Amp'ed RF
Wireless Technology

Fast Track Your Wireless Project
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Wifi Getting Started Guide

1 Preface

This document provides a description on how to update a FW image, configure a Wi-Fi module, join/scan, connect to Wi-Fi networks and exchange data with the iPhone demo.

2 Preparation

The evaluation tool for Wi-Fi module serial control and iPhone application demo are available here:

http://www.ampedrftech.com/dnload.php

3 Function

This section details each function on how to use the Wi-Fi module.

3.1 FW download Using EvalTool

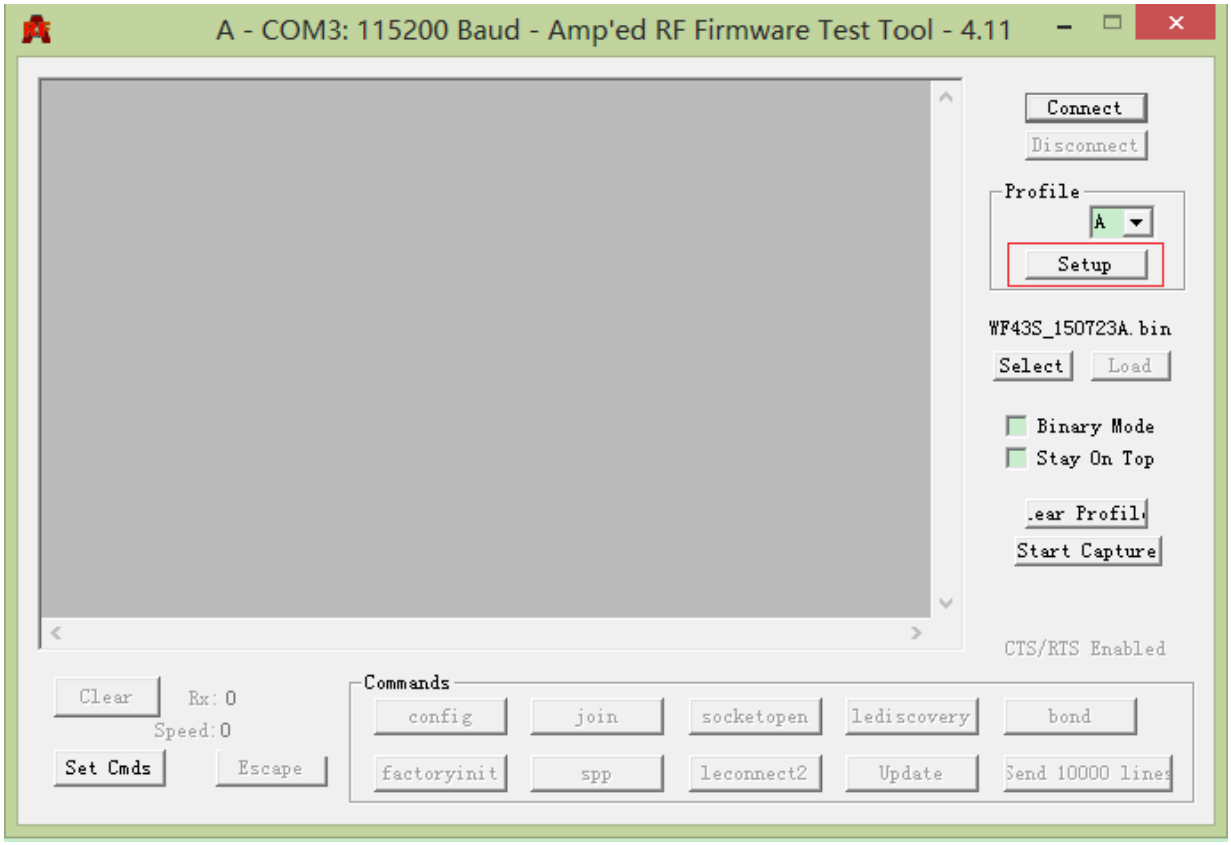
This section describes how to update the FW image of the Wi-Fi module.

Command: at+wf invalidateapplication

Once entered, the previous application FW will be erased.

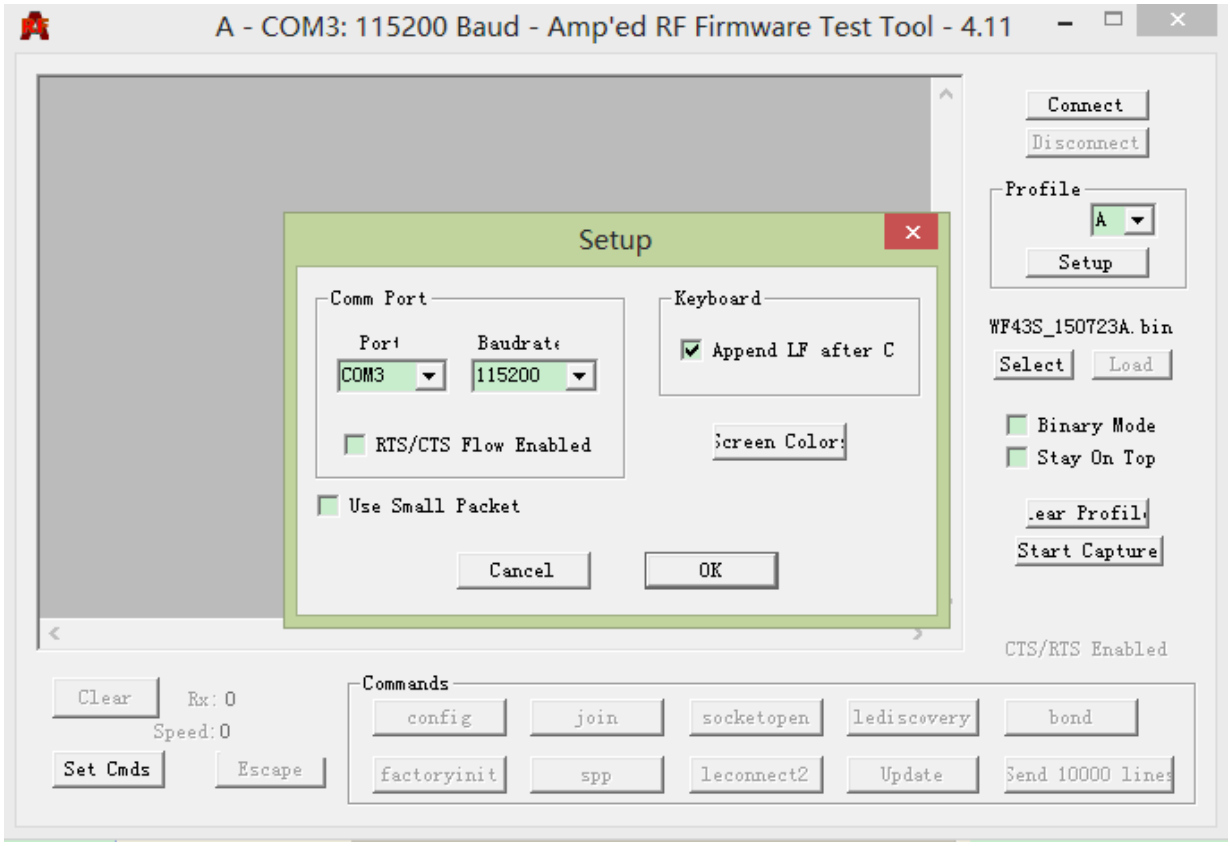
Process:

Step 1: Click “Setup”.



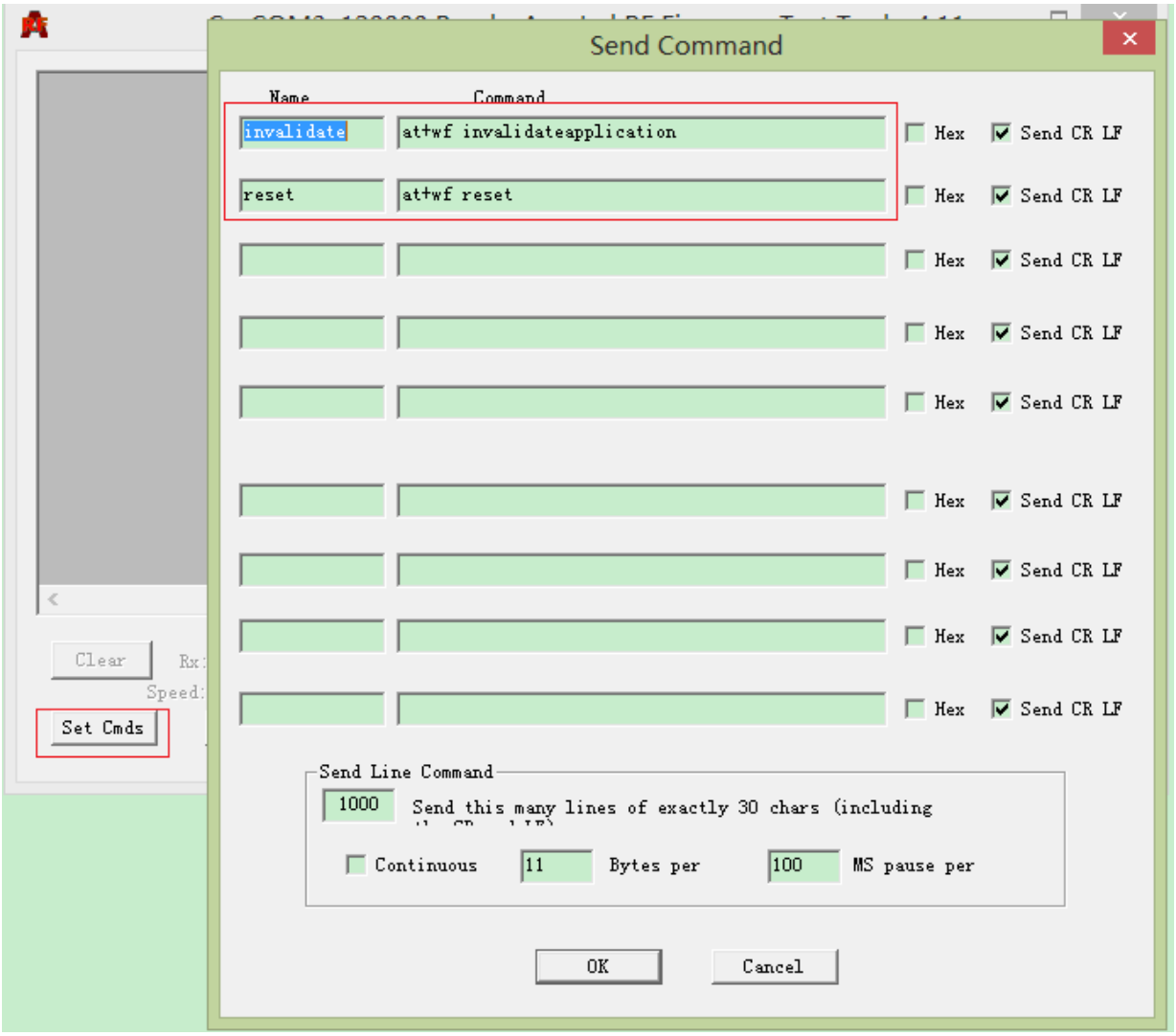
Step 2: Change the setup configuration

Change the “Port” and “Baudrate” (default is 115200 in Boot mode). Do not select “RTS/CTS Flow Enabled” or “Use Small Packets” when re-flashing.

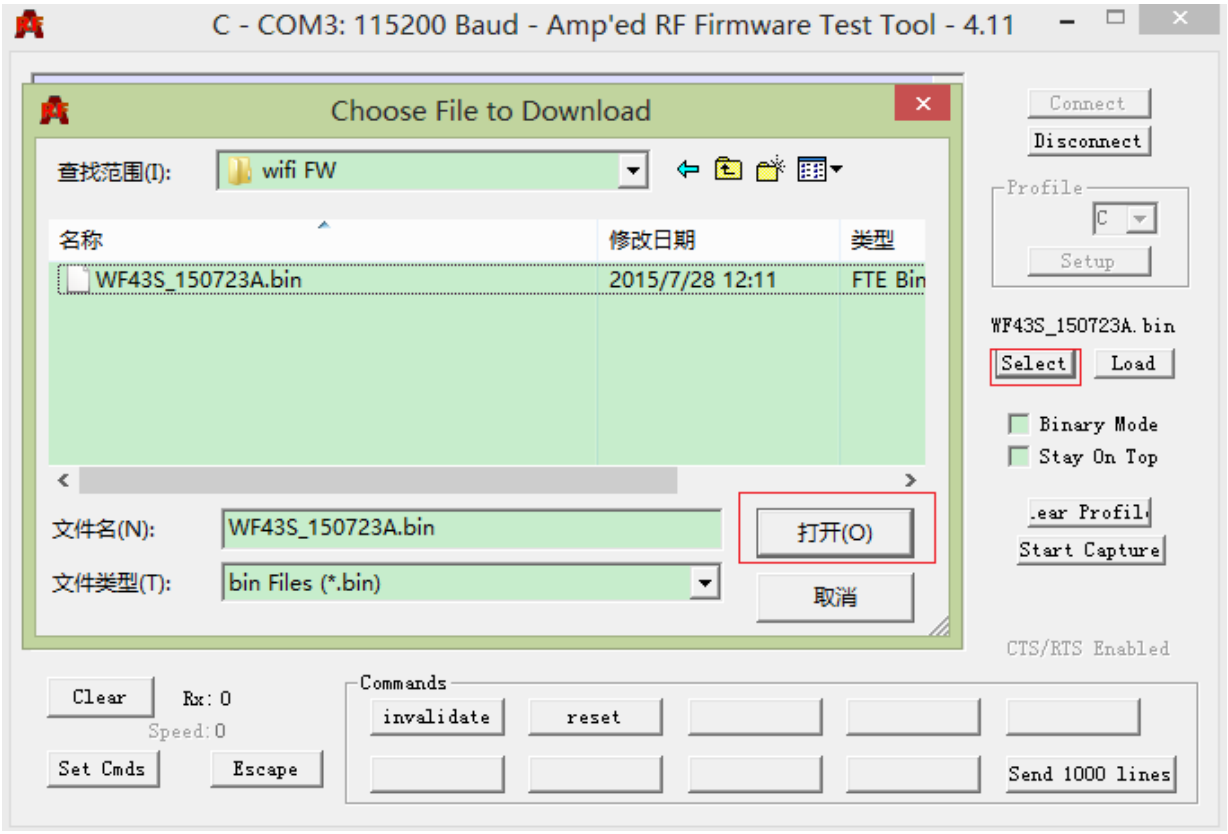


Step 3: Add the command

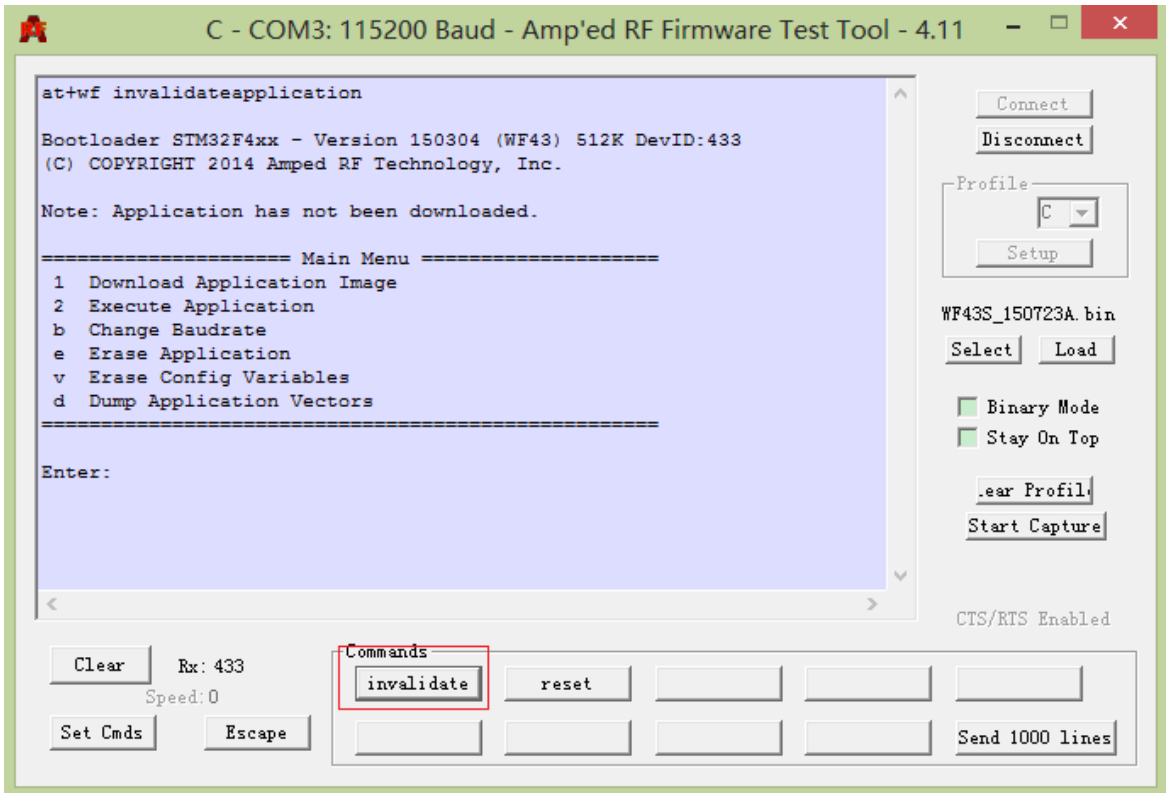
Click “SetUp Cmds” and add the “AT+AB InvalidateApplication” command and name it. Press “OK”.

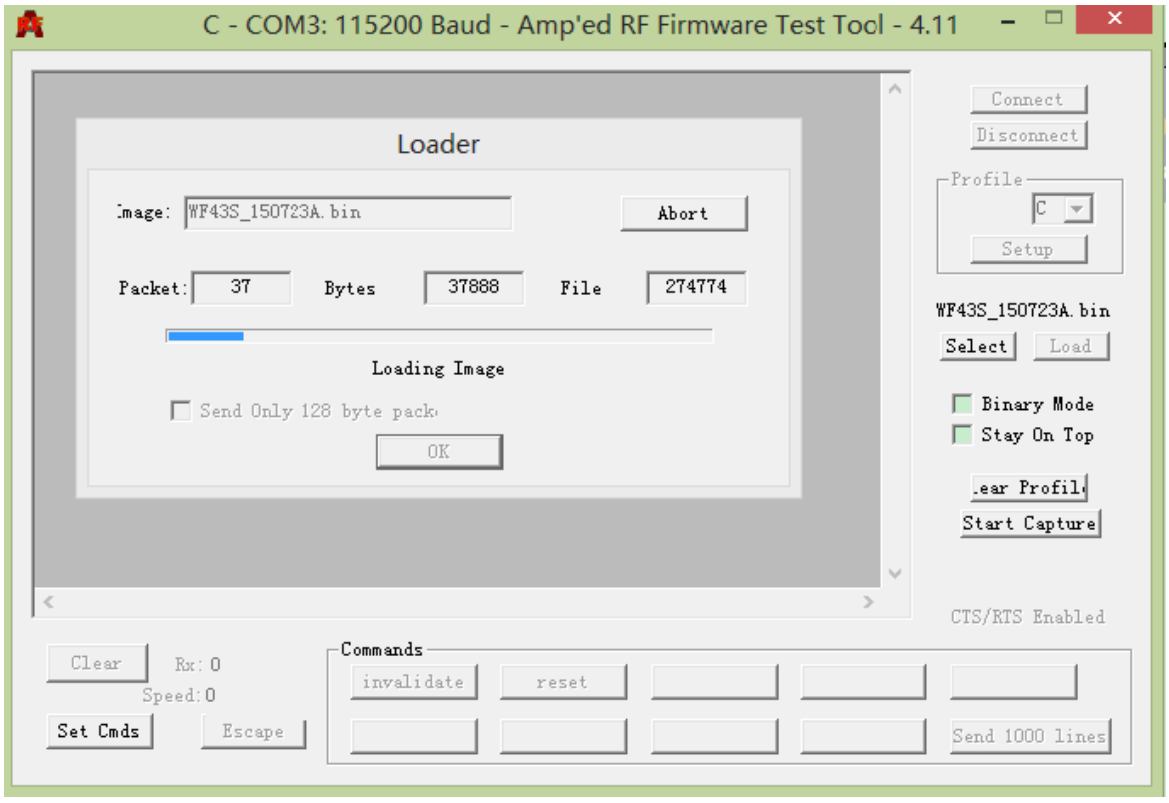


Step 4: Click “Select” to add the new FW image (bin file).

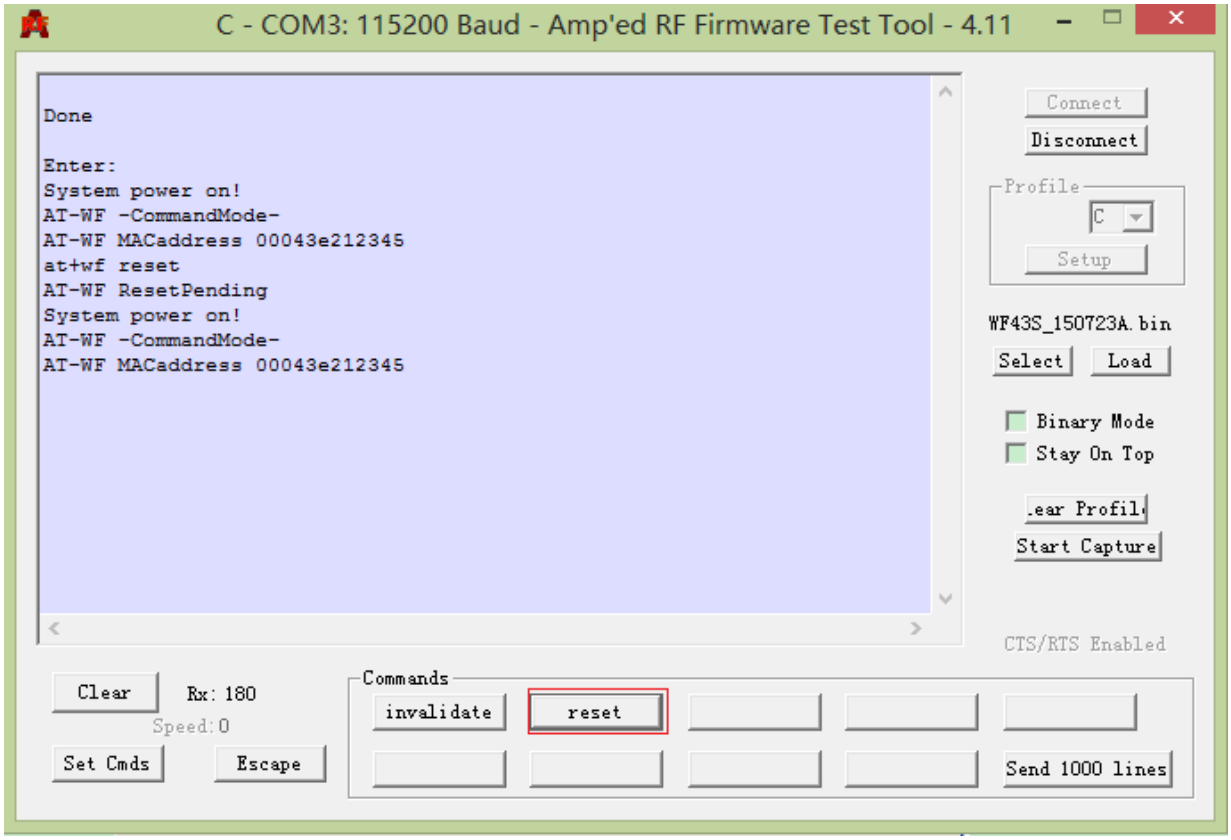


Step 5: Click “Invalidate” to go into bootloader mode, and then click “Load” to update the new FW.





Step 6: After finishing the loading process, make a reset (at+ab reset) to config the NVM settings.



3.2 Configurations for SSID, Password, etc.

To set a configuration variable, enter "at+wf config xxxx = yyyy", where "xxxx" is the variable name and "yyyy" is the value to set. A variable name can also be specified as "varzz", where “zz” is the sequence number of the variable.

Example: Change device name Parameter: “DeviceName = AmpedWI-FI”

at+wf config DeviceName=Amp

3.2.1 Set SSID

SSID is the network name you want to join. Below is the method to change the SSID.

Command: at+wf config SSID=[Name]

Response: If the operation is successful, the response is:

AT-WF ConfigOk

Example:

at+wf config SSID=Amp'ed RF Tech

AT-WF ConfigOk

3.2.2 Set Password

Password is the network’s password. Below is the method to change the password.

Command: at+wf config PassPhrase=[password]

Response: If the operation is successful, the response is:

AT-WF ConfigOk

Example:

at+wf config PassPhrase=ampedrf123

AT-WF ConfigOk

3.2.3 Set IP Address

The IP address is the Wi-Fi module’s IP address. Below is the method to change the IP address.

Command: at+wf config IPAddress =[number]

Response: If the operation is successful, the response is:

AT-WF ConfigOk

Example:

at+wf config IPAddress=192.168.1.2

AT-WF ConfigOk

3.2.4 Set DHCP

In STATION mode: if DHCPMode=True or 1, the IP address of the Wi-Fi module is arranged by the router; if DHCPMode=Flase or 0, the IP address is the value of IPAddress in NVM settings. Below is the method to change DHCP.

Command: at+wf config DHCPMode=[true or false]

Response: If the operation is successful, the response is:

AT-WF ConfigOk

Example:

at+wf config DHCPMode=1

AT-WF ConfigOk

at+wf config DHCPMode=true

AT-WF ConfigOk

3.3 Scan/Join/Socket Open

This section describes how to scan the Wi-Fi network nearby, join the dedicated network and open the socket.

3.3.1 Scan

Command: at+wf scan

This command will scan the Wi-Fi network, obtain the BSSID signal strength, frequency, SSID and flags.

Response:

AT-WF ScanComplete

Example:

at+wf scan

BSSID	*Signal*	*Freq*	*SSID*	*Flags*
14:e6:e4:95:2b:2c	*-61 dBm*	*2422*	*Amp'ed_AP*	*[WPA-PSK-CCMP][WPA2-PSK-CCMP]*
a8:57:4e:10:90:7a	*-57 dBm*	*2437*	*TZ_3MAO*	*[WPA-PSK-CCMP][WPA2-PSK-CCMP]*
14:75:90:b8:cb:ca	*-77 dBm*	*2437*	*TJZYHBKJ3*	*[WPA-PSK-CCMP][WPA2-PSK-CCMP]*
14:75:90:c3:eb:62	*-73 dBm*	*2437*	*TJZYHBKJ*	*[WPA-PSK-CCMP][WPA2-PSK-CCMP]*
28:2c:b2:e3:4a:54	*-75 dBm*	*2462*	*AmpedRF1*	*[WPA-PSK-CCMP][WPA2-PSK-CCMP]*
28:2c:b2:e3:49:96	*-60 dBm*	*2462*	*[WPA-PSK-CCMP][WPA2-PSK-CCMP]*	

AT-WF ScanComplete

3.3.2 Join

Before joining, set the necessary parameter and then reset.

- at+wf config DeviceMode=AP (AP or STA mode)
- at+wf config SSID= AmpedRF1
- at+wf config PassPhrase=123456789
- at+wf reset (reset after changes)

Command: at+wf join

Response:

If the connection is successful, the response is:

28:2c:b2:e3:4a:54 -80 dBm 2462 AmpedRF1 [WPA-PSK-CCMP][WPA2-PSK-CCMP]

AT-WF JoinOK [AmpedRF1]

AT-WF DHCP OK. Get ip:192.168.1.37

If the connection is unsuccesful, the response is:

AT-WF JoinFailed [SSID name]

Example:

at+wf join

Successful:

28:2c:b2:e3:4a:54 -80 dBm 2462 AmpedRF1 [WPA-PSK-CCMP][WPA2-PSK-CCMP]

AT-WF JoinOK [AmpedRF1]

AT-WF DHCP OK. Get ip:192.168.1.37

Fail:

AT-WF JoinFailed [AmpedRF1]

3.3.3 Socket Open

After the connection is successful, you can open the socket and then send data to remote with UDP packet.

Command: at+wf socketopen

Response:

AT-WF StartUDP

AT-WF -BypassMode-

Example:

at+wf join

28:2c:b2:e3:4a:54 -77 dBm 2462 AmpedRF1 [WPA-PSK-CCMP][WPA2-PSK-CCMP]

AT-WF JoinOK [AmpedRF1]

AT-WF DHCP OK. Get ip:192.168.1.37

at+wf socketopen

AT-WF StartUDP

AT-WF -BypassMode[a1]-

3.4 Connection and data exchange with iPhone in STA mode

This section describes how to connect the Wi-Fi module in STATION mode to an iPhone via UDP, as well as show simple data transfer between iPhone and Wi-Fi module.

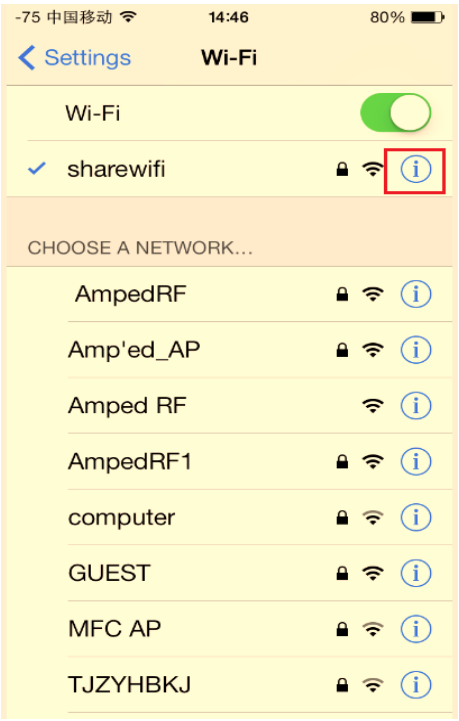
The process to make a connection:

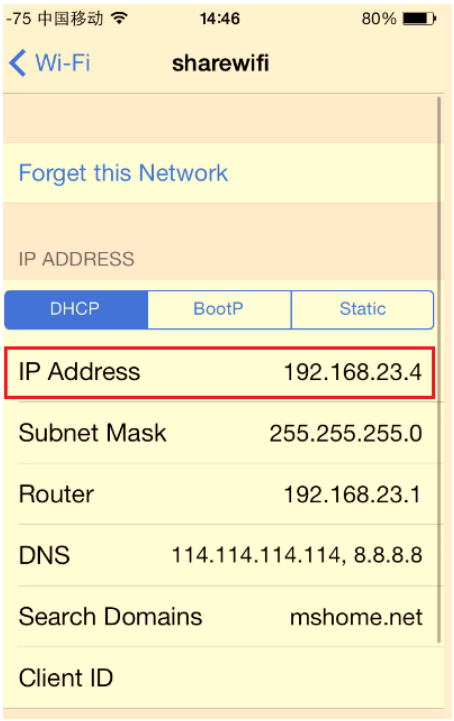
Step 1: Config the iPhone and Wi-Fi module

iPhone side:

- Install the Wi-Fi demo (you can download it from the website or connect your supporter for it.)

- Connect the iPhone to a Wi-Fi network and record the IP address of the iPhone (SSID: shareWi-Fi, IP address: 192.168.23.4).





Set the Wi-Fi module side as below. Then, reset the Wi-Fi module.

- at+wf config DeviceMode=STA (station mode)
- at+wf config SSID= shareWi-Fi
- at+wf config PassPhrase=1234567890 (router password)
- at+wf config HostIPAddr=192.168.23.4 (iPhone IP address)
- at+wf config LocalPort=xxx (default is 2015)
- at+wf reset (reset after changes)

Step 2: Connect the Wi-Fi module to the Wi-Fi network

- Have the Wi-Fi module join the same Wi-Fi network as the iPhone: at+wf join

at+wf join

28:e3:47:0a:f8:d2 -49 dBm 2462 shareWi-Fi [WPA2-PSK-CCMP]

AT-WF JoinOK [shareWi-Fi]

AT-WF DHCP OK. Get ip:192.168.23.5

- Open the socket: at+wf socketopen

at+wf join

28:e3:47:0a:f8:d2 -49 dBm 2462 shareWi-Fi [WPA2-PSK-CCMP]

AT-WF JoinOK [shareWi-Fi]

AT-WF DHCP OK. ***Get ip:192.168.23.5***

at+wf socketopen

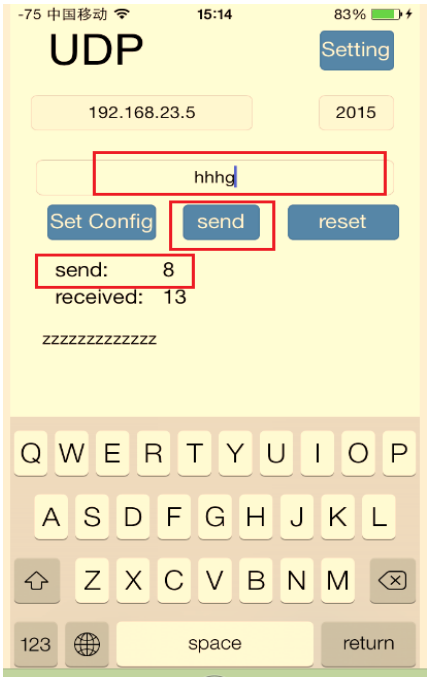
AT-WF StartUDP

AT-WF -BypassMode-

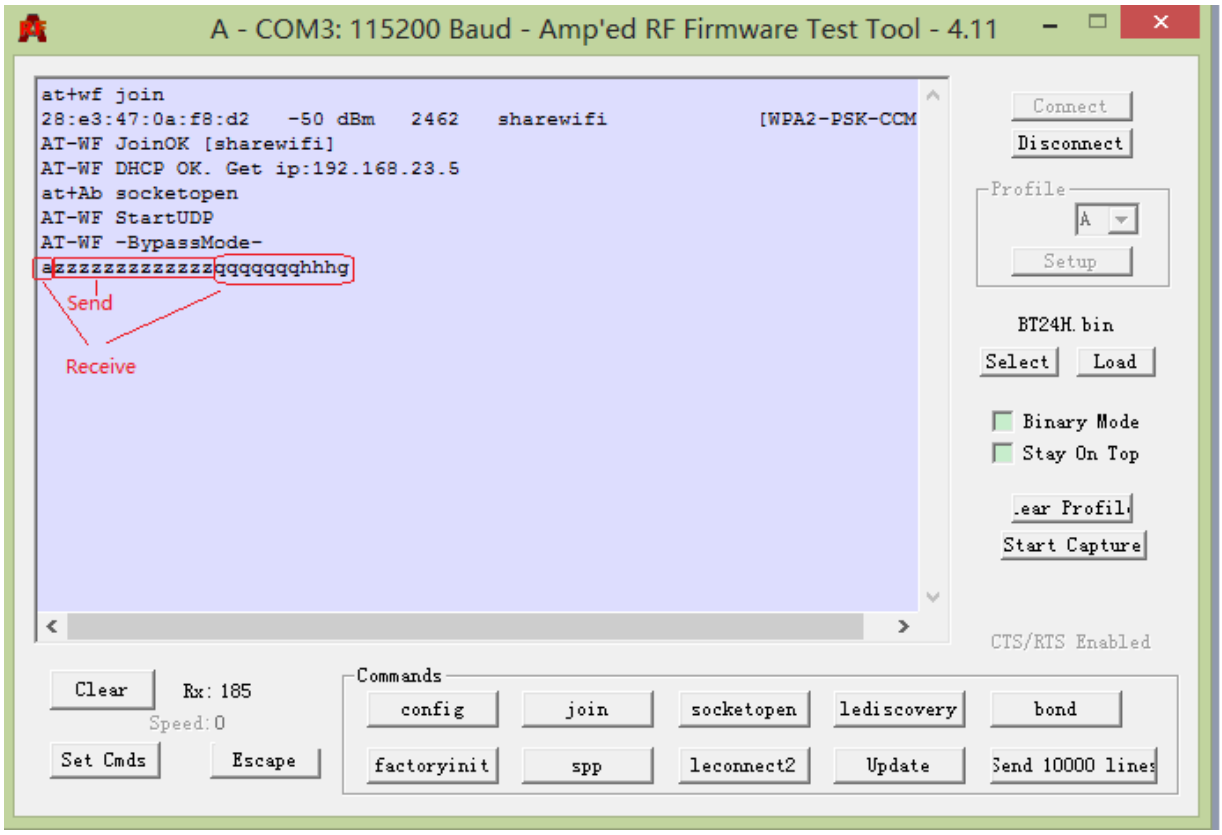
_Step 3: Open the Wi-Fi demo and select “UDP”. Input “192.168.23.5” as the IP, “2015” as the port, and then click “Set Config”.

Step 4: Data transfer

Data from the iPhone demo to the Wi-Fi module:
Input data in the “sendText” area, then click “send”. The Wi-Fi side will receive the data.



Data from the Wi-Fi module to the iPhone demo:
Input data in the Eval tool, which will transfer the data to the iPhone demo.

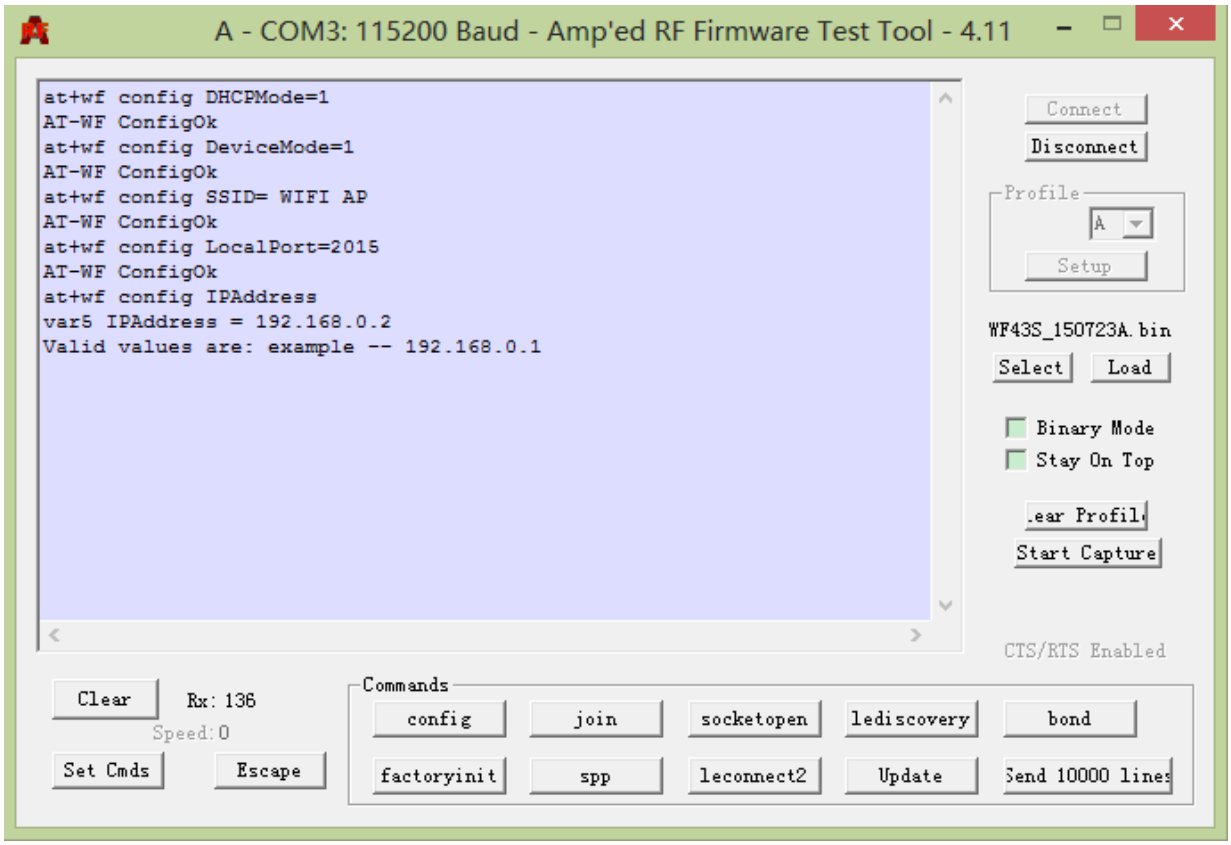


3.5 Connection and data exchange with iPhone in AP mode

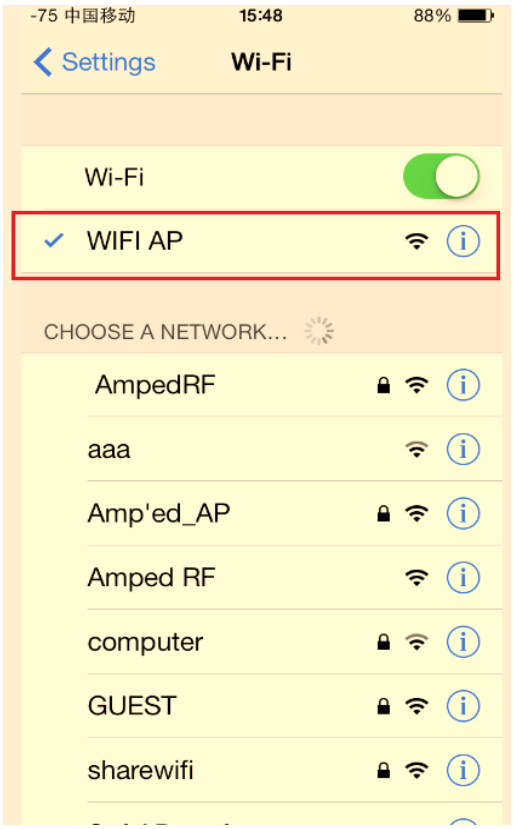
This section describes how to connect to the iPhone when the Wi-Fi module is in AP mode via UDP, as well as show simple data transfer between the iPhone and Wi-Fi module.

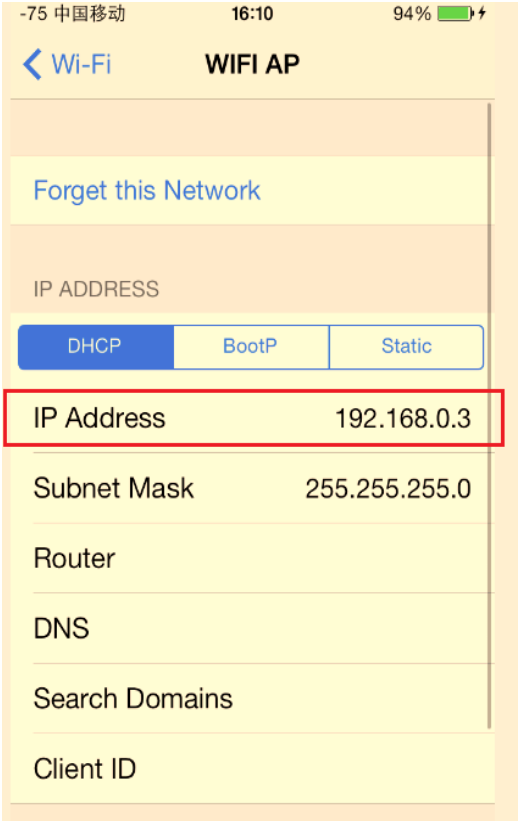
Step 1: Change the Wi-Fi module config and then reset the Wi-Fi module.

- at+wf config DHCPMode = true
- at+wf config DeviceMode=AP (AP mode)
- at+wf config SSID= WI-FI AP (name)
- at+wf config LocalPort=xxx (default is 2015)
- at+wf config IPAddress, get the Wi-Fi IP address (default is 192.168.0.2)
- at+wf reset (reset after changes)


A - COM3: 115200 Baud - Amp'ed RF Firmware Test Tool - 4.11
at+wf config DHCPMode=1
AT-WF ConfigOk
at+wf config DeviceMode=1
AT-WF ConfigOk
at+wf config SSID= WIFI AP
AT-WF ConfigOk
at+wf config LocalPort=2015
AT-WF ConfigOk
at+wf config IPAddress
var5 IPAddress = 192.168.0.2
Valid values are: example -- 192.168.0.1
Connect
Disconnect
Profile
A
Setup
WF43S_150723A.bin
Select
Load
Binary Mode
Stay On Top
Start Capture
CTS/RTS Enabled
Clear
Rx: 136
Speed: 0
Set Cmds
Escape
Commands
config
join
socketopen
lediscovery
bond
factoryinit
spp
leconnect2
Update
Send 10000 lines

Step 2: Find the Wi-Fi network “WI-FI AP” and connect to it on the iPhone side. We can find the IP address of the iPhone: 192.168.0.3.





Step 3: When the iPhone connects to the Wi-Fi module, there is a response from the Wi-Fi module to the Eval tool. The IP address of the iPhone is “192.168.0.3”. Set the IP address on the Wi-Fi module

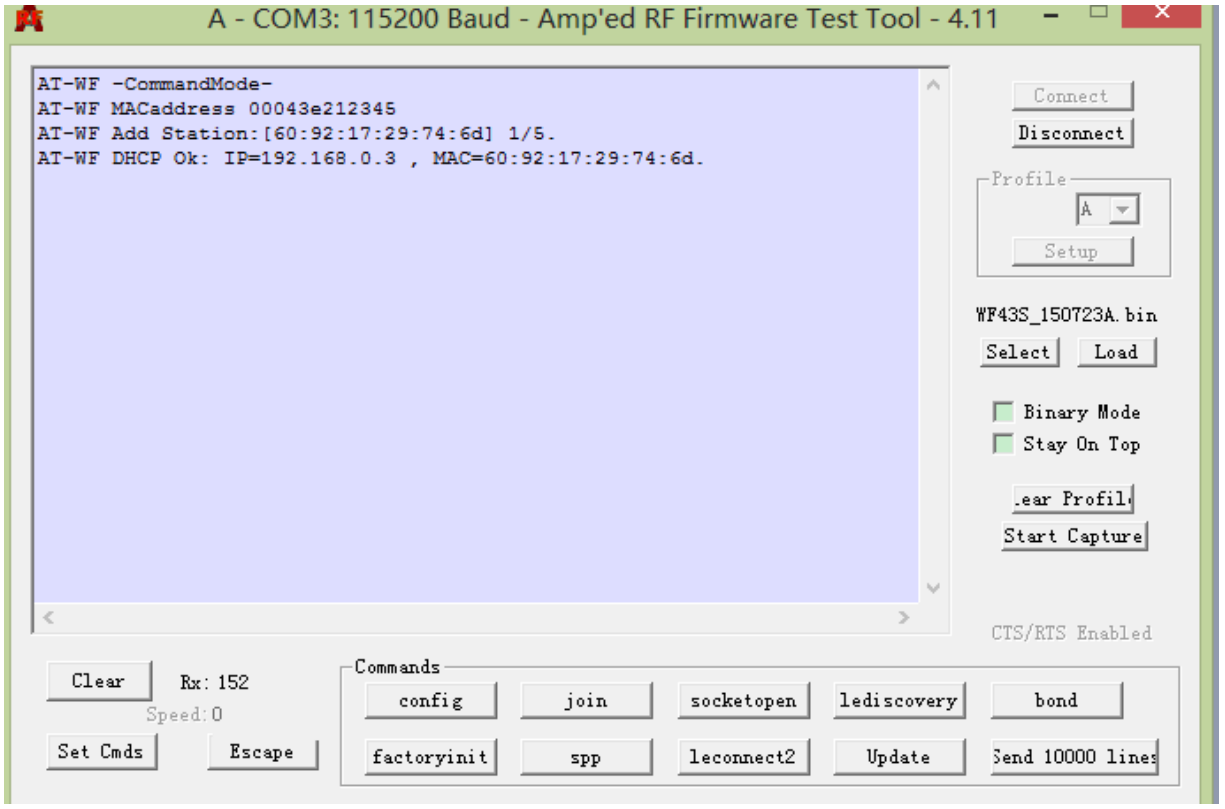
AT-WF Add Station:[60:92:17:29:74:6d] 1/5.

*AT-WF DHCP Ok: **IP=192.168.0.3** , MAC=60:92:17:29:74:6d.*

AT-WF Free Station:[60:92:17:29:74:6d] 0/5.

AT-WF Add Station:[60:92:17:29:74:6d] 1/5.

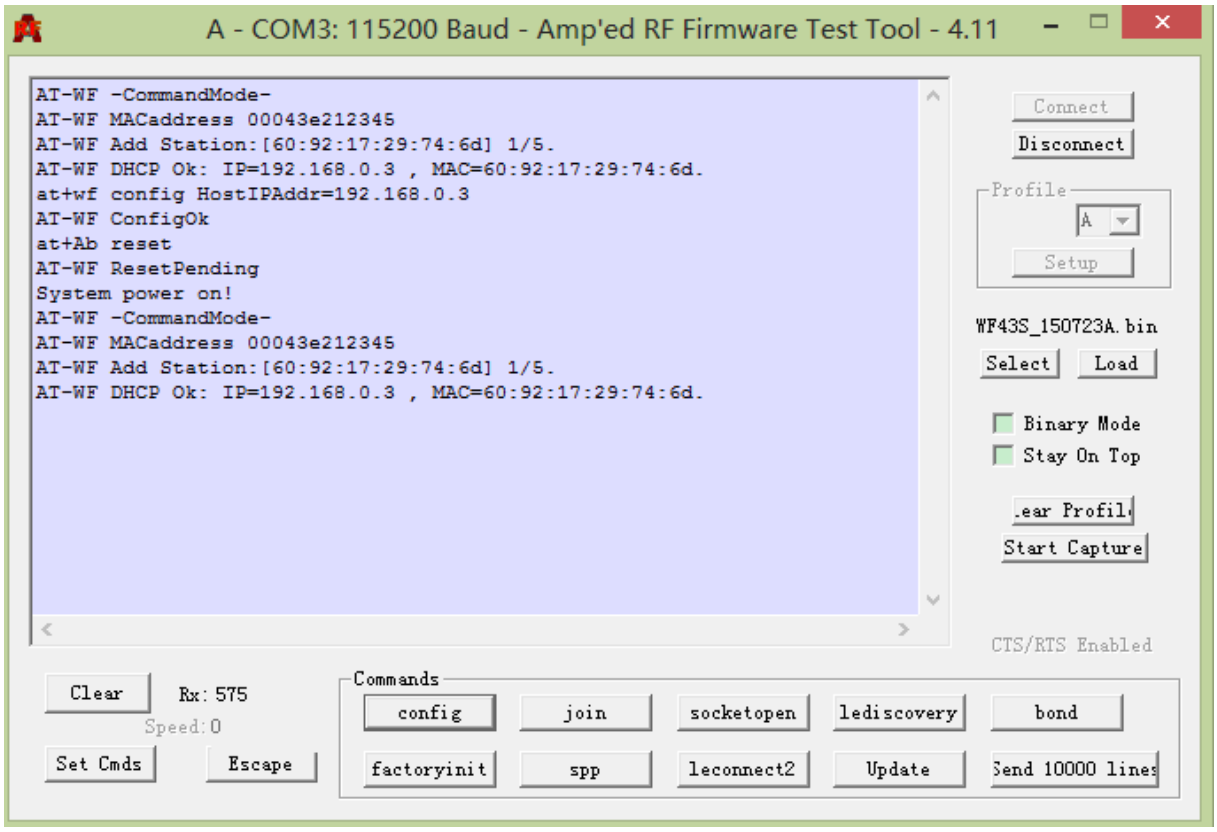
AT-WF DHCP Ok: IP=192.168.0.3 , MAC=60:92:17:29:74:6d.



Step 4: Change the HostIPAddr on the Wi-Fi module side to be the same as the iPhone's IP address and then reset the Wi-Fi module.

At+wf config HostIPAddr=192.168.0.3

Step 5: Connect the iPhone to the Wi-Fi network "WI-FI AP" again.



Step 6: Open socket on the Wi-Fi module side: At+wf socketopen

AT-WF Add Station:[60:92:17:29:74:6d] 1/5.

AT-WF DHCP Ok: IP=192.168.0.3 , MAC=60:92:17:29:74:6d.

AT-WF Free Station:[60:92:17:29:74:6d] 0/5.

AT-WF Add Station:[60:92:17:29:74:6d] 1/5.

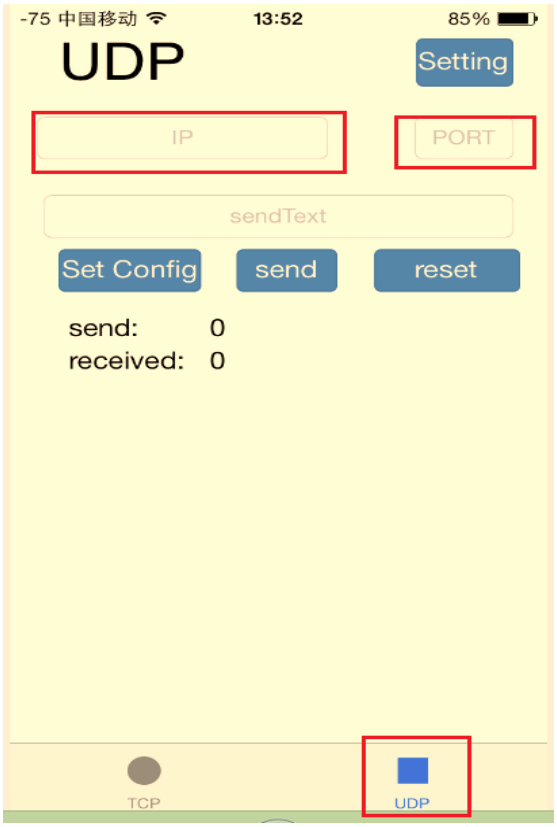
AT-WF DHCP Ok: IP=192.168.0.3 , MAC=60:92:17:29:74:6d.

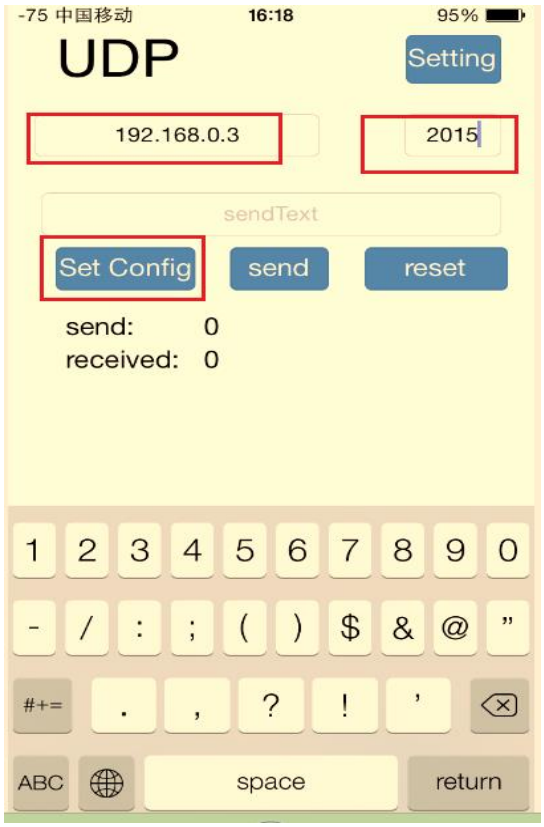
at+wf socketopen

AT-WF StartUDP

AT-WF -BypassMode-

Step 7: Open the Wi-Fi demo on iPhone, select “UDP”, input the IP “192.168.0.2”, the port “2015”, and then click “Set Config”.

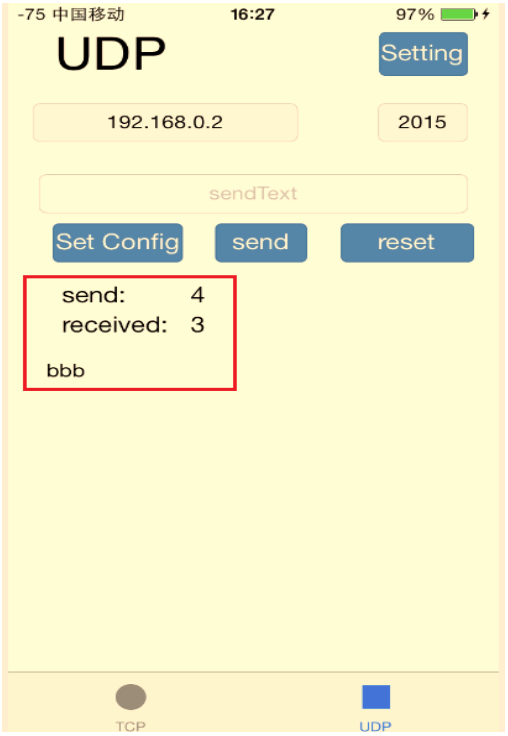




Step 8: Data transfer

Data from the iPhone demo to the Wi-Fi module:

Input data in the “sendText” area, then click “send”. The Wi-Fi side will get the data.



Data from the Wi-Fi module to the iPhone demo:

Input data in the Eval tool which will transfer the data to the iPhone demo.