Access Point (AP) Deployment Guide

Introduction

AX83H is an enterprise portable Wi-Fi IP color screen phone that caters to the communication needs of mobile offices. It finds extensive applications in small and medium-sized enterprises, offices, warehouses, supermarkets, hotels, and other mobile office scenarios. Featuring a built-in Bluetooth 5.0 module and a dual-band 2.4G/5G Wi-Fi 6 module, coupled with advanced seamless roaming technology, it enables you to keep pace with the ever-evolving trends in the wireless era and stay ahead of the game.
With the continuous expansion of Wi-Fi network coverage, wireless access points (AP) are now widely employed in small and medium-sized enterprises, multi-story offices, commercial establishments, and branch offices to provide seamless Wi-Fi access and mobile solutions. This guide offers comprehensive insights and step-by-step instructions for deploying an Access Point (AP) environment.

Access Point Feature Requirements

1. Embedded Wireless Controller
2. Wi-Fi roaming Protocol Suport 802.11k, 802.11v, 802.11r
3. Wi-Fi Protocol Support 802.11ac, 802.11ax, 802.11n
4. Interfaces: At least 1x 10/100/1000 Base-T (Ethernet) Uplink Interface, support POE
5. Radio Support:2.4GHz,5GHz

Recommended AP List

The following table lists the APs that have been tested by Yealink and have good compatibility with AX83H for reference.

Cisco Wireless Access Points

Feature	Cisco Catalyst 9105i Access Point	Cisco Catalyst 9115 Access Point
Embedded Wireless Controller	√	√
Wi-Fi roaming support 802.11k, 802.11v,802.11r	√	√
Wi-Fi Protocol Support 802.11ac, 802.11ax, 802.11n	√	√
Interfaces: At least 1 * 10/100/1000 Base-T (Ethernet) Uplink Interface, support POE	√	√

Radio Support: 2.4GHz, 5GHz	√	√

TIP
AC Controller: Not required (one AC can be reused)

HPE (Aruba) Wireless Access Points

Feature	503 Series	610 Series
Embedded Wireless Controller	×	×
Wi-Fi roaming support 802.11k, 802.11v, 802.11r	√	√
Wi-Fi Protocol Support 802.11ac, 802.11ax, 802.11n	√	√
Interfaces: At least 1 * 10/100/1000 Base-T (Ethernet) Uplink Interface, support POE	√	√
Radio Support: 2.4GHz, 5GHz	√	√

TIP
AC Controller: HPE Aruba Networking 7005 (it is recommended that at least 2 AP management licenses be configured).

Rucks Wireless Access Points

Feature	R350	H350
Embedded Wireless Controller	×	×
Wi-Fi roaming support 802.11k, 802.11v, 802.11r	√	√
Wi-Fi Protocol Support 802.11ac, 802.11ax, 802.11n	√	√
Interfaces: At least 1 * 10/100/1000 Base-T (Ethernet) Uplink Interface, support POE	√	√
Radio Support: 2.4GHz, 5GHz	√	√

TIP
AC Controller: SmartZone 100 (it is recommended that at least 2 AP management licenses be configured).

Deployment Guidance

AP Deployment Requirements

When deploying a Wi-Fi network with multiple APs for AX83H roaming, follow these guidelines:

1. Make sure the AP is properly powered on and connected to your network.
2. Connect your PC to the same network as the AP. This PC is used to configure the AP and other necessary devices through the Web GUI.
3. Access the AP using the PC's Web GUI. Configure the AP for settings.
4. Set the same SSID for all APs. SSID is case-sensitive.
5. Make sure the IP addresses assigned to the APs belong to the same network segment and the same VLAN.

Conventional Obstacle Penetration Loss Comparison Table

Certain building structures and obstacles can directly interfere with or attenuate AP signals. The signal attenuation after penetrating different obstacles can be found in the following table:

Classic Obstacle	Thickness (mm)	2.4G Signal Attenuation (dB)	5G Signal Attenuation (dB)
Regular Brick Wall	120	10	20
Thickened Brick Wall	240	15	25
Concrete	254	25	30
Asbestos	8	3	4
Foam Board	8	3	4
Hollow Wood	20	2	3
Regular Wooden Door	40	3	4
Solid Wood Door	40	10	15
Regular Glass	8	4	7
Thickened Glass	12	8	10
Bulletproof Glass	30	25	35
Load-bearing Column	500	25	30
Roller Shutter Door	10	15	20
Steel Plate	80	30	35
Elevator	80	30	35

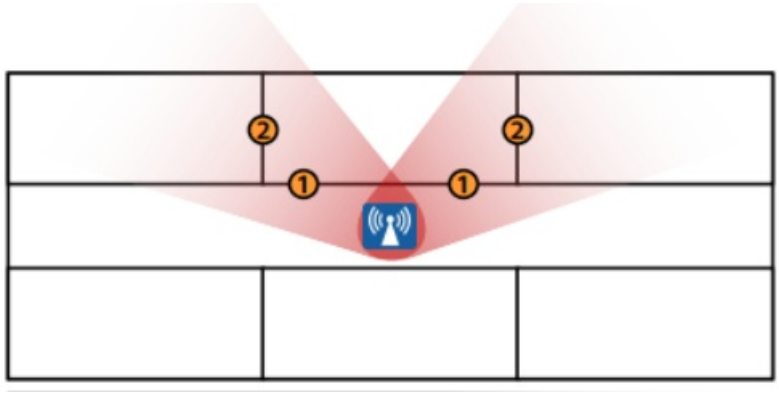
Recommended Overlap Range for AP Signal Coverage

During the deployment phase, it is essential to carefully consider the cell edge coverage for each access point (AP). It is recommended to design the cell edge of each AP with a signal strength of -67dBm to ensure optimal performance. Moreover, it is advised to maintain a 20% - 30% overlap between adjacent APs at this signal level. Failure to meet these requirements may lead to potential packet loss or blind areas at the cell edge, hindering the seamless switchover process for AX83H devices. To ensure uninterrupted roaming capabilities, it is highly recommended that AX83H devices consistently receive an RSSI of -67dBm or higher from the associated access point.

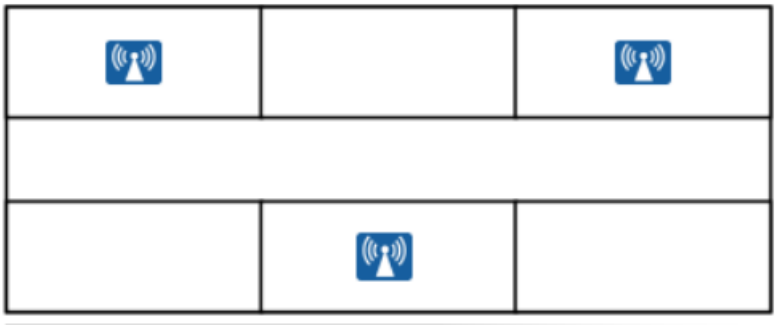
AP Placement

The placement of APs is crucial in the construction of wireless networks. Through a well-designed AP layout, signal interference can be avoided, signal attenuation can be minimized, and better network performance and user experience can be achieved.

Improper placement of APs: Signals pass through multiple walls



Reasonable placement of APs: Signals pass through a single wall



IMPORTANT

1. Minimize the number of obstacles that the signal passes through.
2. Ensure that the AP is facing the target coverage area and is placed away from interference sources.
3. For scenarios that require a PoE power supply, the distance between the AP placement location and the weak current room (PoE power supply end) must be considered. The distance is recommended to be less than 100 meters.

Important WI-FI Parameters on APs

There are several crucial parameters in Wi-Fi configuration for APs. Proper configuration of these parameters will enhance the roaming performance of AX83H.

Parameter	Description
Beacon Interval	The beacon interval defines the frequency at which the AP sends 802.11 beacon management frames. The default value is typically set to 100ms. It is recommended to keep the default value on the AP.

DTIM	This is the Delivery Traffic Indication Message (DTIM) period within the beacon. **TIP** It is recommended to set it to 2.
Unicast Mode and Multicast Mode	In unicast mode, the controller unicasts each multicast data packet to every associated access point. In multicast mode, the controller sends multicast data packets to the CAPWAP multicast group. This method reduces the overhead on the controller's processor and offloads the packet replication work to your network. It is recommended that unicast mode be used to ensure call quality.
WMM (Wi-Fi Multimedia)	WMM is a wireless QoS protocol and a subset of the 802.11e protocol used to ensure high-priority packets are sent first, thus guaranteeing quality of service for applications such as voice and video. **TIP** · **QoS for SIP Layer 3** Defines the QoS parameters for Layer 3 packets of SIP messages in decimal format. This value is used for IP precedence, Diff-Serv, or MPLS. The default setting is 26, equivalent to the DSCP name constant CS6. · **QoS for Audio Layer 3** Defines the QoS parameters for Layer 3 packets of RTP messages in decimal format. This value is used for IP precedence, Diff-Serv, or MPLS. The default setting is 46, equivalent to the DSCP name constant CS6.
Band Steering	Dual-band operation with band steering detects clients capable of operating at 5 GHz frequency and guides them to that frequency, making the more congested 2.4 GHz band available for traditional clients. This helps improve the end-user experience by reducing channel utilization, especially in high-density environments. It is recommended to enable band steering on the AP, which means that by default, the 5 GHz band should be used (if the 5 GHz signal is weak, users can switch to 2.4 GHz).

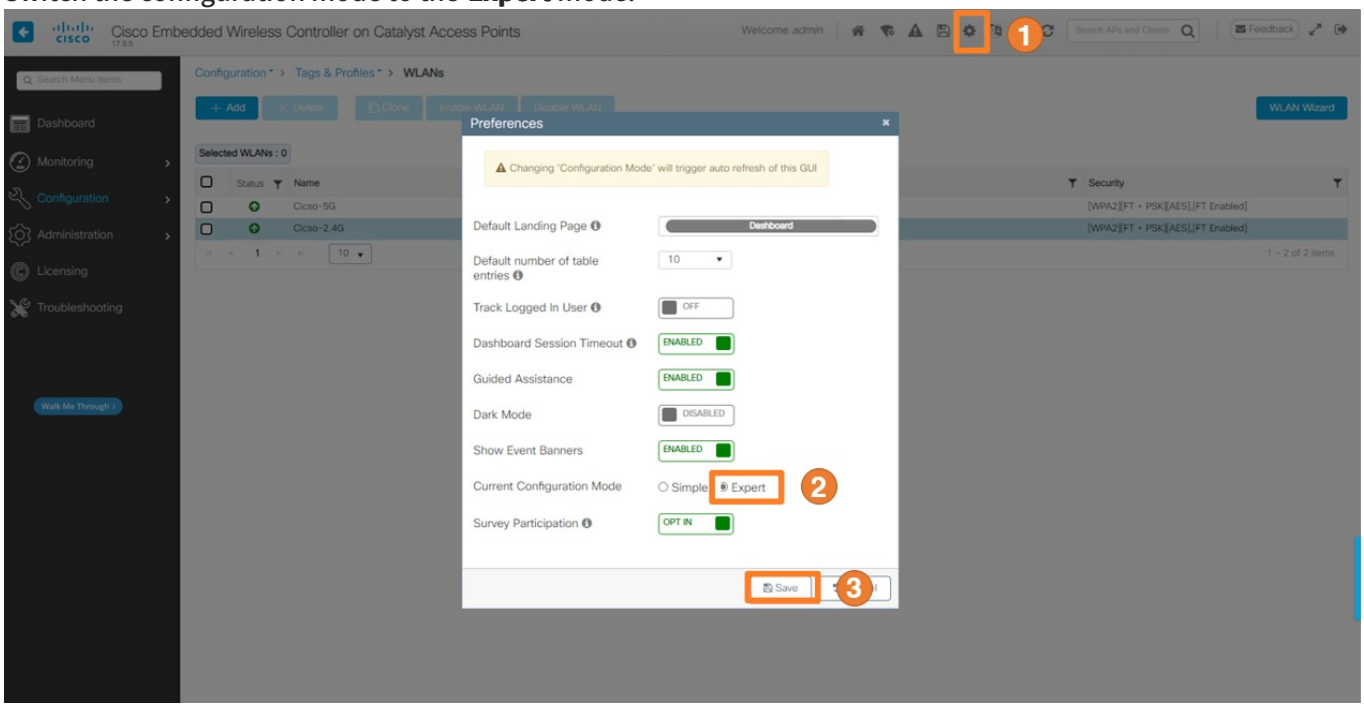
For the above important parameters, the following sections provide configuration methods for different vendor APs for reference.

Cisco Embedded Wireless Controller

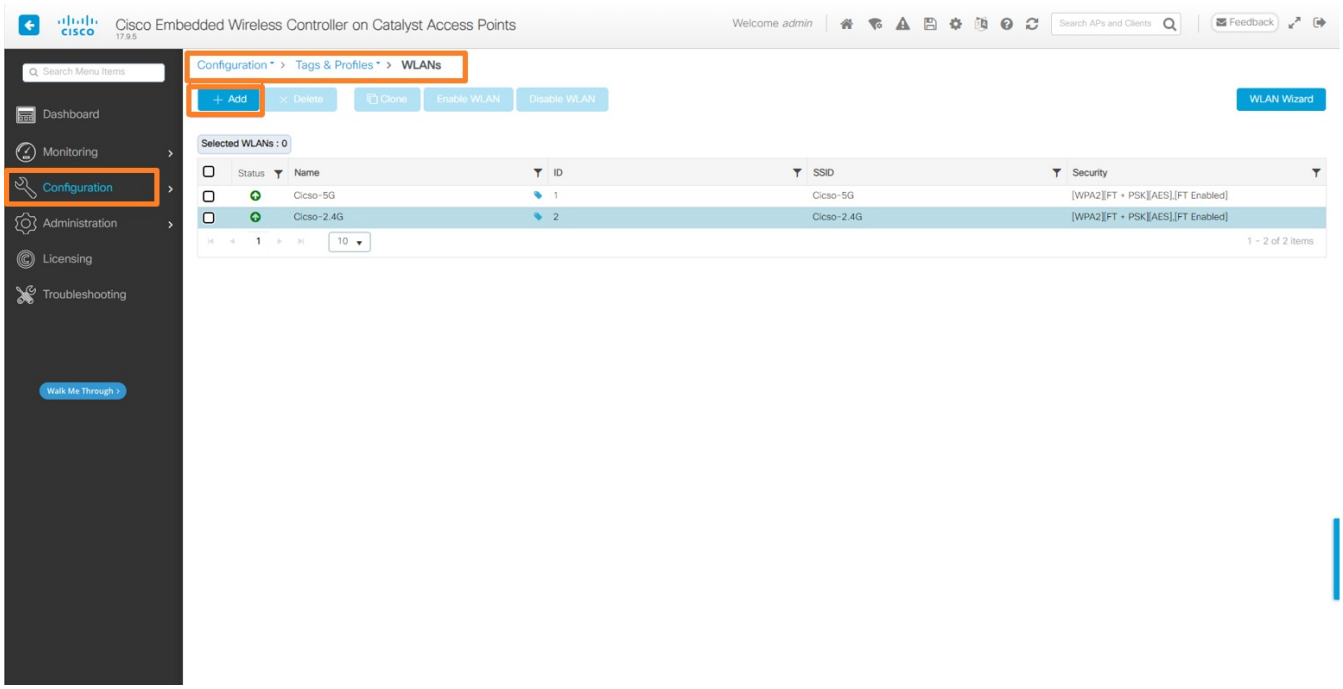
TIP
If you need more detailed information, you can visit the Cisco Support website.

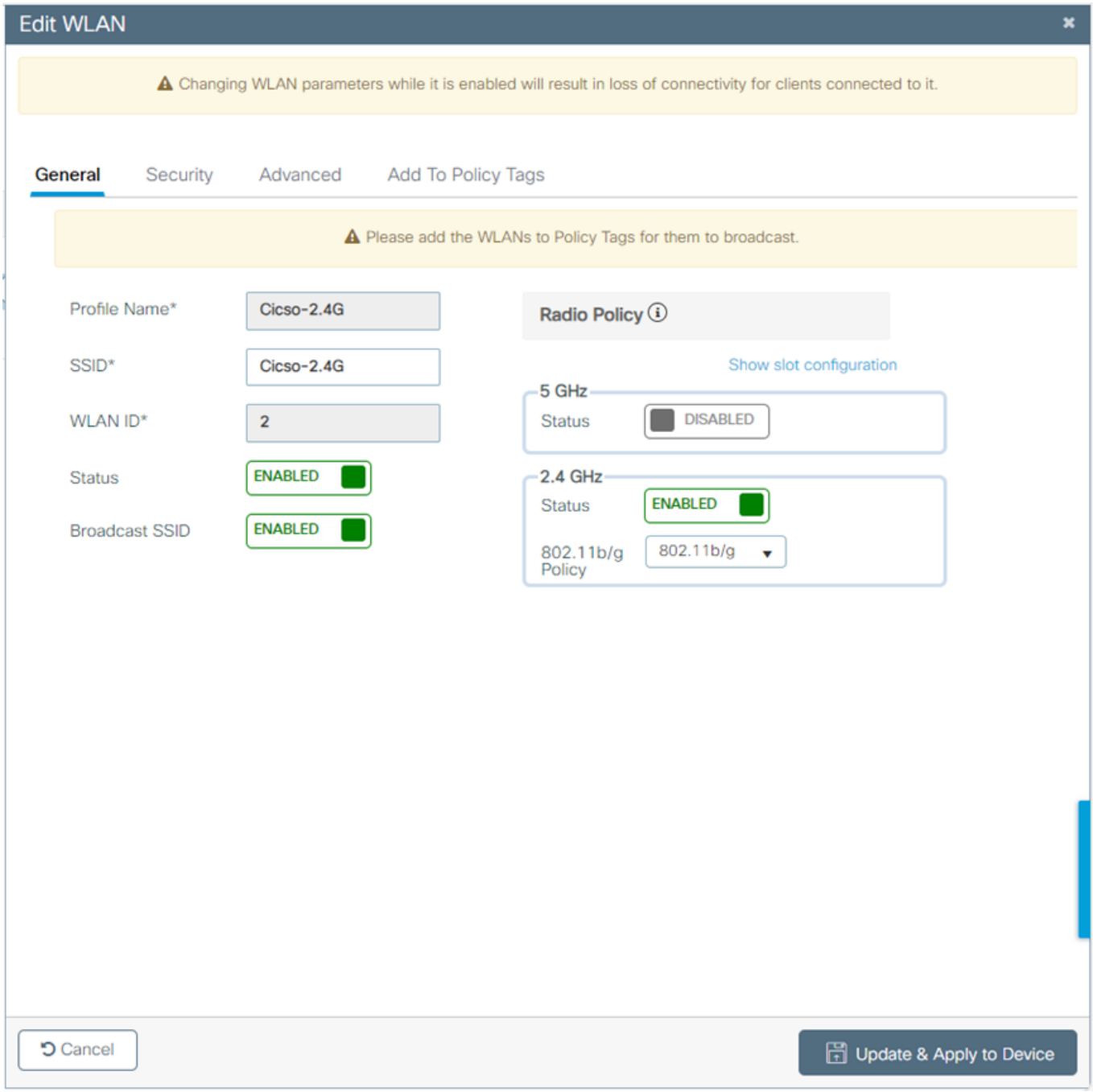
1. Log in to the web user interface.

2. Switch the configuration mode to the **Expert** mode.

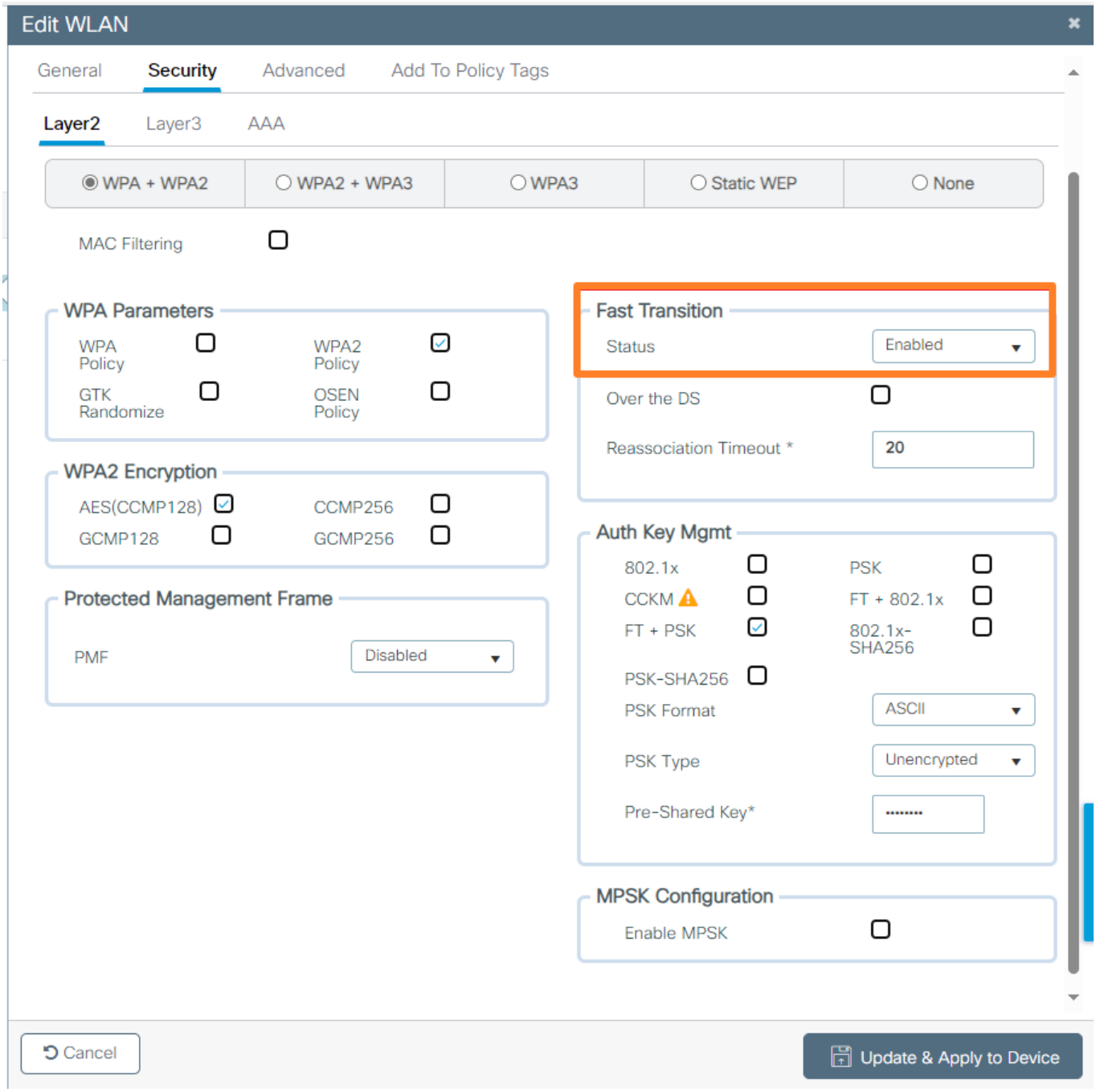


3. Add new WLAN. Go to **Configuration** > **Tags & Profiles** > **Wlans** > **Add**.

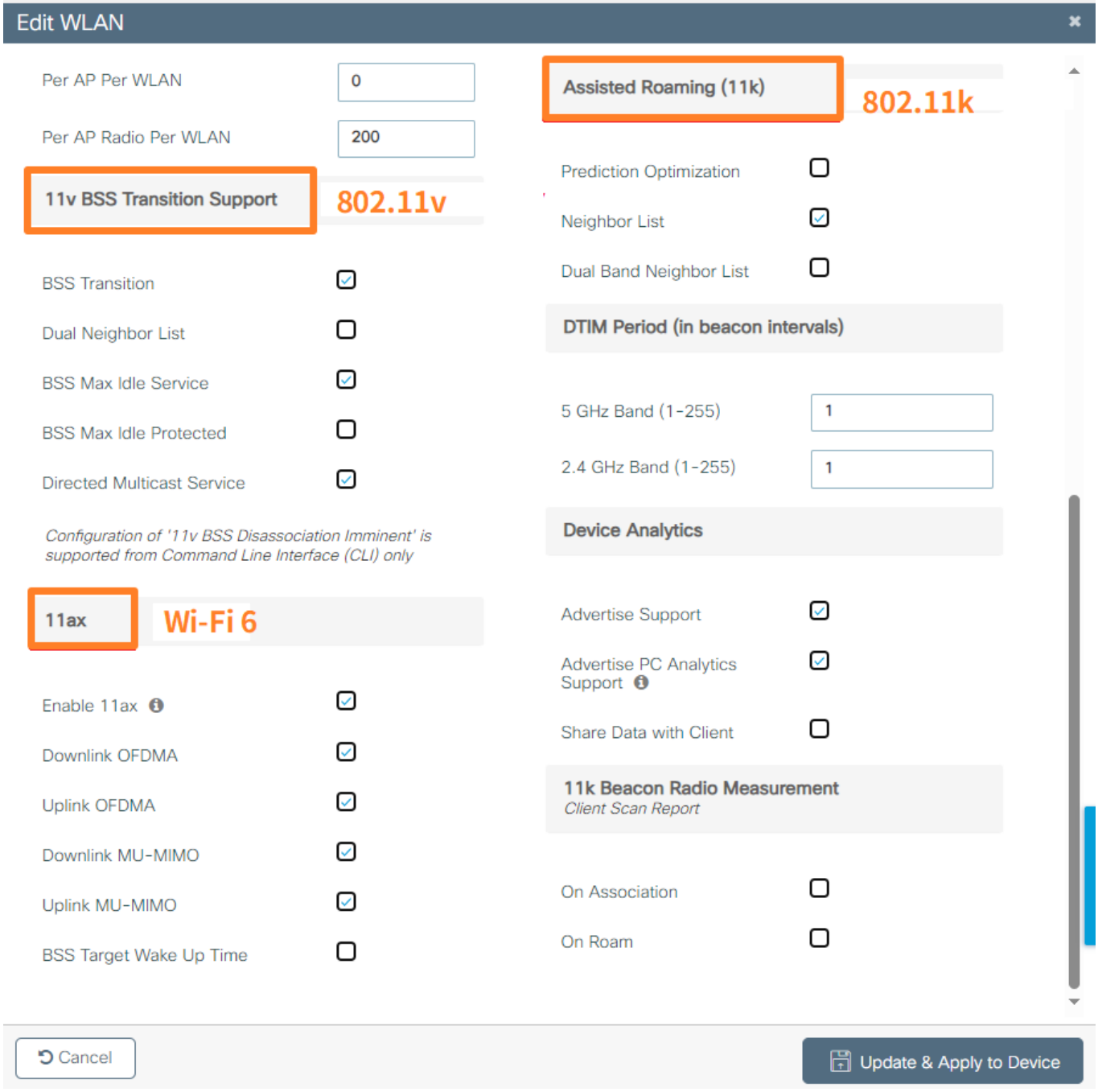



Edit WLAN
Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.
General
Security
Advanced
Add To Policy Tags
Please add the WLANs to Policy Tags for them to broadcast.
Profile Name*
Cicso-2.4G
SSID*
Cicso-2.4G
WLAN ID*
2
Status
ENABLED
Broadcast SSID
ENABLED
Radio Policy
Show slot configuration
5 GHz
Status
DISABLED
2.4 GHz
Status
ENABLED
802.11b/g Policy
802.11b/g
Cancel
Update & Apply to Device

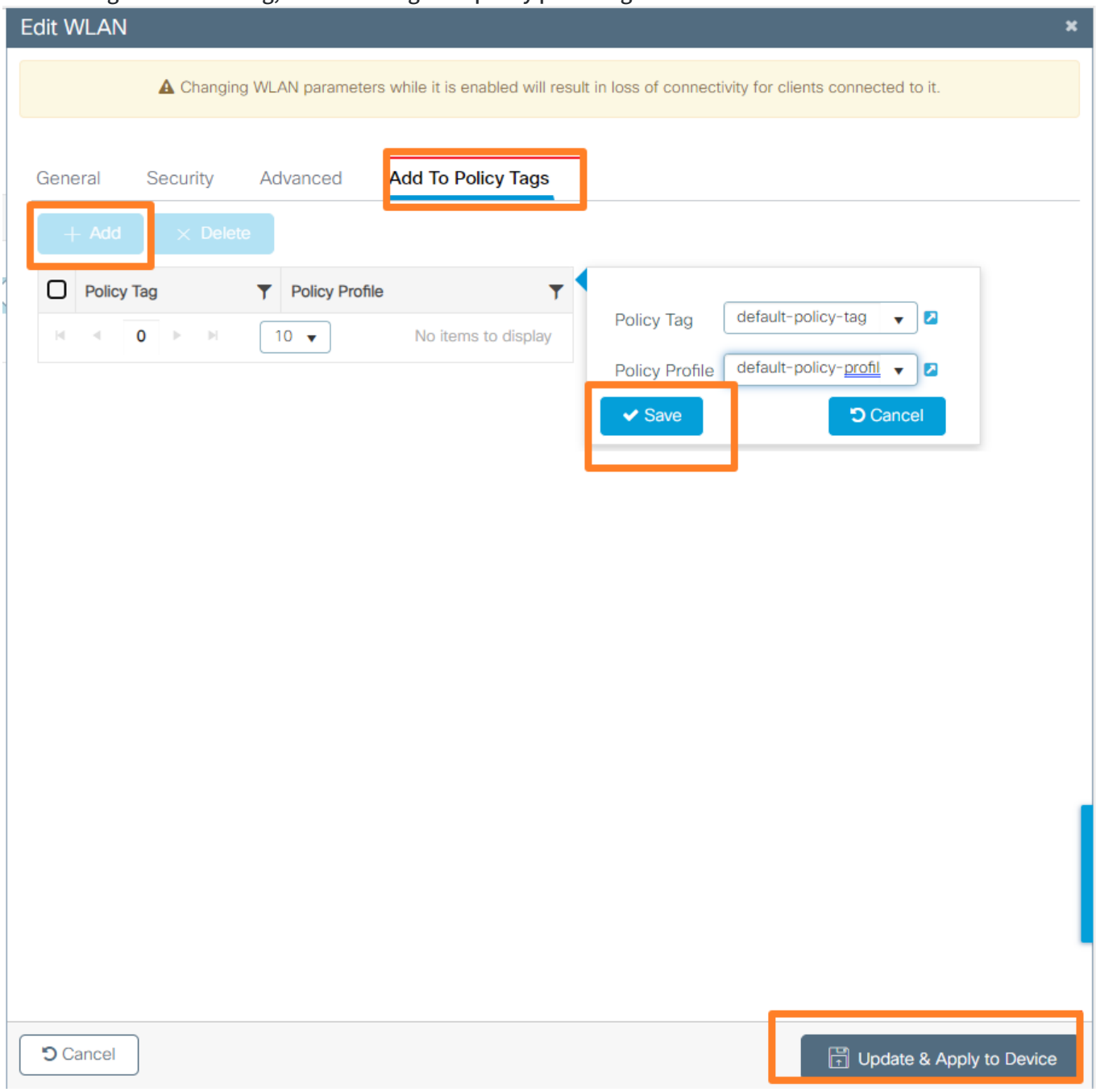
4. Set the authentication method and fast roaming 802.11r.



5. Set the fast roaming 802.11k, 802.11v, and Wi-Fi 6.



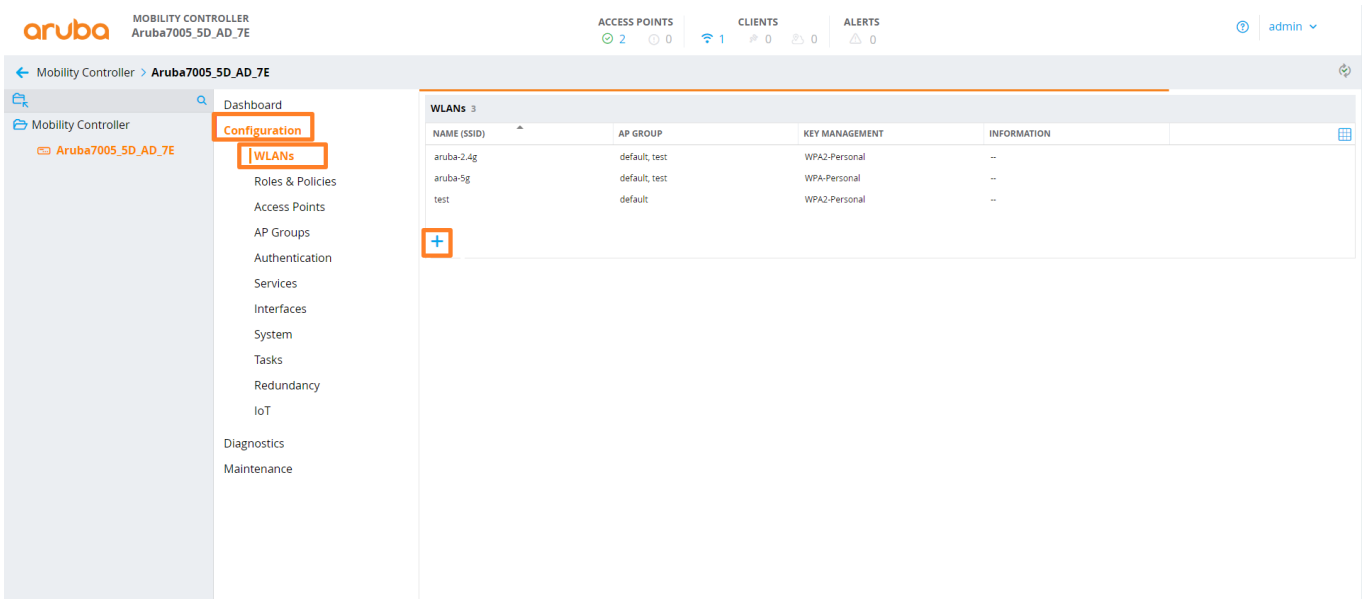
6. After saving and submitting, edit and assign the policy profile again.

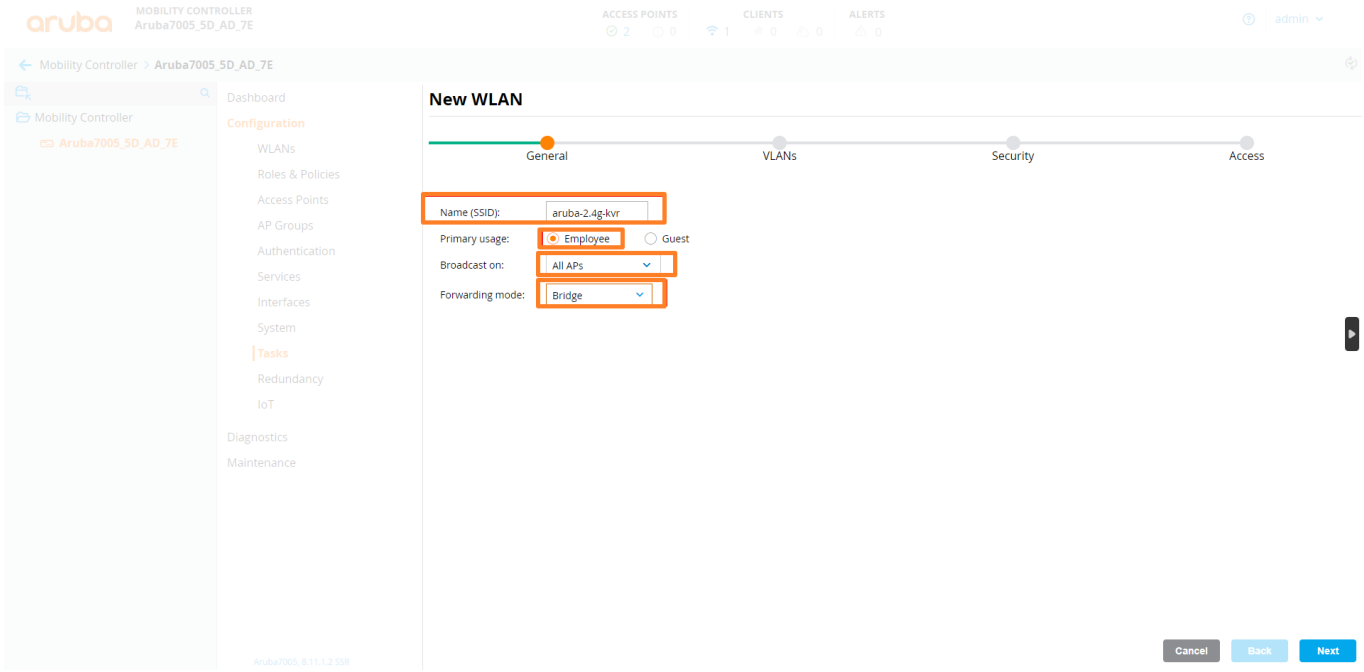


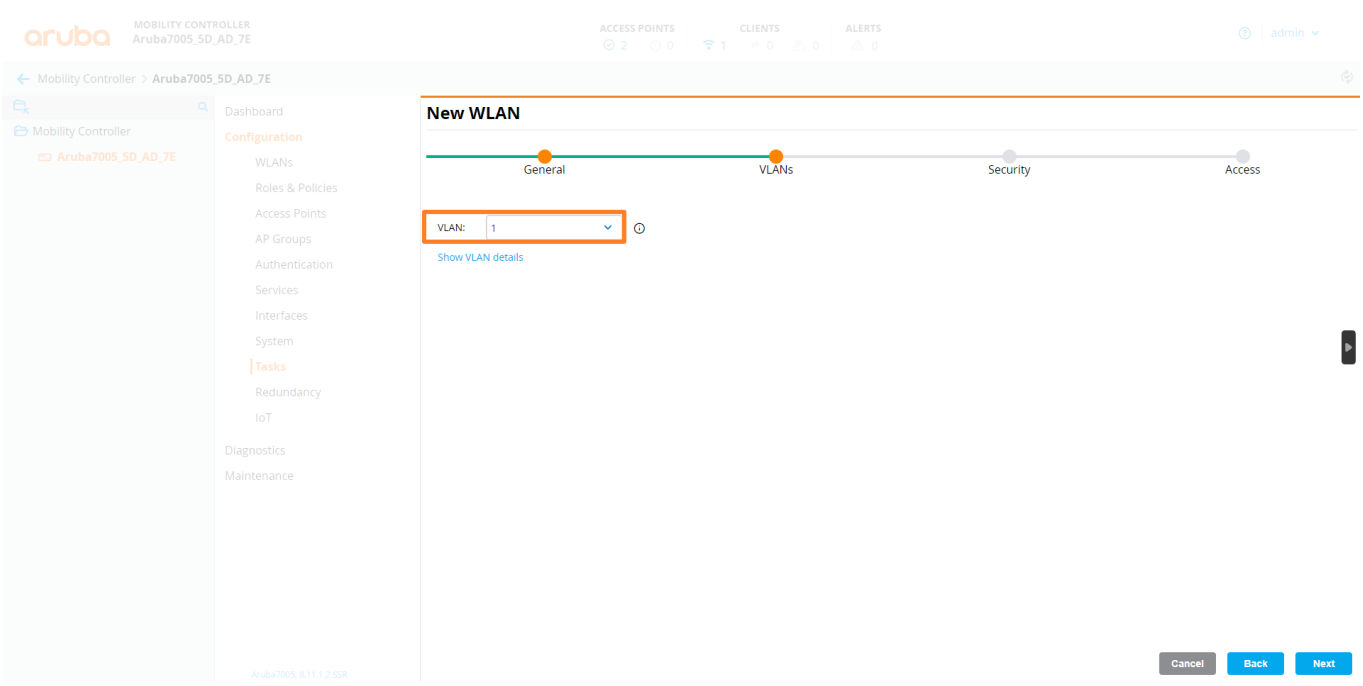
Aruba

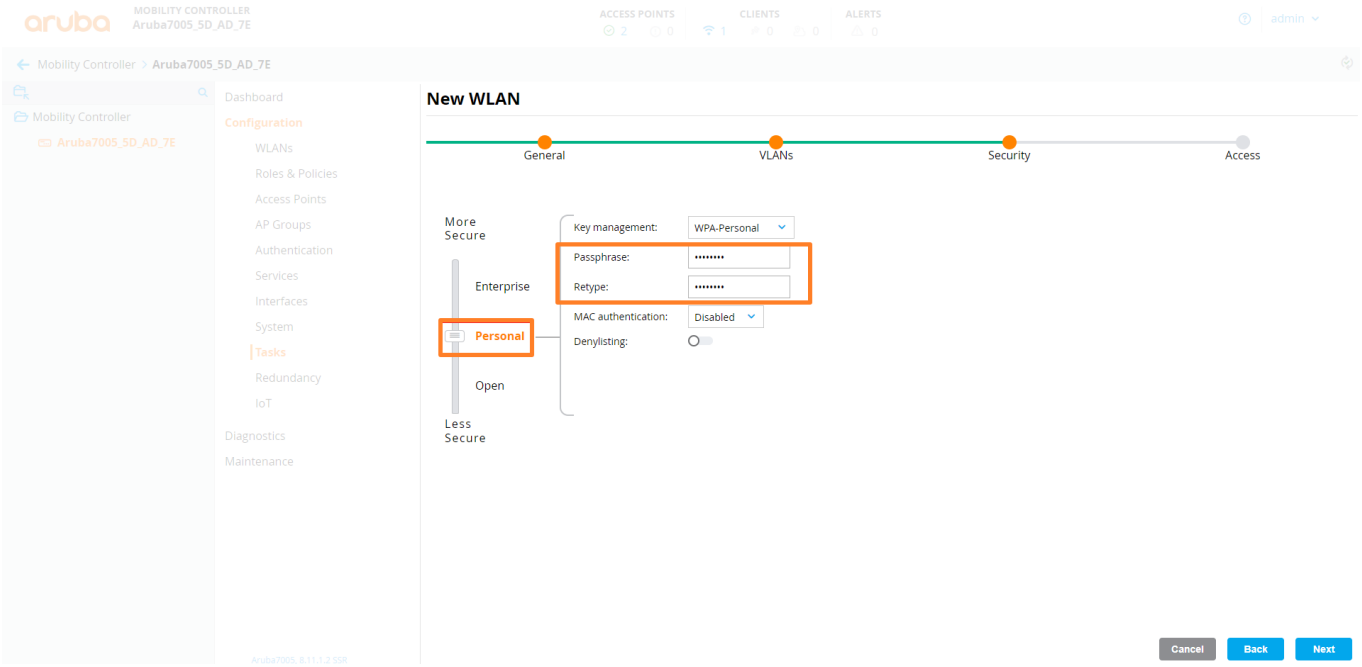
> **TIP**
> If you need more detailed information, you can visit the Aruba Support website.

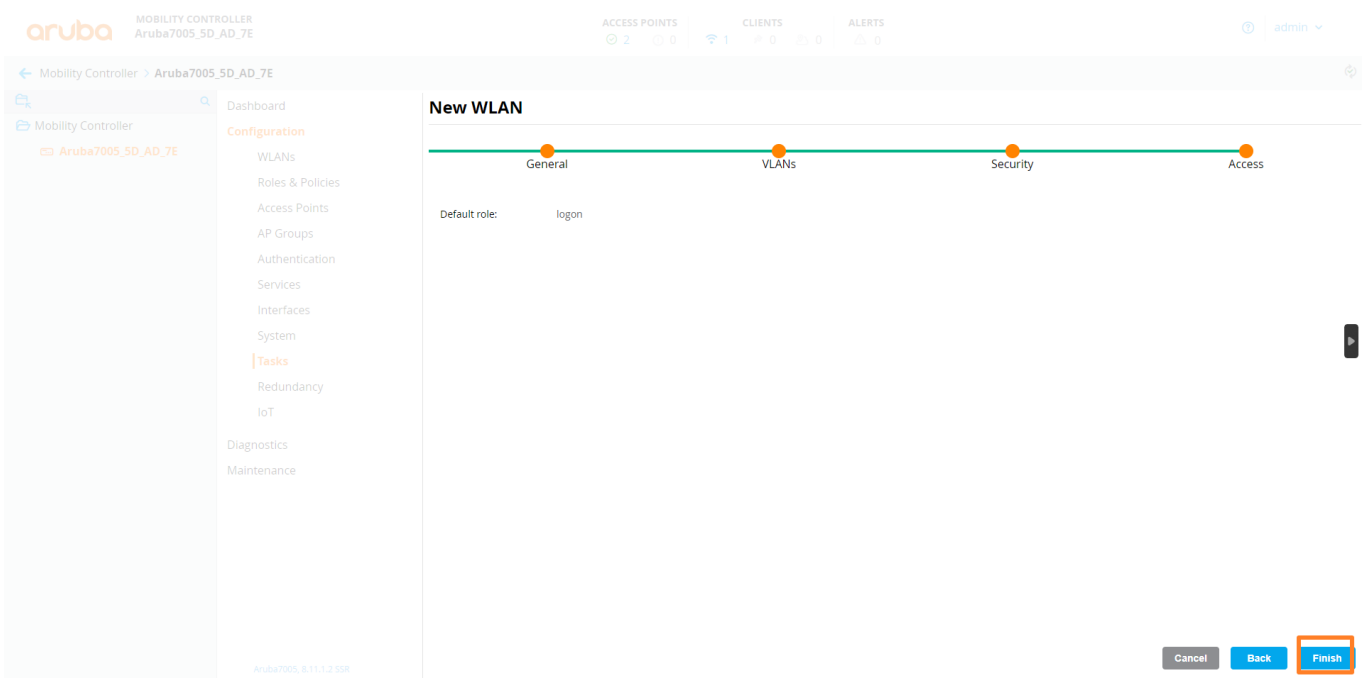
1. Log in to the web user interface.
2. Go to **Dashboard** > **Configuration** > **WLANs** > + to add a new WLAN.

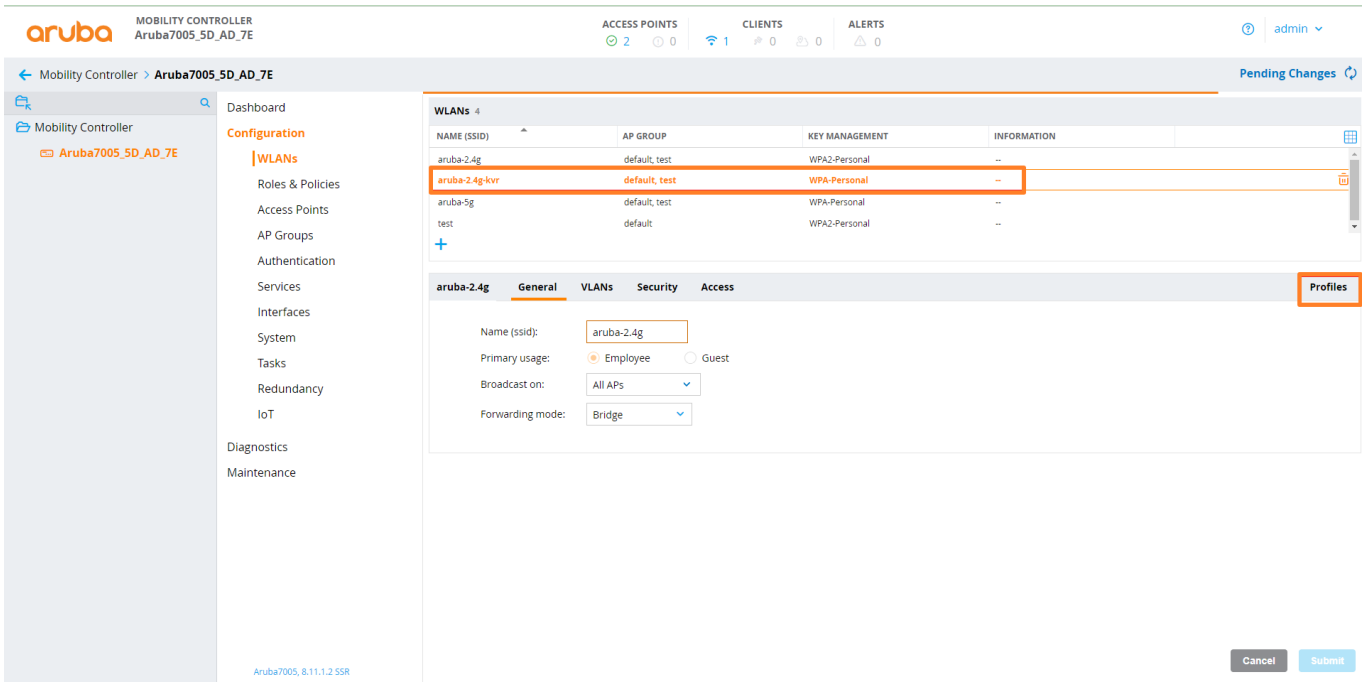

aruba
MOBILITY CONTROLLER
Aruba7005_5D_AD_7E
ACCESS POINTS
2 0
CLIENTS
1 0 0
ALERTS
0
admin
Mobility Controller > Aruba7005_5D_AD_7E
Mobility Controller
Aruba7005_5D_AD_7E
Dashboard
Configuration
WLANs
Roles & Policies
Access Points
AP Groups
Authentication
Services
Interfaces
System
Tasks
Redundancy
IoT
Diagnostics
Maintenance
WLANs 3
NAME (SSID)
AP GROUP
KEY MANAGEMENT
INFORMATION
aruba-2.4g
default, test
WPA2-Personal
aruba-5g
default, test
WPA-Personal
test
default
WPA2-Personal
+


New WLAN
General
VLANs
Security
Access
Name (SSID):
aruba-2.4g-kvr
Primary usage:
Employee
Guest
Broadcast on:
All APs
Forwarding mode:
Bridge
Cancel
Back
Next

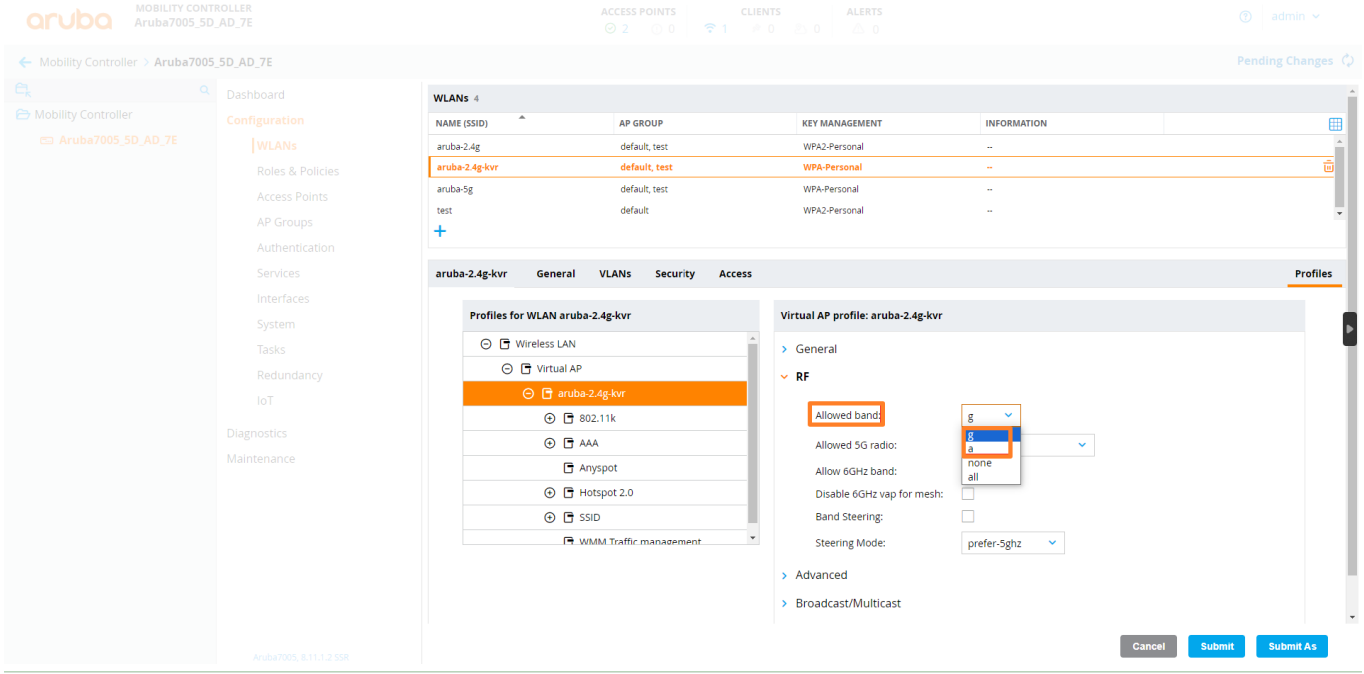

MOBILITY CONTROLLER
Aruba7005_5D_AD_7E
ACCESS POINTS
CLIENTS
ALERTS
admin
Mobility Controller > Aruba7005_5D_AD_7E
Mobility Controller
Aruba7005_5D_AD_7E
Dashboard
Configuration
WLANs
Roles & Policies
Access Points
AP Groups
Authentication
Services
Interfaces
System
Tasks
Redundancy
IoT
Diagnostics
Maintenance
New WLAN
General
VLANs
Security
Access
VLAN:
1
Show VLAN details
Cancel
Back
Next

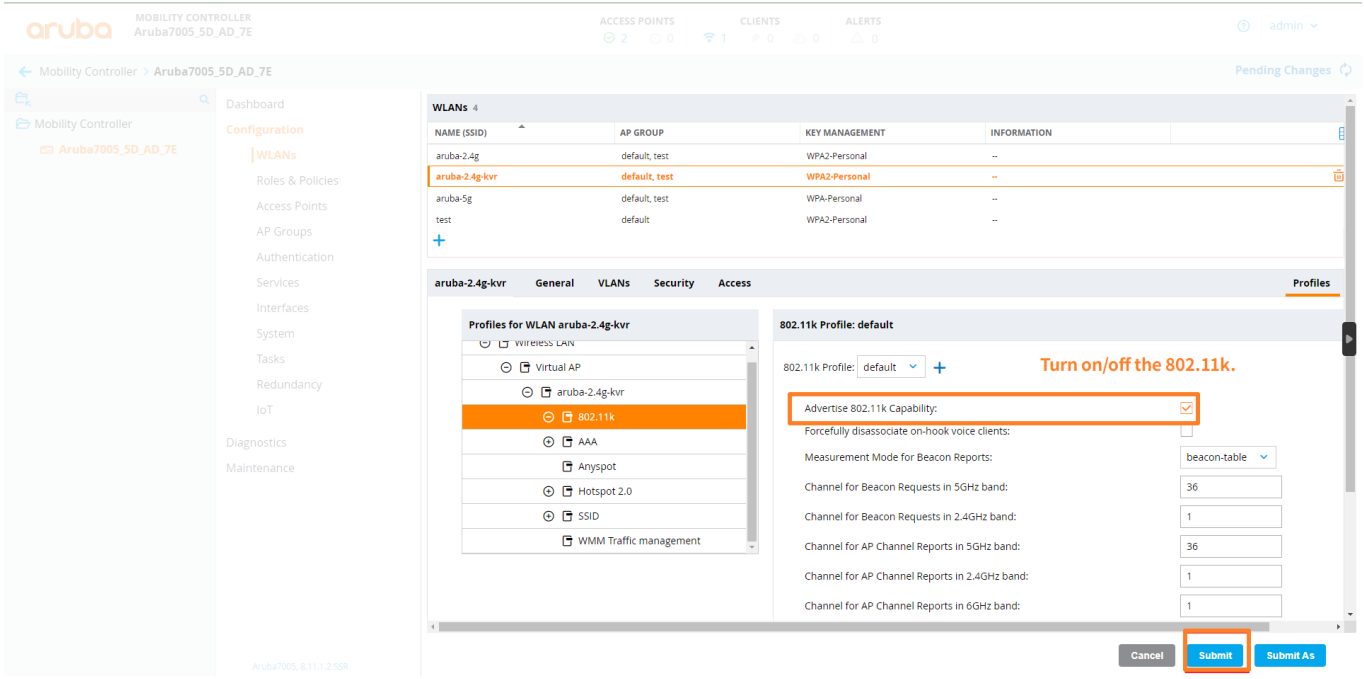

MOBILITY CONTROLLER
Aruba7005_5D_AD_7E
ACCESS POINTS
CLIENTS
ALERTS
admin
Mobility Controller > Aruba7005_5D_AD_7E
Mobility Controller
Aruba7005_5D_AD_7E
Dashboard
Configuration
WLANs
Roles & Policies
Access Points
AP Groups
Authentication
Services
Interfaces
System
Tasks
Redundancy
IoT
Diagnostics
Maintenance
New WLAN
General
VLANs
Security
Access
More Secure
Enterprise
Personal
Open
Less Secure
Key management:
WPA-Personal
Passphrase:
Retype:
MAC authentication:
Disabled
Denylisting:
Cancel
Back
Next


MOBILITY CONTROLLER
Aruba7005_5D_AD_7E
ACCESS POINTS
CLIENTS
ALERTS
admin
Mobility Controller > Aruba7005_5D_AD_7E
Dashboard
Configuration
WLANs
Roles & Policies
Access Points
AP Groups
Authentication
Services
Interfaces
System
Tasks
Redundancy
IoT
Diagnostics
Maintenance
New WLAN
General
VLANs
Security
Access
Default role:
logon
Cancel
Back
Finish

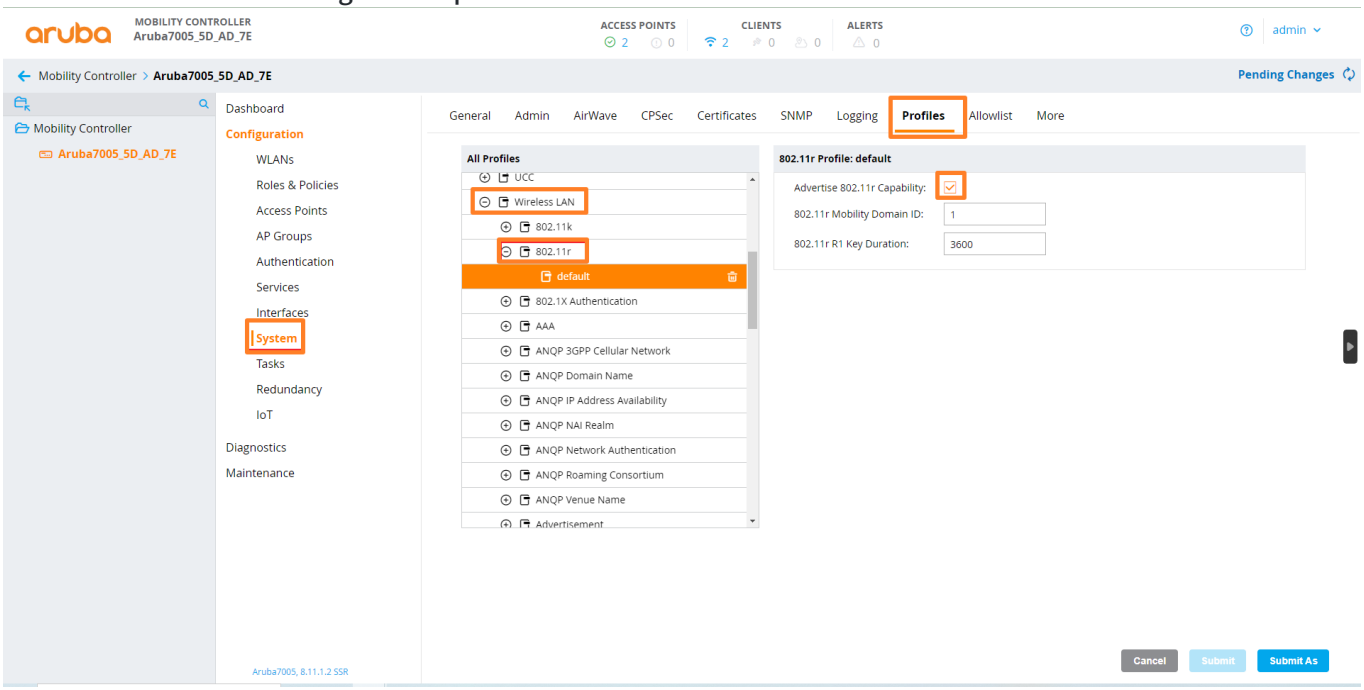

MOBILITY CONTROLLER
Aruba7005_5D_AD_7E
ACCESS POINTS
CLIENTS
ALERTS
admin
Mobility Controller > Aruba7005_5D_AD_7E
Pending Changes
Mobility Controller
Aruba7005_5D_AD_7E
Dashboard
Configuration
WLANs
Roles & Policies
Access Points
AP Groups
Authentication
Services
Interfaces
System
Tasks
Redundancy
IoT
Diagnostics
Maintenance
WLANs 4
NAME (SSID)
AP GROUP
KEY MANAGEMENT
INFORMATION
aruba-2.4g
default, test
WPA2-Personal
aruba-2.4g-kvr
default, test
WPA-Personal
aruba-5g
default, test
WPA-Personal
test
default
WPA2-Personal
aruba-2.4g
General
VLANs
Security
Access
Profiles
Name (ssid):
aruba-2.4g
Primary usage:
Employee
Guest
Broadcast on:
All APs
Forwarding mode:
Bridge
Cancel
Submit

3. 5G cannot be turned off individually, but 2.4G can be enabled individually when **Allowed band** is set to **a** or **g**.

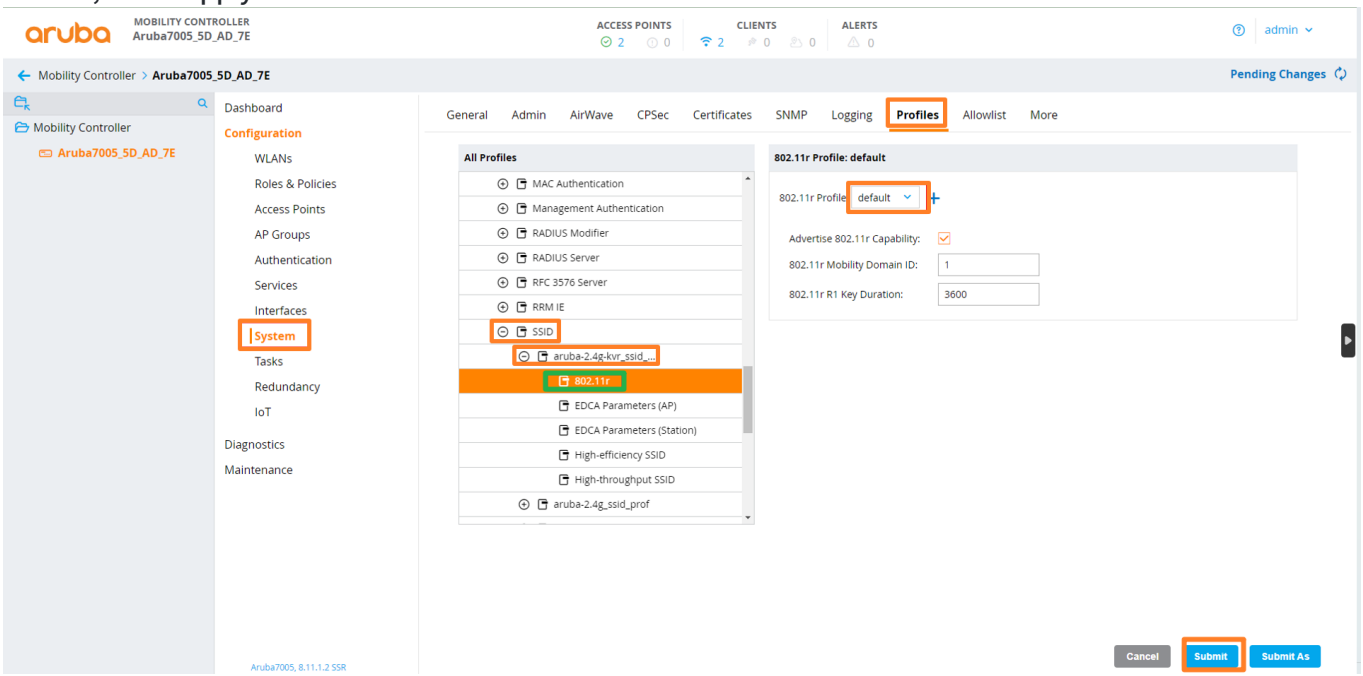




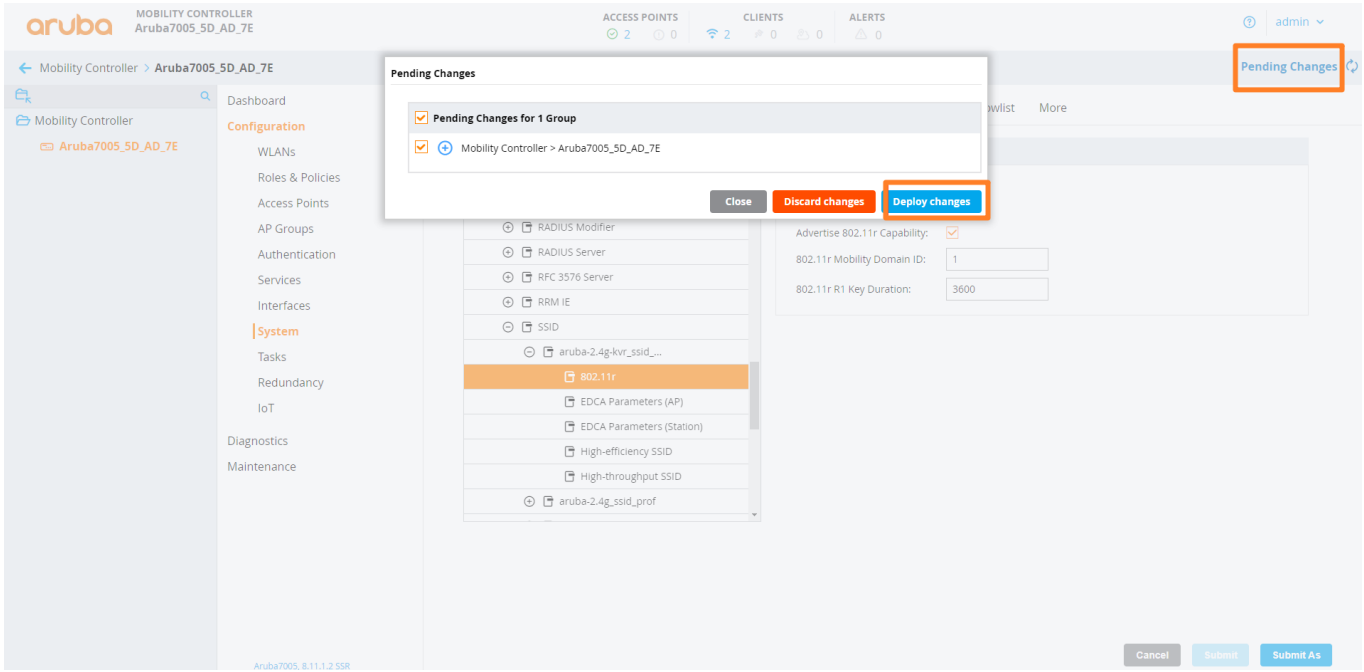
4. Set the 802.11R fast roaming feature profile.



5. In **SSID**, select Apply 802.11r Profile.



6. Save.

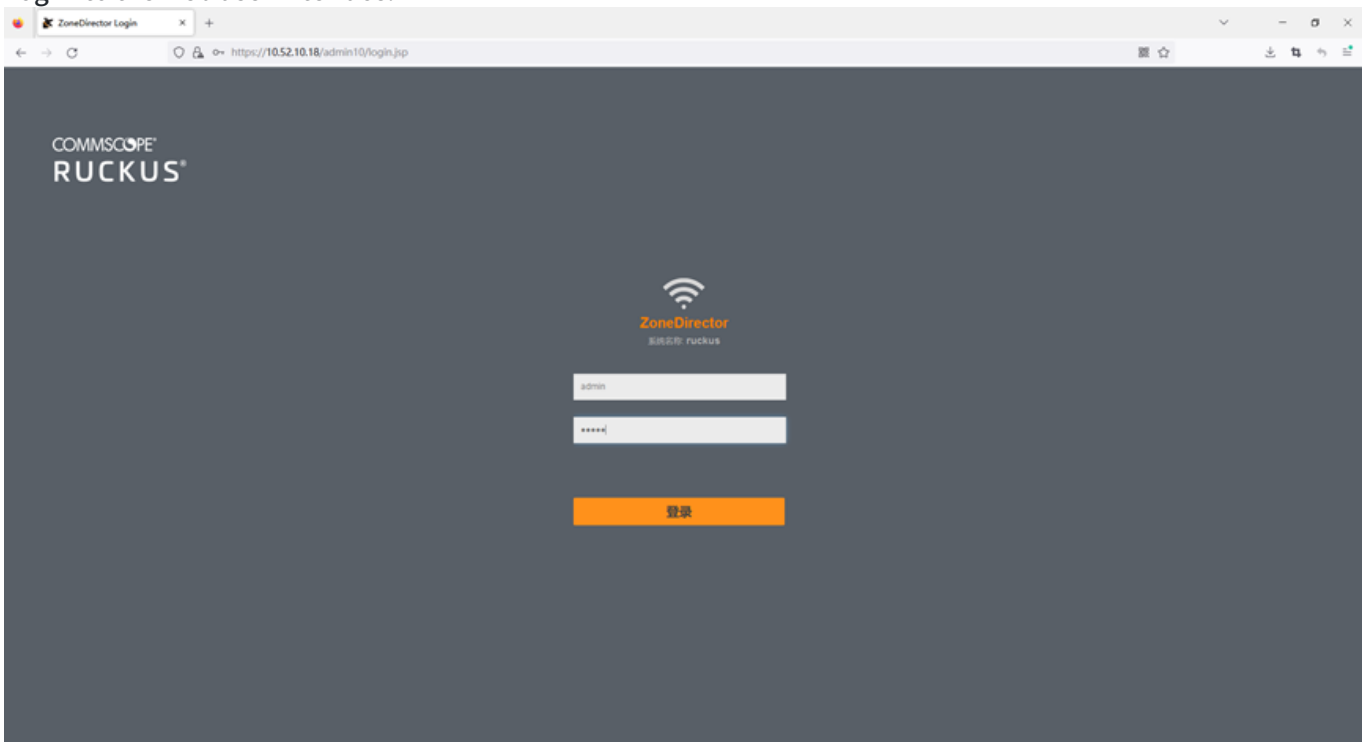


Ruckus

> **TIP**
> If you need more detailed information, you can visit the Ruckus Support website.

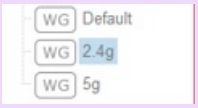
> **NOTE**
> 802.11v is enabled by default and cannot be configured in the GUI or the CLI.

1. Log in to the web user interface.



2. Add a new WLAN. We will add a 2.44GHZ WLAN as an example.

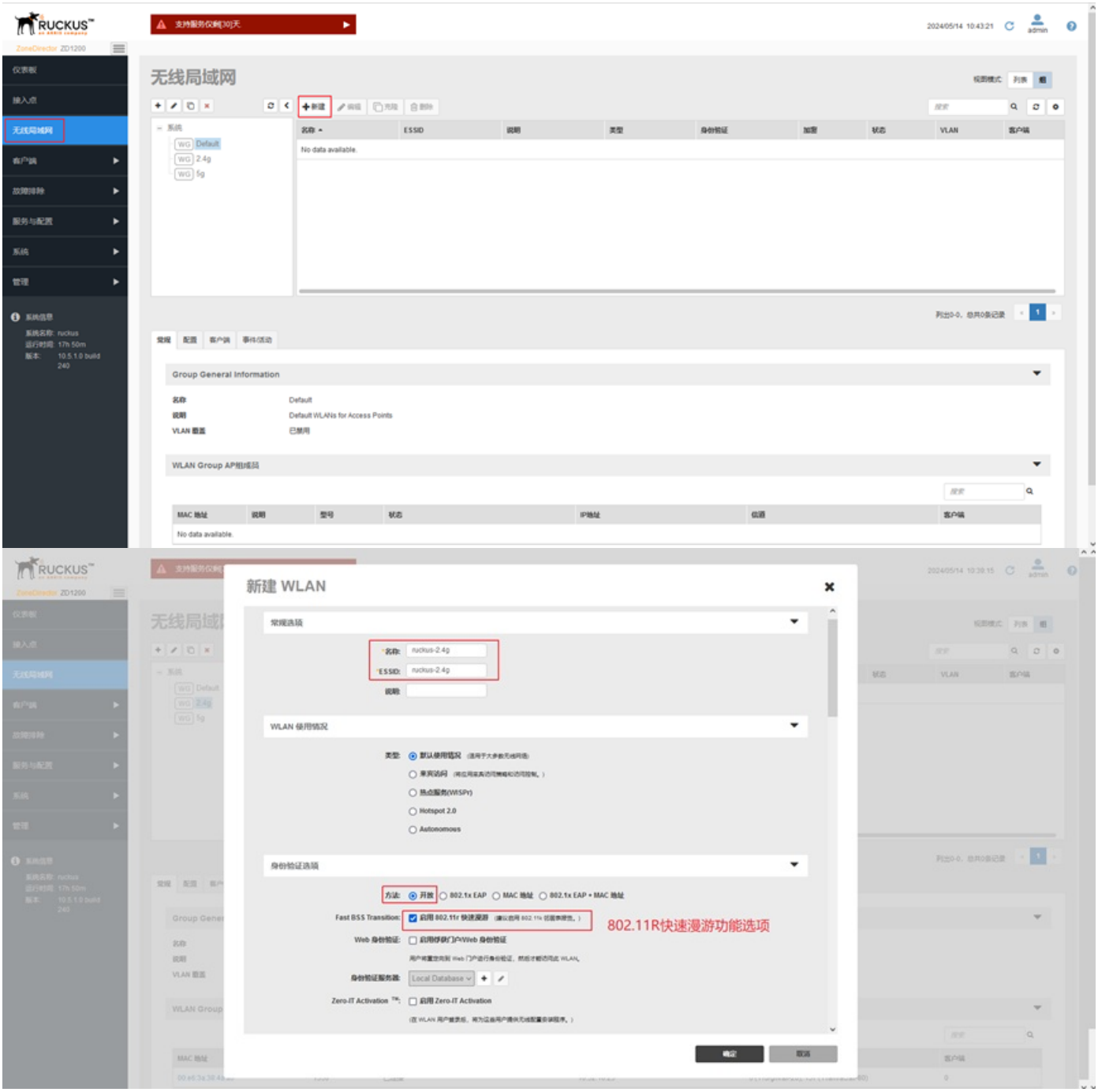
ⓘ NOTE



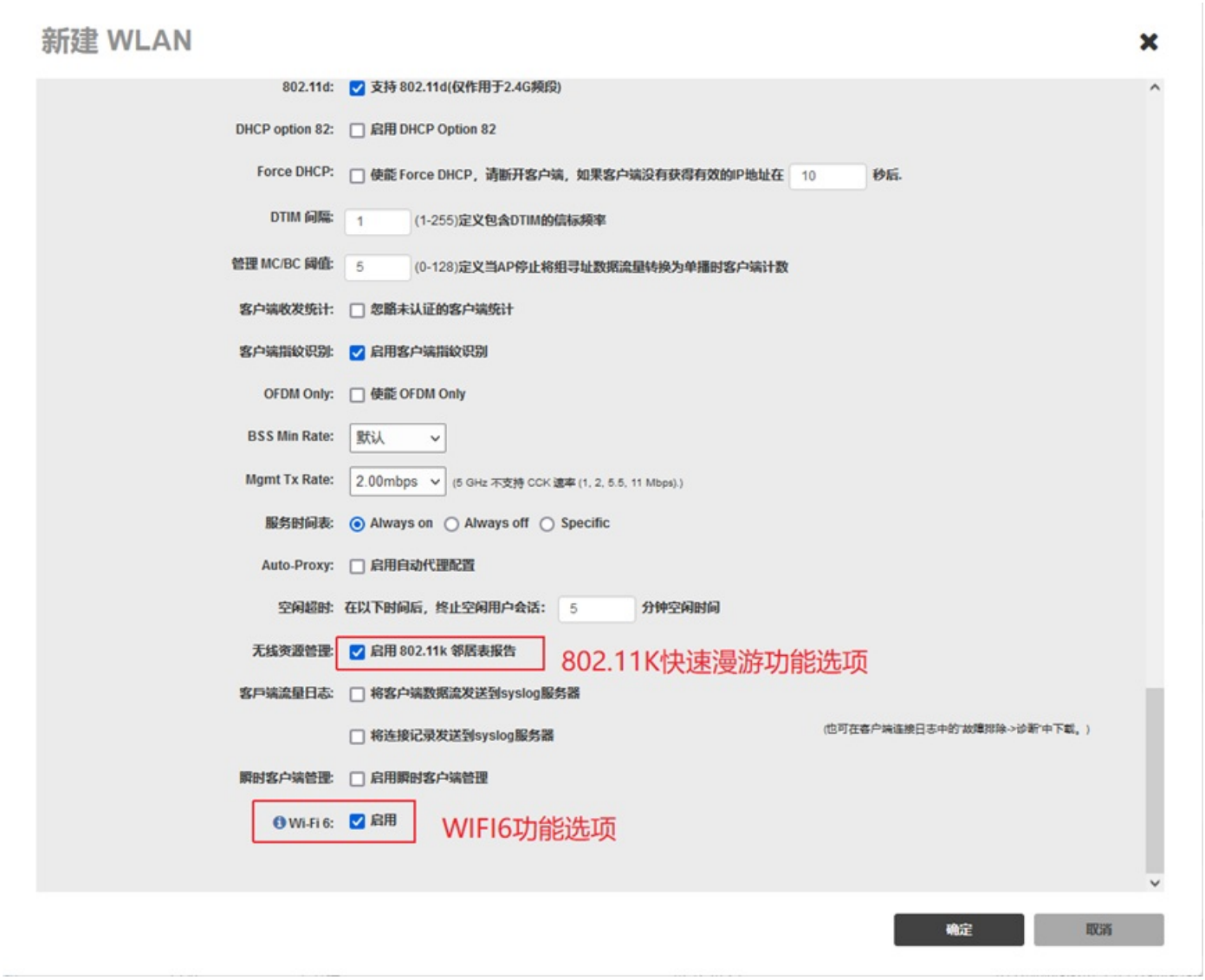
The WLAN group **Default** is used for dual-band WLAN.

The WLAN group **2.4g** is used for 2.4GHZ WLAN.

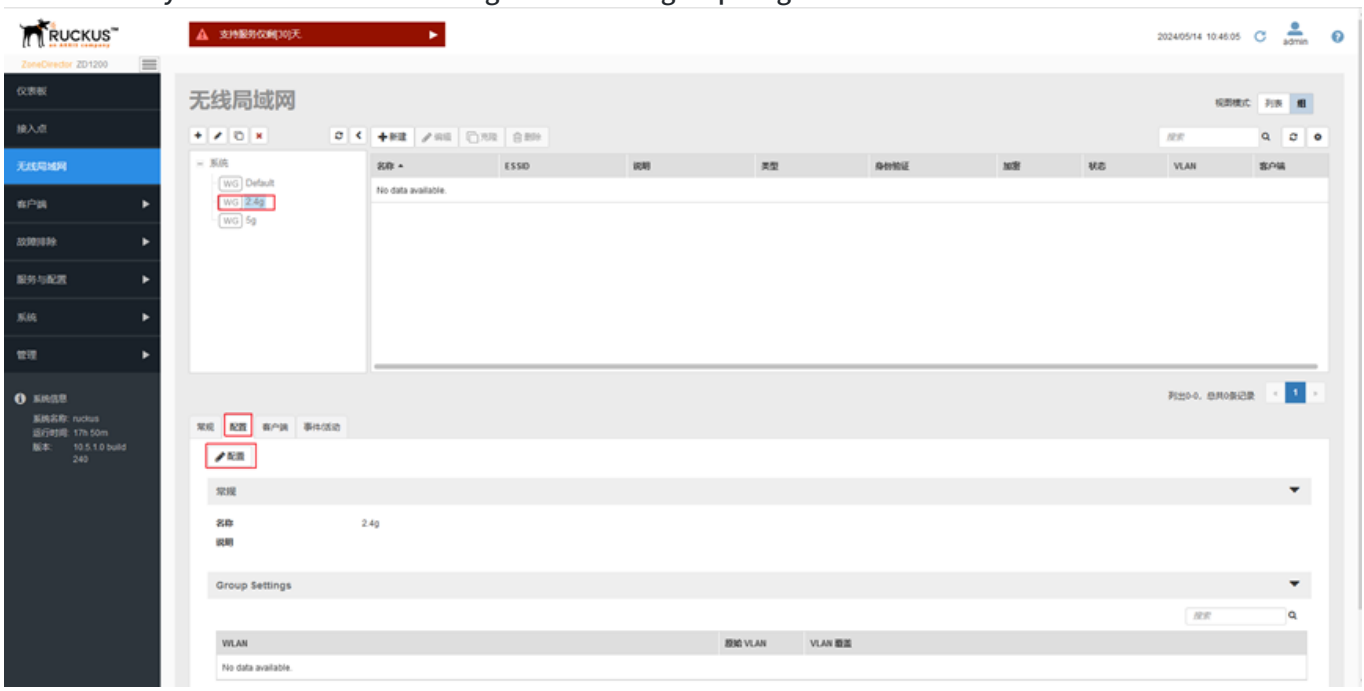
The WLAN group **5g** is used for 5GHZ WLAN.

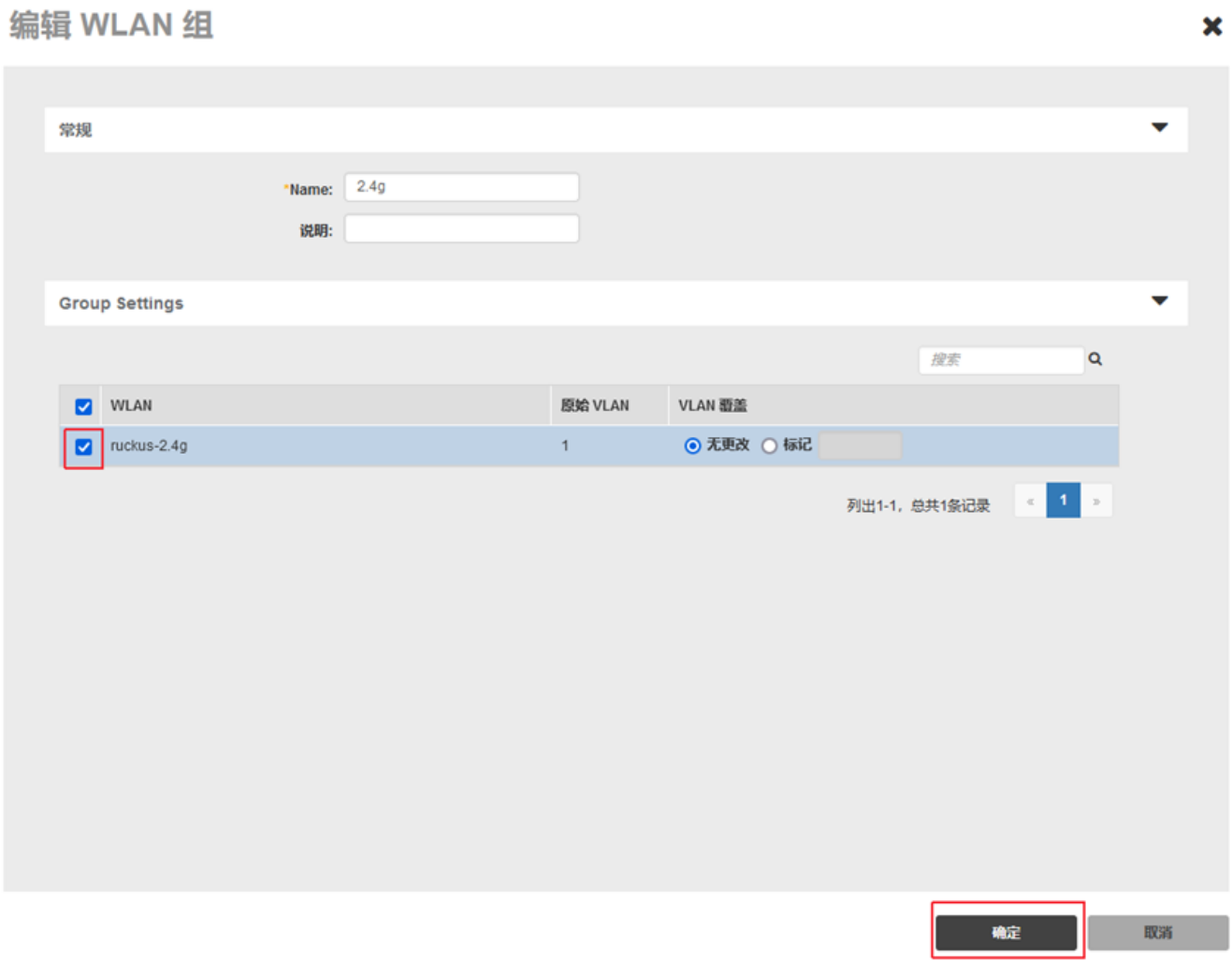



新建 WLAN
加密选项
方法: WPA2 WPA3 WPA2/WPA3-Mixed OWE WPA-Mixed None
算法: AES 自动 (TKIP+AES)
*密码: 12345678
802.11w MFP: 已禁用 可选择的 必须的
高级选项
无线用户隔离: 在相同的AP上的其他用户隔离无线用户频道。
在相同的AP或子网上的所有用户隔离无线用户频道。
不使用白名单
(网关和其他被允许的主机需要白名单)
WLAN 优先级: 高 低
记帐服务器: 禁用 发送周期更新，间隔为 10 分钟
访问控制: L2/MAC 无 ACL
L3/4/IP 地址 无 ACL
设备访问策略 无 优先级策略 Default
启用基于角色的访问控制策略
需要在"管理 & 服务" -> "角色" 中启用基于角色的访问控制策略
应用识别控制: 启用应用识别控制
URL 过滤: 启用URL过滤
确定
取消

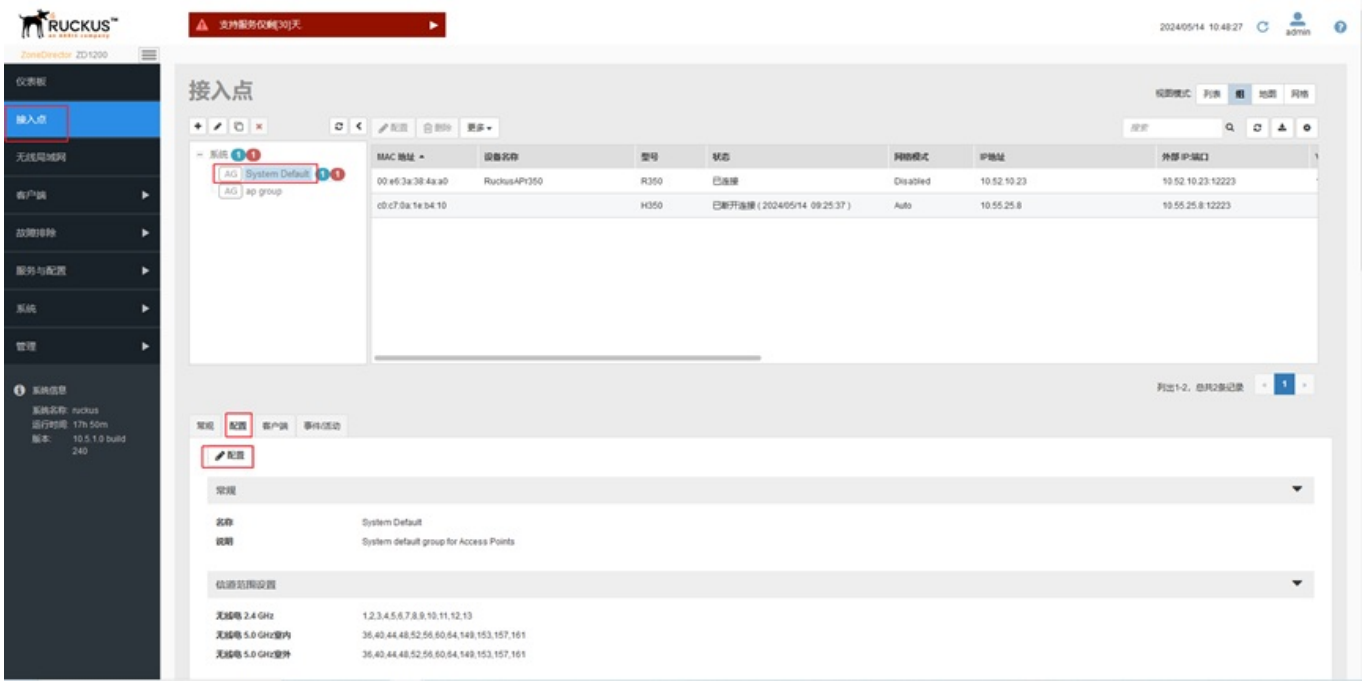

新建 WLAN
802.11d: 支持 802.11d(仅作用于2.4G频段)
DHCP option 82: 启用 DHCP Option 82
Force DHCP: 使能 Force DHCP，请断开客户端，如果客户端没有获得有效的IP地址在 10 秒后.
DTIM 间隔: 1 (1-255)定义包含DTIM的信标频率
管理 MC/BC 阈值: 5 (0-128)定义当AP停止将组寻址数据流量转换为单播时客户端计数
客户端收发统计: 忽略未认证的客户端统计
客户端指纹识别: 启用客户端指纹识别
OFDM Only: 使能 OFDM Only
BSS Min Rate: 默认
Mgmt Tx Rate: 2.00mbps (5 GHz 不支持 CCK 速率 (1, 2, 5.5, 11 Mbps).)
服务时间表: Always on Always off Specific
Auto-Proxy: 启用自动代理配置
空闲超时: 在以下时间后，终止空闲用户会话: 5 分钟空闲时间
无线资源管理: 启用 802.11k 邻居表报告
802.11K快速漫游功能选项
客户端流量日志: 将客户端数据流发送到syslog服务器
将连接记录发送到syslog服务器
(也可在客户端连接日志中的"故障排除->诊断"中下载。)
瞬时客户端管理: 启用瞬时客户端管理
Wi-Fi 6: 启用
WIFI6功能选项
确定
取消

3. Add the newly created WLAN ruckus 2.4g to the WLAN group 2.4g.





4. Access Point Configuration.



5. The current configuration is that the WLAN group **2.4g** uses 2.4GHZ, and the WLAN group **5g** uses 5GHZ. If you need WLAN to support dual-band, set the WLAN group in the Radio settings to **Default**. The WLAN in the **Default **group can use dual-band transmission signals.