

# **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. The FRA is a new feature added to the RRM to analyze the Neighbor Discovery Protocol (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 slot 0= 802.11b,g,n and slot 1=802.11a,n,ac.

### XOR Support in 2.4-GHz or 5-GHz Bands

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**

- Solves the problem of 2.4–GHz over coverage.
- Creating two 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 the 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)**

#### Procedure

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

	Command or Action	Purpose
Step 3	[no] ap fra	Enables or disables FRA on the AP.
	Example:	
	Device(config)# [no] ap fra	
Step 4	ap fra interval Example:	Configures the FRA interval in hours. The range is 1 to 24 hours.
	Device(config)# ap fra interval 3	<b>Note</b> The FRA interval has to be more than the configured RRM interval.
Step 5	ap fra sensitivity {high   medium   low}	Configures the FRA sensitivity.
	<pre>Example: Device(config)# ap fra sensitivity high</pre>	<ul> <li>high: Sets the FRA Coverage Overlap Sensitivity to high.</li> </ul>
		• medium: Sets the FRA Coverage Overlap Sensitivity to medium.
		• <b>low</b> : Sets the FRA Coverage Overlap Sensitivity to <b>low</b> .
Step 6	end	Returns to privileged EXEC mode.
	Example:	Alternatively, you can also press <b>Ctrl-Z</b> to exit
	Device(config)# end	gioou companying moue.
Step 7	ap fra revert {all   auto-only} {auto   static}	Rolls back the XOR Radio state.
	Example:	• all: Reverts all XOR Radios
	Device# ap fra revert all auto	• <b>auto-only</b> : Revert only XOR radios currently in automatic band selection.
		• <b>auto</b> : 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	Shows the configuration and statistics of 802.11 Cisco APs
	Example:	
	Device# show ap dot11 5ghz summary	
Step 9	Device# show ap fra	Shows the current FRA configuration.
	Example:	
	Device# <b>show ap fra</b>	
	FRA State	
	FRA Sensitivity	
	: medium (95%) FRA Interval	

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	Command or Action	Purpose
	: 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	π
	COF : Coverage Overlap Factor	
	test_machine#	
Step 10	show ap name <i>ap-name</i> config dot11 dual-band	Shows the current 802.11 dual-band parameters in a given AP.
	Example:	
	Device# show ap name config dot11 dual-band	

# **Configuring an FRA Radio (GUI)**

### Procedure

Step 1	Choose Configuration > Radio Configurations > RRM > FRA		
Step 2	In the <b>Flexible Radio Assignment</b> window, enable FRA status and determine the overlapping 2.4 GHz or 5 GHz coverage for each AP, choose <b>Enabled</b> in the <b>FRA Status</b> field. By default, the FRA status is disabled.		
Step 3	Under the From the <b>FRA Interval</b> 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 <b>FRA Sensitivity</b> 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	Check the Client Aware check box to take decisions on redundancy.		
	When enabled, the <b>Client Aware</b> 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.