



Cisco Flexible Radio Assignment

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Information About Flexible Radio Assignment

Flexible Radio Assignment (FRA) takes advantage of the dual-band radios included in APs like 4800, 3800, 2800 and the new 11AX APs. FRA is a new feature added to the RRM to analyze the NDP measurements, which manages the hardware used to determine the role of the new flexible radio (2.4 GHz, 5 GHz, or Monitor) in your network

Traditional legacy dual-band APs always had 2 radio slots, (1 slot per band) and were organized by the band they were serving, that is slot0= 802.11b,g,n and slot1=802.11a,n,ac.

The flexible radio (XOR) offers the ability to serve the 2.4-GHz or the 5-GHz bands, or passively monitor both bands on the same AP. The AP models that are offered are designed to support dual 5-GHz band operations, with the Cisco APs *i* model supporting a dedicated Macro/Micro architecture, and the *e* and *p* models supporting Macro/Macro architecture.

When using FRA with the internal antenna (*i* series models), two 5-GHz radios can be used in a Micro/Macro cell mode. When using FRA with external antenna (*e* and *p* models) the antennas may be placed to enable the creation of two completely separate macro (wide-area cells) or two micro cells (small cells) for HDX or any combination.

FRA calculates and maintains a measurement of redundancy for 2.4-GHz radios and represents this as a new measurement metric called COF (Coverage Overlap Factor).

This feature is integrated into existing RRM and runs in mixed environments with legacy APs. The **AP MODE** selection sets the entire AP (slot 0 and slot1) into one of several operating modes, including:

- Local Mode
- Monitor Mode
- FlexConnect Mode
- Sniffer Mode
- Spectrum Connect Mode

Before XOR was introduced, changing the mode of an AP propagated the change to the entire AP, that is both radio slot 0 and slot 1. The addition of the XOR radio in the slot 0 position provides the ability to operate a single radio interface in many of the previous modes, eliminating the need to place the whole AP into a mode. When this concept is applied to a single radio level, its is called *role*. Three such roles can be assigned now:

- Client Serving
- Either 2.4 GHz(1) or 5 GHz(2)
- Monitor-Monitor mode (3)

**Note**

- MODE—Assigned to a whole AP (slot 0 and slot 1)
- ROLE—Assigned to a single radio interface (slot 0)

Benefits of the FRA Feature

- Solves the problem of 2.4–GHz over coverage.
- Creating 2 diverse 5–GHz cells doubles the airtime that is available.
- Permits one AP with one Ethernet drop to function like two 5–GHz APs.
- Introduces concept of Macro/Micro cells for airtime efficiency.
- Allows more bandwidth to be applied to an area within a larger coverage cell.
- Can be used to address nonlinear traffic.
- Enhances the High-Density Experience (HDX) with one AP.
- XOR radio can be selected by the corresponding user in either band–servicing client mode or monitor mode.

Configuring an FRA Radio (CLI)

Follow the procedure given below to configure an FRA radio.

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device# enable	Enters privileged EXEC mode.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	[no] ap fra Example: Device(config)# [no] ap fra	Enables or disables FRA on the AP.
Step 4	ap fra interval Example: Device(config)# ap fra interval 3	Configures the FRA interval in hours. The range is 1 to 24 hours. Note The FRA interval has to be more than configured RRM interval.
Step 5	ap fra sensitivity {high medium low} <ul style="list-style-type: none">• high—Sets the FRA Coverage Overlap Sensitivity to high.• medium—Sets the FRA Coverage Overlap Sensitivity to medium.• low—Sets the FRA Coverage Overlap Sensitivity to low. Example: Device(config)# ap fra sensitivity high	Configures the FRA sensitivity.
Step 6	end Example: Device(config)# end	Returns to privileged EXEC mode. Alternatively, you can also press Ctrl-Z to exit global configuration mode.
Step 7	ap fra revert {all auto-only} {auto static} Example: Device# ap fra revert all auto	Rolls back the XOR Radio state. <ul style="list-style-type: none">• all: Reverts all XOR Radios• auto-only: Revert only XOR radios currently in automatic band selection.• auto: sets the XOR radios in automatic band selection.• static: sets the XOR radio in static 2.4-GHz band.
Step 8	show ap dot11 {24ghz 5ghz} summary Example: Device# show ap dot11 5ghz summary	Displays the configuration and statistics of 802.11 Cisco APs
Step 9	Device# show ap fra Example: Device# show ap fra FRA State : Disabled	Displays the current FRA configuration.

	Command or Action	Purpose
	<pre> FRA Sensitivity : medium (95%) FRA Interval : 1 Hour(s) AP Name MAC Address Slot ID Current-Band COF % Suggested Mode AP00A6.CA36.295A 006b.f09c.8290 0 2.4GHz None 2.4GHz COF : Coverage Overlap Factor test_machine# </pre>	
Step 10	<p>show ap name <i>ap-name</i> config dot11 dual-band</p> <p>Example:</p> <pre> Device# show ap name config dot11 dual-band </pre>	Displays the current 802.11 dual-band parameters in a given AP.

Configuring an FRA Radio (GUI)

Procedure

- Step 1** Choose **Configuration > Radio Configurations > RRM > FRA**.
- Step 2** On the **Flexible Radio Assignment** page, enable FRA status and determine the overlapping 2.4 GHz or 5 GHz coverage for each AP, choose *Enabled* in the **FRA Status** field. By default, the FRA status is disabled.
- Step 3** From the **FRA Interval** drop-down list, choose the FRA run interval. The interval values range from 1 hour to 24 hours. You can choose the FRA run interval value only after you enable the FRA status.
- Step 4** From the **FRA Sensitivity** drop-down list, choose the percentage of Coverage Overlap Factor (COF) required to consider a radio as redundant. You can select the supported value only after you enable the FRA status.

The supported values are as follows:

- Low—100 percent
- Medium (default)—95 percent
- High—90 percent

The **Last Run** and **Last Run Time** fields will show the time FRA was run last and the time it was run.

- Step 5** Select the **Client Aware** check box to take decisions on redundancy.

When enabled, the **Client Aware** feature monitors the dedicated 5 GHz radio and when the client load passes a pre-set threshold, automatically changes the Flexible Radio assignment from a monitor role into a 5 GHz role, effectively doubling the capacity of the cell on demand. Once the capacity crisis is over and Wi-Fi load returns to normal, the radios resume their previous roles.

Step 6 In the **Client Select** field, enter a value for client selection. The valid values range between 0 and 100 percent. The default value is 50 percent.

This means that if the dedicated 5 GHz interface reaches 50% channel utilization, this will trigger the monitor role dual-band interface to transition to a 5 GHz client-serving role.

Step 7 In the **Client Reset** field, enter a reset value for the client. The valid values range between 0 and 100 percent. The default value is 5 percent.

Once the AP is operating as a dual 5 GHz AP, this setting indicates the reduction in the combined radios overall channel utilization required to reset the dual-band radio to monitor role.

Step 8 Click **Apply** to save the configuration.
