BLX-403-20 Lab Brick® Signal Generator

500 – 40,000 MHz Frequency

Features/Benefits

- Reliable and Repeatable solid state signal generation
- Standard Internal/external pulse modulation
- USB/Ethernet Control
- 10 MHz external or internal reference
- 100 Hz Frequency Resolution
- Easily portable
- Sized to fit into a single rack unit for ATE applications

Applications

- Portable LO Source
- Engineering/Production Test Labs
- Automated Test Equipment (ATE)
- Wi-Fi, Wi-Fi6E, 4G, 5G, LTE Test Systems

The Lab Brick™ series of synthesized signal generators bring affordability, functionality, and simplicity to the microwave test bench. Vaunix offers standard products with frequencies covering from .5 MHz up to 40 GHz with 100 Hz frequency resolution, +20 dBm output power with a minimum of 40 dB output level control. They offer advanced features such as frequency sweeping, internal/external 10 MHz reference and pulse modulation.

The BLX-403-20 offers both USB and Ethernet interfaces. The USB port uses a native HID interface to avoid the difficulties inherent in using older serial or IEEE-488 interfaces implemented over USB. As a result, Lab Brick™ users can get to work faster without having to install kernel level drivers, and Lab Brick™ devices can be easily used on any system that supports USB HID devices, including low-cost embedded computers using Linux or similar operating systems. The Ethernet interface is configurable for Static IP or DHCP with the ability to assign the HTTP port for extra security.

The BLX-403-20 is an affordable Signal Generator with reliable performance. The BLX-403-20 provides calibrated power control from 500 to 40000 MHz with a 100 Hz frequency setting resolution. The signal generator is easily programmable for fixed frequency operation, unidirectional or bidirectional frequency sweep and pulse modulation directly from the included Graphical User Interface (GUI). Alternatively, for users wishing to develop their own interface, Vaunix supplies LabVIEW drivers, Windows API DLL files, Linux drivers, Python examples and much more.

vaunix

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www.Vaunix.com
Revision A1 3/18/25

BLX-403-20 Specifications

Parameter	Test Conditions	Min	Typ	Max
Frequency	Range (MHz)	500		40,000
	Step Size (Hz)	100		
	Accuracy/stability (ppm)			+/- 2.0
Phase Noise (dBc/Hz) @ 1/10/100/1000 kHz	@ 1 GHz	-95/-100/-105/-130	-105/-110/-115/-140	
	@10 GHz	-80/-85/-90/-120	-85/-90/-100/-130	
	@ 40 GHz	-70/-75/-80/-110	-75/-80/-90/-120	
Output Power	Standard (dBm)		+20	
	Control Range (dB)	50		
	Step Size (dB)		0.5	
	Accuracy (dB)	-2.5	+/-1	+2.5
Spurious	Inband (dBc)[1]	-50	-70	
	Harmonics (dBc)		-25	
	Subharmonics (dBc)		-35	
Switching Speed (ms)			5	
Internal/External Reference	Frequency (MHz)		10	
	Input Level (Vpp)	0.5	1	3
Pulse Modulation	Pulse Width (ns)	100		
	Pulse Repitition Rate (ns)	200		
	Pulse Depth (dB)	35	45	
VSWR			2.0:1	
Power Requirements		12 VDC 800 mA		
Environmental	Operating Temperature	0 °C to +40 °C		
	Relative Humidity (non-condensing)	<95%		
Physical Connections	Power	2.5mmx2.1mm		
	Control	USB/Ethernet		
	RF Connector	2.92mm – female		
	Reference	SMA – female		
	Pulse Modulation	SMA - female		
Mechanical	Size	7.0 x 3.64 x 1.68 inches 177.8 x 92.5 x 42.7 millimeters		
	Weight	1.7 pounds 770 grams		

[1] Inband spurious is defined as +/- 500 MHz from the output frequency

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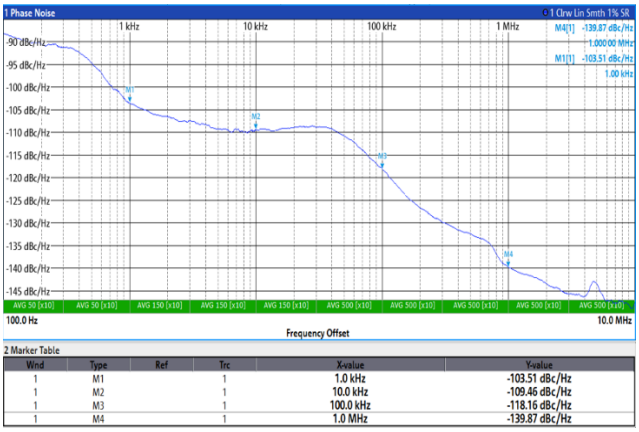
BLX-403-20 Performance – Phase Noise

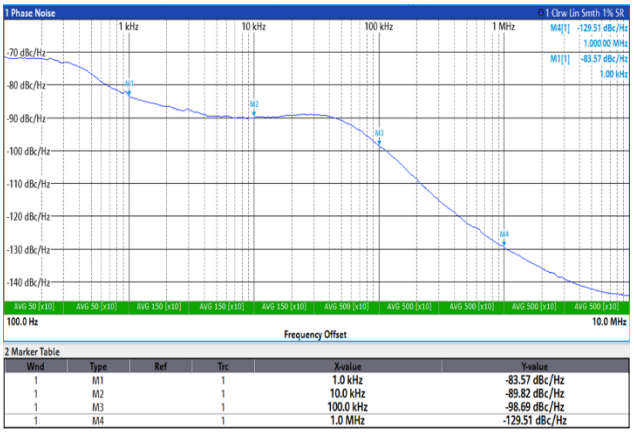
Phase Noise - 1 GHz



2 Marker Table

Wnd	Type	Ref	Trc	X-value	Y-value
1	M1		1	1.0 kHz	-103.51 dBc/Hz
1	M2		1	10.0 kHz	-109.46 dBc/Hz
1	M3		1	100.0 kHz	-118.16 dBc/Hz
1	M4		1	1.0 MHz	-139.87 dBc/Hz

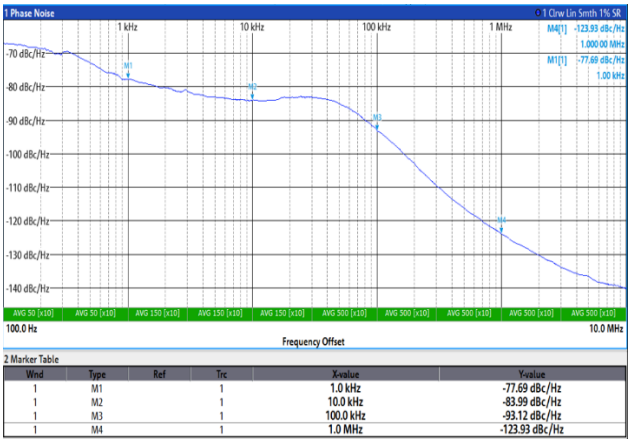
Phase Noise - 10 GHz



2 Marker Table

Wnd	Type	Ref	Trc	X-value	Y-value
1	M1		1	1.0 kHz	-83.57 dBc/Hz
1	M2		1	10.0 kHz	-89.82 dBc/Hz
1	M3		1	100.0 kHz	-98.69 dBc/Hz
1	M4		1	1.0 MHz	-129.51 dBc/Hz

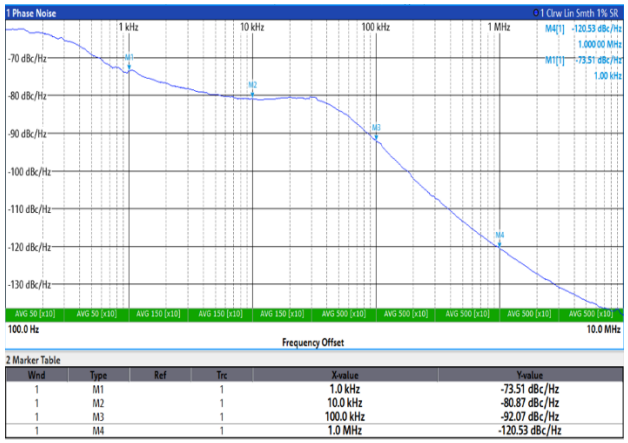
Phase Noise - 20 GHz



2 Marker Table

Wnd	Type	Ref	Trc	X-value	Y-value
1	M1		1	1.0 kHz	-77.69 dBc/Hz
1	M2		1	10.0 kHz	-83.99 dBc/Hz
1	M3		1	100.0 kHz	-93.12 dBc/Hz
1	M4		1	1.0 MHz	-123.93 dBc/Hz

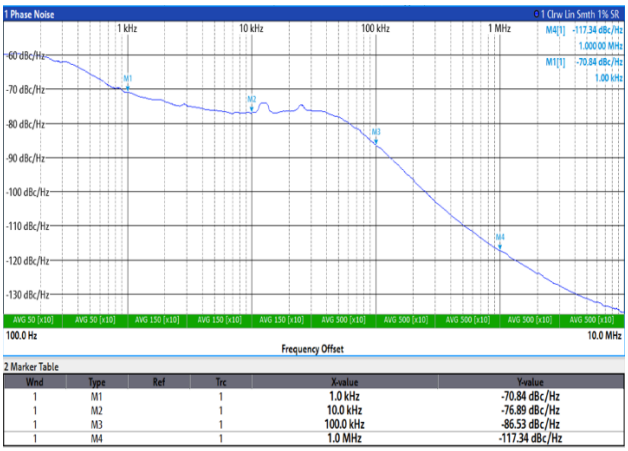
Phase Noise - 30 GHz



2 Marker Table

Wnd	Type	Ref	Trc	X-value	Y-value
1	M1		1	1.0 kHz	-73.51 dBc/Hz
1	M2		1	10.0 kHz	-80.87 dBc/Hz
1	M3		1	100.0 kHz	-92.07 dBc/Hz
1	M4		1	1.0 MHz	-120.53 dBc/Hz

Phase Noise - 40 GHz



2 Marker Table

Wnd	Type	Ref	Trc	X-value	Y-value
1	M1		1	1.0 kHz	-70.84 dBc/Hz
1	M2		1	10.0 kHz	-76.89 dBc/Hz
1	M3		1	100.0 kHz	-86.53 dBc/Hz
1	M4		1	1.0 MHz	-117.34 dBc/Hz

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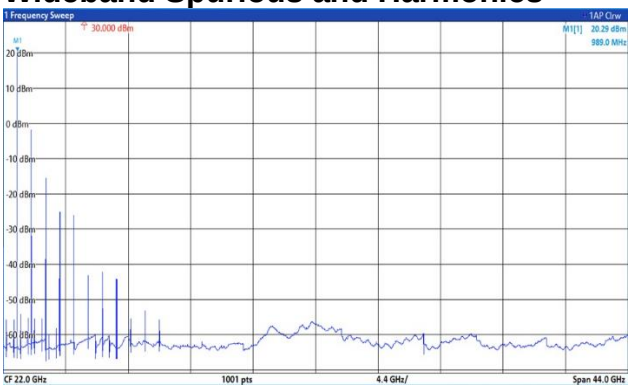
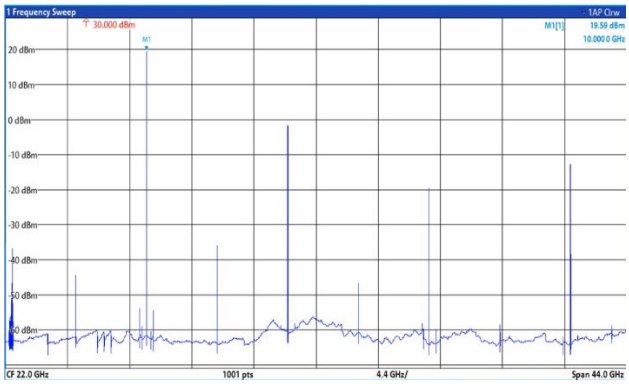
BLX-403-20 Performance – Harmonics, Subharmonics, and Spurious

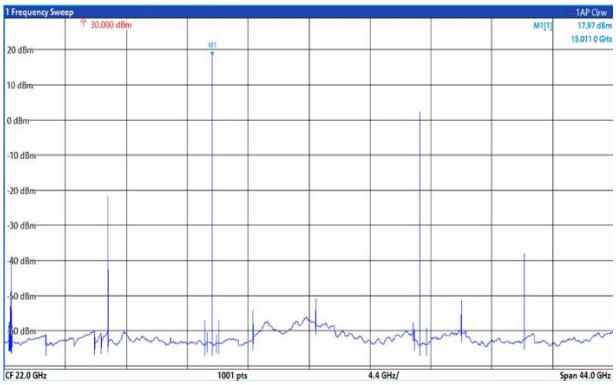
Wideband Spurious and Harmonics



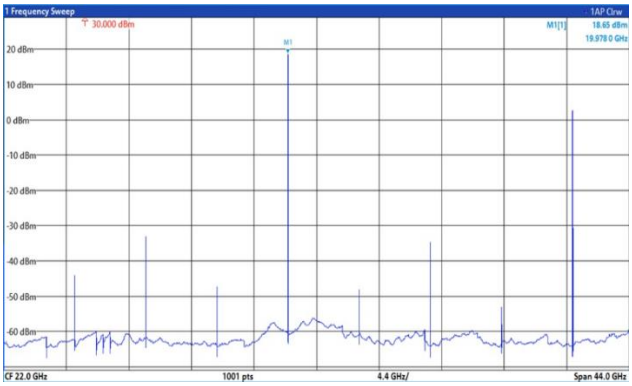
Carrier = 1 GHz



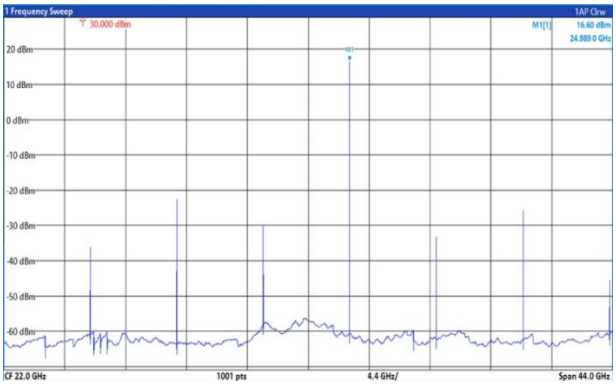
Carrier = 10 GHz



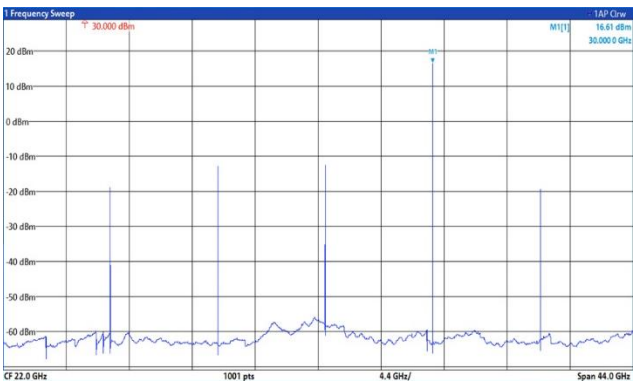
Carrier = 15 GHz



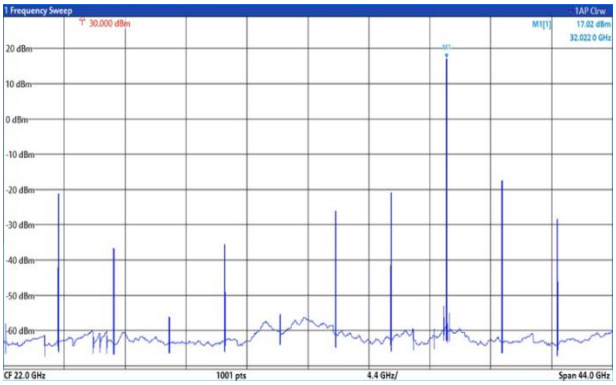
Carrier = 20 GHz



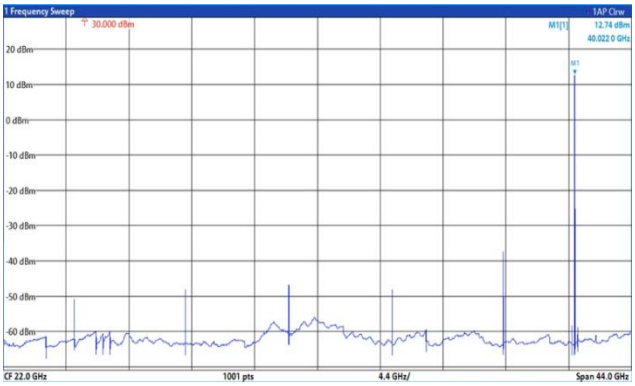
Carrier = 25 GHz



Carrier = 30 GHz



Carrier = 32 GHz



Carrier = 40 GHz

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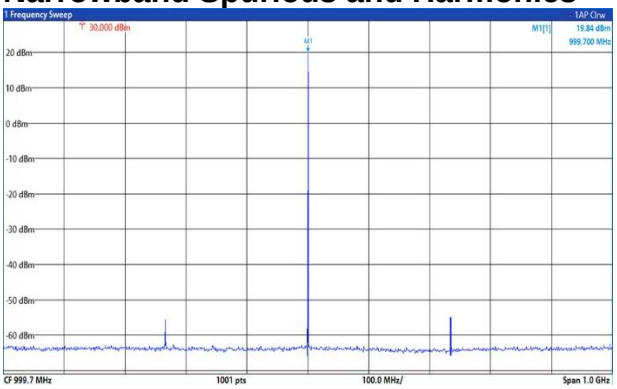
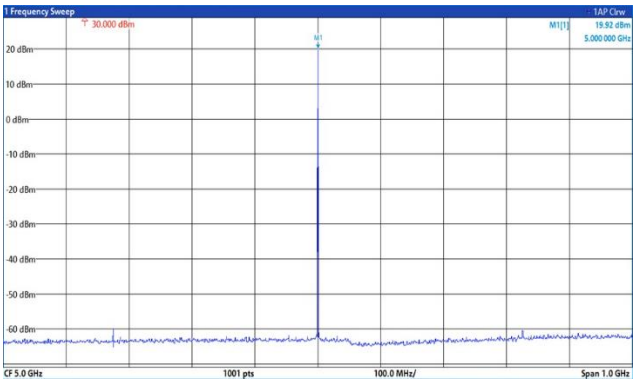
BLX-403-20 Performance – Harmonics, Subharmonics, and Spurious

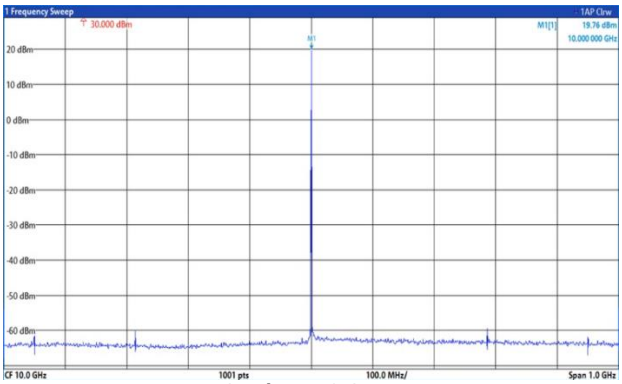
Narrowband Spurious and Harmonics



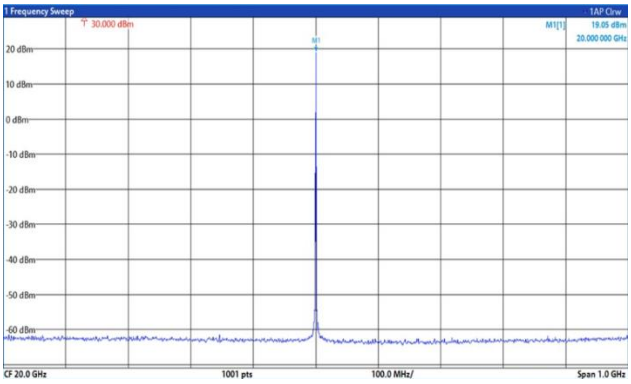
Carrier = 1 GHz



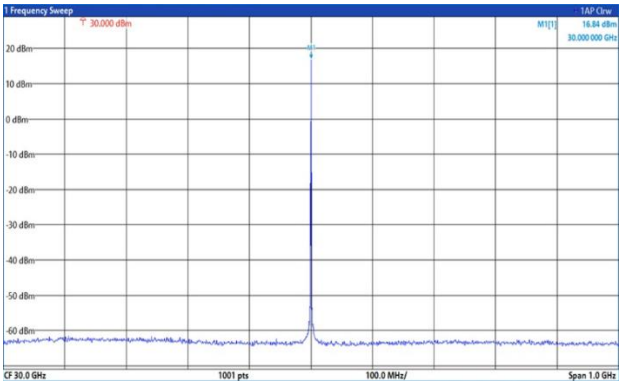
Carrier = 5 GHz



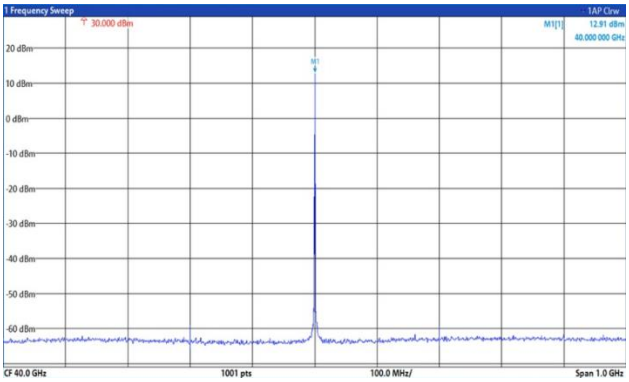
Carrier = 10 GHz



Carrier = 20 GHz



Carrier = 30 GHz



Carrier = 40 GHz

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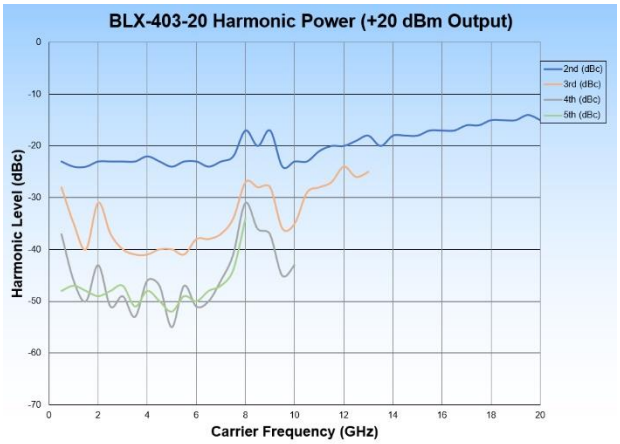
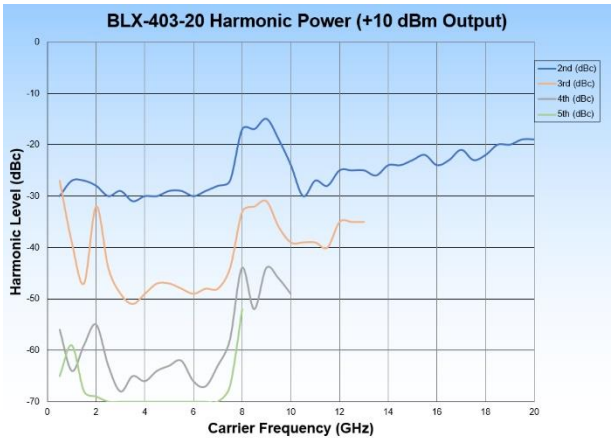
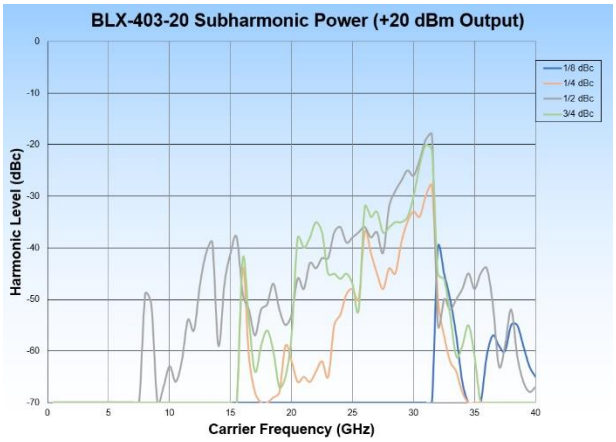
BLX-403-20 Performance – Harmonics, Subharmonics, and Spurious

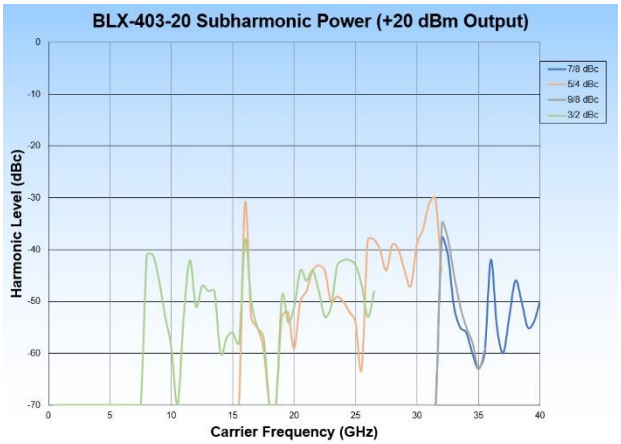
Harmonics

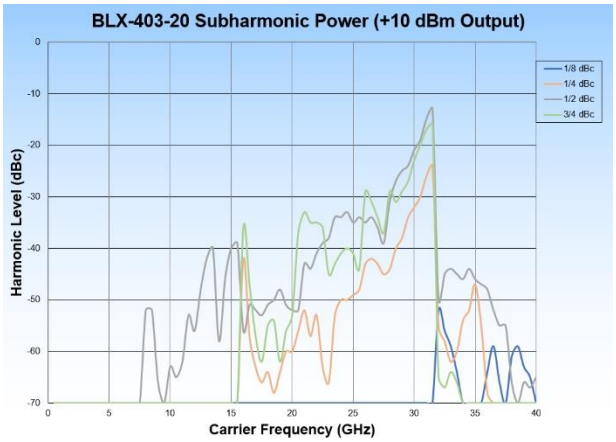


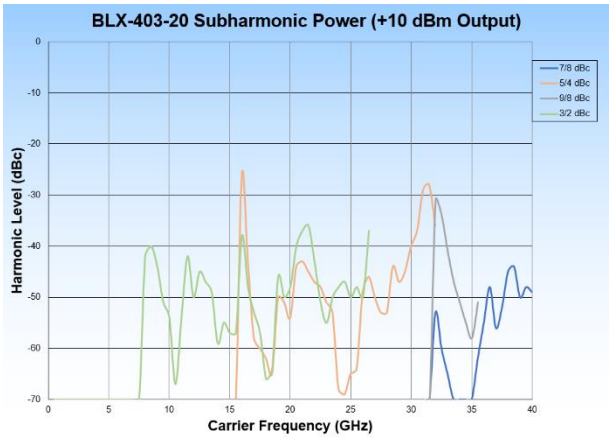


Subharmonics









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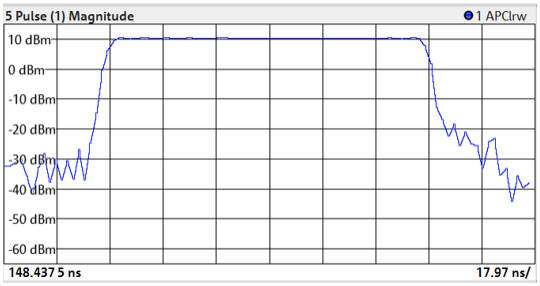
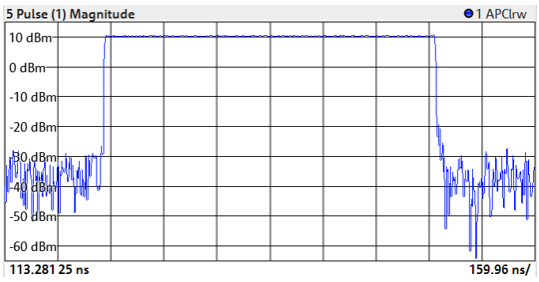
BLX Performance – Pulse Modulation



2 Pulse Results (Curr: 8 | Total: 8)

ID	Pulse No.	Rise Time (ns)	Fall Time (ns)	Pulse Width (us)	PRI (us)	PRF (kHz)	Avg ON Power (dBm)	Avg Tx Power (dBm)
1	1	5.433	4.955	0.105	0.217	4616.283	10.216	7.268
2	2	5.349	5.033	0.109	0.217	4613.519	10.227	7.275
3	3	5.372	4.998	0.109	0.217	4616.698	10.215	7.264
4	4	5.311	4.985	0.109	0.217	4616.324	10.210	7.258
5	5	5.514	5.032	0.109	0.217	4616.833	10.201	7.251
6	6	5.655	4.998	0.109	0.217	4612.973	10.206	7.255
7	7	5.623	5.127	0.109	0.217	4613.800	10.212	7.262
8	8	5.734	4.970	0.109	...	...	10.224	...

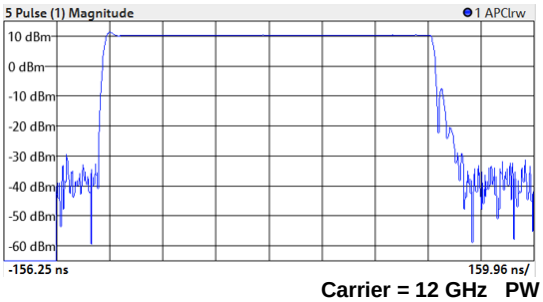
Carrier = 6 GHz PW = 100ns PRI = 200ns



2 Pulse Results (Curr: 10 | Total: 10)

ID	Pulse No.	Rise Time (ns)	Fall Time (ns)	Pulse Width (us)	PRI (us)	PRF (kHz)	Avg ON Power (dBm)	Avg Tx Power (dBm)
1	1	5.642	4.968	1.001	2.008	497.908	10.341	7.316
2	2	5.521	5.206	1.001	2.008	497.960	10.340	7.315
3	3	5.509	5.013	1.001	2.008	498.001	10.336	7.319
4	4	5.729	4.966	1.001	2.009	497.825	10.334	7.313
5	5	5.373	4.931	1.001	2.008	497.918	10.339	7.314
6	6	5.405	5.317	1.001	2.008	497.939	10.346	7.321
7	7	5.704	5.042	1.001	2.008	497.996	10.339	7.319
8	8	5.719	4.934	1.001	2.009	497.877	10.336	7.311
9	9	5.429	4.941	1.001	2.008	497.920	10.335	7.310
10	10	5.392	5.273	1.001	...	...	10.329	...

Carrier = 6 GHz PW = 10µs PRI = 20µs



2 Pulse Results (Curr: 11 | Total: 11)

ID	Pulse No.	Rise Time (ns)	Fall Time (ns)	Pulse Width (us)	PRI (us)	PRF (kHz)	Avg ON Power (dBm)	Avg Tx Power (dBm)
1	1	16.651	16.575	1.000	2.008	498.041	10.283	7.264
2	2	16.286	16.396	1.000	2.008	497.919	10.285	7.266
3	3	16.600	16.688	1.001	2.009	497.870	10.283	7.267
4	4	16.372	16.623	1.000	2.008	497.886	10.285	7.265
5	5	16.518	16.422	1.000	2.008	498.018	10.286	7.267
6	6	16.463	16.653	1.000	2.008	497.927	10.288	7.269
7	7	16.524	16.456	1.000	1.981	504.850	10.281	7.326
8	8	...	...	...	...	...	...	...
9	9	16.389	16.353	1.000	2.008	497.926	10.286	7.267
10	10	16.530	16.562	1.000	2.008	497.958	10.288	7.268
11	11	16.619	16.250	1.000	...	...	10.289	...

Carrier = 12 GHz PW = 10µs PRI = 20µs

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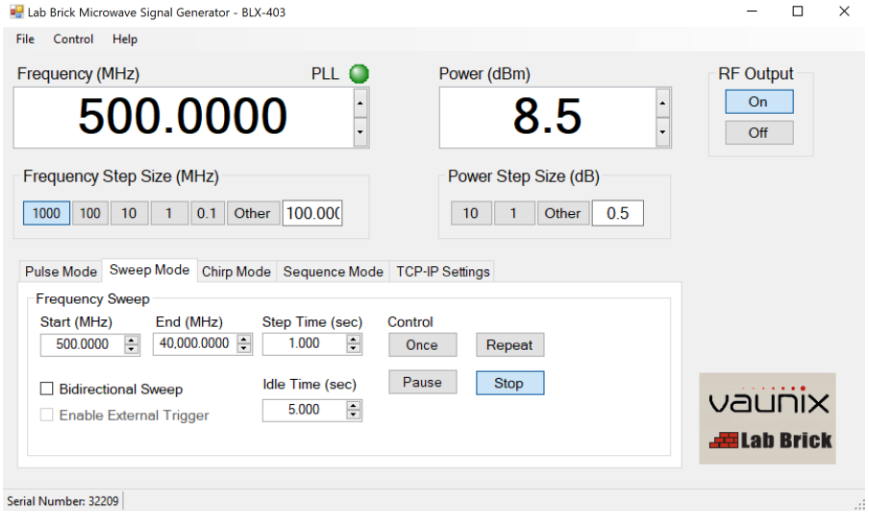
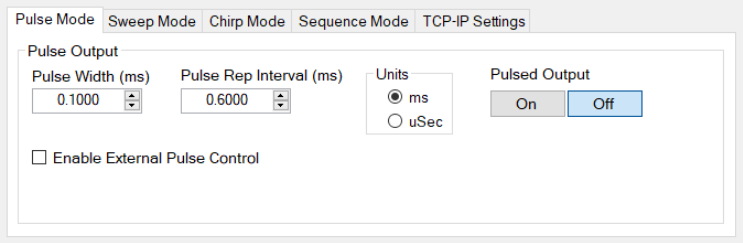
BLX-403 Windows GUI

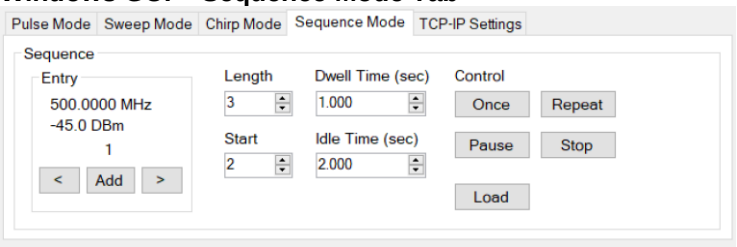
Windows GUI



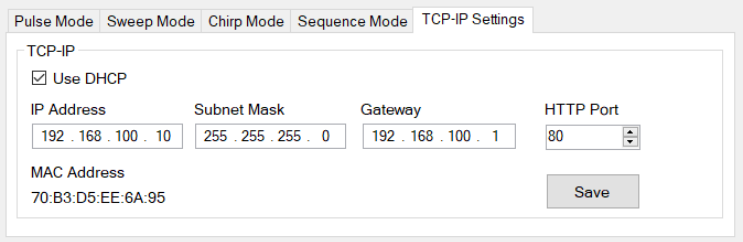
Windows GUI – Pulse Mode Tab



Windows GUI – Sequence Mode Tab



Windows GUI – TCPIP Tab



*Note: Chirp Mode is not currently available

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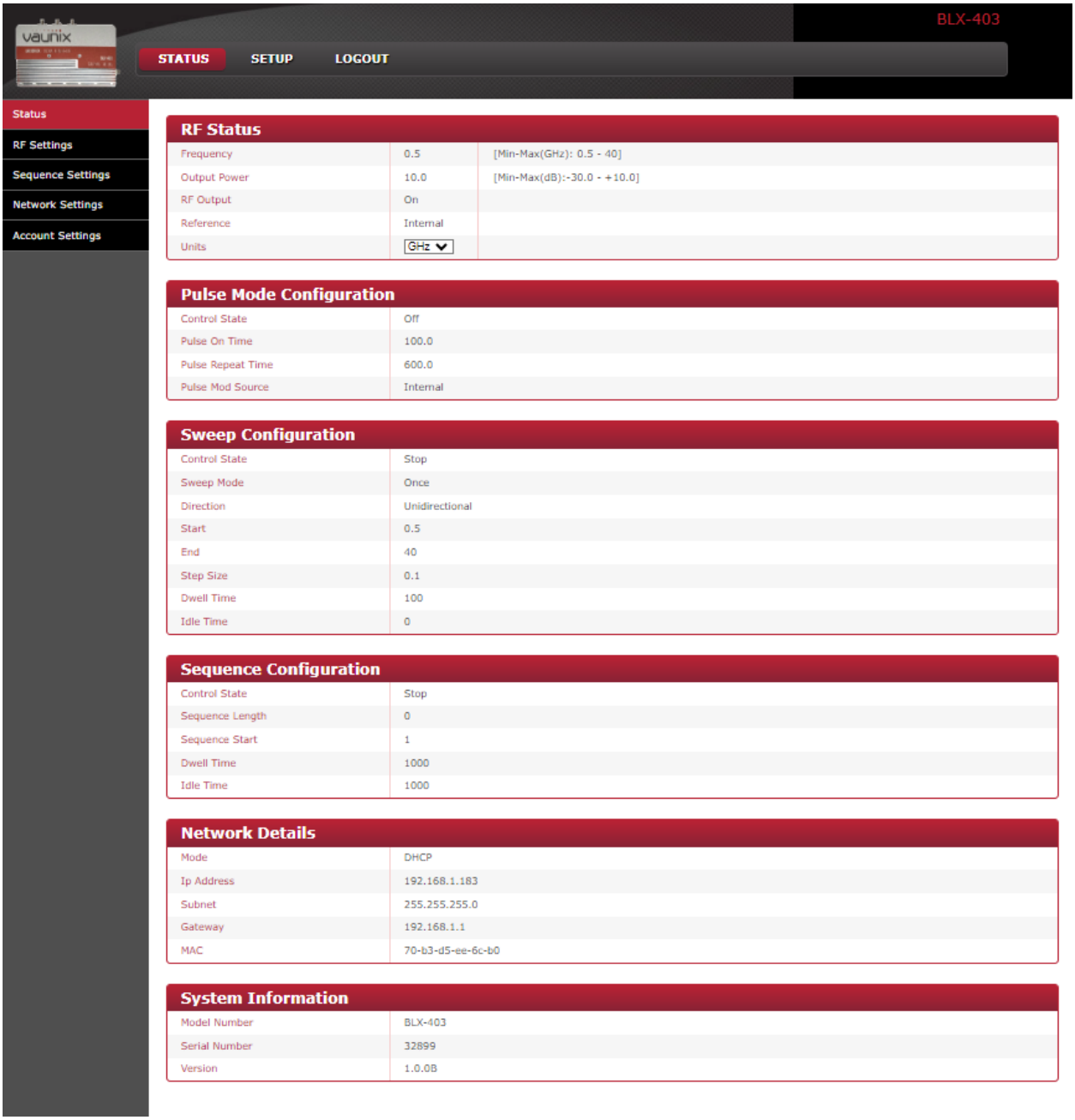
BLX-403 WebUI



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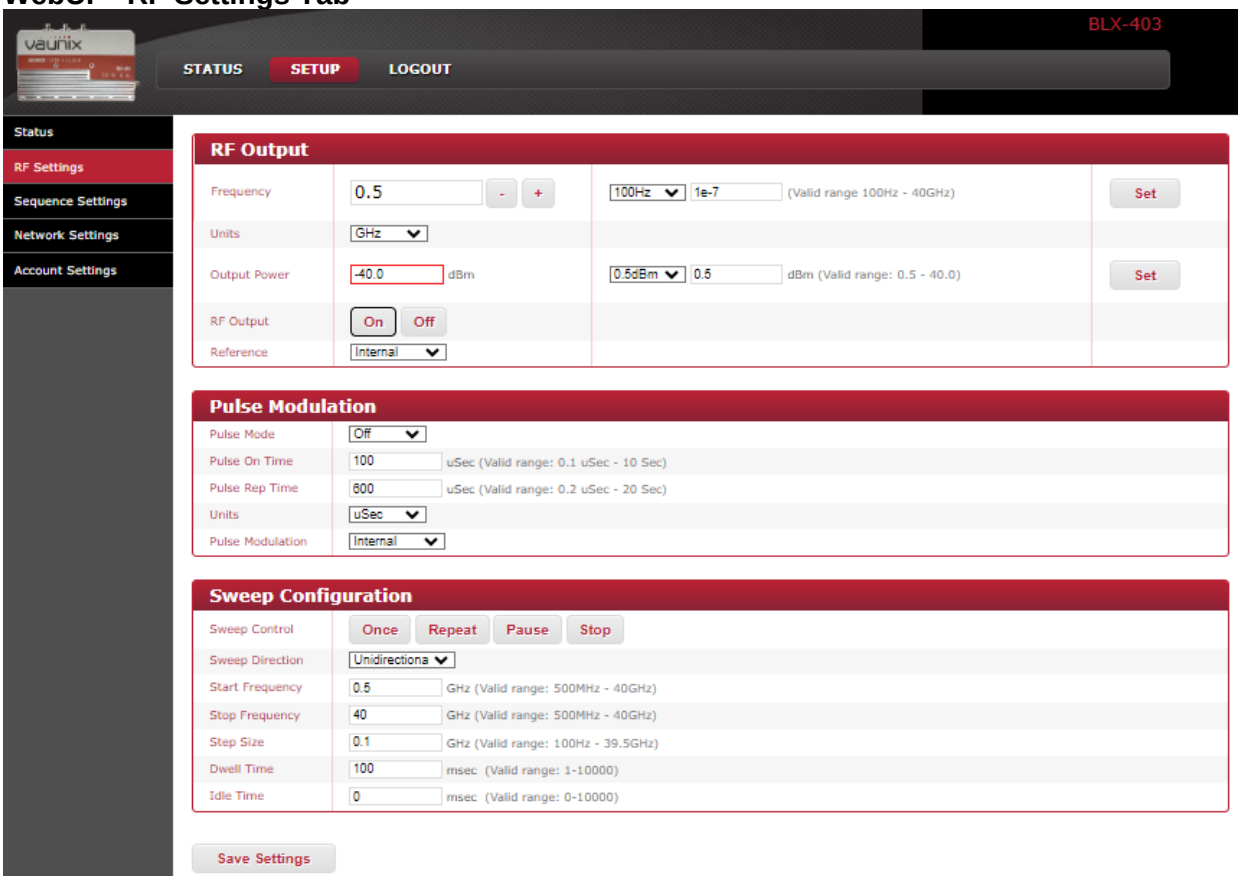
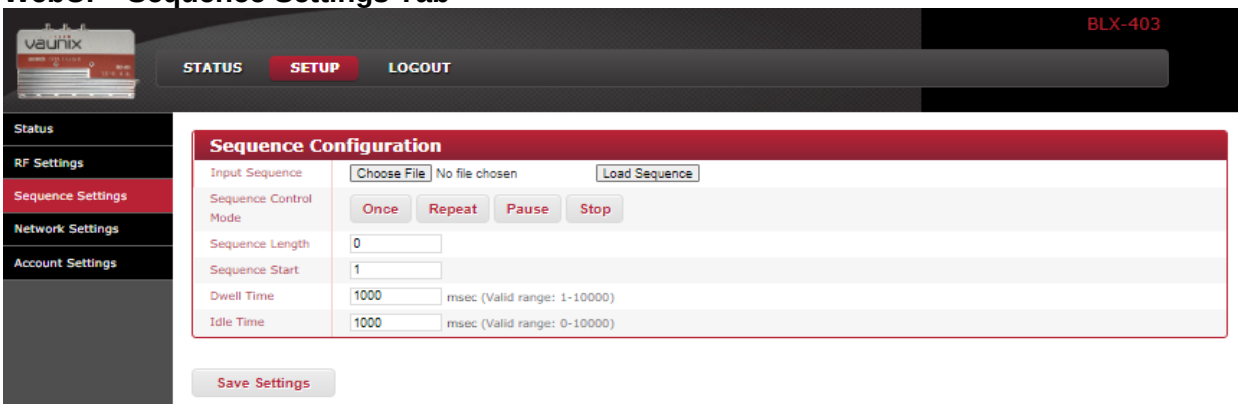
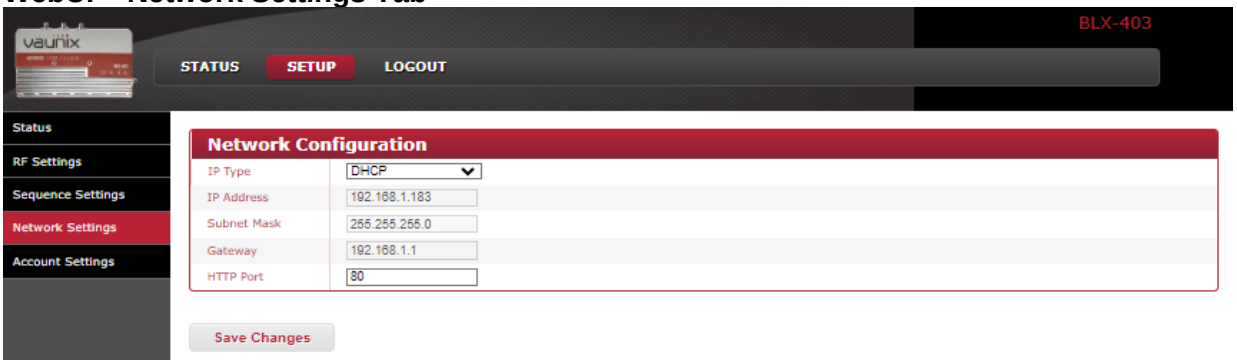
WebUI – RF Settings Tab



WebUI – Sequence Settings Tab



WebUI – Network Settings Tab



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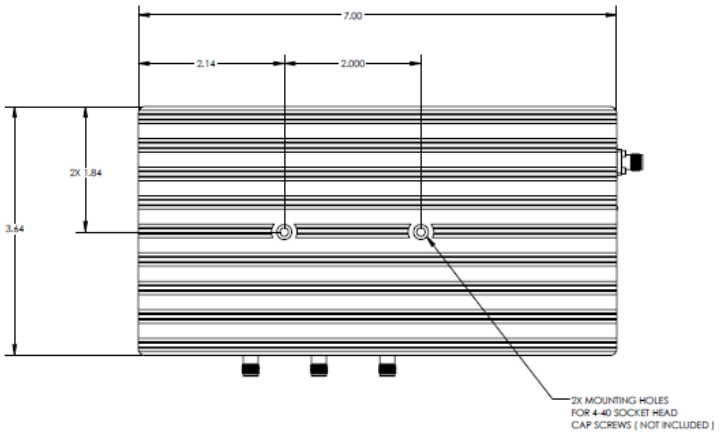
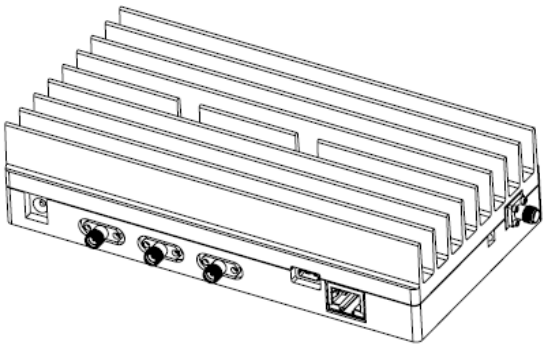
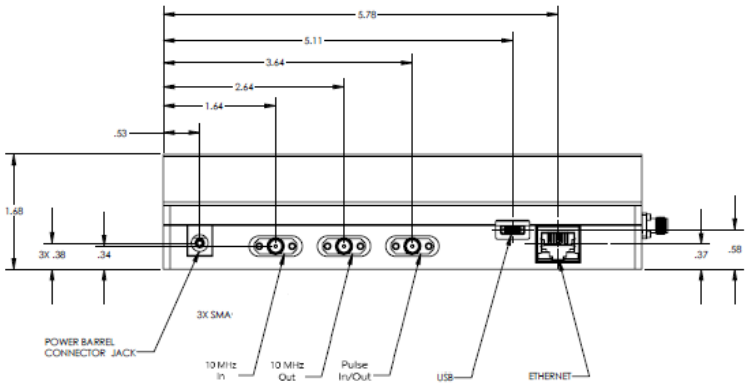
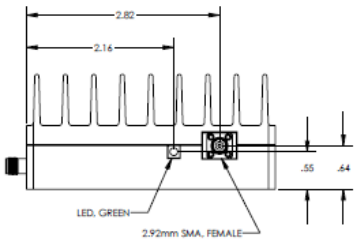
BLX-403-20 Mechanical Outline









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