

OpenWRT

Custom Wireless Router Firmware compatible with Rocket M* Series Wifi Nodes which can be used to build a MANET.

OpenWRT MANET

OPENWRT + 802.11s Mesh

PROS:

- ▶ License Free
- ▶ Stock equipment can use the same power output as AREDN
- ▶ Native Multicast Support (Server not necessary)
- ▶ Easily bridges to the internet without violating any ITU\FCC Rules
- ▶ More devices are supported

CONS:

- ▶ Does not have access to channels outside ISM Band.

Authors & Contributors

Discord: Many thanks to the following authors/contributors who helped us put this guide together.

- ▶ @Hayt - OG researcher who pioneered this setup
- ▶ @crusty11b - OG SME

Device Specific Setup Instructions

Below are device specific setup steps that have been tested and working.

Hardware Compatibility

We have found through trial and error that there are for sure XM and XW variants on the M2 and M5 units floating around. Unsure which revisions exist for the M900.

Try to flash the newest firmware first, if that fails try the older one.

Unit	XW	XM	Firmware Links	Notes	
Rocket M2	Confirmed	Confirmed	<ul style="list-style-type: none">▶ XM (old)<ul style="list-style-type: none">▶ openwrt-22.03.2-ath79-tiny-ubnt_rocket-m-squashfs-factory.bin ↗▶ XW (new)<ul style="list-style-type: none">▶ openwrt-19.07.9-ar71xx-generic-ubnt-rocket-m-xw-squashfs-factory.bin ↗▶ openwrt-19.07.9-ar71xx-generic-ubnt-loco-m-xw-squashfs-factory.bin ↗	Newer units with FCC ID "SWX-RM2W" are likely XW units. Older units with FCC ID "SWX-M2" are likely XM units.	
Rocket M5	Confirmed	Confirmed	<ul style="list-style-type: none">▶ XM (old)<ul style="list-style-type: none">▶ openwrt-22.03.2-ath79-tiny-ubnt_rocket-m-squashfs-factory.bin ↗▶ XW (new)<ul style="list-style-type: none">▶ openwrt-19.07.9-ar71xx-generic-ubnt-rocket-m-xw-squashfs-factory.bin ↗	No outward distinguishable signs to tell the XM from XW models.	
Rocket M900					

OpenWRT Firmware V19 WARNING - You will need to install mesh11sd manually since you will not be able to

update from list.

https://downloads.openwrt.org/snapshots/packages/mipsel_24kc/routing/mesh11sd_1.2.0-3_all.ipk ↗

Verify your device version

Newer devices are likely the “XW” model, if you try to flash the wrong firmware it will fail validation and you will need to download the correct one and flash again. This will not harm your device, just put it back into TFTP mode and flash again with the correct one.

You can login to the stock device before flashing and it should say the model on the login splash page (have not confirmed this)

- ▶ Change your device IP to 192.168.1.X (where X is any number except 20)
- ▶ Open a browser and go to 192.168.1.20
- ▶ Accept the SSL Warning and continue to site

Login Not secure | https://192.168.1.20/login.cgi?uri=/

airOS™

User Name:

Password:

Country: Select Your Country

Language: English

TERMS OF USE

This Ubiquiti Networks, Inc. radio device must be professionally installed. Properly installed shielded Ethernet cable and earth grounding must be used as conditions of product warranty. It is the installer's responsibility to follow local country regulations including operation within legal frequency channels, output power, and Dynamic Frequency Selection (DFS) requirements. You are responsible for keeping the unit working according to these rules.

I have read and agree to the [TERMS OF USE](#), [EULA](#) and [PRIVACY POLICY](#)


Have a SmartPhone? Try our new UNMS to install this device

[GET IT ON Google Play](#) [Download on the App Store](#)

- ▶ Login with
 - ▶ User: ubnt
 - ▶ Password: ubnt
- ▶ Note your device version

The screenshot shows the airOS web interface for a Ubiquiti Rocket M2. The top navigation bar includes links for MAIN, WIRELESS, NETWORK, ADVANCED, SERVICES, SYSTEM, UNMS, Tools, and Logout. The main content area has two tabs: Status and Monitor.

Status:

- Device Model: Rocket M2
- Device Name: Rocket M2
- Network Mode: Bridge
- Wireless Mode: Station
- SSID: ubnt
- Security: none
- Version: v6.2.0 (XW)** (highlighted with a red box)
- Uptime: 00:03:47
- Date: 2019-07-03 11:20:41
- CPU: 5 %
- Memory: 35 %
- AP MAC: Not Associated
- Signal Strength: -
- Chain0 / Chain1: 0 / 0 dBm
- Noise Floor: -
- Transmit CCQ: -
- TX/RX Rate: - / -
- airMAX: -
- UNMS: [?] Disabled

Monitor:

Throughput | AP Information | Interfaces | ARP Table | Bridge Table | Routes | Firewall | Log

LAN0

RX: 9.76kbps
TX: 18.7kbps

Warning Message:

You are using the default Administrator password.
Please change it in [System](#) page.

Genuine Product

Ubiquiti Rocket M2/M5/M900 Setup

- ▶ Amazon Link to device: <https://a.co/d/dSzJUtg>
- ▶ **We suggest you use the included POE Injector during the flashing and setup process, under/over voltage can provide unreliable results or damage the device.**
- ▶ **Make sure the Ethernet cables are fully seated and clicked into the ports, a poor connection can result in weird issues during flashing/use.**

Flashing the OpenWRT Firmware

- ▶ Install/Enable TFTP on your computer if it is not already
- ▶ Download the latest stable firmware build for your device here: <https://downloads.openwrt.org/releases/>



- ▶ See Hardware Compatibility Section above for tested and working builds
- ▶ Change your computers IP address to 192.168.1.X where X is any number except 20 (this is the one your device uses in TFTP mode)
- ▶ Connect two Ethernet cables to the POE injector that came with your M2, Connect your PC to the LAN port.
DO NOT PLUG YOUR M2 INTO POE PORT YET!!!
- ▶ Press and hold the reset button next to the Ethernet jack on the M2 while you plug it in to give it power, continue to hold the button for ~15 seconds until lights 1-3 and 2-4 start flashing in an alternating pattern. You are now in TFTP mode.
- ▶ Open a terminal and ping 192.168.1.20 to make sure your device is reachable
- ▶ Navigate to the folder you saved the Firmware file to and launch the TFTP application to write the firmware to the device:

(Each of these commands must be entered individually)

```
1 | tftp 192.168.1.20
```

```
1 | bin
```

```
1 | trace on
```

```
1 | put openwrt-22.03.2-ath79-tiny-ubnt_rocket-m-squashfs-factory.bin
```

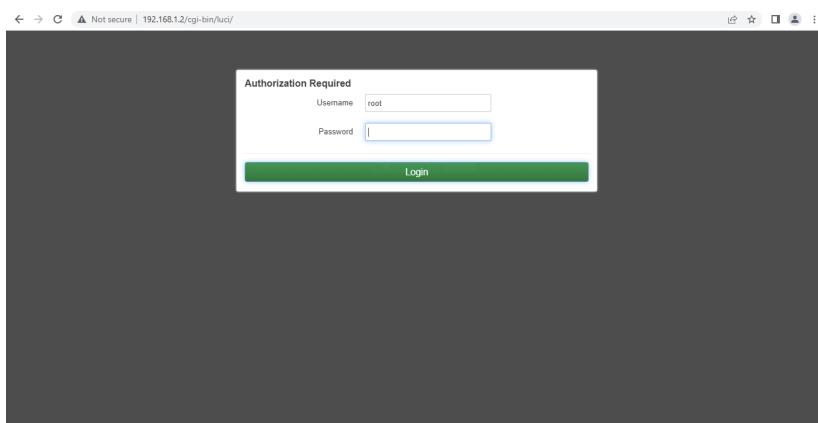
```
lenovo@lenovo:~/Downloads/m2$ tftp 192.168.1.20
tftp> bin
tftp> trace on
Packet tracing on.
tftp> put aredn-3.22.1.0-ar71xx-generic-ubnt-loco-m-xw-squashfs-factory.bin
```

- ▶ Wait 1-2mins for the lights to stop flashing and the device to reboot, once done with flashing if it was successful the LED all the way on the right will blink for a while as openWRT boots up, after it is done the 2nd light from the left will be solid green and you are now ready to connect and configure your device.

Configure Primary Node

Once you have reboot your Rocket, set your computer's Ethernet device back to automatic IP.

Navigate to <http://192.168.1.1>. The Luci router UI will prompt you to login. There is no password to login to the UI.



Note: After any change, you must hit Save , and then Save and Apply for your changes to take effect.

Navigate to [System/System](#) and set your [hostname](#) , [timezone](#) , and [country](#) .

The screenshot shows the 'System Properties' configuration page. At the top, there are tabs for General Settings, Logging, Time Synchronization, and Language and Style. The General Settings tab is active. Below it, the Local Time is displayed as 2022-10-14 18:56:29, with buttons for Sync with browser and Sync with NTP-Server. The Hostname field contains 'ATAK-OPENWRT-2' and is highlighted with a red box. The Description field is empty with a placeholder note: 'An optional, short description for this device'. The Notes field is empty with a placeholder note: 'Optional, free-form notes about this device'. The Timezone dropdown is set to 'America/New York' and is also highlighted with a red box. At the bottom right, there are buttons for Save & Apply, Save, and Reset.

Navigate to [System/Administration](#) and set a password for the radio GUI

The screenshot shows the 'Router Password' configuration page. At the top, there are tabs for Router Password, SSH Access, SSH-Keys, and HTTP(S) Access. The Router Password tab is active. It says 'Changes the administrator password for accessing the device'. There are two input fields: 'Password' and 'Confirmation', both of which have asterisks (*) indicating they are required. At the bottom right, there is a 'Save' button.

Navigate to [Network/Interfaces](#) and edit the LAN interface

Ensure your static IPv4 address is: 192.168.1.1

(See "Configure Additional Nodes" section for setting up the rest of your nodes, the primary "Gateway Node" is setup differently than additional nodes.)

Install Required Packages

Next we need to bridge your WIFI to the Rocket to install some packages.

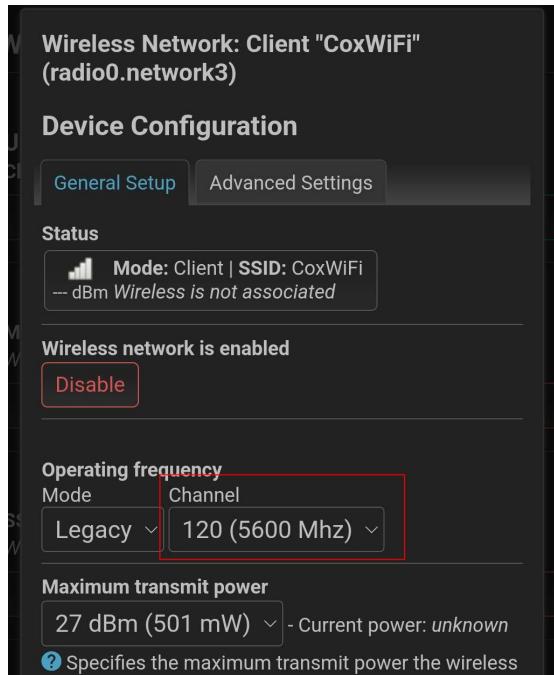
Navigate to Network/Wireless and tap [Scan](#).

Wireless Overview



You'll find your WiFi network that is connected to the Internet and connect to it. Follow the prompts to enter the password to your WiFi.

WARNING: You should probably change the default channel boxed in red below, because it is likely in use and will create a conflict in the next step when you try to download the packages you need, and you will get errors because you're not connected to the internet due to two devices fighting over the same channel.



Navigate to [System/Software](#), select [Installed](#), and type in `wpad-wolfssl`. Uninstall `wpad-wolfssl`. (You may also see `wpad-basic-wolfssl` instead, this is the one to remove.)

Note, on the legacy M5 XW Board the package to remove was named `wpad-basic`

The screenshot shows the 'Software' section of the OpenWRT interface. A modal window titled 'Executing package manager' displays the message 'Removing package wpad-basic-wolfssl from root...'. Below the modal, there is a search bar with the filter 'wpad' and several action buttons: 'Dismiss', 'Update lists...', 'Upload Package...', and 'Configure opkg...'. At the bottom of the screen, there is a navigation bar with tabs for 'Available', 'Installed', and 'Updates'. The main table area shows one package entry:

Package name	Version	Size (.ipk)	Description
wpad-basic-wolfssl	2022-01-16-cff80b4f-13.1	-	<button>Remove...</button>

OpenWRT Firmware V19 WARNING - You will need to install mesh11sd manually since you would be able to update from list.

https://downloads.openwrt.org/snapshots/packages/mipsel_24kc/routing/mesh11sd_1.2.0-3_all.ipk

Tap **Available**, and then tap **Update Lists...** under the **Actions:** menu.

Then in the Filter bar, type **wpad-mesh-wolfssl** and install that plugin, and then type **mesh11sd** and install that plugin as well.

The screenshot shows the 'Software' section of the OpenWRT interface. The 'Actions:' menu has 'Update lists...' selected. In the 'Filter' bar, the text 'wpad-mesh-wolfssl' is entered. The main table area shows one package entry:

Package name	Version	Size (.ipk)	Description
wpad-mesh-wolfssl	2022-01-16-cff80b4f-14.1	641.6 KB	This package contains a minimal IEEE 802.1x/WPA Authenticator and Suplicant (with 802.11s mesh and SAE support).

At the bottom right of the table row, there is a button labeled 'Install...'. The rest of the interface is similar to the first screenshot, with a top navigation bar and a modal window for package management.

Software

Free space:
51% (1.0 MB)

Filter: mesh11 Download and install package: Package name or URL... Actions:

Displaying 1-1 of 1

Package name	Version	Size (.ipk)	Description	Action
mesh11sd	1.2.0-3	5.0 KB	Mesh11sd is a dynamic parameter configuration daemon for 802.11s mesh networks....	<input type="button" value="Install..."/>

Create your Wireless Mesh Network

Navigate to [Network/Wireless](#) and delete the connection to your Wifi.

Tap [ADD](#) and create a new network.

For Operating Frequency, select [Legacy](#) and pick a channel for your mesh to operate on. ALL Nodes will need to be on the same channel. Select the Maximum transmit power you desire.

Wireless Network: Mesh Point "TAK-MESH" (mesh0)

Device Configuration

[General Setup](#) [Advanced Settings](#)

Status:  Mode: Mesh Point | SSID: ?
---/-95 dBm BSSID: DC:9F:DB:64:1B:82
Encryption: WPA3 SAE (CCMP)
Channel: 120 (5.600 GHz)
Tx-Power: 22 dBm
Signal: 0 dBm | Noise: -95 dBm
Bitrate: 0.0 Mbit/s | Country: US

Wireless network is enabled

Operating frequency: Mode [Legacy](#) Channel [120 \(5600 Mhz\)](#)

Maximum transmit power: [27 dBm \(501 mW\)](#) - Current power: 22 dBm + 5 dB offset = 27 dBm

[?](#) Specifies the maximum transmit power the wireless radio may use. Depending on regulatory requirements and wireless usage, the actual transmit power may be reduced by the driver.

Interface Configuration

General Setup Wireless Security Advanced Settings

Mode: 802.11s

Mesh Id: TAK-MESH

Network: lan:

Choose the network(s) you want to attach to this wireless interface or fill out the *custom* field to define a new network.

Under General setup, select **802.11s** as the mode, set a network name for **Mesh Id**, and on the Network bar, select **lan**.

You can then go to Wireless Security and add encryption, but it is suggested to wait until you have verified your mesh network is functional.

You will know your Wireless Mesh is functioning because neighboring nodes will show up under **Associated Stations**

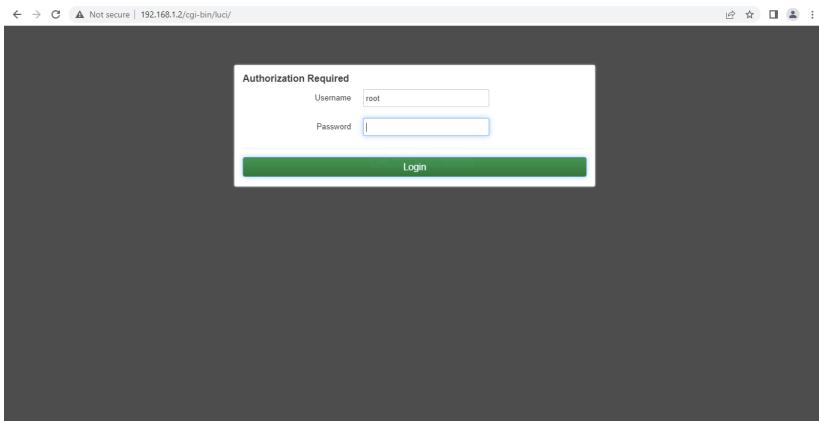
Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate
Mesh Point "TAK-MESH" (mesh0)	00:27:22:8A:A6:97	?	-9/-95 dBm	9.0 Mbit/s, 20 MHz 9.0 Mbit/s, 20 MHz

Configure Additional Nodes

Once you have reboot your Rocket, set your computer's Ethernet device back to automatic IP.

Navigate to <http://192.168.1.1>. The Luci router UI will prompt you to login. There is no password to login to the UI.



Note: After any change, you must hit Save , and then Save and Apply for your changes to take effect.

Navigate to [System/System](#) and set your [hostname](#) , [timezone](#) , and [country](#) .

ATAK-OPENWRT-2 Status ▾ [System](#) ▾ Network ▾ Logout REFRESHING UNSAVED CHANGES: 2

System

Here you can configure the basic aspects of your device like its hostname or the timezone.

System Properties

General Settings Logging Time Synchronization Language and Style

Local Time 2022-10-14 18:56:29
Sync with browser Sync with NTP-Server

Hostname ATAK-OPENWRT-2

Description
ⓘ An optional, short description for this device

Notes
ⓘ Optional, free-form notes about this device

Timezone America/New York

Save & Apply Save Reset

Navigate to [System/Administration](#) and set a password for the radio GUI

ATAK-OPENWRT-2 Status ▾ System ▾ Network ▾ Logout UNSAVED CHANGES: 2

Router Password SSH Access SSH-Keys HTTP(S) Access

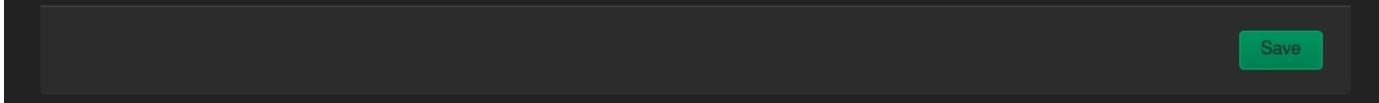
Router Password

Changes the administrator password for accessing the device

Password *

Confirmation *

Save



Navigate to [Network/Interfaces](#) and edit the LAN interface

Interfaces » LAN

General Settings Advanced Settings Firewall Settings DHCP Server

Status
 Device: br-lan
Uptime: 0h 21m 33s
MAC: DC:9F:DB:65:1B:82
RX: 1.30 MB (12580 Pkts.)
TX: 2.34 MB (12013 Pkts.)
IPv4: 192.168.1.2/24
IPv6: fdb1:aa1:8f24::1/60

Protocol

Device  br-lan

Bring up on boot

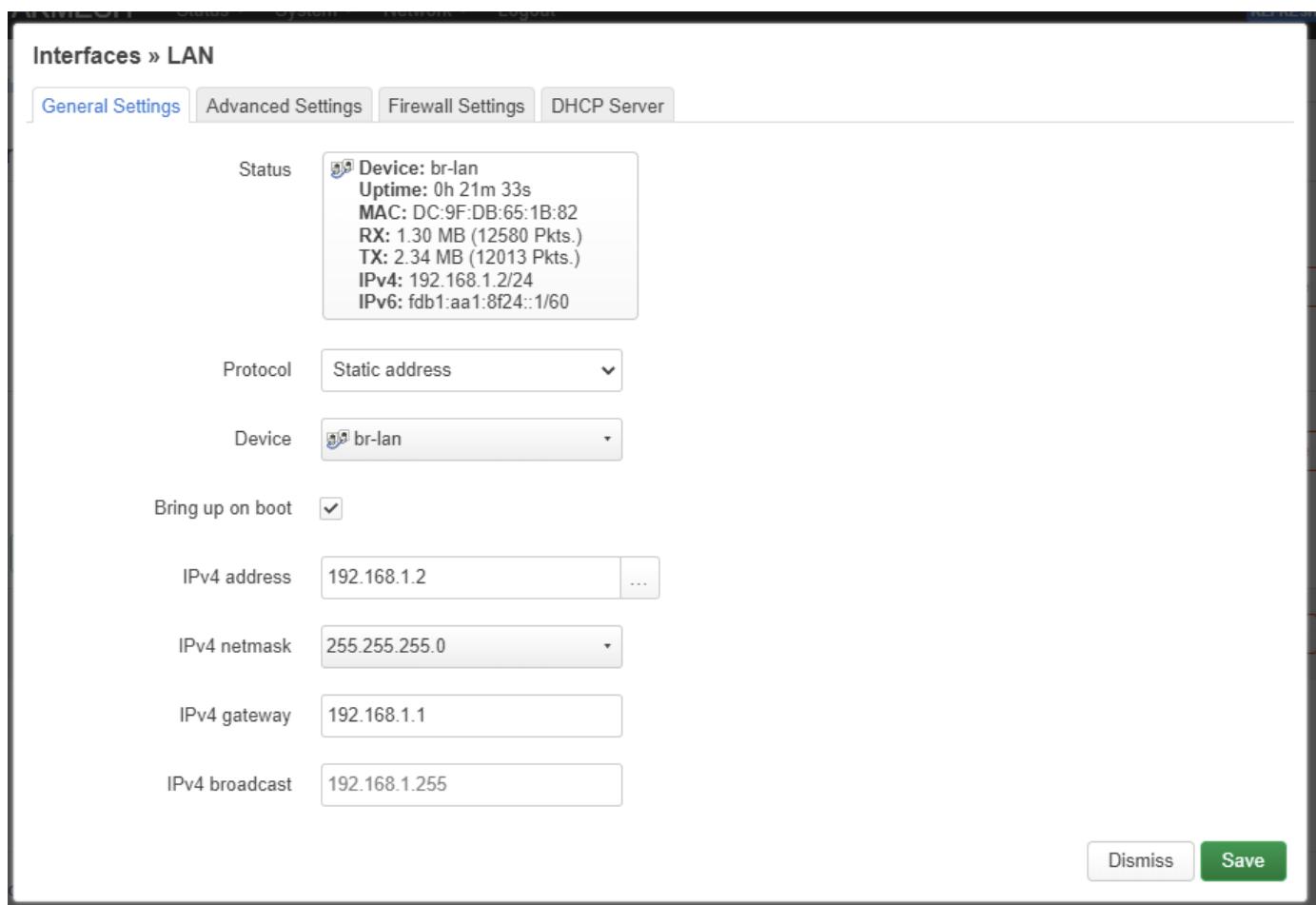
IPv4 address ...

IPv4 netmask

IPv4 gateway

IPv4 broadcast

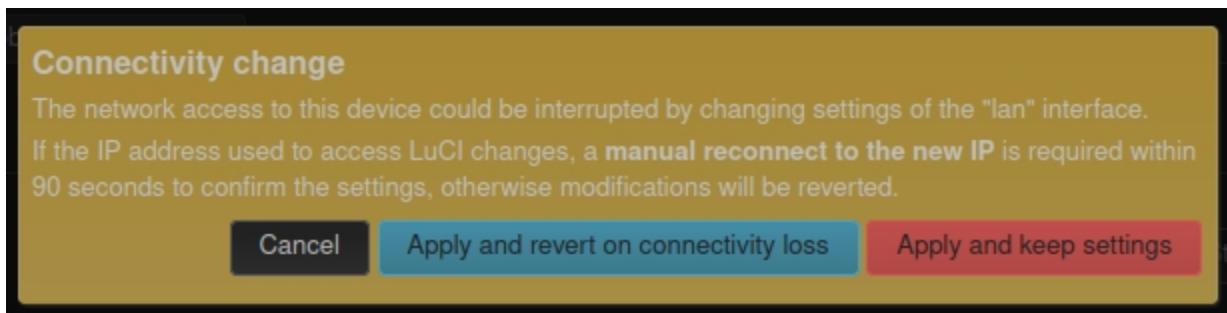
Dismiss Save



First set a static IPv4 address ONLY ex: [192.168.1.2](#)

For each additional node, you'll set a static IPv4 address in numerical succession, [192.168.1.2](#), [192.168.1.3](#) , etc.

Save , then [Save and Apply](#) and you will be presented with this warning, accept it and then give it a few seconds before you try to reconnect to the admin UI using the new IP address [192.168.1.2](#)



Reconnect to your node using the new IP, ex: 192.168.1.2 then go back to the same configuration menu and change the IPv4 gateway to the IP for your "gateway node" in your mesh setup. ex: 192.168.1.1.

Save , then [Save and Apply](#)

Install Required Packages

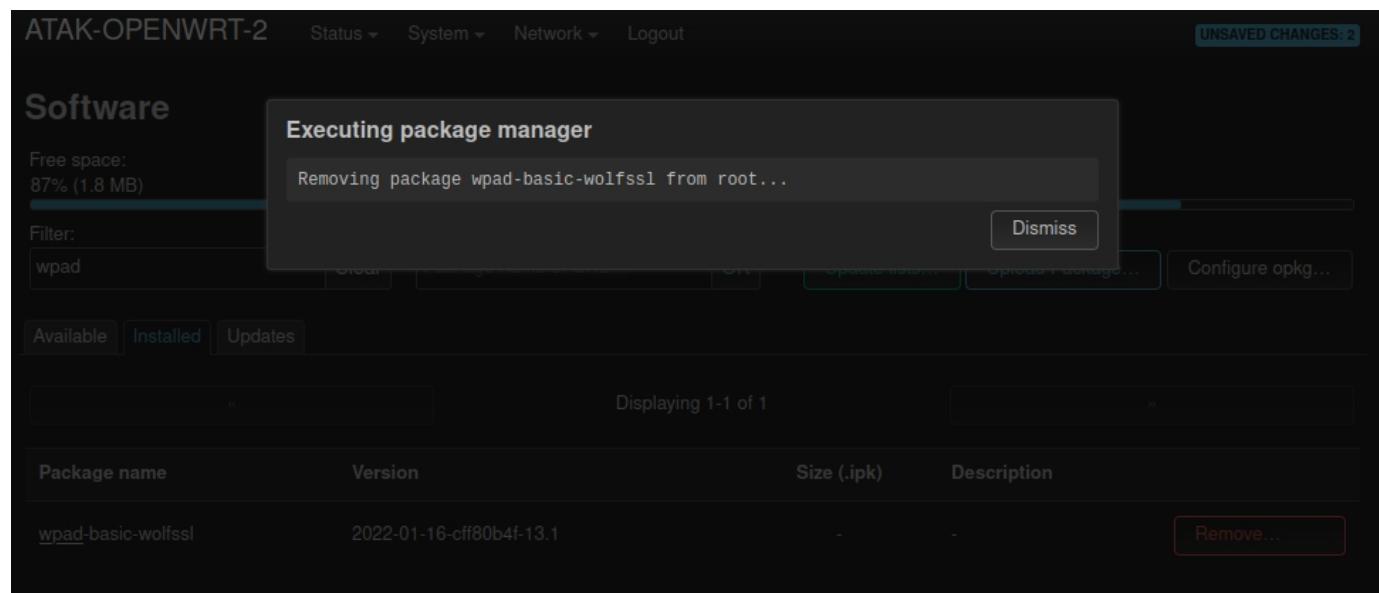
Navigate to Network/Wireless and tap [Scan](#) .

Wireless Overview



You'll find your WiFi network that is connected to the Internet and connect to it. Follow the prompts to enter the password to your WiFi.

Navigate to [System/Software](#) , select [Installed](#) , and type in [wpad-wolfssl](#) . Uninstall [wpad-wolfssl](#) . (You may also see [wpad-basic-wolfssl](#) instead, this is the one to remove.)



OpenWRT Firmware V19 WARNING - You will need to install mesh11d manually since you would be able to update from list.

https://downloads.openwrt.org/snapshots/packages/mipsel_24kc/routing/mesh11sd_1.2.0-3_all.ipk

Tap **Available**, and then tap **Update Lists...** under the **Actions:** menu.

Then in the Filter bar, type **wpad-mesh-wolfssl** and install that plugin, and then type **mesh11sd** and install that plugin as well.

Package name	Version	Size (.ipk)	Description	Action
wpad-mesh-wolfssl	2022-01-16-cff80b4f-14.1	641.6 KB	This package contains a minimal IEEE 802.1x/WPA Authenticator and Suplicant (with 802.11s mesh and SAE support).	Install...

Package name	Version	Size (.ipk)	Description	Action
mesh11sd	1.2.0-3	5.0 KB	Mesh11sd is a dynamic parameter configuration daemon for 802.11s mesh networks....	Install...

Create your Wireless Mesh Network

Navigate to **Network/Wireless** and delete the connection to your Wifi.

Tap **ADD** and create a new network.

For Operating Frequency, select **Legacy** and pick a channel for your mesh to operate on.

ALL Nodes will need to be on the same channel. Select the Maximum transmit power you desire.

Wireless Network: Mesh Point "TAK-MESH" (mesh0)

Device Configuration

General Setup Advanced Settings

Status

 Mode: Mesh Point | SSID: ?
---/-95 dBm BSSID: DC:9F:DB:64:1B:82
Encryption: WPA3 SAE (CCMP)
Channel: 120 (5.600 GHz)
Tx-Power: 22 dBm
Signal: 0 dBm | Noise: -95 dBm
Bitrate: 0.0 Mbit/s | Country: US

Wireless network is enabled Disable

Operating frequency

Mode	Channel
Legacy ▾	120 (5600 Mhz) ▾

Maximum transmit power

27 dBm (501 mW) ▾	- Current power: 22 dBm + 5 dB offset = 27 dBm
-------------------	--

? Specifies the maximum transmit power the wireless radio may use. Depending on regulatory requirements and wireless usage, the actual transmit power may be reduced by the driver.

Interface Configuration

General Setup Wireless Security Advanced Settings

Mode 802.11s ▾

Mesh Id TAK-MESH

Network lan:  ▾

? Choose the network(s) you want to attach to this wireless interface or fill out the *custom* field to define a new network.

Dismiss

Save

Under General setup, select **802.11s** as the mode, set a network name for **Mesh Id**, and on the Network bar, select **lan**.

ALL NODES MUST HAVE THE SAME Mesh Id

You can then go to Wireless Security and add encryption, but it is suggested to wait until you have verified your mesh network is functional.

You will know your Wireless Mesh is functioning because neighboring nodes will show up under

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate
Mesh Point "TAK-MESH" (mesh0)	00:27:22:8A:A6:97	?	-9/-95 dBm	9.0 Mbit/s, 20 MHz 9.0 Mbit/s, 20 MHz

Access Point Setup

Once your Mesh Network is functioning, you can create a virtual wireless Access Point. This step is the same for all nodes.

In Network/Wireless, Tap ADD and create a new network. The Operating Frequency, Channel, and Transmit power must be the same as the Mesh network.

Under General Setup, select **Access Point** as your **Mode**, create an **ESSID**, and then select **lan** for the **Network**.

The screenshot shows the LuCI web interface for a device named "TAKMESH - Wireless - LuCI". The URL is 192.168.1.2/cgi-bin/luci/admin/network/wireless. The page displays the configuration for a "Wireless Network: Master "TAKMESH-AP-2" (radio0.network2)".

Device Configuration (General Setup tab selected):

- Status: Mode: Master | SSID: TAKMESH-AP-2 (disabled)
- Wireless network is disabled (button: Enable)
- Operating frequency: Legacy, Channel: 120 (5600 Mhz)
- Maximum transmit power: 27 dBm (501 mW) - Current power: unknown
- A note states: "Specifies the maximum transmit power the wireless radio may use. Depending on regulatory requirements and wireless usage, the actual transmit power may be reduced by the driver."

Interface Configuration (General Setup tab selected):

- Mode: Access Point
- ESSID: TAKMESH-AP-2
- Network: lan (dropdown menu)
- A note states: "Choose the network(s) you want to attach to this wireless interface or fill out the custom field to define a new network."

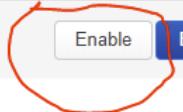
The bottom of the screen shows the Windows taskbar with various icons and the system tray indicating the date and time (11/15/2022, 6:42 PM).

When powering up the node, you'll need to log into the Luci GUI and **disable**, then **enable** the AP. Wait

1 minute for the radio to start broadcasting the AP ESSID.

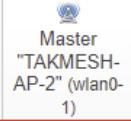
Wireless Overview

 radio0	Ubiquiti Rocket M5 802.11an Channel: 120 (5.600 GHz) Bitrate: ? Mbit/s	Restart Scan Add
 ---/-95 dBm	Mesh ID: TAK-MESH Mode: Mesh Point BSSID: DC:9F:DB:64:1B:82 Encryption: WPA3 SAE (CCMP)	Disable Edit Remove
 disabled	SSID: TAKMESH-AP-2 Mode: Master Wireless is disabled	Enable Edit Remove



All mesh and wireless device connections will show up under [Associated Stations](#)

Associated Stations

Network	MAC address	Host	Signal / Noise	RX Rate / TX Rate
 Mesh Point "TAK-MESH" (mesh0)	00:27:22:8A:A6:97	?	 -8/-95 dBm	54.0 Mbit/s, 20 MHz 54.0 Mbit/s, 20 MHz
 Master "TAKMESH-AP-2" (wlan0-1)	BA:E4:A9:63:DC:5F	Pixel-4-XL.lan (192.168.1.137, [REDACTED])	 -41/-95 dBm	6.0 Mbit/s, 20 MHz 54.0 Mbit/s, 20 MHz

[Disconnect](#)

Adding Encryption

Work in progress...

Adding Internet Back-haul

Put your Rocket's IP on the same LAN as your internet WiFi, then all other mesh Rocket's will use the Internet connected Rocket as their Gateway.

Troubleshooting Package Installation

If you get error such as this when you try to update your package list or download a package, it's because you did not connect your WiFi that is hooked up to the internet successfully in the first step.

```
Executing package manager

Downloading http://downloads.openwrt.org/releases/19.07.10/targets/ar71xx/mikrotik/packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/targets/ar71xx/mikrotik/packages.gz

Downloading http://downloads.openwrt.org/releases/19.07.10/targets/ar71xx/mikrotik/kmod-4.14.275-1-48ac8ed5a50ef9376062d2f90a31388/Packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/targets/ar71xx/mikrotik/kmod-4.14.275-1-48ac8ed5a50ef9376062d2f90a31388/Packages.gz

Downloading http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/base/Packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/base/Packages.gz

Downloading http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/freifunk/Packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/freifunk/Packages.gz

Downloading http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/luci/Packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/luci/Packages.gz

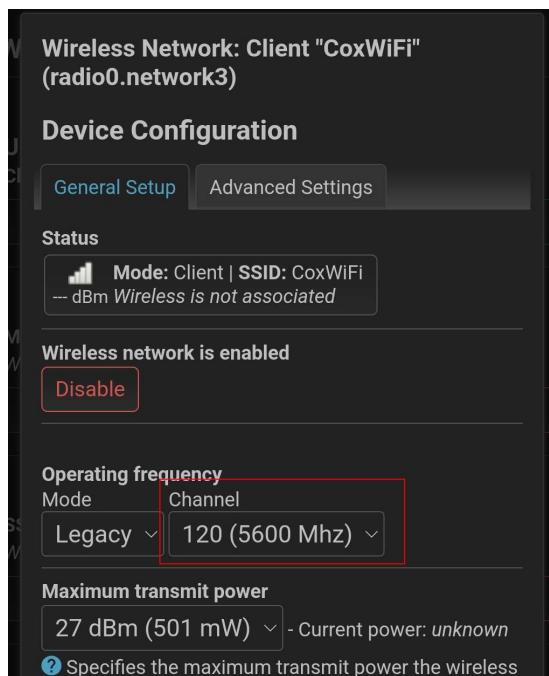
Downloading http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/packages.gz

Downloading http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/routing/Packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/routing/Packages.gz

Downloading http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/telephony/Packages.gz
*** Failed to download the package list from http://downloads.openwrt.org/releases/19.07.10/packages/mips_24kc/telephony/Packages.gz

Errors
Failed to send request: Operation not permitted
Failed to send request: Operation not permitted
```

You likely need to change the channel its broadcasting on and try again as another device is likely conflicting with it:



Field Testing

The following are the results of range testing in the Sonoran Desert.

Terrain

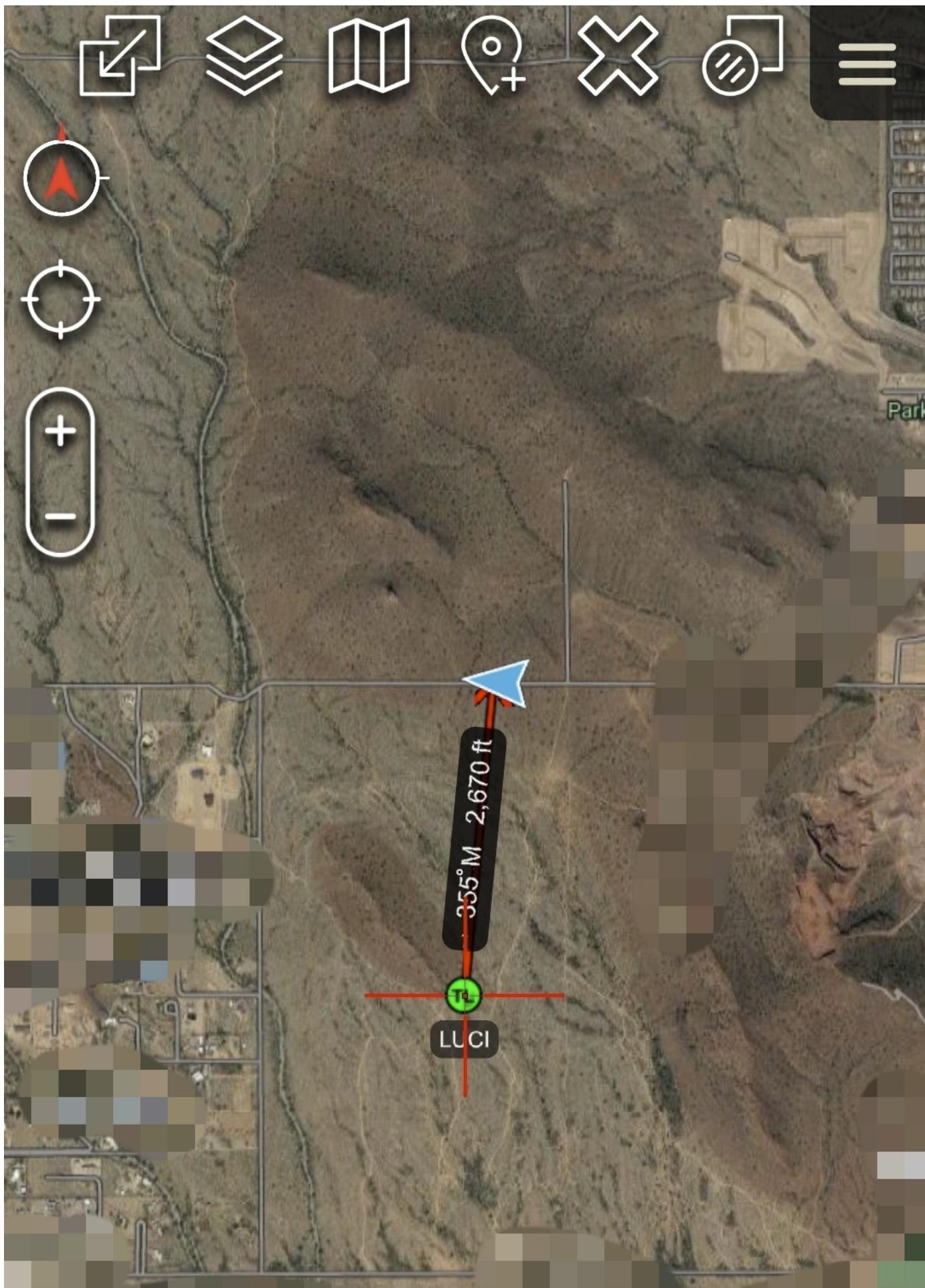
The test range terrain was hilly with various trees, bushes, and cacti.

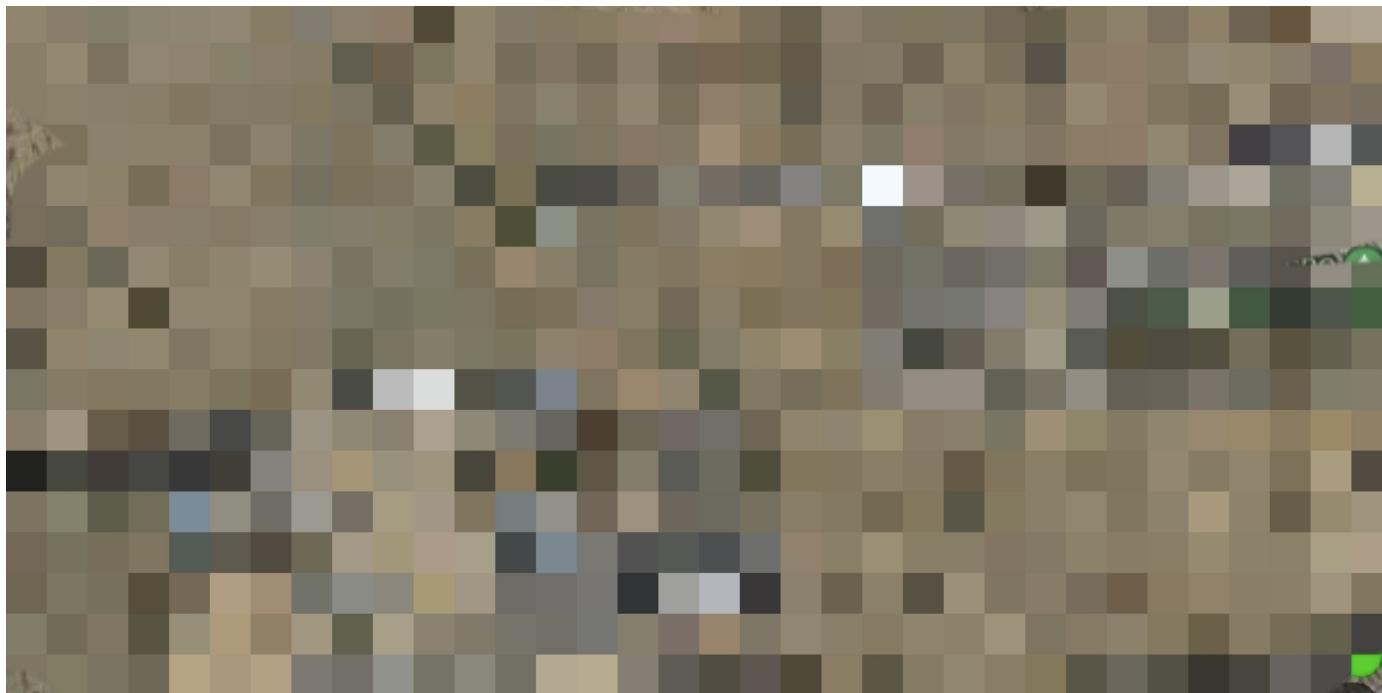


Testing range

Range

Max range achieved was +/- 800 meters LOS, however further range was not tested.







Elevation Profile

At times LOS was lost, the mesh was broken, but quickly reestablished when LOS was required.

TAK Ecosystem

Attached to one node was a TAK-IN-A-BOX kit with 2 Raspberry Pi 4 8gb SBCs, one with TAKSERVER, and one running RTSP Simple Server. Both SBCs are connected to a GL.inet AR150 travel router setup in bridge mode and connected to the mesh by Ethernet.





TAK-IN-A-BOX

Voice comms

Voice comms were tested using a VOIP app called LINPHONE and Intercom for Android.

LINPHONE

<https://play.google.com/store/apps/details?id=org.linphone>



Not connected

sip:luci@192.168.1.129



1^{oo}

2

3

4

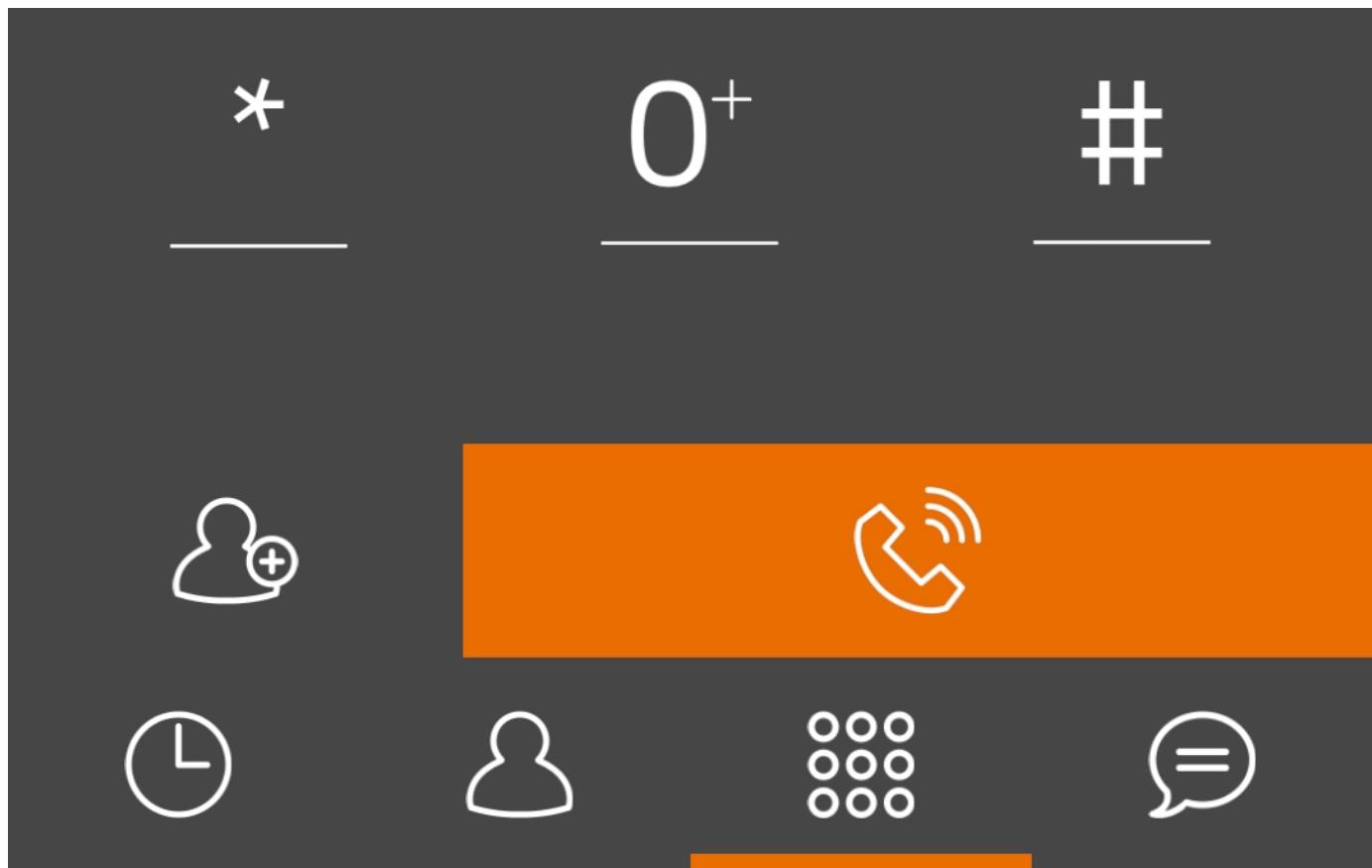
5

6

7

8

9



Linphone

Intercom for Android PTT

<https://play.google.com/store/apps/details?id=com.androidintercom>





PTT

Intercom for Android PTT

Intercom for Android is a very easy PTT app that works over multicast. There is no setup required, just install, map your PTT button, and start talking. This test was used with a Samsung S-21, USB-C to 3.5mm cable, and a 3.5mm to Kenwood K1 cable connected to Peltor COMTAC headsets.

UASTool

UASTOOL was tested but video was not successfully transmitted over the mesh network. This was likely due to a misconfiguration with RTSP Simple Server.

However, CoT from the drone as well as pictures were sent across the mesh network successfully.



Uastool mapshot

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