

# **xPico-SMT EVB**

*Wi-Fi RF test user guide*

## *Revision history*

<i>Revision</i>	<i>Date</i>	<i>Change description</i>
1.0	2014/11/05	First draft of the document

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## About this document

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### Purpose of this document

This document provides an overview of the manufacturing test application and the Iperf application available for use with xPico-SMT EVB. The document describes the purpose of these applications and how to use them. The images will have already been downloaded to our xPico evaluation boards.

## Driver Installation and setup

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When you receive the EVB, the application will have already been downloaded to it. Plug on the USB cord in the upper left corner and connect it to your PC. **Note that the OS of the PC is Linux:**

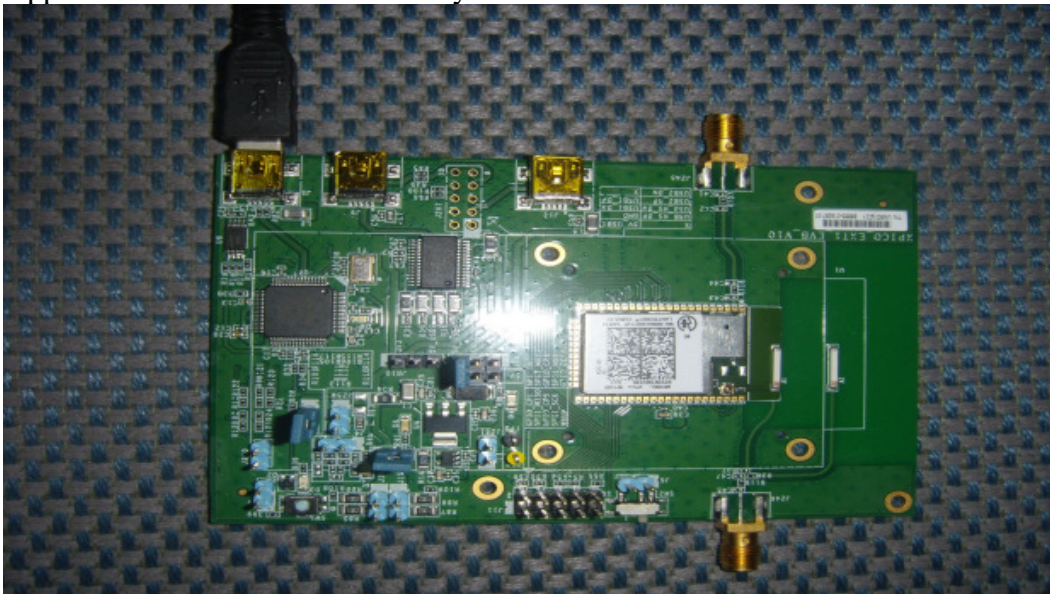


Figure 1. xPico-SMT EVB setup

Next, you should install ftdi driver by type command as follow in the command line:

```
$ sudo rmmod ftdi_sio  
$ sudo rmmod usbserial  
$ sudo modprobe ftdi_sio vendor=0xa5c product=0x43fa
```

Finally, use the tool minicom to open uart port ttyUSB1 as follow:

```
$ minicom -s  
1. choose Serial port setup  
   A - Serial Device   : /dev/ttyUSB1  
2. choose Exit
```

After that, you will have opened ttyUSB1 using minicom. The testing environment is similar to the structure bellow

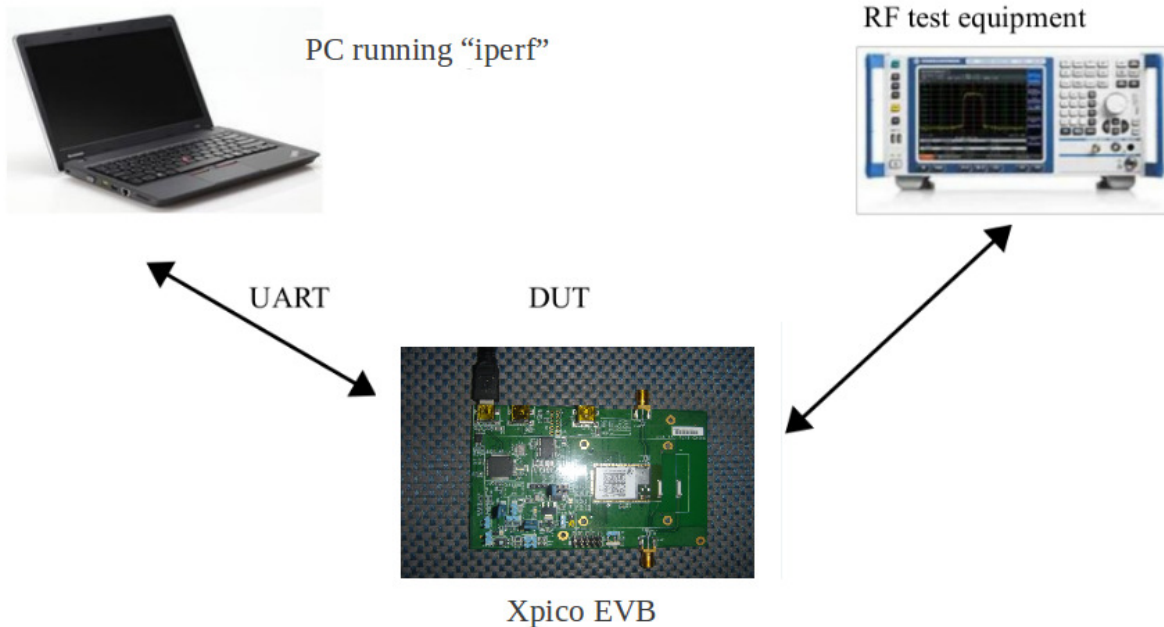


Figure 2. Testing Environment

## Iperf application

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Iperf is already downloaded to the device as a console application. Connect to xPico-SMT EVB with a terminal program (e.g., minicom or PuTTY) with parameters 115200 8N1.

After the program starts, it will try to connect to the default AP “YOUR\_AP\_SSID”. If your AP ssid is set to “YOUR\_AP\_SSID”, the xPico EVB will connect to your AP automatically when power on. We can connect to another AP by using the “join” command also. Type “help” for an explanation of all commands.

<b>Console Commands:</b>
<i>help</i> [ <i>&lt;command&gt;</i> [ <i>&lt;example_num&gt;</i> ]]
- Print help message or command example.
<i>Join</i> <i>&lt;ssid&gt;</i> <i>&lt;open\wpa\wpa2&gt;</i> [ <i>key</i> ] [ <i>key length</i> ]
- Join an AP. DHCP is needed.
<i>scan</i>
- Scan all enabled channels and print a list of Aps found.
<i>start_ap</i> <i>&lt;ssid&gt;</i> <i>&lt;open\wpa\wpa2&gt;</i> <i>&lt;key&gt;</i> <i>&lt;channel&gt;</i>
-Start AP mode.
<b>iperf</b>
<b>- Run iperf –help for usage.</b>
<i>ping</i>
- Get status.
<i>status</i>
- Get status.
<i>set_tx_power</i> <i>&lt;0-32&gt;</i>
- Set the tx power in dBm.
<i>get_tx_power</i>

- Gets the tx power in dBm.
<i>set_bg_rate</i>
- Sets rate for the B/G PHY
<i>get_bg_rate</i>
- Gets rate for the B/G PHY
<i>thread [priority] &lt;cmds&gt;</i>
- Spawns a new thread for the specified command. Optionally run at a specific priority.
<i>thread_kill &lt;thread id&gt;</i>
- Kills the specified running thread
<i>thread_list</i>
- Lists the current running threads
<i>thread_spawn [priority] &lt;cmds&gt;</i>
- Spawns a new thread for the specified command. Optionally run at a specific priority.

Figure 3. Console help

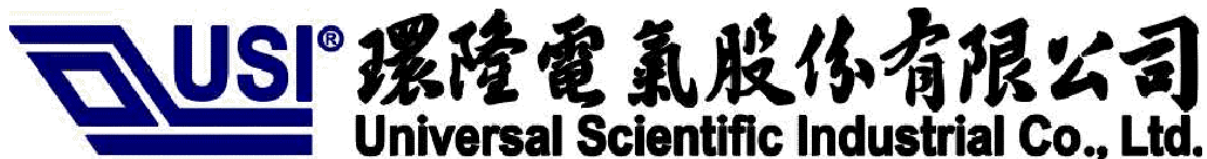
For example, to join an AP with no security enabled:

**Start join to an AP**

> join Buffalo-OPEN open

Joining : Buffalo-OPEN  
 Exit wiced\_wifi\_prepare\_join in Wiced/WWD/internal/wwd\_wifi.c at 790  
 Failed to join : Buffalo-OPEN .. retrying  
 Exit wiced\_wifi\_prepare\_join in Wiced/WWD/internal/wwd\_wifi.c at 790  
 Successfully joined : Buffalo-OPEN  
 Obtaining IP address via DHCP  
 Network ready IP: 172.18.121.156

**Start running Iperf throughput tests:**



After xPico-SMT successfully connect to an AP, we can start running Iperf throughput tests.

Start a TCP server:

```
> iperf -s
```

Start an UDP server

```
> iperf -s -u
```

Start an UDP multi-cast server bound to 224.1.1.1:

```
> iperf -s -u -B 224.1.1.1
```

Start a TCP client:

```
> iperf -c 192.168.1.136
```

Start an UPD client and send at void priority (using the “-S” option), for 90 seconds at 10 Mbps, followed by the same command at video, best effort and background levels of priority:

```
> iperf -c 192.168.1.136 -u -S * -t 90 -b 10M
```

The corresponding “-S” option is set to 7, 5, 0, 1, respectively; “-t” specifies the duration of the test in seconds; you can also specify the report interval using “-i”.

Start an UDP multi-cast client:

```
> iperf -c 224.1.1.1 -u
```

Start Iperf in a thread to enable concurrent client and server modes for bi-directional testing. The default application priority is 7 so new threads should start at 7, as shown. However, it can be set to 6.

```
> thread 7 iperf -s
```

Start a bi-directional UDP throughput test. Note that each instance of Iperf must start on a separate port using “-p \*\*\*”

```
xPico> thread 7 iperf -s -u -i 10 -p 6000
```

```
xPico> iperf -c 192.168.1.136 -u -b 10M -t 90 -p 7000
```

```
HOST> iperf -s -u -i 10 -p 7000
```

```
HOST>iperf -c <xPico address> -u -b 10M -p 6000
```

Start a bi-directional TCP throughput test. Note that each instance of Iperf must start on a separate port using “-p \*\*\*”

```
xPico> thread 7 iperf -s -i 10 -p 6000  
xPico> iperf -c 192.168.1.136 -t 90 -p 7000
```

```
HOST> iperf -s -i 10 -p 7000  
HOST> iperf -c <xPico IP address> -p 6000
```

Note:

- Many Iperf parameters cannot be changed, for example TCP window size and max segment size.
- If the "thread" command is not used then after running an Iperf server the WICED module must be reset, i.e., there is no break key to restore the console prompt.
- The "thread\_kill" command is not supported.

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Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz-300 GHz) (IEC 62311:2007 (Modified))

- EN 300 328 V1.8.1: 2012

Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

- EN 301 489-1 V1.9.2: 2008

Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

EN 301 489-17 V2.2.1: 2012

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

**<insert CE mark + notified body number + alert mark here>**

<input type="checkbox"/> Česky [Czech]	[ <i>Jméno výrobce</i> ] tímto prohlašuje, že tento [ <i>typ zařízení</i> ] je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
<input type="checkbox"/> Dansk [Danish]	Undertegnede [ <i>fabrikantens navn</i> ] erklærer herved, at følgende udstyr [ <i>udstyrets typebetegnelse</i> ] overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
<input type="checkbox"/> Deutsch [German]	Hiermit erkläre [ <i>Name des Herstellers</i> ], dass sich das Gerät [ <i>Gerätetyp</i> ] in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
<input type="checkbox"/> Eesti [Estonian]	Käesolevaga kinnitab [ <i>tootja nimi = name of manufacturer</i> ] seadme [ <i>seadme tüüp = type of equipment</i> ] vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
<input type="checkbox"/> English	Hereby, [ <i>name of manufacturer</i> ], declares that this [ <i>type of equipment</i> ] is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
<input type="checkbox"/> Español [Spanish]	Por medio de la presente [ <i>nombre del fabricante</i> ] declara que el [ <i>clase de equipo</i> ] cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
<input type="checkbox"/> Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ [ <i>name of manufacturer</i> ] ΔΗΛΩΝΕΙ ΟΤΙ [ <i>type of equipment</i> ] ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.
<input type="checkbox"/> Français [French]	Par la présente [ <i>nom du fabricant</i> ] déclare que l'appareil [ <i>type d'appareil</i> ] est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
<input type="checkbox"/> Italiano [Italian]	Con la presente [ <i>nome del costruttore</i> ] dichiara che questo [ <i>tipo di apparecchio</i> ] è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

<input type="checkbox"/> Latviski [Latvian]	Ar šo [name of manufacturer / izgatavotāja nosaukums] deklarē, ka [type of equipment / iekārtas tips] atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
<input type="checkbox"/> Lietuvių [Lithuanian]	Šiuo [manufacturer name] deklaruoja, kad šis [equipment type] atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
<input type="checkbox"/> Nederlands [Dutch]	Hierbij verklaart [naam van de fabrikant] dat het toestel [type van toestel] in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
<input type="checkbox"/> Malti [Maltese]	Hawnekk, [isem tal-manifattur], jiddikjara li dan [il-mudel tal-prodott] jikkonforma mal-htigijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
<input type="checkbox"/> Magyar [Hungarian]	Alulírott, [gyártó neve] nyilatkozom, hogy a [... típus] megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.
<input type="checkbox"/> Polski [Polish]	Niniejszym [nazwa producenta] oświadczam, że [nazwa wyrobu] jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
<input type="checkbox"/> Portugê s [Portuguese ]	[Nome do fabricante] declara que este [tipo de equipamento] está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
<input type="checkbox"/> Slovensk o [Slovenian]	[Ime proizvajalca] izjavlja, da je ta [tip opreme] v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
<input type="checkbox"/> Slovensk y [Slovak]	[Meno výrobcu] týmto vyhlasuje, že [typ zariadenia] spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
<input type="checkbox"/> Suomi [Finnish]	[Valmistaja = manufacturer] vakuuttaa täten että [type of equipment = laitteen tyyppimerkintä] tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
<input type="checkbox"/> Svenska	Härmed intygar [företag] att denna [utrustningstyp] står i överensstämmelse med de väsentliga

## Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- ◆ Reorient or relocate the receiving antenna.
- ◆ Increase the separation between the equipment and receiver.
- ◆ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ◆ Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

**This device is intended only for OEM integrators under the following conditions:**

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

**IMPORTANT NOTE:** In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

## End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: R68XPICOW". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

## Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

## Industry Canada Statement

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

## Radiation Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

## Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

### **This device is intended only for OEM integrators under the following conditions: (For module device use)**

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

### **Cet appareil est conçu suivantes: (Pour utilis**

### **es conditions**

L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

**IMPORTANT NOTE:** *In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.*

**NOTE IMPORTANTE:** *Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.*

### **End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:

"Contains IC: 3867A-XPICOW".

### **Plaque signalétique du produit final**

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 3867A-XPICOW".

### **Manual Information To the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

### **Manuel d'information à l'utilisateur final**

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

### **Manufacturer's Contact:**

Lantronix, Inc.  
167 Technology Drive, Irvine, CA 92618 USA  
Tel: 949-453-3990  
Fax: 949-453-3995