

TiWi-R2

RADIO TOOLS USER GUIDE



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1 Introduction

1.1 Purpose & Scope

The purpose of this document is to describe the software tools available to the mass market to test the WLAN and Bluetooth radios. Also described in this document is what hardware requirements are necessary in the TiWi-R2 Host Board to use these tools.

Also described in this document are the API's required to invoke these test modes. This would allow a software developer to build these commands into the Host Micro and avoid the need for an external interface to a PC.

1.2 Audience

This document is intended to be read by engineers and technical management. A general knowledge of common engineering practices is assumed.

1.3 Applicable Documents

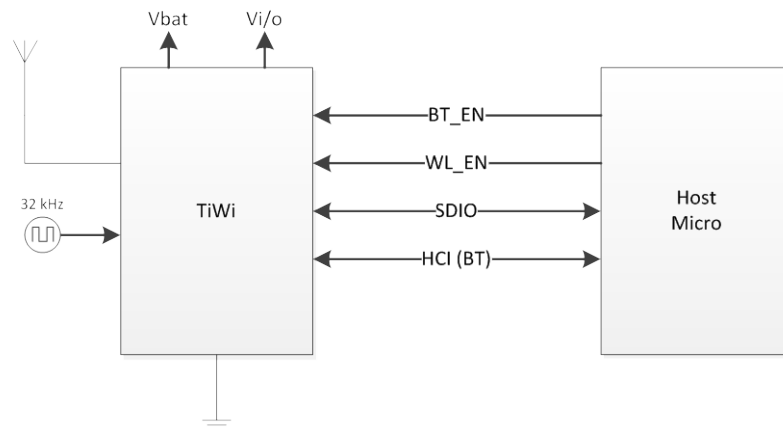
- TiWi-R2 Datasheet 330-0045

1.4 Revision History

Date	ECN	Change Description	Revision
9/26/2011	-	Initial release	1.0

Table 1 Revision History

2 Implementing Test Mode API's on Host Micro



2.1 WLAN

Under Development by TI

The current TI Wiki page is dated October 2010 – TI will be updating this page to include additional information on API's to invoke WLAN Test Modes.

http://processors.wiki.ti.com/index.php/OMAP35x_Wireless_Connectivity_PLT_Recommendations

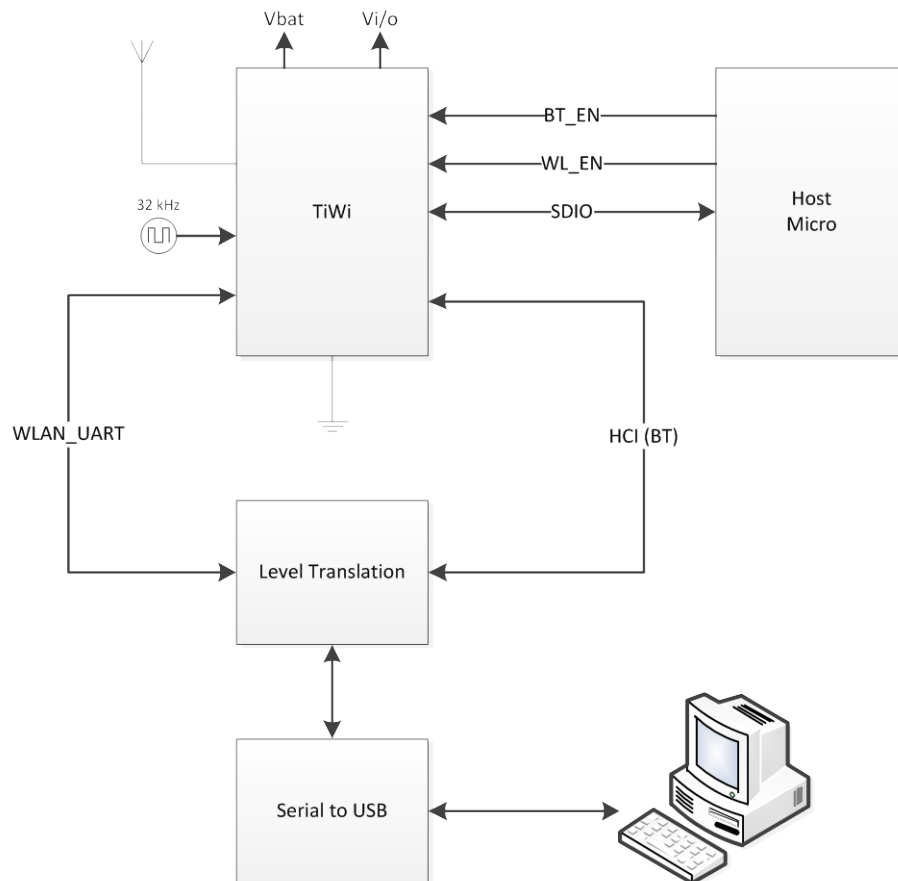
2.2 Bluetooth

Under Development by TI

The current TI Wiki page is dated October 2010 – TI will be updating this page to include additional information on API's to invoke WLAN Test Modes.

http://processors.wiki.ti.com/index.php/OMAP35x_Wireless_Connectivity_PLT_Recommendations

3 Using LSR Tools to Invoke Test Modes



3.1 Obtaining the LSR Software

3.1.1 TiWi Bluetooth Evaluation Tool (LSR Part Number 930-0030)

The TiWi Bluetooth Evaluation Tool can be obtained from the TiWi Page on the LSR website or by contacting LS Research.

3.1.2 TiWi WLAN Evaluation Tool (LSR Part Number 930-0019)

The TiWi WLAN Evaluation Tool can be obtained from the TiWi Page on the LSR website or by contacting LS Research.

3.2 Using the Software

3.2.1 TiWi Bluetooth Evaluation Tool

To use the TiWi Bluetooth Eval Tool effectively, the user must use the tool in this order:

1. Connect to the TiWi on the specified COM port
2. Load the appropriate patch file into the TiWi module
3. Evaluate constant transmit or constant receive

3.2.1.1 Connecting to the TiWi Bluetooth Port

Open the tool, select the desired COM port and press the connect button. Upon connecting to the Bluetooth device successfully, an appropriate message will be displayed.

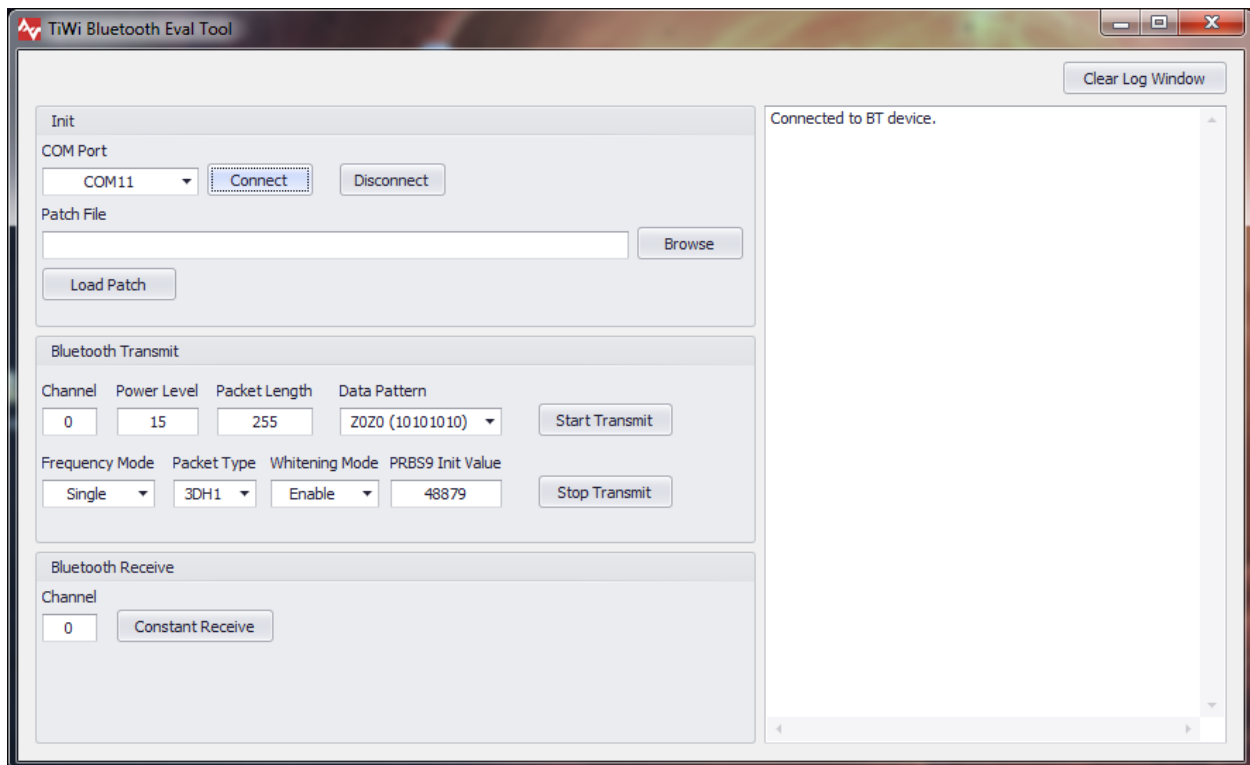


Figure 1 BT device connected successfully

NOTE: The serial communication between the PC tool and the TiWi module runs at 115,200 baud.

3.2.1.2 Loading the BT patch

To load the BT patch into the module, the user can type the patch file path in or use the browse button to select the patch file. An appropriate patch file will have a .hci extension. Once the patch file is selected, the user can click the “Load Patch” button and the patch will be loaded into the module. Depending on the size of the patch, this can take several seconds.

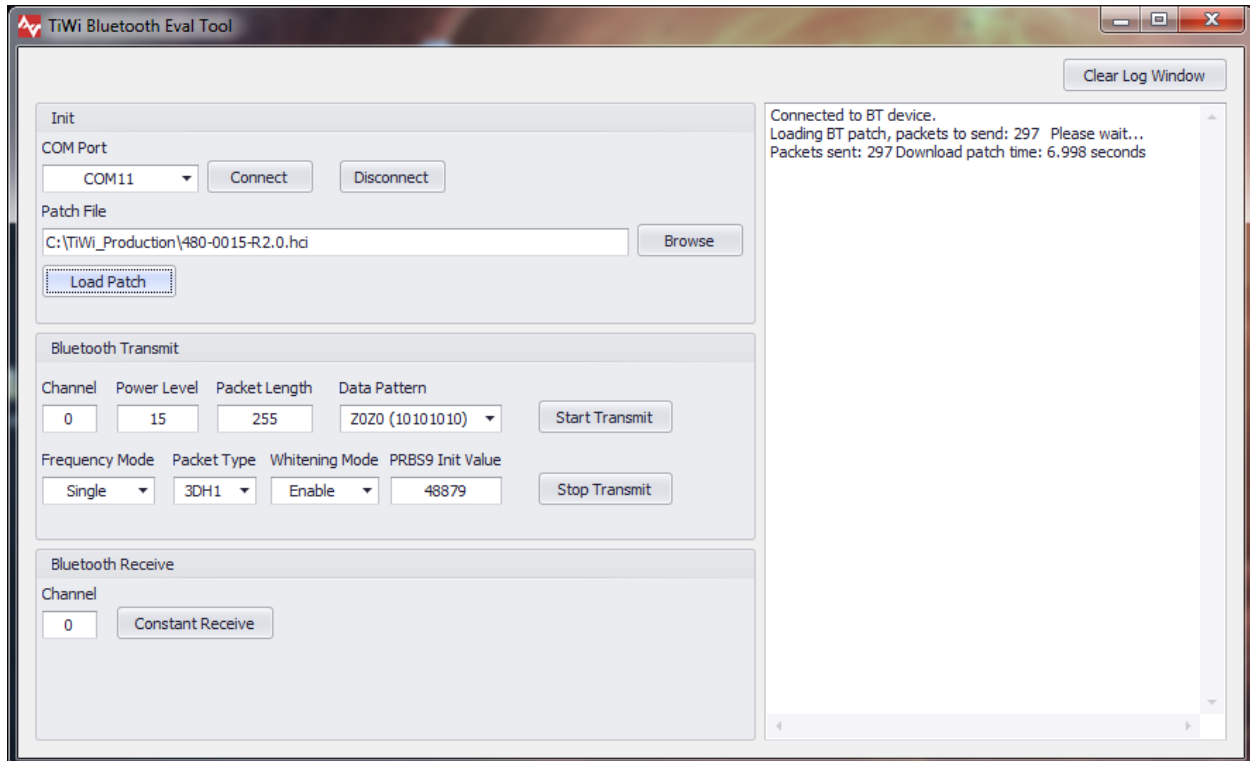


Figure 2 Load BT patch successfully

Once the patch is loaded, the tool can be used to evaluate the constant transmit or receive characteristics of the TiWi module.

3.2.2 TiWi WLAN Evaluation Tool

To use the TiWi WLAN Eval Tool effectively, the user must use the tool in this order:

1. Connect to the TiWi on the specified COM port
2. Load the appropriate firmware into the TiWi module
3. Run a transmit BIP calibration so accurate transmit levels are reached
4. Evaluate constant transmit or constant receive

3.2.2.1 Connecting to the TiWi WLAN Port

Open the tool, select the desired COM port, baud rate, and make sure the FREF Clock is set to 38.4MHz and the select the “Connect” button.

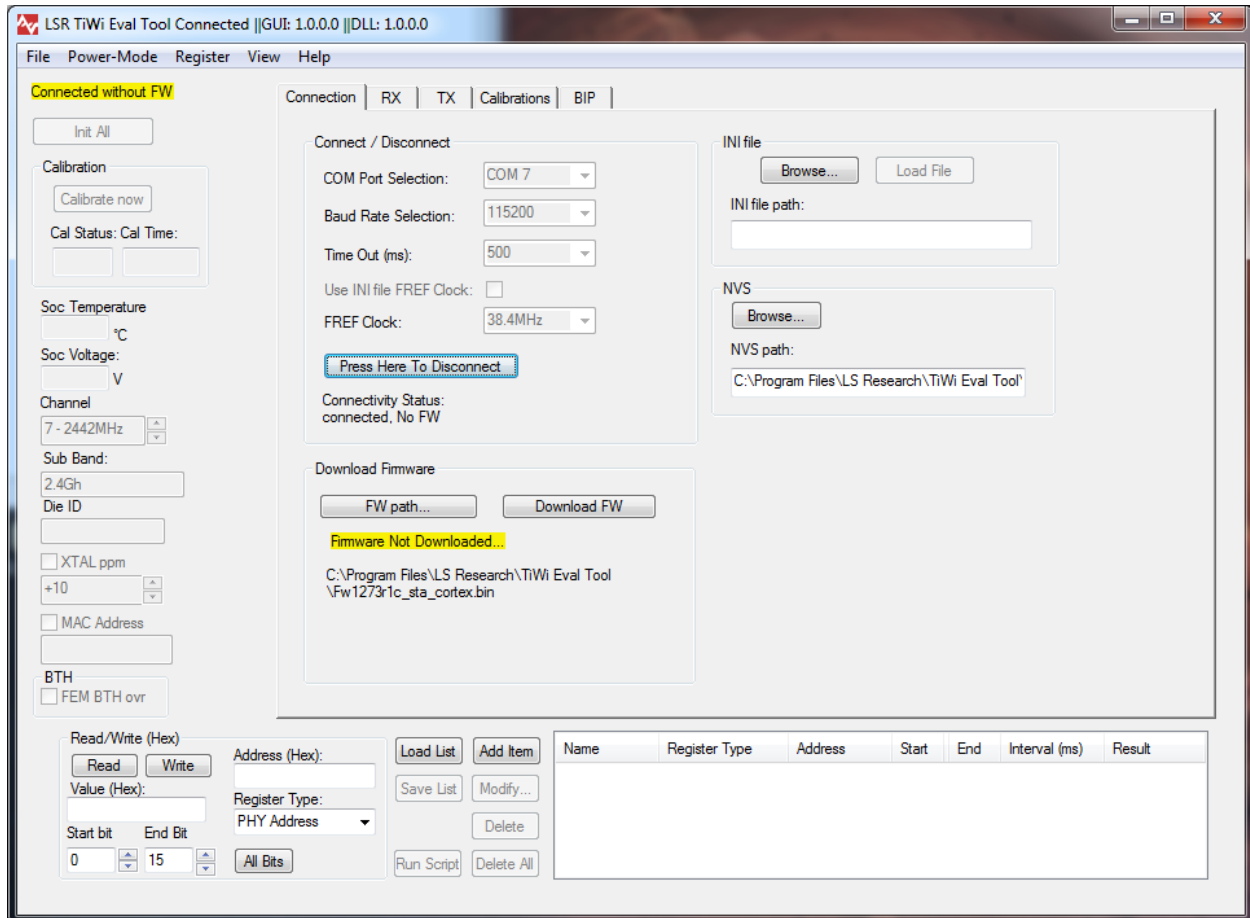


Figure 3 Connected to TiWi WLAN successfully

3.2.2.2 Loading the WLAN firmware

The user must select the desired firmware and INI file and then click the “Download FW” button.

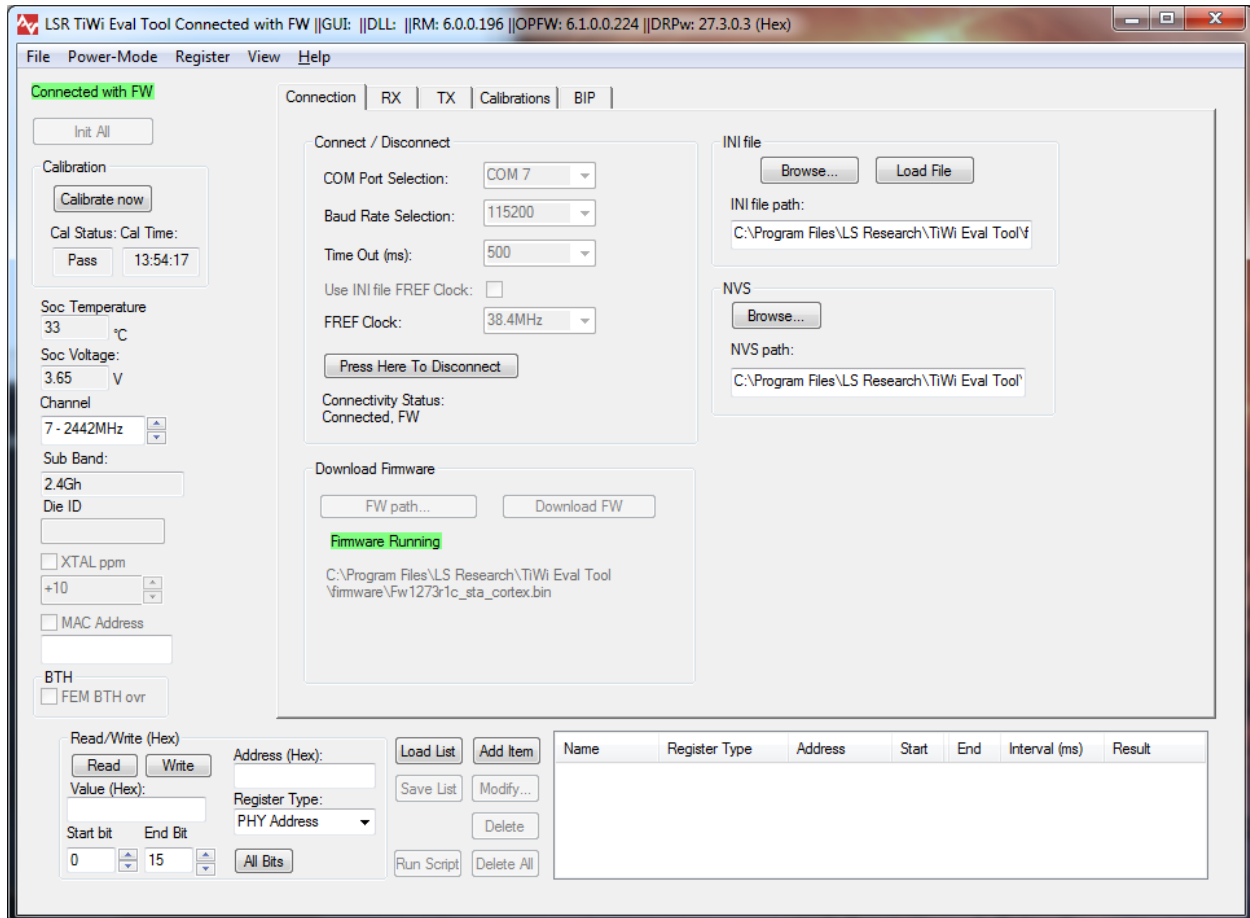


Figure 4 WLAN firmware loaded successfully

3.2.2.3 Running TX BIP (Transmit calibration)

To run the TX BIP, the user must navigate to the BIP tab of the tool. 16dBm and 375mV should be entered in the appropriate boxes. The user must then click the “Run TX BiP” button. When the calibration has completed successfully a message displaying “Notify: RX BIP Wasn’t performed.”

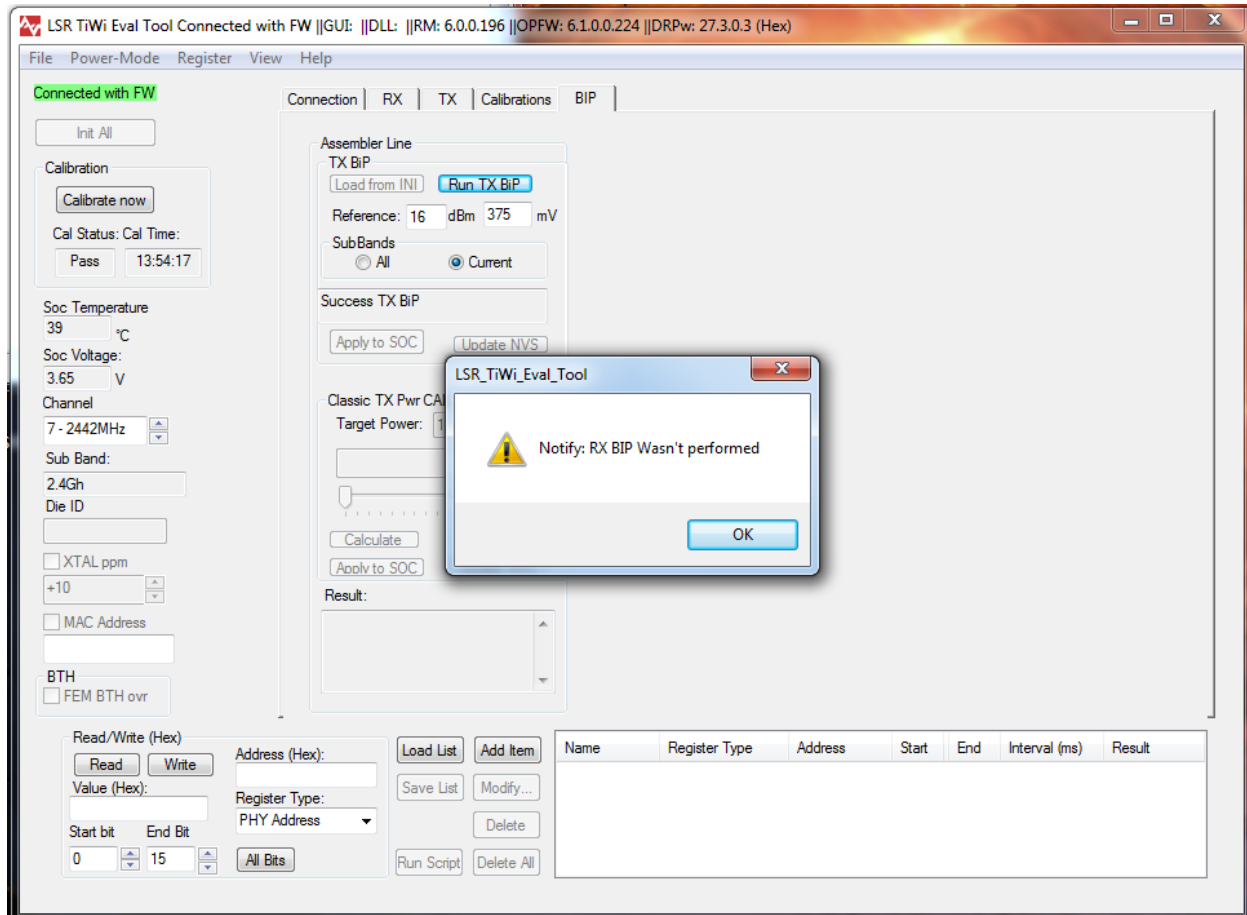


Figure 5 TX BIP ran successfully

3.2.2.4 Evaluating WLAN TX and RX

The TX and RX characteristics of the TiWi module can be evaluated using the respective tabs.

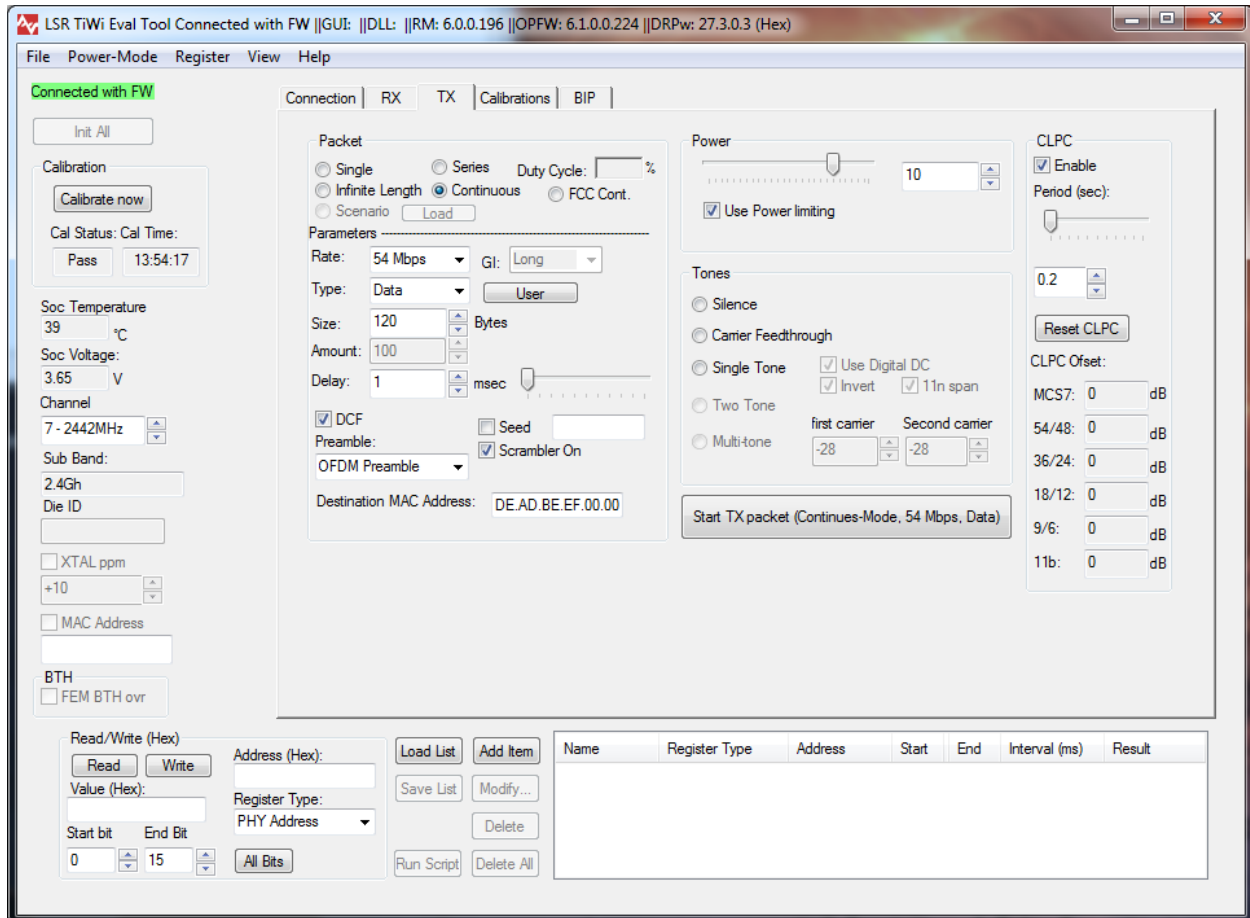


Figure 6 TiWi WLAN TX tab

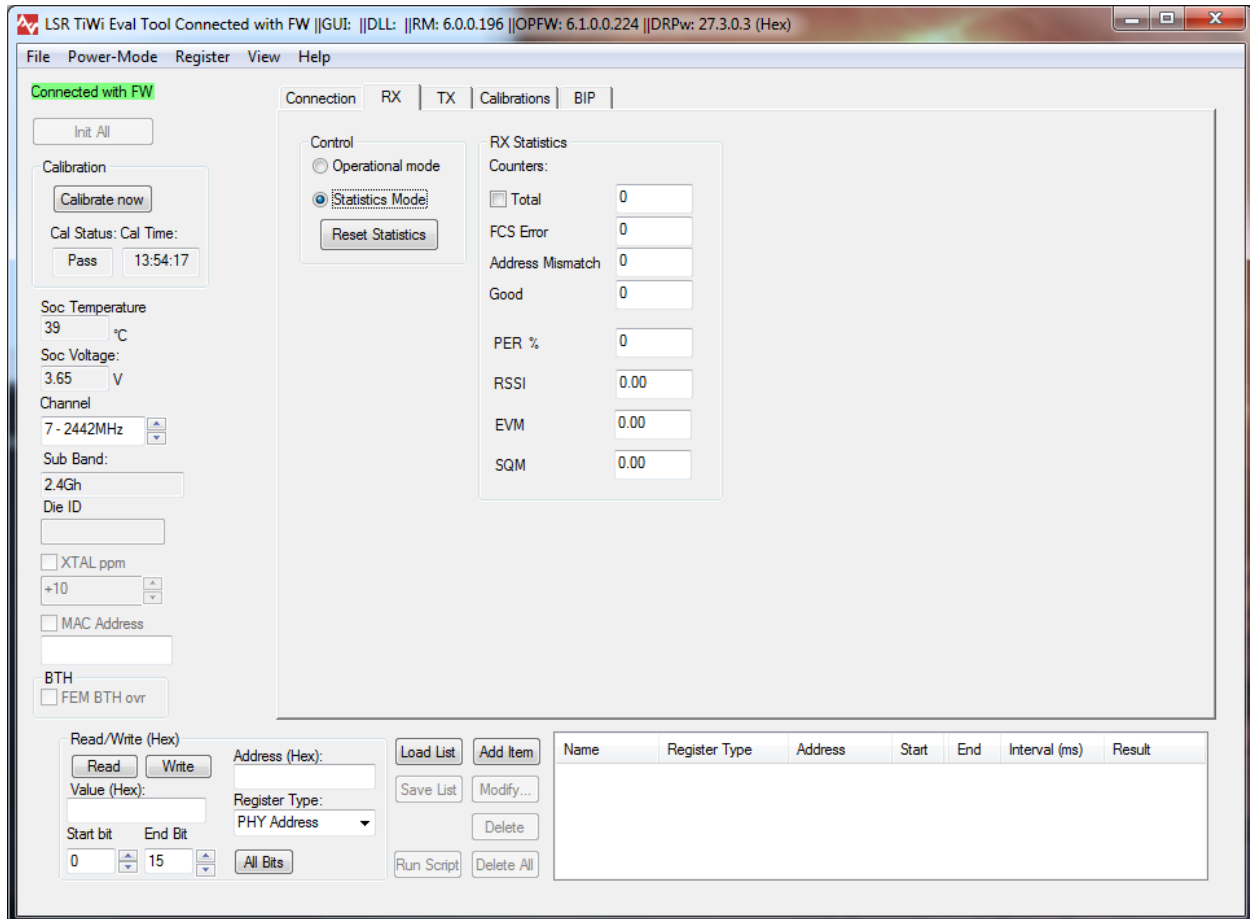


Figure 7 TiWi WLAN RX tab

4 Hardware Requirements for LSR Tools

4.1 USB to Serial Conversion

A UART connection to the TiWi-R2 module is needed to put both the WLAN and Bluetooth radios into test modes. The most common way to do this is with a USB to serial converter such as made by FTDI (<http://www.ftdichip.com/>).

4.2 Level Translation

The I/O on the TiWi-R2 module operates at 1.8V DC, but the USB to serial converters commonly run a 3.3V DC, therefore level translation is needed. LS Research has used a Fairchild 74VCX164245MTD for voltage translation on past designs successfully.

4.3 Minimum Required TiWi-R2 Connections

The Power-Up Sequence Diagram in the TiWi Datasheet must be followed.

Pin Number	Pin Description	Connect To
1	VBAT	3.3V DC
11	VIO	1.8V DC
19	SLOW_CLK	32.768 kHz clock
12,30,44-47,49-56	GND	GND

4.4 TiWi-R2 Connections for WLAN

Pin Number	Pin Description
7	WL_RS232_RX
8	WL_RS232_TX
10	WL_EN

4.4.1 WLAN Enable Pin

The WLAN Enable Pin (WL_EN) must be properly asserted per the Power-Up Sequence Diagram in the TiWi Datasheet.

4.5 TiWi-R2 Connections for Bluetooth

Pin Number	Pin Description
34	HCI_RX
35	HCI_RTS
36	HCI_TX
39	HCI_CTS
5	BT_EN

4.5.1 Bluetooth Enable Pin

The Bluetooth Enable Pin (BT_EN) must be properly asserted per the Power-Up Sequence Diagram in the TiWi Datasheet.

4.5.2 Sharing the HCI Port for Bluetooth

The Bluetooth HCI Port needs to be shared between the Host Micro and Bluetooth Test Tool (PC). Provisions need to be in place on the Printed Circuit Board to prevent contention between the PC's UART and the Host Micro's UART. There are various ways this could be implemented; a simple method that may work in some applications is to use resistor population options to disconnect the unused port.

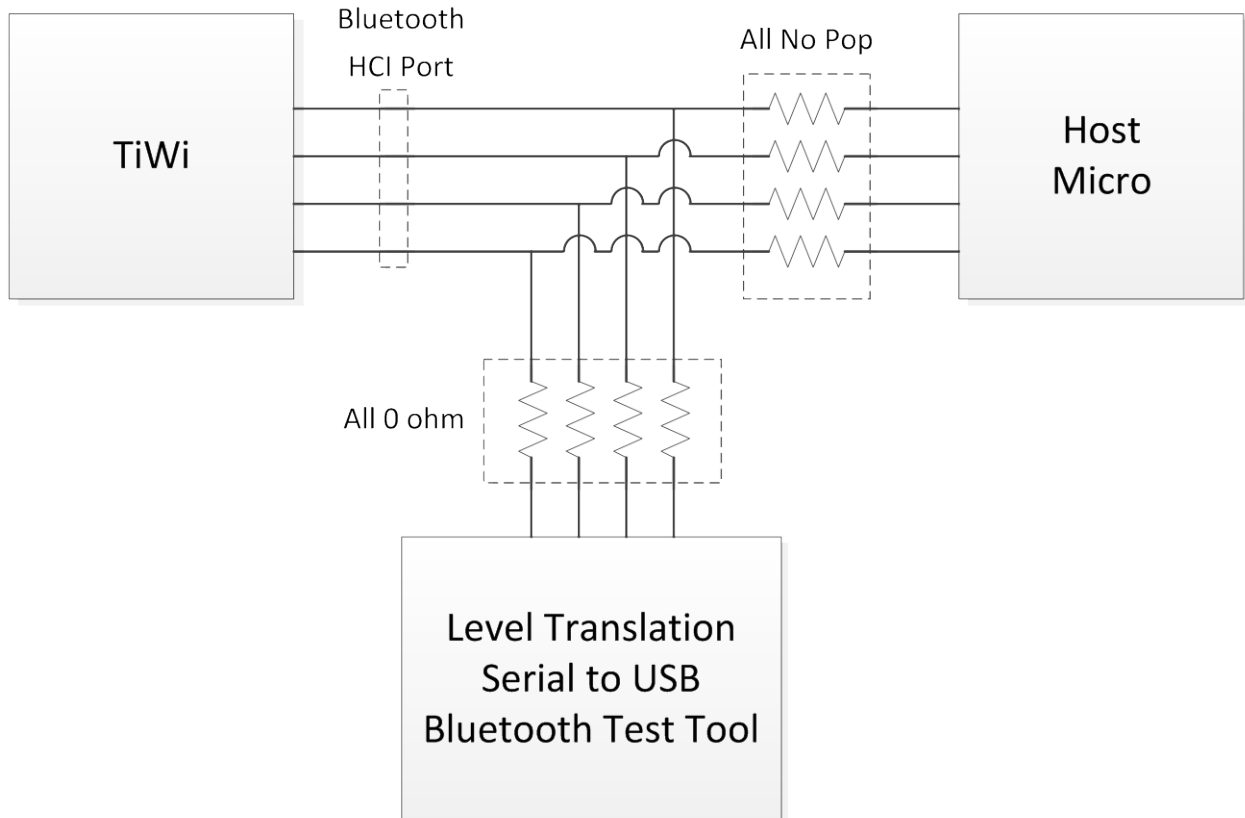


Figure 8

5 Contacting LS Research

Headquarters	LS Research, LLC W66 N220 Commerce Court Cedarburg, WI 53012-2636 USA Tel: 1(262) 375-4400 Fax: 1(262) 375-4248
Website	www.lsr.com
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