



## AP Power Save

- [Feature History for AP Power Save, on page 1](#)
- [Information About AP Power Save, on page 2](#)
- [Wakeup Threshold for Access Point Power Save Mode, on page 9](#)
- [AP Power Save Scenarios, on page 9](#)
- [Configuring Power Policy Profile \(GUI\), on page 11](#)
- [Configuring a Power Policy Profile \(CLI\), on page 11](#)
- [Configuring a Calendar Profile \(GUI\), on page 14](#)
- [Configuring a Calendar Profile \(CLI\), on page 15](#)
- [Configuring a Power Policy in an AP Join Profile \(GUI\), on page 16](#)
- [Mapping a Power Profile Under an AP Profile \(CLI\), on page 16](#)
- [Configuring Client Wakeup Threshold \(CLI\), on page 17](#)
- [Configuring PoE-Out Interface in Power Profile \(GUI\), on page 18](#)
- [Configuring PoE-Out Interface in Power Profile \(CLI\), on page 18](#)
- [Configuration Example of Power Profile, on page 19](#)
- [Verifying Access Point Power Policy \(GUI\), on page 19](#)
- [Verifying the Access Point Power Profile, on page 20](#)
- [Verifying Radio Spatial Streams, on page 21](#)
- [Verifying Client Threshold, on page 22](#)
- [Verifying PoE-Out Details, on page 22](#)

## Feature History for AP Power Save

This table provides release and related information for the feature explained in this module.

This feature is also available in all the releases subsequent to the one in which they are introduced in, unless noted otherwise.

**Table 1: Feature History for AP Power Save**

Release	Feature Information
Cisco IOS XE Cupertino 17.8.1	This feature allows a network administrator to force APs to operate in low-power mode to reduce power consumption.

Release	Feature Information
Cisco IOS XE Cupertino 17.9.1	Feature support for the following APs: <ul style="list-style-type: none"> <li>• Cisco Catalyst 9164 Series Access Points</li> <li>• Cisco Catalyst 9166 Series Access Points</li> </ul>
Cisco IOS XE Dublin 17.10.1	The following features are supported: <ul style="list-style-type: none"> <li>• Radio spatial streams</li> <li>• Flexible PoE profiles</li> </ul>
Cisco IOS XE 17.13.1	AP Power Distribution support in Cisco Catalyst 9124 Series APs.

## Information About AP Power Save

The power-save mode in APs allows a network administrator to force APs to operate in low-power mode to reduce power consumption.

The AP Power Save feature is supported in the following APs:

- Cisco Catalyst 9115 Series Access Points
- Cisco Catalyst 9120 Series Access Points
- Cisco Catalyst 9124 Series Access Points
- Cisco Catalyst 9130 Series Access Points
- Cisco Catalyst 9136 Series Access Points
- Cisco Catalyst 9164 Series Access Points
- Cisco Catalyst 9166 Series Access Points
- Cisco Catalyst 9162 Series Access Points

## Access Point Power Policy

The access point power policy allows you to define the power budget utilization available for an AP, wherein, you can define a set of policies for different interfaces on an AP. You can manage interfaces such as Wi-Fi radios, USB, and so on, as required.

Cisco Catalyst 9124 AXI/D APs support up to two radio interfaces (single 5 GHz), and Cisco Catalyst 9124 AXE APs support up to three (dual 5 GHz) radio interfaces. When Cisco Catalyst 9124 Series APs operate under 802.3at/PoE+/30W insufficient power condition, the new operating modes support both dual or Tri-Radio mode.

### Use Case for AP Power Policy

The following is the use case of an AP power policy:

- You can define a power policy for the available power inputs, such as, 802.3af, 802.3at, 802.3bt (for multiple levels), DC power, and so on. With tri-radio and quad-radio APs, the power requirement has gone beyond the capability of the 802.3at Power over Ethernet (PoE) mode. Therefore, with the AP power policy, for example, we statically predefine an AP operation when provided with non-802.3bt power (such, as TX power, radio chains, USB port, SFP, and so on).

## Power-Save Mode

The power-save mode enables an AP to switch to a low-power mode when no clients are associated with the AP. For example, when this mode is enabled in workspaces, the AP falls asleep during after hours, thereby saving power consumption of the AP throughout the night.

From Cisco IOS-XE Cupertino 17.10.1 onwards, you can shut down AP radios or lower the radio spatial streams, to reduce usage of power. You can enforce radio speed by configuring the number of spatial streams on the radios. The combinations for radio spatial stream policies are: 1X1, 2X2, 3X3 (only for Cisco Catalyst 9130 Series Access Points), 4X4, and 8X8.

The following are the advantages of the power-save mode:

- Increases the energy saving per AP: In the power save mode you can reduce AP functions during off-peak hours and save an additional 20% in energy costs compared to the regular idle mode.
- Enables environmentally conscious purchases: Large enterprises and companies track environmental performance as one of their key indices. They have a centralized energy team to monitor their energy efficiency, which magnifies the importance of the power-save feature.

## PoE Profiles

- Fixed PoE Profile: The APs negotiate the power that is required, from the switches they are connected to. The power required varies from one AP model to another AP model. If an AP is not granted the power it requested, it operates under the power budget. In such conditions, some of the interfaces operate under *degraded conditions*.

For example, some radios may operate at 2SS instead of at 4SS, which they are capable of. The operating conditions for each of the AP interfaces differs from one power level to another. These are referred to as fixed PoE profiles. Fixed PoE profiles are applied when the AP is operating in normal mode, that is, nonpower-save mode. When the AP operates in power-save mode, the configured PoE power policies are applied.

- PoE Power Policy: With power policies or profiles, you can configure interfaces that you want to set at certain speeds. With this policy, you can configure a profile of your choice that will be pushed to the AP based on your calendar or timing. For example, on a group of APs in the second floor, push a profile where you want to turn off all APs, except 2.4-GHz radio, from 7 p.m. to 7 a.m.
- Flexible PoE Profile: With flexible PoE profiles, you can configure different interfaces and set specific parameter values and states for each interface, instead of following fixed PoE profile rules. If an AP does not get the power it requires, it operates under the power budget by using the flexible PoE profile.

In Cisco IOS XE 17.13.1, PoE-out is a new interface introduced in Cisco Catalyst 9124 Series APs, in addition to the USB, Ethernet, and LAN interfaces. The PoE-out for Cisco Catalyst 9124 Series AP RLAN works only if you have enabled the RLAN port.

Table 2: AP Power Draw Specifications: Cisco Catalyst 9115, 9120, 9130 Series APs

Access Points	PoE-In-Mode/DC Mode	Consumption @ Power Device	Consumption @ Power Source Equipment	Feature Mode						
		AP	Worst-Case Cable	Radio 1	Radio 2	Radio 3	Ethernet	USB	Module	PoEOut
Cisco Catalyst 9115AXI Access Points	.3af	13.0	15.4	2X2	2X2	—	1G	N	—	—
	.3at	16.0	18.9	4X4	4X4	—	2.5G	N	—	—
	.3at	20.4	24.1	4X4	4X4	—	2.5G	Y(3.75W)	—	—
Cisco Catalyst 9115AXE Access Points	.3af	13.0	15.4	2X2	2X2	—	1G	N	—	—
	.3at	17.0	20.1	4X4	4X4	—	2.5G	N	—	—
	.3at	21.4	25.3	4X4	4X4	—	2.5G	Y(3.75W)	—	—
Cisco Catalyst 9120AXE Access Points	.3af	13.8	15.4	1X1	1X1	Enabled	1G	N	—	—
	.3at	20.5	23.2	4X4	4X4	Enabled	2.5G	N	—	—
	.3at	25.5	30.0	4X4	4X4	Enabled	2.5G	Y(4.5W)	—	—
Cisco Catalyst 9130AXE Access Points	.3af	13.8	15.4	1X1	1X1	Enabled	1G	N	—	—
	.3at	25.5	30.0	8X8	4X4	Enabled	5G	N	—	—
	.3at	25.5	30.0	Primary 4X4 Secondary Off	4X4	Enabled	5G	Y(4.5W)	—	—
	.3at	25.5	30.0	Primary 4X4 Secondary 4X4	Disabled	Enabled	5G	Y(4.5W)	—	—
	.3bt	30.5	33.3	8X8	4X4	Enabled	5G	Y(4.5W)	—	—

Table 3: AP Power Draw Specifications: Cisco Catalyst 9136 Series APs

Access Points	Profile	Consumption @Power Device	Consumption @Power Source Equipment	Feature Mode								
		at AP	Worst-Case Cable	5G Radio	2G Radio	6G Radio	AUX Radio	Mgig0	Mgig1	USB	Module	PoEOut
Cisco Catalyst 9136 Series Access Points	.3af - Fixed	13.9	15.4	Disabled	Disabled	Disabled	Enabled	1G	Disabled	Disabled	—	—
	.3at - Fixed	24.0	27.90	Primary - 4X4 Secondary - Disabled	2X2	2X2	Enabled	2.5G	2.5G (hitless failover standby)	Disabled	—	—
	.3bt - Fixed	43.4	54.81	8X8 or Dual 4X4	4X4	4X4	Enabled	5G	5G	Y(9W)	—	—
	.3bt - PoE Policy 1	37.3	41.63	8X8 or Dual 4X4	4X4	4X4	Enabled	5G	5G	Disabled	—	—

Table 4: AP Power Draw Specifications: Cisco Catalyst 9166 Series APs

Access Points	Profile	Consumption @Power Device	Consumption @Power Source Equipment	Feature Mode								
				at AP	Worst-Case Cable	5G Radio	2G Radio	6G Radio	AUX Radio	Mgig0	Mgig1	USB
Cisco Catalyst 9166 Series Access Points	.3af - Fixed	13.9	15.4	Disabled	Disabled	Disabled	Enabled	1G	—	Disabled	—	—
	.3at - Fixed Policy	25.5	30.0	4X4	4X4	4X4	Enabled	5G	—	Disabled	—	—
	.3bt - Fixed	30.5	32.8	4X4	4X4	4X4	Enabled	5G	—	Y (4.5 W)	—	—
	DC Jack - Fixed	30.5	—	4X4	4X4	4X4	Enabled	5G	—	Y (4.5 W)	—	—

Table 5: AP Power Draw Specifications: Cisco Catalyst 9164 Series APs

Access Points	Profile	Consumption @Power Device	Consumption @Power Source Equipment	Feature Mode								
				at AP	Worst-Case Cable	5G Radio	2G Radio	6G Radio	AUX Radio	Mgig0	Mgig1	USB
Cisco Catalyst 9164 Series Access Points	.3af - Fixed	13.9	15.4	Disabled	Disabled	Disabled	Enabled	1G	—	Disabled	—	—
	.3at - Fixed	25.5	30.0	4X4	2X2	4X4	Enabled	2.5G	—	Disabled	—	—
	.3bt - Fixed	30.1	32.8	4X4	2X2	4X4	Enabled	2.5G	—	Y (4.5 W)	—	—
	DC Jack - Fixed	30.1	—	4X4	2X2	4X4	Enabled	2.5G	—	Y (4.5 W)	—	—

Table 6: AP Power Draw Specifications: Cisco Catalyst 9162 Series APs

Access Points	PoE Mode	Consumption @Power Device	Consumption @Power Source Equipment	Feature Mode								
		at AP	Worst-Case Cable	5G Radio	2G Radio	6G Radio	AUX Radio	Mgig0	Mgig1	USB	Module	PoEOut
Cisco Catalyst 9162 Series Access Points	.3af	13.3	14.32	1X1	Disabled	1X1	Enabled	1G	—	Disabled	—	—
	.3at	20.1	22.67	2X2	2X2	2X2	Enabled	2.5G	—	Disabled	—	—
	.3at	25.5	30	2X2	2X2	2X2	Enabled	2.5G	—	Y (4.5W)	—	—

Table 7: AP Power Draw Specifications: Cisco Catalyst 9124 Series APs

Access Points	PoE Mode	Consumption @Power Device	Consumption @Power Source Equipment	Feature Mode										
		at AP	Worst-Case Cable	Radio 0	R0 dBm Per Path	Radio 1	R1 dBm Per Path	Radio 2	R02 dBm Per Path	AUX Radio	Port Mgig	SFP Module	GbE PHY	PoEOut
				2.4 GHz Radio	5 GHz Primary Radio		5 GHz Secondary Radio		Qwave					
Cisco Catalyst 9124 AXI	.3af	13.8	15.4	Disabled	—	Disabled	—	NA	NA	Enabled	1G	N	N	N
	.3at	25.5	30	2X2	23	2X2	23	NA	NA	Enabled	1G	N	Y	N
Cisco Catalyst 9124 AXD	.3bt	33.6	39.5	4X4	24	4X4	24	NA	NA	Enabled	2.5G	Y	Y	N
	UPE /DC													
Cisco Catalyst 9124 AXE Dual Radio Mode	.3bt	51	60	4X4	24	4X4	24	NA	NA	Enabled	2.5G	Y	Y	Y
	UPE /DC													

Access Points	Profile	Consumption @Power Device	Consumption @Power Source Equipment	Feature Mode										
		at AP	Worst-Case Cable	Radio 0	R0 dBm Per Path	Radio 1	R1 dBm Per Path	Radio 2	R02 dBm Per Path	AUX Radio	Port Mgmt	SFP Module	GbE PHY	REQt
				2.4 GHz Radio		5 GHz Primary Radio		5 GHz Secondary Radio		On/Off				
Cisco Catalyst 9124 AXI  Cisco Catalyst 9124 AXD  Single 5G Radio	.3at	25.5	30	Subwn	—	4X4	24	Subwn	—	Enbld	2.5G	Y	N	N
Cisco Catalyst 9124 AXE Tri-Band Mode	.3af	13.8	15.4	Disbld	—	Disbld	—	Disbld	—	Enbld	1G	N	N	N
	.3at	25.5	30	Disbld	—	Disbld	—	Disbld	—	Enbld	1G	N	N	N
	.3bt / UPE / DC	33.6	39.5	2X2	24	2X2	24	2X2	24	Enbld	2.5G	Y	Y	N
	.3bt / UPE / DC	51	60	2X2	24	2X2	24	2X2	24	Enbld	2.5G	Y	Y	Y
Cisco Catalyst 9124 AXE Dual 5G Radio	.3at	25.5	30	Subwn	—	2X2	23	2X2	23	Enbld	1G	N	Y	N



## Wakeup Threshold for Access Point Power Save Mode

The Wakeup Threshold feature enables you to define the client threshold in the AP power profile configuration to determine when the AP wakes up from the power save mode or enter into the power save mode.

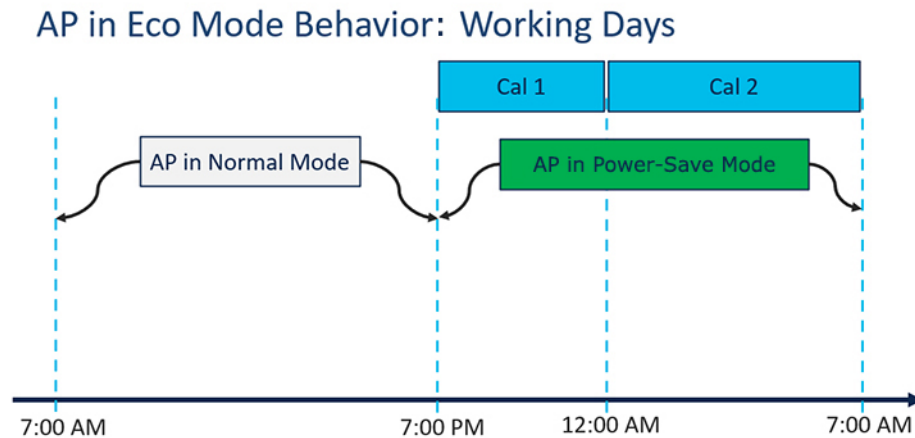
When the AP applies the calendar associated power profile (for an active calendar), and the number of connected clients reach the wakeup threshold, the AP wakes up from power save mode and goes into the Fixed power profile mode or the Regular power profile (insufficient power) mode.

When the AP applies the calendar associated power profile (for an active calendar), and the number of connected clients is less than the wakeup threshold, the AP applies the calendar associated power profile to shut down the interface or to lower the interface speed to save power.

## AP Power Save Scenarios

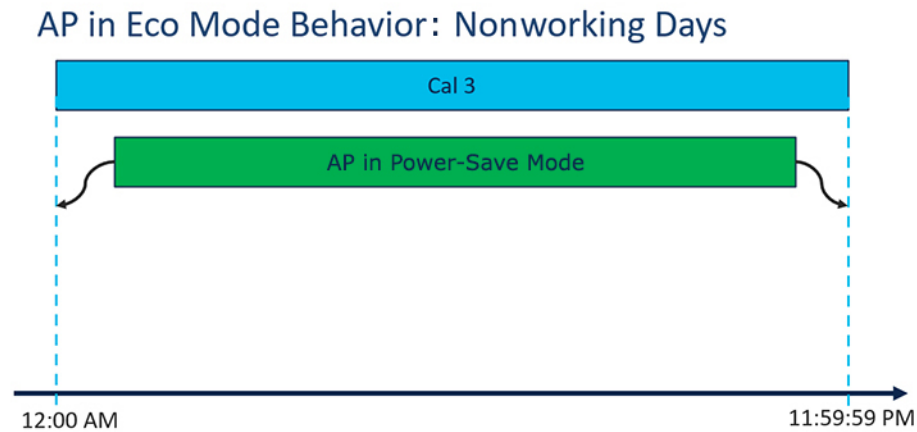
The AP Power Save feature helps APs to enter into a power-save mode or low-power mode by applying a calendar, for example, for after hours, associated with the corresponding power profile. The AP profile is enhanced to associate a PoE power policy with calendar profiles. The following are the scenarios for Eco mode APs:

- **Figure 1: AP in Eco Mode Behavior: Working Days**



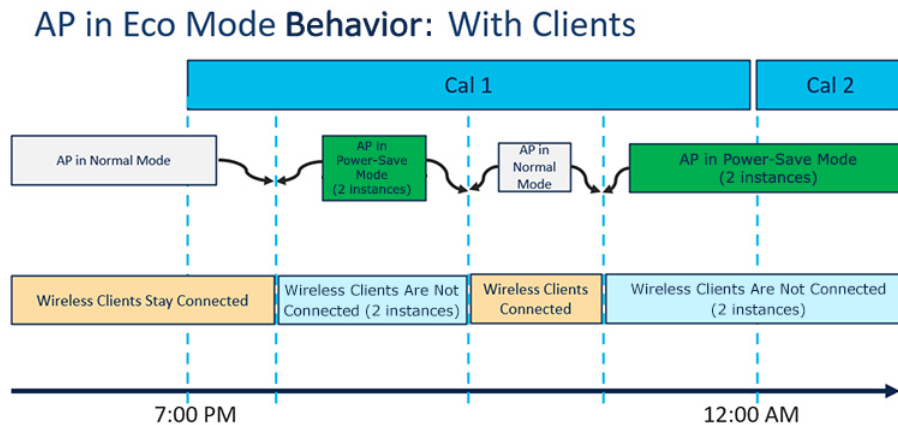
On working days, from 7:00 a.m. to 7:00 p.m., the AP functions in normal mode or fixed mode, when the maximum number of clients are connected to the AP. From 7:00 p.m. to 12:00 a.m., the **Cal1** calendar profile timer starts to put the AP in the power-save mode. Likewise, the **Cal2** calendar profile timer starts, and extends the power-save mode from 12:00 a.m. to 7:00 a.m. Again, at 7:00 a.m., the AP goes into normal mode.

• **Figure 2: AP in Eco Mode Behavior: Nonworking Days**



On nonworking days, the AP goes into power-saving mode from 12:00 a.m. to 11:59:59 p.m. The **Cal3** calendar profile is applied here. This profile defines the timer for the power-save mode. This means that there are no clients connected to the AP, and that the AP is asleep.

• **Figure 3: AP in Eco Mode Behavior: With Clients**



When clients are connected to the AP, the AP automatically switches to the normal mode. For example, in the calendar profile **Cal1**, the AP is in normal mode, because wireless clients are connected to the AP. At 8:00 p.m., clients get dissociated from the AP, and the AP goes into power-save mode. When clients enter the AP coverage area at 9:30 p.m., the AP automatically switches from power-save mode to normal mode of operation.

## Configuring Power Policy Profile (GUI)

### Procedure

- 
- Step 1** Choose **Configuration > Tags & Profiles > Power Profile**.
- Step 2** Click **Add**.  
The **Add Power Profile** window is displayed.
- Step 3** Enter a name and description for the power profile. The name must be ASCII characters of up to 128 characters, without leading or trailing spaces.
- Step 4** Click **Add** to add rules for the power profile.
- Step 5** In the **Sequence number** field, enter a unique sequence number to designate the priority in which power should be disabled for the component. The sequence number of 0 indicates that the component should be disabled first.
- Step 6** From the **Interface** and **Interface ID** drop-down list, choose interface and interface ID to designate to the component for which the power derating rule applies.
- Step 7** From the **Parameter** and **Parameter value** drop-down list, choose the values depending on the interface you chose in step 6.  
  
For example, if you chose **Ethernet** as an interface, you can further customize the rule for the interface by choosing the associated speed. This rule ensures that the AP disables power for the Ethernet interface that is operating at a higher speed, and thereby consuming more power.
- Step 8** Click the check mark to save and then click **Apply to Device**.
- 

## Configuring a Power Policy Profile (CLI)

### Before you begin

You must keep at least one radio interface up and running before you configure a power policy profile.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# <code>configure terminal</code>	Enters global configuration mode.
<b>Step 2</b>	<b>wireless profile power</b> <i>power-profile-name</i>  <b>Example:</b> Device(config)# <code>wireless profile power</code> <i>power-profile-name</i>	Configures the power policy profile.

	Command or Action	Purpose
<b>Step 3</b>	<p><i>sequence-number</i> ethernet {GigabitEthernet0   GigabitEthernet1 speed {1000mbps   100mbps   2500mbps   5000mbps}   LAN1   LAN2   LAN3 state disable}</p> <p><b>Example:</b></p> <pre>Device(config-wireless-power-profile)# 10 ethernet gigabitethernet1 speed 1000mbps</pre>	<p>Configures the power policy for Ethernet.</p> <p><i>sequence-number</i>: The power profile settings are ordered by sequence numbers. AP derating takes place as per the sequence number entered. The same combination of interface identifiers and parameter values does not appear in another sequence number. The same interface with the same parameter can appear multiple times with different parameter values.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• The Ethernet interface is used to join the controller. The uplink interface is not disabled even if it is defined in the power policy.</li> <li>• Ethernet speed configuration is not operational in Cisco IOS XE Cupertino 17.8.1.</li> </ul>
<b>Step 4</b>	<p><i>sequence-number</i> radio 24ghz {spatial-stream {1   2   3   4}   state shutdown}</p> <p><b>Example:</b></p> <pre>Device(config-wireless-power-profile)# 20 radio 24ghz spatial stream 2</pre>	<p>Configures spatial stream for the 2.4-GHz band radio.</p> <p>Here:</p> <p><i>sequence-number</i>: The power profile settings are ordered by sequence numbers. AP derating takes place as per the sequence number entered. The same combination of interface identifiers and parameter values does not appear in another sequence number. The same interface with the same parameter can appear multiple times with different parameter values.</p> <ul style="list-style-type: none"> <li>• 1: Specifies a 1X1 radio spatial stream.</li> <li>• 2 : Specifies a 2X2 radio spatial stream.</li> <li>• 3 : Specifies a 3X3 radio spatial stream.</li> <li>• 4 : Specifies a 4X4 radio spatial stream.</li> </ul> <p><b>state shutdown</b>: Indicates that the radio state is down.</p>
<b>Step 5</b>	<p><i>sequence-number</i> radio 5ghz {spatial-stream {1   2   3   4   8}   state shutdown}</p> <p><b>Example:</b></p> <pre>Device(config-wireless-power-profile)# 30 radio 5ghz spatial stream 4</pre>	<p>Configures spatial stream for the 5-GHz band radio.</p> <p>Here:</p> <p><i>sequence-number</i>: The power profile settings are ordered by sequence numbers. AP derating takes place as per the sequence number entered.</p>

	Command or Action	Purpose
		<p>The same combination of interface identifiers and parameter values does not appear in another sequence number. The same interface with the same parameter can appear multiple times with different parameter values.</p> <ul style="list-style-type: none"> <li>• 1 : Specifies a 1X1 radio spatial stream.</li> <li>• 2 : Specifies a 2X2 radio spatial stream.</li> <li>• 3 : Specifies a 3X3 radio spatial stream.</li> <li>• 4 : Specifies a 4X4 radio spatial stream.</li> <li>• 8 : Specifies a 8X8 radio spatial stream.</li> </ul> <p><b>state shutdown:</b> Indicates that the radio state is down.</p>
<p><b>Step 6</b></p>	<p><i>sequence-number</i> <b>radio secondary-5ghz</b> {<b>spatial-stream</b> {1   2   3   4   8}   <b>state shutdown</b>}</p> <p><b>Example:</b></p> <pre>Device(config-wireless-power-profile)# 40 radio 5ghz spatial stream 4</pre>	<p>Configures spatail stream for a secondary 5-GHz band radio.</p> <p>Here:</p> <p><i>sequence-number:</i> The power profile settings are ordered by sequence numbers. AP derating takes place as per the sequence number entered. The same combination of interface identifiers and parameter values does not appear in another sequence number. The same interface with the same parameter can appear multiple times with different parameter values.</p> <ul style="list-style-type: none"> <li>• 1: Specifies a 1X1 radio spatial stream.</li> <li>• 2 : Specifies a 2X2 radio spatial stream.</li> <li>• 3 : Specifies a 3X3 radio spatial stream.</li> <li>• 4 : Specifies a 4X4 radio spatial stream.</li> <li>• 8 : Specifies a 8X8 radio spatial stream.</li> </ul> <p><b>state shutdown:</b> Indicates that the radio state is down.</p>
<p><b>Step 7</b></p>	<p><i>sequence-number</i> <b>radio 6ghz</b> {<b>spatial-stream</b> {1   2   3   4   8}   <b>state shutdown</b>}</p> <p><b>Example:</b></p> <pre>Device(config-wireless-power-profile)# 50 radio 6ghz spatial stream 2</pre>	<p>Configures spatail stream for the 6-GHz band radio.</p> <p>Here:</p> <p><i>sequence-number:</i> The power profile settings are ordered by sequence numbers. AP derating takes place as per the sequence number entered. The same combination of interface identifiers and parameter values does not appear in another</p>

	Command or Action	Purpose
		<p>sequence number. The same interface with the same parameter can appear multiple times with different parameter values.</p> <ul style="list-style-type: none"> <li>• 1 : Specifies a 1X1 radio spatial stream.</li> <li>• 2 : Specifies a 2X2 radio spatial stream.</li> <li>• 3 : Specifies a 3X3 radio spatial stream.</li> <li>• 4 : Specifies a 4X4 radio spatial stream.</li> <li>• 8 : Specifies a 8X8 radio spatial stream.</li> </ul> <p><b>state shutdown:</b> Indicates that the radio state is down.</p>
<b>Step 8</b>	<p><i>sequence-number</i> <b>usb 0 state disable</b></p> <p><b>Example:</b></p> <pre>Device(config-wireless-power-profile)# 60 usb 0 state disable</pre>	Configures the power policy for USB.

## Configuring a Calendar Profile (GUI)

Configure calendar profiles to set up a daily, weekly, or monthly recurrence schedule.

### Procedure

- 
- Step 1** Choose **Configuration > Tags & Profiles > Calendar**.
- Step 2** Click **Add**.  
The **Add Calendar Profile** window is displayed.
- Step 3** Enter a name for the calendar profile. The name must be ASCII characters of up to 32 characters, without leading or trailing spaces.
- Step 4** From the **Recurrence** drop-down list, choose the schedule for which you want to create a profile.
- Step 5** Select the **Start Time** and the **End Time** for the recurrence schedule.

**Note**

- For daily recurrences, you can select the start time and end time. For example, if you want the AP to derate the power on certain interfaces between 7 p.m. to 7 a.m. daily, or if you want the controller to not allow any clients to be associated during this period, you can set up this daily recurrence schedule.

To cover this timespan, you must create two calendar profiles, one for 7 p.m. till 23:59:59, and another one from midnight to 7 a.m. of the next calendar day, and map it to the same power profile. After this, assign it to the AP Join profile.

- For weekly recurrences, select the specific days of the week along with the start and end time.
- For monthly recurrence, select the specific days of the month along with the start and end time.

**Step 6** Click **Apply** to save the configuration.

## Configuring a Calendar Profile (CLI)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>wireless profile calendar-profile name</b> <i>calendar_profile_ap_power</i>  <b>Example:</b> Device# wireless profile calendar-profile name ap_power_calendar	Configures a calendar profile. Enters the calendar profile configuration mode.  Here, <b>name</b> refers to the name of the calendar profile.
<b>Step 3</b>	<b>recurrence daily</b>  <b>Example:</b> Device(config-calendar-profile)# recurrence daily	Configures daily recurrence for daily profile.
<b>Step 4</b>	<b>start start-time end end-time</b>  <b>Example:</b> Device(config-calendar-profile)# start 16:00:00 end 20:00:00	Configures the start time and end time for calendar profile.
<b>Step 5</b>	<b>end</b>  <b>Example:</b>	Returns to privileged EXEC mode.

	Command or Action	Purpose
	Device(config-calendar-profile)# end	

## Configuring a Power Policy in an AP Join Profile (GUI)

Power policy supports the use of a power profile or a mapped configuration of a power profile and a calendar profile that are pushed to an AP during an AP join session. You can map a maximum of five combination profiles (calendar and power) per AP profile.

### Before you begin

Ensure that the power profile and calendar profile are created and displayed in the respective drop-down lists in the GUI.

### Procedure

**Step 1** Choose **Configuration > Tags & Profiles > AP Join**.

The **Add AP Join Profile** window is displayed.

**Step 2** Click the **AP** tab.

**Step 3** Under the AP tab, click the **Power Management** tab.

**Step 4** From the **Regular Power Profile** drop-down list, choose the power profile.  
The AP applies these settings to derate the power based on the configured priority list.

**Note** If you want the AP to apply the power profile configuration during a specific time period, choose the **Calendar Profile** and map it to the power profile from the drop-down list.

**Step 5** Click the check mark to associate the mapping.

**Step 6** Click **Apply to Device** to save the configuration.

## Mapping a Power Profile Under an AP Profile (CLI)

### Before you begin

Ensure that you have defined a calendar profile in the wireless profile, before you map the calendar profile to an AP join profile.

### Procedure

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



	Command or Action	Purpose
<b>Step 2</b>	<b>ap profile</b> <i>ap-profile-name</i> <b>Example:</b> Device(config)# <b>ap profile</b> <i>ap-profile-name</i>	Configures an AP profile and enters AP profile configuration mode.
<b>Step 3</b>	<b>power-profile</b> <i>power-profile-name</i> <b>Example:</b> Device(config-ap-profile)# <b>power-profile</b> <i>power-profile-name</i>	Configures the AP power profile.  This power profile is used during non-calendar hours to meet the power budget provided by the switch connected to the AP.
<b>Step 4</b>	<b>calendar-profile</b> <i>calendar-profile-name</i> <b>Example:</b> Device(config-ap-profile)# <b>calendar-profile</b> <i>ap-calendar-profile</i>	Maps a calendar profile to the AP profile. Enters the AP profile calendar configuration mode.
<b>Step 5</b>	<b>[no] action power-saving-mode power-profile</b> <i>power-profile-name</i> <b>Example:</b> Device(config-ap-profile-calendar)# <b>action power-saving-mode</b> <b>power-profile</b> <i>power-profile1</i>	Maps a specific power profile to a specific calendar profile. Maps the power-saving mode action for the calendar profile. Use the <b>no</b> form of this command to disable the command.  <b>Note</b> You can have more than one mapping of calendar profile to power profile.

## Configuring Client Wakeup Threshold (CLI)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 2</b>	<b>wireless profile power</b> <i>power-profile-name</i> <b>Example:</b> Device(config)# <b>wireless profile power</b> <i>power-profile1</i>	Configures the power policy profile.
<b>Step 3</b>	<b>power-save-client-threshold</b> <i>client-threshold</i> <b>Example:</b> Device(config-wireless-power-profile)# <b>power-save-client-threshold</b> 5	Configures the client threshold up to which the AP can stay in the power save mode. The valid range is between 1 and 32 clients. The default value is 1.

## Configuring PoE-Out Interface in Power Profile (GUI)

### Before you begin

Enable the RLAN port for the AP.

### Procedure

- 
- Step 1** Choose **Configuration > Tags & Profiles > Power Profile**.
- Step 2** Click **Add**.  
The **Add Power Profile** window is displayed.
- Step 3** Enter a name and description for the power profile. The name can contain up to 128 ASCII characters, without leading or trailing spaces.
- Step 4** (Optional) From the **Power Save Client Threshold** counter, select a value to set a limit to the number of client associations with the AP. The default value is 1. The valid range is between 1 to 32.
- Step 5** Click **Add** to create a rule for the PoE-Out interface.  
The **Rule** section is displayed in the window.
- Step 6** In the **Rule** section, complete the following steps:
- In the **Sequence number** field, enter a unique sequence number to assign the priority in which power should be disabled for the component. A sequence number of 0 indicates that the component should be disabled first.
  - From the **Interface** drop-down list, choose **Ethernet** as the interface.
  - From the **Interface ID** drop-down list, choose one of the following interfaces: **LAN1**, **LAN2**, or **LAN3**.
  - From the **Parameter** drop-down list, choose **POE-out**.
- A POE-out port on an AP is used to provide power to the another device, for example, a camera. This selection ensures that the power usage of the port is reduced or shut down at the specified sequence.
- Step 7** Click the check mark button to save.
- Step 8** Click **Apply to Device**.
- 

## Configuring PoE-Out Interface in Power Profile (CLI)

### Procedure

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

	Command or Action	Purpose
<b>Step 2</b>	<b>wireless profile power</b> <i>power-profile-name</i> <b>Example:</b> Device(config)# wireless profile power <i>poe-out-power-profile</i>	Configures the power policy profile. Enters the wireless power profile configuration mode.
<b>Step 3</b>	<i>sequence-number</i> <b>ethernet LAN1 poe-out</b> <b>disable</b> <b>Example:</b> Device(config-wireless-power-profile)# 1 ethernet LAN1 poe-out disable	Disables the PoE-out state.

## Configuration Example of Power Profile

The following example shows how to define a power save policy:

```
wireless profile power power-save
  10 radio 5ghz state shutdown
  20 radio secondary-5ghz state shutdown
  30 radio 6ghz state shutdown
  40 usb 0 state disable
```

The following example shows how to define a calendar profile:

```
wireless profile calender-profile name eve-to-midnight
  recurrence daily
  start 19:00:00 end 23:59:59
wireless profile calender-profile name midnight-to-morning
  recurrence daily
  start 00:00:00 end 07:00:00
wireless profile calender-profile name weekends
  recurrence weekly
  day Saturday
  day Sunday
  start 00:00:00 end 23:59:59
```

The following example shows how to define an AP join profile and map a calendar profile to a power profile:

```
ap profile wireless-prof-sitel
  calendar-profile eve-to-midnight
  action power-saving-mode power-profile power-save
  calendar-profile midnight-to-morning
  action power-saving-mode power-profile power-save
  calendar-profile weekends
  action power-saving-mode power-profile power-save
```

## Verifying Access Point Power Policy (GUI)

To verify the applied configuration on the GUI, follow these steps:

## Procedure

---

- Step 1** Choose **Monitoring > AP Statistics**.
  - Step 2** Click a Cisco Catalyst 9136 series AP from the list of APs.  
The **General** window is displayed.
  - Step 3** Click the **Power** tab.  
The **Power Operational Status** and the **AP Fixed Power Policy** details are displayed.
  - Step 4** Click **OK**.
- 

To verify the AP fixed power policy details from the list of configured APs, follow these steps:

## Procedure

---

- Step 1** Choose **Configuration > Access Points**.
  - Step 2** Click a Cisco Catalyst 9136 series AP from the list of APs.  
The **Edit AP** window is displayed.
  - Step 3** Click the **Interfaces** tab.  
The **AP Fixed Power Policy** details are displayed.
  - Step 4** Click **Update & Apply**.
- 

# Verifying the Access Point Power Profile

To view the calendar profile and its mapping, run the following command:

```
Device# show ap profile name default-ap-profile detailed
AP Profile Name           : default-ap-profile
Description                : default ap profile
Power profile name        : power_prof_day
AP packet capture profile : Not Configured
AP trace profile          : Not Configured
Mesh profile name         : default-mesh-profile
Power profile name        : Not Configured
Calendar Profile
  Profile Name             : cal47
  Power saving mode profile name : pow_da
-----
  Profile Name             : cal48
  Power saving mode profile name : pow23
-----
```

To view the operational details of the AP, run the following command:

```
Device# show ap name cisco-ap power-profile summary
AP power derate Capability : Capable

Power saving mode
Power saving mode profile : pow2
Associated calendar profile : cal1
```

```
AP power profile status      : Insufficient De-rating
```

Interface	Interface-ID	Parameter	Parameter value	Status
Radio	5 GHz	State	DISABLED	Success
Radio	6 GHz	State	DISABLED	Not Applicable
Ethernet	LAN1	State	DISABLED	Not Applicable
Radio	2.4 GHz	State	DISABLED	Success
Ethernet	Gig0	Speed	5000 MBPS	Fixed Policy

**AP power derate capability** is displayed in the output as **Capable** only for those APs that support power policy. For the other APs, it is displayed as **Not Capable**.

In the **show ap name cisco-ap power-profile summary** output, in the power saving mode, the status of the interface configured in the power profile (for example, **pow2**) is applied on the AP, and the AP sends the details (that are displayed in the show command) such as, the name of the power saving profile and the associated calendar profile.

The table that is displayed shows the interfaces and the parameter status of the power saving profile. The AP sends the information as to which of the interfaces are disabled. For example, if the AP does not have a 6-GHz radio interface, the **Status** is displayed as **Not Applicable**. If the interfaces are applied without any errors, then **Success** is displayed.



**Note** When the AP uses the fixed power policy, due to inactive calendar or client connectivity, the interfaces are not displayed in the power profile summary if their status is UP on the AP.

## Verifying Radio Spatial Streams

To view the configuration and operational details of radio spatial stream rules in the power profile, run the following commands:

```
Device# show wireless profile power detailed wireless_pow_profile_name
Power profile name      : wireless_pow_profile_name
-----
Description            :
.
.
Seq No      Interface  Interface-id  Parameter      Parameter value
-----
100         Radio        6 GHz        Spatial Stream  2 x 2
200         Radio        5 GHz        Spatial Stream  8 x 8
400         USB          USB0         State          DISABLED
500         Ethernet    Gig0         Speed          100 MBPS
600         Radio        6 GHz        State          DISABLED
700         Radio        2.4 GHz     State          DISABLED
900         Radio        5 GHz        State          DISABLED

Device# show ap name cisco-ap-name power-profile summary
AP power derate Capability : Capable

AP fixed power policy
-----

Interface  Interface-ID  Parameter      Parameter value  Status
-----
Ethernet   Gig0          Speed          5000 MBPS       Fixed Policy
Radio      2.4 GHz      Spatial Stream  4 x 4           Fixed Policy
```

Radio	5 GHz	Spatial Stream	8 x 8	Fixed Policy
Radio	Sec 5 GHz	Spatial Stream	4 x 4	Fixed Policy
USB	USB0	State	DISABLED	Fixed Policy

## Verifying Client Threshold

To view the client threshold details, run the following command:

```
Device# show wireless profile power detailed profile1
Power profile name          : profile1
-----
Description                  : Power profile 1
Power save client threshold : 5
Seq No      Interface      Interface-id      Parameter          Parameter value
-----
0           Radio          6 GHz            State              DISABLED
1           Radio          5 GHz            Spatial Stream     1 x 1
2           Radio          2.4 GHz          Spatial Stream     2 x 2
3           USB            USB0             State              DISABLED
```

## Verifying PoE-Out Details

To view the PoE-out details in the wireless power profile, run the following commands:

```
Device# show wireless profile power detailed poe-out_profile_name
Power profile name          : poe-out_profile_name
-----
Description                  : profile-description
Seq No      Interface      Interface-id      Parameter          Parameter value
-----
10 ...
20          Ethernet      LAN 1            POE_OUT           DISABLED
30 ...

Device# show ap name Cisco-Ap1 power-profile summary
AP power derate Capability  : Capable

AP fixed power policy
-----

Interface      Interface-ID      Parameter          Parameter value    Status
-----
...
Ethernet       LAN 1            POE_OUT           DISABLED           Fixed Policy
...
```