



PORTABLE MI-FI WIRELESS ROUTER WITH INTEL PLATFORM

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Abstract:

Mi-fi Router is at the forefront of wireless 4G sharing. Equipped with a built-in Intel 4G LTE modem, you can instantly establish your own Wi-Fi hotspot simply by inserting a 4G SIM card at the interior of the device. With up to 25.6Mbps download and 9.76Mbps upload speeds. Mi-fi is able to provide 4G wireless sharing to up to 11 users (10 Wi-Fi enable and 1 USB tethering) simultaneously. The main motive of this device is to providing high speed 4G internet access up to 11 users via USB tethering and WI-FI tethering with having attractive display and 2GB internal Space. Its pocket-sized design and powerful 2500mAh internal battery make it an ideal travel companion, allowing users to work or play for hours on end. Besides, with its innovative OLED display, users can have a much more intuitive view of the device's working status, such as network type signal strength, network status, Wi-Fi status, battery meter, number of connected device (except USB tethering), SSID, Device and IDEL mode.

Key Words: mi-fi; OLEED; LTE, SoC, Testing & WebGui

1. Introduction:

MI-FI is at the forefront of wireless 4G sharing. Equipped with a built-in 4G INTEL LTE modem, you can instantly establish your own Wi-Fi hotspot simply by inserting a 4G SIM card at the interior of the device. With up to 70Mbps download and 25Mbps upload speeds. MI-FI is able to provide 4G wireless sharing to up to 11 users (10 Wi-Fi enable and 1 USB tethering) simultaneously. MiFi is a mobile router cum access point device aimed at providing LTE connectivity to devices supporting only the WLAN.



Figure 1: mi-fi network view

It acts as a bridge between LTE and Wi-Fi as shown in the figure 1. It is a Portable mobile router with Display. This device allows you to connect your notebook, tablet, laptop desktop and other smart phones with WIFI connectivity to access the high speed 4G network and share this connection with other users wirelessly. Thisrouter is ideal forPeople that need a portable solution, for example remote workers or people that are moving house and need a temporary Internet connection. This also support USB connectivity and storage using internal space micro card.

Highlights:

- ✓ Motive of this device is to providing high speed 4G internet access up to 11 users
- ✓ Company wants to provide cheaper system for end user
- ✓ Intel wants to introduce new platform for mobile and other wireless device

Motivation Behind the Project:

The main motive of this device is to providing high speed 4G internet access up to 11 users via USB tethering and WI-FI tethering with having attractive display and 2GB internal Space. Its pocket-sized design and powerful 2500mAh internal battery make it an ideal travel companion, allowing users to work or play for hours on end. Besides, with its innovative OLED display, users can have a much more intuitive view of the device's working status, such as network type signal strength, network status, Wi-Fi status, battery meter, number of connected device (except USB tethering), SSID, Device and IDEL mode.

2. Related Work:

This topic gives us an introduction about existing device with limitation. There are many similar devices already present with different feature, structure and platform (SoC). Many of similar products are available with the different platforms and symbols. So following are some of the most popular existing systems.

Novatel Wireless MiFi:

The Novatel Wireless MiFi Intelligent Mobile Hotspot (models 2352 / 2372) (MiFi) allows you more freedom than ever before. No wires, no cables, just access to your data when you need it. Plus it can simultaneously support up to five WiFi enabled devices, depending on your setup. You can securely connect virtually any WiFi enabled device to MiFi for a total mobile Internet experience. Surf the Web, download files and music, share photos, manage e-mail, and more. In addition you can use MiFi in USB modem mode (tethered modem) by plugging it into a USB port on your computer [3].



Figure 2: Novatel MiFi

Limitations:

- ✓ This does not support high speed 4G internet access.
- ✓ MiFi does not support internal space.
- ✓ MiFi does not have display
- ✓ MiFi does not have WPS Pin/Push functionality
- ✓ MiFi has limited end user connectivity (up to 5 user)
- ✓ MiFi does not hybrid mode connection

TP-Link M5350 3G Mobile Wi-Fi:

TP-LINK's M5350 is wireless 3G sharing. Equipped with a built-in 3G modem, you can instantly establish your own Wi-Fi hotspot simply with up to 21.6Mbps download and 5.76Mbps upload speeds, M5350 is able to provide 3G wireless sharing to up to 10 users simultaneously. with its innovative OLED display, users can have a much more intuitive view of the devices working status, such as network type (3G/1x/R) and

signal strength, network status, dial-up type, Wi-Fi status, message, battery meter this does not support high speed 4G internet access. And no internal space. Battery is not removable [4].



Figure 3: TP-Link MiFi

Limitations:

- ✓ MiFi is very expensive.
- ✓ This Device does not support high speed 4G internet Access.
- ✓ MiFi not having WPS PIN/PUSH functionality
- ✓ MiFi does not support internal space for 32 GB SD card.

In today’s fast moving world, it is a challenge for any company to continuously maintain and improve the quality and efficiency of software systems development. In many software projects, testing is neglected because of time or cost constraints. This leads to a lack of product quality, followed by customer dissatisfaction and ultimately to increased overall quality costs.

Testing:

Testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements. This section describe the type of testing with may be used to test a software during SDLC [5, 6].

Manual Testing

This type includes the testing of the Software manually i.e. without using any automated tool or any script. In this type the tester takes over the role of an end user and test the Software to identify any un-expected behavior or bug. There are different stages for manual testing like unit testing, Integration testing, System testing and User Acceptance testing. Testers use test plan, test cases or test scenarios to test the Software to ensure the completeness of testing. Manual testing also includes exploratory testing as testers explore the software to identify errors in it [5, 6].

Automation Testing:

Automation testing which is also known as “Test Automation”, is when the tester writes scripts and uses another software to test the software. This process involves automation Test Automation of a manual process. Automation Testing is used to re-run the test scenarios that were performed manually, quickly and repeatedly [5, 6, 7]

3. Proposed System:

The proposed system integrates all the limitation of all existing system into one system and giving less expensive, reliable, secured, compatible and portable device for end user. This system uses Intel chipset with Openwrt Linux platform [8]. The proposed system support attractive OLED display to see the status of your Router and WebGui

(browser interface) that allows you to configure the device and access its many features. Using your Web browser, you can open the MiFi Home page that gives you access to the many features of the device. For example, you can do the following:

- ✓ View the status of the wireless network, your internet connection, the battery, and the MiFi itself on OLED.
- ✓ Set up wireless security to safeguard your files including using MAC filters.
- ✓ Access files on your micro SDHC card and set up file sharing so others connected to your network can access those files also.
- ✓ Control your internet access using WebGui.

Advantage and Highlights of Proposed System:

- ✓ It's cheaper than other MiFi device
- ✓ Share high speed 4G connection with multiple smartphone, tablets and notebooks, with download speeds of up to 70 Mbps
- ✓ OLED display allows you to see the status of your Router to help you stay connected.
- ✓ WebGui for control
- ✓ WPS PIN/PUSH functionality
- ✓ Power saver functionality
- ✓ Connectivity up to 10 client using wi-fi and 1 using USB
- ✓ USIM card slot for connection to mobile Internet services
- ✓ Micro SD card slot allows you to add storage
- ✓ Internal Space of 2 GB
- ✓ Portability
- ✓ Up to six hours of battery life in one charge so you can stay connected for longer
- ✓ Small size lets you drop it in a purse or pocket and take it wherever you go
- ✓ Compatibility

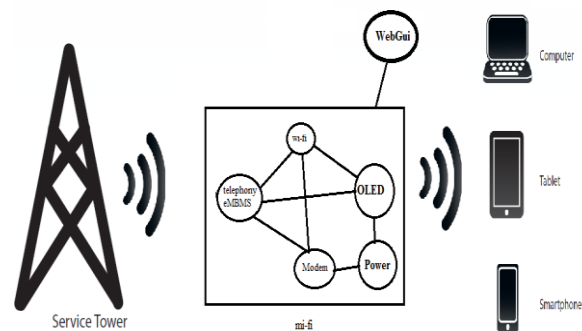


Figure 4: mi-fi Router Overview Connectivity

4. Implementation:

This test case initializes the test case by preparing the DUT and flashing it with the latest software available on which testing should be performed.

```
Void flash ()  
{  
  //check for DUT presence  
  //flash data collected with specific parameters  
  //check for flash ports  
  //call flash tool and flash new binaries on DUT  
  //return  
}
```

After flashing check whether the device is booted and reaches home screen without any issues. Boot up loga capture into .txt file.

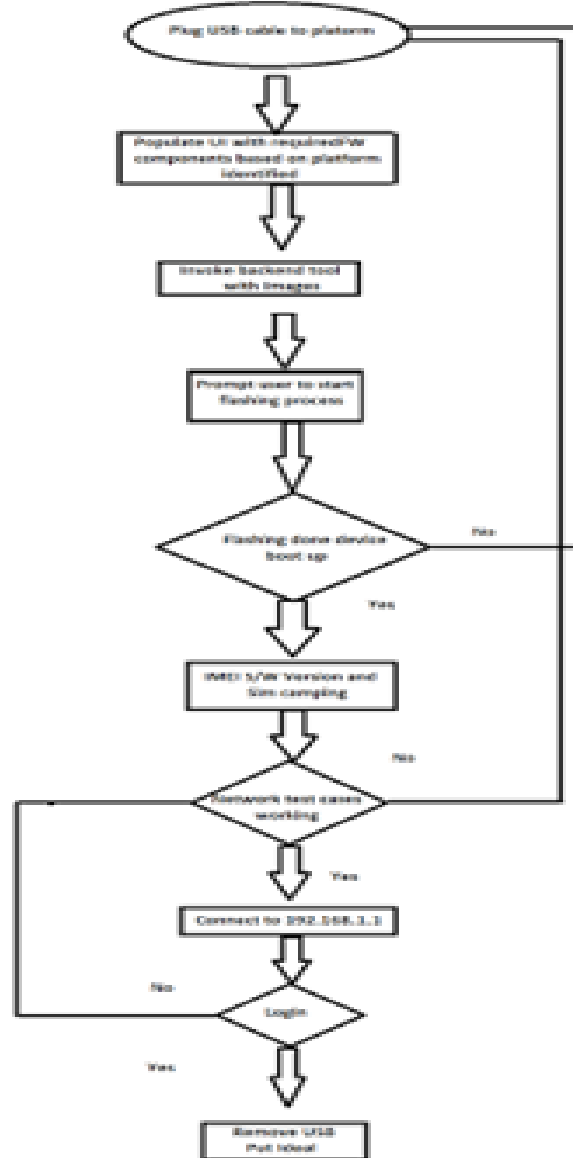


Figure 5: Flow Chart

```
Void boot_up_check ()  
{  
  //check for DUT presence  
  //checking boot up sequence record time  
  //switch off  
  //switch on  
  //check for devices using Linux commands  
  //return  
}
```

Checking of IMEI is done in this test. As IMEI is already configure during NVM parameter punching process.

```
Void imei()  
{  
  //check for devices IMEI (default)
```

```
// check at+cgsn
//check for the IMEI to be set as defined in tc_control_flow
//if(default==set) return
//else (IMEI==set values)
//boot
//return
```

After checking IMEI check OLED related functionality. And the final result will store in result.xml file.

5. Results:

The Result of this SANITY will automatically save in result.xml file. This file will show pass or fail status of test case.

Test Name	Description	Expected Result	Actual Result
Flashing	Flashing device with latest software	DUT should be flashed with the binaries as specified	Pass
Boot Up Sequence	Check Boot up sequence with time (logo→welcome→main screen)	DUT should boot up in within 22-25 sec	Pass
IMEI	Display IMEI's	IMEI should be correct	Pass
S/W Version	After flashing check build version	Should be flashed version	Pass
Suspend/Resume	Leave idea DUT for 10 min. after 10 min display will off	Snooze mode appear in display	Pass
Deep Sleep	Leave idea DUT for 10 min. after 10 min display will off, measure current	15 mA appear in power tool	Pass
WPS Pin/Push	Connectivity to AP	DUT connect	Pass
SSID Display	Press WPS key SSID will display	SSID display in OLED	Pass

6. Conclusions:

mi-fi device is to providing high speed 4G internet access up to 11 users via USB tethering and WI-FI tethering with having attractive display and 2GB internal Space, users can have a much more intuitive view of the device’s working status, such as network type signal strength, network status, Wi-Fi status, battery meter, number of connected device (except USB tethering), SSID, Device and IDEL mode.mi-fi is at the forefront of wireless 4G sharing. Equipped with a built-in 4G INTEL LTE modem, you can instantly establish your own Wi-Fi hotspot simply by inserting a 4G SIM card at the interior of the device. With up to 70Mbps download and 25Mbps upload speeds.

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