

URWB Radio Mode

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Configure URWB radio mode

The wireless interfaces are configured to operate in a specific mode, or you can disable it. Once you configure the Radio mode, the device starts working as a Fluidity or Fixed infrastructure.

Table 1: Radio mode configuration

Radio Role	Radio Mode	Description
Fixed Infrastructure	Fixed Fluidmax primary Fluidmax secondary	P2P mode (point to point) P2MP (point to multipoint) mode (Fluidmax) and P2MP P2MP mode (Fluidmax) and P2MP
Mobility AP	Fluidity	Mobility mode
Mobility Client	Fluidity	Mobility mode

Table 2: Operating mode of radio interface

Radio 1 / Radio 2	Fixed Infrastructure	Fluidity
Fixed Infrastructure	Fluidity disabled	Fluidity enabled
Fluidity	Fluidity enabled	Fluidity enabled

Table 3: Configuration of multiple radio interfaces

Radio 1 / Radio 2	Fixed Infrastructure / Mesh	Mobility AP	Mobility client
Fixed Infrastructure / Mesh	ME/MP relay, P2MP (mesh)	Yes, trailer use case (Mining trailer)	Supported but no specific use case
Mobility AP	Yes, trailer use case (Mining trailer)	Standard Fluidity (multiple clients on each radio)	Not supported, use V2V or Fixed + AP
Mobility client	Supported but no specific use case	Not supported, use V2V or Fixed + AP	Standard Fluidity (multiple clients on each radio)

Configure radio-off mode from CLI

This task allows you to configure radio-off mode to disable all wireless interfaces on the device when both Fluidity and fixed radios need to be turned off.

Radio-off mode is used when you need to disable wireless functionality on mesh devices. When you specify radio-off, the device disables all the wireless interfaces. This configuration is performed through CLI commands that set the device's operating mode and radio settings.

Before you begin

Follow these steps to configure radio-off mode from CLI:

Procedure

Step 1 Set the device's current operating mode.

Mode could be mesh end, mesh point or global gateway (L3).

Example:

```
Device# configure modeconfig mode {meshpoint | meshend | gateway}
```

Step 2 Set the device's selected Multi-Protocol Label Switching (MPLS) OSI layer.

The possible value of layer is 2 (OSI Layer-2) or 3 (OSI Layer-3).

Example:

```
Device# configure modeconfig mode {meshpoint | meshend | gateway} [layer {2|3}]
```

Step 3 Set the radio-off mode.

Example:

```
Device# configure modeconfig mode { meshpoint | meshend | gateway } [layer {2|3}] [ radio-off {fluidity
 | fixed}]
```

Step 4 End the current configuration and save it.

Example:

```
Device# (configure modeconfig mode { meshpoint | meshend | gateway } [layer {2|3}] [ radio-off
{fluidity | fixed}])# end

Device# write
```

Example:

```
Configure modeconfig mode meshend radio-off fluidity

Configure modeconfig mode meshend radio-off fixed
```

Configure radio mode for URWB from CLI

Configure the radio mode for URWB to set the operating function of wireless interfaces and enable mixed Fluidity and fixed infrastructure combinations for different interfaces.

The device allows mixed Fluidity and fixed infrastructure combinations for different interfaces. When at least one interface is set to Fluidity mode, the device operates globally in Fluidity mode. If all interfaces are set to fixed, Fluidity is disabled.

Before you begin

Follow these steps to configure radio mode for URWB from CLI:

Procedure

Step 1 Configure the wireless with radio interface number <1 or 2>.

Example:

```
Device# configure dot11Radio <interface>
```

Step 2 Configure an operating mode for the specified interface.

Example:

```
Device# configure dot11Radio <interface> mode {fixed|fluidity|fluidmax}
```

Fluidity - This interface operates the device in Fluidity, either as a mobility infrastructure or as a vehice mode.

Fixed - This interface operates in fixed infrastructure mode (no Fluidity).

Fluidmax - This interface operates in Fluidmax P2MP mode. More parameters can be specified to configure the Fluidmax operating features, for example: Primary/Secondary role and cluster ID.

Step 3 Set Fluidmax role for Fluidmax interface mode.

Example:

```
Device# configure dot11Radio <interface>mode {fixed|fluidity|fluidmax} {primary | secondary}
```

Primary - set Fluidmax role to primary

Secondary - set Fluidmax role to secondary

Step 4 To end the current configuration, use the following CLI command:

Example:

```
Device# end
```

Note
When at least one interface is set to Fluidity mode, the device operates globally in Fluidity mode. If all interfaces are set to fixed, Fluidity is disabled.

Configure AMPDU using CLI

This task allows you to configure AMPDU length and priority settings to optimize wireless network performance and transmission efficiency.

AMPDU (Aggregated MAC Protocol Data Unit) configuration enables you to adjust transmission parameters for wireless interfaces to improve network throughput and manage traffic prioritization.

Before you begin

Follow these steps to configure AMPDU using CLI:

Procedure

Step 1 Configure the AMPDU length using the following command:

Example:

```
Device# configure dot11radio <interface> ampdu length <length>
```

length: <0-255> integer number – microseconds

Step 2 Configure AMPDU priority enable or disable setting:

Example:

```
Device# configure dot11radio <interface> ampdu priority {enable | disable}
```

enable: enable AMPDU tx priority

disable: disble AMPDU tx priority

Step 3 Configure AMPDU priority for specific indexes:

Example:

```
Device# configure dot11radio <interface> ampdu priority [enable]
```

0: AMPDU tx priority for index 0

1: AMPDU tx priority for index 1

2: AMPDU tx priority for index 2

3: AMPDU tx priority for index 3

4: AMPDU tx priority for index 4

5: AMPDU tx priority for index 5

6: AMPDU tx priority for index 6

7: AMPDU tx priority for index 7

all: AMPDU tx priority for all indexes (index 0 to 7)

Configure frequency from CLI

Configure an operating frequency for a dot11radio interface using CLI commands.

Use the CLI to set the operating frequency for wireless radio interfaces.

Procedure

Configure the operating frequency.

Example:

```
Device# configure dot11radio <interface> frequency <frequency>
```

Valid range for operating frequency is 0-7125 in MHz.

Configure maximum modulation coding scheme index from CLI

Configure the maximum MCS index to optimize wireless performance and data transmission rates.

The maximum MCS index determines the highest modulation and coding scheme that can be used for wireless transmission. You can set this value manually or allow automatic configuration.

Procedure

Configure the maximum MCS index using the following CLI command:

Example:

```
Device# configure dot11radio <interface> mcs <maxmcs>
```

Set maximum MCS index in integer or string AUTO. For AUTO, the background process automatically configures the maxmcs.

Valid values are from 0 to 11 or AUTO.

Note
If High Efficiency mode is disabled, set the MCS index value ranging from 0 to 9. If High Efficiency mode is enabled, set the MCS index value as 10 or 11.

Configure maximum number of spatial streams index from CLI

Configure the maximum number of spatial streams (NSS) index to optimize wireless performance based on device capabilities and antenna configuration.

The NSS index determines the maximum number of spatial streams that can be used for wireless communication. This setting can be configured manually with specific values or set to AUTO for automatic configuration.

Procedure

Configure the maximum number of spatial streams index using the following command:

Example:

```
Device# configure dot11radio <interface> spatial-stream <maxnss>
```

Set maximum spatial stream number in integer or string AUTO. For AUTO, the background process automatically configures the maxnss.

Valid values range from 1 to 4 or AUTO.

Note
Catalyst IW9165 supports up to two spatial streams and Catalyst IW9167 supports up to four spatial streams. The maximum number of spatial streams configured must be same or less than the number of antennas enabled.

Configure Rx-SOP threshold from CLI

Configure the receiver start of packet (Rx-SOP) threshold to control signal detection sensitivity on the wireless interface.

The Rx-SOP threshold setting determines the minimum signal level required for the receiver to detect the start of a packet.

Procedure

Configure the Rx-SOP threshold using the following CLI command:

Example:

```
Device# configure dot11radio <interface> rx-sop-threshold
```

<0 - 91> Enter rx-SOP- threshold (0: AUTO, VALUE: -VALUE dBi).

Configure RTS mode from CLI

Configure RTS mode to control ready to send protection on wireless interfaces, either by disabling RTS protection or enabling it with a specific threshold value.

RTS mode configuration allows you to manage wireless transmission protection mechanisms on dot11radio interfaces.

Procedure

Step 1 To disable ready to send (RTS) mode, use the following CLI command:

Example:

```
Device# configure dot11radio <interface> rts <disable>
```

Step 2 To enable RTS with threshold value, use the following CLI command:

Example:

```
Device# configure dot11radio <interface> rts enable <threshold>
```

The threshold range is from 0 to 2346.

Configure WMM mode from CLI

This task allows you to configure wireless multimedia (WMM) mode and manage wireless statistics counters.

WMM mode configuration is essential for managing different types of network traffic through class-of-service (CoS) parameters. This configuration helps prioritize voice, video, best-effort, and background traffic appropriately.

Procedure

Step 1 Configure wireless multimedia (WMM) mode using the appropriate class-of-service parameter.

Example:

```
Device# configure dot11radio <interface> wmm [bk|be|vi|vo]
```

[bk|be|vi|vo]: Represents the class-of-service (CoS) parameters.

- be: Best-effort traffic queue (CS0 and CS3).
- bk: Background traffic queue (CS1 and CS2).

- vi: Video traffic queue (CS4 and CS5).
- vo: Voice traffic queue (CS6 and CS7).

Step 2 Clear wireless statistics counters if needed.

Example:

```
Device# configure dot11Radio <interface> wifistats clear
```

Configure NTP from CLI

Configure Network Time Protocol (NTP) settings to ensure accurate time synchronization on the device.

NTP configuration includes setting up server addresses, authentication methods, timezone settings. Proper NTP configuration ensures time synchronization across network devices.

Procedure

Step 1 Use the **configure ntp server** *string* command to configure the NTP server address.

Example:

```
Device# configure ntp server 192.168.216.201
```

String - IP address or domain name.

Step 2 Use the **configure ntp authentication** command to configure NTP authentication.

Example:

```
Device# configure ntp authentication none
Device# configure ntp authentication md5 <password> <keyid>
Device# configure ntp authentication sha1 <password> <keyid>
```

none - disables the NTP authentication md5|sha1 - authentication method.

Note
Optional, the md5 password and keyid should match NTP server's md5 password and keyid.

To configure a new password using a GUI or CLI, the password should match the following criteria:

- The password length range is from 8 to 20 characters.
- The following special characters are not allowed:
  - ' (apex)
  - " [double apex]
  - ` [backtick]
  - $ [dollar]
  - = [equal]

- \ [backslash]
- # [number sign]
- whitespace

Example:

```
Device# configure ntp authentication md5 test1234 65535
```

Step 3 Use the **configure ntp** {**enable** | **disable**} command to enable or disable the NTP service.

Example:

```
Device# configure ntp enable
```

Step 4 Use the **configure ntp timezone** *string* command to configure the NTP timezone.

Example:

```
Device# configure ntp timezone Asia/Shanghai
```

Step 5 Use the **show ntp config** command to validate the NTP configuration and status.

Example:

```
Device# show ntp config
NTP status: enabled
NTP server: 192.168.216.201
authentication: MD5
password: test123
keyid: 5
timezone: Asia/Shanghai
```

Step 6 Use the **show ntp** command to check if device can sync up time with NTP server.

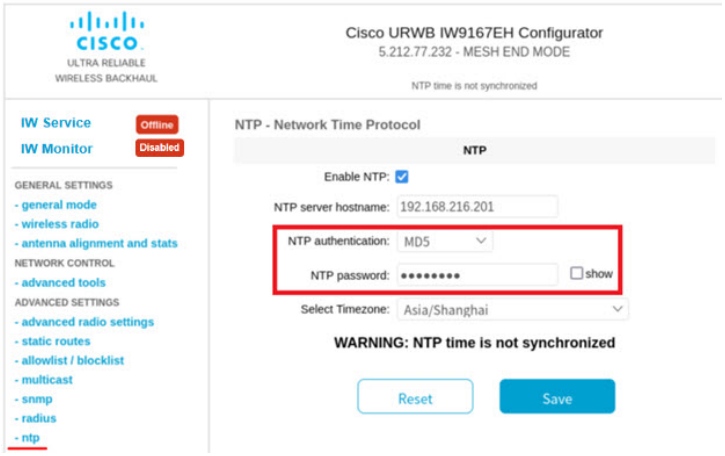
Example:

```
Device# #show ntp
Stratum Version Last Received  Delay    Offset  Jitter    NTP server
1          4      9sec ago    1.840ms -0.845ms 0.124ms 192.168.216.201
```

Configure NTP using GUI

This topic provides the graphical interface configuration steps for synchronizing device clocks with network time servers.

Figure 1: NTP GUI



Validate radio mode for URWB

To validate Radio mode, use the show commands described here.

```
Device# show dot11Radio <interface> config
```

Example:

```
Device# show dot11Radio 1 config
Interface : enabled
Mode : fluidity
Frequency : 5785 MHz
Channel : 157
Channel width : 40 MHz
```

```
Device# show dot11Radio 2 config
Interface : enabled
Mode : fluidmax secondary
Frequency : 5180 MHz
Channel : 36
Channel width : 40 MHz
```

To change the Radio mode of vehicle access point (mobility client) to Fixed or Fluidmax, configure Fluidity role as infrastructure using CLI:

```
Device# configure fluidity id infrastructure
```

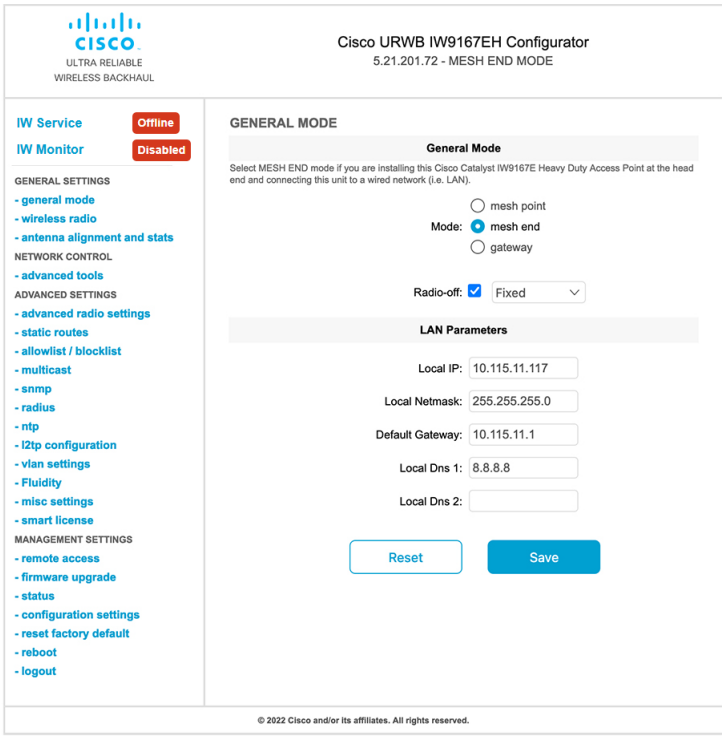
Configure radio-off mode using GUI

This task configures Radio-off mode to optimize wireless network performance.

Use this procedure when setting up Catalyst IW9167E access points at the head end that will be connected to a wired network such as LAN.

Procedure

Step 1 Choose either **Fixed** or **Fluidity** mode for **Radio-off** configuration.



Step 2 Select mode as **mesh end** when installing the Catalyst IW9167E access point at the head end and connecting this device to a wired network such as LAN.

Configure Radio mode using GUI

Configure the Radio mode using the GUI to set the operating frequency and enable wireless connections between devices.

To establish a wireless connection the operating frequency should be same between the devices.

Before you begin

Follow these steps to configure a Radio mode using GUI:

Procedure

Step 1 Set the operating mode for specified Radio (Radio1 and Radio2) interface.



Step 2 In the **WIRELESS RADIO** section, choose Radio 1 Role as **Fluidmax Primary** with FluidMAX Cluster ID.

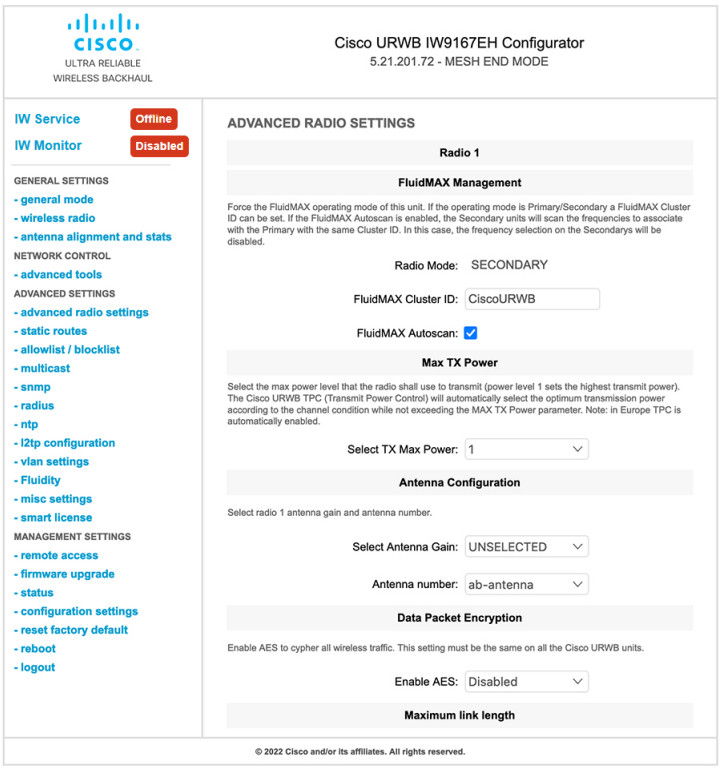
In this scenario, the frequency selection for the Primary is enabled and Secondary is disabled. In the **ADVANCED RADIO SETTINGS** window, go to **Max TX Power** section, and choose power level as 1 from the **Select TX Max Power** drop-down list and URWB transmission power control (TPC) automatically selects the optimum transmission power.



Note
In Europe TPC is automatically enabled.

Step 3 In the **WIRELESS RADIO** section, choose Radio 1 Role as **Fluidmax Secondary** with FluidMAX Cluster ID.

In the **ADVANCED RADIO SETTINGS**, if you check the **FluidMAX Autoscan** check box, the secondary devices scan the frequencies to associate with the Primary with the same Cluster ID. In this case the frequency selection on the Secondary is in disable mode. In the **Max TX Power** section, and choose power level as 1 from the **Select TX Max Power** drop-down list and URWB TPC automatically selects the optimum transmission power.



Note
In Europe TPC is automatically enabled.

Step 4 In the **Fluidity SETTINGS** section, choose **Unit Role** as **Infrastructure** from the drop-down list.

When the device acts as the entry point of the infrastructure for the mobile vehicles or choose unit role as **Infrastructure (WIRELESS relay)** only when it used as a wireless relay agent to other infrastructure unit or choose unit role as a **Vehicle** when it is mobile.

Step 5 Choose network type based on the general network architecture.

- Choose **Flat** mode from **Network Type** drop-down list, if the network belongs to single layer-2 broadcast domain.
- Choose **Multiple subnets** if the network belongs to single layer-3 broadcast domain.


Cisco URWB IW9167EH Configurator
5.21.201.72 - MESH END MODE
ULTRA RELIABLE WIRELESS BACKHAUL
IW Service
Offline
IW Monitor
Disabled
GENERAL SETTINGS
- general mode
- wireless radio
- antenna alignment and stats
NETWORK CONTROL
- advanced tools
ADVANCED SETTINGS
- advanced radio settings
- static routes
- allowlist / blocklist
- multicast
- snmp
- radius
- ntp
- l2tp configuration
- vlan settings
- Fluidity
- misc settings
- smart license
MANAGEMENT SETTINGS
- remote access
- firmware upgrade
- status
- configuration settings
- reset factory default
- reboot
- logout
WIRELESS RADIO
Wireless Settings
"Shared Passphrase" is an alphanumeric string or special characters excluding '[apex] "[double apex] `[backtick] $[dollar] =[equal] \[backslash] and whitespace (e.g. "mysecurecamnet") that indentifies your network. It MUST be the same for all the Cisco URWB units belonging to the same network.
Shared Passphrase: PASSWORD
In order to establish a wireless connection between Cisco URWB units, they need to be operating on the same frequency.
Radio 1 Settings
Role: Fluidity
Frequency (MHz): 5180
Channel Width (MHz): 80
Radio 2 Settings
Role: Disabled
Reset
Save
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Cisco URWB IW9167EH Configurator
5.21.201.72 - MESH END MODE
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- vlan settings
- Fluidity
- misc settings
- smart license
MANAGEMENT SETTINGS
- remote access
- firmware upgrade
- status
- configuration settings
- reset factory default
- reboot
- logout
FLUIDITY
Fluidity Settings
The unit can operate in 3 modes: Infrastructure, Infrastructure (wireless relay), Vehicle.
The unit must be set as Infrastructure when it acts as the entry point of the infrastructure for the mobile vehicles and it is connected to a wired network (backbone) which possibly includes other Infrastructure nodes. The unit must be set as Infrastructure (wireless relay) ONLY when it is used as a wireless relay agent to other Infrastructure units. In this operating mode, the unit MUST NOT be connected to the wired network backbone as it will use the wireless connection to relay the data coming form the mobile units.
The unit must be set as Vehicle when it is mobile. Vehicle ID must be set ONLY when the unit is configured as Vehicle. Specifically, Vehicle ID must be a unique among all the mobile units installed on the same vehicle. Unit installed on different vehicles must use different Vehicle IDs.
The Network Type filed must be set according to the general network architecture. Choose Flat if the mesh and the infrastructure networks belong to a single layer-2 broadcast domain. Use Multiple Subnets if they are organized as different layer-3 routing domains.
Unit Role: Infrastructure
Network Type: Multiple subnets
The following advanced settings allow to fine-tune the performance of the system depending on the specific environment. Please do not alter this settings unless you have read the manual first and you know what you are doing.
The Handoff Logic controls the algorithm used by a mobile radio to select the best infrastructure point to connect to. In Normal mode, the point providing the strongest signal is selected. In Load Balancing mode, the mobile radio prefers the point which provides the best balance between signal strength and amount of traffic carried.
Handoff Logic: Standard
Reset
Save
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