

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

Product Name: Bluetooth Earphones

Trade Mark: Altec Lansing

Test Model: MZW101

FCC ID: 2AL9B-MZW101

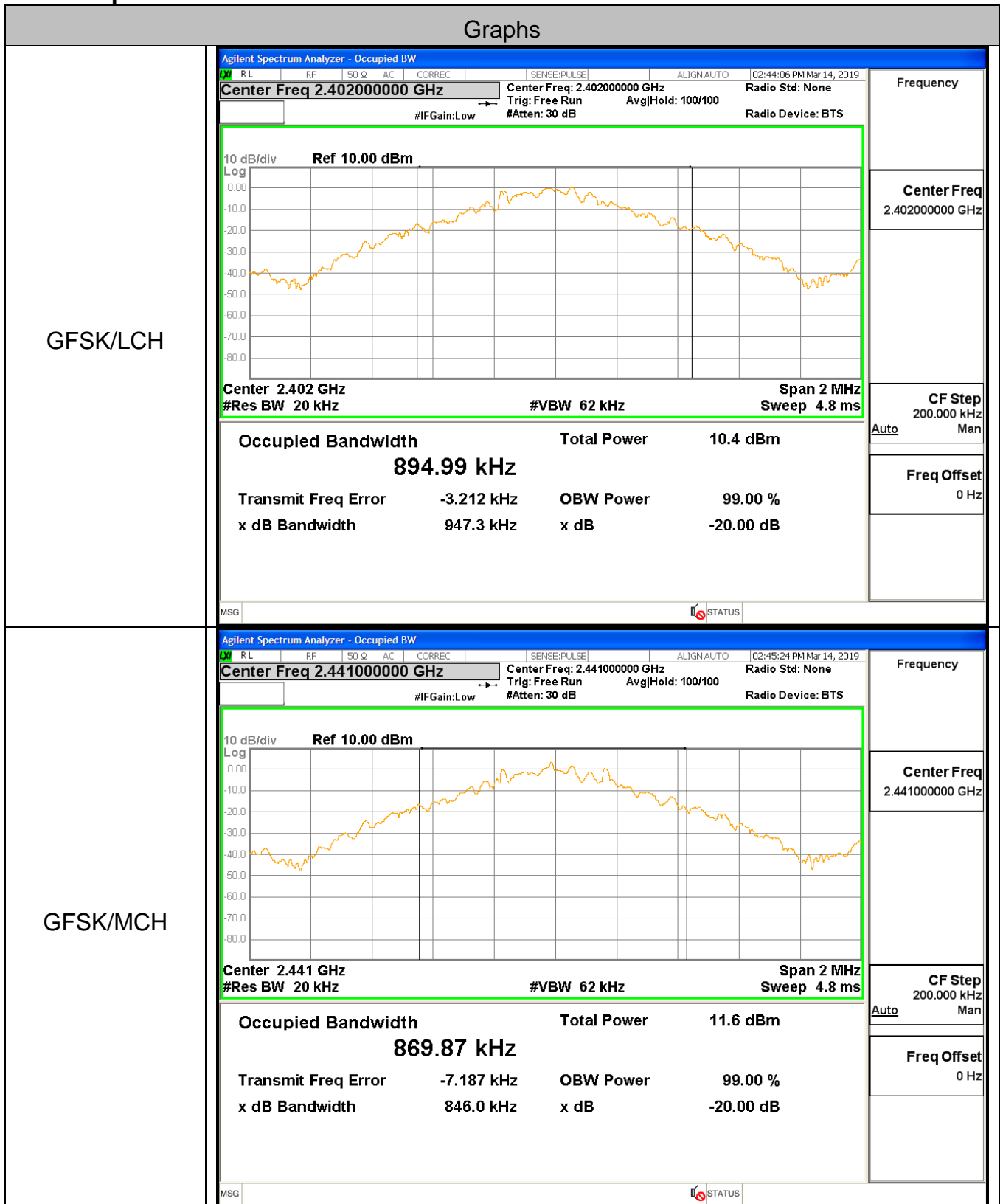
Environmental Conditions

Temperature:	23.2 °C
Relative Humidity:	55%
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	0.947	Not Specified	PASS
GFSK	MCH	0.846	Not Specified	PASS
GFSK	HCH	0.800	Not Specified	PASS
$\pi/4$ DQPSK	LCH	1.201	Not Specified	PASS
$\pi/4$ DQPSK	MCH	1.200	Not Specified	PASS
$\pi/4$ DQPSK	HCH	1.204	Not Specified	PASS

Test Graph



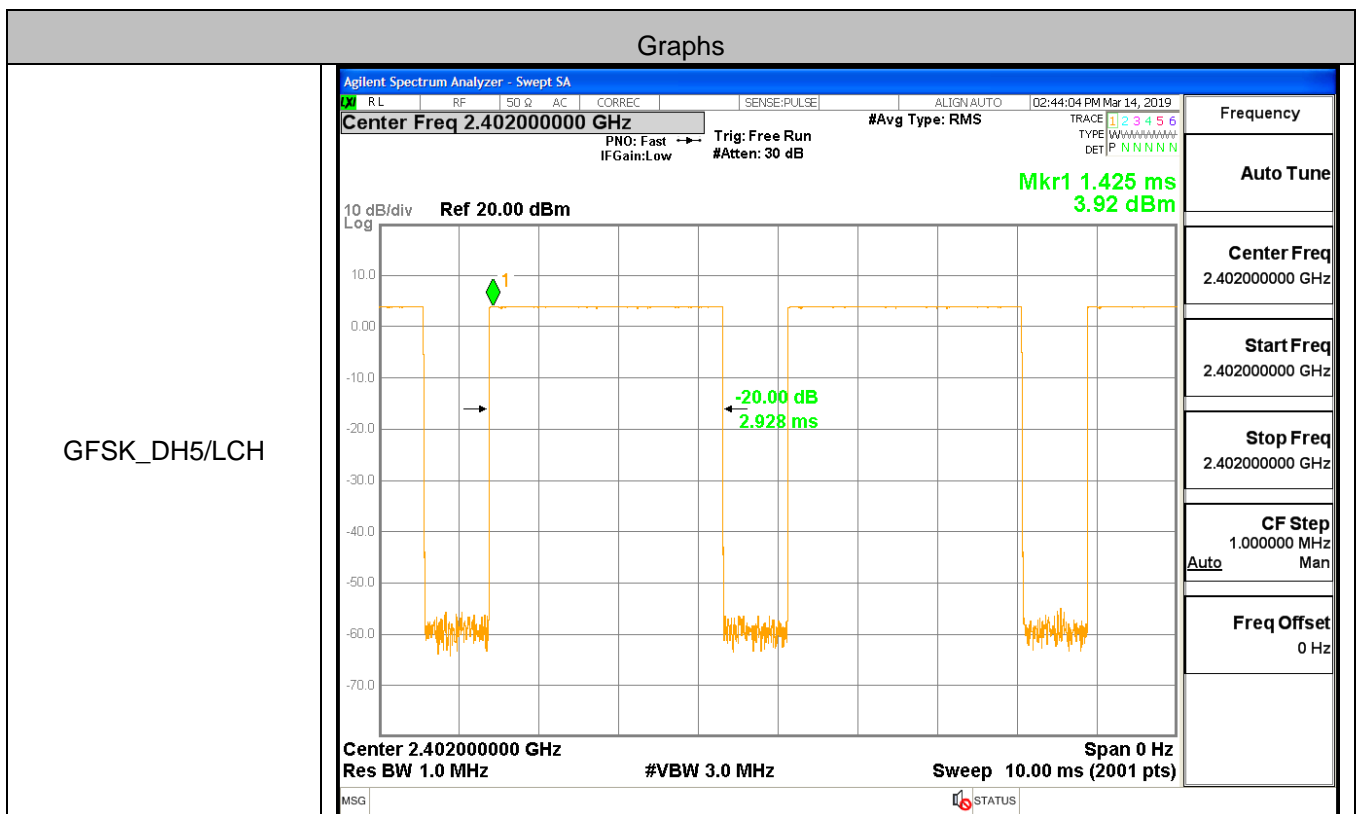
<p>GFSK/HCH</p>	<div> <div>Agilent Spectrum Analyzer - Occupied BW</div> <div> <div> <div> <div> <div>RL</div> <div>RF</div> <div>50 Ω</div> <div>AC</div> <div>CORREC</div> </div> <div> <div>SENSE:PULSE</div> <div>ALIGN: AUTO</div> <div>02:46:27 PM Mar 14, 2019</div> </div> </div> <div> <div>Center Freq 2.480000000 GHz</div> <div> <div>Center Freq: 2.480000000 GHz</div> <div>Trig: Free Run</div> <div>Avg/Hold: 100/100</div> </div> <div>Radio Std: None</div> </div> <div> <div>#IFGain: Low</div> <div>#Atten: 30 dB</div> <div>Radio Device: BTS</div> </div> </div> <div> <div>10 dB/div</div> <div>Ref 10.00 dBm</div> </div> <div> <div>Center 2.48 GHz</div> <div>#Res BW 20 kHz</div> <div>#VBW 62 kHz</div> <div>Span 2 MHz</div> <div>Sweep 4.8 ms</div> </div> <div> <div>Occupied Bandwidth</div> <div>870.65 kHz</div> <div>Total Power</div> <div>12.1 dBm</div> </div> <div> <div>Transmit Freq Error</div> <div>-4.398 kHz</div> <div>OBW Power</div> <div>99.00 %</div> </div> <div> <div>x dB Bandwidth</div> <div>800.2 kHz</div> <div>x dB</div> <div>-20.00 dB</div> </div> </div> <div> <div>MSG</div> <div>STATUS</div> </div> </div>
<p>$\pi/4$DQPSK/LCH</p>	<div> <div>Agilent Spectrum Analyzer - Occupied BW</div> <div> <div> <div> <div>RL</div> <div>RF</div> <div>50 Ω</div> <div>AC</div> <div>CORREC</div> </div> <div> <div>SENSE:PULSE</div> <div>ALIGN: AUTO</div> <div>02:48:06 PM Mar 14, 2019</div> </div> </div> <div> <div>Center Freq 2.402000000 GHz</div> <div> <div>Center Freq: 2.402000000 GHz</div> <div>Trig: Free Run</div> <div>Avg/Hold: 100/100</div> </div> <div>Radio Std: None</div> </div> <div> <div>#IFGain: Low</div> <div>#Atten: 30 dB</div> <div>Radio Device: BTS</div> </div> </div> <div> <div>10 dB/div</div> <div>Ref 10.00 dBm</div> </div> <div> <div>Center 2.402 GHz</div> <div>#Res BW 20 kHz</div> <div>#VBW 62 kHz</div> <div>Span 2 MHz</div> <div>Sweep 4.8 ms</div> </div> <div> <div>Occupied Bandwidth</div> <div>1.1828 MHz</div> <div>Total Power</div> <div>9.59 dBm</div> </div> <div> <div>Transmit Freq Error</div> <div>-1.429 kHz</div> <div>OBW Power</div> <div>99.00 %</div> </div> <div> <div>x dB Bandwidth</div> <div>1.201 MHz</div> <div>x dB</div> <div>-20.00 dB</div> </div> </div> <div> <div>MSG</div> <div>STATUS</div> </div>

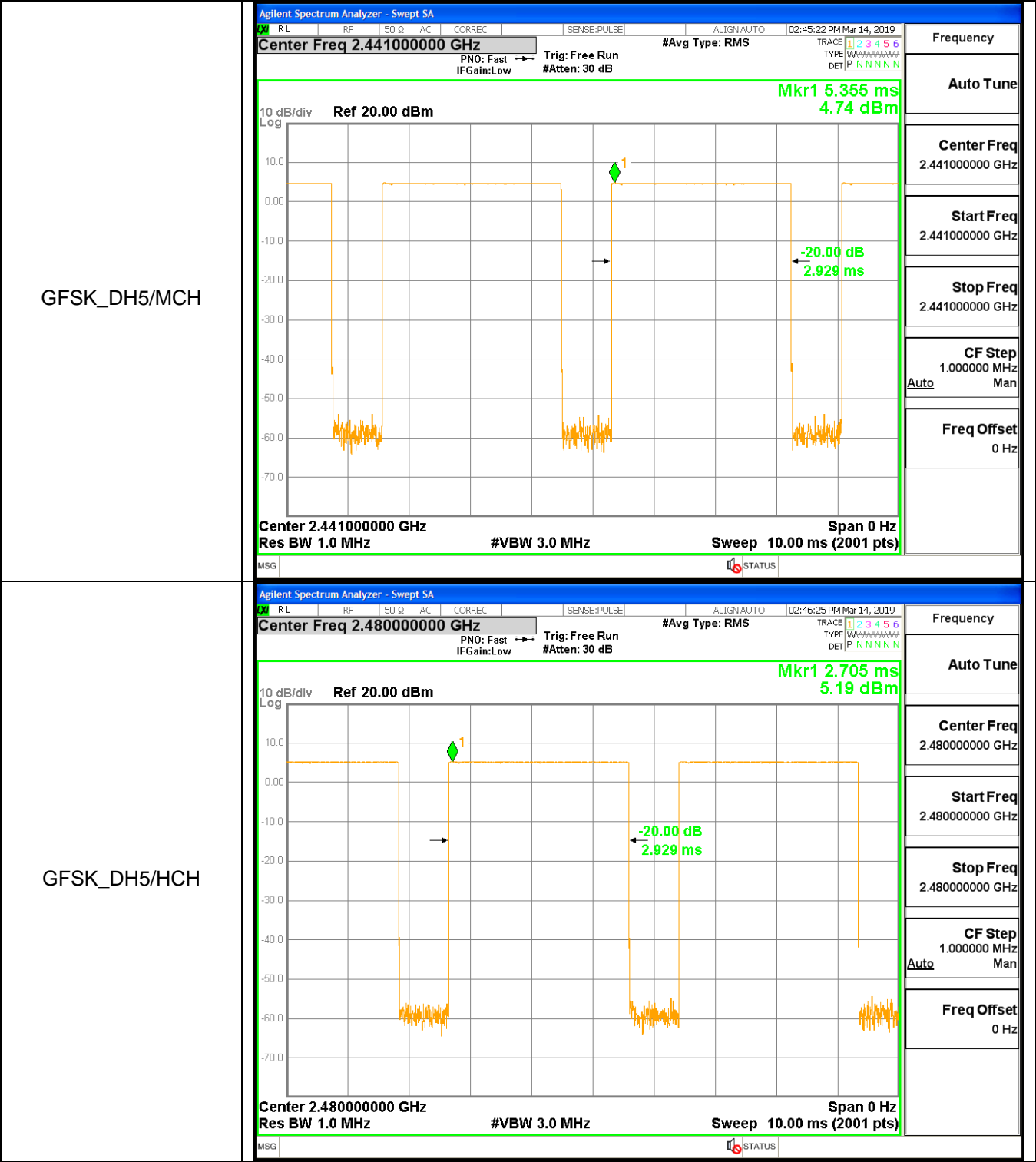
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<div>π/4DQPSK/HCH</div>	<div><div>Agilent Spectrum Analyzer - Occupied BW</div><div><div><div><div>RL</div><div>RF</div><div>50 Ω</div><div>AC</div><div>CORREC</div></div><div><div>SENSE:PULSE</div><div>ALIGN:AUTO</div><div>02:51:07 PM Mar 14, 2019</div></div></div><div><div>Center Freq 2.480000000 GHz</div><div>Center Freq: 2.480000000 GHz</div><div>Trig: Free Run</div><div>Avg/Hold: 100/100</div><div>Radio Std: None</div></div><div><div>#IFGain:Low</div><div>#Atten: 30 dB</div><div>Radio Device: BTS</div></div></div><div><div>10 dB/div</div><div>Ref 10.00 dBm</div><div></div><div><div>Center 2.48 GHz</div><div>#Res BW 20 kHz</div><div>#VBW 62 kHz</div><div>Span 2 MHz</div><div>Sweep 4.8 ms</div></div><div><div>Occupied Bandwidth</div><div>1.1947 MHz</div><div>Total Power</div><div>11.0 dBm</div><div>Transmit Freq Error</div><div>-351 Hz</div><div>OBW Power</div><div>99.00 %</div><div>x dB Bandwidth</div><div>1.204 MHz</div><div>x dB</div><div>-20.00 dB</div></div><div><div>MSG</div><div> STATUS</div></div></div><div><div>Frequency</div><div>Center Freq</div><div>2.480000000 GHz</div><div>CF Step</div><div>200.000 kHz</div><div>Man</div><div>Auto</div><div>Freq Offset</div><div>0 Hz</div></div></div>

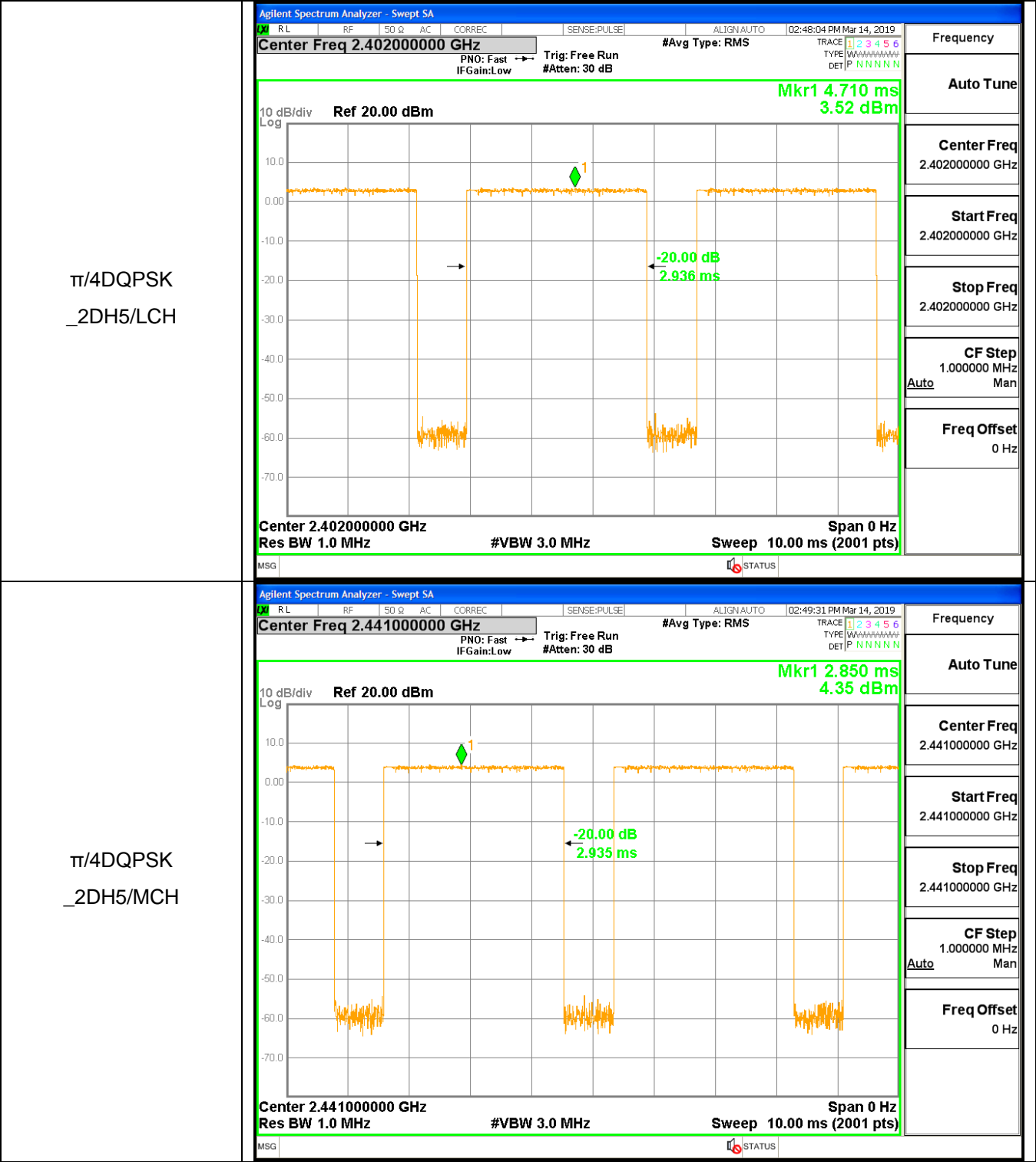
A.2 Dwell Time

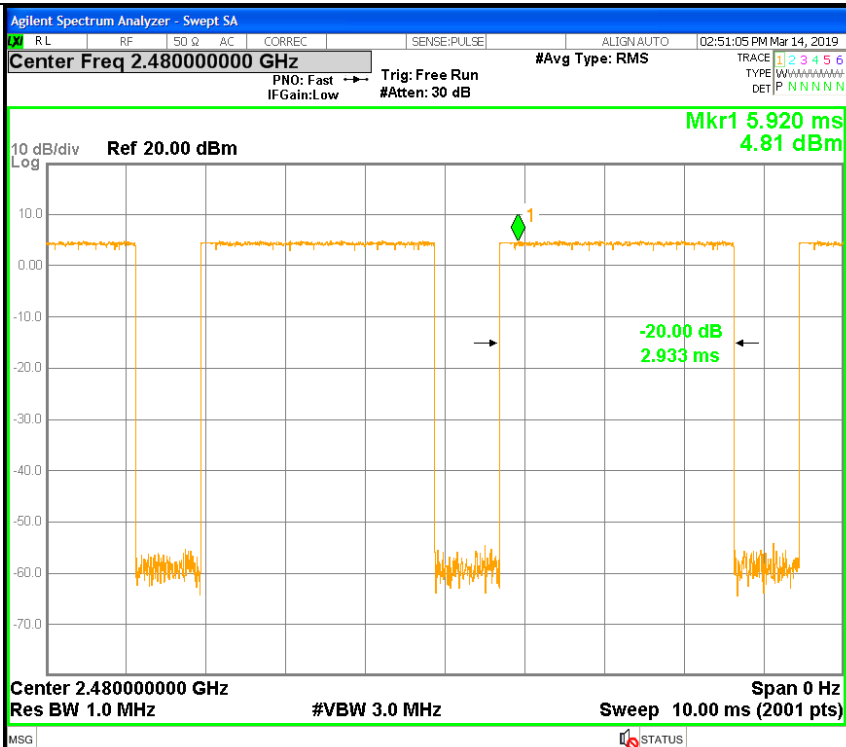
Mode	Packet	Channel	Burst Width [s/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	0.002928	106.7	0.31242	0.4	PASS
GFSK	DH5	MCH	0.002929	106.7	0.312472	0.4	PASS
GFSK	DH5	HCH	0.002929	106.7	0.312493	0.4	PASS
$\pi/4$ DQPSK	2DH5	LCH	0.002936	106.7	0.313274	0.4	PASS
$\pi/4$ DQPSK	2DH5	MCH	0.002935	106.7	0.31312	0.4	PASS
$\pi/4$ DQPSK	2DH5	HCH	0.002933	106.7	0.31295	0.4	PASS

Test Graph





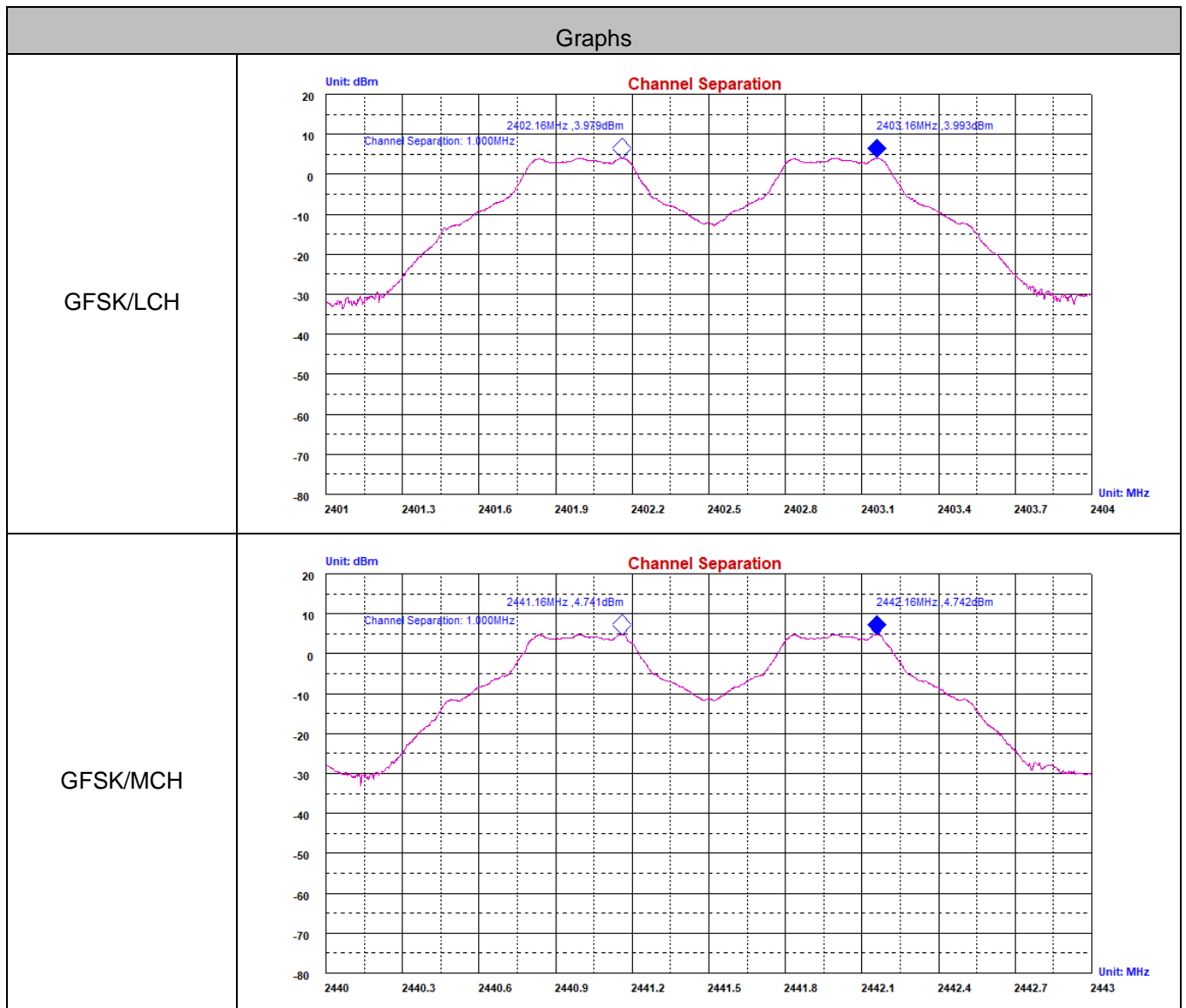


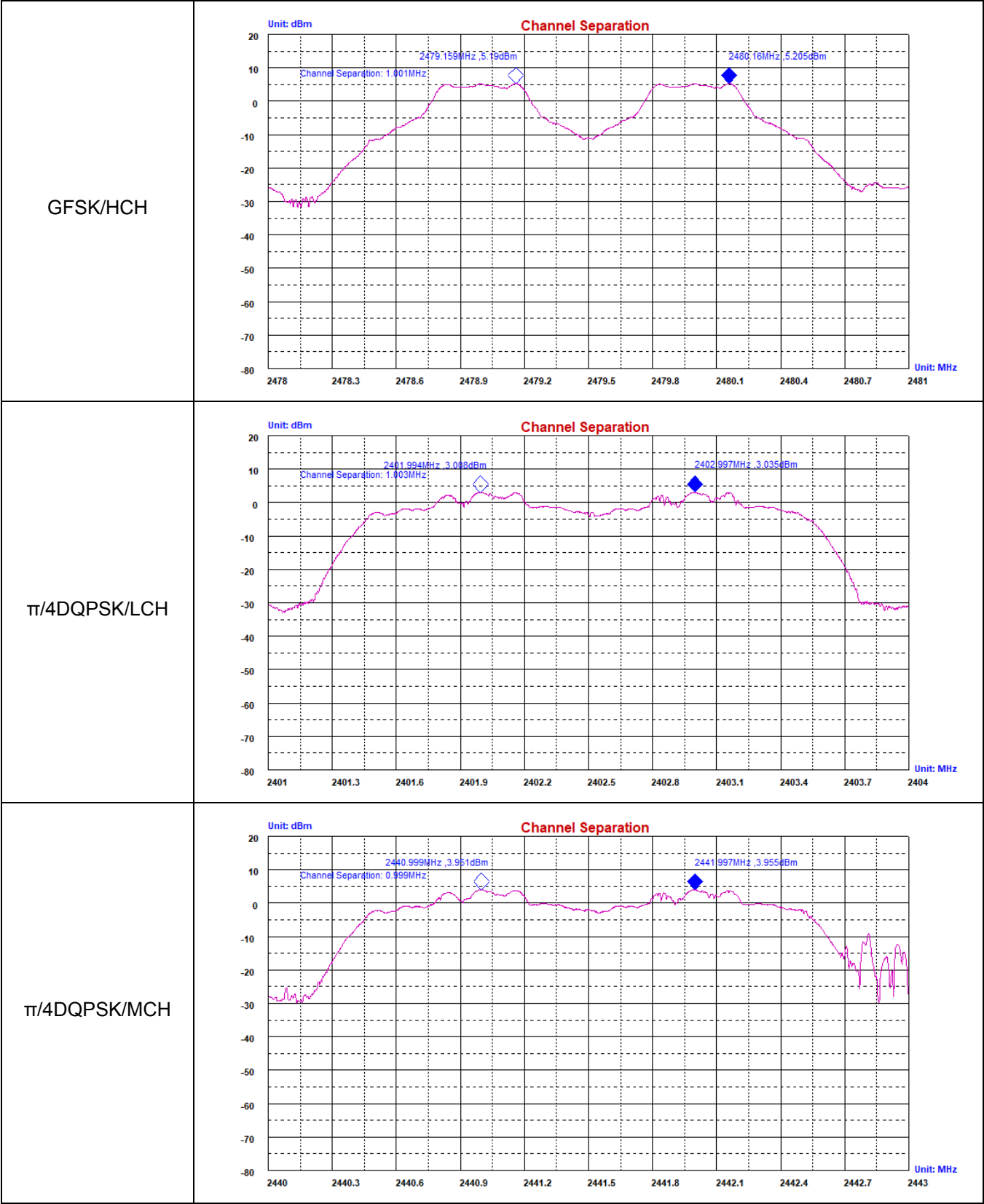


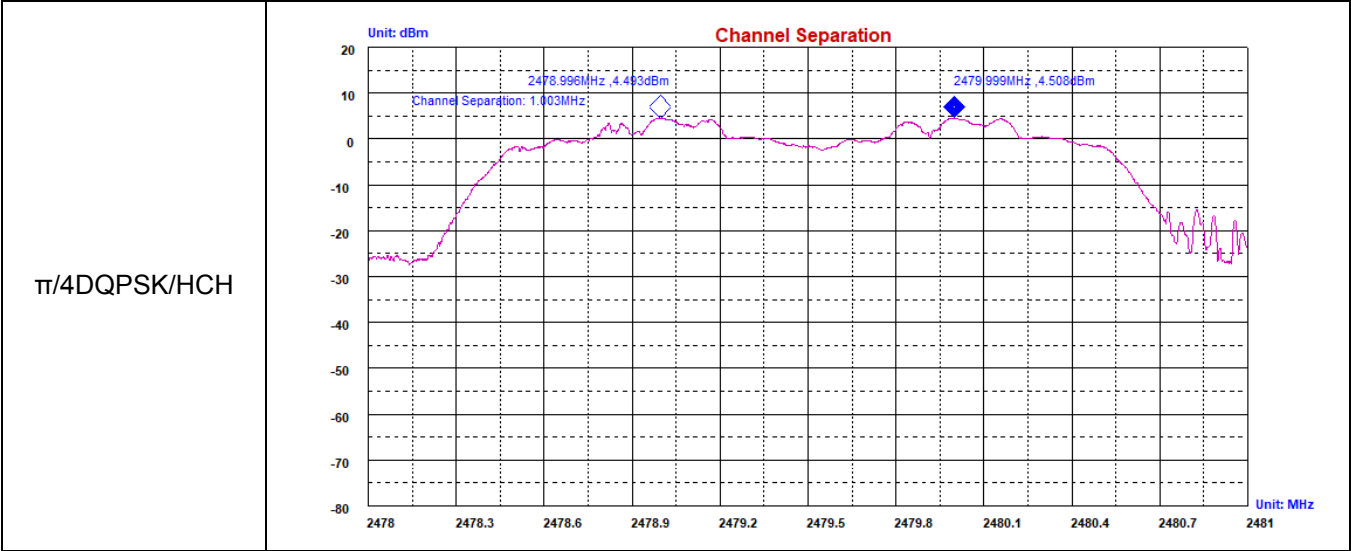
A.3 Carrier Frequency Separation

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.000	0.631	PASS
GFSK	MCH	1.000	0.564	PASS
GFSK	HCH	1.001	0.533	PASS
$\pi/4$ DQPSK	LCH	1.003	0.801	PASS
$\pi/4$ DQPSK	MCH	0.999	0.800	PASS
$\pi/4$ DQPSK	HCH	1.003	0.803	PASS

Test Graph



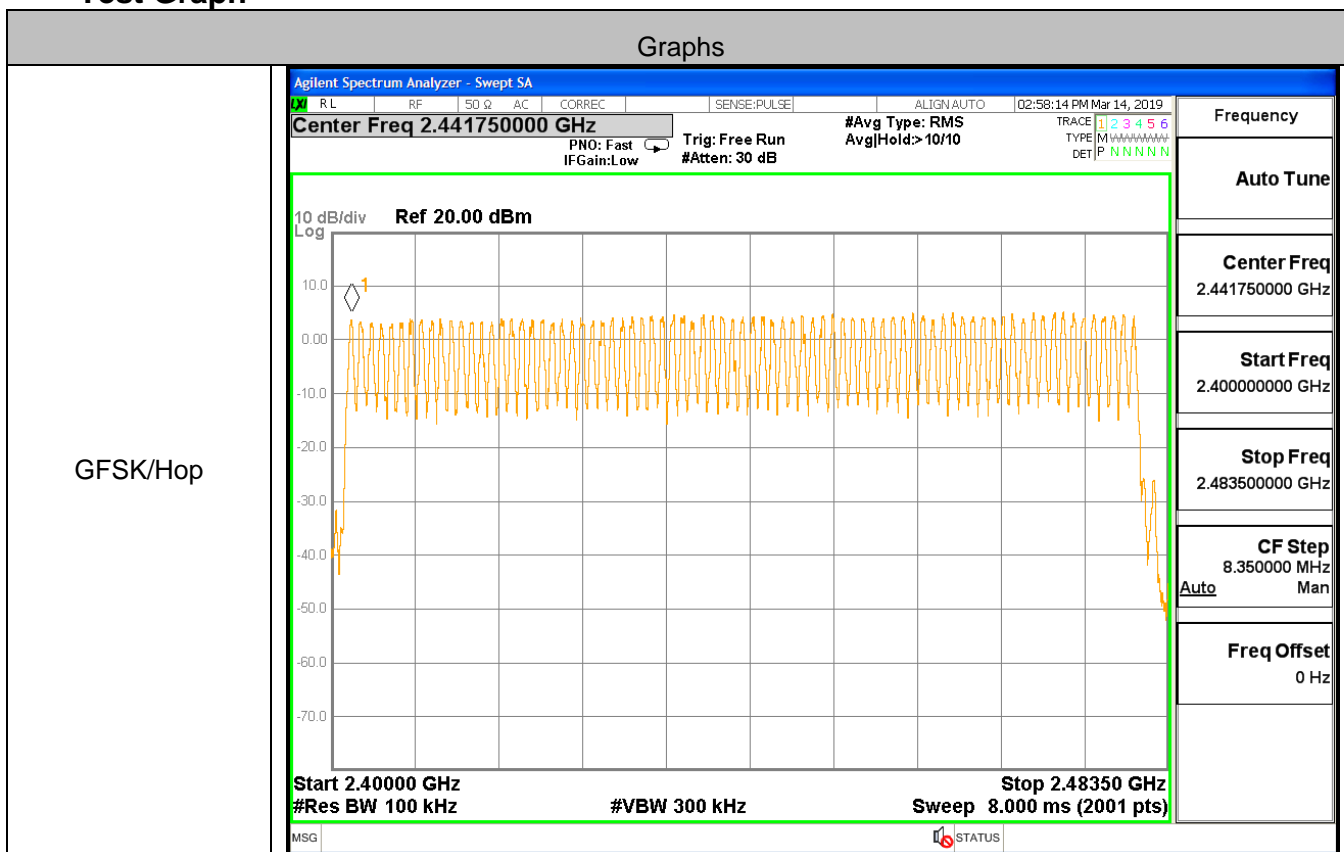




A.4 Hopping Channel Number

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

Test Graph

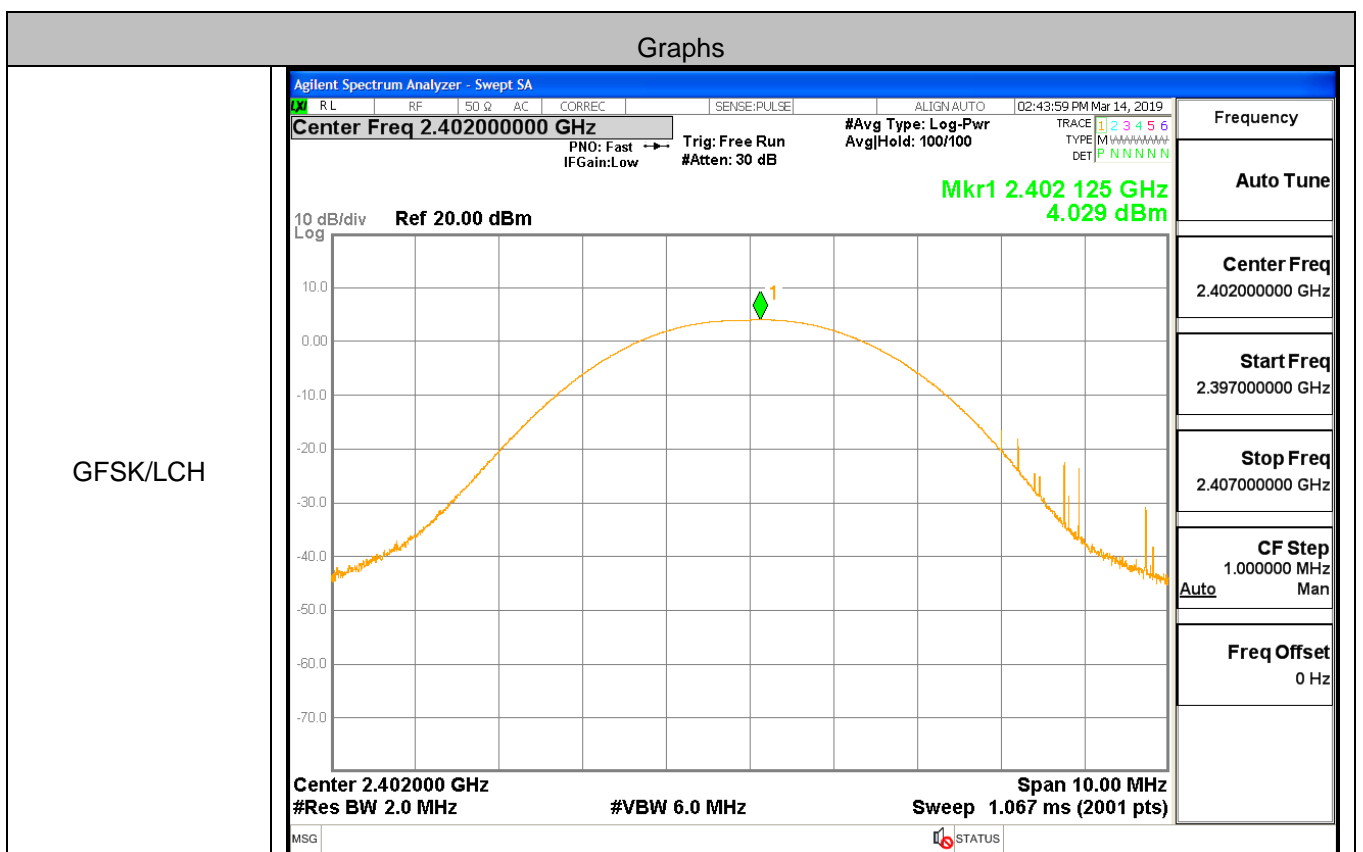


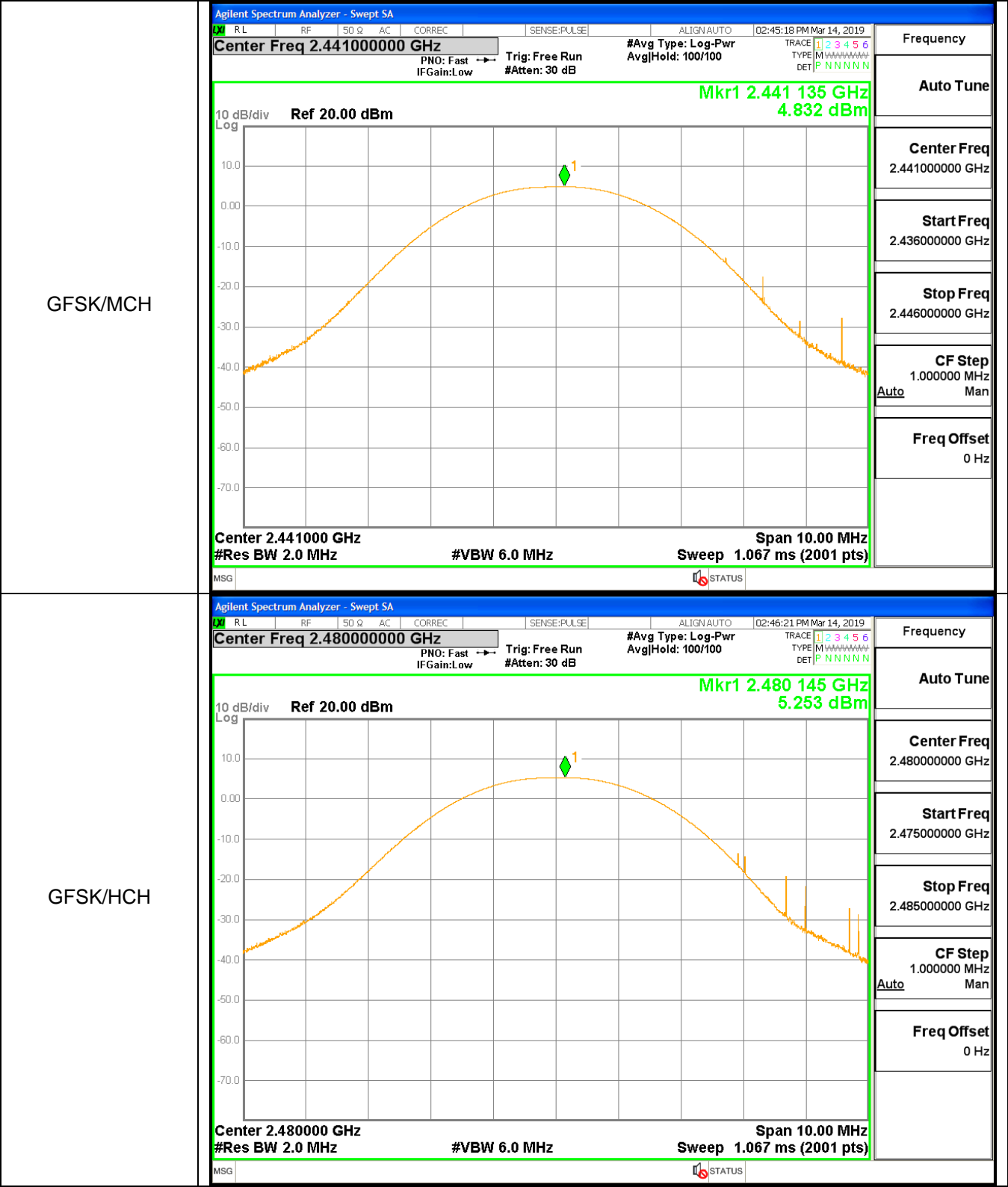


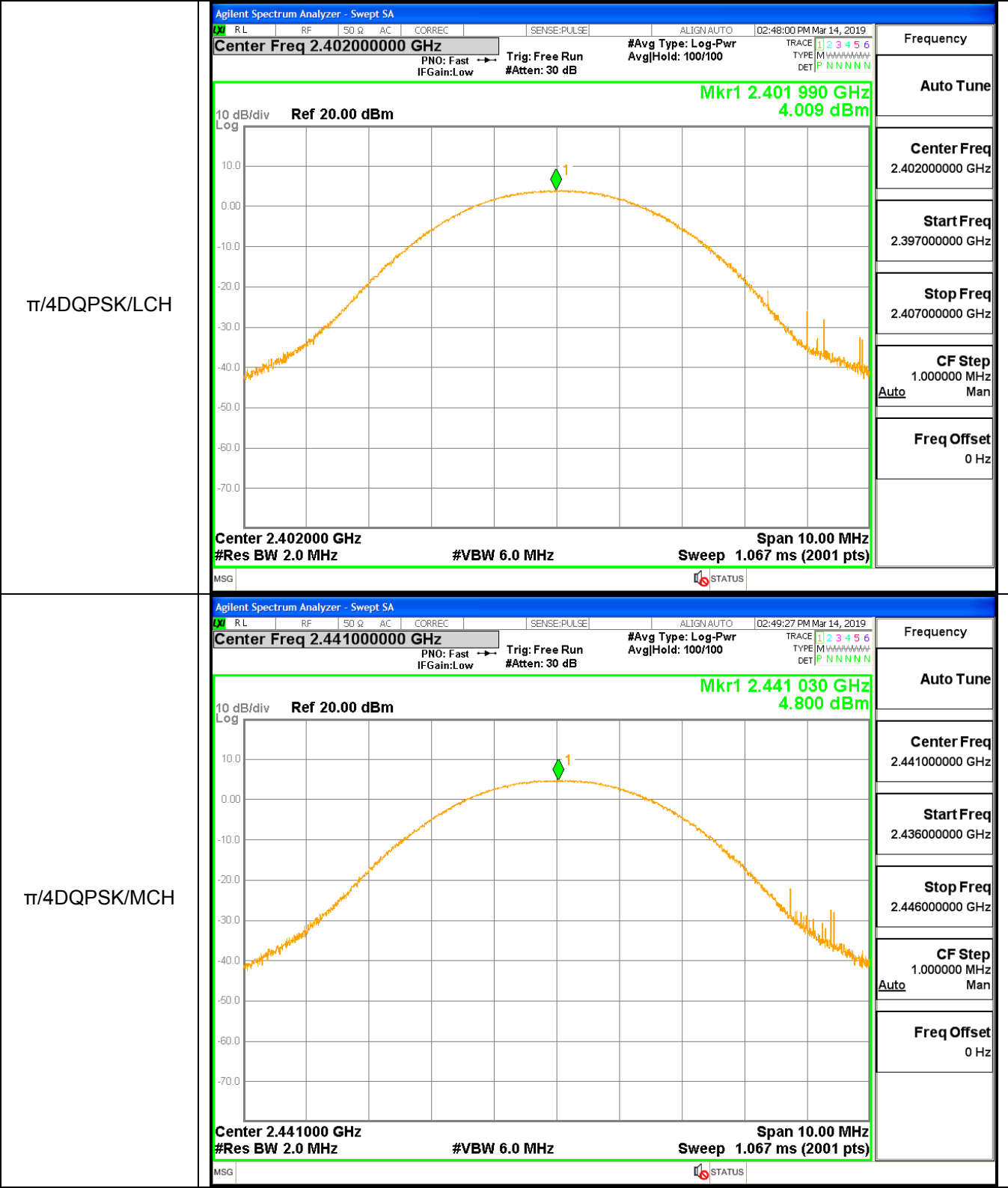
A.5 Conducted Peak Output Power

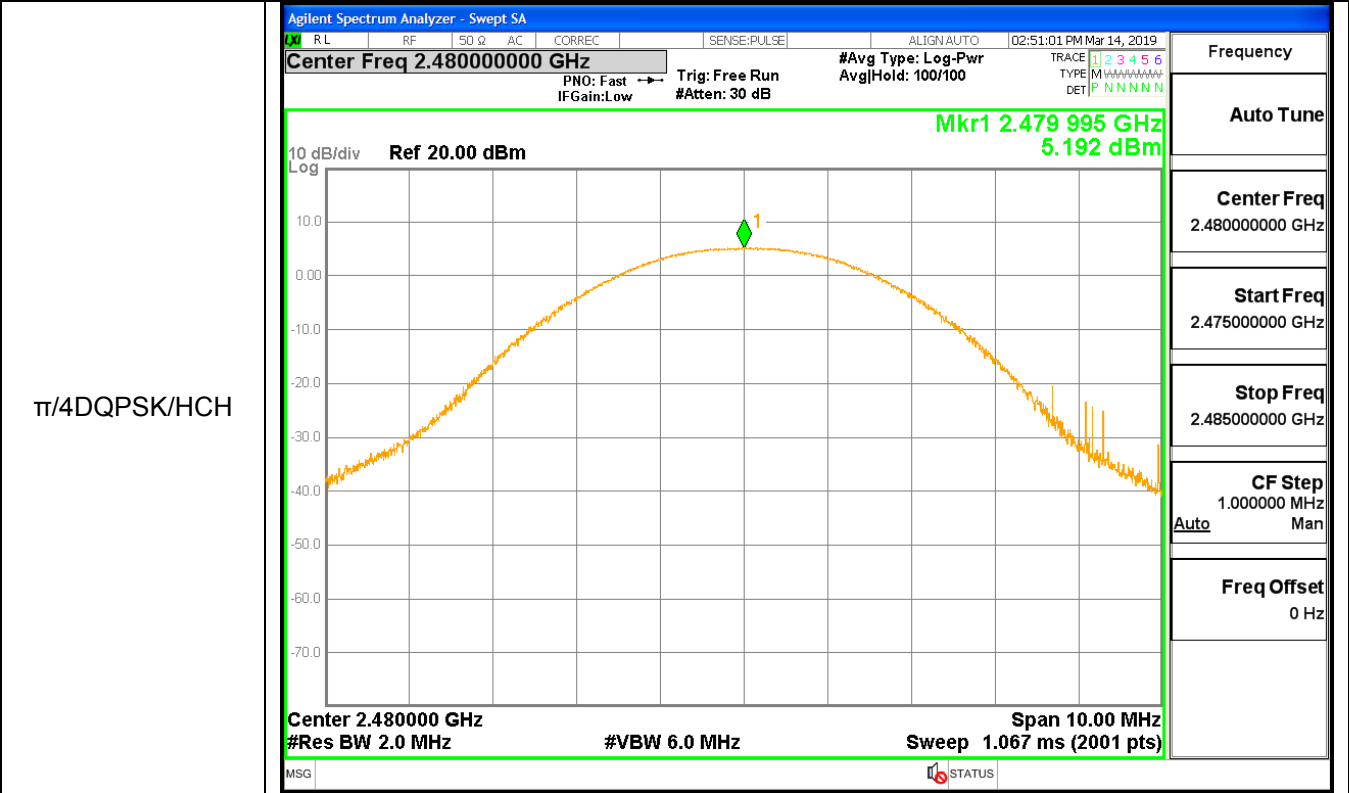
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.029	21	PASS
GFSK	MCH	4.832	21	PASS
GFSK	HCH	5.253	21	PASS
$\pi/4$ DQPSK	LCH	4.009	21	PASS
$\pi/4$ DQPSK	MCH	4.800	21	PASS
$\pi/4$ DQPSK	HCH	5.192	21	PASS

Test Graph





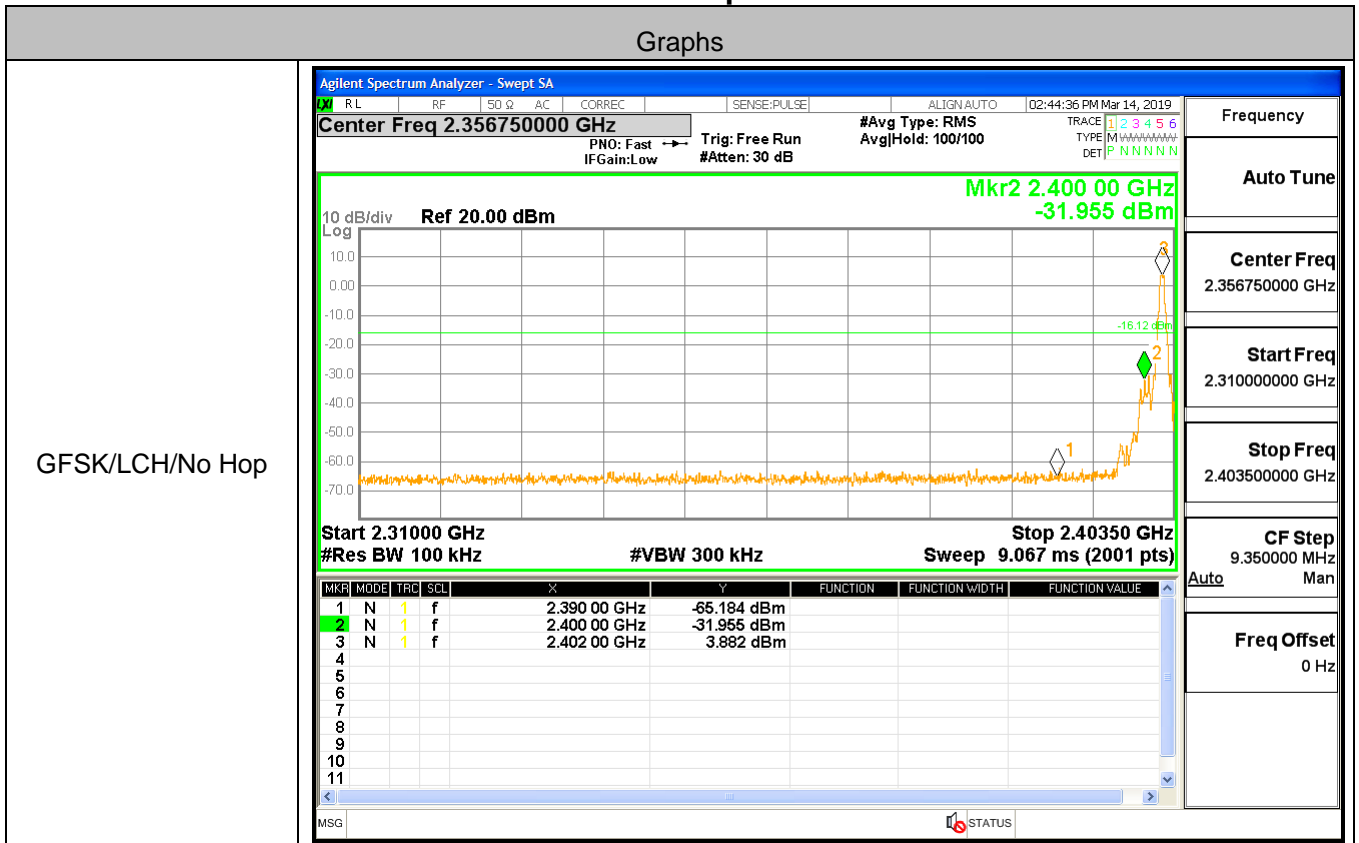


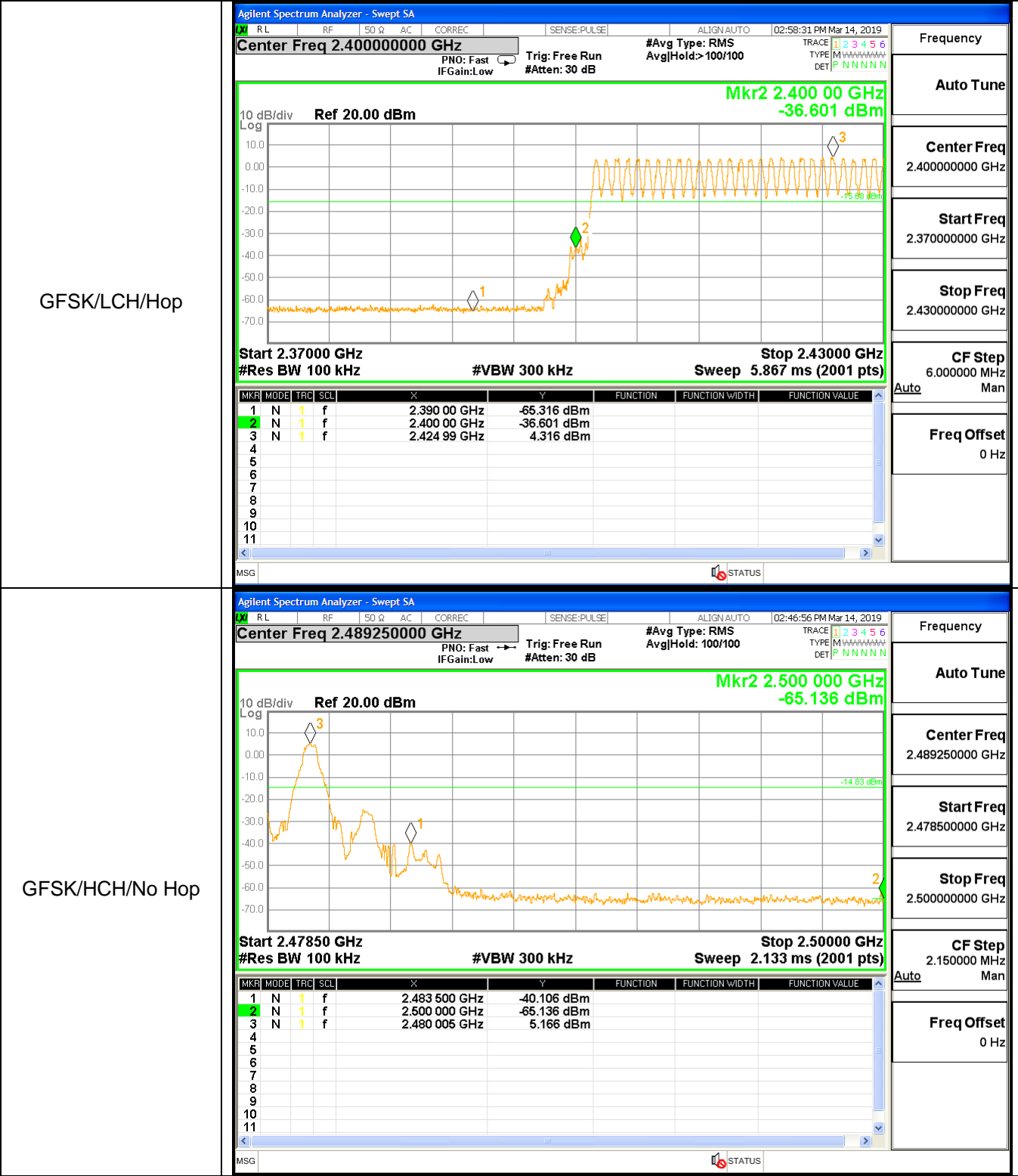


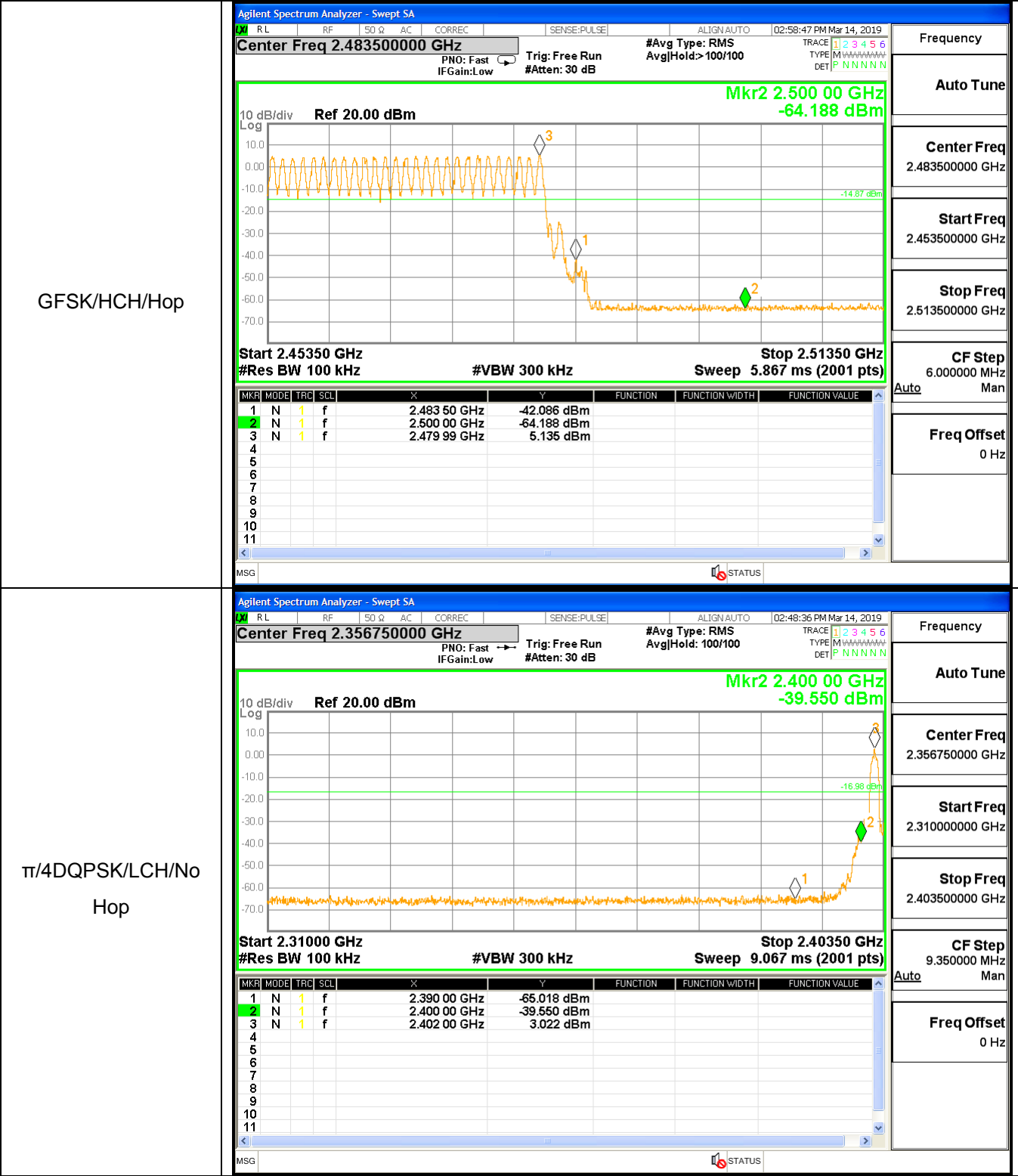
A.6 Band-edge for RF Conducted Emissions

Type	Carrier Frequency(MHz)	Frequency(MHz)	Carrier Frequency Power [dBm]	Bandedge Peak(dBm)	Upper limit(dBm)	Conclusion
1DH5	2402	2390	3.88	-65.18	-16.12	Pass
1DH5	2402	2400	3.88	-31.96	-16.12	Pass
1DH5-Hopping	2402	2390	4.32	-65.32	-15.68	Pass
1DH5-Hopping	2402	2400	4.32	-36.60	-15.68	Pass
1DH5	2480	2483.5	5.17	-40.11	-14.83	Pass
1DH5	2480	2500	5.17	-65.14	-14.83	Pass
1DH5-Hopping	2480	2483.5	5.14	-42.09	-14.87	Pass
1DH5-Hopping	2480	2500	5.14	-64.19	-14.87	Pass
2DH5	2402	2390	3.02	-65.02	-16.98	Pass
2DH5	2402	2400	3.02	-39.55	-16.98	Pass
2DH5-Hopping	2402	2390	3.59	-51.15	-15.69	Pass
2DH5-Hopping	2402	2400	3.59	-63.69	-15.69	Pass
2DH5	2480	2483.5	4.51	-42.45	-15.49	Pass
2DH5	2480	2500	4.51	-67.02	-15.49	Pass
2DH5-Hopping	2480	2483.5	4.31	-64.38	-16.42	Pass
2DH5-Hopping	2480	2500	4.31	-30.52	-16.42	Pass

Test Graph

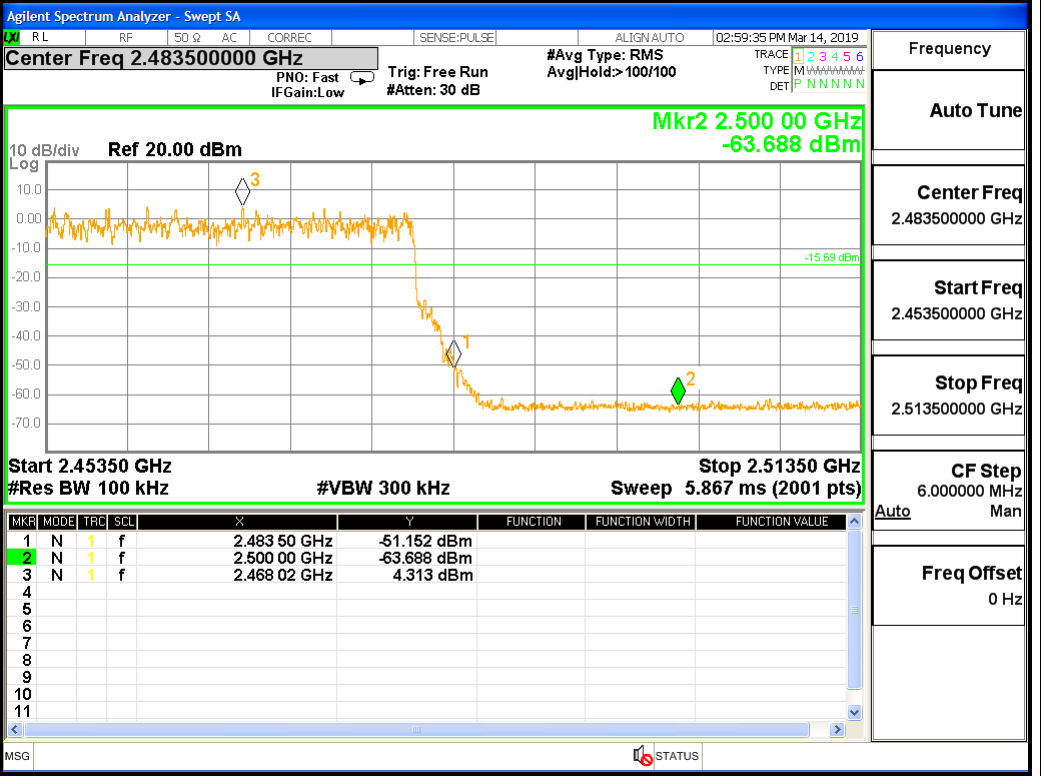






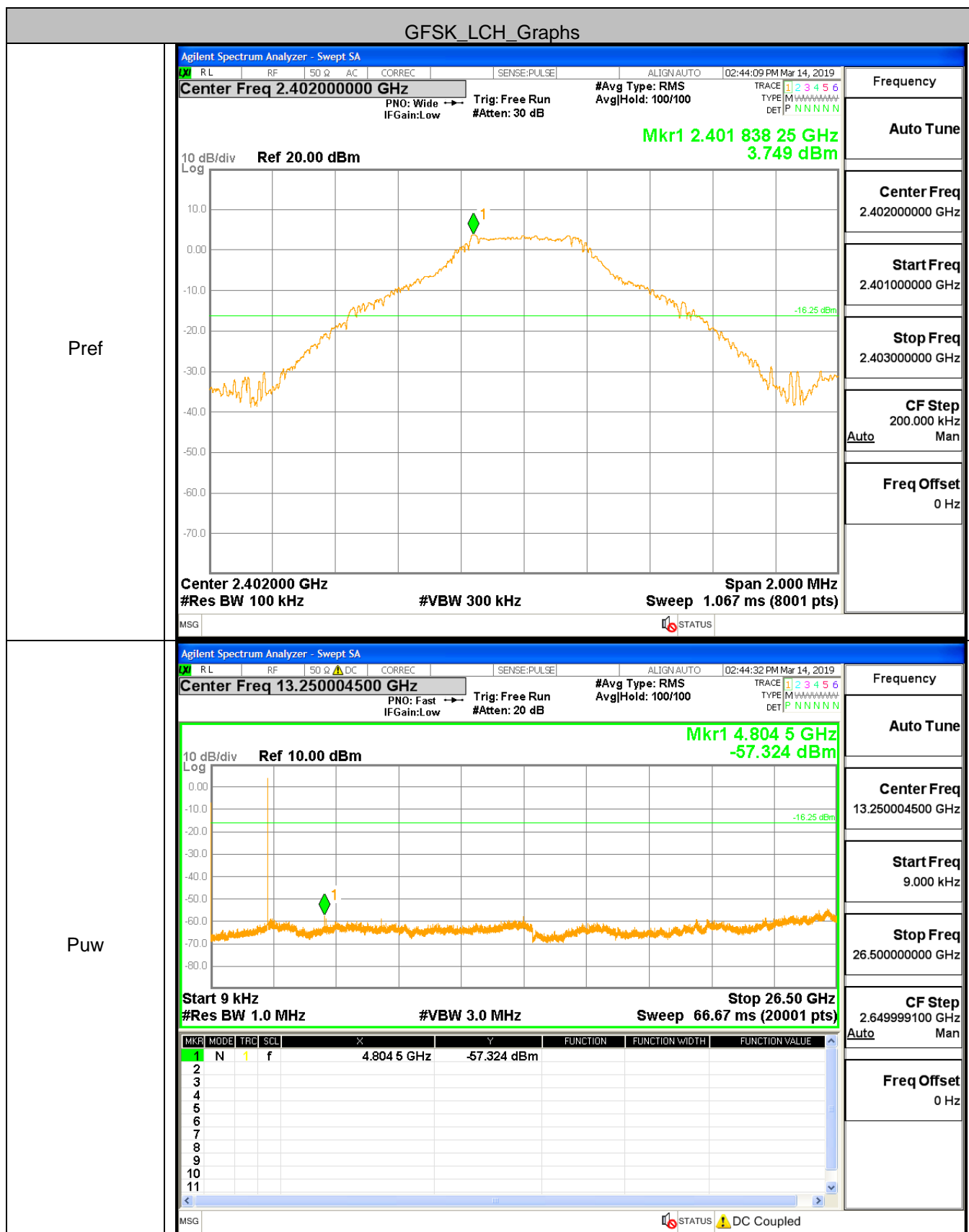
[illegible]

$\pi/4$ DQPSK/HCH/Hop



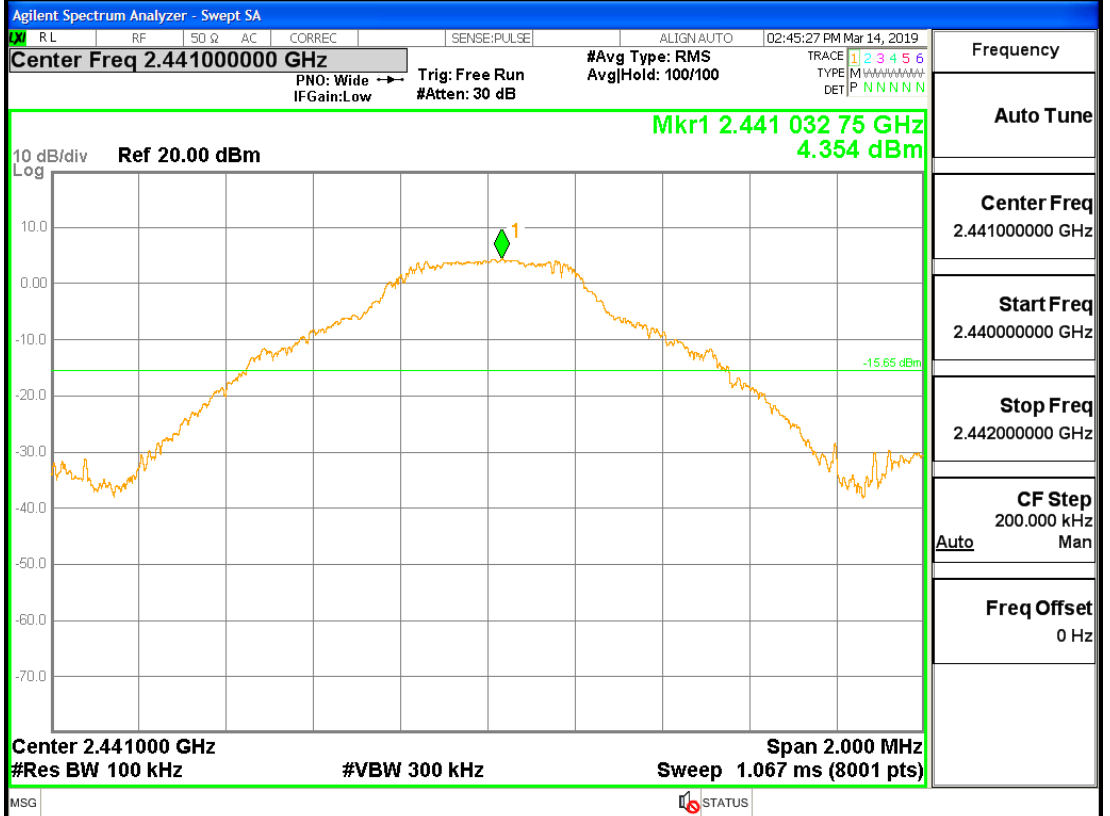
A.7 RF Conducted Spurious Emissions

Test Graph



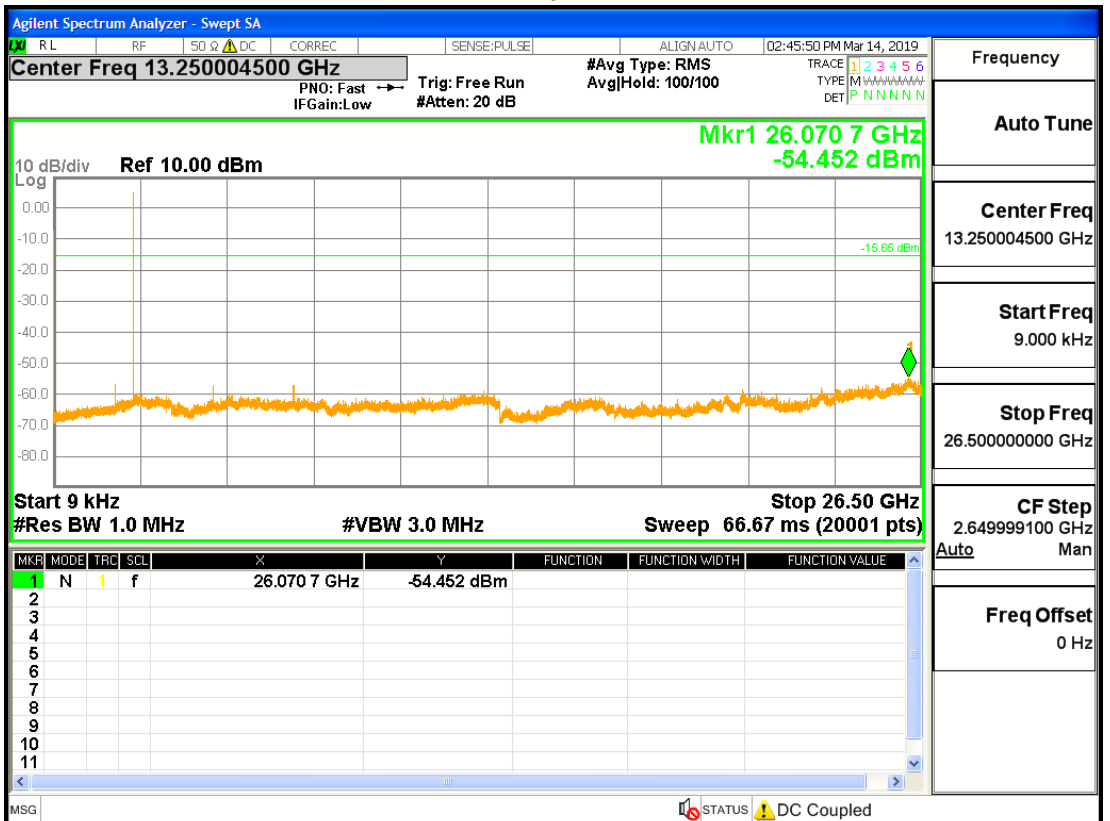
GFSK_MCH_Graphs

Pref



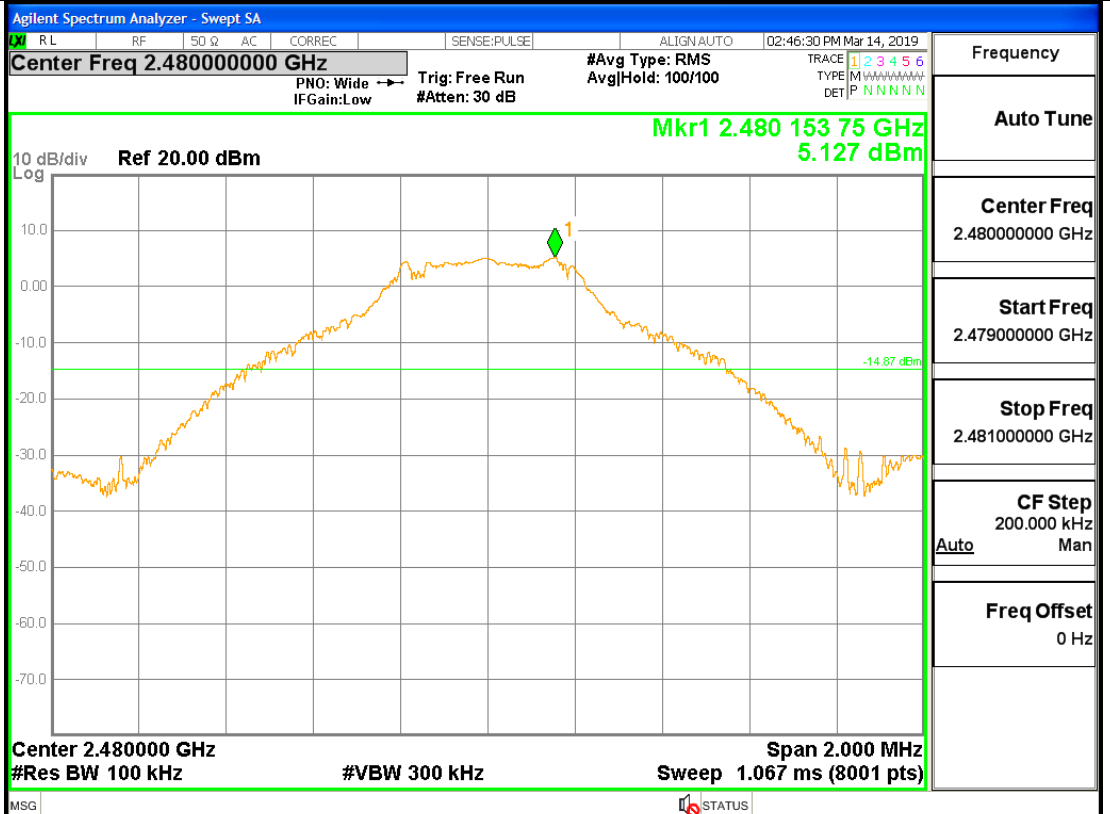
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Puw

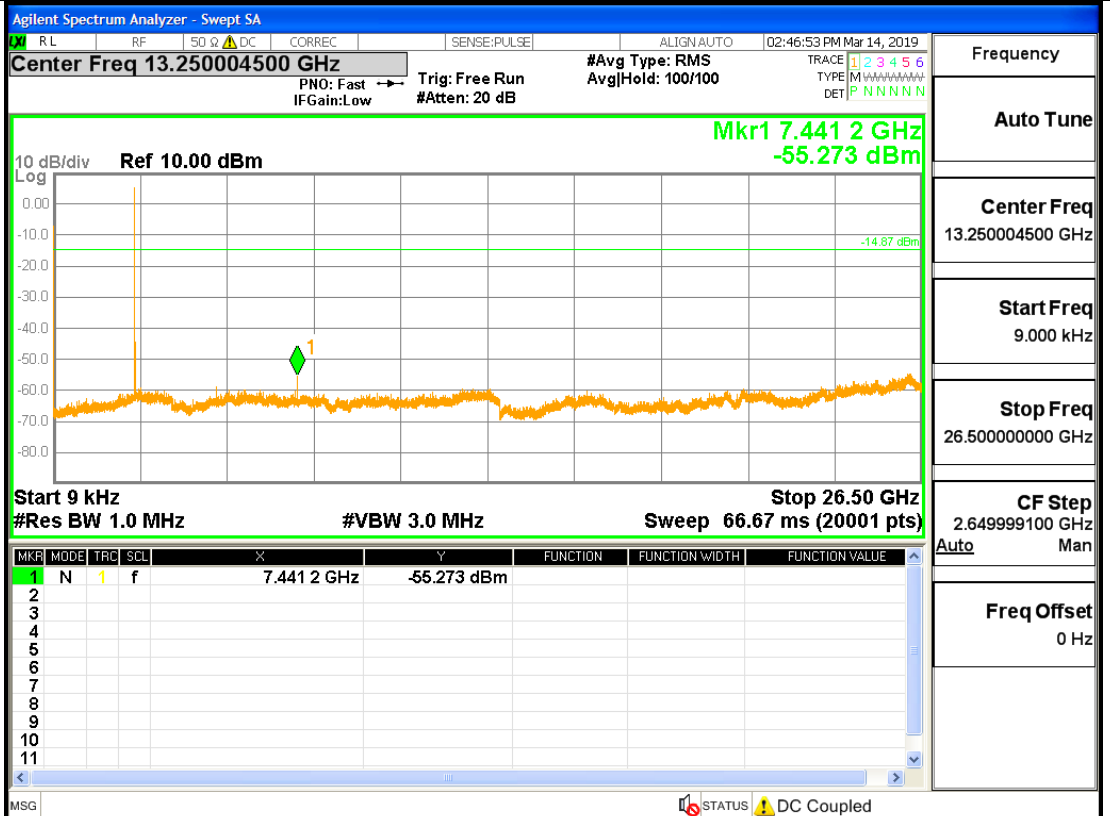


GFSK_HCH_Graphs

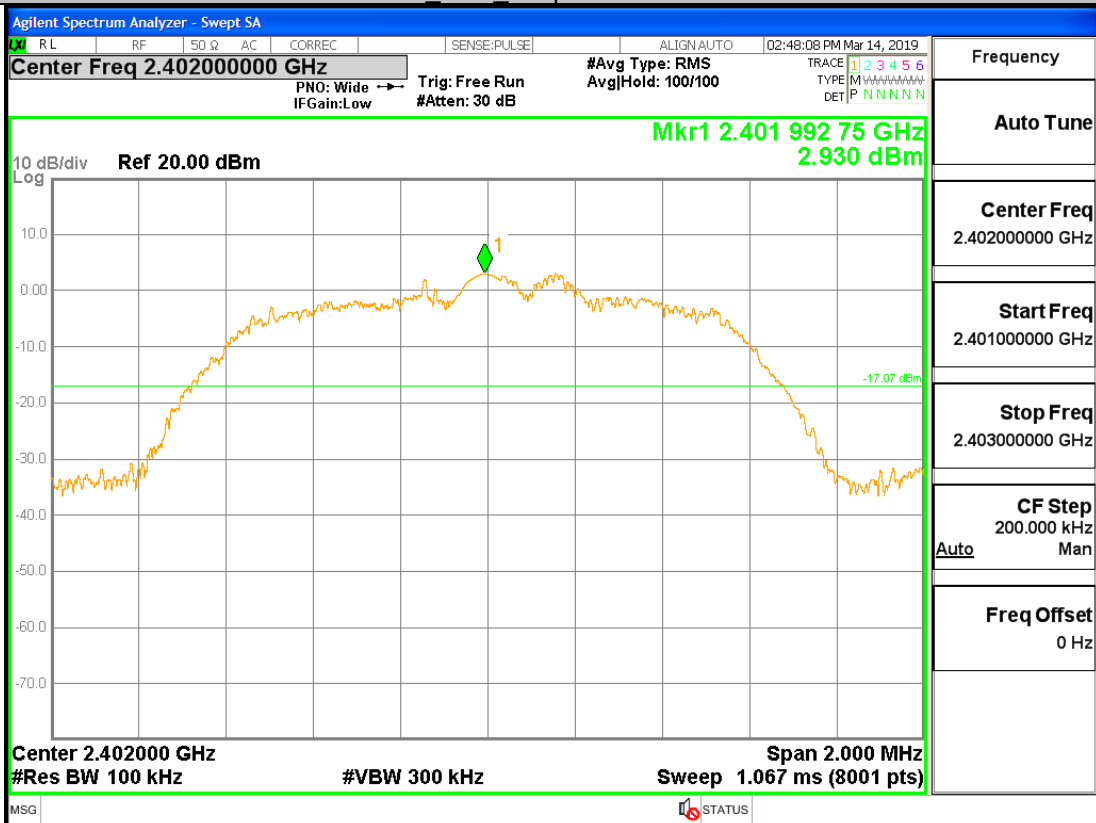
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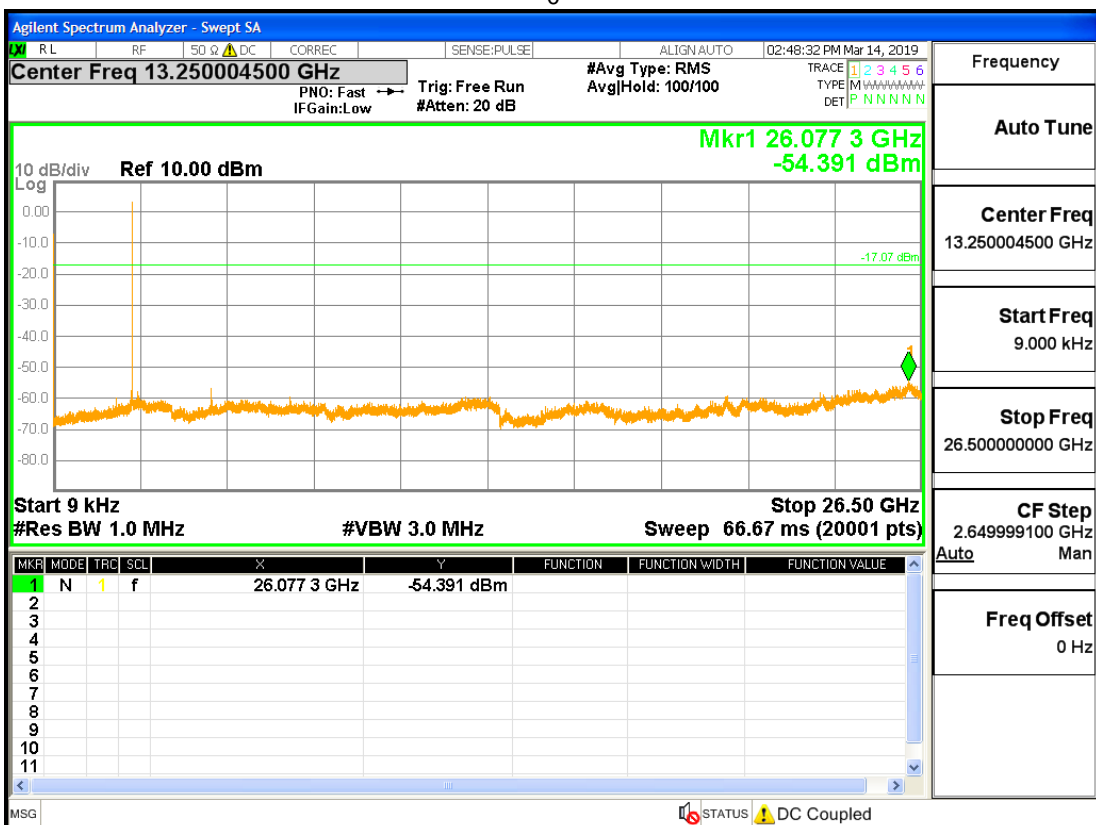
Puw



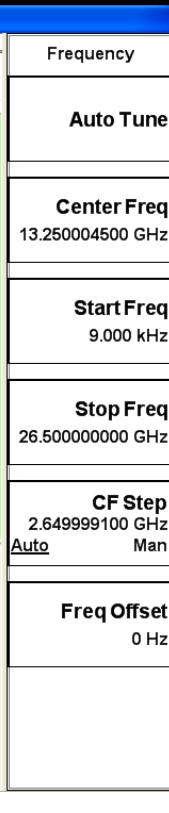
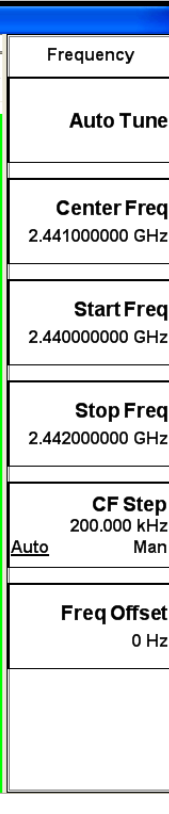
$\pi/4$ DQPSK LCH Graphs



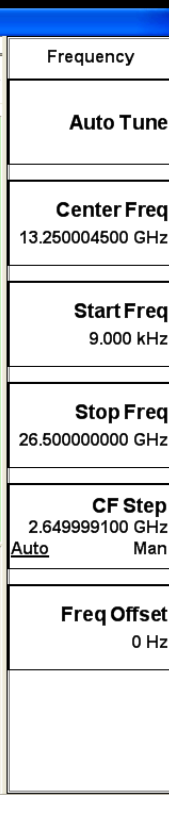
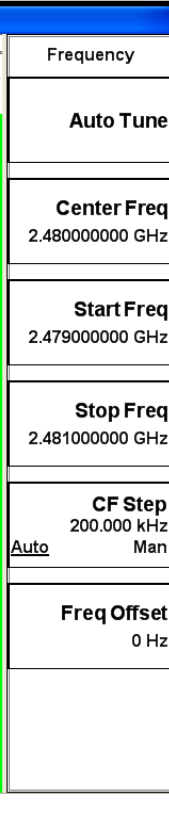
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$\pi/4$ DQPSK MCH Graphs



$\pi/4$ DQPSK HCH Graphs



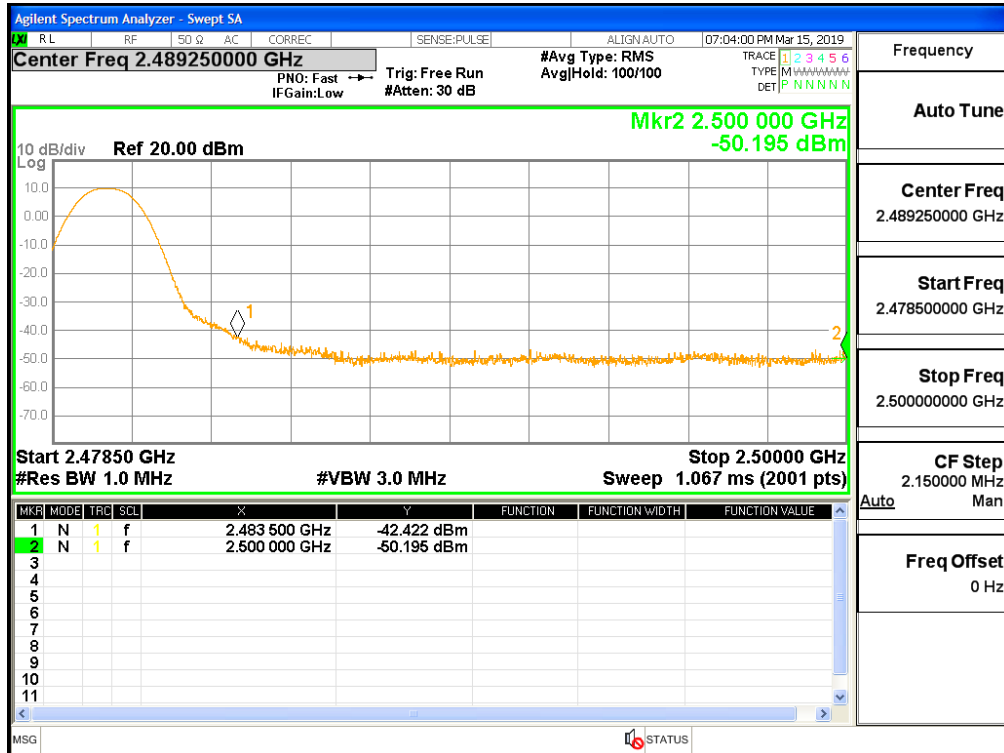
A.8 Restrict-band measurements

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	-57.14	40.06	74	-63.78	33.42	54	Pass
1DH5	2402	2390	2.00	0.00	-55.48	41.72	74	-63.06	34.14	54	Pass
1DH5	2480	2483.5	2.00	0.00	-42.42	54.78	74	-47.75	49.45	54	Pass
1DH5	2480	2500	2.00	0.00	-50.2	47	74	-57.66	39.54	54	Pass
2DH5	2402	2310	2.00	0.00	-50.92	46.28	74	-58.86	38.34	54	Pass
2DH5	2402	2390	2.00	0.00	-51.78	45.42	74	-58.41	38.79	54	Pass
2DH5	2480	2483.5	2.00	0.00	-43.65	53.55	74	-50.3	46.9	54	Pass
2DH5	2480	2500	2.00	0.00	-50.89	46.31	74	-57.8	39.4	54	Pass

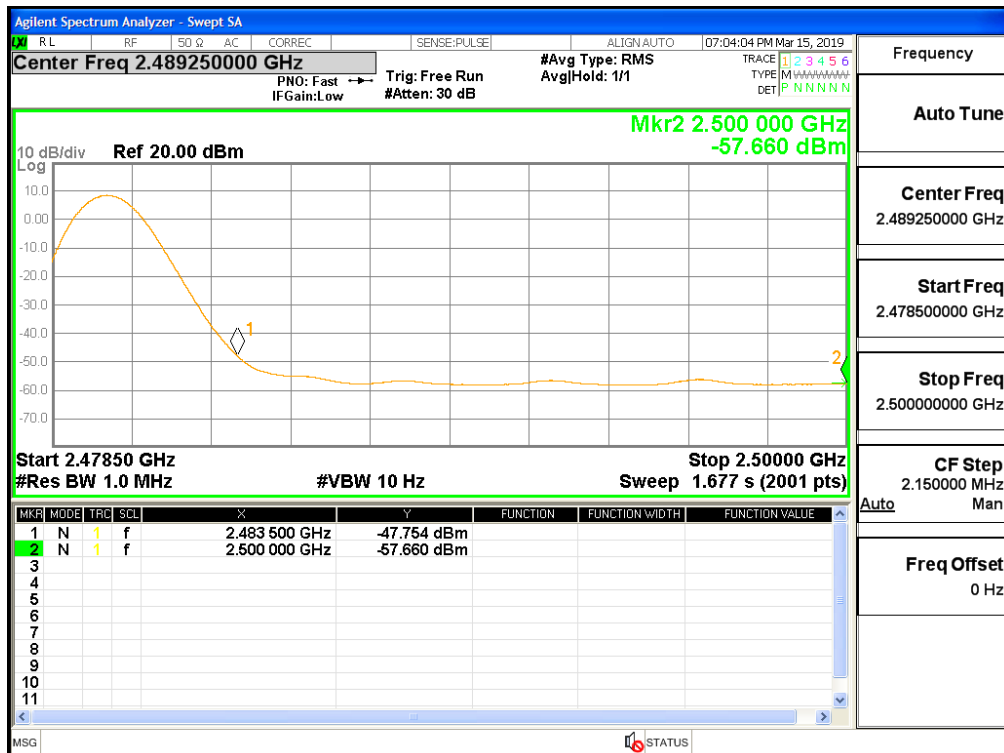
Test Graph



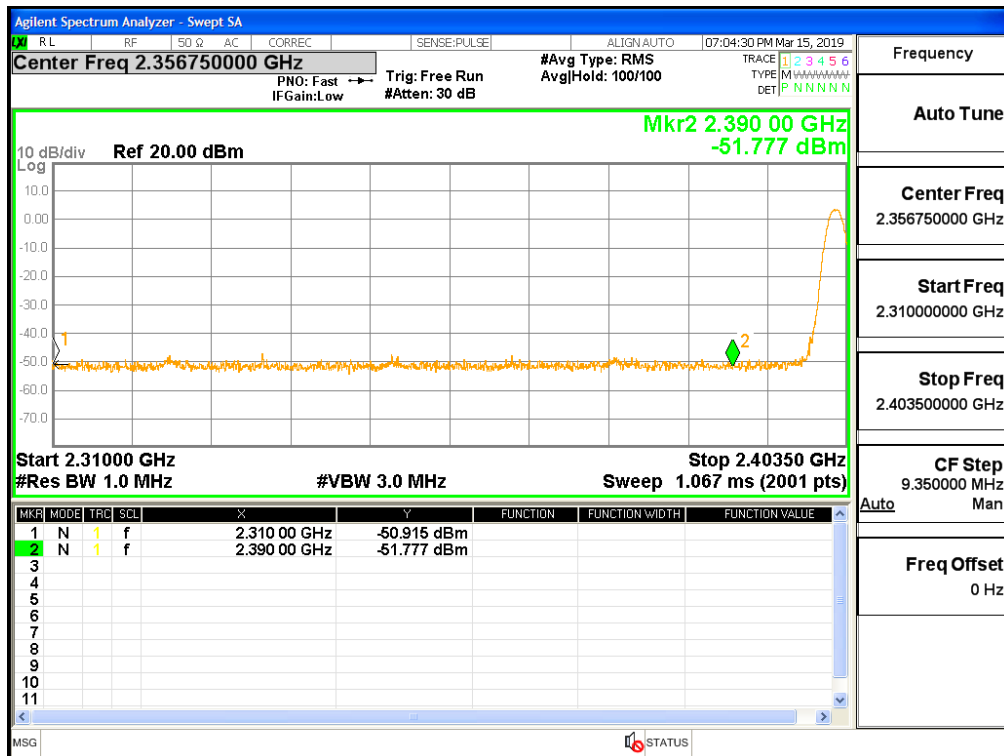
Restrict-band band-edge measurements_2480_PEAK_DH5



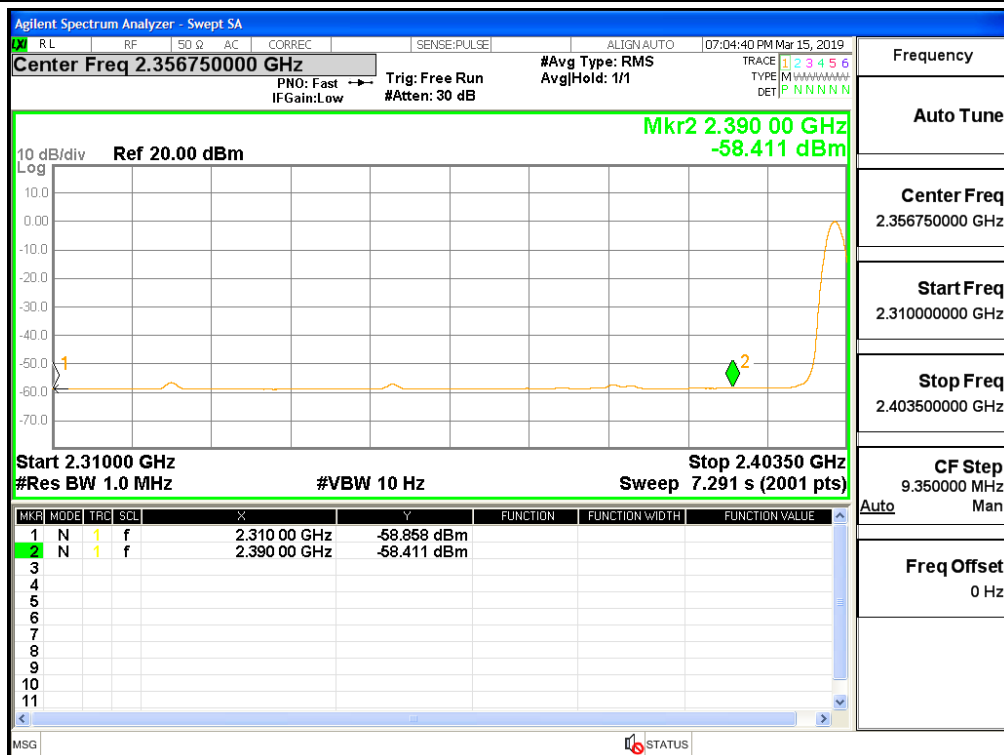
Restrict-band band-edge measurements_2480_AV_DH5



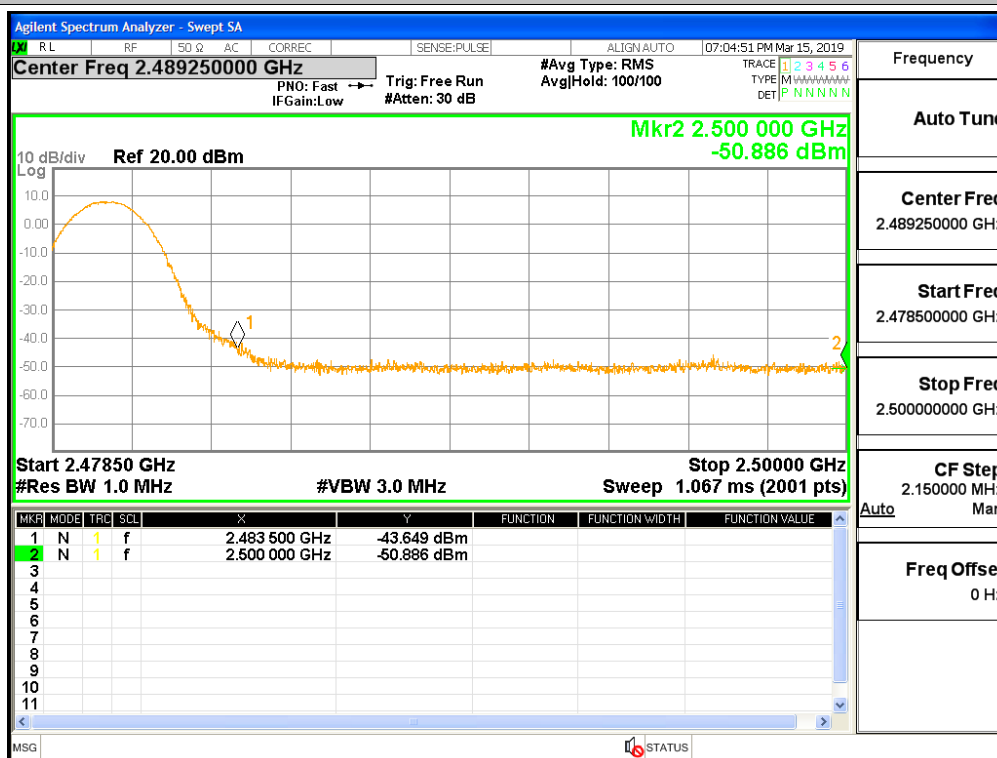
Restrict-band band-edge measurements_2402_PEAK_2DH5



Restrict-band band-edge measurements_2402_AV_2DH5



Restrict-band band-edge measurements_2480_PEAK_2DH5



Restrict-band band-edge measurements_2480_AV_2DH5

