



How to Use the **RF Power Tool System** to Enable Non-Traditional RF Customers

FTF-IND-F1279

Paul Gan | RF Power Product Marketing

JUNE 2015



External Use

Freescall, the Freescall logo, AllVee, C-S, CodeTEST, CodeWarrior, ColdFire, ColdFire+, C-Ware, the Energy Efficient Solutions logo, Kinetic, MagniV, mobileGT, PEG, PowerQUICC, Proccesor Expert, QorIQ, QorIQ Converge, QorIQ, Ready Plus, SafeAssure, the SafeAssure logo, StarCore, Synphony, VortiGo, Vybrid and Xilinx are trademarks of Freescall Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Airtel, iBeeK, iBeeStack, CoreNet, Flexis, Layerscape, M3C, Platform in a Package, QUICC Engine, SMARTMO2, Tower, TurboLink and UMMS are trademarks of Freescall Semiconductor, Inc. All other product or service names are the property of their respective owners. © 2015 Freescall Semiconductor, Inc.



Introducing the RF Power Tool: RF for non-RF engineers



PC with LabView



RF Power Tool



PA module



Customer system

RF Power Tool Purpose

- The RF Power Tool is designed for non-RF engineers, to **evaluate** Solid-State RF and **prototype** innovative solutions
- This modular bench-in-a-box removes the need to invest in a full RF bench while making access to RF **easy** thanks to its intuitive User Interface
- Combines an RF Generator and test bench capabilities



What is it exactly?

RF Signal Generator

+

Test bench

with 10 measurements points:

- Power (input, intermediate, output, reflected)
- Temperature, Current, Voltage for both driver and final stage transistor



RF Power Tool



PA module

Removes the need to invest upfront in these:



Or When Mounted:



RF Power Tool Equipped Bench Setup



Hardware Overview

RF Power Tool

Front View



2.45GHz 250W PA

Shielded PA with 2 HDMI connectors



2.45GHz
RF port

Back View



USB
connection
to PC

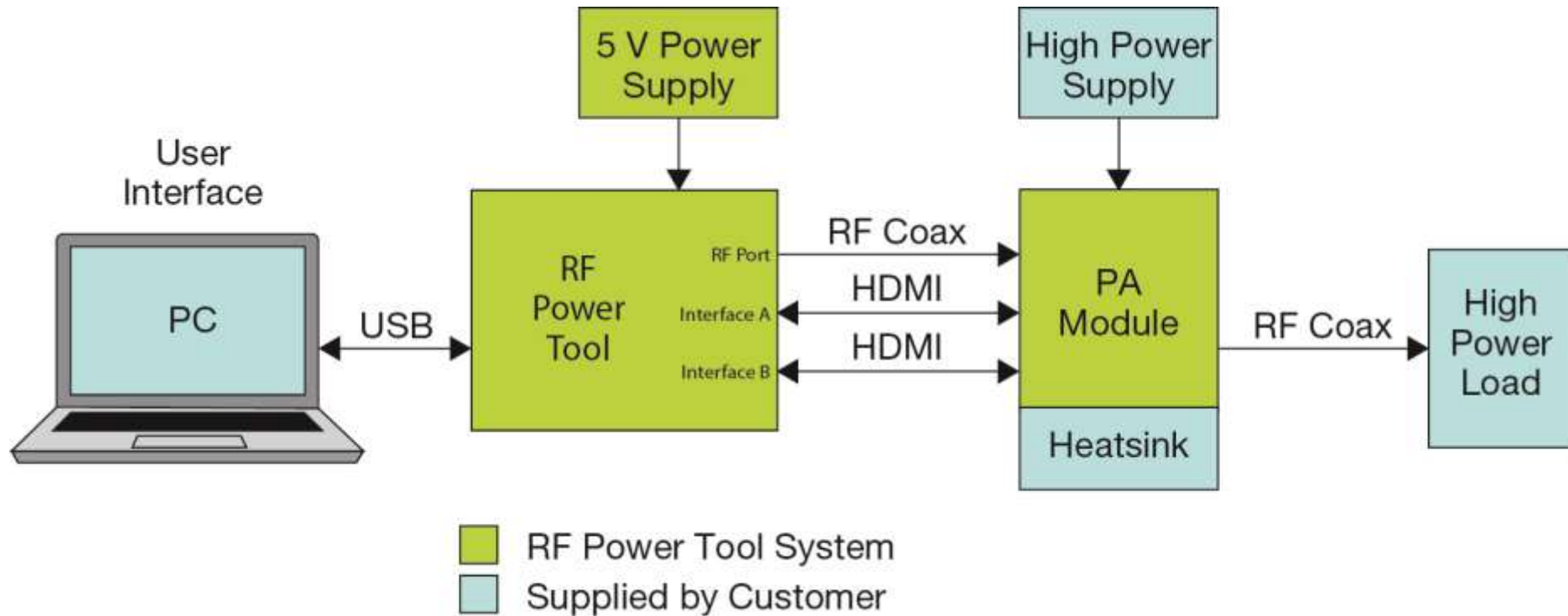
Inside: one full RF line-up and one detection board







Block diagram



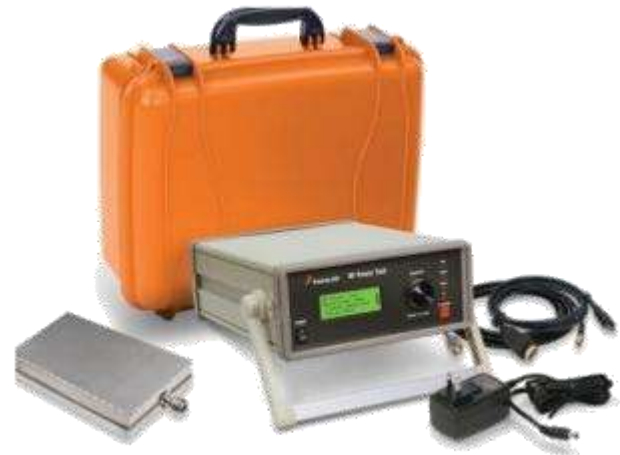
RF Power Tool Setup: In The Box

RF Power Tool box

- RF Power Tool
- Wall adaptor
 - 5V 3A universal input, with adaptors for various countries.
- SMA – SMA coaxial cable
 - RF cable suitable for frequencies from 1MHz to 5GHz
- 2 HDMI cables
 - Used as 4 shielded twisted pair cables, not as digital video cables.
- USB cable
- PC software
- Orange Case
- Documentation:
 - Quick Start Guide
 - Hardware user guide with SCPI command list
 - GUI (Graphical User Interface) user guide

PA Module box

- Power Amplifier line-up with couplers & sensors
- Orange case
- Documentation:
 - Circuit Information Document
 - Measured data (Pin/Pout, Frequency sweep)



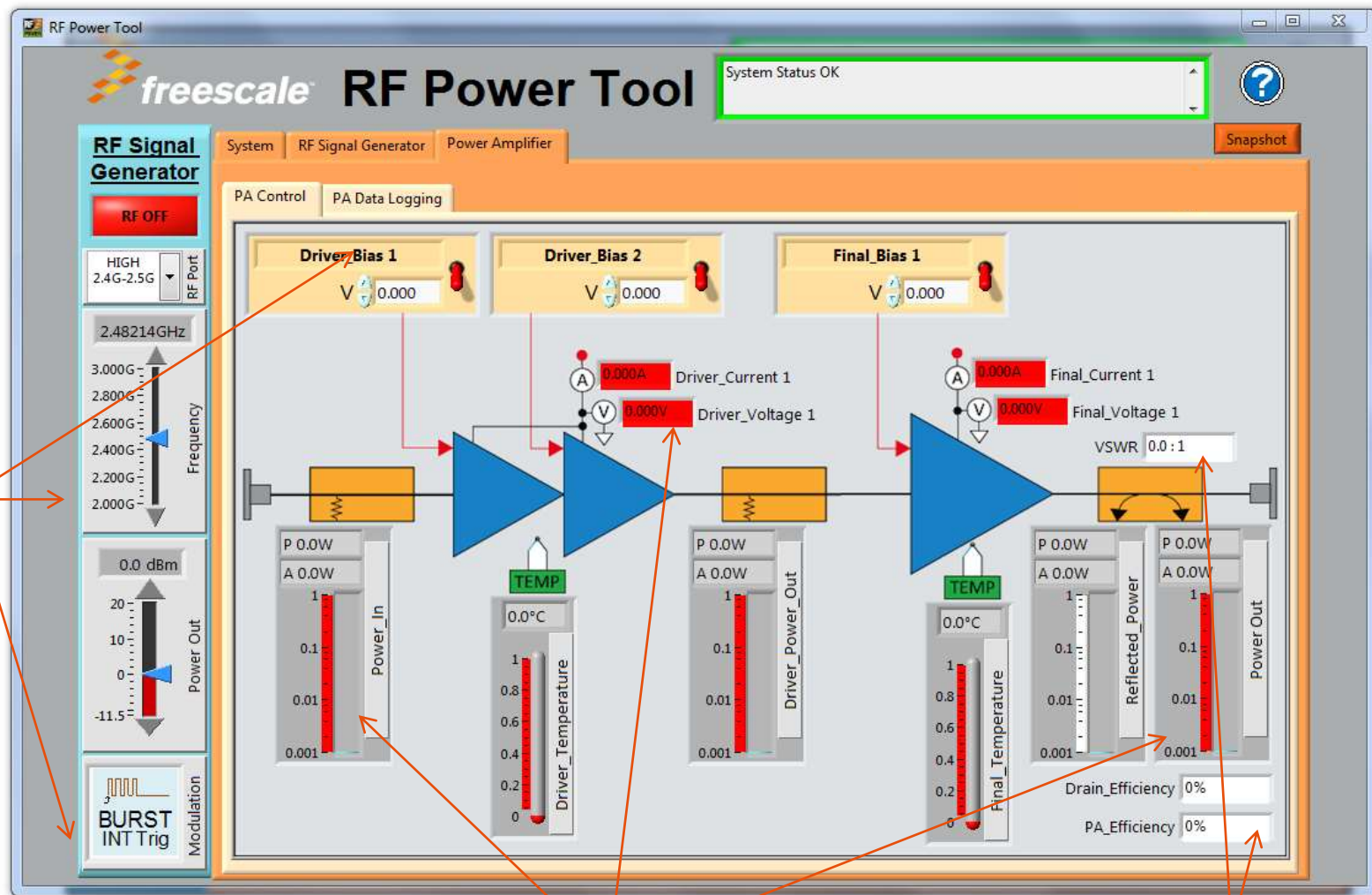
User Supplied Parts



- High power supply
 - Size is 2x rated power of Power amplifier at rated voltage of the final transistor
 - Suggest using TDK Lambda or MeanWell server brick style ([link](#))
- Load
 - Suggest using Bird or Dielectric labs that are rated for frequency and power of the PA ([link](#))
- Cooling method
 - Easiest is large heatsink with 6inch square flat surface to mount the PA.
 - 6 x12 , 3 inch high will suffice for 100W without fan, 250W with fan ([link](#))
- Connecting cable between PA and Load.
 - Careful to select one suitable for power of the amplifier, and have minimum loss.
 - Bigger is better. ([link](#))



Intuitive LabView User Interface for PC

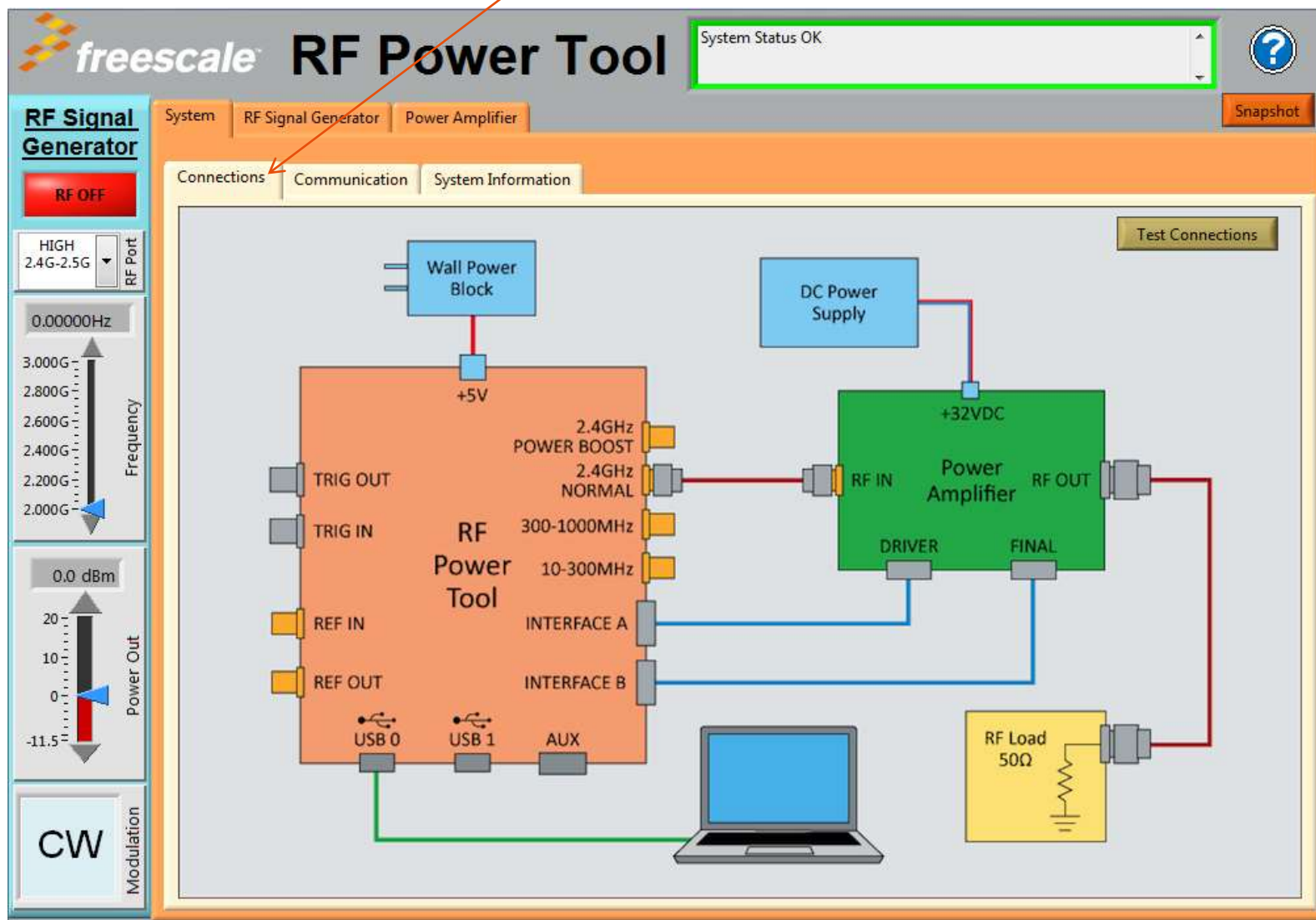


Key parameters of the RF source

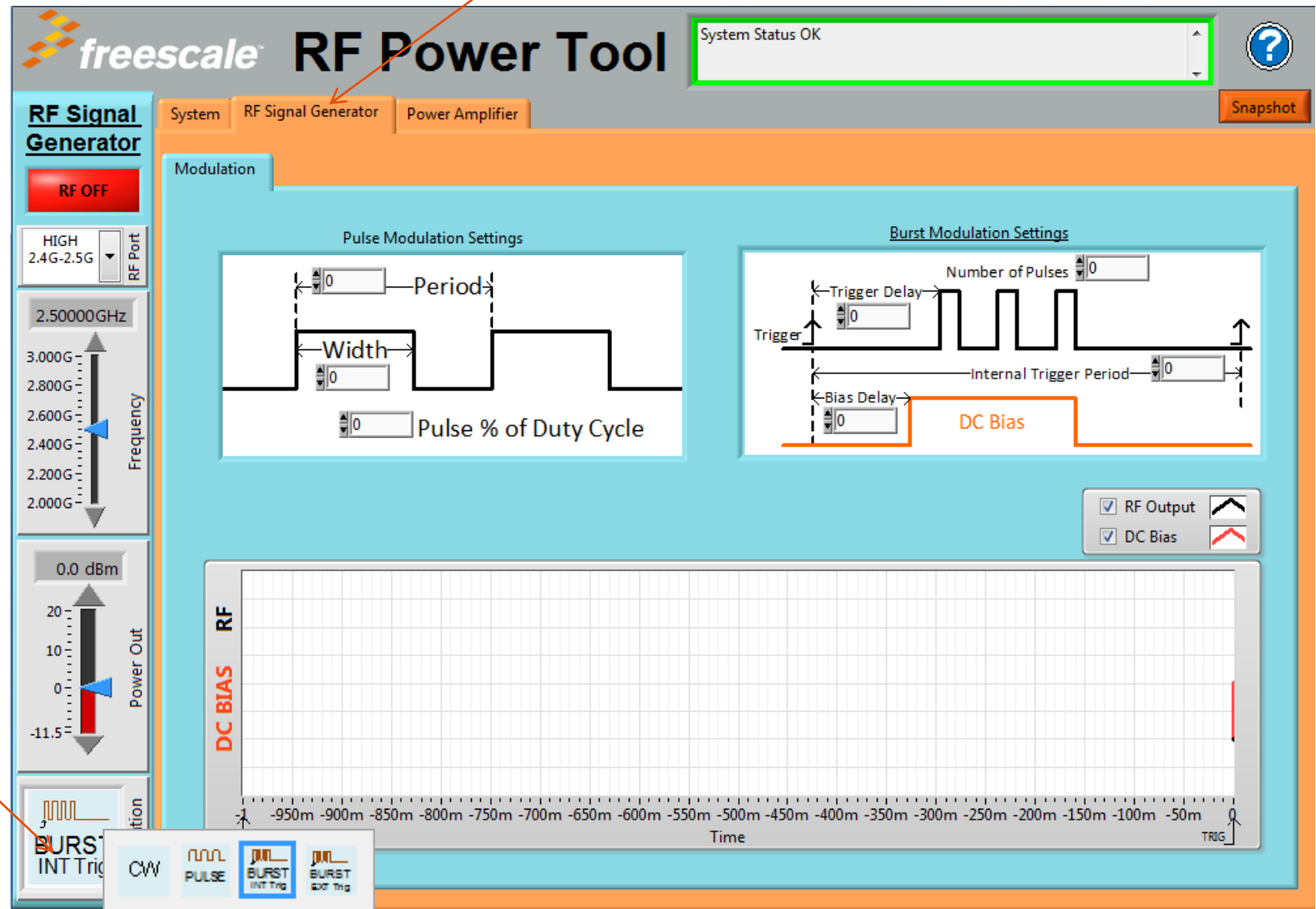
10 Measurements from the PA module
(2 temp, 2 voltage, 2 current, 4 power)

Calculated Data
(VSWR, efficiency)

Connection self-check



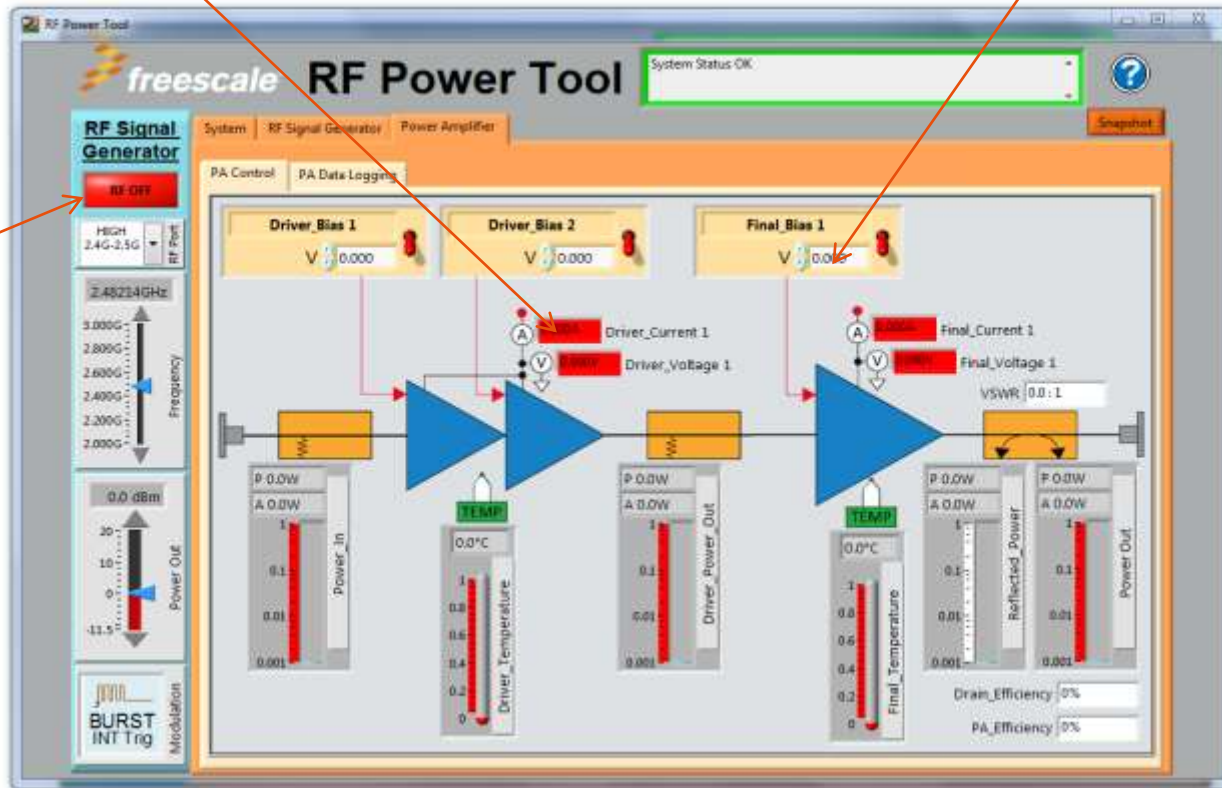
Pulse signal generation



Built-in Security

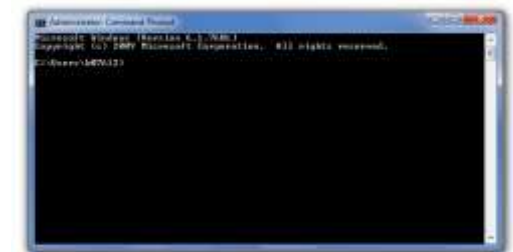
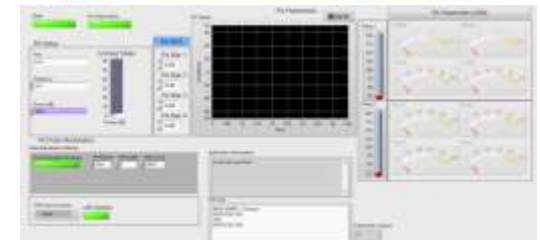
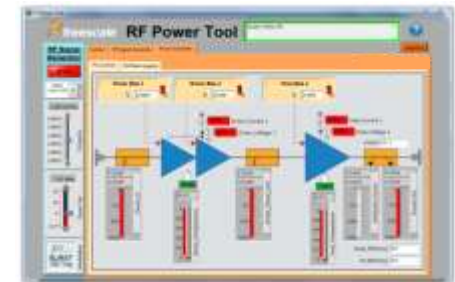
Each measurement point blinks if warning threshold reached

Biassing voltage is limited to max value



5 ways to use the RF Power Tool

1. No PC
 - RF Power Tool built-in display
2. Freescale reference LabView interface
3. User-defined LabView interface
 - LabView driver provided
4. Text command – serial Interface
 - SCPI command reference list provided
 - Enables scripting
5. Custom embedded software
 - Using Freescale embedded processors



RF Power Tool Capabilities

- Signal Generation
 - Frequency 10MHz to 3GHz with 10Hz steps
 - Power Level adjustable in 0.5dB steps
 - Pulse Modulation 1% to 100%, 1uS resolution
 - Bias Voltage Supply (0-5V 10mV steps)
- Measurement bench with 10 measurement points
 - Power (input, intermediate, output, reflected)
 - Temperature (driver, final stage transistor)
 - Current (driver, final stage transistor)
 - Voltage (driver, final stage transistor)



Ordering Information

- Order now on www.freescale.com/rfpowertool or through Freescale Distributors
- RF Power Tool:
 - RFPOWERTOOL1000
 - \$5,500
- PA Module:
 - RFPT-H2450-250 (250W at 2450 MHz)
 - RFPT-175-075 (75W over 135-175 MHz)
 - Contact Freescale for next PA Module releases
 - \$1,650
- Lead Time 6 weeks



RF Power Tool summary

- The RF Power Tool is designed for non-RF engineers, to **evaluate** Solid-State RF and **prototype** innovative solutions
- This unique and modular bench-in-a-box removes the need to invest in a full RF bench while making access to RF **easy** thanks to its intuitive User Interface
- Combines an RF Generator and test bench capabilities





www.Freescale.com