Configure and Troubleshoot Point to Point Full Mesh (Ring Topology)

Contents

Introduction

This document describes the configuration of a full Mesh (Ring Topology) setup via GUI and used for fixed infrastructure networks with CURWB devices.

Components Used

Cisco Catalyst IW9167 radios

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

High-level system design (Terminology)

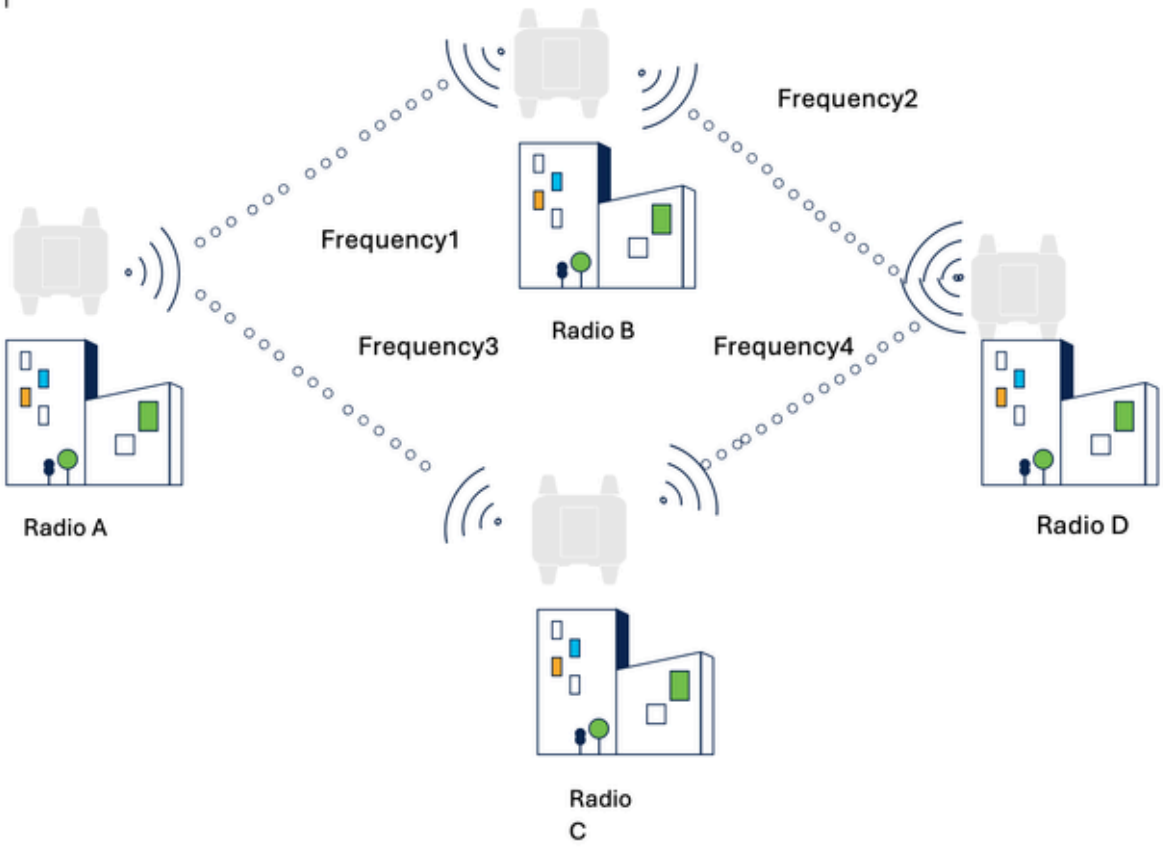
Passphrase: This parameter is configured on radios within a specific network cluster or broadcast domain; enabling them to communicate and establish connections. The passphrase encrypts signaling information transmitted between radios and facilitates connection formation prior to data transmission. The default passphrase is **CiscoURWB**.

Mesh ID: A Mesh ID is a unique four-octet identifier assigned to each CURWB device, typically formatted as **5.a.b.c**. This is the MAC address of the CURWB device

Mesh End: A CURWB radio or device that serves as the gateway between the core network and the CURWB network. Typically, a Mesh End device is explicitly designated by a system administrator. However, a radio can be automatically elected as a Mesh End by other radios in the network if it has the lowest Mesh ID number and no other Mesh End is configured within the cluster.

Mesh Point: A CURWB radio that functions as a remote unit within the CURWB network; transmitting data to end devices

AutoTap: A network-loop prevention mechanism enables CURWB devices to detect connections and maintain a dedicated ingress/egress route to and from the Mesh End or network core. IW radios distribute received data to connected radios, and to prevent loops, one port is blocked. This situation typically arises in ring topology designs or when two Ethernet ports from two radios connect to the same switch, necessitating the blocking of one Ethernet port while allowing the other.



Advangate and Setup Consideration of Full Mesh Topology

- Full Mesh/Ring topology configurations offer greater network flexibility compared to Point-to-Point networks by providing wireless redundancy.
- Ideally, each location could use one radio, as each radio has two interfaces. However, to ensure wireless redundancy and cover failure scenarios, each location must realistically have two radios. This setup ensures that if one radio fails, the alternate route of the ring topology can deliver the traffic.
- Radios located at the aggregation point, typically closest to the core network, must be set as the Mesh End.
- The Mesh End serves as the gateway between the CURWB wireless network and the wired core network, while the remaining radios function as mesh points. The CURWB radio role must be specified based on the function each radio performs.

Full Mesh (Ring Topology) Configuration

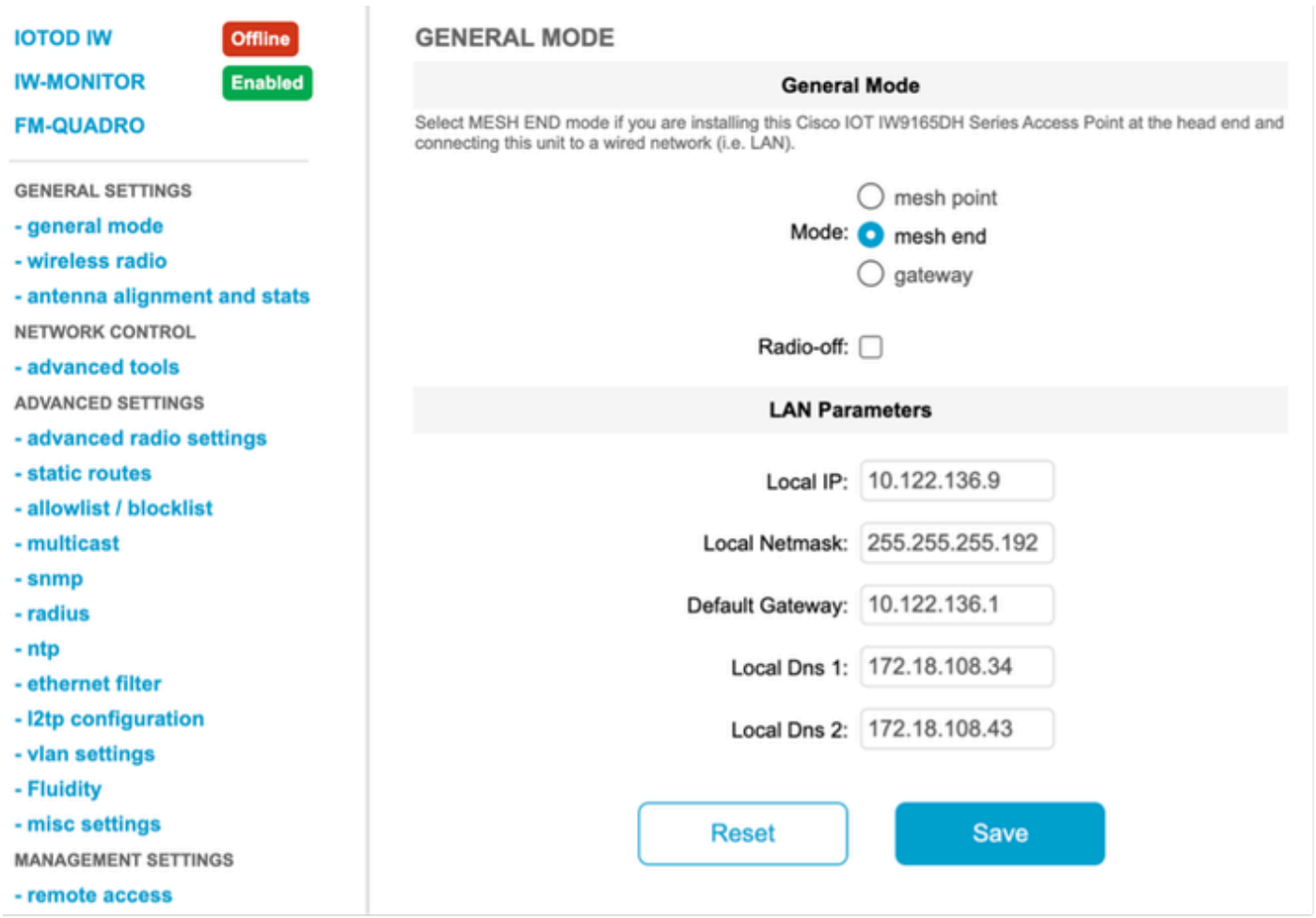
To create a Full Mesh Network, we must configure these parameters:

1. General Mode
2. Lan Parameters
3. Passphrase, Frequency, Radio-Role

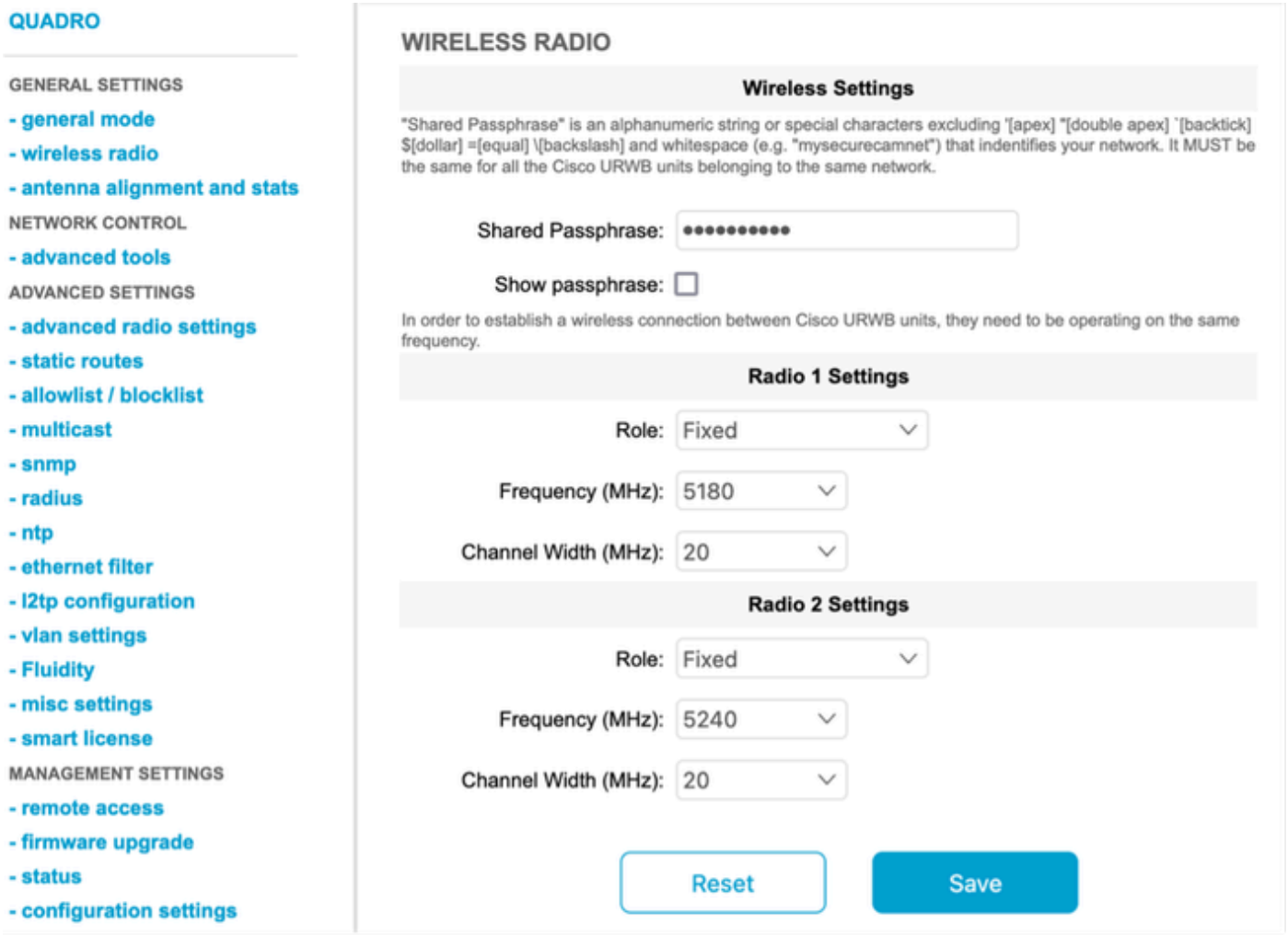
This is essential that any additional features like VLAN, AES if enabled on one radio needs to be activated on all radios.

General mode: Radio mode and IP addresses are configurable from this page. Careful selection of the Mesh

End is essential, with the radio physically closest to the core network typically configured as the Mesh End.



Wireless Radio: Configuration of passphrase, frequency, channel width, and radio role occurs within the wireless radio settings. Radios configured in full mesh mode must be set to Fixed mode, rather than Fluidmax Primary or Secondary mode.



Advanced Radio Settings: Selection of the antenna number aligns with the type of antenna used on site. Additionally, AES encryption can be enabled to secure the data plane.

ADVANCED RADIO SETTINGS

Radio 1

FluidMAX Management

Force the FluidMAX operating mode of this unit. If the operating mode is Primary/Secondary a FluidMAX Cluster ID can be set. If the FluidMAX Autoscan is enabled, the Secondary units will scan the frequencies to associate with the Primary with the same Cluster ID. In this case, the frequency selection on the Secondarys will be disabled.

Radio Mode: OFF

Max TX Power

Select the max power level that the radio shall use to transmit (power level 1 sets the highest transmit power). The Cisco URWB TPC (Transmit Power Control) will automatically select the optimum transmission power according to the channel condition while not exceeding the MAX TX Power parameter. Note: in Europe TPC is automatically enabled.

Select TX Max Power: 1

Antenna Configuration

Select radio 1 antenna gain and antenna number.

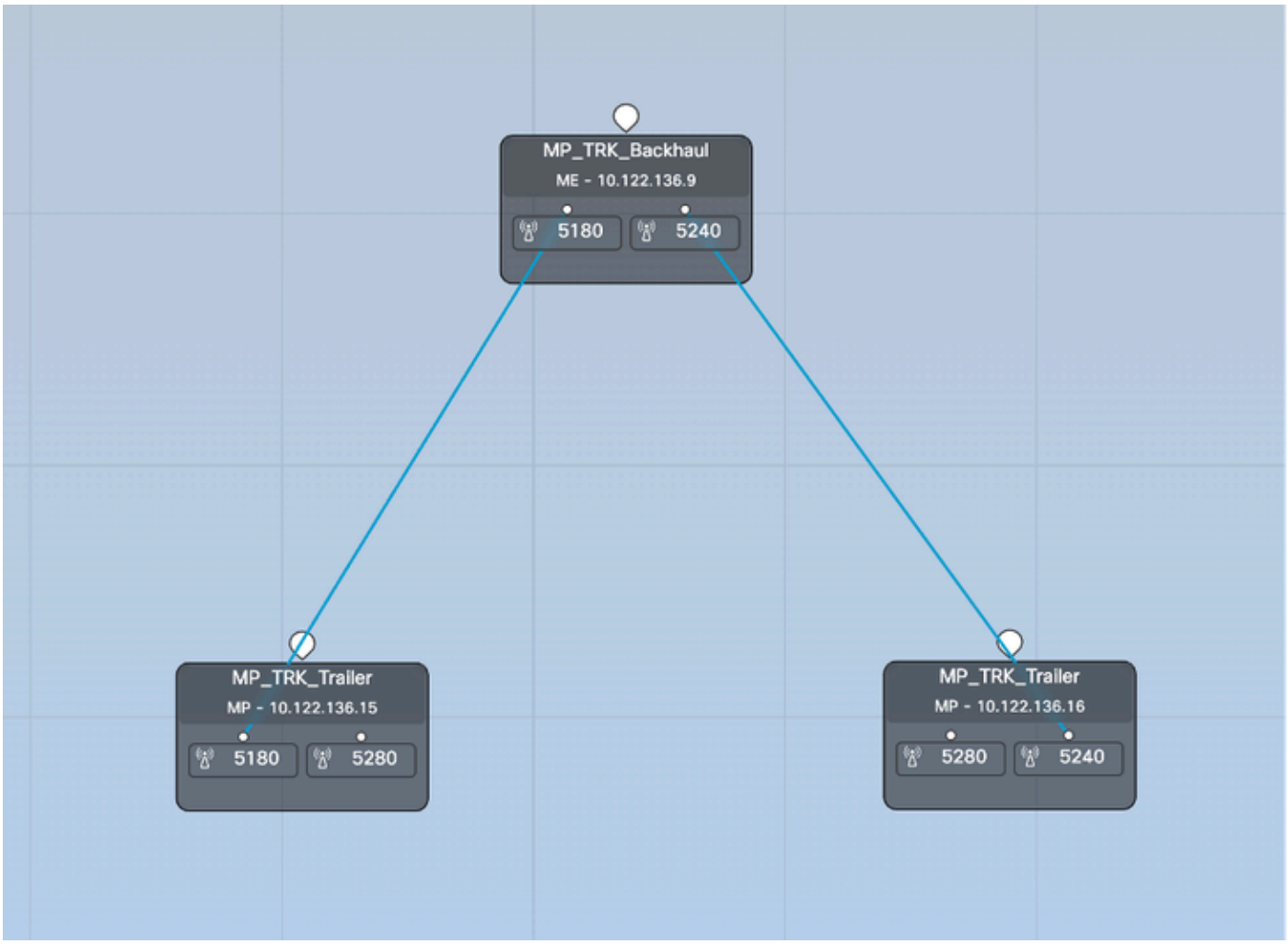
Select Antenna Gain: UNSELECTED

Antenna number: ab-antenna

Data Packet Encryption

Enable AES to cypher all wireless traffic. This setting must be the same on all the Cisco URWB units.

Enable AES: Disabled



Troubleshooting the Mesh Network

- A full mesh network extends multiple point-to-point links, forming a ring topology. Similar to point-to-point links, radios must maintain direct line of sight. The RSSI for both uplink and downlink across all links must range from -45 to -65 dBm.
- In full mesh networks, multiple point-to-point links are always present, and each link must operate on a non-overlapping frequency to prevent interference. Additionally, all links must use the same passphrase.
- Ideally, a single radio per location suffices, given that each radio has two interfaces. However, for realistic wireless redundancy and to address potential radio failure, each location must have two radios. This setup ensures that if one radio fails, the alternate route within the ring topology continues to deliver traffic.