

BLX-403 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, +10 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 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 is an affordable Signal Generator with reliable performance. The BLX-403 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.

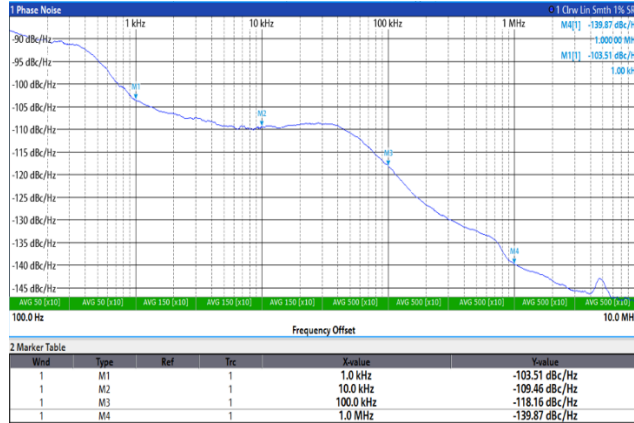
BLX-403 Specifications

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)		+10		
	Control Range (dB)	50			
	Step Size (dB)		0.5		
	Accuracy (dB)	-2.5	+/-1	+2.5	
Spurious	Inband (dBc) ¹	-50	-70		
	Harmonics (dBc)	< 8 GHz	-20	-30	
		8 - 11 GHz	-8	-15	
		>11 GHz	-20	-25	
	Subharmonics (dBc)	<8 GHz	-70	<-70	
		8 - 27.5 GHz	-20	-35	
		27.5 - 32.5 GHz	-10	-20	
>32.5 GHz		-20	-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 Repetition 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	6.5 x 3.64 x 1.0 inches 165.1 x 92.5 x 25.4 millimeters			
	Weight	1.7 pounds 770 grams			

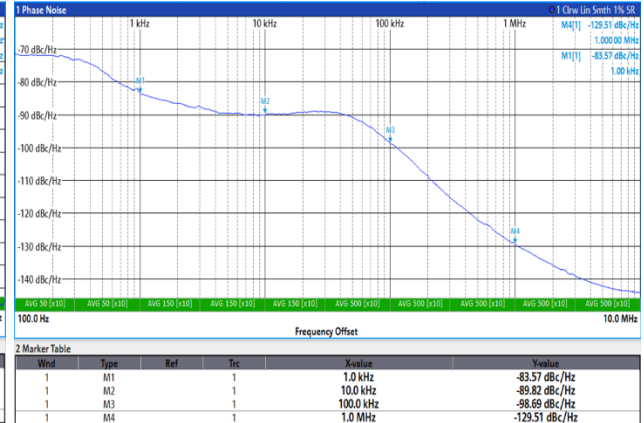
¹ Inband spurious is defined as +/- 500 MHz from the output frequency

BLX-403 Performance – Phase Noise

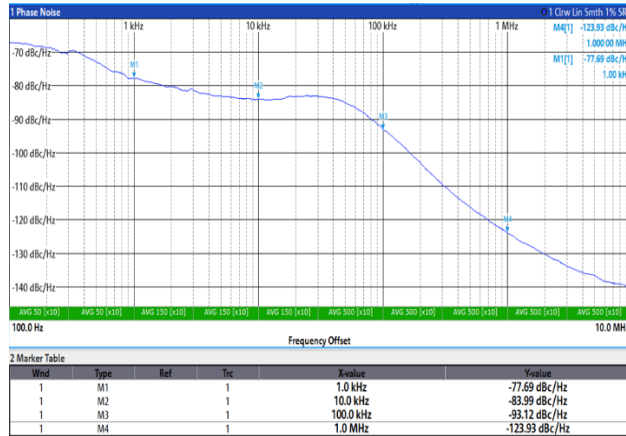
Phase Noise - 1 GHz



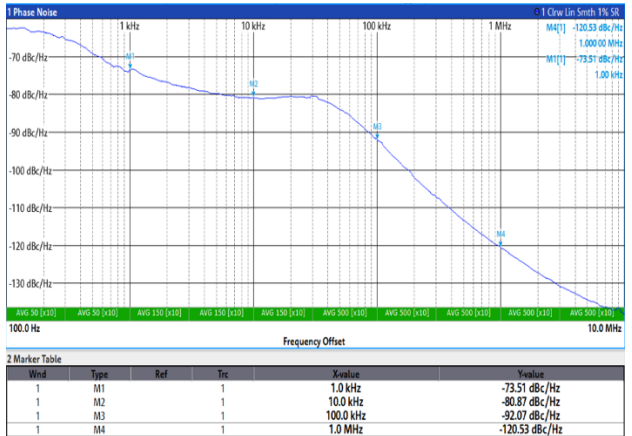
Phase Noise - 10 GHz



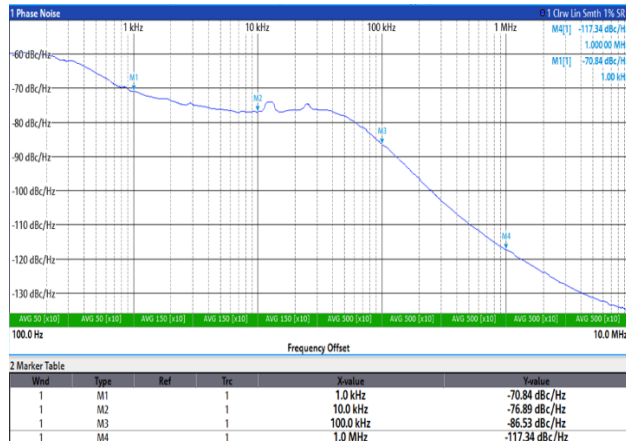
Phase Noise - 20 GHz



Phase Noise - 30 GHz



Phase Noise - 40 GHz

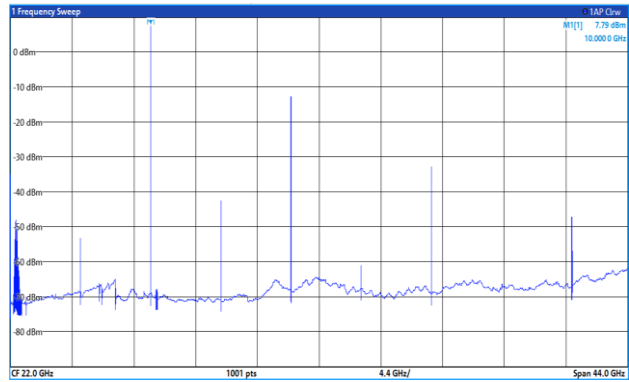


BLX-403 Performance – Harmonics, Subharmonics, and Spurious

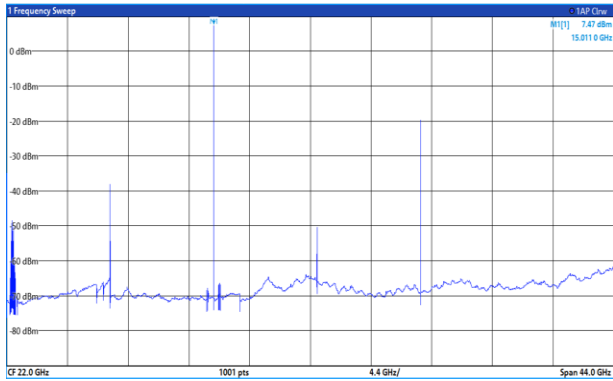
Wideband Spurious and Harmonics



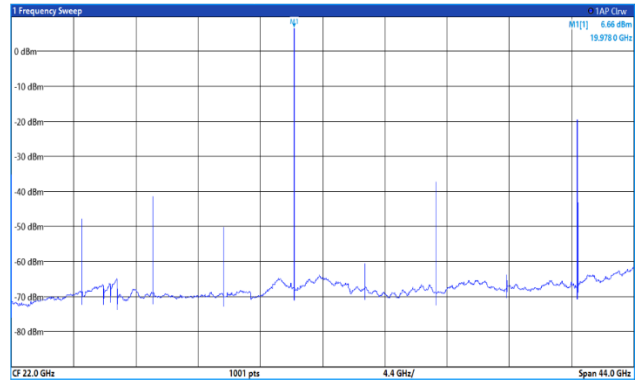
Carrier = 1 GHz



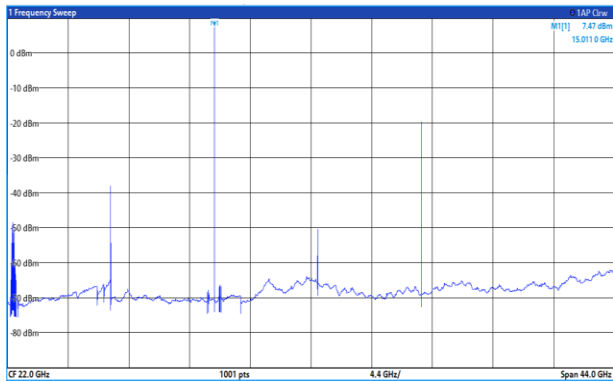
Carrier = 10 GHz



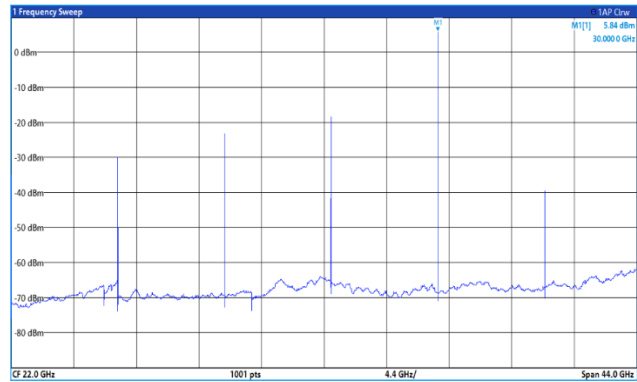
Carrier = 15 GHz



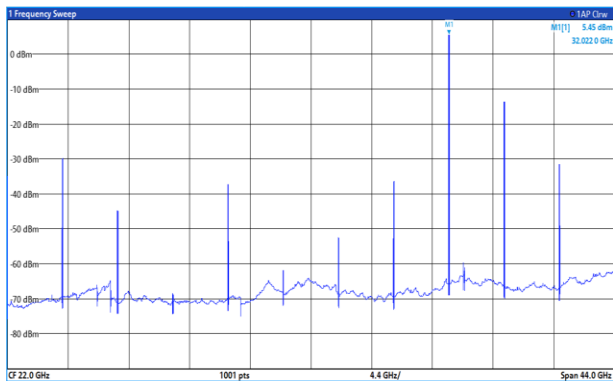
Carrier = 20 GHz



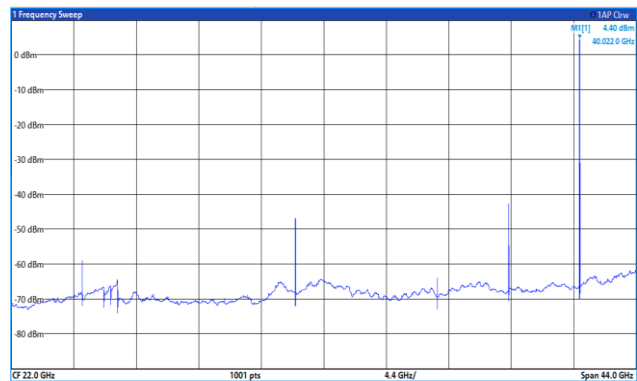
Carrier = 25 GHz



Carrier = 30 GHz



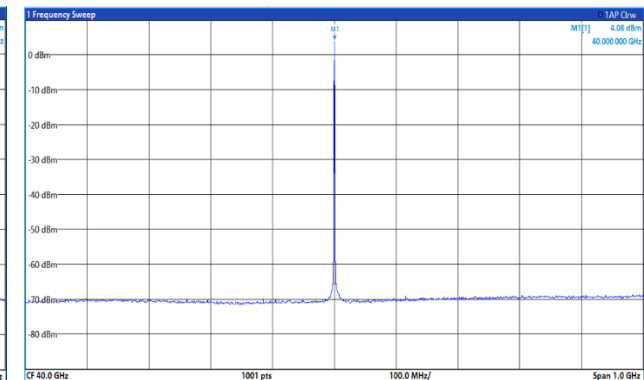
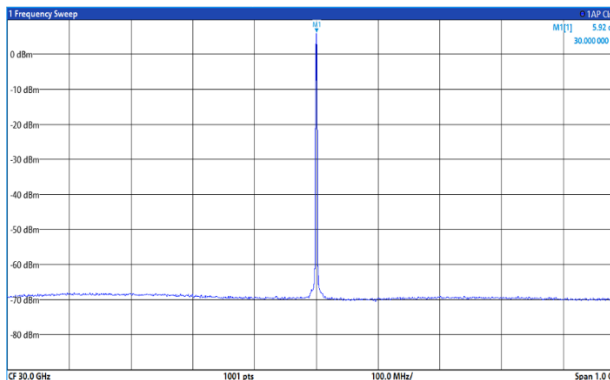
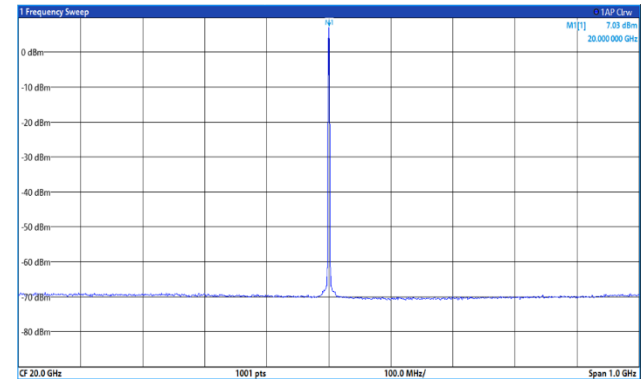
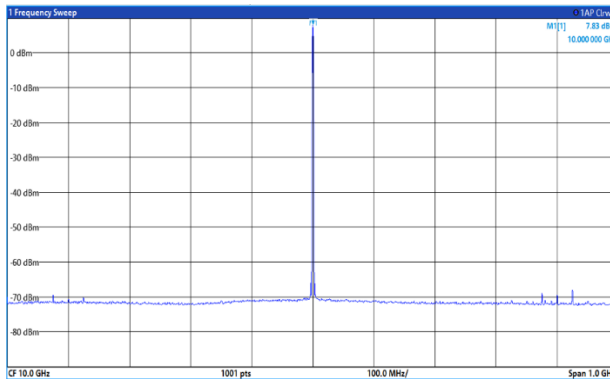
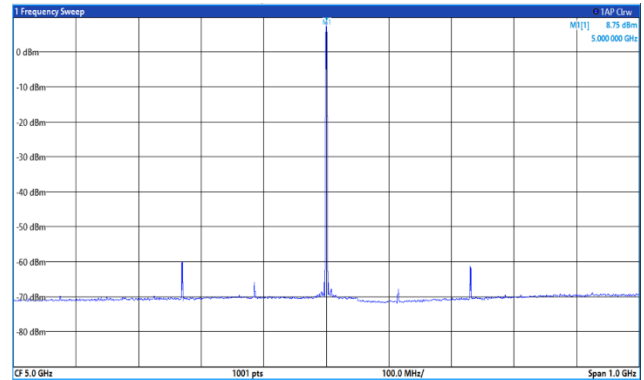
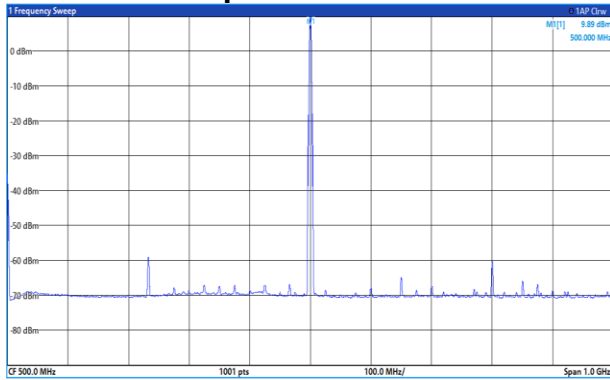
Carrier = 32 GHz



Carrier = 40 GHz

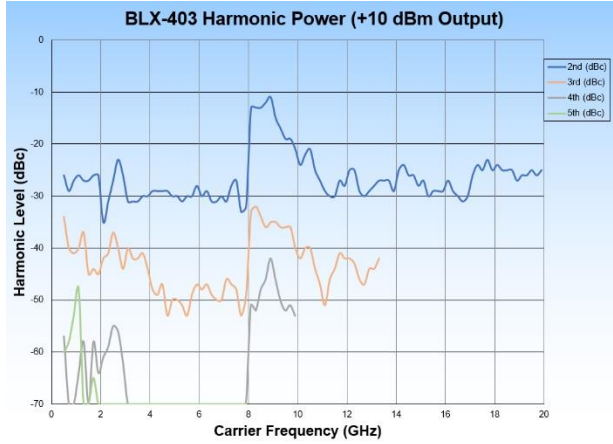
BLX-403 Performance – Harmonics, Subharmonics, and Spurious

Narrowband Spurious and Harmonics

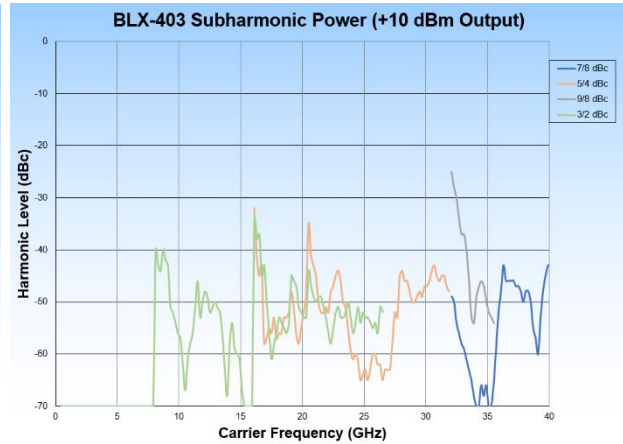
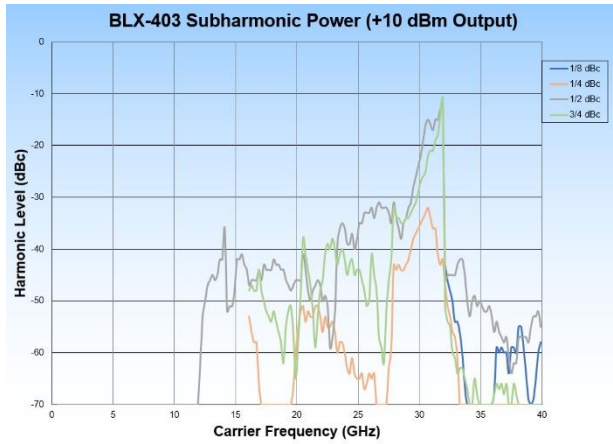


BLX-403 Performance – Harmonics, Subharmonics, and Spurious

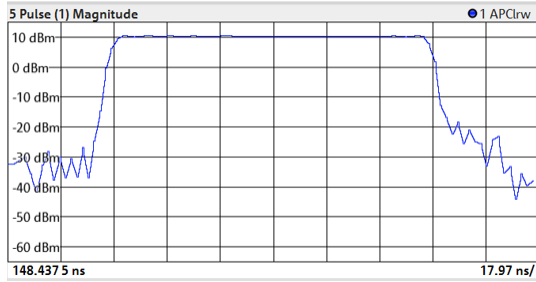
Harmonics



Subharmonics

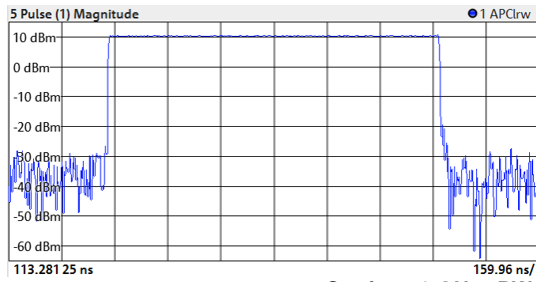


BLX Performance – Pulse Modulation



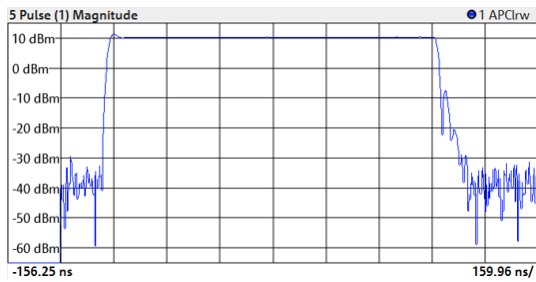
2 Pulse Results (Curr: 8 | Total: 8)

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	4.875	4.955	0.109	0.217	4618.261	10.218	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	...



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	4.950	1.001	2.008	497.958	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	...

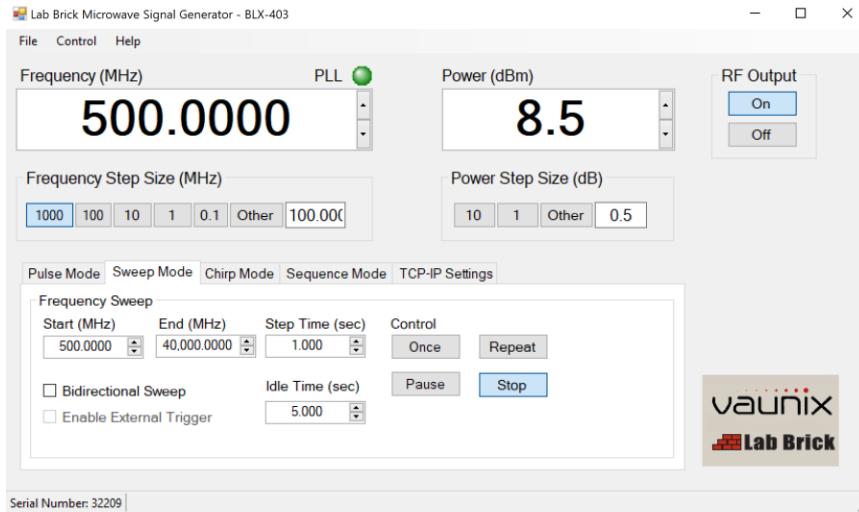


2 Pulse Results (Curr: 11 | Total: 11)

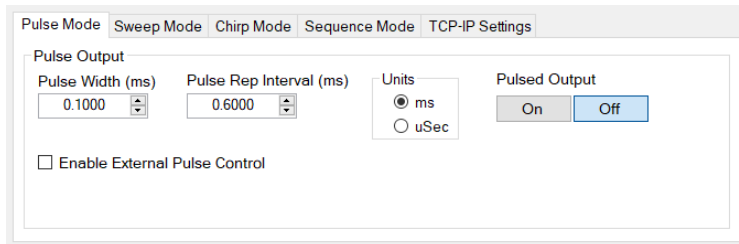
ID	Pulse No.	Rise Time (ns)	Fall Time (ns)	Pulse Width (us)	PRI (us)	PRF (kHz)	Avg ON Power (dBm)	Avg Tx Power (dBm)
1	1	16.651	16.536	1.000	2.008	498.041	10.280	7.261
2	2	16.286	16.396	1.000	2.008	497.919	10.285	7.266
3	3	16.600	16.688	1.001	2.009	497.870	10.283	7.267
4	4	16.372	16.623	1.000	2.008	497.886	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	...

BLX-403 Windows GUI

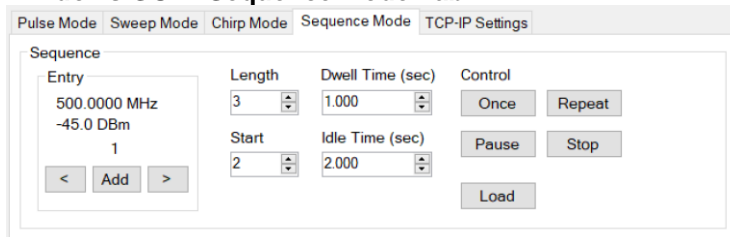
Windows GUI



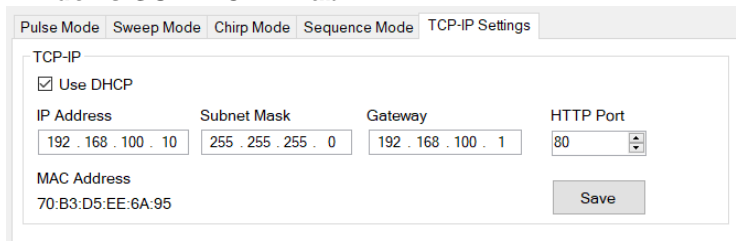
Windows GUI – Pulse Mode Tab




Windows GUI – Sequence Mode Tab



Windows GUI – TCP-IP Tab



*Note: Chirp Mode is not currently available

BLX-403

STATUS SETUP LOGOUT

- Status
- RF Settings
- Sequence Settings
- Network Settings
- Account Settings

RF Status

Frequency	0.5	[Min-Max(GHz): 0.5 - 40]
Output Power	10.0	[Min-Max(dB):-30.0 - +10.0]
RF Output	On	
Reference	Internal	
Units	GHz ▼	

Pulse Mode Configuration

Control State	Off
Pulse On Time	100.0
Pulse Repeat Time	600.0
Pulse Mod Source	Internal

Sweep Configuration

Control State	Stop
Sweep Mode	Once
Direction	Unidirectional
Start	0.5
End	40
Step Size	0.1
Dwell Time	100
Idle Time	0

Sequence Configuration

Control State	Stop
Sequence Length	0
Sequence Start	1
Dwell Time	1000
Idle Time	1000


Network Details

Mode	DHCP
Ip Address	192.168.1.183
Subnet	255.255.255.0
Gateway	192.168.1.1
MAC	70-b3-d5-ee-6c-b0

System Information

Model Number	BLX-403
Serial Number	32899
Version	1.0.0B

WebUI – RF Settings Tab



STATUS SETUP LOGOUT

BLX-403

Status

RF Settings

Sequence Settings

Network Settings

Account Settings

RF Output

Frequency	<input type="text" value="0.5"/> - <input type="text" value="100Hz"/> <input type="text" value="1e-7"/> (Valid range: 100Hz - 40GHz)	<input type="button" value="Set"/>
Units	<input type="text" value="GHz"/>	
Output Power	<input type="text" value="-40.0"/> dBm <input type="text" value="0.5dBm"/> <input type="text" value="0.5"/> dBm (Valid range: 0.5 - 40.0)	<input type="button" value="Set"/>
RF Output	<input type="button" value="On"/> <input type="button" value="Off"/>	
Reference	<input type="text" value="Internal"/>	


Pulse Modulation

Pulse Mode	<input type="text" value="Off"/>
Pulse On Time	<input type="text" value="100"/> uSec (Valid range: 0.1 uSec - 10 Sec)
Pulse Rep Time	<input type="text" value="800"/> uSec (Valid range: 0.2 uSec - 20 Sec)
Units	<input type="text" value="uSec"/>
Pulse Modulation	<input type="text" value="Internal"/>

Sweep Configuration

Sweep Control	<input type="button" value="Once"/> <input type="button" value="Repeat"/> <input type="button" value="Pause"/> <input type="button" value="Stop"/>
Sweep Direction	<input type="text" value="Unidirectiona"/>
Start Frequency	<input type="text" value="0.5"/> GHz (Valid range: 500MHz - 40GHz)
Stop Frequency	<input type="text" value="40"/> GHz (Valid range: 500MHz - 40GHz)
Step Size	<input type="text" value="0.1"/> GHz (Valid range: 100Hz - 39.5GHz)
Dwell Time	<input type="text" value="100"/> msec (Valid range: 1-10000)
Idle Time	<input type="text" value="0"/> msec (Valid range: 0-10000)

WebUI – Sequence Settings Tab



STATUS SETUP LOGOUT

BLX-403

Status

RF Settings

Sequence Settings


Network Settings

Account Settings

Sequence Configuration

Input Sequence	<input type="button" value="Choose File"/> No file chosen <input type="button" value="Load Sequence"/>
Sequence Control Mode	<input type="button" value="Once"/> <input type="button" value="Repeat"/> <input type="button" value="Pause"/> <input type="button" value="Stop"/>
Sequence Length	<input type="text" value="0"/>
Sequence Start	<input type="text" value="1"/>
Dwell Time	<input type="text" value="1000"/> msec (Valid range: 1-10000)
Idle Time	<input type="text" value="1000"/> msec (Valid range: 0-10000)

WebUI – Network Settings Tab



STATUS SETUP LOGOUT

BLX-403

Status

RF Settings

Sequence Settings

Network Settings

Account Settings

Network Configuration

IP Type	<input type="text" value="DHCP"/>
IP Address	<input type="text" value="192.168.1.183"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text" value="192.168.1.1"/>
HTTP Port	<input type="text" value="80"/>

BLX-403 Mechanical Outline

