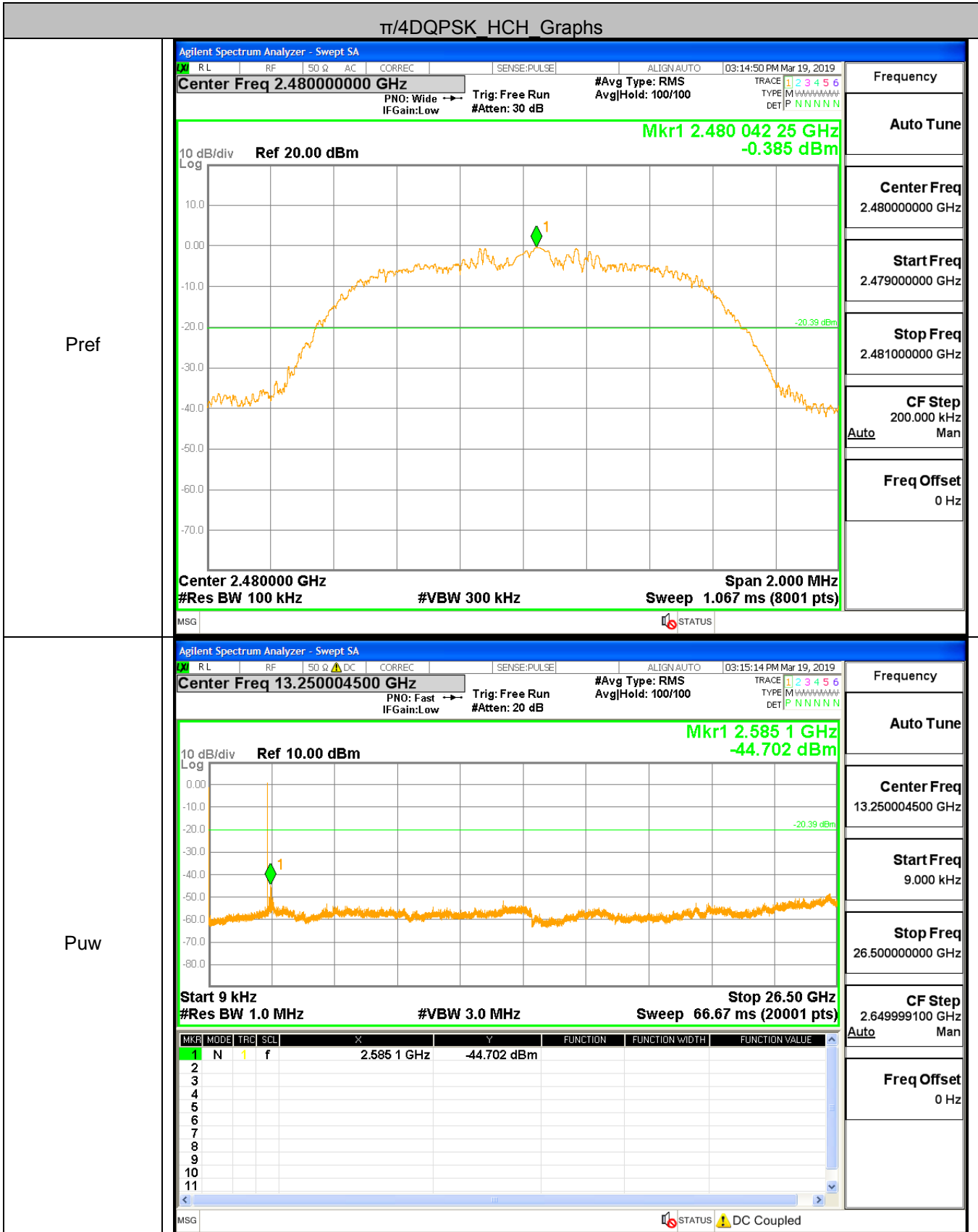
$\pi/4$ DQPSK LCH Graphs



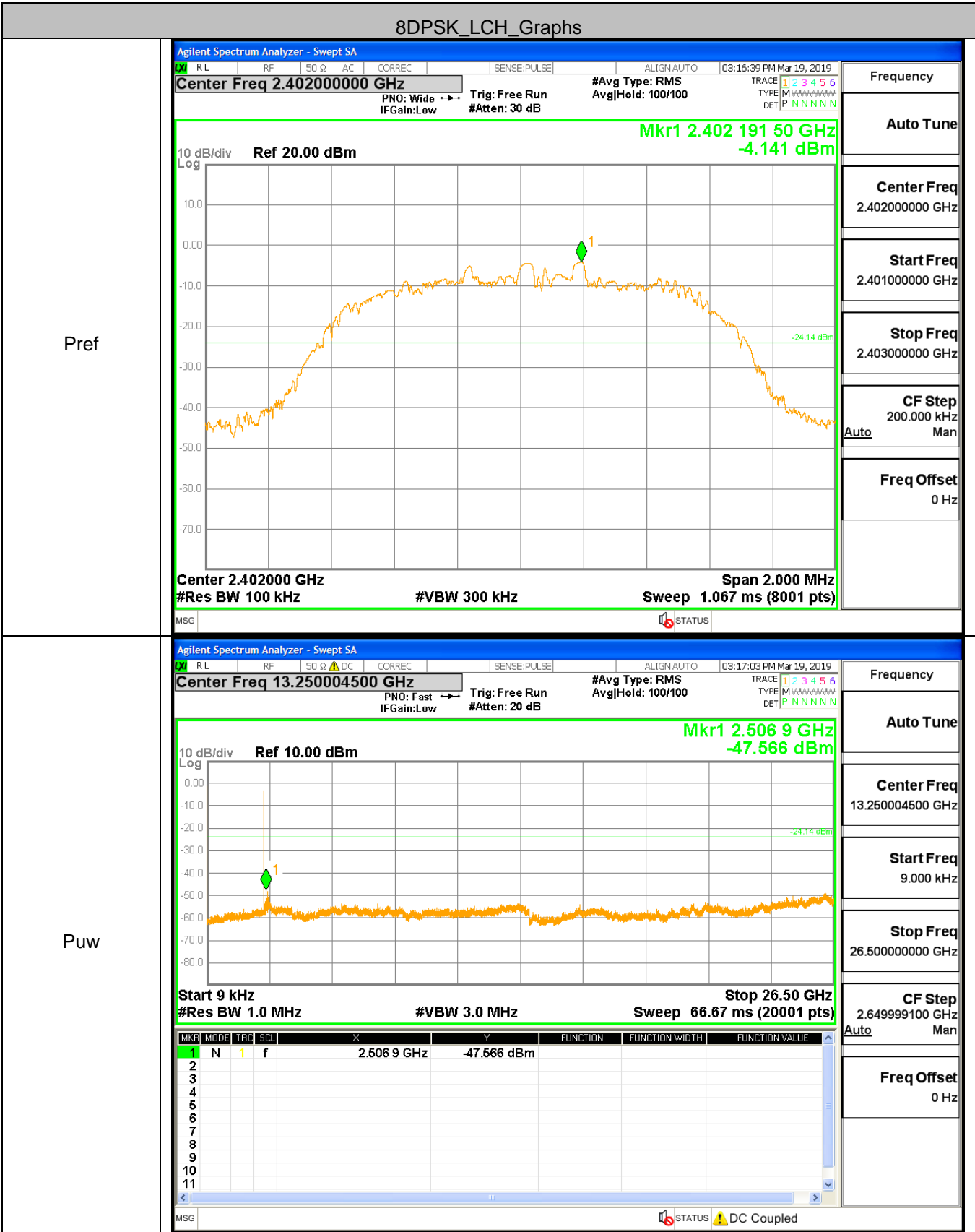
$\pi/4$ DQPSK MCH Graphs



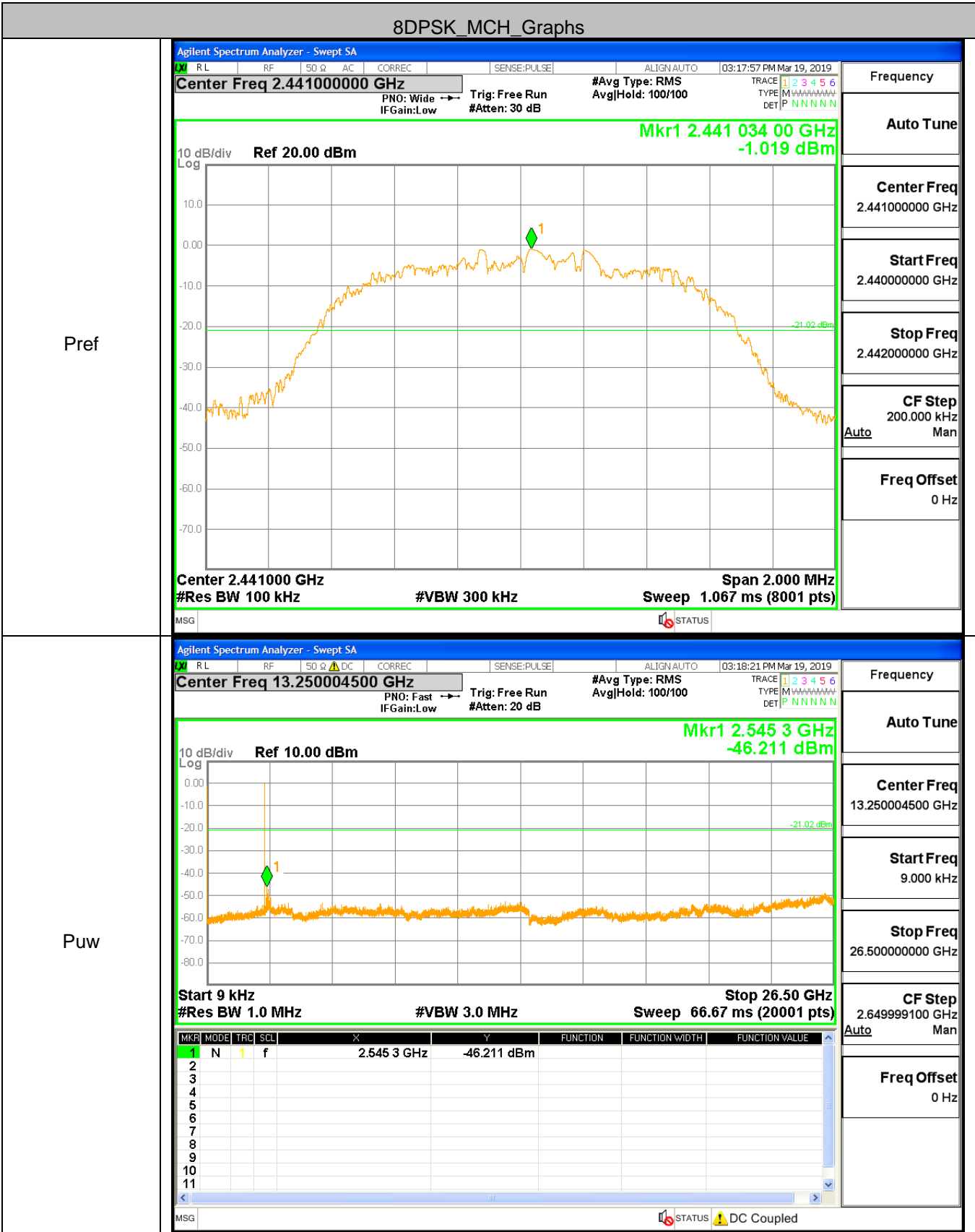
$\pi/4$ DQPSK HCH Graphs



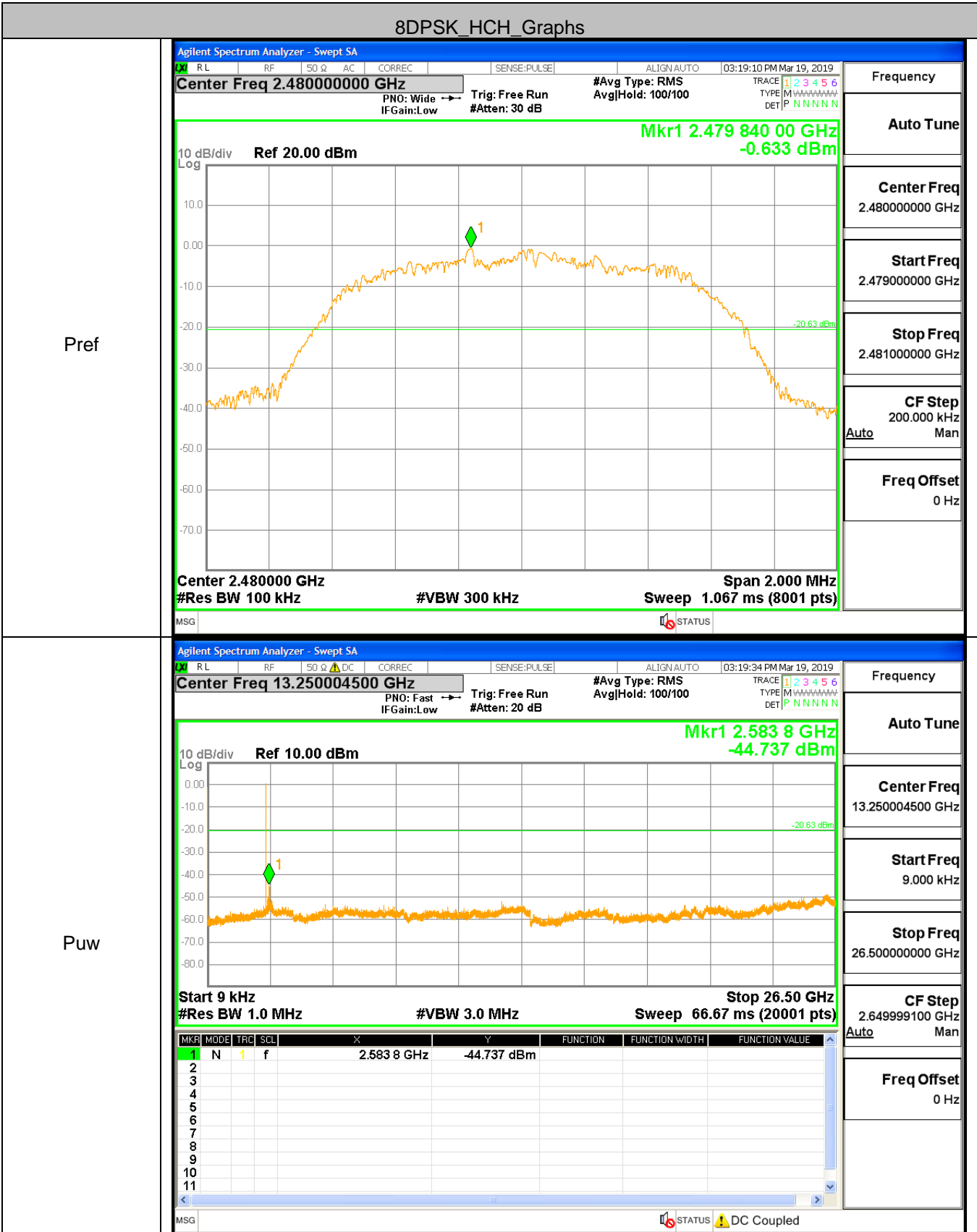
8DPSK\_LCH\_Graphs



8DPSK\_MCH\_Graphs



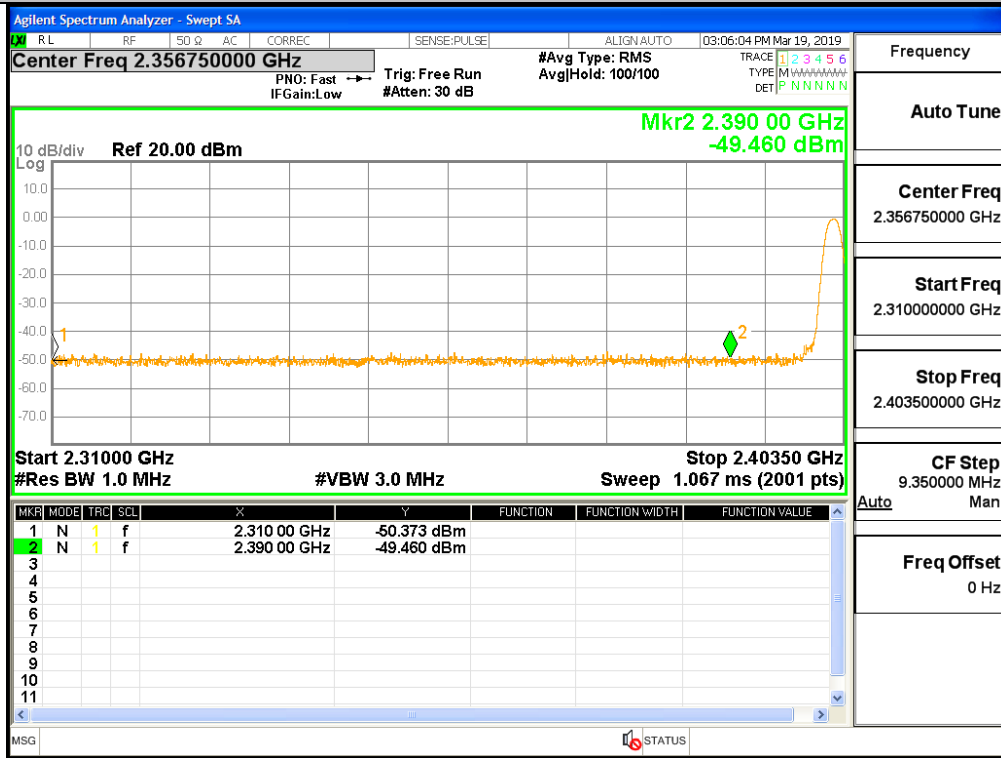
8DPSK\_HCH\_Graphs



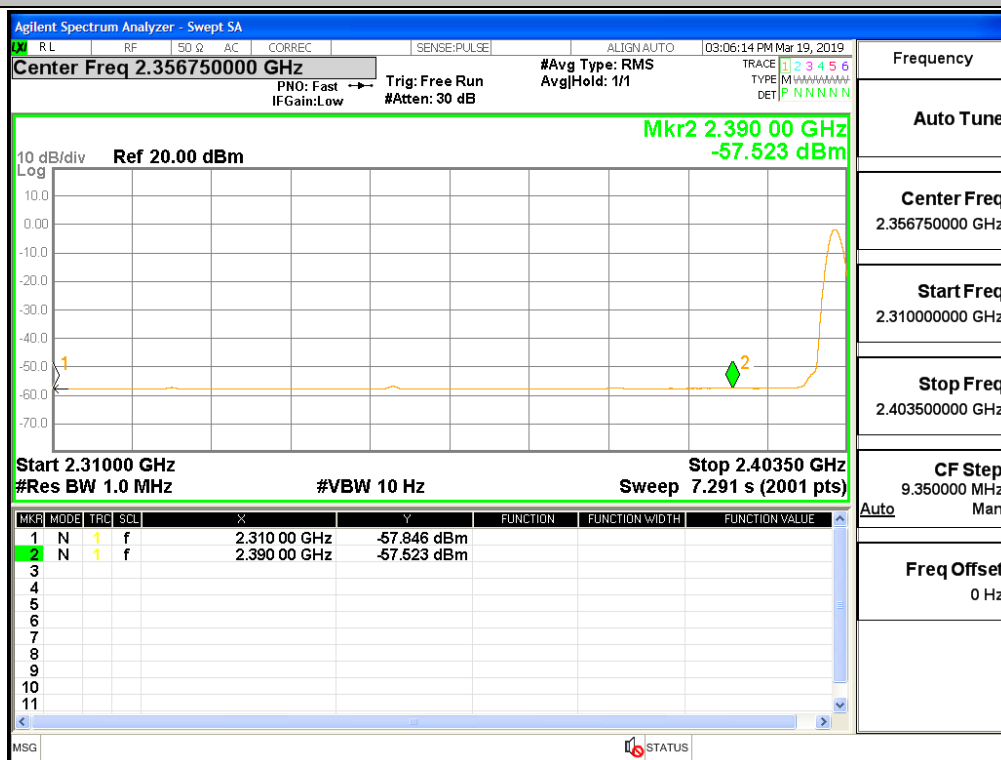
**A.8 Restrict-band band-edge measurements**

Type	Carrier Frequency (MHz)	Frequency(MHz)	Gain	Ground Factor	Peak Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Average Value(dBm)	E [dBuV/m]	Limit [dBuV/m]	Conclusion
1DH5	2402	2310	2.00	0.00	-50.37	46.83	74	-57.85	39.35	54	Pass
1DH5	2402	2390	2.00	0.00	-49.46	47.74	74	-57.52	39.68	54	Pass
1DH5	2480	2483.5	2.00	0.00	-47.58	49.62	74	-53.35	43.85	54	Pass
1DH5	2480	2500	2.00	0.00	-50.65	46.55	74	-56.96	40.24	54	Pass
2DH5	2402	2310	2.00	0.00	-51.77	45.43	74	-57.79	39.41	54	Pass
2DH5	2402	2390	2.00	0.00	-51.40	45.80	74	-57.57	39.63	54	Pass
2DH5	2480	2483.5	2.00	0.00	-46.95	50.25	74	-54.34	42.86	54	Pass
2DH5	2480	2500	2.00	0.00	-49.66	47.54	74	-56.99	40.21	54	Pass
3DH5	2402	2310	2.00	0.00	-50.43	46.77	74	-57.89	39.31	54	Pass
3DH5	2402	2390	2.00	0.00	-50.34	46.86	74	-57.57	39.63	54	Pass
3DH5	2480	2483.5	2.00	0.00	-47.80	49.40	74	-54.29	42.91	54	Pass
3DH5	2480	2500	2.00	0.00	-50.33	46.87	74	-56.96	40.24	54	Pass

Restrict-band band-edge measurements\_2402\_PEAK\_DH5

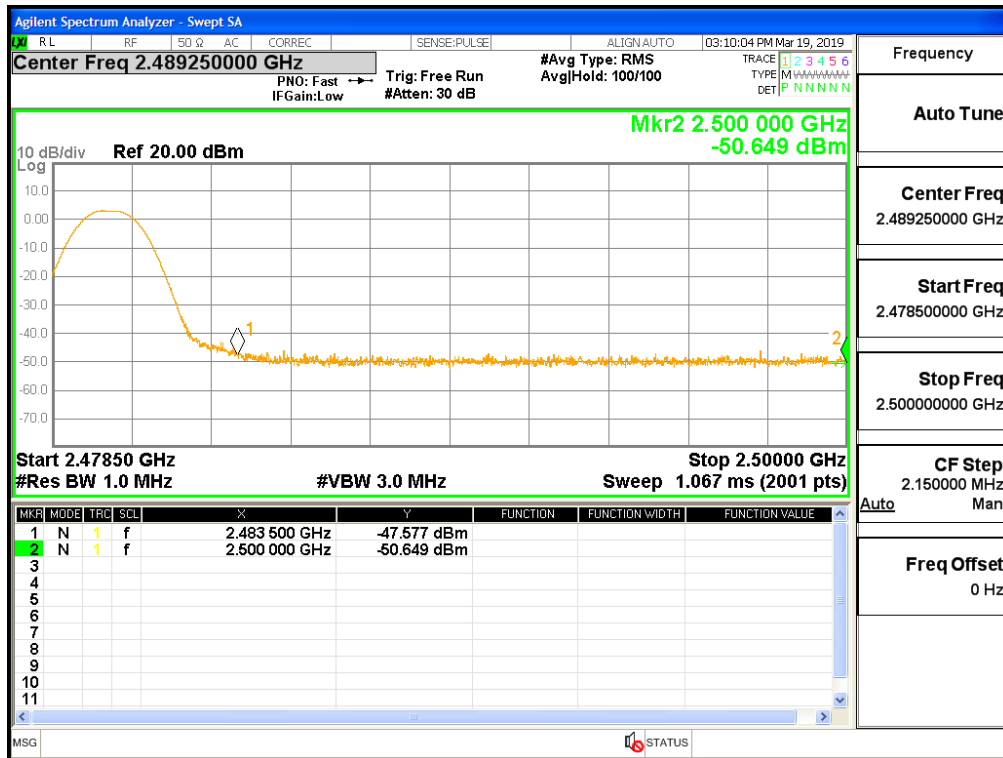


Restrict-band band-edge measurements\_2402\_AV\_DH5

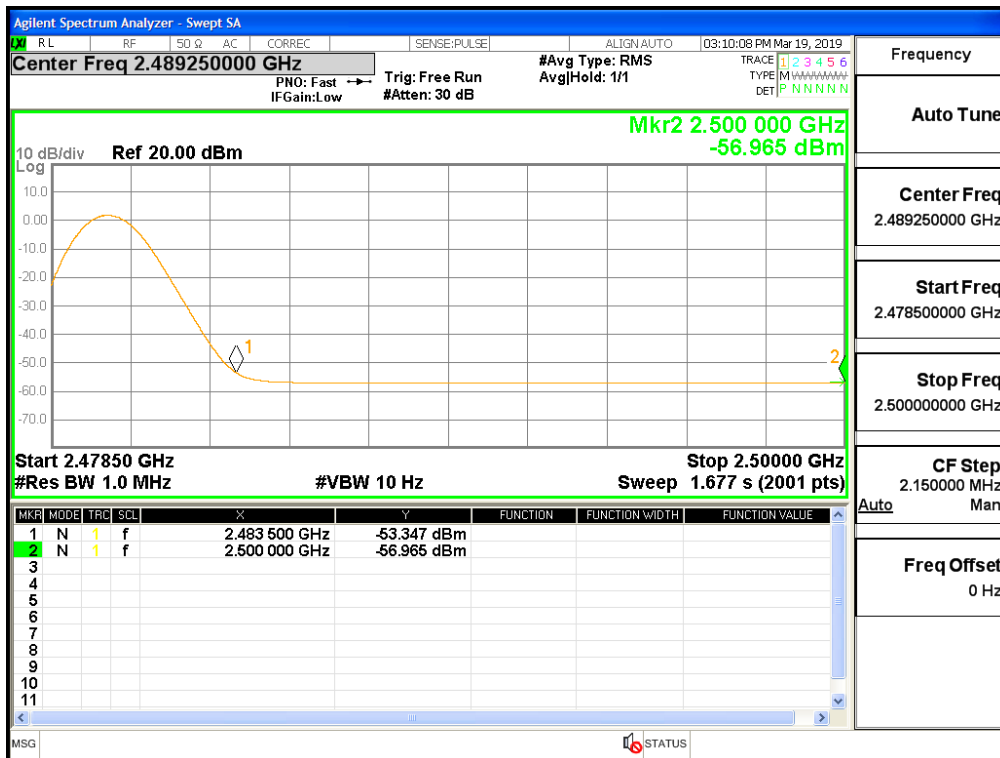




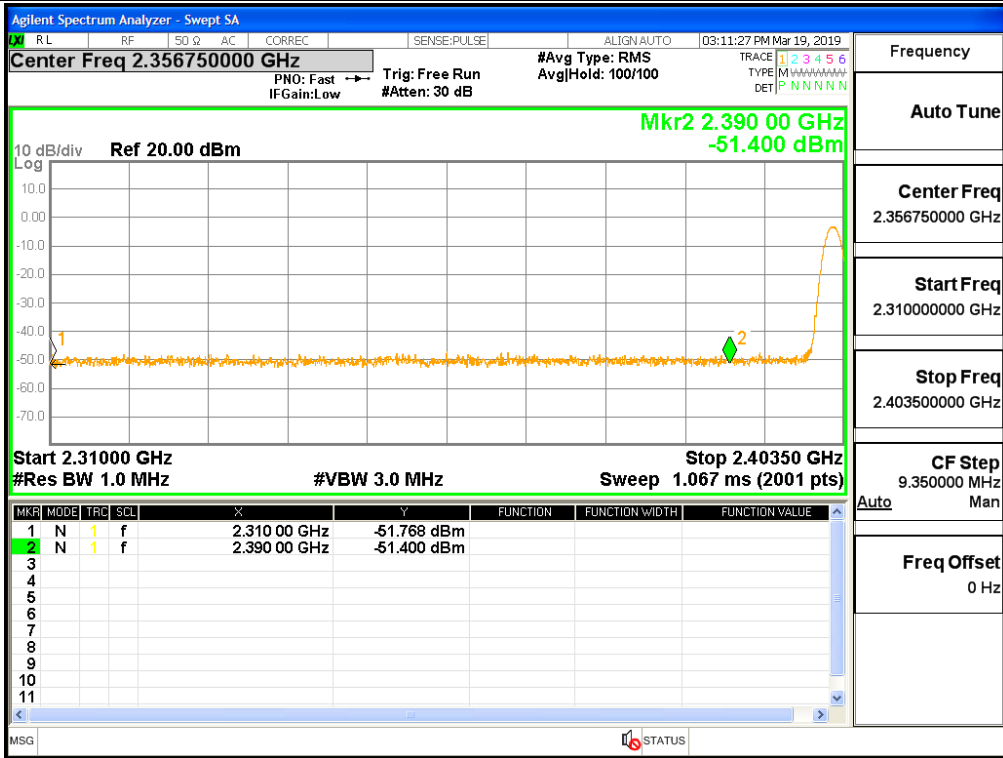
Restrict-band band-edge measurements\_2480\_PEAK\_DH5



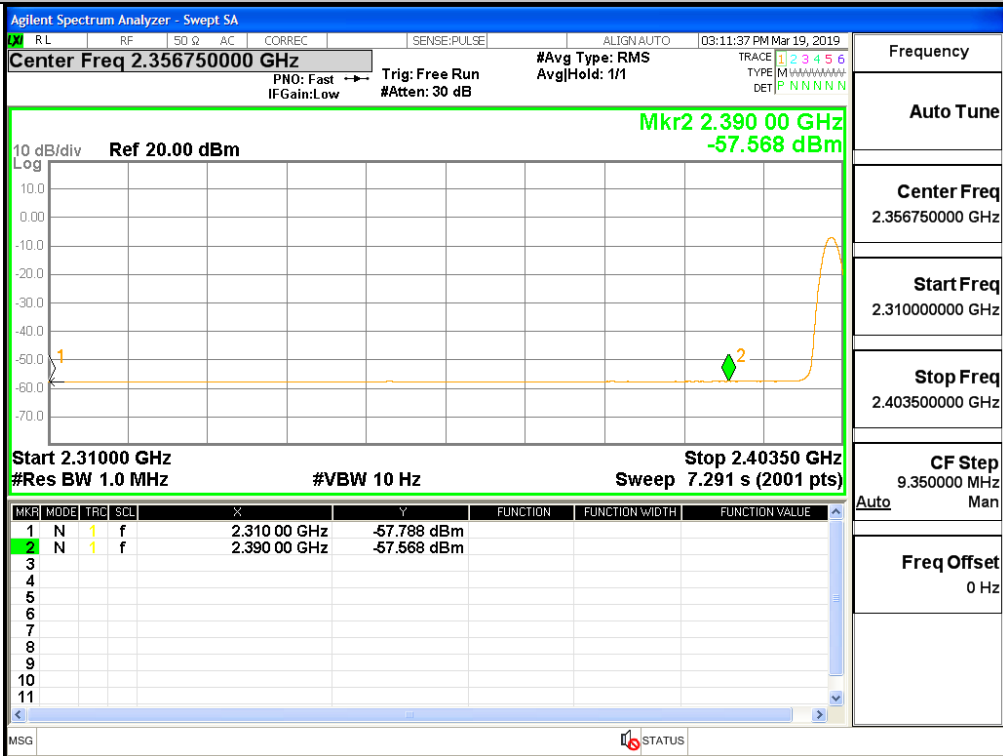
Restrict-band band-edge measurements\_2480\_AV\_DH5



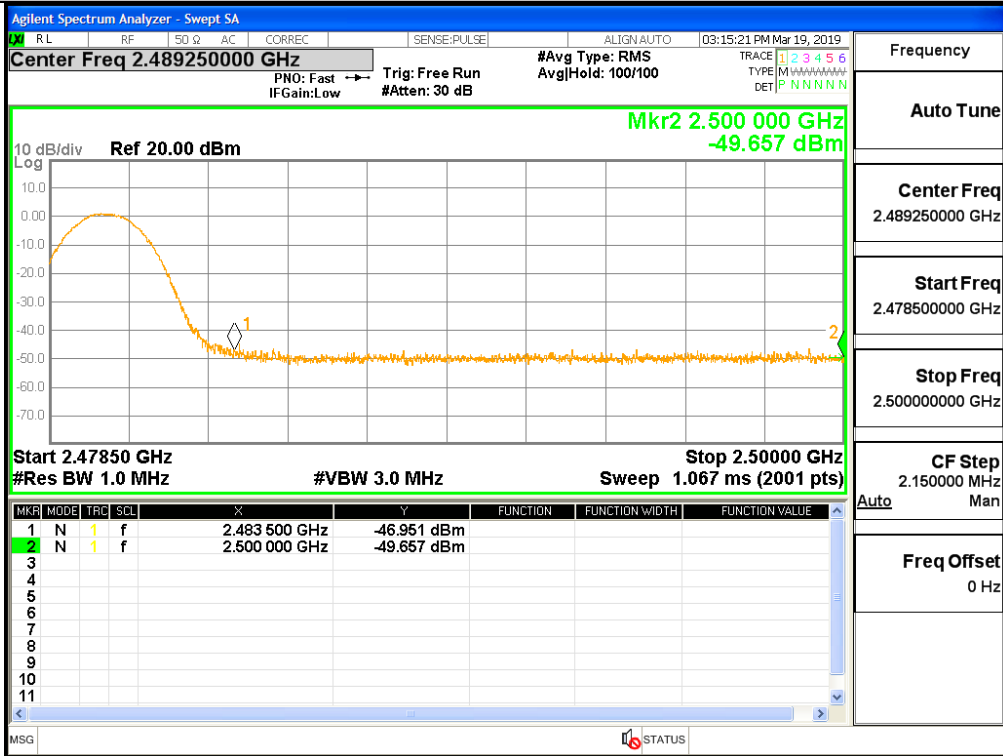
Restrict-band band-edge measurements\_2402\_PEAK\_2DH5



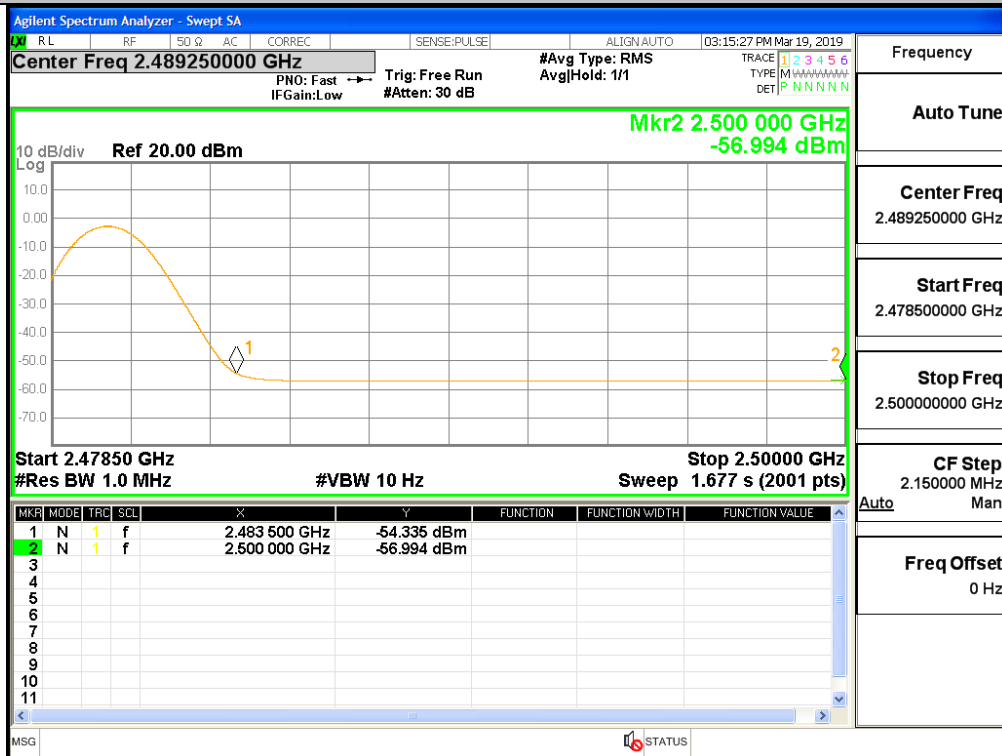
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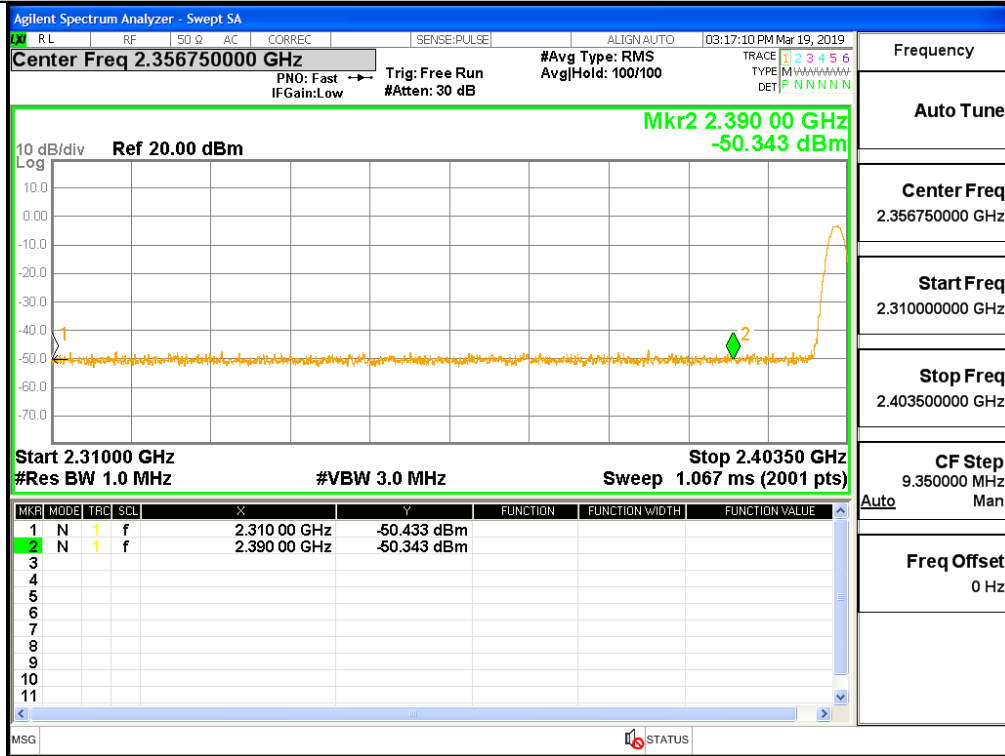
Restrict-band band-edge measurements\_2480\_PEAK\_2DH5



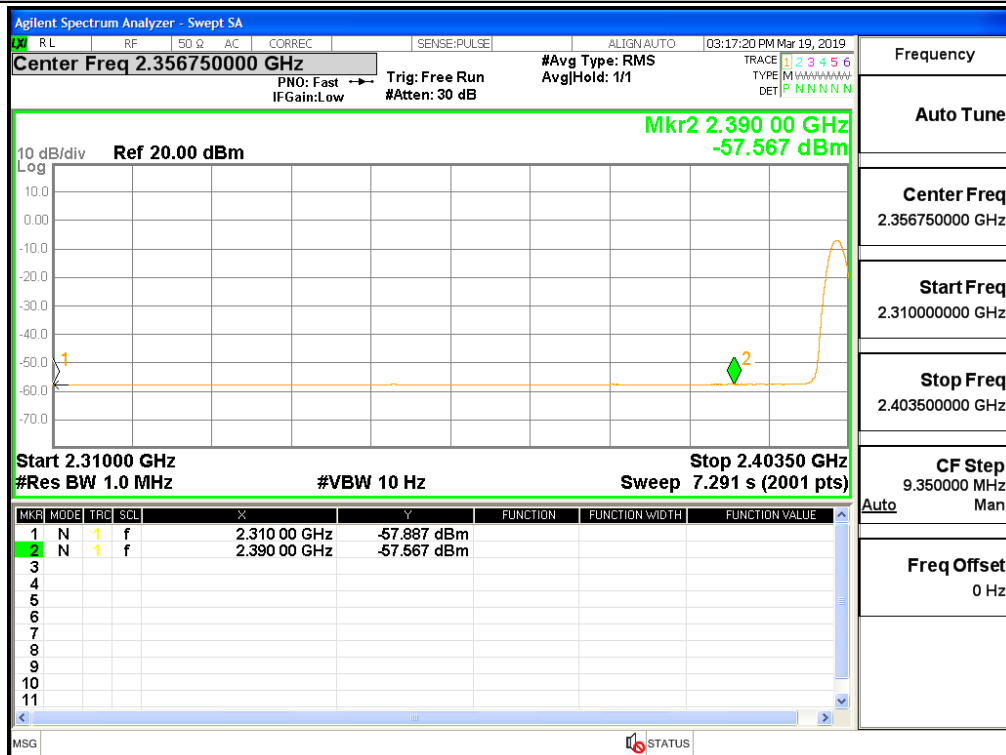
Restrict-band band-edge measurements\_2480\_AV\_2DH5



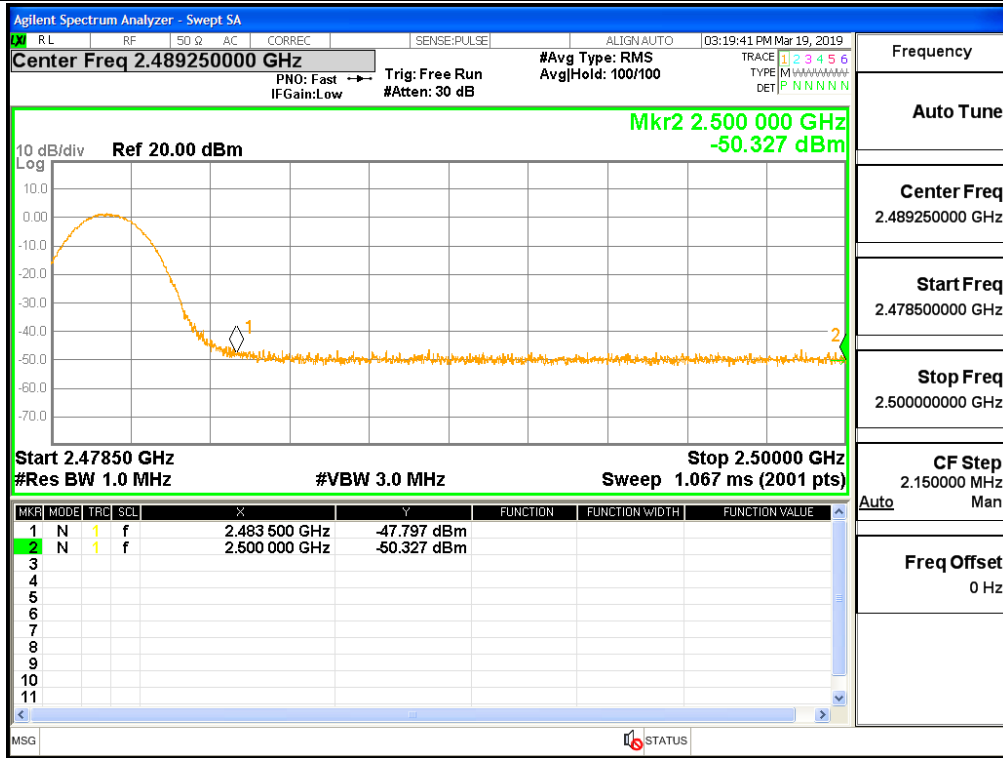
Restrict-band band-edge measurements\_2402\_PEAK\_3DH5



Restrict-band band-edge measurements\_2402\_AV\_3DH5



Restrict-band band-edge measurements\_2480\_PEAK\_3DH5



Restrict-band band-edge measurements\_2480\_AV\_3DH5

