80 Channel HTOL System

Introduction

For cost-effective HTOL testing it's desirable to test large numbers of units simultaneously. This requires a system capable of distributing a test signal over a large number of channels with a high power signal source used in order to overcome the inevitable splitter losses.

In the configuration shown in Figure 1, the use of four HPA-100W-63+ amplifier units are used to power 80 test channels. This setup is popular for use in high-throughput production testing applications such as HTOL where parallel processing of many DUTs is a requirement.

The entire system can be placed into a single Rack Frame, shown in Figure 2.

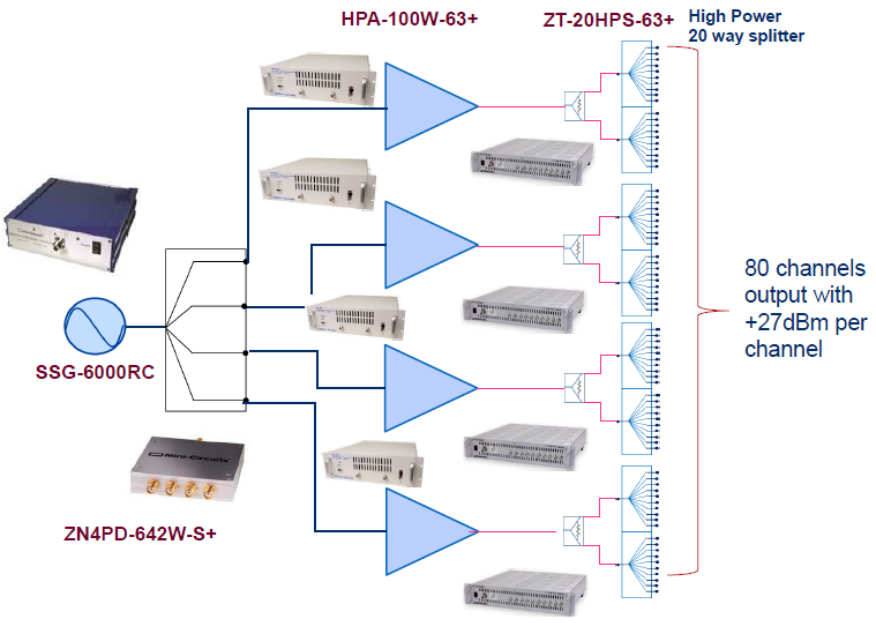

Figure 1
Mini-Circuits' HTOL System

Figure 2
Rack Setup for HTOL System

Cautionary Notes

In the initial setup, set the SSG to low power with the following instructions to make sure all connections are correct. After that, set the SSG power to achieve the desired output power as shown on page 3 & 4.

Recommended sequence for connecting the amplifier:

A. Connect AC mains power supply
B. Connect output loads. **Make sure all ports are terminated**
C. Turn on the AC power of the amplifier
D. Set RF input signal to -30 dBm
E. Apply the RF input signal

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Signal Generator GUI Control

Mini-Circuits' Signal Generators can be controlled via the MCL GUI or via a multitude of programming languages. This section will go through the basics of using the MCL GUI.

Mini-Circuits' GUI can be downloaded on our website in the Software Download Section: https://www.minicircuits.com/softwaredownload/sg.html

Once downloaded and installed, simply open the GUI (it'll be named Mini-Circuits Generator) and connect by either USB or Ethernet (available to RC models only).

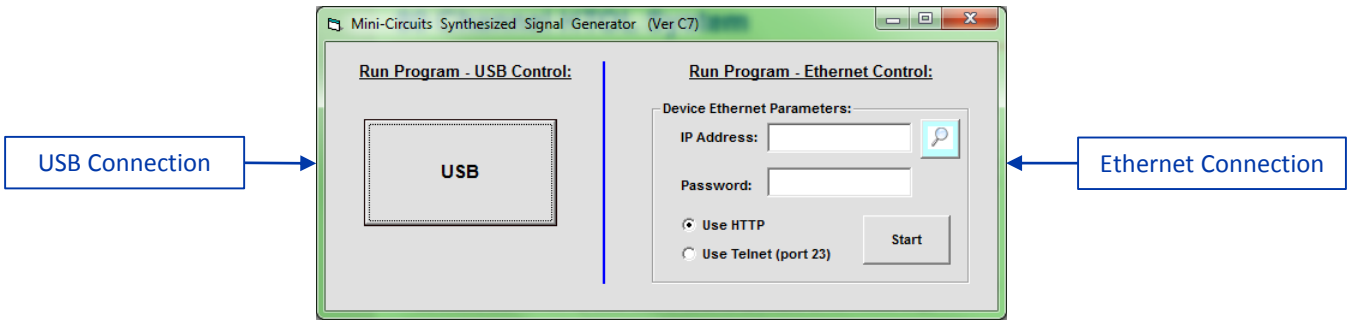

Figure 3
Mini-Circuits SSG GUI Connection Screen

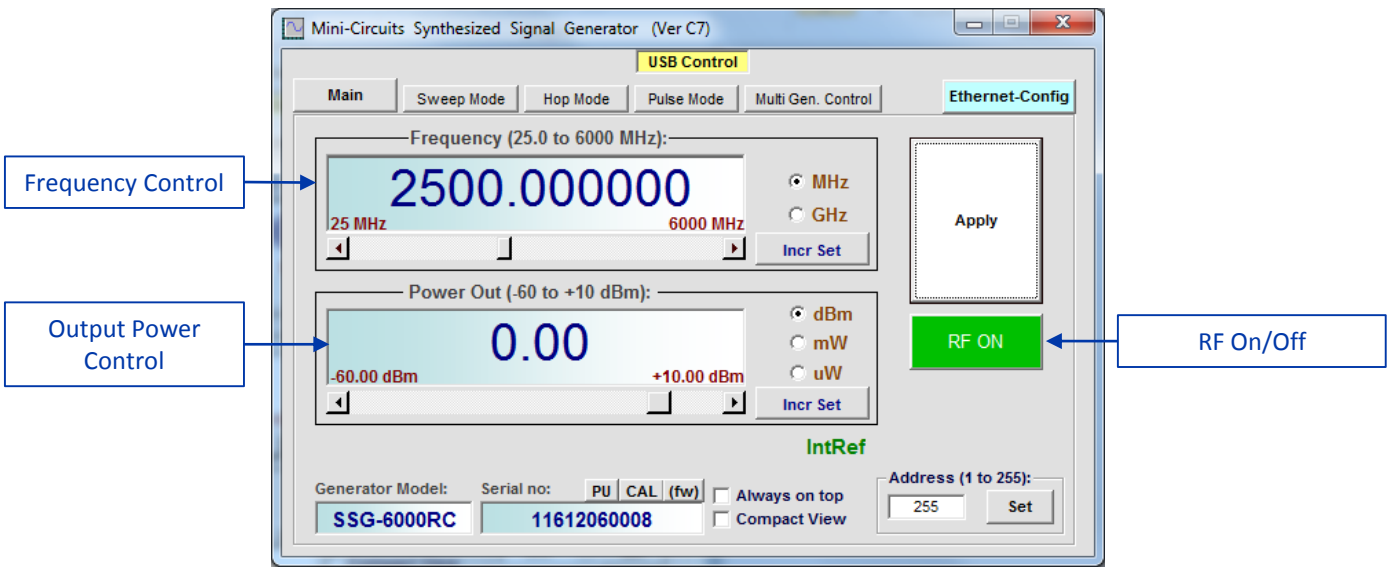

Figure 4
Mini-Circuits SSG GUI Home Screen

For a more in-depth look on using the GUI or for help with controlling the unit via your own programming environment, view the User Guide and/or the Programming Manual found in the *Software Download* section on the website. There are also Programming Examples in various programming environments to help you get started.

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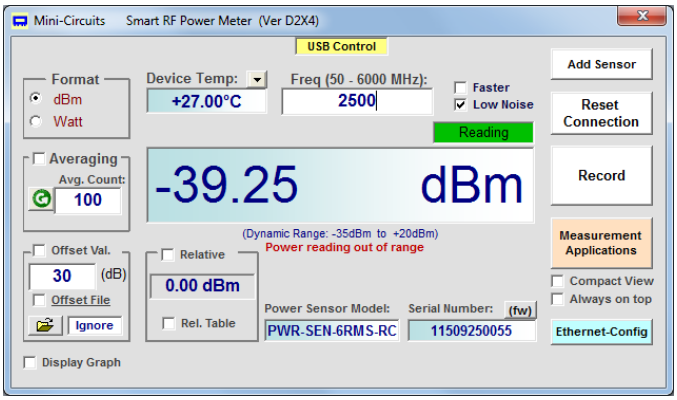
Attenuation of 40dB Attenuator

To protect our reading equipment, a 40dB High Power Attenuator was connected to it. The attenuation of this was measured at the specific frequencies we'll be testing the system at. You'll notice the offset values of our measurements are based on the attenuator's values at those frequencies.

Attenuation at 2500 MHz	Attenuation at 2700 MHz	Attenuation at 6000 MHz
39.25	39.29	38.25



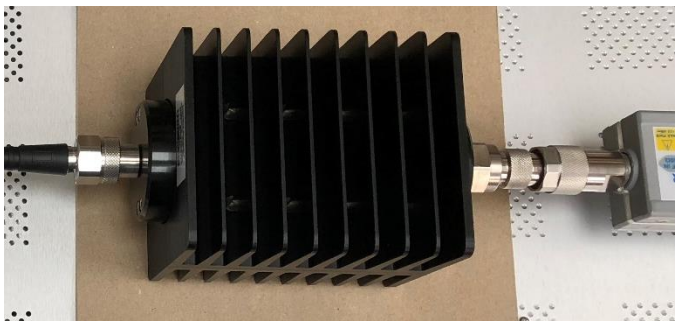


Figure 5
Attenuation at 2500 MHz

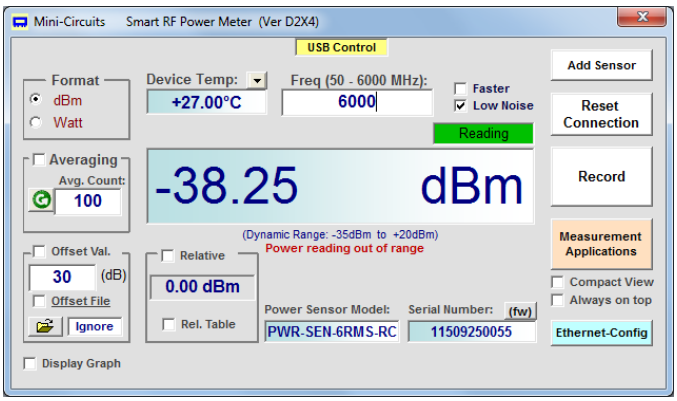


Figure 7
Attenuation at 6000 MHz

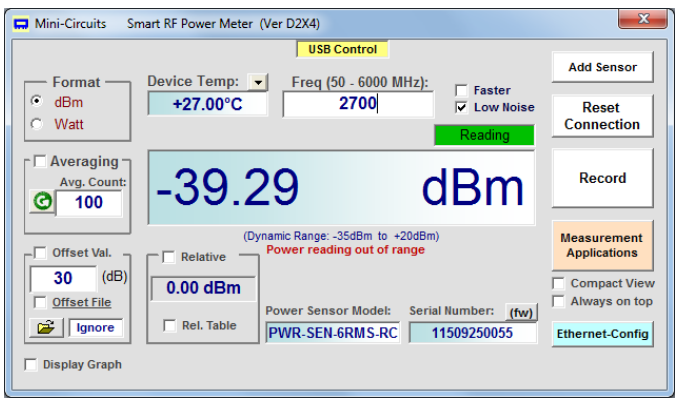


Figure 6
Attenuation at 2700 MHz

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RF System Performance

Frequency (MHz)	Output Power of SSG (dBm)	Output Power of ZN4PD (dBm)	Output Power (dBm)	
			Channel 1	Channel 2
2500	0.00	-7.43	+31.19	+31.39

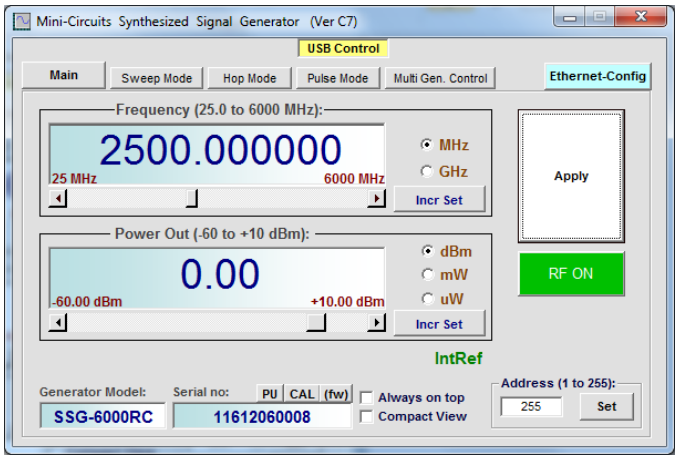

Figure 8
Output Power of SSG

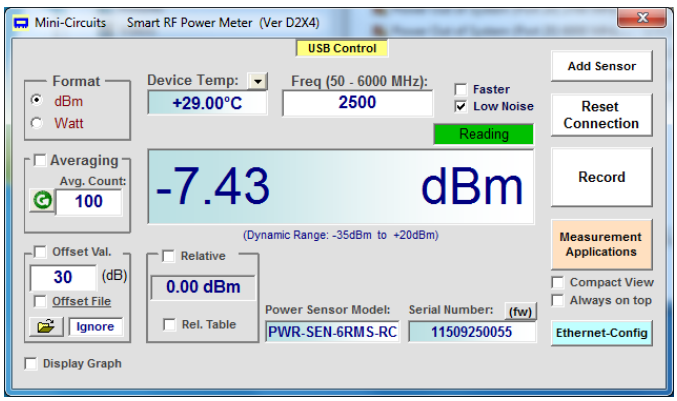

Figure 9
Output Power of ZN4PD

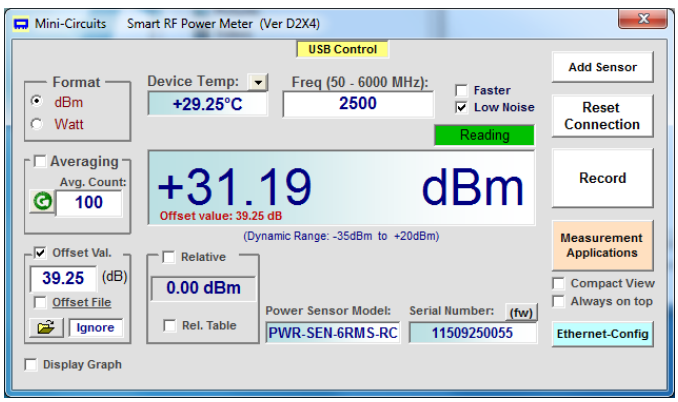

Figure 10
Output Power of Channel 1

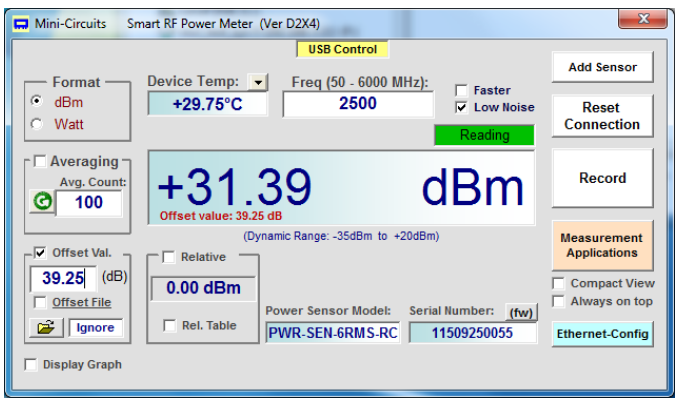

Figure 11
Output Power of Channel 20

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RF System Performance

Frequency (MHz)	Output Power of SSG (dBm)	Output Power of ZN4PD (dBm)	Output Power (dBm)	
			Channel 1	Channel 2
2700	0.00	-7.59	+31.22	+31.47

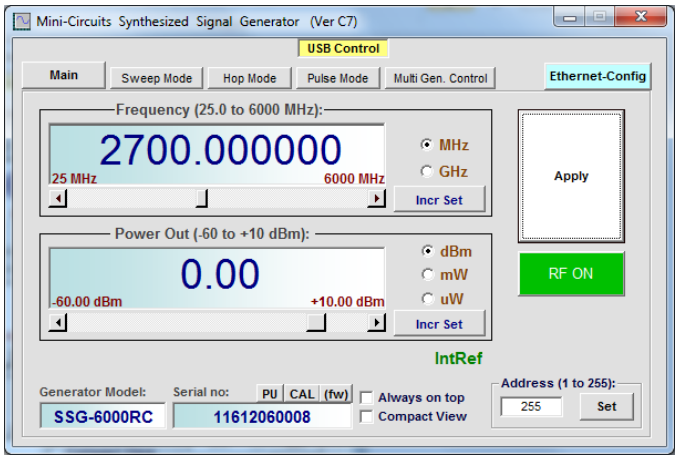

Figure 12
Output Power of SSG

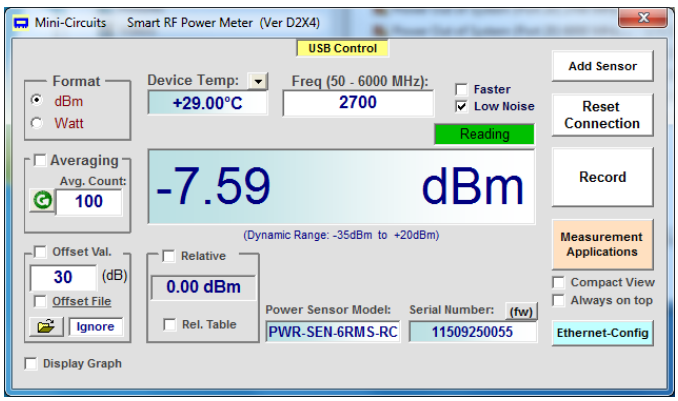

Figure 13
Output Power of ZN4PD

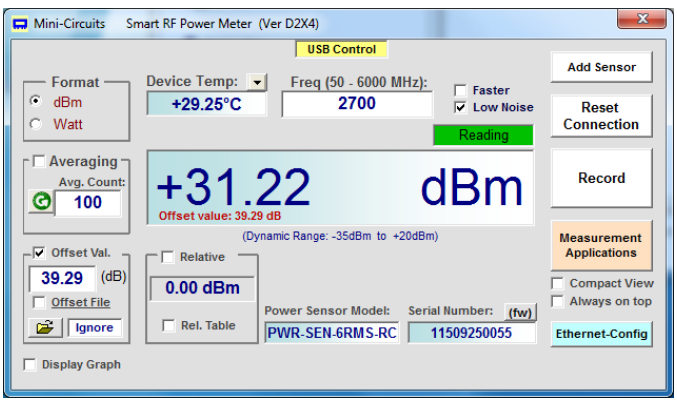

Figure 14
Output Power of Channel 1

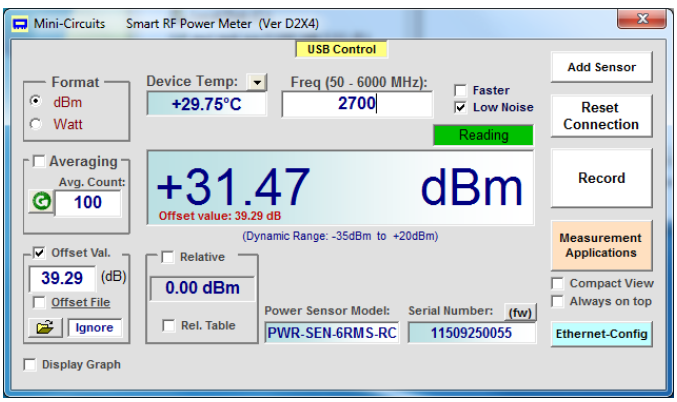

Figure 15
Output Power of Channel 20

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RF System Performance

Frequency (MHz)	Output Power of SSG (dBm)	Output Power of ZN4PD (dBm)	Output Power (dBm)	
			Channel 1	Channel 2
6000	0.00	-8.53	+28.29	+27.87

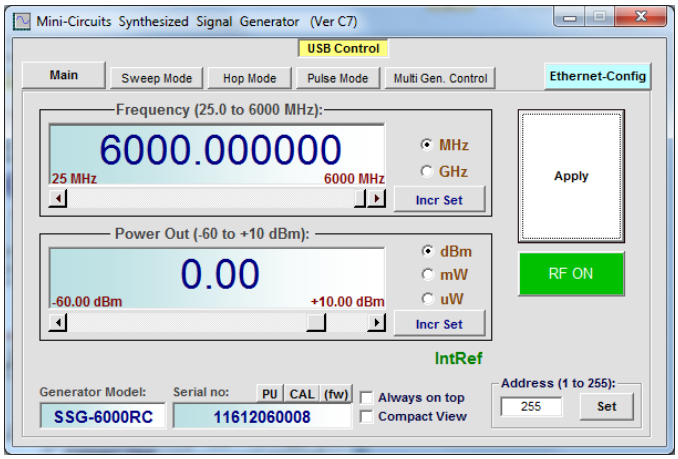

Figure 16
Output Power of SSG

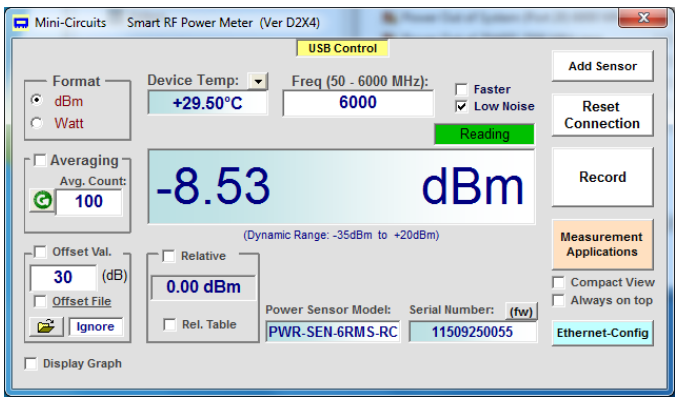

Figure 17
Output Power of ZN4PD

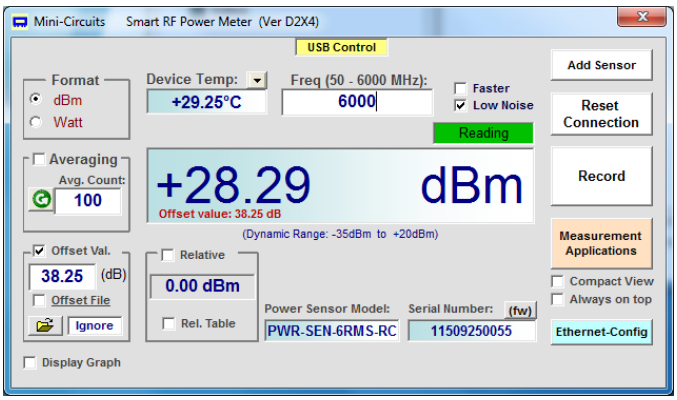

Figure 18
Output Power of Channel 1

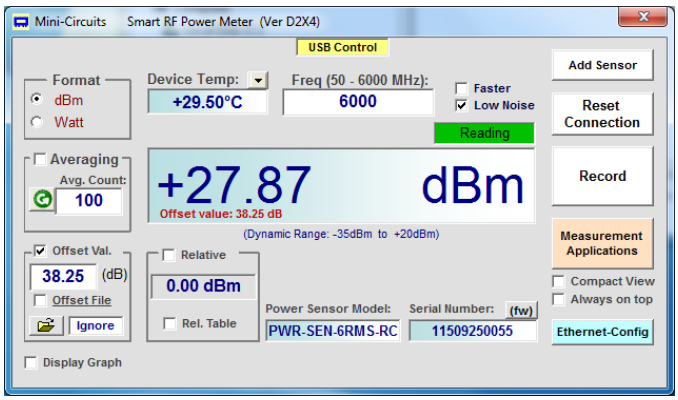

Figure 19
Output Power of Channel 20

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Securing Mini-Circuits' Products to the Rack

Our suggested placement of all 8 units is shown in Figure 20.

Placing each "set", where a set is a single HPA-100W-63+ with a single ZT-20HPS-63-S+, together will help minimize and equalize the cable lengths you will need. Currently, the cable lengths used between the HPA and the ZT is 2-feet.

Notice that the SSG-6000RC and the ZN4PD-642W-S is not placed into the Rack. They can be placed there as well, but it would need more cable management to accomplish.

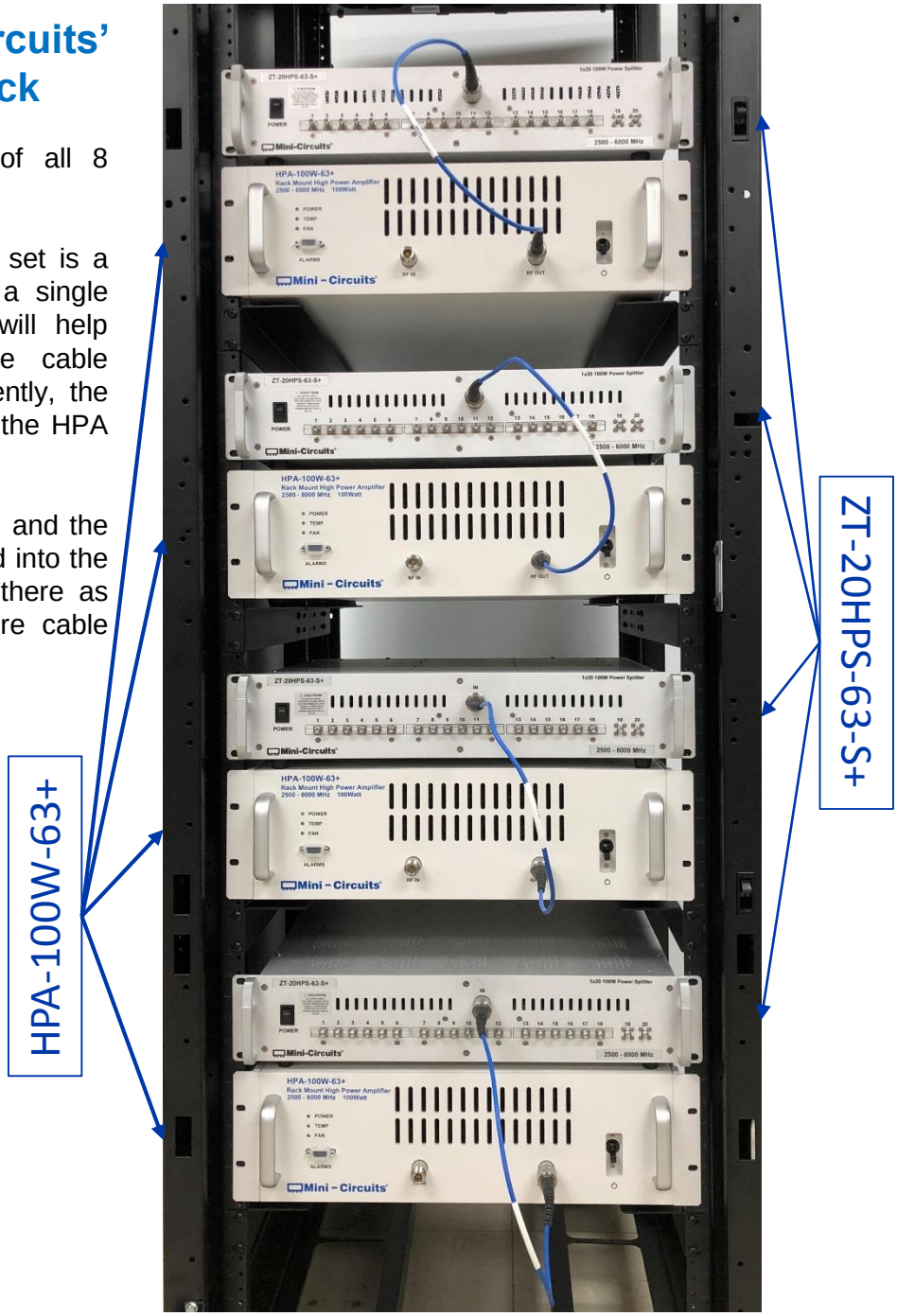

Figure 20
HTOL Test Rack MCL Suggested Placement