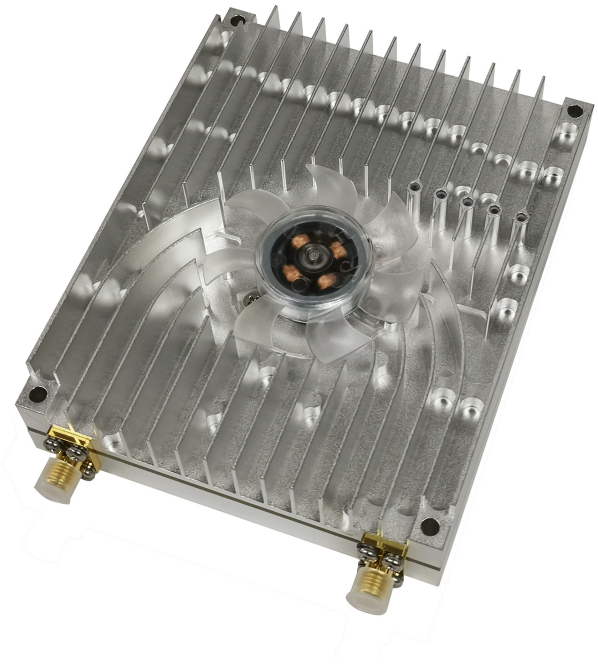
Potomac 100km
1.4G Advanced Video & Data Wireless Transmission System

User Manual



Airmobi Limited - https://www.airmobi.com - info@airmobi.com - Tel: +86-180-30032780

1. Product Overview

Potomac is a bidirectional wireless video & data transmission system designed for UAVs, UGVs, and emergency robots. By leveraging advanced multi-carrier modulation, it delivers long-range links with robust anti-interference and excellent penetration, supporting stable, low-latency HD video in dynamic environments.

The system supports MESH networking where modules auto-join using a shared Mesh ID, and once connected, any computer on the network can view cameras attached to other modules. Up to two hops are supported in MESH mode.

2. Key Features

• Up to 100 km line-of-sight transmission (site-dependent).

• Low-latency, full-duplex video & data link for HD streaming.

• Robust anti-interference using advanced multi-carrier modulation.

• MESH networking with automatic join; up to two hops.

• Flexible channel bandwidths: 5/10/20 MHz.

• Configurable frequency lists (up to 256 center frequencies).

• Multiple encryption options: None / AES-256 / DES.

• IP mode (default) and MAC transparent mode (for operators).

• Rich interfaces: Ethernet, RS232, TTL, dual antennas, 24 V power.

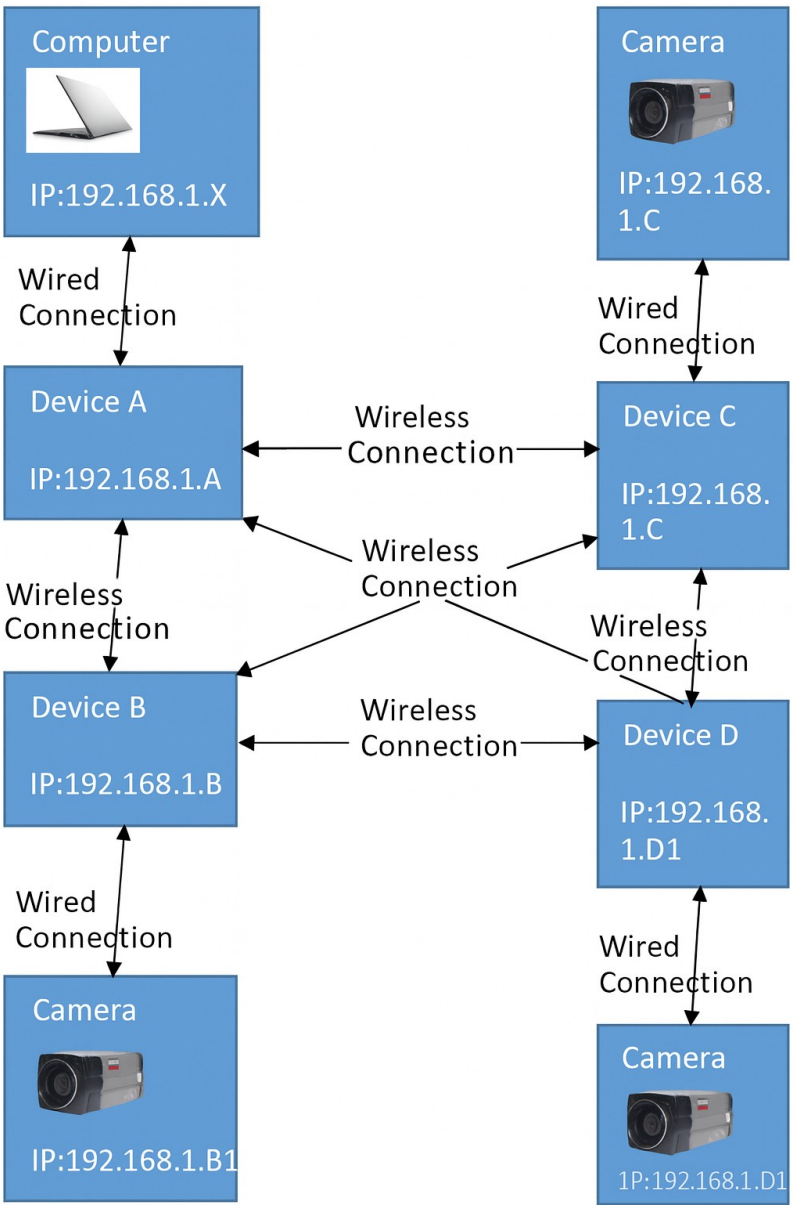
3. Technical Specifications

Operating Band	1.4 GHz band (site-dependent)
Max Range	Up to 100 km LOS
Channel Bandwidth	5 / 10 / 20 MHz
Networking	MESH (auto join, up to 2 hops)
Encryption	None / AES-256 / DES (custom key)
Interfaces	10/100M Ethernet, RS232 (x2), TTL UART, dual antennas, 24 V DC
Indicators	Power, Link (Green/Red), RSSI (Green→Yellow→Red→OFF)

Serial-over-IP	UDP (1-to-1), TCP (1-to-many)
Power Supply	24 V DC (GND | VCC)
Use Cases	UAV, UGV, emergency robot video/data backhaul

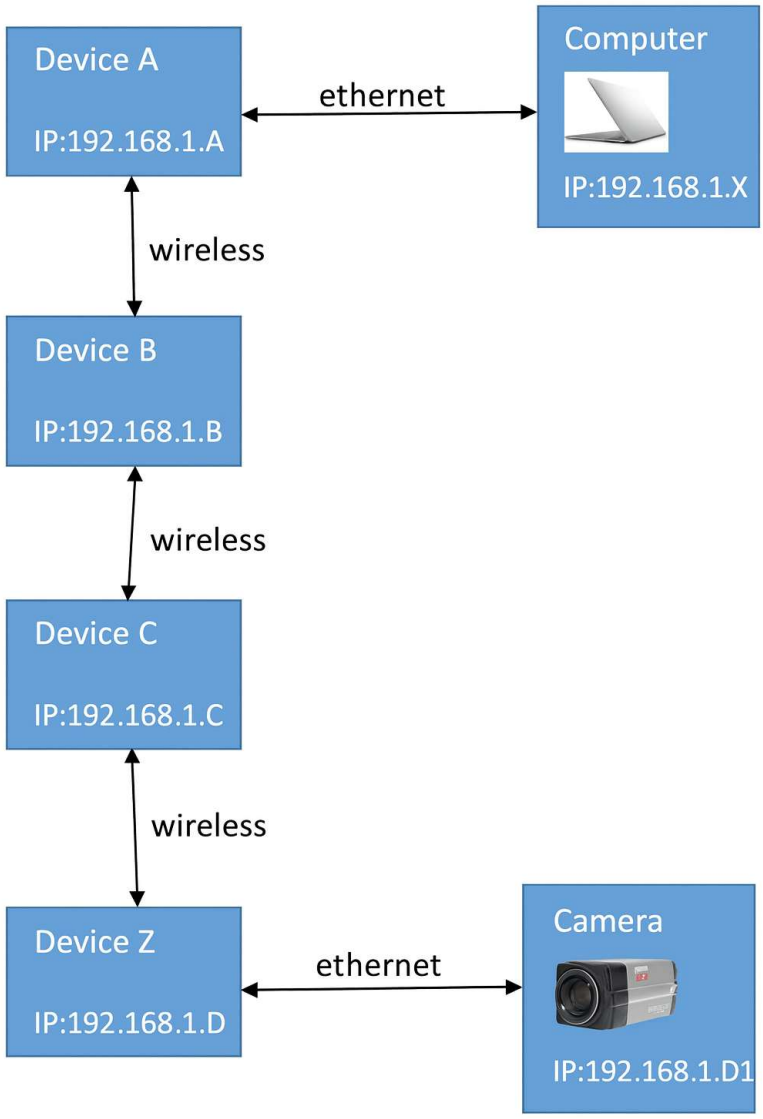
4. Networking Introduction

4.1 Short-range Multi-module Topology



In short-range scenarios, Devices A/B/C/D and multiple cameras connect via a mix of wired (cameras to devices) and wireless (device-to-device) links. A computer can join any module via Ethernet to access the entire camera fleet.

4.2 Multi-hop Networking



MESH supports up to two hops. With matching Mesh ID, packets are forwarded between nodes, enabling extended coverage. Keep the hop count and RF environment in mind to maintain low latency and stable throughput.

5. Hardware Interface Description

① DC24V: DC 24V Power Input — Left-to-right pinout: GND, VCC

② LAN1: 10/100M Ethernet Port — Left-to-right pinout: RX1-, RX1+, TX1-, TX1+

③ LAN2: 10/100M Ethernet Port — Left-to-right pinout: RX1-, RX1+, TX1-, TX1+

④ RS232: Data Serial Port — Left-to-right pinout: RX, GND, TX; RX, GND, TX

⑤ TTL: Data Serial Port — Left-to-right pinout: RX, GND, TX

⑥ Power Indicator LED: Solid on after power-up; if off, cut power and troubleshoot immediately.

⑦ Signal Strength LED: From strong to weak: green, yellow, red, off

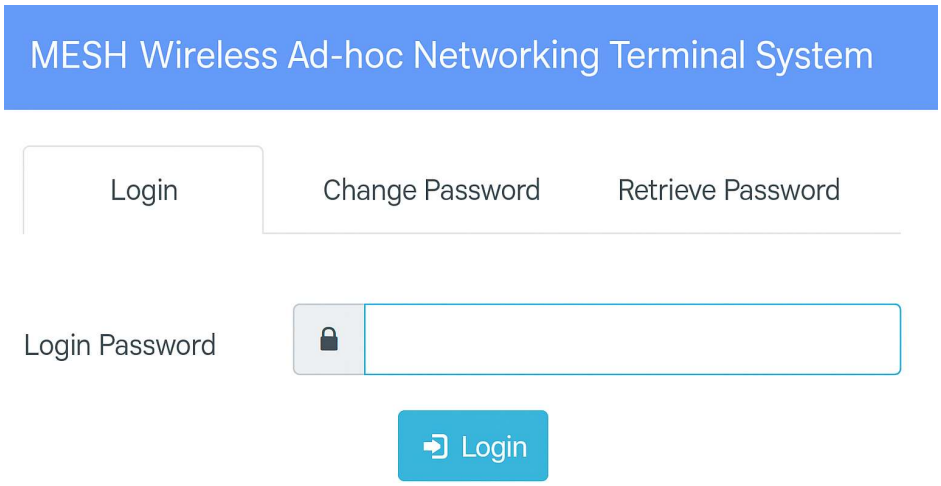
⑧ Link Indicator LED: Green when link is established; red when no link

⑨ ⑩ On when the corresponding Ethernet port is connected; blink based on data traffic. See datasheet for port–LED mapping

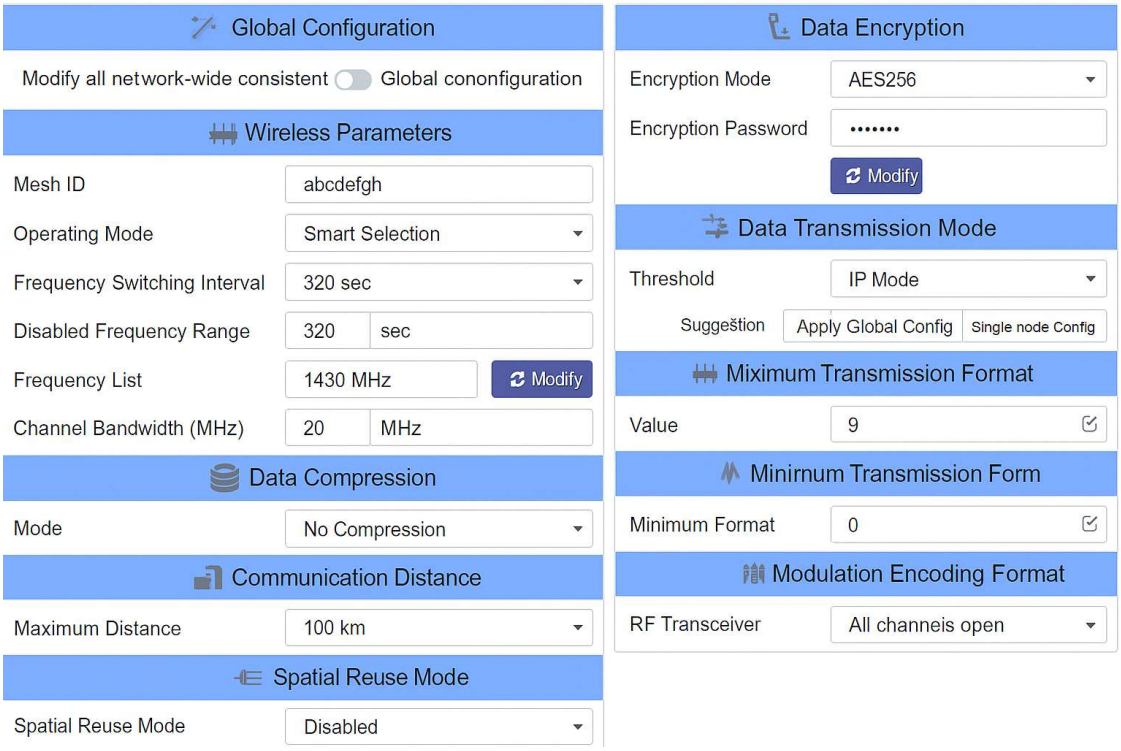
Color-coded ports make installation intuitive: red (power), blue (Ethernet), green (RS232), purple (TTL), gray (antennas). LEDs provide immediate status for power, link, and RSSI strength.

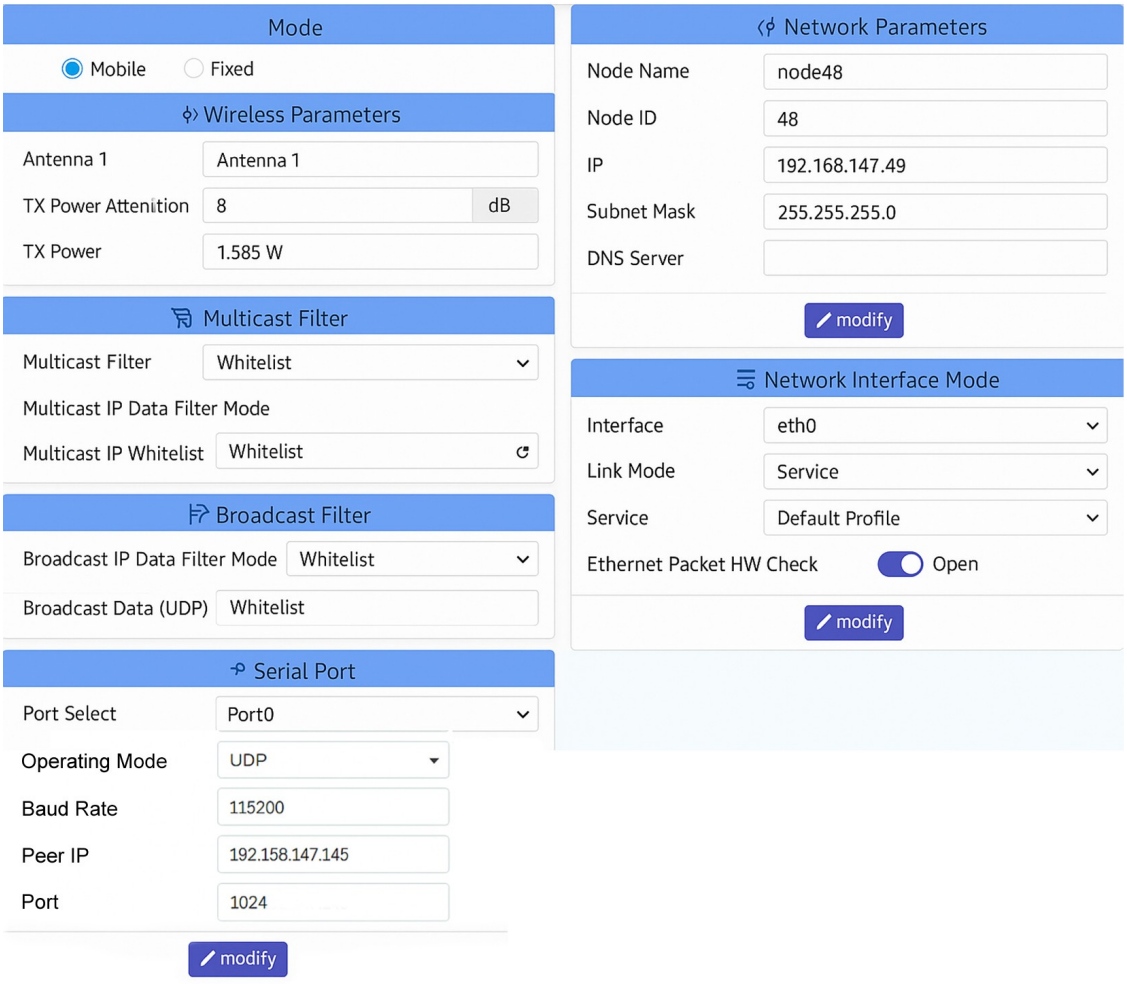
6. Software Operation

6.1 Web Configuration (Parameters)



Log in via the Ethernet business port (default web admin password: admin). Use Global Config to synchronize settings across all nodes. Ensure Mesh ID matches; choose operating mode (Roaming / Smart Frequency / Single-channel), set the Frequency List and Channel Bandwidth, adjust TX power, and apply encryption if required.





Configuration Instructions

① **Menu Bar Navigation**

Select the corresponding section in the menu bar based on your needs. Click **X** to collapse the menu bar.

② **Global Configuration Synchronization**

When global configuration is enabled, any parameter modifications will automatically be applied to all other networking modules.

③ **Bandwidth Slot Allocation**

The allocation of bandwidth transmission slots currently only supports the **Peer-to-Peer** mode.

④ **Mesh ID Requirement**

Only modules with the same **Mesh ID** can form a network. You can modify the Mesh ID manually, but using the factory default is recommended.

⑤ **Operating Modes**
Three operating modes are available: **Roaming**, **Smart Frequency Selection**, and **Single-Channel**.

⑥ **Frequency List**
A list used to configure center frequencies, supporting up to **256 entries**.

⑦ **Channel Bandwidth Options**
Available bandwidth options: **1.25M**, **2.5M**, **5M**, **10M**, **20M**, and **10/20/40M**.

⑧ **Data Compression**
Two compression modes are available: **No Compression** and **Full Compression**. The default setting is **No Compression**.

⑨ **Distance Setting**
Configure the distance parameter based on actual deployment requirements.

⑩ **Multi-hop Transmission Enhancement**
Improves network transmission performance in multi-hop scenarios. Disabled by default.

⑪ **Encryption Options**
Three encryption modes are available: **None**, **AES256**, and **DES**.

⑫ **Encryption Key**
Encryption keys support **Chinese characters** and have **no length limit**.

⑬ **Data Transmission Modes**
The default mode is **IP Mode**.
MAC Mode is a transparent pass-through mode specifically designed for operators.

⑭ **Maximum Bandwidth Threshold**
The larger the set value, the higher the maximum transmission bandwidth. The factory default is **9**.

⑮ **Minimum Data Transmission Requirement**
If the transmission rate falls below this threshold, **data transmission will fail**.

⑯ **RF Channel Control**
Allows enabling or disabling RF channels. By default, **all channels are enabled**.

⑰ **Station Type**
By default, the system operates in **Mobile Station Mode**.

⑱ **TX Power Configuration**
Used to configure the transmission power of the ports. By default, the factory power setting is used. **Power modifications take effect immediately.**

⑲ **Multicast Settings**
Determine the multicast list. The list content is configured in the **Multicast Filter** section.

⑳ **Multicast Whitelist & Blacklist**

Whitelist: IPs in the whitelist **can** perform multicast data communication.

Blacklist: IPs in the blacklist **cannot** perform multicast data communication.

㉑ **Broadcast Whitelist & Blacklist**

Whitelist: IPs in the whitelist **can** perform broadcast data communication.

Blacklist: IPs in the blacklist **cannot** perform broadcast data communication.

㉒ **Serial Communication (1-to-1 via UDP)**
Use **UDP** for one-to-one serial communication by specifying the target module's **IP** and **Port**.

㉓ **Serial Communication (1-to-Many via TCP)**
Use **TCP** for one-to-many serial communication:

Sender = **TCP Server**

Receiver(s) = **TCP Client(s)**

Note: Data size should not be too large, otherwise serial processing pressure will increase significantly.

㉔ **Network Segment Configuration**

The network segment can be configured by directly modifying the **IP address**.

The last octet of the IP can also be automatically derived from the **Node ID**.

Formula: **IP last octet = Node ID + 1**.

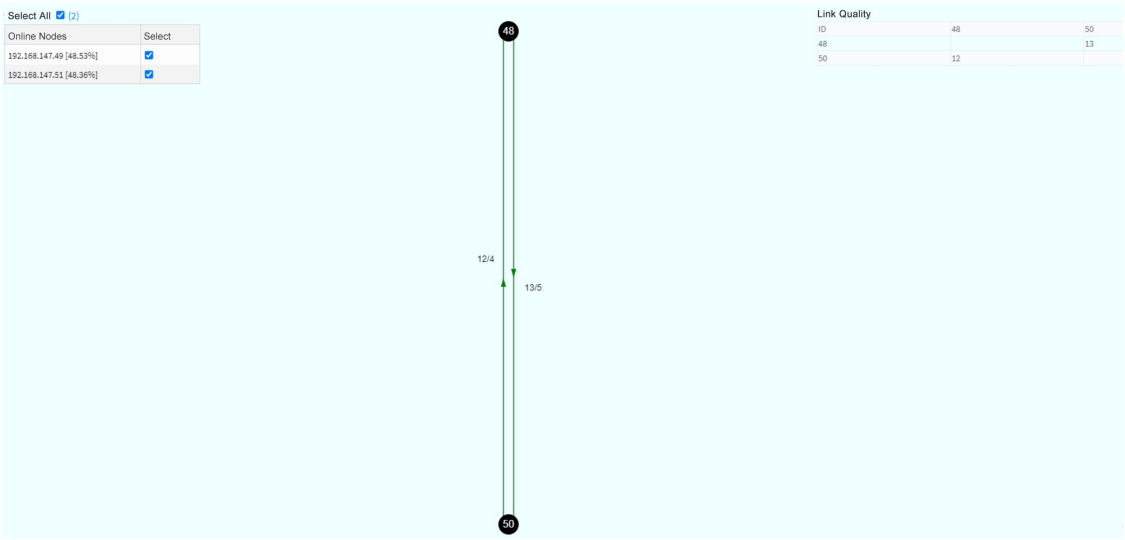
Subnet mask is usually left as the **factory default**.

It is recommended to align **Node ID** and **Node Name** for consistency.

㉕ **Ethernet Port Operating Mode**

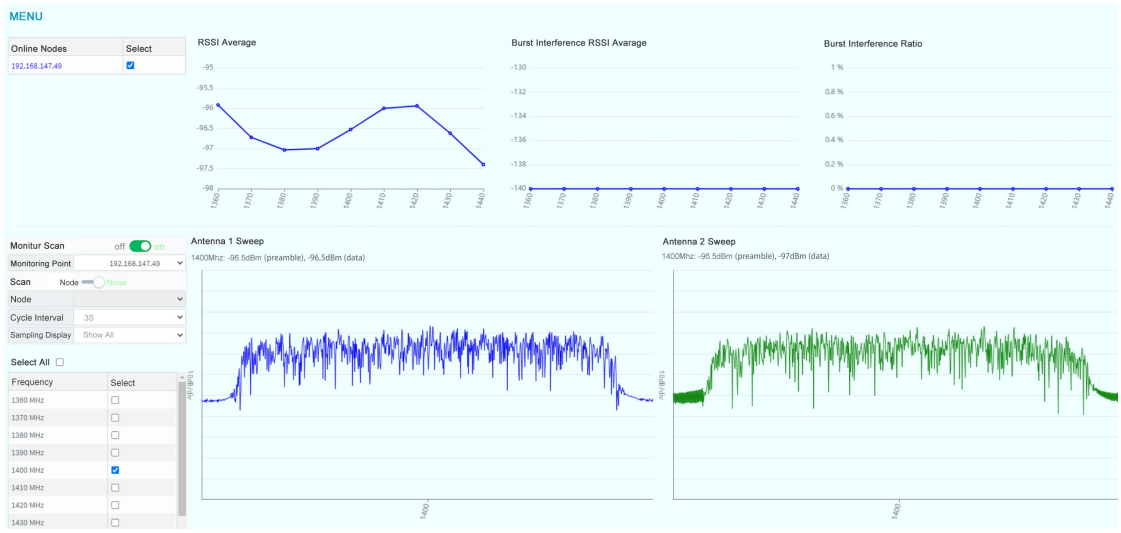
By default, the Ethernet port operates in **Business Mode**, allowing direct access to the parameter configuration webpage via the network interface.

6.2 Network Topology View



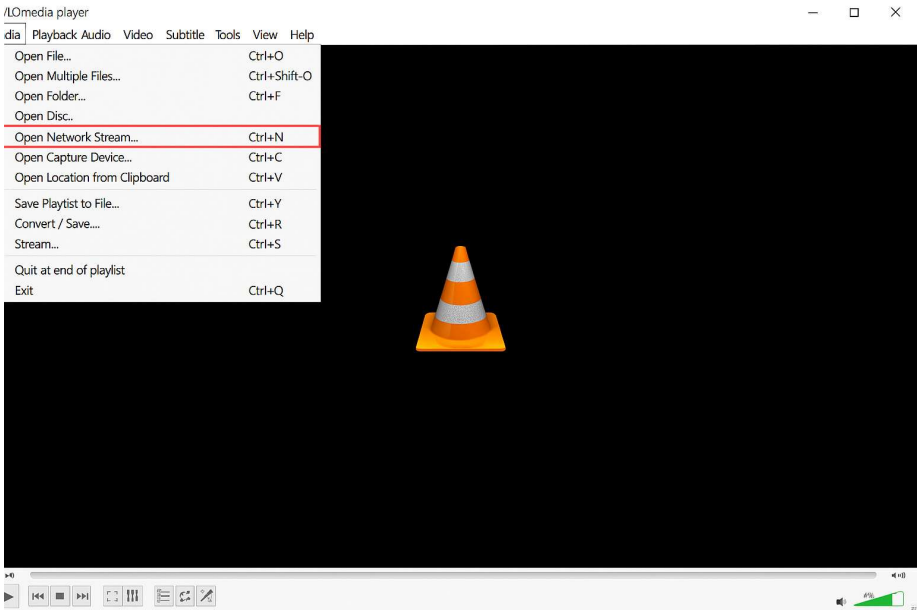
The Topology view shows online device IDs and link states. Use it to verify connectivity, track link quality (RSSI/SNR), and validate multi-hop paths.

6.3 Spectrum Scanning



Spectrum scanning displays average noise RSSI and burst interference levels across frequencies. Antenna port power can also be inspected. Use this to select clean channels and optimize bandwidth and power.

6.4 Video Playback Setup (VLC)



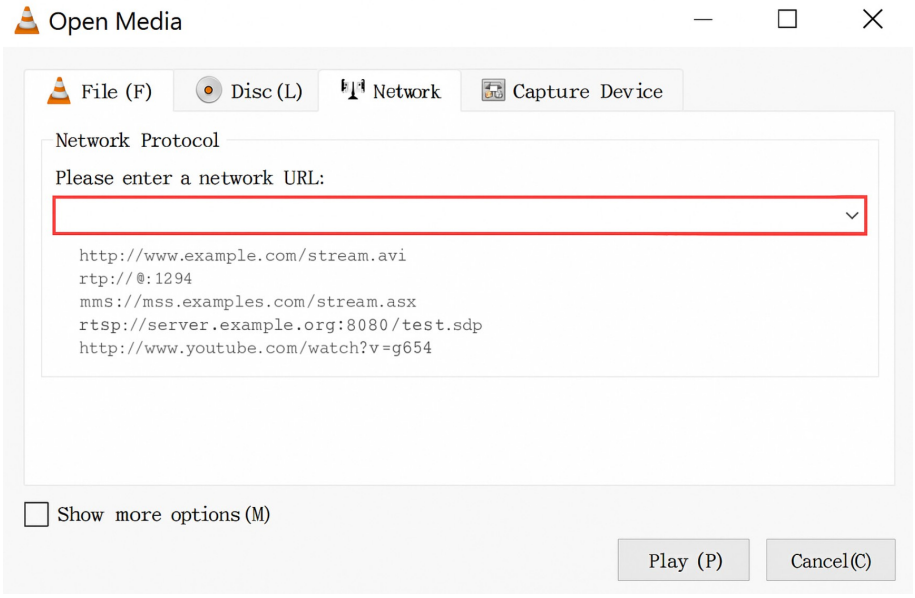
Install and open VLC media player → Media → Open Network Stream (Ctrl+N).

Enter the corresponding camera configuration in the red box under Open Network Stream, then click Play to start video playback.

Example: Camera IP: 192.168.1.X

In this case, the Network URL will be: rtsp://192.168.1.X

The format for entering the Network URL is: rtsp://<Camera IP>



7. Quick Start Guide

• Mount antennas, connect 24 V power, and wire cameras to module Ethernet.

• Connect a computer to any module via Ethernet and access the web UI (admin).

• Set a common Mesh ID and operating mode; verify frequency list and bandwidth.

• Check the Topology view for online nodes and link status.

• Open VLC and test the RTSP stream (rtsp://192.168.1.X).

• Fine-tune TX power and bandwidth based on Spectrum scanning for best performance.

8. Safety Notes & Best Practices

• Turn off power before handling the board or changing antennas.
• Use certified antennas and follow local RF regulations.
• Keep line-of-sight whenever possible for maximum range.
• Label device IDs and IPs to match the network plan.
• Regularly review Spectrum scans to avoid crowded channels.

For any questions, please contact us.

AIRMOBI LIMITED
Leading Supplier of Long Range Drones

Address: F4 Tower B, Taidi Center, Haicang Xiamen 361026 China
E-mail: info@airmobi.com
Wechat: airmobi
Tel/Whatsapp: 0086-18030032780