

# The Plant-Floor Wireless Setup Guide

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## Configuring 802.11s Mesh & Layer 2 Transparent Bridges for Industrial Networks (Siemens / Rockwell)

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### Before You Begin (Prerequisites)

Before ditching your physical Ethernet cables, ensure you have the following on your bench:

- **Valtoris VT-LTE400 Gateways** (Minimum 2 units, acting as Master and Node).
- **Firmware Check:** Ensure devices are running firmware **v1.4 or higher**.
- **Power:** 24V DC DIN-rail power supply.
- **Network:** A PC with an Ethernet port to access the gateway's Web UI (Default IP: 192.168.1.1).

## Part 1: Establishing the 802.11s Mesh Backbone

*Unlike standard WiFi repeaters, an 802.11s Mesh network is self-healing. All nodes communicate directly with each other without routing back to a central router.*

### Step 1: Configure the "Master" Node (Connected to SCADA)

1. Power up the VT-LTE400 and connect your PC to **LAN 1**.
2. Open your browser and navigate to `http://192.168.1.1` (Default: admin/admin).
3. Navigate to **Network > Wireless**.
4. Select the **5GHz Radio** (Recommended for factory floors to avoid motor interference).
5. Set the **Operating Mode** to: 802.11s Mesh.
6. Set the **Mesh ID (ESSID)**: e.g., `Factory_Mesh_Zone1` (*All nodes must share this*).
7. **Lock the Channel:** Select a fixed channel (e.g., Channel 36). **Do not use Auto.**
8. Click **Save & Apply**.

### Step 2: Configure the "Relay / Remote" Nodes

1. Connect your PC to the second VT-LTE400.
2. Change the LAN IP to avoid conflicts (e.g., change IP to 192.168.1.2).
3. Go to **Network > Wireless**, select 5GHz Radio, set mode to 802.11s Mesh.
4. Enter the **exact same Mesh ID** and **exact same Channel**.
5. Click **Save & Apply**. Check **Status > Wireless** to verify connection.

## Part 2: Enabling Layer 2 Transparent Bridging

**CRITICAL:** Standard WiFi drops Multicast packets. If you are running **Profinet** or **EtherNet/IP**, you **MUST** enable Layer 2 transparency.

### Step 3: Bridging the LAN and Mesh Interfaces

1. On **both** nodes, navigate to **Network > Interfaces**.
2. Click **Edit** on the LAN interface and go to the **Physical Settings** tab.
3. Check the box for **"Create a bridge over multiple interfaces"**.
4. Select both the Ethernet Adapter (eth0/LAN) **AND** the Wireless Network (802.11s Mesh).
5. Enable the **"Relay Bridge" (WDS / Layer 2 Transparent Mode)** option.
6. Click **Save & Apply**.

*Result: A Siemens PLC on Node A can now directly broadcast MAC-level Profinet packets to an I/O block on Node B.*

## Part 3: Antenna Optimization & Pro-Tips

- **The Faraday Cage Effect:** Industrial control panels are giant metal boxes. If you leave standard antennas inside a closed cabinet, your signal will die.
- **The Fix:** Always use the included **Magnetic Extended Antennas**. Mount the magnetic base on the *outside* top of the metal cabinet.
- **Bypassing Metal Silos:** If a massive metal tank blocks the signal between Node A and Node C, drop a third gateway (Node B) halfway. The 802.11s mesh will automatically bounce the signal around the tank.

## Troubleshooting Guide

Symptom	Cause	Solution
Nodes won't connect	Channel mismatch	Ensure all nodes are locked to the exact same WiFi channel. Do not use "Auto".
Profinet faults / drops	Layer 2 not active	Double-check that "Relay Bridge" is checked on both gateway interfaces.
Pings > 100ms	2.4GHz Interference	Switch the Mesh radio from 2.4GHz to 5GHz. Industrial motors destroy 2.4GHz bands.

### Need Help with Your Specific Architecture?

Our engineers are ready to review your factory floor layout.

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