Default Access Credentials

- Default IP address: **192.168.1.1**
- Default password: **admin**
- Default username (for SSH): **root**
- Default link (for settings): **https://192.168.1.1**

Telco X1 Pro Documentation

RCM Certified

Table of Contents

Telco X1 Pro

Hardware Specifications

Electrical

- PoE powered - guaranteed 50m range over Cat6 cable
- Antenna connectors
    - 2x Mobile data: SMA Female antenna connector
    - 2x Wifi: RP-SMA Female

- 2.4GHz WiFi - 802.11a/b/g/n
    - up to 300Mbps capacity
    - up 100m radius outdoor coverage area 30m indoor
    - Recommended for up to 100 clients
- 5GHz wiFi - 802.11ac
    - Up to 900Mbps capacity
    - Up to 100m radius outdoor coverage area 30m indoor
    - Recommended for up to 100 clients

- 1000Mbps Gigabit Ethernet: 4 LAN, 1 WAN
    - 1x WAN Port
        - Can be changed to extra LAN
    - 4x LAN Ports

- Cat12 LTE Advanced Pro Modem
    - Peak Download Rate: 600Mbps
    - Peak Upload Rate: 150Mbps
    - Maximum aggregated bandwidth: up to 60MHz
    - Transmit Power (max)
        - LTE Bands: +23 dBm +/- 2dB
        - UMTS Bands: +24 dBm +/- 3dB
    - Supported Frequency Bands)
        - LTE Band 1
        - LTE Band 2
        - LTE Band 3
        - LTE Band 5
        - LTE Band 7
        - LTE Band 8
        - LTE Band 9
        - LTE Band 12
        - LTE Band 13

    - LTE Band 14
    - LTE Band 17
    - LTE Band 18
    - LTE Band 19
    - LTE Band 20
    - LTE Band 21
    - LTE Band 25
    - LTE Band 26
    - LTE Band 28
    - LTE Band 29
    - LTE Band 30
    - LTE Band 32
    - LTE Band 38
    - LTE Band 39
    - LTE Band 40
    - LTE Band 41
    - LTE Band 66
    - UMTS Band 1
    - UMTS Band 5
    - UMTS Band 6
    - UMTS Band 8
    - UMTS Band 9
    - UMTS Band 19
- 1x Nano-SIM slot
- Power consumption: < 12W

Physical

- Height: 30mm
    - With antennas: add 145mm to height
- Width: 155mm
- Depth: 110mm
- Weight: 200g
- Material: Metal
- Operating temperature: -10° to +55° C
- Operating humidity: 10% to 90% non-condensing
- DIN Rail Installation - DIN rail mounts included
- Backplate Installation - Mounts available
- Desktop/Set top Installation

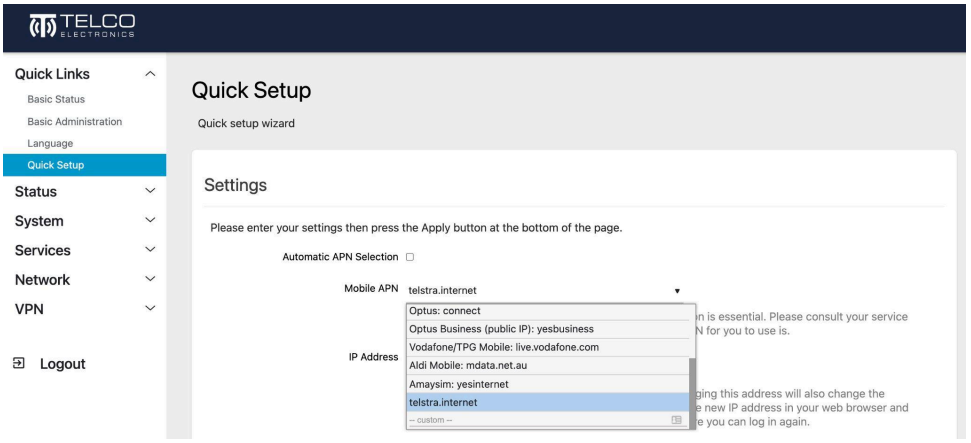
1 Package Contents

Please ensure your package contains everything in the following list. In the event that anything is missing or damaged, please do not hesitate to contact us at sales@telcoantennas.com.au or +61 (07) 3393 9919 M-F 9am to 5pm AEST.

1. 1x Telco X1 Pro
2. 1x Power Supply
3. 2x LTE antennas
4. 2x Wifi antennas
5. 1x Ethernet cable
6. 2x DIN rail mounts

Important changes in TelcOS 2.3

1. When Changing the **APN**, please use the new **Quick Setup Wizard** located under **Quick Links** > **Quick Setup.** This is a workaround for a bug in the new Linux Distributed Switch Architecture which will remove a required “device” attribute from the MOBILEDATA interface configuration. This bug will be addressed in a future release.

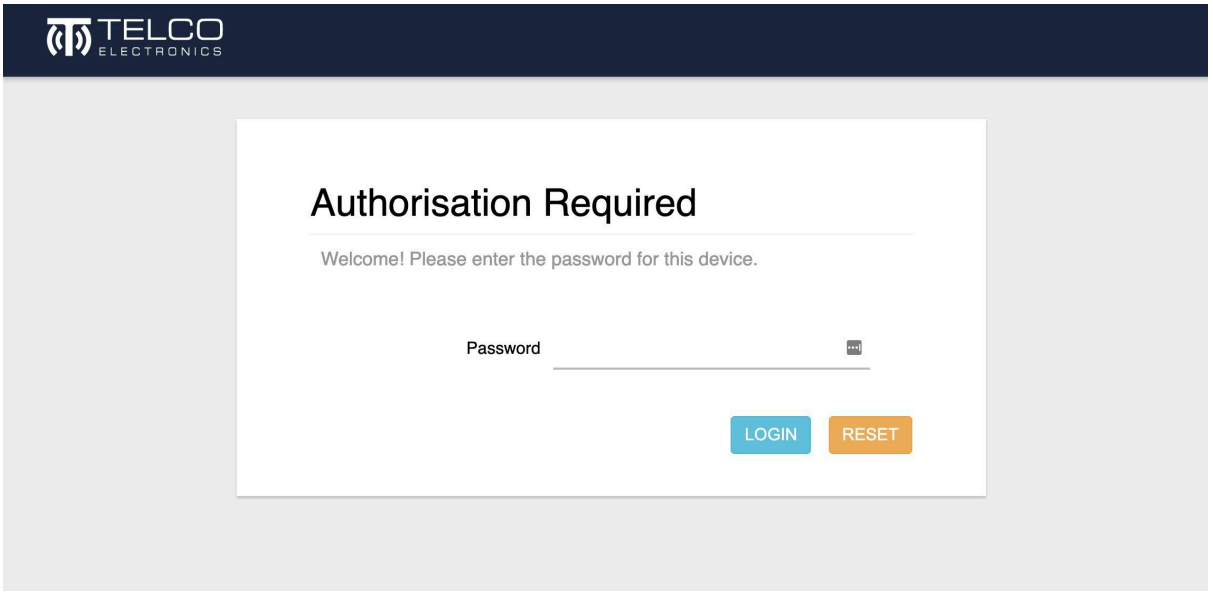


Quick Start Procedure

2 General Setup & Quick Start

2.0.1 Default Access Credentials

- Default IP address: **192.168.1.1**
- Default Password: **admin**
- Default Username (for SSH): **root**

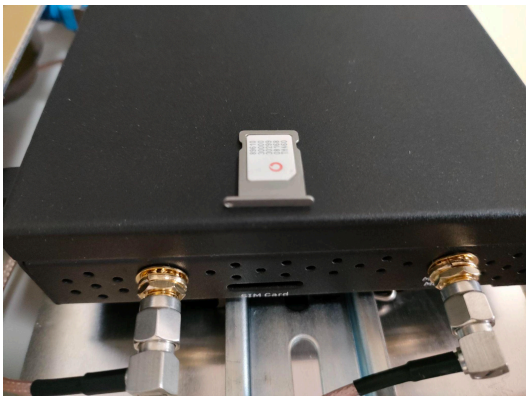


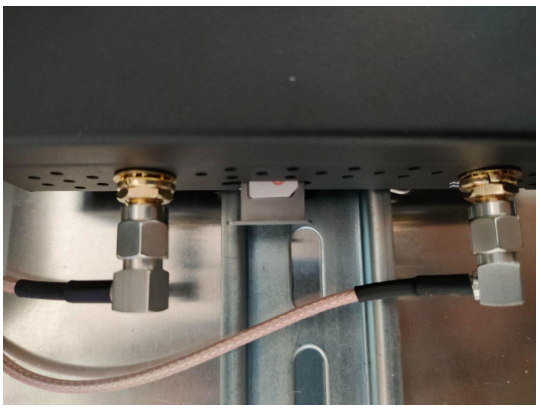
2.1 Firmware Upgrade

Please visit www.telcoelectronics.com.au/downloads for the latest firmware, free for life, which contains new features, enhancements and fixes.
Power cycling the device is required after a firmware upgrade.

2.2 Quick Start

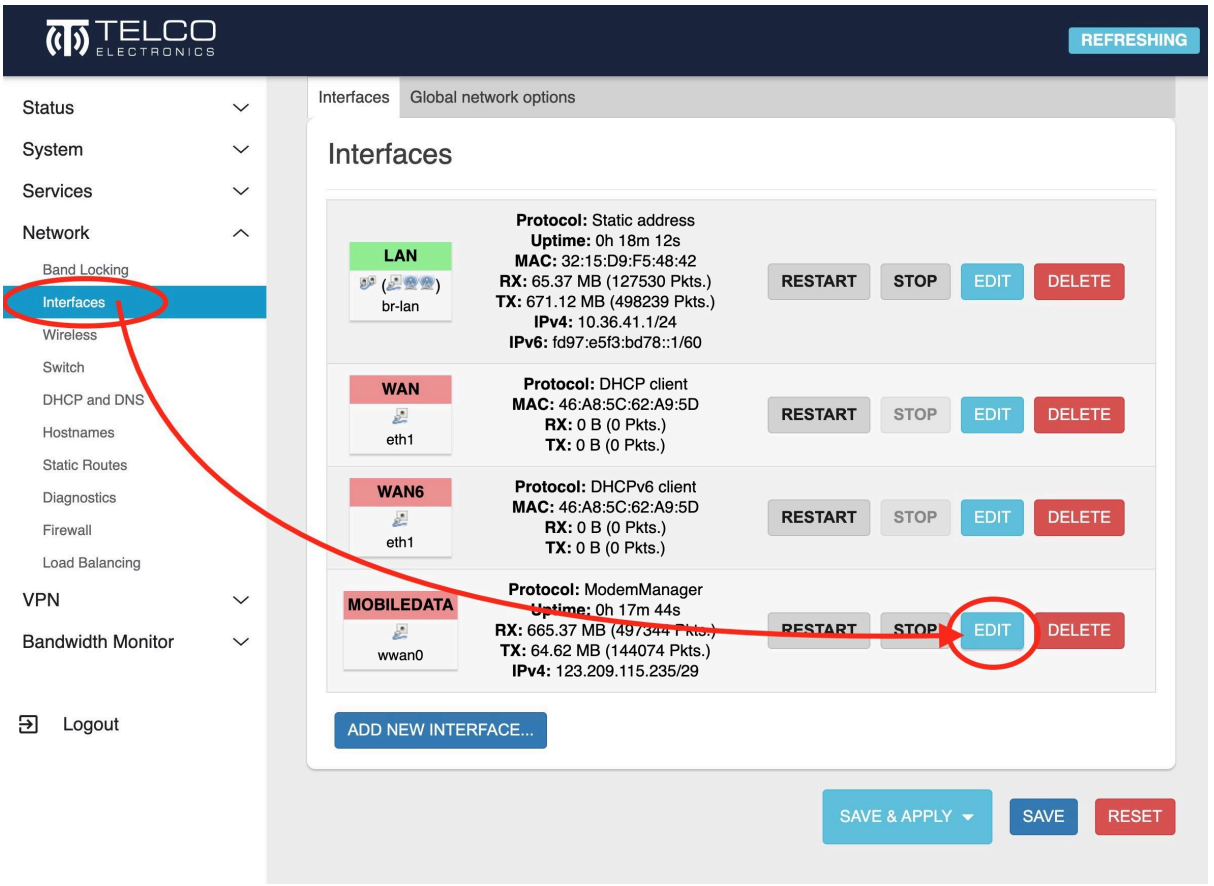
1. Insert your SIM card and power up the device



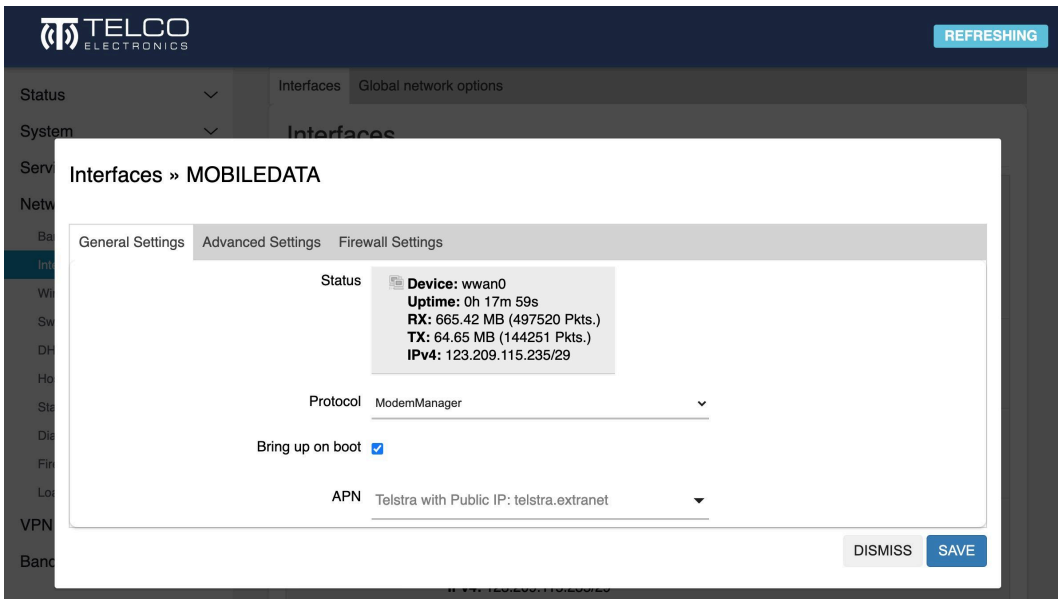


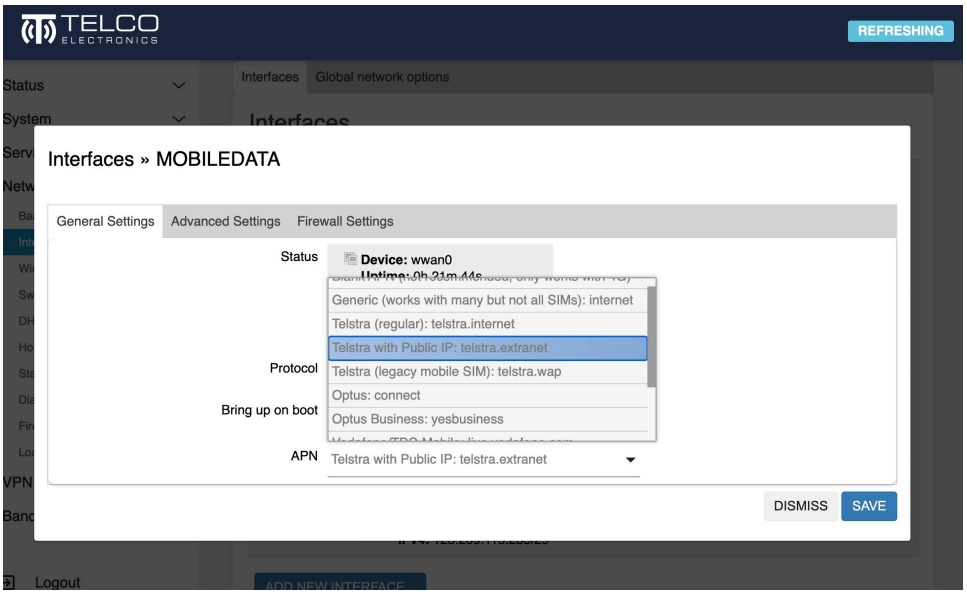
SIM should be **facing upwards** when inserted. Push SIM tray all the way in until flush with the case (not shown)

2. Connect your computer to the device via LAN port or use Wifi
3. Log in using the access credentials
4. Navigate to **Network** > **Interfaces** > **MobileData** and click **Edit**



5. Enter your APN or choose appropriately from the dropdown menu

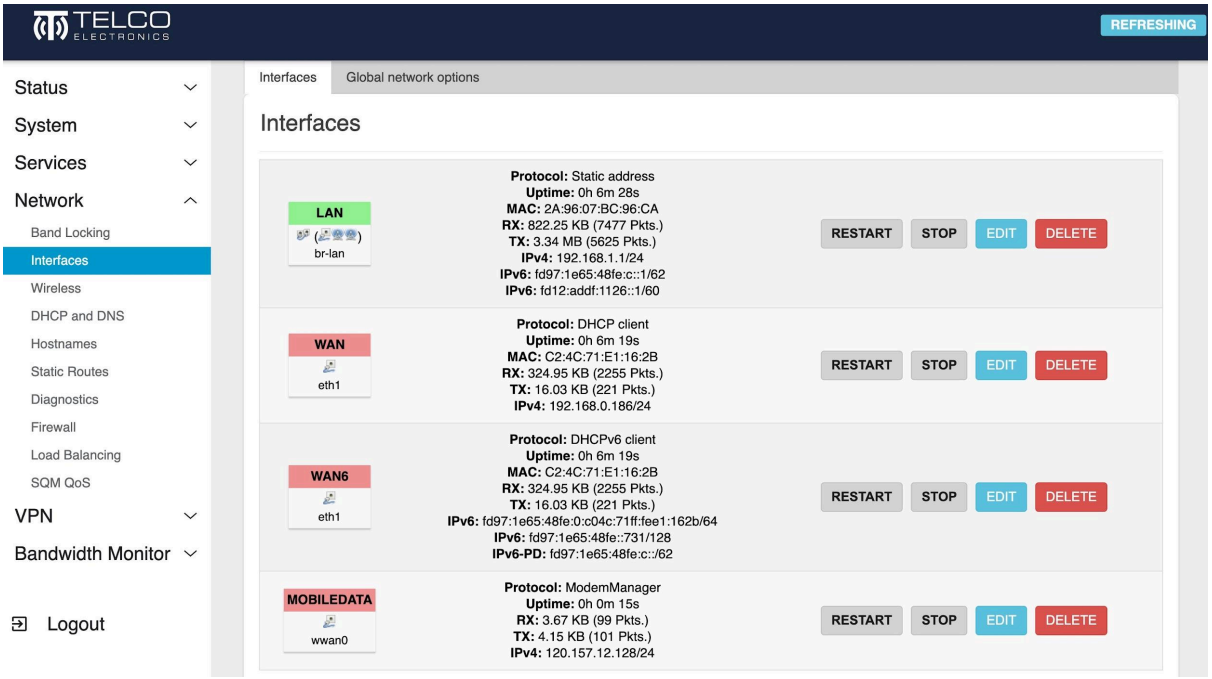




6. Proceed to **Advanced Setup** if necessary, outlined in Section 3 of this documentation

7. Set up Wifi as required - outlined in Section 4 of this documentation
    a. To set the Wifi Password (key): Navigate to **Network** > **Wireless** > **Edit** > **Wireless Security.** For details, see Section 4.3.2
8. Physically install the device as required

Done!

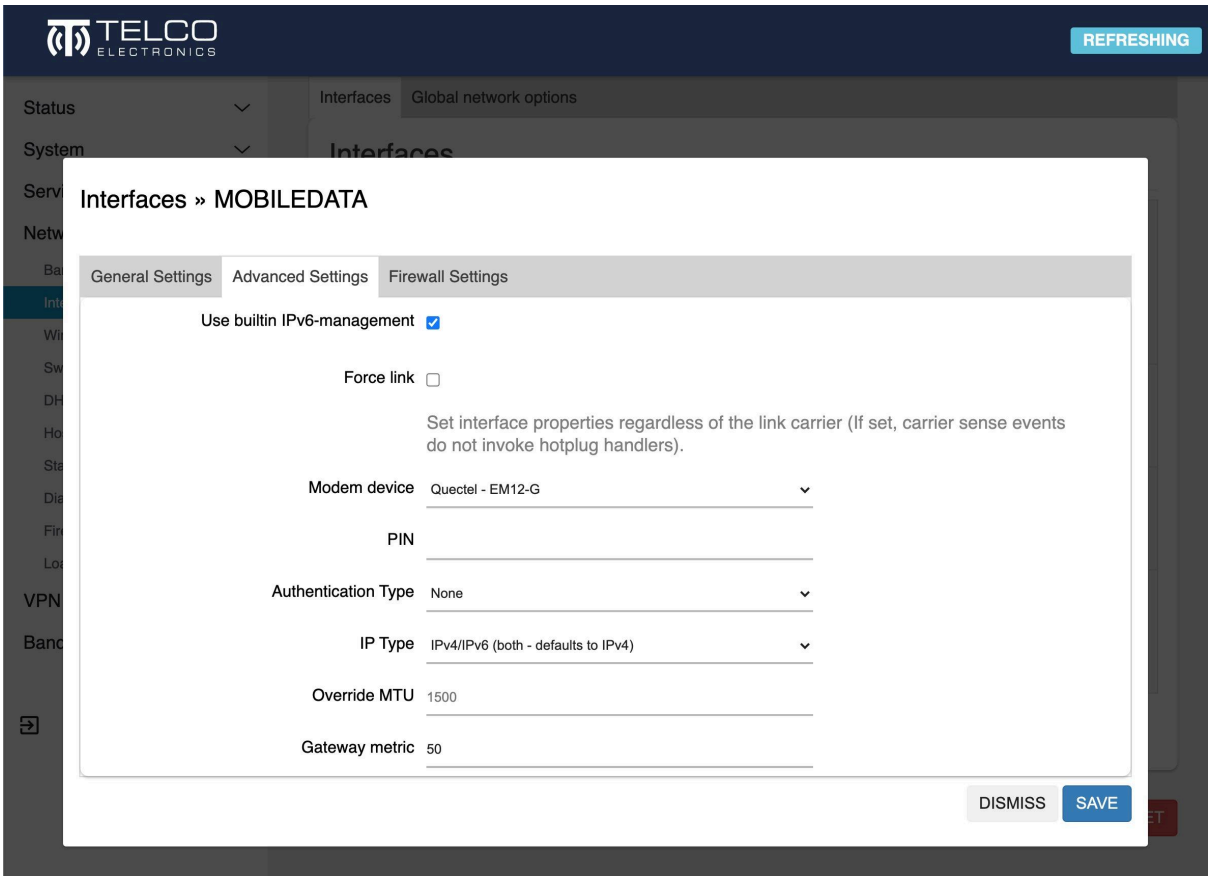


MobileData interface up and running, along with WAN interface

3 Mobile Data - Advanced Setup

3.1 Authentication

If your connection requires the use of extra parameters, these are located under the Advanced Setup options.



The following advanced options are revealed by navigating to the **Advanced** tab when editing the **MobileData** interface:

- PIN
- Authentication type: None, PAP/CHAP (both), PAP, CHAP
- PAP/CHAP username (requires Authentication type not set to 'None')
- PAP/CHAP password (requires Authentication type not set to 'None')
- IP connection type: IPv4/IPv6 (default to IPv4), IPv4 only, IPv6 only

Tip: Use of these options depend on your SIM card and mobile data plan. Please consult your mobile network operator (*e.g.* Telstra) for the details. These details are normally included with your SIM as accompanying documentation if they are required.

Note: Either incorrectly setting, or erroneously omitting any of these values, will result in a connection failure.

3.2 Band Locking

Lock to Frequency Bands

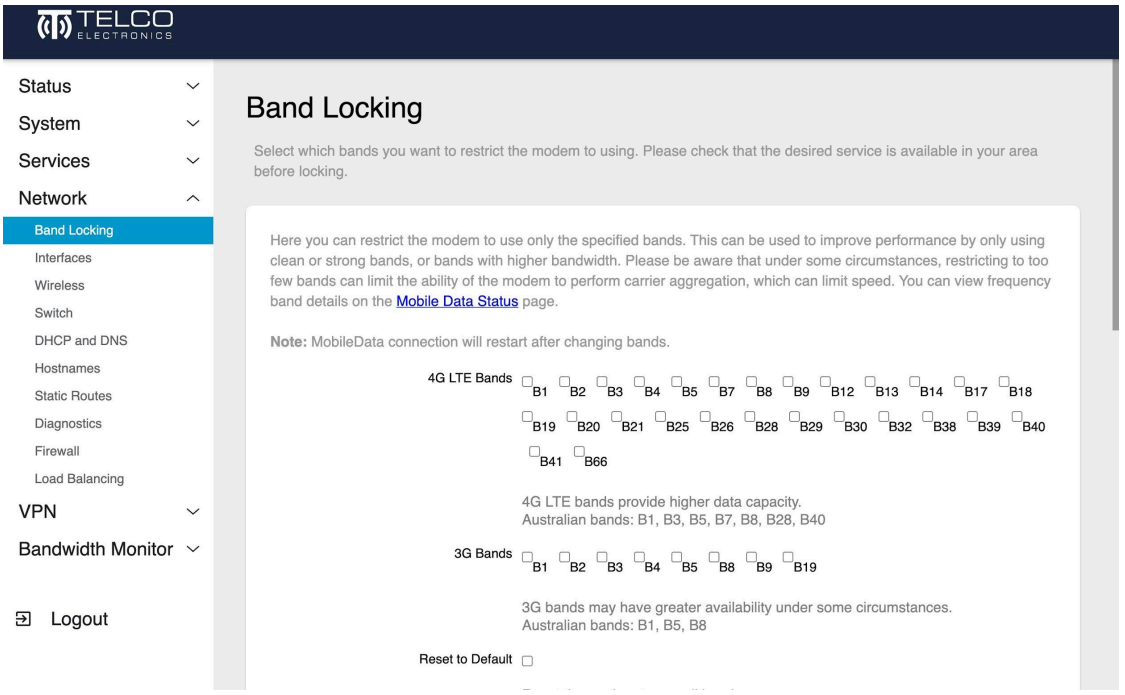
- Menu location: **Network** > **Band Locking**

You may set the X1 Pro to only use a selection of 3G and 4G frequency bands.

Important: please check beforehand that the desired frequency bands are indeed available in your area, else you may lock to bands that are not available and thus will not connect to the mobile data network.

Steps

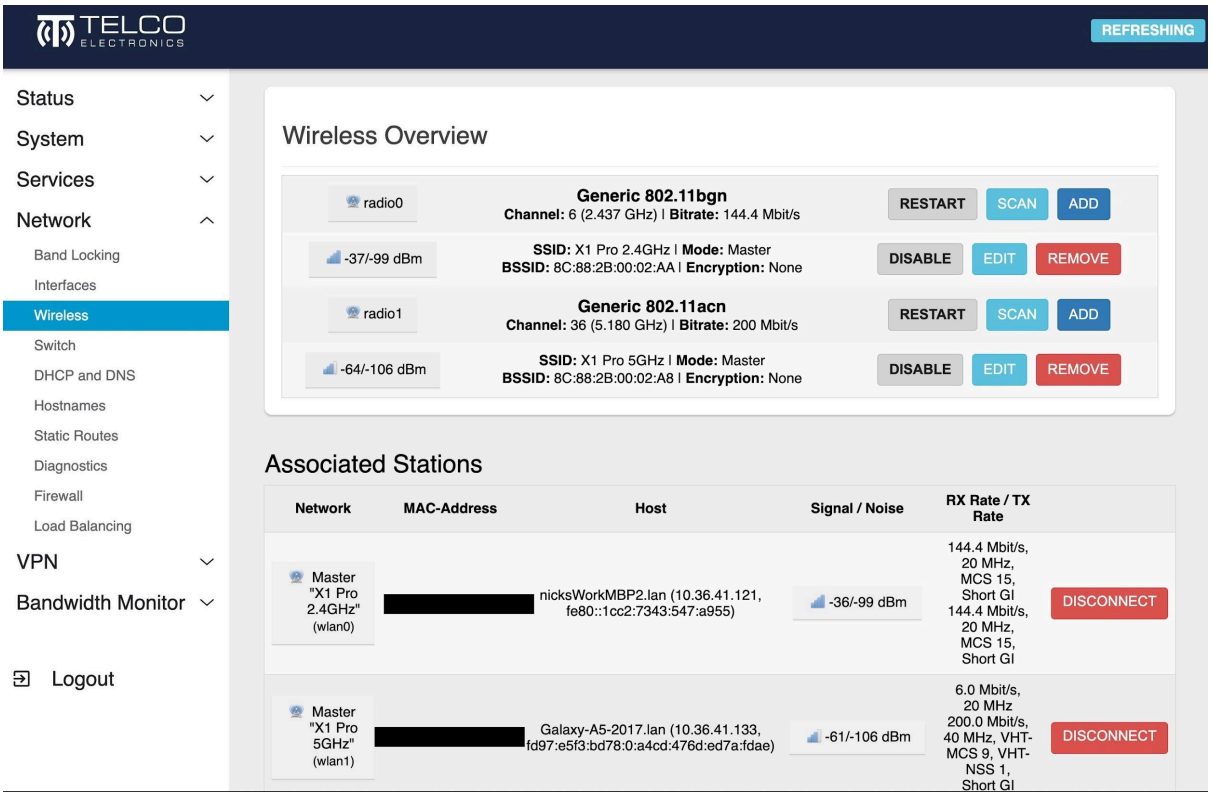
1. Select the desired bands
2. Click **Lock Bands**
3. Wait a moment as the X1 Pro locks bands then restarts the mobile connection.
4. Check the **Status > Mobile Data Status** page to confirm you are on the desired bands.



4 Wifi - Advanced Setup

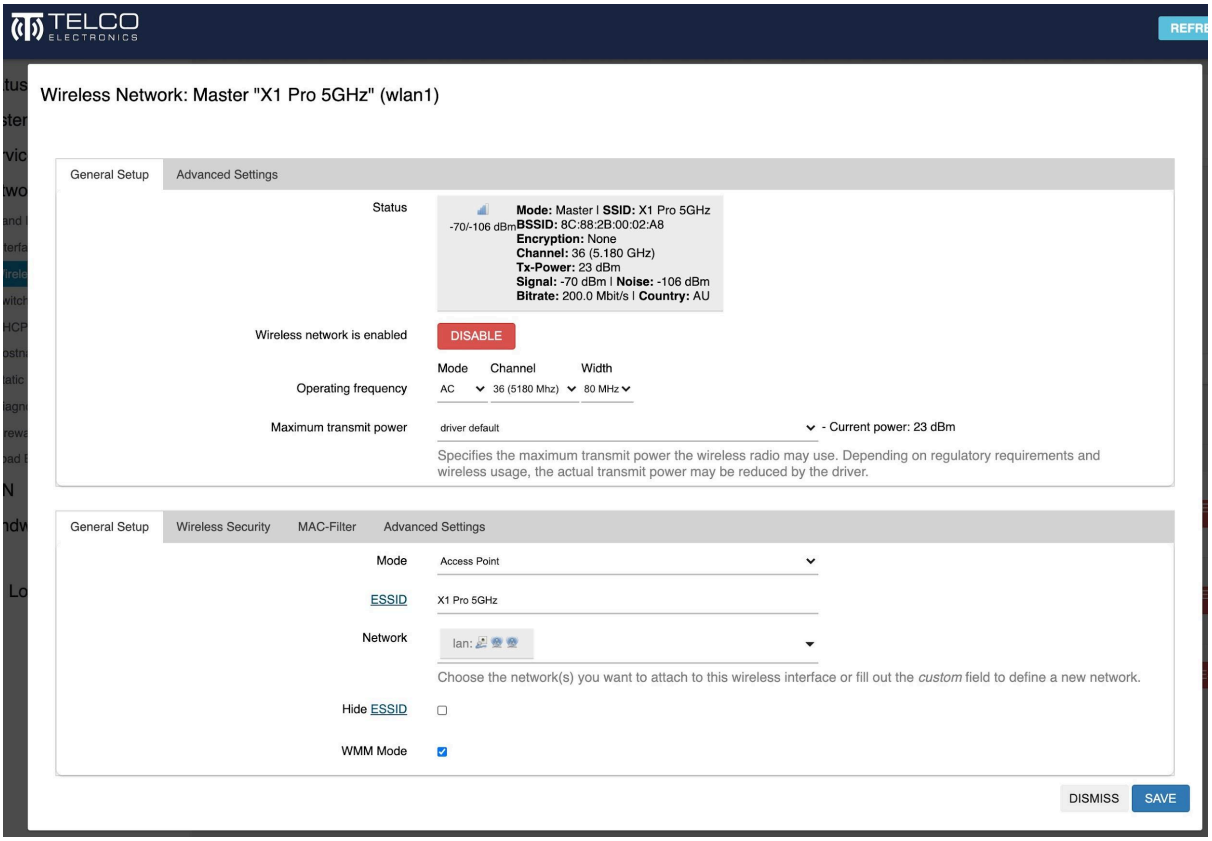
While it works great out of the box, X1 Pro offers a wide array of options that give you complete control over the dual band wireless LAN hardware. Wifi performance will decrease the further you move away from the access point and will vary depending on environmental factors such as: obstructions, interference, and the quality of the connecting devices. The X1 Pro gives you all the tools you need to maximise performance for your deployment.

Navigate to **Network** > **Wireless** and **Edit** the Wifi network



Wireless configuration options are distinguished by **Device** options, which are changeable parameters of the wifi radio for that network, and by **Interface** options, which are changeable parameters of a particular Wifi ESSID or Mesh ID that identifies that network. X1 Pro supports multiple networks, all with different parameters*.

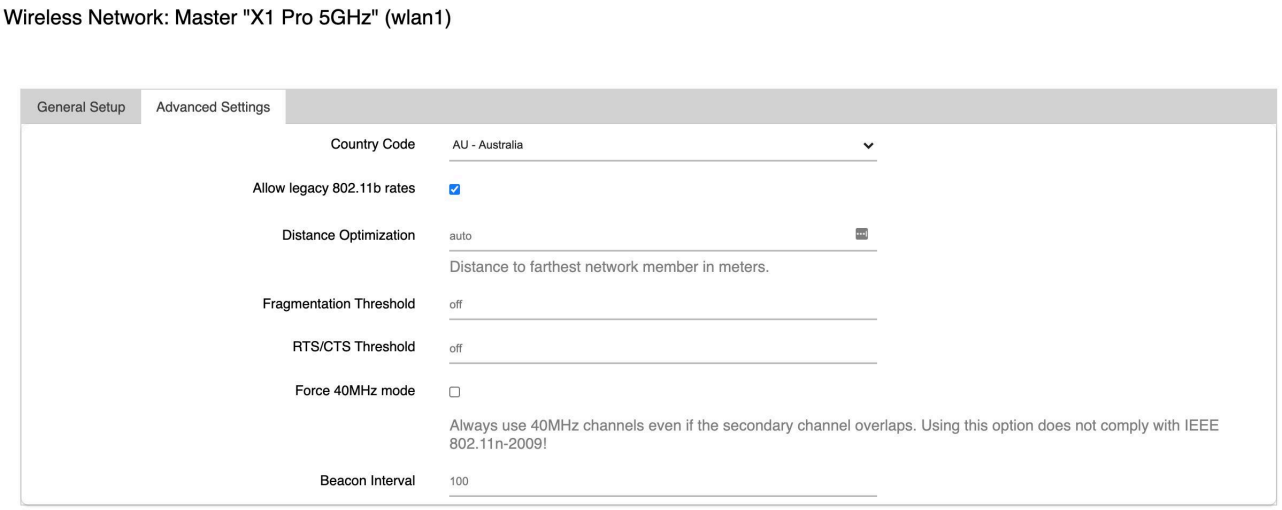
4.1 Wifi Radio Configuration



4.1.1 General

- **Transmit Power** - amount of power output by the radio, limited by the EIRP limit dictated by the Country Code
    - Default: auto
    - Unit: expressed as both dBm and mW
- **Channel**
    - Default: auto
    - Selectable in **Access Point** mode
- **Mode**
    - AC (5GHz radio)
    - N
    - Legacy (b/g)
- **Width**
    - 20MHz
    - 40MHz (Only possible if no overlapping channel exists. ACMA Regulation). Firmware will actively scan and check for an overlapping channel in order to comply with ACMA regulations.
    - 80MHz (5GHz) ACMA Regulations Apply

4.2 Advanced Wifi Radio Configuration



Advanced device options include the following:

- **Country Code** - the ISO/IEC 3166 country code which determines the frequencies and transmit power allowed to be used in that designated regulation domain. Please set this to the country you are operating the device in, in order to comply with local regulations.
    - Default: AU - Australia
- **Allow legacy 802.11b rates** - allow 802.11b devices to connect the expense of losing faster data rates. We recommend disabling this unless you explicitly need to support 802.11b devices.
    - Default: Enabled
- **Distance Optimisation** - Used by proprietary system to optimize transmission to the furthest client.
    - Default: blank
    - Unit: meters
- **Fragmentation Threshold** - specify the maximum size of a frame before it is broken into smaller frames. Useful when operating in areas with interference or long distance links. Setting to the maximum value of 2346 effectively disables this feature.
    - Default value: blank
    - Unit: 802.11 frame size (bytes, *i.e.* octets)
- **RTS/CTS Threshold** - Request To Send/Clear To Send threshold - use the 802.11 RTS/CTS protocol for frames above this size limit. Useful when operating in areas with a high concentration of other Access Points or clients, though setting the value too low adds unnecessary overhead. Setting to the maximum value of 2346 effectively disables this feature.
    - Default: blank
    - Unit: 802.11 frame size (bytes, *i.e.* octets)

- **Force 40MHz mode** - force the radio to use 40MHz channels even if the bonded channel overlaps with the primary channel. This is not compliant with 802.11n-2009, but can increase the available bandwidth, however its use must be considered against the effects of self-interference.
    - Default: Disabled
- **Beacon Interval** - Time Units between broadcasts of the 802.11 beacon (a management frame) which serves to synchronise devices connected to the AP. Setting a lower value can improve throughput at the expense of raised power usage by the clients. Setting too high a value could lower power consumption but may cause connectivity issues.
    - Default: 100
    - Unit: 802.11 Time Unit (100TU = 102.4ms)

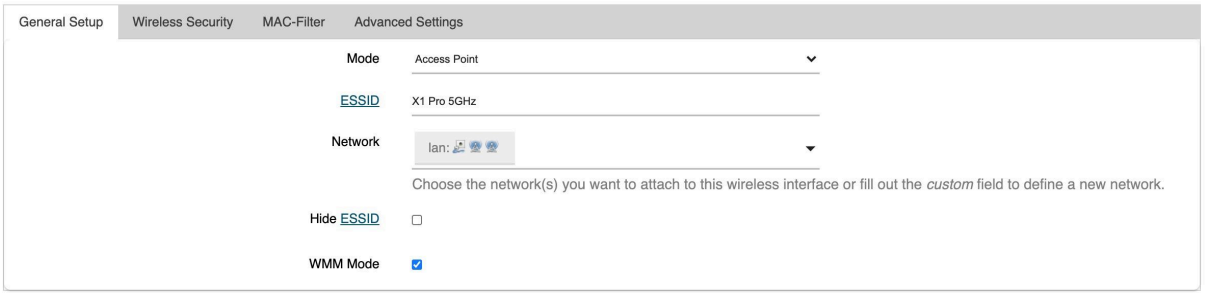
About ACMA WiFi Regulations

If Channel Width is set to 40MHz, the wifi driver will perform a legally required scan to check for overlapping channels. If any such channel is detected, the wifi radio will fallback to 20MHz and will be noted in the system log as such:

```
daemon.notice hostapd: wlan0: ACS-COMPLETED freq=2412 channel=1
daemon.notice hostapd: wlan0: interface state ACS->HT_SCAN
daemon.notice hostapd: 20/40 MHz operation not permitted on channel pri=1
sec=5 based on overlapping BSSes
```

4.3 Advanced Interface Options

The **Wireless Interface** section contains options for changing the operation of a wireless interface.

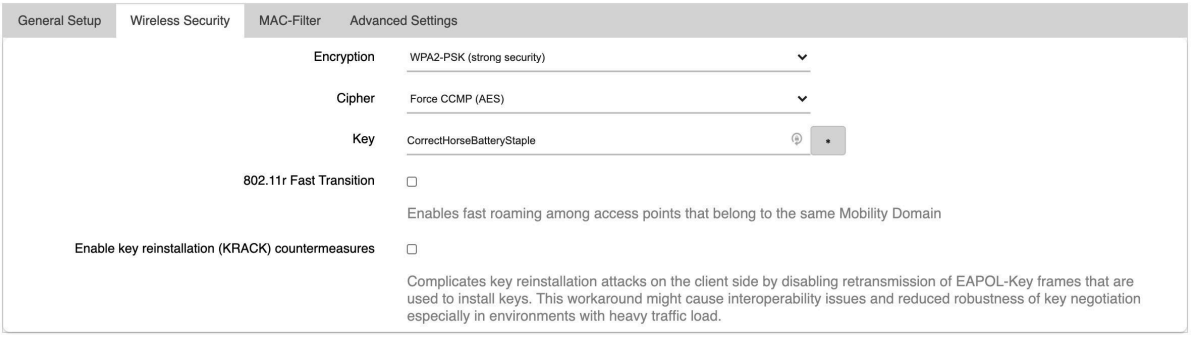


4.3.1 General Tab

- **Mode** - the primary function of this interface
    - **Access Point** - a complete, standard wireless access point which broadcasts an SSID and allows clients to connect
    - **Client** - allows connecting the X1 Pro to another SSID as a client. Correct SSID and authentication credentials are required. See also: **Scan** for the recommended way of setting up a Client network
    - **802.11s** - mesh network support
    - **Ad-Hoc** - legacy mesh network support
    - **Pseudo Ad-hoc** - useful for PtP topology with no interference. Included for legacy support.
    - **Monitor** - monitor wireless traffic
    - **Access Point (WDS)** - useful for PtP relay networks, normally requiring 2 AP's.
        - *Tip: Prevent WDS throughput loss by connecting your devices to the LAN port of the X1 Pro.*
    - **Client (WDS)** - useful for PtP relay networks
- **ESSID** - Extended Service Set Identification, other devices will see this as the **SSID**.
- **Network** - the network to attach this interface to. Networks are where firewall rules and routing settings are managed.
- **Hide ESSID** - hide the broadcast of the ESSID (SSID)
    - Default: disabled
- **WMM Mode** - Toggle Wifi Multimedia Mode support
    - Default: enabled

4.3.2 Wireless Security Tab

Wireless Security options are where you will change the encryption and passwords used to secure your Wifi network.

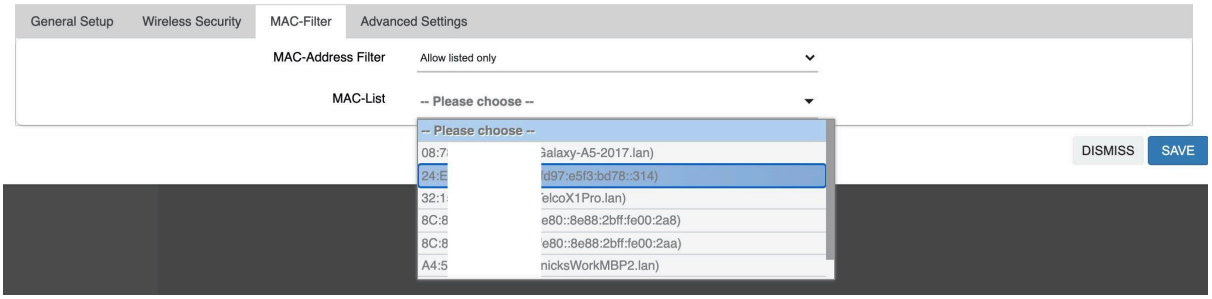


Tip: For the most secure Wifi access point use the following settings: *WPA2-PSK*, *Force CCMP (AES), Enable KRACK countermeasures* and a strong password.

- **Encryption**
  - No Encryption
  - WPA2-PSK - Wifi Protected Access v2 with Pre-shared Key
    - Pre-Shared key is the password
  - WPA-PSK - Wifi Protected Access v1 with Pre-shared Key
  - WEP Open System
  - WEP Shared Key
  - WPA-PSK/WPA2-PSK - Default to WPA2, but fall back to WPA if not supported by the client. Trade-off is security for backwards compatibility.
- **Cipher**
  - Various ciphers are included for backwards compatibility and state of the art security.
- **Key**
  - The wifi password, in technical terms known as a “key”
- **Enable key reinstallation (KRACK) countermeasures**
  - Countermeasure for the WPA2 KRACK vulnerabilities disclosed in late 2017. We recommend enabling this feature.

2.4.3.3 MAC Filter Tab

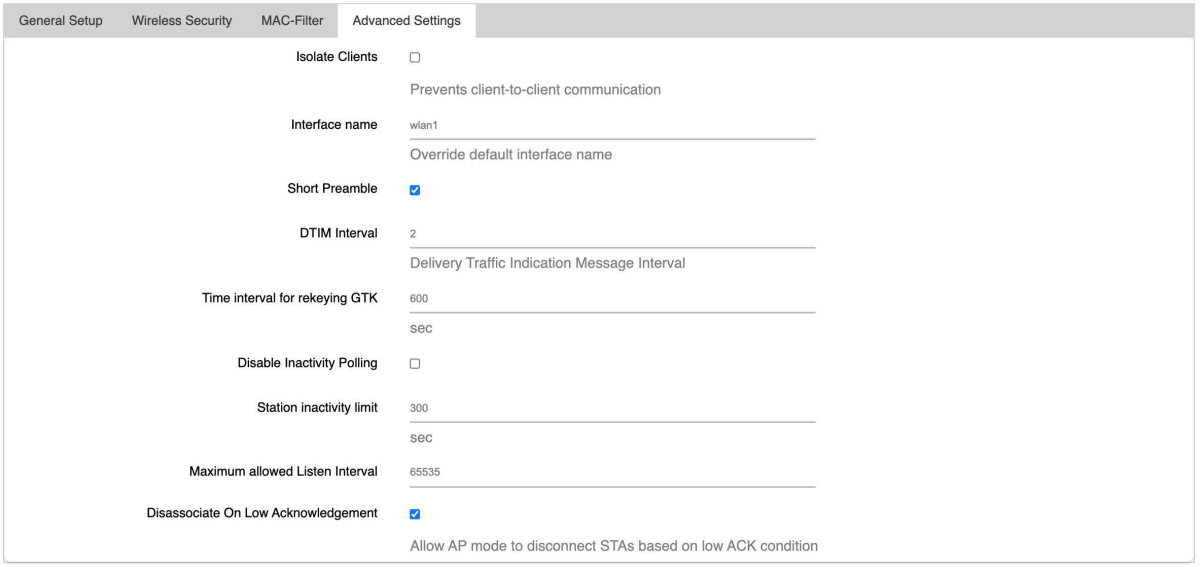
The **MAC-Filter** tab contains settings for controlling access to the Wifi based on a MAC address blacklist or whitelist.



- **Allow listed only** - basic whitelisting policy
- **Allow all except listed** - basic blacklisting policy
- **MAC-List** - Choose from a dropdown containing connected hosts, or select *--custom--* to enter one.

2.4.3.4 Advanced Settings

Advanced Settings contain options for fine tuning Wifi parameters.



- **Isolate Clients** - prevent client-to-client communication
    - Default: disabled
- **Interface name** - Override the default interface name
    - Default: blank
- **Short Preamble** - shorten the 802.11 preamble to reduce overhead
    - Default: enabled
- **DTIM Interval** - Delivery Time Indication Message Interval is used to aid power saving for wireless devices. A longer interval could save more power on mobile devices but could reduce performance in latency-sensitive applications such as VoIP.
    - Range: 1 to 255
    - Default: 2
- **Disassociate On Low Acknowledgement** - When the ACK from clients (stations) is low, disassociate, or kick the client from the AP. Recommended to leave enabled

5 Advanced - Command Line Interface

5.0.1 Access the Command Line Interface

TelcOS Melaleuca contains a BusyBox shell environment accessible via SSH featuring a writable file system, scripting support in Lua and Shell script, and ships with two powerful text editors (as of Melaleuca 1.2): vi and GNU nano.

SSH Credentials

- **Username**: root
- **Password**: the current device password, the default is **admin**

Example

5.0.2 Show all available commands

Command
mmcli --help-all

5.1 Signal Information

These commands must be run from a shell on the device.

5.1.2 Get Signal Strength

Command

```
mmcli -m any --signal-get
```

Example Output

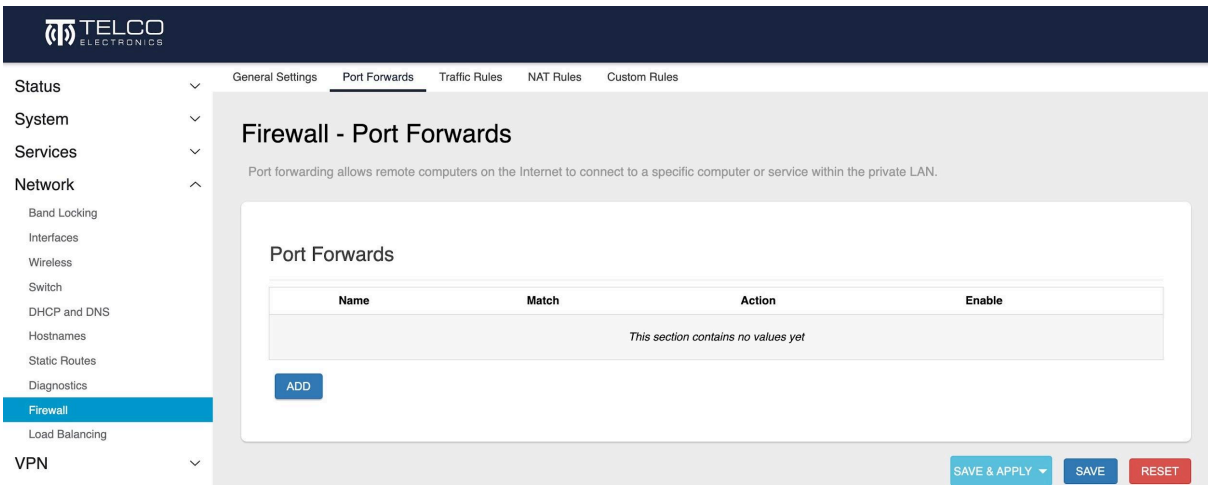
Current:
    Network 'lte': '-65 dBm'
RSSI:
    Network 'lte': '-65 dBm'
ECIO:
    Network 'lte': '-2.5 dBm'
IO: '-106 dBm'
SINR (8): '9.0 dB'
RSRQ:
    Network 'lte': '-16 dB'
SNR:
    Network 'lte': '1.0 dB'
RSRP:
    Network 'lte': '-96 dBm'

6 Advanced Networking

6.1 Port Forwarding

Port forwarding allows you to make a service available on the internal network available on an external network, such as the Internet. In the TelcOS Melaleuca, port forwarding is accomplished with the Port Forwards Wizard, located in the Firewall settings.

- Menu Location: **Network** > **Firewall** > **Port Forwards**



6.1.1 Adding a Port Forward Rule

A port forward rule requires seven items, three of which are pre-filled:

- **External Port**: The port you will use on the WAN-side to access the forwarded port
- **Internal Port**: The port you wish to make available from the WAN
- **Internal IP Address**: The IP address of the device with the port you wish to forward
- **Name**: a label for the rule, can be anything
- **Protocol**: TCP and UDP, TCP only, UDP only
- **External Zone**: normally WAN (internet)
- **Internal Zone**: LAN

Steps

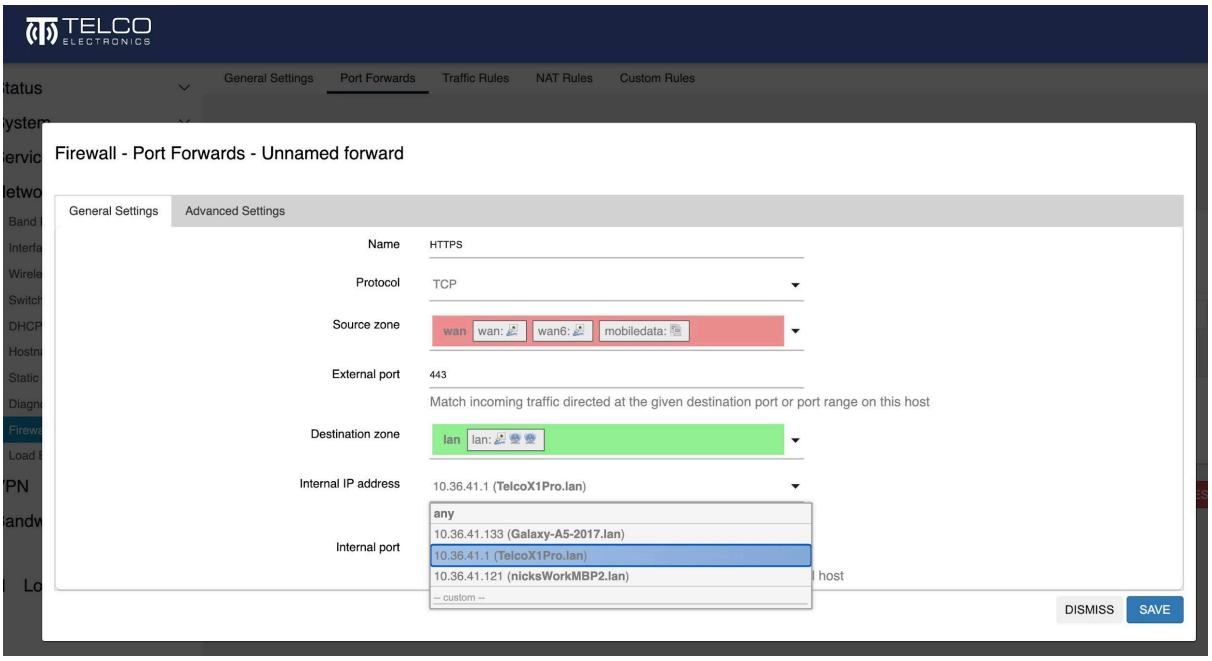
1. Enter a name for the rule
2. Enter the external port
3. Select the device with the to-be-forwarded port from the menu, or type in the IP address manually

4. Enter the internal port to be forwarded
5. Save & Apply

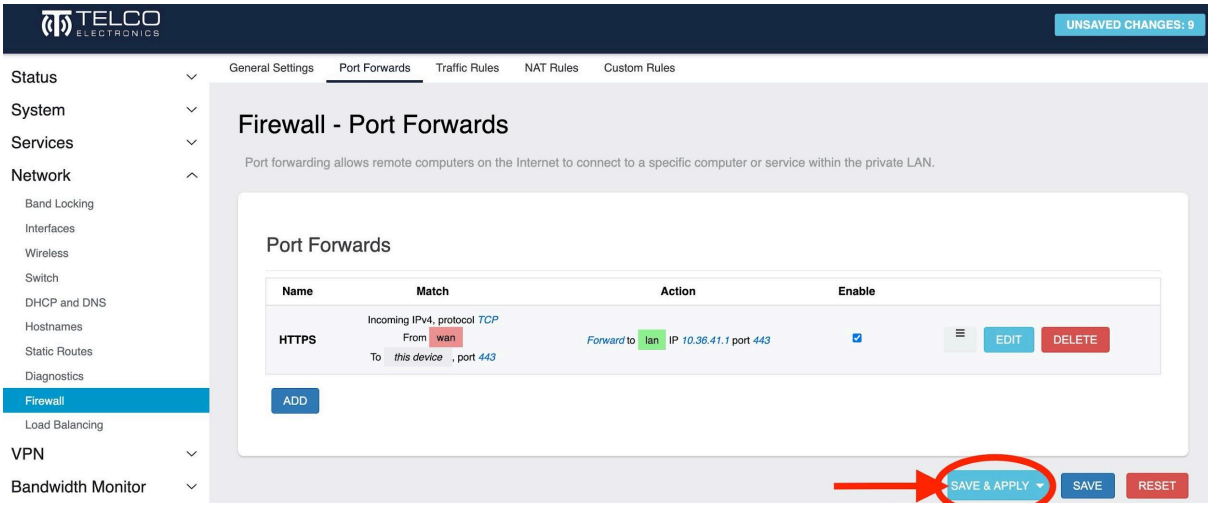
Once applied, the rule is active instantly. Note, to access your newly forwarded device from the internet, you must specify the port and protocol.

Example

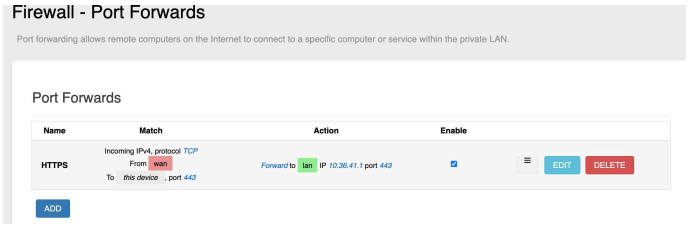
Entering the rule



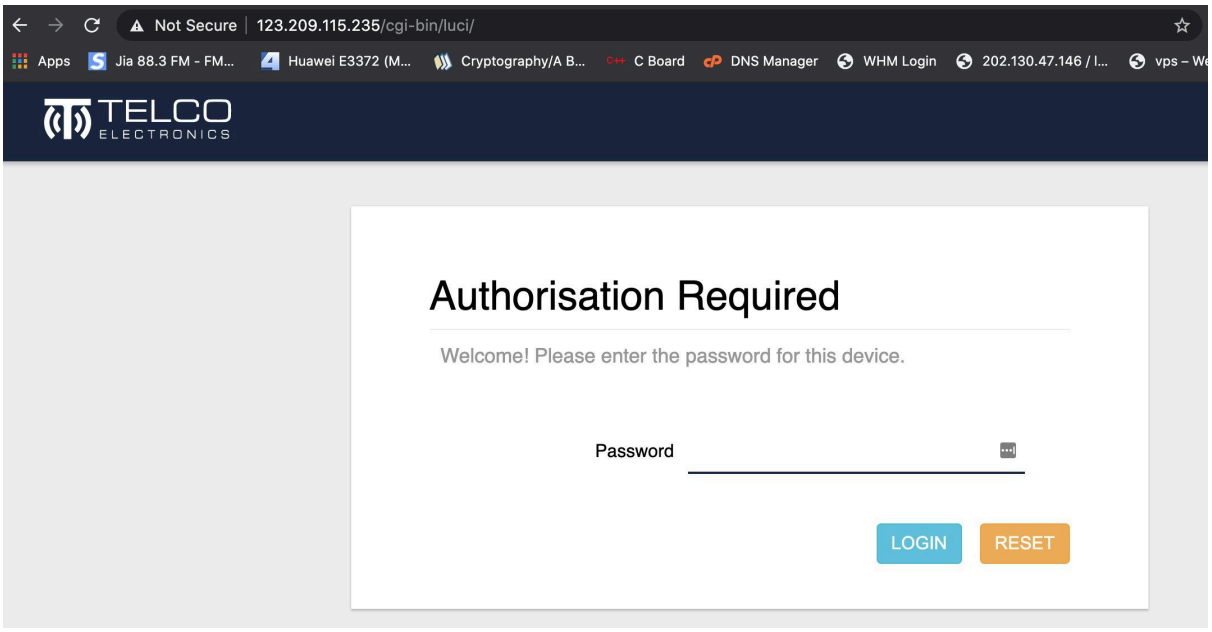
Save and Apply



Active and enabled rule



Testing the rule (note public IP address in browser)



6.2 Using WAN Port as an Extra LAN Port

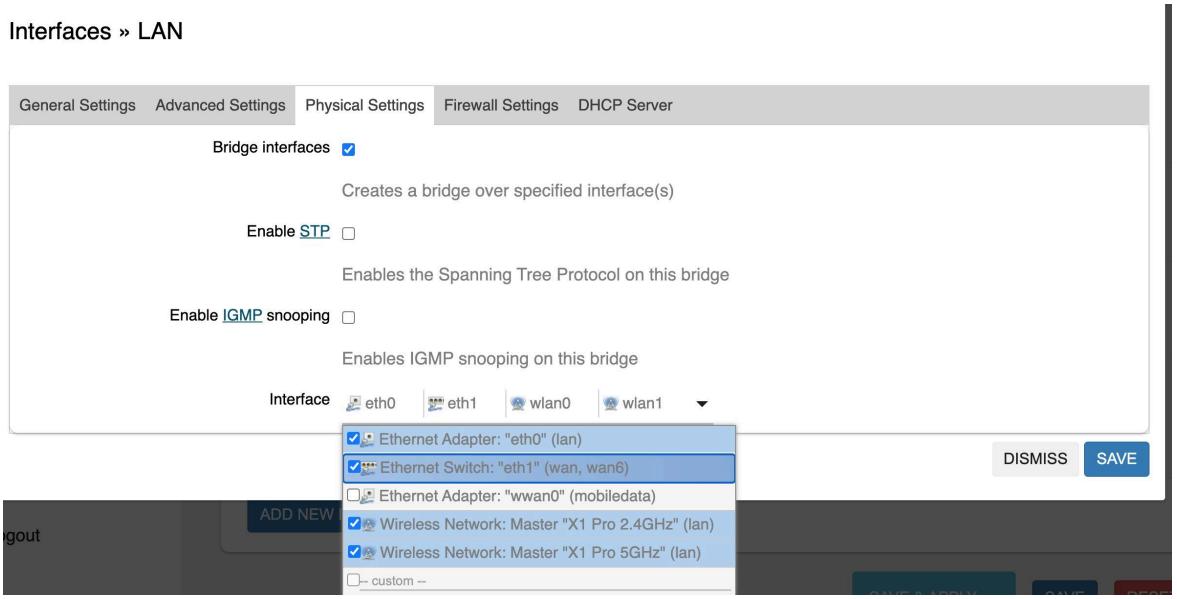
Port functionality is configurable. By performing the following steps, both ports will function as LAN ports and any device plugged into WAN will receive an IP address and internet connectivity from the X1 Pro.

- Menu Location: **Network** > **Interfaces** > **LAN** > **Edit** > **Physical Settings**

Steps

1. Navigate the menu to Network > Interfaces > LAN > Edit > Physical Settings
2. In the Interface drop down, add **Ethernet Adapter eth1** to the group by ticking the box next to it.
3. Apply & Save, then reboot or power cycle the X1 Pro.

The Ethernet Adaptor eth1 has been added to the LAN group.



6.3 WAN Failover Options

WAN failover is configurable by setting the **Gateway Metric** value on either the MobileData or WAN interface. **The interface with the lowest *gateway metric* value is used as the priority connection**. If at any time the primary connection goes down, the modem will switch over to the using the interface with the next lowest metric in a matter of seconds. Once the primary link becomes available again the modem will revert to using it.

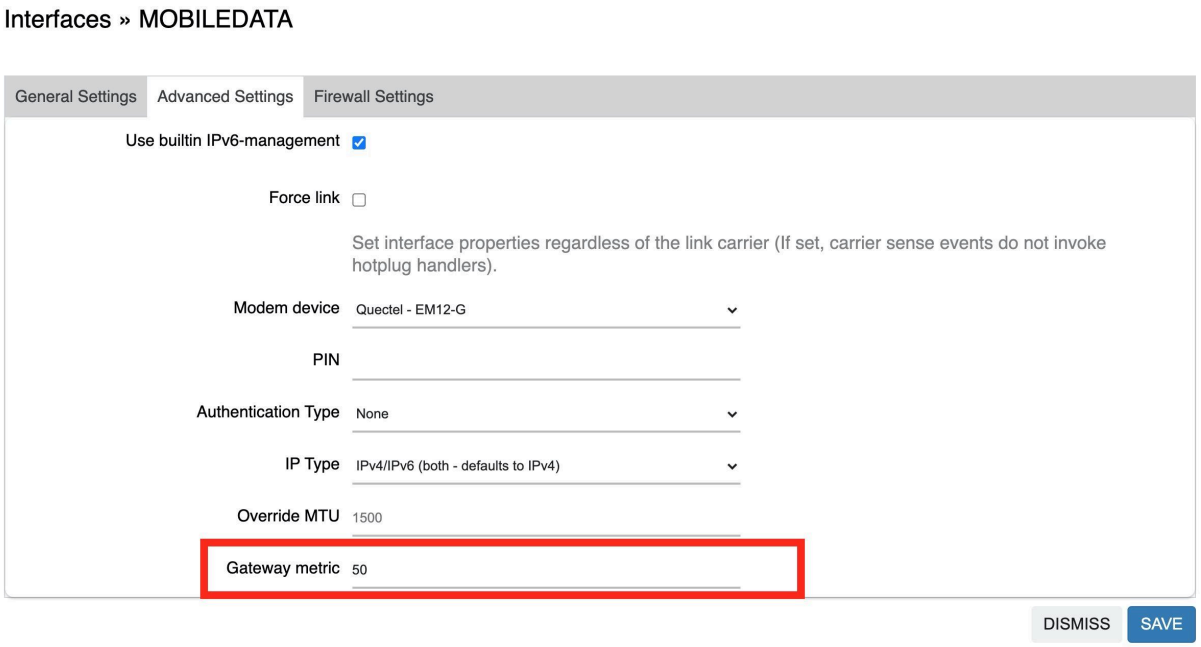
- Menu Location: **Network** > **Interfaces** > **WAN/MobileData** > **Edit** > **Advanced Settings** > **Gateway Metric**

- **Default Values:**
  - MobileData: 50
  - WAN: 10

By default the MobileData interface is a backup connection, and the wired WAN, if connected, will be the primary. To swap this behaviour, simply **swap the two interfaces' gateway metric values**.

Steps

1. Navigate the menu to **Network** > **Interfaces** > **WAN/MobileData** > **Advanced** > **Gateway Metric**
2. Edit the gateway metric value
3. Apply & Save both then reboot or power cycle the X1 Pro.



6.4 Guest WiFi Configuration Example

This guide will set up a secure **guest wifi** network that has access to the Internet but not to the LAN or the router admin interface or command line. This same concept can be applied to public WiFi, kiosks, IoT, or any application where you want to supply wireless Internet access but do not want to allow the devices using it to access the X1 Pro configuration page, other guest devices, or any services other than HTTP and HTTPS.

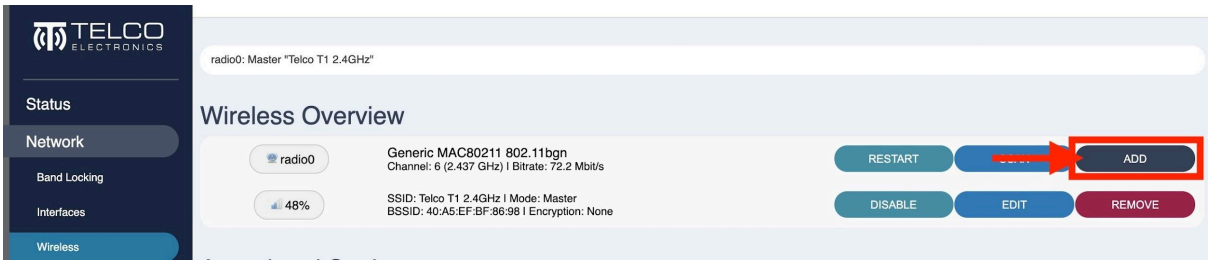
You can download a configuration patch to apply to your own Telco X1 Pro here. For your convenience we recommend applying it to a factory reset Telco X1 Pro, as **it will replace** the existing Wireless, Network, Firewall and DHCP configuration with factory defaults plus the items mentioned in this section. You can use the rest of this guide to familiarise yourself with the settings you may want to change after applying this patch, such as the WiFi network name, password, or other settings.

Learn how to apply the configuration patch in Restore or Transfer Settings.

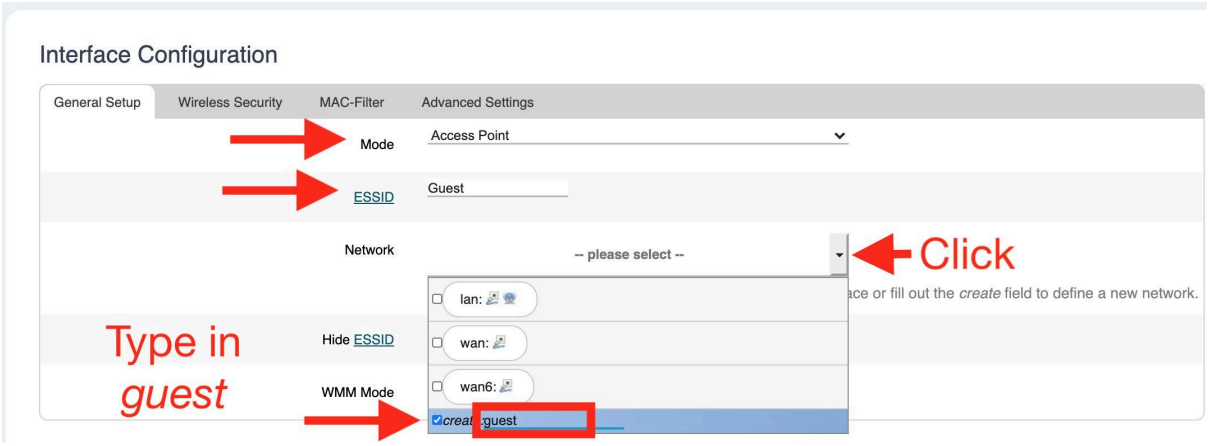
6.4.1 Wireless Configuration for the Guest Network

Here we will set up the Wireless SSID, Wireless Security and other WiFi options such as Client Isolation.

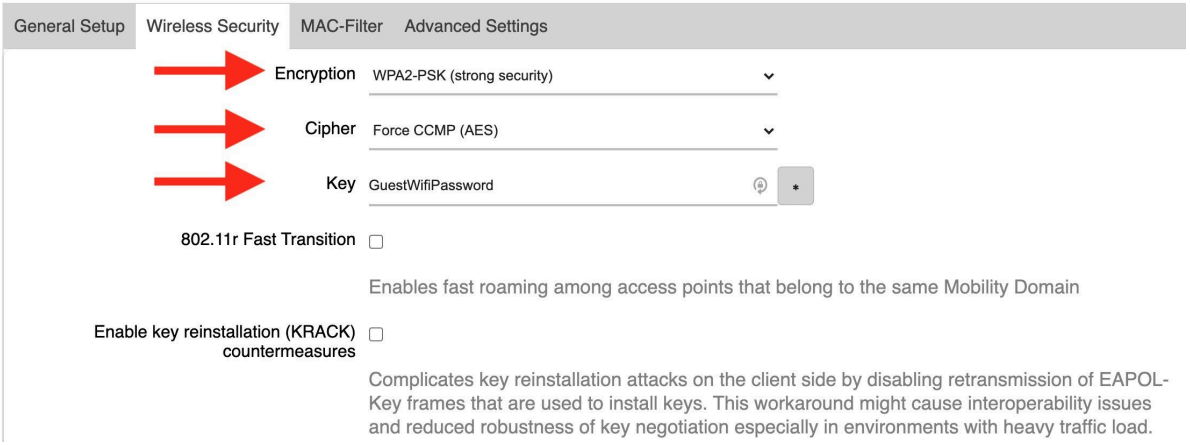
1. Navigate to **Network** > **Wireless** and click **Add**



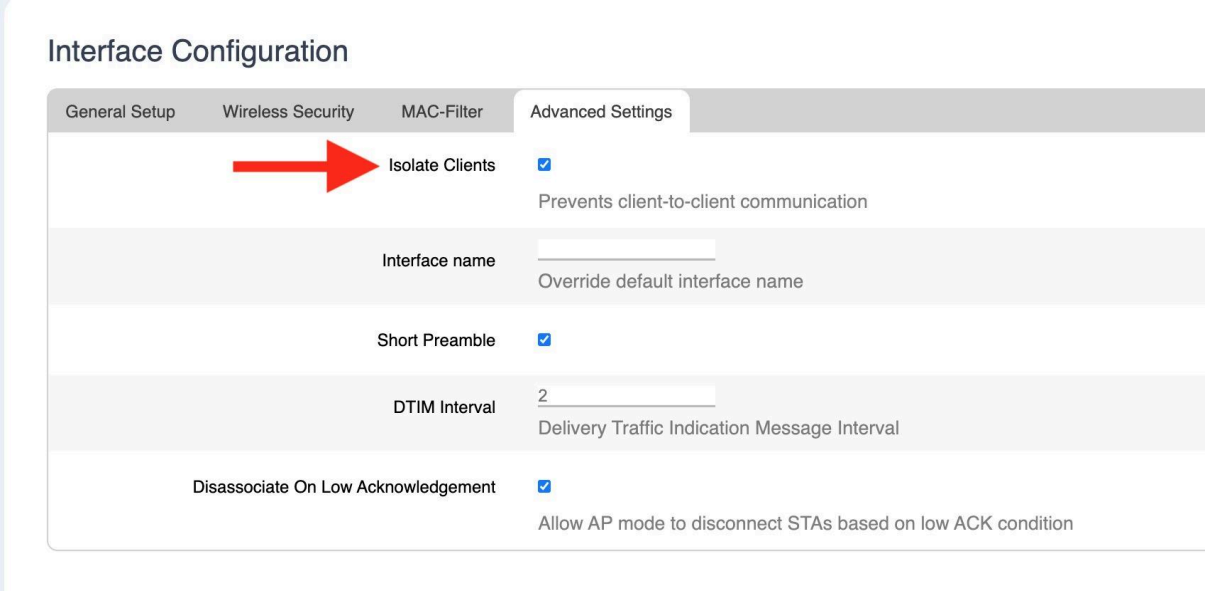
2. Create the new WiFi network. Here we name the WiFi SSID *Guest* and create a new Interface called *guest,* at the same time.



3. Configure the *Guest* SSID **Wireless Security**
   Here we use strong **WPA2-PSK** encryption with the **AES** cipher and **GuestWiFiPassword** as the Key/Password.



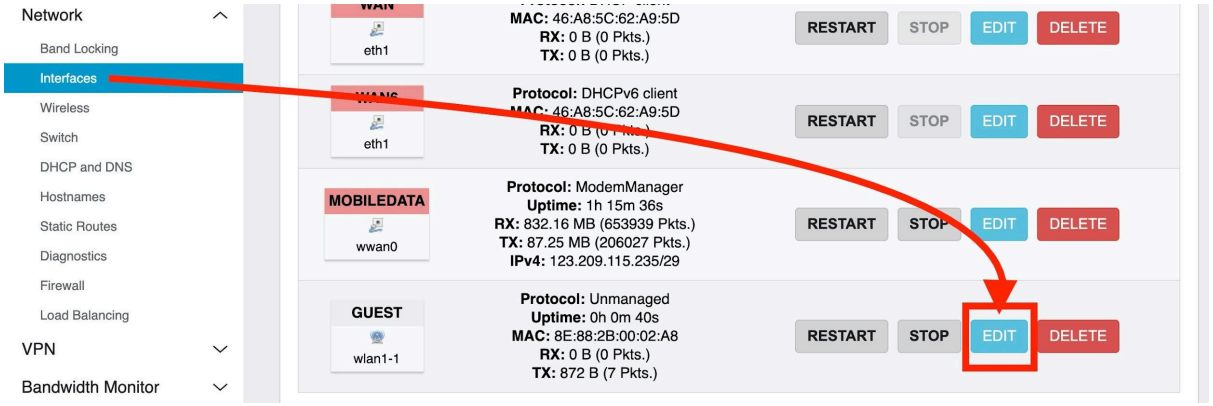
4. Enable **Client Isolation** if you do not want clients on the Guest wifi network to be able to access one another.



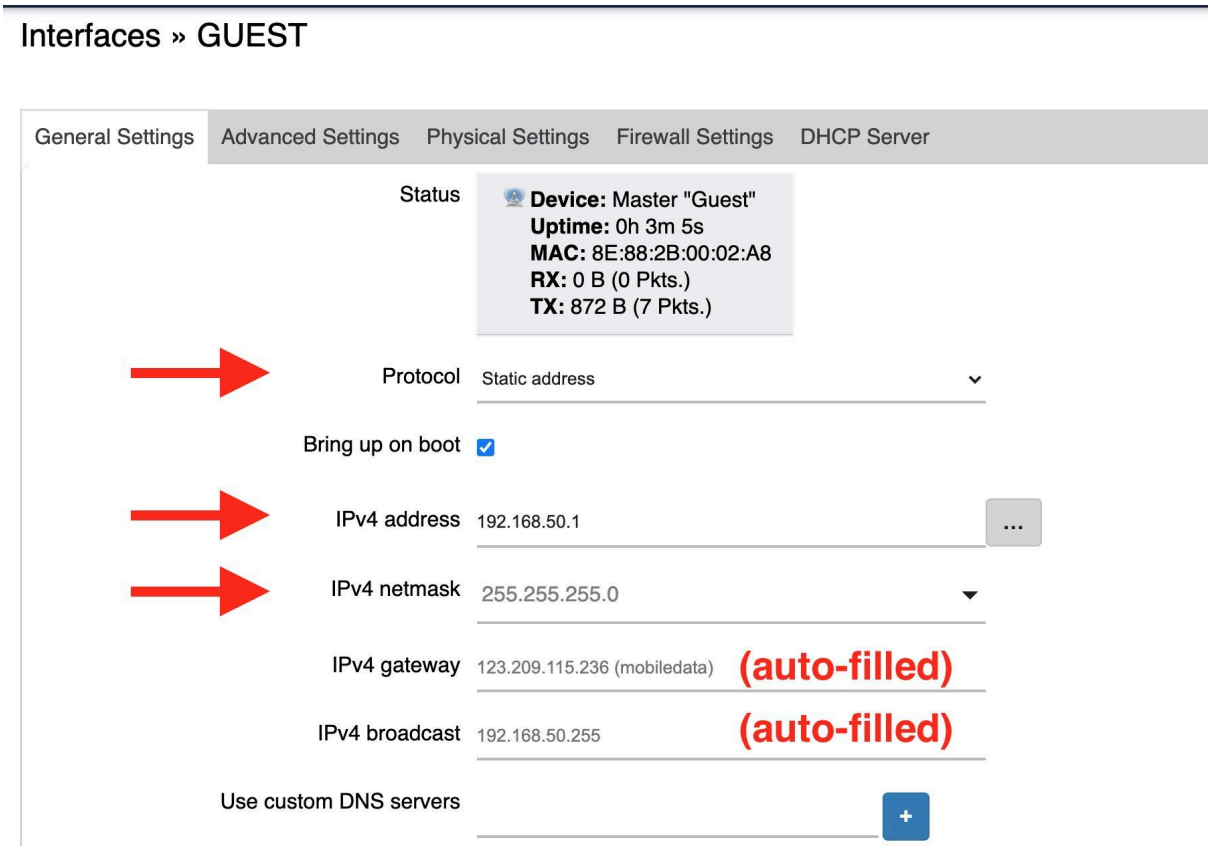
6.4.2 Network Configuration for the Guest Network

Here we will specify the IP address scope, DHCP options, and DNS settings for the Guest network. We are setting up a guest network with capacity for up to 253 active DHCP leases. You have the option of setting custom DNS servers for guests as well.

1. Navigate to **Network** > **Interfaces** and **Edit** the new **Guest** network.

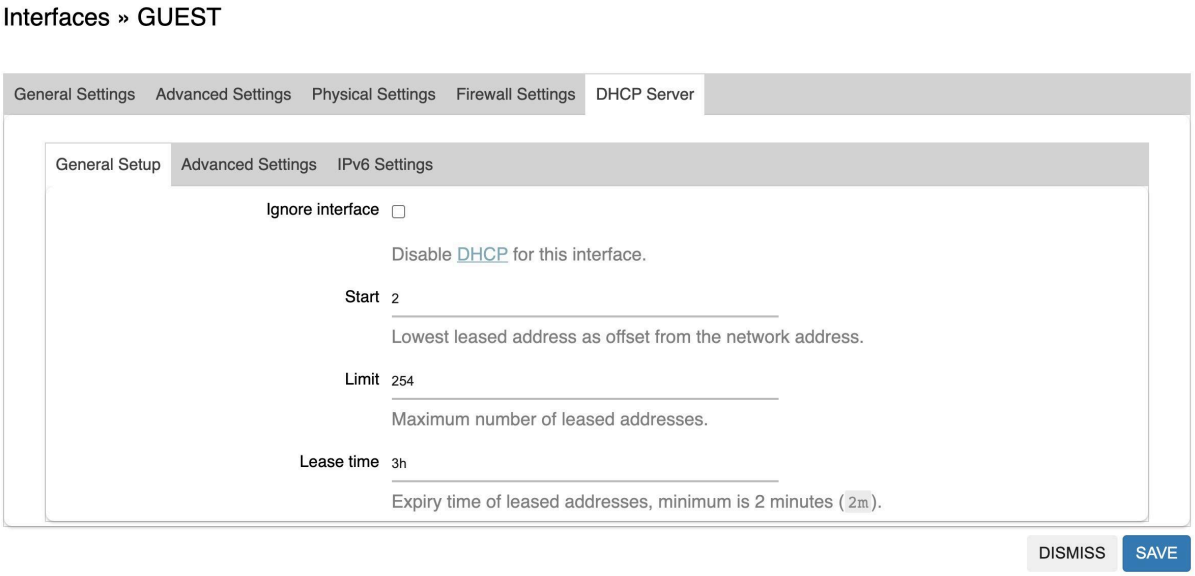


2. Use the **Static address** protocol, and the following settings:

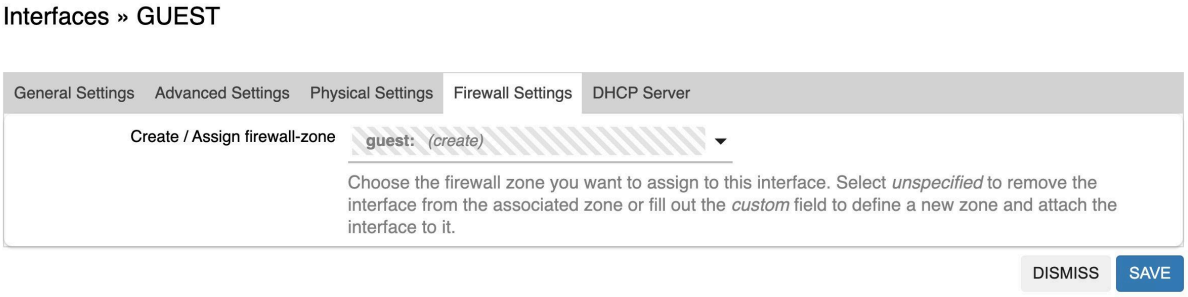


3. Scroll down to edit the DHCP server options. We do not expect *guests* to hang around for long so we want to make the lease time shorter than the default 12h,

so the DHCP pool does not contain a lot of stale leases. You can tweak this setting to your requirements.



4. Navigate to the **Firewall Settings** tab of the **Guest** Interface (at the top under Common Configuration) and assign it to the **Guest firewall zone**. If the zone does not exist, you can create it there.

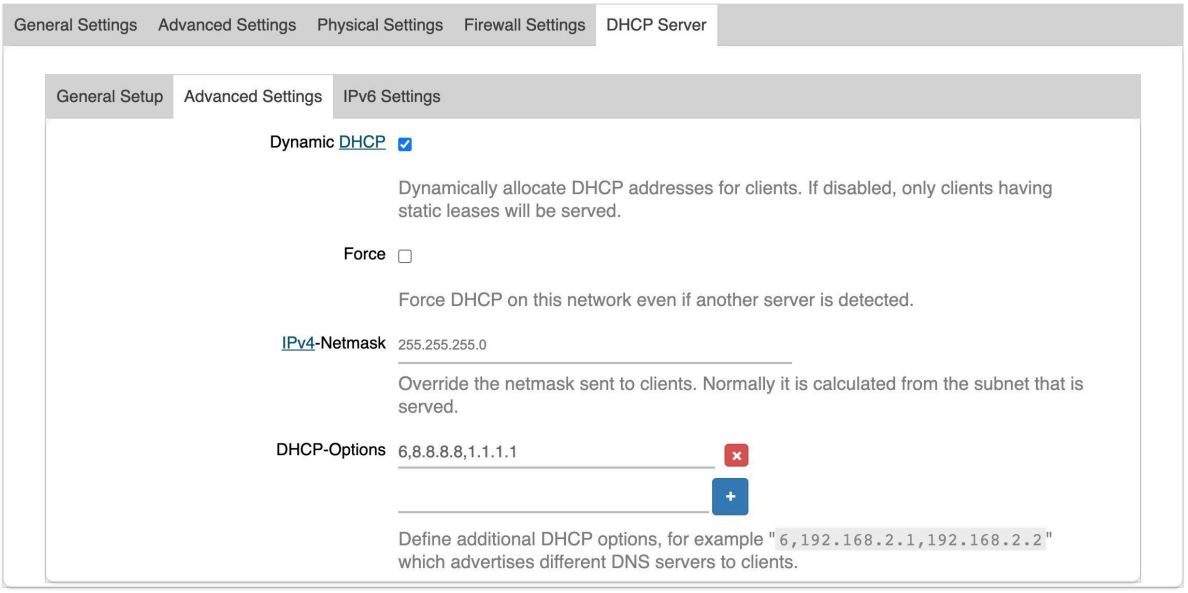


5. **Add External DNS Servers**

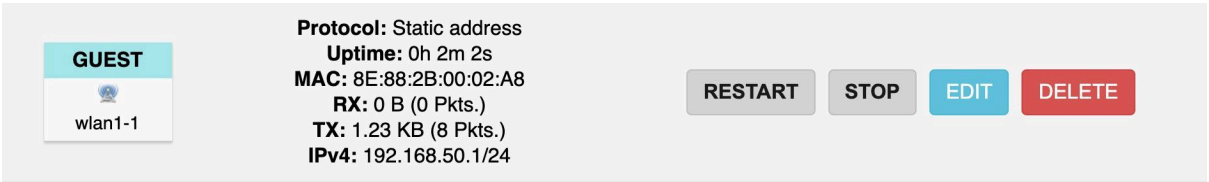
Go to the DHCP Server > Advanced tab and enter the following to make the hosts on this network use Google and Cloud Flare public DNS

DHCP-Options: 6,8.8.8.8,1.1.1.1

Interfaces » GUEST



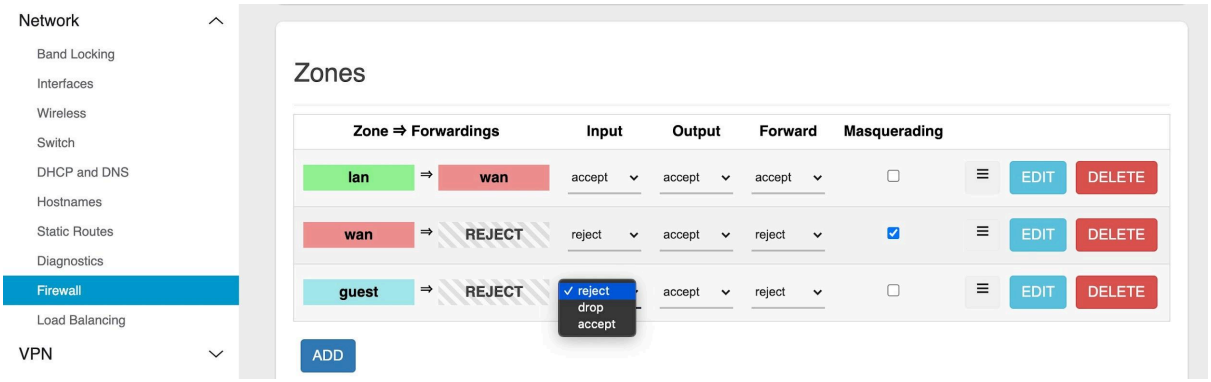
6. **Save and Apply** the Guest Interface configuration, which should now look something like this:



6.4.3 Firewall Rules for the Guest Network

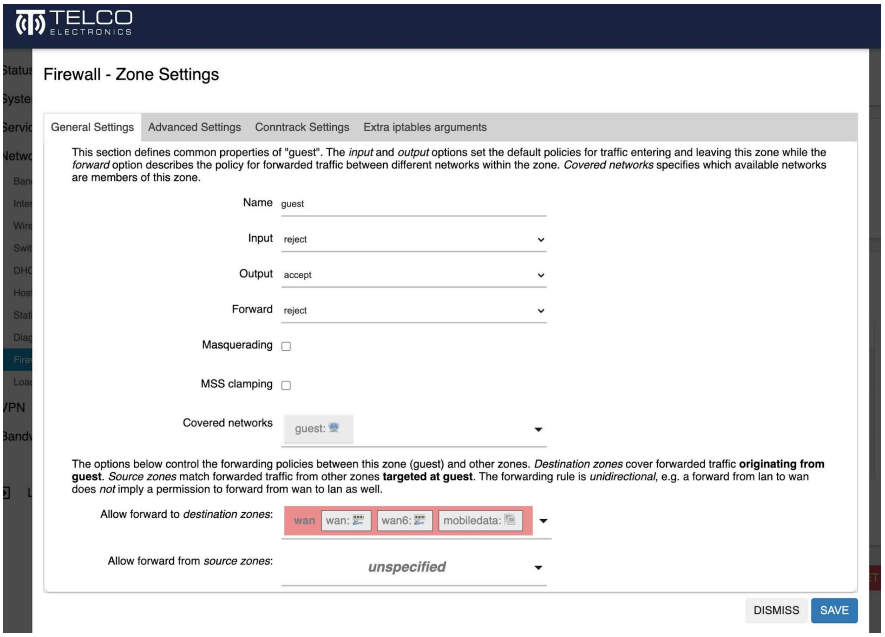
In this section we will finally specify exactly what the Guest network should and should not have access to. We want Guests to be able to access the Internet, but do not want them to be able to access the router settings, or, in our case, anything besides HTTP and HTTPS. Note that the guests also require DNS and DHCP in order to use HTTP/HTTPS, so we need to create rules to allow that traffic to reach the guests, but that is about all.

1. Navigate to **Network** > **Firewall**
2. Set the **Guest** firewall zone Input policy to **reject**
3. **Save and Apply**



4. **Edit** the **Guest** Firewall zone

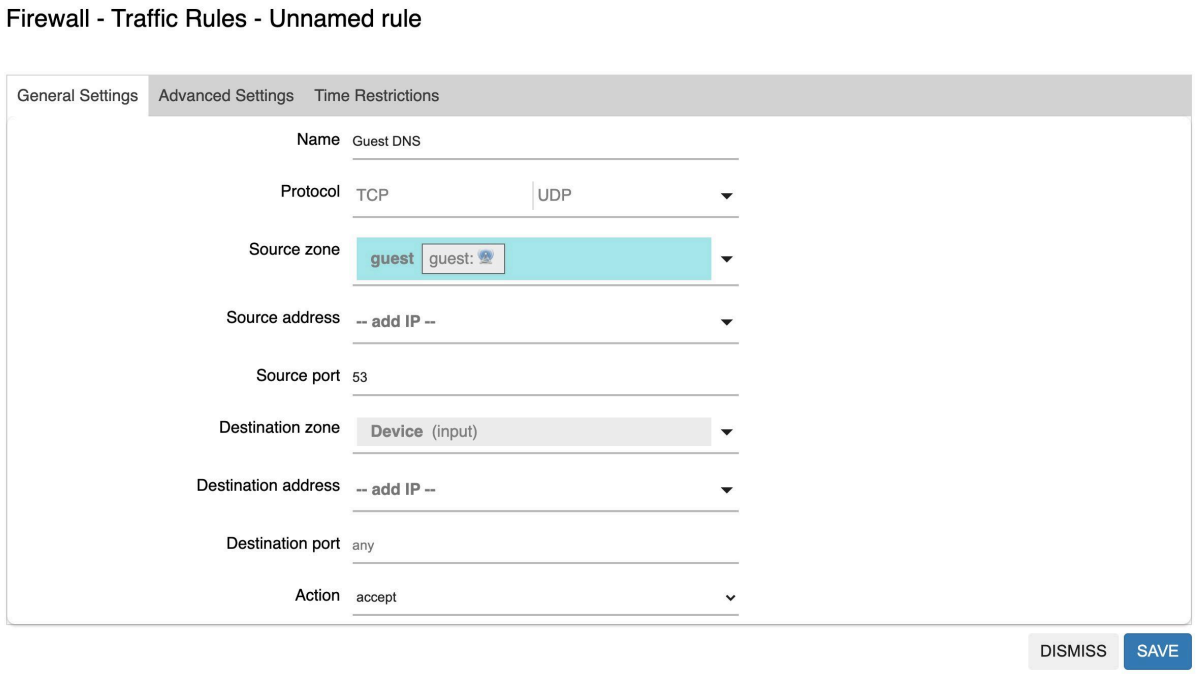
   We will now allow the Guest zone to access the WAN.



5. Set ***Allow forward to destination zones***: **WAN**
6. **Save and Apply**

Allow Guests to use DNS

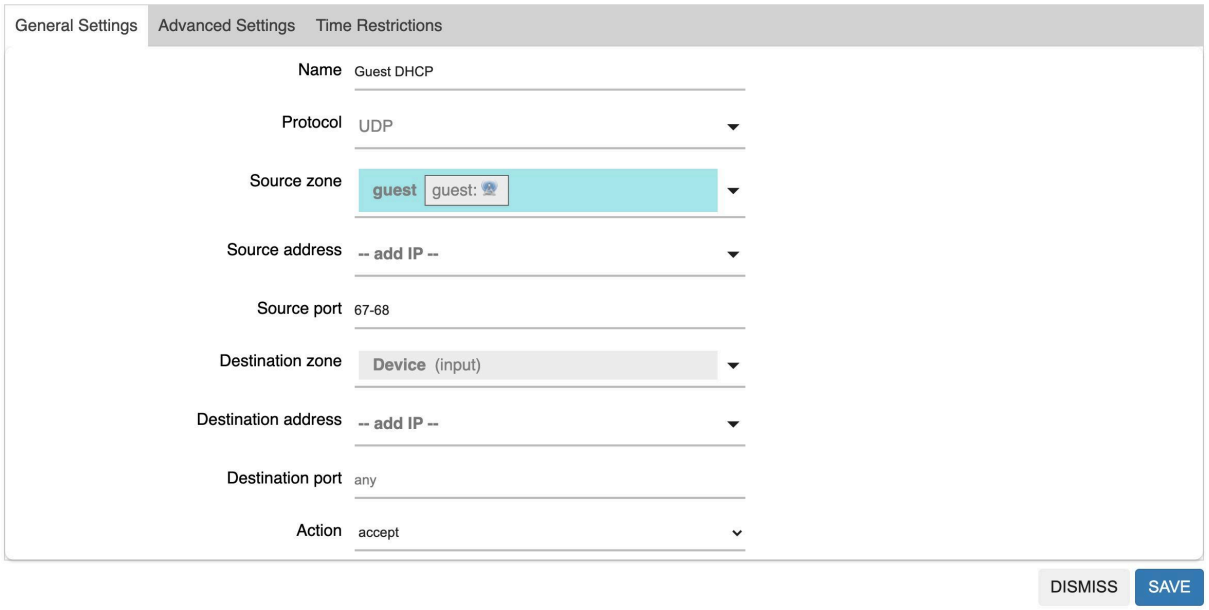
1. Create a new **Traffic Rule** by navigating to **Firewall** > **Traffic Rules** and clicking **Add** at the bottom of the page.
2. Settings for this rule
    a. **Name**: Guest DNS
    b. **Protocol**: TCP + UDP
    c. **Source Zone**: guest
    d. **Source Port**: 53
    e. **Destination Zone**: Device (input)
3. **Save and Apply**



Allow Guests to use DHCP

1. Create another Rule to allow DHCP for Guests.
2. Settings for this rule
    a. **Name**: Guest DHCP
    b. **Protocol**: UDP
    c. **Source Port**: 67-68
    d. **Destination Zone**: Device (input)

Firewall - Traffic Rules - Guest DHCP



Conclusion

You have now set up a secure Guest WiFi network that allows guests to securely connect to the Internet, without being able to access the router settings, or other guests on the network. This protects both the guests using your network from nefarious actors, as well as your network from said actors.

6.5 Bridge Mode

Bridge Mode is a special mode of operation that allows the IP address from the Mobile Data connection to be passed on to a device connected to one of the LAN ports. When Bridge Mode is activated, the X1 Pro will be inaccessible, as it is acting as a modem only. You can access the X1 Pro via SSH via the WAN port by configuring your PC to have a static IP address on the 192.168.1.1/24 subnet, such as 192.168.1.2. You should only have one device connected to the LAN when Bridge Mode is active, because this device will receive the IP address configuration settings from the mobile data network via DHCP.

6.5.1 How to use Bridge Mode

1. Navigate to **Network** > **Bridge Mode**
2. Select the correct APN for your SIM card and data plan
3. Optionally enter the PIN, Username and Password associated with the SIM
4. Confirm

5. Click Enable Bridge Mode

6.5.2 Bridge Mode Tips

Band Locking

You can lock the X1 Pro to a specific set of frequency bands by performing the Band Locking *before* activating Bridge Mode. This allows you to ensure the selected bands work, and also that the required level of performance has been achieved before putting the X1 Pro into Bridge Mode.

Access X1 Pro while in Bridge Mode

Starting in firmware version 2.1.10, The X1 Pro can be accessed via the WAN port while in bridge mode. Set your computer to have a static IP with the following settings:

- Address: `192.168.1.1`
- Subnet Mask: `255.255.255.0`
- Gateway: `192.168.1.1`

You can now SSH into the X1 Pro

- `ssh root@192.168.1.1`

Quit Bridge Mode

Bridge Mode can be undone by resetting the X1 Pro to factory defaults using the Reset Button or by SSHing in and running the

Button

When the X1 Pro is fully booted, press and hold the reset button for 10 seconds, then release it. You will see the lights begin flashing, which indicates that the reset is in progress.

SSH

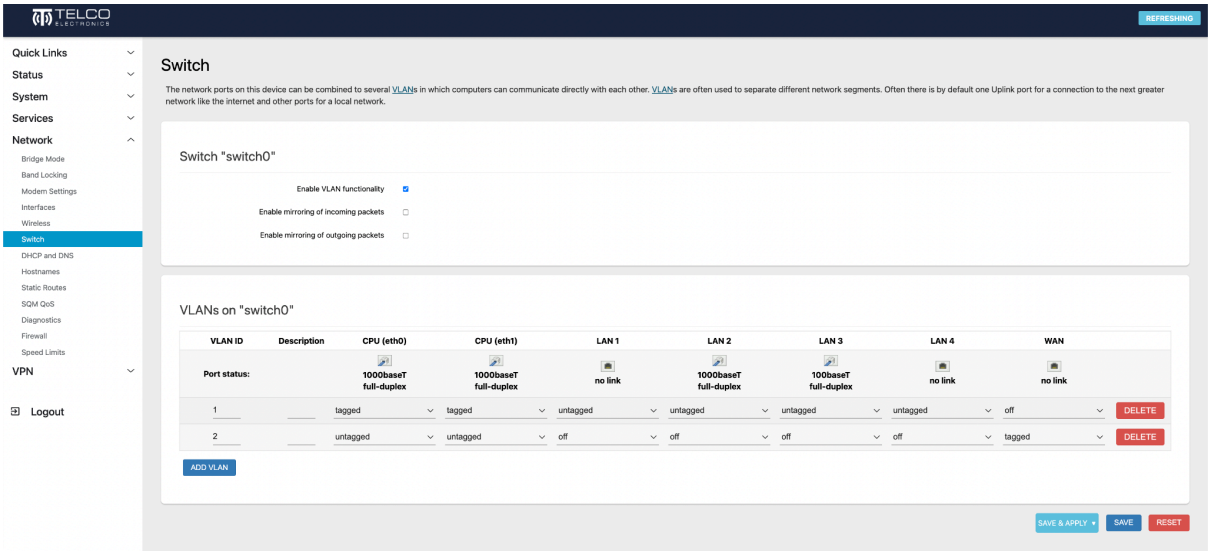
SSH in to the X1 Pro via the WAN port, then run the reset command:

- `firstboot -y`
- `Reboot`

6.6 NBN Connectivity

NBN is not officially supported by the X1 Pro, but it is possible to connect the X1 Pro to NBN FTTC service with the following configuration:

1. Navigate to **Network** > **Interfaces** > **Switch**
2. Set the **VLAN** configuration as per the following image:



3. **Save and Apply** the Switch/VLAN settings
4. Navigate to **Network** > **Interfaces** > **WAN** and change the protocol from DHCP to **PPPoE**
5. Enter the credentials (PAP/CHAP username and password) to authenticate with your NBN provider's account (contact your NBN provider or check your supplied router for this information). Leave all other settings at their defaults.
6. **Save and Apply** the WAN interface changes
7. Connect the NBN ethernet cable to the WAN port then **reboot** the X1 Pro and other devices

7 Services

7.1 Dynamic DNS (DDNS)

DDNS allows a device with a dynamically changing, but public IP address to be reached via a static hostname. TelcOS Melaleuca supports a wide range of DDNS service providers including but not limited to: No-IP, DynDNS, Google, and more. TelcOS Melaleuca supports running multiple DDNS services simultaneously. Normally, a special mobile data plan is required to get a public IP address, and uses a purpose built APN, such as *Telstra.Extranet*. Consult your mobile network operator for details.

Menu Location: **Services** > **Dynamic DNS**

Steps

On the Basic Tab

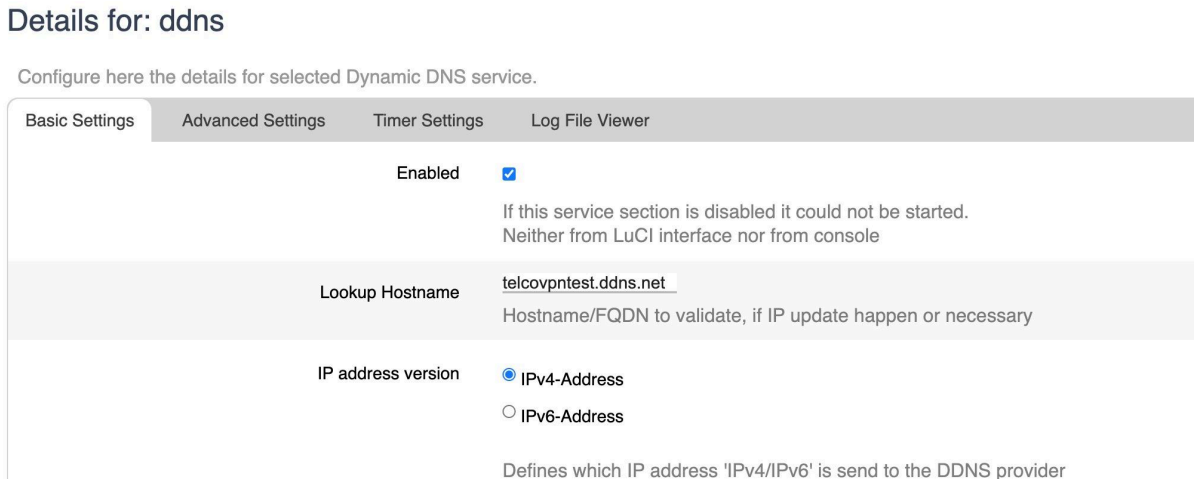
1. Give your new DDNS instance a **name** and click **Add**
2. Fill out the required details as follows:
    a. Select the **DDNS Service Provider** from the list
    b. Click the **Change Provider** button
    c. **Enable** the service by ticking the Enable box
    d. Enter the Fully Qualified Domain Name (FQDN) of the **Lookup Hostname** as provided by your DDNS provider, for example: mytest.ddns.net
    e. Enter the same FQDN in the **Domain Field**

On the Advanced Tab:

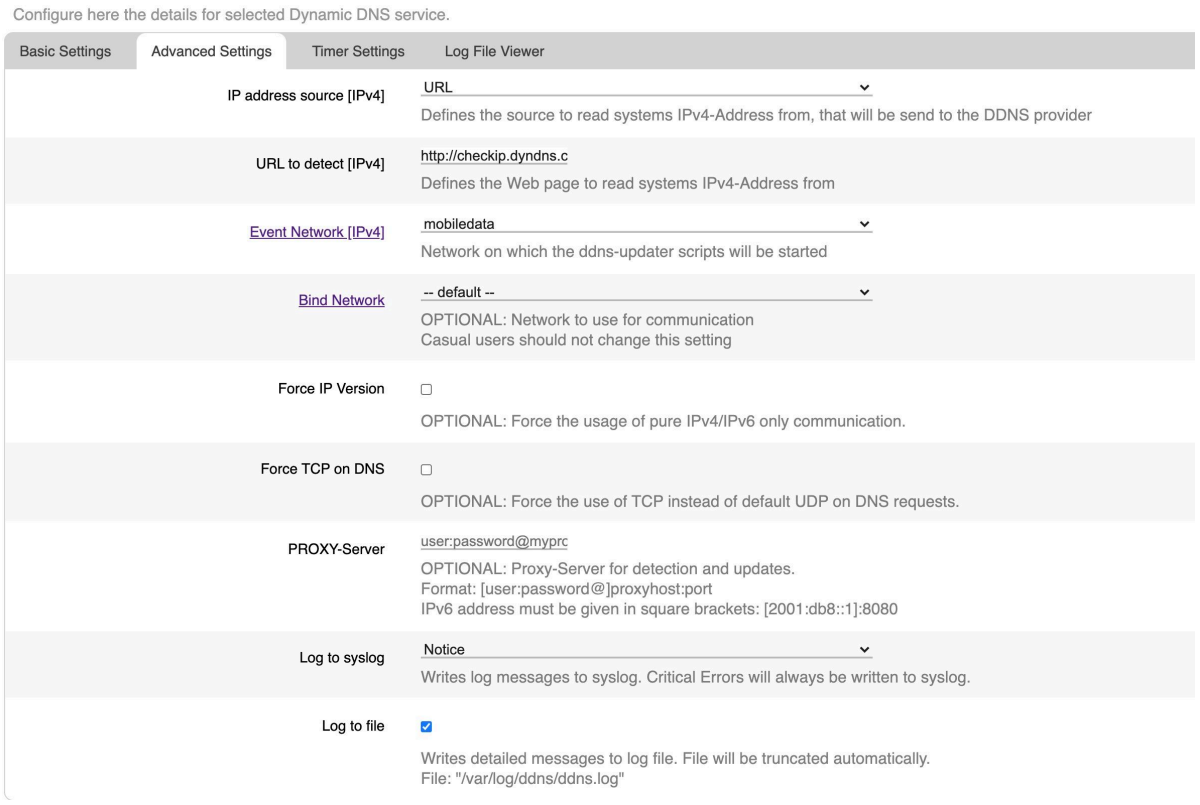
3. Change the **IP Address Source** to URL
4. Set the **Event Network** to the appropriate network, such as mobiledata for 4G or WAN for a wired connection
5. **Save and Apply**
6. **Reboot** the device for the changes to take effect.

See screenshots as follows:

Basic Settings



Advanced Settings



7.2 Automatic Recovery

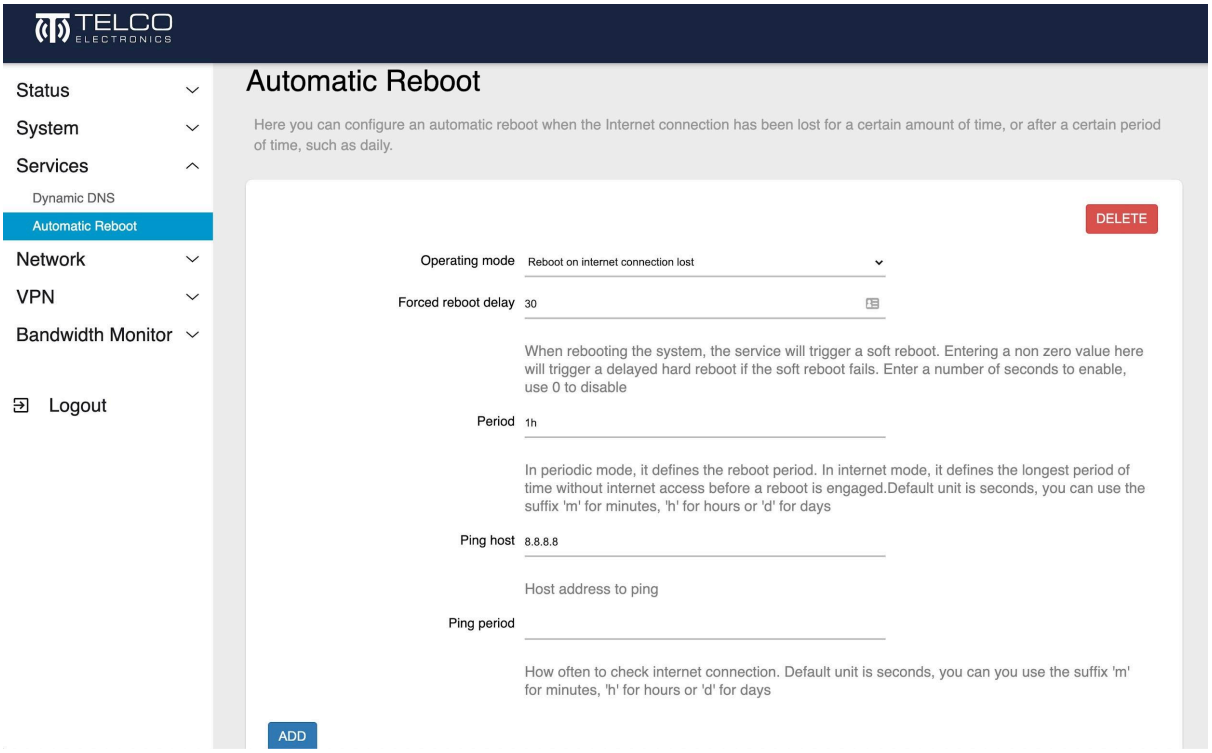
In the Automatic Recovery section you can configure automatic reboots triggered when the internet connection becomes unavailable or at a specified interval of time.

Menu Location: **System** > **Automatic Recovery**

- **Operating Mode** - Choice of
  - Reboot on Internet Connection Lost
  - Periodic Reboot (an interval of time such as 1 hour)
- **Force Reboot Delay** - After this many seconds the device will trigger a forced hard reboot if the soft reboot fails, ensuring the reboot takes place.
- **Period** - In periodic mode, it defines the reboot period. In internet mode, it defines the longest period of time without internet access before a reboot is engaged. Default unit is seconds, you can use the suffix 'm' for minutes, 'h' for hours or 'd' for days.
- **Ping Host** - The IP address or FQDN of the host to ping, normally an Internet server that is expected to always be up, such as Google DNS 8.8.8.8
- **Ping Period** - How often to ping the Ping Host.

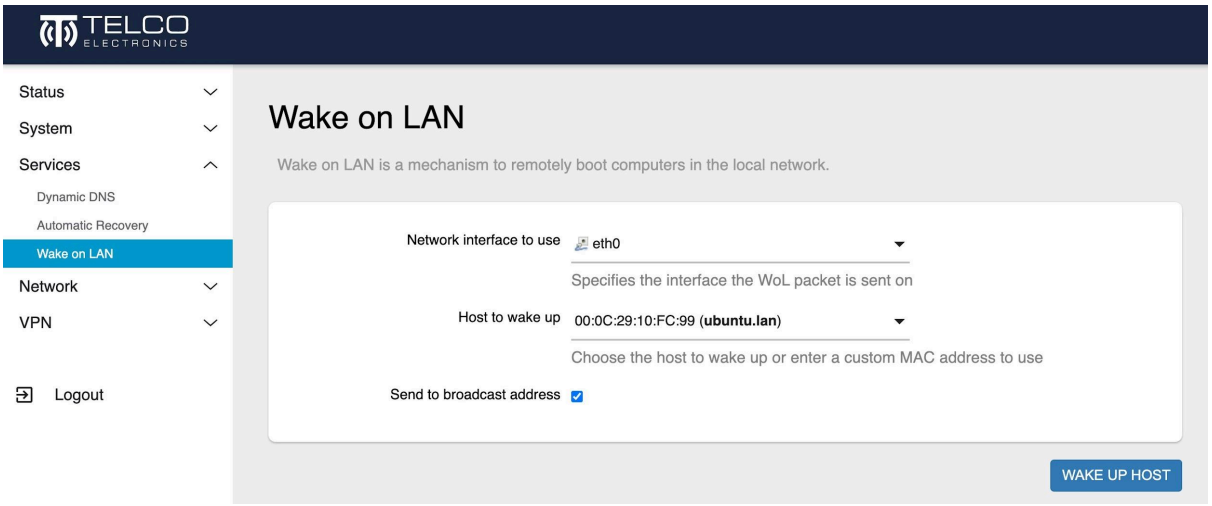
7.2.1 Example

Example configuration to reboot after 5 minutes of loss of internet connectivity:



7.3 Wake on LAN

Wake on LAN allows you to send a “magic packet” to a device attached to the Telco X1 Pro. The target device must support Wake on LAN functionality in its network card and BIOS. If that support is enabled on the target host, then you can send a Wake on LAN packet to it and it will power on.



7.3 File Shares (SAMBA/NAS)

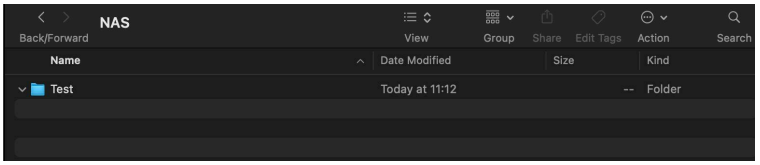
TelcOS Melaleuca supports sharing disks with the network (NAS - network attached storage). To set up a shared disk follow the following steps:

1. Format your disk using the **FAT** or **ext4** file system
2. Plug in the disk to the USB port on the Telco X1 Pro / Telco X1 Pro 5G
3. Navigate the main menu to **System** > **Mount Points**
4. Add a new Mount Point using the **Add** button and selecting your disk from the dropdown menu.
    a. Leave **Enabled** ticked

    b. Give it a mount point, such as: **/mnt/NAS**
    c. **Save and apply**

5. Navigate the main menu to **Services** > **Network Shares**
6. Set the **Listen interface** to be **LAN**, or your desired interface, such as a VPN interface
7. Add a new **Shared Directory** using the **Add** button, and fill in the following properties:
    a. **Name**: the name to display the share under, e.g. "***NAS***"
    b. **Path:** the path used under the Mount Points. i.e. **/mnt/NAS**
    c. **Force Root**: enable this to avoid complicated filesystem permissions if you just want everyone to be able to read/write from the disk, otherwise set up file system permissions using standard Linux practices
    d. **Allow guests**: enabled
    e. **Create Mask**: 0700
    f. **Directory Mask**: 0700
8. Reboot the Telco X1 Pro / Telco X1 Pro 5G to finalise the settings

To confirm everything is working, open your network share browser on your PC or Mac and you should see your new share advertised as available. Access it using **guest** credentials.


NAS
Back/Forward
View
Group
Share
Edit Tags
Action
Search
Name
Date Modified
Size
Kind
Test
Today at 11:12
--
Folder

8 Firmware and Backup

- Menu Location: **System** > **Firmware and Backup**

8.1 Backup

You can download a configuration backup on the Firmware and Backup page. This file can be used to transfer settings between Telco X1 Pro units.

8.2 Restore or Transfer Settings

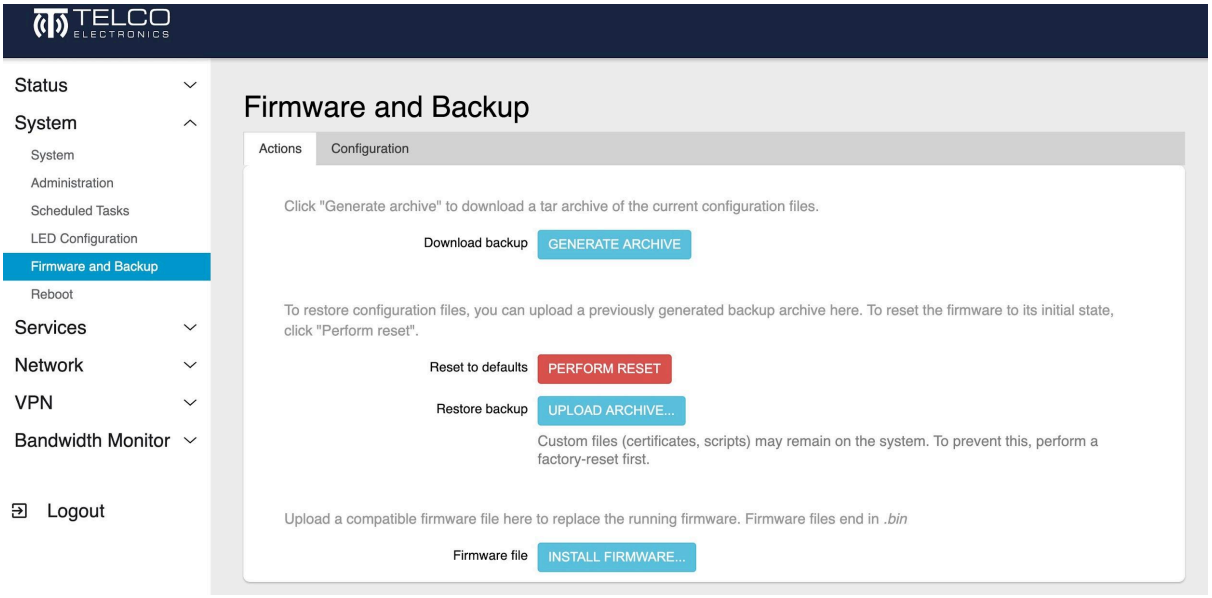
Upload a previously generated X1 Pro Backup file here. The X1 Pro will immediately reboot and apply the settings.

8.3 Install New Firmware

Here you can install a new or previous Telco X1 Pro firmware version. For a clean installation untick the “keep settings” box. Beware that sometimes settings between versions may conflict.

8.4 Reset

Restore the device to factory default settings.



9 Tips and Recommendations

The following practices may help to improve the security and performance of your Telco Electronics device. While predominantly low risk, not all of these practices may be applicable to your network environment or deployment, *i.e.* some may even be counterproductive depending on the scenario. These practices are listed here to serve as a guide to what options you have at your disposal.

9.1 Wireless Security and Performance

- Enable KRACK vulnerability countermeasures
  - Location: Wireless Security tab when editing wireless network
- Use *WPA-2* encryption with the *CCMP AES* cypher and a secure key
  - Location: Wireless Security tab when editing wireless network
- Disable *Allow legacy 802.11b rates* to improve wireless performance
  - Location: Network > Wireless > Edit > Device Configuration > Advanced Settings

9.2 Device Security

- Use key-based authentication instead of a password to access the X1 Pro via SSH. Add your key and deselect *Password Authentication*
  - Location: Password and SSH page
- Change the default router password to something secure
  - Location: Password and SSH page

9.3 Network Security

- Use DNS servers that provide protection from known malicious domains
  - Location: Edit MobileData and WAN > Advanced > deselect *Use Provider's DNS Servers* and enter your preferred
- Enable *Drop Invalid Packets* in firewall
  - Location: Network > Firewall > General Settings
- Isolate wifi clients if you wish to prevent wifi hosts from communicating with one another
  - Location: Wireless Security tab when editing wireless network

9.4 Network Reliability

- Set up an automatic reboot if the internet connection goes down. Follow our example in the Ping Reboot section.

- Run the modem in MBIM mode if you do not require advanced features such as Band Locking or Bridge Mode.
    - Change modes via SSH with the following two commands:
        - `modem_mbim`
        - `modem_qmi`

End of Document