Countries and Regulations

- Country codes, on page 1
- Regulatory compliance domain, on page 4
- Remove 8 channel restriction on slot 1 of Cisco Catalyst 9166 series APs, on page 5
- Ensure 6 GHz radio band persistence after CAPWAP reset, on page 6
- Regulatory compliance domain, on page 7
- Remove 8 channel restriction on slot 1 of Cisco Catalyst 9166 series APs, on page 8
- Ensure 6 GHz radio band persistence after CAPWAP reset, on page 9

Country codes

A country code is a regulatory identifier that

- specifies the country of operation for wireless devices, such as controllers and APs which must comply with varying regulatory requirements, and
- ensures each radio's broadcast frequency bands, interfaces, channels, and transmit power levels comply with country-specific regulations.

Each AP radio receives a regulatory domain at the factory, such as -E for Europe. Set the country code to match the location—for example, FR for France or ES for Spain.

Information About Japanese Country Codes

Country codes define the legal channels for each country. These country codes are available for Japan:

- J2: which allows only -P radios to join the controller, and
- J4: which allows 2.4GHz JPQU and 5GHz PQU to join the controller.

Prerequisites for configuring country codes

- Generally, you should configure one country code per device. Select a country code that matches where the device and its APs are physically located. You can configure up to 200 country codes per device. You can manage APs in different countries from one device using multiple-country support.
- If you use the multiple-country feature, configure all devices joining the same RF group with the same countries in the same order.

- Each AP uses all available legal frequencies, but it is assigned frequencies approved for its domain.
- The RF group leader's country list decides which channels are available for group members. The RF group leader's country list does not depend on the countries on group members.
- If your device is in the Japan regulatory domain, configure at least one Japan country code (JP, J2, or J3) before the most recent boot.
- For devices in the Japan regulatory domain, you should have one or more Japan country codes (J2, or J4) configured on your device at the time of the most recent boot.
- For devices in the Japan regulatory domain, you must have at least one access point with a -J regulatory domain joined to your device.
- You cannot delete a country code with the **wireless country country-code** command if you configured it with the **ap country list** command. You also cannot delete a country code using the **ap country list** command if you configured it with the **wireless country country-code** command.

Configure country codes (GUI)

Set the allowed country codes on wireless APs to comply with local regulations.

Procedure

Step 1 Choose **Configuration** > **Wireless** > **Access Points** > **Country**.

Step 2 On the **Country** page, check the check box for each country where your APs are installed. If you select more than one check box, a message displays that RRM channels and power levels are limited to common channels and power levels.

Step 3 Click **Apply**.

Configure country codes (CLI)

Assign and verify country codes on an AP or wireless controller to ensure regulatory compliance for wireless operation.

Procedure

Step 1 Display the list of all the available country codes.

Example:

```
Device# show wireless country supported
```

Step 2 Enter the global configuration mode and disable the 802.11b/g network, if you use 24GHz, 5GHz or 6GHz.

Example:

```
Device# configure terminal
```

```
Device(config)# ap dot11 {24ghz | 5ghz| 6ghz} shutdown
```

Step 3 Assign APs to a specific country.

Example:

```
Device(config)# ap country country_code IN
```

Configure the country code on the controller so that APs joining the controller match the country code and the corresponding regulatory domain codes for the AP.

Note
You can configure more than one country code.

Step 4 Configure 200 country codes per device.

Example:

```
Device(config)# wireless country country_code IN
```

Note
Use this command for deployments with more than 20 countries.

Step 5 Return to the privileged EXEC mode and display the configured countries.

Example:

```
Device(config)# exit
Device# show wireless country configured
```

Step 6 Display the list of available channels for the country codes configured on your device and enter the global configuration device.

Example:

```
Device# show wireless country channels
```

Note
Complete the next three steps only if you have configured multiple country codes in step 6.

Step 7 Enter the global configuration mode and enable the 802.11b/g network, if you use 24GHz, 5GHz or 6GHz. Return to the privileged EXEC mode and disable the AP.

Example:

```
Device# configure terminal
Device(config)# no ap dot11 {24ghz | 5ghz| 6ghz} shutdown
Device(config)# end
Device# ap name cisco-ap AP02 shutdown
```

Note
Make sure to disable only the AP that you are configuring with country codes.

Step 8 Enter the global configuration mode and assign each AP with a country code from the controller country code list.

Example:

```
Device# configure terminal
Device# ap name cisco-ap AP02 country country_code US
```

Note
- Ensure that the country code that you choose is compatible with the regulatory domain of at least one of the APs radios.
- Disable the AP before changing its country code.

Step 9 Return to privileged EXEC mode and enable the AP.

Example:

```
Device(config)# end
```

```
Device# ap name cisco-ap AP02 no shutdown
```

Configuration examples for configuring country codes

View channel list for country codes

This example shows how to display the list of available channels for the country codes on your devicedevice:

```
DeviceDevice# show wireless country channels

Configured Country.......................: US - United States
KEY: * = Channel is legal in this country and may be configured manually.
     A = Channel is the Auto-RF default in this country.
     . = Channel is not legal in this country.
     C = Channel has been configured for use by Auto-RF.
     x = Channel is available to be configured for use by Auto-RF.
  (-,-) = (indoor, outdoor) regulatory domain allowed by this country.
-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-
802.11bg         :
Channels         :                  1 1 1 1 1
                  1 2 3 4 5 6 7 8 9 0 1 2 3 4
-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-
(-A ,-AB ) US    : A * * * * A * * * * A . . .
Auto-RF          : . . . . . . . . . . . . . .
-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
802.11a          :                        1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Channels         :3 3 3 4 4 4 4 4 5 5 6 6 0 0 0 1 1 2 2 2 3 3 4 4 5 5 6 6
                  4 6 8 0 2 4 6 8 2 6 0 4 0 4 8 2 6 0 4 8 2 6 0 9 3 7 1 5
-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
(-A ,-AB ) US    : . A . A . A . A A A A A * * * * * . . . * * * A A A A*
Auto-RF          : . . . . . . . . . . . . . . . . . . . . . . . . . . . .
-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
4.9GHz 802.11a   :
Channels         :                  1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2
                  1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
-----------------:+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
US (-A ,-AB )    : * * * * * * * * * * * * * * * * * * * A * * * * * A
Auto-RF          : . . . . . . . . . . . . . . . . . . . . . . . . . .
```

Regulatory compliance domain

A regulatory domain is a set of country-specific rules that

- are designed for use in multiple countries with varying regulatory requirements

- enables you to specify a particular country of operation, such as FR for France or ES for Spain, and
- ensures that each radio's broadcast frequency bands, interfaces, channels, and transmit power levels comply with country-specific regulations.

This feature reduces the number of regulatory domains by updating the pre-provisioned domains workflow. It determines the regulatory domain at runtime for each country code. The new Rest of World (RoW) domain includes the nine earlier domains. Each AP selects its regulatory domain from these options by referencing the regulated power table and allowed radio channels.

The transmission power value in the TPC IE of the beacon may differ from the AP's transmission power value by up to 2 dB. You can check this difference by using the **show controllers dot11radio** command. The maximum allowed deviation in the TPC IE of the beacon is two dB.

Global country-level domains

This topic lists detailed information about the power table and supported channels of countries in the global domain for 2.4GHz, 5GHz, 6GHz, and Rest of World domains.

- Use this information to determine the allowed configurations for each region.
- For additional technical details and Rest of World/6GHz support, see the Cisco Catalyst 9100AX Access Points Technical Reference.
- For more information about country phase and codes, refer to Cisco CW917x Wi-Fi 7 Access Point Country Codes and Phases.

Remove 8 channel restriction on slot 1 of Cisco Catalyst 9166 series APs

A channel restriction on an XOR radio is a regulatory and configuration constraint that

- limits the number of usable channels on the 5GHz or 6GHz bands based on region and device mode
- dynamically adjusts channel availability and power settings according to band selection and regional compliance, and
- enables optimized performance and access to all channels in supported configurations.

Starting with Cisco Catalyst IOS XE 17.12.5 release, you can restrict channels on slot 1 of Cisco Catalyst 9166 Series APs.

The Cisco 9166 Series AP includes dynamic XOR 5GHz or 6GHz radio band switching that optimizes performance and ensuring regulatory compliance. During startup, the XOR radio defaults to the 5GHz band in regions where 6GHz is not supported. Otherwise, it defaults to 6GHz. The AP actively adjusts and communicates channel power settings. It offers all full 5GHz channels when configured for 6GHz and restricted channels when in 5GHz mode.

The XOR radio infrastructure manages channel power payload adjustments when users switch between the 5GHz and 6GHz bands. The XOR radio can function as either a single 5GHz or a dual 5GHz setup. When operating in a single 5GHz mode, the AP provides a complete list of 5GHz channels available in the selected

country. In dual 5GHz mode, the system configures and communicates channel power settings. It offers full 5GHz channels in one slot and restricted channels in the other.

Note If 6GHz is not supported in your country, use slot 2 in either 5GHz or 6GHz. Configure the AP to Client serving mode to prevent resets.

For 6G unsupported countries, you must use slot 1 as a full band and configure slot 2 to 6GHz in Client serving mode.

Configure XOR 5/6GHz radio slot for 6GHz band (CLI)

Assign the 6GHz band to the XOR 5/6GHz radio slot on an access point to support Wi-Fi 6E clients.

Procedure

Step 1 Enter the privileged EXEC mode.

Example:

```
Device# enable
```

Step 2 Disable dual-band radio hosted on slot 2 for a specific AP.

Example:

```
Device# ap name ap-name AP-SIDD-A06 dot11 dual-band slot 2 shutdown
Device# ap name ap-name AP-SIDD-A06 [no] dot11 dual-band slot 2 shutdown
```

Use the **no** form of this command to enable the dual-band radio.

Step 3 Configure the dual-band role in client-serving mode.

Example:

```
Device# ap name ap-name AP-SIDD-A06 dot11 dual-band slot 2 radio role manual client-serving
```

Step 4 Configure the 802.11 dual-band radio's current band to 6Ghz.

Example:

```
Device# ap name ap-name AP-SIDD-A06 dot11 dual-band slot 2 band 6ghz
```

Ensure 6 GHz radio band persistence after CAPWAP reset

This procedure describes how to configure the AP radio role to manual for slot 2. This change ensures that the 6 GHz radio band remains active, even after a CAPWAP reset. If the radio role is set to auto, the AP might revert to the 5 GHz band upon reset.

Before you begin

Ensure you have CLI access to the AP.

Procedure

Step 1 Verify the current radio role configuration. From the AP CLI, check the current radio configuration for slot 2.

Example:

```
show capwap client config | i Radio
```

If the output shows the radio role for slot 2 as auto, proceed to Step 2.

If the output shows the radio role for slot 2 as manual, no further action is required for this setting

Step 2 Configure the radio role to manual and set the 6 GHz band. Execute these commands on the AP CLI to set the radio role for slot 2 to manual and configure it for the 6 GHz band. This step ensures the controller applies the manual radio role to the AP.

Example:

```
ap name NAME dot11 dual-band slot 2 shutdown
ap name NAME dot11 dual-band slot 2 radio role manual client-serving
ap name NAME dot11 dual-band slot 2 band 5ghz
ap name NAME dot11 no dual-band slot 2 shutdown
ap name NAME dot11 dual-band slot 2 shutdown
ap name NAME dot11 dual-band slot 2 band 6ghz
```

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The XOR radio infrastructure manages channel power payload adjustments when users switch between the 5GHz and 6GHz bands. The XOR radio can function as either a single 5GHz or a dual 5GHz setup. When operating in a single 5GHz mode, the AP provides a complete list of 5GHz channels available in the selected country. In dual 5GHz mode, the system configures and communicates channel power settings. It offers full 5GHz channels in one slot and restricted channels in the other.

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Assign the 6GHz band to the XOR 5/6GHz radio slot on an access point to support Wi-Fi 6E clients.

Procedure

Step 1 Enter the privileged EXEC mode.

Example:

```
Device# enable
```

Step 2 Disable dual-band radio hosted on slot 2 for a specific AP.

Example:

```
Device# ap name ap-name AP-SIDD-A06 dot11 dual-band slot 2 shutdown
```

```
Device# ap name ap-name AP-SIDD-A06 [no] dot11 dual-band slot 2 shutdown
```

Use the **no** form of this command to enable the dual-band radio.

Step 3 Configure the dual-band role in client-serving mode.

Example:

```
Device# ap name ap-name AP-SIDD-A06 dot11 dual-band slot 2 radio role manual client-serving
```

Step 4 Configure the 802.11 dual-band radio's current band to 6Ghz.

Example:

```
Device# ap name ap-name AP-SIDD-A06 dot11 dual-band slot 2 band 6ghz
```

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Step 1 Verify the current radio role configuration. From the AP CLI, check the current radio configuration for slot 2.

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Step 2 Configure the radio role to manual and set the 6 GHz band. Execute these commands on the AP CLI to set the radio role for slot 2 to manual and configure it for the 6 GHz band. This step ensures the controller applies the manual radio role to the AP.

Example:

```
ap name NAME dot11 dual-band slot 2 shutdown
ap name NAME dot11 dual-band slot 2 radio role manual client-serving
ap name NAME dot11 dual-band slot 2 band 5ghz
ap name NAME dot11 no dual-band slot 2 shutdown
```

```
ap name NAME dot11 dual-band slot 2 shutdown
ap name NAME dot11 dual-band slot 2 band 6ghz
```