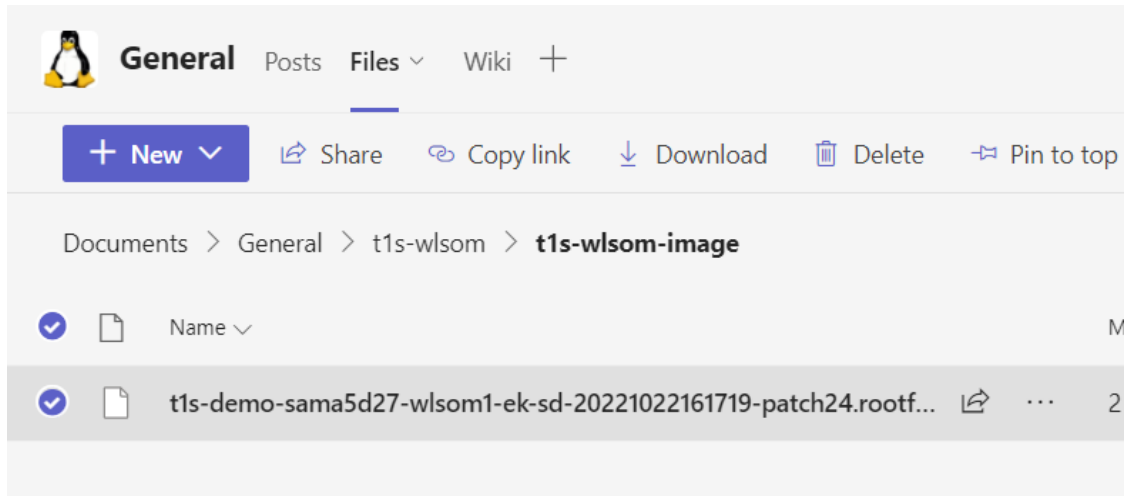


LAN867x USB dongle QuickStart

Section1. Installing Image

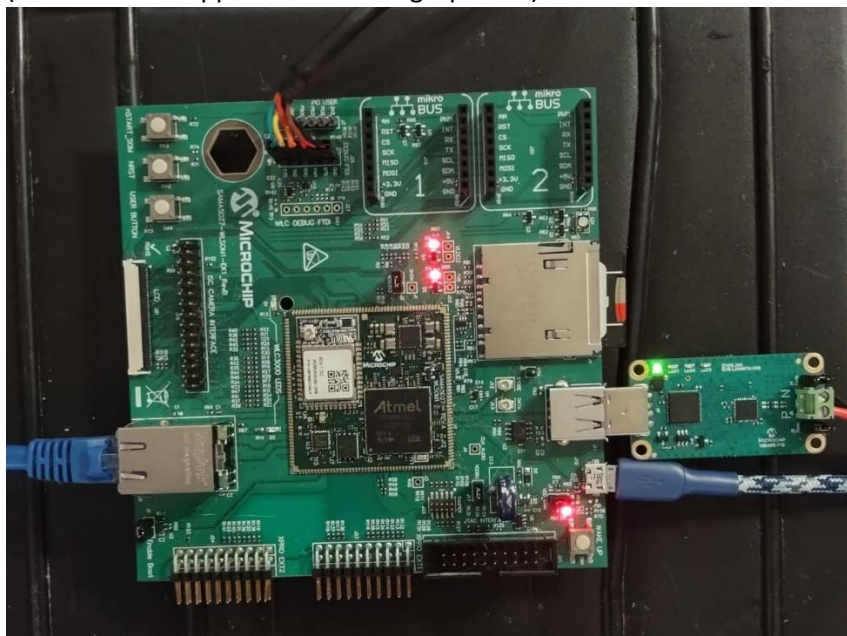
1. Download the t1s image. The one for WLSOM is in the t1s-wlsom folder here: [t1s-wlsom](#)



2. Use Balena etcher program to copy the wic image onto an SD.
3. See instructions on creating an SD card here: <https://www.linux4sam.org/bin/view/Linux4SAM/DemoSD>
4. Insert SD card into your eval board.

Section 2. Bringing Up Image

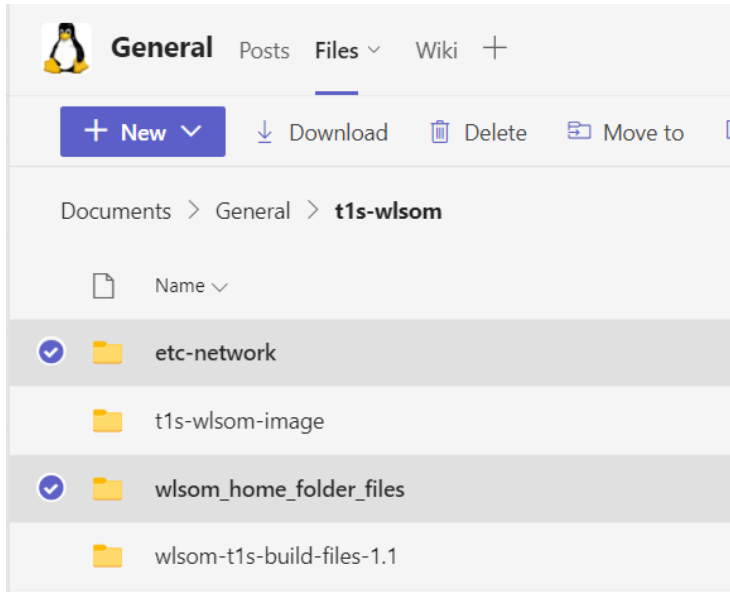
1. Connect 5V supply into J10 connector
 2. Connect a USB-serial adapter to the debug connector (J26 for the WLSOM) and USB port of computer
 3. Connect ethernet cable (J6 on WLSOM) and other end to a running Access Point
- (For WiFi - see Appendix 1 - Setting Up WiFi)



4. Open serial terminal program of choice and connect to USB adapter serial port with settings: 115200bps 8-N-1
5. Press “nSTART_SOM” button on the eval board (There should be messages appearing on the screen)
6. When messages are finished enter “root” to login:

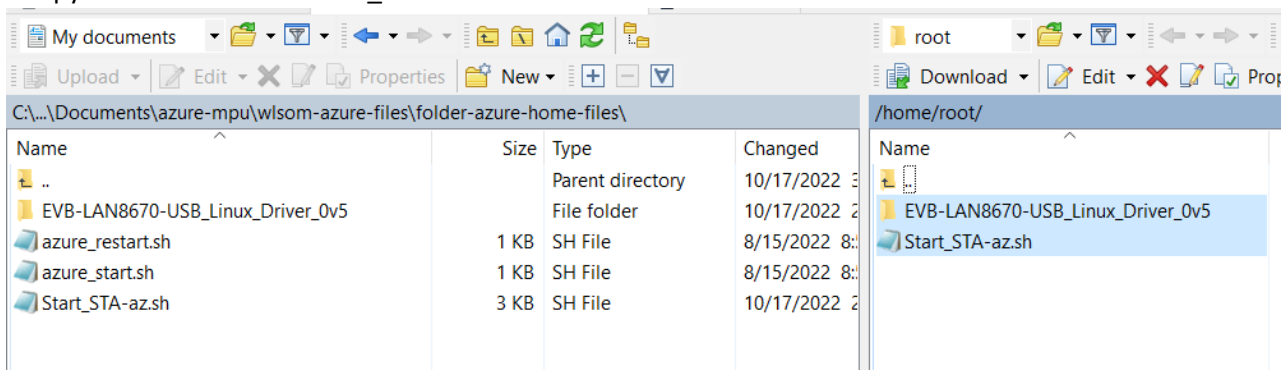
```
login as: root
Last login: Tue Aug 16 21:25:46 2022 from 192.168.1.144
root@sama5d27-wlsom1-ek-sd:~#
```

7. Download files from home_folders and etc-network folder:

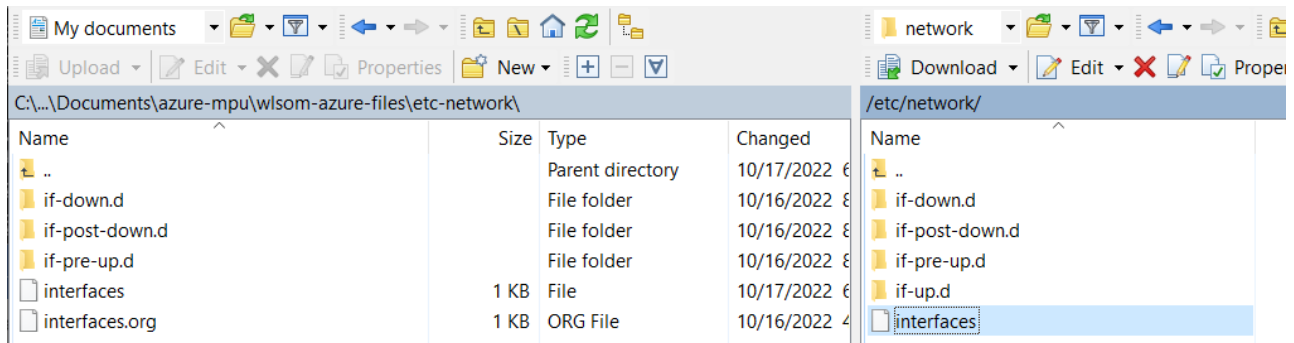


8. Copy files onto the eval board. You can use SCP to copy your file where they need to be. You can do this with command line commands or with a graphical program like WinSCP (Suggest WinSCP as it is easier to manipulate and modify files).

- Copy EVB-LAN8670 and Start_STA.sh to home folder:



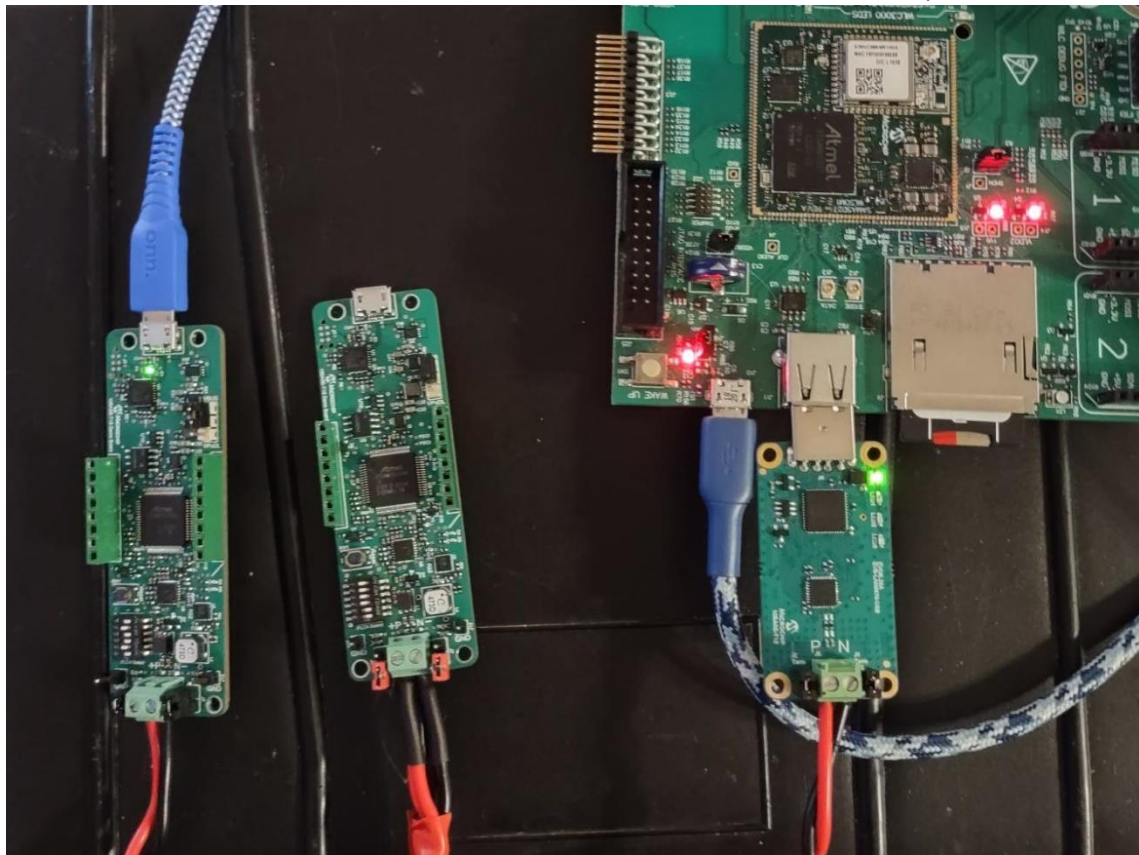
- Copy interfaces file to /etc/network folder:



Section 3. Starting 10base-t1s network

1. Wire up your t1s network and power up nodes:

(Make sure termination resistors are enabled on the two end nodes, and the polarities are correct)



2. Go to your serial terminal window you have previously started and type "ls" to see the files:

```
root@sama5d27-wlsom1-ek-sd:~# ls
EVB-LAN8670-USB_Linux_Driver_0v5  Start_STA-az.sh
root@sama5d27-wlsom1-ek-sd:~#
```

3. Navigate to the EVB-LAN8670-USB_Linux_Driver_0v5/t1s-usb folder:

```

root@sama5d27-wlsom1-ek-sd:~# cd EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb/
root@sama5d27-wlsom1-ek-sd:~/EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# ls
KB - EUB-LAN8670-USB Enablement for Debian_Ubuntu_Raspbian.docx
Makefile
ReadMe.txt
phy-driver
smc95xx-drv
t1s-wlsom-100.sh
t1s-wlsom.sh
root@sama5d27-wlsom1-ek-sd:~/EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# █

```

4. Modify the t1s-wlsom.sh script to executable with `chmod +x t1s-wlsom.sh`:

```

root@sama5d27-wlsom1-ek-sd:~/EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# chmod +x
t1s-wlsom.sh
root@sama5d27-wlsom1-ek-sd:~/EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# █

```

5. Now run the script to start the t1s network:

(t1s-wlsom-100.sh sets up ip addr as 192.168.100.10 instead of default 192.168.0.10)

(0 at the end of the command sets up the wlsom as coordinator, other numbers set up as node)

```

root@sama5d27-wlsom1-ek-sd:~/EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# ./t1s-wls
om-100.sh 0
Configure 10BASE-T1S adapter as node 0:
Removed drivers:
-
Present drivers:
lan867x_phy          12288  0
smc95xx              20480  0
usbnet               24576  1 smc95xx
MCHP 10BASE-T1S adapter found.
Microchip 10BASE-T1S LAN867X Rev.B1 PHY usb-001:002:00: attached PHY driver (mi
_bus:phy_addr=usb-001:002:00, irq=POLL)
smc95xx_t1s 1-2:1.0 eth1: Link is Up - 10Mbps/Half - flow control off
IPv6: ADDRCONF(NETDEV_CHANGE): eth1: link becomes ready
5: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP gr
oup default qlen 1000
    inet 192.168.100.10/24 scope global eth1
Done.
root@sama5d27-wlsom1-ek-sd:~/EUB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# █

```

Section 3. Test 10base-t1s network

1. Get the ip addr of another node (This example uses netinfo on the node com port to get 192.168.100.18):

```

netinfo
----- Interface <eth0/GMAC> -----
Host Name: MCHPBOARD_C - NBNS disabled
IPv4 Address: 192.168.100.18
Mask: 255.255.255.0
Gateway: 192.168.100.1
DNS1: 192.168.100.1
DNS2: 0.0.0.0
MAC Address: 00:04:25:1c:a0:12
default IP address is ON
dhcp is enabled
Link is UP
Status: Ready
>█

```

2. Now try to ping the wlsom's ip addr of 192.168.100.10:

```

>ping 192.168.100.10
>Ping: reply[1] from 192.168.100.10: time = 2ms
Ping: reply[2] from 192.168.100.10: time = 1ms
Ping: reply[3] from 192.168.100.10: time = 1ms
Ping: reply[4] from 192.168.100.10: time = 1ms
Ping: done. Sent 4 requests, received 4 replies.
█

```

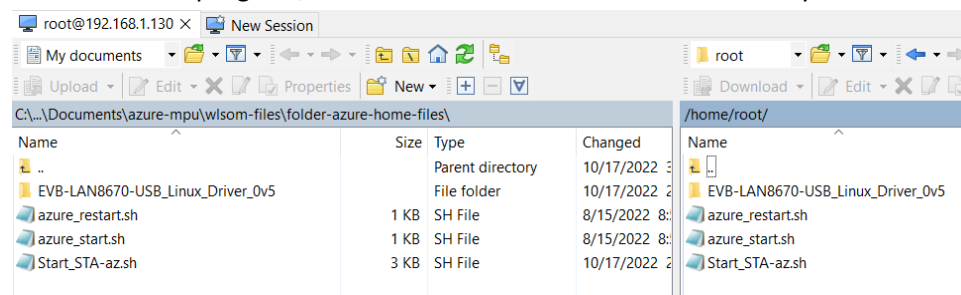
3. Now go to the serial terminal session and ping the node at 192.168.100.18:

(Hit Ctrl+C to stop the pings)

```
root@sama5d27-wlsom1-ek-sd:~/EVB-LAN8670-USB_Linux_Driver_0v5/t1s-usb# ping 192.168.100.18
PING 192.168.100.18 (192.168.100.18) 56(84) bytes of data:
64 bytes from 192.168.100.18: icmp_seq=1 ttl=64 time=0.908 ms
64 bytes from 192.168.100.18: icmp_seq=2 ttl=64 time=0.841 ms
64 bytes from 192.168.100.18: icmp_seq=3 ttl=64 time=0.919 ms
64 bytes from 192.168.100.18: icmp_seq=4 ttl=64 time=0.938 ms
64 bytes from 192.168.100.18: icmp_seq=5 ttl=64 time=0.913 ms
64 bytes from 192.168.100.18: icmp_seq=6 ttl=64 time=0.914 ms
^C
--- 192.168.100.18 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5007ms
rtt min/avg/max/mdev = 0.841/0.905/0.938/0.030 ms
root@sama5d27-wlsom1-ek-sd:~/EVB-LAN8670-USB_Linux_Driver_0v5/t1s-usb#
```

Appendix 1. - Setting Up WiFi

All of these steps have been put into a script called Start_STA-az.sh. It will just prompt you for your routers ssid and password then setup the WiFi automatically. You can find this script in a file called azure-home-files.zip. This archive contains this shell script for bringing up wifi as well as scripts for bringing up azure iotedge and the lan687x t1s usb dongle. Just unzip contents and copy the files you need somewhere into the home folder. You can use an SCP program, like WinSCP to connect over the eth0 to your PC for transferring files back and forth.



This example was tested on WAP with a default gateway 192.168.1.1 (The user must select an IP address that is within the same subnet as the gateway and rest of the network. 192.168.1.xxx

1. Update wlan0 information in /etc/network/interfaces, if this file doesn't exist, create it

```
root@sama5d27-wlsom1-ek-sd:~# cat /etc/network/interfaces

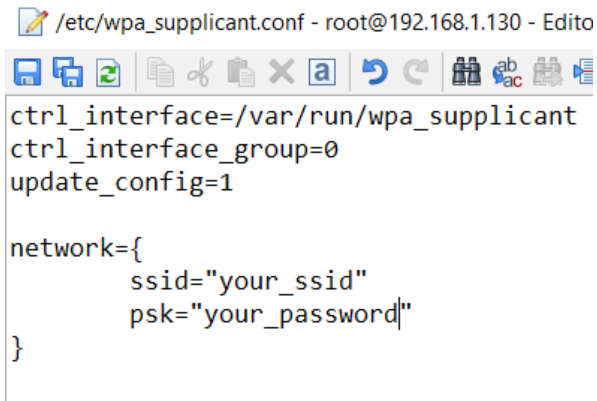
# /etc/network/interfaces -- configuration file for ifup(8), ifdown(8)

# The loopback interface
auto lo
iface lo inet loopback

# Wireless interfaces
auto wlan0
iface wlan0 inet dhcp
    wireless_mode managed
    wireless_essid YOUR_SSID
    wireless_key YOUR_PSK
    wpa-driver wext
    wpa-conf /etc/wpa_supplicant.conf

iface atm10 inet dhcp
```

2. Update /etc/wpa_supplicant.c with your routers ssid and password:



```
/etc/wpa_supplicant.conf - root@192.168.1.130 - Edito

ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
update_config=1

network={
    ssid="your_ssid"
    psk="your_password"
}
```

3.Reboot the board

```
root@sama5d27-wlsom1-ek-sd:~# reboot
```

4. Start wpa supplicant:

The following command silences the flood of debug messages that you may see when you turn the wifi on. If you want to see these messages then just omit the following command. It is optional.

```
echo 0 > /sys/kernel/debug/wilc/wilc_debug_region
```

The next command allows the wlan0 to turn on. Without this command the wlan0 is blocked from turning on:
rfkill unblock all

This command uses the previously modified file to read your routers SSID and password:

```
wpa_supplicant -B -iwlan0 -Dnl80211 -c /etc/wpa_supplicant.conf &

echo 0 > /sys/kernel/debug/wilc/wilc_debug_region
Debug region set to 0
root@sama5d27-wlsom1-ek-sd:~# rfkill unblock all
power up request for already powered up source Wifi
Device already up. request source is Wifi
root@sama5d27-wlsom1-ek-sd:~# wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
wilc_update_mgmt_frame_registrations setup authframe
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wpa_supplicant -B -iwlan0 -Dnl80211 -c /etc/wpa_supplicant.conf &
[1] 362
root@sama5d27-wlsom1-ek-sd:~# Successfully initialized wpa_supplicant
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
```

5.Start DHCP client, which allows the router to issue an IP address:

```
udhcpc -i wlan0 &
```

```

echo 0 > /sys/kernel/debug/wilc/wilc_debug_region
Debug region set to 0
root@sana5d27-wlson1-ek-sd:~# rfkill unblock all
power up request for already powered up source Wifi
Device already up. request source is Wifi
root@sana5d27-wlson1-ek-sd:~# wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
wilc_update_mgmt_frame_registrations setup authframe
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Info message received
IPv6: ADDRCONF(NETDEV_CHANGE): wlan0: link becomes ready
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wilc_wlan_cfg_indicate_rx: Scan Notification Received
wpa_supplicant -B -iwlan0 -Dnl80211 -c /etc/wpa_supplicant.conf &
[1] 362
root@sana5d27-wlson1-ek-sd:~# Successfully initialized wpa_supplicant
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
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nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
nl80211: kernel reports: Match already configured
ctrl_iface exists and seems to be in use - cannot override it
Delete '/var/run/wpa_supplicant/wlan0' manually if it is not used anymore
Failed to initialize control interface '/var/run/wpa_supplicant'.
You may have another wpa_supplicant process already running or the file was
left by an unclean termination of wpa_supplicant in which case you will need
to manually remove this file before starting wpa_supplicant again.

nl80211: deinit ifname=wlan0 disabled_11b_rates=0
wilc_wlan_cfg_indicate_rx: Scan Notification Received
udhcpc -i wlan0 &
[2] 546
[1] Done(255)
udhcpc: started. v1.31.1
root@sana5d27-wlson1-ek-sd:~# udhcpc: sending discover
udhcpc: sending select for 192.168.1.130
udhcpc: lease of 192.168.1.130 obtained. lease time 86400
/etc/udhcpc.d/50default: Adding DNS 74.40.74.40
/etc/udhcpc.d/50default: Adding DNS 74.40.74.41
/etc/udhcpc.d/50default: Adding DNS 192.168.1.1

```

6. Set wlan0 IP address:

ifconfig wlan0 192.168.1.105

7. Verify whether network can be connected to external sites:

```

/etc/udhcpc.d/50default: Adding DNS 192.168.1.1
ping www.yahoo.com
PING new-fp-shed.wg1.b.yahoo.com (74.6.231.20) 56(84) bytes of data.
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=1 ttl=51 time=72.5 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=2 ttl=51 time=71.0 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=3 ttl=51 time=75.3 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=4 ttl=51 time=71.6 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=5 ttl=51 time=72.5 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=6 ttl=51 time=71.3 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=7 ttl=51 time=71.6 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=8 ttl=51 time=72.2 ms
64 bytes from media-router-fp73.prod.media.vip.ne1.yahoo.com (74.6.231.20): icmp_seq=9 ttl=51 time=80.1 ms

```